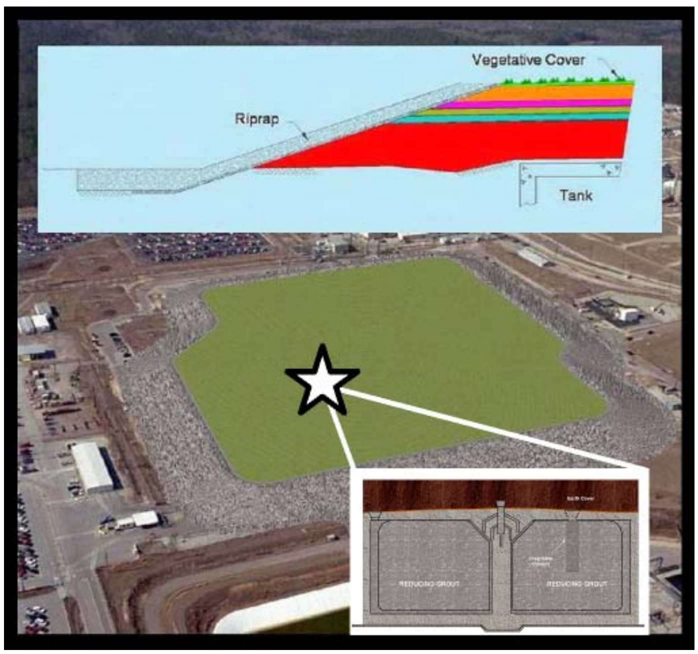
SRS-REG-2007-00002
Revision 1

PERFORMANCE ASSESSMENT for the F-TANK FARM at the SAVANNAH RIVER SITE



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REVISION SUMMARY

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A	Initial issue to DOE-SR	12/28/2007
B	Issue to DOE Low Level Waste (LLW) Federal Review Group (LFRG)	03/05/2008
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ACRONYMS / ABBREVIATIONS

10-ky	10,000 years
ACP	Accelerated Closure Plan
ALARA	As Low As Reasonably Achievable
ARF	Airborne Release Fraction
ASTM	American Society of Testing and Materials
C&IS	Computer and Information Security
CAB	Citizens Advisory Board
CAP-88	Clean Air Act Assessment Package – 1988
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFD	Computational Fluid Dynamics
cfs	cubic feet per second
Ci	curie
CLM	Central Climatology
CLSM	Controlled Low Strength Material
CMCOC	Contaminant Migration Constituents of Concern
COPC	Constituent of Potential Concern
CPT	Cone Penetration Test
CRC	Cesium Removal Column
CSH	Calcium Silicate Hydrate
CSRA	Central Savannah River Area
CTS	Concentrate Transfer System
CZ	Contamination Zone
d	Day(s)
D&D	Deactivation and Decommissioning
DB	Diversion Box
DCF	Dose Conversion Factors
DOE	United States Department of Energy
DOE-SR	Department of Energy – Savannah River Operations Office
DOT	Department of Transportation
DRF	Dose Release Factors
DSA	Documented Safety Analysis

DWPF	Defense Waste Processing Facility
E_h	Oxidation Potential
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
FDB	F-Tank Farm Diversion Box
FFA	Federal Facility Agreement
FAST	Fourier Amplitude Sensitivity Test
FPP	F-Tank Farm Pump Pit
ft	foot
FTF	F-Tank Farm
FY	Fiscal Year
gal	gallon
GBM	Gradient Boosting Models
GCL	Geosynthetic Clay Liner
GDL	Gravity Drain Line
GM	Geometric Mean
GS	General Service
GSA	General Separations Area
GSAD	General Separations Area Database
GSD	Geometric Standard Deviation
GTG	GoldSim Technology Group LLC
HDPE	High Density Polyethylene
HELP	Hydrologic Evaluation of Landfill Performance
HFO	Hydrous Ferrous Oxides
hr	hour
HTF	H-Tank Farm
IAL	Inter-Area Line
ICRP	International Commission on Radiological Protection
IHI	Inadvertent Human Intruder
in	inch
INEEL	Idaho National Engineering and Environmental Laboratory
ISCM	Integrated Site Conceptual Model
ISMS	Integrated Safety Management System
K_d	Distribution Coefficients
kg	kilogram

L	liter
LDB	Leak Detection Box
LFRG	Low Level Waste Federal Review Group
LLTSM	Low-Level Threat Source Material
LLW	Low-Level Waste
m	meter
max	maximum
MCL	Maximum Contaminant Level
MEI	Maximally Exposed Individual
min	minimum
MLDB	Modified Leak Detection Box
MOP	Member of the Public
MP	Management Policy
mrem	millirem
MSL	Mean Sea Level
N/A	Not Applicable
ND	Non-Detectable
NE	Not Estimated
NDAA	National Defense Authorization Act
NERP	National Environmental Research Park
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
NRC	United States Nuclear Regulatory Commission
NRMP	Natural Resources Management Plan
OA	Oxalic Acid
OD	Outer Diameter
OECD	Organization for Economic Co-Operation and Development
OUO	Official Use Only
PA	Performance Assessment
PCA	Pollution Control Act
pCi	picocurie
PMP	Probable Maximum Precipitation
PP	Pump Pit
ppb	parts per billion
ppm	parts per million

PRG	Preliminary Remediation Goal
PS	Production Support
psi	pounds per square inch
PTSM	Principal Threat Source Material
PUREX	Plutonium Recovery and Extraction
QA	Quality Assurance
QAMP	Quality Assurance Management Plan
QC	Quality Control
rad	Radioactive
RCRA	Resource Conservation and Recovery Act
RESRAD	RESidual RADioactivity Computer Software
RI	Remedial Investigation
ROD	Record of Decision
ROI	Region of Influence
RSL	Regional Screening Level
SA	Sensitivity Analysis
SC	Safety Class
SCDHEC	South Carolina Department of Health and Environmental Control
SCS	Soil Conservation Service
SDF	Saltstone Disposal Facility
SDWA	Safe Drinking Water Act
sec	second
SI	Sensitivity Indices
SMA	Strong Motion Accelerometer
SPF	Saltstone Production Facility
SQAP	Software Quality Assurance Plan
SREL	Savannah River Ecology Laboratory
SRNL	Savannah River National Laboratory
SRR	Savannah River Remediation
SRS	Savannah River Site
SS	Safety Significant
SS&ES	Safeguards, Security & Emergency Services
TCCZ	Tan Clay Confining Zone
TEDE	Total Effective Dose Equivalent
TSR	Technical Safety Requirement

UA	Uncertainty Analyses
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UTR	Upper Three Runs
UTR-LZ	Upper Three Runs – Lower Zone
UTR-UZ	Upper Three Runs – Upper Zone
UV	Ultraviolet
VZMS	Vadose Zone Monitoring System
WCS	Waste Characterization System
WES	Waterways Experiment Station
WQS	Water Quality Standard
WSRC	Washington Savannah River Company
wt%	weight percent
yr	Year

1.0 EXECUTIVE SUMMARY

This Performance Assessment (PA) for the Savannah River Site (SRS) was prepared to support the eventual operational closure of the F-Tank Farm (FTF) underground radioactive waste tanks and ancillary equipment. This PA provides the technical basis and results to be used in subsequent documents to demonstrate compliance with the pertinent requirements identified below for final closure of FTF as indicated in Table 1.0-1.

- United States Department of Energy (DOE) Order 435.1-1,
- "*Ronald W. Reagan National Defense Authorization Act (NDAA) for Fiscal Year 2005*" Section 3116 (hereafter referred to as: NDAA Section 3116) [NDAA_3116],
- South Carolina Department of Health and Environmental Control (SCDHEC), "*Industrial Wastewater Construction and Operating Permits*",
- SRS Federal Facility Agreement (FFA), WSRC-OS-94-42, accessed via the following website: *http://www.srs.gov/general/programs/soil/ffa/ffa.pdf*.

The key requirements from these documents necessitate development and calculation of the following for the FTF: potential radiological doses to a hypothetical Member of the Public (MOP); potential radiological doses to a hypothetical inadvertent intruder; radiological dose to a human receptor via the air pathway, radon flux, and water concentrations. All of these calculations were performed to provide results over a minimum of 10,000 years. The water concentrations were calculated for both radioactive and non-radioactive contaminants at multiple locations outside FTF.

Table 1.0-1: Key Limits from Regulatory Requirements

Requirement	All-Pathway Dose	Intruder Dose	Air Pathway Dose	Radon Flux	Groundwater Protection
NDAA Section 3116: 10 CFR 61.41 and 61.42	25 mrem/yr	500 mrem/yr	N/A	N/A	N/A
DOE O 435.1-1	25 mrem/yr	500 mrem – acute 100 mrem/yr – chronic	10 mrem/yr	20 $pCi/m^2/s$ at ground surface	<MCL
SCDHEC Wastewater Construction and Operating Permits	N/A	N/A	N/A	N/A	<MCL

N/A = Not applicable
MCL = Maximum Contaminant Level

The FTF is in the north-central portion of SRS and occupies approximately 22 acres within F-Area. The FTF is an active radioactive waste storage facility consisting of 22 carbon steel waste tanks and ancillary equipment such as transfer lines, evaporators and pump tanks. The FTF stores and processes liquid radioactive waste generated primarily from the Plutonium Recovery and Extraction (PUREX) process. FTF began radioactive operations in 1954. Two of the 22 tanks (Tanks 17 and 20) were closed in 1997 by filling with grout. In accordance with the FFA, Industrial Wastewater Regulations, construction and operating permits were obtained from SCDHEC for the underground waste tanks. [SCDHEC R.61-67] The FFA requires that waste tank system(s) which DOE decides to remove from service that have been issued an Industrial Wastewater Operating Permit under the Pollution Control Act (PCA), shall be removed from service in accordance with the Pollution Control Act, S.C. Code Ann., Section 48-1-10, et seq. (1985) and all applicable regulations promulgated pursuant to the PCA. [*http://www.srs.gov/general/programs/soil/ffa/ffa.pdf*, Section IX.E.(4)] SCDHEC has advised that this process will involve two bureaus (Bureau of Water and Bureau of Land and Waste Management). Those waste tanks that do not meet the standards for secondary containment established in Appendix B of the FFA are the priority for waste removal and operational closure. [*http://www.srs.gov/general/programs/soil/ffa/ffa.pdf*] The FTF waste tanks and systems are operated under an Industrial Wastewater Permit granted by SCDHEC.

The regulatory process to complete closure of the FTF requires the development of multiple detailed technical documents with reviews and approvals by multiple state and federal agencies. The documents involved include an FTF Section 3116 Basis Document, which will be used to demonstrate compliance with the NDAA Section 3116 criteria. [NDAA_3116] The FTF Section 3116 Basis Document is reviewed and approved by the DOE, in consultation with the United States Nuclear Regulatory Commission (NRC). Approval of a Section 3116 Waste Determination by the Secretary of Energy is then required to determine that the residual waste in FTF can be classified as non-high level waste for purposes of onsite disposition. The Secretary of Energy determination under NDAA Section 3116 incorporates by reference performance objectives in an NRC regulation: Title 10 (Energy) of the Code of Federal Regulations (CFR) Part 61 (Licensing Requirements for Land Disposal of Radioactive Waste), Subpart C (Performance Objectives). The FTF PA provides the technical basis that will be used to demonstrate compliance with 10 CFR 61.41 (Protection of the General Population from Releases of Radioactivity), and 61.42 (Protection of Individuals from Inadvertent Intrusion) performance objectives that will be presented in the FTF Section 3116 Basis Document. [10 CFR 61] These performance objectives are used in lieu of the comparable performance objectives from DOE O 435.1-1. Compliance with the SCDHEC requirements will be demonstrated using two primary documents that are supported by the FTF PA. The first is the FTF Industrial Wastewater General Closure Plan, which will establish the general protocols, requirements, and processes for closure of FTF. The second document(s) are Tank-Specific Closure Modules that authorize the closure and grouting of a specific tank, group of tanks, or ancillary equipment. Both the FTF Industrial Wastewater General Closure Plan and the FTF Tank-Specific Closure Modules are reviewed and approved by DOE, SCDHEC, and the United States Environmental Protection Agency (EPA).

Performance Assessment scoping meetings were held with technical staff from all of the involved state and federal agencies during the development of the FTF PA to support completion of tank closure activities in a timely and efficient manner. The meetings were utilized to review and discuss the PA inputs and assumptions in detail to maximize the up-front understanding for all the groups involved. While it was recognized that concerns may develop for specific inputs or assumptions at a later time, the scoping meetings should reduce the risk and severity of issues arising during the reviews and approvals of the PA as well as the associated documents.

The FTF Section 3116 Basis Document will specify the point of compliance to be used for 10 CFR 61.41 and the FTF Closure Plan will specify the point of compliance to be used for applicable SCDHEC requirements. Since the point(s) of compliance have not been determined, the FTF PA provides the technical information at different points of assessment that can be utilized in the subsequent documents. The FTF PA provides groundwater radionuclide concentrations at 1m, 100m and exposure points at the two seeplines approximately 1,600m from FTF. The groundwater concentrations are provided for each of the three aquifers as applicable as a part of the FTF groundwater modeling. The FTF PA also provides groundwater concentrations for 17 chemical contaminants at 1m, 100m and the two seeplines. In addition, the FTF PA provides intruder doses consistent with the requirements for 10 CFR 61.42, as well as analyses for the air pathways and radon ground surface flux. The key radiological results from the PA modeling and dose calculations are shown in Table 1.0-2, Note 1 and Note 2.

Table 1.0-2: Summary Radiological Results for F-Tank Farm

Location	Peak Within 10,000 Years		
	All-Pathways Dose (mrem/yr)	Groundwater Pathway Dose (mrem/yr)	Air Pathway Dose (mrem/yr)
100m from FTF	2.5 at ~ year 10,000	2.3 at ~ year 10,000	0.2
At Seepline	0.09 at ~ year 10,000	0.04 at ~ year 10,000	0.05

Note 1: The peak intruder dose is 73 mrem/yr at year 101 from a chronic scenario, drilling through a transfer line and using groundwater concentrations at the maximum 1m FTF location.

Note 2: The peak radon flux at the ground surface is 3.6E-08 pCi/m^2/sec.

The peak groundwater radionuclide concentrations were calculated and only Np-237, U-233 and U-234 were above the Preliminary Remediation Goal (PRG) at 100m, no MCLs were exceeded at 100m. All radionuclides were well below the MCL or PRG at the seepline. The peak concentrations for 17 chemicals were calculated, and all were less than the MCL or Regional Screening Level (RSL) at a distance of 100m from FTF.

This FTF PA provides the necessary technical basis and information to support development of the other regulatory documents required for closure of the FTF tanks and systems. The information from the FTF PA can be utilized to determine compliance with the specific requirements, such as the all-pathways dose or the MCL, during the development of the various individual documents.

2.0 INTRODUCTION

The potential radiological dose to receptors typically is evaluated with a PA model that simulates the release of radionuclides from the disposal or closure site, transport of radionuclides through the environment, and exposure of potential receptors from residual material. The PA process provides the technical basis for subsequent decision documents for demonstrating compliance with the performance objectives of the NDAA Section 3116, DOE O 435.1-1, Industrial Wastewater Regulations, and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). [NDAA_3116, SCDHEC R.61-67, *www.epa.gov/superfund/policy/cercla.htm*] SRS FTF PA utilized enhanced inter-agency scoping meetings during the development/planning phases of the FTF PA, which resulted in an increased understanding of PA modeling approaches and assumptions.

2.1 General Approach

Performance Assessments are used to provide the DOE with a reasonable expectation that Low-Level Waste (LLW) disposal or closure of facilities will meet defined performance objectives for the protection of the public and the environment into the future.

The FTF PA was completed to support the upcoming FTF Closure Plan and tank-specific closure modules. These documents support the closure of waste tanks to meet SRS FFA commitments. [*http://www.srs.gov/general/programs/soil/ffa/ffa.pdf*] The PA development process included scoping meetings with interface agencies in the input development stage. The purpose of the scoping meetings held during the development/planning phases of PA inputs was to identify potential issues early, assess the reasonableness of key modeling assumptions, and reduce the risk of significant rework and remodeling after the PA is finalized.

In accordance with the FFA, DOE obtained Industrial Wastewater Construction and Operating Permits from SCDHEC for the underground liquid waste tanks. DOE is now removing from service SRS liquid waste tanks that do not meet the standards established in Appendix B of the FFA. [*http://www.srs.gov/general/programs/soil/ffa/ffa.pdf*]

After waste removal operations, any residual contaminants will be stabilized and the waste tanks shall be removed from service in accordance with the PCA, S.C. Code Ann., Section 48-1-10, et seq. (1985) and all applicable regulations promulgated pursuant to the PCA. [*http://www.srs.gov/general/programs/soil/ffa/ffa.pdf*, Section IX.E.(4)] Applicable regulations include SCDHEC Regulation 61-67, Standards for Wastewater Facility Construction and SCDHEC Regulation 61-82, Proper Closeout of Wastewater Treatment Facilities. Removal from service includes operational closure of the waste tank systems under, and then removal from, the industrial wastewater permit that regulates their operation, the F and H Area High Level Radioactive Waste Tank Farms Construction Permit No. 17,424-IW and the SRS FFA. [DHEC_03-03-1993, *http://www.srs.gov/general/programs/soil/ffa/ffa.pdf*]. DOE followed this process in closure of Tanks 17 and 20.

The general protocol that DOE is following in closing the underground waste tank systems will appear in the closure plan, to be issued at a later date. Each waste tank system will have a detailed tank-specific closure module, and that after each waste tank system operational closure activities have been satisfactorily completed, the waste tank system will be removed from the conditions of Construction Permit No. 17,424-IW. [DHEC_03-03-1993] The contents of the closure plan and the closure modules will be consistent with State regulations implementing the South Carolina PCA, S. C. Code Ann., Section 48-1-10, et seq. (1985). [Title 48_Chapter 1_SC Laws]

Because of previous releases to the environment, the FTF will be closed under the FFA after all the individual waste tanks are closed in place. Both tank farms have been designated an "area operable unit" in the FFA. FTF is identified as F-Tank Farm Area Operable Unit, SRS Index Number: 580 and Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) OU Number: 23. These operable units will undergo closure in accordance with the FFA and CERCLA. [*http://www.srs.gov/general/programs/soil/ffa/ffa.pdf* - Appendix C, *www.epa.gov/superfund/policy/cercla.htm*]

This process facilitates accounting for both single tank and collective tank impacts from the closed waste tanks and related ancillary equipment in relation to the performance objectives for the tanks farms. The impacts from the tank systems will be considered, along with impacts of previous release sites in FTF that are not covered by the Industrial Wastewater Permits, as well as impacts of other facilities in the area in determining the final closure status of the General Separations Area (GSA), where the waste tanks are located.

The PA is prepared to additionally support the waste determination process to be followed to ensure that the NDAA Section 3116 criteria are met before the process of closing waste tanks in place begins. The NDAA was passed by Congress on October 9, 2004, and signed by the President on October 28, 2004. Section 3116 of the NDAA specifies the criteria for DOE to classify waste as non-high level waste for purposes of onsite disposition. The NDAA is applicable only to South Carolina and Idaho. The DOE intends to coordinate the waste determination and State closure plan approval efforts to support the tank closure schedule provided in the FFA. [NDAA_3116, *http://www.srs.gov/general/programs/soil/ffa/ffa.pdf*]

2.1.1 Performance Assessment Scoping Meetings

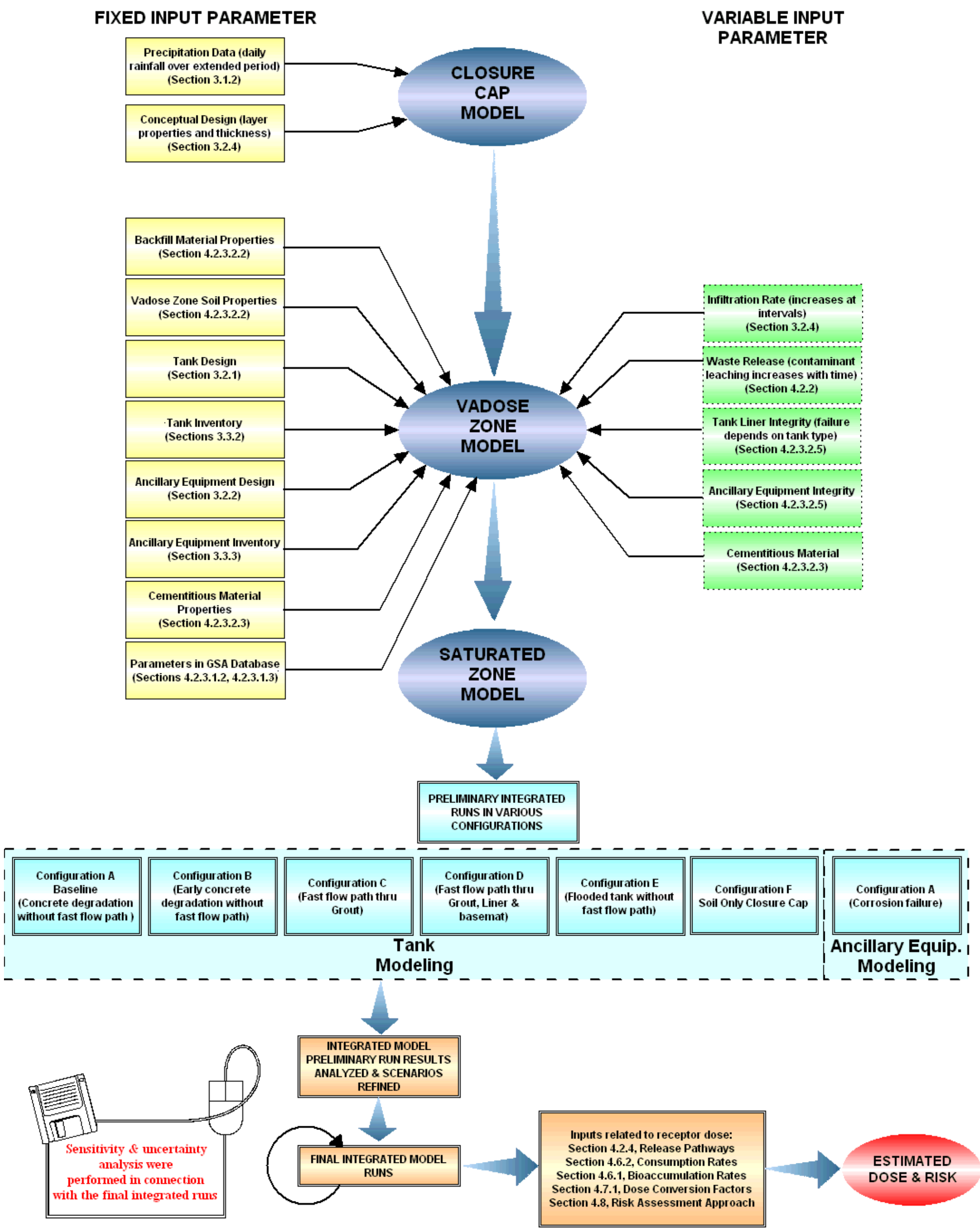
In order to complete closure activities in a timely manner for meeting FFA commitments, it was desired to reduce the comment resolution schedule durations and potential remodeling resulting from reviews of the PA after completion. It was therefore prudent to have scoping meetings during PA input data development to obtain up-front input understanding and assess the reasonableness of assumptions to minimize downstream rework and remodeling. While it is recognized that concerns may surface on input parameters utilized after modeling and additional reviews are completed, up-front reviews and comments certainly minimize the risk and severity of concerns after completion of modeling.

The purpose of the scoping meetings was to facilitate candid technical discussion on input parameters related to the tank farm-specific PA modeling. To accomplish this goal, a series of meetings were held to discuss and review individual input packages with representatives from SCDHEC, EPA and NRC.

2.1.2 Modeling Process

Figure 2.1-1 illustrates the general process followed in implementing the Integrated Site Conceptual Model (ISCM) for the PA. This figure shows the three component models and their key inputs.

Figure 2.1-1: F-Tank Farm PA Modeling Relationships



Some inputs involve fixed parameters that do not change over time. These are generally shown on the left side of the figure. The inputs on the right side of the figure do change over time. The manner in which an input changes are described in the section identified in the input block. Input packages were prepared as review materials for the scoping meetings. The input package contents and any action items from the review team meetings are incorporated into the respective PA sections. The enhanced consultation process advantages are further discussed in a memo issued by the NRC. [ML071550458]

As shown in Figure 2.1-1, six waste tank configurations and one ancillary equipment configuration were identified for the model runs, which were accomplished using the applicable computer codes identified in Section 4.3. These configurations were analyzed by running the models using different combinations.

The results of the preliminary model runs were analyzed. Based on this analysis, the model was refined. Such refinements, for example, involved eliminating one or more of the waste tank configurations used in the preliminary analyses or revising a waste tank configuration to make the scenario more appropriate.

After these refinements were made, the final model runs were performed. Uncertainty and sensitivity analyses were performed in connection with the final model runs, with the results being incorporated into the final model runs.

The final result of this process produced predicted contaminant concentrations in groundwater and surface water that could impact a MOP. The data for radiological contaminants were used in combination with the inputs related to receptors shown on the figure to estimate the potential dose to a hypothetical MOP or an intruder. The data for non-radiological contaminants were used as specified in Section 4.8 to determine the resulting risk to the hypothetical MOP. This risk assessment approach followed the Area Completion Projects (ACP) protocols for human health and ecological risk assessments. [ERD-AG-003_F.17, ERD-AG-003_P.1.4, ERD-AG-003_P.1.5, ERD-AG-003_P.5.2, and ERD-AG-003_P.10.1]

2.2 General Facility Description

2.2.1 Savannah River Site

SRS is located in south-central South Carolina, approximately 100 miles from the Atlantic Coast. The major physical feature at SRS is the Savannah River, approximately 20 miles which serves as the southwestern boundary of the site and the South Carolina-Georgia border. SRS encompasses portions of Aiken, Barnwell, and Allendale Counties in South Carolina. SRS occupies an almost circular area of approximately 310 square miles, or 198,344 acres, and contains production, service, and research and development areas. The developed areas occupy less than 10% of SRS area while the remainder of the site is undeveloped forest or wetlands.

2.2.2 F-Tank Farm

The F-Area is in the north-central portion of SRS and occupies 364 acres. Refer to Section 3.1.1 for the detailed location for F-Area, and the location of FTF within F-Area. The FTF is an active waste storage facility consisting of 22 carbon steel waste tanks that store, or once stored liquid radioactive waste generated primarily from the F-Canyon PUREX process. Tank 17 and Tank 20 have already been filled with grout and closed via a SCDHEC and EPA reviewed and approved Closure Plan and Closure Modules. [PIT-MISC-0002, http://soildatamart.nrcs.usda.gov/Manuscripts/SC696/0/savannah.pdf]

The proposed sequence of events for closure of FTF is as follows:

- Closure of the remaining Type IV tanks, the Type I tanks and finally the Type III/IIIA tanks. The ancillary equipment, such as transfer lines, pump tanks and pits, diversion boxes (DBs) and valve boxes, will be closed as appropriate with a goal of closing geographic sections of FTF in stages.
- Following closure of a geographic section such as the Type IV tanks and 242-F Evaporator area, the area will be left in an interim closure state in preparation for final closure. For example, the area may be filled in with backfill after closure of the individual waste tanks and ancillary equipment to establish an even grade elevation with the remainder of FTF.
- Following closure of all FTF waste tanks and ancillary equipment, FTF will undergo closure in accordance with the FFA and CERCLA. [http://www.srs.gov/general/programs/soil/ffa/ffa.pdf, www.epa.gov/superfund/policy/cercla.htm]

2.3 Facility Life Cycle

The FTF waste tanks were built during four separate construction periods, with a different tank design for each period, leading to the designation of the following four different tank groups:

- Tanks 1 through 8 are Type I tanks and were constructed between 1951 and 1953.
- Tanks 17 through 20 are Type IV tanks and were constructed between 1956 and 1958.
- Tanks 33 and 34 are Type III tanks and were constructed between 1969 and 1972.
- The fourth group of eight tanks, which consists of Tanks 25 through 28 and 44 through 47 are Type IIIA tanks and were constructed in two phases between 1975 and 1978, and 1977 and 1980, respectively.

The waste tank types and numbers identified above are located in FTF and are not sequential because tank numbers 9 through 16, 21 through 24, 29 through 32, 35 through 43, and 48 through 51, as well as the missing tank type (Type II) are all located in the H-Area Tank Farm and will be addressed in the H-Tank Farm (HTF) PA to be issued at a later date. The history of the construction periods for the waste tanks is documented in the *Annual Radioactive Waste Tank Inspection Program – 2008*. [WSRC-STI-2009-00352]

The FTF is currently in the operational period, during which residual waste removal from the waste tanks is in progress, and the tanks will be grouted in accordance with FFA commitments. [http://www.srs.gov/general/programs/soil/ffa/ffa.pdf] It is currently anticipated that the operational period will last until between 2020 and 2030. Once the FTF waste tanks and ancillary equipment have been grouted, a closure cap will be installed and a 100-year period of institutional control will begin. The closure cap will be monitored, maintained and repaired as necessary during the institutional control period.

2.4 Related Documents

This PA was prepared within the regulatory context of LLW management per DOE O 435.1-1 and associated implementation manual. [DOE M 435.1-1] Additional context has been added to address NDAA Section 3116, Industrial Wastewater Regulations, and CERCLA. [NDAA_3116, SCDHEC R.61-67, www.epa.gov/superfund/policy/cercla.htm] The *Radioactive Waste Management Manual* and *Format and Content Guide for U.S. Department of Energy Low-Level Waste Disposal Facility Performance Assessments and Composite Analyses-DRAFT* were also relied on for guidance. [DOE M 435.1-1, DOE Format Guide_OUO] The PA was influenced by, and has an influence on, other documents that are discussed in this section.

2.4.1 Groundwater Protection Management Program

In accordance with the FFA, DOE obtained Industrial Wastewater Construction and Operating Permits from SCDHEC for the underground liquid waste tanks. The FTF Closure Plan and tank-specific closure modules will document requirements for protection of water resources. These documents support the closure of waste tanks to meet SRS FFA commitments. [http://www.srs.gov/general/programs/soil/ffa/ffa.pdf] The FFA requires SRS to comply with all applicable federal, state and local regulations for the operation, closure and remediation of FTF. The appropriate measures for protection of water resources have been determined to be the EPA Safe Drinking Water Act (SDWA) MCLs. [www.epa.gov/safewater/sdwa/index.html] The MCLs for the radionuclides is based on 4 mrem/yr for beta-gamma emitting nuclides, 15 pCi/L for alpha emitting nuclides and 5 pCi/L for radium. The MCLs are listed with the 100m results in Section 5.2, Tables 5.2-3 through 5.2-8.

The plan for protection of groundwater at SRS is documented in the *SRS Groundwater Protection Program*. The hydrogeologic information utilized in this FTF PA is consistent with that in the groundwater protection program. The *SRS Groundwater Protection Program* is focused on those activities regulated by external agencies (i.e., the State of South Carolina and the EPA). [SRNS-TR-2009-00076] Consistent with guidance for preparing the PA, the requirement of DOE O 435.1-1 to identify impacts to water resources has been addressed by assessing the concentrations of radioactive or chemical contaminants against standards for public drinking water supplies established by the EPA.

Site Planning Documents

Plans for the future of SRS are addressed in two key planning documents: *SRS End State Vision* and *Savannah River Site (SRS) Long Range Comprehensive Plan*. [PIT-MISC-0089, PIT-MISC-0041_OUO]

2.4.2 End State Vision

The *SRS End State Vision* focuses on site facilities and areas that are the responsibility of the DOE Office of Environmental Management, which includes FTF. [PIT-MISC-0089] This document describes planned end states for these facilities and areas. It indicates that each of the 22 underground waste tanks in FTF will be cleaned, filled with grout to stabilize residual material, and closed in place. Like the *Long Range Comprehensive Plan*, which is addressed below, the *SRS End State Vision* is founded on the following basic assumptions about land ownership and use.

- The entire site will be owned and controlled by the federal government in perpetuity,
- The property will be used only for industrial purposes,
- Site boundaries will remain unchanged, and
- Residential use will not be allowed onsite.

DOE solicited public input into the *SRS End State Vision*. The document contains an appendix that addresses public comments received, including recommendations/endorsement from the SRS Citizens Advisory Board (CAB). [PIT-MISC-0041_OUO, PIT-MISC-0089]

2.4.3 SRS Long Range Comprehensive Plan

The *Long Range Comprehensive Plan* provides the framework for integrating the SRS mission and vision with ecological, economic, cultural, and social factors in a regional context and to support decision-making for near-term and long-term use of the site. This plan reflects a cooperative working relationship between DOE and the state of South Carolina. [PIT-MISC-0041_OUO]

The *Long Range Comprehensive Plan* describes the current site conditions, defines a vision for the evolution of the site over the next 50 years, outlines actions to achieve the vision, and guides the allocation of resources toward attainment of that vision. This plan provides guidance and direction for the future physical development of the site and provides a framework within which detailed analyses will be conducted to determine the courses of action required to reach optimum site configuration. The plan is based on specific assumptions. If these assumptions were to change, the plan would be updated to reflect the changed conditions. Chapter 3 of the *Long Range Comprehensive Plan* contains the Future Land Use Plan. [PIT-MISC-0041_OUO] Guidelines on which SRS land use is based include:

- Giving priority to protection of workers and the public;
- Maintaining site security;
- Maintaining other appropriate institutional controls;
- Considering worker, public, and environmental risks, benefits, and costs;
- Restricted use programs for units regulated under the Comprehensive Environmental Response, Compensation and Liability act (CERCLA) of 1980, Title 42, United States Code (U.S.C) §§ 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986. Pub. L. 99-499, or under the Resource Conservation and Recovery Act (RCRA) Federal law of the United States contained in Title 42, U.S.C. §§6901-6992k. [*www.epa.gov/superfund/policy/cercla.htm*, *www.epa.gov/epawaste/laws-regs/rcrahistory.htm*]
- Maintaining existing SRS boundaries;
- Continuing federal ownership of the land; and
- Prohibiting residential use of any SRS land.

DOE considered stakeholder input on future use of the site property, as was solicited in development of the *SRS End State Vision*. Chapter 3 of the *Long Range Comprehensive Plan* describes future use of the site that was developed with input from public meetings, workshops, and consultation with state and federal agencies. [PIT-MISC-0041_OUO, PIT-MISC-0089]

2.4.4 High Level Waste Environmental Impact Statement

In May 2002, DOE issued the *High-Level Waste Tank Closure Final Environmental Impact Statement* (EIS) on waste tank cleaning and stabilization alternatives. [DOE-EIS-0303] DOE studied five alternatives:

1. Empty, clean and fill with grout,
2. Empty, clean and fill waste tank with sand,
3. Empty, clean and fill waste tank with saltstone,
4. Clean and remove waste tanks,
5. No action.

The EIS concluded the Fill with Grout option under the Stabilize Tanks Alternative was preferred. DOE also issued an EIS Record of Decision (ROD) selecting the Fill with Grout alternative for SRS waste tank closure. [DOE-EIS-0303 ROD]

Evaluations described in the EIS showed the Fill with Grout alternative to be the best approach to minimize human health and safety risks associated with closure of the waste tanks. [DOE-EIS-0303 ROD] This alternative offers several advantages over the other alternatives evaluated such as:

- Provides greater long-term stability of the waste tanks and their residual waste than the sand-fill approach;
- Provides for retaining radionuclides within the waste tanks by use of reducing agents in a fashion that the sand-fill would not;
- Avoids the technical complexities and additional worker radiation exposure of the fill-with-saltstone approach;
- Produces smaller impacts due to radiological contaminant transport than the sand- and saltstone-fill alternatives,
- Avoids the excessive personnel radiation exposure and greater occupational safety impact that would be associated with the clean and remove alternative.

2.4.5 Federal Facility Agreement

The FFA between SCDHEC, the DOE, and EPA was issued to "govern the corrective/remedial action process for site investigation through site remediation and describe procedures for the process." The FFA establishes the regulatory framework for the operation, new construction, and eventual closure of the liquid waste tank systems. [*http://www.srs.gov/general/programs/soil/ffa/ffa.pdf*]

The FFA results in enforceable timetables for the closure of waste tanks as well as provisions for prevention and mitigation of releases or potential releases from the tank systems. Pursuant to the FFA, Section IX, SRS submitted applications to SCDHEC for a Clean Water Act/South Carolina PCA Wastewater Construction Permit and Operation Permits for the waste tank systems on July 8, 1991, and received construction and operating approval from SCDHEC on March 3, 1993 (Permit # 17,424-IW). [DHEC_03-03-1993] The FFA, Section IX.E, addresses the eventual removal of waste tanks and ancillary equipment from service and the final closure of the waste tanks. For waste tanks and systems that are governed by a Industrial Wastewater Permit, the closure must be performed in accordance with the South Carolina PCA, and all regulations implementing that Act. [*http://www.srs.gov/general/programs/soil/ffa/ffa.pdf*, Title 48_Chapter 1_SC Laws]

SRS waste tanks that do not meet secondary containment standards, as established in the FFA, must be removed from service per the FFA schedule. There are a total of 24 waste tanks at SRS that do not meet the secondary containment standards, 12 are located in FTF, and are scheduled for closure by 2022. Tanks 17 and 20 have been previously closed, and Tanks 19 and 18 are the next two waste tanks planned for closure.

DOE has determined that there are previous release sites in the waste tank systems that may require response actions under the FFA. These release sites were previously placed on the FFA by DOE at the time of the FFA approval for evaluation and possible remediation under a separate schedule. [*http://www.srs.gov/general/programs/soil/ffa/ffa.pdf*]

2.5 Performance Criteria

The PA objectives are identified in 10 CFR 61 referenced by the NDAA. Section 3116 criteria are to be met before the process of closing waste tanks in place begins. Section 3116 of the NDAA specifies the criteria for DOE to classify waste as non-high level waste for purposes of onsite disposition. The NDAA is applicable only to South Carolina and Idaho. The DOE intends to coordinate the waste determination and State closure plan approval efforts to support the waste tank closure schedule provided in the FFA. [NDAA_3116, *http://www.srs.gov/general/programs/soil/ffa/ffa.pdf*]

2.5.1 10 CFR 61 Performance Objectives

Subpart C of 10 CFR 61 lists the five performance objectives, which are reproduced below:

> ***"Section 61.40 General requirement.***
>
> *Land disposal facilities must be sited, designed, operated, closed, and controlled after closure so that reasonable assurance exists that exposures to humans are within the limits established in the performance objectives in Sections 61.41 through 61.44."*

> *"**Section 61.41 Protection of the general population from releases of radioactivity.***
>
> *Concentrations of radioactive material which may be released to the general environment in ground water, surface water, air, soil, plants, or animals must not result in an annual dose exceeding an equivalent of 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public. Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable."*

The NRC acknowledged that using a performance objective of 25 mrem/yr effective dose, as calculated in this PA, is acceptable versus considering individual organ doses. [NUREG-1854]

> *"**Section 61.42 Protection of individuals from inadvertent intrusion.***
>
> *Design, operation, and closure of the land disposal facility must ensure protection of any individual inadvertently intruding into the disposal site and occupying the site or contacting the waste at any time after active institutional controls over the disposal site are removed."*

> *"**Section 61.43 Protection of individuals during operations.***
>
> *Operations at the land disposal facility must be conducted in compliance with the standards for radiation protection set out in part 20 of this chapter, except for releases of radioactivity in effluents from the land disposal facility, which shall be governed by Section 61.41 of this part. Every reasonable effort shall be made to maintain radiation exposures as low as is reasonably achievable."*

> *"**Section 61.44 Stability of the disposal site after closure.***
>
> *The disposal facility must be sited, designed, used, operated, and closed to achieve long-term stability of the disposal site and to eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure so that only surveillance, monitoring, or minor custodial care are required."*

2.5.2 DOE O 435.1-1 Performance Objectives and Requirements

The DOE LLW disposal performance objectives are defined in DOE M 435.1-1 IV.P (1). DOE Headquarters issued a letter from Mr. Rispoli to Mr. Allison, *Compliance with DOE M 435.1-1 Waste Incidental to Reprocessing Requirements and Implementation of Section 3116(a) of the National Defense Authorization Act for Fiscal Year 2005 (NDAA)*, which offers guidance and clarification concerning the requirements in DOE O 435.1-1 when the requirements of Section 3116 of the NDAA are also applicable to avoid duplication of efforts. [DOE_02-09-2006]

The DOE LLW disposal performance objectives (DOE M 435.1-1 IV.P (1)) are:

> *"Low-level waste disposal facilities shall be sited, designed, operated, maintained, and closed so that a reasonable expectation exists that the following performance objectives will be met for waste disposed of after September 26, 1988:*
>
> *(a) Dose to representative members of the public shall not exceed 25 mrem (0.25 mSv) in a year Total Effective Dose Equivalent (TEDE) from all exposure pathways, excluding the dose from radon and its progeny in air.*
> *(b) Dose to representative members of the public via the air pathway shall not exceed 10 mrem (0.10 mSv) in a year TEDE, excluding the dose from radon and its progeny.*
> *(c) Release of radon shall be less than an average flux of 20 pCi/m^2/s (0.74 Bq/m^2/s) at the surface of the disposal facility. Alternatively, a limit of 0.5 pCi/l (0.0185 Bq/l) of air may be applied at the boundary of the facility."*

Item *(a)* is similar to 10 CFR 61.41 and this PA provides the information relative to items *(b)* and *(c)* for completeness.

2.6 Summary of Key Assessment Assumptions

Numerous assumptions were made in assessing the performance of FTF, and are noted and discussed in subsequent sections. A summary of the key assumptions in the analyses prepared in support of the FTF PA are listed below.

2.6.1 General Facility Description Assumptions

The *Long Range Comprehensive Plan* assumes that the entire site will be owned and controlled by the Federal Government in perpetuity. [PIT-MISC-0041_OUO] However, for the purpose of this PA, no federal protection is assumed beyond the 100-year period of institutional control. The period of compliance will be 10,000 years following closure. A 100-year period of institutional control will begin in year 2020.

2.6.2 Site Characteristics Assumptions

Infiltration rates and aquifer depths can naturally vary over long time periods. Short-term changes in these parameters (e.g., seasonal, annual fluctuations, etc.) are not simulated in the conceptual model because of the extended time ranges involved in the model. A steady-state model was used to approximate the flow field and that the groundwater divide between the two creeks remained constant over the course of the modeling. The flow model uses available data to simulate a future precipitation rate and the resulting infiltration rate, which changes over time as the closure cap degrades. As modeled, the average depth to the water table does not diminish from the Base Case value. Characterization and monitoring data in the SRS GSA was extensive and provides a clear understanding of hydrogeology below and around the FTF.

2.6.3 Facility Design Assumptions

A low-infiltration closure cap will be placed above the grouted waste tanks and is expected to perform as described in Section 3.2.4.

2.6.4 Stabilized Contaminant Characteristics Assumptions

Estimates of residual activity in the waste tanks and ancillary equipment described in Section 3.3 sufficiently bound the actual inventory that will remain in the waste tanks after cleaning. It is assumed that the final residual inventory volume can be estimated with enough accuracy to ensure PA results are protective. The residual waste tank inventory will be a discrete layer at the bottom of the tanks after they are filled with reducing grout. This discrete layer is referred to as the Contamination Zone (CZ).

2.6.5 Integrated Site Conceptual Model Assumptions

The time of initial waste release from the closed waste tanks is initiated upon failure of the carbon steel waste tank liners (i.e., through-wall thinning due to general corrosion), and for the Base Case, only the Type IV tanks have a mean liner failure time in the 10,000-year evaluation period. The conceptual model of radionuclide release assumed water infiltration from the ground surface, through the closure cap and into the tank fill grout provided the pore fluids necessary to leach contaminants from the waste tank. The cementitious materials will degrade over time as described in Section 3.2.3. The primary mechanism for transport of radionuclides from the FTF is advective movement of contaminants leaching from the waste tanks to the groundwater. Concrete surrogate samples obtained from a P-Reactor waste water tank foundation basemat are assumed to be representative of the waste tank basemats/concrete for obtaining concrete physical properties. The results of basemat testing are found in WSRC-STI-2007-00369, Section 3.2. The P-Reactor pad was selected based on similar function (foundation support to tank), and strength properties (3,000 psi compressive strength) to basemats utilized under FTF waste tanks. The release of contaminants from the CZ was based on solubility controls described in Section 4.2.2. For Pu, Tc and U, the solubility values correspond to majority controlling mechanisms of iron-co-precipitation. The most important factors associated with dose to hypothetical MOP and inadvertent intruders are the location, depth of the water well, and drilling through a transfer line, respectively. Six waste tank configurations and one ancillary equipment configuration were used in the groundwater model to simulate potential conditions in the FTF closure system over the 10,000-year evaluation period. While only one configuration (Configuration A) was simulated in the baseline analysis, the six different configurations were considered in the probabilistic analysis.

2.6.6 Airborne Radionuclides and Radon Pathway Assumptions

Radionuclide and radon migration from the CZ to ground surface was assumed to occur by diffusion in vapor-filled pores only. Assuming the stabilized contaminant layer, reducing grout, and concrete roof are dry makes the air-filled porosity equal to the total porosity. This approach maximizes diffusive transport through these materials, since gaseous flux is through the air-filled porosity.

3.0 FACILITY CHARACTERISTICS

Section 3.1 provides information regarding site characteristics with more detailed information furnished for those characteristics that influence the contaminant transport modeling assumptions provided in Section 4.

- Section 3.1.1 provides a general description and layout of the site and the FTF to orient the reader, and includes the current (as of 2007) estimated population distribution of the surrounding area as well as future land use planning for information purposes.
- Section 3.1.2 describes meteorological and climatological data collection at SRS. This data collection determines appropriate modeling assumptions related to rainfall and temperature to assess the performance of the FTF closure cap presented in WSRC-STI-2007-00184_OUO. Dose Release Factors (DRFs) are developed from atmospheric dispersion conditions based on the meteorological data collected, and are used to model the dispersion of gaseous contaminants emanating to the surface from the closed FTF site described in Section 4.5.
- Section 3.1.3 provides a general description of the ecology of the site for information purposes.
- Section 3.1.4 provides information regarding the geology and seismology of the site that is used to determine appropriate modeling parameters for the PA.
- Section 3.1.5 provides information regarding the hydrogeology of the site that determines the modeling assumptions related to the flow of surface water and groundwater.
- Section 3.1.6 identifies the sources of information available regarding the geochemistry of the soils and cementitious material that determines the modeling assumptions related to the depletion of radionuclides during their migration to potential sites of release to the environment.
- Sections 3.1.7 and 3.1.8 address natural resource management of the site and sources of natural and background radiation exposure, respectively, for information purposes.

Section 3.2 describes in detail the design and construction features of existing FTF waste tanks and ancillary equipment and the proposed design and construction features of FTF waste tank and ancillary equipment grouting system and the FTF closure cap concept.

- Sections 3.2.1 and 3.2.2 provide the details of design and construction of the FTF waste tanks and ancillary equipment, respectively.
- Section 3.2.3 provides the functional performance and design requirements of the grouting system to provide for stabilized contaminant immobilization, intruder deterrence, structural stability and a chemical environment to retard the mobility of certain radionuclides by increasing their insolubility.
- Section 3.2.4 provides the design performance requirements and constructability requirements for the proposed FTF closure cap concept and the results of the infiltration analysis of the closure cap presented in WSRC-STI-2007-00184_OUO.

Section 3.3 presents characterization of the stabilized contaminants at the time of FTF closure.

- Section 3.3.1 lists the radionuclides that are used in the assessment modeling that have passed through the screening process described in Section 4.2.1.
- Section 3.3.2 provides the estimated radioactive and non-radioactive inventory in the FTF waste tanks based on sample analysis, process history data collected within the Waste Characterization System (WCS) and special analyses and assumed remaining stabilized contaminants volume for tanks not yet cleaned and based on measurements of residual solids in Tanks 17 through 20.
- Section 3.3.3 provides the estimated inventory remaining inside ancillary equipment including waste transfer lines (considering diffusion, oxide film layer, and residual material following flushing), pump tanks (except for measured Concentrate Transfer System [CTS] tank), catch tank (assuming an estimated residual material volume), and evaporator systems (based on field characterization of the shutdown 242-F evaporator system).

3.1 Site Characteristics

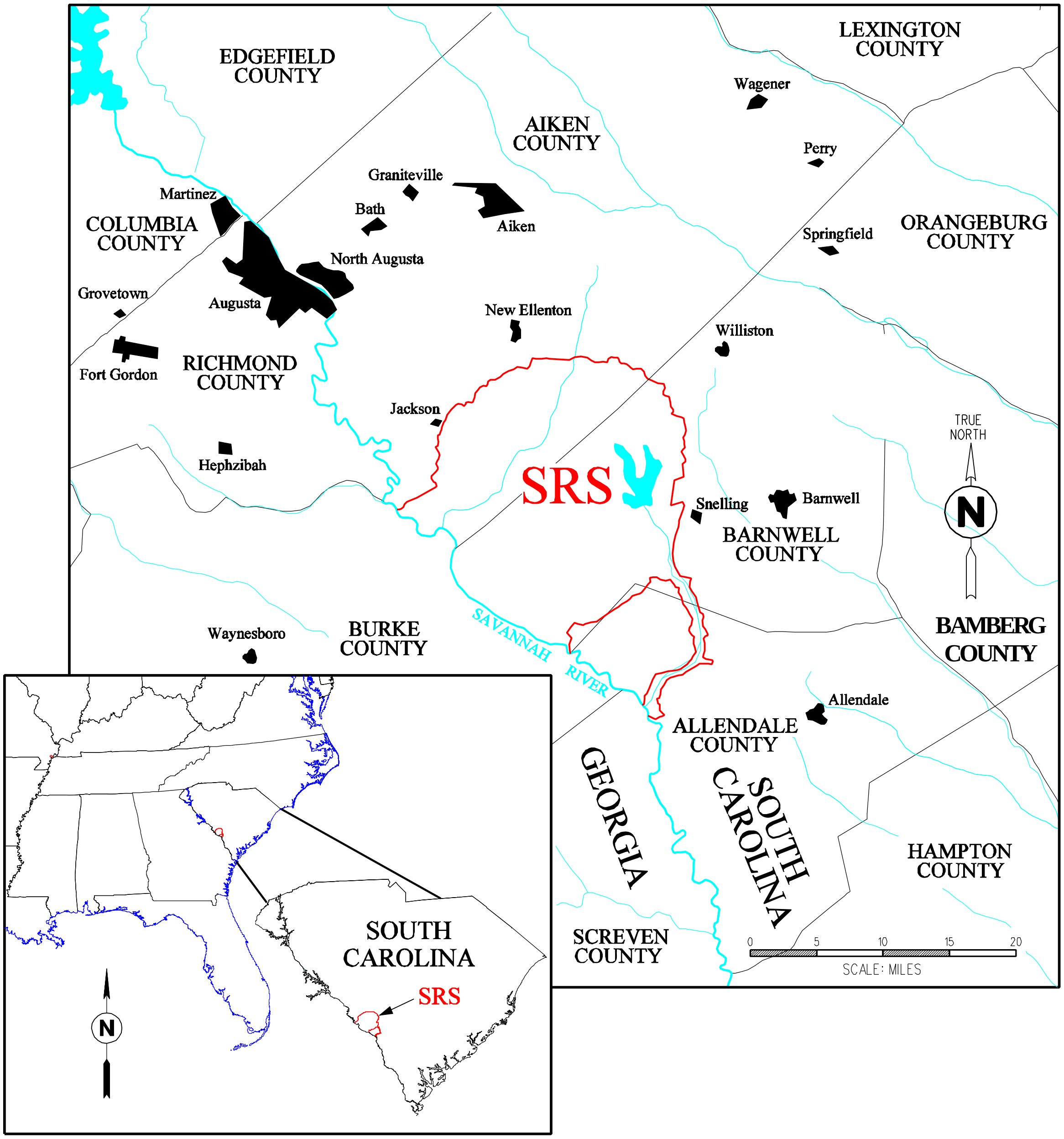
Evaluation of radionuclide transport from the FTF, and of human exposure resulting from release of radionuclides to the environment, requires careful consideration of factors affecting transport processes and exposure potential. Topographic features and hydrogeologic characteristics strongly affect the direction and flow of radionuclides potentially released from the closure site. Projected land use and population distributions affect the estimation of human exposure. In this section, the relevant natural and demographic characteristics of F-Area and surrounding area are discussed.

3.1.1 Geography and Demography

3.1.1.1 SRS Site Description

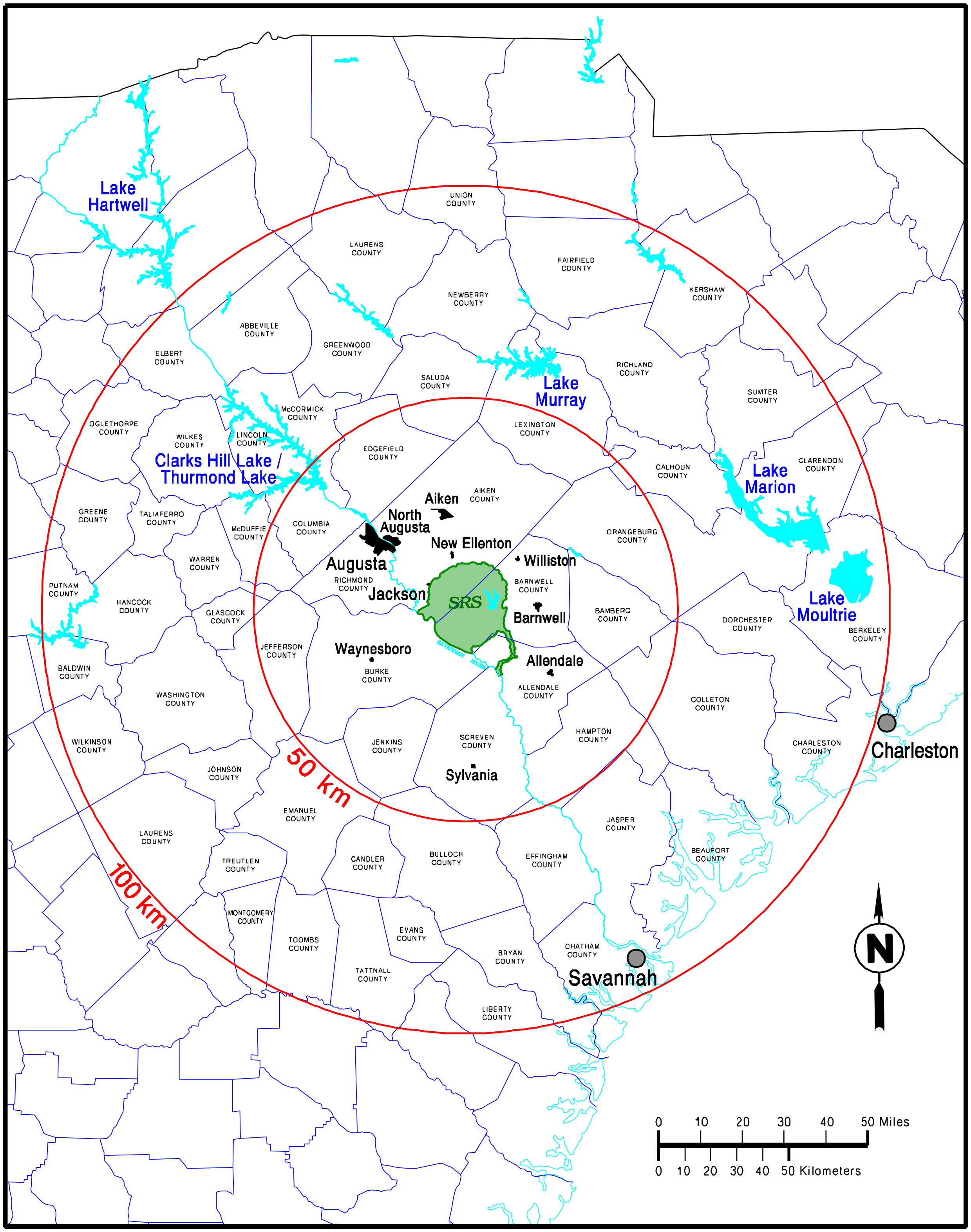
SRS, one of the facilities in the DOE complex, was constructed starting in the early 1950s to produce nuclear materials (such as Pu-239 and tritium). The site covers approximately 310 square miles in South Carolina and borders the Savannah River. SRS encompasses 198,344 acres in Aiken, Allendale, and Barnwell counties of South Carolina. The site is approximately 12 miles south of Aiken, South Carolina, and 15 miles southeast of Augusta, Georgia, as shown in Figure 3.1-1. [WSRC-STI-2008-00057]

Figure 3.1-1: Physical Location of Savannah River Site



Prominent geographic features within 30 miles of SRS include the Savannah River and Clarks Hill Lake (also known as Thurmond Lake), shown in Figure 3.1-2. The Savannah River forms the southwest boundary of SRS. Clarks Hill Lake is the largest nearby public recreational area. This reservoir is located on the Savannah River, approximately 40 miles upstream of the center of SRS.

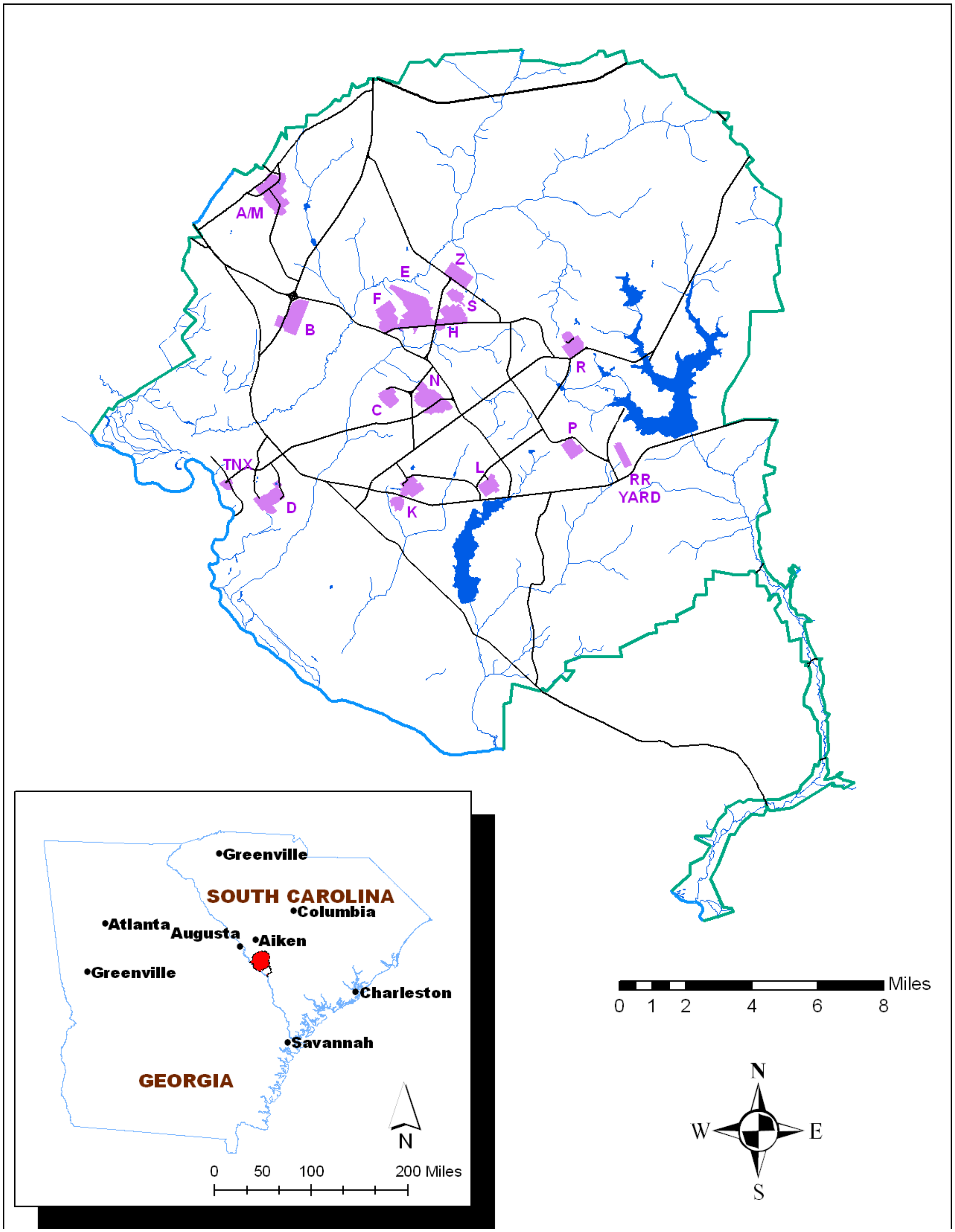
Figure 3.1-2: Location of Savannah River Site and Adjacent Areas



Within the SRS boundary, prominent water features include Par Pond and L Lake, shown in Figure 3.1-3. Par Pond, a former reactor cooling water impoundment, covers approximately 2,700 acres and lies in the eastern sector of SRS. L Lake, another former reactor cooling water impoundment, covers approximately 1,000 acres and lies in the southern sector of SRS. [WSRC-IM-2004-00008, pg 1.4-11]

Figure 3.1-3 also shows the major operational areas at SRS. Prominent operational areas, both past and present, include, Separations (F- and H-Areas), Waste Management Operations (E-, F-, and H-Areas), the Reactor Areas (C, K, L, P, R), and Defense Waste Processing (J-, S- and Z-Areas). Savannah River National Laboratory (SRNL) and Savannah River Ecology Laboratory (SREL) are located in A-Area. Administrative and support services are located in B-Area and construction administration activities are located in N-Area. D-Area is the coal-fired powerhouse that provides steam to SRS. M-Area and TNX have undergone Deactivation and Decommissioning (D&D).

Figure 3.1-3: SRS Operational Area Location Map



3.1.1.2 Closure Site Description

The FTF is in F-Area which is located in the central region of SRS. Figure 3.1-4 presents the area known as the GSA. The GSA is located atop a ridge running southwest-northeast that forms the drainage divide between Upper Three Runs (UTR) to the north and Fourmile Branch to the south. The GSA contains the F- and H-Area Separations Facilities, the S-Area Defense Waste Processing Facility (DWPF), the Z-Area Saltstone Facility, and the E-Area Low-Level Waste Disposal Facilities. The FTF is a liquid waste storage facility consisting of 22 carbon steel waste tanks, shown in Figure 3.1-5, which store liquid radioactive waste generated primarily from the F-Canyon PUREX process. Note that two tanks, 17 and 20, have been cleaned, closed and filled with grout. The FTF design features (e.g., waste tanks, transfer lines, evaporator systems) are discussed in more detail in Sections 3.2.1 and 3.2.2.

Figure 3.1-4: Layout of the General Separations Area

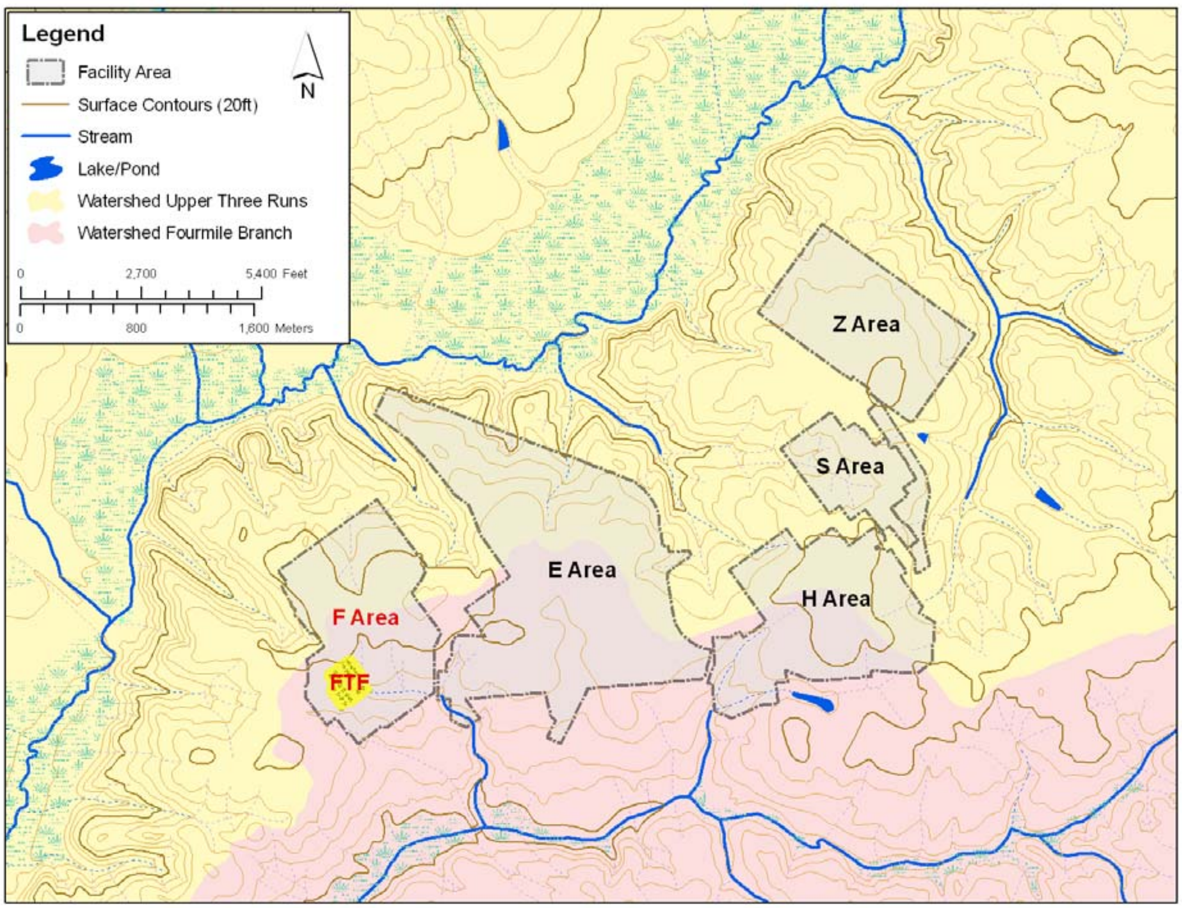
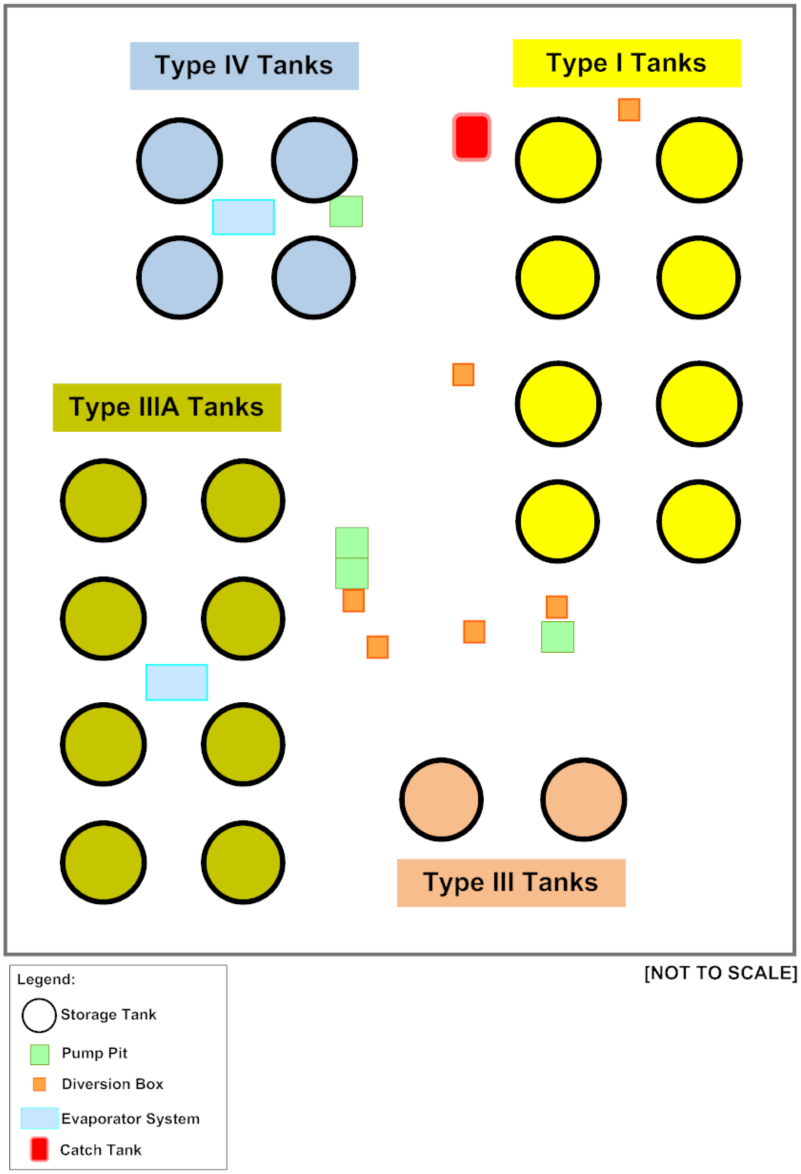


Figure 3.1-5: General Layout of F-Tank Farm



3.1.1.3 Population Distribution

According to U.S. Census Bureau data, the estimated 2008 population in the eight-county region of influence (ROI) was 550,675. Four of the counties lie in South Carolina and include: Aiken, Allendale, Bamberg, and Barnwell. The other four counties lie in Georgia and include Burke, Columbia, Richmond and Screven (see Figure 3.1-2). The ROI includes the counties immediately adjacent to SRS and the counties where the majority of SRS workers reside. Approximately 84% of the ROI population live in the following three counties: Aiken (28%), Richmond (36.2%) and Columbia (20.1%). Only about 16% of the ROI population live in the remaining counties as shown in Table 3.1-1. [*http://factfinder.census.gov*]

Table 3.1-1: Population Distribution and Percent of Region of Influence (% ROI) for Counties and Selected Communities

Jurisdiction	2008 Population Estimate[1]	2008 % ROI
SOUTH CAROLINA		
Aiken County	**154,071**	**28**
Aiken, City	29,434	5.4
Jackson, Town	1,647	0.3
New Ellenton, Town	2,227	0.4
North Augusta, City	20,712	3.8
Allendale County	**10,447**	**1.9**
Allendale, Town	3,659	0.7
Bamberg County	**15,307**	**2.8**
Bamberg, Town	3,432	0.6
Barnwell County	**22,872**	**4.2**
Barnwell, City	4,783	0.9
GEORGIA		
Burke County	**22,986**	**4.2**
Columbia County	**106,887**	**19.8**
Richmond County	**194,398**	**35.9**
Screven County	**15,190**	**2.8**
Eight-County Total	**540,952**	

[1]2008 Population estimates based on 2000 population census and are provided by the U.S. Census Bureau, Population Estimates Program; data for births, deaths, and domestic and international migration were used by the U.S. Census Bureau to update the 2000 base counts. [*http://factfinder.census.gov*]

From 2000 to 2008 the population in the eight-county region grew an estimated 5.8%. Columbia County had the highest estimated growth at approximately 23.9% followed by Aiken County with an estimated growth of approximately 8.1% and Burke County with an estimated growth of 2.2%. Allendale, Bamberg, Barnwell, and Screven Counties experienced a net population loss. Calculations are based on information obtained from the U. S. Census Bureau website: [*http://factfinder.census.gov*]

Population projections and further information regarding the region around SRS can be found in the *High-Level Waste Tank Closure Final Environmental Impact Statement*. [DOE-EIS-0303]

3.1.1.4 Land Use – Present and Planned

Land within a five mile radius of FTF is entirely within SRS boundaries and is currently used either for industrial purposes or as forested land. Current land use within the entire GSA is classified as heavy nuclear industrial. Plans for the future of SRS are addressed in two key planning documents identified below and described in Sections 2.4.2 and 2.4.3.

- The *SRS End State Vision* [PIT-MISC-0089] , and
- The *Savannah River Site (SRS) Long Range Comprehensive Plan*. [PIT-MISC-0041_OUO]

3.1.2 Meteorology and Climatology

3.1.2.1 General SRS Climate

The SRS region has a humid subtropical climate characterized by relatively short, mild winters and long, warm, and humid summers. Summer-like conditions typically last from May through September, when the area is frequently under the influence of a western extension in the semi-permanent Atlantic subtropical anticyclone (i.e., the 'Bermuda' high). Winds in summer are light and cold fronts generally remain well north of the area. Daily high temperatures during the summer months exceed 90°F on more than half of all days on average. Scattered afternoon and evening thunderstorms are common. The influence of the Bermuda high begins to diminish during the fall as continental air masses become more prevalent, resulting in lower humidity and more moderate temperatures.

Average rainfall during the fall is usually the least of the four seasons. In the winter months, mid-latitude low pressure systems and associated fronts often migrate through the region. As a result, conditions frequently alternate between warm, moist, subtropical air from the Gulf of Mexico region and cool, dry polar air. The Appalachian Mountains to the north and northwest of SRS help moderate the extremely cold temperatures that are associated with occasional outbreaks of Arctic air. Consequently, less than one-third of winter days have minimum temperatures below freezing on average, and days with temperatures below 20°F are infrequent. Measurable snowfall occurs an average of once every two years. Tornadoes occur more frequently in spring than the other seasons of the year. Although spring weather is somewhat windy, temperatures are usually mild and humidity is relatively low. [WSRC-TR-2007-00118]

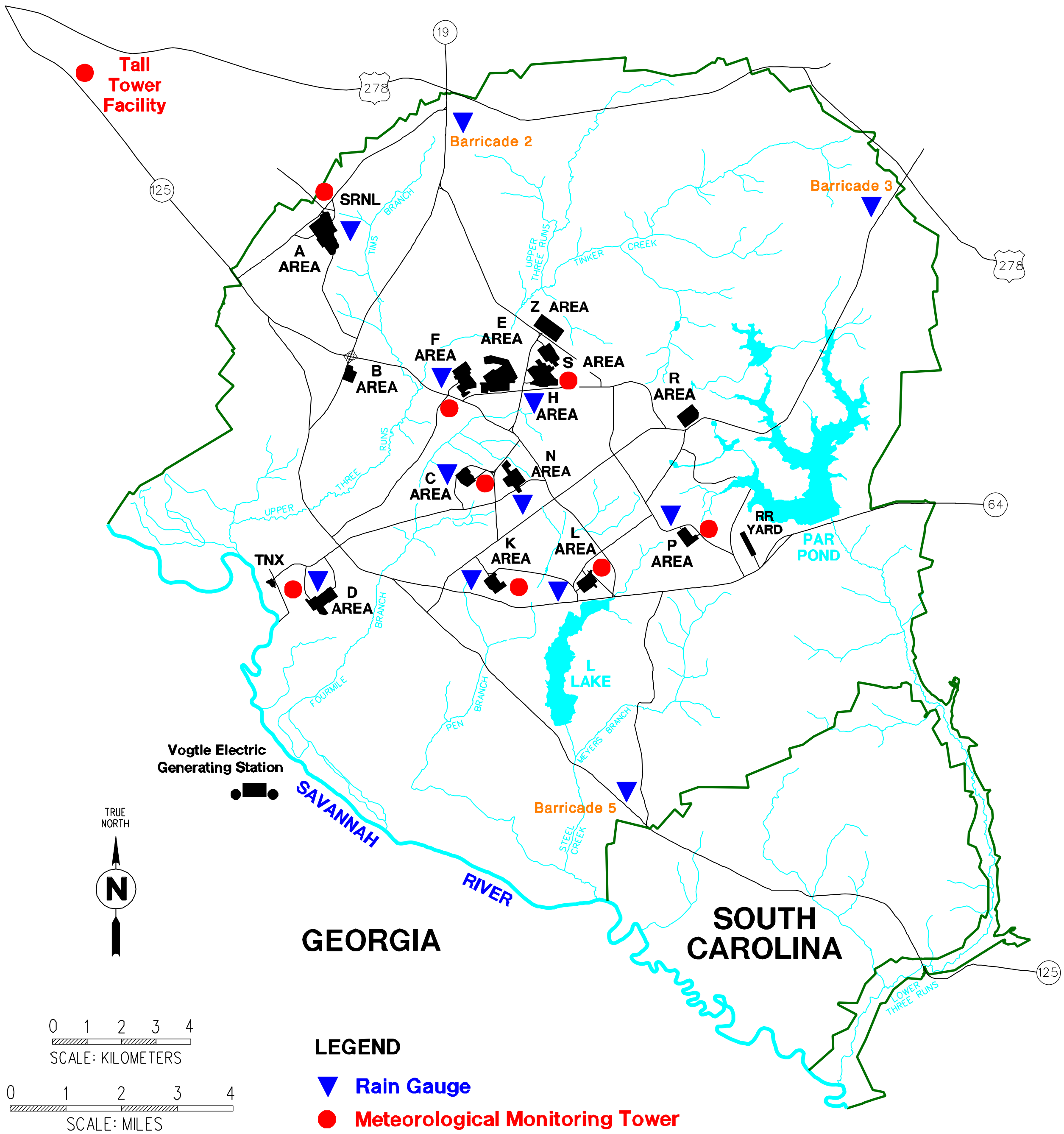
3.1.2.2 Meteorological Data Collection

Meteorological data are collected at SRS from a network of nine primary monitoring stations (Figure 3.1-6). Towers located adjacent to each of eight areas (A-, C-, D-, F-, H-, K-, L-, and P-Areas) are equipped to measure wind direction and wind speed at 201.3 feet above ground and to measure temperature and dew point at both 6.6 feet (2m) and 201.3 feet above ground. Temperature and dew point are also measured at 2m. A ninth tower near N-Area, known as the Central Climatology (CLM) Site, is instrumented with wind, temperature, and dew point sensors at four levels: 6.6 feet (13.2 feet for wind), 59.4 feet, 118.8 feet, and 201.3 feet. The CLM site is also equipped with an automated tipping bucket rain gauge, a barometric pressure sensor, and a solar radiometer near the tower at ground level. Data acquisition units at each station record a measurement from each instrument at 1-second intervals. Every 15 minutes, 900 data points are processed to generate statistical summaries for each variable, including averages and instantaneous maxima. The results are then uploaded to a relational database for permanent archival.

In addition, the Tall Tower facility near Beech Island, South Carolina, provides a set of high-quality meteorological measurements that is unique to the southeast United States. This facility utilizes fast-response sonic anemometers, water vapor sensors, barometric pressure sensors, slow-response temperature sensors and relative humidity sensors. Data are collected at 100 feet, 200 feet, and 1,000 feet above ground level. Spread-spectrum modems at each measurement level transmit raw data to a redundant set of personal computers at the SRNL. Data processing software on the personal computers determine mean values and other statistical quantities every 15 minutes and uploads the results to the relational database.

Precipitation measurements are collected from a network of 13 rain gauges across SRS (Figure 3.1-6). Twelve of these gauges are read manually by security or operations personnel once per day, usually around 6 am. The daily data are reported to the SRNL Atmospheric Technologies Center, where it is technically reviewed and manually entered into a permanent electronic database. The other is an automated rain gauge at the CLM previously addressed above.

Figure 3.1-6: SRS Meteorological Monitoring Network



[WSRC-TR-2007-00118]

3.1.2.3 Data Pertinent to PA Modeling

Weather data pertinent to the PA modeling are atmospheric dispersion, precipitation, and air temperature. Each is discussed below.

3.1.2.3.1 Atmospheric Dispersion

Since the mid-1970s, a five-year database of meteorological conditions at SRS is updated in order to support dose calculations for accident or routine release scenarios for onsite and offsite populations. The meteorological database includes wind speed, wind direction, temperature, dew point, and horizontal and vertical turbulence intensities. The most recent database is for the time period January 1, 2002 through December 31, 2006, and consists of one-hour time averages of temperature and dew-point; wind speed, direction, and turbulence. [WSRC-STI-2007-00613] This data is used to determine DRFs in the evaluation for air pathway dose modeling described in Section 4.5, and reported in WSRC-STI-2007-00343.

3.1.2.3.2 Precipitation

Compilations of rainfall data obtained from meteorological data collection described above for years 1952 through 2006 for the site and for years 1961 through 2006 obtained from the 200-F weather station are provided in WSRC-STI-2007-00184_OUO. An average precipitation of 48.5 inches per year results from the 55 year monitoring period for the site and 49 inches per year from the 46 year monitoring period for F-Area. This data is used to determine appropriate rainfall assumptions for the performance evaluation of infiltration through the closure cap described in Section 3.2.4 and evaluated in WSRC-STI-2007-00184_OUO.]

3.1.2.3.3 Air Temperature

A compilation of air temperature data obtained from meteorological data collection described above for years 1968 through 2005 is provided in WSRC-STI-2007-00184_OUO. For this 37 year period the annual average air temperature is approximately 64°F with an average monthly air temperature from a low of approximately 46°F to a high of approximately 81°F. This data is used to determine appropriate assumptions for the performance evaluation of infiltration through the closure cap described in Section 3.2.4 and evaluated in WSRC-STI-2007-00184_OUO.

3.1.3 Ecology

Comprehensive descriptions of SRS ecological resources and wildlife can be found in *SRS Ecology Environmental Information Document* and are briefly discussed in this section. [WSRC-TR-2005-00201]

SRS supports abundant terrestrial and semi-aquatic wildlife, as well as a number of species considered threatened or endangered. Since the early 1950s, the Site has changed from 67% forest and 33% agriculture to 94% forest, with the remainder in aquatic habitats and developed areas. Wildlife populations correspondingly shifted from forest-farm edge-utilizing species to a predominance of forest-dwelling species. SRS now supports 44 species of amphibians, 60 species of reptiles, 255 species of birds, and 55 species of mammals. These populations include urban wildlife, several commercially and recreationally important species, and a few threatened and endangered species. Protection and restoration of all flora and fauna to a point where their existence is not jeopardized are principal goals of federal and state environmental programs. Those species of plants and animals afforded governmental protection are collectively referred to as “species of concern.” [WSRC-TR-2005-00201, page 3-1]

SRS has extensive, widely distributed wetlands, most of which are associated with floodplains, creeks, or impoundments. In addition, approximately 200 Carolina bays occur on SRS. Carolina bays are unique wetland features of the southeastern United States. They are isolated wetland habitats dispersed throughout the uplands of SRS. The approximately 200 Carolina bays on SRS exhibit extremely variable hydrogeology and a range of plant communities from herbaceous marsh to forested wetland. [DOE-EIS-0303, pg 3-26]

The Savannah River bounds SRS to the southwest for approximately 20 miles. The river floodplain supports an extensive swamp, covering approximately 15 square miles of SRS; with a natural levee separating the swamp from the river. Timber was cut in the swamp from the turn of the century until 1951, when the Atomic Energy Commission assumed control of the area. At present, the swamp forest is comprised of two kinds of forested wetland communities. Areas that are slightly elevated and well-drained are characterized by a mixture of oak species, as well as red maple, sweetgum, and other hardwood species. Low-lying areas that are continuously flooded are dominated by second-growth bald cypress and water tupelo. [DOE-EIS-0303, page 3-26, 3-29]

SRS supports abundant herpetofauna because of its temperate climate and diverse habitats. The species of herpetofauna include 17 salamanders, 27 frogs and toads, one crocodilian, 13 turtles, nine lizards, and 36 snakes. The class Amphibia is represented on site by two orders, 11 families, 16 genera, and 44 species. The Reptilia are represented by three orders, 12 families, 41 genera, and 59 species. [WSRC-TR-2005-00201, page 3-2]

Waterfowl and wading birds, as well as many upland species, use SRS aquatic habitats year round. Sixty-seven percent use Carolina bays and emergent marshes. Sixty-eight percent of the upland species use this habitat type. Edge or shoreline areas accounted for high numbers of upland birds at Carolina bays and emergent marshes, stream, and small drainage corridors, and river swamp habitats. The aquatic birds are most common in large and small open water habitat. [WSRC-TR-2005-00201, pages 3-10]

More than 255 species of birds are found in the SRS. Large mammals inhabiting the site include white-tailed deer and feral hogs. Raccoon, beaver, and otter are relatively common throughout the wetlands of SRS. In addition, the gray fox, opossum, bobcat, gray squirrel, fox squirrel, eastern cottontail, mourning dove, northern bobwhite, and eastern wild turkey are common at SRS. Threatened and endangered plant and animal species known to occur or that might occur on the overall SRS include the smooth purple coneflower, wood stork, red-cockaded woodpecker, and shortnose sturgeon.

The FTF is located within a densely developed, industrialized area of SRS. The immediate area provides habitat for only those animal species typically classified as urban wildlife.

Species commonly encountered in this type of urban landscape include the Southern toad, green anole, rat snake, rock dove, European starling, house mouse, opossum, and feral cats and dogs. Grasses and landscaped areas within F-Area also provide some marginal terrestrial wildlife habitat. A number of ground-foraging bird species (e.g., American robin, killdeer, and mourning dove) and small mammals (e.g., cotton mouse, cotton rat, and Eastern cottontail) that use lawns and landscaped areas around buildings may be present at certain times of the year, depending on the level of human activity (e.g., frequency of mowing). Pine plantations managed for timber production by the U.S. Forest Service (under an interagency agreement with DOE) occupy surrounding areas.

The Fourmile Branch seepline area is located in a bottomland hardwood forest community. The canopy layer of this bottomland forest is dominated by sweetgum, red maple, and red bay. Sweet bay is also common. The understory consists largely of saplings of these same species, as well as a herbaceous layer of smilax, dog hobble, giant cane, poison ivy, chain fern, and hepatica. At the seepline's upland edge, scattered American holly and white oak occur. Dominant along Fourmile Branch in this area are tag alder, willow, sweetgum, and wax myrtle. The UTR seepline is located in a similar bottomland hardwood forest community. [DOE-EIS-0303, page 3-30]

No endangered or threatened fish or wildlife species have been recorded near the UTR and Fourmile Branch seeplines. The seeplines and associated bottomland community do not provide habitat favored by endangered or threatened fish and wildlife species known to occur at SRS. The American alligator is the only Federally protected species that could potentially occur in the area of the seeplines. Fourmile Branch does support a small population of American alligator in its lower reaches, where the stream enters the Savannah River swamp. [DOE-EIS-0303, pg 3-30]

According to summaries of studies on UTR documented in the *SRS Ecology Environmental Information Document*, the macroinvertebrate communities of UTR drainage are unusual. [WSRC-TR-2005-00201] They include many rare species and contain species not often found living together in the same freshwater system. Since UTR is a spring-fed stream and is colder and generally clearer than most surface water at its low elevation, species typical of unpolluted streams in northern North America or the Southern Appalachian Mountains are found here along with lowland (Atlantic Coastal Plain) species.

The fish community of UTR is typical of third- and higher-order streams on SRS that have not been greatly affected by industrial operations, with shiners and sunfish dominating collections. The smaller tributaries to UTR are dominated by shiners and other small-bodied species (i.e., pirate perch, madtoms, and darters) indicative of unimpacted streams in the Atlantic Coastal Plain. In the 1970s, the United States Geological Survey (USGS) designated UTR as a National Hydrological Benchmark Stream due to its high water quality and rich fauna. However, this designation was rescinded in 1992 due to increased development of the UTR watershed north of SRS site boundaries. [DOE-EIS-0303, page 3-31]

3.1.4 Geology, Seismology, and Volcanology

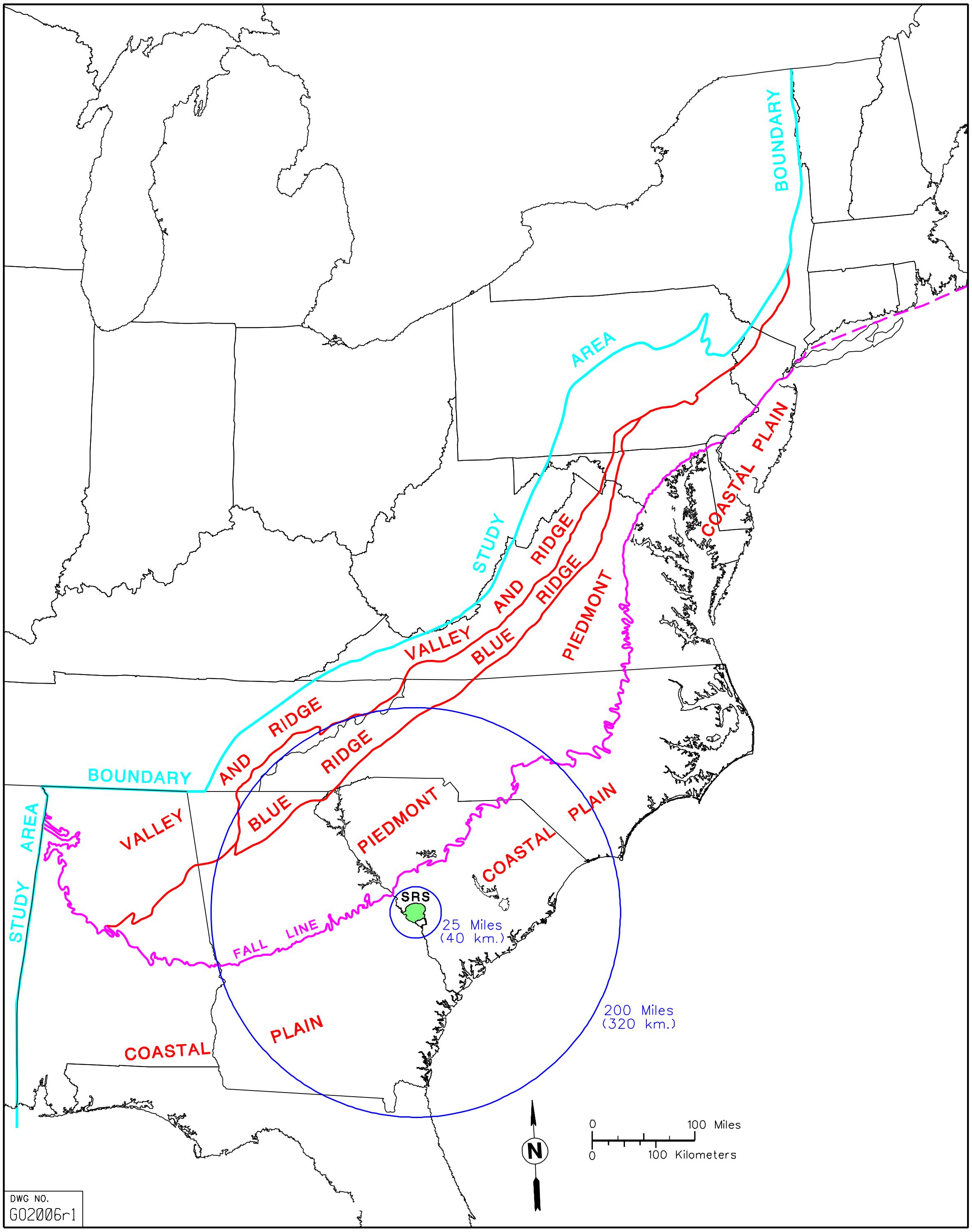
Regional and local information on the geologic and seismic characteristics of the FTF are presented in this section. Because SRS is not located within a region of active plate tectonics characterized by volcanism, volcanology is not an issue of concern in this PA, and thus further discussion of this topic is omitted from the following discussion. [WSRC-IM-2004-00008, page 1.5-7]

3.1.4.1 Regional and Site-Specific Topography

The SRS is on the Atlantic Coastal Plain, Physiographic Province approximately 25 miles southeast of the Fall Line that separates the relatively unconsolidated Coastal Plain sediments. Beneath the Coastal Plain sedimentary sequence are two geologic terranes: 1) the Dunbarton basin, a Triassic-Jurassic Rift basin, filled with lithified terrigenous and lacustrine sediments; and 2) a crystalline terrane of metamorphosed sedimentary and igneous rock that may range in age from Precambrian to late Paleozoic from the crystalline igneous and metamorphic rocks of possibly late Precambrian to late Paleozoic age in the Piedmont Province. Early to middle Mesozoic (Triassic to Jurassic) rocks occur in isolated fault-bounded valleys either exposed within the crystalline belts or buried beneath the Coastal Plain sediments. The Coastal Plain sediments were derived from erosion of the crystalline rocks during late Mesozoic (Cretaceous) in stream and river valleys and are represented locally by gravel deposits adjacent to present-day streams and by sediments filling upland depressions (sinks and Carolina Bays). The Cretaceous and younger sediments are not significantly indurated. The total thickness of the sediment package at SRS varies between approximately 700 feet at the northwest boundary and 1,200 feet at the southeast boundary. [WSRC-TR-95-0046]

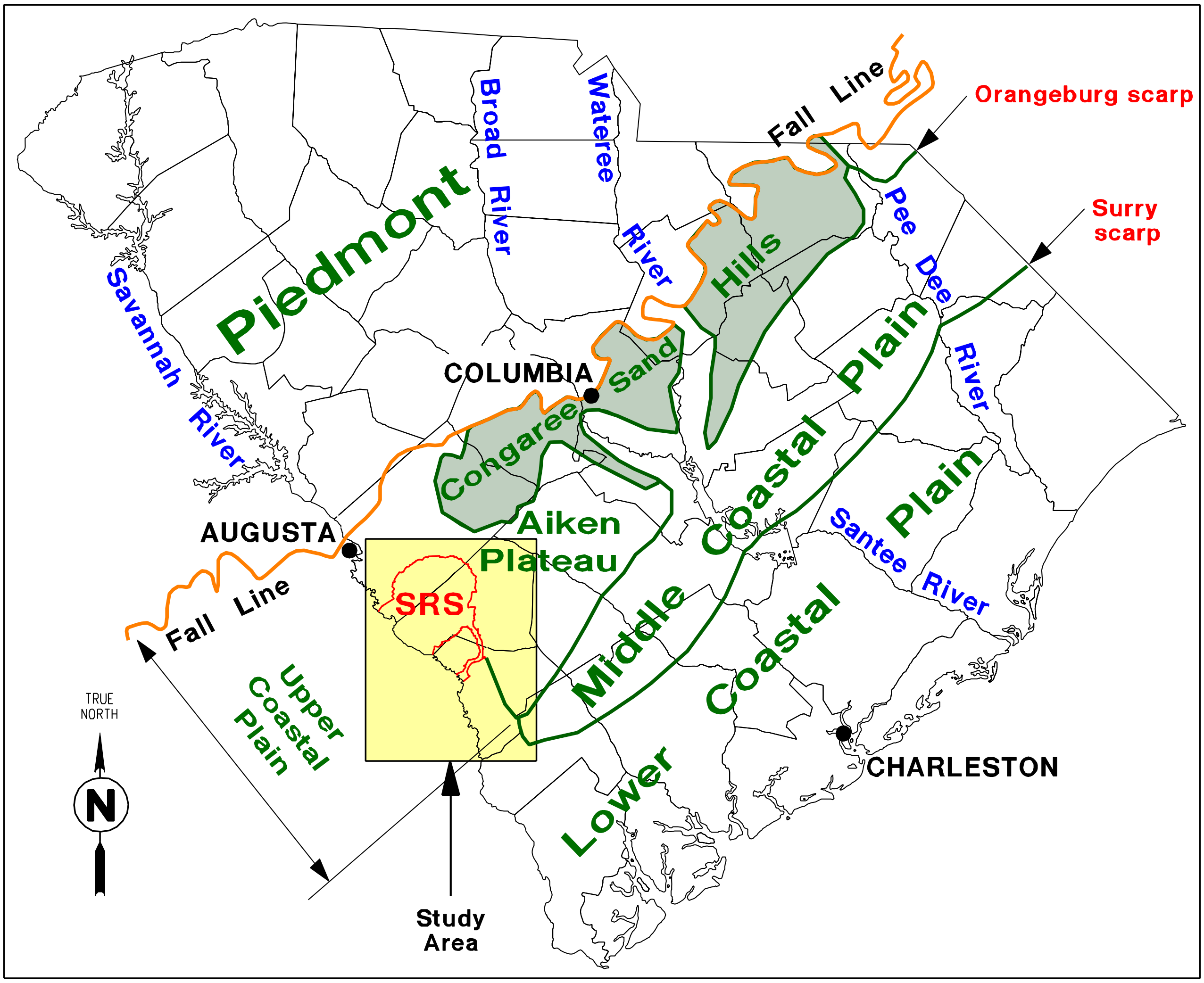
Figure 3.1-7 shows the relationship of SRS to overall regional geological provinces, and Figure 3.1-8 details the regional physiographic provinces in South Carolina. As can be seen on Figure 3.1-8, much of SRS lies within the Aiken Plateau, and this Plateau slopes to the southeast approximately 5 feet per mile. The Plateau is bounded by the Savannah and Congaree Rivers and extends from the fall line to the Orangeburg Escarpment. The highly dissected surface of the Aiken Plateau is characterized by broad interfluvial areas with narrow, steep-sided valleys. Local relief can be as much as 300 feet. [WSRC-TR-95-0046] Figure 3.1-9 shows the topography and 10 foot contour lines of the GSA.

Figure 3.1-7: Regional Geological Provinces of Eastern United States



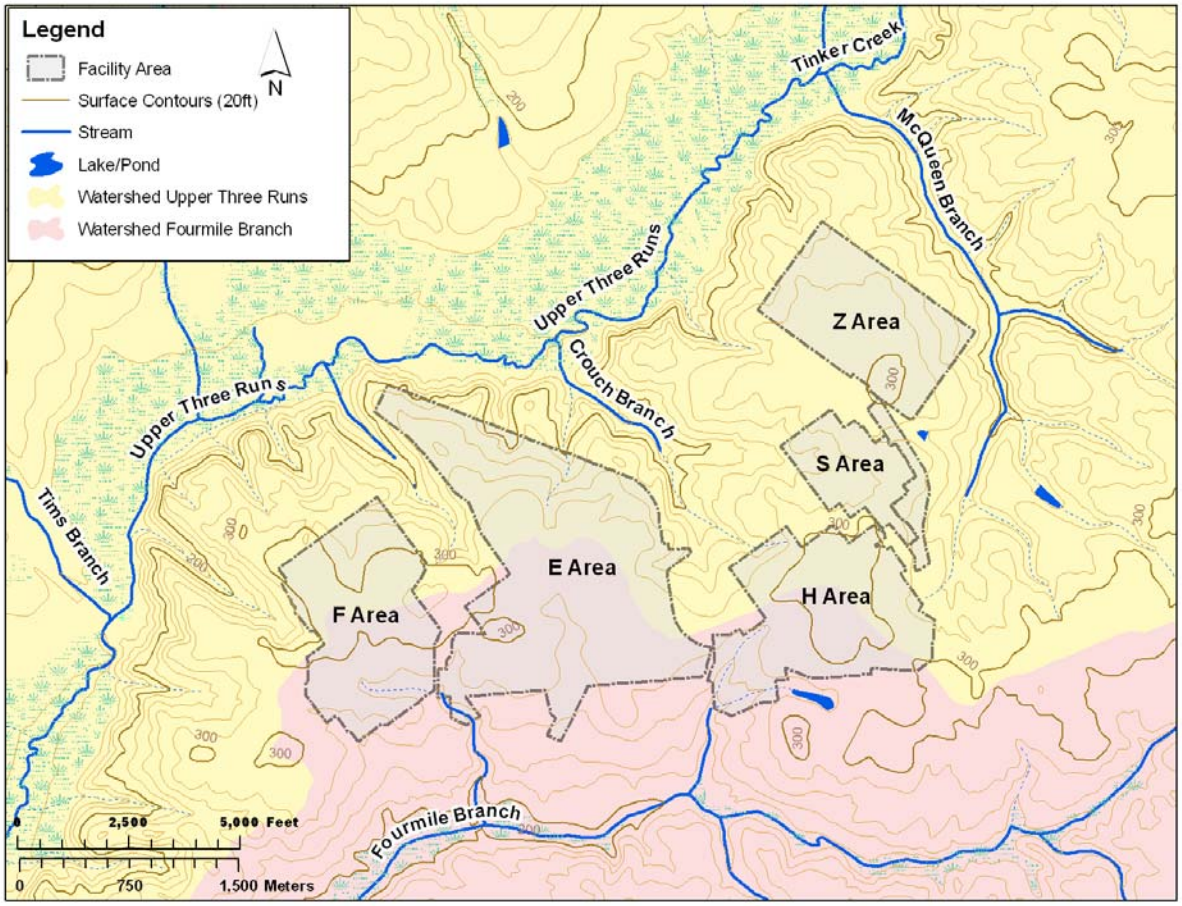
[WSRC-TR-95-0046, Figure 4-1]

Figure 3.1-8: Regional Geologic Provinces of South Carolina



[WSRC-TR-95-0046, Figure 2-3]

Figure 3.1-9: GSA Topography



Currently, FTF storm water drainage is directed to an outfall, which will be unaffected by FTF operations and tank closure activities. The installation of the FTF closure cap (Section 3.2.4) will necessitate changes to the FTF drainage system which will be designed later as part of the overall closure of FTF.

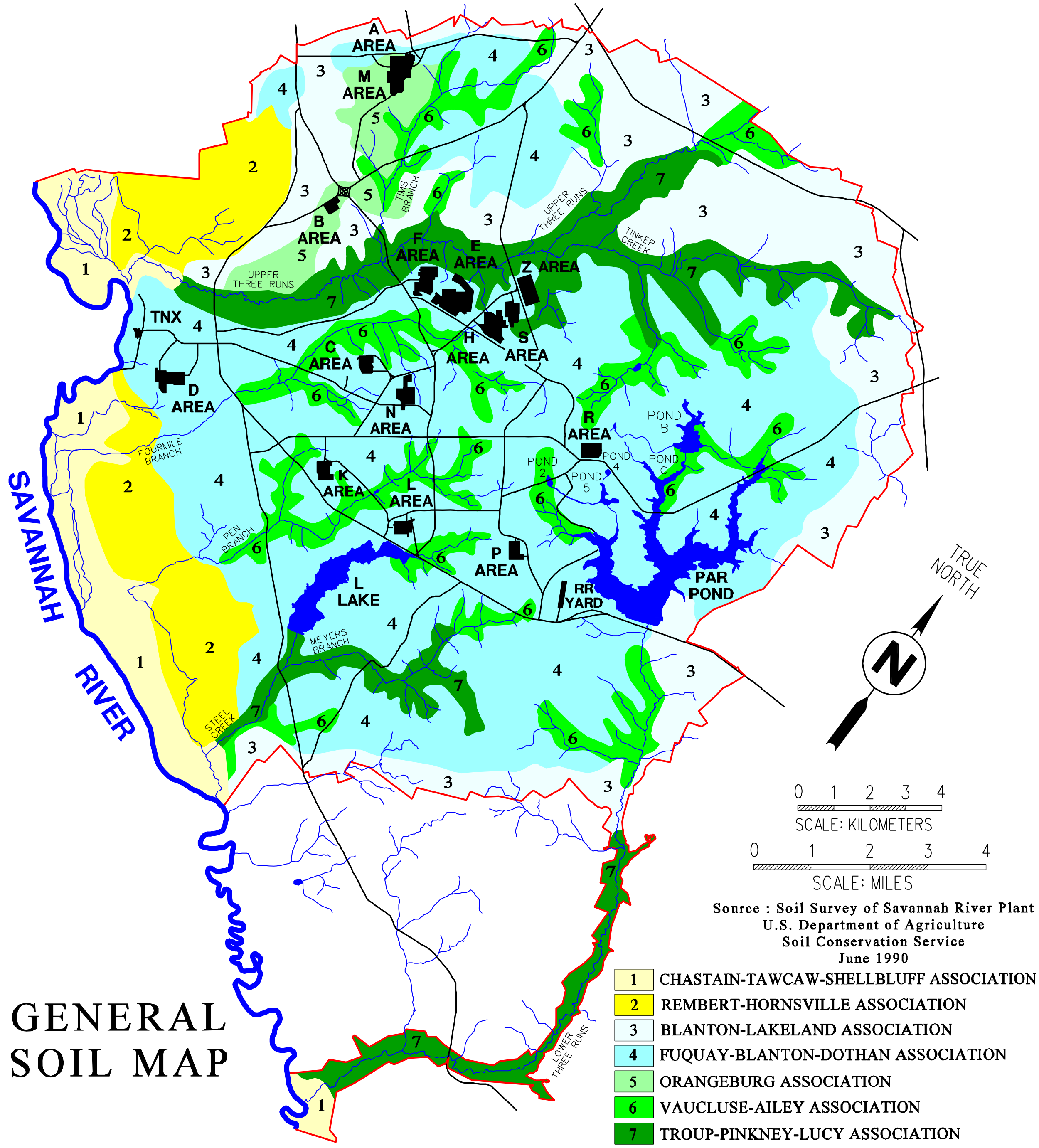
3.1.4.2 Local Geology and Soils

The vadose zone is comprised of the middle to late Miocene-age "Upland Unit," that extends over much of SRS. The term "Upland Unit" is an informal name used to describe sediments at higher elevations located in the Upper Coastal Plain in southwestern South Carolina. This area has also been referred to as the Aiken Plateau. The occurrence of cross-bedded, poorly sorted sands with clay lenses in the Aiken Plateau indicates fluvial deposition (high-energy channel deposits to channel-fill deposits) with occasional transitional marine influence. This depositional environment results in wide differences in lithology and presents a very complex system of transmissive and confining beds or zones. The lower surface of the "Upland Unit" is very irregular due to erosion of the underlying formations.

A notable feature of the “Upland Unit” is its compositional variability. This formation predominantly consists of red-brown to yellow-orange, gray, and tan colored, coarse to fine grained sand, pebbly sand with lenses and beds of sandy clay and clay. Generally vertically upward through the unit, sorting of grains becomes poorer, clay beds become more abundant and thicker, and sands become more argillaceous and indurated. In some areas, small-scale joints and fractures, both of which are commonly filled with sand or silt, traverse the unit. The mineralogy of the sands and pebbles primarily consists of quartz, with some feldspars. In areas to the east-southeast, sediments may become more phosphatic and dolomitic. The soils at F-Area may contain as much as 20% to 40% clay. [DOE-EIS-0303, pages 3-1 and 3-5]

SRS is comprised of seven major soil associations. They are: Chastin-Tawcaw-Shellbluff; Rembert-Hornsville; Blanton-Lakeland; Fuquay-Blanton-Dothan; Orangeburg; Vaucluse-Ailey; and Troup-Pinkney-Lucy. Figure 3.1-10 delineates the general soil associations for SRS. Details regarding these associations may be found in the *Soil Survey of the Savannah River Plant, U.S. Department of Agriculture, Soil Conservation Service*. [*http://soildatamart.nrcs.usda.gov/Manuscripts/SC696/0/savannah.pdf*]

Figure 3.1-10: General Soil Associations for SRS



[http://soildatamart.nrcs.usda.gov/Manuscripts/SC696/0/savannah.pdf]

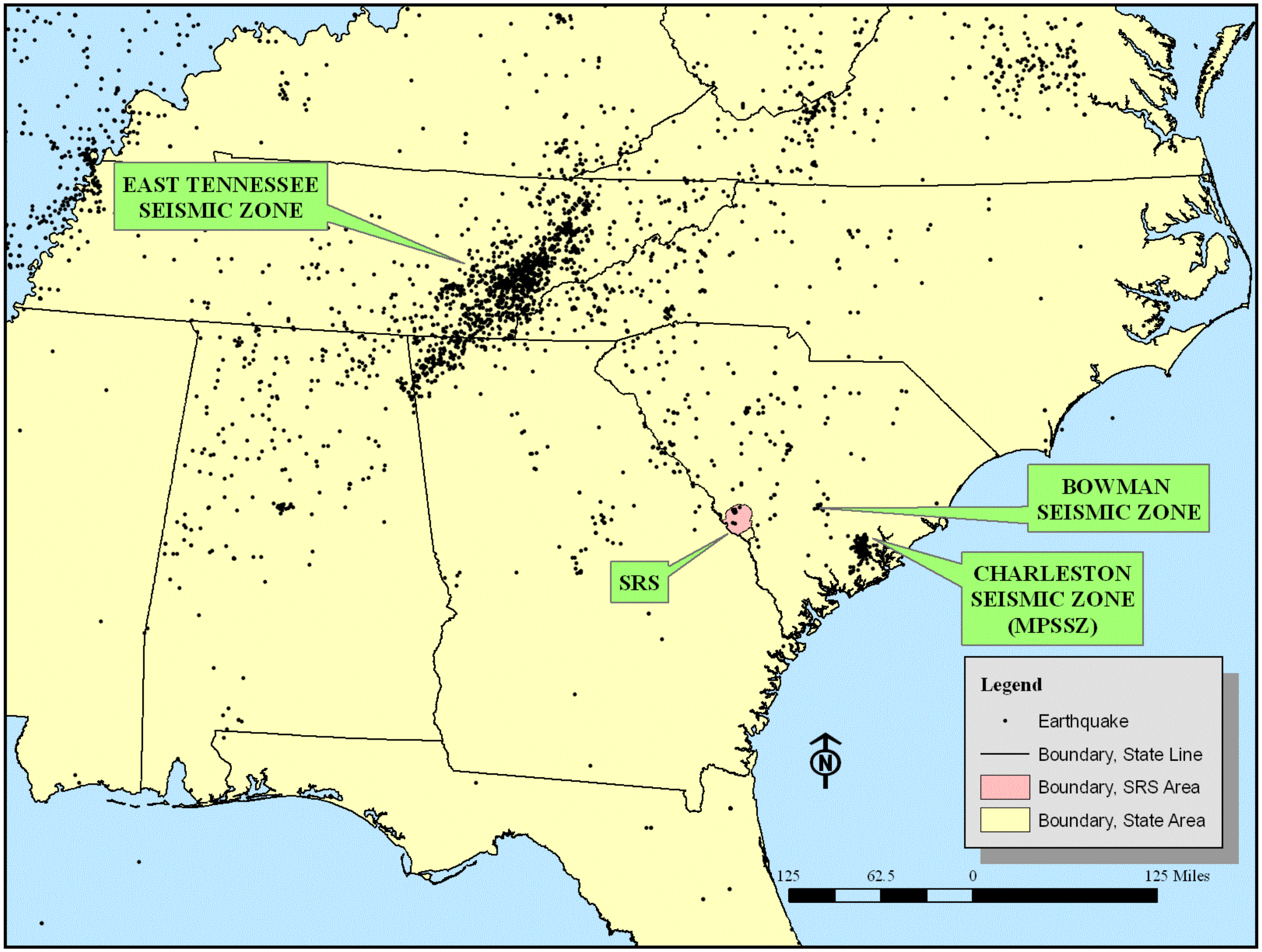
The overall general soil association for F-Area is the Fuquay-Blanton-Dothan. The most predominant soil types within F-Area are classified as Udorthents. Udorthents consist of well-drained soils that formed in heterogeneous materials, which are the spoil or refuse from excavations and major construction operations. The soil material has been removed, mixed, and moved. Udorthents range from sandy to clayey, depending upon the source of material or geologic parent material. Udorthents are most commonly associated with well-drained to excessively drained upland soils. A few small, poorly drained areas that have spoil are also included. Typical profiles for Udorthents are not shown due to the unconsolidation within short distances. Clayey soil has demonstrated good retention for most radionuclides. There are also areas that consist of cross-bedded, poorly sorted sand with lenses and layers of silt and clay.

A more detailed description of the geology and soils of the F-Area can be found in a report titled *Hydrogeologic Framework of West-Central South Carolina*. [PIT-MISC-0112]

3.1.4.3 Seismology

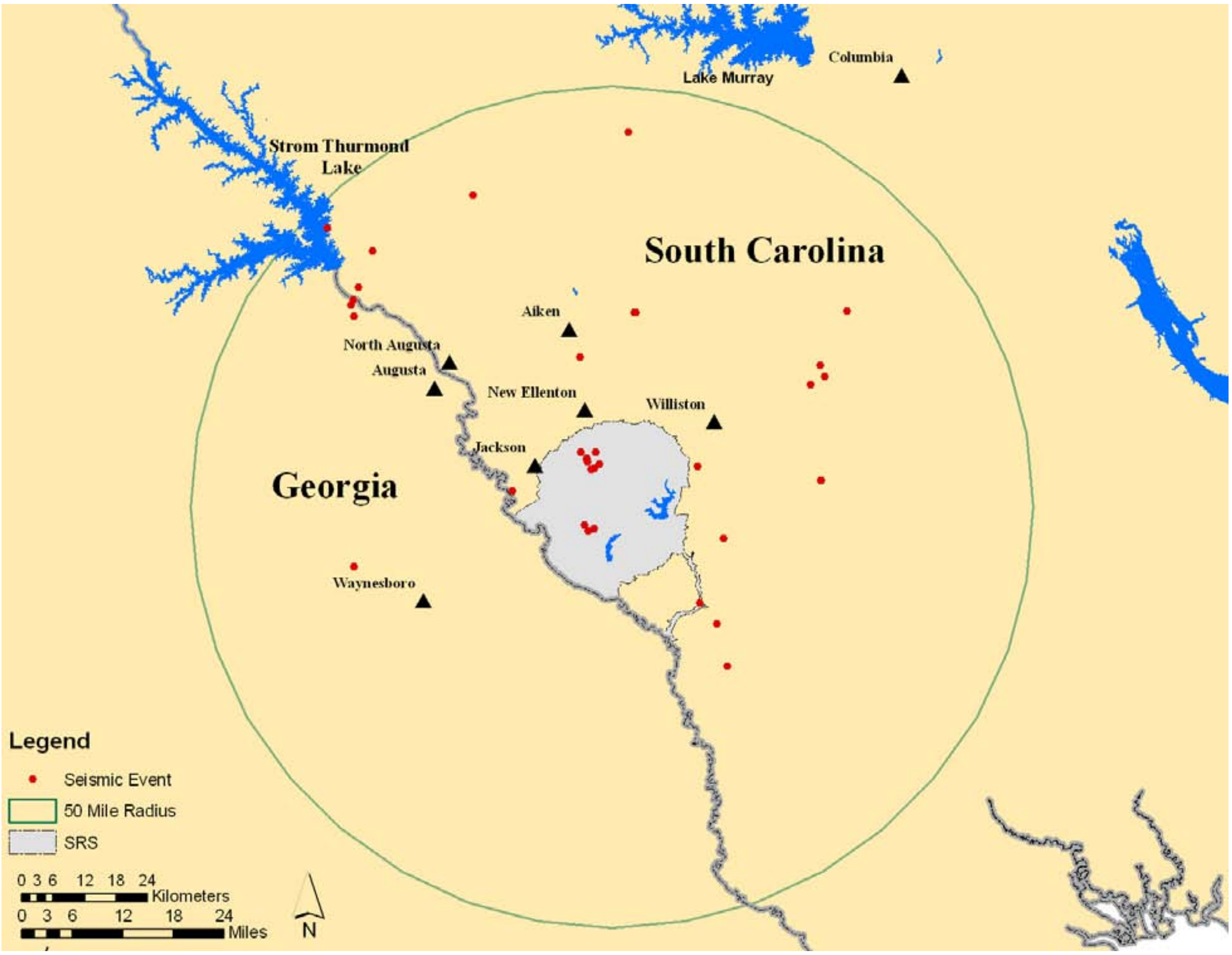
The seismic history of the southeastern U.S. (of which SRS is a part) spans a period of nearly three centuries, and is dominated by the Charleston earthquake of August 31, 1886 (estimated magnitude of 7.0). The historical database for the region is essentially composed of two data sets extending back to as early as 1698. The first set is comprised of pre-network, mostly qualitative data (1698-1974), and the second set covers the relatively recent period of instrumentally recorded or post-network seismicity, 1974 through April 2009. Figure 3.1-11 shows the locations of historical seismic events in the southeast. Figure 3.1-12 denotes the epicenter locations of seismic events within a 50 mile radius of SRS. [WSRC-MS-2003-00617, *http://neic.cr.usgs.gov/neis/last_event_states/*]

Figure 3.1-11: Historical Seismic Events in the Southeast



[*http://neic.cr.usgs.gov/neis/last_event_states/*]

Figure 3.1-12: Seismic Events within a 50 Mile Radius of SRS

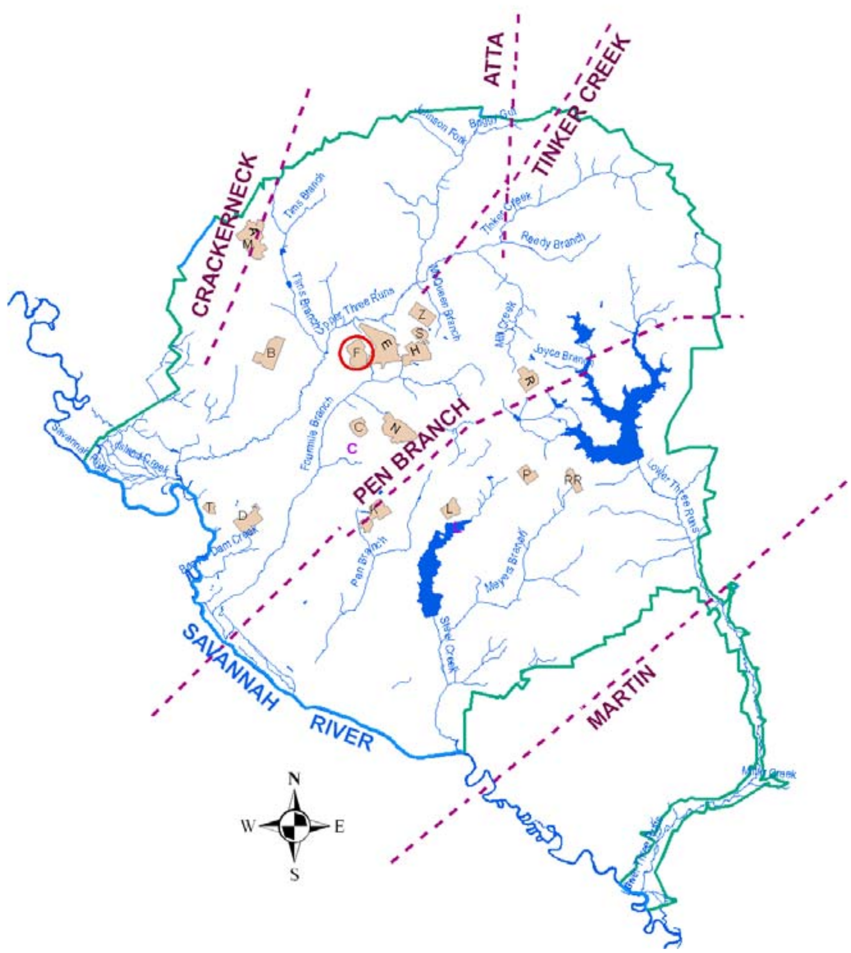


[WSRC-MS-2003-00617, *http://neic.cr.usgs.gov/neis/last_event_states/*]

The most recent seismic event occurring within a 50 mile radius of SRS was on March 27, 2009, with a magnitude of 2.6. No damage to SRS was recorded. There have, however, been four earthquakes with epicenter locations within SRS. They occurred on June 9, 1985 (magnitude of 2.6); August 5, 1988 (magnitude of 2.0); May 17, 1997 (magnitude of 2.3), and October 8, 2001 (magnitude of 2.6). No Strong Motion Accelerometers (SMAs) were triggered as a result of these earthquakes. Note that additional seismic events with epicenter locations within SRS occurred shortly after the October 2001 earthquake, however, these seismic events were attributed to aftershocks and not actual earthquakes. [WSRC-MS-2003-00617]

The regional faults within SRS and vicinity are shown in Figure 3.1-13, a study entititled *Comparison of Cenozoic Fauling at the Savannah River Site to Fault Characteristics of the Atlantic Coast Fault Province: Implications for Fault Capability* (WSRC-TR-2000-00310) provides additional data. The study concludes that these regional faults exhibit the same general characteristics, and are closely associated with the faults of the Atlantic Coastal Fault Province, and thus are part of the Atlantic Coastal Fault Province. Several faults of the Atlantic Coastal Fault Province have been the subject of detailed investigations. In all cases, the conclusion has been reached that these faults have not had a movement within the past 35,000 years and no movement of a recurring nature within the past 500,000 years. Inclusion in the Atlantic Coastal Fault Province means that the historical precedent established by decades of previous studies on the seismic hazard potential for the Atlantic Coastal Fault Province is relevant to faulting at the SRS.

Figure 3.1-13: Regional Scale Faults for SRS and Vicinity



[WSRC-TR-2000-00310, Figure 10]

In 1976, a short-period seismic network was established. This network continues to be upgraded and in 1999 a 10-station SMA network was installed throughout the complex. Specific to F-Area, one SMA is located near the tanks in the tank farm. Detailed information regarding seismic characteristics at SRS can be found in the Documented Safety Analysis (DSA) document, WSRC-IM-2004-00008.

Seismic considerations are included in the design of the FTF closure cap to ensure seismic induced degradation mechanisms are addressed. Section 3.2.4 discusses the design of the FTF closure cap which will appropriately consider and handle static loading induced settlement, seismic induced liquefaction and subsequent settlement, and seismic induced slope instability.

3.1.5 Hydrogeology

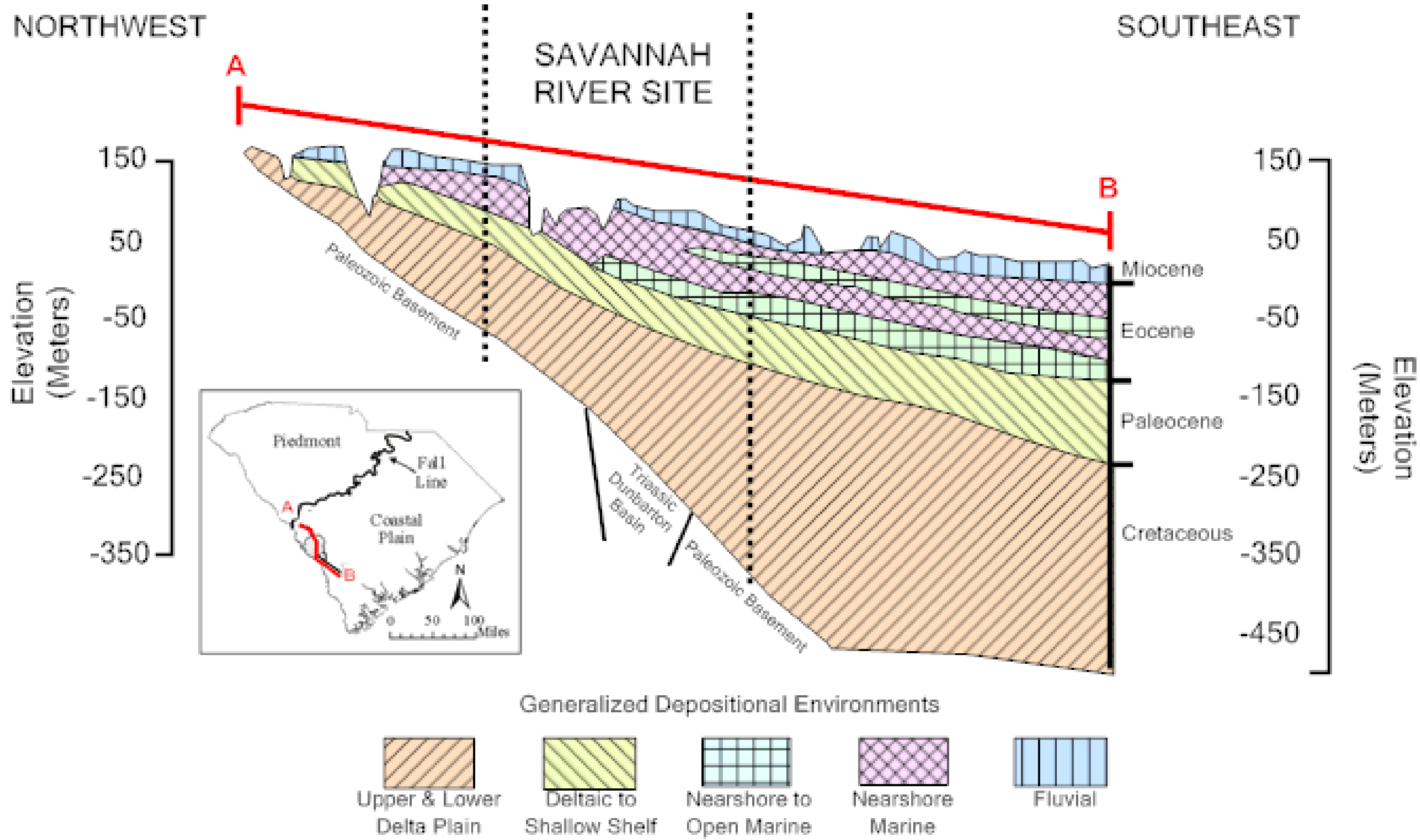
An understanding of the hydrogeology of the FTF is required in order for an estimate of the fate and transport of the residual FTF contaminants to be modeled. Characterization and monitoring data in the SRS GSA is extensive and provides a clear understanding of hydrogeology containing the FTF, and permitted generation of the General Separations Area Database (GSAD). Additional background information supporting this conclusion is presented in Section 3.1.5.2.

3.1.5.1 Regional Hydrogeology

SRS lies in the Atlantic Coastal Plain, a southeast-dipping wedge of unconsolidated and semi-consolidated sediment, which extends from its contact with the Piedmont Province at the Fall Line to the continental shelf edge. Sediments range in geologic age from Late Cretaceous to Recent and include sands, clays, limestones and gravels. This sedimentary sequence ranges in thickness from essentially zero at the Fall Line to more than 1,219m (4,000 feet) at the Atlantic Coast. At SRS, coastal plain sediments thicken from approximately 213m (700 feet) at the northwestern boundary to approximately 430m (1,410 feet) at the southeastern boundary of the site and form a series of aquifers and confining or semi-confining units. Aquifer systems include the Floridan, Dublin and Midville systems. [WSRC-TR-96-0399-Vol. 1]

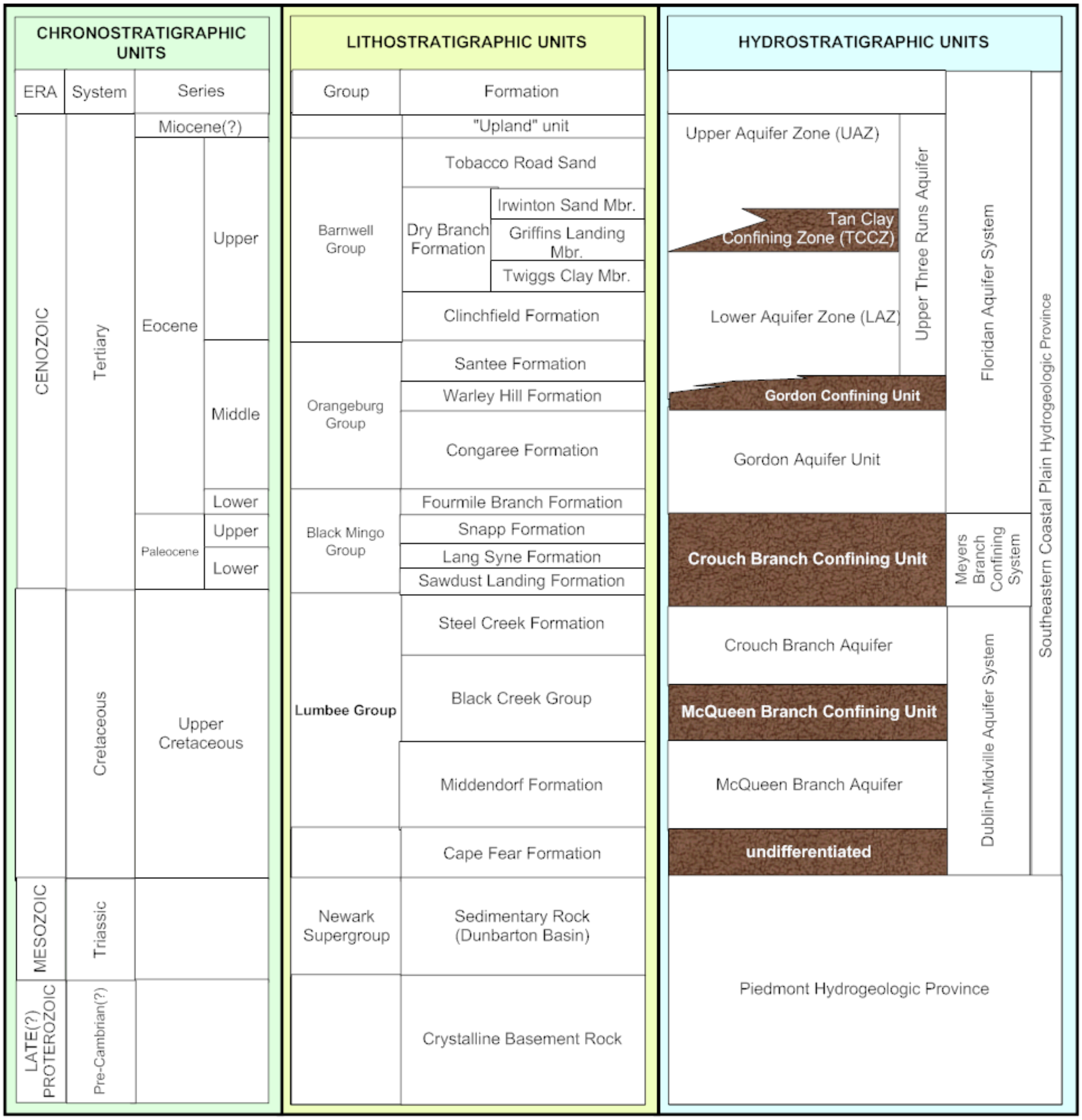
Figure 3.1-14 shows a generalized cross section of the sedimentary strata and their corresponding depositional environments for the Upper Coastal Plain down-dip through SRS into the Lower Coastal Plain. Figure 3.1-15 shows the regional lithologic units and their corresponding hydrostratigraphic units at SRS. This classification system is consistent with the established system, and is now widely used as SRS standard. [WSRC-TR-96-0399-Vol. 1, WSRC-TR-95-0046, WSRC-STI-2008-00057, Page 7-1]

Figure 3.1-14: Regional NW to SE Cross Section



[WSRC-TR-95-0046]

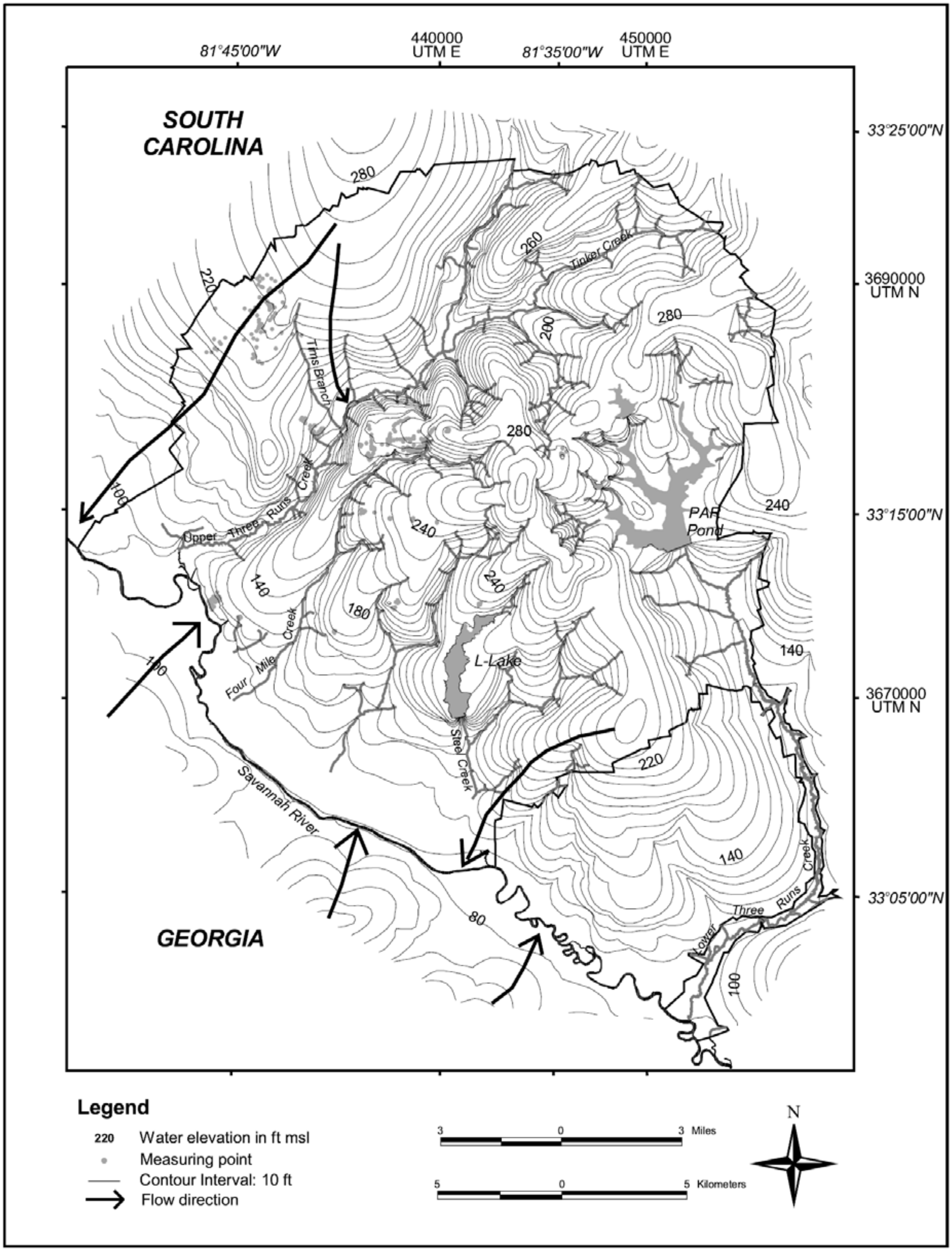
Figure 3.1-15: Comparison of Chronostratigraphic, Lithostratigraphic, and Hydrostratigraphic Units in the SRS Region



[WSRC-TR-95-0046]

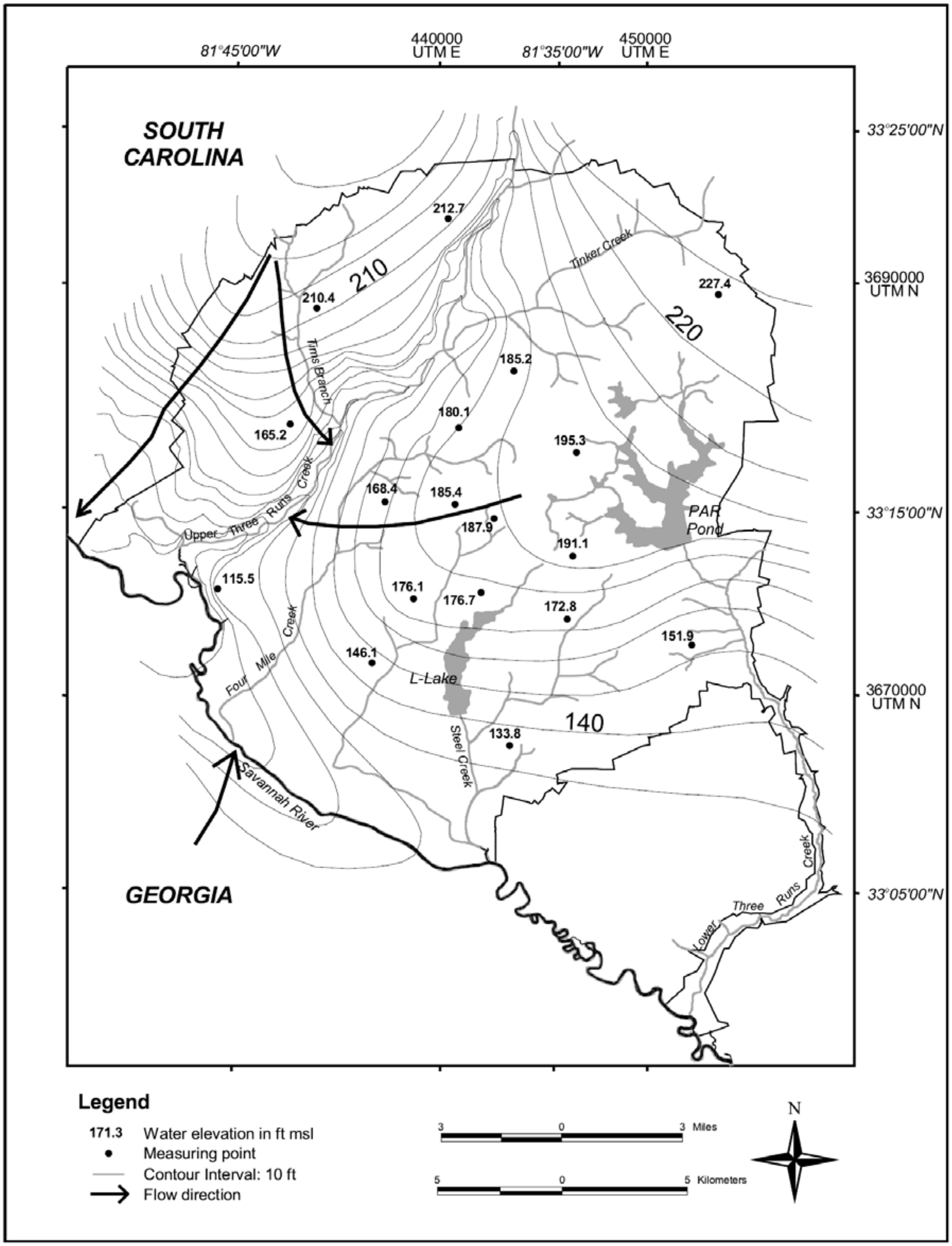
Figures 3.1-16 and 3.1-17 illustrate potentiometric maps of the UTR and Gordon Aquifers. Groundwater within the Floridan Aquifer system flows toward streams and swamps and into the Savannah River at rates ranging from inches to several hundred feet per year. The depth to which nearby streams cut into sediments, the lithology of the sediments, and the orientation of the sediment formations control the horizontal and vertical movement of the groundwater. The valleys of smaller perennial streams, such as Fourmile Branch, McQueen Branch, and Crouch Branch in the GSA, allow discharge from the shallow saturated geologic formations. The valleys of major tributaries of the Savannah River (e.g., UTR) drain formations of greater depth. With the release of water to the streams, the hydraulic head of the aquifer unit releasing the water can become less than that of the underlying unit. If this occurs, groundwater has the potential to migrate upward from the lower unit to the overlying unit. [DOE-EIS-0303, page 3-10]

Figure 3.1-16: Potentiometric Surface of the Upper Three Runs Aquifer



[WSRC-STI-2008-00057-SRS Maps, Page 18]

Figure 3.1-17: Potentiometric Surface of the Gordon Aquifer

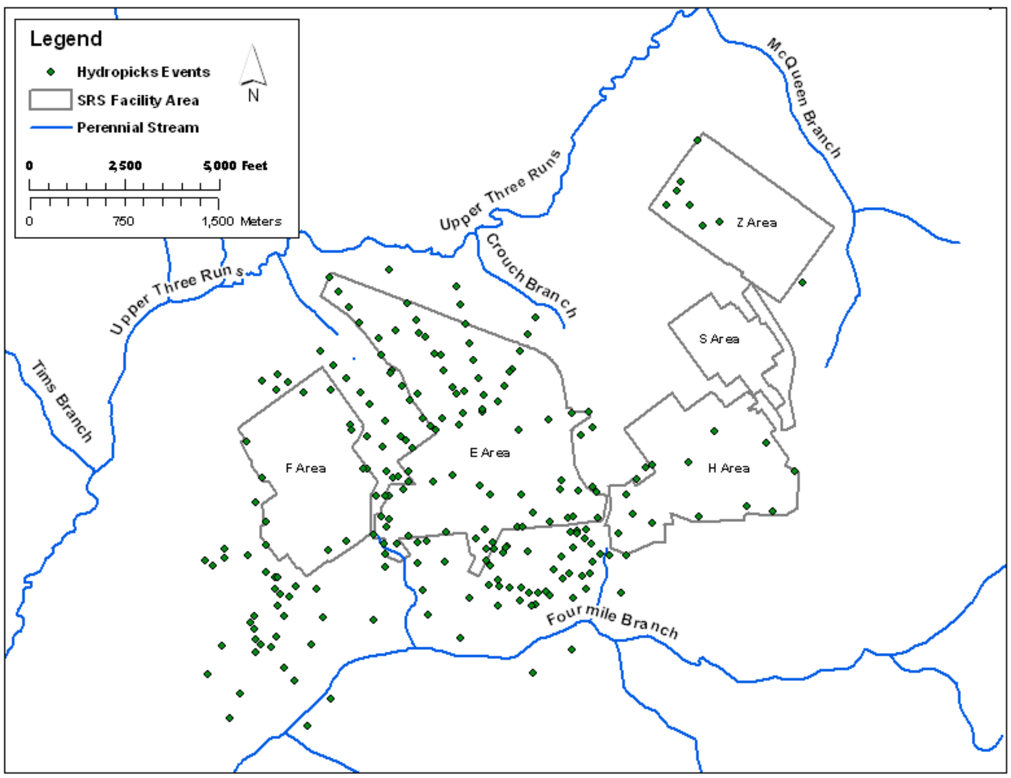


[WSRC-STI-2008-00057-SRS Maps, Page 19]

3.1.5.2 Characterization of Local Hydrogeology

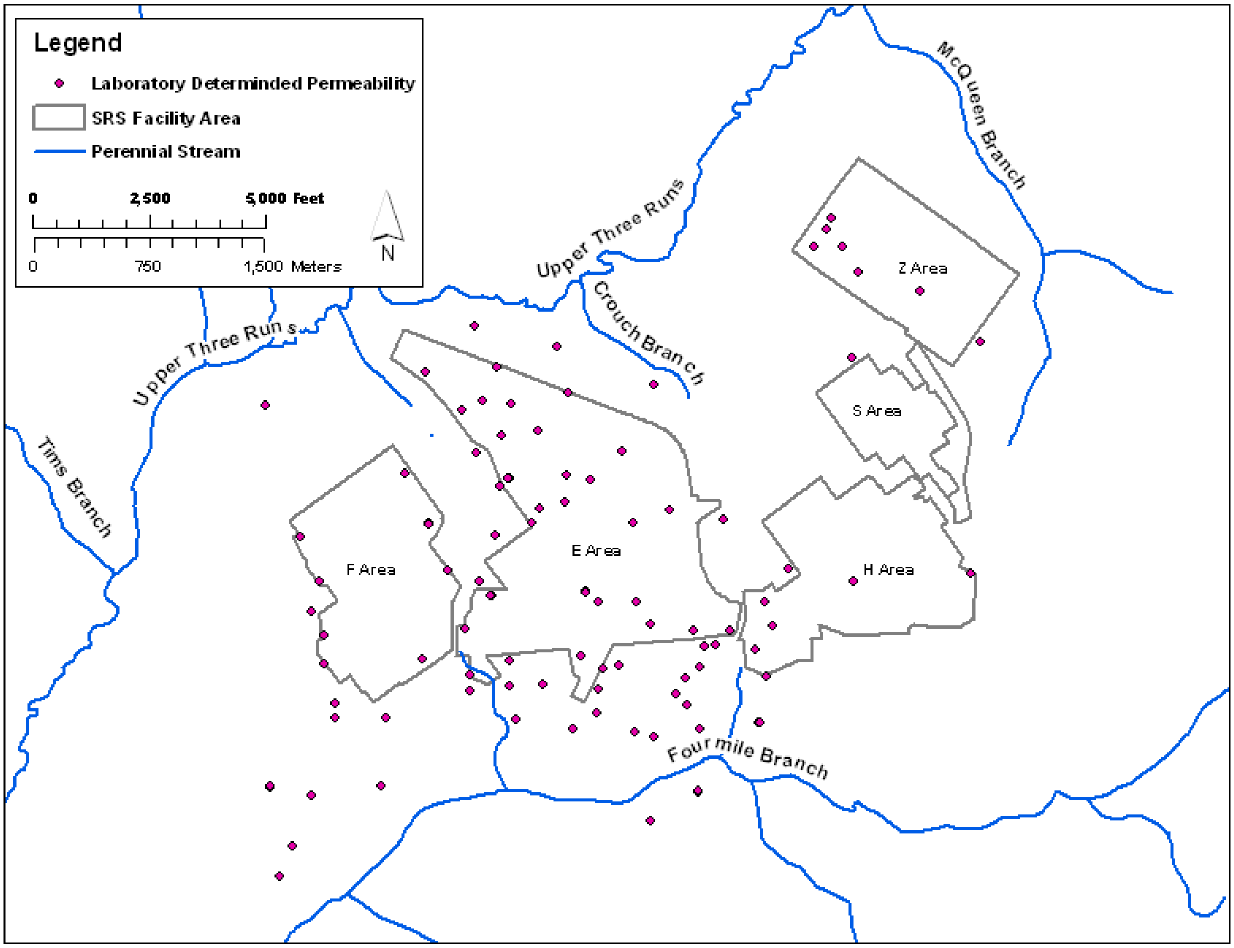
The GSA has been the focus of numerous geological and hydrogeologic investigations. Early work included installation of monitoring wells in the 1950's and 1960's. Further characterization and monitoring were conducted in the area during the 1970's through present time, largely to support groundwater monitoring and decommissioning activities. The GSAD was developed using field data and interpretations for the GSA and vicinity through 1996. Although characterization and monitoring have been ongoing, the additional data has not altered fundamental understanding of groundwater flow patterns and gradients in the GSA. The GSAD is a subset of site-wide data sets of soil lithology and groundwater information. Figure 3.1-18 shows the location of all hydrostratigraphic picks used in the GSAD. Picks were made based on a combination of geophysical logs, Cone Penetration Test (CPT) logs, and core descriptions. Figures 3.1-19 through 3.1-22 show locations of laboratory permeability data, multiple well pump tests, single well pump test and slug test data used in the GSAD. Table 3.1-2 presents a summary of the characterization and monitoring data in the GSAD. These data provide detailed understanding of local hydrogeology beneath the FTF. See WSRC-TR-96-0399, Volumes 1 and 2 for a more comprehensive discussion of the data set. The GSAD, comprising SRS characterization and monitoring data and interpretations is used as the basis of hydrogeologic input values into the computational model for groundwater flow and contaminant transport as described in Section 4.2.3.1.3.

Figure 3.1-18: Hydrostratigraphic Picks in GSAD Database



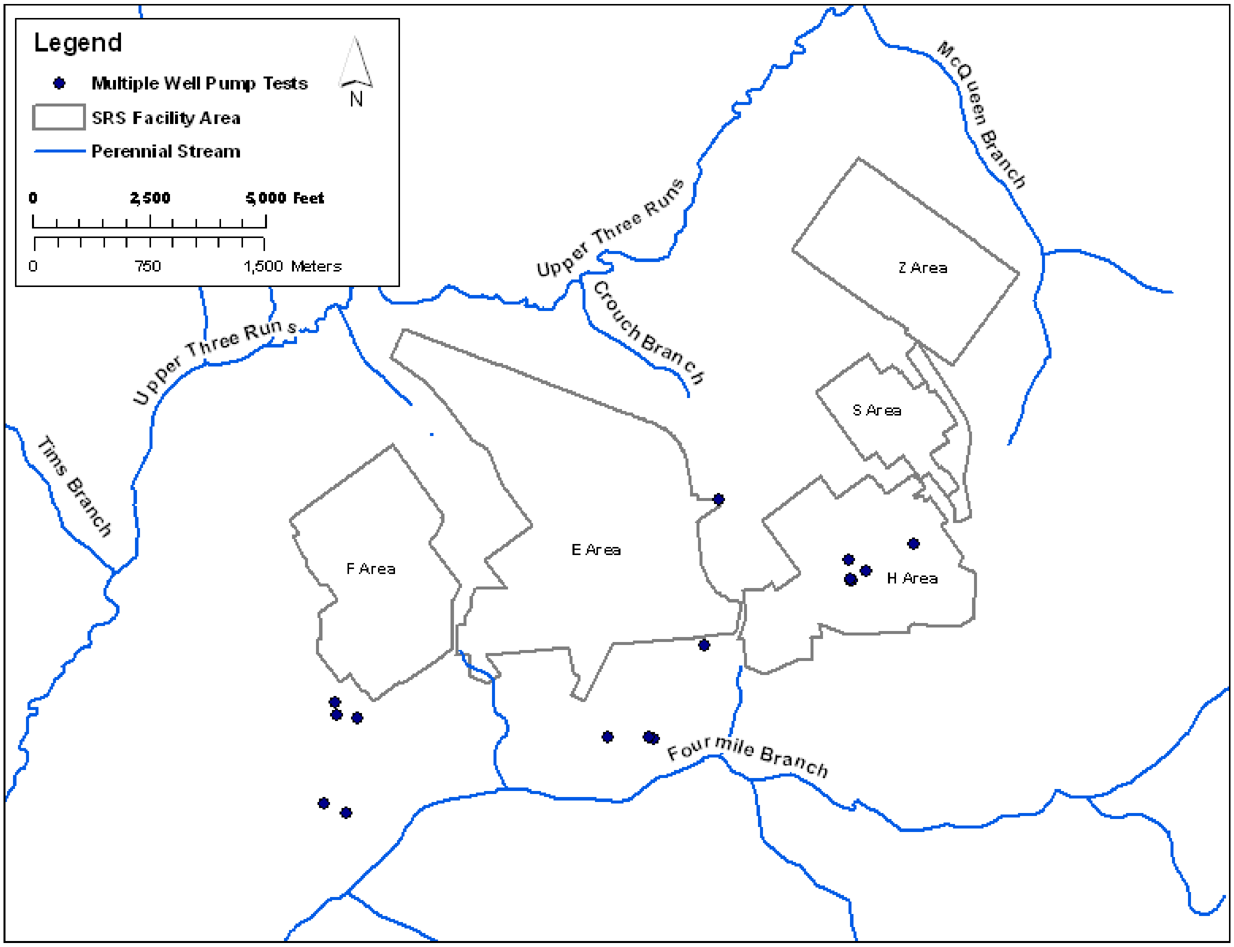
[WSRC-TR-96-0399-Vol. 2]

Figure 3.1-19: Laboratory Determined Permeability Data in GSAD Database



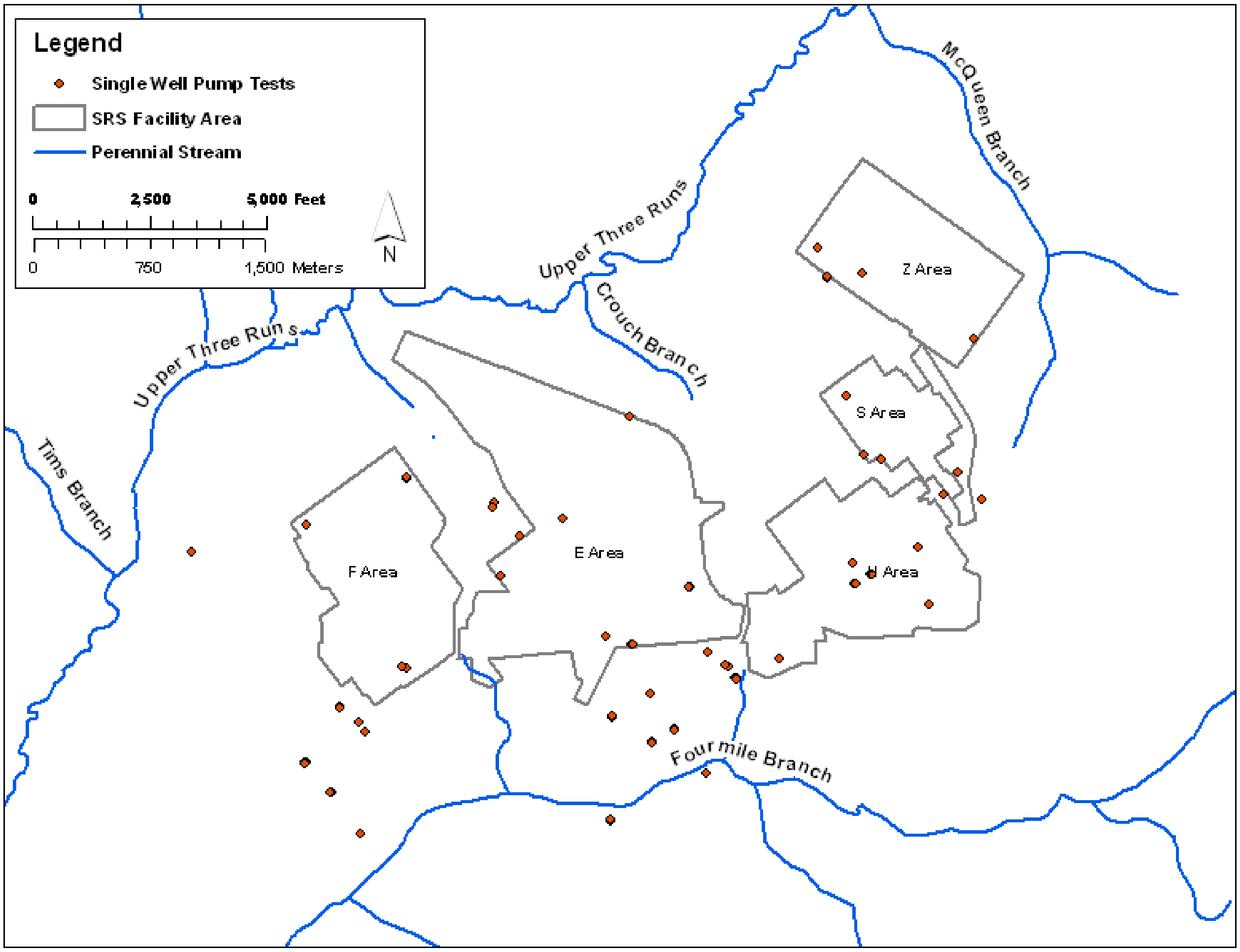
[SRNL-ESB-2007-00035]

Figure 3.1-20: Multiple Well Pump Test Data in GSAD Database



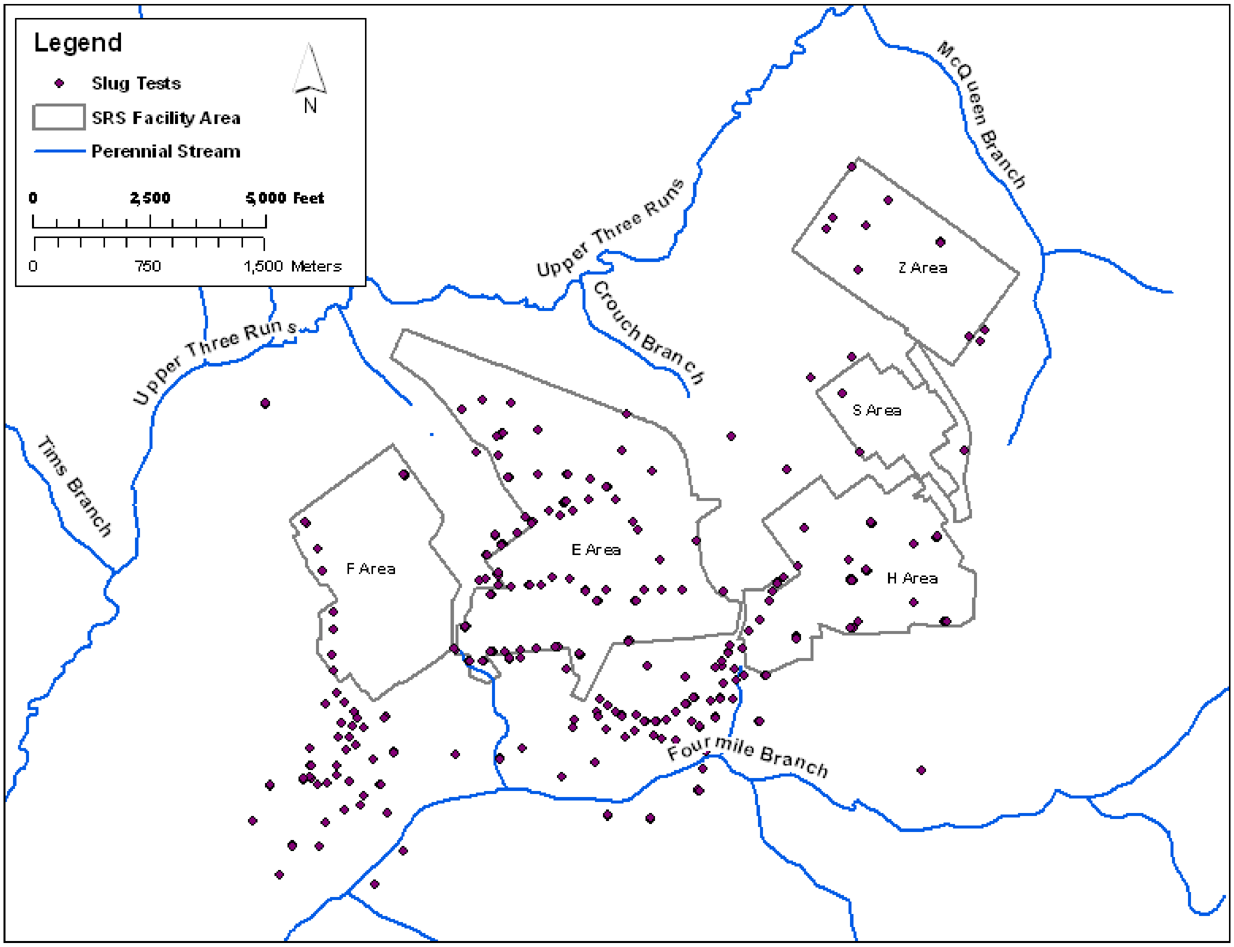
[WSRC-TR-96-0399-Vol. 2]

Figure 3.1-21: Single Well Pump Test Data in GSAD Database



[WSRC-TR-96-0399-Vol. 2]

Figure 3.1-22: Slug Test Data in GSAD Database



[WSRC-TR-96-0399-Vol. 2]

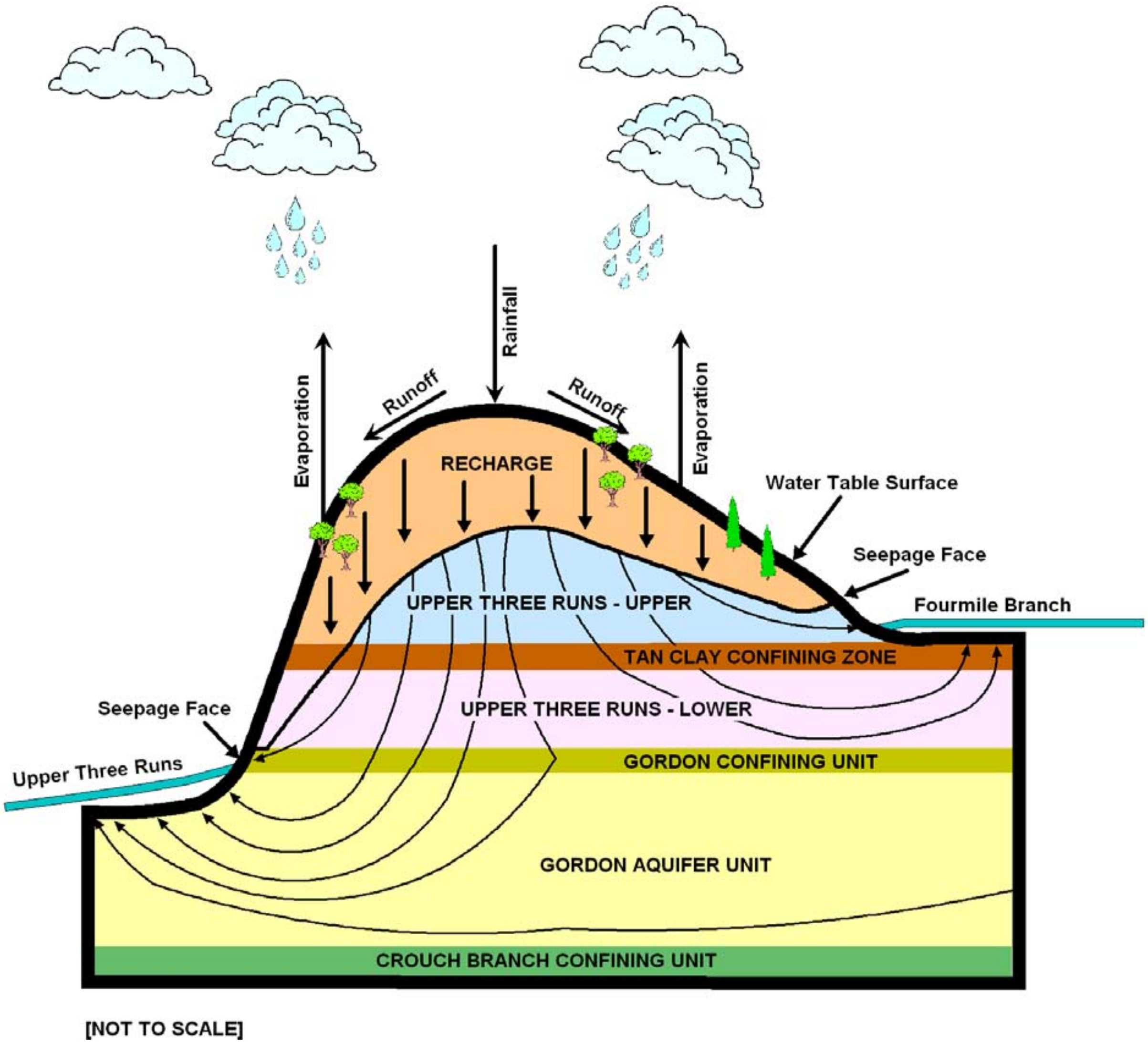
Table 3.1-2: Characterization and Monitoring Data in the GSAD Database

Data Type	Quantity	Reference
Sediment Core Descriptions	204 Locations; ~37,500 feet	WSRC-TR-96-0399-Vol. 1, App. B
Tops of Hydrostratigraphic Units/Zones		
Gordon Aquitard	52 Locations	WSRC-TR-96-0399-Vol. 1, App. A
Gordon Aquifer	146 Locations	
Green Clay Aquitard	161 Locations	
Upper Three Runs – Lower Zone (UTR-LZ)	222 Locations	
Tan Clay Aquitard	225 Locations	
Permeability Measurements		
Pumping Tests	85 Values	WSRC-TR-96-0399-Vol. 2, App. B
Slug Tests	481 Values	
Laboratory Permeability	258 Values	
Water Levels		
Gordon Aquifer	79 Locations	WSRC-TR-96-0399-Vol. 2, App. C
UTR-LZ	173 Locations	
Upper Three Runs – Upper Zone (UTR-UZ)	387 Locations	

3.1.5.3 Groundwater Flow in the GSA

The aquifers of primary interest for FTF modeling are the UTR and Gordon Aquifers. Plate 17 of the *Hydrogeological Framework of West-Central South Carolina Report* (PIT-MISC-0112) gives the leakance of the Crouch Branch confining unit (of the Meyers Branch confining system) as roughly 3E-06 day^{-1}, which corresponds to 0.13 in/yr for every 10 feet of head difference. The head difference across the Crouch Branch confining unit ranges from 0 to 20 feet, causing an upward flow averaging 0.13 in/yr. [PIT-MISC-0112, Figure 30] Flow across the unit is therefore a small fraction of total recharge, and is negligible in the FTF modeling. Potential contamination from the FTF is not expected to enter the deeper Crouch Branch Aquifer because an upward gradient exists between the Crouch Branch and Gordon Aquifers near UTR. Figure 3.1-23 is a cross-sectional schematic representation of groundwater flow patterns in the UTR and Gordon Aquifers along a north-south cross-section running through the center of FTF, shown with significant vertical exaggeration. Sections 4.2.3.1.2 and 4.2.3.1.3 provide the modeling inputs associated with groundwater flow characteristics obtained from the GSAD.

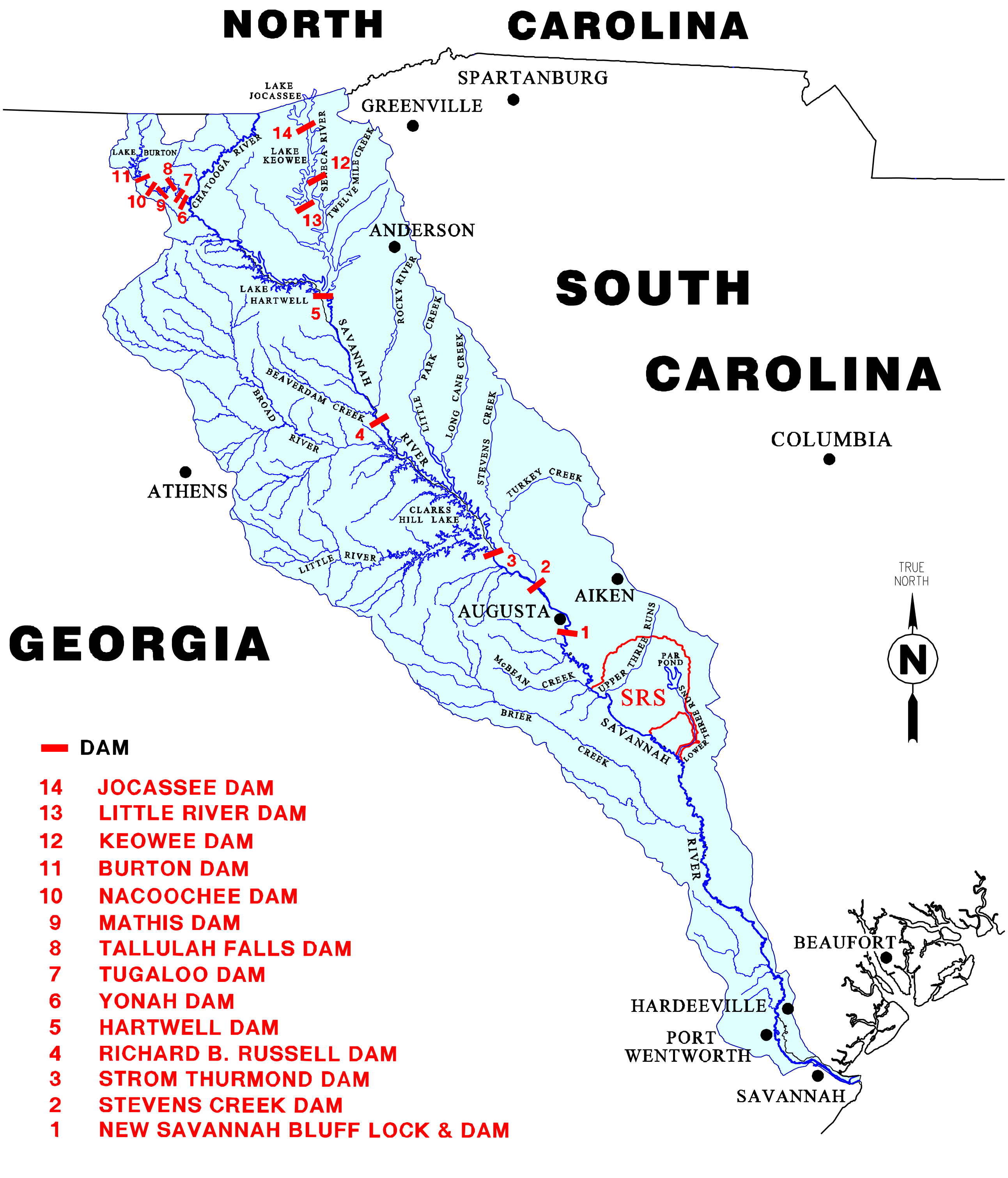
Figure 3.1-23: Conceptual Diagram of Groundwater Flow Beneath the GSA



3.1.5.4 Surface-Water Flow in the GSA

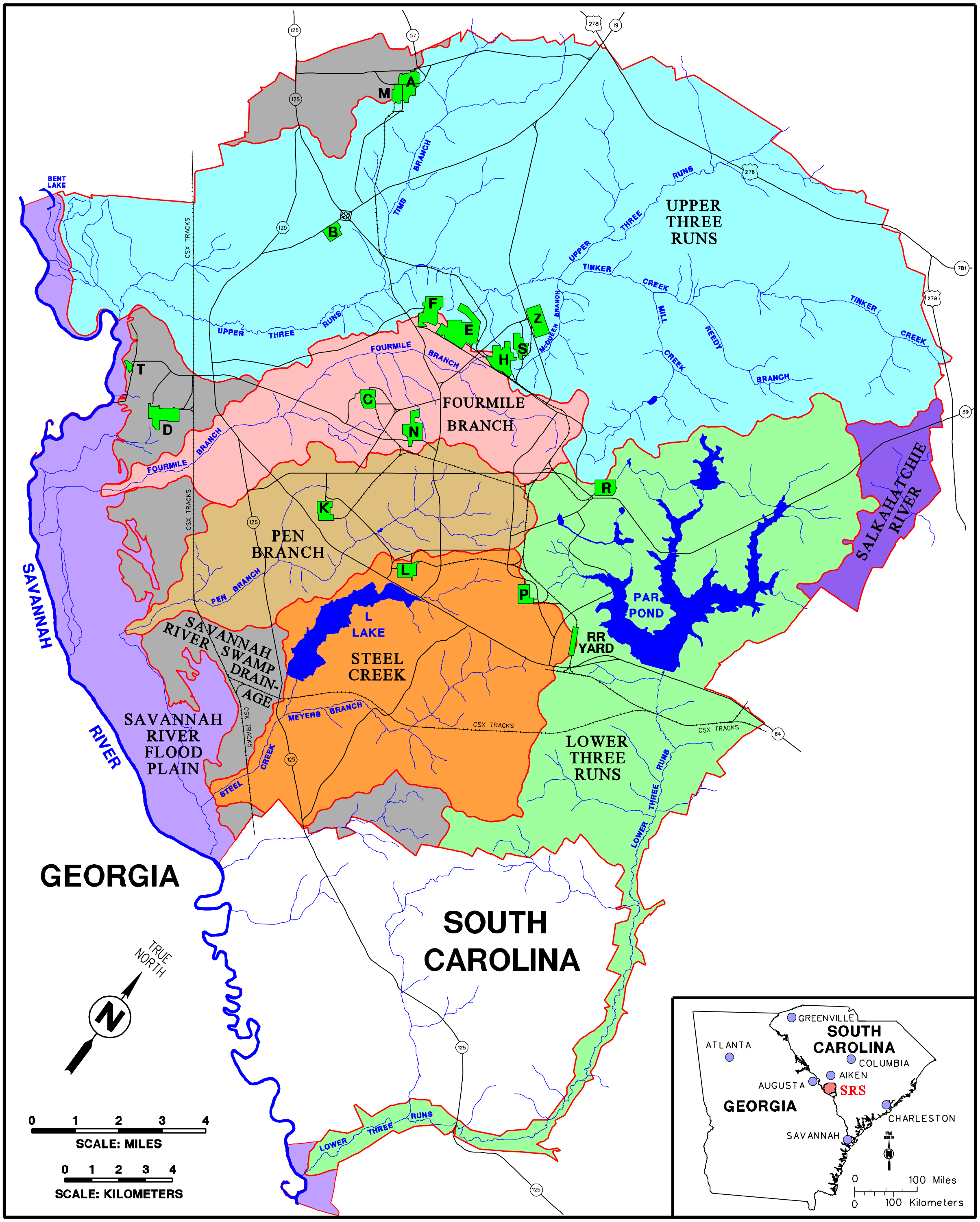
The Savannah River, which forms the boundary between Georgia and South Carolina, is the principal surface-water system near SRS. The river adjoins the site along its southwestern boundary for a distance of approximately 20 miles, and the site is 160 river-miles from the Atlantic Ocean. Five upstream reservoirs – Jocassee, Keowee, Hartwell, Richard B. Russell, and Clarks Hill Lake (also known as Thurmond Lake), minimize the effects from droughts and the impacts of low flow on downstream water quality and fish and wildlife resources in the river. Figure 3.1-24 shows the Savannah River Basin dams. The long-term yearly Savannah River flow averages approximately 10,400 cubic feet per second (cfs) at SRS. For 2007, the annual average measured flow rate was 6,090 cfs. [WSRC-TR-2005-00201, Table 4-24, WSRC-STI-2008-00057]

Figure 3.1-24: Savannah River Basin Dams



The major tributaries that occur on SRS are UTR, Fourmile Branch, Pen Branch, Steel Creek, and Lower Three Runs (Figure 3.1-25). These tributaries drain all of SRS with the exception of a small area on the northeast side, which drains to a tributary of the Salkehatchie River. Each of these streams originates on the Aiken Plateau in the Coastal Plain and descends 50 to 200 feet before discharging into the river. The source of most of the surface water on SRS is either natural rainfall (Section 3.1.2), water pumped from the Savannah River and used for cooling site facilities, or groundwater discharging to surface streams. The streams, which historically have received varying amounts of effluent from SRS operations, are not commercial sources of water. Downstream of SRS, Savannah River supplies domestic water and is used for commercial and sport fishing, boating, and other recreational activities. [DOE-EIS-0303, page 3-7]

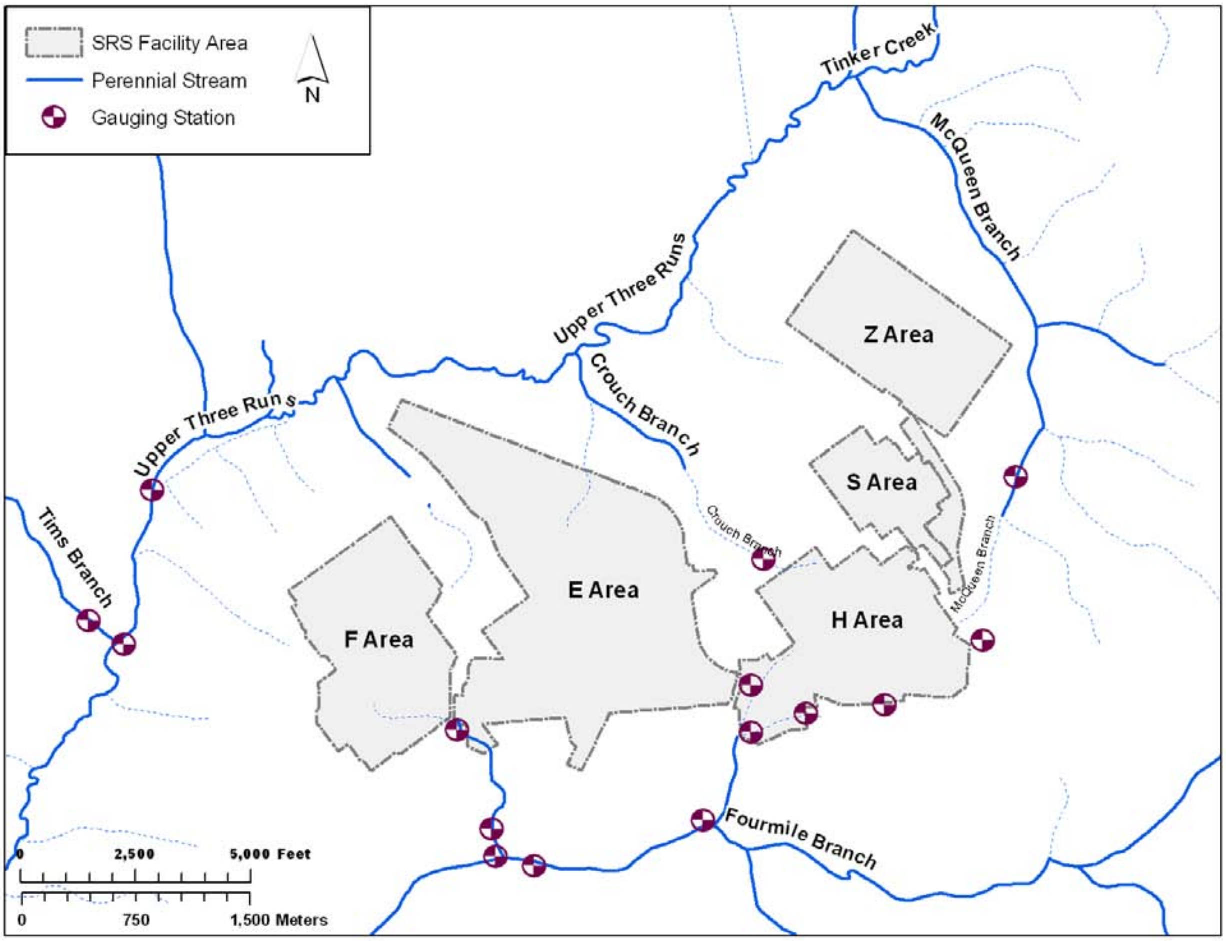
Figure 3.1-25: SRS Watershed Boundaries and Major Tributaries



[WSRC-STI-2008-00057]

The natural flow of SRS streams range from 8 cfs in smaller streams to 245 cfs in UTR. [WSRC-IM-2004-00008, Table 1.4-14] Gauging stations located in the GSA (Figure 3.1-26) monitor flows for UTR and Fourmile Branch. Both Fourmile Branch and UTR are measured monthly for water flow, temperature, and quality. The annual *Savannah River Site Environmental Report* contains detailed information on flow rates and water quality of the Savannah River and SRS streams. [WSRC-STI-2008-00057]

Figure 3.1-26: GSA Gauging Stations



The SCDHEC regulates the physical properties and concentrations of chemicals and metals in SRS effluents under the National Pollutant Discharge Elimination System (NPDES) program. SCDHEC, which also regulates biological Water Quality Standards (WQS) for SRS waters, have classified the Savannah River and SRS streams as "Freshwaters." "Freshwaters" are described as suitable for primary and secondary contact recreation and as a source for drinking water supply after treatment in accordance with SCDHEC requirements. "Freshwaters" are suitable for fishing, for the survival and propagation of a balanced indigenous aquatic community of fauna and flora, and for industrial and agricultural uses. [DOE-EIS-0303]

UTR, the longest of SRS streams, is a large blackwater stream in the northern part of SRS that discharges to the Savannah River. It drains an area of over 195 square miles and is approximately 25 miles long, with its lower 17 miles within SRS boundaries. This stream receives more water from underground sources than other SRS streams and is the only stream with headwaters arising outside the site. It is the only major tributary on SRS that has not received thermal discharges. The UTR valley has meandering channels, especially in the lower reaches, and its floodplain ranges in width from 0.25 to 1 mile. It has a steep southeastern side and gently sloping northwestern sides. [DOE-EIS-0303]

Fourmile Branch is a blackwater stream that originates near the center of SRS and flows southwest for 15 miles before emptying into the Savannah River. It drains an area of approximately 22 square miles inside SRS including much of F-, H-, and C-Areas. Fourmile Branch flows parallel to the Savannah River behind natural levees and enters the river through a breach downstream from Beaver Dam Creek. In its lower reaches, Fourmile Branch broadens and flows via braided channels through a delta formed by the deposition of sediments eroded from upstream during high flows. Downstream from the delta, the channels rejoin into one main channel. Most of the flow discharges into the Savannah River while a small portion flows west and enters Beaver Dam Creek. The valley is V-shaped, with sides varying from fairly steep to gently sloping. The floodplain is up to 1,000 feet wide. [DOE-EIS-0303, pages 3-8 and 3-9]

Flood hazard recurrence frequencies have been calculated for the various SRS site areas. The 100-year, 1,000-year and 10,000-year flood water levels for UTR Basin near F-Area is approximately 138, 140 and 143 feet above MSL, respectively. [WSRC-TR-99-00369] As shown in Table 3.2-1, the lowest elevation of a waste tank within FTF is approximately 227 feet above MSL; thus the highest period flood water level of approximately 143 feet above MSL is approximately 84 feet below the lowest elevation of an FTF waste tank. In addition, the lowest elevation of the lower foundation layer, at the bottom of the side slope of the conceptual closure cap is approximately 270 feet above MSL, which is approximately 127 feet above the highest flood water level of 143 feet. [WSRC-STI-2007-00184_OUO] Therefore, flooding is not a concern for this PA.

3.1.6 Geochemistry

The migration of radionuclides in the subsurface environment is dependent on physical and chemical parameters or properties of cementitious materials, soils, and groundwater. Studies and analyses have been conducted to determine appropriate Distribution Coefficients (K_ds) and are identified below. The data used in the radionuclide transport model is presented in Sections 4.2.2 and 4.2.3.2 specific to the GSA and is not reproduced in this section. The following studies detail the information:

- WSRC-TR-2006-00004, *Geochemical Data Package for Performance Assessment Calculations Related to the Savannah River Site*.
- SRNL-ESB-2007-00008, *F-Area Tank Farm Vadose Zone Material Property Recommendations*.
- WSRC-STI-2007-00544, *Conceptual Model of Waste Release from the Contaminated Zone of Closed Radioactive Waste Tanks*
- SRNL-SCS-2007-00011, *Preliminary Guidance for the Distribution of Cs, SR, and U, Geochemical Input Terms to Stochastic Transport Models*.

3.1.7 Natural Resources

Natural resources at SRS are managed under the *Natural Resources Management Plan* (NRMP) prepared for the DOE by the United States Department of Agriculture (USDA). [NRMP-2005] The NRMP was recently updated in May 2005, and fosters the following principles which govern SRS natural resource management:

- All work will be done in accordance with Integrated Safety Management Procedures found in DOE P 450.4, *Safety Management System Policy*.
- Environmental stewardship activities will be compatible with future SRS missions.
- SRS will continue to protect and manage SRS natural resources.
- Sustainable resource management will be applied to SRS natural resources.
- Close cooperation will be maintained among organizations when managing and protecting SRS natural resources.
- The results of research, monitoring, and operational findings will be used in the management of SRS natural resources.
- Restoration of native communities and species will continue.
- Employees, customers, stakeholders, state natural resource officials, and regulators will be invited to participate in the natural resource planning process.
- SRS will maintain the area as a National Environmental Research Park (NERP).

3.1.7.1 Water Resources

SRS monitors non-radioactive liquid discharges to surface waters through the NPDES, as mandated by the EPA Clean Water Act. [*http://epw.senate.gov/water.pdf*] As required by EPA and SCDHEC, SRS has NPDES permits in place for discharges to the waters of the United States and South Carolina. These permits establish the specific sites to be monitored, parameters to be tested, and monitoring frequency—as well as analytical, reporting, and collection methods. [WSRC-STI-2008-00057, page 4-7] Continuous surveillance monitoring of site streams occurs downstream of several process areas to detect and quantify levels of radioactivity in effluents transported to the Savannah River. [WSRC–STI–2008–00057, page 5-3]

3.1.7.1.1 Surface Water

SRS streams and the Savannah River are classified by SCDHEC as "Freshwaters," which are defined as surface water suitable for:

- Primary and secondary contact recreation and as a drinking water source after treatment in accordance with SCDHEC requirements,
- Fishing and survival and propagation of a balanced indigenous aquatic community of fauna and flora, and
- Industrial and agricultural uses. [WSRC–STI–2008–00057]

Table 3.1-3 characterizes Savannah River water quality both upstream and downstream of SRS. Table 3.1-4 characterizes water quality in the UTR upstream and downstream of the GSA.

Table 3.1-3: Water Quality in the Savannah River Upstream and Downstream from SRS (Calendar Year 2007)

Parameter	Unit of Measure	Upstream		Downstream	
		Minimum	Maximum [a]	Minimum	Maximum [a]
Aluminum	mg/L	0.062	0.97	0.0777	0.622
Cadmium	mg/L	ND	ND	ND	ND
Chromium	mg/L	ND	ND	ND	ND
Copper	mg/L	ND	0.0388	ND	0.0083
Dissolved Oxygen	mg/L	6.1	11.1	6.2	10.1
Gross Alpha Radioactivity	pCi/L	ND	1.26	ND	1.55
Lead	mg/L	ND	ND	ND	0.0023
Mercury	mg/L	ND	0.000023	ND	0.000024
Nickel	mg/L	ND	0.003	ND	0.0066
Nitrate (as N)	mg/L	0.18	0.57	0.19	0.41
pH	pH units	5.9	7.1	6.6	16.1 [b]
Phosphate	mg/L	0.032	0.18	0.084	0.17
Suspended solids	mg/L	1	47	4	15
Temperature	°F	52.5	78.6	53.2	82.4
Tritium	pCi/L	ND	229	140	1,060
Zinc	mg/L	ND	0.0087	ND	0.0173

Notes: Information extracted from WSRC-STI-2008-00057 accompanying data files. Parameters are those DOE routinely measures as a regulatory requirement, or as part of ongoing monitoring programs.
ND = non detectable
a) The maximum listed concentration is the highest single result found during one sampling event.
b) Highest one month sample, next highest value reported was 7.2 pH unit.

Table 3.1-4: Water Quality in Upper Three Runs

	Temperature (°F)	pH	Dissolved Oxygen (mg/L)	Total Suspended Solids (mg/L)
Sampling Location: Upper Three Runs (Upstream of GSA)				
Mean	61	5.9	9.1	4.6
Range	51 - 70	5.4 - 6.7	4.4 - 14	3 - 9
Sampling Location: Upper Three Runs (Downstream of GSA)				
Mean	65	6.5	9.6	6.2
Range	52 - 74	5.2 - 7.6	6.4 - 16	4 - 11

[All data extracted from WSRC-STI-2008-00057 accompanying data files]

3.1.7.1.2 Groundwater

The SDWA was enacted in 1974 to protect public drinking water supplies. [*www.epa.gov/safewater/sdwa/index.html*] SRS domestic water is supplied by 17 separate systems, all of which utilize groundwater sources. The A-Area, D-Area, and K-Area systems are actively regulated by SCDHEC, while the remaining 14 site water systems receive a reduced level of regulatory oversight. [WSRC-STI-2008-00057]

Table 3.1-5 provides the summary of maximum groundwater monitoring results for those areas that most likely outcrop to Fourmile Branch obtained from the *2007 Environmental Report*. [WSRC-STI-2008-00057] The groundwater in these areas is not being consumed and active remediation projects are in progress to address the groundwater conditions.

Table 3.1-5: Summary of Maximum Groundwater Monitoring Results for Major Areas that Outcrop to Fourmile Branch, 2006–2007

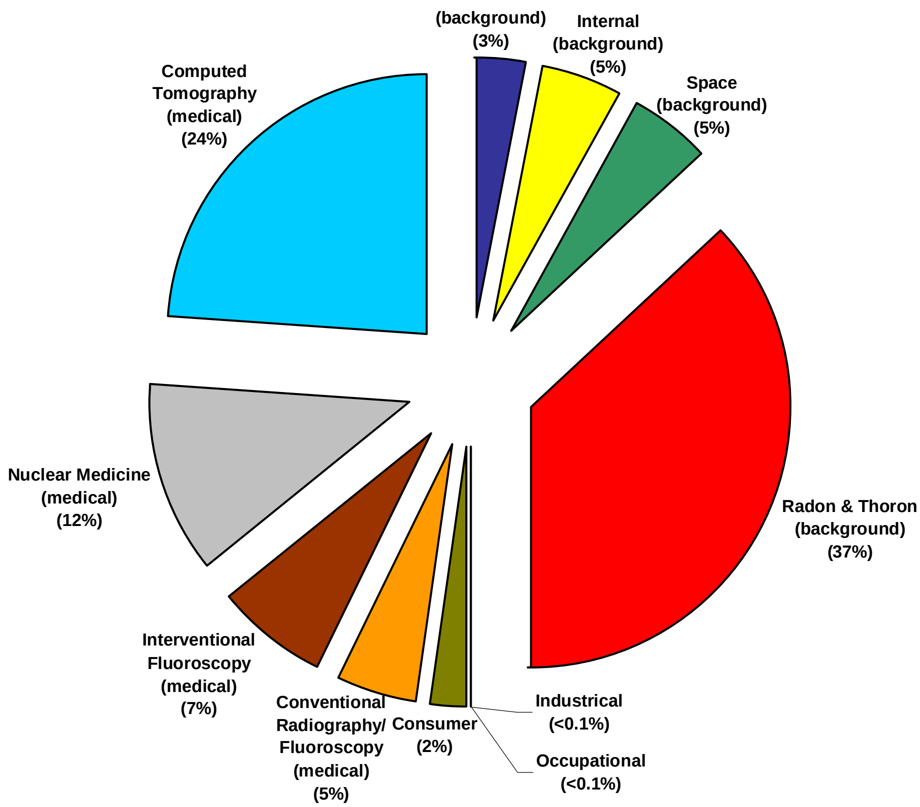
Location	Major Contaminants	Units	2006 Maximum	MCL	2007 Maximum	Likely Outcrop Point
E-Area	Tritium TCE	pCi/L ppb	33,600,000 750	20,000 5	30,800,000 370	UTR/Crouch Branch in North; Fourmile Branch in South
F-Area	TCE Tritium Gross alpha Beta	ppb pCi/L pCi/L pCi/L	78.9 91,500 2,030 1,620	5 20,000 15 4 mrem/yr[a]	52.2 73,000 2,120 380	UTR/Crouch Branch in North; Fourmile Branch in South
F-Area Seepage Basin	Tritium Gross alpha Beta	pCi/L pCi/L pCi/L	7,140,000 627 2,360	20,000 15 4 mrem/hr[a]	5,710,000 523 1,870	Fourmile Branch
H-Area	Tritium Gross alpha Beta	pCi/L pCi/L pCi/L	80,400 98 116	20,000 15 4 mrem/yr[a]	67,200 25.5 55.6	UTR/Crouch Branch in North; Fourmile Branch in South
H-Area Seepage Basins	Tritium Gross alpha Beta	pCi/L pCi/L pCi/L	3,690,000 103 2,840	20,000 15 4 mrem/yr[a]	3,020,000 88.4 2,970	Fourmile Branch

[a] The activity (pCi/L) equivalent to 4 mrem/yr varies according to which specific beta emitters are present in the sample. [WSRC-STI-2008-00057, Page 7-9]

3.1.8 Natural and Background Radiation

All human-beings are exposed to sources of ionizing radiation that include naturally occurring and man-made sources. An individual's average dose contribution estimates from various sources were obtained from the review information presented in NCRP Report 160 and are shown in Figure 3.1-27. [NCRP-160] On average, a person living in the United States or the Central Savannah River Area (CSRA) receives approximately the same annual radiation dose of 620 mrem/year. The dose from SRS operations to the maximally exposed offsite individual during calendar year 2007 was estimated to be 0.1 mrem. [WSRC-STI-2008-00057, page 6-7]

Figure 3.1-27: Major Sources of Radiation Exposure in the Vicinity of SRS



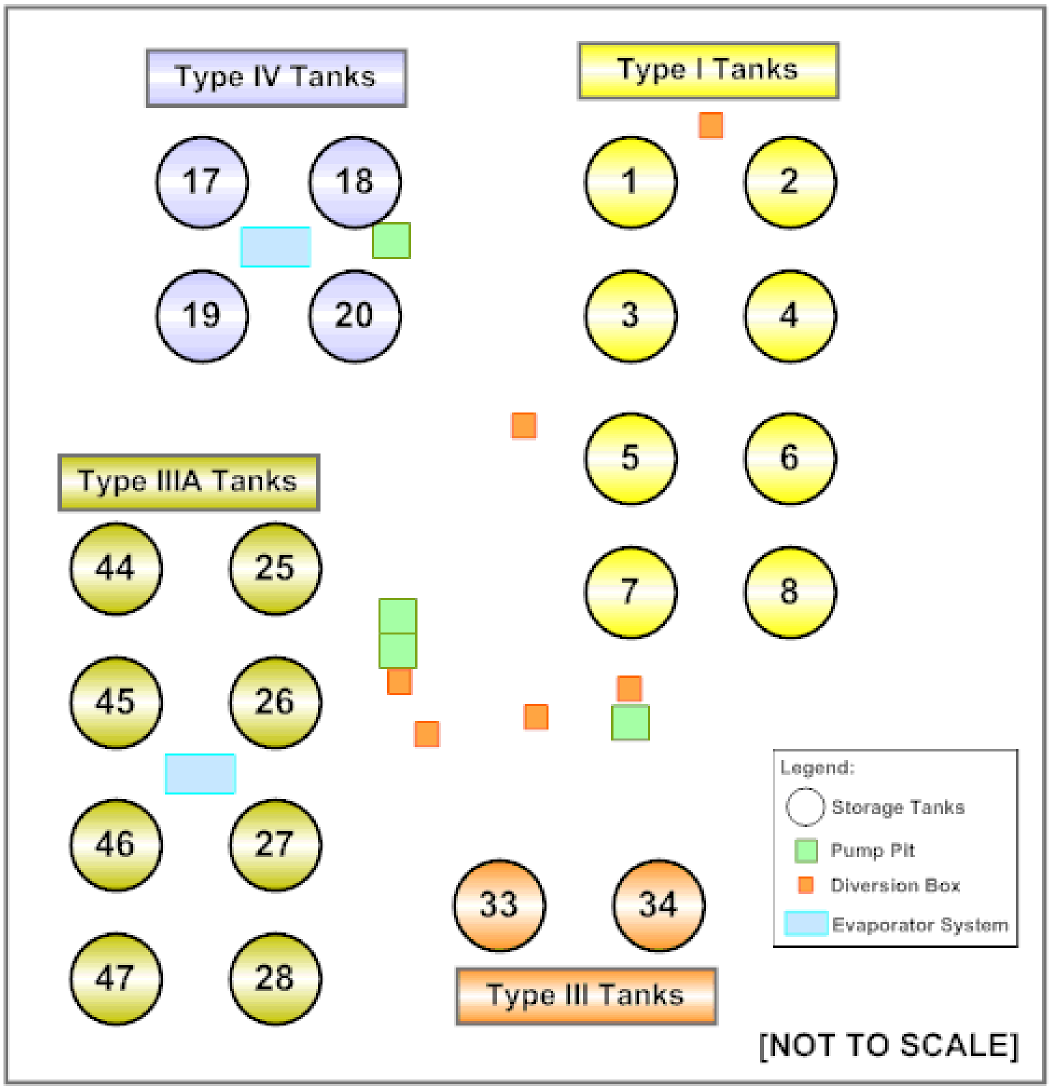
[NCRP-160]

The major sources of radiation exposure to an average MOP in the CSRA is attributed to naturally occurring radiation (311 mrem/yr) and medical exposure (300 mrem/yr). This naturally occurring radiation is often referred to as natural background radiation and includes dose from background radon and its decay products (228 mrem/yr), cosmic radiation (33 mrem/yr), internal radionuclides occurring naturally in the body (29 mrem/yr), and natural radioactive material in the ground (21 mrem/yr). The dominant medical sources include dose from computed tomography (147 mrem/yr), nuclear medicine (77 mrem/yr), and radiography/fluoroscopy (77 mrem/yr). The remainder of the dose is from consumer products (13 mrem/yr), industrial/educational/research activities (<1 mrem/yr), and occupational exposure (<1 mrem/yr). [NCRP-160]

3.2 Principal Facility Design Features

The FTF occupies a 22 acre site within an area of SRS commonly referred to as the GSA, which encompasses E-, F-, H-, S-, and Z-Areas. FTF consists principally of 3 control rooms, 45,000 feet of transfer lines, six DBs, three Pump Pits (PPs) (with three pump tanks), 242-3F CTS PPs, one catch tank, two evaporators, and 22 waste tanks (Figure 3.2-1). In 1997, following approval by the state of South Carolina with oversight by EPA, DOE operationally closed Tank 17 and Tank 20 in December 1997 and June 1997, respectively. [DOE-EIS-0303 ROD] On June 30, 2000, the NRC issued to DOE its final report confirming the SRS approach. [PIT-MISC-0054, PIT-MISC-0091]

Figure 3.2-1: General Layout of F-Tank Farm Including Ancillary Equipment



In order to model the potential risk associated with the FTF stabilized contaminant inventory expected to remain after the closure of FTF, locations with the potential for stabilized contaminant retention and the design features affecting those locations were identified. There are two primary categories of facility design with the potential for stabilized contaminant retention in FTF:

- Waste Tanks
- Ancillary Equipment

Waste tanks refer to the 22 subsurface tanks in FTF designed for storing aqueous liquid wastes. Ancillary equipment refers to the other equipment used in the FTF to transfer waste (e.g., transfer lines, pump tanks) and reduce waste volume though evaporation (e.g., the evaporator systems).

3.2.1 Waste Tanks

There are 22 waste tanks in FTF. The waste tanks are all built of carbon steel and reinforced concrete, but the designs vary. There are three principal types of waste tanks in FTF, designated as Type I, III/IIIA, and IV tanks (a fourth type, Type II, is found only in HTF). The waste tanks were constructed at different times during which design features were improved on. However, all of the waste tanks are of the same basic construction design. Waste tank design types are covered in Sections 3.2.1.1 through 3.2.1.3.

The FTF waste tank number designations along with their design type are as follows:

- Type I: Tanks 1 through 8
- Type IV: Tanks 17 through 20
- Type IIIA: Tanks 25 through 28
- Type III: Tanks 33 through 34
- Type IIIA: Tanks 44 through 47

The FTF waste tank locations (longitude and latitude) and basemat elevations are summarized in Table 3.2-1.

Table 3.2-1: FTF Waste Tank Locations and Elevations

Tank	North Location	East Location	Bottom Elevation of Basemat (MSL)	References
1	77385	53116	241.28	W145491 W145293
2	77385	53220	241.28	W145491 W145293
3	77285	53116	239.86	W145491 W145293
4	77285	53220	239.86	W145491 W145293
5	77185	53116	238.44	W145491 W145293
6	77185	53220	238.44	W145491 W145293
7	77085	53116	237.02	W145491 W145293
8	77085	53220	237.02	W145491 W145293
17	77385	52723	228.31	W166430 W167482
18	77385	52835	228.31	W166430 W167482
19	77273	52723	227.39	W166430 W167482
20	77273	52835	227.39	W166430 W167482
25	77070	52785	244.28	W700283
26	76940	52785	245.63	W700283
27	76815	52785	245.63	W700283
28	76695	52785	244.28	W700283
33	76723.33	53040.50	244	W238154
34	76723.33	53155.50	244	W238154
44	77070	52585	243.96	W700598
45	76940	52585	245.39	W700598
46	76815	52585	245.39	W700598
47	76695	52585	243.96	W700598

The main component of a waste tank is the primary tank where the liquid waste is contained. The primary tank is cylindrical in shape and made of carbon steel. Each primary tank type differs in size and capacity.

Type I and III/IIIA tanks are enclosed by a secondary containment shell, which is larger in diameter than the primary tank. The secondary containment shell, like the primary tank, is constructed of carbon steel. Since the secondary containment is larger in diameter than the primary tank, an area is formed between them called the annulus. The annulus differs in size and capacity for each tank type. Type IV tanks do not have a secondary containment. The annulus serves several purposes for the waste tanks. It provides a collection point for any leakage from the primary tank and provides a method for heating or cooling the primary tank wall in conjunction with the annulus ventilation system.

A reinforced concrete vault surrounds the secondary containment. The vault provides both structural support and radiation shielding. The bottom part of the vault is called the basemat. Underneath the basemat of the Type I, Type III, and Type IIIA tanks is a working slab.

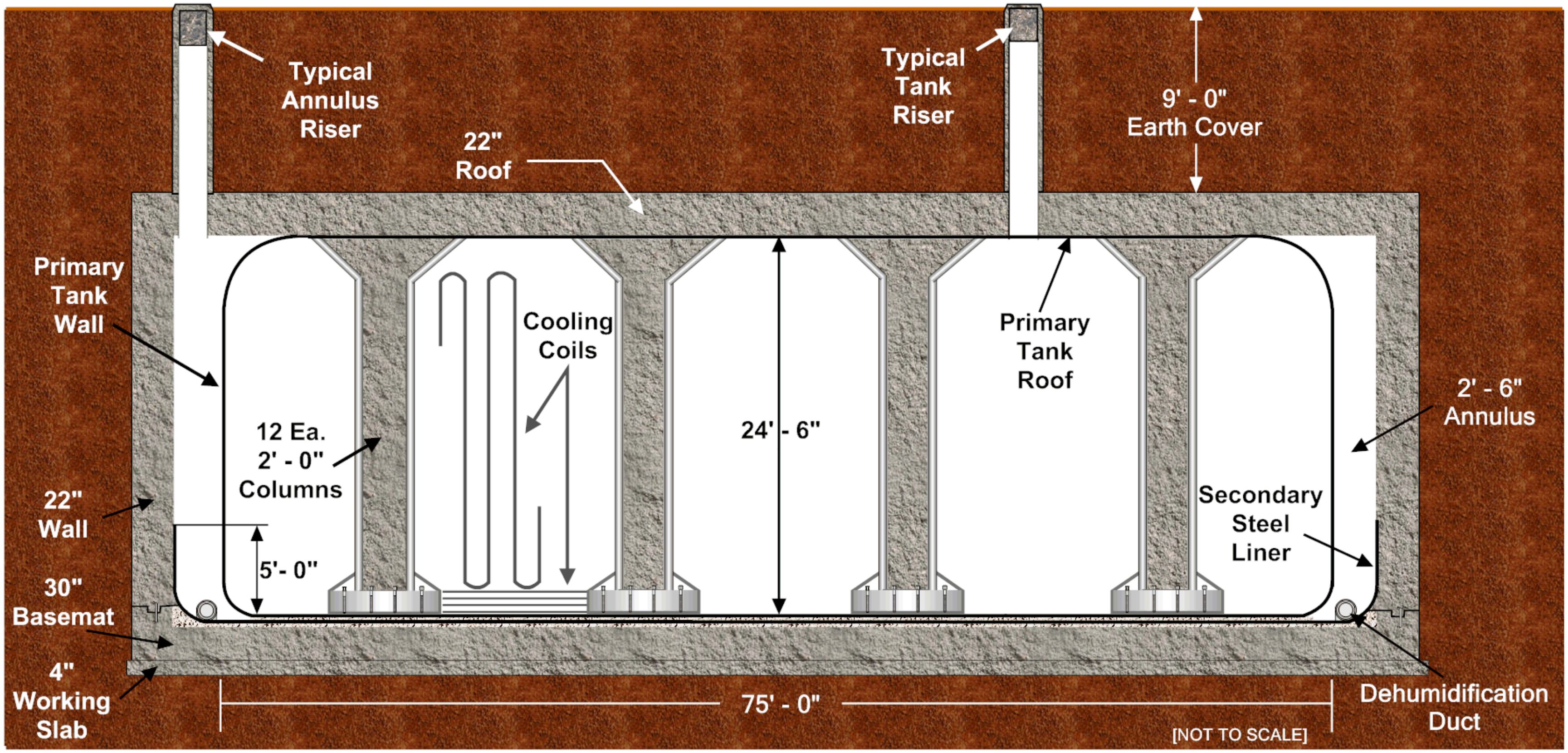
The primary cooling method for the liquid waste is provided from chromated cooling water, which runs through cooling coils located inside the primary tank. These cooling coils are installed on Type I and III/IIIA tanks and vary in design for the different waste tank types. Type IV tanks do not have cooling coils.

Risers provide access to the waste tank and annulus interiors. Risers are used primarily for inspections, level detection, dip samples, and the installation of equipment such as annulus jets, dip tubes, thermocouples, conductivity probes, ventilation inlet and outlets, reel tapes, hydrogen monitors, and waste removal equipment. Lead or concrete plugs are inserted in the riser opening if no equipment is installed. The riser structures are made of concrete and lined with carbon steel. Riser layout is dependent on the specific waste tank being discussed. However, waste tanks of a given type have similar equipment installed in the risers. Riser plugs can weigh anywhere from a few pounds to several thousand pounds.

3.2.1.1 Type I Tanks

There are eight Type I tanks in the FTF. The FTF Type I tanks were constructed in the early 1950s. A typical Type I tank is shown in Figure 3.2-2. These waste tanks are 75 feet in diameter and 24.5 feet high, with a nominal operating capacity of 750,000 gallons.

Figure 3.2-2: Sketch of Typical Type I Tank (Cross-sectional View)



3.2.1.1.1 Working Slab and Basemat

The working slab for a Type I tank is 4 inches thick, with a 42 feet - 5 inch radius, and a 2 inch wire mesh layered in the middle. [W145293] The concrete for the working slab was installed per the requirements of DuPont Spec-3019 - Section B A, with 2,500 psi strength and a 28 day cure time. [W145225] A 1.5 inch thick layer of waste tank plaster and membrane waterproofing sits above the working slab. A 30 inch reinforced concrete base (i.e., the basemat) sits on top of the working slab. [W145293] The basemat was also installed per the requirements of DuPont Spec-3019 - Section B A, with 2,500 psi strength at a 28 day cure time. [W145225] A 3 inch layer of grout sits on top of the basemat, and the annulus pan (secondary liner) sits above the grout. [W145293] Figure 3.2-3 shows the soil preparation and working slab construction for Tanks 1 through 8. Figure 3.2-4 shows the basemat construction for Tanks 1 through 8.

Figure 3.2-3: Tanks 1 through 8 Working Slab Soil Preparation

Figure 3.2-4: Tanks 1 through 8 Basemat Construction

3.2.1.1.2 Primary and Secondary Liner

The primary liner for Type I tanks are cylinders made of 0.5 inch American Society of Testing and Materials (ASTM) A285-50T carbon steel. [ASTM A 285/A 285 M – 03] The inner radius of the primary container is 37.5 feet, and the inner height is 24.5 feet. The walls of the primary container are welded to the top and bottom of the waste tank by a 0.5 inch thick, curved knuckle plate. The steel specifications, including material and welding information, are provided in Spec-3206. [W145379] Figure 3.2-5 shows the construction of the primary and secondary steel liners for Tanks 1 through 8.

Figure 3.2-5: Tanks 1 through 8 Steel Liner Construction

The annulus pan (secondary liner) for the Type I tanks forms an annulus space 2.5 feet wide between the secondary and primary liners. The primary liner sits on a three inch layer of grout (above the secondary liner). The upper portion of the annular space is formed by the concrete vault while the bottom is formed by the 5 foot high carbon steel annulus pan. Figure 3.2-6 shows the construction of both the primary and secondary steel liners, and Figure 3.2-7 shows a detail from this picture clearly showing the 5 foot high carbon steel secondary liner.

Figure 3.2-6: Steel Liner Construction

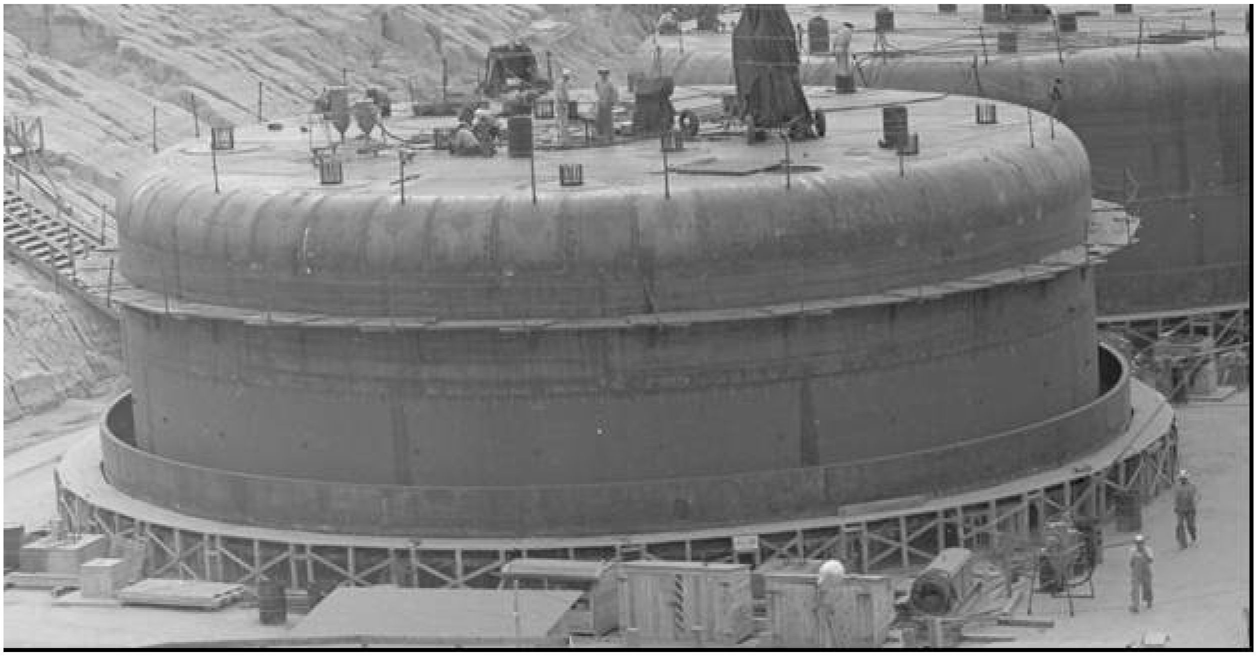
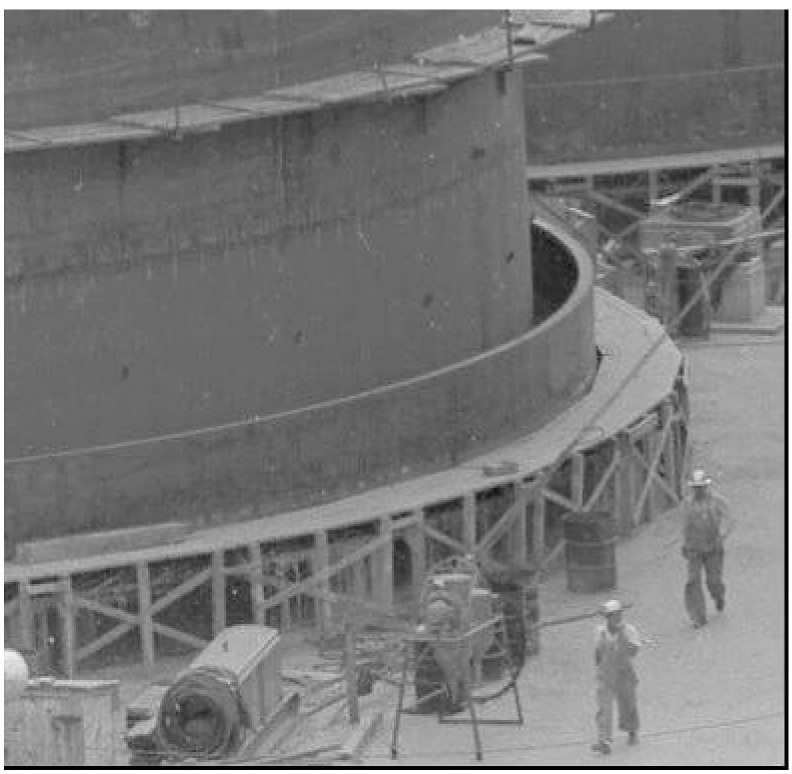


Figure 3.2-7: Secondary Containment Detail Showing Annulus



The annulus pan (secondary liner) material is ASTM A285-50T carbon steel. [W145573, ASTM A 285/A 285 M – 03] The carbon steel stiffener angles located at the top of the annulus pan measure 6 inches x 4 inches x 0.375 inches. All the seams in the bottom plates of the annulus pan are full penetration butt welded using backup strip on underside. The steel specifications, including material and welding information, are provided in Spec-3206. [W145367]

The primary liner has transfer line penetrations near the top of the tank. Three inch inlet waste transfer lines enter the primary tank through the top knuckle and terminate a few feet inside the waste tank. The 3 inch stainless steel waste transfer lines are each enclosed in a 4 inch carbon steel jacket pipe where they bridge across the waste tank annulus. Each jacket pipe is welded to the primary tank; the internal pipe is free to move to accommodate thermal expansion and contraction. [W145573]

3.2.1.1.3 Tank Concrete Vault

An 80 foot inner diameter vault surrounds the Type I tank primary container, creating a 2.5 foot wide annulus (the upper portion is formed by the concrete vault while the bottom is formed by the 5 foot high carbon steel annulus pan). The vault is formed by a 22 inch thick reinforced concrete roof and walls that surround the primary container and connect to the basemat. [W145573] The vault concrete was installed per the requirements of DuPont Spec-3019 - Section B A, with 2,500 psi strength. The side walls have no vertical construction joints, but horizontal construction joints were used when necessary. [W145225] A 9 foot layer of backfill covers the top of the waste tank. [W145491] The Type I tank backfill was installed per the requirements of DuPont Spec-3019 - Section C E. [W145225] Figures 3.2-8 and 3.2-9 show the construction of the concrete vaults and riser construction for Tanks 1 through 8.

Figure 3.2-8: Construction of Type I Tank Concrete Vault

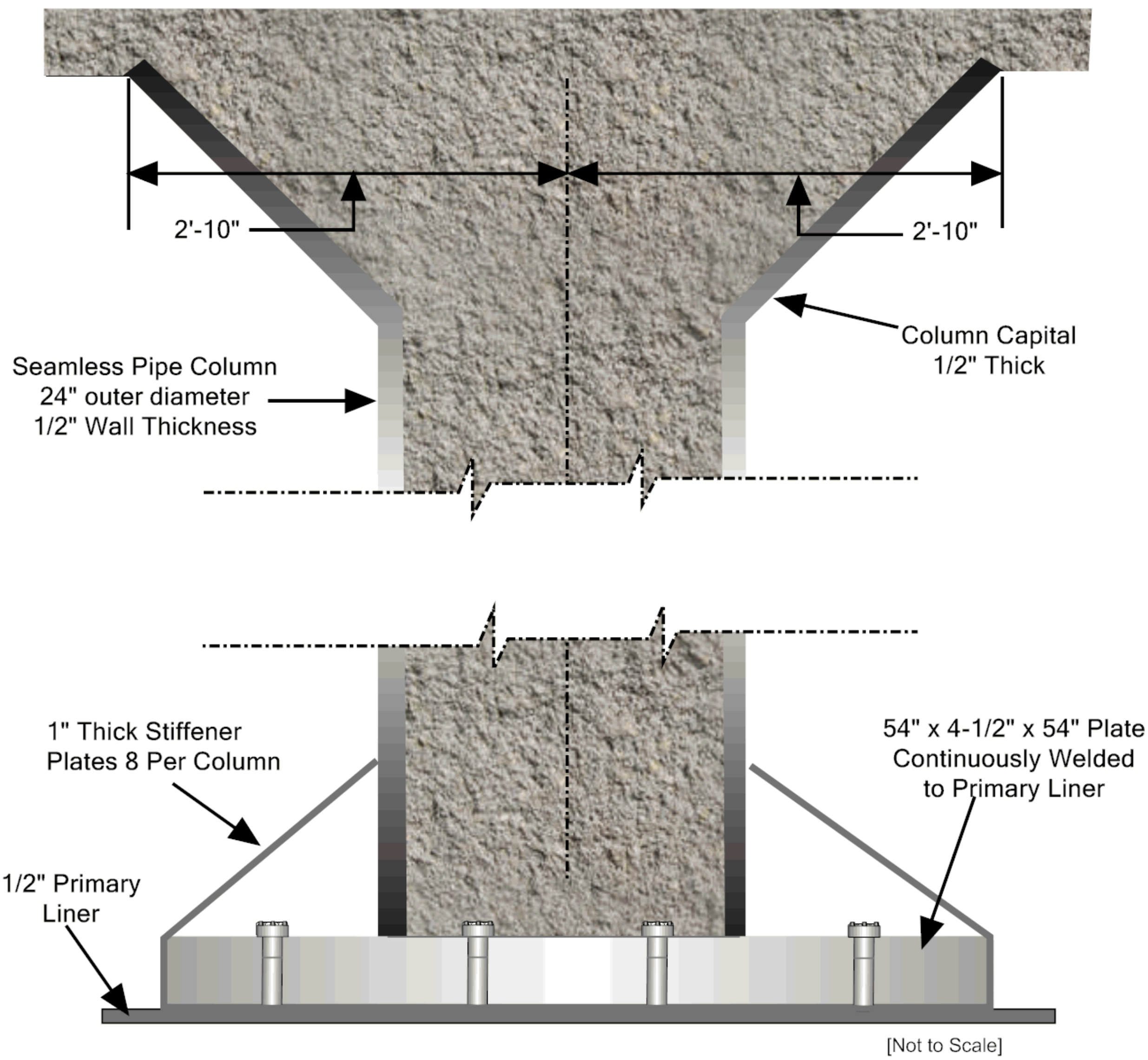
Figure 3.2-9: Tanks 1 through 8 Riser Construction

3.2.1.1.4 Support Columns

Twelve concrete and steel columns support the roof of a Type I tank (Figures 3.2-10 and 3.2-11). These columns were made from steel pipes welded to a steel bottom plate. The pipes are 0.5 inch thick carbon steel with a 2 foot outside diameter, and are filled with concrete. The columns have flared capitals at the top filled with concrete. The bottom of the columns is cylindrical and has eight, 1 inch thick stiffeners on each column. The columns are welded to the top and bottom of the primary container. The steel specifications, including material and welding information, are provided in Spec-3206.

Figure 3.2-10: Support Column During Construction

Figure 3.2-11: Support Column Top/Bottom Detail



[W145379]

3.2.1.1.5 Cooling Coils

The Type I tanks are equipped with a cooling system. The tanks have 34 vertical cooling coils that are supported by hanger and guide rods that are welded to the primary liner. [D116048] Two horizontal cooling coils extend across the bottom of the tanks and are supported by guide rods welded to the bottom of the primary liner. [D116001] The cooling coils are 2 inch diameter schedule 40 carbon steel seamless pipe (ASTM A 106, or A-53 Grade A). Figure 3.2-12 shows Type I tank cooling coils during construction. [ASTM A 106/A 106M - 08, ASTM A 53/A 53M - 07]

Figure 3.2-12: Type I Tank Cooling Coils During Construction

3.2.1.2 Type III/IIIA Tanks

There are two Type III and eight Type IIIA tanks in the FTF. The FTF Type III tanks were completed in 1969 (Tank 33) and 1972 (Tank 34) and the FTF Type IIIA tanks were completed in 1978 (Tanks 25 through 28) and 1980 (Tanks 44 through 47). Typical Type III and IIIA tanks are shown in Figures 3.2-13 and 3.2-14, respectively. These waste tanks are 85 feet in diameter and 33 feet high, with a nominal operating capacity of 1,300,000 gallons.

Figure 3.2-13: Sketch of Typical Type III Tank (Cross-sectional View)

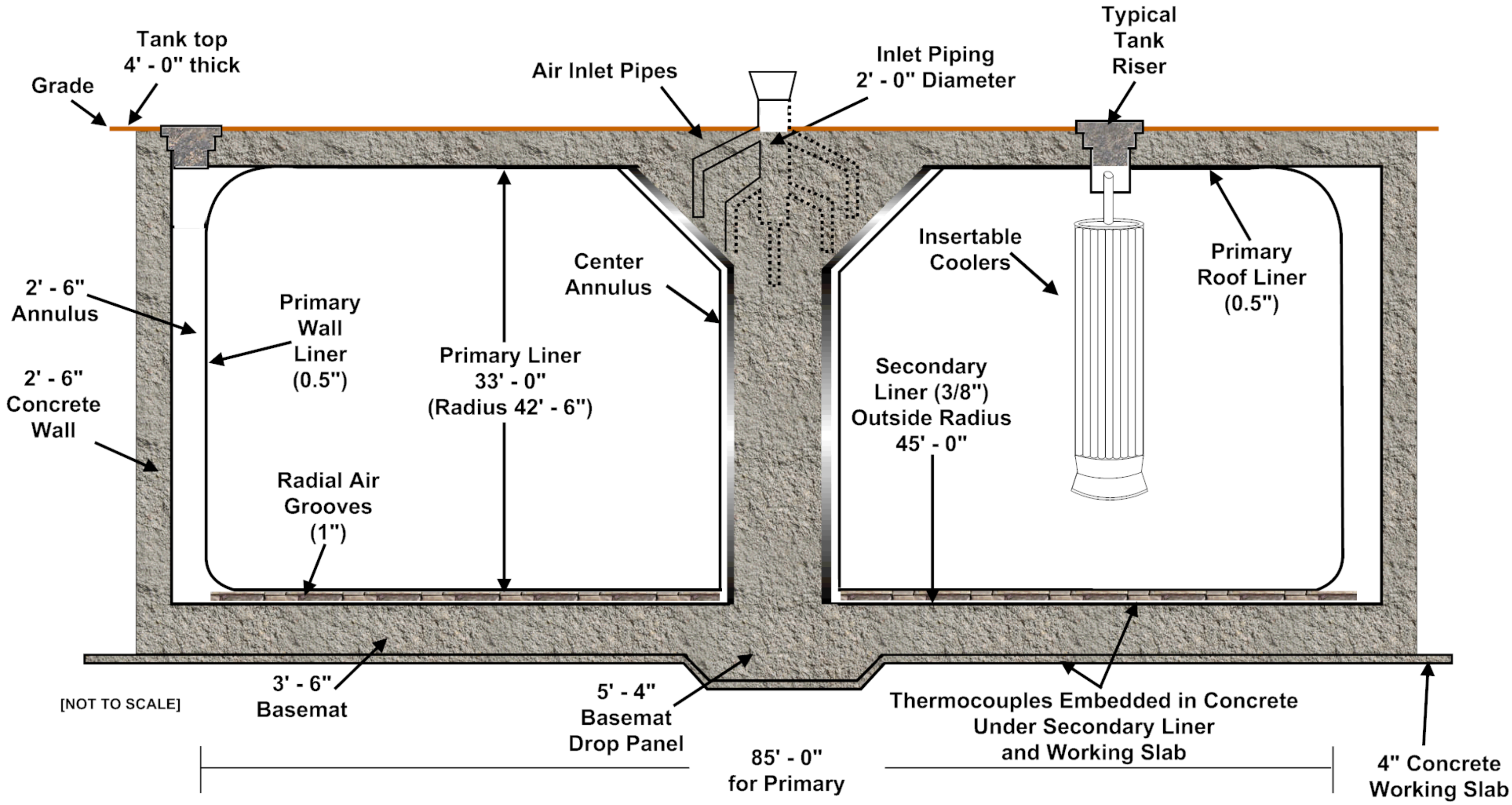
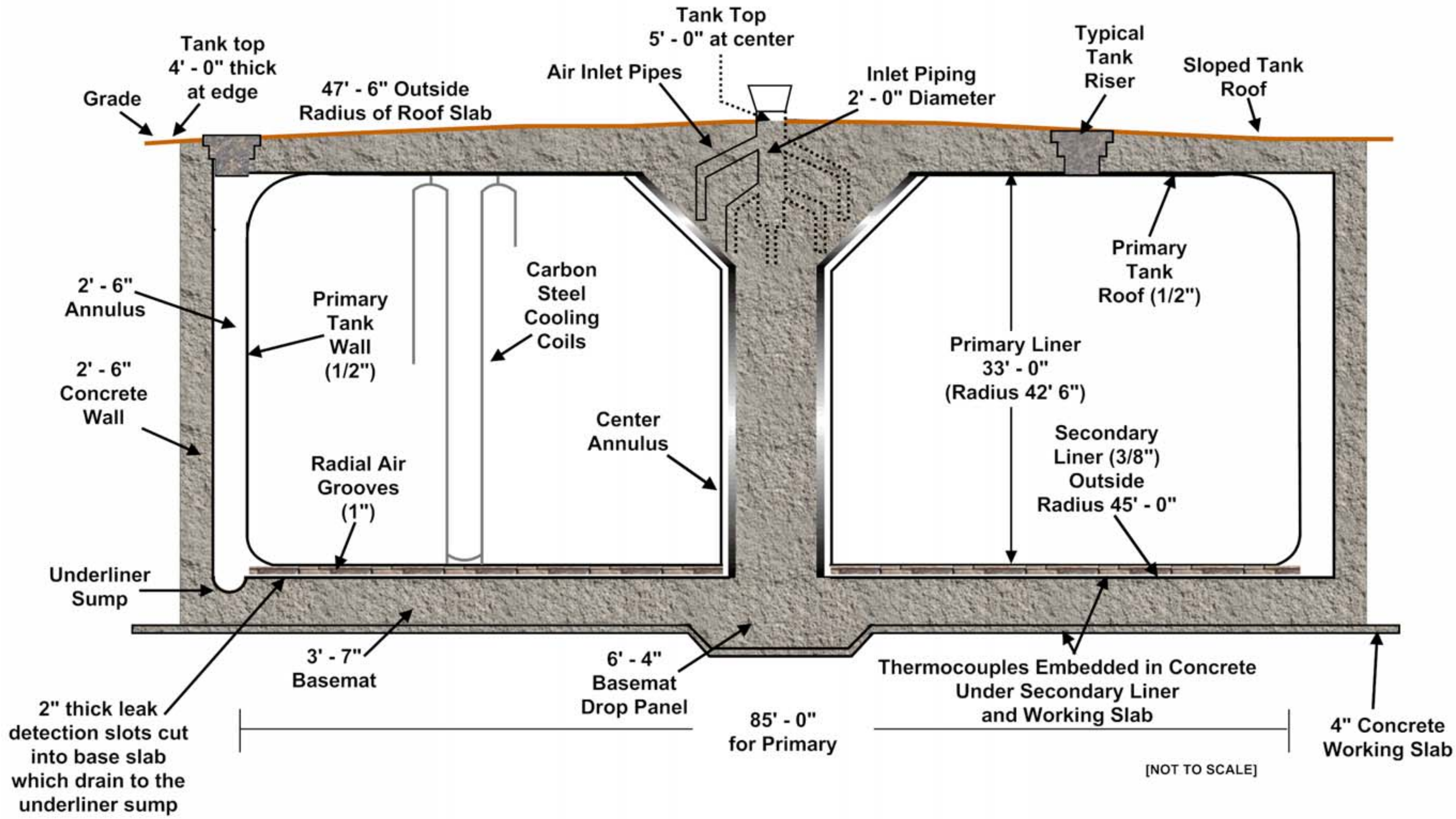


Figure 3.2-14: Sketch of Typical Type IIIA Tank (Cross-sectional View)



3.2.1.2.1 Type III Tanks Working Slab and Basemat

Type III tanks have a 4 inch working slab that extends 30 feet beyond the edge of the waste tank and slopes away from the tank. [W238154] The Type III tank basemat, made of reinforced concrete, has a 3.5 foot minimum thickness (5 feet – 4 inches at drop panel at tank center) with a radius of 45 feet (not including the 2.5 foot wall radius). The basemat in Type III tanks do not have leak detection slots. [W238169] The basemat concrete is Class C per SB 6 A. [Spec-3019, pages 111 – 113 of 540] The concrete design specification was 3,000 psi minimum compressive strength at 28 days. [W238169]

3.2.1.2.2 Type IIIA Tanks Working Slab and Basemat

Type IIIA tanks have a 4 inch working slab that extends under and beyond all eight Type IIIA tanks. [W700598] Figure 3.2-15 shows the soil under Tanks 25 through 28 being prepared for working slab construction. The Type IIIA tank basemat, made of reinforced concrete, has a 3 foot – 7 inch minimum thickness (6 feet – 4 inches at drop panel at tank center) with a radius of 45 feet (not including the 2.5 foot wall radius). [W703133] The waste tank in the foreground of Figure 3.2-16 shows rebar placement in preparation for basemat construction (the three tanks in the foreground have completed working slabs). Figure 3.2-17 shows the same tanks after the basemat has been completed. The basemat concrete is Class C per SB 6 A (Spec-3019, pages 111 – 113 of 540), using Type I Portland Cement without additives. The concrete design specification was 3,000 psi minimum compressive strength at 28 days. The top of the basemat was specified to have a Type 8 finish per standard specification SB 10 U. Concrete placement was per standard specification SB 9 U. [W703133]

Type IIIA tanks have an underliner sump located between the secondary containment bottom and basemat. A grid of 2 inch deep interconnected radial channels is grooved into the concrete basemat upon which the secondary liner rests (Figure 3.2-17). The channels are sloped to drain through a center collection pipe to a sump outside the concrete enclosure around the waste tanks. An access pipe rises to grade from the sump to allow for liquid measurement, sampling, and pump-out of collected liquid. [W703786] No primary tank leakage has been detected in the underliner sumps.

Figure 3.2-15: Soil Under Tanks 25 through 28 Working Slab

Figure 3.2-16: Early Construction of a Type III/IIIA Tank Basemat

Figure 3.2-17: Tanks 25 through 28 Completed Basemat

3.2.1.2.3 Primary and Secondary Liner

The Type III/IIIA tank primary liner is made of concentric cylinders joined to circular top and bottom plates by curved knuckle plates. Figures 3.2-18 and 3.2-19 show early and late construction of the primary and secondary liner for a Type IIIA tank. After construction, the Type III/IIIA tanks were fully stress-relieved by heating after fabrication to help prevent cracking. The liner plate thicknesses are summarized in Table 3.2-2. [W700321]

Figure 3.2-18: Type IIIA Tank Primary and Secondary Liner - Early Construction

Figure 3.2-19: Type IIIA Tank Primary and Secondary Liner - Late Construction

Table 3.2-2: Primary Liner Plate Thicknesses for Type III/IIIA Tanks

Location	**Thickness**
Top and bottom	0.5 inch
Upper knuckle	0.5 inch
Outer wall	
Upper band	0.5 inch
Middle band	0.625 inch
Lower band	0.750 inch
Inner wall (at column)	
Upper band	0.5 inch
Lower band	0.625 inch
Lower Knuckle	
Outer	0.875 inch
Inner (at column)	0.625 inch

3.2.1.2.3.1 Primary Liner for Tanks 33 and 34

Steel plates for the Tanks 33 and 34 primary liners are ASTM A-516 carbon steel. [ASTM A 516/A 516M - 06] There are multiple penetrations through the primary liner (e.g., 2 inch and 3 inch sleeves) near the top of the tank. Stainless steel lines enclosed in carbon steel jacket pipes traverse the sleeves where they bridge across the tank annulus. The lines enter the primary tank liner and terminate a few feet inside the waste tank. The jacket pipe is welded to the primary tank; the internal pipe is free to move to accommodate thermal expansion and contraction. The annulus between the jacket pipe and internal waste inlet transfer line is packed with asbestos wick packing. The pipe jacket extends outward from the primary tank through the concrete tank vault. [W238168]

3.2.1.2.3.2 Primary Liner for Tanks 25 through 28 and Tanks 44 through 47

Steel plates for the Tanks 25 through 28 primary liners are ASTM A-516 carbon steel. The waste tank steel liner specifications for Tanks 25 through 28, including material and welding information, are provided in Spec-6797. Steel plates for the Tanks 44 through 47 primary liners are ASTM A-537 Class I normalized steel. [ASTM A 537/A 537M - 08] The waste tank steel liner specifications for Tanks 44 through 47, including material and welding information, are provided in Spec-7100. There are multiple penetrations through the primary liner (e.g., 2 inch and 3 inch lines) near the tank tops. [W700325]

3.2.1.2.3.3 Secondary Liner

The secondary liner is made from 0.375 inch carbon steel and is the same height as the primary tank with a diameter of 90 feet (creating a 2.5 foot annulus for both Type III and Type IIIA tanks). [W238161] Figure 3.2-20 shows scaffolding setup on the basemat in preparation for secondary liner construction. Steel plates for the secondary liners are ASTM A-516 carbon steel. [Spec-7100, ASTM A 516/A 516M - 06] The secondary liner specifications for the Type IIIA tanks, including material and welding information, are provided in Spec-6797 (Tanks 25 through 28) and Spec-7100 (Tanks 44 through 47).

The Type III/IIIA tanks have a thick bed of insulating concrete grooved for air flow at the bottom of the primary liner (on top of the secondary annulus liner) (Figure 3.2-21 and 3.2-22). The thickness of the bed of insulating concrete varies for Tanks 33 and 34. [W238160] The thickness of the bed of insulating concrete is 8 inches for Tanks 25 through 28 and Tanks 44 through 47. [W700339] Type III tanks have a 1 inch grout layer (surrounding radial 1 inch thick thermocouple tubing) between the secondary liner and the concrete basemat. [W238169] The Type IIIA tanks have the thermocouple imbedded in the basemat below the secondary liner. [W702756]

Figure 3.2-20: Scaffolding Set-up on Basemat

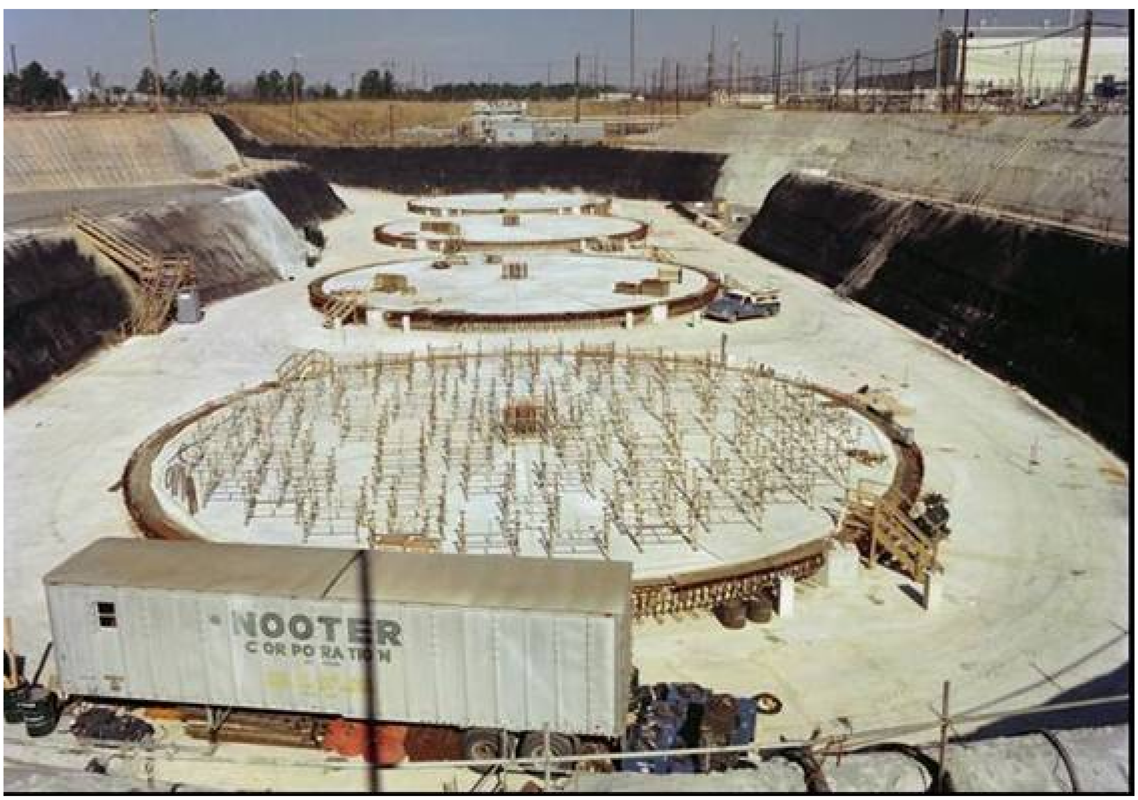


Figure 3.2-21: Radial Air Grooves for Type III/IIIA Tanks

Figure 3.2-22: Radial Air Groove Close-up

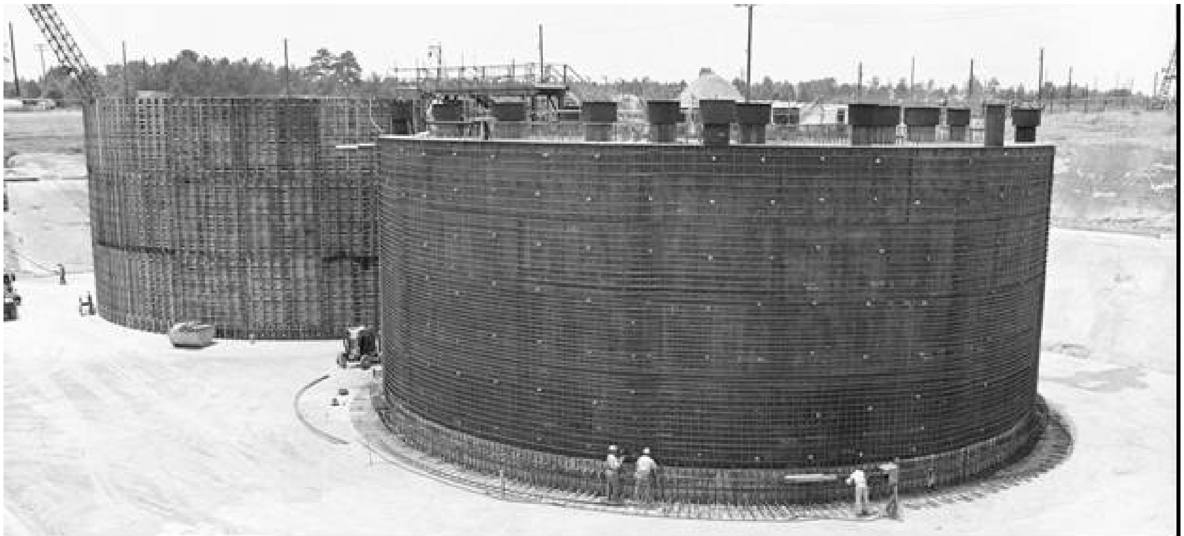
3.2.1.2.4 Tank Concrete Vault

The Type III/IIIA tanks are completely enclosed in a concrete vault. The vault roof is at least 48 inches thick and the walls are 30 inches thick. Because of this thick enclosure, no earthen cover is required for shielding on top of the Type III/IIIA tanks. Type III/IIIA tanks have both a center and outer annulus. The center annulus is formed between the primary tank wall and the roof support column. The center annulus allows for ventilation airflow to the tank bottom and then out to the outer annulus through the radial air grooves. The Type IIIA tanks have conductivity probes that cross through the tank top concrete into the center annulus. [W238163] Multiple conductivity probes are also installed in the outer annulus to provide redundant leak detection capability. No primary tank leakage has been detected in the Type III/IIIA secondary liners or concrete vaults.

Type IIIA tank tops are sloped to provide drainage for rainwater with walls 5 feet thick at the tank center and 4 feet thick at the edge. [W700324] The tank wall and roof concrete is Class C per SB 6 A, 1.5 inch max aggregate. [Spec-3019, pages 111 – 113 of 540, W238169] The tank wall and roof have reinforcing bars placed throughout, with the length and type of bar varying depending upon the location of the bar. [W704922] Figure 3.2-23 shows placement of the tank top reinforcing bars and center annulus ventilation ductwork in preparation for concrete pouring. Figure 3.2-24 shows placement of side wall reinforcing bars on Tanks 33 and 34 in preparation for concrete pouring.

Figure 3.2-23: Tank Top Preparation for Concrete Pour

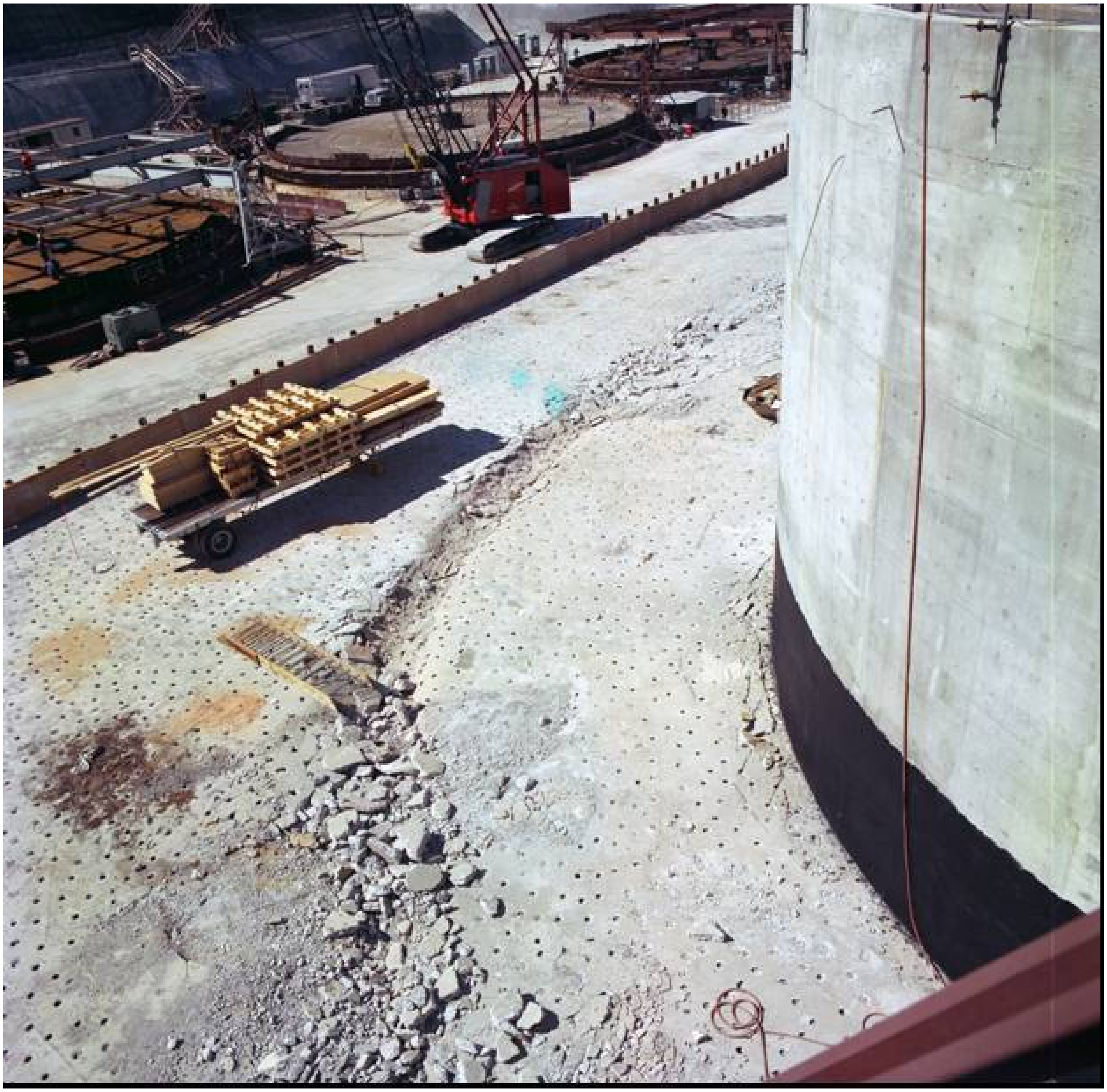
Figure 3.2-24: Tanks 33 and 34 Side Wall Rebar



A completed Type IIIA tank (prior to receiving backfill) is shown in Figure 3.2-25. Areas receiving backfill (including sloped areas) were prepared per the requirements of Engineering Standard SC 5 E - Section 4. [Spec-3019, pages 90 – 91 of 540] Prior to placing backfill, the construction working slab was either broken up or 4 inch holes, 18 inch off center were punched in the slab (Figure 3.2-26). Backfill used was per the requirements of Engineering Standard SC 5 E with the amount (%) of water most favorable to achieve not less than 95% of the maximum dry density. [Spec-3019, pages 90 – 91 of 540, W704824]

Figure 3.2-25: Final Construction of a Type III/IIIA Tank

Figure 3.2-26: Drilled Working Slab Around a Type IIIA Tank



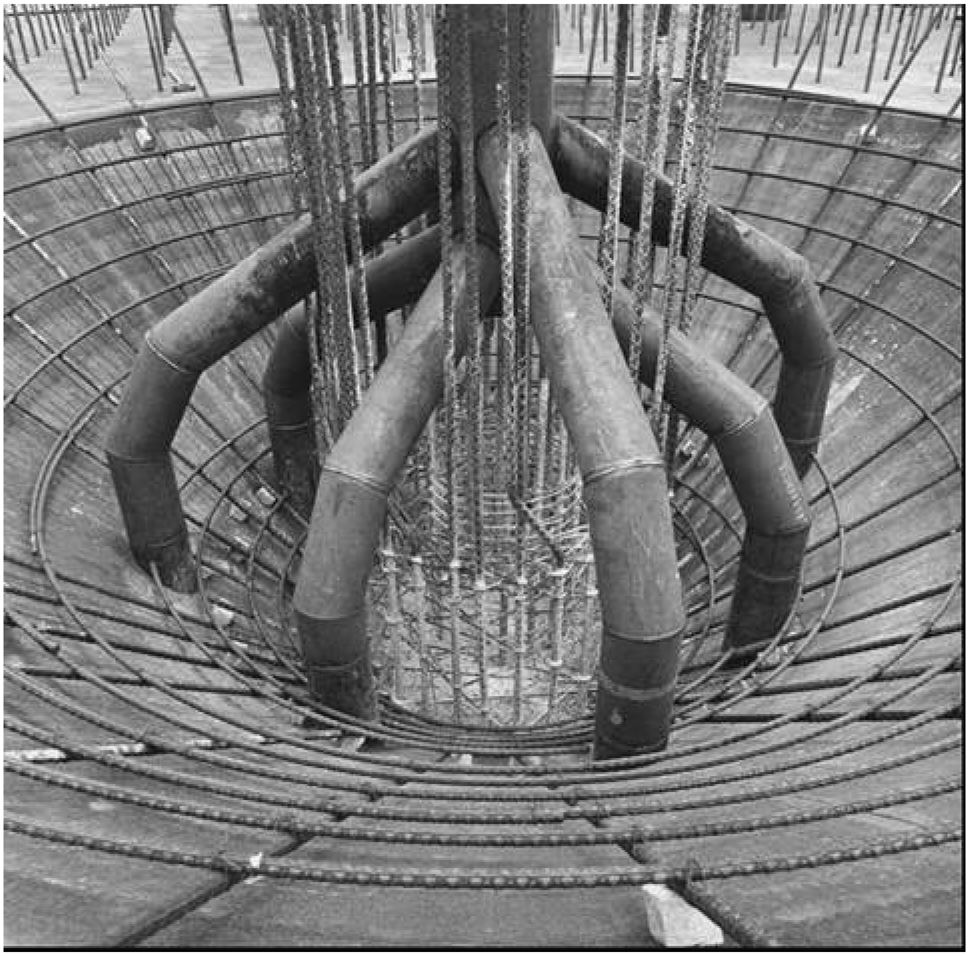
3.2.1.2.4.1 Support Column

The roof support for the primary tank is a 6 foot – 2 inch diameter steel-lined center support column that is integrated into the concrete basemat (Figure 3.2-27). As a result, the tank bottom does not support the weight of the roof. The thickness of the basemat under the center support column is either 64 inches thick (Type III tank) or 76 inches thick (Type IIIA tank). [W703133] A ventilation and cooling system is embedded in the center column (Figure 3.2-28). [W238160] Air flows through the column, into the inner annulus, through the cooling channels, and out through the outer annulus. The center column concrete is Class C, 1.5 inch maximum aggregate. The concrete design specification was to develop 3,000 psi minimum compressive strength at 28 days. The center support column has reinforcing bars placed throughout, with the length and type of bar varying depending upon the location of the bar. [W238167]

For the Type III tanks, the secondary liner is 6 foot – 4 inch outer diameter (OD) and the primary liner 6 foot – 9 inch OD at the center column. [W238163] For the Type IIIA tanks, the secondary liner is 6 feet – 2 inch inner diameter, and the primary liner is 6 foot – 9 inch OD at the center column. [W700324]

Figure 3.2-27: Center Column Roof Support in a Type III/IIIA Tank

Figure 3.2-28: Center Column Ventilation Supply Ductwork



3.2.1.2.4.2 Cooling Coils

In the Type III tanks, cooling coil piping consists of deployable coolers that were inserted through the waste tank risers. The bottoms of the waste tanks are cooled by the air passing through the annulus and channels in the insulating layer. [W238160]

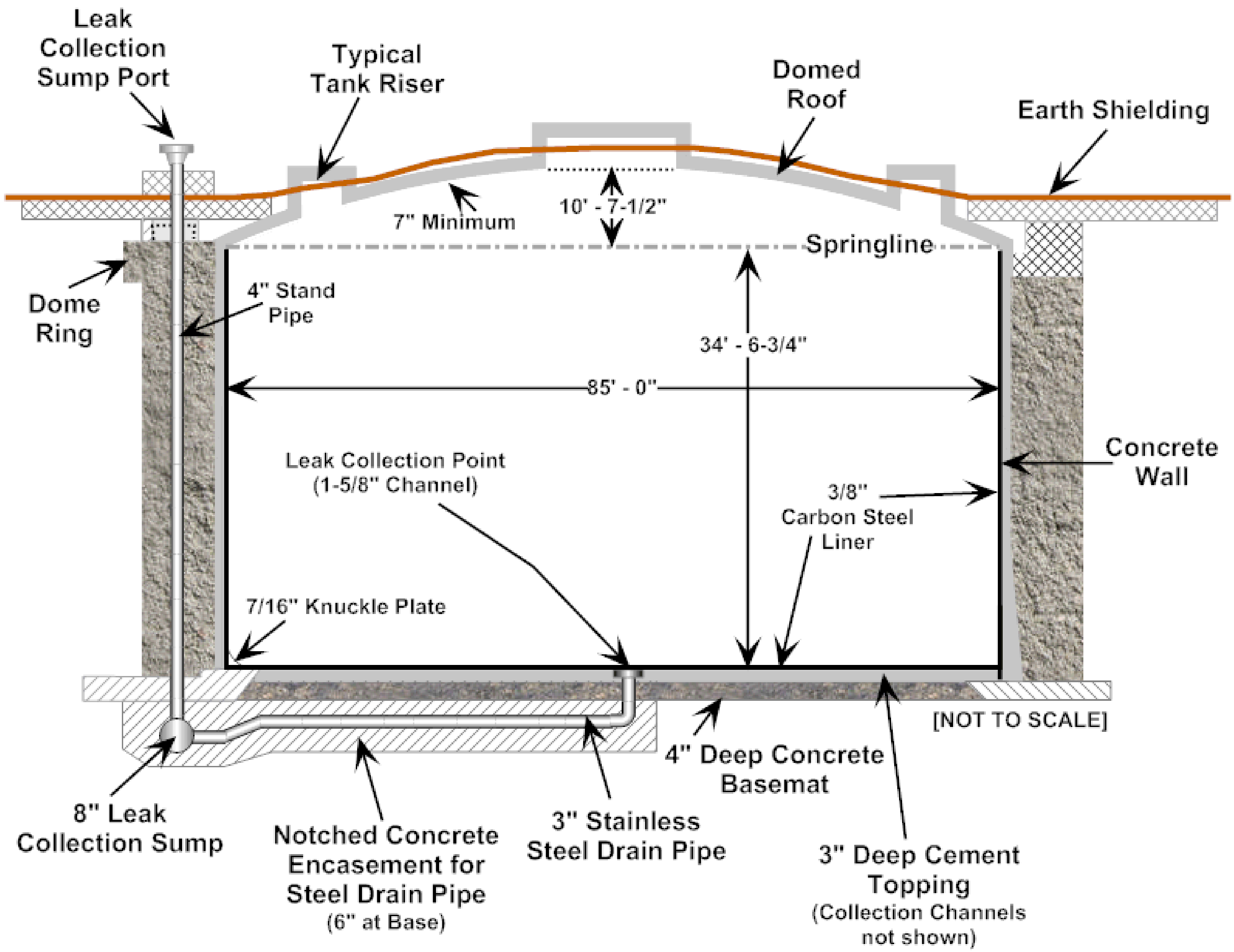
Type IIIA tanks have permanently installed cooling coils (Figure 3.2-29). The vertical coils are bottom supported on 3 foot triangular centers. The supports are welded to the bottom of the primary liner. The horizontal coils are near the bottom of the waste tank. All of the cooling coils are made from 2 inch schedule 40 carbon steel pipe. [W705828]

Figure 3.2-29: Cooling Coils in a Type IIIA Tank

3.2.1.3 Type IV Tanks

There are four Type IV tanks in the FTF. The FTF Type IV tanks were constructed in the late 1950s. A typical Type IV tank is shown in Figure 3.2-30. These waste tanks have a single liner with a spherical reinforced concrete domed roof that supports itself. Type IV tanks are 85 feet in diameter and approximately 34 feet high at the side wall, with a nominal operating capacity of 1,300,000 gallons.

Figure 3.2-30: Sketch of Typical Type IV Tank



3.2.1.3.1 Basemat

A 4 inch thick reinforced concrete slab forms the bottom layer of the Type IV tank. The basemat is made of Class C concrete and was poured without construction joints on undisturbed soil. [Spec-3552 - Sheet 8, DP-478 - Sheet 28] The basemat was specified to be 4 inches thick with a tolerance of plus 0.5 inches and minus 0.25 inches. [Spec-3552 - Sheet 8] Specifications called for the basemat to have a screeded surface level within plus or minus 0.25 inches from a true level. [Spec-3552 - Sheet 8, DP-478 - Sheet 28] The basemat was reinforced with No. 4 (0.125 inch) rebar, at 10 inch on centers East-West, placed 1.125 inches from the slab bottom. [DP-478, Page 24, W167482]

The basemat is covered with a wire mesh, and then a 3 inch cement topping covers this, having a float and trowel finish with a maximum tolerance of plus or minus 0.125 inches from a true level. The 4 inch basemat and 3 inch cement topping together comprise a nominal 7 inch basemat. Drainage channels (1.625 inches deep and approximately 3.5 inches wide, 3.625 inches at the top and 3.125 inches at the bottom) to be used for leak detection were formed in the 3 inch deep cement topping (Figure 3.2-31). The channels coincide with the locations of welds and backup strips. A 3 inch stainless steel drainpipe to collect any leakage is located at the center of the basemat and runs to a collection chamber below the footing at the edge of the waste tank wall. This 3 inch stainless steel line was placed below the 4 inch basemat and run to an 8 inch diameter by 8 inch long collection chamber below the footing at the edge of the waste tank wall. A 4 inch pipe connected the leak collection chamber to the surface so that a leak collection probe might be placed in the chamber. [DP-478 - Sheet 28, W167482]

As necessary, the leak collection chamber can be pumped out to plastic bottles and sampled. The periodicity of leak collection chamber pump out has varied over time, but is typically required once a month/once a quarter, depending upon the amount of rainfall in the period preceding pump out. Sump samples of concern are investigated via procedure. Past sampling of the liquid removed from the Tank 18/19 leak collection sumps has indicated that leakage into the sump has been from groundwater intrusion and is not due to leakage from the waste tank. Liquid was detected in the Type IV leak collection sumps even before the waste tanks were all put into service. The sump liquid was sampled and the source of the liquid was considered to be groundwater. [DPSPU-82-11-10, page 2] High leak collection sump liquid level in Tank 20 was attributed to groundwater entering through an imperfect seal between the steel tank liner and the basemat, not through cracks in the basemat. [DPSPU-82-11-10, page 3] Tank 19 leak collection sump samples began to show some radioactivity in July 1973. The source contamination was found to be condensate from the inner surface of the domed concrete roof leaking down the interface between the concrete tank wall and the steel liner and reaching the lead detection grids in the cement topping layer.

Figure 3.2-31: Leak Collection Channels in Type IV Waste Tanks

3.2.1.3.2 Primary Liner

The Type IV tank primary container is a cylinder (open at top) made of 0.375 inch carbon steel plates and 0.4375 inch knuckle plates. [W163941] Figures 3.2-32 and 3.2-33 show construction of the primary liner for a Type IV tank. The knuckle plates at the junction between the tank bottom and sidewalls rest on a concrete tank ring. The primary tank liner is reinforced with three circumferential carbon steel stiffener angles and is anchored to the concrete wall with eight horizontal rows of 0.375 inch hooked Nelson studs, spaced 3 feet apart circumferentially. The primary liner material is ASTM A-285 Grade B Firebox quality open hearth carbon steel. [DP-478, ASTM A 285/A 285M - 03] The steel specifications, including material and welding information, are provided in Spec-3552.

The Type IV tanks have side wall penetrations for 3 inch stainless steel inlet and outlet transfer lines near the tank tops. These waste tanks also have 4 inch cascade line penetrations. The transfer lines and cascade lines penetrate the vault right below the dome ring and through the primary steel liner. In addition to the liquid transfer line penetrations, carbon steel ventilation pipes traverse the vault through the riser wall. The 6 inch vent pipes are welded to steel plates inside the riser. [W163941]

Figure 3.2-32: Construction of the Primary Liners in Type IV Tanks (View 1)

Figure 3.2-33: Construction of the Primary Liners in Type IV Tanks (View 2)

3.2.1.3.3 Tank Concrete Vault

The Type IV tank is completely enclosed in a concrete vault. The waste tanks wall foundation and 4 inch basemat are Class C concrete poured without construction joints on undisturbed soil. [Spec-3552 - Sheet 8, DP-478 - Sheet 28] The wall footing is 4 feet – 10 inches wide in total, with 2 inches of the wall footing extending underneath the primary tank liner. The wall footing contains reinforcing steel bars. After the structural floor and foundation were set and cured, the 1.5 foot annular space between then was filled with Embeco grout mixture (a mixture of metallic non-shrink grout). [Spec-3552 - Sheet 8, DP-478 - Sheet 28]

The tank roof consists of a spherical reinforced concrete dome made of 7 to 10 inch thick concrete (the dome concrete is thicker near risers). The concrete dome is reinforced throughout with steel bars. [W167477] The dome has an internal radius of curvature of 90 feet – 4 inches and a rise of 10 feet – 7.5 inches above the spring line. The dome shape of the roof provides its own structural support. Figure 3.2-34 shows the dome and risers on Type IV tanks near the end of the concrete construction phase.

The concrete roof is not lined with carbon steel on the inside. [DP-478, W167477] The dome and center riser are constructed of Class A concrete. [DP-478, W167477] The six side risers, all riser plugs and auxiliary foundation are Class D concrete. [W167477, Spec-3552 - Section 3.36] The center riser has a 10 foot inner diameter. The smaller risers have 2 foot inner diameters. [W167477] The riser locations are detailed in drawing W167801.

Figure 3.2-34: Dome and Risers on Type IV Tanks

The material specifications for all the concrete work are detailed in Section 3.2.3 of the Type IV tank specifications, including the Standard Engineering Specifications for different task areas (e.g., Testing, Finishing Concrete, Curing). [Spec-3552 - Sheets 6 – 7] The testing of concrete and concrete materials was per the requirements of DuPont Standard Engineering Specification SB 5 A (Spec-3019 - pages 110 – 111 of 540). An overview of the concrete work is contained in Section 3.2.3.1 of the Type IV tank specifications. [Spec-3552 - Sheets 8 – 9]

There is no secondary containment structure for Type IV tanks. The concrete vault for Type IV tanks was built around the primary tank using a technique called “Shotcrete”. The core wall was constructed of 0.75 to 1.5 inch thick layers of “Shotcrete”, which were allowed to set up three days between layers. Tests showed that the bond between layers was so strong that, when cores were broken, they invariably broke at other than the joint between layers. The “Shotcrete” utilized Type I Portland Cement. [DP-478]

The walls form a cylinder 85 feet in diameter and 33 feet high surmounted by the dome ring. The core wall is 7 inches thick at the top and 11 inches at the bottom. The total wall thickness, including bands and cover, is 10 inches at the top and 15 inches at the bottom. [DP-478] The dome ring and wall were made monolithic by shooting the layers continually from bottom to top of the wall. The vertical reinforcing in the wall was also carried up into the dome ring. The dome ring and wall act as a unit with a joint between dome ring and dome slab and a joint between the wall and floor. The dowels into the dome slab were placed at the center of the slab, and the dowels from the footing into the wall were placed on the inside to minimize the movement in the footing due to the prestressing. [DP-478]

The side wall was prestressed circumferentially by 163 round bands, each 0.875 inches, roll threaded with a minimum area no smaller than the 0.875 inch rod. The turnbuckles, placed 45° apart on each band, were designed to be stronger than the rods. Rods were tensioned to an average stress of 50,000 psi, which was measured at the quarter point in the individual rod. In order to provide a more uniform distribution of the stresses, the turnbuckles on one band were staggered with those on adjacent bands so that points of higher stress would occur next to points of lower stress. [DP-478]

The turnbuckles required a 1 inch deep notch 18 inches wide, the full height of the wall to provide clearance for turning. This reduced the core wall thickness to an effective thickness of 6 inches at the top and 10 inches at the bottom. [DP-478]

The prestressing in the bands was calculated to provide compression in the core wall under all operating conditions after losses from shrinkage, plastic flow, and friction had taken place, without depending on the compression resulting from backfill. The wall was not prestressed vertically as the load from the dome after adding the earth cover provides a permanent compressive stress of over 100 psi on the wall section and effectively prevents horizontal cracks from opening up. [DP-478] Since no annulus exists, a three-layer backfilling system is used to surround the sidewalls of the concrete vault. The backfill consists of a vermiculite fill layer, a special manually compacted fill of soil, and a test controlled compacted fill of soil. The vermiculite fill provides a cushion layer for expansion of the primary tank with temperature variations of the waste tank and waste tank contents.

Bags of vermiculite are placed in brick fashion on their long edges against the side of the tank to form a layer with an 8 inch minimum thickness. The bags are held in place by a retaining layer of special, manually compacted fill soil. The final test-controlled compacted fill was packed and rolled with heavy equipment. The finished fill had to comply with moisture content and density specifications. [DP-478]

3.2.1.4 Water Infiltration through Tank Design Features

There are multiple elements of the tank design that will serve to minimize water infiltration. The waste tank concrete vaults and steel liners serve to significantly retard water flow through the waste tanks. The design features assumed in FTF modeling are described in detail in Section 4.2.3.2. In addition, the tank tops are covered by the FTF closure cap (Section 3.2.4), and the tank liners are filled with cementitious material (Section 3.2.3), which will further serve to limit the amount of water infiltration into the waste tank CZ.

3.2.1.5 Tank Design Features Structural Stability/Degradation

The structural stability of the vaults and waste tanks is provided by the closure concept of grouting voids. The EIS considered several alternatives for the FTF tanks, including filling them with low-level contaminated grout or leaving a remaining void above the first grout lift. [DOE-EIS-0303 ROD] In this PA, the entire tank is assumed to be filled with grout, therefore structural failure (i.e., collapse) is not considered. The impact of waste tank degradation (e.g., cracking or corrosion leading to increased hydraulic conductivity) was considered in FTF modeling, and is described in detail in Section 4.2.3.2.

A structural evaluation was performed on Type IV Tanks 18 and 19 to demonstrate that the waste tanks would maintain structural integrity during grouting activities. [T-CLC-F-00373] An additional analysis was performed to show that the waste tanks will have minimal settlement (~2 inches max) even after they are grouted and a closure cap installed. [K-CLC-F-00073]

The long term structural behavior/integrity of grout-filled waste tanks in FTF was evaluated. Mechanisms that could lead to cracking, such as material degradation, seismic loads, and settlement were analyzed. The analysis concluded that these mechanisms will not cause the grout-filled waste tank to crack. [T-CLC-F-00421]

3.2.1.6 Tank Design Features as Inadvertent Intruder Barrier

There are multiple elements of the tank design that will serve as inadvertent intruder barriers. The FTF closure cap, waste tank concrete top, and waste tank fill grout are considered sufficient to prevent drilling into the waste form, given Well drilling practices in the region and the presence of nearby land without underground concrete obstructions. The presence of the earthen cover and the intruder barrier will prevent the worker from contacting the waste form during construction of a basement for a residence as an inadvertent intruder. Section 4.2.4 contains a more detailed discussion of the inadvertent intruder and which exposure scenarios are considered credible based on the waste tank design.

3.2.2 Ancillary Equipment

FTF contains ancillary equipment with a residual radiological inventory that must be accounted for as a part of facility closure. This ancillary equipment includes buried pipe (transfer lines), pump tanks, and evaporators, all of which have been in contact with liquid waste over the operating life of the facility. The ancillary equipment was used in the FTF to transfer waste (e.g., transfer lines, pump tanks) and reduce waste volume though evaporation (e.g., the evaporator systems). The amount of contamination on these components depends on such factors as the service life of the component, its materials of construction, and the contaminating medium in contact with the component.

Figure 3.2-1 identifies locations of specific ancillary equipment relative to the FTF waste tanks and relative to other components. The following FTF locations are addressed in the PA waste modeling (discussed further in Section 4.4.2).

- The FTF transfer line system (approximately 45,000 linear feet of transfer lines), including transfer line jackets, Leak Detection Boxes (LDBs) and other transfer line secondary containment systems (e.g., the Type I tank transfer line encasements).
- The FTF pump tanks (FPT-1, FPT-2, and FPT-3) and PPs (FPP-1, FPP-2, and FPP-3) and FTF catch tank.
- The 242-F evaporator system, including the evaporator cell and support tanks (e.g., Mercury Collection Tank, Cesium Removal Column (CRC) Pump Tank, CTS pump tank, and overheads tanks).
- The 242-16F evaporator system, including the evaporator cell and support tanks (e.g., Mercury Collection Tank, CRC Pump Tank, and overheads tanks).

The following approach is used in the conceptual model to explicitly model contaminant release:

- Transfer line inventory is modeled by distributing the assumed inventory uniformly throughout the FTF modeling cells.
- The pump tanks, catch tank, evaporator pots, and CTS pump tank are modeled as uniform inventories spread throughout a single modeling cell at the location of the applicable ancillary source.

Other FTF ancillary equipment, such as DBs (FDB-1, FDB-2, FDB-3, FDB-4, FDB-5, FDB-6), valve boxes (Valve Boxes 1-5, Valve Boxes 28A and 28B, and LDB-17), PPs, Evaporator Cells, and overheads tanks, are not modeled explicitly. This approach is based on the fact that these locations did not serve as primary waste containment, and therefore will not contain significant radiological inventory at closure.

3.2.2.1 Transfer Line System

FTF transfer line details are provided in Table 3.2-3. Reference drawings for all transfer lines identified in Table 3.2-3 are listed in CBU-PIT-2006-00013 (Appendices A and B). Figures 3.2-35 and 3.2.36 show construction of various transfer lines near Tanks 44 through 47, including the Gravity Drain Line (GDL) from the 242-16F evaporator to Tank 46 (the line going from the bottom of the photo to the top tank in Figure 3.2-36).

There are over 45,000 linear feet of transfer line in FTF, with the line segments ranging from a few feet in length to over 4,000 feet. The lowest elevation identified for a segment of FTF transfer line piping was 260.66 feet MSL for Tanks 17 through 20 cascade lines. [W717008] The FTF waste transfer lines are typically constructed of a stainless steel primary core pipe and are normally located below ground. Those lines that are above, or near, the surface are shielded to minimize radiation exposure to personnel. Most primary transfer lines have secondary containments of some type. The majority of primary transfer lines are surrounded by another pipe (jacket) constructed of carbon steel, stainless steel, or cement-asbestos. These jackets typically drain to LDBs, Modified Leak Detection Boxes (MLDBs), or to another primary or secondary containment (e.g., a waste tank). A few primary transfer lines are located inside a covered, concrete encasement.

Waste transfer lines are typically sloped to be self-draining and, where a pipe transitions from one size to another, the bottom of the pipe is generally aligned to prevent a situation which would prevent waste from draining to the intended tank. The line segments are supported using rod or disk type core pipe spacers, core pipe supports, jacket supports, jacket guides, or other approved methods. Typically, core pipe spacers and supports are of stainless steel welded to the core pipe and the jacket, while jacket supports and guides are of stainless steel with a concrete support.

Table 3.2-3: FTF Transfer Line Segment Listing

Line No.	From (b)	To	Core Material (c)	Core Diameter (inches)	Jacket Diameter (inches)	Line Length (ft)
1 (176A)	242-F Evap (N12)	242-3F CTS	SS	3	4	50
2	Tank 33(C2) VN	Tank34(C2) VN	SS	2	3	190
2 (old)	242-F Evap (N13)	Tank 18	SS	3	6	80
3	FDB-1(28)	Tank 18	SS	3	6	430
4	FDB-1(29)	Tank 17	SS	3	6	480
7	Tank17	Tank 19	SS	4	6	55
8	Tank 20	Tank 18	SS	4	6	55
9	#9000	Tank19 (NW)	CS	3	4	35
11 (177A)	242-F Evap	242-3F CTS	SS	3	4	50
33	FDB-1	Tank 1	SS	3	N/A(a)	42
34	FDB-1	Tank 2	SS	3	N/A(a)	42
35	FDB-1	Tank 3	SS	3	N/A(a)	142
36	FDB-1	Tank 4	SS	3	N/A(a)	142
37	FDB-1	Tank 5	SS	3	N/A(a)	242
38	FDB-1	Tank 6	SS	3	N/A(a)	242
39	FDB-1	Tank 7	SS	3	N/A(a)	342
40	FDB-1	Tank 8	SS	3	N/A(a)	342
42	FDB-1	Tank 1	SS	3	N/A(a)	42
43	FDB-1	Tank 2	SS	3	N/A(a)	42
44	FDB-1	Tank 3	SS	3	N/A(a)	142
45	FDB-1	Tank 4	SS	3	N/A(a)	142
46	FDB-1	Tank 5	SS	3	N/A(a)	242
47	FDB-1	Tank 6	SS	3	N/A(a)	242
48	FDB-1	Tank 7	SS	3	N/A(a)	342

Table 3.2-3: FTF Transfer Line Segment Listing (Continued)

Line No.	From (b)	To	Core Material (c)	Core Diameter (inches)	Jacket Diameter (inches)	Line Length (ft)
49	FDB-1	Tank 8	SS	3	N/A[(a)]	342
73	Tank 44 (C1) TJ	Tank 26 (C1)	SS	3	10	447
74	Tank 45 (C1) TJ	Tank 26 (C1)	SS	3	10	289
75	Tank 46 (C1)	Tank 26 (C1)	SS	3	10	404
76	Tank 47(C1)TJ	Tank 26 (C1)	SS	3	10	547
100 (221F)	221-F	#1475	SS	3	10	1661
100 (IAL)	FDB-2(26)	HiPt flush pit (6)	SS	3	4	4288
101 (DB4)	FDB-4(5)	FPP-2(6) pump in.	SS	3	0	34
101 (IAL)	HiPt flush pit (4)	FDB-2(25)	SS	3	4	4288
101(221F)	221-F	#1478	SS	3	10	1661
102 (221F)	221-F	#1488	SS	3	10	1661
102 (DB2)	FPP-1(5)	FDB-2(35)	SS	3	4	46
102 (DB4)	FDB-4(2)	FPP-3(6) pump in.	SS	3	0	50
103 (DB2)	FDB-2(36)	FPP-1 (4)	SS	3	4	40
103 (DB4)	FDB-4(7)	FPP-1(1)	SS	3	4	153
103(221F)	221-F	#1476	SS	3	10	1661
104 (DB2)	FDB-2(27)	FDB-1(8)	SS	3	4	1000
104 (DB4)	FDB-4(9)	FDB-3(9)	SS	3	10	150
105	Tank 27(S) VN	FDB-4(11)	SS	3	10	108
106 (DB2)	FPP-1(2)	FDB-2(28)	SS	3	4	22
106 (DB4)	Tank 28(S) valve box	FDB-4(10)	SS	3	10	538
107 (DB2)	FDB-2(33)	Tank 18	SS	3	4	648
107 (DB4)	Tank 26(C1) TJ	FDB-4(13)	SS	3	10	118
108 (DB2)	FDB-2(32)	FDB-3(15)	SS	3	4	80
108 (DB4)	Tank 25(C1) TJ	FDB-4(16)	SS	3	8	323

Table 3.2-3: FTF Transfer Line Segment Listing (Continued)

Line No.	From (b)	To	Core Material (c)	Core Diameter (inches)	Jacket Diameter (inches)	Line Length (ft)
108 (Tank 18)	FDB-2(32)	Tank 18	SS	3	4	450
109 (DB2)	FDB-2(37)	#3754 & #3755	SS	3	8	60
109 (DB4)	FDB-4(12)	Tank 26(C1) VN	SS	3	10	118
110	#17015	FDB-2(31)	SS	3	6	285
110 (cut)	Tank 7(2)	cut & capped	SS	3	4	23
111	FDB-2(30)	FDB-3(16)	SS	3	8	57
112	FDB-2(29)	FDB-3(17)	SS	3	8	67
114	FDB-1(30)	FPP-1(1A)	SS	3	8	640
115	FDB-1(31)	cut & capped	SS	3	8	10
116	FDB-1(32)	cut & capped	SS	3	8	10
117	FDB-1(33)	cut & capped	SS	3	8	10
118	#5016	#213	SS	3	10	296
118 (DB1)	FDB-1(7)	cut & capped	SS	3	10	519
151 (DB3)	Tank 33(NW)VN	FDB-3(4)	SS	3	8	190
151 (DB4)	FPP-2(5) pump out	FDB-4(6)	SS	3	0	46
152 (DB3)	FDB-3(3)	Tank 33(NW)VN	SS	3	8	190
152 (DB4)	FPP-2(7) TJ	FDB-4(4)	SS	3	0	36
156	Tank 34 (C1) VN	FDB-3(2)	SS	3	8	295
157	FDB-3(1)	Tank 34 (C1) VN	SS	3	8	295
161	FDB-3 sump	FDB-2 sump	SS	1.5	4	84
176 (old)	242-F Evap	Tank 18 (SW)	SS	3	6	20
176 abandoned	242-F Evap	Tank 7 (cut & capped)	SS	3	4	40
176A	242-3F CTS	Tank 7	SS	3	4	500
176B	Tank 7	242-F Evap	SS	3	4	40

Table 3.2-3: FTF Transfer Line Segment Listing (Continued)

Line No.	From (b)	To	Core Material (c)	Core Diameter (inches)	Jacket Diameter (inches)	Line Length (ft)
177 (old)	242-F Evap	Tank 18 (SW)	SS	3	6	20
177 abandoned	Tank 7	252-F Evap (cut & capped)	SS	3	4	40
177A	242-3F CTS	Tank 7	SS	3	4	500
177B	242-F Evap	Tank 18 (SW)	SS	3	6	20
201	FPP-3(5) pump out	FDB-4(3)	SS	3	0	56
202	FPP-3(7) TJ	FDB-4(1)	SS	3	0	47
210	Tank 4(6)TJ	#3752	SS	3	10	227
211	Tank 3(5) TJ	Tank 7(6) VN	SS	3	10	272
212	Tank 2(3)TJ	Tank 7(6) VN	SS	3	10	420
213	#118	Tank 7(6) VN	SS	3	10	376
213 (Tank 1)	Tank 1(3)TJ	cut & capped	SS	3	10	34
213 (DB2)	#109 (DB2)	cut & capped	SS	3	4	9
301	242-3F CTS	Tank 1-4 loop line	SS	2	6	1942
302	Tank 18	242-3F CTS	SS	3	4	70
302 (old)	242-F Evap	Tank 18 (SE)	SS	3	4	20
303	242-F Evap	242-3F CTS	SS	3	4	70
304	Tank 18	242-3F CTS	SS	3	4	70
397	Tank 25(C1) TJ	Tank 26(S)	SS	3	8	312
497	Tank 27(C1) TJ	Tank 26(S)	SS	3	10	283
515	16030	#3754	SS	3	6	60
520	Tank 5(6)	#3751	SS	3	6	128
521	Tank 6(6)	#3753	SS	3	6	133
547	Tank 28(C1) valve box	Tank 26(S)	SS	3	10	392
960	Tank 25(C2) VN	Tank 26(C2)VN	SS	2	6	205

Table 3.2-3: FTF Transfer Line Segment Listing (Continued)

Line No.	From (b)	To	Core Material (c)	Core Diameter (inches)	Jacket Diameter (inches)	Line Length (ft)
1012	Tank 26(R2) VN	242-16F evaporator	SS	1	3	133
1013	Tank 26(C2) VN	Tank 27(C2) VN	SS	2	6	170
1040	Tank 26(R1) VN	FDB-6(4)	SS	3	6	491
1054	Tank 27(C2) VN	Tank 28(C2) VN	SS	2	6	172
1104	Tank 28(C2) VN	FDB-5(9)	SS	2	10	357
1209	3-valve box W328-15-3	Tank 28 TTJ	SS	3	6	23
1377	242-16F evaporator (24)	Tank 26(C3) VN	SS	2	6	75
1378	242-16F evaporator (23)	Tank 25(C3) VN	SS	2	6	110
1379	242-16F evaporator (10)	Tank 27(C3) VN	SS	2	6	77
1380	242-16F evaporator (11)	Tank 28(C3) VN	SS	2	6	176
1383	242-16F evaporator (22)	Tank 44(C3) VN	SS	2	6	190
1384	242-16F evaporator (21)	Tank 45(C3) VN	SS	2	6	97
1385	242-16F evaporator (13)	Tank 46(C3) VN	SS	2	6	97
1386	242-16F evaporator (12)	Tank 47(C3) VN	SS	2	6	181
1408	242-16F Evap.	Tank 27(M) CRC	SS	1.5	6	115
1414	Tank 27(M) CRC	242-16F Evap.	SS	1.5	6	115
1461	Tank 44(C1) TJ	FDB-4(20)	SS	3	10	483
1462	Tank 45(C1) TJ	FDB-4(19)	SS	3	10	340
1467	Tank 46(C1) VN	FDB-4(18)	SS	3	10	685
1468	Tank 47 (C1)	FDB-4(17)	SS	3	10	826
1472	FDB-3(10)	FDB-4(8)	SS	3	10	150
1475	#100 (221F)	FPP-3(1)	SS	3	6	434
1476	#103 (221F)	FPP-3(2)	SS	3	10	650
1478	#101 (221F)	FPP-2(1)	SS	3	10	650

Table 3.2-3: FTF Transfer Line Segment Listing (Continued)

Line No.	From (b)	To	Core Material (c)	Core Diameter (inches)	Jacket Diameter (inches)	Line Length (ft)
1488 (115)	#102 (221F)	FPP-2(2)	SS	3	6	161
3260	FDB-6 sump	FPP-3(3A)	SS	3	6	248
3261	Tank 33(C2) VN	FDB-5 (3)	SS	2	6	141
3265	FDB-5(1)	242-3F CTS	SS	2	8	1910
3265-B	242-3F CTS	Tanks 33 and 34	SS	2	8	22
3266 (via 177A)	242-F Evap.	FDB-6(5)	SS	3	6	324
3267	Tank 7 (1) VN	FDB-6(1)	SS	3	6	192
3273	Tank 25(C2) VN	FDB-5(10)	SS	2	6	393
3274	FDB-5 Waste drain	FPP-2(3)	SS	3	6	124
3275	242-3F CTS	FDB-5(2)	SS	2	8	1910
3275-B	242-3F CTS	Tanks 33 and 34	SS	2	8	22
3276	Tank 34 (C2) VN	FDB-5(4)	SS	2	6	141
3277 (via 177A)	FDB-6(6)	242-F Evap.	SS	3	6	324
3278	FDB-6(2)	Tank 7(1) VN	SS	3	6	192
3279	FDB-6(3)	FPP-3(3)	SS	3	6	248
3751	#520	#3754	SS	3	6	2
3752	#210	#3754	SS	3	6	2
3753	#521	#3754	SS	3	6	2
3754	#515	#109 & #3755	SS	3	6	55
3755	#109 & #3754	#103	SS	3	6	3
4878	Tank 17 (R) TTP	Tank 18(W)	SS	3	4	112
5016	Tank 18 (NE) TTP	#118	SS	3	4	54
9000	#9001	#9	CS	2	N/A	2
9001	Tank 18 (W)	#9000	CS	3	4	108
9852	Tank 20(NW) Valve box	Tank 18	SS	4	6	8

Table 3.2-3: FTF Transfer Line Segment Listing (Continued)

Line No.	From (b)	To	Core Material (c)	Core Diameter (inches)	Jacket Diameter (inches)	Line Length (ft)
16030	Tank 8 (6)	#515	SS	3	4	20
16075	Tank 8 (6)	LDB-17	SS	3	4	8
16076	LDB-17	#515	SS	3	4	12
17015	Tank 7(4) TTP	#110	SS	3	6	96
GDL (3-8)	242-F Evap	Tank 17 through 20	SS	3	12	36
Misc-1	Tank 19	Tank 18	SS	3	4	144
Misc-2	Tank 17	Tank 18	SS	3	4	106

a. These are Type I transfer lines, which are enclosed in a shared reinforced concrete encasement rather than individual jackets.
b. Number in "( )" is riser or nozzle identifier.
c. SS = Stainless Steel, CS = Carbon Steel.

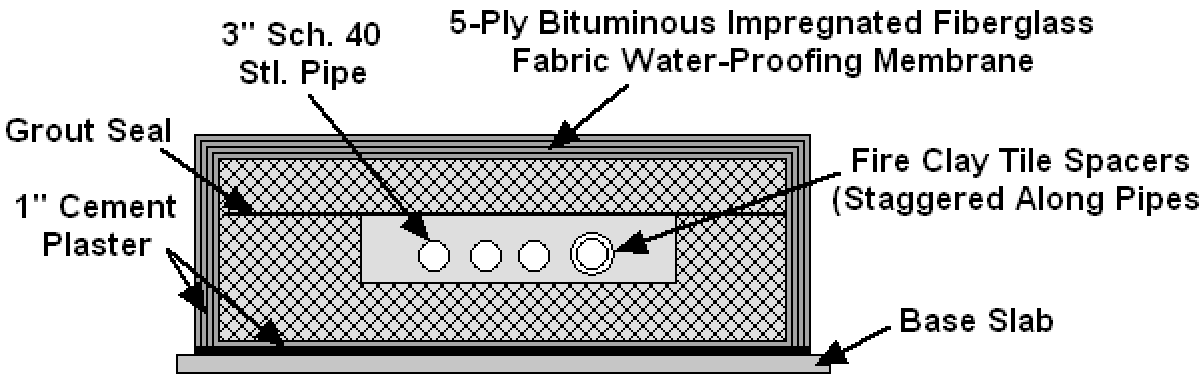
Figure 3.2-35: Transfer Line Construction Near Tanks 44 and 45

Figure 3.2-36: Transfer Line Construction Near Tanks 46 and 47

The following types of transfer lines exist in the FTF (it should be noted that designation of transfer line type and waste tank type are not related):

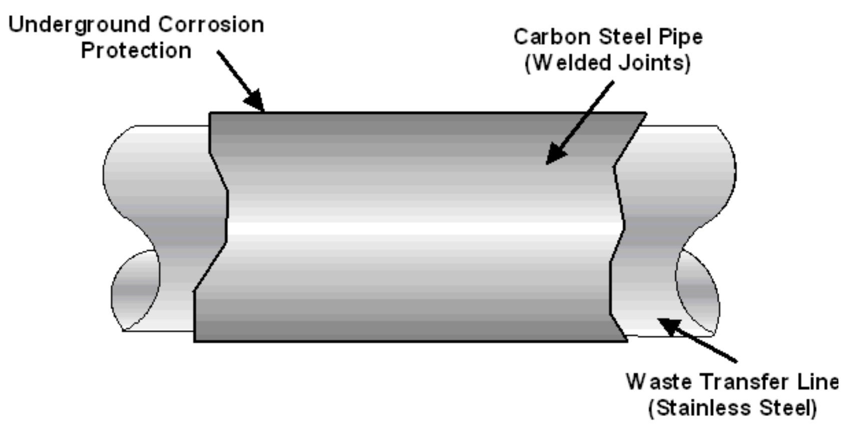
Type I Transfer Line - The core pipe is constructed of stainless steel, which is enclosed in a covered reinforced concrete encasement below ground (e.g., transfer lines from FDB1 to Tanks 1 through 8) (Figure 3.2-37). Core pipe leakage into the encasement and in-leakage of groundwater into the encasement will gravity drain to the catch tank. The catch tank is described later in this section.

Figure 3.2-37: Type I Line Encasement (Sealed Concrete Trench)



Type II Transfer Line - The core pipe is stainless steel inside a carbon steel jacket (Figure 3.2-38). Pipe joints are typically welded and leak tested. Most jackets are encased in insulation. The portion of the carbon steel pipe in contact with the soil is protected against corrosion with polyethylene film wrap or bituminous coating. Type II transfer lines are the most common type of transfer lines in use.

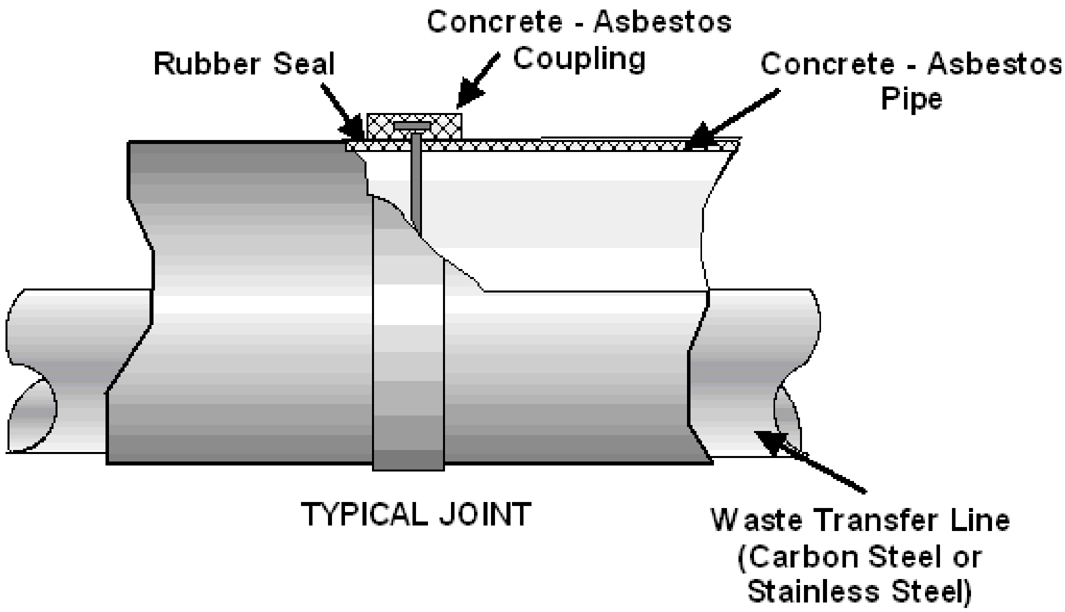
Figure 3.2-38: Type II Line Carbon Steel Jacket



Type IIA Transfer Line - Type IIA lines are similar to Type II except that both core pipe and jacket are of carbon steel. In FTF, this type of line is only used at Tanks 18 and 19 transfer pump risers.

Type III Transfer Line - The core pipe is stainless steel within a cement-asbestos secondary containment with rubber seals in the joints between the sections of cement-asbestos (Figure 3.2-39).

Figure 3.2-39: Type III or Type IIIA Line Concrete Asbestos Jacket



Type IIIA Transfer Line - Type IIIA lines are the same as Type III lines, except the core pipe is made of carbon steel and includes some special end seals and transition pieces.

Type IV Transfer Line - Type IV lines are similar to Type II except that both the core pipe and jacket are stainless steel. This type of line is used for the GDLs within the 242-16F Evaporator cell. Beyond the cell wall, the GDLs transition into Type II transfer lines.

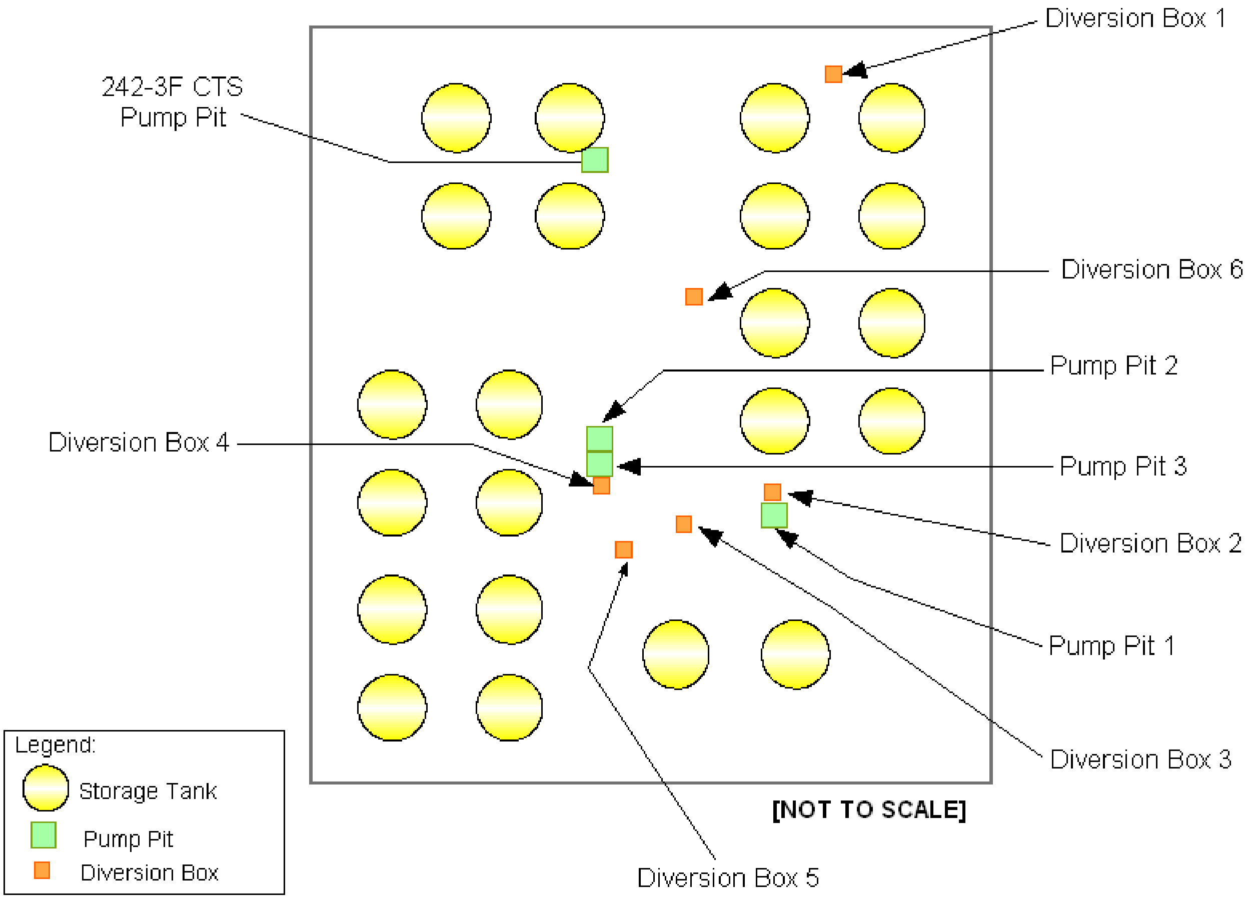
Type V Transfer Line - A Type V transfer line consists of an exposed stainless steel transfer line. Some Type V lines are encased in polyethylene radiation containment. These transfer lines are used within the processing facilities to interconnect pieces of process equipment.

Type VI Transfer Line - Type VI transfer lines are designed to transfer evaporator overheads to and from the CRC. These lines do not have secondary containment because the evaporator overheads do not contain sufficient amounts of contaminants.

3.2.2.2 Pump Pits and Pump Tanks

Pump Pits are shielded reinforced concrete structures located below grade at the low points of transfer lines and are usually lined with stainless steel. PP walls are approximately 2 to 3 feet thick (2 feet – 1 inch minimum), sloped floors are approximately 3 feet thick (2 feet – 9 inch minimum), and cell covers are concrete slabs approximately 2 to 3 feet thick. [W701904] All PPs house a pump tank with the PPs providing secondary containment for pump tanks. See Figure 3.2-40 for locations of the PPs (and DBs) relative to other tank farm components.

Figure 3.2-40: Pump Pit and Diversion Box Locations



The PPs are often constructed in conjunction with a DB, (DBs are discussed in detail later in this section). A typical DB/PP configuration is depicted in Figure 3.2-41. Figure 3.2-42 shows FDB-4/FPP-2/FPP-3 during a concrete construction phase, before the surrounding area has been backfilled. Figures 3.2-43 and 3.2-44 show the FPP-2 concrete vault during construction.

Figure 3.2-41: Typical Diversion Box and Pump Pit Design

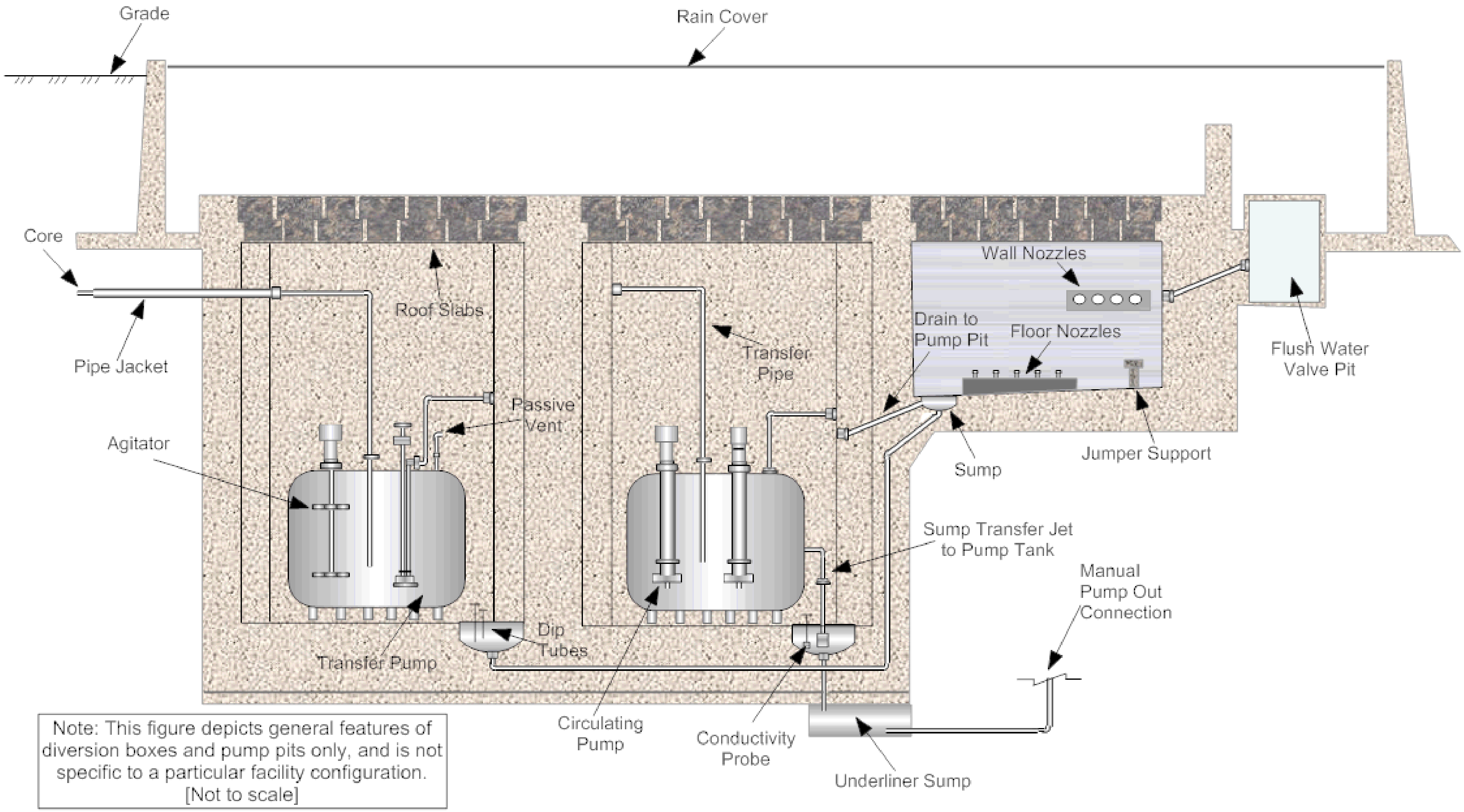


Figure 3.2-42: FDB-4, FPP-2 and FPP-3 During Construction

Figure 3.2-43: FPP-2 Concrete Vault During Construction (View 1)

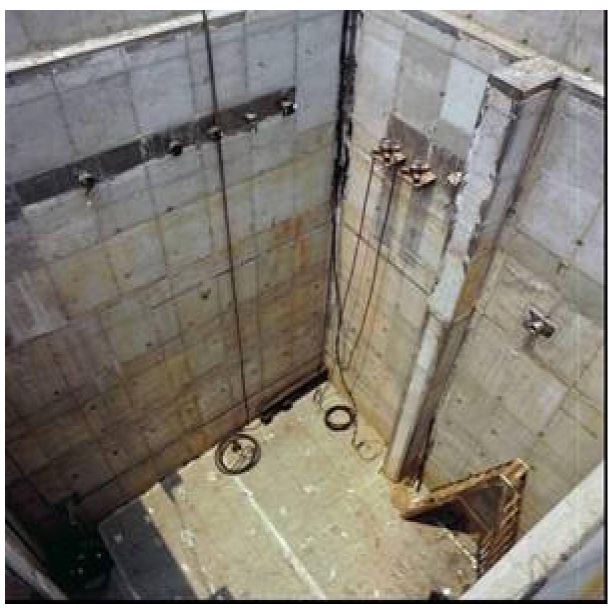


Figure 3.2-44: FPP-2 Concrete Vault During Construction (View 2)

There are three pump tanks in FTF: FPT-1, FPT-2, and FPT-3. The principal reference drawings for the pump tanks are D116850 (FPT-1) and BPF-212512-Sh 1 (FPT-2 & 3). The pump tanks have a nominal capacity of ~7,200 gallons each. The pump tanks installed in FTF are all of the same basic size (8.5 feet tall, 12 feet in diameter). Figure 3.2-45 shows the PP concrete vault after the steel lining has been installed. Figure 3.2-46 shows a top view of a pump tank during PP construction.

Figure 3.2-45: Pump Pit Vault After Steel Liner Installation

Figure 3.2-46: Pump Tank Top View During Construction

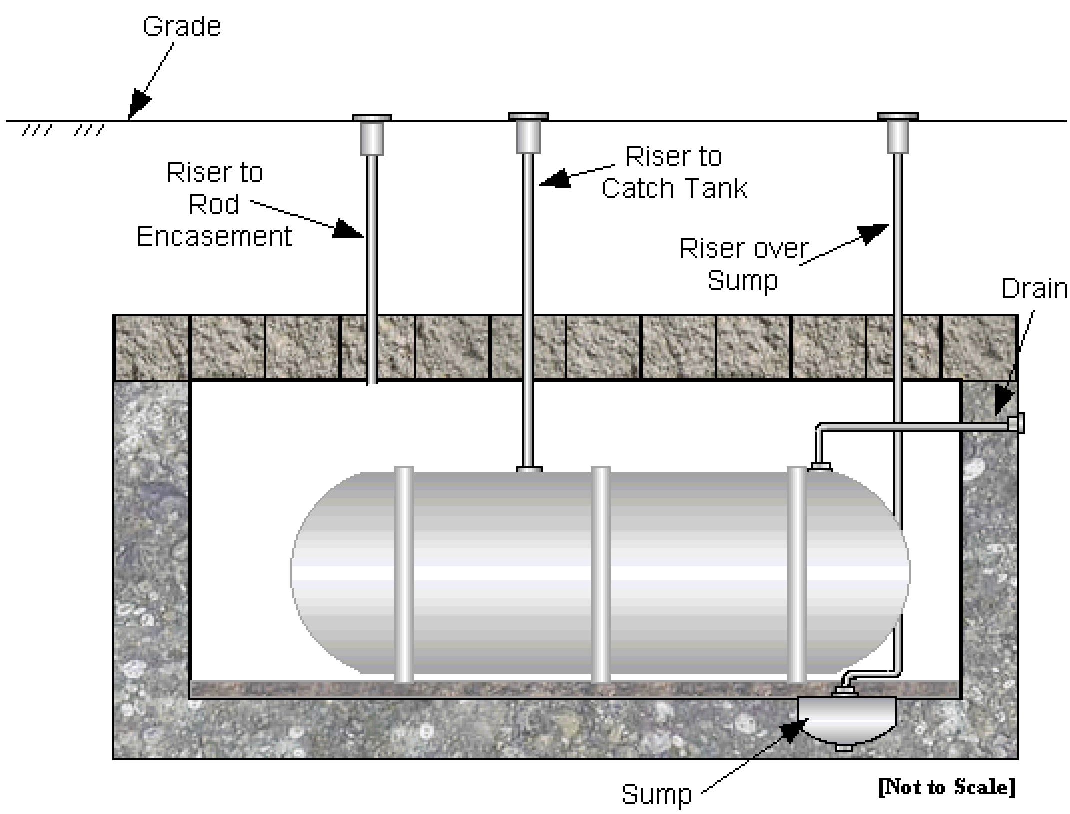
The following is a description of the features of the PPs and pump tanks.

- **FPP-1/FPT-1 —** FPP-1 has a volume of approximately 33,000 gallons. FPT-1 serves as the inter-area pump tank. FPP-1 design details are shown in drawing W236676.
- **FPP-2/FPT-2 and FPP-3/FPT-3** — These PPs have volumes of approximately 37,400 gallons. FDB-4 is connected through vent and drain slots to the adjacent FPP-2. FPP-3 is connected through a pipe chase to the adjacent FPP-2. The FPP-2 and FPP-3 underliners drain to the FPP-2 underliner sump. These pump tanks received waste transfers from the F-Canyon Facility. FPP-2/-3 design details are shown in drawings W701347 and W700839.

3.2.2.3 Catch Tank

There is a single catch tank in FTF (Figures 3.2-47 and 3.2-48) designed to collect drainage from FDB-1 and the Type I tank transfer line encasements. The stainless steel catch tank is approximately 11,700 gallons and is located in an underground reinforced concrete cell. The catch tank encasement has walls over 3 feet thick and is built on a 4 inch thick concrete pad. [W146075]

Figure 3.2-47: Catch Tank Cross Section



[W146075]

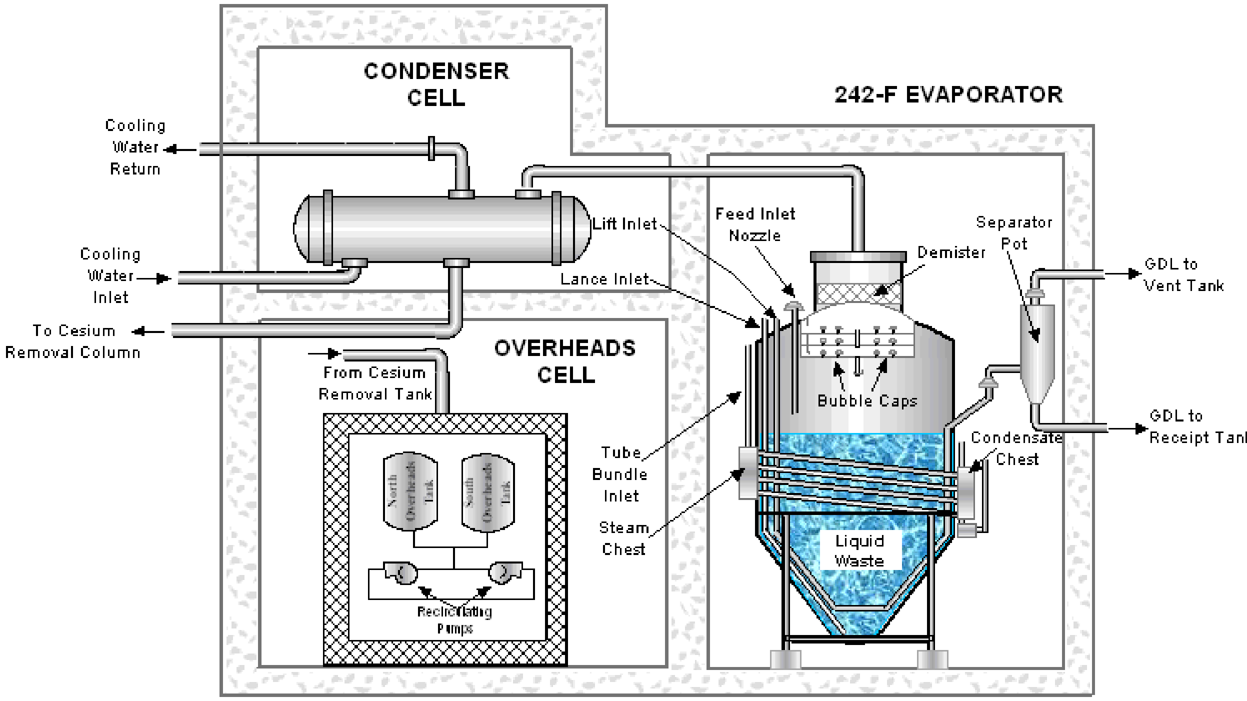
Figure 3.2-48: F-Area Catch Tank During Construction

3.2.2.4 Evaporator Systems

There are two evaporator systems in the FTF, the 242-F Evaporator system (Figures 3.2-49, 3.2-50 and 3.2-51) and the 242-16F Evaporator System (Figure 3.2-52). The evaporators are used to reduce the amount of liquid volume of radioactive waste resulting from nuclear processes. The evaporator systems are principally comprised of the Evaporator, the Overheads System, and the Condenser. The 242-F Evaporator System also included the 242-3F CTS, which was used to distribute evaporator bottoms throughout FTF. The 242-F Evaporator facility was constructed and placed into service in 1960 and was removed from service in 1988. The 242-16F Evaporator facility was constructed in 1980 and continues to operate.

242-F Evaporator design information is provided in CBU-PIT-2006-00013 (pages 2-11). 242-16F cell and 242-16F evaporator pot design details are shown in drawings W230843 and W703793.

Figure 3.2-49: 242-F Evaporator System Schematic

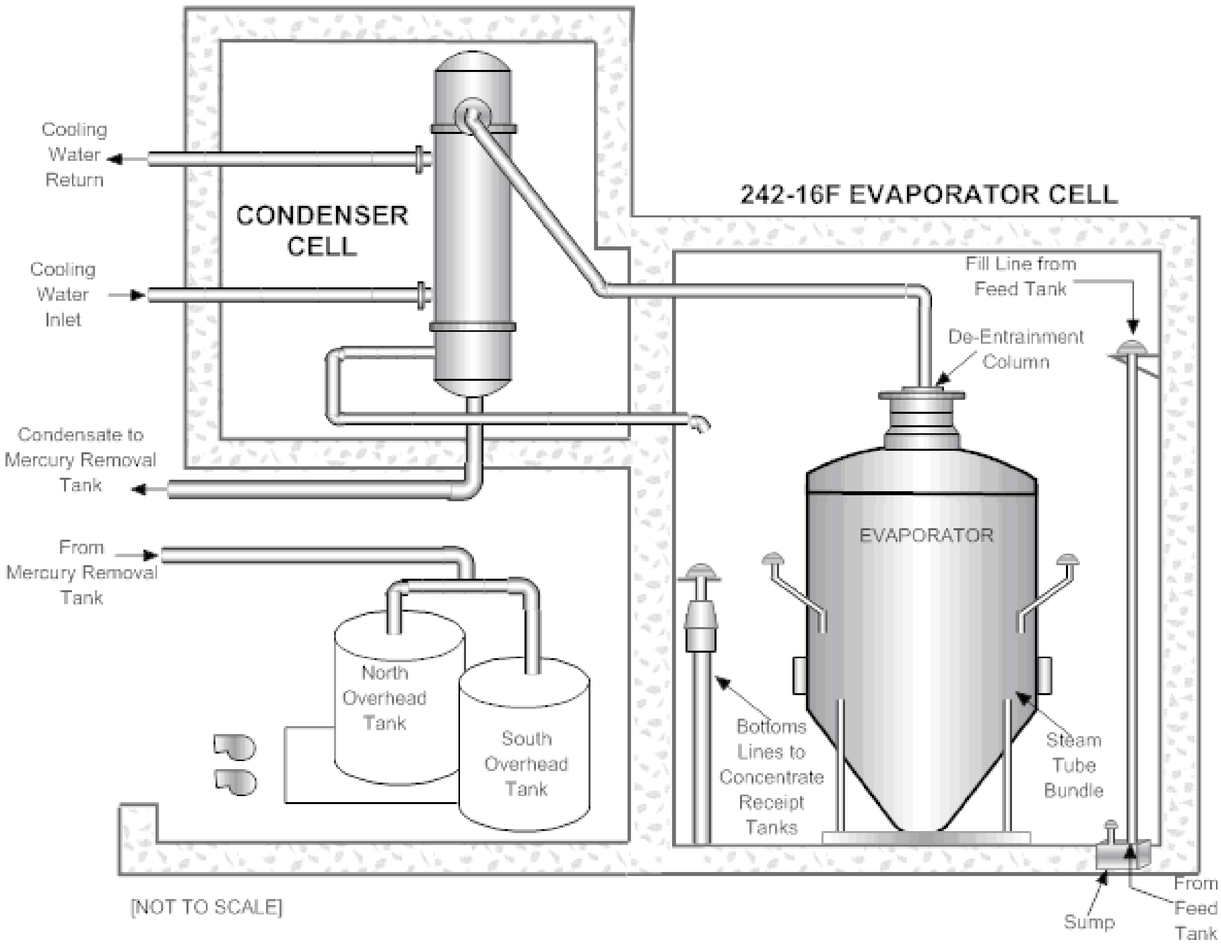


[W230843, W703793]

Figure 3.2-50: 242-F Evaporator Vessel (Top View)

Figure 3.2-51: 242-F Evaporator CTS Pit and Tank

Figure 3.2-52: 242-16F Evaporator System Schematic



3.2.2.4.1 242-F Evaporator System

The 242-F evaporator cell is a cuboid with a 16 feet x 15 feet base and a height of 25 feet (Figure 3.2-49). The cell includes a floor sump measuring 2 feet x 2 feet x 2.5 inches deep. The cell provided containment for the evaporator and served as shielding for personnel protection. The cell includes a stainless steel liner.

3.2.2.4.1.1 242-F Evaporator Pot

The evaporator pot, located inside the 242-F evaporator cell is a stainless steel cylindrical vessel with a cone bottom. The cylindrical portion is 8 feet in diameter and 8 feet – 9.75 inches high. The cone has a maximum diameter of 8 feet, and is 5 feet – 11 inches in height. The evaporator was used to concentrate liquid by evaporating water from the waste in order to reduce waste volumes.

3.2.2.4.1.2 242-F Overheads Systems

The receiver cell is a cuboid with a 15 feet x 9 feet x 8 inch base and a height of 6 feet – 4 inches. The receiver cell includes a floor sump, with the sump having a 1.5 foot x 1.5 foot base x 1.5 foot depth. The receiver cell provided containment for the two overheads tanks. The North and South overheads tanks, located inside the 242-F Receiver Cell, are each cylindrical stainless steel vessels having a diameter of 6 feet and a height of 6 feet. The overheads tanks functioned as receipt tanks for liquids condensed from evaporator vapors. The 242-F condenser is a stainless steel cylindrical vessel with an OD of 18 inches and a height of 9 feet – 10.25 inches. The condenser functioned to condense evaporator vapors into liquid, which was drained to the North and South overheads tanks.

3.2.2.4.1.3 242-F CTS System

The concentrate from the 242-F evaporator was steam lifted to the CTS to prevent the concentrate from forming salt and solidifying in the evaporator system. The CTS draw-off pump circulated the concentrate continuously through a loop line to the concentrate receipt tanks. Various tanks have served as concentrate receipt tanks over the service life of the 242-F evaporator system. When concentrate reached a predetermined level in the CTS tank, a drop valve opened to add the concentrate to a receipt tank.

The CTS Pit is a cuboid having a 12 foot x 12 foot base x 21 foot height. The pit includes a floor sump having a 1.5 foot x 1.5 foot base x 1.5 foot depth. The CTS Pit provided containment for the CTS tank and featured a stainless steel liner. Cell covers provide personnel protection. The stainless steel CTS tank, located inside the 242-3F CTS Pit, is a cylindrical vessel with a diameter of 8 feet and a height of 8 feet – 4 inches. The CTS tank functioned as a pump reservoir for transferring concentrated waste received from the evaporator to underground storage tanks within FTF.

3.2.2.4.2 242-16F Evaporator System

The 242-16F Evaporator facilities are arranged into three cells and a gang valve house. The evaporator cell contains the evaporator; the condenser cell contains the condenser; and a diked overheads cell contains overheads system components other than the condenser (Figure 3.2-52). Figure 3.2-53 shows the evaporator cell during a late concrete construction phase, but before the surrounding area has been backfilled. Initial construction (e.g., basemat and bottom liner work) on several Type IIIA tanks can be seen in the background with later construction (e.g., concrete side wall framing) under way in the right foreground on a single Type IIIA tank.

Figure 3.2-53: 242-16F Evaporator Cell Later Construction Phase

The evaporator cell is 16 feet x 16 feet x 25 feet high with walls constructed of stainless steel lined, grooved concrete that is 3.5 feet thick and a 2 foot thick roof, composed of concrete slab sections and a sloped, galvanized-steel rain cover. The concrete slab sections and the rain cover have access ports for valves and viewing. The evaporator cell is stainless steel-lined for collecting leakage from equipment inside the evaporator or condenser cells, leakage from the lift/lance/evaporator cell sump gang valve vent header, and liquid from cell spray operations. An evaporator underliner sump collects any leakage through the concrete or stainless steel liner.

The condenser cell is 9 feet x 10 feet x 14 feet high with walls constructed of concrete and has a roof composed of concrete slab sections and a sloped, galvanized-steel rain cover. The concrete slab sections and the rain cover have access ports for viewing. The condenser cell contains a stainless steel liner pan on a sloped floor. The condenser cell has an opening to the evaporator cell. The de-entrainment column piping enters the condenser cell through this opening, which also permits airflow to the evaporator cell.

The overheads cell (which is open to the environment) contains the mercury removal tank, CRC feed tank, two CRC pumps, two overheads tanks, an Overheads Tank sample system, filters for removing zeolite from condensate, CRC gamma monitors, CRC charging jet, and two overheads pumps.

3.2.2.4.2.1 242-16F Evaporator Vessel/Pot

The 242-16F evaporator vessel has a capacity of approximately 4,400 gallons. The insulated vessel is 8 feet in diameter and 16.5 feet in height, with a cone-shaped bottom. The vessel is constructed of 0.5 inch 304L stainless steel. There are multiple evaporator vessel service/equipment lines installed in, or penetrating, the vessel, including the feed inlet nozzle, steam tube bundle, warming coil, lift lines, de-entrainment column, lance lines, and the seal pot.

3.2.2.4.2.2 242-16F Overheads System

The 242-16F overheads system includes the condenser, mercury removal tank, CRC feed tank, two CRC pumps, two overheads tanks, and two overhead pumps. The condenser is a vertical, single-pass, counter-flow tube and shell type heat exchanger located in the condenser cell. The mercury removal tank receives condensed overheads from the condenser. When full, the stainless steel tank overflows to the CRC feed tank, permitting the heavier mercury to settle out and remain in the tank. The tank vents to the condenser cell, which vents and drains to the evaporator cell. The path from the evaporator vessel to the overheads tanks travels through a stainless steel CRC feed tank. The overheads tanks are constructed of stainless steel and are 6 feet in diameter by 6 feet in height. A 2 inch overheads tanks overflow line is routed to the cell sump.

3.2.2.5 Diversion Boxes, Valve Boxes, etc.

Diversion Boxes are shielded reinforced concrete structures containing transfer line nozzles to which jumpers are connected in order to direct waste transfers to the desired location. The DBs are often constructed in conjunction with a PP (A typical DB/PP configuration is depicted in Figure 3.2-41). Figure 3.2-42 shows FDB-4/FPP-2/FPP-3 during a concrete construction phase, before the surrounding area has been backfilled. Figures 3.2-54 and 3.2-55 show the FDB-4 concrete vault interior during construction.

Figure 3.2-54: FDB-4 Concrete Vault During Construction (View 1)

Figure 3.2-55: FDB-4 Concrete Vault During Construction (View 2)

The majority of the DBs are located below ground and are either stainless steel lined or sealed with water proofing compounds to prevent ground contamination. Walls are approximately 2 to 3 feet thick and sloped floors are approximately 3 feet thick. DBs have concrete slab-type cell covers, approximately 2 to 3 feet thick that must be removed for changing jumper alignment. Figure 3.2-56 shows FDB-5 during concrete construction phase, with wooden framing and rebar being installed in anticipation of the concrete pour for the side walls. Figure 3.2-57 shows a DB exterior during a later concrete construction phase, before the surrounding area has been backfilled. Figure 3.2-58 shows a DB interior after installation of the stainless steel liner.

Figure 3.2-56: Diversion Box Early Construction Phase

Figure 3.2-57: Diversion Box Later Construction Phase

Figure 3.2-58: Diversion Box Stainless Steel Liner Installation

The following is a description of some of the features associated with the FTF DBs:

- **FDB-1 —** FDB-1 drains to the F-Area Catch Tank and vents to Tank 7. The interior of the DB is painted with chemical-resistant paint and sealer. FDB-1 has no sump. [W146968]
- **FDB-2 —** FDB-2 has a total volume of approximately 8,300 gallons. FDB-2 is ventilated through a vent duct to the adjacent PP (F-Area PP [FPP]-1). Leakage into the FDB-2 sump drains into FPP-1 through an opening in the sump. FDB-2 is the connection point from FTF to the Inter-Area Line (IAL). [W236676]
- **FDB-3 —** FDB-3 has a total volume of approximately 1,900 gallons. The DB is stainless steel lined and has a sump that gravity drains to FDB-2. [D146352]
- **FDB-4 —** FDB-4 has a total volume of approximately 21,700 gallons with an underliner. FDB-4 is ventilated through openings (vent and drain slots, and through the pipe chase) to the adjacent FPP-2 and FPP-3. The DB is stainless steel lined and has a sump that gravity drains into FPP-2. [W701347 and W700839]
- **FDB-5 —** FDB-5 was installed to connect the CTS with waste Tanks 25 through 28 or Tanks 33 through 34. The DB is stainless steel lined and has a sump that gravity drains to FPP-2. [W702452]
- **FDB-6 —** FDB-6 was installed so that the 242-F evaporator could be fed from Tank 26 as well as from Tank 7. The DB is stainless steel lined and has a sump that gravity drains to FPP-3. [W702275]

The High Point Flush Pit, located between FTF and HTF, provides a point to introduce flush water into the IAL between the tank farms. The High Point Flush Pit is outside the scope of the FTF PA.

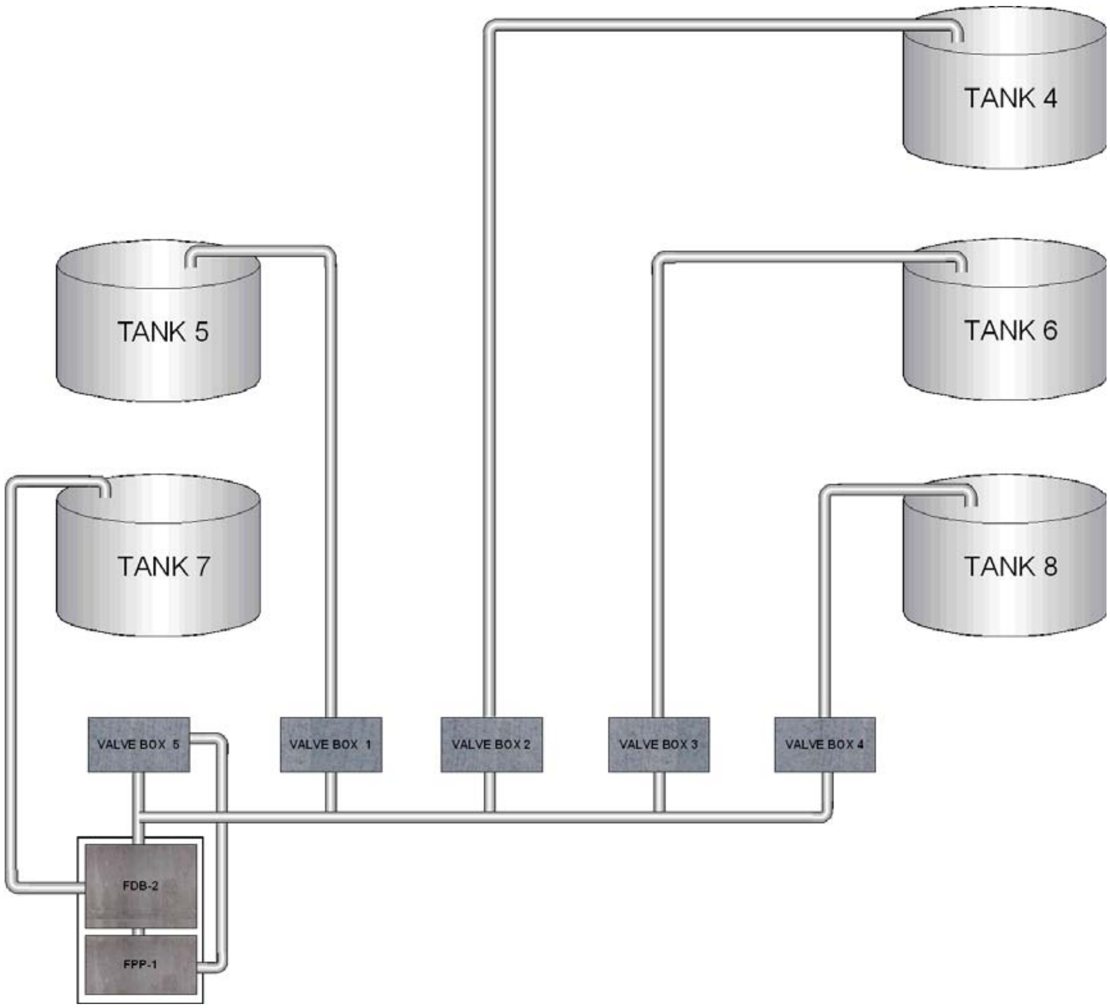
3.2.2.5.1 Transfer Valve Boxes

Transfer valve boxes facilitate specific waste transfers that are conducted frequently. The valves are generally manual ball valves in removable jumpers with flush water connections on the transfer lines. Leakage collects in the valve box and drains back to the associated waste tank, DB, LDB, or LDB Drain Cell. Valve boxes are generally located adjacent to the tanks they serve and are designated accordingly.

3.2.2.5.1.1 Valve Boxes 1 through 5

These valve boxes facilitate transfers between FDB-2, FPP-1 and Tanks 4 through 6 and 8 (Figure 3.2-59). Valve Boxes 1 through 4 have approximate volumes of 330 gallons, while Valve Box 5 is slightly larger at approximately 380 gallons. Valve Box 1 through 5 design details are shown in drawings D181085 and D187892.

Figure 3.2-59: Valve Boxes 1 through 5 Connections to FDB-2



[M-M6-F-3289]

3.2.2.5.1.2 LDB-17 Valve Box

This valve box has an approximate volume of 140 gallons and facilitates Tank 8 transfers. Leakage in LDB-17 drains back to a riser on Tank 8.

3.2.2.5.1.3 Valve Boxes 28A and 28B

Valve Box 28A is located on the top of Tank 28 and has an approximate volume of 450 gallons. Valve Box 28B is adjacent to Tank 28 and has an approximate volume of 365 gallons. Leakage to Valve Box 28B drains to LDBs and the LDB drain header. Valve Box 28A drains back to Tank 28. Valve Boxes 28A and 28B, together, are commonly referred to as Valve Box 28. Valve Box 28A and 28B design details are shown in drawings D199424, D199430, D199421, D199425, and W819641.

3.2.2.6 Other Ancillary Equipment

Leak Detection Boxes provide for the collection and detection of leakage from the transfer line (Figures 3.2-60 and 3.2-61). Drain piping can be run from a transfer line jacket to an LDB, as shown in Figure 3.2-62. LDB design details are shown in drawing W715343. The LDBs have conductivity probe leak detection and drain and overflow plugs. Drain piping for the LDBs is provided so that leaks are diverted to the evaporator cell sump, or to a DB, PP, or drain cell. No leakage into transfer line secondary containment (e.g., transfer line jacket and LDB) due to primary line failure has been detected.

MLDBs serve the same purpose as the LDBs but are larger and are installed at low points that cannot be gravity drained to a collection point. In addition to a conductivity probe, MLDBs also include a vent line to a DB or PP, an above ground pressure gage to monitor for potential over-pressurization, and a smear/cleanout pipe for measuring level and manual pump-out of leakage into the box. MLDB design details are shown in drawing W702976.

Figure 3.2-60: LDB Detail from W715343

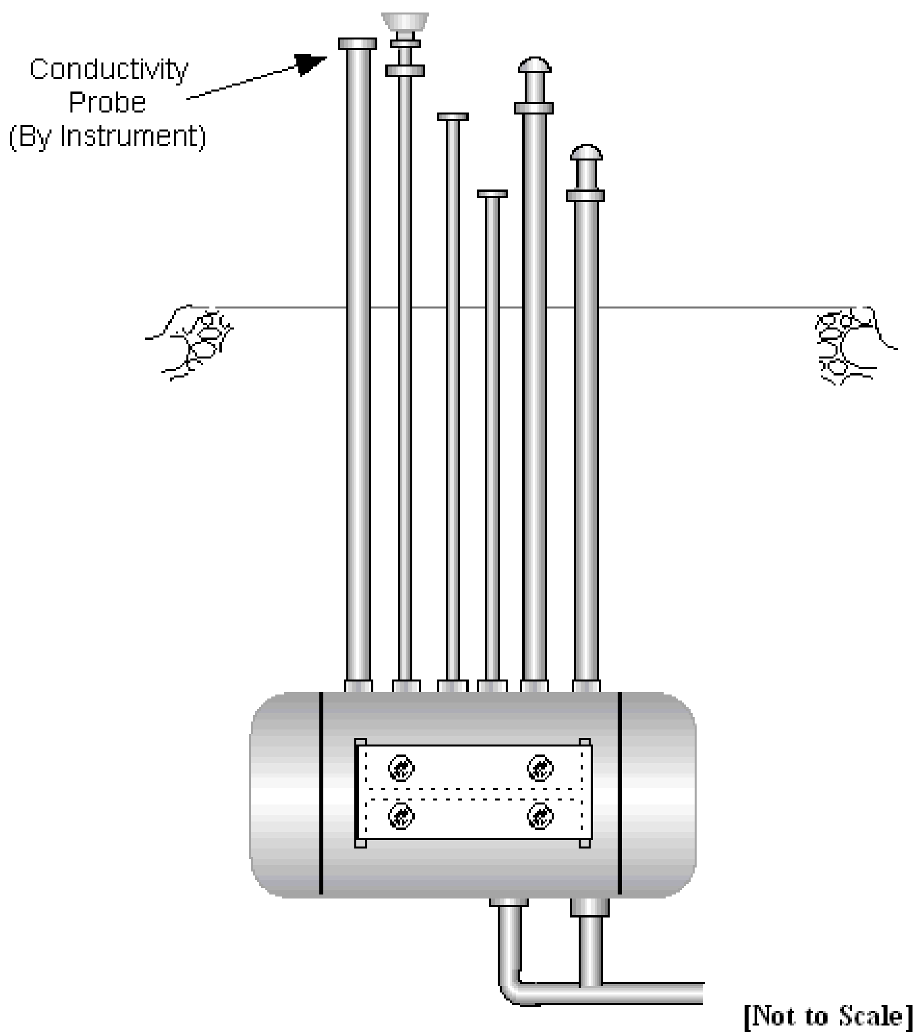
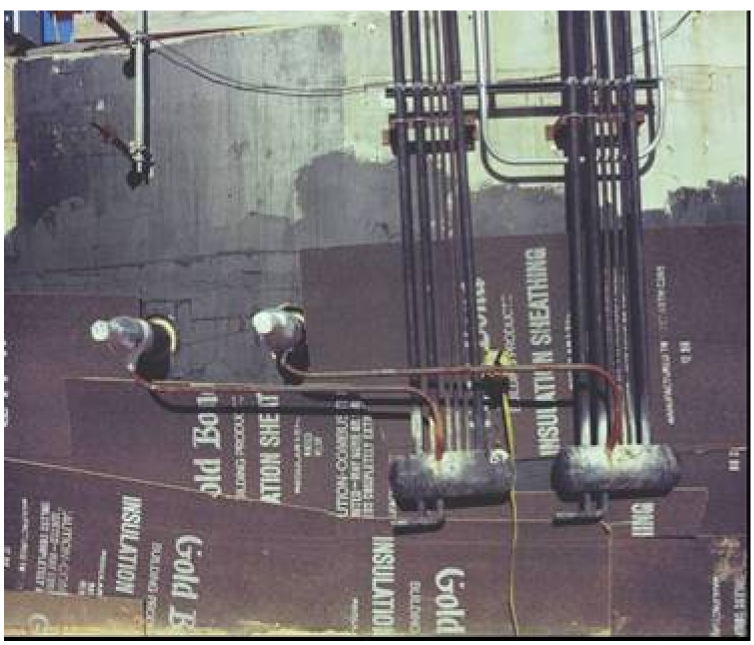


Figure 3.2-61: Typical LDB During Construction

Figure 3.2-62: LDBs with Connection to Transfer Line Jacket Shown



3.2.2.6.1 Water Infiltration through Ancillary Equipment

There are multiple elements of the FTF design that will serve to minimize water infiltration through ancillary equipment. The steel wall liners will serve to significantly retard water flow into ancillary equipment. The design features assumed in FTF modeling are described in detail in Section 4.2.3.2. In addition, the ancillary equipment will be covered by the FTF closure cap (Section 3.2.4) which will further serve to limit the amount of water infiltration into any residual contamination remaining in the ancillary equipment.

3.2.2.6.2 Ancillary Equipment Structural Stability/Degradation

The structural stability of the ancillary equipment is provided by the steel wall liners and surrounding concrete vaults (as applicable to the particular piece of ancillary equipment described previously). The impact of ancillary equipment degradation (e.g., corrosion leading to failure of the stainless steel liner) was considered in FTF modeling, and is described in detail in Section 4.2.3.2.

3.2.2.6.3 Ancillary Equipment as Inadvertent Intruder Barrier

The FTF closure cap, which covers all of the ancillary equipment, will serve as a deterrent to the inadvertent intruder, as will the concrete structures that house the ancillary equipment vessels (i.e., evaporator cells, PPs, catch tank cell) and the steel walls of the structures themselves. For the purpose of modeling, the presence of the earthen cover and the transfer line walls was not assumed to prevent an inadvertent intruder from contacting the stabilized contaminant form during Well-drilling. Section 4.2.4 contains a more detailed discussion of the inadvertent intruder and which exposure scenarios are considered credible based on the FTF ancillary equipment design.

3.2.3 Tank Grouting

In May 2002, DOE issued an EIS on tank cleaning and stabilization alternatives. [DOE-EIS-0303] DOE studied five alternatives:

1. Empty, clean and fill with grout,
2. Empty, clean and fill tank with sand,
3. Empty, clean and fill tank with saltstone,
4. Clean and remove tanks, and
5. No action.

The EIS concluded the Fill with Grout option under the Stabilize Tanks Alternative was preferred. DOE also issued a ROD selecting the Fill with Grout alternative for SRS tank closure. [DOE-EIS-0303 ROD]

Evaluations described in the EIS showed the Fill With Grout alternative to be the best approach to minimize human health and safety risks associated with closure of the tanks. [DOE-EIS-0303] This alternative offers several advantages over the other alternatives evaluated such as:

- Provides greater long-term stability of the tanks and their stabilized contaminants than the sand-fill approach;
- Provides for retaining radionuclides within the tanks by use of reducing agents in a fashion that the sand-fill would not;
- Avoids the technical complexities and additional worker radiation exposure that the fill-with-saltstone approach would entail;
- Produces smaller impacts due to radiological contaminant transport than the sand- and saltstone-fill alternatives,
- Avoids the excessive personnel radiation exposure and greater occupational safety impact that would be associated with the clean and remove alternative. [DOE-EIS-0303]

Cementitious materials are often used to stabilize radioactive wastes. Grout has been one of the most commonly used materials for solidifying and stabilizing radioactive wastes, and the technology is at a mature stage of development. The purpose of this stabilization is to maintain tank structure and minimize water infiltration over an extended period of time, thereby impeding release of stabilized contaminants into the environment. Grout is a mixture of primarily cement and water proportioned to produce a pourable consistency. Recent studies focus on improving grout production and batching, grout flow, measurement of the effective diffusion coefficients in reducing fill grout and measurement of hydraulic properties. [WSRC-STI-2007-00369]

Filling a cleaned tank with grout prevents the walls and ceiling from possibly collapsing. The grout fill also helps to reduce water intrusion into the tank over time. Reducing the amount of water allowed to enter a closed tank retards the migration of residual radioactivity from the tank to the environment. Testing has demonstrated the chemical and physical characteristics of the grout formula used at SRS retards the movement of radionuclides. [WSRC-TR-97-0102]

The fill grout is reducing grout, which has low redox, or oxidation potential (E_h), which minimizes the mobility of the radionuclides after closure. All grout formulas are alkaline because grout is a cement based material that naturally has a high pH to be compatible with the carbon steel of the tank. Grout has a high compressive strength and low permeability, which enhances its ability to limit the migration of contaminants after closure. The grout formulas must be flowable to allow a near level placement.

Alternative fill materials are being evaluated to obtain a preferred grout mix for the tanks. [WSRC-STI-2007-00369] Tanks 17 and 20 were closed using three different types of grout in a three-layer configuration. A combination of admixtures was required to achieve the desired properties in the reducing grout layer. The grout mixes contain ample reducing and alkaline properties to meet the chemistry requirement for stabilizing contaminant waste. The compressive strength of the intruder or strong grout is sufficient to provide a physical barrier to discourage intruders and also to meet the placement requirements for filling the domes of

Type IV tanks only. Additionally, selected equipment already in the tank is to be grouted in place.

3.2.3.1 Tank Grouting Plan

Independent testing determined that certain recipes of grout provide a superior protection for any stabilized contaminant that might remain in the tank. [WSRC-STI-2007-00369] This PA shows that adding grout results in a longer retention time for radioactivity within the tank. Radionuclides decay over time, so the longer the movement of radionuclides can be delayed from migrating into the environment, the greater the protection provided.

Closure of the FTF waste tanks is modeled after the approach used on Tanks 17 and 20. [PIT-MISC-0002, *http://soildatamart.nrcs.usda.gov/Manuscripts/SC696/0/savannah.pdf*] For Type IV tanks, placement of the grout can be through risers in each quadrant of the tank and/or the central riser. [WSRC-RP-2005-01684] Figures 3.2-63 through 3.2-66 illustrate the typical grouted configurations for Type I, III, IIIA and IV tanks.

Figure 3.2-63: Typical Type I Tank Grout Configuration

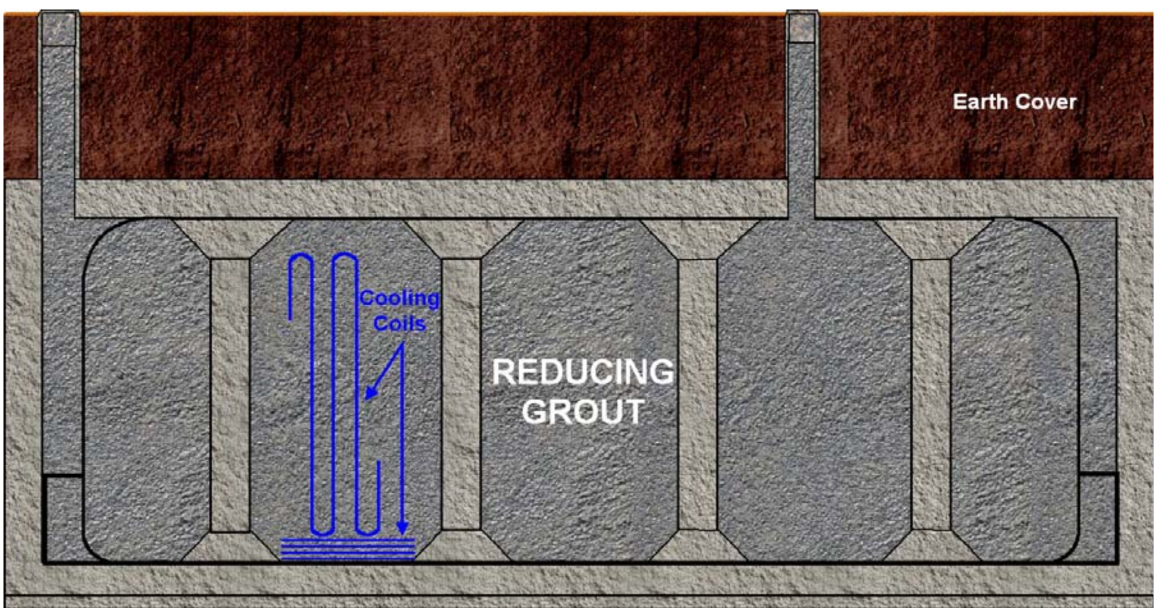


Figure 3.2-64: Typical Type III Tank Grout Configuration

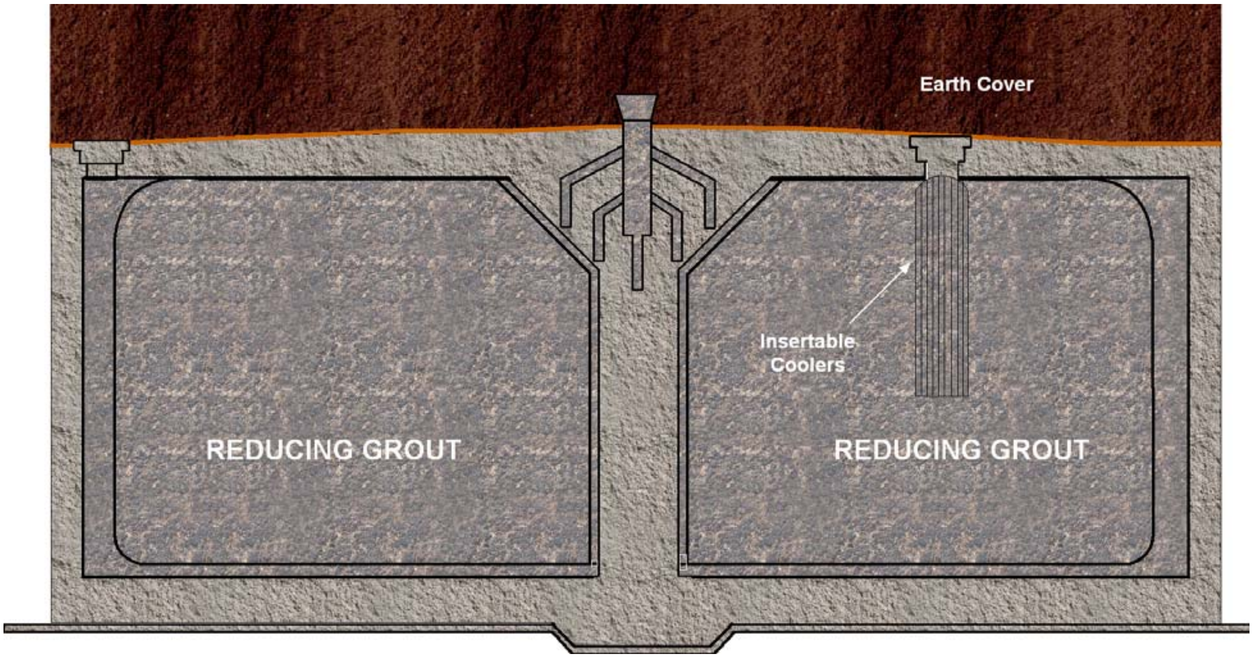


Figure 3.2-65: Typical Type IIIA Tank Grout Configuration

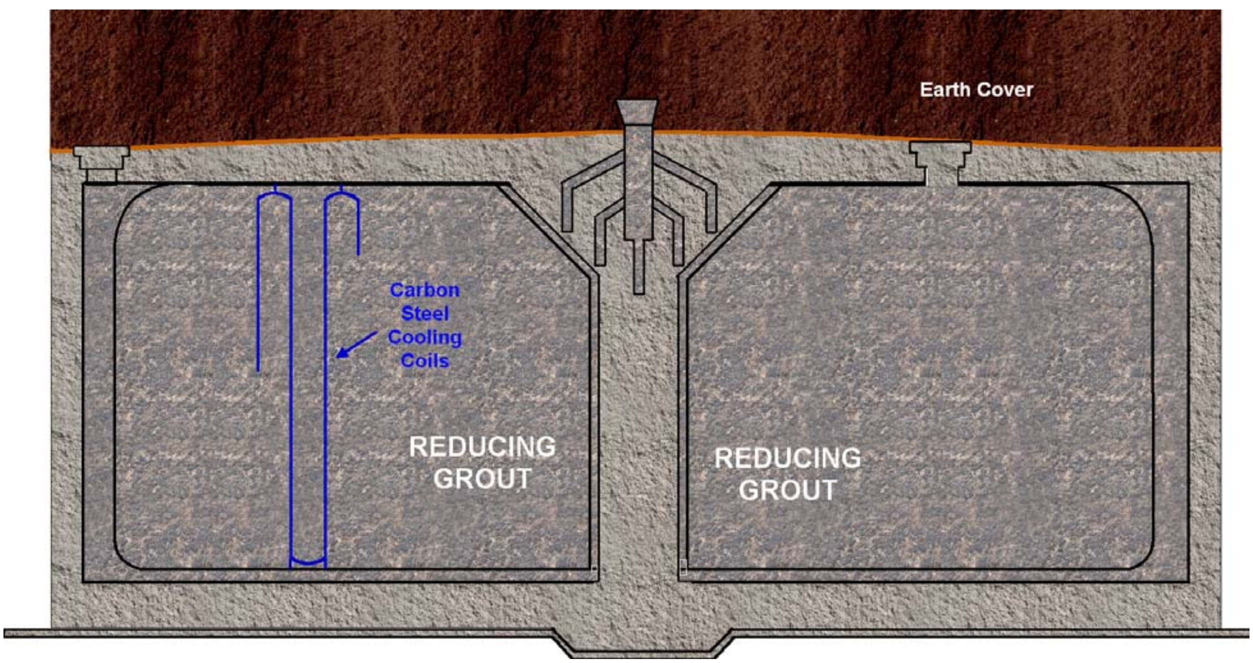


Figure 3.2-66: Typical Type IV Tank Grout Configuration

Reducing grout will be used to fill the entire volume of the Type I, III and IIIA tanks. In the Type IV tanks, reducing grout will cover most of the tank volume, except the tank dome, where strong grout may be used to prevent an intruder from drilling into the tank because of the thin roof. For tank types with cooling coils and annulus, the cooling coils and annulus are grouted to minimize void spaces and for stability. The closure and capping of the cooling coil penetrations in the valve-house will be similar to the risers above the primary tank which will be detailed in the future closure modules. Equipment (jets, dip tubes, etc.) voids inside the annulus will be filled with grout as possible. Annulus risers and ductwork will be filled with grout up to grade level and closed and capped in the same manner as risers. Ancillary equipment such as DBs, PPs, and pump tanks will be stabilized in a manner to prevent subsidence.

The grout attributes important to tank closure are:

- Low Hydraulic Conductivity
- High pH
- Low E_h
- High Degradation Resistance
- Highly Flowable
- Self-Leveling
- Low Bleed Water

The recent grout studies performed identified three alternative grout mixes, out of which at least one grout mix meets or exceeds the chemical and mechanical requirements for the tank closure. [WSRC-STI-2007-00369]

Reducing grout is composed primarily of cement, sand, water, fly ash, slag, silica fume, viscosity modifier (Kelco-Crete or similar), and high range water reducer (ADVAFLOW or similar). The reducing grout mix must be flowable, pumpable, and self-leveling. The intruder grout (strong grout) is composed of cement, water, sand, special viscosifying admixture and high range water reducer. While the admixtures have significant benefit in the early stages of grout placement; they are not expected to have any appreciable affect on the degradation analysis conducted in support of the FTF PA based on the short effective life and the small quantity of the material added to the grout. For both types of grout future changes will be evaluated and used during final closure if further testing indicates the properties of the alternative mixes are superior to the current reducing grout formula. This includes the potential use of reducing grout in place of strong grout for the Type IV tanks if the strong grout requirements are met.

Most of the grout types studied consists of two major states, cured and fresh. [WSRC-STI-2007-00369] The major requirements for cured properties of grout include compressive strength, effective diffusion coefficient, hydraulic conductivity, porosity, dry bulk density and Young's Modulus (E). The fresh grout properties include flow, bleed water, set time, air content, and wet unit weight (density). [WSRC-STI-2007-00641] The quality control of the grout production will be included as part of the grout procurement specification.

Grout requirements consist of both mechanical and chemical properties. The mechanical requirements of the grout consist of adequate compressive strength to withstand the overburden load and provide a physical barrier to discourage intruders. The chemical requirements of grout include high pH and a low E_h. Table 3.2-4 outlines some of the key requirements. The design properties assumed for tank grout (i.e., hydraulic conductivity) in waste tank modeling are described in Section 4.2.3.2 (Model Material Properties) of the PA and will be protected independent of the admixture utilized.

Table 3.2-4: Mechanical and Chemical Requirements for Grout Material

Requirement / Properties	Attribute	
	Reducing Tank Fill	Strong Grout
Mechanical Requirements		
Rheology	ASTM D 6103	ASTM D 6103
Cure time	<72 hours	<72 hours
Compressive Strength at 28 days (nominal)	500 psi	2,000 psi
Leveling Quality	Self	Self
Segregation	Minimal	No requirement
Heat of Hydration	Low Heat Mass Pour	Low Heat Mass Pour
Chemical Requirements		
Initial E_h	<0 mV	No requirement
Initial pH	>12.5	No requirement

[WSRC-TR-97-0102, WSRC-TR-98-271, ASTM D 6103-04]

3.2.3.2 Water Infiltration through Grout

The performance of the grout monolith in the tanks is reflected by the infiltration rate assigned to the medium. [WSRC-STI-2007-00184_OUO]

3.2.3.3 Grout Structural Stability/Degradation

During the grout degradation period, the permeability (hydraulic conductivity) increases from its initial permeability. Conceptually, the increasing permeability reflects an increase in the pathways available for water flow.

The permeability of degraded grout has not been measured but for modeling purposes in this PA, it is assumed to increase as much as 100 times. [WSRC-STI-2007-00607]

The most extensive attack comes from carbonation. The impact of carbonation on the permeability of cementitious barriers in the FTF closure concept depends on whether the barrier contains steel. The annulus and Type IV tanks do not contain rebar or steel, thus the overall effect of carbonation should be minimal regardless of the depth of the penetration.

Sulfate attack represents a complex set of chemical and physical processes and cannot be characterized by a single mechanism. These phenomena are complex and non linear. Such type of degradation typically affects structures in contact with acidic flowing or percolating acidic water for long periods of time. [WSRC-STI-2007-00607]

The alkali-aggregate reactions take place in the concrete when alkalis in the pore solution or from an alkali-rich external source react with carbonate or certain types of alkali to form hygroscopic gels which can imbibe water and expand.

The corrosion of steel reinforcement is the most common cause of deterioration. Metal rebar oxidation in the presence of water results in the formation of iron hydroxide, rust. Progressive oxidation of steel rebars results in volumetric expansion as corrosion products are formed. This expansion causes de-bonding between the concrete and steel, and is responsible for micro cracking and a loss in tensile strength of the structural element. As the process progresses, continued expansion results in more cracking and spalling of the concrete cover, which exposes more steel rebar and accelerates corrosion and loss of mechanical properties.

Acid attack or decalcification of the calcium containing phases in the hydrated Portland cement paste plays a role in most of the chemical degradation processes affecting pastes and composite cementitious material. Decalcification also includes leaching of alkali ions from the cementitious material. Decalcification is a coupled dissolution/diffusion process. The simplest approach for simulating acid leaching is to assume a diffusion controlled process. The description of ionic transport phenomena at the pore scale has advanced considerably over the last 10 years. Most simulate acid attack as leaching of calcium hydroxide from the matrix. Some of these models also take into account the evolution of the porosity as the solid phases dissolve. [WSRC-STI-2007-00607]

A detailed explanation of degradation mechanisms is presented in WSRC-STI-2007-00607.

The strong grout is used in Type IV tanks, and has a minimum compressive strength of 2,000 psi. The strong grout used in the tank dome (Type IV) can be considered to be a sedimentary rock-like material. It consists of insoluble quartz sand in a matrix of Calcium Silicate Hydrates (CSH) and other hydrated phases that bind the sand together. It is not possible to drill through such a material with the standard Well-drilling equipment used for unconsolidated sediments. The tank reinforced concrete roof serves as an intruder barrier for Type I and III/IIIA tanks.

The ability or ease of drilling in soil and sediment is commonly evaluated by measuring the resistance to penetration by one of several methods, for example ASTM D 1586 - 08a.

The strong grout placed in the domes of Tanks 17 and 20 (Type IV) was sampled during production. The compressive strengths were measured and were greater than 2,000 psi after curing. [WSRC-RP-2005-01675]

Table 3.2-5 presents factors known to affect the physical stability of cementitious materials.

Table 3.2-5: Physical and Chemical Factors Related to Grout Stability

PHYSICAL FACTORS	CHEMICAL FACTORS
<u>Loss of Mass</u> - Erosion • Water • Wind **<u>Mechanical Cracking</u>** - Overload - Bio-intrusion - Freeze Thaw - Thermal Stress - Geological Stress • Earthquakes • Subsidence	**<u>Loss of Mass</u>** - Desiccation (Early water loss) – Cracking - Dissolution/Leaching – Increased Porosity • Water • Acids • Microbial degradation **<u>Addition of Mass (Expansion) – Cracking</u>** - Sulfate (Ettringite) - Alkali (ASR hygroscopic gel) - Fe (rebar) + Oxygen, Carbonate, Chloride **<u>Addition of Mass – Fill/Seal Cracks & Pores</u>** - Carbonate (Calcium Carbonate Precipitation

[WSRC-RP-2005-01675]

Mechanical cracking can be caused by overloading the tank and grout fill due to poor design or to geological events such as earthquakes or subsidence. Structural overload of the grout in the tank top is unlikely because the load requirement is the same as that of compacted soil. However, seismic events will not remove material on top of the tank, and the load bearing capacity of the unit is not expected to be reduced to less than that of the surrounding soil. [WSRC-RP-2005-01675]

The reducing and strong grouts are designed to minimize the chemical factors that can lead to cracking caused by shrinkage or expansion. In most cases, desiccation being the exception, cracking is due to the addition of mass rather than removal of mass. The reaction of CO_2 gas with the hydrated phases of the Portland cement in the grout is called carbonation. The products of carbonation block the pores in the grout. In the special case of carbonation of calcium hydroxide and CSH, the strong grout will be slowly converted to calcite (calcium carbonate) and silica gel (amorphous hydrated silica) which are both cementitious. As the result of aging, carbonation will transform the grout from a man-made sandstone-like rock with a hydrated calcium silicate matrix to a sandstone-like rock with a calcite-silicate (aged hydrated Portland cement) matrix. For both the strong grout and reducing grout, the specification requires Type I/II unhydrated Portland cement which has a low to moderate (<5%) tricalcium aluminate concentration. [WSRC-TR-98-271] With this relatively low percentage of reactive aluminum in the unhydrated Portland cement, gypsum in the cement converts all the reactive alumina to ettringite. Ettringite is thermodynamically stable in a sulfate environment minimizing the potential for sulfate attack and sulfate degradation of the grout. [WSRC-STI-2007-00607]

If cracking does occur, the hydraulic conductivity of the grout will be affected, but even in a cracked state the structural requirements are met because of the contained system. This is in contrast to structural concrete in which cracking will accelerate corrosion of rebar and the transmission of load to the rebar. For free standing reinforced structural concrete members and supported reinforced concrete slabs, transmission of load per the design requirements is critical because performance in tension, flexion and shear are typically required in addition to performance in compression. [WSRC-STI-2007-00607]

Finally, models/methodologies have been developed for predicting changes in physical properties of material in response to chemical and physical factors as a function of time. Empirical, theoretical, mechanistic, and probablistic models are sometimes used in addition to analogies with geologic and ancient man made materials. To date only simplistic models have been applied to the tank closure grouts to describe the consequences of bounding (worst) cases. Initial mechanistic evaluations indicated that the grout would only be exposed to infiltrating rain water and geologic forces. [WSRC-STI-2007-00607]

3.2.4 Closure Cap

An engineered closure cap will be installed over the FTF following the closure of the waste tanks and ancillary equipment. The closure cap description is based on a recent SRNL report on the FTF closure cap concept and estimated initial infiltration presented in WSRC-STI-2007-00184_OUO. The design information being provided is for planning purposes sufficient to support evaluation of the closure cap as part of the ISCM being evaluated in this PA. The closure cap design will be finalized closer to the time of FTF closure, to take advantage of possible advances in materials and closure cap technology that could be used to improve the design.

3.2.4.1 Closure Cap Background

An FTF engineered closure cap is anticipated to be necessary for several reasons. One reason is to provide physical stabilization of the closed site. Another is to minimize infiltration of surface water. Surface water that reaches stabilized contaminant wastes in the underground waste tanks and in ancillary equipment could eventually lead to the contaminants reaching the underlying aquifer system. A third reason is to serve as an intruder deterrent to prevent a person who might inadvertently enter the area after active institutional controls have ended from being able to contact buried residual radioactive material. Intruder deterrence is provided by at least 10 feet of material above the waste tanks and significant ancillary equipment. Significant ancillary equipment is defined as equipment that requires intruder protection in association with the closure cap due to the anticipated residual radionuclide inventory. Significant ancillary equipment includes the evaporator facilities, catch tank, PPs, and waste transfer lines.

3.2.4.1.1 Variations in Equipment Elevations Beneath the Closure Cap

The FTF encompasses approximately 20 acres. Within this area are the 22 underground waste tanks and ancillary equipment, including two evaporators housed in concrete buildings, an underground catch tank, PPs, DBs, and various underground transfer lines.

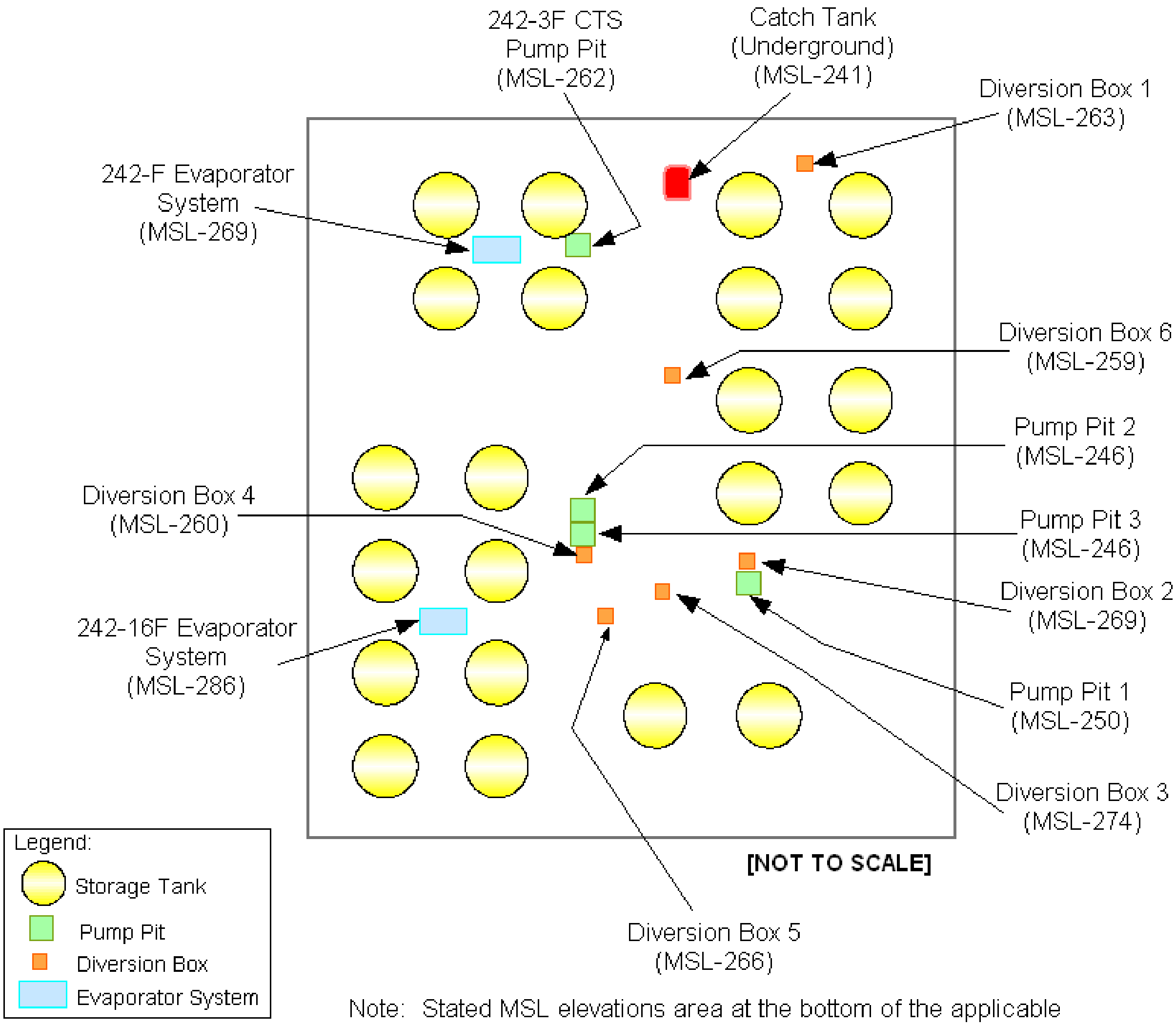
The design of the closure cap is obviously influenced by FTF topography and equipment location. Differences in elevations of the finished grade between tank groupings vary up to 20 feet. Figure 3.2-67 shows the FTF layout. Figure 3.2-68 illustrates the topography of the area. Figure 3.2-69 shows the layout of FTF and the elevation of key ancillary equipment.

Figure 3.2-67: FTF Layout

Figure 3.2-68: FTF Topography (FTF 2005)

Note: This figure is a LIDAR image which shows the relative elevation changes by color differences. The upper left shows the depression area where Tank 17 through 20 are located. The stormwater retention basins are the darker brown areas in the lower right. The darker green circles indicate the tanks and evaporator which are the highest elevations within FTF.

Figure 3.2-69: FTF Layout Including Elevations of Ancillary Equipment



Note: Stated MSL elevations area at the bottom of the applicable Evaporator Cell/Pump Pit/Diversion Box/Catch Tank encasement.

The major steps in construction of each tank group consisted of digging an excavation and stockpiling the excavated soil, emplacing a concrete work slab on the floor of the excavation to provide a stable work platform for tank construction activities, constructing the tanks, and backfilling around the tanks utilizing the previously stockpiled soil. Construction details are presented in Section 3.2.1 for waste tanks, and Section 3.2.2 for the ancillary equipment. The tanks were installed during four separate construction periods, with a different tank design for each period, leading to the designation of the following four different tank groups:

- Tanks 1 through 8, which are designated Type I tanks, were constructed between 1951 and 1953. The backfill around this group of tanks extends approximately 9 feet above these flat topped tanks to a finished grade ranging from 274 to 282 feet above MSL.

- Tanks 17 through 20, which are designated Type IV tanks, were constructed between 1956 and 1958. Approximately 32 inches of backfill were placed over the domed tank tops to a finished grade ranging from 268 to 277 above MSL. The concrete 242-F evaporator building, the top of which is at an elevation of 293.5 feet above MSL, was built in the center of this group of four tanks.
- Tanks 33 and 34, which are designated Type III tanks, were constructed between 1969 and 1972. The backfill around these two tanks extends to the top of the tank perimeter walls, but does not cover the sloping tank top itself. The finished grade, including the tank tops, of this grouping ranges from 283 to 285 feet above MSL.
- The fourth group of eight tanks, which consists of Tanks 25 through 28 and 44 through 47, are designated Type IIIA tanks, and were constructed in two phases between 1975 and 1978, and 1977 to 1980, respectively. The backfill around this group of tanks also extends to the top of the tank perimeter walls, but does not cover the sloping tank top itself. The finished grade, including the tank tops, of this grouping ranges from 285 to 288 feet above MSL. Additionally the concrete 242-16F evaporator building, the top of which is at an elevation of 325.67 feet above MSL, was built in the middle of this group of tanks.

In addition to the waste tanks, the elevation of significant ancillary equipment within the FTF was also considered to ensure adequate coverage by the closure cap. An elevation difference of 57.67 feet exists between the top of the highest piece of significant ancillary equipment, 242-16F evaporator building, and the lowest finished grade elevation in the FTF (i.e., Tanks 17 through 20). WSRC-STI-2007-00184_OUO provides the elevations of the waste tanks, the concrete housings on top of the tanks, and the significant ancillary equipment used to develop the conceptual design of the closure cap.

3.2.4.1.2 Key Time Period Assumptions

During the operational period, that period of time during which waste is removed from the tanks and the tanks will be grouted, it is assumed that active FTF facility maintenance will be performed sufficient to prevent infiltration of rainwater into the tanks and subsurface discharge out of the tanks. After installation of the closure cap, a 100-year institutional control period will begin, during which time active FTF facility maintenance will be conducted sufficient to prevent pine forest succession and to repair any significant erosion. After the institutional control period ends, it is assumed that the 10,000-year post-closure compliance period occurs, during which no active FTF facility maintenance will be conducted.

Currently no site-specific cap performance studies have been completed, therefore, conservative degradation assumptions have been made, for example, pine tree root penetrations through the Geosynthetic Clay Liner (GCL). The closure cap is substantially degraded by approximately 2,600 years after closure.

A potential exception to the cessation of all active maintenance during the post-closure compliance period involves the potential use of bamboo as a final vegetative cover. If it is determined that bamboo is a climax species that prevents or greatly slows the intrusion of pine trees, it is assumed that bamboo will be planted as the final vegetative cover at the end of the 100-year institutional control period. If bamboo is planted, maintenance, which may extend into the post-closure compliance period, will be required to establish a dense bamboo ground cover over the entire area. After such a dense bamboo ground cover has been established, all active FTF facility maintenance would cease. Degradation of the closure cap would accelerate once active FTF facility maintenance has ceased. Currently bamboo is not assumed in the closure cap design and is not modeled.

3.2.4.1.3 Layouts Evaluated and Water Balances Analyzed

The current plan for FTF is to place a single closure cap over all of FTF upon operational closure of the FTF, with the closure cap area boundary defined by the CERCLA closure approach for the western sector of the GSA. [*www.epa.gov/superfund/policy/cercla.htm*] However, other layouts were also considered and evaluated in WSRC-STI-2007-00184_OUO as the details of the conceptual design were developed.

Four different layouts were evaluated. Two layouts involved separate closure caps over each of the four tank groups. Evaluation shows that separate closure caps would not be suitable because they would not cover underground waste transfer lines that run between tank groups and because of the inability of this arrangement to accommodate appropriate side slopes and drainage. The other two layouts involved single closure caps, the main difference being the maximum cap slope length. The design with the smaller maximum slope length (585 feet) was selected because a longer slope length would have resulted in increased infiltration and the need to use larger stones in the erosion barrier and side slope riprap. [WSRC-STI-2007-00184_OUO]

Physical stability calculations of the single closure cap configuration with a maximum 585 foot slope length in relation to erosion show that a maximum surface slope of 2% is acceptable. [WSRC-STI-2007-00184_OUO]

Using the 585 feet maximum slope length and a 2% maximum slope, initial infiltration estimates through seven different FTF closure cap configurations were made utilizing the Hydrologic Evaluation of Landfill Performance (HELP) Model. Based upon these initial estimates, detailed water balances were produced for FTF closure cap configurations. Table 3.2-6 presents the three pertinent closure cap configurations for FTF modeling cases analyzed in WSRC-STI-2007-00184_OUO, and also the resulting average infiltration rate. The other four configurations were infiltration sensitivity runs performed to provide information on individual component effects. These sensitivity runs assessed the following modeling changes:

a. fill the erosion barrier with Controlled Low Strength Material (CLSM) versus sand,
b. eliminate the GCL,
c. eliminated the lateral drainage layer, and
d. eliminate the erosion barrier.

These sensitivity configurations were detailed in WSRC-STI-2007-00184_OUO, but were not utilized in PORFLOW or GoldSim FTF models, and were therefore not included in Table 3.2-6. Details on the development of the input required for the HELP modeling are provided in WSRC-STI-2007-00184_OUO. For the purposes of this modeling, synthetic daily weather data for precipitation, temperature, and solar radiation over 100-years was generated based upon the HELP data for Augusta, Georgia, and modified with SRS-specific average monthly precipitation and temperature data reported in WSRC-STI-2007-00184_OUO. Section 3.1.2 describes the collection process of weather data at SRS.

Table 3.2-6: Closure Cap Initial Configurations Evaluated and Initial Condition Results

Parameter	Configuration # 1a[a]	Configuration # 3	Configuration # 6
Layer (depth)	Topsoil (6 inches)	Topsoil (6 inches)	Topsoil (6 inches)
Layer (depth)	Upper Backfill (30 inches)	Upper Backfill (30 inches)	Backfill - no erosion barrier and no lateral drainage layer (66 inches)
Layer (depth)	Erosion Barrier (12 inches) [soil infill]	Erosion Barrier (12 inches) [CLSM infill]	
Layer (depth)	Middle Backfill (12 inches)	Middle Backfill (12 inches)	
Layer (depth)	Lateral Drainage Layer (12 inches) [soil infill]	Lateral Drainage Layer (12 inches) [CLSM infill]	
Layer (depth)	High Density Polyethylene (HDPE) (0.06 inch)	None	None
Layer (depth)	(GCL) (0.2 inch)	GCL (0.2 inch)	None
Layer (depth)	Foundation Layer – Upper/Lower (84 inches)	Foundation Layer – Upper/Lower (84 inches)	Foundation Layer – Upper/Lower (84 inches)
Average infiltration rate	0.00088 inch / year (through the GCL)	0.74 inch / year (through the GCL)	16 inches / year (through foundation layer)
Average change in water storage	0.06 inch / year	0.10 inch / year	0.14 inch / year

[a] Configuration designations as identified in WSRC-STI-2007-00184_OUO, note that WSRC-STI-2007-00184_OUO identified Configurations # 1 and # 1a which differed by the type of material used within the erosion barrier (CLSM for # 1 and sandy soil for # 1a). For Configuration # 1 the average infiltration rate and the average change in water storage is predicted to be 0.00016 inch/year and 0.06 inch/year, respectively.

Note: While the Geotextile fabric layers are part of the cap design, they are not explicitly modeled in HELP.

3.2.4.2 Ancillary Equipment Strategy

Underground piping will remain in place with a closure strategy consistent with other underground piping at the site that has been closed under CERCLA. [*www.epa.gov/superfund/policy/cercla.htm*] Larger diameter piping (greater than six inches in diameter) will be filled with grout or other materials, as appropriate, to prevent subsidence issues. The criteria for selecting the piping size is based upon grouting practicality and elimination of subsidence potential. Ancillary equipment including the evaporator buildings, the catch tank, PPs, and DBs to the extent practical will remain in place and be filled with grout or other materials, as practical, to eliminate subsidence potential. An exception to leaving ancillary equipment in place will be made for equipment that is significantly higher in elevation than the adjacent waste tanks and would therefore result in a significant increase in the closure cap elevation. An example of structures needing elevation reduction would be the 242-16F Evaporator. D&D of such ancillary equipment would be conducted to reduce it to an appropriate elevation for closure cap construction. Above grade structures, utilities, equipment, etc., (other than substantial above grade concrete associated with the tanks and ancillary equipment) that could interfere with closure cap construction will be removed from the FTF area prior to installation of the closure cap.

3.2.4.3 Closure Cap Installation Sequence

Design and installation of the final FTF closure cap will be coordinated with CERCLA closure activities in the area, and occur at a similar time as overall CERCLA closures as reported in Appendix E of the FFA. [*http://www.srs.gov/general/programs/soil/ffa/ffa.pdf*] CERCLA characterization will be completed, and these results will determine the need for a closure cap over the adjacent basins, or whether soil cover in the basin area will be sufficient. In either case, the final FTF closure cap will be designed with an appropriate interface with adjacent CERCLA closure systems. [*www.epa.gov/superfund/policy/ cercla.htm*]

3.2.4.4 Stability Analysis

Calculations to evaluate the physical stability of the closure cap design in relation to the erosion potential associated with an SRS-specific Probable Maximum Precipitation (PMP) event have been made using standard methodologies for riprap design for a maximum 585 feet slope length. [NUREG-1623] While the methodology presented in NUREG-1623 specifically addresses a 1,000-year timeframe, the use of SRS-specific PMP event data (which is a low frequency of occurrence and a bounding event of greater than 70 inches of rain in one hour) provides assurance of physical stability of the closure cap design for the 10,000-year compliance period. This analysis is presented in detail in WSRC-STI-2007-00184_OUO.

- A 2% slope over a 585 foot slope length for the vegetative soil cover is considered physically stable (i.e., it would prevent the initiation of gullying during a PMP event). Maximum acceptable slopes for portions of the closure cap with slope lengths less than 585 feet may be greater than 2%, if it were to be determined that they would be physically stable during the actual closure cap design process.

- An erosion barrier consisting of 12 inch thick riprap with a D_{50} (median size) of 2.5 inch on a 585 feet long, 2% slope is considered physically stable (i.e., it would prevent any riprap movement during a PMP event). Based upon the D_{50} of 2.5 inch, rock consistent with Type B riprap from Table F-3 of NUREG-1623 or Size R-20 riprap from Table 1 of ASTM D 6092 - 97 is suitable for use in the erosion barrier.
- Side slope riprap that is 24 inches thick with a D_{50} of 9.1 inch on a 120 foot long, 33.3% slope receiving drainage from a 585 feet long, 2% slope is considered physically stable (i.e., it would prevent any riprap movement during a PMP event). Based upon the D_{50} of 9.1 inches, rock consistent with Type D riprap from Table F-3 of NUREG-1623 or Size R-150 riprap from Table 1 of ASTM D 6092 - 97 is suitable for use on the side slopes.
- Toe of the side slope riprap that is 42 inches thick, extends out 20 feet from the side slope, and has a D_{50} of 11.6 inch is considered physically stable (i.e., it would prevent any riprap movement due to receiving runoff from the 2%, 585 feet top slope and 33.3%, 120 feet side slope during a PMP event). Based upon the D_{50} of 11.6 inches, rock consistent with Type D riprap from Table F-3 of NUREG-1623 or Size R-300 riprap from Table 1 of ASTM D 6092 - 97 is suitable for use on the toe.

Erosion barrier, side slope, and toe riprap size may be smaller for portions of the closure cap with shorter slope lengths than those used to determine these requirements if it is determined that the smaller sized riprap would be stable during a PMP event, during the actual closure cap design process.

3.2.4.5 Closure Cap General Design Features

As noted previously, it is anticipated that the closure cap will be installed over all 22 waste tanks and associated ancillary equipment at the end of the operational period. The closure cap design and installation will take into account the waste tank and ancillary equipment characteristics and location, disposition of non-disposal structures and utilities, site topography and hydrogeology, potential exposure scenarios, and lessons learned implementing other closure systems, including those for other SRS facilities, uranium mill tailings sites and other DOE sites.

Figure 3.2-70 presents the general design of the closure cap above a closed waste tank. Figure 3.2-71 presents the closure cap footprint. Figures 3.2-72 and 3.2-73 present cross sections of the closure cap conceptual design. Figure 3.2-74 depicts the finished closure cap. Figure 3.2-75 presents the elevations of the closure cap surfaces and the grading plan.

These figures represent configuration # 1a identified in Table 3.2-6 with the inclusion of a geotextile fabric layer on top of the erosion barrier layer, a geotextile filter fabric layer on top of the lateral drainage layer and a geotextile fabric layer on top of the HDPE geomembrane layer.

Figure 3.2-70: FTF Closure Cap General Concept

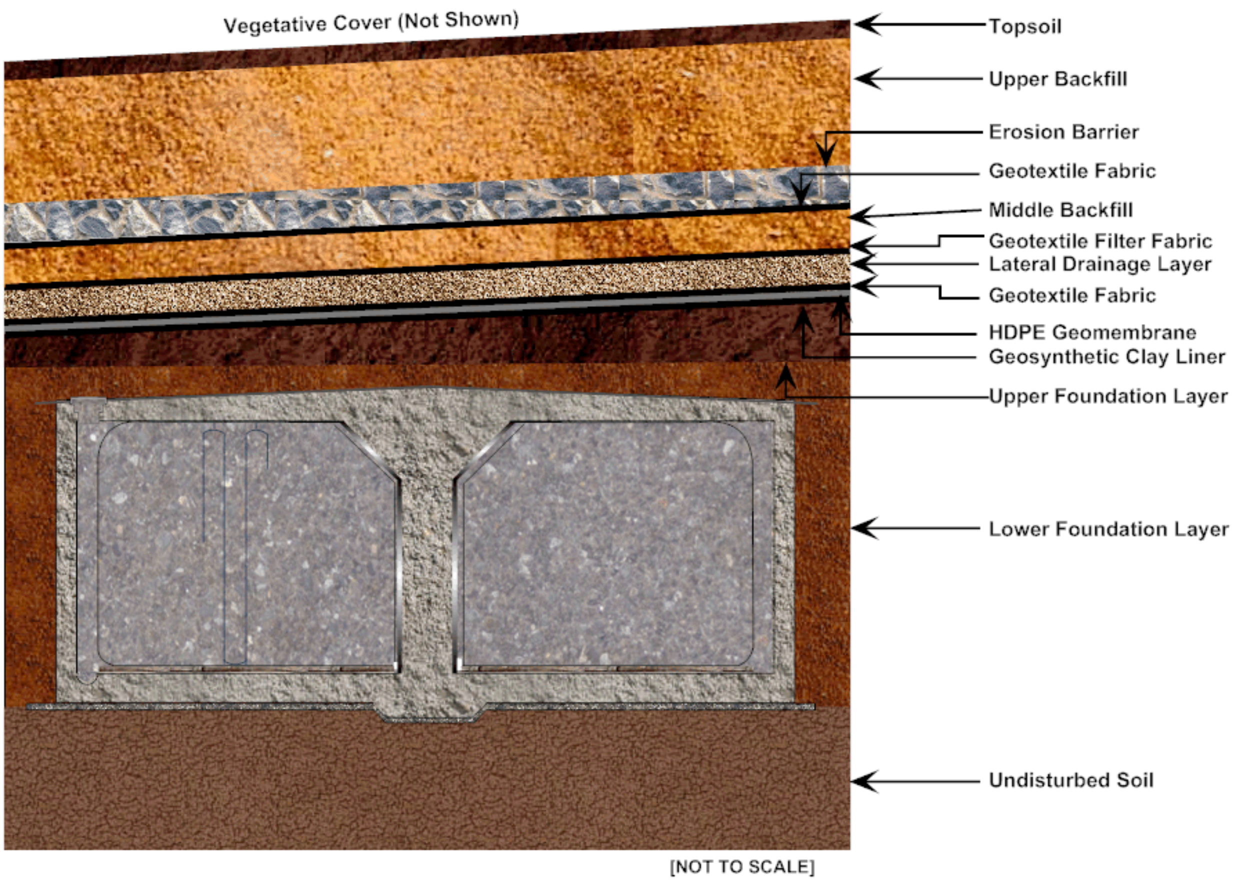


Figure 3.2-71: FTF Closure Cap Conceptual Design, Cap Footprint

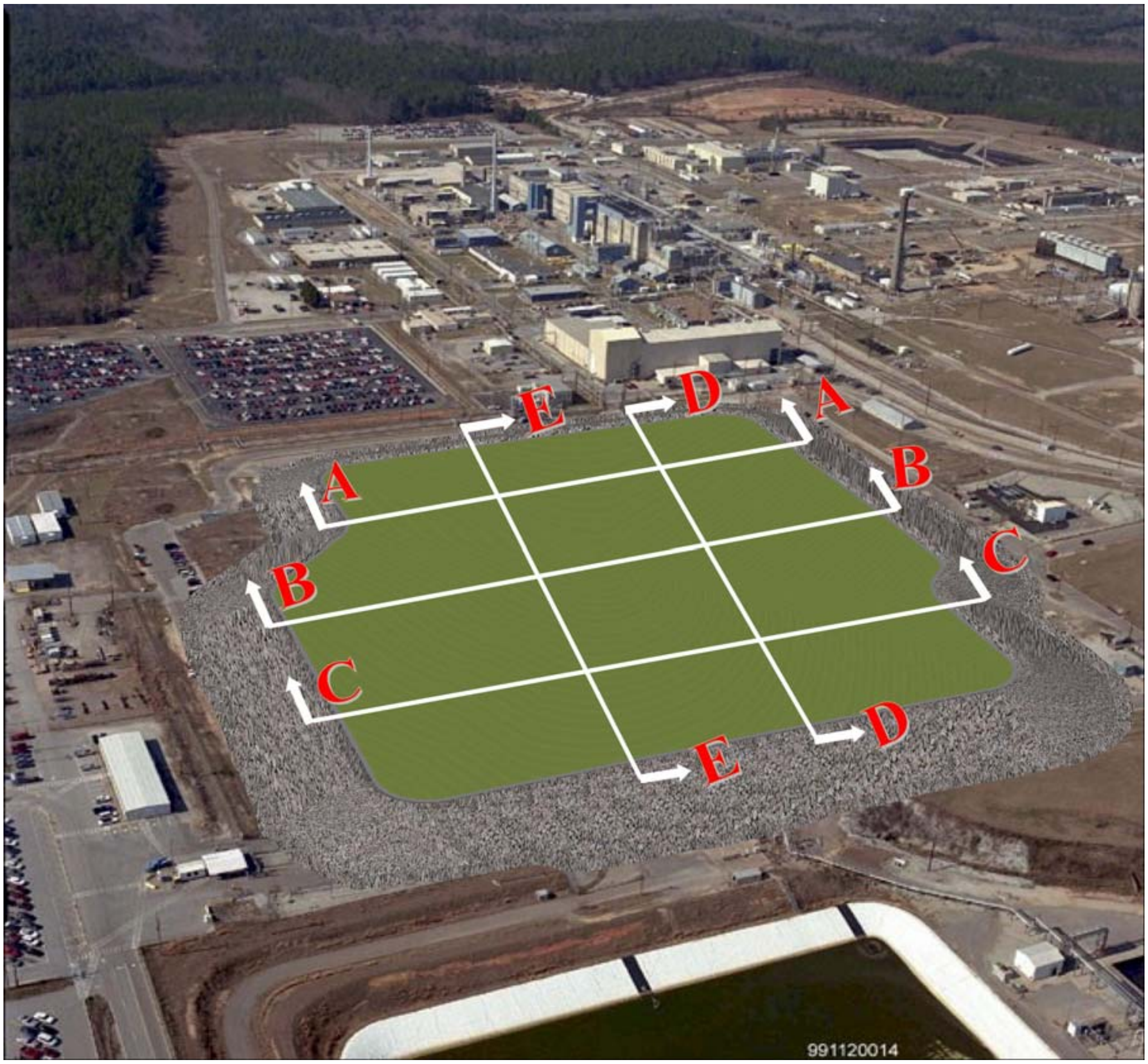
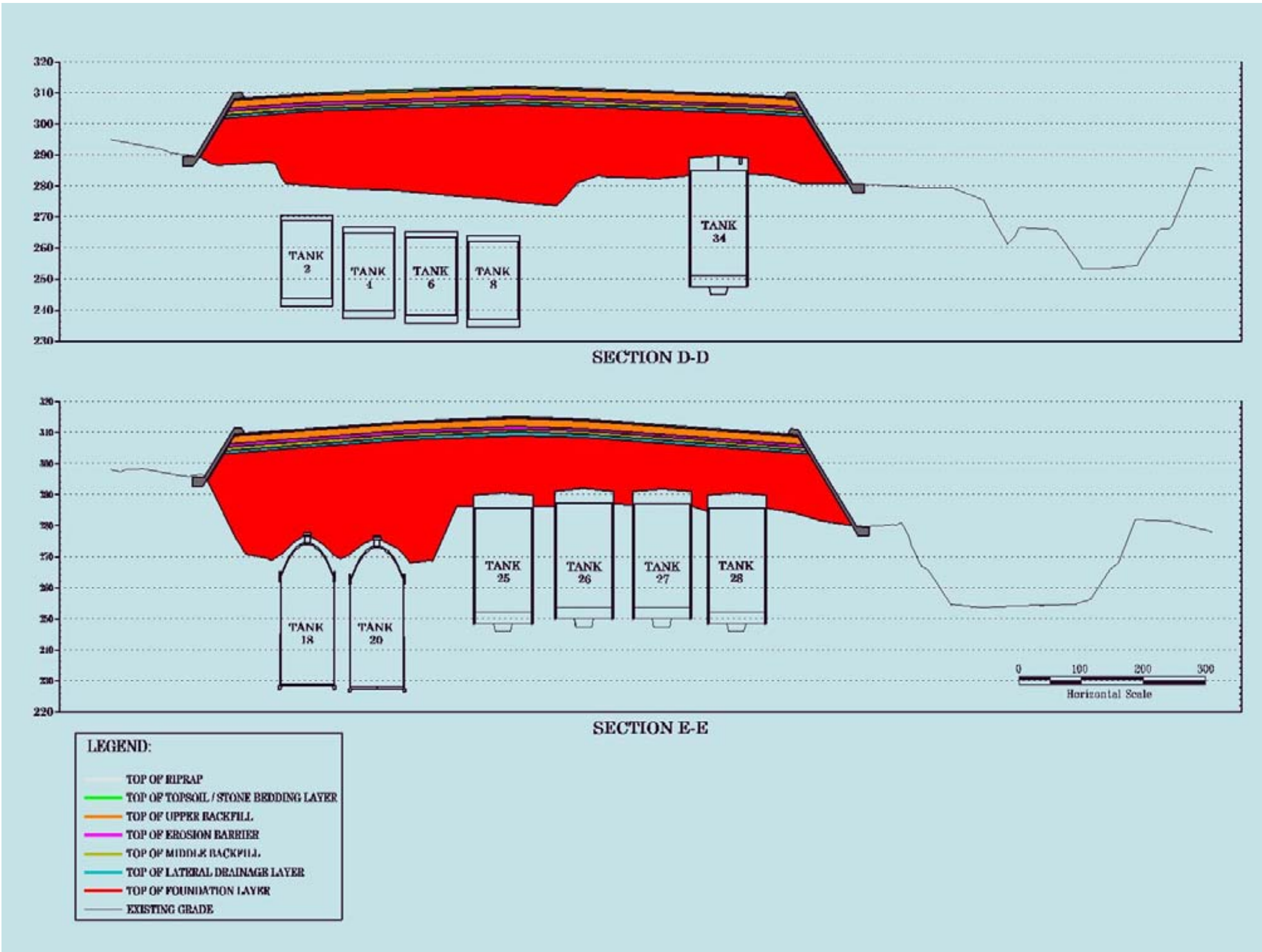


Figure 3.2-72: FTF Closure Cap Conceptual Design, Sections A-A, B-B, and C-C

NOTE: Vertical scale of sections has been exaggerated 5 times in order to show all closure cap layers.

Figure 3.2-73: FTF Closure Cap Conceptual Design, Sections D-D and E-E



NOTE: Vertical scale of sections has been exaggerated 5 times in order to show all closure cap layers.

Figure 3.2-74: FTF Closure Cap Conceptual Design, Finished Cap

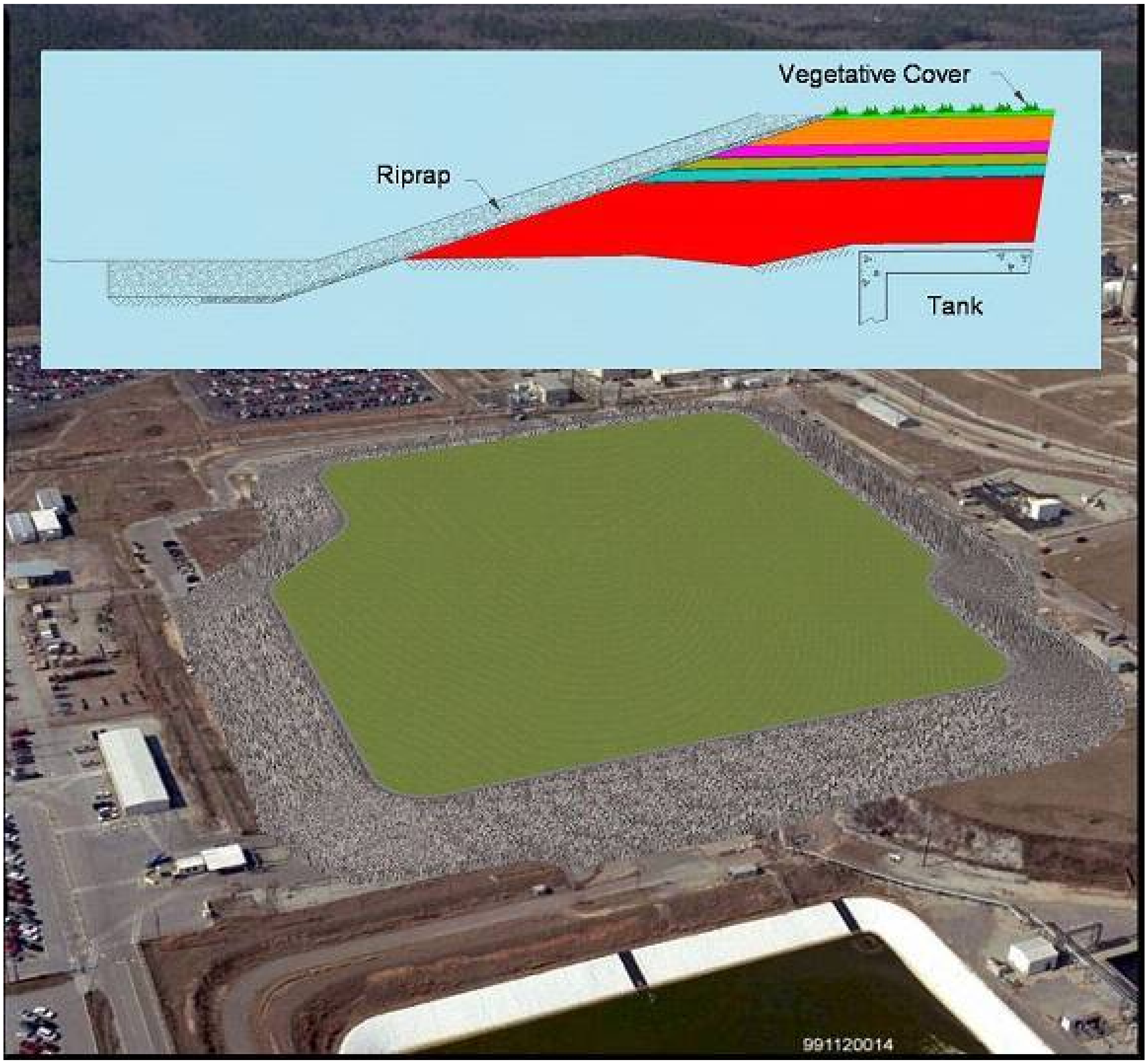
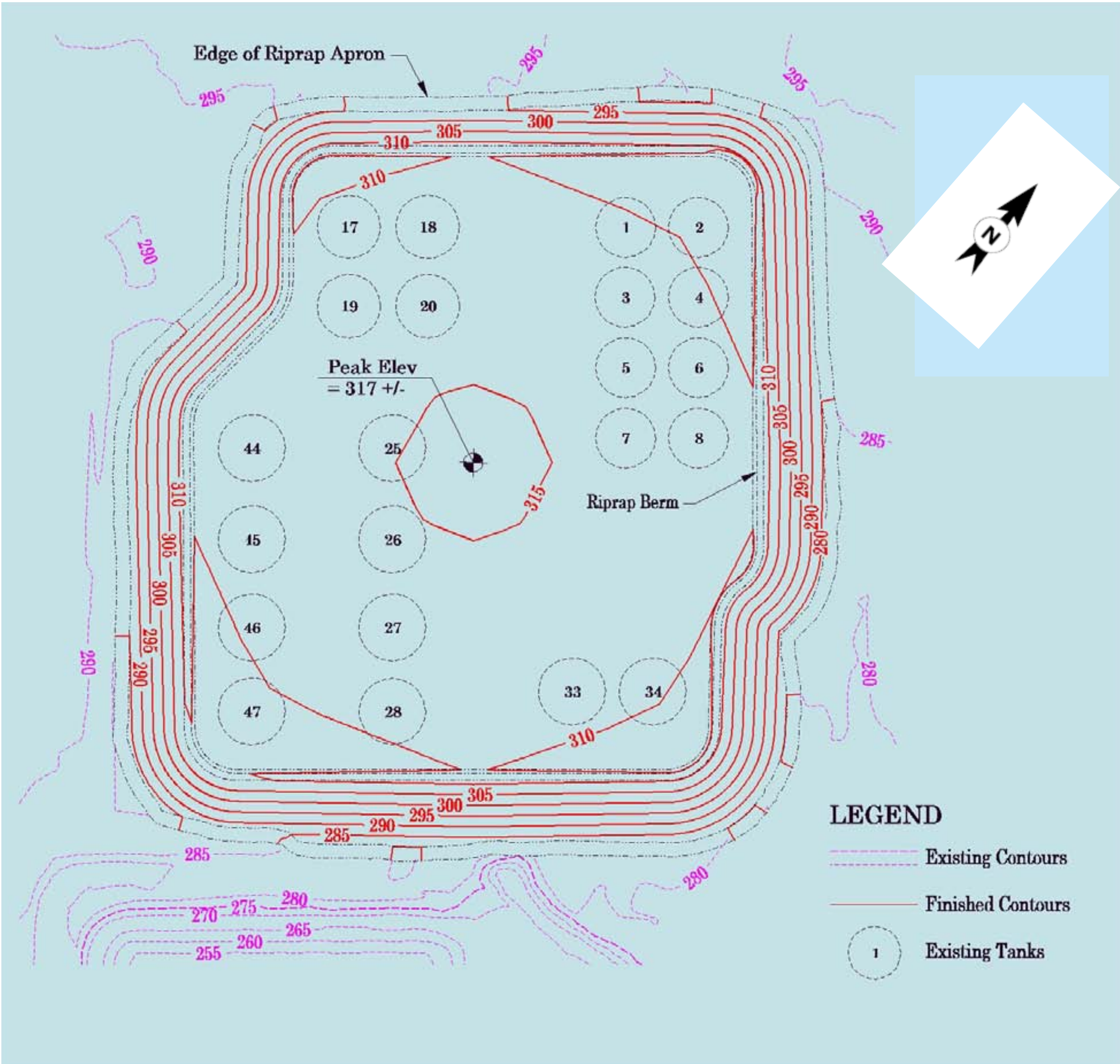


Figure 3.2-75: FTF Closure Cap Conceptual Design, Grading Plan



3.2.4.5.1 Function of Closure Cap Layers

It is anticipated that the FTF closure cap will consist of the layers illustrated in Figure 3.2-70 and identified in Table 3.2-7 from top to bottom. Table 3.2-8 summarizes the function of each of these layers. Detailed discussion of each layer in the FTF closure cap concept is provided in WSRC-STI-2007-00184_OUO. The concepts for the side slopes and toes of the closure cap based upon the results of physical stability calculations referred to above are also detailed in WSRC-STI-2007-00184_OUO.

Table 3.2-7: FTF Closure Cap Layers

Layer	Layer Thickness (in)
Vegetative Cover	Not applicable
Topsoil	6
Upper Backfill	30
Erosion Barrier	12
Geotextile Fabric	-
Middle Backfill	12
Geotextile Filter Fabric	-
Lateral Drainage Layer	12
Geotextile Fabric	-
HDPE Geomembrane	0.06 (60 mil)
GCL	0.2
Upper Foundation Layer	12
Lower Foundation Layer	72 (minimum)

[WSRC-STI-2007-00184_OUO, Table 11]

Table 3.2-8: Function of the FTF Closure Cap Layers

Layer	Function
Vegetative Cover	The vegetative cover will promote runoff, minimize erosion, and promote evapotranspiration. The initial vegetative cover will be a persistent grass such as Bahia. If it is determined that bamboo is a climax species that prevents or greatly slows the intrusion of pine trees, bamboo will be planted as the final vegetative cover at the end of the 100-year institutional control period. Bamboo is not assumed in present design calculations and modeling.
Topsoil	The topsoil is designed to support a vegetative cover, promote runoff, prevent the initiation of gullying, and provide water storage for the promotion of evapotranspiration.
Upper Backfill	The upper backfill is designed to increase the elevation of the closure cap to that necessary for placement of the topsoil and to provide water storage for the promotion of evapotranspiration.
Erosion Barrier	The erosion barrier is designed to prevent riprap movement during a PMP event and therefore form a barrier to further erosion and gully formation (i.e., provide closure cap physical stability). It is used to maintain a minimum 10 feet of clean material above the tanks and significant ancillary equipment to act as an intruder deterrent. It also provides minimal water storage for the promotion of evapotranspiration.
Geotextile Fabric	This geotextile fabric is designed to prevent the penetration of erosion barrier stone into the underlying middle backfill and to prevent piping of the middle backfill through the erosion barrier voids.
Middle Backfill	The middle backfill provides water storage for the promotion of evapotranspiration in the event that the topsoil and upper backfill are eroded away since the overlying erosion barrier provides only minimal water storage.
Geotextile Filter Fabric	This geotextile fabric is designed to provide filtration between the overlying middle backfill layer and the underlying lateral drainage layer. This filtration allows water to freely flow from the middle backfill to the lateral drainage layer while preventing the migration of soil from the middle backfill to the lateral drainage layer.

Table 3.2-8: Function of the FTF Closure Cap Layers (Continued)

Layer	Function
Lateral Drainage Layer	The lateral drainage layer is a coarse sand layer designed to: • Divert infiltrating water away from the underlying tanks and ancillary equipment and transport the water to the perimeter drainage system, in conjunction with the underlying composite hydraulic barrier (i.e., HDPE geomembrane and GCL), and • Provide the necessary confining pressures to allow the underlying GCL to hydrate properly.
Geotextile Fabric	This geotextile fabric is a nonwoven geotextile fabric designed to protect the underlying HDPE geomembrane from puncture or tear during placement of the overlying lateral drainage layer.
HDPE Geomembrane	The HDPE geomembrane forms a composite hydraulic barrier in conjunction with the GCL. The composite hydraulic barrier is designed to promote lateral drainage through the overlying lateral drainage layer and minimize infiltration to the tanks and ancillary equipment.
GCL	The GCL forms a composite hydraulic barrier described above in conjunction with the HDPE geomembrane. As part of the composite hydraulic barrier the GCL is designed to hydraulically plug any holes that may develop in the HDPE geomembrane.
Upper Foundation Layer Lower Foundation Layer	The foundation layers are designed to: • Provide structural support for the rest of the overlying closure cap, • Produce the required contours and produce a slope of 2% for the overlying layers, • Produce the maximum 3:1 side slopes of the closure cap, • Provide a suitable surface for installation of the GCL (i.e., a soil with a moderately low permeability and a smooth surface, free from deleterious materials), • Promote drainage of infiltrating water away from and around the tanks and ancillary equipment, and • Contain utilities, equipment, facilities, etc., that are not removed from above current grade prior to installation of the closure cap.

[WSRC-STI-2007-00184_OUO, Table 12]

3.2.4.5.2 Site Preparation

Site preparation is required to prepare the FTF area for installation of the closure cap. The exact nature of such site preparation will be determined closer to the time of FTF closure. Preparation will address the following:

- Subsidence potential associated with subsurface items that contain significant void space,
- Above grade structures, utilities, equipment, etc., that could interfere with closure cap construction, and
- Existing surfaces (i.e., soils, asphalt, riprap, concrete tank tops, significant ancillary equipment, etc.) over which the closure cap will be constructed.

It is anticipated that subsurface items containing significant void space, such as piping, tanks, PPs, DBs etc., will be grouted or filled with other materials, as appropriate, to eliminate subsidence potential. It is also anticipated that above grade structures, utilities, equipment, etc. (other than substantial above grade concrete associated with the tanks and significant ancillary equipment) that could interfere with closure cap construction will be removed from the FTF area prior to installation of the closure cap.

The existing surfaces (i.e., soils, asphalt, riprap, concrete tank tops, and significant ancillary equipment) over which the closure cap will be constructed must be prepared prior to closure cap construction. It is anticipated that existing soil surfaces will have 3 to 6 in of soil removed to eliminate any topsoil and vegetation present, will be rough graded to establish a base elevation, and will be compacted with a vibratory roller. Existing asphalt surfaces directly over tanks and significant ancillary equipment will likely be left in place; however such surfaces between tanks and significant ancillary equipment may need to be broken up or removed in order to prevent the asphalt from acting as a perched water zone within the closure cap and to promote downward infiltration around the tanks and significant ancillary equipment. It is anticipated that existing riprap will be removed or that the voids within the existing riprap surfaces will be filled to eliminate subsidence potential. It is anticipated that no preparatory actions will be required for the tank tops themselves other than that necessary to provide appropriate protection during closure cap construction. It is anticipated that the significant ancillary equipment will require grouting in order to eliminate subsidence potential.

Detailed information regarding the purpose, design, and constructability of each of the FTF closure cap layers is provided in WSRC-STI-2007-00184_OUO.

3.2.4.5.3 Vegetative Cover

In addition to the modeled closure cap layers, a vegetative cover will promote runoff, minimize erosion, and promote evapotranspiration. The topsoil will be fertilized, seeded, and mulched to provide a vegetative cover. The initial vegetative cover shall be a persistent grass such as Bahia. During seeding and establishment of the initial grass, appropriate mulch, erosion control fabric, or similar substances will be used to protect the surface.

The area will be repaired through transplanting or replanting to ensure that a self maintaining cover is developed. If it is determined that bamboo is a climax species that prevents or greatly slows the intrusion of pine trees, it will be planted as the final vegetative cover at the end of the 100-year institutional control period. Pine trees are typically assumed to be the most deeply rooted naturally occurring climax plant species at SRS, which will degrade the GCL through root penetration. In contrast, bamboo is a shallow-rooted species, which will not degrade the GCL. Additionally, bamboo evapotranspirates year-round in the SRS climate, minimizes erosion, and can sustain growth with minimal maintenance. A study conducted by USDA Soil Conservation Service (SCS) has shown that two species of bamboo will quickly establish a dense ground cover. [WSRC-MS-92-513] All work in association with the vegetative cover shall be performed in accordance with approved drawings, plans, and specifications of the final design, which will be produced near the end of the operational period.

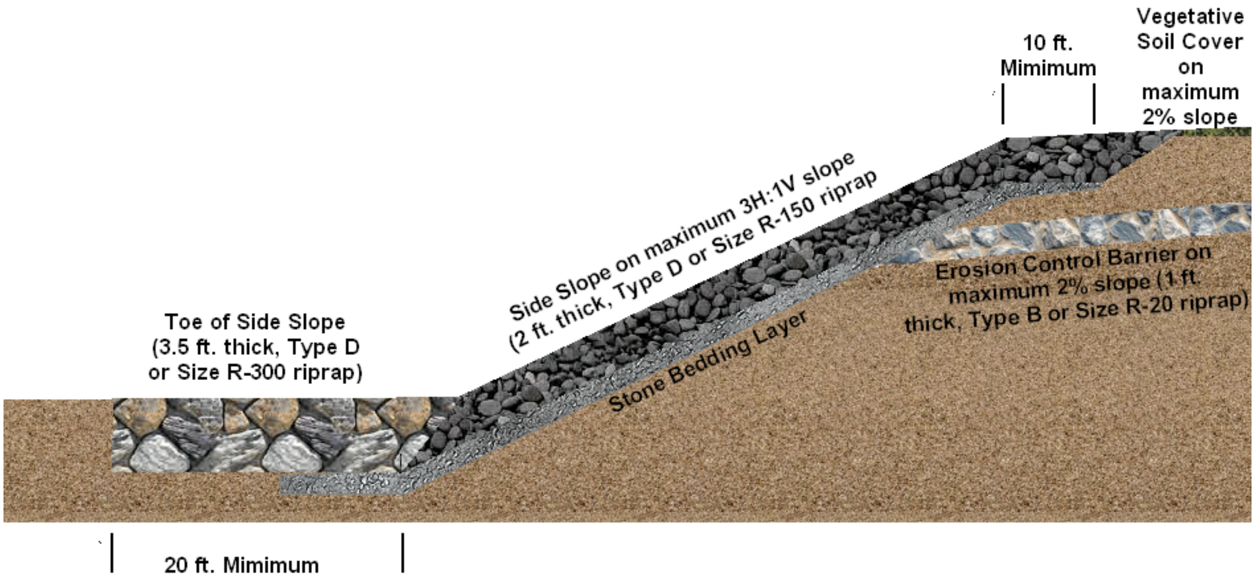
3.2.4.5.4 Closure Cap Slopes

The toe of the closure cap side slope will consist of a riprap layer to stabilize the side slope riprap, provide erosion protection at the toe, transition flow from the side slope to adjacent areas, and provide gully intrusion protection to the embankment. The toe riprap will extend from the toe of the side slope a minimum of 20 feet, as shown in Figure 3.2-76. The toe riprap has been sized based upon the PMP event and the methodology outlined in NUREG-1623. Details of the analysis and recommendations for the riprap are provided in WSRC-STI-2007-00184_OUO.

The closure cap side slopes will be placed at a maximum 3 horizontal to 1 vertical (3H:1V, 33.3%, or 19.5 degrees) and have a riprap surface with an underlying gravel bedding layer to prevent gully formation on the side slopes and to provide long-term slope stability. The side slope riprap and underlying gravel bedding layer will extend from the toe of the side slope up the side slope to a minimum 10 feet onto the top slope, as shown in Figure 3.2-76. Details of the cap side slope design and construction is provided in WSRC-STI-2007-00184_OUO.

An integrated drainage system will be designed and built to handle the runoff from the closure cap and drainage from the closure cap lateral drainage layer. The runoff and lateral drainage will be directed to a system of riprap lined ditches, which will be designed in accordance with NUREG-1623. The riprap lined ditches will direct the water away from the FTF closure cap as a whole and will be constructed around the perimeter of the FTF closure cap. The ditches will discharge into sedimentation basins as necessary for sediment control. The riprap for the ditches has not been sized yet since the FTF is currently in the initial phase operational period. Due to the early phase and lack of a detailed closure cap layout, a detailed drainage system can not yet be designed. Therefore drainage areas and flows cannot be currently assigned in order to size the riprap for various sized ditches.

Figure 3.2-76: FTF Closure Cap Toe and Side Slope Configuration Concept



[WSRC-STI-2007-00184_OUO, Figure 12]

3.2.4.6 Recommended FTF Closure Cap Configuration

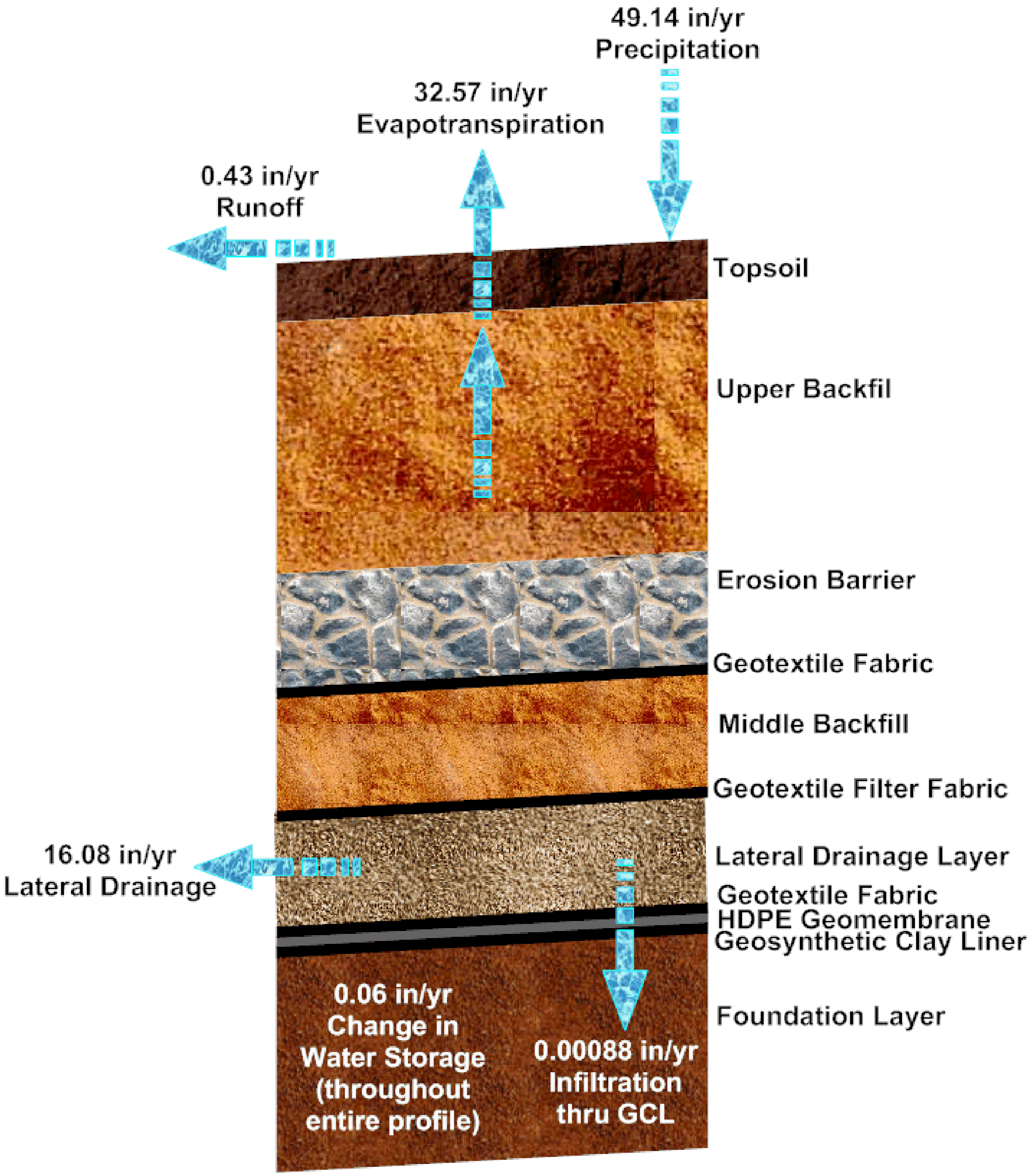
Based on the results from WSRC-STI-2007-00184_OUO, closure cap configuration # 1a which consists of a composite hydraulic layer with an overlaying lateral drainage layer and an erosion barrier is the recommended closure cap configuration. This configuration has the following advantages:

- It results in the least infiltration to the tanks,
- The use of a composite hydraulic barrier (i.e., HDPE geomembrane underlain by a GCL) provides defense-in-depth by the providing a HDPE geomembrane with a significantly lower saturated hydraulic conductivity underlain by the GCL to plug any holes that may develop in the HDPE geomembrane, and
- The use of an erosion barrier provides long-term physical stability for the closure cap.

(Note: Configuration # 1 in WSRC-STI-2007-00184_OUO, results in the lowest infiltration rate – however, the selection of the material to infill the erosion barrier has not been determined and the use of soil as the infill material, used in Configuration # 1a results in a more conservative infiltration rate.)

Figure 3.2-77 depicts the HELP model configuration and results for the recommended closure cap configuration. The material properties utilized in this assessment of the closure cap configuration are provided in WSRC-STI-2007-00184_OUO.

Figure 3.2-77: HELP Model Configuration and Results for the Recommended Closure Cap Configuration



[WSRC-STI-2007-00184_OUO]

3.2.4.7 Closure Cap Degradation Mechanisms

Potential FTF closure cap degradation mechanisms are presented and discussed in detail in WSRC-STI-2007-00184_OUO for the Base Case land use scenario. This scenario assumes a 100-year institutional control period following FTF closure cap construction during which the closure cap is maintained. At the end of institutional control, it is assumed that a pine forest succeeds the closure cap's original vegetative cover. A summary of the degradation mechanisms and proposed course of action to address each mechanism is provided in Table 3.2-9.

Table 3.2-9: FTF Closure Cap Potential Degradation Mechanisms and Course of Action

Affected Layer	Potential Degradation Mechanism	Proposed Course of Action
All Layers	-Static loading induced settlement -Seismic induced liquefaction and subsequent settlement -Seismic induced slope instability	Final design will appropriately consider and handle these mechanisms and thus are not considered for performance modeling purposes.
	-Seismic induced lateral spread	Location of closure cap not conducive to lateral spreading – no action
	-Seismic induced direct rupture due to faulting	Surface faulting is non-existent in Southeast U. S. – no action
	-Stabilized Contaminant Layer Subsidence	Not applicable – tanks and subsurface items containing significant void space will be filled with grout.
Vegetative cover	-Succession -Stressors (droughts, disease, fire, and biological)	Penetration of pine tree roots and the rate of pine tree succession from stressors are included in the performance modeling.
Soil above the erosion barrier	-Erosion	Included in the performance modeling.
	-Desiccation (wet-dry cycles)	Mineralogy and composition of topsoil and backfill and the controlled compaction of the backfill is expected to preclude significant cracking upon drying and thus is not considered for performance modeling purposes.
Erosion barrier	-Weathering (dissolution)	Weathering will be appropriately considered in the final design and thus is not considered for performance modeling purposes.
	-Biological (root penetration)	The hydraulic properties of the erosion barrier are not expected to be appreciably impacted by pine root penetration and thus root penetration is not considered for performance modeling purposes.
	-Biological (burrowing animals)	Design precludes the intrusion of burrowing animals and thus this mechanism is not considered for performance modeling purposes.
	-Chemical (stabilized contaminant leachate)	Not applicable – potential sources are located below this layer.

Table 3.2-9: FTF Closure Cap Potential Degradation Mechanisms and Course of Action (Continued)

Affected Layer	Potential Degradation Mechanism	Proposed Course of Action
Lateral drainage layer	-Silting-in	Performance model includes the migration of colloidal clay from the middle backfill layer to this layer – affecting hydraulic properties.
	-Biological (root penetration)	The presence of pine tree roots within this layer is included in the performance modeling.
HDPE Geomembrane	-Ultraviolet (UV) radiation	During construction timely coverage of the geomembrane limits potential degradation from UV radiation thus not considered for performance modeling purposes.
	-Antioxidant depletion	Included in the performance modeling in conjunction with tensile stress cracking (below).
	-Thermal oxidation	Included in the performance modeling in conjunction with tensile stress cracking (below).
	-High energy irradiation	Estimated dose rate and the 10,000 year integrated dose are not sufficient to cause degradation and is not considered for performance modeling purposes.
	-Tensile stress cracking	Included in the performance modeling.
	-Biological (microbial)	HDPE geomembrane insensitive to microbial biodegradation and is not considered for performance modeling purposes.
	-Biological (root penetration)	Root penetration through existing holes caused by other degradation mechanisms is included in the performance modeling.
	-Biological (burrowing animals)	Existence of erosion barrier above this layer precludes this mechanism and is not considered for performance modeling purposes.
	-Chemical (stabilized contaminant leachate)	Not applicable – potential sources are located below this layer.

Table 3.2-9: FTF Closure Cap Potential Degradation Mechanisms and Course of Action (Continued)

Affected Layer	Potential Degradation Mechanism	Proposed Course of Action
GCL	-Slope stability	Placement is only on 2% slope thus is not considered for performance modeling purposes.
	-Freeze-thaw cycles	Depth of the layer precludes this degradation thus is not considered for performance modeling purposes.
	-Dissolution	Degradation via this mechanism is not considered credible thus is not considered for performance modeling purposes.
	-Divalent cations (Ca^{+2}, Mg^{+2}, etc.)	Included in the performance modeling.
	-Desiccation (wet-dry cycles)	Selection of materials and 6 feet of soil materials preclude this damage thus is not considered for performance modeling purposes.
	-Biological (root penetration)	Root penetration through existing holes in the HDPE geomembrane is included in the performance modeling.
	-Biological (burrowing animals)	Existence of erosion barrier above this layer precludes this mechanism and is not considered for performance modeling purposes.
	-Chemical (stabilized contaminant leachate)	Not applicable – potential sources are located below this layer.

[WSRC-STI-2007-00184_OUO, Table 34]

Based on the identified degradation mechanisms, Table 3.2-10 presents the estimated infiltration rate change over the compliance period.

Table 3.2-10: FTF Closure Cap Estimated Infiltration Rates

Year	Average Infiltration (in/yr)
0	0.00088
100	0.010
180	0.17
290	0.37
300	0.50
340	1.00
380	1.46
560	3.23
1,000	7.01
1,800	10.65
2,623	11.47
3,200	11.53
5,600	11.63
10,000	11.67

[WSRC-STI-2007-00184_OUO, Table 81]

3.2.4.8 Open Issues for Further Design

Listed below are open issues related to the FTF closure cap concept which will be addressed as the design concept matures.

- Is bamboo a climax species that prevents or greatly slows the intrusion of pine trees?
- What are the requirements for the foundation layer particularly in terms of its ability to drain water away from and around the tanks and ancillary equipment?
- What is the estimated weathering rate of the erosion barrier stone (assumed granite) based upon natural or archaeological analogs and available literature?
- What material should be used to fill the stone voids of the erosion barrier to prevent loss of overlying material into the erosion barrier?
- How will the 241-97F Cooling Water Basin and 281-8F Basin be closed? Closure of these basins can influence the surface drainage from the FTF closure cap and the design of the side-slope relative to seismic considerations.
- Should a sodium bentonite or calcium bentonite GCL be utilized?
- The definition of a significant void requiring grouting in order to eliminate subsidence needs to be determined.

The current design concept makes conservative assumptions about these open issues, and is acceptable for use for PA modeling.

3.3 Stabilized Contaminant Characteristics

3.3.1 Stabilized Contaminant Characterization Process Screening

The contaminant screening process consisted of several steps to arrive at an appropriate list of isotopes to be included in the characterization of the FTF stabilized waste.

- An initial radionuclide screening process was developed and performed to evaluate 849 isotopes. [CBU-PIT-2005-00228] Following the steps described in Section 4.2.1, the list of isotopes was reduced to 159 isotopes of concern for the PA modeling. The 159 isotopes are presented in Section 4.2.1 (Table 4.2-2).
- The 159 isotopes resulting from the initial screening were further evaluated to determine which isotopes could be eliminated from the initial inventory. This process eliminated 89 additional isotopes. The elimination process is presented in Section 4.2.1.3 (Table 4.2-6).
- The remaining 70 isotopes are presented in Table 4.2-5. Of these 70 isotopes, four four (Cf-251, Cf-252, Ra-288, Th-232) were removed because they were shown not to be present by special analysis. An additional 12 isotopes were eliminated from the FTF initial inventory characterization because their half life is so short (<5 years) that transport modeling was not warranted. However, these radionuclides may remain factors in the FTF modeling as daughter products from other isotopes in the initial inventory characterization. The final waste tank residual inventory characterization contains 54 isotopes that are identified in Table 3.3-1.

Table 3.3-1: Contaminants with an Initial Inventory

Ac-227	Cl-36	Eu-154	Ni-63	Pu-242	Th-229
Ag	Cm-243	F	NO_2	Pu-244	Th-230
Al-26	Cm-244	Fe	NO_3	Ra-226	U
Am-241	Cm-245	H-3	Np-237	Sb	U-232
Am-242m	Cm-247	Hg	Pa-231	Sb-126	U-233
Am-243	Cm-248	I-129	Pb	Sb-126m	U-234
As	Co-60	K-40	Pd-107	Se	U-235
Ba	Cr	Mn	Pt-193	Se-79	U-236
Ba-137m	Cs-135	Nb-93m	Pu-238	Sm-151	U-238
C-14	Cs-137	Nb-94	Pu-239	Sn-126	Y-90
Cd	Cu	Ni	Pu-240	Sr-90	Zn
Cf-249	Eu-152	Ni-59	Pu-241	Tc-99	Zr-93

3.3.2 Waste Tank Inventory

The waste tank inventories are an integral part of the modeling process. At the core of the FTF PA is the modeling of contaminant release from within operationally closed waste tanks and their impact on various receptors (e.g., an MOP). Therefore, the assumed quantity of contaminants is an important starting point for this process.

The process used to estimate the waste tanks' residual material at operational closure created estimates that were both bounding and reasonable. For those components projected to have insignificant impact on dose, the estimates were developed with considerable conservatism. While more reasonable estimates were developed for those components expected to affect dose, the estimates still provide conservatism over what is expected to remain at operational closure of the waste tanks.

A methodical approach was used to construct estimates of FTF waste tank closure inventories used in FTF PA modeling. Independent steps were developed to systematically construct the FTF waste tank inventories, with each step adjusting inventory either by tank or radionuclide. The steps used in inventory development were as follows:

1. The initial list of radionuclides and chemicals to be included in the FTF waste tank inventories were established.
2. Additional radionuclides were added to the list of radionuclides of concern based on the potential for activation products being present.
3. The list of radionuclides to be included was reduced based on short half-life.
4. The radionuclides and chemical inventories developed for Revision 0 of FTF PA were used as a starting point for the inventory of each individual waste tank. WCS (described in Section 3.3.2.3) was utilized in developing the FTF PA Revision 0 inventories. For the Type IV tanks, this included the contribution associated with corrosion products on the walls (including contaminant diffusion into the waste tank steel liner).
5. The waste tanks were binned according to tank type (Types I, III, IIIA and IV).
6. Within each bin, the inventories were adjusted as applicable within that bin.
7. Within the Type IV tank bin, the Tank 17 and Tank 20 inventories were left unchanged. The Tank 18 and Tank 19 inventories were revised to account for an increased level of uncertainty surrounding the residual inventories remaining after waste removal.
8. Due to future waste removal uncertainties (e.g., unknowns regarding the effectiveness of tank cleaning technologies), the initial individual waste tank inventories were increased one order of magnitude for the Type I and Type IIIA tanks.
9. To account for uncertainty surrounding future operations and movement of material within FTF, the maximum concentration associated with an individual waste tank bin was applied to the other tanks within the bin for the Type I and IIIA tanks.
10. For those radionuclides with an individual waste tank inventory less than 1 Ci, the inventory was typically adjusted up to 1 Ci.
11. The Ra-226 and Th-230 inventories were revised (with respect to the FTF PA Revision 0 inventories) to better reflect the age of waste.

More detail regarding the rationale behind the individual steps and their precise effect on the resulting FTF waste tank inventory is provided in SRR-CWDA-2009-00045.

Tables 3.3-2 and 3.3-3 show the estimated radionuclide and non-radionuclide inventories in each FTF waste tank developed using this process. All values listed in Table 3.3-2 are decayed to 9/30/2020.

Table 3.3-2: FTF Radionuclide Inventories (Ci)

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6	Tank 7	Tank 8
Ac-227	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Al-26	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Am-241	6.0E+02	6.0E+02	6.0E+02	6.0E+02	6.0E+02	6.0E+02	6.0E+02	6.0E+02
Am-242m	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Am-243	1.4E+00	1.4E+00	1.4E+00	1.4E+00	1.4E+00	1.4E+00	1.4E+00	1.4E+00
Ba-137m	8.7E+03	8.7E+03	8.7E+03	8.7E+03	8.7E+03	8.7E+03	8.7E+03	8.7E+03
C-14	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cf-249	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cl-36	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Cm-243	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cm-244	1.2E+02	1.2E+02	1.2E+02	1.2E+02	1.2E+02	1.2E+02	1.2E+02	1.2E+02
Cm-245	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cm-247	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Cm-248	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Co-60	1.8E+01	1.8E+01	1.8E+01	1.8E+01	1.8E+01	1.8E+01	1.8E+01	1.8E+01
Cs-135	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cs-137	9.2E+03	9.2E+03	9.2E+03	9.2E+03	9.2E+03	9.2E+03	9.2E+03	9.2E+03
Eu-152	1.9E+01	1.9E+01	1.9E+01	1.9E+01	1.9E+01	1.9E+01	1.9E+01	1.9E+01
Eu-154	1.3E+02	1.3E+02	1.3E+02	1.3E+02	1.3E+02	1.3E+02	1.3E+02	1.3E+02
H-3	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
I-129	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
K-40	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Nb-93m	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Nb-94	1.0E+00	1.0E-03	1.0E-03	1.0E-03	1.0E+00	1.0E+00	1.0E-03	1.0E-03
Ni-59	6.3E+00	6.3E+00	6.3E+00	6.3E+00	6.3E+00	6.3E+00	6.3E+00	6.3E+00
Ni-63	4.9E+02	4.9E+02	4.9E+02	4.9E+02	4.9E+02	4.9E+02	4.9E+02	4.9E+02
Np-237	2.3E-01	2.3E-01	2.3E-01	2.3E-01	2.3E-01	2.3E-01	2.3E-01	2.3E-01
Pa-231	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Pd-107	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Pt-193	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Pu-238	1.4E+02	1.4E+02	1.4E+02	1.4E+02	1.4E+02	1.4E+02	1.4E+02	1.4E+02
Pu-239	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01
Pu-240	7.2E+00	7.2E+00	7.2E+00	7.2E+00	7.2E+00	7.2E+00	7.2E+00	7.2E+00
Pu-241	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01
Pu-242	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Pu-244	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Ra-226	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Sb-126	9.4E-02	2.5E-02	2.1E-02	2.5E-02	9.9E-02	1.2E-01	3.0E-03	7.1E-03
Sb-126m	6.7E-01	1.8E-01	1.5E-01	1.8E-01	7.1E-01	8.4E-01	2.1E-02	5.1E-02
Se-79	4.5E+00	4.5E+00	4.5E+00	4.5E+00	4.5E+00	4.5E+00	4.5E+00	4.5E+00
Sm-151	1.2E+04	1.2E+04	1.2E+04	1.2E+04	1.2E+04	1.2E+04	1.2E+04	1.2E+04
Sn-126	6.7E-01	1.8E-01	1.5E-01	1.8E-01	7.1E-01	8.4E-01	2.1E-02	5.1E-02
Sr-90	1.3E+05	1.3E+05	1.3E+05	1.3E+05	1.3E+05	1.3E+05	1.3E+05	1.3E+05
Tc-99	7.9E+01	7.9E+01	7.9E+01	7.9E+01	7.9E+01	7.9E+01	7.9E+01	7.9E+01
Th-229	2.4E-01	2.4E-01	2.4E-01	2.4E-01	2.4E-01	2.4E-01	2.4E-01	2.4E-01
Th-230	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
U-232	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
U-233	2.3E-01	2.3E-01	2.3E-01	2.3E-01	2.3E-01	2.3E-01	2.3E-01	2.3E-01
U-234	1.7E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01
U-235	5.8E-03	5.8E-03	5.8E-03	5.8E-03	5.8E-03	5.8E-03	5.8E-03	5.8E-03
U-236	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
U-238	1.7E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01
Y-90	1.3E+05	1.3E+05	1.3E+05	1.3E+05	1.3E+05	1.3E+05	1.3E+05	1.3E+05
Zr-93	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03

Table 3.3-2: FTF Radionuclide Inventories (Ci) (Continued)

	Tank 17	Tank 18	Tank 19	Tank 20	Tank 25	Tank 26	Tank 27	Tank 28
Ac-227	NE	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Al-26	NE	1.0E+00	1.0E+00	NE	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Am-241	8.4E+00	8.2E+01	2.3E+00	1.6E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Am-242m	NE	1.0E+00	1.0E+00	NE	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Am-243	NE	1.0E-01	1.0E-01	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Ba-137m	1.0E+01	9.1E+03	6.2E+03	2.3E+01	4.9E+03	4.9E+03	4.9E+03	4.9E+03
C-14	3.1E-03	1.0E+00	1.0E+00	6.6E-04	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cf-249	NE	1.0E+00	1.0E+00	NE	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cl-36	NE	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Cm-243	NE	1.0E+00	1.0E+00	NE	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cm-244	2.9E-04	1.0E+02	1.0E+00	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Cm-245	4.4E-10	1.0E+00	1.0E+00	NE	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cm-247	NE	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Cm-248	NE	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Co-60	3.4E-02	1.0E+00	1.0E+00	4.8E-03	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cs-135	1.7E-04	1.0E+00	1.0E+00	3.6E-05	1.0E+00	1.0E-03	1.0E+00	1.0E-03
Cs-137	1.1E+01	9.7E+03	6.5E+03	2.4E+01	5.2E+03	5.2E+03	5.2E+03	5.2E+03
Eu-152	NE	1.0E+00	1.0E+00	NE	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Eu-154	2.3E-02	3.2E+00	1.0E+00	1.6E-01	2.9E+00	2.9E+00	2.9E+00	2.9E+00
H-3	5.8E+00	1.0E+00	1.0E+00	NE	1.0E+00	1.0E+00	1.0E+00	1.0E+00
I-129	1.3E-06	1.0E-03	1.0E-03	2.6E-07	1.0E-03	1.0E-03	1.0E-03	1.0E-03
K-40	NE	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Nb-93m	NE	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Nb-94	NE	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Ni-59	1.8E-01	1.0E+00	1.0E+00	3.9E-02	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Ni-63	NE	8.2E+01	1.4E+01	NE	2.4E+01	2.4E+01	2.4E+01	2.4E+01
Np-237	1.4E-02	2.4E-01	2.2E-03	7.2E-04	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Pa-231	NE	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Pd-107	NE	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Pt-193	NE	1.0E-03	1.0E+00	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Pu-238	5.4E+01	7.0E+01	4.4E+00	6.1E+00	1.2E+02	1.2E+02	1.2E+02	1.2E+02
Pu-239	1.5E+01	1.6E+02	6.4E+00	8.5E-01	2.2E+01	2.2E+01	2.2E+01	2.2E+01
Pu-240	3.4E+00	4.9E+01	2.3E+00	1.8E-01	4.8E+00	4.8E+00	4.8E+00	4.8E+00
Pu-241	9.3E+01	1.3E+02	4.6E+00	1.6E+01	5.4E+01	5.4E+01	5.4E+01	5.4E+01
Pu-242	5.3E-03	1.0E+00	1.0E+00	1.6E-03	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Pu-244	NE	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Ra-226	NE	1.9E-03	1.1E-03	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Sb-126	4.0E-03	2.3E-02	3.6E-03	8.3E-04	3.3E-04	5.9E-04	2.7E-04	5.9E-04
Sb-126m	2.8E-02	1.6E-01	2.6E-02	5.9E-03	2.4E-03	4.2E-03	2.0E-03	4.2E-03
Se-79	1.6E-02	1.0E+00	1.0E+00	3.2E-03	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Sm-151	NE	4.6E+01	1.0E+00	NE	7.1E+01	7.1E+01	7.1E+01	7.1E+01
Sn-126	2.8E-02	1.6E-01	2.6E-02	5.9E-03	2.4E-03	4.2E-03	2.0E-03	4.2E-03
Sr-90	6.6E+01	1.1E+03	5.2E+00	2.3E+01	1.0E+03	1.0E+03	1.0E+03	1.0E+03
Tc-99	9.0E-01	1.0E+00	1.4E+00	8.5E-01	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Th-229	NE	2.6E-03	1.0E-03	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Th-230	NE	1.9E-03	1.1E-03	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
U-232	3.7E-05	1.0E+00	1.0E+00	8.0E-06	1.0E+00	1.0E+00	1.0E+00	1.0E+00
U-233	NE	1.1E+00	1.9E-01	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03
U-234	NE	3.8E-01	1.1E-02	NE	2.6E-02	2.6E-02	2.6E-02	2.6E-02
U-235	3.0E-04	8.4E-03	2.6E-04	1.9E-05	1.0E-03	1.0E-03	1.0E-03	1.0E-03
U-236	NE	1.0E+00	1.0E+00	2.7E-05	1.0E+00	1.0E+00	1.0E+00	1.0E+00
U-238	6.4E-03	2.2E-01	8.7E-03	5.6E-04	2.6E-02	2.6E-02	2.6E-02	2.6E-02
Y-90	6.6E+01	1.1E+03	5.2E+00	2.3E+01	1.0E+03	1.0E+03	1.0E+03	1.0E+03
Zr-93	NE	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03

Table 3.3-2: FTF Radionuclide Inventories (Ci) (Continued)

	Tank 33	Tank 34	Tank 44	Tank 45	Tank 46	Tank 47
Ac-227	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Al-26	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Am-241	6.3E+01	1.6E+03	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Am-242m	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Am-243	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Ba-137m	9.0E+02	3.7E+03	4.9E+03	4.9E+03	4.9E+03	4.9E+03
C-14	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cf-249	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cl-36	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Cm-243	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cm-244	1.0E+00	1.0E+00	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Cm-245	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cm-247	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Cm-248	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Co-60	1.7E+01	4.7E+01	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cs-135	1.0E+00	1.0E+00	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Cs-137	9.5E+02	3.9E+03	5.2E+03	5.2E+03	5.2E+03	5.2E+03
Eu-152	3.5E+00	1.3E+01	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Eu-154	4.3E+01	1.4E+02	2.9E+00	2.9E+00	2.9E+00	2.9E+00
H-3	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
I-129	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
K-40	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Nb-93m	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Nb-94	1.0E+00	1.0E+00	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Ni-59	1.0E+00	1.8E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Ni-63	3.8E+01	1.6E+02	2.4E+01	2.4E+01	2.4E+01	2.4E+01
Np-237	2.5E-02	6.8E-02	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Pa-231	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Pd-107	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Pt-193	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Pu-238	3.6E+01	1.0E+00	1.2E+02	1.2E+02	1.2E+02	1.2E+02
Pu-239	2.2E+01	1.4E+01	2.2E+01	2.2E+01	2.2E+01	2.2E+01
Pu-240	3.9E+00	3.2E+00	4.8E+00	4.8E+00	4.8E+00	4.8E+00
Pu-241	5.5E+01	3.1E+01	5.4E+01	5.4E+01	5.4E+01	5.4E+01
Pu-242	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Pu-244	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Ra-226	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Sb-126	7.7E-02	3.4E-01	5.9E-04	5.9E-04	5.9E-04	5.9E-04
Sb-126m	5.5E-01	2.4E+00	4.2E-03	4.2E-03	4.2E-03	4.2E-03
Se-79	1.0E+00	1.3E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Sm-151	9.3E+02	4.0E+03	7.1E+01	7.1E+01	7.1E+01	7.1E+01
Sn-126	5.5E-01	2.4E+00	4.2E-03	4.2E-03	4.2E-03	4.2E-03
Sr-90	1.4E+04	5.5E+04	1.0E+03	1.0E+03	1.0E+03	1.0E+03
Tc-99	5.1E+00	2.2E+01	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Th-229	2.6E-02	7.1E-02	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Th-230	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
U-232	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
U-233	2.5E-02	6.8E-02	1.0E-03	1.0E-03	1.0E-03	1.0E-03
U-234	7.9E-02	8.8E-02	2.6E-02	2.6E-02	2.6E-02	2.6E-02
U-235	1.0E-03	1.2E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
U-236	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
U-238	7.9E-02	8.8E-02	2.6E-02	2.6E-02	2.6E-02	2.6E-02
Y-90	1.4E+04	5.5E+04	1.0E+03	1.0E+03	1.0E+03	1.0E+03
Zr-93	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03

NE – Not Estimated [SRR-CWDA-2009-00045]

Table 3.3-3: FTF Chemical Inventories (Kg)

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6	Tank 7	Tank 8	Tank 17	Tank 18	Tank 19
Ag	5.9E+00	5.9E+00	5.9E+00	5.9E+00	5.9E+00	5.9E+00	5.9E+00	5.9E+00	6.6E+00	3.2E+00	1.2E+00
As	4.5E-02	4.5E-02	4.5E-02	4.5E-02	4.5E-02	4.5E-02	4.5E-02	4.5E-02	NE	8.2E-01	9.7E-01
Ba	1.3E+01	1.3E+01	1.3E+01	1.3E+01	1.3E+01	1.3E+01	1.3E+01	1.3E+01	3.9E+00	3.8E+00	9.9E+00
Cd	4.7E+00	4.7E+00	4.7E+00	4.7E+00	4.7E+00	4.7E+00	4.7E+00	4.7E+00	1.8E+01	1.2E+02	1.1E+00
Cr	9.7E+00	9.7E+00	9.7E+00	9.7E+00	9.7E+00	9.7E+00	9.7E+00	9.7E+00	4.7E+00	1.1E+01	4.2E+00
Cu	3.9E+00	3.9E+00	3.9E+00	3.9E+00	3.9E+00	3.9E+00	3.9E+00	3.9E+00	3.3E+00	5.1E+00	5.1E-01
F	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	3.5E+00	7.2E-01	1.8E+01
Fe	8.1E+02	8.1E+02	8.1E+02	8.1E+02	8.1E+02	8.1E+02	8.1E+02	8.1E+02	5.4E+02	1.7E+03	2.1E+02
Hg	6.3E+00	6.3E+00	6.3E+00	6.3E+00	6.3E+00	6.3E+00	6.3E+00	6.3E+00	1.4E+00	2.0E+01	2.0E+00
Mn	5.7E+02	5.7E+02	5.7E+02	5.7E+02	5.7E+02	5.7E+02	5.7E+02	5.7E+02	4.8E+01	2.1E+02	1.5E+01
Ni	3.1E+02	3.1E+02	3.1E+02	3.1E+02	3.1E+02	3.1E+02	3.1E+02	3.1E+02	8.3E-01	1.9E+01	1.6E+00
NO_2	4.3E+01	4.3E+01	4.3E+01	4.3E+01	4.3E+01	4.3E+01	4.3E+01	4.3E+01	NE	7.8E+00	5.5E+02
NO_3	9.0E+02	9.0E+02	9.0E+02	9.0E+02	9.0E+02	9.0E+02	9.0E+02	9.0E+02	NE	4.6E+00	3.8E+02
Pb	1.3E+01	1.3E+01	1.3E+01	1.3E+01	1.3E+01	1.3E+01	1.3E+01	1.3E+01	5.5E+00	4.0E+01	5.3E+00
Sb	1.9E+00	1.9E+00	1.9E+00	1.9E+00	1.9E+00	1.9E+00	1.9E+00	1.9E+00	NE	2.5E+01	2.2E+01
Se	3.6E-02	3.6E-02	3.6E-02	3.6E-02	3.6E-02	3.6E-02	3.6E-02	3.6E-02	NE	8.2E-01	8.8E+00
U	5.1E+02	5.1E+02	5.1E+02	5.1E+02	5.1E+02	5.1E+02	5.1E+02	5.1E+02	5.6E+01	5.4E+02	1.9E+01
Zn	7.1E+00	7.1E+00	7.1E+00	7.1E+00	7.1E+00	7.1E+00	7.1E+00	7.1E+00	6.6E+00	9.0E+00	7.1E-01

Table 3.3-3: Chemical Inventories (Kg) (Continued)

	Tank 20	Tank 25	Tank 26	Tank 27	Tank 28	Tank 33	Tank 34	Tank 44	Tank 45	Tank 46	Tank 47
Ag	3.1E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	9.5E-01	6.0E-01	3.7E+00	3.7E+00	3.7E+00	3.7E+00
As	NE	1.5E-02	1.5E-02	1.5E-02	1.5E-02	7.4E-03	1.2E-02	1.5E-02	1.5E-02	1.5E-02	1.5E-02
Ba	1.8E+00	2.2E+00	2.2E+00	2.2E+00	2.2E+00	1.6E+00	4.5E+00	2.2E+00	2.2E+00	2.2E+00	2.2E+00
Cd	1.8E+00	1.6E+00	1.6E+00	1.6E+00	1.6E+00	7.8E-01	1.3E+00	1.6E+00	1.6E+00	1.6E+00	1.6E+00
Cr	2.5E+00	2.6E+00	2.6E+00	2.6E+00	2.6E+00	1.4E+00	3.3E+00	2.6E+00	2.6E+00	2.6E+00	2.6E+00
Cu	1.5E+00	1.8E+00	1.8E+00	1.8E+00	1.8E+00	6.4E-01	9.7E-01	1.8E+00	1.8E+00	1.8E+00	1.8E+00
F	2.4E+01	1.9E+00	1.9E+00	1.9E+00	1.9E+00	4.7E-01	1.8E-01	1.9E+00	1.9E+00	1.9E+00	1.9E+00
Fe	2.5E+02	3.0E+02	3.0E+02	3.0E+02	3.0E+02	1.2E+02	2.4E+02	3.0E+02	3.0E+02	3.0E+02	3.0E+02
Hg	6.3E-01	7.6E-01	7.6E-01	7.6E-01	7.6E-01	6.9E-01	2.2E+00	7.6E-01	7.6E-01	7.6E-01	7.6E-01
Mn	1.2E+01	5.7E+01	5.7E+01	5.7E+01	5.7E+01	1.3E+00	1.2E-01	5.7E+01	5.7E+01	5.7E+01	5.7E+01
Ni	8.0E-01	6.8E+02	6.8E+02	6.8E+02	6.8E+02	1.1E+01	6.8E+01	6.8E+02	6.8E+02	6.8E+02	6.8E+02
NO_2	1.7E+01	2.0E+01	2.0E+01	2.0E+01	2.0E+01	7.0E+00	1.1E+01	2.0E+01	2.0E+01	2.0E+01	2.0E+01
NO_3	NE	6.8E+02	6.8E+02	6.8E+02	6.8E+02	3.8E+01	6.3E+01	6.8E+02	6.8E+02	6.8E+02	6.8E+02
Pb	2.6E+00	3.9E+01	3.9E+01	3.9E+01	3.9E+01	1.7E+00	4.3E+00	3.9E+01	3.9E+01	3.9E+01	3.9E+01
Sb	NE	6.4E-01	6.4E-01	6.4E-01	6.4E-01	3.1E-01	5.1E-01	6.4E-01	6.4E-01	6.4E-01	6.4E-01
Se	NE	1.2E-02	1.2E-02	1.2E-02	1.2E-02	5.9E-03	9.6E-03	1.2E-02	1.2E-02	1.2E-02	1.2E-02
U	1.7E+01	7.7E+01	7.7E+01	7.7E+01	7.7E+01	2.3E+02	2.5E+02	7.7E+01	7.7E+01	7.7E+01	7.7E+01
Zn	3.1E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	1.2E+00	1.5E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00

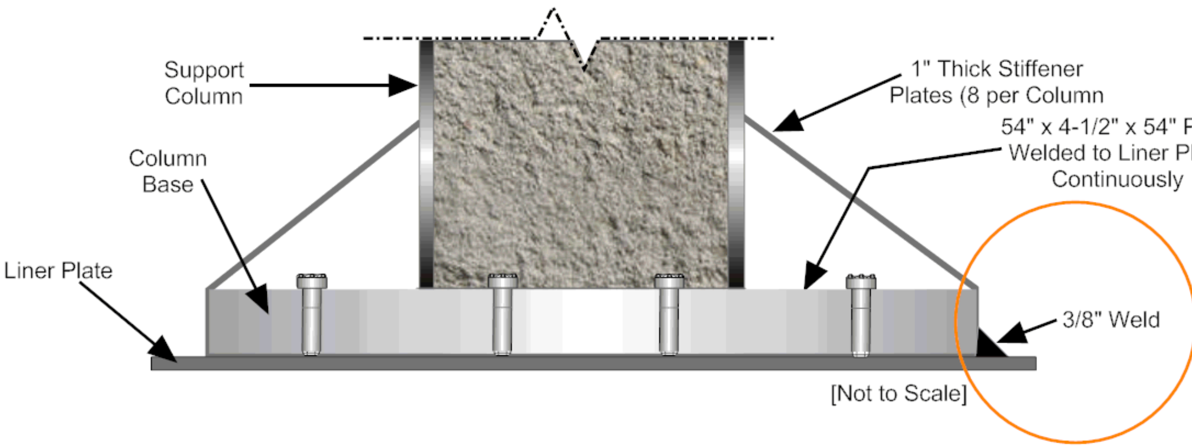
NE = Not Estimated
[SRR-CWDA-2009-00045]

3.3.2.1 Planned Method for Determining Waste Volume after Cleaning

After each tank is cleaned, the amount of residual material remaining is determined. The current visual inspection technique using landmarks, via remote video camera, is assumed to be the method for determining the volume of residual material inside cleaned tanks in the future. The 0.375 inch weld at the base of the support columns in Type I tanks is an example of a landmark that may be used as a visual reference point to estimate the height of residual material (Figure 3.3-1).

The specific volume and concentrations after cleaning do not have individual target values, since only final inventory (curies or kilograms) were modeled. The actual inventory will be used in calculating the potential dose and risk impacts through tank-specific analyses.

Figure 3.3-1: Landmark for Visual Inspection - Type I Tank Support Column Base



[W145379]

Based on experience gained from visually inspecting, via remote video camera, the inside of waste tanks at SRS, it is estimated that the height of residual material on the bottom of a tank can be accurately measured. Visual inspection does not provide as accurate an estimation when material height is greater than the chosen landmark, but for heights less than the landmarks, other methods can be employed. For example, additional landmark objects with known dimensions/markings may be placed in the waste tank if needed to support accurate material height measurement by visual inspection techniques.

3.3.2.2 Waste in Liquid and on Other Surfaces

The inventories of radiological and non-radiological constituents in residual liquid are estimated to be negligible after tank cleaning because the residual liquid will be mostly water following heel removal activities during mechanical cleaning and after chemical cleaning. This conclusion is consistent with the experiences with mechanical cleaning of Tanks 17 through 20. [WSRC-TR-97-0066, U-TR-F-00005, WSRC-TR-2002-00052, and WSRC-TR-96-0267] No inventory was assigned to liquid for Tanks 17 and 20 because significant quantities (more than 200,000 gallons) of clean water were used to clean Tank 17 and because “clean” ballast water was added to Tank 20.

The inventories in the annulus, inside failed cooling coils, and on the surface of the tank walls, cooling coils, and columns are assumed to be covered by the estimated total tank inventories shown in Tables 3.3-2 and 3.3-3 as discussed in the following paragraphs.

Currently, Tanks 1, 5 and 6 contain small amounts of waste in the annulus (Tank 1 < 0.250 inch, Tank 5 < 10 gallons, Tank 6 $\leq$ 1 inch). The material in the annulus is expected to be dried salt that should be dissolved and effectively removed when the annular regions are cleaned during closure preparation.

Cooling coils with the potential for residual waste holdup will be evaluated and flushed as necessary. Flushing is expected to remove essentially all residual waste that may have entered damaged coils. The volume of cooling coils represents a small percentage of the entire tank volume. Table 3.3-4 shows the volume of cooling coils as a percentage of the entire tank volume. The tank volume is based on that portion of the tank potentially wetted by waste. [C-CLC-G-00364, M-CLC-H-02820]

The surfaces of tank internal walls, cooling coils and support columns are not expected to contain significant deposits based on sludge mapping inspections of Tanks 5 and 6 performed to date to support mechanical cleaning activities. Cooling coils represent a significant percentage of the surface area in the tanks. Table 3.3-4 shows the surface area of cooling coils as a percentage of the entire tank internal surface area (i.e., the total not counting the cooling coil surface) for Type I, Type III, and Type IIIA tanks. The tank surface area is based on that portion of the tank potentially wetted by waste. [C-CLC-G-00364, M-CLC-H-02820] However, tank internal walls, cooling coils and support columns will be rinsed with Oxalic Acid (OA), and this process is expected to effectively clean these surfaces. A sample(s) of a representative internal tank component may be obtained and analyzed to provide data to develop the contaminant inventory estimate associated with internal tank components at tank closure, when other tank work affords the opportunity. OA rinsing of the internal walls of Tanks 18 and 19 is not planned. Therefore, the radiological inventory assigned to the corrosion products on the walls of Tanks 18 and 19 is included in the radiological inventories for these two waste tanks as presented in Table 3.3-2, and discussed in SRR-CWDA-2009-00045. It is assumed that the corrosion products on the floor of Tanks 18 and 19 were incorporated into the residual solids during mechanical mixing operations associated with heel removal, so the radiological inventory of the floor corrosion products is accounted for in the residual solids inventory. Additionally, it is assumed that 50% of the corrosion products on the tank walls sloughed off during mechanical mixing. The radiological inventory assigned to the corrosion products on the walls of Tanks 18 and 19 has been adjusted based on revised estimates of the weight of accumulated corrosion products and a revised K_d for Uranium isotopes. [X-CLC-F-00440, C-ESR-F-00043, WSRC-STI-2007-00684, SRT-WPT-2005-00049, SRT-WED-2002-00016]

Table 3.3-4: Cooling Coil Volume and Surface Area as a Percentage of the Waste Tank Volume and Surface Area

Tank Type	Volume Percentage of Cooling Coils	Surface Area Percentage of Cooling Coils
I	0.67	120[a]
III	0.11	27
IIIA	0.27	66

[a] Type I tanks contain approximately 23,000 feet of cooling coils, with a surface area that is 20% greater than the surface area of the other internal tank surfaces.

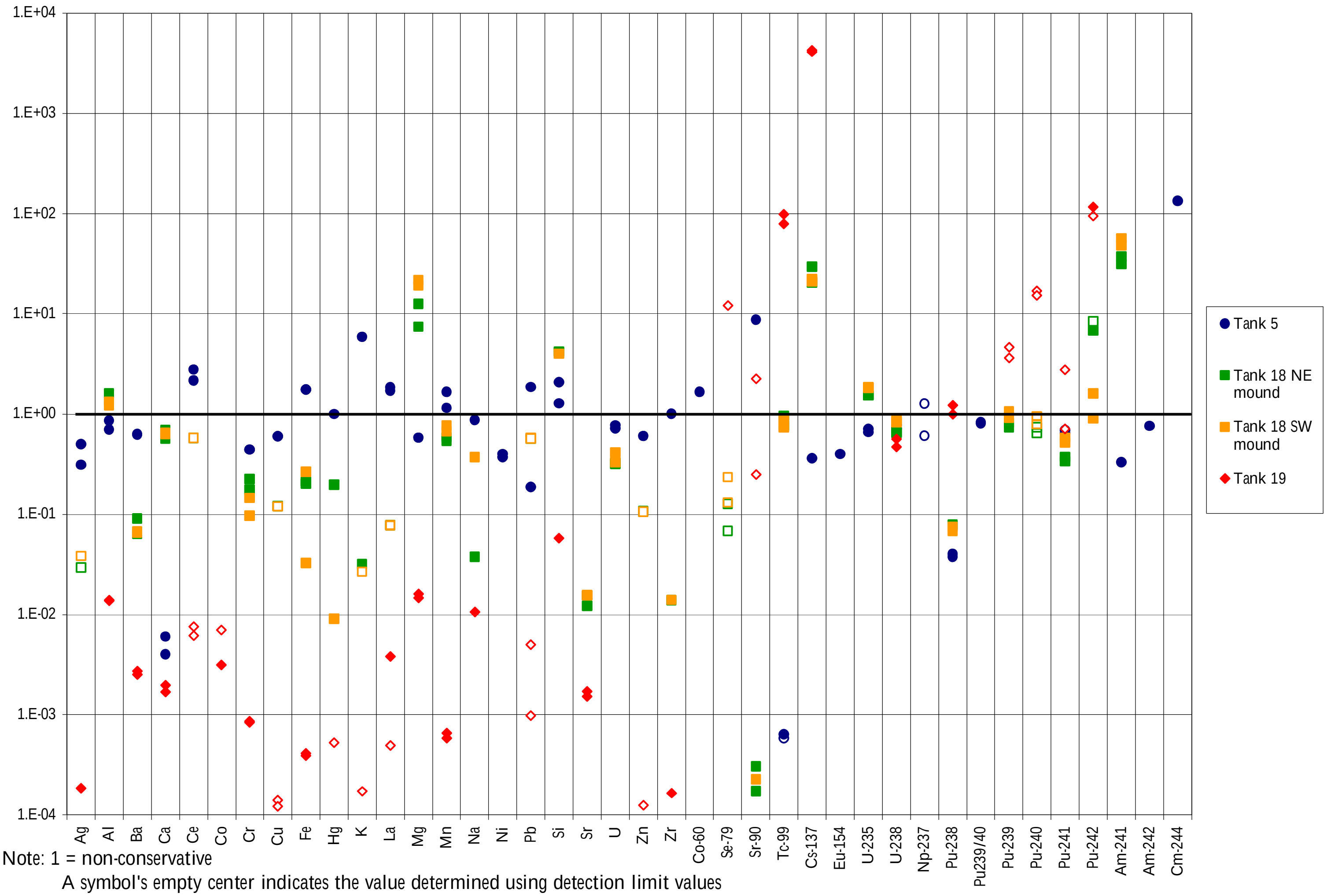
3.3.2.3 WCS Concentration Estimates

The WCS is an electronic information system that tracks waste tank data, including projected radionuclide and non-radiological inventories, based on sample analyses, process histories, composition studies, and theoretical relationships. The system, initially developed in 1995 and loaded with historical information, tracks the dry sludge concentrations of 36 radionuclides and of 19 non-radiological waste constituents in each of the SRS waste tanks. WCS tracks an inventory of Th-232; however, WCS reflects no Th-232 in dry sludge in FTF tanks. These radionuclide and non-radiological constituents are identified in Tables 3.3-2 and 3.3-3, respectively. The 36 radionuclides tracked in the WCS were selected primarily based on their impact on waste tank safety basis source term, inhalation dose potential, or on the E-Area Vault WAC. WSRC-TR-2003-00048 provides information relative to the program requirements for data review and input into WCS.

WCS generated values are generally over-estimated because of two main factors. First, each reactor spent fuel assembly that was reprocessed is assumed to have received the maximum burn-up possible and, therefore, the amounts of actual fission products contained in an assembly were actually less than those entered into WCS. Second, some of the residual material characterized as fission product bearing PUREX Low Heat Waste actually originated as cladding waste or other low radionuclide bearing wastes that contain relatively small amounts of fission products. [LWO-PIT-2007-00025] Another factor expected to provide additional over-estimation is the likelihood that actual concentrations for some constituents in the residual solids on the tank bottoms after tank cleaning will be significantly less than the concentrations for dried sludge currently given in the WCS. This condition is expected to result from flushing of the waste that will take place during mechanical mixing and the use of OA to clean the tanks.

A comparison between actual waste tank samples and WCS estimated values has been completed. Tanks 5, 18 and 19 contents have been sampled and tested to allow for a comparison. Figure 3.3-2 shows a ratio of the actual sample measure values over the predicted WCS values for each constituent (i.e., values less than 1.0 are overestimated by WCS). The comparison of data shows that 75% of the approximately 215 sample results indicate WCS conservatively overestimated or closely matched the sample measure values. This is true for sensitivity run radionuclides identified in Section 5.2.2, which had laboratory results including: U-238, Pu-239, and Pu-240. Excluding less than detection limit values, less than 25% of the sample results indicate that WCS underestimated the sample measure values. [SRS-REG-2007-00008]

Figure 3.3-2: Sample to Prediction Ratio



Note: 1 = non-conservative
A symbol's empty center indicates the value determined using detection limit values
WCS does not provide estimates for As, Cd, Sb, Se, U-233, U-234, U-236, Am-243, and Cm-242 for Tanks 5, 18 and 19

3.3.3 Ancillary Equipment Inventory

Ancillary equipment includes transfer lines, transfer line secondary containment, pump tanks, PPs, the FTF catch tank, DBs, valve boxes, and the evaporator systems. Over the operating life of the facility, radioactive waste comes in physical contact with some of these components, contaminating them and hence, leaving contamination on the components. The degree of contamination depends on many factors, which include, but are not limited to, the service life of the component, the material of construction, and the type of waste in contact with the component. Some of the listed equipment serves only as secondary containment and may not have contacted the waste.

For the purpose of this effort ancillary equipment inventories are estimated for the following three categories:

1. Transfer lines
2. Pump tanks and catch tank
3. Evaporators and CTS Tank

Other ancillary equipment, such as transfer line secondary containment, PPs, valve boxes, and DBs, were not considered as part of the source term for the PA modeling, as described later in this document.

The inventory of each tank, as described in Section 3.3.2, is used to establish the characterization of the residual material in the ancillary equipment and decaying activity to 9/30/2020. [LWO-PIT-2006-00069] The results of a review of waste transfers within FTF and between FTF and HTF have been sorted to determine the percentage of the volume of all waste transfers that can be attributed to each FTF waste tank. The representative concentration is then determined by applying a weighted average to each isotopic distribution in the FTF waste tanks. Because the characterization of dry sludge was used for each waste tank for conservatism, it is assumed that the sludge would have to be slurried in order to remove it from the waste tanks through the ancillary equipment. It is important to note that, while the sludge concentrations are used, dry sludge is only a small portion of the total waste that passes through the transfer lines that are routinely flushed with a high volume of supernate. Using the dry sludge concentrations provides a conservative representation of the actinides and long-lived isotopes. The short-lived isotopes which are more concentrated in the supernate than the sludge will have decayed significantly during the 100-year active institutional control period and are not expected to be as significant to an inadvertent intruder as the long-lived isotopes and actinides.

The Technical Safety Requirements (TSR) limit waste transfers to less than or equal to 16.7 wt% solids and operational parameters are typically well below TSR limits. [S-TSR-G-00001] Conservatively, the slurry concentration is reduced to 20% of the dry sludge concentration. The weighted concentration of radionuclides and non-radiological elements in the slurried sludge is presented in Tables 3.3-5 and 3.3-6 respectively. Because there is no inventory of Th-232, Ra-228, Cf-251 or Cf-252 in the waste tank inventory as described in Section 3.3.1, only 60 radionuclides remain.

Table 3.3-5: Representative Radionuclide Concentrations of Sludge Slurry

Radionuclide	Concentration (Ci/gal)	Radionuclide	Concentration (Ci/gal)	Radionuclide	Concentration (Ci/gal)
Ac-227	3.18E-11	Eu-152	2.76E-04	Rh-106	6.16E-09
Al-26	3.10E-07	Eu-154	3.01E-03	Ru-106	6.16E-09
Am-241	2.43E-02	Eu-155	2.68E-03	Sb-125	1.70E-04
Am-242m	3.50E-05	H-3	3.39E-05	Sb-126	9.27E-06
Am-243	3.97E-06	I-129	2.95E-09	Sb-126m	6.61E-05
Ba-137m	2.27E-01	Na-22	4.87E-07	Se-79	3.53E-05
Bk-249	9.15E-32	Nb-94	1.57E-06	Sm-151	1.03E-01
C-14	1.77E-06	Ni-59	6.98E-05	Sn-126	6.61E-05
Ce-144	7.93E-11	Ni-63	5.78E-03	Sr-90	1.30E+00
Cf-249	3.36E-23	Np-237	3.28E-06	Tc-99	6.24E-04
Cm-242	1.00E-22	Pa-231	1.30E-09	Te-125m	4.16E-05
Cm-243	5.85E-07	Pm-147	2.59E-03	Th-229	2.09E-06
Cm-244	1.12E-03	Pr-144	7.93E-11	Th-230	5.95E-06
Cm-245	1.44E-08	Pu-238	7.63E-03	U-232	3.10E-08
Cm-247	5.36E-21	Pu-239	3.00E-03	U-233	1.55E-05
Cm-248	1.24E-21	Pu-240	1.10E-03	U-234	9.95E-06
Co-60	9.69E-04	Pu-241	5.18E-03	U-235	1.18E-07
Cs-134	5.38E-07	Pu-242	9.07E-06	U-236	1.90E-07
Cs-135	6.82E-07	Pu-244	4.27E-09	U-238	5.82E-06
Cs-137	2.43E-01	Ra-226	5.99E-06	Y-90	1.30E+00

Table 3.3-6: Representative Non-Radionuclide Concentrations of Sludge Slurry

Chemical	Concentration (kg/gal)
Ag	3.40E-04
As	1.15E-05
Ba	4.18E-04
Cd	1.19E-03
Cr	4.46E-04
Cu	2.27E-04
F	3.07E-04
Fe	4.84E-02
Hg	3.24E-04
Mn	8.75E-03
Ni	3.52E-02
NO_2 & NO_3	4.02E-02
Pb	2.49E-03
Sb	2.74E-04
Se	3.53E-05
U	1.90E-02
Zn	4.24E-04

3.3.3.1 Transfer Line Inventory

The amount of residual material in the piping systems was determined analytically. [CBU-PIT-2005-00120] The methodology in the referenced document is used for transfer lines, but with a different concentration. Waste in contact with piping systems adheres to the pipe in three ways:

- Diffusion into the metal
- Residue in the oxide film
- Residue left behind after a transfer and flush

Diffusion calculations assume a 100-year contact time and a 100°C exposure temperature. Appendix B of CBU-PIT-2005-00120 describes the methodology in which diffusion estimates are made.

3.3.3.1.1 Estimation of Residue in Transfer Line Systems

A list of transfer lines in the tank farm are identified in Table 3.2-3. The list documents the pipe diameter, material of construction, and the core pipe dimensions. The inventory of residue in the transfer lines is the sum of:

1. Residue by diffusion into metal;
2. Residue in the oxide film formed on the carbon steel and the stainless steel; and
3. Residue of particles remaining after the transfer lines are flushed.

3.3.3.1.1.1 Residue Diffusion into Metal

Diffusion is the technique for carburizing and nitriding of metals; and therefore is a known industrial transport phenomenon. CBU-PIT-2005-00120 describes the derivation of the diffusion correlations.

3.3.3.1.1.2 Estimation of Diffusion of Isotopes into Carbon and Stainless Steels

A standard methodology for estimating the migration of radionuclides into carbon and stainless steel, CBU-PIT-2005-00120 demonstrates that Fick's Second Law of Diffusion can be used to calculate diffusion in metal. The results of the diffusion calculation are shown in Tables 3.3-7 and 3.3-8.

Table 3.3-7: Radiological Surface Concentration by Diffusion into Metal

Isotope	Diffusion Coefficient (cm^2/sec)		Surface Concentration (Ci/ft^2)	
	Carbon Steel	Stainless	Carbon Steel	Stainless
Ac-227	5.33E-43	1.86E-49	3.76E-29	2.22E-32
Al-26	5.48E-23	7.08E-35	3.72E-15	4.22E-21
Am-241	3.33E-44	1.00E-49	7.18E-21	1.25E-23
Am-242m	3.33E-44	1.00E-49	1.03E-23	1.79E-26
Am-243	3.33E-44	1.00E-49	1.17E-24	2.03E-27
Ba-137m	2.49E-35	6.51E-47	1.83E-15	2.96E-21
Bk-249	1.35E-44	8.33E-50	1.72E-50	4.27E-53
C-14	1.50E-17	1.80E-21	1.11E-11	1.22E-13
Ce-144	7.26E-36	3.87E-47	3.46E-25	7.99E-31
Cf-249	8.60E-45	7.62E-50	5.05E-42	1.50E-44
Cm-242	2.11E-44	9.12E-50	2.36E-41	4.89E-44
Cm-243	2.11E-44	9.12E-50	1.38E-25	2.86E-28
Cm-244	2.11E-44	9.12E-50	2.64E-22	5.49E-25
Cm-245	2.11E-44	9.12E-50	3.39E-27	7.04E-30
Cm-247	2.11E-44	9.12E-50	1.26E-39	2.62E-42
Cm-248	2.11E-44	9.12E-50	2.91E-40	6.05E-43
Co-60	2.59E-36	2.42E-43	2.52E-18	7.72E-22
Cs-134	4.65E-35	8.54E-47	5.94E-21	8.05E-27
Cs-135	4.65E-35	8.54E-47	7.53E-21	1.02E-26
Cs-137	4.65E-35	8.54E-47	2.69E-15	3.64E-21
Eu-152	3.76E-37	1.19E-47	2.73E-19	1.54E-24
Eu-154	3.76E-37	1.19E-47	2.98E-18	1.68E-23
Eu-155	3.76E-37	1.19E-47	2.65E-18	1.49E-23
H-3	9.70E-08	1.48E-09	1.71E-05	2.12E-06
I-129	1.67E-34	1.50E-46	6.17E-23	5.86E-29
Na-22	2.44E-21	2.62E-33	3.90E-14	4.04E-20
Nb-94	2.97E-34	1.00E-44	4.38E-20	2.54E-25
Ni-59	2.01E-33	4.27E-40	5.06E-18	2.33E-21
Ni-63	2.01E-33	4.27E-40	4.19E-16	1.93E-19
Np-237	8.30E-44	1.22E-49	1.53E-24	1.85E-27
Pa-231	2.09E-43	1.50E-49	9.62E-28	8.14E-31
Pm-147	1.21E-36	1.87E-47	4.61E-18	1.82E-23
Pr-144	3.97E-36	3.02E-47	2.56E-25	7.05E-31
Pu-238	5.25E-44	1.10E-49	2.83E-21	4.10E-24

Table 3.3-7: Radiological Surface Concentration by Diffusion into Metal (Continued)

Isotope	Diffusion Coefficient (cm^2/sec)		Surface Concentration (Ci/ft^2)	
	Carbon Steel	Stainless	Carbon Steel	Stainless
Pu-239	5.25E-44	1.10E-49	1.11E-21	1.61E-24
Pu-240	5.25E-44	1.10E-49	4.09E-22	5.93E-25
Pu-241	5.25E-44	1.10E-49	1.92E-21	2.78E-24
Pu-242	5.25E-44	1.10E-49	3.36E-24	4.87E-27
Pu-244	5.25E-44	1.10E-49	1.58E-27	2.30E-30
Ra-226	8.55-E-43	2.09E-49	8.97E-24	4.43E-27
Rh-106	8.10E-32	3.01E-45	2.84E-21	5.47E-28
Ru-106	3.91E-32	2.07E-45	1.97E-21	4.54E-28
Sb-125	1.05E-36	2.73E-46	2.81E-19	4.55E-24
Sb-126	1.05E-36	2.73E-46	1.54E-20	2.48E-25
Sb-126m	6.17E-34	2.73E-46	2.66E-18	1.77E-24
Se-79	2.00E-32	2.79E-43	8.08E-18	3.02E-23
Sm-151	6.71E-37	1.49E-47	1.36E-16	6.41E-22
Sn-126	1.20E-33	3.74E-46	3.71E-18	2.07E-24
Sr-90	1.64E-33	3.77E-44	8.54E-14	4.10E-19
Tc-99	1.70E-31	4.44E-45	4.16E-16	6.72E-23
Te-125m	3.19E-34	2.02E-46	1.20E-18	9.56E-25
Th-229	3.34E-43	1.67E-49	1.95E-24	1.38E-27
Th-230	3.34E-43	1.67E-49	5.56E-24	3.93E-27
U-232	1.32E-43	1.35E-49	1.82E-26	1.84E-29
U-233	1.32E-43	1.35E-49	9.09E-24	9.20E-27
U-234	1.32E-43	1.35E-49	5.84E-24	5.92E-27
U-235	1.32E-43	1.35E-49	6.92E-26	7.00E-29
U-236	1.32E-43	1.35E-49	1.12E-25	1.13E-28
U-238	1.32E-43	1.35E-49	3.42E-24	3.46E-27
Y-90	9.13E-34	2.39E-44	6.38E-14	3.26E-19

Table 3.3-8: Non-Radiological Surface Concentration by Diffusion into Metal

Isotope	Diffusion Coefficient (cm^2/sec)		Surface Concentration (kg/ft^2)	
	Carbon Steel	Stainless	Carbon Steel	Stainless
Ag	9.41E-33	1.01E-45	5.34E-17	1.75E-23
As	3.91E-32	4.82E-43	3.67E-18	1.29E-23
Ba	2.49E-35	6.51E-47	3.37E-18	5.46E-24
Cd	4.69E-33	7.18E-46	1.32E-16	5.17E-23
Cr	5.12E-29	2.15E-40	5.17E-15	1.06E-20
Cu	7.17E-31	5.44E-42	3.11E-16	8.56E-22
F	2.34E-19	2.14E-31	2.41E-10	2.30E-16
Fe	8.41E-30	4.46E-41	2.27E-13	5.23E-19
Hg	4.19E-41	5.79E-49	3.40E-21	4.00E-25
Mn	2.04E-29	9.61E-41	6.39E-14	1.39E-19
Ni	1.58E-30	1.06E-41	7.16E-14	1.86E-19
NO_2 & NO_3	7.18E-17	5.71E-29	5.52E-07	4.92E-13
Pb	1.55E-41	4.40E-49	1.59E-20	2.67E-24
Sb	6.17E-34	2.73E-46	1.10E-17	7.33E-24
Se	2.00E-32	2.79E-43	8.08E-18	3.02E-23
U	1.32E-43	1.35E-49	1.12E-20	1.13E-23
Zn	3.34E-31	2.86E-42	3.97E-16	1.16E-21

3.3.3.1.1.3 Residue in the Oxide Film

Stainless and carbon steels form an oxide film, which provides corrosion protection. Diffusion data of the isotopes into the films is sparse; therefore, a conservative assumption equates the isotopic and chemical concentration of the layer equivalent to that of slurry with 20 wt% solids. The oxide film thicknesses for the two metals are:

Stainless Steel: 10 µm (thickness is used for a conservative estimate). [CBU-PIT-2005-00120]

Carbon Steel: 0.018 inches (the thickness of rust from 100 years of accumulation on the pipe walls at a rate of approximately 0.9 mils per 5 years). [SRT-MTS-2002-20004]

Therefore, the specific volume of oxide for 304L stainless steel was found to be approximately 2.5E-4 gallons per square foot; the specific volume for carbon steel was found to be approximately 1.1E-2 gallons per square foot. Tables 3.3-9 and 3.3-10 present the results of multiplying the concentrations from Tables 3.3-5 and 3.3-6 by these volumetric terms.

Table 3.3-9: Radiological Surface Concentration in the Oxide Layer

Radionuclide	Carbon Steel (Ci/ft^2)	Stainless Steel (Ci/ft^2)	Radionuclide	Carbon Steel (Ci/ft^2)	Stainless Steel (Ci/ft^2)
Ac-227	3.57E-13	7.81E-15	Pa-231	1.46E-11	3.19E-13
Al-26	3.48E-09	7.61E-11	Pm-147	2.91E-05	6.37E-07
Am-241	2.73E-04	5.97E-06	Pr-144	8.90E-13	1.95E-14
Am-242m	3.92E-07	8.58E-09	Pu-238	8.56E-05	1.87E-06
Am-243	4.45E-08	9.74E-10	Pu-239	3.36E-05	7.36E-07
Ba-137m	2.54E-03	5.56E-05	Pu-240	1.24E-05	2.70E-07
Bk-249	1.03E-33	2.25E-35	Pu-241	5.81E-05	1.27E-06
C-14	1.99E-08	4.35E-10	Pu-242	1.02E-07	2.22E-09
Ce-144	8.90E-13	1.95E-14	Pu-244	4.79E-11	1.05E-12
Cf-249	3.77E-25	8.25E-27	Ra-226	6.73E-08	1.47E-09
Cm-242	1.12E-24	2.46E-26	Rh-106	6.92E-11	1.51E-12
Cm-243	6.57E-09	1.44E-10	Ru-106	6.92E-11	1.51E-12
Cm-244	1.26E-05	2.76E-07	Sb-125	1.91E-06	4.17E-08
Cm-245	1.62E-10	3.54E-12	Sb-126	1.04E-07	2.28E-09
Cm-247	6.02E-23	1.32E-24	Sb-126m	7.42E-07	1.62E-08
Cm-248	1.39E-23	3.04E-25	Se-79	3.96E-07	8.67E-09
Co-60	1.09E-05	2.38E-07	Sm-151	1.15E-03	2.52E-05
Cs-134	6.04E-09	1.32E-10	Sn-126	7.42E-07	1.62E-08
Cs-135	7.66E-09	1.67E-10	Sr-90	1.46E-02	3.20E-04
Cs-137	2.73E-03	5.97E-05	Tc-99	7.00E-06	1.53E-07
Eu-152	3.09E-06	6.76E-08	Te-125m	4.66E-07	1.02E-08
Eu-154	3.37E-05	7.38E-07	Th-229	2.35E-08	5.13E-10
Eu-155	3.00E-05	6.57E-07	Th-230	6.68E-08	1.46E-09
H-3	3.81E-07	8.33E-09	U-232	3.47E-10	7.60E-12
I-129	3.31E-11	7.25E-13	U-233	1.74E-07	3.80E-09
Na-22	5.47E-09	1.20E-10	U-234	1.12E-07	2.44E-09
Nb-94	1.76E-08	3.85E-10	U-235	1.32E-09	2.89E-11
Ni-59	7.83E-07	1.71E-08	U-236	2.13E-09	4.66E-11
Ni-63	6.48E-05	1.42E-06	U-238	6.54E-08	1.43E-09
Np-237	3.68E-08	8.05E-10	Y-90	1.46E-02	3.20E-04

Table 3.3-10: Non-Radiological Surface Concentration in the Oxide Layer

Chemical	Carbon Steel (kg/ft^2)	Stainless Steel (kg/ft^2)
Ag	3.82E-06	8.35E-08
As	1.29E-07	2.82E-09
Ba	4.69E-06	1.03E-07
Cd	1.34E-05	2.93E-07
Cr	5.01E-06	1.09E-07
Cu	2.54E-06	5.57E-08
F	3.45E-06	7.55E-08
Fe	5.43E-04	1.19E-05
Hg	3.64E-06	7.96E-08
Mn	9.82E-05	2.15E-06
Ni	3.95E-04	8.63E-06
NO_2 & NO_3	4.52E-04	9.88E-06
Pb	2.79E-05	6.10E-07
Sb	3.08E-06	6.73E-08
Se	3.96E-07	8.67E-09
U	2.14E-04	4.67E-06
Zn	4.76E-06	1.04E-07

The transfer line core piping is flushed three times the line volume following transfers as normal operating procedure. By performance of a mass balance, the waste concentrations follow an exponential decay curve with respect to time. [HLW-STE-99-0023]

$$C(t) = C_o e^{-Qt/V} \qquad (1)$$

Where:

Q = *Volumetric flow rate*
V = *Volume of liquid*
t = *time*

Let F equal the number of flush volumes (3), and since $Q = V / t$, the previous equation becomes,

$$C = C_o e^{-F} \qquad (2)$$

Where C_O is the initial concentration and F is the number of flush volumes. In this case, F = 3 for the number of volumes.

On a per area basis, the following equation applies:

Unit Volume/Unit Area = $\pi\,(d/2)^2 / \pi\, d = d/4$

Surface Area Concentration (Ci/ft^2 *or* kg/ft^2) =

C (Ci/gal or kg/gal) x (7.48 gallons/ft^3*) x d/4 x (1 ft/12 in)*

Or

$$C_{per\ unit\ area} = 0.156\ C\ d \qquad (3)$$

Where C is concentration in Ci/gallon or kg/gallon and d is pipe diameter in inches.

Tables 3.3-11 and 3.3-12 present the remaining surface concentration following 3 flush volumes.

The GDLs leading from the evaporators to the waste tanks have been plugged with salt waste in the past. However, they have been easily cleaned and are expected to be at least as clean as the bulk waste transfer lines after three volume flushes. For the purpose of this calculation of transfer line inventory, the GDLs are assumed to be the same as the bulk waste transfer lines.

Table 3.3-11: Radiological Surface Concentration by Residue after Flushing Three Times

Isotope	Core Pipe Size			Isotope	Core Pipe Size		
	2-inch (Ci/ft^2)	3-inch (Ci/ft^2)	4-inch (Ci/ft^2)		2-inch (Ci/ft^2)	3-inch (Ci/ft^2)	4-inch (Ci/ft^2)
Ac-227	5.11E-13	7.58E-13	9.95E-13	Pa-231	2.08E-11	3.09E-11	4.06E-11
Al-26	4.97E-09	7.38E-09	9.69E-09	Pm-147	4.16E-05	6.18E-05	8.11E-05
Am-241	3.90E-04	5.79E-04	7.60E-04	Pr-144	1.27E-12	1.89E-12	2.48E-12
Am-242m	5.61E-07	8.32E-07	1.09E-06	Pu-238	1.22E-04	1.82E-04	2.38E-04
Am-243	6.37E-08	9.45E-08	1.24E-07	Pu-239	4.81E-05	7.13E-05	9.36E-05
Ba-137m	3.63E-03	5.39E-03	7.08E-03	Pu-240	1.77E-05	2.62E-05	3.44E-05
Bk-249	1.47E-33	2.18E-33	2.86E-33	Pu-241	8.30E-05	1.23E-04	1.62E-04
C-14	2.84E-08	4.22E-08	5.53E-08	Pu-242	1.45E-07	2.16E-07	2.83E-07
Ce-144	1.27E-12	1.89E-12	2.48E-12	Pu-244	6.85E-11	1.02E-10	1.33E-10
Cf-249	5.39E-25	8.00E-25	1.05E-24	Ra-226	9.61E-08	1.43E-07	1.87E-07
Cm-242	1.61E-24	2.38E-24	3.13E-24	Rh-106	9.88E-11	1.47E-10	1.93E-10
Cm-243	9.39E-09	1.39E-08	1.83E-08	Ru-106	9.88E-11	1.47E-10	1.93E-10
Cm-244	1.80E-05	2.67E-05	3.51E-05	Sb-125	2.73E-06	4.05E-06	5.31E-06
Cm-245	2.31E-10	3.43E-10	4.50E-10	Sb-126	1.49E-07	2.21E-07	2.90E-07
Cm-247	8.60E-23	1.28E-22	1.68E-22	Sb-126m	1.06E-06	1.57E-06	2.07E-06
Cm-248	1.99E-23	2.95E-23	3.87E-23	Se-79	5.67E-07	8.41E-07	1.10E-06
Co-60	1.55E-05	2.31E-05	3.03E-05	Sm-151	1.65E-03	2.44E-03	3.21E-03
Cs-134	8.63E-09	1.28E-08	1.68E-08	Sn-126	1.06E-06	1.57E-06	2.07E-06
Cs-135	1.09E-08	1.62E-08	2.13E-08	Sr-90	2.09E-02	3.10E-02	4.07E-02
Cs-137	3.90E-03	5.79E-03	7.60E-03	Tc-99	1.00E-05	1.48E-05	1.95E-05
Eu-152	4.42E-06	6.56E-06	8.61E-06	Te-125m	6.67E-07	9.90E-07	1.30E-06
Eu-154	4.82E-05	7.16E-05	9.39E-05	Th-229	3.35E-08	4.98E-08	6.53E-08
Eu-155	4.29E-05	6.37E-05	8.36E-05	Th-230	9.55E-08	1.42E-07	1.86E-07
H-3	5.44E-07	8.08E-07	1.06E-06	U-232	4.97E-10	7.37E-10	9.67E-10
I-129	4.74E-11	7.03E-11	9.23E-11	U-233	2.48E-07	3.68E-07	4.84E-07
Na-22	7.82E-09	1.16E-08	1.52E-08	U-234	1.60E-07	2.37E-07	3.11E-07
Nb-94	2.52E-08	3.73E-08	4.90E-08	U-235	1.89E-09	2.80E-09	3.68E-09
Ni-59	1.12E-06	1.66E-06	2.18E-06	U-236	3.05E-09	4.52E-09	5.94E-09
Ni-63	9.27E-05	1.38E-04	1.81E-04	U-238	9.34E-08	1.39E-07	1.82E-07
Np-237	5.26E-08	7.81E-08	1.03E-07	Y-90	2.09E-02	3.10E-02	4.07E-02

Table 3.3-12: Non-Radiological Surface Concentration by Residue after Flushing Three Times

Chemical	Core Pipe Size		
	2-inch (kg/ft^2)	3-inch (kg/ft^2)	4-inch (kg/ft^2)
Ag	5.46E-06	8.10E-06	1.06E-05
As	1.84E-07	2.73E-07	3.58E-07
Ba	6.70E-06	9.95E-06	1.31E-05
Cd	1.91E-05	2.84E-05	3.72E-05
Cr	7.15E-06	1.06E-05	1.39E-05
Cu	3.64E-06	5.40E-06	7.08E-06
F	4.93E-06	7.32E-06	9.60E-06
Fe	7.76E-04	1.15E-03	1.51E-03
Hg	5.20E-06	7.72E-06	1.01E-05
Mn	1.40E-04	2.08E-04	2.73E-04
Ni	5.64E-04	8.37E-04	1.10E-03
NO_2 & NO_3	6.45E-04	9.58E-04	1.26E-03
Pb	3.99E-05	5.92E-05	7.77E-05
Sb	4.40E-06	6.52E-06	8.56E-06
Se	5.67E-07	8.41E-07	1.10E-06
U	3.05E-04	4.53E-04	5.95E-04
Zn	6.80E-06	1.01E-05	1.32E-05

The total affected surface area of the transfer lines according to the transfer line inventory in Section 3.2 is approximately 36,000 ft^2. The total radiological and chemical inventory in transfer lines using analytical methods are presented in Tables 3.3-13 and 3.3-14.

Table 3.3-13: Estimate of Residual Radioactivity in FTF Transfer Lines

Isotope	Remaining Curies	Isotope	Remaining Curies	Isotope	Remaining Curies
Ac-227	2.71E-08	Eu-152	2.34E-01	Rh-106	5.24E-06
Al-26	2.64E-04	Eu-154	2.56E+00	Ru-106	5.24E-06
Am-241	2.07E+01	Eu-155	2.27E+00	Sb-125	1.45E-01
Am-242m	2.97E-02	H-3	1.12E-01	Sb-126	7.88E-03
Am-243	3.37E-03	I-129	2.51E-06	Sb-126m	5.62E-02
Ba-137m	1.93E+02	Na-22	4.14 E-04	Se-79	3.00E-02
Bk-249	7.78E-29	Nb-94	1.33E-03	Sm-151	8.73E+01
C-14	1.51E-03	Ni-59	5.93E-02	Sn-126	5.62E-02
Ce-144	6.74E-08	Ni-63	4.91E+00	Sr-90	1.11E+03
Cf-249	2.86E-20	Np-237	2.79E-03	Tc-99	5.30E-01
Cm-242	8.51E-20	Pa-231	1.11E-06	Te-125m	3.53E-02
Cm-243	4.98E-04	Pm-147	2.21E+00	Th-229	1.78E-03
Cm-244	9.55E-01	Pr-144	6.74E-08	Th-230	5.06E-03
Cm-245	1.23E-05	Pu-238	6.49E+00	U-232	2.63E-05
Cm-247	4.56E-18	Pu-239	2.55E+00	U-233	1.32E-02
Cm-248	1.05E-18	Pu-240	9.37E-01	U-234	8.46E-03
Co-60	8.24E-01	Pu-241	4.40E+00	U-235	1.00E-04
Cs-134	4.58E-04	Pu-242	7.71E-03	U-236	1.62E-04
Cs-135	5.80E-04	Pu-244	3.63E-06	U-238	4.95E-03
Cs-137	2.07E+02	Ra-226	5.10E-03	Y-90	1.11E+03
				Total	**2.8E+03**

Table 3.3-14: Estimate of Residual Chemicals in FTF Transfer Lines

Chemical	Remaining Kilograms (kg)
Ag	2.89E-01
As	9.76E-03
Ba	3.55E-01
Cd	1.01E+00
Cr	3.79E-01
Cu	1.93E-01
F	2.61E-01
Fe	4.12E+01
Hg	2.76E-01
Mn	7.44E+00
Ni	2.99E+01
NO_2 & NO_3	3.42E+01
Pb	2.11E+00
Sb	2.33E-01
Se	3.00E-02
U	1.62E+01
Zn	3.61E-01

The majority of the contribution for the transfer line inventory is from the residue after flushing. To illustrate, Table 3.3-15 presents examples of the contribution from each inventory contributor.

Table 3.3-15: Distribution of Estimate Contributions

Isotope	Diffusion into Metal (Ci/ft^2)	% of Total	Residue in Oxide (Ci/ft^2)	% of Total	Particle Residues (Ci/ft^2)	% of Total
Cs-137	3.64E-21	4.75E-17	5.97E-05	7.79E-01	7.60E-03	9.92E+01
Np-237	1.85E-27	1.78E-18	8.05E-10	7.75E-01	1.03E-07	9.92E+01
Pu-238	4.10E-24	1.71E-18	1.87E-06	7.80E-01	2.38E-04	9.92E+01
Ra-226	4.43E-27	2.35E-18	1.47E-09	7.80E-01	1.87E-07	9.92E+01
Tc-99	6.72E-23	3.42E-16	1.53E-07	7.79E-01	1.95E-05	9.92E+01
U-234	5.93E-27	1.89E-18	2.44E-09	7.78E-01	3.11E-07	9.92E+01
U-238	3.46E-27	1.89E-18	1.43E-09	7.80E-01	1.82E-07	9.92E+01

3.3.3.2 Pump Tank and Catch Tank Inventory

Pump tanks and the FTF catch tank differ from piping systems with respect to such features as geometry and usage. Only residue left behind after rinsing and flushing is considered for these components. After tanks are cleaned and inspected, it is expected that residual inventory will be very low. It is assumed that 0.0625 inch of residual material will remain in these vessels.

The material concentrations presented in Tables 3.3-5 and 3.3-6 were used to determine the residual inventory in pump tanks FPT-1, FPT-2, and FPT-3. The Tank 8 characterization from the SRS WCS was used to estimate the inventory in the FTF catch tank. [LWO-PIT-2006-00069] Historically, the only significant event related to the catch tank was an inadvertent overflow of Tank 8. Since the event, the tank has received many tank volumes of rainwater. All of these tanks are accessible for waste removal and cleaning. The residual for the three pump tanks is estimated as 0.0625 inch of residue remaining on the floor of the tank. The diameter of the base of the pump tanks is 12 feet. The residue for each pump tank is therefore estimated at approximately 4.5 gallons each. The FTF catch tank is a 30 foot long cylindrical tank with a 1.25 foot nose on each end laying horizontally, the diameter is 9.5 feet. For simplicity and conservatism, the tank is squared off to a 9.5 feet x 9.5 feet x 32.5 feet rectangular structure and the lower half of the structure is assumed to contain 0.0625 inch of residue. The total residue within the tank is estimated to be approximately 27 gallons. The estimated inventory is presented in Tables 3.3-16 and 3.3-17.

Table 3.3-16: Estimate of Residual Radioactivity in Pump Tanks and Catch Tank

Isotope	FPT-1 Remaining Curies	FPT-2 Remaining Curies	FPT-3 Remaining Curies	FTF Catch Tank Remaining Curies
Ac-227	1.43E-10	1.43E-10	1.43E-10	8.86E-10
Al-26	1.40E-06	1.40E-06	1.40E-06	2.48E-06
Am-241	1.09E-01	1.09E-01	1.09E-01	1.31E-01
Am-242m	1.57E-04	1.57E-04	1.57E-04	1.35E-04
Am-243	1.79E-05	1.79E-05	1.79E-05	1.79E-03
Ba-137m	1.02E+00	1.02E+00	1.02E+00	1.73E+00
Bk-249	4.12E-31	4.12E-31	4.12E-31	3.43E-35
C-14	7.97E-06	7.97E-06	7.97E-06	3.84E-05
Ce-144	3.57E-10	3.57E-10	3.57E-10	5.30E-15
Cf-249	1.51E-22	1.51E-22	1.51E-22	8.20E-22
Cm-242	4.51E-22	4.51E-22	4.51E-22	1.67E-30
Cm-243	2.63E-06	2.63E-06	2.63E-06	3.43E-06
Cm-244	5.05E-03	5.05E-03	5.05E-03	1.33E-01
Cm-245	6.48E-08	6.48E-08	6.48E-08	4.38E-06
Cm-247	2.41E-20	2.41E-20	2.41E-20	1.33E-19
Cm-248	5.57E-21	5.57E-21	5.57E-21	3.07E-20
Co-60	4.36E-03	4.36E-03	4.36E-03	4.83E-03
Cs-134	2.42E-06	2.42E-06	2.42E-06	8.58E-08
Cs-135	3.07E-06	3.07E-06	3.07E-06	1.00E-05
Cs-137	1.09E+00	1.09E+00	1.09E+00	1.83E+00
Eu-152	1.24E-03	1.24E-03	1.24E-03	3.97E-03
Eu-154	1.35E-02	1.35E-02	1.35E-02	3.06E-02
Eu-155	1.20E-02	1.20E-02	1.20E-02	1.21E-02
H-3	1.53E-04	1.53E-04	1.53E-04	8.64E-04
I-129	1.33E-08	1.33E-08	1.33E-08	7.15E-08
Na-22	2.19E-06	2.19E-06	2.19E-06	7.88E-08
Nb-94	7.06E-06	7.06E-06	7.06E-06	6.48E-07
Ni-59	3.14E-04	3.14E-04	3.14E-04	1.35E-03
Ni-63	2.60E-02	2.60E-02	2.60E-02	1.06E-01
Np-237	1.48E-05	1.48E-05	1.48E-05	4.07E-05
Pa-231	5.85E-09	5.85E-09	5.85E-09	1.87E-09
Pm-147	1.17E-02	1.17E-02	1.17E-02	1.90E-03
Pr-144	3.57E-10	3.57E-10	3.57E-10	5.30E-15
Pu-238	3.43E-02	3.43E-02	3.43E-02	1.04E-01
Pu-239	1.35E-02	1.35E-02	1.35E-02	2.56E-02

Table 3.3-16: Estimate of Residual Radioactivity in Pump Tanks and Catch Tank (Continued)

Isotope	FPT-1 Remaining Curies	FPT-2 Remaining Curies	FPT-3 Remaining Curies	FTF Catch Tank Remaining Curies
Pu-240	4.96E-03	4.96E-03	4.96E-03	6.04E-03
Pu-241	2.33E-02	2.33E-02	2.33E-02	2.73E-02
Pu-242	4.08E-05	4.08E-05	4.08E-05	7.62E-06
Pu-244	1.92E-08	1.92E-08	1.92E-08	3.46E-08
Ra-226	2.70E-05	2.70E-05	2.70E-05	1.31E-04
Rh-106	2.77E-08	2.77E-08	2.77E-08	8.04E-12
Ru-106	2.77E-08	2.77E-08	2.77E-08	8.04E-12
Sb-125	7.65E-04	7.65E-04	7.65E-04	1.45E-04
Sb-126	4.17E-05	4.17E-05	4.17E-05	2.26E-04
Sb-126m	2.97E-04	2.97E-04	2.97E-04	1.61E-03
Se-79	1.59E-04	1.59E-04	1.59E-04	8.67E-04
Sm-151	4.62E-01	4.62E-01	4.62E-01	2.38E+00
Sn-126	2.97E-04	2.97E-04	2.97E-04	1.61E-03
Sr-90	5.87E+00	5.87E+00	5.87E+00	2.56E+01
Tc-99	2.81E-03	2.81E-03	2.81E-03	1.50E-02
Te-125m	1.87E-04	1.87E-04	1.87E-04	3.56E-05
Th-229	9.41E-06	9.41E-06	9.41E-06	4.29E-05
Th-230	2.68E-05	2.68E-05	2.68E-05	1.30E-04
U-232	1.39E-07	1.39E-07	1.39E-07	6.35E-07
U-233	6.96E-05	6.96E-05	6.96E-05	4.09E-05
U-234	4.48E-05	4.48E-05	4.48E-05	8.99E-05
U-235	5.30E-07	5.30E-07	5.30E-07	1.95E-06
U-236	8.55E-07	8.55E-07	8.55E-07	1.84E-06
U-238	2.62E-05	2.62E-05	2.62E-05	8.99E-05
Y-90	5.87E+00	5.87E+00	5.87E+00	2.56E+01
Total	**1.22E+01**	**1.22E+01**	**1.22E+01**	**5.36E+01**

Table 3.3-17: Estimate of Residual Chemicals in Pump Tanks and Catch Tank

Chemical	FPT-1 (kg)	FPT-2 (kg)	FPT-3 (kg)	FTF Catch Tank (kg)
Ag	1.53E-03	1.53E-03	1.53E-03	9.29E-03
As	5.16E-05	5.16E-05	5.16E-05	3.13E-04
Ba	1.88E-03	1.88E-03	1.88E-03	1.14E-02
Cd	5.37E-03	5.37E-03	5.37E-03	3.26E-02
Cr	2.01E-03	2.01E-03	2.01E-03	1.22E-02
Cu	1.02E-03	1.02E-03	1.02E-03	6.19E-03
F	1.38E-03	1.38E-03	1.38E-03	8.39E-03
Fe	2.18E-01	2.18E-01	2.18E-01	1.32E+00
Hg	1.46E-03	1.46E-03	1.46E-03	8.85E-03
Mn	3.94E-02	3.94E-02	3.94E-02	2.39E-01
Ni	1.58E-01	1.58E-01	1.58E-01	9.60E-01
NO_2 & NO_3	1.81E-01	1.81E-01	1.81E-01	1.10E+00
Pb	1.12E-02	1.12E-02	1.12E-02	6.79E-02
Sb	1.23E-03	1.23E-03	1.23E-03	7.48E-03
Se	1.59E-04	1.59E-04	1.59E-04	9.64E-04
U	8.57E-02	8.57E-02	8.57E-02	5.20E-01
Zn	1.91E-03	1.91E-03	1.91E-03	1.16E-02

3.3.3.3 Evaporators and CTS Inventory

3.3.3.3.1 Evaporator System Inventory

Field characterization data for the FTF evaporators and the 242-3F CTS pump tank will be used to estimate the residual material in each evaporator and in the CTS. While future cleaning is anticipated for the CTS pump tank, the current inventory is assumed for PA modeling. The full discussion of the characterization is found in CBU-LTS-2004-00078 (Superseded, Revision 0).

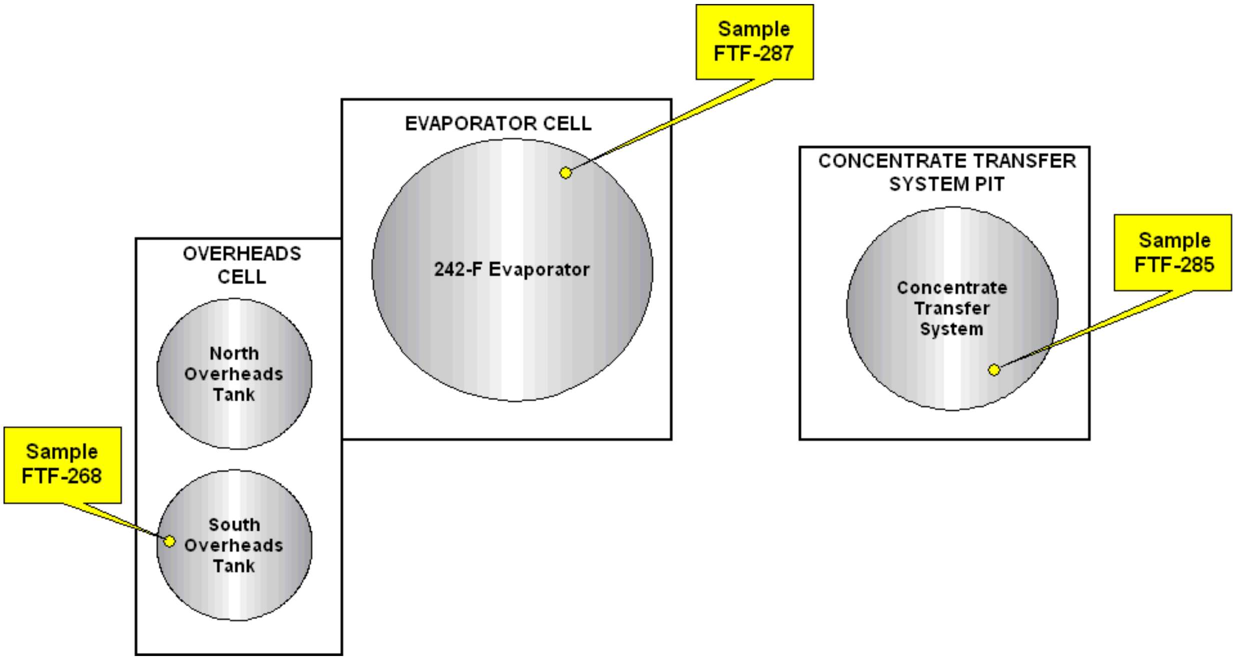
The 242-F Evaporator and the 243-2F CTS Tank were placed in shut-down in 1988 and a campaign of waste removal was completed in 1991 - 1992 and again in 2004. During the last waste removal campaign, field samples were collected and analyzed to aid the characterization of residue remaining in the evaporator vessel and the CTS tank. The details of the characterization are found in CBU-LTS-2004-00078 (Superseded, Revision 0). The future cleaning of the 242-16F evaporator vessel is expected to meet or exceed the decontamination levels reached in the 242-F evaporator vessel.

3.3.3.3.2 CTS Pit and Tank

During the 2004 heel removal campaign, various mixing and transfer cycles were completed from the CTS tank. Contents of the CTS tank were mixed and pumped to the CTS sump which was subsequently transferred to Tank 26 via the north overheads tank and sump. Part of this transferred material included flush water added to the tank and pit for dose rate mitigation during isolation activities.

Video inspection of the 242-3F CTS Pit confirms the absence of solid sludge waste within the cell. No solid waste was observed on the interior pit walls, pump tank exterior, floor sump or piping. Video inspection of the interior of the CTS tank was performed and evaluated. No solid waste was observed on the interior tank walls, steam coils, or pump externals. A very thin scale was observed on the warming coil and a layer of coarse grit was evident at the bottom of the tank. Video-based estimates placed the volume of this sediment at approximately 90 gallons. Additional cleaning is planned prior to closure. The cell was found to be free of sludge-like materials. Samples were taken to estimate the characterization of residual solids. Figure 3.3-3 indicates the location of the sample. Analytical results are shown in Tables 3.3-18 and 3.3-19. While future cleaning is anticipated for the CTS pump tank, the current inventory is assumed for PA modeling.

Figure 3.3-3: 242-F Evaporator System Sample Locations



3.3.3.3.3 242-F Evaporator Cell & Vessel

During the April-May 2004 heel removal campaign, various mixing and transfer cycles were completed from the 242-F evaporator. Contents of the evaporator pot were mixed and pumped to the 242-F cell sump and subsequently transferred to Tank 26 via the north overheads tank and sump.

Video inspection of the 242-F evaporator cell confirmed the absence of sludge waste; however, salt was known to have migrated to the 242-F cell sump. The salt was associated with leaking tank connectors where salt had accumulated on the exterior of the tank and/or connectors. The interior of the 242-F Evaporator cell has been subject to rainwater in-leakage through the cell covers for a number of years and must be periodically pumped. Video inspection of the 242-F Evaporator vessel indicated that conditions of the vessel appeared consistent with normal operations including vessel flushing. Discoloration in the vessel and liquid level marks on the vessel wall are normal with no unusual conditions noted. The volume of residual sludge was estimated at 0.3 gallons. [CBU-LTS-2004-00078, Superseded Revision 0] Samples were taken to estimate the characterization of residual solids. Figure 3.3-3 indicates the location of the sample. Analytical results are shown in Tables 3.3-18 and 3.3-19.

A sample of the overheads was also taken during the heel removal campaign. Due to the low activity and low volume in the overheads tanks, compared to the CTS and evaporators, the inventory of the overheads tanks were not included in the inventory. Residual liquids will be removed prior to closure.

Table 3.3-18: Measured Radionuclide Concentrations in Samples

Isotope	FTF 268, S. Overheads (μCi/g)	FTF 285, CTS Tank (μCi/g)	FTF 287, Evaporator (μCi/g)
Am-241	<7.39E-03	2.95E+00	4.41E+00
Co-60	Not analyzed	Not analyzed	1.33E+00
Cs-137	6.03E+00	1.93E+03	1.02E+03
H-3	Not analyzed	<4.60E-01	<1.62E-02
Np-237	<1.86E-03	1.34E-03	3.89E-03
Pu-238	<4.53E-02	2.95E+00	5.74E+00
Pu-239	<1.64E-01	4.16E+00	1.50E+01
Pu-240	<6.00E-01	1.09E+00	3.32E+00
Pu-241	<7.93E-02	1.51E+01	4.73E+01
Pu-242	<1.01E-02	<3.70E-03	<4.80E-03
Se-79	<3.33E-04	5.00E-06	8.27E-06
Sr-90	3.25E-01	1.52E+02	5.95E+01
Tc-99	<2.25E-03	3.10E-01	1.37E+00
U-233	<2.55E-02	<9.10E-03	<1.20E-02
U-234	<1.65E-02	<5.90E-03	<7.60E-03
U-235	<5.69E-06	1.48E-05	8.72E-05
U-236	<1.70E-04	<6.10E-05	1.47E-04
U-238	4.86E-06	1.11E-03	8.05E-03

[CBU-LTS-2004-00078, Table 5, Superseded Revision 0]

Table 3.3-19: Measured Chemical Concentrations in Samples

Chemical	FTF 268 S. Overheads Wt%	FTF 285 CTS Tank Wt%	FTF 287 Evaporator Wt%
Ag	<7.84E-03	1.74E-03	2.33E-02
Ba	1.82E-01	2.57E-02	7.95E-02
Cd	<1.27E-02	9.86E-03	3.19E-02
Cr	<3.72E-02	6.44E-02	2.72E-01
Cu	<9.78E-03	7.03E-02	8.96E-02
Fe	2.75E+00	1.51E+01	2.32E+01
Mn	7.88E-02	1.76E+00	9.31E-01
Ni	<5.09E-02	1.10E-01	3.23E-01
Pb	<3.28E-01	1.06E-01	1.74E-01
Sb	<6.36E-02	6.68E-02	8.85E-02
U	<2.49E-01	3.30E-01	2.40E+00
V	<3.03E-02	7.48E-03	5.32E-03
Zn	1.26E-01	3.38E-01	2.98E-01
Hg	7.95E-02	2.58E-02	1.08E-01
As	<5.93E-03	3.20E-03	2.20E-03
Se	<5.93E-03	3.20E-03	2.20E-03

[CBU-LTS-2004-00078, Table 9, Superseded Revision 0]

3.3.3.3.4 242-16F Evaporator & Vessel

The 242-16F evaporator cell and vessel remains operational. It is expected that the 242-16F evaporator system will meet or exceed the decontamination levels achieved in the 242-F evaporator system. To support the PA modeling, the estimate of residues remaining in 242-F were used to estimate the residues that will remain in 242-16F at the time of closure.

The total remaining inventory for the evaporator vessel is estimated based on 0.3 gallons of sludge and a dry sludge density of 6.83 lb/gallon. The total remaining inventory of the CTS tank is based on 90 gallons of sludge with a dry sludge density of 8.64 lb/gallon. [CBU-LTS-2004-00078, Superseded Revision 0] The inventory has been decayed to the expected year of closure, 2020, and is presented in Tables 3.3-20 and 3.3-21.

Table 3.3-20: Residual Radionuclide Inventory of Evaporator Systems and CTS

Radionuclide	Inventory in 242-3F CTS Tank (Ci) (a)	Inventory in Evaporator Vessel 242-F (Ci) (a)	Inventory in Evaporator Vessel 242-16F (Ci) (a)
Am-241	1.01E+00	4.01E-03	4.01E-03
Ba-137m	4.43E+02	6.16E-01	6.16E-01
Co-60	Not Analyzed	1.53E-04	1.53E-04
Cs-137	4.73E+02	6.59E-01	6.59E-01
H-3	6.66E-02	Not Analyzed	Not Analyzed
Np-237	4.74E-04	3.62E-06	3.62E-06
Pu-238	9.17E-01	4.72E-03	4.72E-03
Pu-239	1.47E+00	1.40E-02	1.40E-02
Pu-240	3.84E-01	3.08E-03	3.08E-03
Pu-241	2.48E+00	2.05E-02	2.05E-02
Pu-242	1.31E-03	4.47E-06	4.47E-06
Se-79	1.77E-06	7.70E-09	7.70E-09
Sr-90	3.65E+01	3.76E-02	3.76E-02
Tc-99	1.10E-01	1.28E-03	1.28E-03
U-233	3.22E-03	1.12E-05	1.12E-05
U-234	2.09E-03	7.08E-06	7.08E-06
U-235	5.23E-06	8.12E-08	8.12E-08
U-236	2.16E-05	1.37E-07	1.37E-07
U-238	3.92E-04	7.5E-06	7.5E-06
Y-90	3.65E+01	3.76E-02	3.76E-02
Total	**9.95E+02**	**8.90E+00**	**8.90E+00**

(a) Values are decayed to 2020

Table 3.3-21: Residual Chemical Inventory of Evaporator Systems and CTS

Chemical	CTS Tank (kg)	242-F Evaporator (kg)	242-16F Evaporator (kg)
Ag	6.15E-03	2.17E-04	2.17E-04
As	1.13E-02	2.05E-05	2.05E-05
Ba	9.08E-02	7.40E-04	7.40E-04
Cd	3.49E-02	2.97E-04	2.97E-04
Cr	2.28E-01	2.53E-03	2.53E-03
Cu	2.48E-01	8.35E-04	8.35E-04
Fe	5.34E+01	2.16E-01	2.16E-01
Hg	9.12E-02	1.01E-03	1.01E-03
Mn	6.22E+00	8.67E-03	8.67E-03
Ni	3.89E-01	3.01E-03	3.01E-03
Pb	3.75E-01	1.62E-03	1.62E-03
Sb	2.36E-01	8.24E-04	8.24E-04
Se	1.13E-02	2.05E-05	2.05E-05
U	1.17E+00	2.24E-02	2.24E-02
V	2.64E-02	4.95E-05	4.95E-05
Zn	1.19E+00	2.78E-03	2.78E-03

[CBU-LTS-2004-00078, Table 10, Superseded Revision 0]

3.3.3.3.5 Ancillary Equipment – Pump Pits

Pump Pits are shielded reinforced concrete structures located below grade at the low points of transfer lines and are lined with stainless steel. These structures are secondary containments that house the pump tanks described in Section 3.2.2, and are accessible for cleaning at the time of closure. No inventory was assigned to these structures.

3.3.3.3.6 Ancillary Equipment – Diversion Boxes

Diversion Boxes are shielded reinforced concrete structures containing transfer line nozzles to which jumpers are connected in order to direct waste transfers to the desired location. The majority of the DBs are located below ground and are either stainless steel lined or sealed with water proofing compounds to prevent ground contamination. These structures are accessible for cleaning at the time of closure. No inventory was assigned to these structures.

3.3.3.3.7 Ancillary Equipment – Valve Boxes

Transfer valve boxes facilitate specific waste transfers that are conducted frequently. The valves are generally manual ball valves in removable jumpers with flush water connections on the transfer lines. The valve boxes provide secondary containment. These structures are accessible for cleaning at the time of closure. No inventory was assigned to these structures.

3.3.3.3.8 Ancillary Equipment – Transfer Line Secondary Containment

As described in Section 3.2.2, various ancillary equipment serves as transfer line secondary containment (e.g., transfer line jackets, LDB, encasements). No leakage of waste from primary core pipe into secondary containment has been identified. Transfer lines currently in service, which make up approximately 57% of the total linear footage of transfer lines, are tested as part of the Structural Integrity Program. [S-TSR-G-00001] Most of the remaining transfer lines that are no longer in service are part of the 242-F evaporator system and the Tank 17 through 20 systems. Air or helium testing of transfer lines procedurally requires radiological surveys to check for indications of contamination. [SW10.6-SVP-5, Section 7.2] This testing has not identified any significant contamination in FTF secondary containment. Therefore, no inventory was assigned to these structures.

4.0 ANALYSIS OF PERFORMANCE

The purpose of this section is to provide the technical basis for the analysis of performance for the closed FTF facilities over time based on the total remaining inventory.

Section 4.1 provides an overview of the ISCM comprised of three components: 1) closure cap, 2) vadose zone, and 3) saturated zone.

Section 4.2 describes the ISCM approach for contaminant release.

- 4.2.1 presents the analysis conducted to perform the screening of radionuclides for the groundwater pathways and airborne pathway.
- 4.2.2 presents details of the source term release, the analyses performed to estimate the leaching of contaminants from the CZ by the pore fluid, based on solubility controls used for modeling the transport of contaminants from their initial closure locations within the waste tanks and ancillary equipment to the underground aquifers.
- 4.2.3 describes the assumed radionuclide transport mechanisms and parameters used for groundwater pathways modeling to estimate exposures to MOP and the inadvertent intruder for various scenarios.
- 4.2.4 defines the MOP and intruder exposure pathways used for dose calculation.

Section 4.3 describes various computer codes, their purpose and integration utilized in this PA. The computer codes discussed in the section are: HELP, PORFLOW, GoldSim, and CAP88-PC. Section 4.4 describes the integrated closure system, including the assumed waste tank modeling dimensions, configurations of potential conditions of the tanks, and configuration of potential conditions of ancillary equipment. The modeling processes used in PORFLOW and GoldSim are detailed in this section.

Section 4.5 describes the ISCM and modeling assumptions to estimate the potential flux of gaseous radionuclides at the ground surface for the air pathway analysis. Results are provided based on the assumed inventory of radionuclides susceptible to volatilization. A radon analysis is also completed by presenting the ISCM, modeling assumptions, and the results of the radon (Rn-222) surface flux analysis based on source inventories of the parent radionuclides that generate Rn-222.

Section 4.6 presents the factors for each element necessary in the biotic dose pathway model.

- 4.6.1 presents the bioaccumulation factors used in the analysis.
- 4.6.2 presents consumption rates for human health exposure.

Section 4.7 presents the internal and external Dose Conversion Factors (DCFs) utilized in the various dose pathway models.

Section 4.8 describes the risk evaluation, including the ISCM and protocols for the assessment of human health and ecological risk from radioactive and chemical contaminants contained within the closed FTF.

4.1 Overview of Analysis

The purpose of this section is to describe the ISCM to be used for evaluating the performance of the FTF closure system during the 10,000-year period following FTF closure.

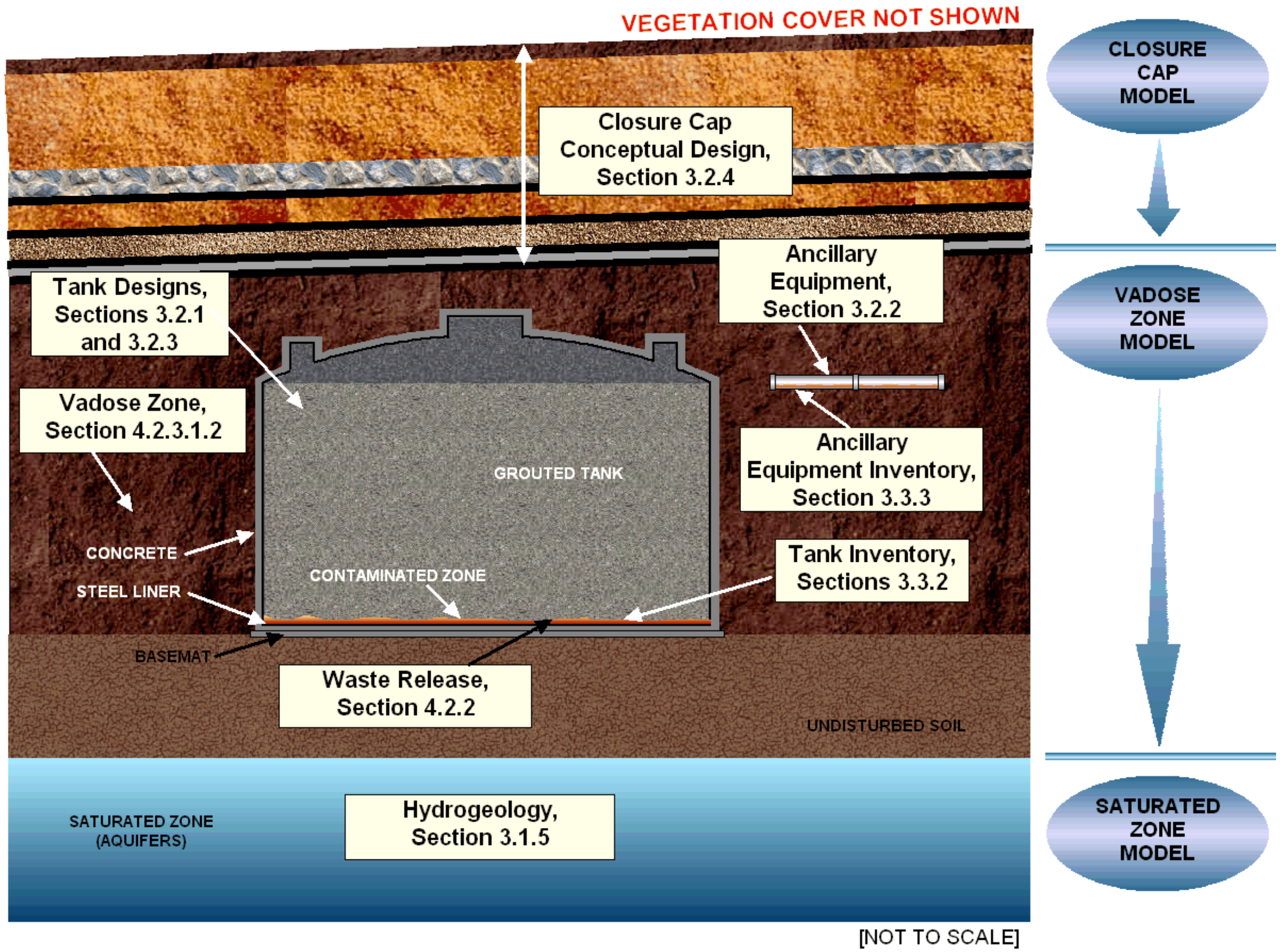
This ISCM is used to evaluate the migration of contaminants from the FTF and is illustrated in Figure 4.1-1. It comprises three related conceptual models that represent the FTF closure system and the environmental media through which contaminants may migrate:

- Closure cap model.
- Vadose zone model.
- Saturated zone model.

Computer codes utilized in the modeling of the ISCM are described in Section 4.3.

The ISCM described in this section is used to simulate the release of radiological and chemical contaminants from the 22 underground waste tanks and the associated ancillary equipment in the FTF, and to simulate migration of the contaminants thorough soil and groundwater. The ancillary equipment of interest includes two evaporators, pump tanks, a catch tank, and a network of underground waste transfer lines in FTF. The waste storage tanks and ancillary equipment are described in detail in Sections 3.2.1 and 3.2.2. The ISCM output is used with other information described throughout Section 4 to predict impacts of contaminants on human receptors through various pathways and exposure routes (described in detail in Section 4.2.4). Although the ISCM focuses mainly on the groundwater exposure pathway, the air pathway is also taken into account. For example, inhalation of volatile radioactive contaminants in water taken from a contaminated well or stream is accounted for in the inputs related to human receptor impacts. Figure 4.1-1 graphically depicts the relationship between the FTF modeling inputs.

Figure 4.1-1: FTF Modeling Input Relationships



4.2 Integrated Site Conceptual Model of Facility Performance

The ISCM simulates the release of radiological and chemical contaminants from the 22 underground waste tanks and associated ancillary equipment in FTF. An independent conceptual waste release model was used to simulate stabilized contaminant release from the grouted tanks, based on various chemical phases in the waste tank controlling solubility and thereby affecting the timing and rate of release from the CZ.

This ISCM approach considers the integrity of the waste tank steel liners and cementitious barriers in waste tank modeling. In the ISCM, steel liner failure triggers waste release from the tanks. After failure, the carbon steel liner is assumed to be absent, or otherwise not a hindrance to advection and diffusion.

With this approach, the time of initial waste release is tied to the integrity of the waste tank primary liners (tank secondary liners were assumed to fail at the same time as the primary liner). This time is calculated based on steel corrosion rates under different conditions (e.g., differing diffusion coefficients for Ca/O_2). The failure times vary with waste tank design, owing to differences in liner properties. [WSRC-STI-2007-00061] The failure analysis considers general and localized corrosion mechanisms of the waste tank steel. Consumption of the waste tank steel encased in grouted conditions is estimated due to carbonation of the concrete leading to low pH conditions, or the chloride-induced de-passivation of the steel leading to accelerated corrosion. The modeling approach used for predicting liner failure is discussed in Section 4.2.3.2.5.

The time of initial waste release from the closed waste tanks is caused by through-wall thinning due to general corrosion. Since corrosion was assumed to occur uniformly, liner failure occurs when the thinnest segment has been completely corroded. Under conservative diffusion coefficient conditions (i.e., when holes from pitting begin to occur), the earliest liner failures are predicted to occur 75 years after FTF closure for the Type IV tanks. The latest liner failures are predicted to occur 12,751 years after FTF closure in the Type III/IIIA tanks through general corrosion under grouted conditions. Prior to failure, steel is assumed to be completely impermeable with respect to both advection and diffusion. After failure, steel is assumed to be absent, or otherwise not a hindrance to advection and diffusion (i.e., there would be no retardation).

Flow in-to and out-of the CZ is impacted by the material properties of the waste tank cementitious materials. The expected degradation rate and timing for the waste tank cementitious materials is based on WSRC-STI-2007-00607 and SRS-REG-2007-00027, and can vary dependent on tank type. The tank fill grout can begin degrading as early as year 800 (Type IV tanks) with full degradation being reached as early as year 13,000 (Type I tanks). The waste tank concrete can begin degrading as early as year 400 (Type IV tank) with full degradation occurring as early as year 800 (Type IV tank).

Soil-solute K_ds for the cementitious materials depend on pore water flow through the material. These values will increase over time in stages as the concrete ages with increasing pore water flow. The infiltrating liquid will initially be characterized as “Region I” and will transition to “Region II”, then finally to “Region III as the liquid pH changes over time. The differences between the chemical phases are summarized in Table 4.2-1. The cementitious material properties are initially characterized as “Reduced – Region II”, then transition to “Oxidized -

Region II" after 371 pore volumes and to "Oxidizing - Region III" after 2,063 pore volumes. [ISSN 1019-0643, WSRC-STI-2007-00544] This aging process is directly related to flow through the grout, and is therefore accelerated when liner failure allows more liquid to come in contact with the cementitious materials inside the waste tank liner.

Table 4.2-1: Summary of Chemical Phases

Chemical Phase	Description
Region I	The pH lies between ~13.3 and 12.5. The pore water composition is dominated by K, Na and OH. The solution is saturated with respect to portlandite ($Ca(OH)_2$ ~ 2.0E-3 M). The major solid phases present in cement have already formed, though hydration may be continuing.
Region II	Contact with "flowing" groundwater has removed virtually all of the highly soluble (K, Na) OH. The pore water composition is now dominated by portlandite ($Ca(OH)_2$ ~20.0E-3 M) which fixes the pH at ~12.5. The portlandite is also being slowly removed by groundwater flow but the quantities contained in the cement are so large that this phase buffers the system over very long periods of time. There are no significant changes in the major solid phases present in Region I and II.
Region III	The removal of ($Ca(OH)_2$ has become significant and the pH falls continuously. The CSH gel is no longer stable and begins to dissolve incongruently. The Ca^{2+} concentration decreases continuously to ~1 to $5.0E^{-3}$ M at pH ~11.

[Taken from: ISSN 1019-0643]

For modeling purposes, the ancillary equipment inventory is initially modeled within a secondary containment buried in soil. The pump tanks (FPT-1, FPT-2 and FPT-3), 242-F Catch Tank, CTS Tank and evaporator pots (242-F, 242-16F) are modeled as point sources located in the FTF at a central point of the individual components. Transfer line inventory is modeled by distributing the assumed inventory equally over all of the FTF. Other ancillary equipment is not modeled explicitly.

Based on stainless steel corrosion calculations, the earliest failure of a stainless steel transfer line is predicted to occur 510 years after FTF closure. [WSRC-STI-2007-00460] Failure is assumed after 25% pitting penetration of the transfer line wall. Predicted failure times are dependent on the thickness of the transfer lines. A more detailed discussion of ancillary equipment corrosion failure is provided in Section 4.2.3.2.5.

4.2.1 Source Term Screening

An initial radionuclide screening process was developed and performed to support characterization efforts and was applicable for FTF PA modeling. CBU-PIT-2005-00228 identifies how SRS performed a screening of radionuclides by initially evaluating 849 isotopes. Of the original 849 isotopes, 159 remained on the list and 690 were excluded from further consideration.

This screening process used the following information:

- physical properties of each radioisotope such as half-life and decay mechanism,
- source and handling of the waste was used in the decisions based on isotope production mechanisms and time since the isotope was produced, and
- screening factors for ground disposal of radionuclides developed in the National Council on Radiation Protection and Measurements document *"Ionizing Radiation Exposure of the Population of the United States (2009)"*, NCRP-123, which convert a quantity of each radionuclide to a dose.

The screening process performed in the initial screening was presented in CBU-PIT-2005-00228 was as follows:

Step 1. Identify isotopes that were part of any of the four decay series (Ac, Np, Th, or U) and retained for further analysis because the FTF waste was known to contain the first member of each of the series.

Step 2. Identify isotopes for which there was high-level waste sludge characterization information and retained for further analysis since these have been determined to be likely to be present in the waste and of importance to some aspect of the program. Note that this step may identify isotopes for inclusion that could have been screened out at some later step if they had not been so designated.

Next, the remaining list of radionuclides was examined to eliminate those isotopes which can be excluded based on the criteria presented for each evaluation step. In the following steps, those that have very long half-lives (and correspondingly low specific activity) and those that have been screened out using the most up-to-date method presented in NCRP-123 were identified for exclusion.

Step 3. Identify isotopes for which there is no dose conversion information (typically very long lived and essentially stable isotopes). The two most comprehensive sources of information are the NCRP-123 and U.S. EPA Risk Assessment Web Site (*www.epa.gov/radiation/heast*), and both of these sources were consulted. DCFs do not exist for these isotopes because they were not considered to merit the development of factors.

Step 4. Identify isotopes that have been screened out in NCRP-123 using the screening methodology for ground disposal.

The next part of the screening process employs some general information about an assumed residual inventory of radionuclides in high-level waste sludge that is an order of magnitude or more than expected at closure.

Step 5. Assuming a large activity level (one million curies) of any isotope remaining in the residual material, and using the screening factors from NCRP-123, identify those that would result in a hypothetical exposure to a MOP of 4 mrem/yr or less and eliminate them from the list. Note that this analysis includes the exposure due to all daughter radionuclides.

Step 6. Assuming a large mass (1,000 lbs) of any isotope remaining in the residual material, and using the screening factors from NCRP-123, identify those that would result in a hypothetical exposure to a MOP of 4 mrem/yr or less and eliminate them from the list. Note that this analysis includes the exposure due to all daughter radionuclides.

Step 7. Identify isotopes that would not be in the waste due to their physical properties (e.g., present as a gas and released in the reactor or during fuel processing).

More specific information about the waste at SRS is used to identify those radionuclides which can be excluded based on history of the site waste.

Step 8. Employ information about the age of the FTF waste (minimum of 15 years) to identify those radionuclides that would not be expected to be in the waste at the time of closure due to their short half-lives. Restrict this analysis to those isotopes that have no on-going source and decay directly to stable products so that no isotopes with significant daughters are prematurely eliminated.

Step 9. Employ information about the age of the FTF waste (minimum of 15 years) to identify those radionuclides that would not be expected to be in the waste at the time of closure due to their short half-lives. Apply this analysis to those isotopes that have no on-going source and decay to short-lived daughters (less than 1 year) and then to stable products so that no isotopes with significant daughters are prematurely eliminated.

Next, some basic information about the duration of institutional control combined with specific isotope characteristics can be used to eliminate radionuclides that are not going to be of future concern to MOP or worker exposure.

Step 10. Employ detailed decay scheme information to identify short-lived isotopes with no ongoing sources that will decay to stable isotopes in multiple short steps. This step requires the careful review of each decay scheme individually. Although there is not a general rule of thumb, it is obvious from inspection of the decay chain that both the parent and the daughters are effectively extinct.

Step 11. Employ detailed decay scheme information to identify those short-lived isotopes with no ongoing sources that will decay to a longer lived isotope that is separately tracked. Once this decay has happened, the short-lived parent isotope is no longer of interest.

Step 12. Employ detailed decay scheme information and an assumed period of institutional control (100 years) to identify those isotopes with no ongoing sources that will decay to a stable isotope during the period of institutional control.

Step 13. Employ detailed decay scheme information and an assumed period of institutional control (100 years) to identify those isotopes with no ongoing sources that will decay to a longer lived isotope that is separately tracked during the period of institutional control. Once this decay has happened, the parent isotope is no longer of interest.

The isotopes remaining on the list which have not been identified for either inclusion or exclusion can now be examined. Many of the isotopes on the list were not created in SRS reactors. This is because the initial list of isotopes for evaluation was pulled from a variety of sources and includes isotopes of interest for many different reasons due to other SRS activities other than just reactor operations.

Step 14. The remaining isotopes are now identified as those isotopes which require further analysis (i.e., pathway and/or inventory specific screening).

The results of the screening process yielded 159 remaining radionuclides for evaluation presented in Table 4.2-2.

Table 4.2-2: Radionuclides Requiring Further Evaluation

Ac-225	Bk-250	Eu-152	Nb-94	Po-213	Rh-106	Th-227
Ac-227	C-14	Eu-154	Ni-59	Po-214	Rn-219	Th-228
Ac-228	Ca-41	Eu-155	Ni-63	Po-215	Rn-220	Th-229
Ag-108m	Ce-144	Fe-60	Np-236	Po-216	Rn-222	Th-230
Al-26	Cf-249	Fr-221	Np-237	Po-218	Ru-106	Th-231
Am-241	Cf-250	Fr-223	Np-239	Pr-144	Sb-125	Th-232
Am-242	Cf-251	Gd-148	Np-240	Pt-193	Sb-126	Th-234
Am-242m	Cf-252	H-3	Pa-231	Pu-236	Sb-126m	Ti-44
Am-243	Cl-36	Hf-178m	Pa-233	Pu-238	Se-79	Tl-207
Am-246	Cm-242	Hf-182	Pa-234	Pu-239	Si-32	Tl-208
At-217	Cm-243	Hg-194	Pb-202	Pu-240	Sm-146	Tl-209
At-218	Cm-244	Ho-166m	Pb-205	Pu-241	Sm-147	Tl-210
Ba-137m	Cm-245	I-129	Pb-209	Pu-242	Sm-151	U-232
Be-10	Cm-246	Ir-192	Pb-210	Pu-243	Sn-121m	U-233
Bi-207	Cm-247	Ir-192m	Pb-211	Pu-244	Sn-126	U-234
Bi-210	Cm-248	K-40	Pb-212	Pu-246	Sr-90	U-235
Bi-210m	Cm-250	La-137	Pb-214	Ra-223	Ta-182	U-236
Bi-211	Co-60	La-138	Pd-107	Ra-224	Tb-157	U-238
Bi-212	Co-60m	Lu-176	Pm-145	Ra-225	Tb-158	U-240
Bi-213	Cs-134	Mn-53	Pm-147	Ra-226	Tc-97	Y-90
Bi-214	Cs-135	Mo-93	Po-210	Ra-228	Tc-98	Zr-93
Bk-247	Cs-137	Na-22	Po-211	Rb-87	Tc-99	
Bk-249	Eu-150	Nb-93m	Po-212	Re-186m	Te-125m	

4.2.1.1 Evaluation of Radionuclides in Principal Decay Chains

Each of the 159 remaining radionuclides from the screening presented in CBU-PIT-2005-00228 were evaluated to determine if they would be included in the FTF PA modeling. Fifty-four of the 159 isotopes are part of the decay series for actinium, neptunium, thorium or uranium (these four decay series are presented in Table 4.2-3). Because the FTF waste storage tanks contain waste that is known to include the first member of these four series, isotopes in these decay chains are addressed in the PA modeling. The GoldSim and PORFLOW modeling software account for decay and progeny in-growth as time progresses, which ensures the daughter products are addressed even if they are not assigned an initial inventory. Therefore, the other daughter product radionuclides are removed from modeling consideration and are not assigned an initial FTF inventory. The 12 isotopes from these four decay chains for which an initial inventory is used in modeling are listed in Table 4.2-4.

Table 4.2-3: Decay Series for Neptunium, Thorium, Uranium, and Actinium

Neptunium Series	Thorium Series	Uranium Series	Actinium Series
Pu-241	Cm-248	U-238	Cm-243
↓	↓	↓	↓
Am-241	Pu-244	Th-234	Pu-239
↓	↓	↓	↓
Np-237	U-240	Pa-234	U-235
↓	↓	↓	↓
Pa-233	Np-240m	U-234	Th-231
↓	↓	↓	↓
U-233	Pu-240	Th-230	Pa-231
↓	↓	↓	↓
Th-229	U-236	Ra-226	Ac-227
↓	↓	↓	↓ ↓
Ra-225	Th-232	Rn-222	Th-227 Fr-223
↓	↓	↓	↓
Ac-225	Ra-228	Po-218	Ra-223
↓	↓	↓	↓
Fr-221	Ac-228	Pb-214	Rn-219
↓	↓	↓	↓
At-217	Th-228	Bi-214	Po-215
↓	↓	↓	↓
Bi-213	Ra-224	Po-214	Pb-211
↓ ↓	↓	↓	↓
Po-213 Tl-209	Rn-220	Pb-210	Bi-211
↓ ↓	↓	↓	↓
Pb-209	Po-216	Bi-210	Tl-207
↓	↓	↓	↓
Bi-209	Pb-212	Po-210	Pb-207
	↓	↓	
	Bi-212	Pb-206	
	↓ ↓		
	Po-212 Tl-208		
	↓ ↓		
	Pb-208		

Note: Only decay modes of greater than 1% included.
[CBU-PIT-2005-00228]

Table 4.2-4: Isotopes from Four Principal Decay Chains Present in Initial Inventory Used in FTF Modeling

Ac-227	Np-237	Pu-241	Th-230	U-233	U-235
Am-241	Pa-231	Ra-226	Th-229	U-234	U-238

4.2.1.2 Evaluation of Radionuclides Identified in WCS

In addition to the 12 isotopes from the four decay chains (the decay series in Table 4.2-3) for which an initial inventory is used in modeling, there are fifty-two additional isotopes that have been determined to possibly be present in the FTF waste tanks residual inventory at the time of closure. Six additional radionuclides were added for evaluation as potential activation products. The 70 isotopes used in determining the initial residual waste tank inventories are presented in Table 4.2-5.

Table 4.2-5: Radionuclides used in Initial FTF Inventory Determination

Ac-227	Cf-251	Cs-134	Nb-93m	Pu-238	Sb-125	Th-230
Al-26	Cf-252	Cs-135	Nb-94	Pu-239	Sb-126	Th-232
Am-241	Cl-36	Cs-137	Ni-59	Pu-240	Sb-126m	U-232
Am-242m	Cm-242	Eu-152	Ni-63	Pu-241	Se-79	U-233
Am-243	Cm-243	Eu-154	Np-237	Pu-242	Sm-151	U-234
Ba-137m	Cm-244	Eu-155	Pa-231	Pu-244	Sn-126	U-235
Bk-249	Cm-245	H-3	Pd-107	Ra-226	Sr-90	U-236
C-14	Cm-247	I-129	Pm-147	Ra-228	Tc-99	U-238
Ce-144	Cm-248	K-40	Pr-144	Rh-106	Te-125m	Y-90
Cf-249	Co-60	Na-22	Pt-193	Ru-106	Th-229	Zr-99

4.2.1.3 Evaluation of Remaining Radionuclides

The remaining 89 isotopes from Table 4.2-2 are screened out of the modeling initial inventory for the reasons described in Table 4.2-6. There are radionuclides that are removed from the initial inventory although they are known to exist due to decay behavior. Justification for removing the in-growth from the initial inventories is discussed below.

The in-growth of radionuclides within a decay series is insignificant. For the short-lived isotopes, the in-growth occurs quickly, such that they are at equilibrium within the 100-year institutional control period. For the longer lived isotopes, the in-growth would be insignificant due to the length of the evaluation period (10,000 years). For example, assuming no in-growth within the initial inventory, the Th-229 in-growth from U-233 decay would be 62.2% of the initial U-233 inventory at 10,000 years. If in-growth is included, the Th-229 in-growth would be 62.5% of the U-233 initial inventory.

Although these radionuclides are not included in the initial inventories, they are included in the modeling software and are grown in as a function of their parent’s inventory and time.

Table 4.2-6: Continued Evaluation of Radionuclides

Isotope	Half-life*	Reason for Elimination from Initial Inventory	Decay Chain
Ac-225	10 days	Generated by Np-237 decay in modeling; short half-life	See Table 4.2-3.
Ac-228	6.15 hours	Generated by Th-232 decay in modeling; short half-life	See Table 4.2-3.
Ag-108m	438 years	No decay source	Ag-108m → Ag-108 → Cd-108 (stable) and Pd-108 (stable)
Am-242	16 hours	Decay from Am-242m in modeling	Am-242m → Am-242 → Cm-242 → Pu-238 → U-234 (in Uranium Series)
Am-246	39 minutes	Ancestors not present, decays to U-238 series	Cm-250 → Pu-246 → Am-246 → Cm-246 → Pu-242 → U-238 (in Uranium Series)
At-217	<1 second	Generated by Np-237 decay in modeling; short half-life	See Table 4.2-3.
At-218	1.5 seconds	Generated by U-238 decay in modeling; short half-life	Decay mode less than 1% of Po-218 decay.
Be-10	1,510,000 years	No decay source	Be-10 → Ba-10 (stable) Long-lived naturally occurring isotope
Bi-207	32.9 years	Ancestors not present	At-207 → Po-207 → Bi-207 → Pb-207 (stable)
Bi-210	5 days	Generated by U-238 decay in modeling; short half-life	See Table 4.2-3.
Bi-210m	3,040,000 years	No decay source	Bi-210m →Tl-206 → Pb-206 (stable)
Bi-211	2.14 seconds	Generated by U-235 decay in modeling; short half-life	See Table 4.2-3.
Bi-212	60.55 minutes	Generated by Th-232 decay in modeling; short half-life	See Table 4.2-3.

Table 4.2-6: Continued Evaluation of Radionuclides (Continued)

Isotope	Half-life*	Reason for Elimination from Initial Inventory	Decay Chain
Bi-213	45.6 minutes	Generated by Np-237 decay in modeling; short half-life	See Table 4.2-3.
Bi-214	20 minutes	Generated by U-238 decay in modeling; short half-life	See Table 4.2-3.
Bk-247	1,380 years	Ancestors not present, decays to U-235 series	Cf-247 → Bk-247 → Am-243 → Np-239 → Pu-239 → U-235 (in Actinium Series)
Bk-250	3.2 hours	Ancestors not present, decays to U-238 series	Md-258 → Es-254 → Bk-250 → Cf-250 → Cm-246 → Pu-242 → U-238 (in Uranium Series); Cm-250 → Bk-250 → Cf-250 → Cm-246 → Pu-242 → U-238 (in Uranium Series)
Ca-41	102,000 years	No decay source	Ca-41 → K-41 (stable)
Cf-250	13.1 years	Ancestors not present, decays to U-238 series	Md-258 → Es-254 → Bk-250 → Cf-250 → Cm-246 → Pu-242 → U-238 (in Uranium Series) Cm-250 → Bk-250 → Cf-250 → Cm-246 → Pu-242 → U-238
Cm-246	4,760 years	Ancestors not present, decays to U-238 series	Cf-250 → Cm-246 → Pu-242 → U-238 (in Uranium Series); Es-250m → Cf-250 and Bk-246 → Cm-246 → Pu-242 → U-238 (in Uranium Series) Cm-250 → Pu-246 → Am-246 → Cm-246 → Pu-242 → U-238 (in Uranium Series)
Cm-250	8,300 years	No decay source	Cm-250 → Pu-246 → Am-246 → Cm-246 → Pu-242 → U-238 (in Uranium Series)
Co-60m	10.5 seconds	Ancestors not present	Fe-60 → Co-60m → Co-60 → Ni-60 (stable)
Eu-150	36.9 years	No decay source	Eu-150 → Sm-150 (stable)

Table 4.2-6: Continued Evaluation of Radionuclides (Continued)

Isotope	Half-life*	Reason for Elimination from Initial Inventory	Decay Chain
Fe-60	1,500,000 years	No decay source	Fe-60 → Co-60m → Co-60 → Ni-60 (stable)
Fr-221	5 minutes	Generated by Np-237 decay in modeling; short half-life	See Table 4.2-3.
Fr-223	22 minutes	Generated by U-235 decay in modeling; short half-life	See Table 4.2-3.
Gd-148	70.9 years	No decay source	Gd-148→ Sm-144 (stable)
Hf-178m	31 years	No decay source	Hf-178m → Hf-178 (stable)
Hf-182	8,900,000 years	Ancestors not present	Hf-182m → Hf-182 → Ta-182 → W-182 (stable)
Hg-194	444 years	Ancestors not present	[Ti-194 and Ti-194m] → Hg-194 → Au-194 → Pt-194 (stable)
Ho-166m	1,200 years	No decay source	Ho-166m → Er-166 (stable)
Ir-192	74 days	Ancestors not present	Ir-192m → Ir-192 → Pt-192 (stable) or Os-192 (stable)
Ir-192m	241 years	No decay source	Ir-192m → Ir-192 → Pt-192 (stable) or Os-192 (stable)
La-137	60,000 years	Ancestors not present	Ce-137m → Ce-137 → La-137 → Ba-137 (stable); Pr-137 → Ce-137 → La-137 → Ba-137 (stable)
La-138	1.02E+11 years	No decay source	La-138→ Ce-138 (stable) Long-lived naturally occurring isotope
Lu-176	3.76E+10 years	No decay source	Lu-176 → Hf-176 (stable) Long-lived naturally occurring isotope
Mn-53	374,000 years	No decay source	Mn-53 → Cr-53 (stable)
Mo-93	4,000 years	Ancestors not present	[Mo-93m and Tc-93 and Tc-93m] → Mo-93 → Nb-93m → Nb-93 (stable)

Table 4.2-6: Continued Evaluation of Radionuclides (Continued)

Isotope	Half-life*	Reason for Elimination from Initial Inventory	Decay Chain
Np-236	1,540 years	No decay source	Np-236 → U-236 → Th-232 (in Thorium Series); Np-236 → Pu-236 Np-236a → U-232 to Th-228 (in Thorium Series)
Np-239	2.4 days	Decay from Am-243 in modeling; short half-life	Cf-247 → Bk-247 → Am-243 → Np-239 → Pu-239 → U-235 (in Actinium Series); Es-255 → Bk-251 or Fm-255 → Cf-251→ Cm-247→ Pu-243 → Am-243 → Np-239 → Pu-239 → U-235 (in Actinium Series)
Np-240	62 minutes	Decay from Pu-244 in modeling; short half-life	Cf-252 → Cm-248 → Pu-244 → U-240 → Np-240 → Pu-240 → U-236 → Th-232 in Thorium Series
Pa-233	27 days	Generated by Np-237 decay in modeling; short half-life	See Table 4.2-3.
Pa-234	6.7 hours	Generated by U-238 decay in modeling; short half-life	See Table 4.2-3.
Pb-202	52,500 years	Ancestors not present	Po-202 → Bi-202 → Pb-202 → [Tl-202 and Hg-198 (stable)]; Tl-202 → Hg-202 (stable)
Pb-205	1.73E+07 years	Ancestors not present	Po-205 → Bi-205 → Pb-205 → Tl-205 (stable)
Pb-209	3.3 hours	Generated by Np-237 decay in modeling; short half-life	See Table 4.2-3.
Pb-210	22 years	Generated by U-238 decay in modeling	See Table 4.2-3.
Pb-211	36 minutes	Generated by U-235 decay in modeling; short half-life	See Table 4.2-3.
Pb-212	10.6 hours	Generated by Th-232 decay in modeling; short half-life	See Table 4.2-3.
Pb-214	27 minutes	Generated by U-238 decay in modeling; short half-life	See Table 4.2-3.

Table 4.2-6: Continued Evaluation of Radionuclides (Continued)

Isotope	Half-life*	Reason for Elimination from Initial Inventory	Decay Chain
Pm-145	18 years	Ancestors not present	Gd-145 → Eu-145 → Sm-145 → Pm-145 → Nd-145 (stable)
Po-210	138 days	Generated by U-238 decay in modeling	See Table 4.2-3.
Po-211	<1 second	Generated by U-235 decay in modeling; short half-life	Decay mode less than 1% of Bi-211 decay.
Po-212	<1 second	Generated by Th-232 decay in modeling; short half-life	See Table 4.2-3.
Po-213	<1 second	Generated by Np-237 decay in modeling; short half-life	See Table 4.2-3.
Po-214	<1 second	Generated by U-238 decay in modeling; short half-life	See Table 4.2-3.
Po-215	<1 second	Generated by U-235 decay in modeling; short half-life	See Table 4.2-3.
Po-216	<1 second	Generated by Th-232 decay in modeling; short half-life	See Table 4.2-3.
Po-218	3 minutes	Generated by U-238 decay in modeling; short half-life	See Table 4.2-3.
Pu-236	3 years	Ancestors not present, decays to Th-228 series	Cf-244 → Cm-240 → Pu-236 → U-232 → Th-228 (in Thorium Series)
Pu-243	5 hours	Decay from Cf-251 in modeling	Cf-251 → Cm-247→ Pu-243 → Am-243 → Np-239 → Pu-239 → U-235 (in Actinium Series)
Pu-246	11 days	Ancestors not present	Cm-250 → Pu-246 →Am-246 → Cm-245 Pu-241 (in Neptunium Series);

Table 4.2-6: Continued Evaluation of Radionuclides (Continued)

Isotope	Half-life*	Reason for Elimination from Initial Inventory	Decay Chain
Ra-223	11 days	Generated by U-235 decay in modeling; short half-life	See Table 4.2-3.
Ra-224	3.6 days	Generated by Th-232 decay in modeling; short half-life	See Table 4.2-3.
Ra-225	15 days	Generated by Np-237 decay in modeling; short half-life	See Table 4.2-3.
Rb-87	4.97E+10 years	Ancestors not present	[Kr-87 and Sr-87m] → Rb-87 → Sr-87 (stable)
Re-186m	200,000 years	No decay source	Re-186m → Re-186 → Os-186 → W-182 (stable)
Rn-219	4 seconds	Generated by U-235 decay in modeling; short half-life	See Table 4.2-3.
Rn-220	56 seconds	Generated by Th-232 decay in modeling; short half-life	See Table 4.2-3.
Rn-222	4 days	Generated by U-238 decay in modeling; short half-life	See Table 4.2-3.
Si-32	132 years	No decay source	Si-32 → P-32 → S-32 (stable)
Sm-146	1.03E+08 years	Ancestors not present	[Gd-146 and Tb-150] → Eu-146 → Sm-146 → Nd-142 (stable); Eu-150m → Gd-150 → Sm-146 → Nd-142 (stable)
Sm-147	1.06E+11 years	Decay from Pm-147 in modeling	Pr-147 → Nd-147 → Pm-147 → Sm-147 → Nd-143 (stable); Tb-147 → Gd-147 → Eu-147 → Sm-147 → Nd-143 (stable)
Sn-121m	44 years	No decay source	Sn-121m → Sn-121 → Sb-121 (stable)
Ta-182	114 days	Ancestors not present	Hf-182m → Hf-182 → Ta-182 → W-182 (stable)
Tb-157	71 years	Ancestors not present	Ho-157 → Dy-157 → Tb-157 → Gd-157 (stable)
Tb-158	180 years	No decay source	Tb-158 → Gd-158 (stable)

Table 4.2-6: Continued Evaluation of Radionuclides (Continued)

Isotope	Half-life*	Reason for Elimination from Initial Inventory	Decay Chain
Tc-97	4.21E+06 years	Ancestors not present	[Ru-97 and Tc-97m] → Tc-97→ Mo-97 (stable)
Tc-98	4.20E+-06 years	No decay source	Tc-98 → Ru-98 (stable)
Th-227	19 days	Generated by U-235 decay in modeling; short half-life	See Table 4.2-3
Th-228	1.9 years	Generated by Th-232 decay in modeling; short half-life	See Table 4.2-3
Th-231	25.5 hours	Generated by U-235 decay in modeling; short half-life	See Table 4.2-3
Th-234	24 days	Generated by U-238 decay in modeling; short half-life	See Table 4.2-3
Ti-44	60 years	No decay source	Ti-44 → Sc-44 → Ca-44 (stable)
Tl-207	5 minutes	Generated by U-235 decay in modeling; short half-life	See Table 4.2-3
Tl-208	3 minutes	Generated by Th-232 decay in modeling; short half-life	See Table 4.2-3
Tl-209	2.2 minutes	Generated by Np-237 decay in modeling; short half-life	See Table 4.2-3
Tl-210	1.3 minutes	Generated by U-238 decay in modeling; short half-life	Decay mode less than 1% of Bi-214 decay.
U-240	14 hours	Decay from Cf-252 in modeling; short half-life	Cf-252 → Cm-248 → Pu-244 → U-240 → Np-240 → Pu-240 → U-236 → Th-232 (in Thorium Series)

*Half-life years obtained from the April 2005 Nuclear Wallet Cards. [PIT-MISC-0072]

4.2.1.4 Groundwater Modeling Initial Inventory

No further screening is performed on the initial inventories listed in Section 3.3 for the purpose of groundwater modeling.

4.2.1.5 Air Pathways Modeling Initial Inventory

The methodology used for airborne pathway screening is based on the NCRP-123 atmospheric screening methodology, while accounting for the fact that the radionuclides of concern for the airborne pathway are constrained by the actual waste tank inventory and the limited number of radionuclides susceptible to volatilization.

The steps in the airborne pathway screening are as follows:

Step 1. The initial list of radionuclides of concern for the airborne pathway is taken from the actual waste tank inventories. From the 64 candidate radionuclides in Table 4.2-5, only those radionuclides assumed to have a measurable inventory at closure are subject to further evaluation

Step 2. As discussed in the *Pathway Screening Analysis for the E-Area Low-Level Waste Facility*, some fundamental principles of physics and chemistry are applied to further reduce the number of radionuclides required to be analyzed for the airborne pathways. [WSRC-STI-2006-00159] The PA only considers times after final facility closure. Once the FTF waste tanks and ancillary equipment are closed and capped, there are only two possible ways for radionuclides to be released to the atmosphere. One is by particulates produced by intrusion, which is considered in a different pathway analysis in the PA, and the other is to be released as a gas. The list of elements in the initial waste tank inventory were reviewed and only those that were judged to have the potential to form a vapor phase in the waste form were considered for further analysis in the PA. The following elements are judged to have the potential to form a vapor phase in the waste form: Ar, As, At, Br, C, Cl, F, Ge, H, Hg, I, Kr, N, O, P, S, Sb, Se, Sn, and Xe. These elements have a total of 137 associated individual radionuclides. Of these 137 radionuclides, only C-14, Cl-36, H-3, I-129, Sb-125, Se-79, and Sn-126 are present in the actual FTF inventory.

4.2.2 Source Term Release

A fundamental part of estimating and understanding the release of stabilized contaminants from FTF waste tanks is a conceptual model of contaminant leaching from residual waste. This section presents a realistic conceptual model followed by an achievable method of implementing the ISCM in the framework of a flow and transport model. [WSRC-STI-2007-00544] In the most general sense, the model assumes that the residual waste remains as a discrete layer at the bottom of the waste tanks after they are filled with reducing grout. This discrete layer is referred to as the CZ. Infiltration from the surface that passes through the waste tanks provides the pore fluids necessary to leach contaminants from the CZ.

Previous models of waste tank closure performance have used a constant leach rate for stabilized contaminant release from the CZ. This is unrealistic because conditions within the waste tanks will evolve over the period of interest and leaching of radionuclides from the CZ depends on the chemical composition of pore fluid passing through the zone. Adsorption and solubility of all of the radionuclides of concern vary with pH, and most vary with redox potential as well. Other parameters, such as carbonate concentration, can also affect the leaching of some of the radionuclides. As the grout-filled waste tanks age, chemical composition of the pore fluid passing through the tanks will change resulting in changes to the solubility and adsorption controls on stabilized contaminant release. This is captured in the conceptual model of radionuclide leaching from the CZ by dividing waste tank evolution into four conditions shown schematically in Figure 4.2-1.

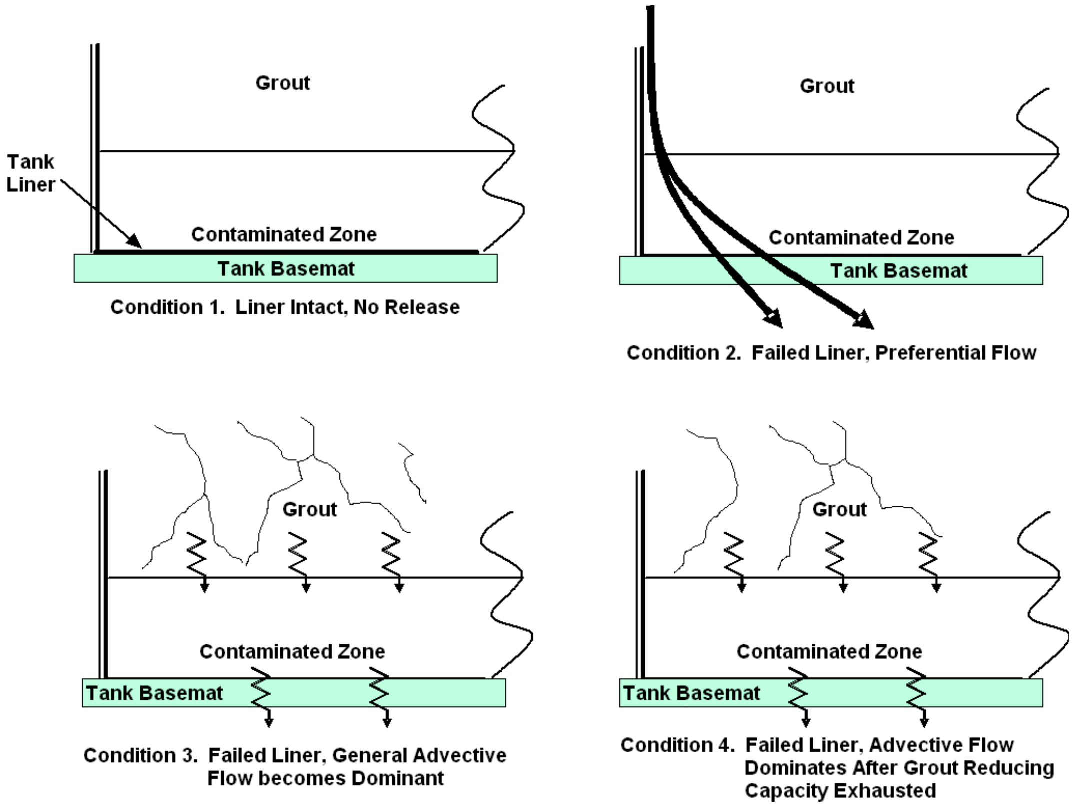
Condition 1: Commences immediately following pouring of grout. The steel waste tank liner is assumed to be intact. It is assumed that pore fluids in the CZ that remain after washing are forced upward into the grout. No stabilized contaminants are released from the waste tank.

Condition 2: Commences when steel waste tank liner is breached, and infiltration flow is predominantly along preferential flow paths. The assumption is that initially the tank grout will be too impermeable to allow significant advective flow, so flow along preferential paths will dominate. These paths could be at the interface of the grout and the steel waste tank liner or the grout and tank infrastructure such as piping. It is assumed that the reducing capacity of the grout along these preferential flow paths is rapidly depleted, thus, conditions of fluid reaching the CZ are relatively oxidizing.

Condition 3: Commences when general advective flow becomes dominant over flow along preferential pathways. For this conceptual model, general advective flow is defined as flow through a porous medium or along a fracture network extensive enough to be considered homogeneous on the scale of the waste tanks. If this is the case when the steel waste tank liner is breached, then Condition 2 does not occur, and the waste tank evolution proceeds to Condition 3. It is assumed that general advective flow through the reducing grout will produce reducing conditions in the pore water passing through the CZ.

Condition 4: Commences when reducing capacity of the tank grout is exhausted. In this condition, general advective flow dominates and pore water passing through the CZ is relatively oxidizing.

Figure 4.2-1: Potential Physical Conditions of Closed Tanks in Conceptual Model



Note: Not all waste tanks enter Condition 2 prior to Condition 3.

These four conditions only reflect changes in redox potential of the pore fluids. The pH of the pore fluids will also evolve as the waste tanks age. *Sorption Databases for the Cementitious Near-Field of a L/ILW Repository for Performance Assessment* described evolution of pore fluid pH in cementitious waste forms in three regions, of which the latter two are pertinent to this conceptual model. [ISSN 1019-0643] It was assumed that cement in Region II had pore fluids in equilibrium with portlandite ($Ca(OH)_2$) and a pH above 12. Eventually, the cement will become fully carbonated and evolve to Region III in which pore fluids are in equilibrium with calcite ($CaCO_3$) and have a pH above 8. To maximize flexibility of the ISCM presented here, chemical states for each of the leaching conditions (Figure 4.2-1) are estimated for both Bradbury and Sarott's Region II and Region III (hereafter referred to only as Region I, II or III). [ISSN 1019-0643]

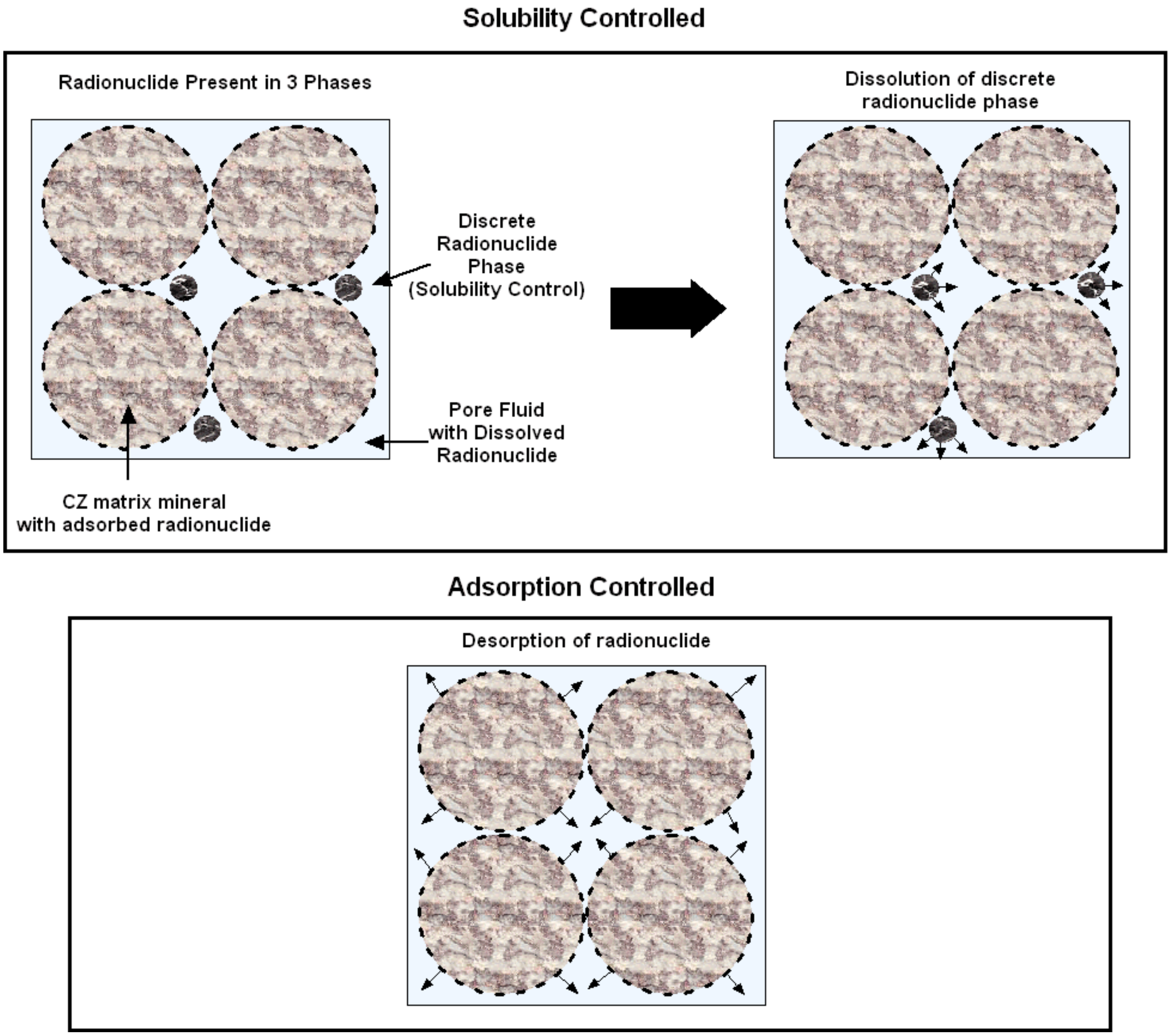
The conceptual model that emerges from this multi-condition approach results in a non-uniform leaching rate that depends on the chemical state of pore fluid contacting the stabilized contaminant at any given time. To allow maximum flexibility, the waste release model addresses four chemical states, shown in Table 4.2-7, and the corresponding waste tank conditions that are represented by these four states. The chemical states do not apply to Condition 1 (Figure 4.2-1) because the waste tank liner is intact and there is no fluid flow through the CZ.

Table 4.2-7: Chemical States of the Waste Tanks and the Waste Tank Condition

Chemical State	Tank Condition
Oxidizing Region II	2 and 4, portlandite dominant
Oxidizing Region III	2 and 4, calcite dominant
Reducing Region II	3, portlandite dominant
Reducing Region III	3, calcite dominant

In the waste release model there are three types of phases considered, an aqueous pore fluid phase, a matrix phase composed mostly of non-radionuclide elements, and discrete radionuclide phases embedded in the matrix. Each radionuclide is partitioned between the aqueous pore fluid, the surfaces of matrix phases in an adsorbed state, and discrete radionuclide phases. As long as the concentration of a radionuclide dissolved in the aqueous phase equals the solubility limit, release of that radionuclide is solubility controlled. Thus, as long as there are discrete particles of a radionuclide present, the rate of that radionuclide release is controlled by the flux of water through the CZ and the solubility of the discrete phase. If enough water passes through the CZ, the discrete phases of a particular radionuclide will be completely removed by dissolution and control of stabilized contaminant release will be by desorption from the surface of the matrix phases. Hence, adsorption controls only dominate the stabilized contaminant release when the mass of contaminant is insufficient to exceed the adsorption capacity of the non-radionuclide matrix phases. This can occur at any point during stabilized contaminant release, depending upon the inventory of a radionuclide and the adsorption capacity of the matrix. From that point on adsorption dominates stabilized contaminant release. Figure 4.2-2 shows this aspect of the waste release model.

Figure 4.2-2: States of Stabilized Contaminant Release



(Solubility controlled until inventory is less than adsorption capacity of matrix)

4.2.2.1 Implementation of Waste Release Model

The first step in calculation of radionuclide solubilities is to estimate the chemical conditions associated with each chemical state listed in Table 4.2-7. This is done under the assumption of thermodynamic equilibrium using the geochemical modeling program *The Geochemist's Workbench*, Release 6.0 (University of Illinois). The thermodynamic database used for solubility calculations was "thermo.com.V8.R6" provided in The Geochemist's Workbench® as an alternative database. This database is a compilation by Lawrence Livermore National Laboratory. As noted in Table 7 of WSRC-STI-2007-00544, additional thermodynamic data for becquerelite was obtained and added to the database.

For the solubility calculations, an assumed infiltrate of composition shown in Table 4.2-8 was equilibrated with either portlandite or calcite for Regions II and Region III. Equilibration with dissolved oxygen and carbon dioxide is determined by the chemical state.

Simulation of Region II is done by initially equilibrating the infiltrate with atmospheric CO_2 ($PCO_2=10^{-3.5}$ atm), and then equilibrating with portlandite. [ISSN 1019-0643] This accounts for the fact that CO_2 will be depleted by reaction with portlandite until the chemical state passes into Region III (calcite controlled, no portlandite). For simulation of Region III, partial pressure of CO_2 is held constant at $10^{-3.5}$ atm. For the oxidized states, the partial pressure of O_2 is held constant at 0.2 atm during mineral reaction, simulating equilibration with atmospheric oxygen. For the reduced states, the grouted tank system is equilibrated with the mineral pyrrhotite (Fe1-xS).

The choice of pyrrhotite to account for the reducing capacity of the tank grout is based on the fact that blast furnace slag is used in the grout. The component in the blast furnace slag that causes the reducing properties is unknown, but pyrrhotite is a reasonable proxy for modeling purposes. Pyrrhotite is a reduced iron sulfide that typically occurs at high temperatures and has been identified in various smelting slags.

Table 4.2-8: Composition of Initial Infiltrate Equilibrated with Grout to Obtain Parameters for Each Chemical State

Constituent	Concentration
pH	5.8
CO_2(aq)	a
O_2(aq)	a
Ca (molar)	2.5E-5
Na (molar)	4.3E-4
Fe (molar)	1.8E-8
Cl (molar)	4.3E-4
SO_4 (molar)	1.0E-5

a. See text above for description of dissolved gas concentrations in each state.

Table 4.2-9 shows composition of pore water estimated for each of the chemical states listed in Table 4.2-7. Establishing the pore water composition of the four states allows solubilities for each radionuclide to be calculated by equilibrating a selected radionuclide phase with the pore water for each state. A total sulfur concentration of 1.0E-5 molar (equivalent to 1mg/L SO_4^{-2}) is added to the pore fluids to be equilibrated with various solubility controlling radionuclide phases. This is a reasonable concentration based on the fact that at pH=12 equilibrium of common cement phases ettringite ($Ca_6Al_2O_6(SO_4)_3{\cdot}32H_2O$) with C4AH13 ($Ca_4Al_2O_7{\cdot}13H_2O$) produces a sulfate concentration of 3 mg/L.

Table 4.2-9: Composition of Pore Water Estimated for Each Chemical State of Grout

Chemical State	pH	E_h(v)	Ca^{+2} (molar)	CO_3^{-2}(molar)
Oxidizing Region II	12.38	0.49	1.7E-2	4.6E-6
Oxidizing Region III	8.23	0.73	4.6E-4	1.7E-6
Reducing Region II	12.38	-0.66	1.8E-2	1.4E-5
Reducing Region III	8.23	-0.34	4.6E-4	2.4E-3

4.2.2.1.1 Selecting Solubility Controlling Phases

A fundamental part of establishing solubility controlled stabilized contaminant release rates is selection of a solubility controlling phase for each radionuclide. For some of the radionuclides of interest there are studies that can guide selection, for others there are no studies. For this reason, selection of solubility controlling phases is generally very conservative, meaning that where multiple phases of a radionuclide were possible, that with the highest solubility is selected.

There are two factors that determine the solubility of a phase, the composition and the structure. For phases with the same composition, amorphous forms usually have higher solubilities than crystalline forms. Thus, where thermodynamic data existed, the amorphous forms are selected for solubility controls. For most, hydroxides were chosen over oxides because the hydroxide of an element usually has a higher solubility than the oxide. For many radionuclides, carbonate phases are selected. This was particularly true for the Region III chemical states because of the higher partial pressures of CO_2. [ISSN 1019-0643] Carbonate phases normally precipitate easily from solution and their occurrence in the grouted tanks is considered to be plausible.

Two special cases of mineral selection are becquerelite for uranium and Tc_2S_7 for technetium. These phases are selected because they have been identified elsewhere in samples subject to conditions similar to those expected for the closed waste tanks. Becquerelite ($Ca(UO_2)_6O_4(OH)_6 \cdot 8H_2O$) is stable at cementitious conditions and has been identified in experiments at these conditions. Likewise, Tc_2S_7 was identified in experiments at conditions near those expected for closed F-Area waste tanks. [WSRC-STI-2007-00544]

4.2.2.1.2 Solubility Values

Table 4.2-10 shows solubility values and controlling phases for all of the elements of interest at each of the chemical states of interest. For Pu, Tc, and U, the Region II solubility values listed correspond to Fe co-precipitation (discussed in detail later in this section) as the controlling mechanism. Solubilities for four of the elements are not calculated because of lack of thermodynamic data. However, each of these has either a very small inventory or a short half-life and is unlikely to be issues at exposure points. Several of the elements have no identified solubility controls and their release is modeled as instantaneous (within the first pore volume).

Table 4.2-10: Calculated Solubilities of Radionuclides of Interest

	Oxidized Region II		Oxidized Region III		Reduced Region II		Reduced Region III	
	Controlling Phase	Solubility (moles/L)	Controlling Phase	Solubility (moles/L)	Controlling Phase	Solubility (moles/L)	Controlling Phase	Solubility (moles/L)
Ac	La(OH)3	5.00E-05	La2(CO3)3:8 H2O	1.60E-08	La(OH)3	5.10E-05	La2(CO3)3:8 H2O	1.40E-08
Am	Am(OH)3	2.40E-09	AmOHCO3	4.90E-08	Am(OH)3	2.40E-09	AmOHCO3	7.70E-08
Ba	Witherite(BaCO3)	3.50E-07	Witherite(Ba CO3)	8.70E-09	Witherite(BaCO3)	2.00E-07	Witherite(Ba CO3)	5.60E-09
Bk	Short half-life	Modeled as instantaneous release	Short half-life	Modeled as instantaneous release	Short half-life	Modeled as instantaneous release	Short half-life	Modeled as instantaneous release
C	Calcite	1.10E-11	Isotopic exchange	Modeled as instantaneous release	Isotopic exchange	Modeled as instantaneous release	isotopic exchange	Modeled as instantaneous release
Ce	Ce(OH)3	9.20E-7	Ce(OH)3	3.40E-4	Ce(OH)3	9.20E-07	Ce(OH)3	4.50E-5
Cf	Tiny inventory	Modeled as instantaneous release	Small inventory	Modeled as instantaneous release	Small inventory	Modeled as instantaneous release	Small inventory	Modeled as instantaneous release
Cm	Cm(OH)3	2.40E-09	AmOHCO3	4.90E-08	Cm(OH)3	2.40E-09	CmOHCO3	7.70E-08
Co	CoFe2O4	8.80E-09	CoFe2O4	5.90E-13	CoFe2O4	9.40E-09	CoFe2O4	5.40E-13
Cs	No solubility control	Modeled as instantaneous release	No solubility control	Modeled as instantaneous release	No solubility control	Modeled as instantaneous release	No solubility control	Modeled as instantaneous release
Eu	Eu(OH)3	1.90E-07	EuOHCO3	1.20E-06	EuOHCO3	2.00E-07	EuOHCO3	1.20E-06
I	No solubility control	Modeled as instantaneous release	No solubility control	Modeled as instantaneous release	No solubility control	Modeled as instantaneous release	No solubility control	Modeled as instantaneous release

Table 4.2-10: Calculated Solubilities of Radionuclides of Interest (Continued)

	Oxidized Region II		Oxidized Region III		Reduced Region II		Reduced Region III	
	Controlling Phase	**Solubility (moles/L)**	**Controlling Phase**	**Solubility (moles/L)**	**Controlling Phase**	**Solubility (moles/L)**	**Controlling Phase**	**Solubility (moles/L)**
Nb	No solubility control	Modeled as instantaneous release	No solubility control	Modeled as instantaneous release	No solubility control	Modeled as instantaneous release	No solubility control	Modeled as instantaneous release
Ni	NiFe2O4	1.40E-09	NiFe2O4	1.20E-07	Heazlewoodite (Ni3S2)	3.40E-10	Polydimite (Ni3S4)	1.20E-10
Np	NpO2(OH)am	2.20E-05	NpO2(OH)am	1.10E-04	Np(OH)4	1.60E-09	Np(OH)4	1.60E-09
Pa	No solubility control	Modeled as instantaneous release	No solubility control	Modeled as instantaneous release	No solubility control	Modeled as instantaneous release	No solubility control	Modeled as instantaneous release
Pm	Pm(OH)3(am)	1.30E-08	Pm2(CO3)3	1.80E-07	Pm(OH)3(am)	1.30E-08	Pm2(CO3)3	1.80E-07
Pr	Pr(OH)3	2.70E-06	Pr(OH)3	9.70E-08	Pr(OH)3	9.20E-05	Pr2(CO3)3	9.50E-08
Pu	Fe co-precipitation	4.0E-14	Pu(OH)4	5.70E-05	Fe co-precipitation	4.1E-12	Pu(OH)4	2.90E-09
Ra	RaSO4	1.10E-05	RaSO4	3.80E-06	RaSO4	1.30E-05	RaSO4	4.60E-04
Rh	Short half-life	Modeled as instantaneous release	Short half-life	Modeled as instantaneous release	Short half-life	Modeled as instantaneous release	Short half-life	Modeled as instantaneous release
Ru	RuO2.2H2O(am)	6.20E-04	RuO2.2H2O(am)	7.60E-07	RuS_2	6.80E-15	RuS_2	9.00E-11
Sb	Sb(OH)3	3.40E-07	Sb(OH)3	8.00E-08	Sb(OH)3	3.50E-07	Sb(OH)3	8.00E-08
Se	No solubility control	Modeled as instantaneous release	No solubility control	Modeled as instantaneous release	Ferroselite (FeSe2)	2.40E-02	Ferroselite (FeSe2)	2.40E-02
Sm	Sm(OH)3(am)	9.80E-05	Sm(OH)3(am)	4.40E-06	Sm(OH)3(am)	1.00E-04	Sm(OH)3(am)	2.60E-04
Sn	Cassiterite (SnO2)	2.70E-08	Cassiterite (SnO2)	2.70E-08	Cassiterite (SnO2)	2.70E-08	Cassiterite (SnO2)	2.70E-08

Table 4.2-10: Calculated Solubilities of Radionuclides of Interest (Continued)

	Oxidized Region II		Oxidized Region III		Reduced Region II		Reduced Region III	
	Controlling Phase	**Solubility (moles/L)**	**Controlling Phase**	**Solubility (moles/L)**	**Controlling Phase**	**Solubility (moles/L)**	**Controlling Phase**	**Solubility (moles/L)**
Sr	Strontianite (SrCO3)	1.00E-04	Strontianite (SrCO3)	4.07E-06	Strontianite (SrCO3)	9.90E-05	Strontianite (SrCO3)	2.70E-06
Tc	Fe co-precipitation	3.00E-13	No solubility control	Modeled as instantaneous release	Fe co-precipitation	3.1E-11	Tc2S7	2.79E-38
Te	Short half-life	Modeled as instantaneous release	Short half-life	Modeled as instantaneous release	Short half-life	Modeled as instantaneous release	Short half-life	Modeled as instantaneous release
Th	Th(OH)4	4.20E-07	Th(OH)4	4.20E-07	Th(OH)4	4.20E-07	Th(OH)4	4.20E-07
U	Fe co-precipitation	1.60E-11	Becquerelite	3.40E-05	Fe co-precipitation	1.7E-09	UO2(am)	3.50E-05
Y	Y(OH)3	2.70E-07	Y(OH)3	5.10E-05	Y(OH)3	2.90E-07	Y(OH)3	1.80E-04

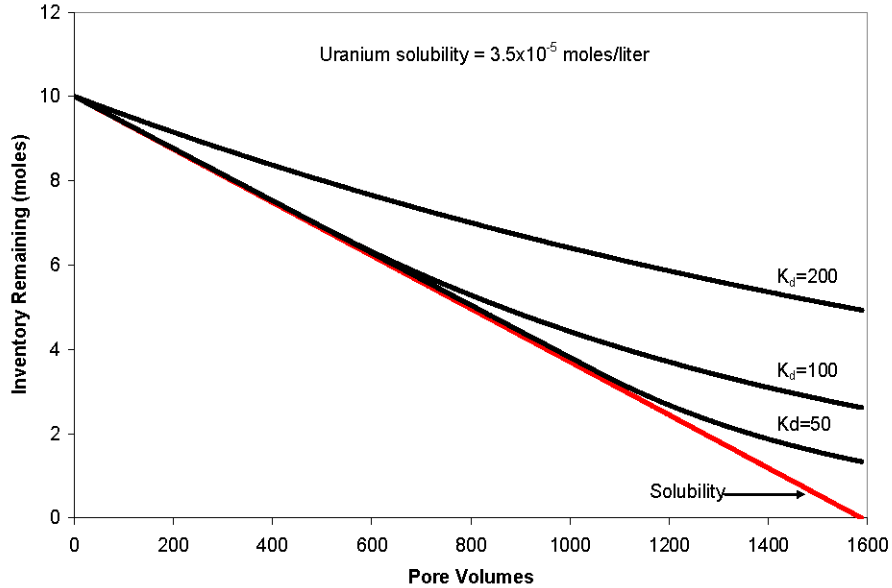
Note: The elements Al, H and Na are not controlled by solubility, and thus are not included in the table, rather they are assumed to be released instantaneously.

In the implementation of the waste release model, it was evident that adsorption controls would play only a minor role as discussed later in this section. For this reason, as well as the inability to calculate reliable adsorption parameters for most of the radionuclides of interest, it was decided to model only solubility controls to account for stabilized contaminant release in fate and transport models. This avoids the need to make assumptions about the mineralogy of the stabilized contaminant layer, the abundance of minerals, and their surface areas based on very limited information.

It is thought that the importance of adsorption controls is minimal because for most of the radionuclides the mass of matrix minerals in the stabilized contaminant will be too low to adsorb a substantial fraction of the radionuclide inventory. In other words, the inventories of most radionuclides exceed the adsorption capacity of the stabilized contaminant. The fact that the radionuclides currently present in the Tanks 18 and 19 residual material remains after extensive washing supports the assumption that they occur in a form less labile than adsorbed.

In an equilibrium model, the assumption that solubility rather than adsorption controls stabilized contaminant release is conservative, resulting in faster overall release of radionuclides. This is because the maximum contaminant that can desorb is controlled by solubility. In effect, if the K_d is low enough that a concentration is released that exceeds solubility, some of the radionuclide will precipitate bringing the concentration down to solubility. The stabilized contaminant release rate will drop below that dictated by solubility when the radionuclide inventory is depleted to where the concentration released is below solubility. At higher K_d values the concentration released at any given time will always be below the concentration dictated by solubility. Thus, time until complete release of a radionuclide using adsorption controls will always be longer than when only solubility controls are used. This is demonstrated in Figure 4.2-3, where an example of uranium release from the CZ under reducing conditions was examined using a total inventory of 10 moles and a solubility of 3.5E-5 moles/L. Adsorption controls result in an overall slower release of uranium.

Figure 4.2-3: Comparison of Solubility Only and Adsorption Only Controls on Uranium Release



Note: (K_d values in ml/g). Assumes a total inventory of 10 moles and a solubility of 3.5E-5 moles/L.

4.2.2.2 Solubility Control vs. Adsorption Controls

The conceptual model for stabilized contaminant release from the CZ assumes the stabilized contaminant release is solubility controlled. This is based on inventories of radionuclides and the volume of stabilized contaminants assumed to remain in the waste tanks after cleaning. For uranium isotopes, plutonium isotopes, Tc-99, Np-237, and Am-241, the post-wash inventories per single pore volume are much higher than would be soluble in a single pore volume. More importantly, apparent K_ds calculated from the post-wash inventories and amount of matrix are generally too high to reasonably conclude that adsorption controls dominate stabilized contaminant release.

The K_d values were calculated by assuming a waste tank bottom area of 527.2 m^2 and a theoretical CZ thickness of 1.6E-3 m, to give a total post-wash waste volume of 0.84 m^3. The porosity of the CZ was assumed to be the same as the grout, 21.1%, giving a pore volume of 0.18 m^3 and a matrix mineral volume of 0.66 m^3. [WSRC-STI-2006-00198] The density of the matrix minerals was assumed to be that of hematite, 5.3 g/cm^3. Thus, the estimated mass of the CZ was assumed to be 3.5E+6 grams.

The K_d is defined as:

$$K_d = \frac{C_{solid}}{C_{aqueous}}$$

where:

C_{solid} is the concentration of the radionuclide in the solid phase, $C_{aqueous}$ is the concentration in the aqueous phase, and Mcz is the mass of the CZ. The inventory in the solid phase is the total inventory (I_T) minus the inventory in the aqueous phase. For these calculations the inventory in the aqueous phase is defined as the calculated solubility (S) in moles/liter of the radionuclide multiplied by the total fluid pore volumes (V_p) in the CZ of a waste tank. Thus, the K_d in milliliters per gram (mL/g) is defined by:

$$C_{solid}\left(\frac{moles}{g}\right) = \frac{I_T - 1000\,V_P S}{M_{CZ}}$$

and $$C_{aqueous}\left(\frac{moles}{ml}\right) = 0.001S$$

therefore $$K_d\left(\frac{ml}{g}\right) = \frac{I_T - 180S}{3500S}$$

where:

I_T is the total radionuclide inventory in moles in the CZ and S is the calculated solubility in moles/L. Table 4.2-11 shows the minimum, maximum, and median values of K_d calculated for all F-Area waste tanks for total uranium, total plutonium, Tc-99, Np-237, and Am-241. The solubility under Reducing Region II conditions is used because it is assumed that these would be the equilibrium conditions when the waste tank liner is breached and stabilized contaminants first leach to the environment. Low K_d values occur in a few waste tanks, particularly for Np-237, because the inventory in these waste tanks is low. It is important to note that if adsorption controls are used to estimate stabilized contaminant release rates and the median K_d values are used, the release rates would be slower than those estimated from solubility controls. This is true even if supersaturation of the pore fluids is allowed.

Table 4.2-11: Calculated Apparent K_d Values in F-Area Waste Tanks if Adsorption was Controlling Stabilized Contaminant Release

Radionuclide/Element	Minimum K_d (ml/g)	Maximum K_d (ml/g)	Median K_d (ml/g)
Am-241	4.5E+14	7.0E+18	1.3E+16
Np-237	3.2	1.2E+5	2.8E+3
Plutonium	6.1E+3	1.8E+6	2.6E+4
Tc-99	1.9E+42	2.4E+45	1.2E+44
Uranium	8.6E+1	2.4E+4	2.8E+2

4.2.2.3 Uncertainty in Solubility Calculations

There are uncertainties in the calculation of the solubilities. Much of the uncertainty is because of unknowns related to the CZ and how the conditions it will experience will evolve with time. Some is due to the limited amount of thermodynamic data available for many of the radionuclides of interest. The uncertainty can be reduced by laboratory studies, but significant uncertainty will always remain. For example, with very careful and detailed analyses, the actual form the dominant radionuclides take in the CZ might be determined. Nevertheless, there would still be considerable uncertainty because as conditions change from initial tank grouting to several thousand years in the future, these radionuclide forms are likely to change as well. The best way to manage this uncertainty in implementation of this ISCM is to be as conservative in assumptions as is reasonable. The impact of uncertainty on solubility control has been incorporated into Section 5.6. The potential variability in solubility limits and chemical transition times discussed in the section are two of the parameters specifically evaluated in the probabilistic GoldSim FTF model (Section 5.6.3.3 and 5.6.3.8).

4.2.2.3.1 Choice of Controlling Phase

For many radionuclides the choice of the solubility controlling phase is the largest uncertainty in calculating solubilities. In this analysis the choice of controlling phase is biased toward higher solubility phases by not considering many phases with low solubilities. For example, where there is thermodynamic data available for both amorphous and crystalline phases of the same stoichiometry, the amorphous phase is chosen because amorphous phases generally have lower solubilities than their crystalline counterparts. Thus, the solubilities reported here may be biased high by many orders of magnitude for many elements. A good example is uranium. Table 4.2-12 compares uranium solubilities calculated for Conditions 2 and 3 (Figure 4.2-1), (Oxidized Region II and Reduced Region II) with solubilities calculated for other potential solubility controlling phases. Choice of becquerelite yields a calculated controlling solubility that is 10 orders of magnitude higher than if $CaUO_4$ was chosen. Choice of the amorphous form of UO_2 rather than the crystalline form (uraninite) yields a solubility that is 5 orders of magnitude higher. To further complicate the issue, there is ample evidence to suggest that uranium concentrations may also be limited by silicate and phosphate phases that were not considered in this evaluation. [ISSN 1019-0643]

Table 4.2-12: Comparison of Calculated Solubilities of Various Uranium Phases

Phase Chosen for Oxidizing Region II	Solubility (mole/L)
Becquerelite	1.5E-5
Other Potential Solubility Controlling Phases for Oxidizing Region I	
$CaUO_4$	2.8E-15
$Na_2U_2O_7$	2.7E-6
Phase Chosen for Reducing Region II	
UO_2 (amorphous)	3.5E-5
Other Potential Solubility Controlling Phases for Reducing Region II	
Uraninite (crystalline UO_2)	3.9E-10

The main reason for choosing high solubility phases over low solubility phases is that precipitation of higher solubility phases are often kinetically favored over low solubility phases. If they weren't, the low solubility phases would always be the controlling phases. Choosing higher solubility phases eliminates consideration of kinetic arguments for why a lower solubility phases would be expected.

For some elements, phases other than the amorphous hydroxides are chosen. For nickel and cobalt, phases with the stoichiometry of XFe_2O_4 are chosen because there is a strong possibility that precipitation of these phases would be catalyzed at the surface of hematite or other ferric iron phases present. For other elements, sulfate or carbonate phases are chosen because these are known to precipitate readily as pipe or tank scale and thus it is assumed that kinetics would not inhibit their precipitation in the waste tanks. For tin, the database for appropriate solid phases is so small that cassiterite (SnO_2) is considered to be the most likely phase to precipitate of those for which there is data.

One way to manage uncertainty related to choice of solubility controlling phase is to consider the probability of different phases occurring. For example, $Pu(OH)_4$ is selected here as the solubility controlling phase. Yet, the more thermodynamically stable PuO_2 is feasible, particularly at the elevated temperatures (~80^{o}C) that will occur from initial grout hydration. [WSRC-TR-97-0102] If PuO_2 was the controlling phase, it would have a large effect on stabilized contaminant release because it's calculated solubility under Reducing Region II conditions is 1.3E-17 moles/L compared to the $Pu(OH)_4$ solubility of 1.7E-9 moles/L. Tables 4.2-13 and 4.2-14 show a possible distribution of phases for plutonium, uranium, neptunium, and technetium, where the probabilities are weighted to account for the possibility of different phases. The probabilities chosen here are not rigorously or mathematically. They are based on professional judgment that accounts for observations in the literature, thermodynamic stability, etc.

Table 4.2-13: Probability Distributions for Various Phases Controlling Reduced Region II Solubility

	Controlling Phase (a)	**Solubility (moles/L)**	**Probability**
Plutonium	$Pu(OH)_4$	1.7E-09	0.4
	PuO_2	1.3E-17	0.1
	Fe co-precipitation (b)	4.1E-12	0.5
Neptunium	$Np(OH)_4$	1.6E-09	0.8
	NpO_2	4.0E-18	0.2
Technetium	Tc_2S_7	9.9E-38	0.4
	$TcO_2.H_2O$	3.3E-08	0.1
	Fe co-precipitation	3.1E-11	0.5
Uranium	UO_2	3.5E-05	0.25
	Uraninite	3.9E-10	0.15
	$CaUO_4$	2.9E-08	0.1
	Fe co-precipitation (b)	1.7E-09	0.5

(a) Fe co-precipitation assumed to be controlling 50% of the time for Pu and U
(b) Value used is larger of two values from Tank 18 and Tank 20 results

Table 4.2-14: Probability Distributions for Various Phases Controlling Oxidized Region II Solubility

	Controlling Phase (a)	Solubility (moles/L)	Probability
Plutonium	$Pu(OH)_4$	1.4E-07	0.35
	PuO_2	1.2E-15	0.1
	$PuO_2(OH)_2$	3.4E-11	0.05
	Fe co-precipitation (b)	4.0E-14	0.5
Neptunium	$NpO_2(OH)$	2.2E-05	0.7
	Np_2O_5	7.1E-05	0.2
	NpO_2	1.1E-07	0.1
Technetium	High solubility (c)	2.95E-06	0.5
	Fe co-precipitation (b)	3.0E-13	0.5
Uranium	Becquerelite	1.5E-05	0.25
	$CaUO_4$	3.0E-15	0.15
	Schoepite	1.0E-03	0.1
	Fe co-precipitation (b)	1.60E-11	0.5

(a) Fe co-precipitation assumed to be controlling 50% of the time for Pu, Tc and U.
(b) Value used is larger of two values from Tank 18 and Tank 20 results.
(c) A high solubility limit was assumed to provide a fast release without overwhelming the stochastic distribution (i.e., not instantaneous release).

4.2.2.3.2 Uncertainty in Thermodynamic Data

Uncertainty in thermodynamic data can result in large discrepancies in mineral solubility. For any given solubility calculation there are numerous thermodynamic quantities involved, each of which has an uncertainty. The uncertainties in each of these compound and can lead to solubility calculations that have a range of uncertainty that spans several orders of magnitude. Typically, the least studied constituents have the highest uncertainty in their thermodynamics, but even well studied constituents can have high thermodynamic uncertainties if their chemistries are complicated. For example, uranium is well studied but has multiple oxidations states, can form aqueous complexes with a variety of anions and cations, and can form dozens of solid phases. Accounting for all of these complexities in experiments measuring thermodynamic quantities is extremely difficult, often resulting in very different values reported for the same quantity. The solubility of the uranium mineral becquerelite is an example. Table 4.2-15 shows values for the log of the equilibrium constants (Log K) measured in four studies for the dissolution reaction:

$$\mathbf{Ca(UO_2)_6O_4(OH)_6 \cdot 8H_2O_{(s)} + 14H^+ = 6UO_2^{+2} + Ca^{+2} + 18H_2O}$$

Table 4.2-15: Values of Log K for Reaction from Various Studies

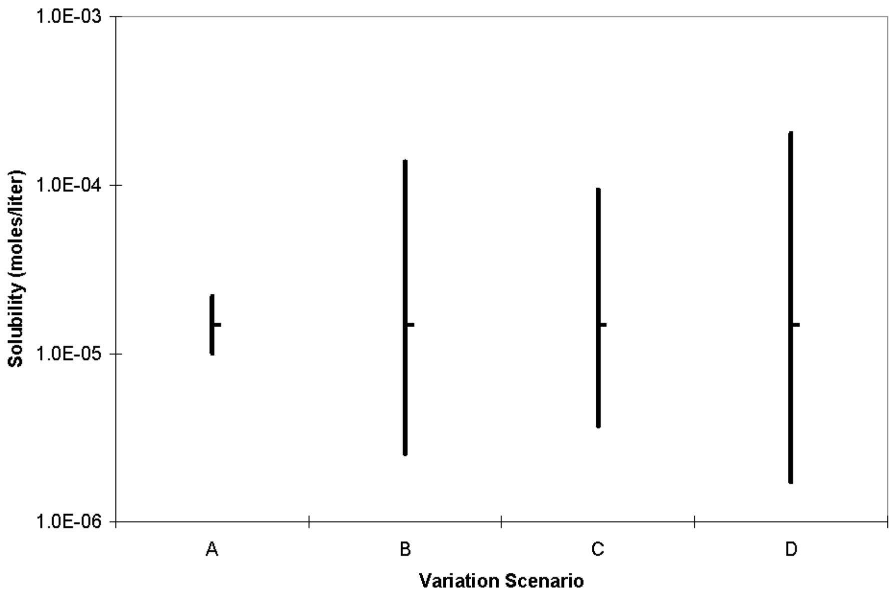
LOG K
41.89
43.6
29
41.4

[WSRC-STI-2007-00544]

The solubility calculated for becquerelite using these values varies by 2 orders of magnitude for the chemical composition associated with Condition 1 (Figure 4.2-1). The reason the calculated solubility only varies by 2 orders of magnitude despite the 14.6 orders of magnitude variation in the equilibrium constant is that, at these conditions, other thermodynamic quantities exert greater control on the solubility of becquerelite. At pH=12.3 and oxidizing conditions, the primary control on the solubility is the association constant of the dominant aqueous uranium complex, $UO_2(OH)_4^{-2}$.

Figure 4.2-4 shows the results of a simple analysis of the sensitivity of calculated becquerelite solubility to the equilibrium constant of the dissolution reaction and the association constant of the dominant aqueous species of uranium. In scenario A, the equilibrium constant of the dissolution reaction is varied ±1 order of magnitude from that used in the original calculation and all other constants are the same as used in the original calculation. In scenario B, the association constant for the dominant aqueous uranium species, $UO_2(OH)_4^{-2}$, is varied by ±1 order of magnitude while all other constants remain the same as in the original calculation. In scenario C, the association constant of the dominant species and the equilibrium constant for the dissolution reaction are varied in the same direction ± 1 order of magnitude. In scenario D, the two constants are varied in opposite directions ±1 order of magnitude. The results show that when the two constants are varied in the opposite directions by an order of magnitude, scenario D, the calculated solubility varies by about ±1 order of magnitude. The results also show the relative insensitivity of the calculated solubility to the equilibrium constant of the dissolution reaction compared to the association constant of the dominant species, at the pH of 12.3 and oxidizing conditions. As chemical conditions approach the stability of the uranium species in the dissolution reaction, $UO2^{+2}$, the calculated solubility becomes more sensitive to the equilibrium constant of this reaction.

Figure 4.2-4: Effect of Varying Different Thermodynamic Parameters on Solubility of Becquerelite



Note: Vertical lines show variation in solubility in each scenario, horizontal tick marks show the solubility reported in this study.

The Nuclear Energy Agency's Organization for Economic Co-Operation and Development (OECD) is developing a thermodynamic database for species and reactions pertinent to the nuclear industry and has published volumes specific to several radioactive elements. Table 4.2-16 shows the range in uncertainty reported in this database for association constants of aqueous species of several radioactive elements.

Table 4.2-16: Variation in Association Constants of Aqueous Species of Various Elements of Interest

ELEMENT	RANGE OF UNCERTAINTY IN LOG K
U	±0.02 to ±2.00
Pu	±0.09 to ±3.00
Np	±0.06 to ±2.69
Tc	±0.15 to ±1.7

[WSRC-STI-2007-00544]

From the sensitivity analysis shown in Figure 4.2-4 and Table 4.2-16 it is assumed a maximum uncertainty in calculated solubilities due to thermodynamic uncertainty to be 2 orders of magnitude for all elements.

4.2.2.4 Stabilized Contaminants Release Control by Co-Precipitation

Co-precipitation as defined here is the incorporation of an element into the crystal structure of a solid phase that is predominantly made of other elements or the trapping of an element within the bulk mass of a phase made up of other elements, but not necessarily within the crystal lattice. The incorporated element is often referred to as a trace or minor element in the solid phase. This differs from adsorption where an element is bound to the surface layers of a solid phase and is available for equilibration with pore fluids. The bulk of a co-precipitated trace element is not available for interaction with pore fluids until the parent phase is dissolved.

An example of co-precipitation is Cr^{+3} incorporated into $Fe(OH)_3$. This can be considered thermodynamically in a simple way by the reaction:

$$\mathbf{Cr^{+3} + Fe(OH)_3 = Cr(OH)_3 + Fe^{+3}}$$

With an equilibrium constant of:

$$K = \frac{aFe^{+3} \times ACr(OH)_3}{aCr^{+3} \times AFe(OH)_3}$$

where:

aFe^{+3} and aCr^{+3} are the activities of the aqueous species and $ACr(OH)_3$ and $AFe(OH)_3$ are the activities of these components in the precipitated solid.

The equilibrium relationship can be rearranged to:

$$K \times \frac{AFe(OH)_3}{ACr(OH)_3} = \frac{aFe^{+3}}{aCr^{+3}}$$

Thus, the amount of chromium that precipitates with $Fe(OH)_3$ is related to the ratio of Fe^{+3} to Cr^{+3} in the aqueous solution by the equilibrium constant, sometimes referred to as the K_d.

Co-precipitation in which the element of interest is not part of the crystal structure of the main phase cannot be treated thermodynamically. Yet, when the molar ratio in solution of an element of interest to a "carrier" element is very small, co-precipitation with the carrier phase can remove much of the element of interest from the solution providing that the element of interest has not already precipitated and settled out of solution. Table 4.2-17 presents the molar ratios of Pu-239, Tc-99, and U-238 to iron in Tanks 18 and 20 residual waste. Chemical Species of Plutonium in *Hanford Radioactive Tank Waste* provides a good discussion of the reasons the authors report that plutonium was co-precipitated with iron or aluminum in Hanford waste tanks. [HNF-SA-3181-FP]

Table 4.2-17: Molar ratios of Pu-239, U-238 and Tc-99 to Fe in FTF Tanks 18 and 20

Tank	Pu-239/Fe (molar)	U-238/Fe (molar)	Tc-99/Fe (molar)
19	5.0E-5	3.0E-2	2.0E-4
20	4.0E-5	5.0E-3	4.0E-4

[Tank 19 Reference: WSRC-TR-2002-00107]
[Tank 20 Reference: WSRC-TR-96-0267]

Many of the radionuclides of interest may be co-precipitated with solid iron or other metal hydroxides or oxides in the residual waste. This is supported by concentrations of rare earth elements, often considered surrogates for actinides, in natural iron oxides and oxyhydroxides formed at low temperature environments. WSRC-STI-2007-00544 provides multiple examples of reports that discuss co-precipitation. For example, rare earth element concentrations have been reported in low temperature hematite, and goethite that range from about 0.1 ppm to 9 ppm (one sample of goethite contained 132 ppm Ce). If all iron and Pu-239 in Tank 18 residual waste resided in hematite the Pu-239 would have a concentration of 1.4 ppm in the hematite. Thus, it is plausible that a large fraction of plutonium and other radionuclides might be in a co-precipitated form. Supporting this idea are reports that document both plutonium and uranium co-precipitated with iron and that found that uranium and plutonium were both effectively removed from solution by co-precipitation with iron hydroxides in a water treatment process. [WSRC-STI-2007-00544] Similarly, removing plutonium from residual waste solutions by co-precipitating it with magnetite and co-precipitation with iron hydroxides quantitatively remove plutonium from liquid samples prior to analysis have been discussed in applicable reports. In the magnetite co-precipitation experiments, decontamination factors in the 10^4 to 10^5 range were achieved, and the experimental data suggests a plutonium K_d on the order of 1,000 in the magnetite produced. [WSRC-STI-2007-00544]

Technetium may also be co-precipitated with iron phases in the waste tanks. A significant fraction of Tc-99 in Hanford waste tank sludge was relatively insoluble (20% in one sample, and 80% in another) and the insoluble Tc-99 was correlated with iron oxides in selective extraction experiments. Calculated apparent solubilities of the co-precipitated Tc-99 to be 4.0E-12 and 1.0E-13 moles/L assumed the iron phase was ferrihydrite and the pH was that typical of Hanford groundwater. Experiments were conducted with perrhenate (an analogue for pertechnitate) under Hanford tank sludge conditions. These experiments concluded that up to 14% of the Tc-99 in tank sludges may be irreversibly sorbed, possibly co-precipitated, in iron and aluminum solids. It was also believed that Tc-99 was removed from solution during titration experiments of acidic groundwater by co-precipitation with iron and aluminum phases. [WSRC-STI-2007-00544]

It is likely that co-precipitation of technetium, uranium and plutonium in iron hydroxides/oxides is initiated by adsorption of these radionuclides on particles of ferric iron phases as they precipitate. As the particles grow or become agglomerated into larger masses, the radionuclides are effectively coprecipitated – isolated from pore fluid by their entrapment in ferric iron phases. The co-precipitation of technetium is postulated to be by adsorption within the microporosity of precipitating ferrihydrite. As the ferrihydrite recrystallizes to hematite or goethite, the microporosity is closed off and the technetium is isolated from interparticle pore fluids. This is likely also the case for uranium and plutonium because none of these radionuclides fit well into the crystal lattice of ferric iron oxides or hydroxides. Thus, a thermodynamic treatment is not applicable. Nevertheless, an apparent solubility can be estimated for radionuclides co-precipitated by this mechanism by assuming that the radionuclides are homogenously distributed within the mass of ferric iron phase. This is not unreasonable if soluble iron was added to the waste stream during or after the radionuclides of interest. Ferrous sulfamate was added during the PUREX process used at SRS to reduce plutonium. It is possible that this iron precipitated upon pH neutralization prior to disposition in the tanks. Ferric iron precipitated by an increase in pH generally occurs initially as colloidal-sized particles of an amorphous hydroxide. The particles subsequently agglomerate and settle out. With time the amorphous hydroxide becomes increasingly crystalline and usually converts to hematite or goethite. A relatively homogenous distribution of radionuclide within an aged ferric iron phase would be expected if the radionuclide was initially adsorbed to the early colloidal particles. This is the inherent assumption used by others to calculate as reported in WSRC-STI-2007-00544 apparent solubility of Tc co-precipitated with iron – that the ratio of the radionuclide to iron in solution as the iron phase is dissolved is equal to the ratio in the solid phase.

Recent work reported in WSRC-STI-2007-00544 suggests that uranium co-precipitated with Hydrous Ferrous Oxides (HFO) becomes less extractable with age as the originally amorphous HFO becomes more crystalline and hematite and goethite begin to crystallize. This is consistent with the recent observations of Tc leachability when co-precipitated with iron. However, other recent studies reviewed and documented in WSRC-STI-2007-00544 showed that uranium is preferentially leached compared to iron when the solid is exposed to extractants. It should be noted that the aged iron phase still contained appreciable ferrihydrite, which suggests that the preferential leaching of uranium by a carbonate extractant may be the result of dissolution of the ferrihydrite with subsequent reprecipitation of the iron. The other possibility is that the uranium is not homogenously distributed in the aged particles, but is concentrated near the surface. This is a reasonable explanation considering the aged particles are very small – on the order of 0.2 micrometers. Radionuclide-bearing iron mineral particles present after waste tank washing are likely to be fused together in much larger agglomerates/crystals or the washing process would remove all of the radionuclide. Thus, on the sub-micrometer scale radionuclides may not be homogenously distributed in iron minerals, but on larger scales can be considered to be homogenously distributed for modeling purposes. [WSRC-STI-2007-00544]

Table 4.2-18 shows calculated apparent solubilities for uranium, plutonium, and technetium coprecipitated with hematite under oxidizing conditions and magnetite under reducing conditions with pore fluids reflecting Region II conditions. These calculations assumed that the ratios of radionuclide to iron in solution equaled those measured in the tank residual waste. Apparent solubilities for the radionuclides under Oxidized Region III conditions are not shown, but would be approximately 2 orders of magnitude lower than those for Oxidized Region II because the solubility of hematite is lower at pH=8.2 than at pH=12.4. [WSRC-STI-2007-00544]

Table 4.2-18: Apparent Solubilities of Pu-239, U-238 and Tc-99 in Residual Waste

Tank	Calculated Apparent Solubility (moles/L)					
	Reduced Region II Pu-239	Oxidized Region II Pu-239	Reduced Region II U-238	Oxidized Region II U-238	Reduced Region II Tc-99	Oxidized Region II Tc-99
19	4.1E-12	4.0E-14	1.7E-9	1.6E-11	1.3E-11	1.2E-13
20	3.5E-12	3.4E-14	4.2E-10	4.0E-12	3.1E-11	3.0E-13

Note: Assumes these radionuclides and all iron in residual waste reside in magnetite. [Tank 19 Reference: WSRC-TR-2002-00107, Tank 20 Reference: WSRC-TR-96-0267]

The choices of hematite (oxidized conditions) and magnetite (reduced conditions) as the carrier phases for co-precipitated radionuclides are reasonable. Iron phases identified in Hanford waste tank residual waste include hematite, goethite, and maghemite. Hematite was identified as a dominant iron phase in Tank 241-C-103. Yet, if goethite was the dominant carrier phase under oxidizing conditions, the apparent solubilities would be approximately 3 times higher than those calculated for hematite as the carrier phase. [WSRC-STI-2007-00544]

The assumption that radionuclide release is controlled by solubility of discrete radionuclide phases rather than co-precipitation is conservative if equilibrium prevails and the choice of solubility controlling minerals is biased towards those with high solubility. This is because apparent solubility from a co-precipitated form only controls the release of the radionuclide to solution if it does not exceed the solubility of the selected discrete phase. Otherwise, the solubility of the selected discrete phase controls radionuclide release. [WSRC-STI-2007-00544]

4.2.2.5 Affect of Partial Pressure of Carbon Dioxide (PCO_2) on Solubility

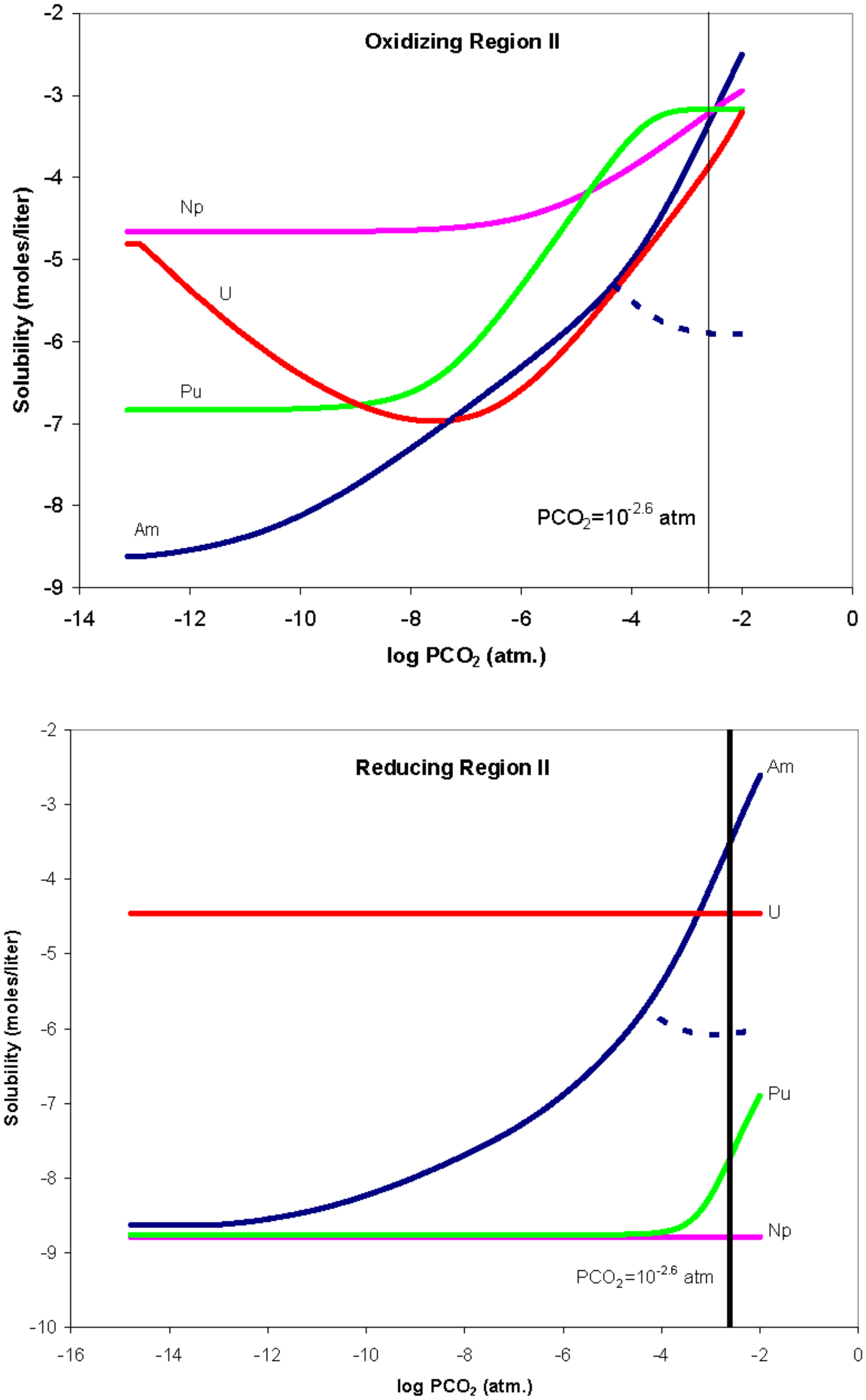
Several elements are known to form aqueous carbonate complexes at elevated pH. Those that have radionuclides with high inventories in the FTF waste tanks and long half-lives that are known to form aqueous carbonate complexes are plutonium, neptunium, uranium, and americium. At a constant elevated pH, as PCO_2 increases the solubility of these elements will increase. PCO_2 is considered differently in calculation of solubilities in Regions II and III. In Region II it is assumed that PCO_2 would be very low, controlled by the reaction of CO_2 with portlandite producing calcite. This was modeled by assuming the infiltrating pore fluid was in equilibrium with atmospheric CO_2 prior to contact with the tank grout. As it passes through the grout more and more CO_2 is removed from solution, and thus the gas phase, by precipitation of calcite. For Region III, where the grout is completely carbonated, it is assumed that the radionuclide solubility reactions were at the PCO_2 of the atmosphere, because there is no reaction to remove CO_2 as infiltrate passes through the grout. [ISSN 1019-0643]

It is possible, though, that the PCO_2 at the CZ is influenced by soil PCO_2 that is typically higher than atmospheric. A sample from a water table well in the vicinity of F-Area was in equilibrium with a calculated PCO_2 of $10^{-2.6}$ atm rather than the atmospheric PCO_2 of $10^{-3.5}$ atm. [WSRC-RP-92-450] This PCO_2 is typical of groundwater in water table aquifers at SRS in which there is little organic matter to drive the PCO_2 values higher. To evaluate how the elevated PCO_2 affects the solubility of plutonium, neptunium, uranium, and americium curves of solubility versus PCO_2 are calculated. The calculations are done using *The Geochemist's Workbench*, and assuming that the CZ is a mixing zone of infiltrate from the grout and CO_2 gas diffusing from soil. The rate that CO_2 diffuses into the CZ relative to the rate of infiltrate advection and/or ion diffusion from the grout may result in different PCO_2 values at steady state. Thus, the composition of the pore fluid in the CZ is assumed to be the same as that in the original solubility calculations, but the PCO_2 is varied up to PCO_2=10^{-2} atm. Reaction of CO_2 with the infiltrate produces calcite and lowers the pH by the overall reaction:

$$\mathbf{CO_2(aq) + Ca^{+2} = CaCO_3 + 2H^+}$$

At a PCO_2 of $10^{-2.6}$ atm, the grouted tank system has equilibrium pH values that range from about 7.3 to 7.7, depending on the original chemical state of the infiltrate. The calculated curves for Region II infiltrate are shown in Figure 4.2-5. The curves for Region III are not shown because the variation in solubilities of the four elements is less than an order of magnitude. This is because the assumed PCO_2 in Region III was already at PCO_2=$10^{-3.5}$ atm (Table 4.2-1). [ISSN 1019-0643]

Figure 4.2-5: Calculated Solubility Curves for U, Pu, Np, and Am vs. PCO_2



Note: Dashed line is solubility of americium allowing carbonate phases to precipitate.

The solubilities of uranium, plutonium, neptunium, and americium are most affected in the oxidizing chemical state, because known aqueous carbonate complexes are more influential at oxidizing conditions. Table 4.2-19 shows the solubilities at a PCO_2 of $10^{-2.6}$ atm compared to the original calculated values. The solubility of plutonium increases about four orders of magnitude and that of americium increases by about five orders of magnitude. The solubilities of uranium and neptunium increase by less than about 1.5 orders of magnitude. Under reducing conditions the solubilities of uranium and neptunium do not increase as PCO_2 increases and that of plutonium increases by less than an order of magnitude. The solubility of americium increases by 5 orders of magnitude under reducing conditions. However, if carbonate phases of americium are allowed to precipitate the increases in solubility under both oxidizing and reducing conditions is much less (the dashed lines in Figure 4.2-5).

Precipitation of calcite during equilibration with elevated soil PCO_2 values may eventually occlude porosity around the CZ and limit stabilized contaminant release. About 0.5 cm^3 of calcite is precipitated for each L of pore fluid equilibrated with a PCO_2 of $10^{-2.6}$ atm. Therefore, after a few hundred pore volumes of infiltrate equilibrate with the elevated PCO_2 the porosity may be completely occluded.

Table 4.2-19: Impact of Partial Pressure of Carbon Dioxide Variability on Solubility

Element	Calculated Solubility (moles/L)	Solubility at $PCO_2=10^{-2.6}$ atm. (moles/L)
Oxidizing Region II		
Uranium[(a)]	1.5E-5	1.5E-4
Plutonium[(b)]	1.4E-7	6.8E-4
Neptunium	2.2E-5	6.4E-4
Americium	2.4E-9	5.4E-4 ($Am(OH)_3$ 1.3E-6 ($Am_2(CO_3)_3$) 3.2E-7 ($AmOHCO_3$)
Reducing Region II		
Uranium[(a)]	3.5E-5	3.5E-5
Plutonium[(b)]	1.7E-9	1.7E-8
Neptunium	1.6E-9	1.6E-9
Americium	2.4E-9	2.8E-4 ($Am(OH)_3$) 8.5E-7 ($Am_2(CO_3)_3$) 2.5E-7 ($AmOHCO_3$)

(a) Solubility values assuming (Pu(OH)4) is controlling phase.
(b) Solubility value assuming UO_2 is controlling phase.

4.2.2.6 Chemical Degradation of Reducing Grout

Evolution of the chemical conditions in the grout was modeled using *The Geochemist's Workbench*. Details of these calculations are presented in Appendix B of WSRC-STI-2007-00544. The database used for grout degradation simulations was "thermo.data", the database recommended by The *Geochemist's Workbench*® (geochemical modeling software (Release 6.0, University of Illinois. 2005). It was modified to include cementitious minerals as reported in WSRC-STI-2007-00544.

The first step in the grout degradation simulation is to estimate the hydrated mineralogy of the reducing grout from the grout formula presented in procurement specification C-SPP-F-00047. This formula, together with chemical compositions of the grout components allows calculation of the final chemical composition of the reducing grout. From this composition, a normative mineralogy is estimated by assuming all calcium is in the phase CSH, all magnesium in hydrotalcite, excess aluminum in gibbsite, and that remaining silica is inert to pore fluids. The amount of pyrrhotite in the reducing grout is estimated from the measured reducing capacity of the slag, the amount of slag, and the following reaction: [WSRC-RP-2005-01674]

$$\mathbf{FeS + 2O_{2(aq)} = Fe^{+2} + SO_4^{-2}}$$

Table 4.2-20 presents the grout formula and the estimated hydrated mineralogy used in the model. The grout mineralogy in Table 4.2-20 is reacted with an infiltrate calculated to simulate rainwater passing through a kaolinitic soil assuming no interaction with waste tank closure cap materials. The reaction is done in the "flush" mode meaning as water enters the block of grout it pushes out an equivalent volume of water that has equilibrated with the grout. The results are shown in Figures 4.2-6 and 4.2-7.

Table 4.2-20: Reducing Grout Formula and Estimated Hydrated Mineralogy

Reducing Grout Formula	
Grout Component	**Amount (lbs/yd^3)**
Portland Cement	75
Class F Fly Ash	375
Slag	210
Quartz Sand	2,300
Water	501
Estimated Hydrated Mineralogy	
Mineral	**Amount (g/m^3)**
CSH	192,583
Hydrotalcite	47,475
Gibbsite	50,505
Pyrrhotite	967

Figure 4.2-6: Pore Fluid E_h Vs. Number of Pore Volumes of Infiltrate Equilibrated with Grout

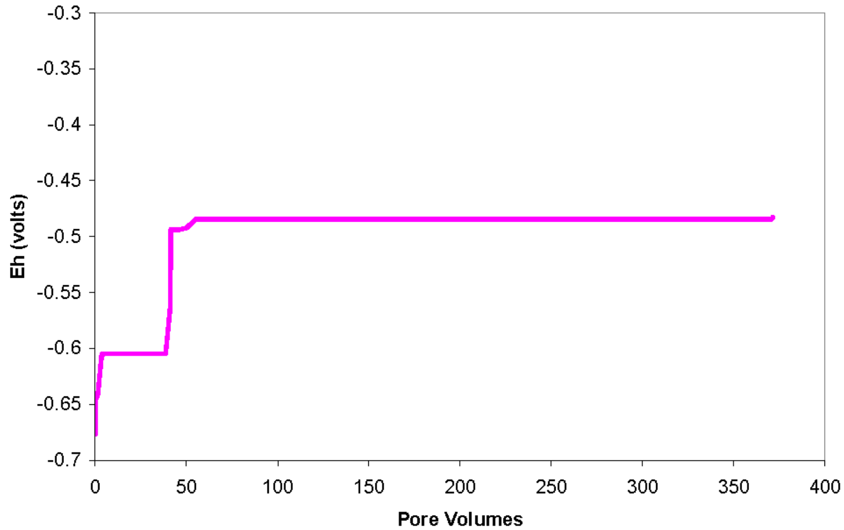
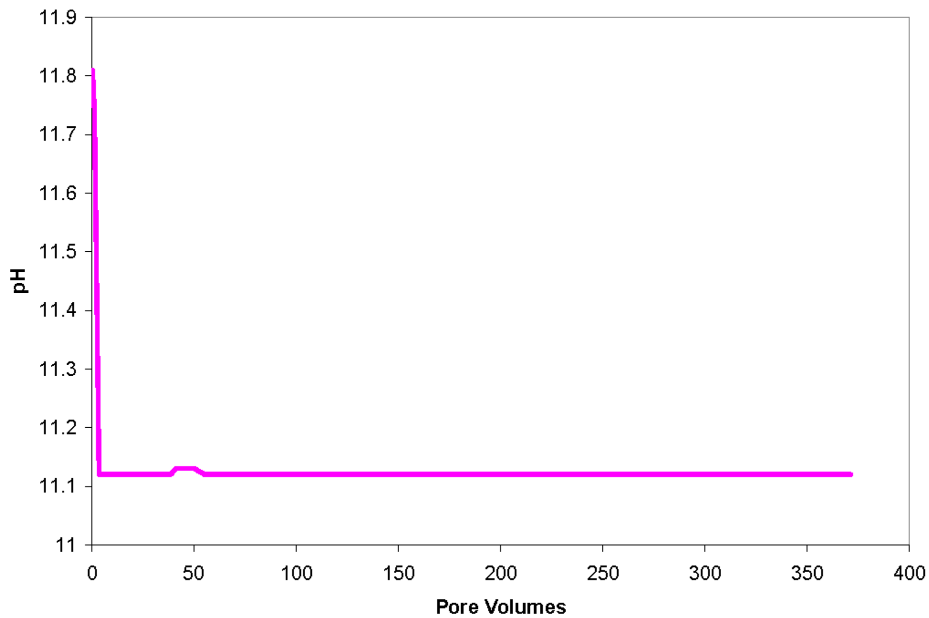


Figure 4.2-7: Pore Fluid pH Vs. Number of Pore Volumes of Infiltrate Equilibrated with Grout



The E_h of the grout rapidly rises from -0.68 to -0.60 volts and maintains this E_h for 39 pore volumes. At this point the E_h again rapidly rises to -0.48 volts and stays at this value for 371 pore volumes. At 371 pore volumes the reducing capacity of the grout is exhausted and the E_h rises to about +0.55 volts. This final rise in E_h does not appear on Figure 4.2-6 because the sudden change in conditions, from reducing to oxidizing, causes the program to become unstable and it terminates at 371 pore volumes. However, similar curves were run in the "batch" mode where infiltrate is added incrementally but the grout minerals equilibrate with the entire volume of infiltrate and these show the rapid rise in E_h after a total infiltrate mass of 102,100 kg (491 pore volumes). It is expected that the grout degrades more slowly in the batch runs than in the flush mode runs because the grout minerals must equilibrate with the total volume of fluid added.

The pH of the grout pore fluid drops rapidly from 11.8 to 11.1 (Figure 4.2-7), but then maintains this pH throughout the duration of the model run (371 pore volumes). Again, batch reactions were run in which the grout pore fluid maintained a pH of 11.1 for reaction with over 208,000 kg of infiltrate. This suggests that pH will be maintained at 11.1 much longer than E_h will stay reducing.

It should be noted that the Reducing state E_h and the Region II pH of these runs are different than those values used to calculate solubilities. This is because the solubility calculations assumed a Region II pH controlled by equilibrium with portlandite. In fact, the composition of the grout constrains the pH by equilibration with CSH. Recalculation of uranium, plutonium, neptunium, technetium, and americium solubilities suggest that this difference has little effect on the solubilities. [ISSN 1019-0643]

Both flush and batch simulations were programmed to run for reaction with 1,000 pore volumes. Though the flush runs terminated after 371 pore volumes, additional information about the longevity of Region II conditions can be gained by analysis of the degradation of CSH, the pH controlling phase. Analysis presented in Appendix B of WSRC-STI-2007-00544 suggests that Region II conditions would last for reaction with 2,063 pore volumes (Table 4.2-1). [ISSN 1019-0643]

4.2.3 Radionuclide Transport

Over the course of time, the mobile contaminants in the closed FTF waste tanks and ancillary equipment are likely to be released from the tanks and gradually migrate downward through unsaturated soil to the hydrogeologic units comprising the shallow aquifers underlying the FTF. Some contaminants will be transported via groundwater through near surface aquifers and crop out at either Fourmile Branch or UTR streams. Exposure to contaminants could occur through various pathways associated with groundwater, surface water uses and air exposure. Figure 3.1-4 shows the location of the FTF within the GSA, which is bounded by UTR to the north and by Fourmile Branch to the south.

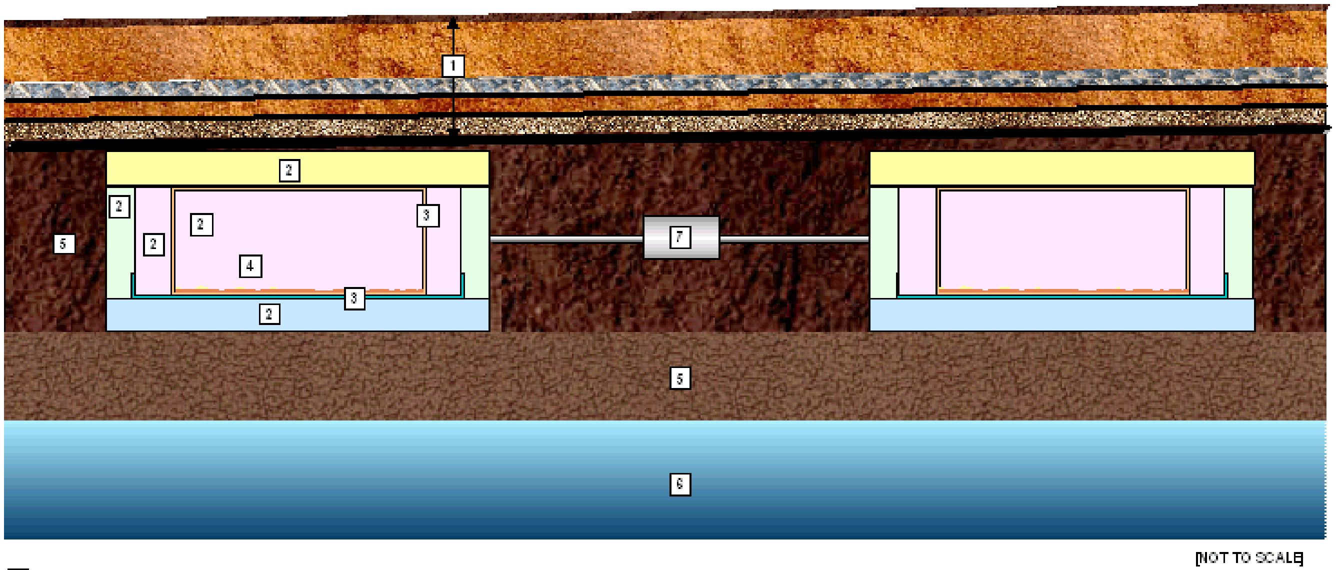
In model simulations, FTF contaminant transport processes in cementitious materials and soils include: advection, dispersion, and sorption, but not colloidal transport. Contaminant transport through the cementitious materials and soils is impeded by sorption, as represented through the K_d of the soils (Section 4.2.3.2.2) and cementitious materials (Section 4.2.3.2.3). The K_d values used are based primarily on SRS site-specific experimental data (e.g., WSRC-TR-2006-00004), some central value of literature, or on expert judgment, with SRS site-specific experimental data being the preferred information source.

WSRC-TR-2006-00004, discusses the development of an approach which might consider colloid – facilitated radionuclide transport in PAs. However, the conceptual model proposed is entirely empirical and is based on two SRS field studies reported in WSRC-TR-2006-00004 that do not resolve whether colloidal transport is a significant process in the SRS subsurface. The conceptual and numerical models need to be improved based upon field and laboratory studies designed to develop a numerical model. Thus, SRNL and Woods Hole Oceanographic Institution are collaborating on a three-year DOE-funded proposal to study colloid-facilitated transport at the SRS. One study published by the American Chemical Society in their Environmental Science & Technology Publication, entitled "*Source-Dependent and Source-Independent Controls on Plutonium Oxidation State and Colloid Associations in Groundwater*" showed that a small fraction of plutonium released from F-Area seepage basins in fact did move with colloids in the SRS subsurface. [ACS_Vol. 43_No. 5] The amount associated with colloids varied with changes in groundwater conditions (pH and E_h) and with the oxidation state of the plutonium. The chemical conditions near the F-Area seepage basins would result in the potential for higher colloidal transport than near FTF. Based on the information available to date, colloid – facilitated radionuclide transport is not assumed to have a significant impact on contaminant movement in the FTF transport models. Potential impacts on radionuclide transport as modeled due to colloid – facilitated transport is addressed indirectly through varying various inputs related to transport in the uncertainty and sensitivity analyses (e.g., by varying radionuclide inventory and K_d values as described in PA Sections 5.6.3.2 and 5.6.3.4, respectively).

4.2.3.1 Model Approach

The near-field ISCM is organized by describing the modeling domain vertically from top to bottom as shown in Figure 4.2-8. For the purposes of this discussion, the ISCM has been broken up into its three component conceptual models: the closure cap, the vadose zone, and the saturated zone (i.e., the aquifers). Simplifying model assumptions have been made for each of these distinct layers or zones.

Figure 4.2-8: FTF Conceptual Closure Model



1 **Closure Cap** - Provides water flux to the top of tank from infiltrating rainwater.

2 **Vault Concrete and Tank Fill Grout** - Provides degradation description of the concrete and grout based materials in the tank system.

3 **Carbon Steel Tank Liner (Primary and Secondary)** - Provides degradation description of the carbon steel liners in the tank system.

4 **Contamination Leaching** - Provides release rates for residual waste heel contaminants based on solubility and sorption rates per nuclide.

5 **Vadose Zone and Backfill** - Provides hydraulic related values for the unsaturated undisturbed soil beneath the tanks and the backfill soil surrounding the tanks.

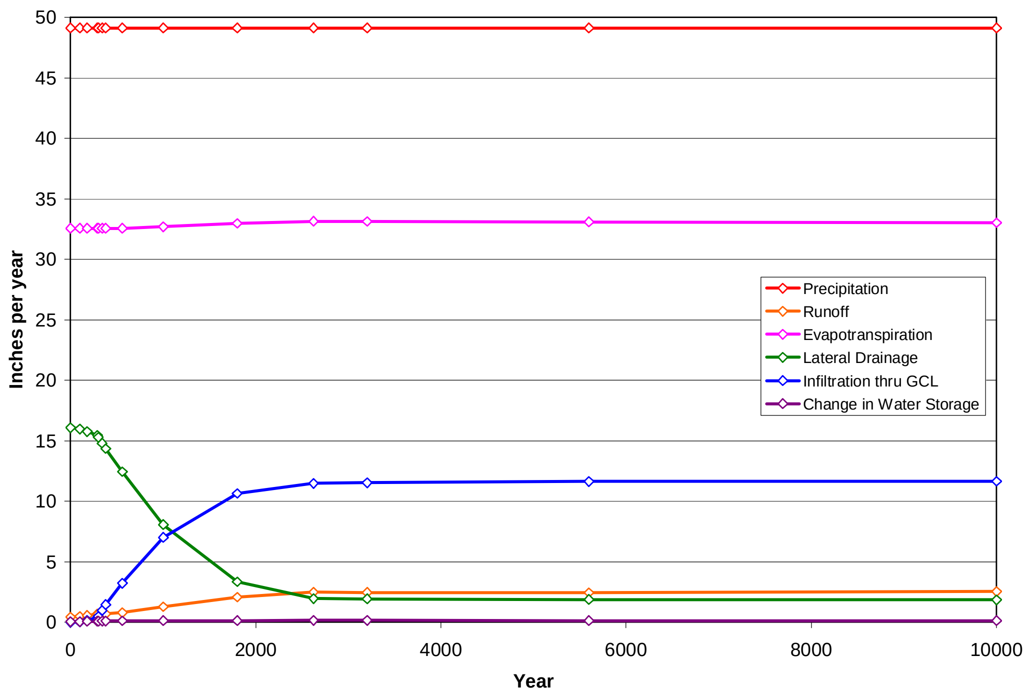
6 **Hydrogeology** - Provides hydraulic related values for the saturated soil beneath the tanks.

7 **Ancillary Equipment** - Provides release model for residual waste associated with ancillary equipment.

4.2.3.1.1 Transport Model Closure Cap

In the closure cap conceptual model, the entire FTF is covered by a single large closure cap. The closure cap conceptual design and expected performance of the closure cap are described in Section 3.2.4. The closure cap design provides a basis for modeling the net infiltration of water to the deeper vadose zone (including waste locations). The infiltration rate through the closure cap is dependant on the assumed precipitation rates, (daily rainfall transient) which is also described in detail in Section 3.2.4. Figure 3.2-70 illustrates the design concept of the FTF closure cap. The average water balance through the closure cap over time is shown in Figure 4.2-9. [WSRC-STI-2007-00184_OUO, Table 31]

Figure 4.2-9: Average Water Balance through Closure Cap Over Time



[WSRC-STI-2007-00184_OUO]

4.2.3.1.2 Transport Model Vadose Zone

Although the closure cap has a finite physical thickness (a minimum of 10 feet, see Section 3.2.4), the closure cap is viewed as a surface feature in the ISCM, as it is modeled separately. The area directly below the closure cap in the ISCM is considered the vadose zone. The vadose zone contains the potential contamination sources in FTF (i.e., the 22 waste tanks and the ancillary equipment) and the surrounding soil, both undisturbed and backfill. A description of the soil properties of the FTF vadose zone is provided in Section 4.2.3.2. The contamination sources are classified as waste storage tanks or ancillary equipment.

The waste tanks are modeled depending on the tank type. A discussion of different model elements for each waste tank type is described later in this section. The material properties of the various waste tank elements and the waste tank system behavior over time are discussed later in this section. Stabilized contaminants release from the waste tanks is described previously in Section 4.2.2.

The model approach used for the FTF ancillary equipment is as follows (the actual is described in detail in Section 3.2.2). Transfer line source term is modeled by distributing the assumed inventory equally over all of the FTF. Pump tanks (FPT-1, FPT-2, and FPT-3), the 242-F Catch Tank, and evaporator pots (242-F, 242-16F) are modeled as point sources located in the FTF at the central point of the individual component. The inventory associated with these waste sources is assumed to be surrounded by a stainless steel vessel (release is predicted upon failure of the steel). The material properties of the ancillary equipment and the ancillary equipment system behavior over time is discussed later in this section. Other ancillary equipment is not modeled explicitly, based on the assumed inventories being insignificant (as discussed in Section 3.3.3).

Certain radionuclides are volatile and partition to the gas-phase, where they may disperse as a vapor and thus deplete aqueous phase concentrations. For the purpose of transport modeling to support the groundwater pathway, this mode of transport is neglected as a conservatism. This modeling choice maximizes the contaminant flux reaching the water table, a boundary condition for subsequent saturated zone (aquifer) transport.

Prior to steel liner failure, contamination does not contact the environment external to the waste tank. By the time of liner failure, the cover system and cementitious materials have also degraded significantly, leading to relatively high vadose zone flows and advection dominated transport when waste release occurs. This includes the unsaturated soil directly beneath the tank.

The concrete walls, basemat, and tank fill grout are generally exposed to low suction conditions, and are water saturated for most of the simulation time. Only at early times, when infiltration through the cap is at the lowest levels, are the cementitious materials partially saturated.

No-flow (flux) boundary conditions are applied at the waste tank centerline and outer radius of the model domain for flow (transport) simulations. At the upper boundary, infiltration with zero incoming concentration is prescribed. At the lower boundary, which coincides with the water table, pressure head is set to zero. An "outflow" boundary condition is specified for transport, whereby the outer flux is through advection but not diffusion. This boundary condition is acceptable for the FTF application because contaminant transport is advection-dominated, as note above.

4.2.3.1.3 Transport Model Saturation Zone

After contaminants have left the vadose zone, over time they will be transported into the aquifers beneath FTF. A description of the FTF hydrogeology is provided in Section 3.1.5. The GSAD, comprising SRS characterization and monitoring data and interpretations, is used as the basis of hydrogeologic input values into the computational model for groundwater flow and contaminant transport. The GSAD was initially developed for other applications, and later ported to PORFLOW and adopted for use in the FTF PA. The chosen model extent allows plume tracking from sources in the GSA to surface water discharge points, and takes advantage of natural features (streams) for defining boundary conditions. [WSRC-TR-2004-00106] The GSAD was developed using field data and interpretations for the GSA and vicinity, and is documented in WSRC-TR-96-0399, Volumes 1 and 2.

The aquifers of primary interest for FTF modeling are the UTR and Gordon Aquifers. Potential contamination from the FTF is not expected to enter the deeper Crouch Branch Aquifer because an upward gradient exists between the Crouch Branch and Gordon Aquifers near UTR.

Groundwater flow in the UTR Aquifer is driven by recharge, with nearby streams intercepting flow from higher elevations. The underlying Gordon Aquifer is strongly influenced by discharge to UTR, and recharged by the UTR and Crouch Branch Aquifers. Plate 17 from the publication *Hydrogeologic Framework of West-Central South Carolina* shows the leakance of the Crouch Branch Confining Unit (of the Meyers Branch Confining System) as roughly 3.0E–6 (feet/day per foot), which corresponds to 0.13 inch/year for every 10 feet of head difference. Hydraulic head in the Crouch Branch Aquifer ranges from 0 to 20 feet higher than the Gordon Aquifer, causing an upward flow averaging 0.13 inch/year. [PIT-MISC-0112] Flow across the unit is therefore a small fraction of total recharge to the Gordon Aquifer, and can be neglected in comparison to recharge from the UTR Aquifer.

Groundwater flow in the UTR Aquifer is predominantly horizontal with a smaller, vertically-downward component. Near groundwater divides located between surface water drainages, the vertical component of groundwater flow is stronger and downward due to the decreasing hydraulic head with increasing depth. In areas along Fourmile Branch, shallow groundwater moves generally in a horizontal direction and deeper groundwater has vertically upward potential to the shallow aquifers. In these areas, hydraulic heads increase with depth. To the north of FTF, however, the rising elevation of the UTR Aquifer and the deep incision of UTR result in truncation of the entire aquifer. In these areas, shallow groundwater may seep out along the major tributaries to UTR above the valley floor or may seep downward to the next underlying aquifer zone and discharge along the stream valley.

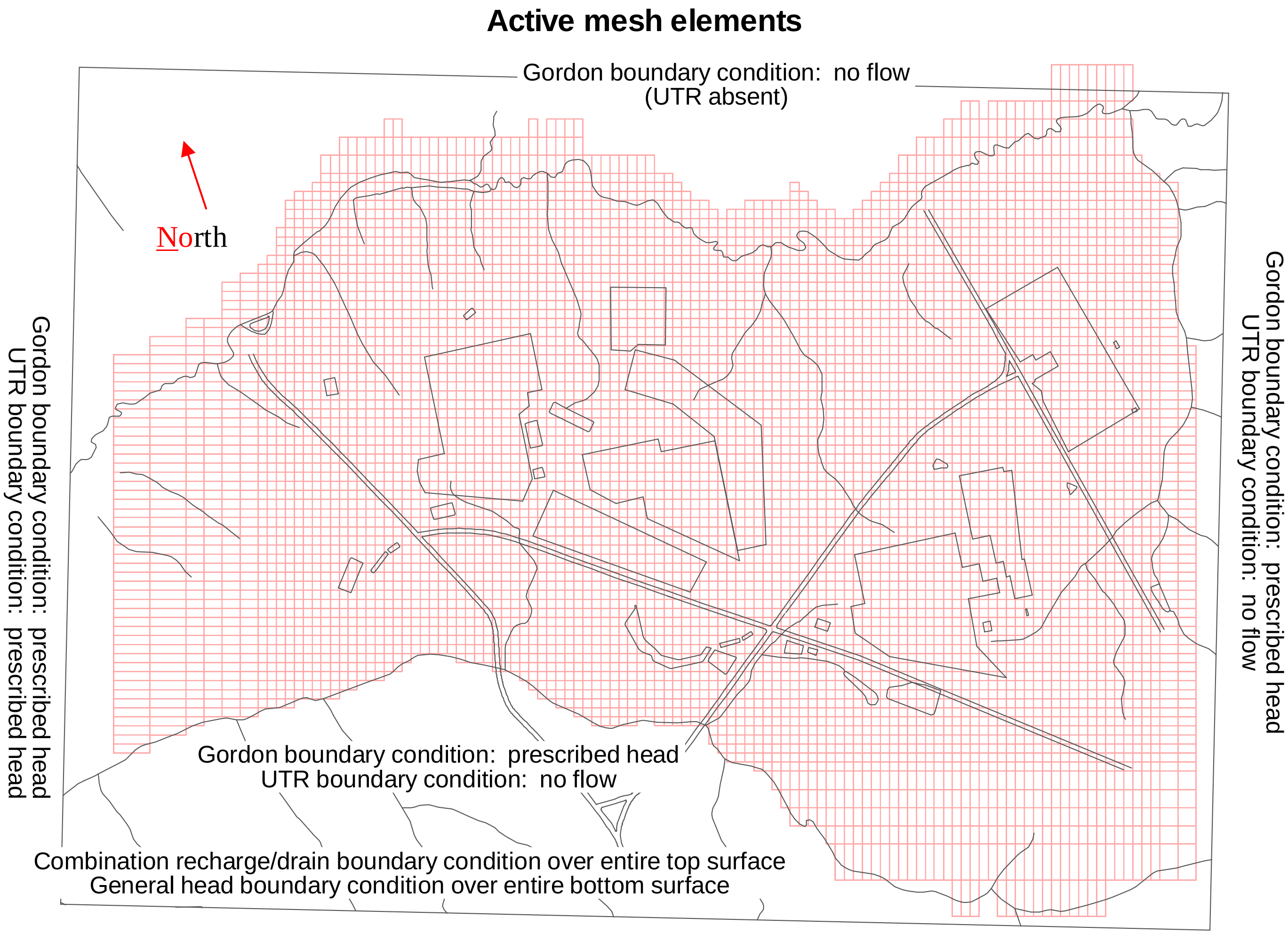
The Gordon Aquifer is overlain by the UTR-LZ Aquifer along the valley of Fourmile Branch. Along UTR, the Gordon Aquifer has been partially eroded by the deep streambed incision. The aquifer discharges to UTR and is locally recharged by leakage from overlying aquifers in the vicinity of FTF. A southeast-to-northwest hydraulic gradient is observed for this aquifer layer in the GSA.

Because the FTF is located over a groundwater divide between UTR and Fourmile Branch, contaminants are expected to eventually discharge to both streams, depending on the location of individual sources.

4.2.3.1.3.1 Groundwater Flow Simulation

The groundwater flow simulation model constructed from the GSAD using the PORFLOW code is referred to as the GSA/PORFLOW model. In the model, groundwater from the UTR Aquifer Unit is assumed to discharge equally from each side of UTR and Fourmile Branch the GSA. Therefore, these streams provide natural, no-flow boundary conditions for most of the UTR Aquifer Unit. The GSA boundary conditions are graphically displayed in Figure 4.2-10. On the west side of the unit, hydraulic head values from a contour map of measured water elevations are prescribed. The Gordon Aquifer is assumed to discharge equally from both sides of UTR and a no-flow boundary condition is specified over the north face of the model. Lacking natural boundary conditions, hydraulic heads are specified over the west, south and east faces of the model within the Gordon Aquifer. Areas of groundwater recharge and discharge consistent with computed hydraulic head at ground surface are computed as part of the model solution using a combined recharge/drain boundary condition applied over the entire top surface of the model. Using this hybrid boundary condition, groundwater discharges to surface water in regions where the computed head is above ground elevation. As noted above, flows across the Crouch Branch Confining Unit are small compared to surface recharge and flow across the Gordon Confining Unit, and are neglected in the model.

Figure 4.2-10: GSA Boundary Conditions



The areal resolution of the aquifer model is 200 feet square except in peripheral areas. There are 108 grid blocks along the east-west axis, and 77 blocks along the north-south axis. The vertical resolution varies depending on hydrogeologic unit and terrain/hydrostratigraphic surface variations as depicted in Figure 4.2-11. Each hydrostratigraphic surface is defined by numerous “picks” ranging in number from approximately 52 to 225 depending on the surface. The Upper Zone of UTR Aquifer Unit is represented with up to 10 finite-elements in the vertical direction. The vadose zone is included in the model. The UTR-LZ contains five finite-elements while the Tan Clay Confining Zone (TCCZ) separating the aquifer zones is modeled with two vertical elements. The Gordon Confining Unit and Gordon Aquifer each contain two elements, for a total of 21 vertical elements from ground surface to the bottom of the Gordon Aquifer. The 3-D grid comprises 102,294 active cells as depicted in Figure 4.2-12.

Figure 4.2-11: North-South Cross-Sectional View of GSA/PORFLOW Computational Mesh at FTF

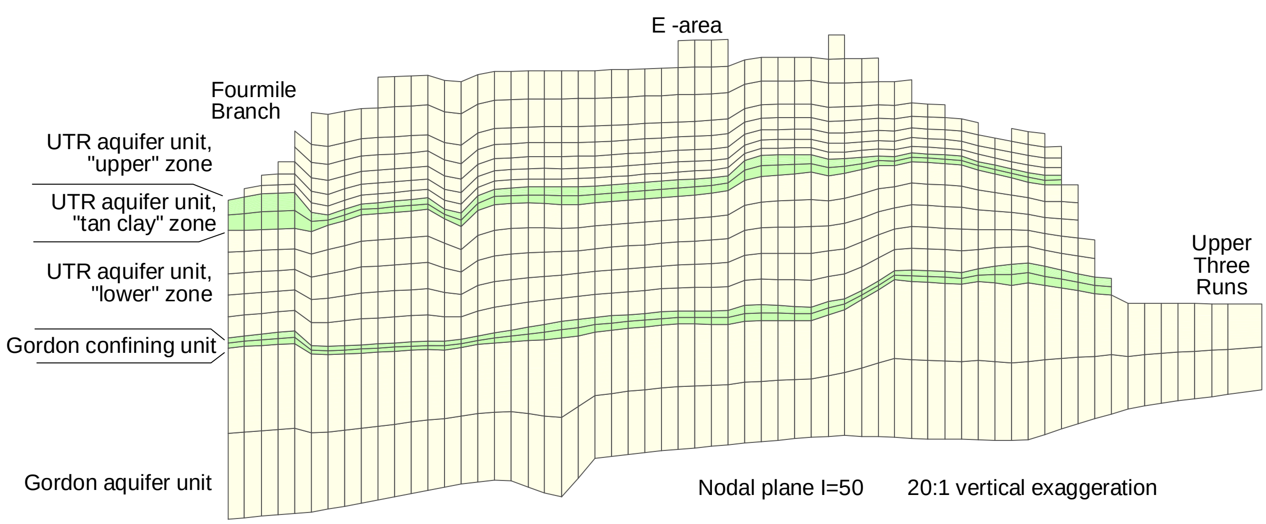
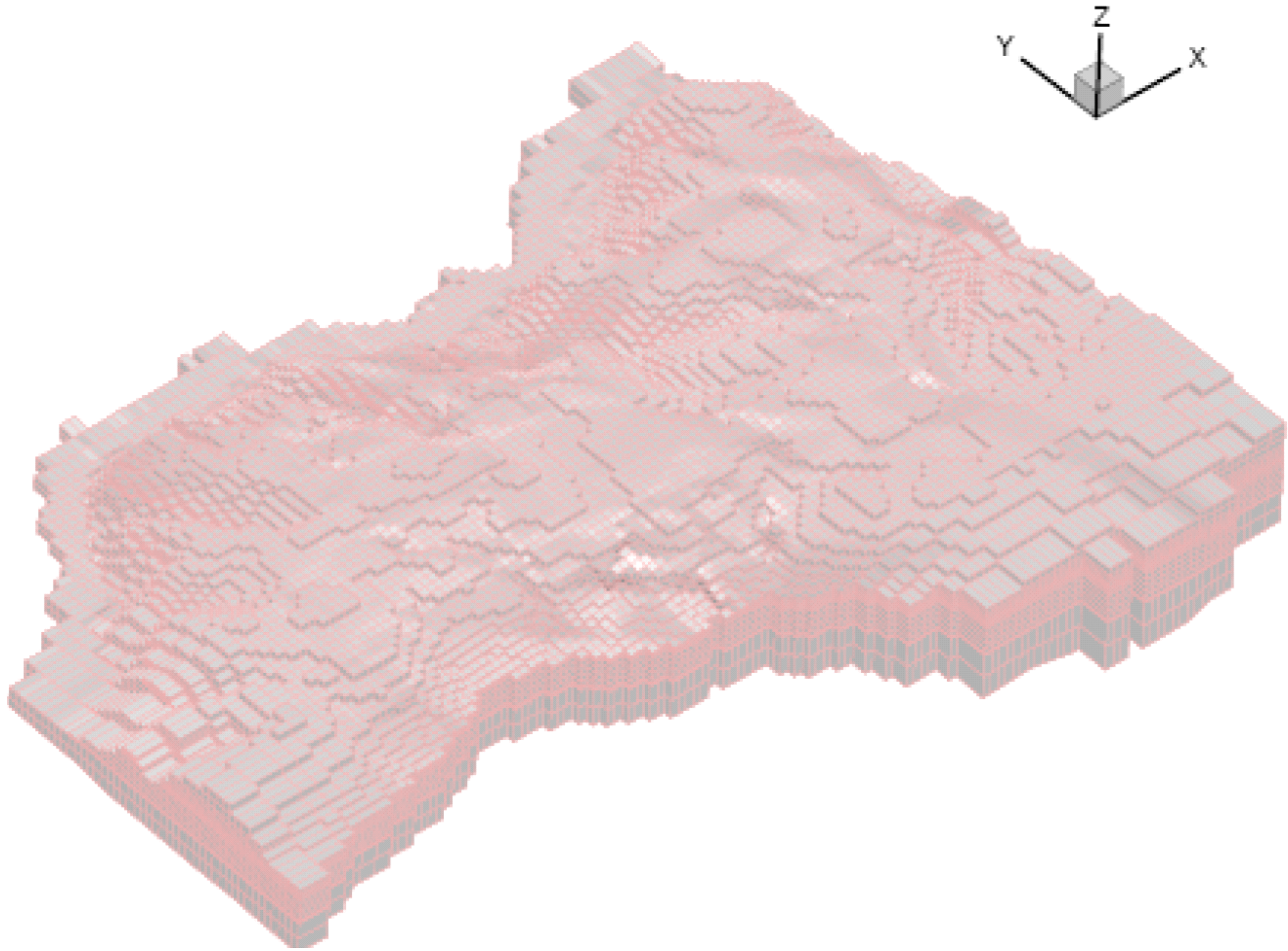


Figure 4.2-12: Perspective View of GSA/PORFLOW Computational Mesh



Hydraulic conductivity values in the model are based on a characterization GSAD database discussed in Section 3.1.5. The conductivity field is heterogeneous within hydrogeologic units and reflects variations present in the characterization data. The average horizontal conductivities in the saturated UTR-UZ, UTR-LZ, and Gordon Aquifer are approximately 10, 13, and 38 feet/day, respectively. The average vertical conductivities for the TCCZ and the Gordon Confining Unit are 6.0E-3 and 1.0E-5 feet/day, respectively. Figures 4.2-13 and 4.2-14 illustrate the horizontal and vertical model hydraulic conductivity field, respectively, along a representative cross-section through FTF. The GSA/PORFLOW model was calibrated and validated using measured well water levels.

Figure 4.2-13: North-South Cross-Sectional View of GSA/PORFLOW Model Showing Representative Horizontal Hydraulic Conductivity Variations

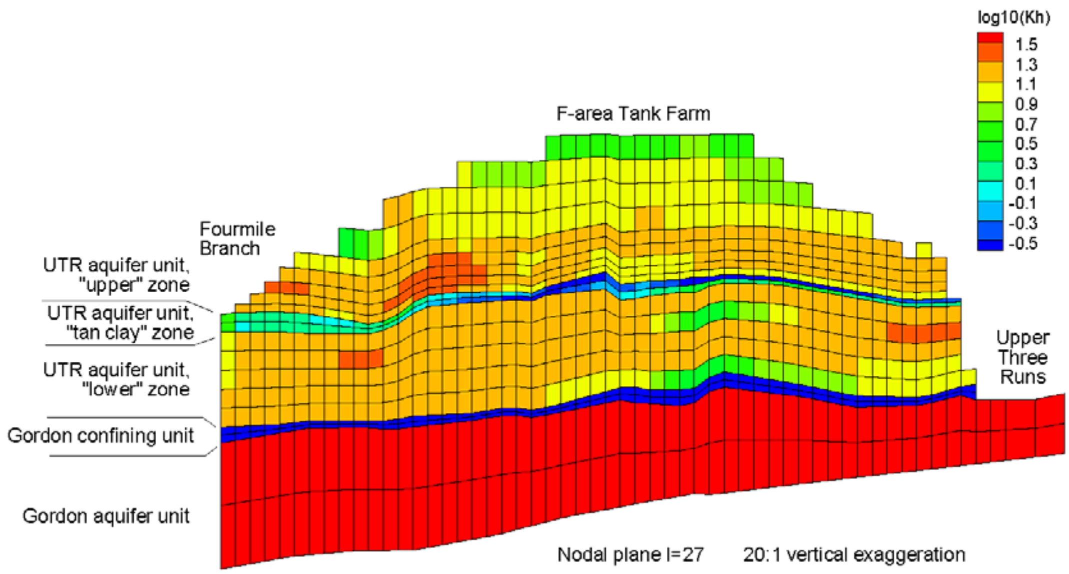
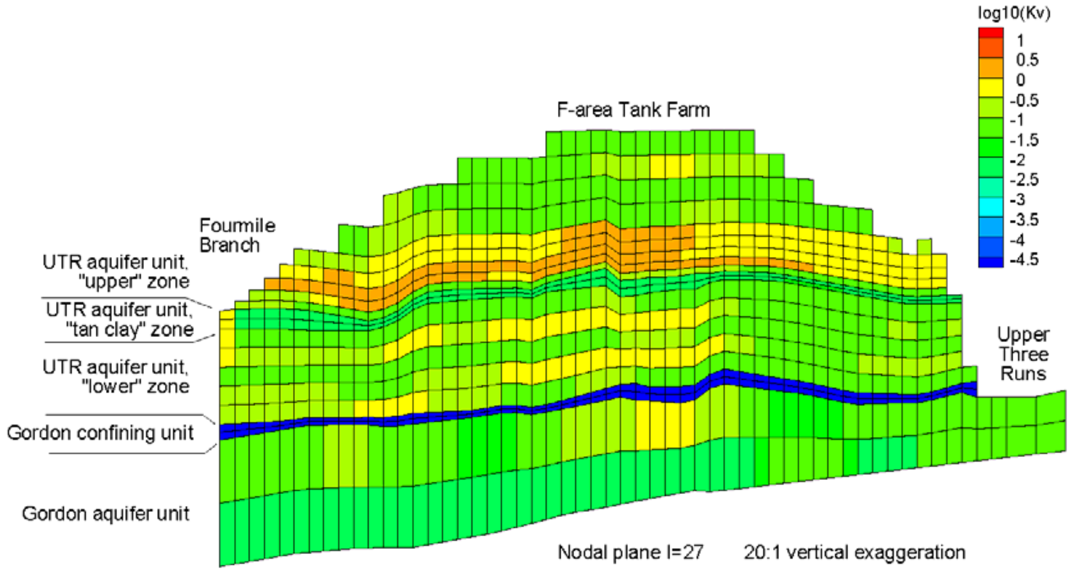


Figure 4.2-14: North-South Cross-Sectional View of GSA/PORFLOW Model Showing Representative Vertical Hydraulic Conductivity Variations

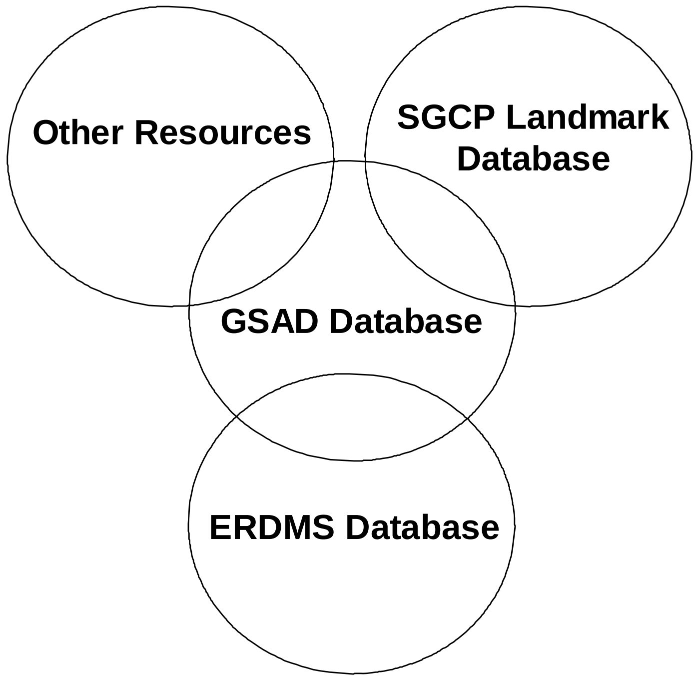


The average natural recharge over the entire model domain is 14.7 inch/year compared to approximately 15 inches/year from prior groundwater budget studies. [WSRC-TR-2004-00106] Various man-made features (e.g., basins) provide additional recharge in localized areas. The estimated discharge rates to UTR and Fourmile Branch, within the model domain are 18.2 and 2.6 ft^3/sec, respectively. [WSRC-TR-2004-00106] The simulated discharge rates are 11.4 and 3.8 ft^3/sec, respectively. Predicted seepage faces are consistent with field observations. Simulated hydraulic heads, vertically-averaged over the entire thickness of the UTR-LZ, UTR-UZ, and Gordon Aquifer, agree with potentiometric maps based on measured heads. The evaluation of simulated versus measured heads utilized GSA/PORFLOW results for the vertically-averaged head and the residuals between computed and measured heads. [WSRC-TR-2004-00106] Simulated flow directions vertically-averaged over the entire thickness of the aquifer zones agree with conceptual models of groundwater flow.

Adequacy of GSAD Data Set for Groundwater Flow Simulation

The GSAD database includes field data and interpretations collected in the GSA through 1996. Although characterization and monitoring have been ongoing, the additional data has not altered fundamental understanding of groundwater flow patterns and gradients in the GSA. The GSAD is a subset of site-wide data sets of soil lithology and groundwater information. These larger sets of data are captured in the Environmental Restoration Data Management System (ERDMS) database, ACP landmark database and other resources. The relationship between GSAD and the full set of data is pictured in Figure 4.2-15.

Figure 4.2-15: GSAD Database Relationship



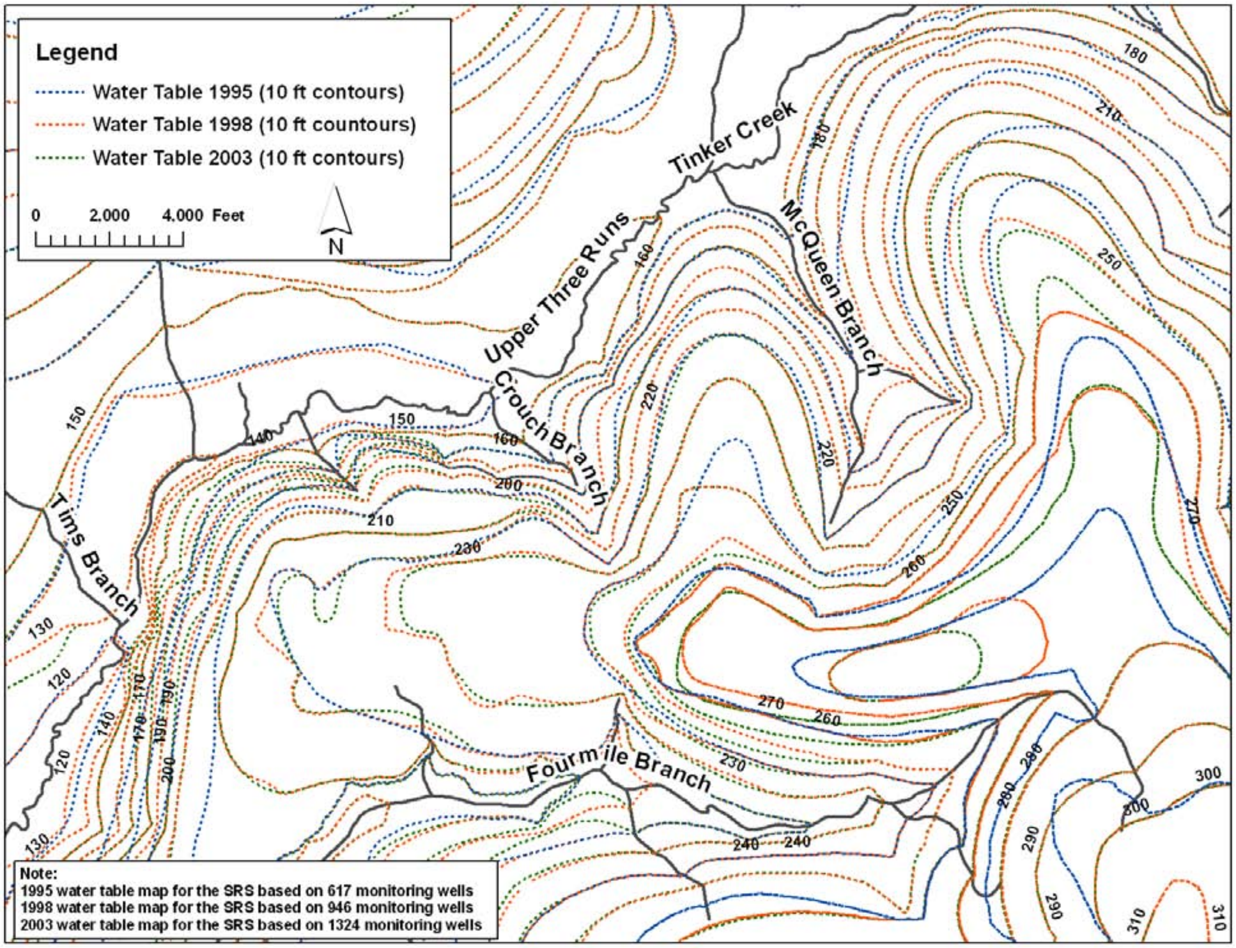
The more recent field data (i.e., 1996-2006) is limited to CPT picks and a few geophysical logs with no new FTF foot-by-foot core descriptions. During the 1980s and early 1990s, significant work was conducted within the GSA to better define the hydrogeology including installation of well clusters and continuous core descriptions and geophysical logs associated with the deepest well in the cluster. At that point, the hydrostratigraphy of the GSA was considered sufficiently defined, and no additional characterization was planned. Since the mid-1990s wells have been installed to better define plumes and CPT logs have been generated for structural/seismic and Vadose zone monitoring purposes. Most of the new data are shallow and consist of CPT or geophysical logs. Most of the new data may provide picks for the top two aquifer surfaces only.

In order to evaluate the need to update the original GSAD database to incorporate new hydrogeologic information, two evaluations were identified. Figure 4.2-16 shows recent hand-drawn water table contour maps for the GSA based on water level data collected in 1995, 1998 and 2003. Contours were developed using mean water levels from SRS wells, field verification of perennial stream reaches and the USGS 1:24000 scale topography data. [WSRC-MS-95-0524, WSRC-TR-98-00045, and WSRC-TR-2003-00250] These contour maps are consistent with each other indicating that there has not been a significant change in our understanding of long-term average water table conditions in the GSA since the mid-1990's.

A report was prepared in 2007 to provide a summary of recent available geotechnical data for the vicinity of FTF. [WSRC-TR-2007-00283] This report focused on sediment descriptions, geotechnical data (e.g., grain size analyses) and interpretations for the vadose zone from historical and recent studies. The report also included potentially significant findings regarding the saturated zone (e.g., existence/thickness of the TCCZ). Review of the data collected in WSRC-TR-2007-00283 showed that the available data is consistent with the assumptions made for vadose zone sediments in the FTF PA modeling effort.

As mentioned above, one area of particular interest in the WSRC-TR-2007-00283 data review was the TCCZ. Measurements of the TCCZ thickness were compared within the FTF to the Tank Clay Confining Zone thickness as represented in the GSA/PORFLOW model, which was developed from data lying outside the FTF. Generally, the two values are close, and differences do not exceed uncertainty in data quality and interpretation. The study indicates that the TCCZ exhibits spatial correlation across FTF, such that interpolation using data outside the FTF produces reasonable estimates of actual thickness. The GSA/PORFLOW representation of the TCCZ is judged to be reasonable for FTF PA modeling.

Figure 4.2-16: Water Table Contour Maps for GSA

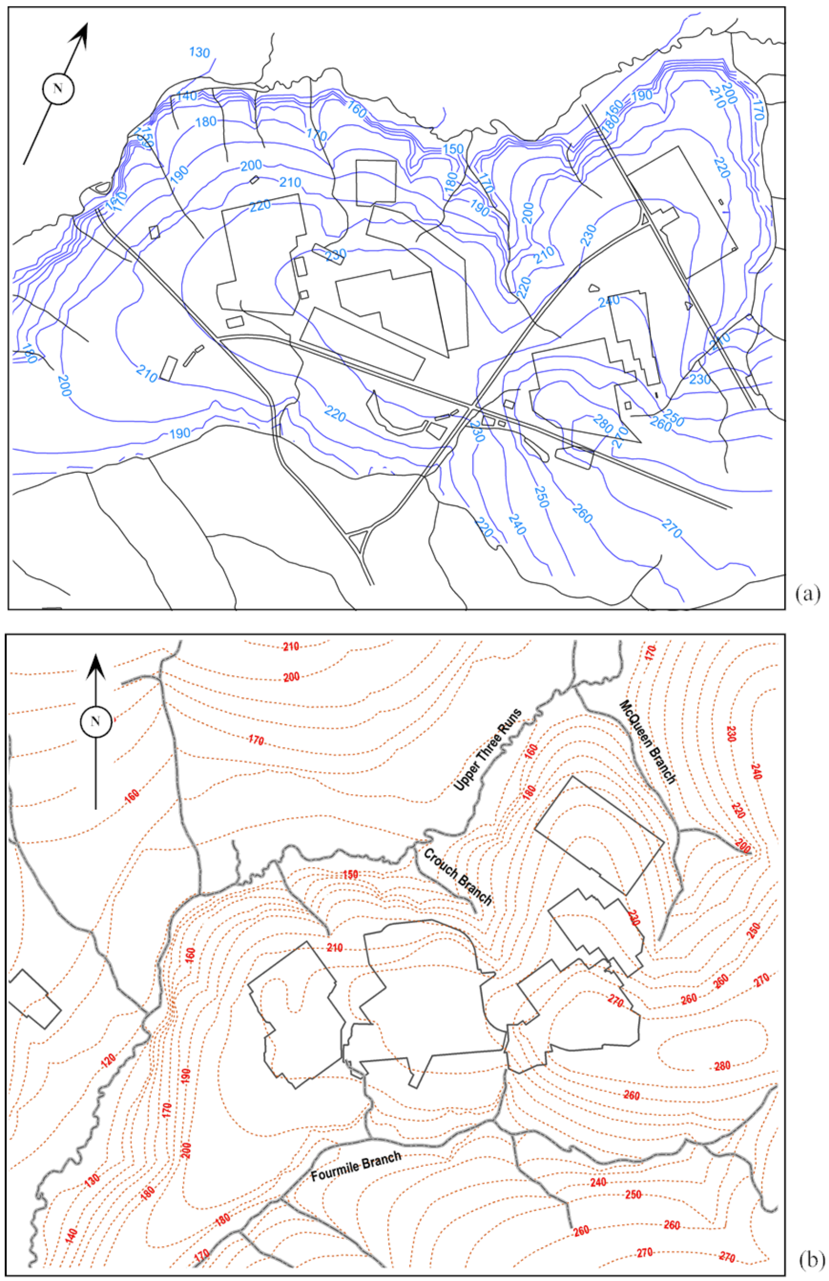


Best-estimate predictions and field monitoring indicate that plume migration can be expected to occur through the UTR-UZ and UTR-LZ Aquifer zones for travel distances through at least 100m. Contamination may or may not pass through the UTR-TCCZ before reaching the 100m perimeter. In PORFLOW modeling, the TCCZ is assigned the same geochemical properties (K_d) as the UTR-UZ and UTR-LZ Aquifer zones. That is, no credit is taken for the TCCZ as a potential chemical barrier to plume migration (lateral and downward). Hydraulically, the TCCZ is assigned a vertical conductivity of 1.8E-6 cm/s (22 in/yr) in F-area. Thus the confining zone is also relatively ineffective as a flow barrier.

Although the Gordon confining unit (Green Clay) may not be completely continuous, the formation has sufficient continuity to function as a significant flow barrier and be classified as a "confining unit" as opposed to a "confining zone" (e.g., TCCZ). Variation in Green Clay leakance within uncertainty bounds would lead to somewhat faster and/or slower travel within the UTR Aquifer. Uncertainty in aquifer velocity/travel time is considered in GoldSim modeling. Higher leakance would increase peak concentration in the Gordon Aquifer unit, but decrease the overall peak, which occurs in the UTR Aquifer. The GSA/PORFLOW representation of the Tan Clay and Green Clay Confining Zones is viewed as reasonable for FTF PA modeling.

Figure 4.2-17 provides a comparison of the 2003 hand-contoured water table map and the water table predicted by the GSA/PORFLOW model.

Figure 4.2-17: Comparison of (a) GSA/PORFLOW Model Predicted Water Table Map with (b) Hand-Contoured 2003 Water Table Map for GSA



[NOT TO SCALE]

Table 4.2-21 summarizes hydraulic head residuals between the model and the field data [WSRC-TR-2004-00106, Section 3.1]. Table 4.2-21 also summarizes more recent well water level data through 2006, available as a result of new well installations and continued monitoring. The agreement between the model and the data set through 2006 is similar to that of the original data set.

Table 4.2-21: Summary of Hydraulic Head Residuals Between the GSA/PORFLOW Model and Field Data through 2006

Aquifer Zone	Number of Wells	Median Residual (feet)	Average Residual (feet)	Root-Mean-Square Residual (feet)	Minimum Residual (feet)	Maximum Residual (feet)
Up to 1995 Data	**638**					
Gordon	79	-0.0	-0.5	1.7	-4.7	2.5
UTR-LZ	173	+0.8	+0.6	4.6	-9.4	27.0
UTR-UZ	386	-0.1	-0.5	3.4	-15.2	10.0
Up to 2006 Data	**917**					
Gordon	94	+0.3	-0.0	1.5	-3.8	2.6
UTR-LZ	272	+1.1	+1.0	4.7	-11.9	27.0
UTR-UZ	551	+0.8	+0.1	3.5	-16.8	14.5

The data collection and quality review process employed in constructing the GSAD is described in *Summary of the Quality Review Process for General Separations Area Aquifer Model Database*. [SRNL-ESB-2007-00001]

4.2.3.1.4 Transport Model Interfaces

As noted earlier, the ISCM of subsurface water flow and contaminant transport comprises three principal elements: the closure cap, the vadose zone, and the saturated aquifer zone, as illustrated in Figure 4.1-1.

A prescribed rainfall condition in the form of daily rainfall values over an extended period of time is the primary input or external boundary condition to the closure cap flow analysis. The closure cap model produces a net infiltration rate at the bottom of the closure cap that becomes a flow boundary condition to the adjoining vadose zone. Water infiltrating the closure cap is assumed to be free of contaminants, so the concentration is set to zero at the top boundary of the vadose zone.

Groundwater flow in the much larger scale saturated zone or aquifer model is controlled by net infiltration or recharge over a broad area surrounding the FTF. Rather than using the flow exiting the vadose zone at the water table as a direct input to the aquifer model, an average recharge value is applied to the aquifer flow model based on field studies. [WSRC-TR-96-0399, Volume 2] For saturated zone contaminant transport, the contaminant flux leaving the bottom of the vadose zone model becomes the source of contamination entering the aquifer.

Each water table flux contribution from an individual waste tank is assigned to the aquifer transport grid by uniformly distributing the flux to those water table cells with centroids lying within the footprint of the waste tank. Each flux originating from discrete ancillary equipment is assigned to the cell with the closest centroid. Flux from transfer lines is spread uniformly over the facility footprint.

4.2.3.2 Model Material Properties

Material properties form a key part of the ISCM and are provided in this section. Material properties for cementitious material and steel are provided. (Note that for carbon steel and stainless steel, the only relevant material property is the projected time of failure under different conditions. This material is assumed to be impermeable up to the time of steel failure, and then becomes sufficiently permeable to not be a barrier to contaminant migration).

4.2.3.2.1 Closure Cap Material Properties

The conceptual design and detailed description of the closure cap are provided in Section 3.2.4. Table 4.2-22 provides the material properties of the closure cap obtained from WSRC-STI-2007-00184_OUO that are pertinent to the transport model. Table 3.2-10 provides the time-variant infiltration rates based on the analysis presented in Section 3.2.4.

Table 4.2-22: FTF Closure Cap Layers from Top to Bottom

Layer	Thickness (inches)	Saturated Hydraulic Conductivity (cm/sec)
Vegetative Cover	Not applicable	-
Topsoil	6	3.1E-03
Upper Backfill	30	4.1E-05
Erosion Barrier	12	1.3E-04
Geotextile Fabric	-	-
Middle Backfill Layer	12	4.1E-05
Geotextile Filter Fabric	-	-
Lateral Drainage Layer	12	5.0E-02
Geotextile Fabric	-	-
HDPE Geomembrane	0.06 (60 mil)	2.0E-13
GCL	0.2	5.0E-09
Foundation Layer (Upper and Lower)	84 (minimum)	1.0E-03

4.2.3.2.2 Vadose Zone Material Properties

This portion of the overall FTF closure ISCM focuses on the region between the existing grade and the top of the water table (excluding the waste tanks themselves). This area includes the concrete working slab on which the tanks were built, the undisturbed, unsaturated soil under this slab, and the existing backfill soil around the waste tanks. The parameters of concern include:

- Vadose zone thickness under each of the 22 waste tanks,
- Concrete working slab thickness,
- Saturated effective diffusion coefficient,
- Average total porosity,
- Average dry bulk density,
- Average particle density,
- Saturated horizontal hydraulic conductivity,
- Saturated vertical hydraulic conductivity,
- K_d values,
- Characteristic curves (suction head, saturation, and relative permeability).

Vadose Zone Background

This section briefly describes the basis for the vadose zone input parameters. The sources of information for the parameters are SRNL-ESB-2007-00008, WSRC-STI-2006-00198, and WSRC-TR-2006-00004, which can be consulted for additional details.

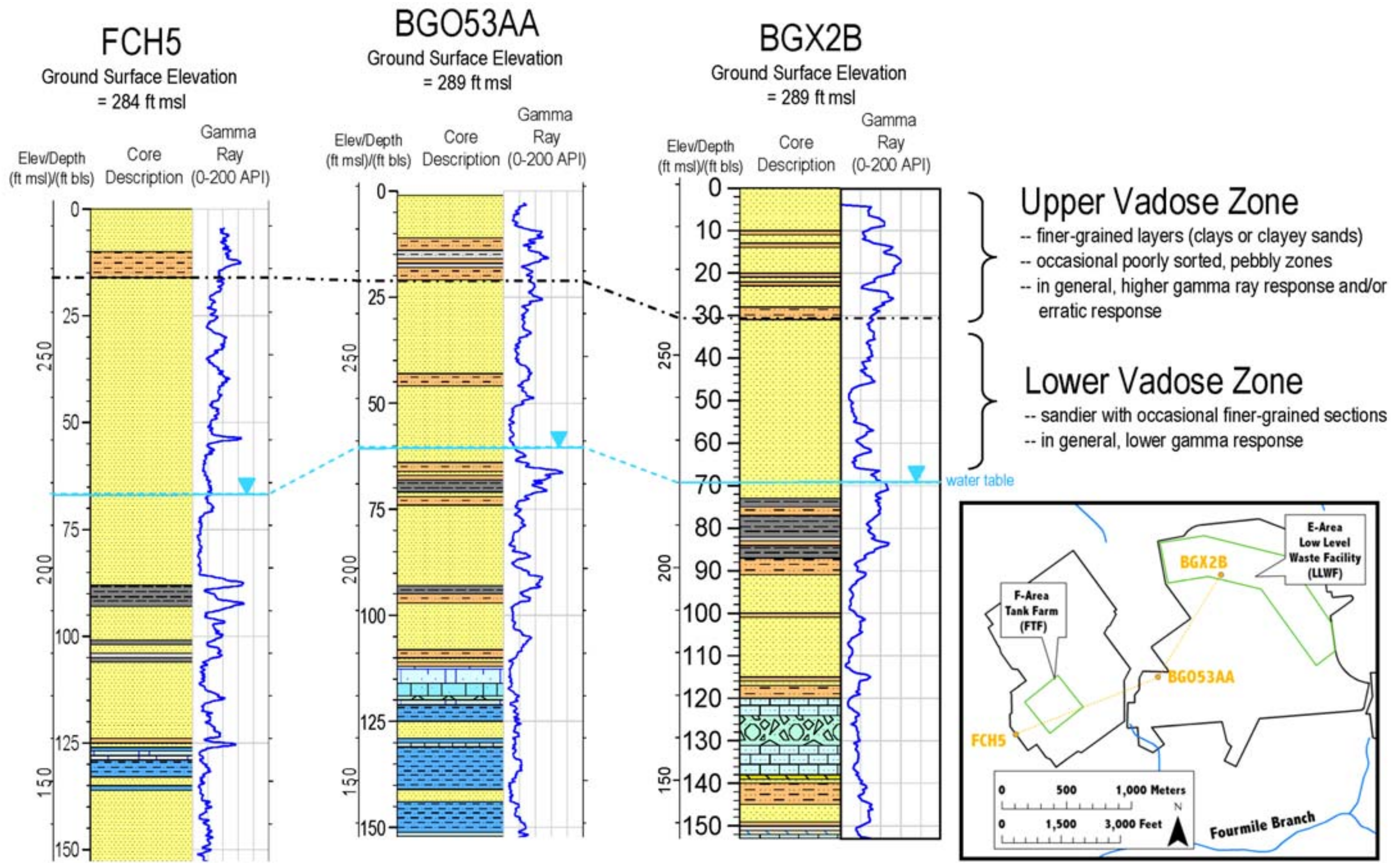
Section 3.2.1 provides a detailed description of the construction of the various waste tank groups situated in the FTF. The general construction approach, as detailed in Section 3.2.1, for each waste tank group involved four major steps:

1. Excavating an area below grade and stockpiling the excavated soil;
2. Laying an unreinforced concrete working slab at the bottom of the excavation to provide a stable platform for construction activities;
3. Constructing the waste tanks (Figure 4.2-18); and
4. Backfilling around the waste tanks with the previously removed soil.

Figure 4.2-18: Type III Tanks under Construction at FTF

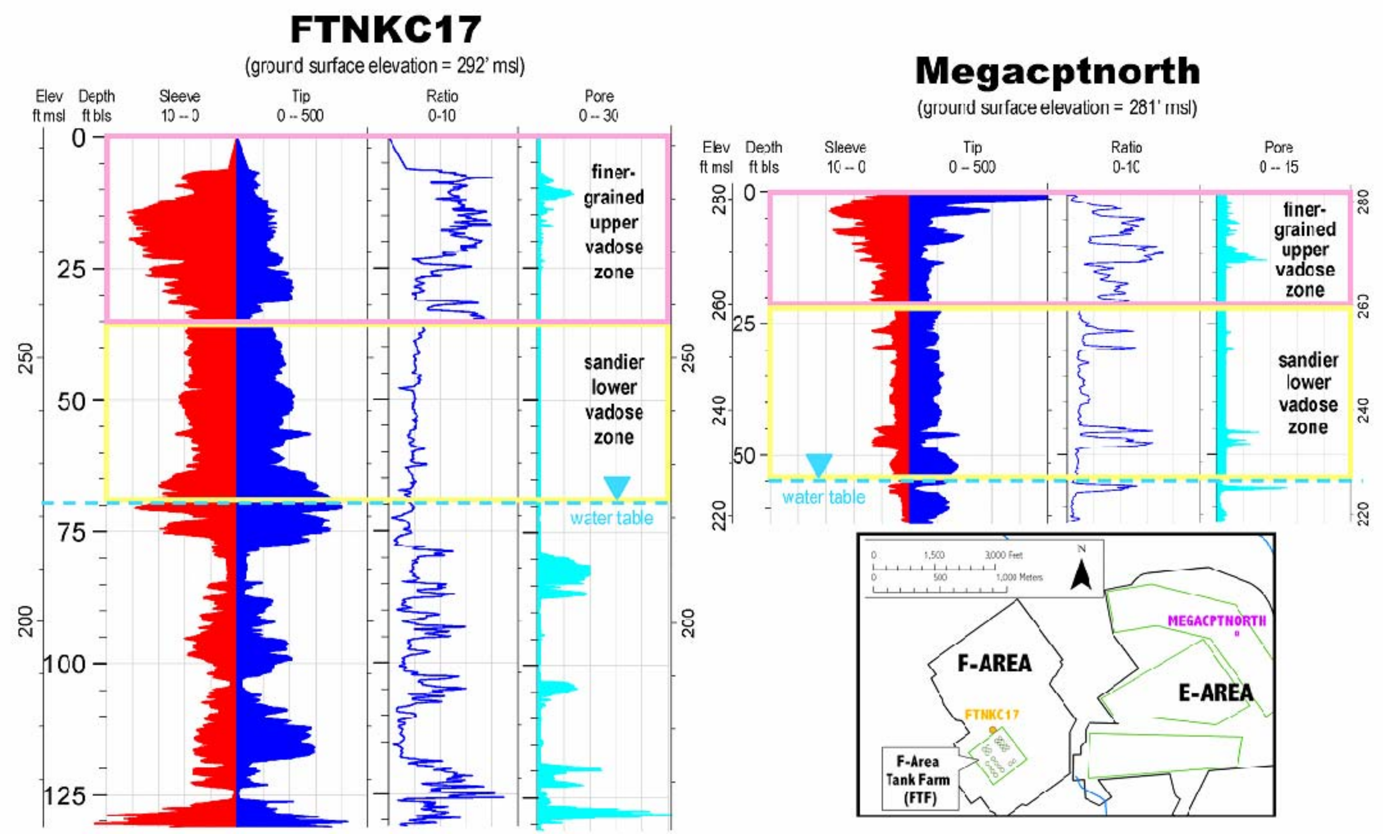
A substantial body of vadose zone characterization data is available for the GSA, especially for the E-Area LLW Facility, which lies about a mile northeast of FTF. Available data show that the vadose zone at FTF is similar to the vadose zone in E-Area. [SRNL-ESB-2007-00008] Figure 4.2-19 provides foot-by-foot core descriptions and gamma ray logs from three boring locations and Figure 4.2-20 shows CPT data from two locations. These figures show that the vadose zone can be divided into two regions, an Upper Zone and a Lower Zone, at FTF and in E-Area. The Upper Zone consists of finer-grained sediments and typically displays a higher gamma ray, friction ratio and pore pressure response. The Lower Zone is sandier and generally exhibits a lower gamma ray, friction ratio and pore pressure response. As shown in Figure 4.2-19, the boundary between the upper and lower vadose zone at FTF lies about 35 feet below the pre-construction ground surface, at an elevation of approximately 257 feet above MSL. These conditions mean that the soil beneath the waste tank bottoms falls entirely within the lower vadose zone region and the backfilled soil is comprised of soil from the upper and lower vadose regions.

Figure 4.2-19: Comparison of E-Area and F-Area Vadose Zone Using Core Descriptions and Gamma Ray Logs



Notes: API – American Petroleum Institute Units; msl = mean sea level; bls = below land surface; m = meters; ft = feet; color coated lithology columns are based on foot-by-foot core descriptions; colors correspond to the following: yellow = sands, grays – clays, oranges = clayey sands, blues = calcitic sections/limestones; water table elevation approximated based on calculated median water table elevations and contours in WSRC-TR-2003-00250; gamma ray, survey and location data from SRS Landmark database; figure modified from SRNL-ESB-2007-00008.

Figure 4.2-20: Comparison of E-Area and F-Area Vadose Zone Using CPT Logs



Notes: Elev = elevation; msl = mean sea level; bls = below land surface; ft = feet; sleeve resistance (tsf); tip = tip resistance (tsf); ratio = friction ration (reflects sleeve/tip); pore = pore pressure (psi); in general, lower tip, higher sleeve, higher ration, higher pore observed in finder-grained (e.g., clay rich) zones whereas higher tip, lower sleeve, lower ratio, lower pore pressures observed in sandier zones; water table elevation approximated based on calculated median water table elevations for nearby water table wells and water table contours in WSRC-TR-2003-00250; pink box corresponds to finer-grained upper vadose zone; yellow box corresponds to sandier lower vadose zone; CPT log data from SRS Landmark database, figure modified from SRNL-ESB-2007-00008.

Table 4.2-23 presents the thickness of the lower vadose zone beneath each of the waste tanks. The thicknesses of the vadose zone below the different waste tanks range from approximately 1 to 20 feet.

Table 4.2-23: FTF Lower Vadose Zone Thickness

Tank Type	Tank Number	Excavation Elevation (feet above MSL)	Approximate Water Table Elevation (feet above MSL)	Lower Vadose Zone Thickness (feet)
I	1	240.57	227.1	13.5
	2	240.57	227.5	13.1
	3	239.15	227.1	12.1
	4	239.15	227.5	11.7
	5	237.64	227	10.6
	6	237.64	227.4	10.2
	7	236.31	226.9	9.4
	8	236.31	227.3	9
IV	17	228.31	225.8	2.5
	18	228.31	226.2	2.1
	19	227.39	225.7	1.7
	20	227.39	226.2	1.2
III	33	243.67	226.3	17.4
	34	243.67	226.6	17.1
IIIA	25	243.95	225.9	18.1
	26	245.3	225.8	19.5
	27	245.3	225.7	19.6
	28	243.95	225.6	18.4
	44	243.63	225.3	18.3
	45	245.06	225.3	19.8
	46	245.06	225.2	19.9
	47	243.63	225.1	18.5

(From SRNL-ESB-2007-00008, Table 2, based on review of waste tank construction drawings identified in Table 1 of that report)

Concrete Working Slabs

As described in Section 3.2.1, all the FTF waste tanks, except the Type IV tanks (Tanks 17 through 20), have a working slab below their basemat. There is a working slab, however, between Tanks 17 through 20. Table 4.2-24 summarizes available information on the design of the working slabs for the different FTF tank types. Figure 4.2-21 shows a typical working slab under construction for Tanks 1 through 8 (Type I tanks). Drawings and photographs (Figure 3.2-26) indicate that the working slabs for the Type IIIA tanks were broken up or perforated with holes before backfilling, and this condition is assumed to exist between the waste tanks, but not underneath the waste tanks.

Table 4.2-24: Waste Tank Working Slab Information by Tank Type

Tank Type	Working Slab Design
I	Bottom of entire excavation was filled with approximately 3 inches of lean concrete to form a working surface for waste tank installation. [W145491]
IV	2 inch drainage and maintenance slab between waste tanks. [W167808]
III	Bottom of entire excavation was filled with minimum 4 inch working slab. [W238154]
IIIA	Bottom of entire excavation was filled with minimum 4 inch working slab which was either broken up or punched with 4 inch diameter holes on 18 inch centers prior to backfilling (Figure 3.2-26). [W704824]

[SRNL-ESB-2007-00008, Table 1, with source drawings indicated]

Figure 4.2-21: Tanks 1 – 8 Working Slab

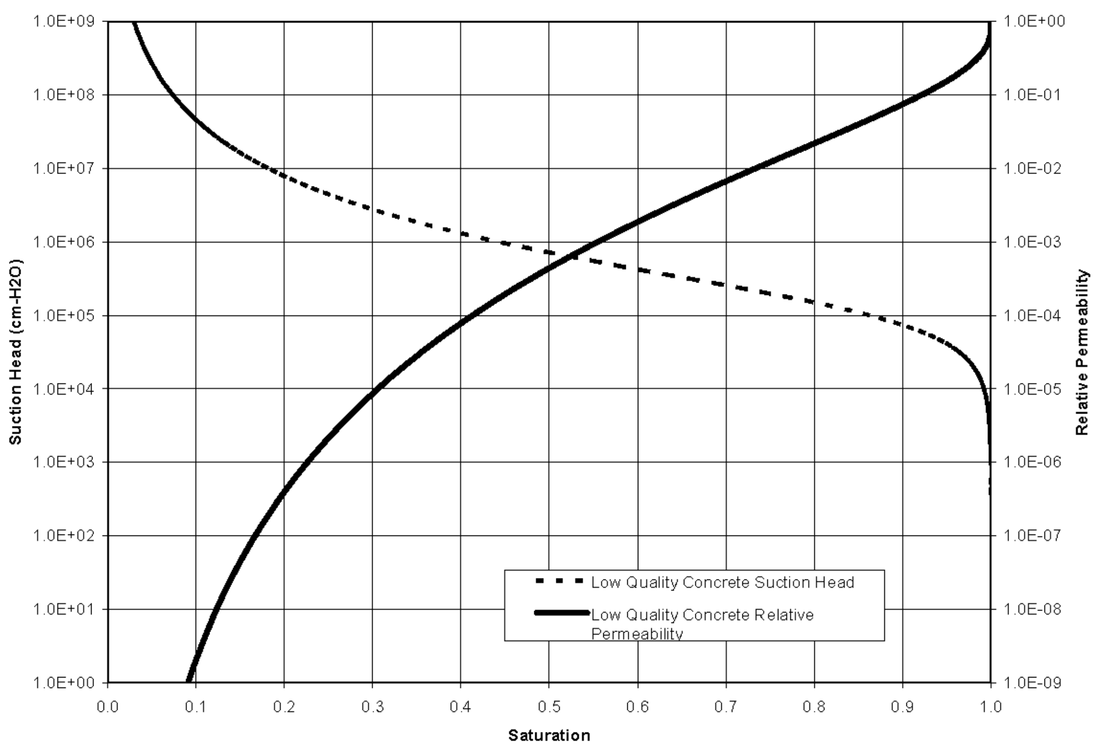
Information from specification SB 6 A (Spec-3019, pages 111 – 113 of 540), indicates that the FTF work slabs were made of concrete with a compressive strength of 1,500 – 2,000 psi. [WSRC-STI-2006-00198] Because the slabs were not reinforced, cracks would have been expected to form in areas where heavy equipment was used and cracks may have formed in the areas beneath the waste tanks when the tanks were being constructed. Table 4.2-25 shows estimated material properties for the working slabs. Figure 4.2-22 provides the characteristic curves (suction head, and relative permeability) for the working slab.

Table 4.2-25: Estimated Working Slab Material Properties of Interest

Material	Saturated Effective Diffusion Coefficient (cm^2/sec)	Effective Porosity (%)	Dry Bulk Density (g/cm^3)	Particle Density (g/cm^3)	Saturated Hydraulic Conductivity (cm/sec)
Low Quality Concrete	8.0E-07	21.1	2.06	2.61	1.0E-08

[WSRC-STI-2006-00198 for low quality concrete]

Figure 4.2-22: Working Slab (Low Quality Concrete) Characteristic Curves



[Data curve from WSRC-STI-2006-00198]

Given the small thickness of the working slabs compared to the waste tank basemats, and the likelihood of cracks in the working slabs, it is appropriate to ignore the working slabs in modeling contaminant transport through the waste tank bottom and the basemat into the vadose zone.

Vadose Zone Material Properties, Backfill and Lower Vadose Zone

The physical and chemical properties of the vadose zone soils surrounding and below the contamination sources are needed for the ISCM. Data tables are presented for several vadose zone material properties: saturated effective diffusion coefficient s, average total porosity, average dry bulk density, saturated horizontal hydraulic conductivity, saturated vertical hydraulic conductivity, and K_d values. The properties are assumed to not change over time because of the stability of the soil and soil structure.

Table 4.2-26 summarizes available information about the backfill that is present around the waste tanks and, in some cases, also over the tanks.

Table 4.2-26: Waste Tank Backfill Information by Tank Type

Tank Type	Backfill Information
I	Excavated soil was compacted around and over the waste tanks. It is uncertain whether it was placed by standard compaction, specification SC 4 E (Spec-3019, pages 88 – 89) or test-controlled compaction, SC 5 E, Section 4 (Spec-3019, pages 90 – 91). [W145225] Nine feet of backfill was emplaced over the waste tank tops. [W145491]
IV	Vermiculite bags installed immediately adjacent to waste tank walls. [DP-478] Standard compaction SC 4 E of excavated soil (sandy clay) around and over waste tanks. [Spec-3019, pages 88 – 89, W167486]
III	Excavated soil was compacted around and over the waste tanks. It is uncertain whether it was placed by standard compaction, SC 4 E (Spec-3019, pages 88 – 89) or test-controlled compaction SC 5 E (Spec-3019, pages 90 – 91). The grading plan does not provide any notes on the backfill around the waste tanks. [W238875]
IIIA	Excavated soil was compacted around the waste tanks. Backfill around waste tanks was installed in accordance with Engineering Requirement 02224-01-R, *Excavation and Backfill*, placed in accordance with SC 5 E, and compacted to 95% of maximum dry soil density. [Spec-3019, pages 90 – 91] After placement of the original soil backfill, superseded drawing W701330, Revision 62 (Superseded) allowed use of CLSM as backfill for new excavations outside of 7 feet from the waste tanks. Excavated soil was compacted around the waste tanks. [W704824] All backfill around the waste tanks was placed in accordance with SC 5 E, and compacted to 95% of maximum dry soil density. [Spec-3019, pages 90 – 91]

[SRNL-ESB-2007-00008, Table 1]

As indicated in Table 4.2-26, the excavated soil was used for backfilling around the waste tanks. Excavated soil was also used to cover the tops of the waste tanks, except for the Type IIIA tanks, as shown in this table. This soil consisted of predominately upper vadose zone soil (i.e., sand with a significant silt and clay content) with some lower vadose zone soil (i.e., a coarser-grained soil). Soil considered to be too sandy was not utilized as backfill. [SRNL-ESB-2007-00008, Section 3.2]

The backfill was variously placed either by standard compaction or by test-controlled compaction. Standard compaction consisted of rolling damp, maximum 12 inch lifts of soil with mechanical compaction equipment until visually uniform compaction was obtained. Test-controlled compaction consisted of compacting moisture conditioned soil with mechanical compaction equipment until densities greater than or equal to 95% of maximum dry soil density was obtained as determined by testing. The two possible exceptions to this general rule are as follows. [SRNL-ESB-2007-00008, Section 3.2]

- Tanks 17 through 20, bags of vermiculite were placed immediately adjacent to the tank walls. This is such a limited amount of material that it is assume to make little difference to the tank modeling.
- Tanks 25 through 28, the use of CLSM was allowed to fill new excavations that were at least 7 feet away from the waste tanks only after initial soil backfill placement. The use of CLSM as backfill around these waste tanks appears to be very limited and therefore it should make little difference to the tank modeling.

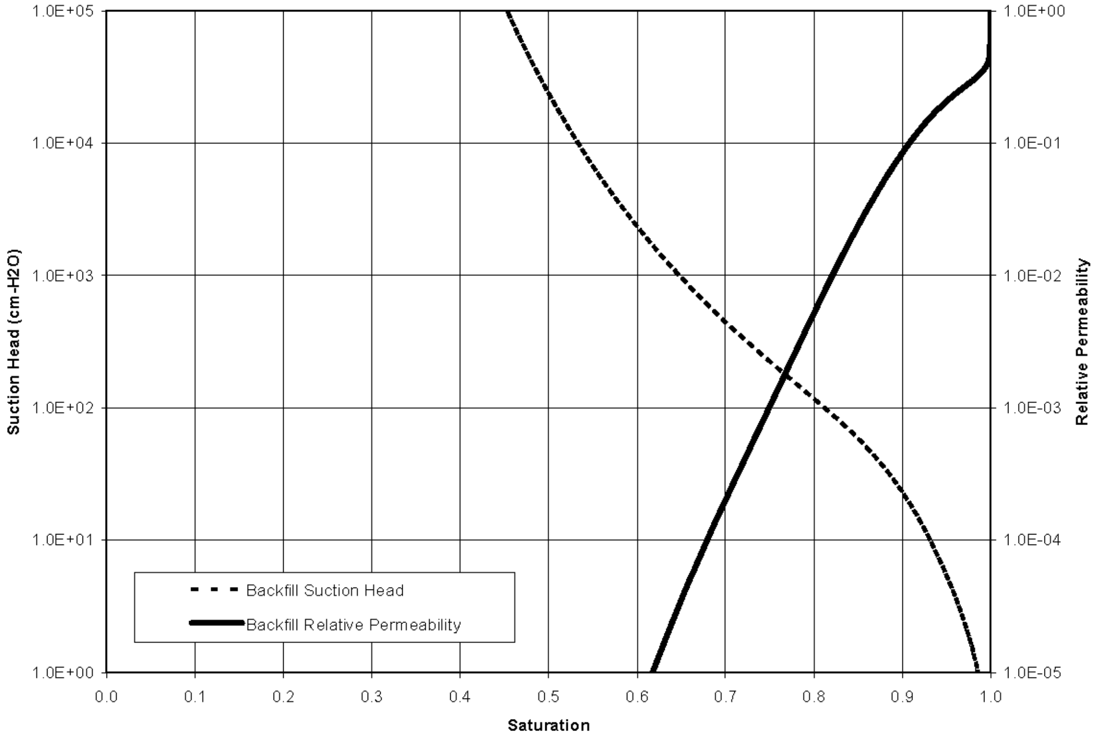
Table 4.2-27 provides the estimated materials properties for the backfill. Figure 4.2-23 provides the characteristic curves (suction head, saturation, and relative permeability) for the backfill.

Table 4.2-27: Estimated Backfill Material Properties of Interest

Material	Saturated Effective Diffusion Coefficient (cm^2/sec)	Average Total Porosity (%)	Average Dry Bulk Density (g/cm^3)	Average Particle Density (g/cm^3)	Saturated Horizontal Hydraulic Conductivity (cm/sec)	Saturated Vertical Hydraulic Conductivity (cm/sec)
Backfill	5.3E-06	35	1.71	2.63	7.6E-05	4.1E-05

[WSRC-STI-2006-00198, Table 4, via SRNL-ESB-2007-00008, for controlled compacted backfill; all property values except for saturated effective diffusion coefficients are based on laboratory data for samples of similar backfill from the GSA; saturated effective diffusion coefficient values are based on literature values]

Figure 4.2-23: Backfill Characteristic Curves



[Data for curve from WSRC-STI-2006-00198]

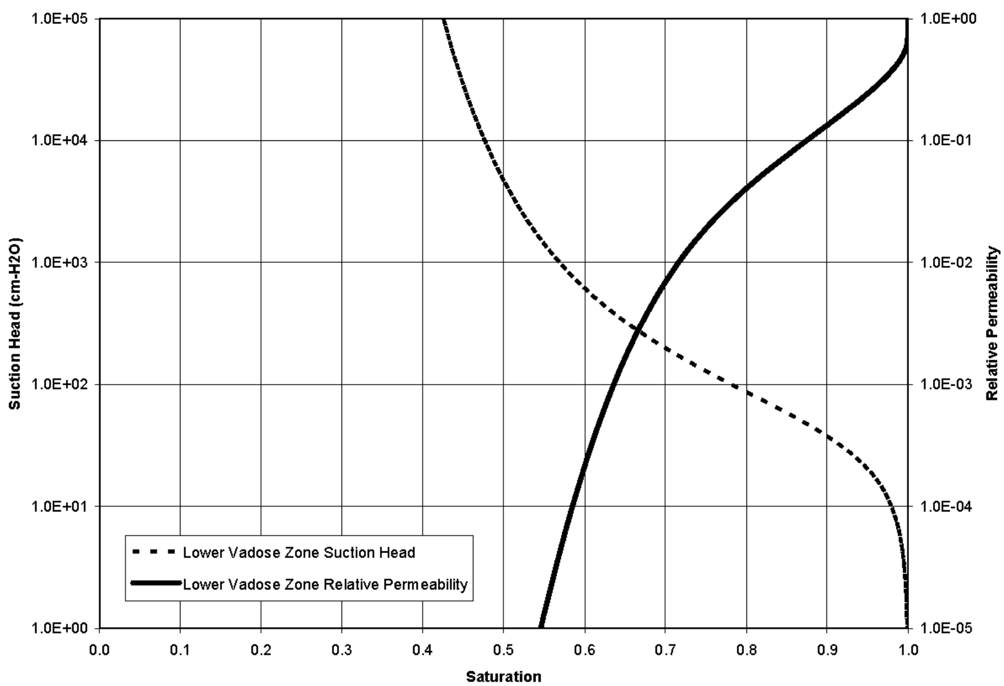
Table 4.2-28 provides the estimated material properties for the lower vadose zone based on a recent geotechnical report on E-Area and Z-Area hydraulic properties. [WRSC-STI-2006-00198] Figure 4.2-24 provides the characteristic curves (suction head, saturation, and relative permeability) for the lower vadose zone produced from data obtained from WRSC-STI-2006-00198. The lower vadose zone properties are primarily based upon site-specific laboratory data modified with site-specific field data with the exception of the saturated effective diffusion coefficient, which is based on literature values.

Table 4.2-28: Estimated Vadose Zone Material Properties of Interest

Material	Saturated Effective Diffusion Coefficient (cm^2/sec)	Average Total Porosity (%)	Average Dry Bulk Density (g/cm^3)	Average Particle Density (g/cm^3)	Saturated Horizontal Hydraulic Conductivity (cm/sec)	Saturated Vertical Hydraulic Conductivity (cm/sec)
Lower Vadose Zone	5.3E-06	39	1.62	2.66	3.3E-04	9.1E-05

Data is extracted from SRNL-ESB-2007-00008, Table 3, which also contains estimated values for the upper vadose zone.

Figure 4.2-24: Lower Vadose Zone Characteristic Curves



[Data for curve from WSRC-STI-2006-00198]

Recommended K_d values for the vadose zone and backfill soil are taken from recent compilations of geotechnical data prepared in support of site PA modeling. [WSRC-TR-2006-00004, SRNL-RPA-2007-00006] For each element and soil type estimates of the K_d values or solubility concentration limits were provided. These values are based primarily on SRS site-specific experimental data, some central value of literature, or on expert judgment, with SRS site-specific experimental data being the preferred information source. Table 4.2-29 provides these values for the PORFLOW modeled vadose zone under the waste tanks (native soil = vadose zone soil), and for the tank backfill (backfill = backfill soil).

Table 4.2-29: Recommended K_d Values for the Vadose Zone and Backfill in mL/g

Element	Soils Media		
	Vadose Zone Soil (mL/g) (4)	Backfill Soil (mL/g) (5)	Ref.
Ac	1,100	8,500	a
Ag (3)	60	150	b
Am	1,100	8,500	a
Ar	0	0	a
As (3)	100	200	b
At	0	0.6	a
Ba (1)	5	17	a
Bk	1,100	8,500	a
C	10	400	f
Cd (3)	4	10	b
Ce	1,000	1,500	a
Cf	1,100	8,500	a
Cl	0	0	a
Cm	1,100	8,500	a
Co	7	30	a
Cr (3)	4	10	b
Cs	50	250	a
Cu (3)	50	70	b
Eu	1,100	8,500	a
F (3)	0	0	b
Fe (3)	200	400	b
Fr	50	250	a
Gd	1,100	8,500	a
H	0	0	a
Hg (3)	800	1,000	b
I	0	0.6	a
K	10	60	b
Kr	0	0	a
Mn (3)	15	200	b
N (3)	0	0	b
Nb	0	0	a
Ni	7	30	a
Np	0.6	35	a
Pa	0.6	35	a
Pb (1)	2,000	5,000	a

Table 4.2-29: Recommended K_d Values for the Vadose Zone and Backfill in mL/g (Continued)

Element	Soils Media		
	Vadose Zone Soil (mL/g) (4)	Backfill Soil (mL/g) (5)	Ref.
Pd	7	30	b
Po	2,000	5,000	a
Pt	900	2,000	g
Pu (2)	270	5,900	a
Pu_4	300	6,000	a
Pu_5	16	5,000	a
Ra	5	17	a
Rb	50	250	a
Re	0.1	0.2	a
Rn	0	0	a
Sb (1)	2,500	2,500	b
Se (1)	1,000	1,000	a
Sm	1,100	8,500	a
Sn	2,000	5,000	a
Sr	5	17	a
Tc	0.6	1.8	e
Te	1,000	1,000	a
Th	900	2,000	a
U (1)	200	300	a
V (3)	0	0	d
Zn (3)	100	200	c
Zr	900	2,000	a

Reference a: WSRC-TR-2006-00004, Table 10
Reference b: SRNL-RPA-2007-00006
Reference c: SRS-REG-2007-00036
Reference d: Assigned a value of zero
Reference e: SRNL-TR-2009-00019
Reference f: SRNS-STI-2008-00445
Reference g: Assigned the same K_d values as Zr

Notes: (1) Elements analyzed for both radiological and chemical concentrations.
(2) Pu is a combination of the oxidation states Pu_4 (reduced species) and Pu_5 (oxidized species) [WSRC-TR-2006-00004, Page 21].
(3) Elements analyzed only for chemical concentration.
(4) Vadose zone soil represented by sandy sediment.
(5) Backfill soil represented by clayey sediment.
(6) SRNS-STI-2008-00286 supports the use of non-zero values for Tc in SRS soils.

4.2.3.2.3 Cementitious Material Properties

The hydraulic and physical properties of the cementitious materials associated with the waste tanks after closure (i.e., tank top and walls, tank basemat, tank grout fill) are integral to the ISCM. Property estimates for cementitious materials associated with the FTF are utilized as input to the tank modeling. Some properties are expected to remain constant over time. These include porosity (η), dry bulk density (ρb), particle density (ρp), and the water retention curves. Because the form of cementitious material degradation is that of cracking, and not the dissolving of the cement paste, the porosity, bulk density and particle density of the cementitious material are expected to be marginally impacted. Since the cementitious materials are fully degraded at the time of liner failure (the steel liner is controlling transport prior to failure), and the degraded properties are sufficient to make the cementitious materials no longer a significant barrier to flow, revised water retention curves for cracked cementitious materials were not developed. While it is recognized that some variability exists, it was judged a reasonable modeling simplification to hold porosity, dry bulk density, particle density, and the water retention curves constant. Section 4.4.2 describes additional configuration cases employed in the model which include the existence of fast flow paths which could be attributed to cracked cementitious materials.

Estimates for these properties for the cementitious materials associated with the FTF waste tanks have been provided in WSRC-STI-2007-00369, Table 20. The cementitious materials in the FTF can be grouped into two types, 1) the grout used to fill the waste tanks at tank closure, and 2) the tank concrete in the vault roof, in the basemat under the waste tanks and in the walls of the waste tanks. The properties associated with the tank grout are taken from the specification fill grout properties in WSRC-STI-2007-00369, which are based on testing of the grout formula planned to be used for tank fill. The properties associated with the tank concrete are taken from the basemat surrogate properties in WSRC-STI-2007-00369, which are based on testing of similar vintage SRS concrete (concrete from a P-Area tank foundation slab that is over 30 years old).

Section 3.2.1 provides detailed descriptions of the various waste tanks located within FTF. Provided in Table 4.2.30 is a summary of the information used in Section 3.2.1 that is used in the conceptual model to address cementitious material thicknesses that surround the various waste tanks.

Table 4.2-30: Cementitious Material Thicknesses Used in the Transport Model

Cementitious Material	Thickness (inches)			
	Type I (Tanks 1 through 8)	Type III (Tanks 33 and 34)	Type IIIA (Tanks 25 through 28 and 44 through 47)	Type IV (Tanks 17 through 20)
Roof	22	48	48	7
Wall	22	30	30	7
Basemat	30	42	41[(1)]	6.9[(2)]

(1) The transport model subtracts 2 inches from the minimum assumed basemat thickness (43 inches), of the Type IIIA tanks to acknowledge the 2 inch deep channels etched into the basemat (see Section 3.2.1.2).

(2) The Type IV basemat consists of a 4 inch slab covered with a 3 inch cement topping. The cement topping has 1.625 inch drainage channels cut into approximately 6% of the slab, giving an effective thickness of 6.9025 inches (Section 3.2.1.3).

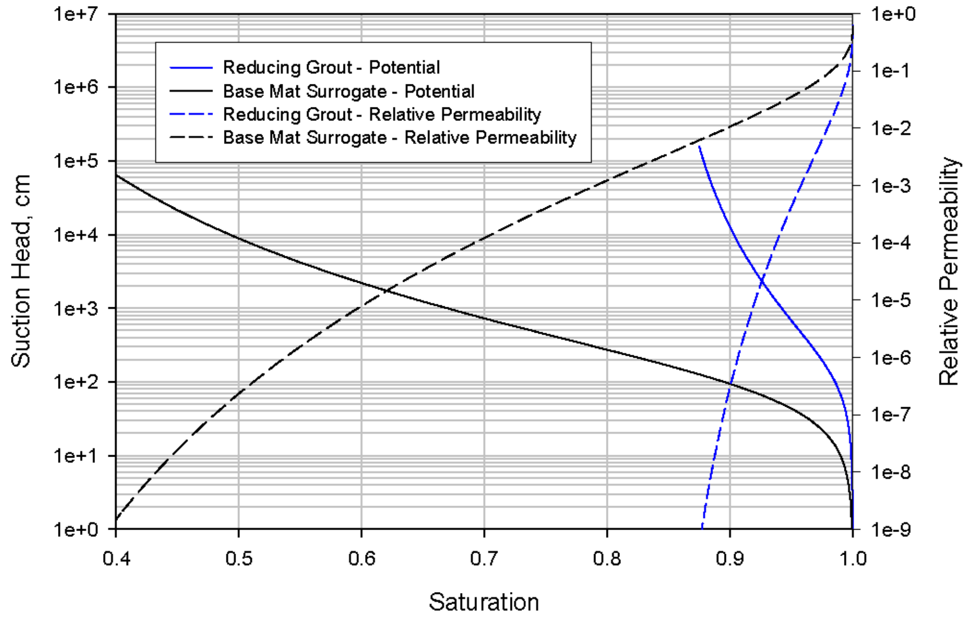
The properties used in the conceptual model were selected from the testing described in WSRC-STI-2007-00369, and are shown in Table 4.2-31 and Figure 4.2-25. A discussion of parameter selection and the associated conservatisms is provided in Sections 6.1.4 and 6.3.4 of WSRC-STI-2006-00198.

Table 4.2-31: Cementitious Material Properties

Material	Porosity η (%)	Dry Bulk Density ρb (g/cm^3)	Particle Density ρp (g/cm^3)	Effective Diffusion Coefficient De (cm^2/sec)	Hydraulic Conductivity (cm/sec)
Tank Concrete (Basemat, Tank Top and Sides)	16.8	2.06	2.51	8.0E-07	3.5E-08
Grout Fill	26.6	1.81	2.51	8.0E-07	3.6E-08

[WSRC-STI-2006-00198, WSRC-STI-2007-00369, SRNL-ESB-2007-00034]

Figure 4.2-25: Recommended Characteristic Curves for Reducing Fill Grout and Tank Concrete



[WSRC-STI-2007-00369]

Cementitious Material Hydraulic Conductivity and Effective Diffusion Coefficient

The hydraulic conductivities and effective diffusion coefficient of the cementitious materials associated with FTF waste tanks are expected to change over time. The degraded concrete and grout hydraulic conductivities will increase by a factor of 100. [WSRC-STI-2007-00607] The effective diffusion coefficient for grout and concrete is assumed to increase by a factor of seven, which is the approximately same ratio as the difference between undegraded grout/concrete (diffusion coefficient of 8E-7 cm^2/sec) and backfill (diffusion coefficient of 5.3E-6 cm^2/sec).

The expected degradation rate and timing for the tank cementitious materials is based on WSRC-STI-2007-00607 and SRS-REG-2007-00027 and will vary depending on tank type. The timing of the degradation of the tank cementitious materials is detailed in Table 4.2-32 for the various tank types.

The grout degradation sub-model conservatively simulates the grout fill degradation processes as they are understood at this time. The principal degradation mechanism captured in the sub-model is movement of the carbonation front through the grout. Two areas bounded by the carbonation front mechanism and therefore not explicitly simulated in the sub-model are shrinkage and thermal cracking of the grout.

When cement paste reacts with carbon dioxide (CO_2) the result is irreversible shrinkage (referred to as carbonation shrinkage). When Ca and CO_2 result in precipitation of calcite $CaCO_3$ on the surface of concrete/grout, the result is an armoring that seals pores with no bulk shrinkage. The consequences of carbonation are a function of the changes in the mineralogy (phases) in or on the surface of the cementitious material. Changes in mineralogy alter the microstructure. The microstructure defines the porosity and therefore the permeability. The rate at which the reactions occur in the specific materials, co-reactants, and the other processes that occur in parallel affect the overall changes in physical/hydraulic properties. The effect of carbonation is material, environment, and total chemistry dependent.

Concrete exposed to carbonation loses water as the result of the carbonation process which results in formation of an anhydrous product. Consequently the concrete behaves as though it has been dried to a much lower relative humidity than to which it is actually exposed. The shrinkage-water loss relationship is similar to that observed for normal drying. Carbonation affects both $Ca(OH)_2$ and CSH, and therefore the entire microstructure of the material. The rate and extent to which cement paste can react with CO_2 and thereby undergo carbonation shrinkage is a function of relative humidity and is greatest around 50% relative humidity. At high humidity, carbonation is low because the pores are mostly filled with water, therefore, CO_2 cannot diffuse quickly into the material. At very low humidity (not the case for waste tank closure grout), the absence of water films (medium that dissolves the CO_2 gas) on the (C-S-H) surfaces results in low carbonation rates.

Shrinkage is a paste property, with aggregates not involved in the processes. Three phenomena are believed to contribute to bulk shrinkage of cement paste:

- Capillary stress,
- disjoining pressure (pressure resulting from adsorption of oriented water molecules in the absorbed film of water between the C-S-H surfaces), and
- changes in the surface free energy.

These phenomena result from the special nature of hydrated cement paste, i.e, high porosity with a network of small capillary pores, van der Waals' bonding in C-S-H, and the high surface area and intrinsic micro porosity of the C-S-H. The net linear shrinkage is a function of the internal pressures developed by these conditions. Shrinkage may occur as the result of several processes, including:

- Water loss,
- carbonation (which includes water loss), and
- autogenous (chemical) shrinkage.

Shrinkage via water loss and carbonation can be classified as either reversible or irreversible. The portion of the drying shrinkage that occurs on the first drying cycle is irreversible and can result in drying shrinkage cracks if it occurs during the curing process when the material has a low tensile strength. Drying shrinkage during the first drying cycle is not expected to be an issue for waste tank closure since the tank closure grout is placed in an intact carbon steel tanks with essentially 100% relative humidity. Subsequent drying shrinkage (after the material is cured) is reversible upon re-wetting. This is also not expected to be a shrinkage issue for waste tank closure for similar reasons discussed above for the first drying cycle (i.e., intact waste tanks, high humidity). Autogenous shrinkage can occur when concrete self-desiccates during hydration (low water to cementitious material ratio or no water curing) is a form of drying shrinkage. Autogenous shrinkage could be an issue for material with a low water to cementitious material ratio, or that is not water cured. It is not expected to be an issue for mixes with water to cementitious materials ratios of 0.4 to 0.6 produced under waste tank conditions which are mostly closed systems. Carbonation shrinkage is a special case of drying shrinkage since water loss accompanies the process.

Thermal cracking is not expected to impact grout degradation. The mixes in the current specification contain relatively low amounts of cementitious material contents in order to control heat of hydration and thermal gradients and thereby reduce potential for thermal cracking. While in service, the fill material will not be subjected to thermal cycling, and is therefore not expected to crack due to thermal expansion/contraction.

The radiological effects on degradation of grouted waste tank residuals are estimated to be bounded by the modeled degradation mechanism based on data from a study on solidification of SRS HLW sludge in Portland cement matrices. In this study, simulated high-level cement waste forms were gamma-irradiated to 10^{10} rad. After irradiation, compressive strength and the strontium leachability of the cement waste forms were measured and compared to samples that were not irradiated. No significant reductions of compressive strength or increase in strontium leaching, which are degradation metrics, were attributed to the radiological exposure. [DP-1448, pg. 45-51] The effects of the gamma radiation on the degradation properties of grout are expected to be less than the effects of the gamma radiation because the alpha dose rates that the grout will be exposed to are lower than the gamma dose rates. [SRNL-PSE-2006-00097]

Table 4.2-32: Cementitious Material Degradation

Cementitious Material Lifetimes	Type I Tank (Years)	Type III Tank (Years)	Type IIIA Tank (Years)	Type IV Tank (Years)
FTF Spec Fill Grout Lifetime (Initial Properties)	0 - 2,600	0 – 5,000	0 – 4,800	0 - 800
Degrading FTF Spec Fill Grout Lifetime	2,600 – 13,000	5,000 – 18,900	4,800 – 18,700	800 – 63,800
Fully Degraded FTF Spec Fill Grout Lifetime	After 13,000	After 18,900	After 18,700	After 63,800
FTF Aged Concrete Lifetime (Initial Properties)	0 – 1,300	0 – 2,500	0 – 2,400	0 - 400
Degrading FTF Aged Concrete Lifetime	1,300 – 2,600	2,500 – 5,000	2,400 – 4,800	400 - 800
Fully Degraded FTF Aged Concrete Lifetime	After 2,600	After 5,000	After 4,800	After 800

[SRS-REG-2007-00027, Table 1]

Cementitious Material K_ds

K_d values are necessary only for cementitious materials through which contaminants have the potential to travel (e.g., basemat, grout). Table 4.2-33, provides K_d values for cementitious materials as a function of aging. The K_d values in this table are based on SRS site-specific data, values from literature, or on engineering judgement, with SRS site-specific data being the preferred information source. [WSRC-RP-2007-01122] The K_d for an element in concrete is dependent on the pH of the concrete pore water, which in turn is dependent upon the amount of water (number of pore water volumes) that has passed through the concrete over time. The water chemistry for the testing reported in WSRC-RP-2007-01122 is found in Table 9 of WSRC-STI-2007-00640. The experimental information for the aged concrete is used as the basemat surrogate. The experimental results are similar to the values for oxidized concrete contained NUREG-CR-6377 except for a non-zero technetium K_d. NUREG-CR-6377 stated that technetium should have a non-zero K_d but the authors defaulted to a zero value due to a lack of calculation data. The experimental information for this PA yielded the K_d values in Table 4.2-33. The experimental values reported in WSRC-RP-2007-01122 are used in conjunction with like element experimental values and previously reported K_d work in WSRC-STI-2007-00640 in the determination of the recommended K_d values reported in Table 4.2-33.

The number of pore water volumes passing through the waste tank and the corresponding transitions to different tank chemistry conditions is included in the FTF modeling. As part of the waste release modeling (discussed in detail in Section 4.2.2), the estimated transition times between various chemical phases was calculated for the waste tank pore water. The waste tank pore water chemistry was calculated to change from Region II Reduced conditions (Middle Age Reducing) to Region II Oxidized conditions (Middle Age Oxdizing) after 371 pore volumes pass through the reducing grout. The change from Region II conditions (Middle Age) to Region III conditions (Old Age) was calculated to occur after 2,063 pore volumes (Table 4.2-1). [ISSN 1019-0643, WSRC-STI-2007-00544]

As a modeling simplification, the pore volume transition times for the Base Case were determined assuming the representative grout formula was present throughout the waste tank interior. This simplifying assumption potentially causes the modeled transition times for Tanks 17 and 20 to occur later than would be expected based on the actual amount of reducing grout available since reducing grout was not utilized through the entire tank volume when these two waste tanks were closed. The delayed start of solubility transition for Tanks 17 and 20 is considered conservative since the Type IV tank liners are modeled failing simultaneously. Allowing all four of the Type IV tanks to transition to different chemical states at the same time will tend to cause the releases from the tanks to peak simultaneously, with the composite dose maximized by allowing the peaks to overlap at the same time. As part of the Uncertainty/Sensitivity Analysis, the transition times between chemical states was varied in the stochastic analysis as described in Section 5.6.3.8.

Based on changes in pH with aging, the K_d values for concrete have been divided into three stages as shown in Table 4.2-33. The young, middle, and old ages correspond to Regions I, II and III. Tank grout and concrete are initially characterized as middle aged (Region II) and transition to Region III over time (Table 4.2-1) as the material properties change. Because the tank grout and cement in individual waste tanks will be aged at the time of overall FTF closure, none of the waste tank cementitious materials were characterized as young (Region I). [ISSN 1019-0643]

For the Base Case, the transition years after closure for the 371 pore volumes and 2,063 pore volumes differ for each tank type. For PORFLOW, the modeled time intervals for each tank type transition are:

a) Type I, Type III and Type IV tanks first: transition year 15,500, second transition year 20,000, and;
b) Type IV tanks: first transition year 10,500, second transition year 20,000.

The PORFLOW models last time interval is 20,000 to 100,000 years, so any transition in this interval is modeled as occurring at year 20,000.

Table 4.2-33: Recommended K_d Values for Cementitious Materials in mL/g

Element	Oxidizing Cementitious Media						Reducing Cementitious Media					
	Young Age (mL/g)	Ref.	Middle Age (mL/g)	Ref.	Old Age (mL/g)	Ref.	Young Age (mL/g)	Ref.	Middle Age (mL/g)	Ref.	Old Age (mL/g)	Ref.
Ac	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d
Ag (3)	1	e	1	e	0.1	e	1	e	1	e	0.1	e
Am	6,000	g	6,000	g	600	g	5,000	g	5,000	g	1,000	g
Ar	0	b	0	b	0	b	0	d	0	d	0	d
As (3)	1,000	e	1,000	e	100	e	1,000	e	1,000	e	100	e
At	8	b	20	b	0	b	8	d	20	d	0	d
Ba (1)	100	b	100	b	70	b	100	d	100	d	70	d
Bk	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d
C	20	b	10	b	0	b	20	d	10	d	0	d
Cd (3)	5,000	g	5,000	g	500	g	5,000	g	5,000	g	1,000	g
Ce	6,000	g	6,000	g	600	g	5,000	g	5,000	g	1,000	g
Cf	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d
Cl	0.8	b	2	b	0	b	0.8	d	2	d	0	d
Cm	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d
Co	4,000	g	4,000	g	1,000	g	5,000	g	5,000	g	1,000	g
Cr (3)	20	e	20	e	2	e	5,000	e	5,000	e	1,000	e
Cs	2	g	20	g	10	g	0	g	2	g	10	g
Cu (3)	1	e	1	e	1	e	1	e	1	e	1	e
Eu	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d
F (3)	20	e	20	e	2	e	20	e	20	e	2	e
Fe (3)	5,000	f	5,000	f	1,000	f	1,000	f	1,000	f	500	f
Fr	2	b	4	b	2	b	2	d	4	d	2	d
Gd	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d

Table 4.2-33: Recommended K_d Values for Cementitious Materials in mL/g (Continued)

Element	Oxidizing Cementitious Media						Reducing Cementitious Media					
	Young Age (mL/g)	Ref.	Middle Age (mL/g)	Ref.	Old Age (mL/g)	Ref.	Young Age (mL/g)	Ref.	Middle Age (mL/g)	Ref.	Old Age (mL/g)	Ref.
H	0	b	0	b	0	b	0	d	0	d	0	d
Hg (3)	300	g	300	g	300	g	1,000	g	1,000	g	300	g
I	8	g	15	g	4	g	2	g	10	g	4	g
K	1	e	2	e	2	e	1	e	2	e	2	e
Kr	0	b	0	b	0	b	0	d	0	d	0	d
Mn (3)	100	e	100	e	10	e	100	e	100	e	10	e
N (3)	0	e	0	e	0	e	0	e	0	e	0	e
Nb	1,000	b	1,000	b	500	b	1,000	d	1,000	d	500	d
Ni	1,000	b	1,000	b	500	b	1,000	d	1,000	d	500	d
Np	1,600	g	1,600	g	250	g	3,000	g	3,000	g	300	g
Pa	1,600	g	1,600	g	250	g	5,000	g	5,000	g	500	g
Pb (1)	500	b	500	b	250	b	500	d	500	d	250	d
Pd	100	e	100	e	10	e	100	e	100	e	100	e
Po	500	b	500	b	250	b	500	d	500	d	250	d
Pt	5,000	i	5,000	i	500	i	5,000	i	5,000	i	500	i
Pu (2)	10,000	h	10,000	h	1,000	h	10,000	h	10,000	h	1,000	d
Pu_4 (2)	10,000	h	10,000	h	1,000	h	10,000	h	10,000	h	1,000	d
Pu_5 (2)	10,000	h	10,000	h	1,000	h	10,000	h	10,000	h	1,000	d
Ra	100	b	100	b	70	b	100	d	100	d	70	d
Rb	2	c	4	c	2	c	2	c	4	c	2	c
Re	0	b	0	b	0	b	5,000	d	5,000	d	5,000	d
Rn	0	b	0	b	0	b	0	d	0	d	0	d
Sb (3)	5,000	e	5,000	e	500	e	5,000	e	5,000	e	500	e
Se (1)	300	b	300	b	150	b	300	d	300	d	150	d

Table 4.2-33: Recommended K_d Values for Cementitious Materials in mL/g (Continued)

Element	Oxidizing Cementitious Media						Reducing Cementitious Media					
	Young Age (mL/g)	Ref.	Middle Age (mL/g)	Ref.	Old Age (mL/g)	Ref.	Young Age (mL/g)	Ref.	Middle Age (mL/g)	Ref.	Old Age (mL/g)	Ref.
Sm	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d
Sn	4,000	g	4,000	g	2,000	g	5,000	g	5,000	g	2,000	g
Sr	3	g	30	g	15	g	0.5	g	3	g	20	g
Tc	0.8	g	0.8	g	0.5	g	5,000	d	5,000	d	5,000	d
Te	300	b	300	b	150	b	300	d	300	d	150	d
Th	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d
U (1)	250	g	250	g	70	g	2,500	g	2,500	g	2,500	g
V (3)	0	a	0	a	0	a	0	a	0	a	0	a
Zn (3)	100	e	100	e	10	e	100	e	100	e	10	e
Zr	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d

Reference a: Assigned a value of zero for modeling purposes.
Reference b: WSRC-TR-2006-00004, Table 13
Reference c: WSRC-TR-2006-00004, Page 22
Reference d: WSRC-TR-2006-00004, Table 14
Reference e: SRNL-RPA-2007-00006
Reference f: SRS-REG-2007-00036
Reference g: WSRC-RP-2007-01122
Reference h: SRNL-TR-2009-00019
Reference i: Assigned the same K_d value as Zr

Notes:
1. Elements analyzed for both radiological and chemical concentrations.
2. Pu a combination of the oxidation states Pu_4 (reduced species) and Pu_5 (oxidized species). [WSRC-TR-2006-00004, Pg 21]
3. Elements analyzed only for chemical concentration.

4.2.3.2.4 Contamination Zone Properties

The physical (e.g., porosity, hydraulic conductivity) and chemical properties (e.g., K_d values) of the CZ material used for the ISCM are assumed to be the same as those of the fill grout for modeling purposes. The CZ conceptual model properties related to the stabilized contaminants release approach (contaminant leaching) are discussed in detail in Section 4.2.2.

4.2.3.2.5 Carbon and Stainless Steel Material Properties

Material properties for carbon steel used in the waste tank liners and stainless steel used in the ancillary equipment are expressed as predicted times of failure due to corrosion under different conditions. Prior to failure, steel is assumed to be impermeable with respect to both advection and diffusion. After failure, steel is assumed to be absent, or otherwise not a hindrance to advection and diffusion (i.e., there would be no retardation). Though not addressed independently in the liner failure analysis, the secondary steel liner is assumed to fail at the same time as the primary steel liner.

<u>Carbon Steel</u>

Predictions for failure of the carbon steel waste tank liners are based on the results of a recent study. [WSRC-STI-2007-00061] The time of liner failure is calculated based on steel corrosion rates under different conditions (e.g., differing diffusion coefficients). These failure times vary with waste tank design, owing to differences in construction. The failure analysis considers general and localized corrosion mechanisms of the waste tank steel exposed to the CZ, grout, and SRS soil conditions. Consumption of the waste tank steel encased in grouted conditions is estimated due to carbonation of the concrete leading to low pH conditions, and the chloride-induced de-passivation of the steel leading to accelerated corrosion.

The liner failure analysis considered the current condition of the FTF waste tanks, with the relevant parameters being known leaksites, their location, and whether they led to accumulation on the annulus floor. A few Type I tanks have experienced stress corrosion cracking. Tank 19, a Type IV tank, has two leaksites that were discovered through artifacts as a function of in-leakage. The Type III/IIIA tanks have not experienced any service-induced pitting or cracking and are assumed to be in the same condition as when put into service. None of the waste tanks are believed to have experienced general corrosion based on the results of ultrasonic inspections. [WSRC-STI-2007-00061, page 16] The liner failure study considered the condition of the FTF waste tanks to be closed when determining the liner failure times. Since the transport model is most concerned with tank failures that could allow significant flow through and away from the CZ, the failure mechanisms of primary concern are those near or at the bottom of the waste tanks that cause significant through-wall flow.

The liner study also considered that the waste tank steel thicknesses at the time of closure may be different than the nominal thicknesses per specifications used for this analysis. Specifically, chemical cleaning utilizing OA has been proposed to remove the last remnants of waste in the tank prior to closure. An analysis of the waste tank closure chemical cleaning was completed to determine any major impacts on the initial thickness. Corrosion testing has been done to determine the effects of the OA cleaning process on the carbon steel. The maximum metal loss due to the cleaning process is very small (less than 10 mils), and does not impact the liner failure model. [WSRC-STI-2007-00061, page 45]

A stochastic approach is used to estimate the distributions of failures based upon the differing mechanisms of corrosion, but accounting for variances in each of the independent variables. It is assumed that life of the waste tank liners is a function of the time to corrosion initiation plus the time for corrosion to propagate through the liner. The corrosion proceeds under grouted conditions, until chloride can induce depassivation of the surface, or carbonation can reduce the pH of the surrounding concrete, thereby negating the high pH “protection” of the steel liner.

The failure time of the liner is defined to be:

$$t_{failure} = t_{initiation} + \frac{Thickness(mils)}{CorrosionRate(mils/year)}$$

where:

$t_{failure}$	=	time to complete consumption of the waste tank wall by general corrosion
$t_{initiation}$	=	time to chloride induced depassivation or carbonation front
Thickness	=	initial thickness of liner (mils)
Corrosion rate	=	Dependent upon condition, i.e., chloride or carbonation

The time to failure of the liner by general corrosion can be due to:

1. General corrosion in grouted conditions,
2. Chloride induced depassivation, followed by general corrosion,
3. Carbonation induced loss of protective capacity of the concrete, or
4. A combination of 1 through 3 above.

The corrosion rate once chloride induced depassivation occurs is calculated based upon oxygen diffusion through the concrete. The corrosion rate once the carbonation front reaches the liner is assumed to be 10 mils/year (discussed in detail in Section 3.3.1 of reference document: WSRC-STI-2007-00061). Thus the system is modeled as a competition between the initiation time to chloride induced depassivation and the initiation time to carbonation induced corrosion rates. The system also addresses the issue of the carbonation front reaching the waste tank liner prior to complete failure by chloride induced corrosion.

The stochastic analysis elucidated insights into the controlling mechanisms of failure for each of the tank types. The failure times, as presented in WSRC-STI-2007-00061, are a function of the diffusion coefficients, thereby controlling the failure times. The analyses are based upon the assumption that carbonation was the most aggressive mechanism of corrosion of the waste tank liner due to the loss of the high pH environment, and that chloride may induce depassivation on the steel surface, but is still dependent upon the oxygen diffusion to drive the corrosion reaction. The relative effects of carbonation and chloride induced corrosion as a function of diffusion coefficient can be examined by comparing the median values of failure for each of the conditions. The results suggest that the carbonation rates are the critical factor in controlling the life estimation. Once the carbonation front has reached the steel liner, the liner is essentially consumed within a nominal time frame of 50 years. As such, the recommendations for failure time used in stochastic modeling for contaminant escape are critically linked to the diffusion coefficients. The diffusion coefficient for oxygen through the concrete is not as critical.

The failure distributions for a diffusion coefficient of 1.0E-6 cm^2/sec shown in Figure 4.2-26, are recommended in the analysis for use in stochastic modeling. The graphics are a statistical test against a nominal distribution (i.e., if all black points line up on the red line, it is normal), and the y-axis are years. The distributions reflect the results of the statistical corrosion analysis using SRS-specific water and soil conditions. [WSRC-STI-2007-00061] These diffusion rates are considered bounding, i.e., faster than rates that are typically reported. Typically, the diffusion rates of each are calculated and/or measured to be approximately 1.0E-8 cm^2/sec. The results indicate that the majority of the statistical observations convert to carbonation related initiation/failure when carbonation diffusion coefficients are greater than 1.0E-5 cm^2/sec.

An additional failure analysis was performed to incorporate a diffusion coefficient distribution and a more bounding corrosion rate distribution into a single waste tank life liner distribution. The additional waste tank liner failure analysis considers the passive current density along with other potential corrosion mechanisms with uncertainty included. The parameters included in the analysis take into account: a) the fact that grout may provide less corrosion protection than high quality concrete, b) the potential for galvanic corrosion with stainless steel, c) initial failures by stress corrosion cracking, d) variability in the passive current density, e) potential rapid gaseous transport pathways leading to small regions with carbonation reaching the tank liner at early time periods, f) spatially variant corrosion rate at different locations on the same tank, and g) the potential for more rapid corrosion of welds. This analysis incorporated a wider range of outcomes into a single distribution, so that the possible liner failure dates and probabilities across the entire spectrum of configurations could be observed at one time. The results of this sensitivity study are shown in Table 4.2-34. [WSRC-STI-2007-00061] The liner failure distributions can be interpreted in two ways, with the specified failure probability and calculated year representing either:

- The year in which the stated percentage of waste tanks will have their liners totally fail (e.g., 25% of all the Type IV tanks will have their liners completely fail at year 90), or
- The year in which a given percentage of an individual waste tank liner fails (e.g., 25% of Tank 19's liner will fail at year 90).

The configurations are meant to represent conditions that may be present without regard to the mechanism that led to those conditions. There are a variety of mechanisms that can lead to earlier degradation times than those modeled in Configuration A (Base Case). In the closed FTF conditions, some mechanisms may be possible although not likely. The configurations should not be interpreted as representing a specific mechanism for liner degradation. The liner failure times modeled in Configurations C, D, and E are meant to encompass various mechanisms and provide information on the risk significance of earlier liner failure than that modeled in the Base Case.

This analysis showed that if differences between expected waste tank modeling configurations (Section 4.4.2) are disregarded, and all liner failure mechanisms are considered simultaneously, the liner life could be shortened. Utilizing different configurations for modeling is still preferred for the ISCM Base Case since independently moving the liner failure date forward can decrease the peak dose within 20,000 years. Early liner failure tends to allow the closure cap to reduce infiltration into the waste tank during release of radionuclides that are not significantly affected by either the waste release solubility limits and/or concrete/soil retardation (e.g., with low soil/concrete K_d values). The early liner failure can, therefore spread the releases out over a longer time period.

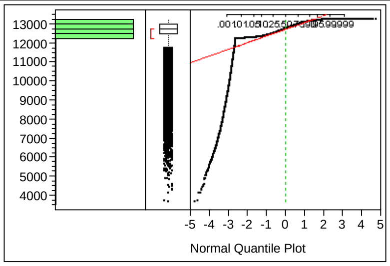
Table 4.2-34: Comprehensive Sensitivity Analysis of Carbon Steel Liner

Tank Type	Years Following FTF Tank Closure		
	25% Failure Probability	50% Failure Probability	75% Failure Probability
Type I	1,925	7,630	14,679
Type III/IIIA	3,397	8,272	15,289
Type IV	90	2,010	8,104

[WSRC-STI-2007-00061]

Figure 4.2-26: Carbon Steel Waste Tank Life Estimates (Years)

Type I Tank Failure Distribution



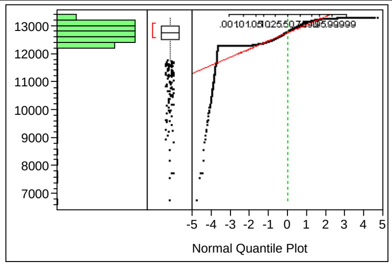
Quantiles

100.0%	maximum	13250
99.5%		13245
97.5%		13225
90.0%		13149
75.0%	quartile	12999
50.0%	median	12747
25.0%	quartile	12496
10.0%		12346
2.5%		12270
0.5%		12250
0.0%	minimum	3717

Moments

Mean	12737.745
Std Dev	352.92285
Std Err Mean	0.3529229
upper 95% Mean	12738.437
lower 95% Mean	12737.053
N	1000000

Type III Tank Failure Distribution



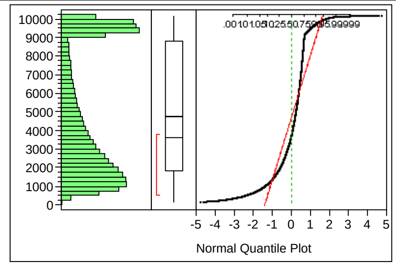
Quantiles

100.0%	maximum	13250
99.5%		13245
97.5%		13225
90.0%		13150
75.0%	quartile	13000
50.0%	median	12751
25.0%	quartile	12500
10.0%		12351
2.5%		12275
0.5%		12255
0.0%	minimum	6789

Moments

Mean	12749.991
Std Dev	289.40127
Std Err Mean	0.2894013
upper 95% Mean	12750.558
lower 95% Mean	12749.424
N	1000000

Type IV Tank Failure Distribution



Quantiles

100.0%	maximum	10125
99.5%		10102
97.5%		10012
90.0%		9693
75.0%	quartile	8819
50.0%	median	3638
25.0%	quartile	1805
10.0%		1071
2.5%		655
0.5%		444
0.0%	minimum	152

Moments

Mean	4758.5687
Std Dev	3324.095
Std Err Mean	3.324095
upper 95% Mean	4765.0838
lower 95% Mean	4752.0536
N	1000000

[WSRC-STI-2007-00061]

Table 4.2-35 presents the deterministic (i.e., single value) and probabilistic (i.e., distribution) values that are used to determine liner failure during modeling. The deterministic values utilize the median values from the stochastic analysis. The results corresponding to the reasonably bounding diffusion rates (1.0E-6 cm^2/sec) were utilized for baseline modeling and for other modeling cases where there were no fast flow paths through the cementitious materials. The results corresponding to the maximum evaluated diffusion rates (1.0E-4 cm^2/sec) were utilized for fast flow case modeling and for the rising aquifer modeling case, where the loss of reducing capability for the cementitious materials might be expected to occur sooner.

Table 4.2-35: Summary of Carbon Steel Life Waste Tank Estimates for Various Tank Types

Tank Type	Applicable Conditions (a)	Condition	Liner Failure Year for Modeling	
			Deterministic (b)	Probabilistic
Type I	A, B, F	Grouted Liner, Diffusion Coefficient E-6	12,747	Figure 4.2-26
	C, D, E	Grouted Liner Diffusion Coefficient E-4	1,140	Table 32 (c)
Type III/IIIA	A, B, F	Grouted Liner Diffusion Coefficient E-6	12,751	Figure 4.2-26
	C, D, E	Grouted Liner Diffusion Coefficient E-4	2077	Table 35 (c)
Type IV	A, B, F	Grouted Liner Diffusion Coefficient E-6	3638	Figure 4.2-26
	C, D, E	Grouted Liner Diffusion Coefficient E-4	75	Table 38 (c)

(a) Conditions are from Table 4.4-1.
(b) Median value from WSRC-STI-2007-00061, results tables.
(c) Tables from WSRC-STI-2007-00061.

Prior to failure, steel is assumed to be completely impermeable with respect to both advection and diffusion. After failure, steel is assumed to be absent, or otherwise not a hindrance to advection and diffusion (i.e., retardation due to the presence of corrosion products is not included in the model).

The failure year associated with Table 4.2-35 median values was used to represent failure, which as discussed previously, was modeled as the date from which the steel liner is absent or otherwise not a hindrance to advection and diffusion. The conceptual model is a reasonable simplification, utilizing a "simultaneous" liner failure model which assumes the entire liner fails in a given year. The simultaneous liner failure model was used instead of using a patch model, which would add percentages of each waste tank failing each year (i.e., leak sites in the liner appearing at different waste tank locations, percent of through wall leakage increasing, and the waste tank gradually failing over time). Though not an exact simulation of the expected liner failure mechanism, the conceptual model liner failure approach is reasonable for the following reasons:

- The CZ of concern is located essentially across the waste tank bottoms, making failure of most tank liner sections unimportant, since they would not result in flow through or contaminant release from the CZ.

- Modeling the entire liner to fail concurrently would tend to simultaneously maximize the flow path into and away from the CZ, which would in turn tend to maximize peak doses. Allowing the entire liner to fail early or allowing small flow paths through the CZ as the patch model approach would simulate, can tend to decrease the resulting peak doses (as detailed in the Section 5.6.7 comprehensive sensitivity analysis discussion).
- Though not addressed independently in the carbon steel failure analysis, in addition to the primary liner, there is a full secondary steel liner for the Type III/IIIA tanks, and a five foot high secondary liner near the CZ for the Type I tanks. In the analysis, these secondary liners are assumed to fail at the same time as the primary steel liner. If the patch model were used, failure of a single patch near the CZ might not result in contaminant release if the nearby secondary liner patches were still intact.

Stainless Steel

Predictions for failure of the stainless steel transfer line core piping are based on the results of a recent study specific to FTF closure. [WSRC-STI-2007-00460] These estimates considered general and localized corrosion mechanisms of the stainless steel exposed to SRS soil conditions for the stainless steel core transfer lines in FTF. Section 3.2.2.1 describes the different types of transfer lines used in the FTF. The vast majority of the piping is 304L stainless steel either encased in concrete, inside a carbon steel jacket, or surrounded by a cement-asbestos jacket. The core pipe has a diameter ranging from 1 inch to 3 inches with minimum wall thicknesses from 0.116 inch to 0.189 inch.

Two conditions were analyzed in WSRC-STI-2007-00460 – general corrosion and pitting penetration. Table 4.2-36 presents the results of the study for these two conditions in soil for various stainless steel wall thicknesses. Pitting corrosion was found to be the controlling mechanism for the degradation of the stainless steel transfer line core piping and its consequent ability to maintain confinement of contaminants. It is assumed that if 75% of the transfer line is intact, the line is capable of providing this confinement function, i.e., once 25% of the line wall has been penetrated, the lines are considered incapable of confining contaminants.

Table 4.2-36: Corrosion Induced Failure Times for Stainless Steel Transfer Lines

SRS Soil Conditions	Years Following FTF Tank Closure		
	3 inch diameter (0.189 inch minimum wall thickness)	2 inch diameter (0.135 inch minimum wall thickness)	1 inch diameter (0.116 inch minimum wall thickness)
Failure: steel consumption	4,725	3,375	2,900
Failure: 25% pitting penetration	532	515	510
First pit penetration	189	135	116

[WSRC-STI-2007-00460]

The results of this study are incorporated into the ISCM Base Case by assuming that the applicable ancillary equipment containment (e.g., pump tank, evaporator pot, and transfer line core pipe) fails and releases the associated inventory into the surrounding soil at the time of 25% pitting penetration for in-soil 0.116 inch thick stainless steel (i.e., year 510). This modeling simplification was considered reasonable for all ancillary equipment containment because in actuality the ancillary equipment containments will not be directly in contact with soil (the pump tanks and evaporator pots are in concrete cells that will be filled with grout and the transfer lines are typically contained within a secondary jacket) and only an insignificant quantity of the FTF transfer lines are carbon steel vs. stainless steel (out of over 45,000 linear feet of pipe there are only three carbon steel lines with a total length of 145 feet). This simplification was important for transfer line modeling since the transfer line inventory was not modeled as point sources; rather the transfer line inventory was spread throughout the entire FTF modeling area, making differing modeling techniques difficult.

For the probabilistic FTF analysis, each piece of ancillary equipment (with the transfer lines being treated as a collective inventory) was assumed to fail independently with the failure time occurring between the time of first pit penetration (116 years) and 100% pitting penetration (approximately 2,900 years). The most probable time of ancillary equipment failure in the probabilistic FTF analysis was assumed to be the time of 25% pitting penetration (510 years).

4.2.3.2.6 Saturated Zone Hydraulic Properties

Within the GSAD, soils with a saturated hydraulic conductivity greater than 1.0E-07 cm/sec are defined as sandy and those with a saturated hydraulic conductivity less than 1.0E-07 cm/sec are defined as clay for the purpose of defining transport properties (i.e., K_d and D_e). [WSRC-STI-2006-00198] For consistency with the vadose zone soils, the saturated zone soils within the GSA model that are defined as sandy are assigned the effective diffusion coefficient of the lower vadose zone (i.e., 5.3E-06 cm^2/sec) and those defined as clay are assigned that of the vadose zone clay (i.e., 4.0E-06 cm^2/sec).

Table 4.2-37 provides a summary of the saturated zone soils hydraulic properties (as represented by the vadose zone soil properties) and the model input used to represent these values. As indicated in Table 4.2-37, the properties of the Lower Vadose Zone is representative of sandy soil and the Saturated Zone soil is representative of both sandy soil and clayey soil (dependent on location). Thus, the K_d values used for transport of contaminants through the Lower Vadose Zone and the sandy soil regions of the Saturated Zone are assigned the K_d values for sandy soil that are presented in Table 4.2-29 for Vadose Zone Soil. For those regions within the Saturated Zone that are representative of clayey soil, the K_d values used for transport of contaminants through these regions are assigned the K_d values for clayey soil that are presented in Table 4.2-29 for Backfill Soil.

Table 4.2-37: Lower Vadose Zone and Effective Saturated Zone Soil Properties

Actual/Model	Porosity (%)	Dry Bulk Density (g/cm^3)	Particle Density (g/cm^3)	Saturated Effective Diffusion Coefficient (cm^2/sec)
Lower Vadose Zone	39 (total)	1.62	2.66	5.3E-06
Saturated Zone Soil (Effective Properties for Modeling Purposes)	25 (effective)	1.04 (effective)	1.39 (effective)	Sandy: 5.3E-06 Clay: 4.0E-06

[WSRC-STI-2006-00198, Section 5.6.1]

4.2.4 Exposure Pathways and Scenarios

In order to calculate receptor doses, MOP and intruder exposure pathways were defined. The primary mechanism for transport of radionuclides from the FTF is expected to be leaching to the groundwater and subsequent human consumption. Tables 4.2-38 and 4.2-39 also indicate whether quantified dose calculations are required for the individual pathways.

Table 4.2-38: Crosswalk of Potential FTF Stabilized Contaminant Exposure Pathways for MOP Receptors

Primary Stabilized Contaminant Source	Stabilized Contaminant Release Mechanism from Soil	Primary Pathway	Secondary Pathway	Tertiary Pathway	Exposure Route	MOP @well	MOP @Stream
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Drinking Water	N/A	Ingestion	N/A	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Showering	N/A	Dermal	N/A	O
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Showering	N/A	Inhalation	N/A	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Showering	N/A	Ingestion (accidental)	N/A	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Swimming	N/A	Inhalation	X	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Swimming	N/A	Dermal	O	O
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Swimming	N/A	Ingestion (accidental)	X	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Swimming, Fishing	Direct Rad Emissions	External Exposure	X	X

Table 4.2-38: Crosswalk of Potential FTF Stabilized Contaminant Exposure Pathways for MOP Receptors (Continued)

Primary Stabilized Contaminant Source	Stabilized Contaminant Release Mechanism from Soil	Primary Pathway	Secondary Pathway	Tertiary Pathway	Exposure Route	MOP @well	MOP @Stream
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Fish	N/A	Ingestion	X	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Shellfish	N/A	Ingestion	O	O
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water to Livestock	Livestock	Meat	Ingestion	N/A	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water to Livestock	Livestock	Milk	Ingestion	N/A	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream Water Irrigation	Garden Vegetables	N/A	Ingestion	N/A	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream Water Irrigation	Garden Fodder	Livestock – Meat	Ingestion	N/A	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream Water Irrigation	Garden Fodder	Livestock – Milk	Ingestion	N/A	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream Water Irrigation	Fugitive Dust Generation during Irrigation	Ambient Air (particulates)	Inhalation	N/A	X

Table 4.2-38: Crosswalk of Potential FTF Stabilized Contaminant Exposure Pathways for MOP Receptors (Continued)

Primary Stabilized Contaminant Source	Stabilized Contaminant Release Mechanism from Soil	Primary Pathway	Secondary Pathway	Tertiary Pathway	Exposure Route	MOP @well	MOP @Stream
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream Water Irrigation	Ambient Air (vapors) from Irrigation	N/A	Inhalation	N/A	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream Water Irrigation	Direct Soil Contact	N/A	Ingestion	N/A	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream Water Irrigation	Direct Rad Emissions	N/A	External Exposure	N/A	X
Waste Tank & Ancillary Equipment	Volatilization	Ambient Air (vapors)	N/A	N/A	Inhalation	X	X
Waste Tank & Ancillary Equipment	Volatilization	Ambient Air (vapors)	Plume Rad Exposure	N/A	External Exposure	X	X
Waste Tank & Ancillary Equipment	Volatilization	Ambient Air (vapors)	Livestock	Meat	Ingestion	X	X
Waste Tank & Ancillary Equipment	Volatilization	Ambient Air (vapors)	Livestock	Milk	Ingestion	X	X
Waste Tank & Ancillary Equipment	Volatilization	Ambient Air (vapors)	Garden Vegetables	N/A	Ingestion	X	X

Table 4.2-38: Crosswalk of Potential FTF Stabilized Contaminant Exposure Pathways for MOP Receptors (Continued)

Primary Stabilized Contaminant Source	Stabilized Contaminant Release Mechanism from Soil	Primary Pathway	Secondary Pathway	Tertiary Pathway	Exposure Route	MOP @well	MOP @Stream
Waste Tank & Ancillary Equipment	Volatilization	Ambient Air (vapors)	Garden Fodder	Livestock - Meat	Ingestion	X	X
Waste Tank & Ancillary Equipment	Volatilization	Ambient Air (vapors)	Garden Fodder	Livestock - Milk	Ingestion	X	X
Waste Tank & Ancillary Equipment	Well	Well Water	Drinking Water	N/A	Ingestion	X	N/A
Waste Tank & Ancillary Equipment	Well	Well Water	Showering	N/A	Dermal	O	N/A
Waste Tank & Ancillary Equipment	Well	Well Water	Showering	N/A	Inhalation	X	N/A
Waste Tank & Ancillary Equipment	Well	Well Water	Showering	N/A	Ingestion (accidental)	X	N/A
Waste Tank & Ancillary Equipment	Well	Well Water	Livestock	N/A	Ingestion	X	N/A
Waste Tank & Ancillary Equipment	Well	Well Water	Milk	N/A	Ingestion	X	N/A

Table 4.2-38: Crosswalk of Potential FTF Stabilized Contaminant Exposure Pathways for MOP Receptors (Continued)

Primary Stabilized Contaminant Source	Stabilized Contaminant Release Mechanism from Soil	Primary Pathway	Secondary Pathway	Tertiary Pathway	Exposure Route	MOP @well	MOP @Stream
Waste Tank & Ancillary Equipment	Well	Well Water Irrigation	Garden Vegetables	N/A	Ingestion	X	N/A
Waste Tank & Ancillary Equipment	Well	Well Water Irrigation	Garden Fodder	Livestock - Meat	Ingestion	X	N/A
Waste Tank & Ancillary Equipment	Well	Well Water Irrigation	Garden Fodder	Livestock - Milk	Ingestion	X	N/A
Waste Tank & Ancillary Equipment	Well	Well Water Irrigation	Fugitive Dust Generation during Irrigation	Ambient Air (particulates)	Inhalation	X	N/A
Waste Tank & Ancillary Equipment	Well	Well Water Irrigation	Ambient Air (vapors) from Irrigation	N/A	Inhalation	X	N/A
Waste Tank & Ancillary Equipment	Well	Well Water Irrigation	Direct Soil Contact	N/A	Ingestion	X	N/A
Waste Tank & Ancillary Equipment	Well	Well Water Irrigation	Direct Soil Contact	Surface Soil	Dermal	O	N/A
Waste Tank & Ancillary Equipment	Well	Well Water Irrigation	Direct Rad Emissions	N/A	External Exposure	X	N/A

X = addressed quantitatively, O = addressed qualitatively, N/A = not applicable

Table 4.2-39: Crosswalk of Potential FTF Waste Exposure Pathways for Intruder Receptors

Primary Stabilized Contaminant Source	Stabilized Contaminant Release Mechanism from Soil	Primary Pathway	Secondary Pathway	Tertiary Pathway	Exposure Route	Acute Intruder	Chronic Intruder
Ancillary Equipment	Drill Cuttings	Fugitive Dust Generation during drilling	Ambient Air (particulates)	N/A	Inhalation	X	N/A
Ancillary Equipment	Drill Cuttings	Biotic Uptake	Garden Vegetables	N/A	Ingestion	N/A	X
Ancillary Equipment	Drill Cuttings	Biotic Uptake	Garden Fodder	Livestock - Meat	Ingestion	N/A	X
Ancillary Equipment	Drill Cuttings	Biotic Uptake	Garden Fodder	Livestock - Milk	Ingestion	N/A	X
Ancillary Equipment	Drill Cuttings	Drill Cuttings dropped on surface	Direct Soil Contact	N/A	Ingestion	X	X
Ancillary Equipment	Drill Cuttings	Drill Cuttings dropped on surface	Direct Soil Contact	N/A	Dermal	O	O
Ancillary Equipment	Drill Cuttings	Drill Cuttings dropped on surface	Direct Rad Emissions	N/A	External Exposure	X	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Drinking Water	N/A	Ingestion	N/A	N/A
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Showering	N/A	Dermal	N/A	N/A
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Showering	N/A	Inhalation	N/A	N/A

Table 4.2-39: Crosswalk of Potential FTF Waste Exposure Pathways for Intruder Receptors (Continued)

Primary Stabilized Contaminant Source	Stabilized Contaminant Release Mechanism from Soil	Primary Pathway	Secondary Pathway	Tertiary Pathway	Exposure Route	Acute Intruder	Chronic Intruder
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Showering	N/A	Ingestion (accidental)	N/A	N/A
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Swimming	N/A	Inhalation	N/A	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Swimming	N/A	Dermal	N/A	O
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Swimming	N/A	Ingestion (accidental)	N/A	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Swimming, Fishing	Direct Rad Emissions	External Exposure	N/A	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Fish	N/A	Ingestion	N/A	X
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water	Shellfish	N/A	Ingestion	N/A	O
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water to Livestock	Livestock	Meat	Ingestion	N/A	N/A
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream water to Livestock	Livestock	Milk	Ingestion	N/A	N/A

Table 4.2-39: Crosswalk of Potential FTF Waste Exposure Pathways for Intruder Receptors (Continued)

Primary Stabilized Contaminant Source	Stabilized Contaminant Release Mechanism from Soil	Primary Pathway	Secondary Pathway	Tertiary Pathway	Exposure Route	Acute Intruder	Chronic Intruder
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream Water Irrigation	Garden Vegetables	N/A	Ingestion	N/A	N/A
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream Water Irrigation	Garden Fodder	Livestock - Meat	Ingestion	N/A	N/A
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream Water Irrigation	Garden Fodder	Livestock - Milk	Ingestion	N/A	N/A
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream Water Irrigation	Fugitive Dust Generation during Irrigation	Ambient Air (particulates)	Inhalation	N/A	N/A
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream Water Irrigation	Ambient Air (vapors) from Irrigation	N/A	Inhalation	N/A	N/A
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream Water Irrigation	Direct Soil Contact	N/A	Ingestion	N/A	N/A
Waste Tank & Ancillary Equipment	Groundwater release at Stream	Stream Water Irrigation	Direct Rad Emissions	N/A	External Exposure	N/A	X
Waste Tank & Ancillary Equipment	Volatilization	Ambient Air (vapors)	N/A	N/A	Inhalation	N/A	X
Waste Tank & Ancillary Equipment	Volatilization	Ambient Air (vapors)	Plume Rad Exposure	N/A	External Exposure	N/A	X

Table 4.2-39: Crosswalk of Potential FTF Waste Exposure Pathways for Intruder Receptors (Continued)

Primary Stabilized Contaminant Source	Stabilized Contaminant Release Mechanism from Soil	Primary Pathway	Secondary Pathway	Tertiary Pathway	Exposure Route	Acute Intruder	Chronic Intruder
Waste Tank & Ancillary Equipment	Volatilization	Ambient Air (vapors)	Livestock	Meat	Ingestion	N/A	O
Waste Tank & Ancillary Equipment	Volatilization	Ambient Air (vapors)	Livestock	Milk	Ingestion	N/A	O
Waste Tank & Ancillary Equipment	Volatilization	Ambient Air (vapors)	Garden Vegetables	N/A	Ingestion	N/A	O
Waste Tank & Ancillary Equipment	Volatilization	Ambient Air (vapors)	Garden Fodder	Livestock - Meat	Ingestion	N/A	O
Waste Tank & Ancillary Equipment	Volatilization	Ambient Air (vapors)	Garden Fodder	Livestock - Milk	Ingestion	N/A	O
Waste Tank & Ancillary Equipment	Well	Well Water	Drinking Water	N/A	Ingestion	N/A	X
Waste Tank & Ancillary Equipment	Well	Well Water	Showering	N/A	Dermal	N/A	O
Waste Tank & Ancillary Equipment	Well	Well Water	Showering	N/A	Inhalation	N/A	X
Waste Tank & Ancillary Equipment	Well	Well Water	Showering	N/A	Ingestion (accidental)	N/A	X

Table 4.2-39: Crosswalk of Potential FTF Waste Exposure Pathways for Intruder Receptors (Continued)

Primary Stabilized Contaminant Source	Stabilized Contaminant Release Mechanism from Soil	Primary Pathway	Secondary Pathway	Tertiary Pathway	Exposure Route	Acute Intruder	Chronic Intruder
Waste Tank & Ancillary Equipment	Well	Well Water	Livestock	N/A	Ingestion	N/A	X
Waste Tank & Ancillary Equipment	Well	Well Water	Milk	N/A	Ingestion	N/A	X
Waste Tank & Ancillary Equipment	Well	Well Water Irrigation	Garden Vegetables	N/A	Ingestion	N/A	X
Waste Tank & Ancillary Equipment	Well	Well Water Irrigation	Garden Fodder	Livestock - Meat	Ingestion	N/A	X
Waste Tank & Ancillary Equipment	Well	Well Water Irrigation	Garden Fodder	Livestock - Milk	Ingestion	N/A	X
Waste Tank & Ancillary Equipment	Well	Well Water Irrigation	Fugitive Dust Generation during Irrigation	Ambient Air (particulates)	Inhalation	N/A	X
Waste Tank & Ancillary Equipment	Well	Well Water Irrigation	Ambient Air (vapors) from Irrigation	N/A	Inhalation	N/A	X
Waste Tank & Ancillary Equipment	Well	Well Water Irrigation	Direct Soil Contact	N/A	Ingestion	N/A	X
Waste Tank & Ancillary Equipment	Well	Well Water Irrigation	Direct Soil Contact	Surface Soil	Dermal	N/A	O

Table 4.2-39: Crosswalk of Potential FTF Waste Exposure Pathways for Intruder Receptors (Continued)

Primary Stabilized Contaminant Source	Stabilized Contaminant Release Mechanism from Soil	Primary Pathway	Secondary Pathway	Tertiary Pathway	Exposure Route	Acute Intruder	Chronic Intruder
Waste Tank & Ancillary Equipment	Well	Well Water Irrigation	Direct Rad Emissions	N/A	External Exposure	N/A	X

X = addressed quantitatively, O = addressed qualitatively, N/A = not applicable

4.2.4.1 Member of the Public Exposure Pathways

The pathways for MOP release to be used in the PA analyses are presented in Table 4.2-38 and discussed below. Table 4.2-38 also indicates whether detailed dose calculations are included as part of the PA. The scenarios are not assumed to occur until after the 100-year institutional control period ends, during which no active FTF facility maintenance will be conducted. The consumption rates and bioaccumulation factors that are used in conjunction with the pathways are discussed in detail in Section 4.6.

4.2.4.1.1 Scenario with Well Water as Primary Water Source

The primary water sources for the MOP release pathways are either a well drilled into the groundwater aquifers or from a GSA stream.

In the groundwater well dose analysis, doses are calculated using water from a well for domestic purposes. The following exposure pathways involving the use of contaminated well water are assumed to occur as presented in Table 4.2-38 and Figure 4.2-27.

- Direct ingestion of well water
- Ingestion of milk and meat from livestock (e.g., dairy and beef cattle) that drink well water
- Ingestion of vegetables grown in garden soil irrigated with well water
- Ingestion of milk and meat from livestock (e.g., dairy and beef cattle) that eat fodder from pasture irrigated with well water
- Ingestion and inhalation of well water while showering

The following exposure pathways involving the use of contaminated surface water (from the applicable stream) for recreational use are assumed to occur:

- Direct irradiation during recreational activities (e.g., swimming, fishing) from stream water
- Dermal contact with stream water during recreational activities (e.g., swimming, fishing)
- Incidental ingestion and inhalation of stream water during recreational activities
- Ingestion of fish from the stream water

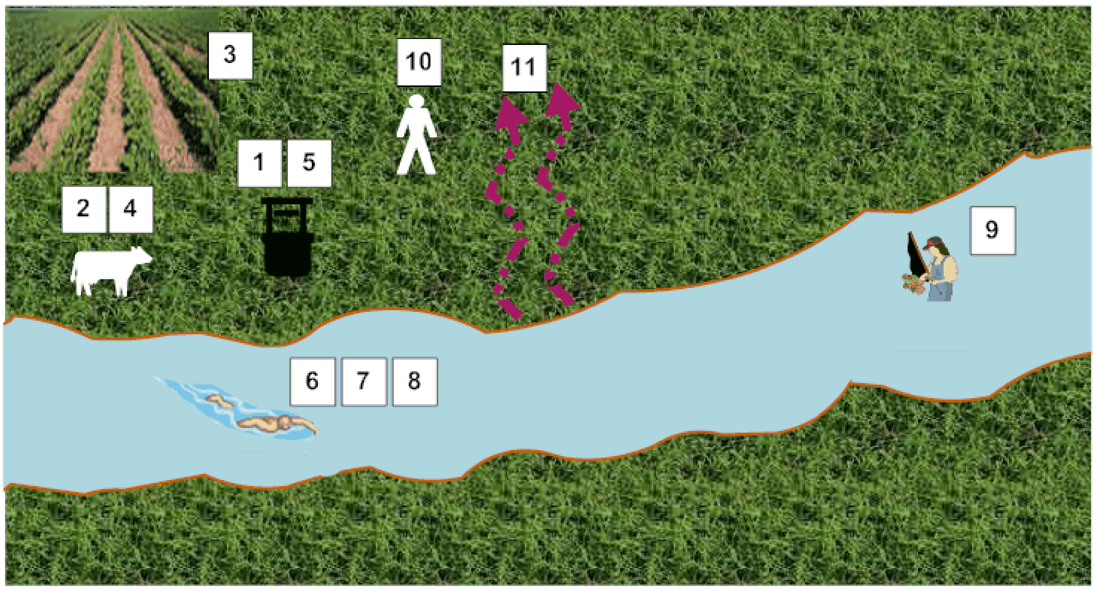
Additional exposure pathways could involve releases of radionuclides into the air from the water taken from the well (i.e., volatile radionuclides such as H-3, C-14, I-129). Exposures from the air pathway in this PA:

- Direct plume shine
- Inhalation

There are other secondary and indirect pathways that contribute relatively minor doses to a receptor when compared to direct pathways such as ingestion of milk and meat. These pathways include:

- Inhalation of well water used for irrigation
- Inhalation of dust from the soil that was irrigated with well water
- Ingestion of soil that was irrigated with well water
- Direct radiation exposure from radionuclides deposited on the soil that was irrigated with well water

Figure 4.2-27: Scenario With Well Water As Primary Water Source



SCENARIO WITH WELL WATER AS PRIMARY WATER SOURCE

1. Direct ingestion of well water
2. Ingestion of milk and meat from livestock (e.g., dairy and beef cattle) that drink well water
3. Ingestion of vegetables grown in garden soil irrigated with well water
4. Ingestion of milk and meat from livestock (e.g., dairy and beef cattle) that eat fodder from pasture irrigated with well water
5. Ingestion and inhalation of well water while showering
6. Direct irradiation during recreational activities (e.g., swimming, fishing) from stream water
7. Dermal contact with stream water during recreational activities (e.g., swimming, fishing)
8. Incidental ingestion and inhalation of stream water during recreational activities
9. Ingestion of fish from the stream water
10. Direct plume shine
11. Inhalation

4.2.4.1.2 Scenario with Stream Water as Primary Water Source

In the stream dose analyses, doses are calculated using water from the closest stream (Fourmile Branch or UTR) for domestic and recreational purposes. The following exposure pathways involving the use of surface water (from the applicable stream) are assumed to occur as presented in Table 4.2-38 and Figure 4.2-28.

- Direct ingestion of stream water
- Ingestion of milk and meat from livestock (e.g., dairy and beef cattle) that drink stream water
- Ingestion of vegetables grown in garden soil irrigated with stream water
- Ingestion of milk and meat from livestock (e.g., dairy and beef cattle) that eat fodder from pasture irrigated with stream water
- Ingestion and inhalation of stream water while showering

The following exposure pathways involving the use of contaminated surface water (from the applicable stream) for recreational use are assumed to occur:

- Direct irradiation during recreational activities (e.g., swimming, fishing) from stream water
- Dermal contact with stream water during recreational activities (e.g., swimming, fishing)
- Incidental ingestion and inhalation of stream water during recreational activities
- Ingestion of fish from the stream water

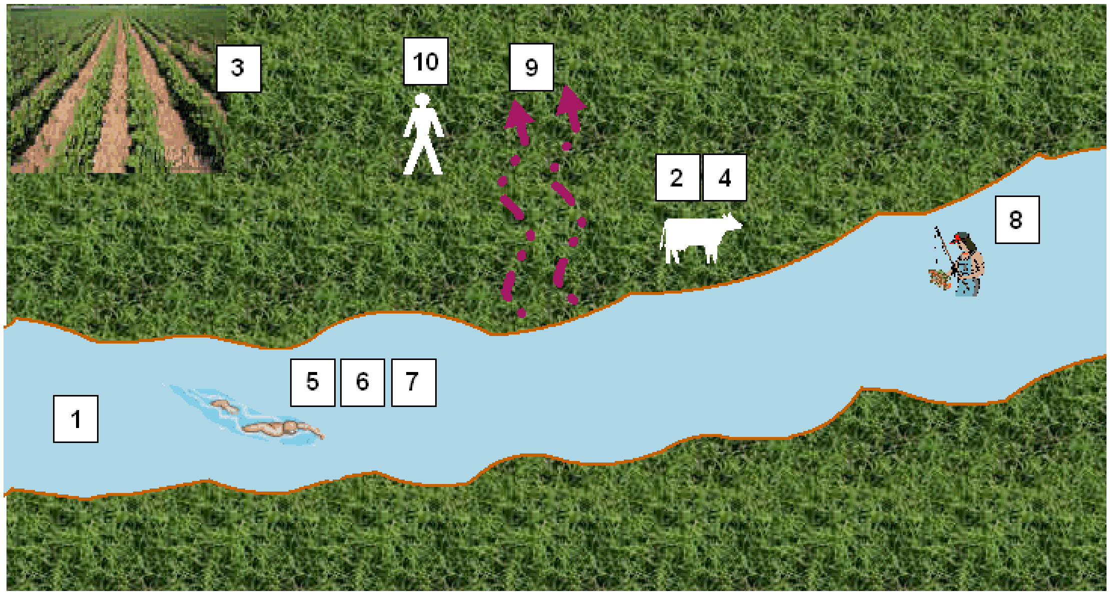
Additional exposure pathways could involve releases of radionuclides into the air from the water taken from the stream (i.e., volatile radionuclides such as H-3, C-14, I-129). Exposures from the air pathway in this PA:

- Direct plume shine
- Inhalation

There are other secondary and indirect pathways that contribute relatively minor doses to a receptor when compared to direct pathways such as ingestion of milk and meat. These pathways include:

- Inhalation of stream water used for irrigation
- Inhalation of dust from the soil that was irrigated with stream water
- Inhalation of gaseous radionuclides released from the soil that was irrigated with stream water
- Ingestion of soil that was irrigated with stream water
- Direct radiation exposure from radionuclides deposited on the soil that was irrigated with stream water

Figure 4.2-28: Dose Analysis Using Stream Water As Primary Water Source Scenario



DOSE ANALYSES USING STREAM WATER AS PRIMARY WATER SOURCE

1. Direct ingestion of water from stream
2. Ingestion of milk and meat from livestock (e.g., dairy and beef cattle) that drink stream water
3. Ingestion of vegetables grown in garden soil irrigated with stream water
4. Ingestion of milk and meat from livestock (e.g., dairy and beef cattle) that eat fodder from pasture irrigated with stream water
5. Direct irradiation during recreational activities (e.g., swimming, fishing) from stream water
6. Dermal contact with stream water during recreational activities (e.g., swimming, fishing)
7. Incidental ingestion and inhalation of stream water during recreational activities
8. Ingestion of fish from the stream water
9. Direct plume shine
10. Inhalation

4.2.4.1.2.1 Basis for Public Release Pathways

Table 4.2-38 was prepared to provide a list the FTF exposure pathways identified as candidates for detailed analysis. The list of candidates was developed based on a review of SRS PA analyses and NRC documents. [CBU-PIT-2005-00146, NUREG-0782, NUREG-0945 (Vol. 1), NUREG-1573] Those activities at SRS that could bring humans in contact with stabilized contaminants (e.g., water use, hunting, fishing, recreational activities such a swimming and boating, habitation in dwellings, other unique activities that involve water use or ground disturbance) were considered (with emphasis on local practices), to ensure that any pathways unique to SRS were taken into account. The *SRS Ecology Environmental Information Document* was used as a source of relevant environmental information and conditions at SRS. [WSRC-TR-2005-00201] For example, the *SRS Ecology Environmental Information Document* was used to identify potential wild game available on site, potential bio-intrusion candidates (flora and fauna), and the potential for the presence of fish and/or shellfish in the creeks bordering the FTF.

Those potential pathways that had quantified analysis are denoted with an “X” for the various receptors. Quantified analysis was not performed for potential pathways denoted with an “O”, based on the applicable justifications provided throughout this section. (Table 4.2-38) NUREG-1854 states that transport pathways may be excluded from PA if it can be demonstrated that either there is limited potential for radionuclides to be released into a particular pathway, or the pathway is not viable (e.g., water is not potable). Other pathways were marked as N/A due to the nature of the scenario making them impossible (e.g., a garden that receives 100% of its irrigation water from a well cannot also receive water from a stream).

4.2.4.1.2.2 Inputs and Assumptions Related to the Public Release Pathways

The following assumptions were made regarding the pathways related to the MOP resident scenario using water from a well or stream:

- The stabilized contaminants release mechanisms to the MOP are leaching of stabilized contaminants to the groundwater and volatilization of the stabilized contaminants to the surface. Well drilling is not a release mechanism, since any well drilling associated with the MOP scenarios will be outside the FTF buffer zone, and therefore will not disturb the stabilized contaminants.
- Bio-intrusion and/or erosion are not considered credible mechanisms for significant stabilized contaminant disturbance based on the depth and form of the stabilized contaminant. The stabilized contaminants will be significantly below ground, from at least 10 feet for ancillary equipment to approximately 40 feet for stabilized contaminant tank heels. The stabilized contaminant is contained within stainless steel or carbon steel equipment and will be stabilized and/or grouted as part of tank closure. No mechanism was identified that would result in stabilized contaminant disturbance and dispersal such that the dose to the MOP (outside the FTF buffer zone) would be impacted.
- In the well water as primary water source scenario, well water will be used as a primary potable water source for a residence near the well (e.g., drinking water, showering) and will be used by the resident as a primary water source for agriculture (e.g., irrigation, livestock water).

- In the MOP near a stream scenario, stream water will be used as a primary potable water source for a residence near the stream (e.g., drinking water, showering) and will be used by the resident as a primary water source for agriculture (e.g., irrigation, livestock water).
- In both MOP scenarios, the resident (near the well and/or near a stream) can use a stream for recreational activities (e.g., swimming, fishing).
- Any wild game ingested (deer, wild pigs) would merely offset ingested livestock, and would result in a lower total dose since the livestock raised near FTF would be more affected by FTF stabilized contaminants than transient wild game.
- There are two creeks (UTR and Fourmile Branch) from which ingestion of finfish with significant contamination is possible. These creeks were conservatively assumed to be a source of dietary fish, but shellfish was excluded because UTR and Fourmile Branch are not significant sources of edible shellfish and shellfish play an insignificant role in local diets in relation to other ingested contributors to dose such as livestock, milk, and vegetables (local invertebrate consumption is a total of 2 kg/year). [WSRC-TR-2005-00201, WSRC-STI-2007-00004]
- Since there is no substantive water source readily available at the well site, pathways related to water-related commercial activities were not considered. Based on the relative proximate of a large, natural water source (i.e., the Savannah River), it is not assumed that a man-made body of water would be created at the MOP resident site.
- The dose associated with dermal absorption of radionuclides is considered insignificant because, unlike some chemicals, radionuclides are generally adsorbed into the body very poorly.
- The quantities of water ingested during the relatively short activities of showering (10 min/day) and swimming (8.9 hr/year) are negligibly small and are not addressed independently. The impact of these activities is addressed by the "direct ingestion of well water" pathway (i.e., they are included in the 337 liters of water that is assumed to be ingested every year). [WSRC-STI-2007-00004]

4.2.4.2 Intruder Exposure Pathways

The stabilized contaminant materials after FTF closure will be primarily located in areas protected by significant materials (e.g., grouted waste tanks, DB cell covers and valve box shielding) which are clearly distinguishable from the surrounding soil and make drilling not a practical scenario based on regional drilling practices. Regional drilling conditions are such that a barrier such as the closure cap erosion barrier, tank top, or grout fill are situations that would cause drillers to stop operations and move drilling location. The most vulnerable location for stabilized contaminants is in a transfer line which may be near grade-level prior to closure and are of a small size (typically 3 inch diameter or less) which makes them the most credible stabilized contaminants hit during any intruder drilling operations even though the probability of hitting a transfer line is small due to the small surface area of transfer lines versus to large FTF footprint. Because 82% of the transfer line length is 3 inch diameter, and only 0.24% is 4 inch diameter and the remainder less than 3 inch diameter, the analysis is performed on 3 inch lines.

The dose pathways for an inadvertent intruder are presented in Table 4.2-39 and discussed below. Table 4.2-39 also indicates whether detailed dose calculations are required. The intruder release scenarios are not assumed to occur until after the 100-year institutional control period ends, after which no active FTF facility maintenance will be conducted.

This scenario is considered conservative because the stainless steel transfer lines maintain their integrity for several hundred years as noted in Section 4.2.3.2.5.

4.2.4.2.1 Intruder Release Scenarios

The consumption rates and bioaccumulation factors that are used in conjunction with the Table 4.2-39 proposed pathways are discussed in detail in Section 4.6.

In order to calculate the dose to an inadvertent intruder, the following intruder scenarios were considered:

- Acute Intruder-Drilling Scenario
- Acute Intruder-Construction Scenario
- Acute Intruder-Discovery Scenario
- Chronic Intruder Agricultural (Post-Drilling) Scenario
- Chronic Intruder-Resident Scenario
- Chronic Intruder-Recreational Hunting Fishing Scenario
- Bio-intrusion Scenario

4.2.4.2.2 Acute Intruder-Drilling Scenario

In this scenario, it is assumed that after the end of active institutional controls, a well is drilled into the waste disposal system. The well is assumed to be used for domestic water use and irrigation. Since no other natural resources have been identified in the FTF, no additional drilling scenarios are considered. In a drilling scenario, an Acute Intruder is assumed to be the person or persons who install the well and are exposed to drill cuttings during well installation.

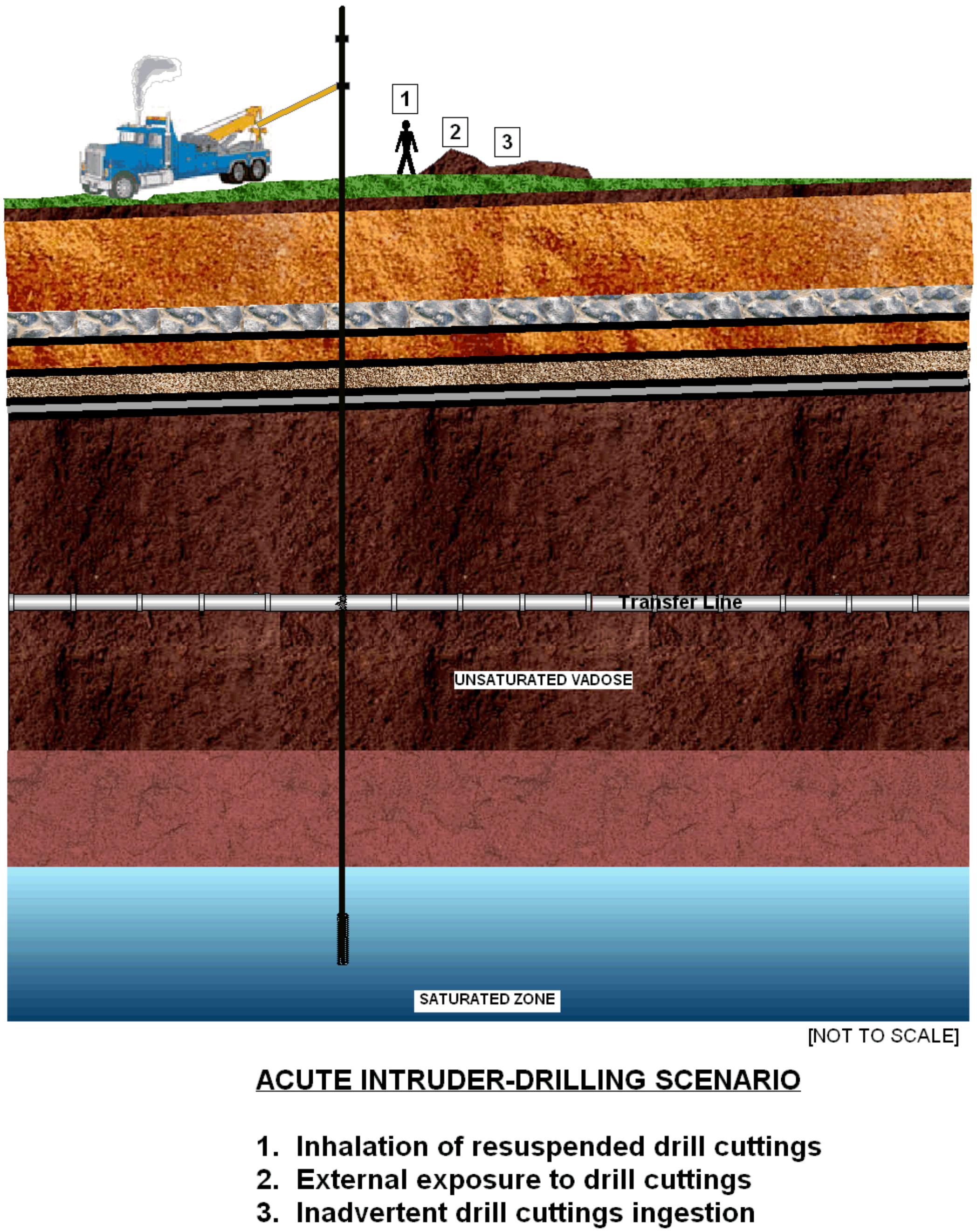
The drilling borehole is assumed to penetrate the waste disposal site. This scenario involves stabilized contaminants below the depth of typical construction excavations. The acute drilling scenario assumes that an inadvertent intruder drills a well into a transfer line, but not into a waste tank. Although the probability of hitting a transfer line within the area may be small, it is assumed that this occurs for the drilling scenario. The intruder is exposed to contaminated drill cuttings spread over the ground and contaminated airborne dust.

Exposure of a resident or farmer to drill cuttings left on the land surface after the installation of a well was considered under the intruder-resident scenario or intruder-agricultural scenarios.

The exposure pathways for this acute drilling scenario include (Figure 4.2-29):

- Inhalation of resuspended drill cuttings
- External exposure to the drill cuttings
- Inadvertent drill cuttings ingestion

Figure 4.2-29: Acute Intruder Drilling Scenario



4.2.4.2.3 Acute Intruder-Construction Scenario

In this scenario, it is assumed that after the end of active institutional controls, a construction project begins at the site with associated earthmoving activities. The intruder-construction scenario involves an inadvertent intruder who chooses to excavate or construct a building on the disposal site. The intruder is assumed to dig a basement excavation to a depth of approximately 10 feet. It is assumed that the intruder does not recognize the hazardous nature of the material excavated. During the excavation of the basement, the intruder is exposed to the exhumed stabilized contaminants by inhalation of resuspended contaminated soil and external irradiation from contaminated soil. Due to the disposal depth of the stabilized contaminants in the waste tanks and in ancillary equipment (from at least 10 feet up to approximately 40 feet below the FTF closure cap), the intruder-construction scenario is not considered applicable.

4.2.4.2.4 Acute Intruder-Discovery Scenario

The intruder-discovery scenario is conceptualized as a modification of the intruder-construction scenario. The basis for the intruder-discovery scenario is the same as the intruder-construction scenario except that the exposure time is reduced. The scenario involves the intruder excavating a basement to a depth of approximately 10 feet. The intruder is assumed to recognize that he or she is digging into very unusual soil immediately upon encountering the tank/piping system and leaves the site. Consequently, the exposure time is reduced. Similar to the intruder-construction scenario, the intruder-discovery scenario was not considered for further analysis due to the disposal depth of the stabilized contaminants in the tanks and in ancillary equipment (from at least 10 feet up to approximately 40 feet below the FTF closure cap).

4.2.4.2.5 Chronic Intruder-Agricultural (Post-Drilling) Scenario

In this scenario, it is assumed that after the end of active institutional controls, a farmer lives on, and consumes food crops grown and animals raised on the disposal area. The Chronic Intruder agriculture (i.e., post-drilling) scenario is an extension of the Acute Intruder drilling scenario. It is assumed in this scenario that an intruder lives in a building near the well drilled as part of the intruder-drilling scenario and engages in agricultural activities on the contaminated site. Excavation to the surface of the stabilized contaminants in the waste tanks was not considered credible due to its depth of more than 40 feet below the closure cap. Therefore, the intruder-agriculture scenario was retained for the ancillary equipment inventory and specifically a waste transfer line because it is less protected than a DB, valve box or PP which are shielded with thick shield covers of several feet of concrete. The soil used for agricultural purposes is assumed to be contaminated by both drill cuttings and irrigation well water.

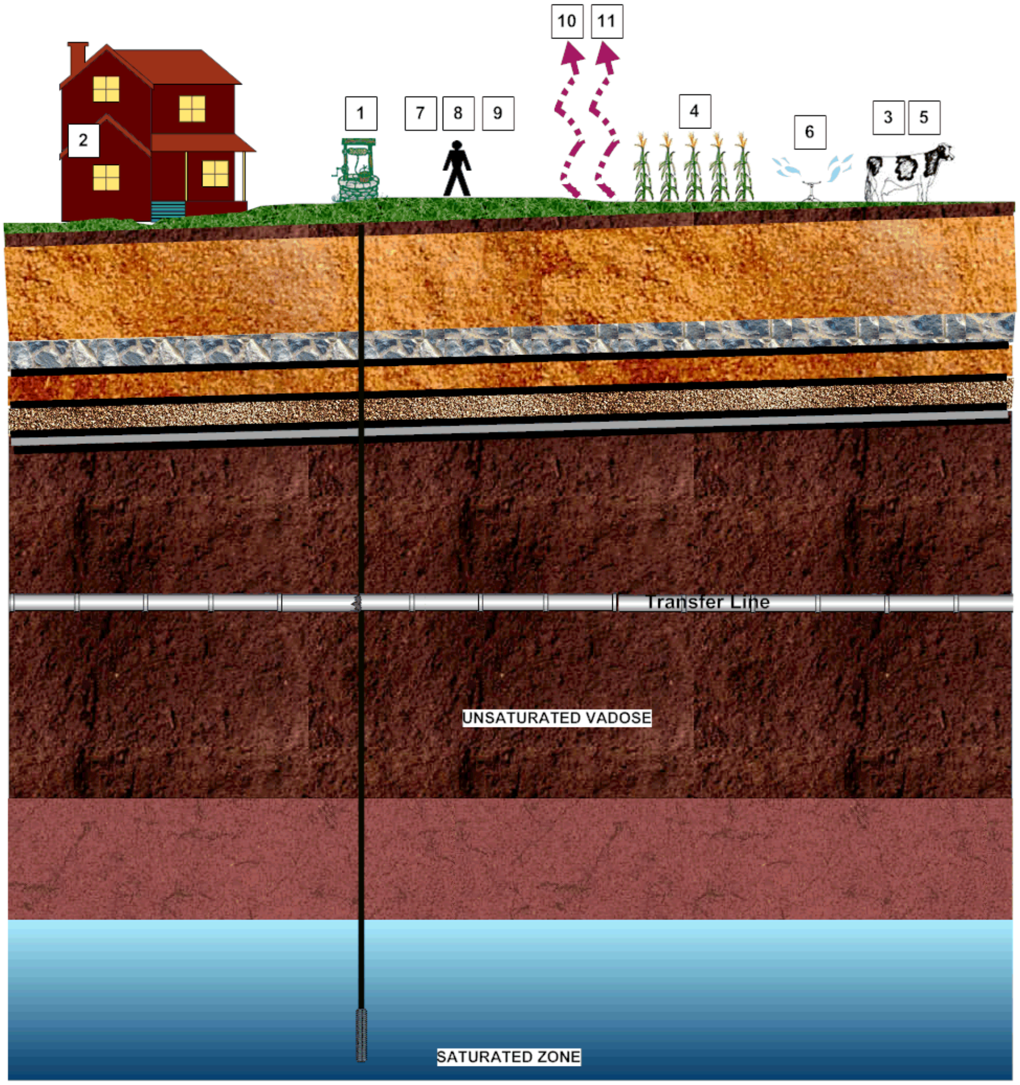
The intruder is exposed to (Figure 4.2-30):

- Direct ingestion of well water
- Ingestion and inhalation of well water while showering
- Ingestion of milk and meat from livestock (e.g., dairy and beef cattle) that drink well water
- Ingestion of vegetables grown in garden soil irrigated with well water and containing contaminated drill cuttings
- Ingestion of milk and meat from livestock (e.g., dairy and beef cattle) that eat fodder from pasture irrigated with well water
- Inhalation of well water used for irrigation
- Inhalation of dust from the soil that was irrigated with well water
- Ingestion of soil that was irrigated with well water
- Direct radiation exposure from radionuclides deposited on the soil that was irrigated with well water

The intruder may also be exposed to a release of volatile radionuclides (e.g., H-3, C-14, I-129) from the drill cuttings and contaminated well water. These pathways include:

- Direct plume shine
- Inhalation

Figure 4.2-30: Chronic Intruder Agricultural (Post-Drilling) Scenario



CHRONIC INTRUDER-AGRICULTURAL (POST-DRILLING) SCENARIO

1. Direct ingestion of well water
2. Ingestion and inhalation of well water while showering
3. Ingestion of milk and meat from livestock (e.g., dairy and beef cattle) that drink well water
4. Ingestion of vegetables grown in garden soil irrigated with well water and containing drill cuttings
5. Ingestion of milk and meat from livestock (e.g., dairy and beef cattle) that eat fodder from pasture irrigated with well water
6. Inhalation of well water used for irrigation
7. Inhalation of dust from the soil that was irrigated with well water
8. Ingestion of soil that was irrigated with well water
9. Direct radiation exposure from radionuclides deposited on the soil that was irrigated with well water
10. Direct plume shine
11. Inhalation

4.2.4.2.6 Chronic Intruder-Resident Scenario

In this scenario, it is assumed that after the end of active institutional controls, an intruder (i.e., the resident intruder) inadvertently constructs a house at, and lives on, the waste disposal area. The intruder-resident scenario involves the same pathways as the Chronic Intruder agriculture (i.e., post-drilling) scenario, with the potential for additional pathways associated with a house constructed over stabilized contaminants. The pathways uniquely associated with construction of a residence over stabilized contaminants were considered insignificant because of the depth of the stabilized contaminants under the closure cap and the shielding provided by the waste tank and ancillary equipment containment shielding. This shielding would reduce the external dose rates to very low levels. Therefore, the intruder- resident scenario will be addressed by the Chronic Intruder agriculture scenario and does not require unique analysis.

4.2.4.2.7 Chronic Intruder-Recreational Hunting/Fishing Scenario

In this scenario, a hunter/fisher is assumed to inadvertently visit the site, perhaps on a periodic basis, and consumes game and fish taken from the site. Given the significant exposure pathways the inadvertent intruder is considered to experience as part of the intruder agriculture scenario (e.g., use of well water as potable water, ingestion of livestock and vegetables raised using well water. The intruder-recreational scenario is bounded by the Chronic Intruder agriculture scenario and does not require unique analysis.

4.2.4.2.8 Bio-intrusion Scenario

The bio-intrusion scenario assumes that an intruder moves onto the site but does not excavate into the stabilized contaminants. Rather, radioactivity is brought to the surface by plants through root uptake and by burrowing animals. Bio-intrusion is not considered a credible mechanism for significant stabilized contaminant disturbance, based on the stabilized contaminant depth and form. The stabilized contaminants will be significantly below ground, from at least 10 feet for ancillary equipment to approximately 40 feet for stabilized contaminant tank heels. The stabilized contaminant is contained within closed waste tanks or stainless steel or carbon steel equipment and will be stabilized and/or grouted as part of tank closure. Of the likely burrowing animal residents at SRS, only one burrower, the Florida Harvester Ant, is expected to burrow below 2m, and then, only 5% of its burrows are expected to be that deep. [WSRC-RP-92-1360] Assuming the FTF cover reverts to pine forest in the future, the pine trees could also pose a bio-intrusion risk, with a mature pine having roots from 6 to 12 feet deep. [WSRC-TR-2003-00436] These bio-intrusion depths are not deep enough to reach the principal FTF stabilized contaminant inventory at closure (stabilized contaminant tank heels), and are unlikely to reach any ancillary equipment inventory, which in almost all cases will be more than 12 feet deep. Even if a pine tree root were to reach the ancillary equipment containment, no significant stabilized contaminant dispersal would be anticipated. The amount of contamination excavated from animal burrows or vegetative intrusion is far less than that involved in the agricultural (intruder-drilling) scenarios for drilling a domestic well into the underlying aquifers, therefore, this scenario is bounded by the intruder-drilling scenario for piping due to the concentrated source term in the piping versus any soil which could be exhumed by animals, and the bio-intrusion scenario does not require further analysis.

4.2.4.2.9 Chronic Intruder-Agricultural Scenario

Table 4.2-39 was prepared to provide a list of all the FTF exposure pathways identified as candidates for detailed analysis. The list of candidates was developed based on a review of SRS PA analyses and NRC documents. [CBU-PIT-2005-00146, NUREG-0782, NUREG-0945 (Vol. 1), NUREG-1573] Those human activities at SRS that could bring humans in contact with stabilized contaminants (e.g., water use, hunting, fishing, recreational activities such a swimming and boating, habitation in dwellings, other unique activities that involve water use or ground disturbance) were considered (with emphasis on local practices), to ensure that any pathways unique to SRS were taken into account. Those potential pathways that had quantitative analysis are denoted with an "X" for the various receptors. Quantitative analysis was not performed for potential pathways denoted with an "O", based on the applicable justifications provided throughout this section. NUREG-1854 states that transport pathways may be excluded from performance analysis if it can be demonstrated that either there is limited potential for radionuclides to be released into a particular pathway, or the pathway is not viable (e.g., water is not potable). Other pathways were excluded due to the nature of the scenario making them impossible (e.g., a garden that receives 100% of its irrigation water from a well can't also receive water from a stream).

4.2.4.2.9.1 Inputs and Assumptions Related to the Intruder Release Pathways

The following assumptions were made regarding the pathways related to the intruder scenario using water from a well or stream.

- The stabilized contaminant release mechanisms to the intruder are well drilling into ancillary equipment, leaching of stabilized contaminants to the groundwater, and volatilization of the stabilized contaminants to the surface. Well drilling into a waste tank is not considered a credible release mechanism, since local practices would cause a well driller to choose a new location before the stabilized contaminant waste tank inventory was disturbed. The local well drillers expect to reach good drinking water aquifers at no more than 150 to 200 feet while drilling through sandy soil (no drilling through high-strength geologic materials). A driller would not expend the effort and equipment damage required to drill through the concrete/grout/steel covering the stabilized contaminant waste tank inventory. Even if the driller did not realize that he had struck a waste tank, and simply thought he had merely hit a layer of high-strength geologic materials, local experience would tell him that moving the drill site a short distance would avoid the impediment. Similarly, well drilling through a transfer line is also unlikely, especially while the line maintains some structural integrity. Nevertheless, as a bounding case for the purposes of this exercise, it has been assumed that a well driller could drill through an intact transfer line immediately after the end of institutional control.

- Well water will be used by the inadvertent intruder as a primary potable water source (e.g., drinking water, showering) and is used as a primary water source for agriculture (e.g., irrigation, livestock water).
- The inadvertent intruder can use a nearby stream for recreational activities (e.g., swimming, fishing).
- Any wild game ingested (deer, wild pigs) would merely offset ingested livestock, and would result in a lower total dose since the livestock raised near FTF would be more affected by FTF stabilized contaminants than transient wild game.
- There are two creeks (UTR and Fourmile Branch) from which ingestion of marine life with significant contamination is possible. These creeks were conservatively assumed to be a source of dietary fish, but shellfish were excluded because UTR and Fourmile Branch are not significant sources of edible shellfish and shellfish play an insignificant role in local diets in relation to other ingested contributors to dose such as livestock, milk, and vegetables. [WSRC-TR-2005-00201, WSRC-STI-2007-00004]
- Since there is no substantive water source readily available at the well site, pathways related to water-related commercial activities were not considered. Based on the relative proximate of a large, natural water source (i.e., the Savannah River), it is not assumed that a man-made body of water would be created at the MOP resident site.
- The showering inhalation and fish ingestion doses were not explicitly included in the intruder dose. These doses were calculated as part of the MOP pathways and their impact on the intruder peak dose is insignificant in comparison to the drill cutting contribution.
- The quantities of water ingested during the relatively short activities of showering (10 min/day) and swimming (8.9 hr/year) are negligibly small and are not be addressed independently. The impact of these activities is addressed by the “direct ingestion of well water” pathway (i.e., they are included in the 337 liters of water that is assumed to be ingested every year). [WSRC-STI-2007-00004]
- The dose associated with dermal absorption of radionuclides is insignificant because, unlike some chemicals, radionuclides are generally adsorbed into the body very poorly. Tritium is an exception to this rule, but tritium is found in such relatively small concentrations in the groundwater that it would not be a significant contributor to dose.

4.3 Modeling Codes

In the process of completing the PA for the FTF, a variety of modeling codes were utilized to perform various media transport, radiological dose and risk assessment calculations for compliance with 10 CFR 61 performance objectives and risk evaluations supporting CERCLA. [*www.epa.gov/superfund/policy/cercla.htm*] The purpose of this section is to present the modeling codes used and describe the modeling code integration. A brief description is provided for each modeling code, which includes the function of the code, available code manuals or technical documents for the applicable code revision, reasons for selection of the particular code and available QA documentation for the code. The results of the FTF PA will be used during the CERCLA closure process and complement any additional evaluations necessary using existing ACP modeling methods for residual materials other than those in the waste tanks and ancillary equipment.

4.3.1 Modeling Codes Used

The HELP model is a quasi-two-dimensional water balance model designed to conduct landfill water balance analyses. The HELP model was used to generate water infiltration estimates through the final closure cap for use in PA calculations at SRS. HELP model infiltration estimates form the input to subsequent flow and contaminant transport models.

4.3.1.1 Hydrologic Evaluation of Landfill Performance (HELP) Model

The HELP model requires the input of weather, soil and design data. It provides estimates of runoff, evapotranspiration, lateral drainage, vertical percolation (i.e., infiltration), hydraulic head and water storage for the evaluation of various landfill designs. United States Army Corps of Engineers (USACE) personnel at the Waterways Experiment Station (WES) in Vicksburg, Mississippi developed the HELP model, under an interagency agreement with the EPA. [EPA-600-R-94-168b] As such, the HELP model is an EPA sanctioned model for conducting landfill water balance analyses. HELP model version 3.07, issued on November 1, 1997, is the latest version of the model and was the version used for the FTF PA calculations. The HELP model was used at SRS during the development of calculations supporting the Salt Processing Facility (SPF) and is the code used by ACP during CERCLA closure evaluations. [*www.epa.gov/superfund/policy/cercla.htm*, CBU-PIT-2005-00146] While other codes for closure cap infiltration calculations exist, the HELP model is a proven code that is appropriate for use at SRS. It is public domain software available from the WES website at: *www.wes.army.mil/el/elmodels/helpinfo.html*, EPA and the USACE have provided the following documentation associated with the HELP model:

- A user's guide which provides instructions for HELP model use. [EPA-600-R-94-168a]

Engineering documentation provides information on the source language used to write the code, the hardware necessary to operate the code, data generation methodologies available for use, and the methods of solution. [EPA-600-R-94-168b]

HELP verification test reports exist which compare the model's drainage layer estimates to the results of large-scale physical models and comparing the model's water balance estimates to "field data from a total of 20 landfill cells at seven sites in the United States". [EPA-600-2-87-049, EPA-600-2-87-050]

The *Closure Cap Concept and Infiltration Estimates* report discusses eight water balance and infiltration studies that have been conducted in and around SRS by various organizations, including SRNL, USGS, State University of New York at Brockport, Pennsylvania State University, University of Arizona, and the Desert Research Institute. Findings from eight such studies are reported in the closure cap report. The summary shows that evapotranspiration dominates the water balance distribution of precipitation at SRS. [WSRC-STI-2007-00184_OUO – Sections 3.2, 3.2.1, 3.2.2]

In summary, additional comparison studies to support HELP appropriateness in humid environments are not needed since the limitations of the software result in conservative infiltration estimates. An action to update the HELP code with more sophisticated software to further enhance PA modeling has been placed on the open items log in WSRC-STI-2007-00184_OUO.

SQAP for the HELP model version used for the FTF PA calculations is documented within Q-SQA-A-00005.

4.3.1.2 PORFLOW

PORFLOW is a commercial Computational Fluid Dynamics (CFD) tool developed by Analytic & Computational Research, Inc., website available at: *www.acricfd.com/software/porflow/*, PORFLOW numerically solves problems involving transient or steady state fluid flow, heat, salinity and mass transport in multi-phase, variably saturated, porous or fractured media with dynamic phase change. PORFLOW was used in FTF PA modeling to calculate fluid flow and contaminant transport in the vadose and saturated zones. PORFLOW transport results were utilized by subsequent modeling codes to calculate radiological doses and perform human health and ecological risk evaluations. PORFLOW flow results were also utilized by GoldSim to conduct contaminant transport via another computational tool. Another use of PORFLOW was to calculate vapor phase radionuclide diffusion to the ground surface from stabilized contaminants material for use in air transport calculations. Figures 4.3-1 and 4.3-2 illustrate the integration of PORFLOW in the modeling efforts and provides additional detail of the integration and steps of PORFLOW calculations for fluid flow and contaminant transport.

PORFLOW options include porous/fractured media may be anisotropic and heterogeneous, arbitrary sources (injection or pumping wells) may be present and, chemical reactions or radioactive decay may take place. PORFLOW accommodates alternate fluid and media property relations and complex and arbitrary boundary conditions. The geometry may be 2D or 3D, Cartesian or Cylindrical and the mesh may be structured or unstructured, giving maximum flexibility to the user. PORFLOW version 6.10.3 was used for PA porous medium flow and transport analyses because its capabilities met program needs, core software functions have been verified through vendor and QA testing, and SRS personnel are experienced in applying PORFLOW in PA analyses. PORFLOW was used at SRS for calculations supporting the SPF and used by Idaho National Engineering and Environmental Laboratory (INEEL) for analyses supporting closure of the Tank Farm Facility. [CBU-PIT-2005-00146, DOE-ID-10966] For the FTF PA, PORFLOW is an appropriate code because it can accommodate calculations in both the saturated and unsaturated zones and more importantly has the ability to simulate first-order decay and progeny in-growth associated with radionuclide chains, which is necessary for calculations involving radioactive stabilized contaminant disposal.

Analytic & Computational Research, Inc. has provided the following documentation associated with PORFLOW:

- A user's guide (ACRi-2002) which provides instructions for PORFLOW use.
- Validation data for PORFLOW (ACRi-1994).

SQAP for the PORFLOW version used for the FTF PA calculations is covered by WSRC-SQP-A-00028 and G-TR-G-00002.

Design check of the data used for the performance of the PORFLOW modeling is documented in SRT-ESB-2007-00046 and all technical findings have been satisfactorily resolved. The scope of the design check includes:

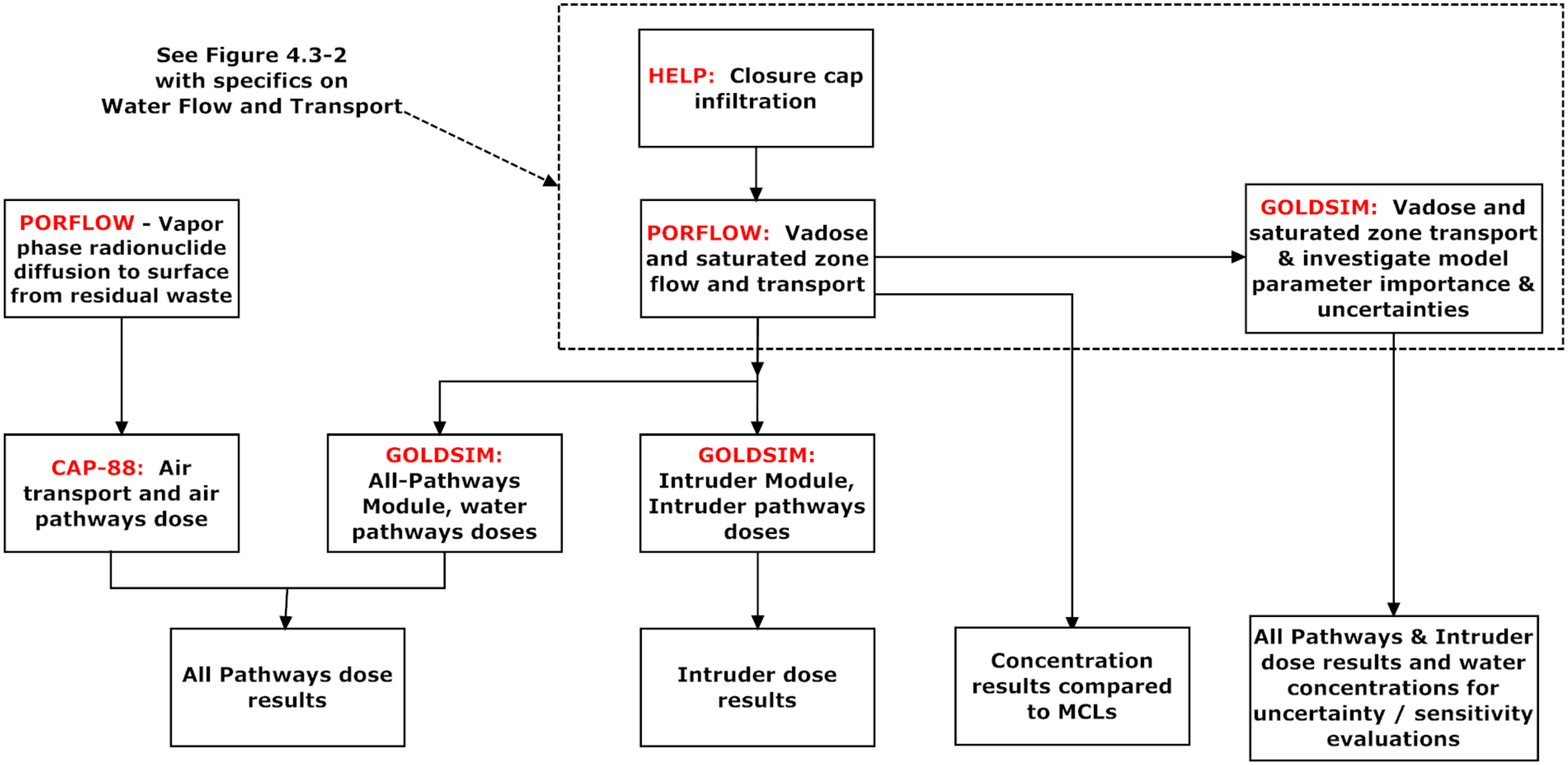
- Vadose zone flow input,
- Vadose zone transport input, and
- Aquifer transport input.

4.3.1.3 GoldSim

GoldSim is a commercial program developed by GoldSim Technology Group LLC (GTG) that is a user-friendly and highly graphical, Windows-based program for carrying out dynamic, probabilistic simulations of complex systems to support management and decision-making in engineering, science and business.

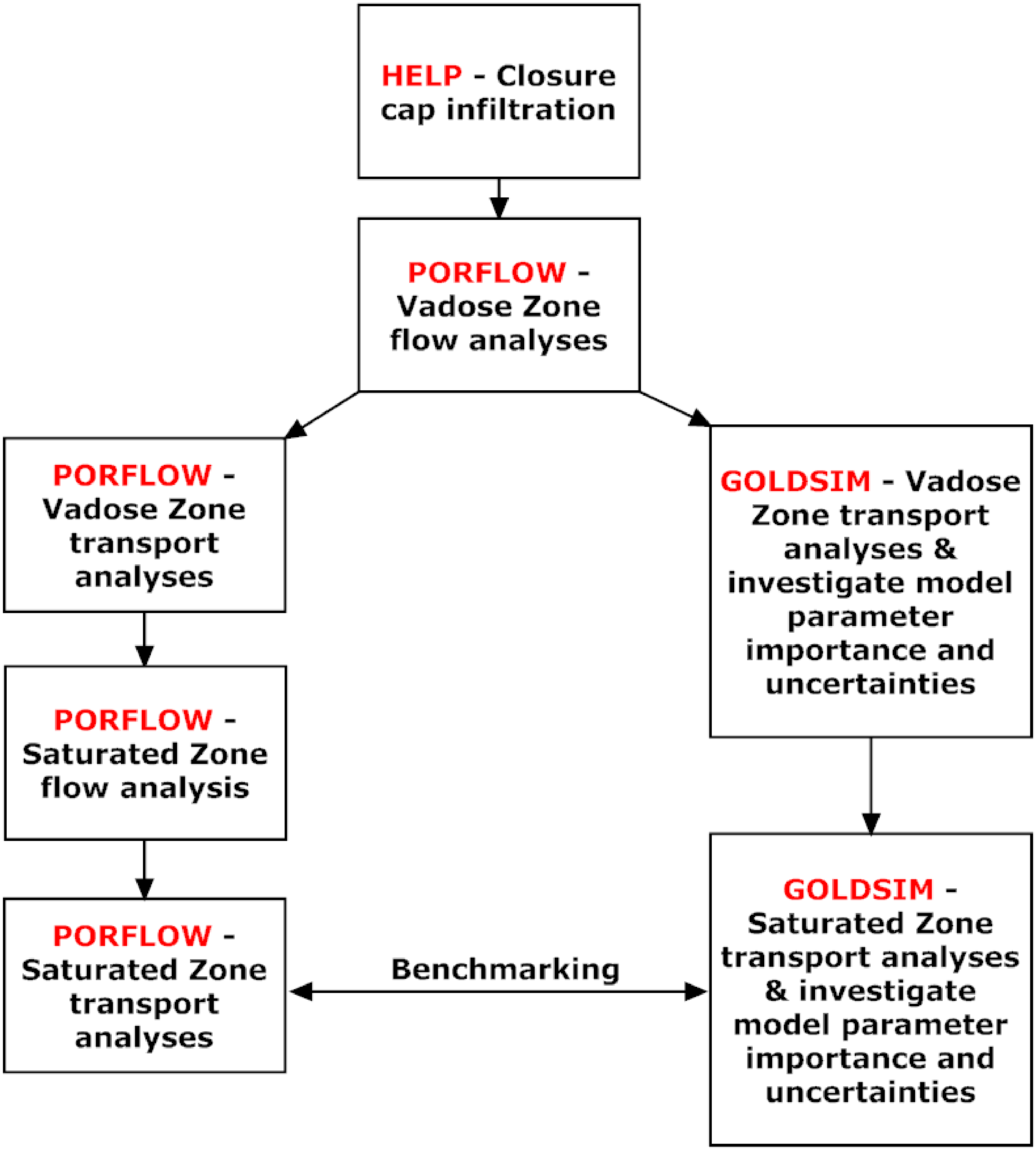
GoldSim was used to assist in developing uncertainty analyses for the FTF PA and identifying from the parameters modeled in GoldSim the important input parameters in the groundwater transport model. GoldSim utilized the flow field outputs from PORFLOW to perform transport calculations and subsequent dose calculations for evaluation of input parameter importance and calculation uncertainties. GoldSim was also used to evaluate parameter importance while developing the initial model for PORFLOW and provide feedback to the PORFLOW modelers on focus areas requiring additional attention. GoldSim was also used to perform all-pathways and intruder analyses by utilizing the contaminant transport results from PORFLOW to calculate groundwater pathways and inadvertent intruder doses. Figures 4.3-1 and 4.3-2 illustrate the integration of GoldSim in the modeling efforts and provides additional detail of the integration and steps of GoldSim calculations for fluid flow and contaminant transport.

Figure 4.3-1: FTF PA Modeling Code Integration



*The ACP protocols are not a specific computer code and are therefore not discussed here.

Figure 4.3-2: FTF PA Modeling Code Integration – Details of Water Flow and Transport



GoldSim was designed to facilitate the construction of large, complex models. The user can build a model of a system in a hierarchical, modular manner, such that the model can evolve and add detail as more knowledge regarding the system is obtained. Other features, such as the ability to manipulate arrays, the ability to "localize" parts of a model, and the ability to assign version numbers to a model which is constantly being modified and improved, further facilitate the construction and management of large models. GoldSim has an extensive internal database of units and conversion factors allowing the user to enter data and display results in any units and/or define customized units. GoldSim ensures dimensional consistency in models and carries out all of the unit conversions internally eliminating the need to carry out (error-prone) unit conversions. The user can dynamically link external programs or spreadsheets directly into a GoldSim model. In addition, GoldSim was specifically designed to support the addition of customized modules (program extensions) to address specialized applications.

GoldSim version 9.60 is used for PA porous medium transport and dose analyses because its capabilities meet program needs, allows for ease of input changes and output visualization and is used by other DOE sites (e.g., Nevada Test Site, Yucca Mountain) and the NRC.

GTG has provided the following documentation associated with GoldSim:

- A user's guide which provides instructions for GoldSim use [GTG-2006a]
- Validation data for GoldSim [GTG-2006b]

SQAP for GoldSim is covered by G-SQA-A-00011.

4.3.1.4 CAP-88

The Clean Air Act Assessment Package – 1988 (CAP-88) computer model is a set of computer programs, databases and associated utility programs developed by the EPA for use in the estimation of dose and risk from radionuclide emissions to air. [*www.epa.gov/rpdweb00/assessment/CAP88/aboutcap88.html*] CAP-88 was used in the FTF PA to estimate annual dose to Maximally Exposed Individuals (MEI) considering plume and ground gamma-shine, inhalation and foodstuff ingestion pathways using the vapor phase radionuclide diffusion to the surface results from PORFLOW.

CAP-88 was developed by the EPA and is used to demonstrate compliance with 40 CFR 61 *National Emissions Standards for Hazardous Air Pollutants (NESHAPs)*, Subpart H, *National Emission Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities*. CAP-88 uses a modified Gaussian plume equation to estimate the average dispersion of radionuclides released from up to six sources at the same release location with different release heights. [*www.epa.gov/rpdweb00/assessment/CAP88/aboutcap88.html*] Assessments are done for a circular grid with a radius up to 50 miles. CAP88-PC Version 1.0 is still in use today at SRS because prior personal computer versions of CAP-88 do not allow for adjustment of site-specific parameters of significance to SRS and CAP88-PC is an accepted model already being used at SRS for NESHAP compliance. CAP88-PC was used at SRS by ACP during CERCLA closure evaluations. In addition, CAP88-PC was used by INEEL during the development of calculations supporting their Tank Farm Facility, and was used at SRS for development of calculations supporting the FTF. [CBU-PIT-2005-00146, DOE-ID-10966, *www.epa.gov/superfund/policy/cercla.htm*]

A user's guide, which provides instruction for use of the CAP88-PC Version 1.0 is available. [EPA 402-B-92-001] SQAP for the CAP88-PC version used for the FTF PA calculations is covered by Q-SQP-A-00002.

4.3.2 Software QA and Validation

General requirements for QA are described in 1Q Manual, Procedure 2-1 *Quality Assurance Program*. The SQAP requirements are described in 1Q Manual, Procedure 20-1, *Software Quality Assurance*. The software QA implementation reports are referenced for the specific software codes are located in Section 4.3.1. The hierarchy of SRS documents is described as follows:

Management Policies (MP), WSRC 1-01, Policy 4.2 contains the SRS policy statement regarding the Company's commitment to provide products and services which meet or exceed the requirements and expectations of our customers. The MP is to be implemented in a manner to support implementation of SRS imperatives of safety, disciplined operations, cost effectiveness, continuous improvement, and teamwork. SRS has established and implemented an Integrated Safety Management System (ISMS). The QA program is consistent with, and an integral part, of the SRS ISMS. The policy requires that the program include appropriate procedures to comply with legal, regulatory, contractual, and corporate requirements related to quality. The policy also requires that the SRS QA program comply with DOE O 414.1C, 10 CFR 830, Subpart A, and the *Quality Assurance Management Plan* (QAMP). [WSRC-RP-92-225] The QA Program applies in a manner which contributes to the safe, reliable, and environmentally sound operation of SRS. It incorporates a graded approach commensurate with risk in the definition and application of QA/Quality Control (QC) requirements. The QAMP provides for the prevention of errors as well as the detection and correction of deficient conditions and incorporates an assessment process for identifying opportunities for continuous improvement. The focus of quality improvement is to reduce the variability of every process that influences the quality and value of SRS products or services. [WSRC 1-01, MP 4.2, WSRC-RP-92-225]

***Quality Assurance Management Plan*, WSRC-RP-92-225,** describes the requirements and responsibilities for execution of the SRS QA Program for implementing DOE O 414.1C, and 10 CFR 830, Subpart A. [WSRC 1-01, MP 4.2] *Quality Assurance Requirements For Nuclear Facility Applications* and other consensus standards are used in the development of the QAMP. [ASME NQA-1-2008, ASME NQA-1a-2009] The plan has been jointly approved by SRS and Department of Energy – Savannah River Operations Office (DOE-SR) and serves as the basis for the establishment of the procedures. [WSRC-RP-92-225]

Quality Assurance Manual* 1-Q, Procedure 2-1, *Quality Assurance Program provides the structure and procedures for achieving and verifying the SRS requirements for quality. The manual consists of a series of QA Procedures which describe applicable QA requirements. Furthermore, Procedure 2-1, Section B states that the QA Program has been developed to be responsive to the requirements of DOE O 414.1C, and DOE *Nuclear Safety Management*, Title 10 CFR 830, Subpart A. Because of the size and complexity of SRS and its varied products, services, and missions, the program has been defined in a standard framework of company policy, procedures, and instructions to be used by the implementing organizations to perform quality-related activities. [1Q Manual, Procedure 2-1]

Conduct of Engineering Manual*, E7, Procedure 2.60, *Conduct of Engineering and Technical Support Procedure Manual is the QA implementing procedure for performing reviews of technical. The end use of data drives the level of review required. Design Verification, the highest level review, must be performed for work affecting Safety Significant (SS) / Safety Class (SC) systems. Design Check is the next lower level of review and is required for all Production Support (PS) and General Service (GS) design output documents. Because the work associated with the PA and associated documents are not associated with SS or SC systems, the Design Check represents the appropriate level of rigor.

A design checker assures the technical accuracy of the design document by performing the following Design Check activities:

- A mathematical check, if appropriate;
- A review for correct use of technical input, including quality requirements;
- A review of the approach used and reasonableness of the output; and
- An administrative check (page numbers, etc.)

A design checker must meet the following criteria to perform a Design Check:

- Did not participate in the development of the portion of the document being checked;
- Is knowledgeable in the area of the design or analysis for which they review;
- Is capable of performing similar design or analysis activities; and
- Has security clearance for access to sufficient information to perform the Design Check.

Between 2002 and 2004 SRNL developed, piloted and then implemented technical review guidelines incorporating the E7 Manual, Procedure 2.60 requirements for performing Design Checks and Design Verification by document review. These guidelines also meet the requirements for review of Type 2 Calculations contained in E7 Manual, Procedure 2.31 *Engineering Calculations*. The guidelines provide a flowchart to map the SRNL technical review process, lines of inquiry for performing reviews, a checklist for communicating instructions and best management practices to set a benchmark for management expectations.

Software QA is conducted in accordance with the requirements of the 1Q Manual, Procedure 20-1 through the development and execution of the SQAP. This procedure fulfills the requirements of DOE O 414.1C and 10 CFR 830, Subpart A. The QA plans and processes used by SRS to verify the inputs and outputs for the different modeling codes used are provided in the code specific descriptions in Section 4.3.1.

4.3.3 Modeling Codes Summary

In conclusion, Figures 4.3-1 and 4.3-2 present the approach to modeling code integration used for the FTF PA. Of extreme importance in the implementation of the modeling integration show in Figures 4.3-1 and 4.3-2 is assurance that the input data to the various codes is verified to be accurate. Documentation of the verification of the model input traced from source documents, to modeling input, and to appropriate sections within this PA has been performed and is described in Appendix H of this document.

4.4 Closure System Modeling

This section describes how the FTF design elements and their associated properties were represented in the computer modeling codes. The closure system conceptual design was an aphysical simplification of the actual FTF system design, which is required for analytical modeling. Certain waste tank features and design elements are by necessity omitted in the conceptual model, and are discussed in Section 4.4.1.

This section also describes how the FTF closure system is expected to behave in the future, and what modeling scenarios are used to depict system behavior over time. Because it is difficult to predict with a high level of certainty just what changes may occur to a closed and grouted waste tank system over the 10,000-year evaluation period, this section describes a range of potential conditions to which a closed waste tank or ancillary system may be subjected. While the baseline analysis (represented through the PORFLOW FTF model) reflected the best estimate of future closure system behavior, the probabilistic analysis (represented through the GoldSim FTF model) considered a variety of possible scenarios. In addition to analyzing differing scenarios in the 10,000-year evaluation period, the transport models were all run to at least 20,000-years for the purposes of determining peak concentrations that occur after the 10,000-year evaluation period.

4.4.1 Individual Waste Tank Modeling

Certain waste tank features and design elements have by necessity been omitted in the conceptual model. The modeling representations are a simplification of the actual physical infrastructure of the waste tanks, which are described in detail in Section 3.2.1. A number of general modeling decisions guidelines were followed for the design representation:

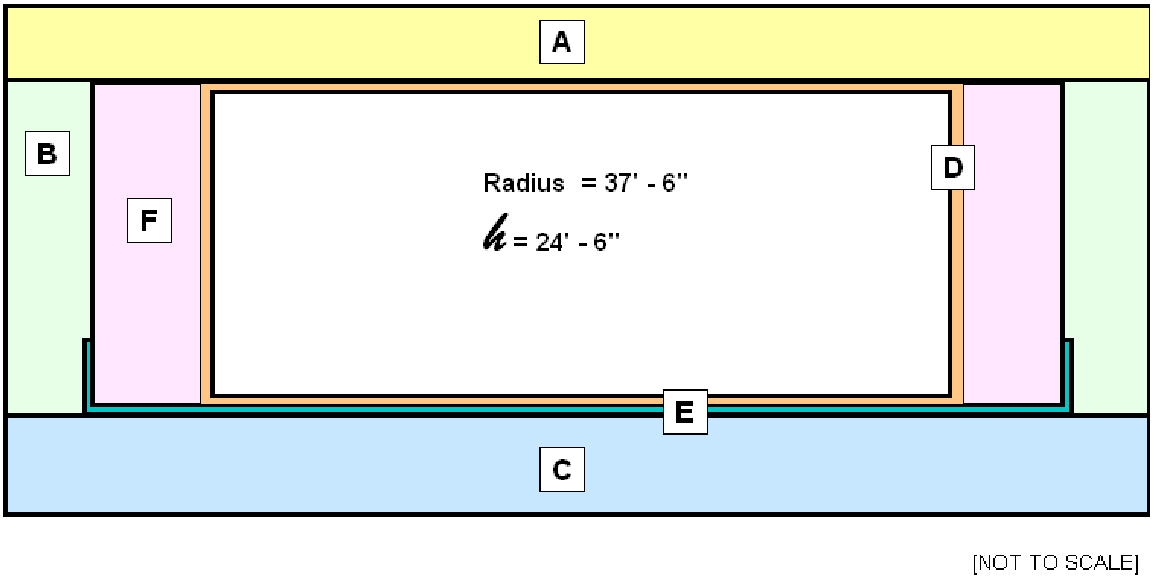
- The intent of the conceptual model was to capture waste tank dimensions and relative material differences for each discrete tank segment.
- Each discrete waste tank segment/area was represented as homogeneous, ignoring interior elements (e.g., rebar, cooling coils) and/or penetrations through the area (e.g., tank risers, transfer lines).
- Minimum segment thicknesses were used in the baseline analysis where an area had variable thickness (e.g., waste tank walls, tank tops).
- Grouting of tank void areas (e.g., waste tank primary, tank annulus, cooling coils) is assumed to have occurred as planned.

4.4.1.1 Type I Tank Modeling

The Type I tank dimensions are presented in Figure 4.4-1. Specific areas where Type I tank modeling decisions of interest are implemented are highlighted below:

- The waste tank basemat segment was based on the basemat thickness and ignores other material layers below the tank (i.e., concrete working slab, grout layer, lean concrete layer, and waterproofing layer).
- The primary liner and annulus liner are explicitly modeled.
- The primary liner and annulus liner assumed thicknesses were based on the minimum thicknesses only.
- The waste tank wall and tank liner penetrations (i.e., transfer lines) were not modeled discretely.
- The waste tank primary cavity or liner was assumed to be filled with grout and was treated as a discrete area.
- The twelve waste tank support columns and cooling coils were not modeled discretely and were included in the tank primary. The waste tank annulus was assumed to be filled with grout and is treated as a discrete area.
- The waste tank roof penetrations (i.e., risers) were not modeled discretely.
- Concrete rebar in the waste tank top, tank walls, and tank basemat was not modeled discretely, such that concrete was considered a homogenous material.
- The waste tank underliner sump was not modeled discretely.

Figure 4.4-1: Typical Type I Tank Modeling Dimensions



LABEL	THICKNESS	MATERIAL
A Concrete Roof	22"	Concrete (Dupont Spec 3019, Sec. B)
B Concrete Wall	22"	Concrete (Dupont Spec 3019, Sec. B)
C Concrete Basemat	30"	Concrete (Dupont Spec 3019, Sec. B)
D Primary Liner	0.5"	Carbon Steel (ASTM A-285-50T)
E Secondary Liner	5' high and 0.5" thick	Carbon Steel (ASTM A-285-50T)
F Grouted Annulus	30"	Tank Fill Grout

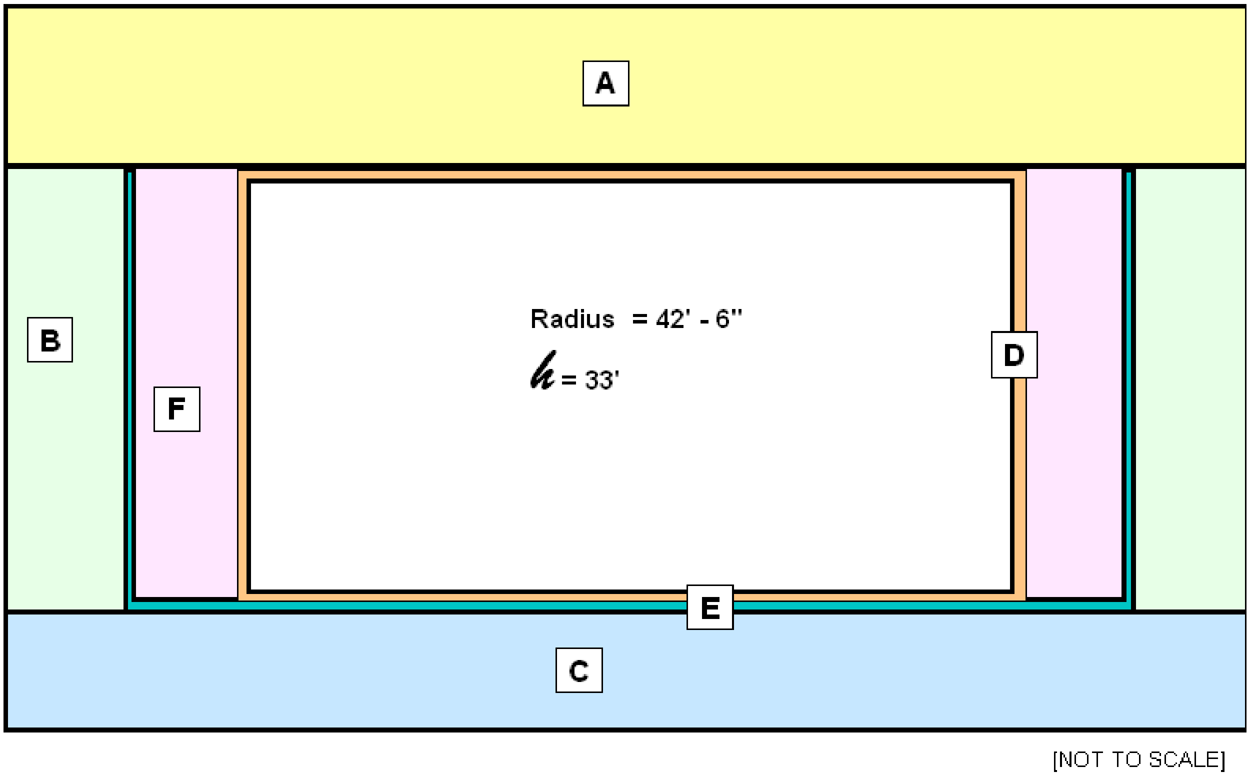
4.4.1.2 Type III and IIIA Tank Modeling

The Type III and Type IIIA tank dimensions are presented in Figures 4.4-2 and 4.4-3. Specific areas where Type III/IIIA tank modeling decisions of interest are implemented are highlighted below:

- The waste tank basemat segment was based on the minimum basemat thickness and ignored the thicker concrete drop panel below the tank center column and other material layers below the tank (i.e., concrete working slab, grout layers). Two inches were subtracted from the Type IIIA basemat thickness to reflect 2 inch leak detection slots cut into the basemat.
- Thermocouple piping running through the waste tank walls and basemat was not modeled discretely.

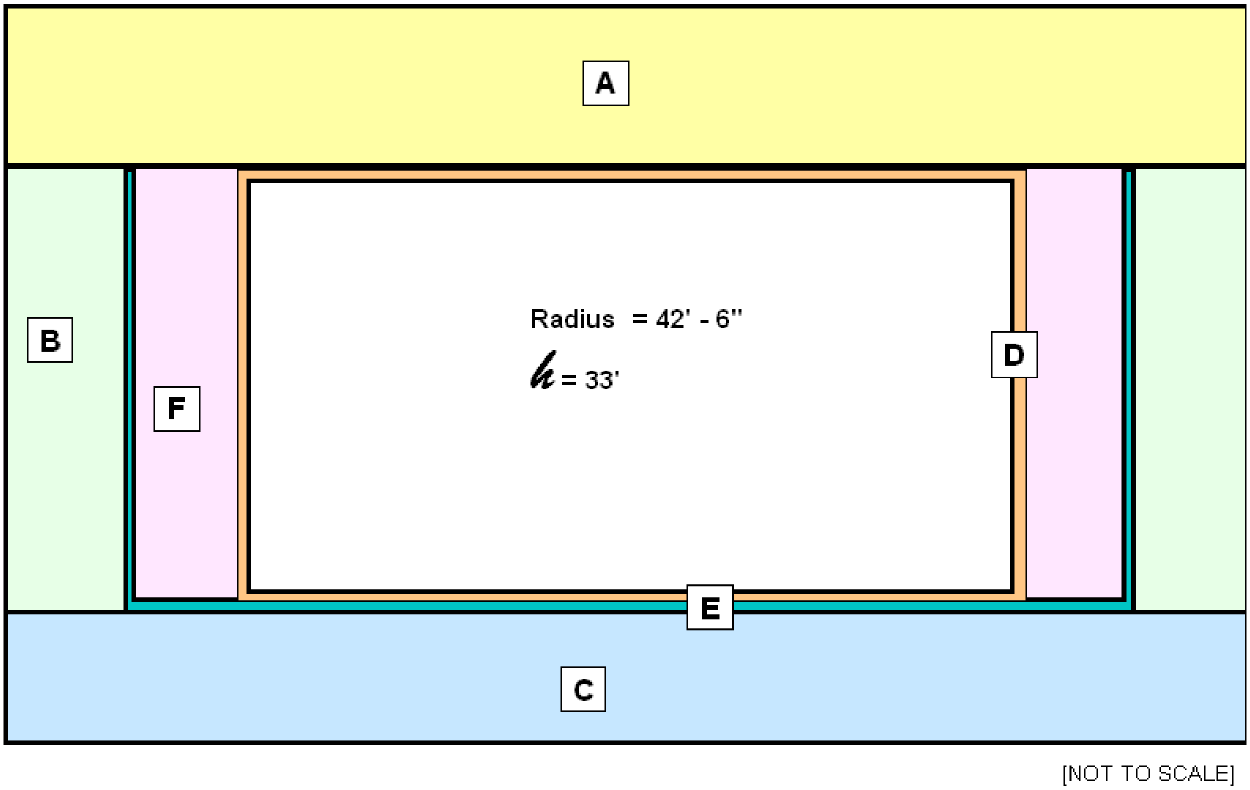
- The waste tank primary cavity or liner was assumed to be filled with grout and was treated as a discrete area. The waste tank center column, center annulus, ventilation ductwork, and cooling coils were not modeled discretely.
- The waste tank annulus cavity or liner was assumed to be filled with grout and was treated as a discrete area.
- The primary liner and annulus liner are modeled explicitly.
- The primary liner and annulus liner assumed thicknesses were based on the minimum thicknesses only (e.g., extra thickness at knuckle not modeled).
- Penetrations through the waste tank wall and tank liner (i.e., transfer lines) were not modeled discretely.
- The waste tank roof penetrations (i.e., risers) were not modeled discretely.
- Concrete rebar in the waste tank top, tank walls, and tank basemat was not modeled discretely, such that concrete was considered a homogenous material.
- The waste tank underliner sump was not modeled discretely

Figure 4.4-2: Typical Type III Tank Modeling Dimensions



LABEL	THICKNESS	MATERIAL
A Concrete Roof	48"	Class C Concrete
B Concrete Wall	30"	Class C Concrete
C Concrete Basemat	42"	Class C Concrete
D Primary Liner	0.5"	Carbon Steel (ASTM A-516)
E Secondary Liner	3/8"	Carbon Steel (ASTM A-516)
F Grouted Annulus	30"	Tank Fill Grout

Figure 4.4-3: Typical Type IIIA Tank Modeling Dimensions



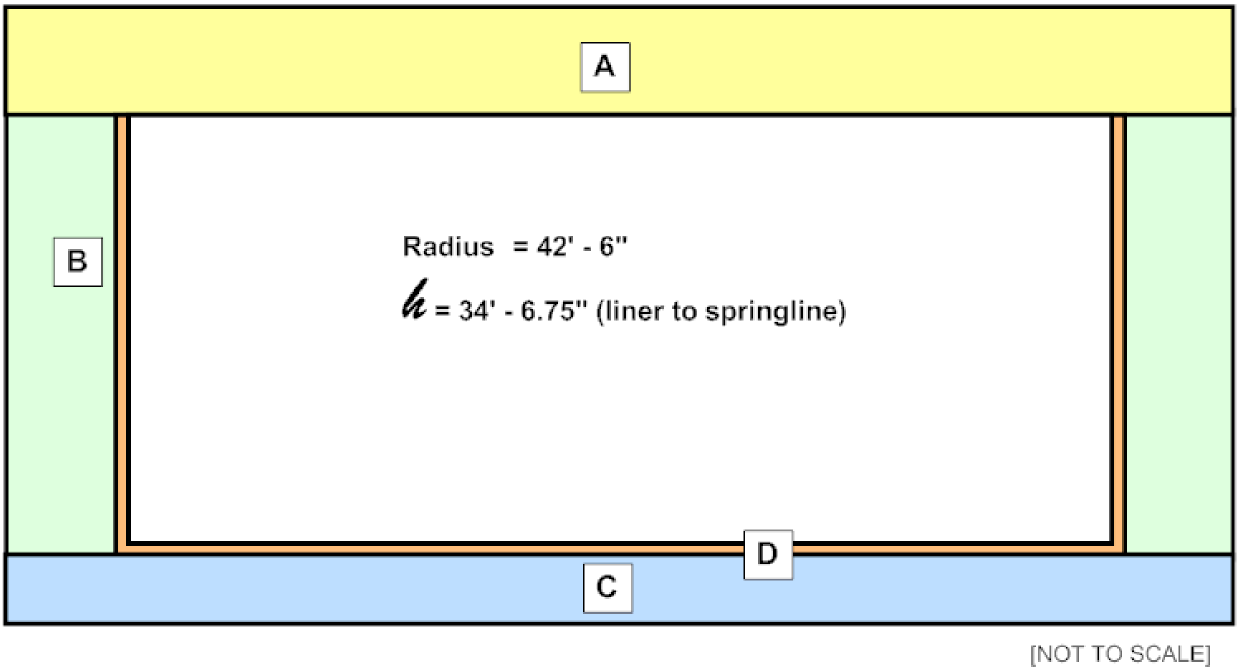
LABEL	THICKNESS	MATERIAL
A Concrete Roof	48"	Class C Concrete
B Concrete Wall	30"	Class C Concrete
C Concrete Basemat	41"	Class C Concrete
D Primary Liner	0.5"	Carbon Steel (Tanks 25 - 28: ASTM A-516) (Tanks 44 - 47: ASTM A-537)
E Secondary Liner	3/8"	Carbon Steel (Tanks 25 - 28: ASTM A-516) (Tanks 44 - 47: ASTM A-537)
F Grouted Annulus	30"	Tank Fill Grout

4.4.1.3 Type IV Tank Modeling

The Type IV tank dimensions are presented in Figure 4.4-4. Specific areas where Type IV tank modeling decisions of interest are implemented are highlighted below:

- The waste tank basemat segment was based on the thickness of the basemat and of the cement topping placed over the basemat. Approximately a tenth of an inch thickness was subtracted to account for the drainage grooves cut into the cement topping. The effective one-tenth inch groove thickness is based grooves being 1.625 inch and covering less than 6% of the waste tank footprint. The waste tank wall footing and the grouted segment between the wall footing and the tank basemat were not modeled discretely.
- The waste tank primary cavity or liner was assumed to be filled with grout and was treated as a discrete modeled area.
- The waste tank primary liner assumed thickness was based on the minimum thicknesses only (e.g., extra thickness at knuckle not modeled).
- The waste tank wall and tank liner penetrations (i.e., transfer lines) were not modeled discretely.
- The waste tank wall thickness was the minimum wall thickness and did not reflect the variable thickness.
- The waste tank roof thickness was the minimum thickness of the dome, and did not reflect the variable thickness of the roof.
- The waste tank roof penetrations (i.e., risers) were not modeled discretely.
- Concrete rebar in the waste tank top and tank basemat was not modeled discretely, such that concrete was considered a homogenous material.
- The waste tank underliner sump was not modeled discretely

Figure 4.4-4: Typical Tank IV Tank Modeling Dimensions



MATERIAL ZONE LABEL	THICKNESS	MATERIAL
A Concrete Roof	7"	Class A Concrete
B Concrete Wall	7"	Type I Portland Cement
C Concrete Basemat	6.9025"	Class C Concrete
D Primary Liner	0.375"	Carbon Steel (ASTM A-285-50T)

4.4.2 Systems and Potential Degradation

As noted previously, there are 22 underground waste tanks and eight discrete ancillary systems identified and modeled in the closure of FTF. Each of these systems will initially be placed in a controlled condition at closure (e.g., physically isolated and in most cases filled with grout). However, the waste tanks themselves, the ancillary equipment, and the closure system may degrade over time, eventually releasing contaminants to the environment. The physical and chemical mechanisms that control the release or leaching of residual contamination from the grouted waste tanks are described in Section 4.2.2.

To simulate potential conditions in the FTF closure system over the 10,000-year evaluation period, six waste tank configurations and one ancillary equipment configuration were identified for analysis. While only one configuration (Configuration A) was simulated in the baseline analysis, the six different configurations were considered in the probabilistic analysis. Each configuration starts out with the system closed as planned, with the tanks filled with grout and the closure cap in place. In the time frames discussed, year 0 was taken to be the year during which the FTF is closed.

Tank Configurations A through E start out with the engineered closure cap in place as planned (Tank Configuration F assumed a "soil only" closure cap). In the analysis of configurations A through E, expected degradation of the closure cap materials over time were simulated using the increasing infiltration rates shown in Table 3.2-10. The waste release process described in Section 4.2.2 and the conceptual model material properties described in Section 4.2.3.2 were employed in each waste tank configuration evaluation. The differences between the six waste tank configurations are summarized in Table 4.4-1 and are discussed in detail in the following sections. The configurations are meant to represent conditions that may be present without regard to the mechanism that led to those conditions. There are a variety of mechanisms that can lead to earlier degradation times than those modeled in Configuration A (Base Case). In the closed FTF conditions, some mechanisms may be possible, although not likely. The configurations should not be interpreted as representing a specific mechanism for liner/grout/concrete degradation. The failure times modeled in Configurations C, D, and E are meant to encompass various mechanisms and provide information on the risk significance of earlier failure than that modeled in the Base Case.

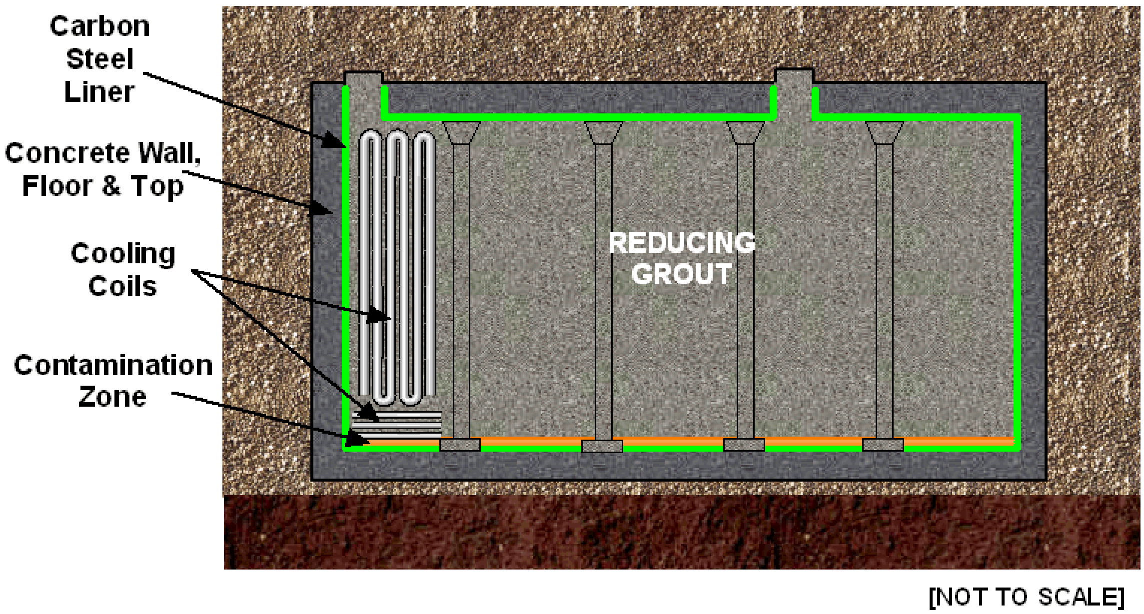
Table 4.4-1: Waste Tank Configuration Summary

Case	Closure Cap	Assumed Fast Flow Paths	Degradation of Cementitious Materials	Liner Failure Time	Water Table Level
A	Engineered Closure Cap	None	Degradation curve based on Table 4.2-33	Later failure date (based on Grouted Diff coefficient of E-6 Ca)	No change
B	Engineered Closure Cap	None	Degradation assumed to be a step change at year 501	Later failure date (based on Grouted Diff coefficient of E-6 Ca)	No change
C	Engineered Closure Cap	Channel with no flow impedance through grout	Degradation assumed to be a step change at year 501	Early failure date (based on Grouted Diff coefficient of E-4 Ca)	No change
D	Engineered Closure Cap	Channel with no flow impedance through grout and basemat	Degradation assumed to be a step change at year 501	Early failure date (based on Grouted Diff coefficient of E-4 Ca)	No change
E	Engineered Closure Cap	N/A	Degradation assumed to be a step change at year 501	Early failure date (based on Grouted Diff coefficient of E-4 Ca)	Above CZ
F	Soil Only (16.45 in/yr infiltration)	None	Degradation assumed to be a step change at year 501	Later failure date (based on Grouted Diff coefficient of E-6 Ca)	No change

4.4.2.1 Tank Configuration A

In Tank Configuration A (Figure 4.4-5), the closure cap was in place and no fast flow path exists from outside the waste tank system, through the tank, and exiting the system. In Tank Configuration A, it was assumed that the concrete that makes up the walls, the tank grout, and basemat concrete degrades over time (with these changes simulated by increasing hydraulic conductivity). Degradation of tank cementitious materials (degradation rate and timing) was based on WSRC-STI-2007-00607 and SRS-REG-2007-00027, and can vary dependant on tank type. The timing of the degradation of the tank cementitious materials is detailed in Table 4.2-32 for the various tank types. Closure cap degradation occurs as shown in Table 3.2-9. Configuration A was considered the FTF Base Case for waste tank closure.

Figure 4.4-5: Tank Configuration A

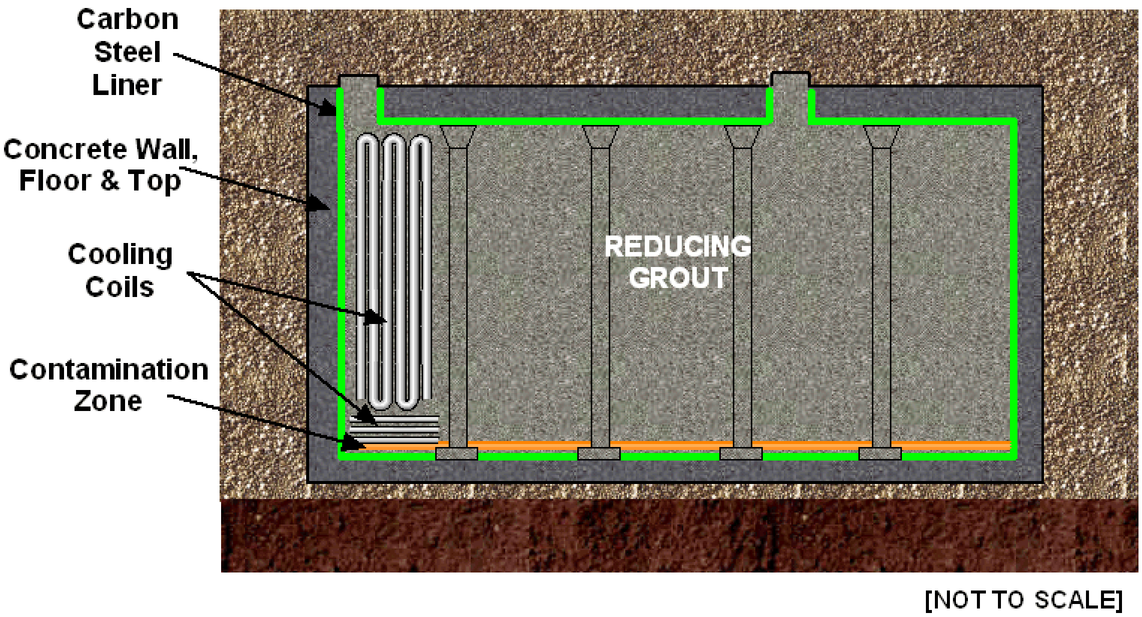


Under Tank Configuration A, the entire steel liner was assumed to be impermeable, with the steel liner in direct contact with intact grout or concrete on all sides. Under these conditions the carbon steel liner was expected to remain impermeable until several thousand years after closure, as shown for the Base Case in Table 4.2-35. After the carbon steel liner fails, it was assumed in Tank Configuration A that contaminants begin to leach from the degraded system, via advection, based on changes to the pH, redox potential, and carbonate concentration of the residual contamination in the floor of the tank system. Individual radionuclide leach rates will vary over time based on solubility and adsorption controls. In this condition, it was assumed that no fast flow exits through the concrete basemat. Rather, contaminants were assumed to be transported through the concrete basemat.

4.4.2.2 Tank Configuration B

Figure 4.4-6 represents Tank Configuration B, a condition where cementitious material degradation is accelerated, with degradation occurring essentially instantaneously at year 500. Concrete degradation could take the form of extensive through-cracking, or shrinkage away from the liner. The grout degradation was not assumed to lead to formation of a fast-flow path through the grout. (i.e., full flow through the grout), but did result in faster flows sooner than in the Base Case.

Figure 4.4-6: Tank Configuration B



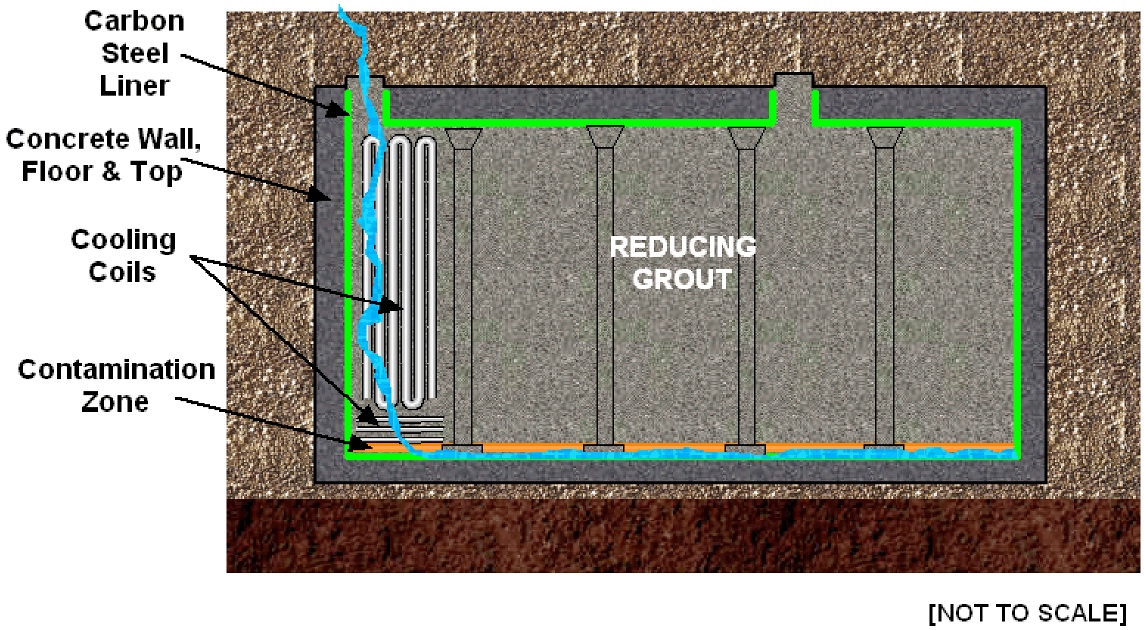
In Tank Configuration B, the closure cap was in place and no fast flow path exists from outside the waste tank system, through the tank, and then exiting the system. The concrete that makes up the walls, the tank grout, and basemat concrete degraded over time (as simulated by increasing hydraulic conductivity). The tank cementitious materials were assumed to begin to degrade at year 500, with degradation occurring essentially instantaneously (full degradation was reached at year 501). Closure cap degradation occurs as shown in Table 3.2-9.

Under Tank Configuration B, the entire steel liner was assumed to be impermeable, with the steel liner in direct contact with intact grout or concrete on all sides. Under these conditions the carbon steel liner was expected to remain impermeable until several thousand years after closure, as shown for the Base Case in Table 4.2-35. After the carbon steel liner fails, it was assumed in Tank Configuration B that contaminants begin to leach from the degraded system, via advection, based on changes to the pH, redox potential, and carbonate concentration of the residual contamination in the floor of the tank system. Individual radionuclide leach rates will vary over time based on solubility and adsorption controls. In this condition, it was assumed that no fast flow exits through the concrete basemat. Rather, contaminants were assumed to be transported through the concrete basemat.

4.4.2.3 Tank Configuration C

In Tank Configuration C (Figure 4.4-7), the closure cap was in place and it was assumed that a fast flow path exists between the waste tank top and CZ, (e.g., from tank riser through cooling coil) due to incomplete filling with grout during closure. The fast-flow path through the grout was represented in the conceptual design by modeling a channel through the grout with full flow. The concrete that makes up the walls, the tank grout, and basemat concrete degrade over time (as simulated by increasing hydraulic conductivity). The tank cementitious materials were assumed to begin to degrade at year 500, with degradation occurring essentially instantaneously (full degradation is reached at year 501). Closure cap degradation occurs as shown in Table 3.2-9.

Figure 4.4-7: Tank Configuration C



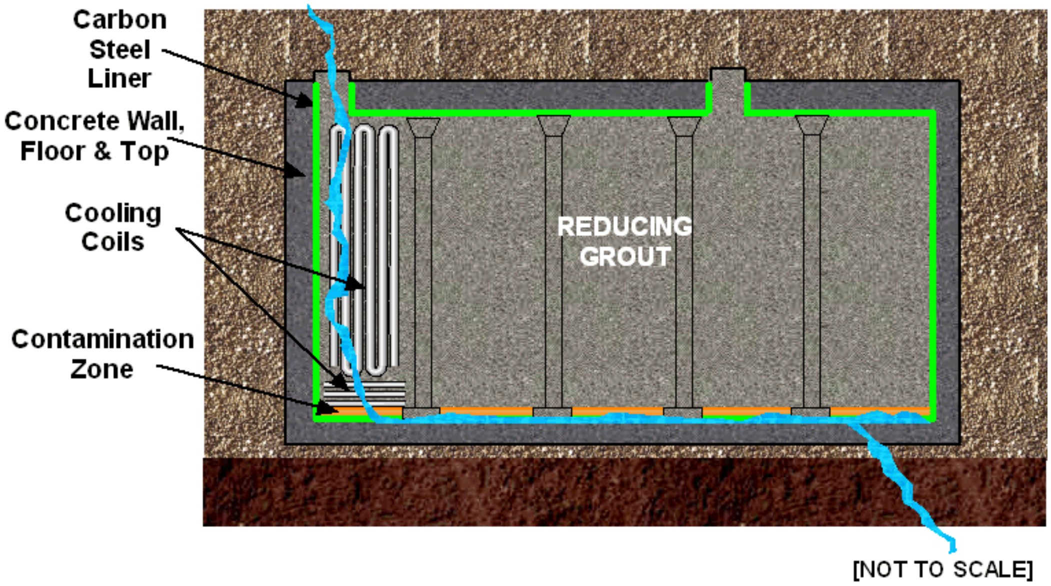
Tank Configuration C assumed no pitting occurs in the carbon steel liner. It is assumed that concrete/grout pore water with relatively high oxygen concentration and low pH is in contact with the steel liner. In this condition, the diffusion coefficients (which control the failure times) are higher than in the Base Case (as shown in Table 4.2-35). Under these conditions the carbon steel liner was expected to remain impermeable until the analyzed failure time (provided in Table 4.2-35) are reached. The analyses were based upon the assumption that carbonation was the most aggressive mechanism of corrosion of the waste tank liner due to the loss of the high pH environment, and that chloride may induce depassivation on the steel surface.

After carbon steel liner failure, it was assumed in Tank Configuration C that contaminants begin to leach from the degraded system, via advection, based on changes to the pH, redox potential, and carbonate concentration of the residual contamination in the floor of the tank system. Individual radionuclide leach rates will vary over time based on solubility and adsorption controls. In Tank Configuration C, it was assumed that no fast flow exits through the concrete basemat. Rather, it was assumed that the basemat has had an increase in permeability based on concrete degradation. Whether the fast flow path is active during any period of time depended on the availability of sufficiently high infiltration through the closure cap.

4.4.2.4 Tank Configuration D

In Tank Configuration D (Figure 4.4-8), the closure cap was in place and it was assumed that a fast flow path exists though the entire closed system (e.g., through a tank riser, through a cooling coil, through the tank fill grout, through pitting in the steel liner, and through the basemat). It was assumed that a fast flow path exists through the concrete/carbon steel roof of the waste tank (e.g., through a riser, due to incomplete filling with grout during closure.). The fast-flow path through the grout and basemat was represented in the conceptual design by modeling a channel through the grout and basemat with full flow. The presence of the channel in the model is not ascribed to a particular cause, but is used to reflect the fact the various mechanisms have been postulated that could result in a significantly increased hydraulic conductivity (e.g., grout shrinkage, seismic induced fractures). For cementitious material not associated with the fast flow channel, degradation was accelerated over the baseline, with degradation occurring essentially instantaneously at year 500. The concrete that makes up the walls, the tank grout, and basemat concrete degrade over time (as simulated by increasing hydraulic conductivity). The tank cementitious materials were assumed to begin to degrade at year 500, with degradation occurring essentially instantaneously (full degradation is reached at year 501). Closure cap degradation occurs as shown in Table 3.2-9.

Figure 4.4-8: Tank Configuration D



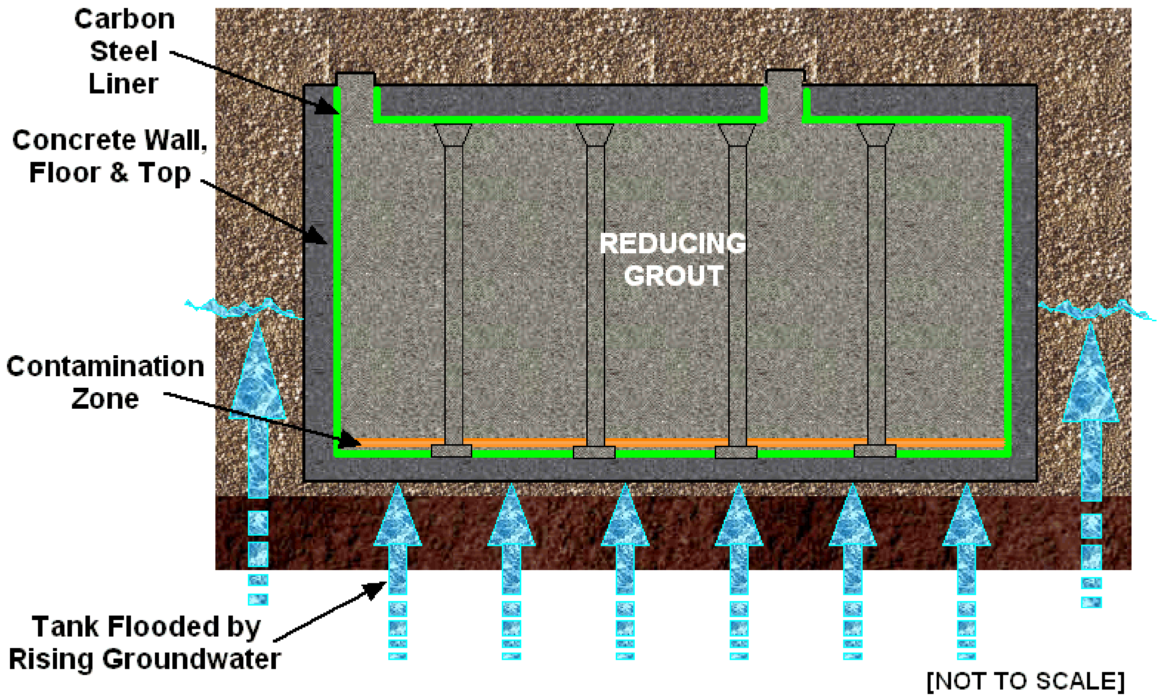
Tank Configuration D assumed that concrete/grout pore water with relatively high oxygen concentration and low pH is in contact with the steel liner. In this condition, the diffusion coefficients (which control the failure times) are higher than in the Base Case (as shown in Table 4.2-35). Under these conditions the carbon steel liner was expected to remain impermeable until the analyzed failure time (provided in Table 4.2-35) are reached. The analyses were based upon the assumption that carbonation was the most aggressive mechanism of corrosion of the waste tank liner due to the loss of the high pH environment, and that chloride may induce depassivation on the steel surface.

After carbon steel liner failure, it was assumed in Tank Configuration D that contaminants begin to leach from the degraded system, via advection, based on changes to the pH, redox potential, and carbonate concentration of the residual contamination in the floor of the tank system. Individual radionuclide leach rates will vary over time based on solubility and adsorption controls. In Tank Configuration D, it was assumed that a fast flow exits through the concrete basemat. As with Tank Configuration C (Figure 4.4-7), actual flow through the available fast flow path was contingent upon adequate infiltration through the closure cap.

4.4.2.5 Tank Configuration E

In Tank Configuration E (Figure 4.4-9), the closure cap was in place and no fast flow path exists from outside the tank system, through the tank, and then exiting the system, however, this configuration assumed that groundwater is above the tank bottom. (Note that Table 4.2-23 shows the distance from the waste tank working slab bottom to the top of the water table for each tank under existing conditions). The concrete that makes up the walls, the tank grout, and basemat concrete degrade over time (as simulated by increasing hydraulic conductivity). The tank cementitious materials were assumed to begin to degrade at year 500, with degradation occurring essentially instantaneously (full degradation is reached at year 501). Closure cap degradation occurs as shown in Table 3.2-9.

Figure 4.4-9: Tank Configuration E



Tank Configuration E assumed that concrete/grout pore water with relatively high oxygen concentration and low pH has been in immediate contact with the steel liner since closure. This configuration assumed the concrete on the outside of the carbon steel liner has degraded to allow groundwater to infiltrate through the concrete to the carbon steel liner. In this condition, the diffusion coefficients (which control the failure times) are higher than in the Base Case, as shown in Table 4.2-35. Under these conditions the carbon steel liner was expected to remain impermeable until the analyzed failure time (provided in Table 4.2-35) were reached. The analyses were based upon the assumption that carbonation was the most aggressive mechanism of corrosion of the waste tank liner due to the loss of the high pH environment, and that chloride may induce depassivation on the steel surface.

After carbon steel liner failure, it was assumed in Tank Configuration E that contaminants begin to leach from the degraded system, via advection and diffusion, based on changes to the pH, redox potential, and carbonate concentration of the residual contamination in the floor of the tank system. Individual radionuclide leach rates will vary over time based on solubility and adsorption controls. Closure cap degradation occurs as shown in Table 3.2-9.

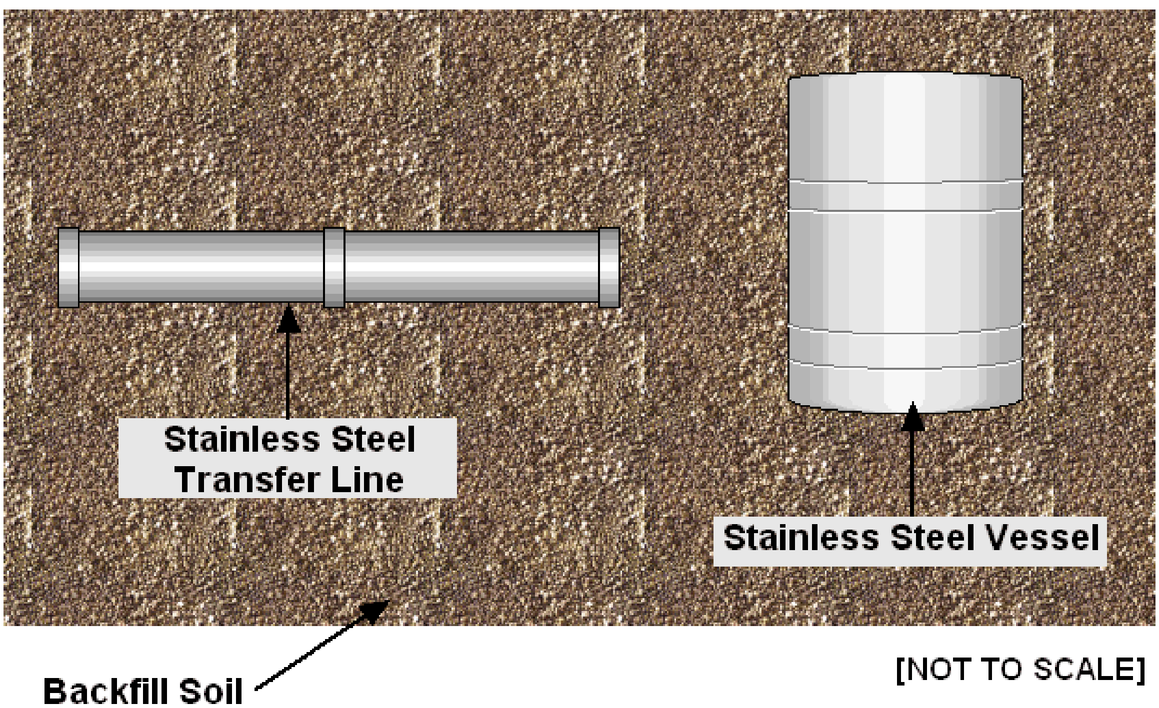
4.4.2.6 Tank Configuration F

Tank Configuration F is exactly the same as Tank Configuration B except that a “soils only” closure cap was assumed to be in place rather than the engineered closure cap that was modeled in the Base Case. The “soil only” closure cap infiltration rate of 16.45 inches per year was held constant over time in Tank Configuration F. [WSRC-STI-2007-00184_OUO, Table 31] The other aspects of this configuration are as described in the Tank Configuration B section.

4.4.2.7 Ancillary Equipment Configuration

In Ancillary Equipment Configuration (Figure 4.4-10), closure cap degradation occurs as shown in Table 3.2-9. The ancillary equipment was located below grade in the FTF (Section 3.2.2 provides additional details of FTF ancillary equipment and its location) and was covered by the closure cap. Modeling consisted of a source geometry of seven separate inventory sources (FPT-1, FPT-2, FPT-3, 242-F, 242-16F, CTS catch tank, and FTF catch tank) and a network of waste transfer lines represented by contaminants distributed over the entire FTF. Any equipment located above grade, such as the portion of one waste line associated with Tank 7, was assumed to have been removed.

Figure 4.4-10: Ancillary Equipment Configuration



The ancillary equipment was assumed to be completely intact at the time of closure. The contaminant release was assumed to occur when the stainless steel fails. As discussed earlier in Section 4.2.3.2.5, predictions for failure of the stainless steel transfer line core piping were based on the results of a recent study specific to the application of the FTF closure PA. [WSRC-STI-2007-00460] These estimates considered general and localized corrosion mechanisms of the stainless steel exposed to SRS soil conditions for the stainless steel core transfer lines in FTF. The results of this study were incorporated by assuming that the applicable ancillary equipment containment (e.g., pump tank, evaporator pot, and transfer line core pipe) failed and released the associated inventory into the surrounding soil at year 510 (the time of 25% pitting penetration for "in soil" 0.116 inch thick stainless steel). This modeling simplification was considered reasonable for all ancillary equipment containment because in actuality the ancillary equipment containments will not be directly in soil (the pump tanks and evaporator pots are in concrete cells that will be filled with grout and the transfer lines are typically contained within a secondary jacket). Only an insignificant quantity of the FTF transfer lines are carbon steel vs. stainless steel (out of over 45,000 linear feet of pipe there are only three carbon steel lines 145 feet long). This simplification was important for transfer line modeling since the transfer line inventory was not modeled as point sources; rather the transfer line inventory was spread throughout the entire FTF modeling area. More complicated transfer line modeling (e.g., concentrating the transfer line inventory in selected tank farm areas) was determined through scoping analyses to be unnecessary. The line inventory is minor relative to tank inventories. Furthermore, the locations where line concentration would occur (primarily the concrete encasement that runs through the center line of the area where the Type I waste tanks are located) would result in inventory being placed farther away from the peak dose sources (the Type IV and Type III waste tanks), and the 100m point of assessment because of groundwater flow direction.

Once the stainless steel containment for ancillary equipment fails, the source term associated with the ancillary equipment was assumed available for release directly in the backfill soil surrounding the ancillary equipment. No hold up or containment of the source term is assumed to be provided by any of the cementitious materials surrounding the vessels, pits, and waste lines (such as the secondary containment structures). The waste transfer lines were modeled assuming no grout fill of the primary transfer line or jacket. After container failure for ancillary equipment, the flow through the CZ was set equal to the closure cap driven infiltration rate.

For the probabilistic FTF analysis, each piece of ancillary equipment (with the transfer lines being treated as a collective inventory) was assumed to fail independently with the failure time occurring between the time of first pit penetration (116 years) and 100% pitting penetration (approximately 1,000 years). The most probable time of ancillary equipment failure in the probabilistic FTF analysis was assumed to be the time of 25% pitting penetration (510 years).

4.4.3 Evaluation of Integrated System Behavior

Upon the closure of FTF, there is an opportunity for the stabilized contaminants to leach from distinct tank systems and ancillary equipment. The various individual system behaviors that are evaluated have been presented for the Tank Configurations A through E (Figures 4.4-5 through 4.4-9) and the Ancillary Equipment Configuration (Figure 4.4-10). The analysis of the Base Case through the PORFLOW FTF model provided results reflecting the best estimate of closure system behavior. These independent modeling scenarios for the FTF waste tanks and ancillary equipment are melded together in the probabilistic analysis to produce integrated results.

The saturated zone was gridded so that individual tanks and ancillary equipment point sources can be individually resolved. Explicit representation of individual sources enables investigation of potential plume overlap from separate sources. Integrated system behavior, as measured by concentration at exposure points, was simulated by applying contaminant flux transients for chosen tank types and configurations to appropriately located grid cells.

Provided below is a short description of the integrated conceptual model process flow for the closure cap and saturated zone. The integrated conceptual model consists of different segments, some of which were represented by independent sub-models. For example, the waste release model developed different solubility limits for different chemical states; the chemical state used in the model was determined in PORFLOW based on the PORFLOW calculated pore volumes. It should be noted that since the sub-models were developed independently and may have different levels of conservatism, some shared input parameters may have different values from sub-model to sub-model. For example, the diffusion coefficient is different between the concrete degradation evaluation and waste tank liner failure evaluation. While the coefficient in the Base Case waste tank liner evaluation (Section 4.2.3.2.5) is a more expected value, the concrete degradation evaluation (Section 4.2.3.2.3) chose a very high coefficient to conservatively estimate degradation rates. Emphasis was placed on ensuring that individual sub-models are defensible, and the fact that two model segments may assume different values for the same parameter was not considered significant if the sub-models are valid and defensible.

The model process flow description below describes how each individual model segment is integrated into the entire model and how its behavior is depicted. The Configuration A (Base Case) and Configuration D (fast flow case) timelines associated with the various model segments for the different tank types are provided in Tables 4.4-2 through 4.4-5.

Table 4.4-2: Type I Waste Tank Process Change Timeline

Change in Model Parameters	Year of Occurrence	
	Configuration A	Configuration D
Concrete (waste tank top, sides, basemat, etc.) starts to degrade hydraulically	1,300	500
Waste tank roof concrete transitions from Oxidized Region II to Oxidized Region III	3,010	1,669
Waste tank grout starts to degrade hydraulically	2,600	500
Concrete fully degraded hydraulically	2,600	501
Closure Cap reaches approximate steady state infiltration rate (11.5 in/yr)	2,625	2,625
Waste tank wall concrete transitions from Oxidized Region II to Oxidized Region III	3,615	17,926
Waste tank annulus concrete transitions from Reducing Region II to Oxidized Region II	4,977	2,152
Waste tank annulus concrete transitions from Oxidized Region II to Oxidized Region III	9,181	19,237
Waste tank basemat concrete transitions from Oxidized Region II to Oxidized Region III	11,102	2,275
Waste tank steel liner fails hydraulically	12,747	1,140
Waste tank grout fully degraded hydraulically	13,000	501
Waste tank grout transitions from Reducing Region II to Oxidized Region II	15,286	4,022
CZ transitions from Reducing Region II to Oxidized Region II	15,286	4,022
Waste tank grout transitions from Oxidized Region II to Oxidized Region III	20,000+	16,180
CZ transitions from Oxidized Region II to Oxidized Region III	20,000+	16,180

Table 4.4-3: Type III Waste Tank Process Change Timeline

Change in Model Parameters	Year of Occurrence	
	Configuration A	**Configuration D**
Concrete (waste tank top, sides, basemat, etc) starts to degrade hydraulically	2,500	500
Closure Cap reaches approximate steady state infiltration rate (11.5 in/yr)	2,625	2,625
Waste tank roof concrete transitions from Oxidized Region II to Oxidized Region III	5,352	2,285
Waste tank grout starts to degrade hydraulically	5,000	500
Concrete fully degraded hydraulically	5,000	501
Waste tank wall concrete transitions from Oxidized Region II to Oxidized Region III	6,401	17,057
Waste tank steel liner fails hydraulically	12,751	2,077
Waste tank annulus concrete transitions from Reducing Region II to Oxidized Region II	13,941	5,273
Waste tank basemat concrete transitions from Oxidized Region II to Oxidized Region III	14,149	3,394
Waste tank grout transitions from Reducing Region II to Oxidized Region II	16,080	5,765
CZ transitions from Reducing Region II to Oxidized Region II	16,080	5,765
Waste tank grout fully degraded hydraulically	18,900	501
Waste tank annulus concrete transitions from Oxidized Region II to Oxidized Region III	20,000+	20,000+
Waste tank grout transitions from Oxidized Region II to Oxidized Region III	20,000+	20,000+
CZ transitions from Oxidized Region II to Oxidized Region III	20,000+	20,000+

Table 4.4-4: Type IIIA Waste Tank Process Change Timeline

Change in Model Parameters	Year of Occurrence	
	Configuration A	Configuration D
Concrete (waste tank top, sides, basemat, etc) starts to degrade hydraulically	2,400	500
Closure Cap reaches approximate steady state infiltration rate (11.5 in/yr)	2,625	2,625
Waste tank roof concrete transitions from Oxidized Region II to Oxidized Region III	3,455	2,290
Waste tank grout starts to degrade hydraulically	4,800	500
Concrete fully degraded hydraulically	4,800	501
Waste tank wall concrete transitions from Oxidized Region II to Oxidized Region III	3,815	17,078
Waste tank steel liner fails hydraulically	12,751	2,077
Waste tank annulus concrete transitions from Reducing Region II to Oxidized Region II	13,885	5,269
Waste tank basemat concrete transitions from Oxidized Region II to Oxidized Region III	14,113	3,364
Waste tank grout transitions from Reducing Region II to Oxidized Region II	16,079	5,645
CZ transitions from Reducing Region II to Oxidized Region II	16,079	5,645
Waste tank grout fully degraded hydraulically	18,700	501
Waste tank annulus concrete transitions from Oxidized Region II to Oxidized Region III	20,000+	20,000+
Waste tank grout transitions from Oxidized Region II to Oxidized Region III	20,000+	20,000+
CZ transitions from Oxidized Region II to Oxidized Region III	20,000+	20,000+

Table 4.4-5: Type IV Waste Tank Process Change Timeline

Change in Model Parameters	Year of Occurrence	
	Configuration A	Configuration D
Concrete (waste tank top, sides, basemat, etc) starts to degrade hydraulically	400	500
Waste tank roof concrete transitions from Oxidized Region II to Oxidized Region III	893	1,049
Waste tank grout starts to degrade hydraulically	800	500
Concrete fully degraded hydraulically	800	501
Waste tank wall concrete transitions from Oxidized Region II to Oxidized Region III	2,973	5,228
Closure Cap reaches approximate steady state infiltration rate (11.5 in/yr)	2,625	2,625
Waste tank steel liner fails hydraulically	3,638	75
Waste tank basemat concrete transitions from Oxidized Region II to Oxidized Region III	4,526	1,013
Waste tank grout transitions from Reducing Region II to Oxidized Region II	10,456	5,957
CZ transitions from Reducing Region II to Oxidized Region II	10,456	5,957
Waste tank grout transitions from Oxidized Region II to Oxidized Region III	20,000+	20,000+
CZ transitions from Oxidized Region II to Oxidized Region III	20,000+	20,000+
Waste tank grout fully degraded hydraulically	20,000+	501

The Simplified model flow process for a single waste tank is provided below.

4.4.3.1 Closure Cap

A flow rate leaving the closure cap over time is determined in the closure cap sub-model. The infiltration rate into the closure cap top is based on the rainfall rates and the closure cap material properties (which are discussed in detail in Section 4.2.3.2.1). The flow rate out of the cap is calculated using the HELP code, with the closure cap modeled as degrading over time. The flow rate through the closure cap reaches a steady state value at approximately year 2500. Table 3.2-10 provides the time-variant infiltration rates based on the closure cap analysis presented in Section 3.2.4.

4.4.3.2 Waste Tank Top

The flow leaving the closure cap travels to the waste tank, with the flow rate being affected by the concrete tank top. Based on the relative hydraulic properties of the two materials (soil vs. concrete), some flow is directed around the waste tank into the surrounding soil, while some flow travels downward through the concrete. The concrete material properties (which are discussed in detail in Section 4.2.3.2.3) are modeled as changing over time. The only waste tank top material properties of concern are the hydraulic properties, since the tank top impacts flow but does not retard contaminant transport (contaminant transport is only modeled as occurring near the CZ at the bottom of the tank). The waste tank top hydraulic properties are defined initially and in the fully degraded state, and a cementitious materials degradation analysis was performed to determine the time it would take to reach the fully degraded state (Table 4.2-32). Once the initial and end state times are set, the model assumes linear degradation of the hydraulic properties over time.

4.4.3.3 Waste Tank Top Liner

After passing through the concrete waste tank top, flow leaving the cap travels into the tank grout (for Type IV tanks and Type I/III/IIIA tanks after liner failure), or reaches the top of the tank liner and is deflected away from the tank (for Type I/III/IIIA tanks before liner failure time). The liner failure time was determined by an independent sub-model analysis (described in Section 4.2.3.2.5) for each tank type (the Type IV tanks do not have a top liner). Prior to failure the liner is modeled as being impermeable to both advection and diffusion. After failure, the liner has no further impact in the model.

4.4.3.4 Waste Tank Grout

Water enters the top of the waste tank grout and travels downward to the CZ at the bottom of the tank. The waste tank grout material properties (e.g., hydraulic conductivity, K_ds, which are discussed in detail in Section 4.2.3.2.3) are modeled as changing over time. In some configurations used in the sensitivity analyses (Section 4.4.2), fast flow paths through the grout are modeled resulting in a higher flow rate through the grout. The hydraulic properties are defined initially and in the fully degraded state, and a cementitious materials degradation analysis was performed to determine the time it would take to reach the fully degraded state (Table 4.2-32). Once the initial and end state times are set, the model assumes linear degradation of the grout hydraulic properties over time.

Table 4.2-33, provides K_d values for cementitious materials as a function of aging, with the grout "age" dependent on the pH of the concrete pore water, which in turn is dependent upon the amount of water (number of pore volumes) that has passed through the concrete over time. A description of pore water chemistry modeling is provided in the Section 4.4.3.5.

The grout material properties of principal concern are the hydraulic properties, since the only time the K_d values are a factor in the model are when contaminants move upward from the CZ into the grout. The only time frame in which upward contaminant transfer is significant is for the Type IV tanks, which do not have a top steel liner, so that prior to liner failure, flow into the Type IV tanks may be contained, forcing contaminants to flow upwards into the grout. The contaminant transport is impacted by the K_d values as it moves into and out of the grout. The grout hydraulic properties influence the water flow rate through the waste tank. The earlier the grout degrades, the earlier the flow rate through the waste tank reaches a steady state maximum flow.

4.4.3.5 Contamination Zone

In the model, the waste tank residual inventory is assumed to be contained within a thin layer (i.e., the CZ) at the bottom of the tank. The release rate of contaminants from the CZ is solubility controlled and is tied to the chemical properties (e.g., E_h, pH) of the tank pore water. The release rate from the CZ is independent of the grout or CZ K_ds. The assumed solubility limit varies depending on waste tank pore water chemistry and the controlling phase of the radionuclide being released. Different solubility limits for different waste tank chemistries were derived for the radionuclides in the CZ (as discussed in Section 4.2.2). Additional emphasis and analysis was placed on those radionuclides shown during initial modeling to have the most impact on peak dose (Pu, Np, U, Tc), including an uncertainty study and development of stochastic distributions for alternative controlling phases (Section 4.2.2.3).

As pore volumes pass through the waste tank, the pH and reducing capability of the grout is affected. The number of pore water volumes passing through the waste tank and the corresponding transitions to different tank chemistry conditions is included in the FTF modeling. As part of the waste release modeling (discussed in detail in Section 4.2.2), the estimated transition times between various chemical phases was calculated for the waste tank pore water. The waste tank pore water chemistry was calculated to change from Region II Reduced conditions (Middle Age Reducing) to Region II Oxidized conditions (Middle Age Oxdizing) after 371 pore volumes have passed through the reducing grout. The change from Region II conditions (Middle Age) to Region III conditions (Old Age) was calculated to occur after 2,063 pore volumes (Table 4.2-1).

4.4.3.6 Tank Liner Sides and Bottom

After leaving the CZ and entering the tank pore water, the tank contaminants do not leave the tank until the tank liner fails. For the Type IV tanks (which do not have a top liner) waste leaving the CZ can migrate into the waste tank grout (based on the grout properties) since it can’t flow downward. The liner failure time was determined by analysis for each tank type, with both the primary and secondary liner (where applicable) failing at the same time. While it utilizes many of the same assumptions, the tank liner analyses calculate failure times independent of the flow and transport model. As discussed in Section 4.4.3.3, when the liner fails, it is assumed to fail completely, with the modeled failed liner layer having no further impact in the model.

4.4.3.7 Basemat

After contaminants exit the waste tank liner, they enter the concrete tank basemat located directly below the liner. The waste tank grout material properties (which are discussed in detail in Section 4.2.3.2.3) are modeled as changing over time. The material properties of the concrete impact both the flow rate through the basemat and the K_d value. The hydraulic properties are defined initially and in the fully degraded state, and a cementitious materials degradation analysis was performed to determine the time it would take to reach the fully degraded state (Table 4.2-32). Once the initial and end state times are set, the model assumes linear degradation of the basemat hydraulic properties over time. In some sensitivity configurations, fast flow paths through the basemat are modeled resulting in a higher flow rate through the basemat.

Contaminant transport is retarded by the basemat concrete, with some radionuclides being slowed greatly depending on their K_ds. Table 4.2-33, provides K_d values for cementitious materials as a function of aging, with the grout "age" dependent on the pH of the concrete pore water, which in turn is dependent upon the amount of water (number of pore water volumes) that has passed through the concrete over time. A description of pore water chemistry modeling is provided in the Section 4.4.3.5. As the waste tank chemistry changes, the concrete transitions from young (Region I) to middle (Region II) to old (Region III), and the associated material properties are modeled as changing.

4.4.3.8 Vadose Zone Beneath the Waste Tank

After contaminants exit the basemat, they enter the vadose zone (e.g., soil) beneath the waste tank, which is discussed in detail in Section 4.2.3.2.2. The vadose zone material properties impact both the flow rate through the soil and the associated K_d values, with both being important to the model. The vadose zone depth below each waste tank can vary depending on the tank involved, as shown in Table 4.2-23. The vadose zone material properties are not modeled as changing over time. In the probabilistic model however, the vadose zone thickness was allowed to vary, which did impact transport time through the soil. The working slabs under waste tank basemats were not explicitly modeled and instead were simply assumed to be soil. Given the thinness of the working slabs relative to the waste tank basemats, as well as the possibility of cracks in the working slabs, it is appropriate to disregard the working slabs in modeling contaminant transport through the waste tank bottom and basemat into the vadose zone.

4.4.4 Modeling Process

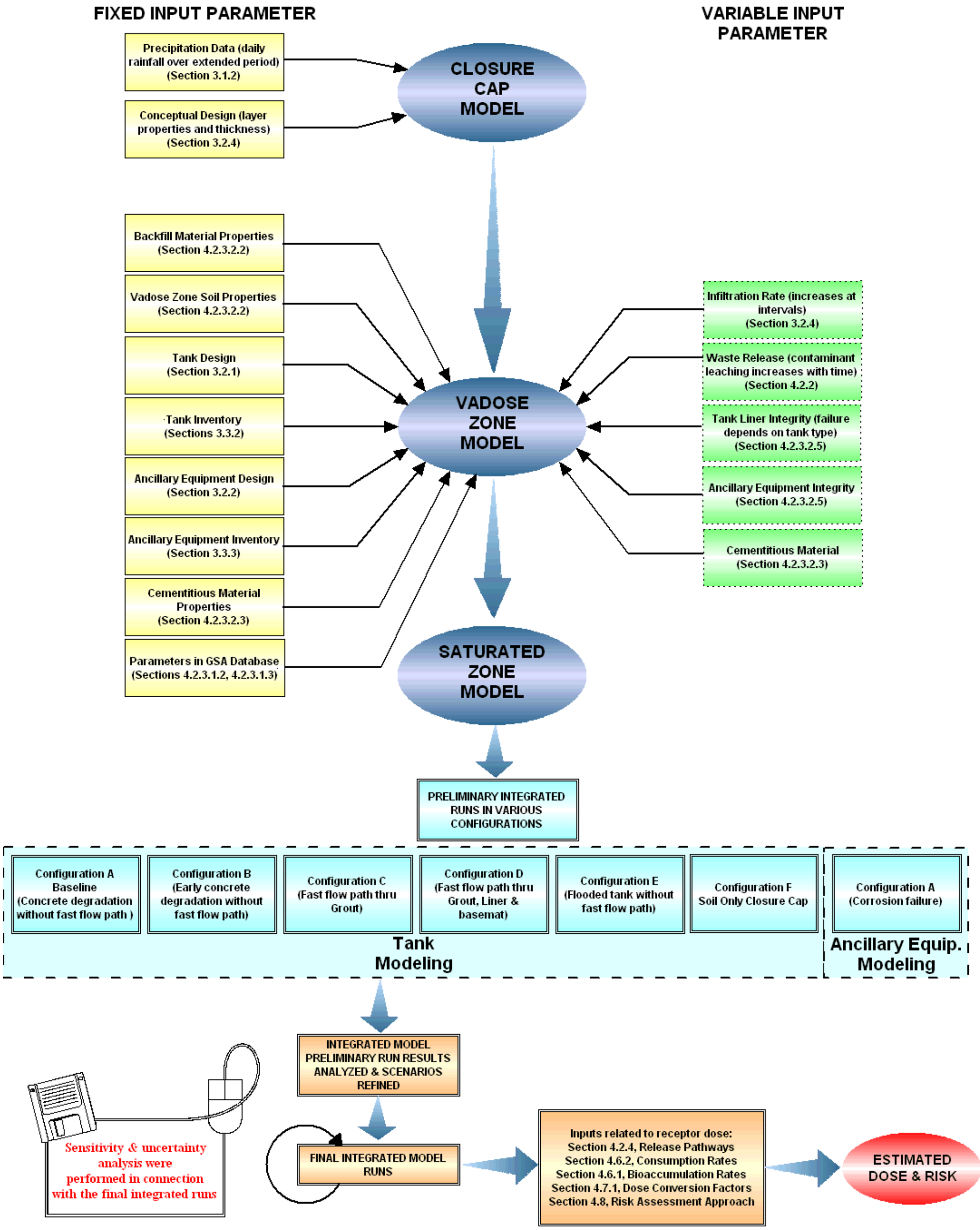
Figure 4.4-11 illustrates the general process followed in implementing the ISCM and presents the three component models and their key inputs.

Some inputs, as indicated by the legend on Figure 4.4-11, involved fixed parameters that do not change over time. These are generally shown on the left side of the figure. The inputs on the right side of the figure do change over time.

As shown in Figure 4.4-11, and as explained previously, six waste tank configurations and one ancillary equipment configuration were used for the probabilistic model runs, which are accomplished using the applicable computer codes identified in Section 4.3. These configurations are analyzed by running the model using different combinations as discussed above. The PORFLOW FTF model was used to simulate the flow behavior for the six configurations. The baseline results are reflected through Tank Configuration A PORFLOW FTF contaminant transport modeling. Uncertainty and sensitivity and analyses were also performed using the multiple configurations and variations of the individual parameters modeled as part of a configuration. The GoldSim model used the PORFLOW FTF model flow results and other parameter distributions to provide a range of possible outcomes, and to identify those parameters of most interest.

The Base Case analysis provided baseline contaminant concentrations in groundwater and surface water. The data for radiological contaminants was used in combination with the inputs related to receptor dose shown on Figure 4.4-11 to calculate impacts on various receptors. The data for non-radiological contaminants was used as specified in Section 4.8 to determine the resulting risk.

Figure 4.4-11: Model Process Flow

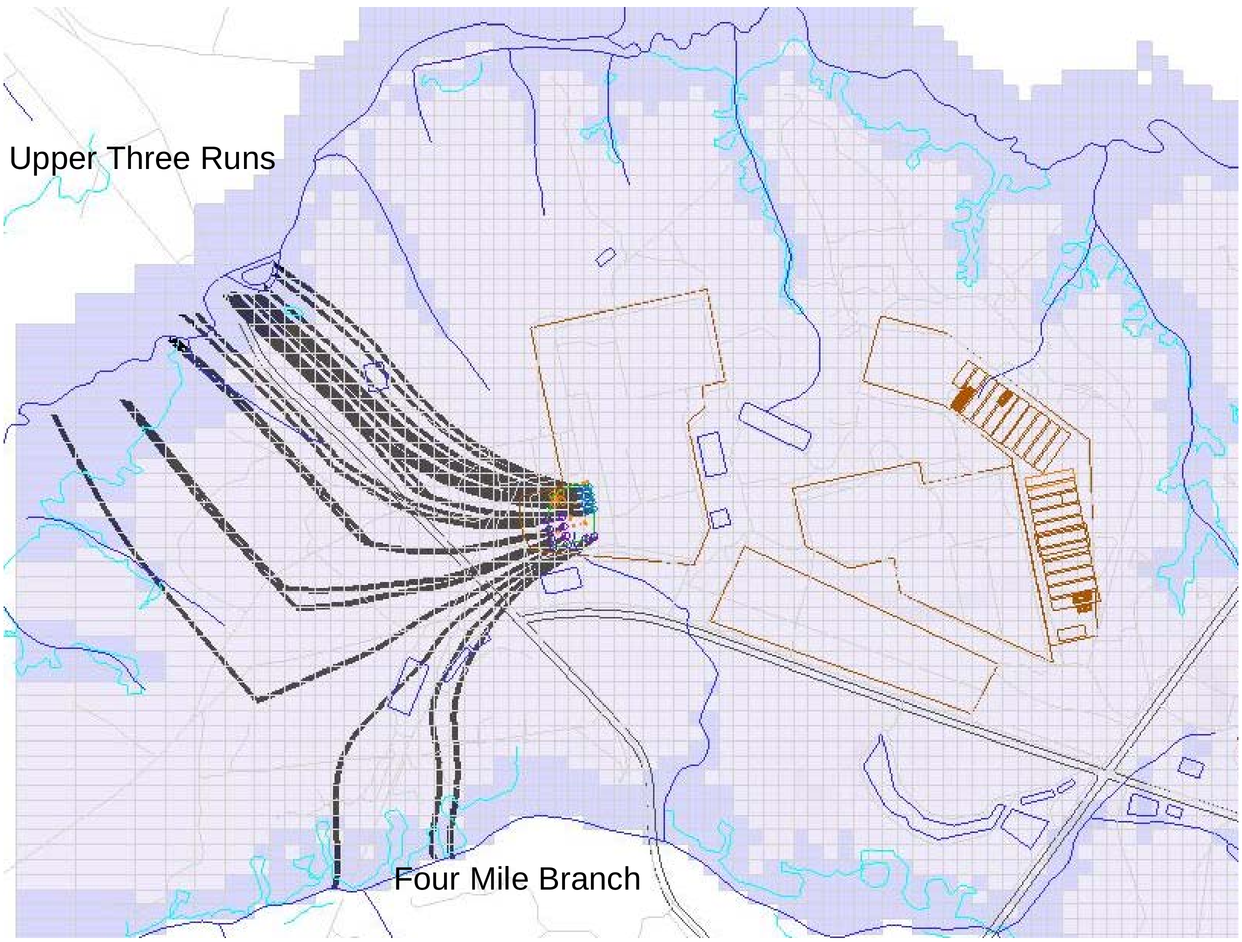


4.4.4.1 PORFLOW Modeling Process

4.4.4.1.1 Regional (GSA) and Local (FTF) Modeling in PORFLOW

The PORFLOW computer code was used to model FTF flow for all configurations and transport for the Base Case. Regional (GSA) modeling in PORFLOW was developed using a 200 foot x 200 foot grid, with the primary focus being on seepline concentration (Figure 4.4-12). Most of the groundwater flow paths discharge to UTR, which more deeply incises the terrain in comparison to Fourmile Branch. The abrupt clockwise turn in some pathlines coincides with passage through the Gordon confining unit from the UTR Aquifer to the Gordon Aquifer. The two aquifers exhibit different flow directions in this area.

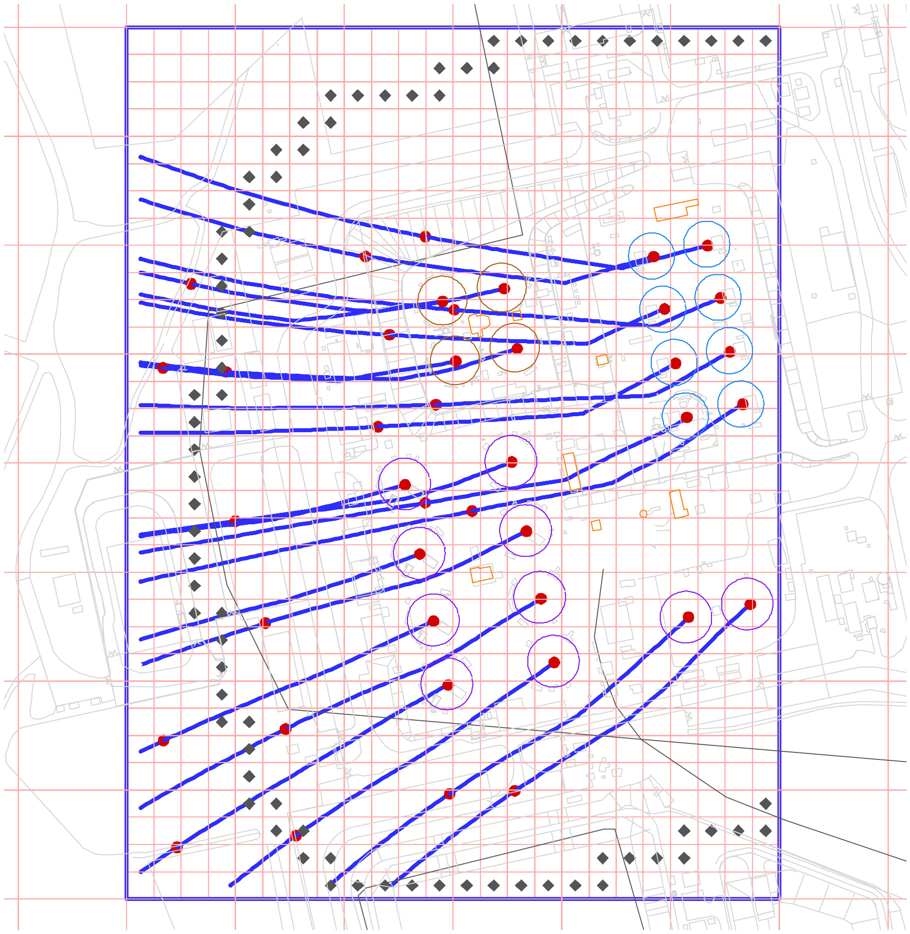
Figure 4.4-12: PORFLOW GSA Modeling



FTF modeling was developed from GSA scale model using a 50 foot x 50 foot grid refinement, with the primary focus being on the 1m and 100m concentrations (Figure 4.4-13). A grid resolution finer than 200 feet x 200 feet is required to avoid excessive numerical dispersion at the 100m scale. The FTF velocity field is generated directly from the coarser scale GSA velocity model using a mass-conserving linear interpolation scheme, rather than a separate flow model requiring its own boundary conditions and properties. This approach ensures strict consistency between the two aquifer flow fields, apart from resolution. The FTF velocity field includes the entire vertical extent of the GSA model within the horizontal confines of the FTF domain. The stream tracers from the FTF waste tanks are shown in Figure 4.4-13 as blue lines emanating from the tank centerlines (red dots). Ten year time markers (red dots located along the stream traces) indicate a 10 – 20 year travel time in the saturated zone between waste tanks and the 100m perimeter (grey diamonds). In aquifer transport modeling, hydrodynamic dispersion is represented by longitudinal and transverse dispersivities of 10m and 1m, respectively, which are 10% and 1% of a nominal 100m plume travel distance. Both the GSA and FTF scale models have been shown to preserve mass to adequate tolerances. [WSRC-TR-2004-00106, Q-SQP-G-00003] The approach used to address numerical dispersion in the FTF PORFLOW model is the same approach addressed in SRNL-STI-2009-00115, Section 4.3 for the Saltstone Disposal Facility (SDF) PA model. [SRR-CWDA-2009-00017] The relevant discussion from SRNL-STI-2009-00115 is as follows:

> "A grid resolution finer than 200 ft. x 200 ft. is required to avoid excessive numerical dispersion at the 100m plume scale. The amount of numerical dispersion depends on the numerical algorithm, grid spacing, and time stepping. For one-dimensional finite difference simulation using upstream spatial weighting and central temporal differencing, the effective dispersivity arising from numerical dispersion alone is equal to $\Delta x/2$, where Δx is the grid resolution. Typical modeling practice, arising from field scale tracer tests, is to assume a longitudinal dispersivity that is 10% of the plume travel distance. For SDF aquifer simulations, the length scale is taken as 100m and an appropriate physical dispersivity is 10 m. An adequate grid resolution for 100m plume simulations is 50 ft. or 15m. Numerical dispersion associated with this resolution is thus equivalent to a dispersivity less than 8m. Therefore, a fifty mesh spacing does not introduce excessive numerical dispersion. This conclusion is supported by numerical studies presented in Section 6 of WSRC-STI-2007-00150."

Figure 4.4-13: PORFLOW FTF Modeling



4.4.4.1.2 General Vadose Zone Tank Modeling in PORFLOW

The waste tanks and surrounding vadose zone soils are modeled in PORFLOW as an axisymmetric, two-dimensional, radial cut (unit radian pie wedge). Up to 20 distinct material zones are used in PORFLOW to represent different materials and to reflect different flow scenarios (e.g., fast flow paths). Approximately 5,000 grid blocks were used to represent each of the four different tank types (grid varies with tank type). A graphic depiction of the PORFLOW grids modeling for the various tank types, including a lower corner detail, is provided in Figures 4.4-14 through 4.4-19 (the Type IIIA tanks are similar to the Type III tanks, so no separate graphic is shown). It should be noted that the color variations within Figures 4.4-14 through 4.4-20 denote different modeling segments. Figure 4.4-20 shows a portion of the fast flow path (when activated) for a Type IV tank. Tank depth to the vadose zone is modeled as a uniform depth for a particular tank type (i.e., one depth for all Type I tanks) using an average of the values in Table 4.2-23 for the associated tank type. The chosen grid resolution is a compromise between two competing objectives: 1) resolution of thin geometric features (e.g., CZ, liners) and sharp flow field transitions (e.g., ponded water flowing over roof edge), and 2) achieving reasonable computer storage and runtimes. Each grid extends 30 feet beyond the outside radius of a waste tank to represent average conditions. At certain angles, obstructions such as adjacent waste tanks are present at shorter distances. A sensitivity study indicates insignificant impact on water table flux for a grid extending to the shorter half-distance between waste tanks. PORFLOW material properties for native soil utilize Section 4.2.3.2.2 parameters for vadose zone soil and for backfill utilize Section 4.2.3.2.2 parameters for backfill soil. Figures 4.4-21 through 4.4-32 display the flow fields for the various tank types over time. The figures are color coded to show the areas of highest saturation (dark blue) and have arrows which denote the flow magnitude. The figures show how PORFLOW models flow and how flow changes over time, affecting tank changes (e.g., cap degradation, grout degradation, liner failure).

Hydrodynamic dispersion is neglected in vadose transport modeling, because most materials are homogeneous (e.g., concrete) or relatively so (e.g., backfilled soil). Preferential flow pathways through cracks, fractures, or other discrete features are modeled using one of two methods, depending on scale. Small-scale features are implicitly represented as a general increase in saturated hydraulic conductivity within a porous medium formulation. Large-scale features are explicitly represented in a porous medium formulation as discrete zones of high permeability (e.g., sand seam). A porous, rather than fractured, medium approach was considered superior because: 1) smaller scale crack/fracture geometry and other properties have not been defined for the degraded material of interest; 2) the scenarios of interest for the FTF PA can be adequately represented in the simpler porous medium approach.

Figure 4.4-14: PORFLOW Type I Tank Model

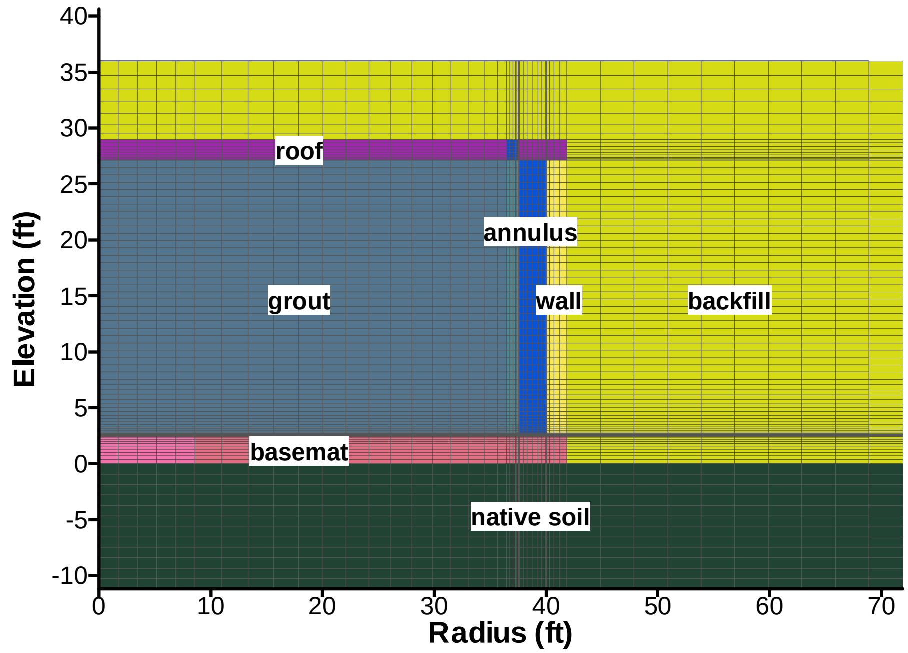


Figure 4.4-15: PORFLOW Type I Tank Model, Lower Corner Details

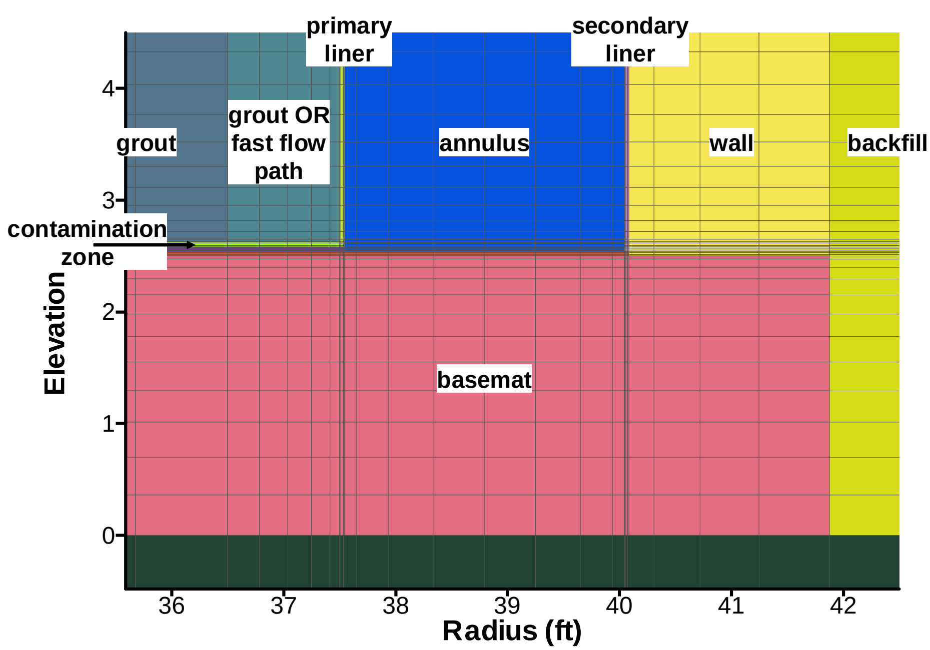


Figure 4.4-16: PORFLOW Type III Tank Model Details

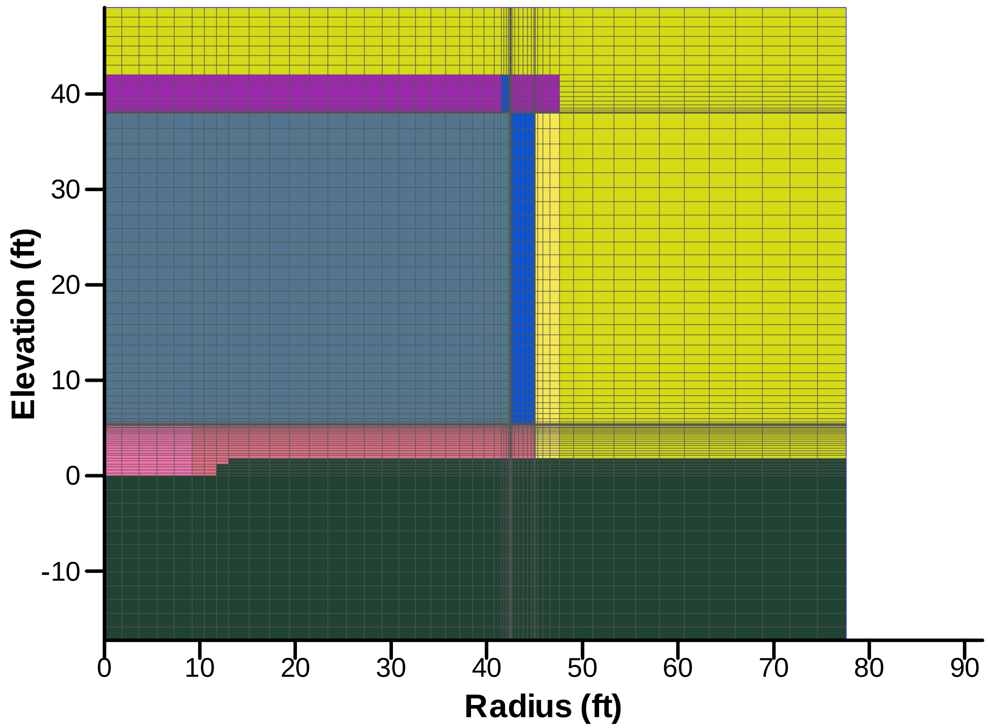


Figure 4.4-17: PORFLOW Type III Tank Model, Lower Corner Details

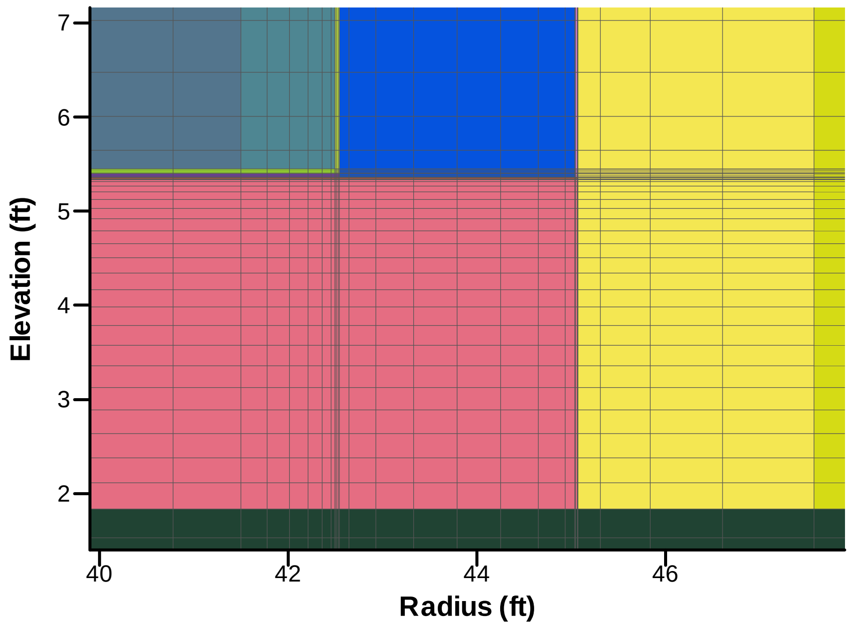


Figure 4.4-18: PORFLOW Type IV Tank Model, Domed Roof Explicitly Modeled

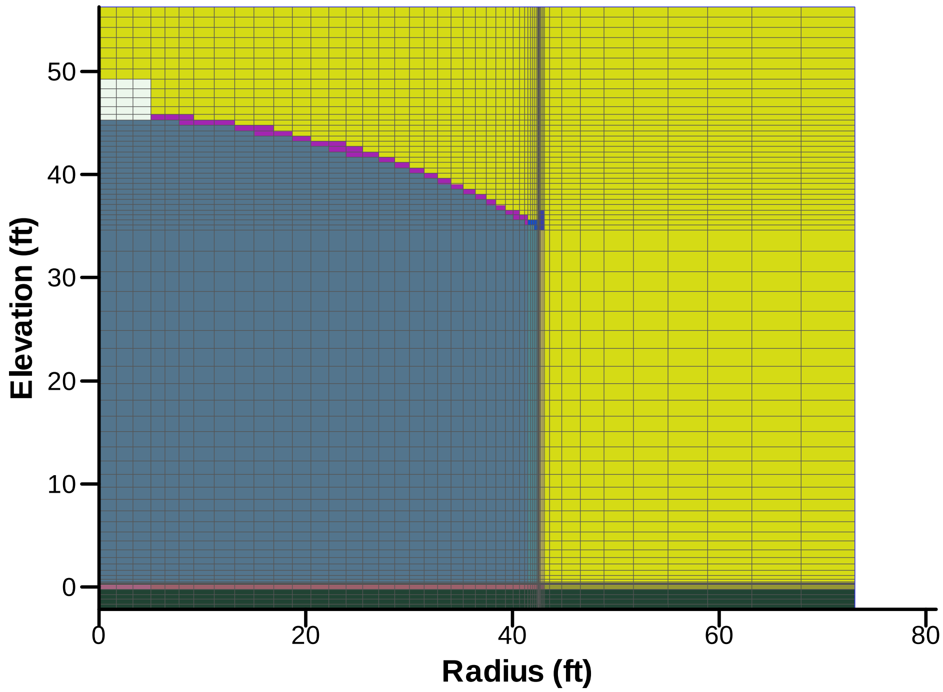


Figure 4.4-19: PORFLOW Type IV Tank Model Lower Corner Detail

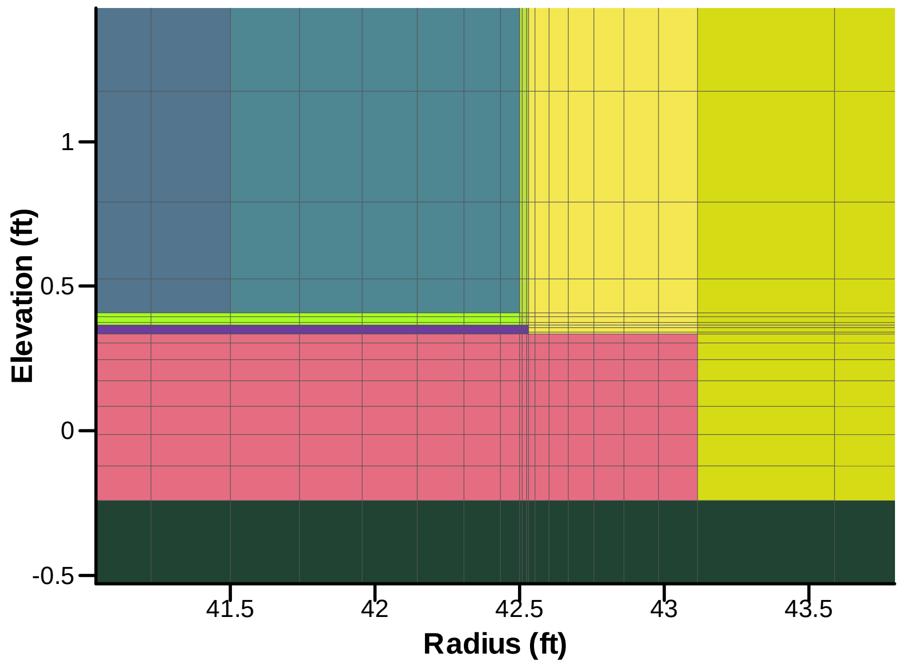


Figure 4.4-20: PORFLOW Type IV Tank Model Tank Top Corner Detail

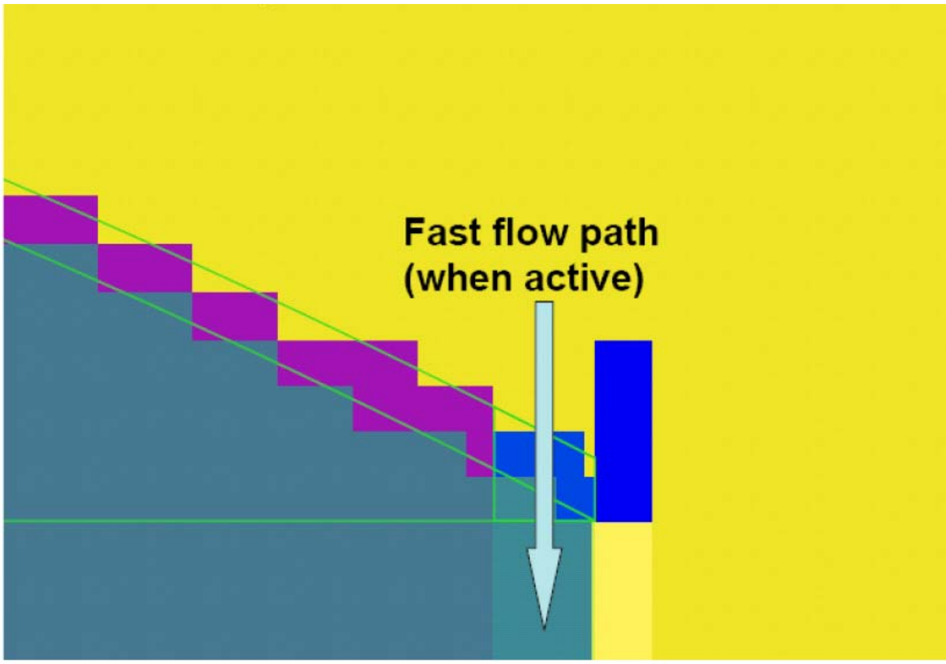
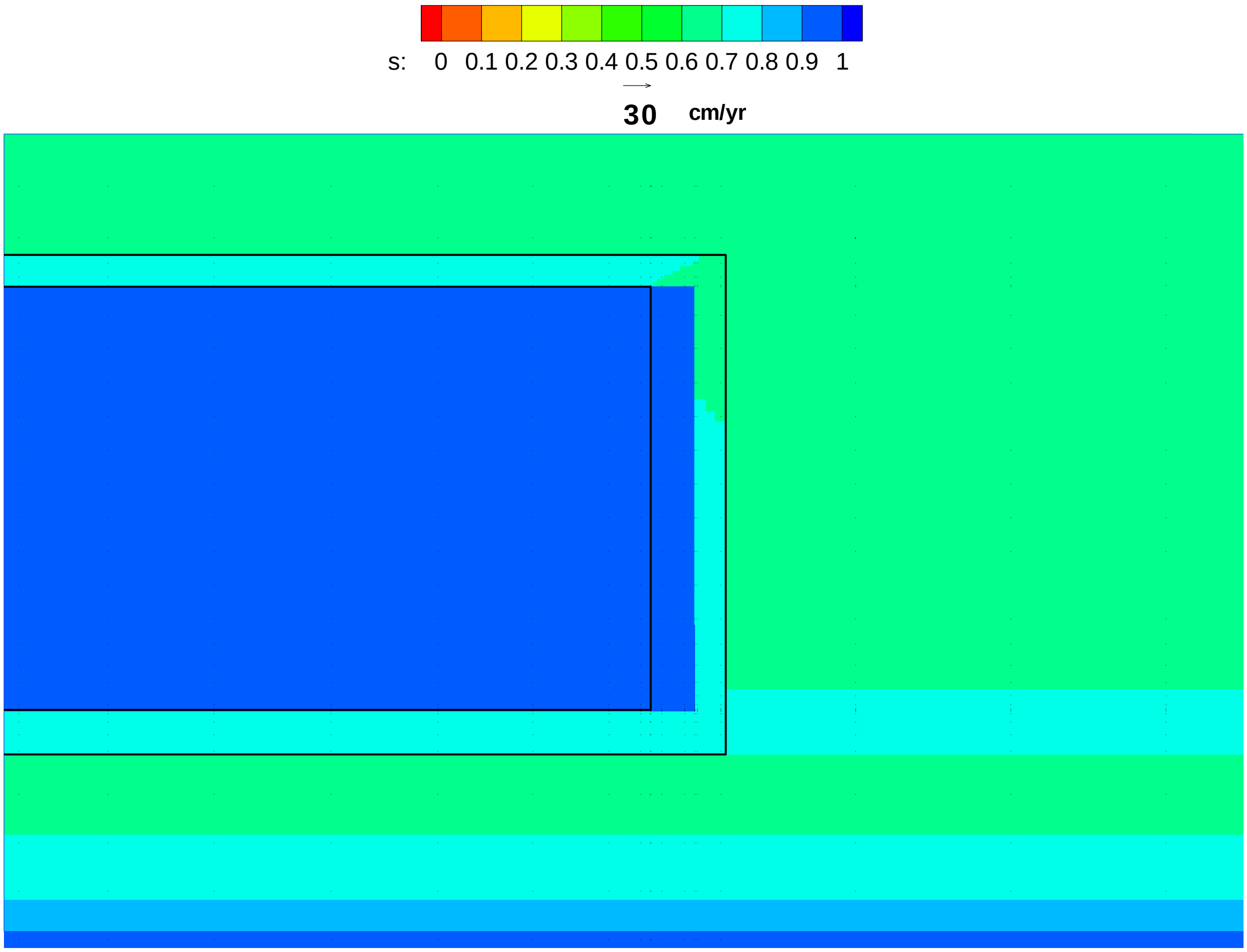
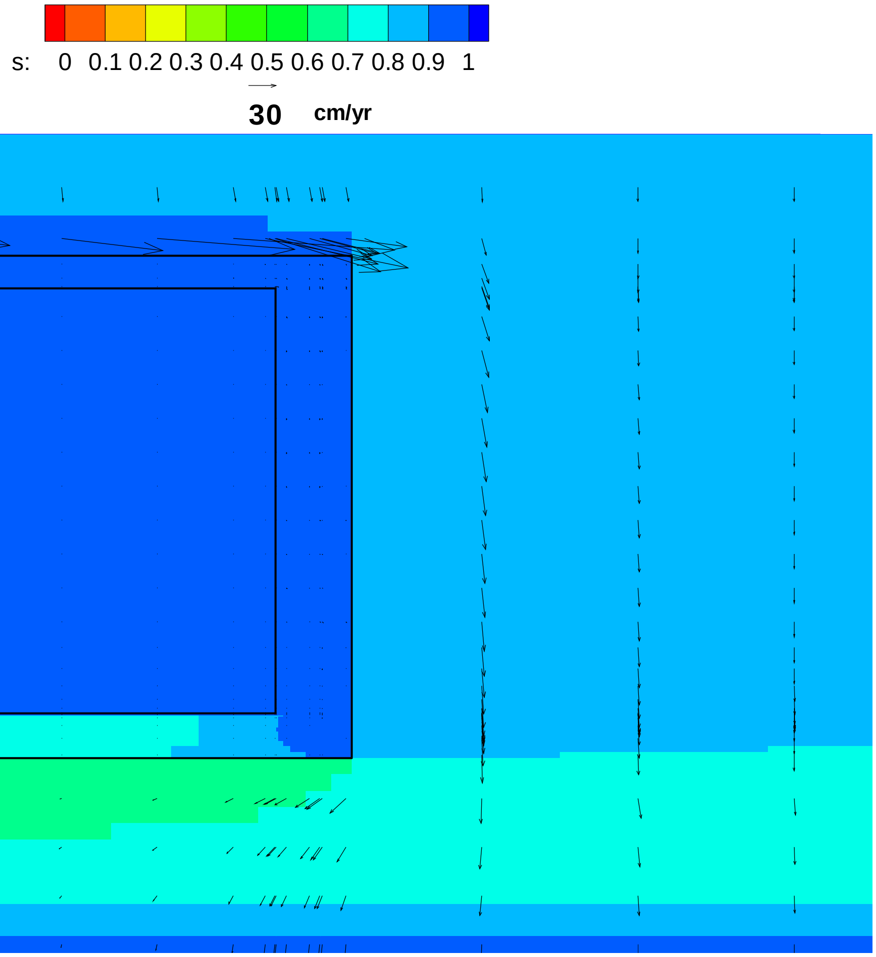


Figure 4.4-21: Type I Tank Flow Field – Year 100



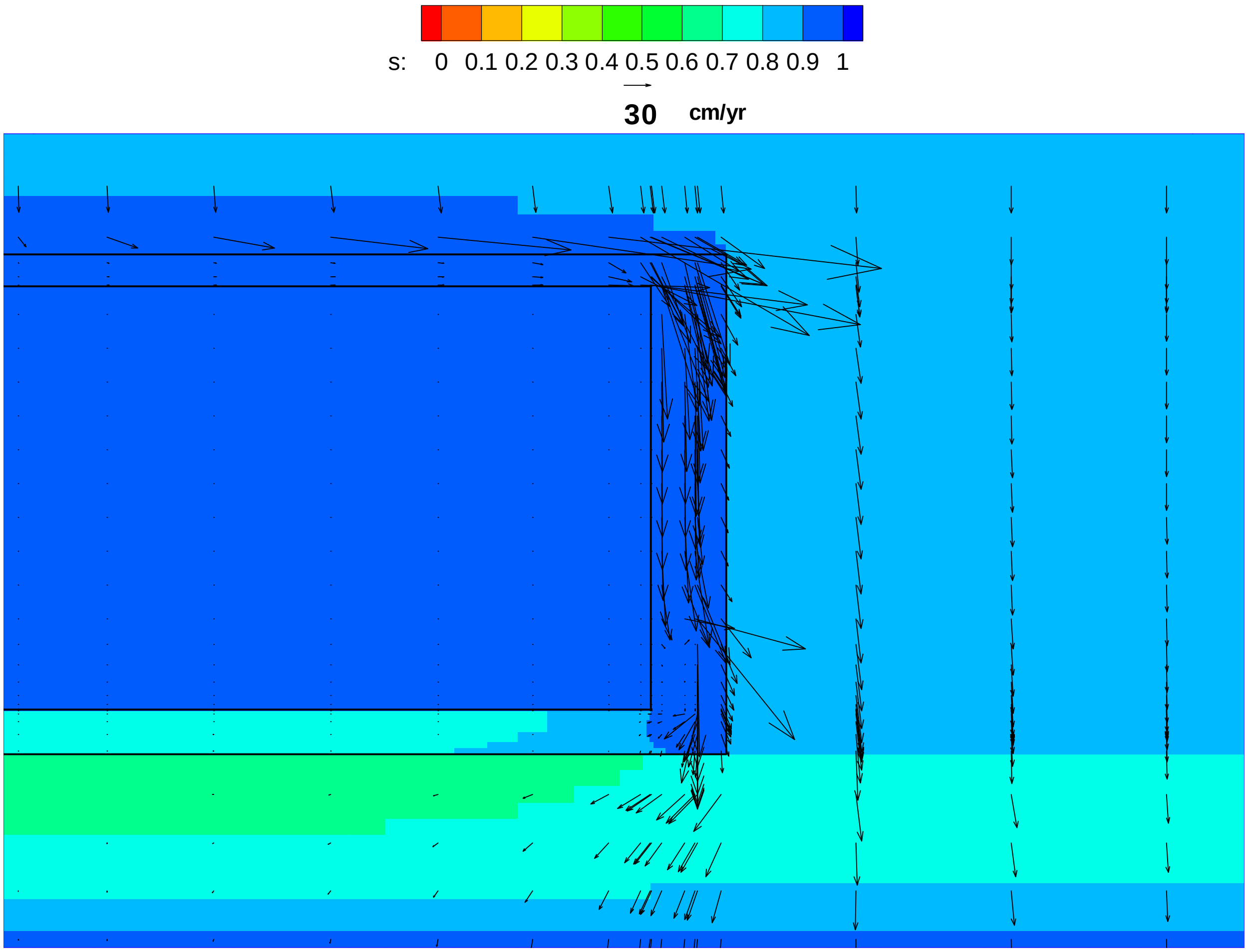
(s: = saturation)

Figure 4.4-22: Type I Tank Flow Field – Year 10,000



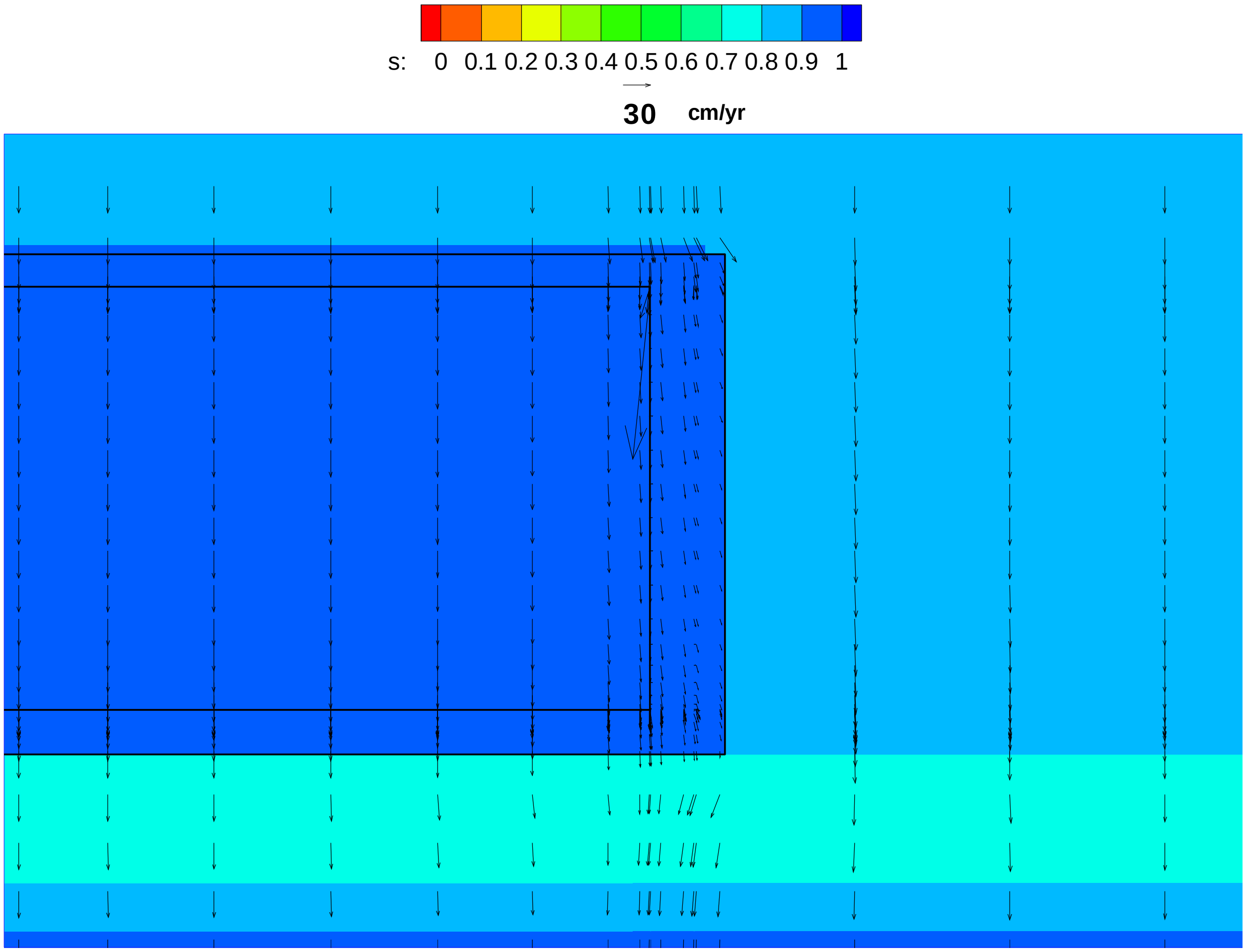
(s: = saturation)

Figure 4.4-23: Type I Tank Flow Field – Immediately Prior to Liner Failure



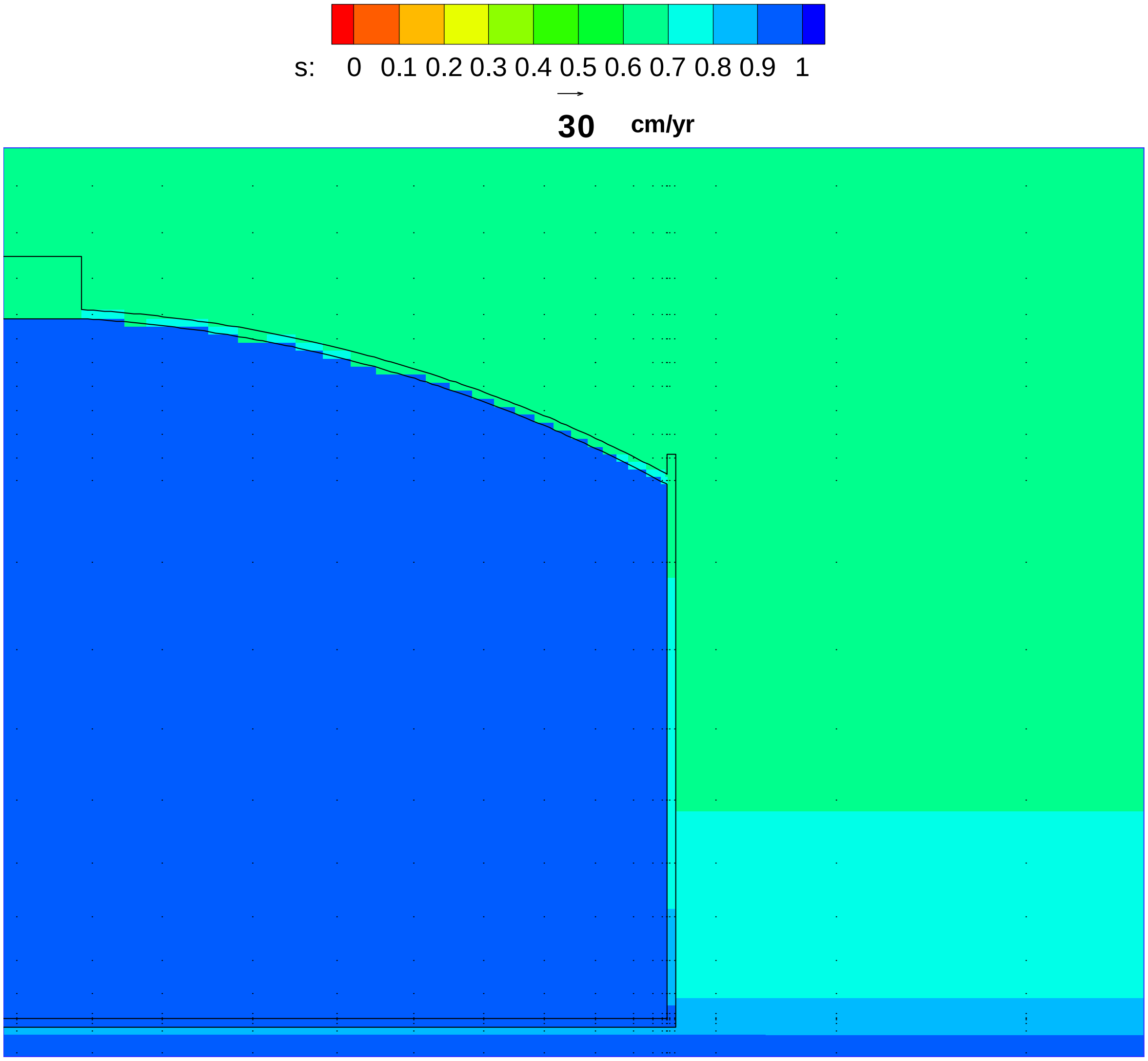
(s: = saturation)

Figure 4.4-24: Type I Tank Flow Field – Year 20,000



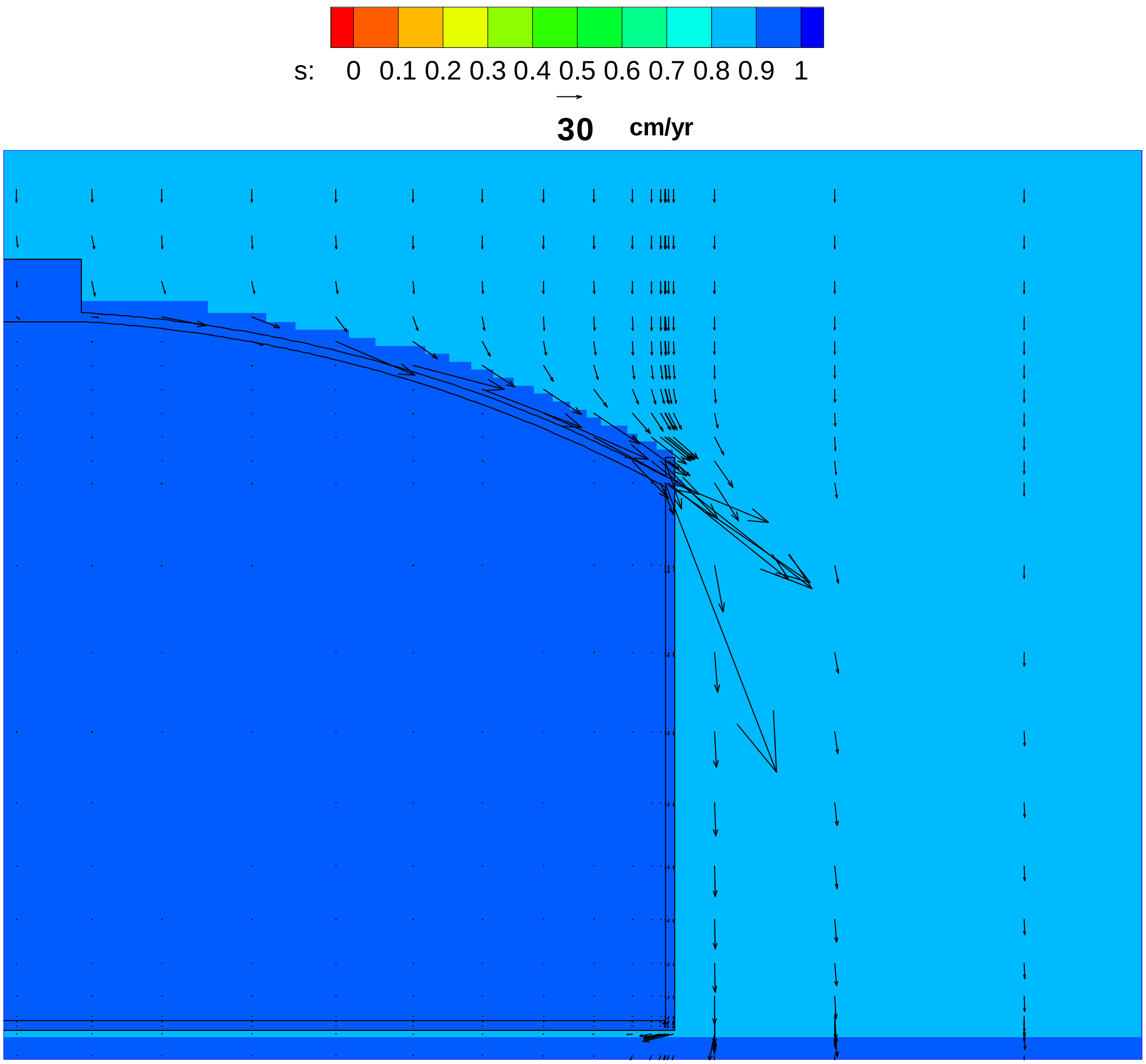
(s: = saturation)

Figure 4.4-25: Type IV Tank Flow Field – Year 100



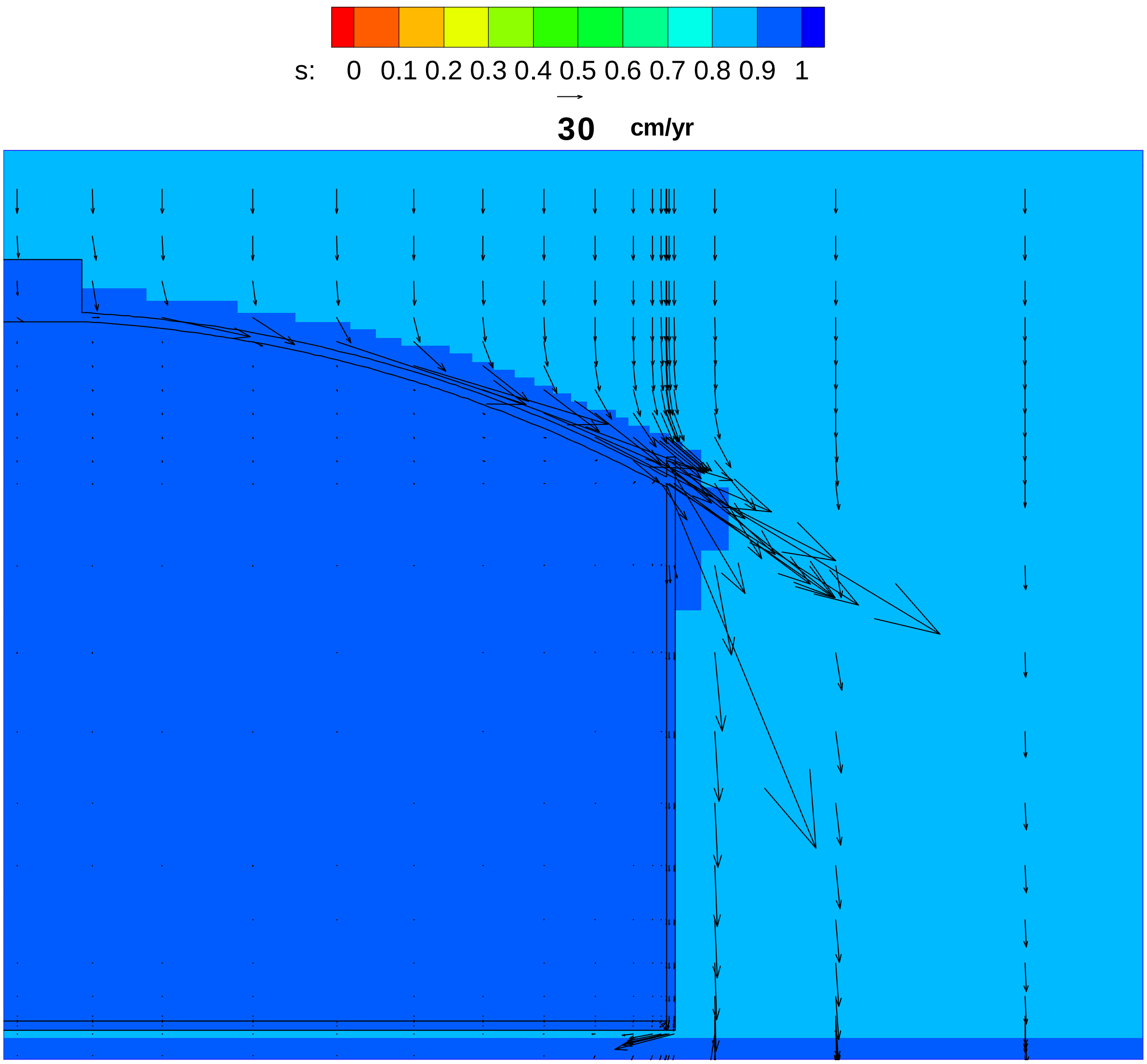
(s: = saturation)

Figure 4.4-26: Type IV Tank Flow Field – Immediately Prior to Liner Failure



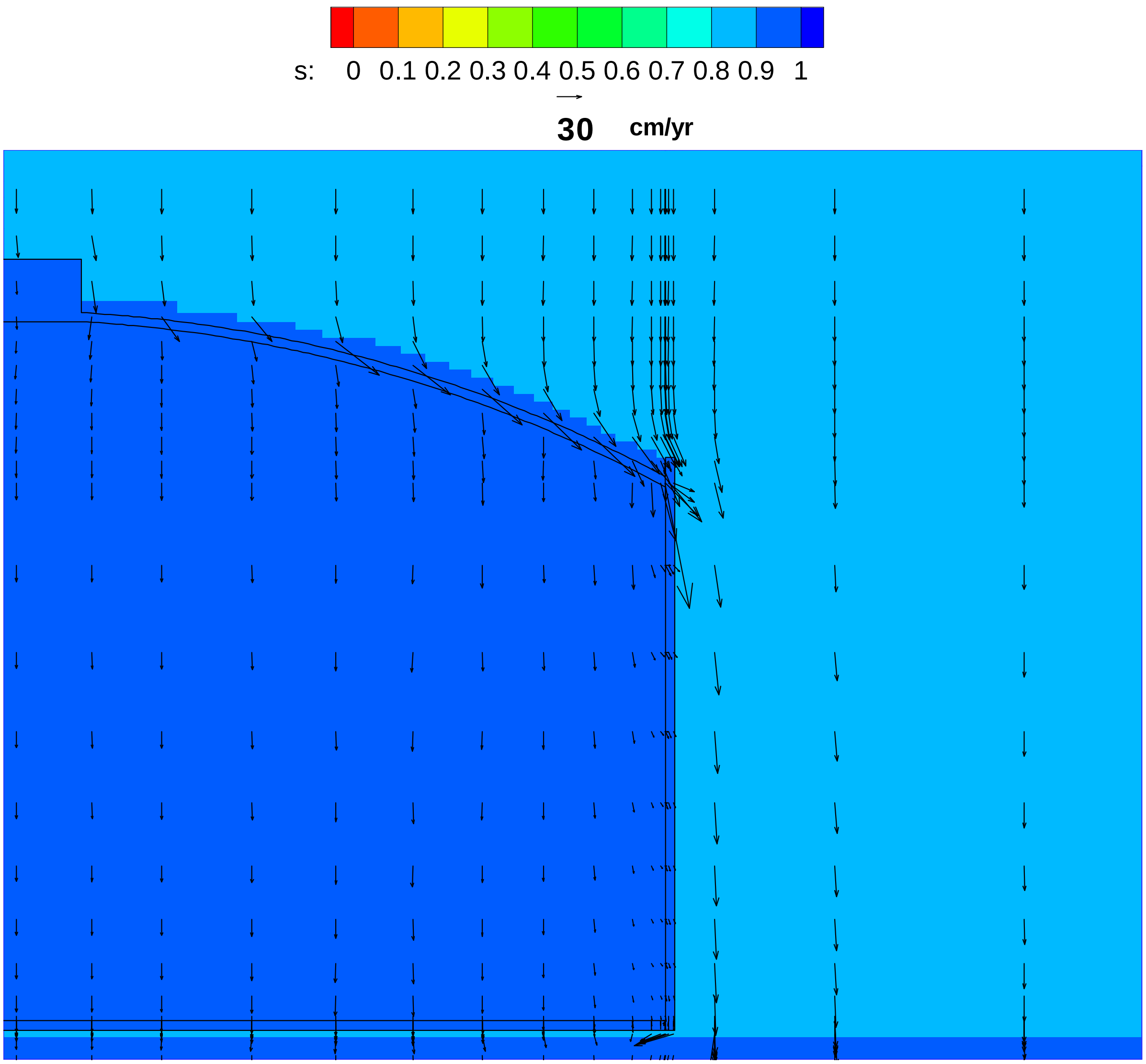
(s: = saturation)

Figure 4.4-27: Type IV Tank Flow Field – Year 10,000



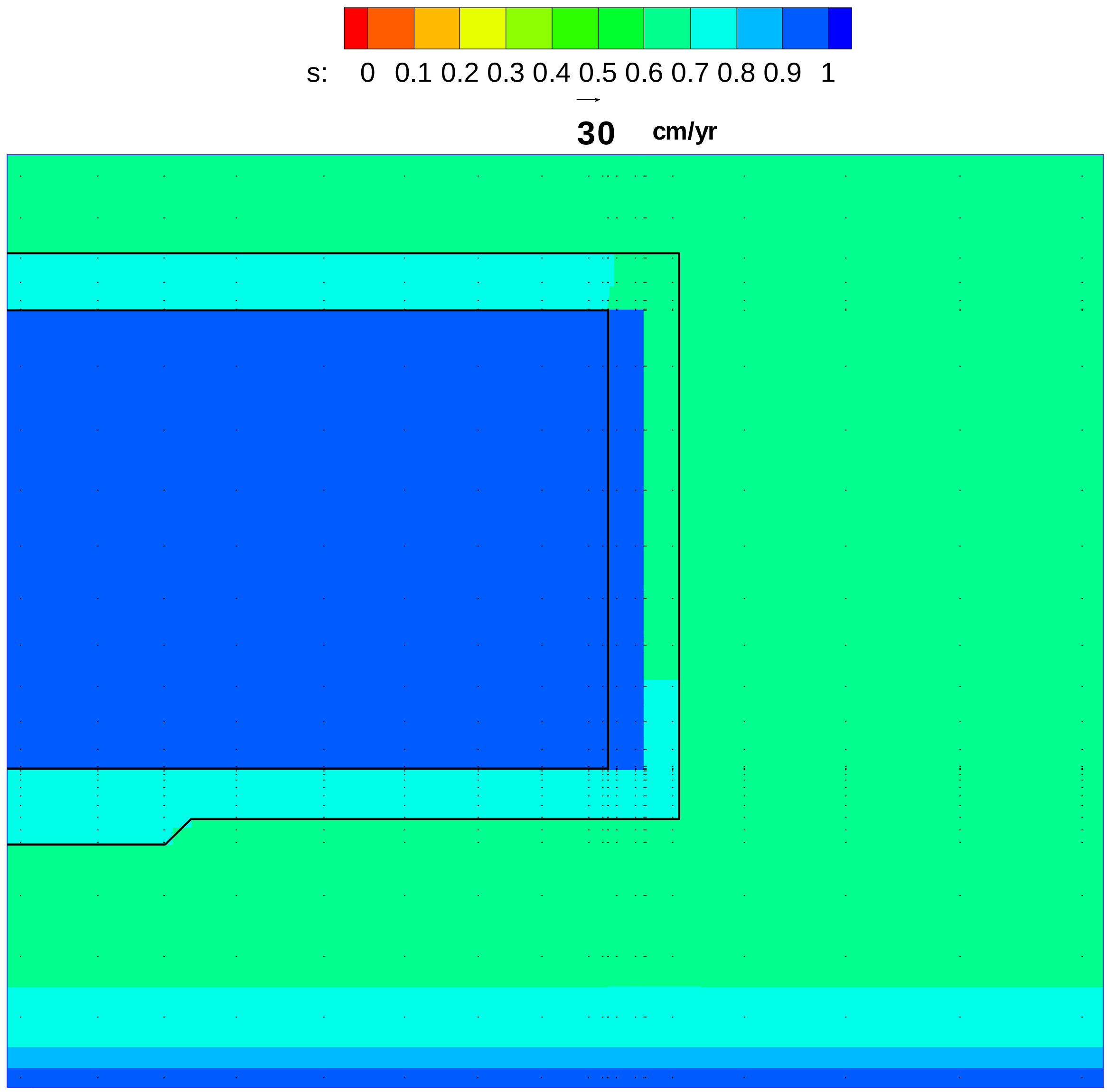
(s: = saturation)

Figure 4.4-28: Type IV Tank Flow Field – Year 20,000



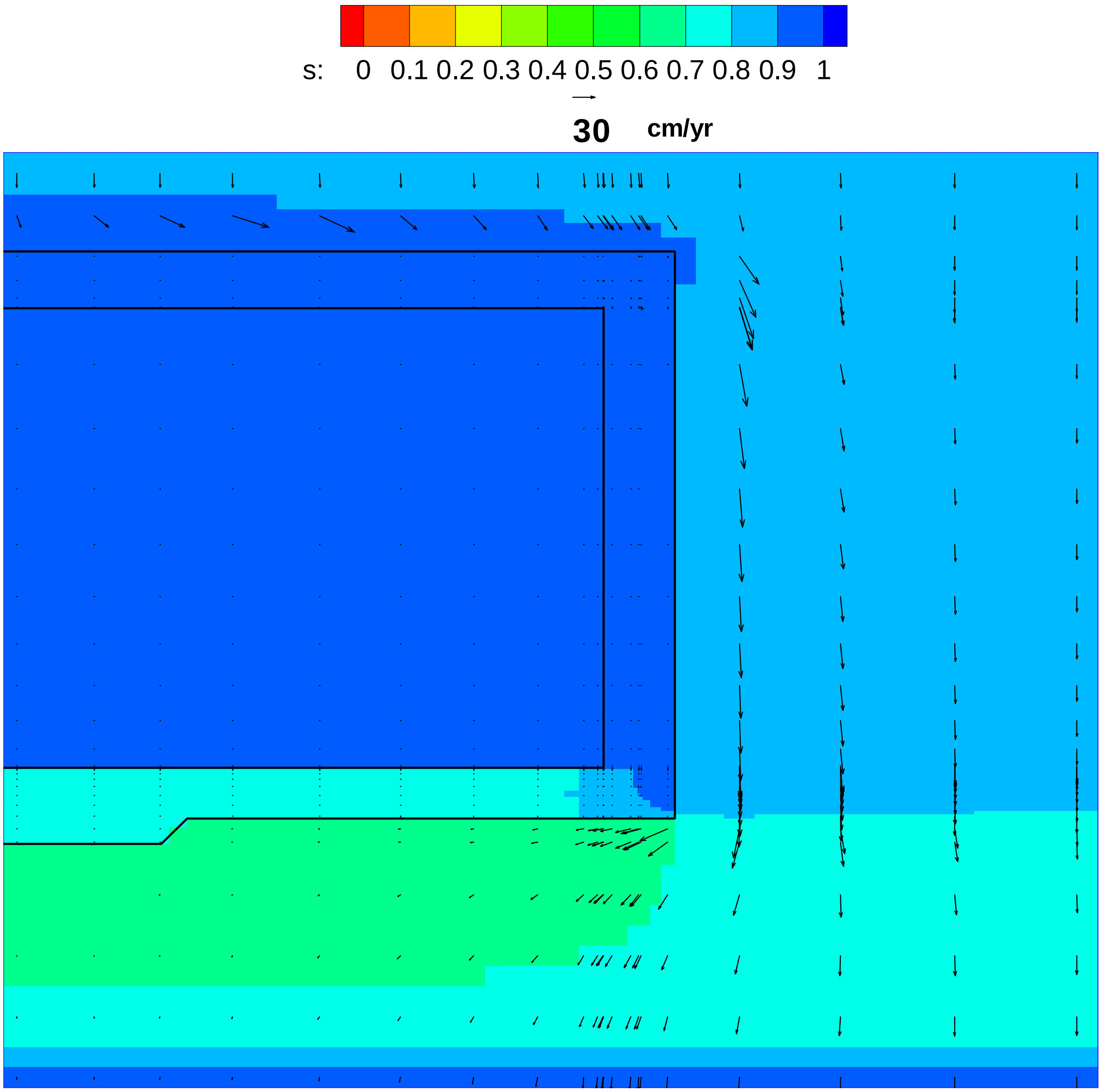
(s: = saturation)

Figure 4.4-29: Type III Tank Flow Field – Year 100



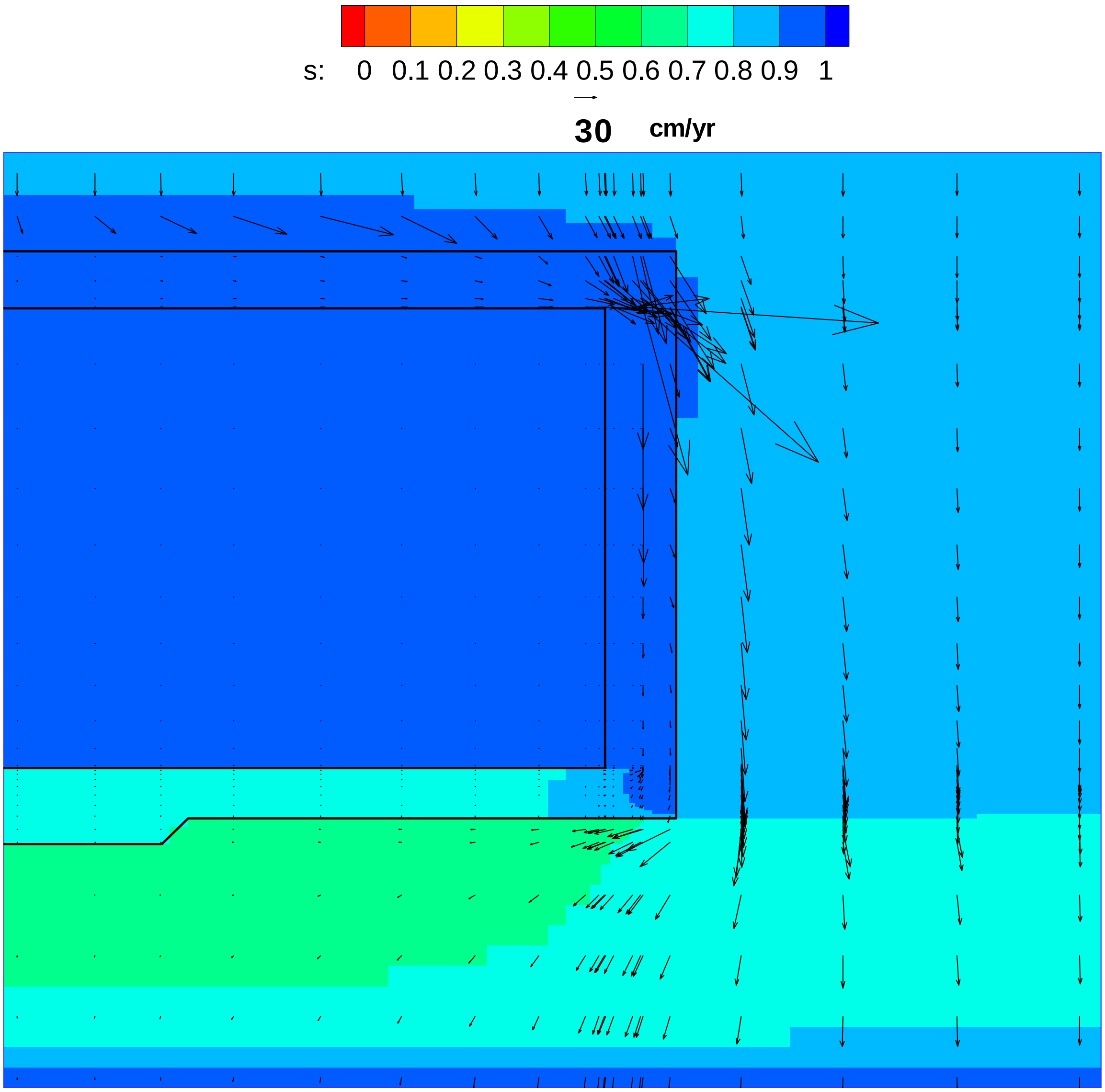
(s: = saturation)

Figure 4.4-30: Type III Tank Flow Field – Year 10,000



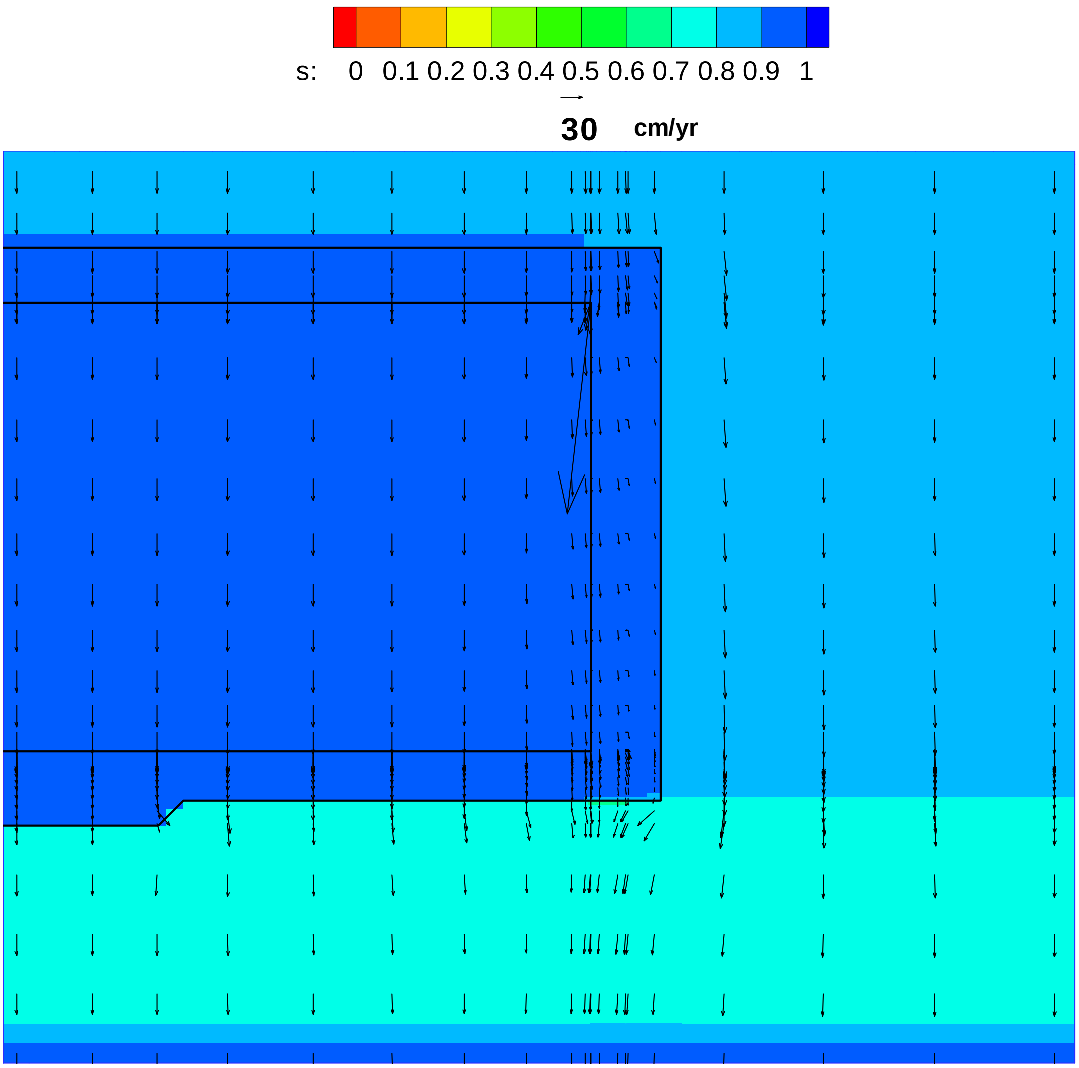
(s: = saturation)

Figure 4.4-31: Type III Tank Flow Field – Immediately Prior to Liner Failure



(s: = saturation)

Figure 4.4-32: Type III Tank Flow Field – Year 20,000



(s: = saturation)

Material properties are independently defined for each grid zone, but are not necessarily different, depending on scenario). Properties are defined as the product of these factors:

- Base value from a materials palette, a time-invariant constant,
- Time-dependent factor #1, intended to represent baseline physical changes,
- Time-dependent factor #2, intended for uncertainty/sensitivity analysis perturbations

The materials palette used in PORFLOW FTF modeling is provided in Table 4.4-6. The latter two factors defining properties can be arbitrary piecewise-linear functions. They are functionally identical, and differ only in intended usage.

Material properties can change in the PORFLOW model over time. In PORFLOW modeling, infiltrate pore volume as a function of time is calculated outside of PORFLOW after flow simulations have been completed. Chemical transitions in subsequent transport modeling are based on these calculations and E_h and pH transitions as a function of pore volumes from WSRC-STI-2007-00544. In general, chemical transitions for a material zone are based on infiltrate pore volumes for the same zone. For example, the volume of flow through the “basemat” zone is calculated and at the year when the calculated pore water volume equals transition volume (i.e., 371 volumes for transition to Oxidized Region II) documented in WSRC-STI-2007-00544, the materials in the “basemat” zone are modeled as having the properties associated with Oxidized Region II from that time frame onward.

An exception to this approach is the CZ. In the case of the CZ, the pore water chemistry of the overlying tank grout is assumed to be imparted on the very thin CZ in intimate contact with grout, and the chemical transition times are identical for the two materials. This assumption holds for all case, including the fast-flow cases (e.g., Configuration D). Based on the flow field data observed for all cases (as exemplified in Figure 4.4-33), the infiltrate reaching the CZ does not bypass the tank grout (via the fast-flow path) after cementitious materials have degraded. Instead downward flow through the grout and basemat remains relatively uniform and significant across the plane of the CZ surface; such that pore water chemistry and transition times remain linked. Chemical degradation is indirectly coupled to hydraulic degradation through infiltrate pore volumes. Hydraulic degradation does not affect chemical transitions as a function of infiltrate pore volumes. However, hydraulic degradation that alters the flow field may affect the infiltrate pore volume count, and thus when E_h and pH transitions occur in time.

Figure 4.4-33: PORFLOW Type I Tank Fast Flow Path Flow Field Case D, Immediately Following Liner Failure (Year 1,140)

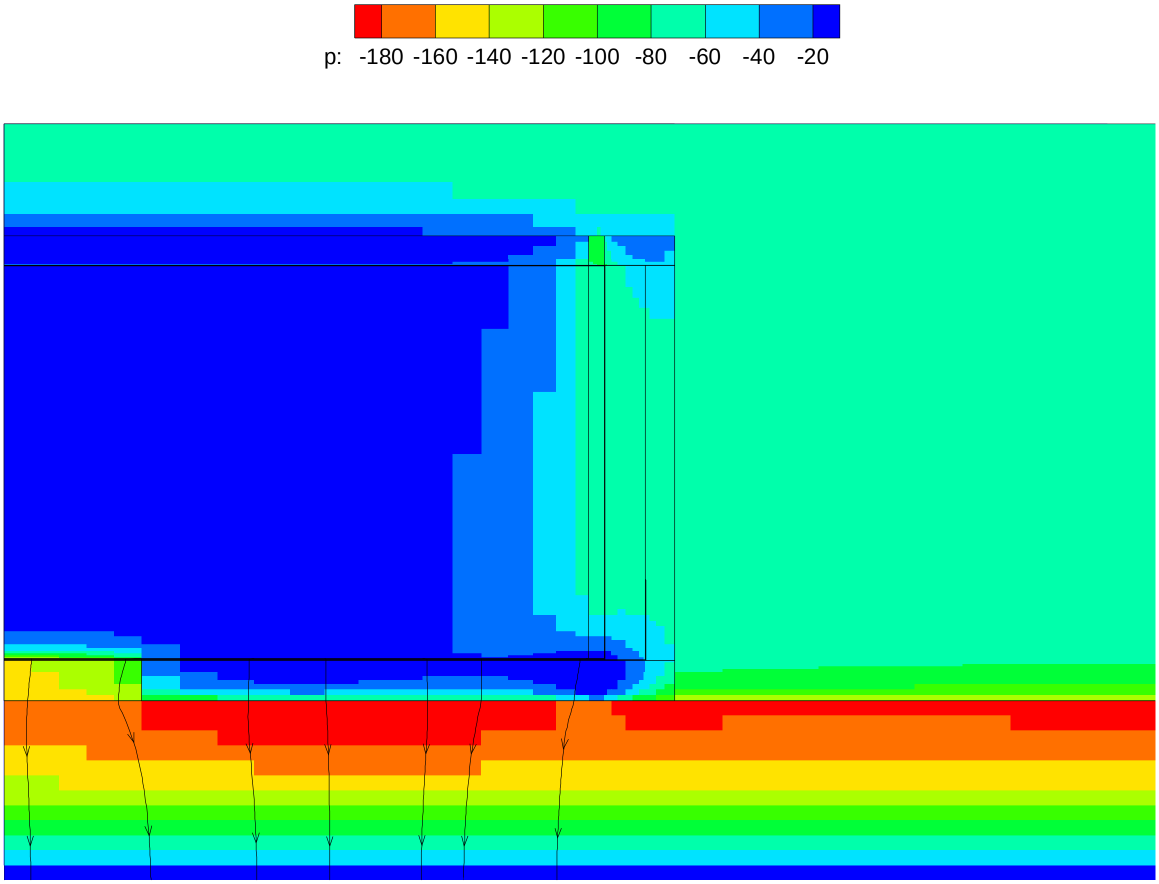


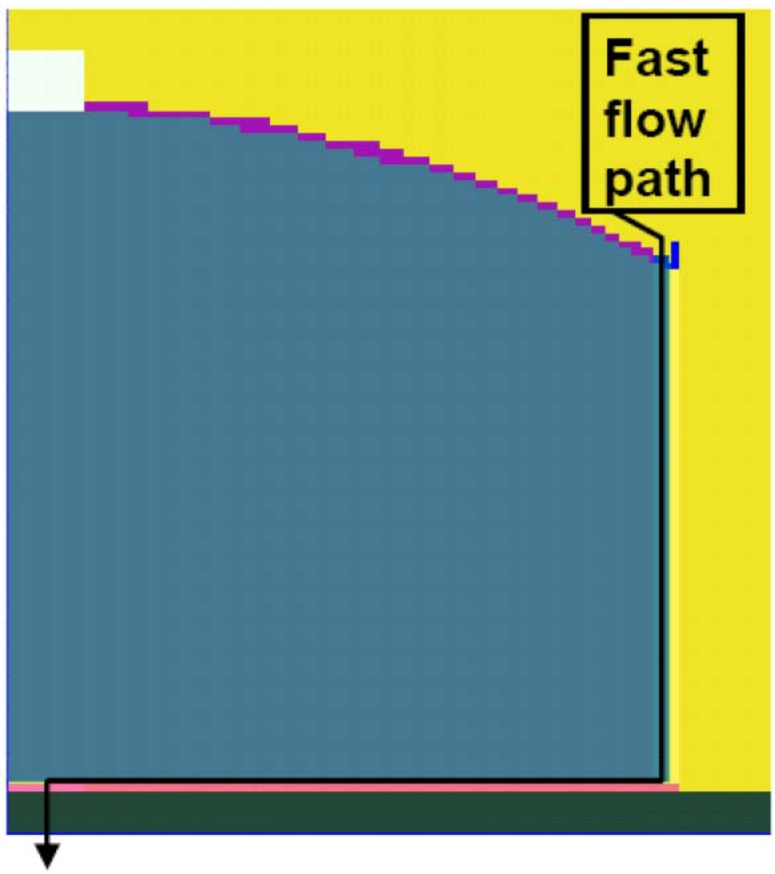
Table 4.4-6: PORFLOW Materials Palette

ID_cementitious	Saturated Hydraulic Conductivity. Ks (cm/sec)	Saturated Hydraulic Conductivity. Ks (cm/yr)1	Saturated Hydraulic Conductivity. Ks (cm/sec)	Saturated Hydraulic Conductivity Ks (cm/yr)1	Saturated Effective Diffusion Coeficient De (cm2/sec)	Saturated Effective Diffusion Coeficient De (cm2/yr)2	Effective Porosity (%)	Total Porosity (unitless)	Dry Bulk Density (g/cm3)	Particle Density (g/cm3)
Id 1	Kh_cm/sec 2	Kh_cm/yr 3	Kv_cm/sec 4	Kv_cm/yr 5	De_cm2/sec 6	De_cm2/yr 7	por_% 8	Por 9	rhob_g/cm3 10	rhop_g/cm3 11
UpperVz	6.2E-05	2.0E+03	8.7E-06	2.7E+02	5.3E-06	167.26	39	0.39	1.65	2.70
native_soil	3.3E-04	1.0E+04	9.1E-05	2.9E+03	5.3E-06	167.26	39	0.39	1.62	2.66
OscBefore	1.2E-04	3.8E+03	1.2E-04	3.8E+03	5.3E-06	167.26	46	0.46	1.44	2.65
OscAfter	1.4E-05	4.4E+02	1.4E-05	4.4E+02	4.0E-06	126.23	27	0.27	1.92	2.65
backfill	7.6E-05	2.4E+03	4.1E-05	1.3E+03	5.3E-06	167.26	35	0.35	1.71	2.63
IlvPermeableBackfill	1.4E-03	4.4E+04	7.6E-04	2.4E+04	8.0E-06	252.46	41	0.41	1.56	2.64
SingleVadoseZone	1.9E-04	6.0E+03	3.0E-05	9.5E+02	5.3E-06	167.26	39	0.39	1.63	2.67
Sand	5.0E-04	1.6E+04	2.8E-04	8.8E+03	8.0E-06	252.46	38	0.38	1.65	2.66
ClaySand	8.3E-05	2.6E+03	2.1E-05	6.6E+02	5.3E-06	167.26	37	0.37	1.68	2.67
Clay	2.0E-06	6.3E+01	9.5E-07	3.0E+01	4.0E-06	126.23	43	0.43	1.52	2.67
Gravel	1.5E-01	4.7E+06	1.5E-01	4.7E+06	9.4E-06	296.64	30	0.30	1.82	2.60
basemat	3.5E-08	1.10E+00	3.5E-08	1.10E+00	8.0E-07	25.25	16.8	0.168	2.06	2.51
grout	3.6E-08	1.14E+00	3.6E-08	1.14E+00	8.0E-07	25.25	26.6	0.266	1.81	2.51
wall_roof	3.5E-08	1.10E+00	3.5E-08	1.10E+00	8.0E-07	25.25	16.8	0.168	2.06	2.51
contaminated_zone	3.6E-08	1.14E+00	3.6E-08	1.14E+00	8.0E-07	25.25	26.6	0.266	1.81	2.51
primary_liner	5.0E-15	1.6E-07	5.0E-15	1.6E-07	1.0E-13	3.16E-06	39	0.39	N/A	2.70
secondary_liner	5.0E-15	1.6E-07	5.0E-15	1.6E-07	1.0E-13	3.16E-06	39	0.39	N/A	2.70
primary_vert_liner	5.0E-15	1.6E-07	5.0E-15	1.6E-07	1.0E-13	3.16E-06	39	0.39	N/A	2.70
secondary_vert_liner	5.0E-15	1.6E-07	5.0E-15	1.6E-07	1.0E-13	3.16E-06	39	0.39	N/A	2.70
ff_grout	5.0E-04	1.6E+04	2.8E-04	8.8E+03	8.0E-06	252.46	38	0.38	1.65	2.66
ff_basemat	5.0E-04	1.6E+04	2.8E-04	8.8E+03	8.0E-06	252.46	38	0.38	1.65	2.66
ff_roof	5.0E-04	1.6E+04	2.8E-04	8.8E+03	8.0E-06	252.46	38	0.38	1.65	2.66
ff_p_liner	5.0E-04	1.6E+04	2.8E-04	8.8E+03	8.0E-06	252.46	38	0.38	1.65	2.66
ff_s_liner	5.0E-04	1.6E+04	2.8E-04	8.8E+03	8.0E-06	252.46	38	0.38	1.65	2.66

4.4.4.1.3 Fast Flow Path Modeling in PORFLOW

PORFLOW was used early in the analysis process to do scoping runs for the various configurations described in Section 4.4.2. To represent the effect of a hypothetical fast flow path through a waste tank (Figure 4.4-34), the PORFLOW model assumed all water being shed from the tank roof was intercepted by a high conductivity vertical leg encircling the tank perimeter just inside the primary liner. Horizontal flow then takes place through the CZ, which is also assigned a large conductivity, with the entire CZ assumed to be contacted by infiltrating water. Contaminant transport was then assumed to take place through a high conductivity center "donut" hole in the waste tank basemat. The hole was sized to allow high flow through the fast flow path and contamination layer in particular. The materials occupying the fast flow zones were assumed to have high conductivity and diffusion coefficient relative to backfilled and native soils, but no adsorption was assumed (i.e., K_d = 0 for all radiological and chemical transport).

Figure 4.4-34: PORFLOW Type IV Tank Fast Flow Path Model



For transport modeling, a fixed time step of one year was chosen for the vadose and saturated zones. The selected step size is a compromise between two competing objectives: 1) resolution of concentration peaks from relatively mobile species that migrate as a pulse, and 2) achieving reasonable computer runtimes. A sensitivity study using the Base Case indicates good accuracy in general, the exception being nitrate, for which the reported results may be low by roughly one-third. However, nitrate results are well below performance objectives so the modeling bias is acceptable.

4.4.4.1.4 Vadose and Aquifer Model Validation in PORFLOW

Additional PORFLOW calibration was performed beyond code verification exercises and GSA/FTF model development. Using characterization and monitoring data, aspects of the PORFLOW vadose zone and aquifer models have been validated against independent field data, as identified below. Additional detail can be obtained in the associated references.

Vadose zone

- Soil suction and water content from Vadose Zone Monitoring System (VZMS) in E-Area. [WSRC-STI-2006-00198, Section 5.8]
- Tracer test pore velocity. [WSRC-TR-2007-00283, Section 4.0]
- Tritium migration beneath the E-Area Slit Trenches.

Aquifer

- Surveyed seeplines. [WSRC-TR-2004-00106]
- Pathline comparisons to existing plumes (herein).

The VZMS monitors soil conditions beneath and alongside solid waste disposal trenches in E-Area under uncapped infiltration conditions (Figure 4.4-35). E-Area is located in the GSA Area adjacent to F-Area. Field measurements using tensiometers and neutron probes indicate that soil suction ranges from approximately 50-200 cm, while water content varies between about 0.15 and 0.30. The latter values suggest a water saturation between 35% and 75%. Infiltration over the affected area is estimated to be 30 cm/yr (12 in/yr). Using the “Upper Vadose Zone” and “Lower Vadose Zone” soil properties recommended in WSRC-STI-2006-00198 and adopted for FTF PA modeling, a PORFLOW representation of E-Area conditions produced suction head and saturation values of 83 cm and 91% in the upper vadose zone, and 170 cm and 72% in the lower vadose zone.

A series of field and laboratory tracer experiments have been conducted at SRS under uncapped (normal infiltration) conditions. The PORFLOW model described above produced pore velocities of approximately 34 in/yr and 43 in/yr for the upper and lower vadose zones. Together, the tracer test data indicate a pore velocity of about 45 in/yr for the same infiltration, which is similar to the model similations.

A PORFLOW vadose zone model, similar to that used for FTF PA simulations was compared to tritium concentration data from the VZMS (Figure 4.4-35). Concentration data was grouped according to elevation (high/low) and location (center/edge) relative to a disposal trench (Figure 4.4-36). The concentration data exhibits large variability, as is commonly observed with point measurements (Figure 4.4-37). The "Generic" and "Concrete" labels in Figure 4.4-37 refer to the waste form(s) containing tritium contamination. "Generic" designates general waste of a variety of forms, whereas "Concrete" is reserved for concrete rubble waste generated from demolition of Building 232-F. In model simulations, tritium in "Generic" waste is immediately available for transport. Tritium embedded in concrete is released more slowly by diffusion. The PORFLOW model has a homogeneous conductivity field and no dispersion was prescribed during transport simulations. Thus, the simulations may under-predict lateral plume spreading compared to actual conditions. For example, sediment layering can cause contamination to migrate outside the footprint of the trench. Small changes in the degree of lateral plume dispersion can lead to large changes in "Edge" concentration, whereas the "Center" (plume centerline) concentration would be less affected. Given uncertainty in the tritium source strength and distribution, and PORFLOW simplification of natural subsurface heterogeneity, close agreement between the data and model is not to be expected. Rather than representing a definitive validation of the model, DOE believes the comparison does not provide evidence of model invalidation. Being equivalent to a spatial average representation, the PORFLOW predictions do not reflect the data scatter, but do appear to be generally consistent with the measurement trends.

GSA/PORFLOW model predictions of seeplines bordering the GSA have been compared to field surveys (Figure 4.4-38). [WSRC-TR-2004-00106] The seepline data was not used in model development or calibration. The simulated seepage faces are generally consistent with the field observations.

The GSA contains a number of tritium plumes, typically associated with E-Area solid waste disposal facilities. Being unretarded, tritium is an ideal tracer of groundwater flow. Groundwater pathlines from the GSA/PORFLOW model were compared to an existing tritium plume map to support the E-Area PA. The model pathlines were observed to be consistent with plume trajectory deduced from monitoring well data (Figure 4.4-39). Simulated pathlines have also been compared to F-Area plumes, with good agreement (Figure 4.4-40). The plume distributions depicted in Figures 4.4-39 and 4.4-40 were generated from field measurements. The GSA/PORFLOW model was not calibrated to these data. The simulated groundwater pathlines are compared to plumes deduced from field measurements as evidence that the GSA/PORFLOW model reproduces plume trajectory in map view. DOE recognizes that the figures do not address other relevant points of comparison, such as travel time and concentration. Such a comparison would require substantially more effort to reconstruct contaminant sources (amount, location, and release history) and interpret plume monitoring data, which is beyond the scope of this PA.

Figure 4.4-35: VZMS Layout and Instrumentation at Slit Trenches 1

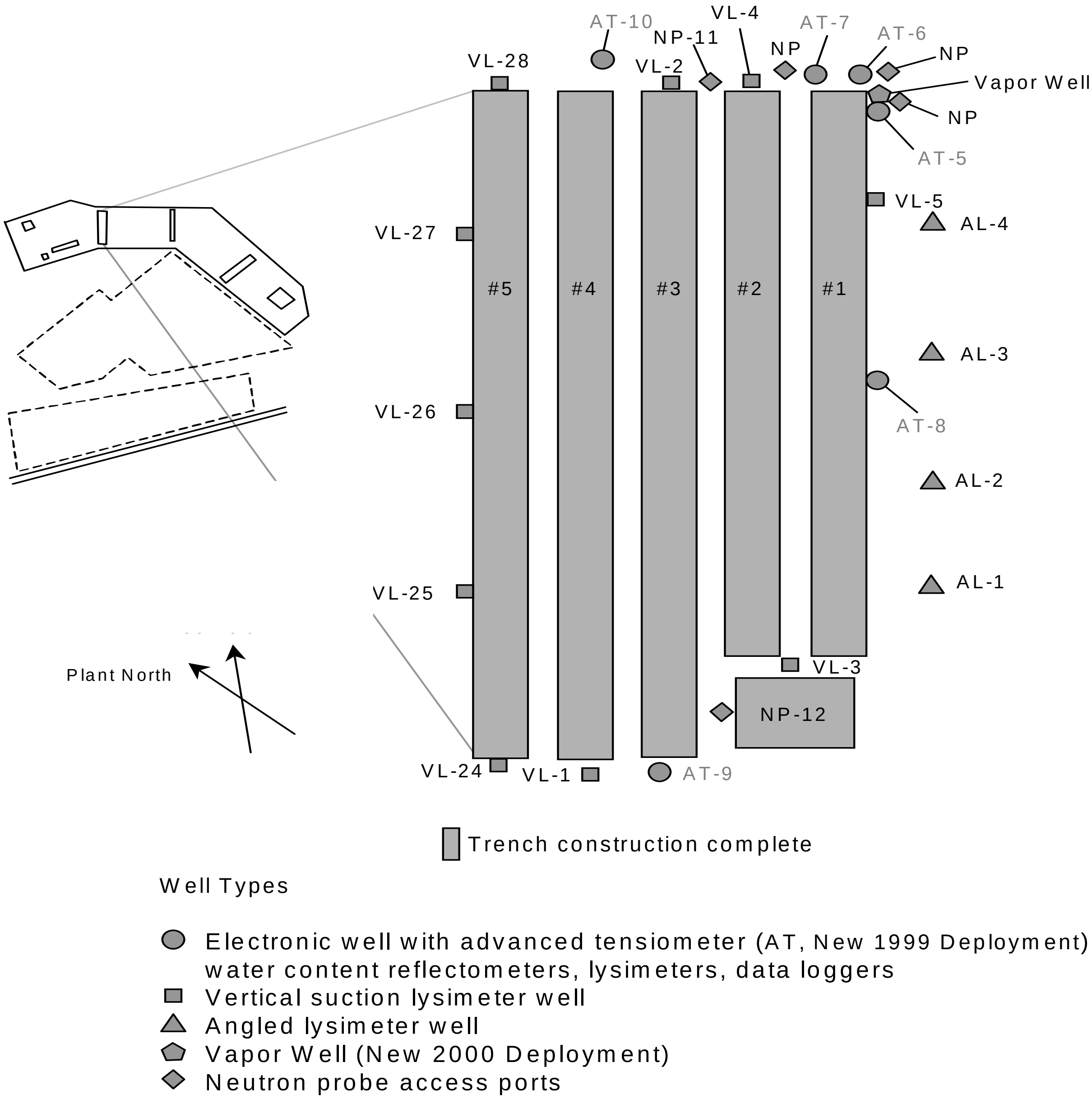


Figure 4.4-36: Basis for PORFLOW Model and VZMS Data Comparison

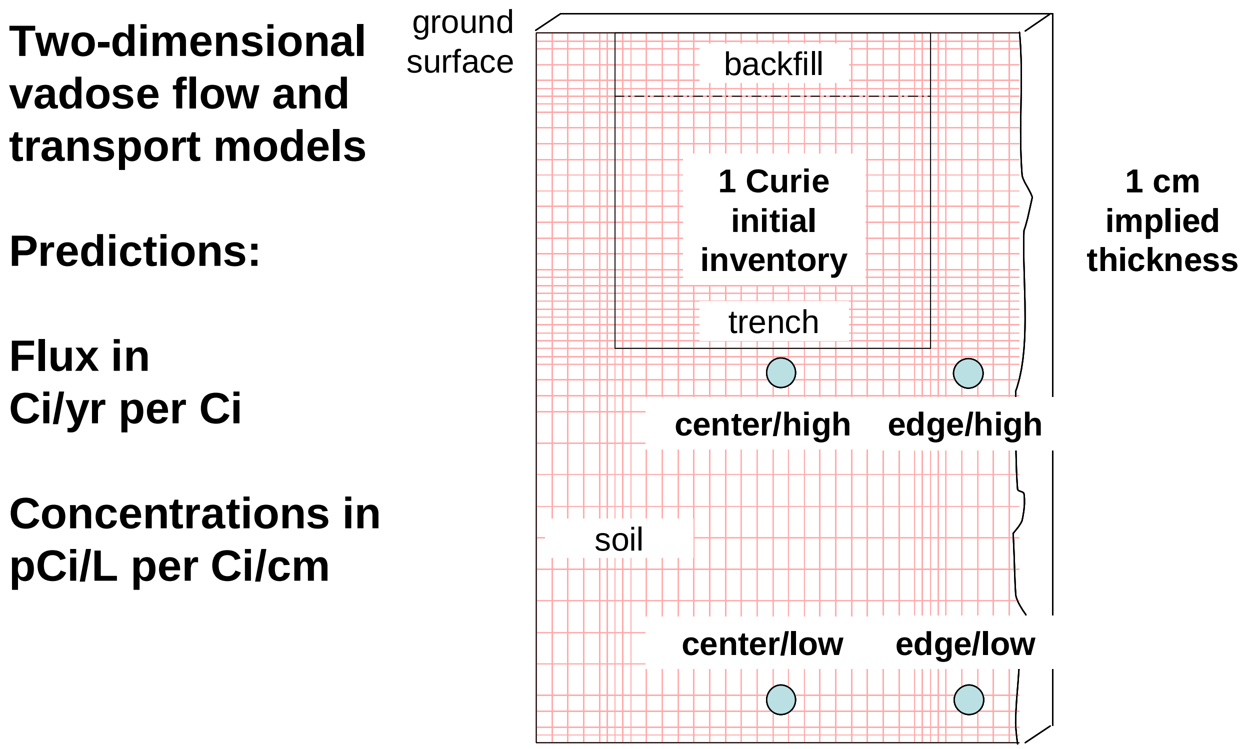


Figure 4.4-37: PORFLOW Model and VZMS Tritium Data Comparison

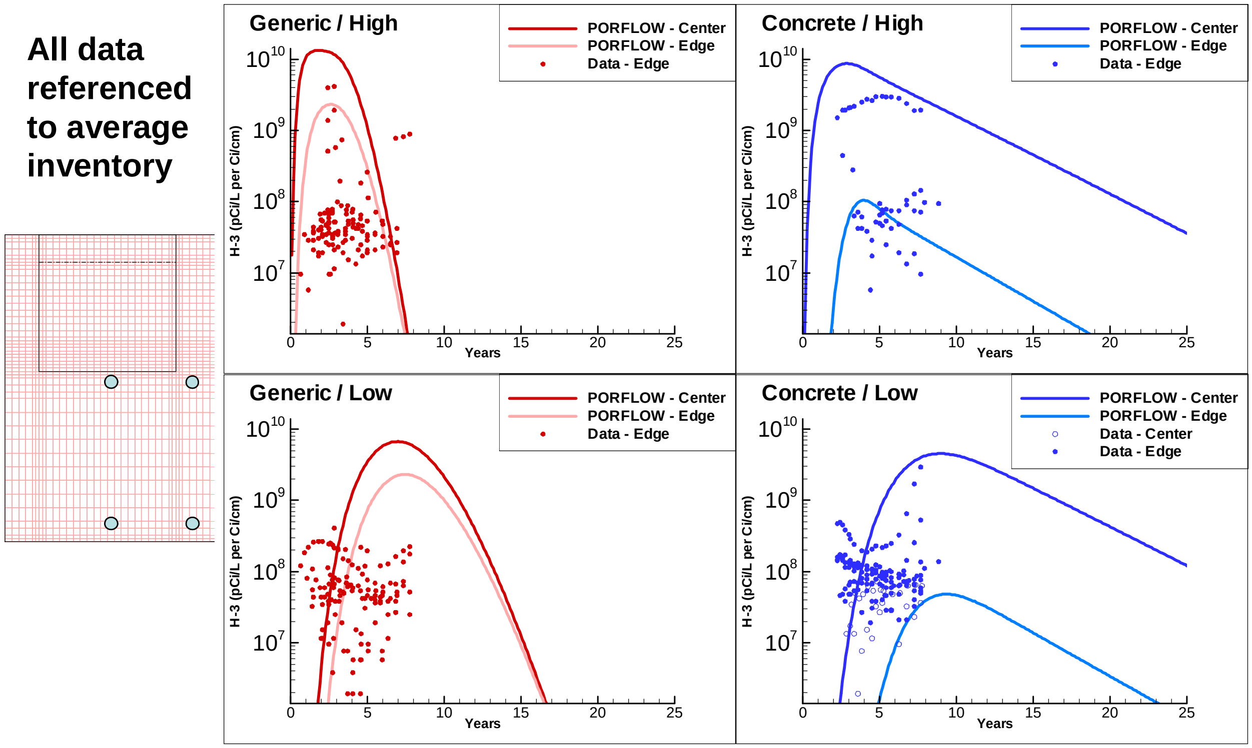
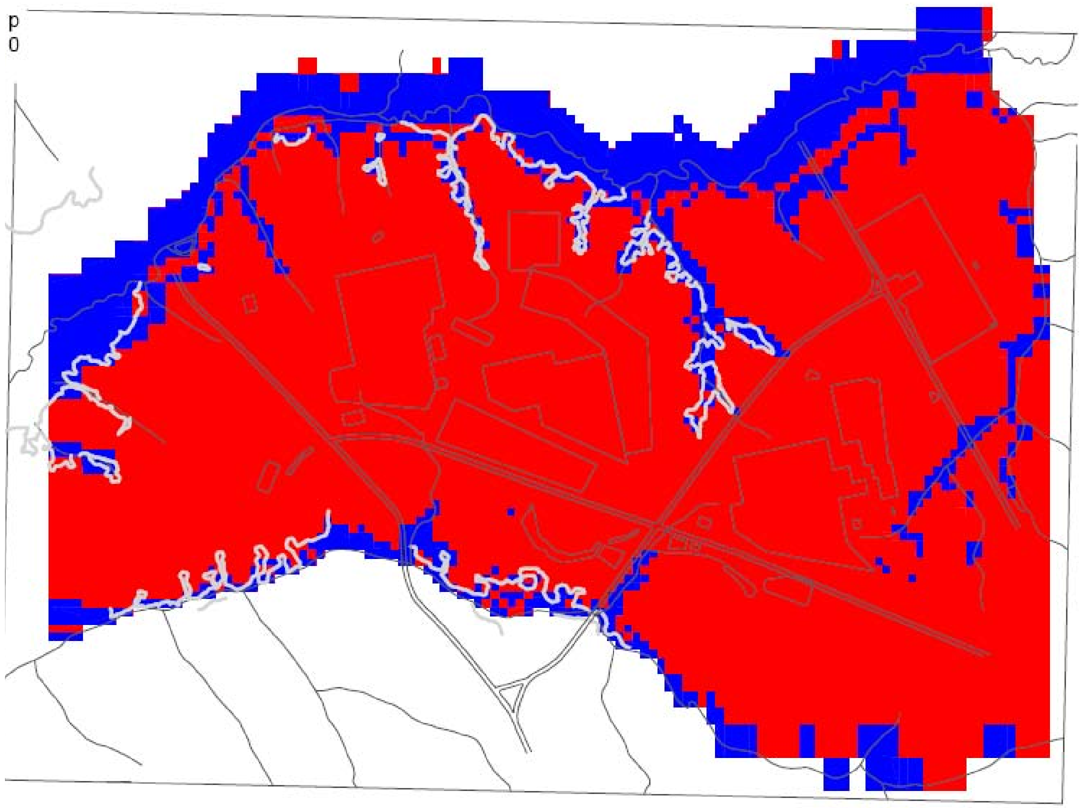


Figure 4.4-38: Surveyed Seeplines Compared to GSA/PORFLOW Model Simulation



Note: Seepline predicted at interface of recharge (red) areas and discharge (blue) areas with surveyed seepline location shown in white trace lines. [WSRC-TR-2004-00106, Figure 3-6]

Figure 4.4-39: Comparison of GSA/PORFLOW Groundwater Pathlines to a Tritium Plume Emanating from the E-Area Mixed Waste Management Facility

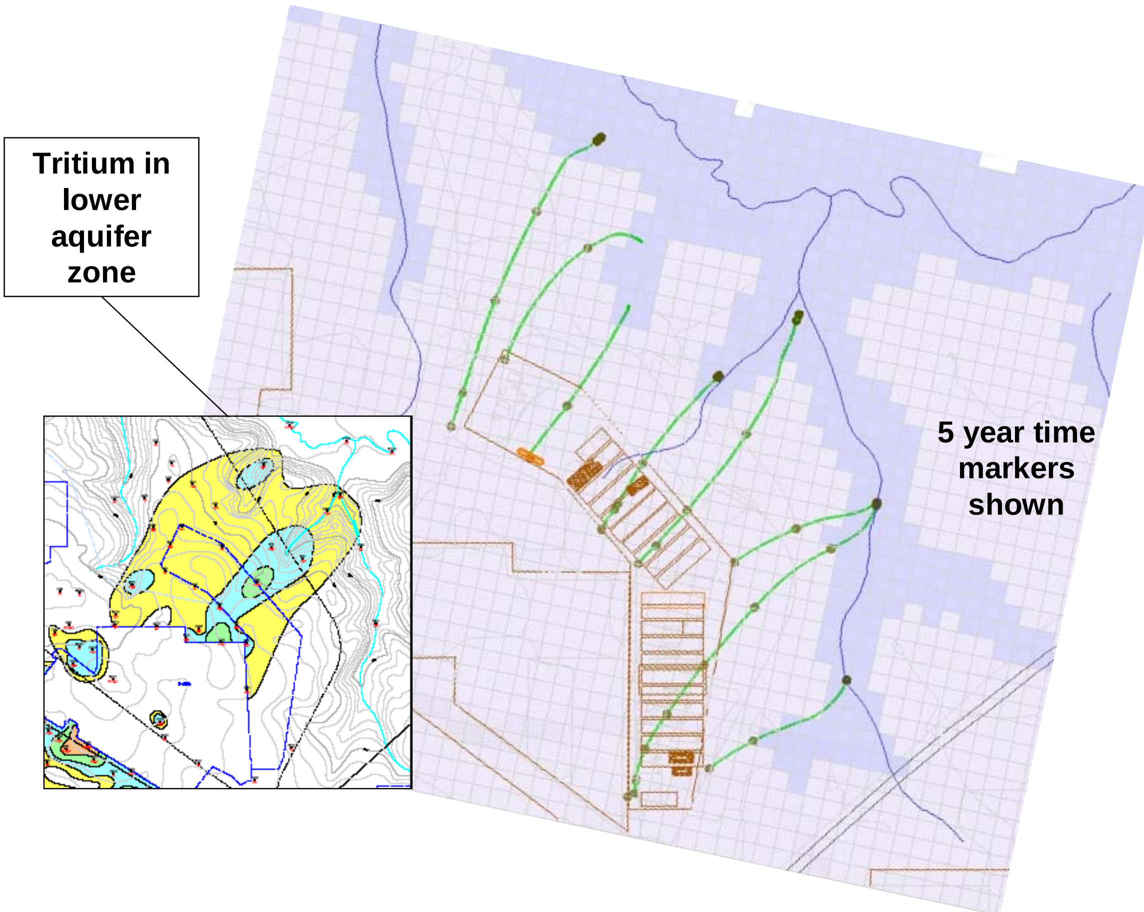
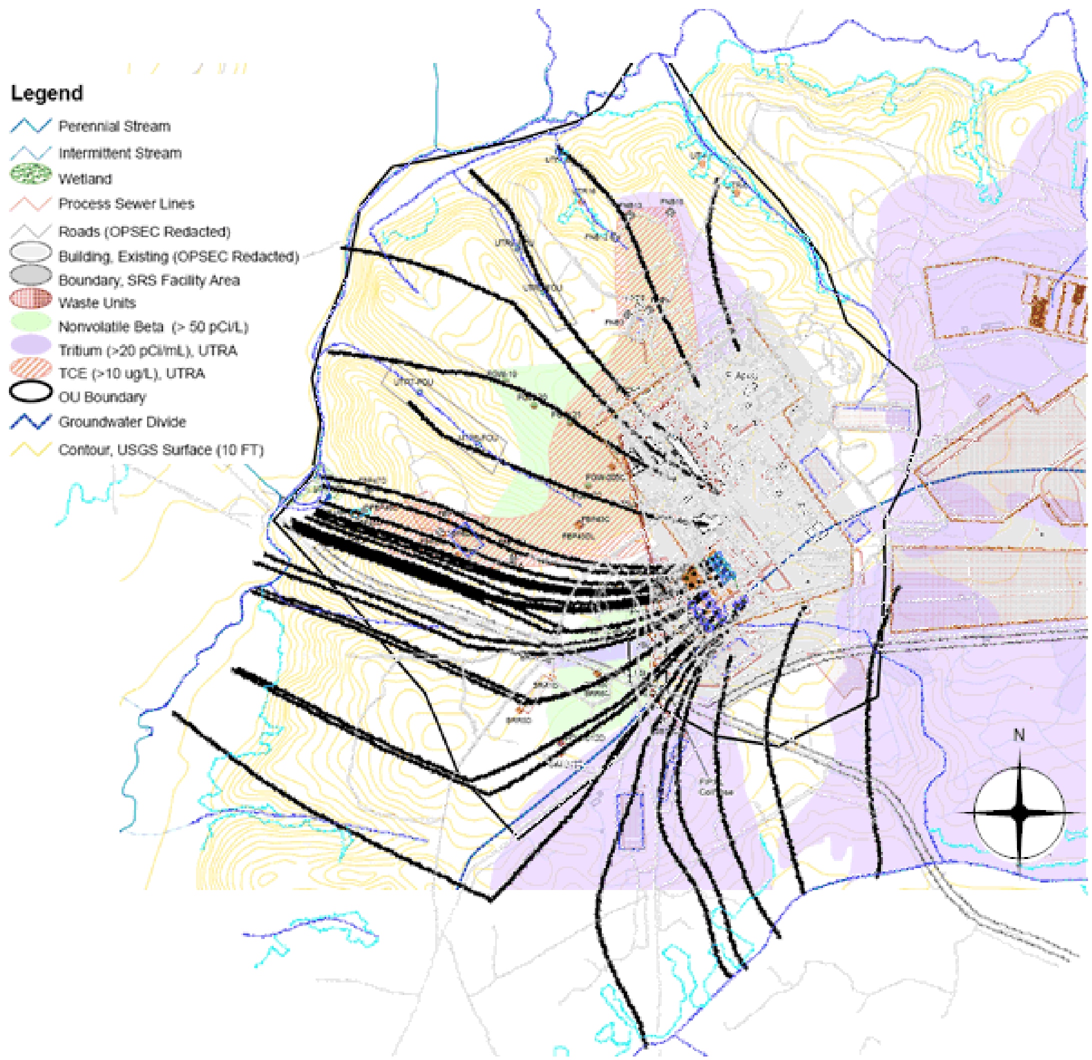


Figure 4.4-40: Comparison of GSA/PORFLOW Groundwater Pathlines to Contaminant Plumes Emanating from F-Area



4.4.4.2 GoldSim Modeling Process

In order to address uncertainty and sensitivity of the modeling of the FTF, a probabilistic model was constructed. This model is necessarily simpler than the PORFLOW groundwater model in its environmental transport calculations, but includes additional calculations that cannot be performed in PORFLOW. The GoldSim systems analysis software, developed by GoldSim Technology Group is uniquely suited to probabilistic PA. This program was developed for the task, and incorporates many features that make it particularly useful, such as integrated solutions of physically-based differential equations from radioactive decay and ingrowth to chemical partitioning and diffusion. With its whiteboard-style graphical user interface and a rich toolset of built-in functions and the ability to define expressions governing relationships between model entities, GoldSim allows modelers to quickly build transparent radiological PA models. The GoldSim model is a one-dimensional model versus a 3-D model (like PORFLOW), so some additional tasks, such as creation of a ring of wells surrounding the FTF (described below) were required during modeling. Validation of the one-dimensional GoldSim model versus the 3-D PORFLOW model is explicitly addressed in the GoldSim benchmarking discussion (Section 5.6.2).

In addition to aiding in uncertainty and sensitivity modeling, a separate model is used to calculate dose results using concentration inputs from PORFLOW (rather than concentrations calculated by the GoldSim FTF model using the FTF rad and non-rad inventories). This "dose calculator" GoldSim model is described in 4.4.4.2.2.

4.4.4.2.1 Vadose Zone Material Properties

This section discusses the GoldSim implementation of the FTF model, and is organized to present the model structure and functionality roughly in the order that the calculations operate. That is, from the definition of model domain, materials, and transport phenomena to the calculation of dose results and their interpretation. This discussion applies to the first released version of the model, "FTF v1.0.gsm".

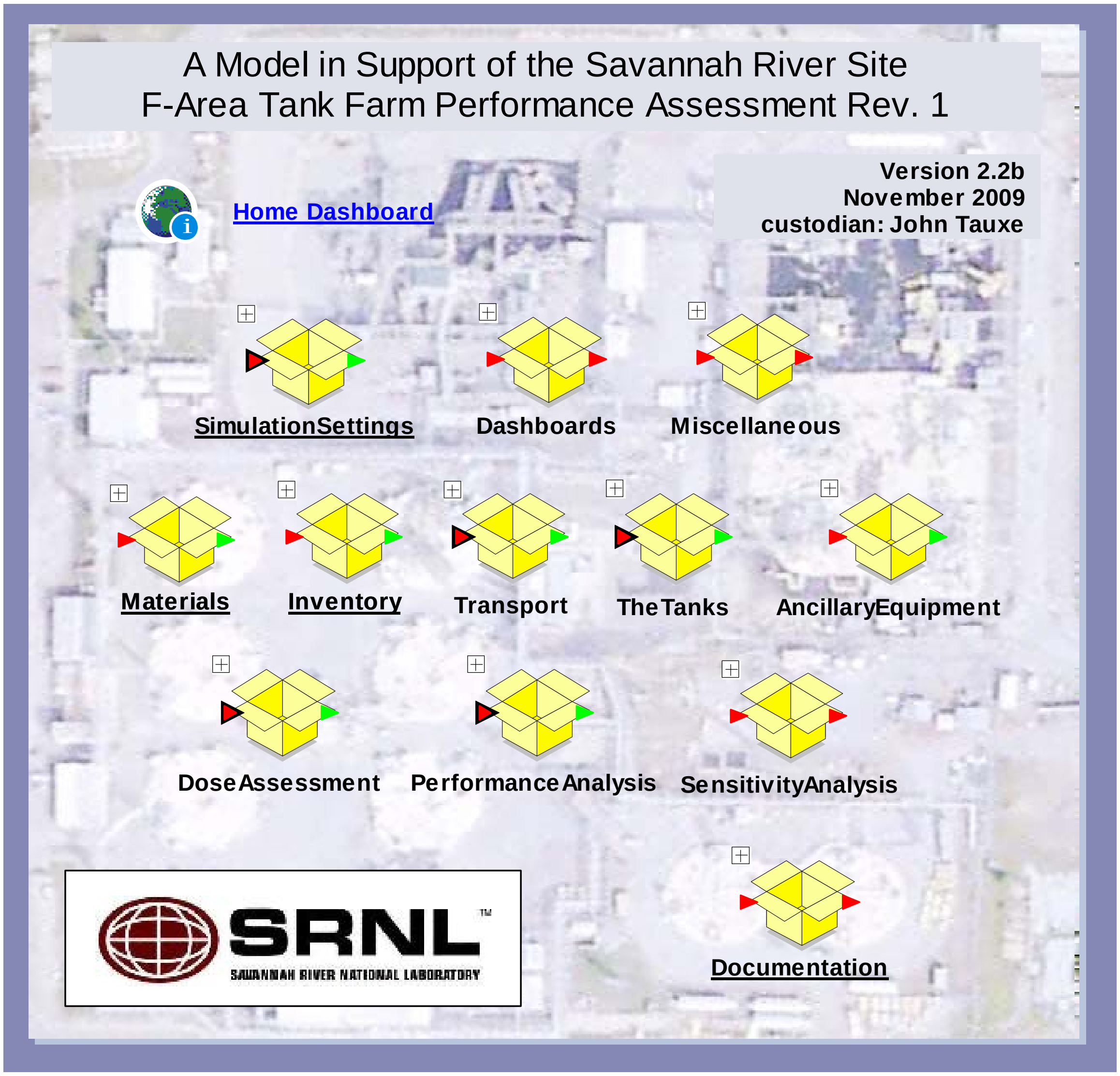
4.4.4.2.1.1 Model Layout and Structure

Like all GoldSim models, the FTF model is organized hierarchically, with the top level (or GoldSim Container) of the model shown in Figure 4.4-41. Model Containers, represented as yellow boxes, hold major model parts. Several of these do not require detailed explanation of their contents, but are introduced here:

- **SimulationSettings** contain global modeling parameters that control the setup and execution of the model, including switches to enable specific transport phenomena or include or exclude specific sources of contamination.
- **Dashboards** contain the GoldSim Dashboards that aid in model control. A Dashboard is similar to a Windows dialog box, where the user may select settings using graphical controls. The Home Dashboard link at the top of the page takes the user directly to the main Dashboard.
- The **Miscellaneous** container holds various modeling elements that are used throughout the model, mostly for the convenience of the modeler.

- **SensitivityAnalysis** contains the elements necessary to collect information for the sensitivity analysis, including final values of model endpoints (e.g., water concentration at well, or dose to a human receptor) and the values of each input stochastic and modeling switch used for each realization in a probabilistic analysis.

Figure 4.4-41: Top Level of the GoldSim FTF Model



The most interesting containers, hosting the bulk of the model's calculations, are outlined here and are described in greater detail in the following sections.

- **Materials** contains definitions for the list of contaminant Species (radionuclides as well as a few stable contaminants of concern) the definition of Water (including chemical solubilities) and all porous media that are used in the model. Soil/water partition coefficients for the various media (defined as GoldSim Solids) and their variations are part of this definition.
- The **Inventory** container hosts GoldSim Data elements defining Species inventories for each FTF waste tank and piece of ancillary equipment.
- Environmental contaminant transport parameters are defined in the **Transport** container. The FTF model currently considers only advection of water in porous media, be it through the waste, the concrete pads below the bottom of the waste tanks, or the geologic media comprising the unsaturated and saturated zones. This container holds only the definitions of rates and other transport-related parameters, but does not perform transport calculations.
- The FTF contains 22 waste tanks, each defined in its own subcontainer within **TheTanks**. Transport calculations are conducted within each of these subcontainers, starting with the release of contaminants from the layer of waste present at the bottom of each waste tank, following their transport through the concrete pad and geologic media to specific exposure locations where future humans may gain access to the contaminated groundwater.
- The **AncillaryEquipment** container is similarly defined, but instead of waste tanks each subcontainer represents a specific piece or collection of pieces of ancillary equipment, such as evaporators and transfer lines that support operations of the tanks.
- **PerformanceAnalysis** contains a collection of results of interest. Once a simulation is completed, the contents of this container should be examined to evaluate the modeling endpoints (water concentrations and doses) and determine their principal causes, for example, by tracing the results, the user can evaluate which well, radionuclide, exposure pathway, and waste tank is the most significant contributor to a specific endpoint for most users, this will be the most interesting part of the model, and it is discussed in its own section below.

More information on GoldSim fundamentals is available at the website *www.goldsim.com*. The GoldSim FTF modeling domain begins at the top of the waste layer and extends to a hypothetical groundwater well located 100m from the FTF boundary. The flow profiles used in the GoldSim FTF model to represent flow through the waste are extracted from the PORFLOW FTF flow model, which allows for changes in the closure cap, tank top, and tank grout to be reflected in the flow used. The model contains all appropriate materials, concrete, soil, etc., as described in detail below. The model is necessarily one-dimensional with downward flow represented in the unsaturated zone and predominantly horizontal flow in the saturated zone. The unsaturated zone is represented as a column underlying each particular item of equipment (i.e., tank, evaporator, etc.) The transfer lines are represented as the entire FTF area, since they traverse the site.

In the FTF GoldSim model, the vadose zone was divided into 10 equal length cells. The cells flow area was set to the waste tank area. As the distance to the water table varied for all the waste tanks and the tanks are of different projected areas, each tank has its own set of parameters. A nodalization study was conducted which showed 10 cells were sufficient, as borne out by the benchmarking. The saturated zone consisted of 50 cells, 10 in the footprint and 40 from the waste tank shadow to the 100m boundary. A nodalization study was conducted to determine the minimum number of cells needed to reach a "convergence" with the PORFLOW results, and this turned out to be 40. As described in GoldSim manual, numerical dispersion can be used to simulate the physical dispersion of a system, and this was borne out by comparisons made during benchmarking. [GTG-2006a]

The water inflow boundary condition, at the boundary of the bottom of the grout mass in the tank and the top of the waste layer, is provided by PORFLOW runs. The PORFLOW output is parsed to select data from approximately 1m under the concrete basemat. Data at that elevation are sampled at five locations and a geometric average of those values is used as the water flow boundary condition through the waste layer. This is consistent with the assumption of continuity through the waste and concrete basemat. This flow is constant downward through the unsaturated zone, though it changes in time as the grout fails hydraulically.

As stated previously, the FTF GoldSim model is not independently modeling flow velocity, but is merely attempting to replicate the flow profiles that PORFLOW has captured from the GSA Database. The water flow boundary condition for the saturated zone bulk flow is also provided by the PORFLOW model. A single representative aquifer velocity was chosen. This was a more difficult task than in the unsaturated zone because the unsaturated zone is essentially a one-dimensional flow (in PORFLOW), but the saturated zone is multidimensional.

An important parameter to capture in flow abstraction is the arrival time of the radionuclide peaks at the 100m boundary. There are several methods by which this could have been accomplished, but the one chosen was to alter the "average" flow velocity in the GoldSim model. This was considered to be the most consistent method of determining the peaks' arrival times. The "average" flow velocity used in the GoldSim model is one chosen to reflect the travel time of a non-sorbing tracer in a 3-D environment. The PORFLOW flow calculations show the flow in the saturated region moving both vertically and horizontally. Although the assessment point is at "100 m" the actual travel of the particle can be much longer. Timing marks were established in the PORFLOW analyses and these, in addition to the non-sorbing tracer's arrival at the 100m boundary, were used to determine the velocities used for the GoldSim analyses. Since GoldSim is not used to calculate flows, its flows are based on the flows from the PORFLOW model.

Two distinct flow velocities were extracted into the GoldSim FTF model because there is a flow divide in FTF. The velocities chosen were derived from the

PORFLOW results during benchmarking and reflect the travel times necessary for a non-sorbing tracer to follow its 3-D (from PORFLOW) path. Additional details regarding the PORFLOW to GoldSim flow extraction process is provided in SRNL-L3500-2009-00009, and in the benchmarking discussion (Section 5.6.2). The recharge flow is not considered in the saturated zone flow as GoldSim does not impose a mass balance of materials (water in this case) but only of Species.

A note regarding the mass balance of recharge water entering the saturated zone is in order. Inspection of the flow of water through the GoldSim Cells that represent the aquifer immediately below the waste tank (e.g., in the Container\TheTanks\Tank01\WasteFootprint) reveals that more water seems to be entering each Cell than leaving. Inflows to each Cell include the regional aquifer flow and recharge from the unsaturated zone within the waste footprint. Outflows include the same aquifer flow, and an implied leakage of excess clean water, representing uncontaminated water below the plume pushed down into the deeper aquifer, driven by infiltration. In essence, the modeled flow is horizontal and constant, with contaminants added from recharge into each Cell. This is preferred to an alternative implementation which could balance the flow by explicitly transferring contaminated water to a sink representing the lower aquifer. This would grossly overestimate vertical dispersion, since each Cell is instantaneously mixed, and would not reflect the conceptual model of a plume of limited thickness.

The GoldSim contaminant transport calculations are, however, perfectly valid in this arrangement, assuming that the contaminant plume is fully mixed over the thickness of the Cells. Further, the Cells are structured so that no contaminants may be transported except within the Cell system. That is, while in reality water must enter and exit any control volume (in this case, the collection of Cells) in equal quantities. This is called the mass balance assumption. GoldSim is designed to assume the volume of water in the Cell is dictated entirely by its Cell definition, paying no attention to competing inflows and outflows. It is up to the modeler to assure that the flows imposed on the Cell are physically correct. In this model, we take advantage of GoldSim's design, which in effect ejects excess (clean) water from the Cell, without ejecting contaminants. In this scheme, then, all contaminants are retained in the row of Cells, consistent with the conceptual model of a plume of limited depth.

See Figure 4.4-42 for an example of one of the 22 waste tank systems that are modeled independently. Ancillary equipment is modeled similarly. The GoldSim model is constructed so that each waste tank and piece of ancillary equipment may be run separately or in any combination. Even if multiple waste tanks and ancillary equipment are being run, each is independent, with its own inventory, dimensions, and containment failure scenario. Figure 4.4-43 shows the Tank Selector Dashboard. The boxes with integers are where the configuration scenario for each waste tank is defined. GoldSim does not recognize characters, so Configurations A through F are denoted as 1 through 6, 1 being the Base Case Configuration A. When a stochastic run is made, the configuration for each waste tank and piece of equipment is chosen randomly. The checkbox (with an "×") for each tank piece of equipment is used to activate that waste tank or piece of equipment in the model.

Figure 4.4-42: Representative Model of a Tank System

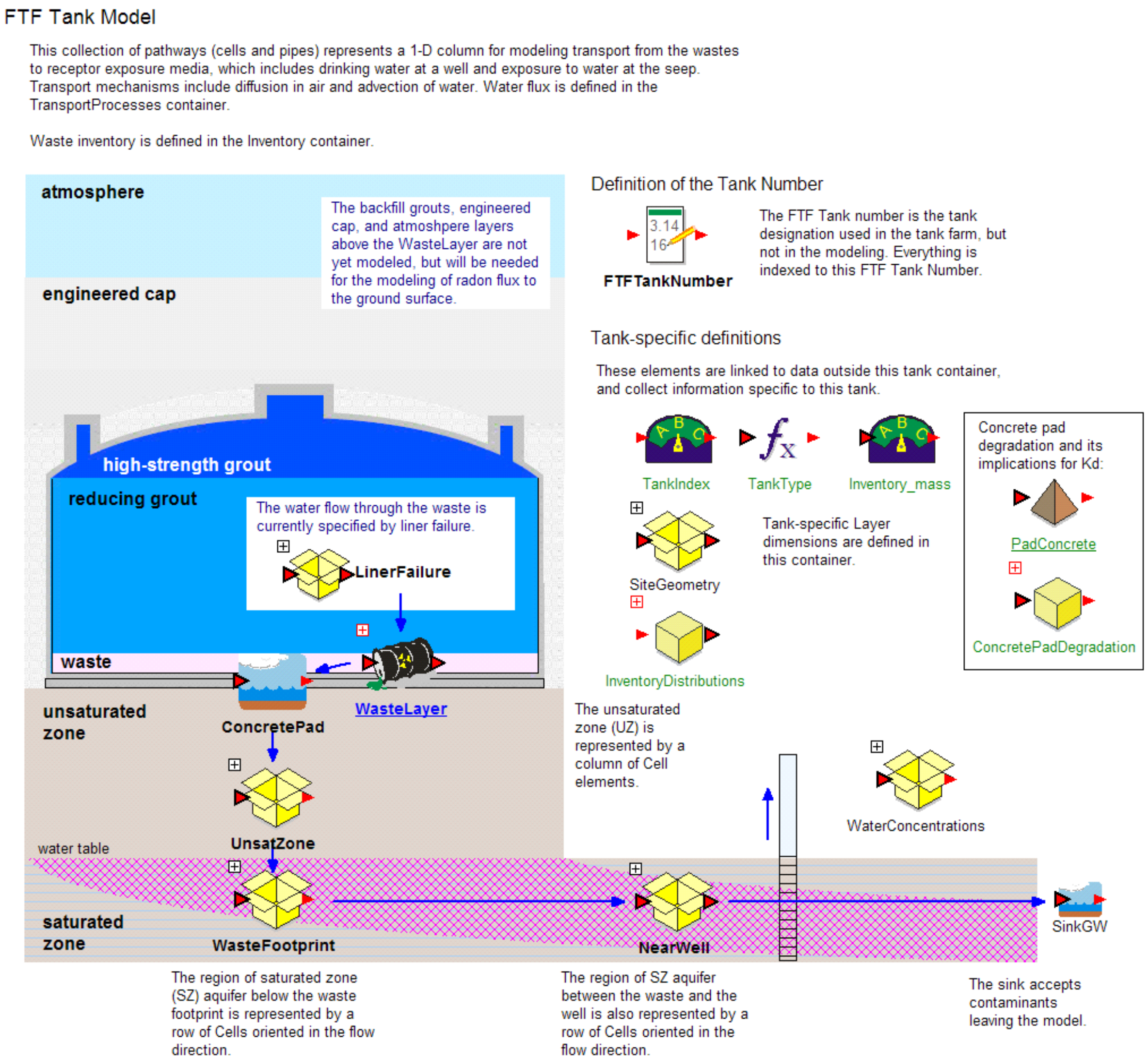
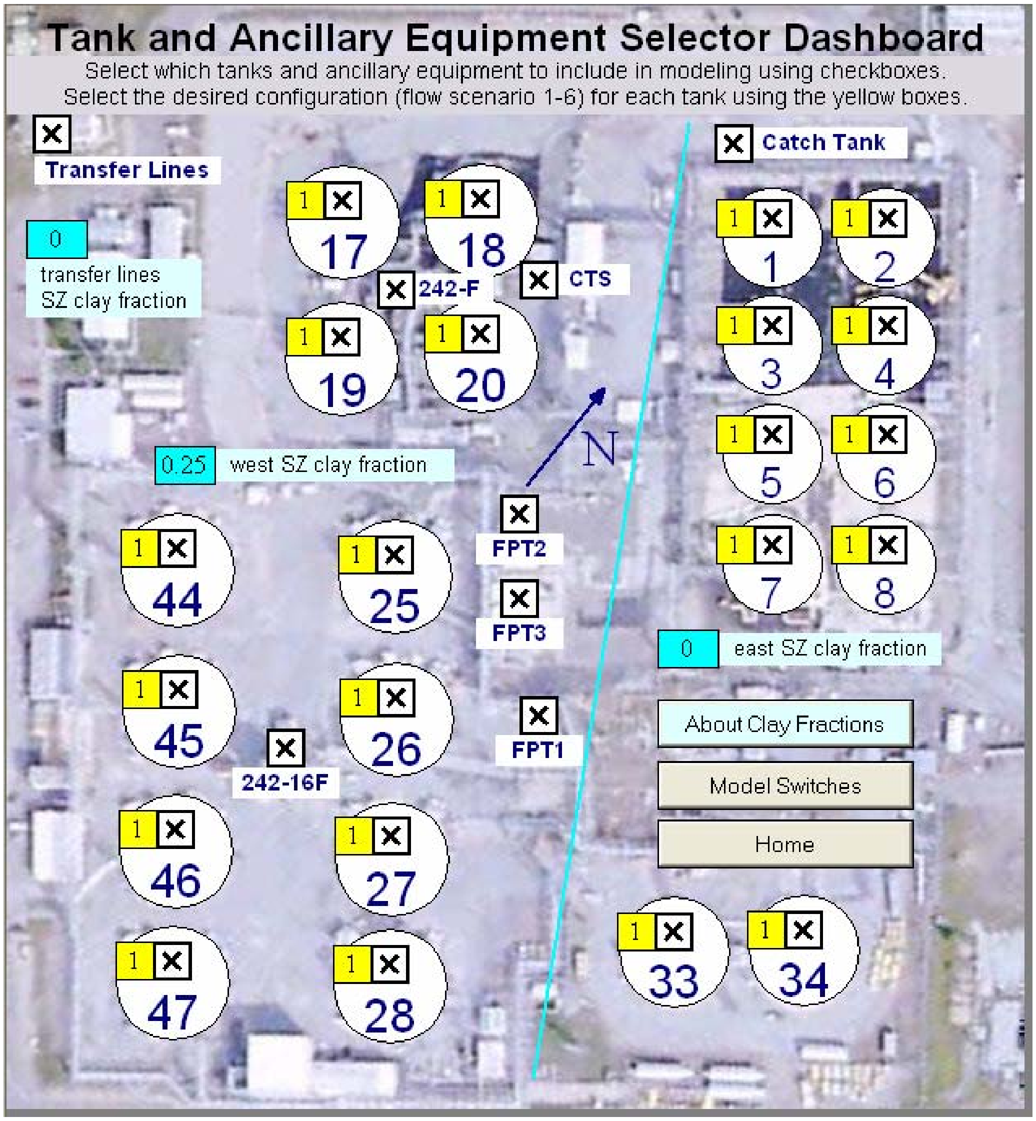


Figure 4.4-43: Tank Selector Dashboard



4.4.4.2.1.2 Materials and Contaminants

The Species element in the Materials container (denoted \Materials\Species) defines all chemical species in the model. Radionuclides are given a half-life, and, if appropriate, one or more decay products, which also must be defined in the Species list. In this way, decay chains of any degree of complexity can be constructed. Each defined radioactive Species has a prefix, like "Pb" in "Pb210" that identifies its element. The numeric value that follows, obviously, is the isotope designation. All isotopes (all numbers for a given element) behave the same chemically, sharing soil/water partitioning (K_d) and aqueous solubility limits. A stable form of the same element should be defined using simply the elemental symbol, such as "Pb". Defined this way, it too will share transport geochemical behavior with its radioactive isotopes.

Stable (non-radioactive) Species are defined in this model using a “zz” prefix before the element or radical specification. There is, for example, a stable form of lead, identified as “zzPb”. The nitrate radical is “zzNO3”. A consequence of this type of definition is that the stable version of lead (or selenium, nickel, or uranium) is not recognized by GoldSim as the same element as the radioactive versions (e.g., Pb210, Se79, Ni63, or U238) and the analysis of fate and transport is therefore independent from the radioactive species. This treatment in the GoldSim model as separate components will tend to amplify the doses associated with these four radionuclides more than if the non-radioactive components were included. If, for example, the non-radioactive inventory of lead were incorporated into the waste release transport, the Pb-210 inventory would be released slower since both the radioactive and non-radioactive lead would contribute to the pore water concentration limit for lead being reached.

4.4.4.2.1.3 Inventory

A baseline inventory of radionuclides and non-radioactive contaminants was developed for each waste tank and piece of equipment, as discussed in Sections 3.3.2 and 3.3.3. The list of radionuclides used by the GoldSim FTF model for transport modeling is abridged from the list of radionuclides in the FTF PA inventories. Radionuclides with very short half-lives (e.g., less than 5 years) are not separated from their parent and do not have to be included in the list of radionuclides because they will have a negligible effect after transport. Also, GoldSim models daughter products during transport, so that very short lived daughter products (e.g., Ba-137m, Y-90) that are in secular equilibrium with the parent do not have to be explicitly included since they rapidly reach secular equilibrium during transport. The following radionuclides are not included in the GoldSim model initial inventories: Ba-137m, Bk-249, Ce-144, Cm-242, Cs-134, Eu-155, Na-22, Pm-147, Pr-144, Rh-106, Ru-106, Sb-125, Sb-126, Sb-126m, Te-125m, and Y-90. None of these radionuclides are considered “sensitivity run radionuclides” as discussed in Section 5.2.2. It should be noted that even though these radionuclides are not included in the initial inventory, they are included in dose calculations if present.

The inventory values are assembled into GoldSim data elements for the waste tanks and for the ancillary equipment in the \Inventory container. The user may choose between these baseline inventories or unit inventories for special studies. These selected inventories are multiplied by uncertainty factors 0.01, 0.1, 1 and 10 (each used with equal probability) in each waste tank container during probabilistic simulations. The effect of this is to modify the entire inventory for a given waste tank by the uncertainty factor, rather than individual radionuclides independently.

After the time of failure of the steel waste tank, which depends on the selected failure configuration, the inventory is assumed to be rinse released. That is, all contaminants are no longer subject to any containment, and are free to migrate about the environment set up by the model.

4.4.4.2.1.4 Engineered Barriers and Release Mechanisms

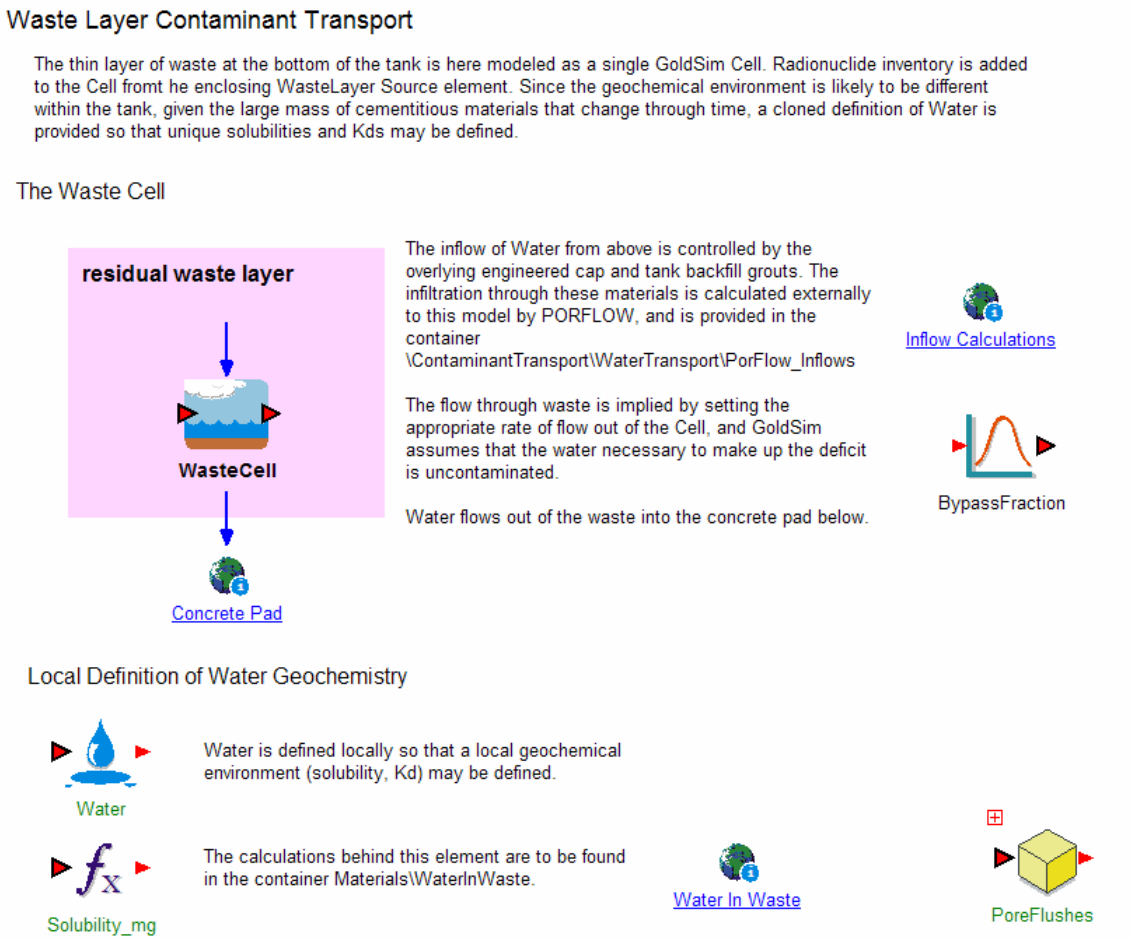
The GoldSim FTF model is used to analyze the various waste tank configurations described in Section 4.4.2. The GoldSim FTF model used flow profiles from the PORFLOW FTF model for the various configurations. In this respect all the failure mechanisms for flow are implicitly represented in the GoldSim model by the PORFLOW flows. The only exception to this is the fast flow path which is explicitly represented by a fraction of the flow which bypasses the concrete basemat. The phenomenon being represented by this is that the fast flow path provides a means for the flow to go through the concrete basemat without interacting with the concrete. In PORFLOW this is represented by a region of no K_ds. By bypassing the concrete basemat, the GoldSim model achieves the same result.

4.4.4.2.1.5 Waste Layer

A representative waste layer container is shown in Figure 4.4-44. The WasteCell consists of a single layer in which solubility control is used. The local material "Water" defines the solubility for its local WasteCell. The PoreFlushes container is where the dynamic pore flush calculation is performed. The BypassFraction is used to represent the percentage of basemat through which a fast flow path may develop. Waste is considered immediately available for transport.

The pore flushes is based on the volume of pore water in the grout above the waste and the rate at which that pore water is replaced. This is not explicitly modeled, but assuming continuity of flow, the grout water flux is equal to the waste water flux, reflecting the change in pore water chemistry in the waste solubility.

Figure 4.4-44: Representative Model of the Waste Layer within Each Waste Tank



4.4.4.2.1.6 Environmental Transport

Environmental transport is predominantly waterborne. Two controlling geochemical parameters are K_d and solubility. The aqueous solubility of various modeled species in cement pore waters changes as the cement degrades. Solubilities are a property of the GoldSim fluid called Water, and so Water changes in response to degradation of concrete pad underlying the waste. This required a GoldSim manipulation: the separate (yet cloned) definition of Water within each WasteLayer container, connected to an independent locally-defined vector of solubilities (Solubility_mg). The change in the physical and chemical behavior of the concrete occurs after a sufficient number of pore water volumes has passed through the porous medium. As concrete ages chemically, it changes from a geochemically reducing environment to an oxidizing one, and a redefinition of K_d values and solubilities accompanies the change. Note that the waste's solubilities change while the concrete basemat K_d values change.

As the concrete ages physically, its hydraulic characteristics change as well. These changes are handled by calculating the number of pore volumes that have passed through the concrete basemat (in the PoreFlushes container), changing from one type of concrete to another. As the concrete basemat changes type, the water flow changes concurrently, using flow fields calculated previously by the PORFLOW model.

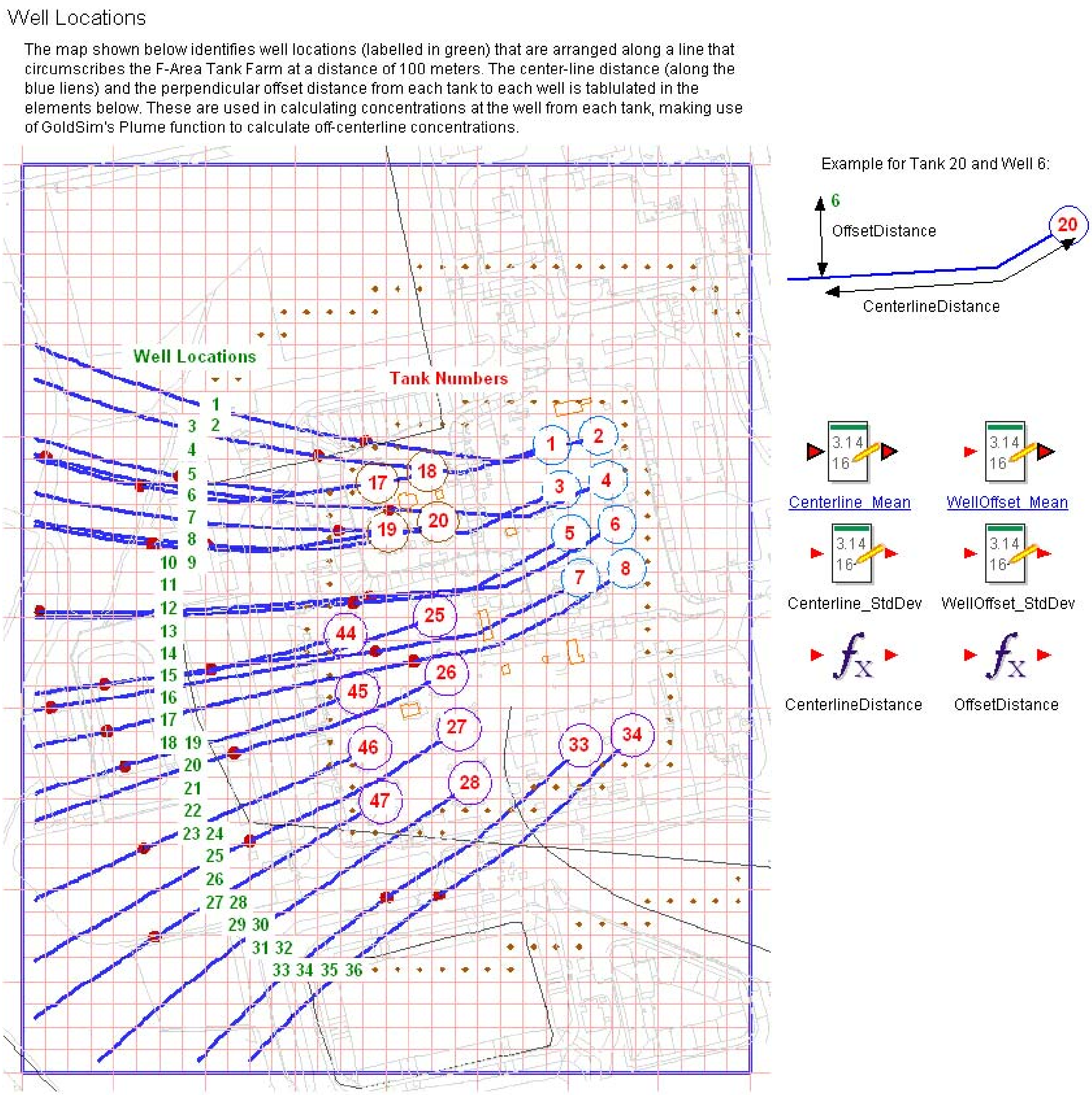
4.4.4.2.1.7 Dose Calculations

In the GoldSim FTF model there are 36 MOP and MCL compliance points evaluated at the 100m boundary, and one evaluated at a location 1m from Tank 17 for the inadvertent intruder). Each of these is discussed below.

4.4.4.2.1.8 Dose to MOP Receptor

The MOP is assumed to have access to groundwater, by the drilling of a well used for drinking water and other purposes, as close as 100m to the FTF boundary. In order to estimate that location which would provide the highest dose, a line of hypothetical wells is placed along the 100m boundary, and the dose that would be incurred by the MOP is calculated using groundwater from each well. Each well gets contaminant contributions from each waste tank, depending on its proximity to the plume emanating from each tank. Figure 4.4-45 shows the 22 waste tanks, with groundwater streamlines from each (as calculated by the PORFLOW model), and the line of 36 wells. The grid lines and well locations are spaced at 50 feet (15.24m) in order to be consistent with the PORFLOW modeling grid. These well locations were used with a novel application of the GoldSim plume function to assess plume overlap. Each waste tanks streamline has its position relative to the wells calculated. Those positions are then used to calculate each waste tank contribution to each well. These individual contributions to a well are summed up to obtain a total concentration for each contaminant. Once the contaminant concentrations are obtained, the doses are calculated by the pathways described in Sections 4.2.4.1 and 5.4.1, including the ingestion of water, vegetables, beef, milk, and soil, and inhalation of shower and irrigation water. A total dose, the sum of the appropriate pathways, is calculated for each well.

Figure 4.4-45: Hypothetical Well Locations



(Red Dots depict a line of hypothetical Well locations, placed 100m from the FTF boundary. Blue lines depict groundwater streamlines from each waste tank.)

4.4.4.2.1.9 Dose to Inadvertent Intruder Receptor

Doses to the inadvertent intruder are calculated by the pathways described in Sections 4.2.4.2, 6.2, and 6.3. The 1m well water dose is calculated by using the worst location during the compliance period.

4.4.4.2.1.10 Modeling Parameterization

Where possible, model input parameters were defined stochastically so that their influences could be evaluated in the sensitivity analysis. Where the distribution was not well understood, a basic form was assumed, with the idea that if the parameter was identified as sensitive, its input distribution could be refined later. A listing of stochastic parameter definitions is provided in Section 5.6.

4.4.4.2.1.11 Modeling Results

The results of modeled simulations are collected into a single high-level container in the FTF model, for the convenience of the user. The PerformanceAnalysis container is organized into subcontainers for doses to the MOP and inadvertent intruder, and water concentrations for comparison to regulatory MCLs. This section discusses the water concentration and dose calculations.

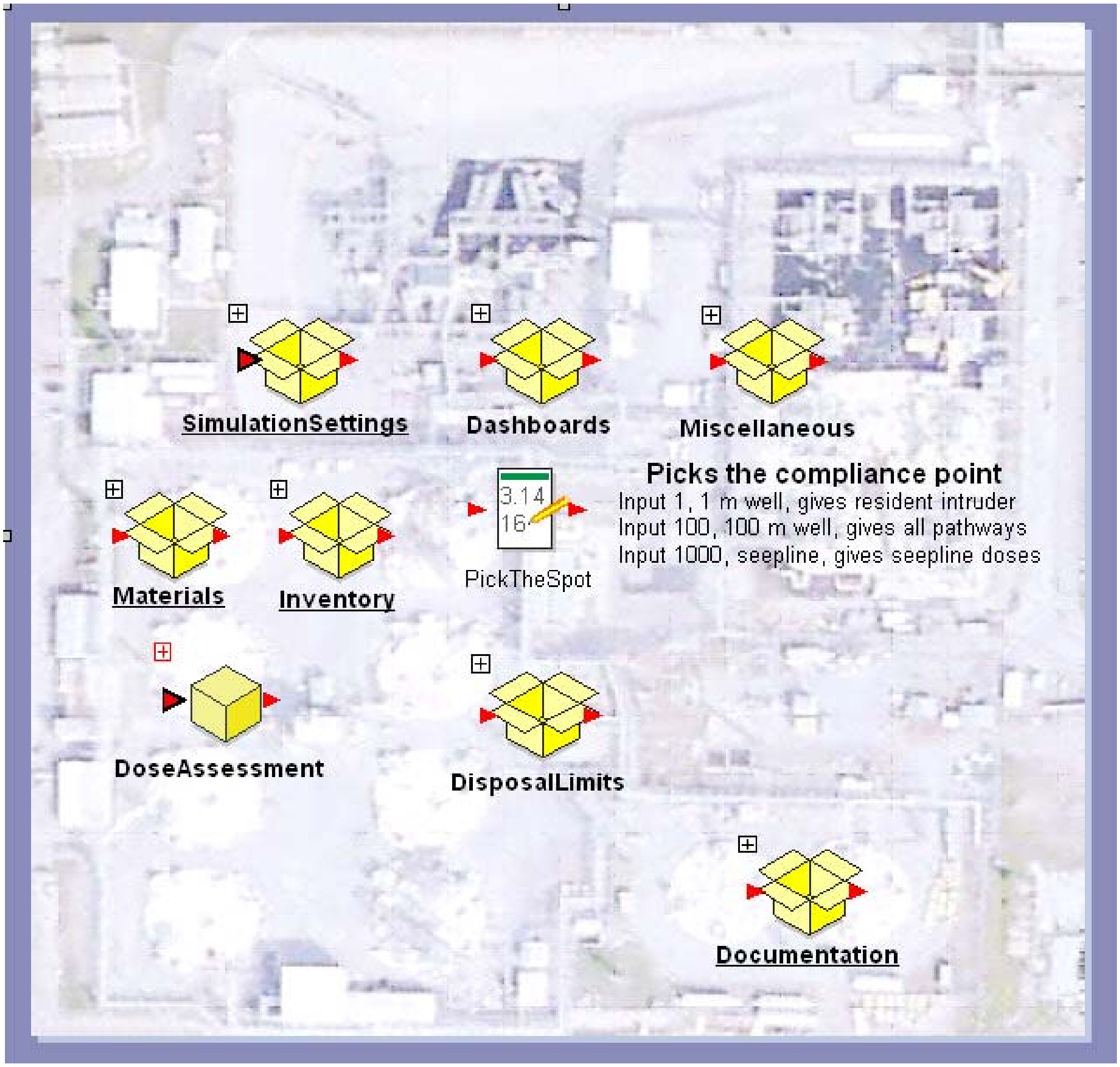
Groundwater concentrations of specific chemical elements, radicals, and compounds are a matter of regulatory concern. The FTF model is set up to estimate aqueous concentrations of specific modeled Species for comparison to MCLs. Such concentrations are evaluated at the same line of wells 100m from the FTF boundary.

4.4.4.2.2 GoldSim Dose Calculator Model Description

The GoldSim dose calculator model is a generic dose calculator in that if the inputs are correctly specified it can be used for any facility. In this case we will be discussing its application to FTF.

The major impetus behind the dose model was to keep it as similar to the FTF model as possible. Figure 4.4-46 shows the model level. Containers not needed for the dose calculation, notably TheTanks, AncillaryEquipment, and Transport have been deleted. The pathways are identical to those described in Section 4.2.4. There are five defined sectors for the 100m well, four defined sectors for the 1m well, and two defined sectors for the seepline. These sectors are shown in Figures 5.2-5 and 5.2.6.

Figure 4.4-46: GoldSim Dose Calculator Model



4.4.4.2.2.1 Input Contaminant Concentrations

The contaminant concentrations used by the stand alone model are, for this PA, obtained from the PORFLOW FTF model. Some data manipulation is required as PORFLOW runs each parent radionuclide separately. From each of those runs it creates output concentrations for each region and each aquifer level. Codes were written to coalesce these data into the single input file needed by the GoldSim model.

Since each parent is run individually, if one wishes to obtain the total concentration of a radionuclide which is the daughter of several parents, all parent files must be searched for that daughter. This must then be done for each region and each aquifer. Taking RegionD as an example, the codes generate four final files. Each file is a matrix of concentrations, in mol/L, with indices (Species, Time). Three of the files are for each aquifer and the fourth is the maximum for each radionuclide of the other three. The dose calculation is run using the maximum contaminant file. The seepline concentrations used by the GoldSim model dose calculator is the peak concentrations calculated by PORFLOW (as discussed in Section 5.4.2), and does not assume any stream dilution.

4.5 Airborne and Radon Analysis

The air and radon pathway analysis was conducted for the 10,000-year post-closure compliance period. The analytical method chosen was a hybrid approach where most parameters were set to their best estimate values (i.e., based on available site-specific measurements or engineering judgment), while other parameters were set to conservative/bounding values. The conceptual PORFLOW transport model used for the air and radon pathway analysis had imbedded within it biases that were intended to be conservative where possible. The conceptual model used for the air and radon pathway analyses were the same and the PORFLOW transport model used for both pathways utilized the same input files.

Of the available four waste tank types, the Type I tank was chosen for this analysis. This analysis did not consider any piping or ancillary equipment associated with the waste tanks. A schematic of the Type I tank is shown in Figure 4.4-1. Of the four tank types, this tank type was selected because it will have the least grout and concrete thickness above the stabilized contaminant zone, which is located at the bottom of the waste tank. Additionally the minimum closure cap thickness over the waste tanks was assumed for conservatism. These assumptions should produce the maximum flux of gaseous radionuclides at the ground surface.

4.5.1 Air and Radon Pathway Conceptual Model

The approach taken focuses primarily on a Base Case where nominal settings for many of the input parameters have been conservatively chosen. The main analysis tool employed was the PORFLOW code which simulates the transport of radionuclide chains (i.e., parents and daughters) in porous media. The flux of radioactive gasses at the land surface above the FTF was evaluated for the closure configuration. [WSRC-STI-2007-00355] Gaseous radionuclides within the CZ diffuse outward into the air-filled pore space of the overlying materials. Ultimately, some of the radionuclides emanate at the land surface. As such, air is the medium through which they diffuse. It was assumed that fluctuations in atmospheric pressure at the land surface that could induce small pulses of air movement into and out of the shallow soil profile over relatively short periods of time will have a zero net effect when averaged over longer time periods. Thus, advective transport of radionuclides in air-filled soil pores was not considered to be a significant process when compared to the rate of air diffusion.

The closure cap, as described in WSRC-STI-2007-00184_OUO, consists of a top soil layer, an upper backfill layer, an erosion barrier layer, middle backfill layer, lateral drainage layer, a HDPE geomembrane, a GCL, an upper foundation layer, and a lower foundation layer. The HDPE geomembrane and the GCL are excluded from this analysis. By excluding these materials, the baseline air analysis was more conservative as these materials would be expected to significantly reduce gaseous flux at the land surface. The HDPE geomembrane would have very low gaseous diffusion coefficients and the GCL would have very little air-filled porosity, since it would be at or near saturation. The top soil layer and the upper backfill layer were also excluded from the baseline analysis, since they are located above the erosion barrier and are therefore subject to erosion. For the purposes of this analysis, it was assumed that those components situated below the top of the erosion barrier (soil layers) remain intact for the duration of the simulation.

The Type I tank includes primary and secondary steel liners situated above a layer of basemat concrete as shown in Figure 4.4-1. The top of the waste tank is covered with a concrete roof. For the baseline analysis, the model domain begins at the top surface of the lower primary liner and extends through the stabilized contaminants to the top of the erosion barrier. The baseline model excluded the upper primary steel liner. As with the exclusion of the geomembrane and GCL, this should make the model more conservative because including the steel liner would be expected to significantly reduce gaseous flux at the land surface.

The total thickness of the waste tank, and cover materials (excluding the top soil, upper backfill, geomembrane, GCL, and steel liner) is 36.33 feet (11.07m), with a stabilized contaminant layer thickness of 1.0 feet (0.30m). The stabilized contaminant layer thickness in this model differs from the groundwater model to provide additional conservatism providing a shorter pathway to the surface. Table 4.5-1 lists the individual components of the Type I tank and closure cap included in the analysis. Materials are indicated with the associated thickness of each component, in inches, feet, and meters.

Table 4.5-1: Vertical Layer Sequence and Associated Thickness for FTF Type I Tank and Cover Material

Layer	Thickness (inches)	Thickness (ft)	Thickness (m)
Erosion Barrier	12	1.00	0.3048
Middle Backfill	12	1.00	0.3048
Lateral Drainage	12	1.00	0.3048
Upper Foundation	12	1.00	0.3048
Lower Foundation	72 (minimum)	6.00	1.83
Concrete Roof	22	1.83	0.56
Reducing Grout	282	23.5	7.16
Stabilized Contaminants Layer	12	1.00	0.3048

[Adapted from WSRC-STI-2007-00184_OUO]

4.5.2 Air and Radon Pathway Diffusive Transport Model

A one-dimensional PORFLOW based diffusive transport model was created for the FTF Type I tank Base Case.

The governing equation for mass transport of species *k* in the fluid phase is given by:

$$\frac{\partial C_k}{\partial t} + \frac{\partial}{\partial x_i}(V_i C_k) = \frac{\partial}{\partial x_i}(D_{ij}\frac{\partial C_k}{\partial x_j}) + \gamma_k$$

Where:

C_k	concentration of species *k*, Ci/m^3
V_i	fluid velocity in the i^{th} direction, m/yr
D_{ij}	effective diffusion coefficient for the species, m^2/yr
γ_k	net decay of species *k*, Ci/m^3 yr
i, j	direction index
t	time, yr
x	distance coordinate, m

This equation is solved within PORFLOW to evaluate transient radionuclide transport above the waste tank and to determine gaseous radionuclide flux at the land surface over time. For this analysis, the advection term was disabled within PORFLOW and only the diffusive and net decay terms were evaluated.

The boundary conditions imposed on the entire model domain included:

- No-flux specified for all radionuclides along sides and bottom
  ($\partial C/\partial X = 0$ at x=0, x=1 and $\partial C/\partial Y = 0$ at y=0)
- Species concentration set to 0 at land surface (top of erosion barrier)
  ($C = 0$ at $y=y_{max}$)

These boundary conditions force all of the gaseous radionuclides to move upward from the stabilized contaminant zone to the land surface. In reality, some lateral and downward diffusion occurs in the air-filled pores surrounding the stabilized contaminant zone; hence ignoring this lateral and downward movement has the effect of increasing the flux at the land surface. This introduced some conservatism in the calculated results. Simulations were conducted in transient mode for diffusive transport in air, with results being obtained over the 10,000-year period.

The initial condition imposed on the domain, except for the stabilized contaminant zone, included:

- Species concentration set to 0 at time = 0
  ($C=0$ for $0 \leq x \leq 1$ at t=0 and $C=0$ for $0 \leq y \leq y_{max}$ at t=0)

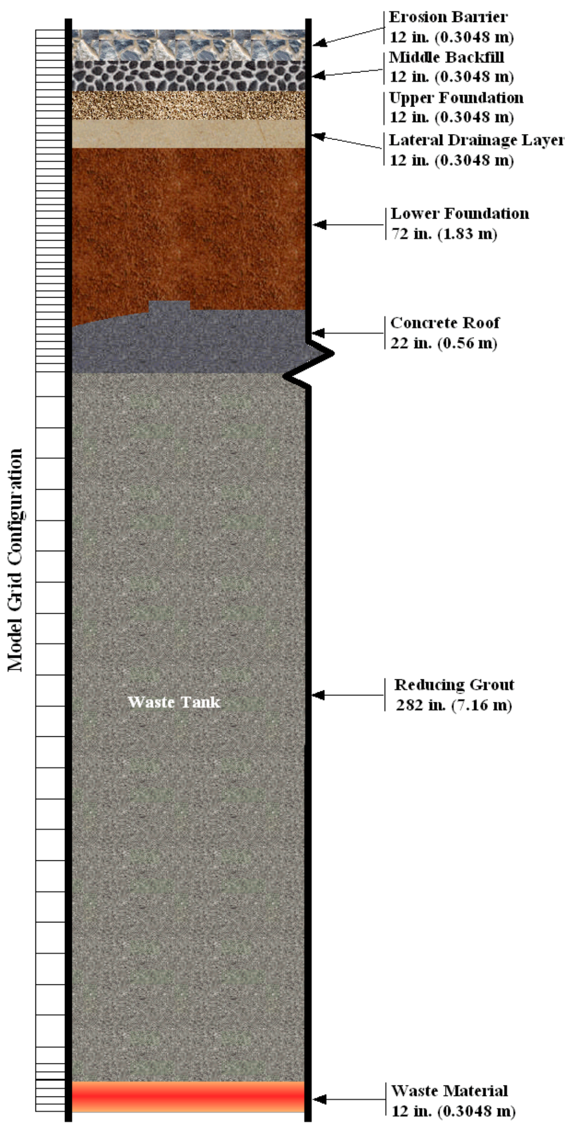
For the air pathway analysis, the initial conditions for the model assumed a 1 Ci inventory of each radionuclide uniformly spread over the stabilized contaminant zone. For the radon pathway analysis, an emanation factor of 0.25 was applied resulting in an initial inventory of

0.25 Ci for each parent radionuclide uniformly spread over the stabilized contaminant zone. The emanation factor for the radon pathway analysis is explained more fully in Section 4.5.6.

4.5.2.1 Grid Construction

The model grid for the waste tank and overlying cover materials was constructed as a node mesh 3 nodes wide by 80 nodes high. This mesh creates a vertical stack of 78 model elements. Figure 4.5-1 shows a schematic of the PORFLOW model grid. The grid extends upward to the top of the erosion barrier, since this is the minimum possible cover thickness that could exist during the simulation period. A set of consistent units was employed in the simulations for length, mass and time, these being meters, grams and years, respectively.

Figure 4.5-1: Schematic of PORFLOW Model Grid for Air and Radon Pathway Analysis



4.5.2.2 Material Zone Properties and Other Input Parameters

Material properties utilized within the one-dimensional numerical model were specified for eight material zones defined within the model domain. Each material zone was assigned values of particle density, total porosity, average saturation, air-filled porosity, air density, and an effective air-diffusion coefficient for each source element or compound. An effective air-diffusion coefficient was used for each radionuclide and material layer. Therefore, tortuosity was assigned a unit value in each material zone. An air fluid density of 1.24E+3 g/m^3 at standard atmospheric conditions was used in the transport simulations. [WSRC-STI-2007-00355]

The stabilized contaminant layer was assumed to be 1 foot thick and confined to the bottom of the waste tank. The waste tank is to be filled with a reducing grout (OPDEXE-X-P-0-BS) from the existing specification, which is described in Section 3.2.3, and it was assumed that the stabilized contaminant layer would have similar properties. The hydraulic and physical properties of this mix are reported in WSRC-STI-2007-00369. Based on the results of this testing, the stabilized contaminant layer and the reducing grout layer was assigned a particle density of 2.51 g/cm^3 and a total and air-filled porosity of 0.266. The concrete roof layer was assumed to be similar to the basemat surrogate tested and reported in WSRC-STI-2007-00369. This layer was assigned a particle density of 2.51 g/cm^3 and a total and air-filled porosity of 0.168. The stabilized contaminant layer, the reducing grout, and the concrete roof were conservatively assumed to be dry (i.e., total porosity = air-filled porosity).

The foundation layer was divided into the upper and lower foundation layers. [WSRC-STI-2007-00184_OUO] It is anticipated that the lower foundation layer will need to promote drainage of infiltrating water away from and around the waste tanks, requiring a relatively high saturated conductivity such as 1.0E-03 cm/sec. It is anticipated that the upper foundation layer will consist of soil with a moderately low permeability (i.e., $\leq$1.0E-06 cm/sec) produced by blending typical SRS backfill with a small weight percent bentonite. The particle density of the lower and upper foundation layers was assigned that of control compacted backfill from WSRC-STI-2006-00198 (i.e., 2.63 g/cm^3).

The particle density of the middle backfill layer was also assigned that of control compacted backfill from WSRC-STI-2006-00198 (i.e., 2.63 g/cm^3). The lateral drainage layer and erosion barrier layer were assigned a particle density typical of quartz (i.e., 2.65 g/cm^3).

Infiltration through the closure cap materials over time as the closure cap degraded was evaluated using the HELP model. [WSRC-STI-2007-00184_OUO] Values for total porosity and volumetric moisture content for the closure cap materials and foundation layers were taken from this analysis. These values were used to calculate the average saturation and the air-filled porosity for the closure cap materials. The maximum air-filled porosity for each material layer over the 10,000-year simulation was utilized, since this represented the greatest air filled porosity in which a gas could diffuse.

Table 4.5-2 provides the values of particle density, total porosity, average saturation, and air-filled porosity utilized for all the layers used in the baseline scenario (i.e., waste material layer to the erosion barrier) for the simulation period.

Table 4.5-2: Particle Density, Total Porosity, Average Saturation, and Air-Filled Porosity by Layer for the FTF Type I Tank Baseline Scenario

Layer	Particle Density (g/cm^3)	Total Porosity (fraction)	Average Saturation (fraction)	Air-filled Porosity (fraction)
Erosion barrier layer [1, 3]	2.65	0.150	0.84	0.024
Middle backfill layer [2, 3]	2.63	0.371	0.82	0.067
Upper Foundation layer [2, 3]	2.63	0.35	0.72	0.098
Lateral drainage layer [1, 3]	2.65	0.417	0.61	0.162
Lower Foundation Layer [2, 3]	2.63	0.457	0.28	0.328
Concrete Roof [4, 7]	2.51	0.168	0.00	0.168
Reducing Grout [5, 7]	2.51	0.266	0.00	0.266
Stabilized Contaminant Layer [6, 7]	2.51	0.266	0.00	0.266

1 Particle density assumed to be that typical of quartz. [WSRC-STI-2007-00355]
2 Values for particle density taken as that of control compacted backfill from WSRC-STI-2007-00184_OUO.
3 Total porosity, average saturation, and air-filled porosity values derived from WSRC-STI-2007-00184_OUO.
4 The concrete roof is assumed to be similar to the basemat surrogate as given by WSRC-STI-2007-00369. Particle density and porosity taken from WSRC-STI-2007-00369.
5 Particle density and porosity of reducing grout taken from WSRC-STI-2007-00369.
6 The stabilized contaminant is assumed to have the properties of reducing grout.
7 The concrete roof, reducing grout, and stabilized contaminant layer are conservatively assumed to be dry; therefore the average saturation is taken as 0 and the air-filled porosity is taken as the total porosity.

4.5.3 Summary of Key Air and Radon Pathway Assumptions

The following are the key air and radon pathway analysis assumptions associated with the FTF baseline scenario:

- The stabilized contaminant layer was represented as a 1 foot layer of material located at the bottom of the waste tank.
- The stabilized contaminant layer was assumed to be dry and to have properties similar to reducing grout.
- Exclusion of the top soil, upper backfill, HDPE geomembrane, GCL, and primary steel liner of the waste tank make the model more conservative.
- The final closure cap as outlined with exclusions was assumed to remain intact for the duration of the simulation.

In this analysis, several conditions introduce conservatism into the calculations. These include:

- The use of boundary conditions that force all of the gaseous radionuclides to move upward from the stabilized contaminant zone to the land surface. In reality, some of the gaseous radionuclides diffuse sideways and downward in the air-filled pores surrounding the stabilized contaminant zone, hence ignoring this has the effect of increasing the flux at the land surface.
- Not taking credit for the removal of radionuclides by pore water moving vertically downward through the model domain. This mechanism would likely remove some dissolved radionuclides, and therefore its omission had the effect of increasing the estimate of instantaneous radionuclide flux at the land surface in simulations conducted as a part of this investigation.
- Exclusion of the HDPE geomembrane, the GCL, and the primary steel liner of the waste tank. Inclusion of these materials in the model would significantly reduce the gaseous flux at the land surface due to their material properties (i.e., low air-filled porosity).
- Exclusion of the cover materials above the erosion barrier (i.e., top soil and upper backfill layers). Excluding these materials shortens the diffusion pathway and could increase the flux at the land surface.
- Assuming the stabilized contaminant layer, the reducing grout, and concrete roof are dry. This makes the air-filled porosity equal to the total porosity. This maximizes diffusive transport through these materials since gaseous flux is through the air-filled porosity.
- Use of the Type I tanks and minimum closure cap thickness.
- Concentrating the entire estimated FTF residual inventory into a 1 foot stabilized contaminant layer in one Type I tank to determine the maximum dose and flux.

4.5.4 Air Pathway Analysis

For the air pathway analysis, a list of radionuclides of interest was chosen based on NCRP-123, atmospheric screening methodology, while accounting for the fact that the radionuclides of concern for the airborne pathway are constrained by the actual waste tank inventory and the limited number of radionuclides susceptible to volatilization. These radionuclides included carbon-14 (C-14), chlorine-36 (Cl-36), iodine-129 (I-129), selenium-79 (Se-79), antimony-125 (Sb-125), tin-126 (Sn-126), tritium (H-3), and technetium-99 (Tc-99). Radon-222 (Rn-222) is addressed separately as required by DOE O 435.1-1. A summary of the radionuclides and compounds of interest is presented in Table 4.5-3.

Table 4.5-3: Radionuclides and Compounds of Interest for Air and Radon Pathway Analysis

Radionuclide	Half-life[1] (yrs)	Atomic Wt.	Molecular form in gaseous state	Molecular Wt.
C-14	5.70E+03	14	CO_2	45.99
Cl-36	3.01E+05	36	Cl_2	72
I-129	1.57E+07	129	I_2	258
Sb-125	2.76E+00	125	Sb	125
Se-79	2.95E+05	79	Se	79
Sn-126	2.30E+05	126	Sn	126
H-3	1.23E+00	3	H_2	6
Tc-99	2.11E+05	99	Tc	99
Rn-222	1.05E-02	222	Rn	222

[1]2005 Nuclear Wallet Cards [PIT-MISC-0072]

The radionuclides of interest are assumed to be in the gas phase and uniformly distributed through the 1 foot stabilized contaminant layer at the bottom of the waste tank. Certain gaseous radionuclides will not likely remain in the monatomic elemental form. These radionuclides will likely combine with other gaseous elements or form diatomic molecules. The state of existence of each of these radionuclides in the gaseous phase is important in evaluating their transport to the land surface because the diffusion coefficient associated with each is related to its molecular weight.

In this investigation it was assumed that:

- C-14 exists as part of the CO_2 molecule
- Cl-36, H-3 and I-129 exist as diatomic gasses
- Sb-125, Se-79, Sn-126, and Tc-99 exist as monatomic gasses

The effective air diffusion coefficient of each radionuclide or compound within each material zone was determined. A relationship was established between moisture saturation and the radon effective air-diffusion coefficient for various pore sizes of earthen materials. [WSRC-STI-2007-00355] Using this method, a radon effective air-diffusion coefficient was determined for each material type based upon the average moisture saturation for the material. Subsequently, using Graham's Law, the effective air-diffusion coefficient of each radionuclide or compound evaluated was determined for each material type based on the radon effective air-diffusion coefficient using the following relationship.

$$D = D'\sqrt{\frac{MWT'}{MWT}}$$

Where:

D = the effective diffusion coefficient of the radionuclide of interest (m^2/yr) within the material zone of interest
D' = the effective diffusion coefficient of Rn-222 (m^2/yr) within the material zone of interest
MWT' = the molecular weight of the reference radionuclide (Rn-222)
MWT = the molecular weight of the element or compound of interest

A summary of the radon effective air-diffusion coefficients and the calculated effective air-diffusion coefficients for each radionuclide/compound by material zone are presented in Table 4.5-4.

Table 4.5-4: Effective Air-Diffusion Coefficients for Each Radionuclide/Compound, by Material for FTF Type I Tank and Closure Cap

Radionuclide	Tank Stabilized Contaminants, Reducing Grout, and Concrete Roof Layer (m^2/yr)	Lower Foundation Layer (m^2/yr)	Upper Foundation Layer (m^2/yr)	Lateral Drainage Layer (m^2/yr)	Middle Backfill Layer (m^2/yr)	Erosion Barrier Layer (m^2/yr)
Rn-222	3.470E+02	1.210E+01	2.618E+00	4.194E+00	1.455E+00	1.301E+00
C-14	7.623E+02	2.658E+01	5.752E+00	9.213E+00	3.196E+00	2.858E+00
Cl-36	6.093E+02	2.124E+01	4.597E+00	7.364E+00	2.555E+00	2.284E+00
I-129	3.219E+02	1.122E+01	2.429E+00	3.890E+00	1.350E+00	1.207E+00
Sb-125	4.624E+02	1.612E+01	3.489E+00	5.589E+00	1.939E+00	1.734E+00
Se-79	5.817E+02	2.028E+01	4.389E+00	7.030E+00	2.439E+00	2.181E+00
Sn-126	4.606E+02	1.606E+01	3.475E+00	5.567E+00	1.931E+00	1.727E+00
H-3	2.111E+03	7.359E+01	1.593E+01	2.551E+01	8.850E+00	7.912E+00
Tc-99	5.196E+02	1.812E+01	3.921E+00	6.280E+00	2.179E+00	1.948E+00

Note: The effective diffusion coefficient for Rn-222 was used to determine the effective air diffusion coefficient of each radionuclide/compound based on Graham's Law (Grahams Law states that the rate of diffusion of a gas in inversely proportional to the square root of its molecular weight).

4.5.5 Air Pathway Model Factors for a Unit Curie (Ci)

4.5.5.1 Air Pathway Flux to Ground Surface

Model simulations were conducted to evaluate the peak flux of each radionuclide (other than radon) emanating from the top of the model domain. A unit inventory of 1 Ci was assigned to the FTF Type I tank stabilized contaminant zone for each radionuclide considered in the analysis. Results were output in Ci/yr, consistent with the set of units employed in the model, and are presented for each radionuclide in Figure 4.5-2. The peak fluxes emanating at the land surface are presented Table 4.5-5. The results are reported in this way to facilitate calculation of human exposure at the SRS boundary, at 100m from FTF, and at 1,600m from FTF (i.e., a representative seepline distance).

Figure 4.5-2: Flux at Land Surface for Each Radionuclide

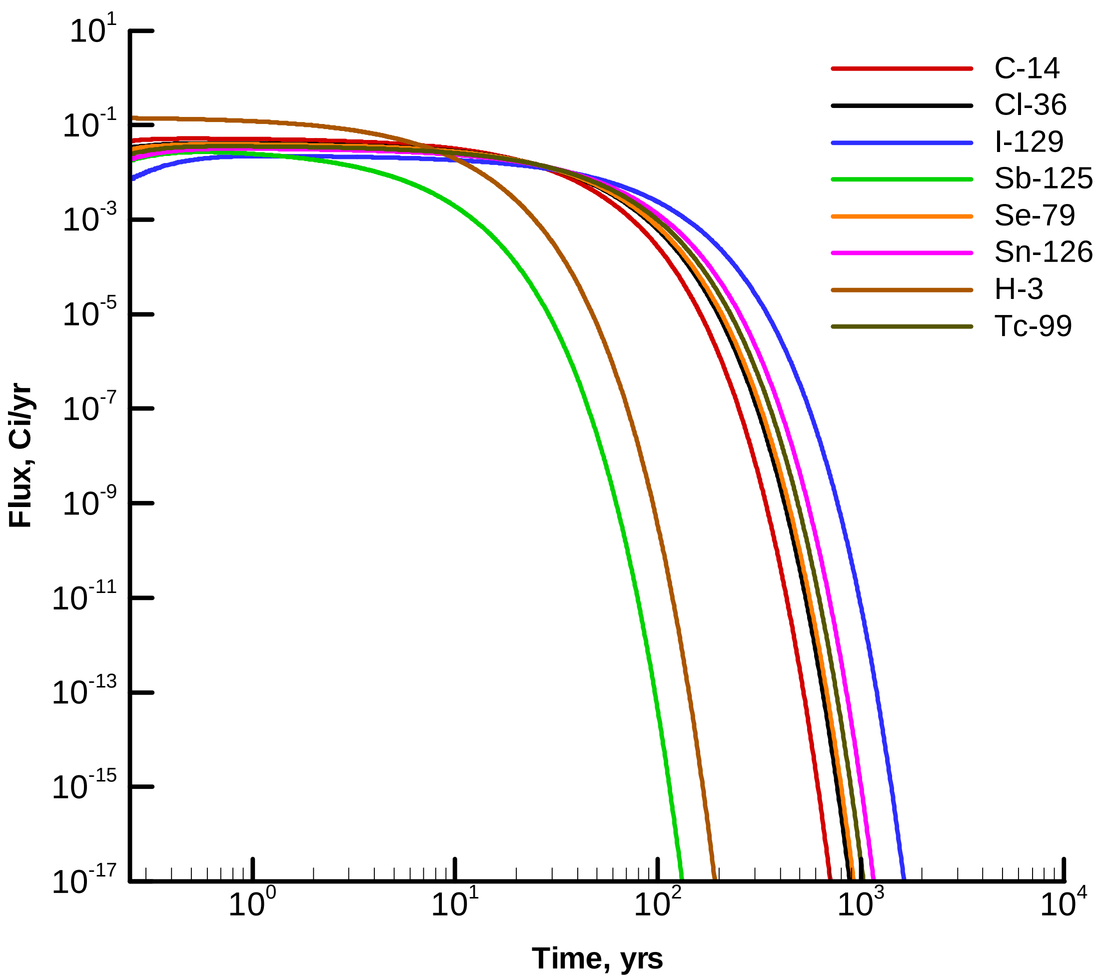


Table 4.5-5: Summary of the Peak Fluxes for Each Radionuclide

Radionuclide	Activity in Residual Waste (Ci)	Peak Flux (Ci/yr/Ci)
C-14	1.0	2.59E-04
Cl-36	1.0	6.07E-04
I-129	1.0	2.38E-03
Sb-125	1.0	3.71E-14
Se-79	1.0	7.02E-04
Sn-126	1.0	1.29E-03
H-3	1.0	3.12E-10
Tc-99	1.0	9.66E-04

4.5.5.2 Air Pathway Dose Calculations

An evaluation was conducted to assess the potential dose to a MEI located at the SRS boundary, at 1,600m from FTF (seepline), and at 100m from FTF. [WSRC-STI-2007-00343] DRFs were calculated for each radionuclide potentially released from the FTF using CAP88-PC, the EPA model for NESHAP. CAP88-PC uses a database of dose and risk factors provided in *Federal Guidance Report 13* for estimating dose and risk, (i.e., factors for lifetime fatal cancer risk). [EPA 402-R-99-001] These dose and risk factors were used for the pathways of ingestion and inhalation intake, ground level air immersion, and ground surface irradiation. DRFs represent the dose to the receptor exposed to 1 Ci of the specified radionuclide potentially released to the atmosphere. For the receptor located at the SRS boundary and at the seepline (1,600m), the distance from the FTF is sufficient for an assumption of a point source. However, the DRFs for the 100m receptor required evaluation of an area source because of the close proximity of FTF to the 100m receptor. For radionuclides not contained within the CAP88-PC library (Se-79, Cl-36) atmospheric transport was estimated by assigning surrogates with similar radiological properties. [WSRC-STI-2007-00343] Doses for these radionuclides were estimated by applying their dosimetric properties to the surrogate's relative air concentrations estimated by the model.

CAP88 models area sources for releases where the receptor distance/source effective length ratio is less than 2.5. The FTF must be treated as an area source when considering receptor distances of 100m and 400m. However, CAP88, Version 1.0 is deemed inappropriate close to the source (distance/diameter ratio is less than 1.3) and it does not handle area sources. Therefore, point source and area source sector-average relative air concentration were estimated.

The estimated point source area concentration (χ/Q) of 8.1E-4 s/m^3 was compared to the area source sector-average relative air concentrations for the FTF to estimate the point/area source ratio for a receptor location of 100m. Similar calculations were performed for 400m, which resulted in an estimated point source area concentration (χ/Q) of 5.9E-5 s/m^3. The area source average air concentrations and point/area source ratios are listed in Table 4.5-6. The point/area sources are conservatively rounded down to the nearest integer to represent the overestimate of the average air concentration that would result from assuming a point source. These factors are applied to the CAP88 modeled 100m and 400m point source estimate to determine areas source EDEs for FTF. [WSRC-STI-2007-00343]

Table 4.5-6: Area to Point Source Comparisons

Receptor Distance (m)	Point Source χ/Q (s/m^3)	Area Source (s/m^3)	Point/Area Ratio
100	8.1E-04	2.8E-05	29
400	5.9E-05	3.8E-06	15

Specific SRS 100m DRFs and the calculated exposure levels for the MEI at 100m are presented in Table 4.5-7. Specific SRS 1,600m DRF and the calculated exposure levels for the MEI at 1,600m are presented in Table 4.5-8. Because the DRFs for 100m are calculated from an assumed area source, while the 1,600m DRFs are calculated from an assumed point source, the results show a more conservative estimate at 1,600m which results in a higher estimated dose at 1,600m than at 100m. See WSRC-STI-2007-00343 for details on the estimation of all DRFs.

Table 4.5-7: 100m Dose Release Factors and 100 – 10,000 Year FTF Exposure Levels

Radionuclide	Peak Flux (Ci/yr/Ci)	SRS 100m DRF[1] (mrem/Ci)	Dose to MEI at 100m Boundary[2] (mrem/yr/Ci)
C-14	2.59E-04	2.8E-04	7.2E-08
Cl-36	6.07E-04	2.9E-02	1.7E-05
I-129	2.38E-03	2.0E+01	4.8E-02
Sb-125	3.71E-14	3.9E-01	1.4E-14
Se-79	7.02E-04	3.8E-02	2.7E-05
Sn-126	1.29E-03	1.8E+01	2.3E-02
H-3	3.12E-10	1.3E-02	4.2E-12
Tc-99	9.66E-04	1.1E-01	1.0E-04

[1] WSRC-STI-2007-00343
[2] Dose to MEI at 100m = Peak Flux × Dose Release Factor. [WSRC-STI-2007-00355]

Table 4.5-8: 1,600m Dose Release Factors and 100 – 10,000 Year FTF Exposure Levels

Radionuclide	Peak Flux (Ci/yr/Ci)	SRS 1,600m DRF[1] (mrem/Ci)	Dose to MEI at 1,600m Boundary[2] (mrem/yr/Ci)
C-14	2.59E-04	2.4E-03	6.2E-07
Cl-36	6.07E-04	6.2E-03	3.7E-06
I-129	2.38E-03	2.3E+00	5.5E-03
Sb-125	3.71E-14	9.7E-02	3.6E-15
Se-79	7.02E-04	9.1E-03	6.4E-06
Sn-126	1.29E-03	4.4E+00	5.7E-03
H-3	3.12E-10	4.9E-05	1.5E-14
Tc-99	9.66E-04	2.6E-02	2.6E-05

[1]From WSRC-STI-2007-00343.
[2]Dose to MEI at 1,600m = Peak Flux × DRF. [WSRC-STI-2007-00355]

4.5.6 Radon Analysis

The permissible radon flux for DOE facilities is addressed in DOE M 435.1-1, Section IV. P.(c) and states the radon flux requirement is that the release of radon shall be less than an average yearly flux of 20 pCi/m^2/sec at the surface of the facility. The performance objective refers only to radon, and the correct species must be analyzed depending on the characteristics of the residual waste stream. The instantaneous Rn-222 flux at the land surface was evaluated for the simulation period and the maximum flux was then compared to the DOE performance objective.

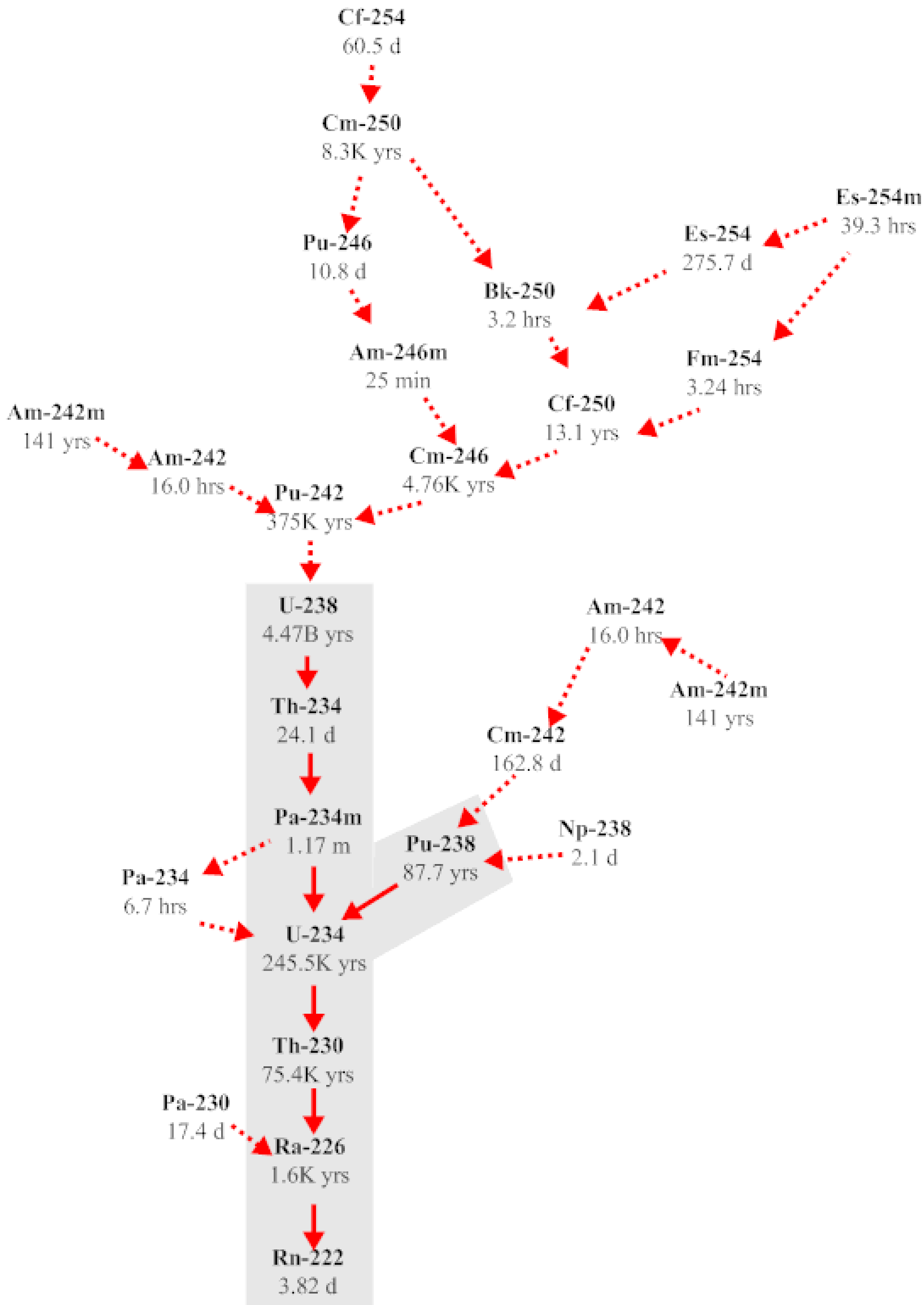
The potential parent radionuclides that can contribute to the creation of Rn-222 are illustrated in Figure 4.5-3. The diagram indicates the specific decay chains that lead to the formation of Rn-222, as well as the half-lives for each radionuclide. The extremely long half-life of U-238 (4.468E+9 years) cause the other radionuclides higher up on the chain of parents to be of little concern with regard to their potential to contribute significantly to the Rn-222 flux at the land surface over the period of interest. In Figure 4.5-3, the parent radionuclides that were individually evaluated are indicated with the gray shaded area (i.e., beginning with Pu-238 and U-238). Rn-222 generated within the stabilized contaminant zone is in the gaseous phase and diffuses outward from this zone into the air-filled soil pores surrounding the FTF, eventually resulting in some of the radon emanating at the land surface. As such, air is the fluid through which Rn-222 diffuses, although some Rn-222 may dissolve in residual pore water.

The parent radionuclides are assumed to exist in the solid phase and therefore do not migrate upward through the air-filled pore space, although they could be leached and transported downward from the stabilized contaminant zone by pore water movement. This potential downward migration of the parent radionuclides was not considered in the radon analysis.

Decay chains evaluated were U-238→Th-234→Pa-234m→U-234→Th-230→Ra-226→Rn-222 and Pu-238 →U-234→Th-230→Ra-226→Rn-222. Each parent in these chains, except Th-234 and Pa-234m, were simulated separately as the starting point of the decay chain. Th-234 and Pa-234m have extremely short half-lives compared to the other parent radionuclides in these chains. Only a fraction of the Rn-222 generated by the decay of each parent is available for migration away from its source and into open pore space. Since the Rn-222 parent radionuclides exist as oxides or in other crystalline forms, only a fraction of Rn-222 generated by decay of Ra-226 has sufficient energy to migrate away from its original location into adjacent pore space before further decay occurs (3.82 day half-life for Rn-222).

The emanation coefficient is generally defined as the fraction of the total amount of Rn-222 produced by radium decay that escapes from soil particles and enters the pore space of the medium. This is the fraction of the Rn-222 that is available for transport. In the case of the FTF, the parent radionuclides are not embedded in soil but are contained within stabilized contaminants entombed in concrete/grout. Literature values for the Rn-222 emanation factor for these conditions are not available. Studies have shown the emanation factor to vary between 0.02 and 0.7 for various soil types depending primarily on moisture content. Generally, higher emanation factors are associated with higher moisture contents.

Figure 4.5-3: Radioactive Decay Chains Leading to Rn-222



RESidual RADioactivity Computer Software (RESRAD) is a model used to estimate radiation dose and risk from residual radioactive materials. This DOE and NRC approved code, assumes an emanation factor of 0.25 for Rn-222 which is representative of a silty loam soil with low moisture content. For the FTF radon pathway analysis, the RESRAD default emanation factor of 0.25 was chosen recognizing that literature values for residual wastes similar to the FTF are not available. The use of 0.25 should be conservative since the stabilized contaminant is assumed to be dry and emanation factors reported in the literature for drier soils are much lower. [ANL-EAD-4] To account for the emanation factor in the model, an effective source term of 0.25 Ci of parent radionuclide was utilized for each Ci disposed within the facility.

Some radon dissolves in pore water but since diffusion proceeds more slowly in that fluid, air diffusion was the only transport process by which Rn-222 was allowed to reach the land surface of the FTF. This assertion is substantiated in ANL-EAD-4. In that report the effective diffusion coefficient for soil is reported to range from the radon open air diffusion coefficient of 1.0E-5 m^2/sec to that of fully saturated soil, 1.0E-10 m^2/sec. This five order of magnitude difference is consistent with the comparison of water diffusion coefficients to air diffusion coefficients of other common molecular compounds and reported in many references. Thus, the larger volume of water-filled pore space compared to air-filled pore space (maximum of 1 order of magnitude difference) is inconsequential, in terms of the ability of water-dissolved radon to diffuse through water-filled pores as compared to the ability of the same compounds to diffuse as gas in the vapor-filled pore spaces.

The molecular diffusion coefficient of Rn-222 in open air is 347 m^2/yr. [WSRC-STI-2007-00355] A relationship between moisture saturation and the radon effective air-diffusion coefficient for various pore sizes of earthen materials was established. This method was used to calculate a radon effective air-diffusion coefficient for each material type based upon the average moisture saturation for the material. Tortuosity was assigned a unit value for each material type. A summary of the radon air-diffusion coefficients by material type are presented in Table 4.5-4.

4.5.7 Radon Pathway Model Results

Model simulations were conducted to evaluate the peak instantaneous Rn-222 flux at the land surface for the simulation period of 10,000 years. Model results were output in Ci/m^2/yr per Ci/m^2 of inventory, consistent with the set of units employed in the model. A graph of these results is shown in Figure 4.5-4, although the units are converted to pCi/m^2/sec per Ci/m^2, which are the units used to define the regulatory flux limit in DOE M 435.1-1. The peak fluxes represent the peak Rn-222 flux per square meter at the land surface for the two time periods and are given in Table 4.5-9.

Figure 4.5-4: Rn-222 Flux at Land Surface Resulting from Unit Source Term

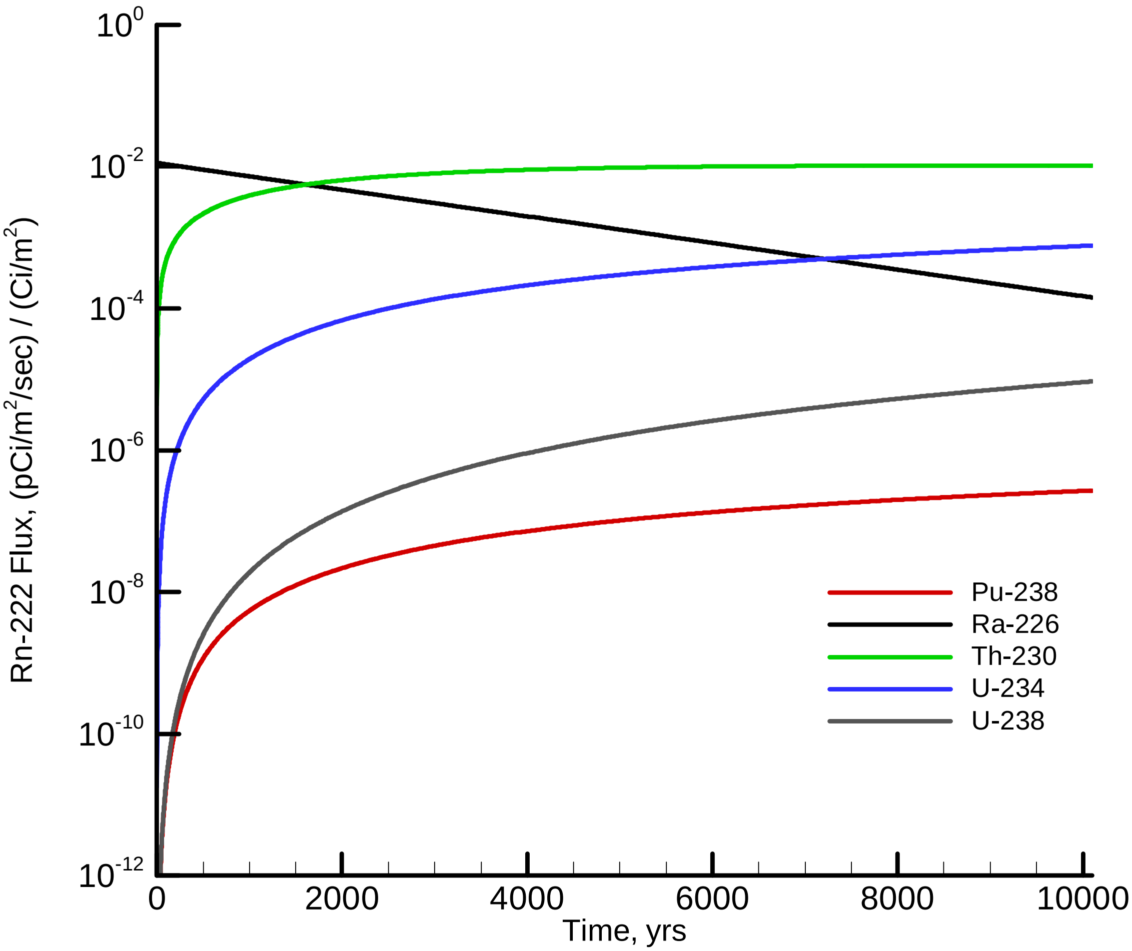


Table 4.5-9: Simulated Peak Instantaneous Rn-222 Flux over 10,000 Years at the Land Surface

Parent Source (1 Ci/m^2)	Peak Instantaneous Rn-222 flux at Land Surface (pCi/m^2/sec) / (Ci/m^2)
Pu-238	2.70E-07
U-238	9.29E-06
U-234	7.68E-04
Th-230	1.03E-02
Ra-226	1.12E-02

4.6 Biotic Pathways

The purpose of this section is to document the Bioaccumulation Factors and Human Health Exposure parameters used in the FTF PA modeling effort. Exposure pathways for the FTF PA are discussed in Section 4.2.4. Bioaccumulation Factors and Human Health Exposure parameters are used to calculate doses for each of the pathways.

4.6.1 Bioaccumulation Factors

For PA analyses at SRS, soil-to-vegetable (also known as soil-to-plant ratios or plant-to-soil ratios), feed-to-milk, feed-to-beef and water-to-fish transfer factors are the bioaccumulation factors considered. Soil-to-vegetable transfer factors determine the fraction of an element that is drawn from the soil into the edible plant. Feed-to-milk transfer factors represent the element fraction transferred from fodder to milk. Feed-to-meat transfer factors represent the element specific fraction transferred from fodder to beef. Water-to-fish transfer factors are the equilibrium ratios between concentration in aquatic foods and concentration in water.

The factors utilized were developed based on comparison to a number of other DOE facilities and generic national/global references to establish relevance of the parameters selected and/or verify the regional differences for the southeastern United States. [WSRC-STI-2007-00004] The values for the parameters are based on expected values along with a range versus estimating an annual dose to the MEI.

4.6.1.1 Bioaccumulation Factor Methodology

A report entitled *Baseline Parameter Update for Human Health Input and Transfer Factors for Radiological Performance Assessments at the Savannah River Site* documents the SRS evaluation and reviews of transfer factors. [WSRC-STI-2007-00004] This report presents additional details on factors utilized in the past and discussion on conversion factors developed for SRS use. This report also established a single bioaccumulation factor parameter source that is up to date with existing data and maintained current via periodic reviews.

In developing the report, a comprehensive literature review was completed and references were updated to include the latest available information. In general, the values from more recent compilations were recommended, rather than those in older publications. The report includes information to establish a range of values for each element which was used to perform uncertainty analysis.

WSRC-STI-2007-00004 recommends updating the factors using site-specific values when available but considers *A Compendium of Transfer Factors for Agricultural and Animal Products* to be the most recent comprehensive evaluation of bioaccumulation factors and recommends this as the secondary source of values if site-specific values are not available. [PNNL-13421]

The hierarchy on document use at SRS for bioaccumulation factors is listed below:

- Site-Specific
- Other site- or regional- specific publications (CDC-2006)
- PNNL-13421
- ORNL-5786
- NCRP-123

In PNNL-13421 the hierarchy of documents used to establish transfer factors is IAEA-364 and then NUREG-CR-5512, then NCRP-123. The International Atomic Energy Agency's Technical Report Series #364, *Handbook of Parameter Values for the Prediction of Radionuclide Transfer in Temperate Environments* encompasses a wide variety of plant types and is the result of extensive background investigations. [IAEA-364] It is based on data compiled by the International Union of Radioecologists. *Residual Radioactive Contamination from Decommissioning: Technical Basis for Translating Contamination Levels to Annual Total Effective Dose Equivalent*, NUREG-CR-5512 is frequently referenced because of its large set of data and traceable references.

In ORNL-5786 the hierarchy of documents used to establish transfer factors is NRC Regulatory Guide 1.109 then the TERRA code values.

In general, site-specific values were used without modification where appropriate. When recent generic compilations were used and the differences between the updated value and the currently used value were larger than two orders of magnitude, a Geometric Mean (GM) of the generic updated value and the currently used value was selected for averaging the ratios. [WSRC-TR-96-0231, SRT-EST-2003-00134]

4.6.1.1.1 Bioaccumulation Parameters

The transfer factors that SRS utilized for the FTF PA appear in Tables 4.6-1 through 4.6-4. The data in these tables were taken from WSRC-STI-2007-00004.

Table 4.6-1: Soil-to-Vegetable Transfer Factors (Unitless)

Atomic No.	Element	Soil-to-Vegetable Transfer Factors		
		Value	Min.	Max.
89	Ac	6.83E-05	6.69E-05	3.50E-03
47	Ag	1.18E-02	2.54E-04	1.50E-01
13	Al	1.27E-04	1.24E-04	4.00E-03
95	Am	6.83E-05	2.15E-06	3.32E-02
18	Ar	0	0	0
33	As	1.17E-03	1.17E-03	8.00E-02
85	At	2.93E-02	2.87E-02	2.00E-01
79	Au	3.51E-03	2.50E-04	1.00E-01
5	B	3.90E-01	1.00E-02	4.00E+00
56	Ba	2.93E-03	2.87E-03	4.00E-02
4	Be	2.93E-04	2.87E-04	4.00E-03
83	Bi	9.75E-02	9.56E-04	1.00E-01
97	Bk	1.00E-03	5.90E-05	1.00E-03
35	Br	2.93E-01	2.93E-01	7.60E-01
6	C	1.37E-01	1.37E-01	5.50E+00
20	Ca	6.83E-02	6.69E-02	5.00E-01
48	Cd	2.93E-02	2.87E-02	5.00E-01
58	Ce	3.90E-03	7.65E-04	3.00E-02
98	Cf	6.83E-05	6.50E-06	1.00E-02
17	Cl	1.37E+01	3.00E-01	7.00E+01
96	Cm	8.39E-05	2.15E-06	2.50E-03
27	Co	1.31E-02	1.34E-03	2.34E-01
24	Cr	8.78E-04	2.50E-04	1.00E-02
55	Cs	9.00E-01	2.15E-04	9.00E-01
29	Cu	4.88E-02	4.88E-02	1.30E-01
66	Dy	3.90E-03	7.80E-04	3.90E-03
68	Er	3.90E-03	7.80E-04	3.90E-03
99	Es	1.00E-03	5.90E-05	1.00E-03
63	Eu	3.90E-03	7.65E-04	4.00E-03
9	F	1.17E-03	1.17E-03	2.00E-02
26	Fe	9.75E-03	1.91E-04	9.75E-03
100	Fm	2.00E-03	2.00E-03	2.00E-03
87	Fr	5.85E-03	5.73E-03	3.00E-02
31	Ga	7.80E-05	7.65E-05	3.00E-03
64	Gd	3.90E-03	7.65E-04	4.00E-03

Table 4.6-1: Soil-to-Vegetable Transfer Factors (Unitless) (Continued)

Atomic No.	Element	Soil-to-Vegetable Transfer Factors		
		Value	Min.	Max.
32	Ge	1.56E-02	1.53E-02	4.00E-01
1	H	4.80E+00	0	6.92E+00
108	Ha	2.00E-03	2.00E-03	2.00E-03
2	He	0	0	0
72	Hf	1.95E-04	1.00E-04	3.00E-03
80	Hg	3.90E-02	3.82E-02	3.80E-01
67	Ho	3.90E-03	7.65E-04	4.00E-03
53	I	7.80E-03	6.63E-05	5.00E-02
49	In	7.80E-05	7.65E-05	3.00E-03
77	Ir	2.93E-03	2.87E-03	3.00E-02
19	K	1.07E-01	1.05E-01	5.50E-01
36	Kr	0	0	0
57	La	6.83E-05	6.83E-05	2.50E-03
3	Li	7.80E-04	7.80E-04	1.71E-03
103	Lr	2.00E-03	2.00E-03	2.00E-03
71	Lu	7.80E-04	7.65E-04	2.50E-03
101	Md	2.00E-03	2.00E-03	2.00E-03
12	Mg	1.07E-01	3.00E-02	2.35E-01
25	Mn	3.90E-02	9.56E-03	3.00E-01
42	Mo	1.56E-01	1.15E-02	8.00E-01
7	N	3.50E-01	9.56E-03	1.28E+01
11	Na	5.85E-02	1.05E-02	3.00E-01
41	Nb	4.88E-03	9.56E-04	1.70E-02
60	Nd	3.90E-03	7.80E-04	3.90E-03
10	Ne	0	0	0
28	Ni	1.17E-02	3.51E-03	3.51E-01
102	No	2.00E-03	2.00E-03	2.00E-03
93	Np	2.54E-03	1.38E-04	2.73E-02
8	O	6.00E-01	6.00E-01	6.00E-01
76	Os	6.83E-04	6.83E-04	3.00E-02
15	P	6.83E-01	6.69E-01	3.50E+00
91	Pa	4.18E-04	4.78E-05	1.00E-02
82	Pb	1.17E-03	2.54E-05	1.00E-02
46	Pd	7.80E-03	7.65E-03	1.00E-01
61	Pm	3.90E-03	7.65E-04	4.00E-03
84	Po	1.37E-03	7.65E-05	7.00E-03
59	Pr	3.90E-03	7.65E-04	3.90E-03
78	Pt	4.88E-03	4.78E-03	1.00E-01

Table 4.6-1: Soil-to-Vegetable Transfer Factors (Unitless) (Continued)

Atomic No.	Element	Soil-to-Vegetable Transfer Factors		
		Value	Min.	Max.
94	Pu	2.15E-04	7.41E-07	1.09E-02
88	Ra	4.64E-03	3.90E-04	4.00E-02
37	Rb	1.76E-01	1.34E-02	9.00E-01
75	Re	1.29E+00	6.83E-02	2.10E+02
104	Rf	3.00E-03	3.00E-03	3.00E-03
45	Rh	7.80E-03	7.65E-03	1.30E+01
86	Rn	0	0	0
44	Ru	7.80E-03	3.82E-03	5.00E-02
16	S	2.93E-01	2.87E-01	6.42E-01
51	Sb	2.49E-03	2.15E-05	1.30E-02
21	Sc	1.95E-04	1.91E-04	2.00E-03
34	Se	5.14E-02	4.78E-03	1.30E+00
14	Si	1.37E-02	1.34E-02	8.80E-02
62	Sm	3.90E-03	7.65E-04	4.00E-03
50	Sn	1.17E-03	1.15E-03	3.00E-01
38	Sr	9.75E-02	1.70E-02	2.73E+00
73	Ta	4.88E-03	4.78E-04	2.00E-02
65	Tb	3.90E-03	7.80E-04	3.90E-03
43	Tc	4.68E-02	4.68E-02	5.46E+00
52	Te	1.20E-02	7.65E-04	1.30E+00
90	Th	6.44E-05	5.85E-06	4.20E-03
22	Ti	5.85E-04	1.00E-04	3.00E-03
81	Tl	7.80E-05	7.65E-05	2.00E-01
69	Tm	7.80E-04	7.80E-04	2.00E-03
92	U	2.34E-03	2.73E-04	2.73E-02
23	V	5.85E-04	5.73E-04	3.00E-03
74	W	5.00E-02	1.91E-03	8.00E-01
54	Xe	0	0	0
39	Y	1.95E-03	1.15E-03	3.00E-01
70	Yb	7.80E-04	7.80E-04	2.00E-03
30	Zn	6.83E-02	6.83E-02	2.34E+00
40	Zr	1.95E-04	9.56E-05	1.00E-03

[WSRC-STI-2007-00004, Table B-1]

Table 4.6-2: Feed-to-Milk Transfer Factors (d/L)

Atomic No.	Element	Feed-to-Milk Transfer Factors		
		Factor	Min.	Max.
89	Ac	2.00E-05	2.00E-06	2.06E-05
47	Ag	1.58E-03	5.00E-05	5.00E-02
13	Al	2.06E-04	2.00E-04	2.06E-04
95	Am	1.50E-06	4.00E-07	5.00E-06
33	As	6.00E-05	6.00E-05	1.00E-04
85	At	1.03E-02	1.00E-02	1.03E-02
79	Au	5.50E-06	5.00E-06	1.00E-05
5	B	1.55E-03	1.50E-03	3.00E-03
56	Ba	4.80E-04	3.50E-04	8.00E-03
4	Be	9.00E-07	9.00E-07	2.00E-06
83	Bi	5.00E-04	5.00E-04	1.00E-03
97	Bk	2.00E-06	4.00E-07	2.00E-06
35	Br	2.00E-02	2.00E-02	2.06E-02
6	C	1.20E-02	1.05E-02	1.20E-02
20	Ca	3.00E-03	3.00E-03	1.03E-02
48	Cd	1.00E-03	1.20E-04	2.00E-03
58	Ce	3.00E-05	2.00E-05	1.00E-04
98	Cf	1.50E-06	7.50E-07	2.00E-06
17	Cl	1.70E-02	1.50E-02	2.00E-02
96	Cm	2.00E-05	2.00E-06	2.06E-05
27	Co	3.00E-04	3.00E-04	2.06E-03
24	Cr	1.00E-05	1.00E-05	2.20E-03
55	Cs	7.90E-03	7.00E-03	1.20E-02
29	Cu	2.00E-03	1.50E-03	1.40E-02
66	Dy	3.00E-05	2.00E-05	6.00E-05
68	Er	3.00E-05	2.00E-05	6.00E-05
99	Es	2.00E-06	4.00E-07	2.00E-06
63	Eu	3.00E-05	2.00E-05	6.00E-05
9	F	1.00E-03	1.00E-03	7.00E-03
26	Fe	3.00E-05	3.00E-05	1.20E-03
87	Fr	2.06E-02	8.00E-03	2.06E-02
31	Ga	5.00E-05	1.00E-05	5.15E-05
64	Gd	3.00E-05	2.00E-05	6.00E-05
32	Ge	7.21E-02	1.00E-02	7.21E-02
1	H	1.50E-02	0	1.50E-02
105	Ha	5.00E-06	5.00E-06	5.00E-06
2	He	0	0	0

Table 4.6-2: Feed-to-Milk Transfer Factors (d/L) (Continued)

Atomic No.	Element	Feed-to-Milk Transfer Factors		
		Factor	Min.	Max.
72	Hf	5.50E-07	5.50E-07	2.50E-05
80	Hg	4.70E-04	4.50E-04	5.00E-04
67	Ho	3.00E-05	2.00E-05	6.00E-05
53	I	9.00E-03	6.00E-03	1.20E-02
49	In	2.00E-04	1.00E-04	2.00E-04
77	Ir	2.00E-06	2.00E-06	2.06E-06
19	K	7.20E-03	7.00E-03	7.21E-03
57	La	2.00E-05	5.00E-06	6.00E-05
3	Li	2.06E-02	2.06E-02	5.00E-02
103	Lr	5.00E-06	5.00E-06	5.00E-06
71	Lu	2.06E-05	2.00E-05	6.00E-05
101	Md	5.00E-06	5.00E-06	5.00E-06
12	Mg	3.90E-03	3.90E-03	8.00E-03
25	Mn	3.00E-05	3.00E-05	3.61E-04
42	Mo	1.70E-03	1.50E-03	7.50E-03
7	N	2.50E-02	1.00E-02	2.58E-02
11	Na	1.60E-02	1.60E-02	4.00E-02
41	Nb	3.20E-05	4.10E-07	2.06E-02
60	Nd	3.00E-05	5.00E-06	6.00E-05
28	Ni	1.60E-02	1.00E-03	2.00E-02
102	No	5.00E-06	5.00E-06	5.00E-06
93	Np	5.00E-06	5.00E-06	1.00E-05
76	Os	5.00E-03	1.00E-04	3.50E+00
15	P	1.60E-02	1.50E-02	2.50E-02
91	Pa	5.00E-06	5.00E-06	5.15E-06
82	Pb	2.60E-04	2.50E-04	3.00E-04
46	Pd	1.00E-02	1.00E-04	1.03E-02
61	Pm	3.00E-05	2.00E-05	6.00E-05
84	Po	3.40E-04	3.40E-04	4.00E-04
59	Pr	3.00E-05	5.00E-06	6.00E-05
78	Pt	5.15E-03	1.00E-04	5.15E-03
94	Pu	1.10E-06	1.00E-07	2.00E-06
88	Ra	1.30E-03	4.50E-04	1.30E-03
37	Rb	1.20E-02	1.00E-02	3.00E-02
75	Re	1.50E-03	1.40E-04	2.00E-03
104	Rf	2.00E-05	2.00E-05	2.00E-05
45	Rh	1.00E-02	5.00E-04	1.03E-02
86	Rn	0	0	0

Table 4.6-2: Feed-to-Milk Transfer Factors (d/L) (Continued)

Atomic No.	Element	Feed-to-Milk Transfer Factors		
		Factor	Min.	Max.
44	Ru	3.30E-06	6.00E-07	2.00E-05
16	S	1.60E-02	1.50E-02	2.00E-02
51	Sb	2.50E-05	2.50E-05	1.50E-03
21	Sc	5.00E-06	5.00E-06	6.00E-05
34	Se	4.00E-03	4.00E-03	4.50E-02
14	Si	2.00E-05	2.00E-05	2.06E-05
62	Sm	3.00E-05	5.00E-06	6.00E-05
50	Sn	1.00E-03	1.00E-03	2.50E-03
38	Sr	2.80E-03	8.00E-04	2.80E-03
73	Ta	4.10E-07	4.10E-07	5.00E-06
65	Tb	3.00E-05	2.00E-05	6.00E-05
43	Tc	1.87E-03	2.30E-05	2.50E-02
52	Te	4.50E-04	2.00E-04	1.00E-03
90	Th	5.00E-06	5.00E-06	5.15E-06
22	Ti	7.53E-05	5.50E-07	1.03E-02
81	Tl	2.00E-03	1.00E-03	1.00E-02
69	Tm	2.06E-05	2.06E-05	6.00E-05
92	U	4.00E-04	4.00E-04	6.18E-04
23	V	2.06E-05	2.00E-05	5.00E-04
74	W	3.00E-04	3.00E-04	5.00E-04
39	Y	2.00E-05	1.00E-05	2.00E-03
70	Yb	2.06E-05	2.06E-05	6.00E-05
30	Zn	1.00E-02	1.00E-02	3.90E-02
40	Zr	5.50E-07	5.50E-07	3.09E-05

[WSRC-STI-2007-00004, Table B-2]

Table 4.6-3: Feed-to-Meat Transfer Factors (d/kg)

Atomic No.	Element	Feed-to-Meat Transfer Factors		
		Value	Min.	Max.
89	Ac	4.00E-04	2.00E-05	4.00E-04
47	Ag	3.00E-03	3.00E-03	1.70E-02
13	Al	1.50E-03	5.00E-04	1.50E-03
95	Am	4.00E-05	3.50E-06	2.00E-04
33	As	2.00E-03	1.50E-03	2.00E-02
85	At	1.00E-02	1.00E-02	1.00E-02
79	Au	5.00E-03	2.00E-04	8.00E-03
5	B	8.00E-04	8.00E-04	8.00E-04
56	Ba	2.00E-04	1.50E-04	3.00E-02
4	Be	1.00E-03	1.00E-03	5.00E-03
83	Bi	4.00E-04	4.00E-04	2.00E-03
97	Bk	2.50E-05	2.00E-05	4.00E-05
35	Br	2.50E-02	2.00E-02	5.00E-02
6	C	3.10E-02	3.10E-02	4.89E-02
20	Ca	2.00E-03	7.00E-04	2.00E-03
48	Cd	4.00E-04	4.00E-04	1.00E-03
58	Ce	2.00E-05	2.00E-05	1.20E-03
98	Cf	4.00E-05	4.00E-05	5.00E-03
17	Cl	2.00E-02	2.00E-02	8.00E-02
96	Cm	4.00E-05	3.50E-06	2.00E-04
27	Co	1.00E-02	1.00E-02	3.00E-02
24	Cr	9.00E-03	2.40E-03	3.00E-02
55	Cs	5.00E-02	4.00E-03	5.00E-02
29	Cu	9.00E-03	8.00E-03	1.00E-02
66	Dy	2.00E-05	2.00E-05	5.50E-03
68	Er	2.00E-05	2.00E-05	4.00E-03
99	Es	2.50E-05	2.00E-05	2.50E-05
63	Eu	2.00E-05	2.00E-05	5.00E-03
9	F	1.50E-01	2.00E-02	1.50E-01
26	Fe	2.00E-02	2.00E-02	4.00E-02
100	Fm	2.00E-04	2.00E-04	2.00E-04
87	Fr	2.50E-03	2.50E-03	3.00E-02
31	Ga	5.00E-04	3.00E-04	5.00E-04
64	Gd	2.00E-05	2.00E-05	3.50E-03
32	Ge	7.00E-01	2.00E-01	7.00E-01
1	H		0	1.20E-02
105	Ha	5.00E-06	5.00E-06	5.00E-06
72	Hf	3.16E-05	1.00E-06	1.00E-03

Table 4.6-3: Feed-to-Meat Transfer Factors (d/kg) (Continued)

Atomic No.	Element	Feed-to-Meat Transfer Factors		
		Value	Min.	Max.
80	Hg	2.50E-01	1.00E-02	2.50E-01
67	Ho	3.00E-04	2.00E-05	4.50E-03
53	I	4.00E-02	2.90E-03	4.00E-02
49	In	8.00E-03	4.00E-03	8.00E-03
77	Ir	1.50E-03	1.50E-03	2.00E-03
19	K	2.00E-02	2.00E-02	2.00E-02
57	La	2.00E-03	2.00E-04	2.00E-03
3	Li	1.00E-02	1.00E-02	2.00E-02
103	Lr	2.00E-04	2.00E-04	2.00E-04
71	Lu	4.50E-03	2.00E-03	4.50E-03
12	Mg	2.00E-02	3.00E-03	2.00E-02
25	Mn	5.00E-04	4.00E-04	1.00E-03
42	Mo	1.00E-03	1.00E-03	8.00E-03
7	N	7.50E-02	1.00E-02	7.50E-02
11	Na	8.00E-02	3.00E-02	8.00E-02
41	Nb	2.90E-04	3.00E-07	2.80E-01
60	Nd	2.00E-05	2.00E-05	3.30E-03
28	Ni	5.00E-03	5.00E-03	5.30E-02
102	No	2.00E-04	2.00E-04	2.00E-04
93	Np	1.00E-03	5.50E-05	1.00E-03
76	Os	4.00E-01	2.00E-03	4.00E-01
15	P	5.00E-02	4.60E-02	2.00E-01
91	Pa	4.47E-04	5.00E-06	5.00E-03
82	Pb	4.00E-04	3.00E-04	8.00E-04
46	Pd	4.00E-03	2.00E-04	4.00E-03
61	Pm	2.00E-05	2.00E-05	5.00E-03
84	Po	5.00E-03	9.50E-05	5.00E-03
59	Pr	2.00E-05	2.00E-05	4.70E-03
78	Pt	4.00E-03	2.00E-04	4.00E-03
94	Pu	1.00E-05	5.00E-07	1.00E-04
88	Ra	9.00E-04	2.50E-04	1.00E-03
37	Rb	1.00E-02	1.00E-02	3.10E-02
75	Re	8.00E-03	1.00E-04	1.00E-02
45	Rh	2.00E-03	1.00E-03	2.00E-03
86	Rn	0	0	0
44	Ru	5.00E-02	2.00E-03	4.00E-01
16	S	2.00E-01	1.00E-01	2.00E-01
51	Sb	1.00E-03	4.00E-05	4.00E-03
21	Sc	1.50E-02	2.00E-03	1.50E-02

Table 4.6-3: Feed-to-Meat Transfer Factors (d/kg) (Continued)

Atomic No.	Element	Feed-to-Meat Transfer Factors		
		Value	Min.	Max.
34	Se	1.50E-02	1.50E-02	1.00E-01
14	Si	4.00E-05	4.00E-05	3.00E-04
62	Sm	3.16E-04	2.00E-05	5.00E-03
50	Sn	8.00E-02	1.00E-02	8.00E-02
38	Sr	8.00E-03	3.00E-04	1.00E-02
73	Ta	1.34E-05	3.00E-07	6.00E-04
65	Tb	2.00E-05	2.00E-05	4.50E-03
43	Tc	6.32E-03	1.00E-04	4.00E-01
52	Te	7.00E-03	7.00E-03	7.70E-02
90	Th	4.00E-05	6.00E-06	2.00E-04
22	Ti	1.73E-04	1.00E-06	3.00E-02
81	Tl	4.00E-02	2.00E-03	4.00E-02
69	Tm	4.50E-03	2.00E-03	4.50E-03
92	U	3.00E-04	2.00E-04	8.00E-04
23	V	2.50E-03	2.50E-03	1.00E-02
74	W	4.00E-02	1.30E-03	4.50E-02
39	Y	1.00E-03	3.00E-04	8.00E-03
70	Yb	4.00E-03	2.00E-03	4.00E-03
30	Zn	1.00E-01	3.00E-02	1.00E-01
40	Zr	1.84E-04	1.00E-06	3.40E-02

[WSRC-STI-2007-00004, Table B-3]

Table 4.6-4: Water-to-Fish Bioaccumulation Factors (L/kg)

Atomic No.	Element	Water-to-Fish Bioaccumulation Factors		
		Value	Min.	Max.
89	Ac	2.50E+01	1.50E+01	2.50E+01
47	Ag	5.00E+00	2.30E+00	5.00E+00
13	Al	5.00E+02	1.00E+01	5.00E+02
95	Am	3.00E+01	2.10E+01	2.40E+03
33	As	1.70E+03	1.00E+02	1.70E+03
85	At	1.50E+01	1.50E+01	1.50E+01
79	Au	3.30E+01	3.30E+01	3.50E+01
56	Ba	4.00E+00	4.00E+00	2.00E+02
4	Be	1.00E+02	2.00E+00	1.00E+02
83	Bi	1.50E+01	1.00E+01	1.50E+01
97	Bk	2.50E+01	2.50E+01	2.50E+01
35	Br	4.00E+02	4.00E+02	4.20E+02
6	C*	3.00E+00	N/A	N/A
20	Ca	4.00E+01	4.00E+01	1.00E+03
48	Cd	2.00E+02	2.00E+02	2.00E+02
58	Ce	3.00E+01	1.00E+00	5.00E+02
98	Cf	2.50E+01	2.50E+01	2.50E+01
17	Cl	5.00E+01	5.00E+01	1.00E+03
96	Cm	3.00E+01	2.10E+01	2.50E+02
27	Co	3.00E+02	5.00E+01	3.30E+02
24	Cr	4.00E+00	4.00E+00	2.00E+02
55	Cs	3.00E+03	2.00E+03	4.70E+03
29	Cu	2.00E+02	5.00E+01	2.00E+02
66	Dy	3.00E+01	3.00E+01	3.00E+01
68	Er	3.00E+01	3.00E+01	3.00E+01
99	Es	2.50E+01	1.00E+01	2.50E+01
63	Eu	3.00E+01	2.50E+01	5.00E+01
9	F	1.00E+01	1.00E+01	1.00E+01
26	Fe	2.00E+02	1.00E+02	2.00E+03
87	Fr	3.00E+01	3.00E+01	3.00E+01
31	Ga	4.00E+02	3.33E+02	4.00E+02
64	Gd	3.00E+01	2.50E+01	3.00E+01
32	Ge	4.00E+03	3.33E+03	4.00E+03
2	He	1.00E+00	1.00E+00	1.00E+00
1	H	1.00E+00	9.00E-01	1.00E+00
72	Hf	3.00E+02	3.33E+00	3.00E+02
80	Hg	1.00E+03	1.00E+03	1.00E+03
67	Ho	3.00E+01	2.50E+01	3.00E+01
53	I	4.00E+01	1.50E+01	5.00E+02

*SRNL-STI-2009-00178

Table 4.6-4: Water-to-Fish Bioaccumulation Factors (L/kg) (Continued)

Atomic No.	Element	Water-to-Fish Bioaccumulation Factors		
		Value	Min.	Max.
49	In	1.00E+04	1.00E+04	1.00E+05
77	Ir	1.00E+01	1.00E+01	1.00E+01
19	K	1.00E+03	1.00E+03	1.00E+04
57	La	3.00E+01	2.50E+01	3.00E+01
71	Lu	2.50E+01	2.50E+01	2.50E+01
12	Mg	5.00E+01	5.00E+01	5.00E+01
25	Mn	4.00E+02	1.00E+02	4.00E+02
42	Mo	1.00E+01	1.00E+01	1.00E+01
7	N	2.00E+05	1.50E+05	2.00E+05
11	Na	2.00E+01	8.00E+00	1.00E+02
41	Nb	3.00E+02	2.00E+02	3.00E+04
60	Nd	3.00E+01	2.50E+01	1.00E+02
28	Ni	1.00E+02	1.00E+02	1.00E+02
93	Np	2.10E+01	1.00E+01	2.50E+02
8	O	1.00E+00	1.00E+00	1.00E+00
76	Os	1.00E+03	1.00E+01	1.00E+05
15	P	5.00E+04	1.50E+03	1.00E+05
91	Pa	1.00E+01	1.00E+01	1.13E+01
82	Pb	3.00E+02	1.00E+02	3.00E+02
46	Pd	1.00E+01	1.00E+01	1.00E+01
61	Pm	3.00E+01	2.50E+01	3.00E+01
84	Po	5.00E+01	5.00E+01	5.00E+02
59	Pr	3.00E+01	2.50E+01	1.00E+02
78	Pt	3.50E+01	3.50E+01	1.00E+02
94	Pu	3.00E+01	3.50E+00	4.70E+03
88	Ra	5.00E+01	5.00E+01	7.00E+01
37	Rb	2.00E+03	2.00E+03	2.00E+03
75	Re	1.20E+02	1.19E+02	1.20E+04
45	Rh	1.00E+01	1.00E+01	1.00E+01
45	Rn	0	0	5.70E+01
44	Ru	1.00E+02	1.00E+01	1.00E+02
16	S	8.00E+02	7.50E+02	1.00E+03
51	Sb	1.00E+02	1.00E+00	2.00E+02
21	Sc	1.00E+02	1.00E+02	1.00E+02
34	Se	1.70E+02	1.70E+02	2.00E+02
14	Si	2.00E+01	2.50E+00	2.00E+01
62	Sm	3.00E+01	2.50E+01	3.00E+01
50	Sn	3.00E+03	3.00E+03	3.00E+03
38	Sr	6.00E+01	3.00E+01	5.01E+02

Table 4.6-4: Water-to-Fish Bioaccumulation Factors (L/kg) (Continued)

Atomic No.	Element	Water-to-Fish Bioaccumulation Factors		
		Value	Min.	Max.
73	Ta	3.00E+02	1.00E+02	3.00E+04
65	Tb	3.00E+01	2.50E+01	3.00E+01
43	Tc	2.00E+01	1.50E+01	2.00E+01
52	Te	4.00E+02	4.00E+02	4.00E+02
90	Th	1.00E+02	3.00E+01	1.00E+02
22	Ti	1.00E+03	1.00E+03	1.00E+03
81	Tl	1.00E+04	1.00E+04	1.00E+04
92	U	1.00E+01	2.00E+00	5.00E+01
23	V	2.00E+02	1.00E+01	2.00E+02
74	W	1.00E+01	1.00E+01	1.20E+03
39	Y	3.00E+01	2.50E+01	3.00E+01
30	Zn	3.50E+02	3.50E+02	2.50E+03
40	Zr	3.00E+02	3.30E+00	3.00E+02

[WSRC-STI-2007-00004, Table B-4]

4.6.2 Human Health Exposure Parameters (Consumption Rates)

This section documents the Human Health Exposure parameters (i.e., consumption rates) used in the FTF PA modeling effort. The parameters utilized were compared to a number of other DOE facilities and generic national references to establish relevance of the parameters selected and/or verify the regional differences for the southeastern United States. The values for the parameters recommended were based on expected values along with a range for these values versus estimating an annual dose to the MEI. The consumption rates that SRS utilized for the FTF PA appear in Tables 4.6-5 through 4.6-7. The data in these tables were taken from WSRC-STI-2007-00004.

4.6.2.1 Human Health Exposure Parameters Methodology

A report entitled *Baseline Parameter Update for Human Health Input and Transfer Factors for Radiological Performance Assessments at the Savannah River Site* documents the results of the SRS evaluation and reviews of consumption rates. [WSRC-STI-2007-00004] Refer to this report for additional discussion on parameters such as water ingestion rates, crop yields, garden fractions and sizes along with soil exposure times. This report established a single Human Health Exposure parameters source that is up to date with existing data and maintained current via periodic reviews.

In developing the report, a comprehensive literature review was completed and references were updated to include the latest available information. In general, the values from more recent compilations were recommended, rather than those in older publications. This report includes information to establish a range of values for each parameter which were used to perform uncertainty analysis.

A hierarchy of data sources was established to select values for human health exposure parameters. The utilization of site-specific values from the most recent and comprehensive references are given priority. Values promulgated by national or international organizations were used as representative of the SRS area practices in the absence of site-specific values. The *Risk-Based Screening of Radionuclide Releases from the Savannah River Site* was used as a source to validate the receptor practices in the areas surrounding SRS. [CDC-2006] The values given for the parameters are given as expected values, together with an observed range.

Site-specific information is available for most of the human health exposure parameters required to estimate doses. *Land and Water-Use Characteristics in the Vicinity of the Savannah River Site* and *Site-Specific Parameter Values for the Nuclear Regulatory Commission's Food Pathway Dose Model*, surveyed county agents in South Carolina and Georgia and compiled county-specific statistics on land and water use within a 50-mile radius of SRS. [WSRC-RP-91-17, ISSN 0017-9078 - Volume 62, Page 136] When these reports do not provide site-specific information for physical parameters and consumption rates, global data are used. [WSRC-RP-91-17, ISSN 0017-9078 - Volume 62, Page 136] Documents ANL-EAD-4 and ANL-EAIS-8 provide data for use in RESRAD, a NRC and DOE supported dose model, based on literature review of standard values and publications. The EPA report *Exposure Factors Handbook* summarizes and recommends human health exposure parameter data for human exposure to environmental contaminants based on studies published through August 30, 1997. [EPA-600-P-95-002] NUREG-CR-5512 provides generic and site-specific human health data for estimating dose from exposure to residual radioactive contamination.

The general hierarchy of the global data use is listed below:

- Site-Specific [WSRC-RP-91-17, ISSN 0017-9078, Volume 62, Page 136]
- Other site- or regional- specific publications [CDC-2006]
- EPA Exposure Factors Handbook [EPA-600-P-95-002]
- RESRAD Version 6 [ANL-EAD-4, ANL-EAIS-8]
- NUREG-CR-5512

Table 4.6-5: Crop Exposure Times and Productivity

Parameter	Recommendation			
	Value		Min	Max
Pasture exposure time to irrigation (d)	30		30	90
Vegetable crop exposure time to irrigation (d)	70		60	90
Soil exposure time period to irrigation (d) (Buildup time in soil)	183		60	365
Productivity				
Pasture grass (kg/m^2)	1.8		0.7	2
Agricultural (veg/produce) (kg/m^2)	0.7		0.5	4
Vegetable crop yield (kg/m^2)	0.7		0.2	4
Fraction of Foodstuff Produced Locally	**All-pathways**	**Intruder**		
Vegetables	0.173	0.308	0	0.5
Meat	0.306	0.319	0	0.5
Milk	0.207	0.254	0	0.5
Dilution Factor for Mixing of Waste in Vegetable Garden				
Agricultural scenario	0.2		0.2	0.2
Post-Drilling Scenario	0.02		0.002	0.02

[WSRC-STI-2007-00004, Table 3-1]

Table 4.6-6: Physical Parameters

Parameter	Value	Min	Max
Areal density of soil (kg/m^2)	240	180	270
Soil Density (kg/m^3)	1,600	1,350	1,600
Atmospheric mass loading of soil (kg/m^3)			
while working in garden	1.00E-07	1.0E-09	3.0E-07
while residing in home	1.00E-08	1.0E-09	3.0E-08
Depth of garden (cm)	15	15	61
Garden irrigation rate ($L/d/m^2$)	3.6*	2.08	5.5
Fraction of the year that crops are irrigated**	0.2	0.2	0.25
Crop weathering constant (L/d)	0.0495	0.03	0.0495
Fractional retention of deposition on leaves	0.25	0.2	0.25
Area of garden for family of four (m^2)	100	100	1,000

[WSRC-STI-2007-00004, Table 3-2]

* Based on an assumption of 1 in/wk = 0.36 cm/d. For a 1 m^2 area, 0.36 cm/d x 10,000 cm^2/m^2 x 1L/1000 cm^3=3.6 $L/d/m^2$.

** Based on literature validation of estimated 70 days of irrigation in growing season of total year.

Table 4.6-7: Individual Exposure Times and Consumption Rates

Parameter	Recommendation		
	Value	Min	Max
Breathing rate (m^3/yr)	5,548	1,267	11,600
Consumption Rate			
Soil consumption (kg/yr)	0.0365	0.0008	0.05
Leafy vegetable consumption (kg/yr)	21	18	43
Other vegetable consumption (kg/yr)	163	90	276
Meat consumption (kg/yr)	43	26	81
Finfish consumption (kg/yr)	9	2.2	19
Seafood consumption (kg/yr)	0	0	5
Milk consumption (L/yr)	120	73.7	230
Water consumption (L/yr)	337	184	730
Fodder – Beef cattle (kg/d)	36	27	50
Fodder – Milk cattle (kg/d)	52	36	55
Fraction of milk-cow intake from pasture	0.56	0.5	1
Fraction of beef-cow intake from pasture	0.75	0.5	1
Water (beef cow) (L/d)	28	28	50
Water (milk cow) (L/d)	50	50	60
Exposure Time			
Shoreline exposure (hr/yr)	23	11	35
Swimming exposure (hr/yr)	8.9	8.9	13
Boating exposure (hr/yr)	21	9.1	31.5
Showering exposure (min/d)	10	10	30
Fraction of year working in garden (/yr)	0.01	0.01	0.08
Fraction of year residing in home (/yr)	0.7	0.3	0.7
Fraction of time cattle on pasture (/yr)	1	0.75	1
Transports (days)			
Vegetable transport time (d)	6	6	14
Feed-milk-man transport time (d)	3	1	4
Time from slaughter to consumption (d)	6	6	20

[WSRC-STI-2007-00004, Table 4-1]

4.7 Dose Analysis

Over time, the mobile contaminants in the FTF waste tanks and ancillary equipment will gradually migrate downward through unsaturated soil to the hydrogeologic units comprising the shallow aquifer underlying the FTF. Some contaminants will be transported by groundwater through the aquifers to the outcrops at Fourmile Branch and UTR. Upon reaching the surface water, the contaminants could be present at the seepline, in sediments at the bottom of streams, and at the shoreline. Human receptors could be exposed to contaminants through various pathways associated with the aquifers and surface water as described in Section 4.2.4.

The potential dose to MOP via the air pathway was also evaluated as described in Section 4.5.

4.7.1 Dose Conversion Factors

The purpose of this section is to present the set of DCFs used in dose calculations for the FTF PA modeling effort. A comprehensive list of DCFs was prepared and included in Table 4.7-1, even though only a subset of the values listed was actually utilized in the PA modeling.

Radiation doses to humans may result from internal intake of radionuclides by inhalation or ingestion or from external exposure to radionuclides present in the environment. Dose assessment at SRS is carried out by considering radionuclide concentrations in environmental media, factoring in human exposure conditions, and performing the conversion of exposure to dose. For internal exposure, radionuclide activity intake is calculated by combining the radioactivity concentration in environmental media (e.g., food, soil, air, and water) with the amount of environmental medium taken into the body. Then, using internal DCFs, radionuclide intake is converted into dose. To assess exposure from external sources, SRS uses external DCFs that convert radionuclide concentrations in environmental media to doses for the duration of exposure. Only internal DCFs for adults were utilized in the FTF PA consistent with guidance in DOE Guide 435.1-1, Section IV.P.(2).

4.7.1.1 Internal DCFs

Previous SRS PA analyses utilized the DCFs from EPA Federal Guidance Report 11, published in 1988. [EPA-520-1-88-020] The International Commission on Radiological Protection (ICRP) published new DCFs based upon updated dosimetric models in ICRP Publication 72 in 1996. [ICRP-72] The DOE has begun using the ICRP models for occupational exposure internal dose assessments at different sites including SRS and they are also used for SRS safety basis calculations. Safety Basis Documents, as defined in 10 CFR 830, Subpart B, are the DSA and hazard controls that provide reasonable assurance that a DOE nuclear facility can be operated safely in a manner that adequately protects workers, the public, and the environment. [10 CFR 830]

The DCFs are converted to standard units for input into the calculations by multiplying the ICRP 72 DCFs by 3.7E+06 (Sv/Bq x 3.7E+6 = rem/µCi). [ICRP-72] The internal DCFs in rem/µCi are presented in Table 4.7-1 for the various radionuclides. For inhalation DCFs, the most likely lung absorption type from Table 2 of ICRP-72 was used if available, and if not available, the most conservative type was assumed.

Because the ICRP data is the most recent data available and is based on the most recent dosimetric models, the ICRP 72 DCFs are used for this FTF PA analysis. [ICRP-72]

4.7.1.2 External DCFs

External DCFs for uniformly distributed contamination at an infinite depth with no shielding and at 15 cm are taken from EPA Federal Guidance Report 12. [EPA-402-R-93-081] The external DCFs in EPA-402-R-93-081 represent the dose rate per unit of activity of soil contaminated at various depths, reported in SI units (Sv/s per Bq/m^3). The DCFs are converted to standard units for input into PA calculations by multiplying the Federal Guidance Report No. 12 DCF by 1.168E+14 ((rem/yr per µCi/m^3) / (Sv/s per Bq/m^3)) [EPA-402-R-93-081] External DCFs in rem/yr per µCi/m^3 are presented in Table 4.7-1 for various radionuclides.

Table 4.7-1: Internal and External Dose Conversion Factors

Radionuclide	Internal DCFs (rem/µCi)		External DCFs (rem/yr per µCi/m^3)		
	Ingestion	Inhalation	Infinite Depth	15 cm	Water Immersion
Ac-225	8.88E-02	3.15E+01	3.98E-05	3.90E-05	1.88E-04
Ac-227	4.07E+00	2.04E+03	3.10E-07	3.06E-07	1.52E-06
Ac-228	1.59E-03	9.25E-02	3.74E-03	3.22E-03	1.21E-02
Al-26	1.30E-02	7.40E-02	1.09E-02	9.03E-03	3.43E-02
Am-241	7.40E-01	1.55E+02	2.73E-05	2.73E-05	2.20E-04
Am-242	1.11E-03	6.29E-02	3.12E-05	3.12E-05	1.61E-04
Am-242m	7.03E-01	1.37E+02	1.06E-06	1.05E-06	8.50E-06
Am-243	7.40E-01	1.52E+02	8.88E-05	8.88E-05	5.77E-04
Ar-39	0	0	5.40E-07	5.31E-07	2.06E-06
At-217	0	0	1.11E-06	1.01E-06	3.76E-06
At-218	0	0	3.65E-06	3.65E-06	3.21E-05
Ba-133	5.55E-03	1.15E-02	1.24E-03	1.15E-03	4.57E-03
Ba-137m	0	0	2.25E-03	2.00E-03	7.31E-03
Bi-210	4.81E-03	3.44E-01	2.25E-06	2.17E-06	7.39E-06
Bi-211	0	0	1.60E-04	1.49E-04	5.66E-04
Bi-212	9.62E-04	1.15E-01	7.32E-04	6.26E-04	2.34E-03
Bi-213	7.40E-04	1.11E-01	4.79E-04	4.38E-04	1.62E-03
Bi-214	4.07E-04	5.18E-02	6.13E-03	5.09E-03	1.94E-02
Bk-249	3.59E-03	5.92E-01	2.91E-09	2.90E-09	1.89E-08
C-14	2.15E-03	7.40E-03	8.41E-09	8.41E-09	5.13E-08
Ca-41	7.03E-04	3.52E-04	0	0	0
Cd-113m	8.51E-02	4.07E-01	4.05E-07	3.99E-07	1.57E-06
Ce-144	1.92E-02	1.33E-01	4.49E-05	4.44E-5	2.23E-04
Cf-249	1.30E+00	2.59E+02	1.16E-03	1.07E-03	4.03E-03
Cf-250	5.92E-01	1.26E+02	7.40E-08	7.40E-08	1.24E-06
Cf-251	1.33E+00	2.63E+02	3.29E-04	3.22E-04	1.45E-03
Cf-252	3.33E-01	7.40E+01	1.10E-07	1.10E-07	1.38E-06

Table 4.7-1: Internal and External Dose Conversion Factors (Continued)

Radionuclide	Internal DCFs (rem/μCi)		External DCFs (rem/yr per μCi/m^3)		
	Ingestion	Inhalation	Infinite Depth	15 cm	Water Immersion
Cl-36	3.44E-03	2.70E-02	1.50E-06	1.42E-06	5.23E-06
Cm-242	4.44E-02	1.92E+01	1.07E-07	1.06E-07	1.55E-06
Cm-243	5.55E-01	1.15E+02	3.64E-04	3.53E-04	1.52E-03
Cm-244	4.44E-01	9.99E+01	7.87E-08	7.87E-08	1.34E-06
Cm-245	7.77E-01	1.55E+02	2.13E-04	2.10E-04	1.03E-03
Cm-246	7.77E-01	1.55E+02	7.26E-08	7.26E-08	1.23E-06
Cm-247	7.03E-01	1.44E+02	1.11E-03	1.03E-03	3.82E-03
Cm-248	2.85E+00	5.55E+02	5.49E-08	5.49E-08	9.30E-07
Co-60	1.26E-02	3.70E-02	1.01E-02	8.47E-03	3.20E-02
Cs-134	7.03E-02	2.44E-02	5.92E-03	5.22E-03	1.92E-02
Cs-135	7.40E-03	2.55E-03	2.39E-08	2.40E-08	1.28E-07
Cs-137	4.81E-02	1.70E-02	4.70E-07	4.60E-07	1.74E-06
Eu-152	5.18E-03	1.55E-01	4.38E-03	3.76E-03	1.44E-02
Eu-154	7.40E-03	1.96E-01	4.80E-03	4.11E-03	1.55E-02
Eu-155	1.18E-03	2.55E-02	1.14E-04	1.14E-04	6.55E-04
Fr-221	0	0	9.60E-05	9.23E-05	3.76E-04
Fr-223	8.88E-03	3.29E-03	1.24E-04	1.18E-04	5.97E-04
Gd-152	1.52E-01	7.03E+01	0	0	0
H-3	6.66E-05	1.67E-04	0	0	0
I-129	4.07E-01	1.33E-01	8.10E-06	8.10E-06	1.04E-04
K-40	2.29E-02	7.77E-03	6.51E-04	5.34E-04	2.03E-03
Kr-85	0	0	8.94E-06	8.14E-06	2.98E-05
Mo-93	1.15E-02	2.18E-03	3.69E-07	3.69E-07	6.91E-06
Na-22	1.18E-02	4.81E-03	8.55E-03	7.37E-03	2.74E-02
Nb-93m	4.44E-04	1.89E-03	6.50E-08	6.50E-08	1.21E-06
Nb-94	6.29E-03	4.07E-02	6.05E-03	5.29E-03	1.95E-02
Ni-59	2.33E-04	4.81E-04	0	0	0
Ni-63	5.55E-04	1.78E-03	0	0	0
Np-237	4.07E-01	8.51E+01	4.87E-05	4.86E-05	2.71E-04
Np-238	3.37E-03	7.77E-03	2.15E-03	1.84E-03	6.88E-03
Np-239	2.96E-03	3.44E-03	4.71E-04	4.56E-04	1.99E-03
Np-240	3.03E-04	3.15E-04	4.83E-03	4.26E-03	1.60E-02
Np-240m	0	0	1.26E-03	1.11E-03	4.10E-03
Pa-231	2.63E+00	5.18E+02	1.19E-04	1.12E-04	4.42E-04
Pa-233	3.22E-03	1.44E-02	6.38E-04	6.03E-04	2.39E-03
Pa-234	1.89E-03	1.48E-03	7.22E-03	6.28E-03	2.37E-02
Pa-234m	0	0	5.61E-05	4.90E-05	1.78E-04

Table 4.7-1: Internal and External Dose Conversion Factors (Continued)

Radionuclide	Internal DCFs (rem/μCi)		External DCFs (rem/yr per μCi/m^3)		
	Ingestion	Inhalation	Infinite Depth	15 cm	Water Immersion
Pb-209	2.11E-04	2.07E-04	4.83E-07	4.76E-07	1.83E-06
Pb-210	2.55E+00	4.07E+00	1.53E-06	1.53E-06	1.53E-05
Pb-211	6.66E-04	4.07E-02	1.91E-04	1.70E-04	6.32E-04
Pb-212	2.22E-02	6.29E-01	4.40E-04	4.23E-04	1.78E-03
Pb-214	5.18E-04	5.18E-02	8.39E-04	7.83E-04	3.03E-03
Pd-107	1.37E-04	2.18E-03	0	0	0
Pm-147	9.62E-04	1.85E-02	3.13E-08	3.12E-08	1.64E-07
Po-210	4.44E+00	1.22E+01	3.27E-08	2.86E-08	1.05E-07
Po-211	0	0	2.98E-05	2.62E-05	9.66E-05
Po-212	0	0	0	0	0
Po-213	0	0	0	0	0
Po-214	0	0	3.21E-07	2.80E-07	1.03E-06
Po-215	0	0	6.35E-07	5.82E-07	2.15E-06
Po-216	0	0	6.52E-08	5.69E-08	2.10E-07
Po-218	0	0	3.53E-08	3.07E-08	1.13E-07
Pr-144	1.85E-04	6.66E-05	1.58E-04	1.32E-04	4.85E-04
Pu-238	8.51E-01	1.70E+02	9.46E-08	9.43E-08	1.33E-06
Pu-239	9.25E-01	1.85E+02	1.85E-07	1.78E-07	1.12E-06
Pu-240	9.25E-01	1.85E+02	9.17E-08	9.16E-08	1.30E-06
Pu-241	1.78E-02	3.33E+00	3.69E-09	3.68E-09	1.89E-08
Pu-242	8.88E-01	1.78E+02	8.00E-08	8.00E-08	1.09E-06
Pu-243	3.15E-04	3.07E-04	4.98E-05	4.90E-05	2.70E-04
Pu-244	8.88E-01	1.74E+02	4.72E-08	4.72E-08	8.13E-07
Ra-223	3.70E-01	2.74E+01	3.77E-04	3.62E-04	1.58E-03
Ra-224	2.41E-01	1.11E+01	3.20E-05	3.06E-05	1.20E-04
Ra-225	3.66E-01	2.33E+01	6.89E-06	6.89E-06	7.58E-05
Ra-226	1.04E+00	1.30E+01	1.99E-05	1.93E-05	8.12E-05
Ra-228	2.55E+00	9.62E+00	0	0	0
Rb-87	5.55E-03	1.85E-03	8.81E-08	8.78E-08	4.13E-07
Re-188	5.18E-03	2.00E-03	2.01E-04	1.83E-04	7.31E-04
Rh-106	0	0	8.07E-04	7.18E-4	2.62E-3
Rn-219	0	0	1.93E-04	1.80E-04	6.83E-04
Rn-220	0	0	1.44E-06	1.28E-06	4.71E-06
Rn-222	0	0	1.47E-06	1.33E-06	4.86E-06
Ru-106	2.59E-02	1.04E-01	0	0	0
S-35	4.81E-04	5.18E-03	9.31E-09	9.31E-09	5.54E-08
Sb-125	4.07E-03	1.78E-02	1.53E-03	1.38E-03	5.13E-03

Table 4.7-1: Internal and External Dose Conversion Factors (Continued)

Radionuclide	Internal DCFs (rem/μCi)		External DCFs (rem/yr per μCi/m^3)		
	Ingestion	Inhalation	Infinite Depth	15 cm	Water Immersion
Sb-126	8.88E-03	1.04E-02	1.07E-02	9.50E-03	3.49E-02
Sb-126m	1.33E-04	7.03E-05	5.82E-03	5.19E-03	1.90E-02
Sc-46	5.55E-03	2.52E-02	7.93E-03	6.77E-03	2.52E-02
Se-79	1.07E-02	4.07E-03	1.16E-08	1.16E-08	6.93E-08
Sm-151	3.63E-04	1.48E-02	6.15E-10	6.15E-10	9.93E-09
Sn-121	8.51E-04	8.51E-04	1.23E-07	1.21E-07	5.37E-07
Sn-121m	1.41E-03	1.67E-02	1.23E-06	1.23E-06	1.65E-05
Sn-126	1.74E-02	1.04E-01	9.22E-05	9.22E-05	5.56E-04
Sr-90	1.04E-01	1.33E-01	4.40E-07	4.34E-07	1.71E-06
Tc-99	2.37E-03	1.48E-02	7.85E-08	7.82E-08	3.67E-07
Te-125m	3.22E-03	1.26E-02	9.47E-06	9.46E-06	1.24E-04
Th-227	3.26E-02	3.70E+01	3.26E-04	3.10E-04	1.25E-03
Th-228	2.66E-01	1.48E+02	4.96E-06	4.87E-06	2.39E-05
Th-229	1.81E+00	2.63E+02	2.01E-04	1.99E-04	1.00E-03
Th-230	7.77E-01	5.18E+01	7.56E-07	7.46E-07	4.60E-06
Th-231	1.26E-03	1.22E-03	2.28E-05	2.27E-05	1.38E-04
Th-232	8.51E-01	9.25E+01	3.26E-07	3.25E-07	2.32E-06
Th-234	1.26E-02	2.85E-02	1.51E-05	1.51E-05	8.92E-05
Tl-207	0	0	1.24E-05	1.11E-05	3.95E-05
Tl-208	0	0	1.44E-02	1.13E-02	4.49E-02
Tl-209	0	0	8.08E-03	6.76E-03	2.59E-02
U-232	1.22E+00	2.89E+01	5.64E-07	5.57E-07	3.76E-06
U-233	1.89E-01	1.33E+01	8.74E-07	8.46E-07	4.25E-06
U-234	1.81E-01	1.30E+01	2.51E-07	2.50E-07	2.04E-06
U-235	1.74E-01	1.15E+01	4.51E-04	4.38E-04	1.86E-03
U-236	1.74E-01	1.18E+01	1.34E-07	1.33E-07	1.35E-06
U-238	1.67E-01	1.07E+01	6.45E-08	6.45E-08	9.29E-07
U-240	4.07E-03	1.96E-03	8.90E-07	8.90E-07	1.06E-05
W-181	2.81E-04	9.99E-05	4.78E-05	4.78E-05	3.76E-04
W-185	1.63E-03	4.44E-04	2.71E-07	2.69E-07	1.30E-06
W-188	7.77E-03	2.11E-03	6.05E-06	5.75E-06	2.31E-05
Y-90	9.99E-03	5.55E-03	1.50E-05	1.40E-05	4.24E-05
Zr-93	4.07E-03	3.70E-02	0	0	0

4.7.2 Member of the Public Dose Analysis

Two distinct release scenarios were analyzed to assess the potential MOP doses associated with the FTF. The difference in the scenarios was the primary water source, with one being a well drilled into the groundwater aquifers and the other being an FTF stream. The MOP dose pathways used in the PA analyses are discussed in detail in Section 4.2.4.1.

The consumption rates and bioaccumulation factors that are used in conjunction with the proposed pathways are discussed in detail in Section 4.6.

4.7.3 Intruder Dose Analysis

Two distinct release scenarios were analyzed to assess the potential intruder doses associated with the FTF. The intruder scenarios of concern are the Acute Intruder-Drilling Scenario and the Chronic Intruder Agricultural (Post-Drilling) Scenario. The intruder dose pathways used in the PA analyses are discussed in detail in Section 4.2.4.2.

The consumption rates and bioaccumulation factors that are used in conjunction with the proposed pathways are discussed in detail in Section 4.6.

4.7.4 Analysis Approach

The MOP and intruder exposure scenarios were analyzed for FTF to provide results to demonstrate compliance with the performance criteria. The analysis provides not only the maximum projected dose and time of occurrence, but also the dominant pathway contributing to the dose and the radionuclides responsible for the maximum dose. The doses to the MOP and inadvertent intruder are based on scenarios, and may not be the same as a dose to the MEI as defined in the CAP88 computer model that is used to model the air pathways dose. The MOP scenario represents the MOP and the intruder scenario represents the potential inadvertant intruder, although some consumption rates use the MEI values or use MEI values as a guide.

The groundwater and surface water concentrations and resulting human health impacts are calculated for the Base Case using the PORFLOW computer code. The analysis approaches used for FTF are based upon the radionuclide inventories (Sections 3.3.2 and 3.3.3), stabilized contaminant release mechanisms (Section 4.2.2), and radionuclide transport models (Section 4.2.3) as described previously in this document.

4.8 RCRA/CERCLA Risk Evaluation

Protocols have been developed, with approval of SCDHEC and the EPA, to support the SRS ACP remediation activities. [ERD-AG-003_F.17, ERD-AG-003_P.1.4, ERD-AG-003_P.1.5, ERD-AG-003_P.5.2, and ERD-AG-003_P.10.1] The protocols provide instructions for the development of conceptual site models used in the RCRA Facility Investigation and CERCLA Remedial Investigation (RI) process. [*www.epa.gov/superfund/policy/cercla.htm*] These same protocols were used to evaluate the potential for adverse affects associated with exposure to constituents present at the FTF in the stabilized contaminants. Groundwater concentrations at the FTF were compared to the SDWA MCL. In the absence of MCLs, groundwater radionuclide concentrations were compared to calculated PRGs and non-radionuclide concentrations were compared to RSLs.

PRGs are risk-based tools used to evaluate and clean up contaminated sites. The use of PRGs to evaluate risk/hazard is a simple and accepted method; however this method does not replace the current Constituent of Potential Concern (COPC) identification process which considers the residential soil PRGs in the initial screening step.

The December 2009 version of the EPA Regional Screening Level Tables are the source of RSLs for nonradiological constituents; it combines current EPA toxicity values with standard exposure factors to estimate contaminant concentrations in environmental media (soil, air, and water) that the agency considers protective of humans (including sensitive groups), over a lifetime. Region 3 RSL concentrations are based on direct contact pathways for which generally accepted methods, models, and assumptions have been developed (i.e., quantitative ingestion, dermal contact, and inhalation factors) for specific land use conditions. [*http://www.epa.gov/region09/superfund/prg/index.html*]

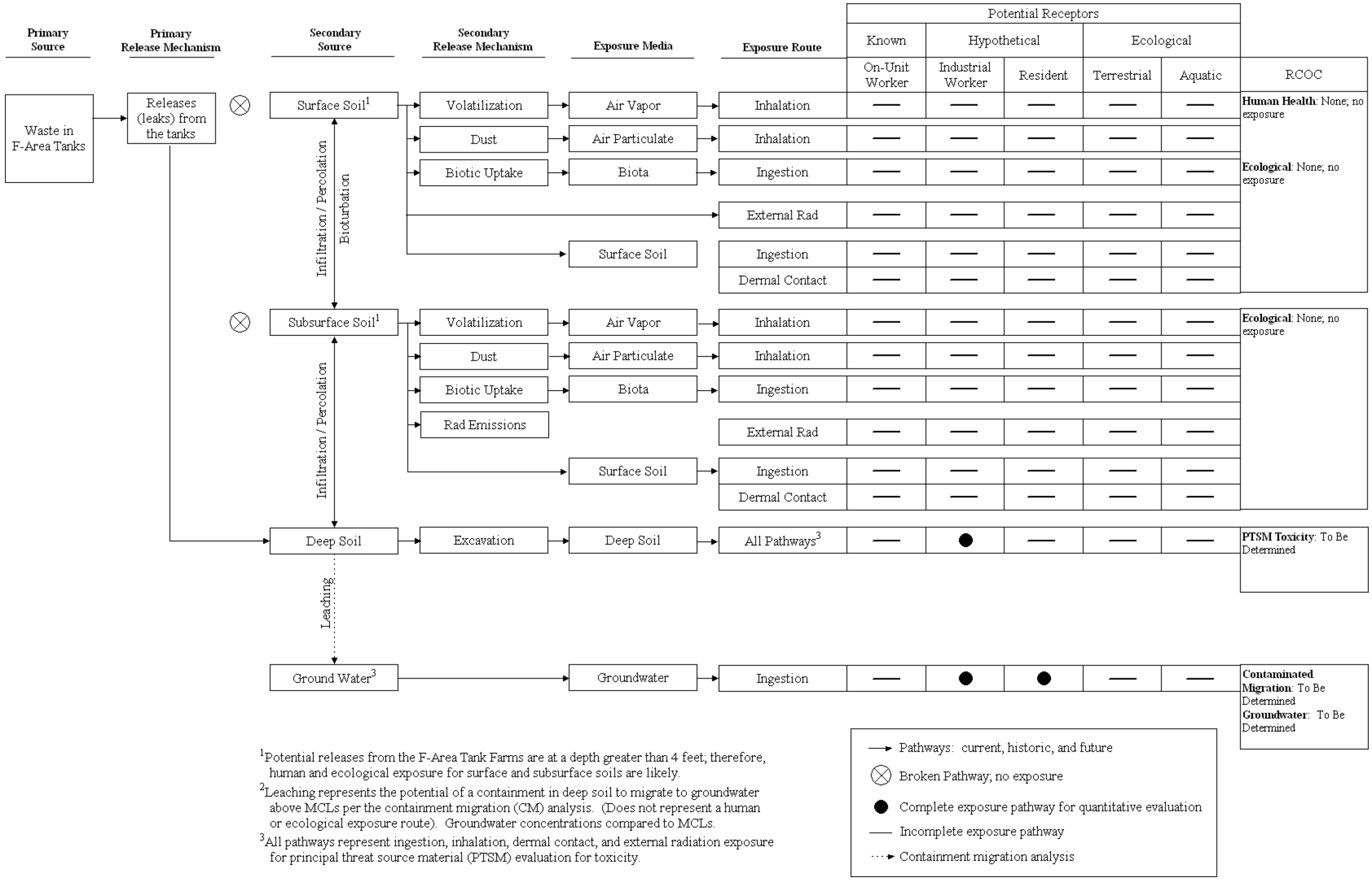
The EPA does not publish radiological values in a standardized table as they do nonradiological RSLs. However, the agency has issued updated guidance on calculation methods used for determining radionuclide activity screening levels. EPA's Superfund radionuclide PRG website provides a database tool with which to derive risk-based PRGs calculated using default parameters and the latest toxicity values. The database tool also allows the user to modify input parameters to create site-specific PRGs. The PRGs for radiological constituents are identified in calculation K-CLC-G-00077. The EPA website provides specific details regarding use of the database tool to calculate the PRGs. [*http://epa-prgs.ornl.gov/radionuclides/*] More detailed information can be found at the EPA website: *www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/*

4.8.1 Integrated Site Conceptual Model

The ISCM for FTF (Figure 4.8-1) depicts the understanding of the site and focuses on identifying potential contaminant migration from the sources to potential receptors. The ISCM identifies potential sources of contamination, release mechanisms, media of concern, exposure routes, and potential receptors. For the purposes of the ISCM, the surface soil interval is defined as the 0 to 0.3m (0 to 1 feet) interval and is evaluated for human and ecological exposure. The subsurface soil interval is the 0.3 to 1.2m (1 to 4 feet) interval and is evaluated for ecological exposure. The deep soil interval (>1.2m) is defined on a subunit specific basis and is evaluated for Principal Threat Source Material (PTSM) (future excavation scenario) and contaminant migration potential. The approved risk evaluation approach used in the RCRA Facility Investigation and CERCLA RI process differs slightly from the general analysis approach used calculating the PA dose results in Sections 5 and 6, such that there will be some differences between the risk analysis release scenarios (shown in Figure 4.8-1), and the dose analysis pathways and scenarios (Section 4.2.4). [*www.epa.gov/superfund/policy/cercla.htm*]

Initially, the ISCM provides a representation of the source of contamination and how it was released into the environment. It also includes potential release mechanisms and exposure routes based on existing understanding of the nature and extent of contamination. For this evaluation, because the FTF will remain operational while the individual waste tanks are closed, only the stabilized contamination in the waste tanks is considered. Final closure of the FTF will include the evaluation of potential surface soil contamination.

Figure 4.8-1: Integrated Conceptual Site Model for FTF



[1]Potential releases from the F-Area Tank Farms are at a depth greater than 4 feet; therefore, human and ecological exposure for surface and subsurface soils are likely.

[2]Leaching represents the potential of a containment in deep soil to migrate to groundwater above MCLs per the containment migration (CM) analysis. (Does not represent a human or ecological exposure route). Groundwater concentrations compared to MCLs.

[3]All pathways represent ingestion, inhalation, dermal contact, and external radiation exposure for principal threat source material (PTSM) evaluation for toxicity.

4.8.1.1 Primary Source of Contamination

The primary source of contamination was the stabilized contaminants in the FTF waste tanks and ancillary equipment. Contaminants may be released from primary sources through release of contaminants (migration) from the waste tanks and ancillary equipment.

4.8.1.2 Secondary Sources of Contamination

Environmental media impacted by the release of primary source contamination becomes a secondary source. After grouting waste tanks and ancillary equipment, at least 10 feet of material will be placed as backfill. Potential releases from the FTF are then at depths greater than (1.2m); therefore human and ecological exposure for surface or subsurface soils is unlikely (incomplete pathway). Secondary sources of contamination include: deep soils beneath the waste tanks and groundwater.

Environmental media may serve as both a contaminant reservoir, via chemical bonding and biotic uptake, and/or secondary release mechanism of contaminants. Secondary release mechanisms include: leaching of constituents from deep soils to groundwater; and excavation of deep soils.

4.8.1.3 Exposure Pathways (Media)

Contact with contaminated environmental media creates exposure pathways for human receptors. Potential exposure media includes excavation of deep soil and groundwater.

4.8.1.4 Exposure Routes

Potential exposure routes for human receptors may include the following:

- Ingestion of excavated soil;
- Inhalation of air vapor and particulates from excavated soil;
- Dermal contact with excavated soil;
- External radiation exposure from radiological constituents in excavated soil; and
- Ingestion of groundwater.

4.8.1.5 Receptors

Potential releases from the FTF are at a depth greater than 1.2m (4 feet); therefore, the standard human and ecological receptor scenarios do not apply. A future industrial worker scenario is considered for deep soils at the PTSM toxicity threshold to take into account potential exposure through excavation.

4.8.2 Risk Assessment

The risk assessment for the FTF closure follows the ACP protocols for human health and ecological risk assessments. [ERD-AG-003_F.17, ERD-AG-003_P.1.4, ERD-AG-003_P.1.5] Based on available characterization data and estimated volume of residual material expected to remain in each of the waste tanks and ancillary equipment, the chemical and radiological inventory used for PA modeling has been calculated for FTF as discussed in Section 3.3. Modeling was conducted to determine the peak concentrations of the non-radiological and radiological contaminants in the groundwater over the next 10,000 years.

When each waste tank is closed, analysis will be performed to compare the actual residual inventory versus the calculated values used in the modeling.

4.8.2.1 Human Health Risk Assessment

ACP protocols call for evaluation of surface soils from 0 to 1 foot in depth for exposure to a future industrial worker. Some of the ancillary equipment may currently be within the 0 to 1 foot depth. However, since the waste tanks and ancillary equipment will be stabilized and covered with at least 10 feet of backfill, there will be no pathway for future industrial worker exposure. Therefore, based on the evaluation using the ACP protocols, no human health risk assessment is required at this time. [ERD-AG-003_F.17, ERD-AG-003_P.1.4, ERD-AG-003_P.1.5]

4.8.2.2 Ecological Risk Assessment

ACP protocols call for evaluation of surface soils from 0 to 4 feet for ecological exposure. Some of the ancillary equipment may currently be within the 0 to 4 foot depth. However, since the waste tanks and ancillary equipment will be stabilized and covered with at least 10 feet of backfill, there will be no pathway for ecological exposure. Therefore, based on the evaluation using the ACP protocols, no ecological risk assessment is required at this time. [ERD-AG-003_F.17, ERD-AG-003_P.1.4, ERD-AG-003_P.1.5]

4.8.2.3 Principal Threat Source Materials

PTSM are those materials that include or contain hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water or air, or that act as a source for direct exposure. [OSWER 9380.3-06FS] Source characterizations are necessary to determine whether the source(s) can be designated as PTSM, Low-Level Threat Source Material (LLTSM), or non-hazardous materials.

The closed FTF waste tanks and ancillary equipment are, by the above definition, PTSM. The waste tanks and the residue remaining in the tanks will be stabilized and then covered as part of tank closure. This approach is consistent with ACP remediation of reactor seepage basins which contained contaminated soils determined to be PTSM. [ERD-AG-003_F.17, ERD-AG-003_P.1.4, ERD-AG-003_P.1.5, ERD-AG-003_P.10.1]

4.8.2.4 Contaminant Migration Constituents of Concern

Contaminant Migration Constituents of Concern (CMCOCs) were identified through a system that is consistent with both the ACP protocols and the PA. CMCOCs were identified by modeling the release of contaminants and their travel through the vadose zone. The same model utilized in the PA to meet 10 CFR 61 requirements is used as the basis of the CMCOC evaluation. Any radiological contaminants that are modeled to reach the water table are compared to MCL or PRG or other appropriate standards in cases where the constituent does not have an MCL. Non-radiological contaminants are compared to MCLs or RSLs. Any constituents that are predicted to exceed these standards in the groundwater directly beneath FTF are identified as CMCOCs. CMCOCs are often addressed by the placement of a low permeability cap such as is planned for the FTF closure. [ERD-AG-003_F.17, ERD-AG-003_P.1.4, ERD-AG-003_P.1.5, ERD-AG-003_P.5.2] Risk Assessment modeling results are discussed in detail in Section 5.7.

5.0 RESULTS OF ANALYSIS

The purpose of this section is to present the results for the analyses described in Section 4 of this PA.

Section 5.1 presents the Source Term results. The purpose of this section is to present the stabilized contaminant release rates for sensitivity run radionuclides.

Section 5.2 presents peak groundwater concentrations for the radionuclides and chemicals discussed in Section 4.2.1. Maximum groundwater concentrations for multiple exposure points are provided:

1. 100m from the FTF.
2. At the UTR and Fourmile Branch seeplines.

Section 5.3 presents the Air Pathway and Radon release results.

Section 5.4 presents individual Biotic Pathway formulas used to calculate the doses to the MOP.

Section 5.5 presents the MOP Dose Analysis.

Section 5.6 presents the Uncertainty and Sensitivity Analysis.

Section 5.7 presents the Risk Analysis.

Section 5.8 presents the As Low As Reasonably Achievable (ALARA) Analysis.

5.1 Source Term (Analysis Results)

The purpose of this section is to present the peak stabilized contaminant release rates from the FTF waste tanks and ancillary equipment. The release rates (fluxes) were calculated using the PORFLOW FTF baseline model presented in Section 4.4. The flux from the FTF waste tanks and ancillary equipment were calculated at two locations:

1. Exiting the inventory source containment.
2. Entering the upper aquifer below the associated inventory source.

It should be noted that the flux exiting the inventory source containment is different than the flux leaving the CZ since a radionuclide can leave the CZ and still be held up in the containment. This fact can lead to peaks associated with containment (e.g., liner) failure since the source material that left the CZ is collected in the containment and then released simultaneously when the containment fails.

In the analysis, the release of radionuclides from the waste tanks was controlled in most cases by solubility, which will vary with pH, and can vary with redox potential as well. All chemicals and some radionuclides are modeled as being released instantaneously from the CZ. In addition to solubility, the stabilized contaminant release rate for waste tanks was also impacted by the water flow through the tank, which varied by tank type and changed over time as the hydraulic properties of the tank materials changed. The flux from the applicable containment (e.g., transfer line wall, pump tank wall, evaporator pot wall) was less complicated for the ancillary equipment, because the entire waste inventory was released instantaneously from the ancillary source location when the containment failed. After a contaminant had left its applicable containment, the basemat retardation (for waste tanks only) and soil retardation impacted the contaminant's transport rate into the aquifers.

Table 5.1-1 presents the peak flux (in Ci/yr) from the containment for any FTF source (tank or ancillary equipment) for the sensitivity run radionuclides. The determination of the sensitivity run radionuclides is discussed in Section 5.2.2. Radionuclides are designated as sensitivity run radionuclides if the radionuclides contribute greater than 0.1 mrem/yr to the dose to the MOP and also if the radionuclides have a significant impact on progeny to those radionuclides that contribute greater than 0.1 mrem/yr to the dose to the MOP. Only the radionuclides designated as sensitivity run radionuclides, because of their impact on the MOP dose, are included in Table 5.1-1. Appendix A.1 of this document contains data curves showing the flux (Ci/year) leaving the associated containment for the individual waste tanks and ancillary equipment out to 20,000 years. The flux is provided for all radionuclides and chemicals.

Table 5.1-1: Peak Fluxes Exiting Containment Out to 10,000 and 20,000 Years

Radionuclide	Peak FTF Flux in 10,000 Years (Ci/yr)	Source of Peak Flux	Year Largest Flux in 10,000 Years Occurs	Peak FTF Flux in 20,000 Years (Ci/yr)	Source of Peak Flux	Year Largest Flux in 20,000 Years Occurs
C-14	3.07E-03	Tank 18 or 19	3,639	3.07E-03	Tank 18 or 19	3,639
Cs-135	1.05E-02	Tank 18 or 19	3,639	1.90E-02	Tank 33 or 34	12,752
I-129	4.77E-06	Tank 18 or 19	3,639	8.65E-06	Tank 33 or 34	12,752
Np-237	2.19E-05	Tank 18	9,601	1.34E-01	Tank 34	16,081
Pa-231	4.33E-07	Tank 18	3,639	1.19E-06	Type I	15,288
Pu-239	1.29E-04	242-3F	2,501	1.29E-04	242-3F	2,501
Pu-240	3.55E-05	Tank 18	9,601	4.95E-05	Type I	12,749
Ra-226	2.84E-05	Tank 18	3,640	1.08E-04	Type I	12,749
Tc-99	9.26E-03	242-3F	511	9.26E-03	242-3F	511
Th-229	1.36E-04	Tank 18	3,639	1.36E-04	Tank 18	3,639
U-233	2.64E-04	Tank 18	8,001	3.30E-04	Type I	15,287
U-234	1.35E-04	Tank 18	6,001	2.96E-04	Type I	15,287

Table 5.1-2 presents the peak flux (Ci/yr) entering the upper aquifer for any FTF source (waste tank or ancillary equipment) for the sensitivity run radionuclides. Only the radionuclides designated as sensitivity run radionuclides, because of their impact on the MOP dose, are included in Table 5.1-2. Appendix A.2 of this document contains data curves showing the waste flux (Ci/year) entering the upper aquifer for the individual waste tanks and ancillary equipment out to 20,000 years. The flux is provided for all radionuclides and chemicals.

Table 5.1-2: Peak Fluxes Entering Upper Aquifer Out to 10,000 and 20,000 Years

Radionuclide	Peak FTF Flux in 10,000 Years (Ci/yr)	Source of Peak Flux	Year Largest Flux in 10,000 Years Occurs	Peak FTF Flux in 20,000 Years (Ci/yr)	Source of Peak Flux	Year Largest Flux in 20,000 Years Occurs
C-14	1.63E-03	Tank 18 or 19	3,903	1.63E-03	Tank 18 or 19	3,903
Cs-135	1.24E-03	Tank 18 or 19	4,310	1.29E-03	Type I	13,786
I-129	3.17E-06	Tank 18 or 19	3,780	6.14E-06	Type I	12,803
Np-237	2.21E-05	Tank 18	9,604	2.42E-04	Tank 18	10,848
Pa-231	5.31E-07	Tank 18	6,008	6.38E-07	Type I	14,958
Pu-239	5.29E-06	Tank 18 or 19	10,000	6.45E-05	242-3F	19,999
Pu-240	1.72E-05	Tank 18	9,998	2.87E-05	Tank 18	12,001
Ra-226	1.25E-05	Tank 18	4,639	3.67E-05	Type I	13,341
Tc-99	4.01E-03	Transfer Lines	702	4.01E-03	Transfer Lines	702
Th-229	5.31E-05	Tank 18	10,000	6.41E-05	Tank 18	12,001
U-233	2.74E-04	Tank 18	9,001	2.74E-04	Tank 18	9,001
U-234	1.37E-04	Tank 18	7,170	1.37E-04	Tank 18	7,170

5.2 Environmental Transport of Radionuclides

The purpose of this section is to present the groundwater concentrations for all of the radionuclides and chemicals discussed in the source term screening section of the PA (Section 4.2.1). Maximum groundwater concentrations are presented for two exposure points:

1. 100m from the FTF
2. At the seeplines (UTR and Fourmile Branch)

Results are presented for the three distinct aquifers modeled (UTR-UZ, UTR-LZ, and Gordon Aquifer).

The groundwater concentrations at 100m and at the seepline were calculated using the PORFLOW FTF model for the Base Case discussed in Section 4.4.2.1. A summary of several key parameters used in the baseline PORFLOW FTF modeling configuration are provided in Table 5.2-1.

Table 5.2-1: Baseline Configuration

FTF Parameter	Baseline
Radiological Inventory	Table 3.3-2
Chemical Inventory	Table 3.3-3
Solubilities (reduced and oxidized)	Table 4.2-10
Vadose K_d values	Table 4.2-29
Cementitious K_d values	Table 4.2-33
Cementitious Material Degradation Times	Table 4.2-32
Type I Basemat thickness (inches)	30
Type III Basemat thickness (inches)	42
Type IIIA Basemat thickness (inches)	41
Type IV Basemat thickness (inches)	6.9025
Bypass Fraction (% Basemat with K_d = 0, Represents fast flow path in GoldSim)	0%
Tank configuration	Configuration A (Section 4.4.2.1)
Vadose Zone Thickness	Table 4.2-23
Type I Tank Liner failure (year)	12,747
Type III/IIIA Tank Liner failure (year)	12,751
Type IV Tank Liner failure (year)	3,638
Ancillary Equipment containment failure (year)	510
Chemical Transition of tank grout from Reduced to Oxidized (pore volumes)	371
Chemical Transition of tank grout from Region II to Region III (pore volumes)	2,063

The uncertainties and sensitivities associated with the Base Case are discussed in detail in Section 5.6.

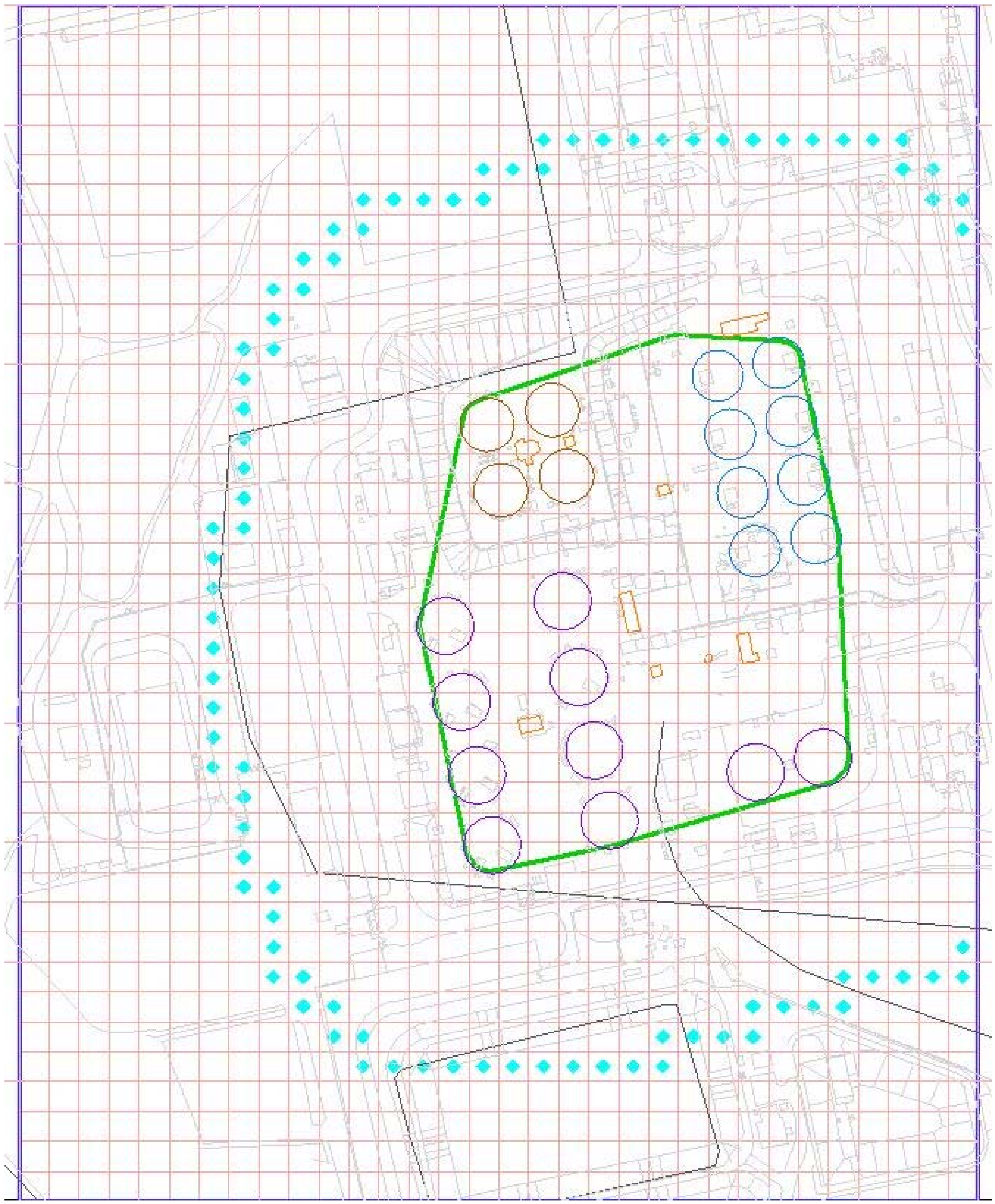
5.2.1 Groundwater Concentrations at 100m

The 100m groundwater concentrations were calculated using the PORFLOW FTF model, which divides the area around FTF into computational cells. The green band in Figure 5.2-1 is the demarcation line from which the 1m and 100m concentrations are calculated. The blue diamonds in Figure 5.2-1 show the 100m distance from FTF. Figure 5.2-2 illustrates the contaminant flow from the waste tanks. Since contaminant transport is not via a straight line, but rather by the applicable aquifers, the actual travel distance to reach 100m from the FTF boundary is greater than 100m for some sources. Table 5.2-2 shows the approximate distances a contaminant has to travel from each waste tank to reach a point 100m from the

FTF boundary in the direction of the flow. The groundwater concentrations at 100m are assumed to be the highest concentration in the area 100m or farther from the FTF. This assumption is supported by Figures 5.2-3 and 5.2-4, which present the plume that would result from a continuous (non-depleting) source of tracer (no decay, nor sorption). Figure 5.2-3 is a projection of plume centerline concentration onto a map view that displays the highest concentration at any location, irrespective of depth/aquifer. Similarly, Figure 5.2-4 is a projection of plume centerline onto the cross-sectional slice A-A' shown in Figure 5.2-3. The plume was generated from a hypothetical constant source of a non-sorbing, non-decaying tracer placed in the waste tank source zones. The tracer plume illustrates groundwater flow directions and dispersion.

Peak concentration is observed to decrease monotonically with travel distance from the source zone, as a result of hydrodynamic dispersion. No physical mechanism exists to concentrate contamination beyond the source zone in the fully 3-D PORFLOW simulations. Hence, monitoring at 100m is adequate to capture the peak concentration that can occur at any location beyond 100m.

Figure 5.2-1: 100m Distance from FTF



Green Band = Demarcation line from which the 1m and 100m concentrations are calculated.
Blue Diamonds = 100m distance from FTF

Figure 5.2-2: Stream Traces from FTF

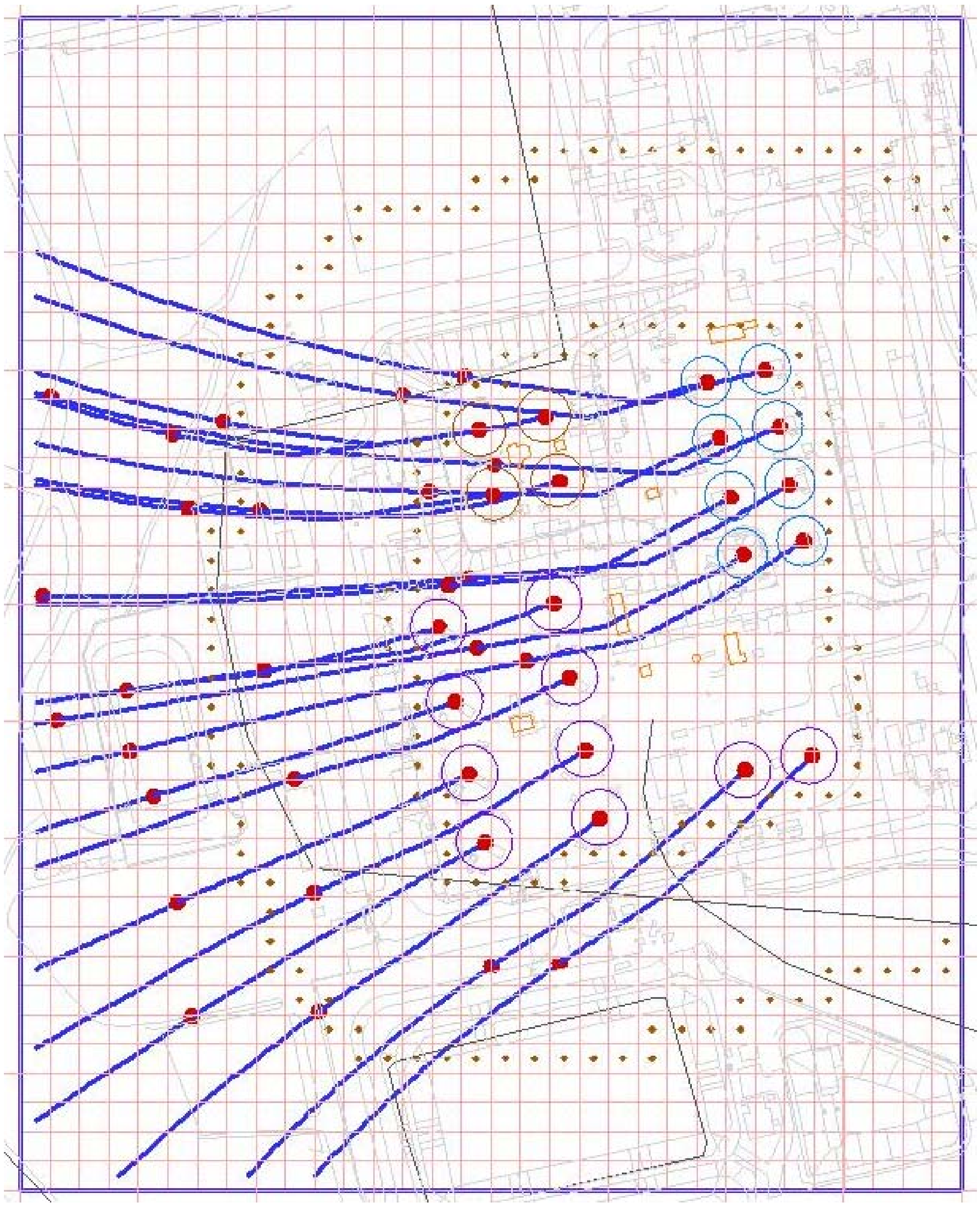


Table 5.2-2: Approximate Aquifer Travel Distance to the FTF 100m Boundary

Tank	Approximate Distance to 100m Boundary (Meters)
1	224
2	248
3	244
4	274
5	264
6	300
7	274
8	310
17	112
18	132
19	127
20	152
25	183
26	173
27	178
28	160
33	244
34	244
44	112
45	104
46	112
47	119

Figure 5.2-3: Contaminant Plume Leaving FTF – Aerial View

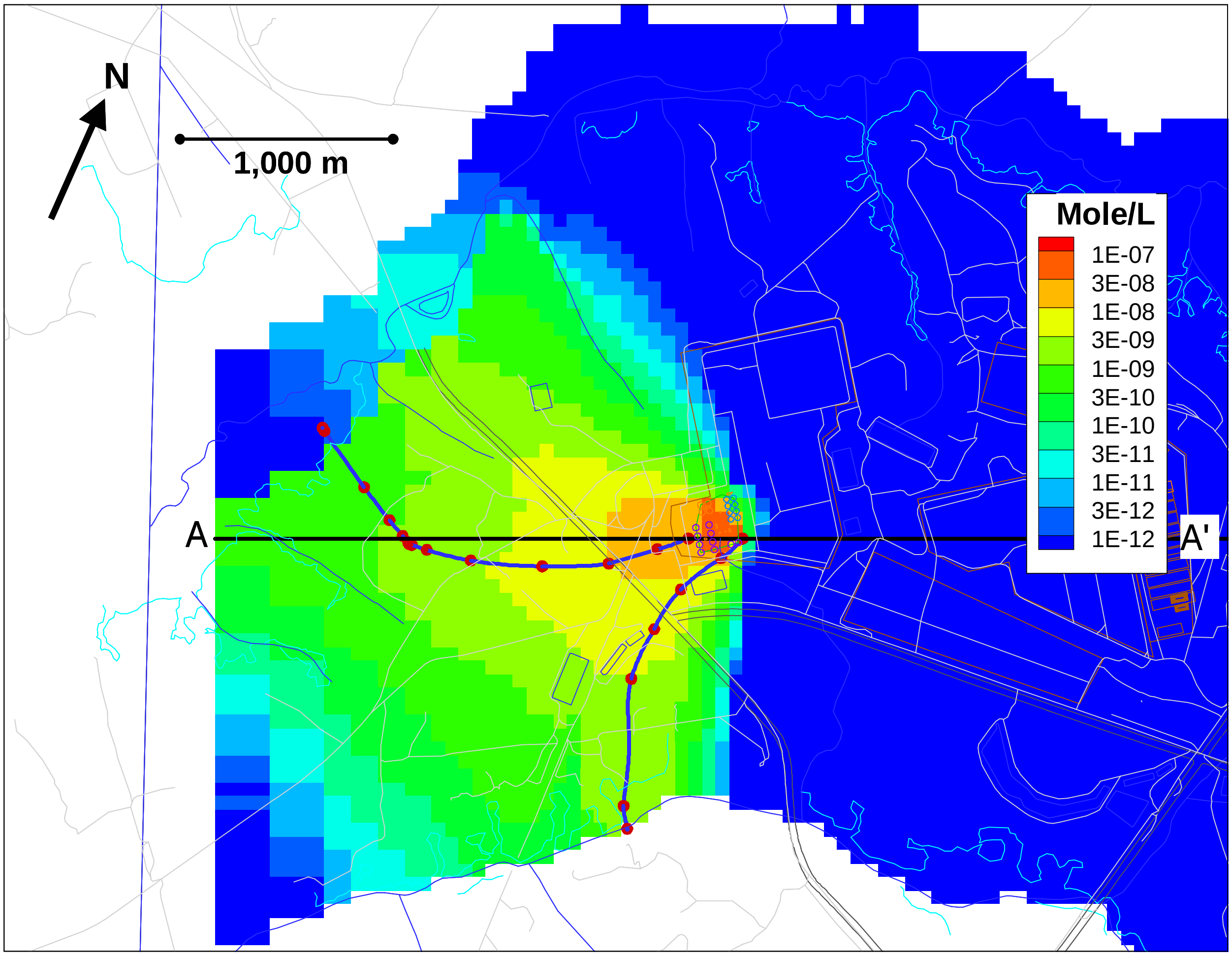
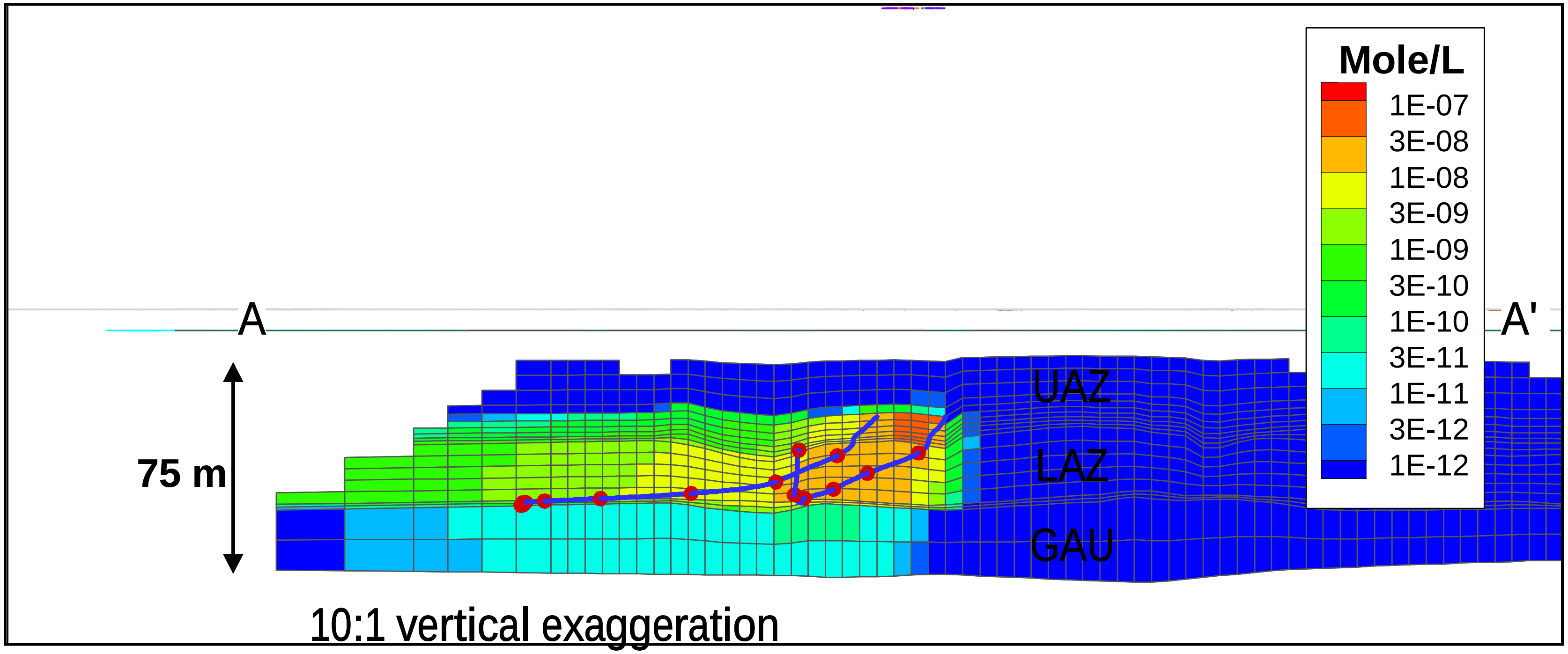


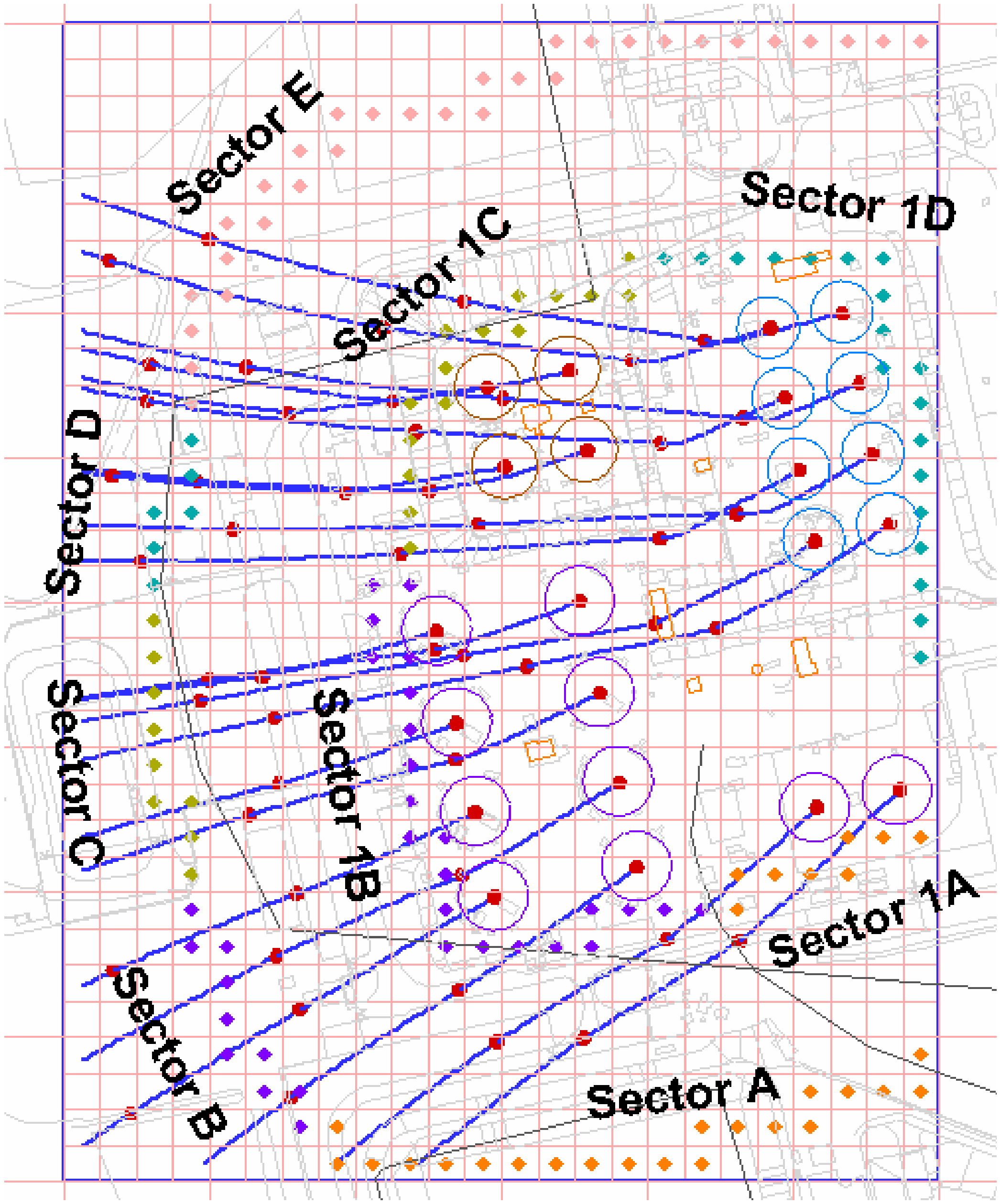
Figure 5.2-4: Contaminant Plume Leaving FTF – Cross Sectional View



UAZ = Upper Aquifer Zone
LAZ = Lower Aquifer Zone
GAU = Gordon Aquifer Zone

The PORFLOW 100m concentrations are calculated for five sectors (Sectors A – E) as shown on Figure 5.2-5. The peak concentration values for the 100m results are recorded for the three aquifer depths of concern (i.e., UTR-UZ, UTR-LZ, and Gordon Aquifer). The concentration for each aquifer represents peak concentration in any vertical computational mesh within the aquifer. The mesh vertical thicknesses (heights) in the computational model are less than 10 feet in the UTR-UZ, and less than 15 feet in the UTR-LZ. No well screen averaging was used in determining the concentrations for dose calculations because the typical well screen length of 20 feet is approximate to the computational mesh height. Dividing the results into sectors was necessary to allow the large amount of concentration data to be stored from PORFLOW and used by the GoldSim dose calculator model, but also allowed variability in peak concentration for different areas of the FTF to be more easily evaluated. The five sectors are analyzed for each radionuclide and chemical to find the maximum groundwater concentrations at 100m from the FTF. The PORFLOW 1m concentrations are calculated for four sectors (Sector 1A – 1D), as shown in Figure 5.2-5. Using the sectors to determine the highest groundwater concentrations causes the calculated peak doses to be higher than they actually are, since the peak concentrations are determined for each radionuclide independent of the location within the sector.

Figure 5.2-5: PORFLOW FTF 1m and 100m Model Evaluation Sectors



Note: The individual sectors are indicated by unique diamond colors.

Tables 5.2-3 through 5.2-5 present the peak 100m radionuclide concentrations within the 10,000-year performance period in each sector for the three aquifers. These radionuclide concentrations reflect the peak concentrations for each radionuclide in the sector. These values are conservatively high for the radionuclides present in multiple decay chains because the totals are simply the sum of the individual peaks within that sector for a given radionuclide, without regard to time or location. For example, if Pb-210 were present as a daughter product in six decay chains, those six concentrations would all be added (along with the initial Pb-210) together to arrive at a single Pb-210 concentration for that sector, even though the peaks for six daughters might have occurred at different times and at different locations within the sector. Tables 5.2-6 through 5.2-8 show the peak 100m chemical concentrations within the 10,000-year performance period in each sector for the three aquifers. Nitrate and nitrite are modeled as nitrogen, therefore, the MCL for nitrate plus nitrite (10,000 µg/L) is compared to the total nitrogen concentration. Tables 5.2-3 through 5.2-5 also list the MCL for each constituent with the derived values for beta and photo emitters from Table II-3 of FR-00-9654. The MCLs provided in the reference are derived for a beta-gamma dose of 4 mrem/yr. The peak concentration of each beta-gamma emitter is compared to a specific MCL to determine their fraction. To determine if the 4 mrem/yr beta-gamma limit is met, the sum of the fractions must be less than 1.0. The total alpha MCL includes Ra-226, but does not include radon or uranium. The radium MCL includes both Ra-226 and Ra-228. [SCDHEC R.61-58]

Table 5.2-3: Radiological 100m Concentrations for UTR-UZ

Radionuclide	Maximum Contaminant Level (MCL) (pCi/L)**	Sector A		Sector B		Sector C		Sector D		Sector E	
		Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs
Ac-227	N/A	3.0E-08	1,740	5.2E-08	1,734	3.2E-06	6,122	4.1E-05	6,116	3.9E-05	6,120
Al-26	N/A	1.6E-27	10,000	6.1E-25	10,000	6.1E-14	10,000	6.3E-08	10,000	7.7E-10	10,000
Am-241	Total α	3.7E-25	10,000	1.9E-22	10,000	3.6E-12	10,000	1.1E-06	10,000	2.4E-08	10,000
Am-242m	Total α	<1.0E-30	9,614	<1.0E-30	9,880	<1.0E-30	8,484	2.3E-26	7,538	1.3E-28	7,944
Am-243	Total α	1.3E-26	10,000	6.2E-24	10,000	1.5E-13	10,000	5.3E-08	10,000	1.1E-09	10,000
Ba-137m	N/A	*	*	*	*	*	*	*	*	*	*
Bk-249	2,000	*	*	*	*	*	*	*	*	*	*
C-14	2,000	1.2E-03	4,656	4.6E-02	4,582	2.4E+01	4,302	2.2E+02	4,188	1.2E+02	4,226
Ce-144	N/A	*	*	*	*	*	*	*	*	*	*
Cf-249	Total α	<1.0E-30	10,000	<1.0E-30	10,000	1.6E-20	10,000	5.4E-15	10,000	1.1E-16	10,000
Cl-36	N/A	6.9E-06	10,000	3.9E-04	3,690	1.8E-01	3,684	1.5E+00	3,680	8.4E-01	3,682
Cm-242	Total α	*	*	*	*	*	*	*	*	*	*
Cm-243	Total α	<1.0E-30	1,902	<1.0E-30	1,904	<1.0E-30	1,622	<1.0E-30	1,420	<1.0E-30	1,490
Cm-244	Total α	<1.0E-30	1,342	<1.0E-30	1,350	<1.0E-30	1,172	<1.0E-30	1,048	<1.0E-30	1,094
Cm-245	Total α	2.5E-25	10,000	1.2E-22	10,000	2.7E-12	10,000	8.9E-07	10,000	1.8E-08	10,000
Cm-247	Total α	5.5E-28	10,000	2.7E-25	10,000	5.8E-15	10,000	2.0E-09	10,000	4.0E-11	10,000
Cm-248	Total α	5.3E-28	10,000	2.6E-25	10,000	5.6E-15	10,000	1.9E-09	10,000	3.9E-11	10,000
Co-60	100	<1.0E-30	384	<1.0E-30	432	<1.0E-30	190	<1.0E-30	164	<1.0E-30	168
Cs-134	N/A	*	*	*	*	*	*	*	*	*	*
Cs-135	900	9.8E-04	8,106	2.3E-02	7,140	1.3E+01	6,158	1.2E+02	5,586	6.6E+01	5,812
Cs-137	200	5.0E-29	2,076	5.6E-26	1,370	4.4E-19	1,154	2.3E-15	996	2.8E-16	1,050
Eu-152	200	<1.0E-30	1,032	<1.0E-30	1,038	<1.0E-30	918	<1.0E-30	832	<1.0E-30	864
Eu-154	60	<1.0E-30	482	<1.0E-30	486	<1.0E-30	392	<1.0E-30	326	<1.0E-30	324
Eu-155	N/A	*	*	*	*	*	*	*	*	*	*
Gd-152	N/A	*	*	*	*	*	*	*	*	*	*

Table 5.2-3: Radiological 100m Concentrations for UTR-UZ (Continued)

Radionuclide	Maximum MCL (pCi/L)**	Sector A		Sector B		Sector C		Sector D		Sector E	
		Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs
H-3	20,000	1.8E-12	558	3.2E-12	558	7.5E-11	206	2.5E-09	202	3.6E-09	202
I-129	1	3.1E-04	584	5.3E-04	584	6.4E-02	3,792	5.5E-01	3,790	3.1E-01	3,790
K-40	N/A	1.1E-06	10,000	9.4E-05	4,406	5.1E-02	4,200	4.7E-01	4,084	2.6E-01	4,126
Na-22	N/A	*	*	*	*	*	*	*	*	*	*
Nb-93m	N/A	6.0E-06	10,000	6.5E-04	10,000	3.8E-01	10,000	3.6E+00	10,000	1.9E+00	9,998
Nb-94	N/A	4.3E-01	564	7.4E-01	562	7.1E-01	560	6.4E-01	560	3.9E-01	560
Ni-59	300	5.8E-01	2,060	9.9E-01	2,036	2.5E+00	10,000	2.2E+01	9,986	1.7E+01	7,302
Ni-63	50	5.2E-04	1,502	1.1E-03	1,468	1.2E-03	1,428	1.0E-03	1,478	3.3E-03	1,208
Np-237	Total α	5.7E-02	1,594	9.8E-02	1,594	9.4E-02	1,586	1.8E+00	6,058	2.5E+00	6,056
Pa-231	Total α	4.0E-05	1,712	6.8E-05	1,706	4.3E-03	6,064	5.5E-02	6,056	5.2E-02	6,060
Pb-210	N/A	1.6E-04	1,748	2.7E-04	1,730	2.7E-04	1,728	2.7E-03	10,000	3.8E-03	10,000
Pd-107	N/A	6.9E-07	5,114	7.2E-05	5,056	3.8E-02	4,872	3.4E-01	4,792	1.9E-01	4,824
Pm-147	N/A	*	*	*	*	*	*	*	*	*	*
Pr-144	N/A	*	*	*	*	*	*	*	*	*	*
Pu-238	Total α	<1.0E-30	5,310	<1.0E-30	8,018	5.1E-26	7,282	2.8E-21	6,742	9.8E-23	6,956
Pu-239	Total α	1.5E-07	10,000	4.2E-09	10,000	8.7E-06	10,000	5.2E-03	10,000	4.2E-03	10,000
Pu-240	Total α	2.5E-08	10,000	7.2E-10	10,000	1.0E-05	10,000	7.2E-03	10,000	1.0E-02	10,000
Pu-241	300	1.4E-24	10,000	7.2E-22	10,000	1.4E-11	10,000	4.3E-06	10,000	9.2E-08	10,000
Pu-242	Total α	5.7E-10	10,000	1.7E-11	10,000	3.2E-07	10,000	2.2E-04	10,000	2.8E-04	10,000
Pu-244	Total α	2.8E-13	10,000	8.2E-15	10,000	1.4E-09	10,000	8.9E-07	10,000	1.5E-07	10,000
Ra-226	Total α/Ra	6.0E-02	1,720	1.04E-01	1,702	1.0E-01	1,694	1.1E+00	10,000	1.5E+00	9,998
Ra-228	Total Ra	9.8E-14	10,000	1.1E-13	10,000	3.9E-09	10,000	7.5E-07	10,000	2.4E-07	10,000
Rh-106	N/A	*	*	*	*	*	*	*	*	*	*
Rn-222	N/A	6.0E-02	1,720	1.0E-01	1,702	1.0E-01	1,694	1.1E+00	10,000	1.5E+00	9,998
Ru-106	N/A	*	*	*	*	*	*	*	*	*	*

Table 5.2-3: Radiological 100m Concentrations for UTR-UZ (Continued)

Radionuclide	Maximum MCL (pCi/L)**	Sector A		Sector B		Sector C		Sector D		Sector E	
		Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs
Sb-125	N/A	*	*	*	*	*	*	*	*	*	*
Sb-126	N/A	*	*	*	*	*	*	*	*	*	*
Sb-126m	N/A	*	*	*	*	*	*	*	*	*	*
Se-79	N/A	3.6E-22	10,000	2.4E-19	10,000	9.9E-10	10,000	9.3E-05	10,000	5.7E-06	10,000
Sm-147	N/A	*	*	*	*	*	*	*	*	*	*
Sm-151	1,000	<1.0E-30	4,422	<1.0E-30	4,558	<1.0E-30	3,650	<1.0E-30	3,024	<1.0E-30	3,246
Sn-126	N/A	<1.0E-30	10,000	<1.0E-30	10,000	1.3E-19	10,000	1.3E-12	10,000	2.2E-12	10,000
Sr-90	8	9.9E-10	1,108	3.1E-09	1,084	1.4E-08	1,026	7.1E-09	1,048	1.2E-07	990
Tc-99	900	3.5E+01	746	6.0E+01	744	5.8E+01	740	2.0E+02	694	1.6+02	694
Te-125m	N/A	*	*	*	*	*	*	*	*	*	*
Th-228	Total α	9.8E-14	10,000	1.1E-13	10,000	3.9E-09	10,000	7.5E-07	10,000	2.4E-07	10,000
Th-229	Total α	1.8E-07	10,000	2.7E-07	10,000	9.9E-04	10,000	8.5E-02	10,000	7.2E-02	10,000
Th-230	Total α	2.8E-09	10,000	1.4E-09	10,000	6.2E-06	10,000	1.9E-03	10,000	5.9E-03	10,000
Th-232	Total α	2.9E-16	10,000	1.8E-16	10,000	1.0E-11	10,000	1.1E-09	10,000	6.7E-10	10,000
U-232	Total U**	<1.0E-30	2,874	<1.0E-30	2,986	2.6E-26	2,416	1.1E-21	2,016	4.5E-23	2,162
U-233	Total U**	3.6E-06	10,000	4.5E-06	10,000	6.3E-02	10,000	3.3E+00	10,000	3.6E+00	10,000
U-234	Total U**	2.0E-06	10,000	1.5E-06	10,000	4.1E-03	10,000	9.8E-01	10,000	2.7E+00	10,000
U-235	Total U**	1.9E-08	10,000	1.5E-08	10,000	5.2E-05	10,000	4.4E-03	10,000	6.1E-03	10,000
U-236	Total U**	3.7E-08	10,000	3.6E-08	10,000	1.2E-03	10,000	8.6E-02	10,000	5.7E-02	10,000
U-238	Total U**	9.1E-07	10,000	6.8E-07	10,000	1.5E-05	10,000	5.5E-04	10,000	5.7E-04	10,000
Y-90	N/A	*	*	*	*	*	*	*	*	*	*
Zr-93	N/A	4.0E-26	10,000	2.6E-23	10,000	1.3E-13	10,000	1.6E-08	10,000	5.1E-10	10,000

Table 5.2-3: Radiological 100m Concentrations for UTR-UZ (Continued)

Radionuclide	Maximum MCL (pCi/L)***	Sector A		Sector B		Sector C		Sector D		Sector E	
		Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs
Sum of beta/gamma MCL fractions		4.1E-02	446	7.1E-02	744	1.6E-01	740	1.1E+01	3,790	6.8E-01	3,790
Total alpha	15	1.2E-01	1,688	2.0E-01	1,676	1.9E-01	1,658	2.7E+00	10,000	3.8E+00	10,000
Total Ra	5	6.0E-02	1,720	1.0E-01	1,702	1.0E-01	1,694	1.1E+00	10,000	1.5E+00	10,000

* Short-lived radionuclides decayed prior to liner failure. PORFLOW does not track short-lived radionuclides during transport modeling, but the DCFs do include the equilibrium progeny.

** Total uranium is evaluated in Table 5.2-6.

*** MCL values for beta and photon emitters are calculated in Table II-3 of FR-00-9654 based on a beta-gamma dose of 4 mrem/yr.

Table 5.2-4: Radiological 100m Concentrations for UTR-LZ

Radionuclide	Maximum Contaminant Level (MCL) (pCi/L) ***	Sector A		Sector B		Sector C		Sector D		Sector E	
		Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs
Ac-227	N/A	4.1E-08	10,000	8.9E-08	10,000	2.2E-06	6,128	3.3E-05	6,114	4.9E-05	10,000
Al-26	N/A	<1.0E-30	10,000	4.7E-29	10,000	6.6E-18	10,000	1.2E-11	10,000	5.5E-13	10,000
Am-241	Total α	2.8E-29	10,000	3.0E-26	10,000	9.9E-16	10,000	6.1E-10	10,000	3.7E-11	10,000
Am-242m	Total α	<1.0E-30	10,000	<1.0E-30	10,000	<1.0E-30	9,284	1.2E-30	8,454	<1.0E-30	8,626
Am-243	Total α	<1.0E-30	10,000	9.2E-28	10,000	3.6E-17	10,000	2.6E-11	10,000	1.5E-12	10,000
Ba-137m	N/A	*	*	*	*	*	*	*	*	*	*
Bk-249	N/A	*	*	*	*	*	*	*	*	*	*
C-14	2,000	1.3E-03	4,710	5.8E-02	4,674	1.5E+01	4,398	1.8E+02	4,272	1.5E+02	4,304
Ce-144	N/A	*	*	*	*	*	*	*	*	*	*
Cf-249	Total α	<1.0E-30	10,000	<1.0E-30	10,000	4.1E-24	10,000	2.8E-18	10,000	1.6E-19	10,000
Cl-36	N/A	7.1E-06	10,000	5.3E-04	3,692	1.2E-01	3,686	1.3E+00	3,682	1.1E+00	3,682
Cm-242	N/A	*	*	*	*	*	*	*	*	*	*
Cm-243	Total α	<1.0E-30	2,058	<1.0E-30	2,118	<1.0E-30	1,840	<1.0E-30	1,650	<1.0E-30	1,686
Cm-244	Total α	<1.0E-30	1,458	<1.0E-30	1,488	<1.0E-30	1,316	<1.0E-30	1,194	<1.0E-30	1,218
Cm-245	Total α	1.8E-29	10,000	1.9E-26	10,000	7.0E-16	10,000	4.6E-10	10,000	2.7E-11	10,000
Cm-247	Total α	<1.0E-30	10,000	4.2E-29	10,000	1.5E-18	10,000	1.0E-12	10,000	6.0E-14	10,000
Cm-248	Total α	<1.0E-30	10,000	4.0E-29	10,000	1.5E-18	10,000	9.8E-13	10,000	5.8E-14	10,000
Co-60	100	<1.0E-30	402	1.2E-53	448	<1.0E-30	206	<1.0E-30	182	<1.0E-30	186
Cs-134	N/A	*	*	*	*	*	*	*	*	*	*
Cs-135	900	1.1E-03	8,322	2.9E-02	7,922	7.5E+00	6,616	9.2E+01	6,002	7.7E+01	6,160
Cs-137	200	<1.0E-30	1,534	6.8E-28	1,470	4.2E-21	1,250	2.7E-17	1,110	6.6E-18	1,142
Eu-152	200	<1.0E-30	1,114	<1.0E-30	1,136	<1.0E-30	1,016	<1.0E-30	934	<1.0E-30	950
Eu-154	60	<1.0E-30	544	<1.0E-30	560	<1.0E-30	470	<1.0E-30	404	<1.0E-30	390

Table 5.2-4: Radiological 100m Concentrations for UTR-LZ (Continued)

Radionuclide	Maximum MCL (pCi/L)***	Sector A		Sector B		Sector C		Sector D		Sector E	
		Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs
Eu-155	N/A	*	*	*	*	*	*	*	*	*	*
Gd-152	N/A	*	*	*	*	*	*	*	*	*	*
H-3	20,000	1.6E-12	562	3.1E-12	560	4.1E-11	208	1.4E-09	204	2.4E-09	204
I-129	1	3.4E-04	586	6.4E-04	586	4.3E-02	3,792	4.8E-01	3,790	4.1E-01	3,790
K-40	N/A	1.2E-06	10,000	1.2E-04	4,562	3.1E-02	4,298	3.8E-01	4,170	3.2E-01	4,200
Na-22	N/A	*	*	*	*	*	*	*	*	*	*
Nb-93m	N/A	7.2E-06	10,000	8.0E-04	10,000	2.3E-01	9,998	2.9E+00	9,998	2.4E+00	9,998
Nb-94	N/A	4.6E-01	564	8.6E-01	564	8.9E-01	564	8.4E-01	564	7.1E-01	564
Ni-59	300	6.3E-01	2,098	1.2E+00	2,100	1.7E+00	10,000	1.9E+01	9,990	1.8E+01	7,374
Ni-63	50	2.9E-04	1,578	6.9E-04	1,530	9.9E-04	1,358	6.7E-04	1,554	3.2E-03	1,274
Np-237	Total α	6.2E-02	1,598	1.2E-01	1,600	1.2E-01	1,600	1.2E+00	6,064	2.7E+00	6,060
Pa-231	Total α	4.3E-05	1,714	8.3E-05	1,712	2.9E-03	6,074	4.3E-02	6,062	6.5E-02	6,062
Pb-210	N/A	1.7E-04	1,790	3.1E-04	1,782	3.3E-04	1,772	2.0E-03	10,000	4.6E-03	10,000
Pd-107	N/A	9.0E-07	5,182	9.3E-05	5,116	2.3E-02	4,936	2.8E-01	4,850	2.3E-01	4,870
Pm-147	N/A	*	*	*	*	*	*	*	*	*	*
Pr-144	N/A	*	*	*	*	*	*	*	*	*	*
Pu-238	Total α	<1.0E-30	5,666	<1.0E-30	8,364	1.0E-28	7,632	5.7E-24	7,166	5.5E-25	7,282
Pu-239	Total α	1.7E-09	10,000	8.2E-11	10,000	2.5E-07	10,000	2.7E-04	10,000	2.7E-04	10,000
Pu-240	Total α	2.9E-10	10,000	1.4E-11	10,000	2.2E-07	10,000	3.6E-04	10,000	6.5E-04	10,000
Pu-241	300	1.1E-28	10,000	1.2E-25	10,000	3.8E-15	10,000	2.4E-09	10,000	1.4E-10	10,000
Pu-242	Total α	6.7E-12	10,000	3.3E-13	10,000	7.0E-09	10,000	1.1E-05	10,000	1.8E-05	10,000
Pu-244	Total α	3.2E-15	10,000	1.6E-16	10,000	2.9E-11	10,000	4.8E-08	10,000	1.2E-08	10,000
Ra-226	Total α/Ra	6.4E-02	1,762	1.2E-01	1,752	1.3E-01	1,746	7.5E-01	10,000	1.7E+00	10,000
Ra-228	Total Ra	4.0E-15	10,000	8.0E-15	10,000	3.1E-10	10,000	7.6E-08	10,000	5.3E-08	10,000

Table 5.2-4: Radiological 100m Concentrations for UTR-LZ (Continued)

Radionuclide	Maximum MCL (pCi/L)***	Sector A		Sector B		Sector C		Sector D		Sector E	
		Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs
Rh-106	N/A	*	*	*	*	*	*	*	*	*	*
Rn-222	N/A	6.4E-02	1,762	1.2E-01	1,752	1.3E-01	1,746	7.5E-01	10,000	1.7E+00	10,000
Ru-106	N/A	*	*	*	*	*	*	*	*	*	*
Sb-125	N/A	*	*	*	*	*	*	*	*	*	*
Sb-126	N/A	*	*	*	*	*	*	*	*	*	*
Sb-126m	N/A	*	*	*	*	*	*	*	*	*	*
Se-79	N/A	5.7E-26	10,000	8.6E-23	10,000	6.2E-13	10,000	1.4E-07	10,000	1.9E-08	10,000
Sm-147	N/A	*	*	*	*	*	*	*	*	*	*
Sm-151	1,000	<1.0E-30	4,840	<1.0E-30	5,040	<1.0E-30	4,218	<1.0E-30	3,670	<1.0E-30	3,780
Sn-126	N/A	<1.0E-30	10,000	<1.0E-30	10,000	1.9E-24	10,000	2.6E-17	10,000	2.4E-16	10,000
Sr-90	8	3.4E-10	1,142	1.7E-09	1,116	1.0E-08	1,060	2.0E-09	1,082	6.6E-08	1,026
Tc-99	900	3.8E+01	750	7.2E+01	752	7.5E+01	738	2.2E+02	704	2.7E+02	702
Te-125m	N/A	*	*	*	*	*	*	*	*	*	*
Th-228	Total α	4.0E-15	10,000	8.0E-15	10,000	3.1E-10	10,000	7.6E-08	10,000	5.3E-08	10,000
Th-229	Total α	7.0E-07	10,000	1.3E-06	10,000	7.9E-05	10,000	1.7E-02	10,000	1.7E-02	10,000
Th-230	Total α	9.2E-11	10,000	6.1E-11	10,000	4.5E-07	10,000	2.3E-04	10,000	1.3E-03	10,000
Th-232	Total α	9.2E-18	10,000	9.2E-18	10,000	7.1E-13	10,000	1.9E-10	10,000	1.6E-10	10,000
U-232	Total U**	<1.0E-30	3,148	<1.0E-30	3,254	6.2E-29	2,692	2.8E-24	2,330	2.8E-25	2,414
U-233	Total U**	1.3E-05	10,000	2.4E-05	10,000	6.3E-03	10,000	9.2E-01	10,000	1.1E+00	10,000
U-234	Total U**	7.9E-08	10,000	7.4E-08	10,000	3.7E-04	10,000	1.5E-01	10,000	8.1E-01	10,000
U-235	Total U**	7.7E-10	10,000	7.3E-10	10,000	4.7E-06	10,000	9.5E-04	10,000	1.7E-03	10,000
U-236	Total U**	1.5E-09	10,000	2.1E-09	10,000	1.1E-04	10,000	2.0E-02	10,000	1.8E-02	10,000
U-238	Total U**	3.7E-08	10,000	3.4E-08	10,000	3.1E-06	10,000	1.2E-04	10,000	1.5E-04	10,000
Y-90	N/A	*	*	*	*	*	*	*	*	*	*
Zr-93	N/A	5.7E-30	10,000	8.1E-27	10,000	7.5E-17	10,000	2.0E-11	10,000	1.4E-12	10,000

Table 5.2-4: Radiological 100m Concentrations for UTR-LZ (Continued)

Radionuclide	Maximum MCL (pCi/L)***	Sector A Concentration (pCi/L)	Sector A Year Peak Contribution Occurs	Sector B Concentration (pCi/L)	Sector B Year Peak Contribution Occurs	Sector C Concentration (pCi/L)	Sector C Year Peak Contribution Occurs	Sector D Concentration (pCi/L)	Sector D Year Peak Contribution Occurs	Sector E Concentration (pCi/L)	Sector E Year Peak Contribution Occurs
Sum of beta/gamma MCL fractions		4.5E-02	750	8.4E-02	752	1.5E-01	738	9.8E-01	3,790	9.3E-01	3,790
Total alpha	15	1.2E-01	1,704	2.3E-01	1,700	2.4E-01	1,698	1.8E+00	9,814	4.4E+00	9,810
Total Ra	5	6.4E-02	1,762	1.2E-01	1,752	1.3E-01	1,746	7.5E-01	10,000	1.7E+00	10,000

* Short-lived radionuclides decayed prior to liner failure. PORFLOW does not track short-lived radionuclides during transport modeling, but the DCFs do include the equilibrium progeny.

** Total uranium is evaluated in Table 5.2-7.

*** MCL values for beta and photon emitters are calculated in Table II-3 of FR-00-9654 based on a beta-gamma dose of 4 mrem/yr.

Table 5.2-5: Radiological 100m Concentrations for Gordon Aquifer

Radionuclide	Maximum Contamin-ation Limit (MCL) (pCi/L) ***	Sector A		Sector B		Sector C		Sector D		Sector E	
		Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs
Ac-227	N/A	3.6E-12	10,000	2.0E-11	10,000	1.4E-10	10,000	2.3E-09	10,000	6.4E-09	10,000
Al-26	N/A	<1.0E-30	10,000	<1.0E-30	10,000	<1.0E-30	10,000	3.1E-25	10,000	3.4E-25	10,000
Am-241	Total α	<1.0E-30	10,000	<1.0E-30	10,000	1.1E-30	10,000	1.2E-24	10,000	1.4E-24	10,000
Am-242m	Total α	<1.0E-30	10,000	<1.0E-30	10,000	<1.0E-30	10,000	<1.0E-30	9,734	<1.0E-30	9,714
Am-243	Total α	<1.0E-30	10,000	<1.0E-30	10,000	<1.0E-30	10,000	4.5E-26	10,000	4.9E-26	10,000
Ba-137m	N/A	*	*	*	*	*	*	*	*	*	*
Bk-249	N/A	*	*	*	*	*	*	*	*	*	*
C-14	2,000	1.4E-09	9,996	1.8E-08	9,994	1.6E-06	9,992	2.6E-05	9,992	4.3E-05	9,998
Ce-144	N/A	*	*	*	*	*	*	*	*	*	*
Cf-249	Total α	<1.0E-30	10,000	<1.0E-30	10,000	<1.0E-30	10,000	<1.0E-30	10,000	<1.0E-30	10,000
Cl-36	N/A	3.6E-09	10,000	1.2E-07	3,796	1.8E-05	3,792	3.2E-04	3,790	5.8E-04	3,794
Cm-242	N/A	*	*	*	*	*	*	*	*	*	*
Cm-243	Total α	<1.0E-30	2,358	<1.0E-30	2,412	<1.0E-30	2,130	<1.0E-30	1,934	<1.0E-30	1,936
Cm-244	Total α	<1.0E-30	1,642	<1.0E-30	1,672	<1.0E-30	1,498	<1.0E-30	1,372	<1.0E-30	1,352
Cm-245	Total α	<1.0E-30	10,000	<1.0E-30	10,000	<1.0E-30	10,000	9.0E-25	10,000	9.7E-25	10,000
Cm-247	Total α	<1.0E-30	10,000	<1.0E-30	10,000	<1.0E-30	10,000	2.0E-27	10,000	2.1E-27	10,000
Cm-248	Total α	<1.0E-30	10,000	<1.0E-30	10,000	<1.0E-30	10,000	1.9E-27	10,000	2.1E-27	10,000
Co-60	100	<1.0E-30	452	<1.0E-30	476	<1.0E-30	446	<1.0E-30	216	<1.0E-30	220
Cs-134	N/A	*	*	*	*	*	*	*	*	*	*
Cs-135	900	1.5E-09	10,000	3.8E-08	10,000	6.9E-06	10,000	1.4E-04	9,998	2.2E-04	10,000
Cs-137	200	<1.0E-30	1,724	<1.0E-30	1,644	<1.0E-30	1,434	2.0E-28	1,310	2.1E-28	1,340
Eu-152	200	<1.0E-30	1,242	<1.0E-30	1,264	<1.0E-30	1,136	<1.0E-30	1,058	<1.0E-30	1,038
Eu-154	60	<1.0E-30	634	<1.0E-30	648	<1.0E-30	562	<1.0E-30	498	<1.0E-30	480
Eu-155	N/A	*	*	*	*	*	*	*	*	*	*
Gd-152	N/A	*	*	*	*	*	*	*	*	*	*

Table 5.2-5: Radiological 100m Concentrations for Gordon Aquifer (Continued)

Radionuclide	Maximum MCL (pCi/L)***	Sector A		Sector B		Sector C		Sector D		Sector E	
		Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs
H-3	20,000	2.7E-17	580	1.5E-16	190	8.8E-16	188	2.2E-14	226	6.7E-14	226
I-129	1	2.4E-08	732	1.3E-07	730	6.3E-06	4,086	1.1E-04	4,086	2.0E-04	4,090
K-40	N/A	1.3E-11	10,000	8.9E-10	10,000	1.3E-07	9,990	2.2E-06	9,996	3.8E-06	10,000
Na-22	N/A	*	*	*	*	*	*	*	*	*	*
Nb-93m	N/A	2.6E-10	10,000	3.8E-08	10,000	6.9E-06	10,000	1.3E-04	9,998	2.3E-04	10,000
Nb-94	N/A	3.8E-05	614	2.1E-04	614	3.5E-04	614	3.8E-04	614	3.8E-04	614
Ni-59	300	1.6E-05	6,440	8.8E-05	6,400	2.0E-04	10,000	1.5E-03	10,000	2.6E-03	10,000
Ni-63	50	5.1E-11	1,886	3.1E-10	1,852	7.1E-10	1,730	7.1E-10	1,768	1.7E-09	1,496
Np-237	Total α	1.7E-06	6,836	9.4E-06	6,884	1.7E-05	9,352	9.1E-05	10,000	3.8E-04	10,000
Pa-231	Total α	4.4E-09	10,000	2.6E-08	10,000	1.8E-07	10,000	2.8E-06	10,000	8.2E-06	10,000
Pb-210	N/A	3.7E-09	10,000	2.0E-08	10,000	3.7E-08	10,000	1.3E-07	10,000	5.0E-07	10,000
Pd-107	N/A	1.3E-11	9,842	1.9E-09	9,796	2.7E-07	9,714	4.8E-06	9,950	8.3E-06	9,996
Pm-147	N/A	*	*	*	*	*	*	*	*	*	*
Pr-144	N/A	*	*	*	*	*	*	*	*	*	*
Pu-238	Total α	<1.0E-30	6,390	<1.0E-30	8,992	<1.0E-30	8,290	<1.0E-30	7,880	<1.0E-30	7,806
Pu-239	Total α	1.6E-22	10,000	1.3E-22	10,000	7.2E-19	10,000	6.7E-16	10,000	1.3E-15	10,000
Pu-240	Total α	2.7E-23	10,000	2.1E-23	10,000	2.8E-19	10,000	1.0E-15	10,000	3.0E-15	10,000
Pu-241	300	<1.0E-30	10,000	<1.0E-30	10,000	4.2E-30	10,000	4.5E-24	10,000	5.5E-24	10,000
Pu-242	Total α	6.3E-25	10,000	5.0E-25	10,000	8.0E-21	10,000	3.2E-17	10,000	8.4E-17	10,000
Pu-244	Total α	3.0E-28	10,000	2.4E-28	10,000	2.5E-23	10,000	9.8E-20	10,000	8.8E-20	10,000
Ra-226	Total α/Ra	1.4E-06	10,000	7.8E-06	10,000	1.4E-05	9,998	5.1E-05	10,000	1.9E-04	9,998
Ra-228	Total Ra	6.4E-25	10,000	7.9E-24	10,000	4.0E-19	10,000	2.8E-16	10,000	7.4E-16	10,000
Rh-106	N/A	*	*	*	*	*	*	*	*	*	*
Rn-222	N/A	1.4E-06	10,000	7.8E-06	10,000	1.4E-05	9,998	5.1E-05	10,000	1.9E-04	9,998
Ru-106	N/A	*	*	*	*	*	*	*	*	*	*

Table 5.2-5: Radiological 100m Concentrations for Gordon Aquifer (Continued)

Radionuclide	Maximum MCL (pCi/L)***	Sector A		Sector B		Sector C		Sector D		Sector E	
		Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs
Sb-125	N/A	*	*	*	*	*	*	*	*	*	*
Sb-126	N/A	*	*	*	*	*	*	*	*	*	*
Sb-126m	N/A	*	*	*	*	*	*	*	*	*	*
Se-79	N/A	<1.0E-30	10,000	<1.0E-30	10,000	2.2E-25	10,000	8.7E-20	10,000	8.8E-20	10,000
Sm-147	N/A	*	*	*	*	*	*	*	*	*	*
Sm-151	1,000	<1.0E-30	5,752	<1.0E-30	5,900	<1.0E-30	5,080	<1.0E-30	4,516	<1.0E-30	4,522
Sn-126	N/A	<1.0E-30	10,000	<1.0E-30	10,000	<1.0E-30	10,000	<1.0E-30	10,000	<1.0E-30	10,000
Sr-90	8	1.4E-17	1,240	1.5E-16	1,218	1.5E-15	1,152	1.5E-15	1,142	1.2E-14	1,088
Tc-99	900	2.2E-03	1,078	1.2E-02	1,074	2.0E-02	1,080	2.6E-02	1,078	3.1E-02	1,076
Te-125m	600	*	*	*	*	*	*	*	*	*	*
Th-228	Total α	6.4E-25	10,000	7.9E-24	10,000	4.0E-19	10,000	2.8E-16	10,000	7.4E-16	10,000
Th-229	Total α	3.2E-10	9,998	1.8E-09	10,000	2.8E-09	10,000	5.0E-09	10,000	1.1E-08	10,000
Th-230	Total α	2.2E-20	10,000	9.9E-20	10,000	8.7E-16	10,000	1.2E-12	10,000	1.6E-11	10,000
Th-232	Total α	2.1E-27	10,000	1.2E-26	10,000	1.2E-21	10,000	1.1E-18	10,000	2.3E-18	10,000
U-232	Total U**	<1.0E-30	3,926	<1.0E-30	3,742	<1.0E-30	3,194	<1.0E-30	2,872	<1.0E-30	2,816
U-233	Total U**	6.2E-09	10,000	3.2E-08	10,000	5.1E-08	10,000	1.4E-07	10,000	3.7E-07	10,000
U-234	Total U**	3.0E-17	10,000	1.6E-16	10,000	1.1E-12	10,000	1.3E-09	10,000	1.6E-08	10,000
U-235	Total U**	2.9E-19	10,000	1.5E-18	10,000	1.4E-14	10,000	1.1E-11	10,000	3.5E-11	10,000
U-236	Total U**	5.5E-19	10,000	3.7E-18	10,000	3.0E-13	10,000	2.1E-10	10,000	4.3E-10	10,000
U-238	Total U**	1.4E-17	10,000	7.1E-17	10,000	4.0E-14	10,000	1.6E-12	10,000	6.9E-12	10,000
Y-90	30	*	*	*	*	*	*	*	*	*	*
Zr-93	N/A	<1.0E-30	10,000	<1.0E-30	10,000	4.2E-30	10,000	1.9E-24	10,000	2.0E-24	10,000

Table 5.2-5: Radiological 100m Concentrations for Gordon Aquifer (Continued)

Radionuclide	Maximum MCL (pCi/L)***	Sector A		Sector B		Sector C		Sector D		Sector E	
		Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs	Concen-tration (pCi/L)	Year Peak Contri-bution Occurs
Sum of beta/gamma MCL fractions		2.5E-06	1,078	1.4E-05	1,074	2.9E-05	1080	1.5E-04	4,086	2.4E-04	4,090
Total Alpha	15	3.1E-06	6,876	1.7E-05	6,882	3.1E-05	10,000	1.4E-04	10,000	5.8E-04	10,000
Total Ra	5	1.4E-06	10,000	7.8E-06	10,000	1.4E-05	9,998	5.1E-05	10,000	1.9E-04	10,000

* Short-lived radionuclides decayed prior to liner failure. PORFLOW does not track short-lived radionuclides during transport modeling, but the DCFs do include the equilibrium progeny.

** Total uranium is evaluated in Table 5.2-8.

*** MCL values for beta and photon emitters are calculated in Table II-3 of FR-00-9654 based on a beta-gamma dose of 4 mrem/yr.

Table 5.2-6: Chemical 100m Concentrations for UTR-UZ

Chemical	Maximum Contaminant Level (MCL) (µg/L)	Sector A		Sector B		Sector C		Sector D		Sector E	
		Concen-tration (µg/L)	Year Peak Contri-bution Occurs	Concen-tration (µg/L)	Year Peak Contri-bution Occurs	Concen-tration (µg/L)	Year Peak Contri-bution Occurs	Concen-tration (µg/L)	Year Peak Contri-bution Occurs	Concen-tration (µg/L)	Year Peak Contri-bution Occurs
Ag	N/A	5.96E-04	8,908	1.14E-03	8,532	4.62E-02	6,744	6.69E-01	5,892	8.48E-01	5,754
As	1.00E+01	8.16E-06	10,000	1.81E-05	10,000	4.75E-03	9,818	4.26E-02	8,622	2.11E-02	9,098
Ba	2.00E+03	5.39E-03	1,714	9.39E-03	1,690	5.02E-02	4,976	3.95E-01	4,910	3.76E-01	6,394
Cd	5.00E+00	2.30E-02	1,414	3.94E-02	1,394	4.42E-02	7,326	1.74E+00	7,252	2.54E+00	7,258
Cr	1.00E+02	8.71E-03	1,416	1.53E-02	1,406	3.68E-02	4,738	4.03E-01	4,692	4.88E-01	4,686
Cu	N/A	6.47E-04	6,346	1.14E-03	6,238	2.99E-02	6,280	5.44E-01	5,608	7.27E-01	5,496
F	N/A	8.60E-02	564	1.48E-01	562	1.73E+00	3,842	1.05E+01	3,838	1.95E+00	3,838
Fe	N/A	6.57E-06	10,000	4.47E-06	10,000	4.17E-03	10,000	1.29E+00	10,000	2.64E+00	10,000
Hg	2.00E+00	4.93E-23	10,000	3.02E-20	10,000	2.53E-11	10,000	8.82E-07	10,000	1.37E-06	10,000
Mn	N/A	1.29E-02	5,288	2.36E-02	5,638	1.00E+00	5,276	2.49E+01	5,106	3.54E+01	5,074
N	1.00E+04	3.31E+00	564	5.72E+00	562	5.63E+01	3,658	4.37E+02	3,654	1.90E+01	3,654
Ni	N/A	2.99E-01	2,068	5.11E-01	2,038	4.90E-01	2,008	4.43E-01	1,878	2.91E-01	1,668
Pb	1.50E+01	1.78E-31	10,000	4.11E-29	10,000	3.49E-17	10,000	1.34E-10	10,000	2.06E-10	10,000
Sb	6.00E+00	4.94E-35	10,000	1.04E-32	10,000	8.77E-20	10,000	1.78E-12	10,000	6.28E-15	10,000
Se	5.00E+00	3.23E-24	10,000	2.18E-21	10,000	8.92E-12	10,000	8.39E-07	10,000	2.77E-09	10,000
U	3.00E+01	2.98E-06	10,000	2.24E-06	10,000	4.69E-05	10,000	1.57E-03	10,000	1.70E-03	10,000
V	N/A	1.54E-05	578	1.32E-04	578	5.94E-03	562	1.01E-01	558	8.15E-02	558
Zn	N/A	3.02E-04	10,000	6.38E-04	10,000	2.69E-02	9,532	5.02E-01	8,122	6.76E-01	7,890

Table 5.2-7: Chemical 100m Concentrations for UTR-LZ

Chemical	Maximum MCL (μg/L)	Sector A		Sector B		Sector C		Sector D		Sector E	
		Concen-tration (μg/L)	Year Peak Contri-bution Occurs	Concen-tration (μg/L)	Year Peak Contri-bution Occurs	Concen-tration (μg/L)	Year Peak Contri-bution Occurs	Concen-tration (μg/L)	Year Peak Contri-bution Occurs	Concen-tration (μg/L)	Year Peak Contri-bution Occurs
Ag	N/A	6.46E-04	9,218	1.42E-03	9,014	3.29E-02	7,324	4.74E-01	6,430	6.45E-01	6,272
As	1.00E+01	3.68E-06	10,000	1.01E-05	10,000	2.54E-03	10,000	3.45E-02	9,506	2.55E-02	9,848
Ba	2.00E+03	5.84E-03	1,736	1.11E-02	1,728	3.85E-02	5,026	3.61E-01	4,952	3.64E-01	4,948
Cd	5.00E+00	2.50E-02	1,434	4.64E-02	1,440	4.81E-02	1,432	1.16E+00	7,284	2.87E+00	7,266
Cr	1.00E+02	9.46E-03	1,436	1.82E-02	1,448	2.60E-02	4,778	3.41E-01	4,726	4.95E-01	4,720
Cu	N/A	6.72E-04	7,136	1.34E-03	7,292	2.15E-02	6,758	3.73E-01	6,046	6.38E-01	5,910
F	N/A	9.27E-02	564	1.72E-01	564	1.38E+00	3,844	1.09E+01	3,840	5.55E+00	3,840
Fe	N/A	2.62E-07	10,000	2.26E-07	10,000	2.24E-04	10,000	1.42E-01	10,000	4.49E-01	10,000
Hg	2.00E+00	1.61E-26	10,000	2.31E-23	10,000	3.50E-14	10,000	2.96E-09	10,000	8.66E-09	10,000
Mn	N/A	1.41E-02	5,378	3.08E-02	5,718	6.91E-01	5,414	1.68E+01	5,226	3.66E+01	5,180
N	1.00E+04	3.59E+00	564	6.68E+00	564	3.68E+01	3,660	3.96E+02	3,656	1.22E+02	3,658
Ni	N/A	3.26E-01	2,104	6.10E-01	2,118	6.32E-01	2,102	5.95E-01	2,098	4.99E-01	2,050
Pb	1.50E+01	2.23E-36	10,000	1.07E-33	10,000	1.05E-21	10,000	7.02E-15	10,000	5.32E-14	10,000
Sb	6.00E+00	1.78E-40	10,000	5.69E-38	10,000	5.61E-25	10,000	1.69E-17	10,000	4.45E-19	10,000
Se	5.00E+00	5.14E-28	10,000	7.75E-25	10,000	5.61E-15	10,000	1.28E-09	10,000	3.40E-11	10,000
U	3.00E+01	1.21E-07	10,000	1.12E-07	10,000	9.81E-06	10,000	3.46E-04	10,000	4.45E-04	10,000
V	N/A	1.44E-05	580	1.43E-04	578	4.53E-03	564	1.03E-01	560	1.36E-01	560
Zn	N/A	1.36E-04	10,000	3.58E-04	10,000	1.83E-02	10,000	3.40E-01	9,026	5.82E-01	8,720

Table 5.2-8: Chemical 100m Concentrations for Gordon Aquifer

Chemical	Maximum Contaminant Level (MCL) (µg/L)	Sector A		Sector B		Sector C		Sector D		Sector E	
		Concen-tration (µg/L)	Year Peak Contri-bution Occurs	Concen-tration (µg/L)	Year Peak Contri-bution Occurs	Concen-tration (µg/L)	Year Peak Contri-bution Occurs	Concen-tration (µg/L)	Year Peak Contri-bution Occurs	Concen-tration (µg/L)	Year Peak Contri-bution Occurs
Ag	N/A	1.46E-09	10,000	8.55E-09	10,000	1.05E-07	10,000	1.84E-06	10,000	3.84E-06	10,000
As	1.00E+01	2.38E-13	10,000	1.80E-12	10,000	2.44E-10	10,000	1.67E-08	10,000	2.38E-08	10,000
Ba	2.00E+03	1.76E-07	4,354	9.79E-07	4,314	5.41E-06	10,000	7.33E-05	10,000	1.07E-04	10,000
Cd	5.00E+00	8.41E-07	3,044	4.66E-06	3,022	7.94E-06	10,000	2.19E-04	10,000	1.21E-03	10,000
Cr	1.00E+02	3.17E-07	3,044	1.77E-06	3,024	4.83E-06	9,032	7.04E-05	9,794	1.73E-04	9,924
Cu	N/A	1.16E-08	10,000	6.51E-08	10,000	3.46E-07	10,000	4.98E-06	10,000	1.40E-05	10,000
F	N/A	7.69E-06	614	4.25E-05	614	5.16E-04	3,998	6.38E-03	3,994	7.05E-03	3,994
Fe	N/A	5.47E-17	10,000	2.71E-16	10,000	2.70E-13	10,000	2.65E-10	10,000	1.53E-09	10,000
Hg	2.00E+00	6.13E-40	10,000	1.99E-35	10,000	3.70E-26	10,000	7.51E-21	10,000	5.06E-20	10,000
Mn	N/A	1.24E-07	10,000	7.06E-07	10,000	2.01E-06	10,000	2.18E-05	10,000	8.04E-05	10,000
N	1.00E+04	2.99E-04	614	1.65E-03	614	2.75E-03	614	3.64E-02	3,716	3.76E-02	3,716
Ni	N/A	8.47E-06	6,762	4.69E-05	6,686	7.81E-05	6,736	8.52E-05	6,768	8.82E-05	6,902
Pb	1.50E+01	3.60E-53	10,000	6.16E-49	10,000	3.59E-37	10,000	6.00E-30	10,000	7.25E-29	10,000
Sb	6.00E+00	6.04E-58	10,000	5.64E-54	10,000	1.00E-40	10,000	5.43E-33	10,000	6.09E-33	10,000
Se	5.00E+00	6.55E-42	10,000	2.69E-37	10,000	1.97E-27	10,000	7.76E-22	10,000	3.06E-22	10,000
U	3.00E+01	4.59E-17	10,000	2.32E-16	10,000	1.31E-13	10,000	4.51E-12	10,000	3.86E-11	10,000
V	N/A	7.82E-10	628	1.81E-08	626	2.86E-07	612	7.47E-06	610	1.70E-05	610
Zn	N/A	8.79E-12	10,000	6.65E-11	10,000	3.30E-09	10,000	2.31E-07	10,000	8.03E-07	10,000

The 100m radionuclide and chemical concentration curves (for 20,000 years) associated with the five sectors and three aquifers for the Base Case, as described in Section 4.4.2.1, are captured in Appendix B.

- Appendix B.1 – 100m Radiological and Chemical Concentrations at the UTR-UZ (Sectors A through E).
- Appendix B.2 – 100m Radiological and Chemical Concentrations at the UTR-LZ (Sectors A through E).
- Appendix B.3 - 100m Radiological and Chemical Concentrations at the Gordon Aquifer (Sectors A through E).

To support further and varied investigation of sensitivity run radionuclides (e.g., individual waste tank contributions, peak beyond the 10,000-year evaluation period), additional 100m groundwater concentrations were calculated using the PORFLOW FTF model. Appendix D contains100,000-year curves for the 100m radionuclide concentrations for all of FTF (waste tank and ancillary inventories). Appendix E contains 20,000-year data curves for the 100m radionuclide concentrations for selected FTF sources (Tanks 1, 5, 6, 17, 18, 19, 20, 33, 34 and ancillary equipment). These Base Case concentration results are for sensitivity run radionuclides only and are presented from the three aquifers of concern (UTR-UZ, UTR-LZ and Gordon Aquifer) for Sectors A through E.

5.2.2 Sensitivity Run Radionuclide Determination

The purpose of this section is to present the methodology used in determining which radionuclides were most significant and to document which radionuclides would be considered a "sensitivity run radionuclide". While all radionuclides identified in the FTF tank inventory (Section 3.3.2) were included in 100m groundwater modeling efforts, narrowing the catalog of radionuclides down to a sensitivity run radionuclide list allowed the analysis to concentrate on the few radionuclides which posed more risk and concentrated modeling efforts on the areas of greatest concern. Only the sensitivity run radionuclides were included in the PORFLOW seepline modeling runs, with doses associated with seepline concentrations for the other rads calculated by using 20% of the applicable 100m concentrations. The 20% factor is based on the ratio seen between the bounding concentrations for the "sensitivity run" radionuclides at 100m and the seepline (see Appendix F.1).

The sensitivity run radionuclides were determined based on the peak 100m groundwater concentrations (it should be noted that the peak dose for each individual radionuclide are not necessarily in the same year). Any radionuclide with a dose (assuming Base Case pathways and assumptions) greater than 0.1 mrem/yr was considered a sensitivity run radionuclide. The sensitivity run radionuclide determination was conducted based on the peak 100m groundwater dose within 20,000 years. The screening conclusions are provided in Table 5.2-9. The resulting sensitivity run radionuclides are Am-241, Am-243, C-14, Cm-244, Cs-135, I-129, Np-237, Pa-231, Pu-238, Pu-239, Pu-240, Ra-226, Tc-99, Th-229, Th-230, U-233, U-234, and U-235. The 0.1 mrem/yr screening threshold was considered sufficiently low, such that the seepline contribution of the radionuclides that were screened out would not appreciably impact the peak dose results, even accounting for cumulative pathway effects. In order to fully evaluate the contribution of the sensitivity run radionuclides, some radionuclides with a contribution of less than 0.1 mrem/yr were included because they had a significant (i.e., > 0.1 mrem/yr) impact on progeny; Am-241 (for Np-237), Am-243 (for Pu-239), Cm-244 (for Pu-240), Pu-238 (for Ra-226), Th-230 (for Ra-226), and U-235 (for Pa-231).

Table 5.2-9: Determination of Sensitivity Run Radionuclides

Radio-nuclide (a)	Sector A 20k Peak dose (mem/yr)	Sector B 20k Peak dose (mem/yr)	Sector C 20k Peak dose (mem/yr)	Sector D 20k Peak dose (mem/yr)	Sector E 20k Peak dose (mem/yr)	Basis
Ac-227	0.00	0.00	0.00	0.00	0.00	
Al-26	0.00	0.00	0.00	0.00	0.00	
Am-241	0.01	0.01	0.01	0.02	0.01	Np-237 parent
Am-242m	0.00	0.00	0.00	0.00	0.00	
Am-243	0.00	0.00	0.00	0.00	0.00	Pu-239 parent
C-14	0.09	0.18	0.18	0.29	0.20	Dose > 0.1
Cf-249	0.00	0.00	0.00	0.00	0.00	
Cl-36	0.01	0.02	0.02	0.01	0.01	
Cm-243	0.00	0.00	0.00	0.00	0.00	
Cm-244	0.00	0.00	0.00	0.00	0.00	Pu-240 parent
Cm-245	0.00	0.00	0.00	0.02	0.00	
Cm-247	0.00	0.00	0.00	0.00	0.00	
Cm-248	0.00	0.00	0.00	0.00	0.00	
Co-60	0.00	0.00	0.00	0.00	0.00	
Cs-135	0.68	0.69	0.72	0.71	0.63	Dose > 0.1
Cs-137	0.00	0.00	0.00	0.00	0.00	
Eu-152	0.00	0.00	0.00	0.00	0.00	
Eu-154	0.00	0.00	0.00	0.00	0.00	
H-3	0.00	0.00	0.00	0.00	0.00	
I-129	0.24	0.44	0.43	0.46	0.44	Dose > 0.1
K-40	0.01	0.01	0.01	0.01	0.01	
Mo-93m	0.00	0.00	0.00	0.00	0.00	
Nb-93m	0.00	0.00	0.00	0.00	0.00	
Nb-94	0.03	0.03	0.05	0.08	0.06	
Ni-59	0.01	0.01	0.02	0.02	0.02	
Ni-63	0.00	0.00	0.00	0.00	0.00	
Np-237	1.26	2.40	9.17	10.54	10.01	Dose > 0.1
Pa-231	0.08	0.17	0.24	0.25	0.25	Dose > 0.1
Pb-210	0.01	0.01	0.03	0.03	0.03	
Pd-107	0.00	0.00	0.00	0.00	0.00	
Pu-238	0.00	0.00	0.00	0.00	0.00	Ra-226 parent
Pu-239	0.00	0.01	0.05	0.43	0.35	Dose > 0.1
Pu-240	0.00	0.00	0.04	0.59	0.63	Dose > 0.1
Pu-241	0.00	0.00	0.00	0.00	0.00	
Pu-242	0.00	0.00	0.00	0.03	0.02	
Pu-244	0.00	0.00	0.00	0.00	0.00	
Ra-226	0.74	1.59	3.96	4.62	4.96	Dose > 0.1
Ra-228	0.00	0.00	0.00	0.00	0.00	
Rn-222	0.00	0.00	0.00	0.01	0.01	

Table 5.2-9: Determination of Sensitivity Run Radionuclides (Continued)

Radio-nuclide (a)	Sector A 20k Peak dose (mem/yr)	Sector B 20k Peak dose (mem/yr)	Sector C 20k Peak dose (mem/yr)	Sector D 20k Peak dose (mem/yr)	Sector E 20k Peak dose (mem/yr)	Basis
Se-79	0.00	0.00	0.00	0.01	0.00	
Sm-151	0.00	0.00	0.00	0.00	0.00	
Sn-126	0.00	0.00	0.00	0.00	0.00	
Sr-90	0.00	0.00	0.00	0.00	0.00	
Tc-99	0.05	0.09	0.09	0.27	0.33	Dose > 0.1
Th-228	0.00	0.00	0.00	0.00	0.00	
Th-229	0.00	0.00	0.07	1.16	1.86	Dose > 0.1
Th-230	0.00	0.00	0.00	0.02	0.04	Ra-226 parent
Th-232	0.00	0.00	0.00	0.00	0.00	
U-232	0.00	0.00	0.00	0.00	0.00	
U-233	0.00	0.00	0.05	0.98	1.55	Dose > 0.1
U-234	0.00	0.00	0.01	0.38	0.61	Dose > 0.1
U-235	0.00	0.00	0.00	0.00	0.00	Pa-231 parent
U-236	0.00	0.00	0.00	0.03	0.03	
U-238	0.00	0.00	0.00	0.00	0.00	
Zr-93	0.00	0.00	0.00	0.00	0.00	

(a) Sensitivity run radionuclides are shaded gray.

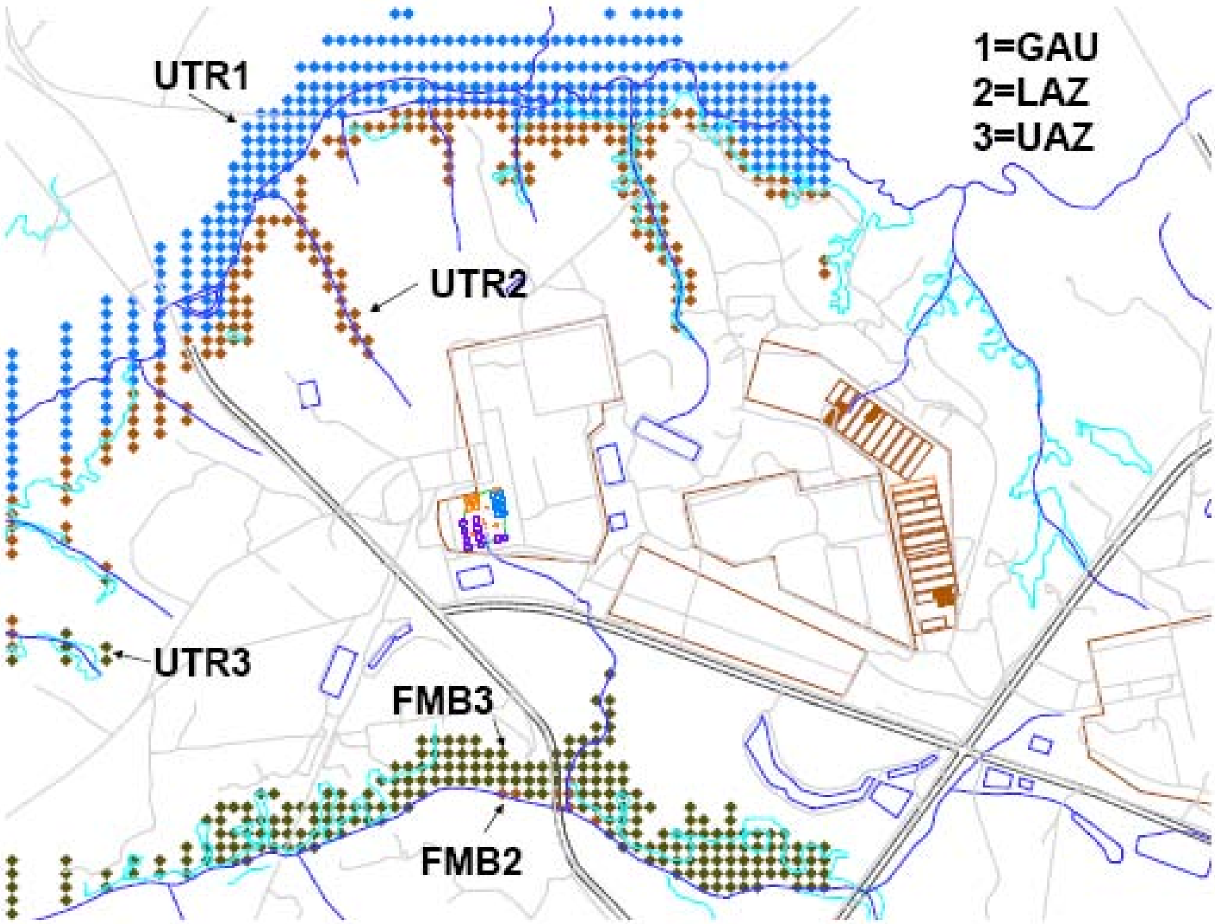
5.2.3 Groundwater Concentrations at the Seeplines

The seepline groundwater concentrations were calculated using the PORFLOW FTF model, which grids the GSA surrounding FTF. Figure 5.2-6 shows the FTF seeplines (UTR-UZ, UTR-LZ and Fourmile Branch) in relation to the FTF. The PORFLOW seepline concentrations are provided for two sectors (UTR and Fourmile Branch) and five aquifers (three for UTR and two for Fourmile Branch) as shown on Figure 5.2-6. The peak concentration values for the seepline results were recorded for the three aquifer depths of concern (i.e., UTR-UZ, UTR-LZ and Gordon Aquifer). The diamond shapes on Figure 5.2-6 correspond to the PORFLOW calculated location where the applicable aquifer is outcropping. For example, the blue diamonds represent the location where the Gordon Aquifer outcrops to UTR. For Fourmile Branch, there are only two sets of diamonds, since the Gordon Aquifer does not outcrop to Fourmile Branch. Dividing the results into sectors allows variability in peak concentration for different areas of the FTF to be more easily seen. The five aquifers were analyzed for each sensitivity run radionuclide to find the maximum groundwater concentrations at each seepline.

Tables 5.2-10 (UTR) and 5.2-11 (Fourmile Branch) show the peak seepline radionuclide concentrations in the 10,000-year evaluation period and out to 20,000 years. These radionuclide concentrations reflect the peak concentrations for each radionuclide in the highest sector. These values are conservatively high for the radionuclides present in multiple decay chains because the totals are simply the sum of the individual peaks within that sector for a given radionuclide, without regard to time or location.

Appendix C contains data curves showing the far field (i.e., seepline) radionuclide concentrations (sensitivity run radionuclides only for 20,000 years) for all of FTF (waste tank and ancillary inventories) for the Base Case.

Figure 5.2-6: PORFLOW FTF Seepline Evaluation Sectors



Note: GAU = Gordon Aquifer
LAZ = UTR-LZ
UAZ = UTR-UZ

Table 5.2-10: Upper Three Runs Seepline Sensitivity Run Radionuclide Concentrations

Radionuclide	Peak Seepline Concentration in 10,000 Yrs (pCi/L)	Location of Largest Contributor (Sector)	Year Largest Contribution in 10,000 Years Occurs	Peak Seepline Concentration in 20,000 Yrs (pCi/L)	Location of Largest Contributor (Sector)	Year Largest Contribution in 20,000 Years Occurs
Am-241	5.80E-34	UTR-LZ	10,000	1.37E-28	UTR-LZ	19,998
Am-243	5.97E-31	UTR-LZ	10,000	1.05E-18	UTR-LZ	20,000
C-14	2.31E+00	UTR-LZ	5,422	3.07E+00	UTR-LZ	14,670
Cm-244	6.16E-91	UTR-LZ	1,452	6.16E-91	UTR-LZ	1,452
Cs-135	5.91E-01	UTR-LZ	10,000	2.15E+00	UTR-LZ	20,000
I-129	1.35E-02	UTR-LZ	3,820	8.51E-02	UTR-LZ	12,852
Np-237	6.00E-02	UTR-LZ	6,174	2.47E+00	UTR-LZ	16,720
Pa-231	1.68E-03	UTR-LZ	6,180	1.03E-02	UTR-LZ	16,820
Pu-238	2.27E-45	UTR-LZ	7,944	2.27E-45	UTR-LZ	7,944
Pu-239	1.31E-15	UTR-LZ	10,000	1.85E-06	UTR-LZ	20,000
Pu-240	1.05E-15	UTR-LZ	10,000	1.49E-06	UTR-LZ	20,000
Ra-226	3.09E-02	UTR-LZ	10,000	3.11E-01	UTR-LZ	14,246
Tc-99	5.86E+00	UTR-LZ	798	5.86E+00	UTR-LZ	798
Th-229	2.42E-07	UTR-LZ	10,000	1.18E-04	UTR-LZ	20,000
Th-230	3.20E-13	UTR-LZ	10,000	7.60E-06	UTR-LZ	20,000
U-233	5.14E-06	UTR-LZ	10,000	3.53E-03	UTR-LZ	20,000
U-234	4.54E-10	UTR-LZ	10,000	2.02E-03	UTR-LZ	20,000
U-235	1.36E-12	UTR-LZ	10,000	3.94E-06	UTR-LZ	20,000

Table 5.2-11: Fourmile Branch Seepline Sensitivity Run Radionuclide Concentrations

Radionuclide	Peak Seepline Concentration in 10,000 Yrs (pCi/L)	Location of Largest Contributor (Sector)	Year Largest Contribution in 10,000 Years Occurs	Peak Seepline Concentration in 20,000 Yrs (pCi/L)	Location of Largest Contributor (Sector)	Year Largest Contribution in 20,000 Years Occurs
Am-241	2.04E-30	UTR-UZ	10,000	2.69E-27	UTR-UZ	17,320
Am-243	2.46E-25	UTR-UZ	10,000	5.94E-16	UTR-UZ	20,000
C-14	1.69E-01	UTR-UZ	5,586	4.58E+00	UTR-UZ	14,530
Cm-244	8.33E-82	UTR-UZ	1,294	8.33E-82	UTR-UZ	1,294
Cs-135	4.49E-02	UTR-UZ	10,000	3.35E+00	UTR-UZ	20,000
I-129	1.17E-03	UTR-UZ	3,828	1.20E-01	UTR-UZ	12,948
Np-237	9.52E-03	UTR-UZ	1,694	1.15E+00	UTR-UZ	16,650
Pa-231	8.80E-05	UTR-UZ	6,222	9.90E-03	UTR-UZ	16,080
Pu-238	1.93E-41	UTR-UZ	5,914	1.93E-41	UTR-UZ	5,914
Pu-239	1.00E-12	UTR-UZ	10,000	3.33E-06	UTR-UZ	20,000
Pu-240	1.79E-13	UTR-UZ	10,000	4.07E-07	UTR-UZ	20,000
Ra-226	7.08E-03	UTR-UZ	2,172	1.73E-01	UTR-UZ	14,412
Tc-99	5.39E+00	UTR-UZ	826	5.39E+00	UTR-UZ	826
Th-229	2.72E-08	UTR-UZ	10,000	8.40E-06	UTR-UZ	20,000
Th-230	2.77E-13	UTR-UZ	10,000	1.19E-07	UTR-UZ	20,000
U-233	2.85E-07	UTR-UZ	10,000	1.77E-04	UTR-UZ	20,000
U-234	2.97E-10	UTR-UZ	10,000	2.56E-05	UTR-UZ	20,000
U-235	2.47E-12	UTR-UZ	10,000	1.75E-07	UTR-UZ	20,000

5.3 Air Pathway and Radon Analysis

Section 4.5 describes the method used to conservatively bound the dose from airborne radionuclides. The results in that section provided a dose to MEI per Ci of inventory. The total waste tank and ancillary equipment inventory of selected potentially airborne isotopes, as described in Section 3.3 is summarized in Table 5.3-1. Specific SRS 100m DRFs and the calculated exposure levels for the 100 to 10,000 year MEI at 100m are presented in Table 5.3-2. Specific SRS 1,600m (seepline) DRFs and the calculated exposure levels for the 10,000-year MEI at 1,600m are presented in Table 5.3-3. The contribution of Sb-125 to the air-pathways dose is insignificant based on the revised waste tank inventory and the short half-life of Sb-125, and is not included in Tables 5.3-2 and 5.3-3. Because the DRFs for 100m are calculated from an assumed area source, while the 1,600m DRFs are calculated from an assumed point source, the results reflect a conservative estimate at 1,600m, which results in a higher estimated dose at 1,600m than at 100m for C-14. See WSRC-STI-2007-00343 for details on the estimation of all DRFs.

The dose to the MEI at 100m and 1,600m are 0.21 mrem/yr and 0.052 mrem/yr respectively. For the air pathway, the flux of seven radionuclides was modeled. Each of these radionuclides reached peak flux within the first year of simulation, as shown in Figure 4.5-2. Since the flux is steadily decreasing at the end of the 100-year institutional control period, it can be assumed that would also be the time of the maximum dose. For the radon pathway, the Rn-222 flux resulted from five radionuclides: Pu-238, Ra-226, Th-230, U-234, and U-238. As shown in Figure 4.5-4, with the exception of Ra-226, the peak flux of Rn-222 occurs at the end of the simulation period (10,100 years). This is due to the long half-life for each of the parent radionuclides. For Ra-226, the peak flux of Rn-222 occurs within the first year of the simulation. The peak dose of radon for the performance period is assumed to be at 10,000 years. These results are highly conservative because the entire inventory is assumed to be concentrated in a 1 foot layer in a Type I tank. Section 4.5.3 describes other factors contributing to the conservative nature of the results.

Table 5.3-1: Summary of Projected Total FTF Inventory of Gaseous Radionuclides

	C-14 (Ci)	**Cl-36 (Ci)**	**H-3 (Ci)**	**I-129 (Ci)**	**Se-79 (Ci)**	**Sn-126 (Ci)**	**Tc-99 (Ci)**
All Waste Tanks	2.0E+01	2.0E-02	2.6E+01	2.0E-02	4.8E+01	6.0E+00	6.7E+02
Transfer Lines	1.5E-03	NE	1.1E-01	2.5E-06	3.0E-02	5.6E-02	5.3E-01
FPT-1	8.0E-06	NE	1.5E-04	1.3E-08	1.6E-04	3.0E-04	2.8E-03
FPT-2	8.0E-06	NE	1.5E-04	1.3E-08	1.6E-04	3.0E-04	2.8E-03
FPT-3	8.0E-06	NE	1.5E-04	1.3E-08	1.6E-04	3.0E-04	2.8E-03
FTF Catch Tank	3.8E-05	NE	8.6E-04	7.2E-08	8.7E-04	1.6E-03	1.5E-02
242-3F CTS	NE	NE	6.7E-02	NE	1.8E-06	NE	1.1E-01
Evaporator Vessel - 242-F	NE	NE	NE	NE	7.7E-09	NE	1.3E-03
Evaporator Vessel - 242-16F	NE	NE	NE	NE	7.7E-09	NE	1.3E-03
Total FTF Inventory	**2.0E+01**	**2.0E-02**	**2.6E+01**	**2.0E-02**	**4.8E+01**	**6.1E+00**	**6.7E+02**

NE = Not Estimated

Table 5.3-2: 100m DRFs and 10,000 Year FTF Dose

Radionuclide	Peak Flux (Ci/yr/Ci)	SRS 100m DRF[1] (mrem/Ci)	Dose to MEI at 100m Boundary[2] (mrem/yr/Ci)	FTF Inventory (Ci)	Dose to MEI at 100m Boundary (mrem/yr)
C-14	2.59E-04	2.8E-04	7.2E-08	2.0E+01	1.4E-06
Cl-36	6.1E-04	2.9E-02	1.7E-05	2.0E-02	3.4E-07
H-3	3.1E-10	1.3E-02	4.2E-12	2.6E+01	1.1E-10
I-129	2.4E-03	2.0E+01	4.8E-02	2.0E-02	9.6E-04
Se-79	7.0E-04	3.8E-02	2.7E-05	4.8E+01	1.3E-03
Sn-126	1.3E-03	1.8E+01	2.3E-02	6.1E+00	1.4E-01
Tc-99	9.7E-04	1.1E-01	1.0E-04	6.7E+02	6.7E-02
Total Dose					**2.1E-01**

[1]From WSRC-STI-2007-00343
[2] Dose to MEI = Peak Flux × DRF

Table 5.3-3: 1,600m DRFs and 10,000 Year FTF Dose

Radionuclide	Peak Flux (Ci/yr/Ci)	SRS 1,600m DRF[1] (mrem/Ci)	Dose to MEI at 1,600m Boundary[2] (mrem/yr/Ci)	FTF Inventory (Ci)	Dose to MEI at 1,600m Boundary (mrem/yr)
C-14	2.6E-04	2.4E-03	6.2E-07	2.0E+01	1.2E-05
Cl-36	6.1E-04	6.2E-03	3.7E-06	2.0E-02	7.4E-08
H-3	3.1E-10	4.9E-05	1.5E-14	2.6E+01	3.9E-13
I-129	2.4E-03	2.3E+00	5.5E-03	2.0E-02	1.1E-04
Se-79	7.0E-04	9.1E-03	6.4E-06	4.8E+01	3.1E-04
Sn-126	1.3E-03	4.4E+00	5.7E-03	6.1E+00	3.5E-02
Tc-99	9.7E-04	2.6E-02	2.6E-05	6.7E+02	1.7E-02
Total Dose					**5.2E-02**

[1]From WSRC-STI-2007-00343
[2]Dose to MEI = Peak Flux × DRF

The instantaneous flux is found by multiplying the peak flux by the total inventory divided by the total area in the FTF. The total inventory of isotopes contributing to the radon flux is summarized in Table 5.3-4. The inventory of Th-230 and Ra-226 in the CTS and evaporator vessels, while not detected in analysis, is known to be present because they are daughter products of other isotopes present. However, the inventory of the CTS and evaporator vessels is much less than that of the waste tanks so it is assumed insignificant to this analysis.

Table 5.3-4: Summary of Total Projected FTF Inventory of Isotopes Producing Rn-222

Inventory Location	Pu-238 (Ci)	U-238 (Ci)	U-234 (Ci)	Th-230 (Ci)	Ra-226 (Ci)
Total Waste Tank	2.3E+03	2.0E+00	2.1E+00	2.1E-02	2.1E-02
Transfer Lines	6.5E+00	5.0E-03	8.5E-03	5.1E-03	5.1E-03
FPT-1	3.4E-02	2.6E-05	4.5E-05	2.7E-05	2.7E-05
FPT-2	3.4E-02	2.6E-05	4.5E-05	2.7E-05	2.7E-05
FPT-3	3.4E-02	2.6E-05	4.5E-05	2.7E-05	2.7E-05
FTF Catch Tank	1.0E-01	9.0E-05	9.0E-05	1.3E-04	1.3E-04
242-3F CTS	9.2E-01	3.9E-04	2.1E-03	N/A	N/A
242-F Evaporator	4.7E-03	7.5E-06	7.1E-06	N/A	N/A
242-16F Evaporator	4.7E-03	7.5E-06	7.1E-06	N/A	N/A
Total FTF Inventory	**2.3E+03**	**1.7E+01**	**2.1E+00**	**2.6E-02**	**2.6E-02**

As shown in Table 5.3-5, the peak instantaneous radon flux using the entire FTF inventory as described in Section 3.3, is 3.6E-08 pCi/m^2/sec.

Table 5.3-5: Peak Instantaneous Rn-222 Flux at Land Surface

Parent Source	FTF Inventory (Ci)	FTF Inventory (Ci/m^2) [1]	Peak Instantaneous Rn-222 flux at Land Surface	
			(pCi/m^2/sec) / (Ci/m^2)	(pCi/m^2/sec)
Pu-238	2.3E+03	2.8E-02	2.7E-07	7.5E-09
U-238	1.7E+01	2.0E-04	9.3E-06	1.9E-09
U-234	2.1E+00	2.6E-05	7.7E-04	2.0E-08
Th-230	2.6E-02	3.2E-07	1.0E-02	3.3E-09
Ra-226	2.6E-02	3.2E-07	1.1E-02	3.4E-09
Total				**3.6E-08**

[1]Total area of FTF is 82,910 m^2

5.4 Biotic Pathways

The MOP exposure pathways are discussed in detail in Section 4.2.4.1. The FTF MOP scenario with 100m well water as a primary water source is graphically represented in Figure 4.2-27. The FTF MOP scenario with stream water as a primary water source is graphically represented in Figure 4.2-28. Provided below are the individual elements of the MOP biotic pathways that were identified for analysis and inclusion in the two MOP scenarios. The GoldSim computer code was used to calculate doses following the dose formulas provided below and utilizing the PORFLOW calculated 100m and seepline concentrations as inputs. Unless otherwise noted, formulas were based on those used in LADTAP model, report WSRC-STI-2006-00123, or in the PA for Idaho Tank Farm, document DOE-ID-10966. While these documents were used as guides for the formulas, ultimately the basis for all the formulas can be traced to NRC Regulatory Guide 1.109.

5.4.1 Member of the Public at the 100m Well Dose Pathways

The MOP exposure pathways detailed below are used in calculating the dose to the MOP receptor with 100m well water as a primary water source. All transfers times are assumed negligible due to the half lives of the radionuclides and the long term analysis of the PA. Unit conversions are not explicitly stated in the equations, but are coded into GoldSim.

5.4.1.1 Member of the Public at the 100m Well Ingestion Dose Pathways

5.4.1.1.1 Ingestion of Water

The drinking water exposure route assumes the receptor uses a well located 100m from the tank farm tanks as a drinking water source. The incidental ingestion of water from showering and during recreational activities is assumed to be negligible when compared to ingestion of drinking water. The dose from consumption of drinking water is calculated using the following formula.

$$D = C_{GW} \times U_W \times DCF$$

where:

D	=	dose from 1 year's consumption of contaminated media; in this equation, groundwater (rem/year)
C_{GW}	=	radionuclide concentration in groundwater from a well (pCi/L)
U_W	=	human consumption rate of water (L/year), Table 4.6-7
DCF	=	ingestion dose conversion factor (rem/μCi), Table 4.7-1

5.4.1.1.2 Ingestion of Beef and Milk

The beef and dairy exposure route assumes cattle drink contaminated stock water and the receptor in turn consumes the contaminated beef and milk from the cattle. Beef and milk are treated separately. The dose is calculated using the following formula.

Beef:

$$D = T_B \times \left(FF_B \times C_f \times Q_{FB} + C_{GW} \times Q_{WB}\right) \times DCF \times U_B \times F_B$$

Milk:

$$D = T_M \times \left(FF_M \times C_f \times Q_{FM} + C_{GW} \times Q_{WM}\right) \times DCF \times U_M \times F_M$$

where:

T_B	=	beef transfer coefficient (d/kg), Table 4.6-3
T_m	=	milk transfer coefficient (d/L), Table 4.6-2
FF_i	=	beef or milk cattle intake fraction from irrigated field/pasture, Table 4.6-7
C_f	=	radionuclide concentration in fodder (pCi/kg)
Q_{Fi}	=	consumption rate of fodder by beef or milk cattle (Kg/d), Table 4.6-7
C_{GW}	=	radionuclide concentration in groundwater from a well (pCi/L)
$\mathrm{Q_{Wi}}$	=	consumption rate of water by beef or milk cattle (L/d), Table 4.6-7
DCF	=	ingestion dose conversion factor (rem/μCi), Table 4.7-1
U_B	=	human consumption rate of beef (kg/year), Table 4.6-7
U_M	=	human consumption rate of milk (L/year), Table 4.6-7
F_B	=	fraction of meat produced locally (unitless), Table 4.6-5
F_M	=	fraction of milk produced locally (unitless), Table 4.6-5

5.4.1.1.3 Ingestion of Vegetables

The dose to humans from ingestion of contaminated leafy vegetables and produce is calculated assuming two contamination routes: (1) direct deposition of contaminated irrigation water on plants and (2) deposition of contaminated irrigation water on soil followed by root uptake by plants. Leafy vegetables and produce are treated separately. The dose is calculated using:

$$D = C_{GW} \times I \times (LEAF + ROOT) \times DCF \times (U_{LV} + U_{OV} \times k) \times FV \times e^{-\lambda_i t_t}$$

$$LEAF = \frac{r \times \left(1 - e^{-\lambda_e t_V}\right)}{Y_V \times \lambda}$$

$$ROOT = \frac{T_{StV} \times \left(1 - e^{-\lambda_i t_b}\right)}{\rho_S \times \lambda_i}$$

$$\lambda_e = \lambda_i + \lambda_w$$

where:

C_{GW}	=	radionuclide concentration in groundwater from a well (pCi/L)
I	=	irrigation rate (L/m^2-d), Table 4.6-6
$LEAF$	=	radionuclide concentration in the vegetable's leaves (m^{2}d/kg)
$ROOT$	=	radionuclide concentration in the vegetable's roots (m^{2}d/kg)
DCF	=	ingestion dose conversion factor (rem/µCi), Table 4.7-1
U_{LV}	=	human consumption rate of leafy vegetables (kg/year), Table 4.6-7
U_{OV}	=	human consumption rate of other vegetables (produce) (kg/year), Table 4.6-7
k	=	fraction retention of deposition on leaves (unitless) [1]
FV	=	fraction of leafy vegetables and produce produced locally (unitless), Table 4.6-5
r	=	fraction of material deposited on leaves that is retained (unitless), Table 4.6-6
λ_e	=	weathering and radiological decay constant (1/d)
λ_w	=	weathering decay constant (0.0495/d)
t_V	=	time vegetables are exposed to irrigation (d), Table 4.6-5
Y_V	=	vegetation production yield (kg/m^2), Table 4.6-5
T_{StV}	=	soil to vegetable ratio (unitless), Table 4.6-1
ρ_S	=	surface soil density (kg/m^2), Table 4.6-6
t_b	=	buildup time of radionuclides in soil, Table 4.6-5
λ_i	=	radiological decay constant (ln2/half life of radionuclide i – 1/d)
t_t	=	transport time (d), assumed to be zero

5.4.1.1.4 Ingestion of Fish

The fish exposure route assumes fish are caught from a stream contaminated from the aquifer, diluted, and the receptor in turn consumes the contaminated fish. The dose is calculated using the following formula.

$$D = C_S \times U_F \times T_F \times DCF$$

where:

C_S	=	radionuclide concentration in groundwater at the seepline (pCi/L)
U_F	=	human consumption rate of finfish (kg/year), Table 4.6-7
T_F	=	fish bioaccumulation factor (L/kg), Table 4.6-4
DCF	=	ingestion dose conversion factor (rem/μCi), Table 4.7-1

5.4.1.1.5 Ingestion of Soil

The soil ingestion exposure route assumes soil is irrigated with groundwater from a 100m well and the receptor in turn consumes the contaminated soil. For simplicity and conservatism, the soil ingested is assumed to be groundwater. This formula was derived following the approach of the previous pathway calculations. The dose is calculated using the following formula.

$$\frac{D = C_{GW} \times DCF \times U_D}{\rho_W}$$

where:

C_{GW}	=	radionuclide concentration in groundwater from a well (pCi/L)
DCF	=	ingestion dose conversion factor (rem/μCi), Table 4.7-1
U_D	=	human consumption rate of dirt (kg/year), Table 4.6-7
ρ_W	=	density of water (g/ml)

5.4.1.2 Member of the Public at the 100m Well Direct Exposure Dose Pathways

5.4.1.2.1 Direct Exposure from Irrigated Soil

The irrigated soil direct exposure route assumes soil is irrigated with groundwater from a 100m well and the receptor in turn is exposed during time spent caring for a garden. The dose is calculated using the following formula.

$$D = C_D \times F_G \times DCF$$

where:

C_D = radionuclide concentration in irrigated soil (pCi/m^3)

DCF = external dose conversion factor, 15cm (rem/yr per μCi/m^3), Table 4.7-1

F_G = fraction of time spent in garden (unitless), Table 4.6-7

5.4.1.2.2 Direct Exposure from Swimming

The swimming direct exposure route assumes the receptor receives dose from swimming in a stream contaminated from the aquifer. The dose is calculated using the following formula.

$$D = GF_S \times t_S \times C_{SW} \times DCF$$

where:

DCF = external dose conversion factor, water immersion (rem/yr per μCi/m^3), Table 4.7-1

GF_S = swimming geometry factor (unitless) [1]

t_S = time per year spent swimming (hr/yr), Table 4.6-7

C_{SW} = radionuclide concentration in water from the stream (undiluted aquifer) (pCi/L)

5.4.1.2.3 Direct Exposure from Fishing/Boating

The fishing/boating direct exposure route assumes the receptor receives dose from fishing or boating in a stream contaminated from the aquifer. The dose is calculated using the following formula.

$$D = GF_B \times t_B \times C_{SW} \times DCF$$

where:

DCF = external dose conversion factor, 15 cm (rem/yr per μCi/m^3), Table 4.7-1

GF_B = boating geometry factor (unitless) [0.5]

t_B = time per year spent boating (hr/yr), Table 4.6-7

C_{SW} = radionuclide concentration in water from the stream (undiluted aquifer) (pCi/L)

5.4.1.3 Member of the Public at the 100m Well Inhalation Dose Pathways

5.4.1.3.1 Inhalation during Irrigation

The irrigation inhalation exposure route assumes soil is irrigated with groundwater from a 100m well and the receptor in turn is exposed by breathing while the garden is irrigated but only during time spent caring for a garden. For simplicity and conservatism, the source material is the moisture contained within the air with equal concentrations as the groundwater. No resistance to vaporization (i.e., vapor pressure) was used. This formula was derived following the approach of the previous pathway calculations. The dose is calculated using the following formula.

$$D = \frac{C_{GW} \times DCF \times U_A \times F_G \times C_{WA}}{\rho_W}$$

where:

C_{GW}	=	radionuclide concentration in groundwater from a well (pCi/L)
DCF	=	inhalation dose conversion factor (rem/µCi), Table 4.7-1
U_A	=	air intake (m^3/yr), Table 4.6-7
F_G	=	fraction of time spent in garden exposed to soil irrigated with contaminated groundwater (unitless), Table 4.6-7
C_{WA}	=	water contained in air at ambient conditions, (g/m^3) [10 g/m^3]
ρ_W	=	water density (g/ml)

5.4.1.3.2 Inhalation during Showering

The showering inhalation exposure route assumes the receptor is exposed by breathing humid air within the shower. The source of water for the shower is a well 100m from the tank farm. For simplicity and conservatism, the source material is the moisture contained within the air with equal concentrations as the groundwater. No resistance to vaporization (i.e., vapor pressure) was used, adding to the conservatism. For example, heavy elements would be greatly influenced by this assumption because they would be less likely to volatize. This formula was derived following the approach of the previous pathway calculations. The dose is calculated using the following formula.

$$D = \frac{C_{GW} \times DCF \times U_A \times t_S \times C_{WS} \times ARF}{\rho_W}$$

where:

C_{GW}	=	radionuclide concentration in groundwater from a well (pCi/L)
DCF	=	inhalation dose conversion factor (rem/µCi), Table 4.7-1
U_A	=	air intake (m^3/yr), Table 4.6-7
t_S	=	time spent in shower (min), Table 4.6-7 GoldSim uses fraction of time [0.0069 = 10 min/day]
C_{WS}	=	water contained in air at shower conditions, (g/m^3) [41 g/m^3]
ARF	=	airborne release fraction [1E-04]
ρ_W	=	water density (g/ml)

5.4.1.3.3 Inhalation of Dust from Irrigated Soil

The irrigation soil inhalation exposure route assumes soil is irrigated with groundwater from a 100m well and the receptor is exposed by breathing dust during time spent caring for a garden. This formula was derived following the approach of the previous pathway calculations. The dose is calculated using the following formula.

$$D = \frac{U_A \times L_{SiA} \times C_D \times DCF \times F_G}{\rho_{SS}}$$

where:

U_A	=	air intake (m3/yr), Table 4.6-7
L_{SiA}	=	soil loading in air while working in a garden (kg/m^3), Table 4.6-6
C_D	=	radionuclide concentration in soil irrigated with water from a well (pCi/m3)
DCF	=	inhalation dose conversion factor (rem/µCi), Table 4.7-1
F_G	=	fraction of time spent in garden exposed to soil irrigated with contaminated groundwater (unitless), Table 4.6-7
ρ_{SS}	=	density of sandy soil (g/cm3)

5.4.1.3.4 Inhalation During Swimming

The swimming inhalation exposure route assumes a stream contaminated from the aquifer and the receptor inhales saturated air. For simplicity and conservatism, the amount of moisture contained in the inhaled air assumed to be groundwater. The dose is calculated using the following formula.

$$D = \frac{\mathrm{U_A} \times GF_S \times t_S \times C_{SW} \times DCF \times C_{WiA}}{\rho_W}$$

where:

U_A	=	air intake (m^3/yr), Table 4.6-7
GF_S	=	swimming geometry factor (unitless) [1]
t_S	=	time per year spent swimming (hr/yr), Table 4.6-7
C_{SW}	=	radionuclide concentration in water from the stream (undiluted aquifer) (pCi/L)
DCF	=	inhalation dose conversion factor (rem/μCi), Table 4.7-1
C_{WA}	=	water contained in air at ambient conditions, (g/m3) [10 g/m^3]
ρ_W	=	water density (g/ml)

5.4.2 Member of the Public at the Stream Dose Pathways

The MOP exposure pathways detailed below are used in calculating the dose to the MOP receptor with stream water as a primary water source. The stream concentrations used in the dose calculations are the peak aquifer concentrations (as discussed in Section 5.2.3), and conservatively assume no stream dilution. All transfer times are assumed negligible due to the half lives of the radionuclides and the long term analysis of the PA. Unit conversions are not explicitly stated in the equations, but are coded into GoldSim.

5.4.2.1 Member of the Public at the Stream Ingestion Dose Pathways

5.4.2.1.1 Ingestion of Water

The drinking water exposure route assumes the receptor uses a well located at the seepline, undiluted, as a drinking water source. The incidental ingestion of water from showering and during recreational activities is assumed to be negligible when compared to ingestion of drinking water. The dose from consumption of drinking water is calculated using the following formula.

$$D = C_{SLW} \times U_W \times DCF$$

where:

D	=	dose from 1 year's consumption of contaminated media; in this equation, groundwater (rem/year)
C_{SLW}	=	radionuclide concentration in water from the seepline aquifer (undiluted) (pCi/L)
U_W	=	human consumption rate of water (L/year), Table 4.6-7
DCF	=	ingestion dose conversion factor (rem/μCi), Table 4.7-1

5.4.2.1.2 Ingestion of Beef and Milk

The beef and dairy exposure route assumes cattle drink contaminated stream water and the receptor in turn consumes the contaminated beef and milk from the cattle. Beef and milk are treated separately. The dose is calculated using the following formula.

Beef:

$$D = T_B \times \left(FF_B \times C_f \times Q_{FB} + C_{SW} \times Q_{WB} \right) \times DCF \times U_B \times F_B$$

Milk:

$$D = T_M \times \left(FF_M \times C_f \times Q_{FM} + C_{SW} \times Q_{WM} \right) \times DCF \times U_M \times F_M$$

where:

T_B = beef transfer coefficient (d/kg), Table 4.6-3

T_m = milk transfer coefficient (d/L), Table 4.6-2

FF_i = beef or milk cattle intake fraction from irrigated field/pasture, Table 4.6-7

C_f = radionuclide concentration in fodder (pCi/kg)

Q_{Fi} = consumption rate of fodder by beef or milk cattle (kg/d), Table 4.6-7

C_{SW} = radionuclide concentration in water from the stream (undiluted aquifer) (pCi/L)

Q_W = consumption rate of water by beef or milk cattle (L/d), Table 4.6-7

DCF = ingestion dose conversion factor (rem/μCi), Table 4.7-1

U_B = human consumption rate of beef (kg/year), Table 4.6-7

U_M = human consumption rate of milk (L/year), Table 4.6-7

F_B = fraction of meat produced locally (unitless), Table 4.6-5

F_M = fraction of milk produced locally (unitless), Table 4.6-5.

5.4.2.1.3 Ingestion of Vegetables

The dose to humans from ingestion of contaminated leafy vegetables and produce is calculated assuming two contamination routes: (1) direct deposition of contaminated irrigation water on plants and (2) deposition of contaminated irrigation water on soil followed by root uptake by plants. Leafy vegetables and produce are treated separately. The dose is calculated using:

$$D = C_{GW} \times I \times (LEAF + ROOT) \times DCF \times (U_{LV} + U_{OV} \times k) \times FV \times e^{-\lambda_i t_t}$$

$$LEAF = \frac{r \times \left(1 - e^{-\lambda_e t_V}\right)}{Y_V \times \lambda}$$

$$ROOT = \frac{T_{StV} \times \left(1 - e^{-\lambda_i t_b}\right)}{\rho_S \times \lambda_i}$$

$$\lambda_e = \lambda_i + \lambda_w$$

where:

C_{SW}	=	radionuclide concentration in groundwater from a well (pCi/L)
I	=	irrigation rate (L/m^2-d), Table 4.6-6
$LEAF$	=	radionuclide concentration in the vegetable's leaves (m^{2}d/kg)
$ROOT$	=	radionuclide concentration in the vegetable's roots (m^{2}d/kg)
DCF	=	ingestion dose conversion factor (rem/μCi), Table 4.7-1
U_{LV}	=	human consumption rate of leafy vegetables (kg/year), Table 4.6-7
U_{OV}	=	human consumption rate of other vegetables (produce) (kg/year), Table 4.6-7
k	=	fraction retention of deposition on leaves (unitless) [1]
FV	=	fraction of leafy vegetables and produce produced locally (unitless), Table 4.6-5
r	=	fraction of material deposited on leaves that is retained (unitless), Table 4.6-6
λ_e	=	weathering and radiological decay constant (1/d)
λ_w	=	weathering decay constant (0.0495/d)
t_V	=	time vegetables are exposed to irrigation (d), Table 4.6-5
Y_V	=	vegetation production yield (kg/m^2)], Table 4.6-5
T_{StV}	=	soil to vegetable ratio (unitless), Table 4.6-1
ρ_S	=	surface soil density (kg/m^2), Table 4.6-6
t_b	=	buildup time of radionuclides in soil, Table 4.6-5
λ_i	=	radiological decay constant (ln2/half life of radionuclide *i* – 1/d)
t_t	=	transport time (d), assumed to be zero

5.4.2.1.4 Ingestion of Fish

The fish exposure route assumes fish are caught from a stream contaminated from the aquifer, and the receptor in turn consumes the contaminated fish. The dose is calculated using the following formula.

$$D = C_{SW} \times U_F \times T_F \times DCF$$

where:

C_{SW} = radionuclide concentration in water from the stream (undiluted aquifer) (pCi/L)

U_F = human consumption rate of finfish (kg/year), Table 4.6-7

T_F = fish bioaccumulation factor (L/kg), Table 4.6-4

DCF = ingestion dose conversion factor (rem/μCi), Table 4.7-1

5.4.2.1.5 Ingestion of Soil

The soil ingestion exposure route assumes soil is irrigated with groundwater from a stream contaminated from the aquifer, and the receptor in turn consumes the contaminated soil. For simplicity and conservatism, the soil ingested is assumed to be groundwater. This formula was derived following the approach of the previous pathway calculations. The dose is calculated using the following formula.

$$\frac{D = C_{SW} \times DCF \times U_D}{\rho_W}$$

where:

C_{SW} = radionuclide concentration in water from the stream (undiluted aquifer) (pCi/L)

DCF = ingestion dose conversion factor (rem/μCi), Table 4.7-1

U_D = human consumption rate of dirt (kg/year), Table 4.6-7

ρ_W = density of water (g/ml)

5.4.2.2 Member of the Public at the Stream Direct Exposure Dose Pathways

5.4.2.2.1 Direct Exposure from Irrigated Soil

The irrigated soil direct exposure route assumes soil is irrigated with groundwater from a stream contaminated from the aquifer, diluted, and the receptor in turn is exposed during time spent caring for a garden. The dose is calculated using the following formula.

$$D = C_D \times F_G \times DCF$$

where:

C_D	=	radionuclide concentration in irrigated soil (pCi/m^3)
DCF	=	external dose conversion factor, 15cm (rem/yr per μCi/m^3), Table 4.7-1
F_G	=	fraction of time spent in garden (unitless), Table 4.6-7

5.4.2.2.2 Direct Exposure from Swimming

The swimming direct exposure route assumes the receptor receives dose from swimming in a stream contaminated from the aquifer. The dose is calculated using the following formula.

$$D = GF_S \times t_S \times C_{SW} \times DCF$$

where:

DCF	=	external dose conversion factor, water immersion (rem/yr per μCi/m^3), Table 4.7-1
GF_S	=	swimming geometry factor (unitless) [1]
t_S	=	time per year spent swimming (hr/yr), Table 4.6-7
C_{SW}	=	radionuclide concentration in water from the stream (undiluted aquifer) (pCi/L)

5.4.2.2.3 Direct Exposure from Fishing/Boating

The fishing/boating direct exposure route assumes the receptor receives dose from fishing or boating in a stream contaminated from the aquifer. The dose is calculated using the following formula.

$$D = GF_B \times t_B \times C_{SW} \times DCF$$

where:

DCF	=	external dose conversion factor, 15 cm (rem/yr per μCi/m^3), Table 4.7-1
GF_B	=	boating geometry factor (unitless) [0.5]
t_B	=	time per year spent boating (hr/yr), Table 4.6-7
C_{SW}	=	radionuclide concentration in water from the stream (undiluted aquifer) (pCi/L)

5.4.2.3 Member of the Public at the Stream Inhalation Dose Pathways

5.4.2.3.1 Inhalation during Irrigation

The irrigation inhalation exposure route assumes soil is irrigated with groundwater from a stream contaminated from the aquifer, and the receptor in turn is exposed by breathing while the garden is irrigated but only during time spent caring for a garden. For simplicity and conservatism, the source material is the moisture contained within the air with equal concentrations as the groundwater. This formula was derived following the approach of the previous pathway calculations. To accound for the quantity of contaminants released into the air and available for inhalation, an Airborne Release Fraction (ARF) is included in the pathway formula. This ARF is conservatively assumed to be 1E-04 taken from DOE-HDBK-3010-94.

$$D = \frac{C_{SLW} \times DCF \times U_A \times F_G \times C_{WA} \times ARF}{\rho_W}$$

where:

C_{SLW}	=	radionuclide concentration in water from the seepline aquifer (undiluted) (pCi/L)
DCF	=	inhalation dose conversion factor (rem/µCi), Table 4.7-1
U_A	=	air intake (m^3/yr), Table 4.6-7
F_G	=	fraction of time spent in garden exposed to soil irrigated with water from the seepline aquifer (unitless), Table 4.6-7
C_{WA}	=	water contained in air at ambient conditions, (g/m^3) [10 g/m^3]
ARF	=	airborne release fraction [1E-04]
ρ_W	=	water density (g/ml)

5.4.2.3.2 Inhalation during Showering

The showering inhalation exposure route assumes receptor exposed by breathing humid air within the shower. The source of water for the shower is a stream contaminated from the aquifer. This formula was derived following the approach of the previous pathway calculations. The ARF described in section 5.4.2.3.1 is included in the pathway formula. The dose is calculated using the following formula.

$$D = \frac{C_{SLW} \times DCF \times U_A \times t_S \times C_{WS} \times ARF}{\rho_W}$$

where:

C_{SLW}	=	radionuclide concentration in water from the seepline aquifer (undiluted) (pCi/L)
DCF	=	inhalation dose conversion factor (rem/μCi), Table 4.7-1
U_A	=	air intake (m^3/yr), Table 4.6-7
t_S	=	time spent in shower (min), Table 4.6-7 GoldSim uses fraction of time [0.0069 = 10 min/day
C_{WS}	=	water contained in air at shower conditions, (g/m^3) [41 g/m^3]
ARF	=	airborne release fraction [1E-04]
ρ_W	=	water density (g/ml)

5.4.2.3.3 Inhalation of Dust from Irrigated Soil

The irrigation soil inhalation exposure route assumes soil is irrigated with groundwater from a stream contaminated from the aquifer, and the receptor in turn is exposed by breathing dust during time spent caring for a garden. This formula was derived following the approach of the previous pathway calculations. The dose is calculated using the following formula.

$$D = \frac{U_A \times L_{SiA} \times CSW \times DCF \times F_G}{\rho_{SS}}$$

where:

U_A	=	air intake (m^3/yr), Table 4.6-7
L_{SiA}	=	soil loading in air while working in a garden (kg/m^3), Table 4.6-6
C_{SW}	=	radionuclide concentration in water from the stream (undiluted aquifer) (pCi/L)
DCF	=	inhalation dose conversion factor (rem/μCi), Table 4.7-1
F_G	=	fraction of time spent in garden exposed to soil irrigated with contaminated groundwater (unitless), Table 4.6-7
ρ_{SS}	=	density of sandy soil (g/cm^3)

5.4.2.3.4 Inhalation during Swimming

The swimming inhalation exposure route assumes a stream contaminated from the aquifer and the receptor inhales saturated air. For simplicity and conservatism, the amount of moisture contained in the inhaled air assumed to be stream water. This formula was derived following the approach of the previous pathway calculations. The dose is calculated using the following formula.

$$D = \frac{\mathrm{U_A} \times GF_S \times t_S \times C_{SW} \times DCF \times C_{WiA}}{\rho_W}$$

where:

U_A	=	air intake (m^3/yr) Table 4.6-7
GF_S	=	swimming geometry factor (unitless) [1]
t_S	=	time per year spent swimming (hr/yr), Table 4.6-7
C_{SW}	=	radionuclide concentration in water from the stream (undiluted aquifer) (pCi/L)
DCF	=	inhalation dose conversion factor (rem/μCi), Table 4.7-1
C_{WA}	=	water contained in air at ambient conditions, (g/m^3) [10 g/m^3]
ρ_W	=	water density (g/ml)

5.5 Dose Analysis

The peak total doses are calculated utilizing the pathways identified in Section 5.4 for (a) the MOP at the 100m well and (b) the MOP at applicable streams (either UTR or Fourmile Branch). The peak doses are calculated using the peak groundwater concentrations identified in Section 5.2. A peak dose is identified for the 10,000-year performance period. In addition, a peak dose associated with the sensitivity run radionuclides is calculated through 100,000 years (100,000 years was set as the end point because the peak doses were shown to be captured in this timeframe). The information after the compliance period is included to improve understanding of the overall PA model and not for comparison to performance objectives consistent with guidance in DOE Guide 435.1-1 Section IV.P.(2) and NUREG-1854 Section 4.1.1.1.

5.5.1 Member of the Public at 100m Groundwater Pathway Dose Results

The groundwater pathway peak doses for the five 100m sectors are calculated using the peak concentration for each radionuclide in the Sector (a discussion of how peak concentrations are determined by sector is provided in Section 5.2). These groundwater pathway peak doses are the total dose associated with all the individual 100m well pathways identified in Section 5.4.

5.5.1.1 Member of the Public 100m Peak Annual Groundwater Pathway Dose

Table 5.5-1 shows a comparison of the 100m peak groundwater pathway doses for the different 100m sectors within both 10,000 and 20,000 years. In calculating the peak groundwater pathway dose, the highest radionuclide concentration within the vertical computational meshes is used from each of the three distinct aquifers modeled (UTR-UZ, UTR-LZ, and the Gordon Aquifer).

The highest peak groundwater pathway dose in the 10,000-year performance period is associated with Sector E. Sector E is the Sector associated most closely with the Type IV tanks, which are the tanks whose liners are modeled as failing earlier than any other tank type (and within the 10,000-year performance period).

Figure 5.5-1 shows the peak doses to the 100m MOP receptor over time during the performance period (10,000 years) for the five 100m sectors. The highest 100m MOP groundwater pathway peak dose in the 10,000-year evaluation period is a 2.3 mrem/yr dose at year 10,000. Figure 5.5-2 shows the 100m MOP receptor doses within 20,000 years for the five 100m sectors.

Table 5.5-1: Member of the Public at 100m Peak Groundwater Pathways Dose by Sector

Sector	Highest Peak Dose in 10,000 Years	Highest Peak Dose in 20,000 Years
A	**0.06 mrem/yr (year 752)** Principal Pathways: Water Ingestion (58%) Vegetable Ingestion (26%) Principal Radionuclide: Tc-99 (81%)	**2.1 mrem/yr (year 17,950)** Principal Pathways: Water Ingestion (59%) Vegetable Ingestion (27%) Principal Radionuclide: Ra-226 (22%) Np-237 (59%)
B	**0.10 mrem/yr (year 754)** Principal Pathways: Water Ingestion (62%) Vegetable Ingestion (28%) Principal Radionuclide: Tc-99 (84%)	**3.6 mrem/yr (year 16,664)** Principal Pathways: Water Ingestion (64%) Vegetable Ingestion (29%) Principal Radionuclide: Ra-226 (22%) Np-237 (66%)
C	**0.2 mrem/yr (year 10,000)** Principal Pathways: Fish Ingestion (71%) Water Ingestion (19%) Principal Radionuclide: Ra-226 (25%) Cs-135 (61%)	**12 mrem/yr (year 16,664)** Principal Pathways: Water Ingestion (66%) Vegetable Ingestion (30%) Principal Radionuclide: Ra-226 (14%) Np-237 (77%)
D	**1.5 mrem/yr (year 10,000)** Principal Pathways: Water Ingestion (62%) Vegetable Ingestion (28%) Principal Radionuclides: Np-237 (20%) Ra-226 (36%)	**17 mrem/yr (year 16,640)** Principal Pathways: Water Ingestion (67%) Vegetable Ingestion (30%) Principal Radionuclides: Ra-226 (12%) Np-237 (63%)
E	**2.3 mrem/yr (year 10,000)** Principal Pathways: Water Ingestion (64%) Vegetable Ingestion (29%) Principal Radionuclide: Ra-226 (40%) Np-237 (23%)	**18 mrem/yr (year 16,638)** Principal Pathways: Water Ingestion (67%) Vegetable Ingestion (30%) Principal Radionuclides: Ra-226 (15%) Np-237 (56%)

Note: Sectors illustrated in Figure 5.2-5

Provided below is a discussion of the peaks that appear in Figures 5.5-1 and 5.5-2. The discussion also relies upon information from Figures 5.5-3 and 5.5-4 relating to the individual radionuclide contributors to the groundwater pathway doses.

- The peaks prior to year 3,600 are associated with ancillary equipment releases, in particular the transfer lines, which are distributed throughout the FTF and therefore affect all sectors. The timing of the ancillary equipment peaks is fairly consistent for all sectors, with the magnitude of the peak varying depending on what ancillary equipment other than the transfer lines are contributing to the peak (i.e., Sectors D and E have more inventory sources, such as the CTS tank and catch tank nearby). The ancillary equipment releases start around the time its containment fails (at year 510). In contrast to the waste tanks (where solubility control was modeled as controlling waste release), the ancillary equipment releases were modeled as instantaneous, so the entire inventory in each ancillary equipment location is available for release at year 510.
- The peaks near year 700 are associated with Tc-99 and Np-237from the ancillary equipment. The Tc-99 travels quickly (K_d in soil 0.1 mL/g) to the 100m boundary after the ancillary equipment containment fails (at year 510). The entire Tc-99 inventory in all ancillary equipment location is available for transport beginning at year 510 and can contribute to a single peak soon thereafter. The largest ancillary equipment Tc-99 inventories are in the transfer lines (0.53 Ci) and CTS tank (0.11 Ci). The Np-237 travels relatively quickly (K_d in soil 0.6 mL/g), but does not travel as quickly as the Tc-99 due to soil retardation being greater for Np, so the peak associated with Np-237 is later and less acute. The largest ancillary equipment Np-237 inventories are in the transfer lines (2.79E-03 Ci) and CTS tank (4.74E-04 Ci). The transfer lines (2.07 Ci) and CTS tank (1.01 Ci) also have the largest inventories of Am-241, which is a parent of Np-237.
- The peaks near year 1,800 are associated with Ra-226 from the ancillary equipment and also the tail end of the Np-237 release from the ancillary equipment. The Ra-226 itself travels fairly quickly through the soil (K_d in soil 5 mL/g), but it lags behind the Np-237 because it is being released primarily as a daughter product of U-234, or as a part of an initial inventory. There is an initial peak associated with the Ra-226 produced in the tank via ingrowth from U-234. After that initial peak, the Ra-226 release is tied to the steady state U-234 release and therefore levels off. Since it is a daughter product, its initial travel time is tied to its parent and uranium has a higher than average K_d (K_d in soil 200 mL/g). The Ra-226 peak is therefore tied to the release and travel of the U-234. Of the ancillary equipment, the transfer lines and CTS tank have the largest inventories of U-234.
- The peak near 3,750 are associated with I-129 from the Type IV tanks. The I-129 contributes to dose quickly because it travels quickly (K_d in basemat 15 mL/g, K_d in soil 0.6 mL/g).
- The peaks between years 3,750 and 12,700 are tied primarily to releases from the Type IV tanks. The peaks after year 12,700 are tied to the tail end of releases from the Type IV tanks and the start of releases from the Type I and III/IIIA tanks. The Type IV tank liners are considered to fail at approximately year 3,750 while the Type

I and III/IIIA tanks don't fail until approximately year 12,700. The releases from the waste tank CZs are potentially solubility limited, such that release fluxes from tank liners may vary by radionuclide dependant on its individual solubility controlled release rate from the CZ.

- The peaks near year 4300 has a contribution from C-14 in the Type IV tanks. The C-14 contributes to dose almost immediately from the Type IV tank inventories because it travels extremely quickly (K_d in basemat ≤ 20 mL/g, K_d in soil = 0.0 mL/g).
- The Sector D and E doses between approximately year 4,000 and 20,000 have a significant Ra-226 contribution. As discussed previously, the Ra-226 contribution is tied to the release and travel of U-234, but once the U-234 is released from the Type IV tanks the Ra-226 travels faster and can reach the 100m boundary before its parent. The Ra-226 contribution starts ramping up almost as soon as the Type IV tank liners fail and steadily increases as more U-234 is released. As expected, there is an initial peak associated with the Ra-226 inventory produced through ingrowth. Since uranium has a higher than average K_d (K_d in soil 200 mL/g), the associated quantity of Ra-226 released tend to increase slowly. The largest Type IV tank U-234 inventories (the parent and principal source of the Ra-226) are in Tank 18 (0.38 Ci). The Ra-226 inventories in the Type IV tanks are insignificant.
- There is a dose spike in Sectors D and E at approximately year 13,750 associated with Ra-226. There is also dose spike for Sectors A and B at approximately year 14,000 associated with Ra-226. These dose peaks are tied to the liner failure dates (~ year 12,700) for the Type I and Type III/IIIA tanks (it should be noted that all the tanks for a given tank type are assumed to fail in the same year). These peaks are associated with the U-234 and its daughter Ra-226 being release from the tank liner. The spike is twice the magnitude of the steady state release due to the Ra-226 ingrowth inside the tank liners for 12,700 years prior to liner failure. There is a lag time between the release from the liner and the peak date as the Ra-226 travels though the Type I and Type III/IIIA tank basemats. The concrete basemats have a relatively low K_d for Ra (basemat K_d 70 -100 mL/g) but are thick (30 inches for the Type I tanks and 41 - 42 inches for the Type III/IIIA tanks). The lag time is slightly longer for Sectors A and B because the primary sources of U-234 (Tanks 33 and 34) are farther from the 100m boundary (~250m) than the Type I tanks. The largest Type I tank U-234 inventories are 0.17 Ci per tank. The Ra-226 inventories are insignificant at 0.001 Ci per waste tank.
- The Sector D and E peaks near year 6,000 are associated with Np-237 from the Type IV tanks. These peaks don't show up in Sectors A – C because these sectors see very little of the plume spread from the Type IV tanks. The timing of the peak near year 6,000 is due to Np-237, which peaks at this time and remains relatively constant (Figure 5.5-3). The Np-237 doesn't begin to contribute to the dose until around year 4,600, but after it appears it spikes rapidly until it peaks near year 6,000. The solubility of Np-237 is relatively high, and the Np-237 is released from the CZ comparatively quickly. The delay between the Type IV tank liner failure date (near year 3,600) and the appearance of Np-237 can be attributed to the basemat K_d for Np, which is initially4,000 mL/g for the basemat. Once the Np-237 travels through the basemat, it doesn't take as long for the peak to be reached since the Np soil K_d is

much lower (soil K_d 0.6 mL/g). The largest Type IV tank Np-237 inventories are in Tank 18 (0.24 Ci). Tank 18 also has 82 Ci of Am-241, which is a parent of Np-237.

- The dose at approximately year 6,000 has a significant contribution from Cs-135 in the Type IV tanks. The Cs-135 contributes to the dose at this time period primarily due to its k_d in sandy soil being relatively low (50 mL/g).
- The Sector D and E peaks at year 10,000 are associated with Ra-226 and Np-237 as explained previously, but also with relatively slow moving radionuclides that are just reaching the 100m boundary at year 10,000. The radionuclides that were released from the Type IV tanks but that are starting to be seen at year 10,000 include U-233, U-234, and Th-229. Release from the CZ for these radionuclides is subject to solubility limits, which tend to flatten their associated peaks. In addition, U and Th have a relatively high K_d value for both the basemat and soil, which explains why Ra-226 doesn't show up for some time after the Type IV tank liner failure date and why the associated peaks are relatively flat.
- The Sector D and E peaks at approximately year 10,900 are associated with Np-237. The peak at that time is due to the transition of the Type IV tank grout from Middle Age (Region II) to Old Age (Region III) at year 10,500. Due to this transition, the K_d for Np changes from 1,600 to 250 mL/g.
- The Sector A and B peaks near years 16,500 and 18,000 are associated with Np-237 from the Type III tanks (Tanks 33 and 34). Np-237 (and its parent Am-241) are released from the Type III tanks after tank liner failure and the first peak in Sector A and the peak in Sector B are driven by the release of inventory built up over time through Np-237 ingrowth (from Am-241). The second peak in Sector A from Np-237 near year 18,000 is caused by the ramping up of Np-237 release near year 17,200 as the impact of the solubility change (to Oxidized Region II) makes its way to the 100m boundary. As mentioned previously, the solubility of Np-237 is relative high, especially once the pore water is oxidized at approximately year 15,500 (2.2E-05 for Oxidized Region II) such that the Np-237 is released from the CZ rapidly. The Np-237 inventories in Tank 33 and Tank 34 are 0.025 Ci and 0.068 Ci respectively. The Am-241 inventories in Tank 33 and Tank 34 are 63 Ci and 1590 Ci respectively. The Tank 34 Am-241 is a significant source of Np-237.
- Sector C mirrors the dose profiles from the other sectors in many ways but always with a smaller magnitude dose. Sector C is nearest to the Type IIIA tanks, which fail at the same time as the Type III tanks but do not have the inventory of sensitivity run radionuclides that the Type III tanks have.

Figure 5.5-1: Member of the Public at 100m Peak Groundwater Pathway Dose Results within 10,000 Years for the Five 100m Sectors

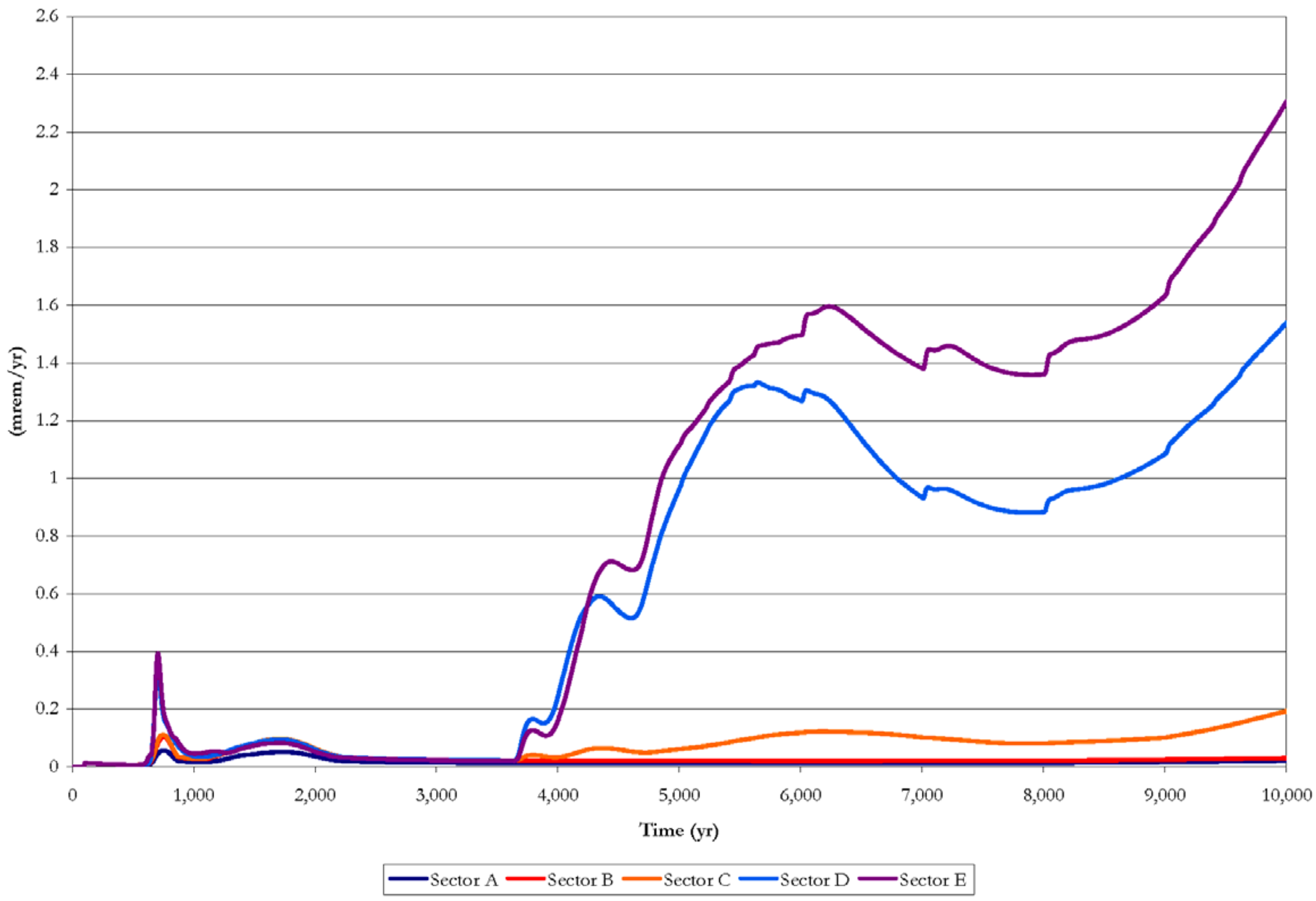
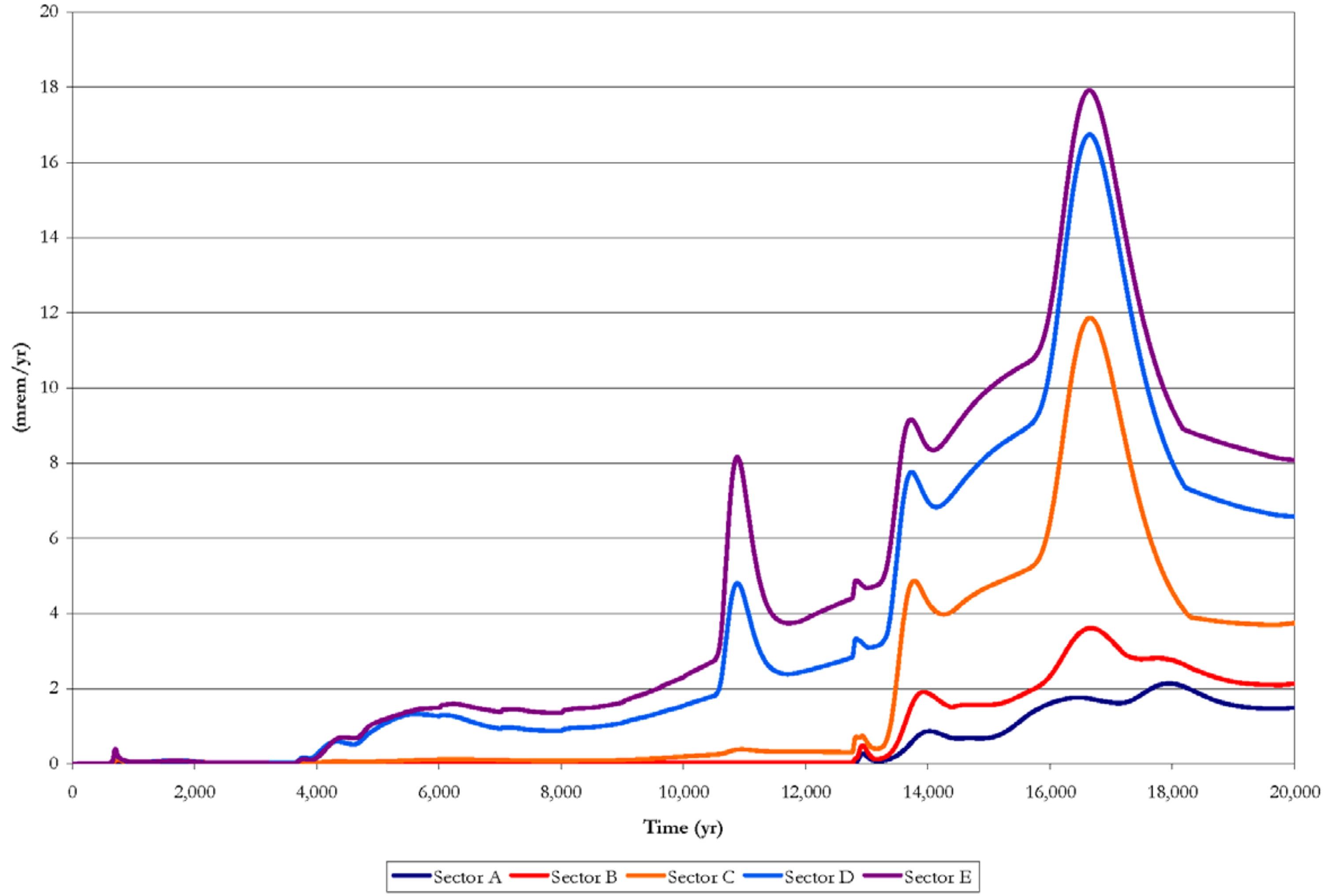


Figure 5.5-2: Member of the Public at 100m Peak Groundwater Pathway Dose Results within 20,000 Years for the Five 100m Sectors



5.5.1.2 Individual Radionuclide Contributions to the MOP 100m Peak Annual Groundwater Pathway Dose

Figures 5.5-3 and 5.5-4 show the relative contribution from the sensitivity run radionuclides to the Sector E 100m groundwater pathway dose over time (10,000 and 20,000 years respectively). Table 5.5-2 shows the relative contribution from the sensitivity run radionuclides to the 2.3 mrem/yr peak groundwater pathway dose. The peak groundwater pathway dose to the MOP at 100m during the 10,000 years evaluation period is primarily associated with Ra-226 (40%) and Np-237 (23%). The top contributors (>5% contribution) to the MOP at 100m peak groundwater pathway dose are Cs-135, Ra-226, U-233, U-234, and Np-237.

Figure 5.5-3: Individual Radionuclide Contributors to the Sector E 100m Peak Groundwater Pathway Dose, 10,000 years

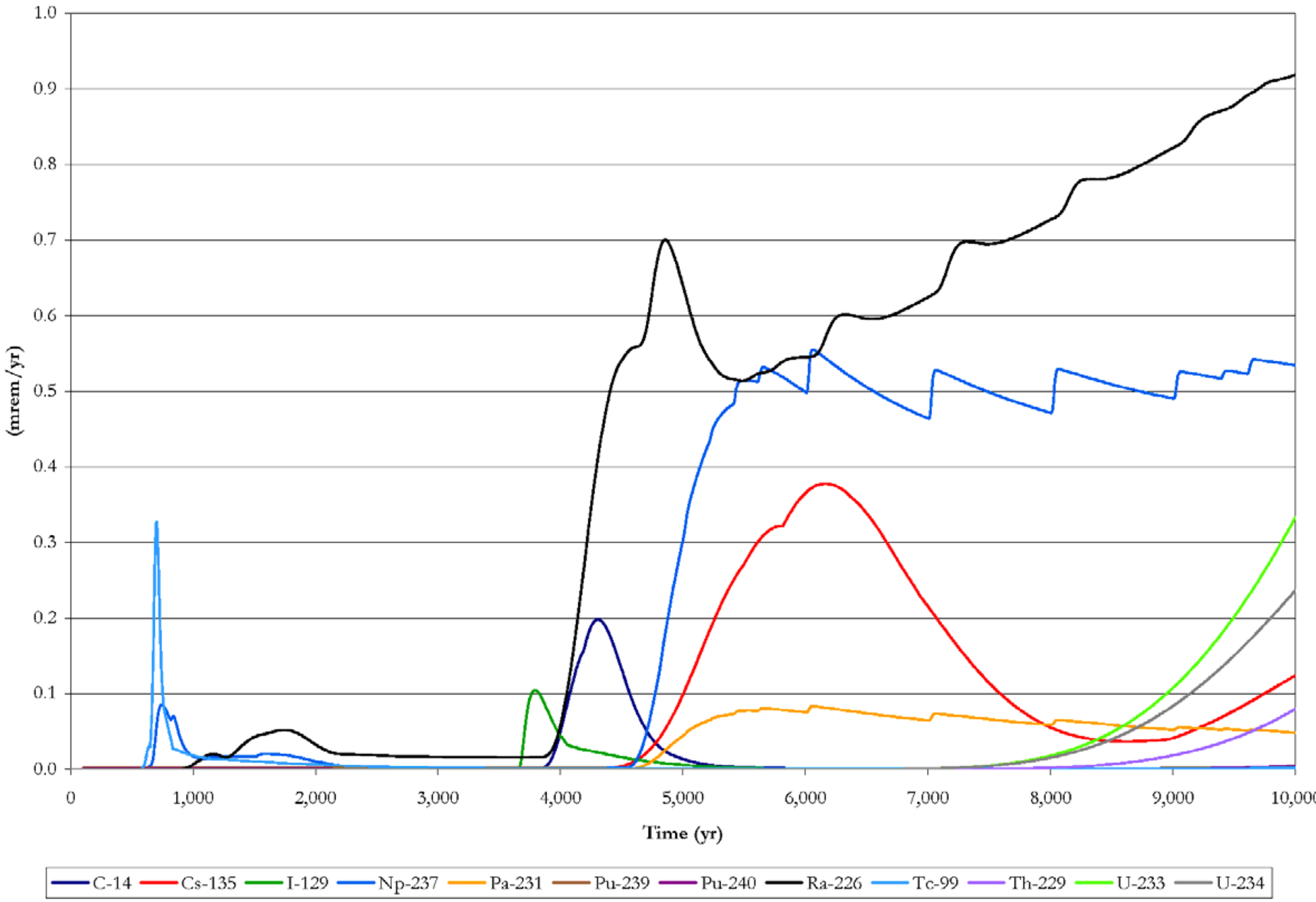


Figure 5.5-4: Individual Radionuclide Contributors to the Sector E 100m Peak Groundwater Pathway Dose, 20,000 years

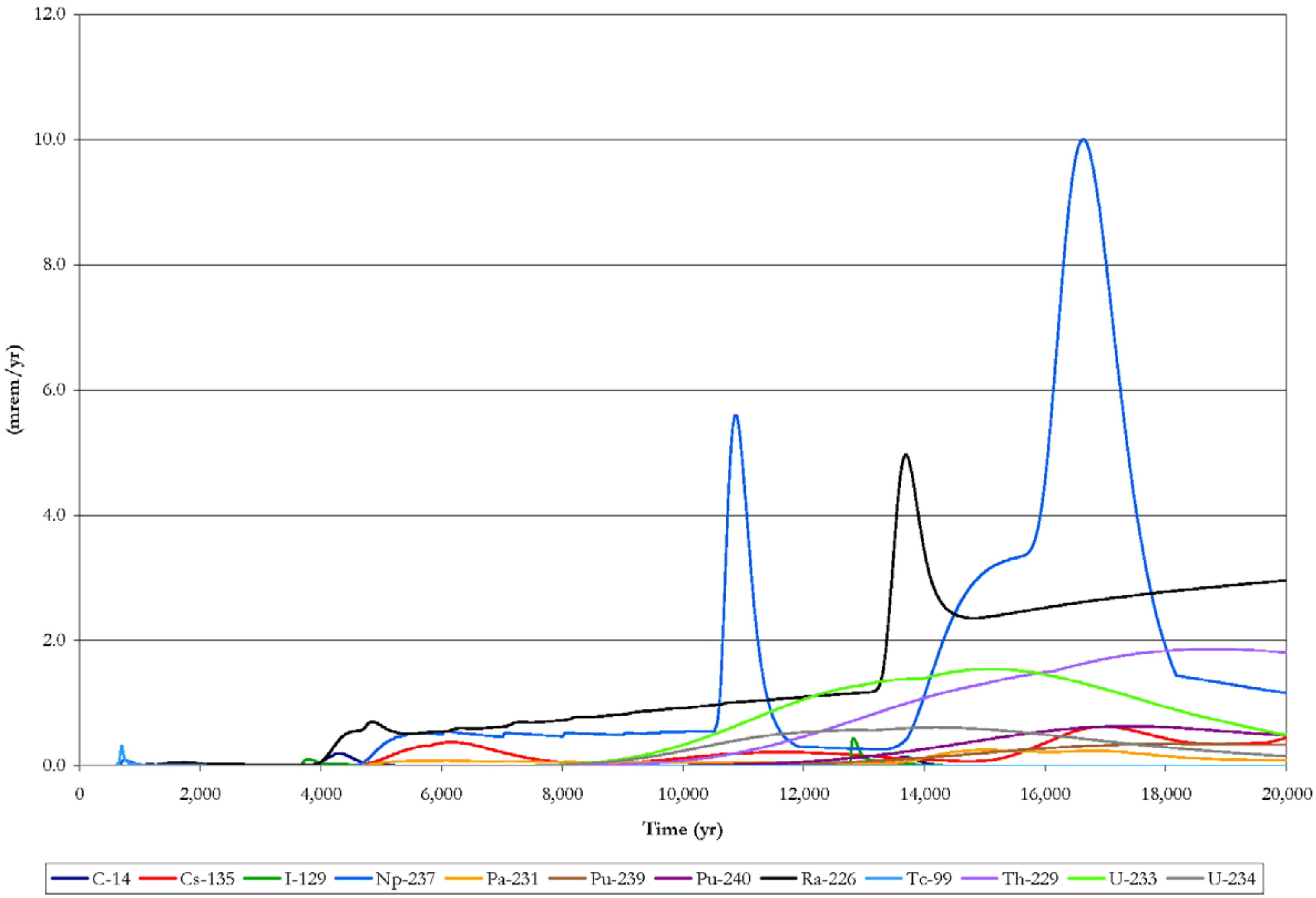


Table 5.5-2: Member of the Public at 100m Peak Groundwater Pathway Dose Individual Radionuclide Contributions at Year 10,000 (Peak Year)

Radionuclide	Contribution to Sector E Peak dose at year 10,000 (mrem/yr)	Percentage of Total Peak Dose
Am-241	<0.01	<1%
Am-243	<0.01	<1%
C-14	<0.01	<1%
Cm-244	<0.01	<1%
Cs-135	0.12	5%
I-129	<0.01	<1%
Np-237	0.53	23%
Pa-231	0.05	2%
Pu-238	<0.01	<1%
Pu-239	<0.01	<1%
Pu-240	<0.01	<1%
Ra-226	0.92	40%
Tc-99	<0.01	<1%
Th-229	0.08	3%
Th-230	<0.01	<1%
U-233	0.33	14%
U-234	0.24	10%
U-236	0.01	<1%
Total	**2.3**	**100%**

5.5.1.3 Individual Tank Contributions to MOP 100m Peak Annual Groundwater Pathway Dose

Table 5.5-3 shows the relative contributions from those waste sources (Tanks 17 through 20 and the transfer lines) which will contribute to the Sector E 100m MOP groundwater pathway dose at 10,000 years (the year of the peak dose). Tanks 1 through 8 and Tanks 33 and 34 were excluded because the liners for these tanks are not expected to fail within 10,000 years. Tanks 25 through 28 and 44 through 47, and the other ancillary equipment were excluded from individual analysis because they have a relatively insignificant residual inventory for the sensitivity run radionuclides. Tank 18 is the primary contributor (~88%) to the 100m Peak Groundwater Pathway Dose in Section E at year 10,000. Appendix E contains the 100m radionuclide concentration curves (20,000 years) for Tanks 1, 5, 6, Tanks 17 through 20, Tanks 33, 34, the transfer lines, and all other sources combined.

Table 5.5-3: Member of the Public at 100m Peak Groundwater Pathway Dose Individual Source Contributions at Year 10,000 (Peak Year) for Sector E

Waste Source	Contribution to Sector E Peak Dose at year 10,000 (mrem/yr)	Percentage of Total Peak Dose
Tank 17	0.12	5%
Tank 18	2.02	88%
Tank 19	0.04	2%
Tank 20	<0.01	0%
Transfer Lines	0.02	1%
Other Sources	0.11	5%
TOTAL	**2.30**	**~100%**

5.5.1.4 Individual Pathway Contributions to MOP 100m Peak Annual Groundwater Pathway Dose

As stated previously, the total peak groundwater pathway dose results are the summation of the doses associated with all the individual 100m well pathways identified in Section 5.4. Table 5.5-4 shows the relative contributions from the individual groundwater pathways to the Sector E 100m MOP receptor dose at 10,000 years (the year of the peak dose). The primary contributors are water ingestion (64% of peak dose) and vegetable ingestion (29% of peak dose).

Table 5.5-4: Member of the Public at 100m Peak Dose Individual Groundwater Pathway Contributions for Sector E

Pathway	Associated Contribution at year 10,000 (mrem/yr)	Percentage of Total Peak Dose	Principal Radionuclide Pathway Dose
Water Ingestion	1.48	64%	Ra-226 (42%)
Vegetable Ingestion	0.66	29%	Ra-226 (42%)
Finfish Ingestion	0.14	6%	Cs-135 (86%)
Milk Ingestion	0.01	1%	Ra-226 (79%)
Beef Ingestion	0.01	<1%	Ra-226 (44%)
TOTAL	**2.30**	**100%**	

Table 5.5-5 shows a comparison of the 100m peak water ingestion doses for the different 100m sectors within both 10,000 and 20,000 years. The peak water ingestion doses for Sectors A through C occur relatively quickly(~year 750) because they are associated with ancillary equipment (whose secondary containment is assumed to be breached at year 510) rather than the waste tanks, which is the case for Sectors D and E. Figure 5.5-5 shows the water ingestion doses to the 100m MOP receptor over time during the 10,000 year period for the five 100m sectors. The highest 100m MOP water ingestion dose in the 10,000 year evaluation period is a 1.5 mrem/yr dose in Sector E at year 10,000. Figure 5.5-6 shows the 100m MOP receptor water ingestion doses within 20,000 years for the five 100m sectors. Figures 5.5-7 and 5.5-8 show the vegetable ingestion doses to the 100m MOP receptor for the five 100m sectors within 10,000 and 20,000 years respectively.

Table 5.5-5: Member of the Public at 100m Peak Water Ingestion Doses by Sector

Sector	Peak Water Ingestion Dose in 10,000 years (mrem/yr)	Principal Radionuclide	Peak Water Ingestion Dose in 20,000 years (mrem/yr	Principal Radionuclide
A	0.034 (year 750)	Tc-99 (90%)	1.3 (year 17,906)	Np-237 (65%)
B	0.065 (year 752)	Tc-99 (88%)	2.3 (year 16,654)	Np-237 (68%)
C	0.069 (year 738)	Tc-99 (87%)	7.8 (year 16,652)	Np-237 (79%)
D	0.96 (year 10,000)	Ra-226 (39%)	11 (year 16,640)	Np-237 (64%)
E	1.5 (year 10,000)	Ra-226 (42%)	12 (year (16,638)	Np-237 (56%)

Figure 5.5-5: Member of the Public at 100m Peak Water Ingestion Dose Results within 10,000 Years for the Five 100m Sectors

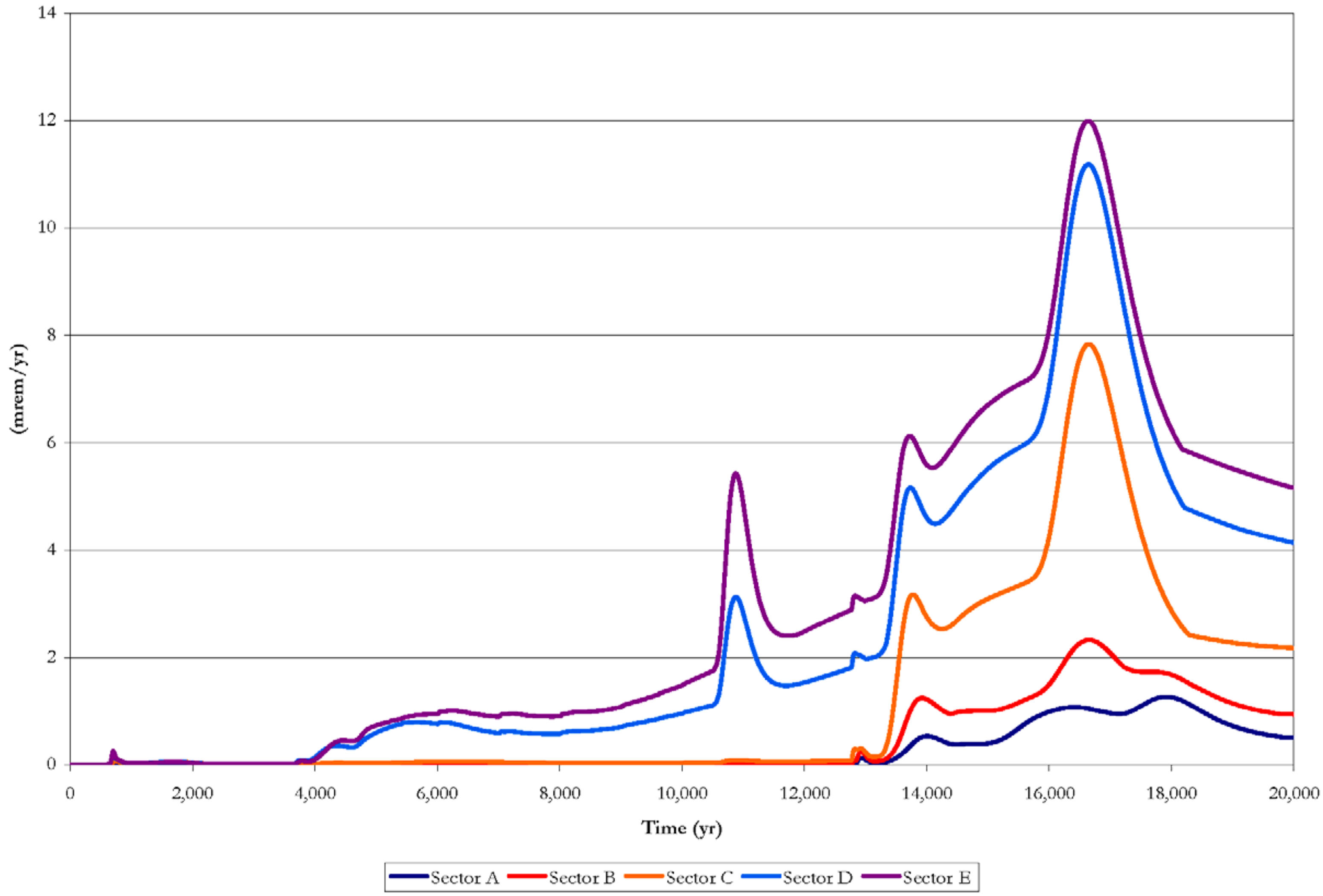


Figure 5.5-6: Member of the Public at 100m Peak Water Ingestion Dose Results within 20,000 Years for the Five 100m Sectors

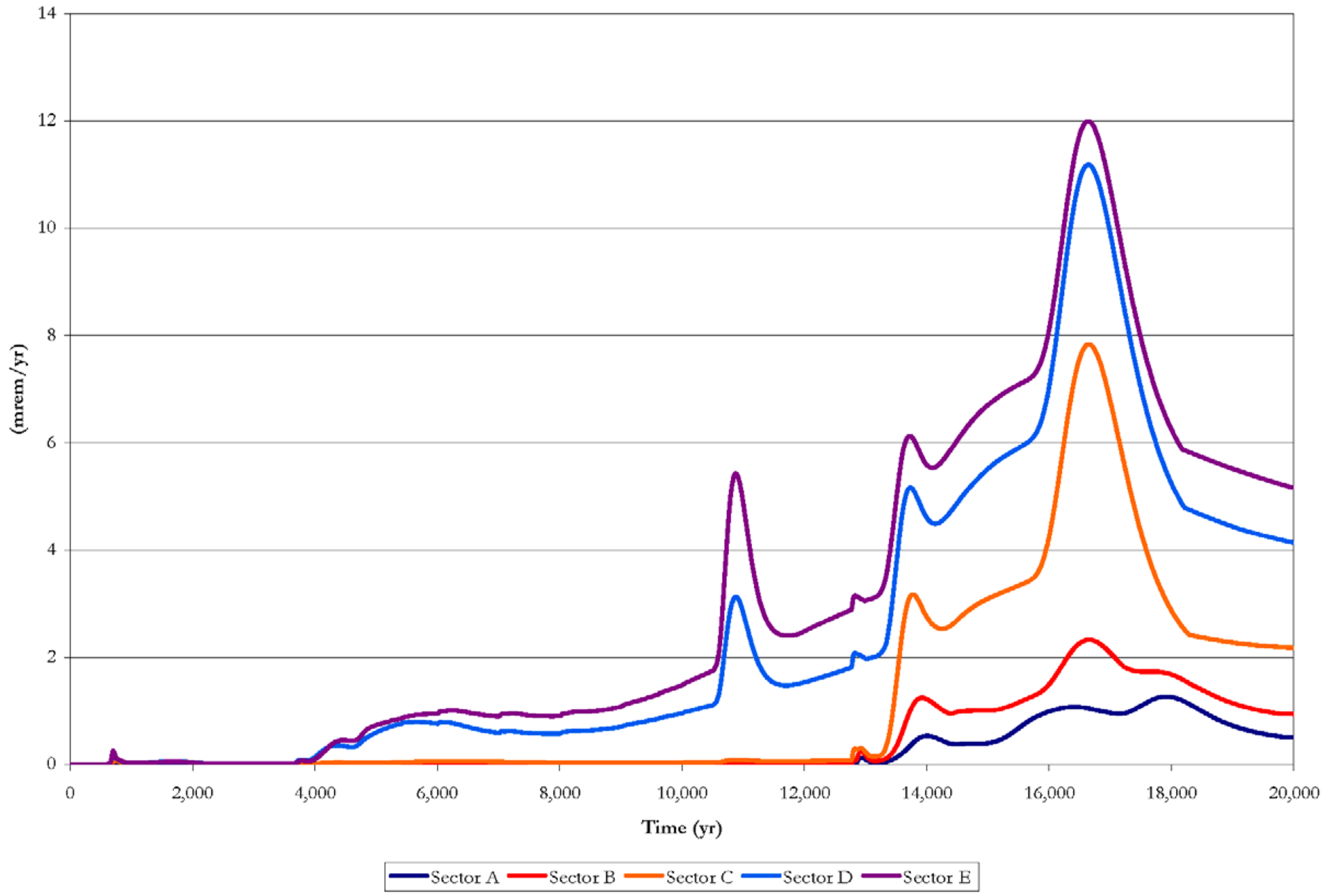


Figure 5.5-7: Member of the Public at 100m Peak Vegetable Ingestion Dose Results within 10,000 Years for the Five 100m Sectors

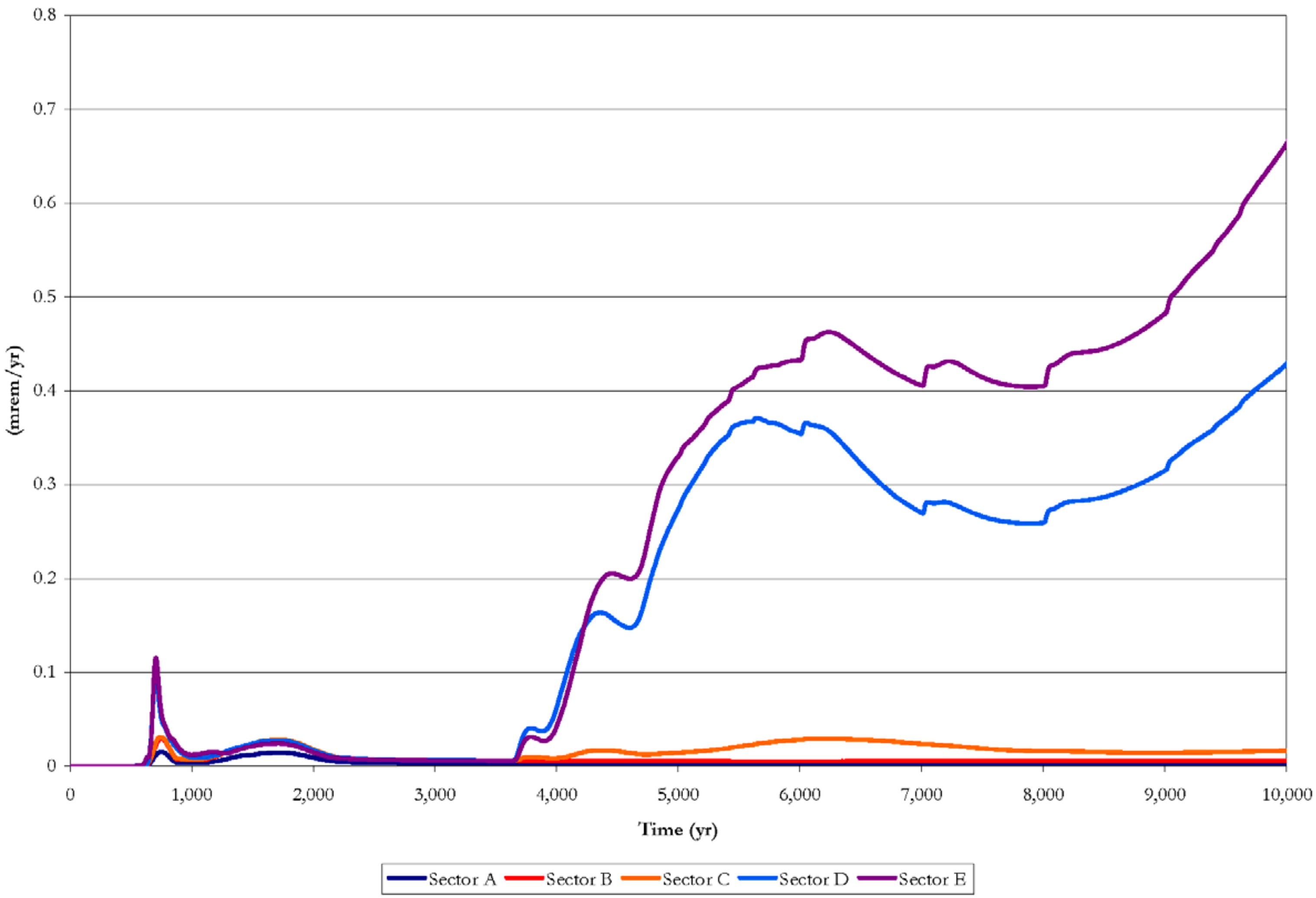
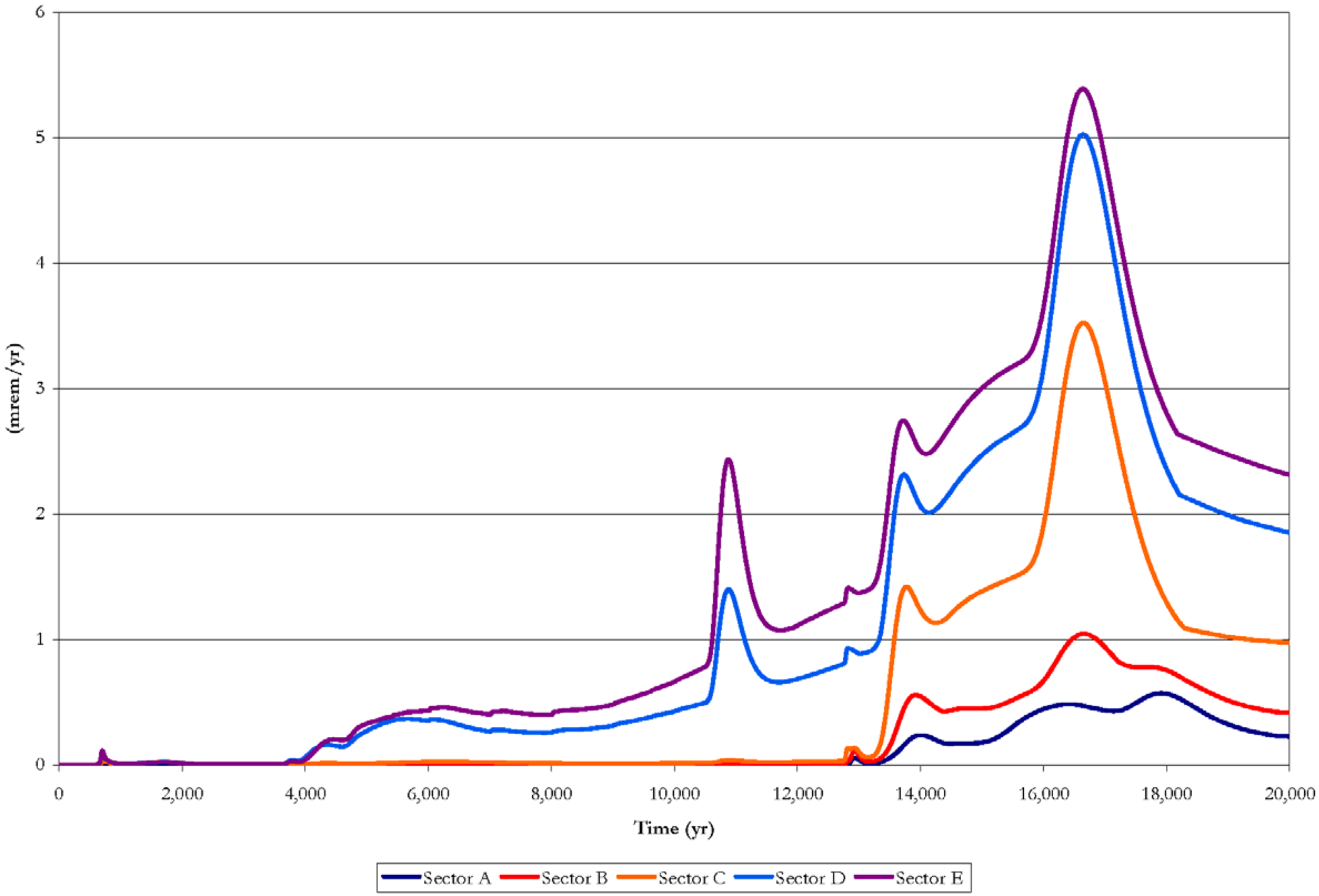


Figure 5.5-8: Member of the Public at 100m Peak Vegetable Ingestion Dose Results within 20,000 Years for the Five 100m Sectors

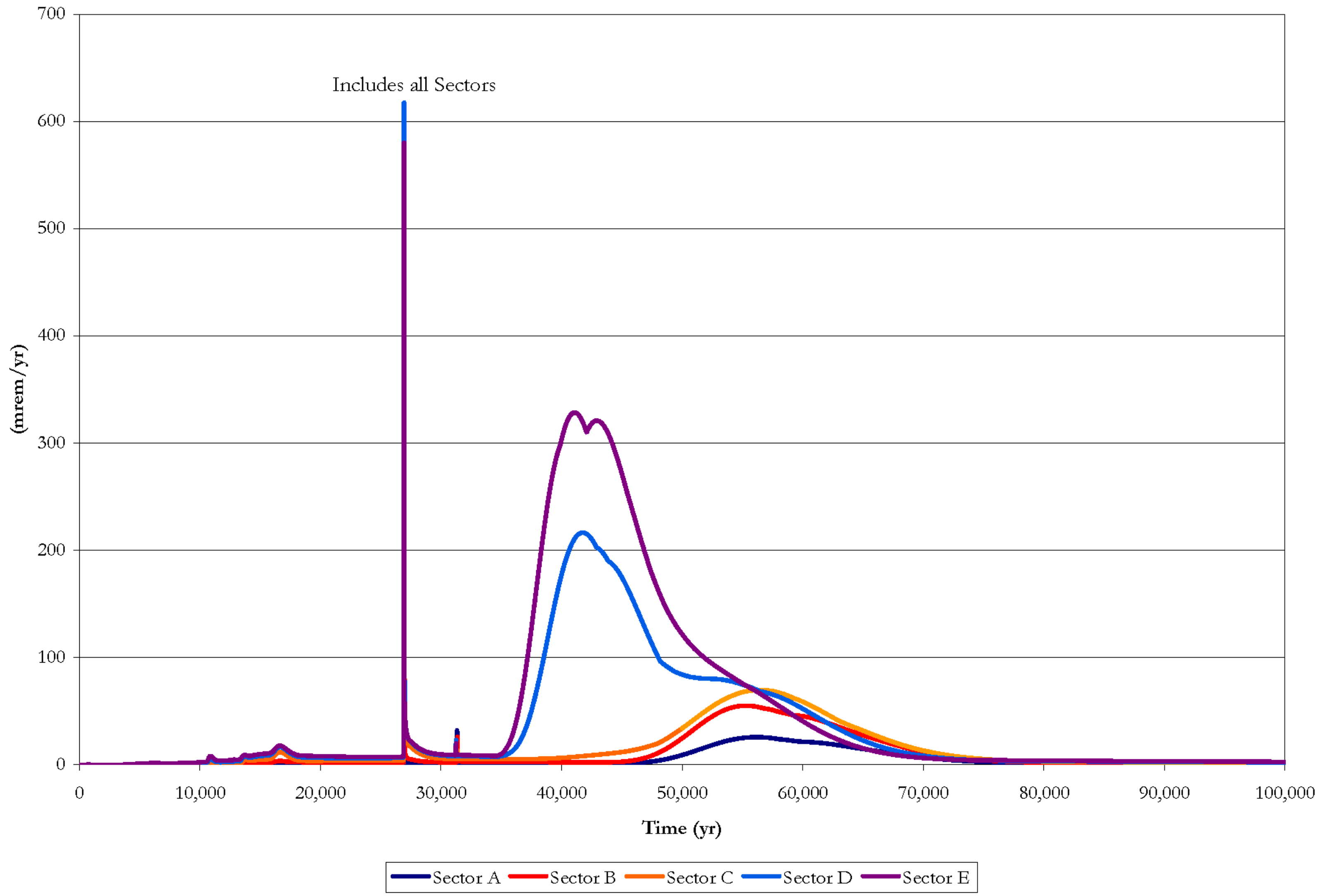


5.5.1.5 Member of the Public 100m Peak Annual Groundwater Pathway Dose Results for 100,000 years

The peak groundwater pathway doses associated with the sensitivity run radionuclides are calculated for100,000 years in order that the dose behavior well past the performance period can be evaluated (Appendix D contains100,000 year curves for the 100m radionuclide concentrations for all of FTF). These peak groundwater pathway doses are the total dose associated with all the individual MOP 100m pathways identified in Section 5.4. Figure 5.5-9 shows the peak 100m groundwater pathway doses over time for 100,000 years for the five 100m sectors. It is evident from Figure 5.5-9 that the groundwater pathway doses associated with the key dose contributors have declined by year 75,000. The later doses peaks (i.e., between years 50,000 and 70,000) are associated with Type I tank radionuclides with very long transport times (e.g., Pu-239). The fact that the doses have declined and are negligible at year 100,000 gives confidence that the peak dose impacts have been captured, since the Type I and Type IV tanks have been shown through sensitivity runs and scoping studies to dominate the peak doses. The Type III tanks have significantly smaller inventories than the Type I and Type IV tanks for the radionuclides that dominate the 100,000 peak doses (i.e., Tc-99, Pu-239).

The peak dose is from Sector D at approximately 620 mrem at year 26,940, and is associated with Tc-99 (99% of the dose). The magnitude of this peak is artificially amplified by the deterministic modeling approach and the fact that Tc-99 was conservatively modeled as being released instantaneously once the CZ reached Oxidized Region III conditions. The deterministic model utilizes a single set of parameters for a given tank type, resulting in all of the Type I waste tanks failing in a single year in the deterministic model. For radionuclides with very fast transport times such as Tc-99 this approach results in the entire Tc-99 inventory in the Type I waste tanks being release concurrently. Since the K_d values associated with concrete and soil are very low for Tc-99, the released Tc-99 inventory from each waste tank arrives at the 100m well simultaneously, magnifying the Tc-99 impact on the peak dose. This approach has less impact on the peak doses associated with slow moving radionuclides (i.e., Pu-239) because their dose contributions are more naturally distributed over time.

Figure 5.5-9: Member of the Public at 100m Peak Groundwater Pathway Dose Results within 100,000 Years



5.5.2 Member of the Public at Stream Groundwater Pathway Dose Results

The peak groundwater pathway doses for two stream seeplines (Fourmile Branch and UTR) are calculated using the highest concentration for each radionuclide in the sector (a discussion of how peak concentrations are determined by sector is provided in Section 5.2). In calculating the peak groundwater pathway dose, the highest radionuclide concentration is used from each of the distinct aquifers modeled (the UTR-UZ, UTR-LZ, and the Gordon Aquifer) for the two sectors. The concentration for each aquifer represents peak concentration in any vertical computational mesh within the aquifer. The mesh vertical thicknesses (heights) in the computational model are less than 10 feet in the UTR-UZ, and less than 15 feet in the UTR-LZ. No well screen averaging was used in determining the concentrations for dose calculations because the typical well screen length of 20 feet is approximate to the computational mesh height. As discussed in Section 4.2.4.1.2, the stream dose analysis assumes direct ingestion of water from the stream location with no stream dilution assumed. These peak groundwater pathway doses are the total dose associated with all the individual MOP stream pathways identified in Section 5.4.

5.5.2.1 Member of the Public at Stream Peak Annual Dose

Table 5.5-6 shows a comparison of the MOP stream peak groundwater pathway doses for the two sectors. The highest peak groundwater pathway dose in the 10,000-year performance period is associated with UTR. Figure 5.5-10 shows the peak groundwater pathway doses over time during the performance period (10,000 years) for the two streams of concern (UTR and Fourmile Branch). The highest MOP at the stream peak groundwater pathway dose in the 10,000-year evaluation period is a 0.044 mrem/yr groundwater pathway dose at year 10,000. Figure 5.5-11 shows the peak groundwater pathway stream doses within 20,000 years.

Table 5.5-6: Member of the Public at Stream Peak Groundwater Pathway Doses by Sector

Sector	Highest Peak Dose in 10,000 Years	Highest Peak Dose in 20,000 Years
Fourmile Branch	**0.015 mrem/yr (year 824)** Principal Pathways: Dust Inhalation (34%) Water Ingestion (32%) Principal Radionuclide: Tc-99 (59%)	**0.85 mrem/yr (year 20,000)** Principal Pathway: Finfish Ingestion (87%) Principal Radionuclide: Cs-135 (81%)
UTR	**0.044 mrem/yr (year 10,000)** Principal Pathway: Water Ingestion (49%) Principal Radionuclide: Ra-226 (39%)	**0.88 mrem/yr (year 20,000)** Principal Pathway: Finfish Ingestion (84%) Principal Radionuclide: Cs-135 (78%)

Figures 5.5-12 and 5.5-13 show the relative contribution from the sensitivity run radionuclides to the groundwater pathway MOP dose at the stream within 20,000 years (Sector A - Fourmile Branch, and Sector B – UTR, respectively).

Figure 5.5-10: Member of the Public at Stream Peak Groundwater Pathway Dose Results within 10,000 Years for the Two Stream Sectors

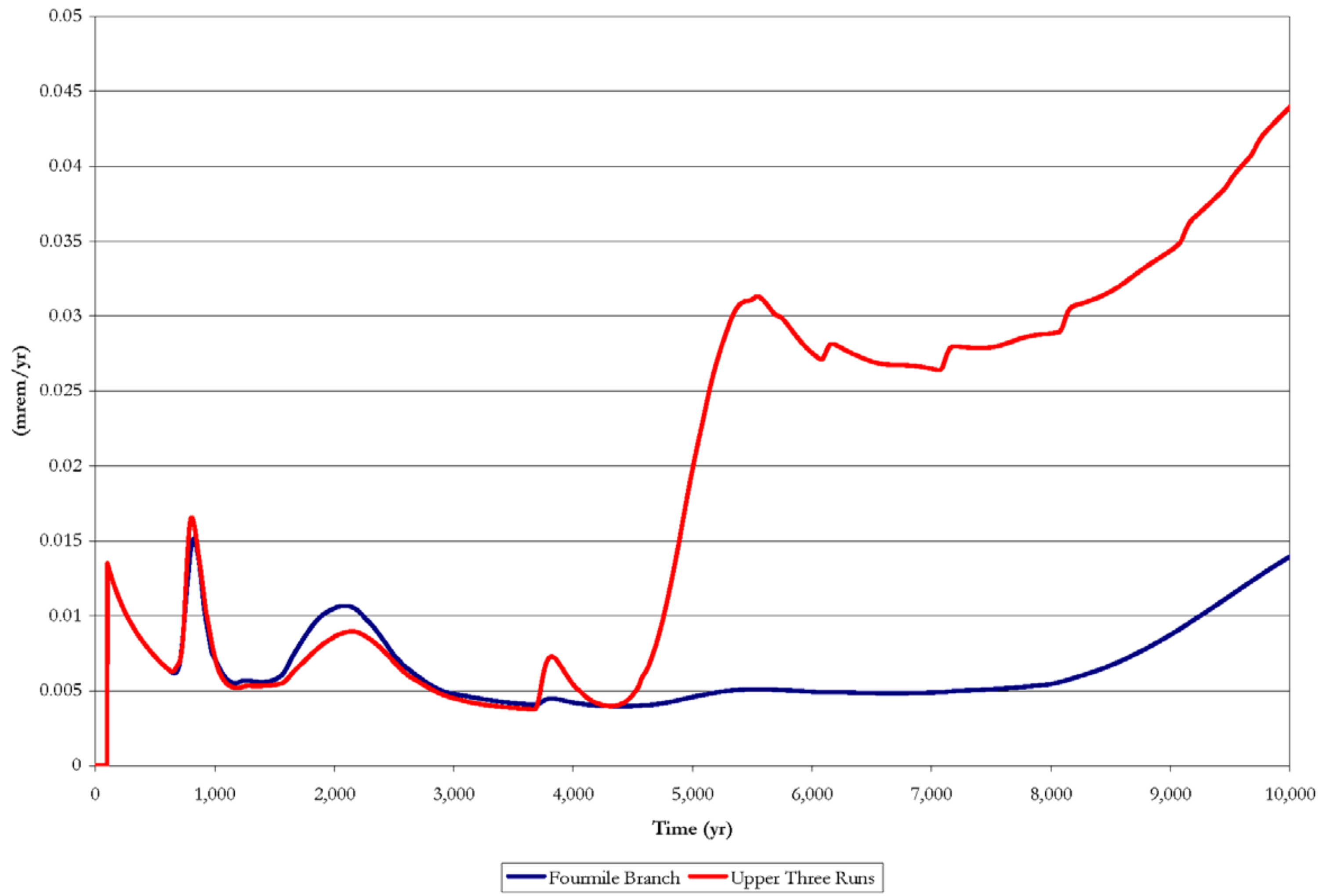


Figure 5.5-11: Member of the Public at Stream Peak Groundwater Pathway Dose Results within 20,000 Years for the Two Stream Sectors

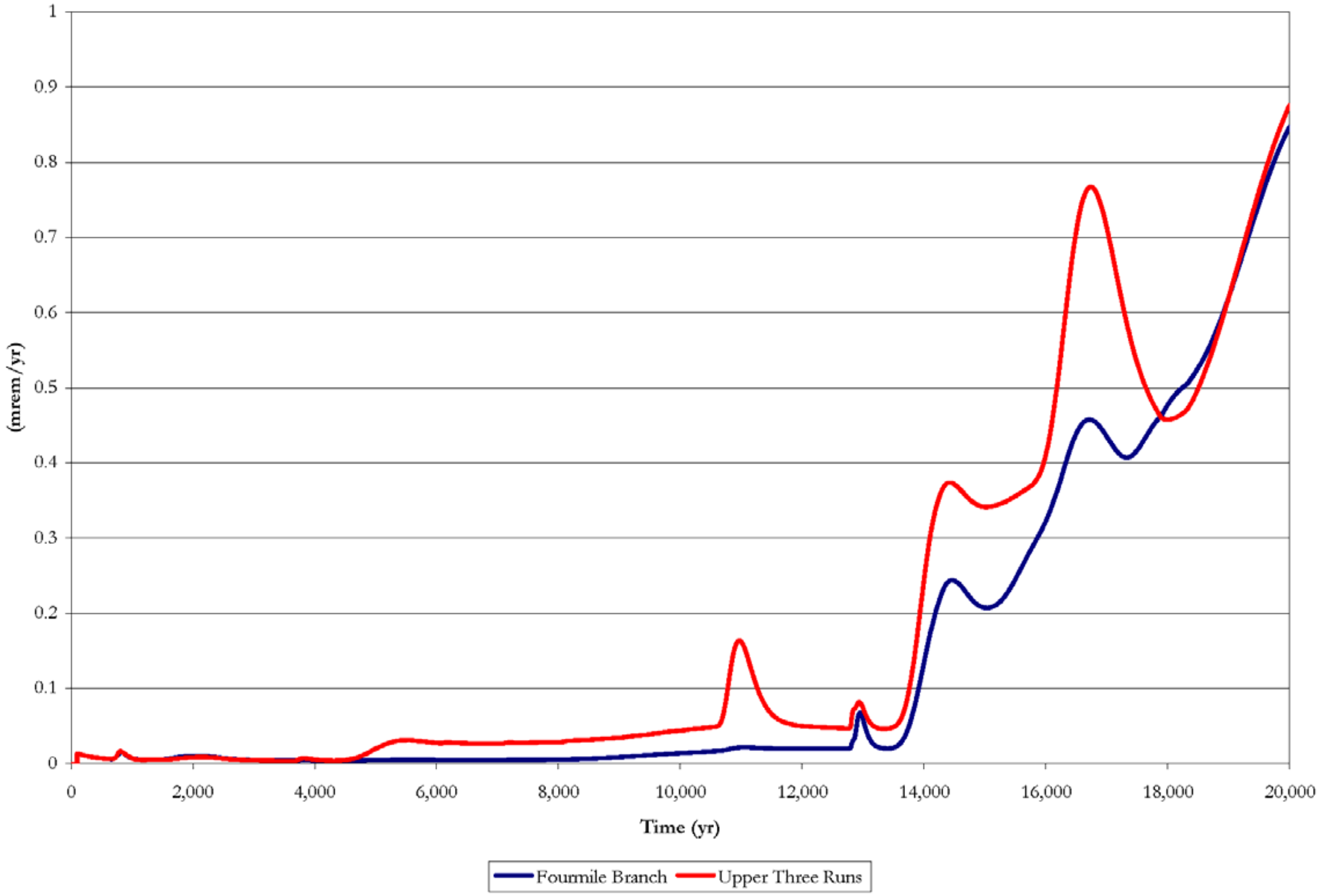


Figure 5.5-12: Individual Radionuclide Contributors to the Fourmile Branch Groundwater Pathway Dose, 20,000 Years

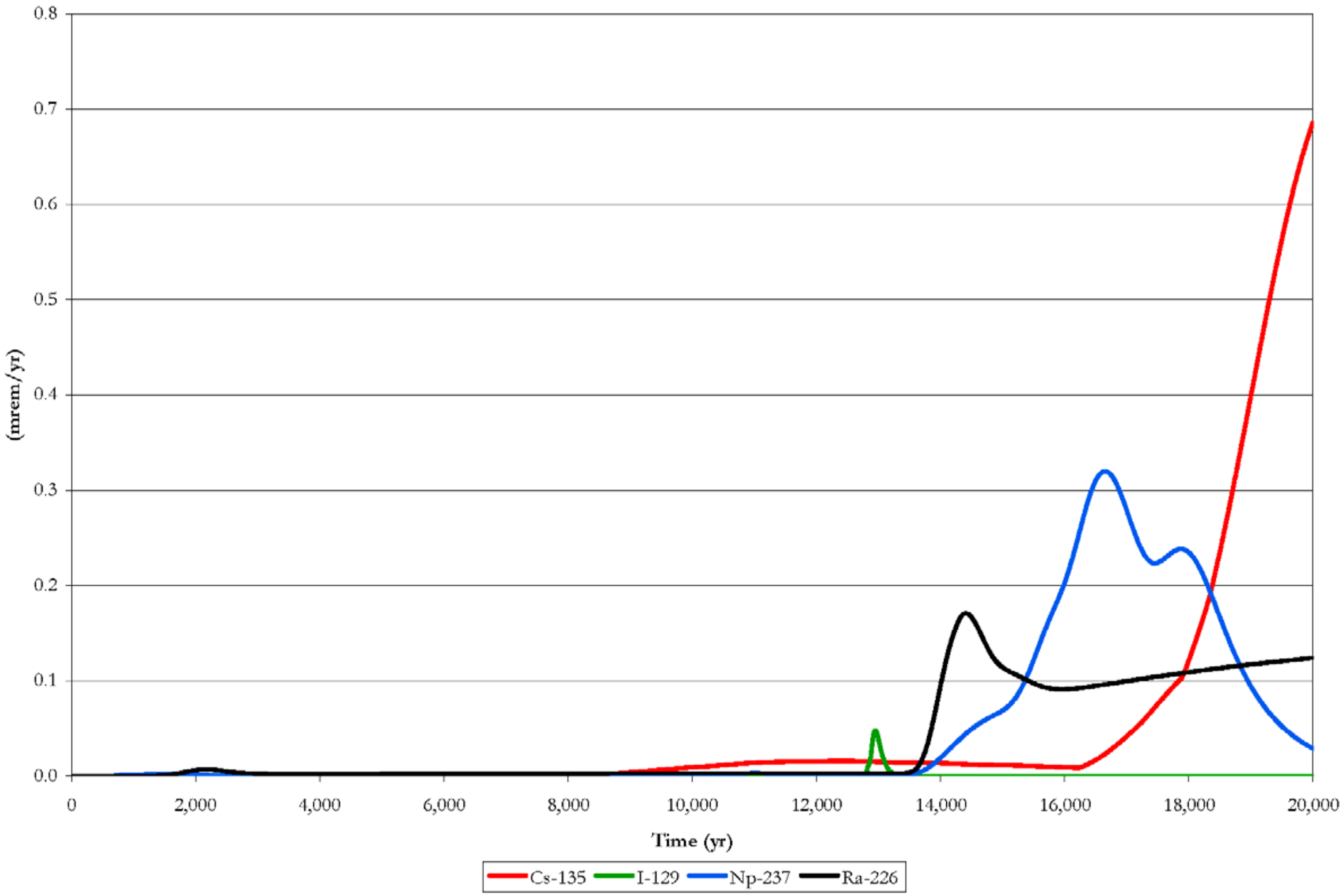
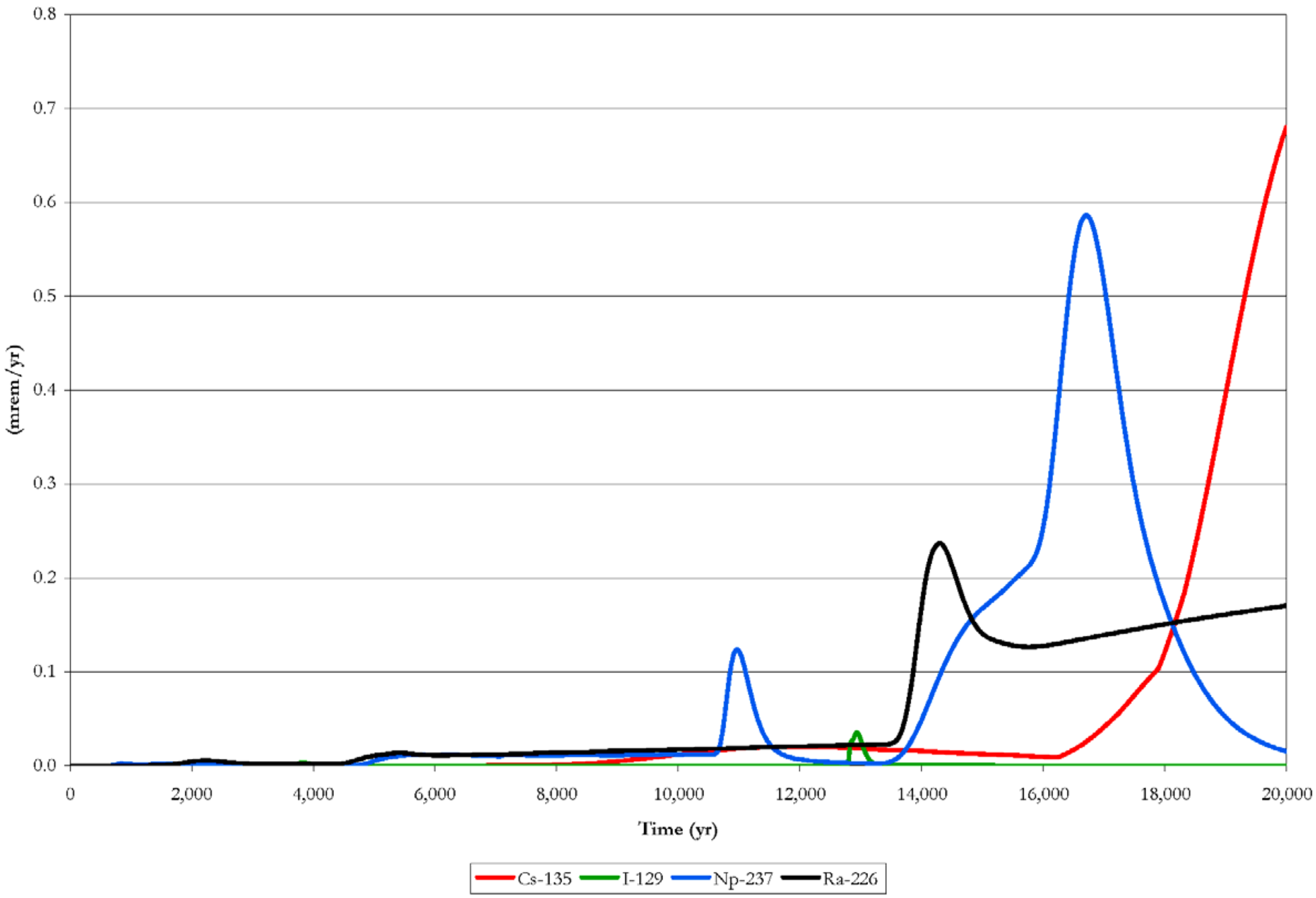


Figure 5.5-13: Individual Radionuclide Contributors to the Upper Three Runs Groundwater Pathway Dose, 20,000 Years



5.5.2.2 Member of the Public at Stream Individual Pathway Contributors

Table 5.5-7 shows the relative contributions from the individual groundwater pathways to the UTR MOP receptor dose at 10,000 years (the year of the peak UTR dose). The primary contributor to the UTR peak is water ingestion (49%) and nearly equal contributions from finfish ingestion (24%), and vegetable ingestion (22%). Table 5.5-8 shows the relative contributions from the individual groundwater pathways to the Fourmile Branch MOP receptor dose at 824 years (the year of the peak Fourmile Branch dose). The primary contributors are dust inhalation (34% of peak dose), and water ingestion (32% of peak dose).

Table 5.5-7: Member of the Public at Stream Peak Dose Individual Groundwater Pathway Contributions for UTR

Pathway	Associated Contribution at year 10,000 (mrem/yr)	Total Peak Dose	Principal Radionuclide Pathway Dose
Water Ingestion	0.02	49%	Ra-226 (51%)
Finfish Ingestion	0.01	24%	Cs-135 (86%)
Vegetable Ingestion	0.01	22%	Ra-226 (84%)
All Others	<0.01	5%	- - -
Total	**0.04**	**100** %	

Table 5.5-8: Member of the Public at Stream Peak Dose Individual Groundwater Pathway Contributions for Fourmile Branch

Pathway	Associated Contribution at year 824 (mrem/yr)	Total Peak Dose	Principal Radionuclide Pathway Dose
Dust Inhalation	0.005	34%	Am-241 (58%)
Water Ingestion	0.005	32%	Tc-99 (88%)
Finfish Ingestion	0.003	17%	Tc-99 (88%)
Vegetable Ingestion	0.002	15%	Tc-99 (88%)
All Others	<0.001	1%	- - -
Total	**0.015**	**100**%	

5.5.3 Member of the Public All-Pathway Dose Results

The purpose of this section is to present the total all-pathway peak doses for both the MOP at 100m and the MOP at the stream. The total all-pathway doses include both the groundwater and air pathway contributors.

5.5.3.1 Member of the Public at 100m Peak Annual All-Pathway Dose

The peak all-pathway annual dose for the MOP at 100m is calculated using the highest 100m groundwater pathway dose results during the 10,000-year performance period (from Section 5.5.1) in combination with the air pathway results (from Section 5.4). The peak all-pathway annual dose for the MOP is 2.51 mrem/yr and is associated with Sector E. The breakdown of the individual dose contributors is provided in Table 5.5-9.

Table 5.5-9: Member of the Public at 100m Peak Annual All-Pathway Dose Contributors

Pathway	Associated Contribution at year 10,000 (mrem/yr)	Percentage of Total Peak Dose	Principal Radionuclide Pathway Dose
Water Ingestion	1.48	59%	Ra-226 (42%)
Vegetable Ingestion	0.66	26%	Ra-226 (42%)
Air Pathway	0.21	8%	Sn-126 (67%)
Finfish Ingestion	0.14	6%	Cs-135 (86%)
Milk Ingestion	0.01	<1%	Ra-226 (79%)
Beef Ingestion	0.01	<1%	Ra-226 (44%)
Total	**2.51**	**100%**	

5.5.3.2 Member of the Public at Stream Peak Annual All-Pathway Dose

The peak all-pathway annual dose for the MOP at the stream is calculated using the highest stream groundwater pathway dose results during the 10,000-year performance period (from Section 5.5.2.1) in combination with the air pathway results (from Section 5.4). The peak all-pathway annual dose for the MOP within 10,000 years is 0.09 mrem/yr and is associated with UTR. The breakdown of the individual dose contributors is provided in Table 5.5-10.

Table 5.5-10: Member of the Public at Stream Peak Annual All-Pathway Dose Individual Groundwater Pathway Contributions

Pathway	Associated Contribution at Year 10,000 (mrem/yr)	Percentage of Total Peak Dose	Principal Radionuclide Pathway Dose
Air Pathway	0.05	56%	Sn-126 (67%)
Water Ingestion	0.02	22%	Ra-226 (51%)
Finfish Ingestion	0.01	11%	Cs-135 (86%)
Vegetable Ingestion	0.01	11%	Ra-226 (84%)
Total	**0.09**	**100%**	

5.6 Uncertainty and Sensitity Analysis

The purpose of the uncertainty and sensitivity section is to consider the effects of uncertainties in the conceptual models used and sensitivities in the parameters used in the mathematical models. This evaluation was conducted for analyses related to MOP as well as those related to inadvertent intruders. These evaluations focused on key uncertainties and key sensitivities identified during modeling. The uncertainty and sensitivity analyses were primarily performed using a probabilistic model (i.e., the GoldSim FTF model), as discussed in Sections 5.6.1 through 5.6.6. As described in Section 5.6.7, some additional single parameter sensitivity analyses were performed through deterministic modeling using both PORFLOW and GoldSim models.

The probabilistic model allows for variability of multiple parameters simultaneously, so concurrent effect of changes in the model can be analyzed, and the potential impact of changes can be assessed. This assessment allows for identification of parameters that are only of significance when varied simultaneously with another parameter. The deterministic model single parameter analysis provides a method to evaluate parametric effects in isolation, so the importance of the uncertainty around a parameter of concern can be more effectively evaluated. Using both probabilistic and deterministic models for sensitivity analysis versus a single approach provides additional information concerning which parameters are of most importance to the FTF model.

5.6.1 Uncertainty and Sensitivity Analysis using Probablistic Modeling

The objective of these analyses was to investigate uncertainties that are inherent in conceptual models, mathematical models, and related data and assumptions to help confirm that the Base Case modeling provides reasonable results.

5.6.1.1 GoldSim FTF Model

In order to address uncertainty and sensitivity of the modeling of the FTF, a probabilistic model was constructed. This model is necessarily simpler than the PORFLOW groundwater model in its environmental transport calculations, but includes additional calculations that cannot be performed in PORFLOW. The GoldSim FTF model is described in detailed in Section 4.4.4.2.

The probabilistic model, written using the GoldSim systems analysis software, accepts uncertainty and variability in the input parameters, the values of which can be defined using probability distributions. If a given model input (e.g., the porosity of sandy soil) is given a distribution, or range of values, then this distribution is sampled in the collection of Monte Carlo runs that constitutes a probabilistic analysis. The collective uncertainty of all stochastic (probabilistic) inputs is reflected in the range and distribution of modeled results, such as water concentrations or dose to hypothetical future human receptors. If a given input parameter is given no range of input values, that is, if it is defined deterministically, then it contributes nothing to the overall uncertainty in the results. In the real world, there are few parameters that have zero uncertainty. An example of a parameter without a defined range is the half-life of radionuclides.

Before probabilistic modeling became computationally feasible, the traditional approach to PA modeling was to assume extreme yet discrete values for parameters whose values were not well known. Practitioners attempted to build what were termed “conservative” models, wherein values would be deliberately chosen to make the result worse, e.g., increasing the dose to a human receptor. This approach is problematic for two reasons: 1) the resulting model was often so far removed from reality that it provided little useful information, and 2) the attempt to determine what a conservative value might be for a given parameter was frustrated by the fact that what may be “conservative” for one exposure pathway may not be for another. Parameterizing the model with realistic input distributions avoids the problem of false conservatism, and produces results that are based on our state of knowledge.

The probabilistic model allows evaluation of the degree of uncertainty in the PA and its role in evaluating results. The results of the uncertainty analysis of this model are discussed in Section 5.6.4. Adopting a probabilistic approach also allows analysts to determine which model input parameters are the most significant to the results. This is done through sensitivity analysis, which identifies covariance between model inputs and results. Section 5.6.6 discusses the sensitivity analysis performed for the FTF model.

A benchmarking of the environmental transport calculations within a deterministic version of the GoldSim FTF model and those performed by the PORFLOW model is discussed in Section 5.6.2.

5.6.1.2 GoldSim FTF Model Assumptions

The minimum evaluation distance from the FTF was determined for the GoldSim FTF model by using Figure 5.2-2, which shows the 100m distance from FTF along the applicable stream tracers. Using this figure it was possible to determine the actual transport distance required to reach the “100m concentration calculation line” distance (Table 5.2-2 presents these distances).

The inventory used for GoldSim FTF stochastic analysis is a slightly abridged version of the inventory used for the Base Case simulations performed using the PORFLOW FTF model. The following radionuclides are not explicitly included in the initial GoldSim inventory: Ba-137m, Bk-249, Ce-144, Cm-242, Cs-134, Eu-155, Na-22, Pm-147, Pr-144, Rh-106, Ru-106, Sb-125, Sb-126, Sb-126m, Te-125m, and Y-90. These radionuclides are not included for various reasons (e.g., short half-life, no DCF) and all of these radionuclides have been shown to have an insignificant contribution to dose (as demonstrated in Section 5.2.1).

Since the GoldSim FTF model did not include explicit stream concentration analysis, in instances where the stochastic analysis required a stream concentration to calculate a dose pathway (e.g., fishing at the stream), a value of 5% of the associated 100m concentration was used. The 5% value is reasonably conservative based on the fact that the peak stream concentration is on average less than 5% of the associated peak 100m concentration (Appendix F.1) and the fact that the water used in the stream pathways would be subject to stream dilution, which is not accounted for when the raw seepline concentration from PORFLOW is used.

5.6.2 GoldSim Benchmarking

The probabilistic model of FTF using the GoldSim systems analysis software is described in Section 4.4.4.2. In order for the probabilistic results of this model to be compared to the results of the PORFLOW FTF model, obtaining a sufficient degree of agreement between the two models is appropriate. Calibration of the PORFLOW model is addressed in Section 4.4.4.1. If possible, the results of a deterministic assessment using the PORFLOW model could be approximated by a similar run in the GoldSim model. Results from both models should generally be comparable for the various configurations and scenarios developed in the conceptual configuration model as well.

Benchmarking of the two models for a Base Case scenario (for selected waste tanks and radionuclides) has achieved the degree of agreement illustrated by the figures within this section. The term “benchmarking” has been chosen, rather than “calibration”, since this process establishes a point from which comparisons can be made rather than attempting to ensure that all results for the two models are identical for all configurations. Only the Base Case configuration was evaluated in the initial benchmarking process. The final benchmarking process also included Case D (a “fast flow” case).

Baseline groundwater modeling was performed using PORFLOW modeling software, a 3-D finite difference porous media flow and transport program. The PORFLOW model can be used for analysis of single parameter changes, but is not designed to model a large number of varying configurations. For this reason, the Uncertainty Analysis (UA) and Sensitivity Analysis (SA) performed for the FTF PA utilized the GoldSim systems analysis software. The GoldSim software is designed to perform probabilistic analysis of abstracted (greatly simplified) systems. To integrate the two software programs, benchmarking was required to demonstrate that the PORFLOW FTF model and the GoldSim FTF model would perform essentially the same calculations and produce comparable results. The challenge was conversion of the 3-D complexity of PORFLOW into the much simpler systems-based modeling used by GoldSim.

The flow fields for the various configurations examined are determined using the PORFLOW FTF model and then extracted for use in the FTF GoldSim model. The flow profiles associated with flow through the CZ for the various configurations are presented in FTF PA Section 5.6.3.1 (Figures 5.6-31 through 5.6-36). The flow profiles are integrated into the FTF GoldSim model as discussed in Section 4.4.4.2 (a detailed discussion of the PORFLOW to GoldSim extraction process is provided in SRNL-L3500-2009-00009). The intent of the benchmarking was to look at the overall model results and adjust the GoldSim model comprehensively so that it better aligned with the FTF PORFLOW model, not to attempt to calibrate individual tanks to match results. Comparison of the flux concentration results between the two models allowed system behaviors to be better diagnosed, which was the intent of the comparison. The comparison allowed for fine tuning of the flow data extracted from PORFLOW into GoldSim. Initial benchmarking efforts identified some general inconsistencies between the model approaches which were corrected irrespective of the results comparison.

Initial benchmarking was documented in Revision 0 of this document, and the results of the initial benchmarking effort are summarized in Section 5.6.2.1, below. Additional benchmarking has since been conducted, and is discussed in detail in Section 5.6.2.2.

5.6.2.1 Initial Benchmarking

The initial benchmarking efforts (carried out in support of Revision 0 of the FTF PA) consisted of two distinct phases. The first phase compared the flux of selected radionuclides into the saturated zone below selected waste tanks. The second phase compared the concentrations of these selected radionuclides in the saturated zone at 100m well locations. The initial benchmarking efforts were described in some detail in Revision 0 of the FTF PA and have been summarized in the following sections.

5.6.2.1.1 Initial Benchmarking Results

Flux benchmarking was conducted on Tc-99, Np-237 and its progeny, Pu-239 and its progeny, and U-238 and its progeny. The flux entering the unsaturated zone below the Type I tanks, Tanks 1, 3 and 5, the Type IV tanks, Tanks 17 and 18, and the Type III tank, Tank 34 were compared between the PORFLOW model and the GoldSim model. This phase of the benchmarking process identified two modeling differences between the PORFLOW model and the GoldSim model which have an impact on the waste release from the contaminated zone. These differences are 1) the model treatment of solubility, and 2) the capability of simulating the transport of contaminants upward into the reducing grout.

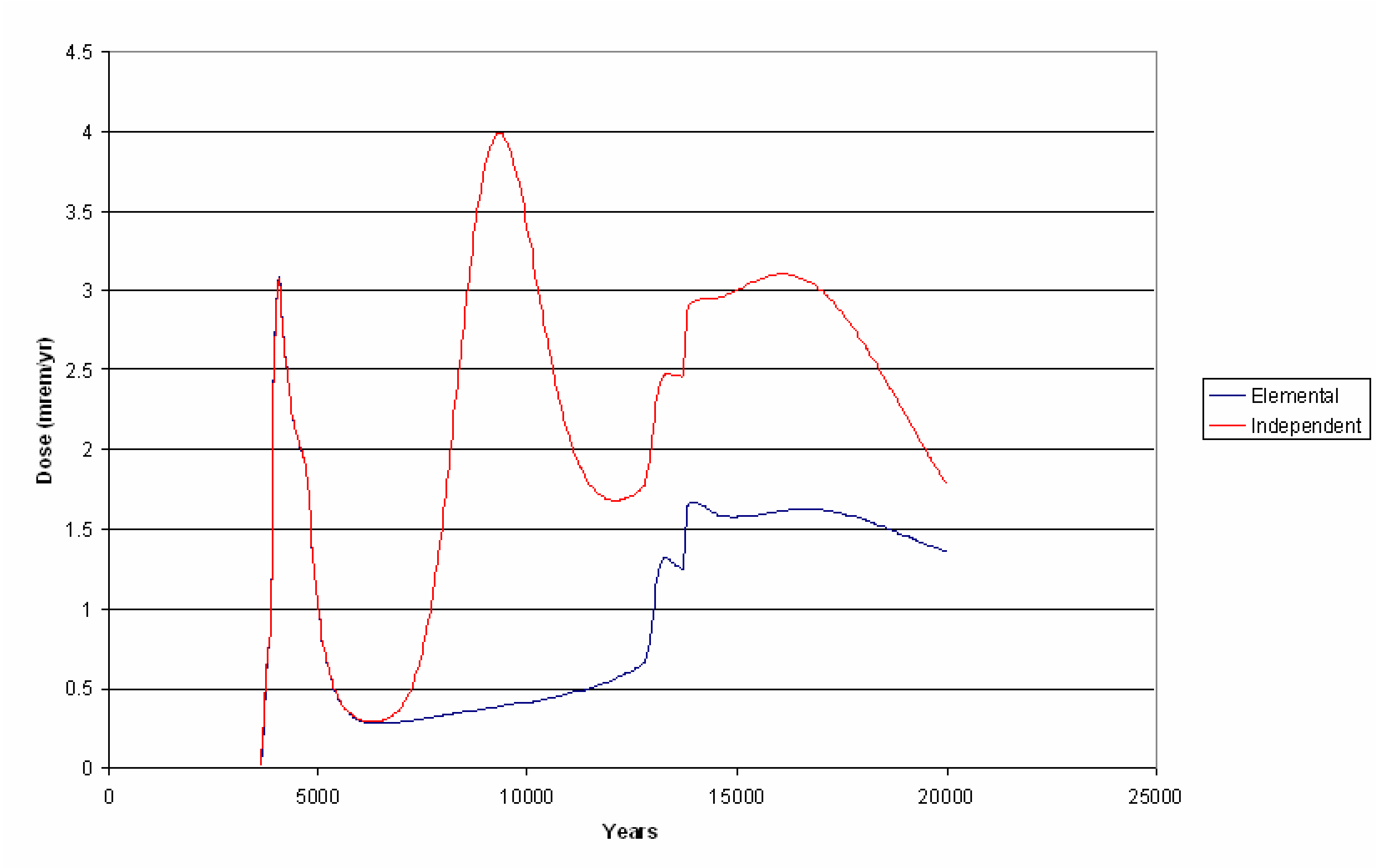
Initial benchmarking of the concentrations of the selected radionuclides in the saturated zone identified several modeling adjustments that were needed to be made to improve the GoldSim model. These adjustments improve the accuracy of the flow data extracted from PORFLOW into GoldSim and include 1) accounting for clayey soil material in the saturated zone, and 2) adding a plume correction and benchmarking fraction to the GoldSim Model. In addition to these two adjustments made for improved flow accuracy, it was identified that the GoldSim results could be improved (in relation to the PORFLOW results) by modifying the longitudinal dispersivity.

5.6.2.1.2 PORFLOW Solubility Control Assessment

PORFLOW does not implement solubility controls for multiple isotopes of the same element. Each isotope of an element is treated independently so that they are not collectively added to reach an elemental solubility limit. This is true when multiple isotopes of the same element appear in the same decay chain or when there are multiple isotopes of the same element within the contaminated zone. This is because the basic implementation of the PORFLOW model is to run each isotope decay chain independently (as a parent). For instance, each plutonium isotope is run as a parent in different simulations. Therefore, the amount of plutonium in solution is based on the single parent when in fact it should be based on the total amount of plutonium in the inventory. Because the waste release within the CZ is solubility controlled, this treatment of solubility by PORFLOW allows for greater release from the CZ than would be expected. The GoldSim model treats solubility by accumulating the quantity of each isotope of an element to determine the waste release and thus models the solubility control more appropriately.

An assessment of the PORFLOW Solubility Control approach was performed in Revision 0 of the FTF PA. This assessment demonstrated that the PORFLOW FTF model differs from actual expected behavior in the way it addresses solubility control. The radionuclides that are potentially most affected by the PORFLOW Solubility Control approach are the plutonium, uranium and thorium isotopes. Even though the solubility control in the PORFLOW FTF model is not elemental, the model results are still valid for use since the solubility control method used allowed more of the contaminant into solution, causing peak doses to occur sooner and with higher peaks. To verify this, two GoldSim model cases were run in support of Revision 0 of the FTF PA. Using Configuration A, and a representative waste tank inventory, one case was run with no isotopes, (i.e., every radionuclide has its own, independent solubility limit), and compared it to the run where the solubility limits were run per element. Figure 5.6-1 shows the effect of the different solubility implementations on the total all-pathways dose. As expected, the independent solubility implementation results in a higher dose. The first peak, around 5,000 years, is driven primarily by Tc-99 which is the lone isotope of that element in the model, hence, the same peak for both implementations. The later peaks come from uranium and plutonium parents, of which there are multiple isotopes.

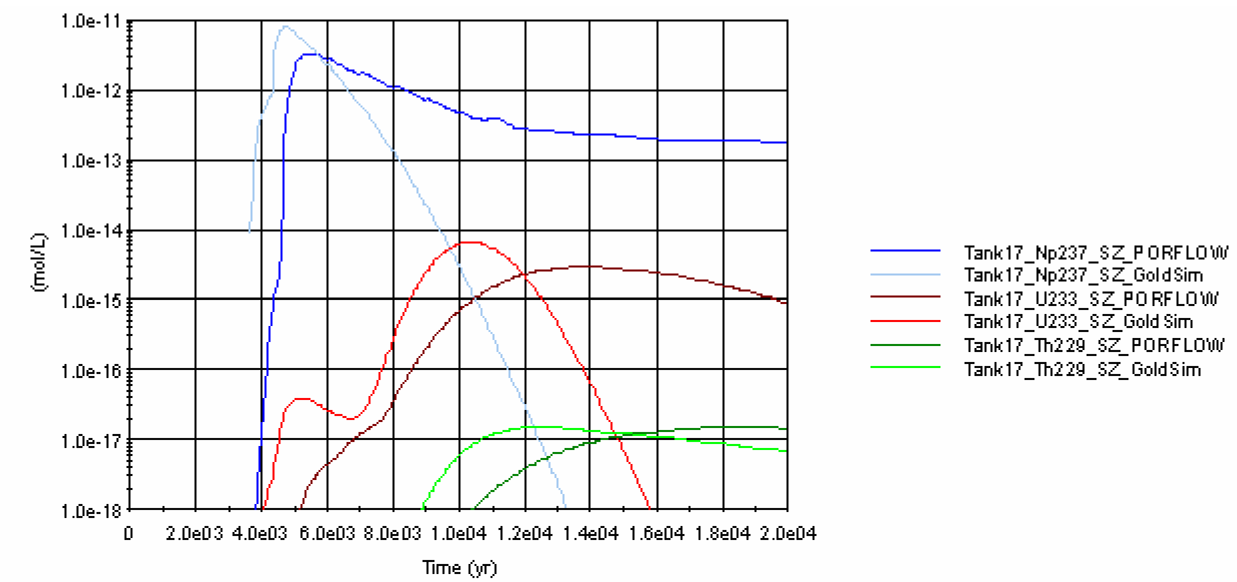
Figure 5.6-1: Elemental versus Independent Solubility (Through 20,000 Years)



5.6.2.1.3 Movement Upward Into the Grout in the FTF PORFLOW Model

The GoldSim model begins at the CZ and directs liquid flow down through the CZ, the tank basemat, and into the unsaturated zone below the tank and finally into the saturated zone. Therefore there is no upward movement of the liquid into the reducing grout volume that sits above the CZ. PORFLOW, on the other hand, allows the upward movement of flow into this reducing grout region and any contaminant release from the waste layer travels into this reducing grout region until the tank liner fails and allows the liquid to leave the tank system. This phenomenon has an impact on the release rate from the tank system when there are upward flows. These upward flows can be experienced by the Type IV tanks which do not have a steel liner at the top of the tank – only a concrete roof. Upward movement of liquid allows for some of the waste to migrate up into the reducing grout. As a result, the PORFLOW model shows a slower release of these elements than the GoldSim model and causes the GoldSim FTF model to allow radionuclides to release earlier than would be expected, since their movement into the grout is not modeled. Figure 5.6-2 presents a comparison of the Np-237 decay chain of Type IV tanks performed in support of Revision 0 of the FTF PA using the GoldSim and PORFLOW models.

Figure 5.6-2: Np-237 Comparison for Type IV Tanks



5.6.2.1.4 Accounting for Clayey Soil Material in the Saturated Zone

The PORFLOW model includes, in its saturated zone transport pathway, more than just GoldSim's simple row of Cells with SandySoil (a solid medium defined in the GoldSim model). In particular, the porous media in PORFLOW include regions of both sandy and clayey soil. Because these media have different adsorption characteristics; as expressed in different soil/water K_ds, some accounting must be made for their presence in the saturated zone transport path. By adding clayey soil, some retardation is added in its most general sense. The solution was to add some of the medium ClayeySoil to the saturated zone transport Cells in the GoldSim model, so that the clayey K_ds would have some influence on the transport. The fraction of ClayeySoil (with the remainder being SandySoil) present in these Cells was used as a benchmarking parameter.

5.6.2.1.5 Plume Correction and Benchmarking Fraction

The plume correction and benchmarking fraction are used within the portion of the GoldSim model that simulates contaminant transport from the individual waste tanks to the evaluation locations (i.e., wells). The transport in the saturated zone is done using a 1-D line of cells to cover the distance between the edge of the waste tank and the line of wells 100-m from the FTF. This 1-D calculation is intended to work along a streamline, and the GoldSim plume function is used to disperse the contamination laterally, so that each well will receive some input from each waste tank. This plume correction, which is in the form of a fraction of the concentration found in the final cell in the series (where the well is hypothesized to be), distributes the contaminant plume across the line of wells. A benchmarking fraction is also applied to the plume function to better align the flow effects in the FTF GoldSim model with the GSA database flow data inherent in the FTF PORFLOW model.

5.6.2.1.6 Longitudinal Numerical Dispersion Correction

Dispersivity accounts for the degree to which a contaminant plume spreads as it travels through a porous medium. In general, a plume will spread longitudinally (parallel to the direction of flow), laterally (transverse to the direction of flow, in the horizontal plane), and vertically (perpendicular to the direction of flow). Dispersivity of plumes is difficult to characterize and are generally based on detailed mapping of discrete plumes which is very difficult in the SRS GSA due to the numerous co-located facilities. Another complicating factor is that numerical approximations to contaminant transport create their own dispersion through discretization of the modeling domain and mathematical mixing within discrete cells. This numerical dispersion occurs in the GoldSim one-dimensional approximation and the PORFLOW 3-D modeling. In the GoldSim model, the longitudinal migration along a one-dimensional flow path is subject to longitudinal numerical dispersion between cells, and an instantaneous dispersion of the plume to the cell width and height. By increasing the number of mixing cells in GoldSim to more closely match the PORFLOW discretization, the timing of the arrival of radionuclides was consistent between the two models.

5.6.2.2 Final Benchmarking

The inventory associated with the waste tanks was changed between Revisions 0 and 1 of the FTF PA, which necessitated a revalidation of the initial benchmarking summarized above. Minor inconsistencies between the PORFLOW model and the GoldSim model identified during this validation were corrected in the GoldSim model prior to completion of the final benchmarking runs.

In addition to correcting these modeling inconsistencies, it was identified that the inherent system behavior could be improved (in relation to the PORFLOW results) by increasing the number of mixing cells used to represent the tank basemat from one to five.

5.6.2.2.1 Final Flux Benchmarking

Final flux benchmarking considered the flux at the unsaturated zone to the water table from each of the distinct tank types: Tank 1 for a Type I tank, Tank 18 for a Type IV tank and Tank 34 for a Type III/IIIA tank. Because of their importance in the dose model, the flux associated with Tc-99, Np-237 and its progeny, Pu-239 and its progeny, and U-234 and its progeny were chosen to be evaluated In addition, flux comparisons were also made for Case D, the fast flow case, to gauge the agreement between the PORFLOW and GoldSim models for a case that has significantly different flow patterns. The analysis of the fluxes showed good agreement between the PORFLOW model and the GoldSim model.

The specific analyses of the fluxes are presented below.

Flux Comparison for Case A

Case A is the Base Case configuration which is described in Section 4.4.2.1. This configuration assumes an initially intact closure cap with degradation of the closure cap and cementitious materials but with no fast flow paths. Timelines showing when significant model changes would occur are presented in Tables 4.4-2 through 4.4-5 for the Type I, Type III, Type IIIA, and Type IV tanks, respectively.

Flux from Tank 1

Figures 5.6-3 through 5.6-6 illustrate the flux comparisons from Tank 1, a Type I tank, between the PORFLOW model and the GoldSim model for Tc-99, Np-237, Pu-239 and U-234, respectively. Figure 5.6-3 shows excellent agreement between the PORFLOW model and the GoldSim model for both the timing of the release and the magnitude of the release. Figures 5.6-4 through 5.6-6 show good agreement between the PORFLOW model and the GoldSim model but also illustrates the differences between the two models on how solubility is treated as shown by the higher flux values in these figures for Uranium and Thorium. The difference in the treatment of solubility between the two models is discussed in Section 5.6.2.1.2.

Figure 5.6-3: Tank 1 Flux to Saturated Zone – Tc-99 (Case A)

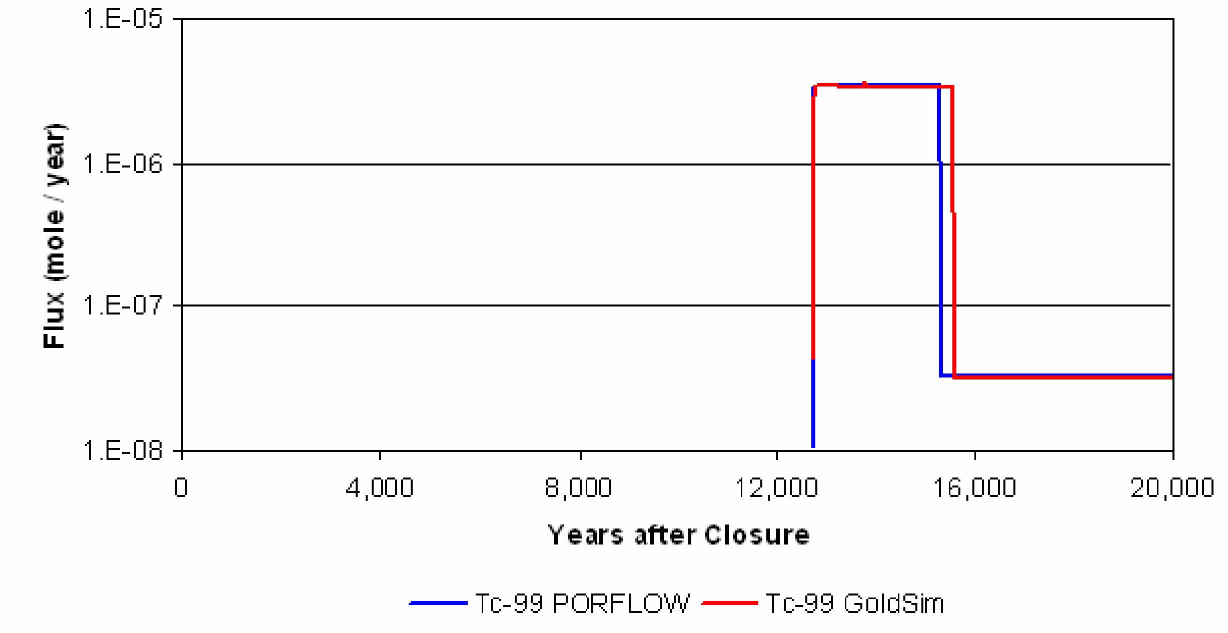


Figure 5.6-4: Tank 1 Flux to Saturated Zone – Np-237 (Case A)

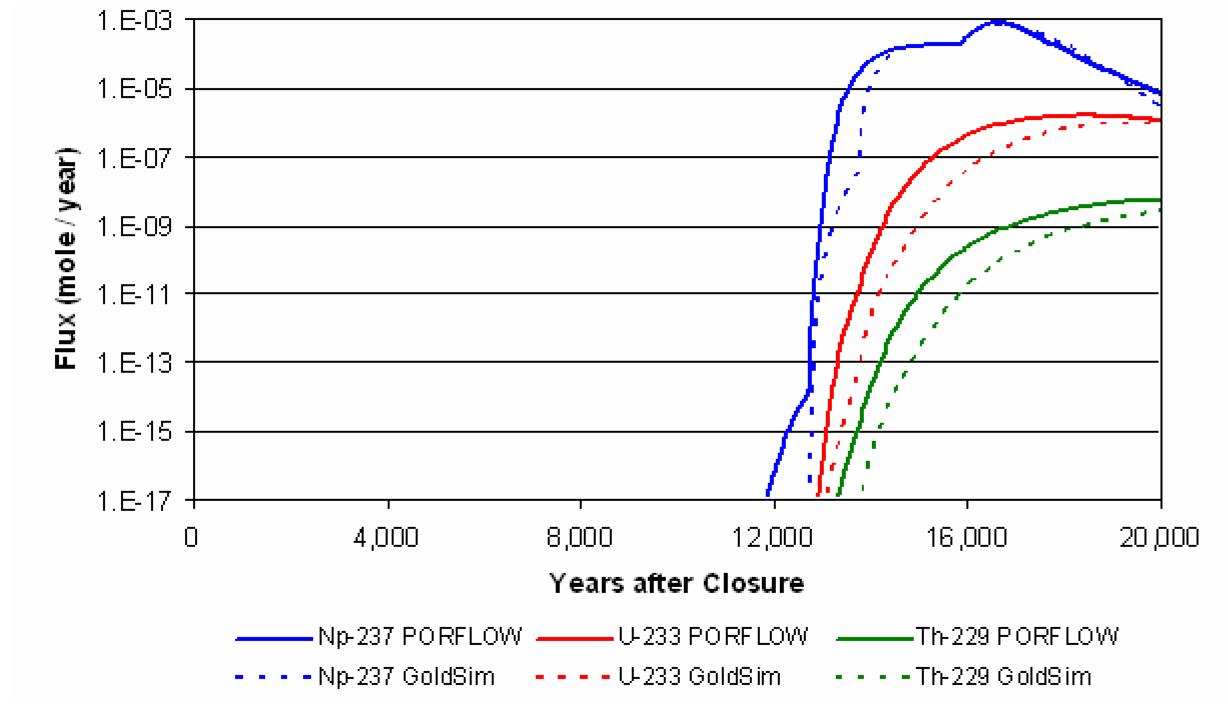


Figure 5.6-5: Tank 1 Flux to Saturated Zone – Pu-239 (Case A)

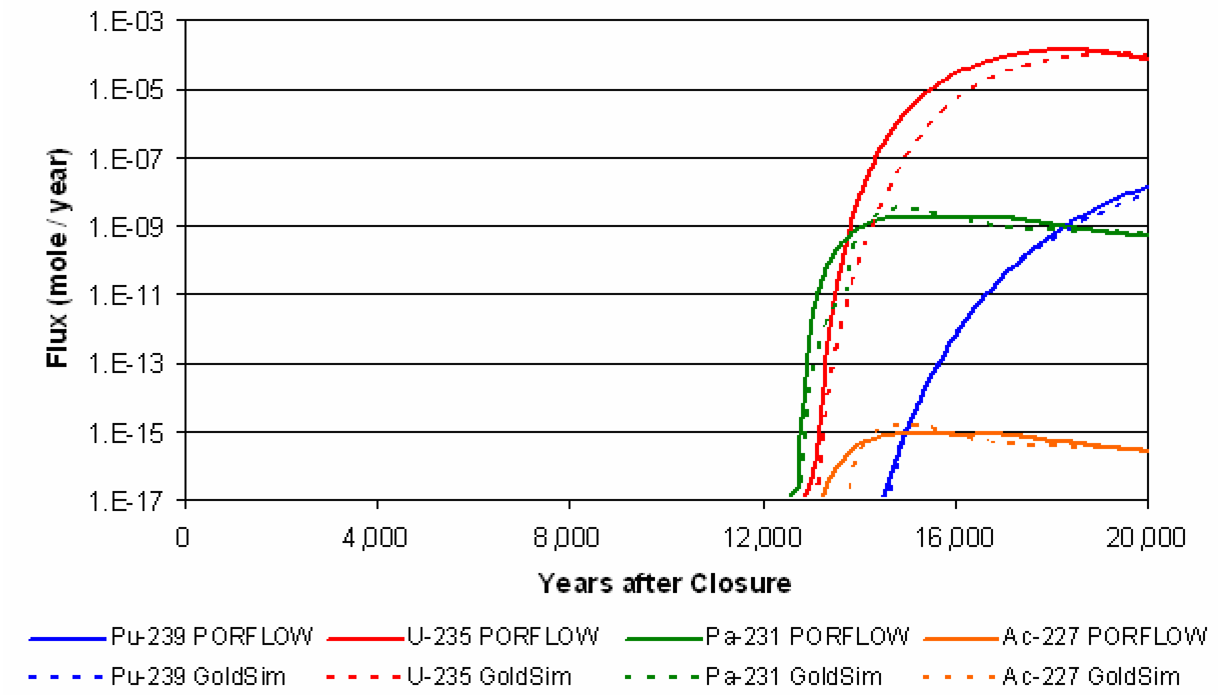
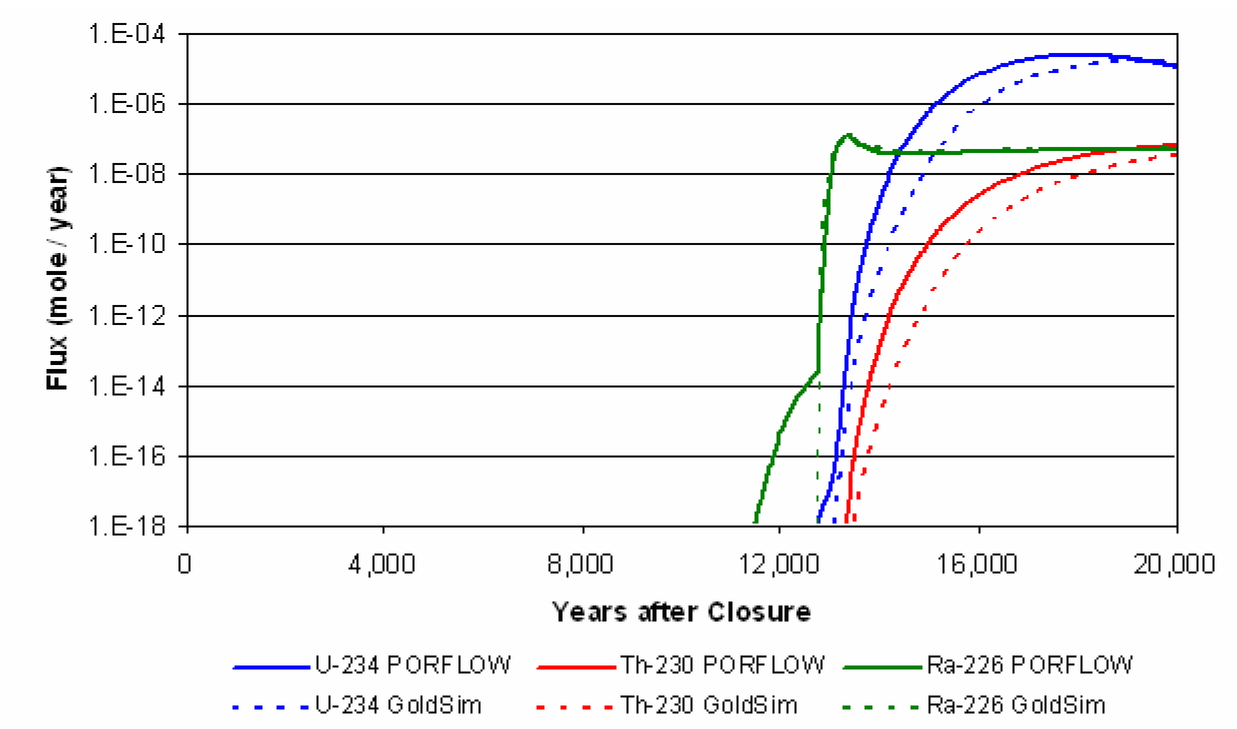


Figure 5.6-6: Tank 1 Flux to Saturated Zone – U-234 (Case A)



Flux from Tank 18

Figures 5.6-7 through 5.6-10 illustrate the flux comparisons from Tank 18, a Type IV tank, between the PORFLOW model and the GoldSim model for Tc-99, Np-237, Pu-239 and U-234, respectively. The flux comparison for Tc-99 shown in Figure 5.6-7 illustrates another modeling difference discussed in the earlier benchmarking process in Section 5.6.2.1.3 – the GoldSim model does not include the flow upward into the reducing grout from the waste zone that would occur prior to tank liner failure. This affect is pronounced in Tank 18 and the other Type IV tanks because the lack of a steel liner on the tank top allows liquid flow into the Type IV tanks to occur earlier and at a greater rate. This flow into the waste tank is allowed to enter into the reducing grout above the waste layer and then is released once the tank bottom steel liner fails. In the GoldSim model no upward flow travel is modeled and thus the inventory remains in the waste zone until it is released after liner failure. Therefore, the Tc-99 release occurs without the benefit of retardation in the grout layer that is accounted for in the PORFLOW model. This modeling difference is also evident in the other flux curves Figures 5.6-8 through 5.6-10. In particular, Figure 5.6-8 shows a rapid drop off of the Np-237 flux in the GoldSim model which is attributed to the early depletion of the available Np-237 inventory due to the lack of retardation within the grout zone above the waste layer.

Figure 5.6-7: Tank 18 Flux to Saturated Zone – Tc-99 (Case A)

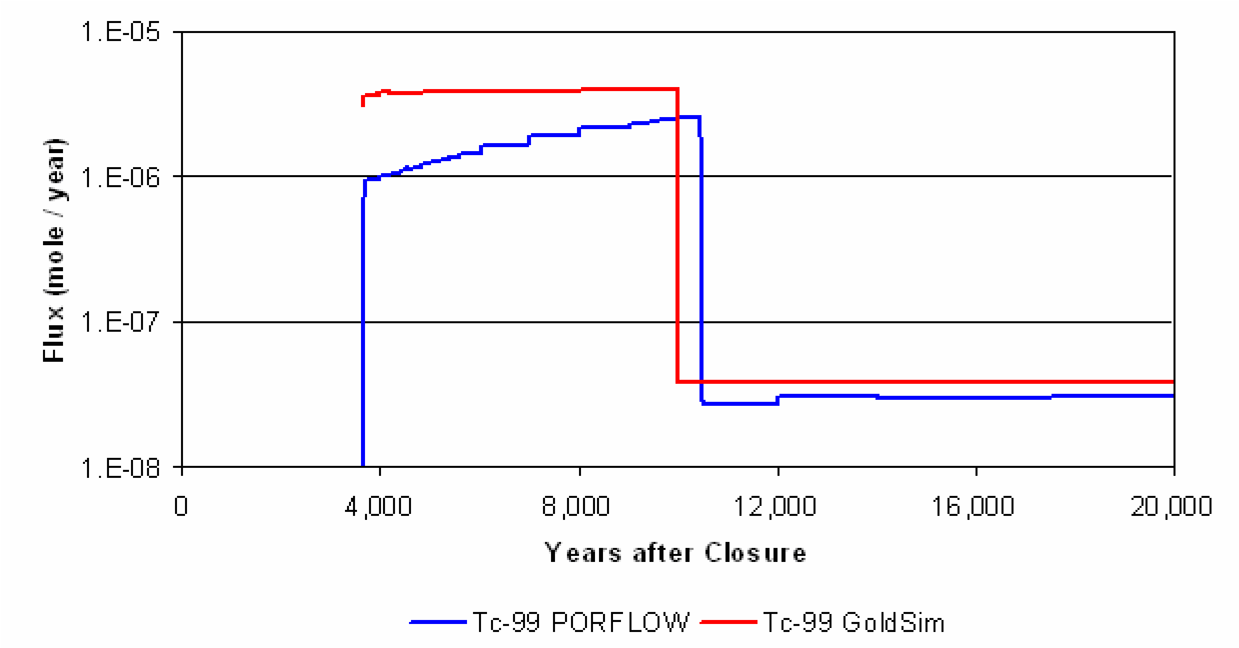


Figure 5.6-8: Tank 18 Flux to Saturated Zone – Np-237 (Case A)

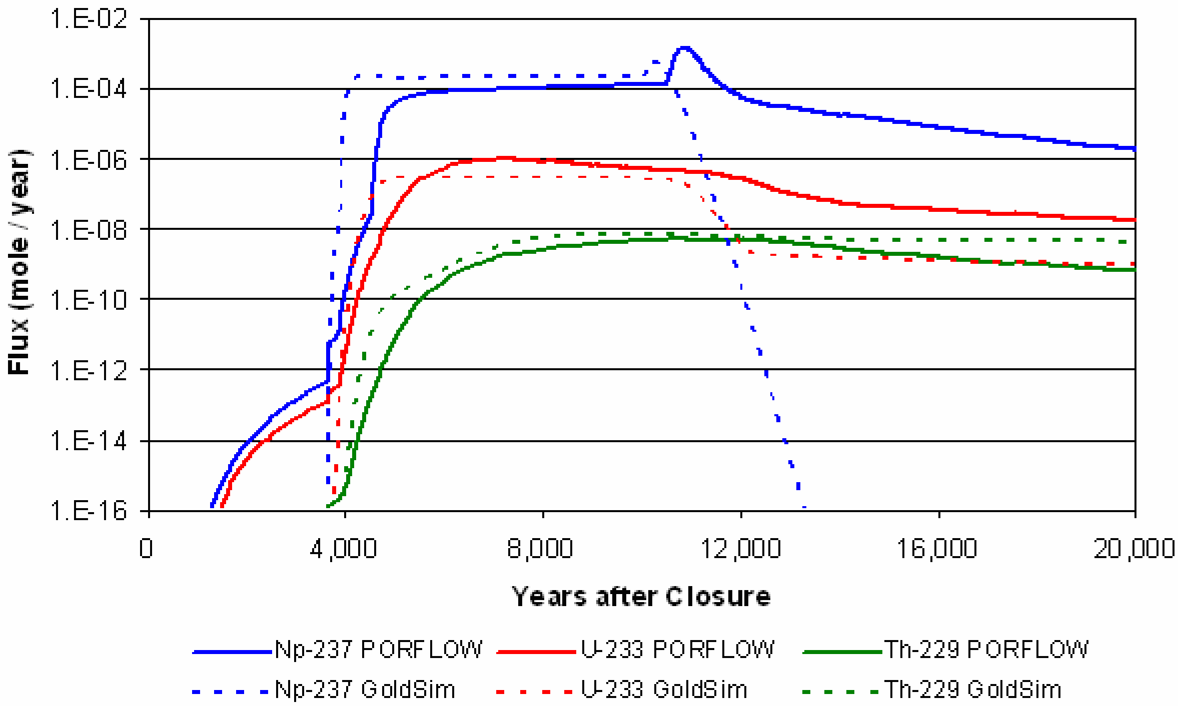


Figure 5.6-9: Tank 18 Flux to Saturated Zone – Pu-239 (Case A)

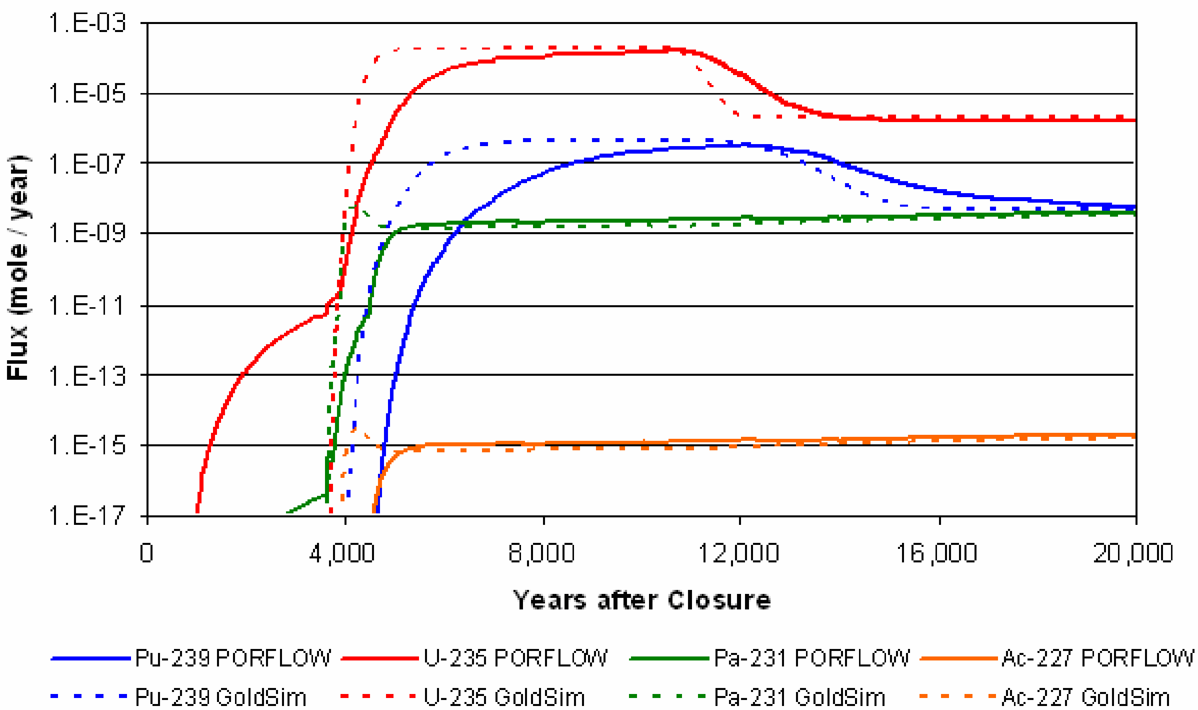
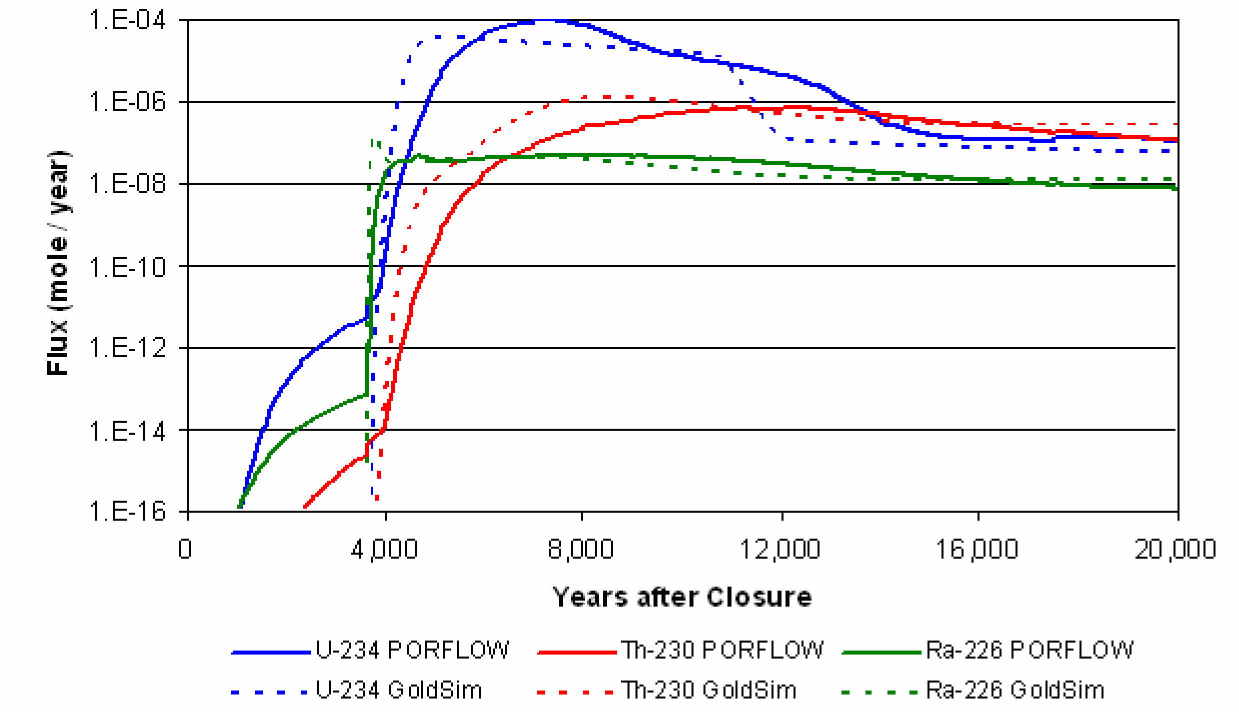


Figure 5.6-10: Tank 18 Flux to Saturated Zone – U-234 (Case A)



Flux from Tank 34

Figures 5.6-11 through 5.6-14 illustrate the flux comparisons from Tank 34, a Type III tank, between the PORFLOW model and the GoldSim model for Tc-99, Np-237, Pu-239 and U-234, respectively. The Tc-99 flux shown in Figure 5.6-11 shows excellent agreement between the GoldSim and PORFLOW models and the other flux curves shown in Figures 5.6-12 through 5.6-14 illustrate a subtle difference between the GoldSim model and the PORFLOW model. The Type III and IIIA tanks have a drop panel as shown in Figures 3.2-11 and 3.2-12. This additional volume of concrete is accounted for in the PORFLOW model which provides a longer period of time before the tank basemat transitions from middle-aged oxidized to old-age oxidized as well as a longer path of travel of the contaminants through the basemat. In the GoldSim model this drop panel is not included. Therefore, elements that have a significant K_d value in middle-aged concrete (hundreds to thousands) but then have much lesser K_d values in old-aged concrete would be released earlier and have an increased rate of release in the GoldSim model than in the PORFLOW model. This is evident in the flux curves for Neptunium, Plutonium, and Thorium shown in Figures 5.6-12 through 5.6-14.

Figure 5.6-11: Tank 34 Flux to Saturated Zone – Tc-99 (Case A)

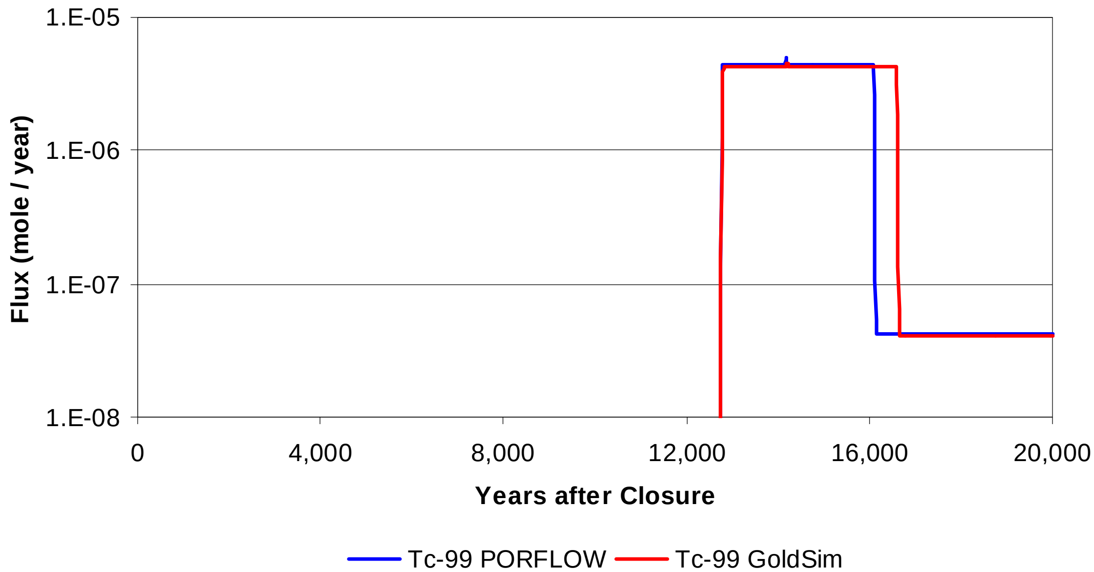


Figure 5.6-12: Tank 34 Flux to Saturated Zone – Np-237 (Case A)

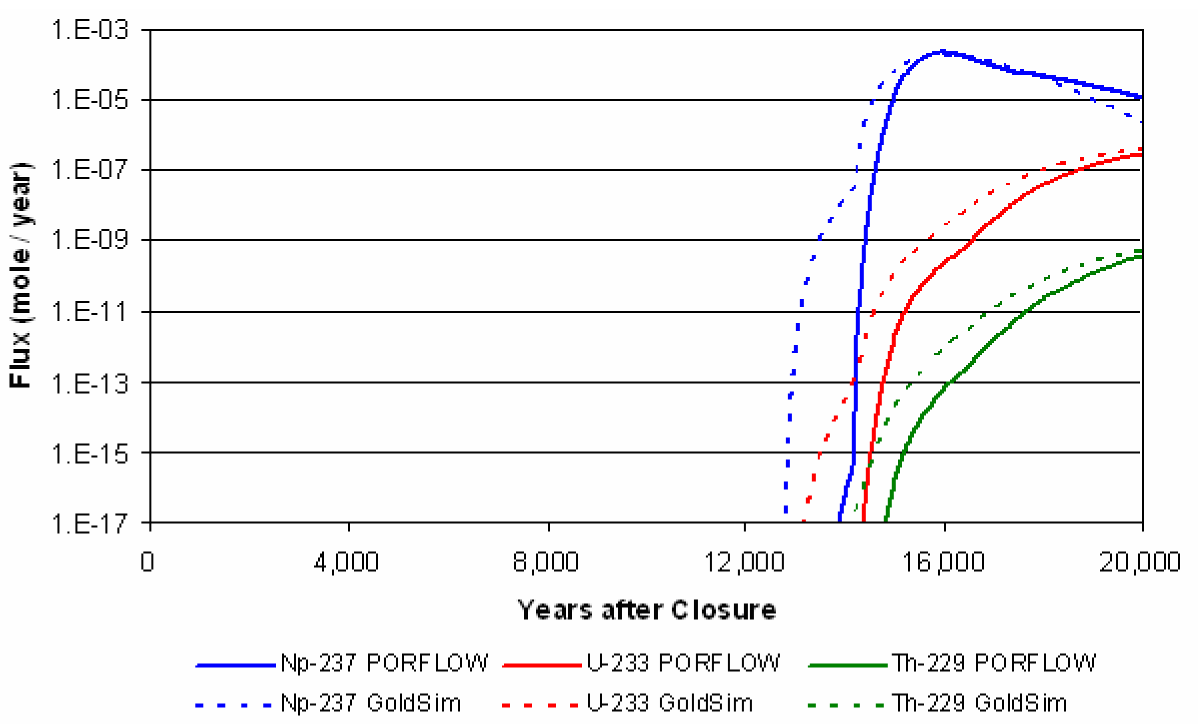


Figure 5.6-13: Tank 34 Flux to Saturated Zone – Pu-239 (Case A)

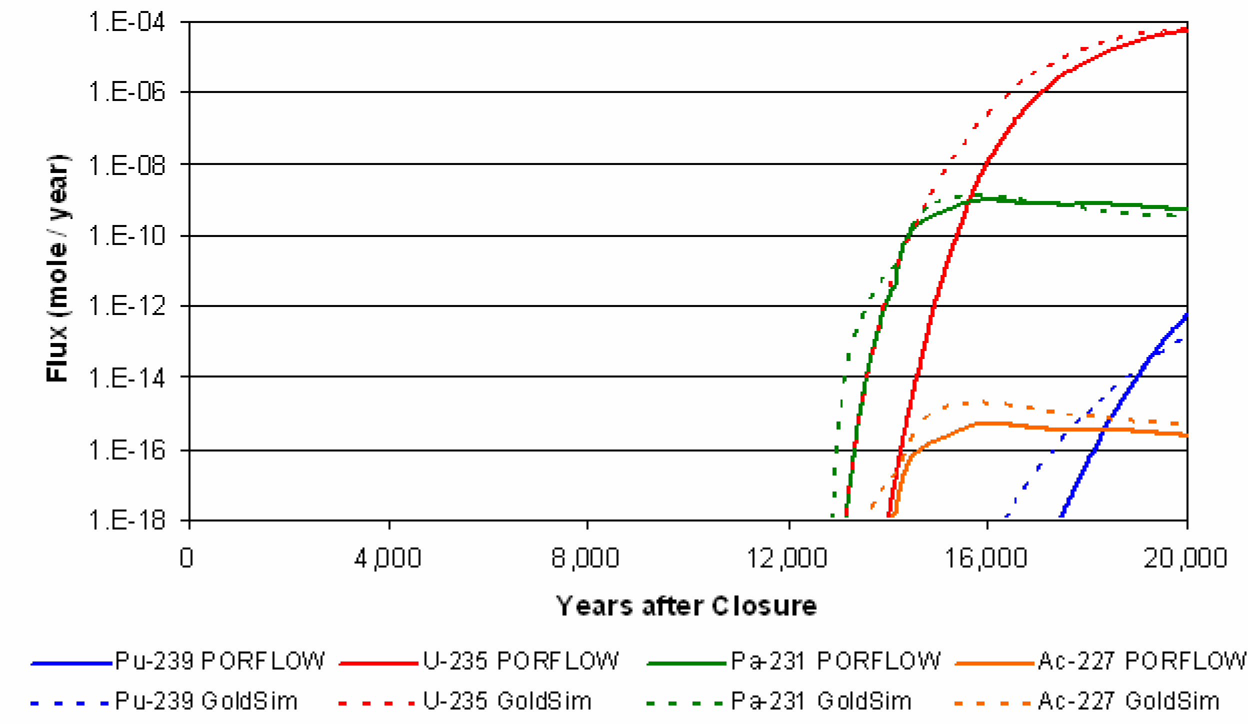
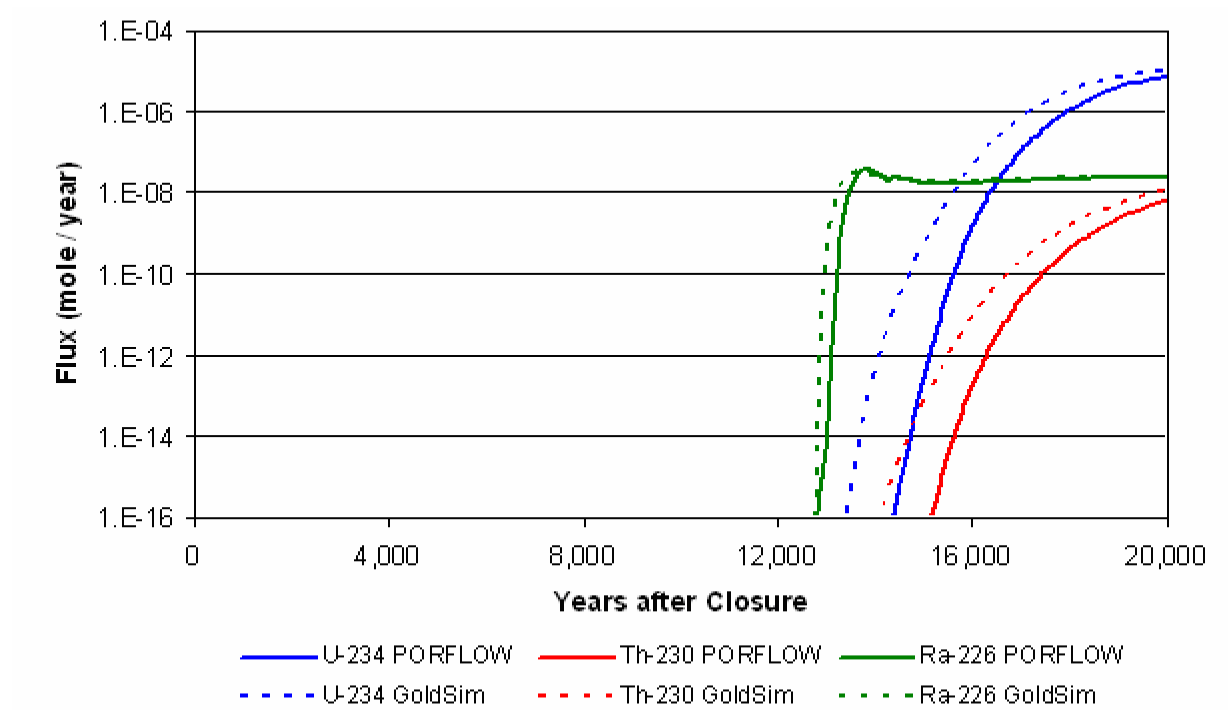


Figure 5.6-14: Tank 34 Flux to Saturated Zone – U-234 (Case A)



Flux Comparison for Case D

Case D is the "fast flow" configuration which is described in Section 4.4.2.4. This configuration assumes an initially intact closure cap with degradation of the cap and cementitious materials but fast flow paths exist that penetrate through the entire closed tank system. Timelines showing when significant model changes would occur are presented in Tables 4.4-2 through 4.4-5 for the Type I, Type III, Type IIIA, and Type IV tanks, respectively.

Flux from Tank 1 (Case D)

Figures 5.6-15 through 5.6-18 illustrate the flux comparisons from Tank 1 between the PORFLOW and GoldSim models. The large spike shown in Figure 5.6-15 illustrates the transition from middle-aged oxidized to old-aged oxidized concrete grout that results in an instantaneous release of the remaining Tc-99 inventory because of the loss of solubility controls in the old-aged oxidized concrete. The later depletion of the Tc-99 inventory in the PORFLOW model versus the GoldSim model is due to the intrusion of liquid into the reducing grout above the CZ prior to liner failure that provides additional retardation of the Tc-99 release. The gradual residual release of Np-237 and U-233, shown in Figure 5.6-16, and of U-234, shown in Figure 5.6-18, from the PORFLOW model, contrary to the sharper drop off shown in the GoldSim model, is also attributed to the intrusion of liquid into the reducing grout above the CZ prior to liner failure that provides additional retardation of these releases. Figure 5.6-17 shows a more rapid early release of Pu-239 in the PORFLOW model than in the GoldSim model. This more rapid release is caused by the loss of retardation provided by the tank basemat due to the fast flow path that bypasses the basemat. This bypass is more noticeable for Pu-239 because of its high K_d value in oxidized concrete (5,000 mL/g).

Figure 5.6-15: Tank 1 Flux to Saturated Zone – Tc-99 (Case D)

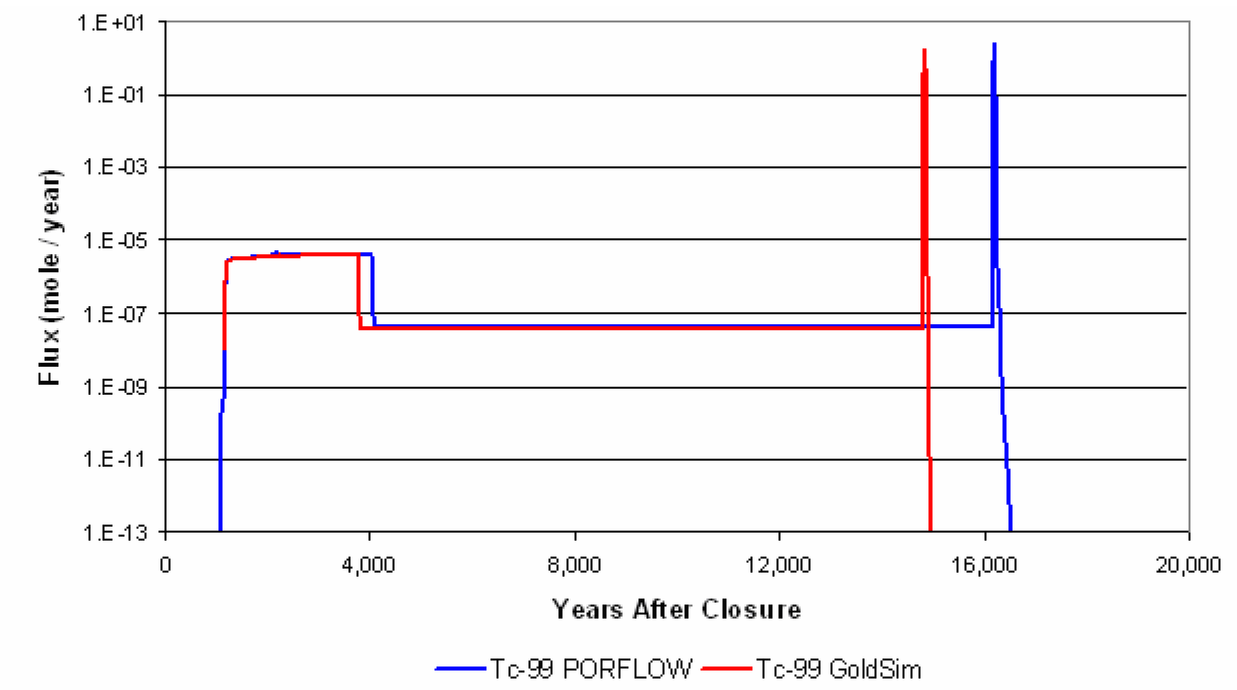


Figure 5.6-16: Tank 1 Flux to Saturated Zone – Np-237 (Case D)

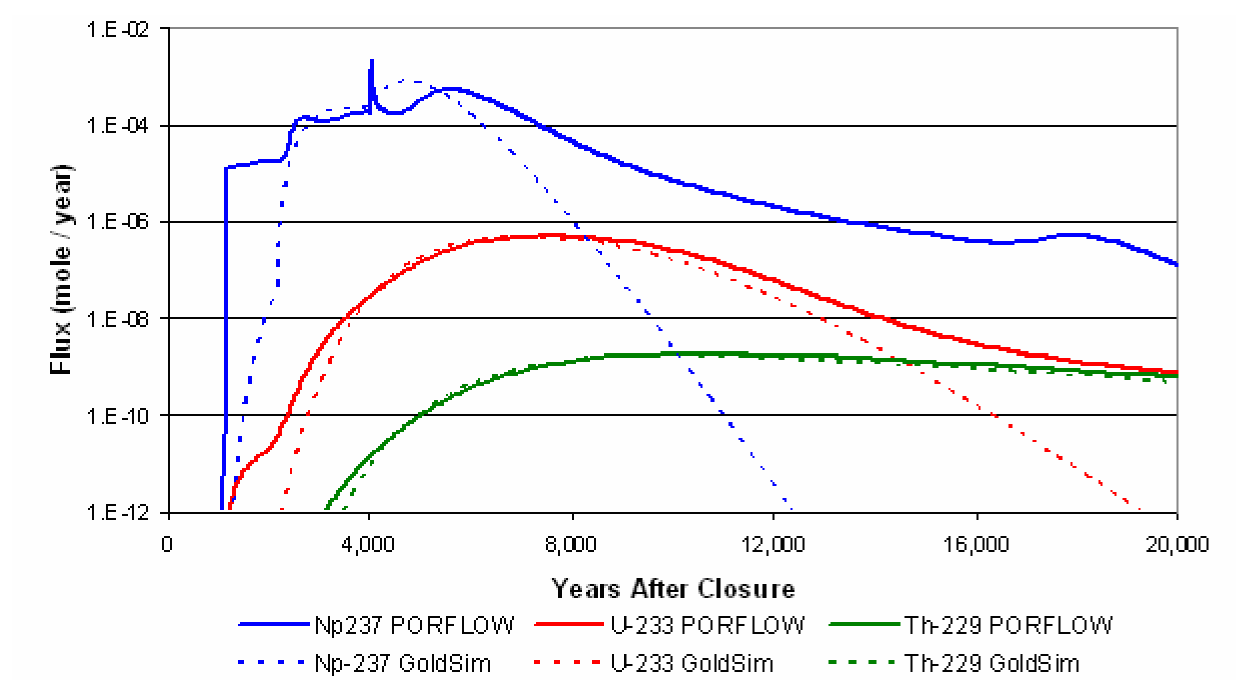


Figure 5.6-17: Tank 1 Flux to Saturated Zone – Pu-239 (Case D)

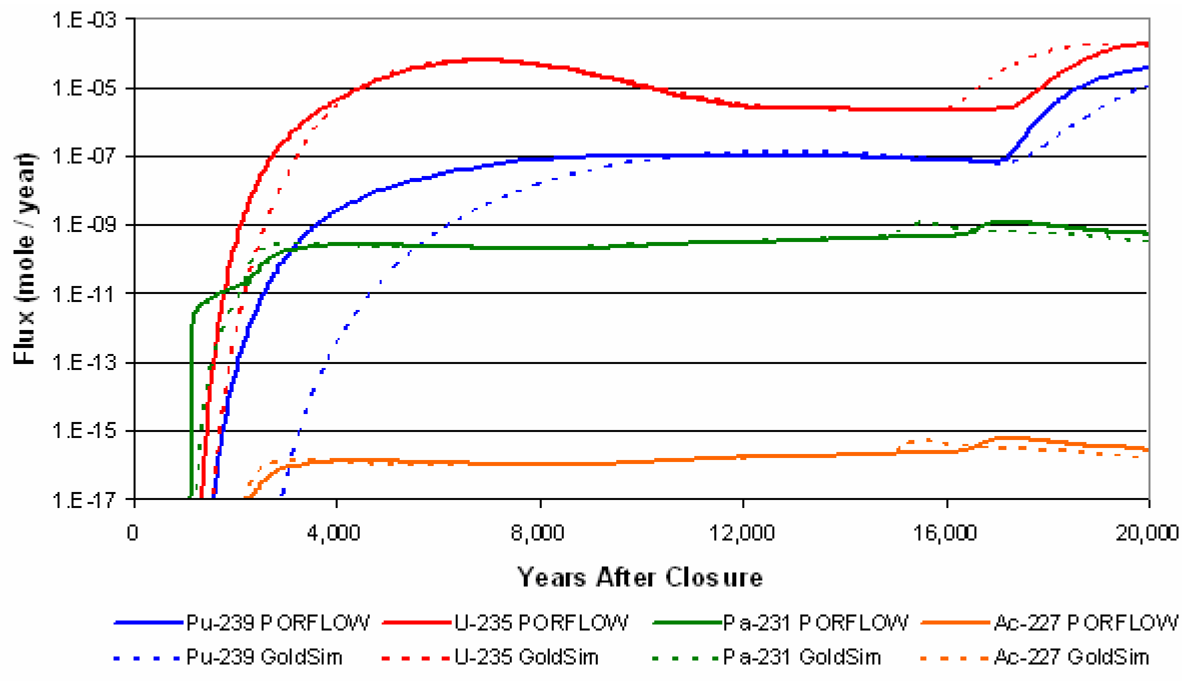
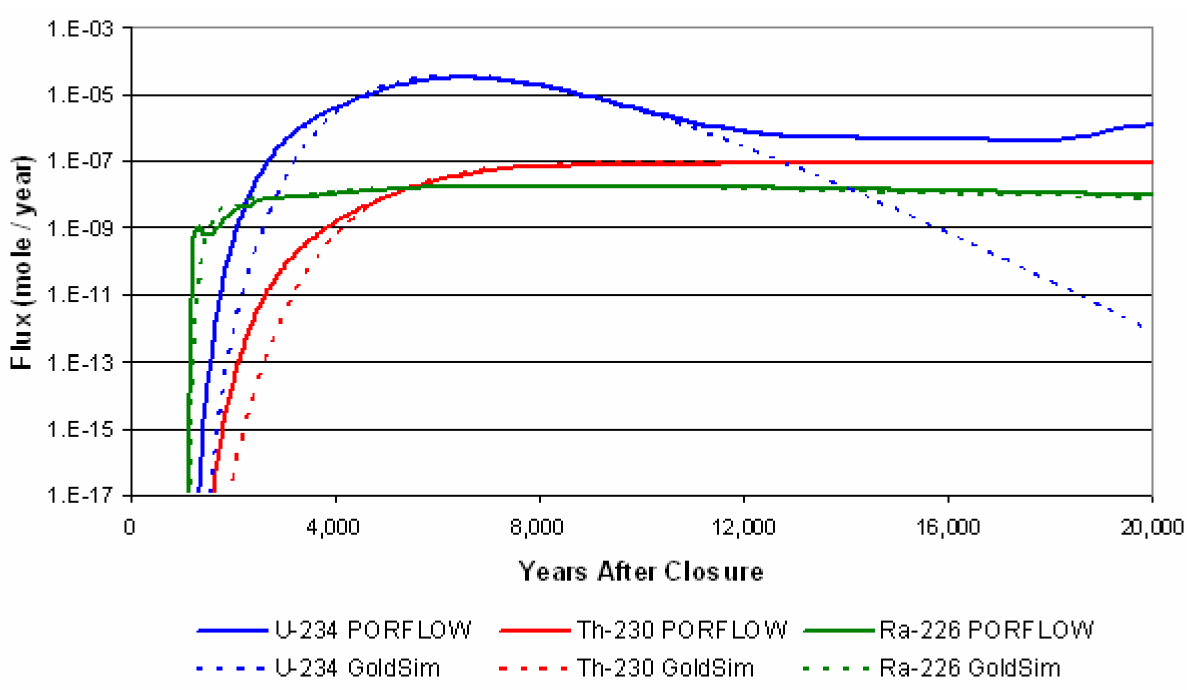


Figure 5.6-18: Tank 1 Flux to Saturated Zone – U-234 (Case D)



Flux from Tank 18 (Case D)

Figures 5.6-19 through 5.6-22 illustrate the flux comparisons from Tank 18 between the PORFLOW and GoldSim models. The relatively thin concrete basemat of the Type IV tanks would tend to show a greater departure between the PORFLOW and GoldSim models. The fast flow path is modeled in PORFLOW as a discrete region through the tank system with hydraulic properties associated with soil and with no retardation (K_d = 0) while in GoldSim this fast flow condition is modeled only by an increase in the flow rates. Thus, the increased flow rates would tend to "flush" the inventory more quickly in the GoldSim model than the PORFLOW model. The flux comparisons shown in Figures 5.6-19 through 5.6-22 shows relatively good agreement between the release magnitudes and timings, with the differences primarily being centered around the timing of inventory depletion due to the inherent modeling differences.

Figure 5.6-19: Tank 18 Flux to Saturated Zone – Tc-99 (Case D)

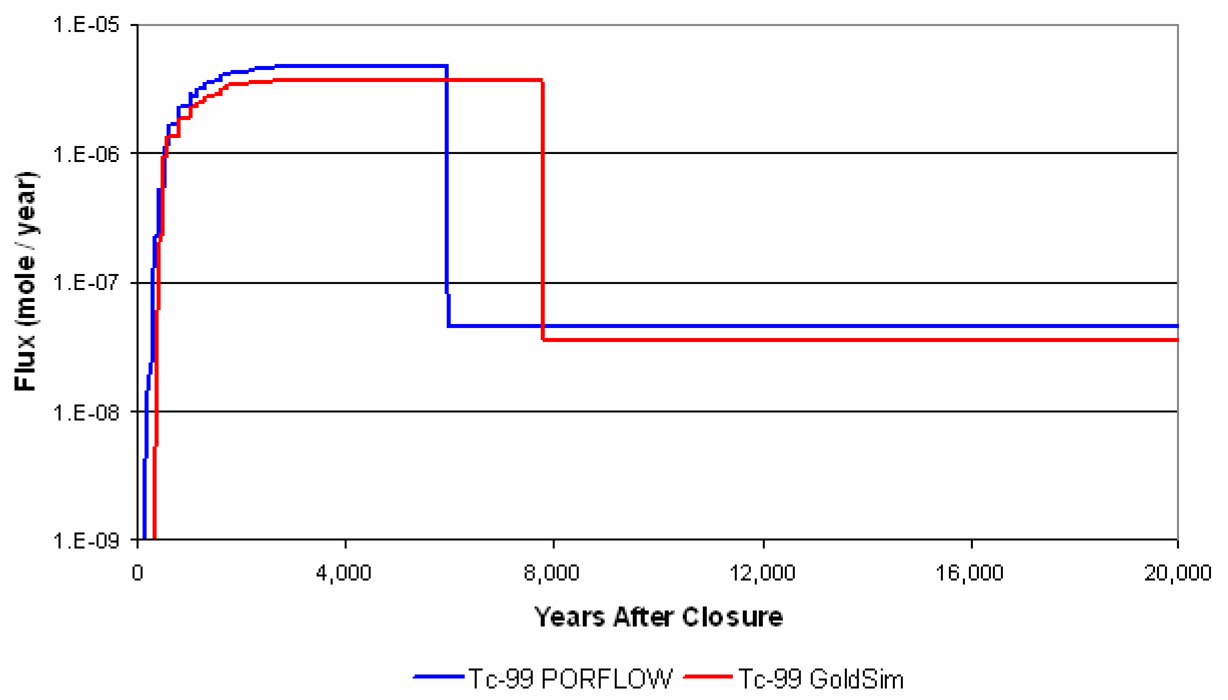


Figure 5.6-20: Tank 18 Flux to Saturated Zone – Np-237 (Case D)

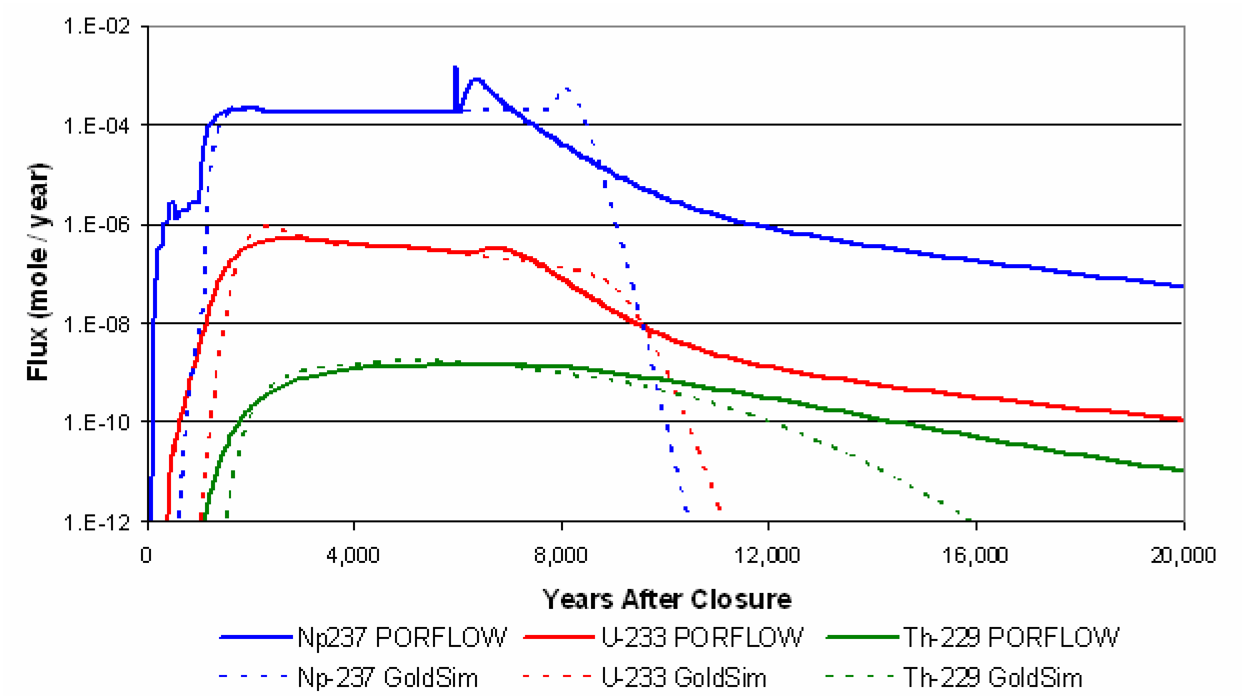


Figure 5.6-21: Tank 18 Flux to Saturated Zone – Pu-239 (Case D)

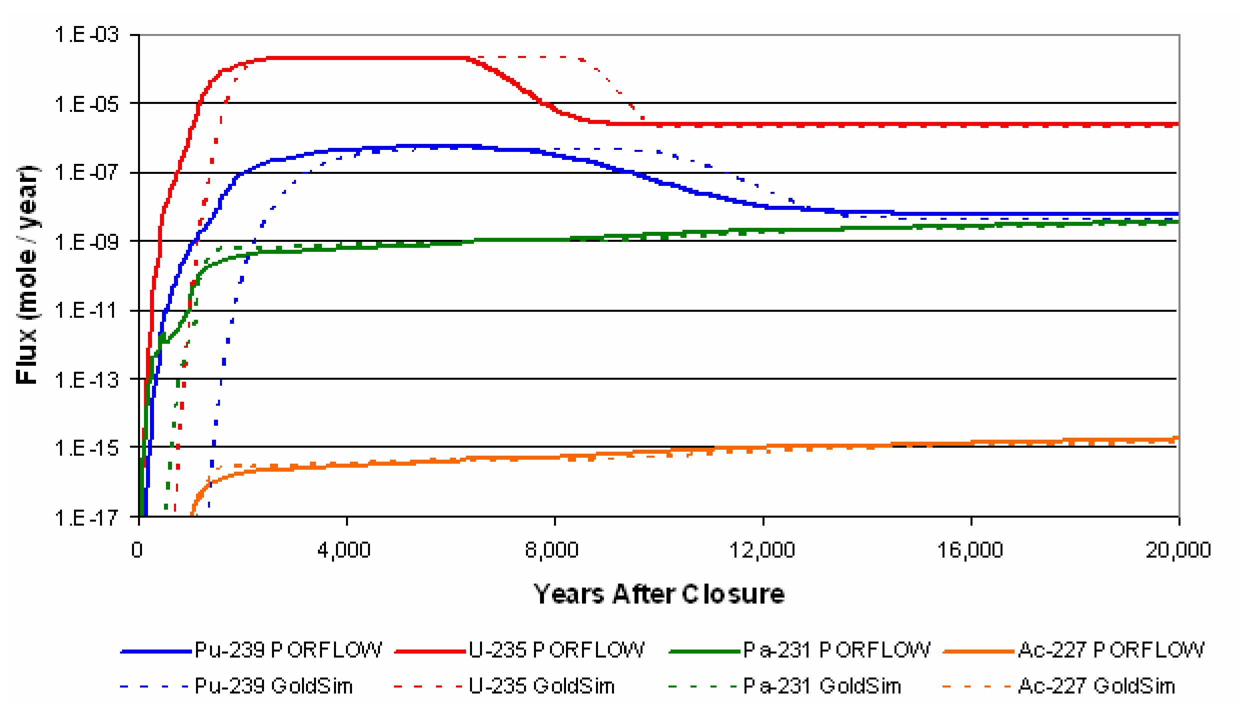
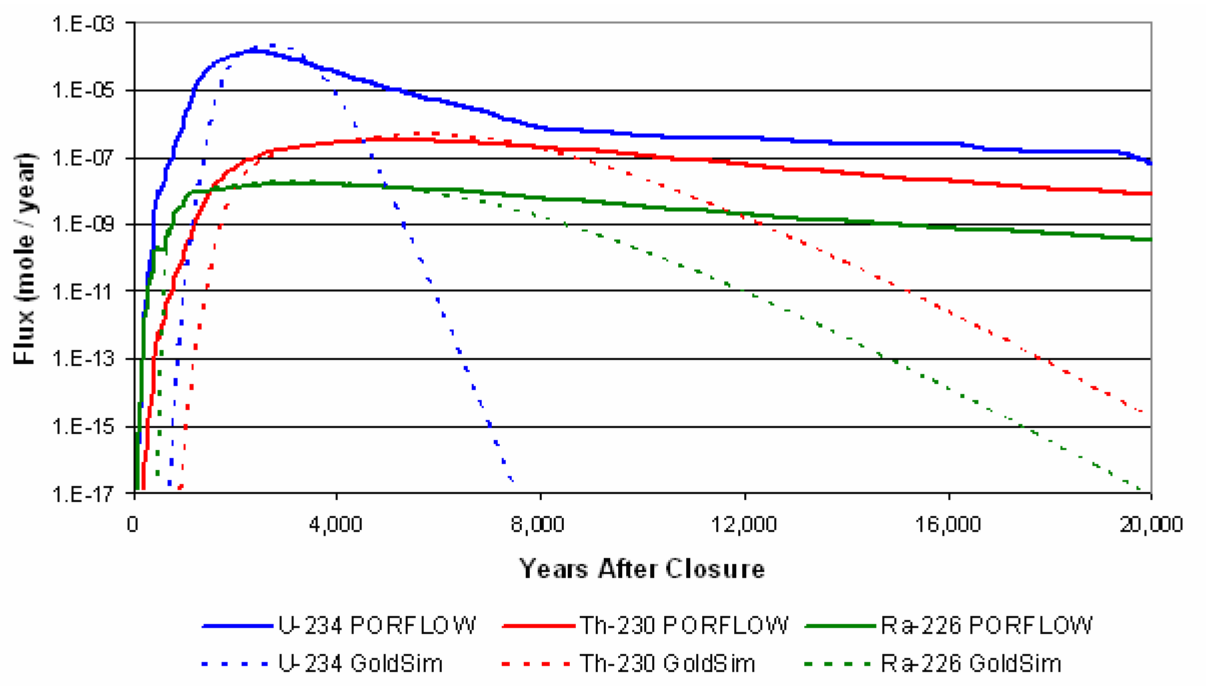


Figure 5.6-22: Tank 18 Flux to Saturated Zone – U-234 (Case D)



Flux from Tank 34 (Case D)

Figures 5.6-23 through 5.6-26 illustrate the flux comparisons from Tank 34 between the PORFLOW and GoldSim models. These figures show excellent agreement between the two models, with the exception of the Np-237 flux shown in Figure 5.6-24 and the Pu-239 flux shown in Figure 5.6-25. The gradual residual release of Np-237 shown in Figure 5.6-24 from the PORFLOW model, contrary to the sharper drop off shown in the GoldSim model, is attributed to the intrusion of liquid into the reducing grout above the CZ prior to liner failure that provides additional retardation of this release. Figure 5.6-25 shows a more rapid early release of Pu-239 in the PORFLOW model than in the GoldSim model. This more rapid release is caused by the loss of retardation provided by the tank basemat due to the fast flow path that bypasses the basemat. This bypass is more noticeable for Pu-239 because of its high K_d value in oxidized concrete (5,000 mL/g).

Figure 5.6-23: Tank 34 Flux to Saturated Zone – Tc-99 (Case D)

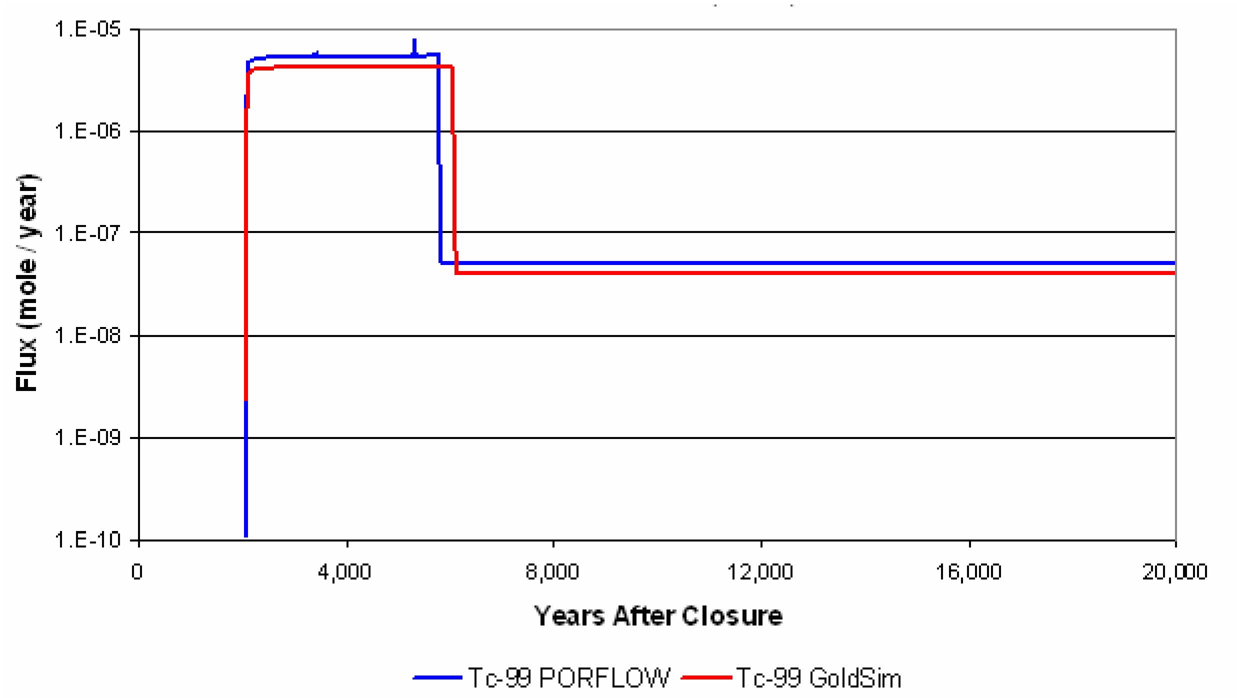


Figure 5.6-24: Tank 34 Flux to Saturated Zone – Np-237 (Case D)

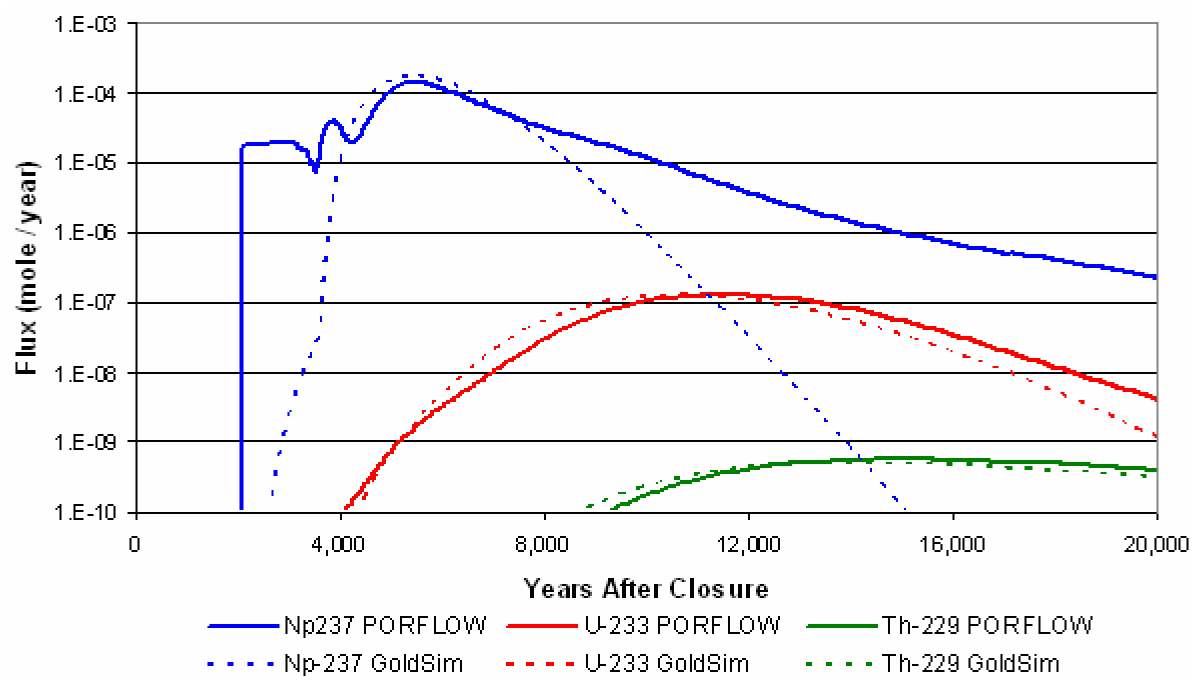


Figure 5.6-25: Tank 34 Flux to Saturated Zone – Pu-239 (Case D)

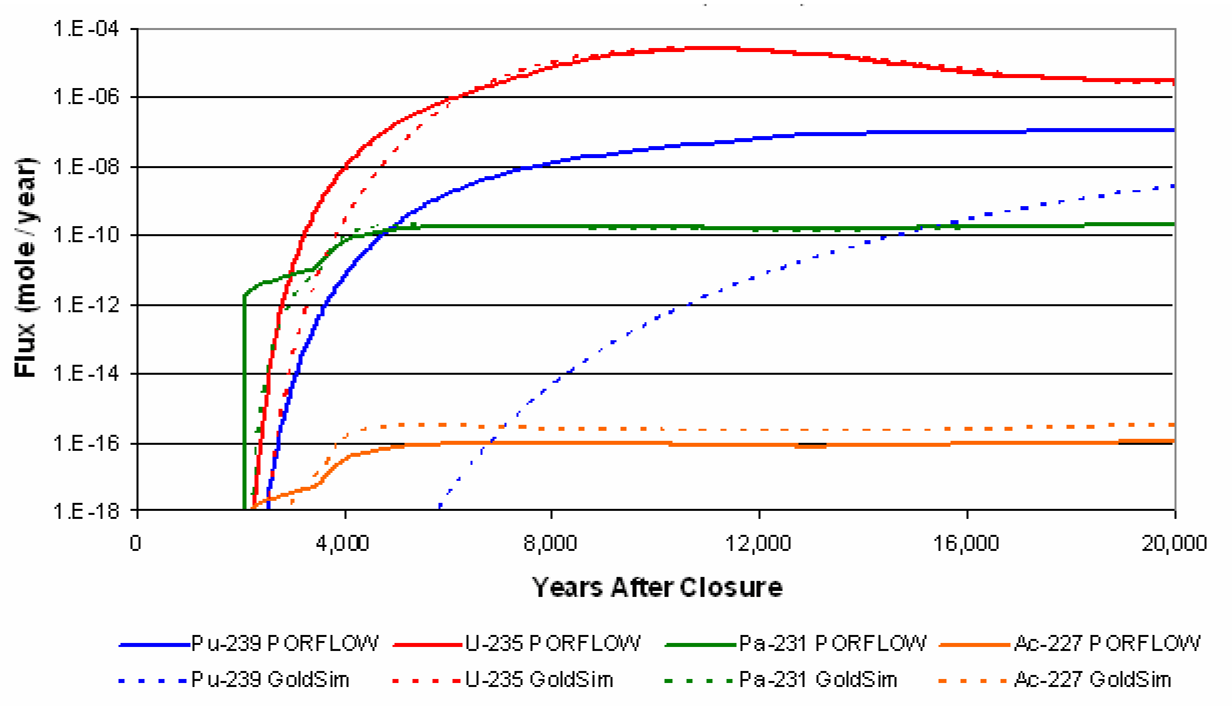
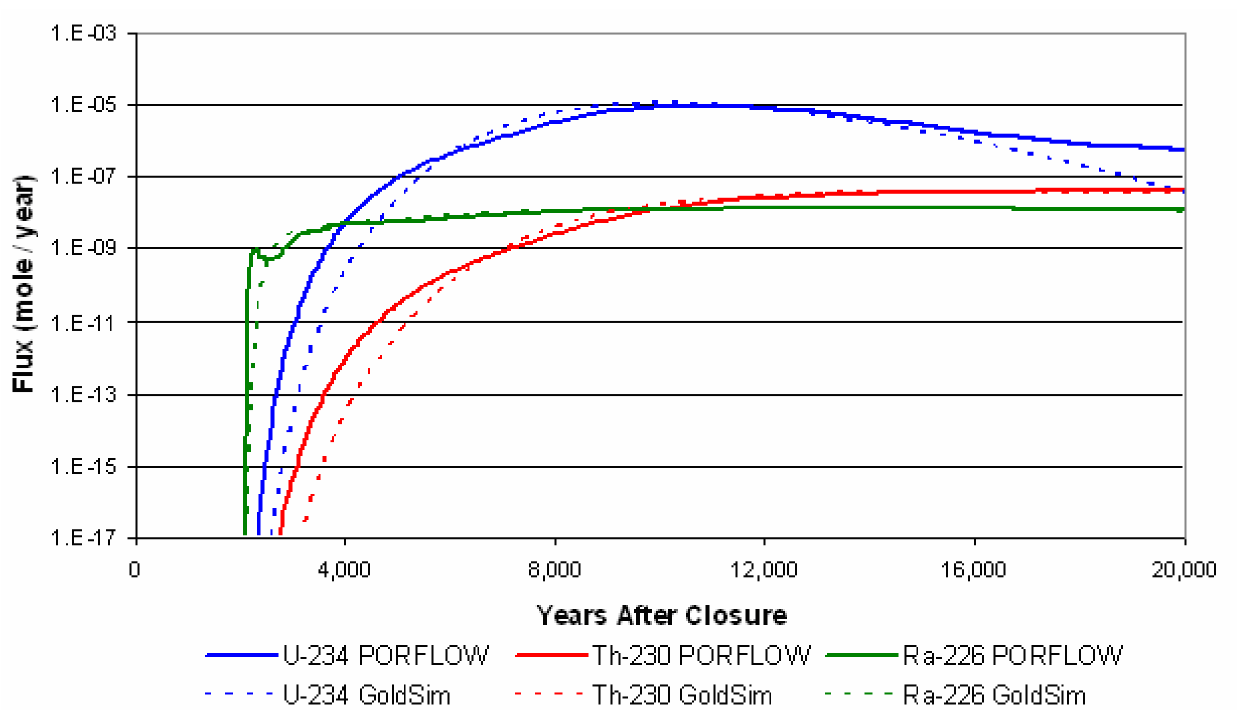


Figure 5.6-26: Tank 34 Flux to Saturated Zone – U-234 (Case D)



Conclusions from Flux Benchmarking

Comparisons of the flux entering the saturated zone for Case A showed excellent agreement between the PORFLOW model and the GoldSim model with respect to the general behavior of the flux curves and the timing and magnitude of the peaks. General agreement was also found for the Case D comparisons even though the modeling between the two models is significantly different. This benchmarking exercise illustrates that the two models will provide reasonably comparable results.

5.6.2.2.2 Dose Benchmarking

Unlike the initial benchmarking effort described in Section 5.6.2.1, this section provides information on dose benchmarking rather than concentration benchmarking. Dose benchmarking was conducted by performing dose calculations at specific modeled well locations within the GoldSim model. The Well locations presented in the GoldSim model are discussed in Section 4.4.4.2. For the dose benchmarking effort, wells were selected to capture the different sectors used in the PORFLOW model. Well 6 was chosen to represent Sector D and to evaluate the impact from the Type IV tanks, Tank 17 through 20, and the Type I tanks (Tanks 1 through 4). Well 12 was chosen to also represent Sector D but to also provide insights to the contribution from Type I tanks (Tanks 5 and 6), and the Type IIIA tanks (Tanks 25 and 44). Well 15 was chosen to represent Sector C and to provide insights on the contribution from Type I tanks (Tanks 7 and 8), and the Type IIIA tanks (Tanks 25, 26, 44, and 45. Well 34 was chosen to represent Sector A and to provide insights on the contribution from Type III tanks (Tanks 33 and 34), and Type IIIA tanks (Tanks 28 and 47).

Base Case (Case A) concentrations were obtained from the PORFLOW model at the 100m locations represented by the aforementioned Well locations and placed into the Dose Calculator model to obtain the dose computed at the location out to 20,000 years. The GoldSim model was run for Case A, and the dose computations were compared to the doses computed using the concentrations obtained from PORFLOW and the doses computed using the GoldSim model.

The final benchmarking dose results are shown in the Figures 5.6-27 through 5.6-30. While inherent model differences (discussed in the flux benchmarking above) make exact agreement between the 100m doses impossible, the dose comparisons were used to show that the overall model results are similar enough to have confidence that the two models reflect the same system behaviors. In addition, comparison of the dose results provided additional data for use in fine tuning the flow data extracted from PORFLOW into GoldSim.

This dose benchmarking yielded the following changes within the GoldSim model from the previous GoldSim model:

- The final clayey soil fraction (discussed in Section 5.6.2.1.4) was set with a 0.13 multiplier in the eastern region of the FTF and a 0.25 multiplier in the western region.

- The final benchmarking fraction (discussed in Section 5.6.2.1.5) applied to the plume function was set with a 0.35 multiplier for the Type I tanks and a 0.30 multiplier for all other tanks.

Figure 5.6-27: Dose Comparison at Well 6

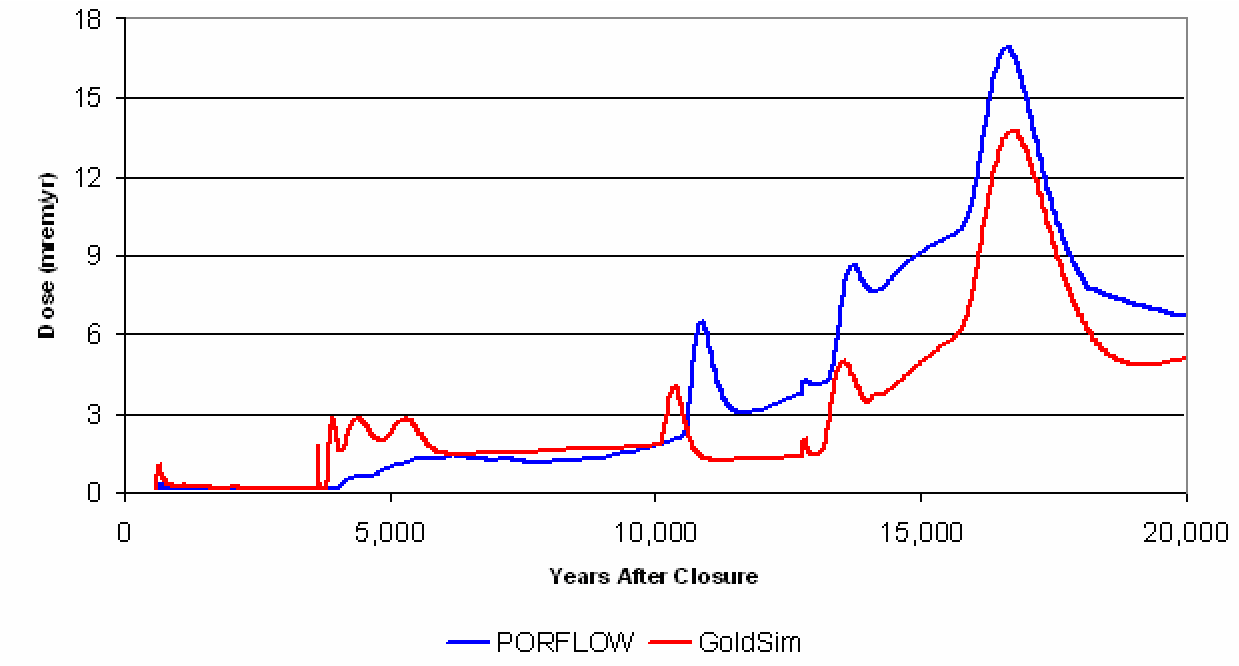


Figure 5.6-28: Dose Comparison at Well 12

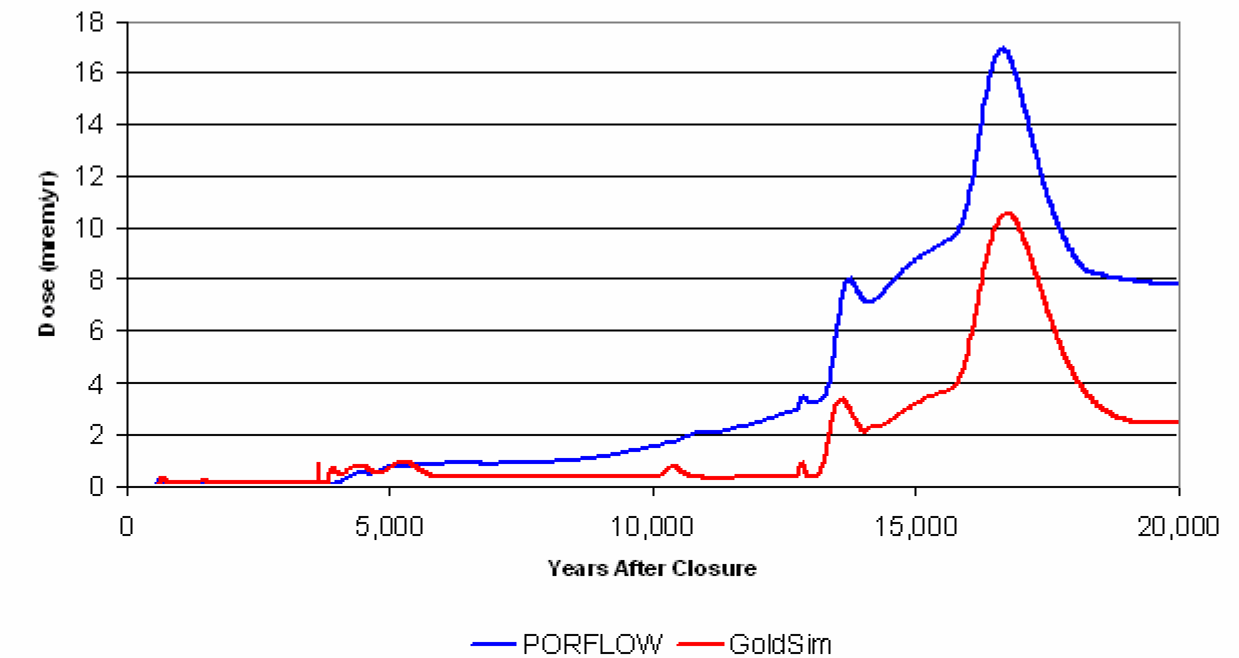


Figure 5.6-29: Dose Comparison at Well 15

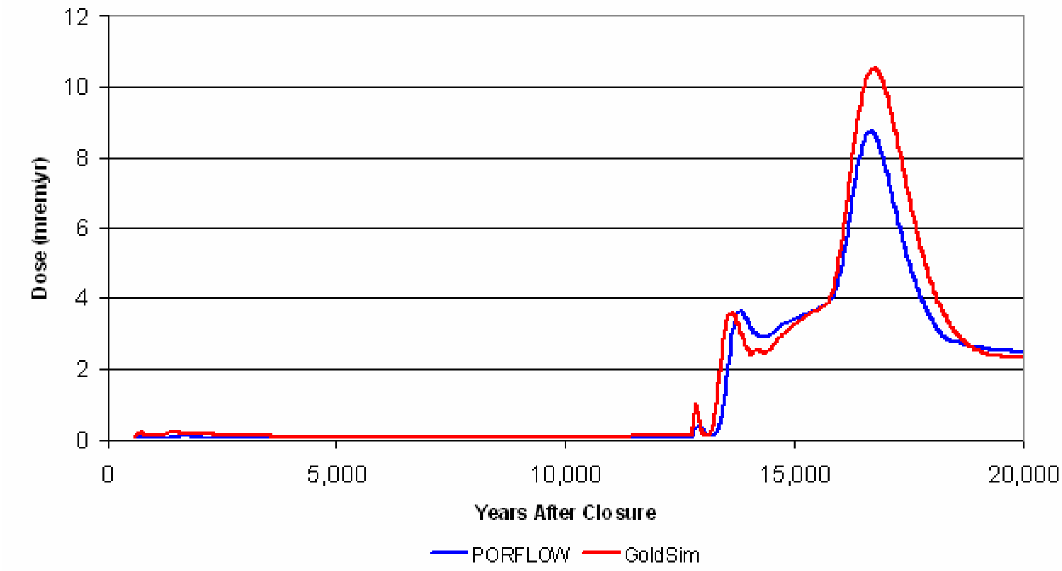
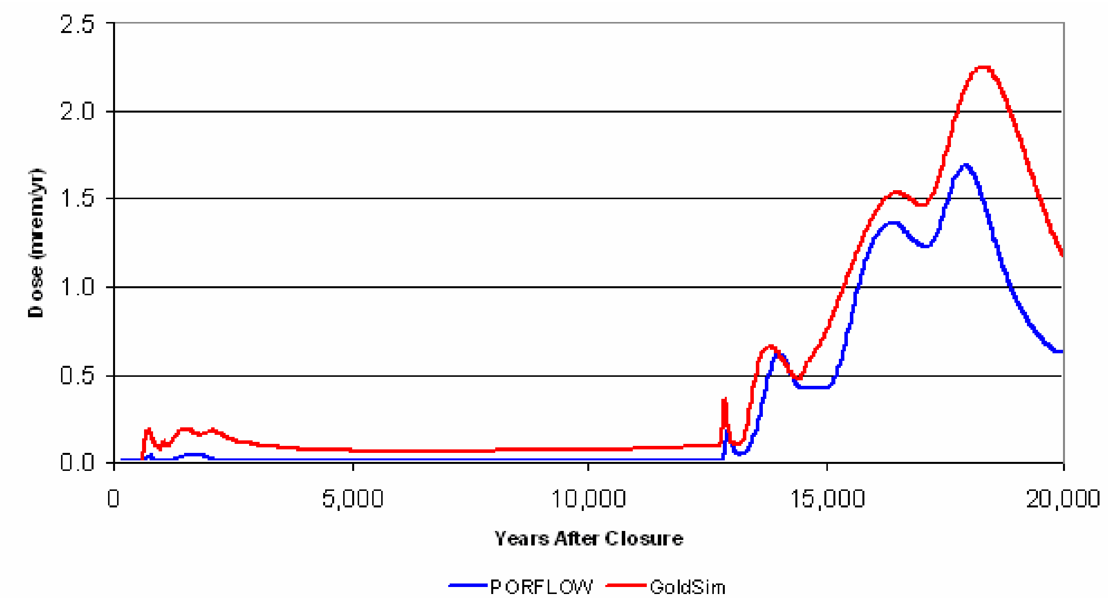


Figure 5.6-30: Dose Comparison at Well 34



5.6.3 Parameters Evaluated in the FTF Probablistic Model

The parameters selected for evaluation in the stochastic analyses were based on modeling experience informed by bases for the selected values and available generic and site-specific data to evaluate the most sensitive parameters. A thorough discussion of the parameters evaluated and the ranges considered is provided in the following discussion.

5.6.3.1 Waste Tank and Ancillary Equipment Configurations

As discussed in Section 4.4.2, six different tank configurations are considered. The scenarios differ based on whether a closure cap or fast flow paths are present, assumptions associated with time of liner failure and cementitious material degradation, and if the water table rises above the CZ. The differences between the six cases are summarized in Table 5.6-1. Depending on the tank type, different probabilities are assumed for each of the potential scenarios (Table 5.6-2). Discrete distributions are chosen using engineering judgment informed by tank design specifics. The tank design differences that informed the probability choices are listed below:

- The fast flow path cases (Configuration C and D) probabilities are much lower than the non-fast flow path cases in general because cracks are not anticipated to occur in the cementitious materials. Any degradation of the cementitious materials that does occur is expected to result in small cracks (which causes increased flow through hydraulic conductivity changes) rather than void spaces. If void spaces develop, it is probable they get filled by material migrating downward from the materials above the void space (e.g., as the cementitious materials degrade). Cracks causing increased flow through hydraulic conductivity changes are modeled independently of the fast flow path cases. In addition, the possibility that fast flow paths might form in the basemat was simulated independently in the GoldSim FTF model through a "Bypass Fraction" (Section 5.6.3.6).
- The "soil only" closure cap configuration (Configuration F), probability is less than the probability associated with Configurations A through E which utilize the engineered closure cap because a closure cap will be in place and will provide some flow retardation. Configuration F reflects the small potential that the closure cap will not perform as designed. Currently, the presumed CERCLA include a closure cap. [*www.epa.gov/superfund/policy/cercla.htm*]
- Type IV rising aquifer case (Configuration E) probability is higher than other tank types because the Type IV tanks are closer to the water table.
- Type IV fast flow path in the grout case (Configuration C) probability is lower than other tank types because the Type IV tanks do not have cooling coils.
- Type IV fast flow path in the basemat case (Configuration D) probability is higher than the grout fast flow path case (Configuration C) probability because the Type IV tank basemat is relatively thin and has drainage channels which lead to a drain (that is planned to be grouted) at the center of the tank. If the center drain is improperly grouted there is a greater chance of a fast flow path developing though the basemat.
- Type III/IIIA fast flow path in the basemat case (Configuration D) probability is lower than for Type I tanks because the Type I tanks are of an older design. It is assumed that better materials of construction and improved engineering practices for the new Type III/IIIA tanks would provide greater confidence in basemat construction since there is approximately a 20-year difference between the timeframe the different tank types were built.

Table 5.6-1: Tank Scenarios

Configuration	Closure Cap	Liner Failure Date	Fast flow paths	Cementitious Materials Degradation	Water Table
A	Present	Later failure (based on grouted diffusion coefficient of E-6)	None	Degradation curve based on WSRC-STI-2007-00607	No change
B	Present	Later failure (based on grouted diffusion coefficient of E-6)	None	Step change at year 501	No change
C	Present	Early failure (based on grouted diffusion coefficient of E-4)	Channel with no flow impedance through grout (no fast flow path through basemat)	Step change at year 501	No change
D	Present	Early failure (based on grouted diffusion coefficient of E-4)	Channel with no flow impedance through grout and basemat	Step change at year 501	No change
E	Present	Early failure (based on grouted diffusion coefficient of E-4)	N/A	Step change at year 501	Above CZ
F	Soil Only (16.45 in/yr)	Later failure (based on grouted diffusion coefficient of E-6)	None	Step change at year 501	No change

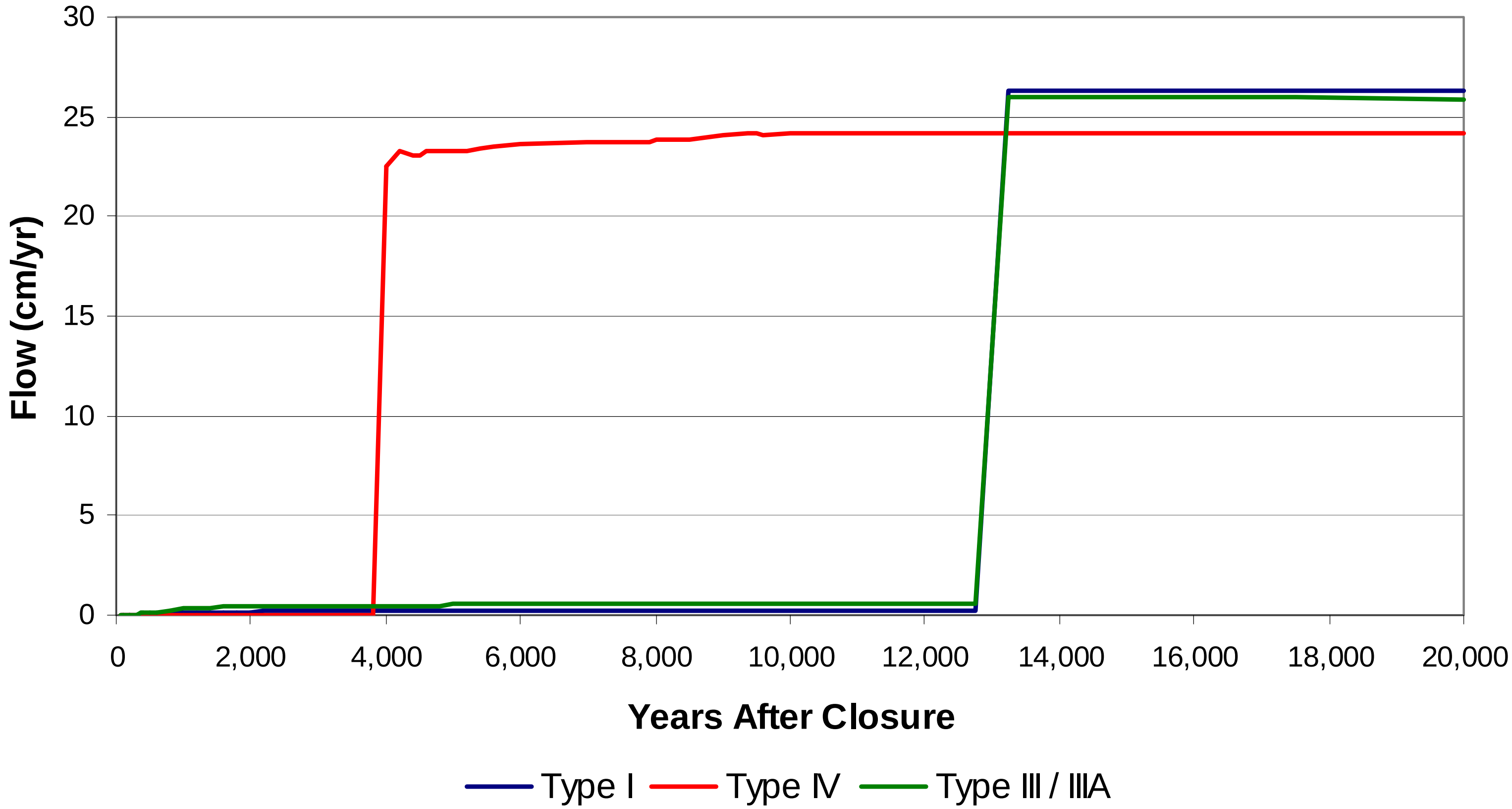
Table 5.6-2: Configuration Probability by Tank Type

Configuration	Probability by Tank Type (a)		
	Type I	Type III/IIIA	Type IV
A	58.25%	60%	54%
B	28%	30%	26%
C	5%	2.5%	1.25%
D	2.5%	1.25%	2.5%
E	5%	5%	15%
F	1.25%	1.25%	1.25%

(a) Discrete distribution chosen using engineering judgment informed by tank specifics. For example Type IV rising aquifer (Configuration E) probability higher based on closeness to water table.

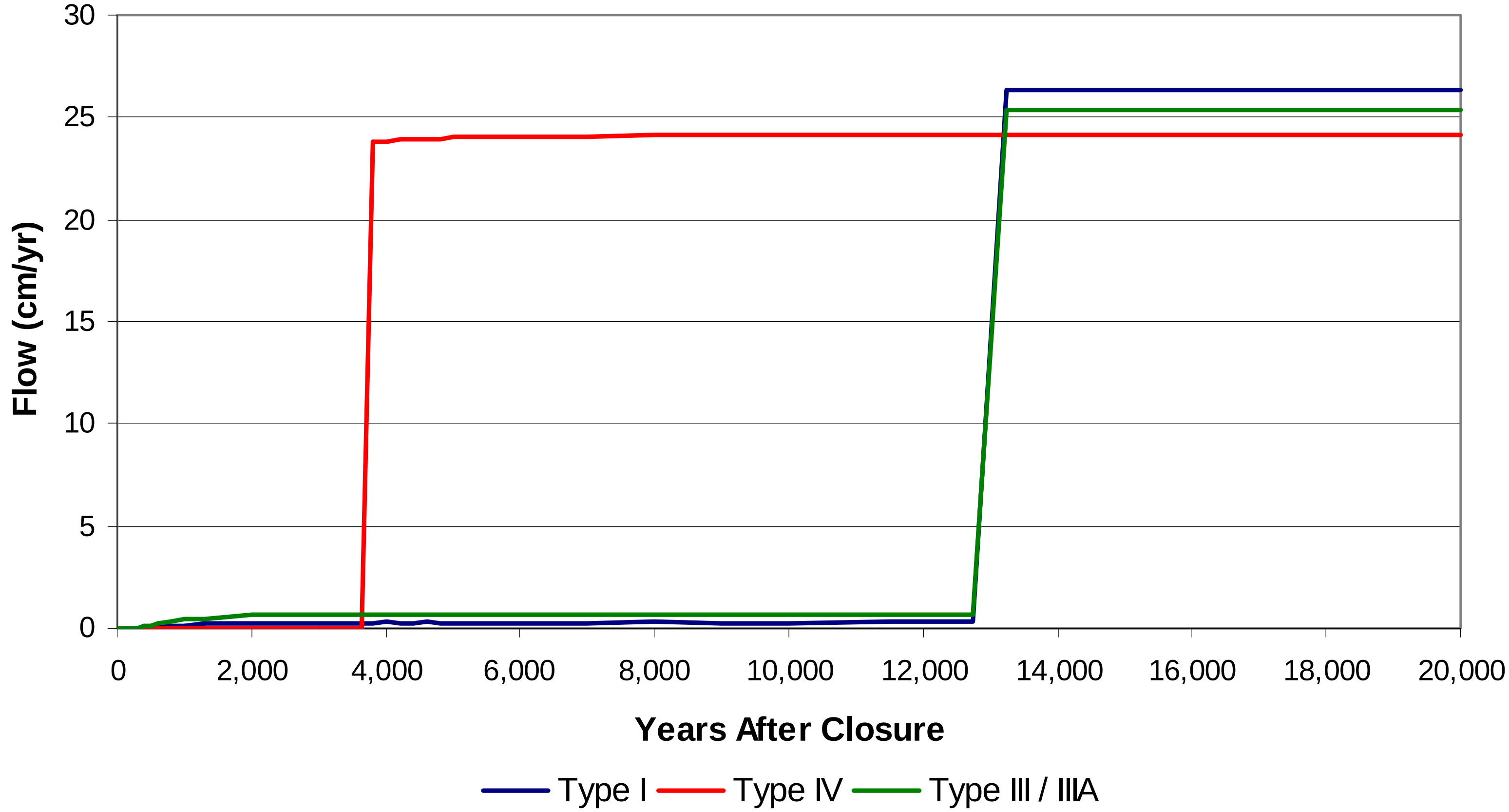
Since the GoldSim FTF model is used only to model contaminant transport, flow profiles over time are calculated for each of the six configurations using the PORFLOW FTF model, as shown in Figures 5.6-31 though 5.6-36. The PORFLOW FTF model flow results are simplified into a one-dimensional steady state flow through the CZ to allow use in the GoldSim FTF model. Having different flow profiles for different cases is the method by which uncertainties in parameters affecting flow (e.g., liner failure date, closure cap infiltration rate, cementitious materials degradation time, water table level) are incorporated into the uncertainty and sensitivity analysis. The extraction of flow data from PORFLOW for inclusion in the GoldSim model is described in Section 4.4.4.2.

Figure 5.6-31: Configuration A Flow Profile



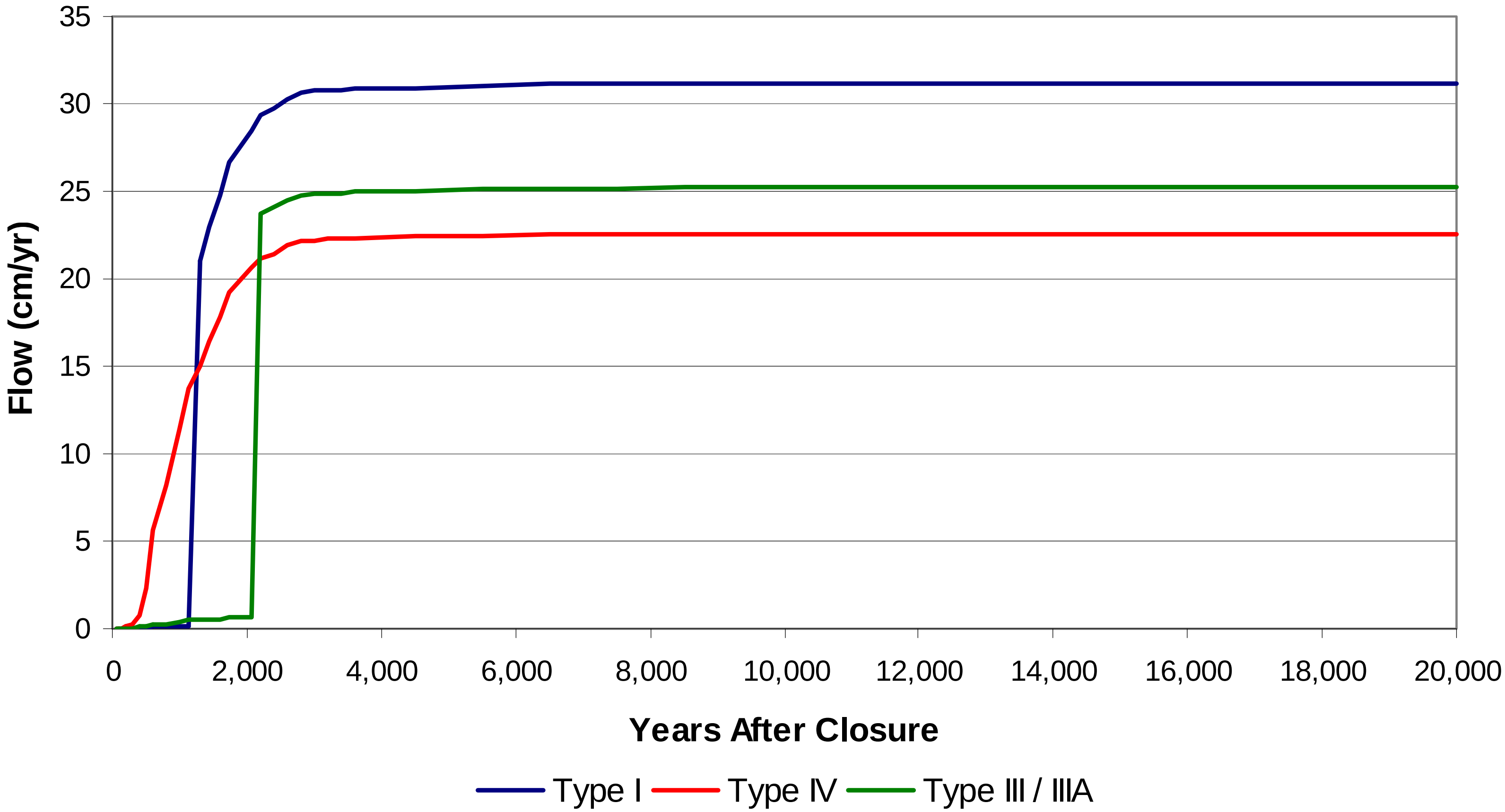
Configuration A: No initial fast flow condition exists, contaminants remain in the CZ until liner failure occurs (3,638 years for Type IV: 12,747 years for Type I; and 12,751 years for Type III/IIIA) and the degradation of the basemat begins at 400 years, 2,600 years, and 4,800 years for Type IV, I, and III/IIIA, respectively. Complete degradation of the basemat is assumed at 63,800 years, 13,000 years, and 18,700 years for Type IV, I, and III/IIIA, respectively.

Figure 5.6-32: Configuration B Flow Profile



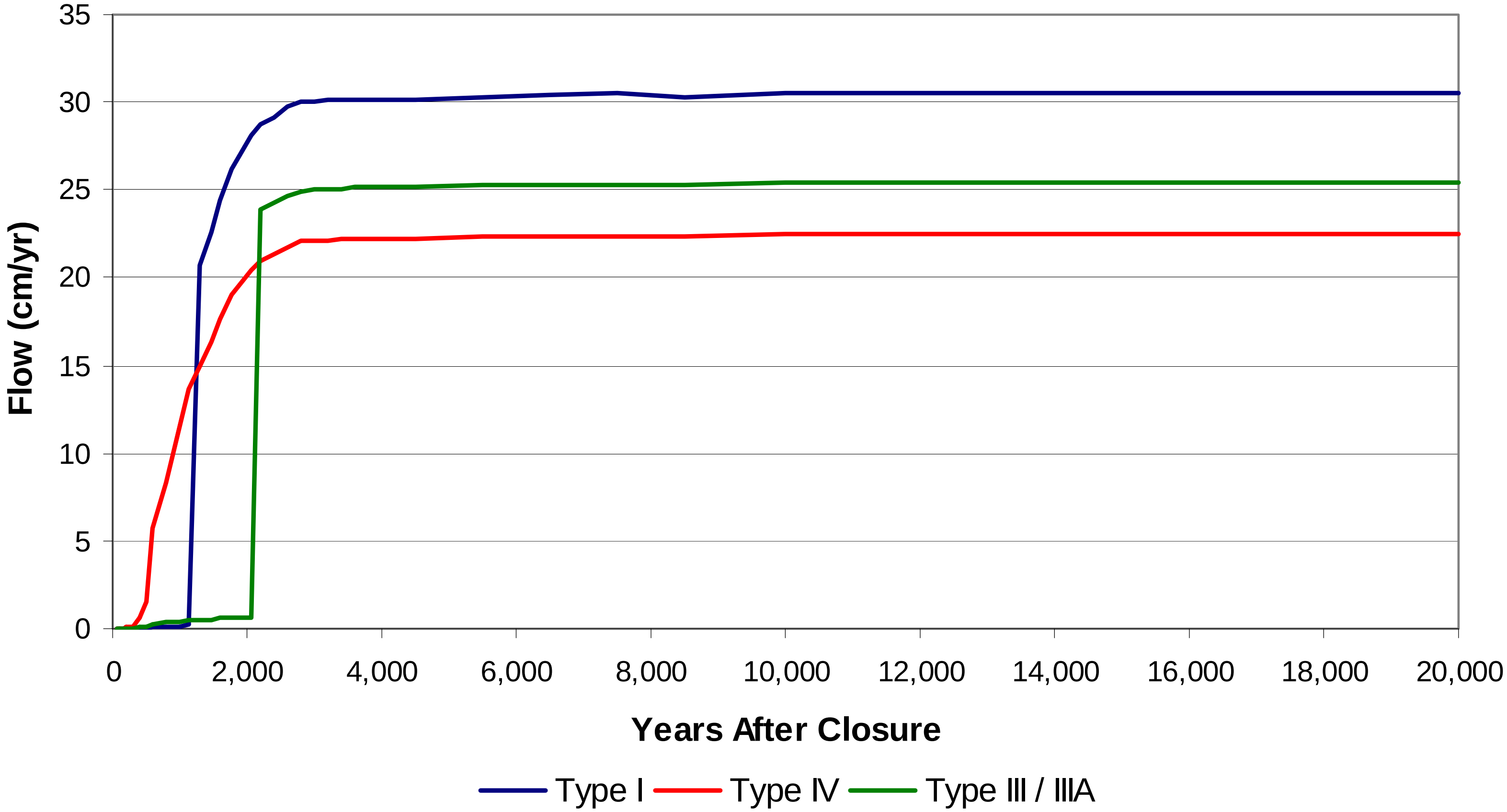
Configuration B: No fast flow condition exists, contaminants remain in the CZ until liner failure occurs (3,638 years for Type IV: 12,747 years for Type I; and 12,751 years for Type III/IIIA) and complete degradation of the basemat occurs at 501 years for all waste tanks.

Figure 5.6-33: Configuration C Flow Profile



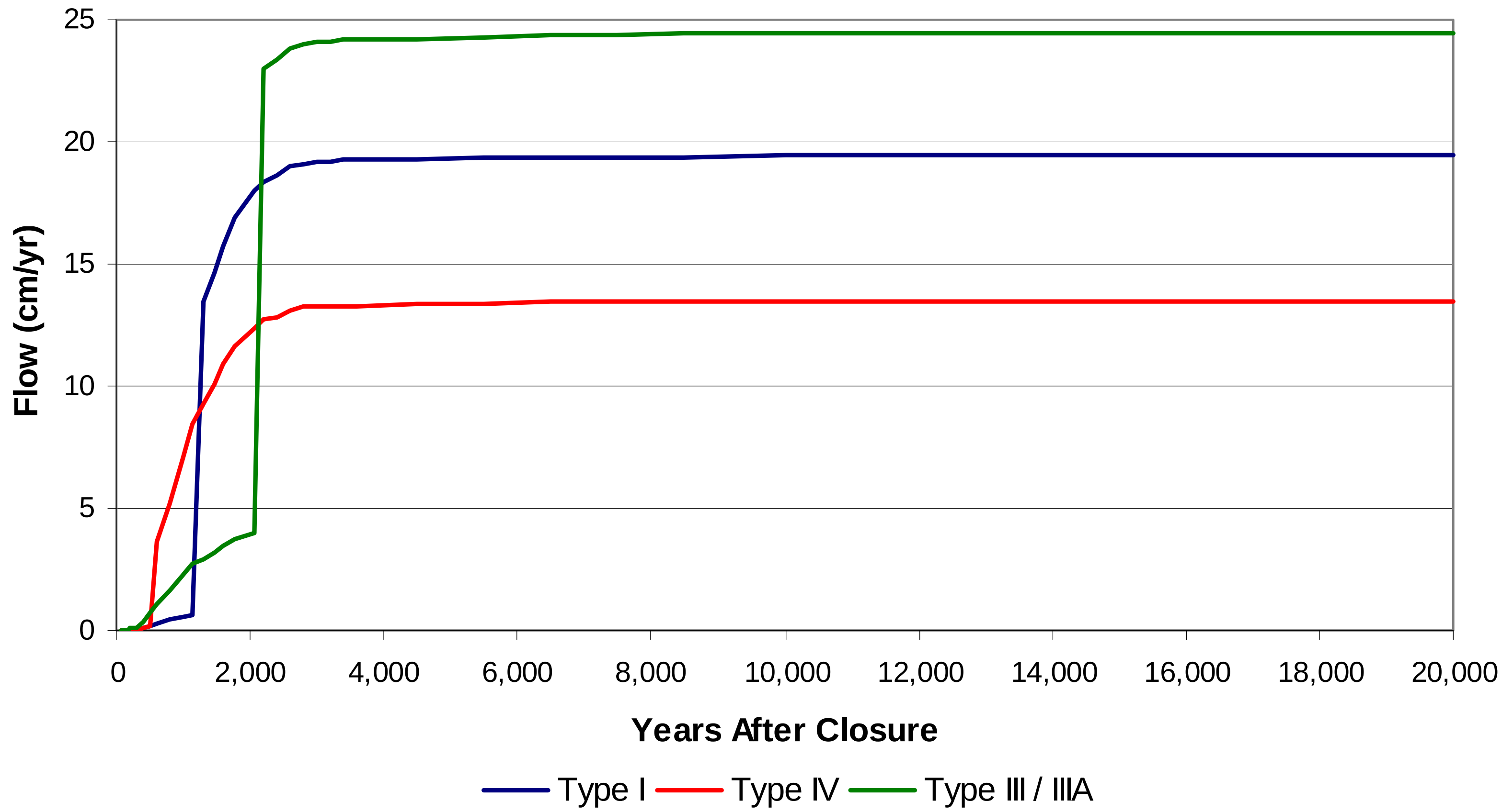
Configuration C: Fast flow condition exists in fill grout, contaminants remain in the CZ until liner failure occurs (75 years for Type IV: 1,140 years for Type I; and 2,077 years for Type III/IIIA) and complete degradation of the basemat occurs at 501 years for all waste tanks.

Figure 5.6-34: Configuration D Flow Profile



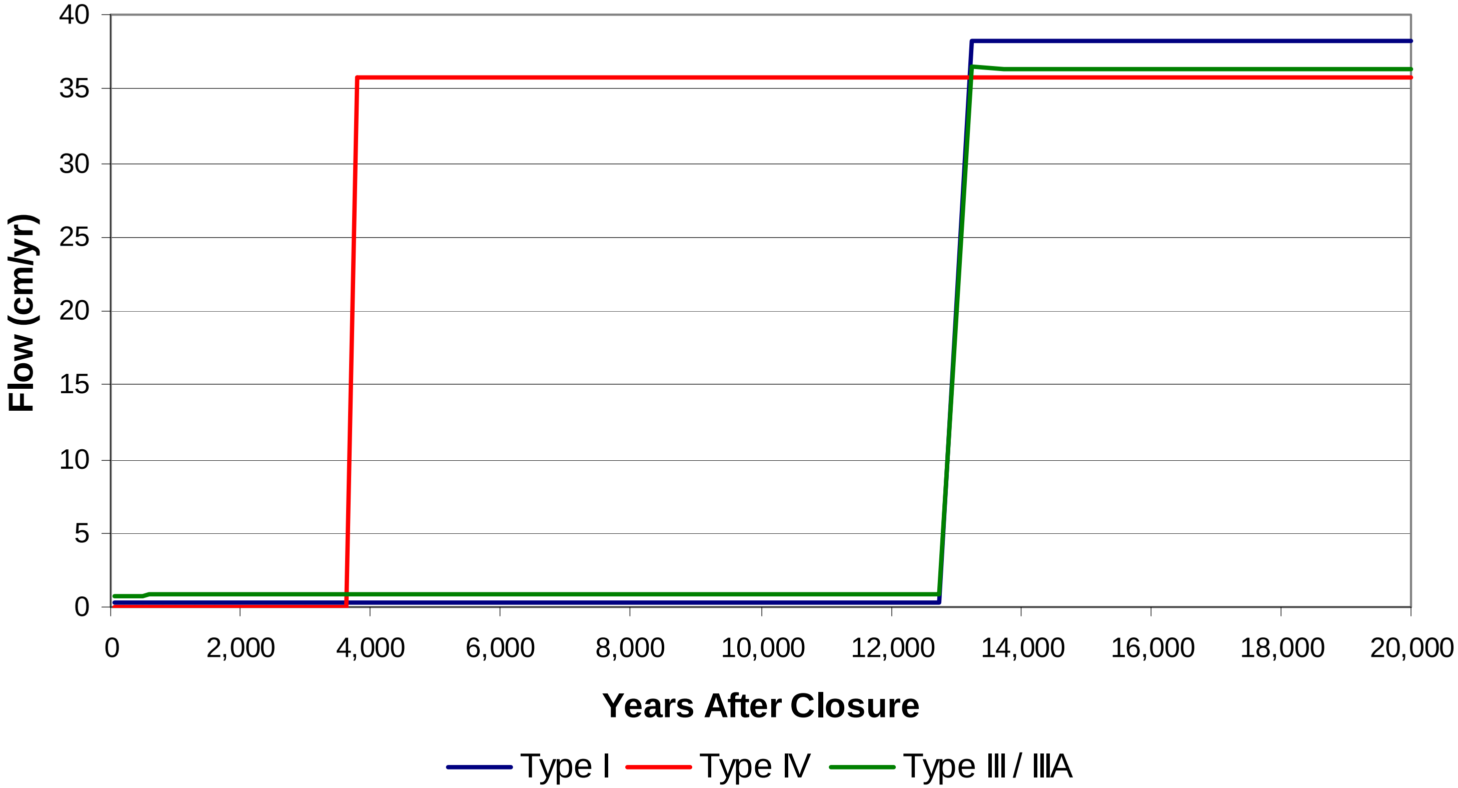
Configuration D: Fast flow condition exists in fill grout and basemat, contaminants remain in the CZ until liner failure occurs (75 years for Type IV: 1,140 years for Type I; and 2,077 years for Type III/IIIA) and complete degradation of the basemat occurs at 501 years for all waste tanks.

Figure 5.6-35: Configuration E Flow Profile



Configuration E: No fast flow conditions exist; however, the water table rises to a level above the tank bottom thus steel degradation starts at time of closure and complete degradation of the basemat occurs at 501 years for all waste tanks.

Figure 5.6-36: Configuration F Flow Profile



Configuration F: Like Configuration B except with a "Soils Only" closure cap. The FTF ancillary equipment consists of seven separate point sources (FPT-1, FPT-2, FPT-3, 242-F, 242-16F, CTS tank, and FTF catch tank) and a network of waste transfer lines represented by waste distributed over the entire FTF. As discussed in Section 4.4.2, only one ancillary equipment scenarios was analyzed. Each individual piece of ancillary equipment is modeled as source in a completely intact steel containment at the time of closure. The contaminant release is assumed to occur when the stainless steel fails. A single flow profile over time is calculated for ancillary equipment modeling. The impact of liner failure date on both tank and ancillary equipment contaminant transport was addressed independently of flow through the liner failure stochastic.

5.6.3.2 Radiological Inventory

The waste tank and ancillary equipment inventories in the GoldSim FTF model control the total amount of contaminants available for release. Sections 3.3 and 4.2.1 describe the bases for estimates of residual radiological inventory in the FTF waste tanks and ancillary equipment. The baseline inventory used for each radionuclide is listed in Table 3.3-2. In the probabilistic analyses of this parameter, the inventories of each radionuclide were adjusted based on the confidence in the estimates. The values in the Table 5.6-3 inventories were used to adjust the baseline inventory. These values will be multiplied by the baseline inventories from Table 3.3-2 to determine the radiological inventory uncertainty. The bases for the distributions used are discussed further in SRR-CWDA-2009-00045.

Table 5.6-3: Inventory Multipliers

	Type I		Tank 18		Tank 19		Type IIIA		Tank 33		Tank 34	
Distribution	**Uniform**		**Uniform**		**Uniform**		**Uniform**		**Uniform**		**Uniform**	
Isotope	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Ac-227	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Al-26	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Am-241	0.01	10	0.5	2	0.5	2	0.01	1	0.1	10	0.1	10
Am-242m	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Am-243	0.01	10	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
C-14	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Cf-249	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Cl-36	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Cm-243	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Cm-244	0.01	10	0.5	2	0.01	1	0.01	1	0.01	1	0.01	1
Cm-245	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Cm-247	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Cm-248	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Co-60	0.01	10	0.01	1	0.01	1	0.01	10	0.1	10	0.1	10
Cs-135	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Cs-137	0.01	10	0.5	2	0.5	2	0.01	10	0.1	10	0.1	10
Eu-152	0.01	10	0.01	1	0.01	1	0.01	1	0.1	10	0.1	10
Eu-154	0.01	10	0.5	2	0.01	1	0.01	10	0.1	10	0.1	10
H-3	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
I-129	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
K-40	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Nb-93m	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Nb-94	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Ni-59	0.01	10	0.01	1	0.01	1	0.01	1	0.1	10	0.1	10
Ni-63	0.01	10	0.5	2	0.01	1	0.01	10	0.1	10	0.1	10
Np-237	0.01	10	0.5	2	0.01	1	0.01	1	0.1	10	0.1	10
Pa-231	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Pd-107	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Pu-238	0.01	10	0.5	2	0.5	2	0.01	10	0.1	10	0.01	1
Pu-239	0.01	10	0.5	2	0.5	2	0.01	10	0.1	10	0.1	10
Pu-240	0.01	10	0.5	2	0.5	2	0.01	10	0.1	10	0.1	10
Pu-241	0.01	10	0.5	2	0.5	2	0.01	10	0.1	10	0.1	10
Pu-242	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Pu-244	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Ra-226	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Se-79	0.01	10	0.01	1	0.01	1	0.01	1	0.01	1	0.1	10
Sm-151	0.01	10	0.5	2	0.01	1	0.01	10	0.1	10	0.1	10
Sn-126	0.01	10	0.01	1	0.01	1	0.01	1	0.01	1	0.1	10
Sr-90	0.01	10	0.5	2	0.5	2	0.01	10	0.1	10	0.1	10
Tc-99	0.01	10	0.01	1	0.5	2	0.01	1	0.1	10	0.1	10
Th-229	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Th-230	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
U-232	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
U-233	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
U-234	0.01	10	0.5	2	0.5	2	0.01	10	0.1	10	0.1	10
U-235	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
U-236	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
U-238	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1
Zr-93	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1	0.01	1

Note: Tanks 17 and 20 were modeled with a normal distribution with a mean of 1 and a standard deviation of 0.5. This distribution was truncated at zero.

5.6.3.3 Solubilities

The waste solubility values in the GoldSim FTF model control contaminant release, with different solubility values resulting in different release rates. Table 4.2-10 (from Section 4.2.2) shows baseline solubility values and controlling phases for all of the elements of interest at each of the chemical states of interest. For plutonium, technetium and uranium, the solubility values listed correspond to Fe co-precipitation (discussed in detail in Section 4.2.2) as the controlling mechanism. As discussed in Section 4.2.2, there are uncertainties in the calculation of the solubilities. Much of the uncertainty is because of unknowns related to the CZ and how the conditions it will experience will evolve with time. Uncertainty in implementation of the solubility conceptual model was managed to a large extent through conservatism in modeling assumptions. As discussed in Section 4.2.2, uncertainty in choice of the solubility controlling phase (which is the largest uncertainty in calculating solubilities) was addressed primarily through conservatism in choice of the controlling phase. For those radionuclides which have in the past been of most concern (Pu, U, Np and Tc), distributions were assigned for Region II conditions (Reducing and Oxidizing). Tables 4.2-13 and 4.2-14 show distribution for different phases for Pu, U, Np and Tc, where the probabilities are weighted to account for the possibility of different phases. In addition, the possibility of Fe co-precipitation controlling was factored into the Pu, Tc, and U probabilities. The probabilities chosen are based on observations in the literature, thermodynamic stability, etc. Reasonably conservative values were chosen for use in the stochastic modeling to ensure that parameters of interest were not masked.

5.6.3.4 K_d Values

The tank basemats and soil under the FTF in the GoldSim FTF model retard contaminant transport, with their effectiveness tied to the assigned K_d values (which will vary for different elements). Tables 4.2-29 and 4.2-33 show baseline K_d values for all of the elements of interest at each of the chemical states of interest (e.g., different Reducing/Oxidizing Regions). Distributions for the K_d values used in the FTF GoldSim modeling are based on the approach described in SRNL-STI-2009-00150. This report recommends lognormal distribution with maximum and minimum values based on the material under consideration. The shape of the lognormal distribution is based on the Geometric Standard Deviation (GSD) which differs by the material under consideration and the magnitude of the baseline value for the K_d. Table 5.6-4 provides the parameters for the lognormal distributions used in the FTF model. To encompass data from SRNL-STI-2009-00634, the K_d value for Np in Clayey Soils has a minimum of 70 mL/g, a maximum of 42 mL/g and a GSD of 8.75; and in Sandy Soils has a minimum of 0.3 mL/g, a maximum of 6 mL/g and a GSD of 10.

Table 5.6-4: K_d Variability in the GoldSim Model

Material Zone	Minimum	Maximum	Lognormal GSD	
Clayey Soils (Backfill Layer)	0.5 x GM [a]	1.5 x GM	GM < 4.0 mL/g	GM = 4.0 mL/g or greater
			1.001 mL/g	0.25 x GM
Sandy Soils (Vadose Zone)	0.25 x GM	1.75 x GM	GM < 2.7 mL/g	GM = 2.7 mL/g or greater
			1.001 mL/g	0.375 x GM
Cementitious Materials	0.25 x GM	1.75 x GM	GM < 2.7 mL/g	GM = 2.7 mL/g or greater
			1.001 mL/g	0.375 x GM

[a] GM = Geometric Mean of the lognormal distribution defined as the baseline value presented in Table 4.2-29 for soils and Table 4.2-33 for cementitious materials.

5.6.3.5 Basemat Thickness

The basemat thickness in the GoldSim FTF model retards contaminant transport, with its effectiveness related to the basemat K_d values and the basemat thickness. Section 4.4.1 shows the design dimensions used in baseline modeling for the various tank types, including concrete basemat thickness. Section 3.2.1 provides design details for the various tank types, including details regarding the concrete basemat designs. The basemat thickness specified on construction drawings is used as the most likely basemat thickness, with other design details used to determine a probable maximum and minimum thickness of basemat concrete. A triangular distribution using these maximum, minimum and the most likely value as the peak was utilized for basemat thickness in the stochastic analysis. The design details used in determining the various thicknesses are described below for each tank type.

5.6.3.5.1 Type IV Tank Concrete Floor Thickness

As described in Section 3.2, Type IV waste tanks basemat was specified to be four inches thick with a tolerance of plus 0.5 inch and minus 0.5 inch. A three inch cement topping was then poured over the basemat and given a float and trowel finish having a maximum tolerance of plus or minus 0.125 inch from a true level. Drainage channels, 1.625 inches deep and approximately 3.5 inches wide (3.625 inches at the top and 3.125 inches at the bottom, for use in leak detection were formed in the basemat's three inch deep cement topping. The drainage channels cover less than six percent of the total foundation area.

Thickness calculations:

Minimum at channel location thickness - 5 inches (3.75 + 2.875 – 1.625)
Minimum w/o channel – 6.625 inches (3.75 + 2.875)
Median at channel location - 5.375 inches (3 + 4 – 1.625)
Median w/o channel – 7 inches (3 + 4)
Maximum at channel location – 6 inches (4.5 + 3.125 – 1.625)
Maximum w/o channel – 7.625 inches (4.5 + 3.125)

Modeling Values Used:

	Inches	**Basis**
Most likely	6.9025	Weighted median (0.06 (5.375) + 0.94 (7))
Minimum	6.5275	Weighted minimum (0.06 (5) + 0.94 (6.625))
Maximum	7.5275	Weighted minimum (0.06 (6) + 0.94 (7.625))
Mean	6.9858	Based on triangular distribution

5.6.3.5.2 Type I Tank Concrete Floor Thickness

As described in Section 3.2, the working slab for a Type I tank is 4 inches thick. The working slab assumed tolerance is plus 0.5 inch and minus 0.5 inch based on requirement Spec 3019 requirement of no visual variance in concrete level. A 30 inch reinforced concrete base (i.e., the basemat) sits on top of the working slab. The basemat assumed tolerance is plus 1 inch and minus 1 inch based on requirement Spec 3019 requirement of no visual variance in concrete level. A 3 inch layer of grout sits on top of the basemat, and the primary container sits above the grout.

Modeling Values Used:

	Inches	**Basis**
Most likely	30	30 inch basemat
Minimum	29	30 inch basemat – 1 inch tolerance on basemat
Maximum	38.5	4 inch working slab + 0.5 inch tolerance on working slab + 30 inch basemat + 1 inch tolerance on basemat + 3 inch grout layer
Mean	32.5	Based on triangular distribution

5.6.3.5.3 Type III Tank Concrete Floor Thickness

As described in Section 3.2, Type III tanks have a 4 inch working slab. The Type III tank basemat, made of reinforced concrete, has a 3 foot - 6 inch minimum thickness (5 foot - 4 inches at drop panel at tank center). The concrete finish shall have a tolerance of 0.125 inches per 10 feet per standard Specification SB 10 U. The basemats in Type III tanks do not have leak detection slots.

Modeling Values Used:

	Inches	Basis
Most likely	42	42 inch basemat (ignore drop panel)
Minimum	41.5	42 inch basemat – 0.5 inch tolerance on basemat
Maximum	46.5	4 inch working slab + 42 inch basemat + 0.5 inch tolerance on basemat (ignore drop panel)
Mean	43.3	Based on triangular distribution

5.6.3.5.4 Type IIIA Tank Concrete Floor Thickness

As described in Section 3.2, Type IIIA tanks have a 4 inch working slab. The Type IIIA tank basemat has a 3 foot - 7 inch minimum thickness (6 feet - 4 inches at drop panel at tank center). The concrete finish shall have a tolerance of 0.125 inch per 10 feet per standard Specification SB 10 U. A grid of two inch deep interconnected radial channels is grooved into the concrete basemat upon which the secondary liner rests.

Modeling Values Used:

	Inches	Basis
Most likely	41	43 inch basemat – 2 inch drainage channels (ignore drop panel)
Minimum	40.5	43 inch basemat – 2 inch drainage channels – 0.5 inch tolerance on basemat
Maximum	45.5	4 inch working slab + 43 inch basemat – 2 inch drainage channels + 0.5 inch tolerance on basemat (ignore drop panel)
Mean	42.3	Based on triangular distribution

5.6.3.6 Basemat Fast Flow

In order to reflect the possibility that fast flow paths might form in the basemat, a "Bypass Fraction" was simulated in the GoldSim FTF model. The bypass fraction allowed a percentage of the basemat to have no retardation (K_d = 0 for all elements). The bypass fraction was represented by a triangular distribution based on engineering judgment, with 0% being set as the most likely value and the upper bound set at 10%. This judgment is based on the fact that cracking in the basemat might possibly lead to some void spaces forming all the way through the basemat, but it was judged much more likely that the cracking would tend to be self-sealing and would not create full channels. Assuming a full 10% of the basemat was replaced by a void space that had no retardation effect was conservative.

5.6.3.7 Tank and Ancillary Equipment Containment Failure Dates

The containment failure dates in the GoldSim FTF model control initial contaminant release from the associated location (tank or ancillary equipment) and to limit the number of pore volume passing through the tank grout (by restricting flow though the tank grout). Table 4.2-35 shows the deterministic (i.e., single value) and probabilistic (i.e., distribution) values that are used to determine liner failure during modeling. The results corresponding to the reasonably bounding diffusion rates (1.0E-6 cm2/sec) were utilized for the modeling cases where there were no fast flow paths through the cementitious materials (Configurations A, B and F). The results corresponding to the maximum evaluated diffusion rates (1.0E-4 cm2/sec) were utilized for fast flow case modeling (Configurations C and D) and for the rising aquifer modeling case (Configuration E), where the loss of reducing capability for the cementitious materials might be expected to occur sooner. The waste tank liner failure distributions used for the various tank types and cases are taken directly from the probabilistic analysis presented in WSRC-STI-2007-00061.

Each piece of ancillary equipment (with the transfer lines being treated as a collective inventory) is assumed in the model to fail independently, with the failure time occurring between the time of first pit penetration (116 years) and 100% pitting penetration (approximately 1,000 years). The most probable time of ancillary equipment failure in the probabilistic FTF analysis was assumed to be the time of 25% pitting penetration (510 years). A triangular distribution using these maximum and minimum and the most likely value as the peak was utilized for ancillary equipment containment failure in the stochastic analysis. More details concerning ancillary equipment containment failure are described in Section 4.2.3.2 and WSRC-STI-2007-00460.

The diffusion rates utilized for all cases are considered bounding (i.e., faster than are typically reported.

5.6.3.8 Transition Times between Chemical States

The “Transition Times between Chemical States” in the GoldSim FTF model determine how many pore water volumes are required to pass through the waste tank before the grout transitions to a different tank chemistry. As part of the waste release modeling (discussed in detail in Section 4.2.2), the estimated transition times between various chemical phases was calculated for the waste tank pore water. The waste tank pore water chemistry was calculated to change from Region II Reducing conditions to Region II Oxidizing conditions after 371 pore volumes pass through the reducing grout. The change from Region II conditions to Region III conditions was calculated to occur after 2,063 pore volumes (Table 4.2-1). [ISSN 1019-0643, WSRC-STI-2007-00544] A triangular distribution using these calculated values (which are used as the most likely values in the baseline) as a peak is utilized in the stochastic analysis for analyzing the “Transition Times between Chemical States”. The maximum and minimum values chosen for the distribution for the first transition were “482” and “260”. The maximum and minimum values chosen for distribution of the second transition were “3,095” and “1,032”. The 30% and 50% variation provided by these values was judged reasonable to provide a distribution that showed the effects of uncertainty without overwhelming the sensitivity analysis. Reasonably conservative values were chosen for use in the stochastic modeling to ensure that parameters of interest were not masked. Varying the transition time allowed the probalistc model to simulate non-mechanistically the multiple factors that could cause early or late transition (e.g., flow differences, chemistry changes). The transition times can have a significant impact on results, as documented in sections 5.6.4 and 5.6.6.

5.6.3.9 FTF Lower Vadose Zone Thickness

The lower vadose zone in the GoldSim FTF model retards contaminant transport, with its effectiveness related to the soil K_d values and the vadose zone thickness. Table 4.2-23 shows the values used in the baseline analysis for thickness of the lower vadose zone beneath each of the waste tanks. The depth of the vadose zone beneath each tank varies in the stochastic model based on the thickness of the saturated zone – as the thickness of the saturated zone increases, the depth of the vadose zone decreases; and as the thickness of the saturated zone decreases the depth of the vadose zone increases. The GoldSim model restricts the minimum thickness of the vadose zone to 0.1 foot. A vadose thickness of less than 0.1 foot is essentially having the water table at the same elevation as the bottom of the waste tank which is configuration Case E described in Section 4.4.2. The variability of the thickness of the saturated zone is discussed in Section 5.6.3.12.1.

5.6.3.10 Well Depth

As discussed in the exposure pathways section of this PA (Section 4.2.4), well water may be used as a primary potable water source for a future residence near the well (e.g., drinking water, showering) and may be used by the resident as a primary water source for agriculture (e.g., irrigation, livestock water). The hypothetical impacts to the receptor can be highly dependent on which aquifer the water is drawn from. SRS-REG-2007-00029 examines available on-site and off-site well drilling data, as well as information from regional commercial well drillers to determine probabilities associated with a future resident using a particular aquifer.

Based on the information obtained, SRS-REG-2007-00029 concludes that a well drilled by a professional driller would have a high probability of being located in the Gordon Aquifer or deeper. There is a possibility that the MOP receptor would choose to drill his own well and would only drill down as far as necessary to meet some short term minimum flow need (e.g., 10 gpm from the UTR-UZ), however this probability is considered reasonably small. Combining the percentages of the wells drilled in each depth range both onsite and offsite, it is reasonable to apply the probabilities in Table 5.6-5 when estimating well depths for well drilling scenarios within the GSA.

Table 5.6-5: Probability of Well Driller Exposure from Each Aquifer

Aquifer (Depth)	% of Total in GSA
UTR-UZ (less than 109 feet)	13%
UTR-LZ (109-170 feet)	44%
Gordon Aquifer (170 feet and lower)	43%

The GoldSim FTF model corresponds to a single aquifer (UTR-UZ) and was benchmarked with the PORFLOW FTF model accordingly. To simulate the probability that a potential well driller (MOP or intruder) might drill into a lower aquifer (UTR-LZ or the Gordon Aquifer), the well depth probabilities in Table 5.6-5 were used as a stochastic in the GoldSim FTF model. To reflect that a well at a different drill depth might have contaminant concentrations different than the single aquifer (UTR-UZ) represented by the GoldSim FTF model, Table 5.6-5 provides the relationships between the contaminant concentrations in the three aquifers of interest. The percentages in Table 5.6-6 are based on a comparison of the 100m peak nitrogen concentrations in the three aquifer zones (from the PORFLOW FTF model). The UTR-UZ and UTR-LZ concentrations are similar because the aquitard that separates them (the "tan clay" layer) is a relatively ineffective flow barrier. In contrast, the aquitard that separates the Gordon Aquifer (the "green clay" layer) is very effective and there is very little downward flow into the Gordon Aquifer relatively to lateral flow along the UTR-LZ Aquifer. The calculations showing that the assumed aquifer ratios (i.e., 100/100/5) are reasonably conservative are based on PORFLOW peak 100m concentrations at the various aquifers (Appendix F.2).

Table 5.6-6: Contaminant Transfer Ratios between Aquifers

Aquifer	Contaminant Concentration % in Relation to UTR-UZ	Calculation used for Basis
UTR-UZ	100%	Not Applicable
UTR-LZ	100%	Peak Concentration UTR-LZ/ Peak Concentration UTR-UZ
Gordon	5%	Peak Concentration Gordon Aquifer/ Peak Concentration UTR-UZ

5.6.3.11 Bioaccumulation Factors and Human Health Exposure Parameters

The Bioaccumulation Factors (Section 4.6.1) and Human Health Exposure (Section 4.6.2) parameters have various functions in the GoldSim FTF model, but they all assist in some way in calculating doses for the exposure pathways. The baseline values and stochastic distributions used for various Bioaccumulation Factors and Human Health Exposure parameters are provided in Tables 5.6-7 through 5.6-9. For the transfer factors in Tables 4.6-1 through 4.6-4, only the most likely value was used in the stochastic analysis (no distributions were created for these values).

Table 5.6-7: Crop Exposure Time and Productivity Stochastics

Parameter	Baseline	Minimum	Maximum	Distribution Used
Vegetable crop exposure times to irrigation(days)[(1)]	70 days	60 days	90 days	Normal
Soil exposure time period to irrigation (Buildup time in soil)	183 days	60 days	365 days	Uniform
Vegetable Crop Yield Productivity	0.7 kg/m^2	0.2 kg/m^2	4 kg/m^2	Lognormal
MOP Fraction of Vegetables Produced Locally	0.173	0	0.5	Triangular
MOP Fraction of Meat Produced Locally	0.306	0	0.5	Triangular
MOP Fraction of Milk Produced Locally	0.207	0	0.5	Triangular
Intruder Fraction of Vegetables Produced Locally	0.308	0	0.5	Triangular
Intruder Fraction of Meat Produced Locally	0.319	0	0.5	Triangular
Intruder Fraction of Milk Produced Locally	0.254	0	0.5	Triangular

(1) average growing time for above ground vegetables.

Table 5.6-8: Pathway Physical Parameter Stochastics

Parameter	Baseline	Minimum	Maximum	Distribution Used
Depth of Garden	15 cm	15 cm	61 cm	Triangular
Garden Irrigation Rate	3.6 L/d/m2	2.08 L/d/m2	5.5 L/d/m2	Triangular
Fraction of Year Garden Irrigated	0.2	0.2	0.25	Triangular
Garden Size	100 m2	100 m2	1,000 m2	Triangular

Table 5.6-9: Consumption Rate, Pathway Exposure Time and Transport Stochastics

Consumption Rate Parameters	Baseline	Minimum	Maximum	Distribution Used
Annual Breathing Rate	5,548 m3/yr	1,267 m3/yr	11,600 m3/yr	Normal
Annual Leafy Veggie Consumption	21 kg/yr	18 kg/yr	43 kg/yr	Lognormal
Annual Other Veggie Consumption	163 kg/yr	90 kg/yr	276 kg/yr	Lognormal
Annual Beef Consumption	43 kg/yr	26 kg/yr	81 kg/yr	Lognormal
Annual Finfish Food Consumption	9 kg/yr	2.2kg/yr	19 kg/yr	Triangular
Annual Milk Consumption	120 L/yr	73.7 L/yr	230 L/yr	Lognormal
Water Consumption Rate	337 L/yr	184 L/yr	730 L/yr (2 L/day)	Triangular
Fodder Beef Cow Consumption	36 kg/day	27 kg/day	50 kg/day	Normal
Fodder Milk Cow Consumption	52 kg/day	36 kg/day	55 kg/day	Normal
Fraction of Beef Cow intake from pasture	0.75	0.5	1	Triangular
Fraction of Milk Cow intake from pasture	0.56	0.5	1	Triangular
Water Beef Cow Consumption	28 L/day	28 L/day	50 L/day	Triangular
Water Milk Cow Consumption	50 L/day	50 L/day	60 L/day	Triangular
Exposure Time Parameters				
Shoreline Exposure Time	23 hr/yr	11 hr/yr	35 hr/yr	Triangular
Showering Exposure Time	10 min/day	10 min/day	30 min/day	Triangular

Where available, site-specific distribution information, obtained from WSRC-STI-2007-00004 was used in determining the stochastic range to be evaluated. Where no specific guidance was available, a triangular distribution using maximum, minimum and most-likely values from WSRC-STI-2007-00004 is utilized in the stochastic analysis. The most likely value is the recommended value from WSRC-STI-2007-00004, and is used as the distribution peak. For cases where site-specific distribution data was not available, it was judged reasonable to use the maximum and minimum values from WSRC-STI-2007-00004. Although they may not be site-specific and have not been weighted for the purpose of the stochastic analysis, they provide a wide range of possible outcomes and are therefore better able to identify parameters of potential concern.

Additional background information regarding a few parameters of interest are provided below.

5.6.3.11.1 Drinking Water Ingestion

Ingestion of water is a key usage factor for the all-pathway and inadvertent intruder analyses. The rate of contaminated water consumption can vary by exposure scenario based on assumed access to the water supply. For the inadvertent intruder where the contaminated water is expected to come from a well an assumption can be made that water from the well is only used for cooking. Likewise, for the all-pathway analyses the assumption could be made that total water intake comes from the community water supply. However, in the absence of site and/or regional specific surveys, national estimates are appropriate.

The RESRAD 511 L/yr (1.4 L/day) average water ingestion rate updated for use in the all-pathway analysis is based on EPA surveys published in the early 1990s. [ANL-EAD-4] The 730 L/yr (2 L/day) water ingestion rates for the inadvertent intruder are taken from *Site-Specific Parameter Values for the Nuclear Regulatory Commission's Food Pathway Dose Model* (ISSN 0017-9078 - Volume 62), and are based on 10 CFR 50, Appendix I rates for the MEI. The average rate for ingestion of drinking water listed in those sources is 370 L/yr (1 L/day). These publications consider indirect ingestion of water but do not consider whether or not the water is bottled or comes from a community or commercial source.

EPA drinking water survey, estimates per capita ingestion of water using data from the combined 1994, 1995, 1996, and 1998 *Continuing Survey of Food Intakes by Individuals (CSFII)*, conducted by the USDA. This publication considers indirect ingestion of water from food with water added at the final phase of food preparation and reports water consumption from community water, bottled water, water from other sources, missing source, and total water. Summary data found in the Executive Summary of EPA-822-R-00-001 (pages vii-viii) provide a 337 L/yr water ingestion rate.

According to EPA, direct water is plain water ingested directly as a beverage and indirect water is water added to foods and beverages during final preparation at home, or by food service establishments such as school cafeterias and restaurants. An example of indirect water is water added to dry cake mix. Community water is tap water from the community water supply; bottled water is purchased plain water; other water is water obtained from a well or rain cistern (household's), spring (household's or public), or other source; and preparation water is water used to prepare foods and includes the water used to prepare foods at home and by local food service establishments (indirect water), as well as, water added by commercial food manufacturers. Missing water source indicates that a survey participant responded "don't know" or "not ascertained" to the survey question regarding the source of water and total water is the sum of direct and indirect water from all sources which includes community water, bottled water, other water and missing sources. [EPA-822-R-00-001]

The EPA drinking water survey reports the mean per capita total water ingestion is 1,233 mL/person/d (450 L/yr) when viewed across genders and all age categories with 75% from community water, 13% from bottled water, 10% from other sources (well, spring and cistern, etc.), and 2% from non identified sources. This yields a mean of 924 mL/person/d (337 L/yr) from community water and 12.3 mL/person/d (4.5 L/yr) from other sources (well water). [EPA-822-R-00-001]

A value of 337 L/yr is used as the nominal water ingestion rate for all MOP and inadvertent intruder pathway analysis. In the stochastic analyses of this parameter, the water ingestion rate range was assumed to be as high as 730 L/yr (2 L/d), which, as discussed above, is a maximum evaluation point provided by the NRC. [Regulatory Guide 1.109] The lower range of the water ingestion rate range was set at 184 L/yr, the minimum recommended water ingestion rate is cut in half (e.g., water or other liquids from a clean source are used instead of drinking water from a contaminated source). A triangular distribution is used in the stochastic analysis which causes the mean value for this parameter to rise well above the most likely value (417 L/yr vs. 337 L/yr).

5.6.3.11.2 Crop Yields

A survey of local practices (WSRC-RP-91-17) surveyed 21 county extension agents in Georgia and South Carolina to estimate the average mass, in kg, of vegetation harvested in a typical square meter of garden or farmland within a 50 mile radius of SRS. Crop yields in kg/m2 were estimated for leafy vegetation (cabbage, lettuce and spinach) and other aboveground vegetables (broccoli, cauliflower, green peas, lima beans, and sweet corn). Average agricultural, garden, and pasture grass productivity for farms in the 50 mile region is estimated to be 0.7 kg/m2, 0.2 kg/m2 and 1.8 kg/m2, respectively. Because the garden productivity was estimated to be an order of magnitude lower than NRC Regulatory Guide 1.109 default, WSRC-RP-91-17 assumed the garden productivity is to be equal to agricultural productivity. This report recommends use of the site-specific value of 0.7 kg/m2 as the expected value for garden productivity, and the 0.2 kg/m2 should be considered in the uncertainty range.

5.6.3.11.3 Fraction of Foodstuff Intake from Garden

The current assumption of the fractions of vegetables, milk, and meat intake that is from a local garden were based on NRC Regulatory Guide 1.109, professional judgment, and *Data Collection Handbook To Support Modeling Impacts Of Radioactive Material In Soil*, considers the 0.5 fraction of vegetable intake to be a maximum value. Table 13-71 of EPA-600-P-95-002 provides regional values for vegetables, milk, and meat intake fractions and scenario specific values. This report recommends use of the values provided in this publication for households with gardens who raise animals for an all-pathways analysis and those for households who farm for an intruder analysis.

5.6.3.11.4 Garden Size

The garden size of 100m2 for a family of four is assumed in SRS PAs, and is based on site specific evaluation of consumption needs and annual productivity. It is assumed that a well would not be drilled for a single individual but rather for a household that includes at least two adults. As discussed in Section 4.6.2, SRS report, WSRC-RP-91-17 estimated that a person within a 50 mile radius of SRS consumes 184 kg of vegetables annually. The crop yields discussion above discusses the average garden vegetable yield of 0.2 kg/m2, but recommends the use of the agricultural 0.7 kg/m2, as reported in

WSRC-RP-91-17. A garden size of 260m2 would be required to support the annual consumption of 184 kg of vegetables for a household with two adults assuming all vegetables consumed by the adults are from their garden. Assuming that only 17% of a person's vegetables are from their home garden (EPA-600-P-95-002), roughly 100m2 would be required to feed a family of four. This report recommends use of the 100m2 garden size for vegetables only. However, this area is not large enough to graze livestock. ANL-EAIS-8 states that an area of 1 hectare (10,000m2) is required to graze a single milk cow. A triangular distribution using the 1,000m2 as a maximum, 100m2 as a minimum, and the most likely value (100m2) as the peak was utilized for garden size in the stochastic analysis.

5.6.3.11.5 Soil Exposure Time Period

For soil exposure time period to irrigation (buildup) SRS report, WSRC-STI-2006-00123 recommends 40 years to indicate the life time of a facility releasing radionuclide and 0.5 of a MEI lifetime assuming the MEI is exposed at that location for their lifetime. For the intruder and MOP scenario, it is assumed that the irrigation and harvesting of vegetables occur during the first year of residence, yielding the 183 day updated value.

5.6.3.11.6 Foodstuff Consumption

For the inadvertent intruder, vegetable, milk and beef consumption rates are taken from ISSN 0017-9078 - Volume 62. These values are based on county specific statistics provided by the counties within the states of South Carolina and Georgia that fall within a 50 mile radius of SRS. This report recommends continued use of WSRC-RP-91-17 as a reference for these values as they are based on a site-specific evaluation. However, this report recommends use of average values for PAs where the MEI values are currently used in some cases. Triangular distributions using values from applicable literature as maximum and minimum values, and the most likely value as the peak was utilized for consumption rates in the stochastic analysis.

5.6.3.12 Saturated Zone Flow Modeling Parameters

As discussed in Section 4.4.2.1, the GoldSim FTF modeling domain begins at the top of the waste layer and extends to a hypothetical groundwater well located 100m from the FTF boundary. The flow profiles used in the GoldSim model to represent flow through the waste are extracted from the PORFLOW model, which allows for changes in the closure cap, tank top and tank grout. The model is one-dimensional with downward flow represented in the unsaturated zone and predominantly horizontal flow in the saturated zone. The unsaturated zone is represented as a column underlying each particular initial inventory location (i.e., tank, evaporator, etc.).

The water flow boundary condition for the saturated zone bulk flow is also provided by the PORFLOW model. Saturated zone modeling Base Case values were refined in the GoldSim model during the benchmarking effort to align the GoldSim model results with the PORFLOW model results, as explained in the GoldSim benchmarking discussion (Section 5.6.2). Three modeling parameters of particular importance are the Saturated Zone

Thickness, the Saturated Zone Darcy Velocity, and the Saturated Zone Width. Additional information for each of these parameters is provided below.

5.6.3.12.1 Saturated Zone Thickness

In the GoldSim model, water leaving the unsaturated zone enters the saturated zone (i.e., the aquifer) as recharge, and this infiltrating water is mixed into the volume of aquifer water. The volume is determined by the flow rate and mixing volume (flow face area times flow velocity time) in the aquifer. The aquifer thickness is important to the model because the volume of water directly affects the concentration. WSRC-TR-96-0399-Vol. 1 provides detailed information about the hydrostratigraphy of the GSA. The water table elevation is approximately 225 feet at FTF (WSRC-TR-96-0399-Vol. 1, Figure 4.2-17) and the Tan Clay elevation varies from 196 to 214 feet over the PORFLOW FTF model domain, averaging approximately 205 feet. The difference is approximately 20 feet or 6m. Thus the saturated thickness of the UTR-UZ averages roughly 5m. The thickness of the UTR-LZ is approximately 20m. Figure 5.2-4 of WSRC-TR-96-0399-Vol. 1 indicates the portion of an overall contaminant plume emanating from the FTF would fill the entire UTR-LZ thickness at 100m. Based on these observations, the aquifer thickness (defined in the GoldSim model as SatThickness) is assigned a Base Case value of 5m. For the stochastic modeling, the Base Case "most likely" value of 5m was assumed as the mean aquifer thickness. The distribution was set as a normal distribution with a standard deviation of 2.3 feet. The thickness of the saturated zone and supporting distribution were based on the hydrogeology referenced above and informed by the benchmarking process results (Section 5.6.2).

5.6.3.12.2 Saturated Zone Darcy Velocity

In the GoldSim FTF model, the saturated zone Darcy Velocity is the primary reference for the velocity of water flowing in the aquifer. The Darcy Velocity is important to the model because it directly affects the concentration. Two distinct Darcy Velocity values were extracted from the PORFLOW results and incorporated into the GoldSim model (Section 4.4.2). Because of the flow divide in FTF, the waste tank dependent Base Case values used in the GoldSim model are either 25 ft/yr or 30 ft/yr based on the location of the waste tank. For the stochastic modeling, the saturated zone Darcy Velocity (defined in GoldSim as SatZoneDarcyVelbyTank) has a normal distribution with a minimum value of 10 ft/yr, a maximum value of 50 ft/yr, and 0.5 ft/yr as the standard deviation.

5.6.3.12.3 Saturated Zone Width

The saturated zone width, in conjunction with the saturated zone thickness and the Darcy Velocity, determines the mixing volume within the aquifer. The saturated zone width (defined in GoldSim as SatWidth) is modeled as a uniform distribution with a minimum of 80% of the mean and a maximum of 120% of the mean. The mean value for each of the FTF sources is the Base Case value which is equal to the diameter of the tank basemat for each waste tank. For the transfer lines the mean value is the width of the FTF model footprint which is 933.38 feet. For the other sources of ancillary equipment the mean is taken as 50 feet to be consistent with the PORFLOW model which assumes each source of ancillary equipment is contained within a 50 foot by 50 foot grid.

As discussed previously, saturated zone modeling values were refined in the GoldSim model during the benchmarking effort to align the GoldSim model results with the PORFLOW model results. Since the GoldSim model relies upon the PORFLOW model for flow data (more detailed explanation regarding the PORFLOW to GoldSim flow extraction process is provided in SRNL-L3500-2009-00009), benchmarking the GoldSim single aquifer results with the PORFLOW peak aquifer (i.e., UTR-LZ) results provides confidence that the GoldSim single aquifer representation is valid for FTF transport saturated zone modeling.

5.6.4 Uncertainty/Sensitivity Analysis using the FTF Probablistic Model

A special model was developed for performing the uncertainty and sensitivity analyses of the FTF PA calculations using the GoldSim systems analysis software. The model is not intended to predict future potential doses, rather the goal is to characterize the context of uncertainty and sensitivity surrounding the PA calculations.

The uncertainty analysis is concerned with how the uncertainty in model input parameters is propagated through the model to the selected model results, or endpoints. These model endpoints are potential radiological doses to hypothetical human receptors and aqueous concentrations of specific contaminants. In contrast, the sensitivity analysis, discussed in section 5.6.6, is focused on determining which of the many input parameters (called explanatory variables, in statistical parlance) are most responsible for determining the endpoints.

The probabilistic results of the GoldSim model are used to characterize the uncertainty manifested in the model input distributions. Some of these distributions are parameter values, such as material properties or water flow rates. Others are more oriented toward model uncertainty, such as the stochastic that selects which waste tank failure configuration to choose for a given realization. Together, the distributions, defined as Stochastic elements in GoldSim, are intended to capture the overall uncertainty in the model. These probabilistic model uncertainty analysis is not intended to quantify conceptual model uncertainty. Identification of conceptual model areas of importance is primarily accomplished throughout the combined sensitivity analyses (both stochastic and single parameter sensitivities). The sensitivity analyses highlight the portions of the conceptual model that most impact the model results (e.g., aquifer thickness, soil thickness, basemat thickness).

The FTF uncertainty and sensitivity analysis is based on inputs and results for the GoldSim FTF model using version “SRS FTF v2.41.1 r1000.gsm”. Three model runs were performed for use in the uncertainty and sensitivity analyses, one utilizing all six tank configurations (All Cases - SRS FTF v2.4 100ky AllCases r1000 s1.gsm), one utilizing the Base Case tank configuration (Case A - SRS FTF v2.4 20ky CaseA r5000 s1.gsm), and one utilizing the fast flow tank configuration (Case D - SRS FTF v2.4 20ky CaseD r5000 s1.gsm). The All Case model run contains the results of 1,000-realizations of the FTF model, while the Case A and Case D model runs contain the results of 5,000-realizations of the FTF model. The *Monte*

Carlo analysis sampled the input distributions with Latin Hypercube Sampling and with a seed value of one.

5.6.4.1 Uncertainty Analysis Summary Results

The most direct way to communicate the uncertain nature of the model results is to show graphs of certain key model endpoints. Statistics for maximum values (i.e., peak of the mean) are summarized in Table 5.6-10 for any time step within 10,000 years. Table 5.6-11 presents the same summary statistics on the peak year (year 10,000) for Case A and D (i.e., peak of the mean). The Case A and Case D results in Table 5.6-10 and Table 5.6-11 are based on the 5,000-realization sensitivity run, configured to provide as much data as possible for the sensitivity analysis, yet without recording time histories. The All Cases results in Table 5.6-10 and 5.6-11 are based on the 1,000-realization uncertainty run, which is shorter than the sensitivity runs due to the additional data storage necessary for recording time histories.

The values in the tables focus on two wells. Well 6 typically has the highest doses of those wells that tap into groundwater bound for UTR (and is similar in location and results to PORFLOW Sector E). Well 33 results are also shown for contrast, since it reflects releases from tanks (e.g., Tanks 33 and 34) whose releases predominately feed Fourmile Branch and are therefore different from the results associated with Well 6. The values in the table focus on maximum doses (and concentrations) at these wells. The values in Table 5.6-10 show the statistics (mean, median, and 95th percentile) on the maximum. This is not the same thing as the statistical time histories shown in the subsequent graphs, which summarize the dose values at each time step as presented in Table 5.6-11.

Figure 5.6-37 shows the uncertainty in the dose to the MOP, using all cases and the maximum concentrations of all the wells at a given time, within 10,000 years, based on 1,000-realizations. Figure 5.6-38 shows the same information, but for the time period following the evaluation period (10,000 to 100,000 years). Figures 5.6-39 and 5.6-40 shows the uncertainty in the dose to the MOP for Case A and Case D respectively using the maximum concentrations of all the wells at a given time, within 10,000 years, based on 5,000-realizations.

It should be noted that 5th and 95th percentiles are significantly below and above the median value. The mean value is also driven higher, approaching the 75th percentile, by the input distributions. This indicates that the model has input distributions with long tails (e.g., lognormal distributions) or extreme values inherent in the distributions. It is somewhat expected that the mean value is higher than the median because many of the dominant distributions were established reasonably conservatively, resulting in the distributions being skewed somewhat to the high end. This approach can inflate the variance in the UA causing a few realizations to dominate the UA results. The intent of Section 5.6.4.2 (Uncertainty Analysis Realizations of Interest) is to investigate which parameters are having the most impact on the UA.

It is important to note that Table 5.6-10, and Figures 5.6-37 through 5.6-40 do not present the same information. Table 5.6-10 shows the statistics of the maximum doses achieved in the 10,000 year time frames (e.g., "mean of peaks" dose). These are means (and medians and 95th percentiles) of the maximum values in dose, no matter when that dose was achieved within the time frame. Each realization produces a single maximum dose value at Well 6, for example. The mean of these maxima is the mean of the maximum dose values averaged over all the realizations, and does not reflect the variability of the dose values at different time steps, only the maximum doses in the period evaluated. Table 5.6-11 reflects the variability over time by presenting statistics for the peak time step (i.e., "peak of the mean" data) and represents the information in Figures 5.6-37 through 5.6-40.

Table 5.6-10: Summary Statistics on the Maximum Dose within 10,000 Years – for any Time Step

Cases Evaluated	Mean (mrem/yr)	Median (50th Percentile) (mrem/yr)	95th Percentile (mrem/yr)
Case A - Maximum Well 6 MOP dose within 10,000 years (mrem/yr) (b)	12	4.9	45
Case A - Maximum Well 33 MOP dose within 10,000 years (mrem/yr) (b)	0.2	0.2	0.6
Case D - Maximum MOP 6 MOP dose within 10,000 years (mrem/yr) (c)	245	72	619
Case D - Maximum MOP 33 MOP dose within 10,000 years (mrem/yr) (c)	11.8	2.3	59
All Cases - Maximum Well 6 MOP dose within 10,000 years (mrem/yr) (a)	28	8.3	108
All Cases - Maximum Well 33 MOP dose within 10,000 years (mrem/yr) (a)	1.7	0.3	3.6

(a) From GoldSim model file SRS FTF v2.4 100ky AllCases r1000 s1.gsm
(b) From GoldSim model file SRS FTF v2.4 20ky CaseA r5000 s1.gsm
(c) From GoldSim model file SRS FTF v2.4 20ky CaseD r5000 s1.gsm

Table 5.6-11: Summary Statistics on the Maximum Dose at Year 10,000

Cases Evaluated	Mean (mrem/yr)	Median (50th Percentile) (mrem/yr)	95th Percentile (mrem/yr)
Case A - Maximum Well 6 MOP dose within 10,000 years (mrem/yr) (b)	4.7	1.7	19.4
Case A - Maximum Well 33 MOP dose within 10,000 years (mrem/yr) (b)	1.8	1.2	6.4
Case D - Maximum MOP 6 MOP dose within 10,000 years (mrem/yr) (c)	101	9.0	333
Case D - Maximum MOP 33 MOP dose within 10,000 years (mrem/yr) (c)	1.3	0.4	5.5
All Cases - Maximum Well 6 MOP dose within 10,000 years (mrem/yr) (a)	9.5	2.6	35.6
All Cases - Maximum Well 33 MOP dose within 10,000 years (mrem/yr) (a)	0.2	0.1	0.7

(a) From GoldSim model file SRS FTF v2.4 100ky AllCases r1000 s1.gsm
(b) From GoldSim model file SRS FTF v2.4 20ky CaseA r5000 s1.gsm
(c) From GoldSim model file SRS FTF v2.4 20ky CaseD r5000 s1.gsm

Figures 5.6-37 through 5.6-40 show statistical summaries by time step of the dose based on the well of highest concentration at each time step. For the All Cases runs, the peak of the means dose within the period of performance is approximately 14 mrem/yr and occurs near year 9,500. The maximum mean dose within 100,000 years is approximately 345 mrem/yr, occurring near year 38,000. The Case A peak of the means dose within the period of performance occurs near year 10,000, with a value of approximately 4.8 mrem/yr. The peak of the means dose within 20,000 years is approximately 121 mrem/yr, occurring near year 16,300. The tables and graphs are not directly comparable since the tables are examining the maximum values at particular wells, and the graphs display the statistics of time histories of doses (not just their maximum values) across all wells.

Figure 5.6-37: Statistical Summary of Time History of Total MOP Dose, at the Well of Maximum Concentration for All Cases (0 to 10,000 Years)

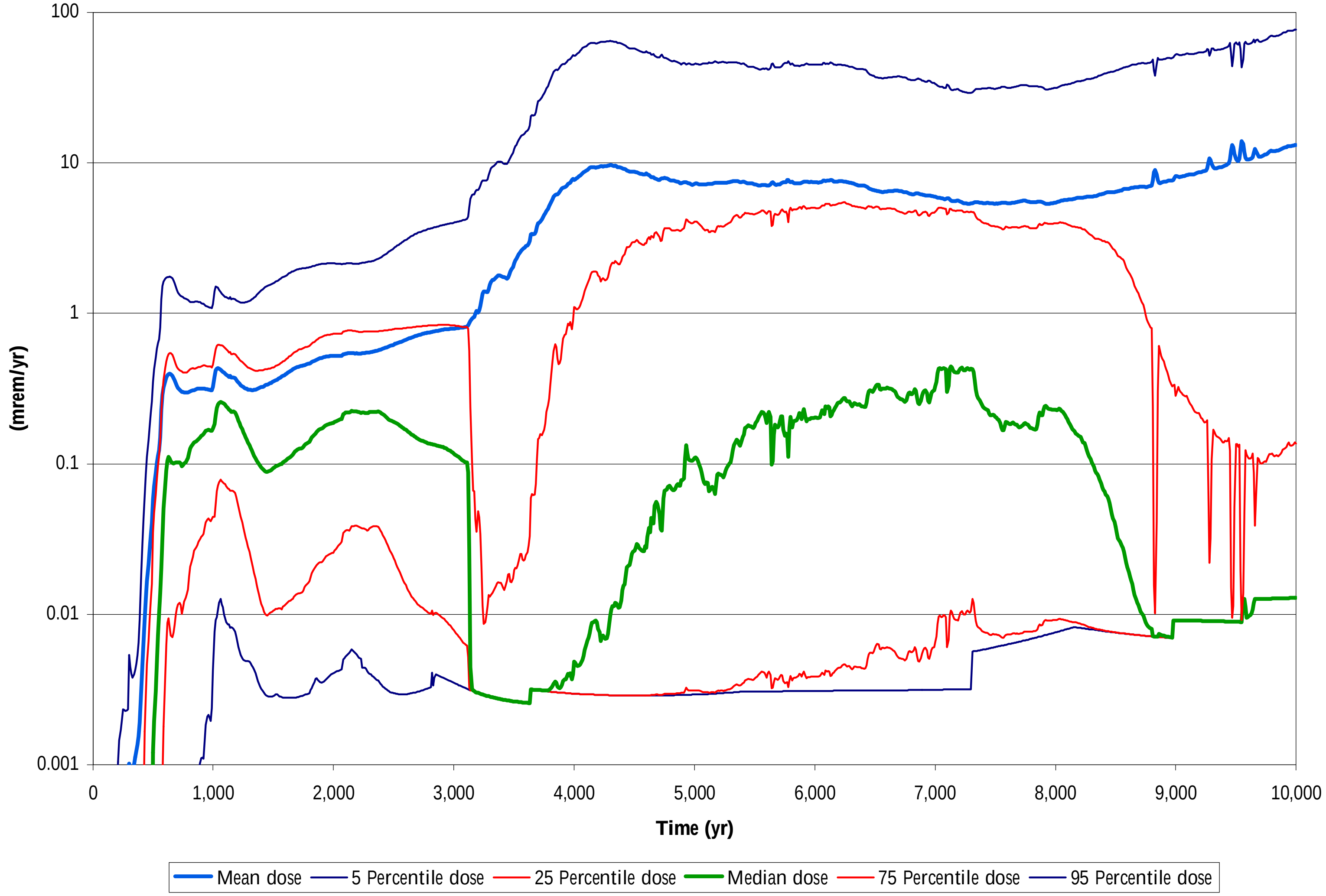


Figure 5.6-38: Statistical Summary of Time History of Total MOP Dose, at the Well of Maximum Concentration for All Cases (10,000 to 100,000 Years)

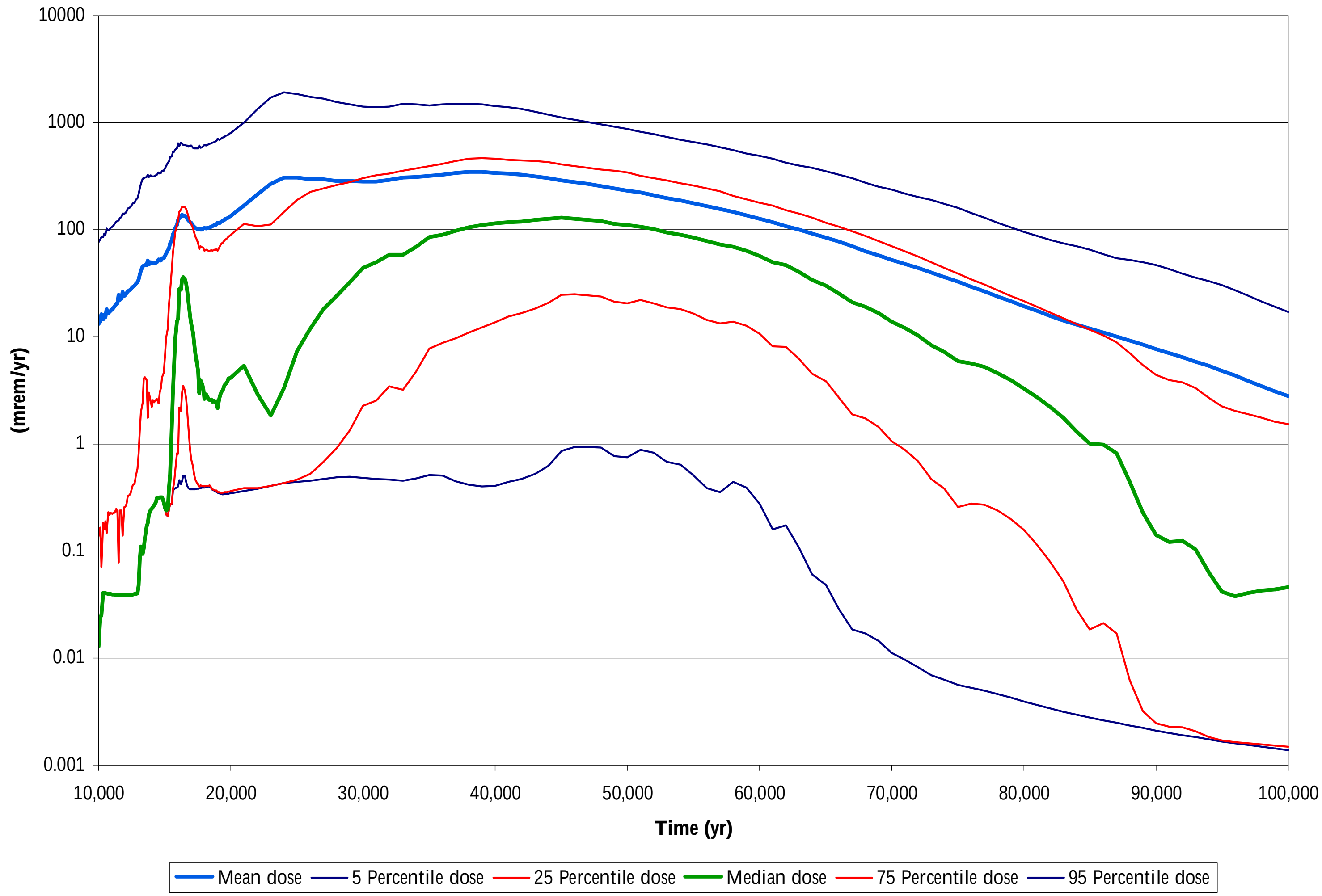


Figure 5.6-39: Statistical Summary of Time History of Total MOP Dose, at the Well of Maximum Concentration for Case A (0 to 10,000 yr)

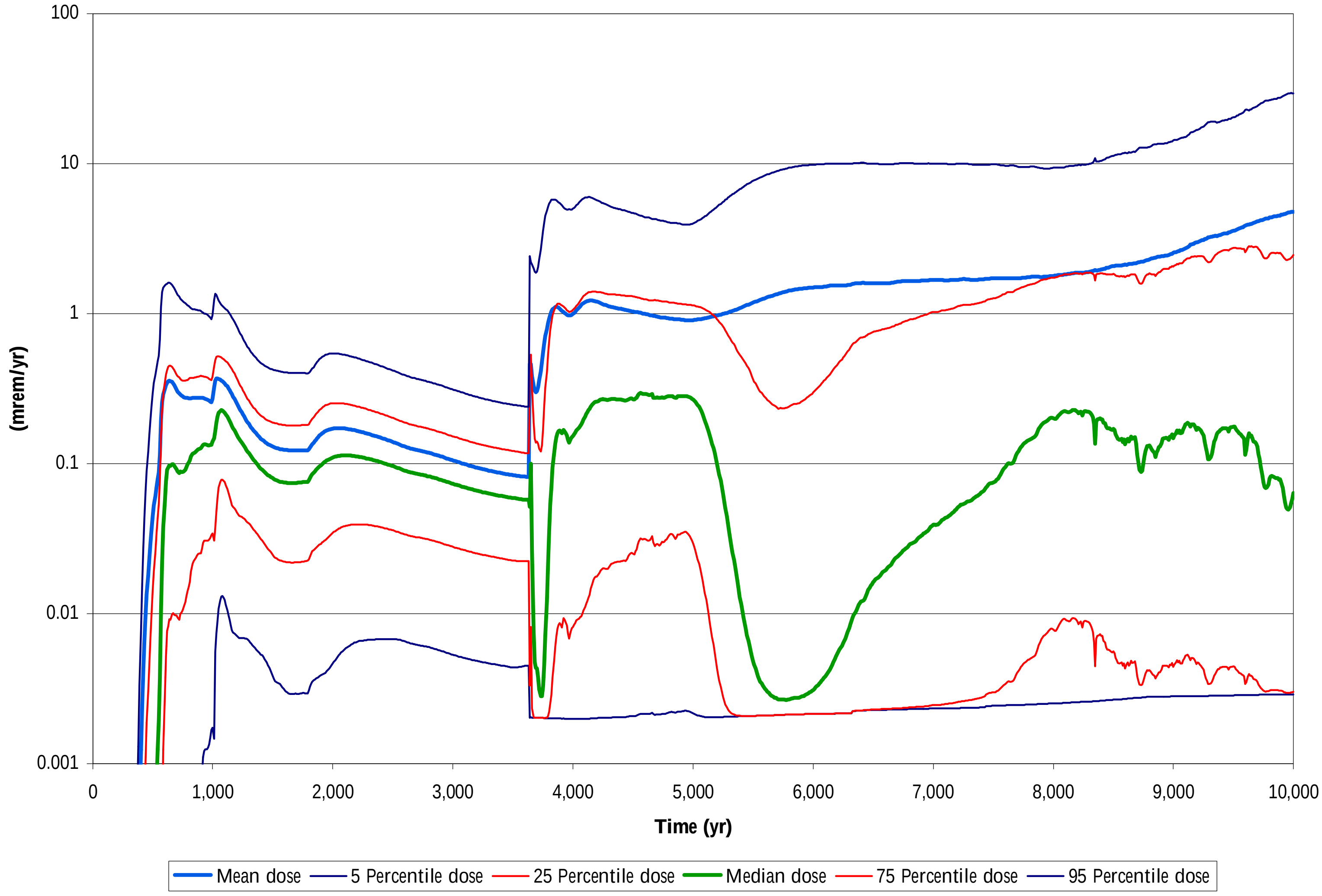
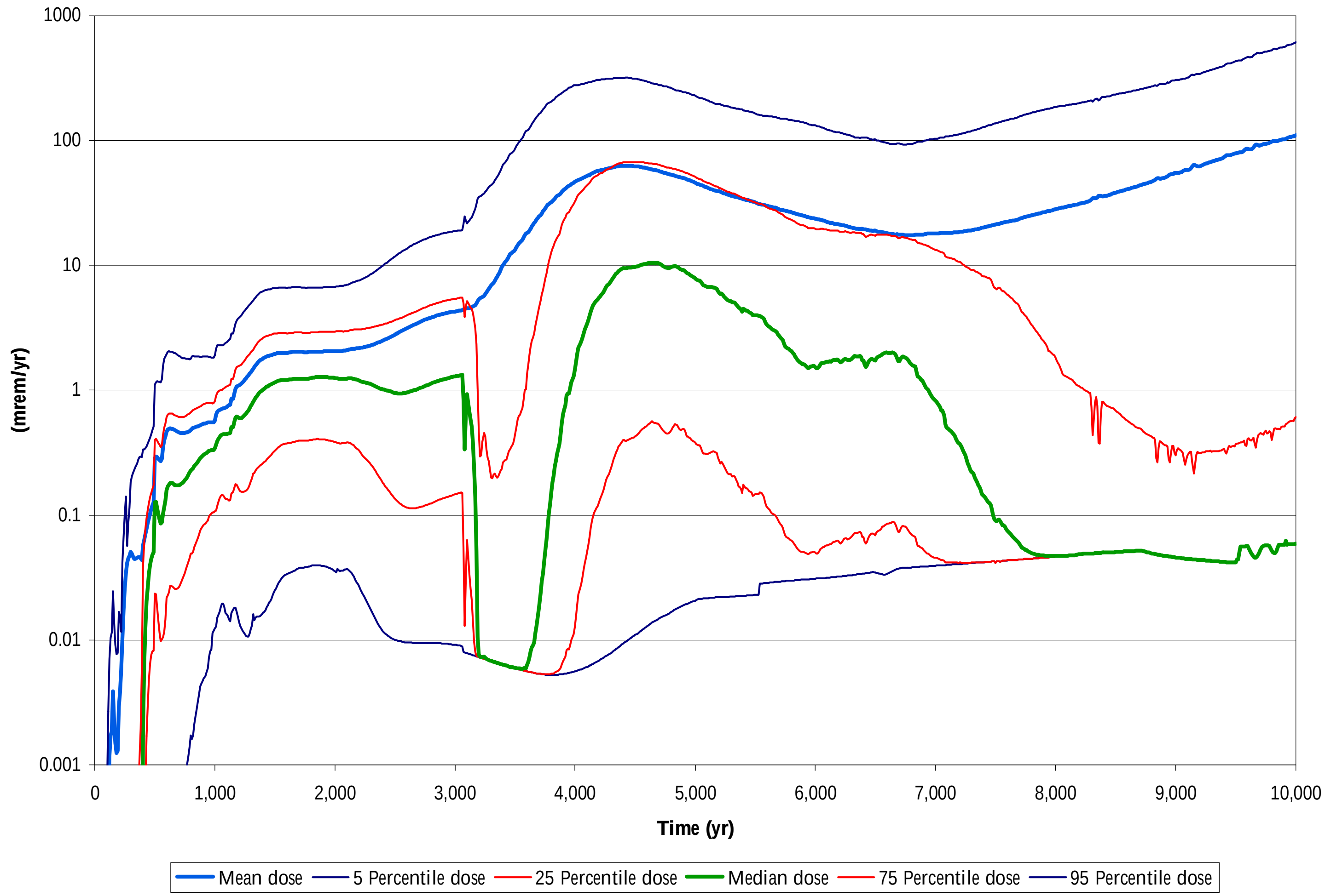


Figure 5.6-40: Statistical Summary of Time History of Total MOP Dose, at the Well of Maximum Concentration for Case D (0 to 10,000 yr)



5.6.4.2 Uncertainty Analysis Realizations of Interest

The purpose of this section is to investigate which individual parameters are having the most impact on the UA by analyzing those runs whose results most influence the overall results.

The top ten realizations for the Case A maximum MOP dose at Well 6 in 10,000 years (using SRS FTF v2.4 20ky CaseA r 5000 s1.gsm), were identified and are listed in Table 5.6-12. The same information for CaseD (using SRS FTF v2.4 20ky CaseD r5000 s1.gsm) is provided in Table 5.6-13. For each of these top realizations, the parameters that were at the extremes of their distributions are listed. This listing was an attempt to systematically identify the parameters of interest, but this methodical approach includes parameters that do not significantly impact the peak dose even though they are at the extreme of their distribution.

The top realizations (without regard to the year of occurrence) for Cases A and D were examined individually in an attempt to gain general insights regarding the UA realizations.

Table 5.6-12: Top Ten Realizations for Case A, Well 6, Maximum MOP Dose in 10,000 Years

Rank	Peak Dose mrem/yr	Stochastic	Parameter Value (varies by stochastic)	Realization
1	276.75	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [Sr90]	0.0207	3,835
1	276.75	/SandySoilKds/Kd Dist [Gd] [mL/g]	275.4300	3,835
1	276.75	/TheTanks/Tank44/InventoryDistributions/Rad Dist By Rad44 [C14]	0.0120	3,835
1	276.75	/TheTanks/Tank01/InventoryDistributions/Rad Dist By Rad1 [Tc99]	0.0323	3,835
1	276.75	/Oxidizing/old concrete kds ox/Kd Dist [La] [mL/g]	125.6000	3,835
1	276.75	/TheTanks/Tank18/InventoryDistributions/Rad Dist By Rad18 [Al26]	0.0115	3,835
1	276.75	/AncillaryEquipment/FPT2/SiteGeometry/SatThickness [m]	3.0575	3,835
1	276.75	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [Co60]	0.0453	3,835
1	276.75	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [Al26]	0.0133	3,835
1	276.75	/TheTanks/Tank18/InventoryDistributions/Rad Dist By Rad18 [U236]	0.0136	3,835
1	276.75	/TheTanks/Tank34/InventoryDistributions/Rad Dist By Rad34 [Ni63]	9.9483	3,835
1	276.75	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Am243]	2.2769	3,835
1	276.75	/TheTanks/Tank34/InventoryDistributions/Rad Dist By Rad34 [Eu154]	9.9456	3,835
1	276.75	/TheTanks/Tank07/InventoryDistributions/Rad Dist By Rad7 [Sn126]	9.9495	3,835
1	276.75	/ClayeySoilKds/Kd Dist [At] [mL/g]	0.6017	3,835
1	276.75	/TheTanks/Tank03/InventoryDistributions/Rad Dist By Rad3 [Am242m]	0.9981	3,835
1	276.75	/TheTanks/Tank06/InventoryDistributions/Rad Dist By Rad6 [Cs137]	9.9732	3,835
1	276.75	/TheTanks/Tank08/InventoryDistributions/Rad Dist By Rad8 [Pu240]	9.9837	3,835
1	276.75	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [Cs135]	0.9990	3,835
1	276.75	/TheTanks/Tank17/InventoryDistributions/Rad Dist By Rad17 [Cs137]	2.8393	3,835
2	260.98	/TheTanks/Tank02/InventoryDistributions/Rad Dist By Rad2 [Al26]	0.0102	743
2	260.98	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Cm245]	0.0100	743
2	260.98	/TheTanks/Tank26/InventoryDistributions/Rad Dist By Rad26 [Ni63]	0.0189	743
2	260.98	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [Cl36]	0.0110	743
2	260.98	/TheTanks/Tank33/InventoryDistributions/Rad Dist By Rad33 [Cm244]	0.0117	743
2	260.98	/TheTanks/Tank45/InventoryDistributions/Rad Dist By Rad45 [Pu242]	0.0123	743
2	260.98	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Am242m]	0.0231	743
2	260.98	/Vegetable Production Yield [kg/m2]	0.2415	743
2	260.98	/TheTanks/Tank08/InventoryDistributions/Rad Dist By Rad8 [Pu239]	0.0367	743

Table 5.6-12: Top Ten Realizations for Case A, Well 6, Maximum MOP Dose in 10,000 Years (Continued)

Rank	Peak Dose mrem/yr	Stochastic	Parameter Value (varies by stochastic)	Realization
2	260.98	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Np237]	0.0125	743
2	260.98	/IRRIDOSE Factors/IrrigationRate [l/m2/d]	5.2585	743
2	260.98	/TheTanks/Tank17/InventoryDistributions/Rad Dist By Rad17 [Am243]	2.2330	743
2	260.98	/TheTanks/Tank02/InventoryDistributions/Rad Dist By Rad2 [Tc99]	9.9145	743
2	260.98	/TheTanks/Tank17/InventoryDistributions/Rad Dist By Rad17 [Sm151]	2.2495	743
2	260.98	/TheTanks/Tank46/LinerFailure/Configuration stoch	6.0000	743
2	260.98	/Oxidizing/middle concrete kds ox/Kd Dist [Zr] [mL/g]	8641.1000	743
2	260.98	/TheTanks/Tank07/InventoryDistributions/Rad Dist By Rad7 [Eu154]	9.9515	743
2	260.98	/TheTanks/Tank05/SiteGeometry/SatWidth [ft]	89.9210	743
2	260.98	/TheTanks/Tank45/InventoryDistributions/Rad Dist By Rad45 [U234]	9.9671	743
2	260.98	/Oxidizing/middle concrete kds ox/Kd Dist [Tc] [mL/g]	0.8024	743
3	251.21	/Water/SatZoneDarcyVelbyTank [T17] [ft/yr]	28.4550	1,867
3	251.21	/TheTanks/Tank44/InventoryDistributions/Rad Dist By Rad44 [Se79]	0.0121	1,867
3	251.21	/TheTanks/Tank17/InventoryDistributions/Rad Dist By Rad17 [Tc99]	0.0365	1,867
3	251.21	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [Eu152]	0.0746	1,867
3	251.21	/TheTanks/Tank27/InventoryDistributions/Rad Dist By Rad27 [Zr93]	0.0168	1,867
3	251.21	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Nb94]	0.0168	1,867
3	251.21	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [Nb93m]	0.0156	1,867
3	251.21	/TheTanks/Tank19/InventoryDistributions/Rad Dist By Rad19 [Cm247]	0.0155	1,867
3	251.21	/TheTanks/Tank02/InventoryDistributions/Rad Dist By Rad2 [Th229]	0.0204	1,867
3	251.21	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Nb94]	0.0658	1,867
3	251.21	/TheTanks/Tank46/InventoryDistributions/Rad Dist By Rad46 [Sn126]	0.9941	1,867
3	251.21	/TheTanks/Tank07/InventoryDistributions/Rad Dist By Rad7 [U232]	0.9959	1,867
3	251.21	/TheTanks/Tank47/InventoryDistributions/Rad Dist By Rad47 [K40]	0.9954	1,867
3	251.21	/ClayeySoilKds/Kd Dist [Ru] [mL/g]	0.0000	1,867
3	251.21	/TheTanks/TankData/AvgWasteThickness dist [T4] [in]	0.3490	1,867
3	251.21	/TheTanks/Tank03/InventoryDistributions/Rad Dist By Rad3 [Zr93]	0.9974	1,867
3	251.21	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Pu240]	2.5306	1,867

Table 5.6-12: Top Ten Realizations for Case A, Well 6, Maximum MOP Dose in 10,000 Years (Continued)

Rank	Peak Dose mrem/yr	Stochastic	Parameter Value (varies by stochastic)	Realization
3	251.21	/IHI /ResidentScenario/GardenSize [m2]	979.0800	1,867
3	251.21	/TheTanks/Tank18/InventoryDistributions/Rad Dist By Rad18 [Cm243]	0.9996	1,867
3	251.21	/TheTanks/Tank45/InventoryDistributions/Rad Dist By Rad45 [Pb210]	1.0000	1,867
4	246.47	/TheTanks/Tank02/InventoryDistributions/Rad Dist By Rad2 [Pu244]	0.0109	2,748
4	246.47	/TheTanks/Tank18/InventoryDistributions/Rad Dist By Rad18 [Sr90]	0.5019	2,748
4	246.47	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Th230]	0.0037	2,748
4	246.47	/TheTanks/Tank34/InventoryDistributions/Rad Dist By Rad34 [Cm247]	0.0109	2,748
4	246.47	/TheTanks/Tank34/InventoryDistributions/Rad Dist By Rad34 [Pu239]	0.1161	2,748
4	246.47	/SandySoilKds/Kd Dist [Eu] [mL/g]	275.8100	2,748
4	246.47	/TheTanks/Tank34/InventoryDistributions/Rad Dist By Rad34 [Th232]	0.0120	2,748
4	246.47	/Oxidizing/old concrete kds ox/Kd Dist [Np] [mL/g]	63.1200	2,748
4	246.47	/TheTanks/Tank47/InventoryDistributions/Rad Dist By Rad47 [Pd107]	0.0151	2,748
4	246.47	/TheTanks/Tank06/InventoryDistributions/Rad Dist By Rad6 [Sr90]	0.0575	2,748
4	246.47	/TheTanks/Tank46/InventoryDistributions/Rad Dist By Rad46 [Np237]	0.9921	2,748
4	246.47	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Al26]	0.9939	2,748
4	246.47	/TheTanks/Tank33/InventoryDistributions/Rad Dist By Rad33 [Pu239]	9.9315	2,748
4	246.47	/TheTanks/Tank27/InventoryDistributions/Rad Dist By Rad27 [Al26]	0.9927	2,748
4	246.47	/TheTanks/Tank04/InventoryDistributions/Rad Dist By Rad4 [Nb94]	0.9948	2,748
4	246.47	/TheTanks/Tank34/InventoryDistributions/Rad Dist By Rad34 [H3]	0.9930	2,748
4	246.47	/TheTanks/Tank46/InventoryDistributions/Rad Dist By Rad46 [Th230]	0.9950	2,748
4	246.47	Vegetable Consumption - Local Fraction	0.4718	2,748
4	246.47	/TheTanks/Tank08/InventoryDistributions/Rad Dist By Rad8 [Pb210]	0.9973	2,748
4	246.47	/TheTanks/TankData/AvgWasteThickness dist [T19] [in]	0.3494	2,748
5	219.57	/TheTanks/Tank03/InventoryDistributions/Rad Dist By Rad3 [Eu154]	0.0198	4,764
5	219.57	/TheTanks/Tank17/InventoryDistributions/Rad Dist By Rad17 [Cm247]	0.0257	4,764
5	219.57	/IHI /FracLocalMilk	0.0212	4,764
5	219.57	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [Se79]	0.0485	4,764
5	219.57	/TheTanks/Tank27/InventoryDistributions/Rad Dist By Rad27 [Ra228]	0.0128	4,764

Table 5.6-12: Top Ten Realizations for Case A, Well 6, Maximum MOP Dose in 10,000 Years (Continued)

Rank	Peak Dose mrem/yr	Stochastic	Parameter Value (varies by stochastic)	Realization
5	219.57	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [Am243]	0.0136	4,764
5	219.57	/TheTanks/Tank46/InventoryDistributions/Rad Dist By Rad46 [Tc99]	0.0149	4,764
5	219.57	/TheTanks/Tank45/InventoryDistributions/Rad Dist By Rad45 [Pu238]	0.0813	4,764
5	219.57	/TheTanks/Tank26/InventoryDistributions/Rad Dist By Rad26 [Cs135]	0.0180	4,764
5	219.57	/TheTanks/Tank07/InventoryDistributions/Rad Dist By Rad7 [Ra228]	0.0194	4,764
5	219.57	/TheTanks/Tank27/InventoryDistributions/Rad Dist By Rad27 [Pu241]	9.9262	4,764
5	219.57	/TheTanks/Tank33/InventoryDistributions/Rad Dist By Rad33 [Ra226]	0.9923	4,764
5	219.57	/TheTanks/Tank34/InventoryDistributions/Rad Dist By Rad34 [Cm247]	0.9924	4,764
5	219.57	/TheTanks/Tank08/InventoryDistributions/Rad Dist By Rad8 [H3]	0.9951	4,764
5	219.57	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Pd107]	2.2835	4,764
5	219.57	/TheTanks/Tank44/InventoryDistributions/Rad Dist By Rad44 [H3]	0.9982	4,764
5	219.57	/TheTanks/Tank19/InventoryDistributions/Rad Dist By Rad19 [Cm245]	0.9990	4,764
5	219.57	/IHI /AirIntake [m3]	11585.0000	4,764
5	219.57	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Pu242]	2.4799	4,764
5	219.57	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Rn222]	2.6782	4,764
6	202.85	/SandySoilKds/Kd Dist [Te] [mL/g]	250.1200	3,903
6	202.85	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [I129]	0.0115	3,903
6	202.85	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Pu240]	0.0128	3,903
6	202.85	/TheTanks/Tank17/InventoryDistributions/Rad Dist By Rad17 [Ac227]	0.0156	3,903
6	202.85	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Ra226]	0.0145	3,903
6	202.85	/SandySoilKds/Kd Dist [Co] [mL/g]	1.7812	3,903
6	202.85	/TheTanks/Tank27/InventoryDistributions/Rad Dist By Rad27 [Th232]	0.0135	3,903
6	202.85	/TheTanks/Tank18/InventoryDistributions/Rad Dist By Rad18 [Zr93]	0.0141	3,903
6	202.85	/TheTanks/Tank26/InventoryDistributions/Rad Dist By Rad26 [Pu244]	0.0147	3,903
6	202.85	/Oxidizing/old concrete kds ox/Kd Dist [Ba] [mL/g]	17.6960	3,903
6	202.85	/TheTanks/Tank08/InventoryDistributions/Rad Dist By Rad8 [Zr93]	0.9926	3,903
6	202.85	/TheTanks/Tank03/InventoryDistributions/Rad Dist By Rad3 [Cm245]	0.9925	3,903
6	202.85	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Co60]	2.1787	3,903
6	202.85	/TheTanks/Tank06/InventoryDistributions/Rad Dist By Rad6 [Ra228]	0.9915	3,903

Table 5.6-12: Top Ten Realizations for Case A, Well 6, Maximum MOP Dose in 10,000 Years (Continued)

Rank	Peak Dose mrem/yr	Stochastic	Parameter Value (varies by stochastic)	Realization
6	202.85	/TheTanks/Tank06/InventoryDistributions/Rad Dist By Rad6 [Cm243]	0.9943	3,903
6	202.85	/TheTanks/Tank02/InventoryDistributions/Rad Dist By Rad2 [Co60]	9.9658	3,903
6	202.85	/TheTanks/Tank04/SiteGeometry/SatWidth [ft]	89.9500	3,903
6	202.85	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [U234]	9.9802	3,903
6	202.85	/TheTanks/Tank03/InventoryDistributions/Rad Dist By Rad3 [H3]	0.9999	3,903
6	202.85	/TheTanks/Tank46/InventoryDistributions/Rad Dist By Rad46 [U236]	0.9992	3,903
7	186	/IHI /FracLocalMilk	0.0055	879
7	186	/TheTanks/Tank02/InventoryDistributions/Rad Dist By Rad2 [Cm247]	0.0104	879
7	186	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [Mo93m]	0.0115	879
7	186	/TheTanks/Tank07/InventoryDistributions/Rad Dist By Rad7 [Pb210]	0.0147	879
7	186	/Oxidizing/middle concrete kds ox/Kd Dist [Pu] [mL/g]	2519.8000	879
7	186	/TheTanks/Tank02/InventoryDistributions/Rad Dist By Rad2 [Am241]	0.0529	879
7	186	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Ra226]	0.0234	879
7	186	/TheTanks/Tank03/InventoryDistributions/Rad Dist By Rad3 [Cm248]	0.0157	879
7	186	/TheTanks/Tank47/InventoryDistributions/Rad Dist By Rad47 [Ra228]	0.0157	879
7	186	/TheTanks/Tank44/InventoryDistributions/Rad Dist By Rad44 [Pu240]	0.1038	879
7	186	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Sm151]	2.1867	879
7	186	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [K40]	0.9935	879
7	186	/TheTanks/Tank33/InventoryDistributions/Rad Dist By Rad33 [U232]	0.9923	879
7	186	/TheTanks/Tank27/InventoryDistributions/Rad Dist By Rad27 [Cm244]	0.9903	879
7	186	/SandySoilKds/Kd Dist [At] [mL/g]	0.0000	879
7	186	/TheTanks/Tank03/InventoryDistributions/Rad Dist By Rad3 [Cs135]	0.9941	879
7	186	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [C14]	2.2113	879
7	186	/Oxidizing/middle concrete kds ox/Kd Dist [K] [mL/g]	2.0051	879
7	186	/TheTanks/Tank19/InventoryDistributions/Rad Dist By Rad19 [U232]	0.9951	879
7	186	/TheTanks/Tank26/InventoryDistributions/Rad Dist By Rad26 [Pu238]	9.9670	879
8	160.88	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [Ac227]	0.0106	4,250
8	160.88	/AncillaryEquipment/CTS/SiteGeometry/SatThickness [m]	2.6519	4,250
8	160.88	/TheTanks/Tank44/InventoryDistributions/Rad Dist By Rad44 [Am242m]	0.0108	4,250

Table 5.6-12: Top Ten Realizations for Case A, Well 6, Maximum MOP Dose in 10,000 Years (Continued)

Rank	Peak Dose mrem/yr	Stochastic	Parameter Value (varies by stochastic)	Realization
8	160.88	/TheTanks/Tank01/InventoryDistributions/Rad Dist By Rad1 [Nb94]	0.0121	4,250
8	160.88	/TheTanks/Tank02/InventoryDistributions/Rad Dist By Rad2 [Cm244]	0.0413	4,250
8	160.88	/TheTanks/Tank47/InventoryDistributions/Rad Dist By Rad47 [Cs137]	0.0501	4,250
8	160.88	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [Nb94]	0.0118	4,250
8	160.88	/TheTanks/Tank06/InventoryDistributions/Rad Dist By Rad6 [Ra226]	0.0134	4,250
8	160.88	/TheTanks/Tank33/InventoryDistributions/Rad Dist By Rad33 [Pu238]	0.1335	4,250
8	160.88	/TheTanks/Tank19/SiteGeometry/SatWidth [ft]	68.1390	4,250
8	160.88	/TheTanks/Tank06/InventoryDistributions/Rad Dist By Rad6 [Pa231]	0.9962	4,250
8	160.88	/SandySoilKds/Kd Dist [Te] [mL/g]	1741.3000	4,250
8	160.88	/Oxidizing/middle concrete kds ox/Kd Dist [K] [mL/g]	2.0056	4,250
8	160.88	/TheTanks/Tank18/SiteGeometry/SatWidth [ft]	101.9400	4,250
8	160.88	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Mo93m]	2.4866	4,250
8	160.88	/Oxidizing/middle concrete kds ox/Kd Dist [Ru] [mL/g]	0.0000	4,250
8	160.88	/TheTanks/Tank01/InventoryDistributions/Rad Dist By Rad1 [Pb210]	0.9993	4,250
8	160.88	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Pb210]	0.9987	4,250
8	160.88	/ClayeySoilKds/Kd Dist Np [mL/g]	41.9030	4,250
8	160.88	/TheTanks/Tank33/InventoryDistributions/Rad Dist By Rad33 [Np237]	9.9999	4,250
9	151.01	/IHI /FracLocalMilk	0.0041	638
9	151.01	/TheTanks/Tank03/InventoryDistributions/Rad Dist By Rad3 [Se79]	0.0197	638
9	151.01	/TheTanks/Tank17/InventoryDistributions/Rad Dist By Rad17 [Cf249]	0.0029	638
9	151.01	/TheTanks/Tank03/InventoryDistributions/Rad Dist By Rad3 [Pd107]	0.0105	638
9	151.01	/TheTanks/Tank47/InventoryDistributions/Rad Dist By Rad47 [I129]	0.0113	638
9	151.01	/TheTanks/Tank08/InventoryDistributions/Rad Dist By Rad8 [Pb210]	0.0131	638
9	151.01	/Oxidizing/middle concrete kds ox/Kd Dist [Rh] [mL/g]	0.0000	638
9	151.01	/TheTanks/Tank19/InventoryDistributions/Rad Dist By Rad19 [Pu238]	0.5047	638
9	151.01	/TheTanks/Tank03/InventoryDistributions/Rad Dist By Rad3 [Sn126]	0.0669	638
9	151.01	/TheTanks/Tank27/InventoryDistributions/Rad Dist By Rad27 [Pu238]	0.0631	638
9	151.01	/Oxidizing/middle concrete kds ox/Kd Dist [At] [mL/g]	34.3870	638

Table 5.6-12: Top Ten Realizations for Case A, Well 6, Maximum MOP Dose in 10,000 Years (Continued)

Rank	Peak Dose mrem/yr	Stochastic	Parameter Value (varies by stochastic)	Realization
9	151.01	/TheTanks/Tank26/InventoryDistributions/Rad Dist By Rad26 [Cs137]	9.9058	638
9	151.01	/TheTanks/Tank01/InventoryDistributions/Rad Dist By Rad1 [Pu240]	9.9191	638
9	151.01	/SandySoilKds/Kd Dist [Kr] [mL/g]	0.0000	638
9	151.01	/TheTanks/Tank03/LinerFailure/Configuration stoch	6.0000	638
9	151.01	/TheTanks/Tank17/InventoryDistributions/Rad Dist By Rad17 [Np237]	2.2904	638
9	151.01	/TheTanks/Tank19/InventoryDistributions/Rad Dist By Rad19 [U238]	0.9945	638
9	151.01	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [U234]	9.9513	638
9	151.01	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [C14]	0.9979	638
9	151.01	/Water/SatZoneDarcyVelbyTank [T2] [ft/yr]	31.4670	638
10	146.67	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [I129]	0.0102	4,047
10	146.67	/TheTanks/Tank19/InventoryDistributions/Rad Dist By Rad19 [U235]	0.0109	4,047
10	146.67	/TheTanks/Tank44/InventoryDistributions/Rad Dist By Rad44 [Sn126]	0.0106	4,047
10	146.67	/TheTanks/TankData/Basemat Thicknesses/TypeIIIABasematThickness [in]	40.5500	4,047
10	146.67	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [U232]	0.0113	4,047
10	146.67	/TheTanks/Tank01/InventoryDistributions/Rad Dist By Rad1 [Cm244]	0.0310	4,047
10	146.67	/TheTanks/Tank18/InventoryDistributions/Rad Dist By Rad18 [Eu152]	0.0138	4,047
10	146.67	/TheTanks/Tank18/InventoryDistributions/Rad Dist By Rad18 [I129]	0.0131	4,047
10	146.67	/TheTanks/Tank18/InventoryDistributions/Rad Dist By Rad18 [Eu154]	0.5088	4,047
10	146.67	/Oxidizing/middle concrete kds ox/Kd Dist [Cf] [mL/g]	1261.6000	4,047
10	146.67	/TheTanks/Tank45/InventoryDistributions/Rad Dist By Rad45 [Cf249]	0.9956	4,047
10	146.67	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Pu241]	9.9466	4,047
10	146.67	/TheTanks/Tank04/InventoryDistributions/Rad Dist By Rad4 [Pu242]	0.9938	4,047
10	146.67	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [Pu238]	9.9629	4,047
10	146.67	/TheTanks/Tank47/InventoryDistributions/Rad Dist By Rad47 [Cf249]	0.9953	4,047
10	146.67	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [U234]	9.9493	4,047
10	146.67	/TheTanks/Tank27/InventoryDistributions/Rad Dist By Rad27 [Nb94]	0.9972	4,047
10	146.67	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [Sm151]	9.9710	4,047
10	146.67	/TheTanks/Tank27/InventoryDistributions/Rad Dist By Rad27 [Cm244]	0.9971	4,047
10	146.67	/Oxidizing/old concrete kds ox/Kd Dist [Sn] [mL/g]	3497.0000	4,047

Table 5.6-13: Top Ten Realizations for Case D, Well 6, Maximum MOP Dose in 10,000 Years

Rank	Peak Dose mrem/yr	Stochastic	Parameter Value (varies by stochastic)	Realization
1	12298	/TheTanks/Tank19/InventoryDistributions/Rad Dist By Rad19 [Ac227]	0.0101	3,954
1	12298	/Water/SatZoneDarcyVelbyTank [T25] [ft/yr]	23.4430	3,954
1	12298	/Oxidizing/old concrete kds ox/Kd Dist [Bk] [mL/g]	125.2200	3,954
1	12298	/TheTanks/Tank18/InventoryDistributions/Rad Dist By Rad18 [Pu240]	0.5018	3,954
1	12298	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [Cm247]	0.0132	3,954
1	12298	/TheTanks/Tank03/InventoryDistributions/Rad Dist By Rad3 [Pd107]	0.0113	3,954
1	12298	/Oxidizing/middle concrete kds ox/Kd Dist [La] [mL/g]	1266.0000	3,954
1	12298	/TheTanks/Tank45/InventoryDistributions/Rad Dist By Rad45 [Th230]	0.0128	3,954
1	12298	/SandySoilKds/Kd Dist [Rn] [mL/g]	0.0000	3,954
1	12298	/TheTanks/Tank03/InventoryDistributions/Rad Dist By Rad3 [Pu242]	0.0152	3,954
1	12298	/TheTanks/Tank26/InventoryDistributions/Rad Dist By Rad26 [Th230]	0.9931	3,954
1	12298	/TheTanks/Tank06/InventoryDistributions/Rad Dist By Rad6 [Co60]	9.9340	3,954
1	12298	/TheTanks/Tank34/InventoryDistributions/Rad Dist By Rad34 [Sn126]	9.9526	3,954
1	12298	/AncillaryEquipment/CTS/SiteGeometry/SatWidth [ft]	59.9090	3,954
1	12298	/TheTanks/Tank04/InventoryDistributions/Rad Dist By Rad4 [Ra228]	0.9955	3,954
1	12298	/TheTanks/Tank19/InventoryDistributions/Rad Dist By Rad19 [Cm245]	0.9956	3,954
1	12298	/SandySoilKds/Kd Dist [Ar] [mL/g]	0.0000	3,954
1	12298	/TheTanks/Tank26/InventoryDistributions/Rad Dist By Rad26 [Cm243]	0.9961	3,954
1	12298	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [Al26]	0.9974	3,954
1	12298	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Th229]	0.9994	3,954
2	11595	/TheTanks/Tank04/InventoryDistributions/Rad Dist By Rad4 [Am241]	0.0105	487
2	11595	/TheTanks/Tank44/InventoryDistributions/Rad Dist By Rad44 [Rn222]	0.0101	487
2	11595	/TheTanks/Tank04/InventoryDistributions/Rad Dist By Rad4 [Cs135]	0.0117	487
2	11595	/TheTanks/Tank04/InventoryDistributions/Rad Dist By Rad4 [Nb93m]	0.0132	487
2	11595	/TheTanks/Tank26/InventoryDistributions/Rad Dist By Rad26 [Am241]	0.0118	487
2	11595	/ClayeySoilKds/Kd Dist [Pr] [mL/g]	0.0000	487
2	11595	/TheTanks/Tank03/InventoryDistributions/Rad Dist By Rad3 [Sn126]	0.0485	487
2	11595	/TheTanks/Tank18/InventoryDistributions/Rad Dist By Rad18 [Eu152]	0.0152	487
2	11595	/TheTanks/Tank45/InventoryDistributions/Rad Dist By Rad45 [Pu240]	0.0649	487

Table 5.6-13: Top Ten Realizations for Case D, Well 6, Maximum MOP Dose in 10,000 Years (Continued)

Rank	Peak Dose mrem/yr	Stochastic	Parameter Value (varies by stochastic)	Realization
2	11595	/TheTanks/Tank08/InventoryDistributions/Rad Dist By Rad8 [Pa231]	0.0188	487
2	11595	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Am241]	2.2138	487
2	11595	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Am243]	0.9922	487
2	11595	/TheTanks/Tank20/LinerFailure/Configuration stoch	6.0000	487
2	11595	/TheTanks/Tank02/InventoryDistributions/Rad Dist By Rad2 [Am243]	9.9445	487
2	11595	/TheTanks/Tank26/InventoryDistributions/Rad Dist By Rad26 [Ni63]	9.9534	487
2	11595	/Oxidizing/old concrete kds ox/Kd Dist [Pr] [mL/g]	0.0000	487
2	11595	/TheTanks/Tank45/InventoryDistributions/Rad Dist By Rad45 [Am242m]	0.9978	487
2	11595	/Oxidizing/middle concrete kds ox/Kd Dist [Pa] [mL/g]	2773.6000	487
2	11595	/Oxidizing/middle concrete kds ox/Kd Dist [Cl] [mL/g]	2.0056	487
2	11595	/SandySoilKds/Kd Dist [At] [mL/g]	0.0000	487
3	8668.4	Plutonium Kd in Sandy Soil [mL/g]	67.8810	1,468
3	8668.4	/TheTanks/Tank17/InventoryDistributions/Rad Dist By Rad17 [Pu239]	0.0427	1,468
3	8668.4	/TheTanks/Tank18/InventoryDistributions/Rad Dist By Rad18 [Rn222]	0.0141	1,468
3	8668.4	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [Np237]	0.0520	1,468
3	8668.4	/TheTanks/Tank19/InventoryDistributions/Rad Dist By Rad19 [Cm243]	0.0175	1,468
3	8668.4	/TheTanks/Tank33/InventoryDistributions/Rad Dist By Rad33 [Pb210]	0.0175	1,468
3	8668.4	/TheTanks/Tank02/InventoryDistributions/Rad Dist By Rad2 [Cm244]	0.0758	1,468
3	8668.4	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [Cm248]	0.0148	1,468
3	8668.4	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Cf249]	0.0189	1,468
3	8668.4	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Eu152]	0.0163	1,468
3	8668.4	/TheTanks/Tank01/InventoryDistributions/Rad Dist By Rad1 [Cs137]	9.9385	1,468
3	8668.4	/TheTanks/Tank45/InventoryDistributions/Rad Dist By Rad45 [Cm245]	0.9968	1,468
3	8668.4	/TheTanks/Tank17/InventoryDistributions/Rad Dist By Rad17 [Pu241]	2.4153	1,468
3	8668.4	/TheTanks/Tank01/InventoryDistributions/Rad Dist By Rad1 [Cm243]	0.9973	1,468
3	8668.4	/TheTanks/Tank01/InventoryDistributions/Rad Dist By Rad1 [U234]	9.9742	1,468
3	8668.4	/TheTanks/Tank04/InventoryDistributions/Rad Dist By Rad4 [Pu241]	9.9835	1,468
3	8668.4	/TheTanks/Tank44/InventoryDistributions/Rad Dist By Rad44 [Mo93m]	0.9991	1,468
3	8668.4	/TheTanks/Tank34/InventoryDistributions/Rad Dist By Rad34 [Cm248]	0.9987	1,468

Table 5.6-13: Top Ten Realizations for Case D, Well 6, Maximum MOP Dose in 10,000 Years (Continued)

Rank	Peak Dose mrem/yr	Stochastic	Parameter Value (varies by stochastic)	Realization
3	8668.4	/TheTanks/Tank06/InventoryDistributions/Rad Dist By Rad6 [I129]	0.9989	1,468
3	8668.4	/TheTanks/Tank26/InventoryDistributions/Rad Dist By Rad26 [Rn222]	0.9990	1,468
4	8599.2	/TheTanks/Tank45/InventoryDistributions/Rad Dist By Rad45 [C14]	0.0100	4,759
4	8599.2	/TheTanks/Tank44/InventoryDistributions/Rad Dist By Rad44 [Cm245]	0.0104	4,759
4	8599.2	/TheTanks/Tank03/SiteGeometry/SatWidth [ft]	60.0830	4,759
4	8599.2	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [Se79]	0.0125	4,759
4	8599.2	Plutonium Kd in Clayey Soil [mL/g]	2958.5000	4,759
4	8599.2	/AncillaryEquipment/CTS/SiteGeometry/SatWidth [ft]	40.0940	4,759
4	8599.2	/TheTanks/Tank01/InventoryDistributions/Rad Dist By Rad1 [Zr93]	0.0159	4,759
4	8599.2	/TheTanks/Tank44/InventoryDistributions/Rad Dist By Rad44 [Sm151]	0.0692	4,759
4	8599.2	/Oxidizing/old concrete kds ox/Kd Dist [At] [mL/g]	0.0000	4,759
4	8599.2	/TheTanks/Tank06/InventoryDistributions/Rad Dist By Rad6 [Sn126]	0.0663	4,759
4	8599.2	/TheTanks/Tank06/InventoryDistributions/Rad Dist By Rad6 [U233]	0.9960	4,759
4	8599.2	/ClayeySoilKds/Kd Dist [Cf] [mL/g]	12686.0000	4,759
4	8599.2	/TheTanks/Tank19/InventoryDistributions/Rad Dist By Rad19 [Am243]	0.9954	4,759
4	8599.2	/TheTanks/Tank02/InventoryDistributions/Rad Dist By Rad2 [Th229]	0.9985	4,759
4	8599.2	/TheTanks/Tank04/InventoryDistributions/Rad Dist By Rad4 [Sm151]	9.9656	4,759
4	8599.2	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [Pu238]	9.9877	4,759
4	8599.2	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [Th228]	0.9988	4,759
4	8599.2	/SandySoilKds/Kd Dist [Po] [mL/g]	3486.4000	4,759
4	8599.2	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Co60]	9.9971	4,759
4	8599.2	/TheTanks/Tank27/InventoryDistributions/Rad Dist By Rad27 [Pu244]	0.9998	4,759
5	8579.7	/ClayeySoilKds/Kd Dist [Ru] [mL/g]	0.0000	2,891
5	8579.7	/TheTanks/Tank44/InventoryDistributions/Rad Dist By Rad44 [Pb210]	0.0111	2,891
5	8579.7	/TheTanks/Tank18/InventoryDistributions/Rad Dist By Rad18 [Cm248]	0.0113	2,891
5	8579.7	/TheTanks/Tank45/InventoryDistributions/Rad Dist By Rad45 [Sm151]	0.0376	2,891
5	8579.7	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Cm245]	0.0125	2,891
5	8579.7	/TheTanks/Tank07/InventoryDistributions/Rad Dist By Rad7 [Cm243]	0.0112	2,891
5	8579.7	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [I129]	0.0117	2,891

Table 5.6-13: Top Ten Realizations for Case D, Well 6, Maximum MOP Dose in 10,000 Years (Continued)

Rank	Peak Dose mrem/yr	Stochastic	Parameter Value (varies by stochastic)	Realization
5	8579.7	/TheTanks/Tank06/InventoryDistributions/Rad Dist By Rad6 [Pd107]	0.0119	2,891
5	8579.7	/TheTanks/Tank17/InventoryDistributions/Rad Dist By Rad17 [Pu241]	0.0184	2,891
5	8579.7	/TheTanks/Tank03/InventoryDistributions/Rad Dist By Rad3 [Cl36]	0.0129	2,891
5	8579.7	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [Ni59]	0.9923	2,891
5	8579.7	/Oxidizing/old concrete kds ox/Kd Dist [Cl] [mL/g]	0.0000	2,891
5	8579.7	/TheTanks/Tank05/SiteGeometry/SatWidth [ft]	89.8270	2,891
5	8579.7	/TheTanks/Tank44/InventoryDistributions/Rad Dist By Rad44 [Cl36]	0.9948	2,891
5	8579.7	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [Pu239]	9.9536	2,891
5	8579.7	/TheTanks/Tank06/InventoryDistributions/Rad Dist By Rad6 [H3]	0.9947	2,891
5	8579.7	/TheTanks/Tank46/InventoryDistributions/Rad Dist By Rad46 [U236]	0.9974	2,891
5	8579.7	/TheTanks/Tank06/InventoryDistributions/Rad Dist By Rad6 [Pu240]	9.9702	2,891
5	8579.7	/TheTanks/Tank47/InventoryDistributions/Rad Dist By Rad47 [Pd107]	0.9987	2,891
5	8579.7	/TheTanks/Tank02/SiteGeometry/SatWidth [ft]	89.9800	2,891
6	7961.8	/TheTanks/Tank04/InventoryDistributions/Rad Dist By Rad4 [Rn222]	0.0101	3,008
6	7961.8	/TheTanks/Tank06/InventoryDistributions/Rad Dist By Rad6 [Pu242]	0.0113	3,008
6	7961.8	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Ni63]	0.0222	3,008
6	7961.8	/Oxidizing/old concrete kds ox/Kd Dist [Sr] [mL/g]	3.7850	3,008
6	7961.8	/TheTanks/Tank44/InventoryDistributions/Rad Dist By Rad44 [Eu154]	0.0471	3,008
6	7961.8	/TheTanks/Tank45/InventoryDistributions/Rad Dist By Rad45 [Eu152]	0.0134	3,008
6	7961.8	/TheTanks/Tank02/InventoryDistributions/Rad Dist By Rad2 [Sr90]	0.0413	3,008
6	7961.8	/Oxidizing/old concrete kds ox/Kd Dist [Gd] [mL/g]	126.4200	3,008
6	7961.8	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Th229]	0.0154	3,008
6	7961.8	/TheTanks/Tank06/InventoryDistributions/Rad Dist By Rad6 [Zr93]	0.0171	3,008
6	7961.8	/TheTanks/Tank33/InventoryDistributions/Rad Dist By Rad33 [C14]	0.9911	3,008
6	7961.8	/TheTanks/Tank17/InventoryDistributions/Rad Dist By Rad17 [Ni63]	2.2545	3,008
6	7961.8	/TheTanks/Tank03/InventoryDistributions/Rad Dist By Rad3 [Cs135]	0.9940	3,008
6	7961.8	/TheTanks/Tank33/InventoryDistributions/Rad Dist By Rad33 [Nb93m]	0.9957	3,008
6	7961.8	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [H3]	0.9950	3,008
6	7961.8	/Water/SatZoneDarcyVelbyTank [T44] [ft/yr]	26.2980	3,008

Table 5.6-13: Top Ten Realizations for Case D, Well 6, Maximum MOP Dose in 10,000 Years (Continued)

Rank	Peak Dose mrem/yr	Stochastic	Parameter Value (varies by stochastic)	Realization
6	7961.8	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Al26]	0.9966	3,008
6	7961.8	/TheTanks/Tank01/InventoryDistributions/Rad Dist By Rad1 [Cl36]	0.9963	3,008
6	7961.8	/Oxidizing/middle concrete kds ox/Kd Dist [Pr] [mL/g]	0.0000	3,008
6	7961.8	/TheTanks/Tank33/InventoryDistributions/Rad Dist By Rad33 [Ni59]	9.9995	3,008
7	7777.8	/Oxidizing/old concrete kds ox/Kd Dist [At] [mL/g]	0.0000	3,090
7	7777.8	/TheTanks/TankData/Basemat Thicknesses/TypeIBasematThickness [in]	29.1300	3,090
7	7777.8	/TheTanks/Tank46/InventoryDistributions/Rad Dist By Rad46 [U236]	0.0131	3,090
7	7777.8	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [U233]	0.0135	3,090
7	7777.8	/ClayeySoilKds/Kd Dist [Ru] [mL/g]	0.0000	3,090
7	7777.8	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [C14]	0.0128	3,090
7	7777.8	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Cf249]	0.0163	3,090
7	7777.8	/TheTanks/Tank19/InventoryDistributions/Rad Dist By Rad19 [Ni59]	0.0171	3,090
7	7777.8	/TheTanks/Tank17/InventoryDistributions/Rad Dist By Rad17 [Ra226]	0.0702	3,090
7	7777.8	/TheTanks/Tank25/InventoryDistributions/Rad Dist By Rad25 [Cl36]	0.0221	3,090
7	7777.8	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [Zr93]	0.9940	3,090
7	7777.8	/Oxidizing/old concrete kds ox/Kd Dist [Cm] [mL/g]	869.8500	3,090
7	7777.8	/Oxidizing/old concrete kds ox/Kd Dist [Pm] [mL/g]	0.0000	3,090
7	7777.8	/TheTanks/Tank18/InventoryDistributions/Rad Dist By Rad18 [Se79]	0.9979	3,090
7	7777.8	/TheTanks/Tank26/InventoryDistributions/Rad Dist By Rad26 [Nb93m]	0.9986	3,090
7	7777.8	/TheTanks/TankData/Basemat Thicknesses/TypeIVBasematThickness [in]	7.4944	3,090
7	7777.8	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [U238]	0.9981	3,090
7	7777.8	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [U234]	9.9768	3,090
7	7777.8	/TheTanks/Tank18/InventoryDistributions/Rad Dist By Rad18 [Eu152]	0.9988	3,090
7	7777.8	/TheTanks/Tank04/InventoryDistributions/Rad Dist By Rad4 [Cm247]	1.0000	3,090
8	7619.8	/TheTanks/Tank19/InventoryDistributions/Rad Dist By Rad19 [U232]	0.0117	2,295
8	7619.8	/TheTanks/Tank17/InventoryDistributions/Rad Dist By Rad17 [Cs135]	0.0278	2,295
8	7619.8	/Pore Water Volumes for Oxidized Region III	1114.1000	2,295
8	7619.8	/TheTanks/Tank06/InventoryDistributions/Rad Dist By Rad6 [K40]	0.0127	2,295
8	7619.8	/ClayeySoilKds/Kd Dist [Cs] [mL/g]	125.5800	2,295

Table 5.6-13: Top Ten Realizations for Case D, Well 6, Maximum MOP Dose in 10,000 Years (Continued)

Rank	Peak Dose mrem/yr	Stochastic	Parameter Value (varies by stochastic)	Realization
8	7619.8	/TheTanks/Tank07/InventoryDistributions/Rad Dist By Rad7 [Pu240]	0.0542	2,295
8	7619.8	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Cs137]	0.0765	2,295
8	7619.8	/Oxidizing/old concrete kds ox/Kd Dist [Rb] [mL/g]	1.9952	2,295
8	7619.8	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [Tc99]	0.1011	2,295
8	7619.8	/SandySoilKds/Kd Dist [K] [mL/g]	2.5663	2,295
8	7619.8	/TheTanks/Tank47/InventoryDistributions/Rad Dist By Rad47 [Pu241]	9.9362	2,295
8	7619.8	/TheTanks/Tank33/InventoryDistributions/Rad Dist By Rad33 [Ni59]	9.9430	2,295
8	7619.8	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [Cs137]	9.9446	2,295
8	7619.8	/TheTanks/Tank07/InventoryDistributions/Rad Dist By Rad7 [Zr93]	0.9940	2,295
8	7619.8	/TheTanks/Tank01/InventoryDistributions/Rad Dist By Rad1 [Zr93]	0.9958	2,295
8	7619.8	/TheTanks/Tank34/InventoryDistributions/Rad Dist By Rad34 [Cm248]	0.9965	2,295
8	7619.8	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [Ac227]	0.9978	2,295
8	7619.8	/TheTanks/Tank34/InventoryDistributions/Rad Dist By Rad34 [Eu154]	9.9854	2,295
8	7619.8	/TheTanks/Tank07/InventoryDistributions/Rad Dist By Rad7 [Cm243]	0.9985	2,295
8	7619.8	/TheTanks/Tank01/InventoryDistributions/Rad Dist By Rad1 [Pu240]	9.9909	2,295
9	7508	/TheTanks/Tank26/InventoryDistributions/Rad Dist By Rad26 [Rn222]	0.0105	3,213
9	7508	/IHI /ResidentScenario/FractionInGarden	0.0106	3,213
9	7508	/SandySoilKds/Kd Dist [Se] [mL/g]	250.7500	3,213
9	7508	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [U236]	0.0112	3,213
9	7508	/TheTanks/Tank05/InventoryDistributions/Rad Dist By Rad5 [U235]	0.0112	3,213
9	7508	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Ni63]	0.0206	3,213
9	7508	/TheTanks/Tank33/InventoryDistributions/Rad Dist By Rad33 [Sm151]	0.1149	3,213
9	7508	/TheTanks/Tank26/InventoryDistributions/Rad Dist By Rad26 [Tc99]	0.0134	3,213
9	7508	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [U233]	0.0129	3,213
9	7508	/IRRIDOSE Factors/VeggieExposureTime [d]	60.1740	3,213
9	7508	/TheTanks/Tank08/InventoryDistributions/Rad Dist By Rad8 [Th232]	0.9873	3,213
9	7508	/TheTanks/Tank46/InventoryDistributions/Rad Dist By Rad46 [Pd107]	0.9932	3,213
9	7508	/TheTanks/Tank47/InventoryDistributions/Rad Dist By Rad47 [Cl36]	0.9904	3,213
9	7508	/TheTanks/Tank04/InventoryDistributions/Rad Dist By Rad4 [Cs137]	9.9157	3,213

Table 5.6-13: Top Ten Realizations for Case D, Well 6, Maximum MOP Dose in 10,000 Years (Continued)

Rank	Peak Dose mrem/yr	Stochastic	Parameter Value (varies by stochastic)	Realization
9	7508	/TheTanks/Tank46/InventoryDistributions/Rad Dist By Rad46 [Tc99]	0.9947	3,213
9	7508	/TheTanks/Tank26/InventoryDistributions/Rad Dist By Rad26 [Sn126]	0.9944	3,213
9	7508	/TheTanks/Tank08/InventoryDistributions/Rad Dist By Rad8 [Zr93]	0.9962	3,213
9	7508	/TheTanks/Tank26/InventoryDistributions/Rad Dist By Rad26 [Cm247]	0.9984	3,213
9	7508	/IRRIDOSE Factors/CattleWaterConsumptionBeef [l/d]	49.1540	3,213
9	7508	/TheTanks/Tank44/InventoryDistributions/Rad Dist By Rad44 [Co60]	9.9719	3,213
10	7455.8	/TheTanks/Tank45/InventoryDistributions/Rad Dist By Rad45 [Pu244]	0.0102	4,154
10	7455.8	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [Am241]	0.0110	4,154
10	7455.8	/TheTanks/Tank34/InventoryDistributions/Rad Dist By Rad34 [Ni63]	0.1110	4,154
10	7455.8	/TheTanks/Tank28/InventoryDistributions/Rad Dist By Rad28 [Cm247]	0.0126	4,154
10	7455.8	/TheTanks/Tank47/InventoryDistributions/Rad Dist By Rad47 [U232]	0.0117	4,154
10	7455.8	/TheTanks/Tank07/InventoryDistributions/Rad Dist By Rad7 [Zr93]	0.0122	4,154
10	7455.8	/TheTanks/Tank07/InventoryDistributions/Rad Dist By Rad7 [H3]	0.0121	4,154
10	7455.8	/TheTanks/Tank04/InventoryDistributions/Rad Dist By Rad4 [Zr93]	0.0128	4,154
10	7455.8	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Cl36]	0.0381	4,154
10	7455.8	/TheTanks/Tank18/InventoryDistributions/Rad Dist By Rad18 [Zr93]	0.0144	4,154
10	7455.8	/TheTanks/Tank19/InventoryDistributions/Rad Dist By Rad19 [Th228]	0.9948	4,154
10	7455.8	/TheTanks/Tank02/LinerFailure/Configuration stoch	6.0000	4,154
10	7455.8	/SandySoilKds/Kd Dist [Cs] [mL/g]	86.7690	4,154
10	7455.8	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Tc99]	2.2701	4,154
10	7455.8	/TheTanks/Tank20/InventoryDistributions/Rad Dist By Rad20 [Sm151]	2.3161	4,154
10	7455.8	/TheTanks/Tank01/InventoryDistributions/Rad Dist By Rad1 [Cm244]	9.9687	4,154
10	7455.8	/Oxidizing/middle concrete kds ox/Kd Dist [Cm] [mL/g]	8695.6000	4,154
10	7455.8	/TheTanks/Tank07/InventoryDistributions/Rad Dist By Rad7 [Am242m]	0.9987	4,154
10	7455.8	/TheTanks/Tank47/InventoryDistributions/Rad Dist By Rad47 [U233]	0.9993	4,154
10	7455.8	/TheTanks/Tank04/InventoryDistributions/Rad Dist By Rad4 [U232]	0.9990	4,154

5.6.4.2.1 Case A Realizations

Information derived from the top five Case A realizations is provided in the following, including the pathways with the highest doses and stochastics of interest for the radionuclides associated with those high dose pathways. The highest dose consequences are those that have a combination of parameters with values significantly different from what is expected (e.g., the Base Case values) such that when they occur concurrently they can lead higher than anticipated doses. Parameters of possible interest are identified below, including those parameters that are significantly different from the mean/median and have the greatest potential to impact the results. The parameter container from the GoldSim model is also included for most stochastic distributions.

<u>Realization 3835</u>

Of the 277 mrem/yr peak dose for Realization 3835, the pathway contributions over 5 mrem/yr are: 189 mrem/yr Pu-239 vegetable ingestion, 16 mrem/yr Pu-240 vegetable ingestion, 17 mrem/yr Np-237 vegetable ingestion, and 38 mrem/yr Pu-239 water ingestion. The Pu-239 dose is almost primarily attributable to releases from Tank 17. The Np-237 dose is almost entirely attributable to releases from Tank 18.

- Well Aquifer = Upper Three Runs Upper Aquifer (13% probability)
  \DoseAssessment\ExposureMediaConc\WellCompletionDepth
- Chemical transition reducing to oxidizing = 347 flushes (median 371 flushes)
- Chemical transition Region II to Region III = 1695 flushes (median 2063 flushes)
- Pu-239 inventory multiplier Tank 17 = 1.16 (mean 1.03)
  \TheTanks\Tank17\InventoryDistributions
- Pu-239 inventory multiplier Tank 18 = 1.93 (mean 1.25)
  \TheTanks\Tank18\InventoryDistributions
- Np-237 inventory multiplier Tank 17 = 0.74 (mean 1.03)
  \TheTanks\Tank17\InventoryDistributions
- Np-237 inventory multiplier Tank 18 = 1.18 (mean 1.25)
  \TheTanks\Tank17\InventoryDistributions
- Pu Reduced Region II solubility = 1.7E-09 mol/l (median 4.1E-12 mol/l)
  \Materials\WaterInWaste\ReducedDistribution
- Np Reduced Region II solubility = 1.6E-09 mol/l (median 1.6E-09 mol/l)
  \Materials\WaterInWaste\ReducedDistribution
- Pu Reduced Oxidized II solubility = 4E-14 mol/l (median 4.1E-12 mol/l)
  \Materials\WaterInWaste\ReducedDistribution
- Np Reduced Oxidized II solubility = 7.1E-05 mol/l (median 2.2E-5 mol/l)
  \Materials\WaterInWaste\ReducedDistribution
- Pu sandy soil Kd = 78 ml/g (median 270 ml/g)
  \Materials\SandySoilKds

- Np sandy soil Kd = 0.6 ml/g (median 0.6 ml/g)
  \Materials\SandySoilKds
- Pu oxidized middle aged concrete Kd = 14435 ml/g (median 10,000 ml/g)
  Materials\Concrete_Kds_Oxidizing\middle_concrete_kds_ox
- Np oxidized middle aged concrete Kd = 2009 ml/g (median 1,600 ml/g)
  Materials\Concrete_Kds_Oxidizing\middle_concrete_kds_ox
- Pu oxidized old aged concrete Kd = 758 ml/g (median 1,000 ml/g)
  Materials\Concrete_Kds_Oxidizing\old_concrete_kds_ox
- Np oxidized old aged concrete Kd = 123 ml/g (median 250 ml/g)
  Materials\Concrete_Kds_Oxidizing\old_concrete_kds_ox
- Type IV liner failure time = year 815 (median 3638)
  \TheTanks\Tank18\LinerFailure
- Tank basemat bypass fraction = 0.001% (median 3.3%)
  \TheTanks\Tank18\WasteLayer
- Type IV Basemat Thickness = 6.8 inches (mean 7.0 inches)
  \TheTanks\TankData\Basemat_Thicknesses
- Saturated Zone thickness = 4.2 meters (mean 5 meters)
  \Transport\WaterTransport
- Water Consumption Rate per year = 390 L/yr (mean 417 L/yr)
- Garden Size = 111 square meters (mean 400 square meters)

<u>Realization 743</u>

Of the 261 mrem/yr peak dose for Realization 743, the pathway contributions over 5 mrem/yr are: 216 mrem/yr Np-237 vegetable ingestion and 38 mrem/yr Np-237 water ingestion. The Np-237 dose is almost entirely attributable to releases from Tank 18.

- Well Aquifer = Upper Three Runs Upper Aquifer (13% probability)
  \DoseAssessment\ExposureMediaConc\WellCompletionDepth
- Chemical transition reducing to oxidizing = 314 flushes (median 371 flushes)
- Chemical transition Region II to Region III = 2411 flushes (median 2063 flushes)
- Np-237 inventory multiplier Tank 18 = 1.6 (mean 1.25)
  \TheTanks\Tank17\InventoryDistributions
- Np Reduced Region II solubility = 4E-18 mol/l (median 1.6E-09 mol/l)
  \Materials\WaterInWaste\ReducedDistribution
- Np Reduced Oxidized II solubility = 7.1E-05 mol/l (median 2.2E-5 mol/l)
  \Materials\WaterInWaste\ReducedDistribution
- Np sandy soil Kd = 0.6 ml/g (median 0.6 ml/g)
  \Materials\SandySoilKds
- Np oxidized middle aged concrete Kd = 2262 ml/g (median 1,600 ml/g)
  Materials\Concrete_Kds_Oxidizing\middle_concrete_kds_ox

- Np oxidized old aged concrete Kd = 70 ml/g (median 250 ml/g)
  Materials\Concrete_Kds_Oxidizing\old_concrete_kds_ox
- TypeIV liner failure time = year 4,181 (median 3638)
  \TheTanks\Tank18\LinerFailure
- Tank basemat bypass fraction = 2% (median 3.3%)
  \TheTanks\Tank18\WasteLayer
- Type IV Basemat Thickness = 6.7 inches (mean 7.0 inches)
  \TheTanks\TankData\Basemat_Thicknesses
- Saturated Zone thickness = 6.0 meters (mean 5 meters)
  \Transport\WaterTransport
- Water Consumption Rate per year = 347 L/yr (mean 417 L/yr)
- Garden Size = 813 square meters (mean 400 square meters)

Realization 1867

Of the 251 mrem/yr peak dose for Realization 1867, the pathway contributions over 5 mrem/yr are: 132 mrem/yr Pu-239 water ingestion, 87 mrem/yr Pu-239 vegetable ingestion, 16 mrem/yr Pu-240 water ingestion, 11 mrem/yr Pu-240 vegetable ingestion. The Pu-239 dose is attributable primarily to releases from Tank 17, Tank 18, and Tank 19.

- Well Aquifer = Upper Three Runs Upper Aquifer (13% probability)
  \DoseAssessment\ExposureMediaConc\WellCompletionDepth
- Chemical transition reducing to oxidizing = 411 flushes (median 371 flushes)
- Chemical transition Region II to Region III = 2121 flushes (median 2063 flushes)
- Pu-239 inventory multiplier Tank 17 = 0.29 (mean 1.03)
  \TheTanks\Tank17\InventoryDistributions
- Pu-239 inventory multiplier Tank 18 = 1.253 (mean 1.25)
  \TheTanks\Tank18\InventoryDistributions
- Pu Reduced Region II solubility = 1.7E-09 mol/l (median 4.1E-12 mol/l)
  \Materials\WaterInWaste\ReducedDistribution
- Pu reduced oxidized II solubility = 3.4E-11 mol/l (median 4.1E-12 mol/l)
  \Materials\WaterInWaste\ReducedDistribution
- Pu sandy soil Kd = 73 ml/g (median 270 ml/g)
  \Materials\SandySoilKds
- Pu oxidized middle aged concrete Kd = 11217 ml/g (median 10,000 ml/g)
  Materials\Concrete_Kds_Oxidizing\middle_concrete_kds_ox
- Pu oxidized old aged concrete Kd = 290 ml/g (median 1,000 ml/g)
  Materials\Concrete_Kds_Oxidizing\old_concrete_kds_ox
- TypeIV liner failure time = year 3314 (median 3638)
  \TheTanks\Tank18\LinerFailure

- Tank basemat bypass fraction = 0.01% (median 3.3%)
  \TheTanks\Tank18\WasteLayer
- Type IV Basemat Thickness = 6.9 inches (mean 7.0 inches)
  \TheTanks\TankData\Basemat_Thicknesses
- Saturated Zone thickness = 5.9 meters (mean 5 meters)
  \Transport\WaterTransport
- Water Consumption Rate per year = 671 L/yr (mean 417 L/yr)
- Garden Size = 979 square meters (mean 400 square meters)

Realization 2748

Of the 246 mrem/yr peak dose for Realization 2748, the pathway contributions over 5 mrem/yr are: 173 mrem/yr Np-237 vegetable ingestion, 15 mrem/yr U-236 vegetable ingestion, 6 mrem/yr U-233 vegetable ingestion and 38 mrem/yr Np-237 water ingestion. The Np-237 dose is almost entirely attributable to releases from Tank 18.

- Well Aquifer = Upper Three Runs Upper Aquifer (13% probability)
  \DoseAssessment\ExposureMediaConc\WellCompletionDepth
- Chemical transition reducing to oxidizing = 361 flushes (median 371 flushes)
- Chemical transition Region II to Region III = 1878 flushes (median 2063 flushes)
- Np-237 inventory multiplier Tank 18 = 0.6 (mean 1.25)
  \TheTanks\Tank17\InventoryDistributions
- Np Reduced Region II solubility = 1.6E-09 mol/l (median 1.6E-09 mol/l)
  \Materials\WaterInWaste\ReducedDistribution
- Np reduced oxidized II solubility = 2.2E -05 mol/l (median 2.2E-5 mol/l)
  \Materials\WaterInWaste\ReducedDistribution
- Np sandy soil Kd = 0.6 ml/g (median 0.6 ml/g)
  \Materials\SandySoilKds
- Np oxidized middle aged concrete Kd = 568 ml/g (median 1,600 ml/g)
  Materials\Concrete_Kds_Oxidizing\middle_concrete_kds_ox
- Np oxidized old aged concrete Kd = 63 ml/g (median 250 ml/g)
  Materials\Concrete_Kds_Oxidizing\old_concrete_kds_ox
- TypeIV liner failure time = year 853 (median 3638)
  \TheTanks\Tank18\LinerFailure
- Tank basemat bypass fraction = 1% (median 3.3%)
  \TheTanks\Tank18\WasteLayer
- Type IV Basemat Thickness = 6.8 inches (mean 7.0 inches)
  \TheTanks\TankData\Basemat_Thicknesses
- Saturated Zone thickness = 5.1 meters (mean 5 meters)
  \Transport\WaterTransport
- Water Consumption Rate per year = 371 L/yr (mean 417 L/yr)
- Garden Size = 611 square meters (mean 400 square meters)

Realization 4764

Of the 220 mrem/yr peak dose for Realization 4764, the pathway contributions over 5 mrem/yr are: 50 mrem/yr Pu-239 water ingestion, 9 mrem/yr Pu-240 water ingestion, 132 mrem/yr Pu-239 vegetable ingestion, and 23 mrem/yr Pu-240 vegetable ingestion. This dose is almost entirely attributable to releases from Tank 18.

- Well Aquifer = Upper Three Runs Upper Aquifer (13% probability) \DoseAssessment\ExposureMediaConc\WellCompletionDepth
- Chemical transition reducing to oxidizing = 405 flushes (median 371 flushes)
- Chemical transition Region II to Region III = 2398 flushes (median 2063 flushes)
- Pu-239 inventory multiplier Tank 18 = 1.0068 (mean 1.25)
  \TheTanks\Tank18\InventoryDistributions
- Pu Reduced Region II solubility = 1.7E-09 mol/l (median 4.1E-12 mol/l)
  \Materials\WaterInWaste\ReducedDistribution
- TypeIV liner failure time = year 2541(median 3638)
  \TheTanks\Tank18\LinerFailure
- Pu oxidized middle aged concrete Kd = 6,300 ml/g (median 10,000 ml/g)
  Materials\Concrete_Kds_Oxidizing\middle_concrete_kds_ox
- Pu oxidized old aged concrete Kd = 821 ml/g (median 1,000 ml/g)
  Materials\Concrete_Kds_Oxidizing\old_concrete_kds_ox
- Tank basemat bypass fraction = 4.5% (median 3.3%)
  \TheTanks\Tank18\WasteLayer
- Type IV Basemat Thickness = 6.8 inches (mean 7.0 inches)
  \TheTanks\TankData\Basemat_Thicknesses
- Pu sandy soil Kd = 74 ml/g (median 270 ml/g)
  \Materials\SandySoilKds
- Saturated Zone thickness = 5.51 meters (mean 5 meters)
  \Transport\WaterTransport
- Water Consumption Rate per year = 568 L/yr (mean 417 L/yr)
- Garden Size = 630 square meters (mean 400 square meters)

5.6.4.2.2 Case D Realizations

Case D Realizations

Information derived from the top five Case D realizations is provided in the following, including the pathways with the highest doses and stochastics of interest for the radionuclides associated with those high dose pathways. The highest dose consequences are those that have a combination of parameters with values significantly different from what is expected (e.g., the Base Case values) such that when they occur concurrently they can lead higher than anticipated doses. Parameters of possible interest are identified below, including those parameters that are significantly different from the mean/median and have the greatest potential to impact the results. The parameter container from the GoldSim model is also included for most stochastic distributions.

Realization 3954

Of the 12,298 mrem/yr peak dose for Realization 3954, the pathway contributions over 25 mrem/yr are: 4578 mrem/yr Pu-239 water ingestion, 616 mrem/yr Pu-240 water ingestion, 6233 mrem/yr Pu-239 vegetable ingestion, and 838 mrem/yr Pu-240 vegetable ingestion. This dose is almost entirely attributable to releases from the Type I tanks (with Tanks 3 and 4 having the largest contributions).

- Well Aquifer = Upper Three Runs Lower Aquifer (44% probability)
  \DoseAssessment\ExposureMediaConc\WellCompletionDepth
- Chemical transition reducing to oxidizing = 392 flushes (median 371 flushes)
- Chemical transition Region II to Region III = 2118 flushes (median 2063 flushes)
- Pu-239 inventory multiplier Tank 3 = 8.5 (mean 5)
  \TheTanks\Tank3\InventoryDistributions
- Pu-239 inventory multiplier Tank 4 = 4.99 (mean 5)
  \TheTanks\Tank4\InventoryDistributions
- Pu-239 inventory multiplier Tank 2 = 7.03 (mean 5)
  \TheTanks\Tank4\InventoryDistributions
- Pu Reduced Region II solubility = 1.7E-09 mol/l (median 4.1E-12 mol/l)
  \Materials\WaterInWaste\ReducedDistribution
- TypeI liner failure time = year 395(median 2607)
  \TheTanks\Tank1\LinerFailure
- Pu oxidized middle aged concrete Kd = 2612 ml/g (median 10,000 ml/g)
  Materials\Concrete_Kds_Oxidizing\middle_concrete_kds_ox
- Pu oxidized old aged concrete Kd = 276 ml/g (median 1,000 ml/g)
  Materials\Concrete_Kds_Oxidizing\old_concrete_kds_ox
- Tank basemat bypass fraction = 2.2% (median 3.3%)
  \TheTanks\Tank1\WasteLayer
- Type I Basemat Thickness = 33.5 inches (mean 32.5 inches)
  \TheTanks\TankData\Basemat_Thicknesses

- Pu sandy soil Kd = 76 ml/g (median 270 ml/g)
  \Materials\SandySoilKds
- Saturated Zone thickness = 6.2 meters (mean 5 meters)
  \Transport\WaterTransport
- Water Consumption Rate per year = 354 L/yr (mean 417 L/yr)
- Garden Size = 339 square meters (mean 400 square meters)

Realization 487

Of the 11595 mrem/yr peak dose for Realization 487, the pathway contributions over 25 mrem/yr are: 4464 mrem/yr Tc-99 water ingestion and 6570 mrem/yr Tc-99 vegetable ingestion. This dose is almost entirely attributable to releases from the Type I tanks.

- Well Aquifer = Upper Three Runs Upper Aquifer (13% probability)
  \DoseAssessment\ExposureMediaConc\WellCompletionDepth
- Chemical transition reducing to oxidizing = 322 flushes (median 371 flushes)
- Chemical transition Region II to Region III = 1289 flushes (median 2063 flushes)
- Tc-99 inventory multiplier Tank 1 = 8.0 (mean 5)
  \TheTanks\Tank1\InventoryDistributions
- Tc Reduced Region II solubility = 3.1E-11 mol/l (median 3.1E-11 mol/l)
  \Materials\WaterInWaste\ReducedDistribution
- Tc Oxidized Region III solubility = 3E-13 mol/l (mean 3E-13 mol/l)
  \Materials\WaterInWaste\ReducedDistribution
- TypeI liner failure time = year 544 (median 2607)
  \TheTanks\Tank1\LinerFailure
- Tc oxidized middle aged concrete Kd = 0.8 ml/g (median 0.8 ml/g)
  Materials\Concrete_Kds_Oxidizing\middle_concrete_kds_ox
- Tc oxidized old aged concrete Kd = 0.5 ml/g (median 0.5 ml/g)
  Materials\Concrete_Kds_Oxidizing\old_concrete_kds_ox
- Tc sandy soil Kd = 0.6 ml/g (median 0.6 ml/g)
  \Materials\SandySoilKds
- Saturated Zone thickness = 5.5 meters (mean 5 meters)
  \Transport\WaterTransport
- Water Consumption Rate per year = 545 L/yr (mean 417 L/yr)
- Garden Size = 158 square meters (mean 400 square meters)

Realization 1468

Of the 8668 mrem/yr peak dose for Realization 1468, the pathway contributions over 25 mrem/yr are: 2932 mrem/yr Pu-239 water ingestion, 374 mrem/yr Pu-240 water ingestion, 4716 mrem/yr Pu-239 vegetable ingestion, and 601 mrem/yr Pu-240 vegetable ingestion. This dose is almost entirely attributable to releases from the Type I tanks (with Tanks 3 and 4 having the largest contributions).

- Well Aquifer = Upper Three Runs Lower Aquifer (44% probability) \DoseAssessment\ExposureMediaConc\WellCompletionDepth
- Chemical transition reducing to oxidizing = 304 flushes (median 371 flushes)
- Chemical transition Region II to Region III = 2055 flushes (median 2063 flushes)
- Pu-239 inventory multiplier Tank 3 = 6.9 (mean 5)
  \TheTanks\Tank3\InventoryDistributions
- Pu-239 inventory multiplier Tank 4 = 9.9 (mean 5)
  \TheTanks\Tank4\InventoryDistributions
- Pu Reduced Region II solubility = 1.7E-09 mol/l (median 4.1E-12 mol/l)
  \Materials\WaterInWaste\ReducedDistribution
- TypeI liner failure time = year 270(median 2607)
  \TheTanks\Tank1\LinerFailure
- Pu oxidized middle aged concrete Kd = 4493 ml/g (median 10,000 ml/g)
  Materials\Concrete_Kds_Oxidizing\middle_concrete_kds_ox
- Pu oxidized old aged concrete Kd = 581 ml/g (median 1,000 ml/g)
  Materials\Concrete_Kds_Oxidizing\old_concrete_kds_ox
- Tank basemat bypass fraction = 3.7% (median 3.3%)
  \TheTanks\Tank1\WasteLayer
- Type I Basemat Thickness = 32.9 inches (mean 32.5 inches)
  \TheTanks\TankData\Basemat_Thicknesses
- Pu sandy soil Kd = 68 ml/g (median 270 ml/g)
  \Materials\SandySoilKds
- Saturated Zone thickness = 5.1 meters (mean 5 meters)
  \Transport\WaterTransport
- Water Consumption Rate per year = 353 L/yr (mean 417 L/yr)
- Garden Size = 259 square meters (mean 400 square meters)

Realization 4759

Of the 8599 mrem/yr peak dose for Realization 4759, the pathway contributions over 25 mrem/yr are: 5505 mrem/yr Pu-239 water ingestion, 974 mrem/yr Pu-240 water ingestion, 1769 mrem/yr Pu-239 vegetable ingestion, and 313 mrem/yr Pu-240 vegetable ingestion. This dose is almost entirely attributable to releases from the Type I tanks (with Tanks 3 and 4 having the largest contributions).

- Well Aquifer = Upper Three Runs Upper Aquifer (13% probability) \DoseAssessment\ExposureMediaConc\WellCompletionDepth
- Chemical transition reducing to oxidizing = 381 flushes (median 371 flushes)
- Chemical transition Region II to Region III = 2683 flushes (median 2063 flushes)
- Pu-239 inventory multiplier Tank 3 = 8.2 (mean 5) \TheTanks\Tank3\InventoryDistributions
- Pu-239 inventory multiplier Tank 4 = 2.2 (mean 5) \TheTanks\Tank4\InventoryDistributions
- Pu Reduced Region II solubility = 1.3E-17 mol/l (median 4.1E-12 mol/l) \Materials\WaterInWaste\ReducedDistribution
- Pu oxidized II solubility = 1.4E-7 mol/l (median 3.4E-11 mol/l) \Materials\WaterInWaste\OxidizedDistribution
- TypeI liner failure time = year 1007 (median 2607) \TheTanks\Tank1\LinerFailure
- Pu oxidized middle aged concrete Kd = 2761 ml/g (median 10,000 ml/g) Materials\Concrete_Kds_Oxidizing\middle_concrete_kds_ox
- Pu oxidized old aged concrete Kd = 253 ml/g (median 1,000 ml/g) Materials\Concrete_Kds_Oxidizing\old_concrete_kds_ox
- Tank basemat bypass fraction = 1.7% (median 3.3%) \TheTanks\Tank1\WasteLayer
- Type I Basemat Thickness = 33.0 inches (mean 32.5 inches) \TheTanks\TankData\Basemat_Thicknesses
- Pu sandy soil Kd = 74 ml/g (median 270 ml/g) \Materials\SandySoilKds
- Saturated Zone thickness = 5.6 meters (mean 5 meters) \Transport\WaterTransport
- Water Consumption Rate per year = 492 L/yr (mean 417 L/yr)
- Garden Size = 266 square meters (mean 400 square meters)

Realization 891

Of the 8580 mrem/yr peak dose for Realization 891, the pathway contributions over 25 mrem/yr are: 2944 mrem/yr Tc-99 water ingestion, 68 mrem/yr Tc-99 beef ingestion, 161 mrem/yr Tc-99 milk ingestion and 5375 mrem/yr Tc-99 vegetable ingestion. This dose is almost entirely attributable to releases from the Type I tanks (with Tanks 3 and 4 having the largest contributions).

- Well Aquifer = Upper Three Runs Upper Aquifer (13% probability)
  \DoseAssessment\ExposureMediaConc\WellCompletionDepth
- Chemical transition reducing to oxidizing = 327 flushes (median 371 flushes)
- Chemical transition Region II to Region III = 1256 flushes (median 2063 flushes)
- Tc Reduced Region II solubility = 3.1E-11 mol/l (median 3.1E-11 mol/l)
  \Materials\WaterInWaste\ReducedDistribution
- Tc Oxidized Region III solubility = 3E-13 mol/l (mean 3E-13 mol/l)
  \Materials\WaterInWaste\OxidizedDistribution
- TypeI liner failure time = year 394 (median 2607)
  \TheTanks\Tank1\LinerFailure
- Tc oxidized middle aged concrete Kd = 0.8 ml/g (median 0.8 ml/g)
  Materials\Concrete_Kds_Oxidizing\middle_concrete_kds_ox
- Tc oxidized old aged concrete Kd = 0.5 ml/g (median 0.5 ml/g)
  Materials\Concrete_Kds_Oxidizing\old_concrete_kds_ox
- Tc sandy soil Kd = 0.6 ml/g (median 0.6 ml/g)
  \Materials\SandySoilKds
- Saturated Zone thickness = 4.6 meters (mean 5 meters)
  \Transport\WaterTransport
- Water Consumption Rate per year = 384 L/yr (mean 417 L/yr)
- Garden Size = 691 square meters (mean 400 square meters)

5.6.4.2.3 Case A and Case D Peak Realizations Insights

Those factors most affecting the magnitude and timing of the peak dose for individual realizations varies depending on the scope of the UA. The Case A UA dose results within 10,000 years appear to be driven by releases from the Type IV waste tanks for well 6, which is as expected since the Type IV tank liners are most likely to fail early in Case A. The Case D UA dose results within 10,000 years appear to be driven by releases from the Type I waste tanks for well 6, which is as expected since the Type I tanks have a relatively large inventory compared to the Type IV tanks and the Type I liners fail earlier in Case D than in Case A (e.g., much earlier than 10,000 years).

A review of the realizations with the highest peak doses indicates that the parameters that are of most significance to the Case A UA results are the parameters leading to fast Pu and Np transport (e.g., sandy soil K_d for Pu, concrete K_ds for Np). For example, when the sandy soil K_ds for Pu is the low end of its distribution (i.e., near 75 ml/g) rather than the median (270 ml/g) any Pu that enters the soil below the waste tanks early will be able to reach the 100m well within the 10,000 year evaluation period. However, the Pu will only enter the soil below the waste tanks early if other conditions are off of their nominal values (e.g., low concrete K_d, early liner failure).

A review of the realizations with the highest peak doses indicates that the parameters that are of most significance to the Case D UA results are the parameters leading to fast Pu and Tc transport (e.g., sandy soil K_d for Pu, chemical transition times, liner failure date). For example, when the chemical transition time from Region II to Region III is greatly accelerated (i.e., occurring at 1289 flushes versus the median of 2063 pore water flushes) the Tc in the Type I tanks will be released faster since the waste release from the Oxidized Region III CZ was conservatively modeled as instantaneous release. If other conditions are off of their nominal values (e.g., Case D flows, Case D early liner failure), more Tc-99 would be available for release in a single "slug" that is able to reach the 100m well within the 10,000 year evaluation period.

Some parameters such as garden size and water consumption rate show up in a few of the realizations and can exacerbate the peak dose, but do not independently cause a realization to become a high dose realization. The aquifer location for Well drilling (discussed in more detail in Section 5.6.3.10) shows up in all of the realizations of interest as important because the Gordon Aquifer concentrations are significantly lower than the UTR Aquifers (Upper and Lower) and the impact of drilling into the Gordon Aquifer can dominate other parameters. It should be noted that the Base Case deterministic results used the well of highest concentration for peak dose calculations.

In summary, the parameters identified of influencing the peak realizations can be significant and lead to higher dose only if they occur simultaneously. These scenarios are not likely because the parameters that lead to the high dose realizations do not have a common mode initiator that would tend to have these independent parameters occur simultaneously. There is not a single set of "critical" parameters that are shared among the high dose realizations. Rather, there are multiple parameters that have strong influence and a smaller set of parameters with a very strong influence, and depending upon the alignment and number of these parameters they can combine to cause the peak dose to trend higher for a given realization. In addition, many of the parameters whose extreme, Non-Base Case values lead to the high dose realizations have Base Case values supported by site specific testing (soil K_ds, concrete K_ds).

5.6.4.3 Uncertainty Analysis Insights

Based on the information presented in the UA section, the following general insights regarding the UA can be drawn.

- The mean of the peak MOP doses within 10,000 years for the Case A well with the maximum dose (i.e., well 6) is 12 mrem/year. The peak of the means dose for Case A is slightly lower at 4.8 mrem/yr.
- The 95th percentile of the peak MOP doses within 10,000 years for the Case A well with the maximum dose (i.e., well 6) is 45 mrem/year. The 95th percentile of the Case A MOP dose at year 10,000 for the peak well is slightly lower at 29 mrem/yr.
- The Case A UA dose results are somewhat lower than the All Case results and an order of magnitude lower than the Case D results, which appear to dominate the All Cases results. Case D is clearly the dominant case, a fact supported by the deterministic model results for Case D provided in Section 5.6.7.4.

For all of the UA runs, the mean value results are higher than the median results because many of the dominant distributions were established reasonably conservatively, resulting in the distributions being skewed somewhat to the high end. This conservative bias can lead to misleading analysis if only the mean values are considered.

5.6.5 Variability in Dose Time Histories

In examining the results of a probabilistic analysis, the focus tends to fall upon the general statistics for a given result. For example, the mean time history of the total MOP dose at each well given 1,000-realizations is shown in Figures 5.6-41 and 5.6-42.

As seen in Figure 5.6-41, the maximum mean of the peak dose for the “All Cases” runs within 10,000 years is 9 mrem/yr. The peak of the mean dose for the “All Cases” runs within 10,000 years is 28 mrem/yr for the Well 6 MOP, as shown in Table 5.6-10. The relatively small difference between the mean of the peak and peak of the mean values provides some assurance that model risk dilution is not a primary concern. It is not unexpected that the peak of the mean value would be somewhat higher than the mean of the peak due to the tendency for some of the stochastic distributions to be reasonably conservative, thereby skewing slightly to the high dose side of their distributions.

Figure 5.6-41: Mean Time History of Total MOP Dose by Well (0 to 10,000 Years)

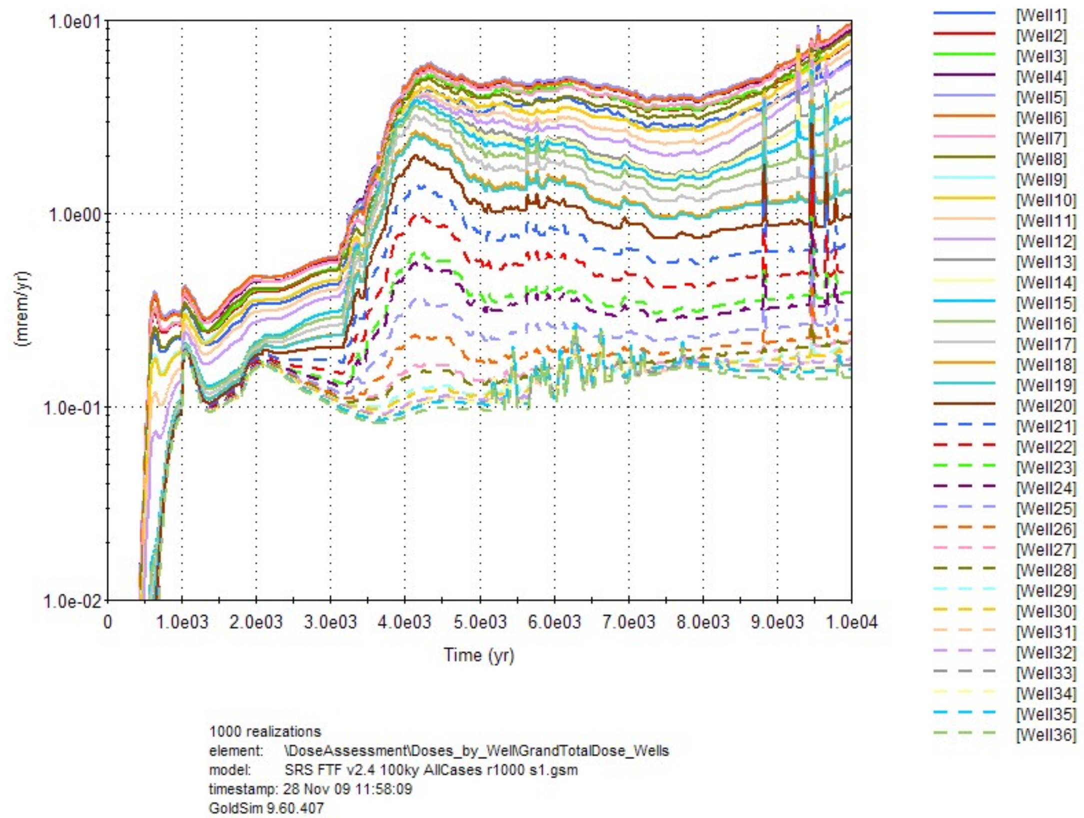
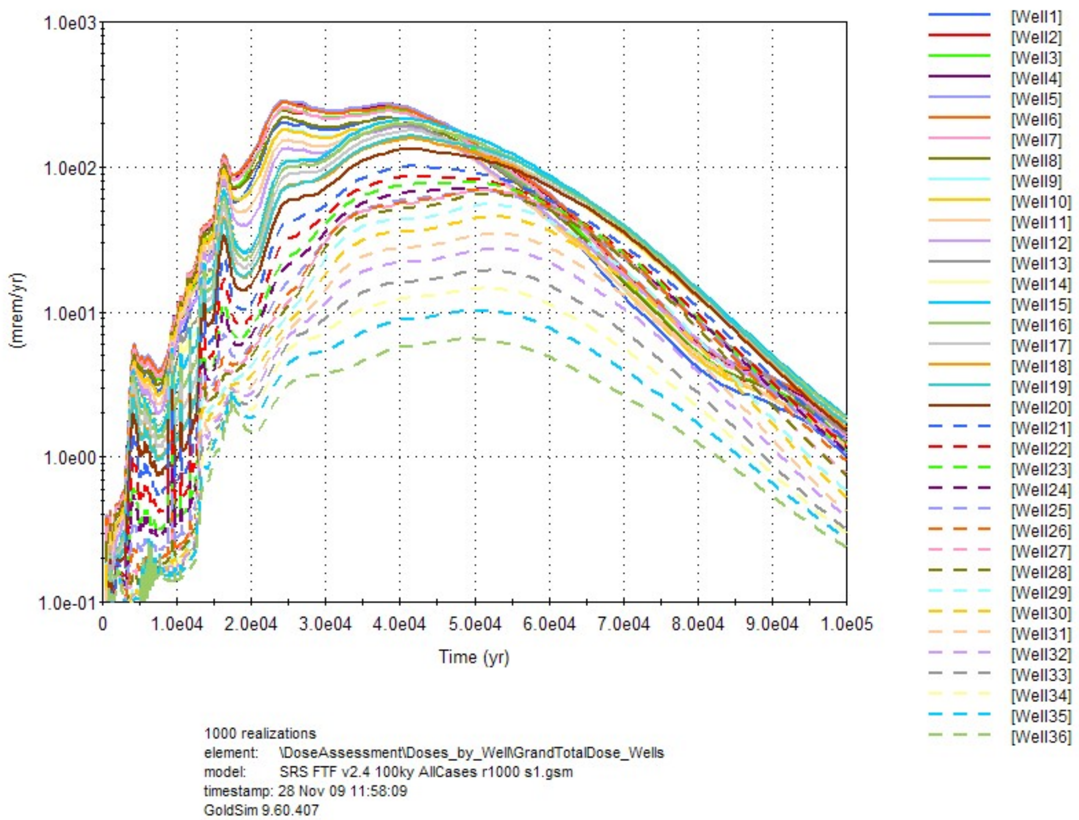


Figure 5.6-42: Mean Time History of Total MOP Dose by Well (0 to 100,000 Years)



5.6.6 Sensitivity Analysis using the FTF Probabilistic Model

Given the uncertainties presented in Section 5.6.4, a natural line of inquiry is to identify those input parameters and other stochastic entities in the model that led to the uncertainties. Even in complex models, the results are often strongly dependent on only a handful of parameters. What is important for one result (e.g., the uranium concentration), may be insignificant for another, such as the maximum dose achieved within the 10,000-year period of performance. In fact, the maximum dose to the MOP will have different sensitivities at different times, since it is driven by the presence of different radionuclides. For example, a MOP dose may be dominated by Tc-99 at one time and by Pu-239 at another time, and these doses will be determined by different aspects of the model (different K_ds, DCFs, decay chains, etc.) Extracting the important model inputs for results of interest is the subject of the sensitivity analysis.

The results of the model output were analyzed using Gradient Boosting Models (GBM). The GBM modeling approach utilizes binary recursive partitioning algorithms that deconstruct a response into the relative influence from a given set of explanatory variables (stochastic model input parameters). That is, the collection of results (the response) is broken up into parts, and each part is examined separately. This process is repeated with smaller and smaller parts, each analyzed for the relationship between the model inputs (explanatory variables) and the results. This sensitivity analysis methodology identifies which stochastic model input parameters are most influential in determining the results, such as media concentrations or future potential doses. It also identifies the ranges over which the influence is strongest.

The model was run using a *Monte Carlo* scheme, where each stochastic input parameter is sampled in different ways, and these are combined to produce many realizations, or equally probable outcomes. This sensitivity analysis is based on 5,000-realization runs.

5.6.6.1 Introduction to FTF Probabilistic Model Sensitivity Analysis

Complex modeling, such as the probabilistic modeling of the FTF, is needed to explore the dynamics of systems where multiple variables interact in a nonlinear manner. The probabilistic simulation approach used in the GoldSim model propagates uncertainty regarding the explanatory variables (e.g., inputs such as physical soil properties or inventory mass) through the model to the predicted response (model "endpoints", such as dose or concentration). Quantitative assessment of the importance of inputs is necessary when the level of uncertainty in the system response exceeds the acceptable threshold specified in the decision making framework. One of the goals of sensitivity analysis is to identify which variables have distributions that exert the greatest influence on the response.

Sensitivity analysis deals with estimating influence measures for input variables. Influence measures can be estimated in either a qualitative or quantitative context. A qualitative sensitivity analysis provides a relative ranking of the importance of input factors without incurring the computational cost of quantitatively estimating the percentage of the output variation accounted for by each input factor. For either approach the estimates can be obtained either locally or globally within the parameter space. A local sensitivity analysis involves varying one explanatory variable while holding all other explanatory variables constant and assessing the impact on the model response. This is local in the sense that only a minimal portion of the full explanatory variable space is explored (i.e., the point at which the explanatory variables are held constant). Although local sensitivity analysis is useful in some applications, the region of possible realizations for the model of interest is left largely unexplored. Global sensitivity analysis attempts to explore the possible realizations of the model more completely. Global sensitivity methods such as the Fourier Amplitude Sensitivity Test (FAST) require construction of model simulations in which a signal is embedded in each input parameter and then the strength of the signal in the model realizations is a measure of parameter sensitivity. This requires construction of a separate GoldSim model with distributions for input parameters constructed specifically for sensitivity analysis, rather than for uncertainty analysis.

The space of possible realizations for the model can be explored through the use of search curves or evaluation of multi-dimensional integrals using Monte Carlo methods. However, these approaches to global sensitivity analysis become more computationally intensive as the dimensionality of the model (i.e., the number of observations and explanatory variables) increases. In this case, the GoldSim SRS FTF v2.4 model includes nearly 2,000 stochastic parameters.

Because of the computational cost, sensitivity analysis of high-dimensional probabilistic models requires efficient algorithms for practical application. Machine learning provides tools that allow for the partitioning of the variance in the model response to the input parameters by exploration of the realizations from a model run for uncertainty analysis. Two common machine learning approaches that could be brought to bear for sensitivity analysis are bagging and boosting of regression trees. The advantages of machine learning approaches include the ability to fit non-monotonic and non-linear effects, the ability to fit parameter interaction effects, and the ability to visualize these effects and their interaction across the range of the response and input parameters. Bagging, boosting and other machine learning approaches typically produce similar results for noisy data. In the case of realizations from a probabilistic GoldSim model, each realization is a deterministic evaluation of the model and all the stochastic predictor variables are available. As such, there is no unexplainable variation in the model response (as is the case with observed data) and the choice of machine learning algorithm should have negligible impact of the results of the sensitivity analysis.

An implementation of Friedman's GBM approach is available in the *R* statistical software in the *gbm* package. To conduct the sensitivity analysis on the FTF GoldSim model, 5,000 realizations of the model were generated and exported to *R*. A GBM analysis was conducted using the *R gbm* package on these realizations generating global Sensitivity Indices (SI) and partial dependence visualization of the impact of model input parameters on the model response. Details of this analysis are presented in Sections 5.6.6.2 and 5.6.6.3. [ISSN 0885-6125 Vol. 40 No 2, ISSN 0885-6125 Vol. 24 No 2]

5.6.6.2 Model Fitting and Validation

This section presents detailed discussion of the statistical methods used in the sensitivity analysis. Global sensitivity is estimated here as the proportion of the variance of the response accounted for by each explanatory variable. This estimation is conducted by fitting GBM model predictions to realizations from the GoldSim model. Variance decomposition of the fitted GBM model is then used to estimate SIs. Under this decomposition approach, the goal is identify the most influential explanatory variables that are identified within a model. The necessary degree of model complexity is assessed using validation metrics based on comparison of model predictions with randomly selected subsets of the data. This approach uses the "deviance" of the model as a measure of goodness of fit. The concept of deviance is fundamental to classical statistical hypothesis tests (e.g., the common t-test can be derived using a deviance-based framework) and guides the model selection process applied here.

The GBM model fitting approach is based on finding the values of each explanatory variable that result in the greatest difference in means for the corresponding subsets of the response. For example, if there were only a single explanatory variable, the GBM would identify the value of the explanatory variable that corresponds to a split of the response into two parts such that no other split would result in corresponding groups of the response variable with a greater difference in means. When multiple explanatory variables are present, these multiple splits are referred to as "trees" and each tree results in an estimate (e.g., prediction) of the response. As multiple potential trees are evaluated, they are compared to the observed data using a loss function. The selection of the loss function is an influential aspect of the GBM process and depends on the distribution of the response variable. For data that are sufficiently skewed (e.g., non-normal), the absolute error loss function tends to produce more reliable results.

There is a trade-off that exists when considering which loss function to use. The squared-error loss function tends to result in better fitting models but can do so at the expense of introducing spurious variables into the model selection process when the response distribution is sufficiently skewed. The absolute error loss function tends to produce model predictions with more variability but is less likely to result in the selection of spurious variables into the model. For this application, the focus has been on using a deviance-based method to obtain models that identify the most important explanatory variables with respect to the observed variability in the response. To this end, the squared-error function was used in these applications.

Once a GBM model is constructed, each of the explanatory variables that exist in the model can be assigned an SI. The SI is obtained through variance decomposition and can be interpreted as the percentage of variability explained in the model by a given explanatory variable. The sum of the SIs across the entire set of explanatory variables in the model will approximately equal the R^2 of the linear regression of the GoldSim output versus the GBM predictions. The R^2 values for this version of the FTF model are typically high, indicating the high degree of predictive power of the GBM in fitting the GoldSim model.

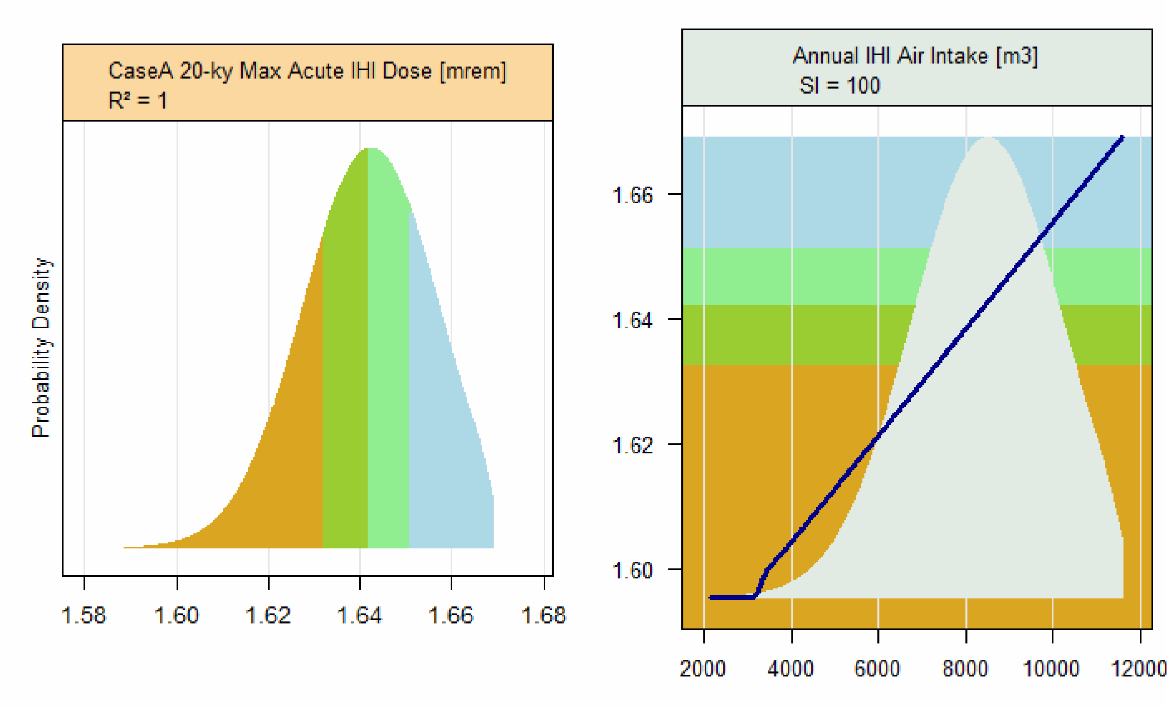
In order to assess the relationship between an individual explanatory variable and the response of interest, partial dependence plots are used (these are presented below for each endpoints of interest) as shown in Figure 5.6-43. The first panel depicts a density estimate of the simulated response from the GoldSim model. The percentiles of the response distribution in this panel are shaded to provide a context for the partial dependence plots presented in the remaining panels. The colors indicate the percentile range of the response as follows:

1. The 0 - 25th percentile region is shaded orange-brown.
2. The 25th - 50th percentile region is shaded dark yellow-green.
3. The 50th - 75th percentile region is shaded light green.
4. The 75th - 100th percentile region is shaded light blue.

The y-axis scale of the partial dependence plots is in units of the response distribution (the x-axis of the first panel). Given that each parameter has a different range and strength of influence on the response, the y-axes of the partial dependence panels depict only the range of the response over which a particular parameter is influential. If the original scale of the response were maintained on each partial dependence panel, then the influence of the least influential parameter would not be visible in many cases. To counteract this scale issue, the background of the partial dependence panels is shaded to depict the percentile of the response over which the parameter is influential. For example, if the background of the partial dependence plot under the partial dependence line is light blue, then that indicates the parameter's influence on the upper end of the response distribution (i.e., the 75th to 100th percentile of the response).

The partial dependence panels in each figure show the distributions of the explanatory variables (shaded gray), and the partial dependence curve (blue line) shows changes in the response as a function of each explanatory variable. In the example provided (Figure 5.6-43), the variable has a truncated normal input distribution, and the dependence of the result on this parameter spans the entire range of the variable and explains 100% of the variation.

Figure 5.6-43: Example of a Result Probability Density and Partial Dependence Plot



The partial dependence is determined through the integration across the joint density to obtain a marginal distribution. The integration is performed using a "weighted tree traversal" measure that is analogous to more common integration procedures performed with Riemann or Lebesgue measures. The vertical axis of the partial dependence plot shows the change in the response variable as a function of the changes in the explanatory variable of interest. With standard linear regression techniques, it is assumed that the relationship between the response and the explanatory variable is a constant (e.g., the parameter estimates in the linear model). With the GBM approach, this relationship is not constrained by assumptions of linearity and the partial dependence plots show the data-based estimate of the relationship between the response and the explanatory variable. This is especially useful for understanding the influence of changes in a single explanatory variable on the response, when integrating across all other explanatory variables.

5.6.6.3 Summary Statistics for Endpoints

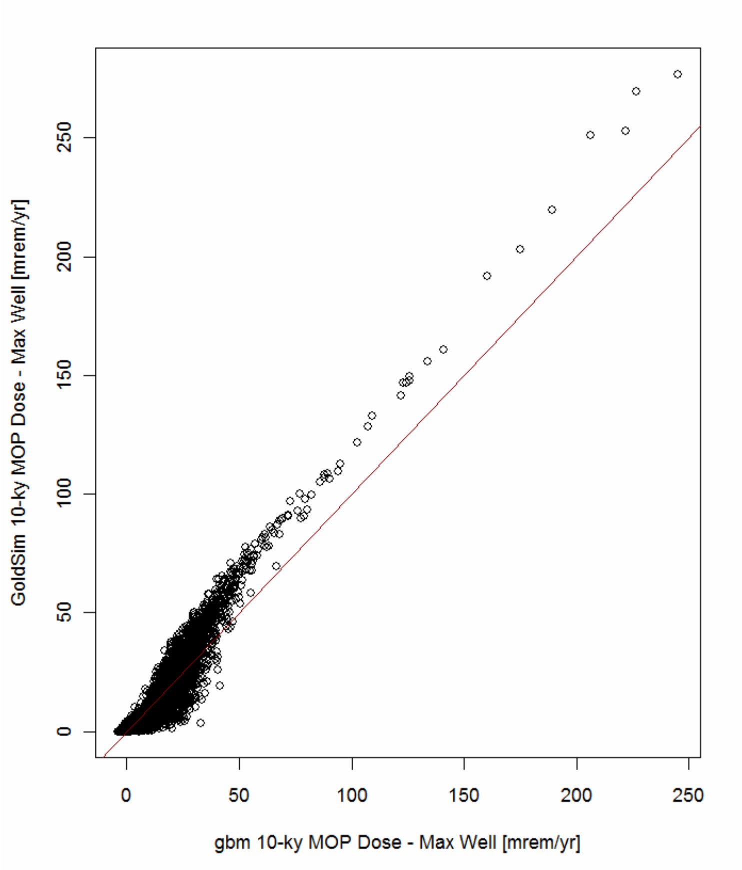
Two GoldSim models were run for this SA, one model for the Base Case (failure configuration Case A) alone and one model for Case D. Both models were run for a 20,000 year time period with 5,000 model realizations. The model runs have the file names “SRS FTF v2.4 20ky CaseA r5000 s1.gsm” and “SRS FTF v2.4 20ky CaseD r5000 s1.gsm” respectively. The “s1” in the name refers to the value of the seed used for Latin Hypercube Sampling of model input distributions. The exporting of results follows the simple procedure outlined in the model, in the *Sensitivity Analysis* container, wherein the tabulated raw data contents of the element *Endpoints_SA* are exported to the files “SRS FTF v2.4 20ky CaseA r5000 s1.gsd” and “SRS FTF v2.4 20ky CaseD r5000 s1.gsd”. Note the different extension, .gsd, for “GoldSim data”.

Endpoints were selected for doses (actually TEDE) to a MOP and for an Inadvertent Human Intruder (IHI), as well as groundwater concentrations of selected radionuclides that contribute heavily to those doses. Doses are examined for maximum values within different time periods (10,000-year and 20,000-year) and at different locations. A hypothetical “envelope” maximum dose from well water is considered, wherein the maximum total dose at any of 36 wells arranged along the 100m perimeter is recorded at each time step. Specific wells are also selected for analysis. Well 6 is representative of those wells intersecting streamlines flowing to UTR, and is consistently one of the highest doses to the MOP. Well 33 is representative of groundwater bound for Fourmile Branch.

For each endpoint, as shown in Tables 5.6-14 and 5.6-15, (for Cases A and D, respectively), the most significant parameters identified by the sensitivity analysis are presented, along with the SI for each. Parameters with SI values below 5 are omitted from the presentation, since their contribution to the given endpoint is relatively low. Figures 5.6-45 through 5.6-68, show the partial dependence of each of the top significant parameters for each endpoint. Summary statistics for the endpoints associated with the dose to the IHI are provided in Section 6.5.

In general, the GBM fits were quite good, with R^2 values ranging from 0.89 to 1. In the sample GBM fit plot given in Figure 5.6-44, the R^2 is 0.89. This tells us that the GBM statistical predictive model is able to mimic the GoldSim modeled results reasonably well, giving us confidence in the statistical analysis. Other GBM fits had even higher values of R^2, as noted in Tables 5.6-14 and 5.6-15.

Figure 5.6-44: Example of a GBM Model Fit Plot



Note: 10-ky = 10,000/years

Cases A and D were the cases run because as the "Base Case" and "Fast Flow Case" they represent a cross section of the configurations evaluated in the PA. The different tank configurations are discussed in detail in Section 5.6.3.1 (Waste Tank and Ancillary Equipment Configurations). Since the GoldSim model is used only to model contaminant transport, flow profiles over time are calculated for each of the Cases A and D using the PORFLOW FTF model. The PORFLOW model flow results are simplified into a one-dimensional steady state flow through the CZ to allow use in the GoldSim model.

Table 5.6-14: Identification of the Most Sensitive Parameters for the Endpoints of Interest for Configuration Case A

Endpoint	SI Rank	Input Parameter	Sensitivity Index
Max. MOP dose at any well within 10,000 yr $R^2 = 0.89$	1	water well completion stratum	21.5
	2	Tank Type IV Cases A & B degradation time	6.30
Max. MOP dose at any well within 20,000 yr $R^2 = 0.95$	1	water well completion stratum	25.2
	2	plutonium K_d in clayey soil	8.98
	3	plutonium K_d in sandy soil	8.97
Max. MOP dose at Well 6 within 10,000 yr $R^2 = 0.89$	1	water well completion stratum	21.3
	2	Tank Type IV Cases A & B degradation time	6.12
Max. MOP dose at Well 6 within 20,000 yr $R^2 = 0.95$	1	water well completion stratum	24.7
	2	plutonium K_d in clayey soil	9.20
	3	plutonium K_d in sandy soil	9.08
Max. MOP dose at Well 33 within 10,000 yr $R^2 = 0.99$	1	water well completion stratum	64.3
	2	vegetable consumption – local fraction	5.9
Max. MOP dose at Well 33 within 20,000 yr $R^2 = 0.99$	1	Tc solubility – Oxidized Region II cements	40.1
	2	water well completion stratum	31.7
	3	Tc solubility – Reduced Region II cements	9.82
Max. conc. Pu-239 at Well 6 within 20,000 yr $R^2 = 0.98$	1	plutonium K_d in sandy soil	18.0
	2	plutonium K_d in clayey soil	16.9
	3	Tank Type IV Cases A & B degradation time	16.1
Max. conc. Ra-226 at Well 6 within 20,000 yr $R^2 = 0.99$	1	water well completion stratum	64.7
	2	radium K_d in middle-aged oxidizing cements	16.9
Max. conc. Np-237 at Well 6 within 20,000 yr $R^2 = 0.99$	1	water well completion stratum	52.7
	2	neptunium K_d in old oxidizing cements	12.9
	3	neptunium K_d in sandy soil	9.56
Max. conc. Tc-99 at Well 6 within 20,000 yr $R^2 = 1$	1	water well completion stratum	58.6
	2	Tc solubility – Oxidized Region II cements	37.7

Table 5.6-14: Identification of the Most Sensitive Parameters for the Endpoints of Interest for Configuration Case A (Continued)

Endpoint	SI Rank	Input Parameter	Sensitivity Index
Max. conc. Pu-239 at Well 33 within 20,000 yr $R^2 = 0.94$	1	plutonium K_d in sandy soil	15.7
	2	Pu solubility – Reduced Region II cements	11.6
	3	water well completion stratum	10.9
Max. conc. Tc-99 at Well 33 within 20,000 yr $R^2 = 1$	1	water well completion stratum	52.3
	2	Tc solubility – Oxidized Region II cements	33.3
	3	Tc solubility – Reduced Region II cements	12.8

Table 5.6-15: Identification of the Most Sensitive Parameters for the Endpoints of Interest for Configuration Case D

Endpoint	SI Rank	Input Parameter	Sensitivity Index
Max. MOP dose at any well within 10,000 yr $R^2 = 0.93$	1	number of pore water volumes to get to Oxidized Region III concrete (*Flushes_2nd*)	8.03
	2	water well completion stratum	5.63
	3	Pu solubility – Oxidized Region II cements	5.2
Max. MOP dose at any well within 20,000 yr $R^2 = 0.94$	1	water well completion stratum	25.7
	2	Tc solubility – Oxidized Region II cements	23.6
	3	Tank Type I Cases C, D & E degradation time	7.22
Max. MOP dose at Well 6 within 10,000 yr $R^2 = 0.93$	1	number of pore water volumes to get to Oxidized Region III concrete (*Flushes_2nd*)	7.48
	2	water well completion stratum	5.38
Max. MOP dose at Well 6 within 20,000 yr $R^2 = 0.95$	1	water well completion stratum	27.1
	2	Tc solubility – Oxidized Region II cements	22.3
	3	Tank Type I Cases C,D & E degradation time	7.40
Max. MOP dose at Well 33 within 10,000 yr $R^2 = 0.99$	1	Tc solubility – Oxidized Region II cements	27.1
	2	water well completion stratum	24.3
	3	Tank Type III Cases C, D & E Degrade. Time	21.5
Max. MOP dose at Well 33 within 20,000 yr $R^2 = 0.95$	1	water well completion stratum	23.4
	2	plutonium K_d in sandy soil	8.46
	3	Pu solubility – Oxidized Region II cements	8.26
Max. conc. Pu-239 at Well 6 within 20,000 yr $R^2 = 0.97$	1	plutonium K_d in sandy soil	25.4
	2	water well completion stratum	20.2
	3	Pu solubility – Oxidized Region II cements	19.8
Max. conc. Ra-226 at Well 6 within 20,000 yr $R^2 = 0.99$	1	water well completion stratum	43.2
	2	Tank Type I Cases C D & E degradation time	26.9
	3	radium K_d in middle-aged oxidizing cements	5.79
Max. conc. Np-237 at Well 6 within 20,000 yr $R^2 = 0.99$	1	water well completion stratum	54.3
	2	neptunium K_d in old oxidizing cements	14.6
	3	neptunium K_d in sandy soil	7.86

Table 5.6-15: Identification of the Most Sensitive Parameters for the Endpoints of Interest for Configuration Case D (Continued)

Endpoint	SI Rank	Input Parameter	Sensitivity Index
Max. conc. Tc-99 at Well 6 within 20,000 yr $R^2 = 0.99$	1	water well completion stratum	36.6
	2	Tc solubility – Oxidized Region II cements	32.4
	3	Tank Type I Cases C D & E degradation time	11.8
Max. conc. Pu-239 at Well 33 within 20,000 yr $R^2 = 0.95$	1	water well completion stratum	23.4
	2	plutonium K_d in sandy soil	8.46
	3	Pu solubility – Oxidized Region II cements	8.26
Max. conc. Tc-99 at Well 33 within 20,000 yr $R^2 = 1$	1	water well completion stratum	32.8
	2	Tc solubility – Oxidized Region II cements	32.4
	3	Tc solubility – Reduced Region II cements	12.6

The partial dependence plots shown in Figure 5.6-45 identify the most significant model input parameters in determining the maximum dose to a MOP at any well within 10,000 years, assuming failure configuration Case A. The statistical analysis (GBM) fit has a reasonably good R^2 of 0.89, the lowest of all the endpoints. This particular dose endpoint is driven by radionuclide concentrations in water drawn from a Well, and in this case, the MOP is exposed to the worst concentration in any well at any given time. The most significant parameter is the well completion stratum. This parameter has three discrete values, used to identify which aquifer a well is likely to be completed in. Values 1 and 2, which have likelihoods of 13% and 44%, respectively, correspond to shallow aquifers which contain the bulk of the contamination. The value three, sampled at 43%, identifies a deeper aquifer, which has only 1/20 of the concentration of the upper aquifers. The great difference in concentrations in the upper and lower aquifers is naturally a strong discriminator for dose, so it is no surprise that this parameter is strongly influential in the dose, and is commonly seen as a sensitive parameter for many of these endpoints. This parameter has a high SI because it has the potential to influence many realizations.

The second-ranked model parameter for influencing the value of this dose endpoint is the timing of failure of the Type IV tank liners, assuming failure modes A and B. This model run considered only Case A, so this would apply to that case.

Figure 5.6-45: Partial Dependence Plot for Maximum MOP Dose from any Well within 10,000 Years: Case A

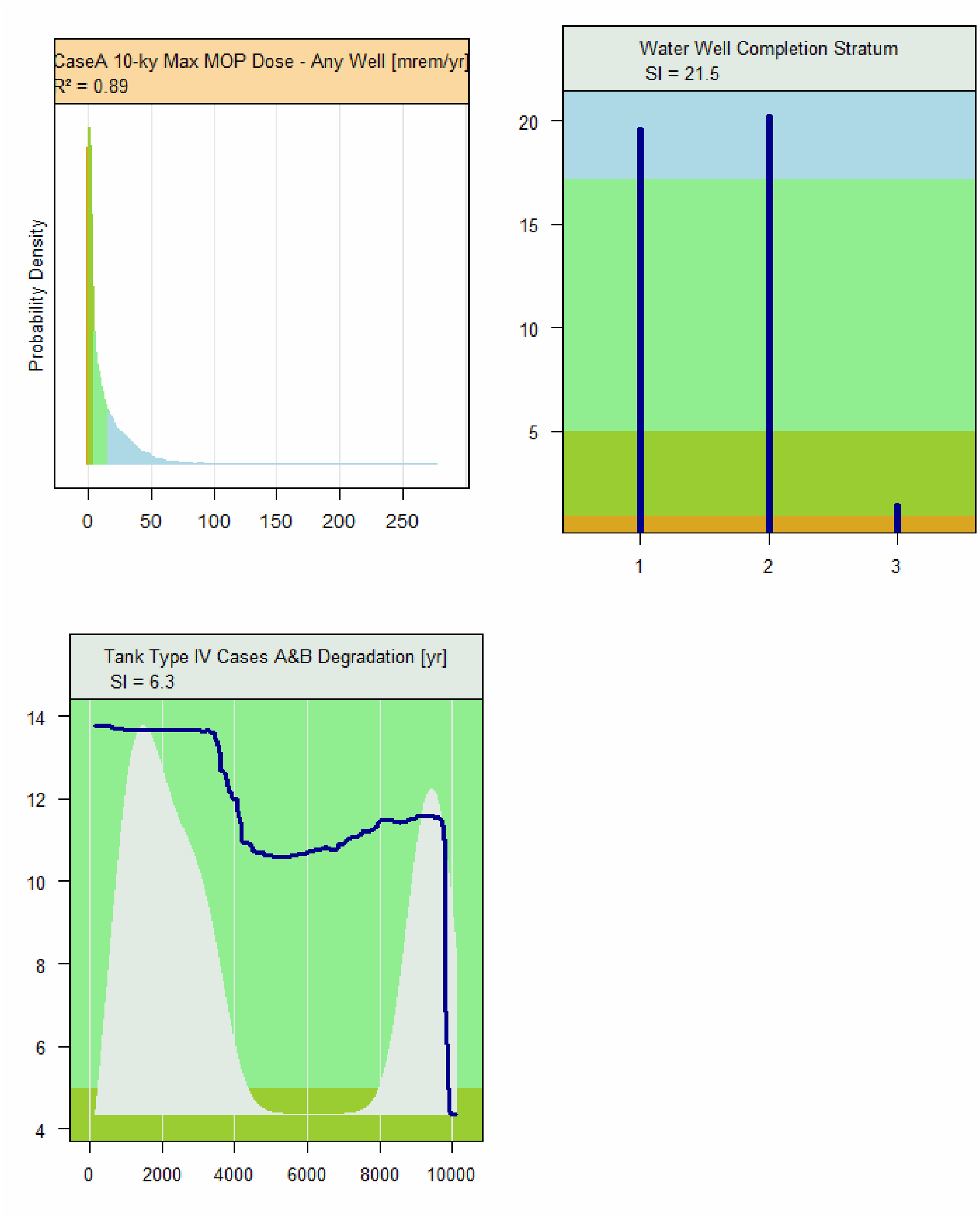
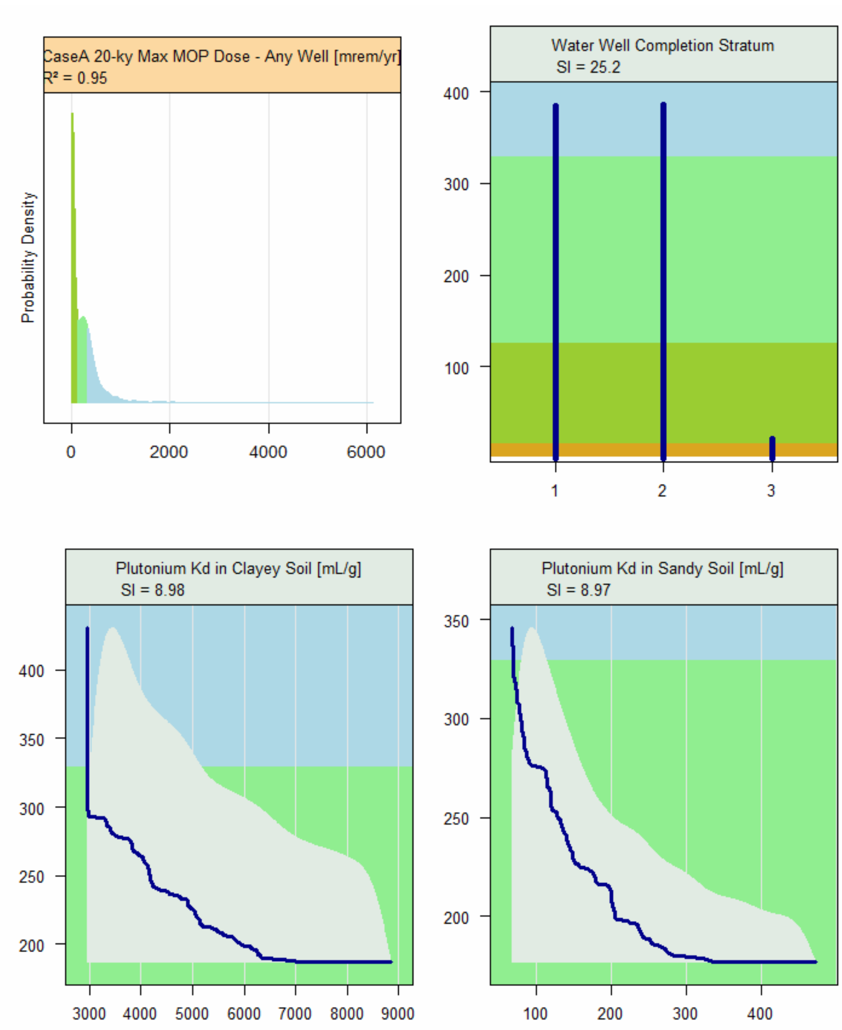


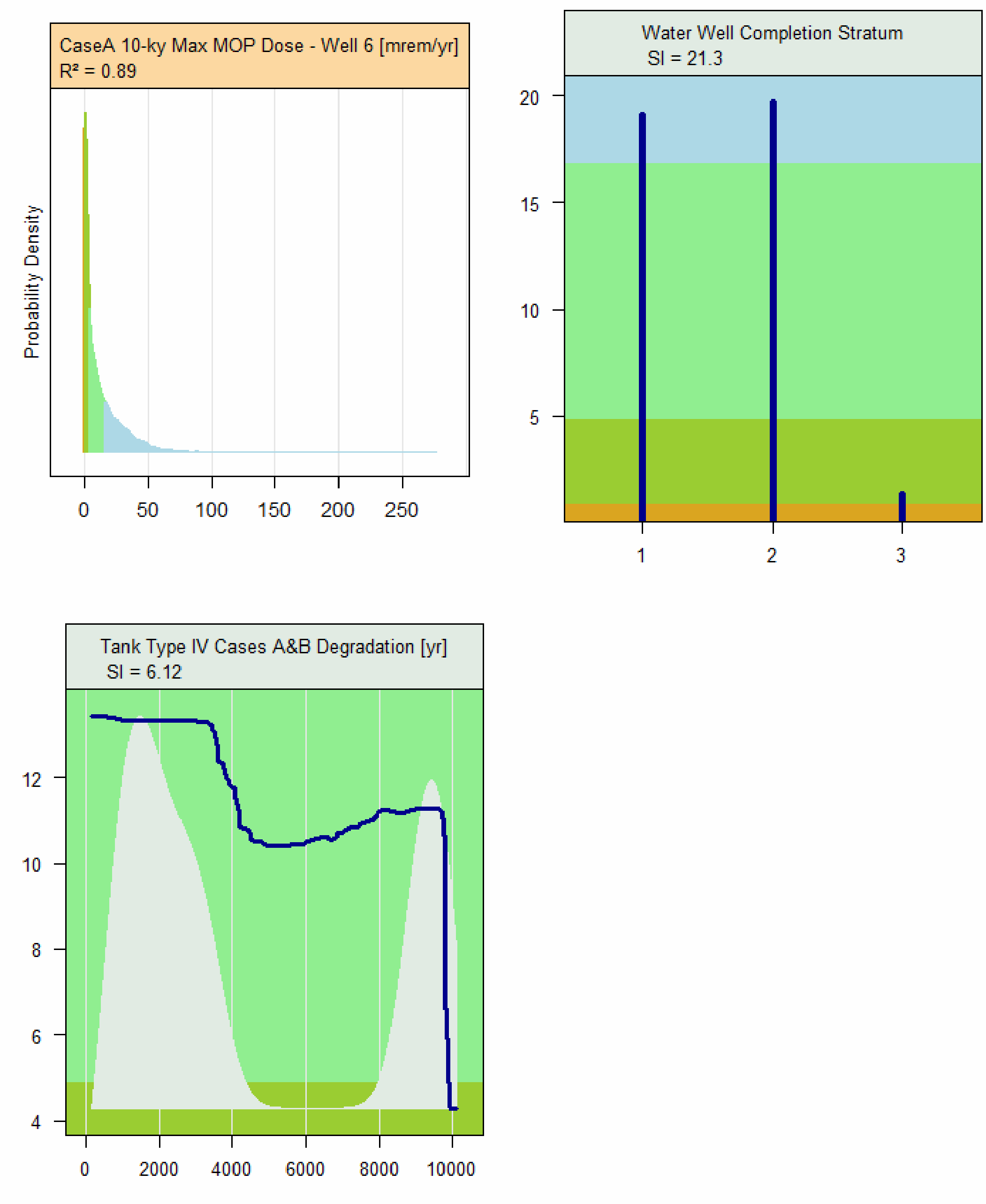
Figure 5.6-46 shows SI plots for the same maximum dose to a MOP from any well, but occurring any time before 20,000 years, rather than 10,000. The model fit is better, with an R^2 of 0.95. Here again, the well completion depth is most significant, explaining even more of the variation. Following that are the K_ds for plutonium in clayey and sandy soils, respectively. Later doses are driven by Pu-239 and the influence of the partition coefficient is such that higher K_ds correspond to lower doses, to a point. A higher value in soils means a lower aqueous concentration, and slower transport to the well. Above a certain value, however (about 7,000 mL/g for clayey soils and 340 mL/g for sandy soil), there is no longer an influence on the maximum dose achieved within 20,000 yr. At that point, the transport of plutonium is so retarded that it does not contribute significantly to the dose.

Figure 5.6-46: Partial Dependence Plot for Maximum MOP Dose from any Well within 20,000 Years: Case A



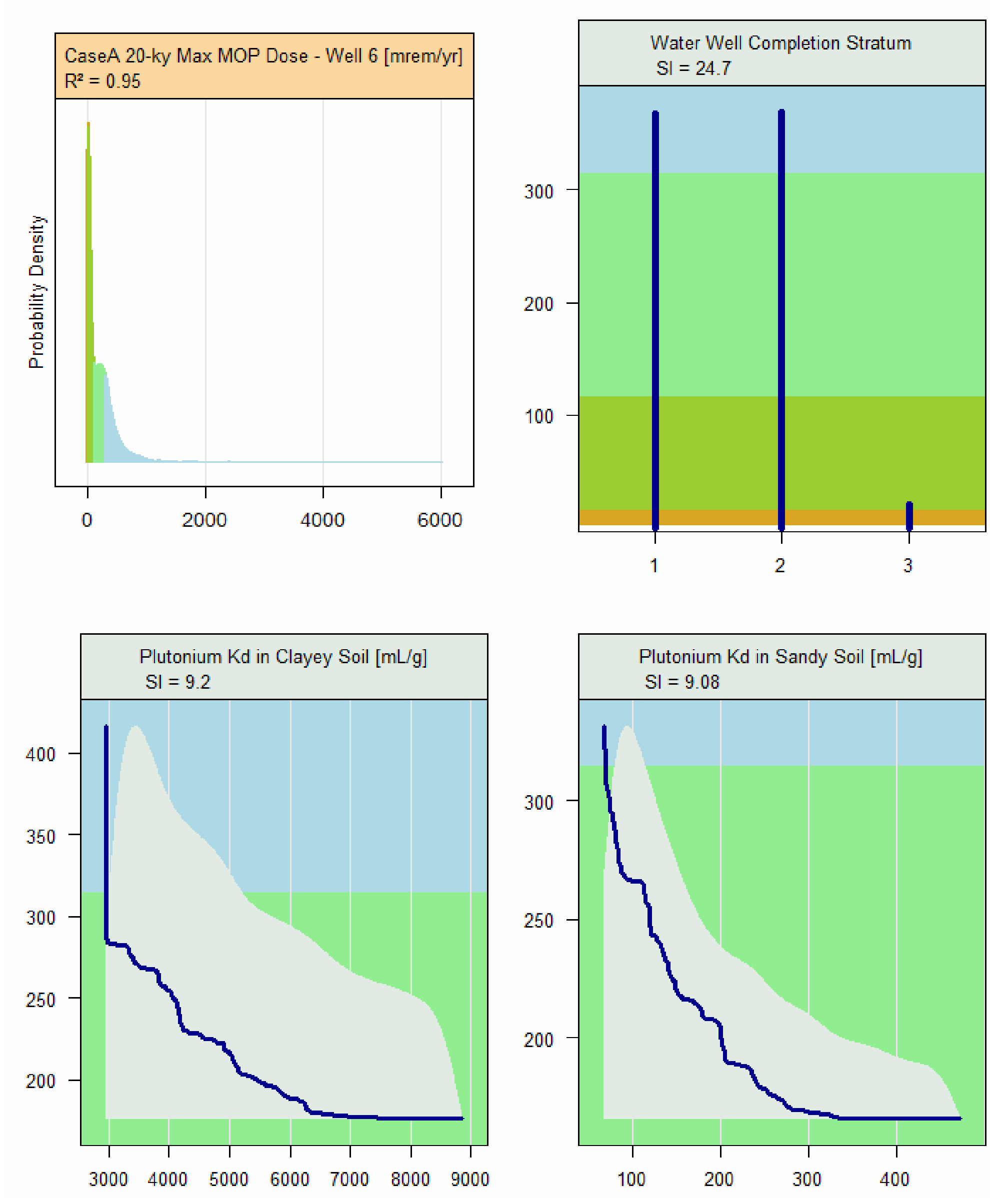
The results for the maximum MOP dose from Well 6 achieved within 10,000 years (Figure 5.6-47) identify the same sensitive parameters as those in the doses from any well within 10,000 yr (Figure 5.6-45), with nearly the same SI. That the same parameters are sensitive to these endpoints is to be expected, since the well with the highest concentrations is usually Well 6.

Figure 5.6-47: Partial Dependence Plot for Maximum MOP Dose from Well 6 within 10,000 Years: Case A



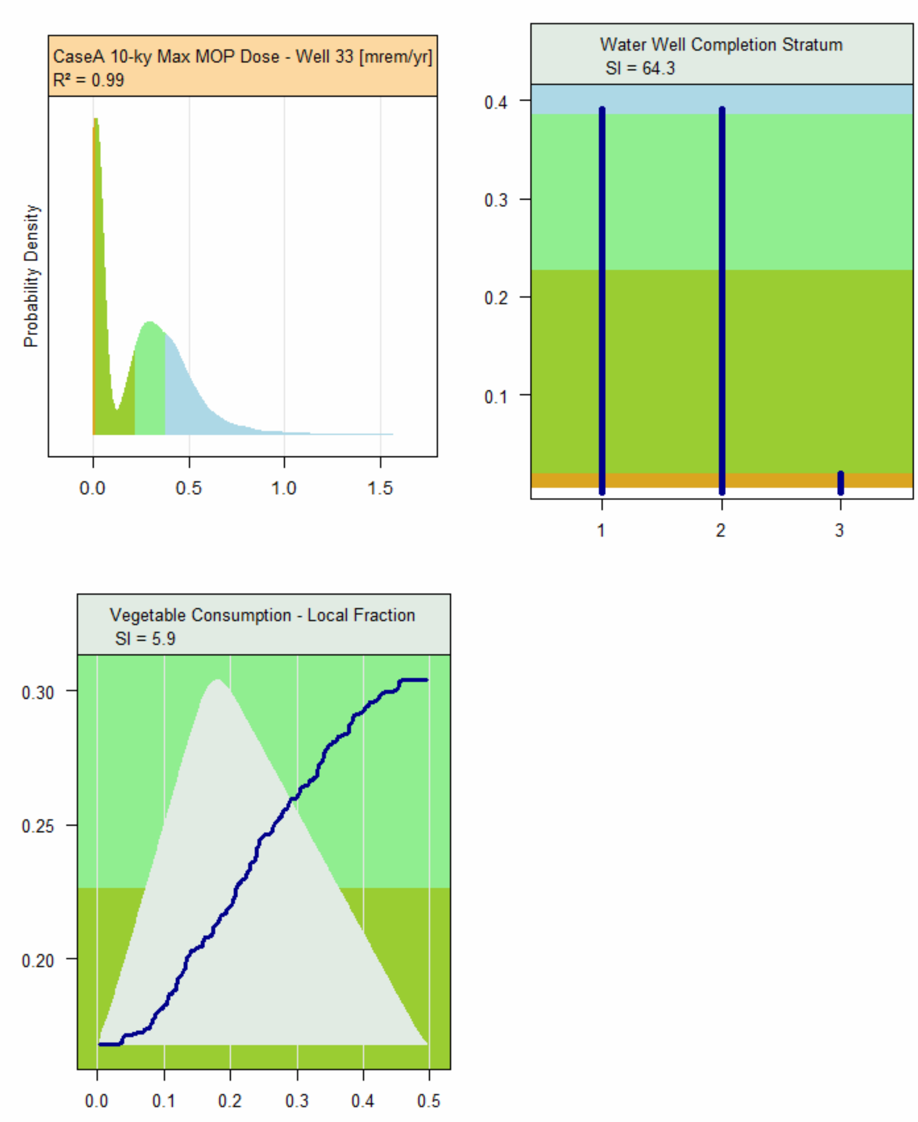
In Figure 5.6-48 the same situation exists as does for the 20,000-year maximum. Well 6 is still the dominant well.

Figure 5.6-48: Partial Dependence Plot for Maximum MOP Dose from Well 6 within 20,000 Years: Case A



As presented in Figure 5.6-49, the maximum MOP dose at Well 33 within the 10,000-year period of performance is also sensitive to the well completion depth, and the GBM analysis has a very high confidence, with an R^2 of 0.99. The well completion stratum has a SI of 64.3, far ahead of the second-ranked parameter: the fraction of consumed vegetables that are grown locally. Note that this second parameter has an influence across all of its range, and that the larger the fraction of local (contaminated) vegetables consumed, the larger the dose. Well 33 water, bound for Fourmile Branch, "sees" a different set of tanks than the groundwater flowing to UTR. The doses are therefore driven by different concentrations of the radionuclide suite, and a different set of sensitive parameters is expected. Both Wells 6 and 33, however, are sensitive to the well completion stratum selector, underscoring the significance of this parameter.

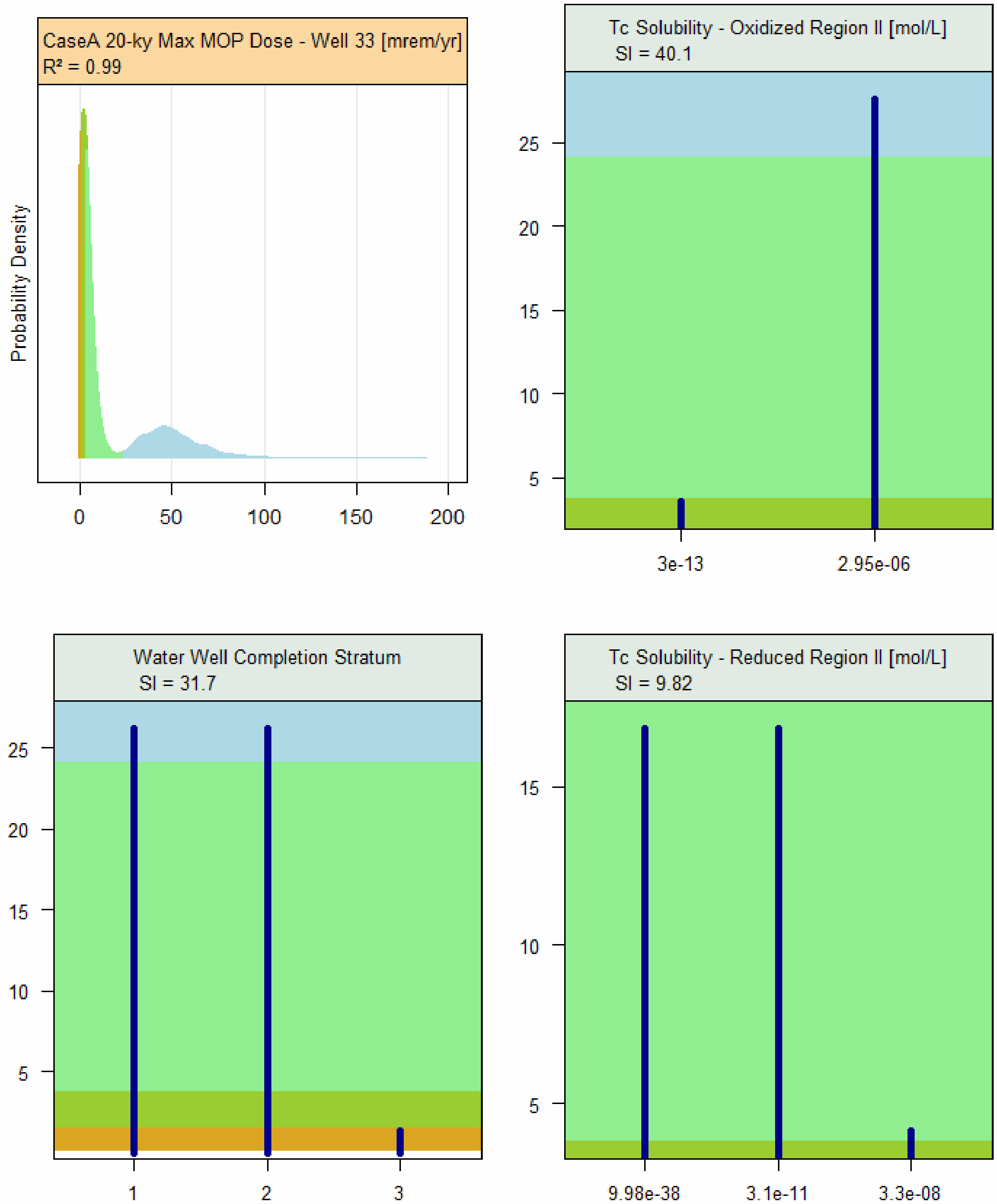
Figure 5.6-49: Partial Dependence Plot for Maximum MOP Dose from Well 33 within 10,000 Years: Case A



In Figure 5.6-50, the maximum MOP dose at Well 33 within 20,000 years reveals that Tc-99 is the principal contributor. The first- and third-ranked sensitive parameters are both related to the solubility of Tc-99, and the second is well completion stratum. The solubilities, for Oxidized Region II and Reduced Region II, are defined as discrete values, representing different chemical phases of Tc-99. The values vary significantly, and have a strong role in the release of Tc-99 from the grout in the waste tanks. This indicates that the determination of Tc-99 solubility is of importance.

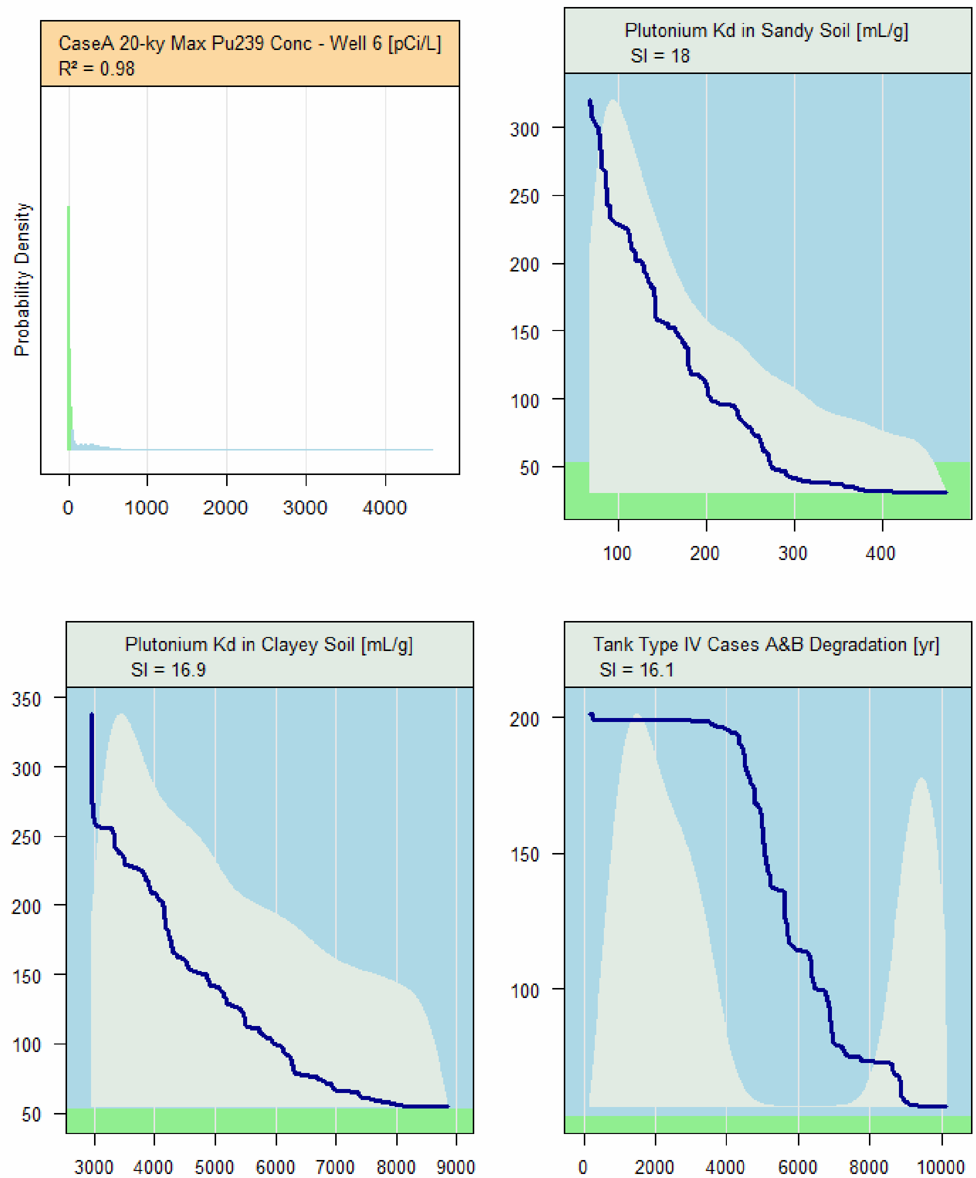
Following these various Case A dose endpoints, we evaluate those related to radionuclide aqueous concentrations in the wells located at the 100m boundary. Doing so effectively removes the influence of the dose assessment calculations, providing a clearer view into what is significant to the contaminant transport part of the model in isolation. The radionuclides chosen for examination are those that have been large contributors to dose, as identified in the preceding partial dependence plots. However, most of the significant parameters related to dose were initially contaminant transport parameters, therefore it is expected that those same parameters are also significant for well water concentrations. After completing the analysis for failure configuration Case A, we repeat the entire presentation for Case D.

Figure 5.6-50: Partial Dependence Plot for Maximum MOP Dose from Well 33 within 20,000 Years: Case A



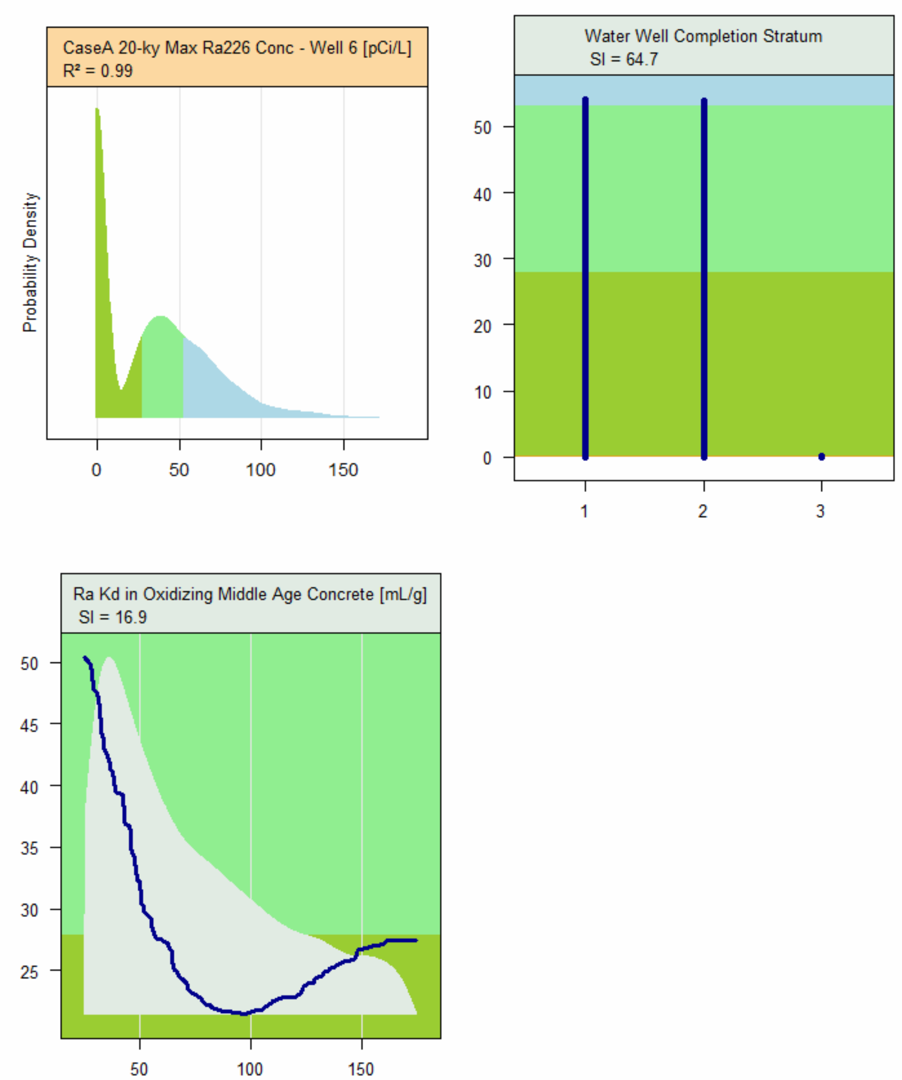
The first aqueous concentration analyses is focused on the 20,000 year maximum concentration of Pu-239 at Well 6, shown in Figure 5.6-51. The R^2 of 0.98 shows that the GBM had an excellent fit, therefore, these parameters are identified with high confidence. The first, with an SI of 18, is the plutonium K_d in sandy soil, followed by that for clayey soil with nearly the same SI. The third of these evenly-ranked parameters is the timing of the configuration Case A failure for the Type IV tanks.

Figure 5.6-51: Partial Dependence Plot for Maximum Aqueous Concentration of Pu-239 at Well 6 within 20,000 Years: Case A



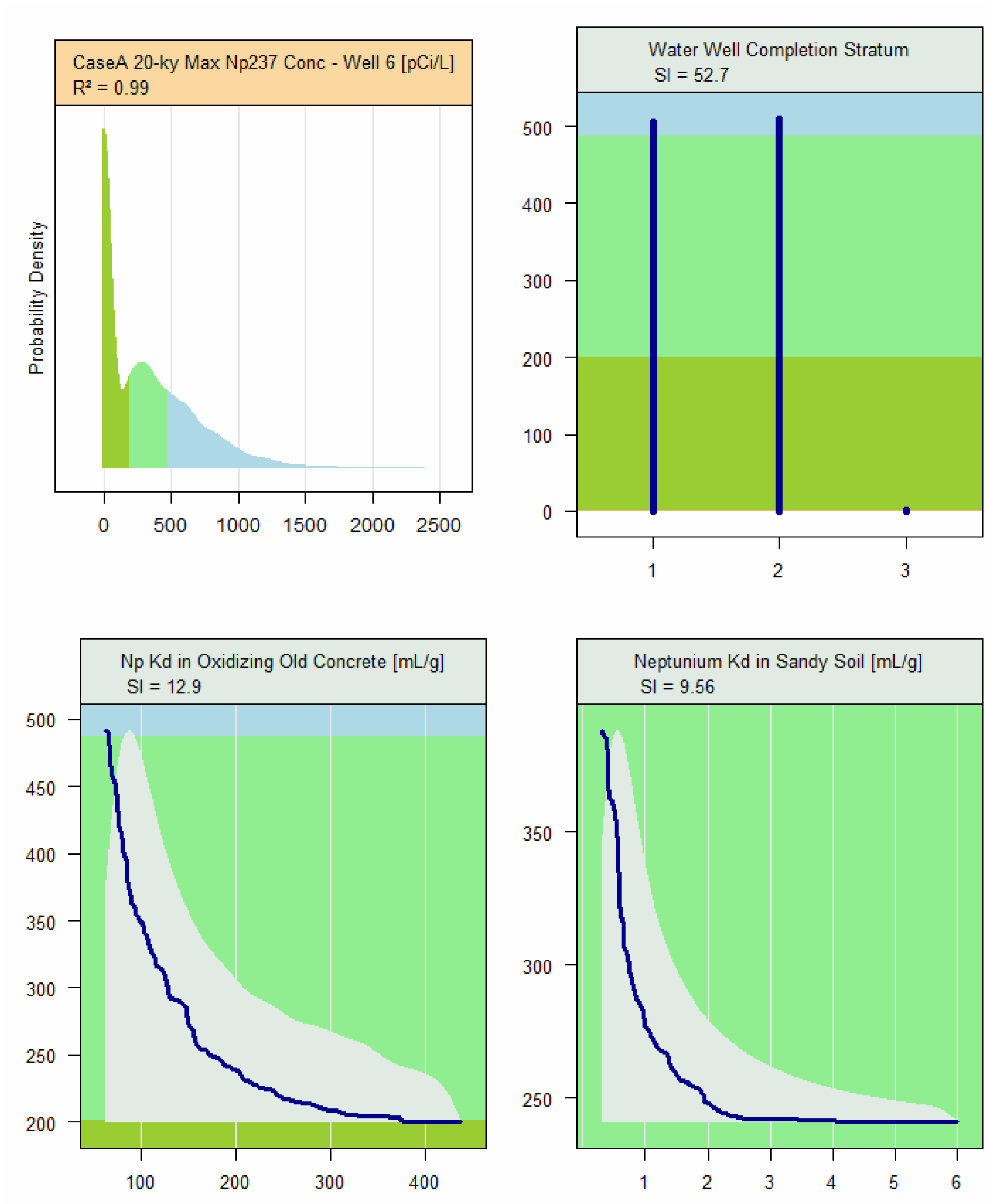
The parameters determining the Case A maximum concentration of Ra-226 at Well 6 are seen in Figure 5.6-52. Again the well completion stratum selector is identified, with a very high SI of 64. Following that is the K_d of radium in oxidizing middle-aged concrete. This partial dependence plot shows some interesting behavior. The radium K_d is influential at low values and at high values, but not so much at intermediate values. Based on the bimodal response shown in the probability density plot, the behavior may be caused by the fact that that at low K_d values the radium is allowed to escape early in time, generating a large initial peak. The high K_d, on the other hand, may "hold up" the radium for enough time that most of it is still in the waste form at the time the waste form fails, again causing a sudden release and a relative peak. At intermediate values, the radium is allowed to leak out of the waste tank at an intermediate rate, resulting in only a broad low peak, which is not seen distinctly in the probability density of the result.

Figure 5.6-52: Partial Dependence Plot for Maximum Aqueous Concentration of Ra-226 at Well 6 within 20,000 Years: Case A



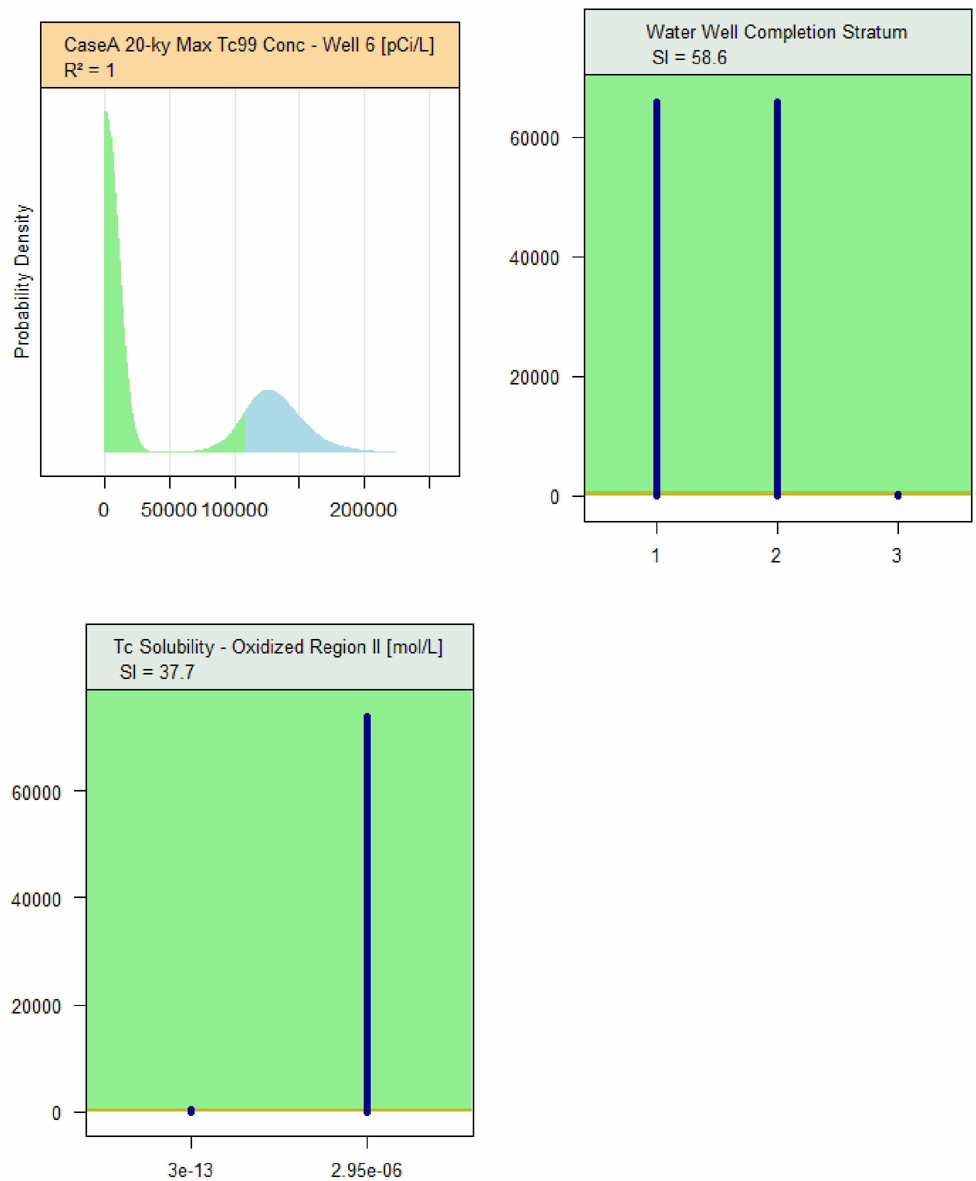
The 20,000 year maximum aqueous concentration of Np-237 at Well 6 has influences similar to those for radium, as shown in Figure 5.6-53. The Well depth selector is again the most significant, followed by K_ds for neptunium in oxidizing old concrete and sandy soils.

Figure 5.6-53: Partial Dependence Plot for Maximum Aqueous Concentration of Np-237 at Well 6 within 20,000 Years: Case A



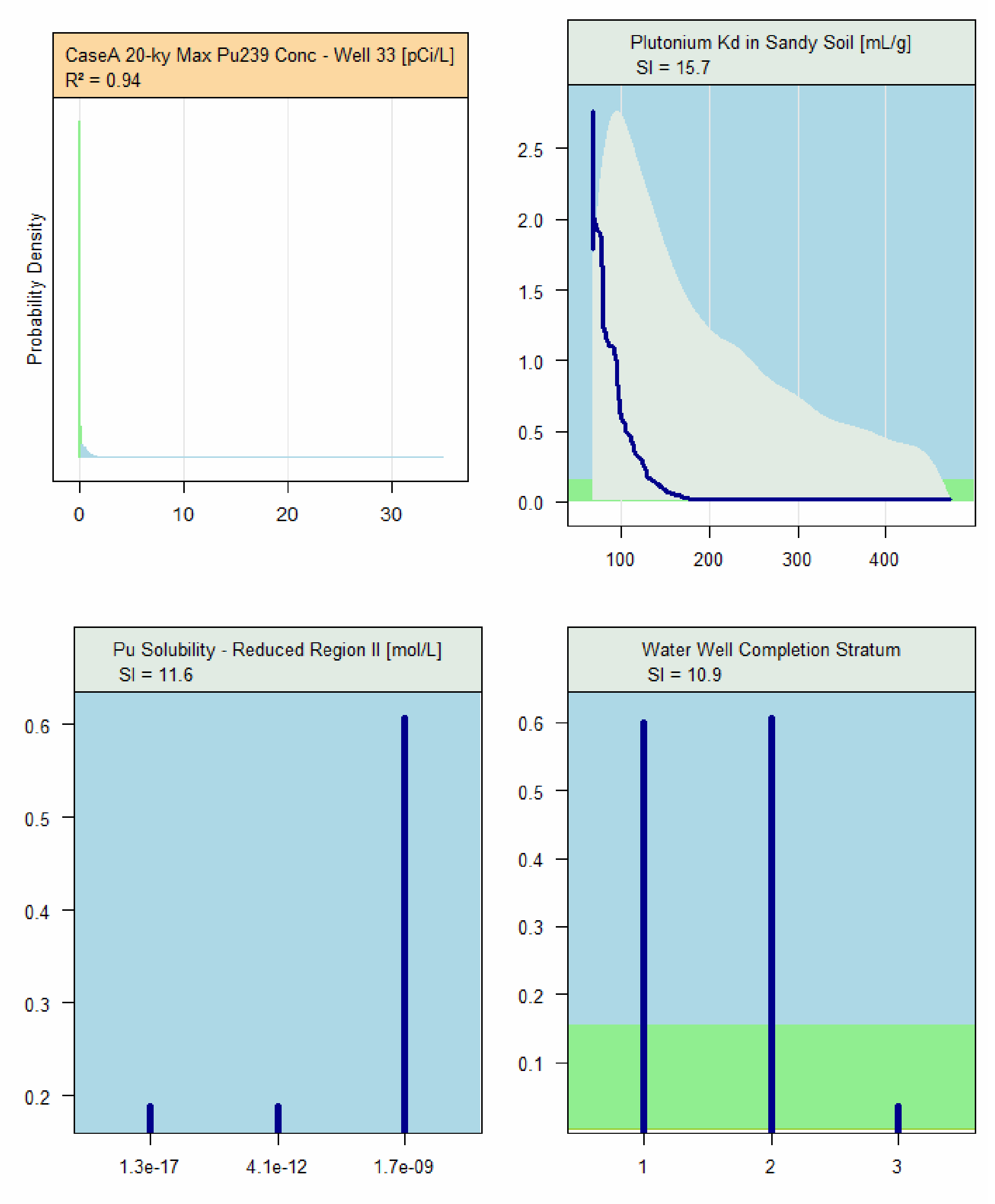
The 20,000-year maximum aqueous concentration of Tc-99 at Well 6 shows a very strong dependence on the well completion stratum, with an SI of 58.6, as shown in Figure 5.6-54. And, with an R^2 of 1, the fit could not be better. The second-ranked sensitive parameter also has a high SI (37.7) and is the technetium solubility in Oxidized Region II concrete. Just these two parameters describe over 96% of the variation for this endpoint.

Figure 5.6-54: Partial Dependence Plot for Maximum Aqueous Concentration of Tc-99 at Well 6 within 20,000 Years: Case A



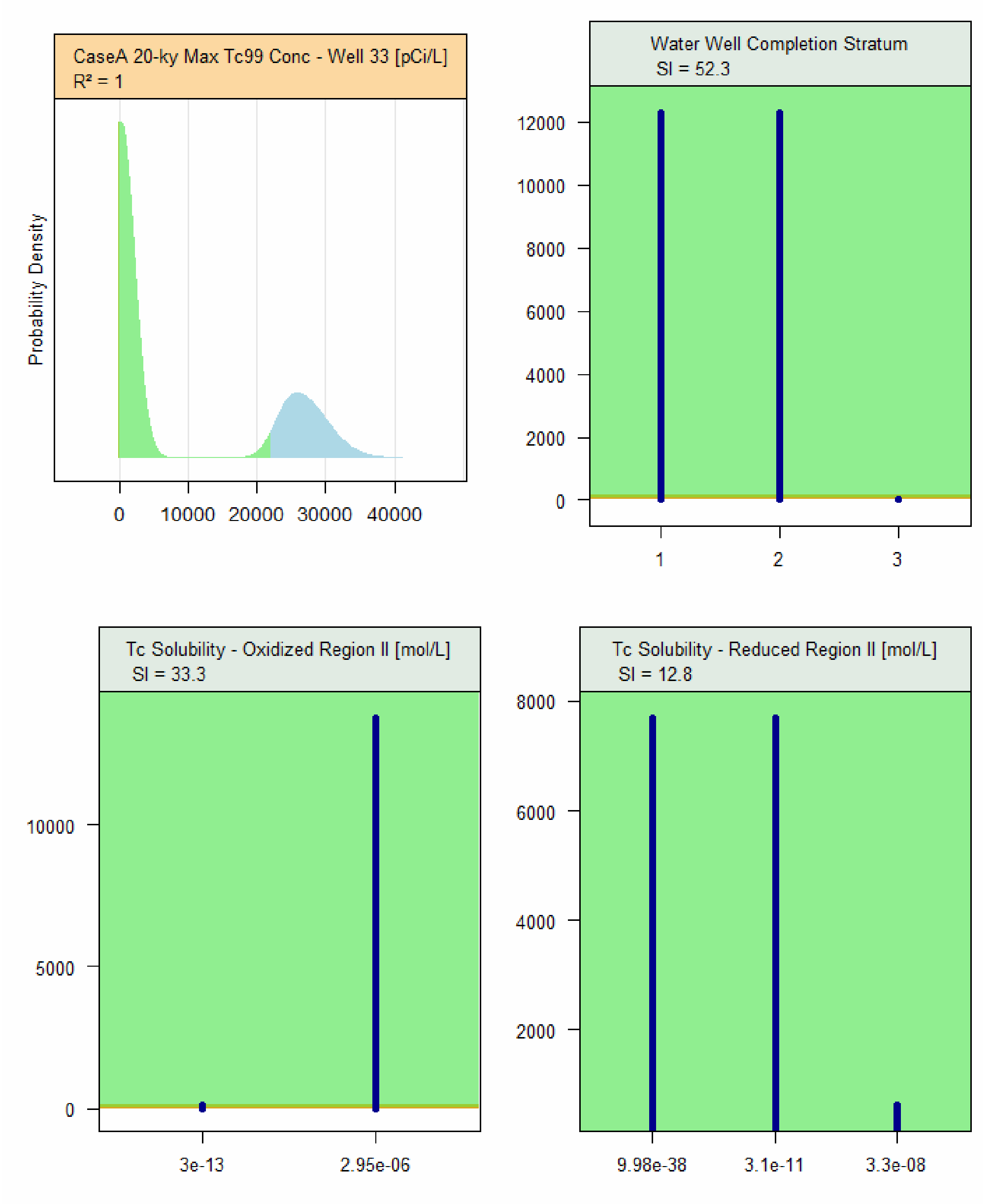
The doses at Well 33 were dominated by Pu-239, so we also examine the maximum aqueous concentration of that radionuclide at the well in 20,000 year. Figure 5.6-55 shows that the most sensitive parameter is the K_d of Pu in sandy soil, followed by its solubility in Reduced Region II concrete, and the third parametric the well completion stratum selector.

Figure 5.6-55: Partial Dependence Plot for Maximum Aqueous Concentration of Pu-239 at Well 33 within 20,000 Years: Case A



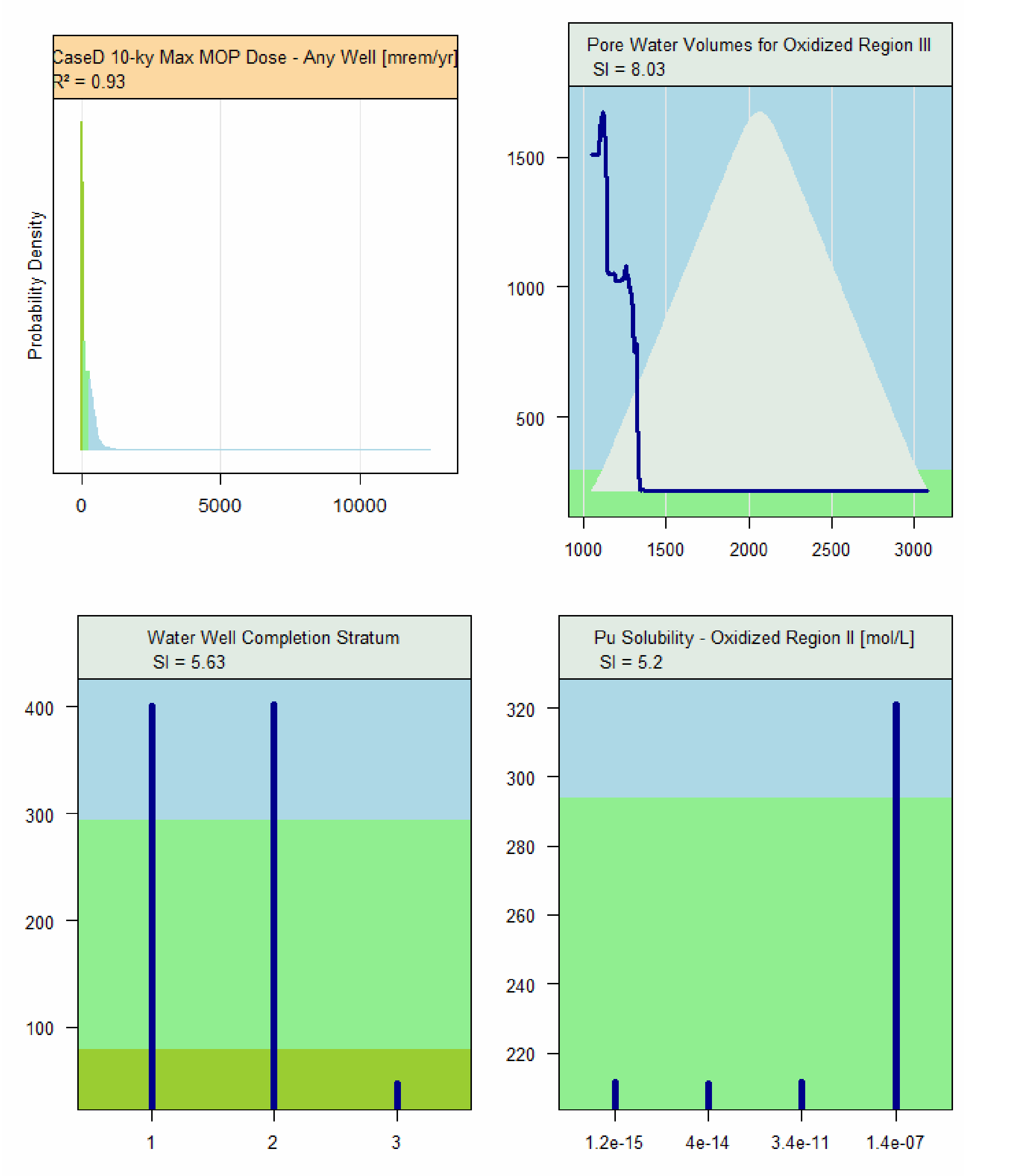
Just as for Well 6, the 20,000-year maximum aqueous concentration of Tc-99 at Well 33 shows a very strong dependence on the well completion stratum, with an SI of 52.3, as shown in Figure 5.6-56. And again, with an R^2 of 1, the fit could not be better. The second-ranked sensitive parameter also has a high SI (33.3), and is again the technetium solubility in Oxidized Region II concrete. The third, Tc solubility in Reduced Region II concrete, has an SI of 12.8. These three parameters describe over 98% of the variation for this endpoint.

Figure 5.6-56: Partial Dependence Plot for Maximum Aqueous Concentration of Tc-99 at Well 33 within 20,000 Years: Case A



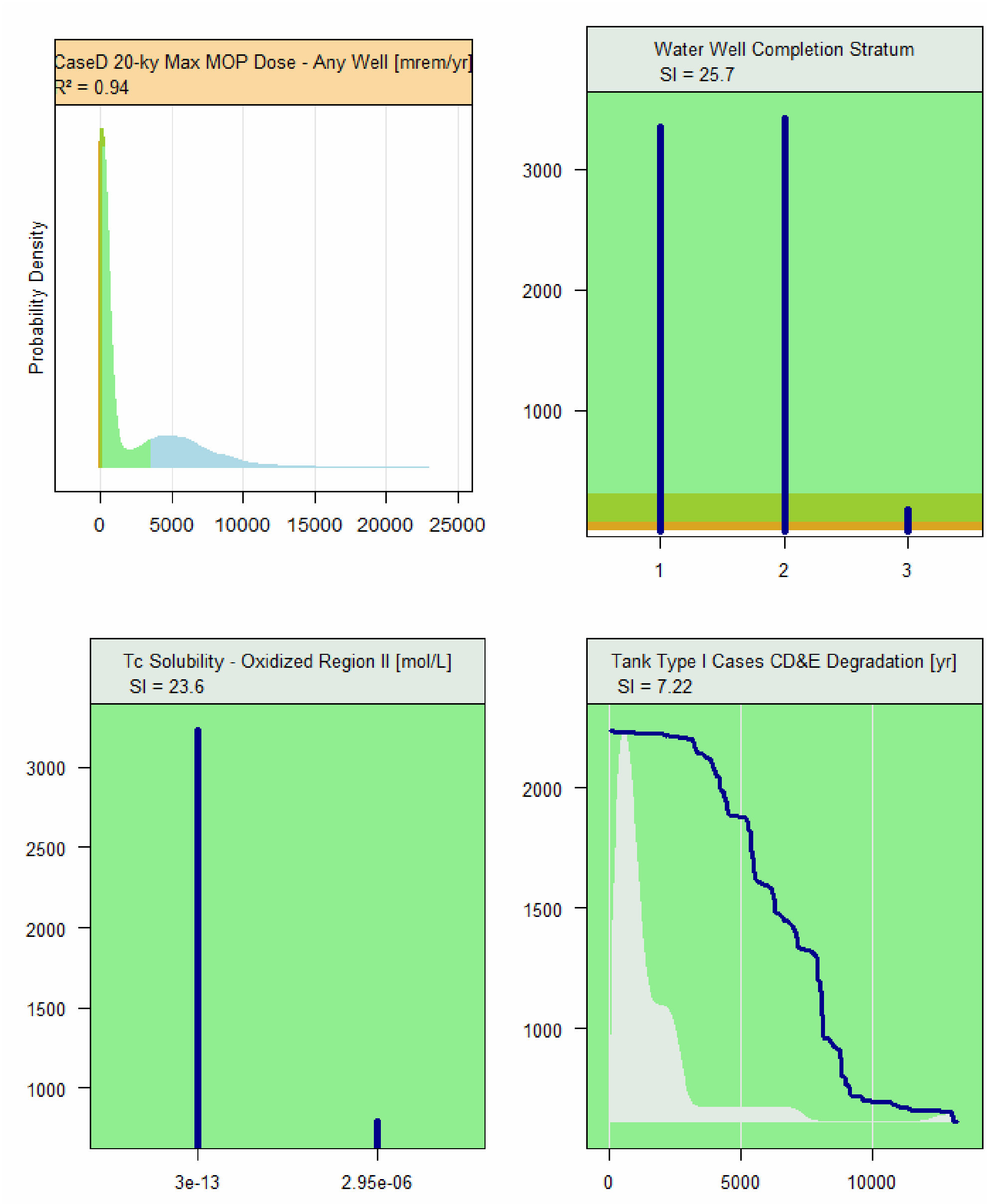
The following analyses provide the same type of information for Case D (the fast flowpath configuration) alone. The maximum MOP dose at any well within 10,000 years, assuming Case D failure mode, is dominated by a new parameter related to concrete failure, as shown in Figure 5.6-57. This is the number of pore water volumes required to convert the concrete from Oxidized Region II to Oxidized Region III (the parameter named *Flushes_2nd*). The SI is not high, however, at only about 8, and the influence is restricted to the low end of the range. The following two parameters are also not strongly sensitive: the well completion stratum selector and the solubility of plutonium in Oxidized Region II concrete.

Figure 5.6-57: Partial Dependence Plot for Maximum MOP Dose from any Well within 10,000 Years: Case D



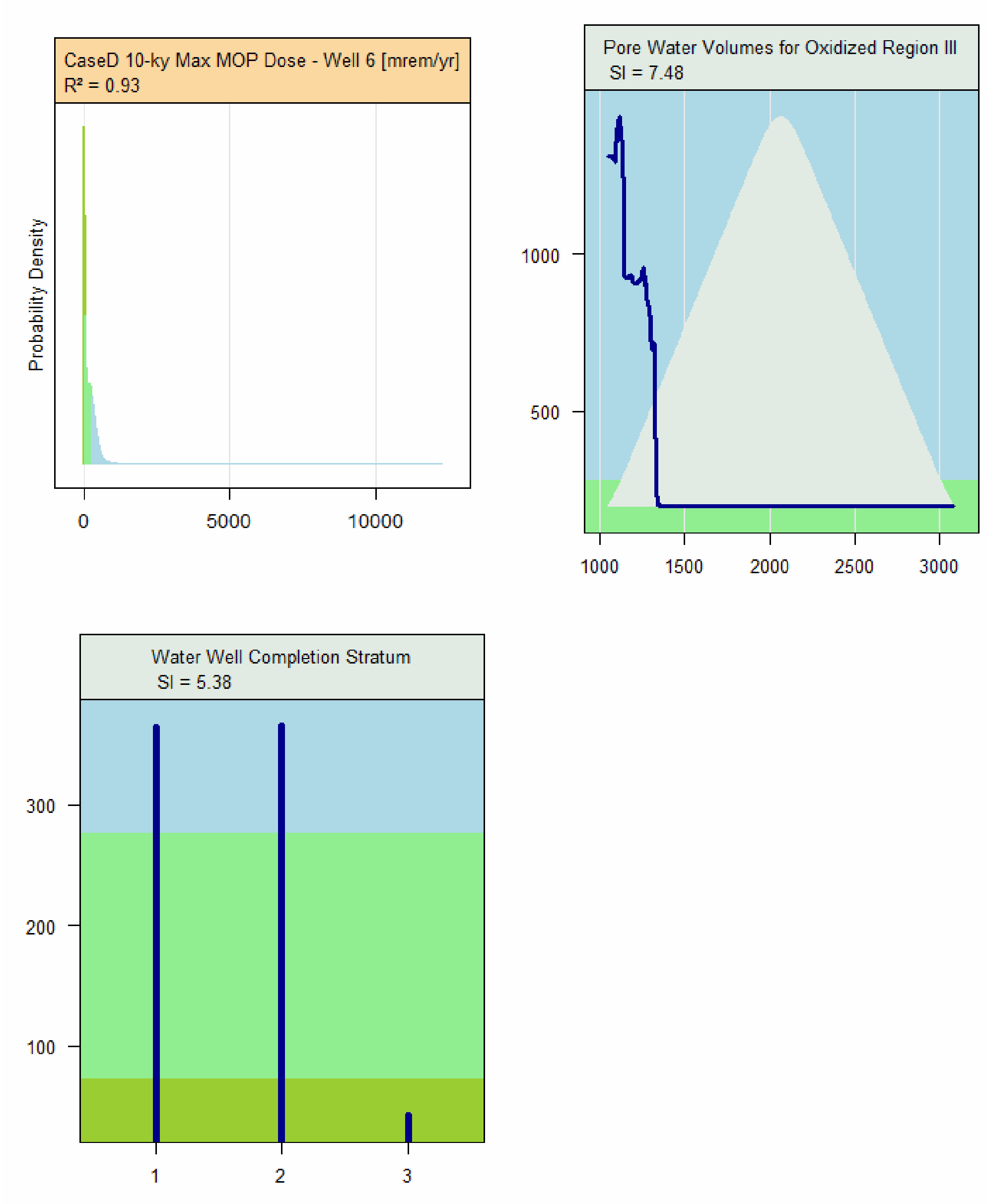
The 20,000-year maximum dose for the same situation, as shown in Figure 5.6-58, is driven primarily by the well completion stratum selector, and to a comparable extent the solubility of technetium in Oxidized Region II concrete, hinting that Tc-99 is involved in the dose. The third-ranked variable is the time of degradation for Type I Tanks, for Cases C, D, and E.

Figure 5.6-58: Partial Dependence Plot for Maximum MOP Dose from any Well within 20,000 Years: Case D



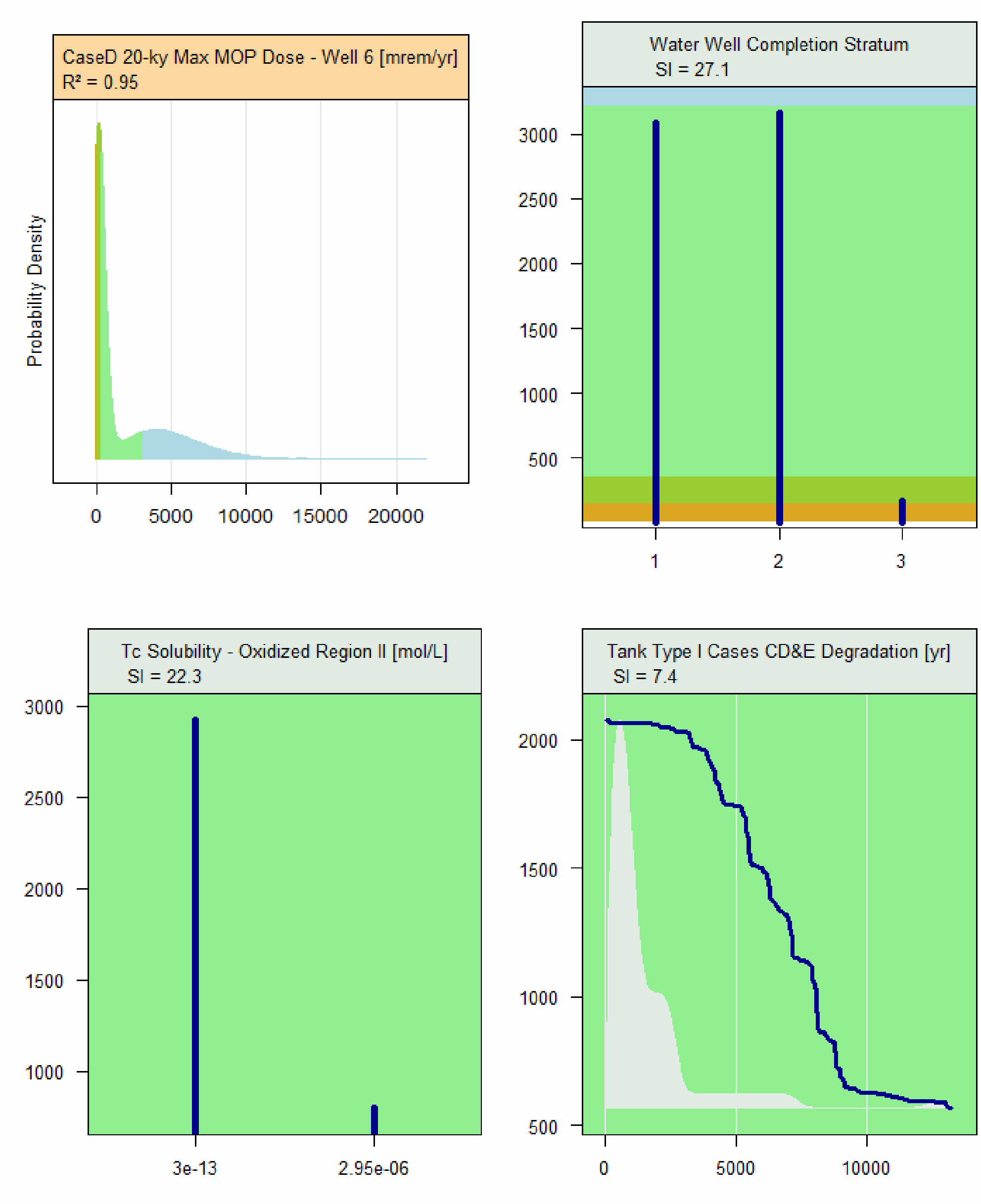
The results for the MOP dose from Well 6 within 10,000 years for Case D (Figure 5.6-59) identify the same sensitive parameters as the doses from any Well. That the same parameters are sensitive to these endpoints is to be expected, since the Well with the highest concentrations is primarily Well 6.

Figure 5.6-59: Partial Dependence Plot for Maximum MOP Dose from Well 6 within 10,000 Years: Case D



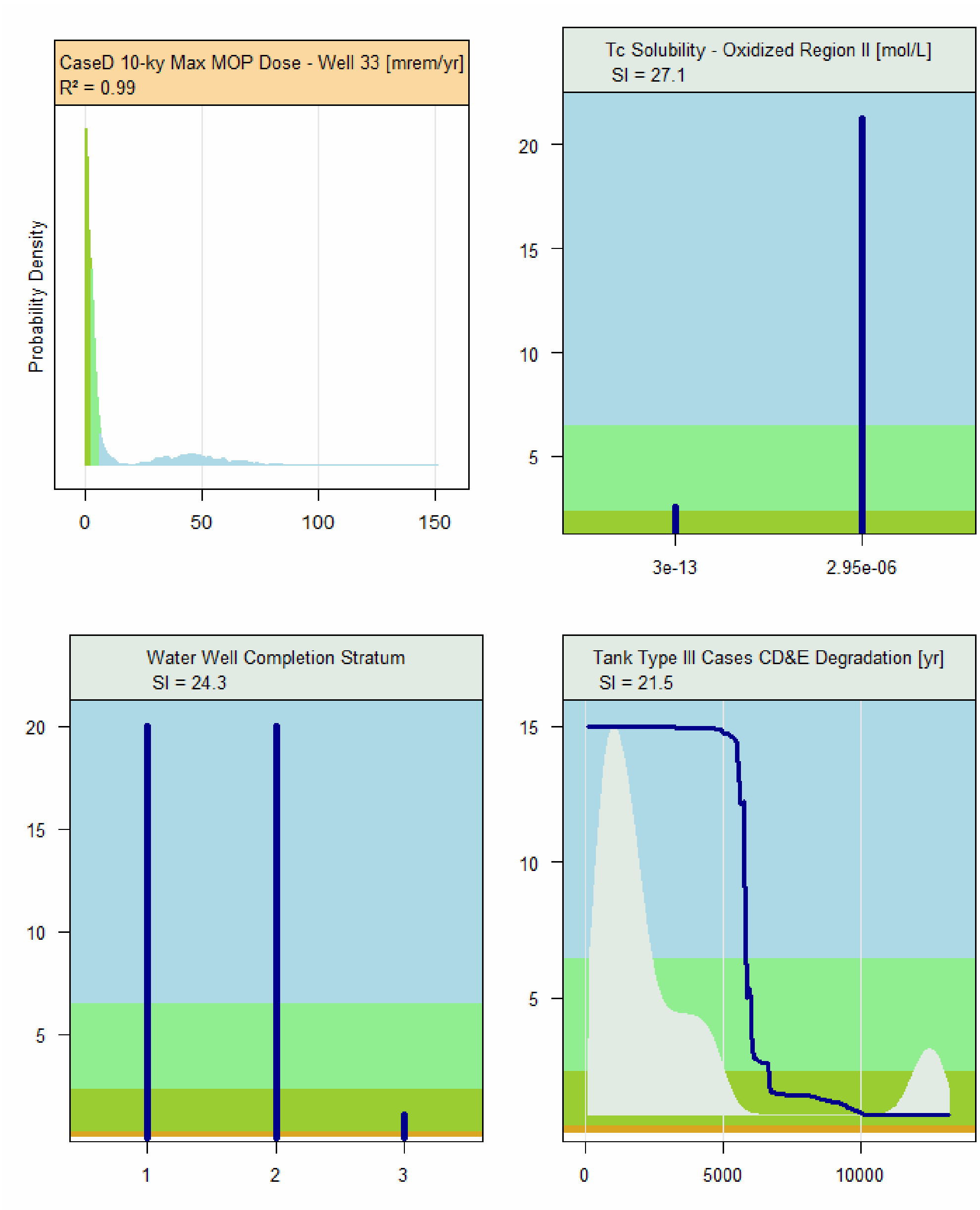
Similarly, the 20,000 year maximum dose for Case D at Well 6, shown in Figure 5.6-60, is driven by the same variables the determine the maximum at any Well. Again, this follows, since Well 6 is representative of the highest concentration of all wells.

Figure 5.6-60: Partial Dependence Plot for Maximum MOP Dose from Well 6 within 20,000 Years: Case D



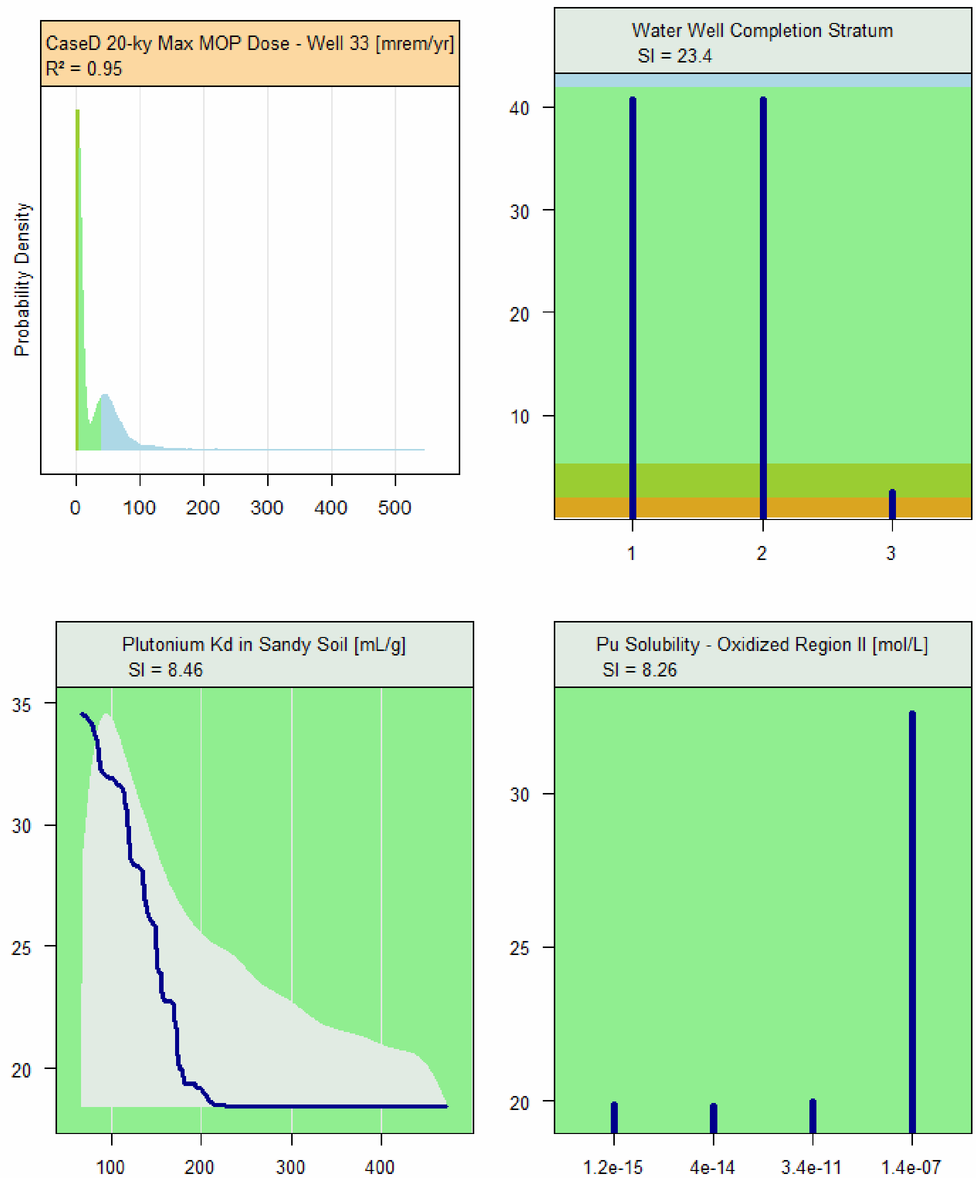
The 10,000-year maximum MOP dose at Well 33 for Case D shows similar sensitivities (Figure 5.6-61), though of course the sensitivity to failure time is for Type III tanks, which lie upstream of Well 33, rather than the Type I tanks that dominate the contributions at Well 6. Again the solubility of Tc in concretes is important, as is the well completion stratum selector.

Figure 5.6-61: Partial Dependence Plot for Maximum MOP Dose from Well 33 within 10,000 Years: Case D



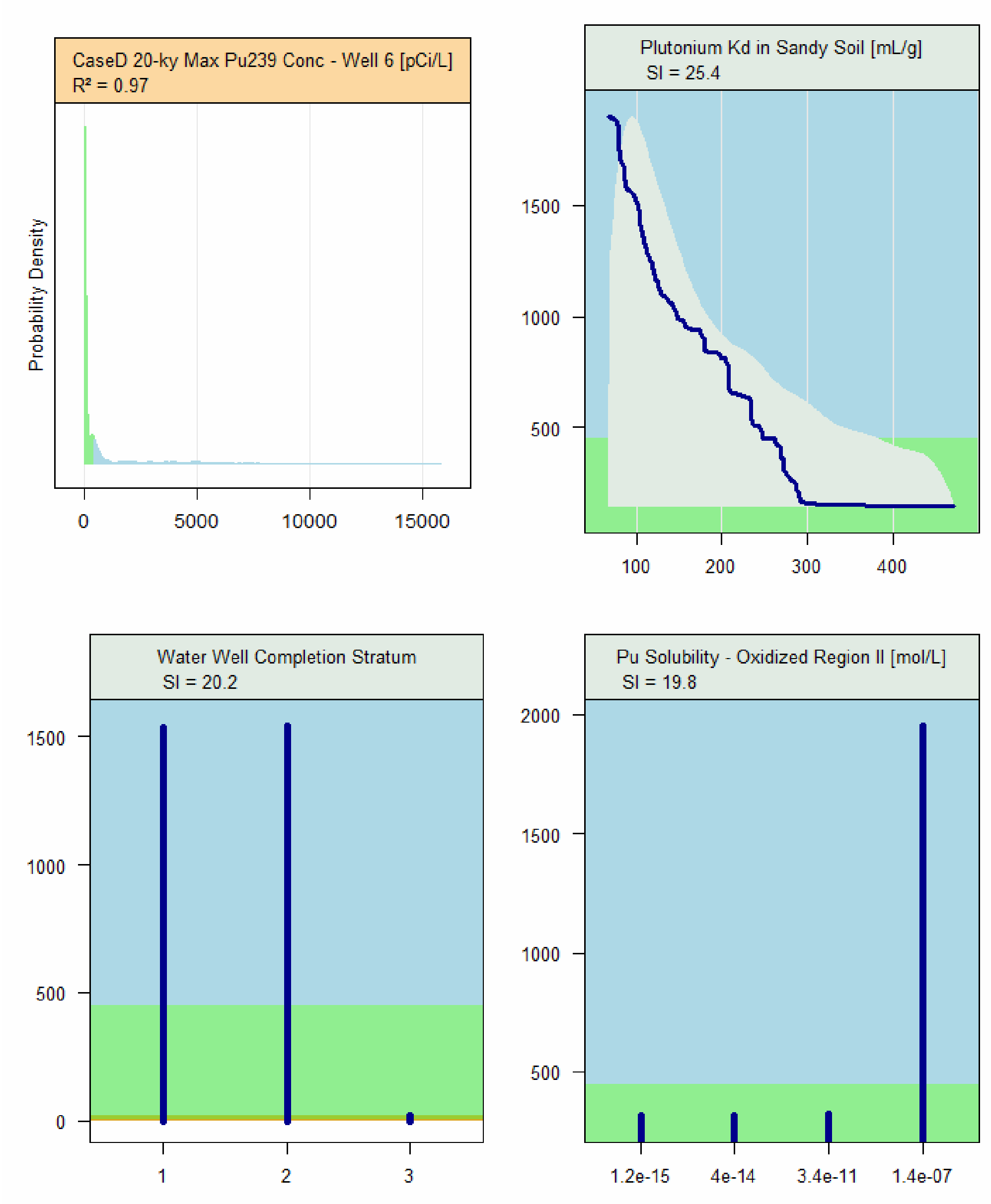
While the 10,000-year Case D MOP dose at Well 33 is dominated by Tc-99, the 20,000-year dose is dominated by Pu-239, as indicated by the parameter sensitivities identified in Figure 5.6-62. The principal determinant for this endpoint is the well completion stratum selector, but the plutonium K_d in sandy soil, and Pu solubility in concrete are also important.

Figure 5.6-62: Partial Dependence Plot for Maximum MOP Dose from Well 33 within 20,000 Years: Case D



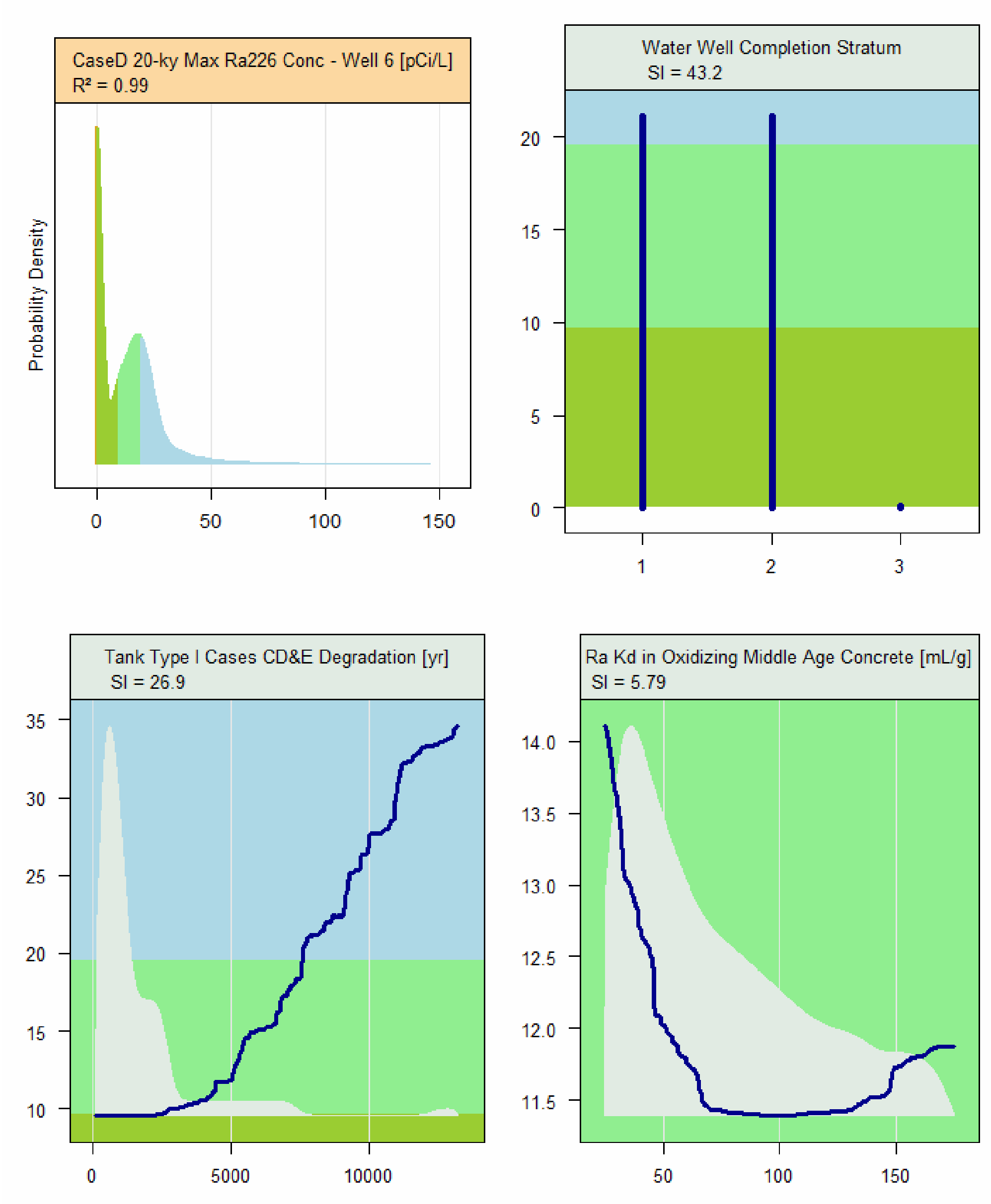
The first of the aqueous concentration analyses is focused on the 20,000-year maximum concentration of Pu-239 at Well 6, shown in Figure 5.6-63. Predictably, the geochemical parameters for sandy soil K_d and concrete solubility of plutonium play a role, as does the well completion stratum selector.

Figure 5.6-63: Partial Dependence Plot for Maximum Aqueous Concentration of Pu-239 at Well 6 within 20,000 Years: Case D



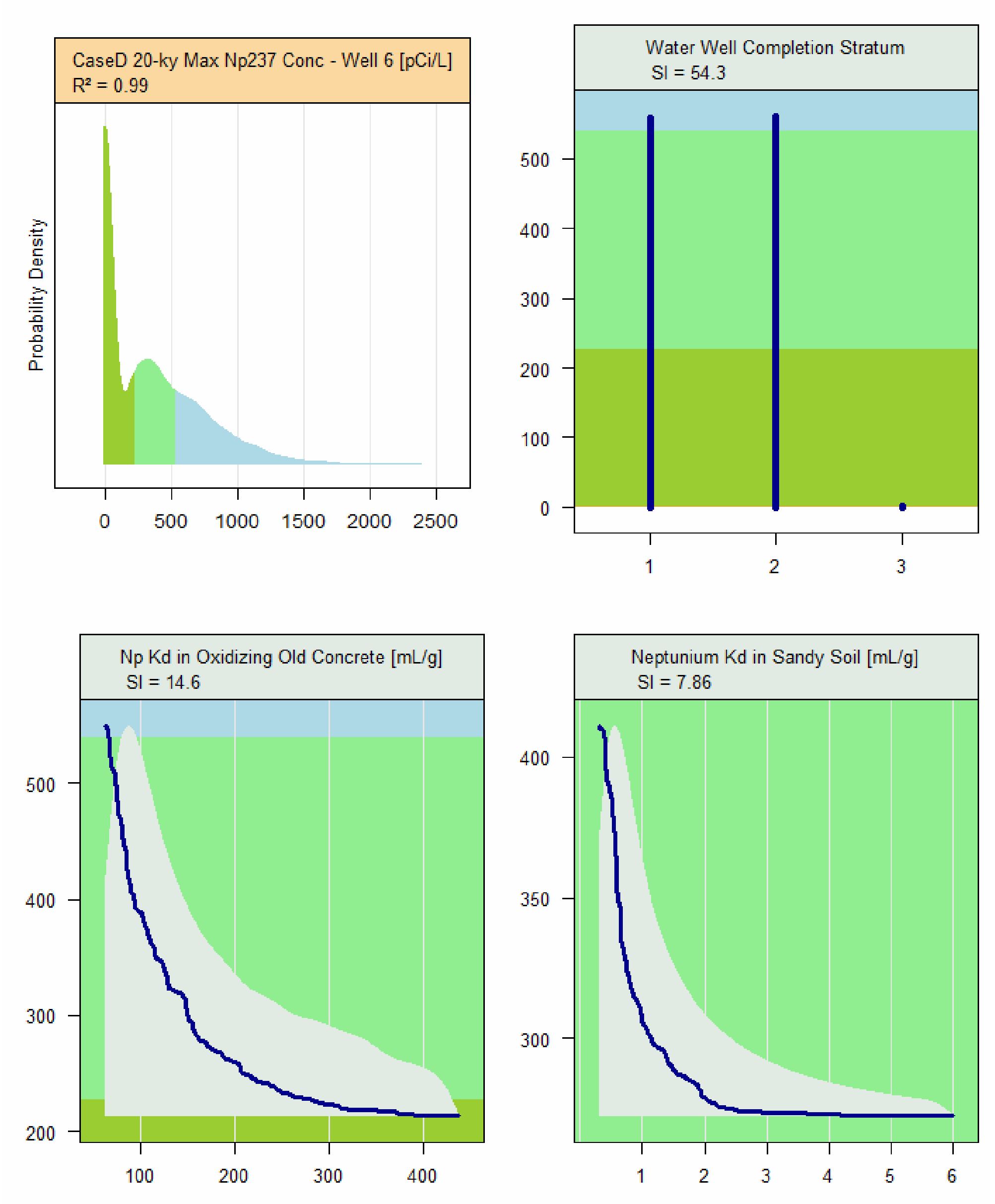
The parameters determining the maximum concentration of Ra-226 at Well 6 are shown in Figure 5.6-64. These are, in order of the value of the SI, the well completion stratum selector, the time to failure for Type I tanks for Case D, and, to a lesser extent, the radium K_d in oxidizing middle-aged concrete.

Figure 5.6-64: Partial Dependence Plot for Maximum Aqueous Concentration of Ra-226 at Well 6 within 20,000 Years: Case D



The variables influencing the maximum aqueous concentration of Np-237 at Well 6 are shown in Figure 5.6-65, which shows the overwhelmingly most important parameter is the global well completion stratum selector, with an SI value of over 54. It is followed by the geochemical parameters for neptunium: K_d in oxidizing old concrete, and K_d in sandy soil.

Figure 5.6-65: Partial Dependence Plot for Maximum Aqueous Concentration of Np-237 at Well 6 within 20,000 Years: Case D



The variables influencing the aqueous concentration of Tc-99 at Well 6 are shown in Figure 5.6-66. This figure shows that the statistical model fit is excellent, with an R^2 of 0.99. The well completion stratum tops the list of sensitive parameters for this endpoint, followed closely by the Tc solubility in Oxidized Region II concrete. The third parameter is the time of failure for Type I tanks assuming Cases C, D, or E.

Figure 5.6-66: Partial Dependence Plot for Maximum Aqueous Concentration of Tc-99 at Well 6 within 20,000 Years: Case D

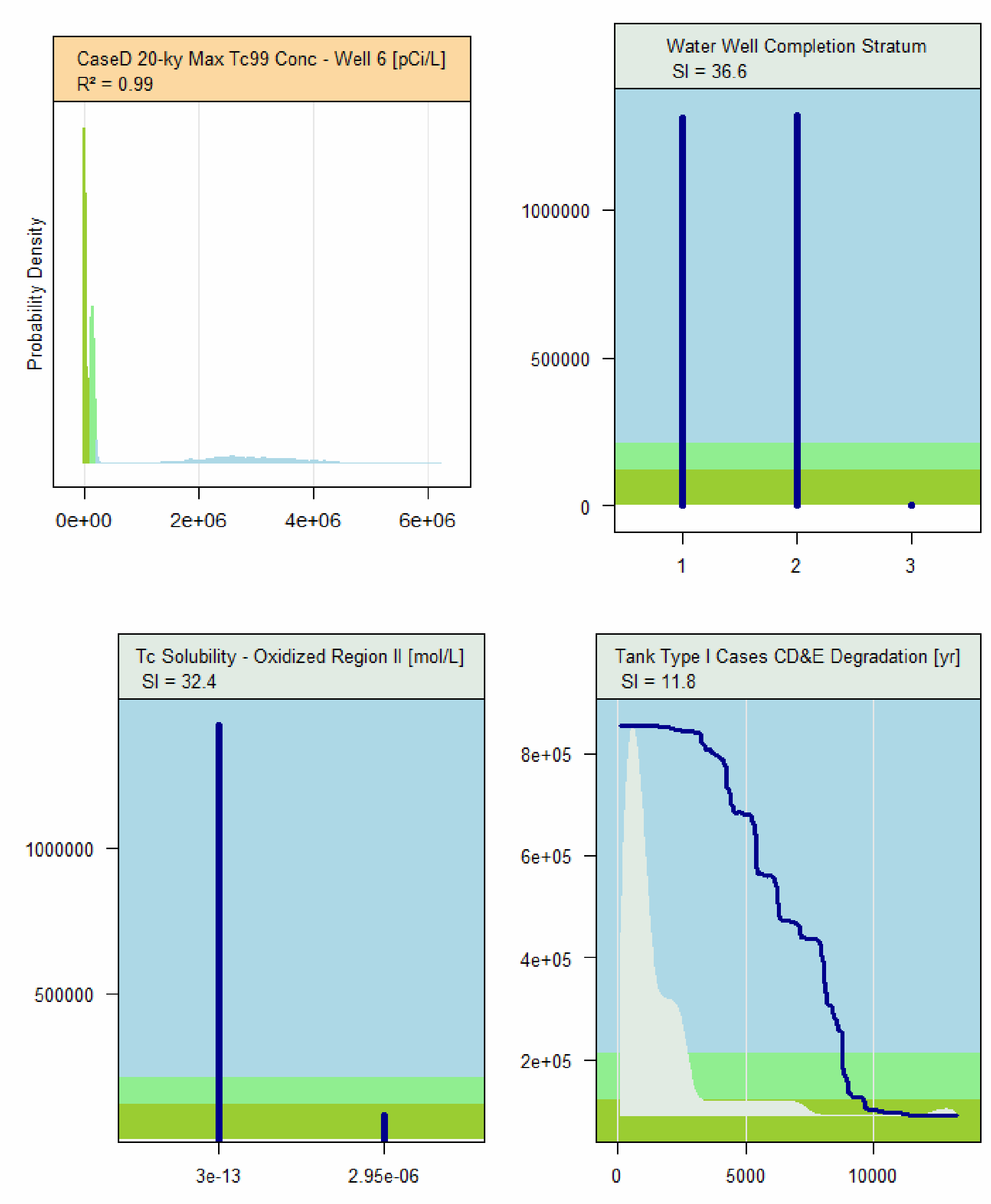
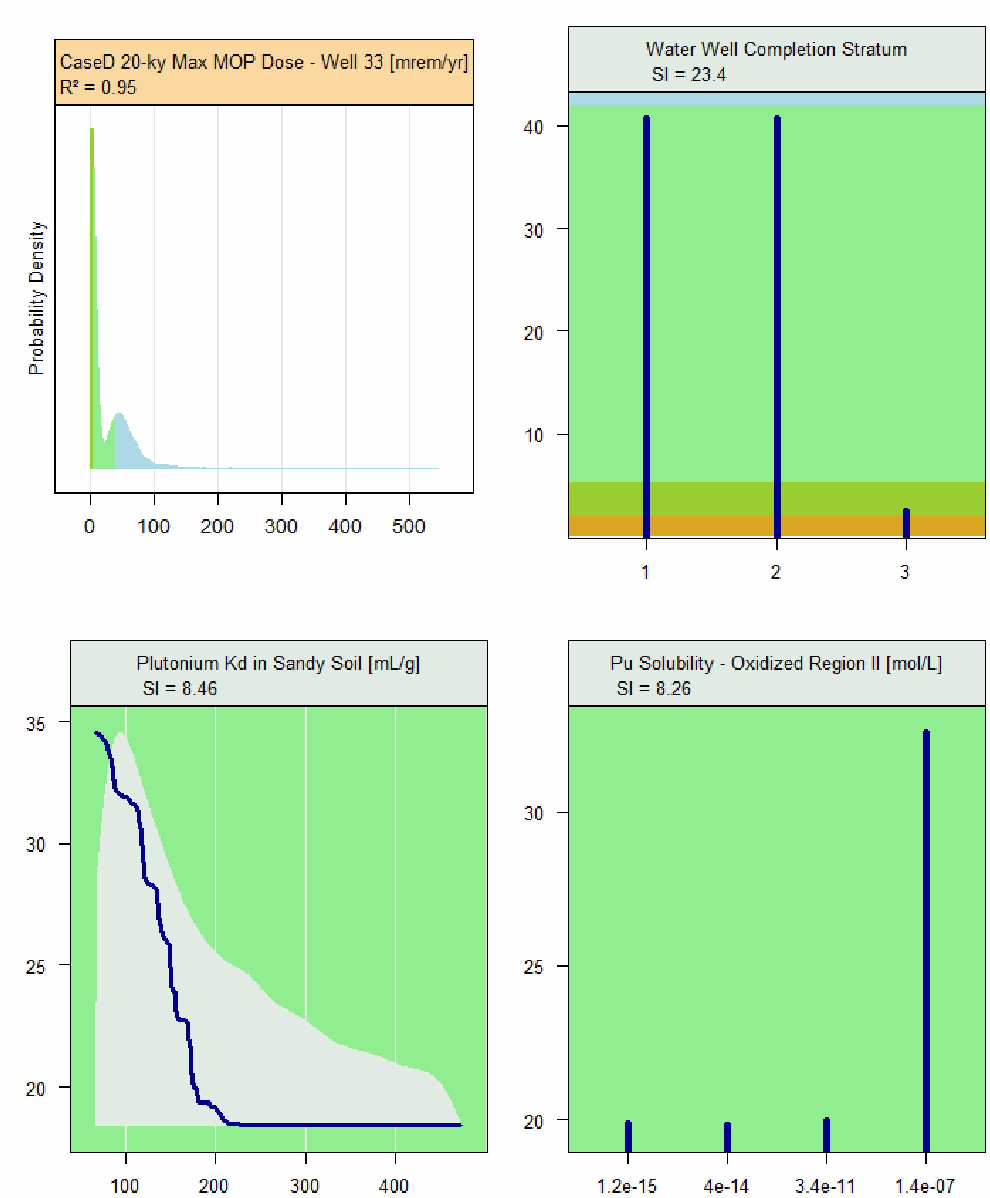


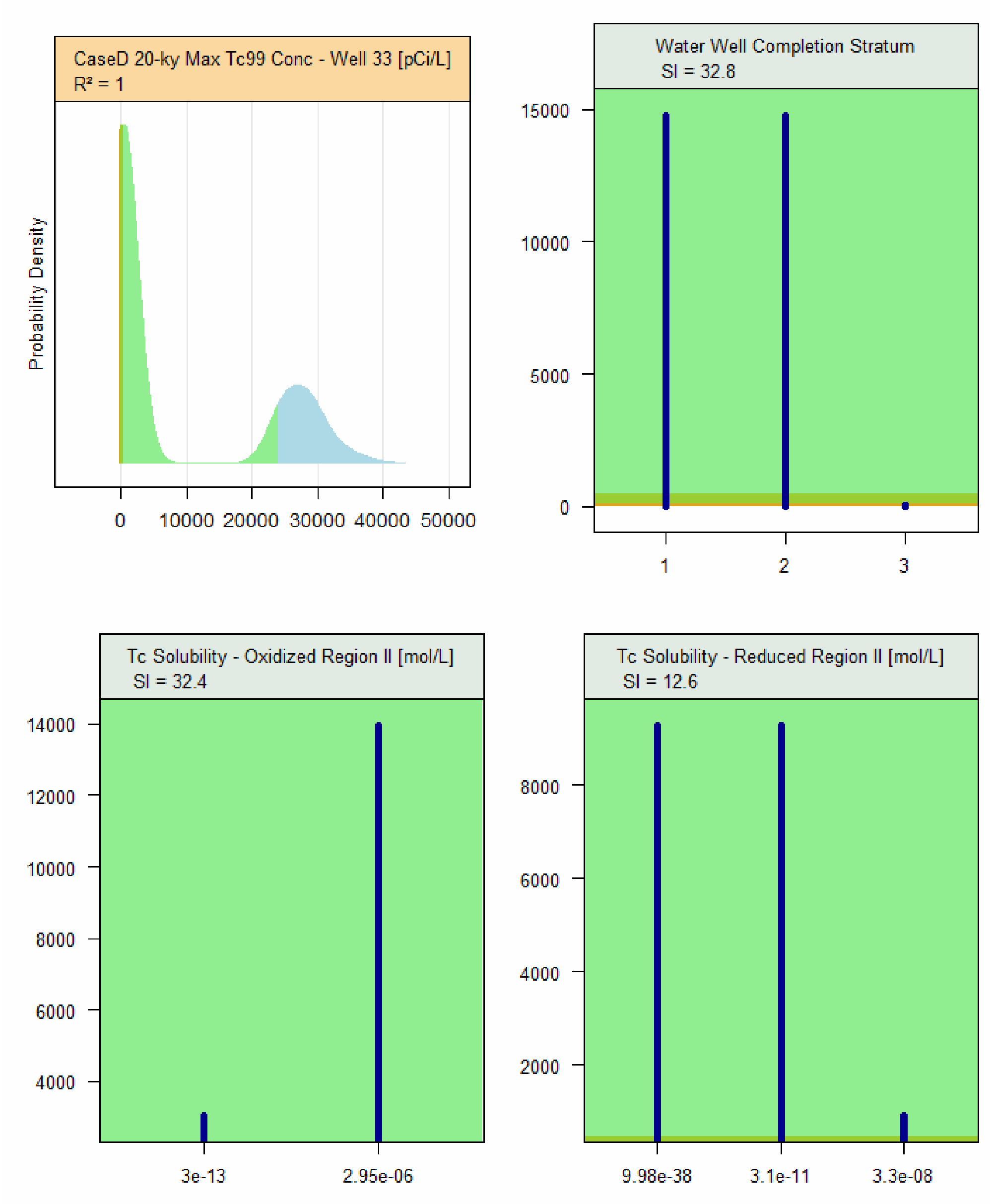
Figure 5.6-67 shows the sensitive parameters for the 20,000-year maximum aqueous concentration of Pu-239 at Well 33, which represents the southern waste tanks that contribute to groundwaters flowing to Fourmile Branch. Again, there is strong dominance by the well completion stratum selector, followed by geochemical parameters. These are of nearly equal influence, and are the K_d for plutonium in sandy soil, and the solubility in Oxidized Region II concrete.

Figure 5.6-67: Partial Dependence Plot for Maximum Aqueous Concentration of Pu-239 at Well 33 within 20,000 Years: Case D



Similar to the analogous result for Case A, the 20,000-year maximum aqueous concentration of Tc-99 at Well 33 for Case D shows a strong dependence on both the well completion stratum and the Tc solubility in Oxidized Region II concrete, as shown in Figure 5.6-68. The third-ranked sensitive parameter is again the Tc solubility in Reduced Region II concrete. The GBM fit as an R^2 of 1.

Figure 5.6-68: Partial Dependence Plot for Maximum Aqueous Concentration of Tc-99 at Well 33 within 20,000 Years: Case D



5.6.6.4 Summary of the FTF Probabilistic Model Sensitivity Analysis

The sensitivity analysis of the FTF v2.4 GoldSim Model was an improvement over the sensitivity analysis associated with the FTF v1.0 GoldSim Model. In the FTF v2.4 analysis, GBM fitting has very high R^2 values, and relationships between input variables and result endpoint variations are clearer. Several recurring themes appeared in the FTF v2.4 sensitivity analysis:

- K_d values are quite significant, both in natural and cementitious materials, for all radionuclides substantially contributing to doses.
- The well completion stratum selector appeared in the top three sensitive parameters for nearly every endpoint.
- The timing of the failure of the waste form for both Cases A and D in various tank types is also critical to determining peak concentrations and doses.
- Aqueous solubilities of important chemical elements (Pu, Tc, etc.) in cementitious materials are quite significant in determining well water concentrations and doses.

Based on the sensitivity analyses results, the parameters that are of most significance are:

1. well completion stratum,
2. Tc-99 solubility limits,
3. Pu-239 solubility limits, and
4. Pu-239 K_d values.

Additional information regarding the treatment of uncertainty with respect to well completion stratum, solubility limits and radionuclide-specific K_ds within the context of the UA/SA results (e.g., addressing the risk significance of the uncertainties) is provided in Section 5.6.3.

5.6.7 Sensitivity Analyses using the FTF Deterministic Model

The purpose of this section is to present SA performed using the FTF deterministic model. Several of the sensitivity studies investigate the impact varying a single parameter might have on the FTF deterministic model, so that the sensitivity of the models to changes in select parameters of concern might be discovered. Additional analyses were performed with the deterministic model investigating the impact of various waste tank configurations and waste release barriers.

5.6.7.1 Inventory Sensitivity Analysis using the PORFLOW Deterministic Model

The waste tank inventory sensitivity analysis results are provided in this section. Using the PORFLOW FTF Base Case presented in Section 4.4, the release rates (fluxes) for select sensitivity run radionuclides were calculated with increased and decreased inventories for Tanks 5, 6, 18 and 19. For Tanks 18 and 19. For the increased inventory cases, the inventory was increased by 1.5 times the Base Case. For the decreased inventory cases, the inventory was decreased by 0.5 times the Base Case. For Tanks 5 and 6, the low case is 0.5X the Base Case, and the high case is 1.5X the Base Case. The results of these sensitivity analyses, showing the maximum flux in 20,000 years for the Base Case and sensitivity cases are presented in Tables 5.6-16 through 5.6-19. The results show that for most of the radionuclides, the flux essentially varies linearly with inventory. The exceptions (e.g., Pu-239, Pu-240, Tc-99, and U-238) are those radionuclides that are solubility controlled through iron co-precipitation and are present in a significant enough quantity for solubility control to have an effect.

Appendix J contains data curves showing the flux (Ci/year) leaving Tanks 5, 6, 18 and 19 for the inventory sensitivity cases. The flux is provided for the select sensitivity run radionuclides.

Table 5.6-16: Tank 5 Inventory Sensitivity Results

Nuclide	Base Case PeakFlux (Ci|/yr)	Higher Inventory PeakFlux (Ci/yr)	Higher Inventory factor	Lower inventory PeakFlux (Ci/yr)	Lower Inventory Factor
C-14	8.49E-04	1.27E-03	1.50	4.24E-04	0.50
Cs-135	1.29E-03	1.93E-03	1.50	6.44E-04	0.50
I-129	6.14E-06	9.21E-06	1.50	3.07E-06	0.50
Np-237	1.75E-04	3.09E-04	1.77	5.22E-05	0.30
Pa-231	6.38E-07	9.56E-07	1.50	3.19E-07	0.50
Pu-239	1.41E-06	1.90E-06	1.35	9.20E-07	0.65
Pu-240	9.41E-07	9.60E-07	1.02	6.64E-07	0.71
Ra-226	3.67E-05	5.51E-05	1.50	1.83E-05	0.50
Tc-99	5.82E-06	5.82E-06	1.00	5.82E-06	1.00
Th-229	3.39E-06	5.14E-06	1.51	1.71E-06	0.50
U-233	5.00E-05	7.60E-05	1.52	2.48E-05	0.50
U-234	4.40E-05	6.71E-05	1.52	2.19E-05	0.50

Table 5.6-17: Tank 6 Inventory Sensitivity Results

Nuclide	Base Case PeakFlux (Ci|/yr)	Higher Inventory PeakFlux (Ci/yr)	Higher Inventory factor	Lower inventory PeakFlux (Ci/yr)	Lower Inventory Factor
C-14	8.49E-04	1.27E-03	1.50	4.24E-04	0.50
Cs-135	1.29E-03	1.93E-03	1.50	6.44E-04	0.50
I-129	6.14E-06	9.21E-06	1.50	3.07E-06	0.50
Np-237	1.75E-04	3.09E-04	1.77	5.22E-05	0.30
Pa-231	6.38E-07	9.56E-07	1.50	3.19E-07	0.50
Pu-239	1.41E-06	1.90E-06	1.35	9.20E-07	0.65
Pu-240	9.41E-07	9.60E-07	1.02	6.64E-07	0.71
Ra-226	3.67E-05	5.51E-05	1.50	1.83E-05	0.50
Tc-99	5.82E-06	5.82E-06	1.00	5.82E-06	1.00
Th-229	3.39E-06	5.14E-06	1.51	1.71E-06	0.50
U-233	5.00E-05	7.60E-05	1.52	2.48E-05	0.50
U-234	4.40E-05	6.71E-05	1.52	2.19E-05	0.50

Table 5.6-18: Tank 18 Inventory Sensitivity Results

Nuclide	Base Case PeakFlux (Ci|/yr)	Higher Inventory PeakFlux (Ci/yr)	Higher Inventory factor	Lower inventory PeakFlux (Ci/yr)	Lower Inventory Factor
C-14	1.63E-03	2.45E-03	1.50	8.15E-04	0.50
Cs-135	1.24E-03	1.86E-03	1.50	6.19E-04	0.50
I-129	3.17E-06	4.75E-06	1.50	1.58E-06	0.50
Np-237	2.42E-04	4.62E-04	1.91	2.46E-05	0.10
Pa-231	5.31E-07	7.97E-07	1.50	2.66E-07	0.50
Pu-239	7.47E-06	8.65E-06	1.16	6.29E-06	0.84
Pu-240	2.87E-05	2.87E-05	1.00	1.98E-05	0.69
Ra-226	1.25E-05	1.89E-05	1.51	6.25E-06	0.50
Tc-99	4.36E-06	4.36E-06	1.00	4.36E-06	1.00
Th-229	6.41E-05	1.15E-04	1.79	2.60E-05	0.41
U-233	2.74E-04	3.35E-04	1.22	1.95E-04	0.71
U-234	1.37E-04	1.72E-04	1.26	6.38E-05	0.47

Table 5.6-19: Tank 19 Inventory Sensitivity Results

Nuclide	Base Case PeakFlux (Ci|/yr)	Higher Inventory PeakFlux (Ci/yr)	Higher Inventory factor	Lower inventory PeakFlux (Ci/yr)	Lower Inventory Factor
C-14	1.63E-03	2.45E-03	1.50	8.15E-04	0.50
Cs-135	1.24E-03	1.86E-03	1.50	6.19E-04	0.50
I-129	3.17E-06	4.75E-06	1.50	1.58E-06	0.50
Np-237	7.13E-07	1.08E-06	1.51	3.55E-07	0.50
Pa-231	1.86E-07	2.79E-07	1.50	9.29E-08	0.50
Pu-239	7.47E-06	8.65E-06	1.16	6.29E-06	0.84
Pu-240	1.44E-05	1.45E-05	1.00	1.44E-05	1.00
Ra-226	1.47E-06	2.20E-06	1.50	7.32E-07	0.50
Tc-99	4.36E-06	4.36E-06	1.00	4.36E-06	1.00
Th-229	8.35E-06	1.20E-05	1.43	4.27E-06	0.51
U-233	5.34E-05	8.93E-05	1.67	2.52E-05	0.47
U-234	3.27E-06	4.93E-06	1.50	1.63E-06	0.50

5.6.7.2 K_d Sensitivity Analysis using the PORFLOW Deterministic Model

The purpose of this section is to present the K_d sensitivity analysis results for selected waste tanks. Using the PORFLOW FTF Base Case presented in Section 4.4, the release rates (fluxes) for Tc-99 and Pu-239 were calculated with increased and decreased K_d values assigned to the associated basemat and soil for Tanks 5, 18 and 34. These three tanks were selected for analysis because they represent one of each tank type, and therefore have different characteristics.

In addition to the Base Case K_d value, four separate PORFLOW runs were made for each nuclide (Pu-239 and Tc-99). The four cases are elevated basemat K_d, lower basemat K_d, elevated soil K_d, and lower soil K_d. The soil and basemat K_d values were varied according to their Base Case value. If the K_d value is greater than or equal to 1,000, then the lower bound is five times less and the upper bound five times greater, and if the K_d value is less than

1,000, then the lower bound is two times less, and the upper bound is two times higher. The results of the K_d sensitivity runs, showing the maximum flux in 20,000 years for the Base Case, and four different cases, are presented in Tables 5.6-20 and 5.6-21 (the four cases are identified in the tables as: CaseA_*, where * represents "base_high", "base_low", "soil_high", "soil_low"). The soil K_d change was for the sandy soil, which includes the area below the tank and much of the aquifer. The results show that the Tc-99 flux is relatively unaffected by K_d changes (since Tc-99 K_d is already very low), while the Pu-239 flux can be significantly impacted, especially when the material layer is thick (e.g., the Type III and Type I basemats).

Appendix I contains data curves showing the flux (Ci/year) leaving Tanks 5, 18, and 34 for the K_d sensitivity cases. The flux is provided for the Tc-99 and Pu-239.

Table 5.6-20: Tc-99 K_d Sensitivity Results

Nuclide	Case	Tank	Peak Flux (Ci/yr)	Ratio to Base Case
Tc-99	CaseA	Tank05	5.82E-06	N/A
Tc-99	CaseA_base_high	Tank05	5.82E-06	1.00
Tc-99	CaseA_base_low	Tank05	5.82E-06	1.00
Tc-99	CaseA_soil_high	Tank05	5.82E-06	1.00
Tc-99	CaseA_soil_low	Tank05	5.82E-06	1.00
Tc-99	CaseA	Tank34	8.29E-06	N/A
Tc-99	CaseA_base_high	Tank34	9.03E-05	1.08
Tc-99	CaseA_base_low	Tank34	7.88E-06	0.95
Tc-99	CaseA_soil_high	Tank34	7.98E-06	0.96
Tc-99	CaseA_soil_low	Tank34	8.64E-06	1.04
Tc-99	CaseA	Tank18	4.36E-06	N/A
Tc-99	CaseA_base_high	Tank18	4.36E-06	1.00
Tc-99	CaseA_base_low	Tank18	4.36E-06	1.00
Tc-99	CaseA_soil_high	Tank18	4.36E-06	1.00
Tc-99	CaseA_soil_low	Tank18	4.36E-06	1.00

Table 5.6-21: Pu-239 K_d Sensitivity Results

Nuclide	Case	Tank	Peak Flux (Ci/yr)	Ratio to Base Case
Pu-239	CaseA	Tank05	2.17E-07	N/A
Pu-239	CaseA_base_high	Tank05	2.43E-12	1.12E-05
Pu-239	CaseA_base_low	Tank05	3.10E-06	14.33
Pu-239	CaseA_soil_high	Tank05	3.44E-09	1.59E-02
Pu-239	CaseA_soil_low	Tank05	1.55E-06	7.14
Pu-239	CaseA	Tank34	9.47E-12	N/A
Pu-239	CaseA_base_high	Tank34	2.46E-22	2.60E-11
Pu-239	CaseA_base_low	Tank34	1.98E-07	2.09E+04
Pu-239	CaseA_soil_high	Tank34	2.18E-15	2.30E-04
Pu-239	CaseA_soil_low	Tank34	4.20E-09	4.44E+02
Pu-239	CaseA	Tank18	5.11E-06	N/A
Pu-239	CaseA_base_high	Tank18	1.93E-06	0.38
Pu-239	CaseA_base_low	Tank18	5.09E-06	1.00
Pu-239	CaseA_soil_high	Tank18	4.40E-06	0.86
Pu-239	CaseA_soil_low	Tank18	4.95E-06	0.97

5.6.7.3 Barrier Analyses using the PORFLOW Deterministic Model

The purpose of this section is to provide a comprehensive barrier analyses that identifies barriers to waste migration and evaluates the capabilities of each barrier as understood from the results of the PA. The barrier analyses will assess the contribution of individual barriers (e.g., closure cap, grout, CZ, waste tank liner, and waste tank concrete) by comparing contaminant flux results under various barrier conditions. The barrier analyses will assess how flux results change with an individual barrier either intact or degraded, assuming the contribution of the other barriers has been minimized to the extent possible. Flux results assuming all barriers intact and assuming all barriers degraded will also be presented as a benchmark for the individual barrier evaluations. The insights from the barrier analyses will be discussed in more detail in Section 7.0 (Interpretation of Results).

5.6.7.3.1 Barrier Analyses Scope

The barrier analysis was carried out for three waste tanks (Tanks 5, 18, and 33, one of each tank type) using the PORFLOW model. Eight different radionuclides were evaluated (Tc-99, Ra-226, Np-237, Pu-239, Th-230, U-233, U-234, and Am-241) using the waste tank inventories associated with the Base Case. The eight radionuclides chosen for analysis were the radionuclides with the most impact on dose and also possessed differing transport characteristics (e.g., K_d values, solubility limits). The analysis point for each barrier was the radionuclide flux entering the water table.

The fifteen cases considered in the barrier analyses are detailed in Table 5.6-22 and Table 5.6-23. Table 5.6-22 identifies the barrier analyses results for the five PORFLOW material zones that were varied (closure cap, waste tank concrete [existing basemat, wall, and roof], waste tank liner, closure grout, and CZ). Table 5.6-22 also describes the

Nominal (N), Partially Degraded (P), and Fully Degraded (F) condition for each material zone. Table 5.6-23 lists the modeling approach utilized for each of the material zones for each of the fifteen cases. The barrier analyses include the PORFLOW Base Case (Case 1) which uses the nominal barrier properties and a Degraded Case (Case 2) where every zone other than the CZ is modeled as fully degraded. There are also specific cases associated with each material zone to evaluate the capabilities of each barrier by holding other material zones conditions constant while varying the condition of the zone being assessed. Information regarding the material zones varied for the various barriers is provided in Sections 4.2.2 and 4.2.3.

Table 5.6-22: Barrier Analyses Variability

Material Zone	N (Nominal)	P (Partially Degraded/ Fast Flow)	F (Failed/Fully Degraded)
Closure Cap	Closure Cap Flow profile per Base Case	Closure Cap flow constant at 11.67 in/yr	Closure Cap flow constant at 16.45 in/yr
Grout	Hydraulic properties (e.g., failure date) and chemical properties unchanged per Base Case	Hydraulic properties (e.g., failure date) and chemical properties unchanged per Base Case. A channel with no flow impedance exists through grout, such that grout does not impart any reducing capacity onto CZ.	Hydraulic properties of failed grout at time 0 – chemical properties unchanged. High flow throughout grout causes grout to impart reducing capacity onto CZ.
Contamination Zone	CZ initial solubility limits are those associated with Base Case	CZ initial solubility limits are those associated with Oxidized Region II. Transition to Region III per Base Case (2,063 pore volumes)	CZ initial solubility limits are those associated with Oxidized Region III
Liner	Later liner failure (based on grouted diffusion coefficient of E-6)	Early liner failure (based on grouted diffusion coefficient of E-4)	No Liner at time 0
Tank Concrete (Basemat, Wall, Roof)	Initial hydraulic properties (e.g., failure date) and initial chemical properties unchanged per Base Case. Transition to Region III per Base Case	Initial hydraulic properties (e.g., failure date) and initial chemical properties unchanged per Base Case, but channel with no flow impedance exists through roof and basemat). Transition to Region III per Base Case	Hydraulic properties of failed concrete – initial chemical properties unchanged. Transition to Region III per Base Case

Table 5.6-23: FTF Conceptual Model – Barrier Analyses Cases

	BC	DC	Cap		Tank Concrete		Liner			Grout		CZ			
Case / **Material Zone**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Closure Cap	N	F	N	P	F	F	F	F	N	F	F	F	F	N	N
Grout	N	F	F	F	F	F	F	F	N	N	P	F	F	N	N
Contamination Zone	N	N	N	N	N	N	N	N	N	N	N	F	P	P	F
Liner	N	F	F	F	F	F	N	P	P	F	F	F	F	N	N
Concrete (basemat, wall, roof)	N	F	F	F	N	P	F	F	N	F	F	F	F	N	N

BC = Base Case, DC=Degraded Case, N=Nominal, P=Partially Degraded/Fast Flow, F=Failed/Fully Degraded.

5.6.7.3.2 Barrier Analyses Transition Times

The release of contaminants from the CZ is controlled by solubility which is affected by the chemistry of the pore fluid that travels through the CZ as described in Section 4.2.3. The pore fluid in the CZ enters into the CZ from the grout above the CZ and, depending on the cases analyzed, from fast flow paths through the grout. The contaminants that are released from the CZ travel through the waste tank basemat which delays their travel based on the K_d value, which is also dependent on the chemistry of the pore fluid that travels through the basemat. Therefore the various barrier cases will influence the times that the cementitious barriers (grout, CZ, and waste tank basemat) transition from one chemical state to another. Figures 5.6-69 through 5.6-77 illustrate the transition times for the cementitious barriers for the three tank types analyzed.

Figure 5.6-69: Transition Times for Closure Grout in Type I Tanks

Figure 5.6-70: Transition Times for CZ in Type I Tanks

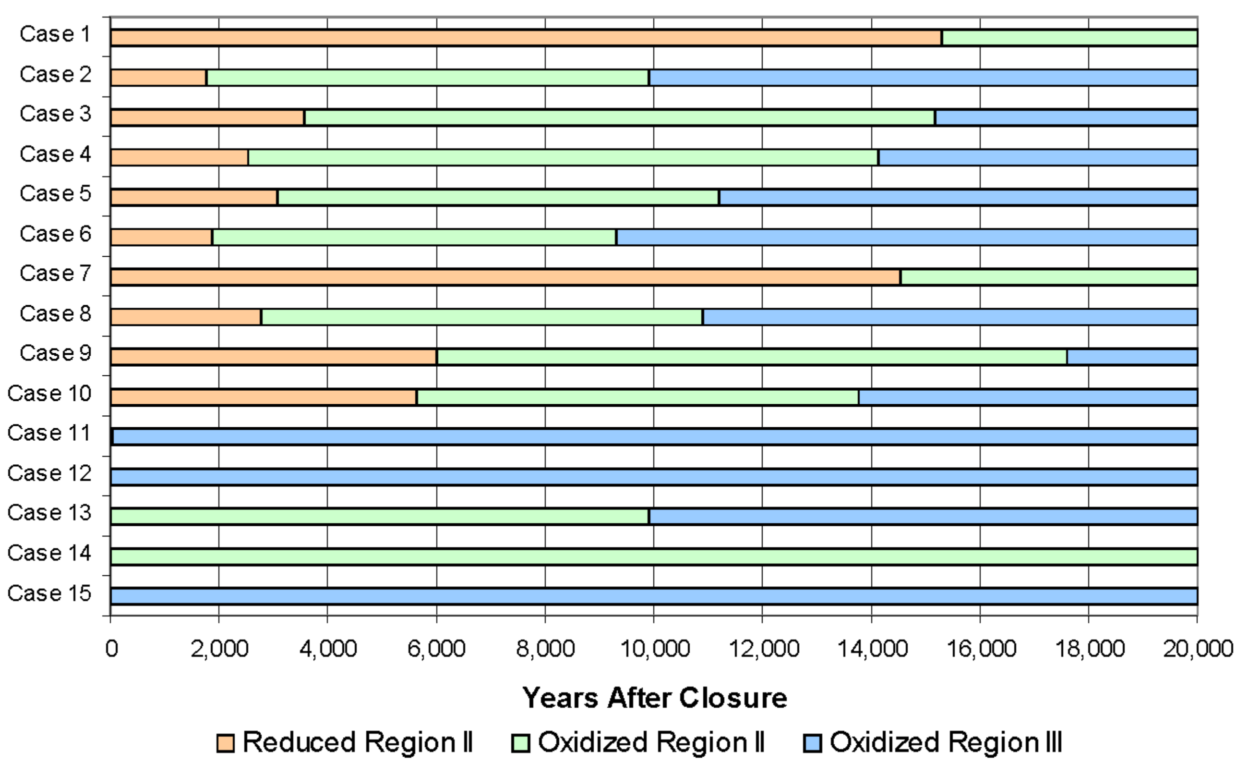


Figure 5.6-71: Transition Times for Basemat in Type I Tanks

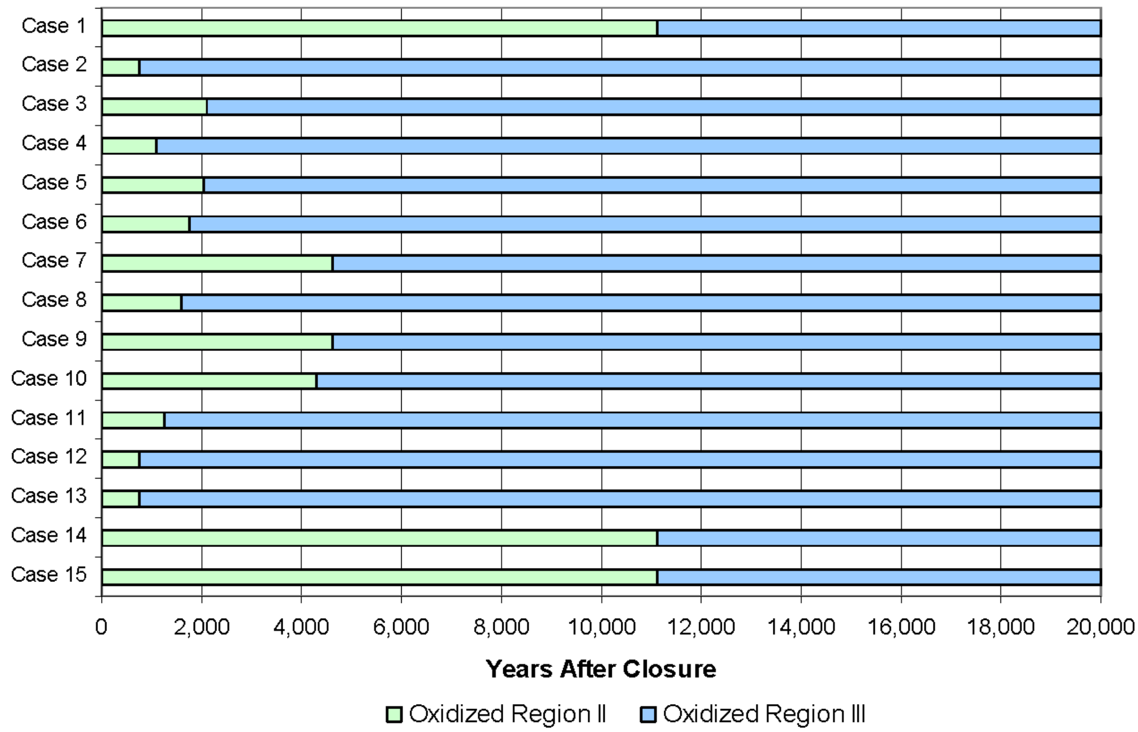


Figure 5.6-72: Transition Times for Closure Grout in Type III Tanks

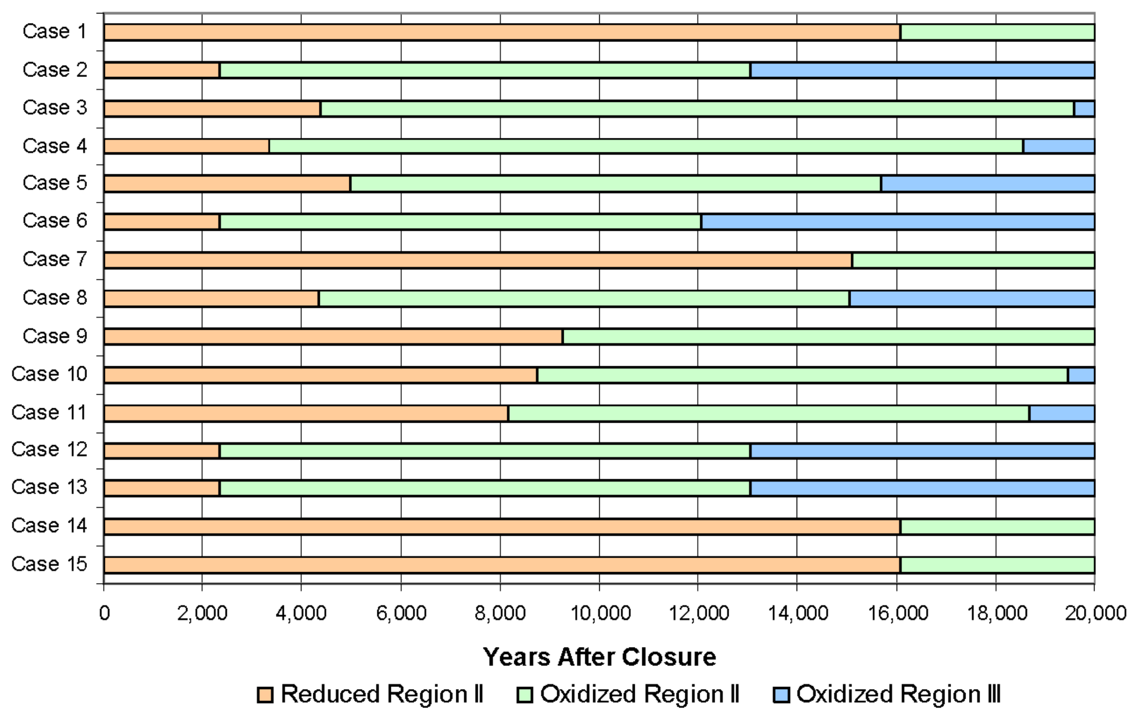


Figure 5.6-73: Transition Times for CZ in Type III Tanks

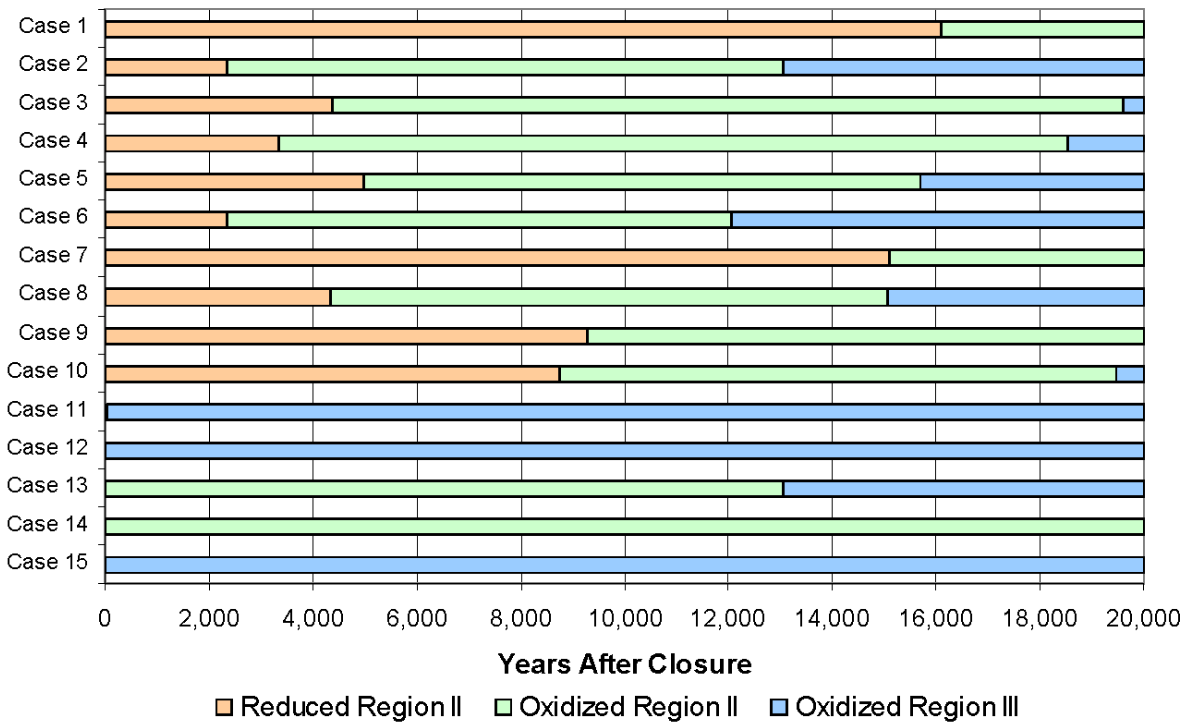


Figure 5.6-74: Transition Times for Basemat in Type III Tanks

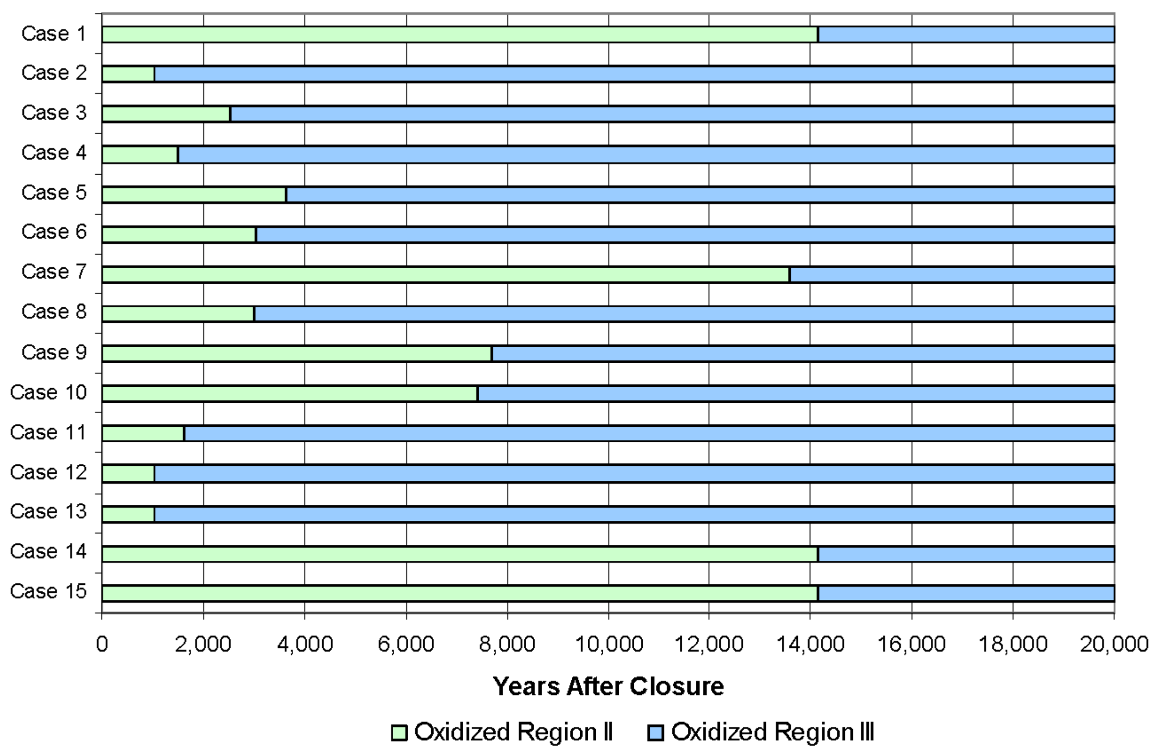


Figure 5.6-75: Transition Times for Closure Grout in Type IV Tanks

Figure 5.6-76: Transition Times for CZ in Type IV Tanks

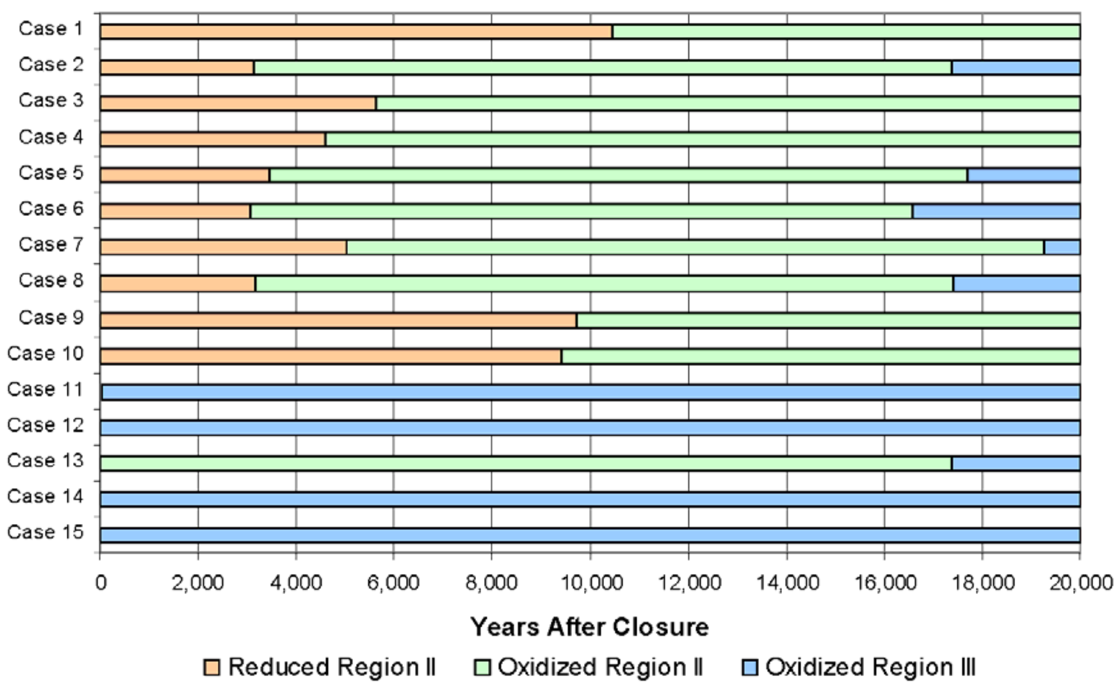
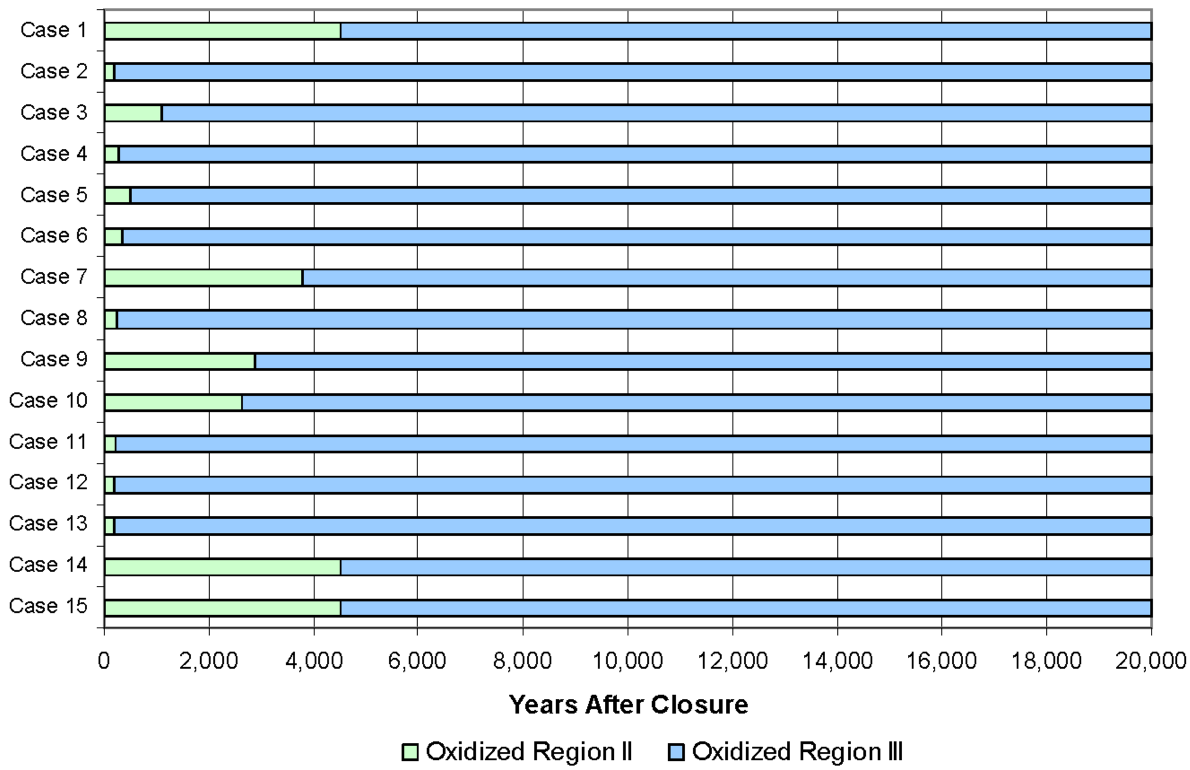


Figure 5.6-77: Transition Times for Basemat in Type IV Tanks



5.6.7.3.3 Summary of Results by Radionuclide

In order to assess the results from the barrier analysis, the fluxes at the water table for each barrier case are compared to the peak flux within the first 10,000 years after closure for the Base Case and the Degraded Case. The comparison to the 10,000 year peak flux illustrates that the barrier analyzed may have an impact on the arrival time of the peak flux as well as the magnitude of the peak flux. Each radionuclide analyzed is evaluated separately to gauge the importance of the barrier for each radionuclide. Within each of the following radionuclide sections, a specific radionuclide is evaluated and three tables are presented, one for each of the three waste tanks analyzed (Tank 18, Tank 5 and Tank 33, [one of each type]). Reference Table 5.6-23 for the definition of each Case presented in Tables 5.6-24 through 5.6-44. Each table provides the peak flux at the aquifer below the respective tank and the time of the peak flux for the various barrier cases within the compliance period (10,000 years after FTF closure). Also shown in each table is the ratio of the peak flux for each barrier case to the peak flux for the Base Case (Case 1) and the Degraded Case (Case 2) within 10,000 years. These tables illustrate that the degradation of the barriers impact both the magnitude and the timing of the peak flux. The importance of the barrier within the compliance period is determined by noting the timing of the peak flux and the ratios of the peak fluxes to the Base Case flux and the Degraded Case flux. Appendix K of this document contains the data curves showing the flux at the water table for the fifteen different barrier analyses cases.

In the following tables very large values may be shown for Tanks 5 and 33 for the ratio of the peak flux for the individual barrier cases to the peak flux for the Base Case. These large values are a result of the Base Case timing of the liner failure for the Type I tanks (Tank 5) and the Type III tanks (Tank 33), and occurs beyond the 10,000 year compliance period.

<u>Tc-99 Analysis</u>

Table 5.6-24: Tc-99 Flux within 10,000 Years from Tank 18

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case A
Case 1	9,603	4.17E-06	N/A	N/A
Case 12	3	1.71E-01	1.86E+04	4.11E+04
Case 11	36	3.88E-02	4.22E+03	9.29E+03
Case 15	4,536	1.66E-04	1.80E+01	3.97E+01
Case 5	512	9.59E-06	1.04E+00	2.30E+00
Case 2	203	9.20E-06	1.00E+00	2.20E+00
Case 8	252	9.20E-06	1.00E+00	2.20E+00
Case 7	3,803	9.20E-06	1.00E+00	2.20E+00
Case 6	501	9.11E-06	9.91E-01	2.18E+00
Case 4	301	6.24E-06	6.78E-01	1.49E+00
Case 3	5,601	5.75E-06	6.25E-01	1.38E+00
Case 9	9,603	4.17E-06	4.54E-01	1.00E+00
Case 10	9,392	4.15E-06	4.51E-01	9.95E-01
Case 13	203	8.90E-08	9.68E-03	2.13E-02
Case 14	9,605	4.04E-08	4.39E-03	9.68E-03

Tc-99 Tank 18 Insights:

1. Lack of solubility controls caused by the CZ initially in Oxidized Region III (Case 12) has an appreciable impact on the magnitude and the timing of the peak flux.
2. A fast flow path through the tank grout has a significant impact on the solubility control in the CZ (Case 11) which significantly impacts the magnitude and the timing of the peak flux.
3. Lack of solubility controls caused by the CZ initially in Oxidized Region III (Case 15) has a greater impact on the release of Tc-99 than the degradation of the remaining barriers (Case 2).
4. The condition of the tank concrete - intact (Case 5) or a fast flow path (Case 6) slightly retards the movement of Tc-99 from the fully degraded concrete case (Case 2) but has no appreciable impact on the magnitude of the peak flux.
5. The timing of the tank liner failure (Cases 7 and 8) only impacts the timing of the peak flux and not its magnitude.

Table 5.6-25: Tc-99 Flux within 10,000 Years from Tank 5

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	10,000	3.78E-14	N/A	N/A
Case 6	9,312	6.20E+00	1.01E+00	1.64E+14
Case 2	9,915	6.16E+00	1.00E+00	1.63E+14
Case 13	9,915	6.16E+00	1.00E+00	1.63E+14
Case 12	15	3.68E+00	5.98E-01	9.74E+13
Case 11	51	6.83E-01	1.11E-01	1.80E+13
Case 5	2,047	9.51E-06	1.54E-06	2.51E+08
Case 8	1,611	9.32E-06	1.51E-06	2.46E+08
Case 10	5,030	7.40E-06	1.20E-06	1.95E+08
Case 4	1,126	6.46E-06	1.05E-06	1.71E+08
Case 9	4,628	6.10E-06	9.90E-07	1.61E+08
Case 3	2,122	5.86E-06	9.51E-07	1.55E+08
Case 15	10,000	1.31E-09	2.12E-10	3.45E+04
Case 7	10,000	4.43E-14	7.19E-15	1.17E+00
Case 14	10,000	3.66E-16	5.94E-17	9.68E-03

Tc-99 Tank 5 Insights:

1. Fully degraded tank concrete has similar results (with respect to the magnitude and the timing of the peak flux) as a fast flow path through the tank concrete (Cases 2 and 6)
2. Assuming that the CZ is initially in Oxidized Region II (Case 13) rather than Reduced Region II (Case 2) has no impact on the results of Case 2.
3. Lack of solubility controls caused by the CZ initially in Oxidized Region III (Case 12) does not appreciably impact the magnitude of the peak flux associated with Case 2, but it has a significant impact on the timing of the peak flux.
4. A fast flow path through the tank grout (Case 11) has a significant impact on the solubility control in the CZ which impacts the timing of the peak flux.

Table 5.6-26: Tc-99 Flux within 10,000 Years from Tank 33

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	10,000	5.13E-12	N/A	N/A
Case 12	23	2.84E-01	2.37E+04	5.53E+10
Case 11	8,201	5.58E-02	4.66E+03	1.09E+10
Case 5	3,643	1.23E-05	1.03E+00	2.40E+06
Case 2	1,062	1.20E-05	1.00E+00	2.33E+06
Case 8	3,031	1.20E-05	1.00E+00	2.33E+06
Case 10	8,051	8.66E-06	7.24E-01	1.69E+06
Case 4	1,540	8.31E-06	6.94E-01	1.62E+06
Case 3	2,559	8.04E-06	6.72E-01	1.57E+06
Case 6	904	7.86E-06	6.57E-01	1.53E+06
Case 9	8,053	7.51E-06	6.28E-01	1.47E+06
Case 13	1,062	1.16E-07	9.68E-03	2.26E+04
Case 15	10,000	4.22E-09	3.53E-04	8.24E+02
Case 7	10,000	5.22E-12	4.37E-07	1.02E+00
Case 14	10,000	4.96E-14	4.15E-09	9.68E-03

Tc-99 Tank 33 Insights:

1. Lack of solubility controls caused by the CZ initially in Oxidized Region III (Case 12) has an appreciable impact on the magnitude and the timing of the peak flux.
2. A fast flow path through the tank grout has a significant impact on the solubility control in the CZ (Case 11) which significantly impacts the magnitude and the timing of the peak flux.
3. Intact tank concrete (Case 5) delays the movement of Tc-99 from the fully degraded concrete case (Case 2) but has no appreciable impact on the magnitude of the peak flux.
4. Early tank liner failure (Case 8) delays the movement of Tc-99 from the degraded case with no tank liner (Case 2) but has no appreciable impact on the magnitude of the peak flux.

Pu-239 Analysis

Table 5.6-27: Pu-239 Flux within 10,000 Years from Tank 18

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	10,000	3.12E-06	N/A	N/A
Case 12	1,760	8.91E-02	9.87E+03	2.85E+04
Case 11	566	3.07E-02	3.40E+03	9.83E+03
Case 15	10,000	1.34E-02	1.48E+03	4.28E+03
Case 5	4,046	9.10E-06	1.01E+00	2.91E+00
Case 2	3,744	9.03E-06	1.00E+00	2.89E+00
Case 8	3,771	9.02E-06	9.99E-01	2.89E+00
Case 6	3,621	8.87E-06	9.82E-01	2.84E+00
Case 7	6,003	6.88E-06	7.62E-01	2.20E+00
Case 4	5,470	5.91E-06	6.55E-01	1.89E+00
Case 3	6,522	5.89E-06	6.53E-01	1.89E+00
Case 10	9,998	3.67E-06	4.06E-01	1.17E+00
Case 9	10,000	3.51E-06	3.89E-01	1.12E+00
Case 13	9,660	9.17E-08	1.02E-02	2.93E-02
Case 14	9,999	3.05E-08	3.37E-03	9.75E-03

Pu-239 Tank 18 Insights

1. Lack of solubility controls caused by the CZ initially in Oxidized Region III (Case 12) has an appreciable impact on the magnitude and the timing of the peak flux.
2. A fast flow path through the tank grout has a significant impact on the solubility control in the CZ (Case 11) which significantly impacts the magnitude and the timing of the peak flux.
3. Lack of solubility controls caused by the CZ initially in Oxidized Region III (Case 15) has a greater impact on the release of Pu-239 than the degradation of the remaining barriers (Case 2).
4. The condition of the tank concrete - intact (Case 5) or a fast flow path (Case 6), does not have an appreciable impact on the timing nor the magnitude of the peak flux compared to the fully degraded concrete case (Case 2).
5. The timing of tank liner failure – early (Case 8) or later (Case 7) has no appreciable impact on the magnitude or the timing of the peak flux as compared to the no liner case (Case 2).

Table 5.6-28: Pu-239 Flux within 10,000 Years from Tank 5

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	10,000	1.05E-38	N/A	N/A
Case 12	8,011	5.56E-03	1.76E+03	5.28E+35
Case 11	10,000	2.29E-03	7.27E+02	2.18E+35
Case 2	8,306	3.15E-06	1.00E+00	2.99E+32
Case 5	9,625	3.15E-06	9.99E-01	2.99E+32
Case 8	9,263	3.13E-06	9.94E-01	2.98E+32
Case 6	3,445	1.47E-06	4.68E-01	1.40E+32
Case 4	10,000	1.36E-06	4.30E-01	1.29E+32
Case 10	10,000	7.88E-07	2.50E-01	7.49E+31
Case 3	10,000	7.68E-07	2.44E-01	7.30E+31
Case 13	10,000	6.83E-08	2.17E-02	6.49E+30
Case 9	10,000	3.81E-08	1.21E-02	3.62E+30
Case 7	10,000	2.83E-28	8.98E-23	2.69E+10
Case 15	10,000	2.73E-34	8.65E-29	2.59E+04
Case 14	10,000	1.03E-40	3.26E-35	9.76E-03

Pu-239 Tank 5 Insights

1. Lack of solubility controls caused by the CZ initially in Oxidized Region III (Case 12) has an appreciable impact on the magnitude and the timing of the peak flux.
2. A fast flow path through the tank grout has a significant impact on the solubility control in the CZ (Case 11) which significantly impacts the magnitude and the timing of the peak flux.
3. An intact tank concrete (Case 5) slightly delays the movement of Pu-239 compared to the fully degraded concrete case (Case 2) but has no appreciable impact on the magnitude of the peak flux.
4. Early tank liner failure (Case 8) slightly delays the movement of Pu-239 compared to the no tank liner case (Case 2) but has no appreciable impact on the magnitude of the peak flux.
5. A fast flow path through the tank concrete (Case 6) results in a lower magnitude of the peak flux than the intact concrete case (Case 5) but a faster arrival time of the peak flux.

Table 5.6-29: Pu-239 Flux within 10,000 Years from Tank 33

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	10,000	7.02E-56	N/A	N/A
Case 12	10,000	1.12E-03	9.48E+02	1.60E+52
Case 11	9,980	4.17E-04	3.53E+02	5.95E+51
Case 6	2,600	2.50E-06	2.12E+00	3.56E+49
Case 2	10,000	1.18E-06	1.00E+00	1.68E+49
Case 8	10,000	1.01E-07	8.56E-02	1.44E+48
Case 5	10,000	2.93E-08	2.48E-02	4.18E+47
Case 13	10,000	1.26E-08	1.06E-02	1.79E+47
Case 4	10,000	7.35E-09	6.22E-03	1.05E+47
Case 3	10,000	8.84E-10	7.48E-04	1.26E+46
Case 10	10,000	1.03E-18	8.72E-13	1.47E+37
Case 9	10,000	5.50E-22	4.66E-16	7.84E+33
Case 15	10,000	1.11E-51	9.36E-46	1.58E+04
Case 7	10,000	1.04E-51	8.82E-46	1.48E+04
Case 14	10,000	6.85E-58	5.80E-52	9.76E-03

Tank 33 Pu-239 Insights

1. Lack of solubility controls caused by the CZ initially in Oxidized Region III (Case 12) has an appreciable impact on the magnitude and the timing of the peak flux.
2. A fast flow path through the tank grout has a significant impact on the solubility control in the CZ (Case 11) which significantly impacts the magnitude and the timing of the peak flux.
3. A fast flow path through the tank concrete (Case 6) has a greater impact on the magnitude and the timing of the peak flux than the degraded case (Case 2).

Np-237 Analysis

Table 5.6-30: Np-237 Flux within 10,000 Years from Tank 18

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	9,604	2.21E-05	N/A	N/A
Case 12	393	8.06E-04	2.55E+00	3.64E+01
Case 13	393	8.06E-04	2.54E+00	3.64E+01
Case 7	5,233	5.55E-04	1.75E+00	2.51E+01
Case 11	224	3.75E-04	1.18E+00	1.69E+01
Case 6	3,279	3.47E-04	1.10E+00	1.57E+01
Case 8	3,370	3.20E-04	1.01E+00	1.45E+01
Case 2	3,345	3.17E-04	1.00E+00	1.43E+01
Case 5	3,677	3.15E-04	9.96E-01	1.42E+01
Case 10	9,842	2.34E-04	7.38E-01	1.06E+01
Case 4	4,900	2.02E-04	6.37E-01	9.12E+00
Case 3	5,969	2.00E-04	6.31E-01	9.02E+00
Case 9	10,000	1.50E-04	4.72E-01	6.75E+00
Case 14	5,601	6.80E-05	2.15E-01	3.07E+00
Case 15	5,601	6.80E-05	2.15E-01	3.07E+00

Np-237 Tank 18 Insights

1. The initial condition of the CZ – Oxidized Region III (Case 12) or Oxidized Region II (Case 13) are not appreciably different on their impact to the Np-237 flux. Both cases have similar magnitudes and arrival times of the peak flux and are approximately three times the degraded case (Case 2).
2. Later tank liner failure (Case 7) results in a greater magnitude of the peak flux than the no tank liner case (Case 2) due to the greater holdup of Am-241.
3. A fast flow path through the tank grout (Case 11) results in a greater magnitude of the peak flux than the hydraulically failed tank grout case (Case 2).
4. A fast flow path through the tank concrete (Case 6) results in a greater magnitude of the peak flux than the hydraulically failed tank concrete case (Case 2).
5. Early tank liner failure (Case 8) results in a slightly higher magnitude of the peak flux than the no tank liner case (Case 2) due to the greater holdup of Am-241.

Table 5.6-31: Np-237 Flux within 10,000 Years from Tank 5

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	10,000	2.46E-23	N/A	N/A
Case 12	1,573	4.02E-04	1.70E+00	1.63E+19
Case 13	1,573	3.99E-04	1.69E+00	1.62E+19
Case 6	2,764	3.78E-04	1.60E+00	1.54E+19
Case 10	6,557	2.95E-04	1.25E+00	1.20E+19
Case 5	3,948	2.72E-04	1.15E+00	1.11E+19
Case 8	3,652	2.68E-04	1.13E+00	1.09E+19
Case 2	2,636	2.37E-04	1.00E+00	9.63E+18
Case 9	7,214	2.04E-04	8.61E-01	8.29E+18
Case 11	5,024	1.82E-04	7.69E-01	7.41E+18
Case 3	4,847	1.72E-04	7.29E-01	7.02E+18
Case 4	3,789	1.58E-04	6.67E-01	6.42E+18
Case 7	10,000	2.03E-17	8.57E-14	8.26E+05
Case 15	10,000	5.20E-22	2.20E-18	2.12E+01
Case 14	10,000	4.78E-22	2.02E-18	1.95E+01

Np-237 Tank 5 Insights

1. The initial condition of the CZ – Oxidized Region III (Case 12) or Oxidized Region II (Case 13) are not appreciably different on their impact to the Np-237 flux. Both cases have similar magnitudes and arrival times of the peak flux and are approximately 70% greater than the degraded case (Case 2).
2. The initial condition of the tank concrete – hydraulically failed tank concrete (Case 2), intact tank concrete (Case 5), or a fast flow path in the tank concrete (Case 6) does not have an appreciable impact on the magnitude or timing of the peak flux.
3. Tank grout hydraulic and chemical properties of the Base Case (Case 10) result in an increased magnitude of the peak flux compared to the degraded case of hydraulically failed tank grout (Case 2).
4. Early tank liner failure (Case 8) results in a slightly increased magnitude; but a much earlier arrival time of the peak flux compared to the degraded case (Case 2).

Table 5.6-32: Np-237 Flux within 10,000 Years from Tank 33

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	10,000	8.70E-28	N/A	N/A
Case 6	4,276	3.77E-05	1.02E+00	4.33E+22
Case 2	2,261	3.70E-05	1.00E+00	4.25E+22
Case 12	2,235	3.70E-05	1.00E+00	4.25E+22
Case 13	2,235	3.70E-05	9.99E-01	4.25E+22
Case 10	9,087	3.60E-05	9.73E-01	4.14E+22
Case 5	4,883	2.88E-05	7.78E-01	3.31E+22
Case 8	4,301	2.66E-05	7.18E-01	3.05E+22
Case 4	3,257	2.51E-05	6.80E-01	2.89E+22
Case 9	9,449	2.23E-05	6.04E-01	2.57E+22
Case 3	4,318	2.16E-05	5.84E-01	2.48E+22
Case 11	8,324	1.07E-05	2.89E-01	1.23E+22
Case 7	10,000	5.03E-27	1.36E-22	5.79E+00
Case 14	10,000	2.04E-27	5.50E-23	2.34E+00
Case 15	10,000	1.90E-27	5.14E-23	2.19E+00

Np-237 Tank 33 Insights

1. A fast flow path through the tank concrete (Case 6) results in a slightly higher peak flux than the degraded case with hydraulically failed tank concrete (Case 2) but the timing is delayed by more than 2,000 years.
2. The initial condition of the CZ – Oxidized Region III (Case 12) or Oxidized Region II (Case 13) are not appreciably different on their impact to the Np-237 flux. Both cases have similar magnitudes and arrival times of the peak flux and are approximately equal to the degraded case (Case 2).
3. The initial condition of the CZ – Oxidized Region II (Case 14) or Oxidized Region III (Case 15) are very similar on their impact to the Np-237 flux. Both cases have similar magnitudes and arrival times of the peak flux and are approximately twice the magnitude of the peak flux for Case 1 within 10,000 years.

Ra-226 Analysis

Table 5.6-33: Ra-226 Flux within 10,000 Years from Tank 18

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	4,639	1.19E-05	N/A	N/A
Case 7	3,828	3.96E-05	2.75E+00	3.33E+00
Case 2	104	1.44E-05	1.00E+00	1.21E+00
Case 12	104	1.44E-05	1.00E+00	1.21E+00
Case 13	104	1.44E-05	1.00E+00	1.21E+00
Case 14	9,601	1.36E-05	9.45E-01	1.14E+00
Case 5	442	1.18E-05	8.19E-01	9.92E-01
Case 15	4,637	1.17E-05	8.10E-01	9.81E-01
Case 8	183	1.11E-05	7.70E-01	9.32E-01
Case 9	7,001	9.99E-06	6.92E-01	8.38E-01
Case 10	7,001	9.87E-06	6.84E-01	8.28E-01
Case 4	154	9.36E-06	6.48E-01	7.85E-01
Case 6	198	8.63E-06	5.98E-01	7.24E-01
Case 11	7,001	6.35E-06	4.40E-01	5.33E-01
Case 3	1,169	5.33E-06	3.69E-01	4.47E-01

Ra-226 Tank 18 Insights

1. Later tank liner failure (Case 7) results in a magnitude of the peak flux which is almost three times that for no tank liner (Case 2) with the timing of the peak greatly delayed from Case 2. This is associated with the holdup of the radionuclides producing Ra-226 as they decay within the tank.
2. The assumed initial condition of the CZ has no impact on the release of Ra-226 when all other barriers are degraded – Cases 2, 12, and 13.
3. The assumed initial condition of the CZ has no significant impact on the magnitude of the peak flux when all other barriers are nominal – Cases A, 14, and 15. The nominal condition of the CZ (Case 14) does delay the arrival of the peak flux by nearly 5,000 years.
4. The magnitude of the peak flux for hydraulically degraded tank concrete (Case 2) is less than 20% greater than that for nominal tank concrete (Case 5).

Table 5.6-34: Ra-226 Flux within 10,000 Years from Tank 5

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	10,000	3.81E-17	N/A	N/A
Case 13	9,998	6.03E-06	2.30E+00	1.58E+11
Case 9	9,639	5.68E-06	2.16E+00	1.49E+11
Case 10	4,501	5.67E-06	2.16E+00	1.49E+11
Case 11	7,701	4.26E-06	1.62E+00	1.12E+11
Case 3	7,341	4.23E-06	1.61E+00	1.11E+11
Case 5	1,842	3.90E-06	1.49E+00	1.03E+11
Case 4	6,130	3.54E-06	1.35E+00	9.30E+10
Case 8	5,284	3.25E-06	1.24E+00	8.54E+10
Case 6	5,450	3.16E-06	1.20E+00	8.30E+10
Case 12	434	2.63E-06	1.00E+00	6.90E+10
Case 2	4,285	2.63E-06	1.00E+00	6.90E+10
Case 7	10,000	1.29E-16	4.91E-11	3.39E+00
Case 15	10,000	6.67E-17	2.54E-11	1.75E+00
Case 14	10,000	2.39E-17	9.09E-12	6.27E-01

Ra-226 Tank 5 Insights

1. Assuming the CZ is initially in Oxidized Region II (Case 13) rather than in Reduced Region II (Case 2) increases the magnitude of the peak flux from Case 2 because of the adverse impact on solubility control.
2. Early tank liner failure (Case 9) has a significant impact on the magnitude of the 10,000 year peak flux compared to the nominal tank liner case (Case 1).
3. Differing the initial conditions of the tank grout – Base Case properties (Case 10) or a fast flow path through the grout (Case 11) have a similar impact on the magnitude of the peak flux which is greater than the magnitude of the peak flux for the hydraulically degraded tank grout case (Case 2). Case 11 delays the arrival of the peak flux in comparison to Case 2. Note that the hydraulically degraded tank grout of Case 2 allows for greater reducing capacity in the CZ.
4. A degraded closure cap (Case 2) results in lower peak flux within the 10,000 year time period than the Base Case closure cap flow profile (Case 3) and the partially degraded closure cap case (Case 4).
5. Base Case hydraulic properties of the tank concrete (Case 5) has a greater magnitude of the peak flux than the hydraulically degraded tank concrete case (Case 2) and the timing of the peak flux is significantly earlier than that for Case 2.

Table 5.6-35: Ra-226 Flux within 10,000 Years from Tank 33

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	10,000	1.99E-16	N/A	N/A
Case 10	7,672	3.68E-06	1.83E+00	1.85E+10
Case 9	8,013	3.40E-06	1.70E+00	1.71E+10
Case 5	3,469	3.37E-06	1.68E+00	1.70E+10
Case 11	7,148	3.06E-06	1.53E+00	1.54E+10
Case 6	3,212	2.96E-06	1.48E+00	1.49E+10
Case 3	9,984	2.92E-06	1.46E+00	1.47E+10
Case 13	9,999	2.91E-06	1.45E+00	1.47E+10
Case 8	9,458	2.65E-06	1.32E+00	1.33E+10
Case 4	9,558	2.62E-06	1.31E+00	1.32E+10
Case 2	6,780	2.00E-06	1.00E+00	1.01E+10
Case 12	6,779	2.00E-06	9.96E-01	1.00E+10
Case 7	10,000	1.45E-16	7.25E-11	7.31E-01
Case 15	10,000	1.35E-16	6.76E-11	6.81E-01
Case 14	10,000	1.33E-16	6.64E-11	6.69E-01

Ra-226 Tank 33 Insights

1. Differing the initial conditions of the tank grout – Base Case properties (Case 10) or a fast flow path through the grout (Case 11) have a similar impact on the magnitude of the peak flux and are greater than the magnitude of the peak flux for the hydraulically degraded tank grout (Case 2). Note that the hydraulically degraded tank grout of Case 2 allows for greater reducing capacity in the CZ.
2. Early tank liner failure (Case 9) has a significant impact on the magnitude of the 10,000 year peak flux compared to the nominal tank liner case (Case 1).
3. Base Case hydraulic properties of the tank concrete (Case 5) has a greater magnitude of the peak flux than the hydraulically degraded tank concrete case (Case 2) and the timing of the peak flux is significantly earlier than that for Case 2.

U-233 Analysis

Table 5.6-36: U-233 Flux within 10,000 Years from Tank 18

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	9,001	2.74E-04	N/A	N/A
Case 12	633	1.49E-03	2.43E+00	5.46E+00
Case 5	1,879	6.20E-04	1.01E+00	2.27E+00
Case 8	1,622	6.15E-04	1.00E+00	2.25E+00
Case 2	1,566	6.14E-04	1.00E+00	2.25E+00
Case 6	1,768	6.05E-04	9.85E-01	2.21E+00
Case 7	4,992	6.04E-04	9.83E-01	2.21E+00
Case 4	2,279	4.13E-04	6.72E-01	1.51E+00
Case 3	3,301	4.08E-04	6.65E-01	1.49E+00
Case 11	216	3.82E-04	6.22E-01	1.40E+00
Case 15	7,003	2.84E-04	4.62E-01	1.04E+00
Case 10	8,001	2.64E-04	4.30E-01	9.66E-01
Case 9	8,004	2.58E-04	4.19E-01	9.42E-01
Case 13	1,497	5.94E-06	9.67E-03	2.17E-02
Case 14	8,001	4.03E-06	6.55E-03	1.47E-02

U-233 Tank 18 Insights

1. Assuming the CZ to be initially in Oxidized Region III (Case 12) has an appreciable impact on the magnitude and the timing of the peak flux as compared to the Base Case properties of the CZ (Case 2).
2. The condition of the tank concrete – nominal (Case 5) or with a fast flow path (Case 6) does not have an appreciable affect on the magnitude or the timing of the peak flux as compared to hydraulically failed concrete (Case 2).
3. Early tank liner failure (Case 8) does not have an appreciable affect on the magnitude or the timing of the peak flux as compared to no tank liner (Case 2).
4. Later tank liner failure (Case 7) does not appreciably affect the magnitude of the peak flux compared to the no tank liner (Case 2); however, the timing of the peak flux is delayed by more than 3,000 years versus Case 2.

Table 5.6-37: U-233 Flux within 10,000 Years from Tank 5

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	10,000	5.14E-21	N/A	N/A
Case 10	7,508	1.10E-04	1.01E+00	2.15E+16
Case 2	3,509	1.09E-04	1.00E+00	2.13E+16
Case 12	3,444	1.09E-04	9.98E-01	2.12E+16
Case 5	4,901	1.02E-04	9.36E-01	1.99E+16
Case 8	4,501	1.02E-04	9.35E-01	1.99E+16
Case 6	4,529	9.16E-05	8.39E-01	1.78E+16
Case 11	6,954	7.47E-05	6.85E-01	1.46E+16
Case 4	5,060	7.42E-05	6.80E-01	1.44E+16
Case 9	8,663	7.32E-05	6.71E-01	1.43E+16
Case 3	6,223	7.02E-05	6.44E-01	1.37E+16
Case 13	4,500	6.44E-06	5.90E-02	1.25E+15
Case 7	10,000	3.44E-18	3.16E-14	6.71E+02
Case 15	10,000	2.06E-20	1.89E-16	4.01E+00
Case 14	10,000	5.42E-22	4.96E-18	1.06E-01

U-233 Tank 5 Insights

1. Failed tank grout in Case 2 has a similar magnitude of the peak flux as the nominal or Base Case tank grout properties (Case 10) but the hydraulically failed tank grout hastens the arrival time of the peak flux by approximately 4,000 years.
2. Assuming the CZ to be initially in Oxidized Region III (Case 12) has no appreciable impact on the magnitude or the timing of the peak flux as compared to the Base Case properties of the CZ of Reduced Region II (Case 2).
3. The condition of the tank concrete – nominal (Case 5) or with a fast flow path (Case 6) does not have an appreciable affect on the magnitude of the peak flux as compared to hydraulically failed concrete (Case 2) but the peak is delayed by approximately 1,000 years.
4. Early tank liner failure (Case 8) does not have an appreciable affect on the magnitude of the peak flux as compared to no tank liner (Case 2) but the peak is retarded by approximately 1,000 years.
5. A fast flow path in the tank grout (Case 11) reduces the magnitude of the peak flux by approximately one-third and nearly doubles the arrival time of the peak flux as compared to the hydraulically failed tank grout (Case 2).

Table 5.6-38: U-233 Flux within 10,000 Years from Tank 33

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	10,000	3.94E-25	N/A	N/A
Case 2	5,648	7.67E-06	1.00E+00	1.94E+19
Case 12	5,635	7.67E-06	1.00E+00	1.94E+19
Case 6	7,734	7.21E-06	9.41E-01	1.83E+19
Case 5	8,596	7.00E-06	9.13E-01	1.78E+19
Case 8	8,100	6.81E-06	8.88E-01	1.73E+19
Case 13	6,637	6.15E-06	8.02E-01	1.56E+19
Case 4	8,136	5.29E-06	6.90E-01	1.34E+19
Case 3	9,599	4.93E-06	6.43E-01	1.25E+19
Case 11	10,000	2.45E-06	3.19E-01	6.21E+18
Case 10	10,000	2.98E-07	3.89E-02	7.57E+17
Case 9	10,000	7.83E-09	1.02E-03	1.99E+16
Case 7	10,000	3.72E-23	4.85E-18	9.44E+01
Case 15	10,000	1.63E-25	2.13E-20	4.14E-01
Case 14	10,000	1.03E-26	1.34E-21	2.61E-02

U-233 Tank 33 Insights

1. Assuming the CZ to be initially in Oxidized Region III (Case 12) has no appreciable impact on the magnitude or the timing of the peak flux as compared to the Base Case properties of the CZ of Reduced Region II.(Case 2).
2. The condition of the tank concrete – nominal (Case 5) or with a fast flow path (Case 6) does not have an appreciable affect on the magnitude of the peak flux as compared to hydraulically failed concrete (Case 2) but the peak is delayed by 2,000 years or more.
3. Early tank liner failure (Case 8) does not have an appreciable affect on the magnitude of the peak flux as compared to no tank liner (Case 2) but the peak is delayed by approximately 2,500 years.
4. Assuming the CZ to be initially in Oxidized Region II (Case 13) reduces the magnitude of the peak flux by 20% of the peak flux associated with Case 2 which assumes the CZ initially is in Reduced Region II. The timing of the peak flux is delayed by approximately 1,000 years for Case 13 versus Case 2. This is not unexpected since the solubility of Uranium in Oxidized Region II (1.6E-11 moles/L) is less than the solubility in Reduced Region II (1.7E-09 moles/L).

U-234 Analysis

Table 5.6-39: U-234 Flux within 10,000 Years from Tank 18

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	7,170	1.31E-04	N/A	N/A
Case 12	626	5.16E-04	1.46E+00	3.94E+00
Case 6	1,200	3.62E-04	1.02E+00	2.77E+00
Case 5	1,311	3.60E-04	1.02E+00	2.75E+00
Case 2	996	3.54E-04	1.00E+00	2.71E+00
Case 8	1,044	3.53E-04	9.97E-01	2.70E+00
Case 4	1,458	2.36E-04	6.66E-01	1.81E+00
Case 3	2,401	2.17E-04	6.11E-01	1.66E+00
Case 7	4,453	2.06E-04	5.82E-01	1.58E+00
Case 11	214	1.32E-04	3.72E-01	1.01E+00
Case 10	6,265	1.18E-04	3.33E-01	9.03E-01
Case 9	6,310	1.15E-04	3.24E-01	8.78E-01
Case 15	7,001	9.84E-05	2.78E-01	7.53E-01
Case 13	2,793	3.80E-06	1.07E-02	2.91E-02
Case 14	9,986	1.83E-06	5.17E-03	1.40E-02

U-234 Tank 18 Insights

1. Assuming the CZ to be initially in Oxidized Region III (Case 12) increases the magnitude of the peak flux by approximately 50% and hastens the timing of the peak flux by more than 300 years as compared to the Base Case properties of the CZ (Reduced Region II) in Case 2.
2. The condition of the tank concrete – nominal (Case 5) or with a fast flow path (Case 6) does not have an appreciable affect on the magnitude or the timing of the peak flux as compared to hydraulically failed concrete (Case 2).
3. Early tank liner failure (Case 8) does not have an appreciable affect on the magnitude or the timing of the peak flux as compared to no tank liner (Case 2).
4. Later tank liner failure (Case 7) decreases the magnitude of the peak flux by approximately 40% compared to the no tank liner (Case 2); however, the timing of the peak flux is delayed by more than 3,000 years versus Case 2.

Table 5.6-40: U-234 Flux within 10,000 Years from Tank 5

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	10,000	3.30E-21	N/A	N/A
Case 2	3,488	8.04E-05	1.00E+00	2.44E+16
Case 12	3,431	8.02E-05	9.98E-01	2.43E+16
Case 10	7,485	7.98E-05	9.93E-01	2.42E+16
Case 8	4,467	7.53E-05	9.37E-01	2.28E+16
Case 5	4,866	7.50E-05	9.34E-01	2.28E+16
Case 6	4,516	6.70E-05	8.33E-01	2.03E+16
Case 4	5,039	5.45E-05	6.78E-01	1.65E+16
Case 11	6,930	5.41E-05	6.73E-01	1.64E+16
Case 9	8,620	5.29E-05	6.59E-01	1.60E+16
Case 3	6,174	5.15E-05	6.41E-01	1.56E+16
Case 13	5,191	3.75E-06	4.66E-02	1.14E+15
Case 7	10,000	2.34E-18	2.91E-14	7.10E+02
Case 15	10,000	1.51E-20	1.87E-16	4.57E+00
Case 14	10,000	3.10E-23	3.86E-19	9.41E-03

U-234 Tank 5 Insights

1. Assuming the CZ to be initially in Oxidized Region III (Case 12) has no appreciable impact on the magnitude or the timing of the peak flux as compared to the Base Case properties of the CZ of Reduced Region II (Case 2).
2. Failed tank grout in Case 2 has a similar magnitude of the peak flux as the nominal or Base Case tank grout properties (Case 10) but the failed tank grout hastens the arrival time of the peak flux by approximately 4,000 years.
3. Early tank liner failure (Case 8) does not have an appreciable affect on the magnitude of the peak flux as compared to no tank liner (Case 2) but the peak is delayed by approximately 1,000 years.
4. The condition of the tank concrete – nominal (Case 5) or with a fast flow path (Case 6) does not have an appreciable affect on the magnitude of the peak flux as compared to hydraulically failed concrete (Case 2) but the timing of the peak is delayed by approximately 1,000 years.
5. A fast flow path in the tank grout (Case 11) reduces the magnitude of the peak flux by approximately one-third and nearly doubles the arrival time of the peak flux as compared to the hydraulically failed tank grout (Case 2). Note Case 2 with the hydraulically failed grout allows for greater reducing capacity within the CZ.

Table 5.6-41: U-234 Flux within 10,000 Years from Tank 33

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	10,000	3.59E-25	N/A	N/A
Case 2	5,614	2.41E-05	1.00E+00	6.73E+19
Case 12	5,600	2.41E-05	1.00E+00	6.73E+19
Case 5	8,491	2.13E-05	8.84E-01	5.95E+19
Case 8	7,952	2.06E-05	8.53E-01	5.74E+19
Case 6	7,749	2.03E-05	8.43E-01	5.67E+19
Case 4	8,046	1.66E-05	6.88E-01	4.63E+19
Case 3	9,421	1.54E-05	6.39E-01	4.30E+19
Case 11	10,000	7.58E-06	3.14E-01	2.11E+19
Case 13	8,794	4.75E-06	1.97E-01	1.32E+19
Case 10	10,000	8.37E-07	3.47E-02	2.33E+18
Case 9	10,000	3.35E-08	1.39E-03	9.33E+16
Case 7	10,000	7.81E-23	3.24E-18	2.18E+02
Case 15	10,000	5.08E-25	2.11E-20	1.42E+00
Case 14	10,000	3.38E-27	1.40E-22	9.41E-03

U-234 Tank 33 Insights

1. Assuming the CZ to be initially in Oxidized Region III (Case 12) has no impact on the magnitude or the timing of the peak flux as compared to the Base Case properties of the CZ of Reduced Region II (Case 2).
2. Early tank liner failure (Case 8) does not have an appreciable affect on the magnitude of the peak flux as compared to no tank liner (Case 2) but the peak is delayed by more than 2,000 years.
3. The condition of the tank concrete – nominal (Case 5) or with a fast flow path (Case 6) does not have an appreciable affect on the magnitude of the peak flux as compared to hydraulically failed concrete (Case 2) but the timing of the peak is delayed by more than 2,000 years.
4. A fast flow path in the tank grout (Case 11) reduces the magnitude of the peak flux by approximately two-thirds and nearly doubles the arrival time of the peak flux as compared to the hydraulically failed tank grout (Case 2).

Pa-231 Analysis

Table 5.6-42: Pa-231 Flux within 10,000 Years from Tank 18

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	9,601	2.55E-08	N/A	N/A
Case 14	9,601	2.88E-08	1.52E+00	1.13E+00
Case 13	10,000	2.76E-08	1.45E+00	1.08E+00
Case 7	9,999	2.38E-08	1.25E+00	9.30E-01
Case 9	9,601	2.31E-08	1.22E+00	9.04E-01
Case 10	9,601	2.30E-08	1.21E+00	9.02E-01
Case 6	9,997	1.92E-08	1.01E+00	7.51E-01
Case 2	9,999	1.90E-08	1.00E+00	7.43E-01
Case 8	9,999	1.90E-08	9.99E-01	7.42E-01
Case 5	9,996	1.83E-08	9.66E-01	7.18E-01
Case 3	9,999	1.80E-08	9.46E-01	7.03E-01
Case 4	9,999	1.79E-08	9.42E-01	7.00E-01
Case 15	7,001	1.78E-08	9.38E-01	6.97E-01
Case 11	6,001	9.94E-09	5.24E-01	3.89E-01
Case 12	1,036	2.03E-09	1.07E-01	7.94E-02

Pa-231 Tank 18 Insights

1. For Tank 18 the various barrier cases do not have significant impacts on the magnitude of the peak flux.

Table 5.6-43: Pa-231 Flux within 10,000 Years from Tank 5

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1 (10,000 yr)
Case 1 (10,000 yr)	10,000	4.19E-22	N/A	N/A
Case 10	5,477	9.71E-09	2.47E+00	2.32E+13
Case 6	9,858	9.18E-09	2.33E+00	2.19E+13
Case 9	5,770	8.17E-09	2.08E+00	1.95E+13
Case 13	10,000	4.99E-09	1.27E+00	1.19E+13
Case 11	5,007	4.63E-09	1.18E+00	1.10E+13
Case 2	10,000	3.93E-09	1.00E+00	9.37E+12
Case 8	9,998	3.35E-09	8.53E-01	7.99E+12
Case 4	10,000	3.29E-09	8.38E-01	7.85E+12
Case 5	10,000	3.19E-09	8.11E-01	7.60E+12
Case 3	3,639	2.86E-09	7.27E-01	6.81E+12
Case 12	3,780	1.97E-09	5.00E-01	4.68E+12
Case 7	10,000	8.25E-20	2.10E-11	1.97E+02
Case 15	10,000	2.47E-21	6.28E-13	5.89E+00
Case 14	10,000	4.20E-24	1.07E-15	1.00E-02

Pa-231 Tank 5 Insights

1. Base Case tank grout properties (Case 10) increases the magnitude of the peak flux by more than two times the magnitude of the peak flux within the 10,000 year period from the hydraulically failed tank grout in Case 2; and the timing of the peak is delayed to a significant amount versus Case 2. Note Case 2 with the hydraulically failed grout allows for greater reducing capacity within the CZ.
2. A fast flow path in the tank concrete (Case 6) increases the magnitude of the peak flux by more than two times the magnitude of the peak flux within the 10,000 year period from the hydraulically failed tank concrete in Case 2; and the timing of the peak is delayed to a significant amount versus Case 2.
3. Case 9 which assumes an early tank liner failure, and maintaining all the other model parameters the same as the Base Case, results in a magnitude of the peak flux that is more than twice the degraded case (Case 2) and significantly delays the arrival of the peak flux.
4. Assuming the CZ to be initially in Oxidized Region II (Case 13) increases the magnitude of the peak flux by only 20% of the peak flux associated with Case 2 which assumes the CZ initially is in Reduced Region II.

Table 5.6-44: Pa-231 Flux within 10,000 Years from Tank 33

Case	Peak Flux Time (year)	Peak Flux (Ci/yr)	Ratio to Case 2	Ratio to Case 1
Case 1	10,000	4.41E-22	N/A	N/A
Case 10	9,029	1.32E-08	5.71E+00	3.00E+13
Case 9	9,351	1.02E-08	4.40E+00	2.31E+13
Case 11	9,749	5.83E-09	2.52E+00	1.32E+13
Case 5	4,850	3.76E-09	1.62E+00	8.54E+12
Case 13	9,999	3.23E-09	1.39E+00	7.32E+12
Case 8	4,320	2.88E-09	1.25E+00	6.55E+12
Case 6	4,225	2.74E-09	1.18E+00	6.21E+12
Case 3	4,347	2.48E-09	1.07E+00	5.63E+12
Case 2	10,000	2.32E-09	1.00E+00	5.26E+12
Case 4	9,998	2.23E-09	9.65E-01	5.07E+12
Case 12	6,125	2.14E-09	9.23E-01	4.85E+12
Case 15	10,000	1.26E-21	5.42E-13	2.85E+00
Case 7	10,000	4.84E-22	2.09E-13	1.10E+00
Case 14	10,000	4.37E-24	1.89E-15	9.92E-03

Pa-231 Tank 33 Insights

1. Base Case tank grout properties (Case 10) increases the magnitude of the peak flux by more than five times the magnitude of the peak flux within the 10,000 year period from the hydraulically failed tank grout in Case 2; and the timing of the peak is delayed versus Case 2. Note Case 2 with the hydraulically failed grout allows for greater reducing capacity within the CZ.
2. Case 9 which assumes an early tank liner failure, and maintains all the other model parameters the same as the Base Case, results in a magnitude of the peak flux that is more than four times the degraded case (Case 2) and delays the arrival of the peak flux.
3. A fast flow path through the tank grout (Case 11) more than doubles the magnitude of the peak flux associated with hydraulically failed tank grout (Case 2). Note Case 2 with the hydraulically failed grout allows for greater reducing capacity within the CZ.

5.6.7.3.4 Summary of Results by Barrier

5.6.7.3.4.1 Closure Cap (Cases 3 and 4)

The closure cap barrier analyses looked at cases where the closure cap is the only intact barrier initially, with the cap either fully intact as in the Base Case (Case 3) or partially degraded case with a Closure Cap flow constant at 11.67 in/yr (Case 4). The degraded case (Case 2) modeled the Closure Cap with a flow constant at 16.45 in/yr. As seen in Figures 5.6-78 thru 5.6-83, the closure cap has a minimal effect on the peak flux in 10,000 years. For Case 3 or Case 4, the peak flux in 20,000 years can move forward in time due to the failed closure cap allowing more flow earlier. For the Type I tanks (Tank 5) and Type III tanks (Tank 33), Cases 3 and 4 have peak fluxes which occur earlier, but not before year 10,000 as shown in Figures 5.6-79, 5.6-80, 5.6-82, and 5.6-83.

In some instances, the closure cap being the only barrier initially (Cases 3 and 4) can diminish the magnitude of the peak flux. This is due to the fact that an intact closure cap can delay the flow increase that a degraded cap allows, with the higher flow diluting the inventory available for release before daughter products can build up. The decrease is more pronounced for radionuclides with significant parent contributions (e.g., Ra-226). This trait is exhibited by the peak Tank 18 Ra-226 flux for the Base Case (1.19E-05Ci/yr) being higher than the peak flux for Case 4 with the closure cap degraded (9.36E-06 Ci/yr) as shown in Table 5.6-33.

Figure 5.6-78: Tc-99 Flux from Tank 18 (Closure Cap Barrier Analysis)

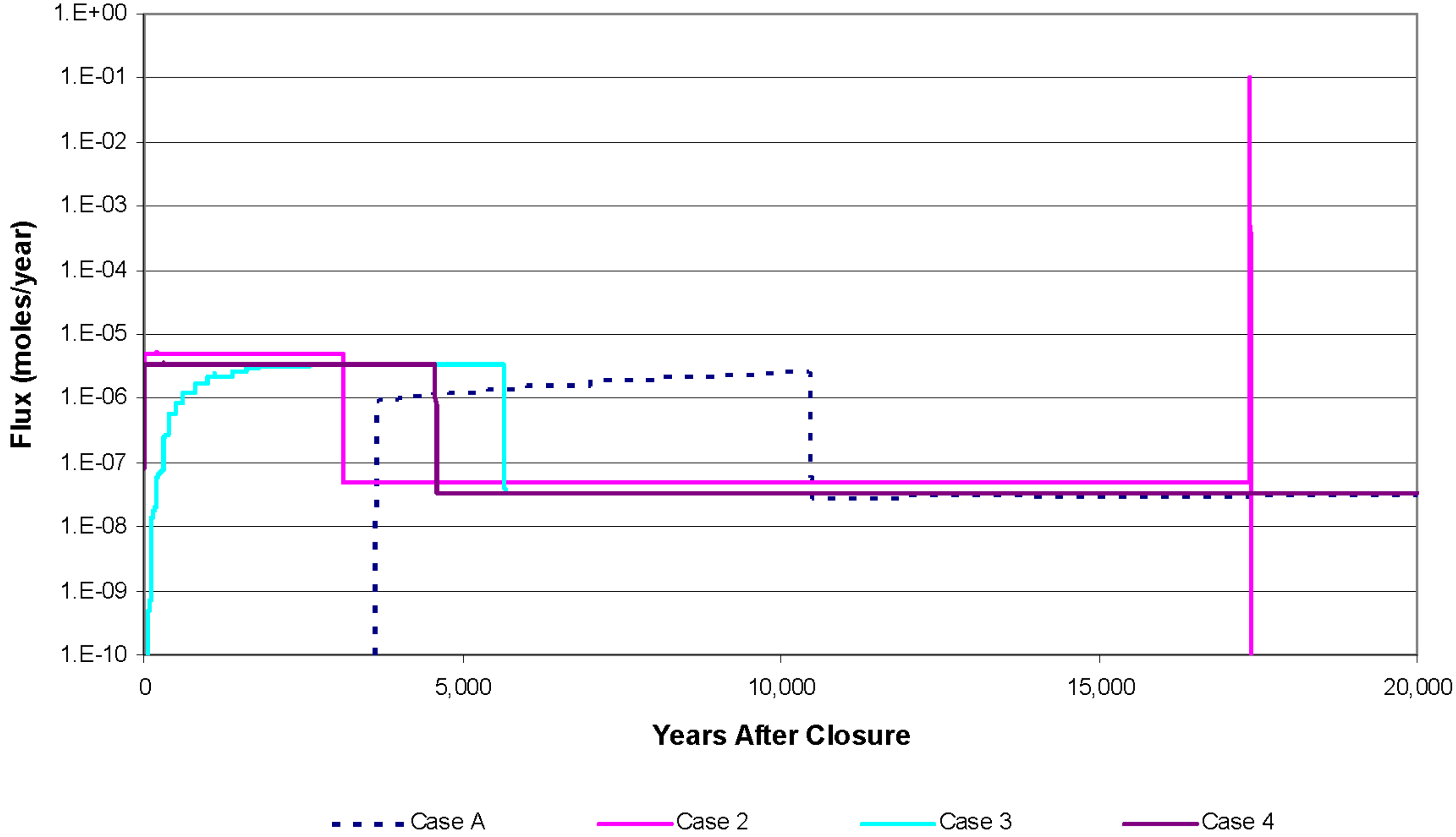


Figure 5.6-79: Tc-99 Flux from Tank 5 (Closure Cap Barrier Analysis)

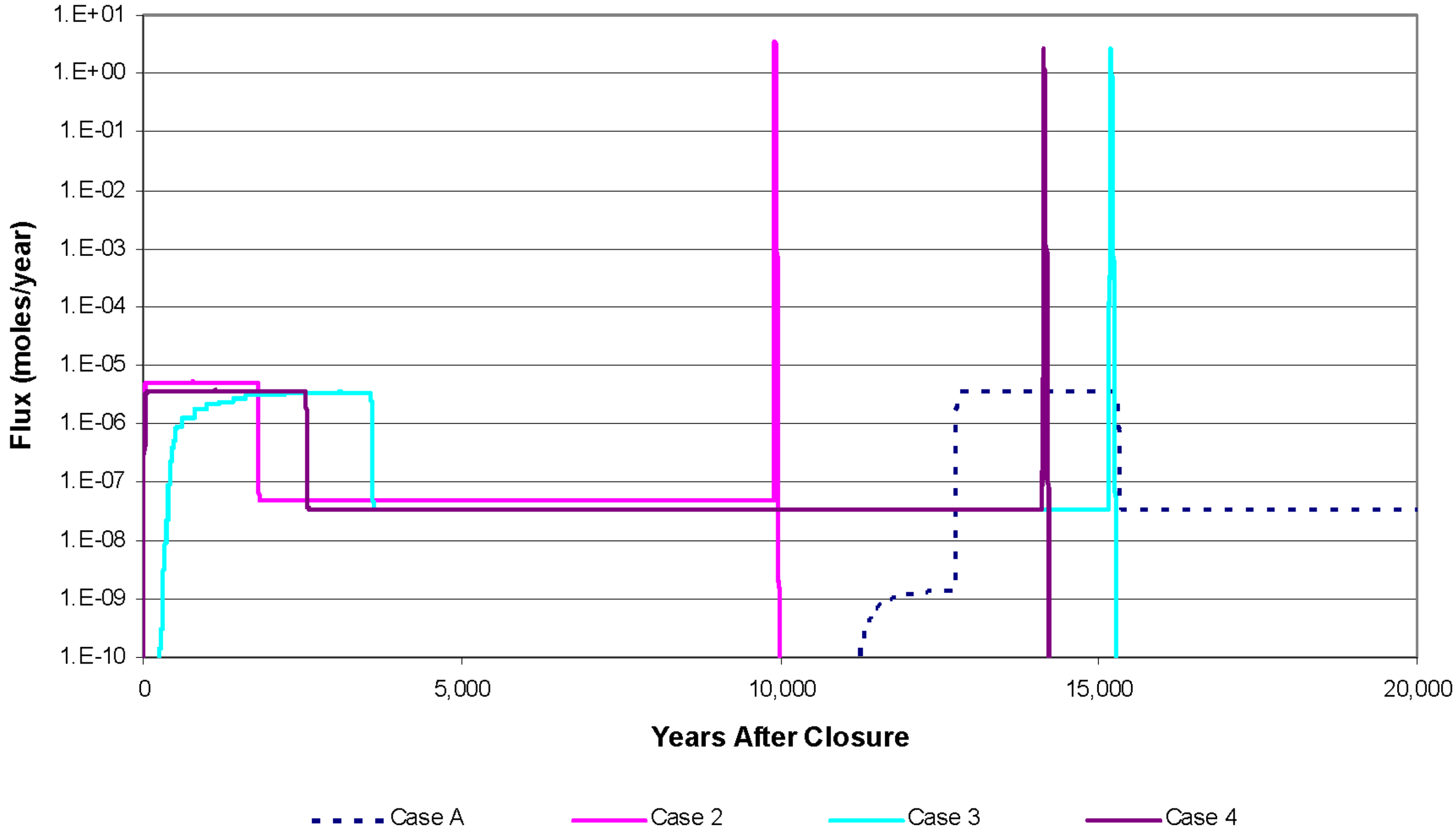


Figure 5.6-80: Tc-99 Flux from Tank 33 (Closure Cap Barrier Analysis)

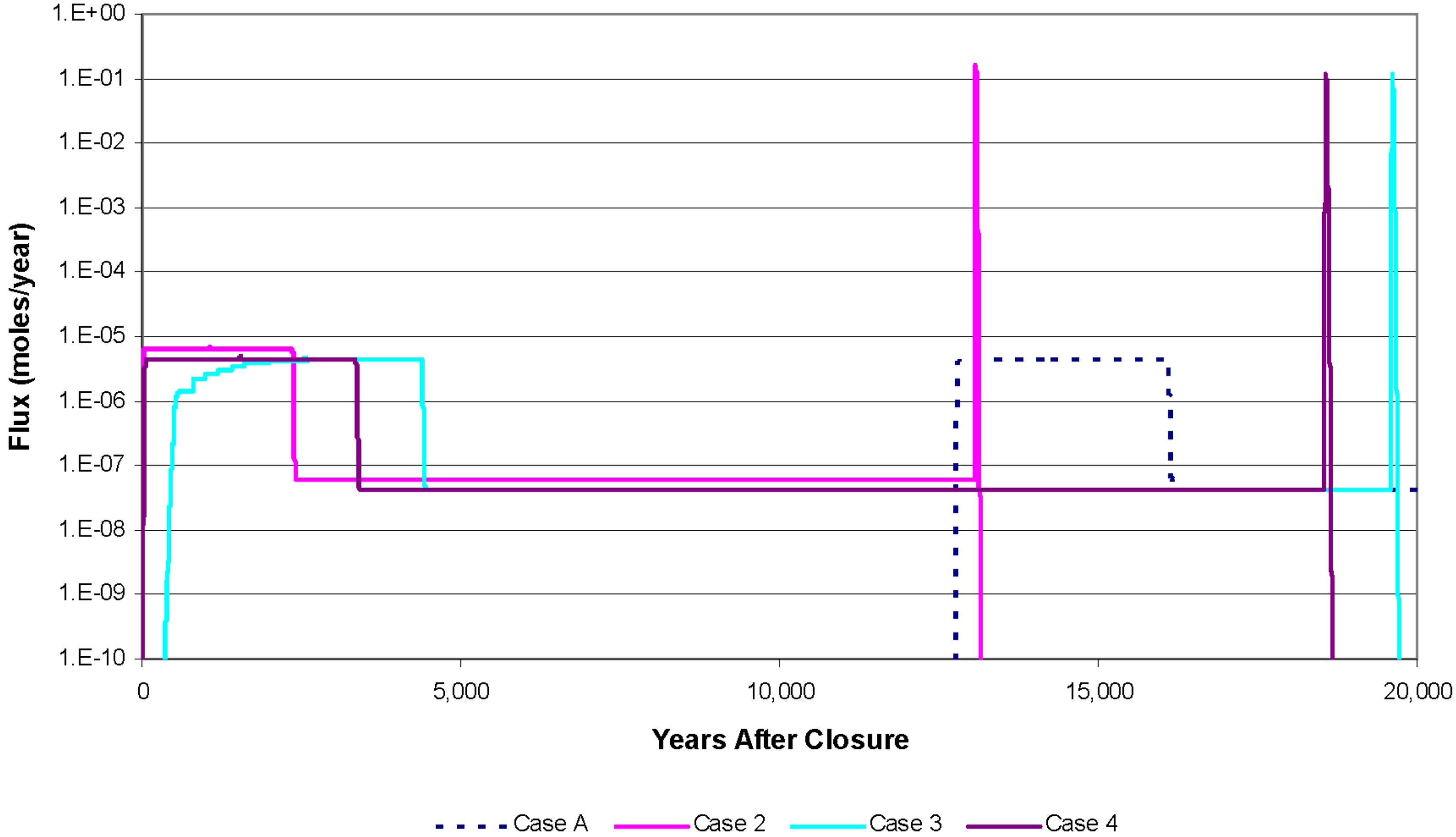


Figure 5.6-81: Pu-239 Flux from Tank 18 (Closure Cap Barrier Analysis)

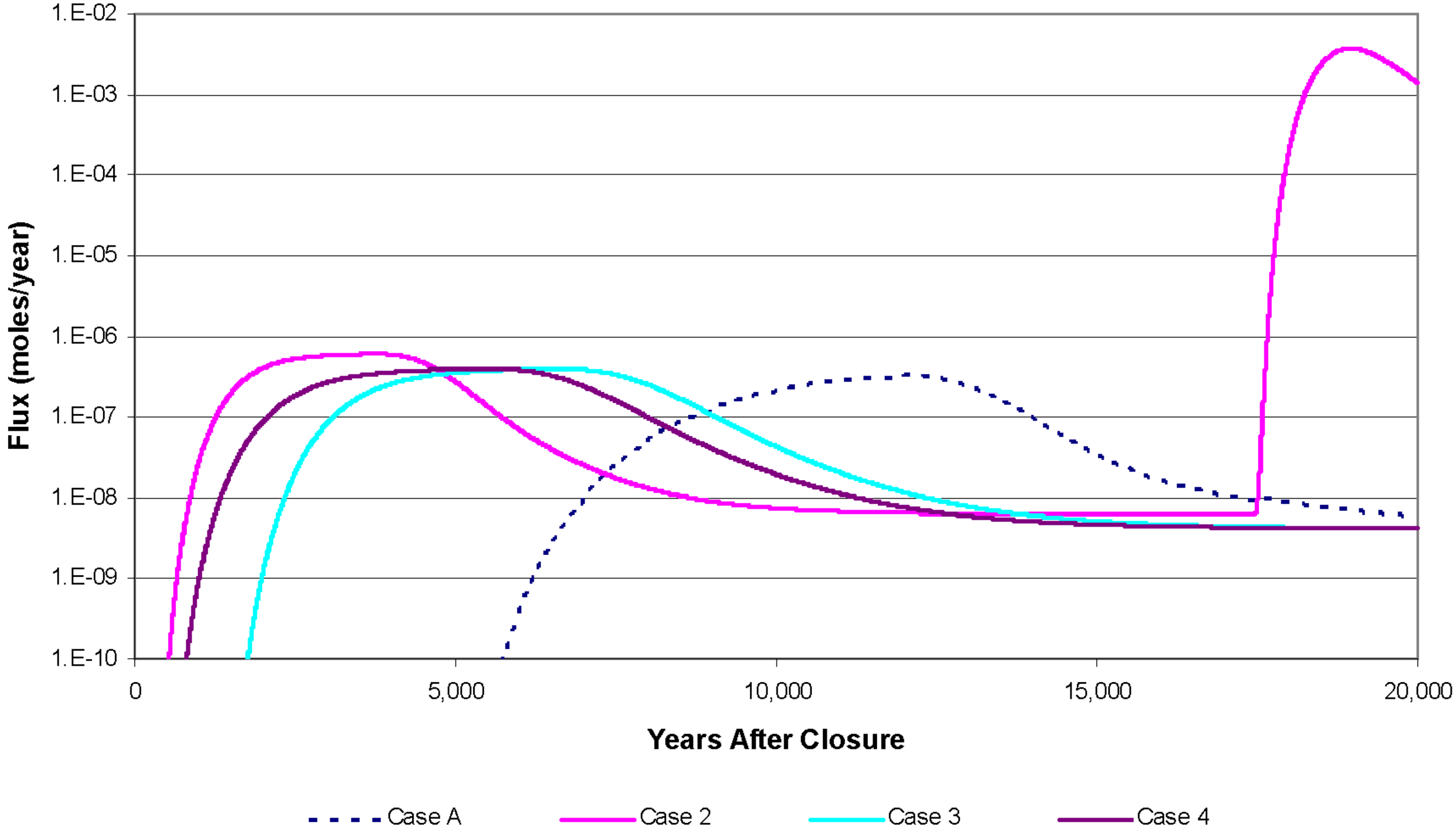


Figure 5.6-82: Pu-239 Flux from Tank 5 (Closure Cap Barrier Analysis)

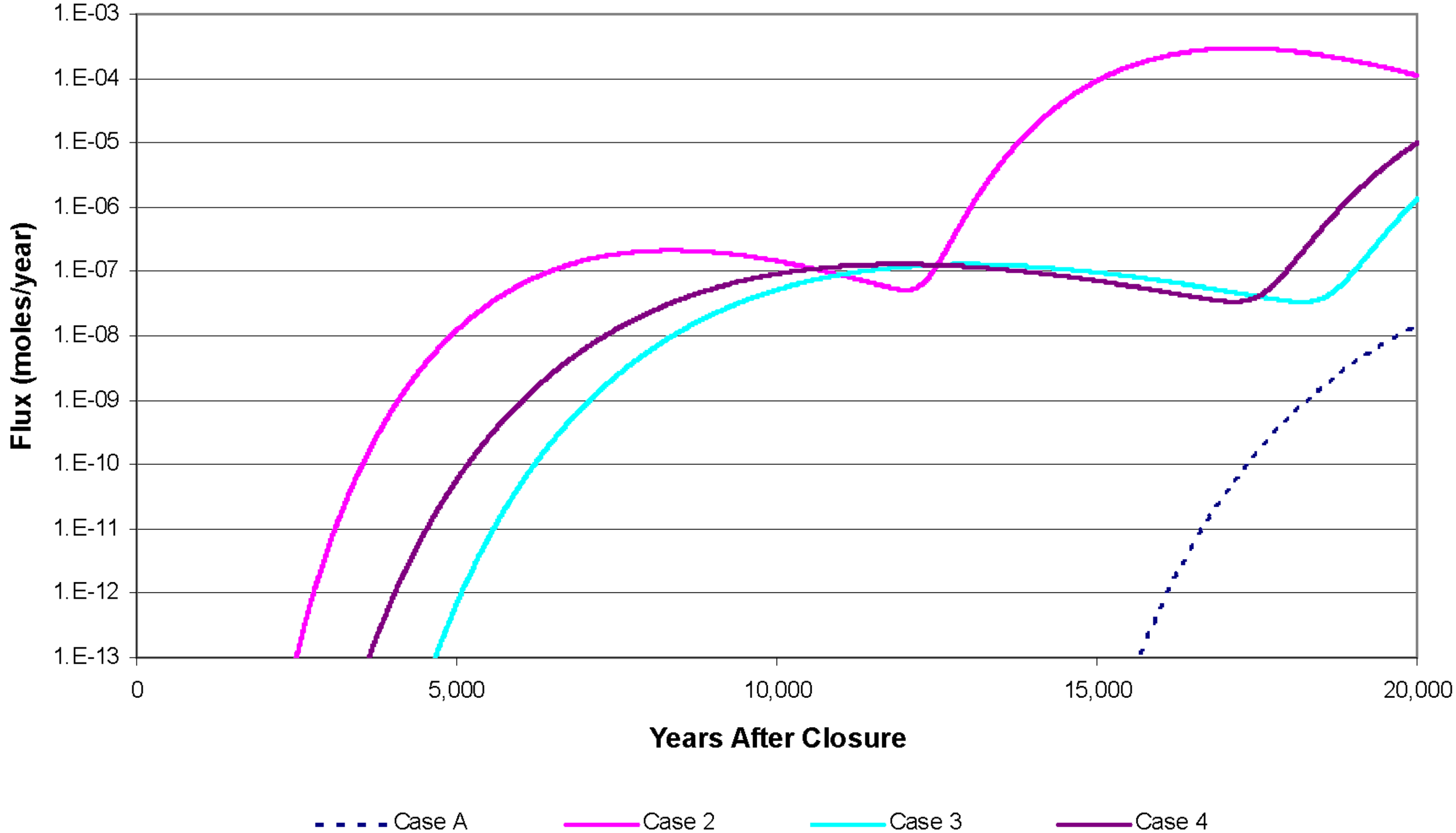
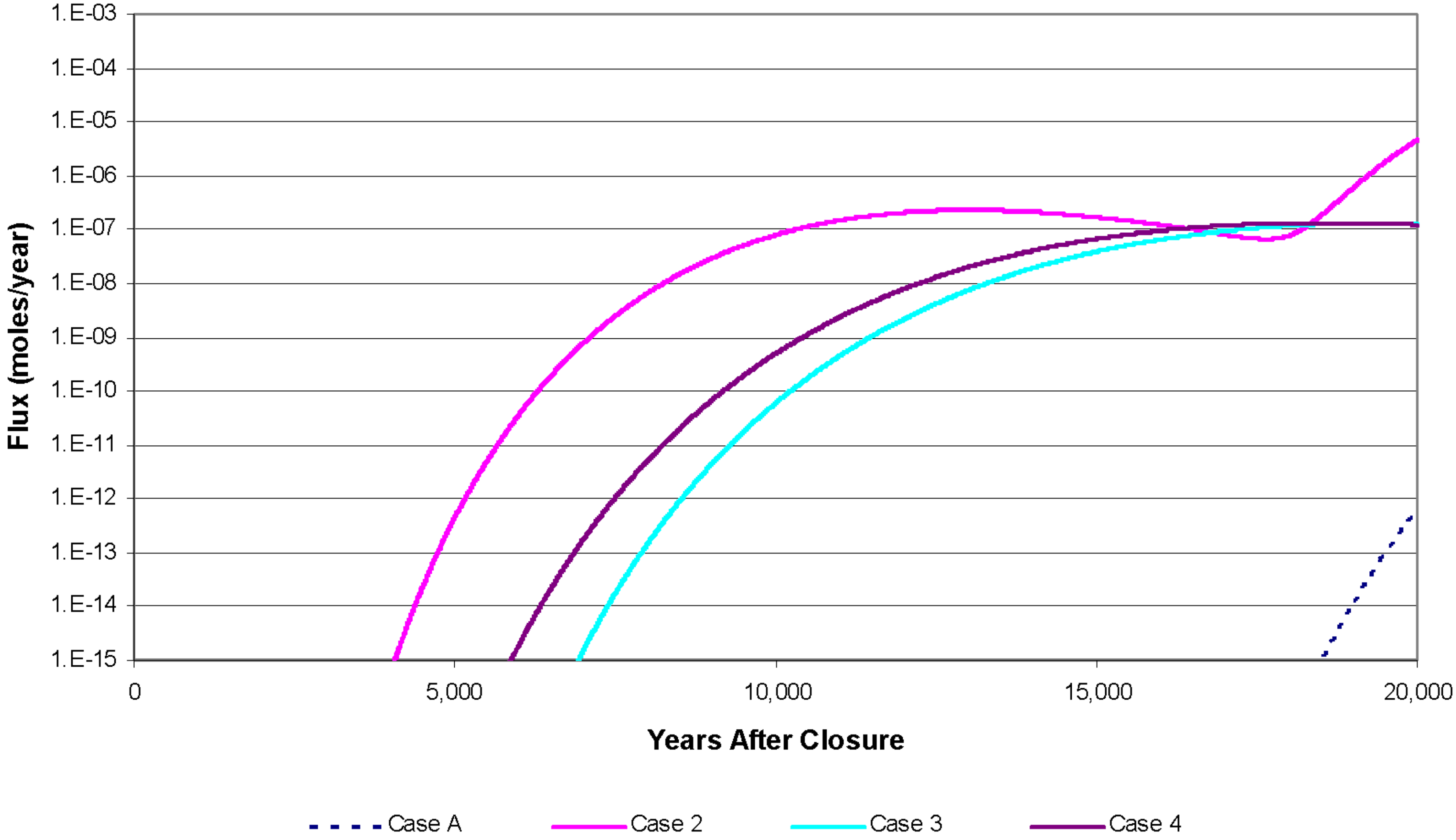


Figure 5.6-83: Pu-239 Flux from Tank 33 (Closure Cap Barrier Analysis)



5.6.7.3.4.2 Liner (Cases 7, 8 and 9)

The liner barrier analyses looked at three different cases:

a. The liner is the only intact barrier initially, with the later liner failure (based on grouted diffusion coefficient of E-6 Ca/O2) assumed as in the Base Case (Case 7),
b. The liner fails early (failure based on grouted diffusion coefficient of E-4 Ca) with the other barriers degraded (Case 8), and
c. The liner fails early with the other barriers intact (Case 9). The degraded case (Case 2) was modeled with no liner present starting at year 0.

As seen in Figures 5.6-84 and 5.6-87, the Type IV tanks (Tank 18) liner failing early with other barriers intact (Case 9) has minimal impact on peak flux, as exhibited by the timing and magnitude of the peak Tank 18 fluxes (e.g., Tc-99, Pu-239) being essentially the same for both the Base Case and Case 9. The liner also has minimal impact as an independent barrier (Case 7 and Case 8), as shown in Figures 5.6-84 and 5.6-87. The peak flux in 10,000 years is not notably changed, with the primary impact being the peak flux in 20,000 years can move forward in time. The fact that peak fluxes associated with the liner as an independent barrier (Case 7 and 8) are not appreciably different from the degraded case (Case 2) shows that the liner is not a significant independent barrier.

For the Type I tanks (Figures 5.6-85 and 5.6-88 for Tank 5) and Type III tanks (Figures 5.6-86 and 5.6-89 for Tank 33), the tanks liner being the only intact barrier initially (Case 7) has minimal impact on peak flux, as exhibited by the timing and magnitude of the peak fluxes being essentially the same for both the Base Case and Case 7. This is as expected, since the intact liner prevents release from the tank. For the Type I and Type III tanks with early liner failure (Case 8 and Case 9), the peak flux in 10,000 years is not notably changed for radionuclides with fast (e.g., Tc-99) transport times. The primary impact in Case 8 and 9 is that the peak flux in 20,000 years for fast transport time radionuclides such as Tc-99 can move forward in time. The peak fluxes associated with the other barriers degraded (Case 8) are similar to the degraded case (Case 2) for Tc-99, but delayed in time. For the Type I and Type III tanks, the peak flux in 10,000 years is not notably changed for radionuclides with slow (e.g., Pu-239) transport times with the other barriers intact (Case 9), with the primary impact being the release leading to peak flux in 20,000 years beginning earlier (Figures 5.6-88 and 5.6-89). If the liner fails early with other barriers degraded (Case 8), the flux curve resembles that associated with the degraded case (Case 2).

In some instances, the liner degrading early (Cases 8 and 9) can diminish the magnitude of the peak flux radionuclides with significant parent contributions (e.g., Ra-226). This is due to the fact that the liner delays any releases, allowing time for daughter products to build up the inventory available for release before liner failure. This trait is exhibited by the peak Tank 18 Ra-226 flux for the Base Case (1.19E-05Ci/yr) being higher than the peak flux in Case 8 (1.11E-05 Ci/yr) and Cases 9 (9.99E-06 Ci/yr) as shown in Table 5.6-33.

In summary, the impact of the liner is variable, with the impact of the liner as a barrier depending upon the tank type and radionuclide involved. In general the liner does not have a significant impact on the peak fluxes in 10,000 years.

Figure 5.6-84: Tc-99 Flux from Tank 18 (Liner and Tank Concrete Barrier Analysis)

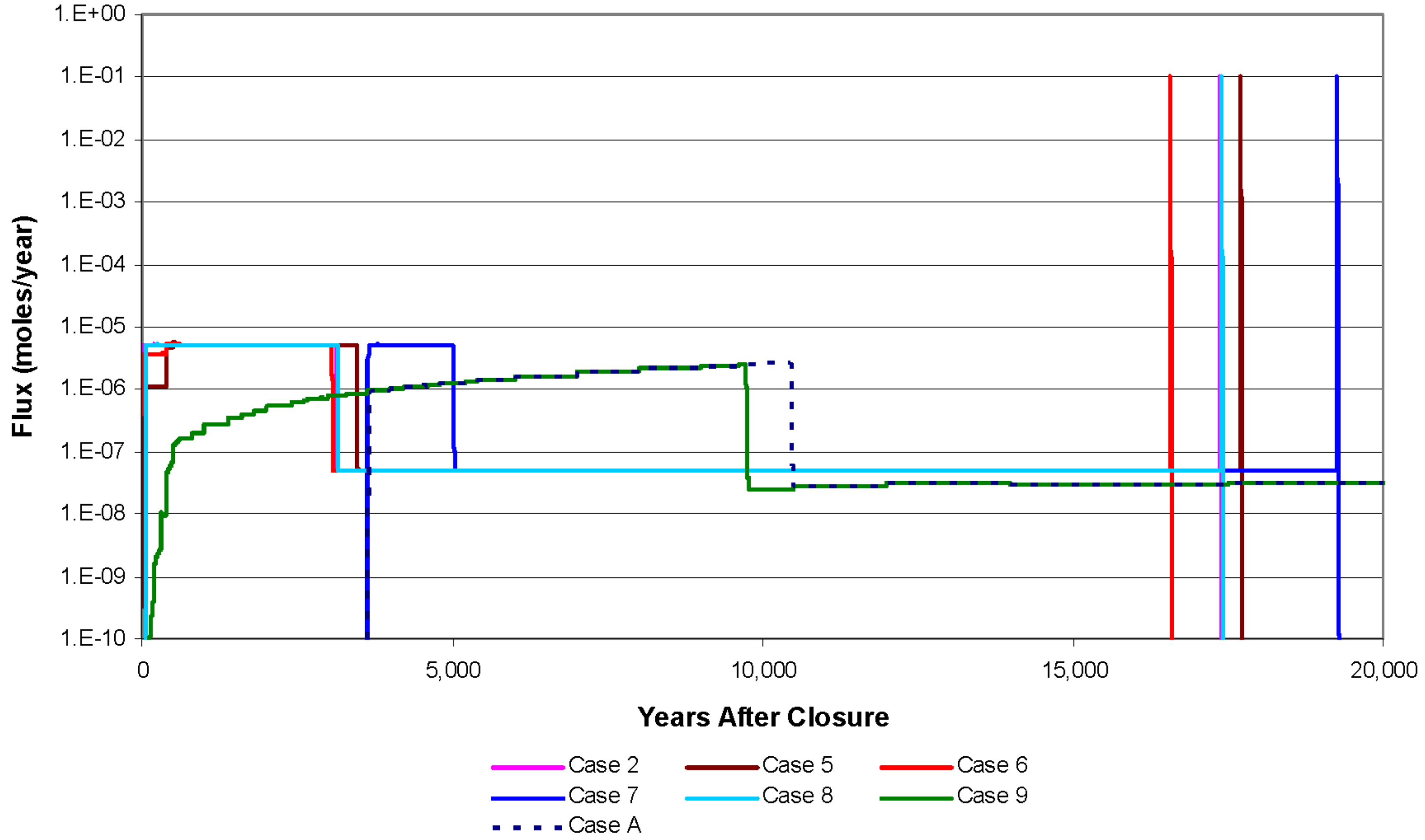


Figure 5.6-85: Tc-99 Flux from Tank 5 (Liner and Tank Concrete Barrier Analysis)

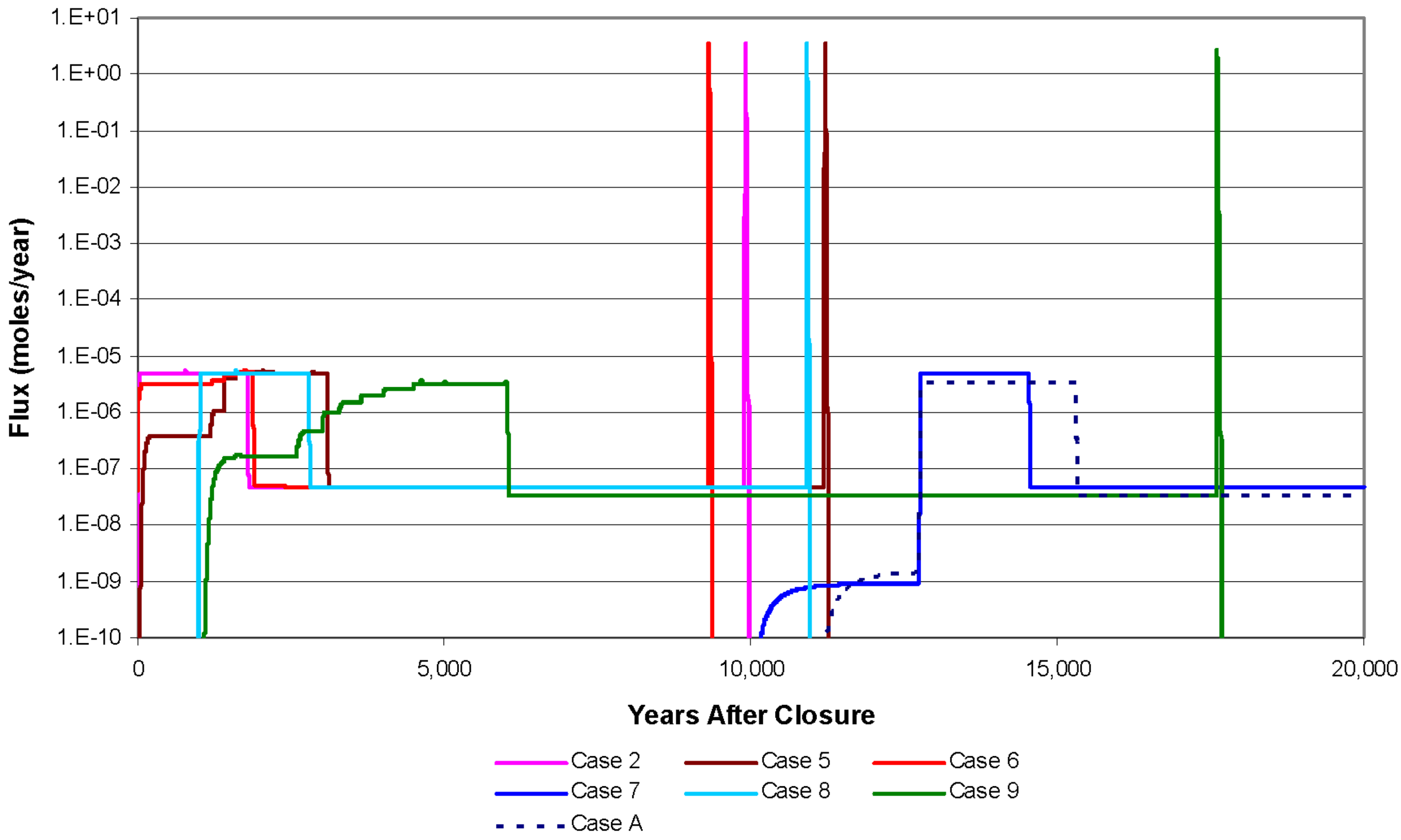


Figure 5.6-86: Tc-99 Flux from Tank 33 (Liner and Tank Concrete Barrier Analysis)

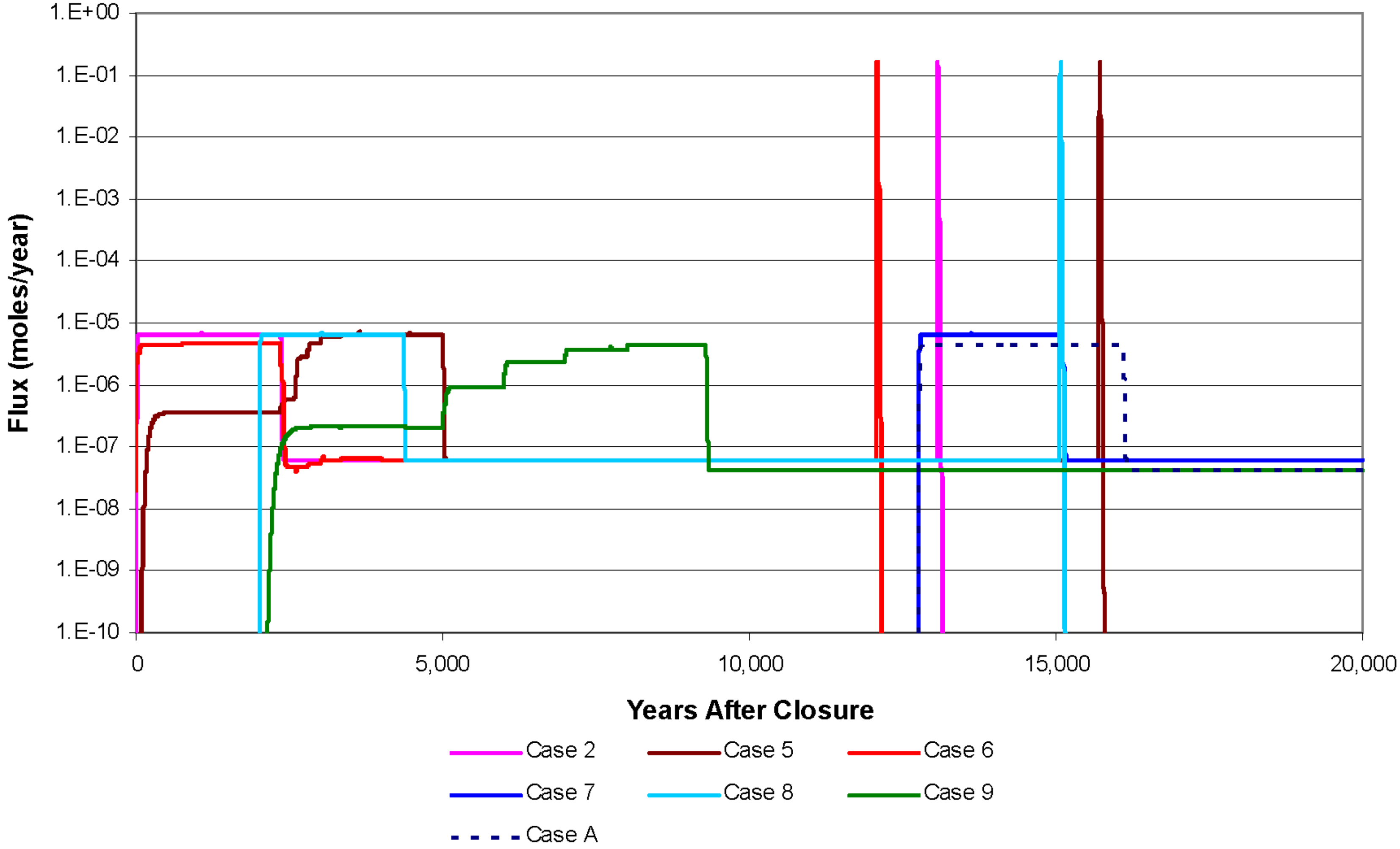


Figure 5.6-87: Pu-239 Flux from Tank 18 (Liner and Tank Concrete Barrier Analysis)

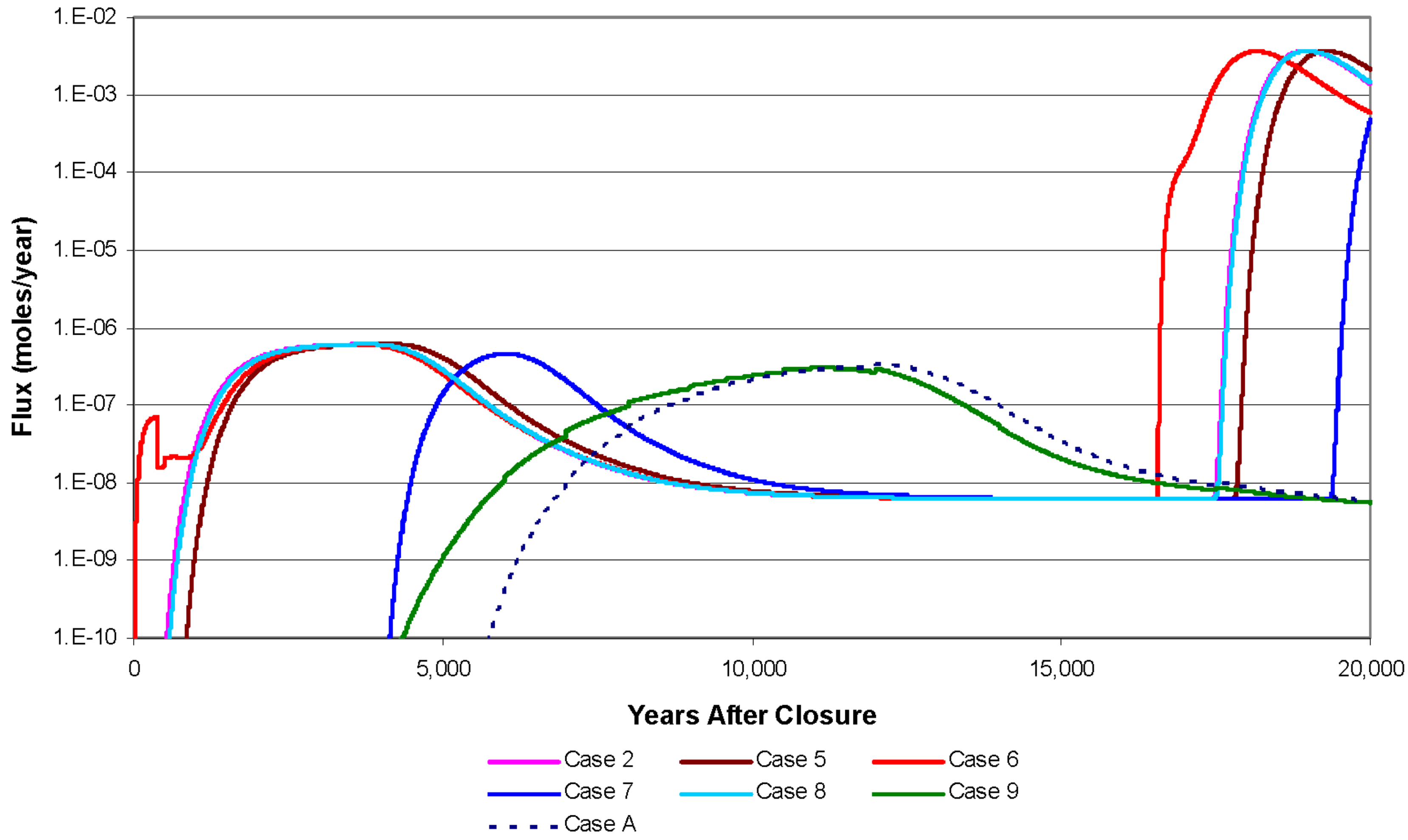


Figure 5.6-88: Pu-239 Flux from Tank 5 (Liner and Tank Concrete Barrier Analysis)

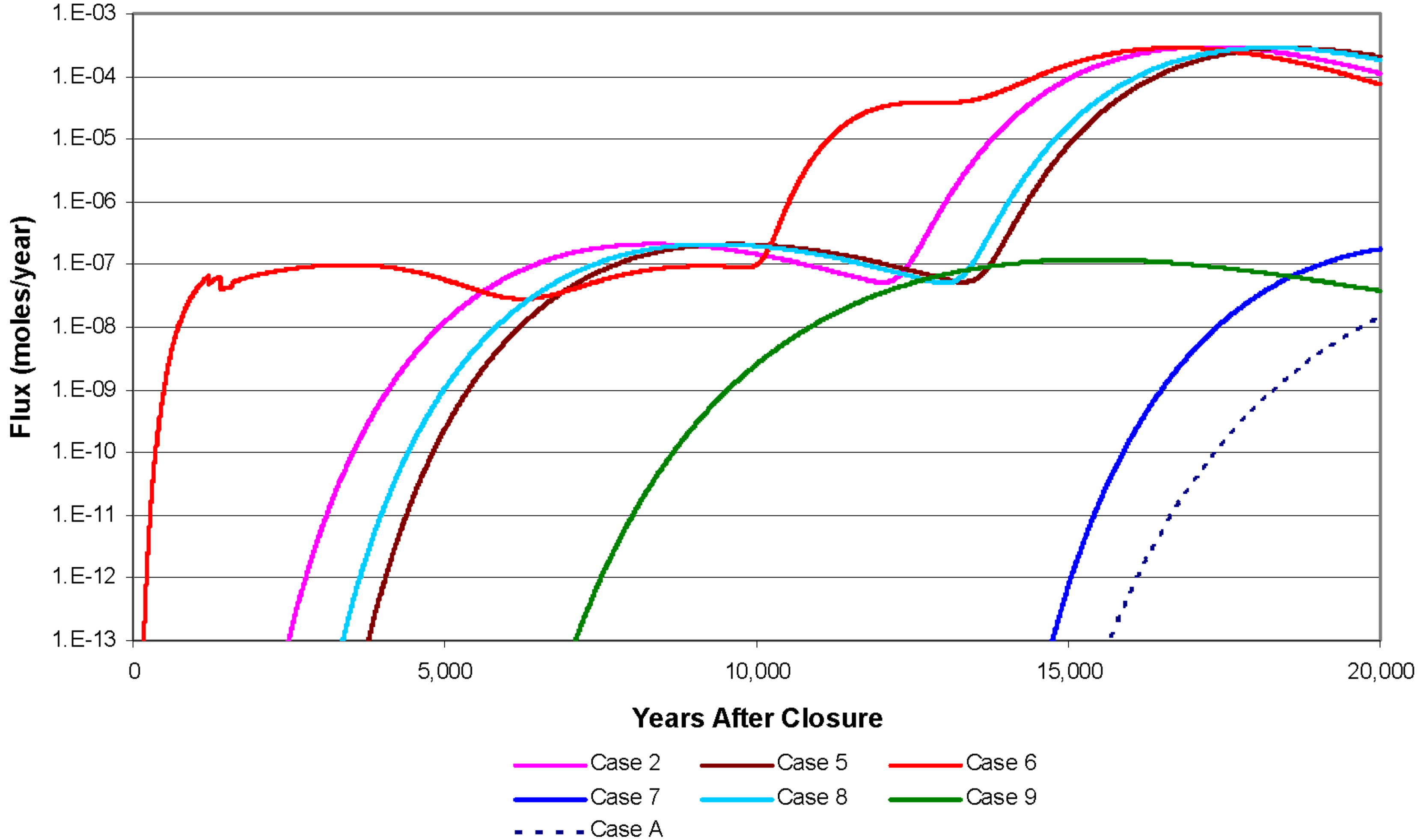
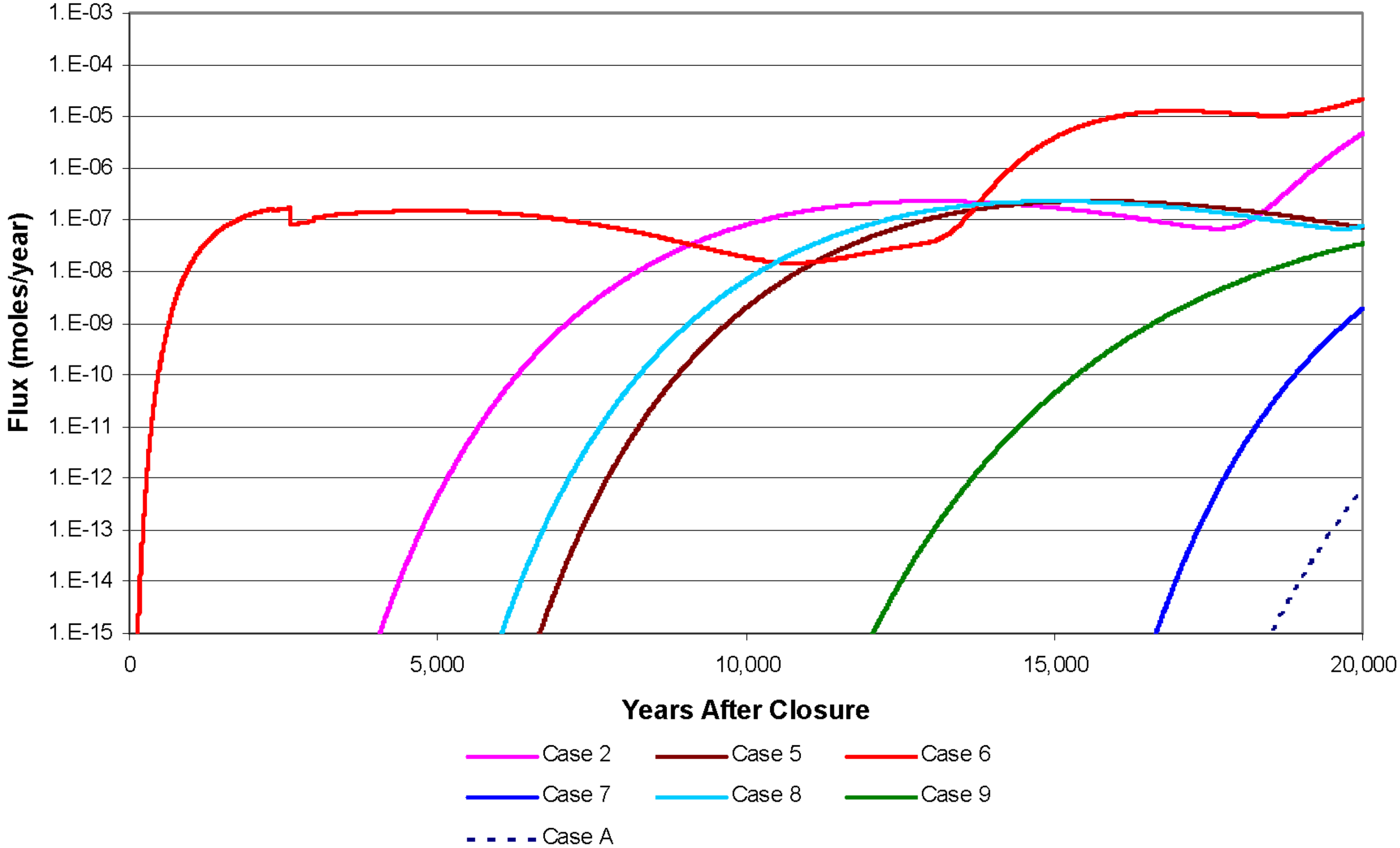


Figure 5.6-89: Pu-239 Flux from Tank 33 (Liner and Tank Concrete Barrier Analysis)



5.6.7.3.4.3 Tank Concrete (Basemat, Wall, and Roof) (Cases 5 and 6)

The concrete barrier analyses looked at cases where the concrete (Basemat, Wall, Roof) is the only barrier intact initially (Case 5) and where the concrete contained a fast flow path (Case 6). The intact concrete has initial hydraulic properties (e.g., failure date) and initial chemical properties unchanged per the Base Case. The partially degraded concrete has initial hydraulic properties (e.g., failure date) and initial chemical properties unchanged per Base Case, but a channel with no flow impedance exists through roof and basemat). The degraded case (Case 2) modeled the concrete as having the hydraulic properties of failed concrete – initial chemical properties unchanged. For all three cases the concrete transitions to Region III earlier than the Base Case.

As seen in Figures 5.6-84 thru 5.6-89 for the concrete cases (Case 5 and Case 6), the concrete barrier does not independently impact the peak flux in 10,000 years but can effect the flux in 20,000 years. The concrete alone can reduce the magnitude of the peak flux and delay the timing of the peak flux, as seen by comparing Case 5 to the concrete partially degraded case (Case 6) and the degraded case (Case 2).

The concrete barrier impact as an independent barrier can be significant (like the grout barrier, but somewhat lesser), independent of the tank type or radionuclide involved. Like the grout cases (discussed below), the concrete barrier degradation case can allow more flow to reach the CZ which can have a considerable impact on many other variables. The concrete as a barrier can have a significant impact on the peak fluxes in 20,000 years.

5.6.7.3.4.4 Grout (Cases 10 and 11)

The grout barrier analyses looked at cases where the grout is the only barrier intact initially (Case 10) and where the grout contained a fast flow path (Case 11). The intact grout has hydraulic properties (e.g., failure date) and chemical properties unchanged per Base Case. The partially degraded grout has hydraulic properties (e.g., failure date) and chemical properties unchanged per Base Case. A channel with no flow impedance exists through the partially degraded grout contains, such that grout does not impart any reducing capacity onto CZ. The degraded case (Case 2) modeled the grout as having the hydraulic properties of failed grout at time 0 – chemical properties unchanged. High flow throughout grout causes grout to impart reducing capacity onto CZ.

As seen in Figures 5.6-90 thru 5.6-95, the grout can have a significant effect on the peak flux. Even with grout as the only barrier intact initially (case 10), the peak flux can be delayed in time for both fast and slow transport times radionuclides. For all tank types, the grout alone can reduce the magnitude of the peak flux and delay the timing of the peak flux, as seen by comparing Case 10 to the grout partially degraded case (Case 11) and the degraded case (Case 2). Comparing the grout fast flow case (Case 11) and the degraded case (Case 2) demonstrate that a fast flow path through the grout has more of an impact than partially degraded grout.

In summary, the impact of the grout as an independent barrier can be pronounced, independent of the tank type or radionuclide involved. The importance of the grout is due to the fact that in some cases the degraded grout is not able to impart any reducing capacity onto CZ and the degraded grout can greatly increase the flow reaching the CZ. The grout as a barrier can have a significant impact on the peak fluxes in 10,000 years.

5.6.7.3.4.5 Contamination Zone (Cases 12 through 15)

The CZ barrier analyses looked at cases where the CZ initial solubility limits are those associated with Oxidized Region II and transitions to Region III per Base Case (2,063 pore volumes) (Cases 13 and 14) and where the CZ initial solubility limits are those associated with Oxidized Region III (Cases 12 and 15). In Cases 12 and 13, all of the barriers besides the CZ are assumed to be fully degraded. In Cases 14 and 15, all of the barriers besides the CZ are assumed to behave per the Base Case. The degraded case (Case 2) modeled the CZ per the Base Case with all of the barriers besides the CZ assumed to be fully degraded.

As seen in Figures 5.6-90 thru 5.6-95, the CZ can have a significant effect on the peak flux, when the CZ initial solubility limits are set to those limits associated with Oxidized Region III (Cases 12 and 15). For most radionuclides, this change to the CZ conditions has more effect than even the degraded case (Case 2), which let all the other barriers be fully degraded but kept the CZ per the Base Case. An exception to the preceding is those radionuclides (e.g., Ra-226) whose solubility limits are higher in Region II than in Region III, as evidenced by the Tank 18 Ra-226 peak flux being essentially the same for the Base Case and Case 15 as shown in Table 5.6-33. The effect on peak flux is minimal when the CZ initial solubility limits are set to those limits associated with Oxidized Region II (Cases 13 and 14), since Oxidized Region II conditions are typically met relatively quickly.

The CZ "barrier" can have a significant impact as an independent barrier if the Oxidized Region III conditions are assumed, independent of the tank type involved. If the Oxidized Region III conditions are assumed for the CZ, the waste release rates for most radionuclides are increased (since most radionuclides have solubility limits higher in Region II than in Region III).

Figure 5.6-90: Tc-99 Flux from Tank 18 (Grout and CZ Barrier Analysis)

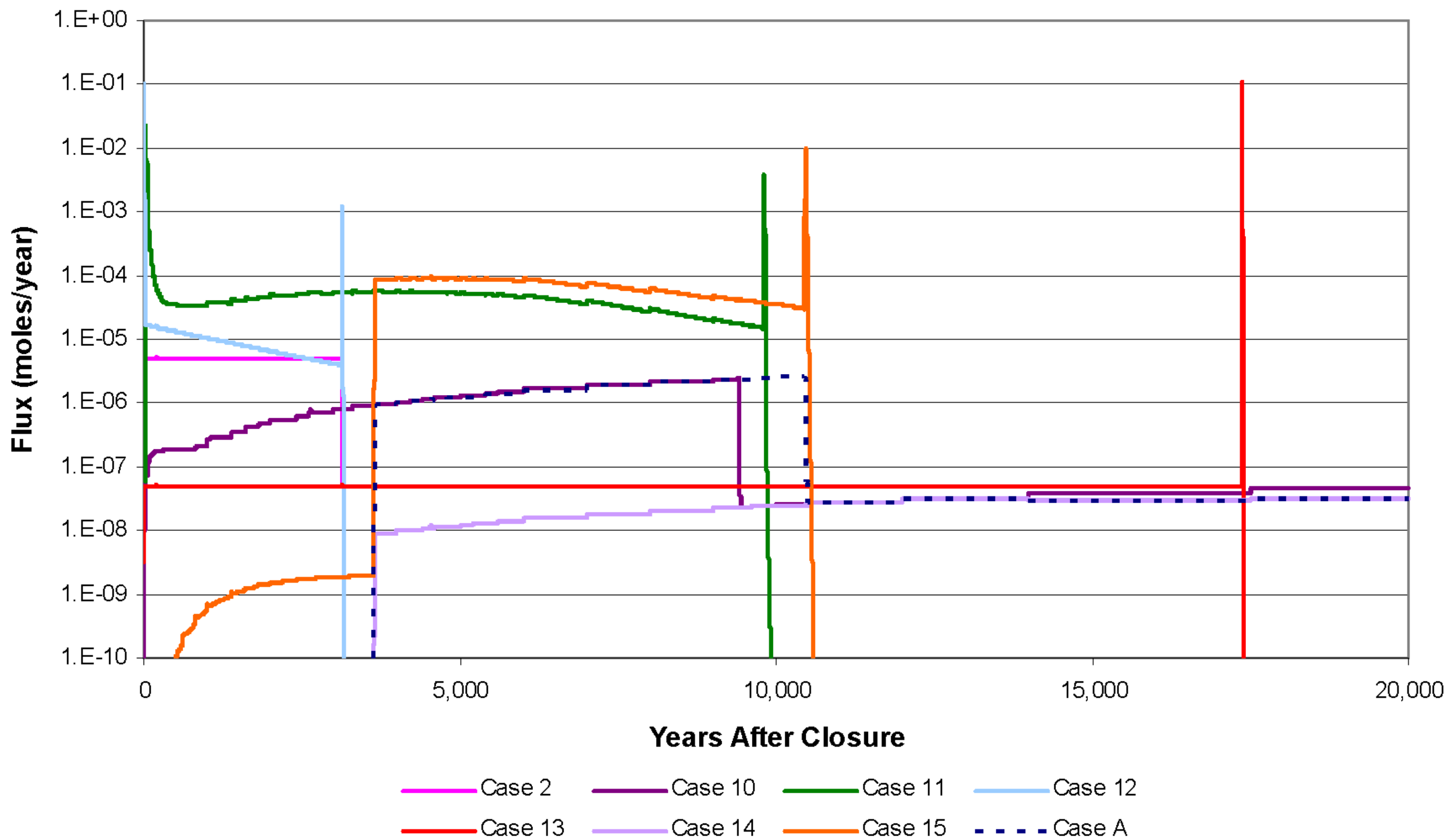


Figure 5.6-91: Tc-99 Flux from Tank 5 (Grout and CZ Barrier Analysis)

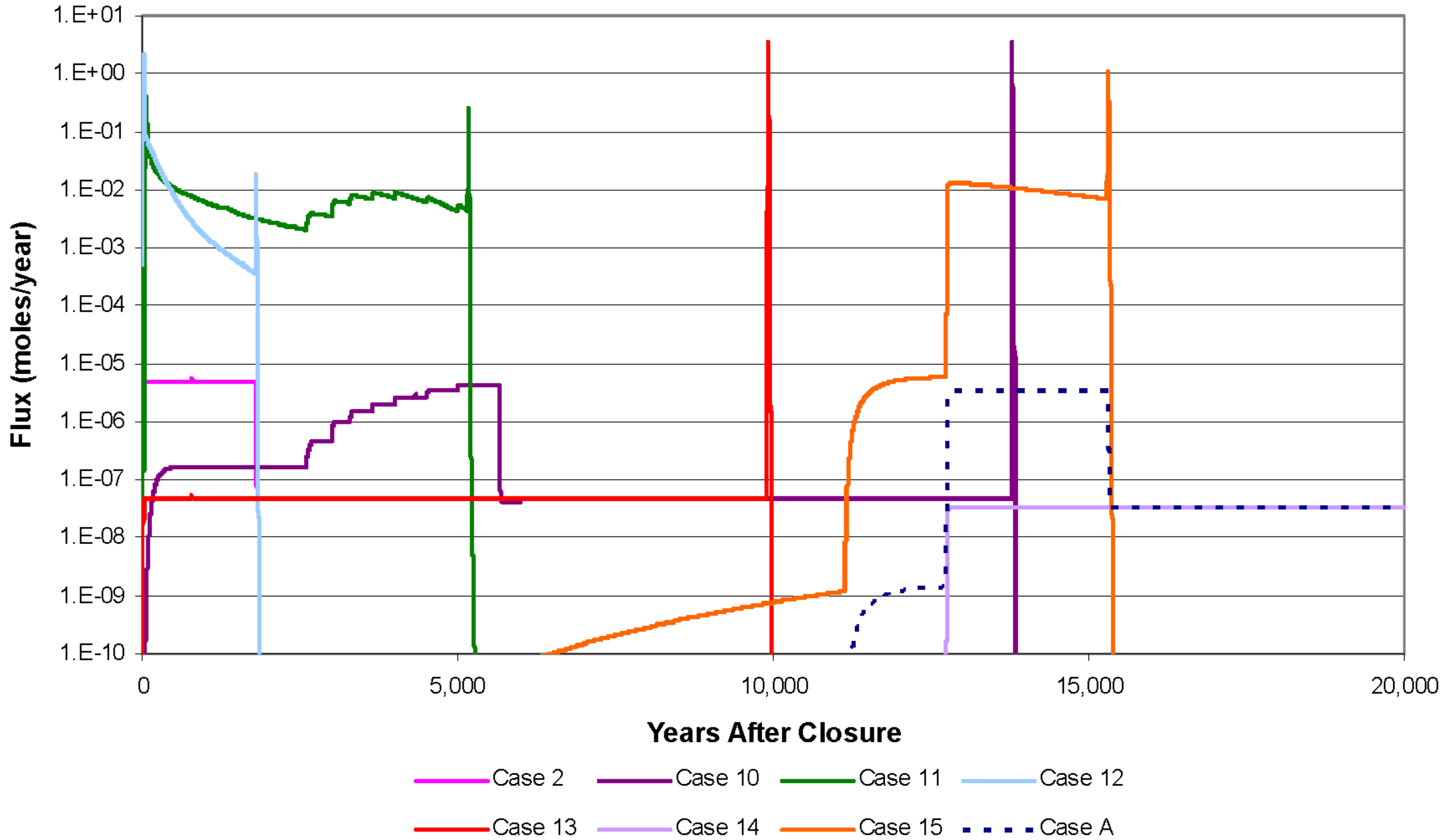


Figure 5.6-92: Tc-99 Flux from Tank 33 (Grout and CZ Barrier Analysis)

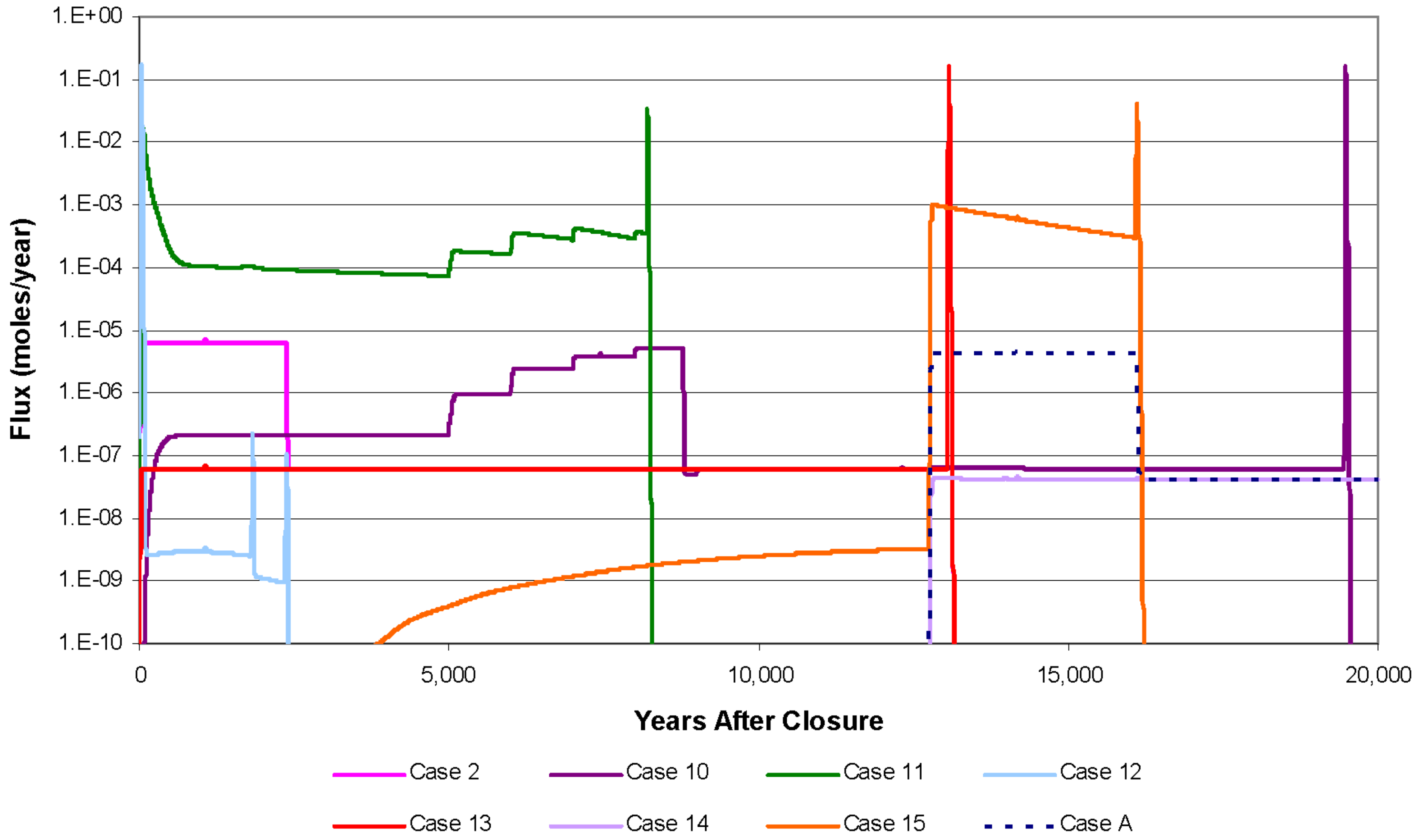


Figure 5.6-93: Pu-239 Flux from Tank 18 (Grout and CZ Barrier Analysis)

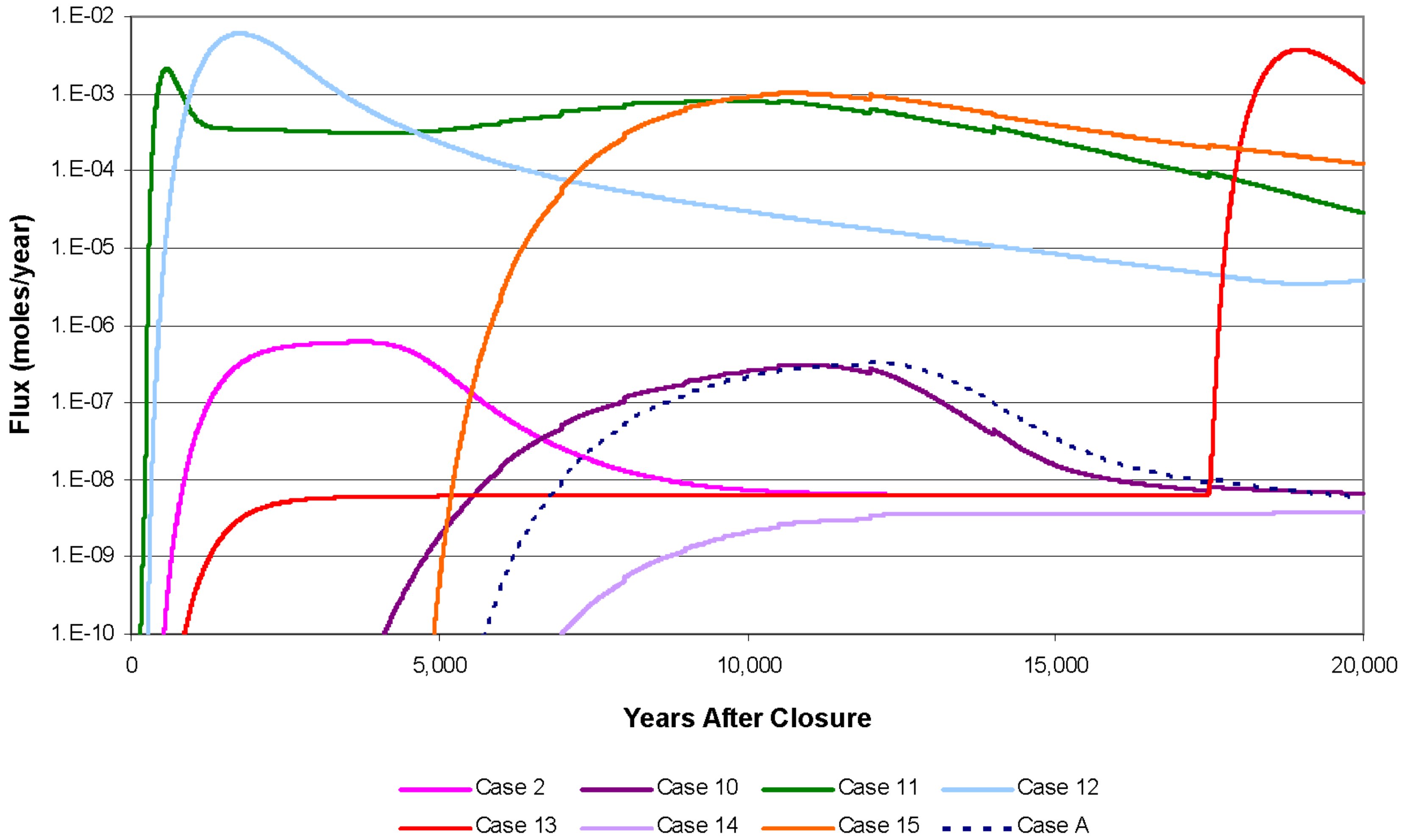


Figure 5.6-94: Pu-239 Flux from Tank 5 (Grout and CZ Barrier Analysis)

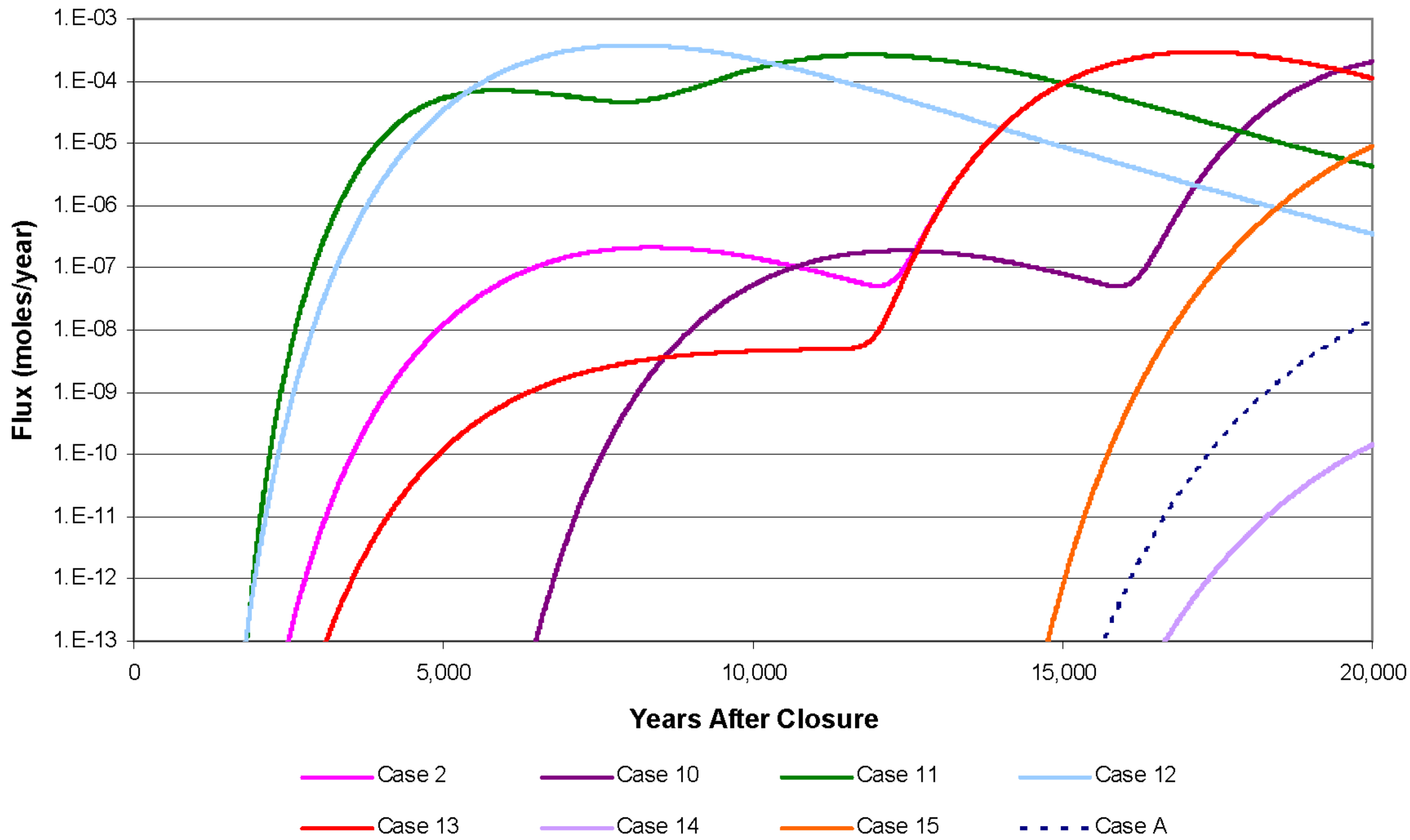
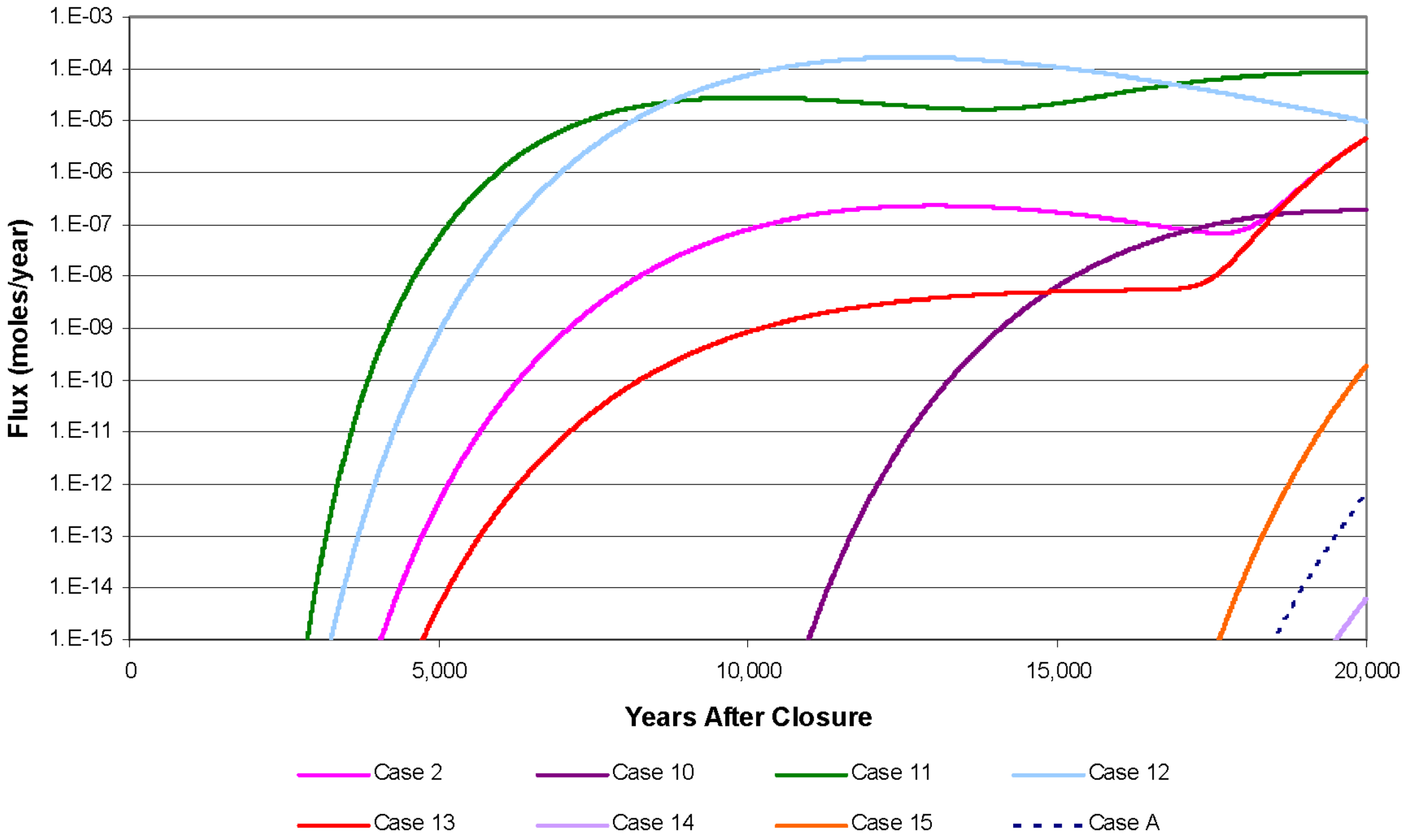


Figure 5.6-95: Pu-239 Flux from Tank 33 (Grout and CZ Barrier Analysis)



5.6.7.4 Case D Analyses using the PORFLOW Deterministic Model

The purpose of this section is to present the fast flow configuration (Case D) sensitivity analysis results obtained using the PORFLOW model. Select parameters within the PORFLOW model have been changed to assess the impact on the groundwater pathways dose at 100m for this Case. A detailed discussion of Configuration D is provided in Section 4.4.2.4. The process change timeline associated with the Case D runs is provided in Section 4.4.3. Case D was chosen as the Case to be presented because it reflects a fast flow configuration and was shown in scoping runs to result in higher peak doses. The Case B results are similar to the Case A results and the Case C results are similar to the Case D results. A summary of the key input differences between the cases and the different flow profiles associated with the cases is provided in Section 5.6.3.1. The peak concentrations for Case D tend to be earlier in time and higher than other cases because Case D allows the barriers to degrade earlier (more information regarding how individual barriers impact results is located in Section 5.6.7.3, Barrier Analyses). The UA/SA results in Section 5.6 show that Case D has a significant influence on the overall results. The 100m sensitivity run radionuclide concentrations for Case D and for the other Non-Base Case configurations (i.e., Cases B, C, E, and F) are documented in Appendices L through P.

The 100m radionuclide concentrations documented in Appendix L were used to calculate the Case D total dose associated with the individual MOP 100m pathways identified in Section 5.4. Figure 5.6-96 shows the Case D peak 100m groundwater pathway doses over time for 10,000 years for the five 100m sectors. The peak dose is from Sector D at approximately 15 mrem/yr at year 4,100, and is associated with Np-237 (greater than 90% of the dose). The individual radionuclide contributions are shown in Figure 5.6-97. As seen in the process change timeline in Section 4.4.3, many of the waste tank model elements (e.g., grout, liner, basemat) degrade earlier and or faster in Case D, causing most radionuclides to reach the 100 meter well earlier. Many dose peaks that were observed between years 10,000 and 20,000 for Case A are moved in time to prior to year 10,000 for Case D.

Figure 5.6-96: Case D Member of the Public Peak Groundwater Pathway Results within 10,000 Years for the Five 100m Sectors

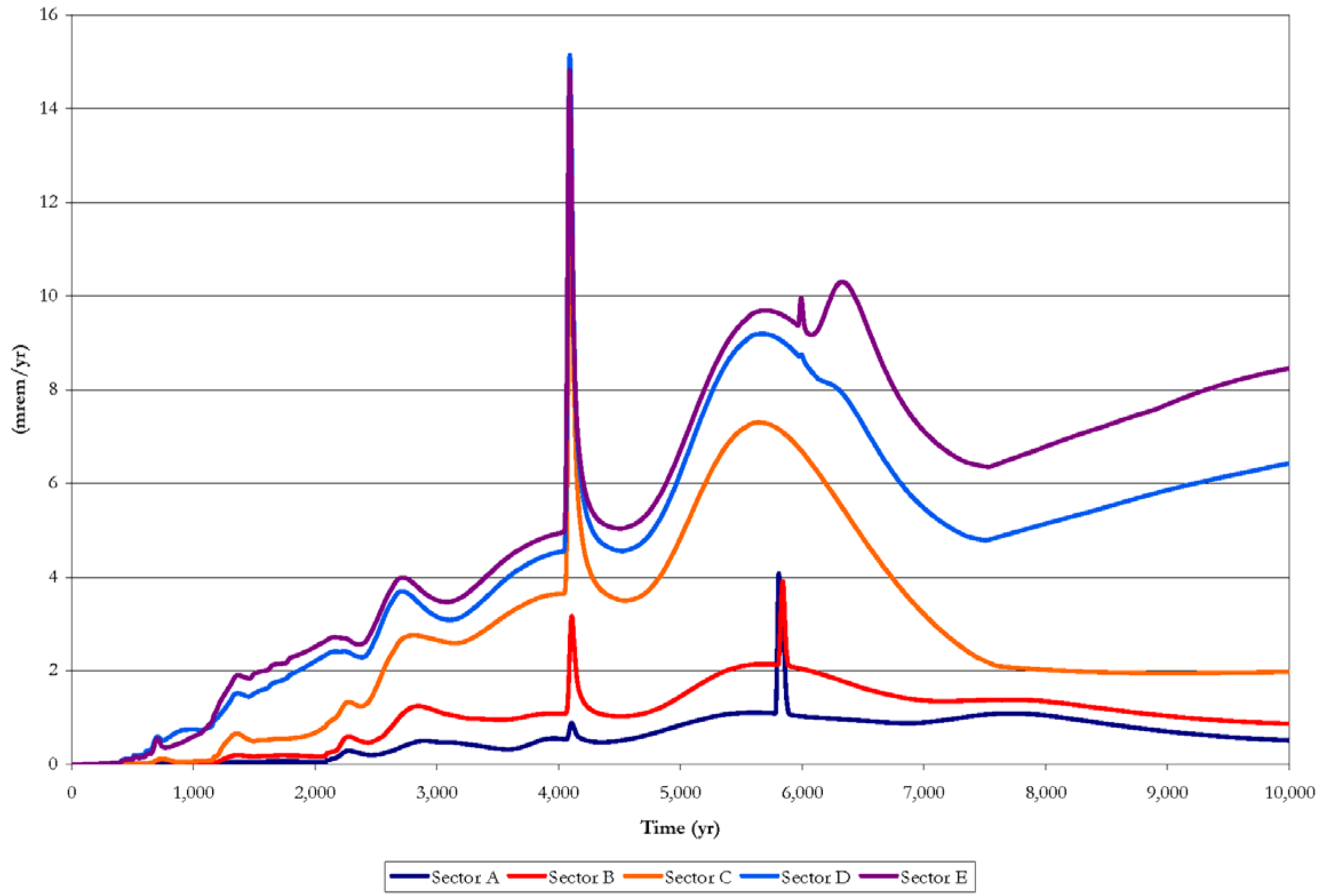
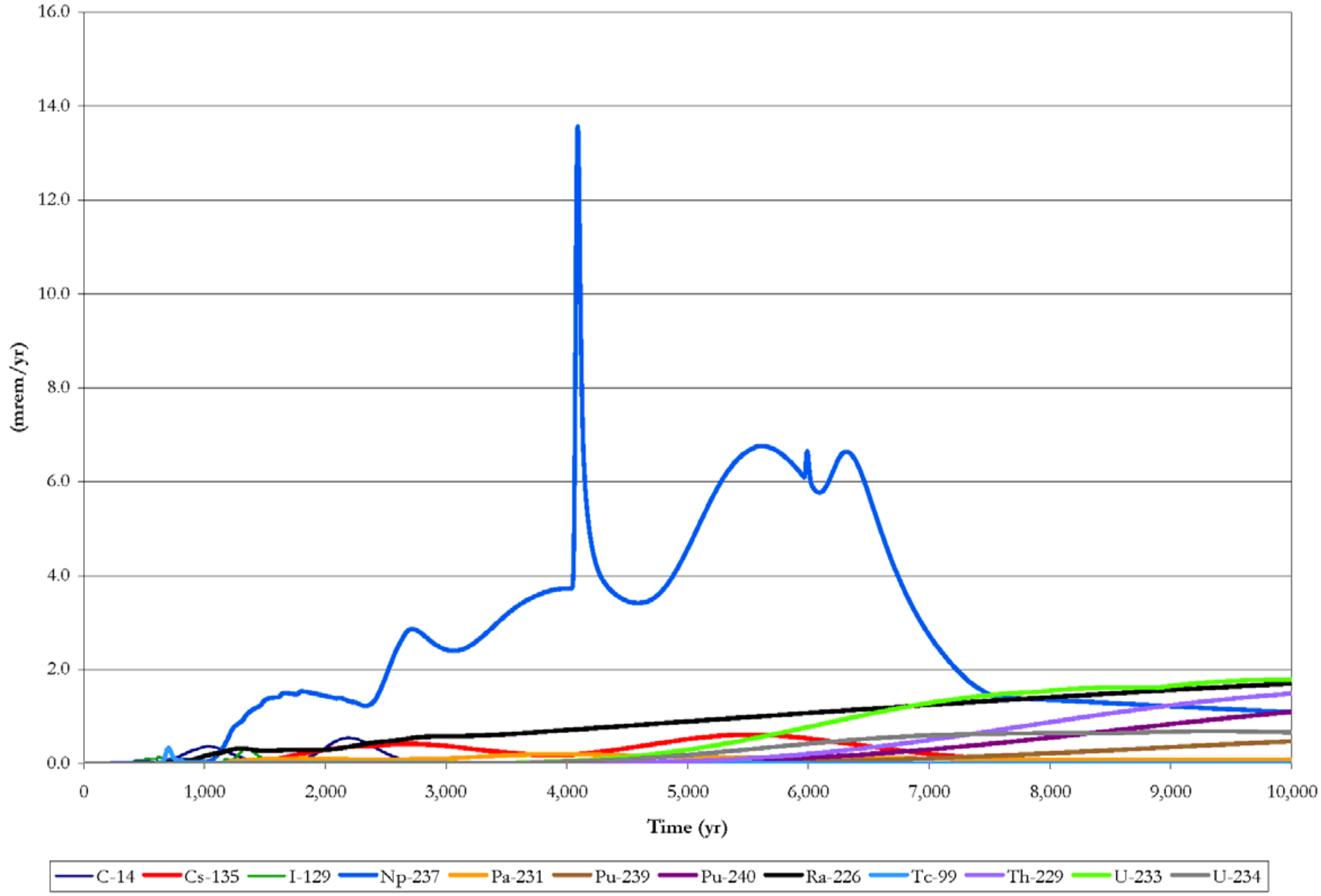


Figure 5.6-97: Case D Individual Radionuclide Contributors to the Sector D 100m Peak Groundwater Pathway Dose – 10,000 Years



5.7 RCRA/CERCLA Risk Analysis

The RCRA/CERCLA risk assessment for the FTF closure follows the current ACP protocols for human health and ecological risk assessments. [ERD-AG-003_F.17, ERD-AG-003_P.1.4, ERD-AG-003_P.1.5, ERD-AG-003_P.5.2, and ERD-AG-003_P.10.1] Based on available characterization data and estimated volume of residual material expected to remain in each of the waste tanks and ancillary equipment, the chemical and radiological inventory used for PA modeling has been calculated for FTF as discussed in Section 3.3. As discussed in Section 4.8, the placement of a low-permeability closure cap with at least 10 feet of clean backfill soil will ensure that the surface soils (0 to 1 foot) and the subsurface soils (1 to 4 feet) will not be contaminated and that there is no pathway for human health or ecological risk. The potential receptors of contamination include:

1. The industrial worker excavating deep soil containing PTSM
2. The resident who will be exposed to groundwater (ingestion and dermal contact)

Modeling was conducted to determine the peak concentrations of the non-radiological and radiological contaminants in the groundwater over the next 10,000 years.

5.7.1 Principal Threat Source Material

PTSMs are those materials that include or contain hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water or air, or that act as a source for direct exposure. The USEPA defines PTSM as those sources materials considered to be highly toxic or mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. [OSWER 9380.3-06FS]

The FTF waste tanks and ancillary equipment will contain a heel of highly contaminated material that would present a significant risk should exposure occur, so they are, by definition, PTSM. The tanks and the heels remaining in the tanks will be stabilized and then covered as part of tank closure. This approach is consistent with ACP remediation of reactor seepage basins which contain highly contaminated soils determined to be PTSM. No additional evaluation will be made to determine that the source material is PTSM.

5.7.2 Contaminant Migration Constituents of Concern (CMCOC)

CMCOCs were identified through a system that is consistent with both the ACP protocols and the PA. CMCOCs were identified by modeling the release of contaminants and their travel through the vadose zone. The same model used for the PA to meet 10 CFR 61 requirements is the basis of the CMCOC evaluation. The concentrations of contaminants that are modeled to reach the water table are compared to MCL, RSLs, PRG or other appropriate standards in cases where the constituent does not have an MCL. Any constituents that are predicted to exceed these standards (i.e., fraction greater than 1.0) in the groundwater directly beneath FTF (1m from boundary) are identified as CMCOCs as shown in Table 5.7-1 and 5.7-2. The CMCOCs identified using the described protocols are: I-129, K-40, Np-237, Pa-231, Pu-239, Pu-240, Ra-226 + Ra-228, Tc-99, Th-229, U-233, U-234, U-236, Cd and Mn.

Table 5.7-1: Groundwater Radionuclide Concentrations at 1m from FTF (a)

Radionuclide	MCL (pCi/L)	Residential Tap Water PRG** (pCi/L)	Peak Concentration (pCi/L) 1 to 10,000 Years	Fraction of MCL or PRG at 1m
Ac-227	N/A	2.4E-01	2.3E-04	9.6E-04
Al-26	N/A	2.8E+00	5.7E-02	2.0E-02
Am-241	N/A	4.6E-01	2.1E-01	4.6E-01
Am-242m	N/A	6.7E-01	7.4E-19	1.1E-18
Am-243	N/A	4.6E-01	1.2E-02	2.6E-02
Ba-137m*	N/A	Cs-137 daughter	*	N/A
Bk-249	N/A	4.3E+01	*	N/A
C-14	2,000	MCL used***	8.8E+02	4.4E-01
Ce-144	N/A	1.4E+00	*	N/A
Cf-249	N/A	3.8E-01	2.0E-09	5.3E-09
Cl-36	700	MCL used***	5.5E+00	7.9E-03
Cm-242	N/A	1.2E+00	*	N/A
Cm-243	N/A	5.0E-01	<1.0E-30	<1.0E-30
Cm-244	N/A	5.7E-01	<1.0E-30	<1.0E-30
Cm-245	N/A	4.6E-01	1.8E-01	3.9E-01
Cm-247	N/A	4.8E-01	4.0E-04	8.3E-04
Cm-248	N/A	5.0E-03	3.8E-04	7.6E-02
Co-60	100	MCL used***	<1.0E-30	<1.0E-30
Cs-134	N/A	1.1E+00	*	N/A
Cs-135	900	MCL used***	5.5E+02	6.1E-01
Cs-137	200	MCL used***	3.1E-11	1.6E-13
Eu-152	200	MCL used***	<1.0E-30	<1.0E-30
Eu-154	60	MCL used***	<1.0E-30	<1.0E-30
Eu-155	N/A	2.5E+01	*	N/A
Gd-152	N/A	1.6E+00	*	N/A
H-3	20,000	MCL used	2.0E-08	1.0E-12
I-129	1	MCL used***	2.0E+00	2.0E+00
K-40	N/A	1.9E+00	2.1E+00	1.1E+00
Mo-93m	N/A	1.5E+02	*	N/A
Na-22	N/A	5.0E+00	*	N/A
Nb-93m	1,000	MCL used***	1.5E+01	1.5E-02
Nb-94	N/A	6.1E+00	1.9E+00	3.1E-01
Ni-59	N/A	1.7E+02	7.8E+01	4.6E-01
Ni-63	N/A	7.1E+01	2.5E-01	3.5E-03
Np-237	N/A	7.7E-01	1.3E+01	1.7E+01
Pa-231	N/A	2.8E-01	3.1E-01	1.1E+00
Pb-210	N/A	5.4E+02	2.1E-02	3.9E-05
Pd-107	N/A	1.9E+02	1.5E+00	7.9E-03
Pm-147	N/A	2.8E+01	*	N/A

Table 5.7-1: Groundwater Radionuclide Concentrations at 1m from FTF (Continued)

Radionuclide	MCL (pCi/L)	Residential Tap Water PRG** (pCi/L)	Peak Concentration (pCi/L) 1 to 10,000 Years	Fraction of MCL or PRG at 1m
Pr-144	N/A	5.9E+02	*	N/A
Pu-238	N/A	3.6E-01	6.6E-16	1.8E-15
Pu-239	N/A	3.5E-01	1.6E+00	4.6E+00
Pu-240	N/A	3.5E-01	4.0E+00	1.1E+01
Pu-241	N/A	2.7E+01	8.0E-01	3.0E-02
Pu-242	N/A	3.7E-01	8.9E-02	2.4E-01
Pu-244	N/A	3.5E-01	1.5E-04	4.3E-04
Ra-226 + Ra-228	5.00E+00	MCL used	8.1E+00	1.6E+00
Ra-228	N/A	4.6E-02	4.1E-04	8.9E-03
Rh-106*	N/A	Ru-106 daughter	*	N/A
Ru-106 + D	N/A	1.1E+00	*	N/A
Sb-125	N/A	1.1E+01	*	N/A
Sb-126	N/A	4.3E+00	*	N/A
Sb-126m	N/A	7.2E+02	*	N/A
Se-79	N/A	6.5E+00	3.4E+00	5.2E-01
Sm-147	N/A	1.3E+00	*	N/A
Sm-151	1,000	MCL used	1.3E-24	1.3E-27
Sn-126	N/A	1.9E+00	5.1E-04	2.7E-04
Sr-90	8	MCL used	4.0E-05	5.0E-06
Tc-99	900	MCL used	1.1E+03	1.2E+00
Te-125m	N/A	1.4E+01	*	N/A
Th-228	N/A	4.5E-01	4.1E-04	9.1E-04
Th-229	N/A	2.1E-01	5.4E+00	2.6E+01
Th-230	N/A	5.2E-01	3.5E-01	6.7E-01
Th-232	N/A	4.7E-01	5.5E-07	1.2E-06
U-232	N/A	1.6E-01	2.3E-16	1.4E-15
U-233	N/A	6.6E-01	1.1E+02	1.7E+02
U-234	N/A	6.7E-01	5.1E+01	7.6E+01
U-235	N/A	6.8E-01	9.7E-02	1.4E-01
U-236	N/A	7.1E-01	1.8E+00	2.5E+00
U-238	N/A	7.4E-01	2.5E-02	3.4E-02
Y-90*	N/A	2.6E+00	*	N/A
Zr-93	2,000	MCL used***	1.0E-03	5.0E-07

(a) CMCOCs are shaded gray in the table.
* Daughters are assumed to be in equilibrium with the parent nuclide.
** Residential tap water PRGs are calculated at *http://epa-prgs.ornl.gov/radionuclides/*, based on a target cancer risk of 1.0E-06.
*** MCL values for beta and photon emitters are calculated in Table II-3 of FR-00-9654 based on a beta-gamma dose of 4 mrem/yr.

N/A = Not Available

Table 5.7-2: Groundwater Chemical Concentrations at 1m from FTF

Chemical	MCL (μg/L)	Tap Water RSLs* (μg/L)	Peak Concentration (μg/L) 1 to10,000 Yrs	Fraction of MCL or PRG at 1m
Sb	6.0E+00	MCL used	4.5E-05	7.5E-06
As	1.0E+01	MCL used	1.9E-01	1.9E-02
Ba	2.0E+03	MCL used	1.6E+00	8.0E-04
Cd	5.0E+00	MCL used	1.4E+01	2.8E+00
Total Chromium	1.0E+02	MCL used	2.7E+00	2.7E-02
Cu	1.0E+03	MCL used	4.4E+00	4.4E-03
F	2.0E+03	MCL used	3.9E+01	2.0E-02
Fe	3.0E+02	MCL used	2.0E+02	6.7E-01
Pb	1.5E+01	MCL used	5.8E-03	3.9E-04
Mn	5.0E+01	MCL used	2.2E+02	4.4E+00
Hg	2.0E+00	MCL used	7.6E-02	3.8E-02
Ni	N/A	7.3E+02	4.0E+00	5.5E-03
NO_2+ NO_3	1.0E+04	MCL used	1.9E+03	1.9E-01
Se	5.0E+01	MCL used	3.1E-02	6.2E-04
Ag	N/A	1.8E+02	4.6E+00	2.6E-02
U	3.0E+01	MCL used	1.4E-01	4.7E-03
Zn	5.0E+03	MCL used	4.2E+00	8.4E-04

* RSLs are calculated at: www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/, based on a target cancer risk of 1.0E-06.

N/A = Not Available

5.7.2.1 Iodine-129

Iodine-129 has a peak concentration of 2.0 pCi/L at 1m compared to the MCL of 1.0 pCi/L. This peak concentration occurs approximately 3784 years following the assumed 100-year active control period. As shown in Table 5.7-3, the peak concentration drops to 0.55 pCi/L at 100m, which is below the MCL and drops to 1.3E-02 pCi/L at the UTR seepline

5.7.2.2 Potassium-40

Potassium-40 has a peak concentration of 2.1 pCi/L at 1m compared to the PRG of 1.9 pCi/L. This peak concentration occurs approximately 3924 years following the assumed 100-year active control period. As shown in Table 5.7-3, the peak concentration drops to 0.47 pCi/L at 100m, which is below the PRG value and drops to 0 pCi/L at the UTR seepline

5.7.2.3 Neptunium-237

Neptunium-237 does not have an MCL so the peak concentration of 13 pCi/L at 1m is compared to the calculated PRG of 0.77 pCi/L. [http://epa-prgs.ornl.gov/radionuclides/] This peak concentration occurs 6,036 years following the assumed 100-year active control period.

As shown in Table 5.7-3, the peak concentration drops to 2.7 pCi/L at 100m, and drops to 6.0E-02 pCi/L at the UTR seepline, which is below the PRG value.

5.7.2.4 Protactinium-231

Protactinium-231 does not have an MCL so the peak concentration of 0.31 pCi/L at 1m is compared to the calculated PRG of 0.28 pCi/L. [***http://epa-prgs.ornl.gov/radionuclides/***] This peak concentration occurs 6,034 years following the assumed 100-year active control period. As shown in Table 5.7-3, the peak concentration drops to 6.5E-02 pCi/L at 100m, which is below the PRG value.

5.7.2.5 Plutonium-239 and 240

Both of these plutonium isotopes have calculated PRGs of 0.35 pCi/L. [*http://epa-prgs.ornl.gov/radionuclides/*] The peak concentration for Pu-239 of 1.6 pCi/L at 1m occurs 10,000 years following the assumed 100-year active control period. As shown in Table 5.7-3, the peak concentration drops to 5.2E-03 pCi/L at 100m, which is below the PRG value.

The peak concentration for Pu-240 of 4.0 pCi/L at 1m occurs 10,000 years following the assumed 100-year active control period. As shown in Table 5.7-3, the peak concentration drops to 1.0E-02 pCi/L at 100m, which is below the PRG value.

5.7.2.6 Radium-226 and 228

Radium-226 has a peak concentration of 8.1 pCi/L at 1m compared to the MCL of 5.0 pCi/L for total radium. This peak concentration occurs approximately 10,000 years following the assumed 100-year active control period. As shown in Table 5.7-3, the peak concentration drops to 1.7 pCi/L at 100m which is below the MCL value. The peak concentration of Ra-228 is 4.1E-04 pCi/L at 1 m and 7.5E-07 at 100m.

5.7.2.7 Technetium-99

Technetium-99 has a peak concentration of 1,100 pCi/L at 1m compared to the MCL of 900 pCi/L. This peak concentration occurs approximately 678 years following the assumed 100-year active control period. As shown in Table 5.7-3, the peak concentration drops to 270 pCi/L at 100m, which is below the MCL value and drops to 5.9 pCi/L at the UTR seepline.

5.7.2.8 Thorium-229

Thorium-229 does not have an MCL so the peak concentration of 5.4 pCi/L at 1m is compared to the calculated PRG of 0.21 pCi/L. [*http://epa-prgs.ornl.gov/radionuclides/*] This peak concentration occurs 10,000 years following the assumed 100-year active control period. As shown in Table 5.7-3, the peak concentration drops to 8.6E-02 pCi/L at 100m, which is below the PRG value.

5.7.2.9 Uranium-233

Uranium-233 does not have an MCL so the peak concentration of 110 pCi/L at 1m is compared to the calculated PRG of 0.66 pCi/L. [*http://epa-prgs.ornl.gov/radionuclides/*] This peak concentration occurs at approximately 10,000 years following the assumed 100-year active control period. As shown in Table 5.7-3, the peak concentration drops to 3.6

pCi/L at 100m, and drops to 5.1E-06 pCi/L at the UTR seepline, which is below the PRG value.

5.7.2.10 Uranium-234

Uranium-234 does not have an MCL so the peak concentration of 51 pCi/L at 1m is compared to the calculated PRG of 0.67 pCi/L. [*http://epa-prgs.ornl.gov/radionuclides/*] This peak concentration occurs at approximately 9,000 years following the assumed 100-year active control period. As shown in Table 5.7-3, the peak concentration drops to 2.7 pCi/L at 100m, and drops to 4.5E-10 pCi/L at the UTR seepline, which is below the PRG value.

5.7.2.11 Uranium-236

Uranium-236 does not have an MCL so the peak concentration of 1.8 pCi/L at 1m is compared to the calculated PRG of 0.71 pCi/L. [*http://epa-prgs.ornl.gov/radionuclides/*] This peak concentration occurs 10,000 years following the assumed 100-year active control period. As shown in Table 5.7-3, the peak concentration drops to 0.086 pCi/L at 100m, which is below the PRG value.

5.7.2.12 Cadmium

Cadmium has a peak concentration of 14 μg/L at 1m compared to the MCL of 5.0 μg/L. The peak concentration occurs approximately 7,100 years following the assumed 100-year active control period. As shown in Table 5.7-3, the peak concentration drops to 2.9 μg/L at 100m, which is below the MCL value.

5.7.2.13 Manganese

Manganese has a peak concentration of 222 μg/L at 1m compared to the MCL of 50 μg/L. The peak concentration occurs approximately 4,800 years following the assumed 100-year active control period. As shown in Table 5.7-3, the peak concentration of manganese at 100m drops to 37 mg/L, which is below the MCL value.

Table 5.7-3: Groundwater Concentrations of CMCOCs at 100m and Seepline

Contaminant	MCL (pCi/L[1] or μg/L[2])	Residential Tap Water PRG (pCi/L)	Peak Concentration at 100m (pCi/L or μg/L[2]) 1 to 10,000 Yrs	Fraction of MCL or PRG at 100m	Peak Concentration at UTR Seepline (pCi/L) 1 to 10,000 Yrs	Fraction of MCL or PRG at UTR Seepline
I-129	1.0E+00[1]	MCL used	5.5E-01	5.5E-01	1.3E-02	1.3E-02
K-40	N/A	1.9E+00	4.7E-01	2.5E-01	0.0E+00	0.0E+00
Np-237	N/A	7.7E-01	2.7E+00	3.5E+00	6.0E-02	7.8E-02
Pa-231	N/A	2.8E-01	6.5E-02	2.3E-01	1.7E-03	6.1E-03
Pu-239	N/A	3.5E-01	5.2E-03	1.5E-02	1.3E-15	3.7E-15
Pu-240	N/A	3.5E-01	1.0E-02	2.9E-02	1.1E-15	3.4E-15
Ra-226 + Ra-228	5.0E+00[1]	MCL used	1.7E+00	3.4E-01	N/A	N/A
Tc-99	900[1]	MCL used	2.7E+02	3.0E-01	5.9E+00	6.6E-03
Th-229	N/A	2.1E-01	8.6E-02	4.1E-01	2.4E-07	1.1E-06
U-233	N/A	6.6E-01	3.6E+00	5.5E+00	5.1E-06	7.7E-06
U-234	N/A	6.7E-01	2.7E+00	4.0E+00	4.5E-10	6.7E-10
U-236	N/A	7.1E-01	8.6E-02	1.2E-01	6.3E-12	8.9E-12
Cadmium	5.0E+00[2]	MCL used	2.9E+00[2]	5.8E-01	N/A	N/A
Manganese	5.0E+01[2]	MCL used	3.7E+01[2]	7.4E-01	N/A	N/A

[1] pCi/L
[2] μg/L

Note: Contaminants shaded in gray exceed the PRG at 100m.

5.7.3 Evaluation of Results

CMCOCs are often addressed by the placement of a low permeability cap such as is planned for the FTF closure and described in Section 3.2.4. As described in Sections 2.4.2 and 2.4.3, the *SRS Long Range Comprehensive Plan* (PIT-MISC-0041_OUO) is founded on the following:

- The entire site will be owned and controlled by the federal government in perpetuity,
- The property will be used only for industrial purposes,
- Site boundaries will remain unchanged, and
- Residential use will not be allowed onsite.

Therefore, a scenario in which an individual establishes a residence on the FTF and obtains drinking water from the water table below is very unlikely. A more probable location for the MEI would be at the UTR seepline located approximately one mile from the FTF. As discussed previously, all isotopes meet the PRGs or MCLs at the UTR seepline.

5.8 ALARA Analysis

DOE's approach to radiation protection for LLW disposal units is based on the performance objectives listed in DOE O 435.1-1, which specify maximum doses for various pathways, and on the ALARA principle, which requires doses to be maintained *"As Low As Reasonably Achievable"*. The ALARA requirement states in DOE O 435.1-1: *"Performance assessments shall include a determination that projected releases of radionuclide to the environment shall be maintained as low as reasonably achievable (ALARA).*"

The goal of the ALARA process is attainment of the lowest practical dose level after taking into account social, technical, economic, and public policy considerations. SRS has a well documented ALARA program and processes established in company level policies and procedures.

For the FTF PA modeling, a 100m buffer zone surrounding FTF and the seepline were evaluated after an institutional control period of 100 years. Conservatisms in the PA modeling are summarized in Section 7.2. In addition, SRS land use plans indicate that that the current SRS boundaries will remain unchanged. Under this plan, the land will remain under the ownership of the federal government, consistent with the site's designation as a NERP. Thus, no MOP would have unrestricted access to the FTF. Because the FTF is a much greater distance (approximately five miles) from the site boundary than 100m, and groundwater potentially affected by releases from the FTF is completely intercepted by UTR and Fourmile Branch, the PA modeling demonstrates protection of the public at the site boundary to a much greater degree than at a distance of 100m from the demarcation line from which the 1m and 100m concentrations are calculated. Considerable more dispersion of any radionuclides released to groundwater or air would occur if the closest access point to the FTF is the SRS site boundary.

DOE Manual 435.1-1, Chapter IV, P(2)(f) states:

> "Performance assessments shall include a demonstration that projected releases of radionuclides to the environment shall be maintained as low as reasonable achievable (ALARA). DOE G 435.1-1 provides additional guidance on meeting this requirement. The Guide states in part that the goal of the ALARA process is not the attainment of a particular dose level (or, in this case, level of release), but rather the attainment of the lowest practical dose level after taking into account social, technical, economic, and public policy considerations. The PA should include assessments that focus on alternatives for LLW disposal. ALARA is meant to provide a documented answer to the question: "Have I done all that I can reasonably do to reduce radiation doses or releases to the environment?"

In addition, 10 CFR 61, Section 61.41, *Protection of the General Population from Releases of Radioactivity*, states:

> "Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonable achievable."

DOE's approach to radiation protection is based on meeting the performance objectives identified in DOE M 435.1-1 and 10 CFR 61. These documents specify maximum doses for various pathways based upon the ALARA principle. The annual performance objectives for

DOE M 435.1-1 are: 25 mrem all-pathways; 4 mrem groundwater; and 10 mrem air pathway. The annual performance objective for 10 CFR 61 is 25 mrem all-pathways.

Section 3.2.3 credits the EIS for tank closure for performing the alternative disposal analysis in regards to ALARA. [DOE-EIS-0303] In May 2002, DOE issued the EIS on tank cleaning and stabilization alternatives. DOE studied five alternatives:

1. Empty, clean and fill with grout
2. Empty, clean and fill with sand
3. Empty, clean and fill with saltstone
4. Empty, clean and remove tanks, and
5. No action.

The EIS concluded the fill with grout option was the preferred option with the best approach to minimize human health and safety risks associated with closure of tanks. [DOE-EIS-0303]

In addition, the NDAA Section 3116, and DOE M 435.1-1 require that highly radioactive radionuclides be removed to the maximum extent practical. [NDAA_3116] This basic ALARA principle is accomplished through the cleaning of the waste tanks prior to closure. Section 3.3.2 delineates the estimations of waste tank inventory after tank cleaning.

At this time, it is inappropriate to do an in-depth ALARA cost-benefit analysis, because the cost of new technology and personnel exposures will not be available until following final waste tank cleaning and sampling operations. A more in-depth ALARA analysis will be completed as part of the NDAA Section 3116 Waste Determination and state-required Closure Modules.

The analysis of alternative disposal techniques; the application of cleaning the waste tanks to the maximum extent practical; the stabilization of the remaining inventory with grout; and meeting the performance objectives of DOE M 435.1-1 and 10 CFR 61 are evidence of the application of ALARA in limiting the release of radionuclides into the environment. Furthermore, an additional ALARA analysis will be performed following closure of FTF to support the CERCLA closure, including the final design considerations for the closure cap to evaluate opportunities to further reduce environmental releases. Therefore, the principle of ALARA is satisfied. [*www.epa.gov/superfund/policy/cercla.htm*]

6.0 INADVERTENT INTRUDER ANALYSIS

This section of the PA presents the analyses of the doses to a hypothetical individual who inadvertently intrudes into the FTF closed systems after the period of institutional control has ended.

The purpose of this section is to present the inadvertent intruder results for the analyses described in Section 4 of this PA.

Section 6.1 presents peak 1m groundwater concentrations for the radionuclides and chemicals discussed in the Source Term Screening Section of the PA (Section 4.2.1).

Section 6.2 and 6.3 presents the individual biotic pathway formulas used to calculate the dose to the acute and Chronic Intruder.

Section 6.4 presents Acute and Chronic Intruder dose analyses.

Section 6.5 presents Inadvertent Intruder Uncertainty and Sensitivity Analysis.

6.1 Groundwater Concentrations at 1m

The purpose of this section is to present the 1m groundwater concentrations for all of the radionuclides and chemicals discussed in the source term screening section of the PA (Section 4.2.1). Maximum groundwater concentrations are given for the modeling cell adjoining the analyzed source terms. Results are presented for the three distinct aquifers modeled (the UTR-UZ, the UTR-LZ, and Gordon Aquifer).

The groundwater concentrations at 1m are calculated using the PORFLOW FTF model for the Base Case modeling configuration discussed in Section 4.4. A summary of the key parameters used in the baseline PORFLOW FTF modeling configuration are provided in Table 5.2-1. The PORFLOW 1m concentrations are provided for four sectors as shown on Figure 5.2-5, with results provided for the three aquifer depths of concern (i.e., UTR-UZ, UTR-LZ and Gordon Aquifer). Dividing the results into sectors allows variability in peak concentration for different areas of the FTF to be more easily seen. The four sectors are searched for each radionuclide and chemical to find the maximum groundwater concentrations at 1m from the FTF.

Tables 6.1-1 through 6.1-3 show the peak 1m radionuclides concentrations for the three aquifers in the 10,000 year evaluation period. These radionuclide concentrations reflect the peak concentrations for each radionuclide in the highest sector. These values are conservatively high for the radionuclides present in multiple decay chains because the totals are simply the sum of the individual peaks within that sector for a given radionuclide, without regard to location within the sector (as explained in Section 5.2.1). Tables 6.1-4 through 6.1-6 show the peak 1m chemical concentrations for the three aquifers in the 10,000 year evaluation period. These chemical concentrations also reflect the peak concentrations for the sector.

The 1m radionuclide and chemical concentration curves (for 20,000 years) associated with the four sectors and three aquifers for the Base Case, as described in Section 4.4.2, are captured in Appendix G.

Appendix G.1 – UTR-UZ for Sectors A through D at 1m.

Appendix G.2 – UTR-LZ for Sectors A through D at 1m.

Appendix G.3 - Gordon Aquifer for Sectors A through D at 1m.

Table 6.1-1: Radiological 1m Concentrations for UTR-UZ

Radionuclide	Sector A		Sector B		Sector C		Sector D	
	Concentra-tion (pCi/L)	Year Peak Contribu-tion Occurs	Concentra-tion (pCi/L)	Year Peak Contribu-tion Occurs	Concentration (pCi/L)	Year Peak Contribu-tion Occurs	Concentration (pCi/L)	Year Peak Contribution Occurs
Ac-227	8.0E-08	1,714	5.4E-06	6,110	2.3E-04	6,096	2.9E-09	1,708
Al-26	1.7E-25	10,000	2.3E-06	10,000	5.7E-02	10,000	2.8E-14	10,000
Am-241	5.6E-24	10,000	2.0E-05	10,000	2.1E-01	10,000	8.5E-13	10,000
Am-242m	<1.0E-30	8,290	3.5E-24	7,014	7.4E-19	6,488	<1.0E-30	8,006
Am-243	4.8E-23	10,000	1.1E-06	10,000	1.2E-02	10,000	3.8E-14	10,000
Ba-137m	*	*	*	*	*	*	*	*
Bk-249	*	*	*	*	*	*	*	*
C-14	2.6E-03	2,178	4.4E+01	4,148	8.8E+02	4,026	2.1E-03	4,214
Ce-144	*	*	*	*	*	*	*	*
Cf-249	<1.0E-30	10,000	1.0E-13	9,778	2.0E-09	8,498	4.0E-21	10,000
Cl-36	2.2E-05	10,000	3.0E-01	3,680	5.5E+00	3,676	1.5E-05	3,680
Cm-242	*	*	*	*	*	*	*	*
Cm-243	<1.0E-30	1,814	<1.0E-30	1,302	<1.0E-30	1,188	<1.0E-30	1,416
Cm-244	<1.0E-30	1,294	<1.0E-30	978	<1.0E-30	928	<1.0E-30	1,048
Cm-245	3.9E-24	10,000	1.7E-05	10,000	1.8E-01	10,000	6.7E-13	10,000
Cm-247	8.5E-27	10,000	3.7E-08	10,000	4.0E-04	10,000	1.5E-15	10,000
Cm-248	8.2E-27	10,000	3.5E-08	10,000	3.8E-04	10,000	1.4E-15	10,000
Co-60	<1.0E-30	358	<1.0E-30	150	<1.0E-30	128	<1.0E-30	326
Cs-134	*	*	*	*	*	*	*	*
Cs-135	2.1E-03	6,988	2.4E+01	5,398	5.5E+02	4,834	1.1E-03	5,710
Cs-137	1.3E-24	1,918	8.6E-15	920	3.1E-11	786	8.3E-21	1,040
Eu-152	<1.0E-30	1,000	<1.0E-30	782	<1.0E-30	730	<1.0E-30	830
Eu-154	<1.0E-30	420	<1.0E-30	288	<1.0E-30	236	<1.0E-30	324
Eu-155	*	*	*	*	*	*	*	*

Table 6.1-1: Radiological 1m Concentrations for UTR-UZ (Continued)

Radionuclide	Sector A		Sector B		Sector C		Sector D	
	Concentra -tion (pCi/L)	Year Peak Contribu- tion Occurs	Concentra -tion (pCi/L)	Year Peak Contribu- tion Occurs	Concentration (pCi/L)	Year Peak Contribu- tion Occurs	Concentration (pCi/L)	Year Peak Contribution Occurs
Gd-152	*	*	*	*	*	*	*	*
H-3	7.1E-12	552	1.4E-10	202	2.0E-08	196	2.8E-12	158
I-129	8.2E-04	576	1.1E-01	3,786	2.0E+00	3,784	3.8E-05	536
K-40	4.6E-06	10,000	9.6E-02	4,046	2.1E+00	3,924	4.4E-06	4,110
Na-22	*	*	*	*	*	*	*	*
Nb-93m	2.1E-08	10,000	7.4E-01	10,000	1.5E+01	9,996	3.4E-05	9,998
Nb-94	1.2E+00	556	2.0E+00	556	1.9E+00	556	4.6E-02	554
Ni-59	1.6E+00	1,792	4.3E+00	9,984	7.8E+01	9,992	5.8E-02	1,692
Ni-63	4.3E-03	1,378	7.6E-03	1,178	2.5E-01	1,056	1.6E-03	1,102
Np-237	1.5E-01	1,564	2.6E-01	1,574	1.3E+01	6,036	5.6E-03	1,556
Pa-231	1.1E-04	1,684	7.2E-03	6,054	3.1E-01	6,034	3.8E-06	1,674
Pb-210	4.6E-04	1,634	7.7E-04	1,650	2.1E-02	9,998	1.8E-05	1,592
Pd-107	2.2E-09	4,964	7.0E-02	4,766	1.5E+00	4,686	3.2E-06	4,808
Pm-147	*	*	*	*	*	*	*	*
Pr-144	*	*	*	*	*	*	*	*
Pu-238	3.6E-28	4,738	3.9E-20	6,446	6.6E-16	6,120	3.5E-24	4,178
Pu-239	3.3E-04	10,000	4.8E-03	10,000	1.6E+00	10,000	2.1E-03	10,000
Pu-240	5.6E-05	10,000	7.0E-03	10,000	4.0E+00	10,000	2.4E-04	10,000
Pu-241	2.2E-23	10,000	7.8E-05	10,000	8.0E-01	10,000	3.3E-12	10,000
Pu-242	1.3E-06	10,000	2.1E-04	10,000	8.9E-02	10,000	8.1E-07	10,000
Pu-244	6.2E-10	10,000	7.8E-07	10,000	1.5E-04	10,000	3.8E-09	10,000
Ra-226	1.8E-01	1,606	3.0E-01	1,624	8.1E+00	10,000	6.9E-03	1,560
Ra-228	3.4E-11	10,000	7.2E-07	10,000	4.1E-04	10,000	3.1E-11	10,000
Rn-222	1.8E-01	1,606	3.0E-01	1,624	8.1E+00	10,000	6.9E-03	1,560
Rh-106	*	*	*	*	*	*	*	*
Ru-106	*	*	*	*	*	*	*	*

Table 6.1-1: Radiological 1m Concentrations for UTR-UZ (Continued)

Radionuclide	Sector A		Sector B		Sector C		Sector D	
	Concentra-tion (pCi/L)	Year Peak Contribu-tion Occurs	Concentra-tion (pCi/L)	Year Peak Contribu-tion Occurs	Concentration (pCi/L)	Year Peak Contribu-tion Occurs	Concentration (pCi/L)	Year Peak Contribution Occurs
Sb-125	*	*	*	*	*	*	*	*
Sb-126	*	*	*	*	*	*	*	*
Sb-126m	*	*	*	*	*	*	*	*
Se-79	2.2E-19	10,000	8.3E-04	10,000	3.4E+00	10,000	1.1E-10	10,000
Sm-147	*	*	*	*	*		*	*
Sm-151	<1.0E-30	5,942	<1.0E-30	2,688	1.3E-24	2,424	<1.0E-30	3,354
Sn-126	1.7E-29	10,000	1.9E-10	10,000	5.1E-04	10,000	1.2E-18	10,000
Sr-90	6.4E-08	954	4.3E-07	958	4.0E-05	898	1.8E-07	912
Tc-99	9.3E+01	714	1.6E+02	728	1.1E+03	678	3.4E+00	708
Te-125m	*	*	*	*	*	*	*	*
Th-228	3.4E-11	10,000	7.2E-07	10,000	4.1E-04	10,000	3.1E-11	10,000
Th-229	1.4E-05	10,000	2.9E-02	10,000	5.4E+00	10,000	5.4E-06	10,000
Th-230	1.2E-06	10,000	2.6E-04	10,000	3.5E-01	10,000	1.5E-06	10,000
Th-232	1.2E-13	10,000	4.7E-10	10,000	5.5E-07	10,000	1.4E-13	10,000
U-232	<1.0E-30	3,828	1.5E-20	1,762	2.3E-16	1,522	1.5E-27	2,138
U-233	6.7E-04	10,000	8.5E-01	10,000	1.1E+02	9,992	1.5E-04	10,000
U-234	5.6E-04	10,000	8.6E-02	10,000	5.1E+01	9,016	3.2E-04	9,998
U-235	5.5E-06	10,000	1.0E-03	10,000	9.8E-02	10,000	4.4E-06	9,864
U-236	1.1E-05	10,000	2.4E-02	10,000	1.8E+00	10,000	6.1E-06	10,000
U-238	2.6E-04	10,000	1.1E-03	10,000	2.5E-02	8,490	1.9E-04	9,762
Y-90	*	*	*	*	*	*	*	*
Zr-93	4.7E-25	10,000	1.8E-07	10,000	1.0E-03	10,000	1.8E-14	10,000
Total Alpha	**3.31E-01**	**1,594**	**5.56E-01**	**1,606**	**3.24E+01**	**10,000**	**1.24E-02**	**1,560**
Total Ra	**1.79E-01**	**1,606**	**2.98E-01**	**1,624**	**8.09E+00**	**10,000**	**6.90E-03**	**1,560**

* Short-lived radionuclides decayed prior to liner failure. PORFLOW does not track short-lived radionuclides during transport modeling, but the DCFs do include the equilibrium progeny.

Table 6.1-2: Radiological 1m Concentrations for UTR-LZ

Radionuclide	Sector A		Sector B		Sector C		Sector D	
	Concentra-tion (pCi/L)	Year Peak Contribu-tion Occurs	Concentra-tion (pCi/L)	Year Peak Contribu-tion Occurs	Concentrati on (pCi/L)	Year Peak Contribu-tion Occurs	Concentration (pCi/L)	Year Peak Contributi on Occurs
Ac-227	2.7E-08	1,722	2.3E-06	6,110	1.0E-04	6,102	2.2E-08	10,000
Al-26	3.5E-30	10,000	3.5E-10	10,000	5.6E-06	10,000	4.6E-12	10,000
Am-241	1.1E-27	10,000	9.8E-09	10,000	7.9E-05	10,000	1.1E-10	10,000
Am-242m	<1.0E-30	9,182	6.3E-29	7,950	2.8E-24	7,434	1.0E-30	7,810
Am-243	2.2E-27	10,000	4.4E-10	10,000	3.9E-06	10,000	5.0E-12	10,000
Ba-137m	*	*	*	*	*	*	*	*
Bk-249	*	*	*	*	*	*	*	*
C-14	8.8E-04	2,284	1.7E+01	4,228	3.4E+02	4,106	3.9E-02	4,204
Ce-144	*	*	*	*	*	*	*	*
Cf-249	<1.0E-30	10,000	4.6E-17	10,000	3.9E-13	10,000	5.2E-19	10,000
Cl-36	7.1E-06	10,000	1.2E-01	3,680	2.2E+00	3,678	2.8E-04	3,680
Cm-242	*	*	*	*	*	*	*	*
Cm-243	<1.0E-30	1,998	<1.0E-30	1,530	<1.0E-30	1,378	<1.0E-30	1,498
Cm-244	<1.0E-30	1,416	<1.0E-30	1,118	<1.0E-30	1,026	<1.0E-30	1,098
Cm-245	7.3E-28	10,000	7.7E-09	10,000	6.5E-05	10,000	8.6E-11	10,000
Cm-247	1.6E-30	10,000	1.7E-11	10,000	1.4E-07	10,000	1.9E-13	10,000
Cm-248	1.5E-30	10,000	1.6E-11	10,000	1.4E-07	10,000	1.8E-13	10,000
Co-60	<1.0E-30	376	<1.0E-30	168	<1.0E-30	152	<1.0E-30	350
Cs-134	*	*	*	*	*	*	*	*
Cs-135	7.2E-04	7,530	8.9E+00	5,796	2.0E+02	5,226	2.1E-02	5,656
Cs-137	4.6E-27	2,026	4.9E-17	1,028	1.0E-13	948	5.0E-19	1,008
Eu-152	<1.0E-30	1,084	<1.0E-30	884	<1.0E-30	814	<1.0E-30	866
Eu-154	<1.0E-30	496	<1.0E-30	364	<1.0E-30	300	<1.0E-30	352
Eu-155	*	*	*	*	*	*	*	*

Table 6.1-2: Radiological 1m Concentrations for UTR-LZ (Continued)

Radionuclide	Sector A		Sector B		Sector C		Sector D	
	Concentra-tion (pCi/L)	Year Peak Contribu-tion Occurs	Concentra-tion (pCi/L)	Year Peak Contribu-tion Occurs	Concentrati on (pCi/L)	Year Peak Contribu-tion Occurs	Concentration (pCi/L)	Year Peak Contributi on Occurs
Gd-152	*	*	*	*	*	*	*	*
H-3	2.1E-12	554	4.8E-11	204	4.1E-09	200	1.7E-11	158
I-129	2.8E-04	578	4.4E-02	3,790	7.9E-01	3,786	2.3E-04	536
K-40	1.5E-06	10,000	3.6E-02	4,126	7.7E-01	4,006	8.3E-05	4,098
Na-22	*	*	*	*	*	*	*	*
Nb-93m	1.2E-08	9,996	2.8E-01	10,000	5.6E+00	10,000	6.5E-04	10,000
Nb-94	4.1E-01	558	1.1E+00	560	1.1E+00	560	1.4E-01	558
Ni-59	5.3E-01	1,874	1.8E+00	9,986	3.2E+01	9,894	3.1E-01	1,172
Ni-63	8.7E-04	1,446	4.4E-03	1,212	5.3E-02	1,104	9.5E-03	1,108
Np-237	5.1E-02	1,570	1.5E-01	1,582	5.7E+00	9,646	2.1E-02	686
Pa-231	3.6E-05	1,688	3.0E-03	6,056	1.3E-01	6,040	2.5E-05	6,052
Pb-210	1.5E-04	1,674	4.2E-04	1,702	9.7E-03	10,000	8.6E-05	1,034
Pd-107	1.3E-09	5,028	2.6E-02	4,820	5.5E-01	4,742	6.1E-05	4,800
Pm-147	*	*	*	*	*	*	*	*
Pr-144	*	*	*	*	*	*	*	*
Pu-238	<1.0E-30	5,142	3.5E-23	6,892	1.7E-19	6,608	3.3E-25	6,826
Pu-239	8.6E-06	10,000	2.0E-04	10,000	8.3E-02	10,000	5.4E-03	10,000
Pu-240	1.5E-06	10,000	2.6E-04	10,000	2.1E-01	10,000	6.3E-04	10,000
Pu-241	4.3E-27	10,000	3.8E-08	10,000	3.1E-04	10,000	4.2E-10	10,000
Pu-242	3.4E-08	10,000	8.0E-06	10,000	4.6E-03	10,000	2.1E-06	10,000
Pu-244	1.6E-11	10,000	2.8E-08	10,000	8.2E-06	10,000	9.8E-09	10,000
Ra-226	5.9E-02	1,650	1.6E-01	1,672	3.7E+00	10,000	3.6E-02	1,004
Ra-228	2.3E-12	10,000	2.5E-08	10,000	8.1E-06	10,000	2.9E-10	10,000
Rh-106	*	*	*	*	*	*	*	*
Rn-222	5.9E-02	1,650	1.6E-01	1,672	3.7E+00	10,000	3.6E-02	1,004

Table 6.1-2: Radiological 1m Concentrations for UTR-LZ (Continued)

Radionuclide	Sector A		Sector B		Sector C		Sector D	
	Concentra-tion (pCi/L)	Year Peak Contribu-tion Occurs	Concentra-tion (pCi/L)	Year Peak Contribu-tion Occurs	Concentration (pCi/L)	Year Peak Contribu-tion Occurs	Concentration (pCi/L)	Year Peak Contribution Occurs
Ru-106	*	*	*	*	*	*	*	*
Sb-125	*	*	*	*	*	*	*	*
Sb-126	*	*	*	*	*	*	*	*
Sb-126m	*	*	*	*	*	*	*	*
Se-79	1.6E-23	10,000	1.2E-06	10,000	5.7E-03	10,000	1.1E-08	10,000
Sm-147	*	*	*	*	*	*	*	*
Sm-151	<1.0E-30	6,570	<1.0E-30	3,318	7.9E-30	2,892	<1.0E-30	3,228
Sn-126	<1.0E-30	10,000	2.7E-15	10,000	1.2E-08	10,000	3.1E-16	10,000
Sr-90	9.2E-09	986	1.6E-07	986	5.5E-06	926	9.4E-07	928
Tc-99	3.2E+01	724	9.2E+01	728	5.7E+02	686	2.0E+01	616
Te-125m	*	*	*	*	*	*	*	*
Th-228	2.3E-12	10,000	2.5E-08	10,000	8.1E-06	10,000	2.9E-10	10,000
Th-229	1.0E-06	10,000	3.6E-03	10,000	9.9E-01	10,000	5.9E-05	10,000
Th-230	7.7E-08	10,000	2.9E-05	10,000	7.0E-02	10,000	1.0E-05	10,000
Th-232	8.0E-15	10,000	4.3E-11	10,000	8.8E-09	10,000	1.0E-12	10,000
U-232	<1.0E-30	4,132	1.6E-23	2,110	6.7E-20	1,904	1.4E-25	2,064
U-233	5.3E-05	10,000	1.5E-01	10,000	3.3E+01	10,000	2.1E-03	10,000
U-234	4.2E-05	10,000	1.3E-02	10,000	1.9E+01	10,000	2.7E-03	10,000
U-235	4.2E-07	10,000	1.6E-04	10,000	2.3E-02	10,000	2.7E-05	10,000
U-236	8.2E-07	10,000	3.5E-03	10,000	4.7E-01	10,000	5.3E-05	10,000
U-238	2.0E-05	10,000	3.1E-04	10,000	6.5E-03	9,836	1.2E-03	9,950
Y-90	*	*	*	*	*	*	*	*
Zr-93	1.7E-28	10,000	1.9E-10	10,000	9.3E-07	10,000	1.9E-12	10,000
Total Alpha	**1.09E-01**	**1,634**	**3.07E-01**	**1,648**	**1.07E+01**	**10,000**	**4.65E-02**	**1,004**
Total Ra	**5.86E-02**	**1,650**	**1.61E-01**	**1,672**	**3.72E+00**	**10,000**	**3.60E-02**	**1,004**

- Short-lived radionuclides decayed prior to liner failure. PORFLOW does not track short-lived radionuclides during transport modeling, but the DCFs do include the equilibrium progeny.

Table 6.1-3: Radiological 1m Concentrations for Gordon Aquifer

Radionuclide	Sector A		Sector B		Sector C		Sector D	
	Concentration (pCi/L)	Year Peak Contribution Occurs	Concentration (pCi/L)	Year Peak Contribution Occurs	Concentration (pCi/L)	Year Peak Contribution Occurs	Concentration (pCi/L)	Year Peak Contribution Occurs
Ac-227	8.1E-13	10,000	7.1E-11	10,000	1.9E-09	10,000	6.1E-12	10,000
Al-26	<1.0E-30	10,000	1.8E-24	10,000	1.5E-19	10,000	4.9E-24	10,000
Am-241	<1.0E-30	10,000	3.9E-24	10,000	1.5E-19	10,000	8.6E-24	10,000
Am-242m	<1.0E-30	10,000	<1.0E-30	9,266	<1.0E-30	8,592	<1.0E-30	9,056
Am-243	<1.0E-30	10,000	1.6E-25	10,000	6.8E-21	10,000	3.5E-25	10,000
Ba-137m	*	*	*	*	*	*	*	*
Bk-249	*	*	*	*	*	*	*	*
C-14	2.9E-10	10,000	7.4E-07	9,998	1.2E-05	9,984	2.4E-08	9,994
Ce-144	*	*	*	*	*	*	*	*
Cf-249	<1.0E-30	10,000	<1.0E-30	10,000	7.4E-28	10,000	<1.0E-30	10,000
Cl-36	1.2E-09	10,000	7.7E-06	3,784	1.2E-04	3,778	2.3E-07	3,776
Cm-242	*	*	*	*	*	*	*	*
Cm-243	<1.0E-30	2,288	<1.0E-30	1,814	<1.0E-30	1,660	<1.0E-30	1,774
Cm-244	<1.0E-30	1,596	<1.0E-30	1,298	<1.0E-30	1,200	<1.0E-30	1,274
Cm-245	<1.0E-30	10,000	3.1E-24	10,000	1.2E-19	10,000	6.7E-24	10,000
Cm-247	<1.0E-30	10,000	6.7E-27	10,000	2.7E-22	10,000	1.5E-26	10,000
Cm-248	<1.0E-30	10,000	6.4E-27	10,000	2.6E-22	10,000	1.4E-26	10,000
Co-60	<1.0E-30	418	<1.0E-30	418	<1.0E-30	192	<1.0E-30	392
Cs-134	*	*	*	*	*	*	*	*
Cs-135	4.9E-10	10,000	3.9E-06	10,000	7.0E-05	10,000	1.4E-07	10,000
Cs-137	<1.0E-30	2,288	3.6E-29	1,242	6.1E-26	1,140	3.0E-29	1,200
Eu-152	<1.0E-30	1,210	<1.0E-30	1,002	<1.0E-30	938	<1.0E-30	988
Eu-154	<1.0E-30	586	<1.0E-30	460	<1.0E-30	408	<1.0E-30	446
Eu-155	*	*	*	*	*	*	*	*
Gd-152	*	*	*	*	*	*	*	*

Table 6.1-3: Radiological 1m Concentrations for Gordon Aquifer (Continued)

Radionuclide	Sector A		Sector B		Sector C		Sector D	
	Concentration (pCi/L)	Year Peak Contribution Occurs	Concentration (pCi/L)	Year Peak Contribution Occurs	Concentration (pCi/L)	Year Peak Contribution Occurs	Concentration (pCi/L)	Year Peak Contribution Occurs
H-3	8.1E-18	576	5.5E-16	184	1.2E-14	222	1.2E-16	178
I-129	5.5E-09	746	2.7E-06	4,066	4.2E-05	4,060	8.0E-08	4,056
K-40	2.6E-12	10,000	5.7E-08	10,000	9.1E-07	10,000	1.8E-09	10,000
Na-22	*	*	*	*	*	*	*	*
Nb-93m	2.0E-13	9,998	3.5E-06	10,000	6.3E-05	10,000	1.2E-07	10,000
Nb-94	8.9E-06	612	2.2E-04	610	2.1E-04	608	2.5E-05	604
Ni-59	3.6E-06	6,830	1.1E-04	9,994	6.1E-04	10,000	1.1E-05	5,790
Ni-63	3.2E-11	1,744	8.2E-10	1,558	1.3E-09	1,414	3.5E-10	1,374
Np-237	3.9E-07	7,554	1.0E-05	8,340	1.1E-04	10,000	1.2E-06	9,998
Pa-231	1.0E-09	10,000	8.8E-08	10,000	2.4E-06	10,000	7.9E-09	10,000
Pb-210	8.8E-10	10,000	2.3E-08	10,000	1.6E-07	10,000	3.1E-09	10,000
Pd-107	9.7E-15	10,000	1.2E-07	9,338	1.9E-06	9,166	3.6E-09	9,164
Pm-147	*	*	*	*	*	*	*	*
Pr-144	*	*	*	*	*	*	*	*
Pu-238	<1.0E-30	5,942	<1.0E-30	7,622	<1.0E-30	7,262	<1.0E-30	7,488
Pu-239	4.8E-18	10,000	3.9E-16	10,000	6.1E-14	10,000	1.3E-14	10,000
Pu-240	8.2E-19	10,000	1.7E-16	10,000	1.4E-13	10,000	1.5E-15	10,000
Pu-241	<1.0E-30	10,000	1.4E-23	10,000	5.8E-19	10,000	3.5E-23	10,000
Pu-242	1.9E-20	10,000	5.0E-18	10,000	3.2E-15	10,000	6.1E-18	10,000
Pu-244	9.2E-24	10,000	1.3E-20	10,000	7.2E-18	10,000	2.8E-20	10,000
Ra-226	3.3E-07	10,000	8.9E-06	10,000	6.2E-05	10,000	1.2E-06	10,000
Ra-228	1.6E-21	10,000	1.3E-17	10,000	4.0E-15	10,000	6.1E-18	10,000
Rn-222	3.3E-07	10,000	8.9E-06	10,000	6.2E-05	10,000	1.2E-06	10,000
Rh-106	*	*	*	*	*	*	*	*

Table 6.1-3: Radiological 1m Concentrations for Gordon Aquifer (Continued)

Radionuclide	Sector A		Sector B		Sector C		Sector D	
	Concentration (pCi/L)	Year Peak Contribution Occurs	Concentration (pCi/L)	Year Peak Contribution Occurs	Concentration (pCi/L)	Year Peak Contribution Occurs	Concentration (pCi/L)	Year Peak Contribution Occurs
Ru-106	*	*	*	*	*	*	*	*
Sb-125	*	*	*	*	*	*	*	*
Sb-126	*	*	*	*	*	*	*	*
Sb-126m	*	*	*	*	*	*	*	*
Se-79	<1.0E-30	10,000	1.6E-19	10,000	2.8E-15	10,000	2.6E-19	10,000
Sm-147	*	*	*	*	*	*	*	*
Sm-151	<1.0E-30	7,430	<1.0E-30	4,192	<1.0E-30	3,738	<1.0E-30	4,060
Sn-126	<1.0E-30	10,000	<1.0E-30	10,000	3.8E-25	10,000	2.4E-30	10,000
Sr-90	5.8E-17	1,088	5.0E-15	1,098	1.9E-14	1,058	7.4E-15	1,034
Tc-99	5.0E-04	1,108	1.2E-02	1056	1.6E-02	1,036	1.5E-03	1,026
Te-125m	*	*	*	*	*	*	*	*
Th-228	1.6E-21	10,000	1.3E-17	10,000	4.0E-15	10,000	6.1E-18	10,000
Th-229	7.1E-11	10,000	1.9E-09	10,000	6.6E-09	10,000	2.3E-10	10,000
Th-230	7.7E-17	10,000	4.5E-14	10,000	1.7E-10	10,000	2.7E-13	10,000
Th-232	7.6E-24	10,000	5.8E-20	10,000	2.1E-17	10,000	2.8E-20	10,000
U-232	<1.0E-30	4,756	<1.0E-30	2,680	<1.0E-30	2,396	<1.0E-30	2,574
U-233	1.4E-09	10,000	3.4E-08	10,000	3.4E-07	10,000	4.4E-09	10,000
U-234	8.1E-14	10,000	4.6E-11	10,000	1.4E-07	10,000	2.2E-10	10,000
U-235	7.9E-16	10,000	5.3E-13	10,000	1.5E-10	10,000	6.3E-13	10,000
U-236	1.5E-15	10,000	1.1E-11	10,000	3.2E-09	10,000	4.2E-12	10,000
U-238	3.8E-14	10,000	2.7E-12	10,000	4.2E-11	10,000	2.3E-11	10,000

Table 6.1-3: Radiological 1m Concentrations for Gordon Aquifer (Continued)

Radionuclide	Sector A		Sector B		Sector C		Sector D	
	Concentration (pCi/L)	Year Peak Contribution Occurs	Concentration (pCi/L)	Year Peak Contribution Occurs	Concentration (pCi/L)	Year Peak Contribution Occurs	Concentration (pCi/L)	Year Peak Contribution Occurs
Y-90	*	*	*	*	*	*	*	*
Zr-93	<1.0E-30	10,000	3.9E-24	10,000	7.6E-20	10,000	6.6E-24	10,000
Total Alpha	**7.16E-07**	**7,916**	**1.90E-05**	**10,000**	**1.77E-04**	**10,000**	**2.39E-06**	**9,998**
Total Ra	**3.34E-07**	**10,000**	**8.91E-06**	**10,000**	**6.18E-05**	**10,000**	**1.17E-06**	**10,000**

* Short-lived radionuclides decayed prior to liner failure. PORFLOW does not track short-lived radionuclides during transport modeling, but the DCFs do include the equilibrium progeny.

Table 6.1-4: Chemical 1m Concentrations for UTR-UZ

Chemical	Sector A		Sector B		Sector C		Sector D	
	Concentration (μg/L)	Year Peak Contribution Occurs	Concentration (μg/L)	Year Peak Contribution Occurs	Concentration (μg/L)	Year Peak Contribution Occurs	Concentration (μg/L)	Year Peak Contribution Occurs
Ag	1.74E-03	6,924	1.05E-01	5,846	4.56E+00	4,684	6.47E-05	3,734
As	4.25E-05	10,000	8.92E-03	8,262	1.94E-01	7,012	1.62E-06	9,498
Ba	1.50E-02	1,586	9.77E-02	4,904	1.57E+00	6,264	6.05E-04	998
Cd	6.48E-02	1,266	1.08E-01	1,304	1.36E+01	7,146	2.40E-03	1,228
Cr	2.43E-02	1,266	7.08E-02	4,674	2.65E+00	4,608	9.00E-04	1,228
Cu	2.16E-03	5,296	6.63E-02	5,522	4.44E+00	4,592	8.55E-05	4,938
F	2.47E-01	556	3.51E+00	3,838	3.93E+01	3,834	9.28E-03	554
Fe	1.85E-03	10,000	4.45E-01	10,000	1.96E+02	10,000	2.85E-03	9,950
Hg	2.79E-18	10,000	4.82E-06	10,000	7.58E-02	10,000	1.45E-11	10,000
Mn	3.42E-02	4,774	1.86E+00	5,052	2.22E+02	4,808	3.71E-03	1,776
N	9.63E+00	556	1.01E+02	3,654	1.90E+03	3,650	3.62E-01	554
Ni	8.07E-01	1,802	1.37E+00	1,896	4.01E+00	1,126	3.73E-02	1,166
Pb	1.55E-26	10,000	9.33E-09	10,000	5.80E-03	10,000	2.49E-16	10,000
Sb	2.68E-33	10,000	3.39E-10	10,000	4.52E-05	10,000	1.86E-19	10,000
Se	2.22E-22	10,000	7.47E-06	10,000	3.06E-02	10,000	9.60E-14	10,000
U	8.56E-04	10,000	3.66E-03	10,000	1.43E-01	8,472	1.13E-03	9,804
V	5.48E-09	562	1.14E-02	558	5.54E-01	554	5.71E-07	558
Zn	1.57E-03	10,000	6.04E-02	7,996	4.18E+00	6,120	5.99E-05	9,498

Table 6.1-5: Chemical 1m Concentrations for UTR-LZ

Chemical	Sector A		Sector B		Sector C		Sector D	
	Concentration (μg/L)	Year Peak Contribution Occurs	Concentration (μg/L)	Year Peak Contribution Occurs	Concentration (μg/L)	Year Peak Contribution Occurs	Concentration (μg/L)	Year Peak Contribution Occurs
Ag	5.81E-04	7,532	4.81E-02	6,308	1.16E+00	5,226	3.91E-04	3,788
As	1.24E-05	10,000	3.33E-03	9,080	6.06E-02	7,868	9.25E-06	9,276
Ba	5.00E-03	1,636	4.65E-02	4,928	5.46E-01	6,282	3.66E-03	1,002
Cd	2.18E-02	1,310	6.02E-02	1,360	5.85E+00	7,164	1.34E-02	922
Cr	8.17E-03	1,310	3.15E-02	4,708	9.75E-01	4,644	5.00E-03	922
Cu	7.00E-04	5,794	3.09E-02	5,906	1.41E+00	5,032	3.26E-04	5,586
F	8.23E-02	558	1.71E+00	3,838	1.57E+01	3,836	3.03E-02	534
Fe	1.46E-04	10,000	3.80E-02	10,000	3.02E+01	10,000	1.78E-02	10,000
Hg	6.14E-22	10,000	1.45E-08	10,000	4.97E-04	10,000	1.18E-09	10,000
Mn	1.16E-02	4,920	8.43E-01	5,166	8.47E+01	4,928	2.25E-02	1,790
N	3.20E+00	558	3.96E+01	3,656	5.79E+02	3,652	1.18E+00	534
Ni	2.73E-01	1,880	7.76E-01	1,976	1.21E+00	1,166	2.26E-01	1,172
Pb	5.39E-31	10,000	4.46E-13	10,000	6.57E-07	10,000	5.33E-14	10,000
Sb	2.32E-38	10,000	2.72E-15	10,000	2.38E-10	10,000	5.59E-17	10,000
Se	1.65E-26	10,000	1.09E-08	10,000	3.93E-05	10,000	9.62E-12	10,000
U	6.43E-05	10,000	1.00E-03	10,000	3.75E-02	9,816	6.80E-03	9,982
V	3.43E-09	566	5.69E-03	560	2.99E-01	554	1.20E-05	558
Zn	4.59E-04	10,000	2.81E-02	8,758	1.28E+00	6,978	3.01E-04	5,592

Table 6.1-6: Chemical 1m Concentrations for Gordon Aquifer

Chemical	Sector A		Sector B		Sector C		Sector D	
	Concentration (µg/L)	Year Peak Contribution Occurs	Concentration (µg/L)	Year Peak Contribution Occurs	Concentration (µg/L)	Year Peak Contribution Occurs	Concentration (µg/L)	Year Peak Contribution Occurs
Ag	6.89E-10	10,000	9.27E-08	10,000	1.18E-06	10,000	4.16E-09	10,000
As	7.53E-13	10,000	5.81E-10	10,000	1.84E-08	10,000	3.85E-11	10,000
Ba	4.05E-08	4,600	2.74E-06	10,000	2.35E-05	10,000	1.26E-07	3,924
Cd	1.93E-07	3,160	4.80E-06	2,944	3.19E-04	10,000	7.55E-07	10,000
Cr	7.25E-08	3,160	2.59E-06	8,660	3.56E-05	9,352	2.27E-07	2,758
Cu	3.36E-09	10,000	2.56E-07	10,000	3.97E-06	10,000	1.92E-08	10,000
F	1.78E-06	612	2.86E-04	3,984	2.15E-03	3,978	5.40E-06	602
Fe	1.52E-13	10,000	2.64E-11	10,000	2.17E-08	10,000	1.89E-10	10,000
Hg	1.47E-35	10,000	5.66E-21	10,000	4.37E-16	10,000	6.90E-20	10,000
Mn	2.68E-08	10,000	1.26E-06	10,000	2.62E-05	10,000	1.56E-07	10,000
N	6.92E-05	612	1.70E-03	610	8.33E-03	3,708	2.10E-04	602
Ni	1.95E-06	7,246	4.83E-05	6,528	4.77E-05	6,364	6.03E-06	6,066
Pb	3.19E-47	10,000	4.70E-29	10,000	1.03E-22	10,000	1.37E-27	10,000
Sb	5.98E-55	10,000	1.67E-31	10,000	1.49E-25	10,000	9.34E-31	10,000
Se	6.37E-40	10,000	1.43E-21	10,000	8.09E-18	10,000	2.19E-22	10,000
U	1.23E-13	10,000	8.68E-12	10,000	2.39E-10	10,000	1.34E-10	10,000
V	1.08E-13	620	1.72E-07	606	7.13E-06	600	9.33E-09	600
Zn	2.79E-11	10,000	1.01E-08	10,000	4.74E-07	10,000	1.07E-09	10,000

6.2 Acute Exposure Scenarios

6.2.1 Acute Intruder Ingestion Dose Pathway – Ingestion of Resuspended Drill Cuttings

The drill cuttings ingestion exposure route assumes the drill cuttings from the well installation are distributed across the garden. The receptor in turn is exposed by ingesting dirt. The source of material is a transfer line that is assumed to be penetrated during well installation. Only the exposure from the drill cuttings is included in this calculation (i.e., this does not include any other ingestion sources). Unless otherwise noted, formulas were based on those used in LADTAP model, report WSRC-STI-2006-00123 or in the PA for Idaho Tank Farm, document DOE-ID-10966. While these documents were used as guides for the other formulas, ultimately the basis for all the formulas can be traced to NRC Regulatory Guide 1.109. The dose is calculated using the following formula. Unit conversions are not explicitly stated in the equations, but are coded into GoldSim.

$$D = \frac{C_{Xfer} \times d_W \times c_W \times F_{DC} \times U_S \times DCF}{\frac{d_W^{\,2}}{4} \times \pi \times l_W \times \rho_{SS}}$$

where:

C_{Xfer}	=	transfer line surface radionuclide concentration (pCi/ft^2)
d_W	=	well diameter (ft) [0.667 ft]
c_W	=	transfer line circumference (ft) [0.803 ft (for 3 inch inner diameter)]
F_{DC}	=	fraction of time exposed to drill cuttings (unitless) [0.0023 equates to 20 hours]
DCF	=	ingestion dose conversion factor (rem/μCi), Table 4.7-1
U_S	=	human consumption rate of dirt (kg/year), Table 4.6-7
l_W	=	well depth (ft) [100 ft]
ρ_{SS}	=	density of sandy soil (g/cm^3)

6.2.2 Acute Intruder Inhalation Dose Pathway – Inhalation of Drill Cuttings

The drill cuttings inhalation route assumes the drill cuttings from the well installation are distributed across the garden. The receptor in turn is directly exposed during time spent in the garden. The source of material is a transfer line that is assumed to be penetrated during well installation. Only the exposure from the drill cuttings is included in this calculation (i.e., this does not include any other direct exposure sources). This formula was derived following the approach of the previous pathway calculations, whose bases are found in other PA methods. The dose is calculated using the following formula.

$$D = \frac{C_{Xfer} \times d_W \times c_W \times F_{DC} \times DCF \times U_A \times L_{SiA}}{\frac{d_W^{\ 2}}{4} \times \pi \times l_W \times \rho_{SS}}$$

where:

C_{Xfer} = transfer line surface radionuclide concentration (pCi/ft^2)

d_W = well diameter (ft) [0.667 ft]

c_W = transfer line circumference (ft) [0.803 ft (for 3 inch inner diameter)]

F_{DC} = fraction of time exposed to drill cuttings (unitless) [0.0023 equates to 20 hours]

DCF = inhalation dose conversion factor (rem/μCi), Table 4.7-1

l_W = well depth (ft) [100 ft]

U_A = air intake (m^3/yr), Table 4.6-7

L_{SiA} = soil loading in air while working in a garden (kg/m^3), Table 4.6-6

ρ_{SS} = density of sandy soil (g/cm^3)

6.2.3 Acute Intruder Direct Exposure Dose Pathways – Direct Exposure to Drill Cuttings

The drill cuttings direct exposure route assumes the receptor is directly exposed to the drill cuttings during well drilling operations. The source of material is a transfer line that is assumed to be penetrated during well installation. Only the exposure from the drill cuttings is included in this calculation (i.e., this does not include any other direct exposure sources). This formula was derived following the approach of the previous pathway calculations, whose bases are found in other PA methods. The dose is calculated using the following formula.

$$D = \frac{C_{Xfer} \times d_W \times c_W \times F_{DC} \times DCF}{\frac{d_W^{\ 2}}{4} \times \pi \times l_W}$$

where:

C_{Xfer} = transfer line surface radionuclide concentration (pCi/ft^2)

d_W = well diameter (ft) [0.667 ft]

c_W = transfer line circumference (ft) [0.803 (for 3 inch inner diameter)]

F_{DC} = fraction of time exposed to drill cuttings (unitless) [0.0023 equates to 20 hours]

DCF = external dose conversion factor, 15 cm (rem/yr per μCi/m^3), Table 4.7-1

l_W = well depth (ft) [100 ft]

6.3 Chronic Exposure Scenarios

The exposure pathways for the FTF intruder are discussed in detail in Section 4.2.4.2. The Chronic Intruder Agricultural (Post-Drilling) Scenario analyzed in this PA is graphically represented in Figure 4.2-30. Provided below are the individual elements of the Chronic Intruder biotic pathways that were identified for analysis and inclusion in the Chronic Intruder Agricultural (Post-Drilling) Scenario dose. The GoldSim computer code was used to calculate doses following the dose formulas provided below and utilizing the PORFLOW calculated 1m concentrations as inputs. Unless otherwise noted, formulas were based on those used in LADTAP model report WSRC-STI-2006-00123 or in the PA for Idaho Tank Farm, document DOE-ID-10966. While these documents were used as guides for the other formulas, ultimately the bases for all the formulas can be traced to NRC Regulatory Guide 1.109. Unit conversions are not explicitly stated in the equations, but are coded into GoldSim.

All transfers times are assumed negligible due to the half lives of the radionuclides and the long term analysis of the PA.

6.3.1 Chronic Intruder Ingestion Dose Pathways

6.3.1.1 Ingestion of Water

The drinking water exposure route assumes the receptor uses a well located 1m from the FTF as a drinking water source. The incidental ingestion of water from showering and during recreational activities is assumed to be negligible when compared to ingestion of drinking water.

$$D = C_{GW} \times U_W \times DCF$$

where:

D = dose from 1 year's consumption of contaminated media; in this equation, groundwater (rem/year)

C_{GW} = radionuclide concentration in groundwater from a well located at 1m (pCi/L)

U_W = human consumption rate of water (L/year), Table 4.6-7

DCF = ingestion dose conversion factor (rem/μCi), Table 4.7-1

6.3.1.2 Ingestion of Beef and Milk

The beef and dairy exposure route assumes cattle drink contaminated water and eat contaminated fodder, and the intruder in turn consumes the contaminated beef and milk from the cattle. Beef and milk are treated separately. The dose is calculated using

Beef:

$$D = T_B \times \left(FF_B \times C_f \times Q_{FB} + C_{GW} \times Q_{WB}\right) \times DCF \times U_B \times F_B$$

Milk:

$$D = T_M \times \left(FF_M \times C_f \times Q_{FM} + C_{GW} \times Q_{WM}\right) \times DCF \times U_M \times F_M$$

where:

T_B	=	beef transfer coefficient (d/kg), Table 4.6-3
T_m	=	milk transfer coefficient (d/L), Table 4.6-2
FF_i	=	beef or milk cattle intake fraction from irrigated field/pasture, Table 4.6-7
C_f	=	radionuclide concentration in fodder (pCi/kg)
Q_{Fi}	=	consumption rate of fodder by beef or milk cattle (kg/d), Table 4.6-7
C_{GW}	=	radionuclide concentration in groundwater from a 1m well (pCi/L)
Q_{Wi}	=	consumption rate of water by beef or milk cattle (L/d), Table 4.6-7
DCF	=	ingestion dose conversion factor (rem/μCi), Table 4.7-1
U_B	=	human consumption rate of beef (kg/year), Table 4.6-7
U_M	=	human consumption rate of milk (L/year), Table 4.6-7
F_B	=	fraction of meat produced locally (unitless), Table 4.6-5
F_M	=	fraction of milk produced locally (unitless), Table 4.6-5

where:

$$C_f = \frac{C_{Xfer} \times d_W \times c_W}{A_g \times d_g \times \rho_s}$$

C_{Xfer}	=	*transfer line surface radionuclide concentration (pCi/ft^2)*
d_W	=	*well diameter (ft) [0.667 ft]*
c_W	=	*transfer line circumference (ft) [0.803 ft (for 3 inch inner diameter)]*
A_g	=	*Garden area (m^2)*
d_g	=	*Garden depth (cm)*
ρ_s	=	*Soil density (kg/m^3)*

6.3.1.3 Ingestion of Vegetables

The dose to humans from ingestion of contaminated leafy vegetables and produce is calculated assuming three contamination routes: (1) direct deposition of contaminated irrigation water on plants, (2) deposition of contaminated irrigation water on soil followed by root uptake by plants, and (3) deposition of contaminated drill cuttings in soil followed by root uptake by plants. Leafy vegetables and produce are treated separately. The dose is calculated using:

$$D_{IV} = D_{GW} \times D_{DC}$$

where:

D_{IV} = the intruder dose from vegetable intake

D_{GW} = the vegetable dose to intruder associated with using contaminated well water

D_{DC} = the vegetable dose to intruder associated with drill cutting in the garden soil

$$D = C_{GW} \times I \times (LEAF + ROOT) \times DCF \times (U_{LV} + U_{OV} \times k) \times FV \times e^{-\lambda_i t_t}$$

$$D_{DC} = C_{SD} \times \frac{T_{StV}}{\rho_S} \times DCF \times (U_{LV} \times k + U_{OV}) \times FV$$

$$LEAF = \frac{r \times \left(1 - e^{-\lambda_e t_V}\right)}{Y_V \times \lambda}$$

$$ROOT = \frac{T_{StV} \times \left(1 - e^{-\lambda_i t_b}\right)}{\rho_S \times \lambda_i}$$

$$\lambda_e = \lambda_i + \lambda_w$$

where:

C_{GW} = radionuclide concentration in groundwater from a 1m well (pCi/L)

I = irrigation rate (L/m^2-d), Table 4.6-6

$LEAF$ = radionuclide concentration in the vegetable's leaves (m^{2}d/kg)

$ROOT$ = radionuclide concentration in the vegetable's roots (m^{2}d/kg)

DCF = ingestion dose conversion factor (rem/μCi), Table 4.7-1

U_{LV} = human consumption rate of leafy vegetables (kg/year), Table 4.6-7

U_{OV} = human consumption rate of other vegetables (produce) (kg/year), Table 4.6-7

k = fraction retention of deposition on leaves (unitless) [1]

FV = fraction of leafy vegetables and produce produced locally (unitless), Table 4.6-5

r = fraction of material deposited on leaves that is retained (unitless), Table 4.6-6

λ_e = weathering and radiological decay constant (1/d)

λ_w = weathering decay constant (0.0495/d)

t_V = time vegetables are exposed to irrigation (d), Table 4.6-5

Y_V = vegetation production yield (kg/m^2), Table 4.6-5

T_{StV} = soil to vegetable ratio (unitless), Table 4.6-1

ρ_S = surface soil density (kg/m^2), Table 4.6-6

t_b = buildup time of radionuclides in soil, Table 4.6-5

λ_i = radiological decay constant (ln2/half life of radionuclide i – 1/d)

C_{SD} = concentration in soil due to drill cuttings (pCi/L)

t_t = transport time (d), assumed to be zero

6.3.1.4 Ingestion of Fish

The fish exposure route assumes fish are caught from a stream contaminated from the aquifer, diluted, and the receptor in turn consumes the contaminated fish. The dose is calculated using the following formula.

$$D = C_S \times U_F \times T_F \times DCF$$

where:

C_S	=	radionuclide concentration in groundwater at the seep line (pCi/L)
U_F	=	human consumption rate of finfish (kg/year), Table 4.6-7
T_F	=	fish bioaccumulation factor (L/kg), Table 4.6-4
DCF	=	ingestion dose conversion factor (rem/µCi) Table 4.7-1

6.3.1.5 Ingestion of Soil

The soil ingestion exposure route assumes soil is irrigated with groundwater from a well 1m from the tank farm and the receptor in turn consumes the contaminated soil. This formula was derived following the approach of the previous pathway calculations, whose bases are found in other PA methods. The dose is calculated using the following formula.

$$\frac{D = (C_D + C_W) \times DCF \times U_S}{\rho_{SS}}$$

where:

C_D	=	radionuclide concentration in soil contaminated with drill cuttings (pCi/m^3)
C_W	=	radionuclide concentration in soil irrigated with water from a 1m well (pCi/m^3)
DCF	=	ingestion dose conversion factor (rem/µCi), Table 4.7-1
U_S	=	human consumption rate of dirt (kg/year), Table 4.6-7
ρ_{SS}	=	density of sandy soil (g/cm^3)

6.3.2 Chronic Intruder Direct Exposure Dose Pathways

6.3.2.1 Direct Exposure from Irrigated Soil

The irrigated soil direct exposure route assumes soil is 1) irrigated with groundwater from a well 1m from the tank farm, and 2) contaminated with drill cuttings. The receptor, in turn, is exposed during time spent caring for a garden. The dose is calculated using the following formula.

$$D = (C_D + C_W) \times F_G \times DCF$$

where:

C_D = radionuclide concentration in soil contaminated with drill cuttings (pCi/m^3)

C_W = radionuclide concentration in soil irrigated with water from a 1m well (pCi/m^3)

DCF = external dose conversion factor, 15cm (rem/yr per $\mu Ci/m^3$), Table 4.7-1

F_G = fraction of time spent in garden (unitless), Table 4.6-7

6.3.2.2 Direct Exposure from Swimming

The swimming direct exposure route assumes the receptor receives dose from swimming in a stream contaminated from the aquifer. The dose is calculated using the following formula.

$$D = GF_S \times t_S \times C_{SW} \times DCF$$

where:

DCF = external dose conversion factor, water immersion (rem/yr per $\mu Ci/m^3$), Table 4.7-1

GF_S = swimming geometry factor (unitless) [1]

t_S = time per year spent swimming (hr/yr), Table 4.6-7

C_{SW} = radionuclide concentration in water from the stream (undiluted aquifer) (pCi/L)

6.3.2.3 Direct Exposure from Fishing/Boating

The fishing/boating direct exposure route assumes the receptor receives dose from fishing or boating in a stream contaminated from the aquifer. The dose is calculated using the following formula.

$$D = GF_B \times t_B \times C_{SW} \times DCF$$

where:

DCF = external dose conversion factor, 15 cm (rem/yr per $\mu Ci/m^3$), Table 4.7-1

GF_B = boating geometry factor (unitless) [0.5]

t_B = time per year spent boating (hr/yr), Table 4.6-7

C_{SW} = radionuclide concentration in water from the stream (undiluted aquifer) (pCi/L)

6.3.3 Chronic Intruder Inhalation Dose Pathways

6.3.3.1 Inhalation during Irrigation

The irrigation inhalation exposure route assumes soil is irrigated with groundwater from a well 1m from the tank farm and the intruder in turn is exposed by breathing while the garden is irrigated but only during the time spent caring for a garden. This formula was derived following the approach of the previous pathway calculations, whose bases are found in other PA methods. The ARF described in Section 5.4.2.3.1 is included in the pathway formula. The dose is calculated using the following formula.

$$D = \frac{C_{GW} \times DCF \times U_A \times F_G \times C_{WA} \times ARF}{\rho_W}$$

where:

C_{GW} = radionuclide concentration in groundwater from a 1m well (pCi/L)

DCF = inhalation dose conversion factor (rem/μCi), Table 4.7-1

U_A = air intake (m^3/yr), Table 4.6-7

F_G = fraction of time spent in garden exposed to soil irrigated with contaminated groundwater (unitless), Table 4.6-7

C_{WA} = water contained in air at ambient conditions, (g/m^3) [10 g/m^3]

ARF = airborne release fractions [1E-04]

ρ_W = water density (g/ml)

6.3.3.2 Inhalation during Showering

The showering inhalation exposure route assumes receptor exposed by breathing humid air within the shower. The source of water for the shower is a well 1m from the tank farm. For simplicity and conservatism, the source material is the moisture contained within the air with equal concentrations as the groundwater for most radionuclides. For those isotopes of uranium, an Airborne Release Fraction (ARF) is applied, based on DOE-HDBK-3010-94. A conservative value of 1E-4 is used, which is associated with commercial spray nozzles. This pathway formula was derived following the approach of the previous pathway calculations, whose bases are found in other PA methods. The dose is calculated using the following formula.

$$D = \frac{C_{GW} \times DCF \times U_A \times t_S \times C_{WS} \times ARF}{\rho_W}$$

where:

C_{GW} = radionuclide concentration in groundwater from a well (pCi/L)

DCF = inhalation dose conversion factor (rem/μCi), Table 4.7-1

U_A = air intake (m^3/yr), Table 4.6-7

t_S = time spent in shower (min), Table 4.6-7
Note: GoldSim uses fraction of time [0.0069 = 10 min/day]

C_{WS} = water contained in air at shower conditions, (g/m^3) [41 g/m^3]

ARF = airborne release fraction [1E-04]

ρ_W = water density (g/ml)

6.3.3.3 Inhalation of Dust from Irrigated Soil

The irrigation soil inhalation exposure route assumes soil is irrigated with groundwater from a well 1m from the tank farm and the receptor in turn is exposed by breathing dust during time spent caring for a garden. This formula was derived following the approach of the previous pathway calculations, whose bases are found in other PA methods. The dose is calculated using the following formula.

$$D = \frac{U_A \times L_{SiA} \times C_D \times DCF \times F_G}{\rho_{SS}}$$

where:

U_A = air intake (m^3/yr), Table 4.6-7

L_{SiA} = soil loading in air while working in a garden (kg/m^3), Table 4.6-6

C_D = radionuclide concentration in soil irrigated with water from a well and contaminated with drill cuttings (pCi/m^3)

DCF = inhalation dose conversion factor (rem/μCi), Table 4.7-1

F_G = fraction of time spent in garden exposed to soil irrigated with contaminated groundwater (unitless), Table 4.6-7

ρ_{SS} = density of sandy soil (g/cm^3)

6.3.3.4 Inhalation During Swimming

The swimming inhalation exposure route assumes a stream contaminated from the aquifer and the receptor inhales saturated air. For simplicity and conservatism, the amount of moisture contained in the inhaled air assumed to be stream water. This formula was derived following the approach of the previous pathway calculations, whose bases are found in other PA methods. The dose is calculated using the following formula.

$$D = \frac{\mathrm{U_A} \times GF_S \times t_S \times C_{SW} \times DCF \times C_{WiA}}{\rho_W}$$

where:

U_A	=	air intake (m^3/yr), Table 4.6-7
GF_S	=	swimming geometry factor (unitless) [1]
t_S	=	time per year spent swimming (hr/yr), Table 4.6-7
C_{SW}	=	radionuclide concentration in water from the stream, (undiluted aquifer) (pCi/L)
DCF	=	inhalation dose conversion factor (rem/µCi), Table 4.7-1
C_{WA}	=	water contained in air at ambient conditions, (g/m3) [10 g/m^3]
ρ_W	=	water density (g/ml)

6.4 Intruder Analysis Results

The peak total intruder doses were calculated utilizing the pathways identified in Section 6.2 for the Acute Intruder Scenario and in Section 6.3 for the Chronic Intruder Agricultural (Post-Drilling) Scenario. For the Acute Intruder, doses were calculated assuming the Acute Intruder drills into a three-inch diameter transfer line at any time after the 100 year period of institutional control following FTF closure. For the Chronic Intruder, annual doses were calculated assuming contamination from the drill cuttings, as well as from the use of water obtained from a well representative of each of the four sectors identified as Sectors 1A, 1B, 1C, and 1D, and as presented in Figure 5.2-5.

The peak dose for the Acute Intruder in the 10,000 year performance period was 1.60 mrem at year 100, which was primarily due to exposure to drill cuttings (Table 6.4-1). The Acute Intruder scenario does not include a groundwater contribution and therefore did not vary by FTF Sector. Figure 6.4-1 presents the peak doses over time during the performance period (10,000 years) for the Acute Intruder. Figure 6.4-2 illustrates the concentrations in the soil, as a function of time after FTF closure, for the radionuclides that contribute to the Acute Intruder dose shown in Table 6.4-1.

Table 6.4-1: Acute Intruder Dose Contributors

Acute Intruder Pathway Contributors	Peak Contribution (mrem)	Principal Radionuclide Pathway Dose (%)
Drill Cuttings Direct Exposure	1.52	Cs-137/Ba-137m (94%)
Drill Cuttings Ingestion	0.03	Am-241 (41%), Sr-90 (38%)
Drill Cuttings Inhalation	0.05	Am-241 (70%)
Total	**1.60**	

Figure 6.4-1: Acute Intruder Dose Results within 10,000 Years - Drilling into a Three-Inch Transfer Line

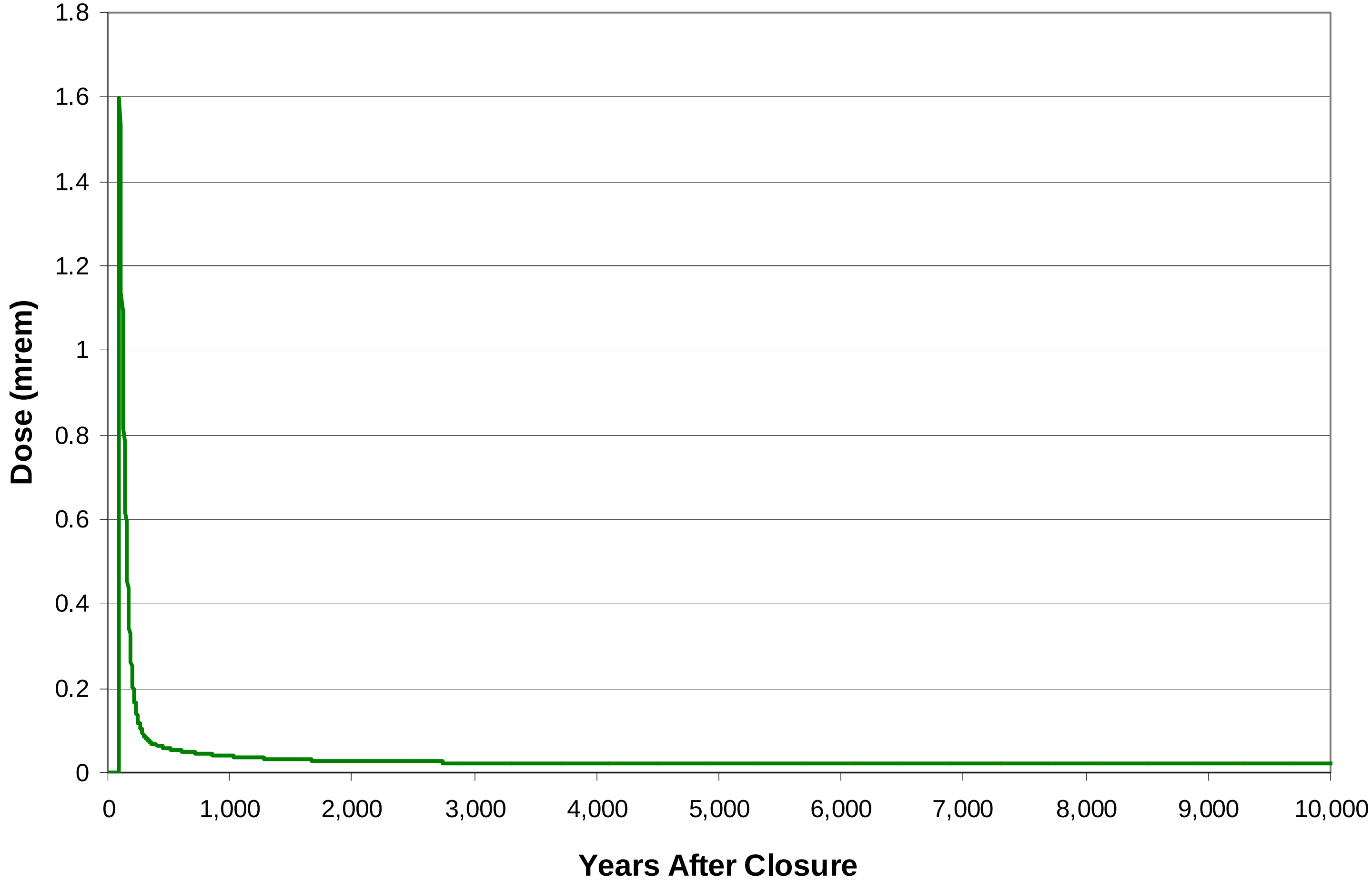
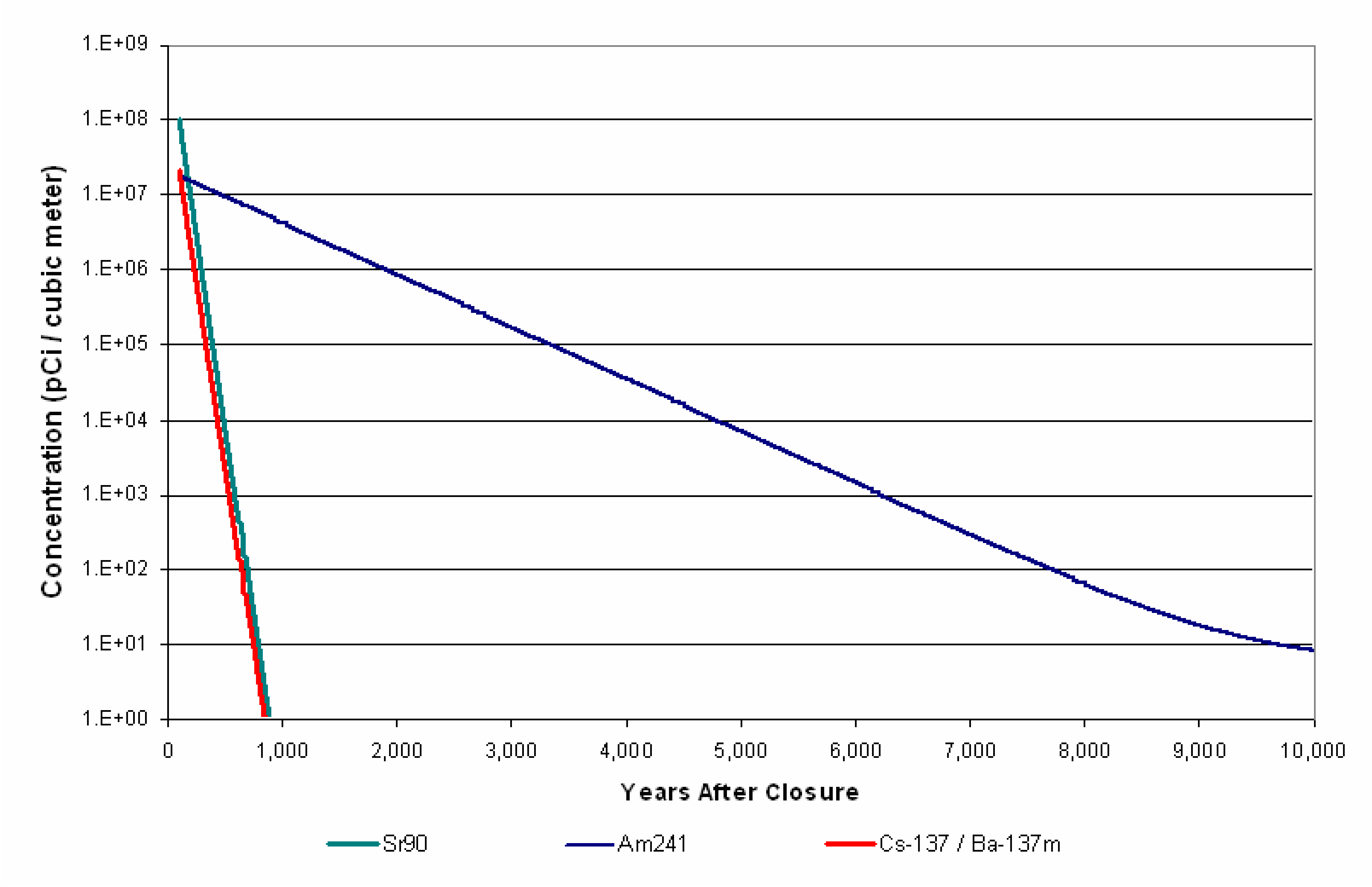


Figure 6.4-2: Concentration of Contributing Radionuclides in the Soil from Drill Cuttings



For the Chronic Intruder, the contributions to the peak doses from the four 1m sectors were calculated using the highest concentration for each radionuclide in the sector (a discussion of how peak concentrations were determined by sector was provided in Section 6.1). These peak doses were the total dose associated with drill cuttings and all the individual 1m well pathways identified in Section 6.3. Figure 6.4-3 graphically presents the annual dose to the Chronic Intruder for each of the four 1m sectors for the 10,000 year performance period after FTF closure. As shown in Figure 6.4-3, the dose to the Chronic Intruder, within the 10,000 year period, is highest at 100 years after FTF closure and is attributed to the earliest time after FTF closure that an intruder is assumed to drill into the closure area. The small peak at approximately 600 years after closure is attributed to the release of contaminants into the aquifers following the assumed failure of the steel liners associated with the ancillary equipment and the transfer lines. The increase of the dose in Sector 1C is attributed to the release of contaminants from the Type IV tanks that are assumed to experience steel liner failure earlier than the other waste tanks.

Table 6.4-2 presents the Chronic Intruder peak dose within the 10,000 year performance period and identifies the contribution from the more significant pathways and their contributing radionuclides. The peak dose for the Chronic Intruder scenario in the 10,000 year performance period was 72.7 mrem/yr at year 100. This peak dose was almost entirely due to ingestion of vegetables contaminated with drill cuttings, with 71.6 of the 72. 7 mrem/yr being due to vegetable ingestion. The principal radionuclide contributors to this vegetable dose were the short lived isotopes Sr-90/Y-90 and Cs-137/Ba-137m. The Chronic Intruder scenario peak dose within the 10,000 year period of performance does not include a groundwater contribution because no liner failures are assumed to occur until 500 years after closure (which are associated with the ancillary equipment and transfer lines). Thus, the peak dose to the Chronic Intruder during the 10,000 year performance period does not vary by FTF Sector.

It should be noted that there are several conservatisms incorporated into the Chronic Intruder analysis within the 10,000 year period after FTF closure. The Chronic Intruder scenario conservatively assumes that the intruder drills into a transfer line immediately after the end of the 100-year institutional control period. Since almost the entire dose comes from the short-lived isotopes, Sr-90/Y-90 and Cs-137/Ba-137m, even a relatively small delay of 100 years in the timing of the intruder drilling would result in a significant reduction in the peak dose (as evident in Figure 6.4-3). Also, no credit is taken for the fact that the intruder would have to drill through the steel transfer line or for some transfer line segments, the concrete encasement containing the transfer lines. In addition, the cross-sectional area of all of the transfer line segments from Table 3.2-3 is 11,400 ft^2 compared to the total FTF footprint of approximately 892,500 ft^2, so the opportunity for an intruder to drill into a transfer line exists for only about 1% of the total area of FTF.

Figure 6.4-3: Annual Dose to the Chronic Intruder – 10,000 Years after FTF Closure

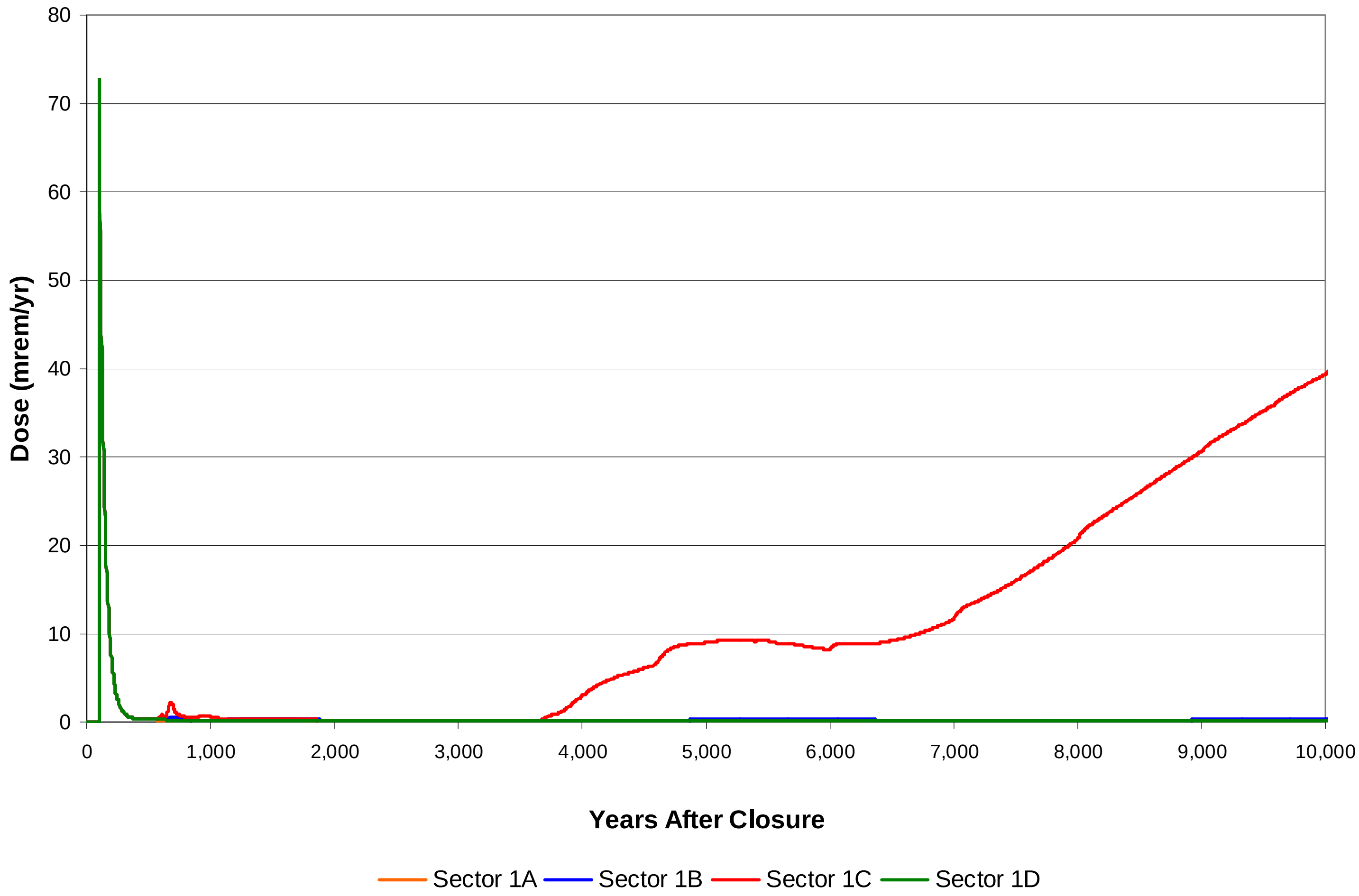


Table 6.4-2: Chronic Intruder Peak Dose Contributors – 10,000 Years after Closure

Chronic Intruder Pathway Contributors	Contribution to Peak (mrem/yr)	Principal Radionuclide Pathway Dose (%)
Vegetable Ingestion	71.6	Sr-90 / Y-90 (56%) Cs-137 / Ba-137m (44%)
Soil Ingestion	0.7	Am-241 (42%) Sr-90 / Y-90 (37%)
External Exposure	0.4	Cs-137 / Ba-137m (94%)
Total	**72.7**	

As illustrated in Figure 6.4-4, the dose to the Chronic Intruder reaches its peak within the 20,000 year period after FTF closure at approximately 10,900 years. This 10,900 year peak dose is attributed to the contribution from the well in Sector 1C which is dominated by the release from the Type IV tanks that experience earlier liner failure than the other waste tanks.

Figure 6.4-4: Annual Dose to the Chronic Intruder – 20,000 Years after FTF Closure

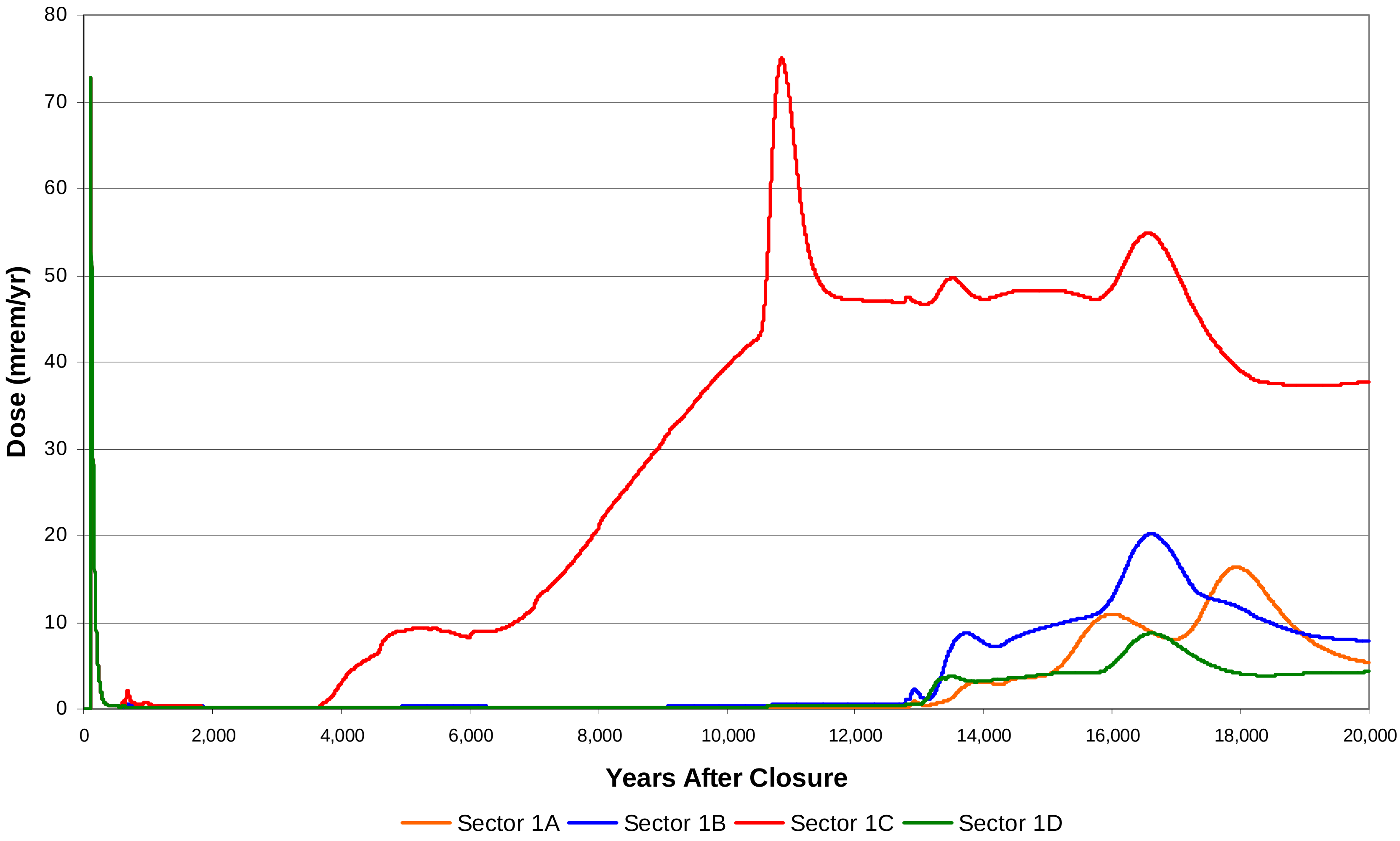


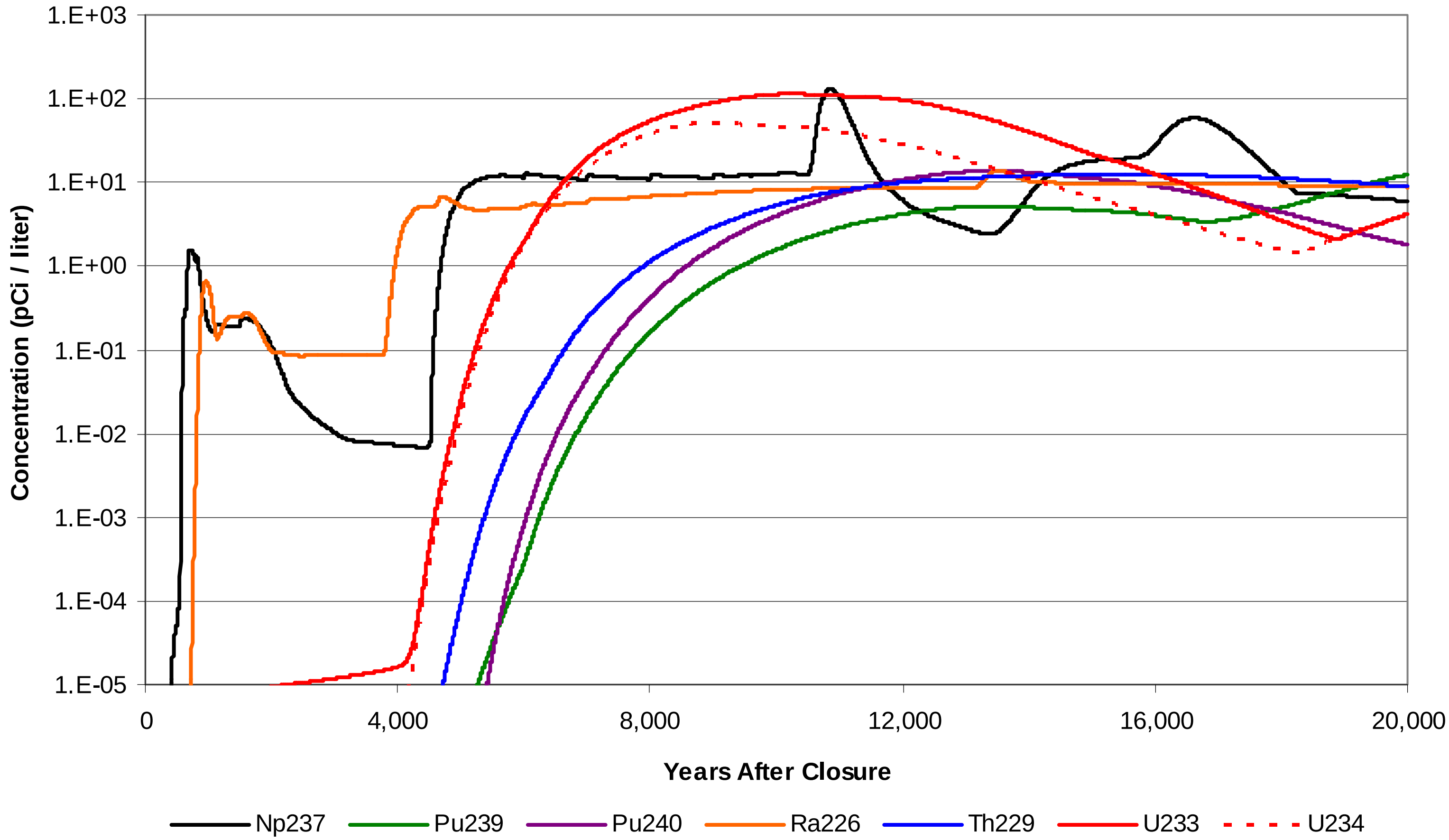
Table 6.4-3 presents the Chronic Intruder peak dose within the 20,000 year period after FTF closure and identifies the contributions from the more significant pathways and their contributing radionuclides. The peak dose for the Chronic Intruder scenario within the 20,000 year period was 75 mrem/yr in Sector 1C, with 99.6% of the dose attributed to the contaminated well associated with this sector. This peak dose is due primarily to two pathways: water ingestion (53.7% of the total) and vegetable ingestion (45.5% of the total). Figure 6.4-5 graphically presents the concentration in the contaminated well associated with Sector 1C for the contributing radionuclides identified in Table 6.4-3.

Table 6.4-3: Peak Chronic Intruder Dose Contributors – 20,000 Years after FTF Closure

Contributing Radionuclides	Water Ingestion Pathway (mrem/yr)	Vegetable Ingestion Pathway (mrem/yr)	All-Pathways (mrem/yr)
Np-237	18.1	15.3	33.5
Pu-239	0.8	0.7	1.6
Pu-240	2.1	1.8	3.9
Ra-226	3.0	2.5	5.6
Th-229	5.8	4.9	10.8
U-233	7.1	6.0	13.1
U-234	2.6	2.2	4.8
All others	0.8	0.7	1.7
Total	40.3	34.1	75.0

Note: All-Pathways include groundwater and drill cuttings exposure pathways.

Figure 6.4-5: Concentrations of Radionuclides Contributing to Chronic Intruder Dose in Sector 1C



6.5 Intruder Uncertainty / Sensitivity Analysis

The purpose of this section was to consider the effects on the Intruder Analyses of uncertainties in the conceptual models used, and sensitivities in the parameters used in the mathematical models.

The Acute Intruder receives an exposure solely from the uptake of drill cuttings via direct external exposure, ingestion, and inhalation, as described in Section 6.2. The drill cuttings are based on the inventory in the three inch transfer lines which are assumed to be uniformly distributed within FTF as described in Section 4.4.2.7. Because of the uniformity of the transfer line inventory throughout the FTF no uncertainty analysis has been conducted for the Acute Intruder.

The Chronic Intruder receives exposure from the various pathways described in Section 6.3. In the GoldSim probabilistic model the Chronic Intruder is assumed to use the 1m well with the highest radionuclide concentration regardless of the intruder's location. The 1m well concentration is based on the release from the FTF tanks which utilize the same parameters as in the MOP analysis; thus the uncertainty analysis conducted for the MOP related to tank release parameters is also applicable to the Chronic Intruder. The peak of the means Chronic Intruder dose for configuration Case A is 639 mrem/yr. This dose compares to a median dose of 112 mrem/yr, and illustrates that the same relationship between the mean and median (as seen for the MOP in Section 5.6.5), also exists for the Intruder UA due to the fact that many stochastic distributions are reasonably conservative.

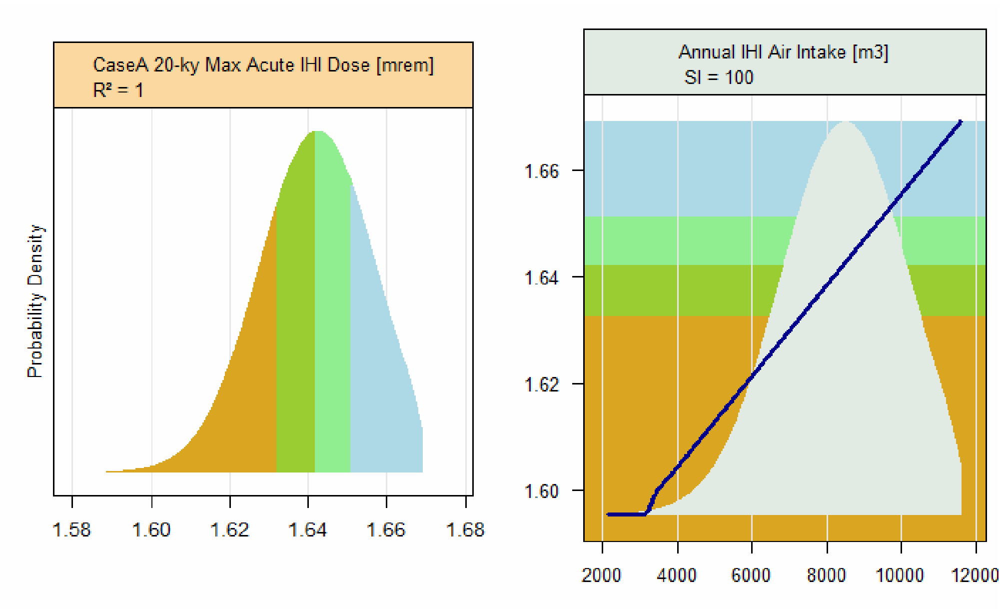
The following section provides the results of the sensitivity analysis conducted for the acute and Chronic Intruder.

6.5.1 Intruder Probabilistic Sensitivity Analysis

Sensitivity analyses were performed using the GoldSim FTF model as described in Section 5.6.6 for Cases A and D for the Acute Intruder and the Chronic Intruder.

As stated above, the Acute Intruder receives an exposure solely from the drill cuttings via direct external exposure, ingestion, and inhalation, as described in Section 6.2. Of these three pathways, only the inhalation pathway, with a distribution on the inhalation rate, has a stochastic which can be analyzed for sensitivity to the dose endpoint. Because this exposure to the Acute Intruder is based on drilling into a three inch transfer line; the sensitivity analysis for the Acute Intruder is independent of the configuration case and the timing of the maximum dose is at the end of institutional control (100 years after closure). Even though the dose to the Acute Intruder is dependent on the inventory in the drill cuttings; a stochastic on transfer line inventory was not considered because the dose to the intruder is linearly dependent on the transfer line inventory. As discussed in Section 3.3.3, the transfer line inventory has been very conservatively assessed. Figure 6.5-1 presents the partial dependence plot for the maximum dose to the Acute Intruder from annual air intake.

Figure 6.5-1: Partial Dependence Plot for Maximum IHI Acute Dose within 20,000 Years - Any Configuration Case



The Chronic Intruder receives exposure from the various pathways described in Section 6.3. In the GoldSim probabilistic model the Chronic Intruder is assumed to use the 1m well with the highest radionuclide concentration regardless of the intruder's location. Based on results from the MOP analysis the 1m well concentration is from Tanks 1, 2, 17 and 18. Drill cuttings also contribute to the dose of the Chronic Intruder; but its greatest significance is only early after waste tank closure, as shown in Section 6.4. Thus the dose to the Chronic Intruder is independent of sector in the GoldSim probabilistic model. Table 6.5-1 identifies the most sensitive parameters for the dose to the Chronic Intruder within 10,000 years and 20,000 years for Cases A and D.

Table 6.5-1: Identification of the Most Sensitive Parameters for the Endpoints of Interest for Configuration Cases A and D

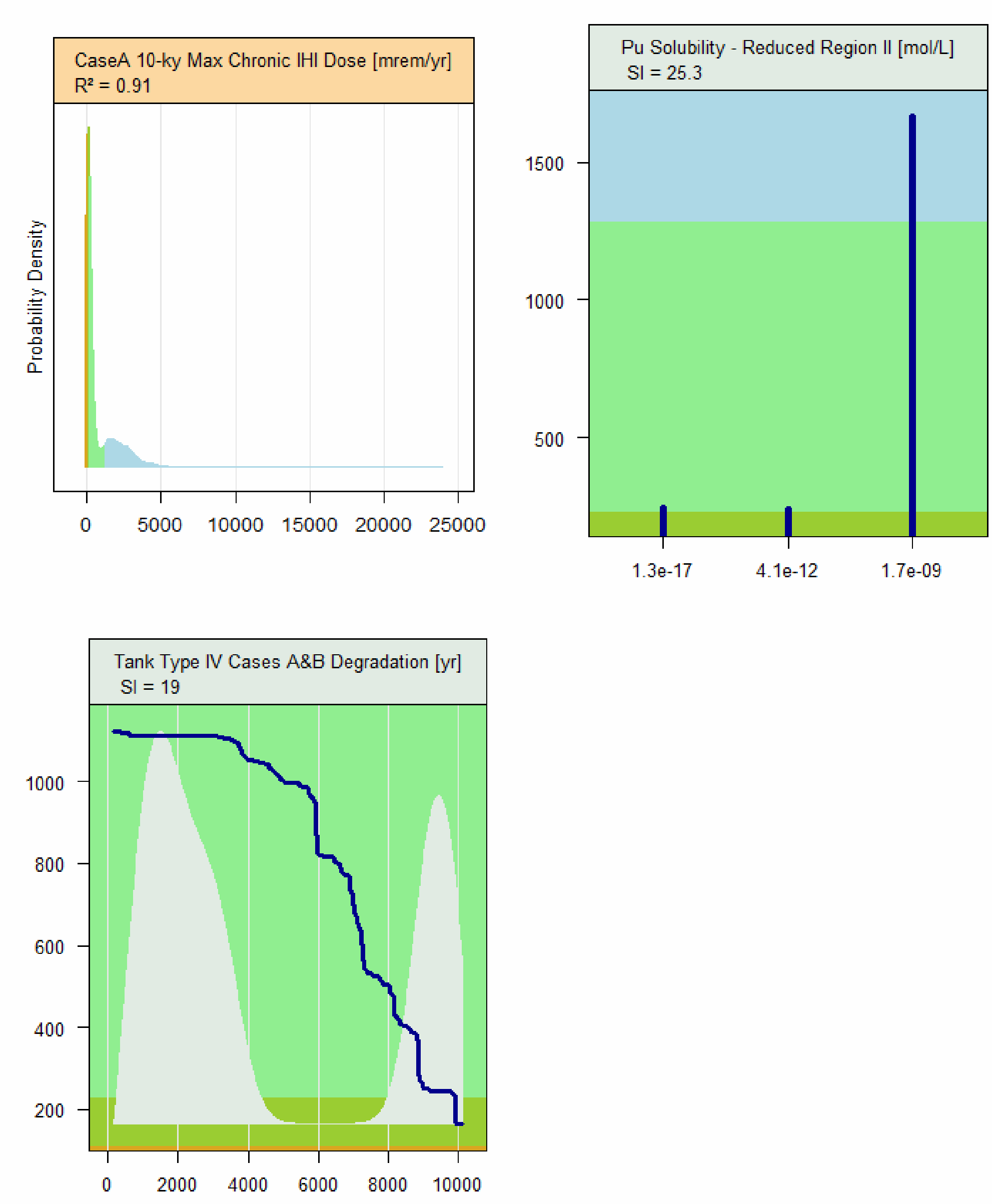
Endpoint	SI Rank	Input Parameter	Sensitivity Index
Max. chronic IHI dose within 10,000 yr – Case A $R^2 = 0.91$	1	Pu solubility – Reduced Region II cements	25.3
	2	Tank Type IV Cases A & B degradation time	19.0
Max. chronic IHI dose within 20,000 yr – Case A $R^2 = 0.97$	1	Pu solubility – Oxidized Region II cements	44.3
	2	Tank 18 inventory of Pu-239	6.16
	3	Aquifer saturated thickness	5.46
Max. chronic IHI dose within 10,000 yr – Case D $R^2 = 0.95$	1	Pu solubility – Oxidized Region II cements	20.8
	2	Plutonium K_d in sandy soil	13.7
	3	Plutonium K_d in old oxidizing cements	12.1
Max. chronic IHI dose within 20,000 yr – Case D $R^2 = 0.92$	1	Pu solubility – Oxidized Region II cements	18.6
	2	Tc solubility – Oxidized Region II cements	16.9
	3	Tank Type I Cases C,D & E degradation time	7.02

Figures 6.5-2 through 6.5-5 provide the partial dependence plots for the most sensitive parameters to the dose to the Chronic Intruder identified in Table 6.5-1.

The parameters most influential to the maximum chronic IHI dose within the 10,000-year period of performance are shown in Figure 6.5-2. The GBM model fit is good, with an R^2 of 0.91. The parameter of primary significance to this endpoint, with a sensitivity index of over 25, is the solubility of plutonium in Reduced Region II. Examining model results shows that Pu-239 is the main contributor to chronic IHI dose within 10,000 years.

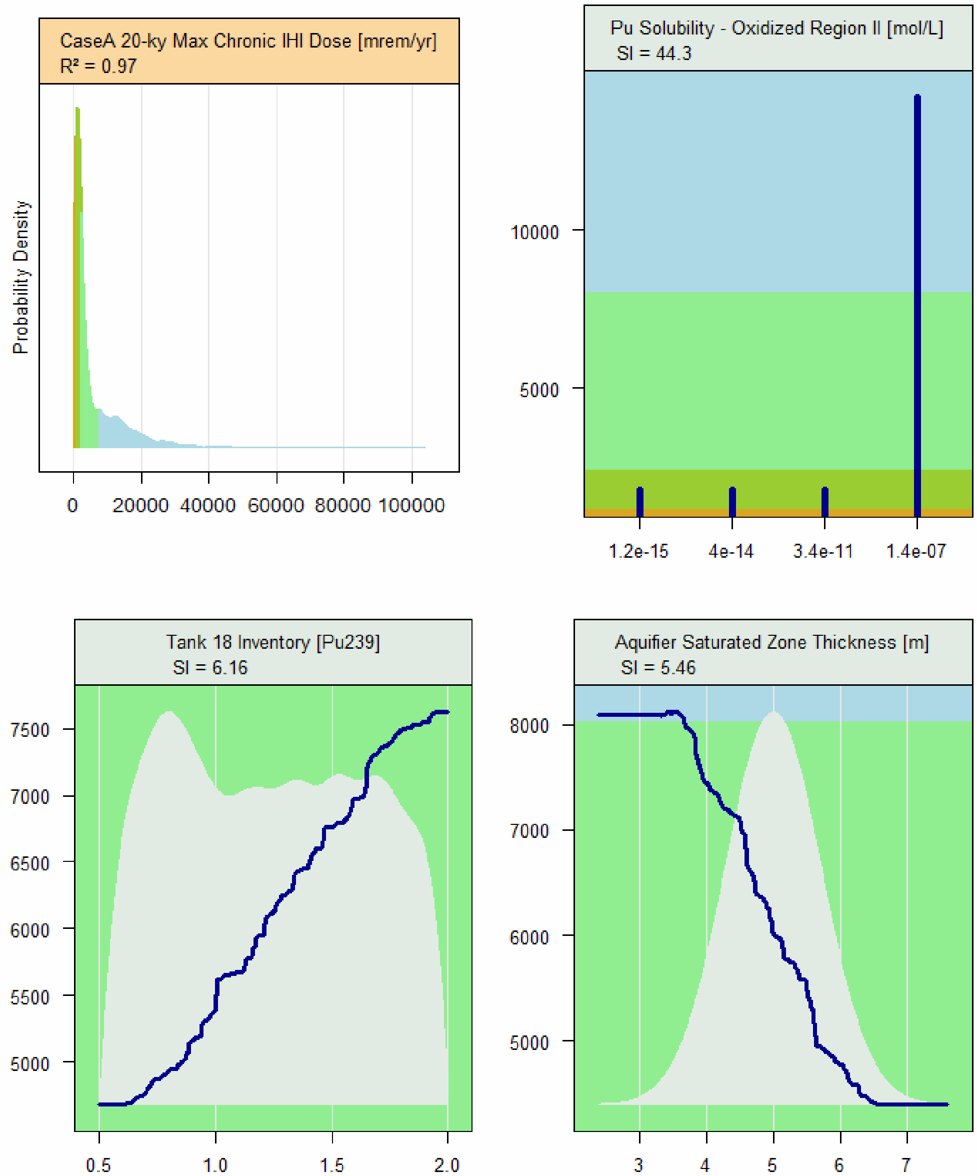
The second-ranked sensitive parameter for this endpoint, with an SI of 19, is the timing of failure under configuration Case A (and B) for the Type IV tanks. Because the significant contributors to the 1m well concentration are the Type IV Tanks 17 and 18, this result is not unexpected.

Figure 6.5-2: Partial Dependence Plot for Maximum IHI Chronic Dose within 10,000 Years - Case A



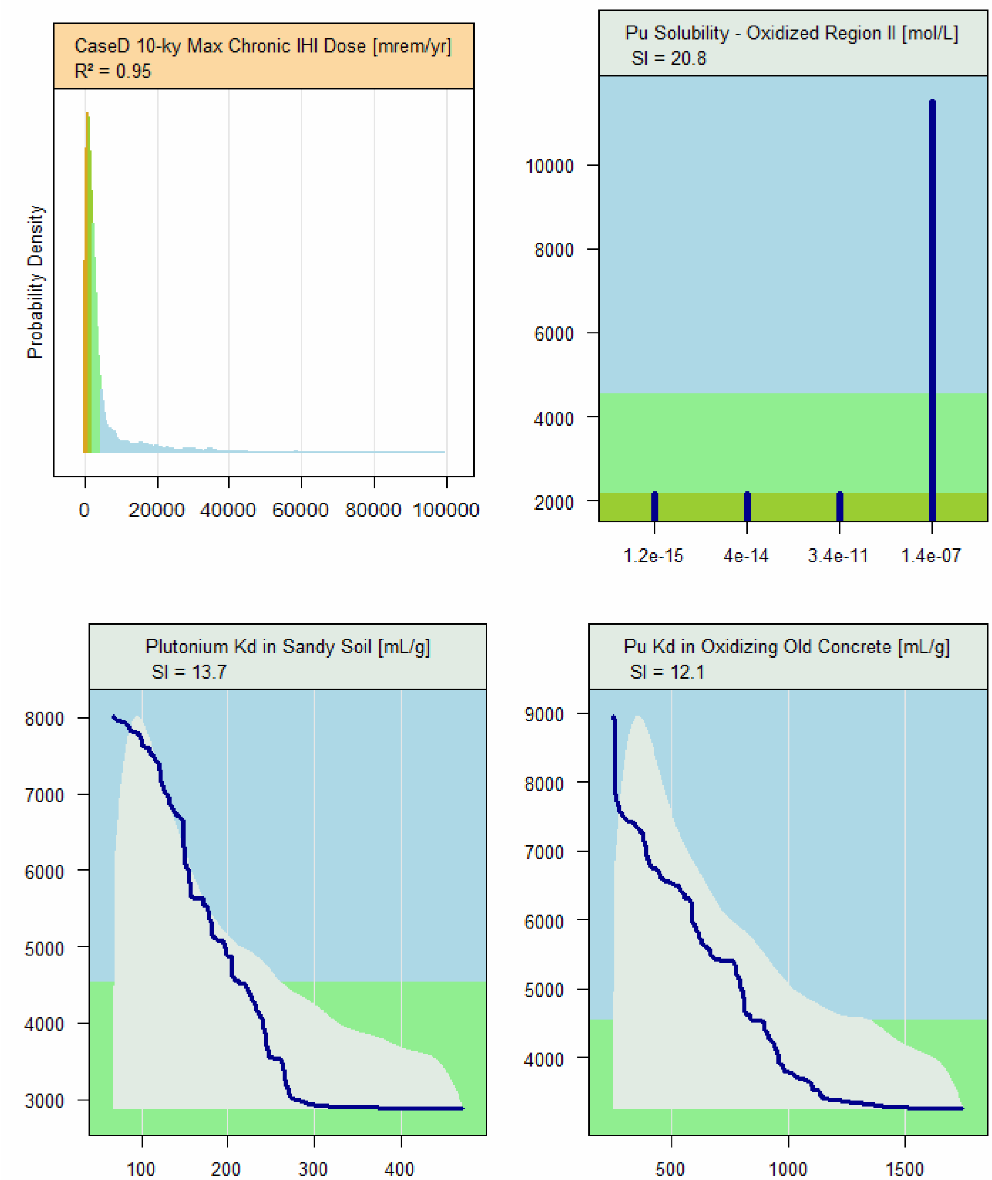
When extending the analysis from 10,000 to 20,000 years, the Chronic IHI is still dependent on Pu-239, but is most strongly influenced by the plutonium solubility in oxidized Region II concrete, as shown in Figure 6.5-3. Note that the reduced concrete solubility was most important before 10,000 years. As the concretes age, they becomes oxidized, and solubility limits change, but their influence on the IHI dose is still dominant, here with an SI of over 44. Of secondary influence is the inventory of Pu-239 in Tank 18, clearly implicating this radionuclide and Tank 18 in the IHI chronic dose. The third parameter, the thickness of the aquifer, is not unexpected.

Figure 6.5-3: Partial Dependence Plot for Maximum IHI Chronic Dose within 20,000 Years - Case A



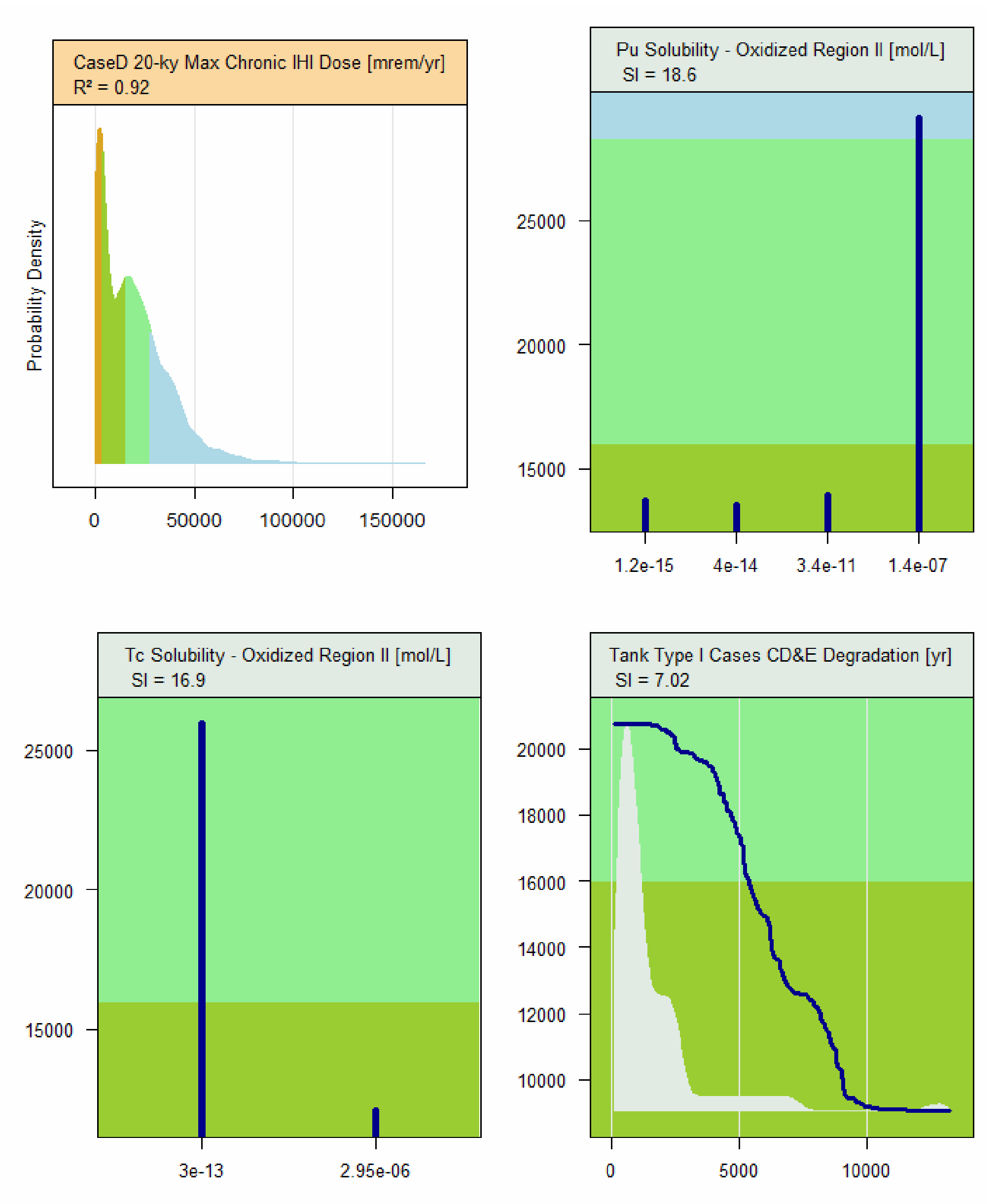
The 10,000 year maximum chronic IHI dose is clearly dominated by plutonium, as shown in Figure 6.5-4. The top three ranked parameters are all related to transport geochemistry of plutonium: the solubility in concrete, K_d in sandy soil, and K_d in concrete. Doses decrease with higher K_d, and increase with higher solubility, as expected in this water-driven system.

Figure 6.5-4: Partial Dependence Plot for Maximum IHI Chronic Dose within 10,000 Years - Case D



When extending the analysis from 10,000 to 20,000 years, the variation in maximum chronic IHI dose is shared by parameters for both Pu and Tc solubility in concrete, as shown in Figure 6.5-5. Following that is the time to failure for Type I tanks for Case D (and Cases C and E). Because the contribution to the worst 1m well is also from the Type I tanks – Tank 1 and Tank 2, this result is not unexpected.

Figure 6.5-5: Partial Dependence Plot for Maximum IHI Chronic Dose within 20,000 Years - Case D



6.5.2 Intruder Single Parameter Deterministic Sensitivity Analyses

The purpose of this section is to present single parameter sensitivity analysis results obtained using the FTF Base Case model. The drill scenario inventories were modified to see the impact this parameter had on the Chronic Intruder scenarios.

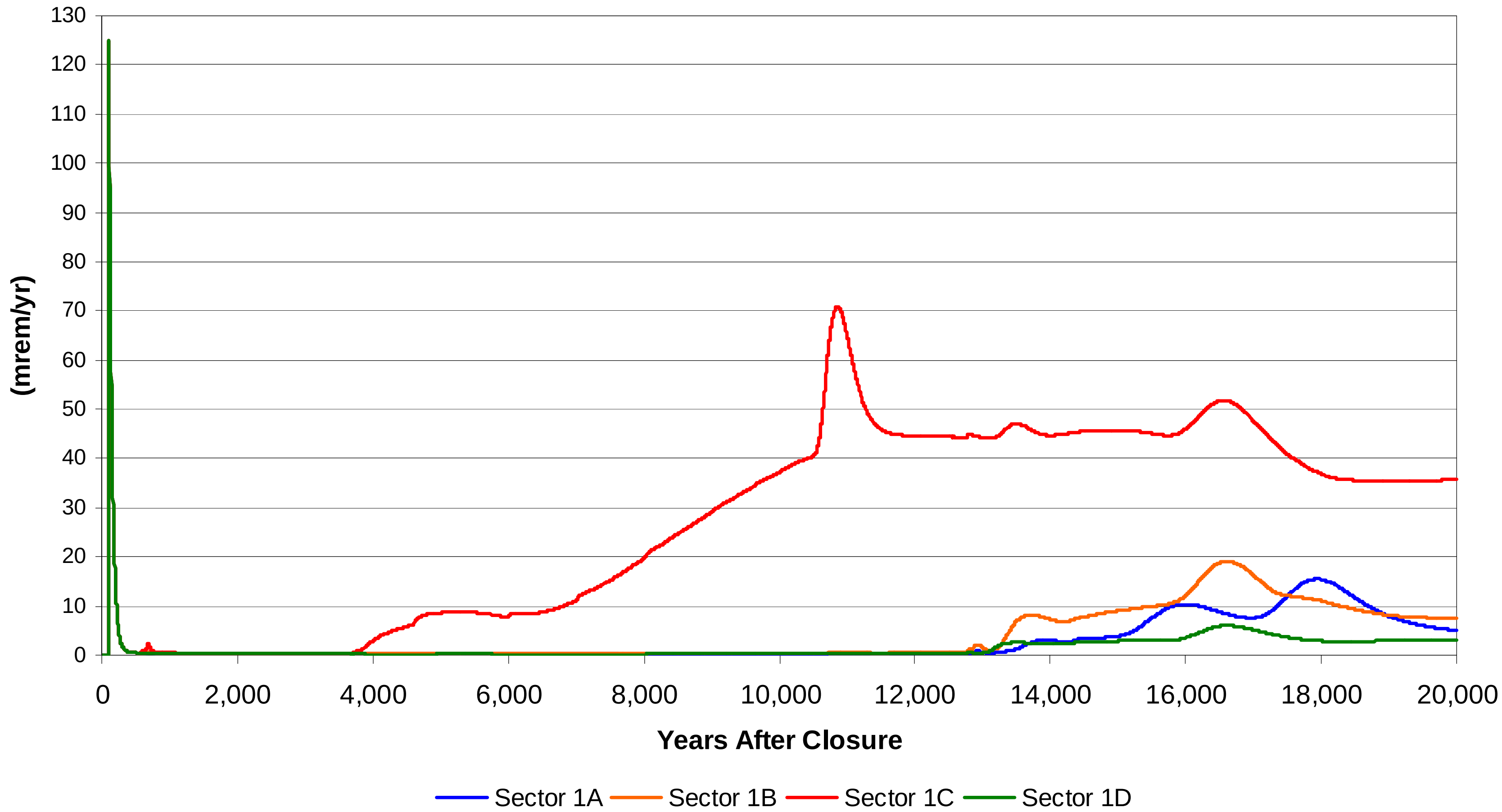
6.5.2.1 Impact of Drilling into a 4 inch Transfer Line vs. a 3 inch Transfer Line

To investigate the effect of an intruder drilling into 4 inch transfer line vs. a 3 inch transfer line (which is not considered likely, since, as discussed in Section 4.2.4.2, only 0.24% of the FTF transfer lines are 4 inch lines), the transfer line inventory for a 4 inch line was substituted for the 3 inch transfer line inventory used in the Base Case modeling that is presented in Section 6.4. All other parameters from the Chronic Intruder scenario were held constant. As presented in Figure 6.5-6, the 4 inch transfer line inventory change has an impact on the magnitude of the peak dose that occurs within the 10,000 year performance period, and is attributed to the earliest time after closure (100 years) that drilling could impact a transfer line. The peak dose at 100 years for this case is 125 mrem/yr, which is approximately 1.7 times the peak dose associated with drilling into a 3 inch transfer line. At 100 years (75 mrem/yr). Because of the rapid decay of the contributing radionuclides to dose attributed to the drill cuttings (as discussed in Section 6.4), the shape of the curve, and the peaks at later years shown in Figure 6.5-6 are very similar to the Base Case shown in Figure 6.4-4.

6.5.2.2 Impact of Drilling into a Waste Tank vs. into a Transfer Line

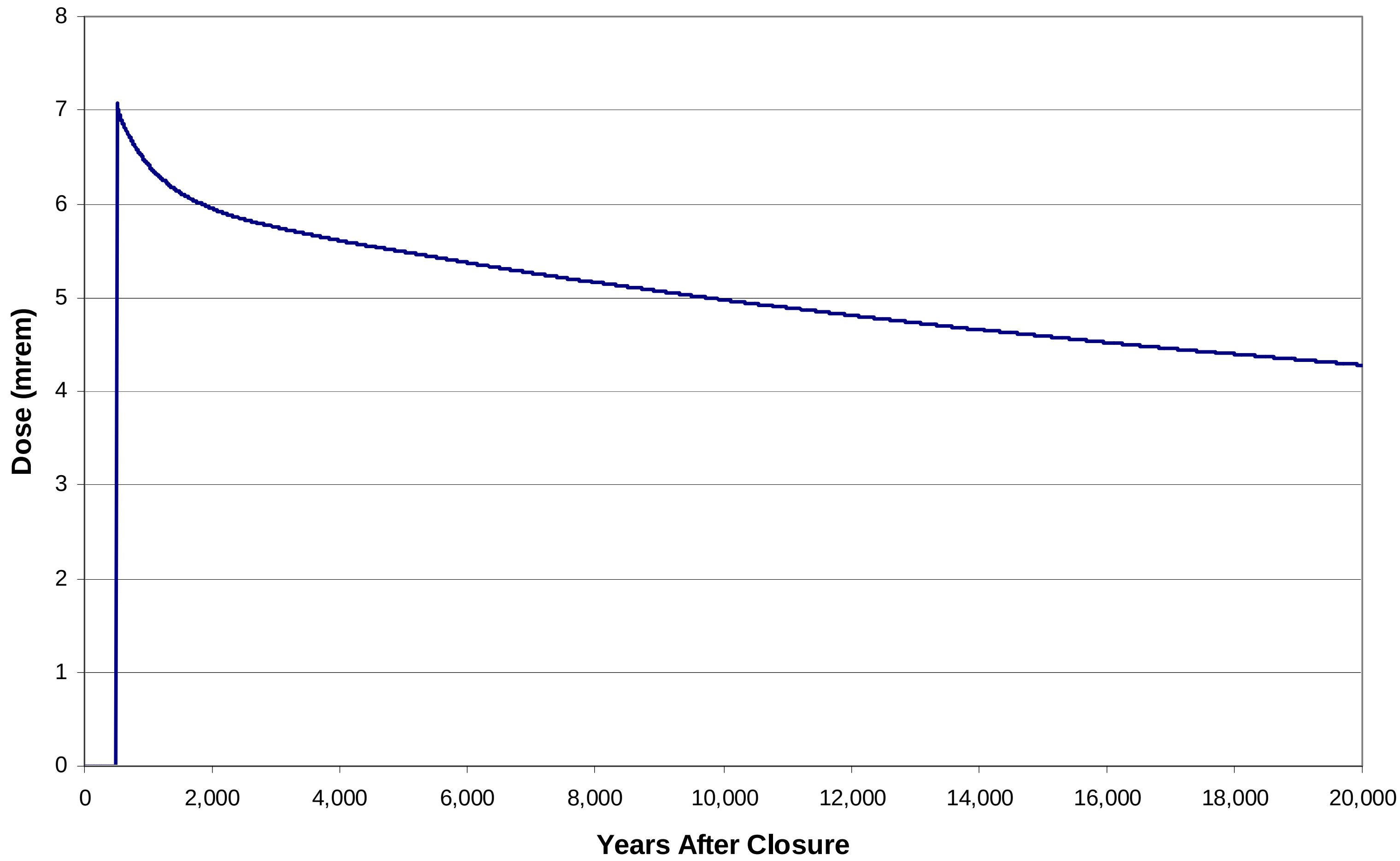
To investigate the effect of an intruder drilling into a waste tank (which is not considered a credible scenario (Section 4.2.4.2), a conservative Tank 18 drilling inventory was substituted for the transfer line drilling inventory. Since the waste tank engineered barriers (e.g., closure cap erosion barrier, tank top concrete, and tank liner, where applicable), will prevent drilling into the waste inventory, this scenario was not considered to occur until 500 years after FTF closure. With the exception of the waste tank walls, all of the steel objects in the system will be encased by several feet of grout in the horizontal direction. All pumps, pipes, etc. that extend into the waste tank are suspended from the risers. The waste tanks are currently subject to a corrosion protection program that prevents corrosion of the walls by maintaining a high pH. [WSRC-TR-2002-00327] After placement of grout, the pH will remain high due to the properties of the grout. [WSRC-TR-97-0102, page 14] This will minimize the degradation effects on the carbon steel tank components and ensure the tank presents a credible drilling barrier, especially in the first 500 years. All other parameters from the Acute Intruder drilling scenario were held constant during the sensitivity run. Figure 6.5-7 shows the peak Acute Intruder dose for 20,000 years with the Tank 18 inventory change in place.

Figure 6.5-6: Chronic Intruder Dose Results Drilling into a 4 Inch Transfer Line



Note: Early peak is associated with all sectors.

Figure 6.5-7: Acute Intruder Dose Results Drilling into Tank 18



7.0 INTERPRETATION OF RESULTS

Summary for Section 7.0.

This section provides an interpretation of results presented in Sections 5 and 6.

Section 7.1 summarizes the results presented in Sections 5 and 6.

Section 7.2 summarizes the conservatisms used in modeling.

7.1 Performance Assessment Results

This section provides a summary and interpretation of the results presented in Sections 5 and 6. Interpretation of the results against 10 CFR 61 performance objectives shall be documented in DOE's Waste Determination documentation per NDAA Section 3116 and against the Industrial Wastewater Regulations in the FTF Closure Plan. [NDAA_3116, SCDHEC R.61-67]

7.1.1 Integrated System Behavior

Provided below is a short description of the impact that various segments of the integrated conceptual model have on dose results (the segments are discussed in some detail in Section 4.4.3).

7.1.1.1 Closure Cap

The Base Case liner failure dates are all after year 2500, so changes in the infiltration rate and corresponding changes in flow near the waste tanks does not significantly affect the flow model in the early years. Since the closure cap reaches the steady state flow values relatively quickly (i.e., less than a 2% increase in infiltration rate after year 2600), the cap has a minimal effect on peak doses.

The closure cap barrier analyses (Section 5.6.7.3) demonstrated that the closure cap has a minimal effect on the peak flux in 10,000 years. Under closure cap barrier analyses Case 3 and Case 4, the peak flux in 20,000 years can move forward in time for some radionuclides due to the failed closure cap allowing more flow earlier. For the Type I and Type III tanks, Cases 3 and 4 have peak fluxes which occur earlier, but not before year 10,000. In some instances, the closure cap being the only barrier initially (Cases 3 and 4) can diminish the magnitude of the peak flux. This is due to the fact that an intact closure cap can delay the flow increase that a degraded cap allows, with the higher flow diluting the inventory available for release before daughter products can build up. The decrease is more pronounced for radionuclides with significant parent contributions (e.g., Ra-226). The Sensitivity Analyses (Section 5.6.6) and the investigation of UA realizations (Section 5.6.4.2) did not identify any closure cap related parameters as dose significant.

7.1.1.2 Tank Top

The timing of waste tank top concrete degradation affects the flow rate into the tank. Early concrete degradation, as modeled in some alternate configurations, allows the steady state flow values to be reached earlier, but doesn't appear to have as pronounced an impact on flow as other segments (e.g., liner failure, basemat bypass). Section 5.6.6 (Sensitivity Analyses) and the investigation of UA realizations (Section 5.6.4.2) did not identify any tank top related parameters as dose significant.

7.1.1.3 Tank Liner Top

Since the entire liner was modeled as failing simultaneously, isolated failure of the tank top liner was not studied. A discussion of the overall affect of the liner failure analyses and results is provided in Section 7.1.1.6.

7.1.1.4 Tank Grout

The timing of tank grout degradation affects the flow rate to the CZ. Early grout degradation, as modeled in some alternate configurations, allows the steady state flow values to be reached earlier. Grout degradation can have different impacts depending upon whether the grout is partially degraded such that it allows increased flow or if it is degraded such that it is a fast flow path. In the FTF models, the partially degraded grout hydraulic conductivity is increased more and/or earlier, but the chemical properties are unchanged. Grout with a fast flow path is modeled as having a channel with no flow impedance and the grout is assumed to impart reducing capacity onto the CZ. The grout degradation does not have as immediate an impact on flow as other segments (e.g., liner failure, basemat bypass), since the grout degradation in most instances is gradual but can have a significant effect on dose in instances where the flow through the grout affects chemical transition times. This is especially true if the grout is assumed to not impart any reducing capacity onto the CZ, since the chemical transition conditions of the CZ can have a significant effect on the waste release rates (as discussed in Section 7.1.1.5).

The grout barrier analyses (Section 5.6.7.3) demonstrated that the impact of the grout as an independent barrier can be pronounced, independent of the tank type or radionuclide involved. The importance of the grout is due to the fact that in some cases the degraded grout does impart reducing capacity onto the CZ and the degraded grout can greatly increase the flow reaching the CZ. The grout as a barrier can have a significant impact on the peak fluxes in 10,000 years. The Sensitivity Analyses (Section 5.6.6) showed that the timing of the failure of the waste form for both Cases A and D in various tank types can be critical to determining peak concentrations and doses. This is as expected since it is in Case D that fast flow paths through the grout are modeled. The investigation of UA realizations (Section 5.6.4.2) identified chemical transition times, which can be grout related as discussed previously, as a parameter of dose significance.

7.1.1.5 Contamination Zone

The CZ modeling segment has a significant impact on the peak dose results. The modeled solubility limits control the release rate of contaminants from the CZ, and higher solubility limits can cause an increased release rate. The Section 5.6.7.1 sensitivity analysis results show that for most of the radionuclides, the waste release flux varies linearly with inventory, with the exceptions being those radionuclides (e.g., Pu-239 and Tc-99) that are solubility limited through iron co-precipitation and are present in a significant enough quantity for solubility control to have an effect. The effect of solubility limits is very radionuclide and chemical state variable.

The barrier analyses (Section 5.6.7.3) demonstrated that the CZ "barrier" can have a significant impact as an independent barrier if the Oxidized Region III conditions are assumed, independent of the tank type involved. If the Oxidized Region III conditions are assumed for the CZ, the waste release rates for most radionuclides are increased (since most radionuclides have solubility limits higher in Region II than in Region III). The Sensitivity Analyses (Section 5.6.6) showed that the Tc-99 solubility limits and Pu-239 solubility limits can be important to peak concentrations and doses. The investigation of UA realizations (Section 5.6.4.2) identified chemical transition times, which can directly impact the CZ, as a parameter of dose significant.

7.1.1.6 Tank Liner Sides and Bottom

In the probabilistic model, the waste tank liner was modeled utilizing different configurations, since independently moving the liner failure date forward tends to decrease the peak10,000 year dose. As discussed in Section 5.6.7.3, early liner failure tends to allow the closure cap to reduce infiltration into the tank during release of radionuclides that are not significantly affected by either the waste release solubility limits and/or concrete/soil retardation (e.g., with low soil/concrete K_d values). The result is to spread the releases out over a longer time period. Early liner failure has only a minor effect on magnitude of the dose peaks within10,000 years. There can be a significant chage in the timing of the early peaks associated with some radionuclides, such as Np-237 which shows a direct relationship to the change in the liner failure date. Since the release rate of the other radionuclides most affecting dose (e.g., Tc, Pu, U) are solubility limited in the 10,000 year period, their contribution to the peak doses are not greatly impacted by early liner failure.

In summary, the barrier analyses (Section 5.6.7.3) demonstrated that the impact of the liner barrier can be variable, with the impact of the liner as a barrier depending upon the tank type and radionuclide involved. In general the liner does not have a significant impact on the peak fluxes in 10,000 years. Early liner failure increases some peak fluxes in 20,000 years (especially for fast transport time radionuclides such as Tc-99) since contributors that were outside the 20,000 years can move forward in time and contribute after year 10,000 but just before 20,000 years. The Sensitivity Analyses (Section 5.6.6) identified the closure configuration assumed (e.g., Cases A versus Case D) as an important parameter to dose and this parameter directly impacts the timing of the liner failure. The investigation of UA realizations (Section 5.6.4.2) identified liner failure as potentially significant to peak doses within 20,000 years.

7.1.1.7 Basemat

The concrete basemat impact as an independent barrier can be significant. The barrier analyses (Section 5.6.7.3) demonstrated that concrete as a barrier does not independently impact the peak flux in 10,000 years but can affect the flux in 20,000 years. Allowing contaminants to bypass the basemat has a minimal affect on tanks with thin basemats (Type IV tanks), but has a more appreciable affect when the waste tanks involved have a very thick basemat (e.g., Type I/III/IIIA tanks). This is due to the fact that bypassing the basemat removes both the flow restricting and K_d impacts of the basemat.

The impact of the basemat can be very radionuclide specific depending on how high the K_d value of the concrete is for the applicable radionuclide. The Section 5.6.7.2 sensitivity analysis results show that the Tc-99 flux is relatively unaffected by K_d changes, while the Pu-239 flux can be significantly impacted, especially when the material layer is thick (e.g., the Type III and Type I basemats). The Sensitivity Analyses (Section 5.6.6) showed numerous radionuclide-specific cementitious material K_ds to be important to peak concentrations and doses, in particular the Pu K_ds. The investigation of UA realizations (Section 5.6.4.2) also identified radionuclide-specific cementitious material K_ds as important, in particular the Pu and Np K_ds.

7.1.1.8 Vadose Zone Beneath Tank

The vadose zone beneath the waste tanks has a very similar radionuclide-specific effect to that of the basemat. The vadose zone depth can have a considerable affect if the vadose layer is thick or if the radionuclide in question has a high K_d in soil. The Sensitivity Analyses (Section 5.6.6) and investigation of UA realizations (Section 5.6.4.2) both identified the Pu K_ds in soil as important, which is not surprising since the Pu travel time in soil is typically long and significant changes to this parameter and other parameters can therefore allow Pu-239 to reach the 100m well much faster than expected. As discussed in Section 5.6.4.2, when the sandy soil K_ds for Pu is the low end of its distribution (i.e., near 75 ml/g), rather than the median (270 ml/g), any Pu that enters the soil below the waste tanks early will be able to reach the 100m well within the 10,000 year evaluation period. However, the Pu will only enter the soil below the waste tanks early if other conditions differ from their nominal values (e.g., low concrete K_d, early liner failure).

7.1.2 100m (Water from Well) Groundwater Pathways Doses

The peak 100m groundwater pathway doses in the 10,000 year performance period are in Sector E (2.3 mrem/yr) and Sector D (1.5 mrem/yr), as expected, because these sectors are closest to the Type IV tanks, which are the only tanks considered to have their liner fail in less than 10,000 years. The peak of means dose within 10,000 years for 1,000 realizations using the probabilistic model (i.e., for all cases) was 14 mrem/yr (see Figure 5.6-37) from the UA. The median (50th Percentile) and 95th Percentile values were 0.4 mrem/yr and 77 mrem/yr respectively. The fact that the peak of the means dose is higher than the deterministic peak dose is not unexpected, since many of the stochastic distributions are reasonably conservative, driving the peak of the means higher.

The primary pathway contributors to the peak 100m groundwater dose are water ingestion and vegetable ingestion. The 100m groundwater pathway dose during the 10,000 years evaluation period is primarily associated with Ra-226 and Np-237. While there is very little Ra-226 in the Type IV tanks, the Ra-226 is a daughter product of U-234 and Th-230, of which there is an appreciable quantity in the Type IV tanks. The Ra-226 is a relatively fast moving (e.g., K_d < 20 units in soil) radionuclide so that it is capable of reaching the 100m location before it's parent. The Np-237is also a relatively fast moving radionuclide which is present in the Type IV tanks.

The peak 100m groundwater pathway dose within 20,000 years is also in Sectors D and E. These sectors are close to the Type IV tanks and also begin to see the releases from the nearby Type I tanks within 20,000 years. While they do not contain the peak groundwater pathway doses, Sectors A and B begin to see noticeable 100m doses within 20,000 years due to releases from the Type III tanks (Tanks 33 and 34). Uncertainties of the results are discussed in Section 5.6. It is important to recognize that the peak doses are associated with specific locations and times. Since there are 29 unique and independent inventory sources modeled in the FTF model, there is significant temporal and spatial complexity inherent in the modeling system. Removal of any one inventory source may reduce the doses (including the peak dose where applicable) associated with that source, but the overall FTF PA peak dose will not necessarily be reduced by a corresponding amount. The overall FTF PA peak dose will merely move to a different location and time. The peak groundwater pathway doses vary over time and location (i.e., the five FTF sectors) and while they are not completely independent (due to plume overlap) there is variability across the five sectors.

The investigation of UA realizations (Section 5.6.4.2) identified some parameters such as garden size and water consumption rate that can have some impact on the peak dose, but do not independently cause a realization to become a high dose realization. The Sensitivity Analyses (Section 5.6.6) and investigation of Uncertainty Analysis Realizations (Section 5.6.4.2) both identified the aquifer location for well drilling (discussed in more detail in Section 5.6.3.10) as important. The aquifer into which the groundwater well is drilled is important because the Gordon Aquifer concentration is significantly lower than the UTR Aquifers (Upper and Lower) and the impact of drilling into the Gordon Aquifer can dominate other parameters. It should be noted that the Base Case deterministic results used the well of highest concentration for peak dose calculations, and did not take into account that most wells would be expected to be drilled into the Gordon Aquifer.

The ancillary equipment (primarily the transfer lines) have an approximately 0.4 mrem/yr peak contribution in 10,000 years which occurs around year 700. The ancillary equipment inventories were modeled as being released from their various locations instantaneously (as discussed in Section 4.4.2.7, Ancillary Equipment Configuration) such that the inventory is available for transport beginning at year 510 and can contribute to a single peak soon thereafter. Even if this 0.4 mrem/yr dose contribution due to ancillary equipment were to occur later in time, it would not have an appreciable impact on the peak dose.

7.1.3 Water at the Stream Groundwater Pathways Doses

The peak groundwater pathway dose at the stream in the 10,000 year performance period is associated with UTR. The MOP at the stream peak groundwater pathway dose in the 10,000 year evaluation period is 0.044 mrem/yr at year 10,000. UTR dose is higher than the Fourmile Branch dose because releases from the Type IV tanks (which are expected to have liner failure earlier than other tank types) will primarily go to UTR. The primary contributor (49% of the peak dose) to the UTR peak is water ingestion.

7.1.4 All-Pathways Dose

The peak all-pathways annual dose for the MOP at 100m is calculated using the highest 100m groundwater pathway dose results during the 10,000 year performance period in combination with the air pathway results. The peak all-pathways annual dose for the MOP is 2.5 mrem/yr and is associated with Sector E at 100m. The all-pathways dose was dominated by the groundwater pathway with a dose of 1.5 mrem/yr 100m from the FTF. The airborne dose adds an additional 0.2 mrem/yr to the MOP.

7.1.5 Intruder Dose

The peak dose for the Acute Intruder in the 10,000 year performance period was 1.60 mrem, which was primarily due to exposure to drill cuttings. The Acute Intruder scenario did not include a groundwater contribution and therefore did not vary by FTF Sector.

The peak dose for the Chronic Intruder scenario in the 10,000 year performance period was 73 mrem/yr. This peak dose was almost entirely due to ingestion of vegetables contaminated with drill cuttings, with 72 of the 73 mrem/yr being due to vegetable ingestion. The principal radionuclide contributors to this vegetable dose were the short lived isotopes Sr-90/Y-90 and Cs-137/Ba-137m. The Chronic Intruder scenario peak dose was not driven by the groundwater contribution and therefore does not vary by FTF Sector.

7.1.6 Airborne Dose

The annual dose from airborne releases resulted in a total dose 0.2 mrem/yr (principally from Sn-126) at 100m from the FTF. These results were very conservative because the flux rates were based on simplified models as described in Section 4.5.

7.1.7 Radon Flux

These simplified models also resulted in a peak flux of radon at the ground surface of 9.3E-08 pCi/m^2/sec.

7.2 Conservatisms Included in the FTF Performance Assessment

Much conservatism was used in conducting the FTF PA as discussed in previous sections. Cumulative effects of the conservatisms are addressed through probabilistic modeling. A summary of those conservatisms are discussed below.

7.2.1 Inventory

As discussed in Section 3.3.2, the process used to estimate the waste tanks' residual material at operational closure created estimates that were both bounding and reasonable. For those contributors projected to have insignificant impact on dose, the estimates were developed with considerable conservatism. The inventory for many radionuclide (e.g., the Tc-99 inventory in the Type I waste tanks) was increased by one order of magnitude to ensure the values used were reasonably conservative. As discussed in Section 5.5.1.5, the impact of increasing the Tc-99 inventory is amplified in the deterministic model due to the tanks all being modeled as failing simultaneously. For a radionuclide that travels relatively fast like Tc-99, all of the Type I tank inventory being released at the same time allows the entire Tc-99 Type I tank inventory to reach the 100 meter point at approximately the same time, magnifying this conservatism.

The reasonable estimates developed for those contributors expected to affect dose also provide some level of conservatism over what is expected to remain at operational closure of the waste tanks. Many of the inventory estimates impacting dose are based on sample analysis and the WCS. WCS generated values are generally conservative because of two main factors. First, each reactor spent fuel assembly that was reprocessed is assumed to have received the maximum burnup possible and, therefore, the amounts of actual fission products contained in an assembly were actually less than those entered into WCS. Second, some of the residual material characterized as fission product bearing PUREX Low Heat Waste actually originated as cladding waste or other low radionuclide bearing wastes that contain relatively small amounts of fission products. [LWO-PIT-2007-00025] Another factor expected to provide additional conservatism is the likelihood that actual concentrations for some constituents in the residual sludge on the waste tank bottoms after tank cleaning will be significantly less than the concentrations for dried sludge currently given in the WCS. This condition is expected to result from various flushing that will take place and the use of OA to clean the tanks.

Analyses of samples from Tanks 5, 18, and 19 indicate that the predicted inventory modeled values are conservative compared to sample analysis values for most (approximately 75 %) of the constituents (Figure 3.3-2).

Using the estimated sludge concentrations for the characterization of ancillary equipment inventory also provides conservatism in the ancillary equipment dose results.

7.2.2 Closure Cap

The following are some of the measures which were taken to try and ensure conservative HELP model infiltration results.

- The precipitation data utilized included maximum daily precipitation up to 6.7 inches (i.e., significant pulses of water).
- The maximum slope length of the closure cap (i.e., 585 feet) was utilized to determine both runoff and lateral drainage for the entire closure cap.
- A maximum evaporative zone depth of 22 inches, which is considered conservative due to the anticipated capillarity of the surficial soils, was utilized.

- The erosion barrier is assumed to be infilled with a sandy soil; the use of a less permeable infill would reduce infiltration.
- A saturated hydraulic conductivity was assigned to the intact portions of the HDPE geomembrane even though water transport through HDPE is a vapor diffusional process.
- It has been assumed that every HDPE geomembrane hole generated over time is penetrated by a pine root that subsequently penetrates the GCL. However the results of the probability based root penetration model demonstrate that this is not the case and that most of the HDPE geomembrane holes are not penetrated by roots over the time period of interest.

7.2.3 Integrated Site Conceptual Model

Several assumptions were made that introduced conservatism into the timing of release of radionuclides from the FTF.

- Prior to failure, steel is assumed to be essentially impermeable with respect to both advection and diffusion. After failure, the steel liner is assumed to be absent, or otherwise not a hindrance to advection and diffusion.
- Failure times for steel liners assume corrosion from both sides.
- Liner failures ignore concrete vaults, pipe jackets and other protection.
- All waste tanks of the same type were assumed to fail simultaneously, which can have a significant impact for some radionuclides, as discussed in Section 7.2.1.
- Tank dimensions default to the minimum. For example, if wall thickness or basemat thickness varied, the minimum dimension was used for the entire wall or basemat.
- Based on stainless steel corrosion calculations, the earliest failure of a stainless steel transfer line is predicted to occur 510 years after FTF closure under SRS soil conditions. [WSRC-STI-2007-00460] Failure is assumed after the first pit penetration of the transfer line wall. Predicted failure times are dependent on the thickness of the transfer lines.
- As discussed in Section 5.6.2.1.2, the deterministic model (PORFLOW) does not implement solubility controls for multiple isotopes of the same element. Each isotope of an element is treated independently so that they are not collectively added to reach an elemental solubility limit. Therefore, the amount of an element such as uranium in solution is based on the single isotope, when in fact it should be based on the total amount of uranium in the inventory. Because the waste release within the CZ is solubility controlled, this treatment of solubility by PORFLOW allows for greater release from the CZ than would be expected. This approach can cause the peak dose to be modeled conservatively by treating U-233 and U-234 independently and allowing them to contribute to 10,000 year peak dose (see Figure 5.5-3), when in fact they would tend to slow each other's release.
- A fundamental part of establishing solubility controlled stabilized contaminant release rates for the waste tanks is selection of a solubility controlling phase for each radionuclide. For some of the radionuclides of interest there are studies that can guide selection, for others it is based on engineering judgment. For this reason, selection of solubility controlling phases is generally very conservative, meaning that

where multiple phases of a radionuclide were possible, that with the highest solubility is selected.

- Some elements were simulated as having no identified solubility controls, with their releases modeled as instantaneous. This can have a pronounced impact on some radionuclides past the 10,000 year evaluation period (e.g., Tc-99 as discussed in Section 5.5.1.5).
- No solubility control is assumed for ancillary equipment inventory. The ancillary equipment inventory is immediately released to the soil after failure with no holdup in the CZ or in any encapsulating cementitious material.
- In an equilibrium model, the assumption that solubility rather than adsorption controls stabilized contaminant release is conservative, resulting in faster overall release of radionuclides. This is because the maximum concentration that can desorb is controlled by solubility. In effect, if the K_d is low enough that a concentration is released that exceeds solubility, some of the radionuclide will precipitate bringing the concentration down to solubility. The stabilized contaminant release rate will drop below that dictated by solubility when the radionuclide inventory is depleted to where the concentration released is below solubility. At higher K_d values the concentration released at any given time will always be below the concentration dictated by solubility. Thus, time until complete release of a radionuclide using adsorption controls will always be longer than when only solubility controls are used.
- The assumption that radionuclide release is controlled by solubility of discrete radionuclide phases rather than co-precipitation is conservative if equilibrium prevails and the choice of solubility controlling minerals is biased towards those with high solubility.
- The waste release model does not credit any additional potential contaminant retardation mechanisms, such as retardation associated with iron oxides/hydroxides from the corroded waste tank liner.

7.2.4 Volatile Radionuclide and Radon Analysis

The following conservatisms were used in the airborne radionuclide and radon analysis that conservatively bound the flux of radionuclides from the contaminant zone to the surface.

- Boundary conditions were used that force all of the gaseous radionuclides to move upward from the stabilized CZ to the land surface. In reality, some of the gaseous radionuclides diffuse sideways and downward in the air-filled pores surrounding the stabilized CZ; hence ignoring this has the effect of increasing the flux at the land surface.
- The removal of radionuclides by pore water moving vertically downward through the model domain was ignored. This mechanism would likely remove some dissolved radionuclides, and therefore its omission had the effect of increasing the estimate of instantaneous radionuclide flux at the land surface in simulations conducted as a part of this investigation.
- The HDPE geomembrane, the GCL, and the primary steel liner of the waste tank were excluded in the modeling. Inclusion of these materials in the model would

significantly reduce the gaseous flux at the land surface due to their material properties (i.e., low air-filled porosity).

- Cover materials above the erosion barrier (i.e., top soil and upper backfill layers) were excluded. Excluding these materials shortens the diffusion pathway and could increase the flux at the land surface.
- The stabilized contaminant layer, the reducing grout, and concrete roof were assumed to be dry. This makes the air-filled porosity equal to the total porosity. This maximizes diffusive transport through these materials since gaseous flux is through the air-filled porosity.
- Use of the Type I tanks and minimum closure cap thickness in the modeling provided the shortest pathway from the CZ to the surface.
- The entire estimated FTF residual inventory was concentrated into a 1 foot stabilized contaminant layer in one Type I tank to determine the maximum dose and flux.

7.2.5 Other Factors Affecting Results

Quantified analysis of some pathways, that have been qualitatively judged insignificant in other PAs, impacted the results. This resulted in contributions that are probably insignificant but are hard to quantify (e.g., showering).

As discussed in Section 5.2.1, the use of sectors in determining groundwater concentrations added conservatism to the peak dose results, since the peak concentrations are determined for each radionuclide independent of the location within the sector.

8.0 PERFORMANCE EVALUATION

Summary for Section 8.0

Section 8 describes the application of the PA.

Section 8.1 describes how the PA will be used.

Section 8.2 describes future work to be done to support maintenance of the PA.

8.1 Use of Performance Assessment Results

This PA for SRS was prepared to support the eventual closure of the FTF underground radioactive waste tanks and ancillary equipment. This PA provides the technical basis and results to be used in subsequent documents to demonstrate compliance with pertinent requirements of DOE O 435.1-1, NDAA Section 3116, the Industrial Wastewater Regulations, and the SRS FFA, as well as final closure of the FTF consistent with the CERCLA. [NDAA_3116, SCDHEC R.61-67, *http://www.srs.gov/general/programs/soil/ffa/ffa.pdf*, *www.epa.gov/superfund/policy/cercla.htm*] The key requirements from these documents necessitate development and calculation of the following for the FTF: potential radiological doses to a hypothetical MOP; potential radiological doses to a hypothetical inadvertent intruder; radiological dose to a human receptor via the air pathway; radon flux at the ground surface; and, water concentrations. All of these calculations were performed to provide results over a minimum of 10,000 years. The water concentrations were calculated for both radioactive and non-radioactive contaminants at multiple locations outside FTF.

The regulatory process to complete closure of the FTF requires the development of multiple detailed technical documents with reviews and approvals by multiple state and federal agencies. The documents involved include an FTF Section 3116 Basis Document which will be used to demonstrate compliance with the NDAA Section 3116 criteria. [NDAA_3116] The FTF Section 3116 Basis Document is reviewed and approved by DOE in consultation with the NRC. Approval of a Section 3116 Waste Determination by the Secretary of Energy is then required so that the residual waste in FTF can be classified as low-level radioactive waste. The Section 3116 criteria include 10 CFR 61, Subpart C. The FTF PA provides the technical basis that will be used to demonstrate compliance with 10 CFR 61.41 and 61.42 performance objectives in the FTF Section 3116 Basis Document. These performance objectives are used in lieu of the comparable performance objectives from DOE O 435.1-1. Compliance with the SCDHEC requirements will be demonstrated using two primary documents that are supported by the FTF PA. The first is the FTF Closure Plan which will establish the general protocols, requirements and processes for closure of FTF. The second document(s) are Tank-Specific Closure Modules that authorize the closure and grouting of a specific tank, group of tanks or ancillary equipment. Both the FTF Closure Plan and the FTF Tank-Specific Closure Modules are reviewed and approved by DOE, SCDHEC and the EPA. The FTF PA will also support the final closure of the FTF consistent with CERCLA. [*www.epa.gov/superfund/policy/cercla.htm*]

8.2 Further Work

Because this PA is considered a living document for the closure of the FTF, it will be reviewed as additional information and studies are conducted to verify that it still bounds the FTF model inputs. As additional data becomes available and the PA needs to be revised, additional modeling will be required. The following areas of future work are presented to facilitate discussion for improving the PA in future revisions.

Further work is planned focusing on model improvement, with areas of interest being co-dependencies of model parameters, linkage between related sub-models, and refinement of flow modeling within the GoldSim FTF model. Additional work should be conducted related to expanding the current uncertainty and sensitivity analyses. The stochastic distributions will be refined to improve the distributions as additional information is available, with emphasis on those stochastics most influencing the model results.

Studies are ongoing to assist in gaining a better understanding of the factors effecting FTF radionuclide transport. For example, the Savannah River National Laboratory and Woods Hole Oceanographic Institution are collaborating on a DOE-funded proposal to study colloid-facilitated transport at SRS.

Future work is also planned in the area of input refinement and confirmation. For example, further work should be conducted to refine and confirm the existing radionuclide inventories that will be present in FTF at site closure. This work includes additional sampling and analysis of existing waste and refinement of potential waste estimates for unsampled areas, such as the piping and other ancillary equipment. Sampling of the waste tanks after cleaning and before grouting will be necessary to evaluate the inventory to ensure that the groundwater protection performance objectives are met. Future waste tank sampling will also take into account the waste release assumptions regarding iron co-precipitation and sampling plans will address the need to investigate not just total radionuclide inventories, but chemical compositions as well. As part of input refinement and confirmation, future materials testing will be performed as needed (e.g., validation of grout properties, site specific soil K_d testing). This future work will consider uncertainty in material properties due to biases in testing methods including laboratory versus field experiments, as well as techniques used to measure properties (e.g., centrifuge versus flexible wall permeameter, column based K_d testing, and influence of cementitious material on vadose zone geochemistry).

9.0 PREPARERS

BIRK, MARCIA, SRR/CLOSURE & WASTE DISPOSAL AUTHORITY

B.S. Chemical Engineering – University of Minnesota, Institute of Technology

Experience: Ms. Birk has over 17 years of experience at SRS in waste management engineering and environmental compliance. In her assignment in 3116, she was responsible for radioactive and chemical characterization of mixed waste to meet offsite treatment facility waste acceptance criteria and Department of Transportation (DOT) requirements for radioactive waste shipments. She has also held responsibility for regulatory compliance and for the maintenance of RCRA permits for the Consolidated Incineration Facility and the Hazardous and Mixed Waste Storage Facilities.

Contributions: Primary development of sections related to air pathways/radon analysis and the CERCLA risk assessment. Ms. Birk also assisted in the preparation and review of various PA sections.

DEAN, BEN, SRR/CLOSURE & WASTE DISPOSAL AUTHORITY

B.S. Chemical Engineering – Clemson University

Experience: With over 10 years experience, four at SRS, Mr. Dean has primarily worked with characterization of waste within the tank farms. Prior to joining WSRC, Mr. Dean spent six years in the chemical industry (chlor-alkai and fiberglass) with experience in operations, process engineering and statistics.

Contributions: Assisted in development of the waste tank characterization and exposure pathway calculations.

DYER, CONNIE, SRR/CLOSURE & WASTE DISPOSAL AUTHORITY

Experience: Ms. Dyer has over 28 years experience in both the government and commercial nuclear sectors. She has over 19 years SRS-specific multi-disciplined engineering support experience. In her assignment in the 3116 Documentation Group, she is responsible for providing technical engineering support and configuration control for site closure and technology innovation activities. Ms. Dyer is responsible for developing internal procedures and processes required for production of regulatory documents being prepared, reviewed and issued under the direction of various government/independent agencies codes, statutes and requirements (including the NRC, SCDHEC, the U.S. EPA, and various oversight committees).

Contributions: Primary development of PA document format/layout. Develop and prepare drawings, process cartoons, diagrams, sketches and flowsheet. Provide document research, editorial and consistency reviews for project engineers in addition to being responsible for providing comment tracking and incorporation.

FLACH, GREGORY, SAVANNAH RIVER NATIONAL LABORATORY

Ph D. Mechanical Engineering – North Carolina State University
M.S. Mechanical Engineering - North Carolina State University
B.S. Mechanical Engineering – University of Kentucky

Experience: Dr. Flach is a Fellow Engineer at SRNL with 18 years of experience related to groundwater hydrology, computational simulation, and numerical code development. He has been the principal investigator on a number of groundwater modeling studies at SRS involving regional and local scale hydrology, contaminant migration from waste sites, and evaluation of environmental cleanup alternatives. Over the last decade his efforts have focused on PA and composite analysis related projects, and research involving dual-domain formulations of contaminant transport.

Contributions: Dr. Flach is one of the principal modeling investigators focusing on the PORFLOW modeling of groundwater pathways.

FLETCHER, DORI, SRR/CLOSURE & WASTE DISPOSAL AUTHORITY

B.S. Business Administration – Southern Wesleyan University

Experience: Ms. Fletcher has over 20 years experience at SRS. Her assignments include program administration within Engineering, Construction, Project Management, and special projects. She has served as a consultant, on special project initiatives, to Bechtel Corporation (Bechtel Group) at other DOE projects. In her assignment with the 3116 Documentation Group, she is responsible for providing technical administrative support and configuration control for site closure and technology innovation activities. She supports the production process of preparing regulatory documents for, review and issue under the direction of various government/independent agency codes, statutes and requirements (including the NRC, SCDHEC, the EPA, and various oversight committees).

Contributions: Primary application of the SDF PA document format/layout. Develop and prepare drawings, process cartoons, diagrams, sketches and flowsheets. Provide document research, editorial and consistency reviews, and comment tracking and incorporation.

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B.S. Communications/Math – Augusta State University

Experience: Ms. Johnson has over 21 years experience in government information technology and graphic development including cad systems. She has over 19 years SRS-specific multi-disciplined engineering support experience including the development of internal procedures and processes required for production of regulatory documents being prepared, reviewed and issued under the direction of various government/independent agencies codes, statutes and requirements (including the NRC, SCDHEC, the U.S. EPA, and various oversight committees). In her recent assignment in the 3116 Documentation Group, she is responsible for providing technical engineering support and configuration control for site closure and technology innovation activities.

Contributions: Primary development of PA document format/layout. Develop and prepare drawings, process cartoons, diagrams, sketches and flowsheet. Provide document research, editorial and consistency reviews for project engineers in addition to being responsible for providing comment tracking and incorporation.

JORDAN, JEFFREY, SAVANNAH RIVER NATIONAL LABORATORY

M.S. Mechanical Engineering – Georgia Institute of Technology
B.S. Physics – Furman University
B.A. History – Furman University

Experience: Jeff is a Senior Engineer at SRNL. He has an M.S. in Mechanical Engineering with a concentration in computational simulation. He has several years of experience with computational modeling of engineered systems.

Contributions: Focused on developing and evaluating the vadose zone PORFLOW models.

LAYTON, MARK, SRR/CLOSURE & WASTE DISPOSAL AUTHORITY

B.S. Nuclear Engineering – University of Cincinnati

Experience: Mr. Layton has over 17 years experience at SRS in various regulatory compliance organizations. The majority of this time was spent working on HLW regulatory compliance assignments and supporting various Safety Basis activities. Mr. Layton also provided safety basis support for numerous other facilities at SRS and across the DOE complex, including Sandia, Pantex, and Oak Ridge.

Contributions: Primary technical author and modeling coordinator of the PA and provided support to the GoldSim modeling.

MARTIN, BRUCE, SRR/CLOSURE & WASTE DISPOSAL AUTHORITY

B.S. Mechanical Engineering – United States Military Academy

Experience: Mr. Martin has over 19 years experience at SRS in various organizations including project management, maintenance, and project and design authority engineering. Recent responsibilities have been associated with nuclear waste tank cleaning, isolation and closure under state and federal regulatory compliance programs.

Contributions: Author of sections related to residual tank farm inventory.

ROSENBERGER, KENT, SRR/CLOSURE & WASTE DISPOSAL AUTHORITY

B.S. Nuclear Engineering – Pennsylvania State University

Experience: Mr. Rosenberger has 17 years of experience at the SRS primarily in the area of radiological controls. He has spent the last 3 years supporting tank closure and Saltstone regulatory documents including 3116 Waste Determination and performance objectives development. He previously has held positions in radiological engineering project and operations support and facility operational radiological control management. Mr. Rosenberger has considerable experience with the SRS HLW processes and facilities, in addition to experience with reactor, chemical separations, plutonium processing and storage, and laboratory facilities.

Contributions: Provided overall technical review and management assistance.

SHEPPARD, RICHARD, SRR/CLOSURE & WASTE DISPOSAL AUTHORITY

M.S. Nuclear Science – University of Michigan
B.S. Mathematics – Michigan Technological University

Experience: Mr. Sheppard has 31 years experience within the Nuclear Industry with 14 years at the SRS and 17 years in the commercial nuclear industry. During his period of commercial nuclear industry experience his emphasis was on accident analyses and dose assessments for various commercial nuclear power plants and regulatory and licensing activities associated with construction and operation. During his period at SRS, Mr. Sheppard coordinated hazard and safety analyses for design projects at various SRS nuclear facilities. He has spent the past two years supporting the WD efforts associated with the Saltstone and the closure of waste Tanks 18 and 19.

Contributions: Conducted data verification for the development of the PA and input to PORFLOW and GoldSim computer simulations.

TAUXE, JOHN, Neptune and Company, Inc.

Ph.D. Civil Engineering – University of Texas at Austin
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B.A. Earth Science – Wesleyan University

Experience: Dr. Tauxe has been working in the earth and environmental sciences and engineering since 1981, and has developed expertise in quantitative hydrology and hydrogeology, and in computer programming, concentrating in the modeling of contaminant fate and transport in the environment. His relevant professional experience centers on modeling in support of radiological performance assessment in a probabilistic context at several sites in the DOE complex since 1994.

Contributions: Supervised uncertainty and sensitivity analysis work within Neptune and Company and provided interpretation of these analyses.

TAYLOR, GLENN, SAVANNAH RIVER NATIONAL LABORATORY

M.S. Mechanical Engineering – University of Texas at Austin
B.S. Engineering Physics – University of Louisville

Experience: Mr. Taylor has 28 years of experience in code development, modeling, and research. His primary emphasis has been non-equilibrium thermal-hydraulics and chemical process methods development and modeling. He has been involved with Probabilistic Risk Assessment-type analyses since the mid-1980s. He has been doing groundwater modeling and contaminant transport modeling for the past 3 years.

Contributions: One of the principal investigators that performed the GoldSim groundwater pathway transport. Glenn also provided technical oversight of the uncertainty and sensitivity analyses provided by Neptune and Company and the dose calculator provided by SRNL staff.

Professional Engineers and Scientists who conducted FTF PA reviews, and/or contributed valuable resources, information, or technical data include:

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10.0 REFERENCES

Note 1: Reference numbers with an –OUO designator have been classified as: ***"Official Use Only, Exemption 2 -- Not Releasable to the Public or Foreign Nationals without prior approval from DOE-SR"*** by the SRS Computer and Information Security (C&IS), Safeguards, Security & Emergency Services (SS&ES) Department.

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11.0 GLOSSARY

A

Absorption Entering of particles of one phase into a different bulk phase by penetrating a surface.

Accuracy Closeness of the result of a measurement to the true value of the quantity.

Actinide Group of elements of atomic number 89 through 103. Laboratory analysis of actinides by alpha spectrometry generally refers to the elements plutonium, americium, uranium, and curium but may also include neptunium and thorium.

Adsorbtion The enrichment or agglomeration of particles on a surface or interface.

Air Content Amount of air incorporated into the grout as the result of mixing and placement.

Air Pathway Exposure pathway to radioactive material dispersed in the air in the form of dusts, fumes, particulates, mists, vapors, or gases.

ALARA As Low As Reasonably Achievable - making every reasonable effort to maintain exposures to radiation as far below the dose limits as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations.

Amorphous Latin meaning without form. Non-crystalline structure.

Ancillary Equipment Ancillary equipment associated with the waste storage tanks, such equipment as transfer line piping, pump tanks, evaporators, that are used to distribute or control the transfer of waste, from one storage point to another storage point.

Annulus — The annulus also referred to as the secondary containment of a waste tank. The secondary containment surrounds the primary tank shell of Types I, II, III, and IIIA waste tanks, providing a location for collection of any leakage from the primary tank shell.

Aquifer — Saturated, permeable geologic unit that can transmit significant quantities of water under ordinary hydraulic gradients.

Aquitard — Geologic unit that inhibits the flow of water.

Argillaceous — Containing, made of, or resembling clay; clayey.

Atomic Energy Commission — Federal agency created in 1946 to manage the development, use, and control of nuclear energy for military and civilian application. It was abolished by the Energy Reorganization Act of 1974 and succeeded by the Energy Research and Development Administration. Functions of the Energy Research and Development Administration eventually were taken over by the U.S. Department of Energy and the U.S. Nuclear Regulatory Commission.

Axisymmetric — Having symmetry around an axis.

B

Background Radiation — Naturally occurring radiation, fallout, and cosmic radiation. Generally, the lowest level of radiation obtainable within the scope of an analytical measurement, i.e., a blank sample.

Base Case — Tank Configuration A, scenario in which the closure cap is assumed in place and no fast flow path exists from outside the waste tank system, through the tank, and exiting the system. It was assumed that the concrete that makes up the walls, the tank grout, and basemat concrete degrades over time (with these changes simulated by increasing hydraulic conductivity).

Basemat — Concrete pad upon which the waste tank is constructed. The pad has close tolerances for leveling of tank and the concrete is quality controlled to ensure the structural integrity to tank foundation. The basemat is also referred to as floor slab or foundation.

Bioaccumulation Factor	Calculations that define parameters used to calculate contaminant concentrations via a variety of environmental mechanisms.
Biotic Transport (Pathway)	Amounts and rates of radionuclides transported by living components (i.e., animals, plants or bacterial life) of an ecosystem.
Blackwater Stream	Waterways that contain high concentrations of naturally occurring tannic acid that gives the water a tea color.
Bleed Water	Water that separates from the grout as the result of solids settling.

C

Carbonation	The reaction of CO_2 gas with the hydrated phases of the Portland cement in the grout blocking the pores in the grout.
Cementitious	Like or relevant to or having the properties of cement.
Central Savannah River Area (CSRA)	Eighteen-county area in Georgia and South Carolina surrounding Augusta, Georgia. The Savannah River Site is included in the Central Savannah River Area. Counties are Richmond, Columbia, McDuffie, Burke, Emanuel, Glascock, Jenkins, Jefferson, Lincoln, Screven, Taliaferro, Warren, and Wilkes in Georgia and Aiken, Edgefield, Allendale, Barnwell, and McCormick in South Carolina.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, was enacted by Congress on December 11, 1980. This law provides to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment. Through the Act, EPA was given power to seek out those parties responsible for any release and assure their cooperation in the cleanup.
Chromated Cooling Water	Coolant comprised of choromate-inhibited water that circulates through the cooling coils of waste tanks to remove radioactive decay heat and other sources of heat (i.e., steam heat loads, ventilation heat loads, or mechanical heat loads from pumping/mixing operations).

Citizens Advisory Board (CAB) The Savannah River Site Citizens Advisory Board is composed of 25 individuals from South Carolina and Georgia. The board members are chosen to reflect the cultural diversity of the population affected by SRS. The Board provides advice and recommendations to the U.S. Department of Energy (DOE) on environmental remediation, waste management and related issues. All meetings are open to the public and public participation is encouraged. Public comment periods are offered at various times throughout the meetings.

Clean Water Act The Clean Water Act is the cornerstone of surface water quality protection in the United States. (The Act does not deal directly with groundwater nor with water quantity issues.) The law employs a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff.

Closure Plan Plan that presents the environmental regulatory standards and guidelines pertinent to the closure of the tanks and describes that process for evaluating and selecting the closure configuration (i.e., residual inventory and form.)

Compressive Strength Force per unit area required to break an unconfined grout or concrete sample.

Concentration Amount (e.g., in grams or moles) per volume of a substance.

Conductivity Probes The conductivity probe is a simple electrical device that works on the principle that liquids conduct electricity more readily than air. If a liquid comes in contact with the probe it will complete an electrical circuit and send a signal for indication or alarm purposes of a waste leak in ancillary equipment.

Cone Penetration Test The cone penetration test (CPT) is an in-situ testing method used to determine the geotechnical engineering properties of soils and delineating soil stratigraphy. The CPT is one of the most used and accepted in-situ test methods for soil investigation. The test method consists of pushing an instrumented cone, tip first, into the ground at a controlled rate.

Consumption Rates Physical human health exposure parameters used for evaluating pathway-specific dose.

Controlled Low Strength Material — CLSM (Controlled Low Strength Material) is a cementitious flowable fill that is used as backfill or infill and has soil-like properties. It is self compacting and consequently does not required mechanical compaction to achieve design density. CLSM typically contains sand, fly ash and less than 100 pounds of hydraulic material per cubic yard of fill.

Cooling coils — Cooling coils are installed in the tanks to remove the decay heat that is generated by the waste in the tanks. Arrangements and designs of cooling coils differ, depending on the type of tank. Type I and II tanks, in addition to having vertical cooling coils, also have cooling coils across the bottom of the tank to provide a means for cooling the bottom of the tank.

Co-Precipitation — Co-precipitation as defined here is the incorporation of an element into the crystal structure of a solid phase that is predominantly made of other elements or the trapping of an element within the bulk mass of a phase made up of other elements, but not necessarily within the crystal lattice.

Core pipe — Internal pipe of transfer line that comes into contact with the waste materials. The core pipe is usually located within a jacket pipe.

Cretaceous — The geological time period between 140 and 65 million years ago.

Curie — A unit of radioactivity; the quantity of nuclear material that has 3.7E+10 disintegrations per second.

D

Darcy Velocity — Formula for measuring velocity and flow of groundwater.

De-Passivation — Deterioration of steel that has been covered with a passivating product (ex., concrete) as a result of the introduction of too much chloride.

Desorption — The opposite process to adsorption meaning the removal of aggregated particles from a surface.

Deterministic — When fixed parameters are used in calculations versus a distribution of values (probabilistic).

Diffusion Movement of contaminants from an area of higher concentration to an area of lower concentration.

Diffusion Coefficient The rate of diffusion of particles, depending on the particle size, viscosity and temperature.

Dip Tubes Dip Tubes are used to provide an estimate of the rate of leakage into the annulus and to serve as a backup for the conductivity probes. Dip tubes operate by relying on the hydrostatic pressure (height) of the liquid column to cause a backpressure on the dip tube.

Dispersivity Equal to the dispersion coefficient divided by the velocity.

Distribution Coefficient (K_d) The quantity of a solute sorbed by a solid, per unit weight of solid, divided by the quantity of the solute dissolved in the water per unit volume of water.

Diversion Box Diversion box is a shielded reinforced concrete structure containing transfer line nozzles to which jumpers are connected in order to direct waste transfers to the desired location.

Dolomitic A magnesia-rich sedimentary rock resembling limestone.

Dose Conversion Factor A factor used to convert radionuclide concentrations in environmental media to doses. Factors are used for inhalation, ingestion, immersion and external exposure.

Dose Limits The permissible upper bounds of radiation doses.

E

Effective Diffusion Coefficient (D_e) The diffusion coefficient of a species through a saturated porous medium taken over the pore area of the medium through which diffusion occurs under steady-state conditions.

Effective Dose Equivalent The sum of the products of the dose equivalent to the organ or tissue (H_T) and the weighting factors (W_T) applicable to each of the body organs or tissues that are irradiated ($H_E = \Sigma W_T H_T$).

E_h The symbol for redox potential in millivolts.

Erosion Barrier	The layer within a multi-part closure cap made of rock (riprap) and filler materials designed to prevent riprap movement during a Probable Maximum Precipitation event and therefore forms a barrier to further erosion and gully formation (i.e., provide closure cap physical stability). It will be used to maintain a minimum 10 ft of clean material above the tanks and significant ancillary equipment to act as an intruder deterrent. It will also act to preclude burrowing animals from access to underlying closure cap layers. It also provides minimal water storage for the promotion of evapotranspiration.
Escarpment	A steep slope or long cliff caused by erosion or faulting separating two level areas of differing heights.
Ettringite	Ettringite is hexacalcium aluminate trisulfate hydrate. Ettrigite is found in hydrated Portland cement system as a result of the reaction of calcium aluminate with calcium sulfate, both present in Portland cement.
Evaporator	Steam-heated, water-cooled system installed in the tank farms to concentrate underground waste storage tank contents, in order to reduce the liquid waste volume.
Evapotranspiration	Evapotranspiration (ET) is a term used to describe the sum of evaporation and plant transpiration from the earth's land surface to atmosphere. Evaporation accounts for the movement of water to the air from sources such as the soil, canopy interception, and waterbodies.
Exposure	Being exposed to ionizing radiation or to radioactive material.
Exposure Pathway	The means by which humans are exposed to contaminants. The key exposure pathways are air and water, with most exposures via drinking water, crops, other foods, inhalation and direct radiation.
External Dose	That portion of the dose equivalent received from radiation sources outside the body.

F

Federal Facility Agreement (FFA) — Agreement between EPA, DOE and SCDHEC that directs the comprehensive remediation of the Savannah River Site (SRS). It contains requirements for (1) site investigation and remediation of releases and potential releases of hazardous substances, and (2) interim status corrective action for releases of hazardous wastes or hazardous constituents.

Fick's Second Law of Diffusion — Movement of contaminants from an area of higher concentration to an area of lower concentrations, where the concentrations are changing over time.

Flow — Ability of the grout to spread evenly without vibration (self-level).

Flux — The time rate of change or concentration. For example, curies per year leaving the CZ.

Fly Ash — Fly ash is a mineral admixture used in grout to enhance finishing characteristics, make the mix more economical, and to improve pumping. It is finer in consistency than cement, and its particles are round. These fine particles make the mix finish easier, and pump easier.

G

Gaussian plume equation — An equation that represents dispersion of a material from a release point.

General Separations Area — Centralized area of SRS including, E, F, H, S and Z Areas that are the heavily industrialized areas of SRS.

The Geochemist's Workbench	The Geochemist's Workbench is a set of software tools for manipulating chemical reactions, calculating stability diagrams and the equilibrium states of natural waters, tracing reaction processes, modeling reactive transport, and plotting the results of these calculations. The package is designed for solving problems in aqueous geochemistry, including those encountered in environmental protection and remediation, the petroleum industry, and economic geology.
Geosynthetic Clay Liner	A woven fabric-like material primarily used for the lining of landfills. It is a kind of geomembrane and geosynthetic which incorporates a bentonite or other clay, which has a very low hydraulic conductivity.
GoldSim	A simulation software program designed to dynamically model the release and transport of radioactive constituents. The fundamental output consists of predicted mass fluxes at specified locations within a system, and predicted concentrations within environmental media (e.g., groundwater, soil, air).
Goethite	Red or yellow or brown mineral; an oxide of iron that is a common constituent of rust found in soil and other low temperature environments.
Gradient Boosting Model	Modeling approach that utilizes binary recursive partitioning algorithms that deconstruct a response into the relative influence from a given set of explanatory variables (stochastic model input parameters).
Grahams Law	Grahams Law states that the rate of diffusion of a gas is inversely proportional to the square root of its molecular weight.
Groundwater Flow	The rate of groundwater movement through the subsurface.
Grout	A cement mixture, sufficiently fluid, which can be pumped into equipment cavities creating a watertight bond, and increasing the strength of the existing structural foundation. Capable of slowing the vertical movement or migration of water.

H

Hematite	A widely distributed mineral which is an important iron ore, occurring in crystalline, massive, or granular form, and reddish-brown when powdered.
Herpetofauna	Term used that refers to reptiles and amphibians, collectively.
Homogenous	Similar or uniform structure or composition throughout.
Hydraulic Conductivity	Velocity of water flow through saturated materials (e.g., concrete, grout, soil)
Hydrostratigraphy	A geologic framework consisting of a body of rock having considerable lateral extent and composing a reasonably distinct hydrologic system.

I

Igneous Rock	An aggregate of interlocking silicate minerals formed by cooling and solidification of magma or lava. Igneous rocks are formed by volcanic processes.
Indurated	Hard or thickened.
Institutional Control	A 100-year period in which DOE retains ownership and control of FTF such that FTF facility maintenance and controls will be performed to prevent inadvertent intrusion and protect public health and the environment.
Interfluvial	The region of higher land between two rivers that are in the same drainage system.
Internal Dose	That portion of the dose equivalent received from radioactive material taken into the body.

J

Jurassic	The geological period between 210 and 140 million years ago.

K

Kelco-Crete	A special viscosity modifying admixture. Kelco-Crete is included in the mix design to enhance physical stability of the grout (minimizing segregation) and achieve a robust mix.

L

Lacustrine Sediments	A type of deposit that comes from lakes which previously occupied the area. They are fine-grained soils that have settled through the water and accumulated on the lake bottom, typically leaving them in a soft condition.
Latin Hypercube Sampling	A form of sampling that can be applied to multiple variables. The method is commonly used to reduce the number or runs necessary for a Monte Carlo simulation to achieve a reasonably accurate random distribution.
Leachate	Leachate is the liquid that drains or 'leaches' from a closure system. It can contain both dissolved and suspended material.
Leaching	Leaching occurs when infiltrating water seeps into the closure system and transports contaminants out of the system.
Leak Detection Boxes	Leak detection boxes provide for the collection and detection of leakage from the transfer lines.

Line Encasement (Sealed Concrete Trench) Enclosed core pipes in a covered reinforced concrete encasement below ground. Any core pipe leakage into the encasement and in-leakage of groundwater into the encasement will gravity drain to catch tank.

Lithified Terrigenous Sediment Sediments derived from the erosion of rocks on land.

Lithology The description of rocks, especially in hand specimen and in outcrop, on the basis of such characteristics as color, mineralogic composition, and grain size.

M

Macroinvertebrate Any nonvertebrate organism that is large enough to be seen without the aid of a microscope.

Maximally Exposed Individual (MEI) A hypothetical individual who, because of proximity, activities, or living habits, could potentially receive the maximum possible dose of radiation or of a hazardous chemical from a given event or process.

Maximum Contaminant Level (MCL) The highest level of a contaminant that is allowed in drinking water, below which there is no known or expected risk to health. MCLs are EPA enforceable standards.

Mesozoic An area of geologic time, from the end of the Paleozoic to the beginning of the Cenozoic, or from about 225 million years to about 65 million years ago.

Metamorphosed Sedimentary Rock Rock that is formed by the consolidation of sediment particles or of the remains of plants and animals.

Miocene-age Middle of Tertiary Period, dating back 13-25 million years.

Molar Relating to a solution that contains *X* moles of solute per liter of solution, where *X* is a number.

Monte Carlo Analysis An analytical technique in which a large numbers of simulations are run using random quantities for uncertain variables and looking at the distribution of results to infer which values are most likely.

N

National Pollutant Discharge Elimination System As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches.

NDAA Section 3116 The Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 Section 3116 was passed by Congress on October 9, 2004 and signed by the President on October 28, 2004. Section 3116 of the NDAA specifies that the term "high-level radioactive waste" does not include radioactive waste that results from reprocessing spent nuclear fuel if the Secretary of Energy determines, in consultation with the NRC, that the waste meets certain criteria.

O

Occupational Dose The dose received by an individual in the course of employment in which the individual's assigned duties involve exposure to radiation or to radioactive material. Occupational dose does not include doses received from background radiation or from any medical administration the individual has received.

Operable Unit Operable Unit is discrete action that comprises an incremental step toward comprehensively addressing site CERCLA problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of release, or pathway of exposure. The remediation of a site is divided into a number of operable units, depending on the complexity of the problems associated with the site. Operable units will not impede implementation of subsequent actions, including final action at the site. FTF is a part of the GSA Western Groundwater Operable Unit.

Operational Period	Period of time during which tanks are in operation, waste is removed from the waste tanks and ancillary equipment, the systems are grouted, and a closure cap is installed in accordance with FFA requirements.
Outcrop	Also referred to as seepline, it is the location where groundwater from the upper aquifers is discharged to the surface.
Oxalic Acid	Oxalic acid is a relatively strong organic acid, being about 10,000 times stronger than acetic acid.
Oxidation Potential	The measure of a material to oxidize or lose electrons.
Oxidized	Combined with or having undergone a chemical reaction with oxygen.

P

Paleozoic	The geological period between 600 to 230 million years ago.
Par Pond	A lake constructed at Savannah River Site in 1958 to provide cooling water for P-Reactor and R-Reactor.
Perennial Stream	A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Run-off from rainfall is a supplemental source of water for stream flow.
Permeability	Capability of a material to let pass other molecules or particles.
pH	A measure of the acidity or alkalinity of a solution, numerically equal to 7 for neutral solutions, increasing with increasing alkalinity and decreasing with increasing acidity.
Phosphatic	Pertaining to, or containing, phosphorus, phosphoric acid, or phosphates; as, phosphatic nodules.
Pitting	Localized corrosion of a metal surface, confined to a point or small area that takes the form of cavities.

Plume	A body of contaminated groundwater eminating from a specific source.
Pore	Hole in a material.
PORFLOW	A comprehensive Comprehensive Fluid Dynamics (CFD) simulation software program developed to accurately solve problems involving transient or steady state fluid flow, heat, salinity and mass transport in multi-phase, variably saturated, porous or fractured media with dynamic phase change. The porous/fractured media may be anisotropic and heterogeneous, arbitrary sources (ex., wells) may be present and, chemical reactions or radioactive decay may take place. It accommodates alternate fluid and property relations and complex and arbitrary boundary conditions.
Porosity	Grout porosity is generally defined as the percentage of total volume of cured grout that is not occupied by the starting cementitious materials and the products that result from reaction of these cementitious materials with water.
Potable Water	Water that is safe for human consumption.
Precambrian	An informal term to include all geologic time from the beginning of the Earth to the beginning of the Cambrian period 570 million years ago.
Preliminary Remediation Goal (PRG)	Health-based chemical or radionuclide concentration in an environmental media associated with a particular exposure scenario. PRGs may be developed based on exposure scenarios evaluated prior to or as a result of a baseline risk assessment.
Primary Tank	The primary tank, sometimes referred to as the “shell,” is the component of the tank that actually contains the liquid waste. The primary tank is contained within the secondary containment, if any, and also houses the support equipment for the tank.
Principal Threat Source Material (PTSM)	PTSM are those materials that include or contain hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water or air, or that act as a source for direct exposure.

Probabalistic A model that assigns a likelihood to events or data within a population, as expressed by a ranked numerical value or an estimate of best case, worst case or most likely.

Probable Maximum Precipitation Theoretically, the greatest depth of precipitation for a given duration that is physically possible over a given size storm area at a particular geographical location at a certain time of the year.

Progeny Decay products or descendants of specific radionuclides.

Public Dose The dose received by a member of the public from exposure to radiation. Public dose does not include occupational dose or doses received from background radiation or from any medical administration the individual has received.

Pump Pit Pump Pits are shielded reinforced concrete structures located below grade at the low points of transfer lines, contain pump tanks and are usually lined with stainless steel.

Pump Tank All pump pits house a pump tank with the pump pits providing secondary containment for pump tanks. The pump tanks have a nominal capacity of ~7,200 gallons each. The pump tanks installed in FTF are all of the same basic size (8.5 feet tall, 12 feet in diameter).

R

RCRA The Resource Conservation and Recovery Act (RCRA) is the public law that creates the framework for the proper management of hazardous and nonhazardous solid waste.

Redox Redox (shorthand for oxidation/reduction reaction) describes all chemical reactions in which atoms have their oxidation number (oxidation state) changed.

Remedial Investigation Process The mechanism for collecting data to characterize site conditions, determine the nature of the waste, or assess risk to human health and the environment as overseen by the EPA.

Residual Radioactivity Radioactivity in structures, materials, soils, groundwater, and other media at a site remaining after closure.

Riemann or Lebesgue Measures	Statistical method of ingegration.
Riser	The risers through the tank tops provide for access to the tank and annulus interiors. Risers are used primarily to provide for the installation of equipment such as pumps and cooling equipment, instrumentation such as level probes and leak detection, and ventilation, and to provide access to the tank interior for sampling, depth measurement, and inspection.

S

Saltcake	Saltcake located in waste tanks consists of crystallized salts with interstitial void space and entrained soluble solids (assumed to be partially sludge solids).
Saltstone	A process in which low-activity salt solution is mixed with dry chemicals (cement, slag, and fly ash) to form a homogeneous grout mixture.
Saturated zone	The saturated zone encompasses the area below ground in which all interconnected openings within the geologic medium are completely filled with water.
Screeded	Screeding is leveling and smoothing the top layer of a material that is poured, such as concrete, so the material is the same height as the forms, or guides, that surround it.
Secondary Containment	The secondary containment also referred to as annulus, of a waste tank. The secondary containment surrounds the primary tank shell of Types I, II, III, and IIIA waste tanks, providing a location for collection of any leakage from the primary tank shell.
Sector	A logical division or grouping.
Seepline	Also referred to as outcrop or far field, it is the location where groundwater from the upper aquifers is discharged to the surface.
Segregation	Separation of sand from binder as the result of impact, and separation of water from grout as the result of gravity settling of the solids from the grout slurry.

Set time	Time after mixing at which the grout responds as a solid.
Shotcrete	Shotcrete is a substance applied via pressure hoses. Shotcrete is usually concrete conveyed through a hose and pneumatically projected at high velocity onto a surface. Shotcrete undergoes placement and compaction at the same time due to the force with which it is projected from the nozzle. Shotcrete was used in the construction of Type IV tanks.
Shrinkage	Percent length change of grout samples cured at 73°F as a function of curing time in saturated and drying environments.
Silica fume	Silica fume, also known as microsilica, is a byproduct of the reduction of high-purity quartz with coke in electric arc furnaces in the production of silicon and ferrosilicon alloys. Silica fume is used as an addition in Portland cement concretes to improve properties. It has been found that silica fume improves compressive strength, bond strength, and abrasion resistance. Addition of silica fume also reduces the permeability of concrete to chloride ions, which protects concrete's reinforcing steel from corrosion.
Slag	Slag was introduced into the design mixes which in addition to its hydraulic activity, also provides chemical reducing power to the mix. Slag has been shown to possess chemically reducing properties that are favorable for technetium reduction and for plutonium and selenium.
Slug test	A slug test is a particular type of aquifer test where water is quickly added or removed from a groundwater well, and the change in hydraulic head is monitored through time, to determine the near-well aquifer characteristics. It is a method used by hydrogeologists to determine the transmissivity and storativity of the material the well is completed in.
Solubility	Mixture of at least two liquid components or of at least one solid and a liquid component.
Source Term	The amount and type of radioactive material released into the environment.
Spalling	Destruction of a surface by frost, heat, corrosion, or mechanical causes.

Stabilized Contaminant Grouted waste remaining in the waste tanks or ancillary equipment after system closure.

Stated Mean Sea Level The reference point used as a standard for determining terrestrial and atmospheric elevation or ocean depths and is calculated as the average of hourly tide levels measured by mechanical tide gauges over extended periods of time.

Stochastic A probabilistic distribution of parameters.

Stoichiometry Calculation of the quantitative relationships between the amounts of reactants and products formed during a chemical reaction.

Supernate Liquid salt solution found above the sludge layer after settling of solids in waste tanks has occurred as a result of a liquid waste transfer to one of the waste processing facilities or receipt tanks.

T

TERRA Code A Three Dimensional Finite Element Code for the Simulation of the Earth's Mantle.

Thermodynamic The science of heat and temperature and of the laws governing the conversion of heat into mechanical, electrical, or chemical energy.

TNX A designation code with no logical derivation for one of the first facilities (T-Area) completed at SRS, Its use was primarily for technical support and development for Separations.

Tortuosity A geometrical parameter which intervenes in the description of the inertial effects between the fluid filled porous material and its structure at high frequency range.

Total Effective Dose Equivalent (TEDE) The sum of the deep-dose equivalent for external exposures and the committed Effective Dose Equivalent (EDE) for internal exposures.

TNX One of the first facilities to be put into operation on SRS. This facility provided a wide range of technical support and development for Separations. TNX was a code designation and had no logical derivation.

Tracer — An amount of material introduced into a system model in order to follow the behavior of some component of that system.

Triassic — The period of geological time between 248 and 213 million years ago.

U

Udorthents — Well drained soils that formed in heterogeneous materials, which are the spoil or refuse from excavations and major construction operations.

Underliner Sump — An underliner sump collects any leakage through the concrete or stainless steel liners beneath waste tanks.

Unit Weight — Weight of a unit volume, typically one cubic foot.

V

Vadose Zone — The unsaturated zone located between the ground surface and the water table or saturated zone.

Van der Waals Force — In physical chemistry, the name van der Waals force refers to the attractive or repulsive forces between molecules (or between parts of the same molecule) other than those due to covalent bonds or to the electrostatic interaction of ions with one another or with neutral molecules.

Valve Boxes — Transfer valve boxes facilitate specific waste transfers that are conducted frequently. The valves are generally manual ball valves in removable jumpers with flush water connections on the transfer piping. The valve boxes provide containment of and access to the valves.

Vault — Term used to describe the underground concrete floor, walls and roof that enclose the steel primary liner of the waste tank.

Viscosity Rheological quality of fluids describing the resistance to flow.

Volatilization The transport of a liquid substance by vaporization.

W

Waste Characterization System Computer based system designed to integrate historical information, current sample data, and physical properties of constituents to develop predictions of concentrations and inventory.

Waste Inventory Residual contaminants remaining in the radioactive waste tanks and associated ancillary equipment.

Working Slab Concrete surface usually placed to create a level construction surface. This concrete is normally lower quality without reinforcement and is either broken up after or cracked during construction activities between the tanks, thus is not considered a barrier to vertical water migration.

Y

Young's Modulus Young's modulus (E) is a measure of the stiffness of a given material. It is also known as the modulus of elasticity, elastic modulus or tensile modulus. It is defined as the ratio, for small strains, of the rate of change of stress with strain.

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Appendix A.1
WASTE FLUX LEAVING TANK LINER AND ANCILLARY EQUIPMENT

Appendix A.1 contains curves showing the waste flux (in Ci/year or Kg/year) leaving the associated liner for the individual tanks and ancillary equipment for 20,000 years. The flux is provided for all radionuclides and chemicals.

Graph heading example "CaseA_Tank01_Ac-227"

Key

CaseA = scenario case/configuration

Tank01 = inventory source is Tank 01

Ac-227 = radionuclide or chemical of concern

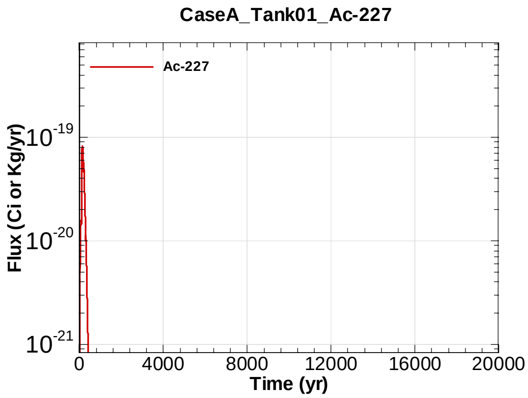

Figure A.1-1 - Flux Leaving Liner for CaseA Tank01 Ac-227

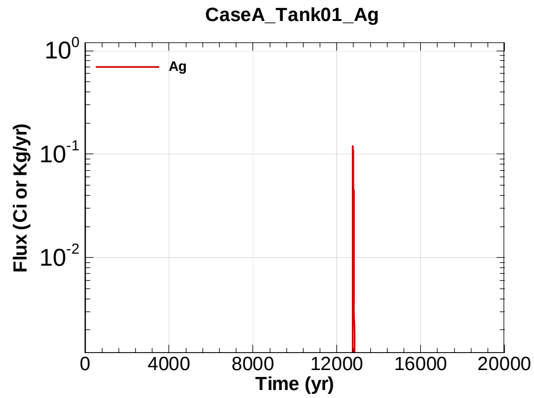

Figure A.1-2 - Flux Leaving Liner for CaseA Tank01 Ag

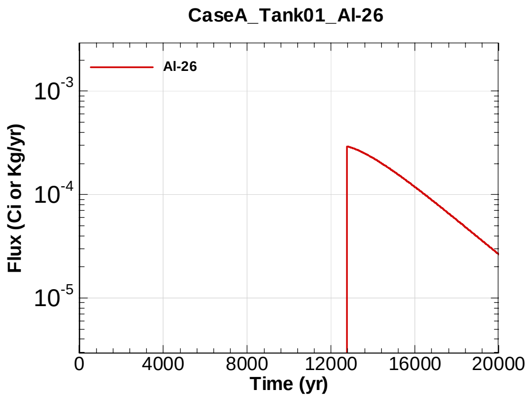

Figure A.1-3 - Flux Leaving Liner for CaseA Tank01 Al-26

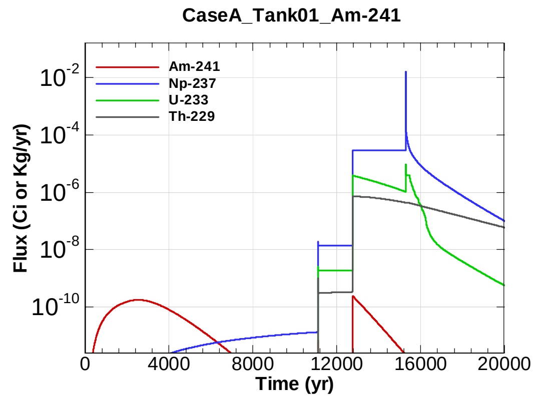

Figure A.1-4 - Flux Leaving Liner for CaseA Tank01 Am-241

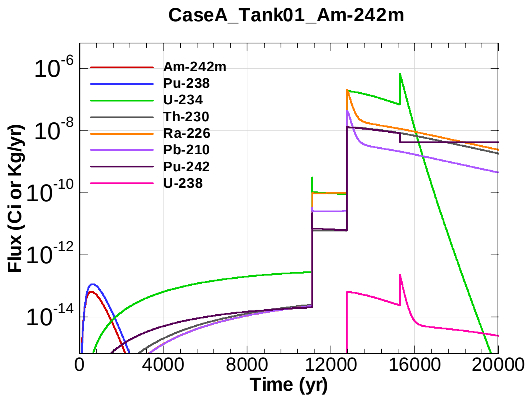

Figure A.1-5 - Flux Leaving Liner for CaseA Tank01 Am-242m

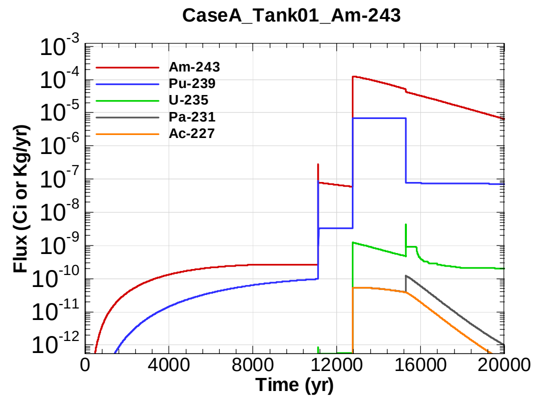

Figure A.1-6 - Flux Leaving Liner for CaseA Tank01 Am-243

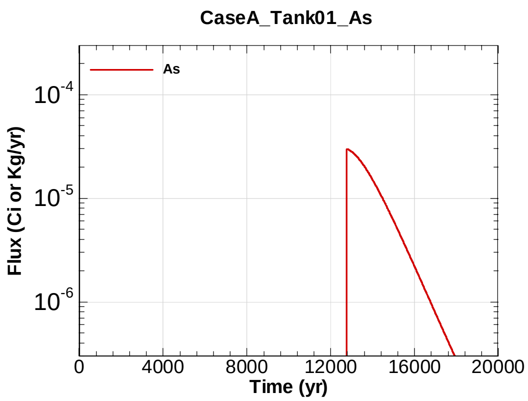

Figure A.1-7 - Flux Leaving Liner for CaseA Tank01 As

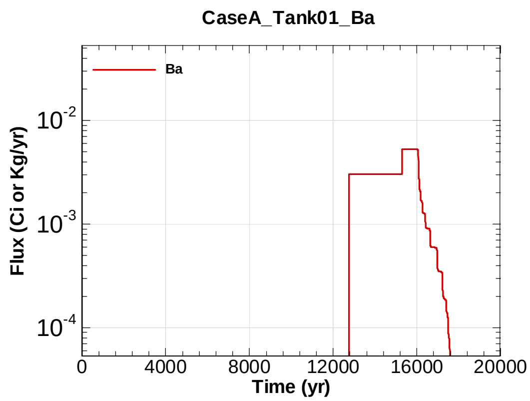

Figure A.1-8 - Flux Leaving Liner for CaseA Tank01 Ba

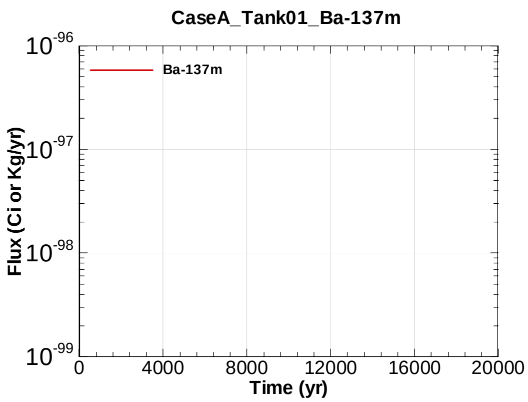

Figure A.1-9 - Flux Leaving Liner for CaseA Tank01 Ba-137m

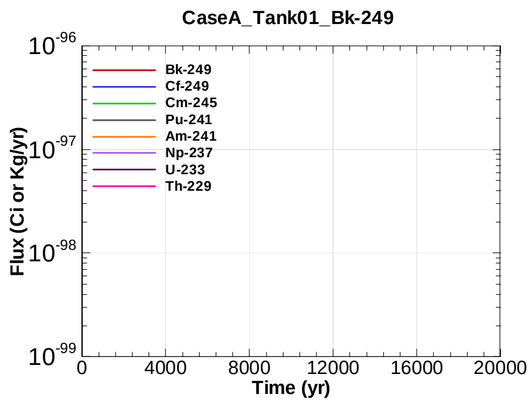

Figure A.1-10 - Flux Leaving Liner for CaseA Tank01 Bk-249

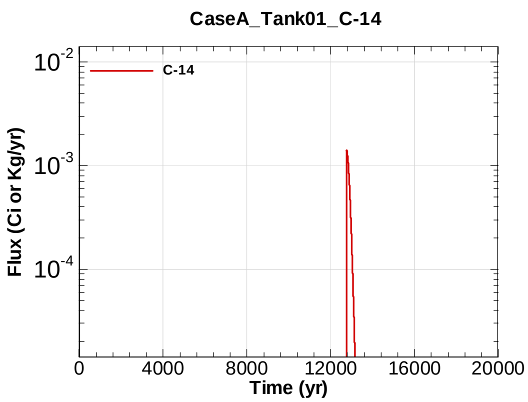

Figure A.1-11 - Flux Leaving Liner for CaseA Tank01 C-14

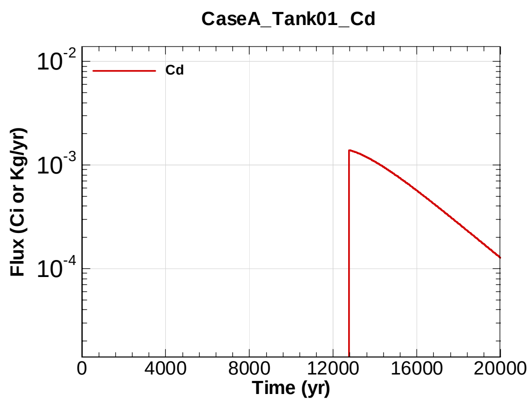

Figure A.1-12 - Flux Leaving Liner for CaseA Tank01 Cd

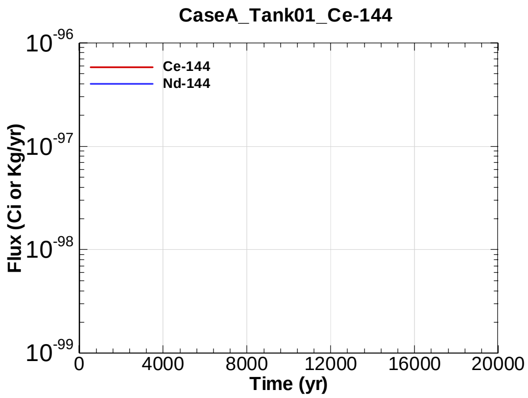

Figure A.1-13 - Flux Leaving Liner for CaseA Tank01 Ce-144

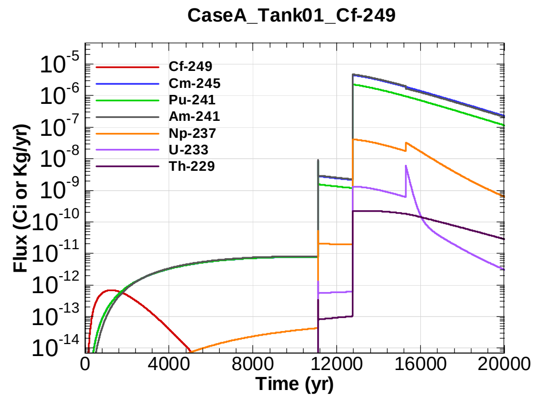

Figure A.1-14 - Flux Leaving Liner for CaseA Tank01 Cf-249

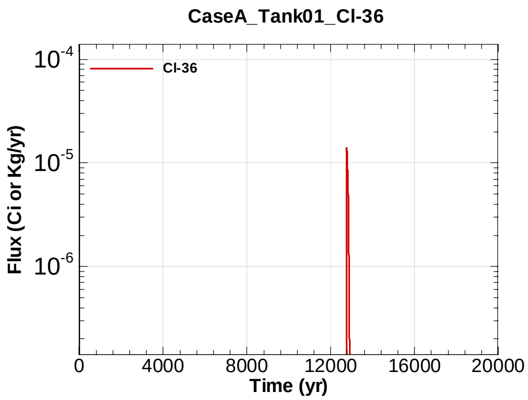

Figure A.1-15 - Flux Leaving Liner for CaseA Tank01 Cl-36

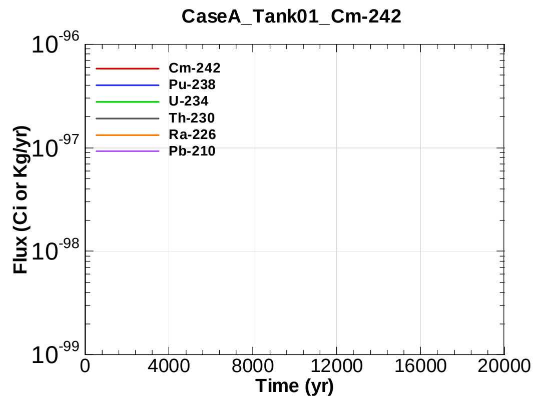

Figure A.1-16 - Flux Leaving Liner for CaseA Tank01 Cm-242

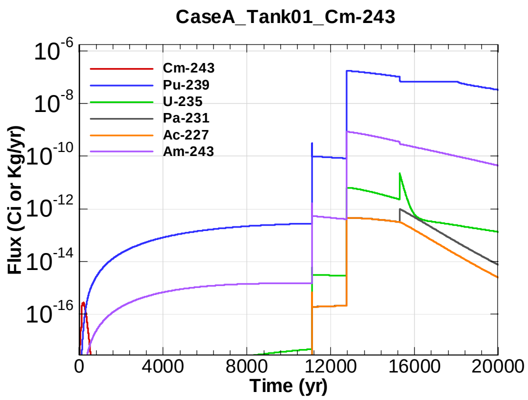

Figure A.1-17 - Flux Leaving Liner for CaseA Tank01 Cm-243

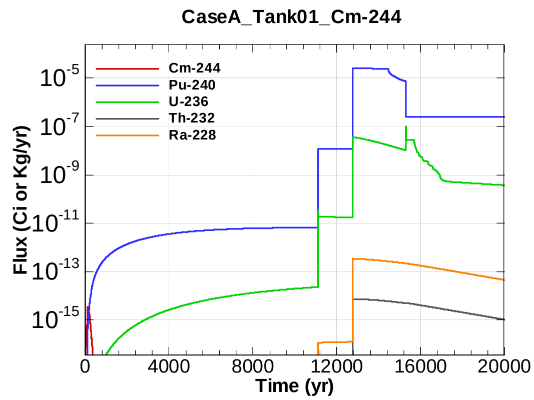

Figure A.1-18 - Flux Leaving Liner for CaseA Tank01 Cm-244

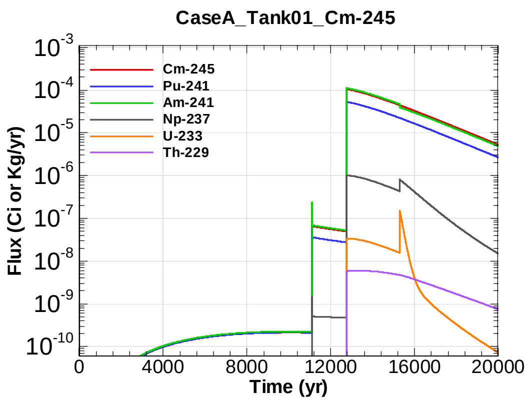

Figure A.1-19 - Flux Leaving Liner for CaseA Tank01 Cm-245

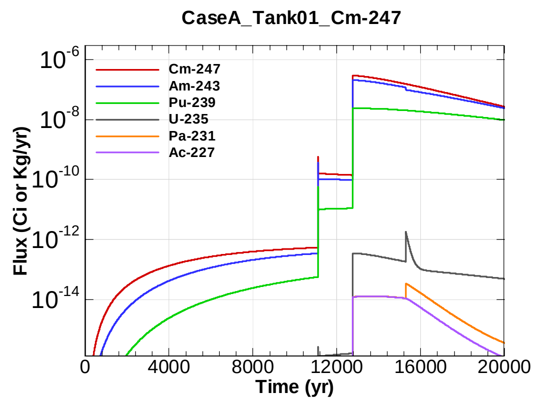

Figure A.1-20 - Flux Leaving Liner for CaseA Tank01 Cm-247

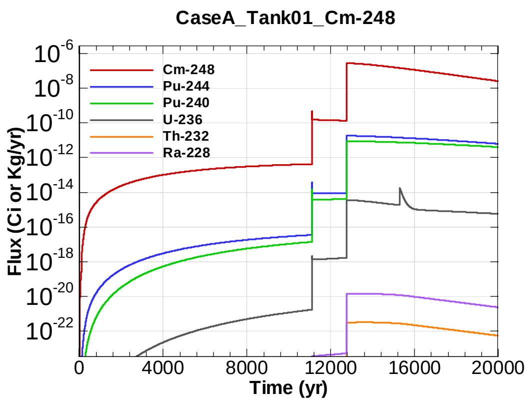

Figure A.1-21 - Flux Leaving Liner for CaseA Tank01 Cm-248

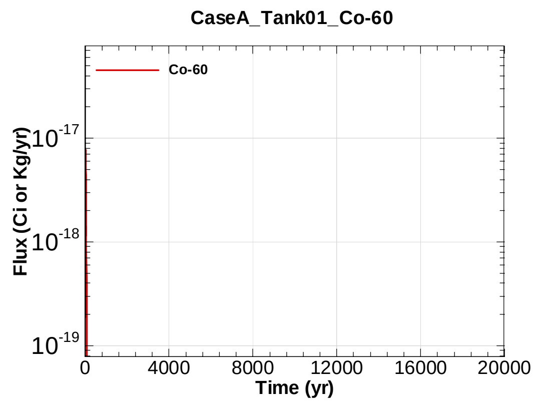

Figure A.1-22 - Flux Leaving Liner for CaseA Tank01 Co-60

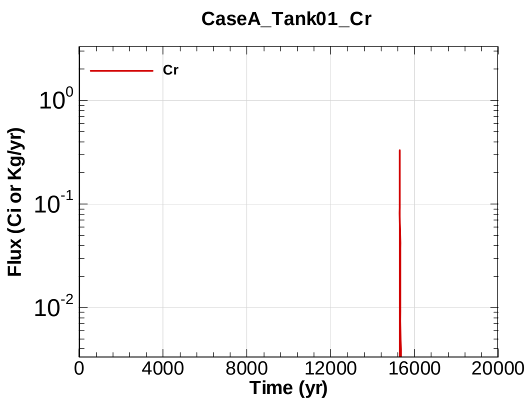

Figure A.1-23 - Flux Leaving Liner for CaseA Tank01 Cr

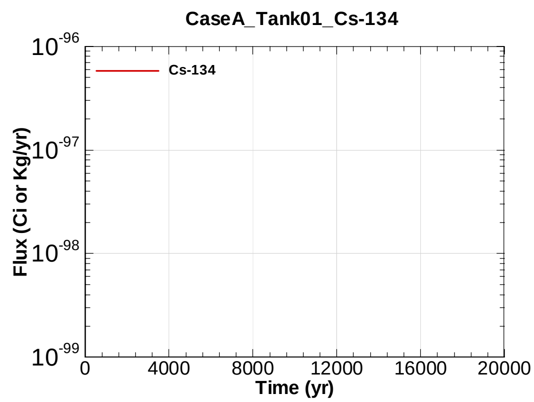

Figure A.1-24 - Flux Leaving Liner for CaseA Tank01 Cs-134

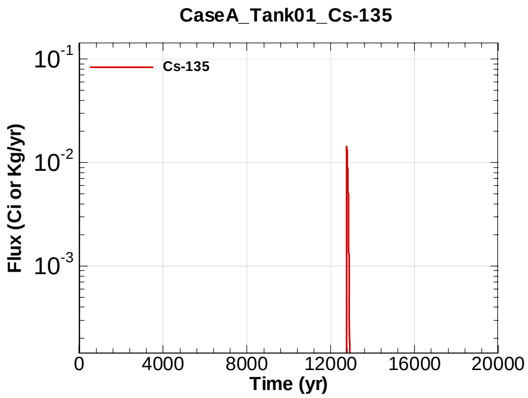

Figure A.1-25 - Flux Leaving Liner for CaseA Tank01 Cs-135

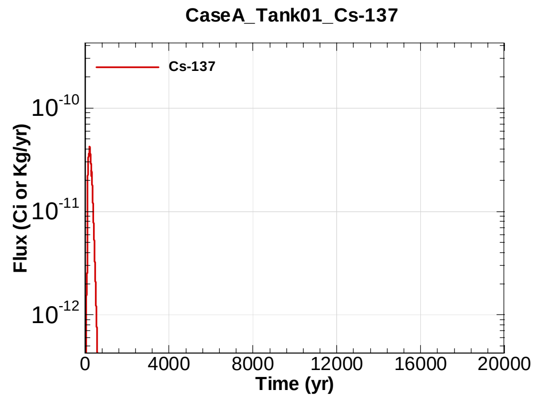

Figure A.1-26 - Flux Leaving Liner for CaseA Tank01 Cs-137

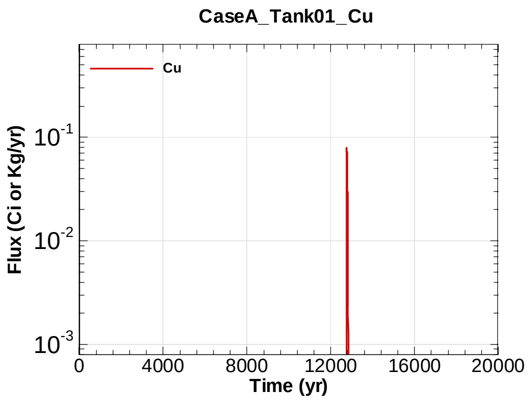

Figure A.1-27 - Flux Leaving Liner for CaseA Tank01 Cu

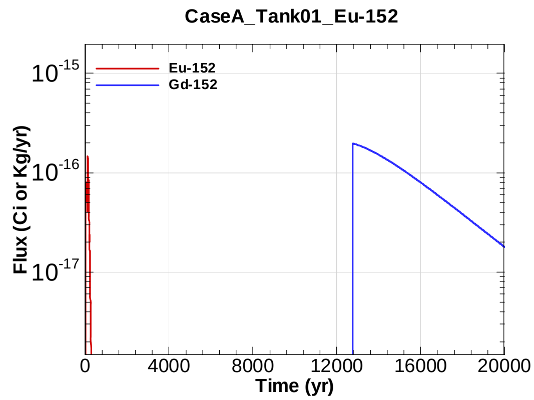

Figure A.1-28 - Flux Leaving Liner for CaseA Tank01 Eu-152

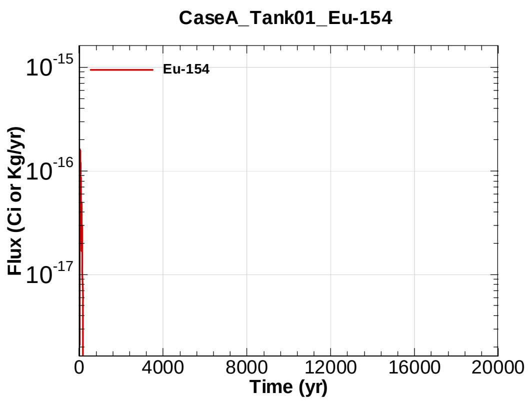

Figure A.1-29 - Flux Leaving Liner for CaseA Tank01 Eu-154

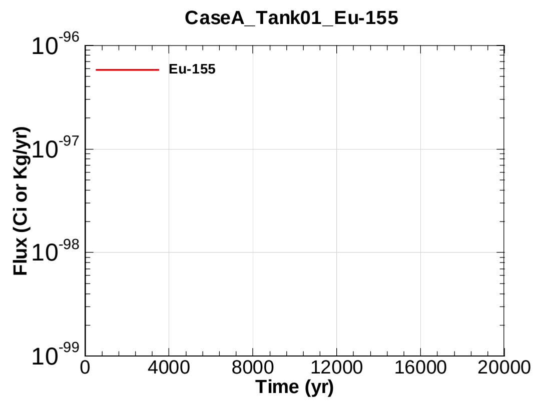

Figure A.1-30 - Flux Leaving Liner for CaseA Tank01 Eu-155

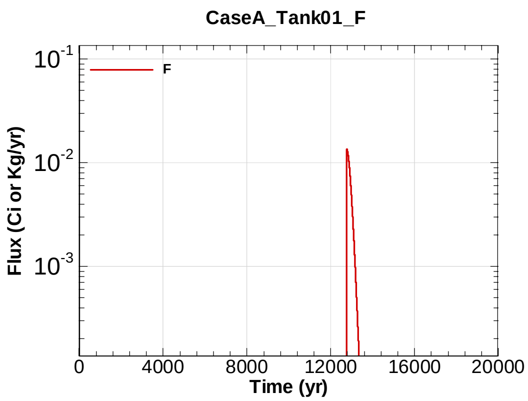

Figure A.1-31 - Flux Leaving Liner for CaseA Tank01 F

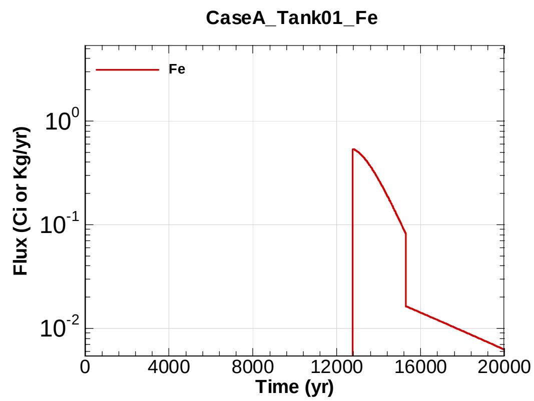

Figure A.1-32 - Flux Leaving Liner for CaseA Tank01 Fe

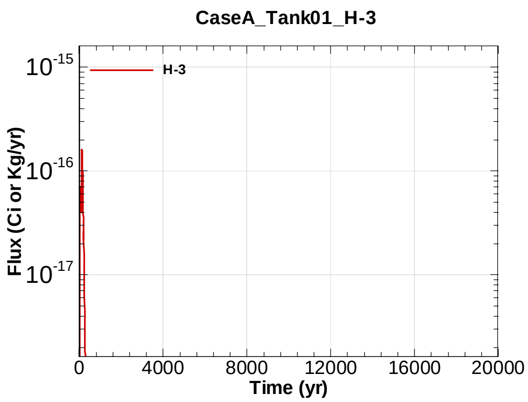

Figure A.1-33 - Flux Leaving Liner for CaseA Tank01 H-3

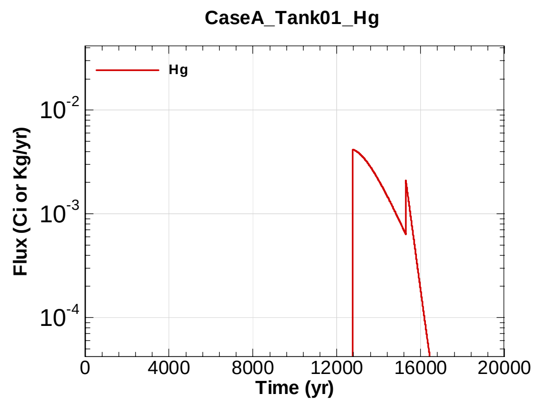

Figure A.1-34 - Flux Leaving Liner for CaseA Tank01 Hg

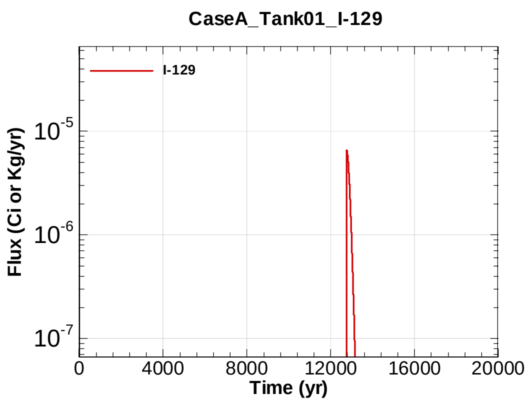

Figure A.1-35 - Flux Leaving Liner for CaseA Tank01 I-129

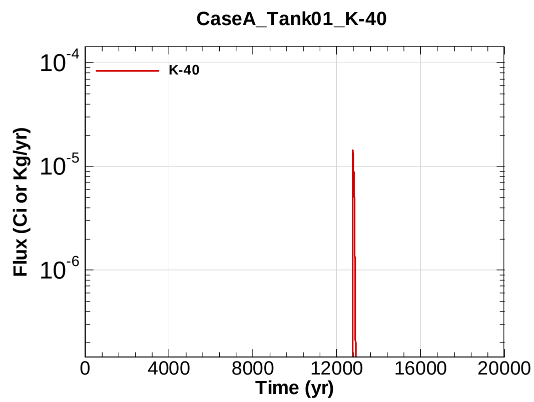

Figure A.1-36 - Flux Leaving Liner for CaseA Tank01 K-40

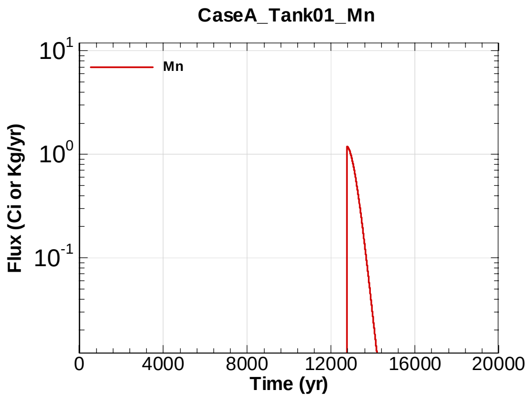

Figure A.1-37 - Flux Leaving Liner for CaseA Tank01 Mn

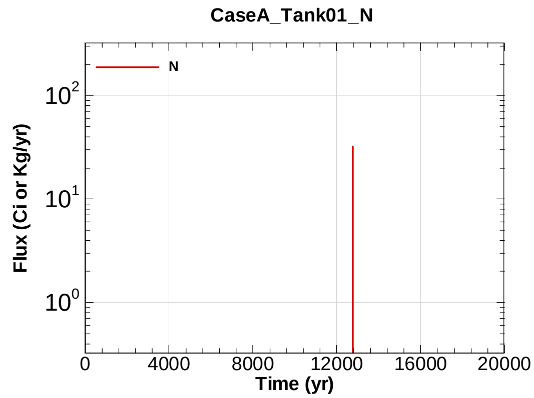

Figure A.1-38 - Flux Leaving Liner for CaseA Tank01 N

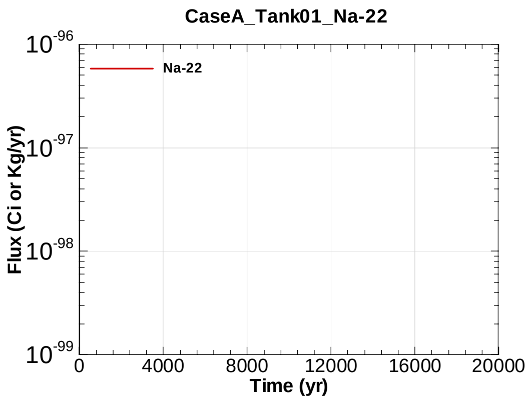

Figure A.1-39 - Flux Leaving Liner for CaseA Tank01 Na-22

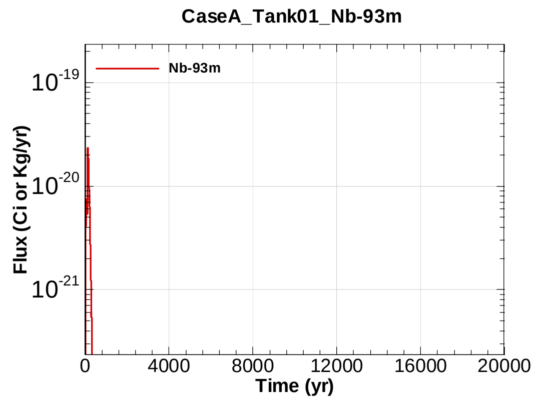

Figure A.1-40 - Flux Leaving Liner for CaseA Tank01 Nb-93m

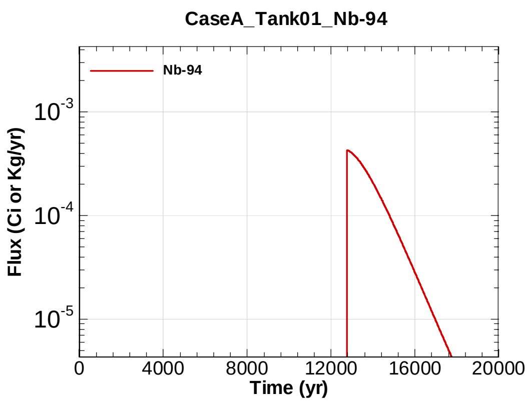

Figure A.1-41 - Flux Leaving Liner for CaseA Tank01 Nb-94

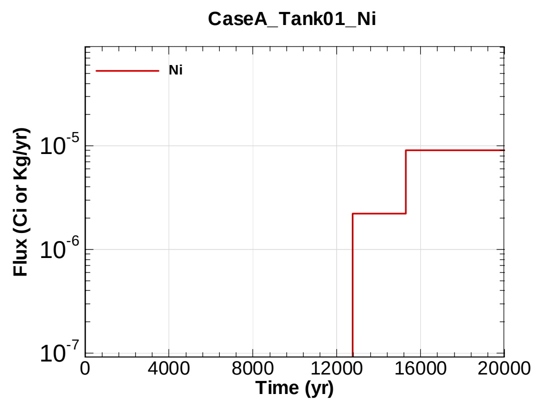

Figure A.1-42 - Flux Leaving Liner for CaseA Tank01 Ni

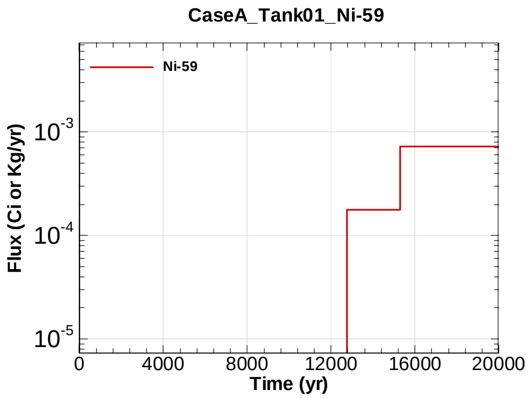

Figure A.1-43 - Flux Leaving Liner for CaseA Tank01 Ni-59

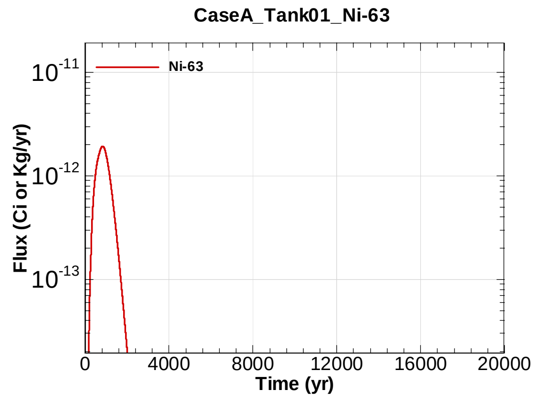

Figure A.1-44 - Flux Leaving Liner for CaseA Tank01 Ni-63

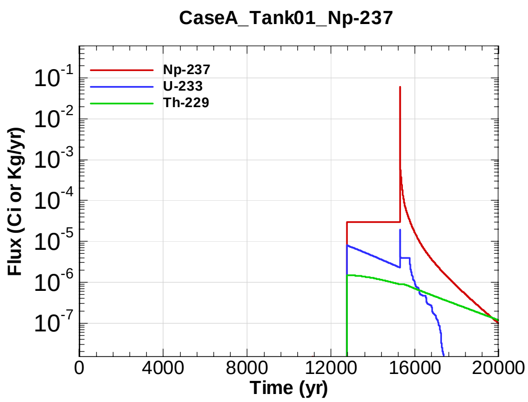

Figure A.1-45 - Flux Leaving Liner for CaseA Tank01 Np-237

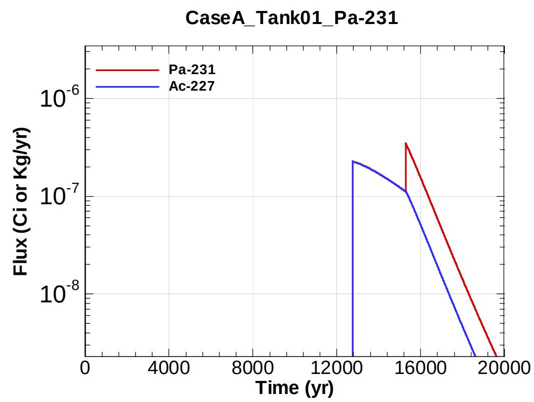

Figure A.1-46 - Flux Leaving Liner for CaseA Tank01 Pa-231

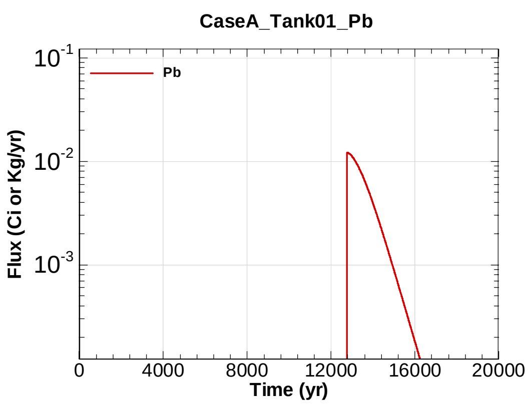

Figure A.1-47 - Flux Leaving Liner for CaseA Tank01 Pb

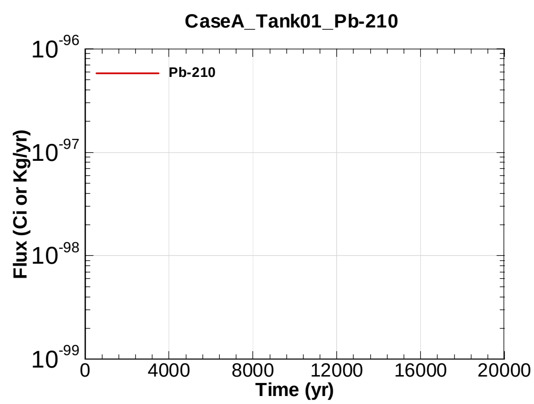

Figure A.1-48 - Flux Leaving Liner for CaseA Tank01 Pb-210

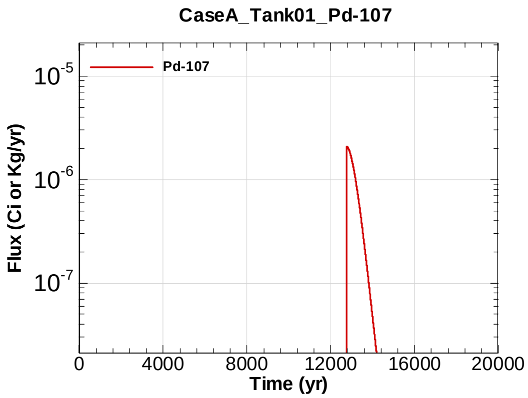

Figure A.1-49 - Flux Leaving Liner for CaseA Tank01 Pd-107

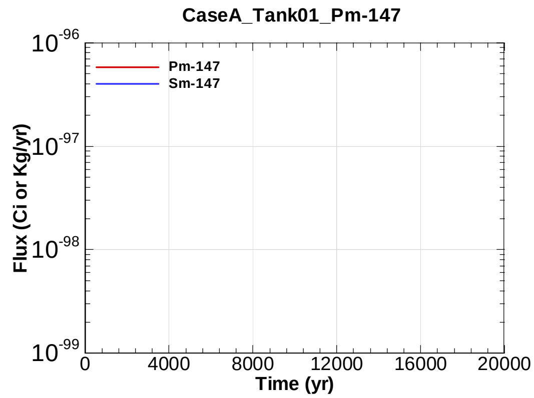

Figure A.1-50 - Flux Leaving Liner for CaseA Tank01 Pm-147

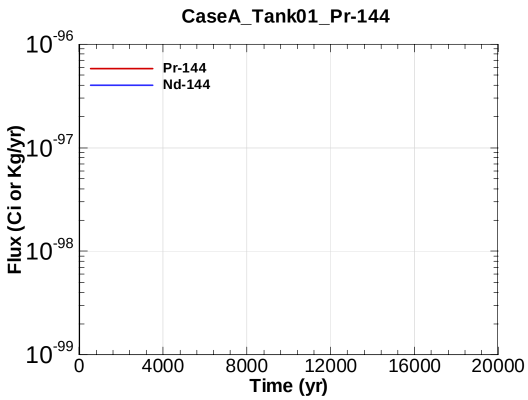

Figure A.1-51 - Flux Leaving Liner for CaseA Tank01 Pr-144

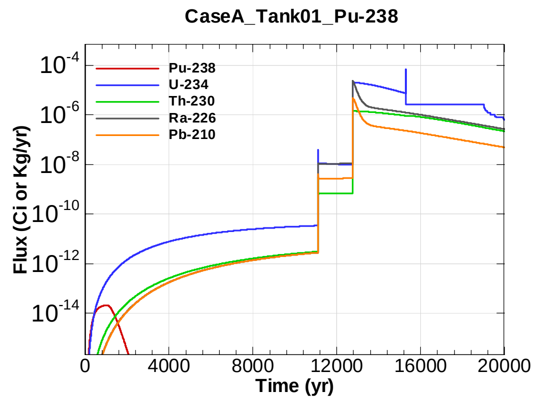

Figure A.1-52 - Flux Leaving Liner for CaseA Tank01 Pu-238

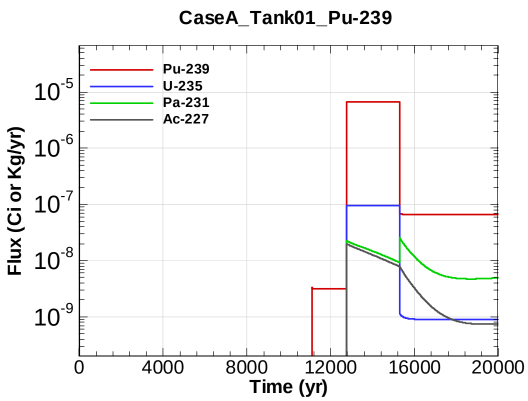

Figure A.1-53 - Flux Leaving Liner for CaseA Tank01 Pu-239

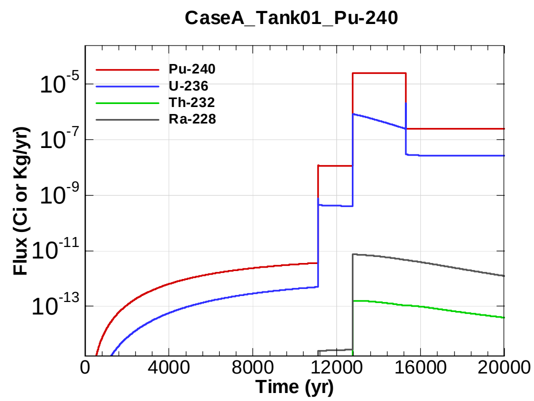

Figure A.1-54 - Flux Leaving Liner for CaseA Tank01 Pu-240

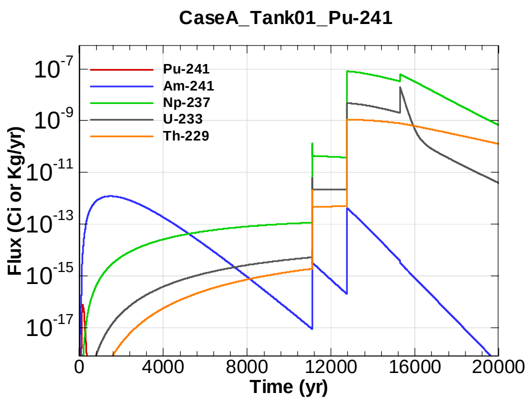

Figure A.1-55 - Flux Leaving Liner for CaseA Tank01 Pu-241

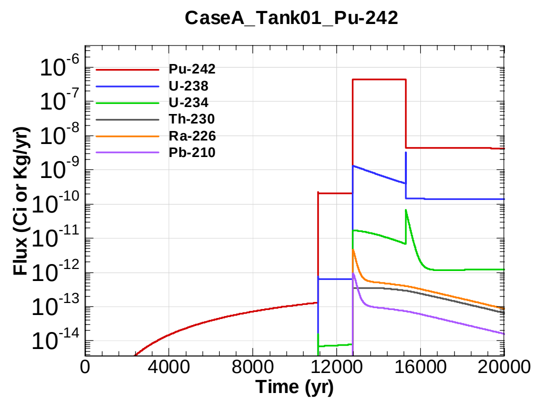

Figure A.1-56 - Flux Leaving Liner for CaseA Tank01 Pu-242

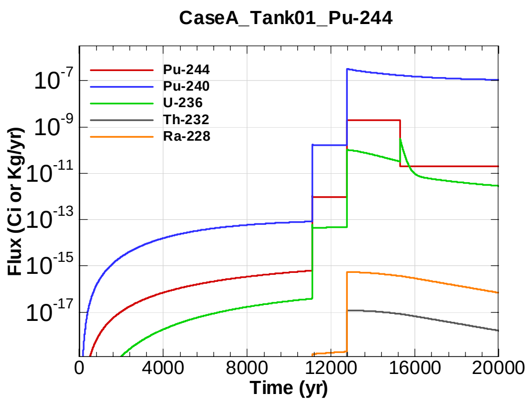

Figure A.1-57 - Flux Leaving Liner for CaseA Tank01 Pu-244

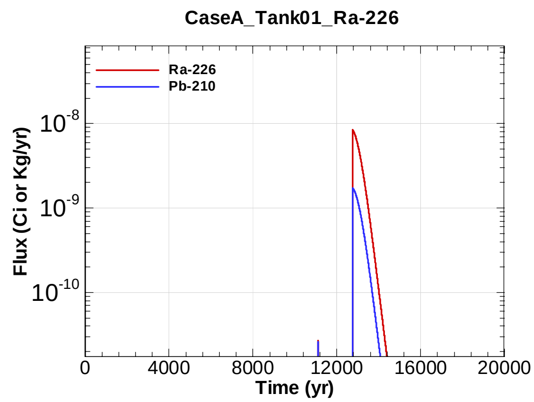

Figure A.1-58 - Flux Leaving Liner for CaseA Tank01 Ra-226

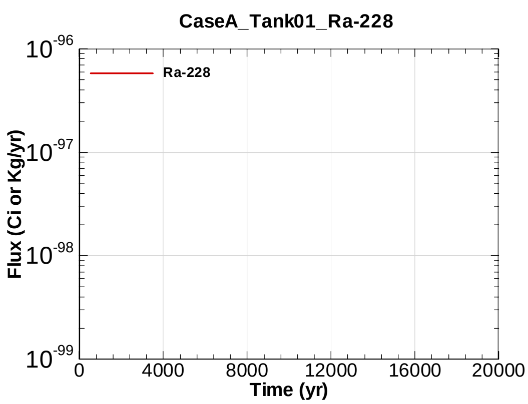

Figure A.1-59 - Flux Leaving Liner for CaseA Tank01 Ra-228

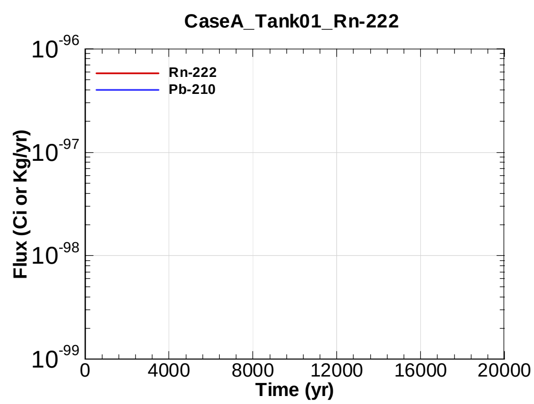

Figure A.1-60 - Flux Leaving Liner for CaseA Tank01 Rn-222

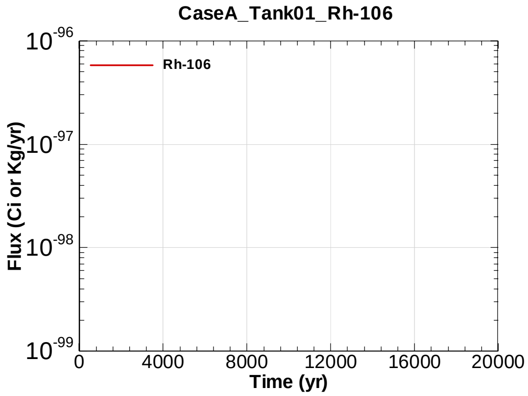

Figure A.1-61 - Flux Leaving Liner for CaseA Tank01 Rh-106

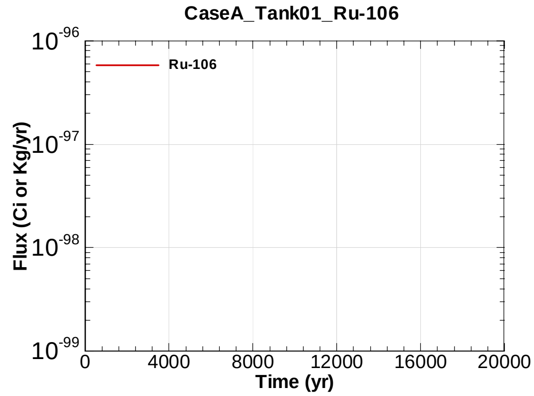

Figure A.1-62 - Flux Leaving Liner for CaseA Tank01 Ru-106

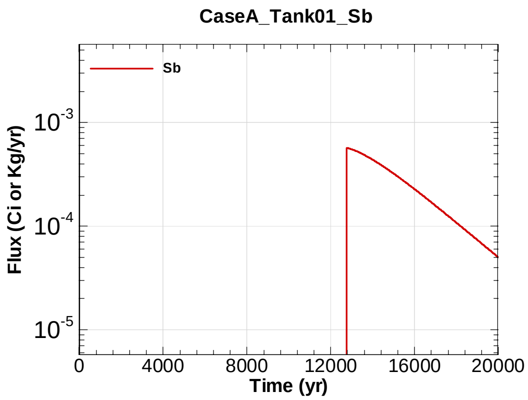

Figure A.1-63 - Flux Leaving Liner for CaseA Tank01 Sb

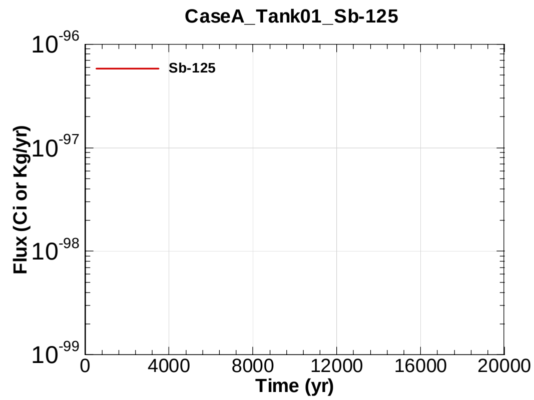

Figure A.1-64 - Flux Leaving Liner for CaseA Tank01 Sb-125

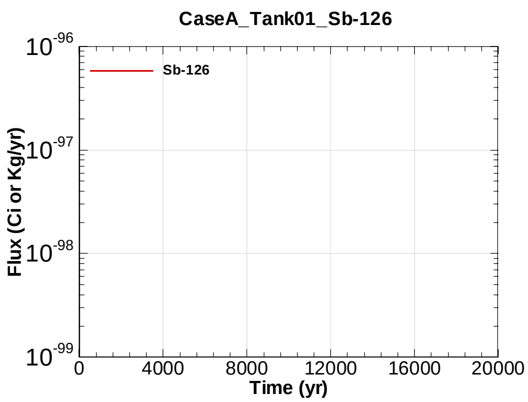

Figure A.1-65 - Flux Leaving Liner for CaseA Tank01 Sb-126

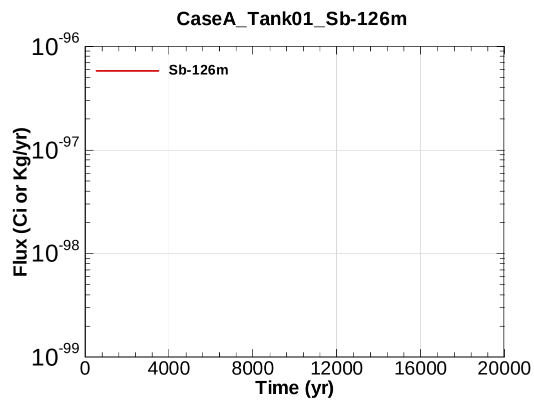

Figure A.1-66 - Flux Leaving Liner for CaseA Tank01 Sb-126m

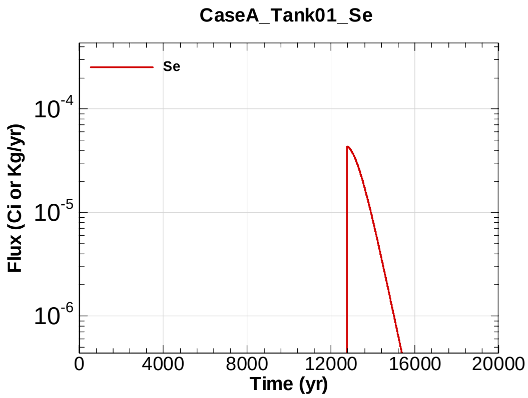

Figure A.1-67 - Flux Leaving Liner for CaseA Tank01 Se

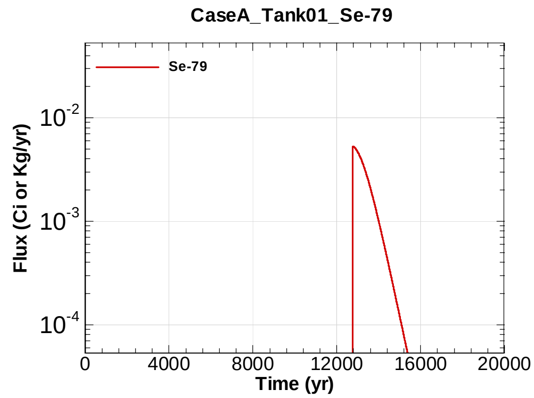

Figure A.1-68 - Flux Leaving Liner for CaseA Tank01 Se-79

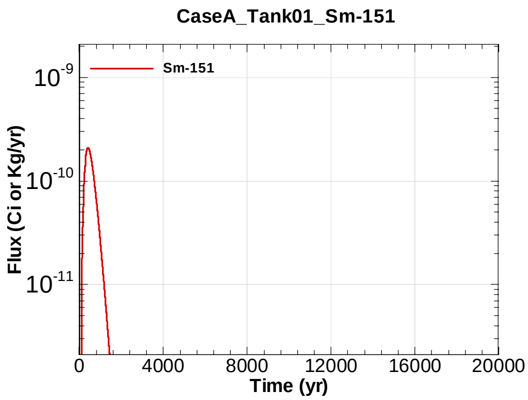

Figure A.1-69 - Flux Leaving Liner for CaseA Tank01 Sm-151

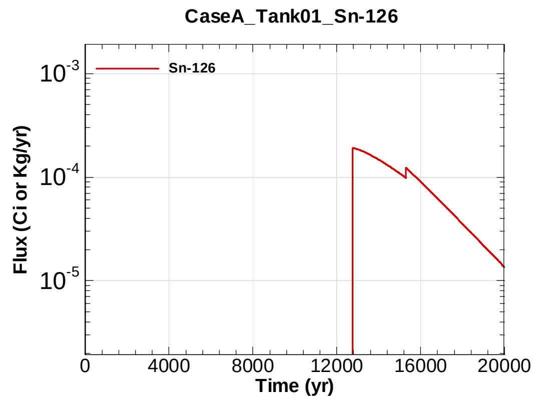

Figure A.1-70 - Flux Leaving Liner for CaseA Tank01 Sn-126

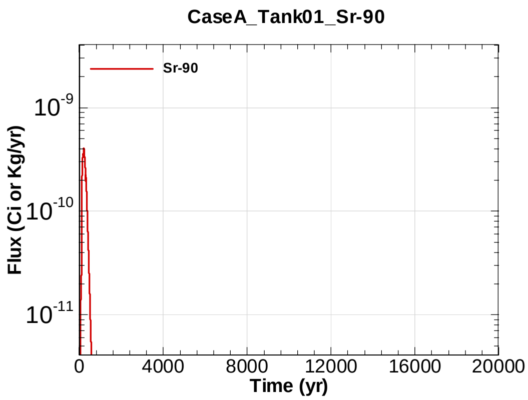

Figure A.1-71 - Flux Leaving Liner for CaseA Tank01 Sr-90

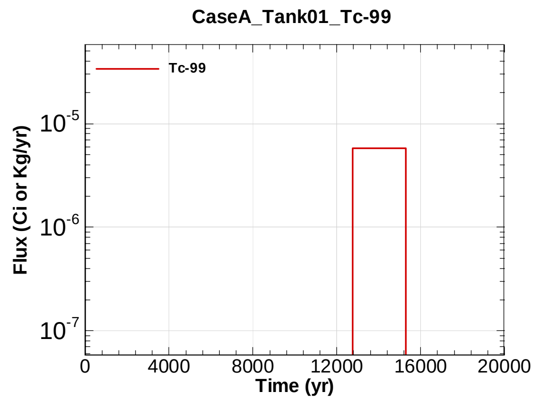

Figure A.1-72 - Flux Leaving Liner for CaseA Tank01 Tc-99

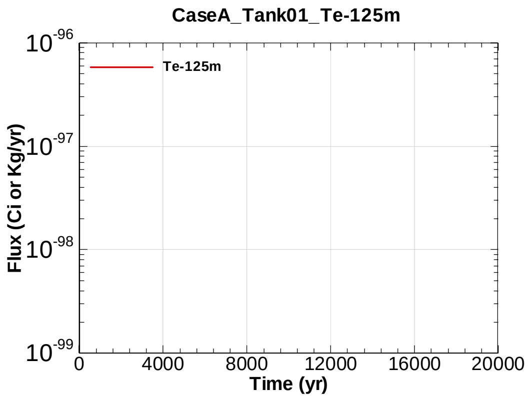

Figure A.1-73 - Flux Leaving Liner for CaseA Tank01 Te-125m

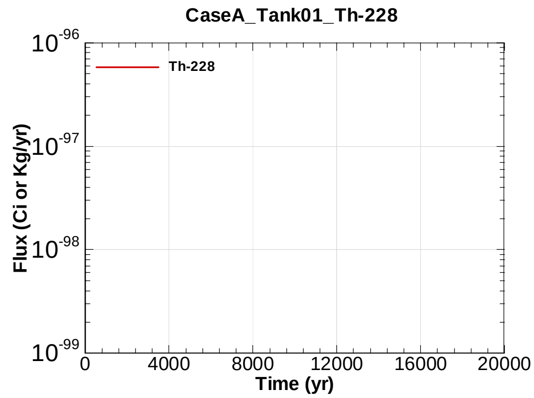

Figure A.1-74 - Flux Leaving Liner for CaseA Tank01 Th-228

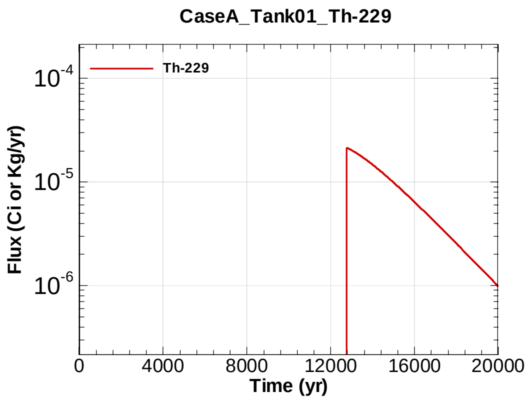

Figure A.1-75 - Flux Leaving Liner for CaseA Tank01 Th-229

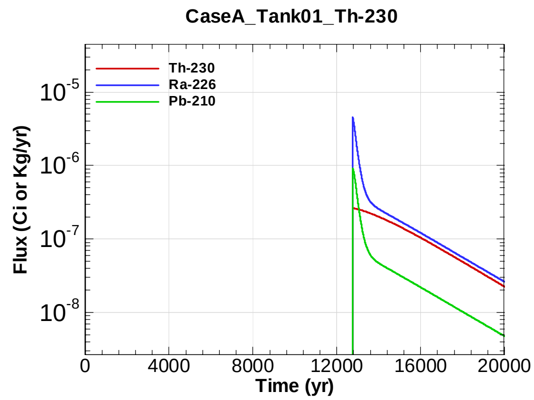

Figure A.1-76 - Flux Leaving Liner for CaseA Tank01 Th-230

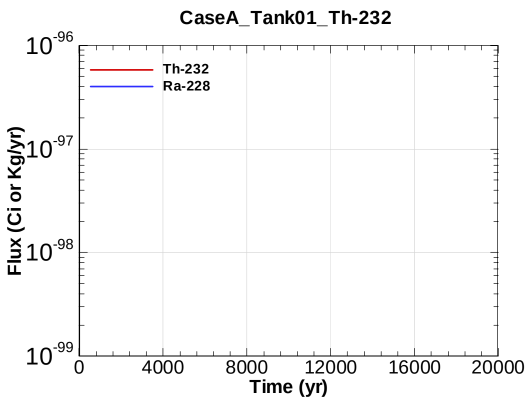

Figure A.1-77 - Flux Leaving Liner for CaseA Tank01 Th-232

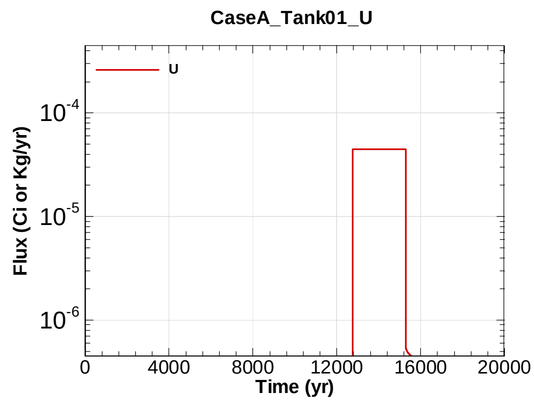

Figure A.1-78 - Flux Leaving Liner for CaseA Tank01 U

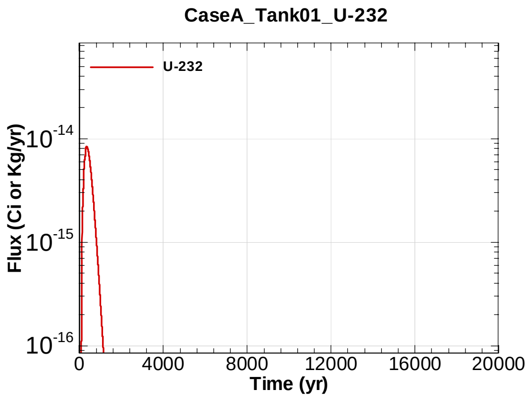

Figure A.1-79 - Flux Leaving Liner for CaseA Tank01 U-232

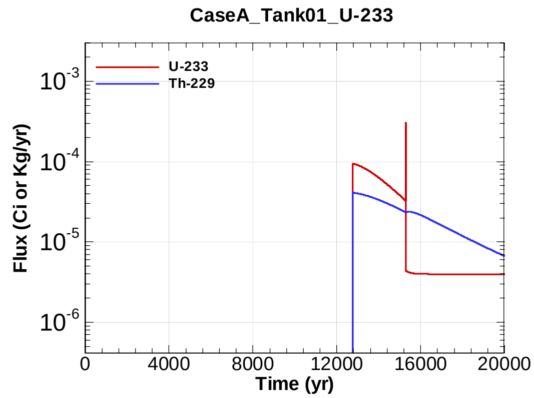

Figure A.1-80 - Flux Leaving Liner for CaseA Tank01 U-233

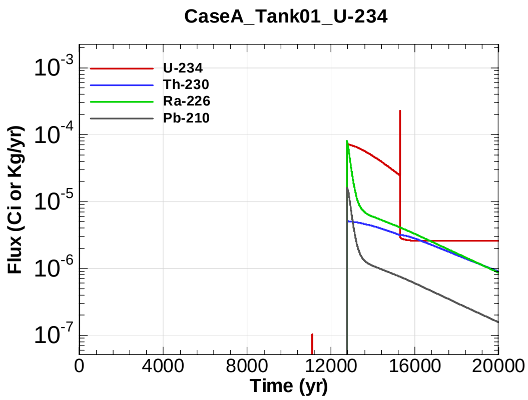

Figure A.1-81 - Flux Leaving Liner for CaseA Tank01 U-234

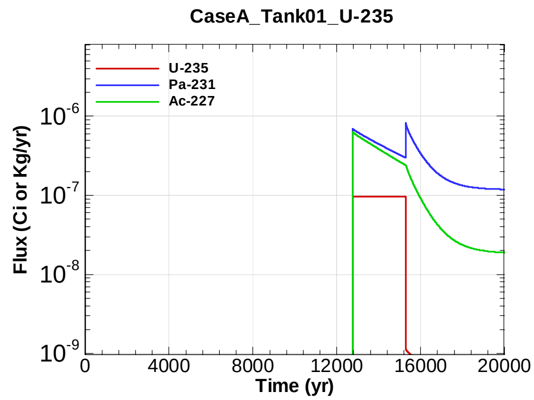

Figure A.1-82 - Flux Leaving Liner for CaseA Tank01 U-235

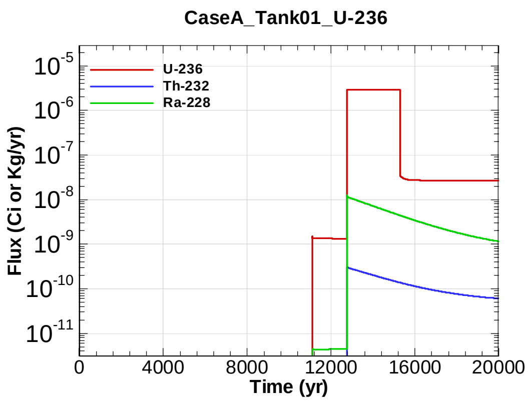

Figure A.1-83 - Flux Leaving Liner for CaseA Tank01 U-236

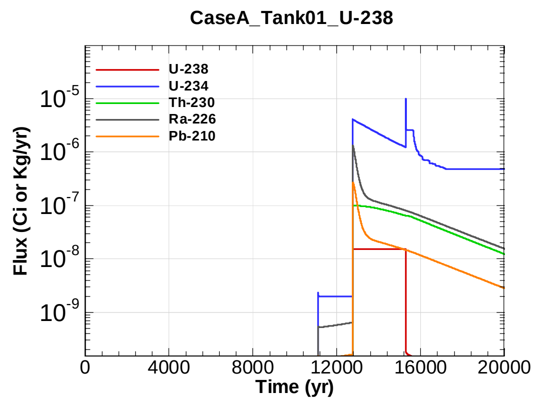

Figure A.1-84 - Flux Leaving Liner for CaseA Tank01 U-238

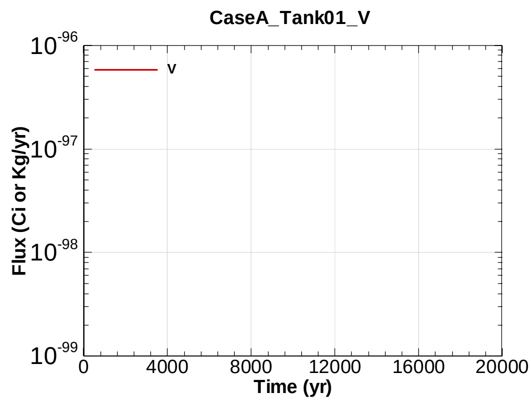

Figure A.1-85 - Flux Leaving Liner for CaseA Tank01 V

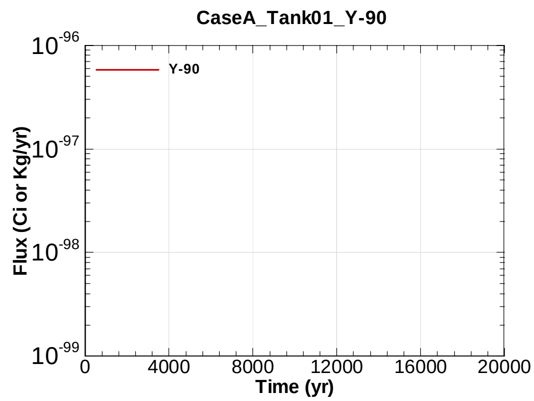

Figure A.1-86 - Flux Leaving Liner for CaseA Tank01 Y-90

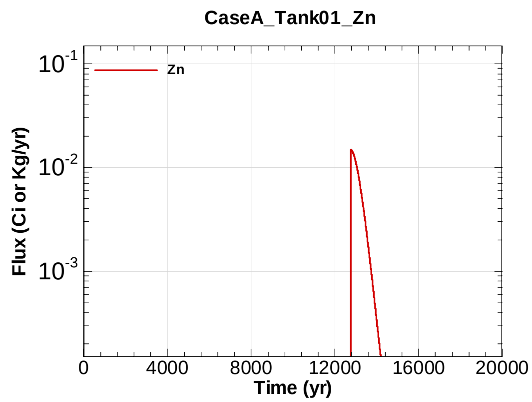

Figure A.1-87 - Flux Leaving Liner for CaseA Tank01 Zn

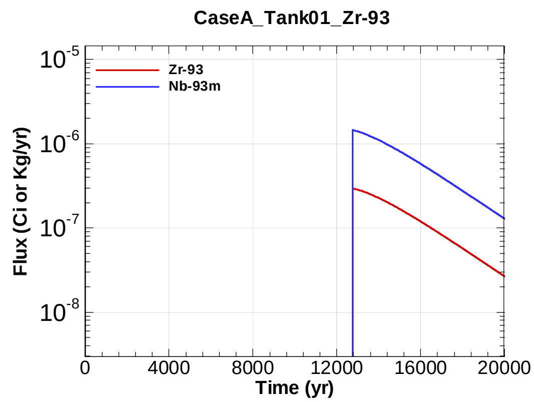

Figure A.1-88 - Flux Leaving Liner for CaseA Tank01 Zr-93

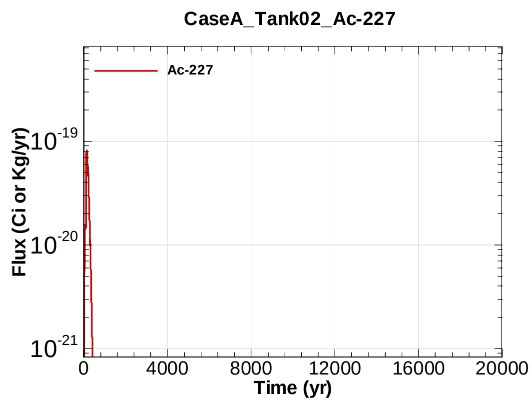

Figure A.1-89 - Flux Leaving Liner for CaseA Tank02 Ac-227

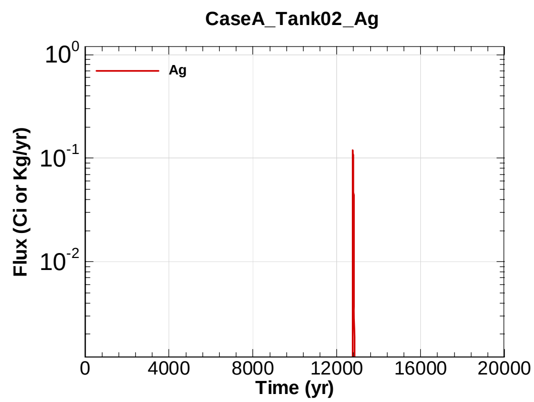

Figure A.1-90 - Flux Leaving Liner for CaseA Tank02 Ag

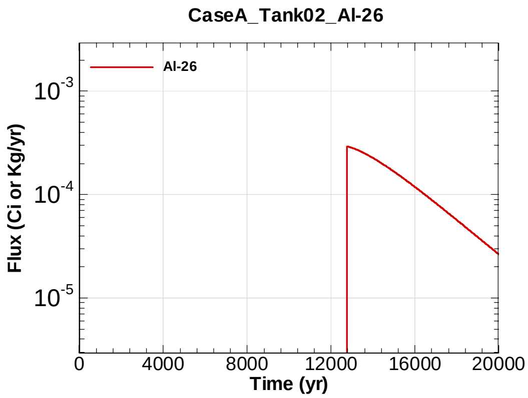

Figure A.1-91 - Flux Leaving Liner for CaseA Tank02 Al-26

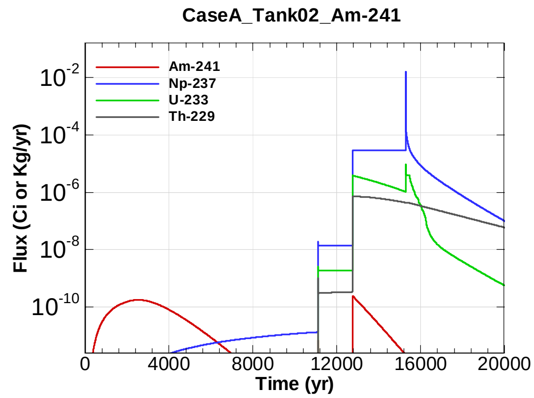

Figure A.1-92 - Flux Leaving Liner for CaseA Tank02 Am-241

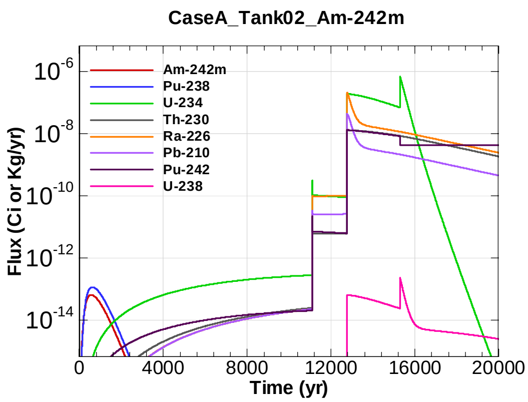

Figure A.1-93 - Flux Leaving Liner for CaseA Tank02 Am-242m

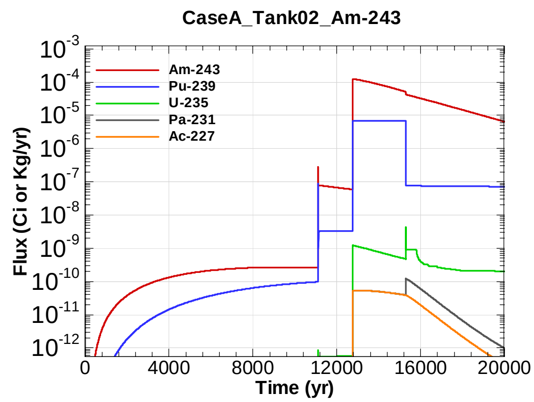

Figure A.1-94 - Flux Leaving Liner for CaseA Tank02 Am-243

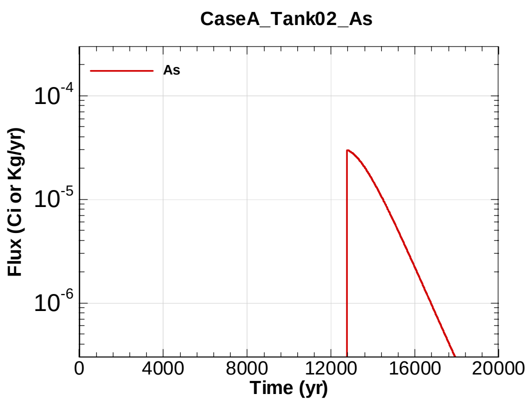

Figure A.1-95 - Flux Leaving Liner for CaseA Tank02 As

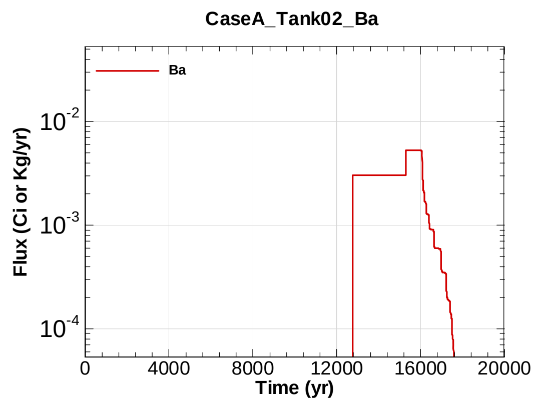

Figure A.1-96 - Flux Leaving Liner for CaseA Tank02 Ba

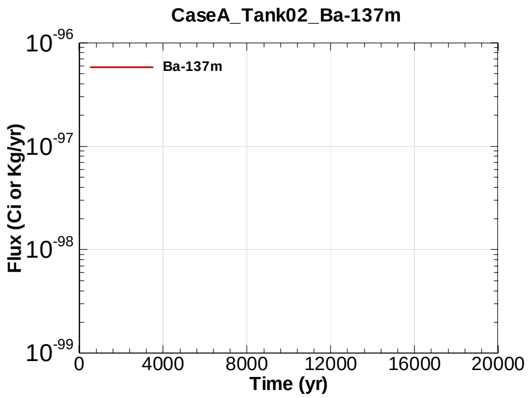

Figure A.1-97 - Flux Leaving Liner for CaseA Tank02 Ba-137m

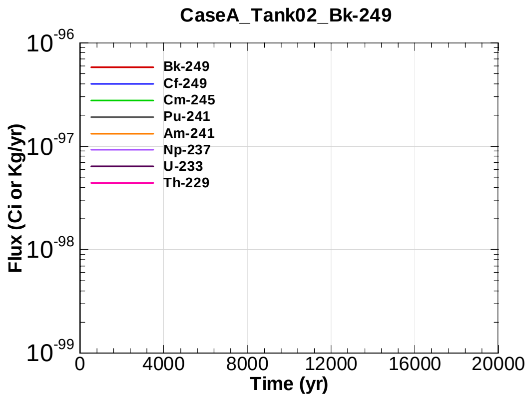

Figure A.1-98 - Flux Leaving Liner for CaseA Tank02 Bk-249

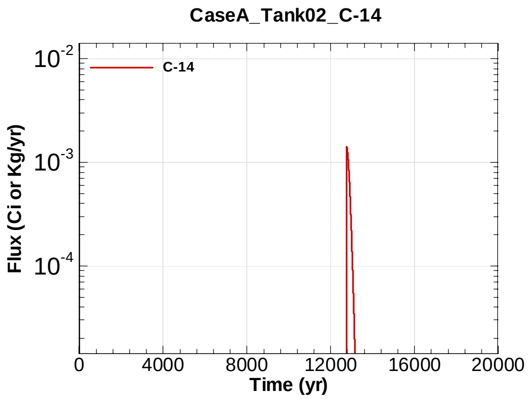

Figure A.1-99 - Flux Leaving Liner for CaseA Tank02 C-14

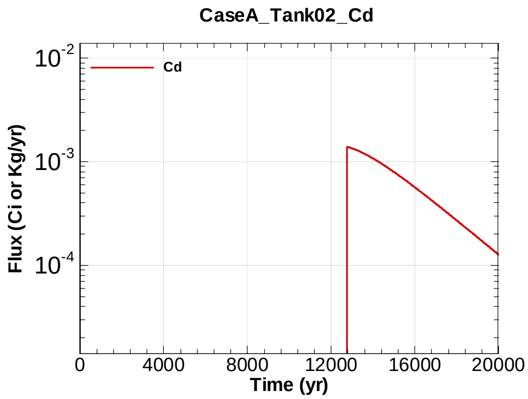

Figure A.1-100 - Flux Leaving Liner for CaseA Tank02 Cd

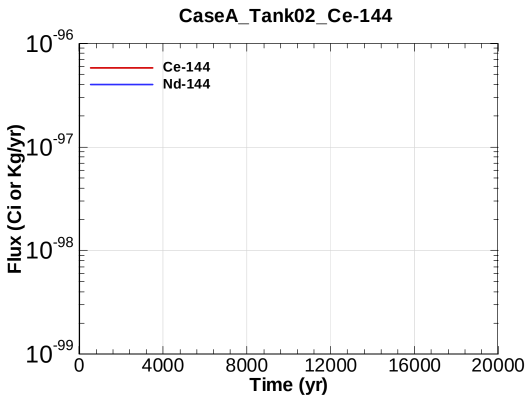

Figure A.1-101 - Flux Leaving Liner for CaseA Tank02 Ce-144

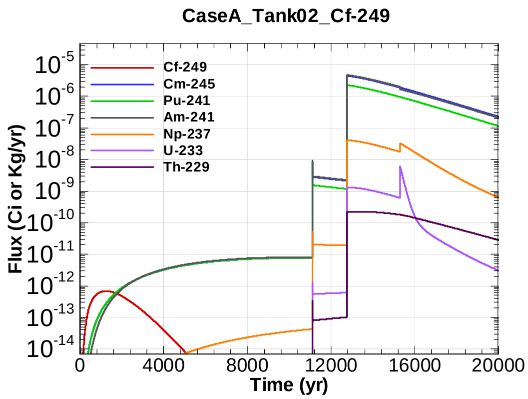

Figure A.1-102 - Flux Leaving Liner for CaseA Tank02 Cf-249

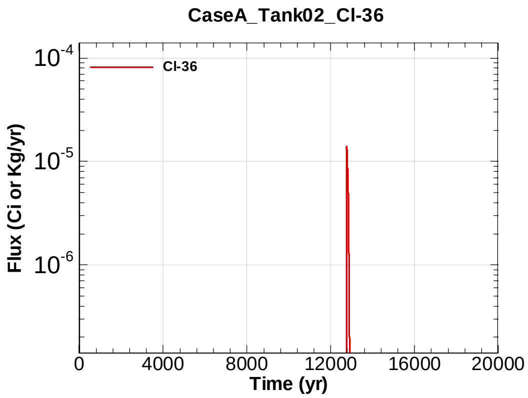

Figure A.1-103 - Flux Leaving Liner for CaseA Tank02 Cl-36

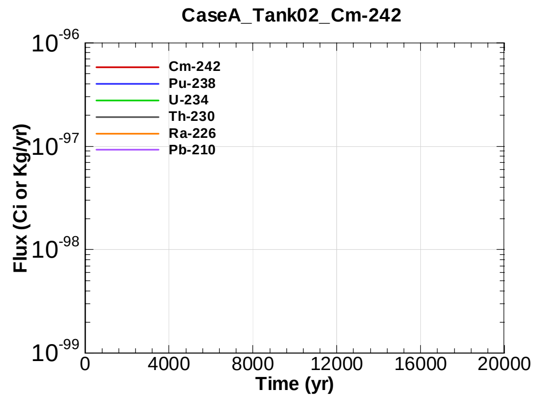

Figure A.1-104 - Flux Leaving Liner for CaseA Tank02 Cm-242

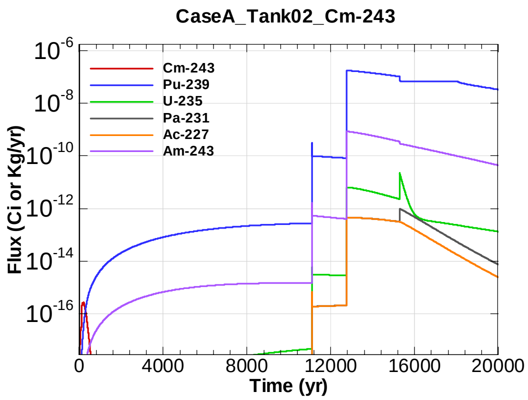

Figure A.1-105 - Flux Leaving Liner for CaseA Tank02 Cm-243

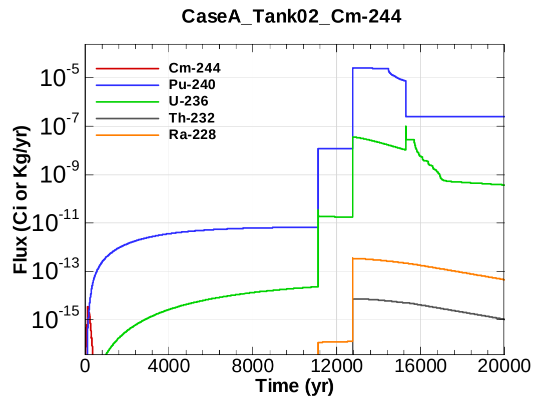

Figure A.1-106 - Flux Leaving Liner for CaseA Tank02 Cm-244

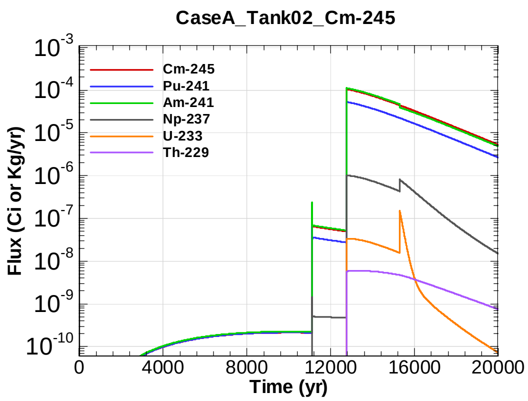

Figure A.1-107 - Flux Leaving Liner for CaseA Tank02 Cm-245

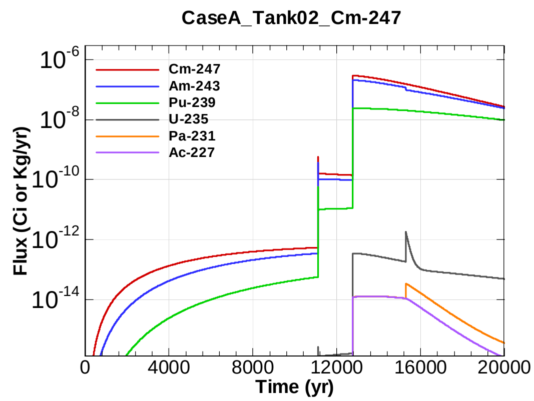

Figure A.1-108 - Flux Leaving Liner for CaseA Tank02 Cm-247

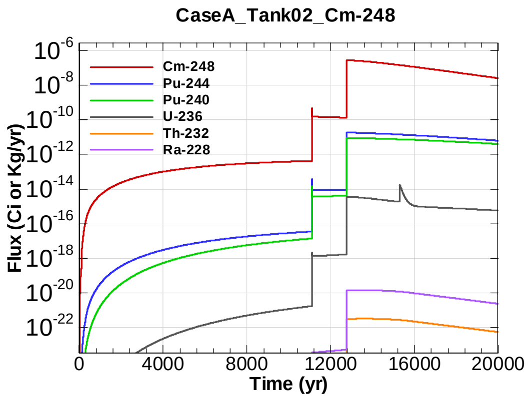

Figure A.1-109 - Flux Leaving Liner for CaseA Tank02 Cm-248

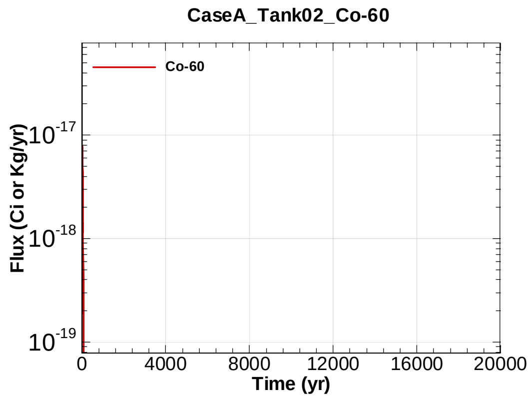

Figure A.1-110 - Flux Leaving Liner for CaseA Tank02 Co-60

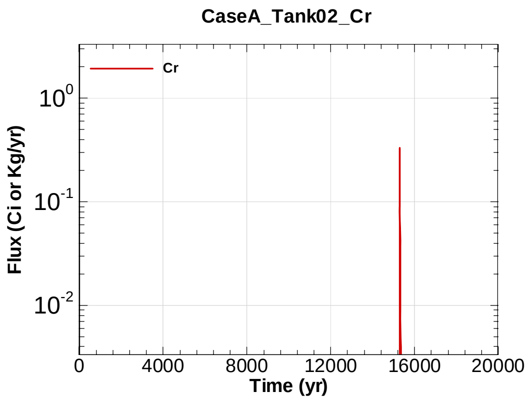

Figure A.1-111 - Flux Leaving Liner for CaseA Tank02 Cr

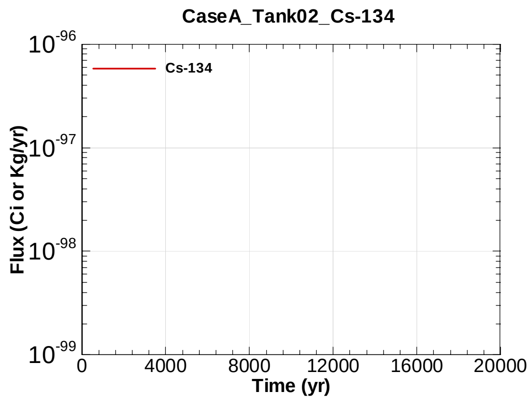

Figure A.1-112 - Flux Leaving Liner for CaseA Tank02 Cs-134

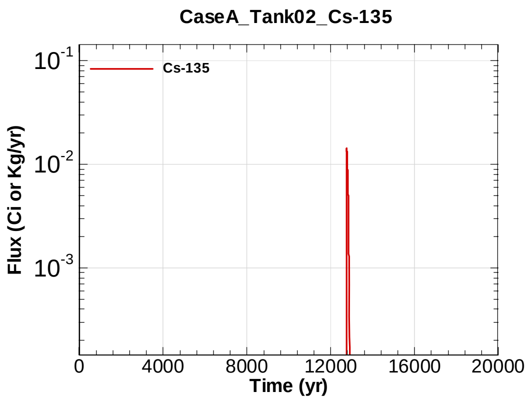

Figure A.1-113 - Flux Leaving Liner for CaseA Tank02 Cs-135

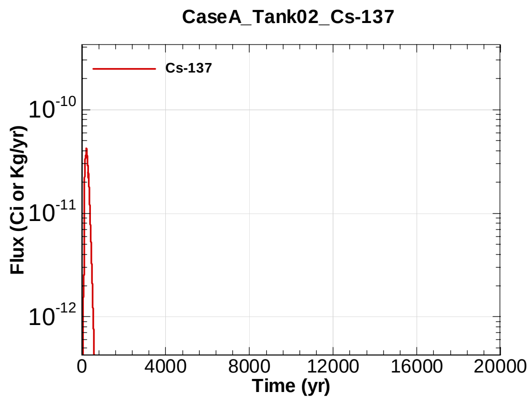

Figure A.1-114 - Flux Leaving Liner for CaseA Tank02 Cs-137

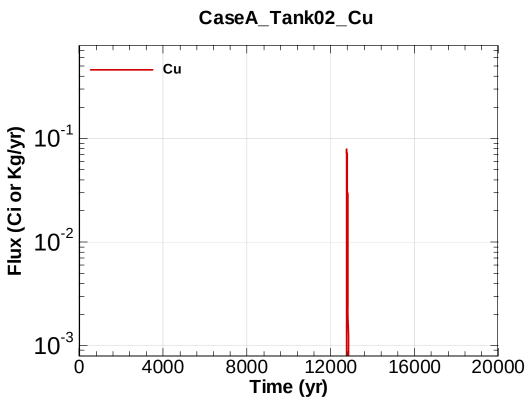

Figure A.1-115 - Flux Leaving Liner for CaseA Tank02 Cu

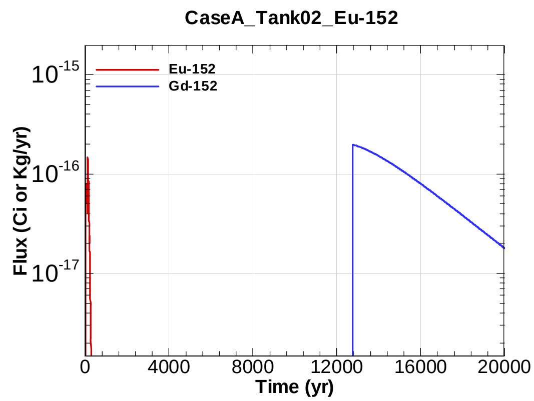

Figure A.1-116 - Flux Leaving Liner for CaseA Tank02 Eu-152

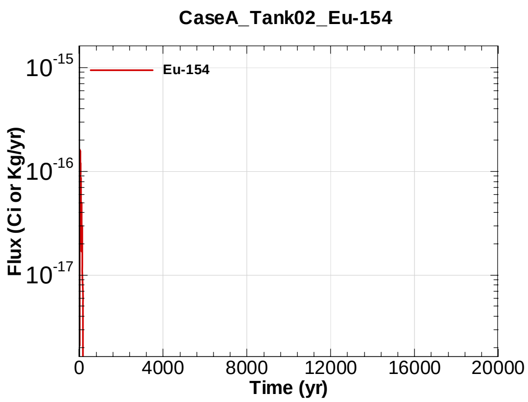

Figure A.1-117 - Flux Leaving Liner for CaseA Tank02 Eu-154

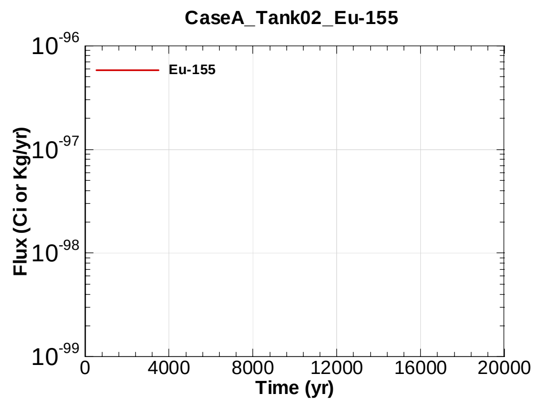

Figure A.1-118 - Flux Leaving Liner for CaseA Tank02 Eu-155

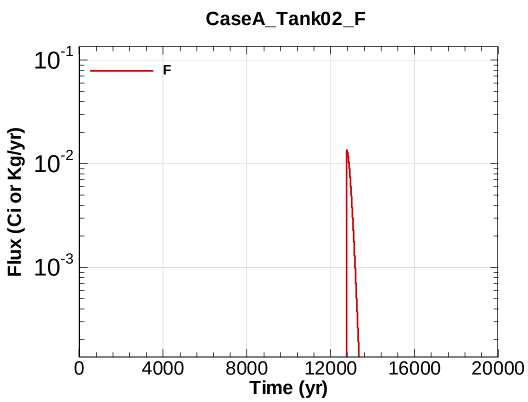

Figure A.1-119 - Flux Leaving Liner for CaseA Tank02 F

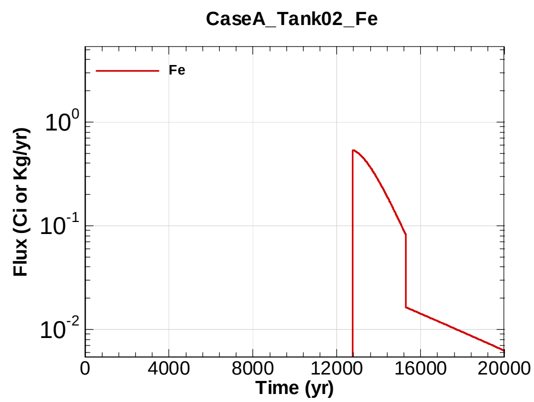

Figure A.1-120 - Flux Leaving Liner for CaseA Tank02 Fe

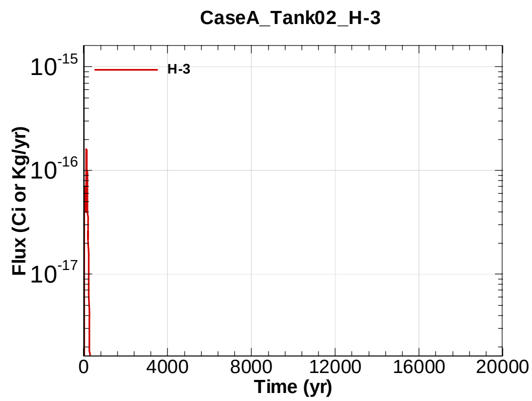

Figure A.1-121 - Flux Leaving Liner for CaseA Tank02 H-3

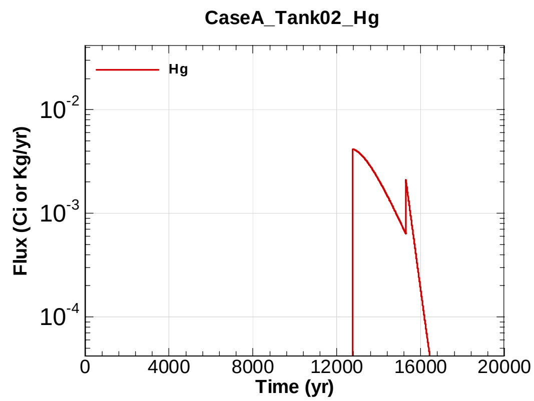

Figure A.1-122 - Flux Leaving Liner for CaseA Tank02 Hg

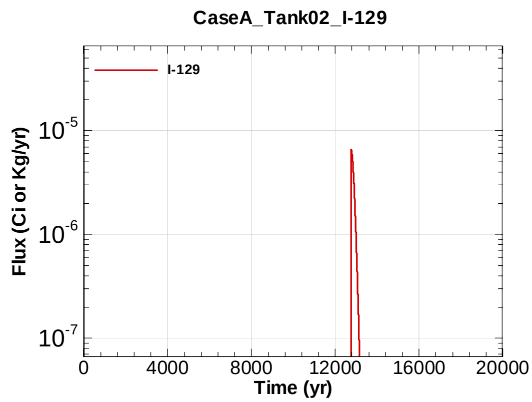

Figure A.1-123 - Flux Leaving Liner for CaseA Tank02 I-129

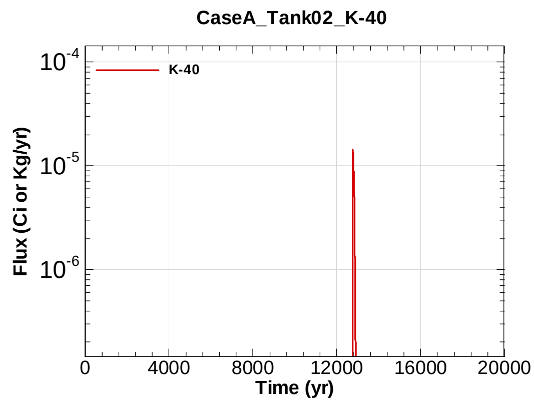

Figure A.1-124 - Flux Leaving Liner for CaseA Tank02 K-40

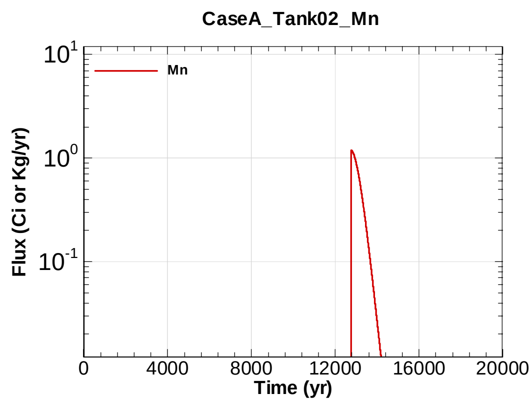

Figure A.1-125 - Flux Leaving Liner for CaseA Tank02 Mn

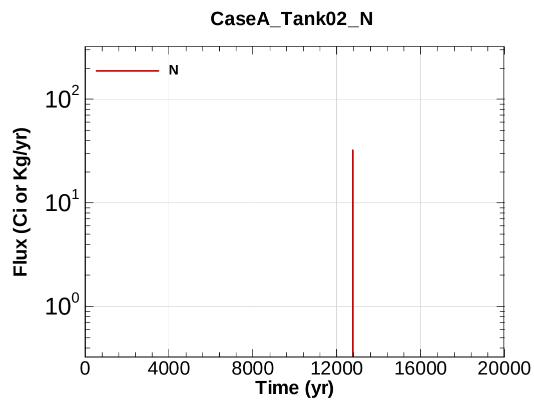

Figure A.1-126 - Flux Leaving Liner for CaseA Tank02 N

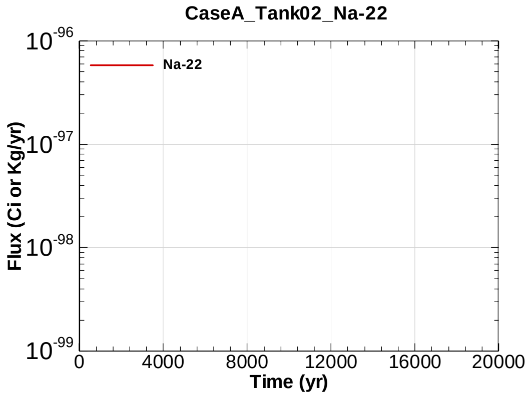

Figure A.1-127 - Flux Leaving Liner for CaseA Tank02 Na-22

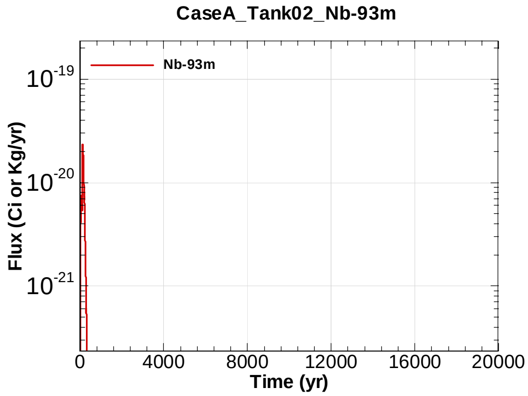

Figure A.1-128 - Flux Leaving Liner for CaseA Tank02 Nb-93m

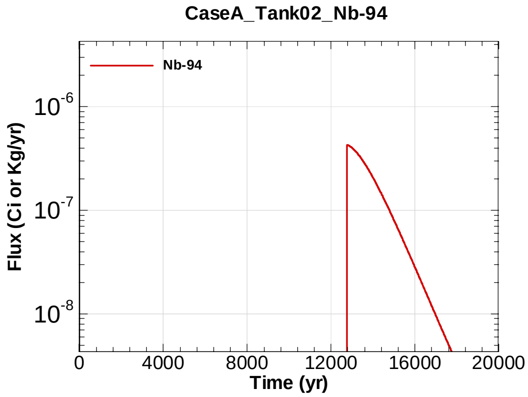

Figure A.1-129 - Flux Leaving Liner for CaseA Tank02 Nb-94

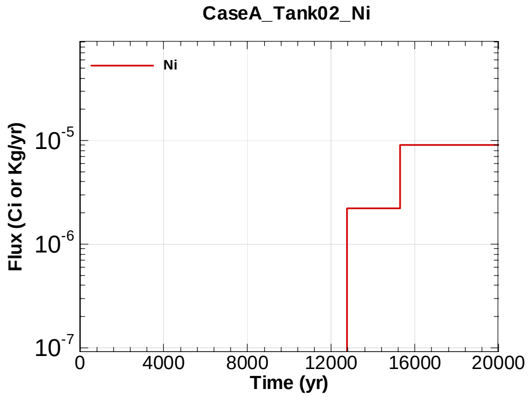

Figure A.1-130 - Flux Leaving Liner for CaseA Tank02 Ni

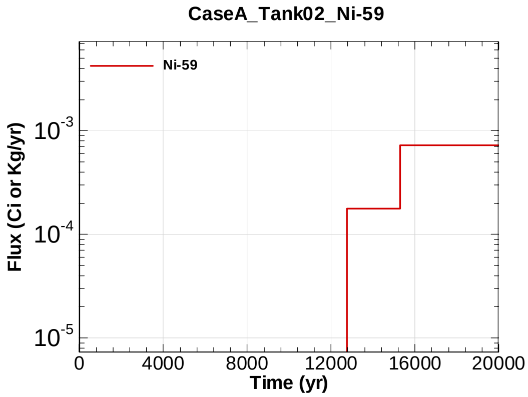

Figure A.1-131 - Flux Leaving Liner for CaseA Tank02 Ni-59

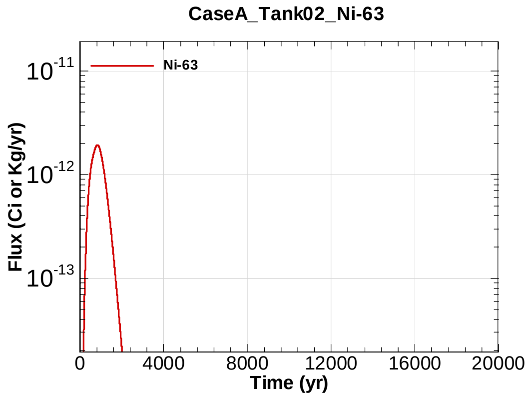

Figure A.1-132 - Flux Leaving Liner for CaseA Tank02 Ni-63

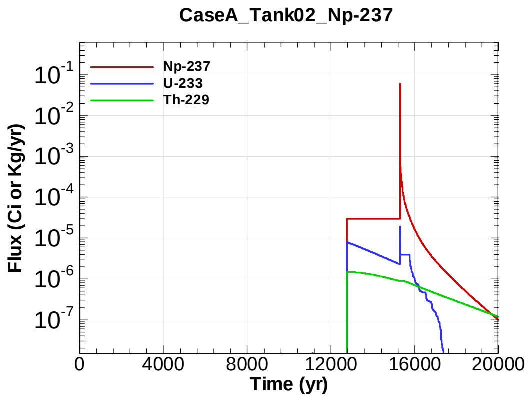

Figure A.1-133 - Flux Leaving Liner for CaseA Tank02 Np-237

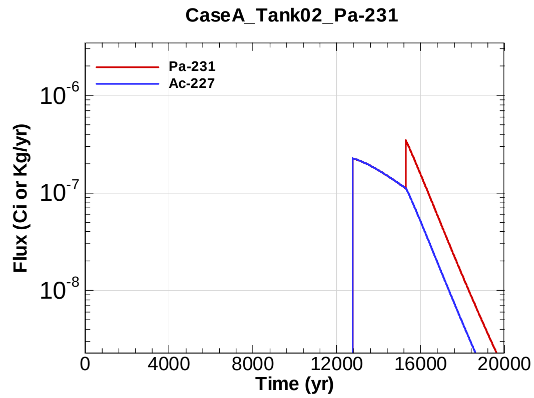

Figure A.1-134 - Flux Leaving Liner for CaseA Tank02 Pa-231

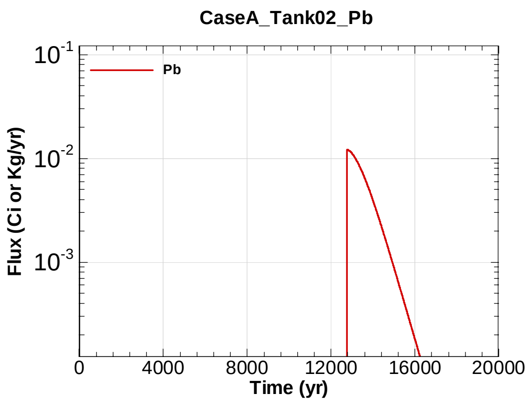

Figure A.1-135 - Flux Leaving Liner for CaseA Tank02 Pb

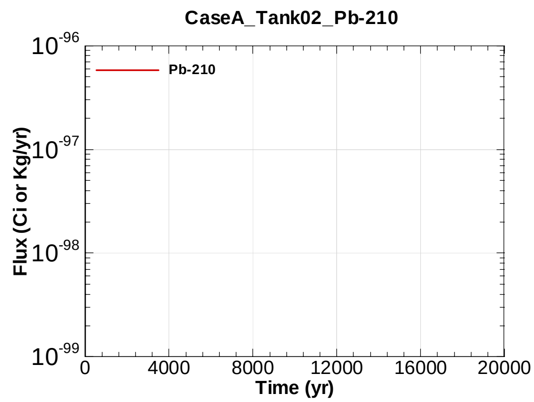

Figure A.1-136 - Flux Leaving Liner for CaseA Tank02 Pb-210

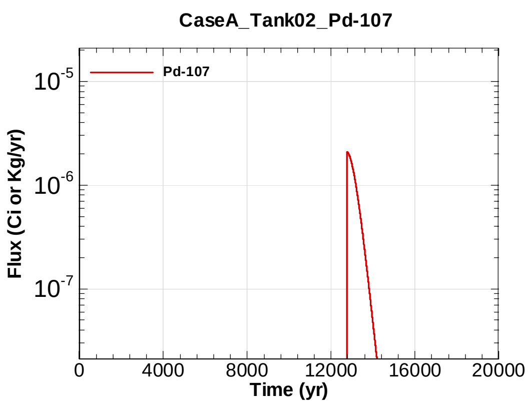

Figure A.1-137 - Flux Leaving Liner for CaseA Tank02 Pd-107

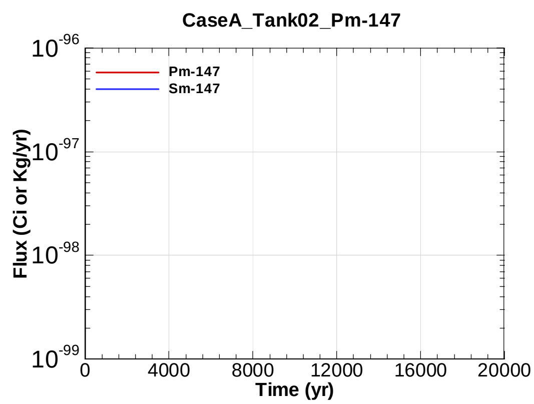

Figure A.1-138 - Flux Leaving Liner for CaseA Tank02 Pm-147

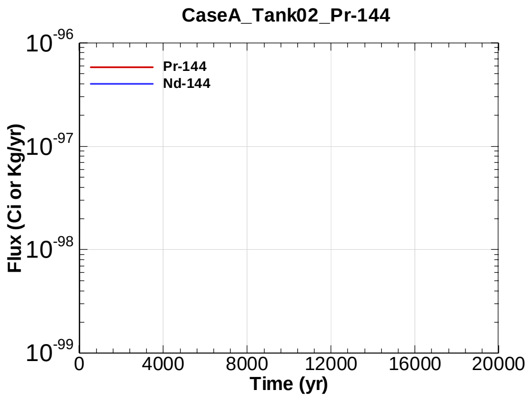

Figure A.1-139 - Flux Leaving Liner for CaseA Tank02 Pr-144

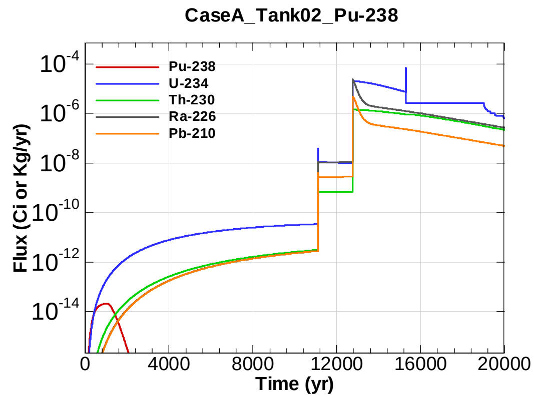

Figure A.1-140 - Flux Leaving Liner for CaseA Tank02 Pu-238

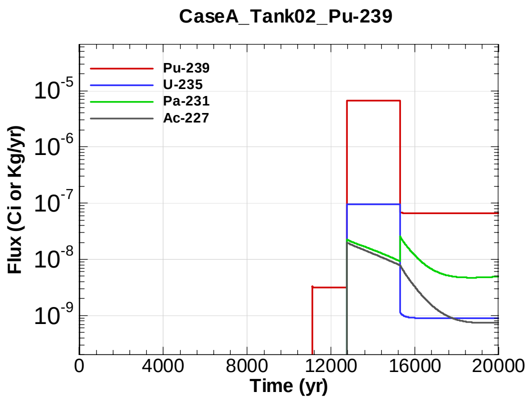

Figure A.1-141 - Flux Leaving Liner for CaseA Tank02 Pu-239

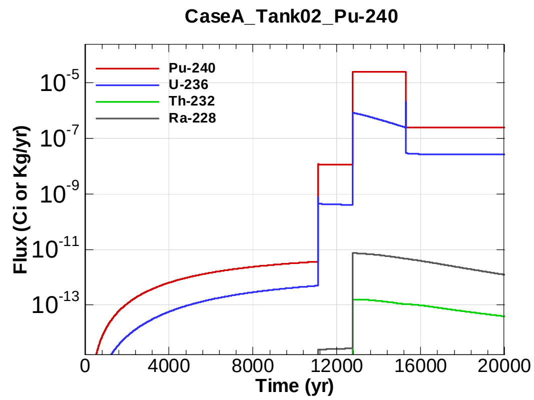

Figure A.1-142 - Flux Leaving Liner for CaseA Tank02 Pu-240

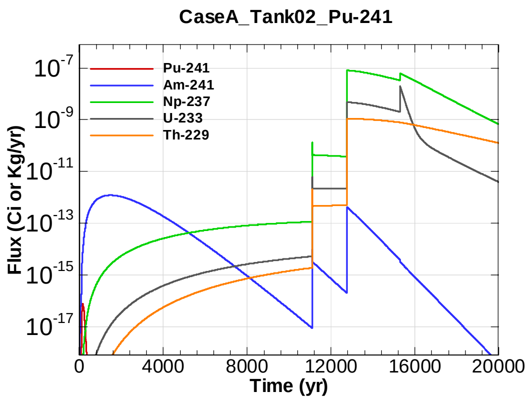

Figure A.1-143 - Flux Leaving Liner for CaseA Tank02 Pu-241

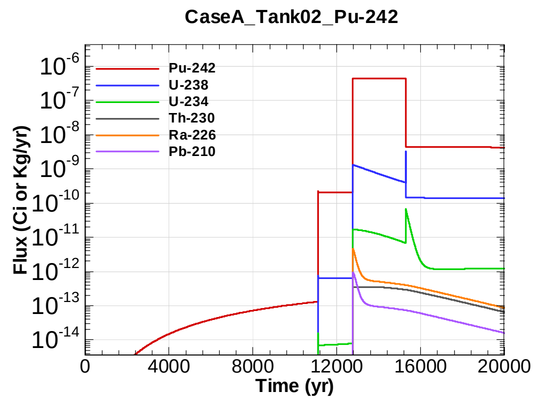

Figure A.1-144 - Flux Leaving Liner for CaseA Tank02 Pu-242

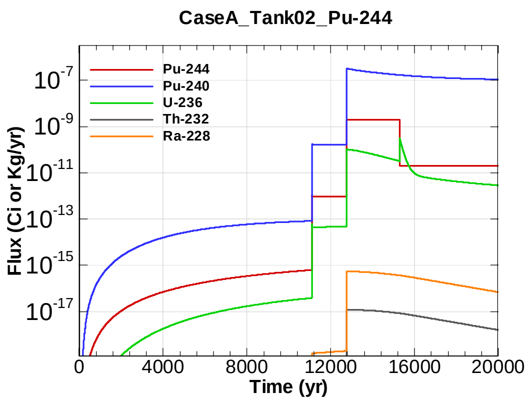

Figure A.1-145 - Flux Leaving Liner for CaseA Tank02 Pu-244

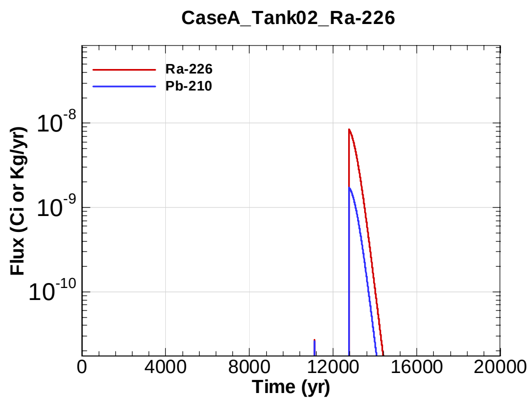

Figure A.1-146 - Flux Leaving Liner for CaseA Tank02 Ra-226

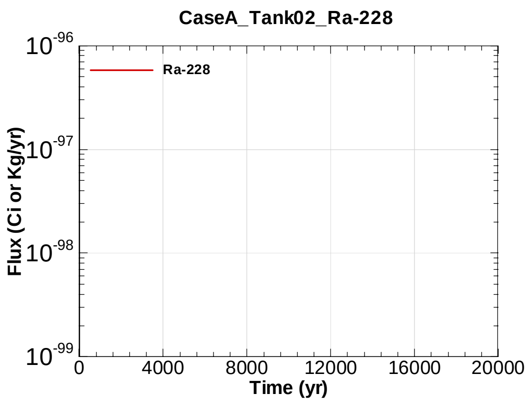

Figure A.1-147 - Flux Leaving Liner for CaseA Tank02 Ra-228

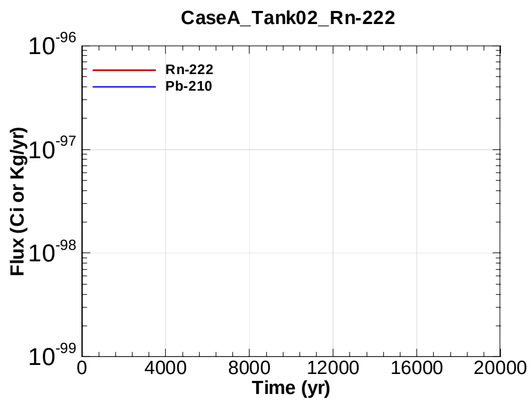

Figure A.1-148 - Flux Leaving Liner for CaseA Tank02 Rn-222

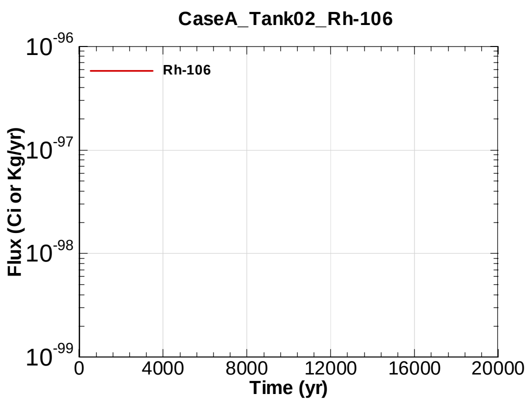

Figure A.1-149 - Flux Leaving Liner for CaseA Tank02 Rh-106

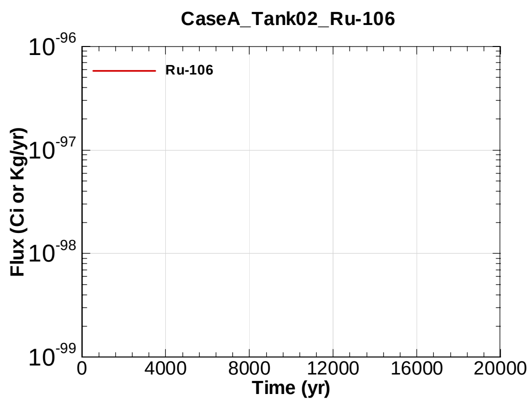

Figure A.1-150 - Flux Leaving Liner for CaseA Tank02 Ru-106

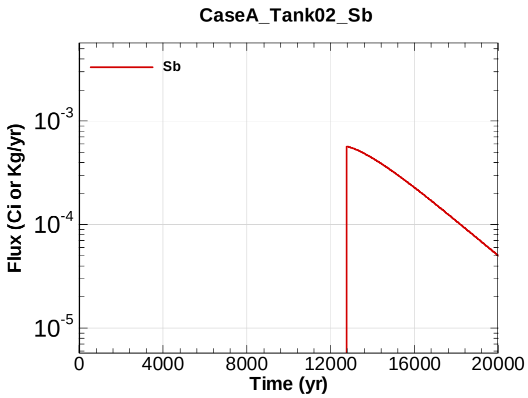

Figure A.1-151 - Flux Leaving Liner for CaseA Tank02 Sb

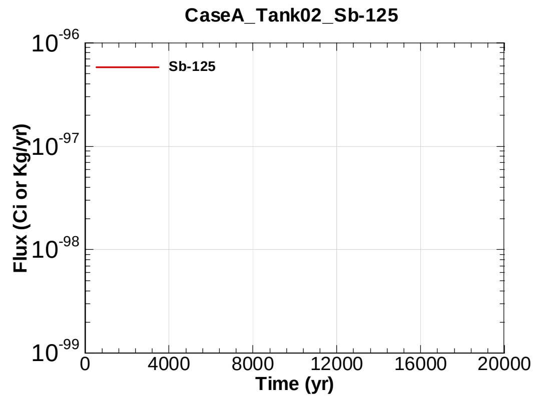

Figure A.1-152 - Flux Leaving Liner for CaseA Tank02 Sb-125

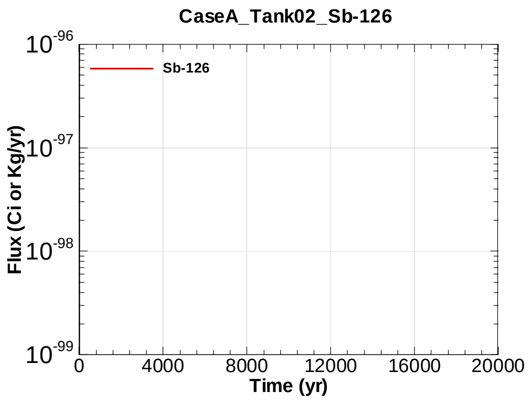

Figure A.1-153 - Flux Leaving Liner for CaseA Tank02 Sb-126

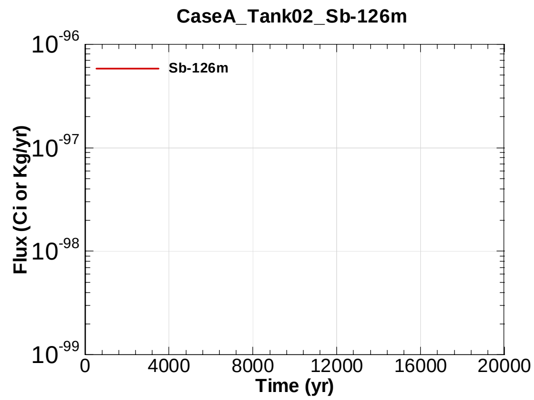

Figure A.1-154 - Flux Leaving Liner for CaseA Tank02 Sb-126m

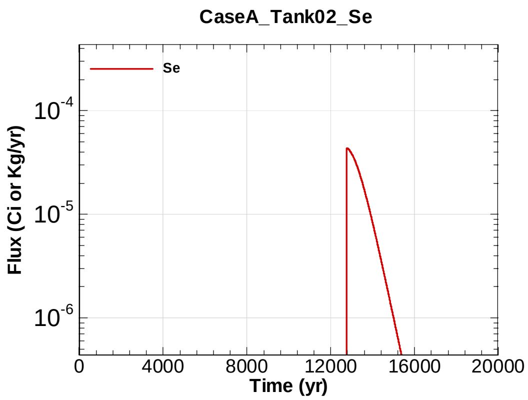

Figure A.1-155 - Flux Leaving Liner for CaseA Tank02 Se

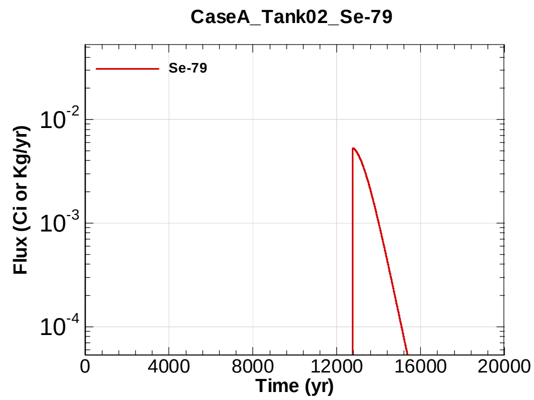

Figure A.1-156 - Flux Leaving Liner for CaseA Tank02 Se-79

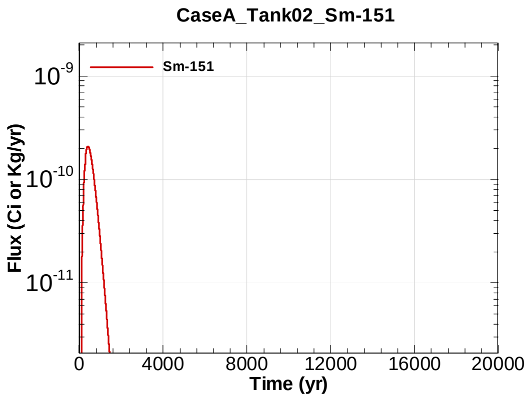

Figure A.1-157 - Flux Leaving Liner for CaseA Tank02 Sm-151

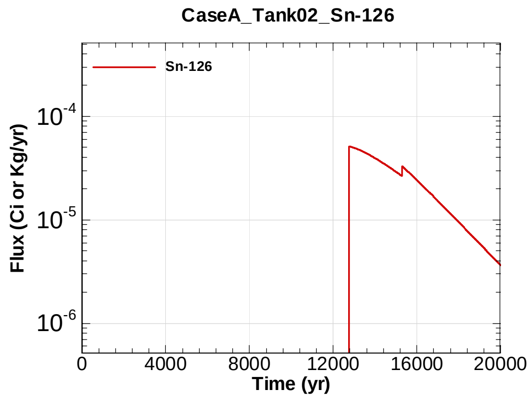

Figure A.1-158 - Flux Leaving Liner for CaseA Tank02 Sn-126

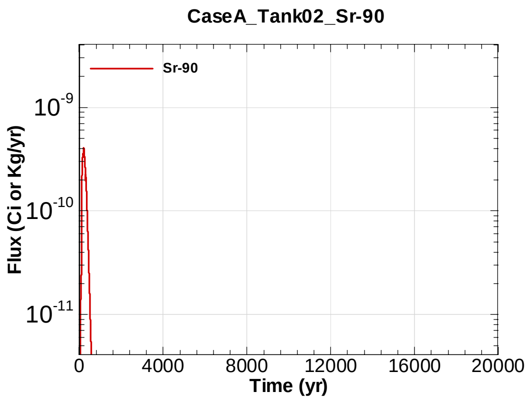

Figure A.1-159 - Flux Leaving Liner for CaseA Tank02 Sr-90

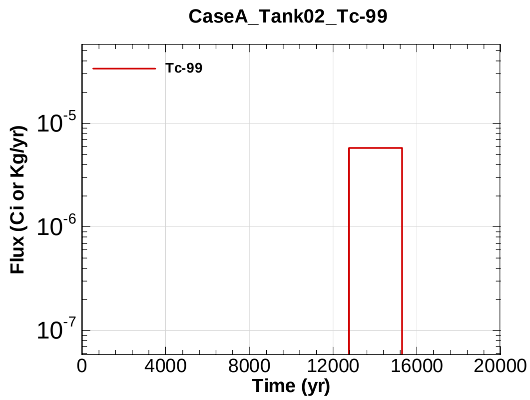

Figure A.1-160 - Flux Leaving Liner for CaseA Tank02 Tc-99

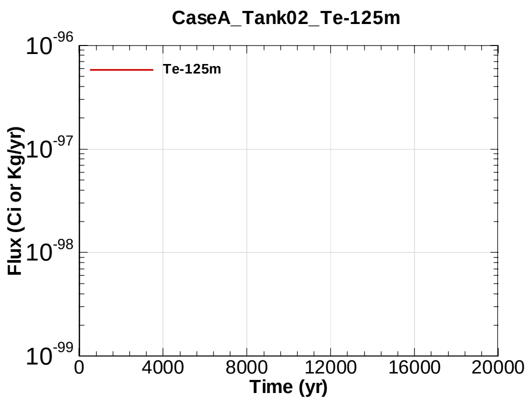

Figure A.1-161 - Flux Leaving Liner for CaseA Tank02 Te-125m

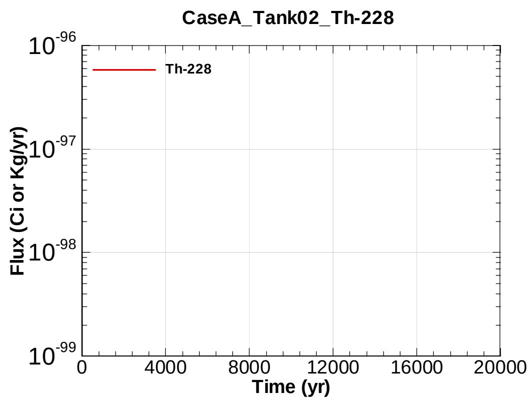

Figure A.1-162 - Flux Leaving Liner for CaseA Tank02 Th-228

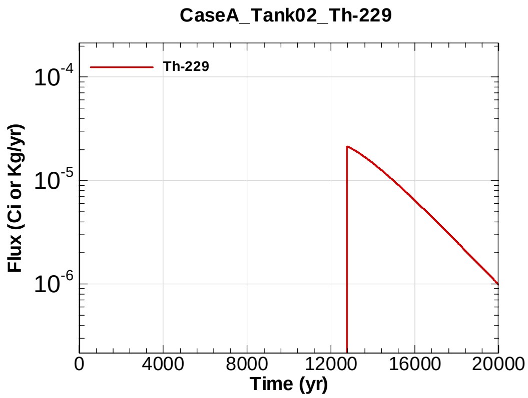

Figure A.1-163 - Flux Leaving Liner for CaseA Tank02 Th-229

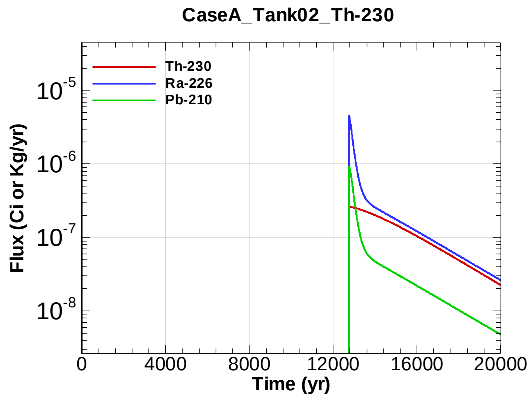

Figure A.1-164 - Flux Leaving Liner for CaseA Tank02 Th-230

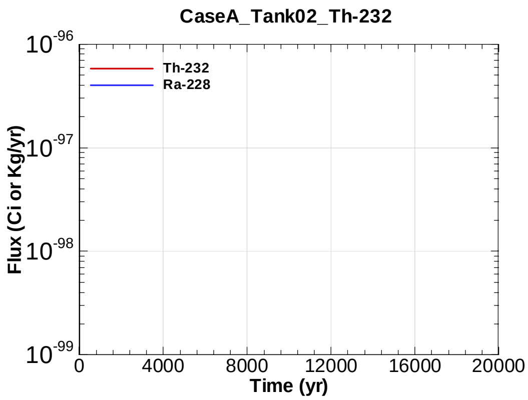

Figure A.1-165 - Flux Leaving Liner for CaseA Tank02 Th-232

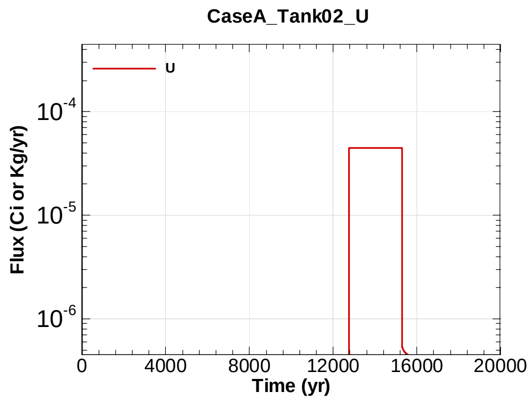

Figure A.1-166 - Flux Leaving Liner for CaseA Tank02 U

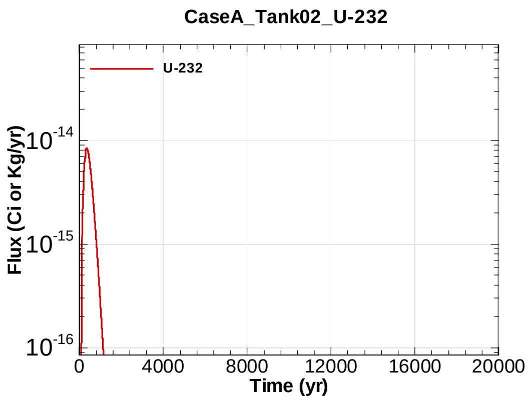

Figure A.1-167 - Flux Leaving Liner for CaseA Tank02 U-232

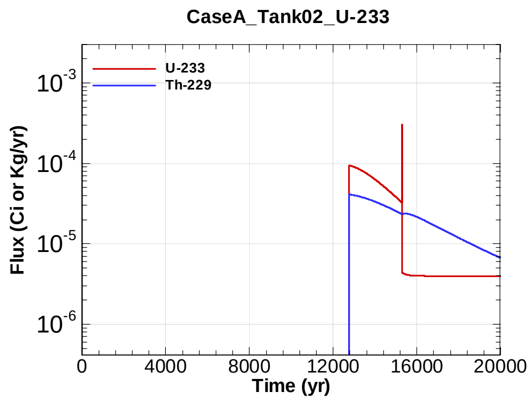

Figure A.1-168 - Flux Leaving Liner for CaseA Tank02 U-233

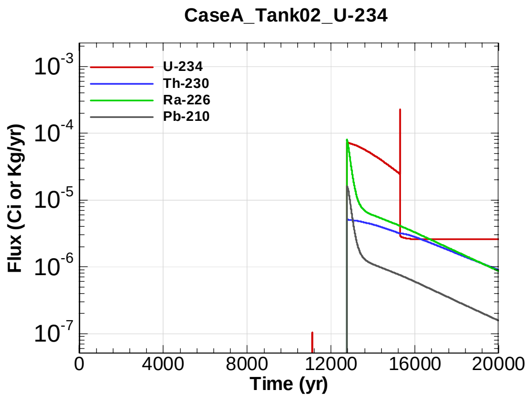

Figure A.1-169 - Flux Leaving Liner for CaseA Tank02 U-234

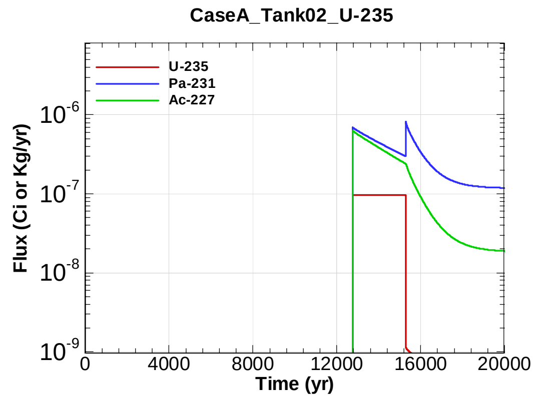

Figure A.1-170 - Flux Leaving Liner for CaseA Tank02 U-235

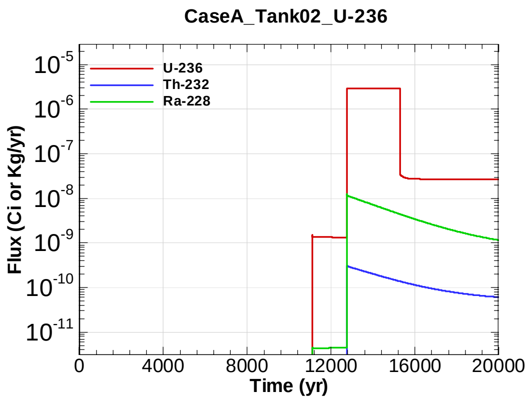

Figure A.1-171 - Flux Leaving Liner for CaseA Tank02 U-236

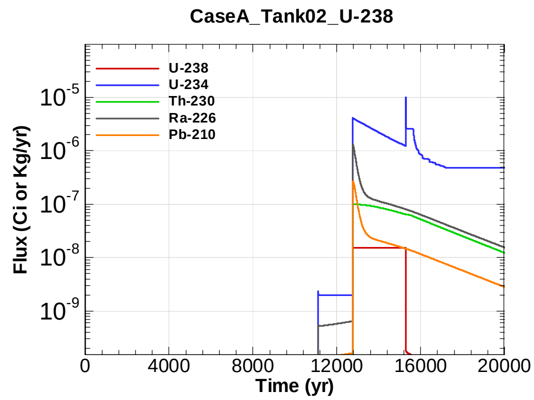

Figure A.1-172 - Flux Leaving Liner for CaseA Tank02 U-238

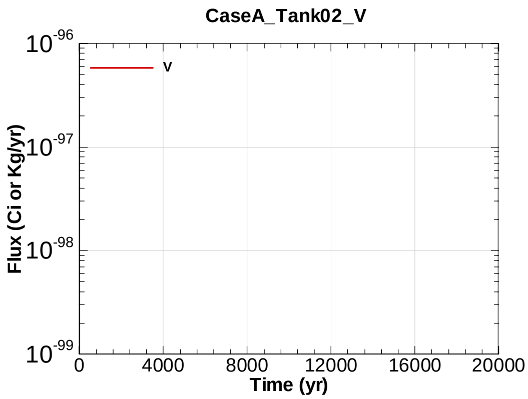

Figure A.1-173 - Flux Leaving Liner for CaseA Tank02 V

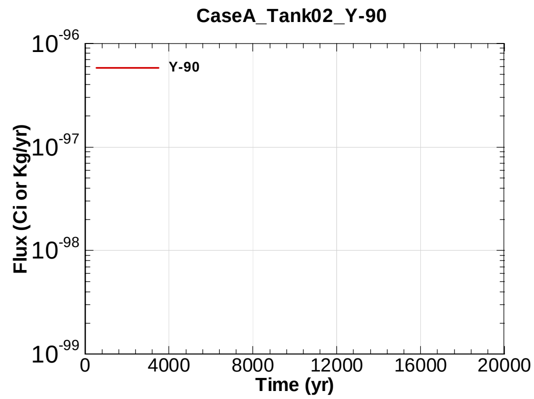

Figure A.1-174 - Flux Leaving Liner for CaseA Tank02 Y-90

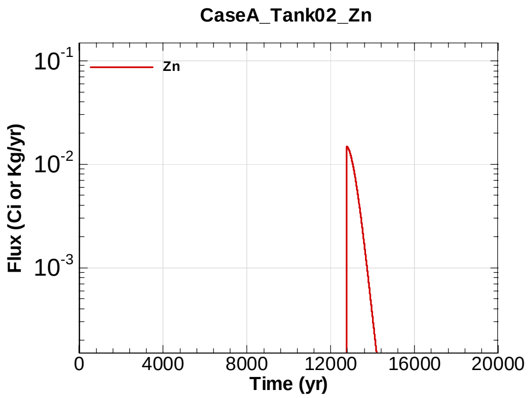

Figure A.1-175 - Flux Leaving Liner for CaseA Tank02 Zn

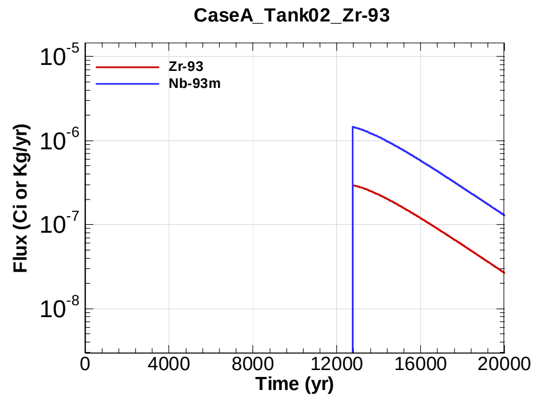

Figure A.1-176 - Flux Leaving Liner for CaseA Tank02 Zr-93

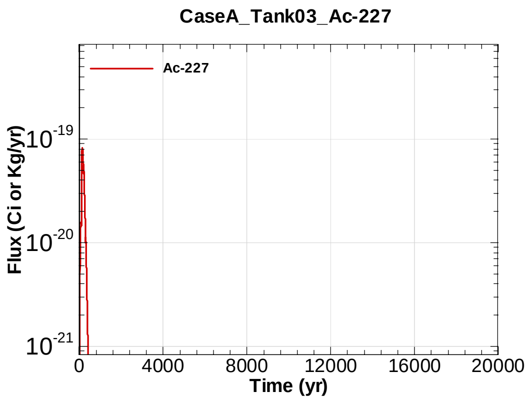

Figure A.1-177 - Flux Leaving Liner for CaseA Tank03 Ac-227

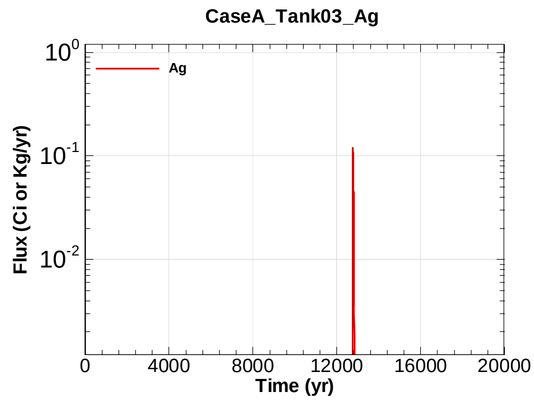

Figure A.1-178 - Flux Leaving Liner for CaseA Tank03 Ag

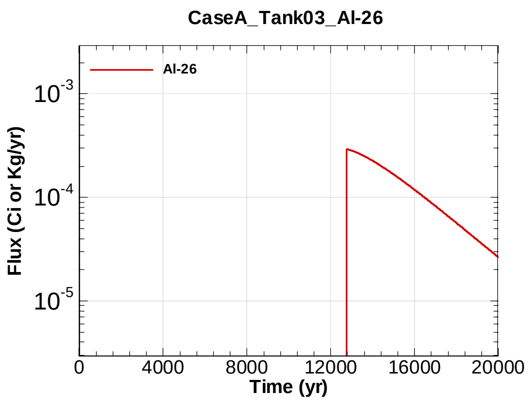

Figure A.1-179 - Flux Leaving Liner for CaseA Tank03 Al-26

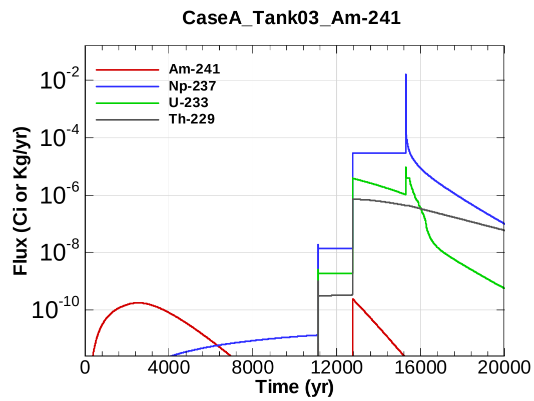

Figure A.1-180 - Flux Leaving Liner for CaseA Tank03 Am-241

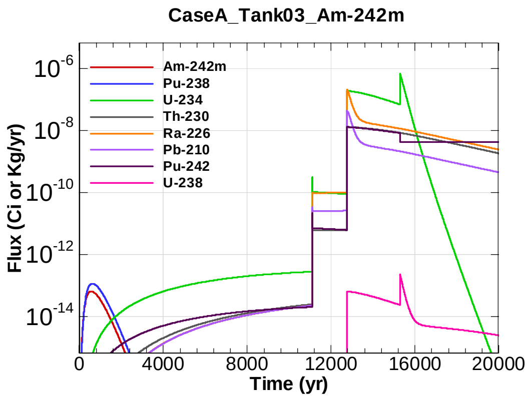

Figure A.1-181 - Flux Leaving Liner for CaseA Tank03 Am-242m

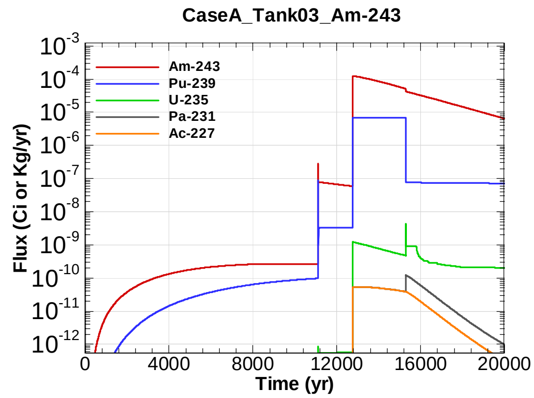

Figure A.1-182 - Flux Leaving Liner for CaseA Tank03 Am-243

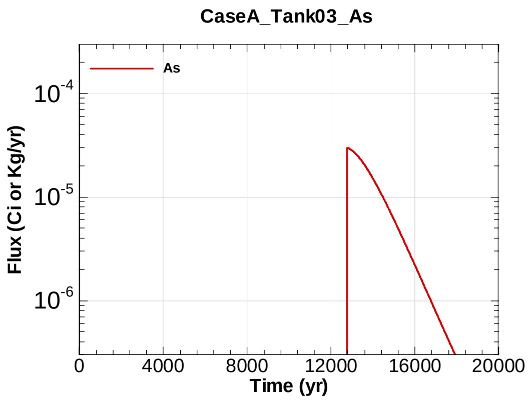

Figure A.1-183 - Flux Leaving Liner for CaseA Tank03 As

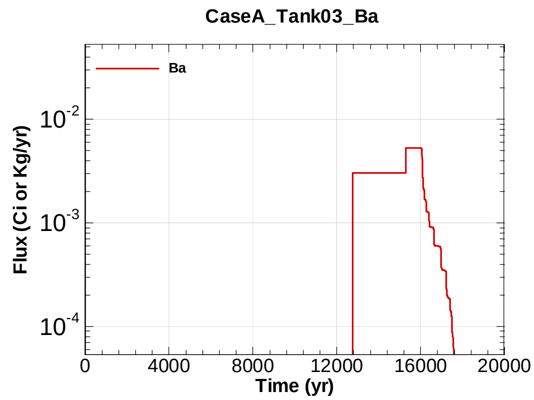

Figure A.1-184 - Flux Leaving Liner for CaseA Tank03 Ba

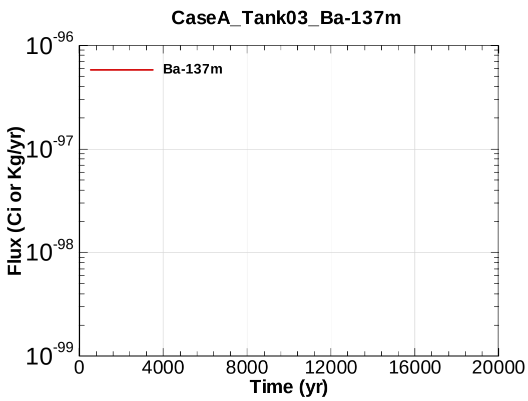

Figure A.1-185 - Flux Leaving Liner for CaseA Tank03 Ba-137m

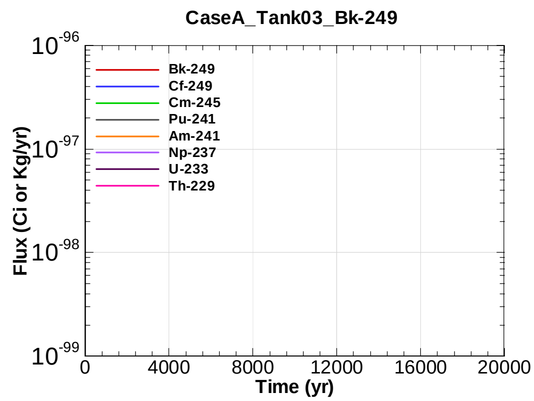

Figure A.1-186 - Flux Leaving Liner for CaseA Tank03 Bk-249

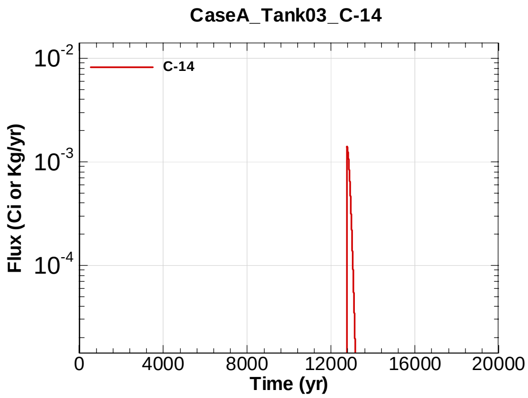

Figure A.1-187 - Flux Leaving Liner for CaseA Tank03 C-14

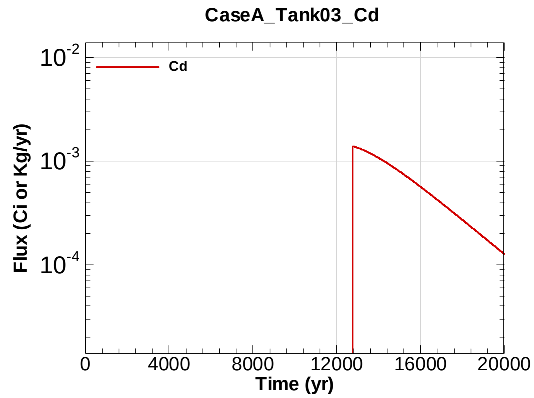

Figure A.1-188 - Flux Leaving Liner for CaseA Tank03 Cd

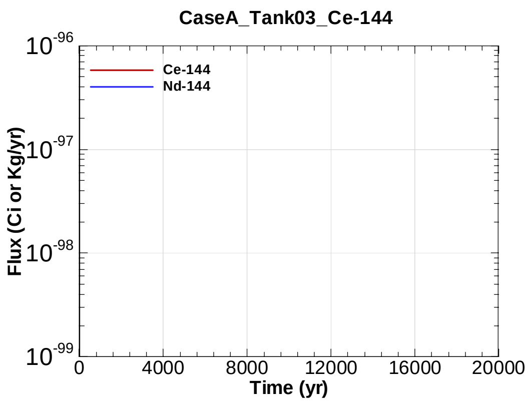

Figure A.1-189 - Flux Leaving Liner for CaseA Tank03 Ce-144

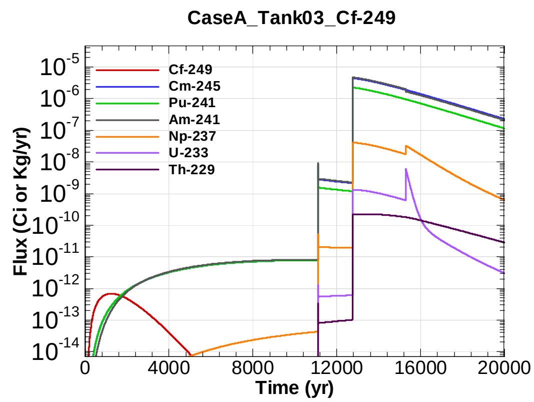

Figure A.1-190 - Flux Leaving Liner for CaseA Tank03 Cf-249

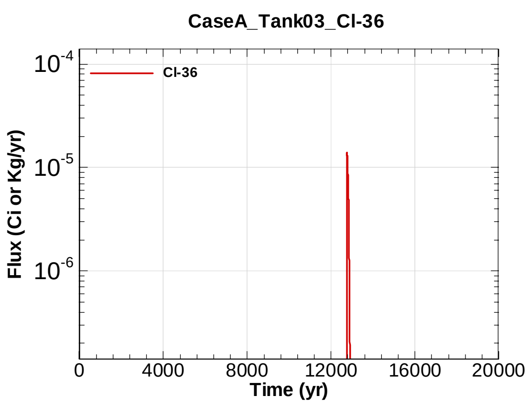

Figure A.1-191 - Flux Leaving Liner for CaseA Tank03 Cl-36

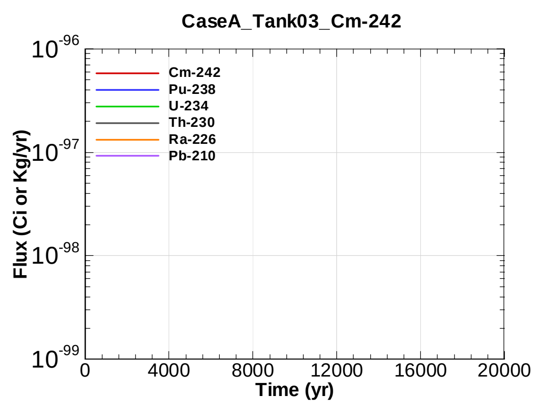

Figure A.1-192 - Flux Leaving Liner for CaseA Tank03 Cm-242

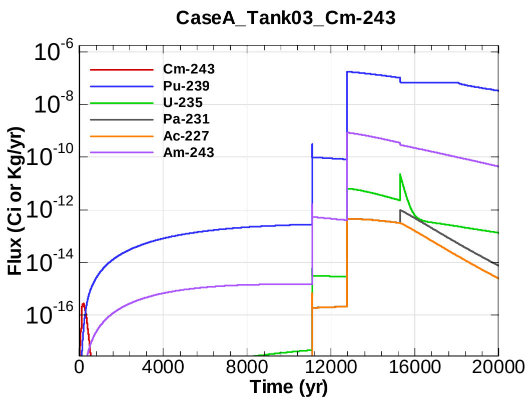

Figure A.1-193 - Flux Leaving Liner for CaseA Tank03 Cm-243

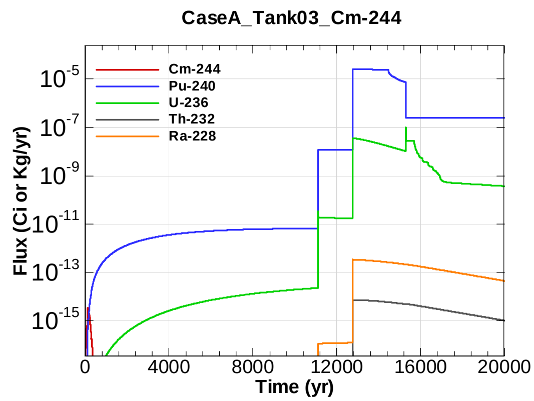

Figure A.1-194 - Flux Leaving Liner for CaseA Tank03 Cm-244

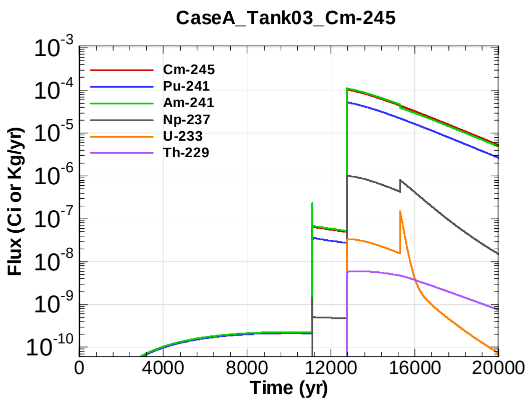

Figure A.1-195 - Flux Leaving Liner for CaseA Tank03 Cm-245

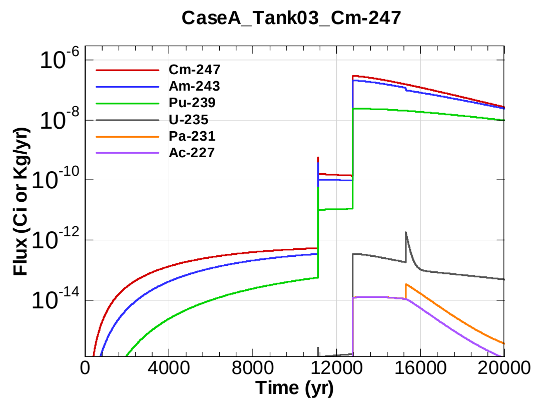

Figure A.1-196 - Flux Leaving Liner for CaseA Tank03 Cm-247

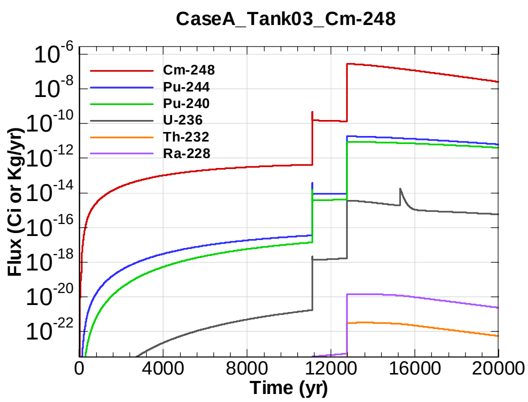

Figure A.1-197 - Flux Leaving Liner for CaseA Tank03 Cm-248

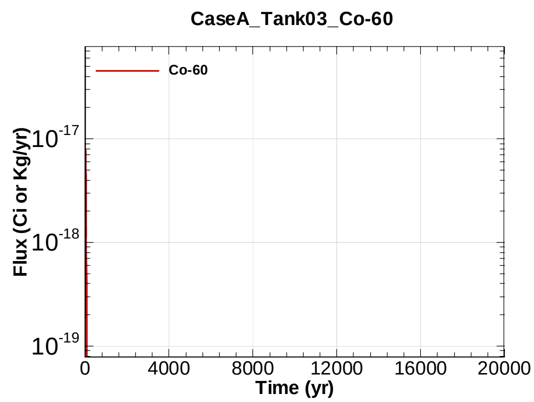

Figure A.1-198 - Flux Leaving Liner for CaseA Tank03 Co-60

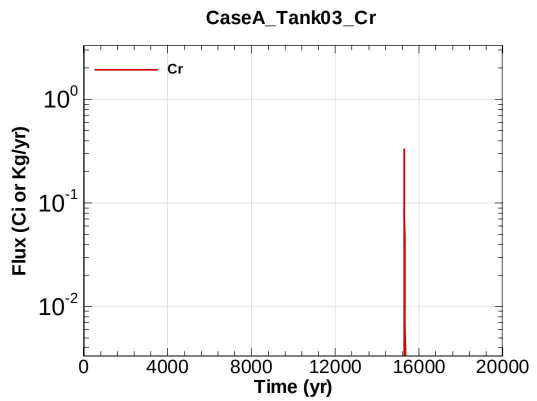

Figure A.1-199 - Flux Leaving Liner for CaseA Tank03 Cr

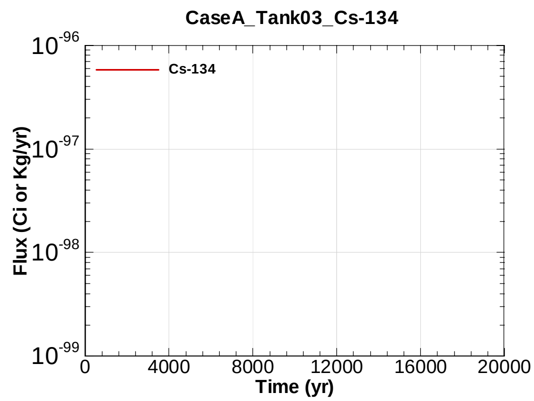

Figure A.1-200 - Flux Leaving Liner for CaseA Tank03 Cs-134

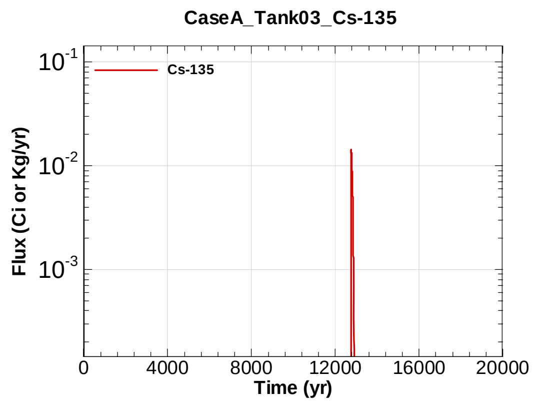

Figure A.1-201 - Flux Leaving Liner for CaseA Tank03 Cs-135

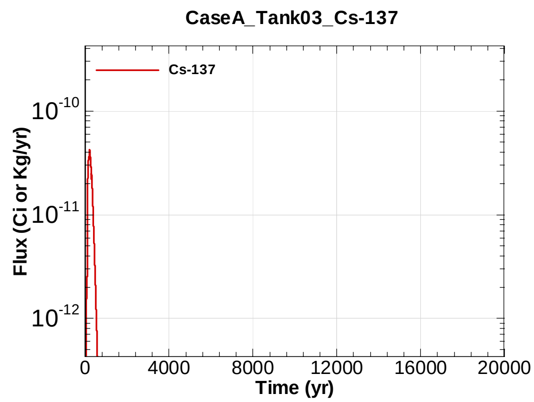

Figure A.1-202 - Flux Leaving Liner for CaseA Tank03 Cs-137

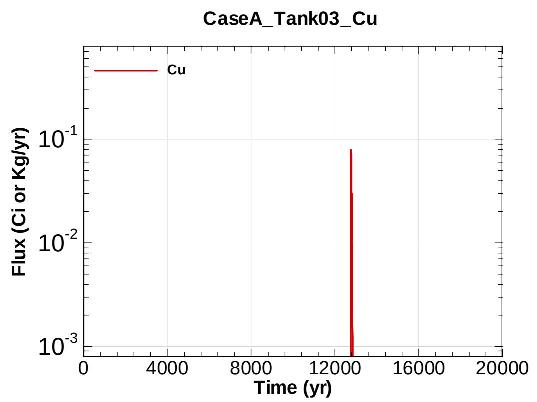

Figure A.1-203 - Flux Leaving Liner for CaseA Tank03 Cu

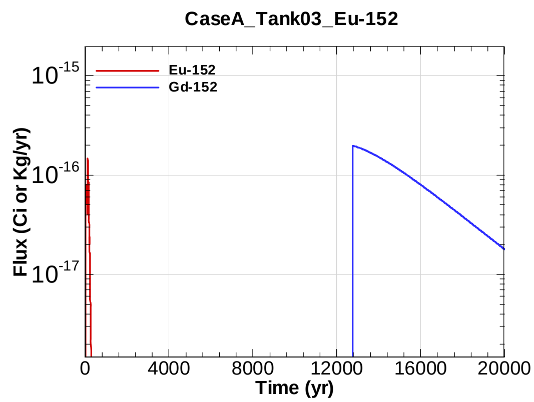

Figure A.1-204 - Flux Leaving Liner for CaseA Tank03 Eu-152

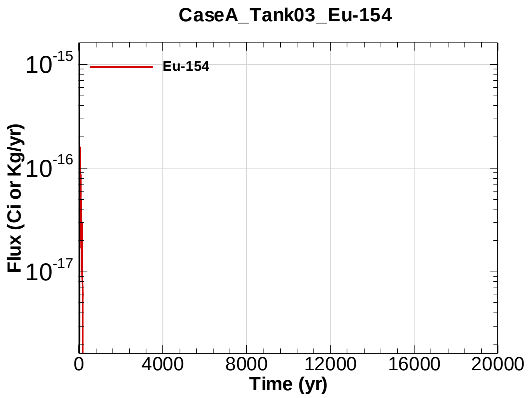

Figure A.1-205 - Flux Leaving Liner for CaseA Tank03 Eu-154

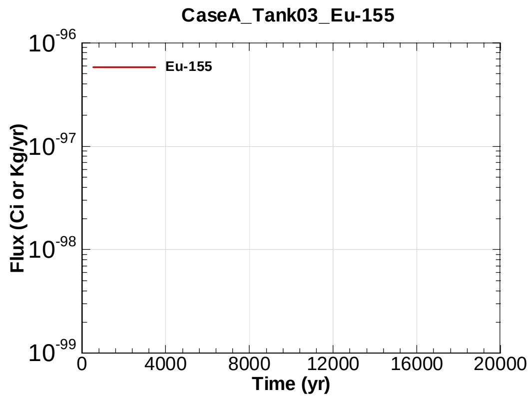

Figure A.1-206 - Flux Leaving Liner for CaseA Tank03 Eu-155

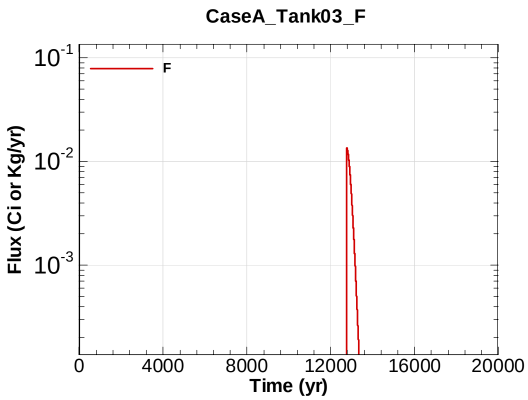

Figure A.1-207 - Flux Leaving Liner for CaseA Tank03 F

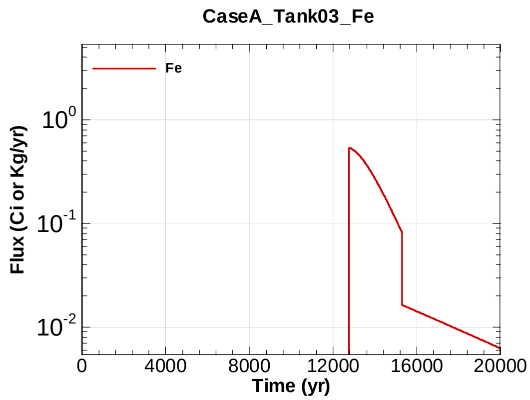

Figure A.1-208 - Flux Leaving Liner for CaseA Tank03 Fe

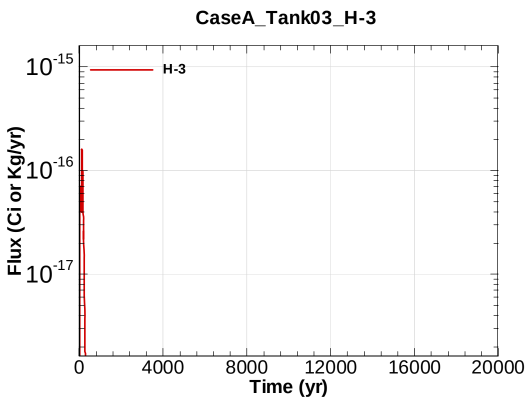

Figure A.1-209 - Flux Leaving Liner for CaseA Tank03 H-3

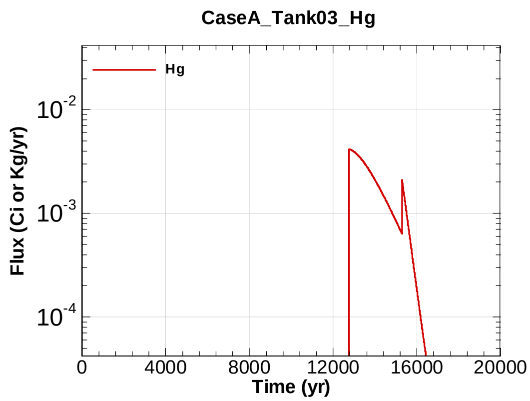

Figure A.1-210 - Flux Leaving Liner for CaseA Tank03 Hg

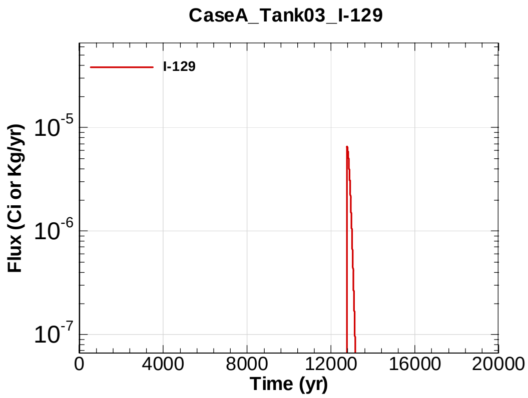

Figure A.1-211 - Flux Leaving Liner for CaseA Tank03 I-129

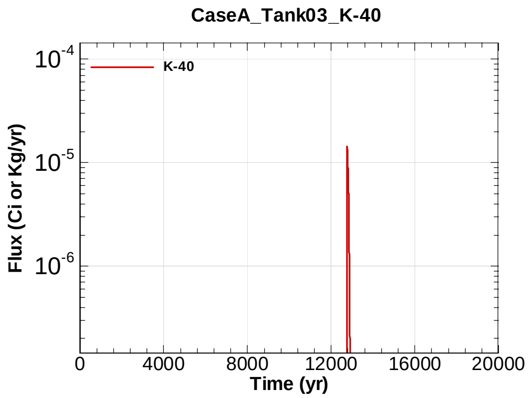

Figure A.1-212 - Flux Leaving Liner for CaseA Tank03 K-40

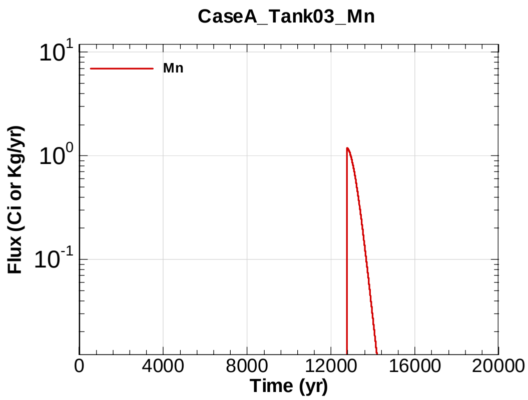

Figure A.1-213 - Flux Leaving Liner for CaseA Tank03 Mn

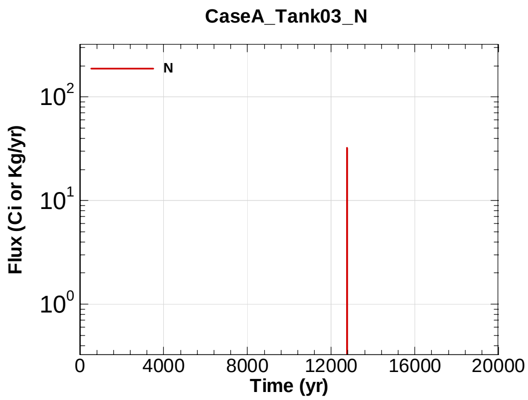

Figure A.1-214 - Flux Leaving Liner for CaseA Tank03 N

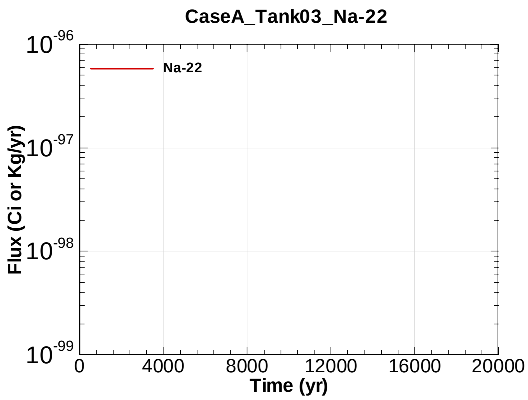

Figure A.1-215 - Flux Leaving Liner for CaseA Tank03 Na-22

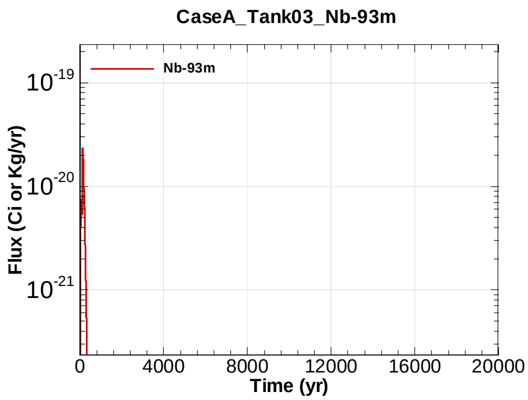

Figure A.1-216 - Flux Leaving Liner for CaseA Tank03 Nb-93m

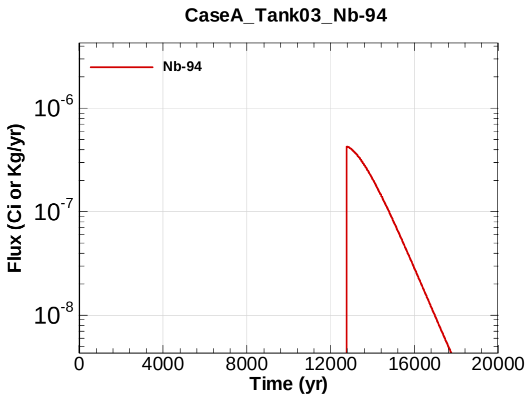

Figure A.1-217 - Flux Leaving Liner for CaseA Tank03 Nb-94

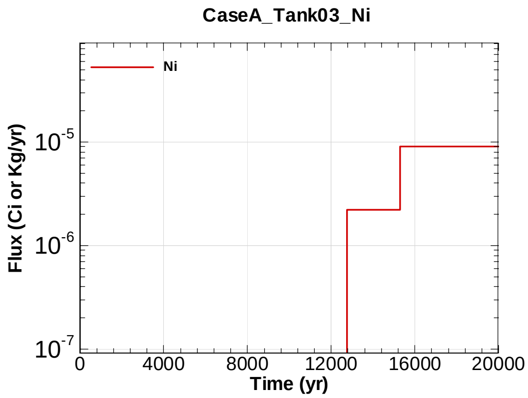

Figure A.1-218 - Flux Leaving Liner for CaseA Tank03 Ni

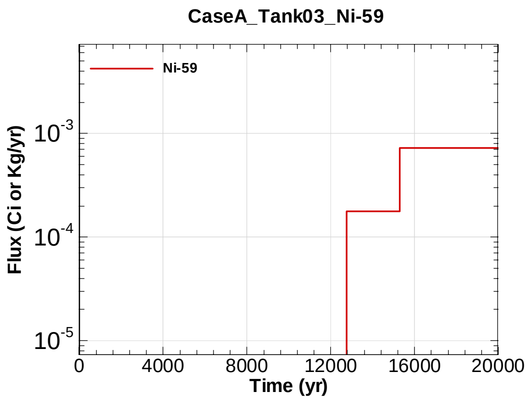

Figure A.1-219 - Flux Leaving Liner for CaseA Tank03 Ni-59

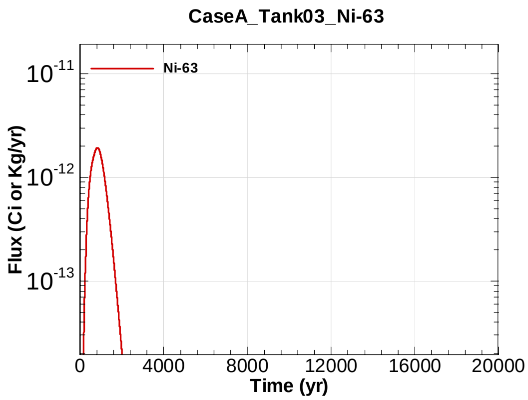

Figure A.1-220 - Flux Leaving Liner for CaseA Tank03 Ni-63

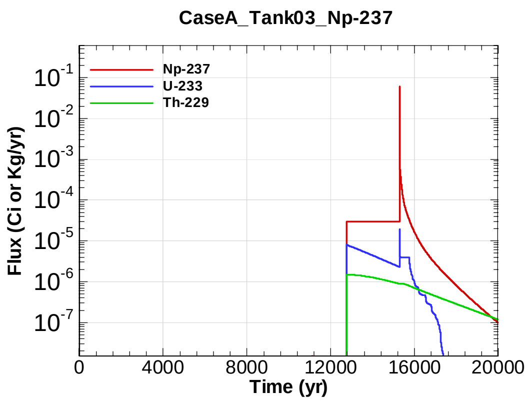

Figure A.1-221 - Flux Leaving Liner for CaseA Tank03 Np-237

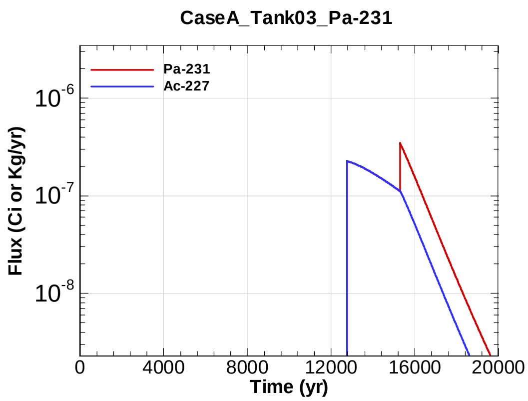

Figure A.1-222 - Flux Leaving Liner for CaseA Tank03 Pa-231

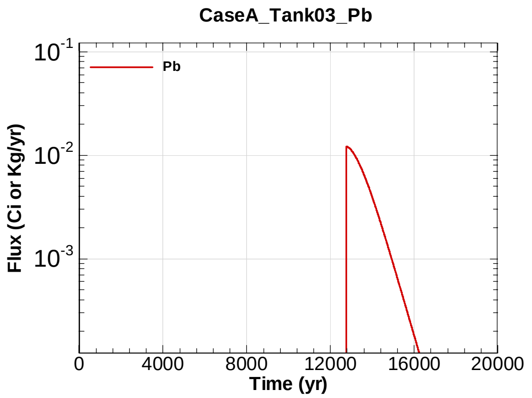

Figure A.1-223 - Flux Leaving Liner for CaseA Tank03 Pb

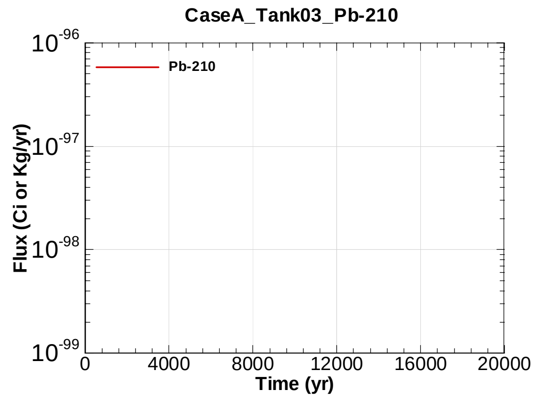

Figure A.1-224 - Flux Leaving Liner for CaseA Tank03 Pb-210

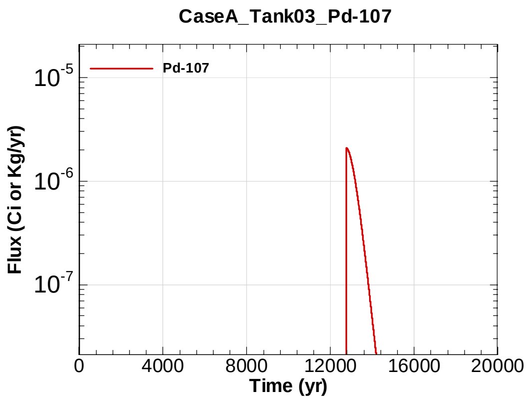

Figure A.1-225 - Flux Leaving Liner for CaseA Tank03 Pd-107

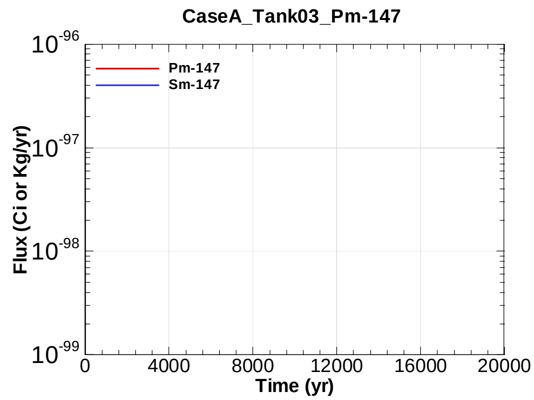

Figure A.1-226 - Flux Leaving Liner for CaseA Tank03 Pm-147

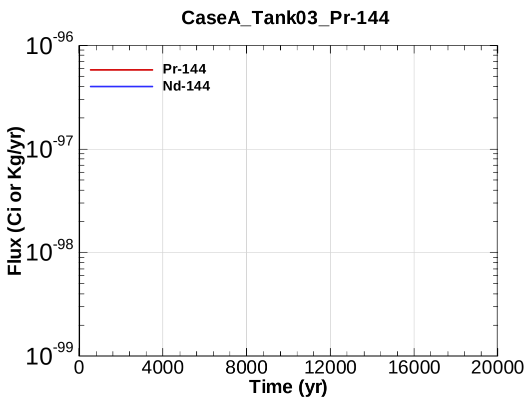

Figure A.1-227 - Flux Leaving Liner for CaseA Tank03 Pr-144

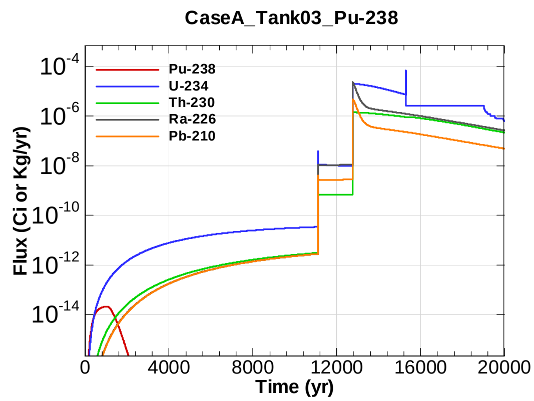

Figure A.1-228 - Flux Leaving Liner for CaseA Tank03 Pu-238

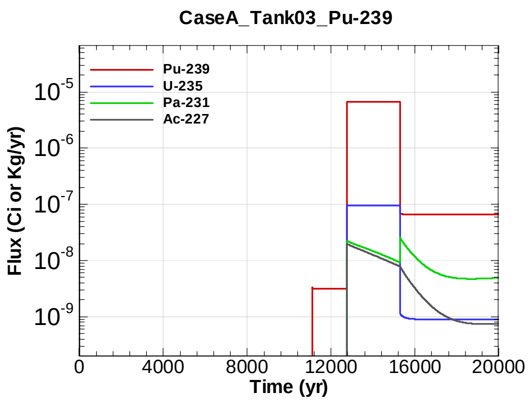

Figure A.1-229 - Flux Leaving Liner for CaseA Tank03 Pu-239

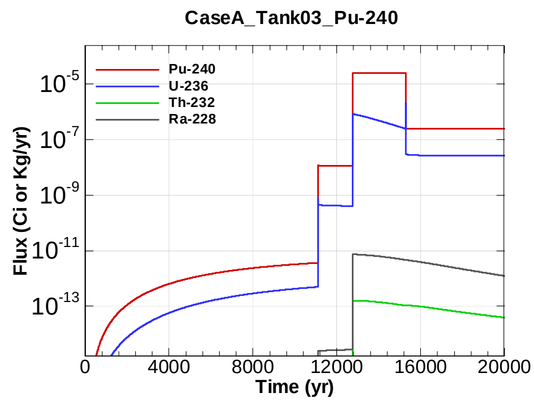

Figure A.1-230 - Flux Leaving Liner for CaseA Tank03 Pu-240

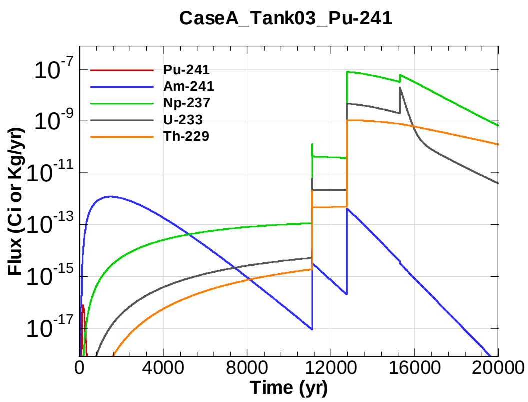

Figure A.1-231 - Flux Leaving Liner for CaseA Tank03 Pu-241

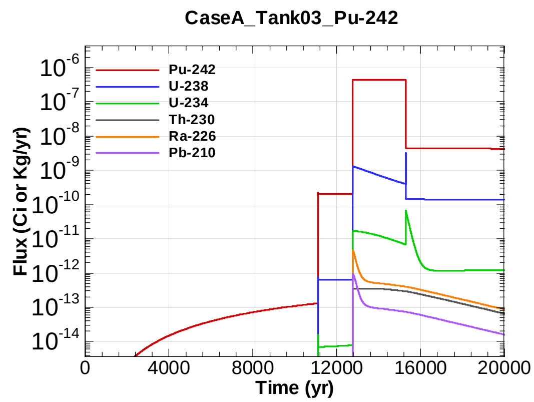

Figure A.1-232 - Flux Leaving Liner for CaseA Tank03 Pu-242

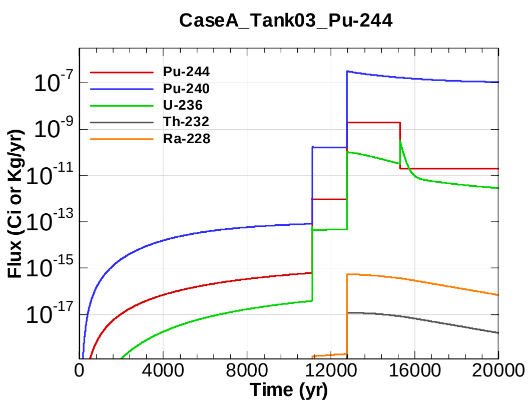

Figure A.1-233 - Flux Leaving Liner for CaseA Tank03 Pu-244

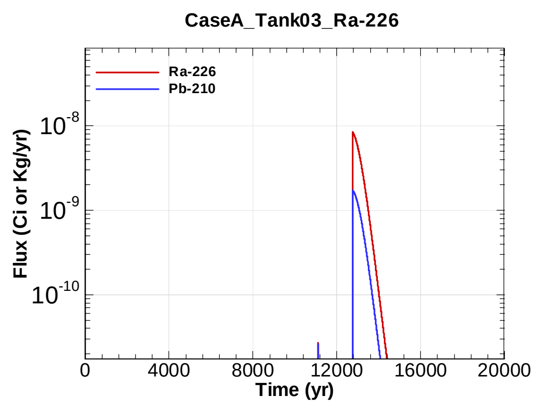

Figure A.1-234 - Flux Leaving Liner for CaseA Tank03 Ra-226

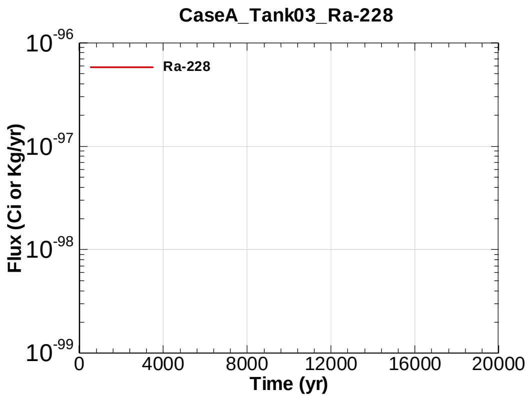

Figure A.1-235 - Flux Leaving Liner for CaseA Tank03 Ra-228

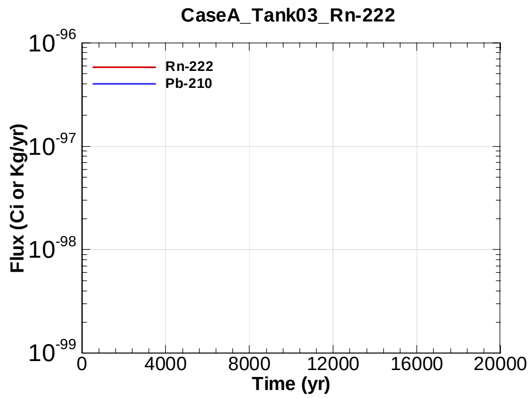

Figure A.1-236 - Flux Leaving Liner for CaseA Tank03 Rn-222

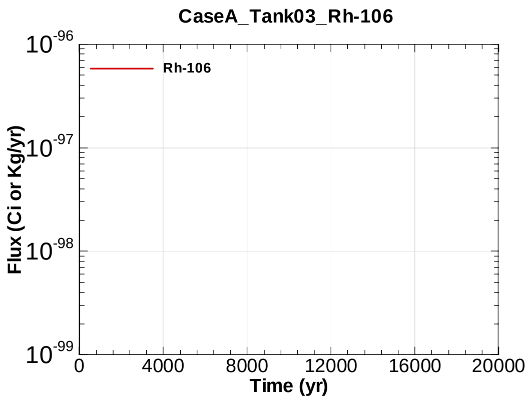

Figure A.1-237 - Flux Leaving Liner for CaseA Tank03 Rh-106

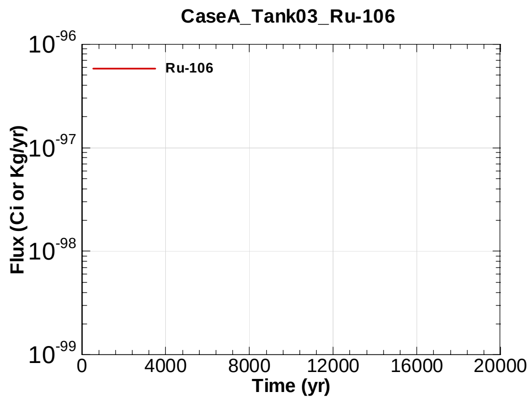

Figure A.1-238 - Flux Leaving Liner for CaseA Tank03 Ru-106

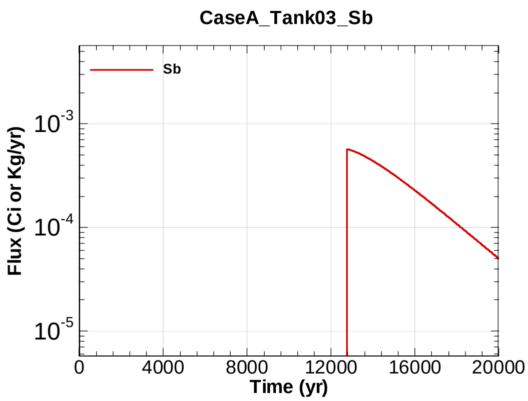

Figure A.1-239 - Flux Leaving Liner for CaseA Tank03 Sb

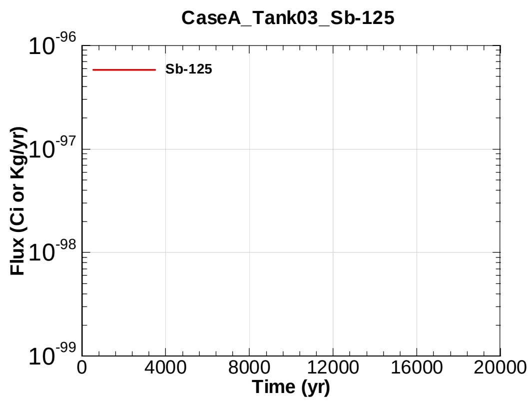

Figure A.1-240 - Flux Leaving Liner for CaseA Tank03 Sb-125

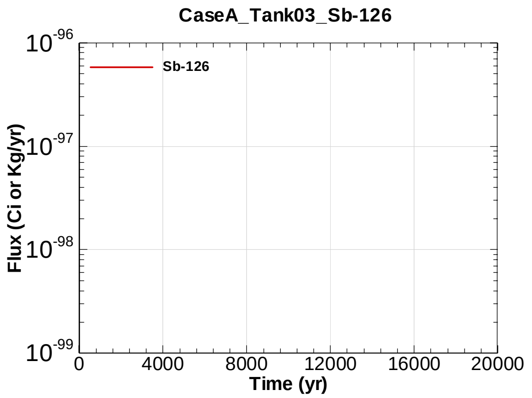

Figure A.1-241 - Flux Leaving Liner for CaseA Tank03 Sb-126

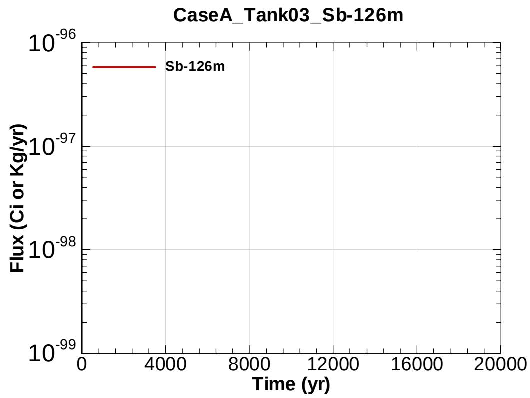

Figure A.1-242 - Flux Leaving Liner for CaseA Tank03 Sb-126m

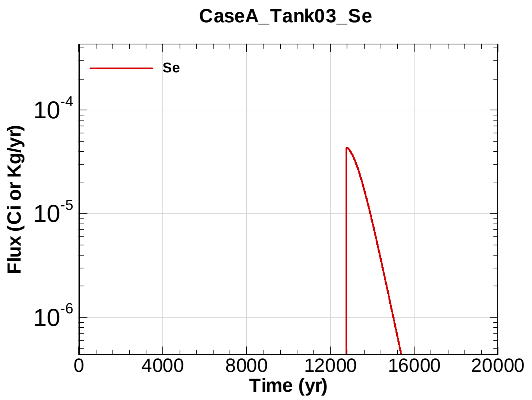

Figure A.1-243 - Flux Leaving Liner for CaseA Tank03 Se

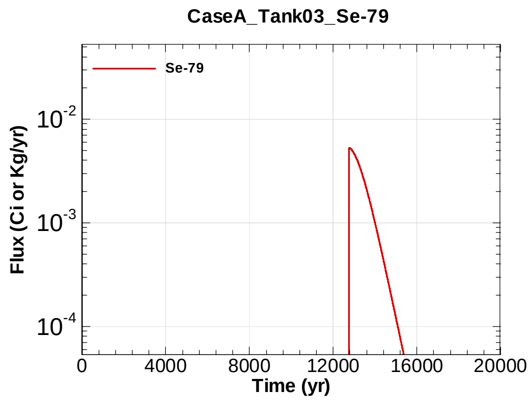

Figure A.1-244 - Flux Leaving Liner for CaseA Tank03 Se-79

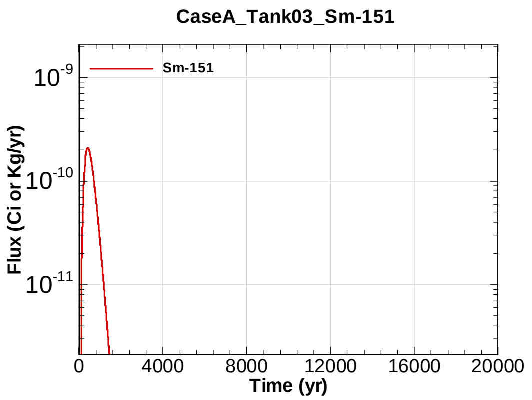

Figure A.1-245 - Flux Leaving Liner for CaseA Tank03 Sm-151

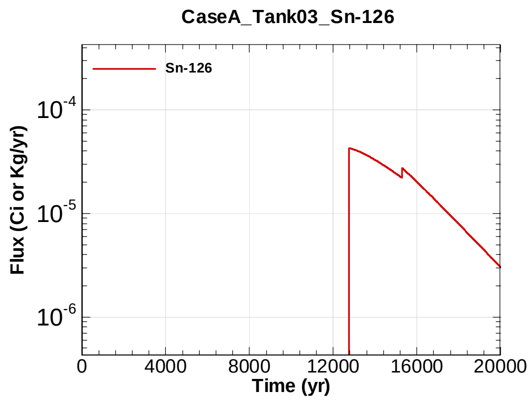

Figure A.1-246 - Flux Leaving Liner for CaseA Tank03 Sn-126

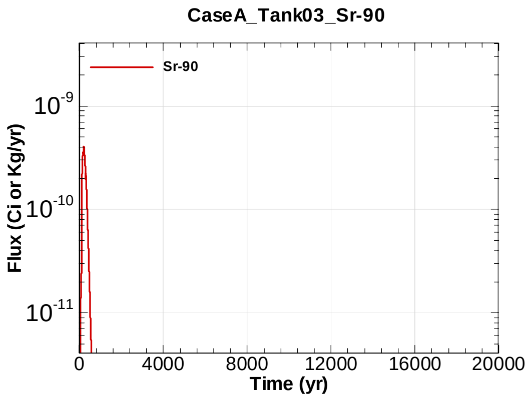

Figure A.1-247 - Flux Leaving Liner for CaseA Tank03 Sr-90

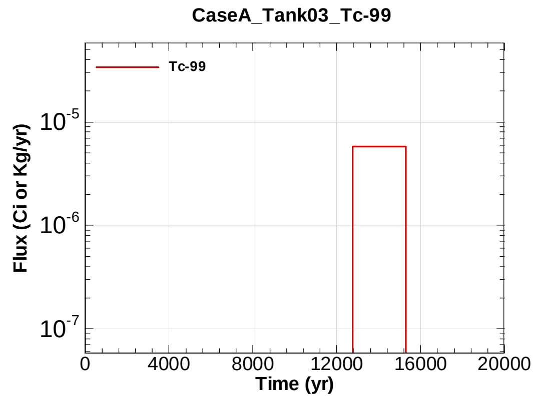

Figure A.1-248 - Flux Leaving Liner for CaseA Tank03 Tc-99

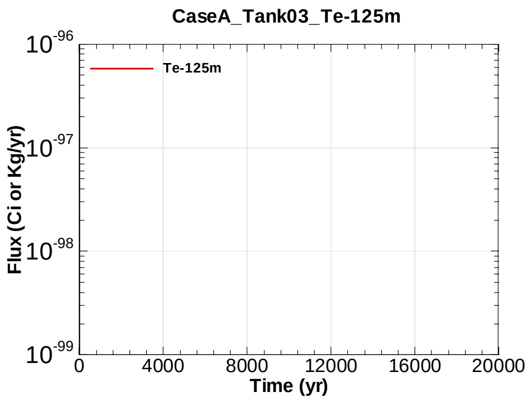

Figure A.1-249 - Flux Leaving Liner for CaseA Tank03 Te-125m

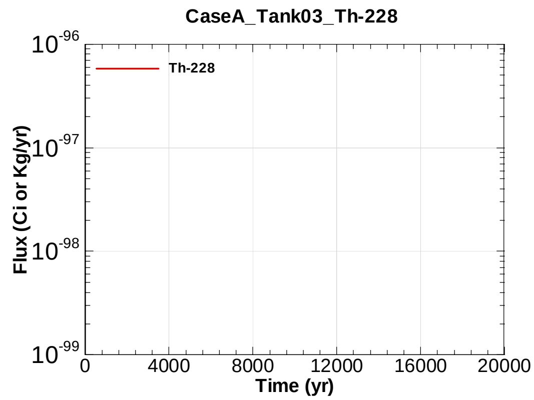

Figure A.1-250 - Flux Leaving Liner for CaseA Tank03 Th-228

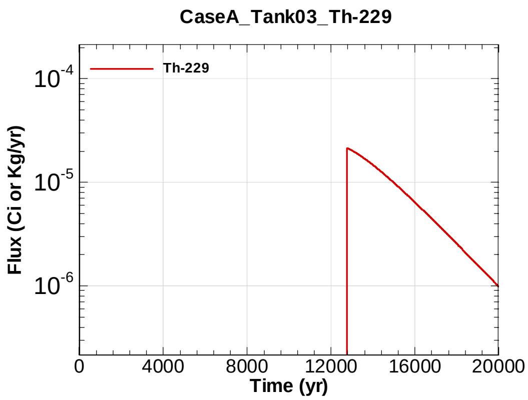

Figure A.1-251 - Flux Leaving Liner for CaseA Tank03 Th-229

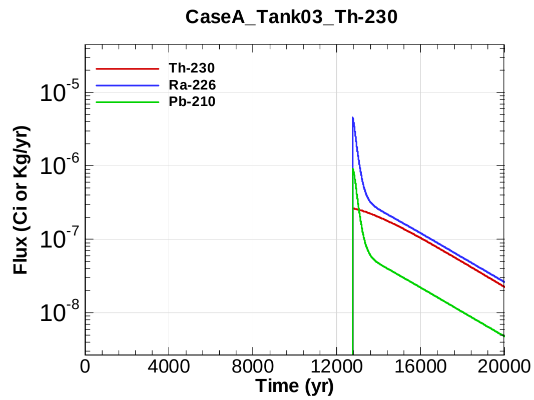

Figure A.1-252 - Flux Leaving Liner for CaseA Tank03 Th-230

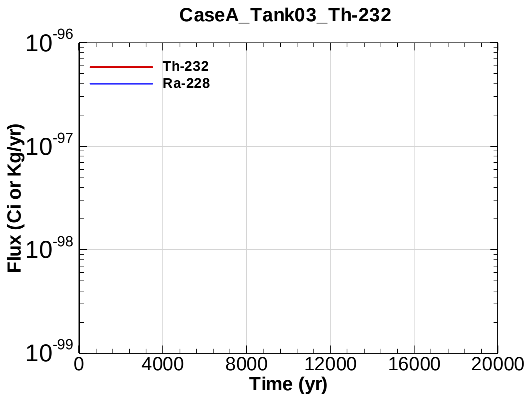

Figure A.1-253 - Flux Leaving Liner for CaseA Tank03 Th-232

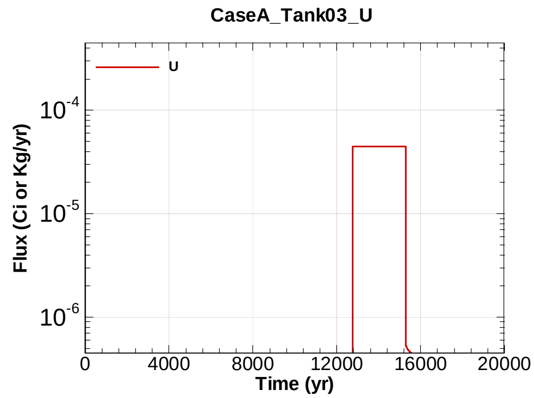

Figure A.1-254 - Flux Leaving Liner for CaseA Tank03 U

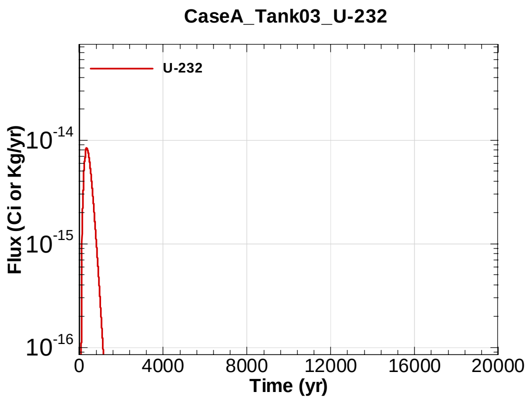

Figure A.1-255 - Flux Leaving Liner for CaseA Tank03 U-232

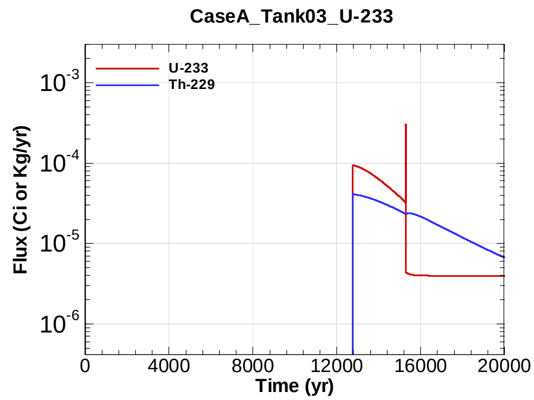

Figure A.1-256 - Flux Leaving Liner for CaseA Tank03 U-233

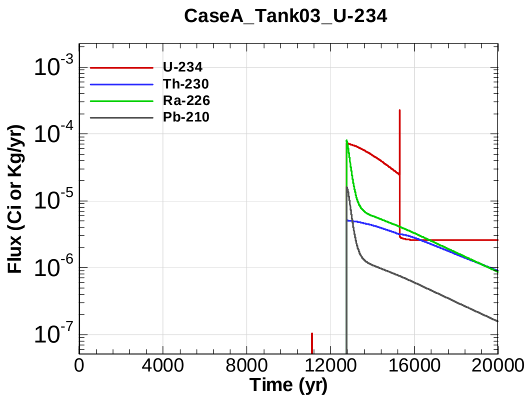

Figure A.1-257 - Flux Leaving Liner for CaseA Tank03 U-234

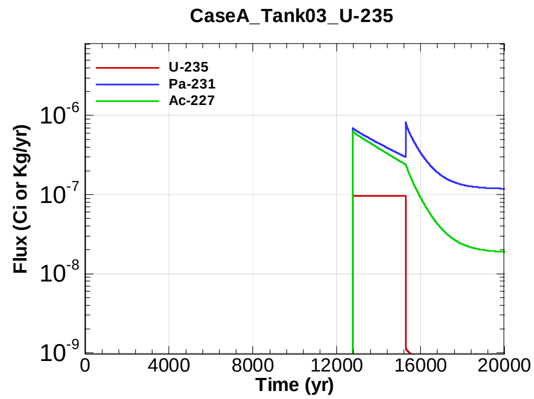

Figure A.1-258 - Flux Leaving Liner for CaseA Tank03 U-235

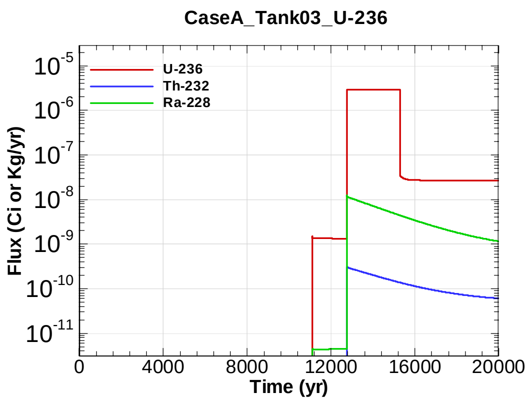

Figure A.1-259 - Flux Leaving Liner for CaseA Tank03 U-236

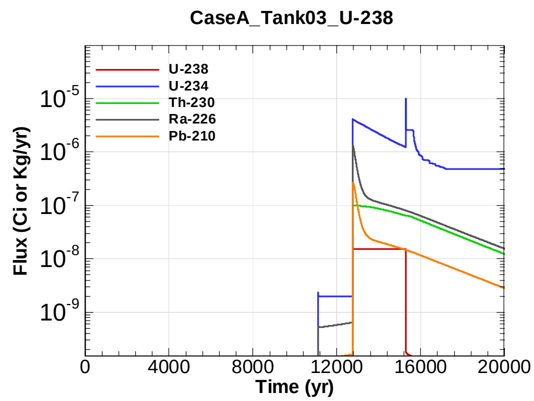

Figure A.1-260 - Flux Leaving Liner for CaseA Tank03 U-238

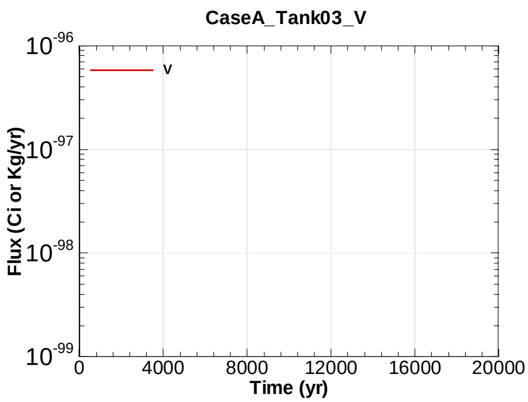

Figure A.1-261 - Flux Leaving Liner for CaseA Tank03 V

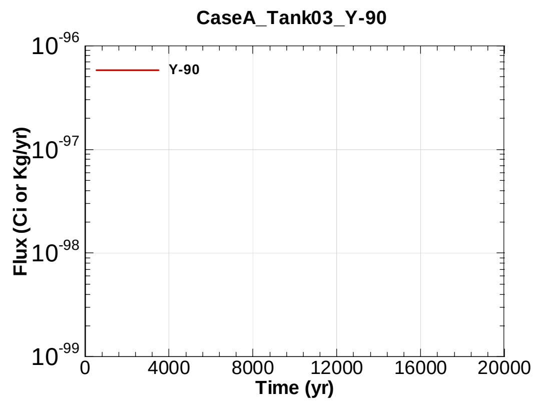

Figure A.1-262 - Flux Leaving Liner for CaseA Tank03 Y-90

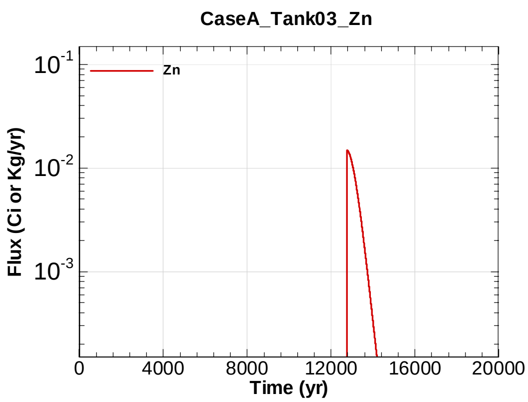

Figure A.1-263 - Flux Leaving Liner for CaseA Tank03 Zn

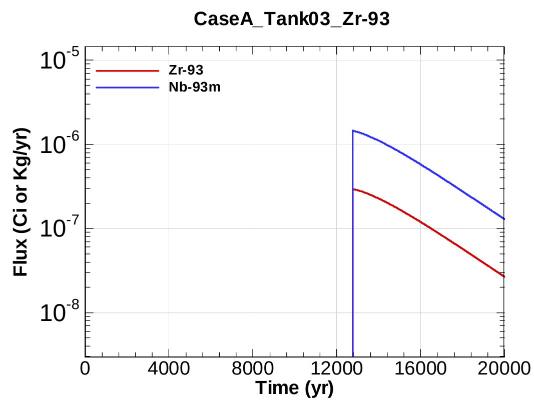

Figure A.1-264 - Flux Leaving Liner for CaseA Tank03 Zr-93

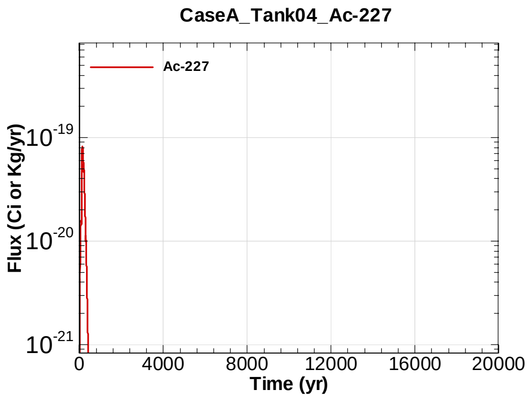

Figure A.1-265 - Flux Leaving Liner for CaseA Tank04 Ac-227

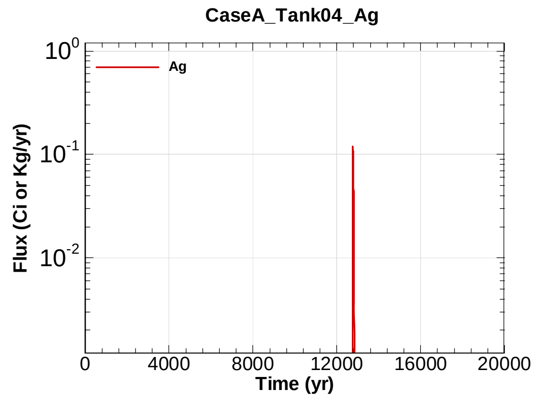

Figure A.1-266 - Flux Leaving Liner for CaseA Tank04 Ag

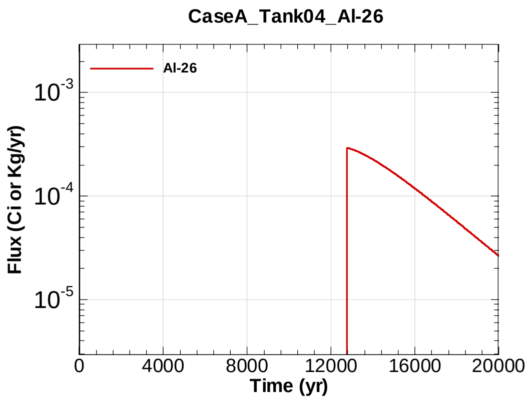

Figure A.1-267 - Flux Leaving Liner for CaseA Tank04 Al-26

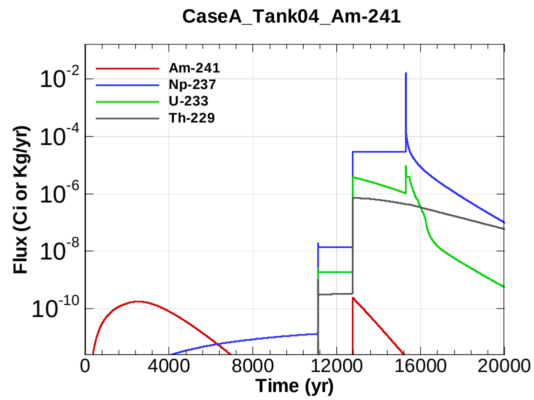

Figure A.1-268 - Flux Leaving Liner for CaseA Tank04 Am-241

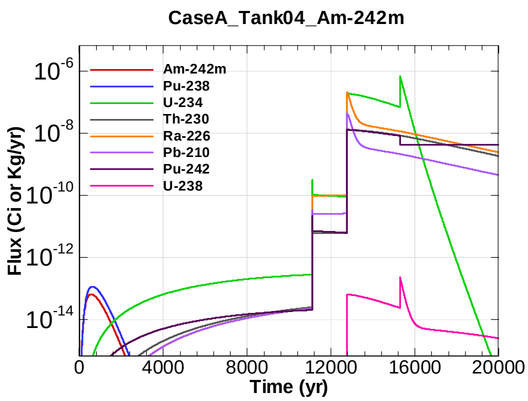

Figure A.1-269 - Flux Leaving Liner for CaseA Tank04 Am-242m

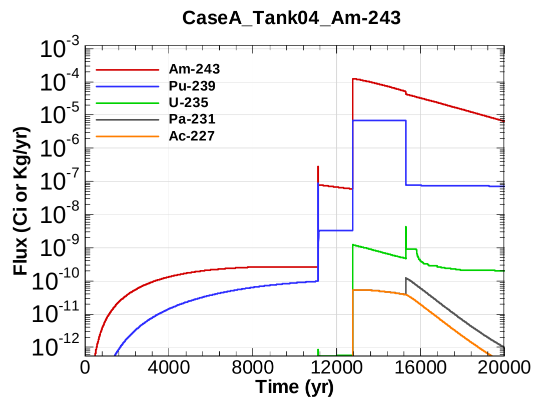

Figure A.1-270 - Flux Leaving Liner for CaseA Tank04 Am-243

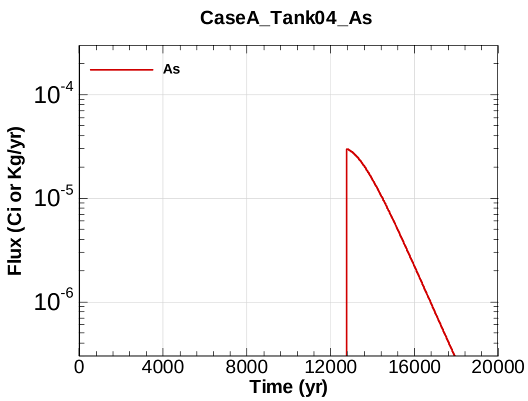

Figure A.1-271 - Flux Leaving Liner for CaseA Tank04 As

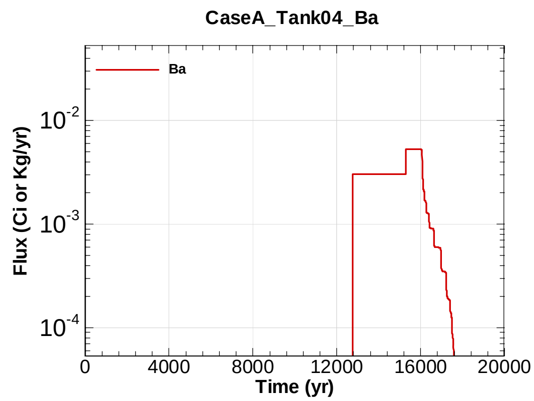

Figure A.1-272 - Flux Leaving Liner for CaseA Tank04 Ba

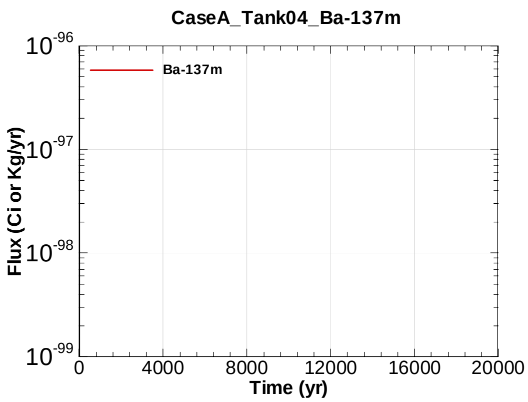

Figure A.1-273 - Flux Leaving Liner for CaseA Tank04 Ba-137m

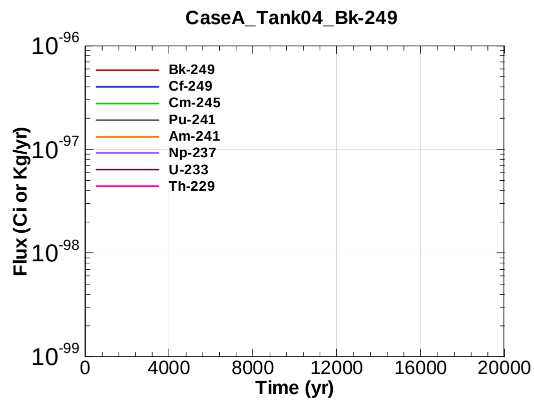

Figure A.1-274 - Flux Leaving Liner for CaseA Tank04 Bk-249

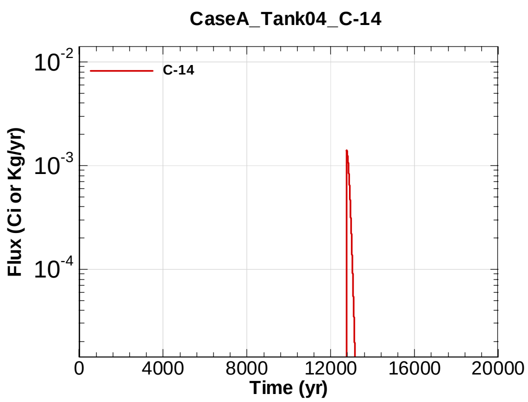

Figure A.1-275 - Flux Leaving Liner for CaseA Tank04 C-14

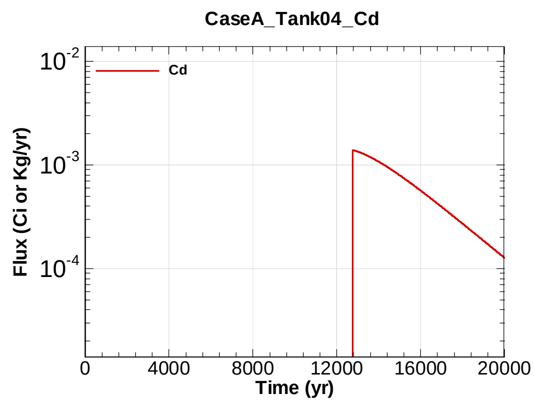

Figure A.1-276 - Flux Leaving Liner for CaseA Tank04 Cd

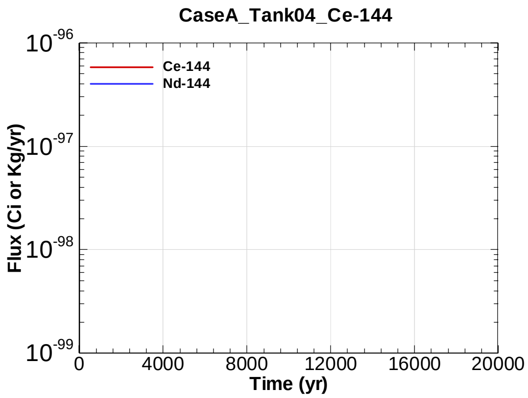

Figure A.1-277 - Flux Leaving Liner for CaseA Tank04 Ce-144

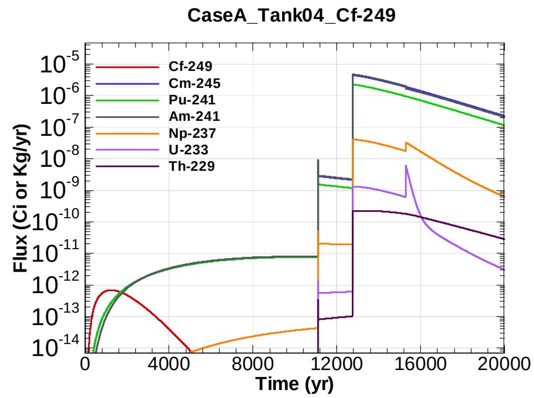

Figure A.1-278 - Flux Leaving Liner for CaseA Tank04 Cf-249

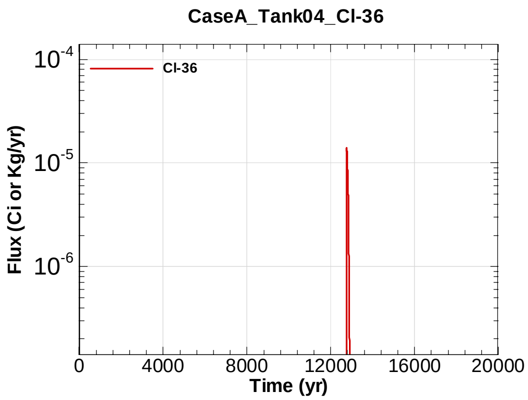

Figure A.1-279 - Flux Leaving Liner for CaseA Tank04 Cl-36

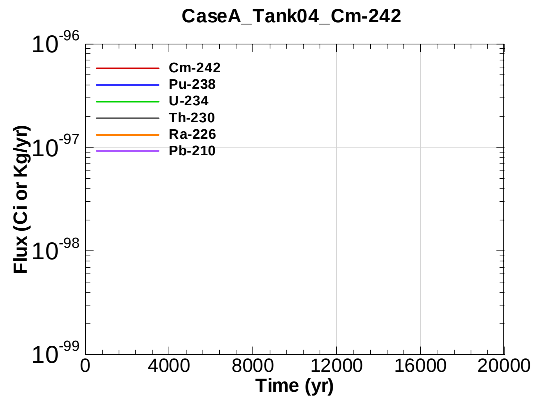

Figure A.1-280 - Flux Leaving Liner for CaseA Tank04 Cm-242

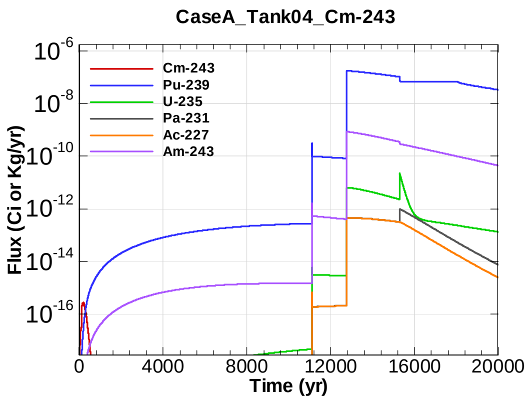

Figure A.1-281 - Flux Leaving Liner for CaseA Tank04 Cm-243

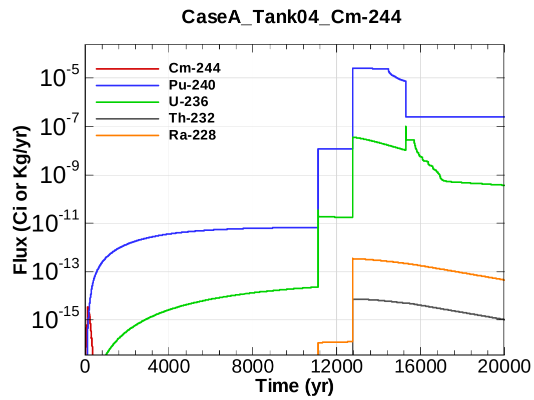

Figure A.1-282 - Flux Leaving Liner for CaseA Tank04 Cm-244

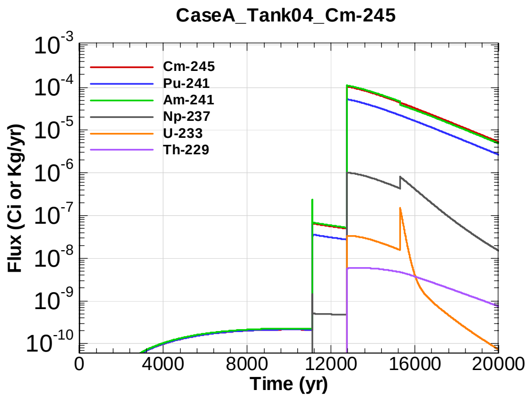

Figure A.1-283 - Flux Leaving Liner for CaseA Tank04 Cm-245

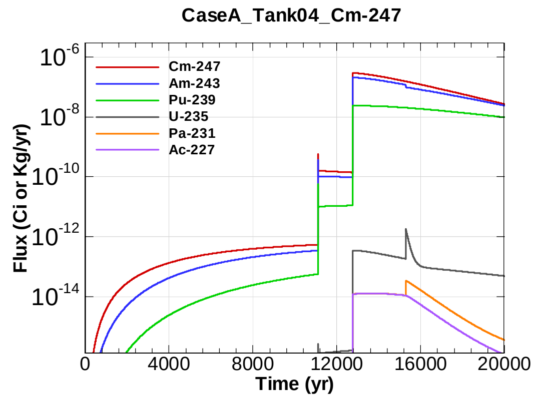

Figure A.1-284 - Flux Leaving Liner for CaseA Tank04 Cm-247

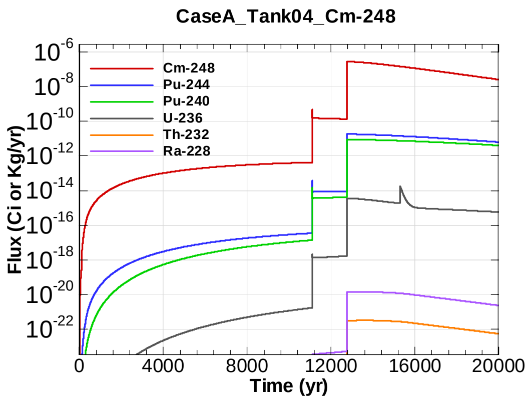

Figure A.1-285 - Flux Leaving Liner for CaseA Tank04 Cm-248

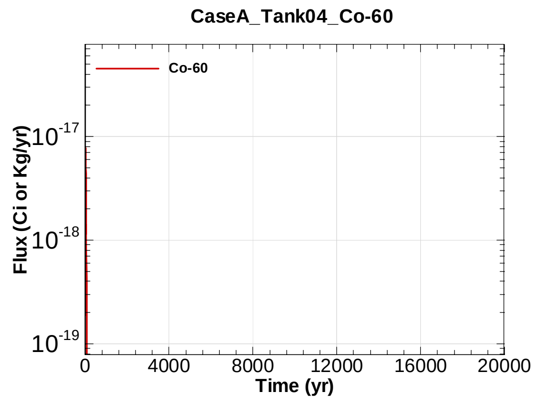

Figure A.1-286 - Flux Leaving Liner for CaseA Tank04 Co-60

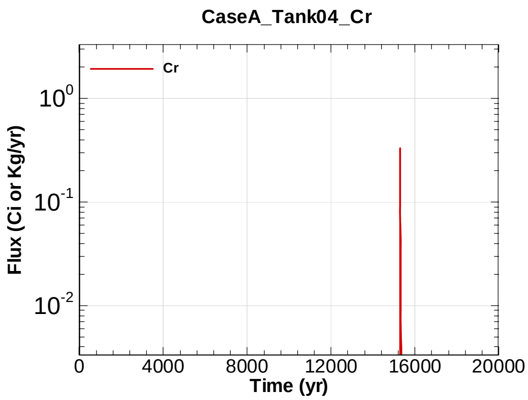

Figure A.1-287 - Flux Leaving Liner for CaseA Tank04 Cr

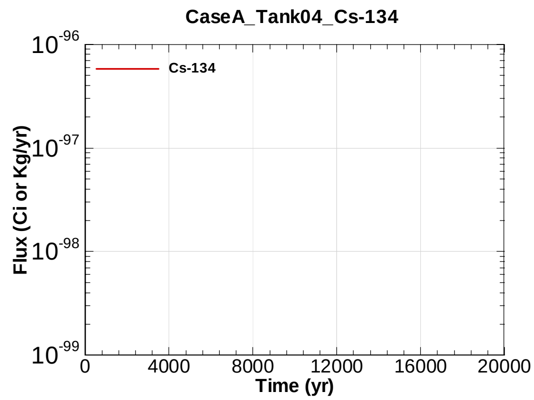

Figure A.1-288 - Flux Leaving Liner for CaseA Tank04 Cs-134

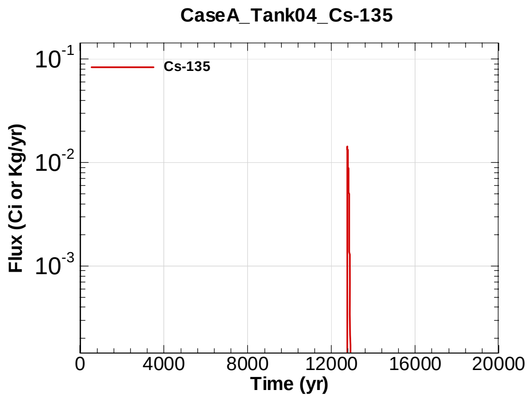

Figure A.1-289 - Flux Leaving Liner for CaseA Tank04 Cs-135

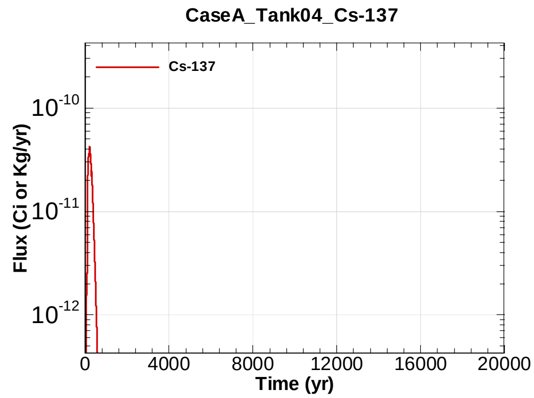

Figure A.1-290 - Flux Leaving Liner for CaseA Tank04 Cs-137

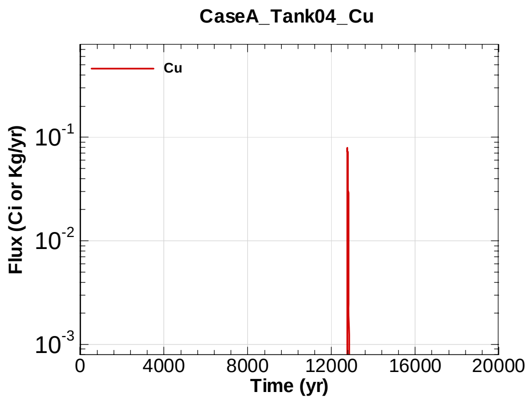

Figure A.1-291 - Flux Leaving Liner for CaseA Tank04 Cu

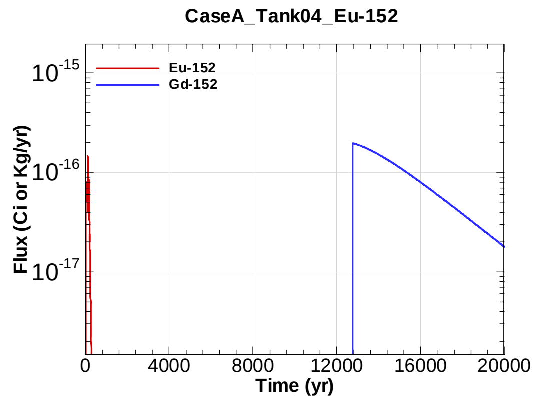

Figure A.1-292 - Flux Leaving Liner for CaseA Tank04 Eu-152

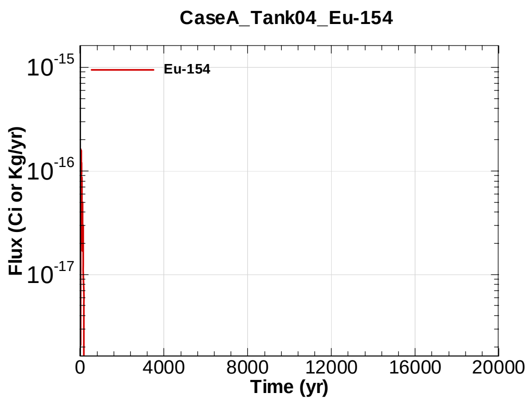

Figure A.1-293 - Flux Leaving Liner for CaseA Tank04 Eu-154

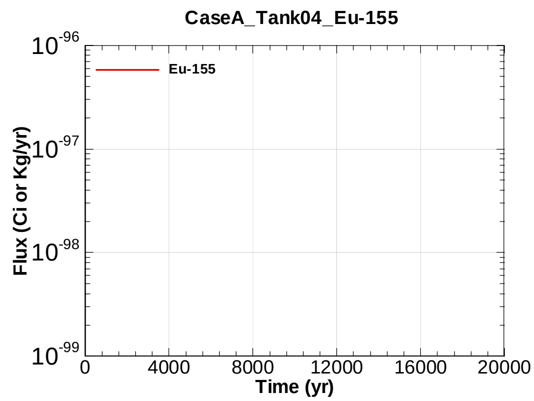

Figure A.1-294 - Flux Leaving Liner for CaseA Tank04 Eu-155

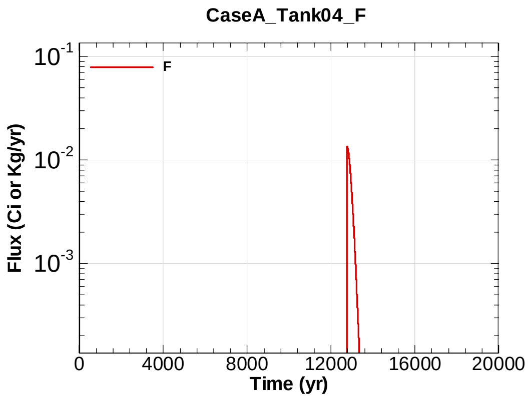

Figure A.1-295 - Flux Leaving Liner for CaseA Tank04 F

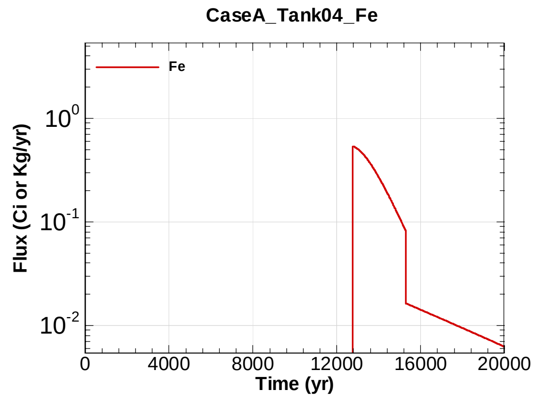

Figure A.1-296 - Flux Leaving Liner for CaseA Tank04 Fe

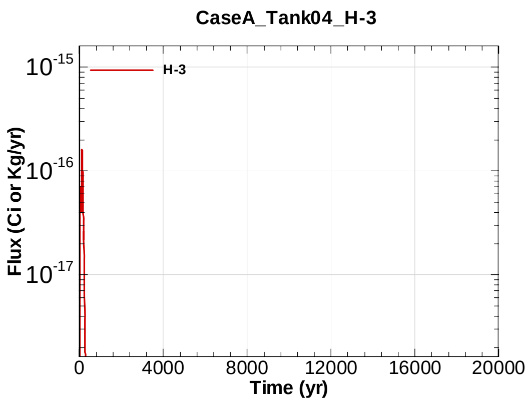

Figure A.1-297 - Flux Leaving Liner for CaseA Tank04 H-3

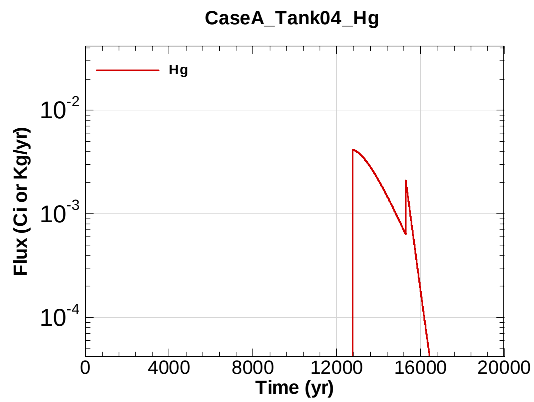

Figure A.1-298 - Flux Leaving Liner for CaseA Tank04 Hg

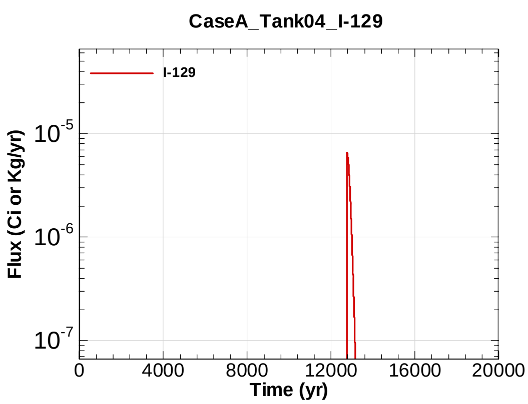

Figure A.1-299 - Flux Leaving Liner for CaseA Tank04 I-129

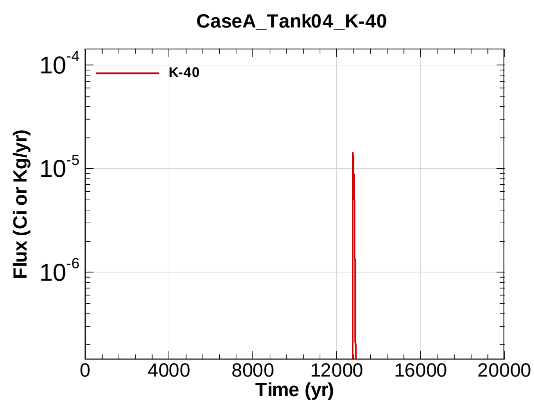

Figure A.1-300 - Flux Leaving Liner for CaseA Tank04 K-40

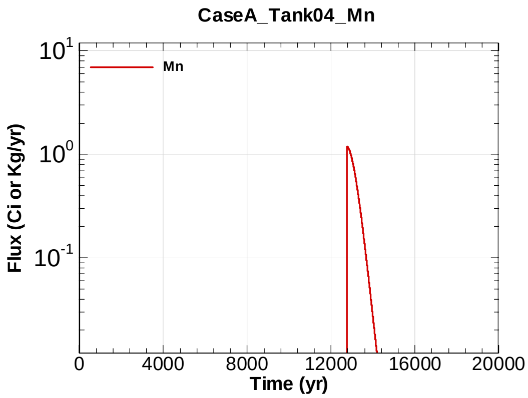

Figure A.1-301 - Flux Leaving Liner for CaseA Tank04 Mn

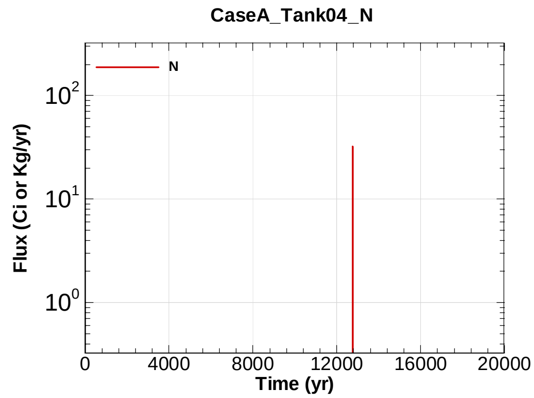

Figure A.1-302 - Flux Leaving Liner for CaseA Tank04 N

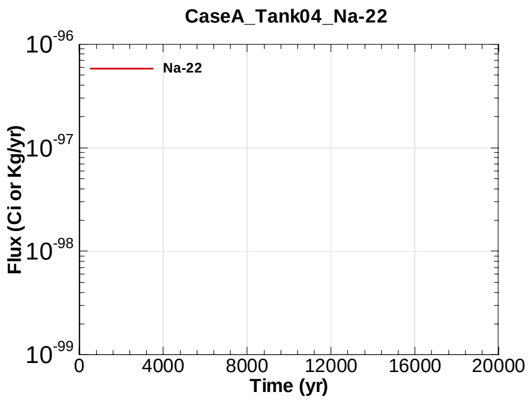

Figure A.1-303 - Flux Leaving Liner for CaseA Tank04 Na-22

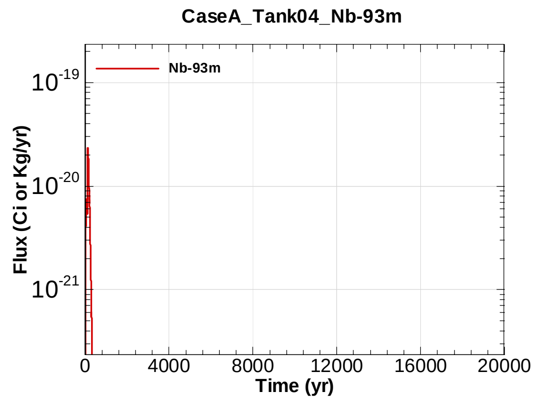

Figure A.1-304 - Flux Leaving Liner for CaseA Tank04 Nb-93m

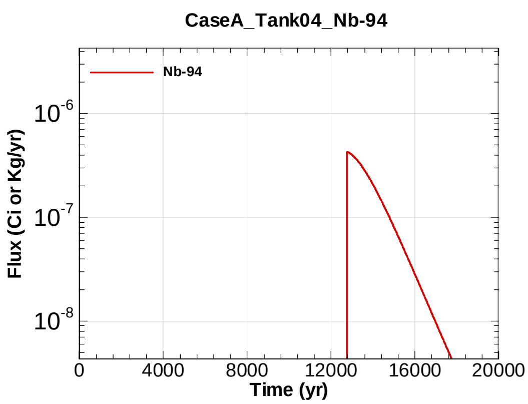

Figure A.1-305 - Flux Leaving Liner for CaseA Tank04 Nb-94

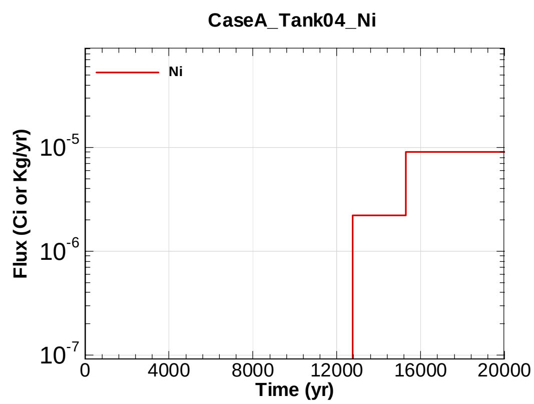

Figure A.1-306 - Flux Leaving Liner for CaseA Tank04 Ni

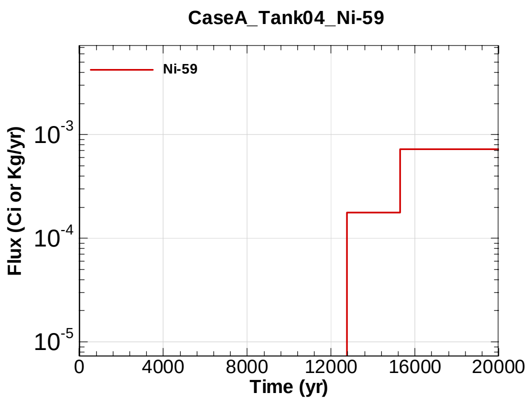

Figure A.1-307 - Flux Leaving Liner for CaseA Tank04 Ni-59

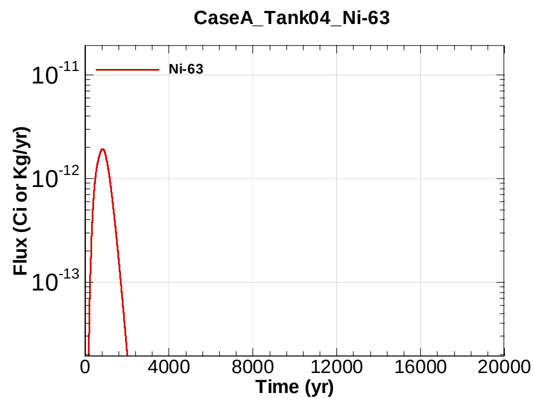

Figure A.1-308 - Flux Leaving Liner for CaseA Tank04 Ni-63

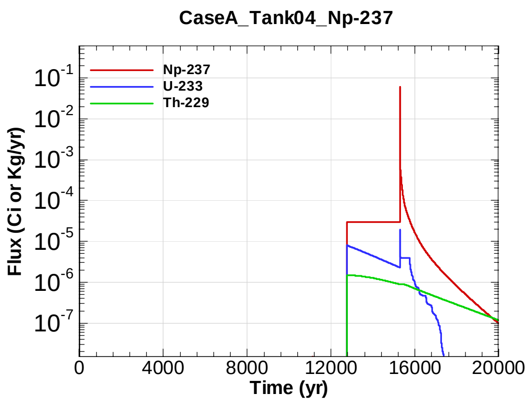

Figure A.1-309 - Flux Leaving Liner for CaseA Tank04 Np-237

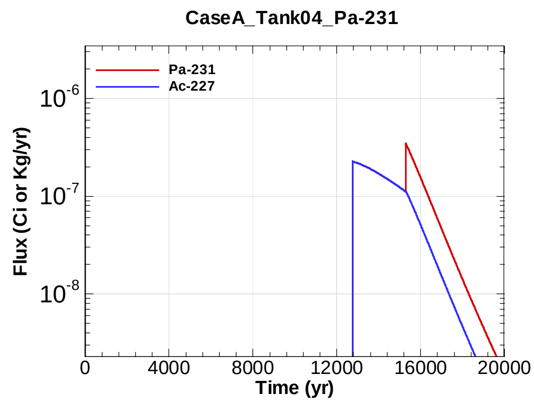

Figure A.1-310 - Flux Leaving Liner for CaseA Tank04 Pa-231

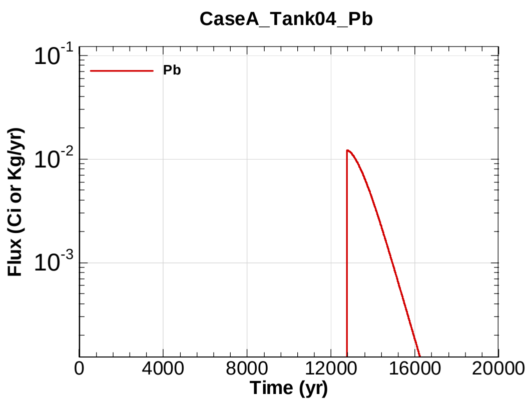

Figure A.1-311 - Flux Leaving Liner for CaseA Tank04 Pb

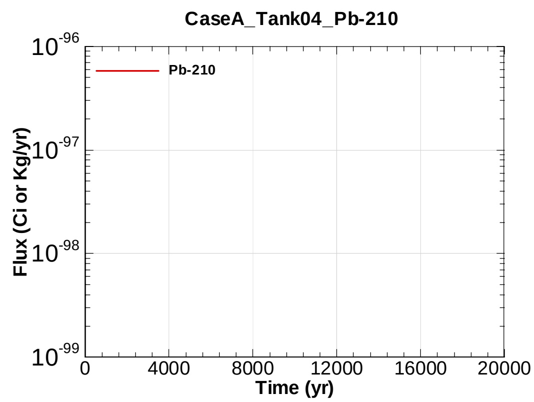

Figure A.1-312 - Flux Leaving Liner for CaseA Tank04 Pb-210

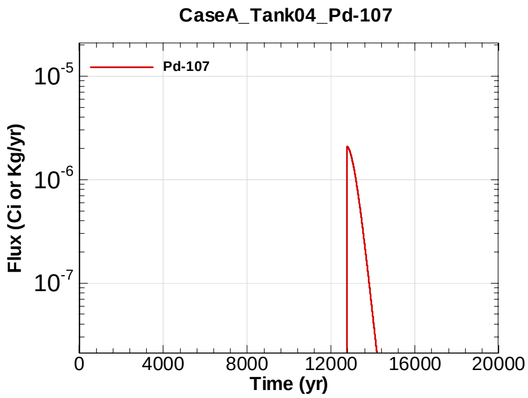

Figure A.1-313 - Flux Leaving Liner for CaseA Tank04 Pd-107

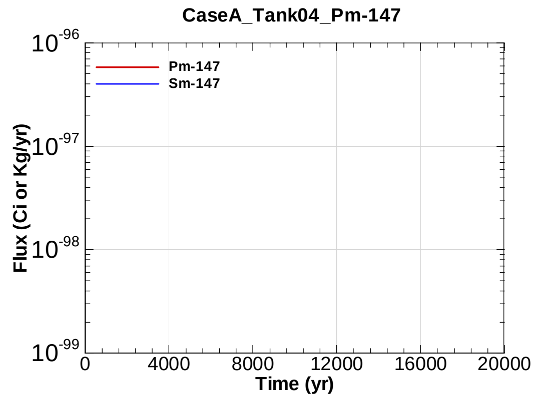

Figure A.1-314 - Flux Leaving Liner for CaseA Tank04 Pm-147

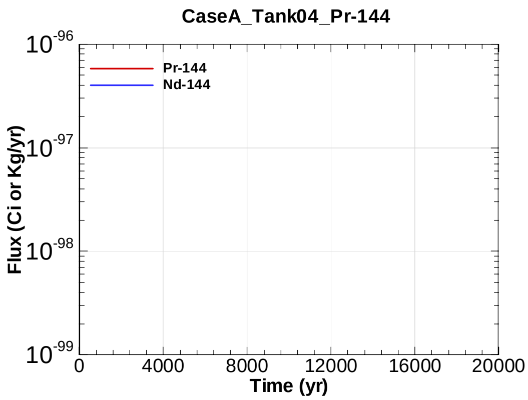

Figure A.1-315 - Flux Leaving Liner for CaseA Tank04 Pr-144

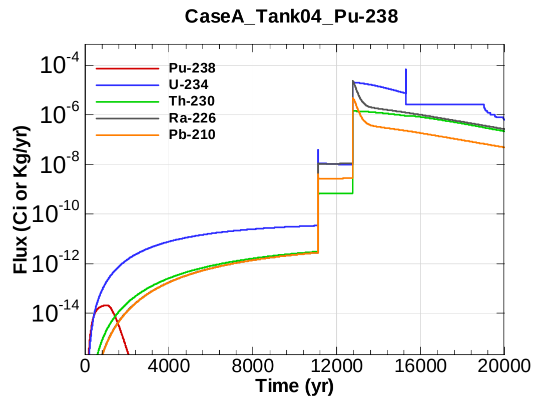

Figure A.1-316 - Flux Leaving Liner for CaseA Tank04 Pu-238

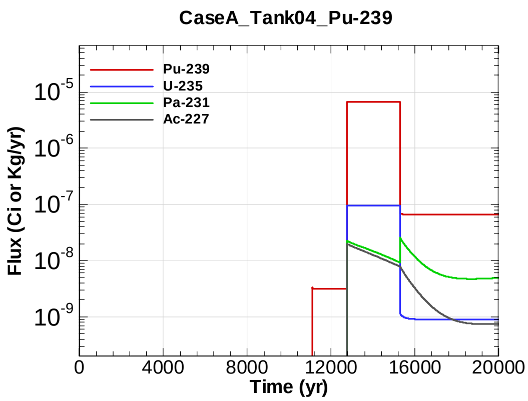

Figure A.1-317 - Flux Leaving Liner for CaseA Tank04 Pu-239

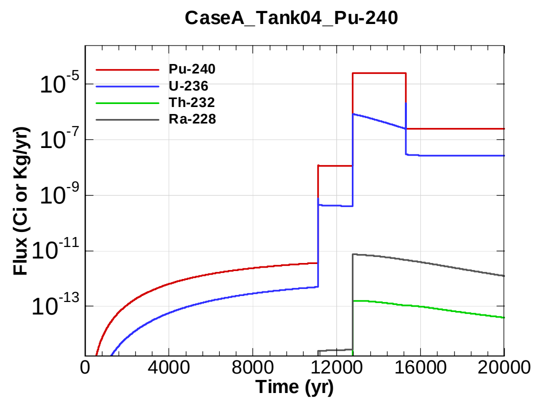

Figure A.1-318 - Flux Leaving Liner for CaseA Tank04 Pu-240

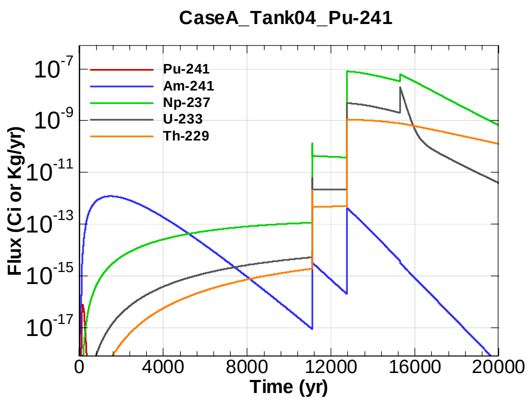

Figure A.1-319 - Flux Leaving Liner for CaseA Tank04 Pu-241

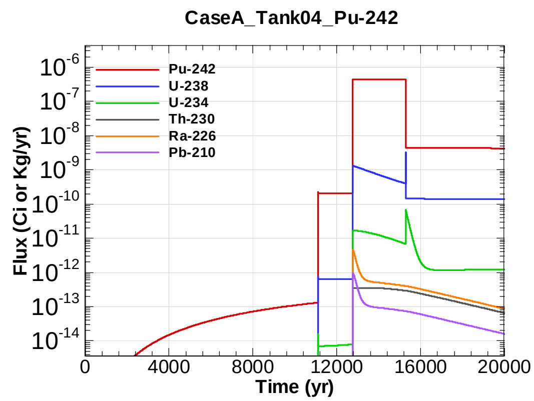

Figure A.1-320 - Flux Leaving Liner for CaseA Tank04 Pu-242

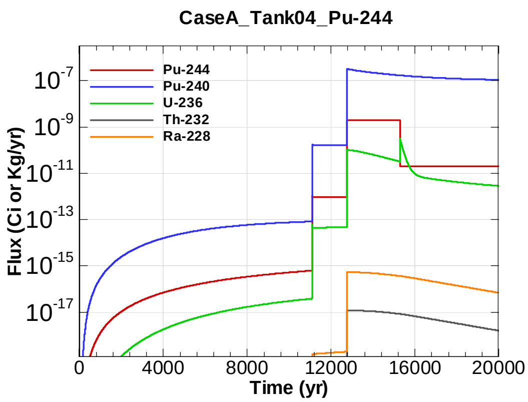

Figure A.1-321 - Flux Leaving Liner for CaseA Tank04 Pu-244

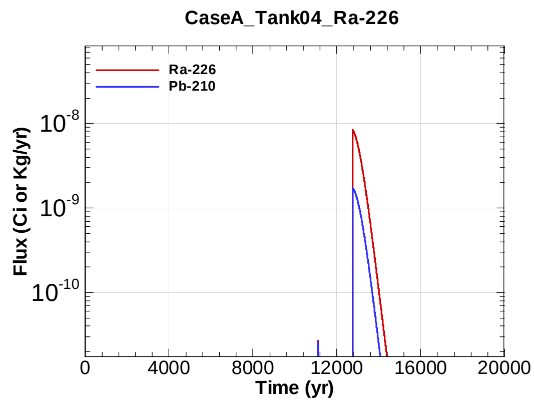

Figure A.1-322 - Flux Leaving Liner for CaseA Tank04 Ra-226

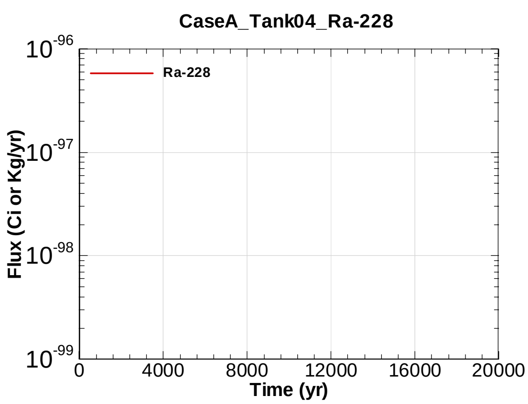

Figure A.1-323 - Flux Leaving Liner for CaseA Tank04 Ra-228

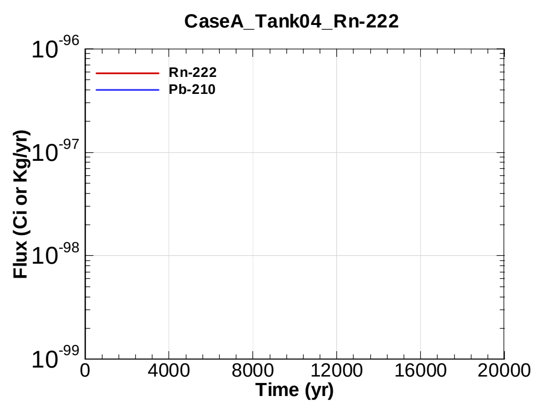

Figure A.1-324 - Flux Leaving Liner for CaseA Tank04 Rn-222

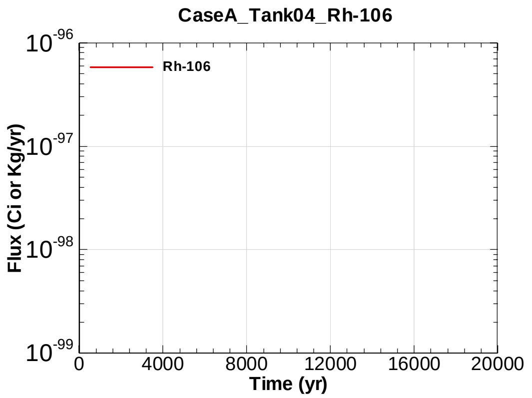

Figure A.1-325 - Flux Leaving Liner for CaseA Tank04 Rh-106

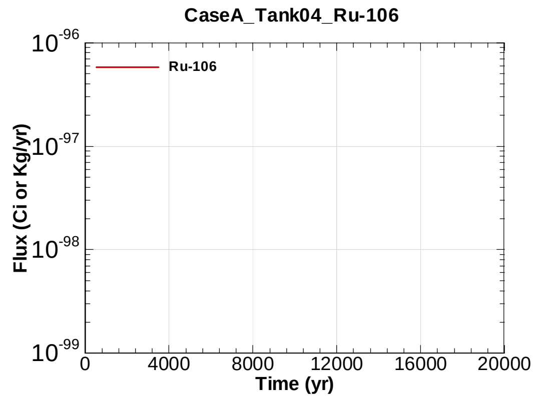

Figure A.1-326 - Flux Leaving Liner for CaseA Tank04 Ru-106

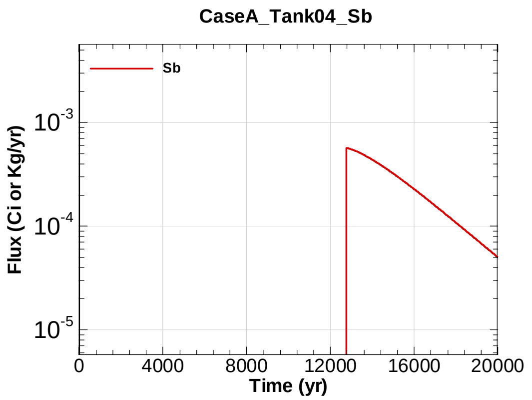

Figure A.1-327 - Flux Leaving Liner for CaseA Tank04 Sb

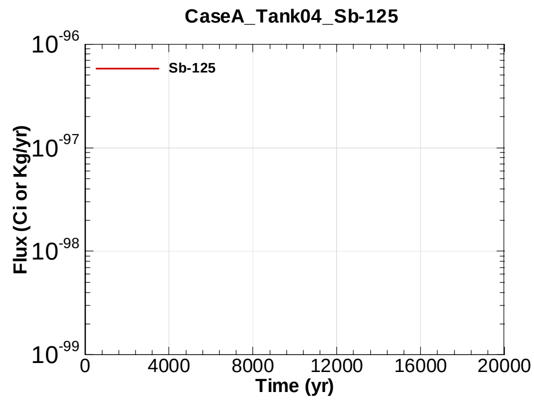

Figure A.1-328 - Flux Leaving Liner for CaseA Tank04 Sb-125

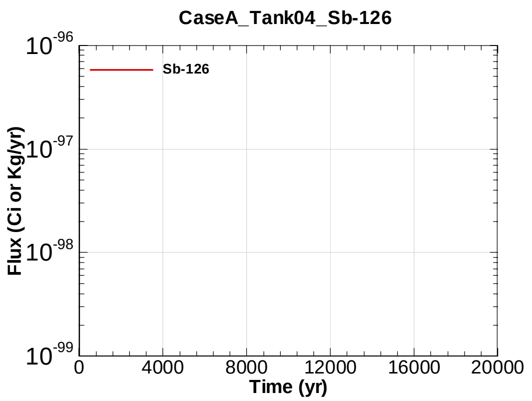

Figure A.1-329 - Flux Leaving Liner for CaseA Tank04 Sb-126

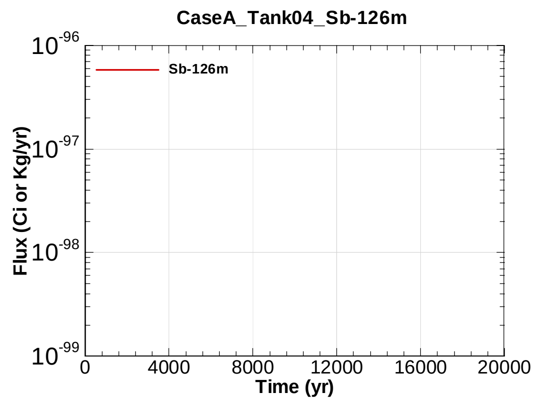

Figure A.1-330 - Flux Leaving Liner for CaseA Tank04 Sb-126m

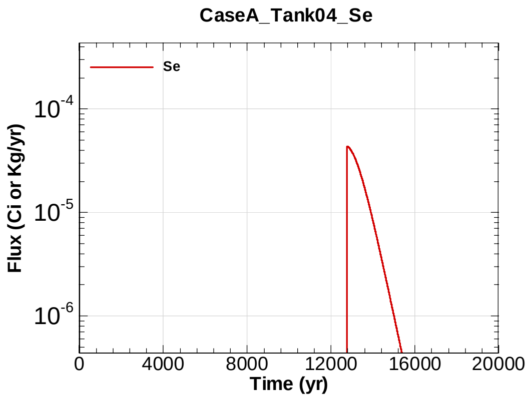

Figure A.1-331 - Flux Leaving Liner for CaseA Tank04 Se

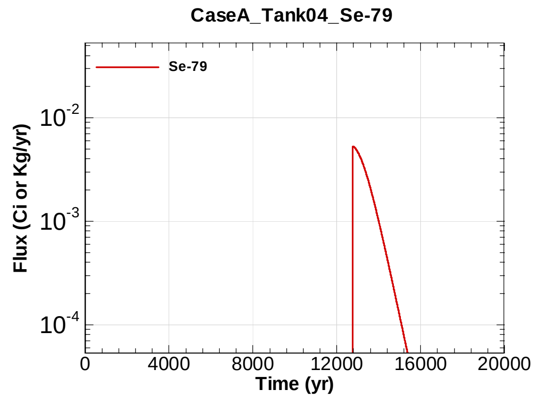

Figure A.1-332 - Flux Leaving Liner for CaseA Tank04 Se-79

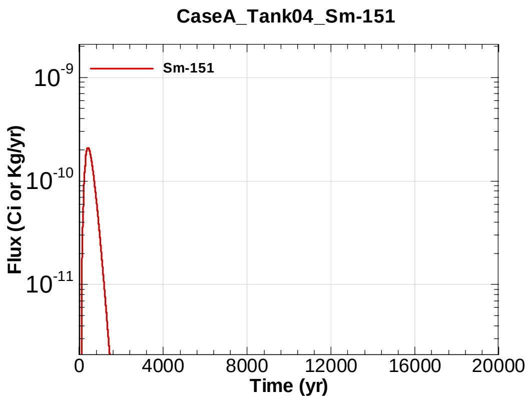

Figure A.1-333 - Flux Leaving Liner for CaseA Tank04 Sm-151

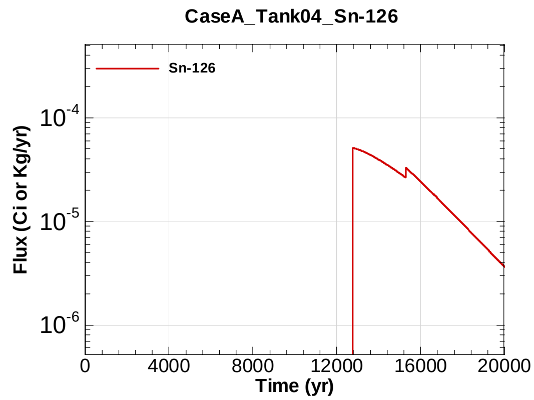

Figure A.1-334 - Flux Leaving Liner for CaseA Tank04 Sn-126

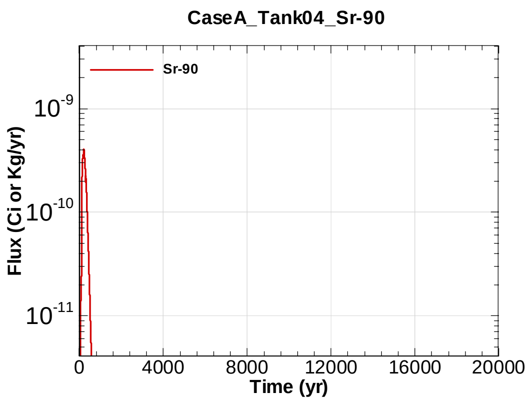

Figure A.1-335 - Flux Leaving Liner for CaseA Tank04 Sr-90

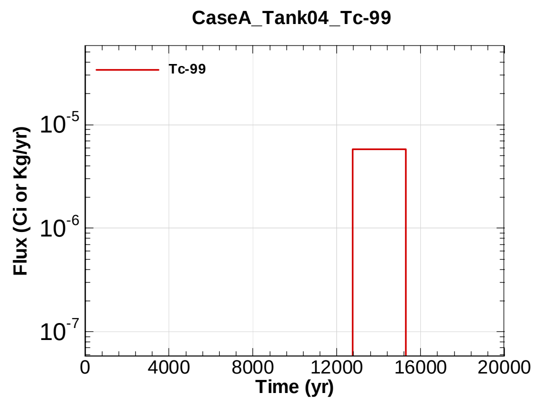

Figure A.1-336 - Flux Leaving Liner for CaseA Tank04 Tc-99

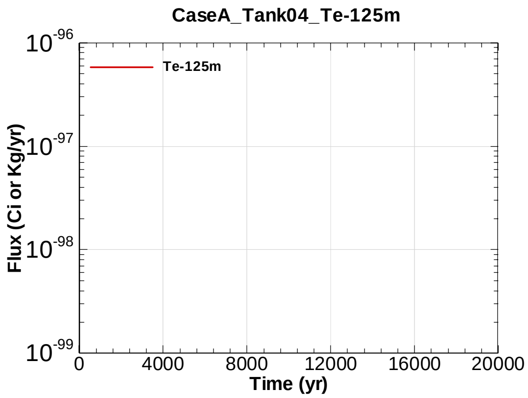

Figure A.1-337 - Flux Leaving Liner for CaseA Tank04 Te-125m

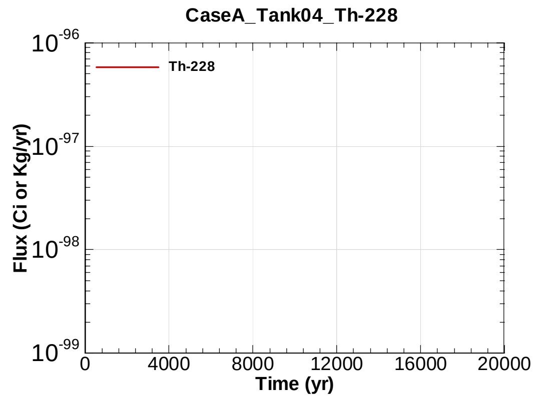

Figure A.1-338 - Flux Leaving Liner for CaseA Tank04 Th-228

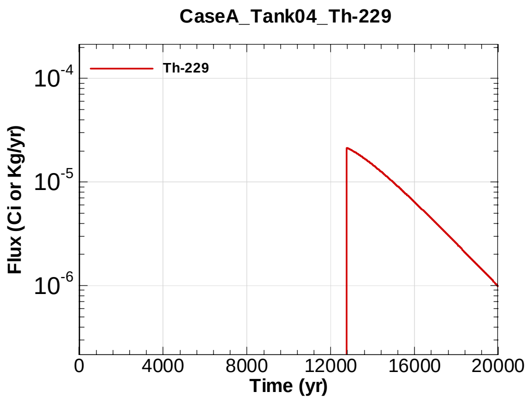

Figure A.1-339 - Flux Leaving Liner for CaseA Tank04 Th-229

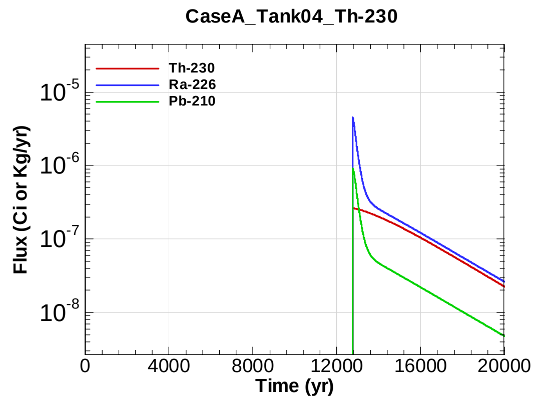

Figure A.1-340 - Flux Leaving Liner for CaseA Tank04 Th-230

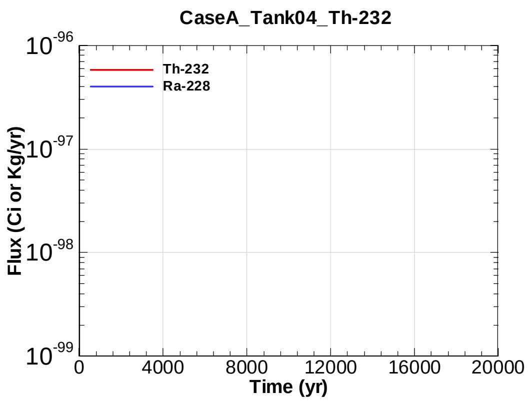

Figure A.1-341 - Flux Leaving Liner for CaseA Tank04 Th-232

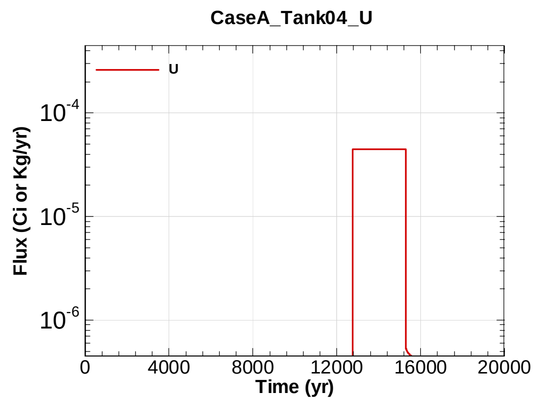

Figure A.1-342 - Flux Leaving Liner for CaseA Tank04 U

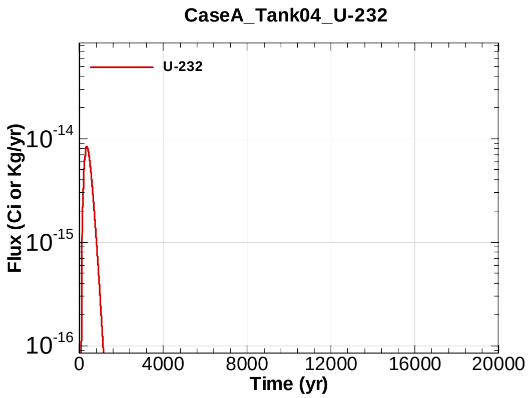

Figure A.1-343 - Flux Leaving Liner for CaseA Tank04 U-232

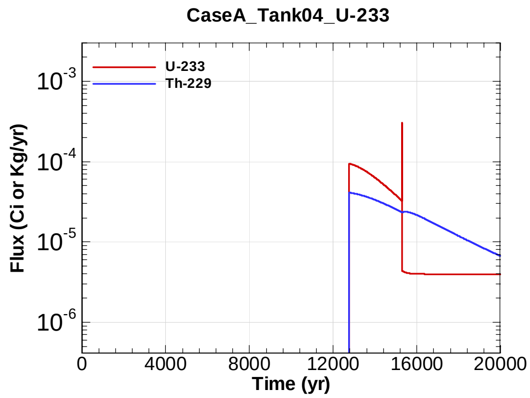

Figure A.1-344 - Flux Leaving Liner for CaseA Tank04 U-233

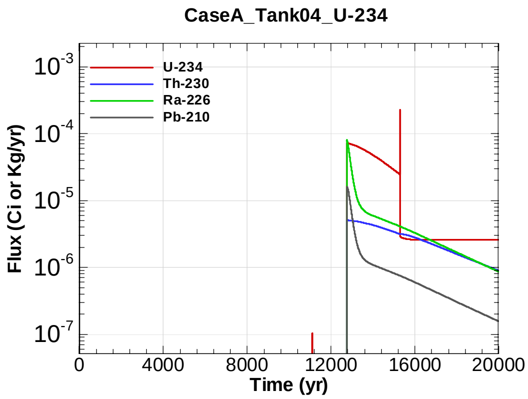

Figure A.1-345 - Flux Leaving Liner for CaseA Tank04 U-234

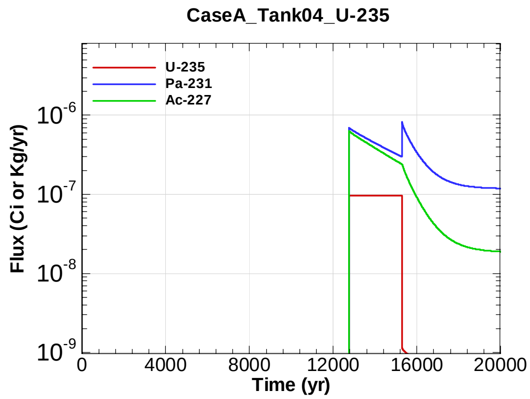

Figure A.1-346 - Flux Leaving Liner for CaseA Tank04 U-235

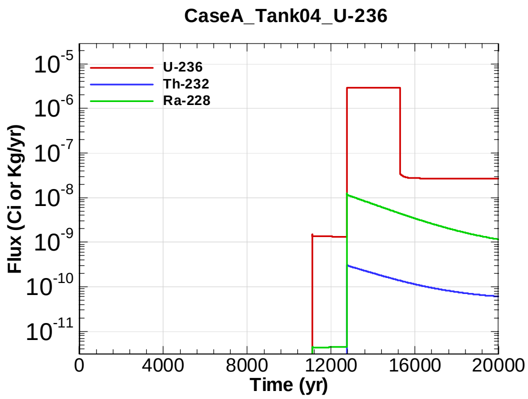

Figure A.1-347 - Flux Leaving Liner for CaseA Tank04 U-236

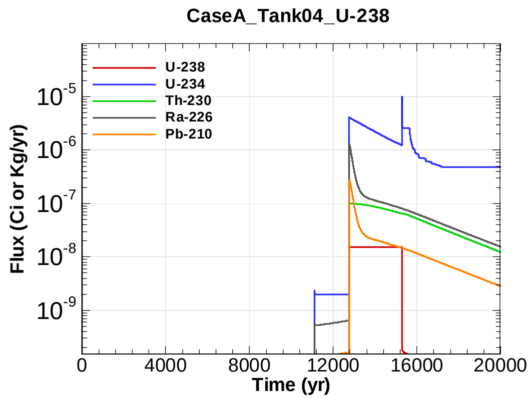

Figure A.1-348 - Flux Leaving Liner for CaseA Tank04 U-238

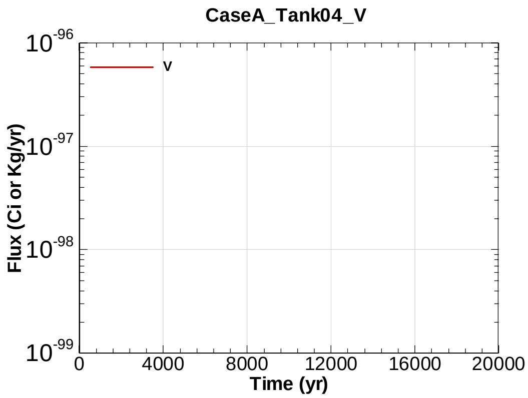

Figure A.1-349 - Flux Leaving Liner for CaseA Tank04 V

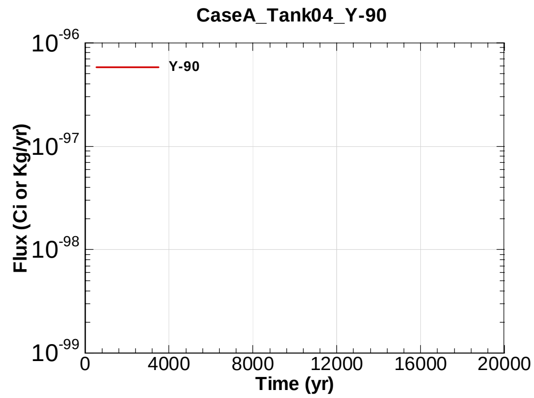

Figure A.1-350 - Flux Leaving Liner for CaseA Tank04 Y-90

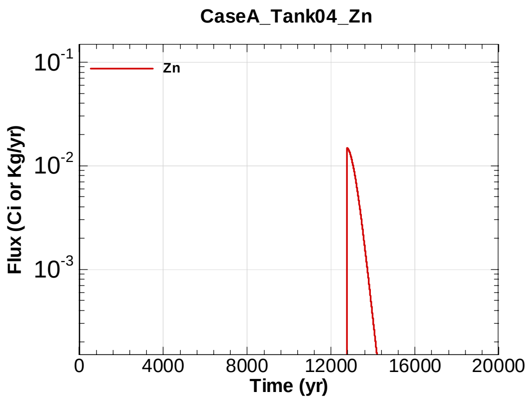

Figure A.1-351 - Flux Leaving Liner for CaseA Tank04 Zn

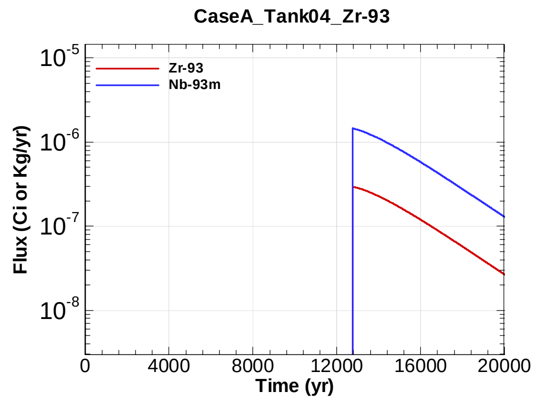

Figure A.1-352 - Flux Leaving Liner for CaseA Tank04 Zr-93

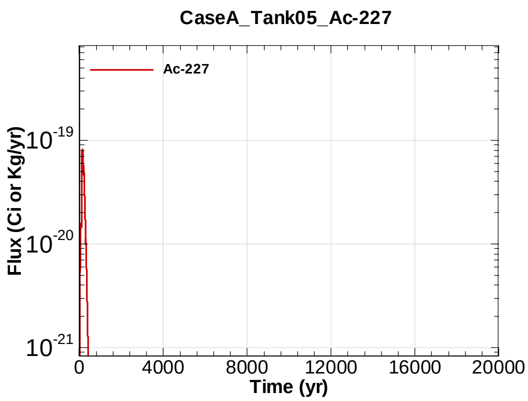

Figure A.1-353 - Flux Leaving Liner for CaseA Tank05 Ac-227

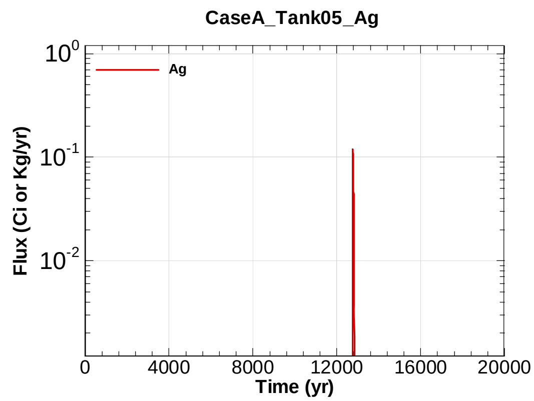

Figure A.1-354 - Flux Leaving Liner for CaseA Tank05 Ag

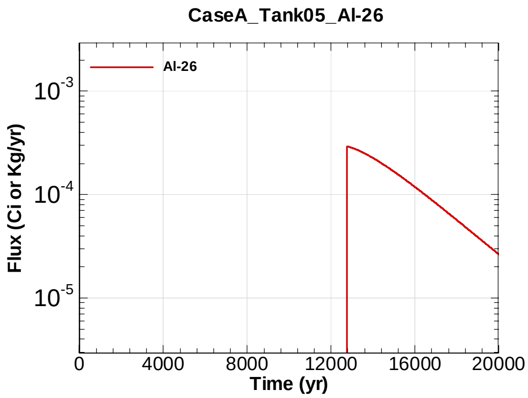

Figure A.1-355 - Flux Leaving Liner for CaseA Tank05 Al-26

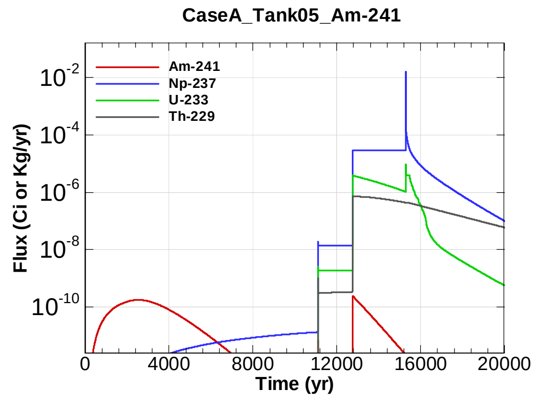

Figure A.1-356 - Flux Leaving Liner for CaseA Tank05 Am-241

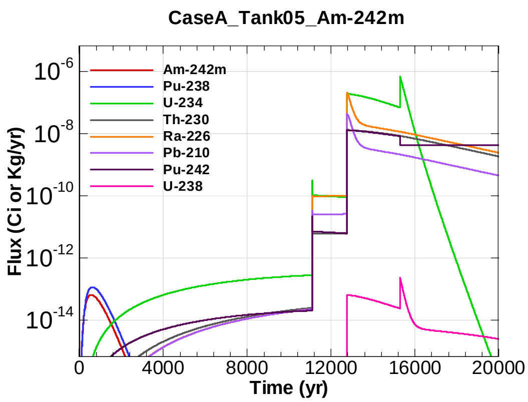

Figure A.1-357 - Flux Leaving Liner for CaseA Tank05 Am-242m

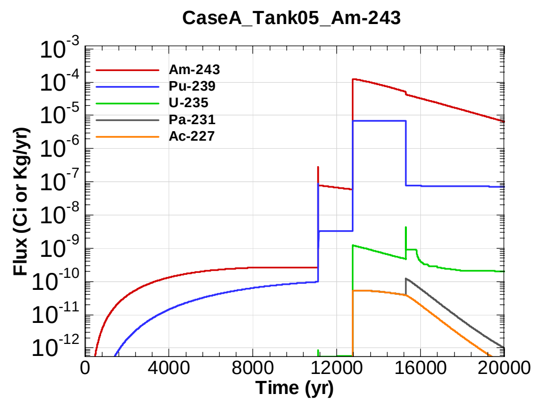

Figure A.1-358 - Flux Leaving Liner for CaseA Tank05 Am-243

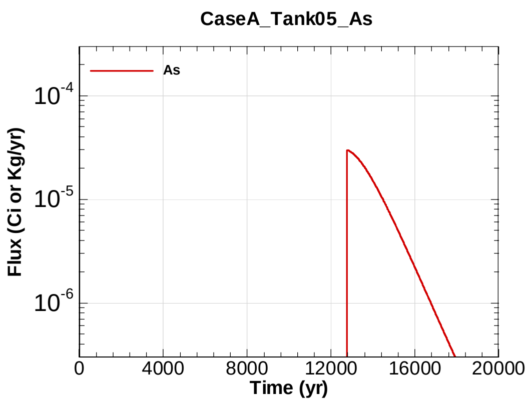

Figure A.1-359 - Flux Leaving Liner for CaseA Tank05 As

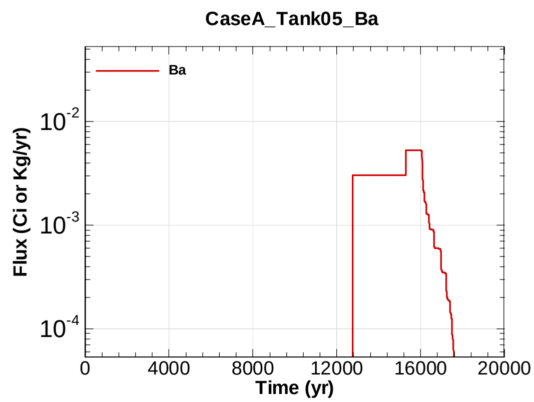

Figure A.1-360 - Flux Leaving Liner for CaseA Tank05 Ba

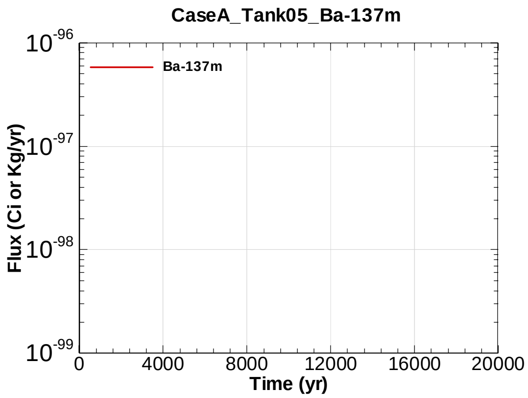

Figure A.1-361 - Flux Leaving Liner for CaseA Tank05 Ba-137m

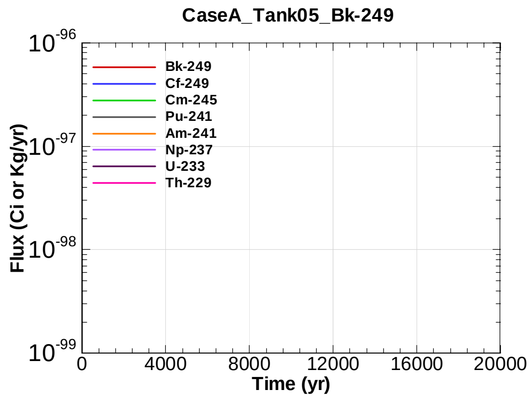

Figure A.1-362 - Flux Leaving Liner for CaseA Tank05 Bk-249

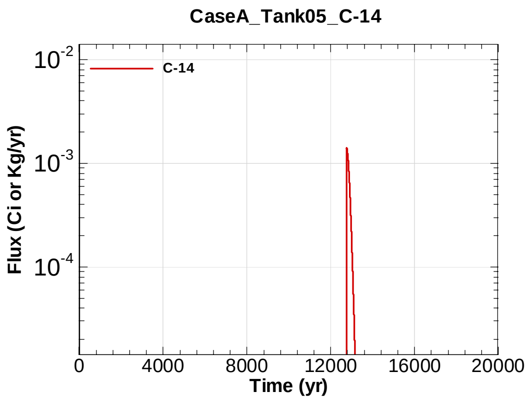

Figure A.1-363 - Flux Leaving Liner for CaseA Tank05 C-14

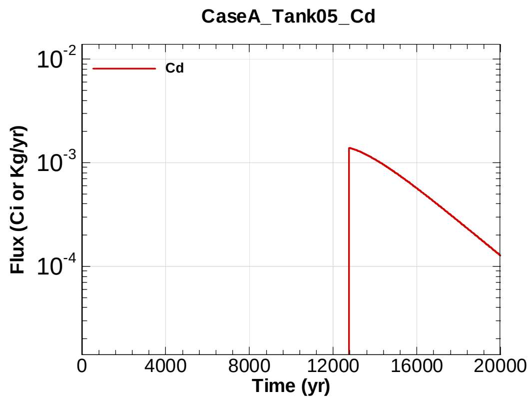

Figure A.1-364 - Flux Leaving Liner for CaseA Tank05 Cd

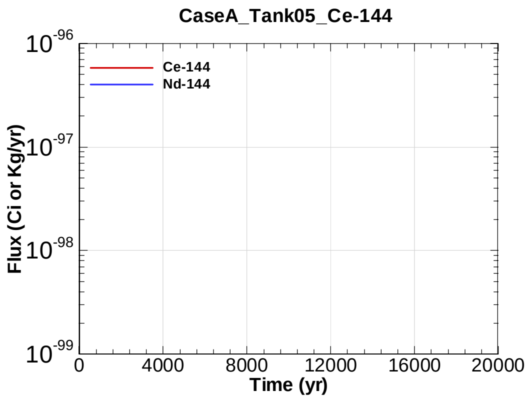

Figure A.1-365 - Flux Leaving Liner for CaseA Tank05 Ce-144

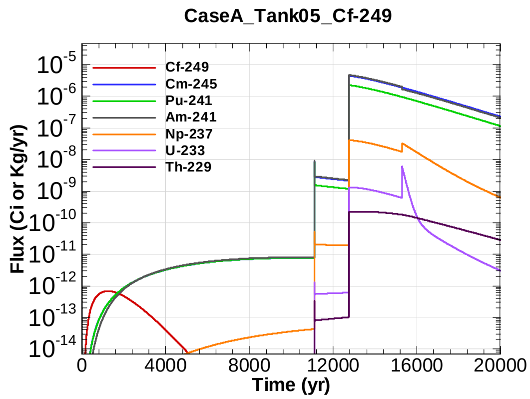

Figure A.1-366 - Flux Leaving Liner for CaseA Tank05 Cf-249

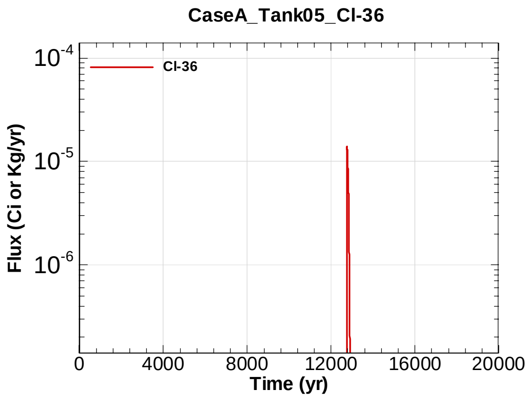

Figure A.1-367 - Flux Leaving Liner for CaseA Tank05 Cl-36

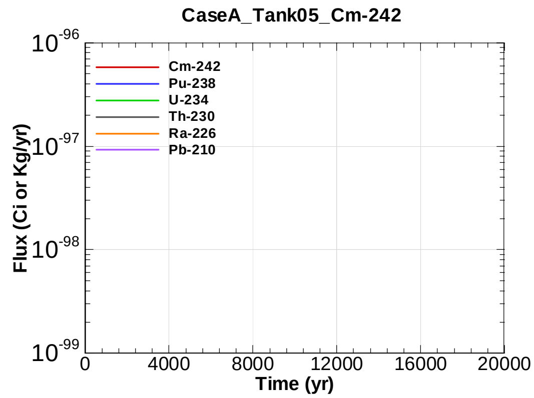

Figure A.1-368 - Flux Leaving Liner for CaseA Tank05 Cm-242

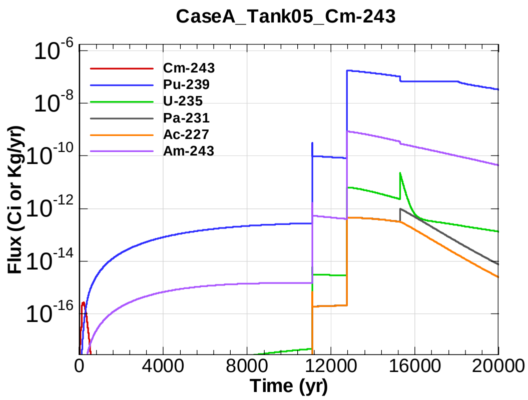

Figure A.1-369 - Flux Leaving Liner for CaseA Tank05 Cm-243

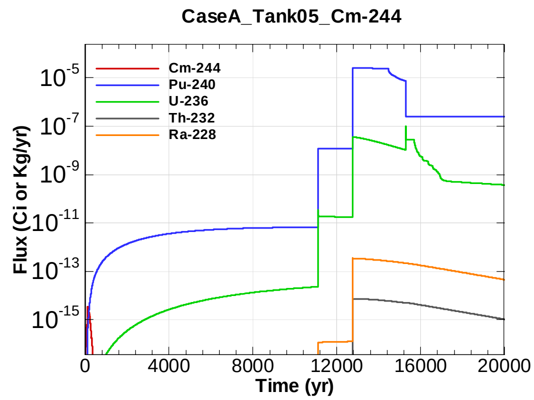

Figure A.1-370 - Flux Leaving Liner for CaseA Tank05 Cm-244

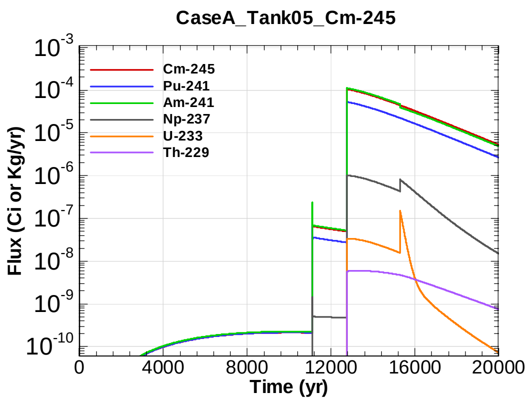

Figure A.1-371 - Flux Leaving Liner for CaseA Tank05 Cm-245

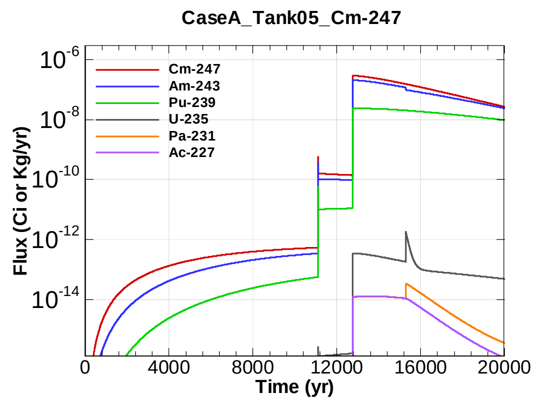

Figure A.1-372 - Flux Leaving Liner for CaseA Tank05 Cm-247

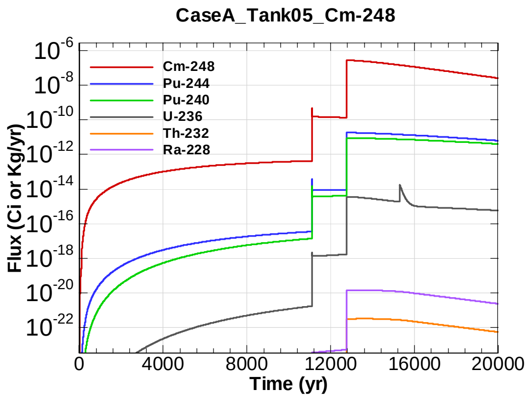

Figure A.1-373 - Flux Leaving Liner for CaseA Tank05 Cm-248

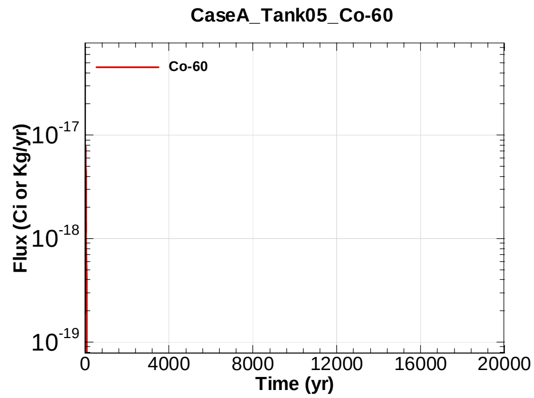

Figure A.1-374 - Flux Leaving Liner for CaseA Tank05 Co-60

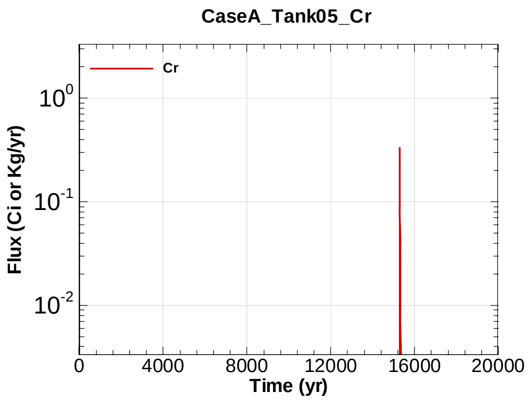

Figure A.1-375 - Flux Leaving Liner for CaseA Tank05 Cr

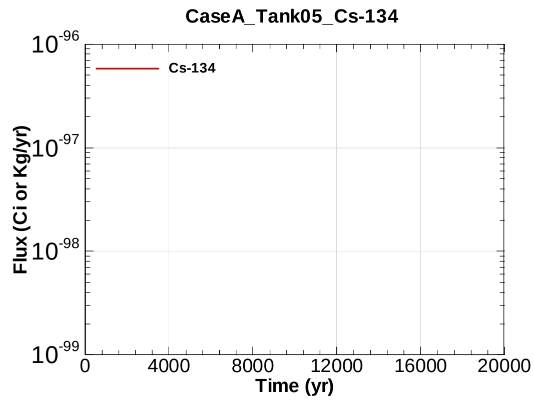

Figure A.1-376 - Flux Leaving Liner for CaseA Tank05 Cs-134

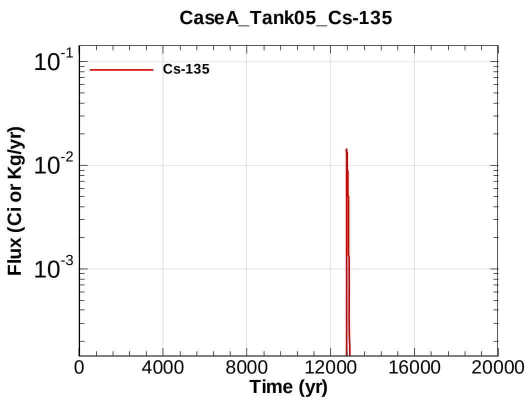

Figure A.1-377 - Flux Leaving Liner for CaseA Tank05 Cs-135

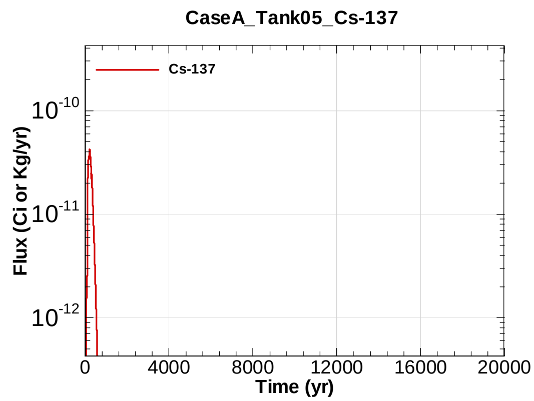

Figure A.1-378 - Flux Leaving Liner for CaseA Tank05 Cs-137

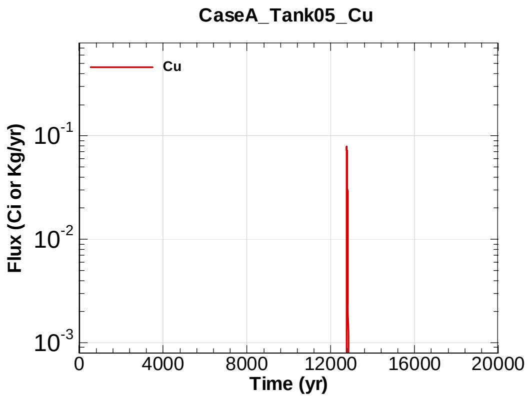

Figure A.1-379 - Flux Leaving Liner for CaseA Tank05 Cu

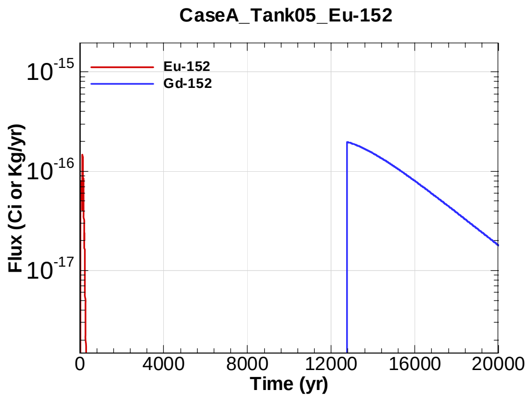

Figure A.1-380 - Flux Leaving Liner for CaseA Tank05 Eu-152

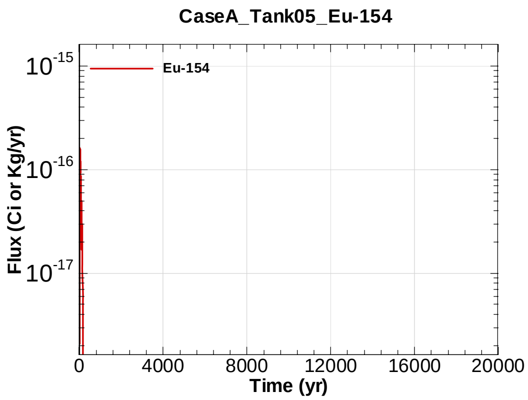

Figure A.1-381 - Flux Leaving Liner for CaseA Tank05 Eu-154

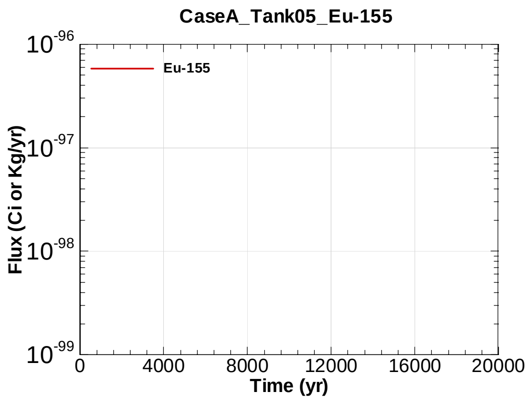

Figure A.1-382 - Flux Leaving Liner for CaseA Tank05 Eu-155

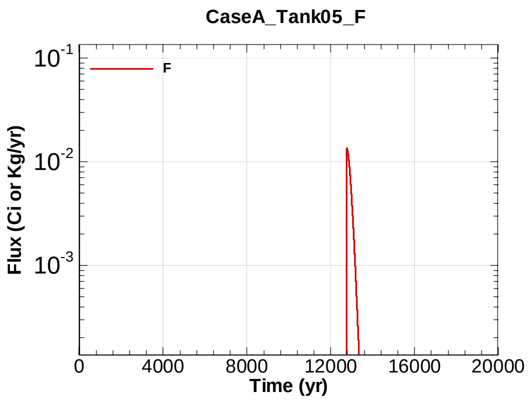

Figure A.1-383 - Flux Leaving Liner for CaseA Tank05 F

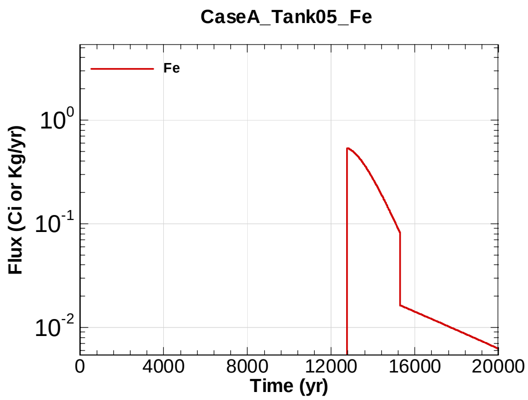

Figure A.1-384 - Flux Leaving Liner for CaseA Tank05 Fe

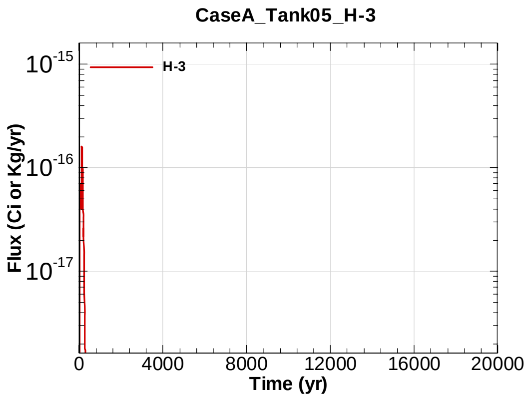

Figure A.1-385 - Flux Leaving Liner for CaseA Tank05 H-3

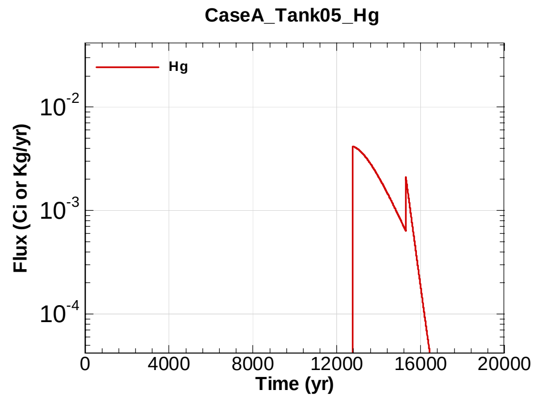

Figure A.1-386 - Flux Leaving Liner for CaseA Tank05 Hg

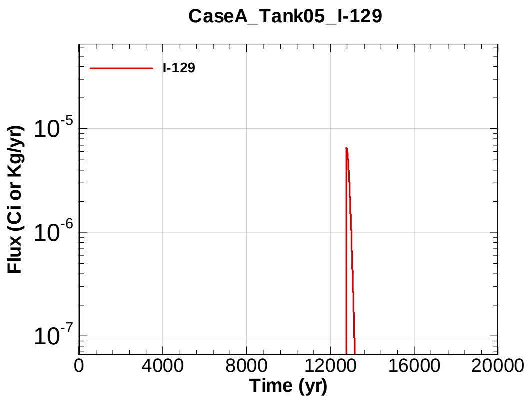

Figure A.1-387 - Flux Leaving Liner for CaseA Tank05 I-129

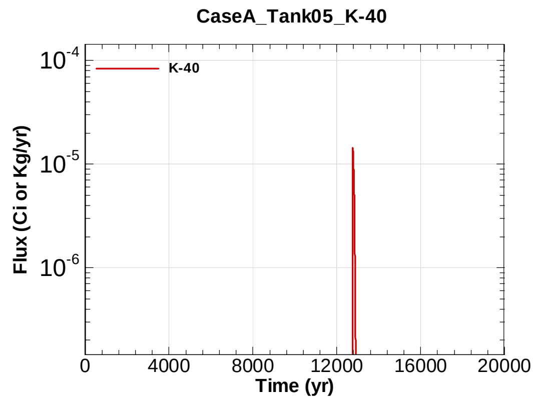

Figure A.1-388 - Flux Leaving Liner for CaseA Tank05 K-40

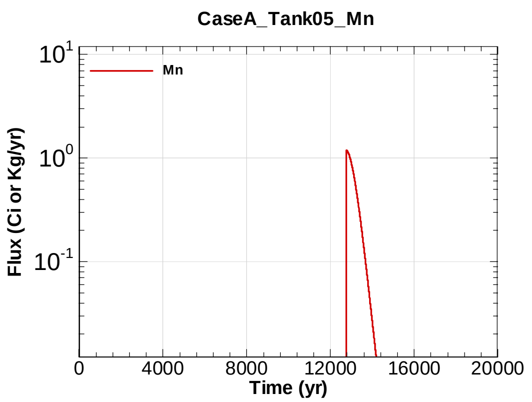

Figure A.1-389 - Flux Leaving Liner for CaseA Tank05 Mn

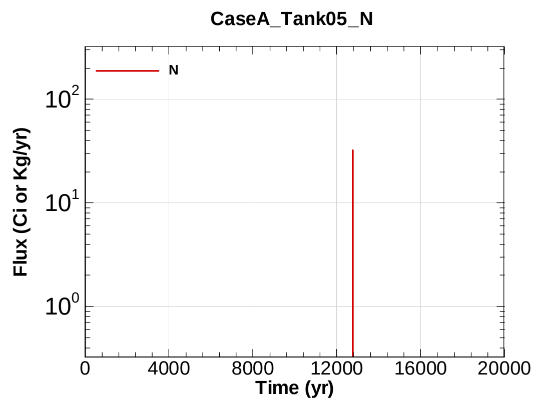

Figure A.1-390 - Flux Leaving Liner for CaseA Tank05 N

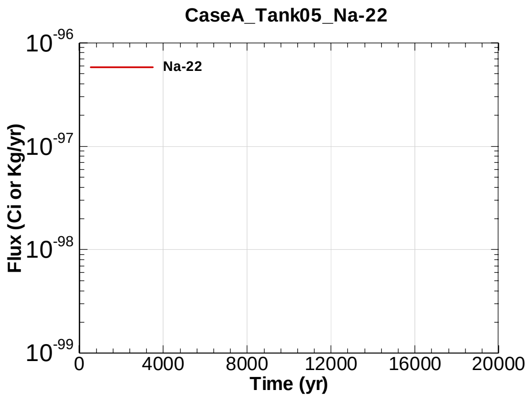

Figure A.1-391 - Flux Leaving Liner for CaseA Tank05 Na-22

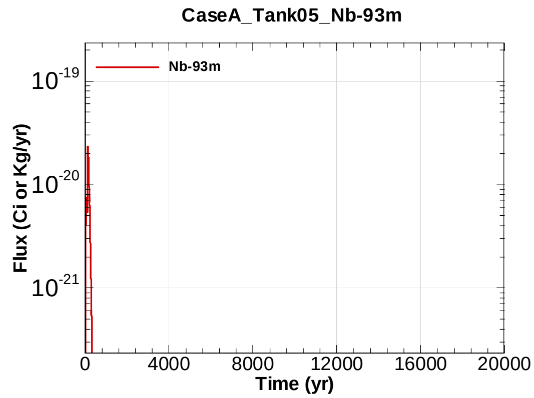

Figure A.1-392 - Flux Leaving Liner for CaseA Tank05 Nb-93m

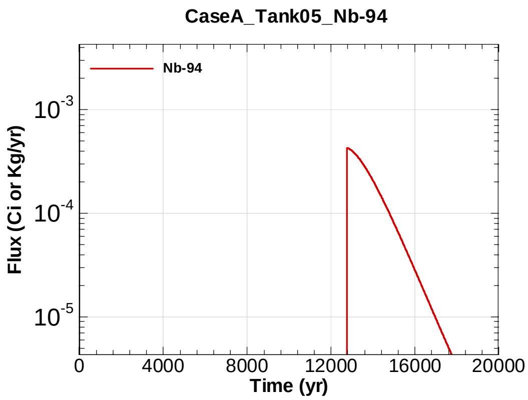

Figure A.1-393 - Flux Leaving Liner for CaseA Tank05 Nb-94

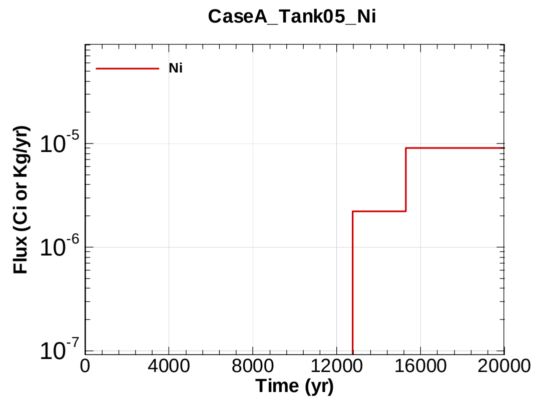

Figure A.1-394 - Flux Leaving Liner for CaseA Tank05 Ni

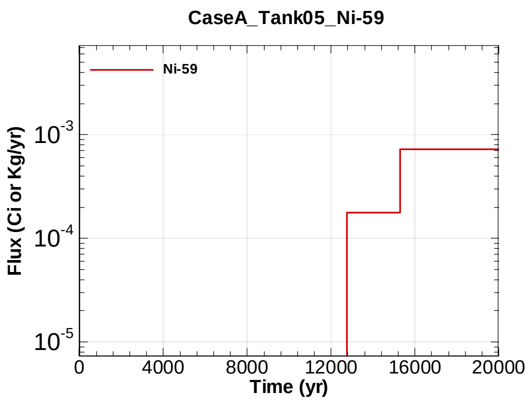

Figure A.1-395 - Flux Leaving Liner for CaseA Tank05 Ni-59

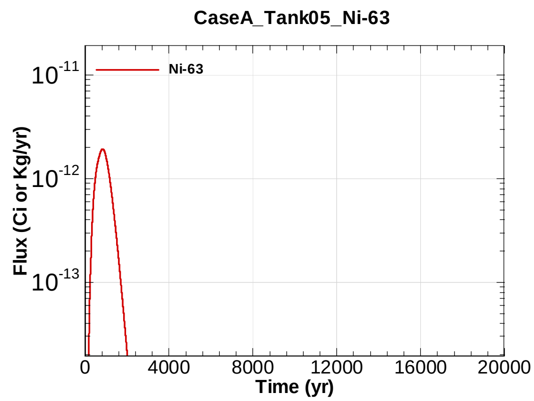

Figure A.1-396 - Flux Leaving Liner for CaseA Tank05 Ni-63

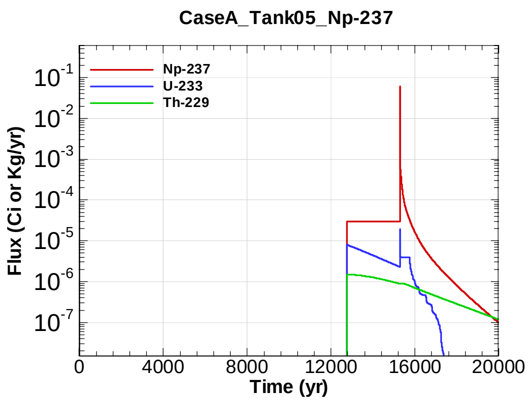

Figure A.1-397 - Flux Leaving Liner for CaseA Tank05 Np-237

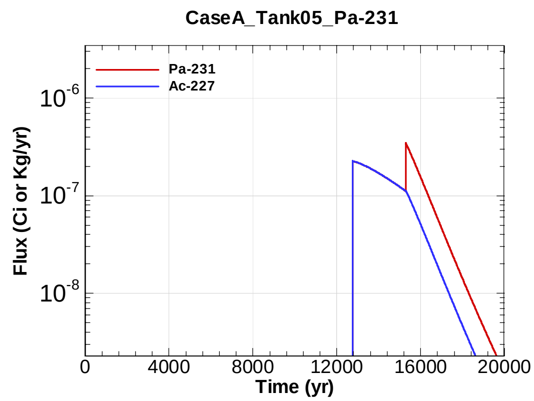

Figure A.1-398 - Flux Leaving Liner for CaseA Tank05 Pa-231

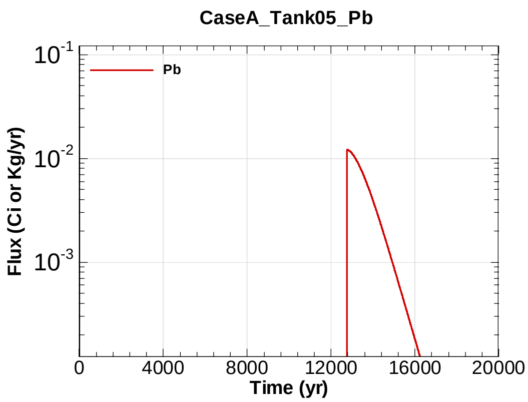

Figure A.1-399 - Flux Leaving Liner for CaseA Tank05 Pb

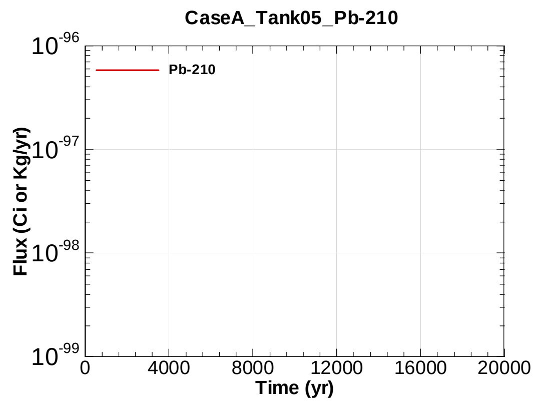

Figure A.1-400 - Flux Leaving Liner for CaseA Tank05 Pb-210

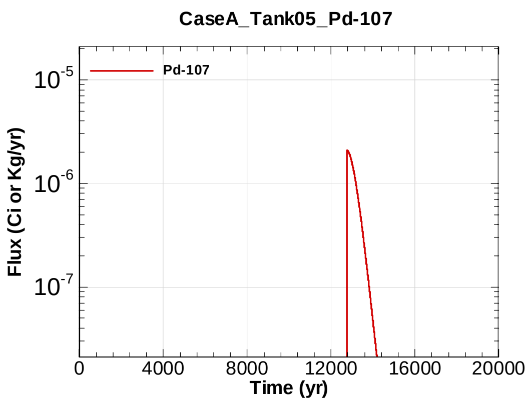

Figure A.1-401 - Flux Leaving Liner for CaseA Tank05 Pd-107

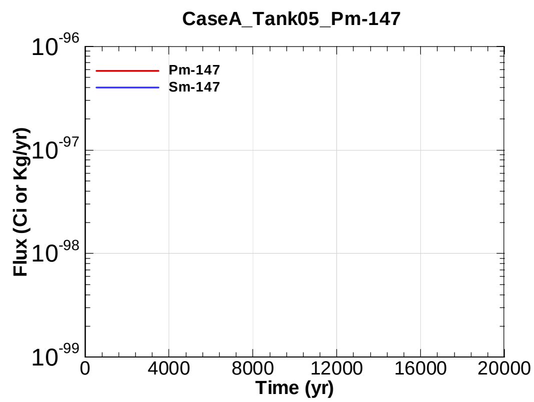

Figure A.1-402 - Flux Leaving Liner for CaseA Tank05 Pm-147

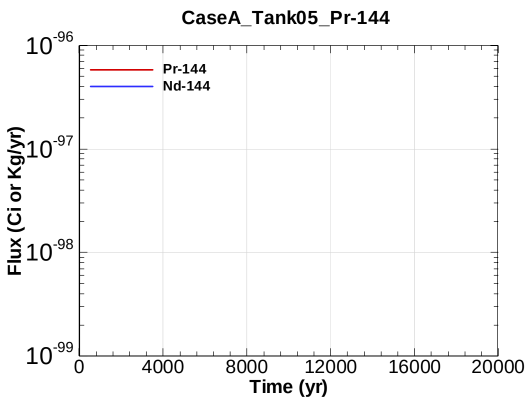

Figure A.1-403 - Flux Leaving Liner for CaseA Tank05 Pr-144

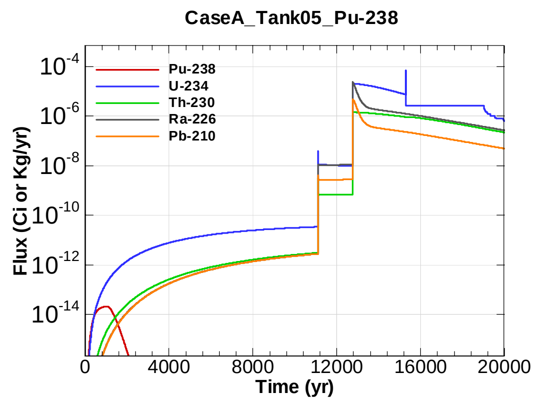

Figure A.1-404 - Flux Leaving Liner for CaseA Tank05 Pu-238

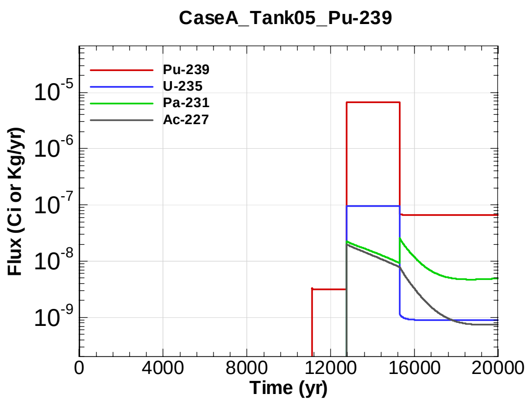

Figure A.1-405 - Flux Leaving Liner for CaseA Tank05 Pu-239

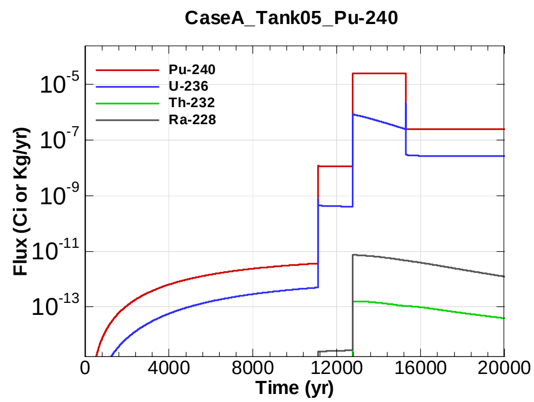

Figure A.1-406 - Flux Leaving Liner for CaseA Tank05 Pu-240

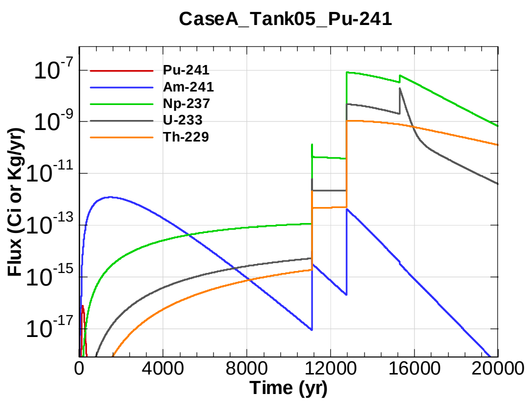

Figure A.1-407 - Flux Leaving Liner for CaseA Tank05 Pu-241

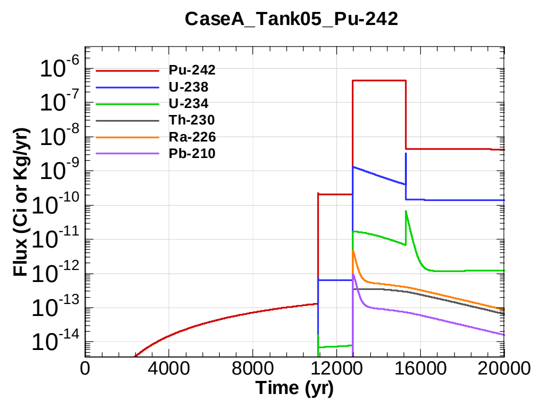

Figure A.1-408 - Flux Leaving Liner for CaseA Tank05 Pu-242

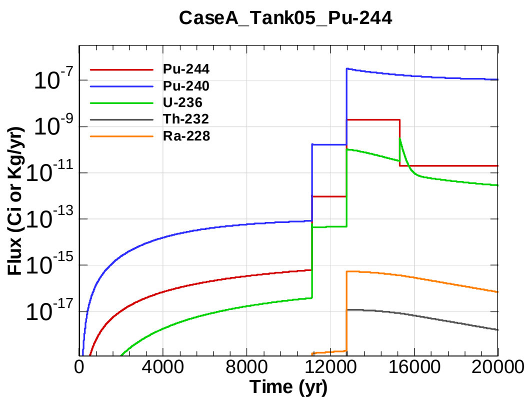

Figure A.1-409 - Flux Leaving Liner for CaseA Tank05 Pu-244

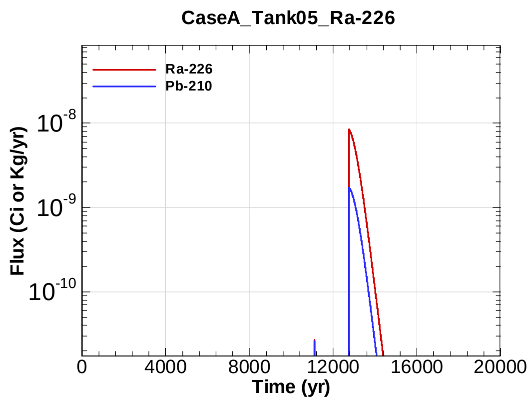

Figure A.1-410 - Flux Leaving Liner for CaseA Tank05 Ra-226

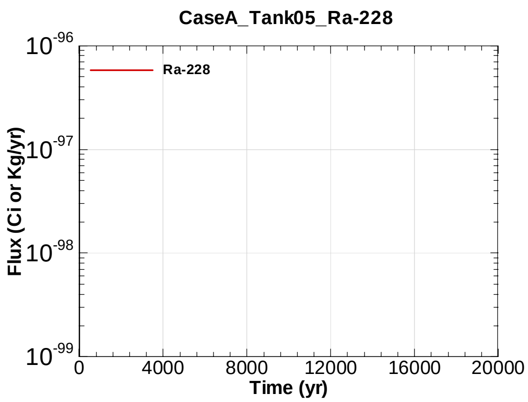

Figure A.1-411 - Flux Leaving Liner for CaseA Tank05 Ra-228

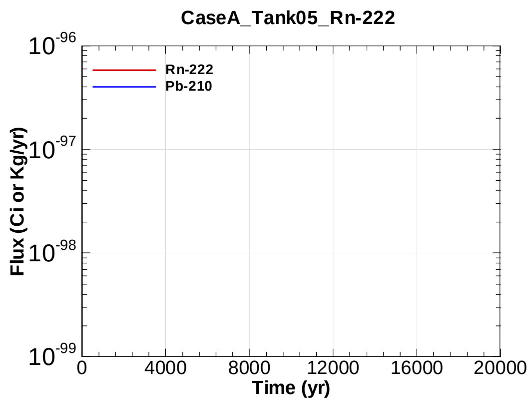

Figure A.1-412 - Flux Leaving Liner for CaseA Tank05 Rn-222

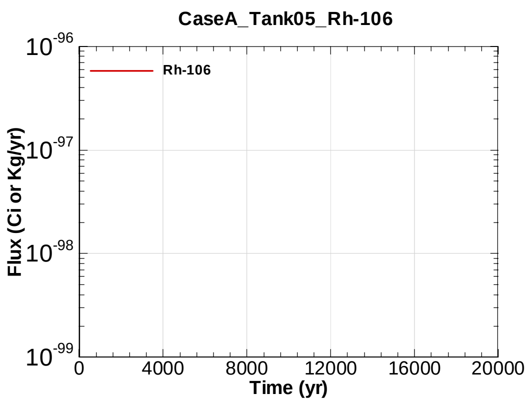

Figure A.1-413 - Flux Leaving Liner for CaseA Tank05 Rh-106

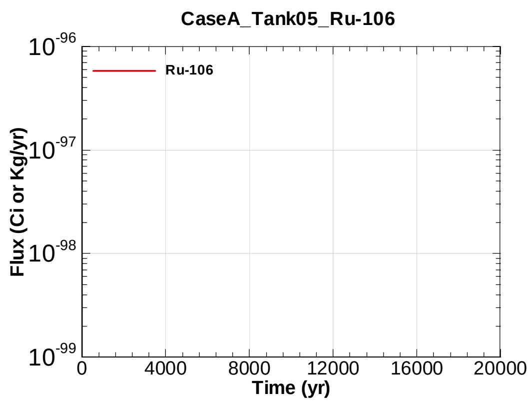

Figure A.1-414 - Flux Leaving Liner for CaseA Tank05 Ru-106

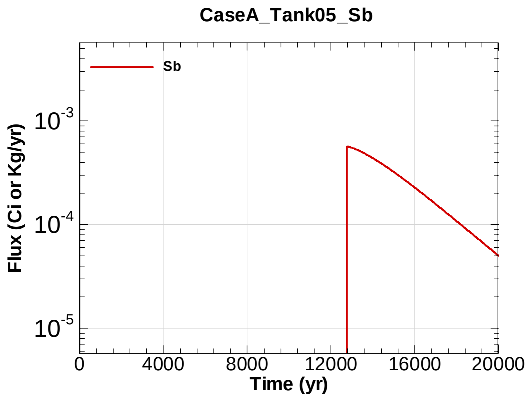

Figure A.1-415 - Flux Leaving Liner for CaseA Tank05 Sb

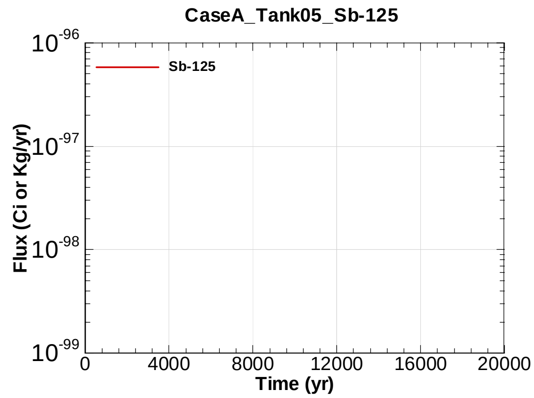

Figure A.1-416 - Flux Leaving Liner for CaseA Tank05 Sb-125

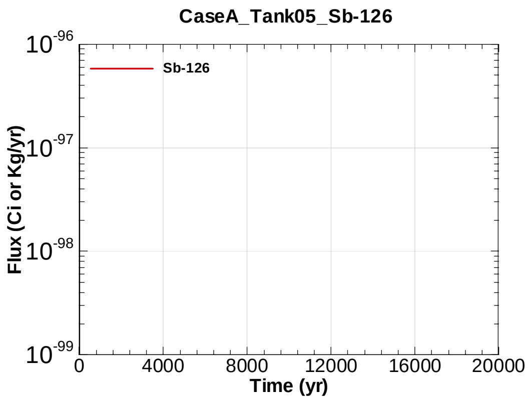

Figure A.1-417 - Flux Leaving Liner for CaseA Tank05 Sb-126

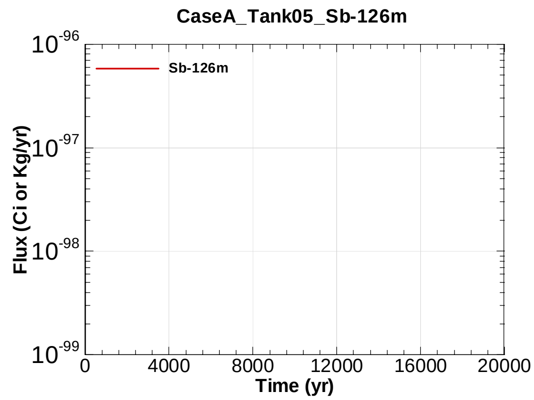

Figure A.1-418 - Flux Leaving Liner for CaseA Tank05 Sb-126m

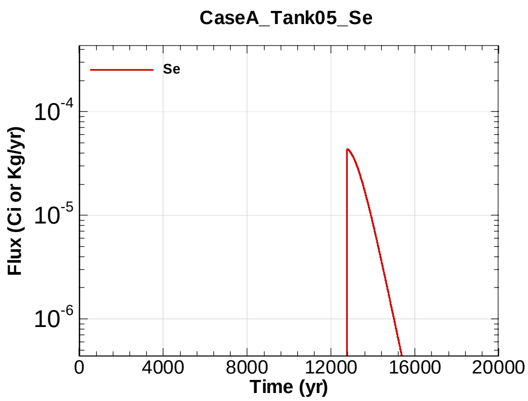

Figure A.1-419 - Flux Leaving Liner for CaseA Tank05 Se

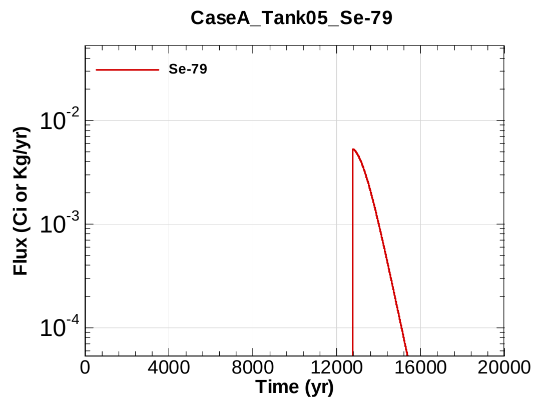

Figure A.1-420 - Flux Leaving Liner for CaseA Tank05 Se-79

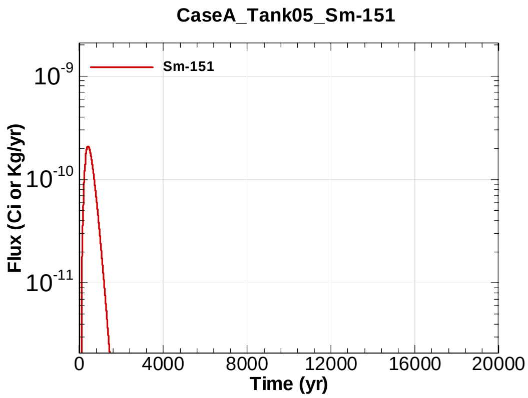

Figure A.1-421 - Flux Leaving Liner for CaseA Tank05 Sm-151

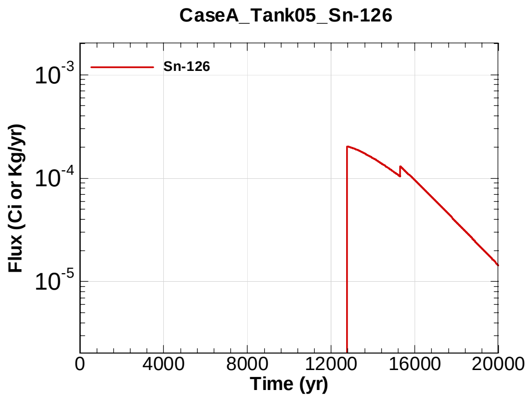

Figure A.1-422 - Flux Leaving Liner for CaseA Tank05 Sn-126

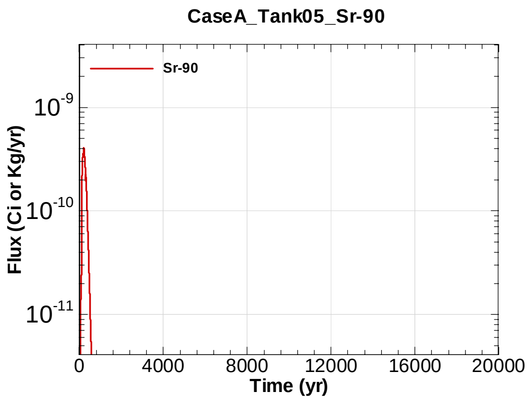

Figure A.1-423 - Flux Leaving Liner for CaseA Tank05 Sr-90

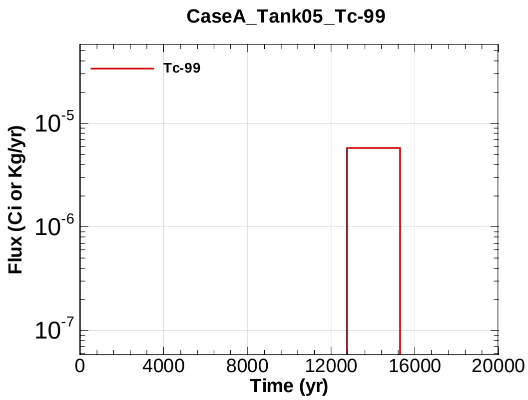

Figure A.1-424 - Flux Leaving Liner for CaseA Tank05 Tc-99

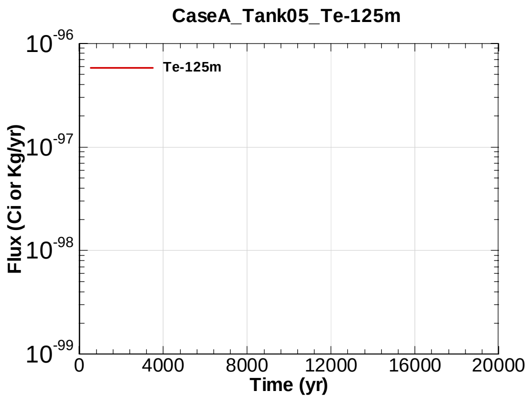

Figure A.1-425 - Flux Leaving Liner for CaseA Tank05 Te-125m

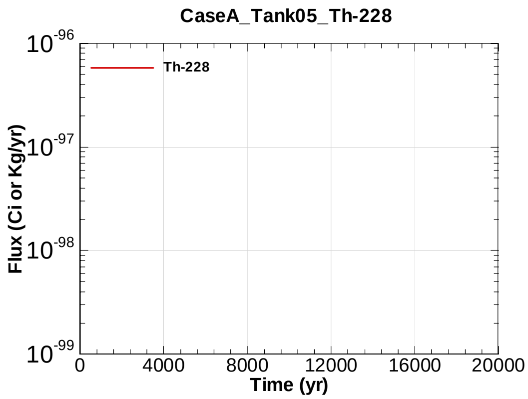

Figure A.1-426 - Flux Leaving Liner for CaseA Tank05 Th-228

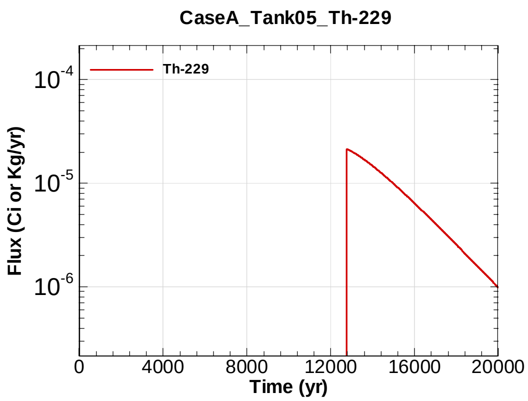

Figure A.1-427 - Flux Leaving Liner for CaseA Tank05 Th-229

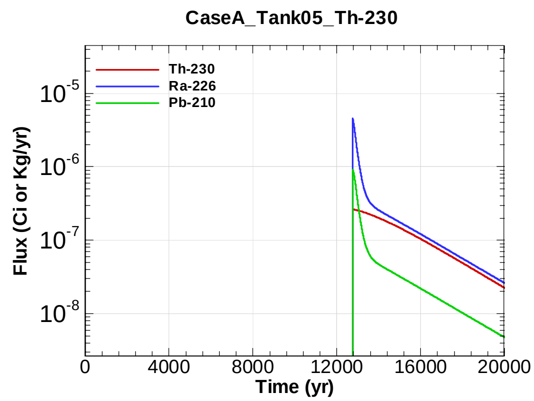

Figure A.1-428 - Flux Leaving Liner for CaseA Tank05 Th-230

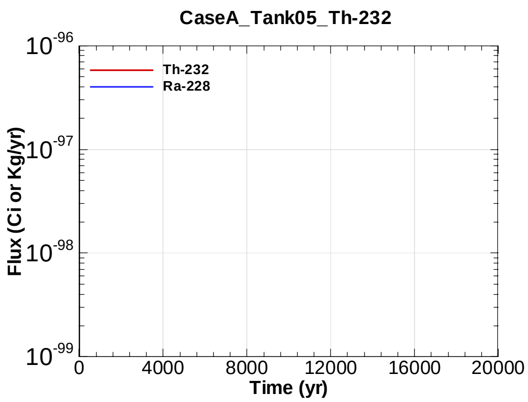

Figure A.1-429 - Flux Leaving Liner for CaseA Tank05 Th-232

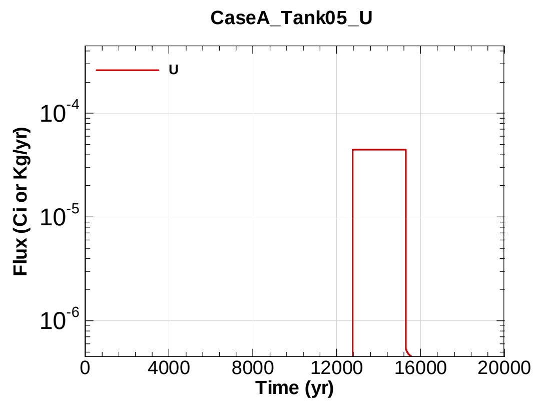

Figure A.1-430 - Flux Leaving Liner for CaseA Tank05 U

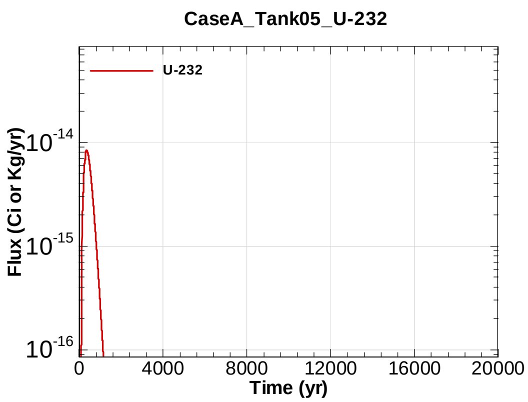

Figure A.1-431 - Flux Leaving Liner for CaseA Tank05 U-232

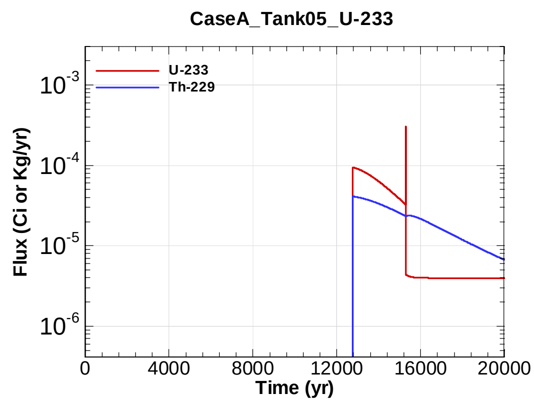

Figure A.1-432 - Flux Leaving Liner for CaseA Tank05 U-233

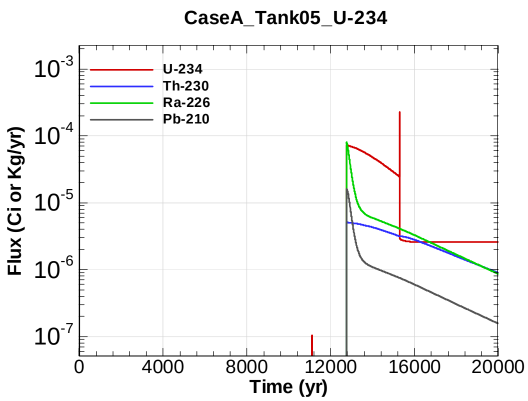

Figure A.1-433 - Flux Leaving Liner for CaseA Tank05 U-234

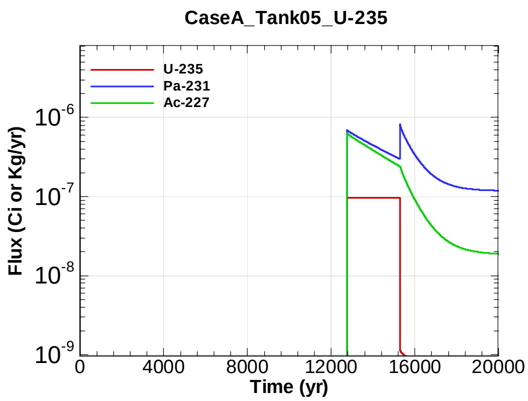

Figure A.1-434 - Flux Leaving Liner for CaseA Tank05 U-235

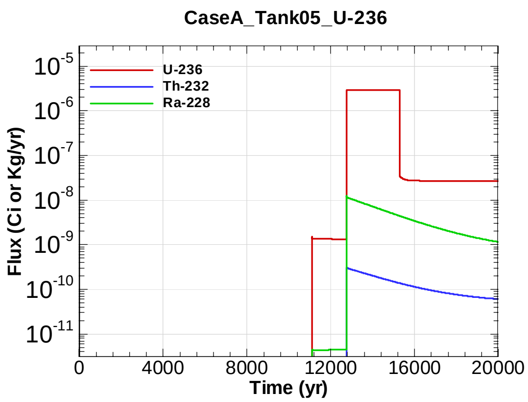

Figure A.1-435 - Flux Leaving Liner for CaseA Tank05 U-236

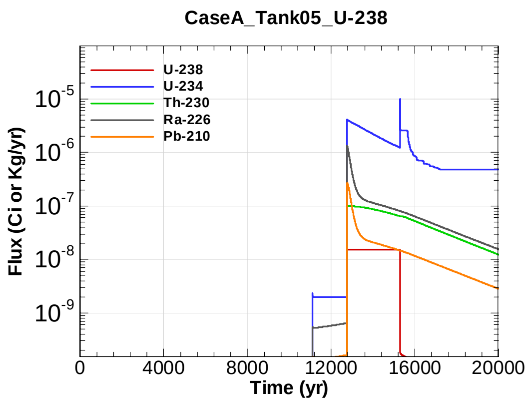

Figure A.1-436 - Flux Leaving Liner for CaseA Tank05 U-238

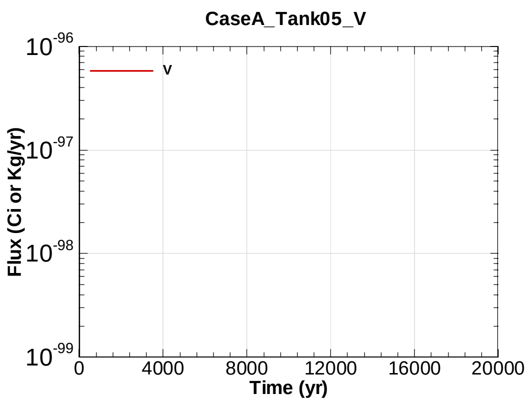

Figure A.1-437 - Flux Leaving Liner for CaseA Tank05 V

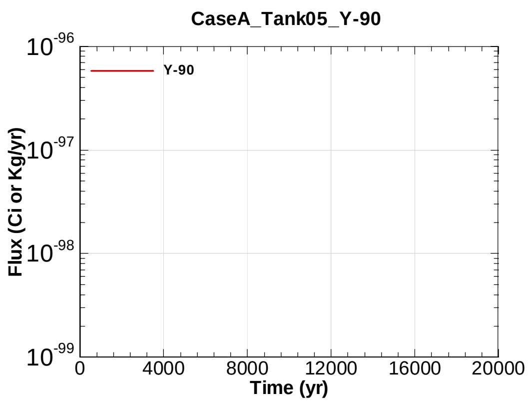

Figure A.1-438 - Flux Leaving Liner for CaseA Tank05 Y-90

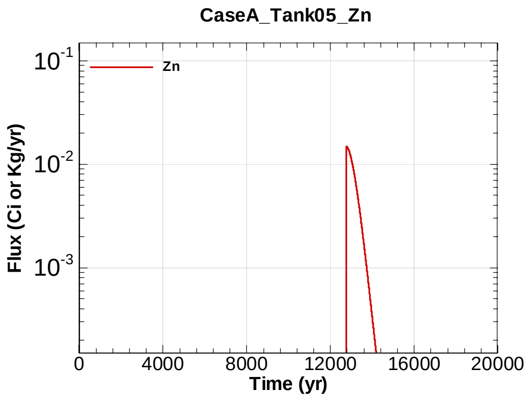

Figure A.1-439 - Flux Leaving Liner for CaseA Tank05 Zn

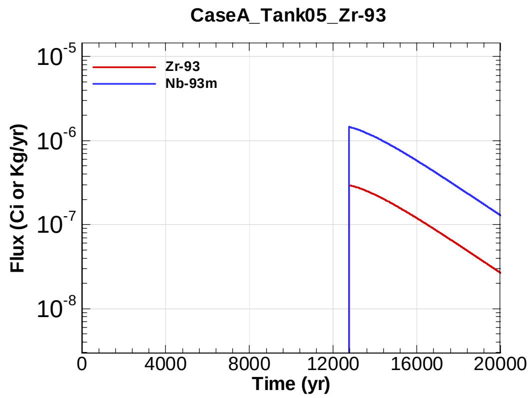

Figure A.1-440 - Flux Leaving Liner for CaseA Tank05 Zr-93

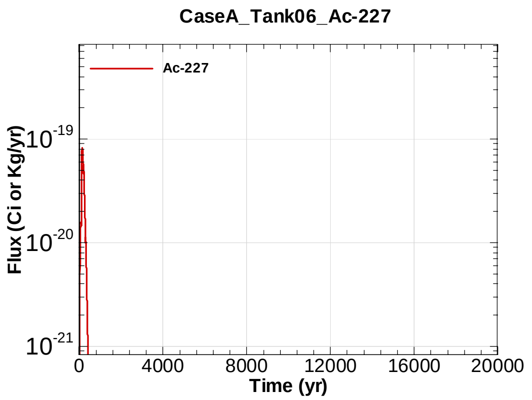

Figure A.1-441 - Flux Leaving Liner for CaseA Tank06 Ac-227

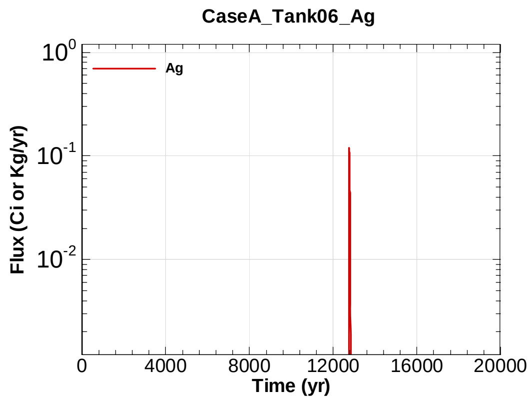

Figure A.1-442 - Flux Leaving Liner for CaseA Tank06 Ag

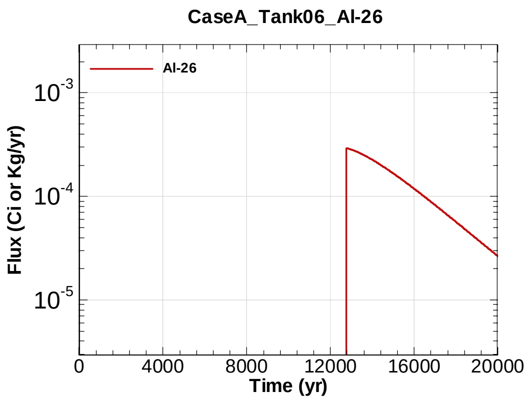

Figure A.1-443 - Flux Leaving Liner for CaseA Tank06 Al-26

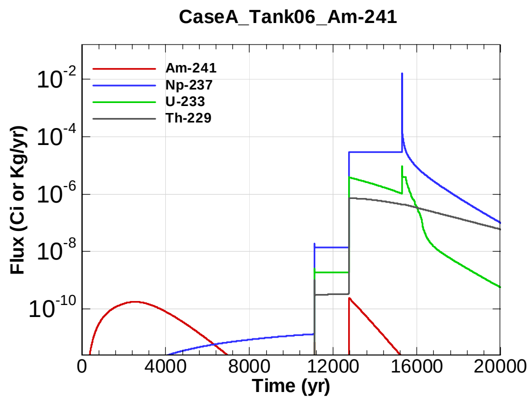

Figure A.1-444 - Flux Leaving Liner for CaseA Tank06 Am-241

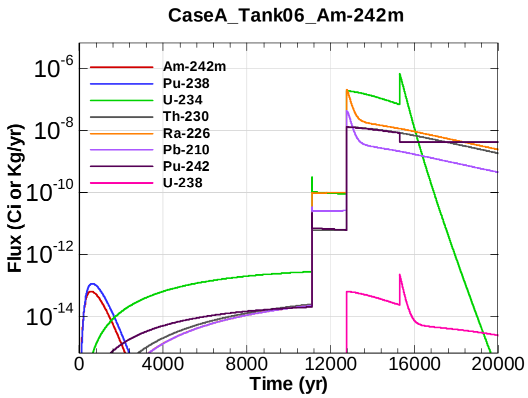

Figure A.1-445 - Flux Leaving Liner for CaseA Tank06 Am-242m

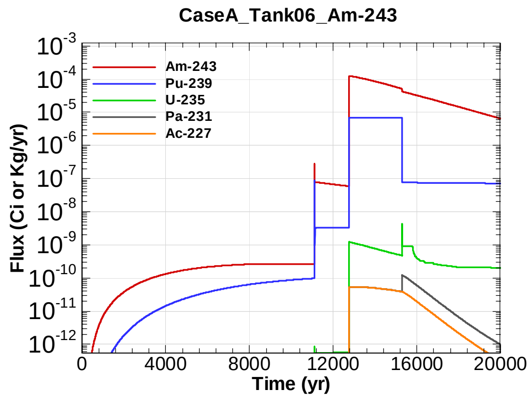

Figure A.1-446 - Flux Leaving Liner for CaseA Tank06 Am-243

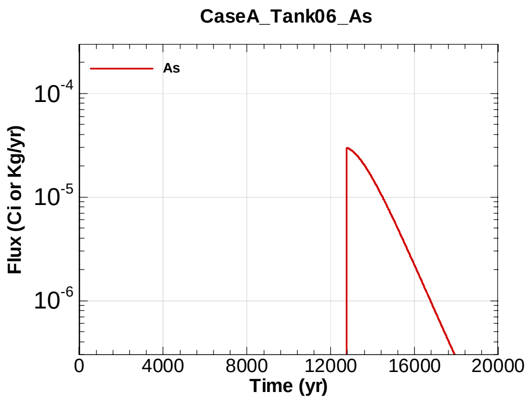

Figure A.1-447 - Flux Leaving Liner for CaseA Tank06 As

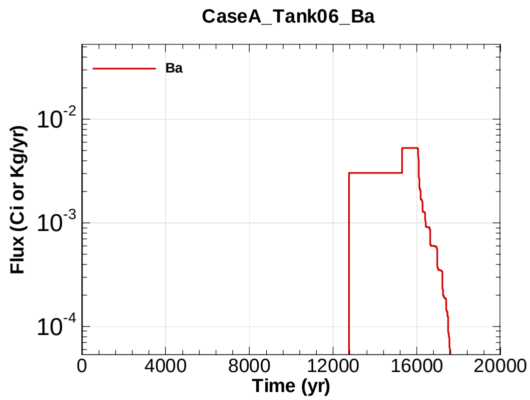

Figure A.1-448 - Flux Leaving Liner for CaseA Tank06 Ba

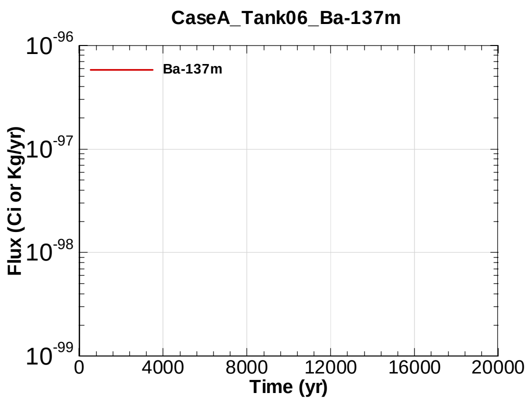

Figure A.1-449 - Flux Leaving Liner for CaseA Tank06 Ba-137m

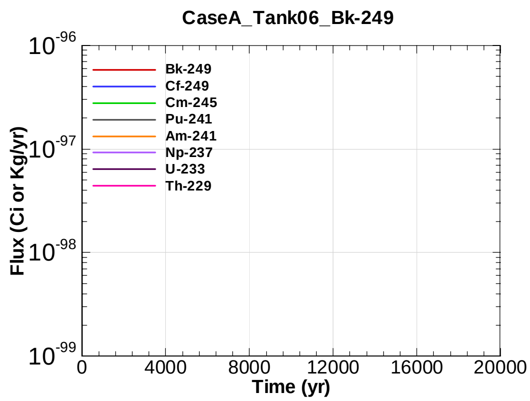

Figure A.1-450 - Flux Leaving Liner for CaseA Tank06 Bk-249

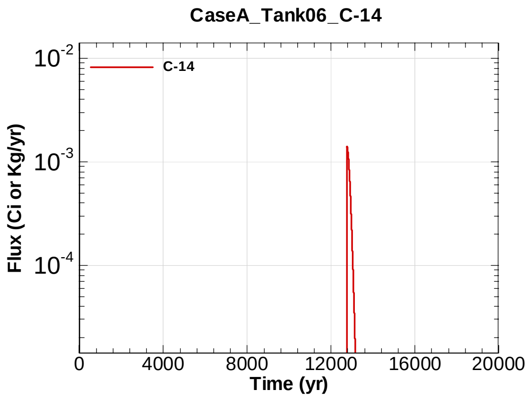

Figure A.1-451 - Flux Leaving Liner for CaseA Tank06 C-14

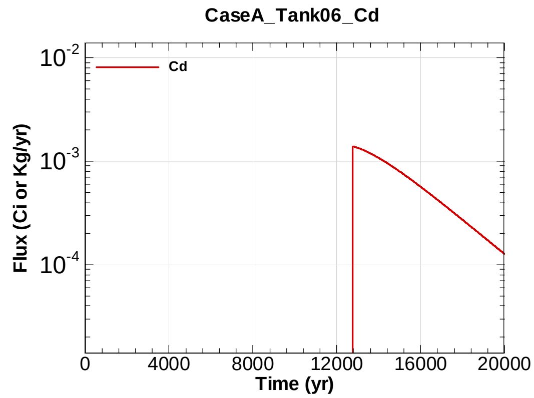

Figure A.1-452 - Flux Leaving Liner for CaseA Tank06 Cd

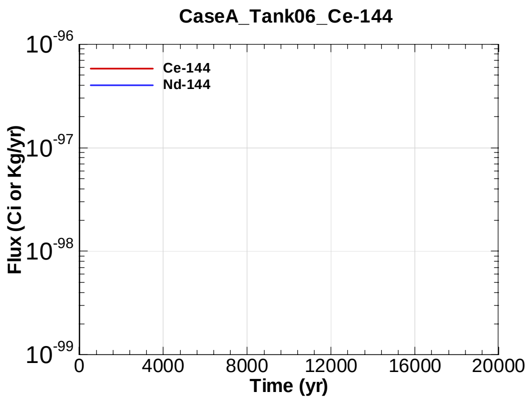

Figure A.1-453 - Flux Leaving Liner for CaseA Tank06 Ce-144

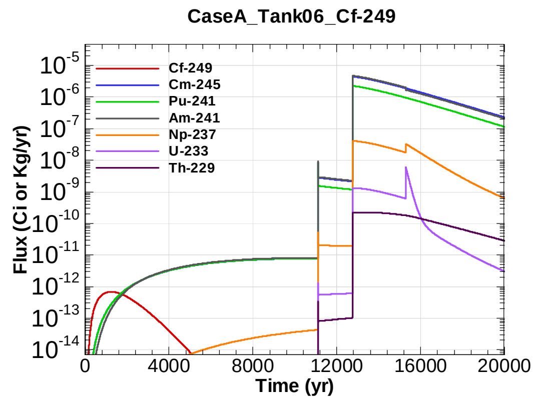

Figure A.1-454 - Flux Leaving Liner for CaseA Tank06 Cf-249

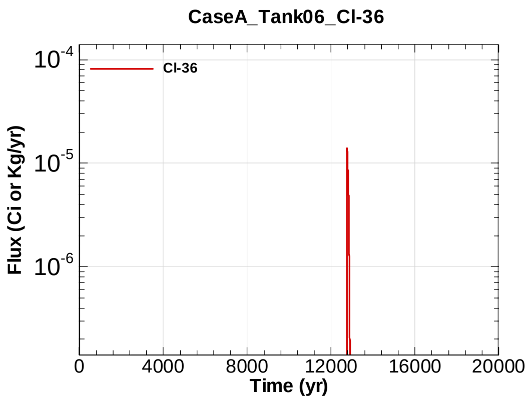

Figure A.1-455 - Flux Leaving Liner for CaseA Tank06 Cl-36

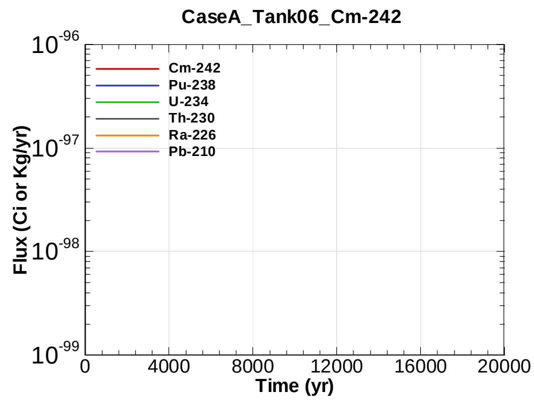

Figure A.1-456 - Flux Leaving Liner for CaseA Tank06 Cm-242

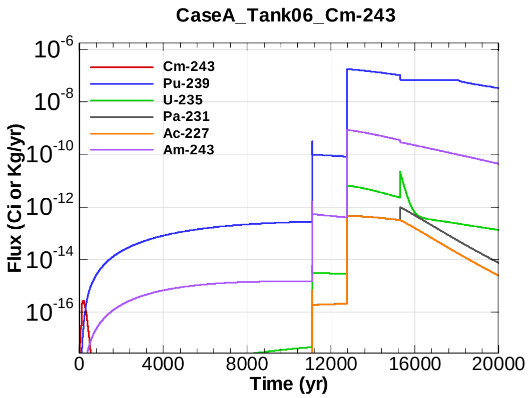

Figure A.1-457 - Flux Leaving Liner for CaseA Tank06 Cm-243

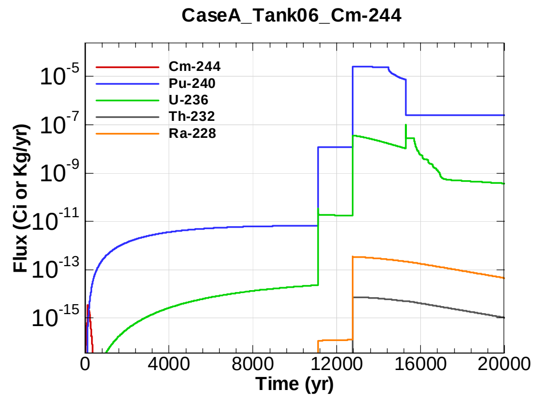

Figure A.1-458 - Flux Leaving Liner for CaseA Tank06 Cm-244

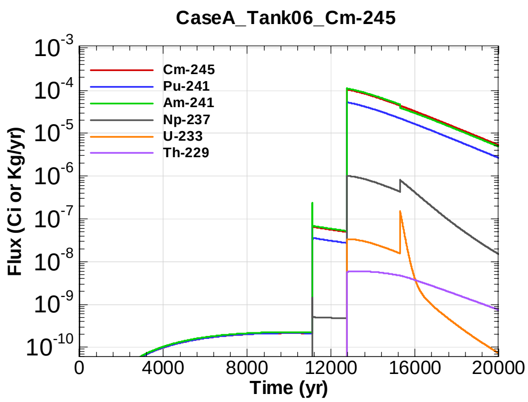

Figure A.1-459 - Flux Leaving Liner for CaseA Tank06 Cm-245

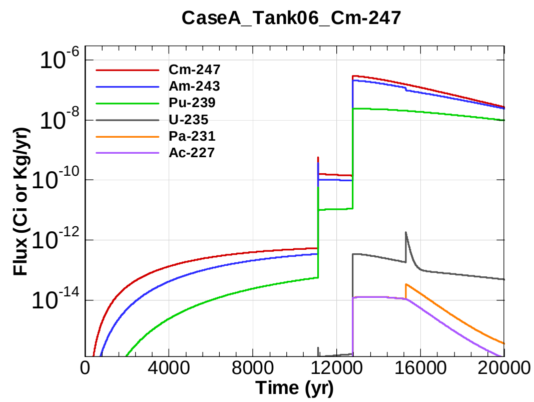

Figure A.1-460 - Flux Leaving Liner for CaseA Tank06 Cm-247

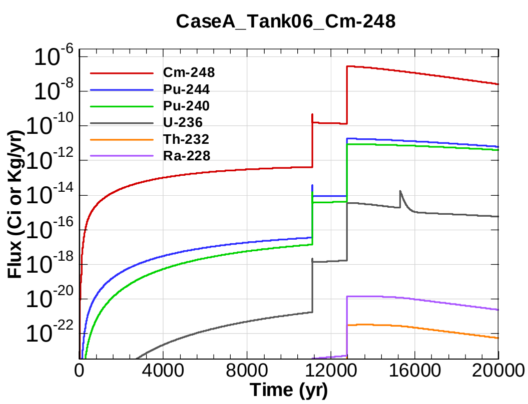

Figure A.1-461 - Flux Leaving Liner for CaseA Tank06 Cm-248

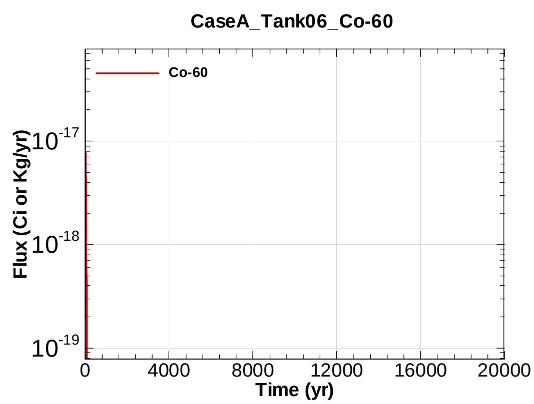

Figure A.1-462 - Flux Leaving Liner for CaseA Tank06 Co-60

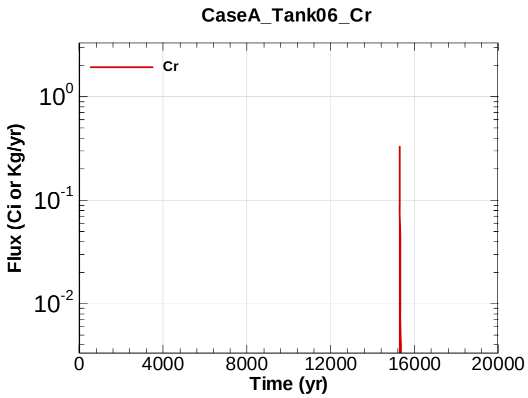

Figure A.1-463 - Flux Leaving Liner for CaseA Tank06 Cr

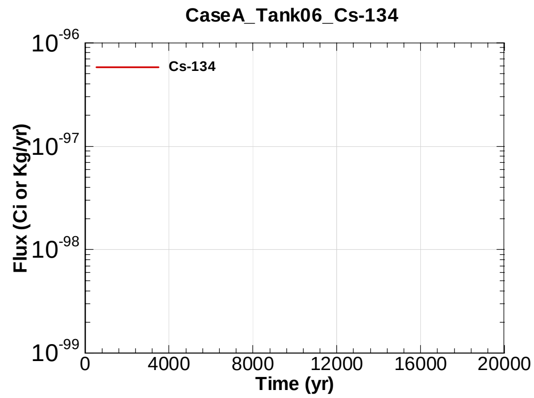

Figure A.1-464 - Flux Leaving Liner for CaseA Tank06 Cs-134

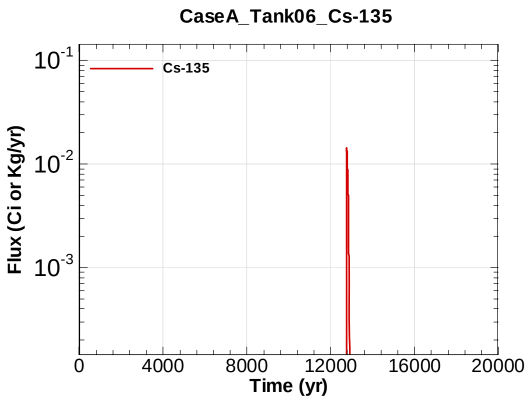

Figure A.1-465 - Flux Leaving Liner for CaseA Tank06 Cs-135

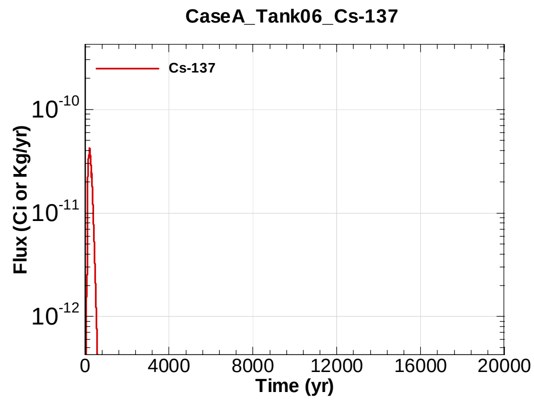

Figure A.1-466 - Flux Leaving Liner for CaseA Tank06 Cs-137

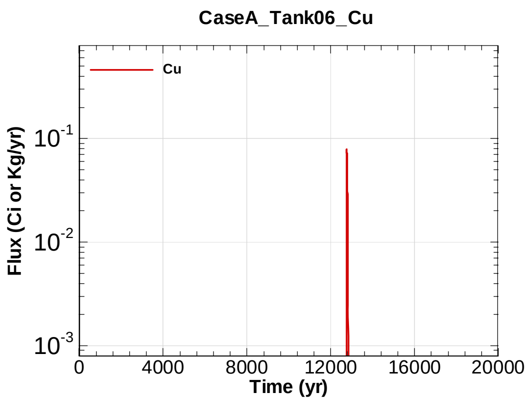

Figure A.1-467 - Flux Leaving Liner for CaseA Tank06 Cu

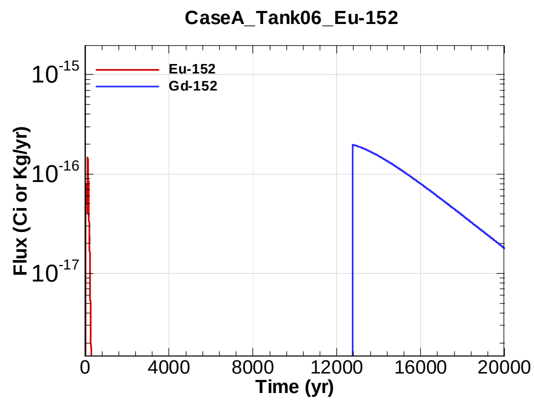

Figure A.1-468 - Flux Leaving Liner for CaseA Tank06 Eu-152

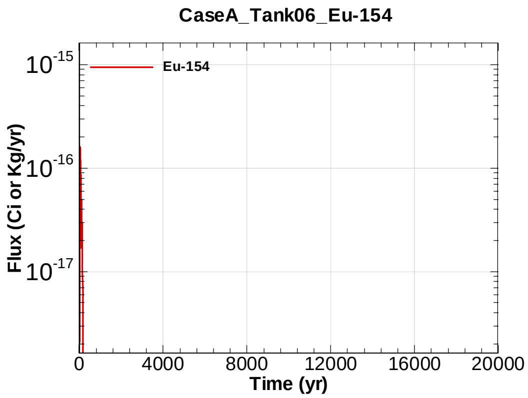

Figure A.1-469 - Flux Leaving Liner for CaseA Tank06 Eu-154

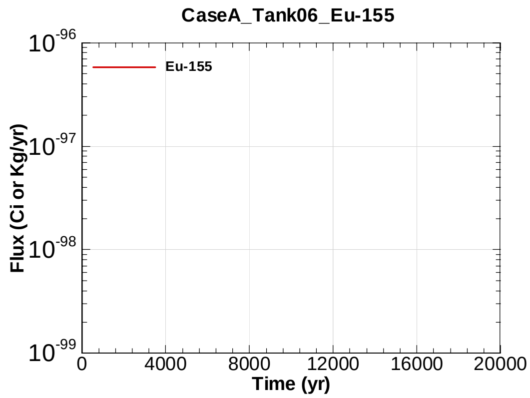

Figure A.1-470 - Flux Leaving Liner for CaseA Tank06 Eu-155

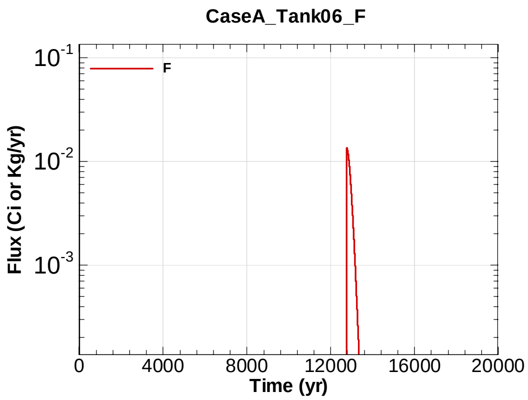

Figure A.1-471 - Flux Leaving Liner for CaseA Tank06 F

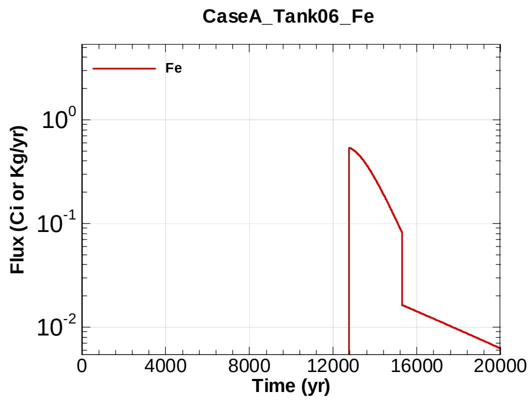

Figure A.1-472 - Flux Leaving Liner for CaseA Tank06 Fe

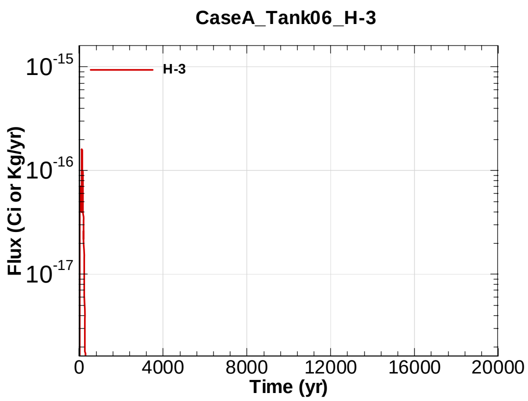

Figure A.1-473 - Flux Leaving Liner for CaseA Tank06 H-3

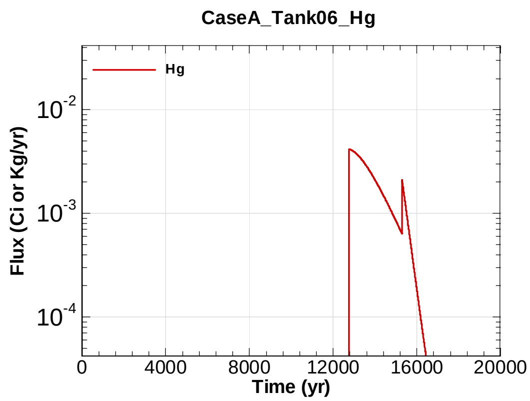

Figure A.1-474 - Flux Leaving Liner for CaseA Tank06 Hg

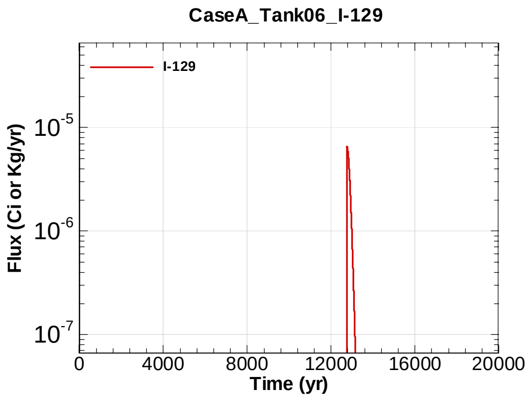

Figure A.1-475 - Flux Leaving Liner for CaseA Tank06 I-129

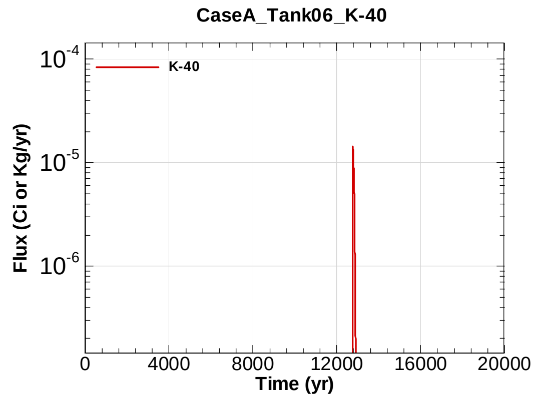

Figure A.1-476 - Flux Leaving Liner for CaseA Tank06 K-40

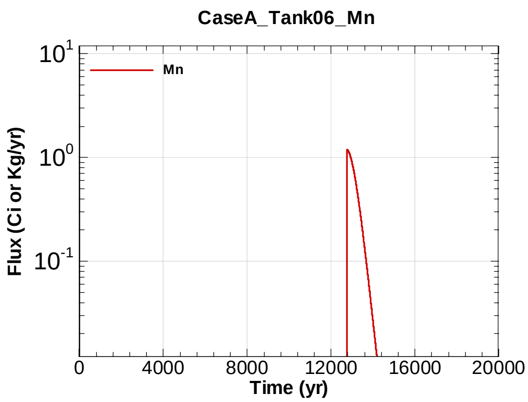

Figure A.1-477 - Flux Leaving Liner for CaseA Tank06 Mn

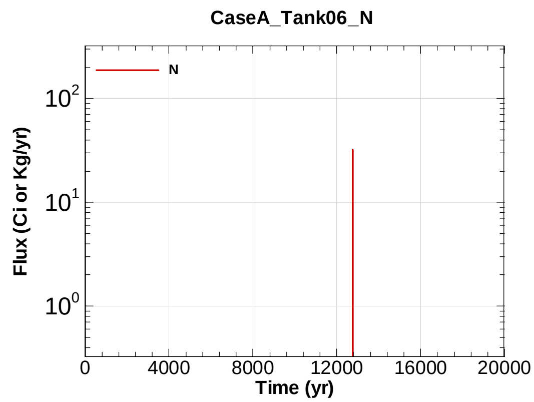

Figure A.1-478 - Flux Leaving Liner for CaseA Tank06 N

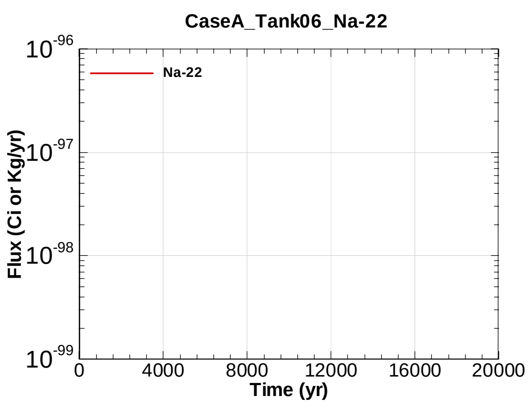

Figure A.1-479 - Flux Leaving Liner for CaseA Tank06 Na-22

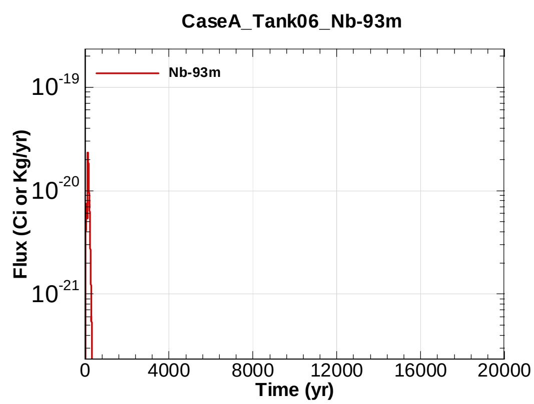

Figure A.1-480 - Flux Leaving Liner for CaseA Tank06 Nb-93m

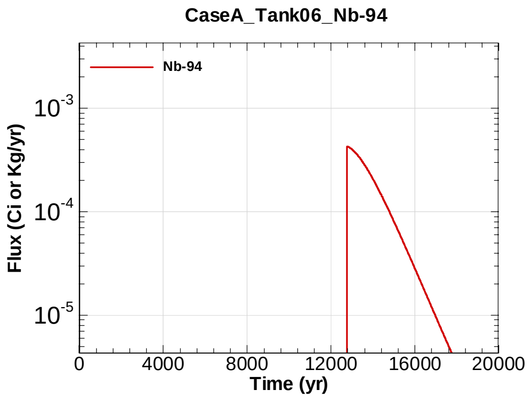

Figure A.1-481 - Flux Leaving Liner for CaseA Tank06 Nb-94

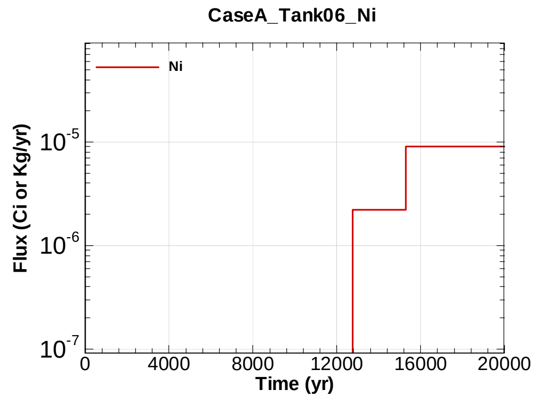

Figure A.1-482 - Flux Leaving Liner for CaseA Tank06 Ni

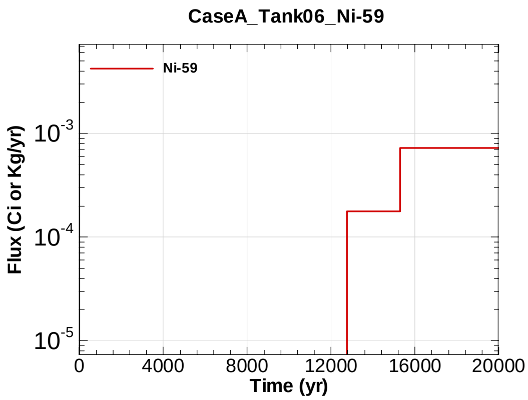

Figure A.1-483 - Flux Leaving Liner for CaseA Tank06 Ni-59

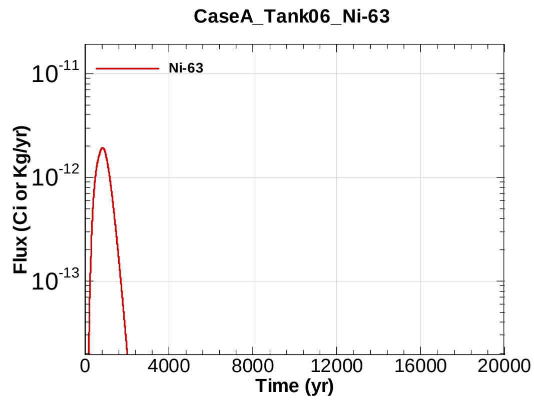

Figure A.1-484 - Flux Leaving Liner for CaseA Tank06 Ni-63

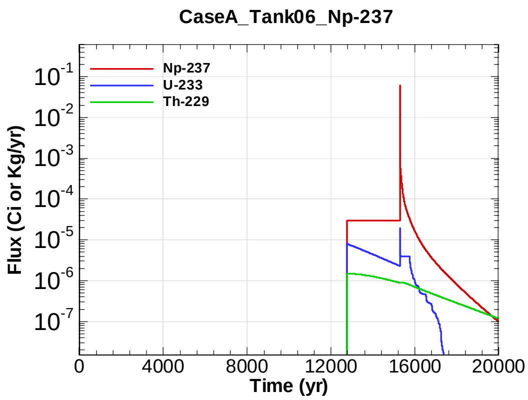

Figure A.1-485 - Flux Leaving Liner for CaseA Tank06 Np-237

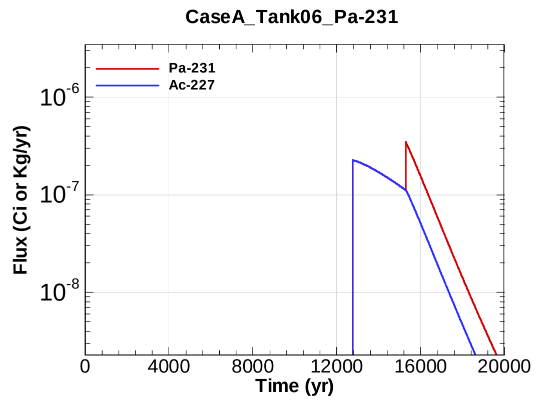

Figure A.1-486 - Flux Leaving Liner for CaseA Tank06 Pa-231

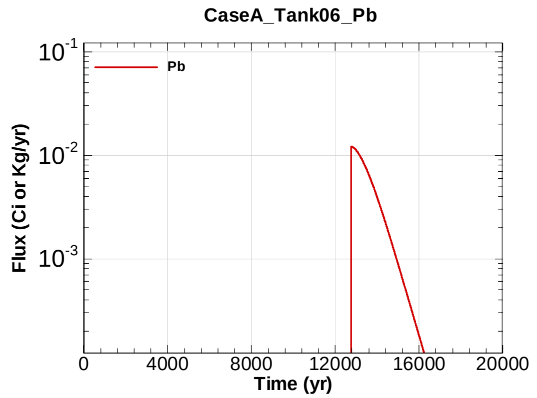

Figure A.1-487 - Flux Leaving Liner for CaseA Tank06 Pb

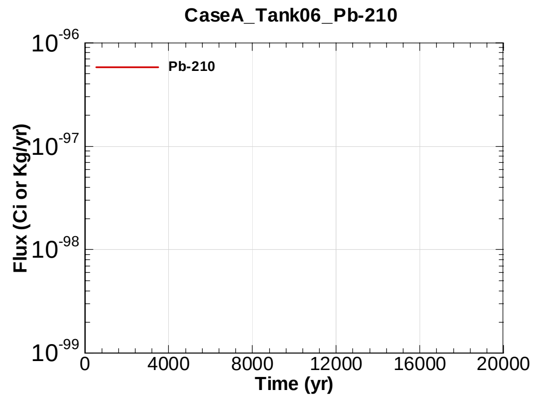

Figure A.1-488 - Flux Leaving Liner for CaseA Tank06 Pb-210

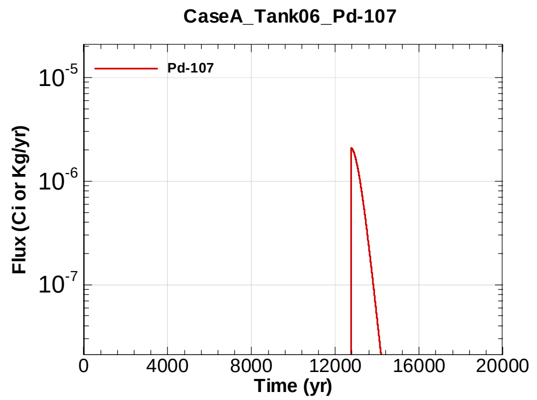

Figure A.1-489 - Flux Leaving Liner for CaseA Tank06 Pd-107

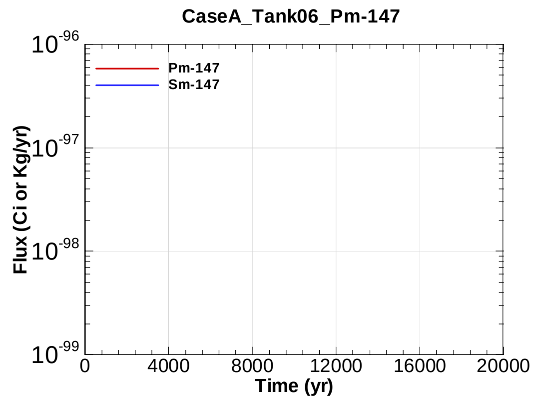

Figure A.1-490 - Flux Leaving Liner for CaseA Tank06 Pm-147

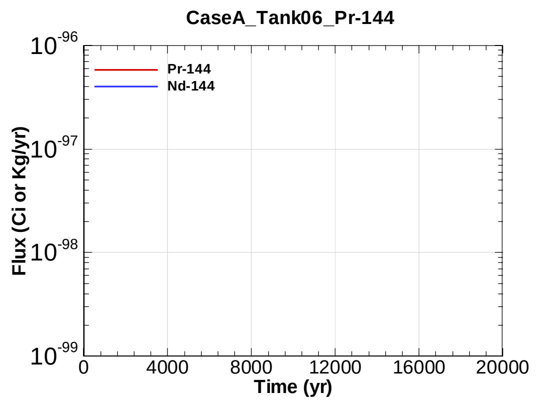

Figure A.1-491 - Flux Leaving Liner for CaseA Tank06 Pr-144

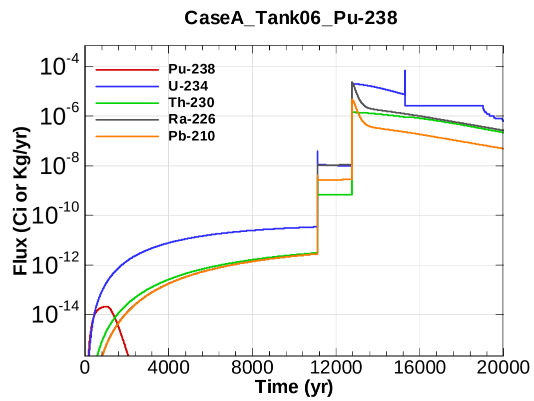

Figure A.1-492 - Flux Leaving Liner for CaseA Tank06 Pu-238

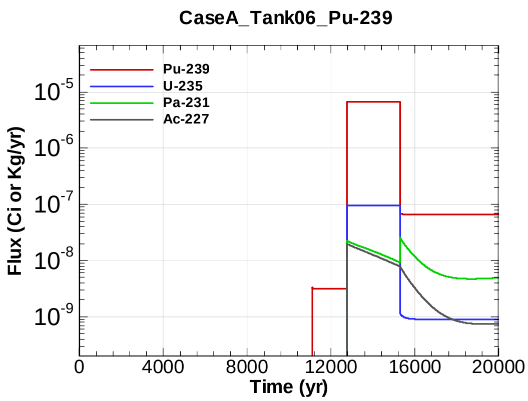

Figure A.1-493 - Flux Leaving Liner for CaseA Tank06 Pu-239

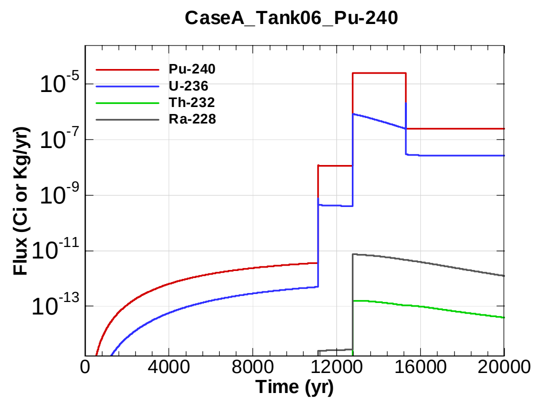

Figure A.1-494 - Flux Leaving Liner for CaseA Tank06 Pu-240

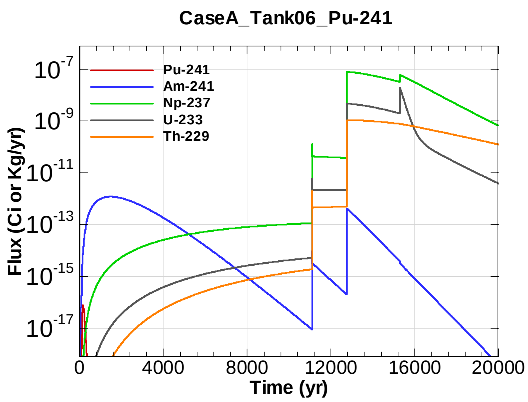

Figure A.1-495 - Flux Leaving Liner for CaseA Tank06 Pu-241

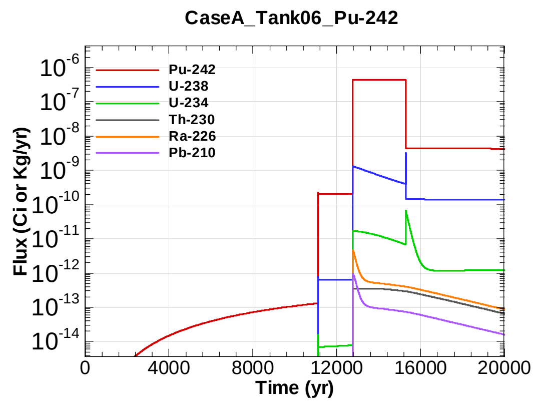

Figure A.1-496 - Flux Leaving Liner for CaseA Tank06 Pu-242

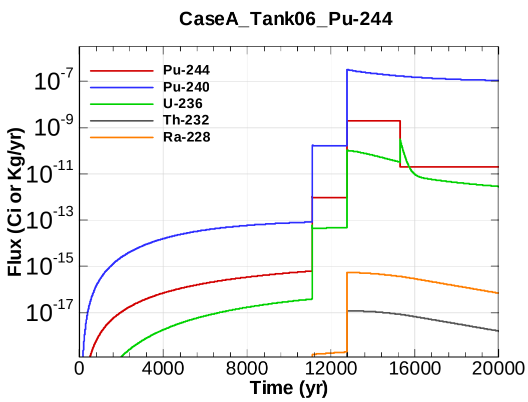

Figure A.1-497 - Flux Leaving Liner for CaseA Tank06 Pu-244

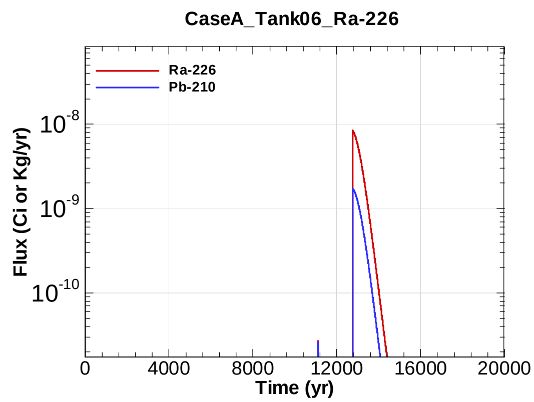

Figure A.1-498 - Flux Leaving Liner for CaseA Tank06 Ra-226

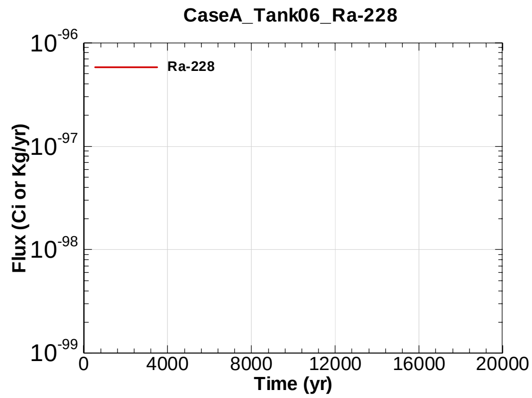

Figure A.1-499 - Flux Leaving Liner for CaseA Tank06 Ra-228

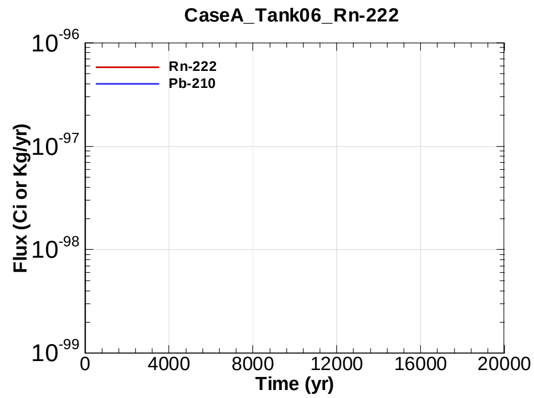

Figure A.1-500 - Flux Leaving Liner for CaseA Tank06 Rn-222

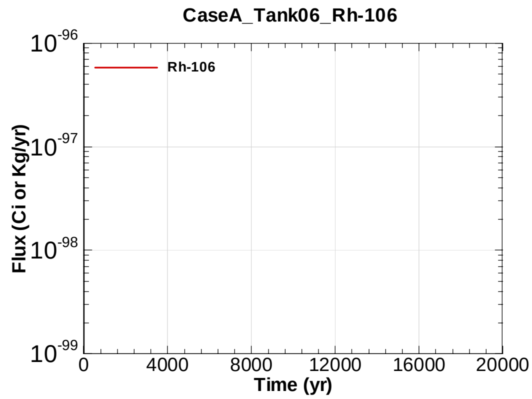

Figure A.1-501 - Flux Leaving Liner for CaseA Tank06 Rh-106

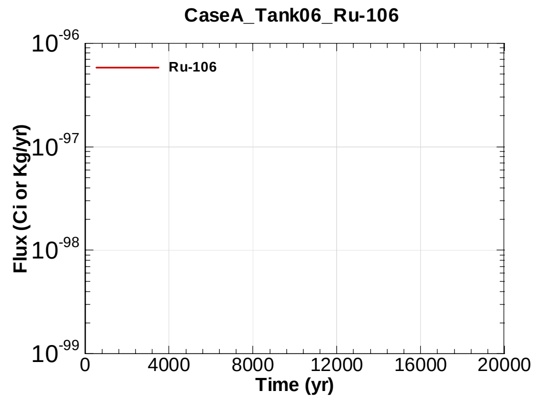

Figure A.1-502 - Flux Leaving Liner for CaseA Tank06 Ru-106

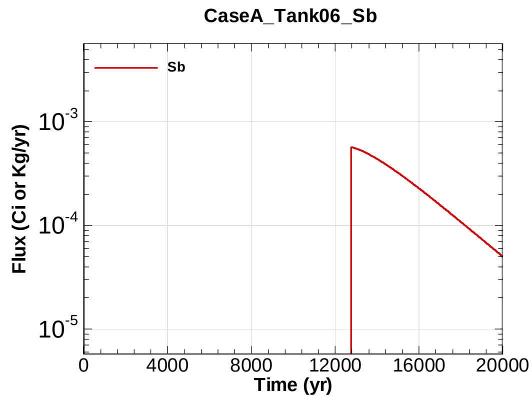

Figure A.1-503 - Flux Leaving Liner for CaseA Tank06 Sb

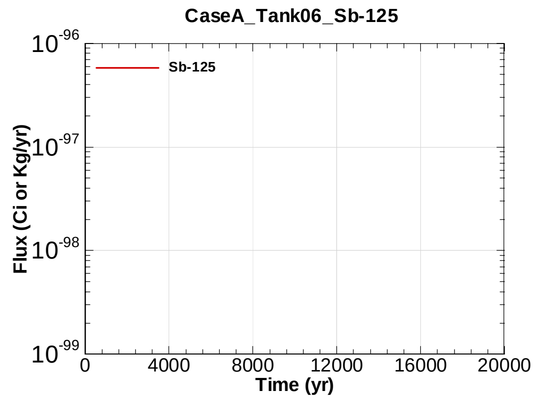

Figure A.1-504 - Flux Leaving Liner for CaseA Tank06 Sb-125

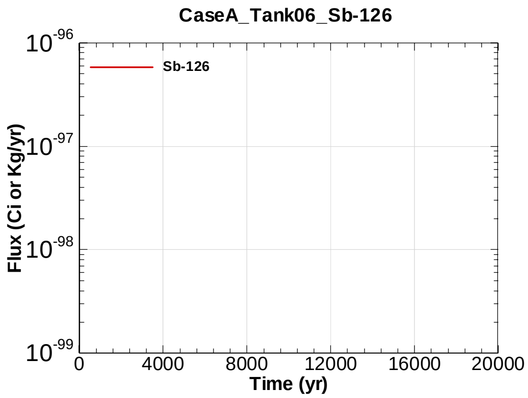

Figure A.1-505 - Flux Leaving Liner for CaseA Tank06 Sb-126

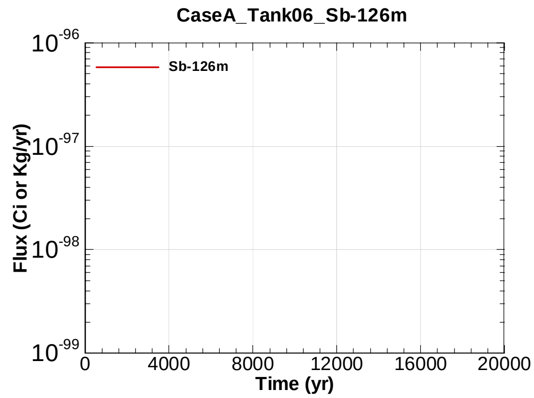

Figure A.1-506 - Flux Leaving Liner for CaseA Tank06 Sb-126m

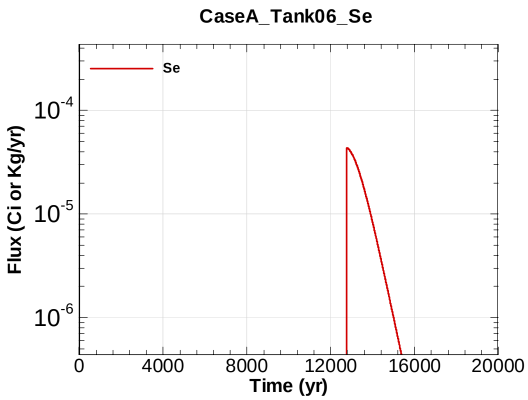

Figure A.1-507 - Flux Leaving Liner for CaseA Tank06 Se

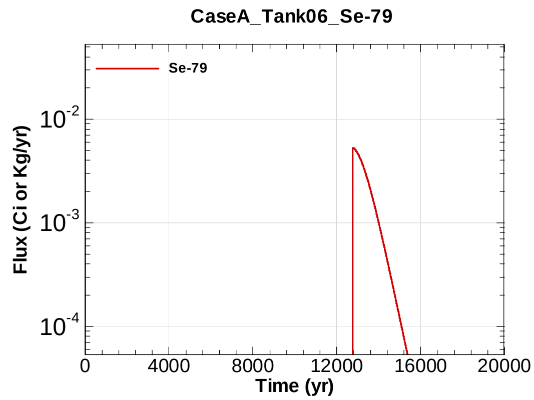

Figure A.1-508 - Flux Leaving Liner for CaseA Tank06 Se-79

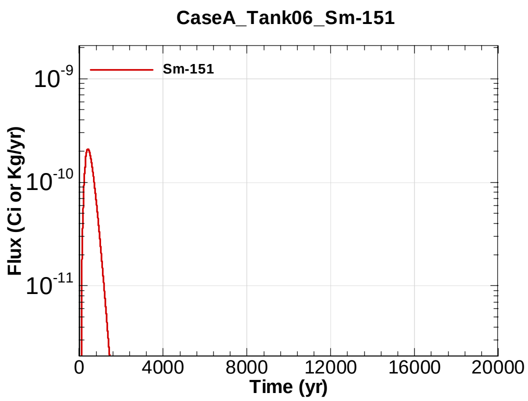

Figure A.1-509 - Flux Leaving Liner for CaseA Tank06 Sm-151

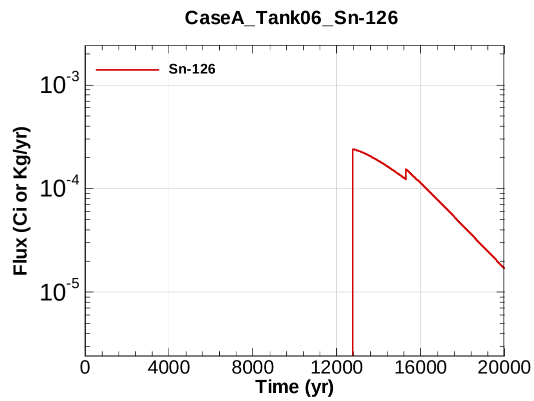

Figure A.1-510 - Flux Leaving Liner for CaseA Tank06 Sn-126

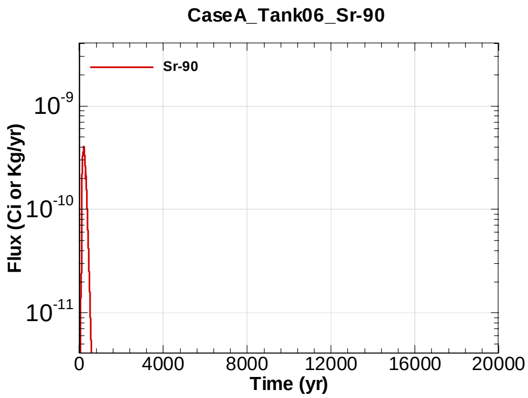

Figure A.1-511 - Flux Leaving Liner for CaseA Tank06 Sr-90

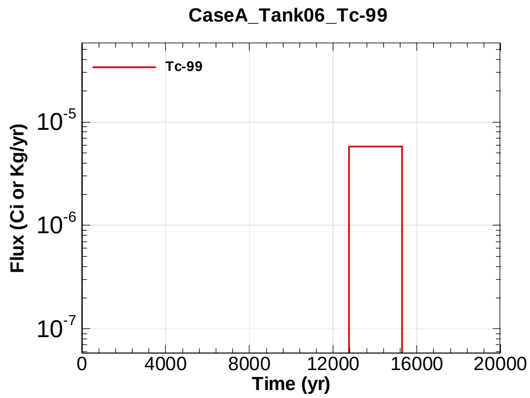

Figure A.1-512 - Flux Leaving Liner for CaseA Tank06 Tc-99

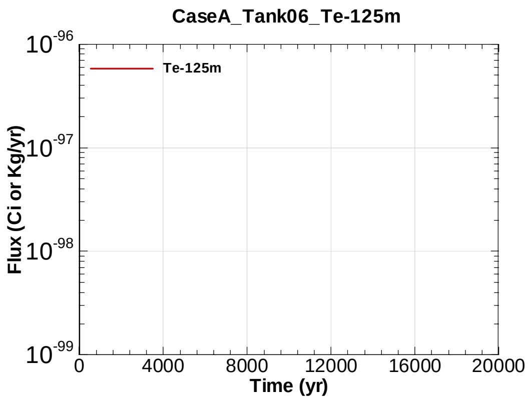

Figure A.1-513 - Flux Leaving Liner for CaseA Tank06 Te-125m

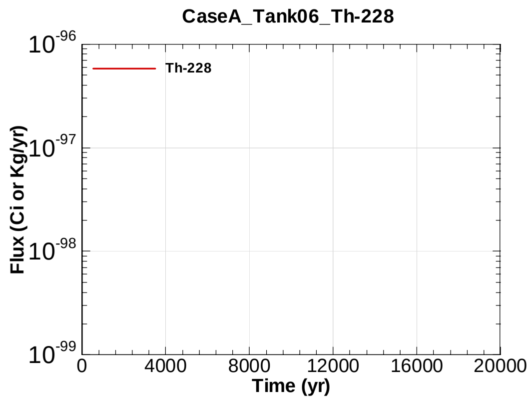

Figure A.1-514 - Flux Leaving Liner for CaseA Tank06 Th-228

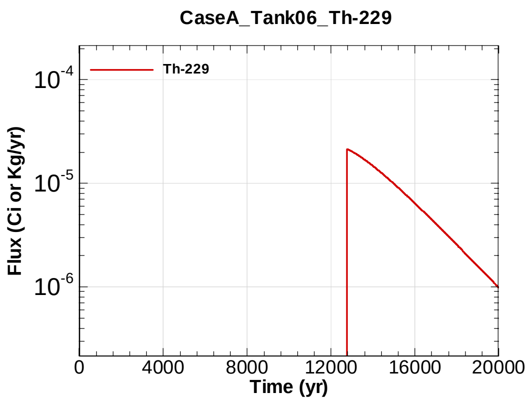

Figure A.1-515 - Flux Leaving Liner for CaseA Tank06 Th-229

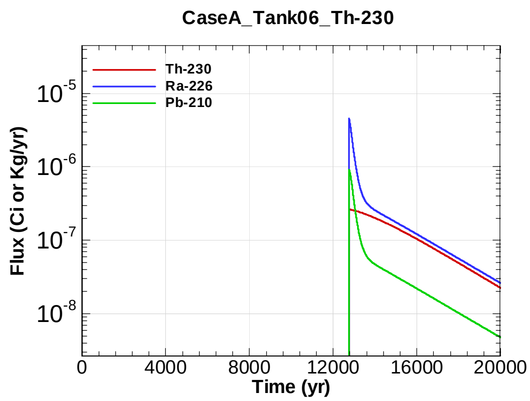

Figure A.1-516 - Flux Leaving Liner for CaseA Tank06 Th-230

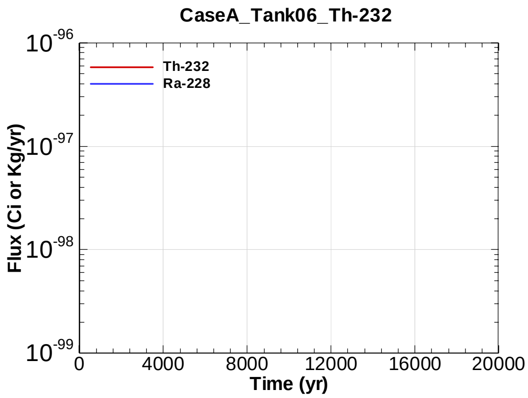

Figure A.1-517 - Flux Leaving Liner for CaseA Tank06 Th-232

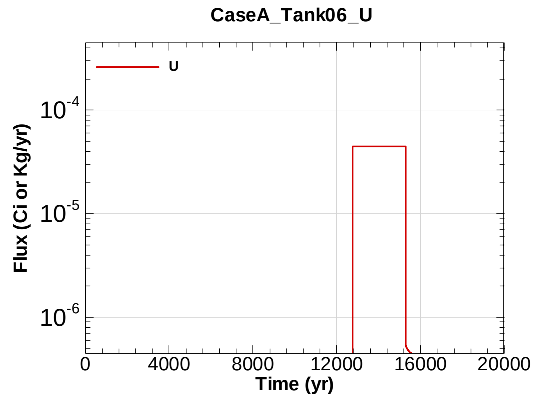

Figure A.1-518 - Flux Leaving Liner for CaseA Tank06 U

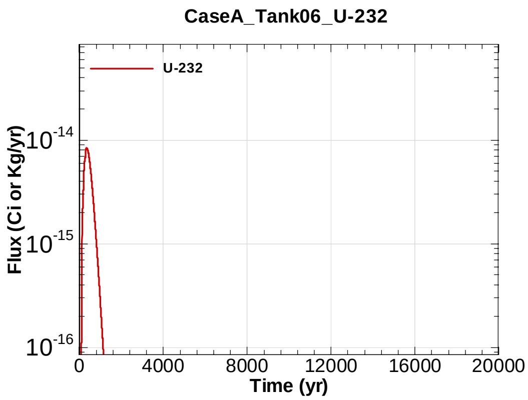

Figure A.1-519 - Flux Leaving Liner for CaseA Tank06 U-232

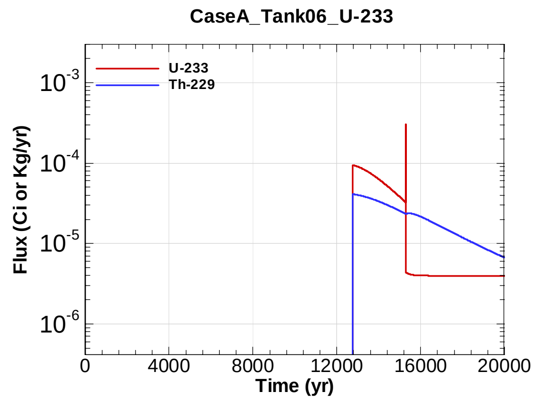

Figure A.1-520 - Flux Leaving Liner for CaseA Tank06 U-233

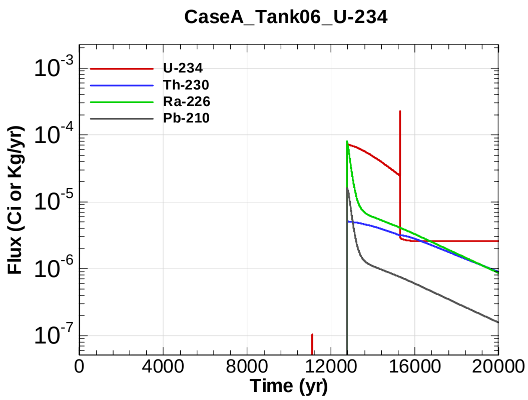

Figure A.1-521 - Flux Leaving Liner for CaseA Tank06 U-234

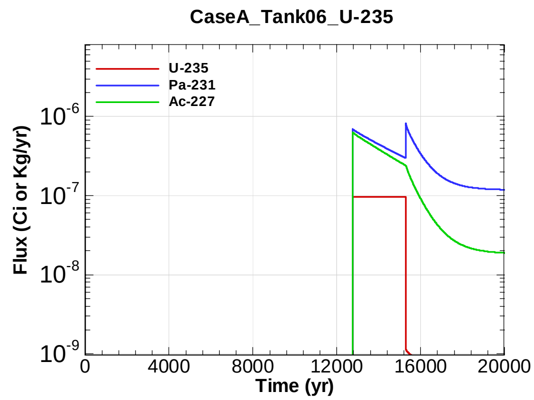

Figure A.1-522 - Flux Leaving Liner for CaseA Tank06 U-235

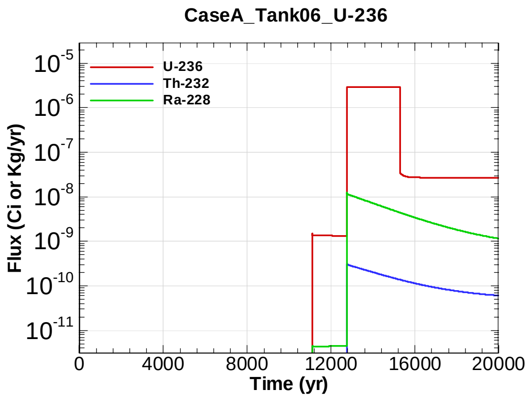

Figure A.1-523 - Flux Leaving Liner for CaseA Tank06 U-236

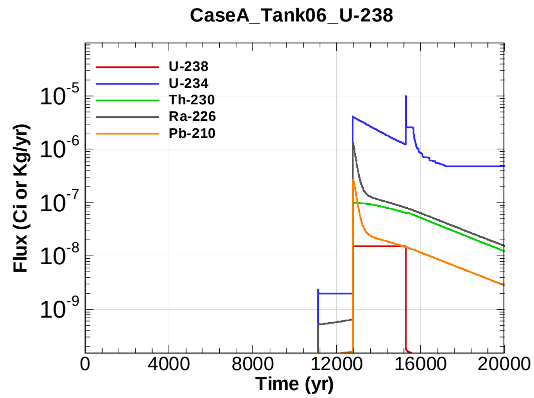

Figure A.1-524 - Flux Leaving Liner for CaseA Tank06 U-238

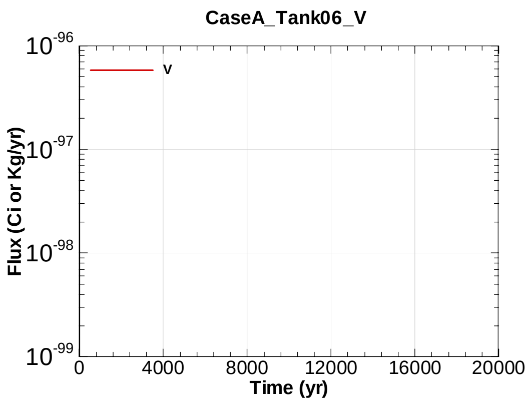

Figure A.1-525 - Flux Leaving Liner for CaseA Tank06 V

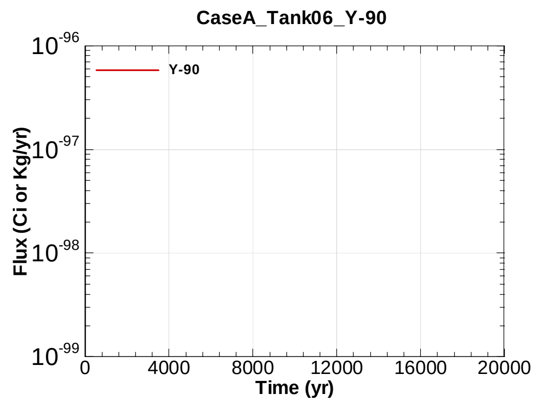

Figure A.1-526 - Flux Leaving Liner for CaseA Tank06 Y-90

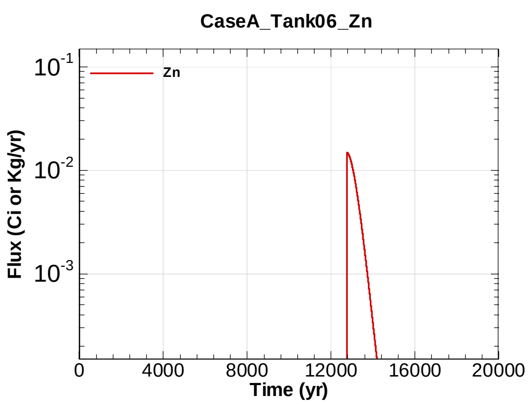

Figure A.1-527 - Flux Leaving Liner for CaseA Tank06 Zn

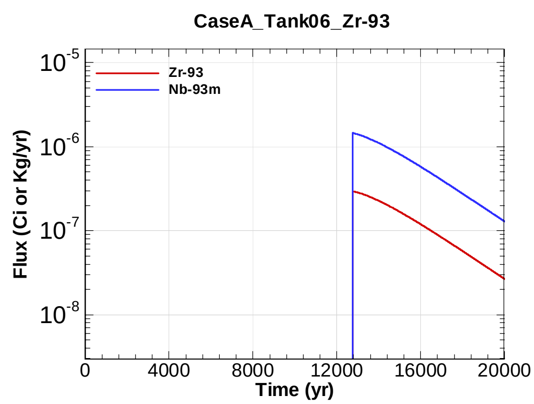

Figure A.1-528 - Flux Leaving Liner for CaseA Tank06 Zr-93

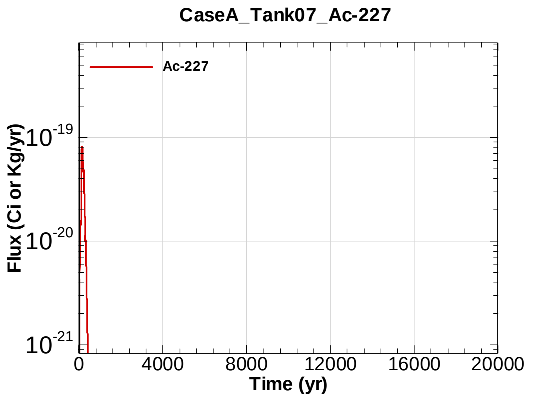

Figure A.1-529 - Flux Leaving Liner for CaseA Tank07 Ac-227

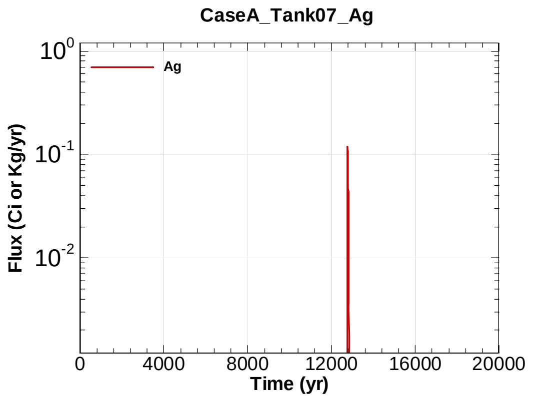

Figure A.1-530 - Flux Leaving Liner for CaseA Tank07 Ag

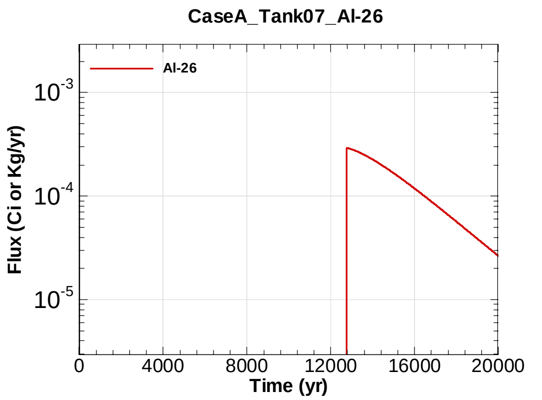

Figure A.1-531 - Flux Leaving Liner for CaseA Tank07 Al-26

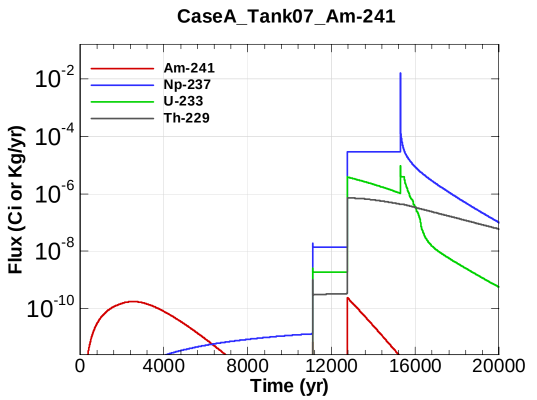

Figure A.1-532 - Flux Leaving Liner for CaseA Tank07 Am-241

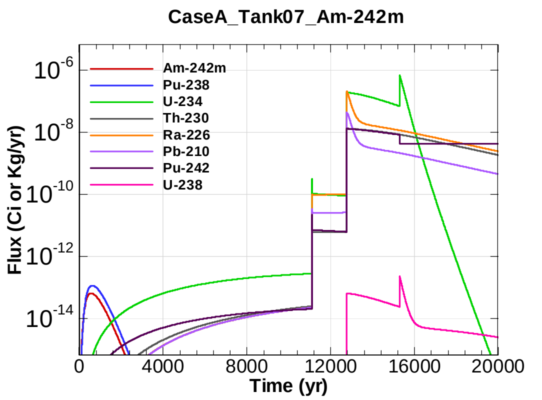

Figure A.1-533 - Flux Leaving Liner for CaseA Tank07 Am-242m

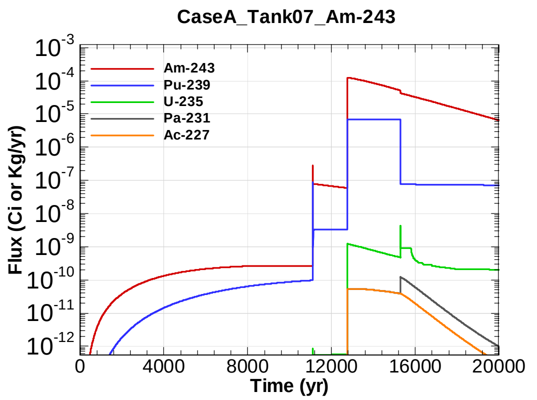

Figure A.1-534 - Flux Leaving Liner for CaseA Tank07 Am-243

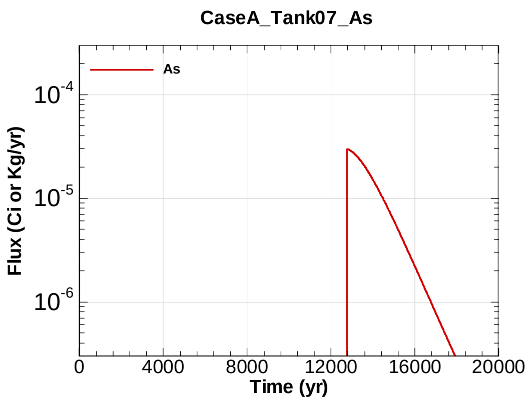

Figure A.1-535 - Flux Leaving Liner for CaseA Tank07 As

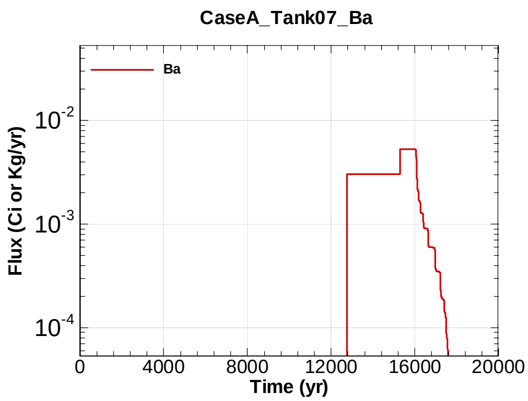

Figure A.1-536 - Flux Leaving Liner for CaseA Tank07 Ba

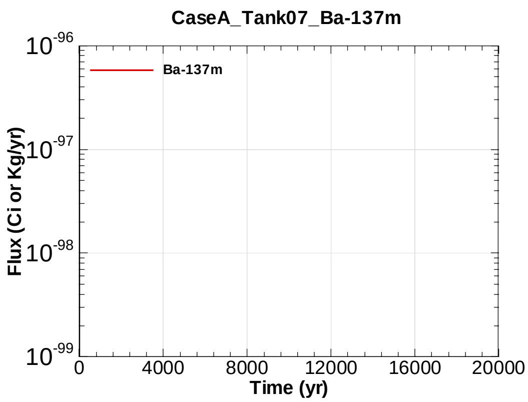

Figure A.1-537 - Flux Leaving Liner for CaseA Tank07 Ba-137m

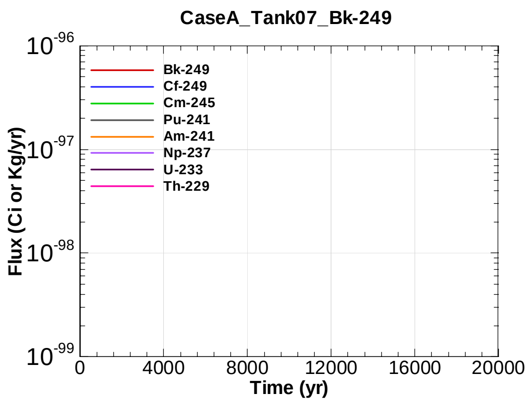

Figure A.1-538 - Flux Leaving Liner for CaseA Tank07 Bk-249

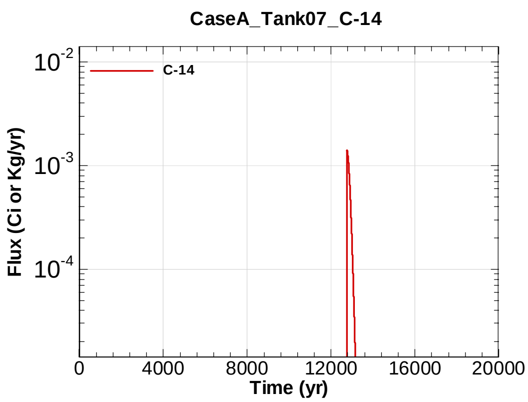

Figure A.1-539 - Flux Leaving Liner for CaseA Tank07 C-14

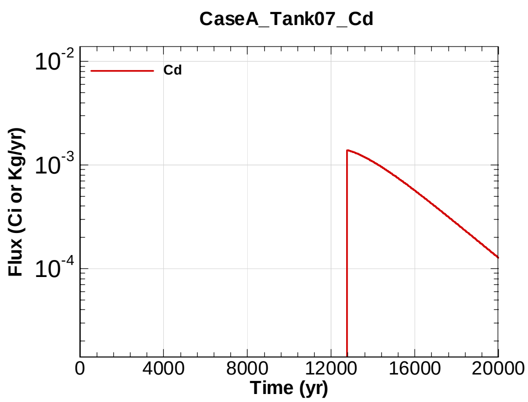

Figure A.1-540 - Flux Leaving Liner for CaseA Tank07 Cd

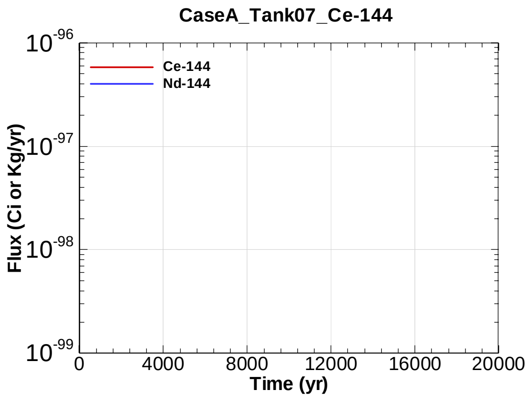

Figure A.1-541 - Flux Leaving Liner for CaseA Tank07 Ce-144

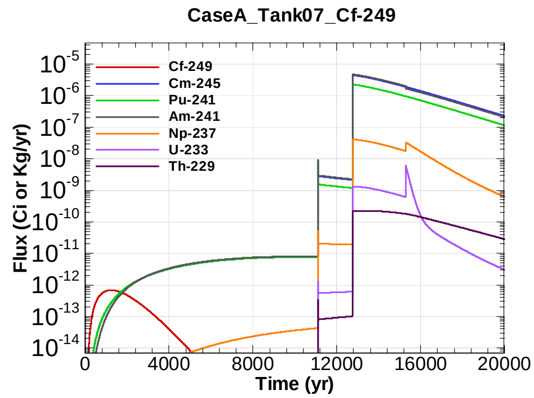

Figure A.1-542 - Flux Leaving Liner for CaseA Tank07 Cf-249

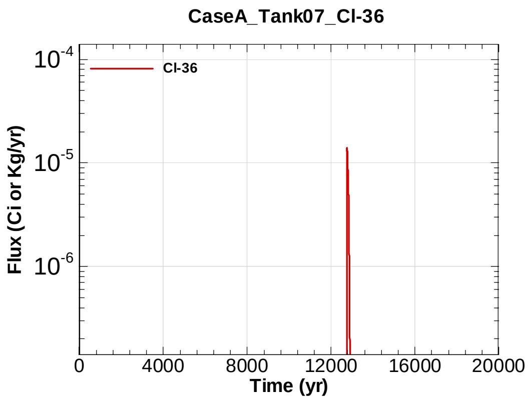

Figure A.1-543 - Flux Leaving Liner for CaseA Tank07 Cl-36

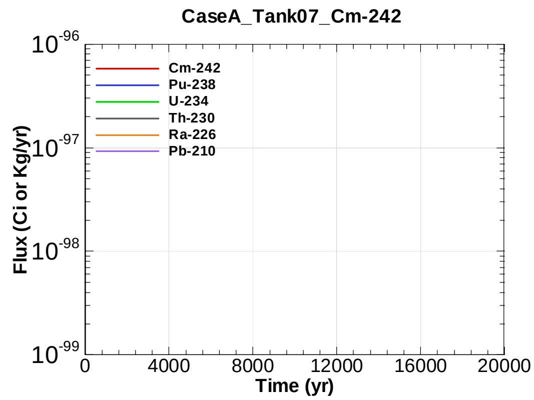

Figure A.1-544 - Flux Leaving Liner for CaseA Tank07 Cm-242

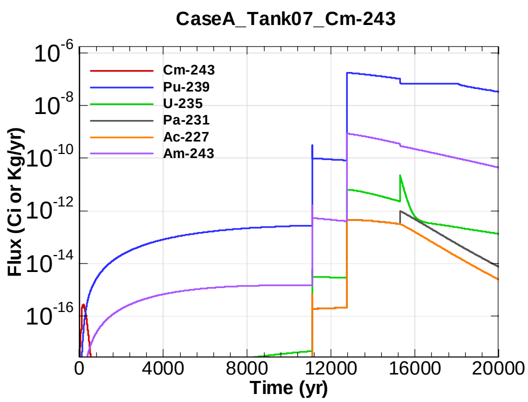

Figure A.1-545 - Flux Leaving Liner for CaseA Tank07 Cm-243

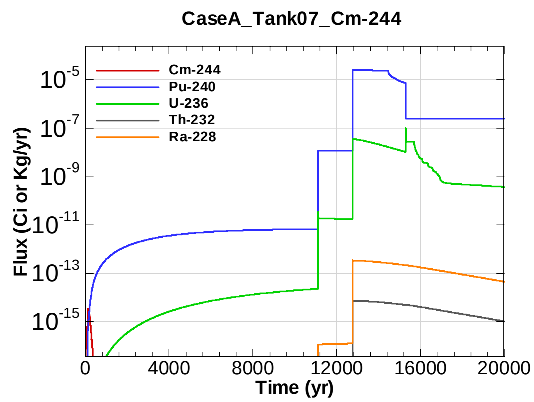

Figure A.1-546 - Flux Leaving Liner for CaseA Tank07 Cm-244

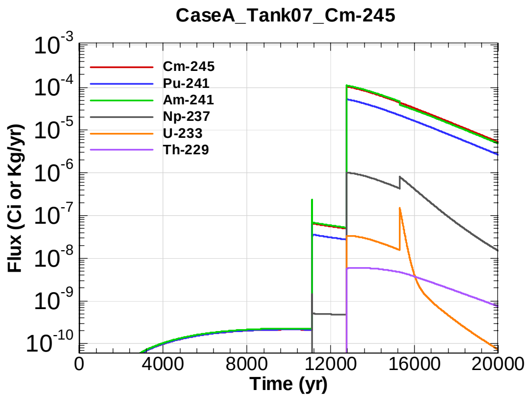

Figure A.1-547 - Flux Leaving Liner for CaseA Tank07 Cm-245

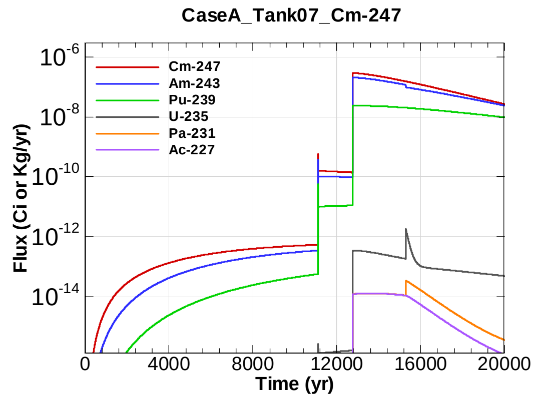

Figure A.1-548 - Flux Leaving Liner for CaseA Tank07 Cm-247

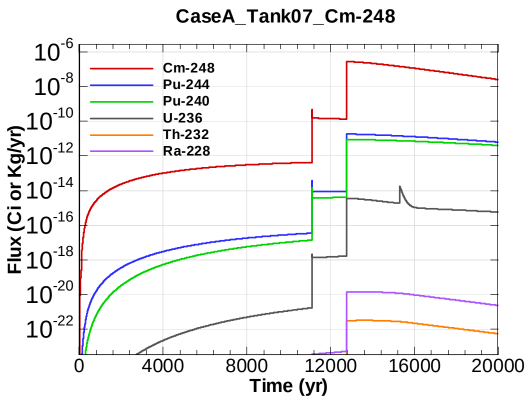

Figure A.1-549 - Flux Leaving Liner for CaseA Tank07 Cm-248

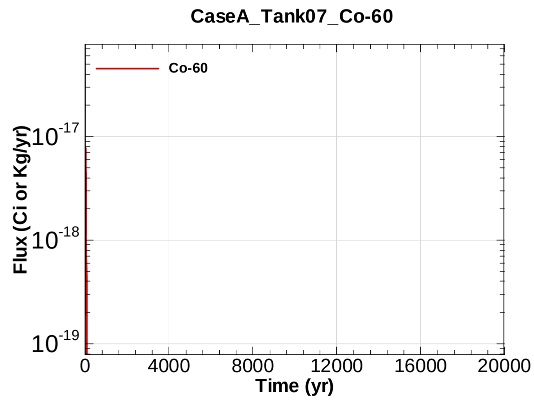

Figure A.1-550 - Flux Leaving Liner for CaseA Tank07 Co-60

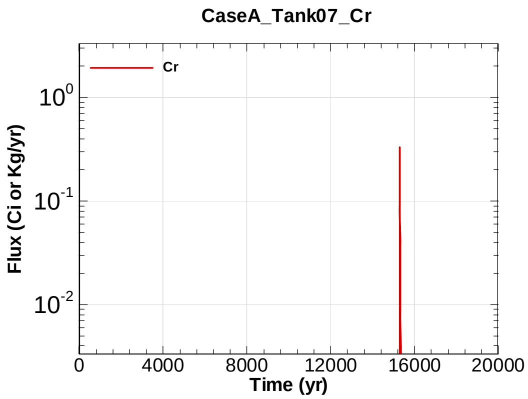

Figure A.1-551 - Flux Leaving Liner for CaseA Tank07 Cr

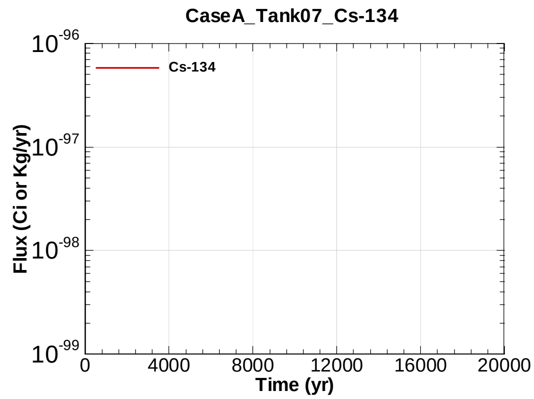

Figure A.1-552 - Flux Leaving Liner for CaseA Tank07 Cs-134

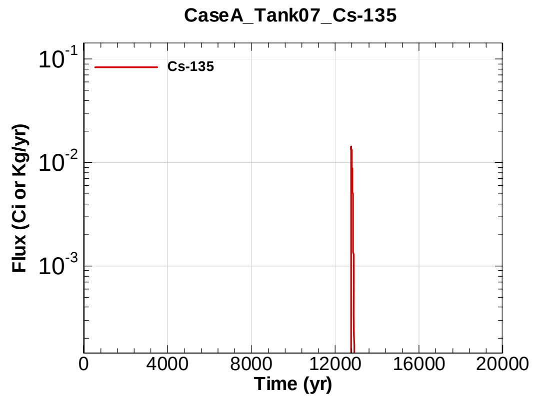

Figure A.1-553 - Flux Leaving Liner for CaseA Tank07 Cs-135

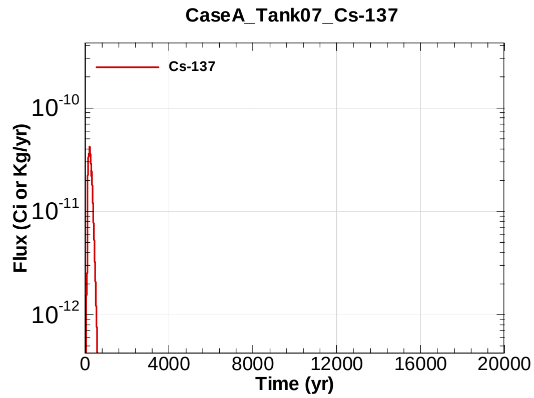

Figure A.1-554 - Flux Leaving Liner for CaseA Tank07 Cs-137

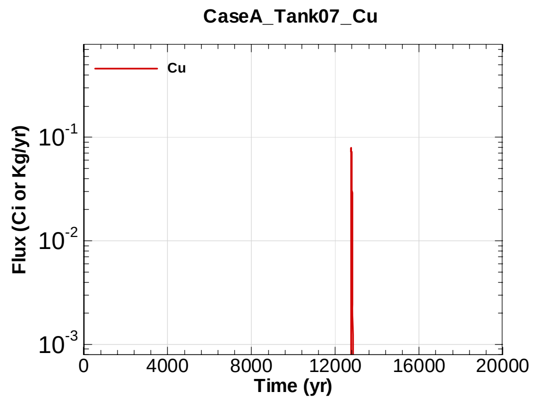

Figure A.1-555 - Flux Leaving Liner for CaseA Tank07 Cu

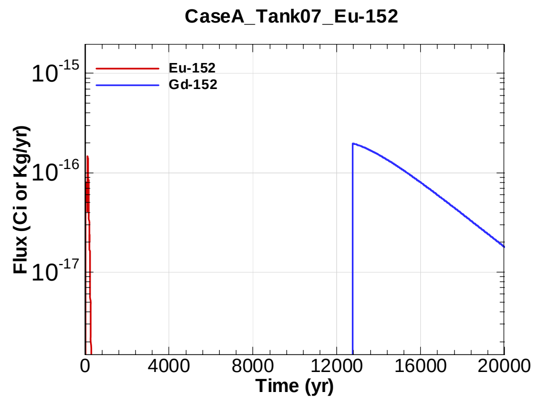

Figure A.1-556 - Flux Leaving Liner for CaseA Tank07 Eu-152

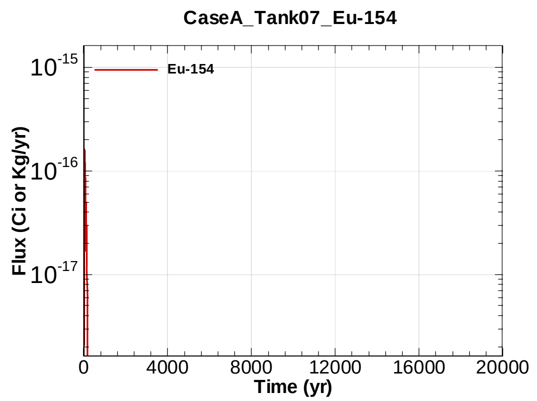

Figure A.1-557 - Flux Leaving Liner for CaseA Tank07 Eu-154

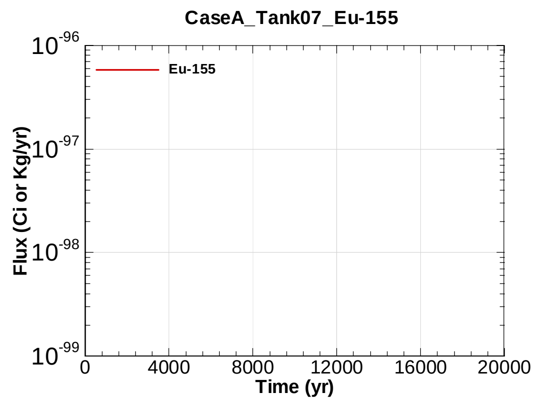

Figure A.1-558 - Flux Leaving Liner for CaseA Tank07 Eu-155

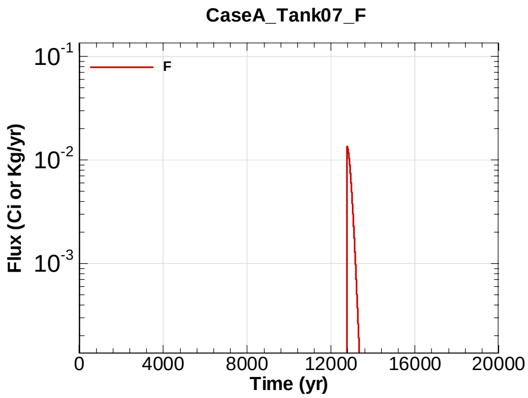

Figure A.1-559 - Flux Leaving Liner for CaseA Tank07 F

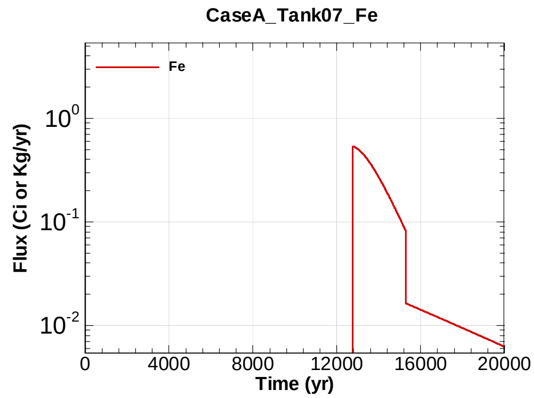

Figure A.1-560 - Flux Leaving Liner for CaseA Tank07 Fe

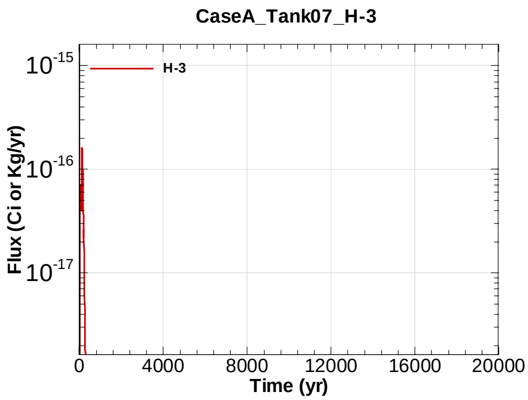

Figure A.1-561 - Flux Leaving Liner for CaseA Tank07 H-3

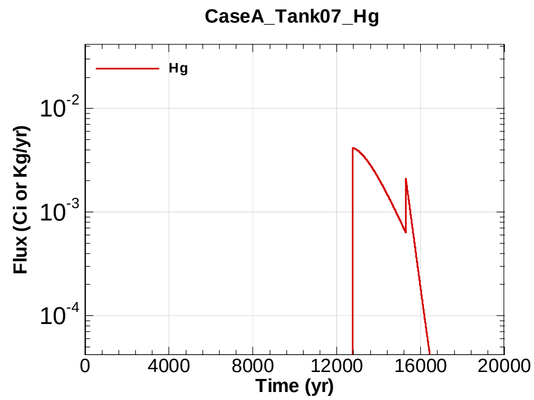

Figure A.1-562 - Flux Leaving Liner for CaseA Tank07 Hg

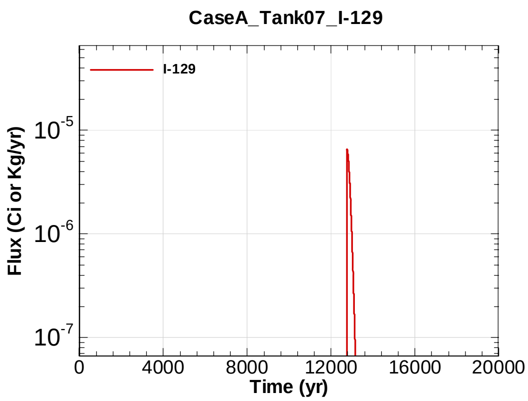

Figure A.1-563 - Flux Leaving Liner for CaseA Tank07 I-129

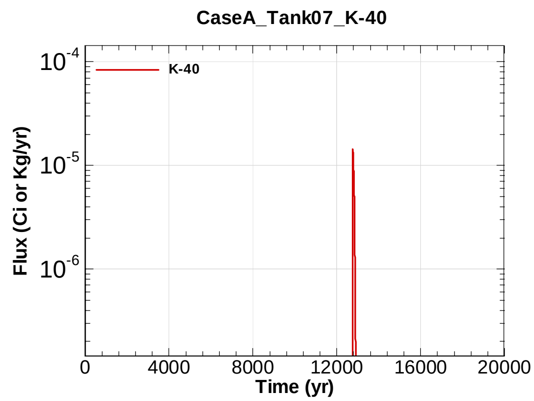

Figure A.1-564 - Flux Leaving Liner for CaseA Tank07 K-40

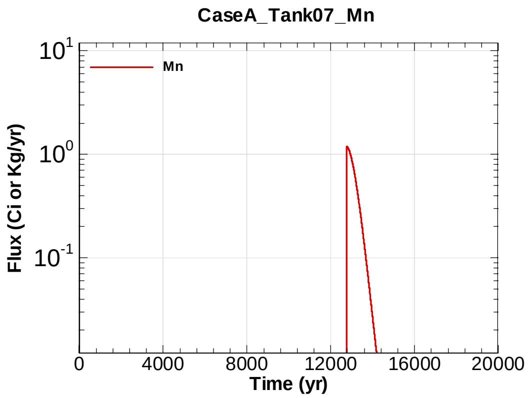

Figure A.1-565 - Flux Leaving Liner for CaseA Tank07 Mn

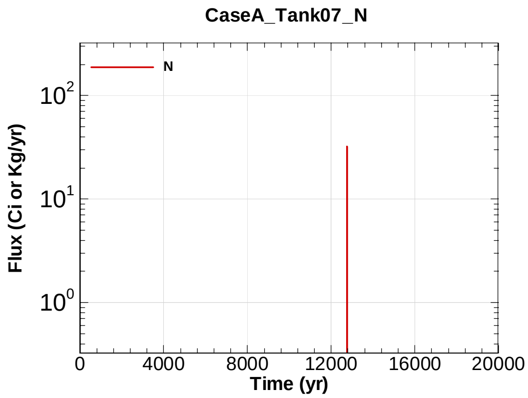

Figure A.1-566 - Flux Leaving Liner for CaseA Tank07 N

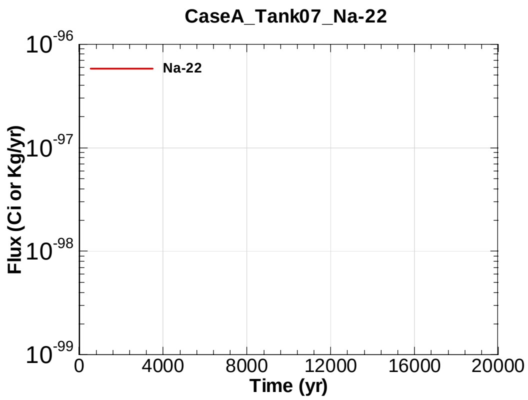

Figure A.1-567 - Flux Leaving Liner for CaseA Tank07 Na-22

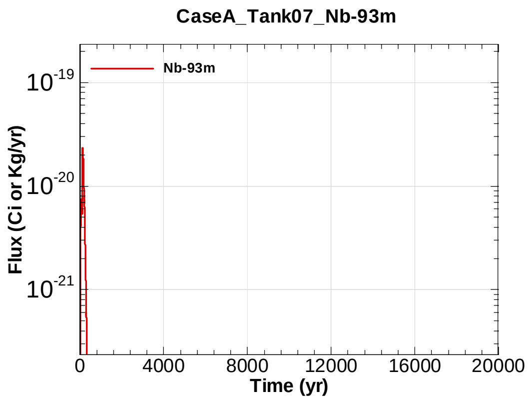

Figure A.1-568 - Flux Leaving Liner for CaseA Tank07 Nb-93m

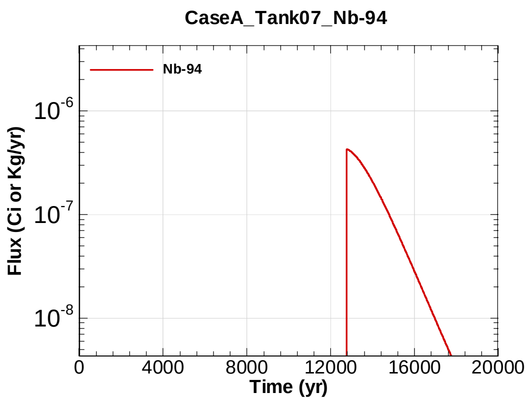

Figure A.1-569 - Flux Leaving Liner for CaseA Tank07 Nb-94

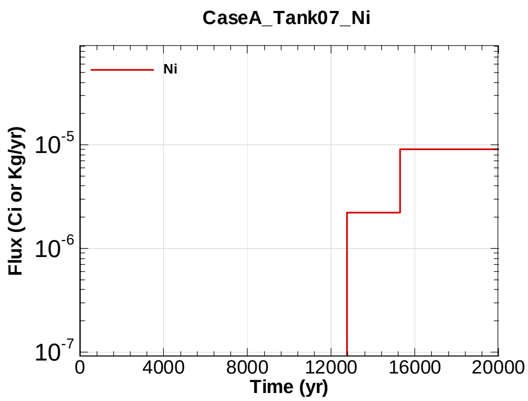

Figure A.1-570 - Flux Leaving Liner for CaseA Tank07 Ni

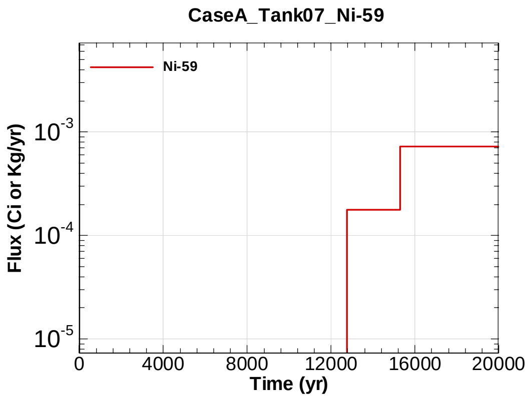

Figure A.1-571 - Flux Leaving Liner for CaseA Tank07 Ni-59

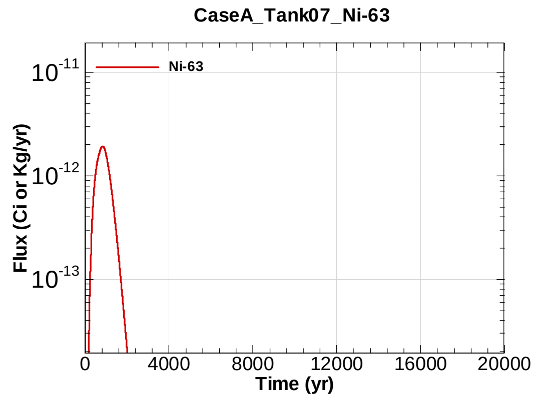

Figure A.1-572 - Flux Leaving Liner for CaseA Tank07 Ni-63

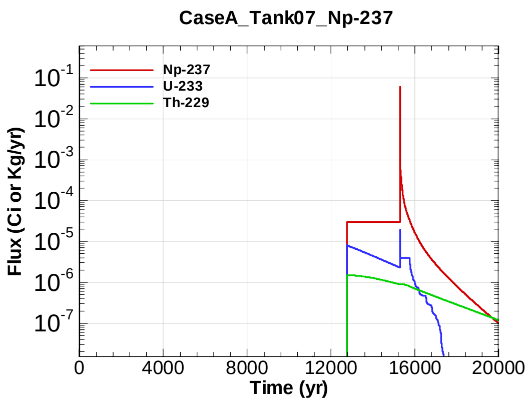

Figure A.1-573 - Flux Leaving Liner for CaseA Tank07 Np-237

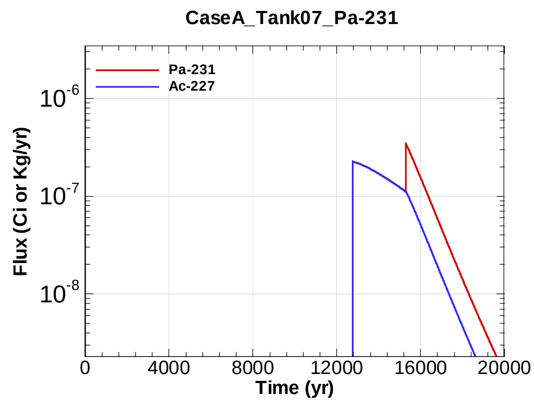

Figure A.1-574 - Flux Leaving Liner for CaseA Tank07 Pa-231

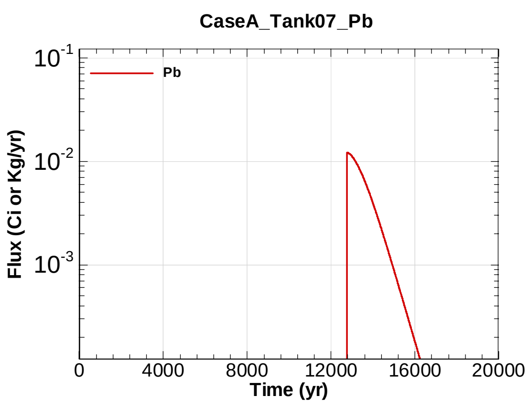

Figure A.1-575 - Flux Leaving Liner for CaseA Tank07 Pb

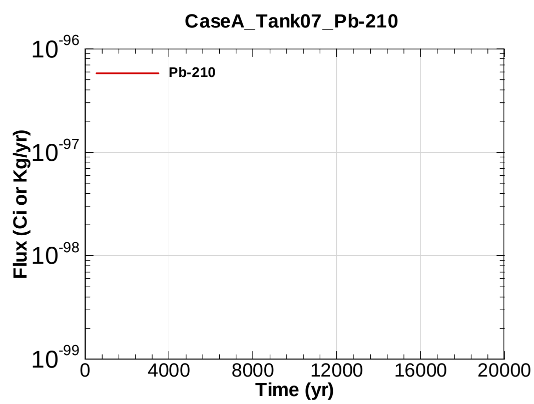

Figure A.1-576 - Flux Leaving Liner for CaseA Tank07 Pb-210

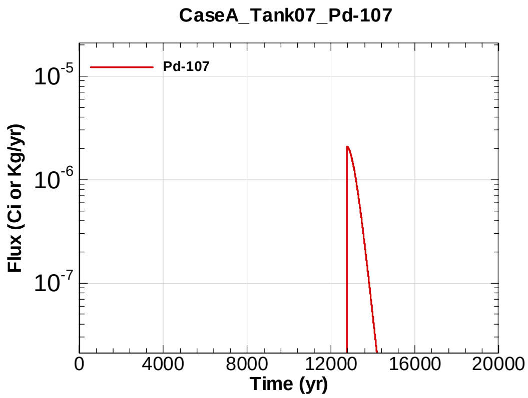

Figure A.1-577 - Flux Leaving Liner for CaseA Tank07 Pd-107

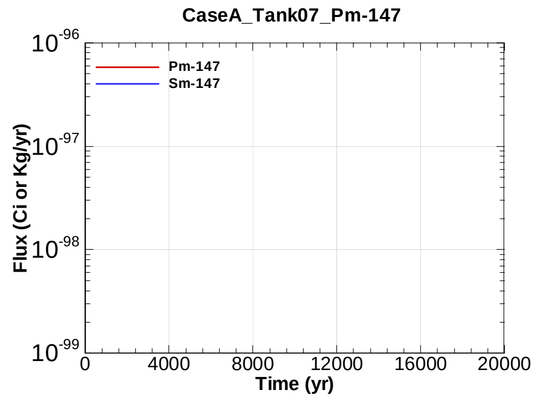

Figure A.1-578 - Flux Leaving Liner for CaseA Tank07 Pm-147

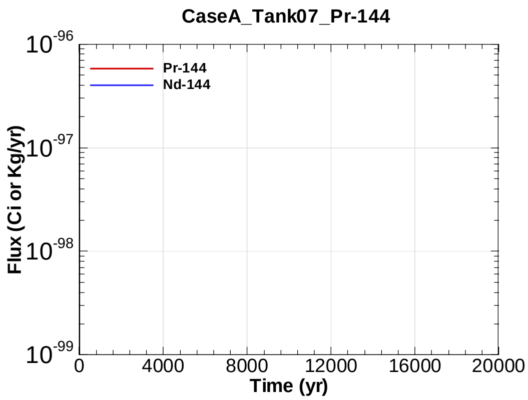

Figure A.1-579 - Flux Leaving Liner for CaseA Tank07 Pr-144

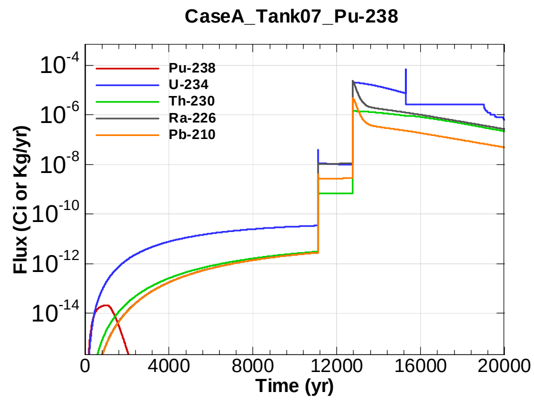

Figure A.1-580 - Flux Leaving Liner for CaseA Tank07 Pu-238

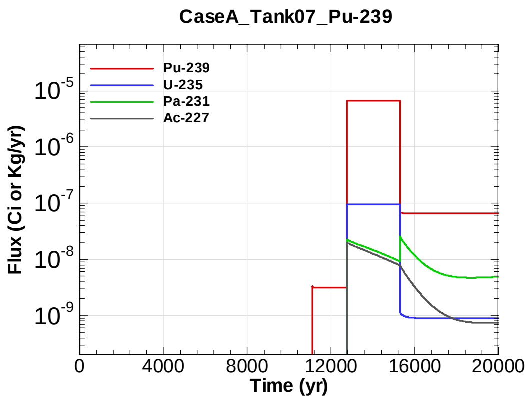

Figure A.1-581 - Flux Leaving Liner for CaseA Tank07 Pu-239

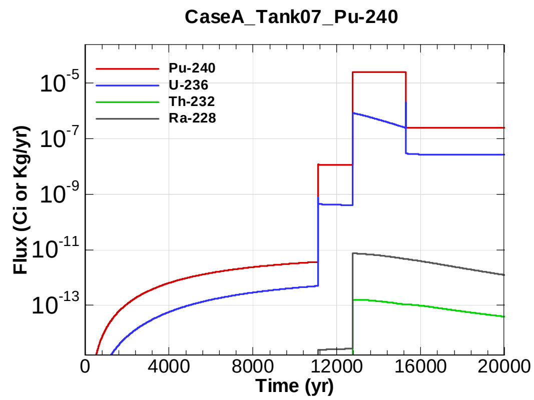

Figure A.1-582 - Flux Leaving Liner for CaseA Tank07 Pu-240

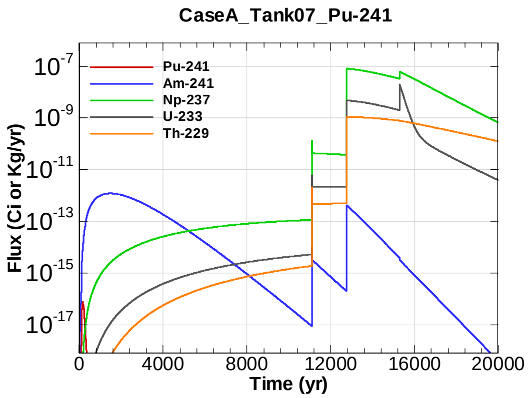

Figure A.1-583 - Flux Leaving Liner for CaseA Tank07 Pu-241

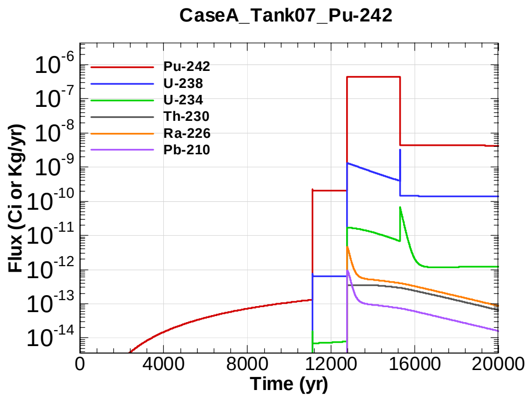

Figure A.1-584 - Flux Leaving Liner for CaseA Tank07 Pu-242

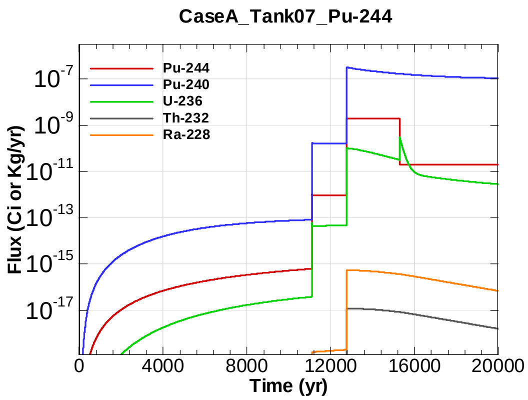

Figure A.1-585 - Flux Leaving Liner for CaseA Tank07 Pu-244

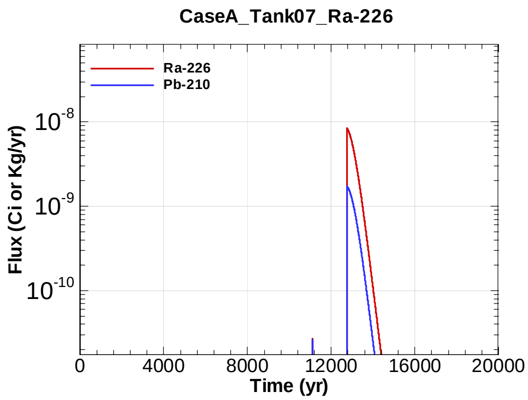

Figure A.1-586 - Flux Leaving Liner for CaseA Tank07 Ra-226

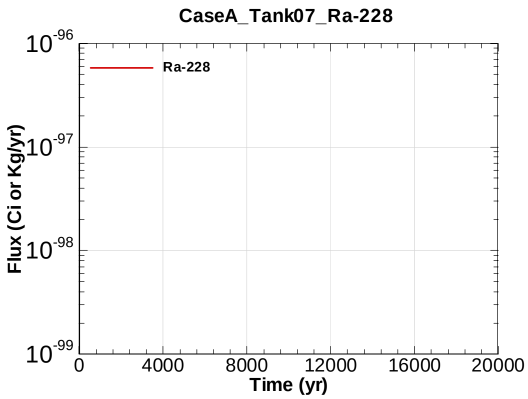

Figure A.1-587 - Flux Leaving Liner for CaseA Tank07 Ra-228

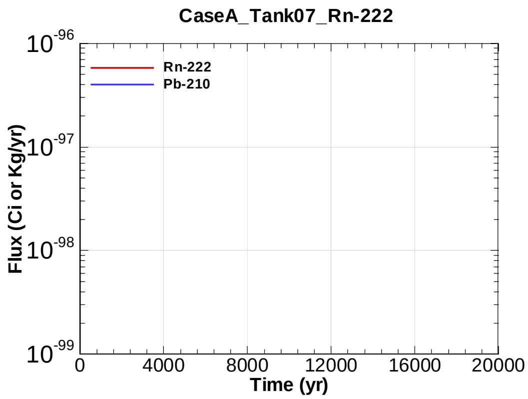

Figure A.1-588 - Flux Leaving Liner for CaseA Tank07 Rn-222

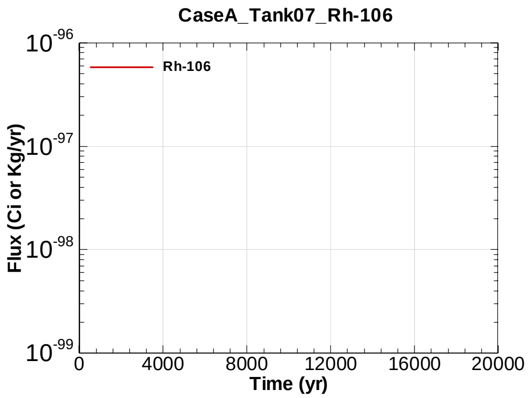

Figure A.1-589 - Flux Leaving Liner for CaseA Tank07 Rh-106

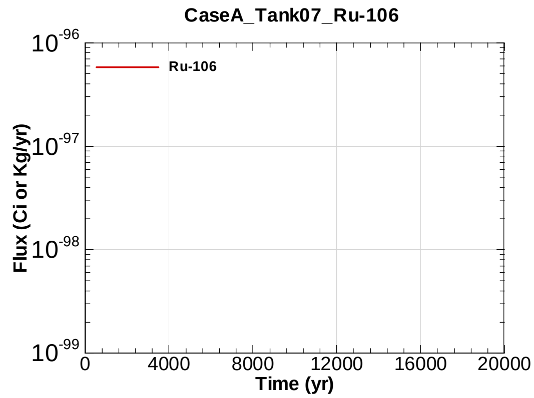

Figure A.1-590 - Flux Leaving Liner for CaseA Tank07 Ru-106

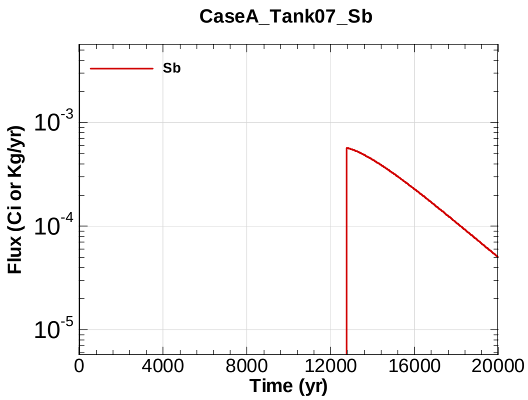

Figure A.1-591 - Flux Leaving Liner for CaseA Tank07 Sb

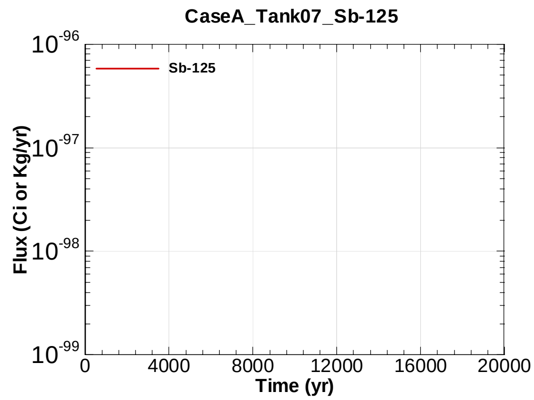

Figure A.1-592 - Flux Leaving Liner for CaseA Tank07 Sb-125

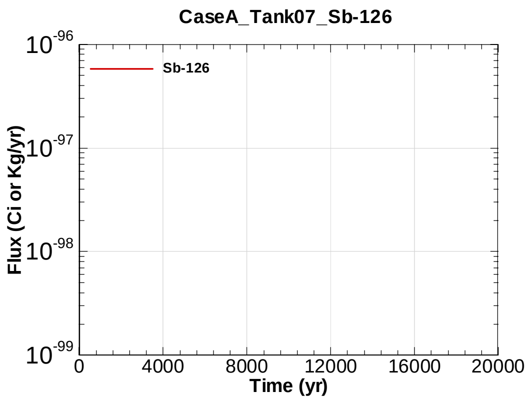

Figure A.1-593 - Flux Leaving Liner for CaseA Tank07 Sb-126

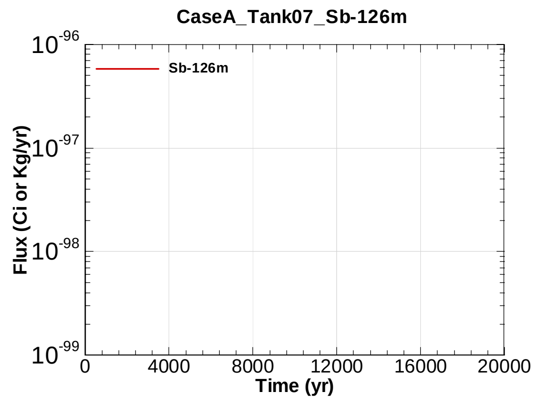

Figure A.1-594 - Flux Leaving Liner for CaseA Tank07 Sb-126m

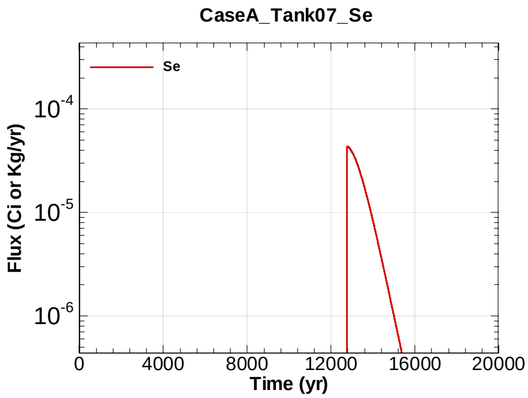

Figure A.1-595 - Flux Leaving Liner for CaseA Tank07 Se

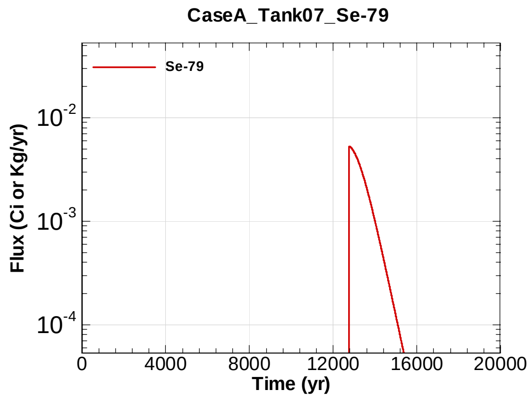

Figure A.1-596 - Flux Leaving Liner for CaseA Tank07 Se-79

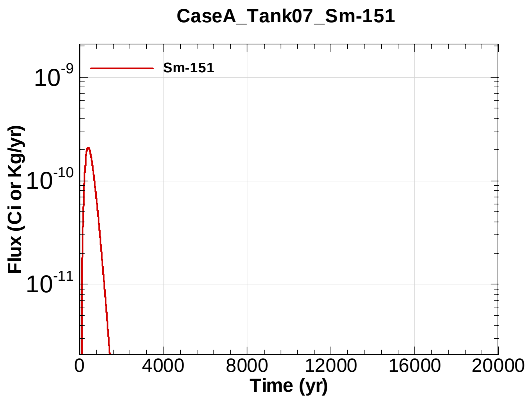

Figure A.1-597 - Flux Leaving Liner for CaseA Tank07 Sm-151

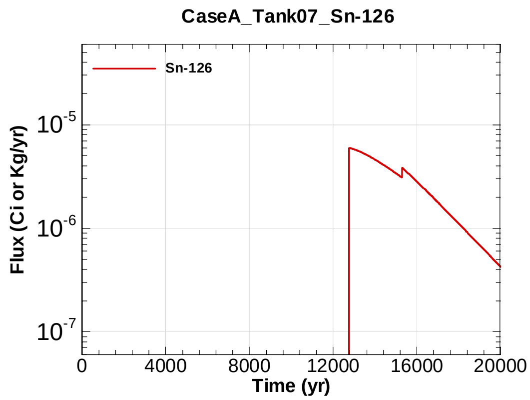

Figure A.1-598 - Flux Leaving Liner for CaseA Tank07 Sn-126

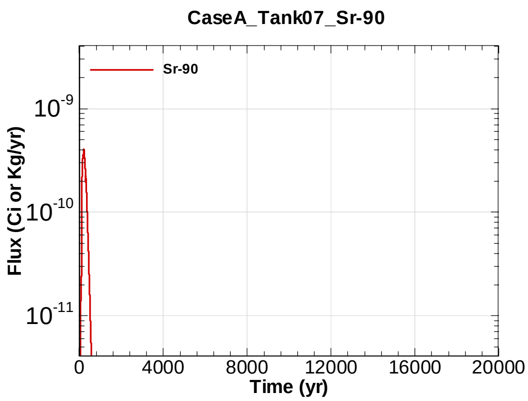

Figure A.1-599 - Flux Leaving Liner for CaseA Tank07 Sr-90

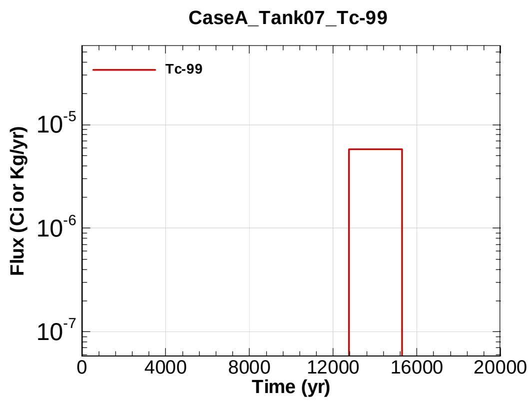

Figure A.1-600 - Flux Leaving Liner for CaseA Tank07 Tc-99

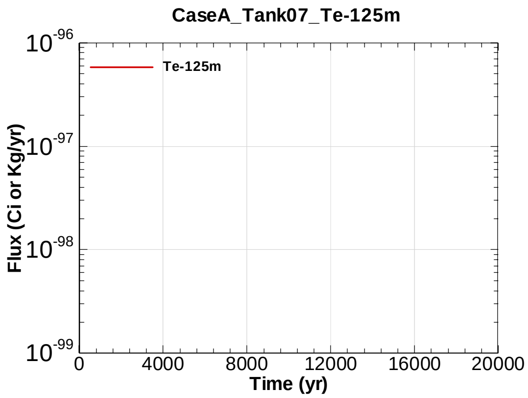

Figure A.1-601 - Flux Leaving Liner for CaseA Tank07 Te-125m

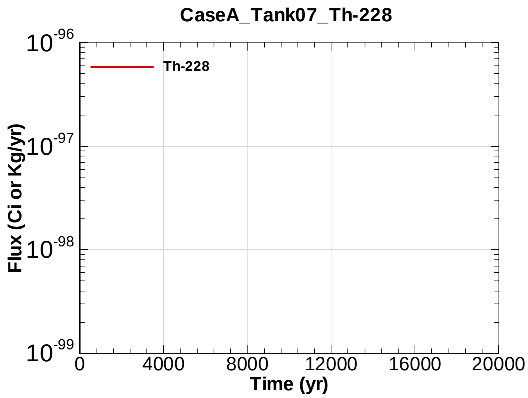

Figure A.1-602 - Flux Leaving Liner for CaseA Tank07 Th-228

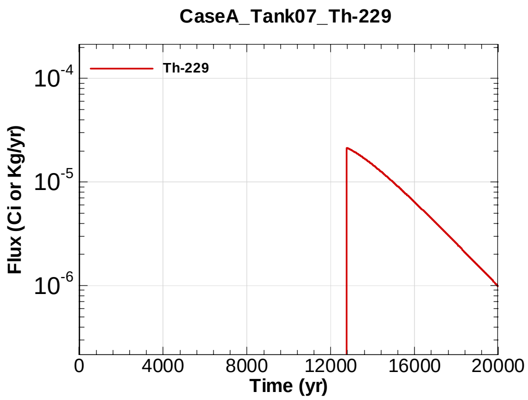

Figure A.1-603 - Flux Leaving Liner for CaseA Tank07 Th-229

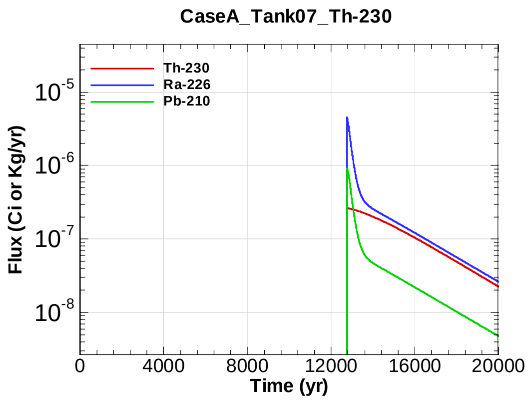

Figure A.1-604 - Flux Leaving Liner for CaseA Tank07 Th-230

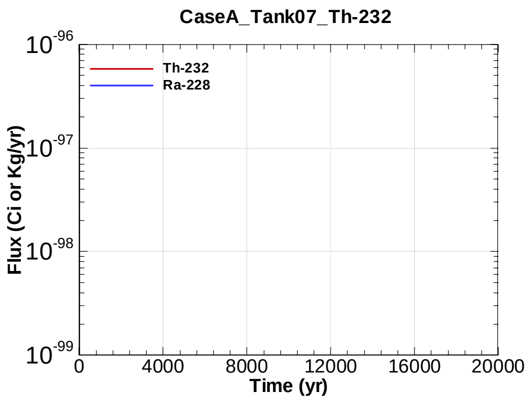

Figure A.1-605 - Flux Leaving Liner for CaseA Tank07 Th-232

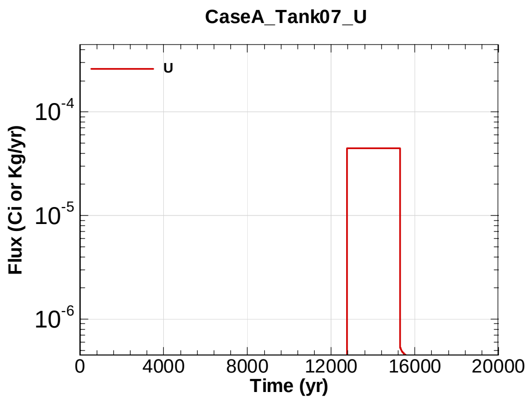

Figure A.1-606 - Flux Leaving Liner for CaseA Tank07 U

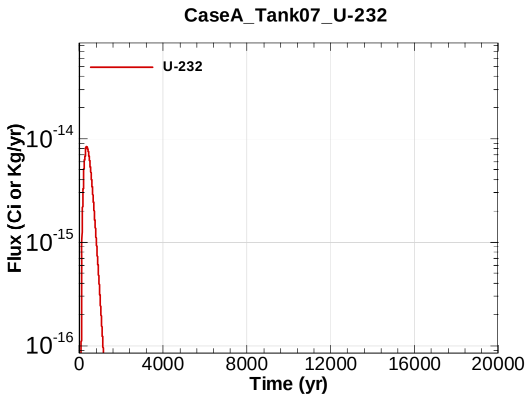

Figure A.1-607 - Flux Leaving Liner for CaseA Tank07 U-232

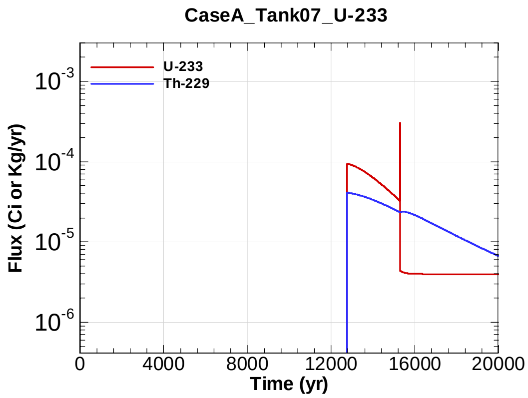

Figure A.1-608 - Flux Leaving Liner for CaseA Tank07 U-233

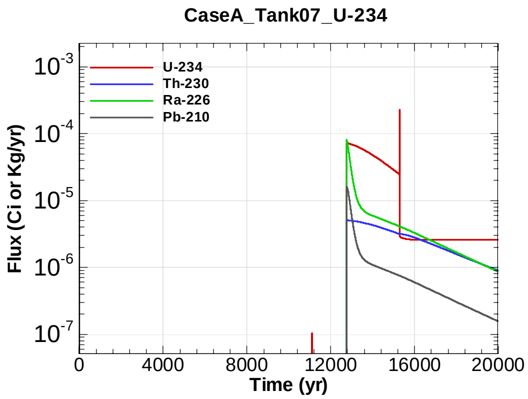

Figure A.1-609 - Flux Leaving Liner for CaseA Tank07 U-234

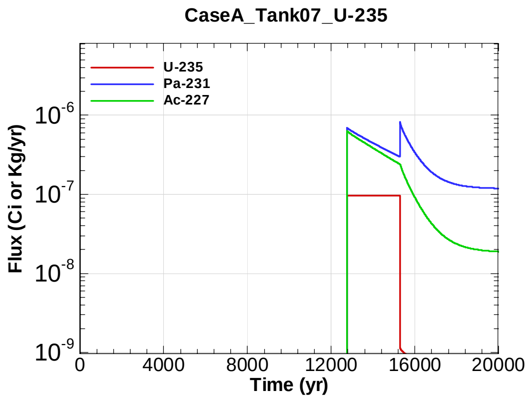

Figure A.1-610 - Flux Leaving Liner for CaseA Tank07 U-235

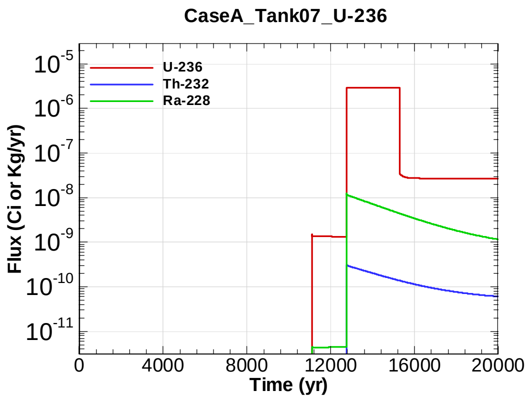

Figure A.1-611 - Flux Leaving Liner for CaseA Tank07 U-236

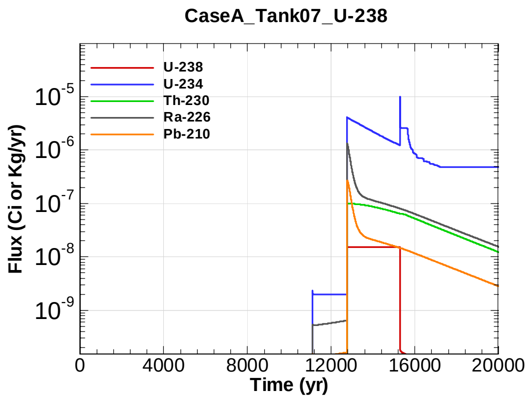

Figure A.1-612 - Flux Leaving Liner for CaseA Tank07 U-238

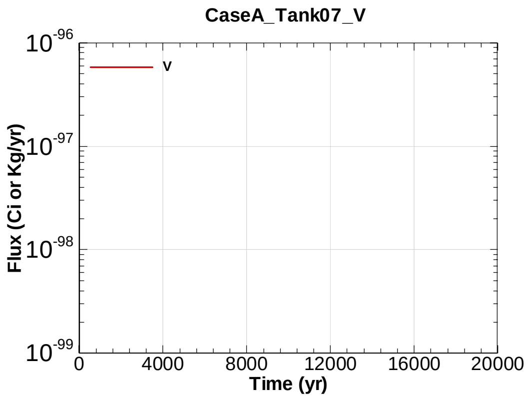

Figure A.1-613 - Flux Leaving Liner for CaseA Tank07 V

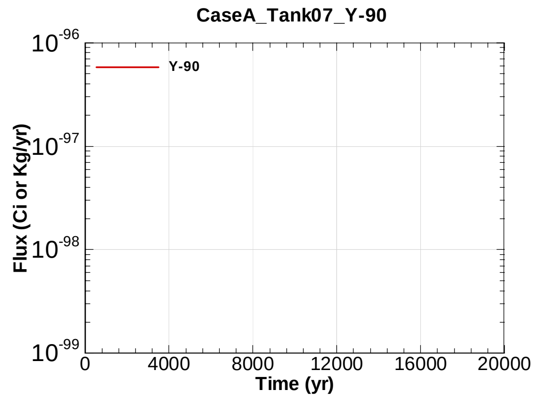

Figure A.1-614 - Flux Leaving Liner for CaseA Tank07 Y-90

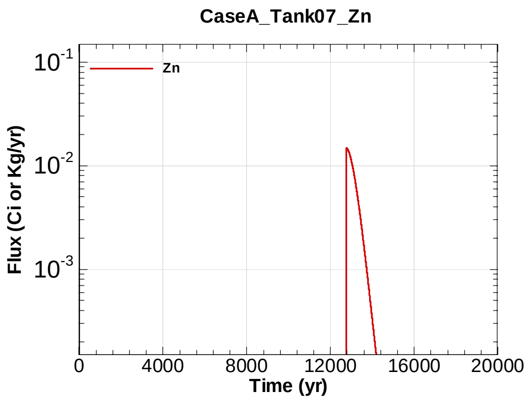

Figure A.1-615 - Flux Leaving Liner for CaseA Tank07 Zn

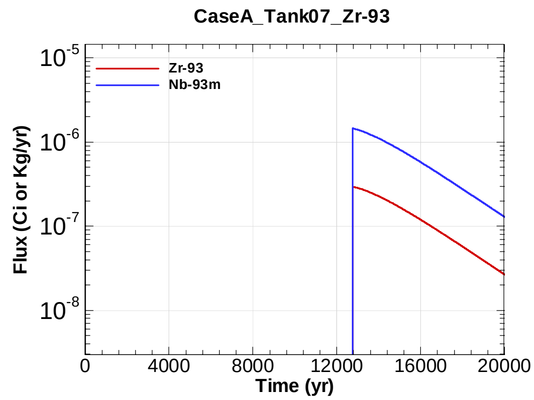

Figure A.1-616 - Flux Leaving Liner for CaseA Tank07 Zr-93

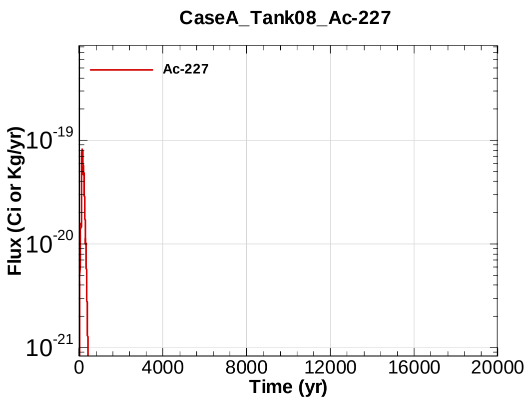

Figure A.1-617 - Flux Leaving Liner for CaseA Tank08 Ac-227

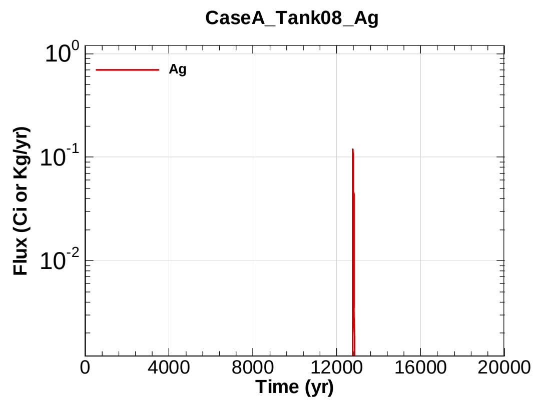

Figure A.1-618 - Flux Leaving Liner for CaseA Tank08 Ag

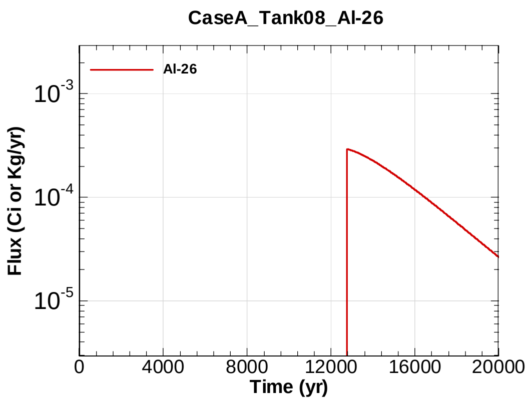

Figure A.1-619 - Flux Leaving Liner for CaseA Tank08 Al-26

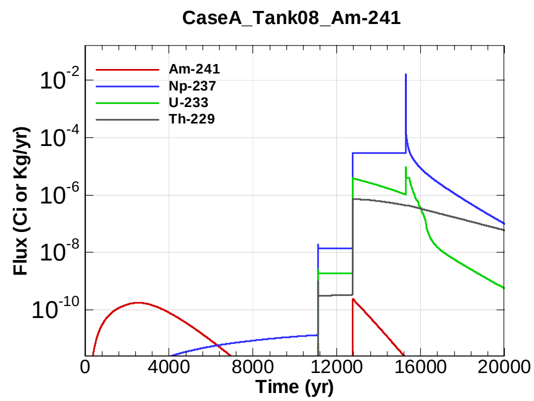

Figure A.1-620 - Flux Leaving Liner for CaseA Tank08 Am-241

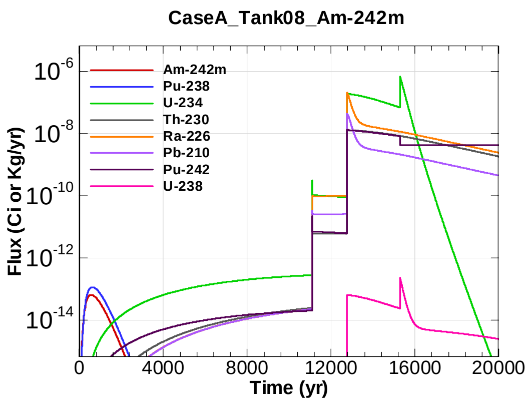

Figure A.1-621 - Flux Leaving Liner for CaseA Tank08 Am-242m

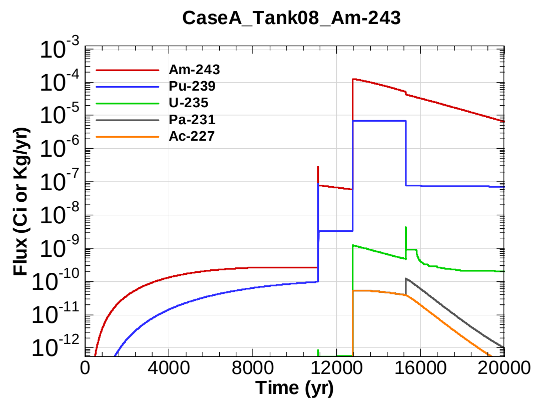

Figure A.1-622 - Flux Leaving Liner for CaseA Tank08 Am-243

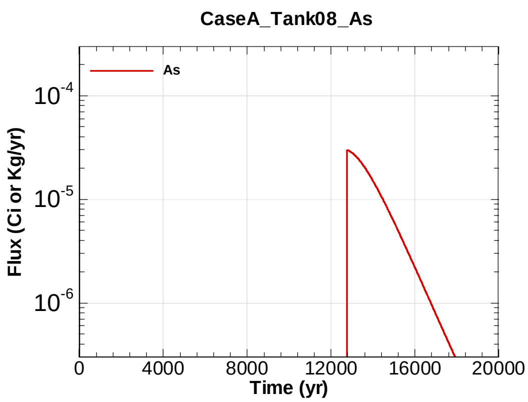

Figure A.1-623 - Flux Leaving Liner for CaseA Tank08 As

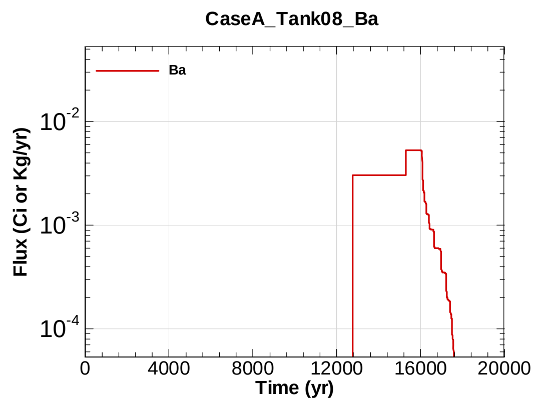

Figure A.1-624 - Flux Leaving Liner for CaseA Tank08 Ba

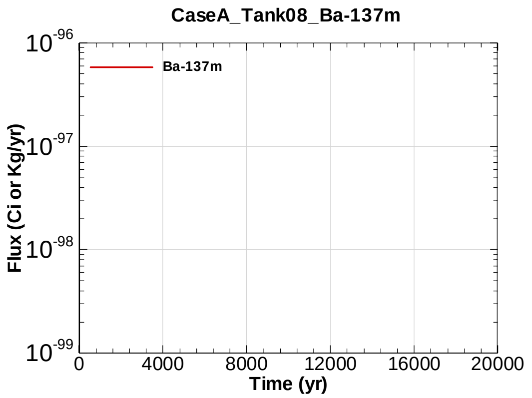

Figure A.1-625 - Flux Leaving Liner for CaseA Tank08 Ba-137m

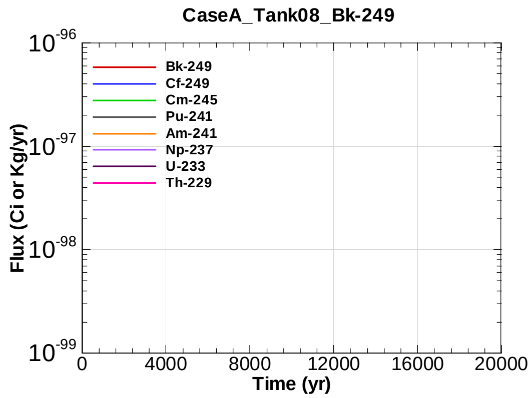

Figure A.1-626 - Flux Leaving Liner for CaseA Tank08 Bk-249

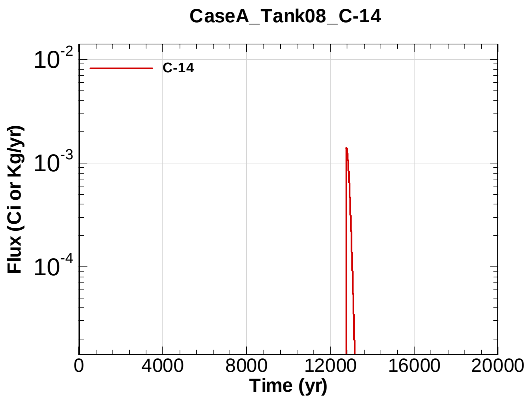

Figure A.1-627 - Flux Leaving Liner for CaseA Tank08 C-14

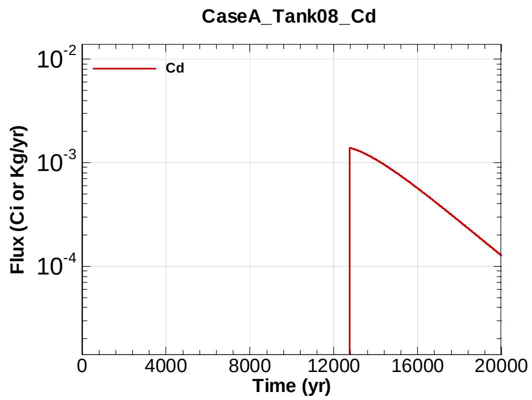

Figure A.1-628 - Flux Leaving Liner for CaseA Tank08 Cd

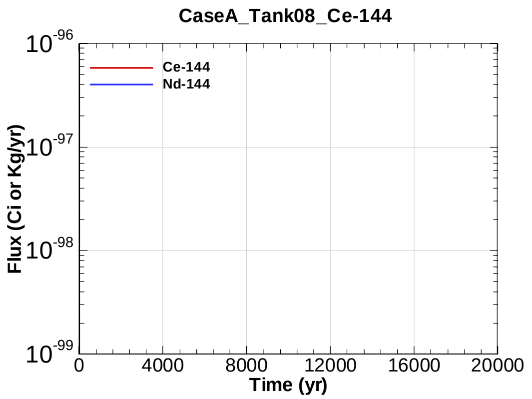

Figure A.1-629 - Flux Leaving Liner for CaseA Tank08 Ce-144

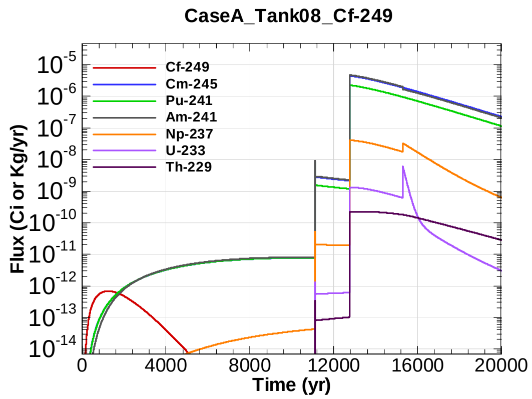

Figure A.1-630 - Flux Leaving Liner for CaseA Tank08 Cf-249

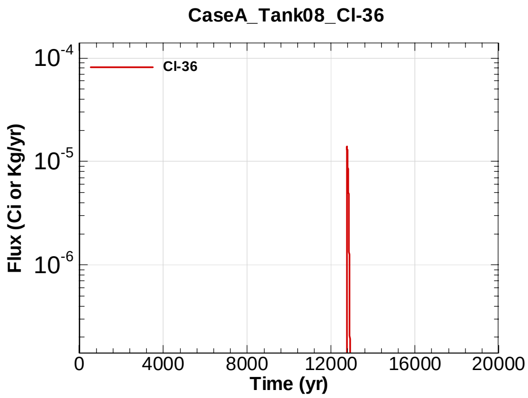

Figure A.1-631 - Flux Leaving Liner for CaseA Tank08 Cl-36

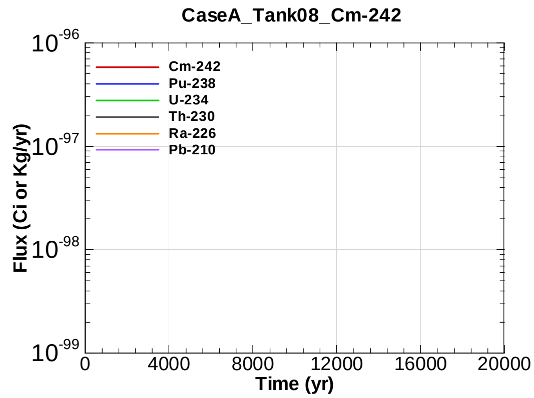

Figure A.1-632 - Flux Leaving Liner for CaseA Tank08 Cm-242

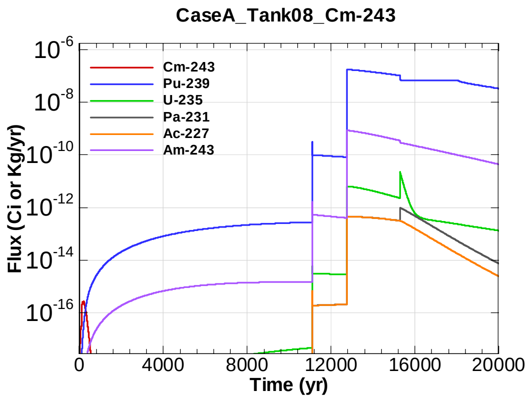

Figure A.1-633 - Flux Leaving Liner for CaseA Tank08 Cm-243

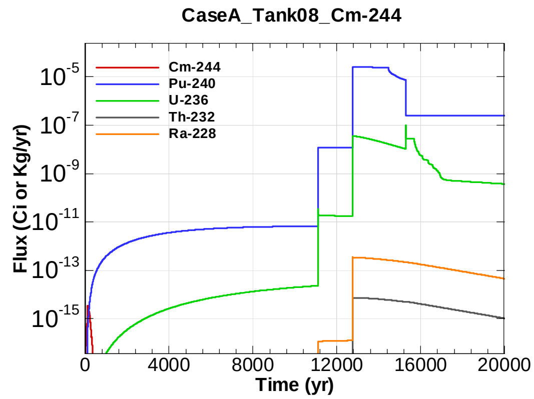

Figure A.1-634 - Flux Leaving Liner for CaseA Tank08 Cm-244

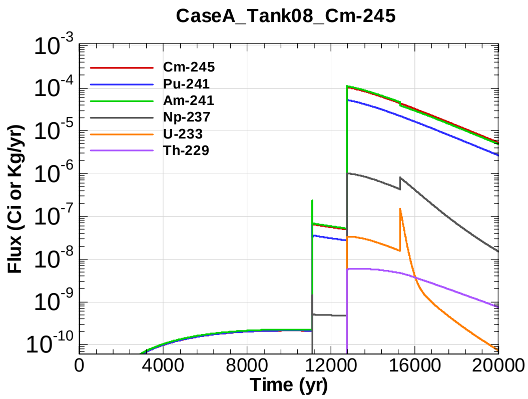

Figure A.1-635 - Flux Leaving Liner for CaseA Tank08 Cm-245

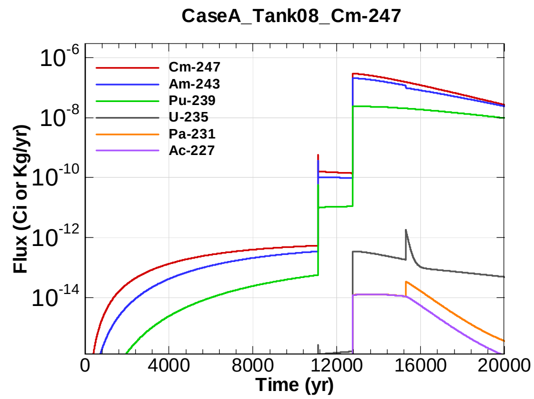

Figure A.1-636 - Flux Leaving Liner for CaseA Tank08 Cm-247

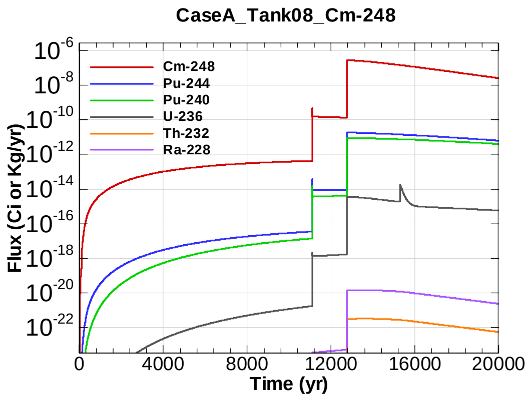

Figure A.1-637 - Flux Leaving Liner for CaseA Tank08 Cm-248

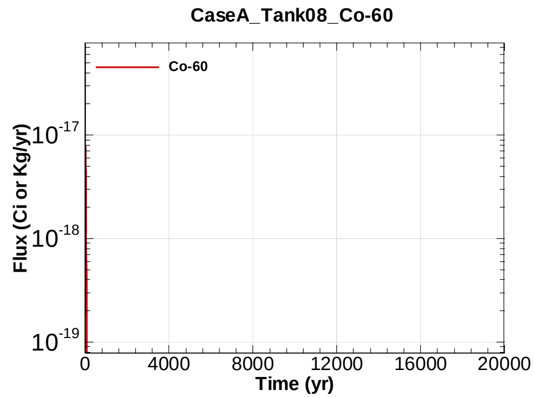

Figure A.1-638 - Flux Leaving Liner for CaseA Tank08 Co-60

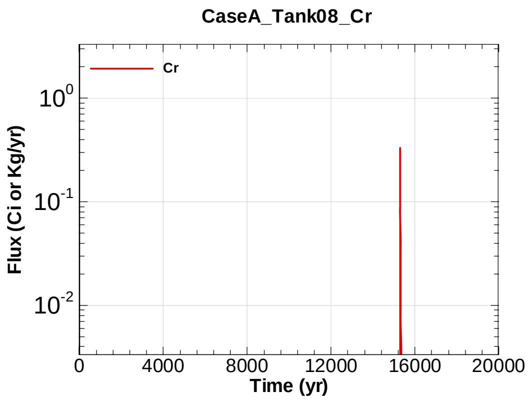

Figure A.1-639 - Flux Leaving Liner for CaseA Tank08 Cr

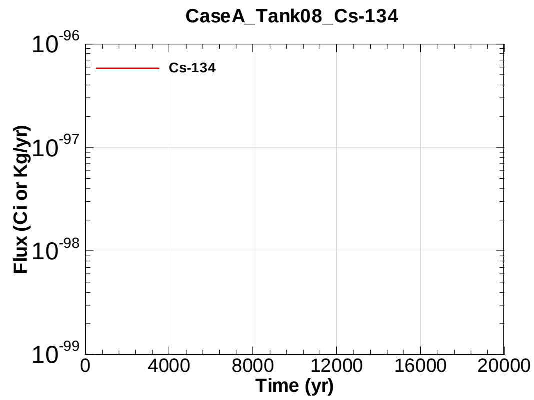

Figure A.1-640 - Flux Leaving Liner for CaseA Tank08 Cs-134

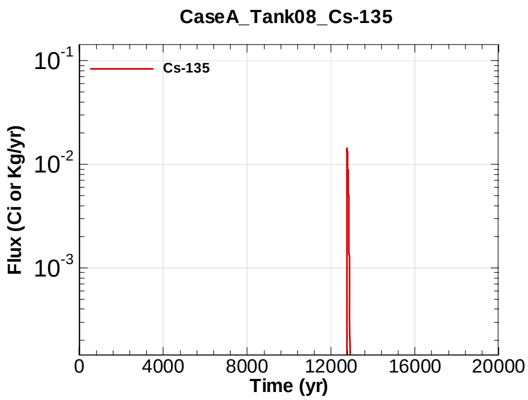

Figure A.1-641 - Flux Leaving Liner for CaseA Tank08 Cs-135

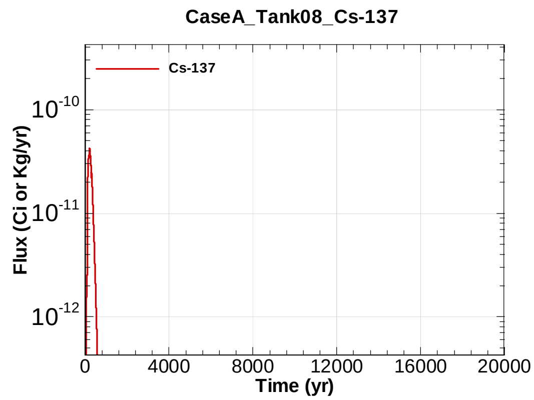

Figure A.1-642 - Flux Leaving Liner for CaseA Tank08 Cs-137

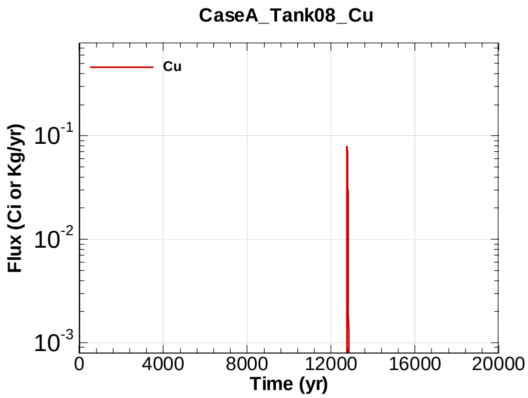

Figure A.1-643 - Flux Leaving Liner for CaseA Tank08 Cu

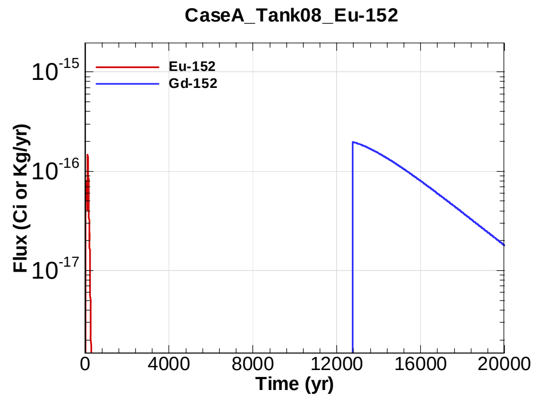

Figure A.1-644 - Flux Leaving Liner for CaseA Tank08 Eu-152

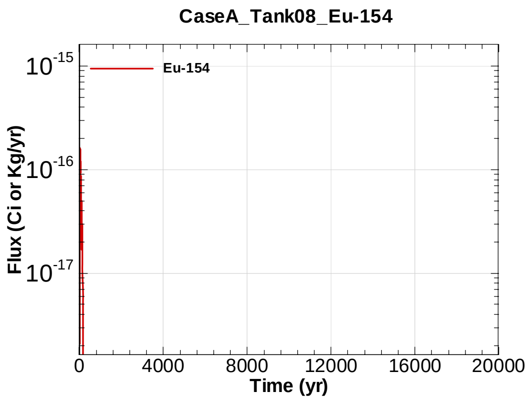

Figure A.1-645 - Flux Leaving Liner for CaseA Tank08 Eu-154

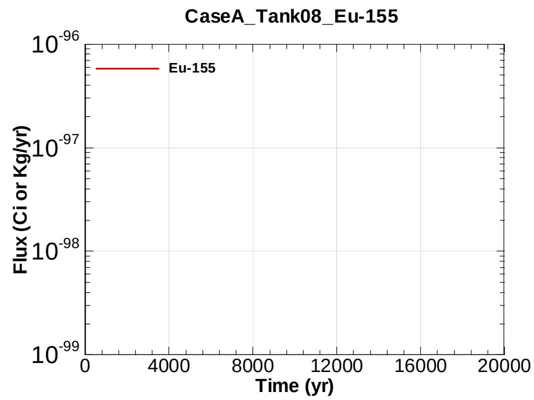

Figure A.1-646 - Flux Leaving Liner for CaseA Tank08 Eu-155

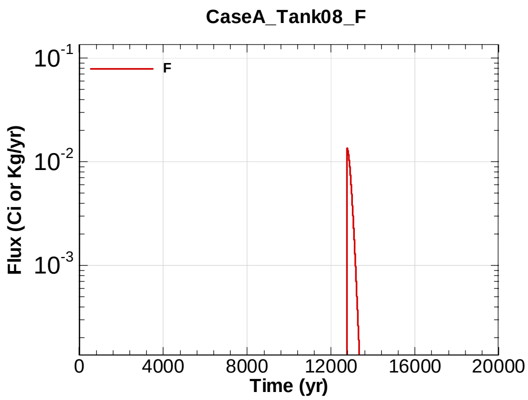

Figure A.1-647 - Flux Leaving Liner for CaseA Tank08 F

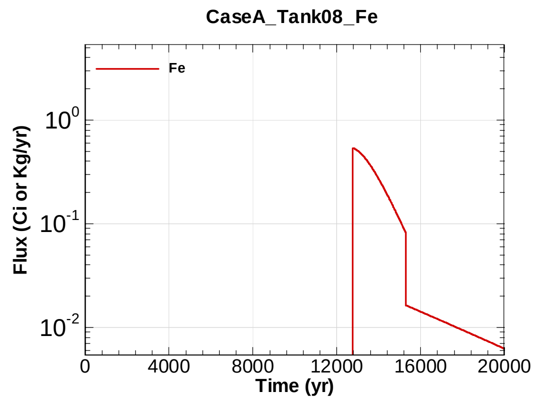

Figure A.1-648 - Flux Leaving Liner for CaseA Tank08 Fe

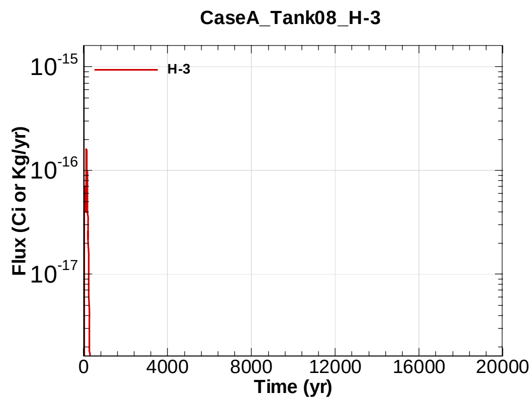

Figure A.1-649 - Flux Leaving Liner for CaseA Tank08 H-3

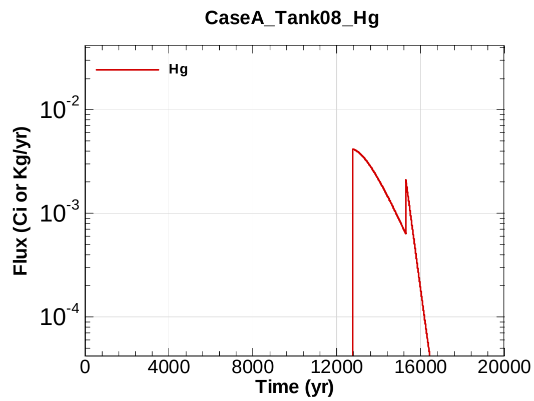

Figure A.1-650 - Flux Leaving Liner for CaseA Tank08 Hg

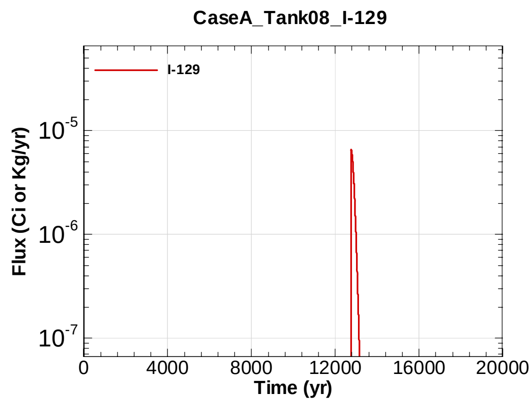

Figure A.1-651 - Flux Leaving Liner for CaseA Tank08 I-129

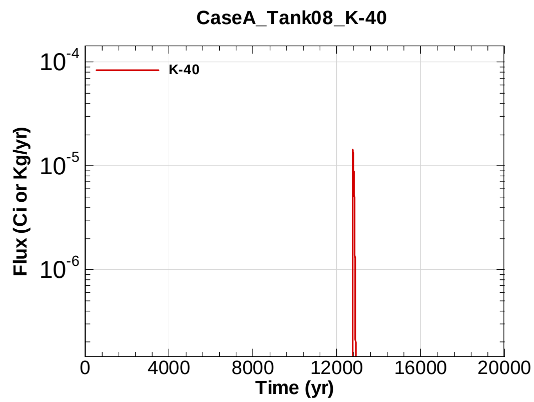

Figure A.1-652 - Flux Leaving Liner for CaseA Tank08 K-40

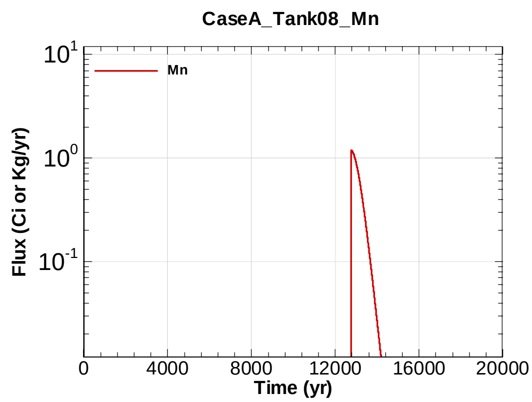

Figure A.1-653 - Flux Leaving Liner for CaseA Tank08 Mn

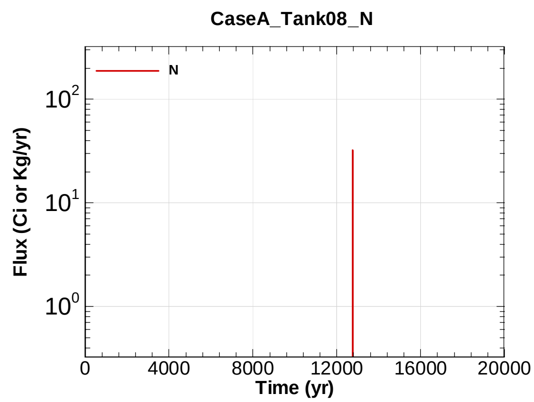

Figure A.1-654 - Flux Leaving Liner for CaseA Tank08 N

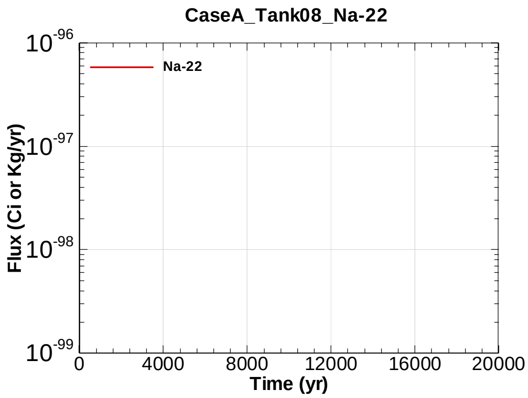

Figure A.1-655 - Flux Leaving Liner for CaseA Tank08 Na-22

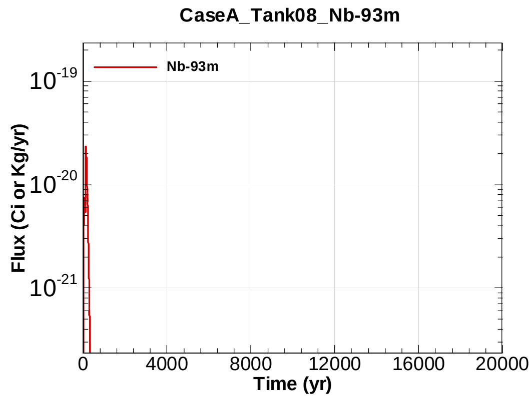

Figure A.1-656 - Flux Leaving Liner for CaseA Tank08 Nb-93m

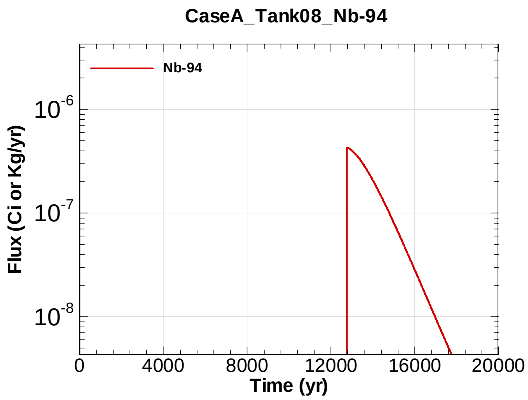

Figure A.1-657 - Flux Leaving Liner for CaseA Tank08 Nb-94

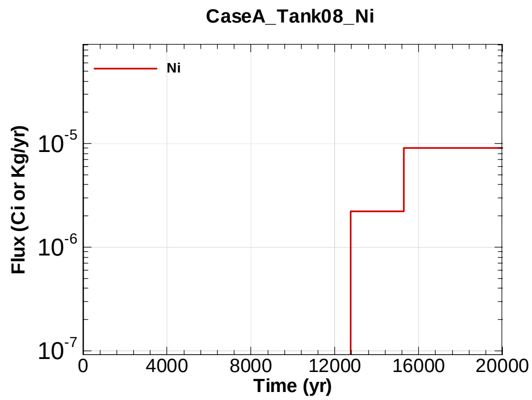

Figure A.1-658 - Flux Leaving Liner for CaseA Tank08 Ni

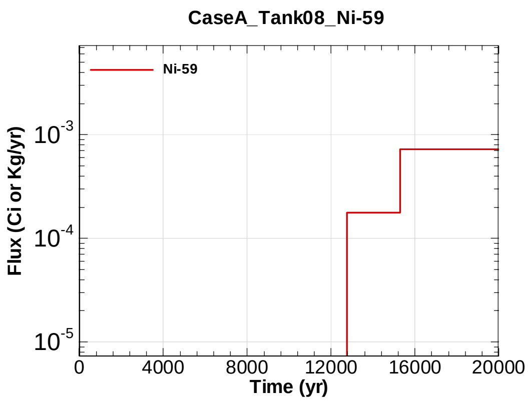

Figure A.1-659 - Flux Leaving Liner for CaseA Tank08 Ni-59

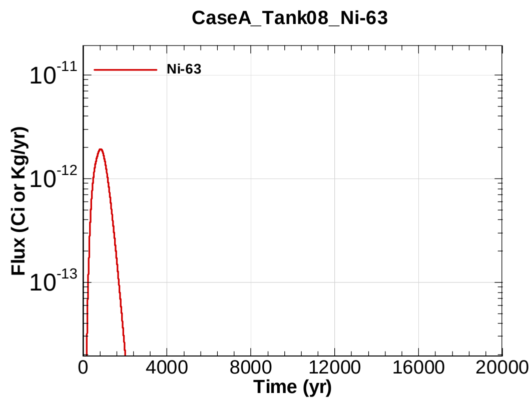

Figure A.1-660 - Flux Leaving Liner for CaseA Tank08 Ni-63

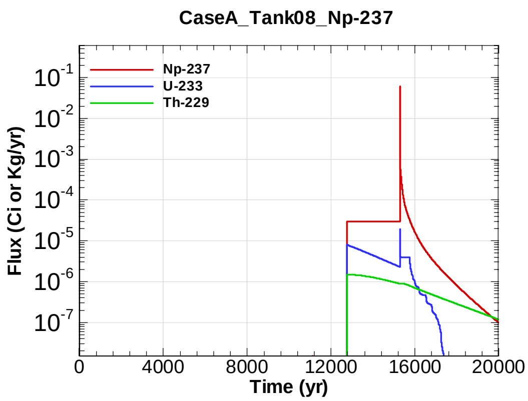

Figure A.1-661 - Flux Leaving Liner for CaseA Tank08 Np-237

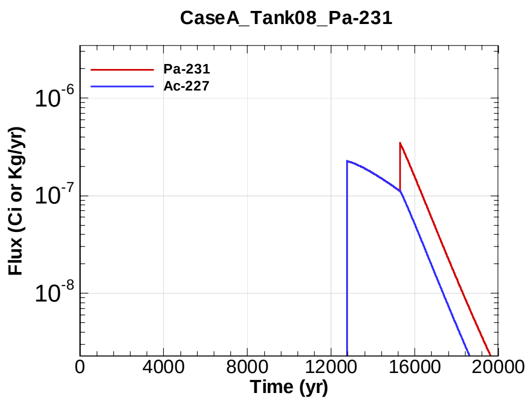

Figure A.1-662 - Flux Leaving Liner for CaseA Tank08 Pa-231

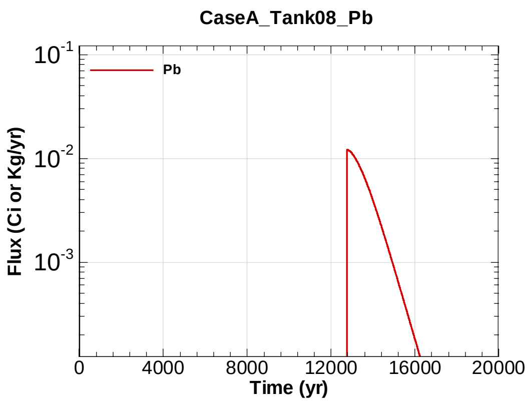

Figure A.1-663 - Flux Leaving Liner for CaseA Tank08 Pb

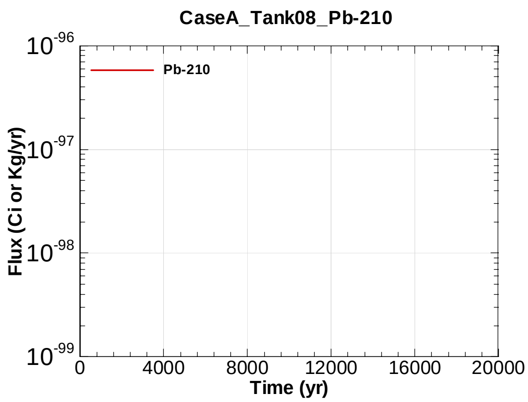

Figure A.1-664 - Flux Leaving Liner for CaseA Tank08 Pb-210

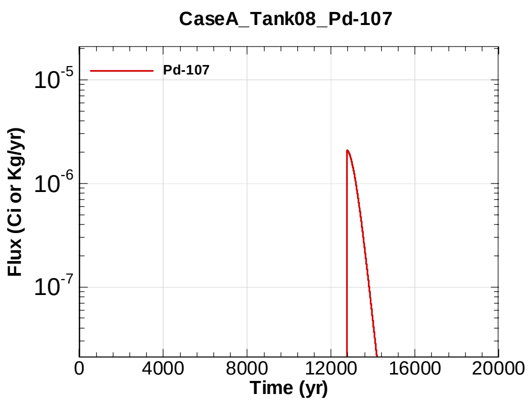

Figure A.1-665 - Flux Leaving Liner for CaseA Tank08 Pd-107

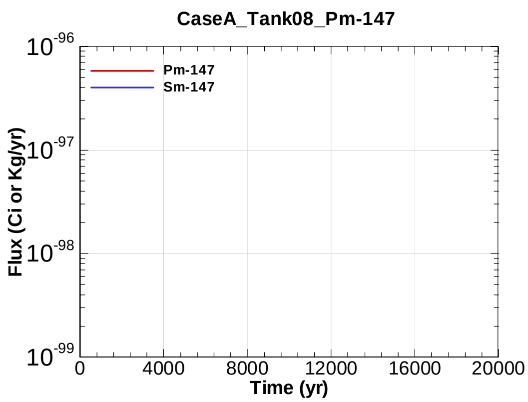

Figure A.1-666 - Flux Leaving Liner for CaseA Tank08 Pm-147

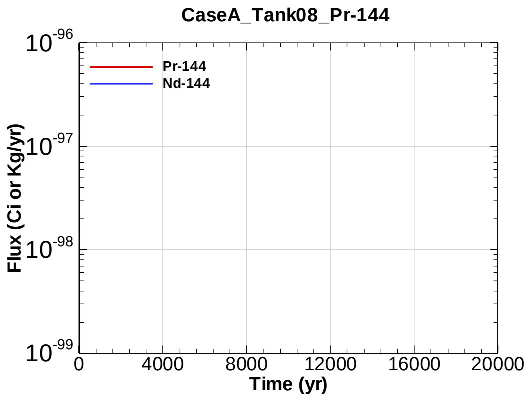

Figure A.1-667 - Flux Leaving Liner for CaseA Tank08 Pr-144

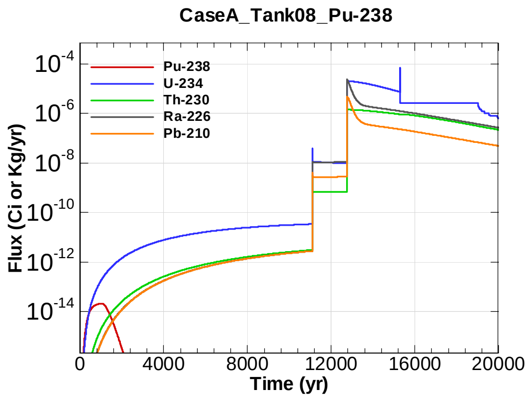

Figure A.1-668 - Flux Leaving Liner for CaseA Tank08 Pu-238

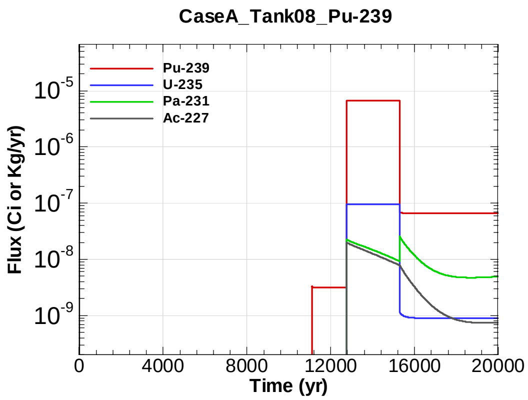

Figure A.1-669 - Flux Leaving Liner for CaseA Tank08 Pu-239

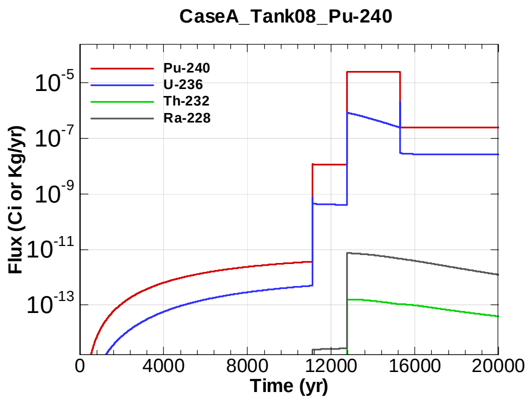

Figure A.1-670 - Flux Leaving Liner for CaseA Tank08 Pu-240

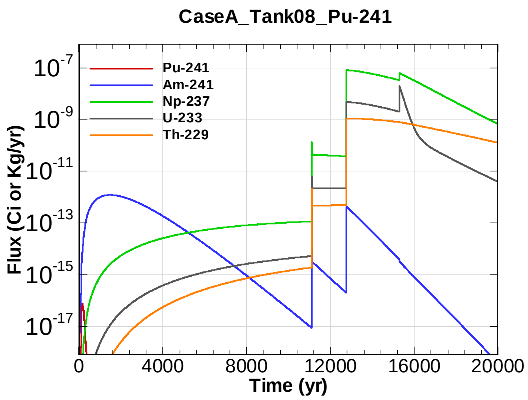

Figure A.1-671 - Flux Leaving Liner for CaseA Tank08 Pu-241

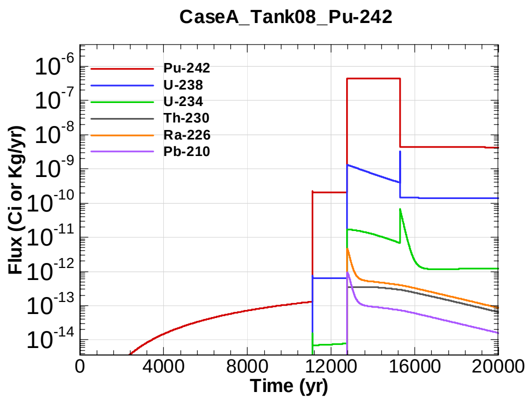

Figure A.1-672 - Flux Leaving Liner for CaseA Tank08 Pu-242

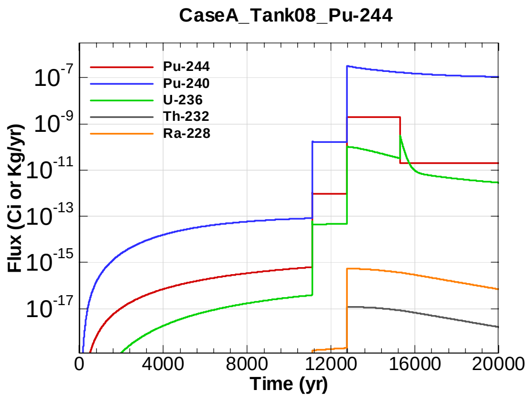

Figure A.1-673 - Flux Leaving Liner for CaseA Tank08 Pu-244

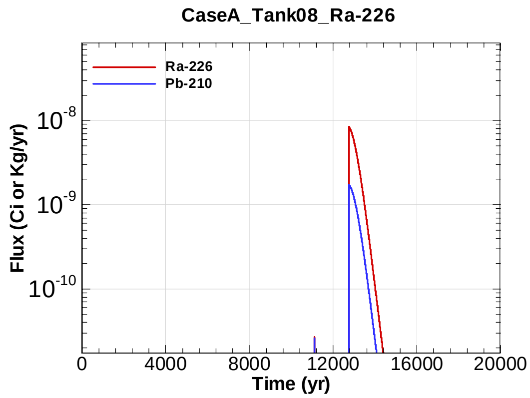

Figure A.1-674 - Flux Leaving Liner for CaseA Tank08 Ra-226

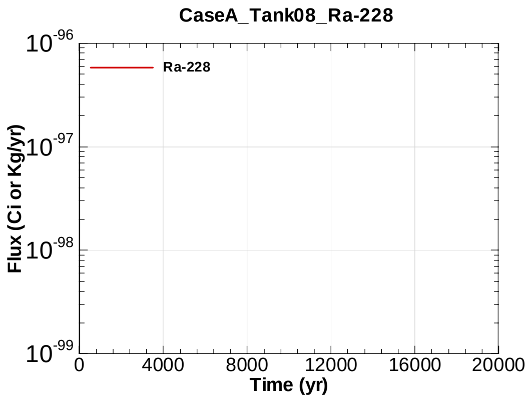

Figure A.1-675 - Flux Leaving Liner for CaseA Tank08 Ra-228

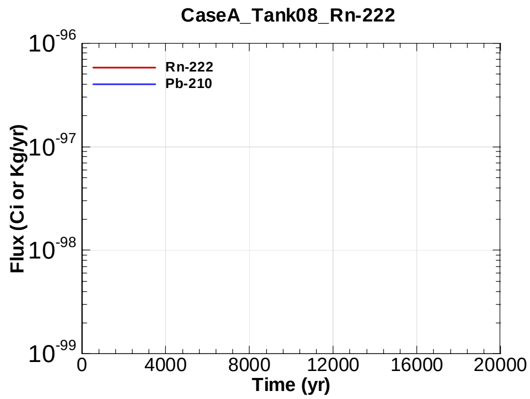

Figure A.1-676 - Flux Leaving Liner for CaseA Tank08 Rn-222

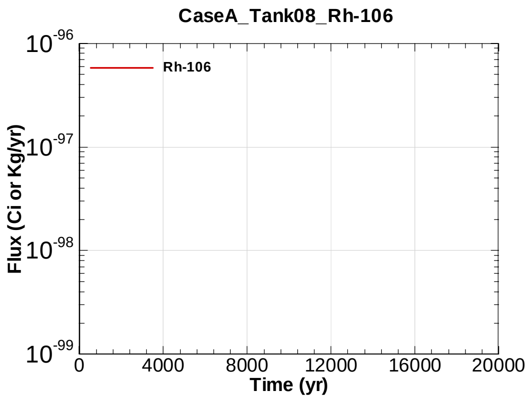

Figure A.1-677 - Flux Leaving Liner for CaseA Tank08 Rh-106

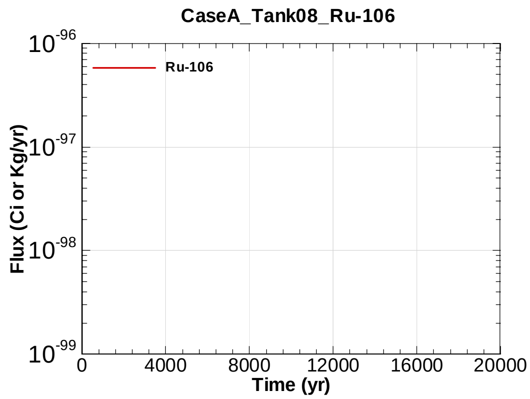

Figure A.1-678 - Flux Leaving Liner for CaseA Tank08 Ru-106

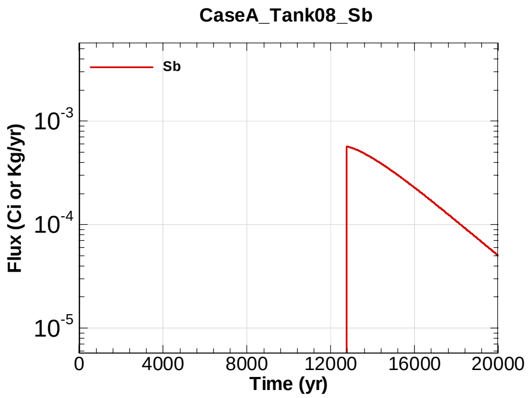

Figure A.1-679 - Flux Leaving Liner for CaseA Tank08 Sb

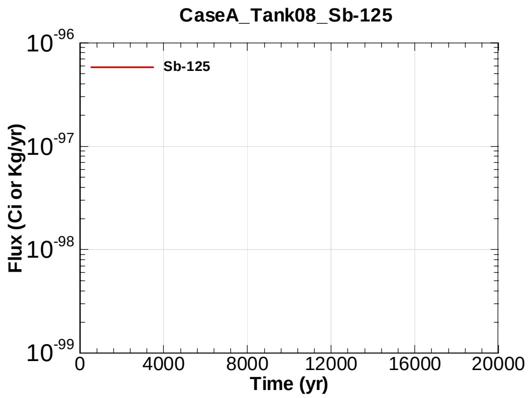

Figure A.1-680 - Flux Leaving Liner for CaseA Tank08 Sb-125

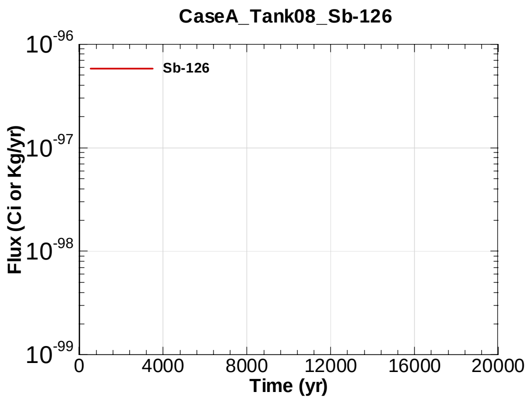

Figure A.1-681 - Flux Leaving Liner for CaseA Tank08 Sb-126

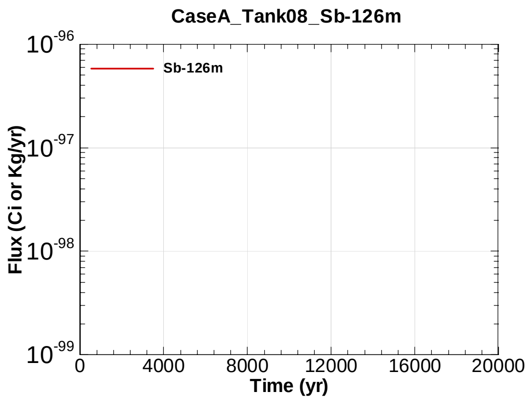

Figure A.1-682 - Flux Leaving Liner for CaseA Tank08 Sb-126m

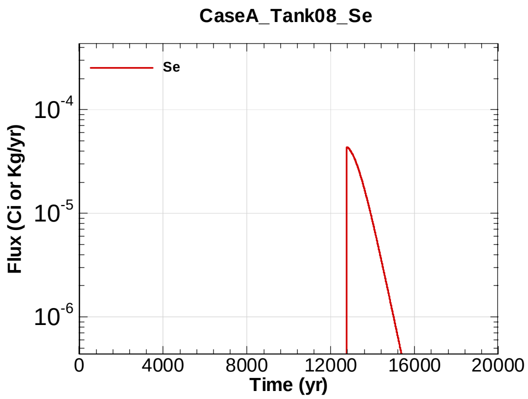

Figure A.1-683 - Flux Leaving Liner for CaseA Tank08 Se

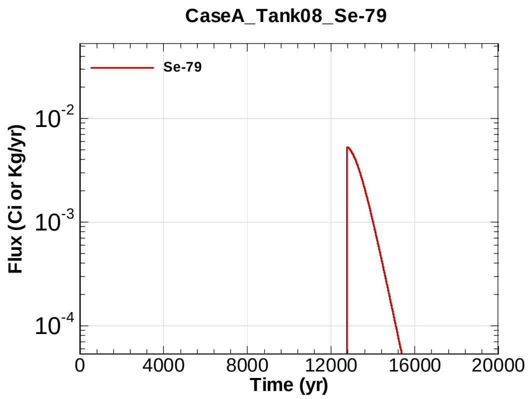

Figure A.1-684 - Flux Leaving Liner for CaseA Tank08 Se-79

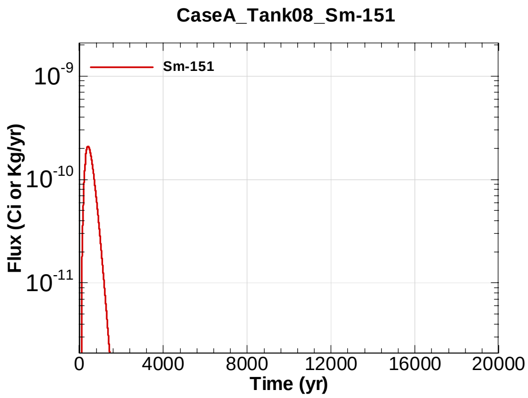

Figure A.1-685 - Flux Leaving Liner for CaseA Tank08 Sm-151

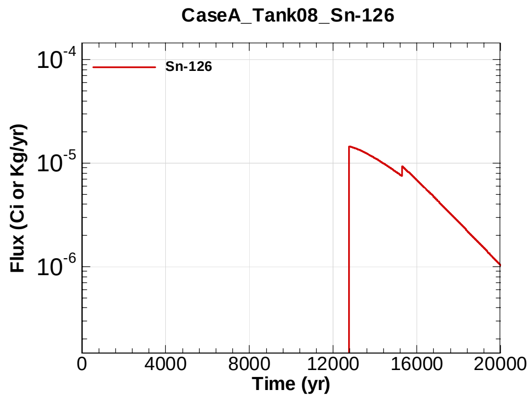

Figure A.1-686 - Flux Leaving Liner for CaseA Tank08 Sn-126

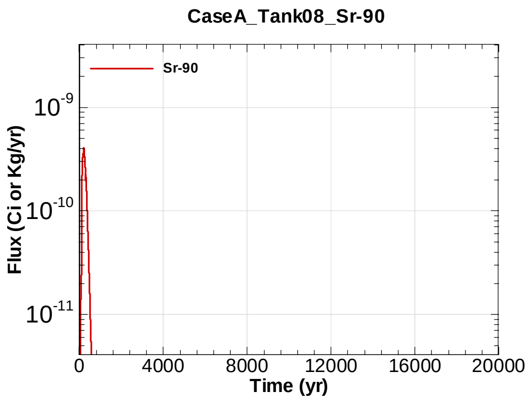

Figure A.1-687 - Flux Leaving Liner for CaseA Tank08 Sr-90

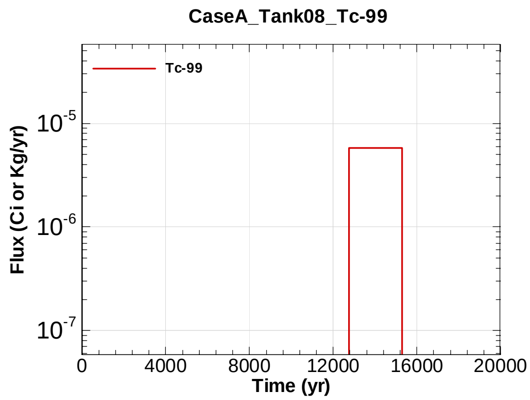

Figure A.1-688 - Flux Leaving Liner for CaseA Tank08 Tc-99

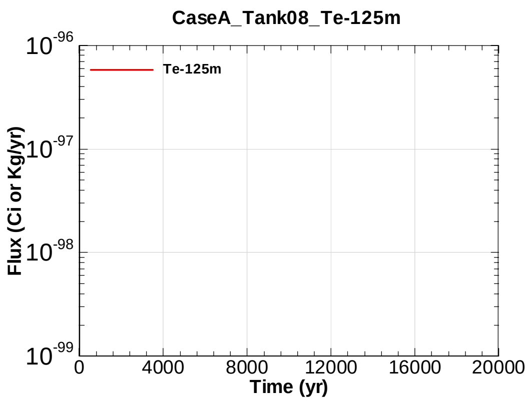

Figure A.1-689 - Flux Leaving Liner for CaseA Tank08 Te-125m

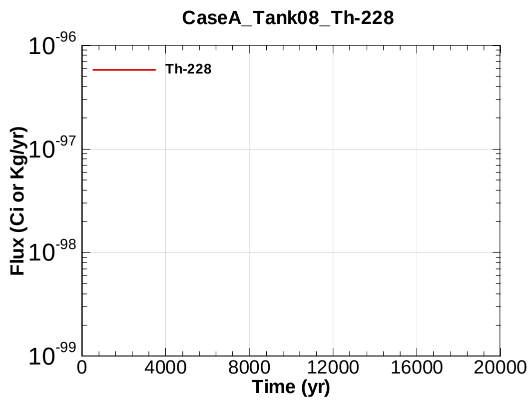

Figure A.1-690 - Flux Leaving Liner for CaseA Tank08 Th-228

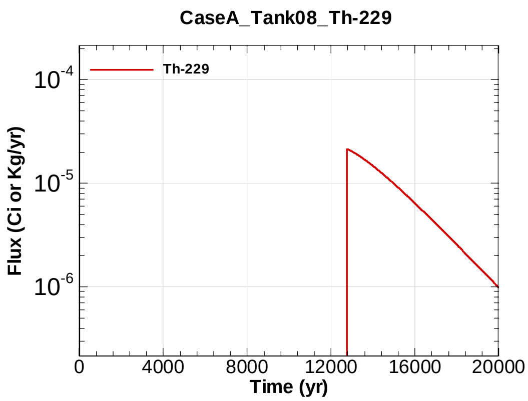

Figure A.1-691 - Flux Leaving Liner for CaseA Tank08 Th-229

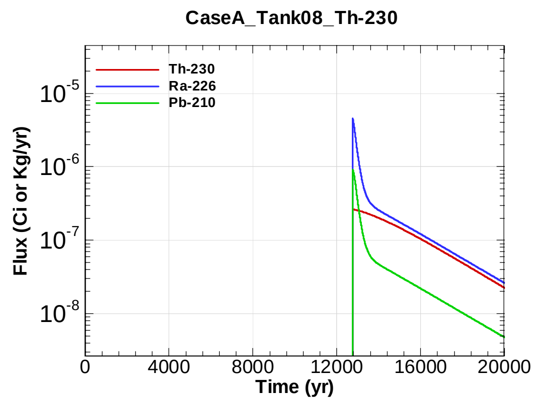

Figure A.1-692 - Flux Leaving Liner for CaseA Tank08 Th-230

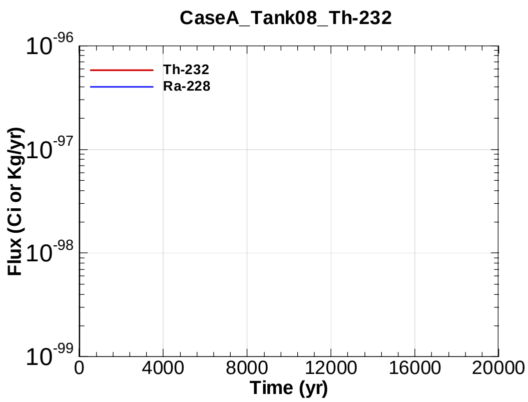

Figure A.1-693 - Flux Leaving Liner for CaseA Tank08 Th-232

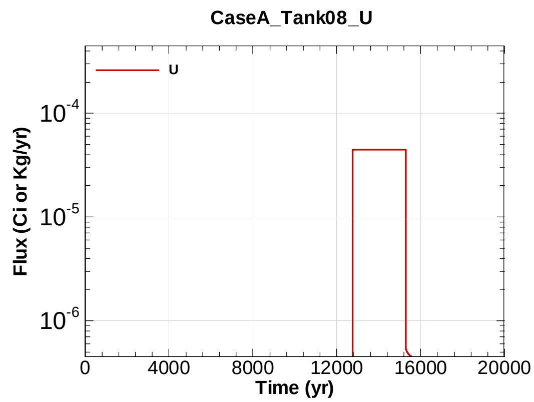

Figure A.1-694 - Flux Leaving Liner for CaseA Tank08 U

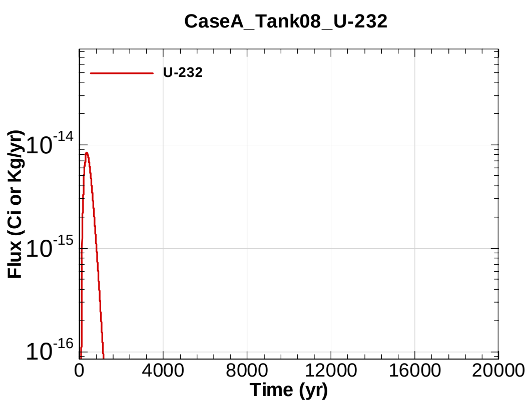

Figure A.1-695 - Flux Leaving Liner for CaseA Tank08 U-232

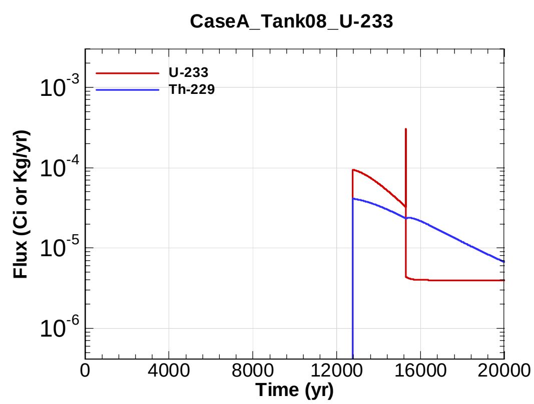

Figure A.1-696 - Flux Leaving Liner for CaseA Tank08 U-233

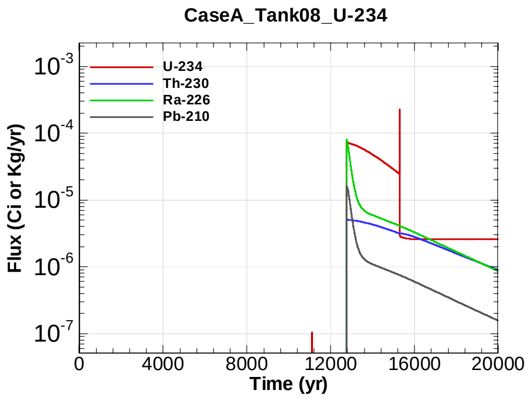

Figure A.1-697 - Flux Leaving Liner for CaseA Tank08 U-234

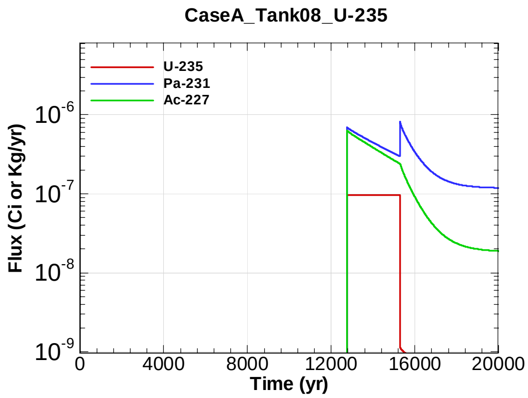

Figure A.1-698 - Flux Leaving Liner for CaseA Tank08 U-235

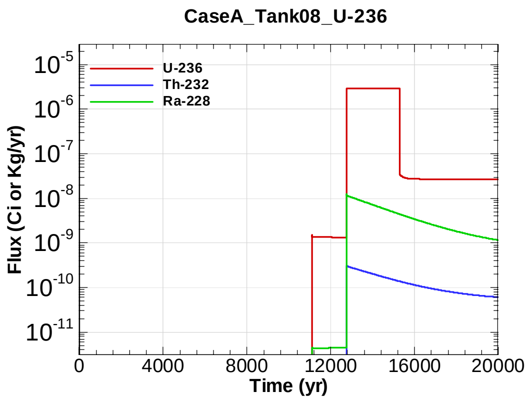

Figure A.1-699 - Flux Leaving Liner for CaseA Tank08 U-236

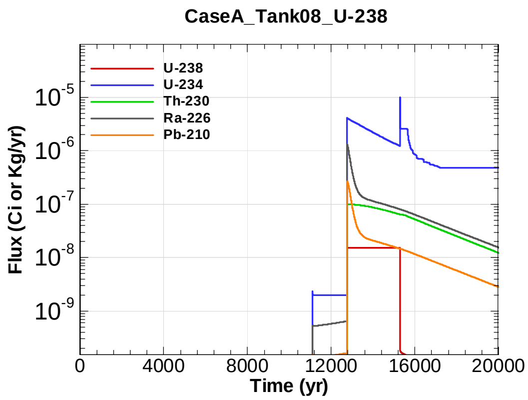

Figure A.1-700 - Flux Leaving Liner for CaseA Tank08 U-238

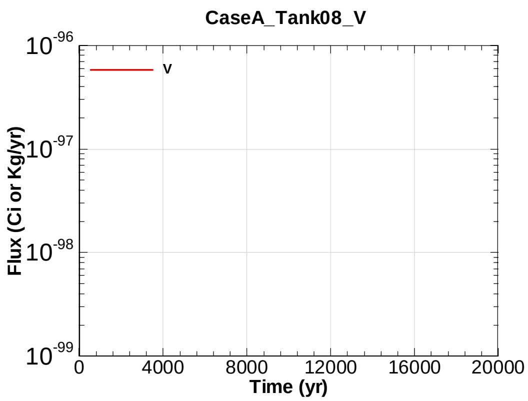

Figure A.1-701 - Flux Leaving Liner for CaseA Tank08 V

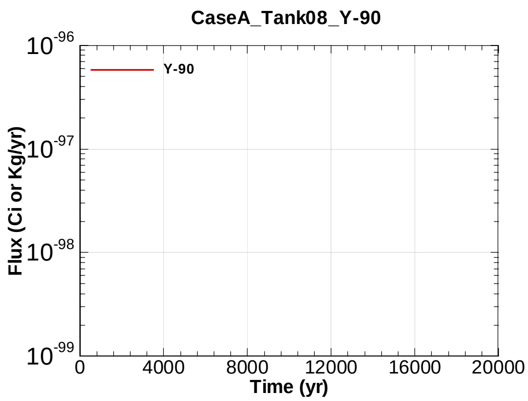

Figure A.1-702 - Flux Leaving Liner for CaseA Tank08 Y-90

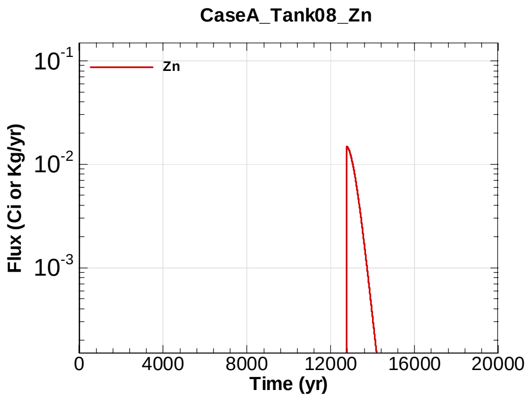

Figure A.1-703 - Flux Leaving Liner for CaseA Tank08 Zn

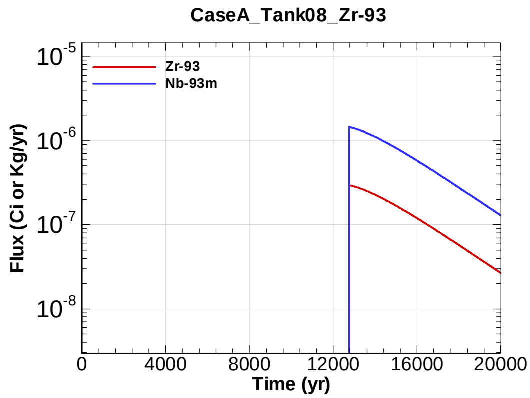

Figure A.1-704 - Flux Leaving Liner for CaseA Tank08 Zr-93

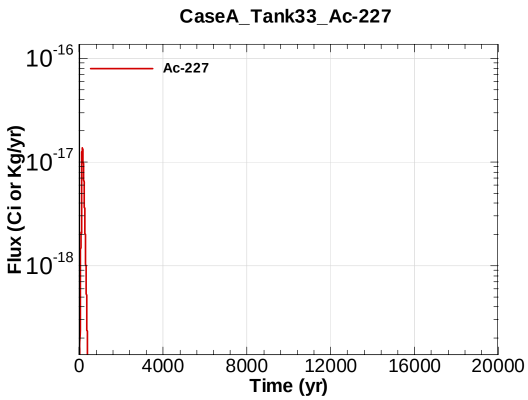

Figure A.1-705 - Flux Leaving Liner for CaseA Tank33 Ac-227

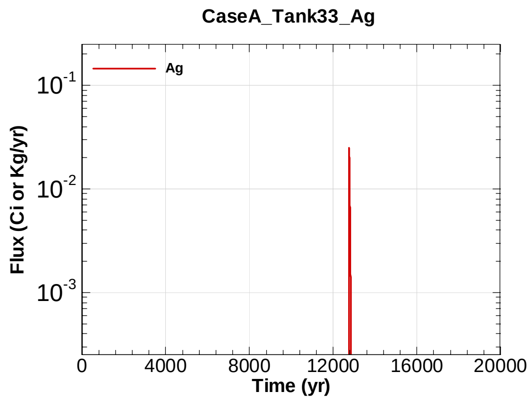

Figure A.1-706 - Flux Leaving Liner for CaseA Tank33 Ag

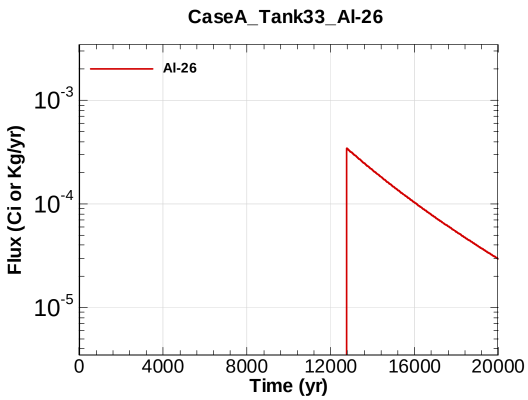

Figure A.1-707 - Flux Leaving Liner for CaseA Tank33 Al-26

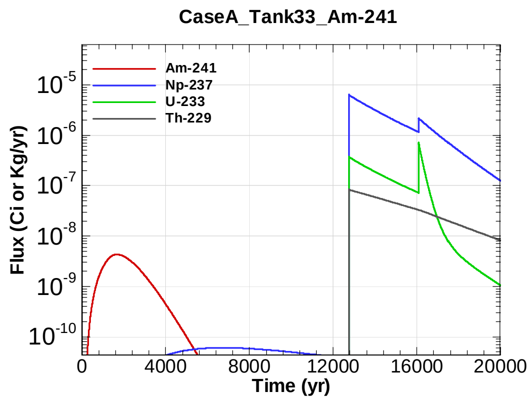

Figure A.1-708 - Flux Leaving Liner for CaseA Tank33 Am-241

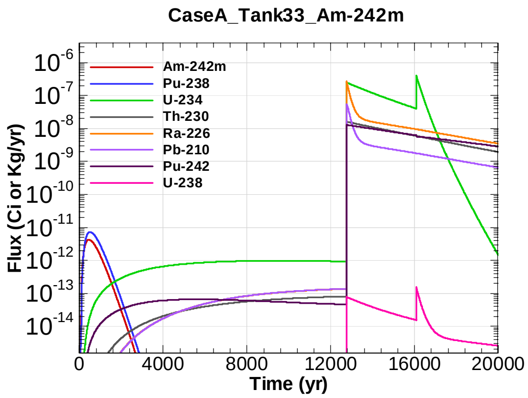

Figure A.1-709 - Flux Leaving Liner for CaseA Tank33 Am-242m

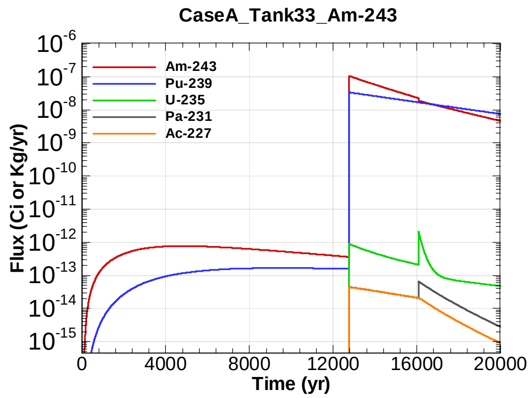

Figure A.1-710 - Flux Leaving Liner for CaseA Tank33 Am-243

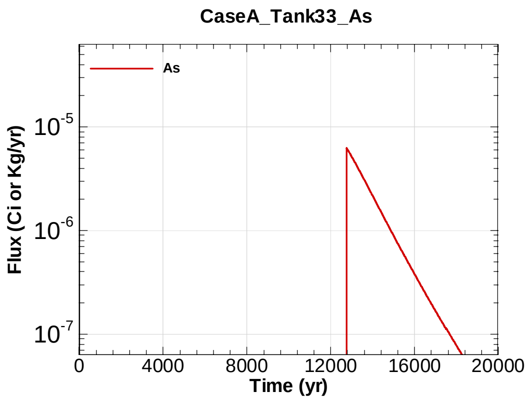

Figure A.1-711 - Flux Leaving Liner for CaseA Tank33 As

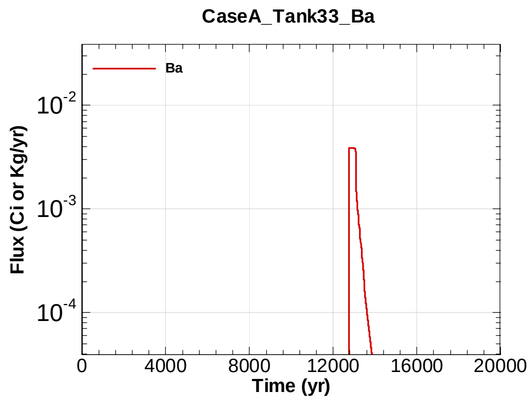

Figure A.1-712 - Flux Leaving Liner for CaseA Tank33 Ba

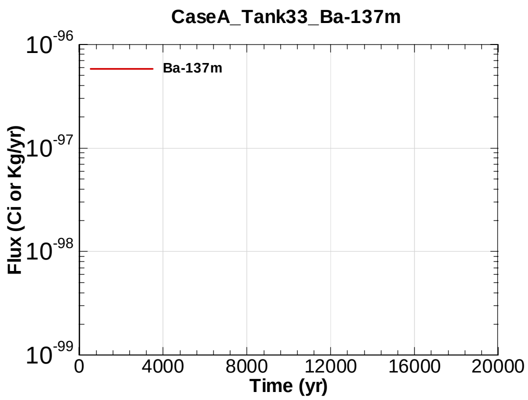

Figure A.1-713 - Flux Leaving Liner for CaseA Tank33 Ba-137m

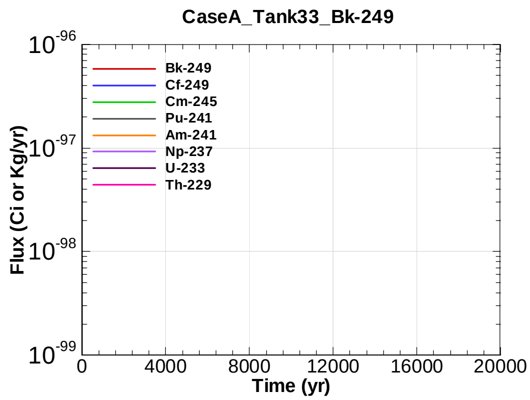

Figure A.1-714 - Flux Leaving Liner for CaseA Tank33 Bk-249

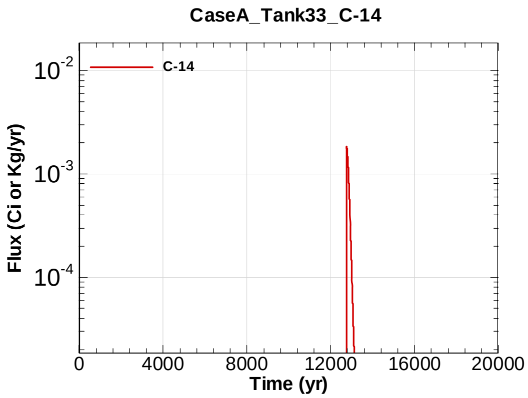

Figure A.1-715 - Flux Leaving Liner for CaseA Tank33 C-14

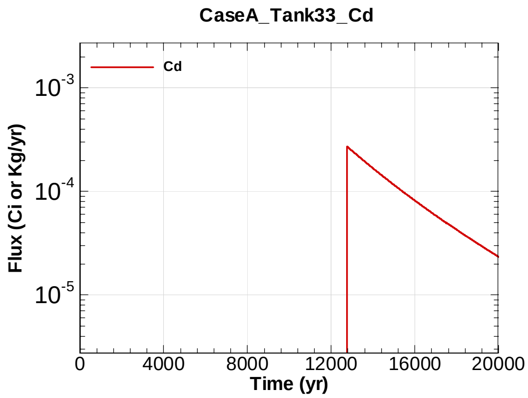

Figure A.1-716 - Flux Leaving Liner for CaseA Tank33 Cd

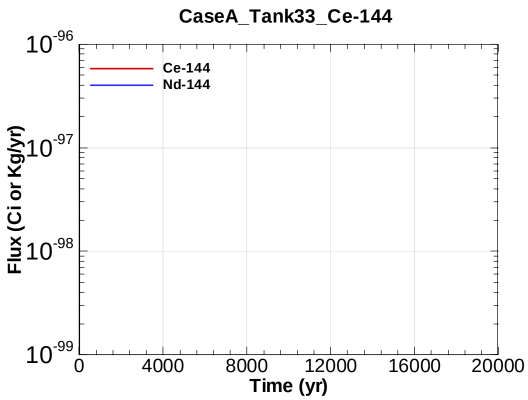

Figure A.1-717 - Flux Leaving Liner for CaseA Tank33 Ce-144

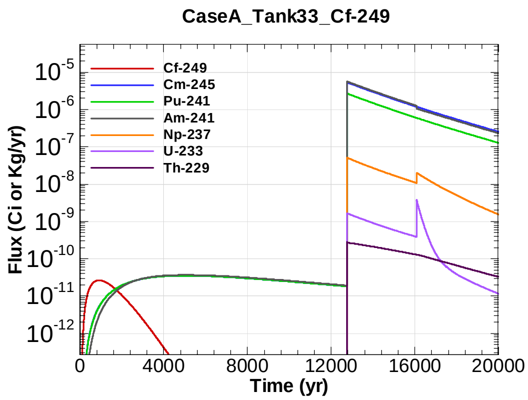

Figure A.1-718 - Flux Leaving Liner for CaseA Tank33 Cf-249

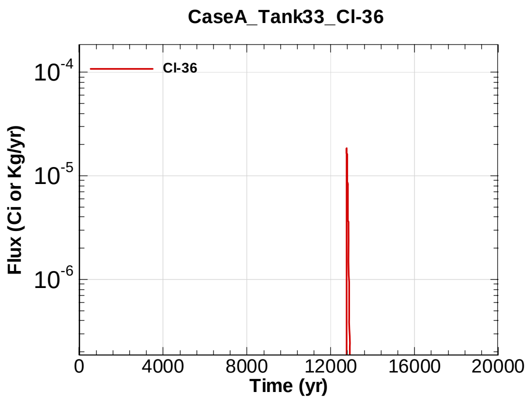

Figure A.1-719 - Flux Leaving Liner for CaseA Tank33 Cl-36

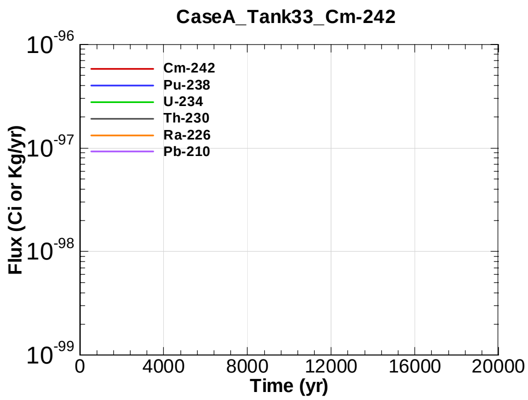

Figure A.1-720 - Flux Leaving Liner for CaseA Tank33 Cm-242

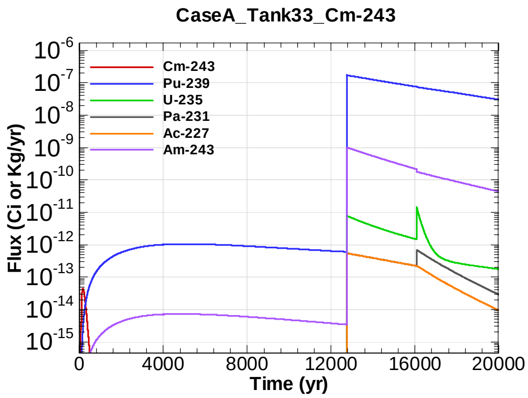

Figure A.1-721 - Flux Leaving Liner for CaseA Tank33 Cm-243

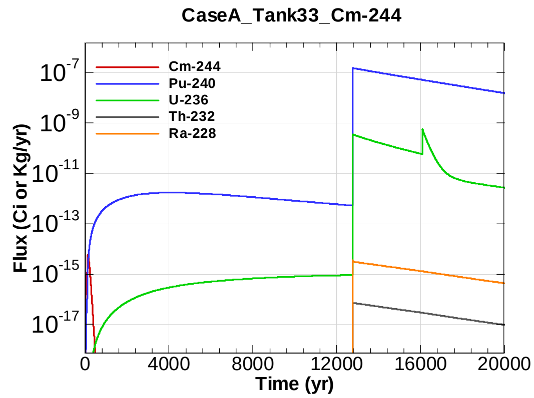

Figure A.1-722 - Flux Leaving Liner for CaseA Tank33 Cm-244

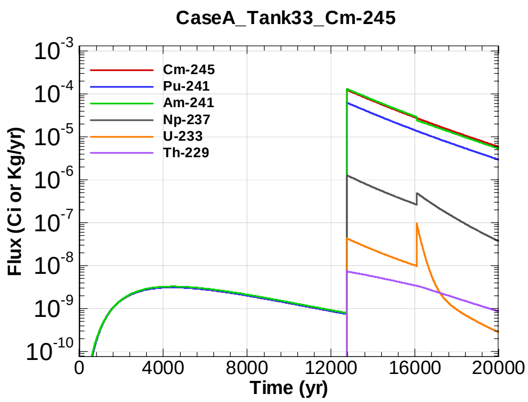

Figure A.1-723 - Flux Leaving Liner for CaseA Tank33 Cm-245

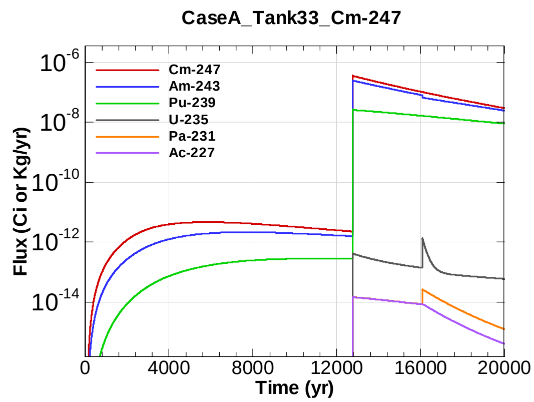

Figure A.1-724 - Flux Leaving Liner for CaseA Tank33 Cm-247

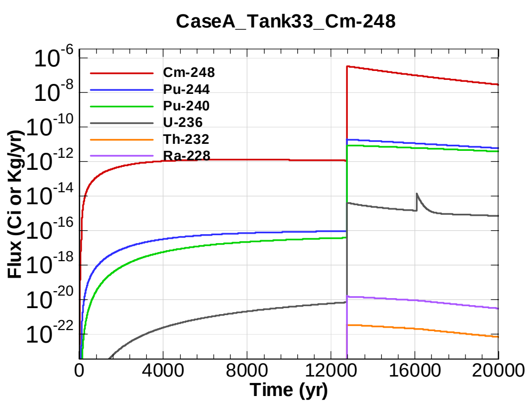

Figure A.1-725 - Flux Leaving Liner for CaseA Tank33 Cm-248

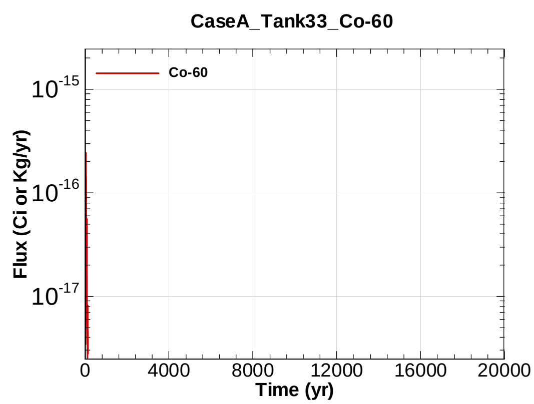

Figure A.1-726 - Flux Leaving Liner for CaseA Tank33 Co-60

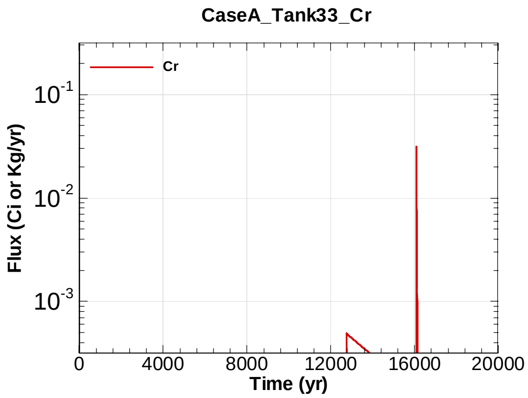

Figure A.1-727 - Flux Leaving Liner for CaseA Tank33 Cr

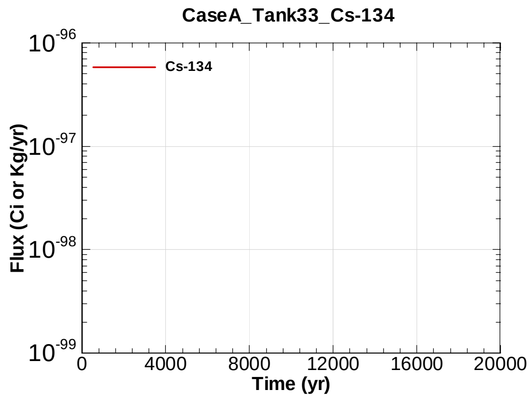

Figure A.1-728 - Flux Leaving Liner for CaseA Tank33 Cs-134

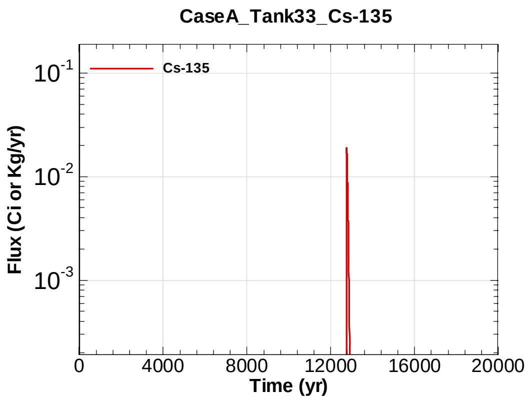

Figure A.1-729 - Flux Leaving Liner for CaseA Tank33 Cs-135

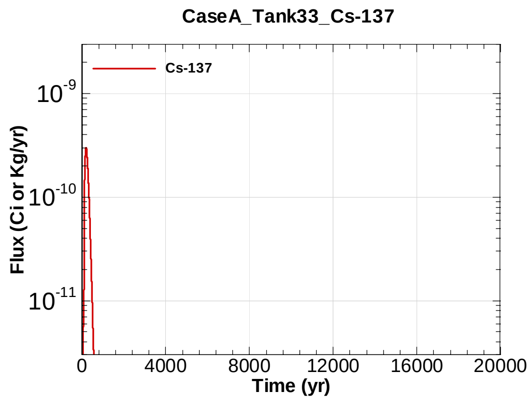

Figure A.1-730 - Flux Leaving Liner for CaseA Tank33 Cs-137

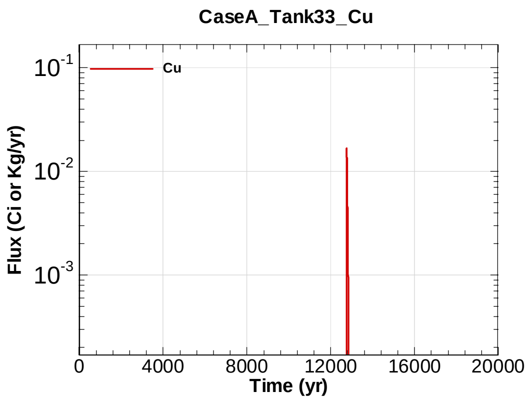

Figure A.1-731 - Flux Leaving Liner for CaseA Tank33 Cu

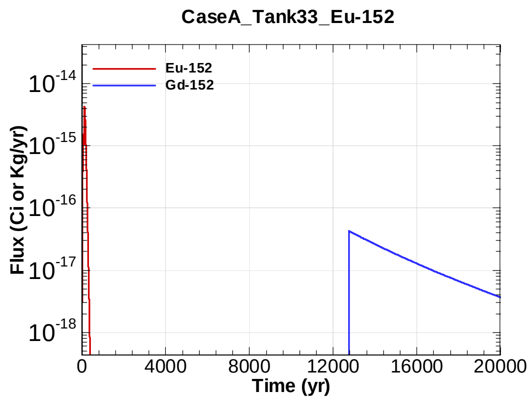

Figure A.1-732 - Flux Leaving Liner for CaseA Tank33 Eu-152

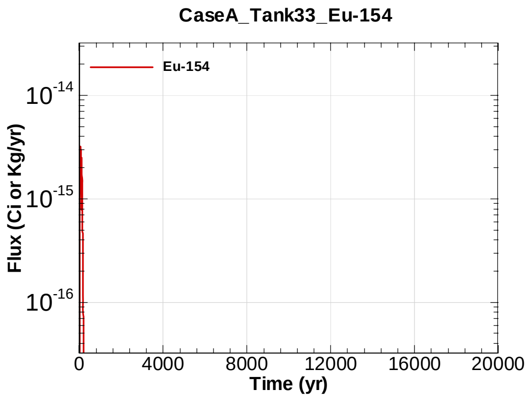

Figure A.1-733 - Flux Leaving Liner for CaseA Tank33 Eu-154

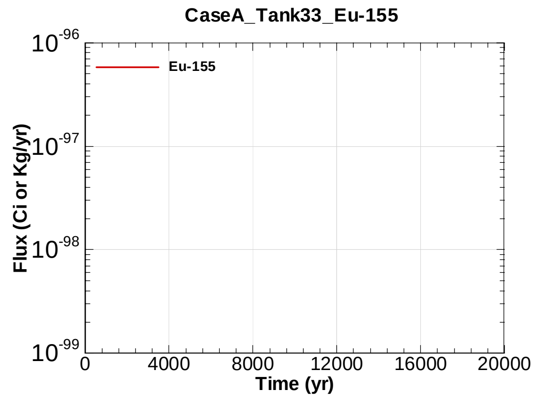

Figure A.1-734 - Flux Leaving Liner for CaseA Tank33 Eu-155

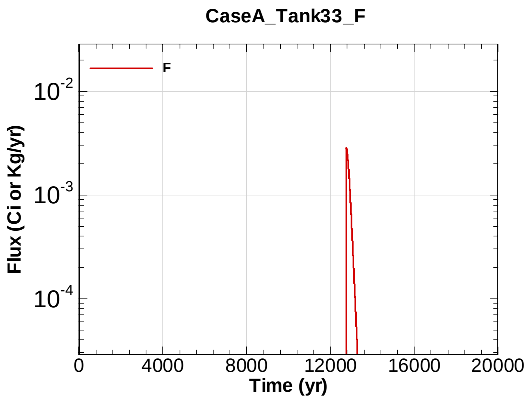

Figure A.1-735 - Flux Leaving Liner for CaseA Tank33 F

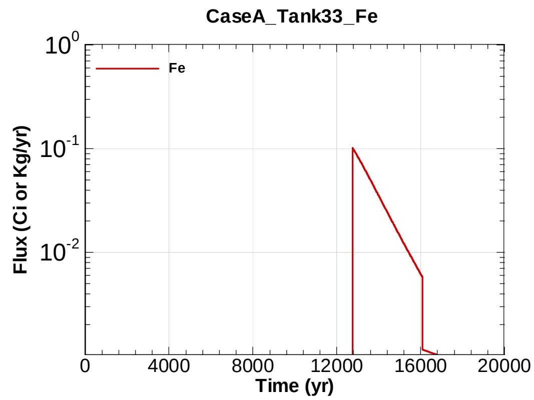

Figure A.1-736 - Flux Leaving Liner for CaseA Tank33 Fe

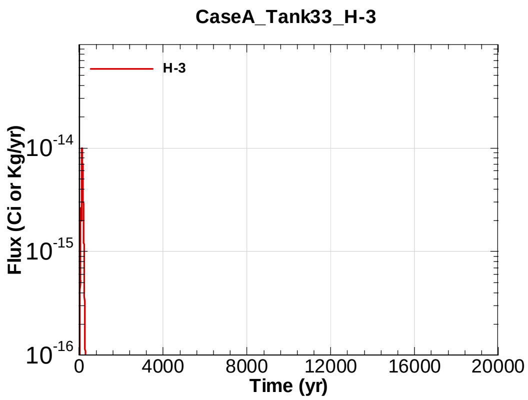

Figure A.1-737 - Flux Leaving Liner for CaseA Tank33 H-3

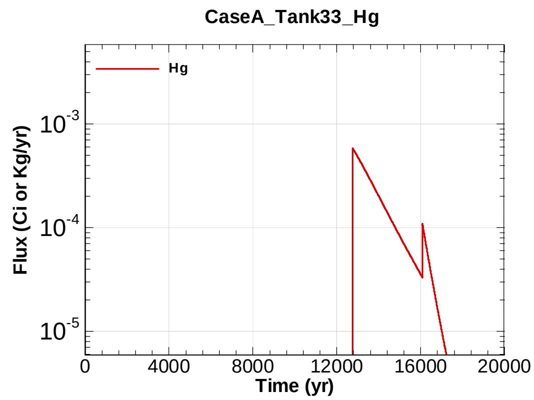

Figure A.1-738 - Flux Leaving Liner for CaseA Tank33 Hg

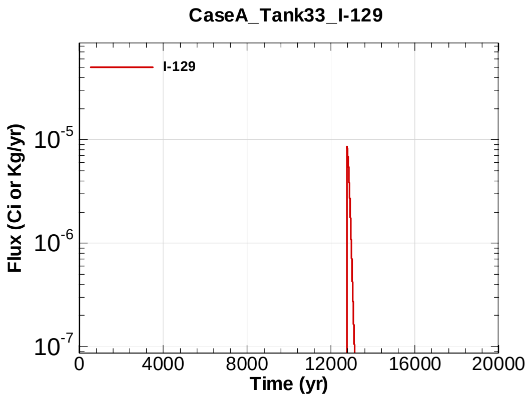

Figure A.1-739 - Flux Leaving Liner for CaseA Tank33 I-129

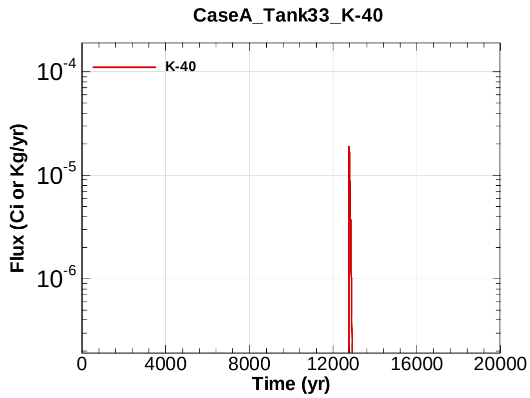

Figure A.1-740 - Flux Leaving Liner for CaseA Tank33 K-40

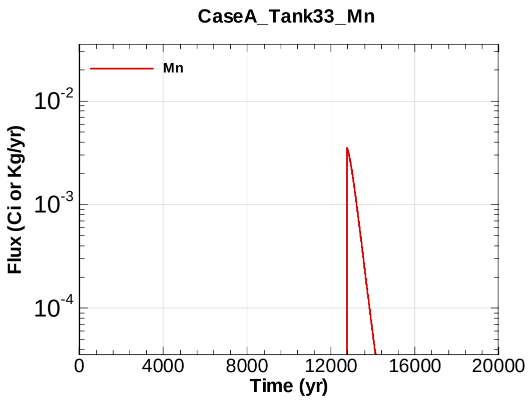

Figure A.1-741 - Flux Leaving Liner for CaseA Tank33 Mn

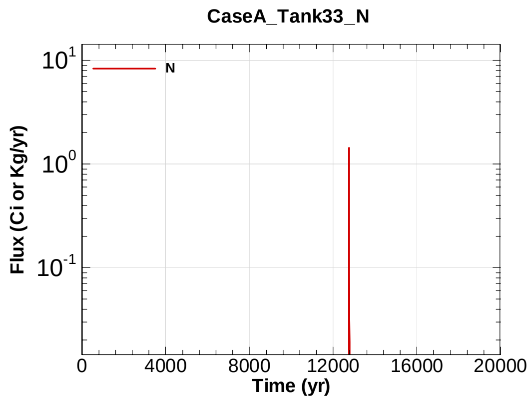

Figure A.1-742 - Flux Leaving Liner for CaseA Tank33 N

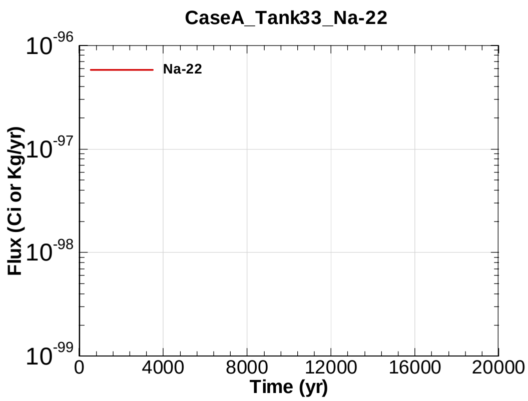

Figure A.1-743 - Flux Leaving Liner for CaseA Tank33 Na-22

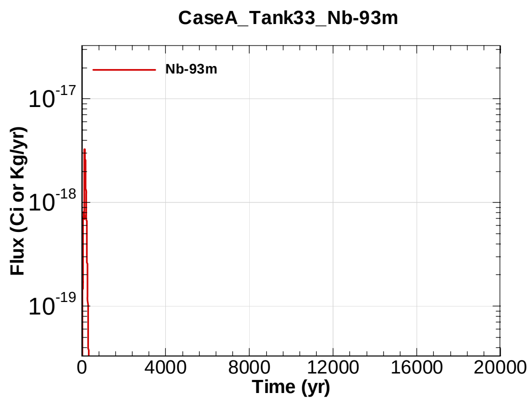

Figure A.1-744 - Flux Leaving Liner for CaseA Tank33 Nb-93m

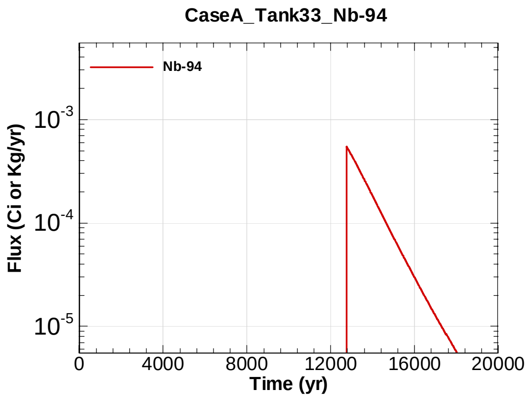

Figure A.1-745 - Flux Leaving Liner for CaseA Tank33 Nb-94

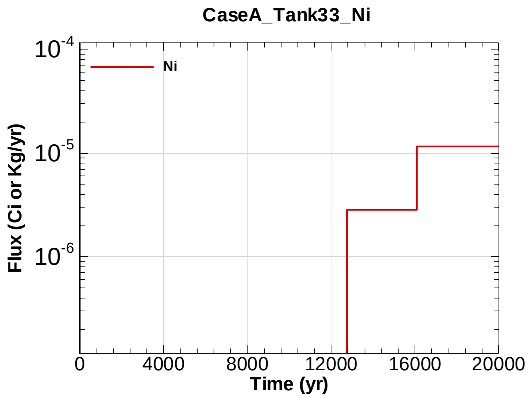

Figure A.1-746 - Flux Leaving Liner for CaseA Tank33 Ni

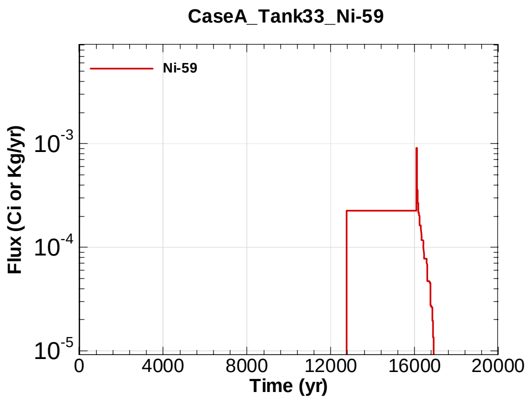

Figure A.1-747 - Flux Leaving Liner for CaseA Tank33 Ni-59

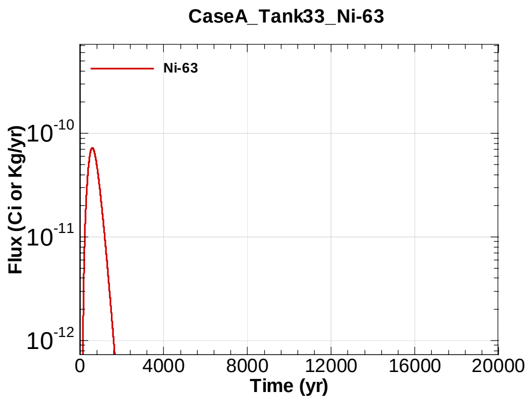

Figure A.1-748 - Flux Leaving Liner for CaseA Tank33 Ni-63

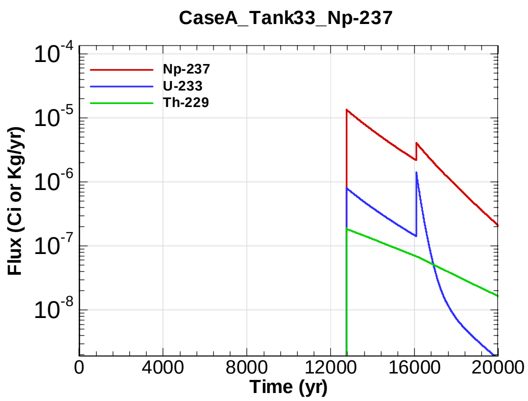

Figure A.1-749 - Flux Leaving Liner for CaseA Tank33 Np-237

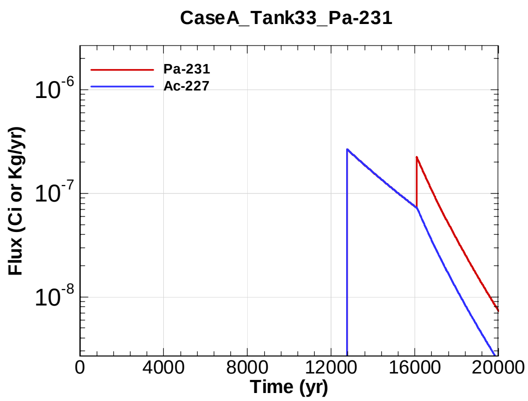

Figure A.1-750 - Flux Leaving Liner for CaseA Tank33 Pa-231

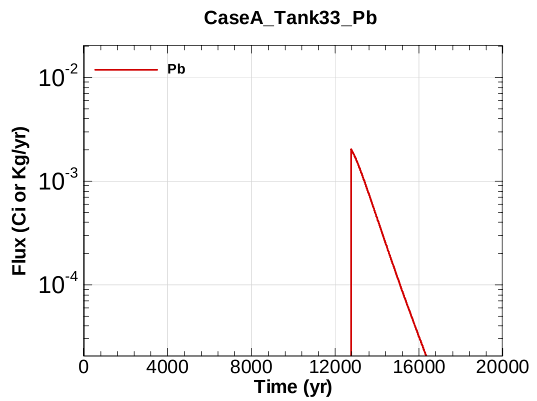

Figure A.1-751 - Flux Leaving Liner for CaseA Tank33 Pb

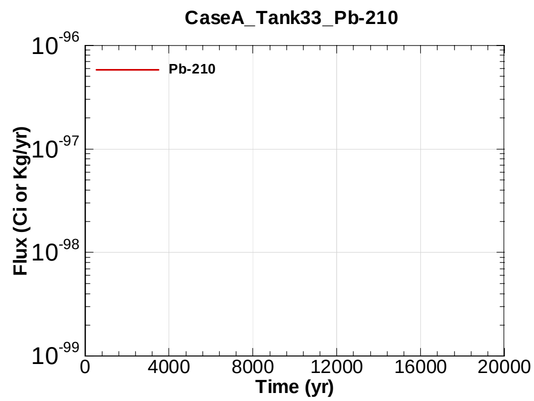

Figure A.1-752 - Flux Leaving Liner for CaseA Tank33 Pb-210

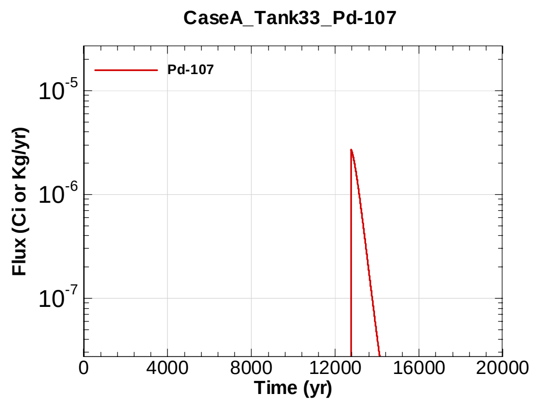

Figure A.1-753 - Flux Leaving Liner for CaseA Tank33 Pd-107

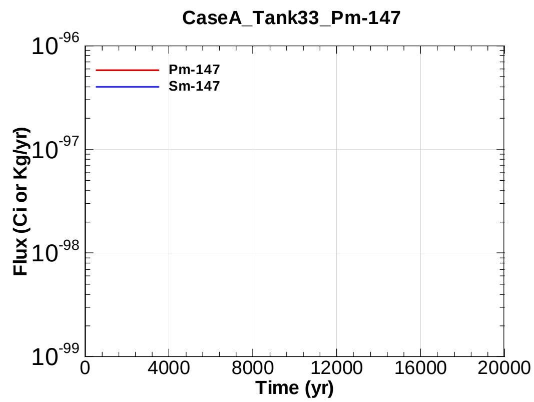

Figure A.1-754 - Flux Leaving Liner for CaseA Tank33 Pm-147

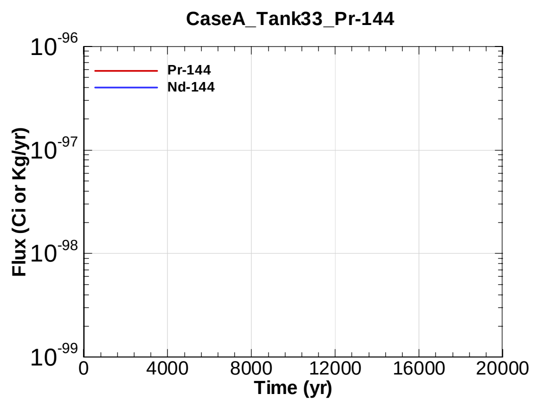

Figure A.1-755 - Flux Leaving Liner for CaseA Tank33 Pr-144

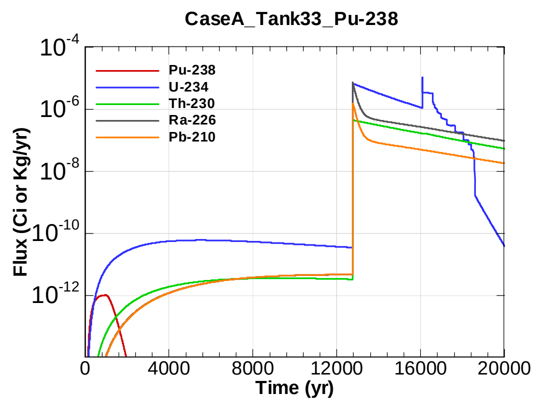

Figure A.1-756 - Flux Leaving Liner for CaseA Tank33 Pu-238

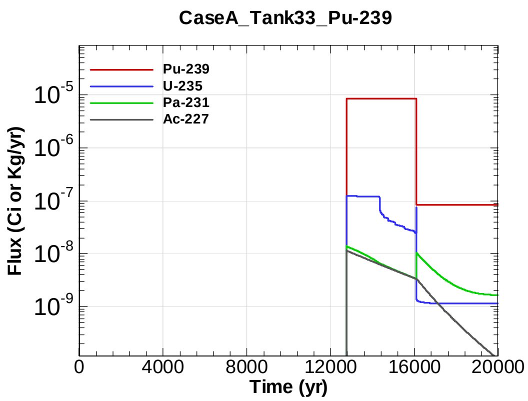

Figure A.1-757 - Flux Leaving Liner for CaseA Tank33 Pu-239

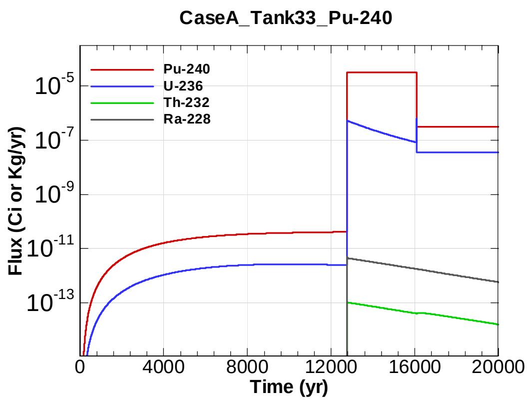

Figure A.1-758 - Flux Leaving Liner for CaseA Tank33 Pu-240

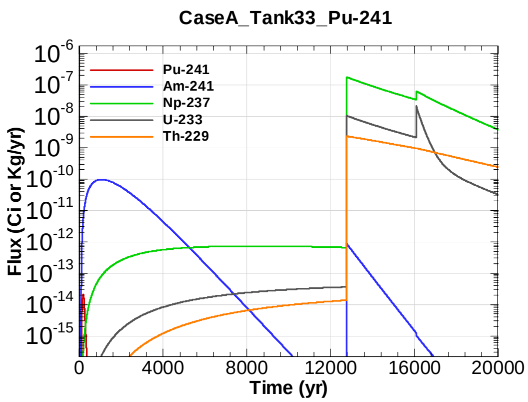

Figure A.1-759 - Flux Leaving Liner for CaseA Tank33 Pu-241

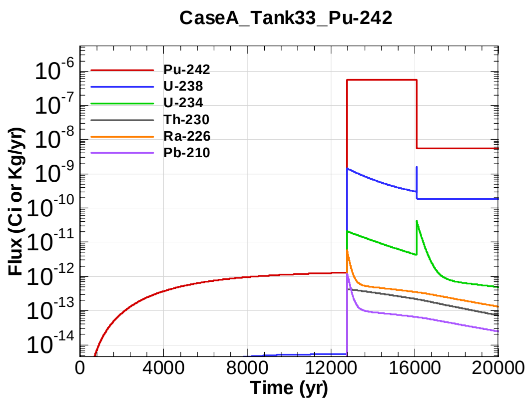

Figure A.1-760 - Flux Leaving Liner for CaseA Tank33 Pu-242

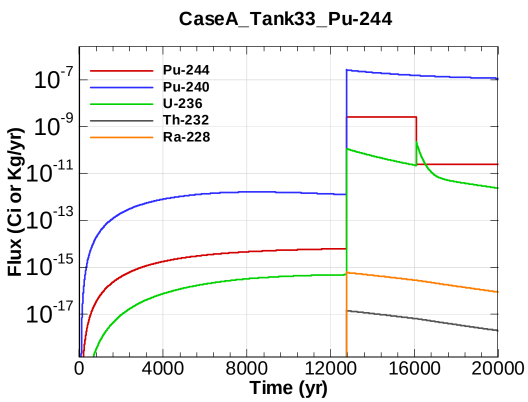

Figure A.1-761 - Flux Leaving Liner for CaseA Tank33 Pu-244

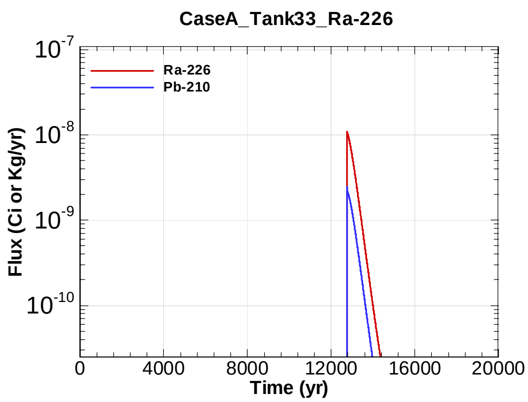

Figure A.1-762 - Flux Leaving Liner for CaseA Tank33 Ra-226

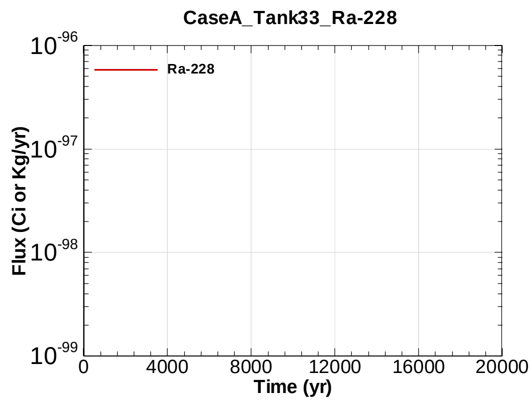

Figure A.1-763 - Flux Leaving Liner for CaseA Tank33 Ra-228

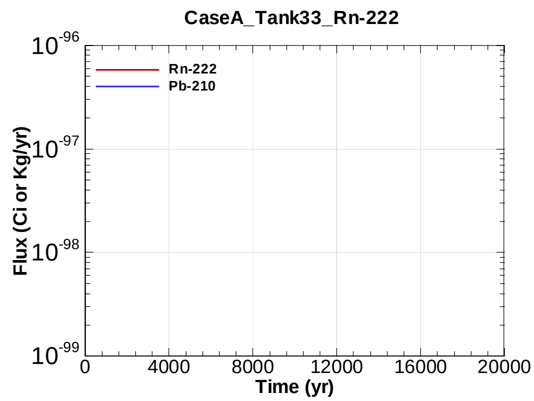

Figure A.1-764 - Flux Leaving Liner for CaseA Tank33 Rn-222

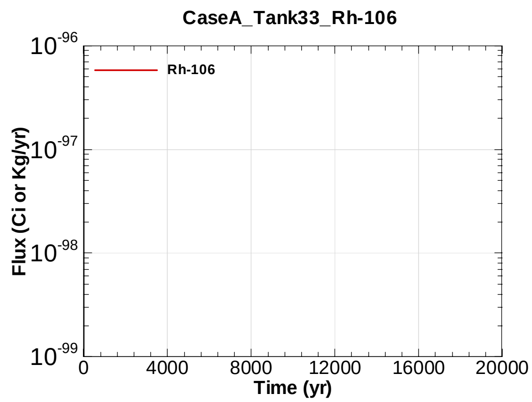

Figure A.1-765 - Flux Leaving Liner for CaseA Tank33 Rh-106

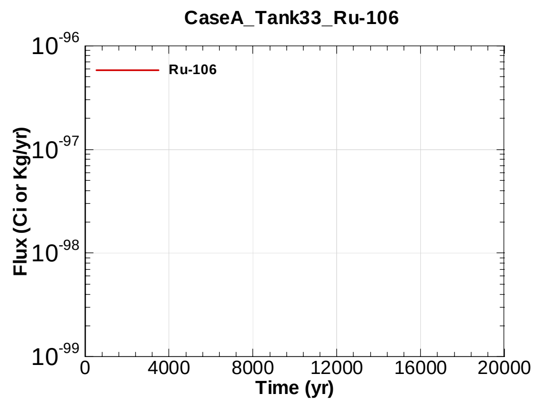

Figure A.1-766 - Flux Leaving Liner for CaseA Tank33 Ru-106

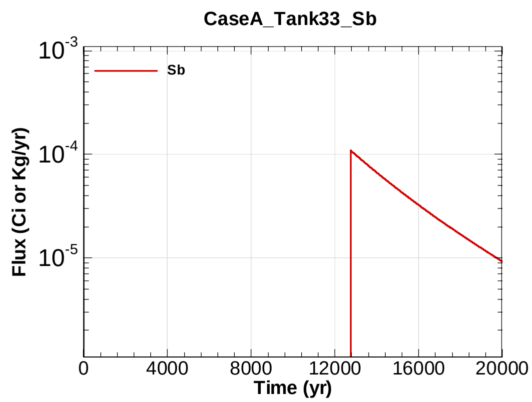

Figure A.1-767 - Flux Leaving Liner for CaseA Tank33 Sb

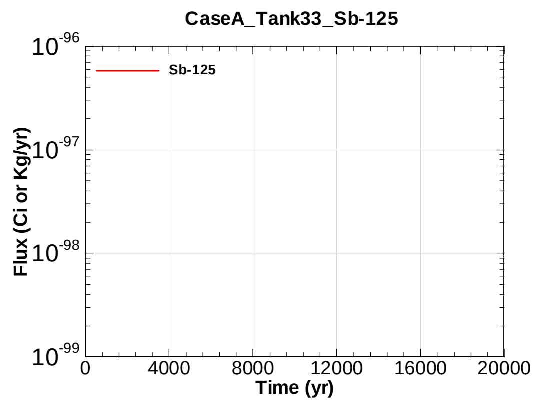

Figure A.1-768 - Flux Leaving Liner for CaseA Tank33 Sb-125

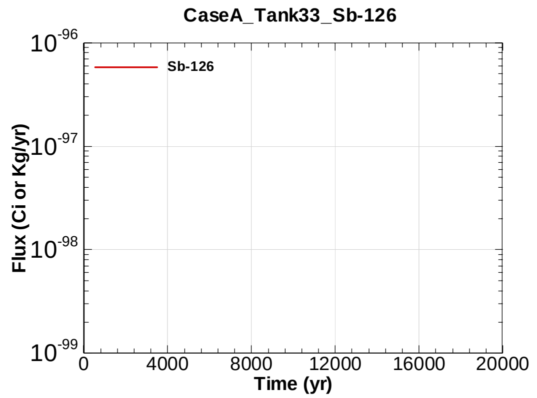

Figure A.1-769 - Flux Leaving Liner for CaseA Tank33 Sb-126

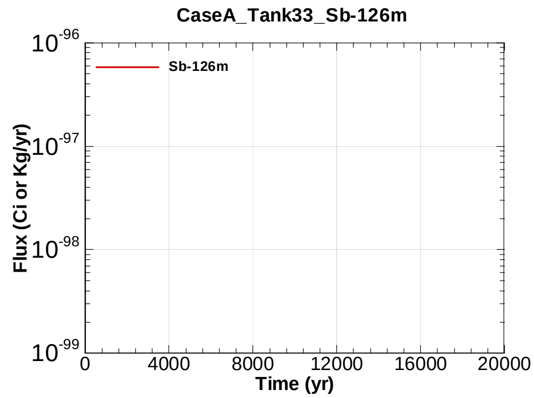

Figure A.1-770 - Flux Leaving Liner for CaseA Tank33 Sb-126m

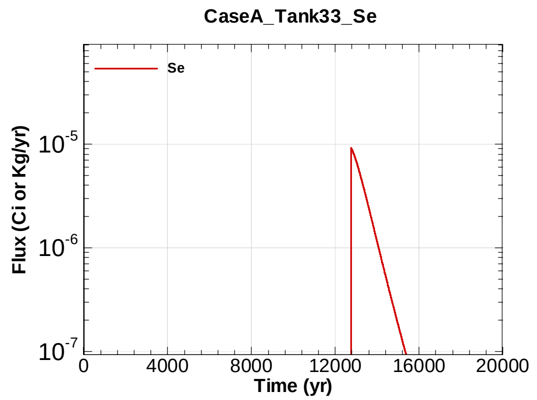

Figure A.1-771 - Flux Leaving Liner for CaseA Tank33 Se

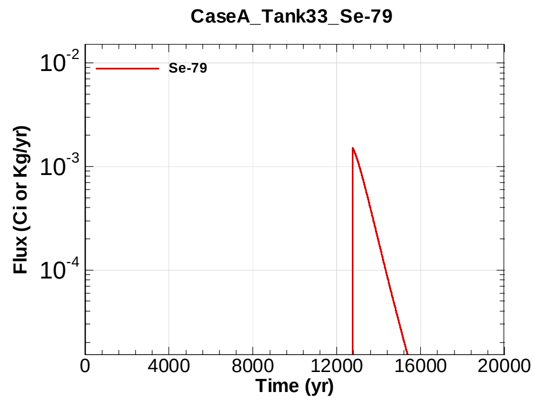

Figure A.1-772 - Flux Leaving Liner for CaseA Tank33 Se-79

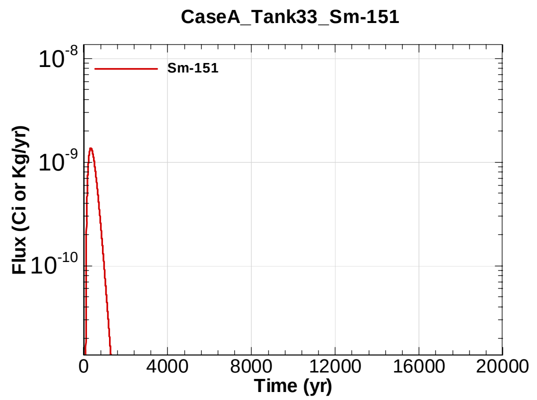

Figure A.1-773 - Flux Leaving Liner for CaseA Tank33 Sm-151

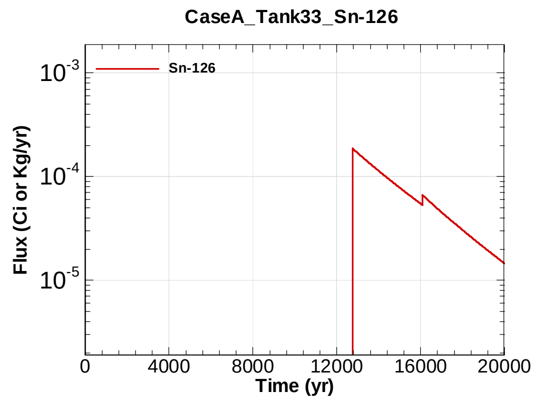

Figure A.1-774 - Flux Leaving Liner for CaseA Tank33 Sn-126

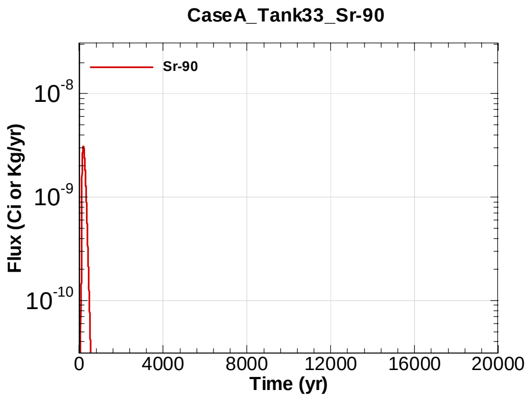

Figure A.1-775 - Flux Leaving Liner for CaseA Tank33 Sr-90

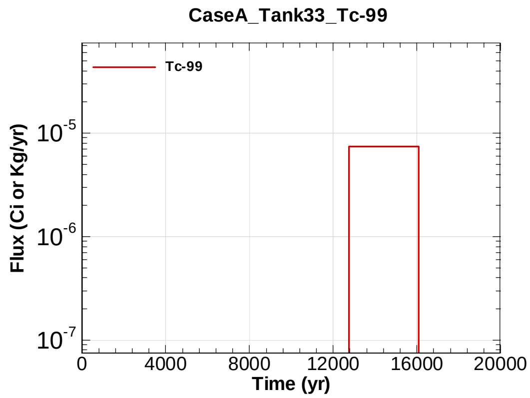

Figure A.1-776 - Flux Leaving Liner for CaseA Tank33 Tc-99

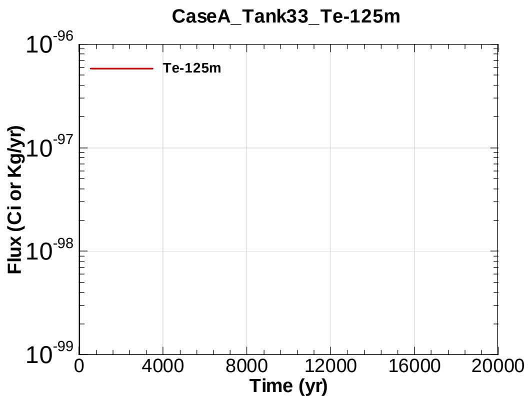

Figure A.1-777 - Flux Leaving Liner for CaseA Tank33 Te-125m

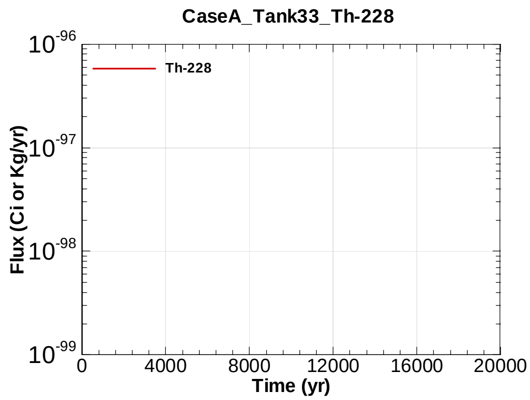

Figure A.1-778 - Flux Leaving Liner for CaseA Tank33 Th-228

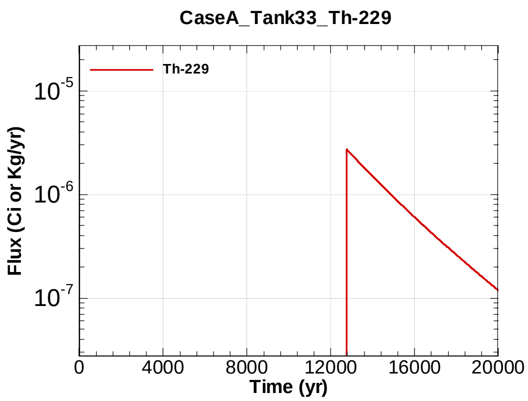

Figure A.1-779 - Flux Leaving Liner for CaseA Tank33 Th-229

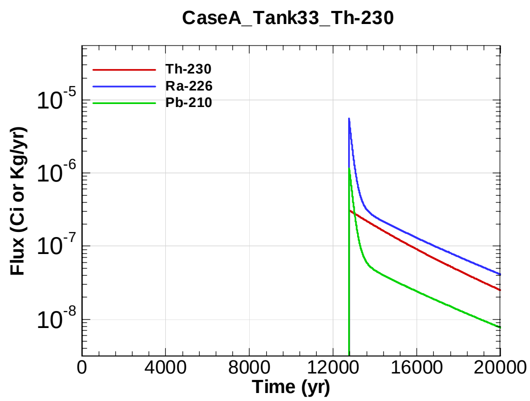

Figure A.1-780 - Flux Leaving Liner for CaseA Tank33 Th-230

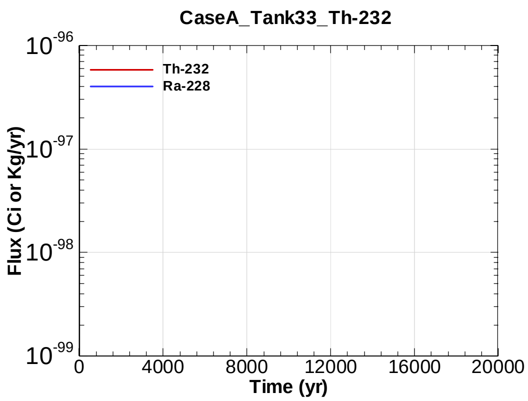

Figure A.1-781 - Flux Leaving Liner for CaseA Tank33 Th-232

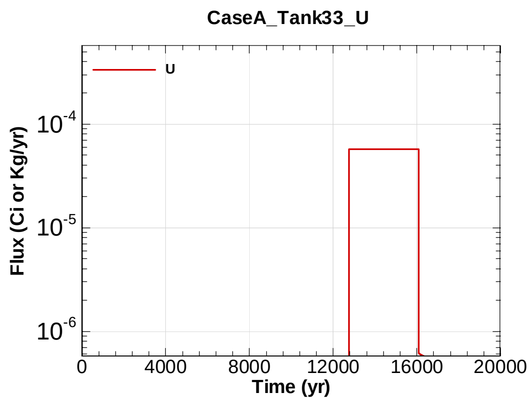

Figure A.1-782 - Flux Leaving Liner for CaseA Tank33 U

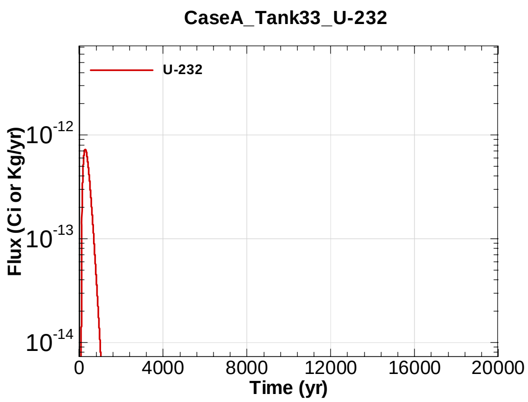

Figure A.1-783 - Flux Leaving Liner for CaseA Tank33 U-232

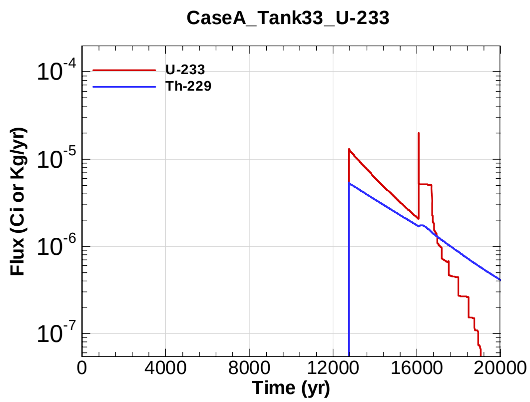

Figure A.1-784 - Flux Leaving Liner for CaseA Tank33 U-233

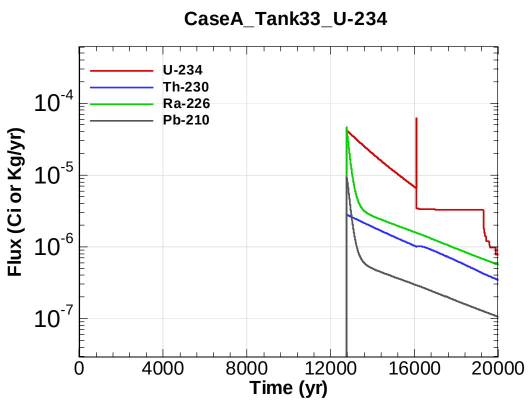

Figure A.1-785 - Flux Leaving Liner for CaseA Tank33 U-234

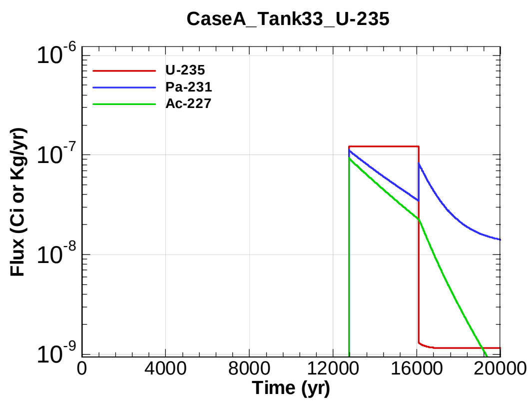

Figure A.1-786 - Flux Leaving Liner for CaseA Tank33 U-235

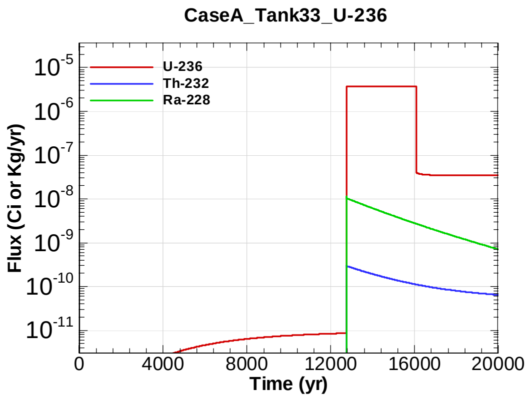

Figure A.1-787 - Flux Leaving Liner for CaseA Tank33 U-236

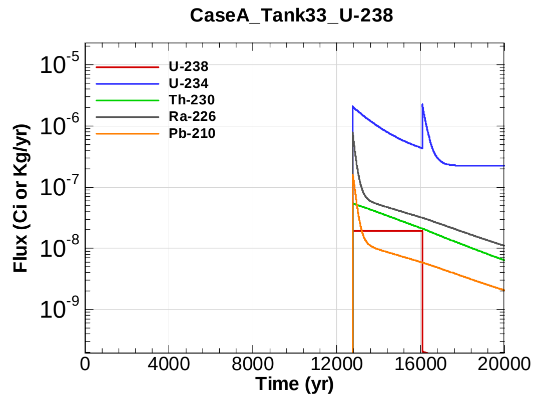

Figure A.1-788 - Flux Leaving Liner for CaseA Tank33 U-238

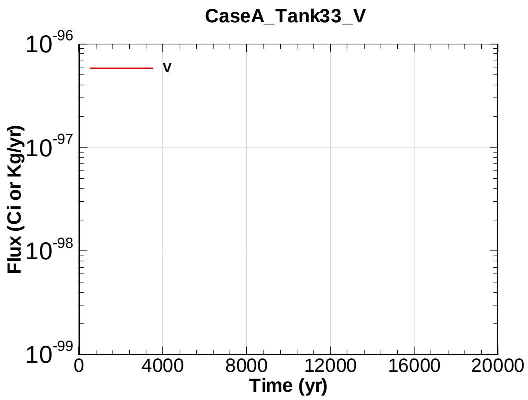

Figure A.1-789 - Flux Leaving Liner for CaseA Tank33 V

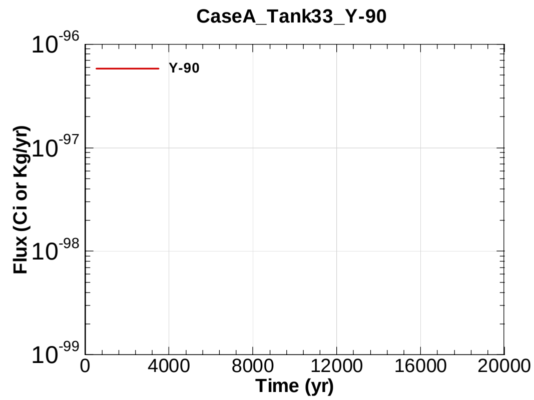

Figure A.1-790 - Flux Leaving Liner for CaseA Tank33 Y-90

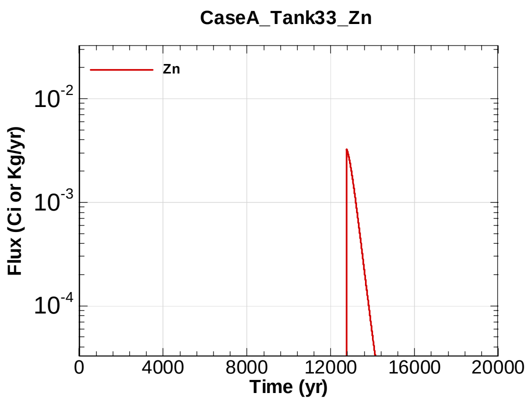

Figure A.1-791 - Flux Leaving Liner for CaseA Tank33 Zn

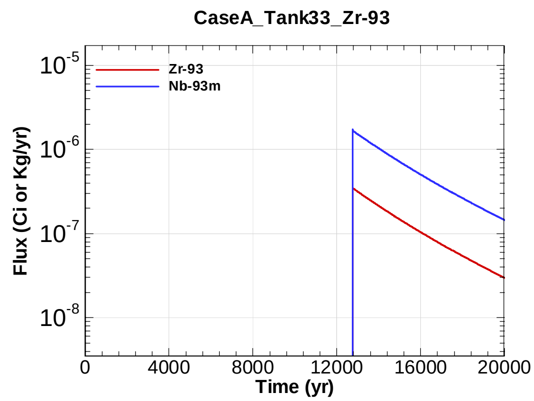

Figure A.1-792 - Flux Leaving Liner for CaseA Tank33 Zr-93

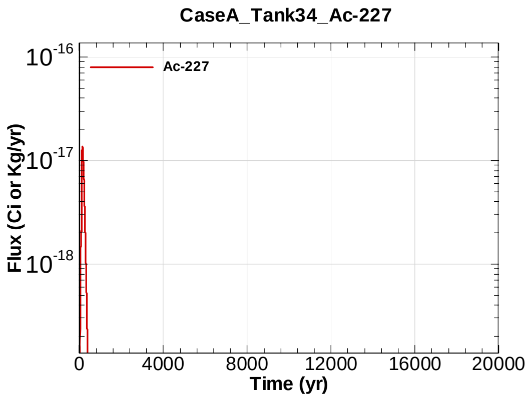

Figure A.1-793 - Flux Leaving Liner for CaseA Tank34 Ac-227

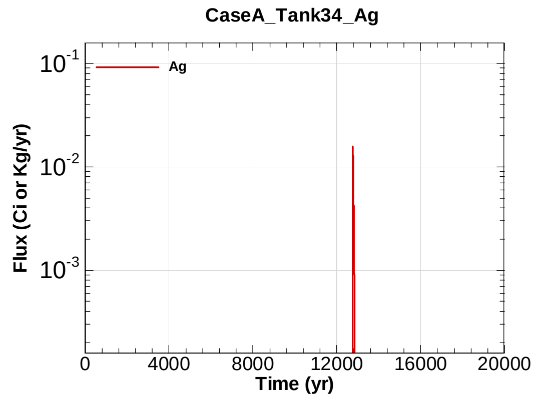

Figure A.1-794 - Flux Leaving Liner for CaseA Tank34 Ag

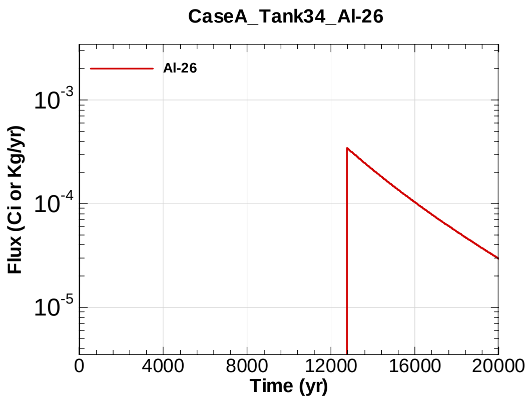

Figure A.1-795 - Flux Leaving Liner for CaseA Tank34 Al-26

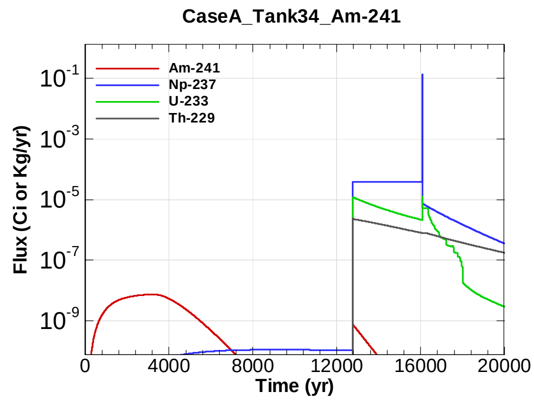

Figure A.1-796 - Flux Leaving Liner for CaseA Tank34 Am-241

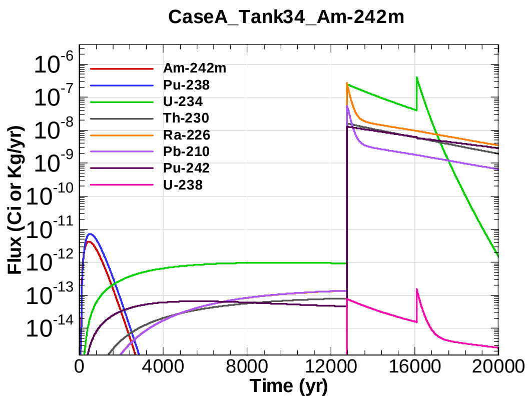

Figure A.1-797 - Flux Leaving Liner for CaseA Tank34 Am-242m

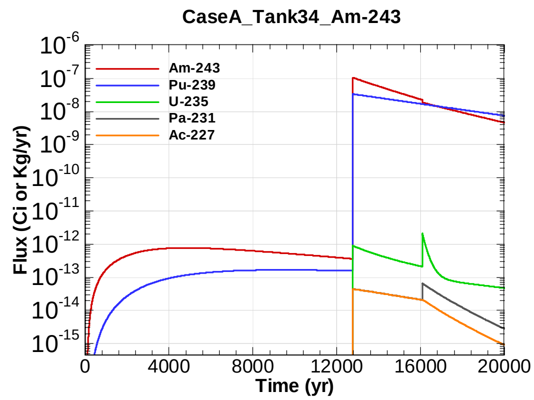

Figure A.1-798 - Flux Leaving Liner for CaseA Tank34 Am-243

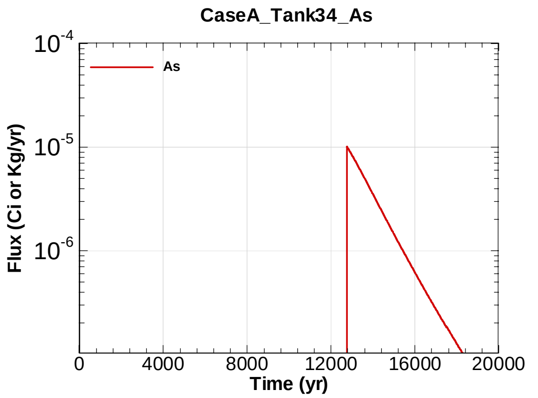

Figure A.1-799 - Flux Leaving Liner for CaseA Tank34 As

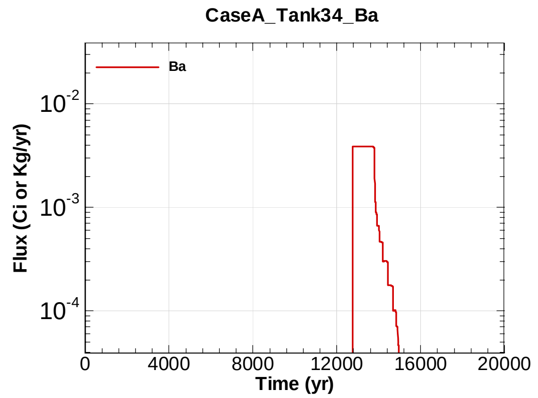

Figure A.1-800 - Flux Leaving Liner for CaseA Tank34 Ba

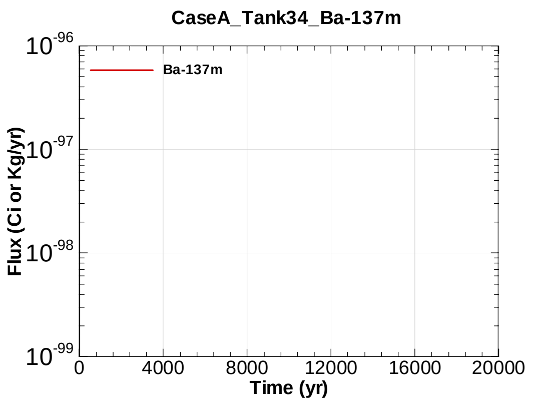

Figure A.1-801 - Flux Leaving Liner for CaseA Tank34 Ba-137m

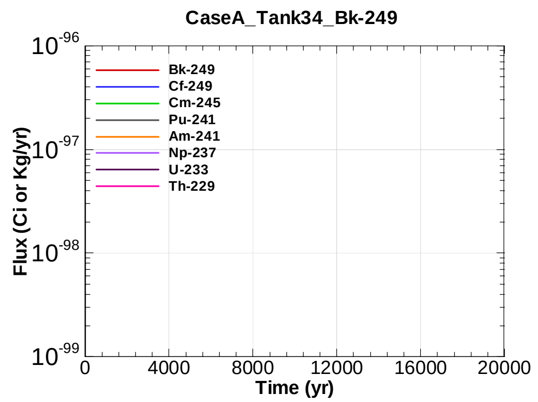

Figure A.1-802 - Flux Leaving Liner for CaseA Tank34 Bk-249

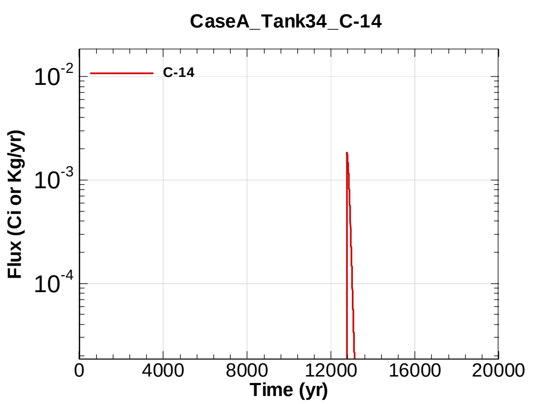

Figure A.1-803 - Flux Leaving Liner for CaseA Tank34 C-14

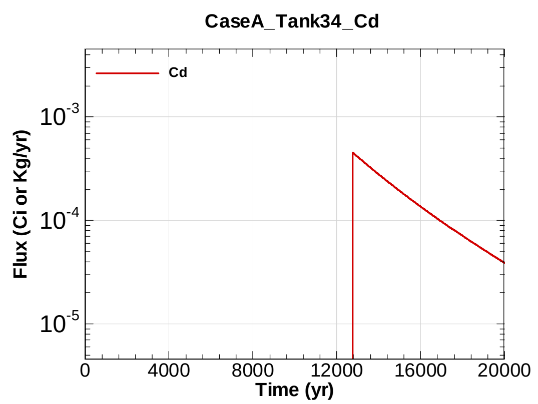

Figure A.1-804 - Flux Leaving Liner for CaseA Tank34 Cd

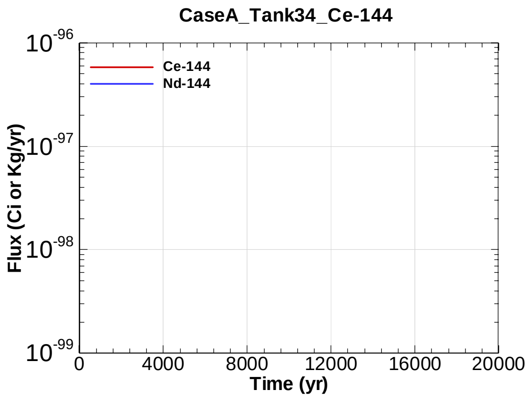

Figure A.1-805 - Flux Leaving Liner for CaseA Tank34 Ce-144

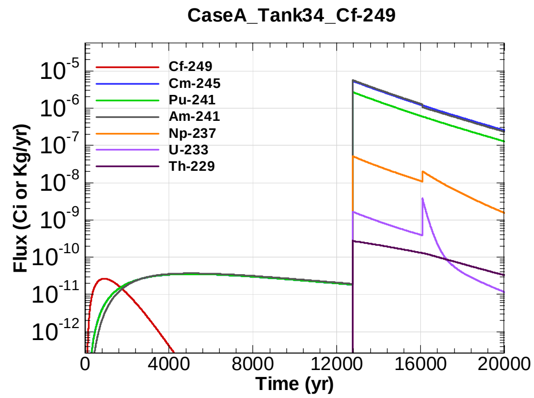

Figure A.1-806 - Flux Leaving Liner for CaseA Tank34 Cf-249

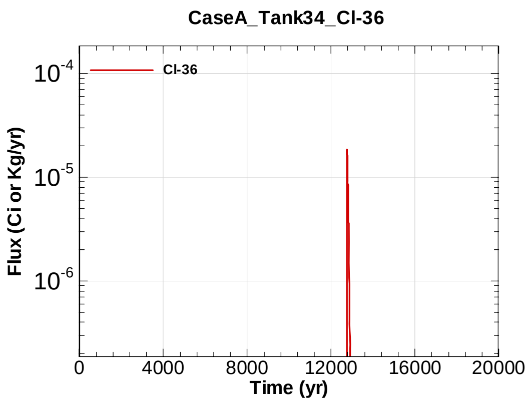

Figure A.1-807 - Flux Leaving Liner for CaseA Tank34 Cl-36

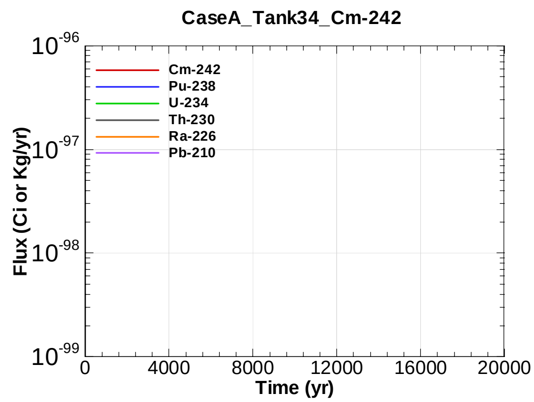

Figure A.1-808 - Flux Leaving Liner for CaseA Tank34 Cm-242

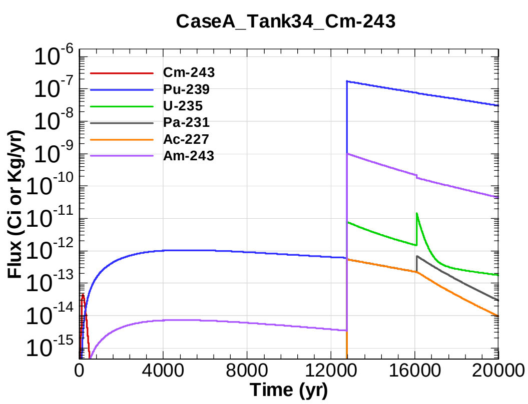

Figure A.1-809 - Flux Leaving Liner for CaseA Tank34 Cm-243

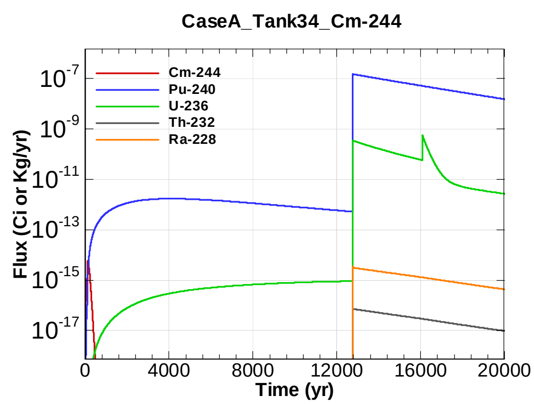

Figure A.1-810 - Flux Leaving Liner for CaseA Tank34 Cm-244

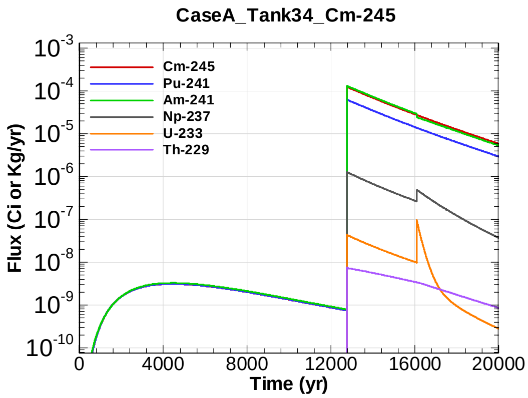

Figure A.1-811 - Flux Leaving Liner for CaseA Tank34 Cm-245

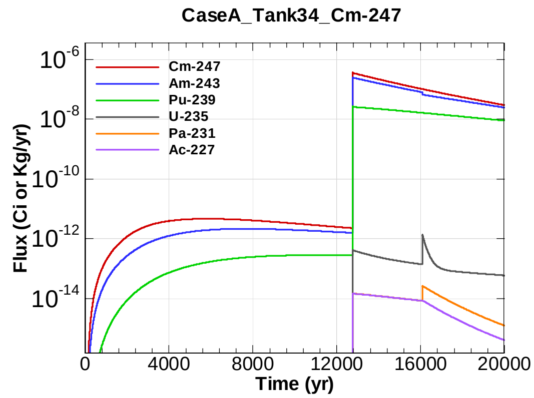

Figure A.1-812 - Flux Leaving Liner for CaseA Tank34 Cm-247

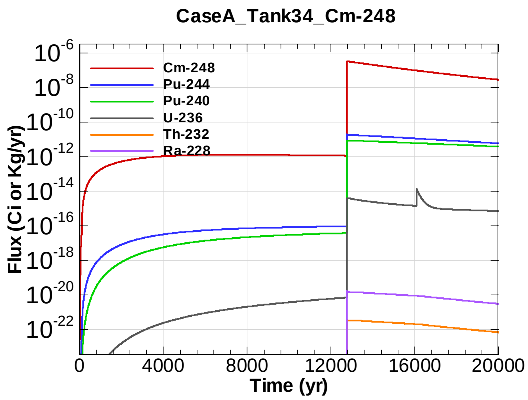

Figure A.1-813 - Flux Leaving Liner for CaseA Tank34 Cm-248

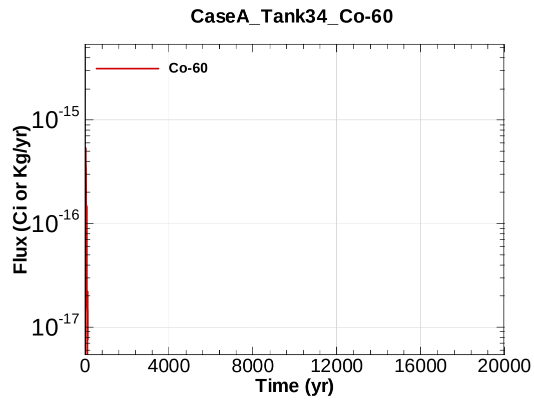

Figure A.1-814 - Flux Leaving Liner for CaseA Tank34 Co-60

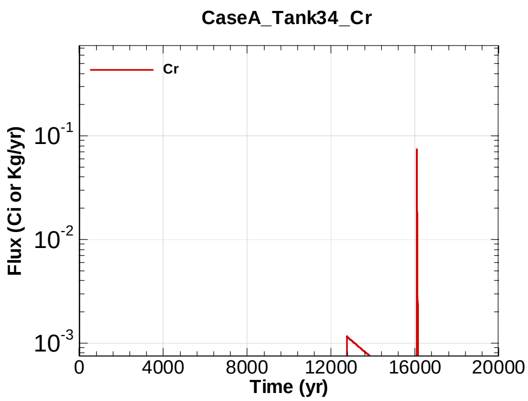

Figure A.1-815 - Flux Leaving Liner for CaseA Tank34 Cr

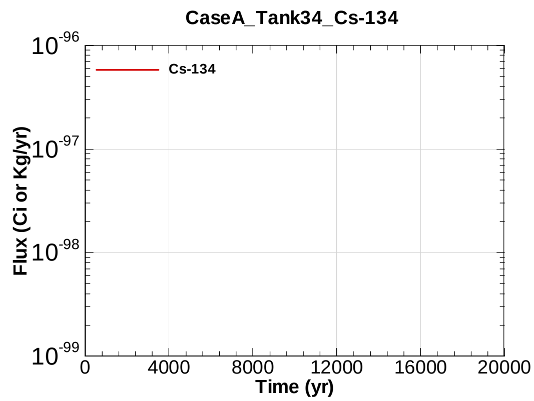

Figure A.1-816 - Flux Leaving Liner for CaseA Tank34 Cs-134

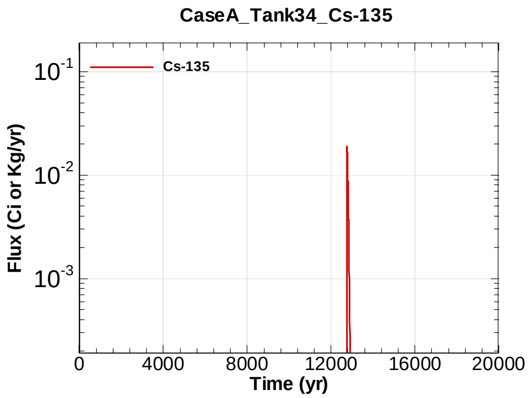

Figure A.1-817 - Flux Leaving Liner for CaseA Tank34 Cs-135

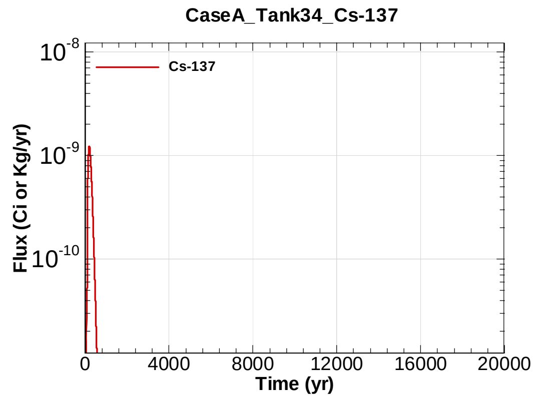

Figure A.1-818 - Flux Leaving Liner for CaseA Tank34 Cs-137

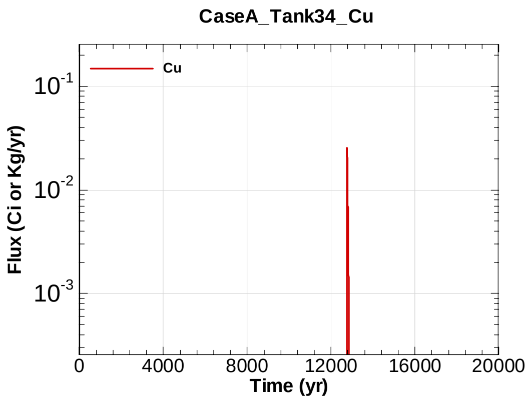

Figure A.1-819 - Flux Leaving Liner for CaseA Tank34 Cu

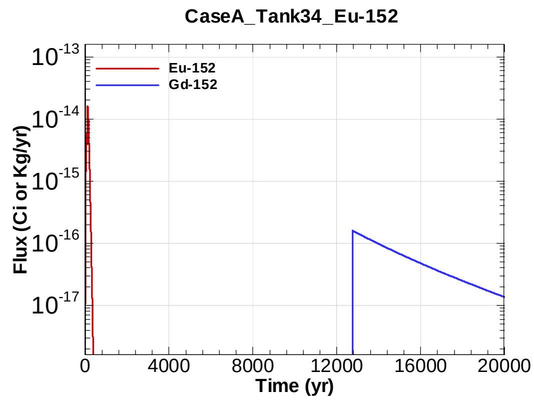

Figure A.1-820 - Flux Leaving Liner for CaseA Tank34 Eu-152

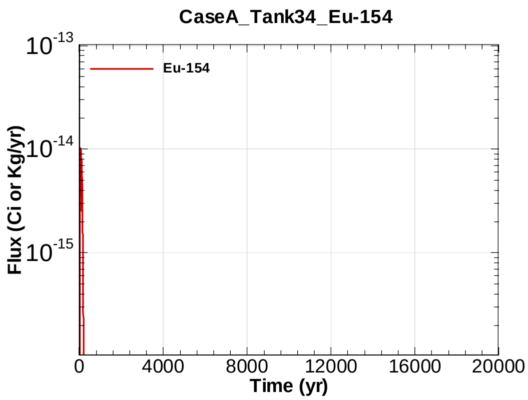

Figure A.1-821 - Flux Leaving Liner for CaseA Tank34 Eu-154

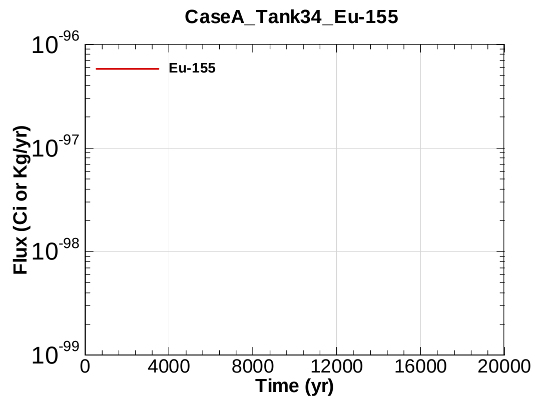

Figure A.1-822 - Flux Leaving Liner for CaseA Tank34 Eu-155

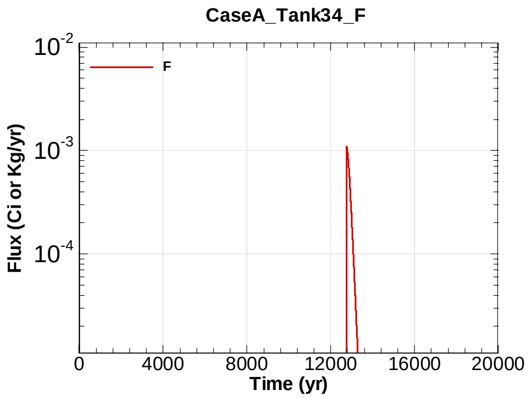

Figure A.1-823 - Flux Leaving Liner for CaseA Tank34 F

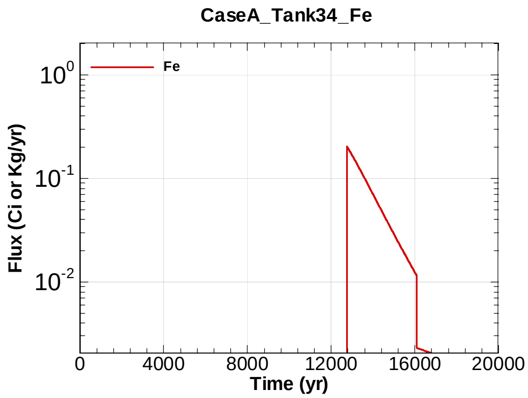

Figure A.1-824 - Flux Leaving Liner for CaseA Tank34 Fe

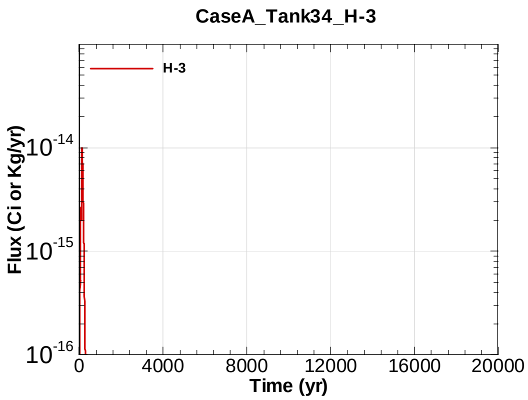

Figure A.1-825 - Flux Leaving Liner for CaseA Tank34 H-3

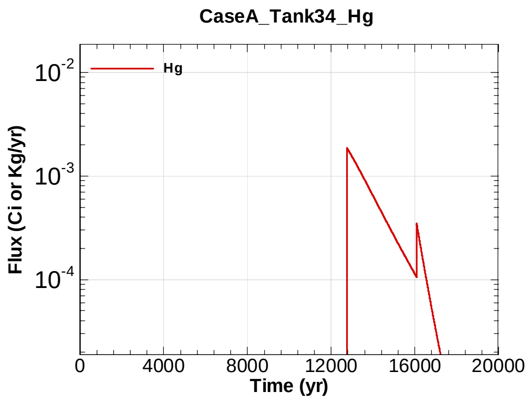

Figure A.1-826 - Flux Leaving Liner for CaseA Tank34 Hg

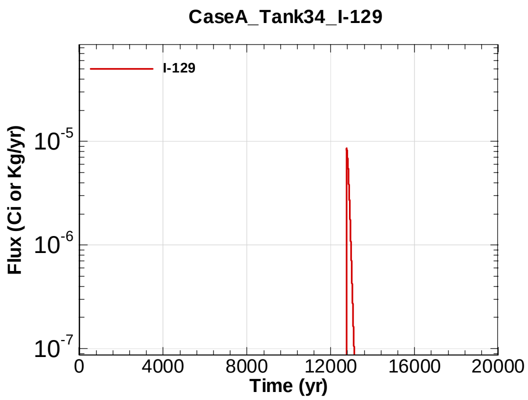

Figure A.1-827 - Flux Leaving Liner for CaseA Tank34 I-129

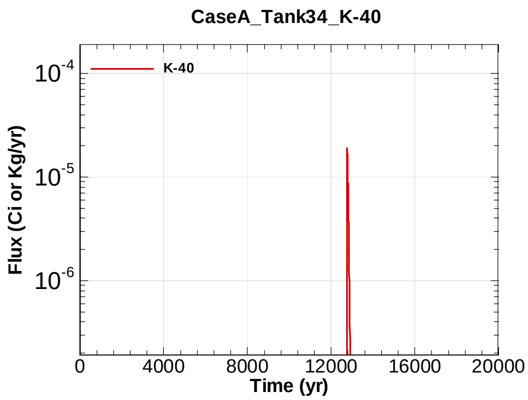

Figure A.1-828 - Flux Leaving Liner for CaseA Tank34 K-40

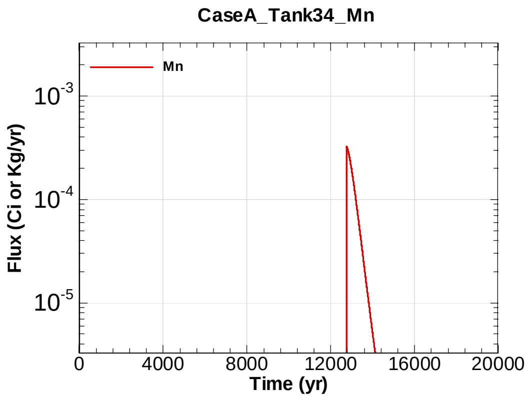

Figure A.1-829 - Flux Leaving Liner for CaseA Tank34 Mn

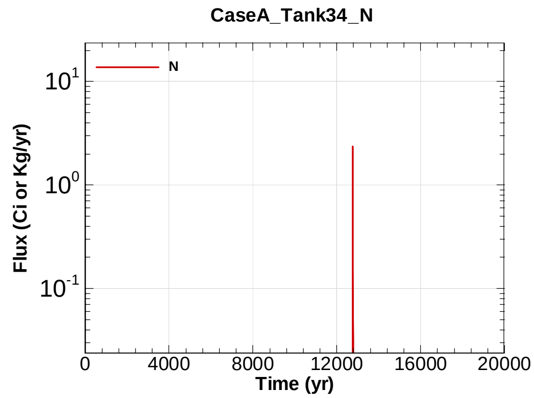

Figure A.1-830 - Flux Leaving Liner for CaseA Tank34 N

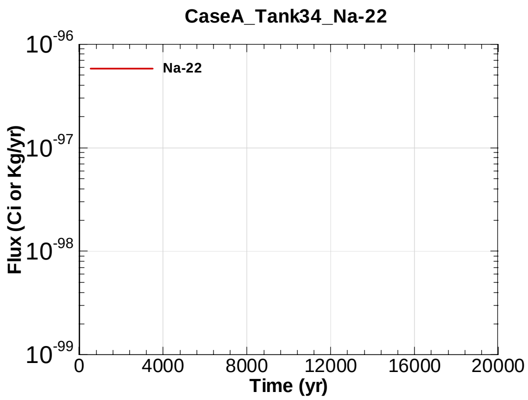

Figure A.1-831 - Flux Leaving Liner for CaseA Tank34 Na-22

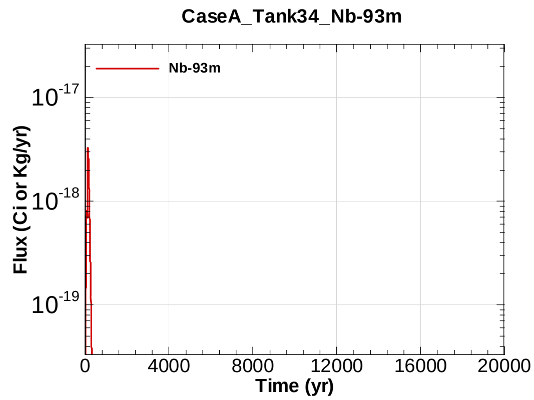

Figure A.1-832 - Flux Leaving Liner for CaseA Tank34 Nb-93m

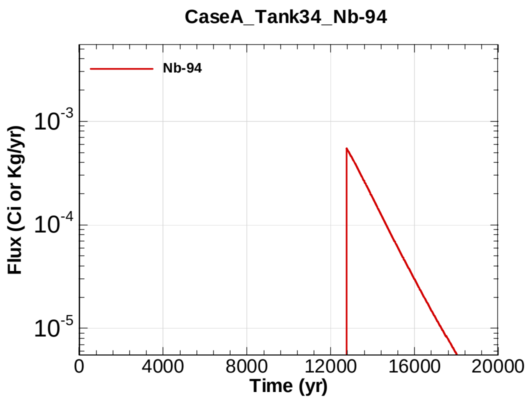

Figure A.1-833 - Flux Leaving Liner for CaseA Tank34 Nb-94

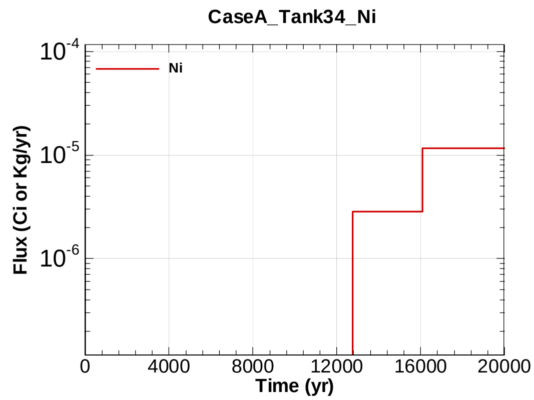

Figure A.1-834 - Flux Leaving Liner for CaseA Tank34 Ni

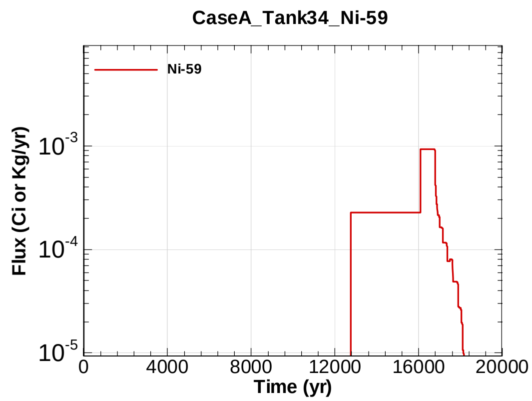

Figure A.1-835 - Flux Leaving Liner for CaseA Tank34 Ni-59

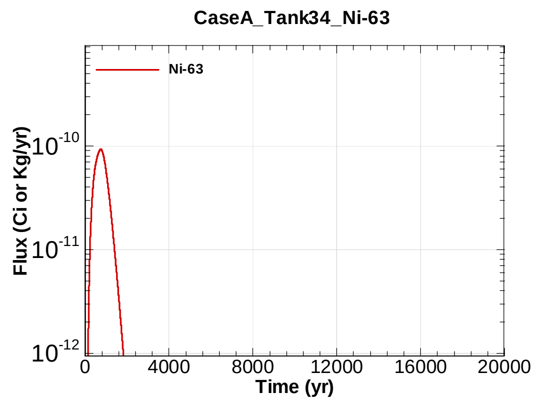

Figure A.1-836 - Flux Leaving Liner for CaseA Tank34 Ni-63

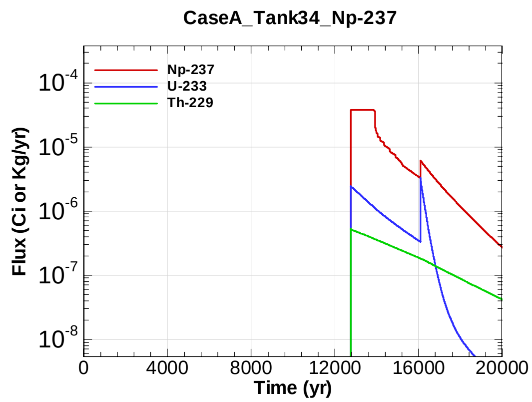

Figure A.1-837 - Flux Leaving Liner for CaseA Tank34 Np-237

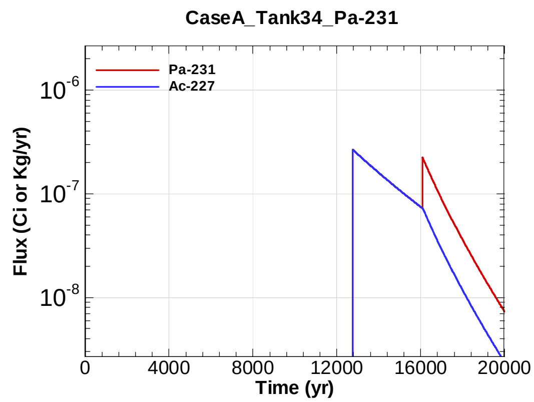

Figure A.1-838 - Flux Leaving Liner for CaseA Tank34 Pa-231

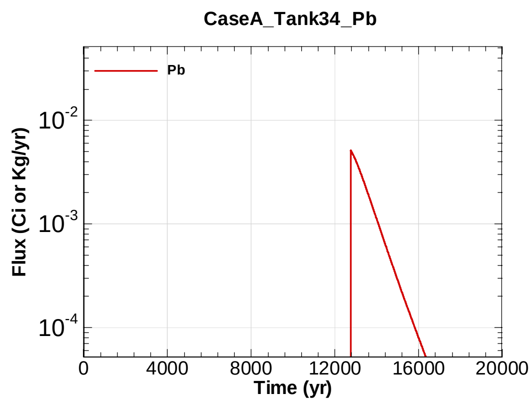

Figure A.1-839 - Flux Leaving Liner for CaseA Tank34 Pb

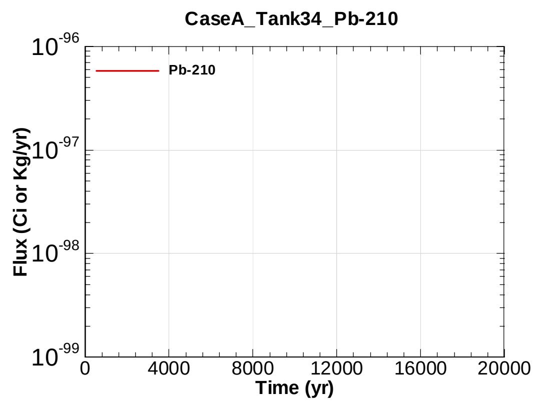

Figure A.1-840 - Flux Leaving Liner for CaseA Tank34 Pb-210

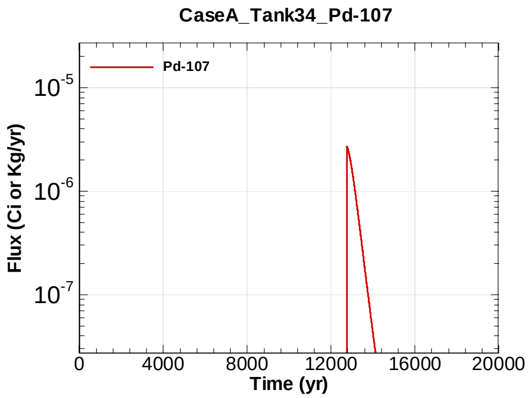

Figure A.1-841 - Flux Leaving Liner for CaseA Tank34 Pd-107

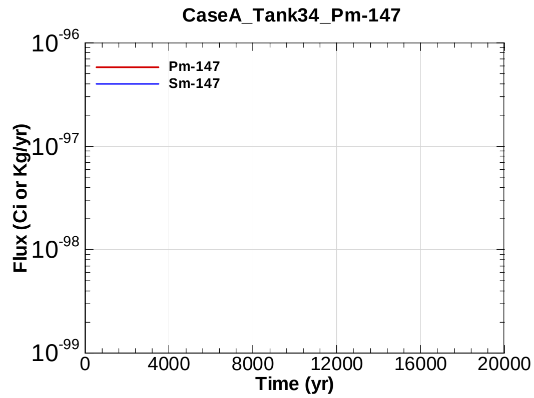

Figure A.1-842 - Flux Leaving Liner for CaseA Tank34 Pm-147

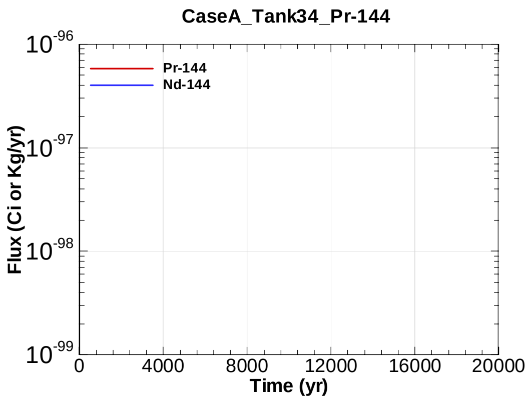

Figure A.1-843 - Flux Leaving Liner for CaseA Tank34 Pr-144

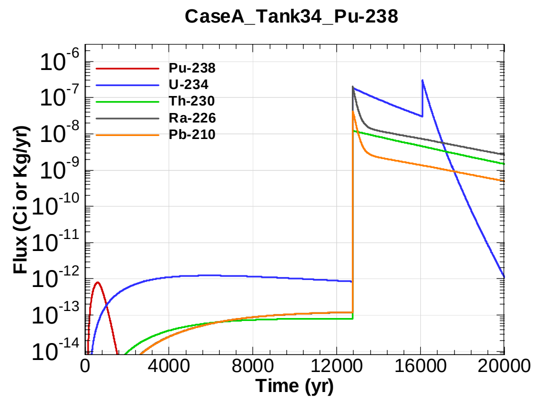

Figure A.1-844 - Flux Leaving Liner for CaseA Tank34 Pu-238

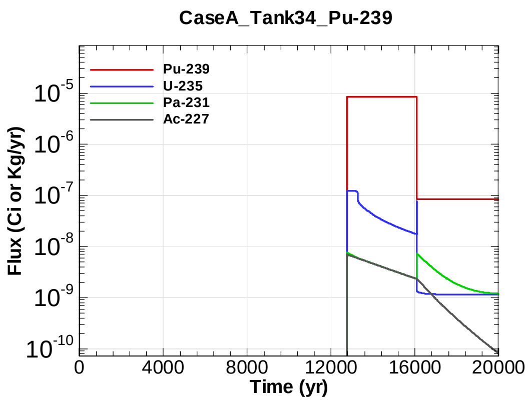

Figure A.1-845 - Flux Leaving Liner for CaseA Tank34 Pu-239

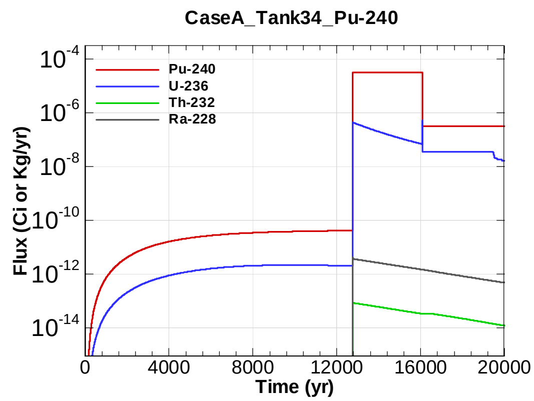

Figure A.1-846 - Flux Leaving Liner for CaseA Tank34 Pu-240

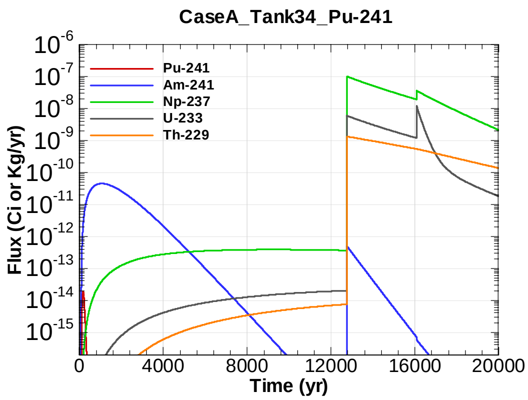

Figure A.1-847 - Flux Leaving Liner for CaseA Tank34 Pu-241

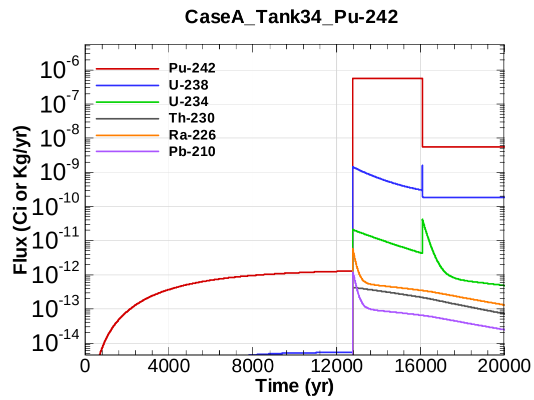

Figure A.1-848 - Flux Leaving Liner for CaseA Tank34 Pu-242

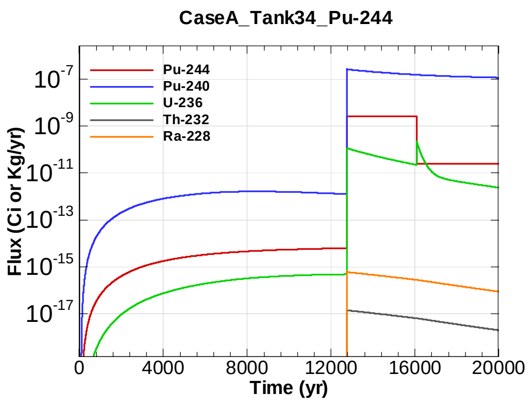

Figure A.1-849 - Flux Leaving Liner for CaseA Tank34 Pu-244

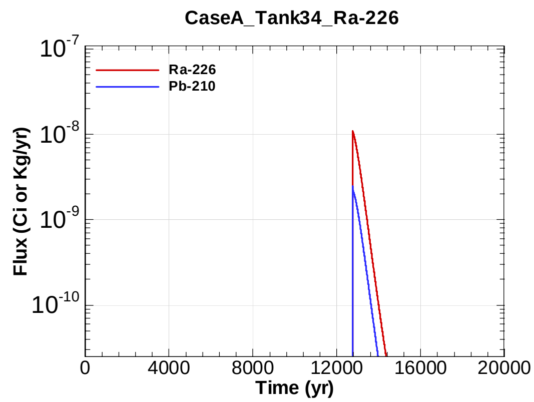

Figure A.1-850 - Flux Leaving Liner for CaseA Tank34 Ra-226

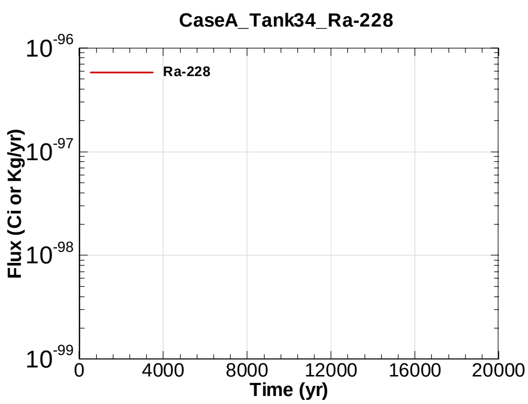

Figure A.1-851 - Flux Leaving Liner for CaseA Tank34 Ra-228

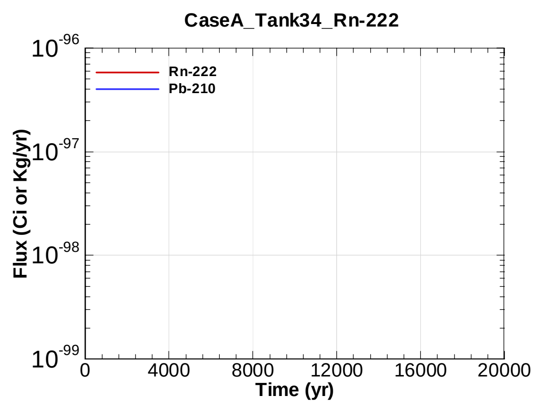

Figure A.1-852 - Flux Leaving Liner for CaseA Tank34 Rn-222

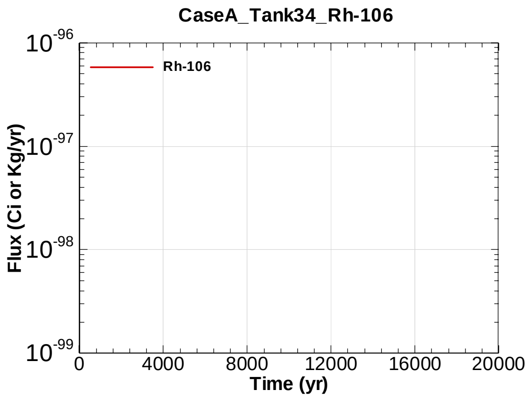

Figure A.1-853 - Flux Leaving Liner for CaseA Tank34 Rh-106

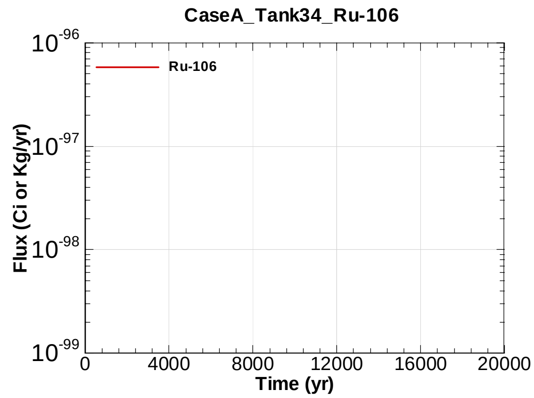

Figure A.1-854 - Flux Leaving Liner for CaseA Tank34 Ru-106

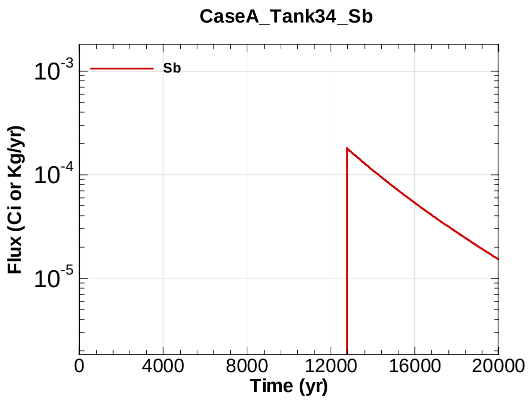

Figure A.1-855 - Flux Leaving Liner for CaseA Tank34 Sb

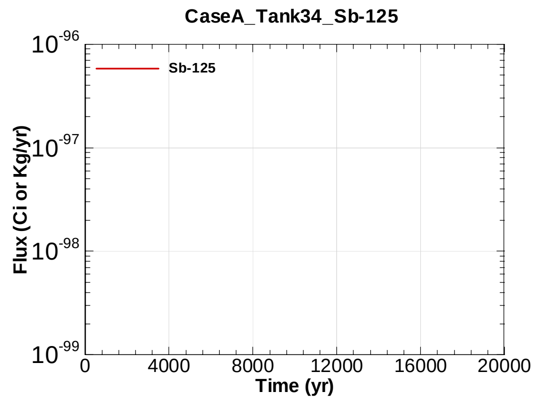

Figure A.1-856 - Flux Leaving Liner for CaseA Tank34 Sb-125

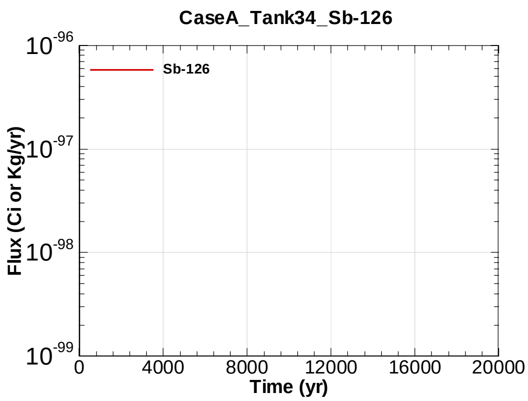

Figure A.1-857 - Flux Leaving Liner for CaseA Tank34 Sb-126

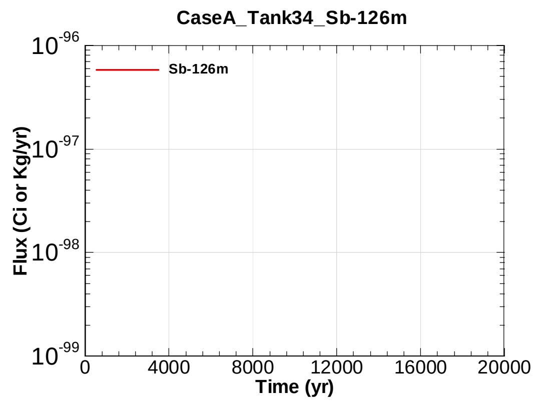

Figure A.1-858 - Flux Leaving Liner for CaseA Tank34 Sb-126m

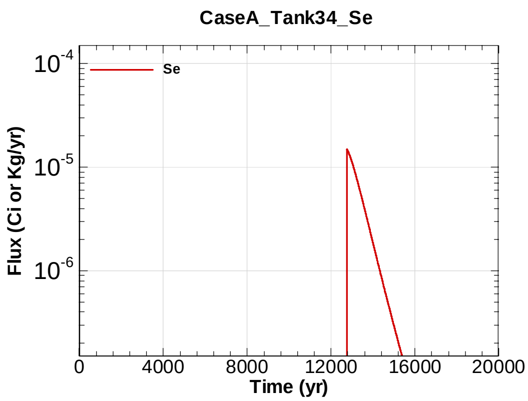

Figure A.1-859 - Flux Leaving Liner for CaseA Tank34 Se

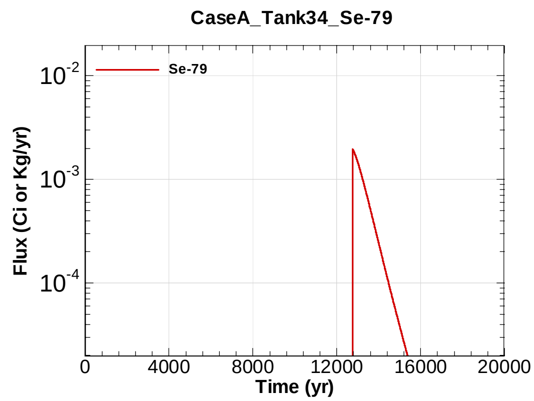

Figure A.1-860 - Flux Leaving Liner for CaseA Tank34 Se-79

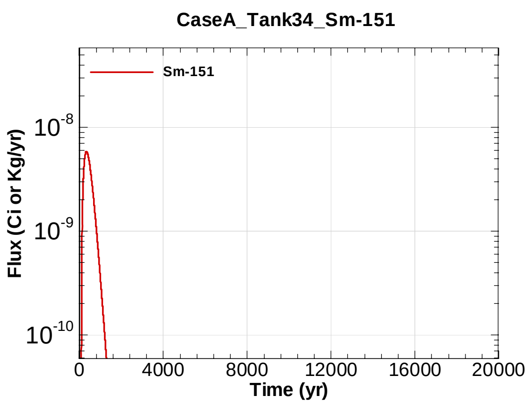

Figure A.1-861 - Flux Leaving Liner for CaseA Tank34 Sm-151

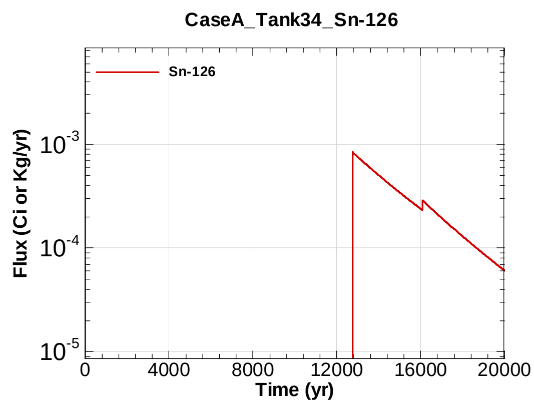

Figure A.1-862 - Flux Leaving Liner for CaseA Tank34 Sn-126

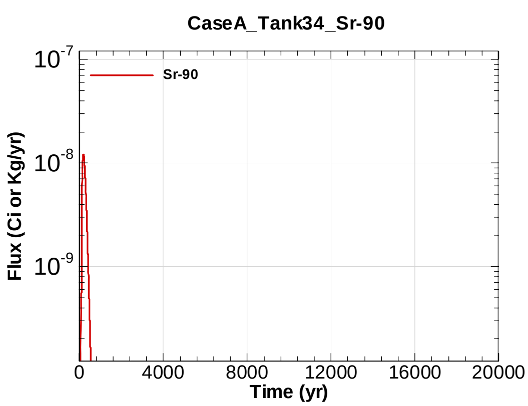

Figure A.1-863 - Flux Leaving Liner for CaseA Tank34 Sr-90

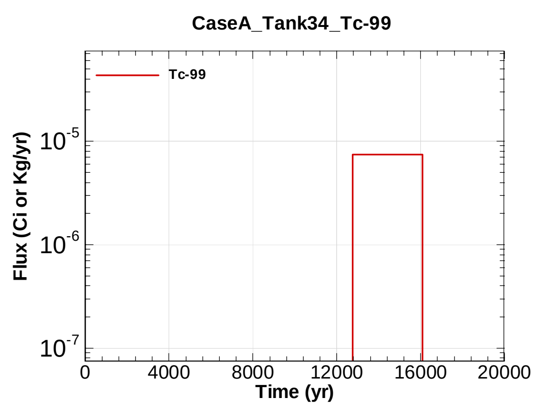

Figure A.1-864 - Flux Leaving Liner for CaseA Tank34 Tc-99

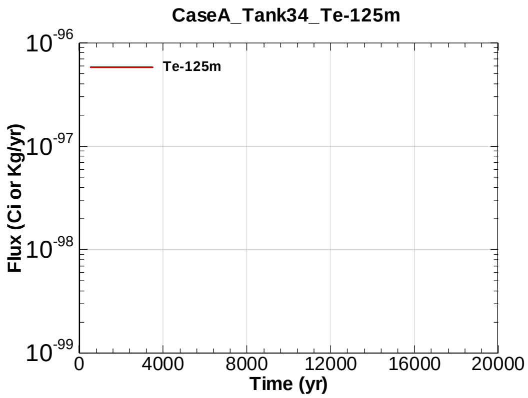

Figure A.1-865 - Flux Leaving Liner for CaseA Tank34 Te-125m

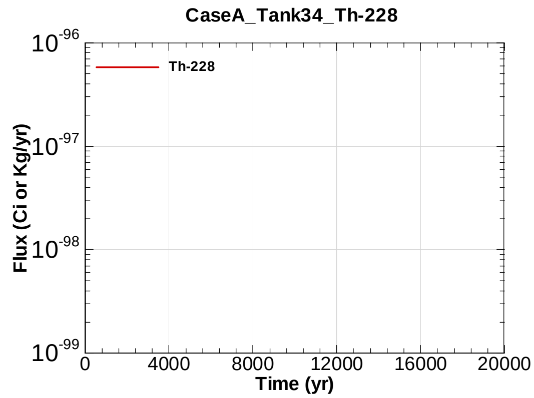

Figure A.1-866 - Flux Leaving Liner for CaseA Tank34 Th-228

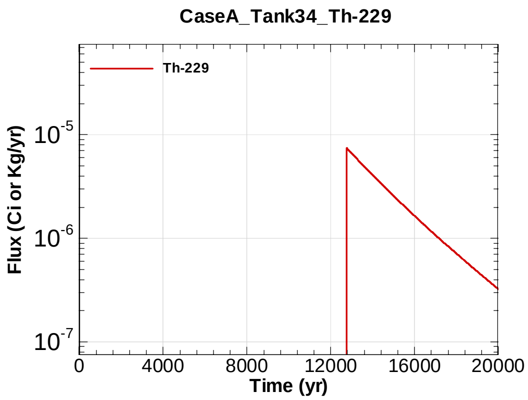

Figure A.1-867 - Flux Leaving Liner for CaseA Tank34 Th-229

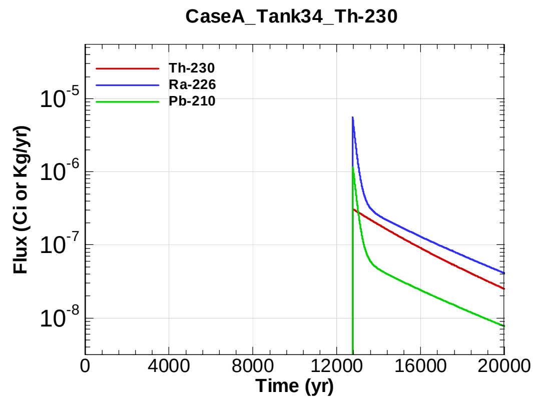

Figure A.1-868 - Flux Leaving Liner for CaseA Tank34 Th-230

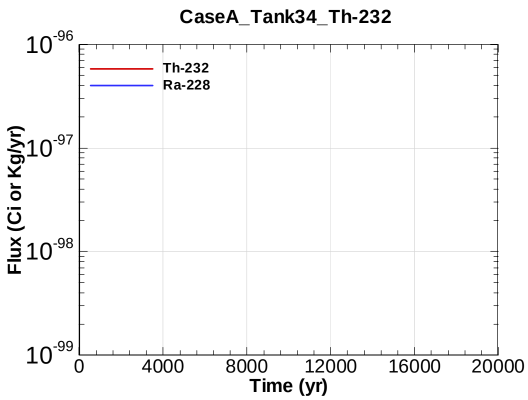

Figure A.1-869 - Flux Leaving Liner for CaseA Tank34 Th-232

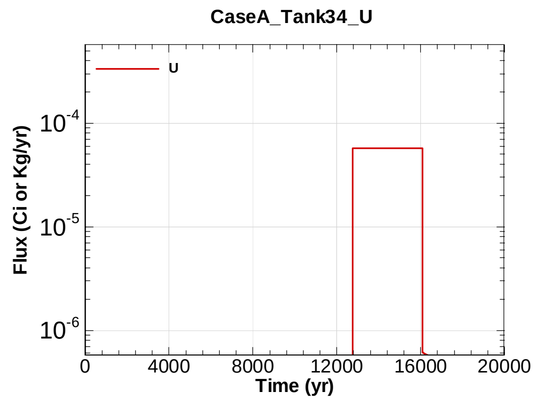

Figure A.1-870 - Flux Leaving Liner for CaseA Tank34 U

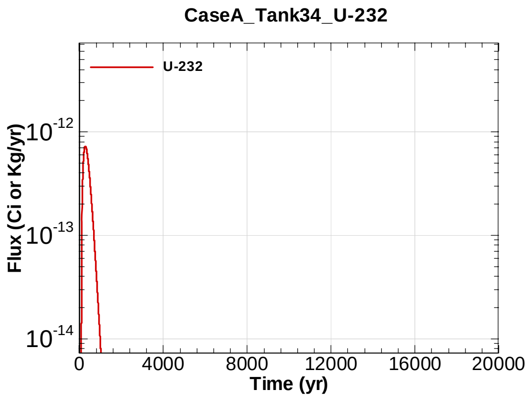

Figure A.1-871 - Flux Leaving Liner for CaseA Tank34 U-232

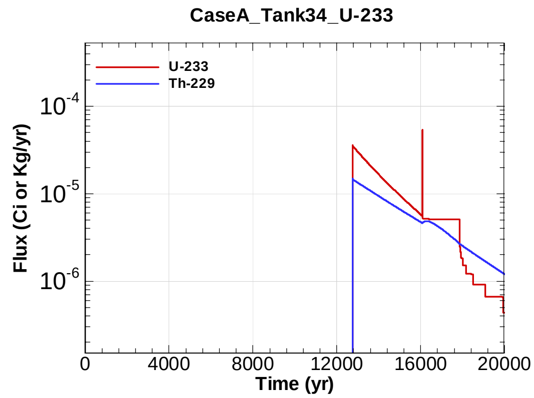

Figure A.1-872 - Flux Leaving Liner for CaseA Tank34 U-233

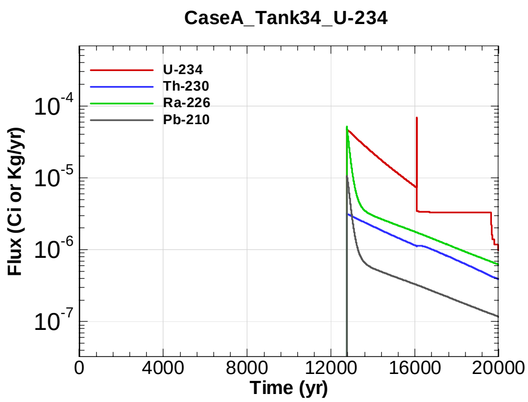

Figure A.1-873 - Flux Leaving Liner for CaseA Tank34 U-234

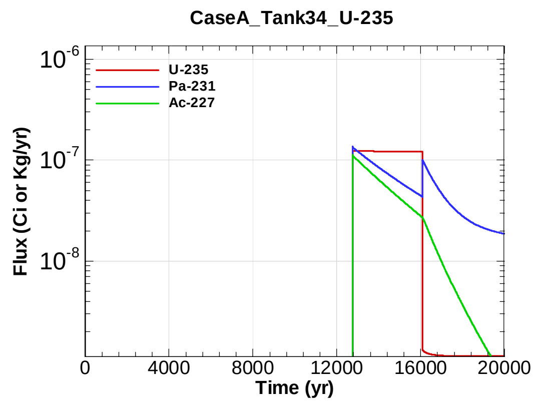

Figure A.1-874 - Flux Leaving Liner for CaseA Tank34 U-235

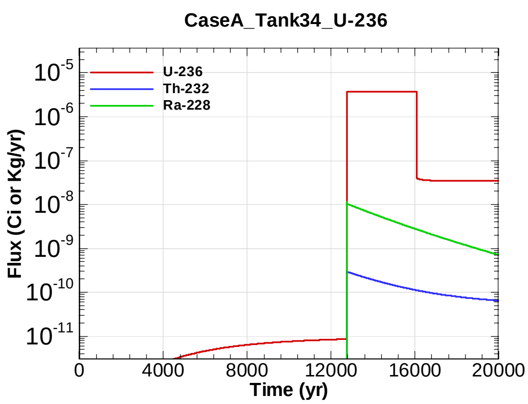

Figure A.1-875 - Flux Leaving Liner for CaseA Tank34 U-236

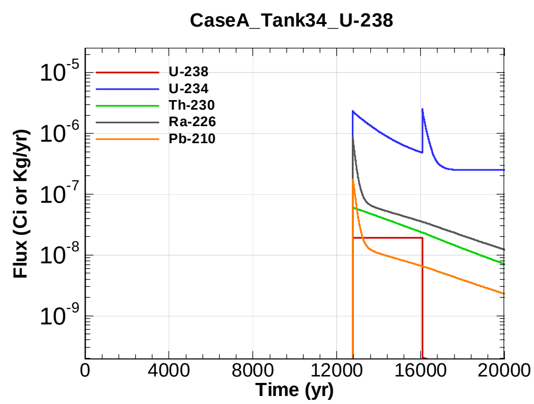

Figure A.1-876 - Flux Leaving Liner for CaseA Tank34 U-238

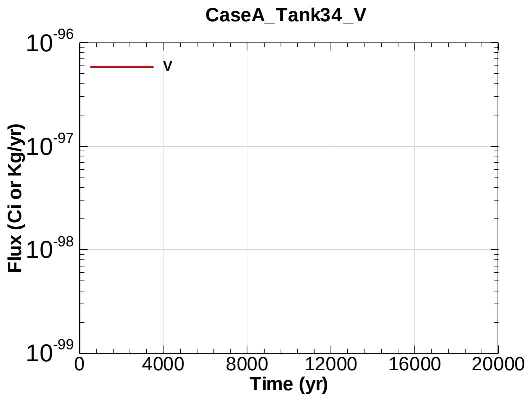

Figure A.1-877 - Flux Leaving Liner for CaseA Tank34 V

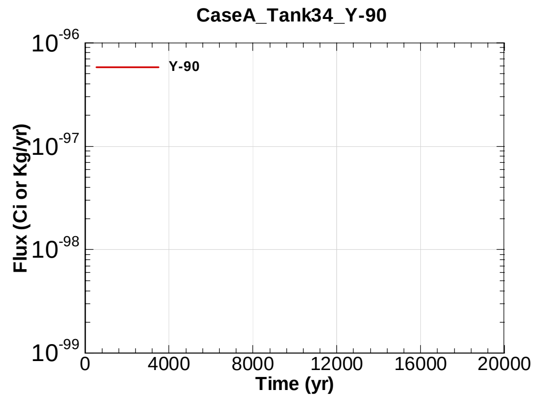

Figure A.1-878 - Flux Leaving Liner for CaseA Tank34 Y-90

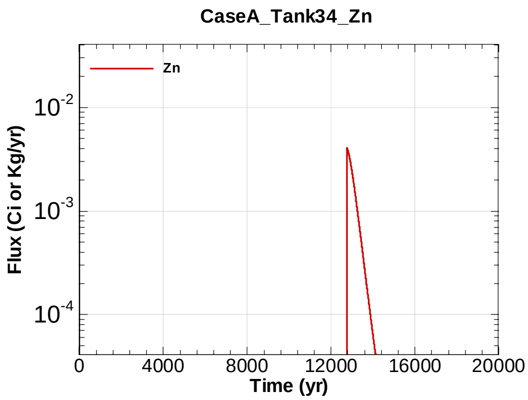

Figure A.1-879 - Flux Leaving Liner for CaseA Tank34 Zn

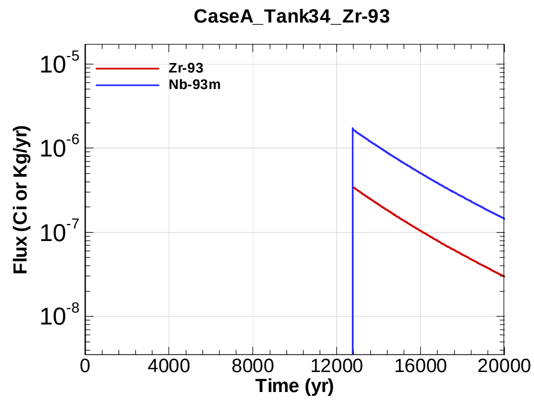

Figure A.1-880 - Flux Leaving Liner for CaseA Tank34 Zr-93

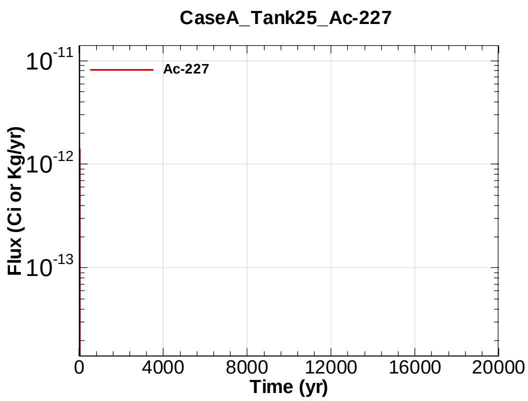

Figure A.1-881 - Flux Leaving Liner for CaseA Tank25 Ac-227

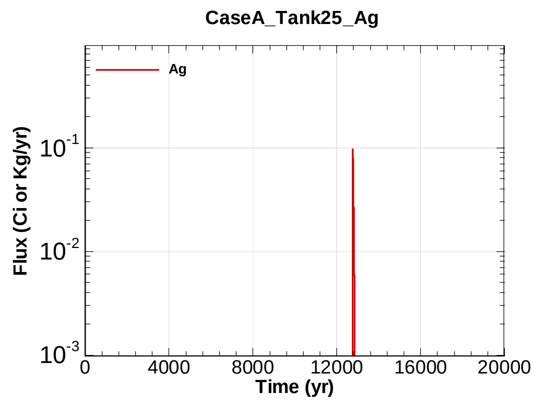

Figure A.1-882 - Flux Leaving Liner for CaseA Tank25 Ag

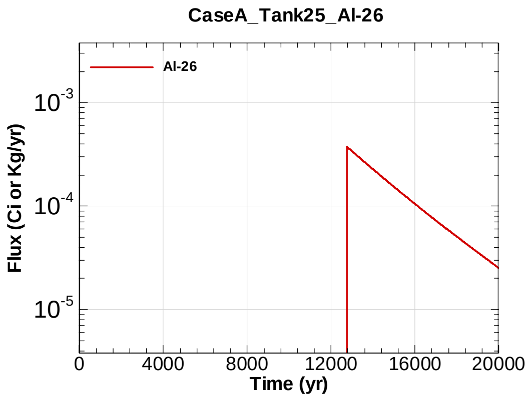

Figure A.1-883 - Flux Leaving Liner for CaseA Tank25 Al-26

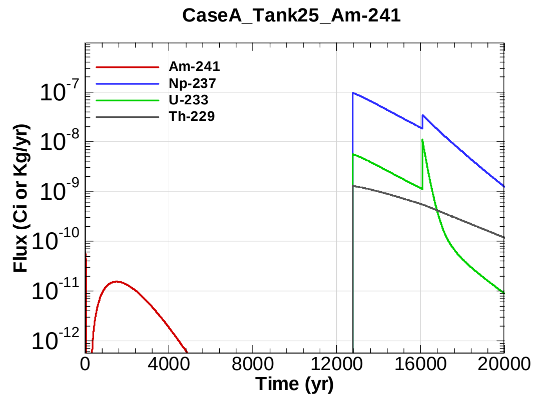

Figure A.1-884 - Flux Leaving Liner for CaseA Tank25 Am-241

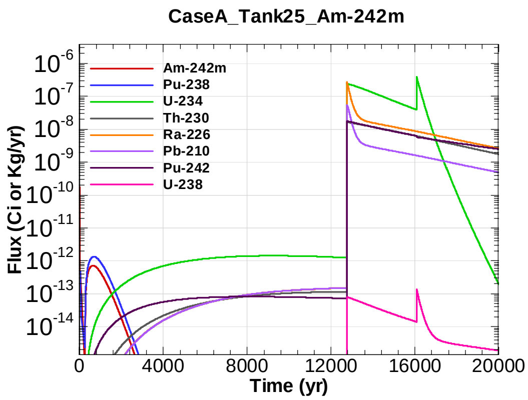

Figure A.1-885 - Flux Leaving Liner for CaseA Tank25 Am-242m

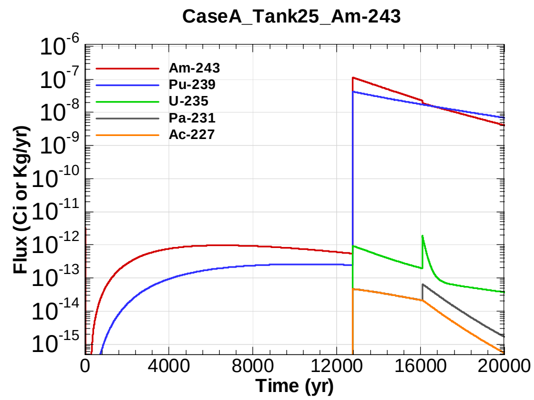

Figure A.1-886 - Flux Leaving Liner for CaseA Tank25 Am-243

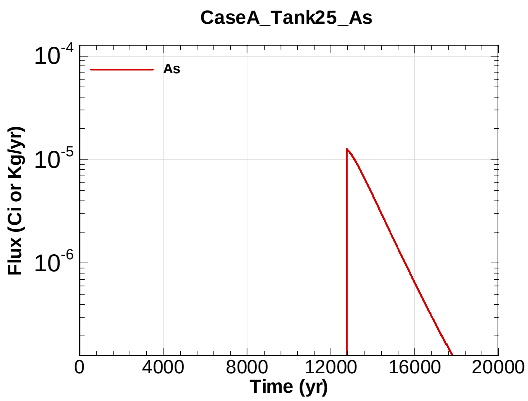

Figure A.1-887 - Flux Leaving Liner for CaseA Tank25 As

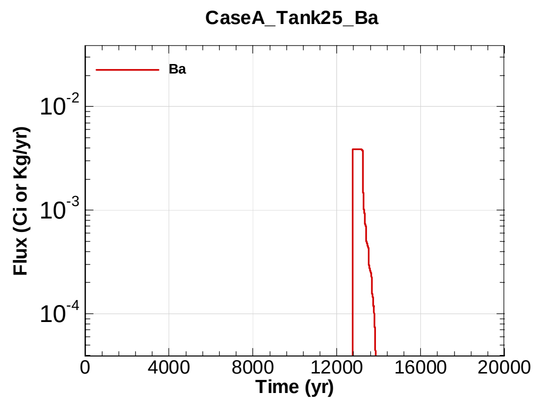

Figure A.1-888 - Flux Leaving Liner for CaseA Tank25 Ba

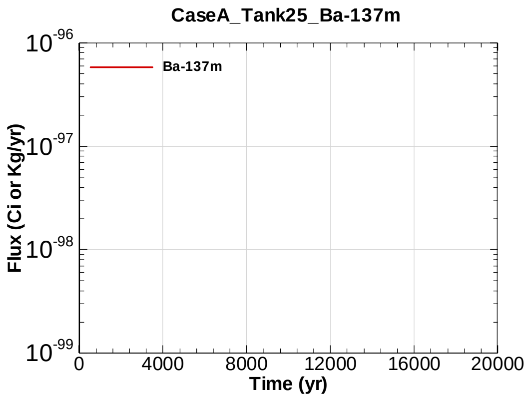

Figure A.1-889 - Flux Leaving Liner for CaseA Tank25 Ba-137m

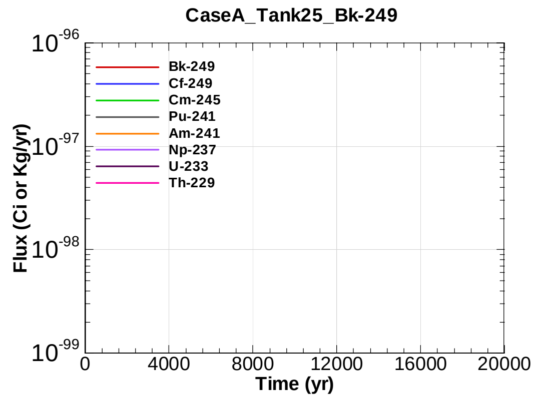

Figure A.1-890 - Flux Leaving Liner for CaseA Tank25 Bk-249

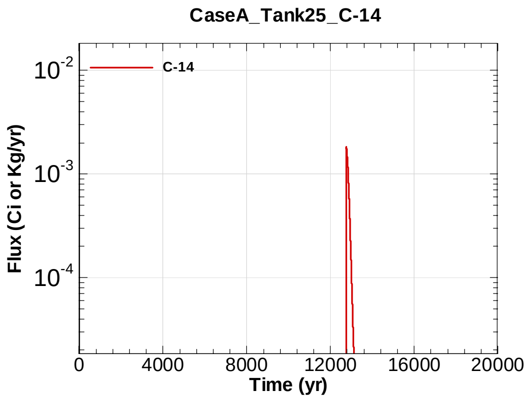

Figure A.1-891 - Flux Leaving Liner for CaseA Tank25 C-14

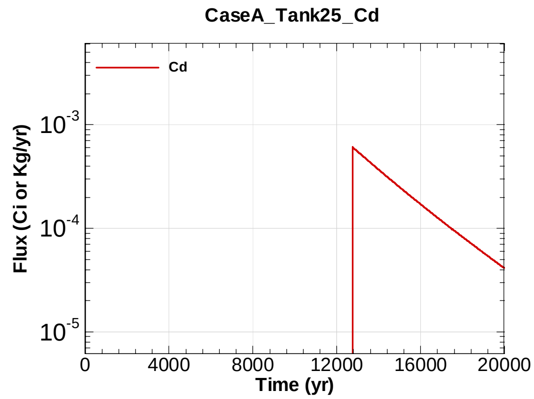

Figure A.1-892 - Flux Leaving Liner for CaseA Tank25 Cd

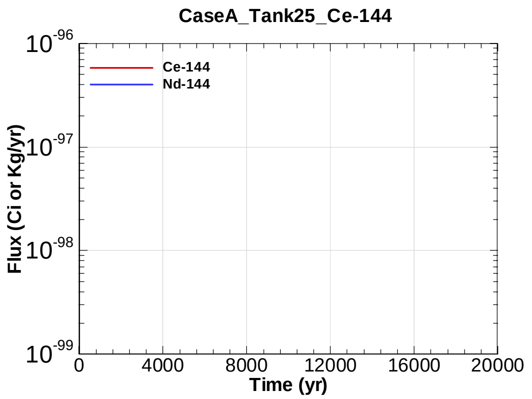

Figure A.1-893 - Flux Leaving Liner for CaseA Tank25 Ce-144

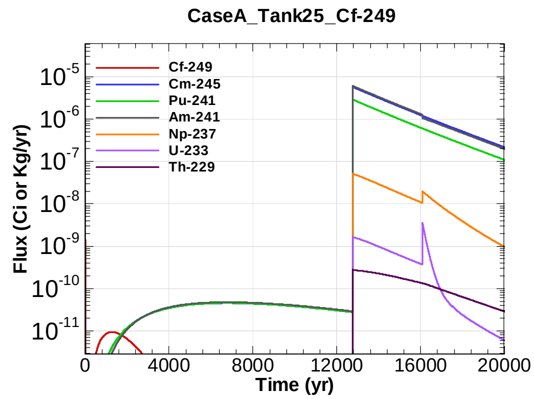

Figure A.1-894 - Flux Leaving Liner for CaseA Tank25 Cf-249

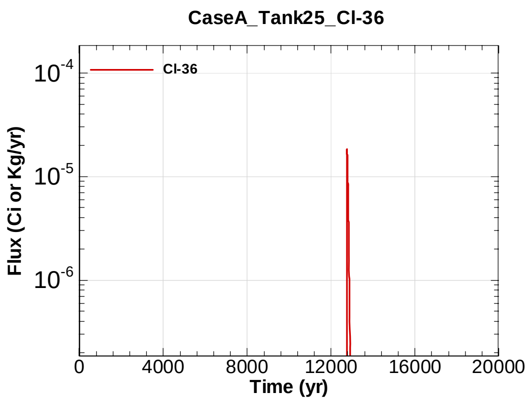

Figure A.1-895 - Flux Leaving Liner for CaseA Tank25 Cl-36

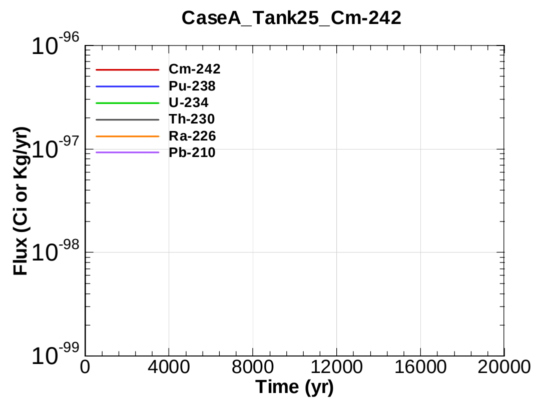

Figure A.1-896 - Flux Leaving Liner for CaseA Tank25 Cm-242

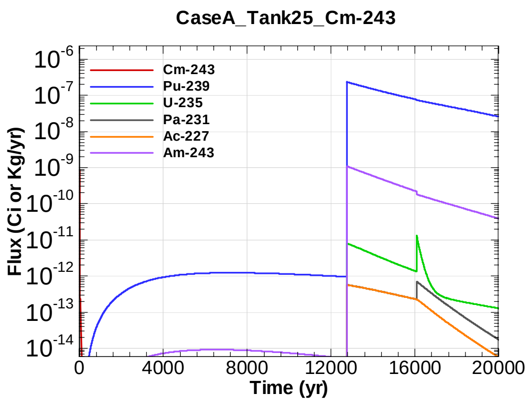

Figure A.1-897 - Flux Leaving Liner for CaseA Tank25 Cm-243

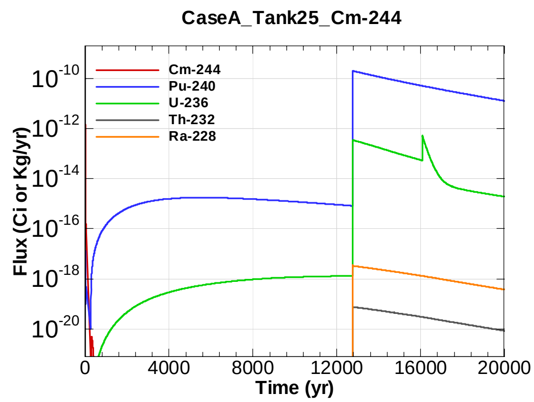

Figure A.1-898 - Flux Leaving Liner for CaseA Tank25 Cm-244

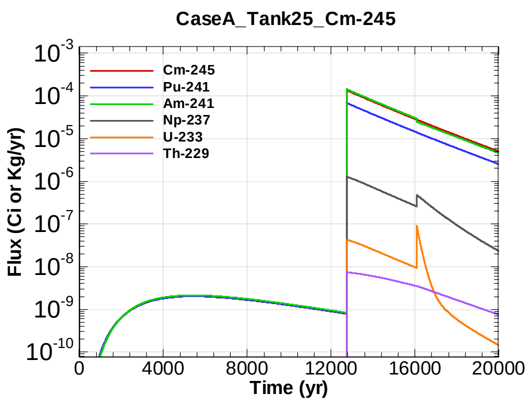

Figure A.1-899 - Flux Leaving Liner for CaseA Tank25 Cm-245

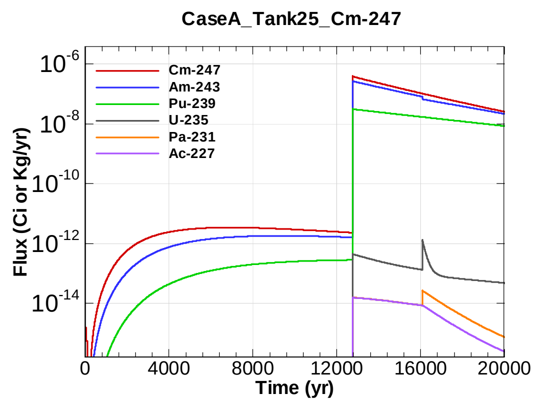

Figure A.1-900 - Flux Leaving Liner for CaseA Tank25 Cm-247

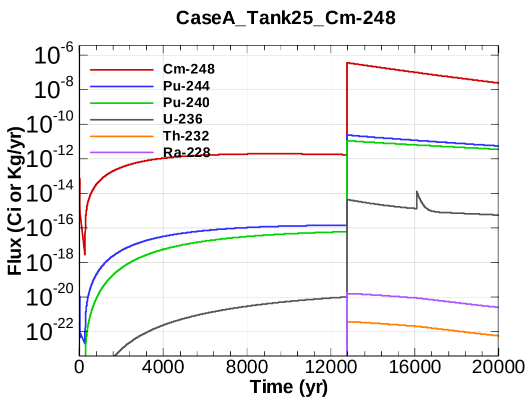

Figure A.1-901 - Flux Leaving Liner for CaseA Tank25 Cm-248

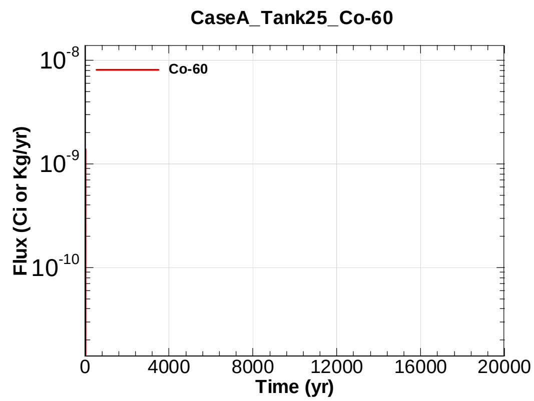

Figure A.1-902 - Flux Leaving Liner for CaseA Tank25 Co-60

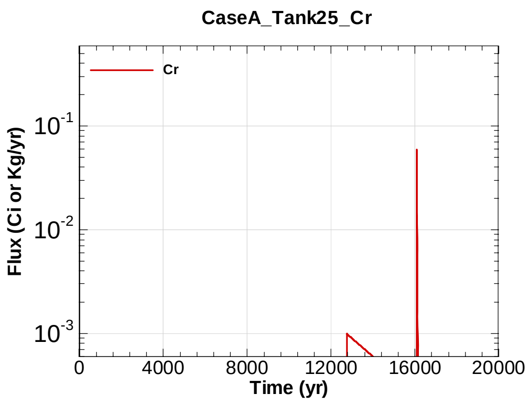

Figure A.1-903 - Flux Leaving Liner for CaseA Tank25 Cr

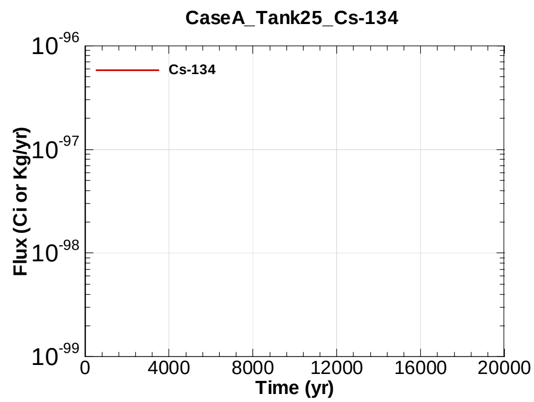

Figure A.1-904 - Flux Leaving Liner for CaseA Tank25 Cs-134

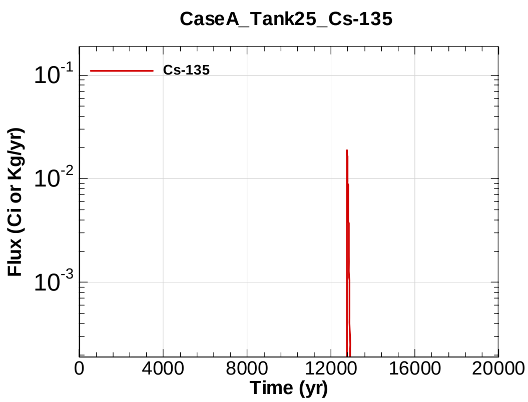

Figure A.1-905 - Flux Leaving Liner for CaseA Tank25 Cs-135

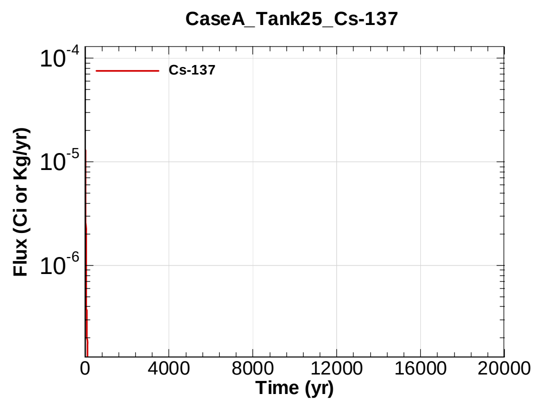

Figure A.1-906 - Flux Leaving Liner for CaseA Tank25 Cs-137

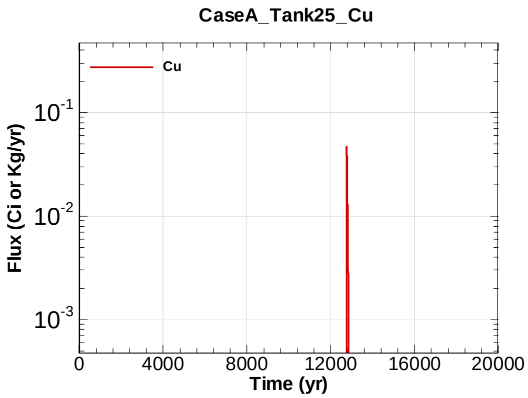

Figure A.1-907 - Flux Leaving Liner for CaseA Tank25 Cu

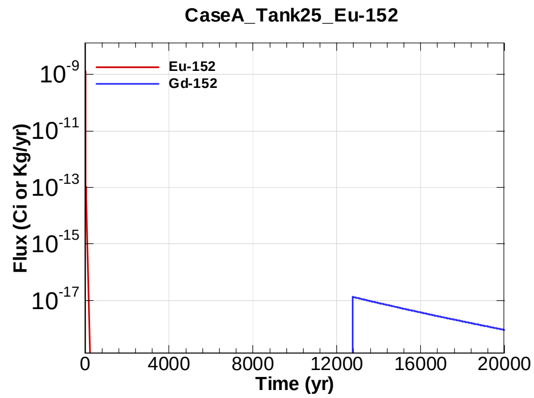

Figure A.1-908 - Flux Leaving Liner for CaseA Tank25 Eu-152

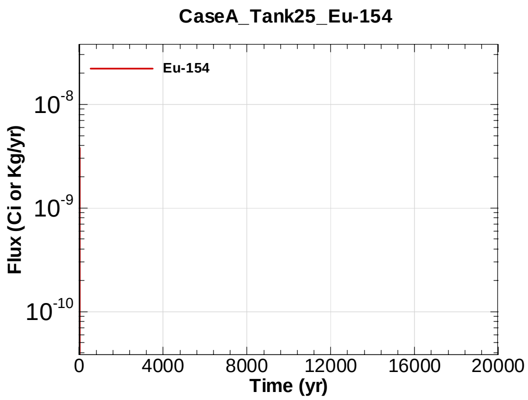

Figure A.1-909 - Flux Leaving Liner for CaseA Tank25 Eu-154

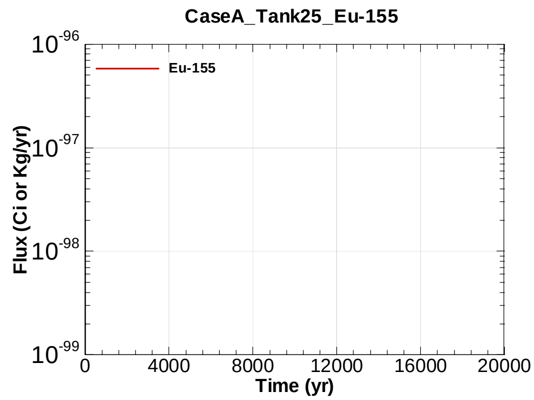

Figure A.1-910 - Flux Leaving Liner for CaseA Tank25 Eu-155

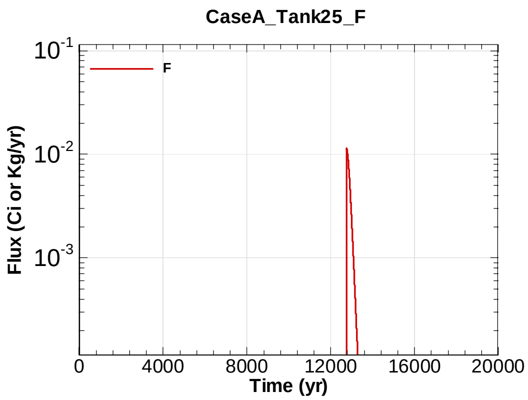

Figure A.1-911 - Flux Leaving Liner for CaseA Tank25 F

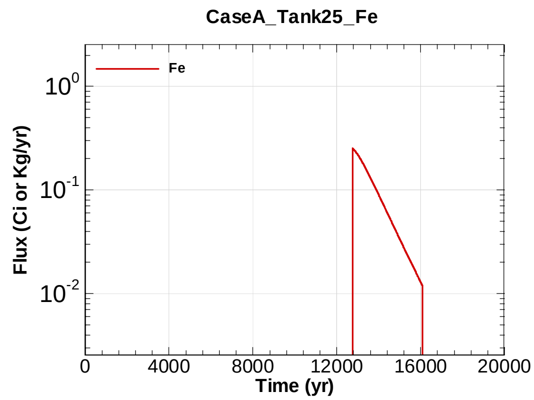

Figure A.1-912 - Flux Leaving Liner for CaseA Tank25 Fe

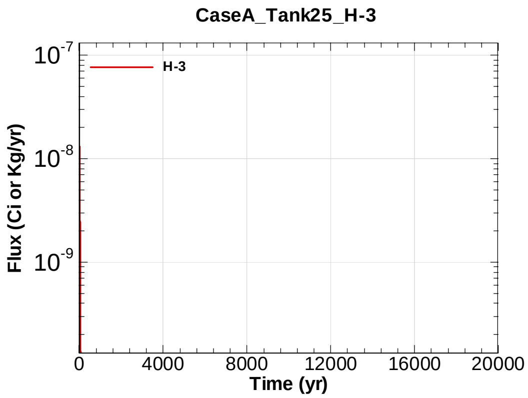

Figure A.1-913 - Flux Leaving Liner for CaseA Tank25 H-3

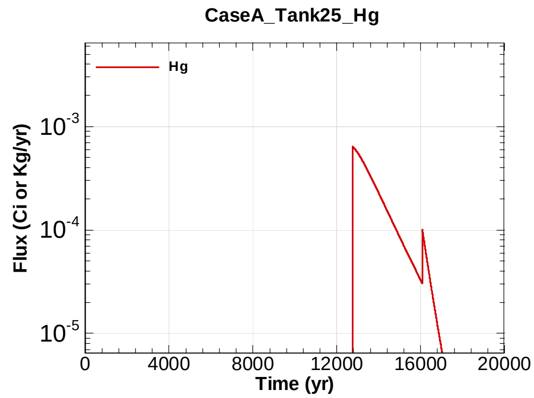

Figure A.1-914 - Flux Leaving Liner for CaseA Tank25 Hg

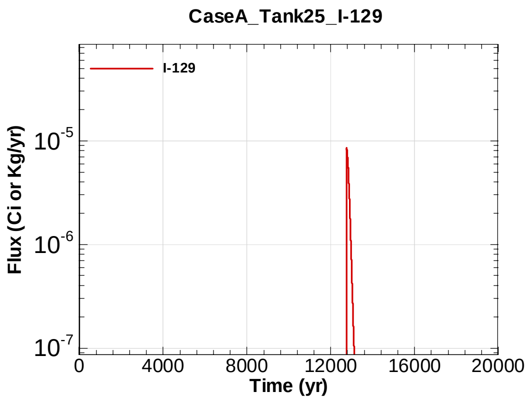

Figure A.1-915 - Flux Leaving Liner for CaseA Tank25 I-129

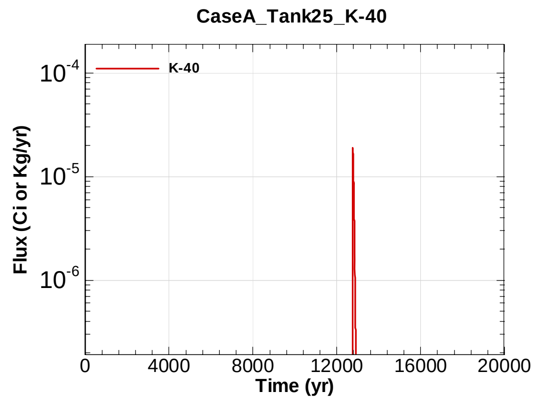

Figure A.1-916 - Flux Leaving Liner for CaseA Tank25 K-40

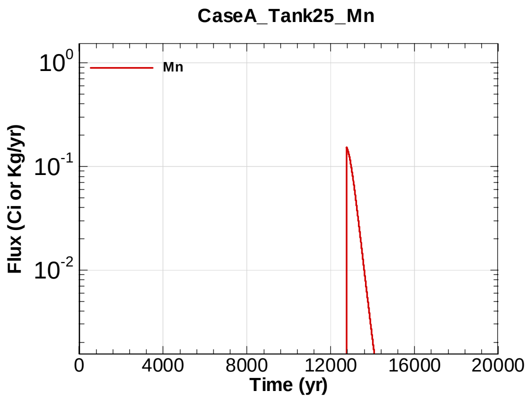

Figure A.1-917 - Flux Leaving Liner for CaseA Tank25 Mn

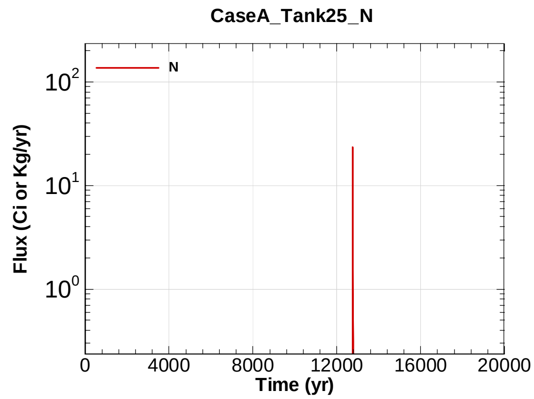

Figure A.1-918 - Flux Leaving Liner for CaseA Tank25 N

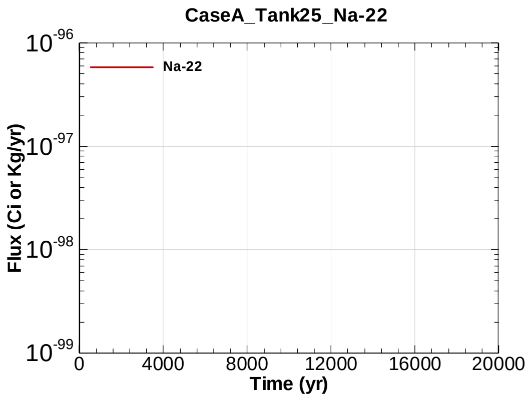

Figure A.1-919 - Flux Leaving Liner for CaseA Tank25 Na-22

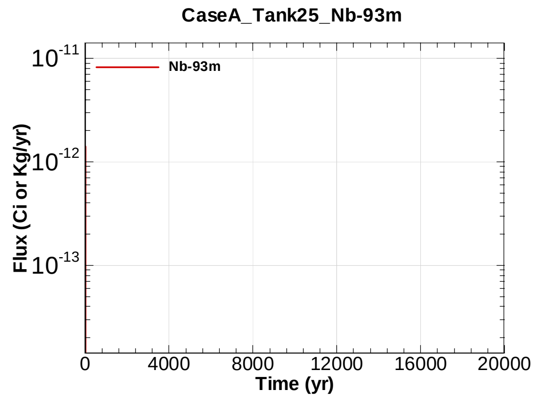

Figure A.1-920 - Flux Leaving Liner for CaseA Tank25 Nb-93m

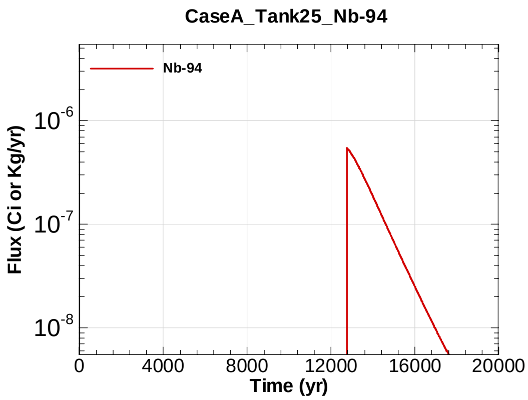

Figure A.1-921 - Flux Leaving Liner for CaseA Tank25 Nb-94

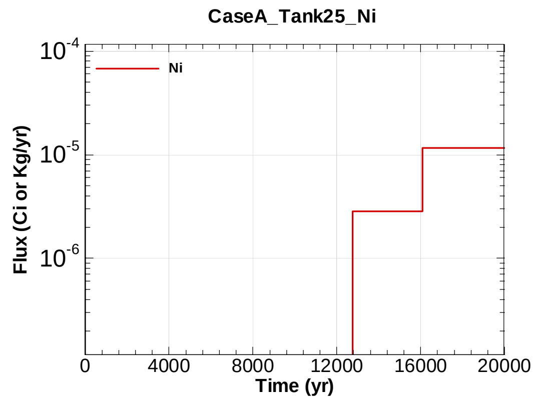

Figure A.1-922 - Flux Leaving Liner for CaseA Tank25 Ni

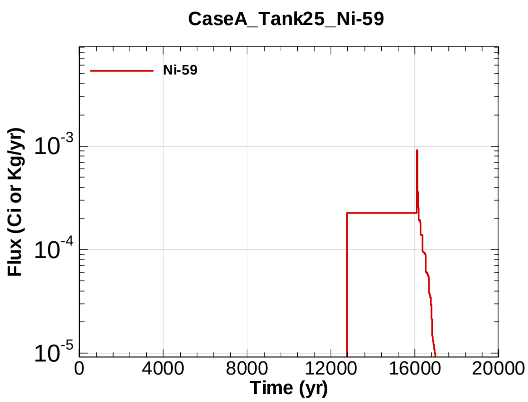

Figure A.1-923 - Flux Leaving Liner for CaseA Tank25 Ni-59

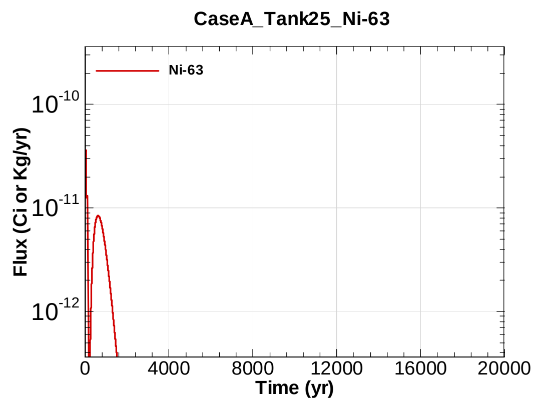

Figure A.1-924 - Flux Leaving Liner for CaseA Tank25 Ni-63

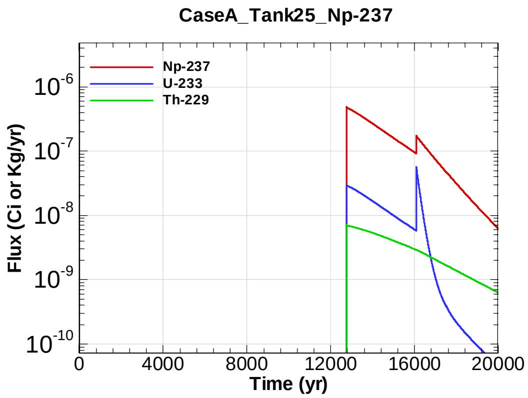

Figure A.1-925 - Flux Leaving Liner for CaseA Tank25 Np-237

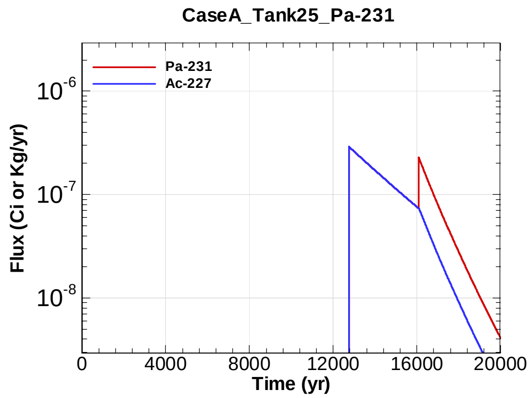

Figure A.1-926 - Flux Leaving Liner for CaseA Tank25 Pa-231

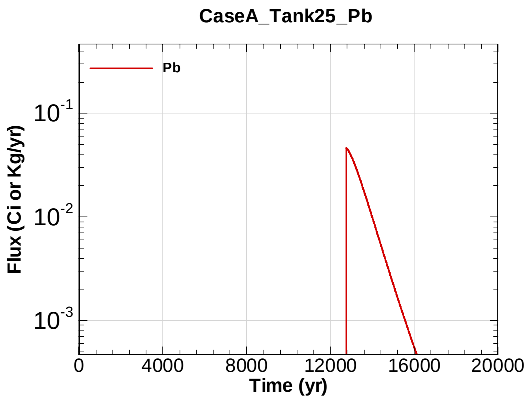

Figure A.1-927 - Flux Leaving Liner for CaseA Tank25 Pb

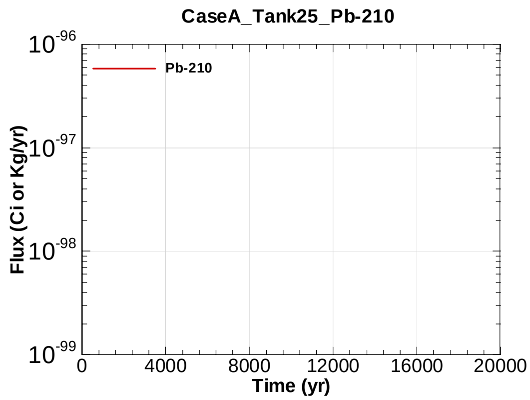

Figure A.1-928 - Flux Leaving Liner for CaseA Tank25 Pb-210

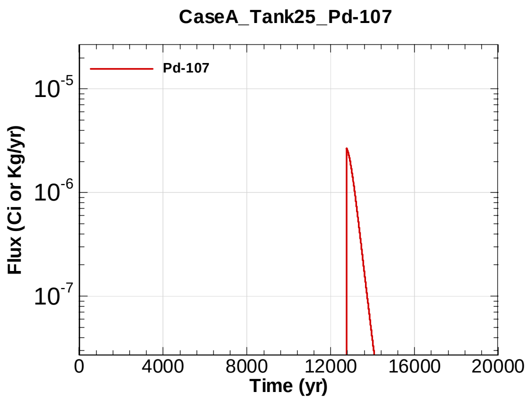

Figure A.1-929 - Flux Leaving Liner for CaseA Tank25 Pd-107

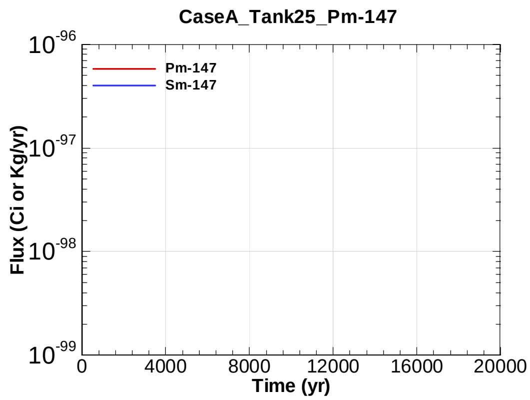

Figure A.1-930 - Flux Leaving Liner for CaseA Tank25 Pm-147

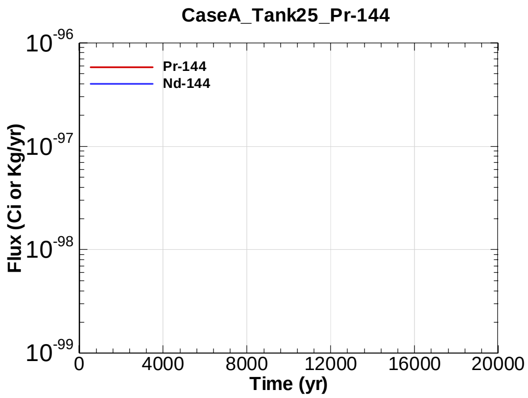

Figure A.1-931 - Flux Leaving Liner for CaseA Tank25 Pr-144

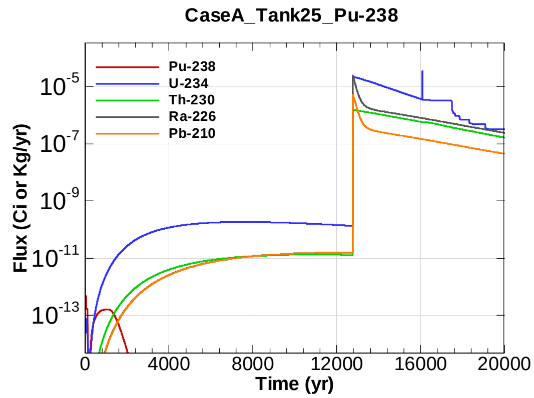

Figure A.1-932 - Flux Leaving Liner for CaseA Tank25 Pu-238

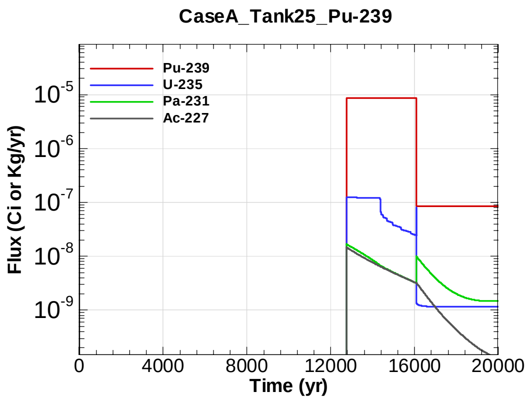

Figure A.1-933 - Flux Leaving Liner for CaseA Tank25 Pu-239

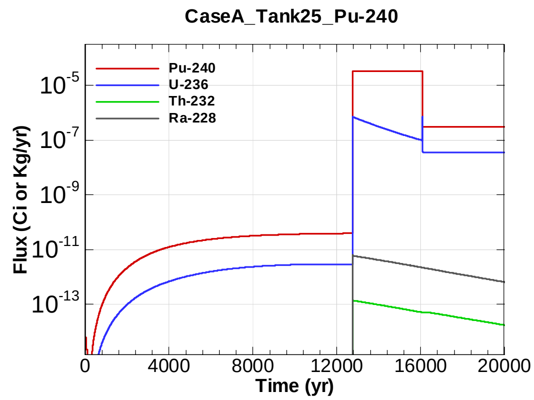

Figure A.1-934 - Flux Leaving Liner for CaseA Tank25 Pu-240

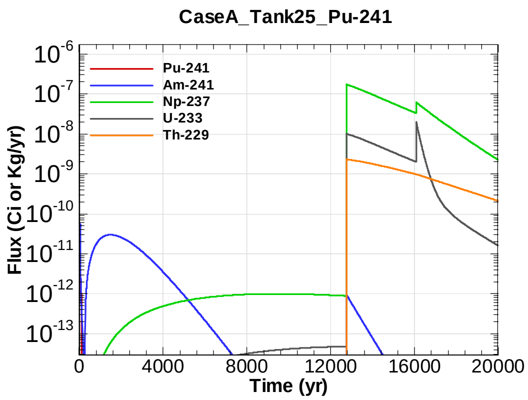

Figure A.1-935 - Flux Leaving Liner for CaseA Tank25 Pu-241

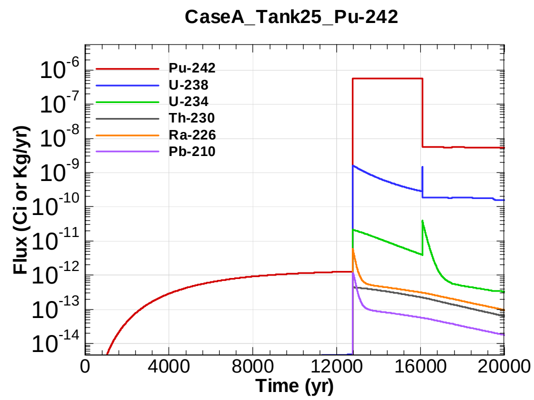

Figure A.1-936 - Flux Leaving Liner for CaseA Tank25 Pu-242

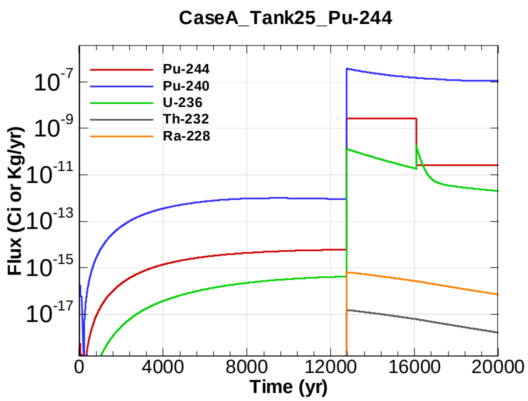

Figure A.1-937 - Flux Leaving Liner for CaseA Tank25 Pu-244

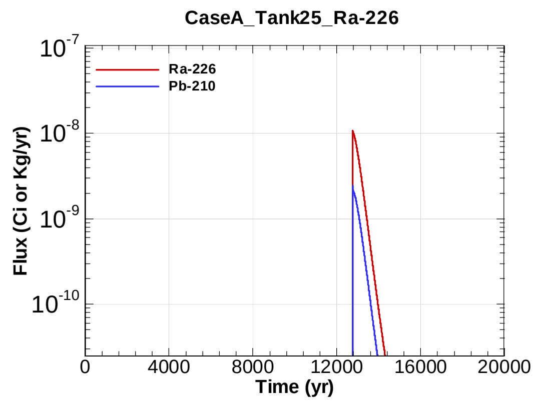

Figure A.1-938 - Flux Leaving Liner for CaseA Tank25 Ra-226

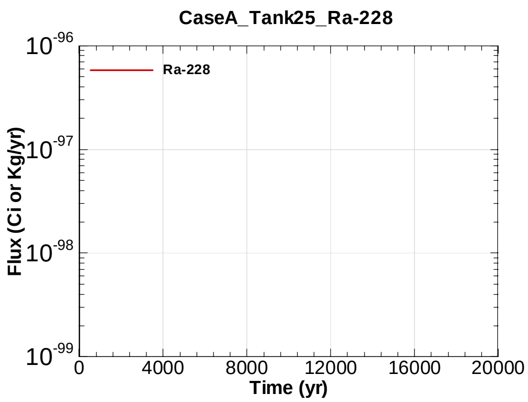

Figure A.1-939 - Flux Leaving Liner for CaseA Tank25 Ra-228

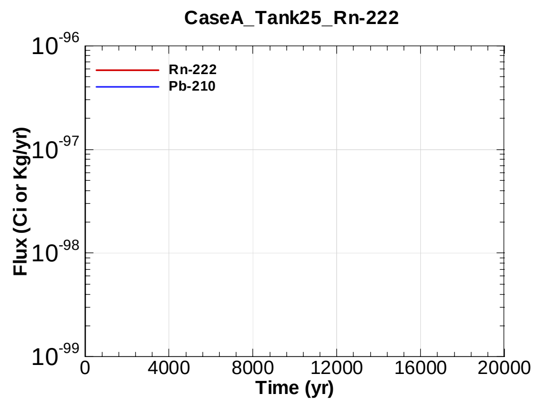

Figure A.1-940 - Flux Leaving Liner for CaseA Tank25 Rn-222

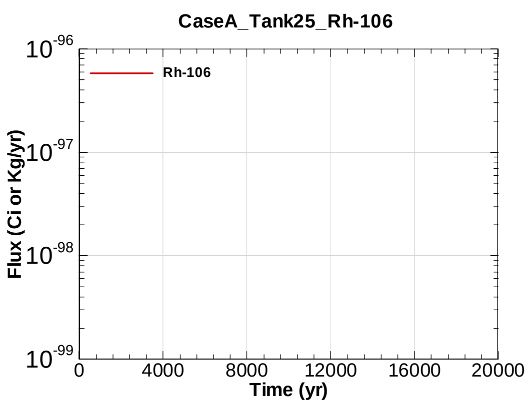

Figure A.1-941 - Flux Leaving Liner for CaseA Tank25 Rh-106

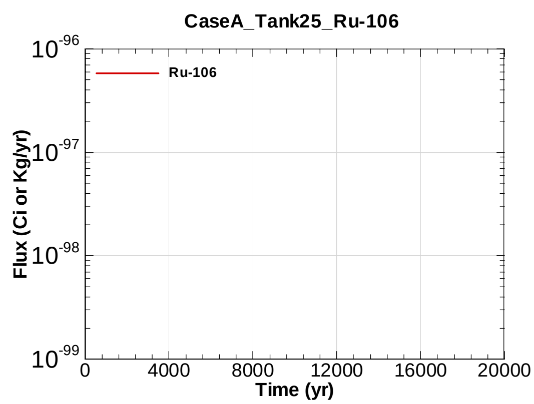

Figure A.1-942 - Flux Leaving Liner for CaseA Tank25 Ru-106

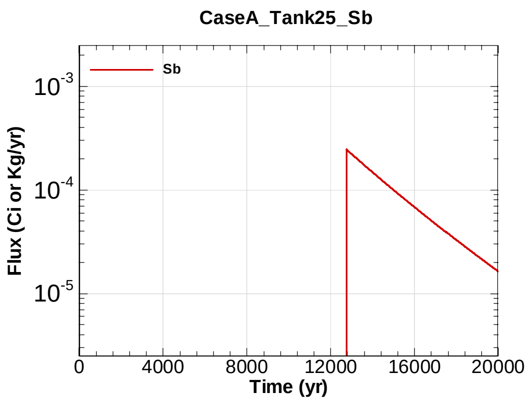

Figure A.1-943 - Flux Leaving Liner for CaseA Tank25 Sb

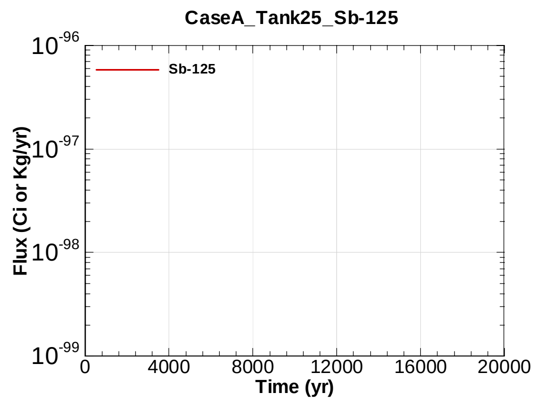

Figure A.1-944 - Flux Leaving Liner for CaseA Tank25 Sb-125

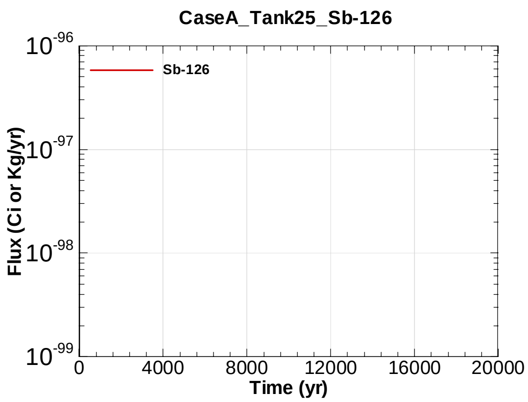

Figure A.1-945 - Flux Leaving Liner for CaseA Tank25 Sb-126

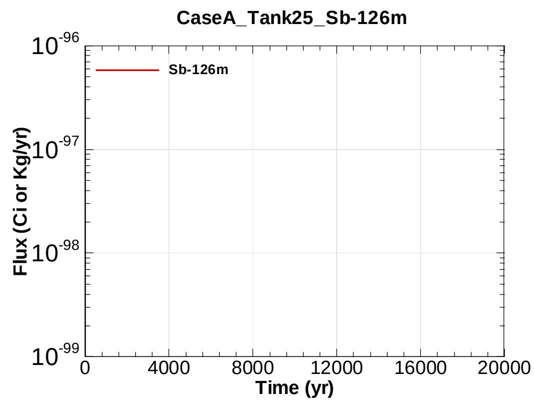

Figure A.1-946 - Flux Leaving Liner for CaseA Tank25 Sb-126m

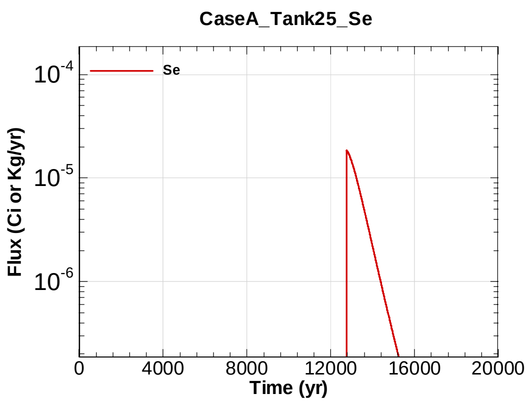

Figure A.1-947 - Flux Leaving Liner for CaseA Tank25 Se

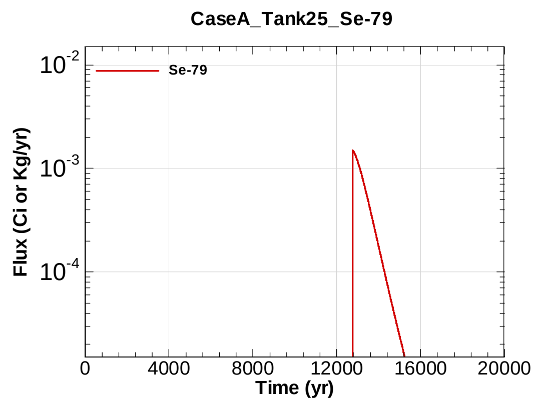

Figure A.1-948 - Flux Leaving Liner for CaseA Tank25 Se-79

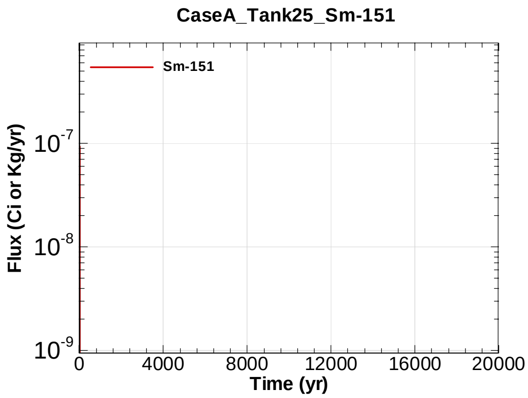

Figure A.1-949 - Flux Leaving Liner for CaseA Tank25 Sm-151

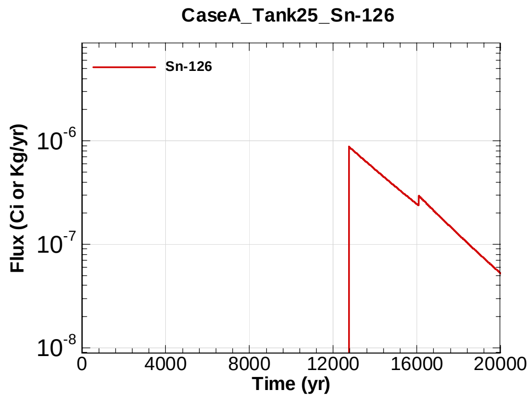

Figure A.1-950 - Flux Leaving Liner for CaseA Tank25 Sn-126

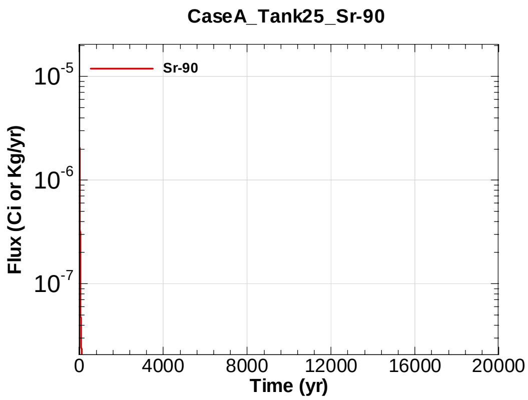

Figure A.1-951 - Flux Leaving Liner for CaseA Tank25 Sr-90

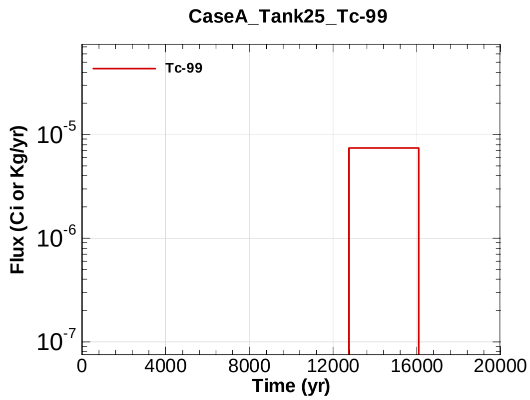

Figure A.1-952 - Flux Leaving Liner for CaseA Tank25 Tc-99

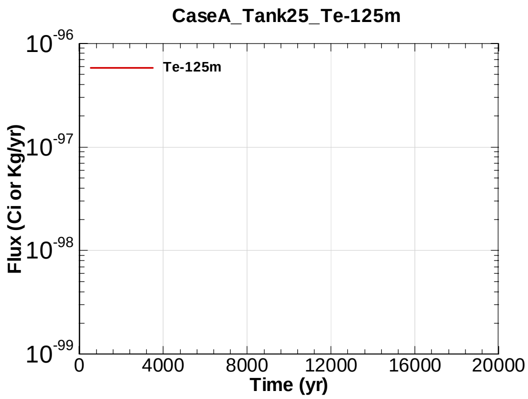

Figure A.1-953 - Flux Leaving Liner for CaseA Tank25 Te-125m

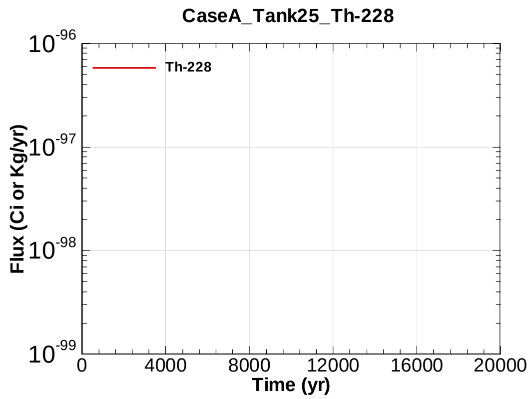

Figure A.1-954 - Flux Leaving Liner for CaseA Tank25 Th-228

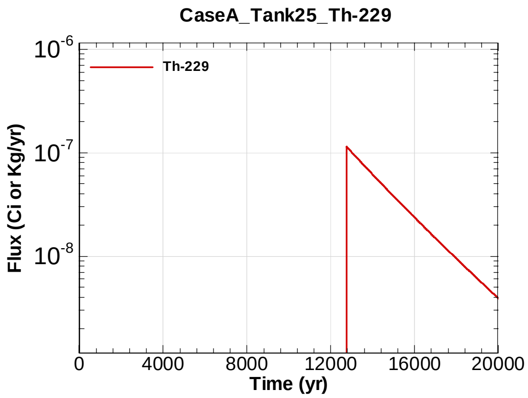

Figure A.1-955 - Flux Leaving Liner for CaseA Tank25 Th-229

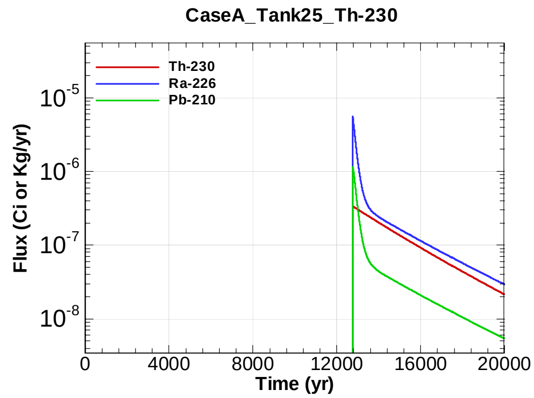

Figure A.1-956 - Flux Leaving Liner for CaseA Tank25 Th-230

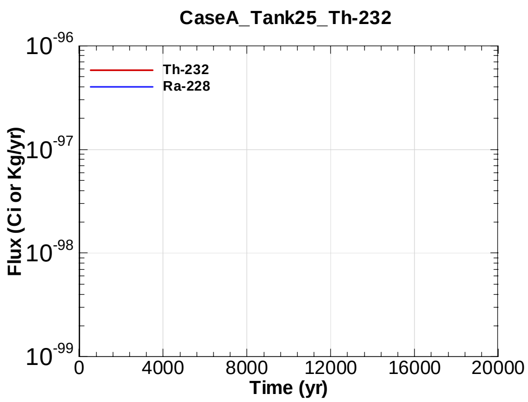

Figure A.1-957 - Flux Leaving Liner for CaseA Tank25 Th-232

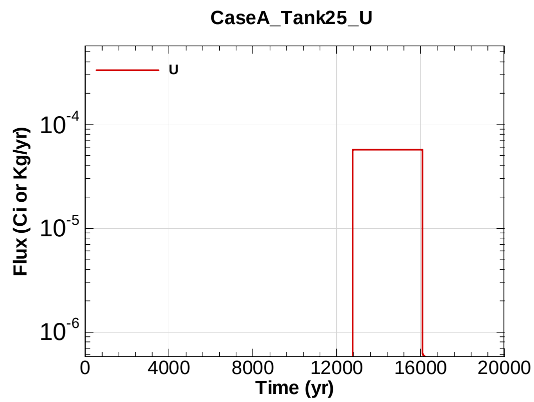

Figure A.1-958 - Flux Leaving Liner for CaseA Tank25 U

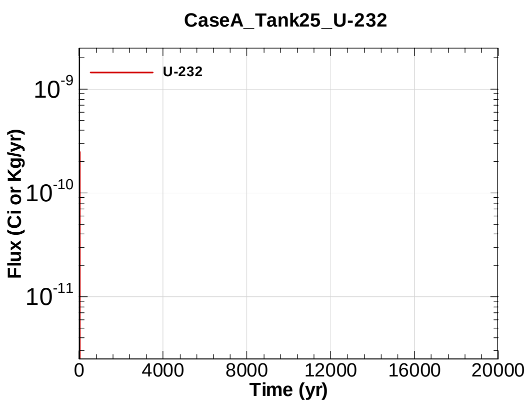

Figure A.1-959 - Flux Leaving Liner for CaseA Tank25 U-232

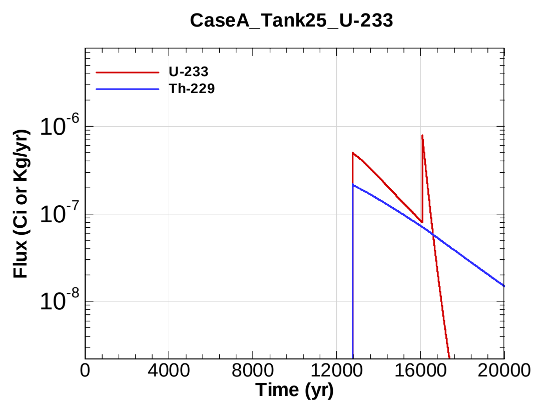

Figure A.1-960 - Flux Leaving Liner for CaseA Tank25 U-233

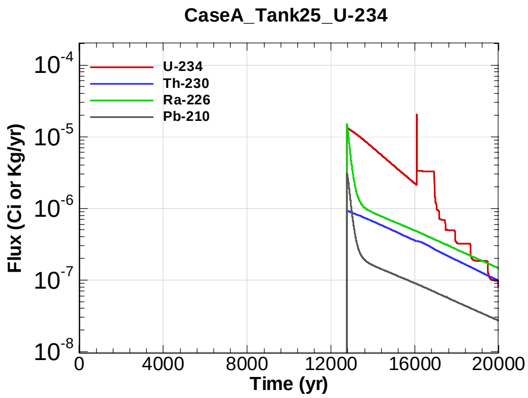

Figure A.1-961 - Flux Leaving Liner for CaseA Tank25 U-234

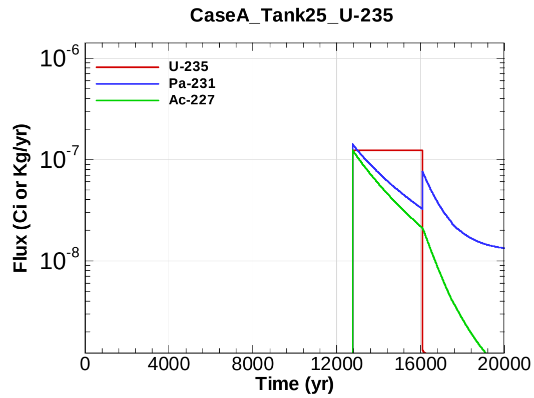

Figure A.1-962 - Flux Leaving Liner for CaseA Tank25 U-235

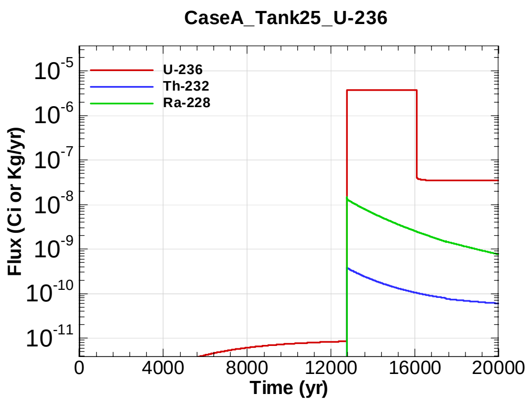

Figure A.1-963 - Flux Leaving Liner for CaseA Tank25 U-236

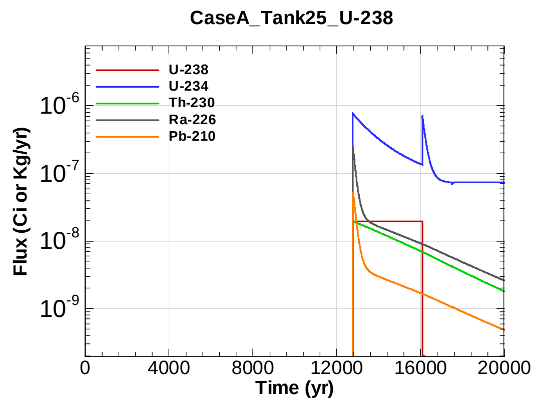

Figure A.1-964 - Flux Leaving Liner for CaseA Tank25 U-238

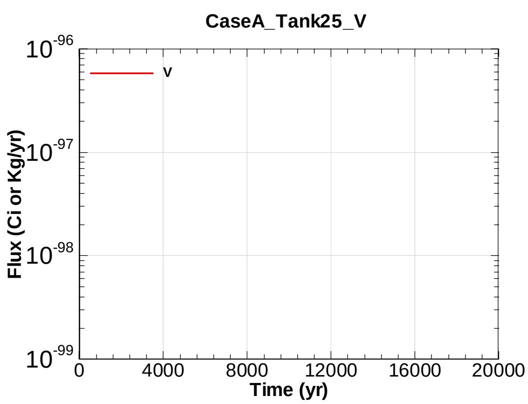

Figure A.1-965 - Flux Leaving Liner for CaseA Tank25 V

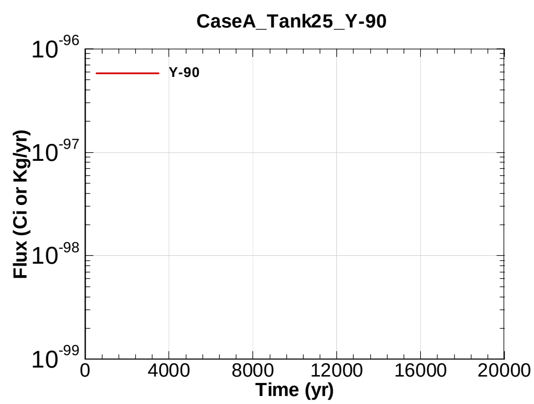

Figure A.1-966 - Flux Leaving Liner for CaseA Tank25 Y-90

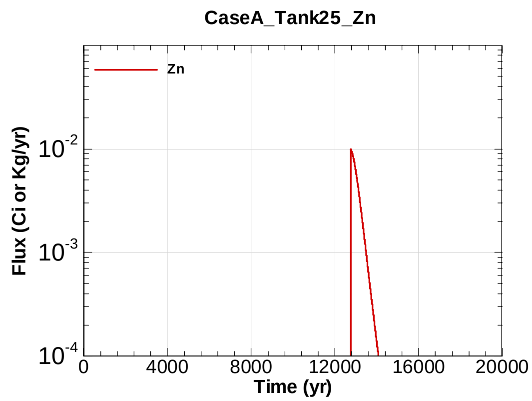

Figure A.1-967 - Flux Leaving Liner for CaseA Tank25 Zn

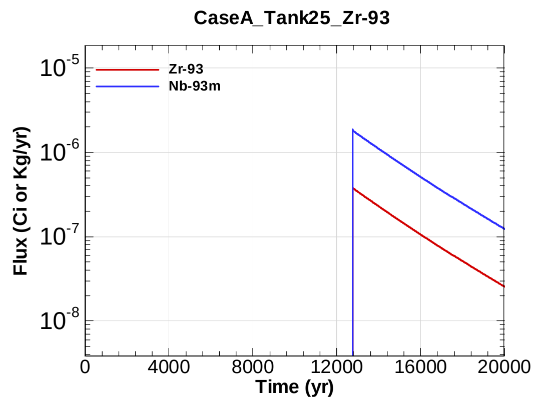

Figure A.1-968 - Flux Leaving Liner for CaseA Tank25 Zr-93

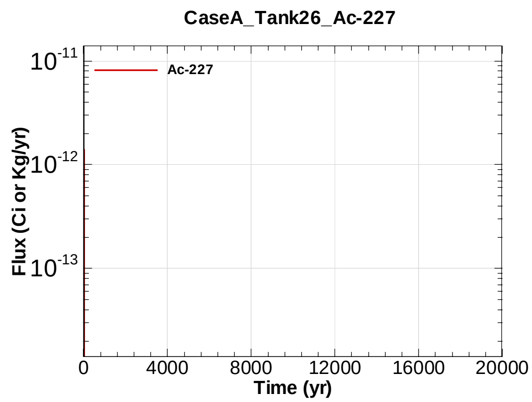

Figure A.1-969 - Flux Leaving Liner for CaseA Tank26 Ac-227

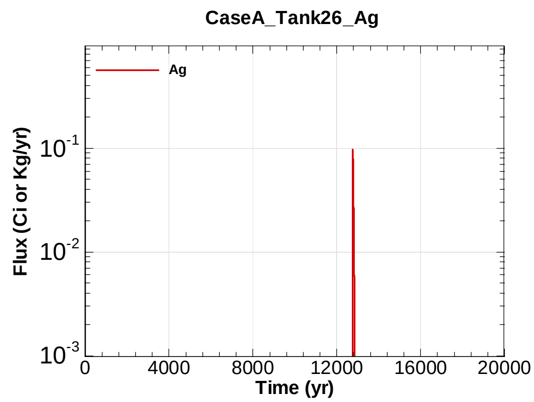

Figure A.1-970 - Flux Leaving Liner for CaseA Tank26 Ag

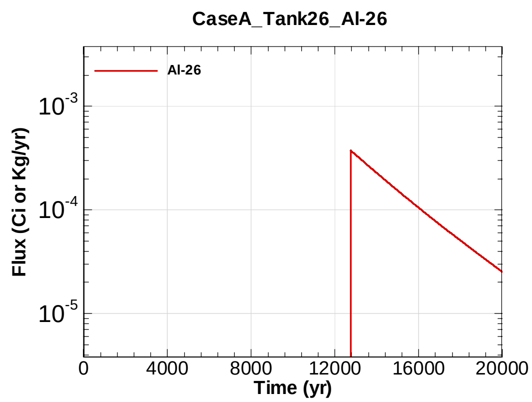

Figure A.1-971 - Flux Leaving Liner for CaseA Tank26 Al-26

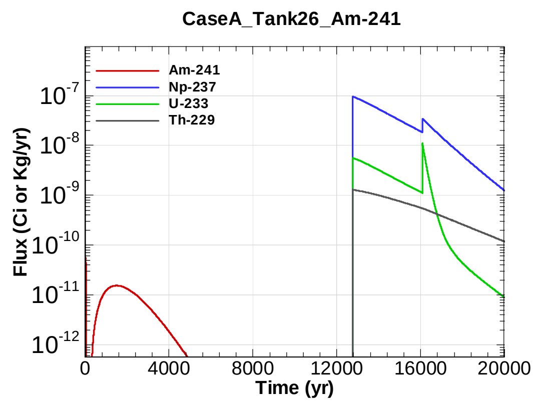

Figure A.1-972 - Flux Leaving Liner for CaseA Tank26 Am-241

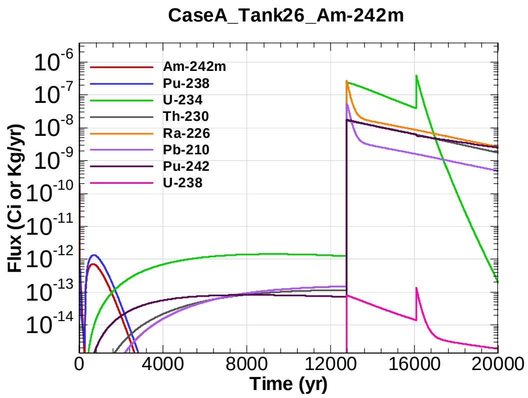

Figure A.1-973 - Flux Leaving Liner for CaseA Tank26 Am-242m

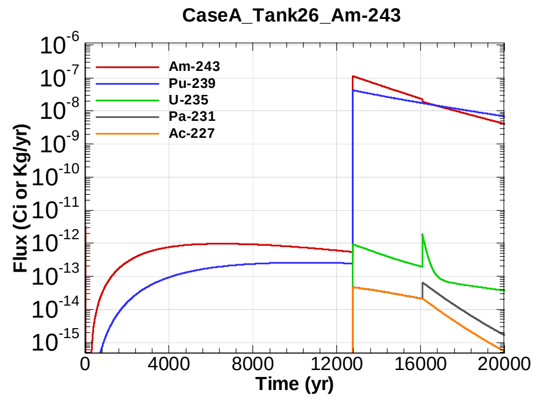

Figure A.1-974 - Flux Leaving Liner for CaseA Tank26 Am-243

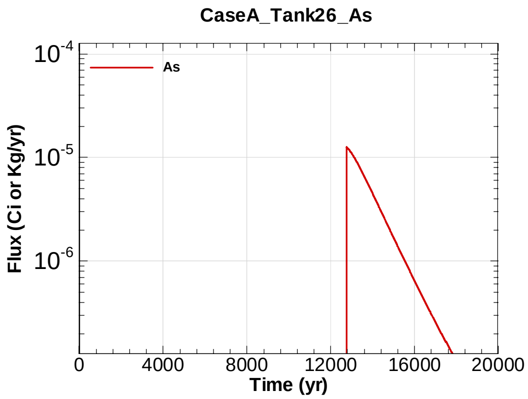

Figure A.1-975 - Flux Leaving Liner for CaseA Tank26 As

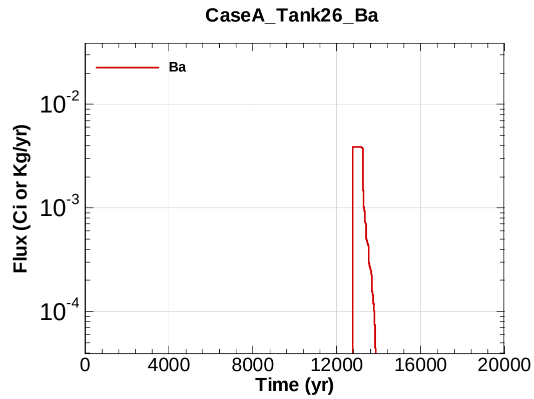

Figure A.1-976 - Flux Leaving Liner for CaseA Tank26 Ba

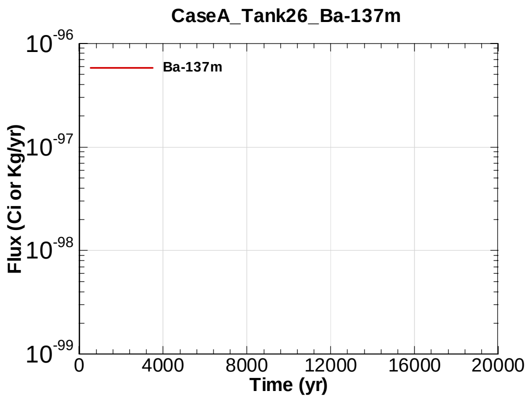

Figure A.1-977 - Flux Leaving Liner for CaseA Tank26 Ba-137m

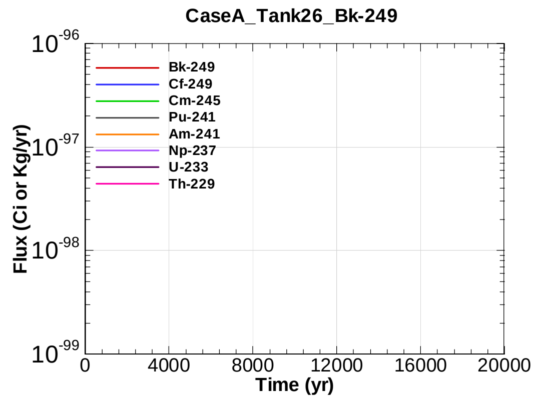

Figure A.1-978 - Flux Leaving Liner for CaseA Tank26 Bk-249

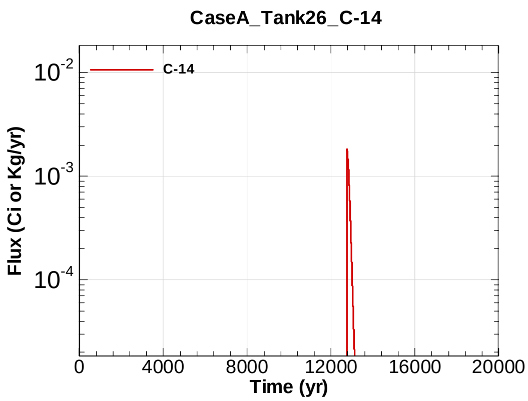

Figure A.1-979 - Flux Leaving Liner for CaseA Tank26 C-14

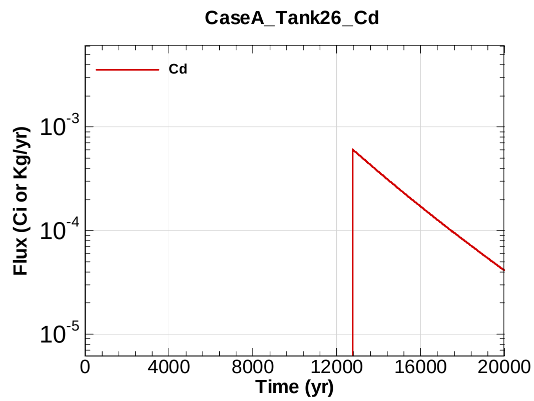

Figure A.1-980 - Flux Leaving Liner for CaseA Tank26 Cd

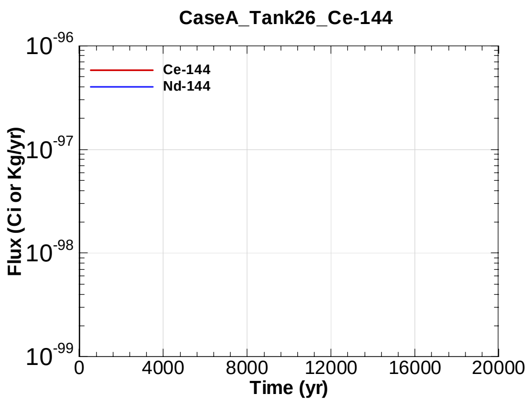

Figure A.1-981 - Flux Leaving Liner for CaseA Tank26 Ce-144

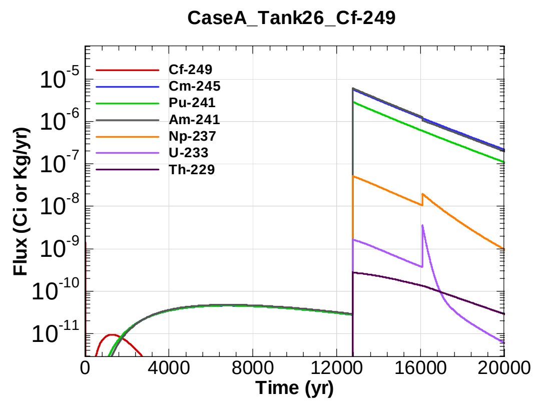

Figure A.1-982 - Flux Leaving Liner for CaseA Tank26 Cf-249

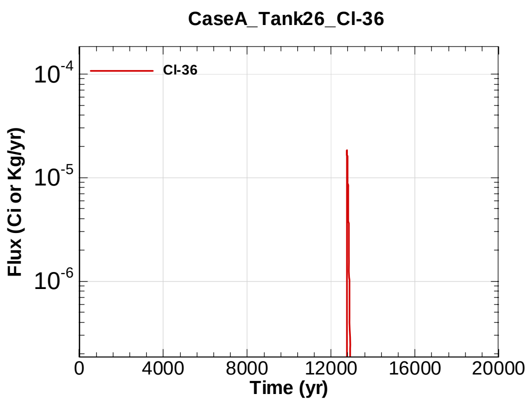

Figure A.1-983 - Flux Leaving Liner for CaseA Tank26 Cl-36

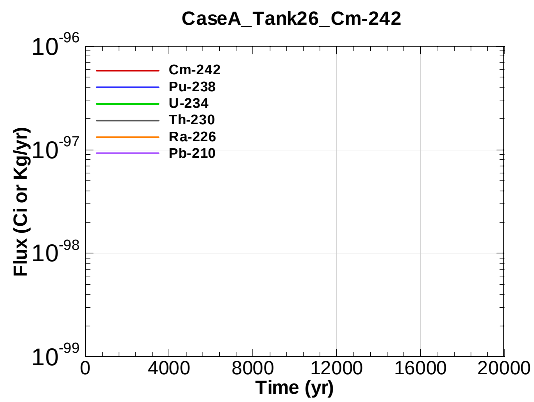

Figure A.1-984 - Flux Leaving Liner for CaseA Tank26 Cm-242

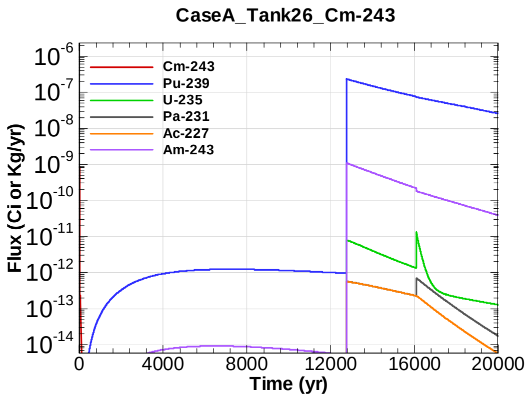

Figure A.1-985 - Flux Leaving Liner for CaseA Tank26 Cm-243

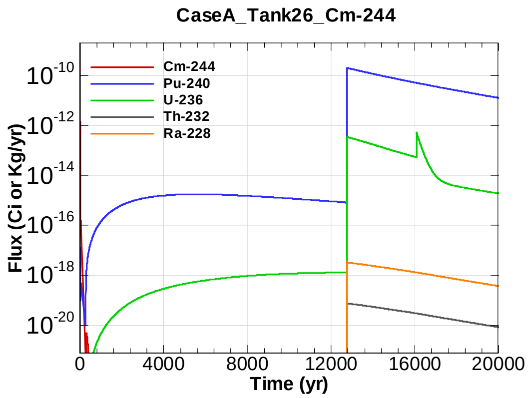

Figure A.1-986 - Flux Leaving Liner for CaseA Tank26 Cm-244

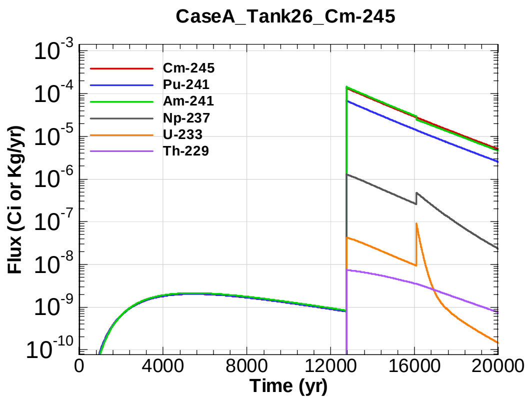

Figure A.1-987 - Flux Leaving Liner for CaseA Tank26 Cm-245

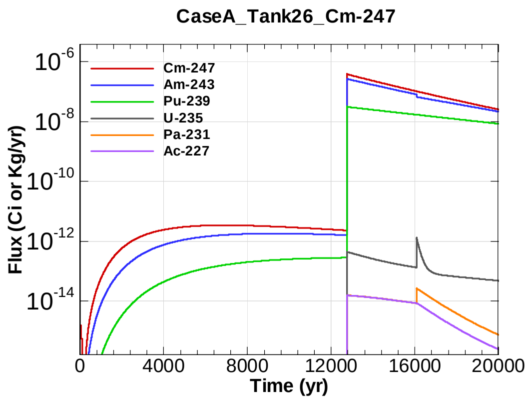

Figure A.1-988 - Flux Leaving Liner for CaseA Tank26 Cm-247

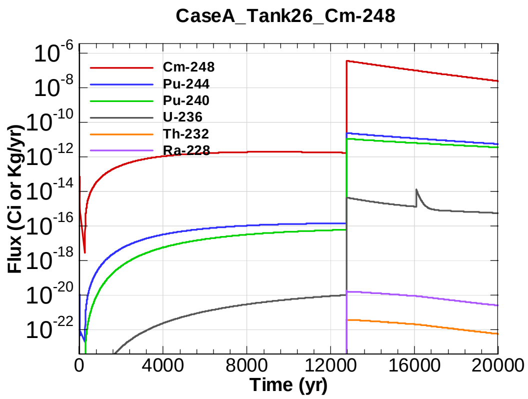

Figure A.1-989 - Flux Leaving Liner for CaseA Tank26 Cm-248

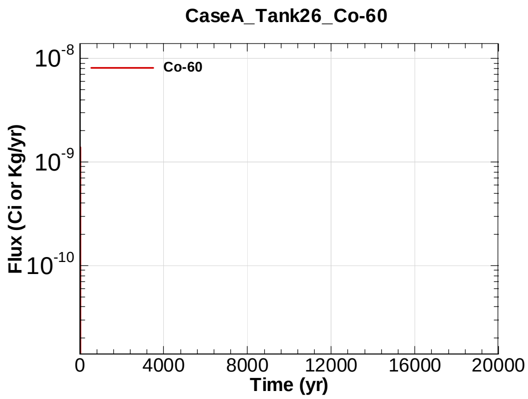

Figure A.1-990 - Flux Leaving Liner for CaseA Tank26 Co-60

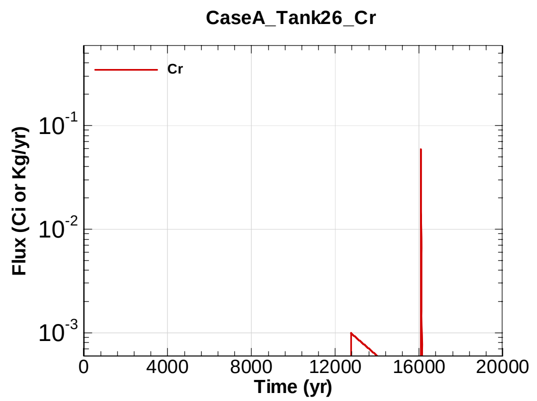

Figure A.1-991 - Flux Leaving Liner for CaseA Tank26 Cr

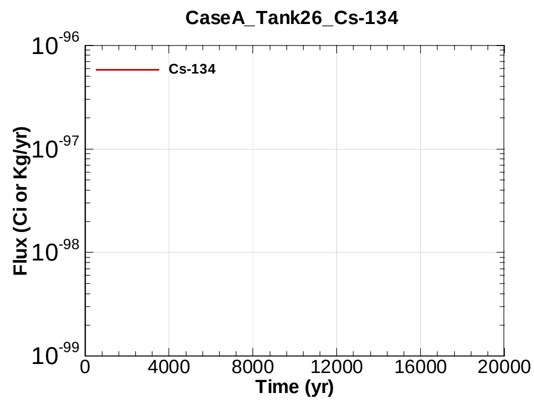

Figure A.1-992 - Flux Leaving Liner for CaseA Tank26 Cs-134

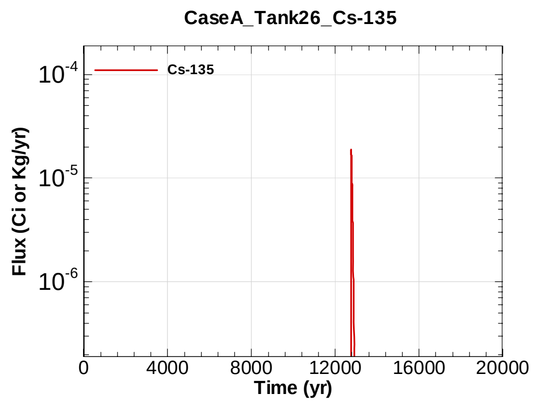

Figure A.1-993 - Flux Leaving Liner for CaseA Tank26 Cs-135

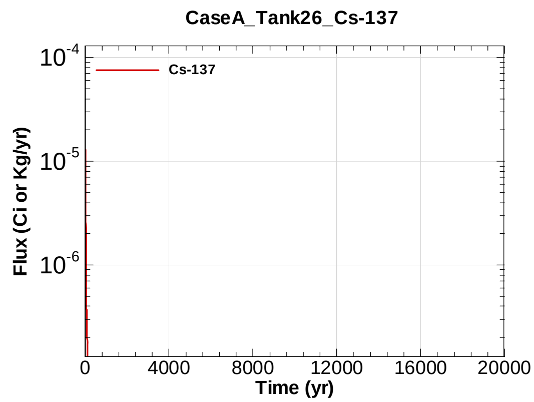

Figure A.1-994 - Flux Leaving Liner for CaseA Tank26 Cs-137

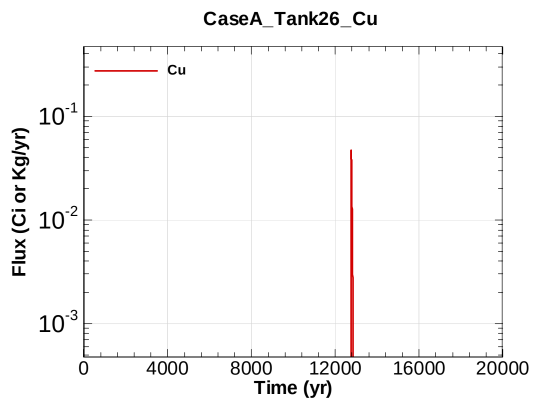

Figure A.1-995 - Flux Leaving Liner for CaseA Tank26 Cu

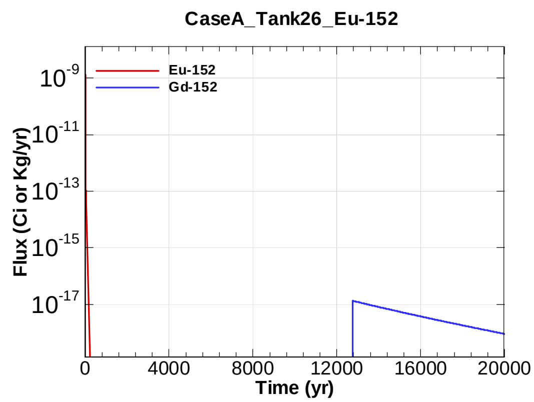

Figure A.1-996 - Flux Leaving Liner for CaseA Tank26 Eu-152

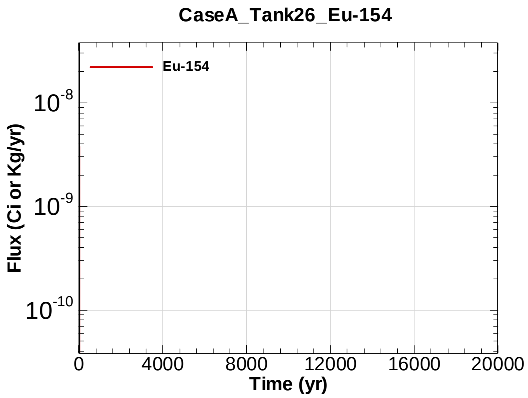

Figure A.1-997 - Flux Leaving Liner for CaseA Tank26 Eu-154

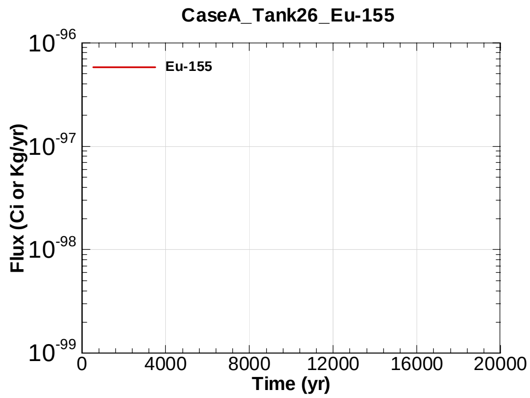

Figure A.1-998 - Flux Leaving Liner for CaseA Tank26 Eu-155

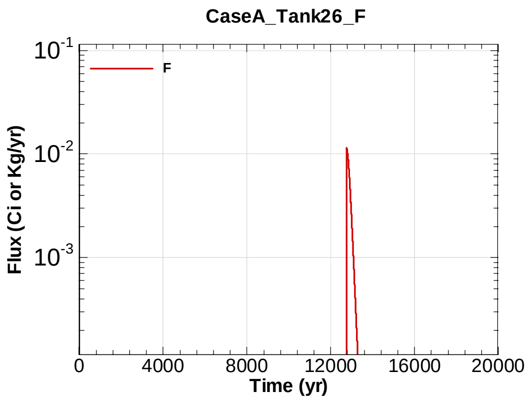

Figure A.1-999 - Flux Leaving Liner for CaseA Tank26 F

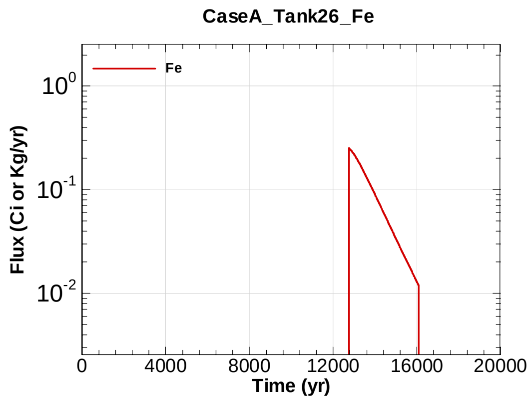

Figure A.1-1000 - Flux Leaving Liner for CaseA Tank26 Fe

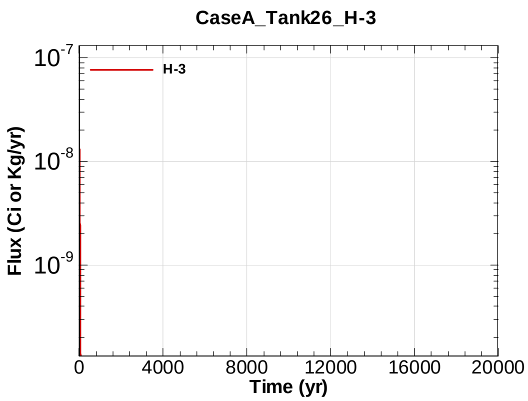

Figure A.1-1001 - Flux Leaving Liner for CaseA Tank26 H-3

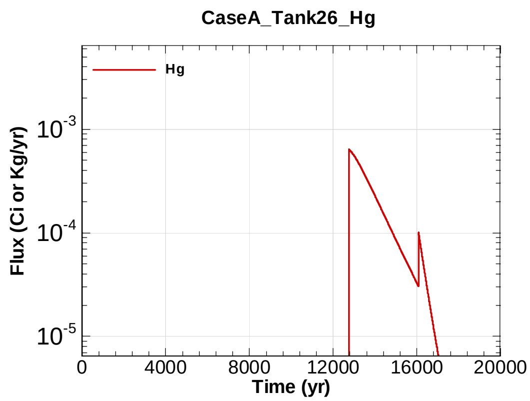

Figure A.1-1002 - Flux Leaving Liner for CaseA Tank26 Hg

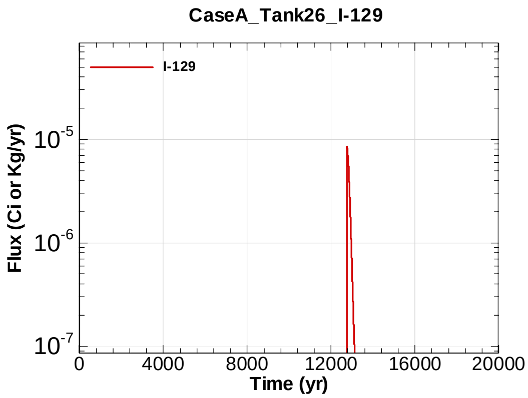

Figure A.1-1003 - Flux Leaving Liner for CaseA Tank26 I-129

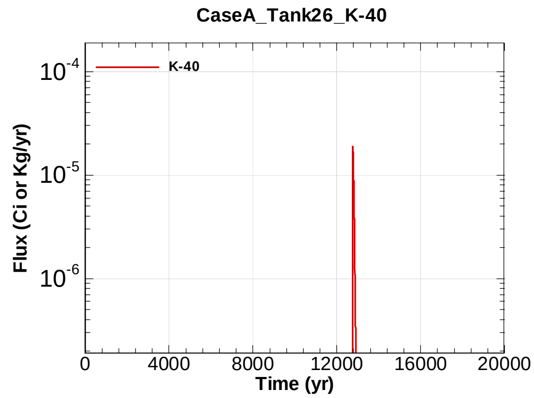

Figure A.1-1004 - Flux Leaving Liner for CaseA Tank26 K-40

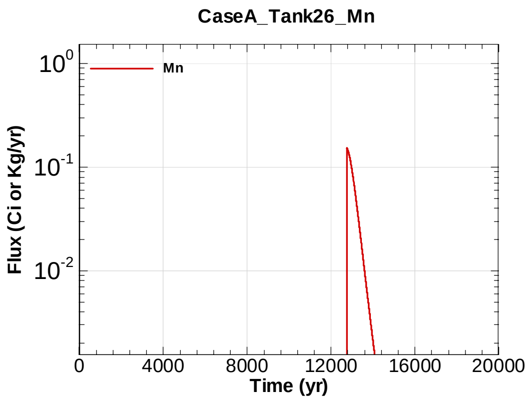

Figure A.1-1005 - Flux Leaving Liner for CaseA Tank26 Mn

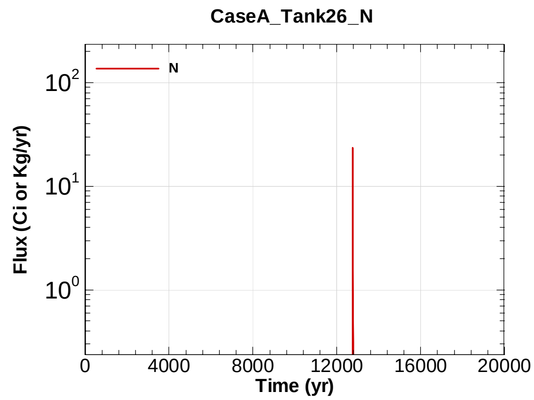

Figure A.1-1006 - Flux Leaving Liner for CaseA Tank26 N

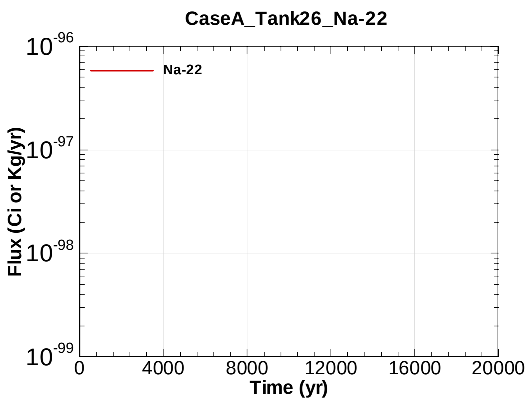

Figure A.1-1007 - Flux Leaving Liner for CaseA Tank26 Na-22

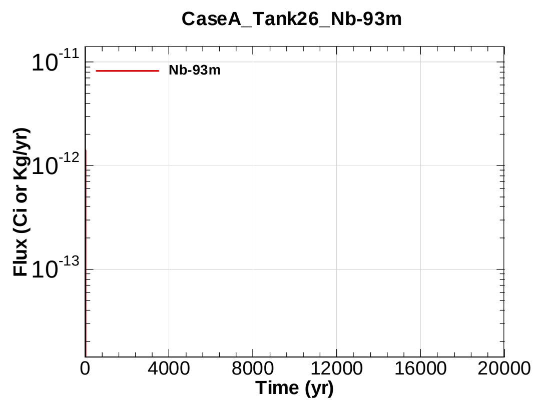

Figure A.1-1008 - Flux Leaving Liner for CaseA Tank26 Nb-93m

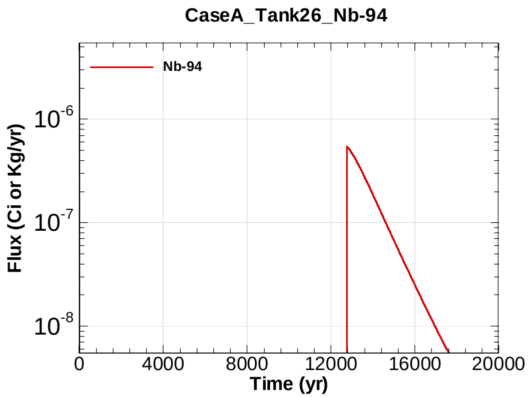

Figure A.1-1009 - Flux Leaving Liner for CaseA Tank26 Nb-94

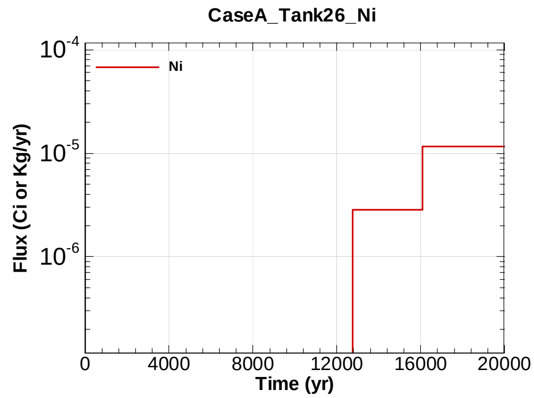

Figure A.1-1010 - Flux Leaving Liner for CaseA Tank26 Ni

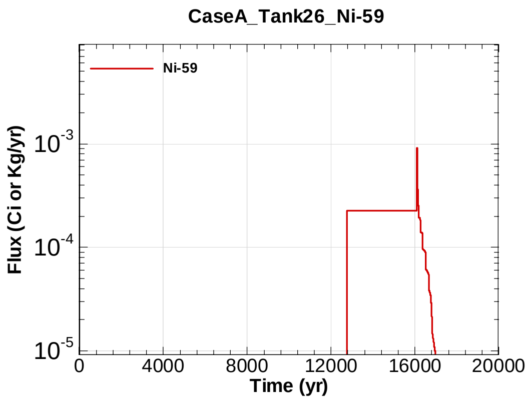

Figure A.1-1011 - Flux Leaving Liner for CaseA Tank26 Ni-59

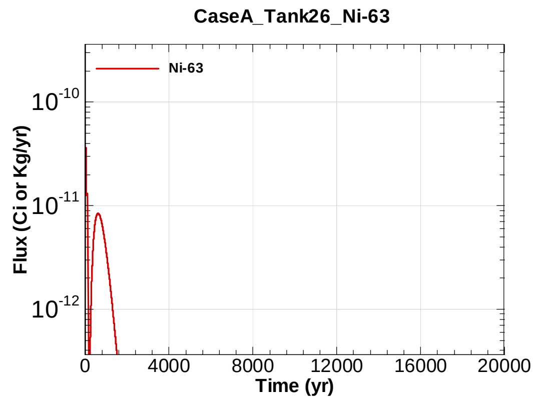

Figure A.1-1012 - Flux Leaving Liner for CaseA Tank26 Ni-63

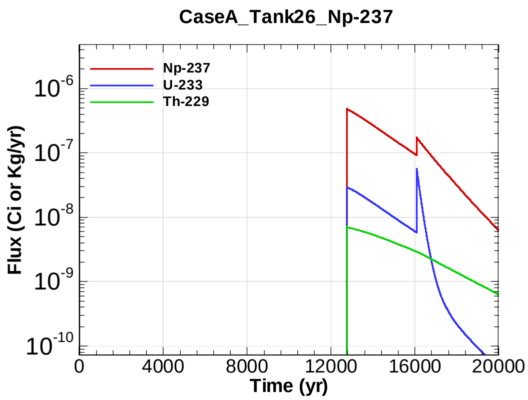

Figure A.1-1013 - Flux Leaving Liner for CaseA Tank26 Np-237

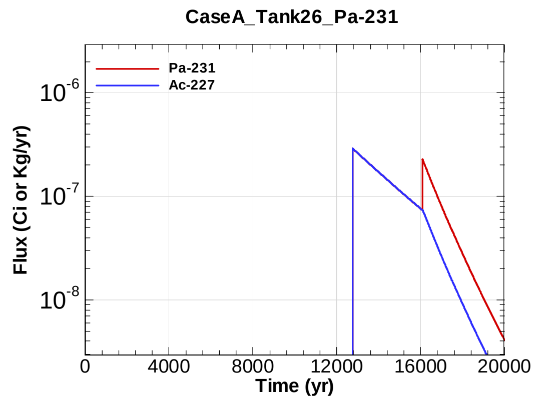

Figure A.1-1014 - Flux Leaving Liner for CaseA Tank26 Pa-231

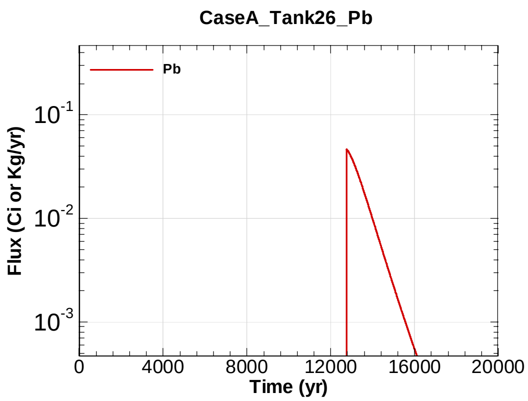

Figure A.1-1015 - Flux Leaving Liner for CaseA Tank26 Pb

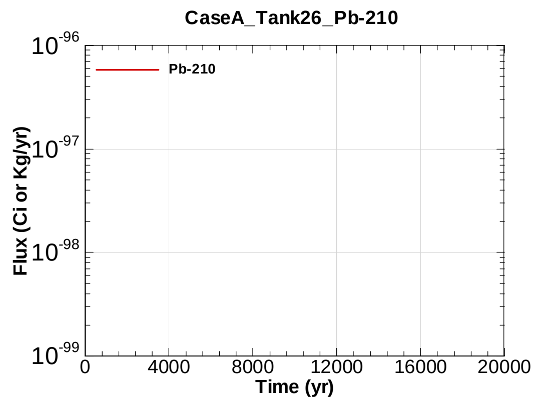

Figure A.1-1016 - Flux Leaving Liner for CaseA Tank26 Pb-210

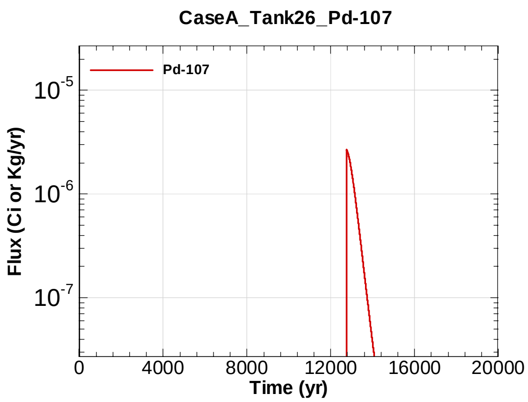

Figure A.1-1017 - Flux Leaving Liner for CaseA Tank26 Pd-107

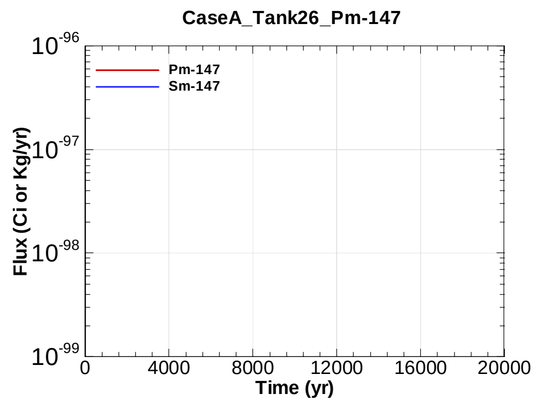

Figure A.1-1018 - Flux Leaving Liner for CaseA Tank26 Pm-147

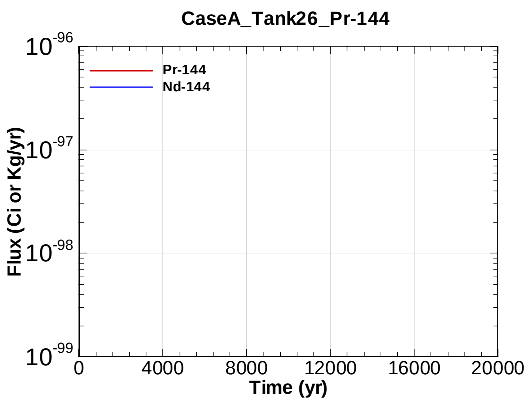

Figure A.1-1019 - Flux Leaving Liner for CaseA Tank26 Pr-144

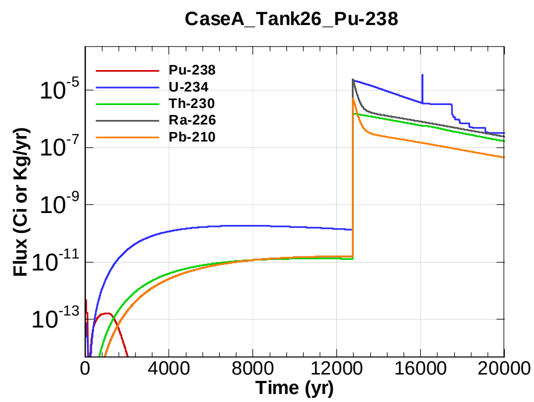

Figure A.1-1020 - Flux Leaving Liner for CaseA Tank26 Pu-238

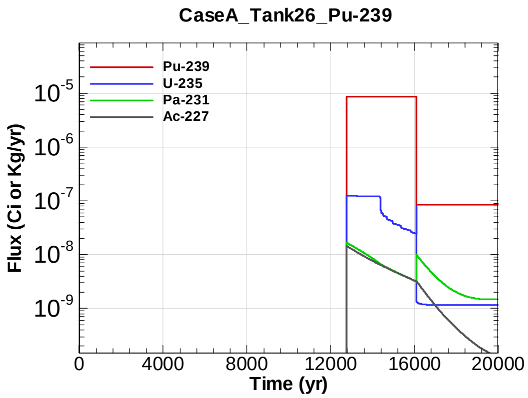

Figure A.1-1021 - Flux Leaving Liner for CaseA Tank26 Pu-239

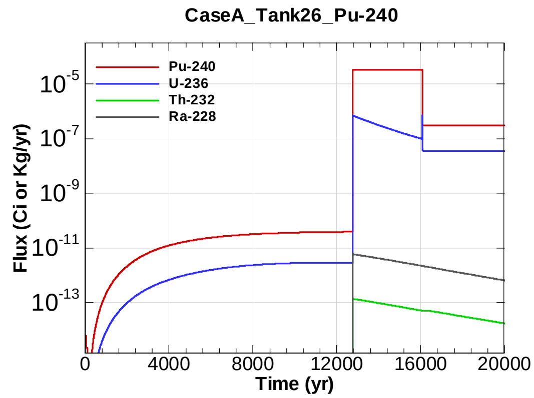

Figure A.1-1022 - Flux Leaving Liner for CaseA Tank26 Pu-240

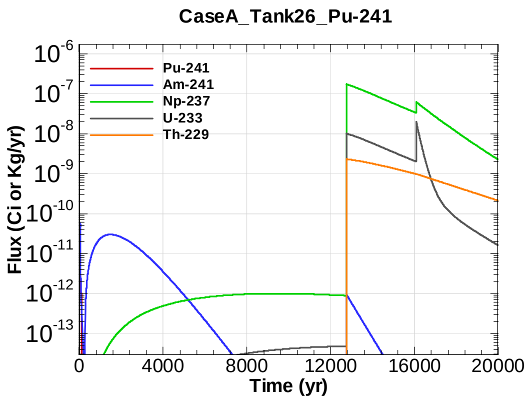

Figure A.1-1023 - Flux Leaving Liner for CaseA Tank26 Pu-241

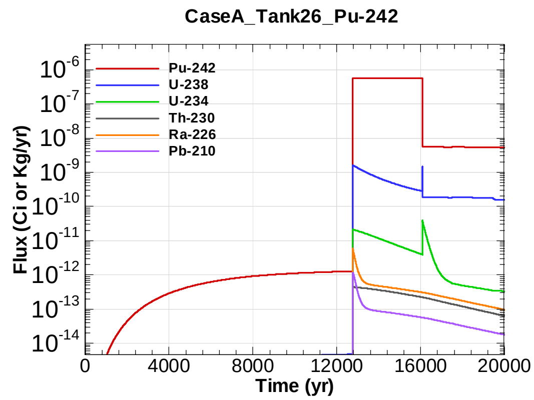

Figure A.1-1024 - Flux Leaving Liner for CaseA Tank26 Pu-242

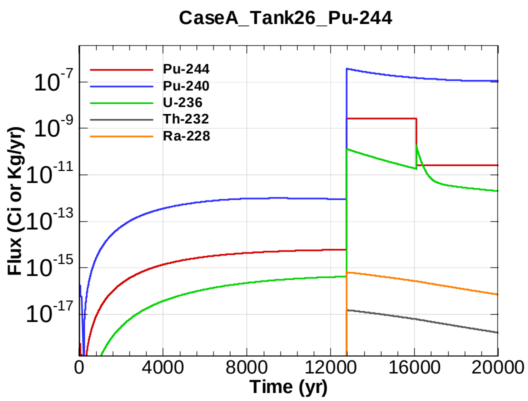

Figure A.1-1025 - Flux Leaving Liner for CaseA Tank26 Pu-244

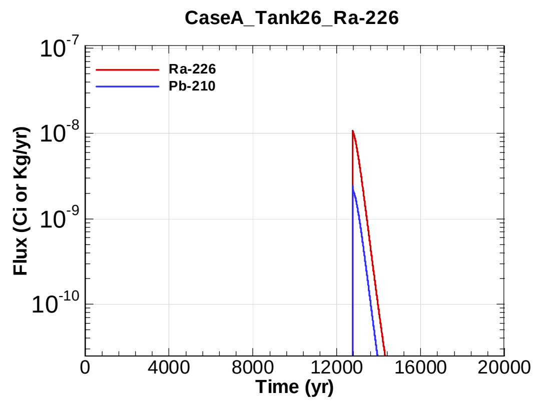

Figure A.1-1026 - Flux Leaving Liner for CaseA Tank26 Ra-226

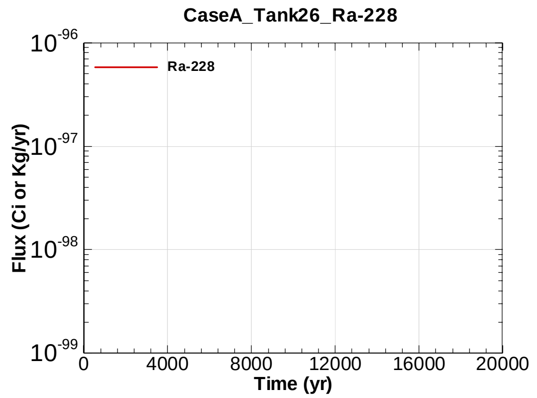

Figure A.1-1027 - Flux Leaving Liner for CaseA Tank26 Ra-228

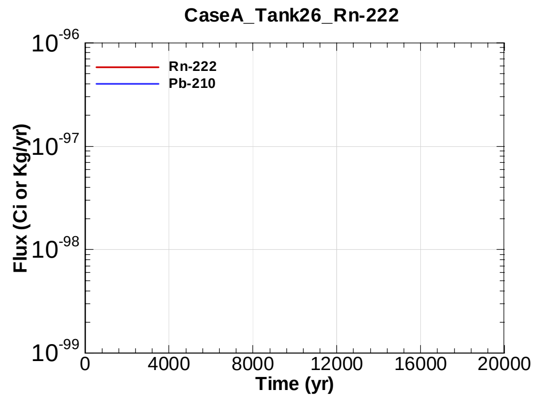

Figure A.1-1028 - Flux Leaving Liner for CaseA Tank26 Rn-222

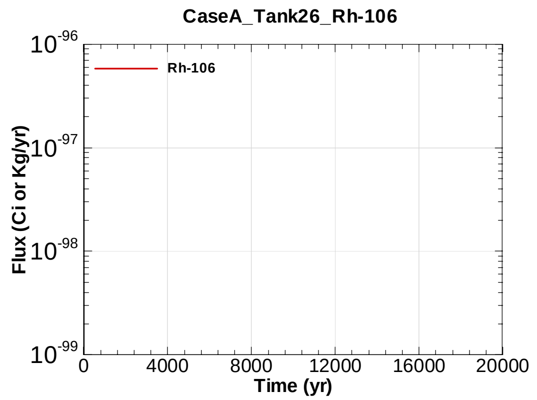

Figure A.1-1029 - Flux Leaving Liner for CaseA Tank26 Rh-106

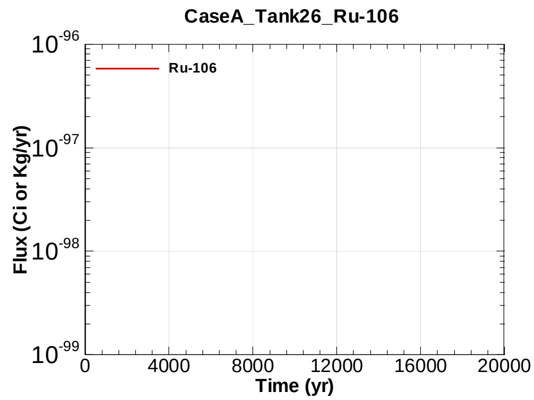

Figure A.1-1030 - Flux Leaving Liner for CaseA Tank26 Ru-106

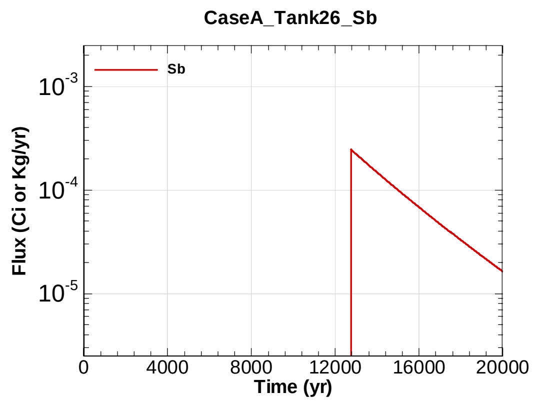

Figure A.1-1031 - Flux Leaving Liner for CaseA Tank26 Sb

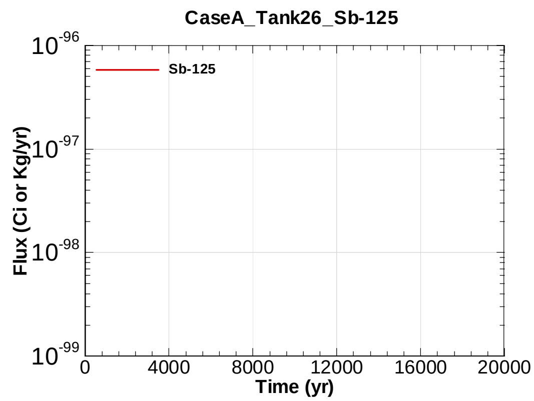

Figure A.1-1032 - Flux Leaving Liner for CaseA Tank26 Sb-125

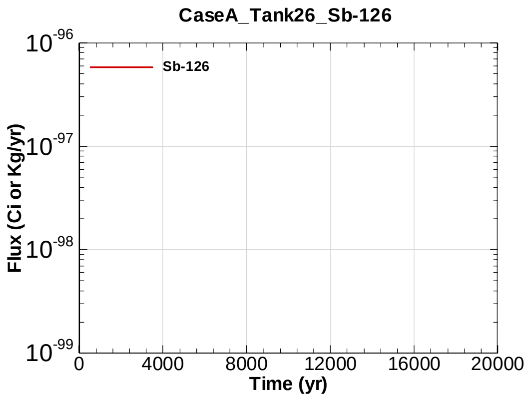

Figure A.1-1033 - Flux Leaving Liner for CaseA Tank26 Sb-126

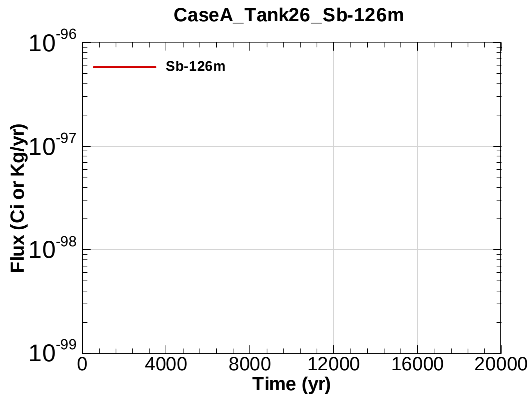

Figure A.1-1034 - Flux Leaving Liner for CaseA Tank26 Sb-126m

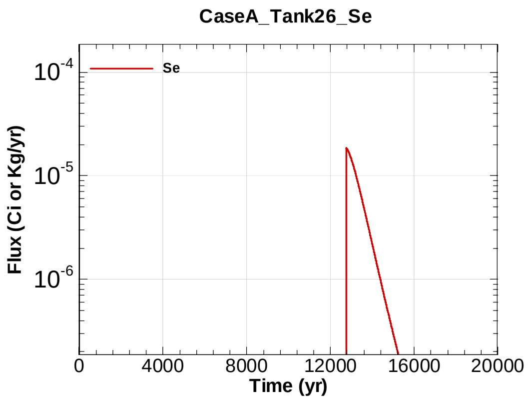

Figure A.1-1035 - Flux Leaving Liner for CaseA Tank26 Se

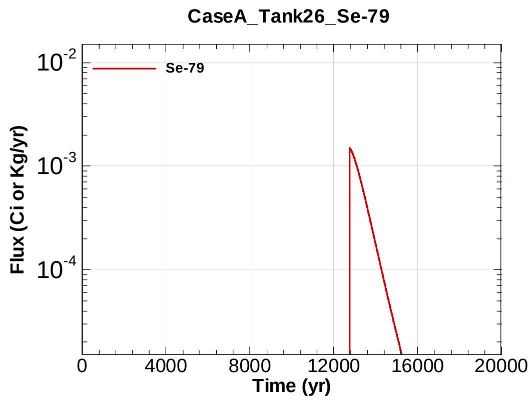

Figure A.1-1036 - Flux Leaving Liner for CaseA Tank26 Se-79

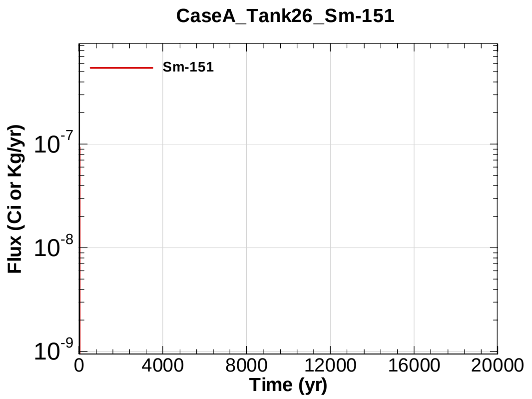

Figure A.1-1037 - Flux Leaving Liner for CaseA Tank26 Sm-151

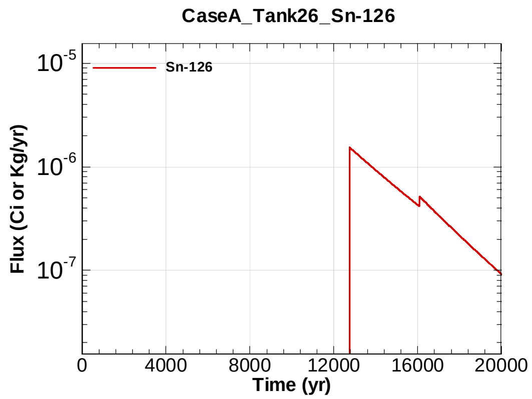

Figure A.1-1038 - Flux Leaving Liner for CaseA Tank26 Sn-126

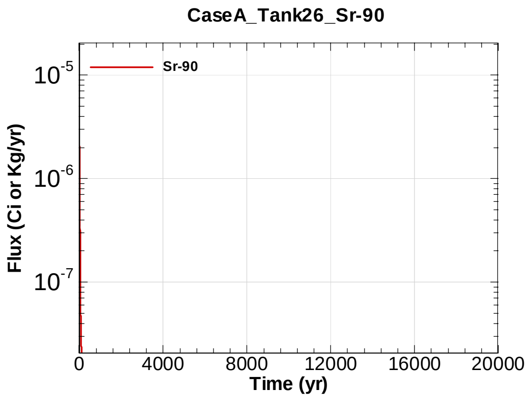

Figure A.1-1039 - Flux Leaving Liner for CaseA Tank26 Sr-90

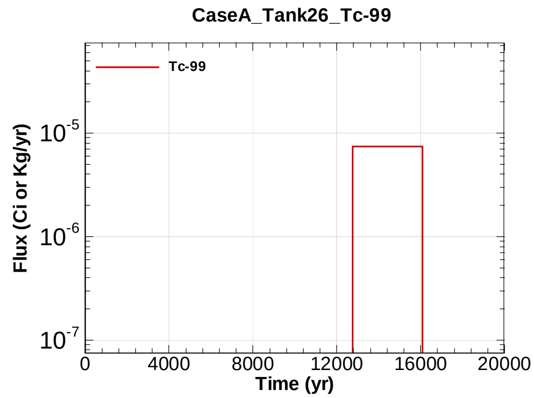

Figure A.1-1040 - Flux Leaving Liner for CaseA Tank26 Tc-99

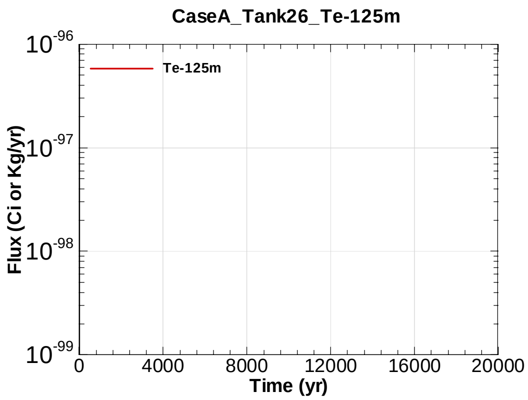

Figure A.1-1041 - Flux Leaving Liner for CaseA Tank26 Te-125m

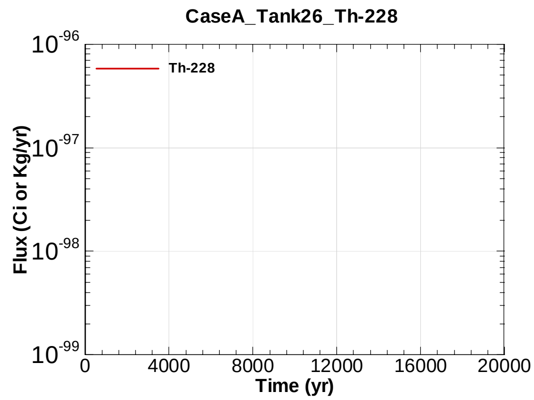

Figure A.1-1042 - Flux Leaving Liner for CaseA Tank26 Th-228

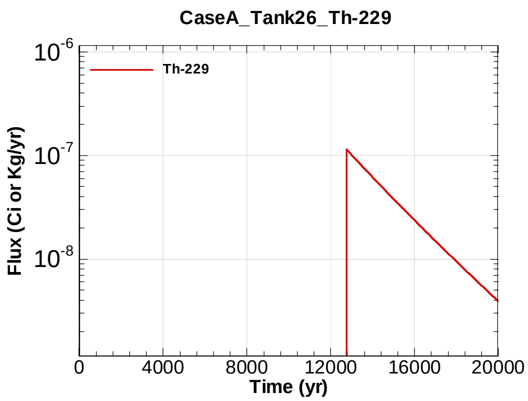

Figure A.1-1043 - Flux Leaving Liner for CaseA Tank26 Th-229

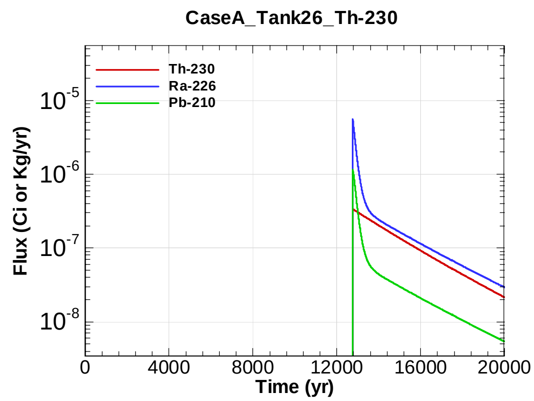

Figure A.1-1044 - Flux Leaving Liner for CaseA Tank26 Th-230

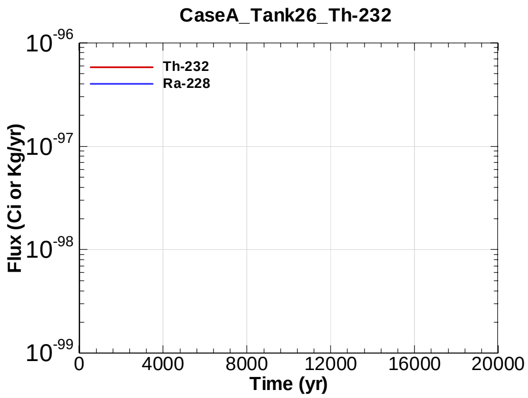

Figure A.1-1045 - Flux Leaving Liner for CaseA Tank26 Th-232

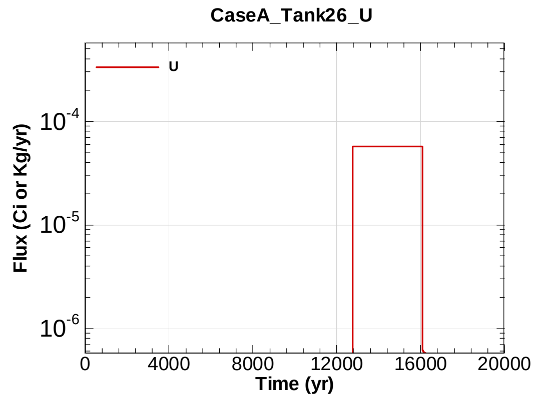

Figure A.1-1046 - Flux Leaving Liner for CaseA Tank26 U

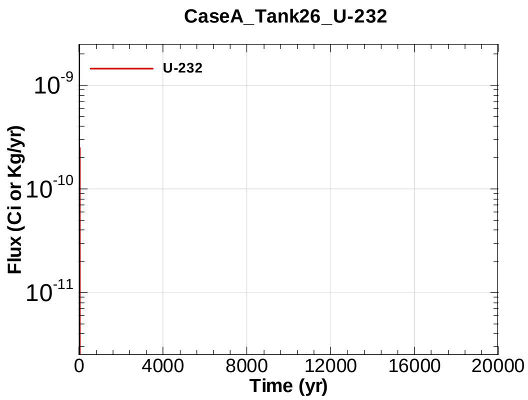

Figure A.1-1047 - Flux Leaving Liner for CaseA Tank26 U-232

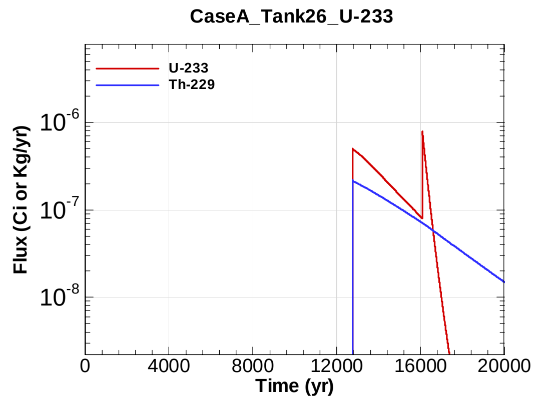

Figure A.1-1048 - Flux Leaving Liner for CaseA Tank26 U-233

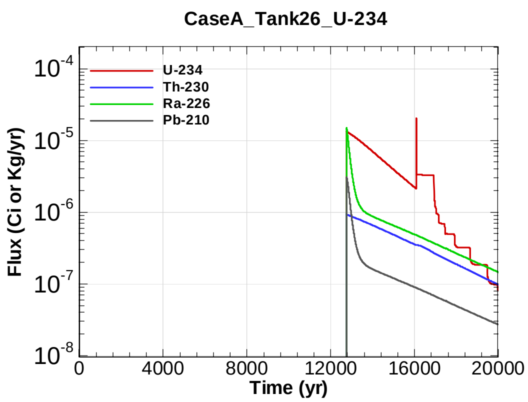

Figure A.1-1049 - Flux Leaving Liner for CaseA Tank26 U-234

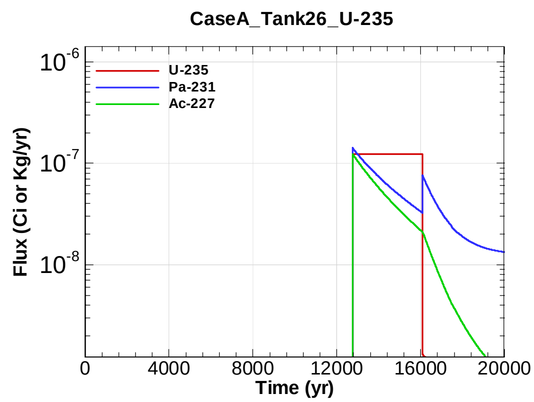

Figure A.1-1050 - Flux Leaving Liner for CaseA Tank26 U-235

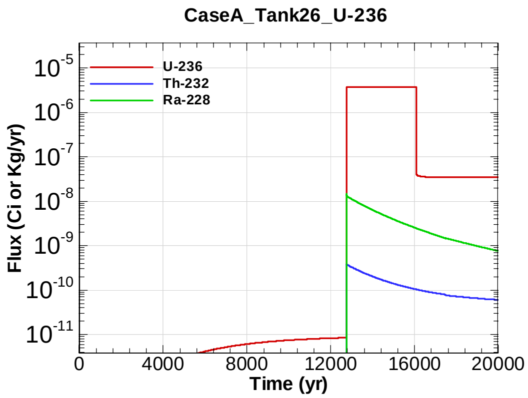

Figure A.1-1051 - Flux Leaving Liner for CaseA Tank26 U-236

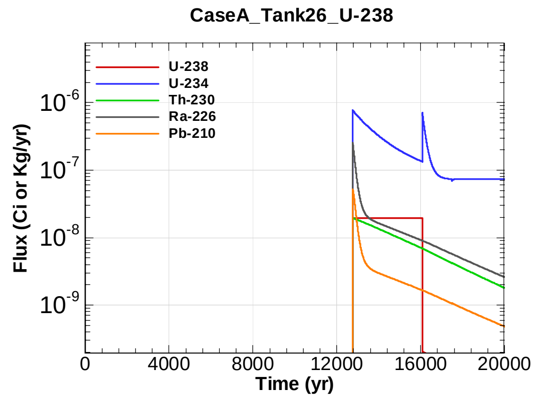

Figure A.1-1052 - Flux Leaving Liner for CaseA Tank26 U-238

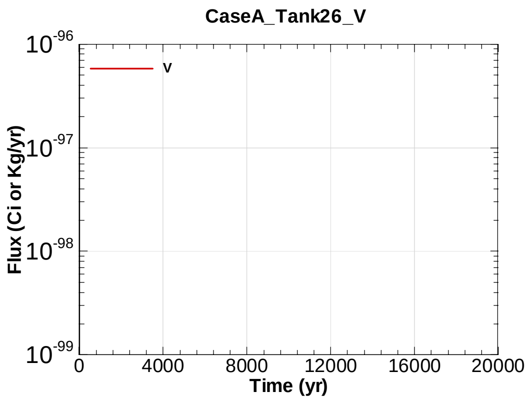

Figure A.1-1053 - Flux Leaving Liner for CaseA Tank26 V

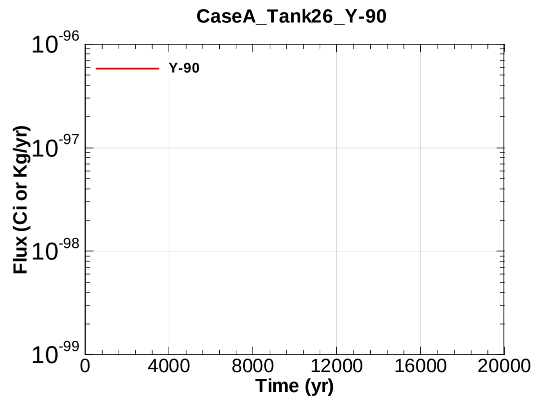

Figure A.1-1054 - Flux Leaving Liner for CaseA Tank26 Y-90

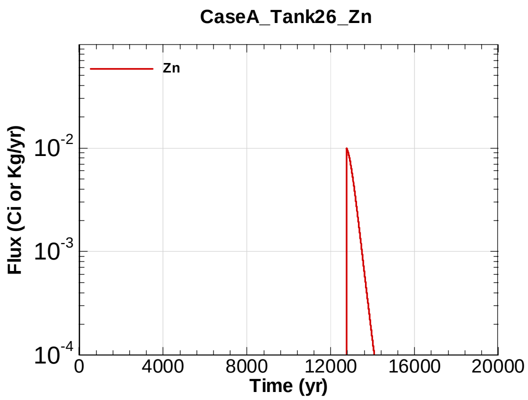

Figure A.1-1055 - Flux Leaving Liner for CaseA Tank26 Zn

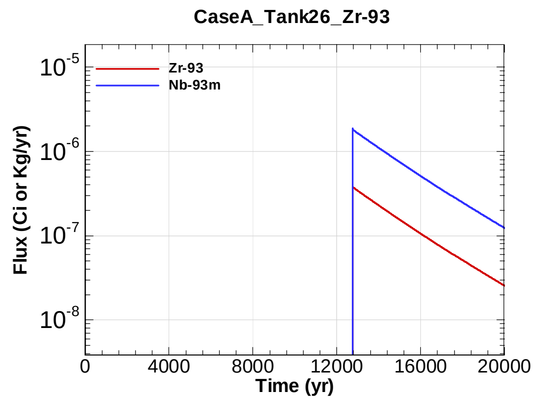

Figure A.1-1056 - Flux Leaving Liner for CaseA Tank26 Zr-93

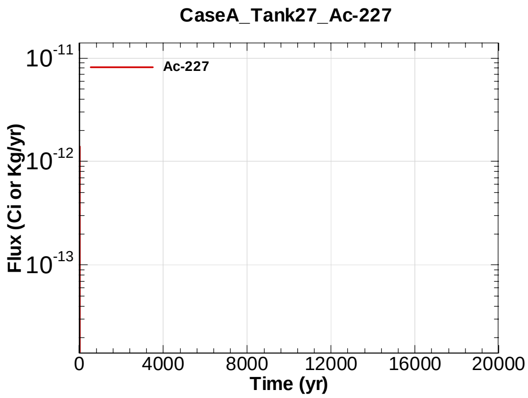

Figure A.1-1057 - Flux Leaving Liner for CaseA Tank27 Ac-227

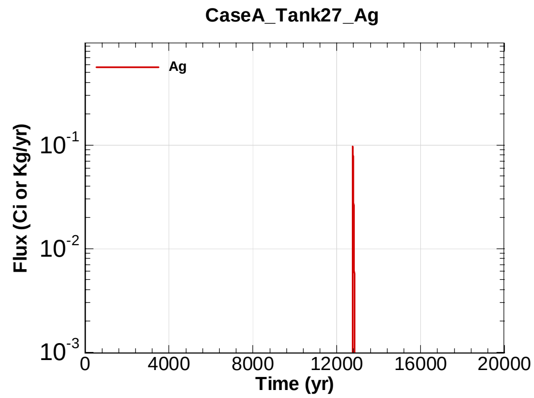

Figure A.1-1058 - Flux Leaving Liner for CaseA Tank27 Ag

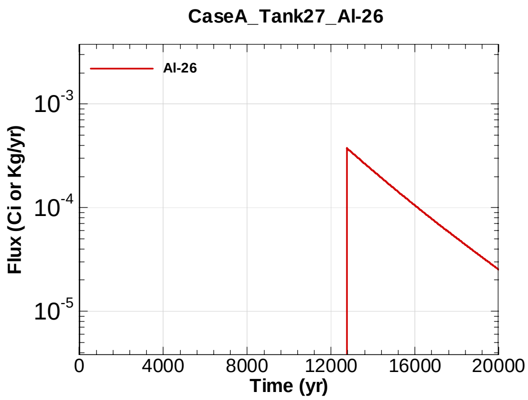

Figure A.1-1059 - Flux Leaving Liner for CaseA Tank27 Al-26

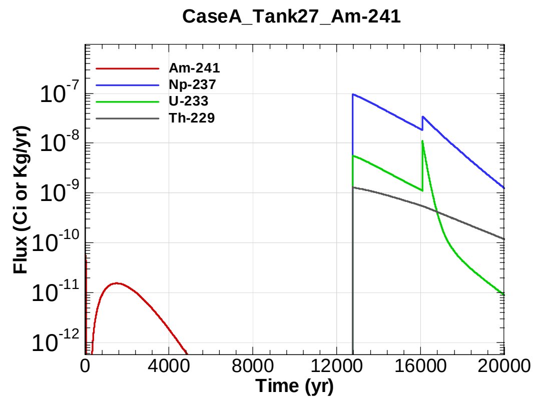

Figure A.1-1060 - Flux Leaving Liner for CaseA Tank27 Am-241

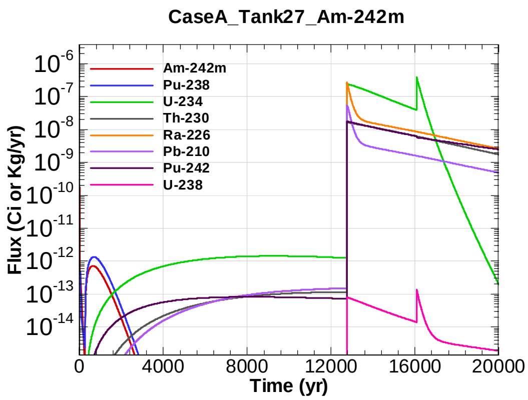

Figure A.1-1061 - Flux Leaving Liner for CaseA Tank27 Am-242m

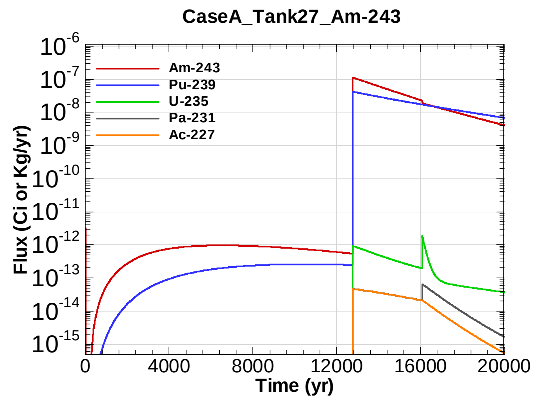

Figure A.1-1062 - Flux Leaving Liner for CaseA Tank27 Am-243

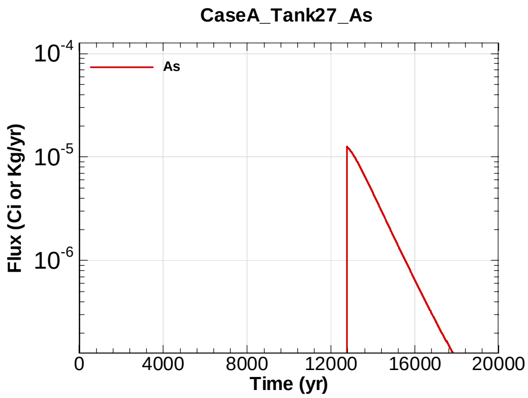

Figure A.1-1063 - Flux Leaving Liner for CaseA Tank27 As

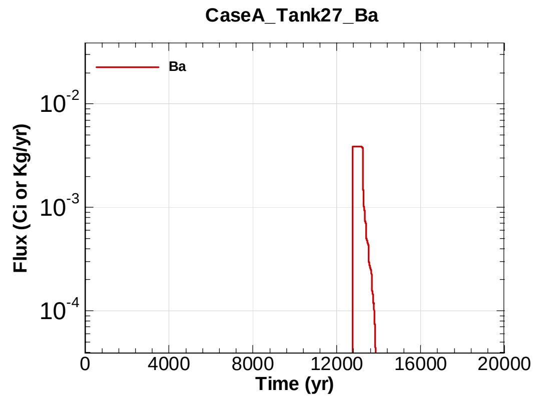

Figure A.1-1064 - Flux Leaving Liner for CaseA Tank27 Ba

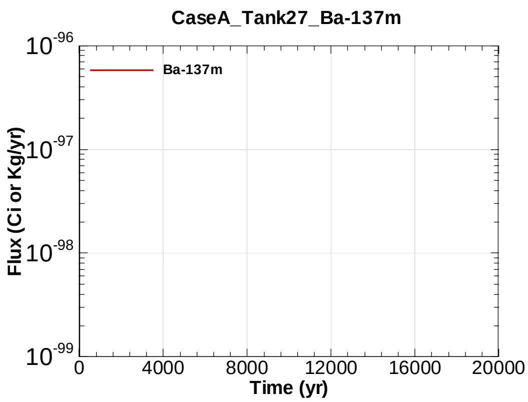

Figure A.1-1065 - Flux Leaving Liner for CaseA Tank27 Ba-137m

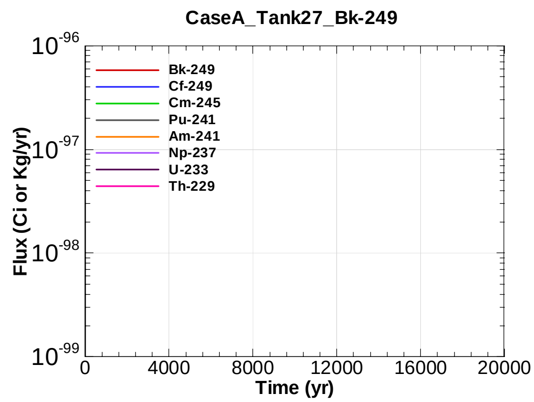

Figure A.1-1066 - Flux Leaving Liner for CaseA Tank27 Bk-249

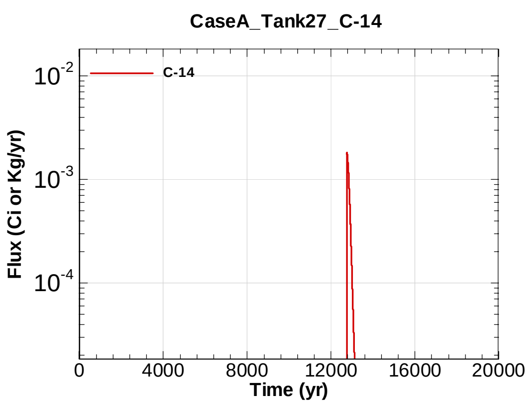

Figure A.1-1067 - Flux Leaving Liner for CaseA Tank27 C-14

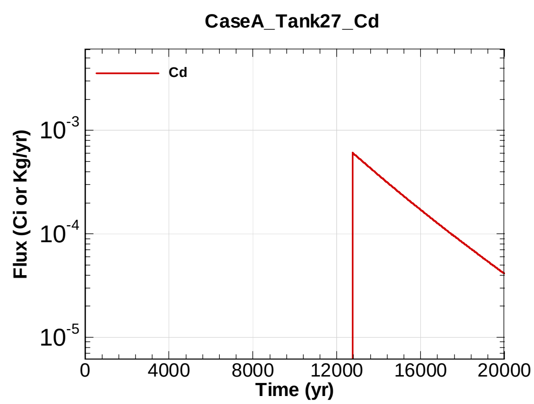

Figure A.1-1068 - Flux Leaving Liner for CaseA Tank27 Cd

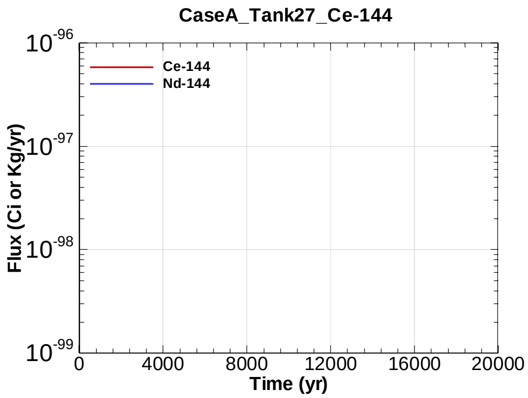

Figure A.1-1069 - Flux Leaving Liner for CaseA Tank27 Ce-144

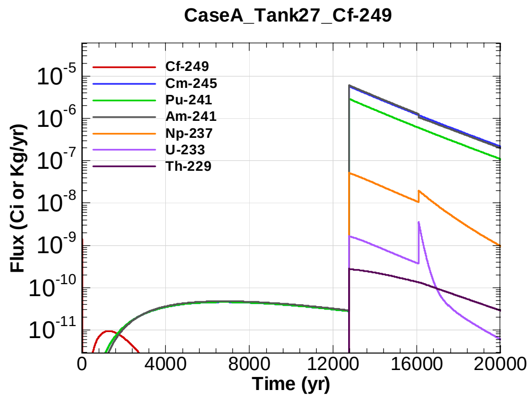

Figure A.1-1070 - Flux Leaving Liner for CaseA Tank27 Cf-249

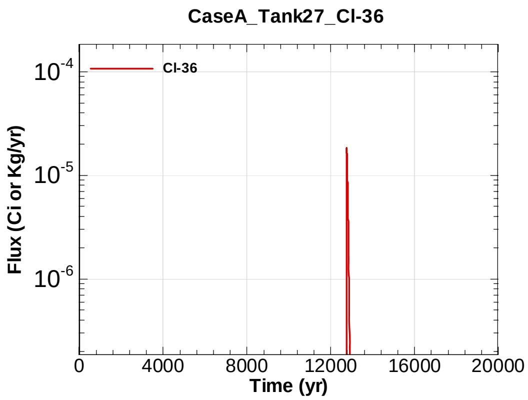

Figure A.1-1071 - Flux Leaving Liner for CaseA Tank27 Cl-36

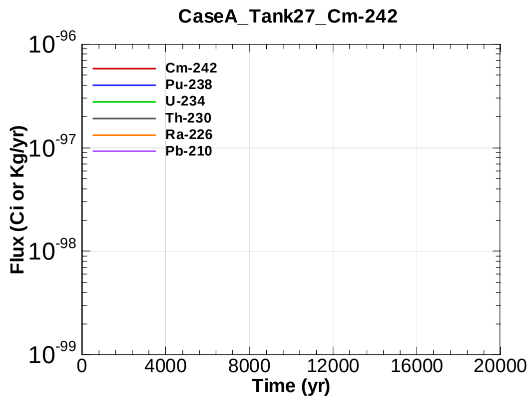

Figure A.1-1072 - Flux Leaving Liner for CaseA Tank27 Cm-242

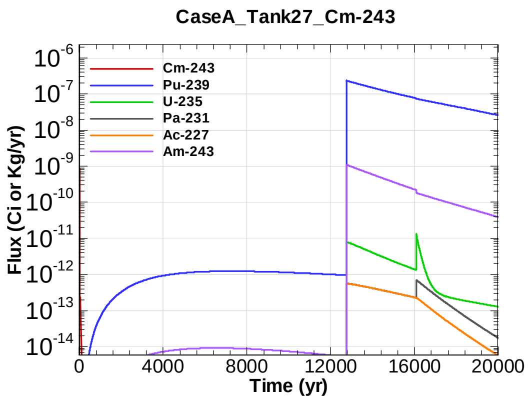

Figure A.1-1073 - Flux Leaving Liner for CaseA Tank27 Cm-243

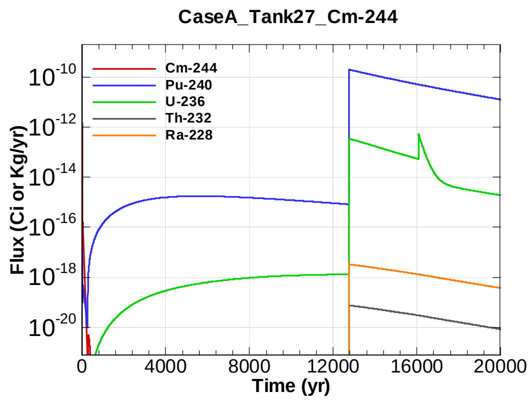

Figure A.1-1074 - Flux Leaving Liner for CaseA Tank27 Cm-244

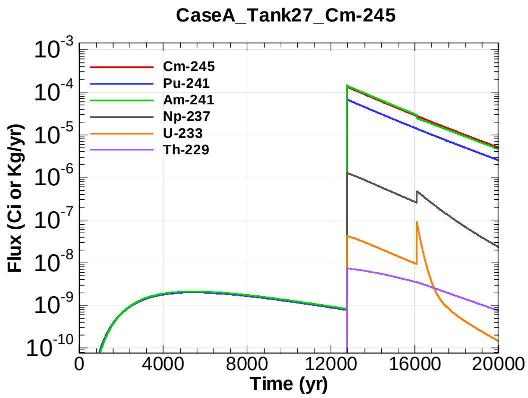

Figure A.1-1075 - Flux Leaving Liner for CaseA Tank27 Cm-245

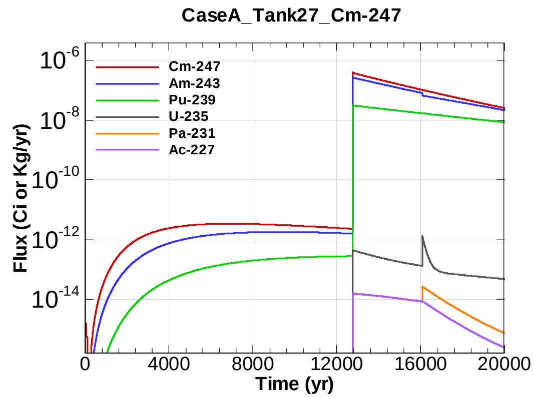

Figure A.1-1076 - Flux Leaving Liner for CaseA Tank27 Cm-247

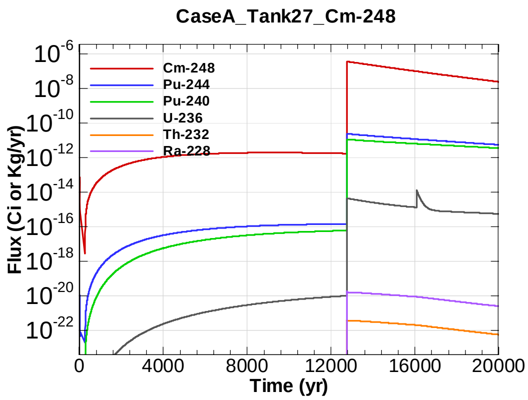

Figure A.1-1077 - Flux Leaving Liner for CaseA Tank27 Cm-248

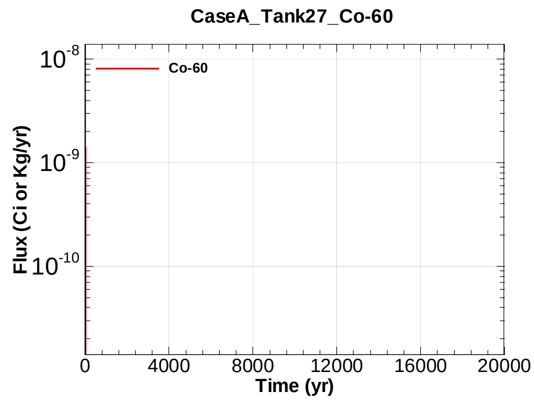

Figure A.1-1078 - Flux Leaving Liner for CaseA Tank27 Co-60

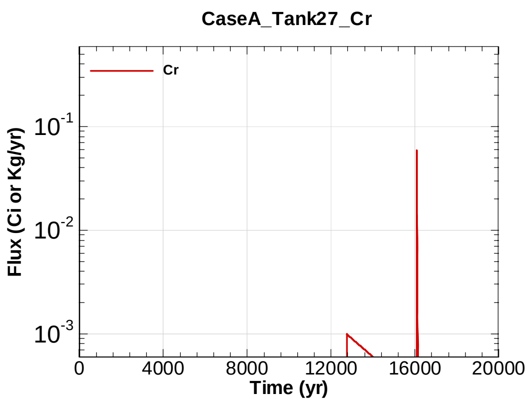

Figure A.1-1079 - Flux Leaving Liner for CaseA Tank27 Cr

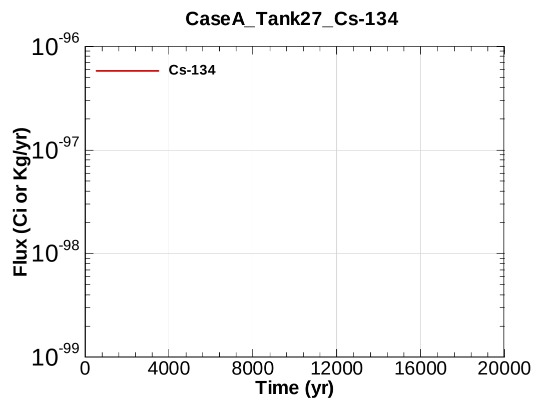

Figure A.1-1080 - Flux Leaving Liner for CaseA Tank27 Cs-134

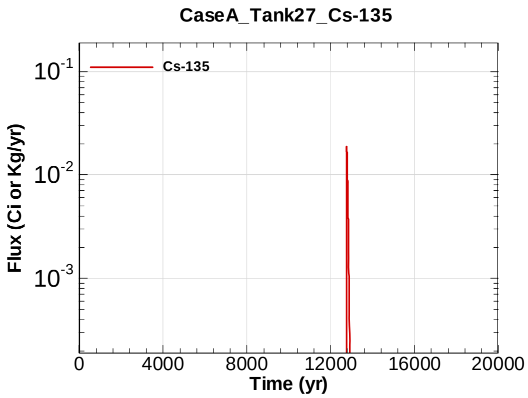

Figure A.1-1081 - Flux Leaving Liner for CaseA Tank27 Cs-135

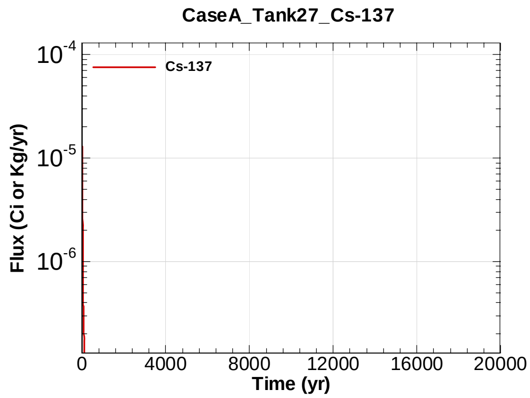

Figure A.1-1082 - Flux Leaving Liner for CaseA Tank27 Cs-137

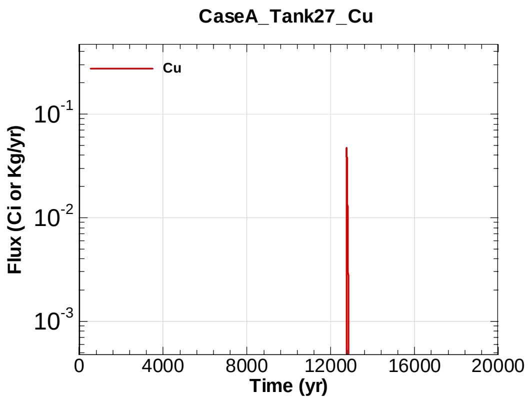

Figure A.1-1083 - Flux Leaving Liner for CaseA Tank27 Cu

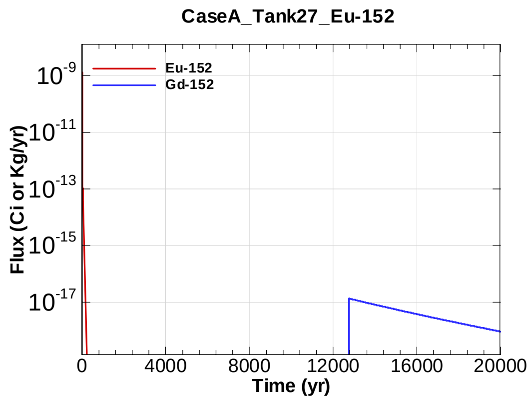

Figure A.1-1084 - Flux Leaving Liner for CaseA Tank27 Eu-152

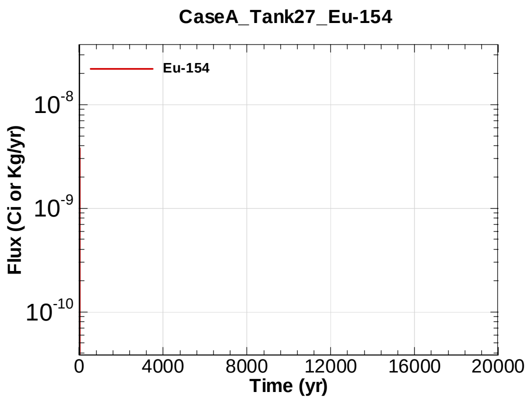

Figure A.1-1085 - Flux Leaving Liner for CaseA Tank27 Eu-154

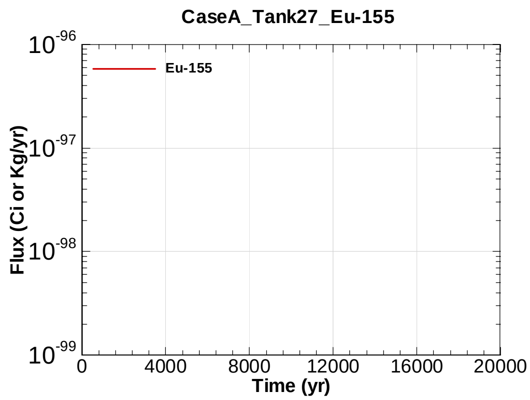

Figure A.1-1086 - Flux Leaving Liner for CaseA Tank27 Eu-155

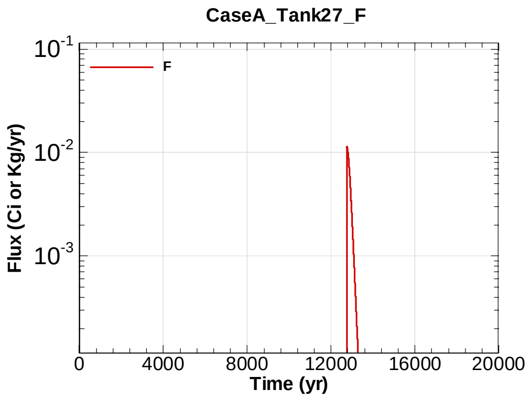

Figure A.1-1087 - Flux Leaving Liner for CaseA Tank27 F

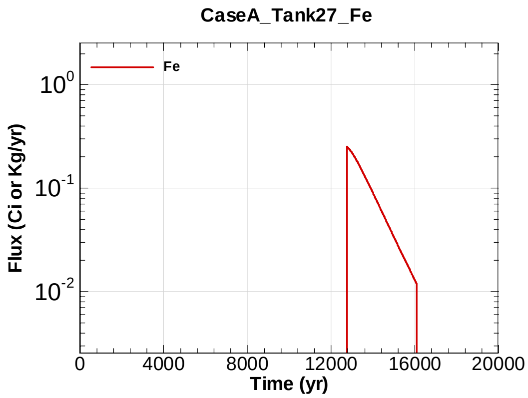

Figure A.1-1088 - Flux Leaving Liner for CaseA Tank27 Fe

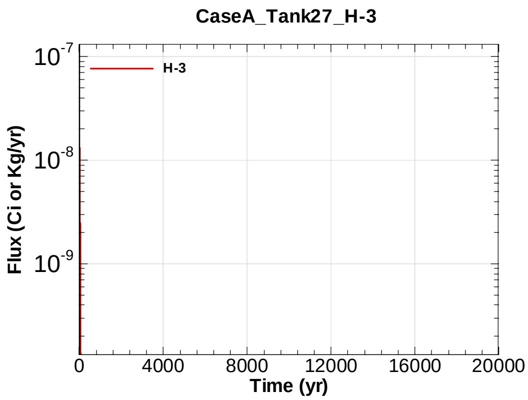

Figure A.1-1089 - Flux Leaving Liner for CaseA Tank27 H-3

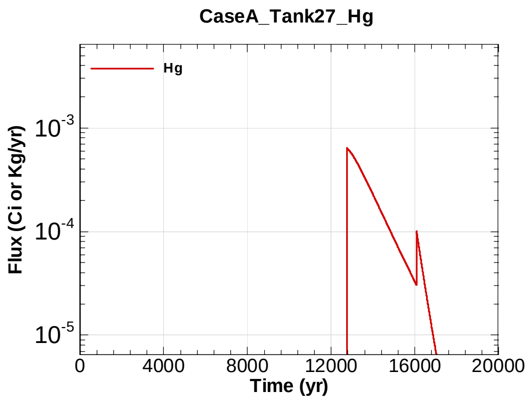

Figure A.1-1090 - Flux Leaving Liner for CaseA Tank27 Hg

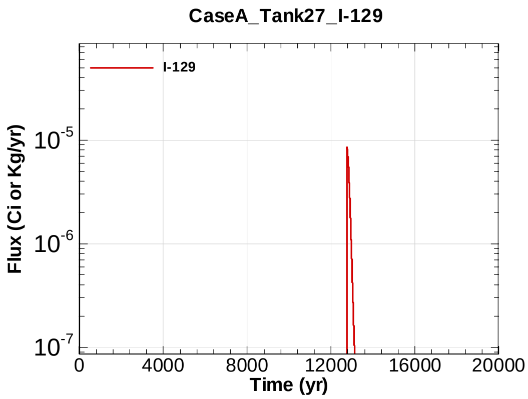

Figure A.1-1091 - Flux Leaving Liner for CaseA Tank27 I-129

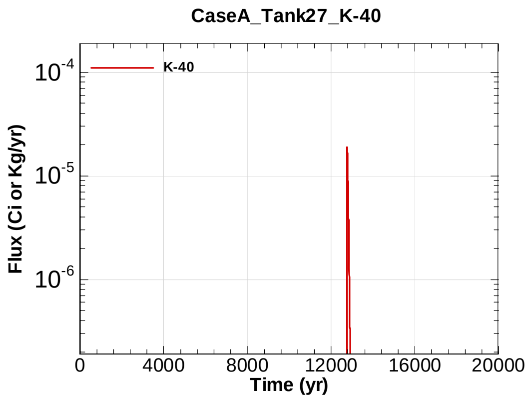

Figure A.1-1092 - Flux Leaving Liner for CaseA Tank27 K-40

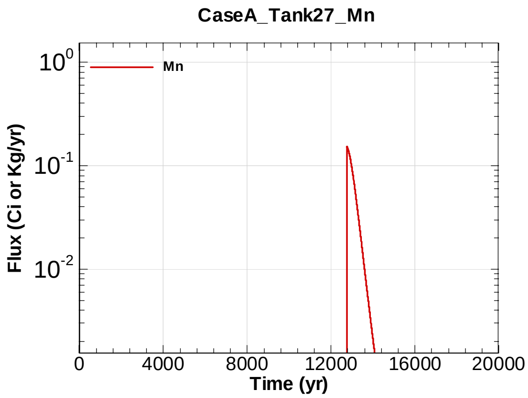

Figure A.1-1093 - Flux Leaving Liner for CaseA Tank27 Mn

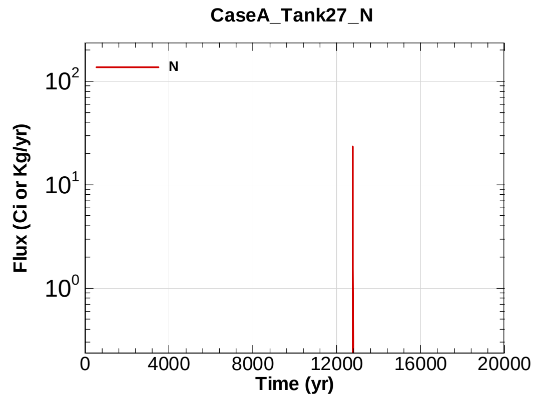

Figure A.1-1094 - Flux Leaving Liner for CaseA Tank27 N

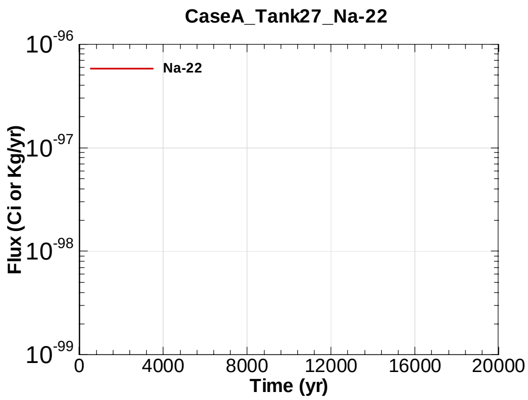

Figure A.1-1095 - Flux Leaving Liner for CaseA Tank27 Na-22

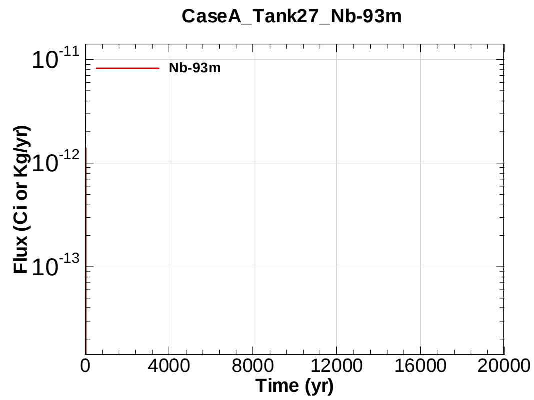

Figure A.1-1096 - Flux Leaving Liner for CaseA Tank27 Nb-93m

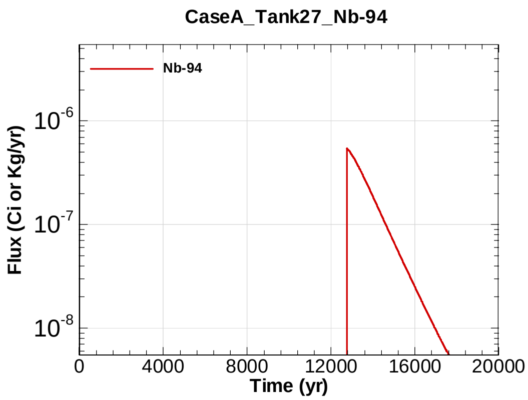

Figure A.1-1097 - Flux Leaving Liner for CaseA Tank27 Nb-94

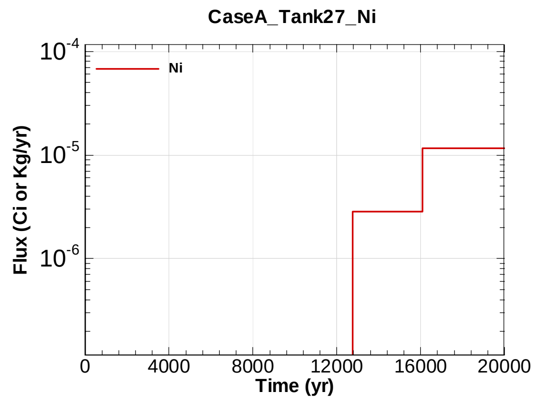

Figure A.1-1098 - Flux Leaving Liner for CaseA Tank27 Ni

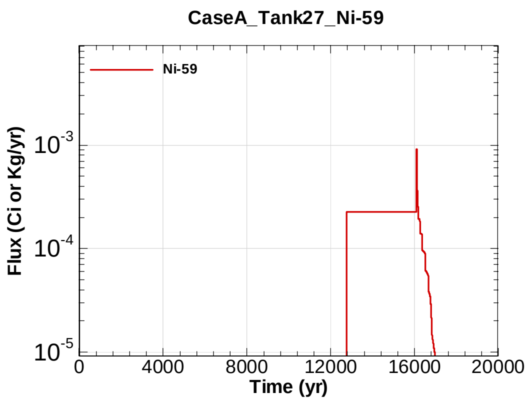

Figure A.1-1099 - Flux Leaving Liner for CaseA Tank27 Ni-59

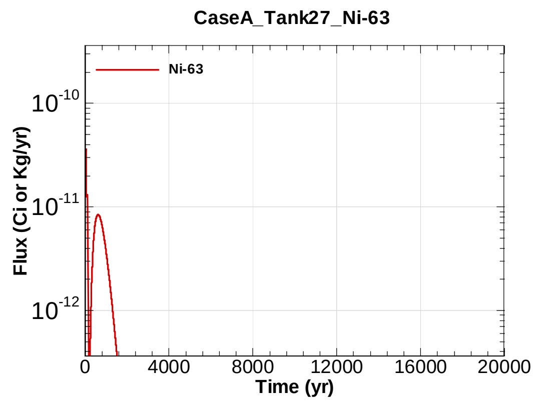

Figure A.1-1100 - Flux Leaving Liner for CaseA Tank27 Ni-63

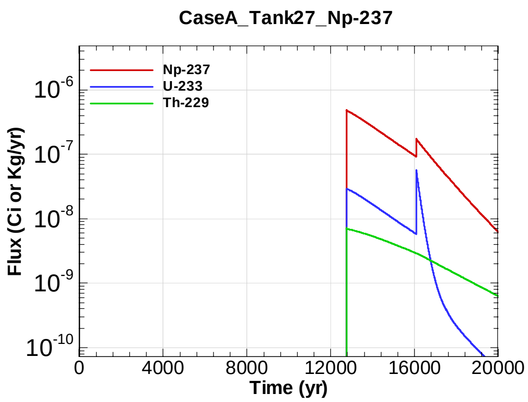

Figure A.1-1101 - Flux Leaving Liner for CaseA Tank27 Np-237

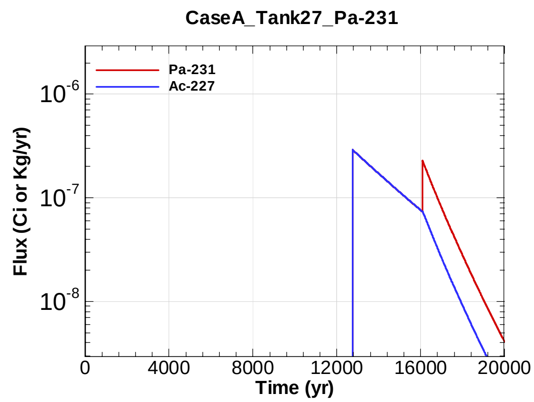

Figure A.1-1102 - Flux Leaving Liner for CaseA Tank27 Pa-231

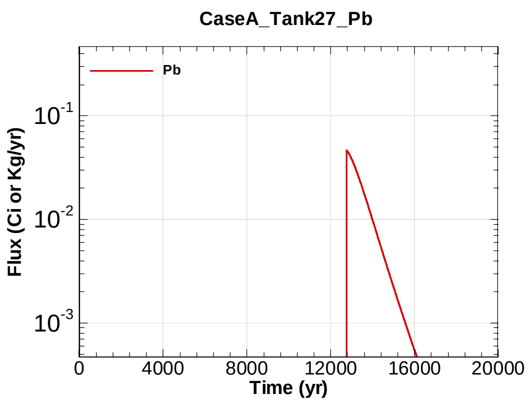

Figure A.1-1103 - Flux Leaving Liner for CaseA Tank27 Pb

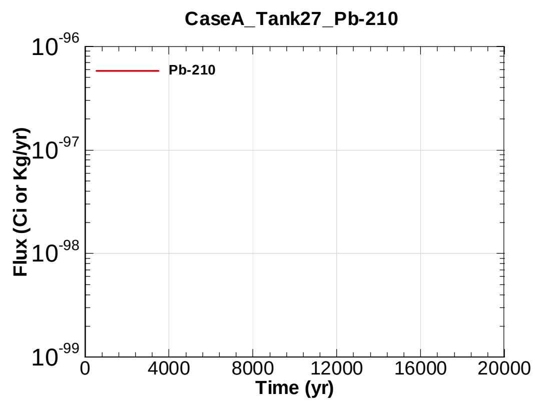

Figure A.1-1104 - Flux Leaving Liner for CaseA Tank27 Pb-210

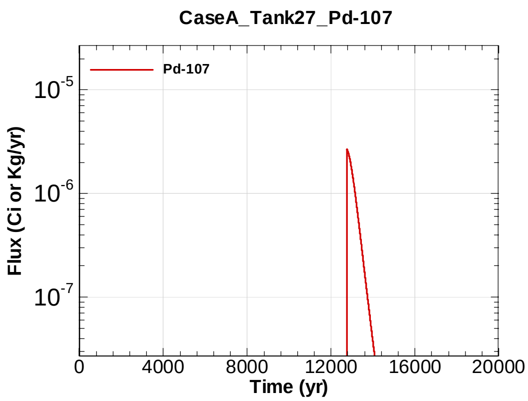

Figure A.1-1105 - Flux Leaving Liner for CaseA Tank27 Pd-107

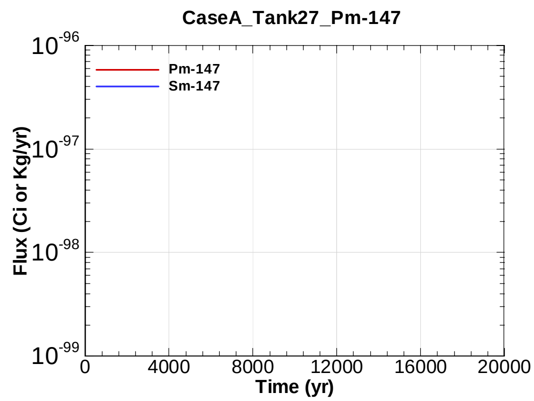

Figure A.1-1106 - Flux Leaving Liner for CaseA Tank27 Pm-147

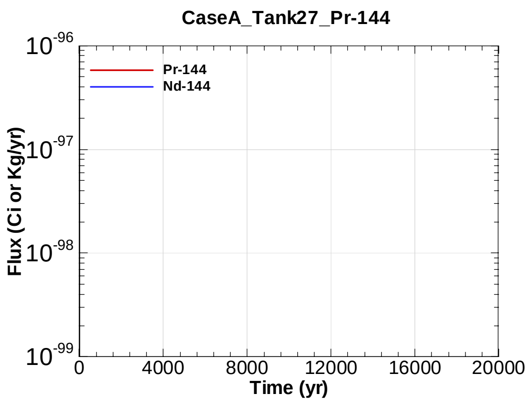

Figure A.1-1107 - Flux Leaving Liner for CaseA Tank27 Pr-144

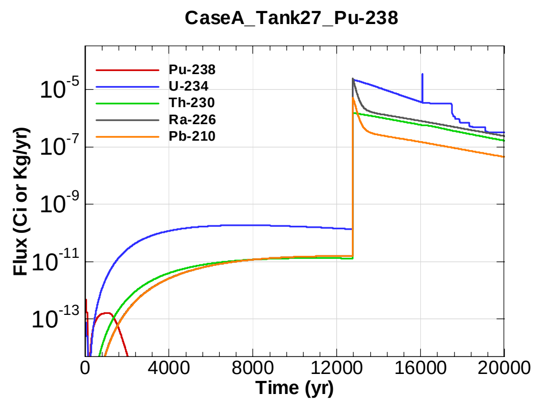

Figure A.1-1108 - Flux Leaving Liner for CaseA Tank27 Pu-238

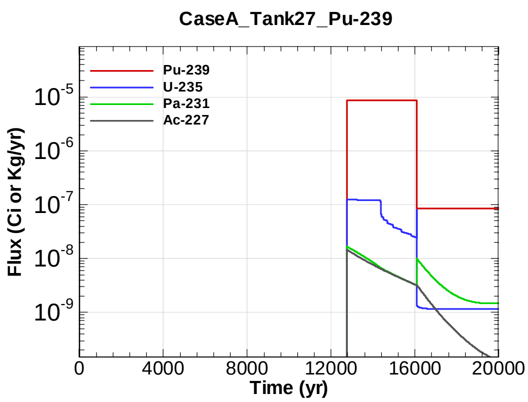

Figure A.1-1109 - Flux Leaving Liner for CaseA Tank27 Pu-239

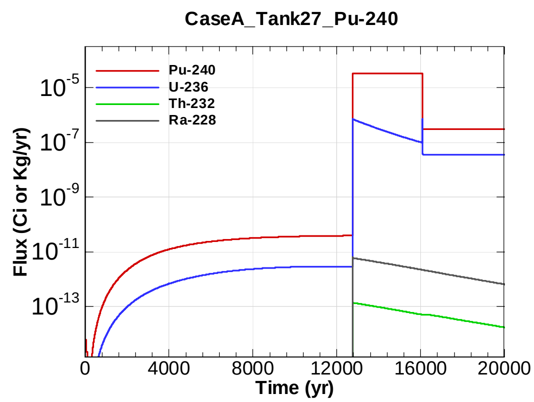

Figure A.1-1110 - Flux Leaving Liner for CaseA Tank27 Pu-240

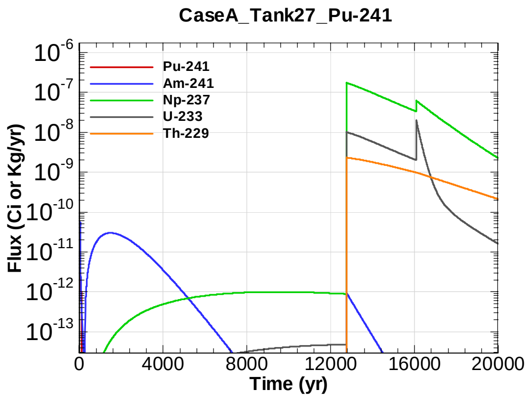

Figure A.1-1111 - Flux Leaving Liner for CaseA Tank27 Pu-241

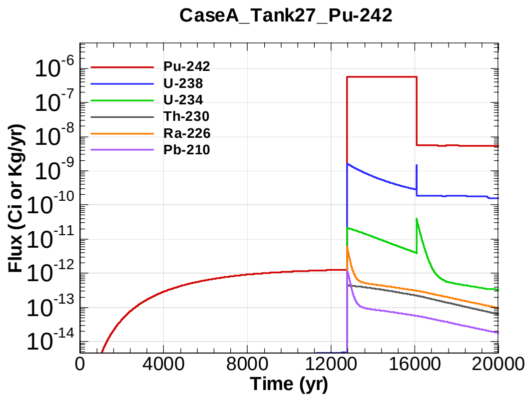

Figure A.1-1112 - Flux Leaving Liner for CaseA Tank27 Pu-242

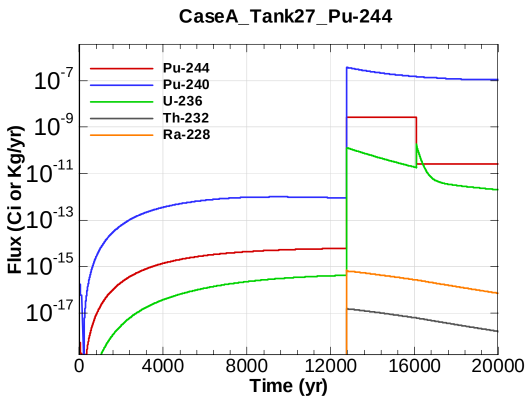

Figure A.1-1113 - Flux Leaving Liner for CaseA Tank27 Pu-244

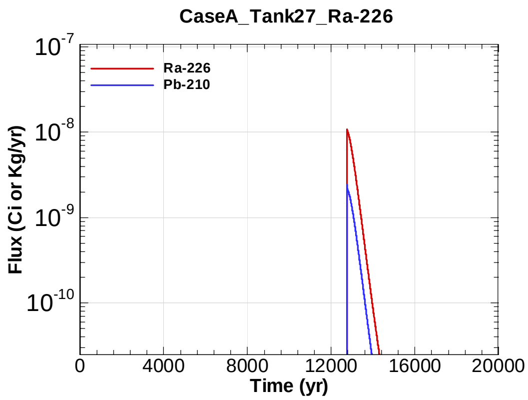

Figure A.1-1114 - Flux Leaving Liner for CaseA Tank27 Ra-226

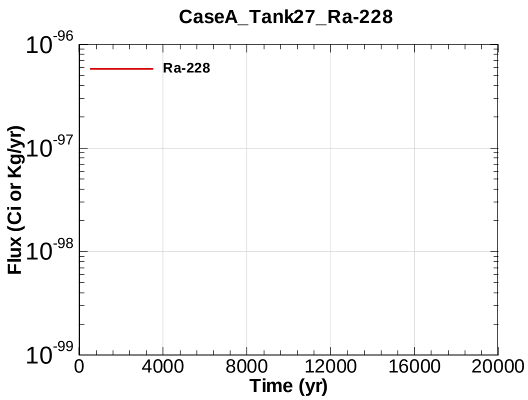

Figure A.1-1115 - Flux Leaving Liner for CaseA Tank27 Ra-228

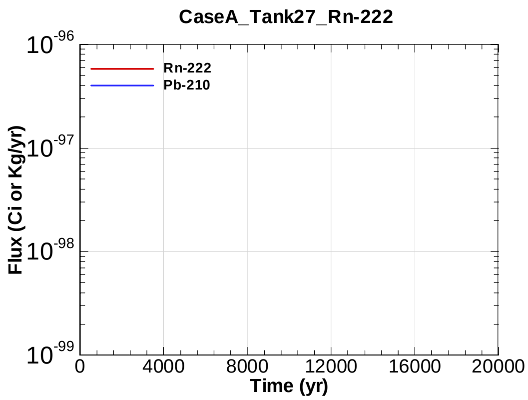

Figure A.1-1116 - Flux Leaving Liner for CaseA Tank27 Rn-222

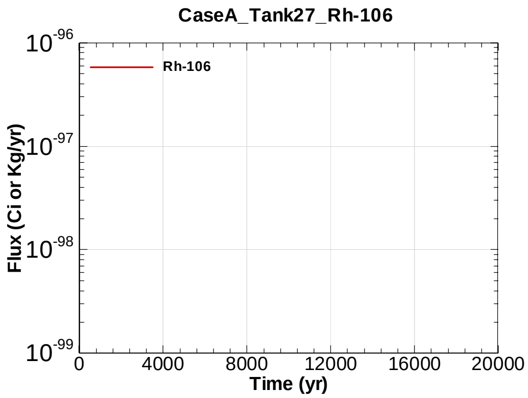

Figure A.1-1117 - Flux Leaving Liner for CaseA Tank27 Rh-106

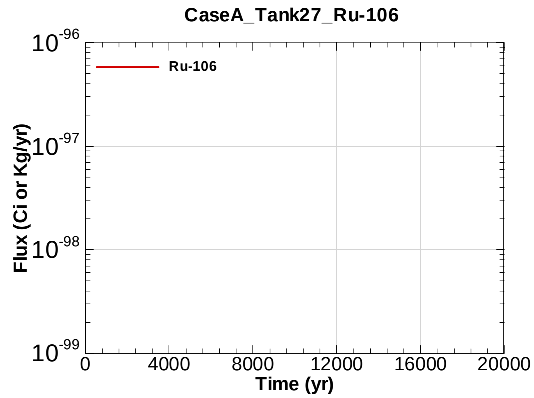

Figure A.1-1118 - Flux Leaving Liner for CaseA Tank27 Ru-106

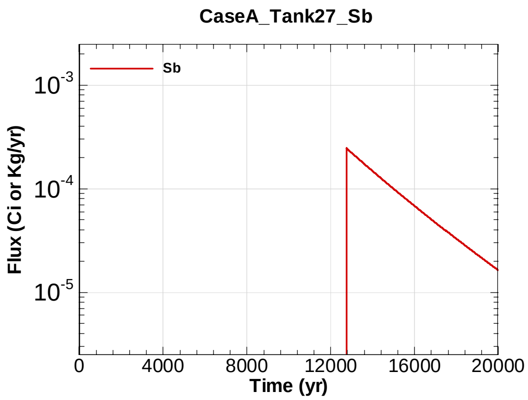

Figure A.1-1119 - Flux Leaving Liner for CaseA Tank27 Sb

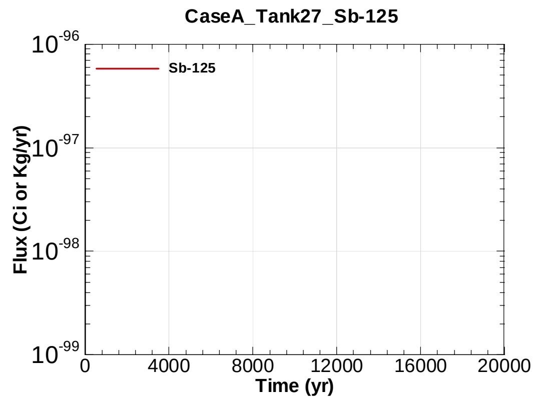

Figure A.1-1120 - Flux Leaving Liner for CaseA Tank27 Sb-125

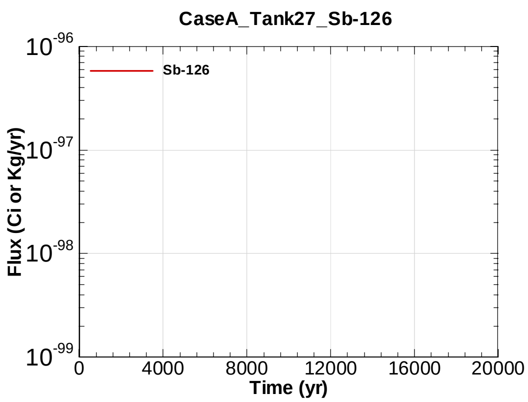

Figure A.1-1121 - Flux Leaving Liner for CaseA Tank27 Sb-126

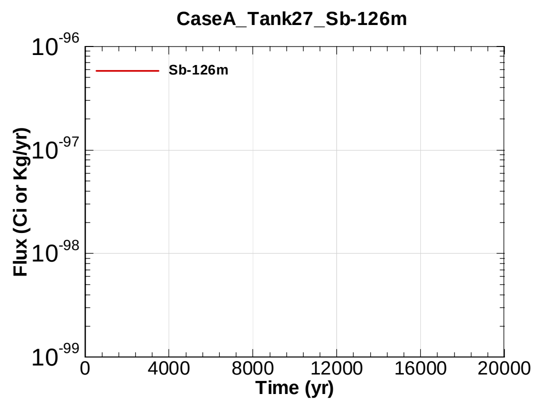

Figure A.1-1122 - Flux Leaving Liner for CaseA Tank27 Sb-126m

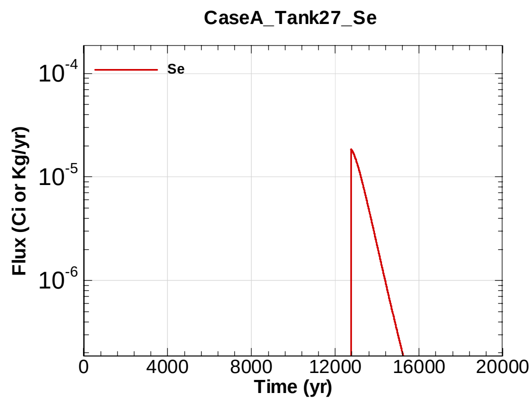

Figure A.1-1123 - Flux Leaving Liner for CaseA Tank27 Se

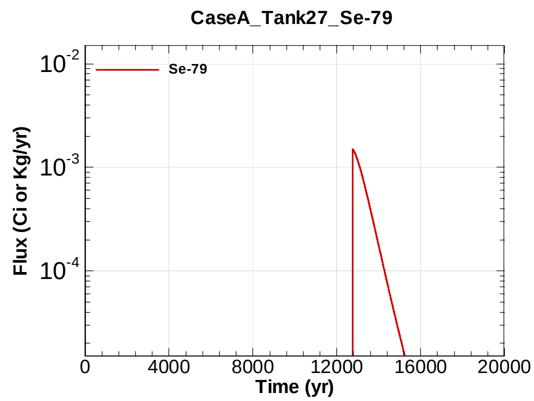

Figure A.1-1124 - Flux Leaving Liner for CaseA Tank27 Se-79

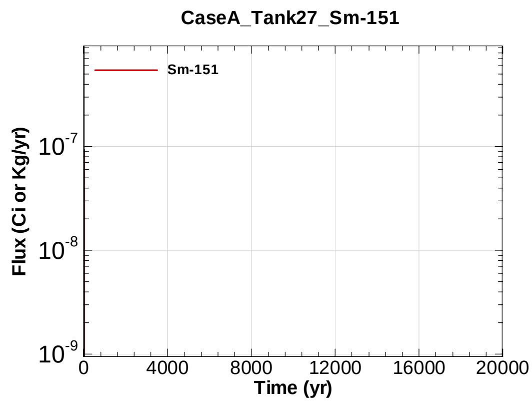

Figure A.1-1125 - Flux Leaving Liner for CaseA Tank27 Sm-151

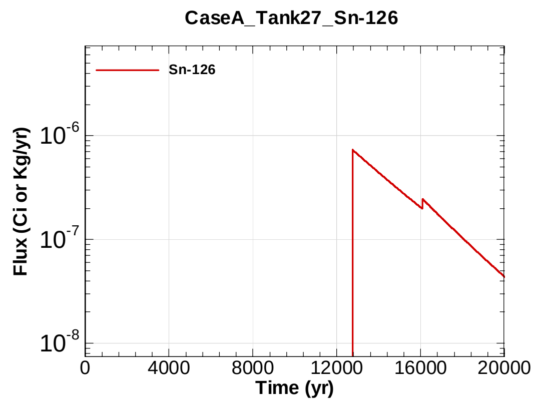

Figure A.1-1126 - Flux Leaving Liner for CaseA Tank27 Sn-126

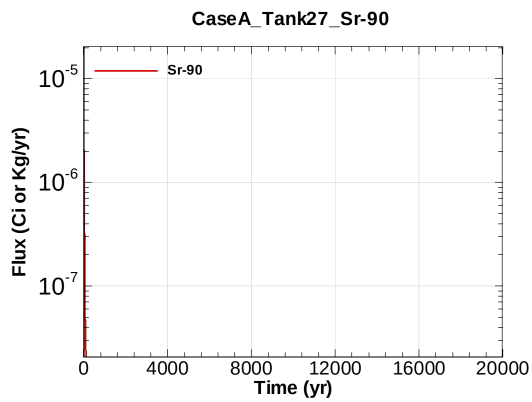

Figure A.1-1127 - Flux Leaving Liner for CaseA Tank27 Sr-90

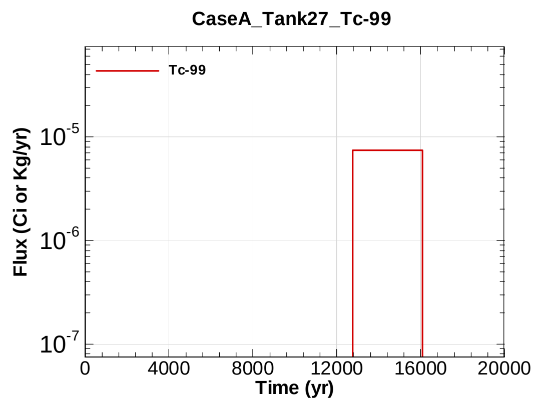

Figure A.1-1128 - Flux Leaving Liner for CaseA Tank27 Tc-99

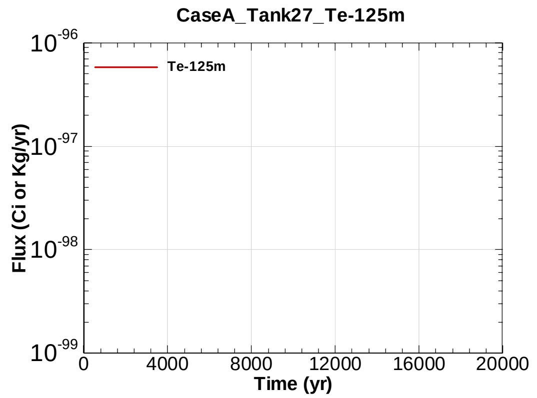

Figure A.1-1129 - Flux Leaving Liner for CaseA Tank27 Te-125m

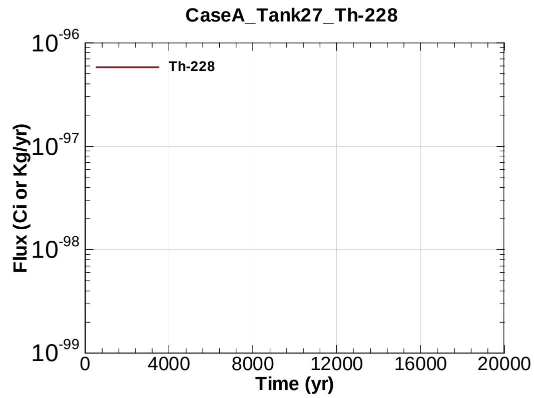

Figure A.1-1130 - Flux Leaving Liner for CaseA Tank27 Th-228

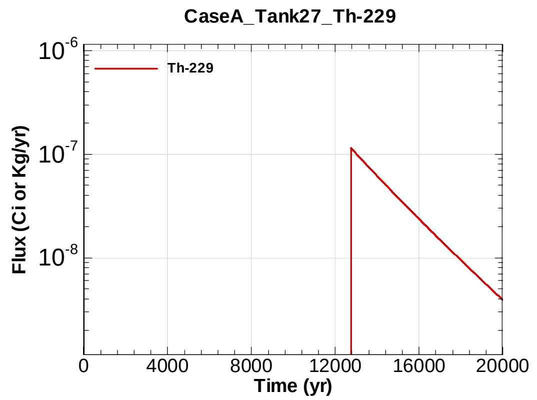

Figure A.1-1131 - Flux Leaving Liner for CaseA Tank27 Th-229

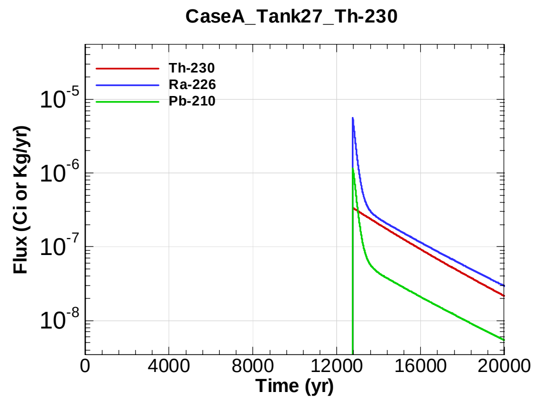

Figure A.1-1132 - Flux Leaving Liner for CaseA Tank27 Th-230

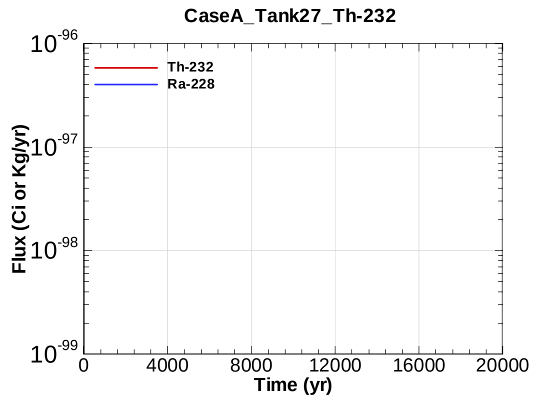

Figure A.1-1133 - Flux Leaving Liner for CaseA Tank27 Th-232

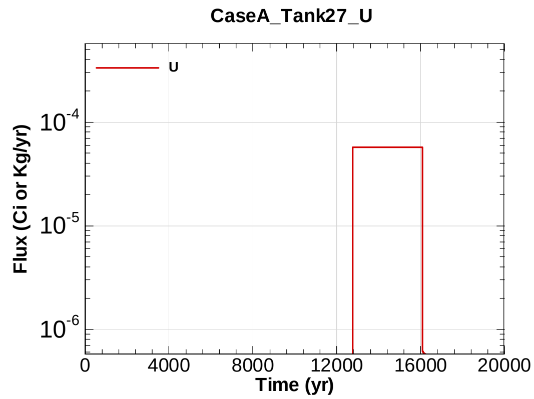

Figure A.1-1134 - Flux Leaving Liner for CaseA Tank27 U

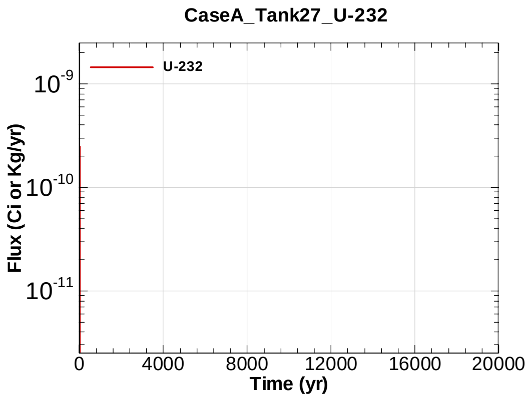

Figure A.1-1135 - Flux Leaving Liner for CaseA Tank27 U-232

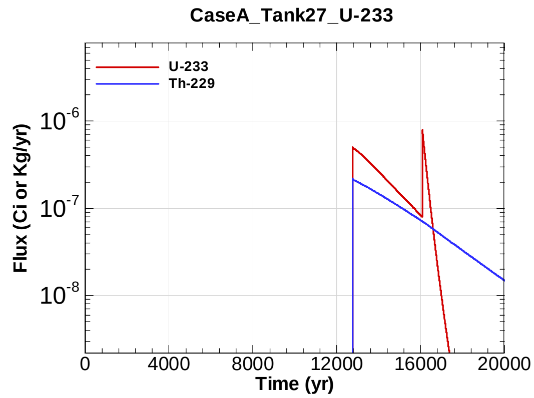

Figure A.1-1136 - Flux Leaving Liner for CaseA Tank27 U-233

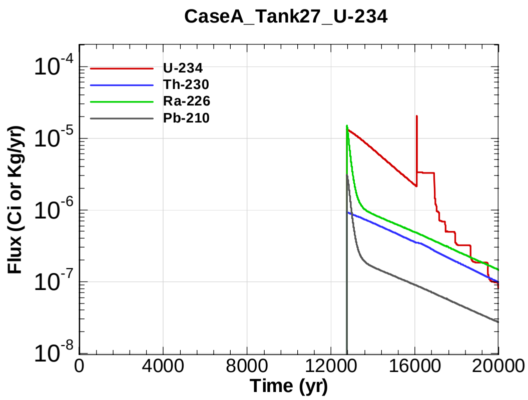

Figure A.1-1137 - Flux Leaving Liner for CaseA Tank27 U-234

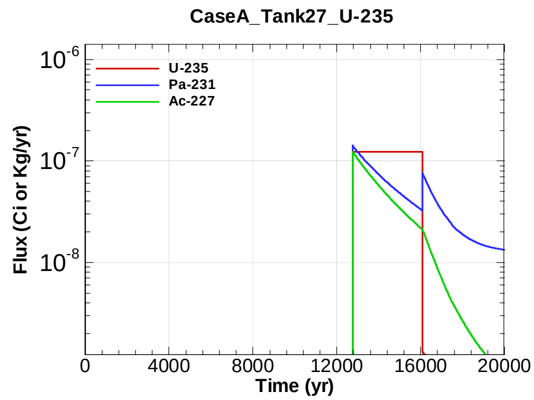

Figure A.1-1138 - Flux Leaving Liner for CaseA Tank27 U-235

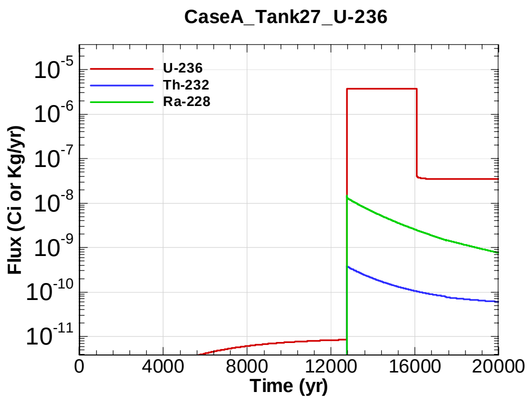

Figure A.1-1139 - Flux Leaving Liner for CaseA Tank27 U-236

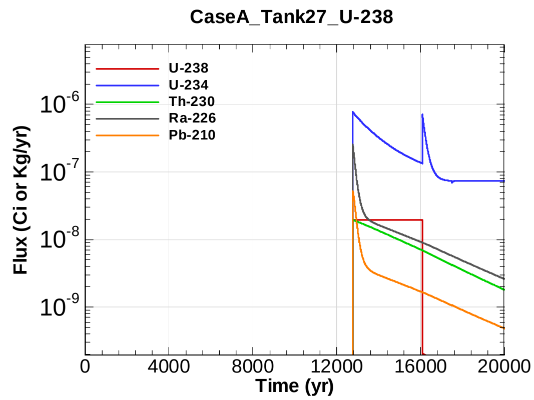

Figure A.1-1140 - Flux Leaving Liner for CaseA Tank27 U-238

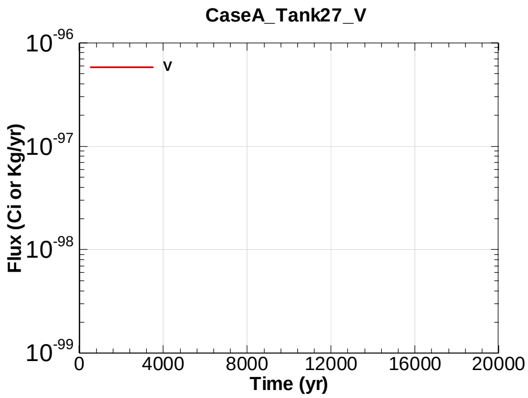

Figure A.1-1141 - Flux Leaving Liner for CaseA Tank27 V

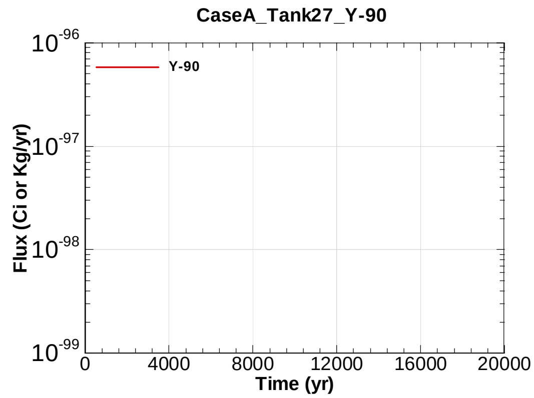

Figure A.1-1142 - Flux Leaving Liner for CaseA Tank27 Y-90

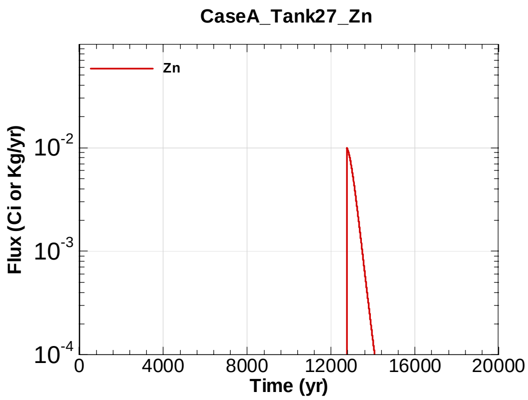

Figure A.1-1143 - Flux Leaving Liner for CaseA Tank27 Zn

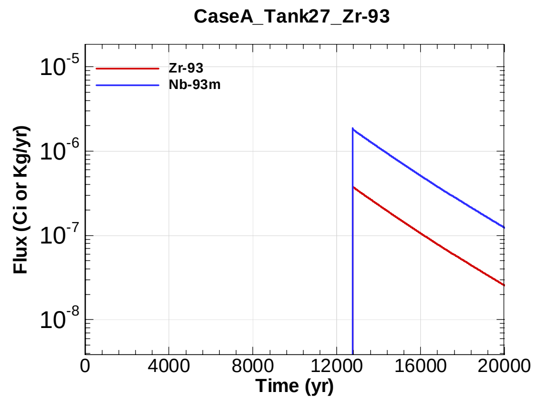

Figure A.1-1144 - Flux Leaving Liner for CaseA Tank27 Zr-93

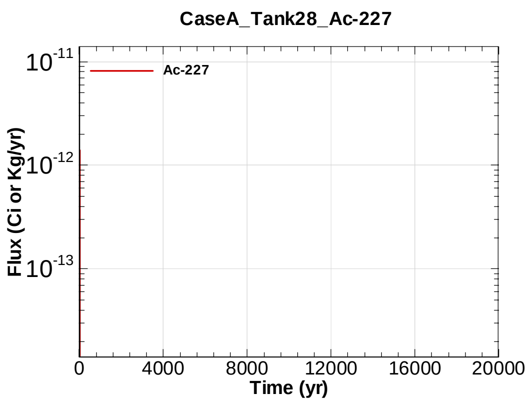

Figure A.1-1145 - Flux Leaving Liner for CaseA Tank28 Ac-227

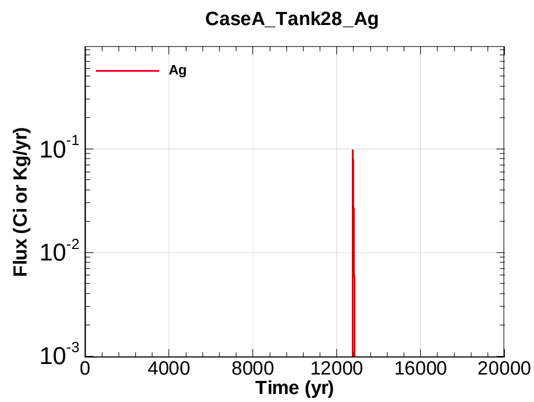

Figure A.1-1146 - Flux Leaving Liner for CaseA Tank28 Ag

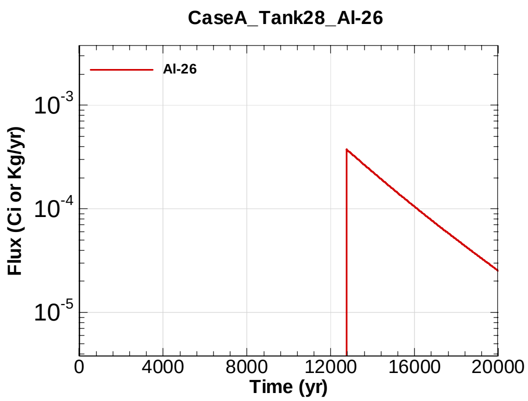

Figure A.1-1147 - Flux Leaving Liner for CaseA Tank28 Al-26

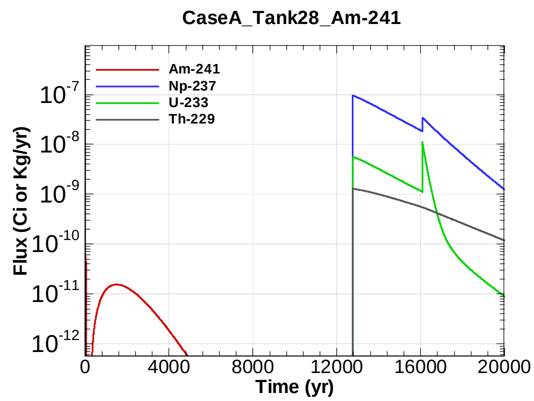

Figure A.1-1148 - Flux Leaving Liner for CaseA Tank28 Am-241

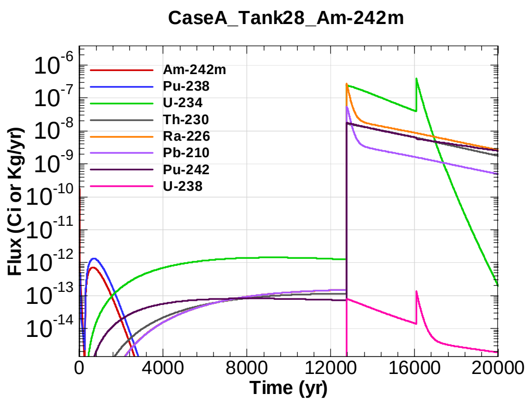

Figure A.1-1149 - Flux Leaving Liner for CaseA Tank28 Am-242m

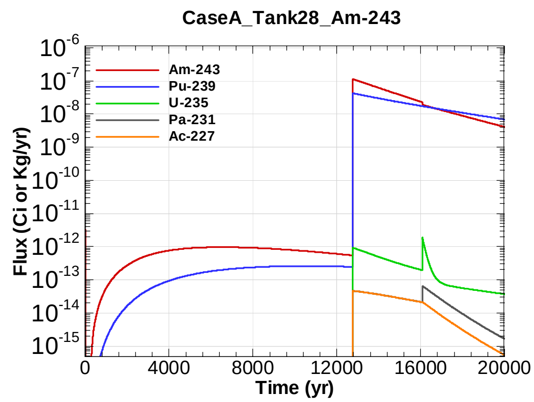

Figure A.1-1150 - Flux Leaving Liner for CaseA Tank28 Am-243

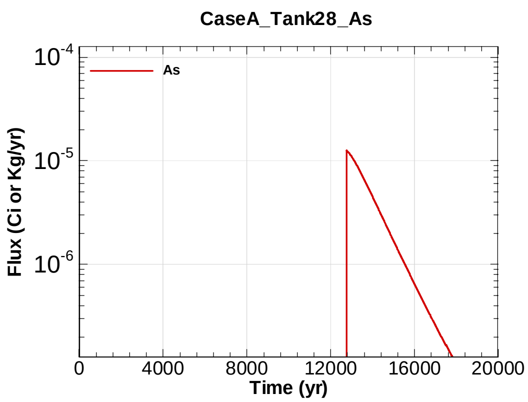

Figure A.1-1151 - Flux Leaving Liner for CaseA Tank28 As

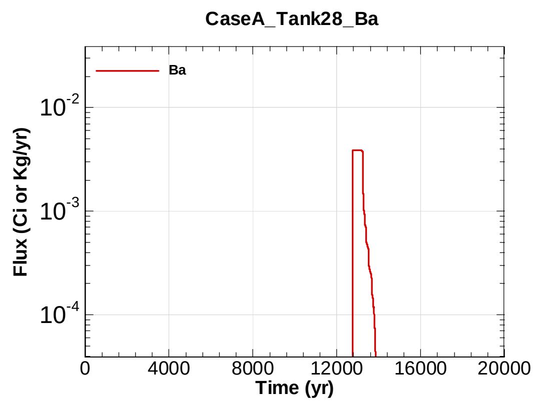

Figure A.1-1152 - Flux Leaving Liner for CaseA Tank28 Ba

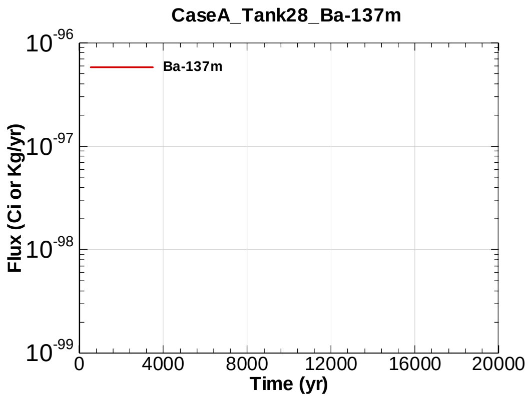

Figure A.1-1153 - Flux Leaving Liner for CaseA Tank28 Ba-137m

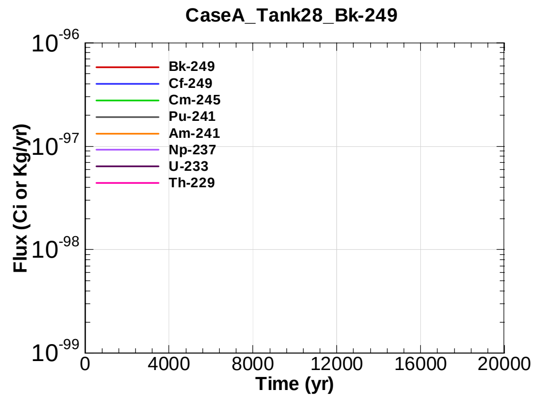

Figure A.1-1154 - Flux Leaving Liner for CaseA Tank28 Bk-249

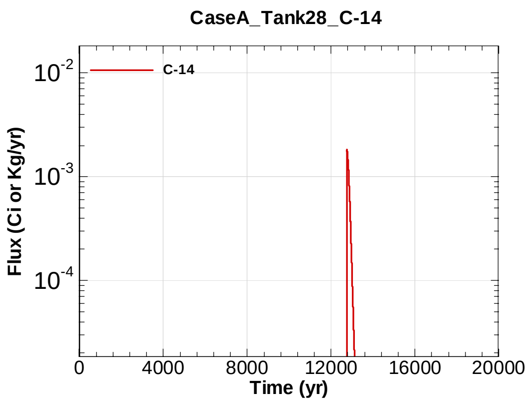

Figure A.1-1155 - Flux Leaving Liner for CaseA Tank28 C-14

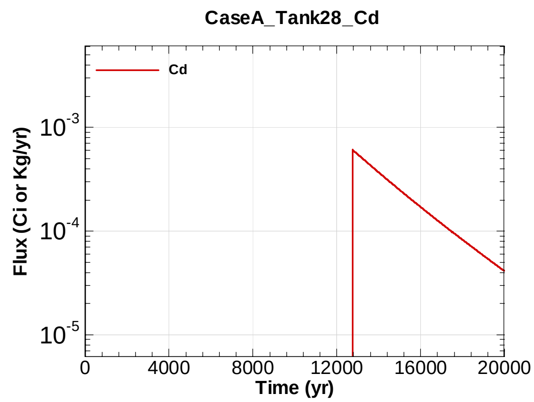

Figure A.1-1156 - Flux Leaving Liner for CaseA Tank28 Cd

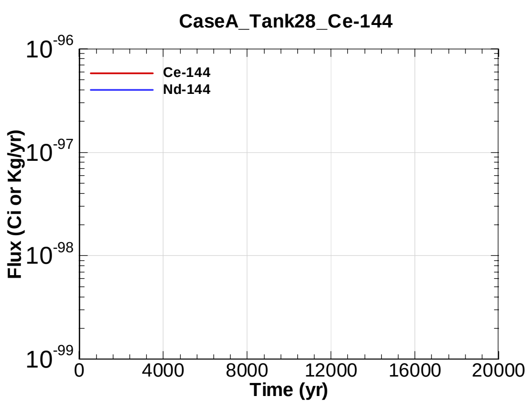

Figure A.1-1157 - Flux Leaving Liner for CaseA Tank28 Ce-144

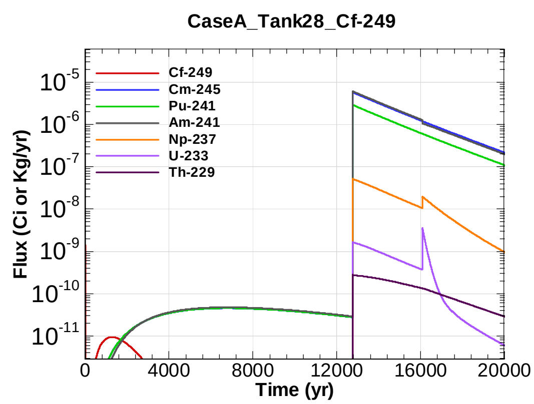

Figure A.1-1158 - Flux Leaving Liner for CaseA Tank28 Cf-249

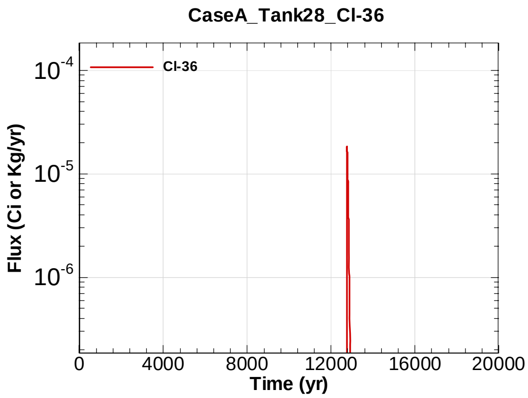

Figure A.1-1159 - Flux Leaving Liner for CaseA Tank28 Cl-36

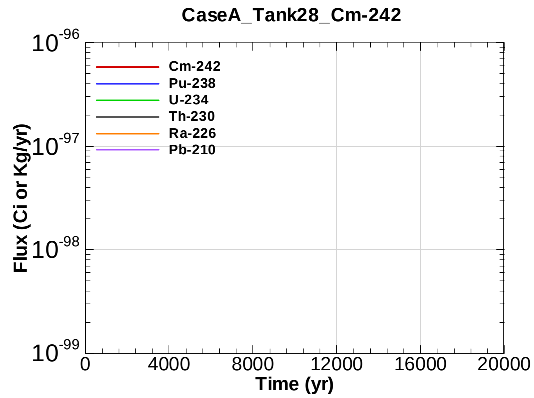

Figure A.1-1160 - Flux Leaving Liner for CaseA Tank28 Cm-242

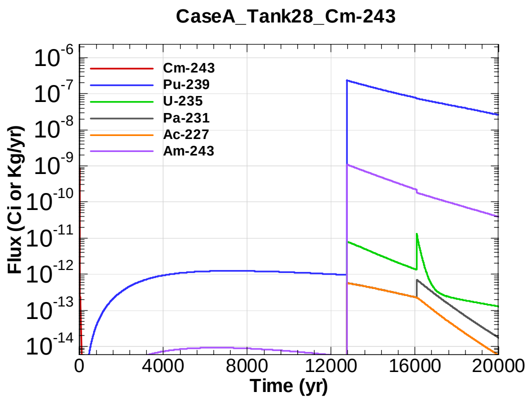

Figure A.1-1161 - Flux Leaving Liner for CaseA Tank28 Cm-243

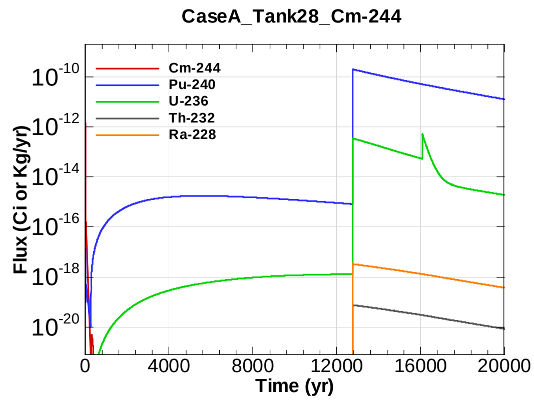

Figure A.1-1162 - Flux Leaving Liner for CaseA Tank28 Cm-244

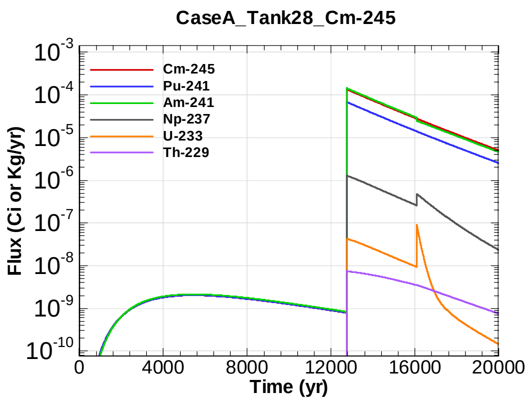

Figure A.1-1163 - Flux Leaving Liner for CaseA Tank28 Cm-245

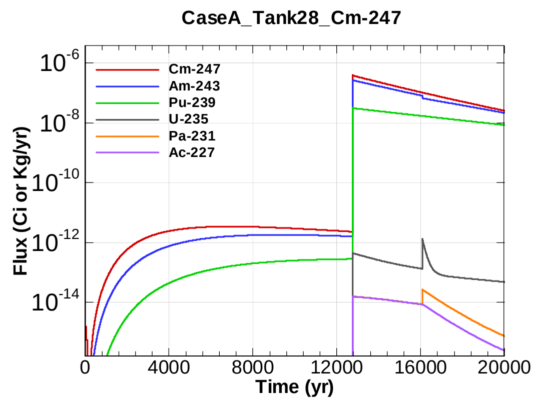

Figure A.1-1164 - Flux Leaving Liner for CaseA Tank28 Cm-247

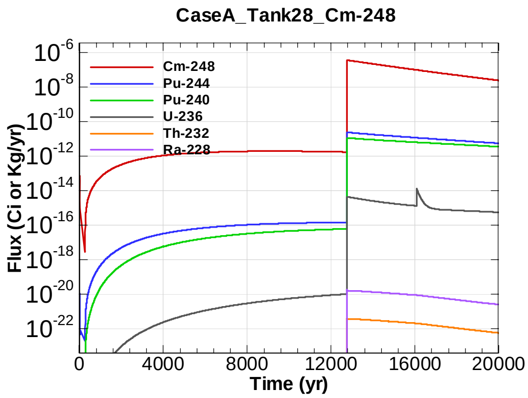

Figure A.1-1165 - Flux Leaving Liner for CaseA Tank28 Cm-248

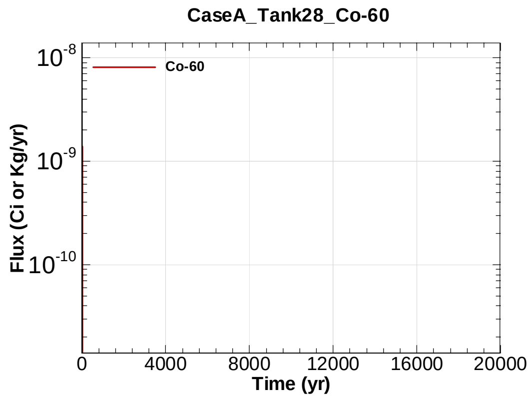

Figure A.1-1166 - Flux Leaving Liner for CaseA Tank28 Co-60

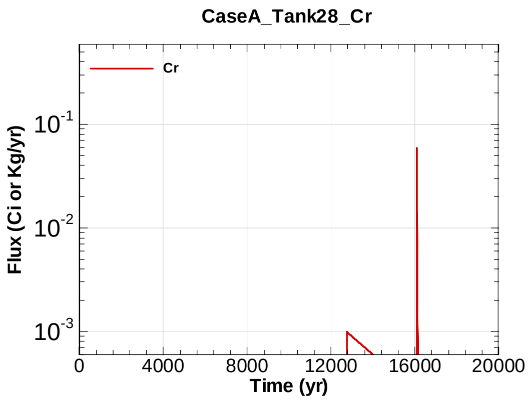

Figure A.1-1167 - Flux Leaving Liner for CaseA Tank28 Cr

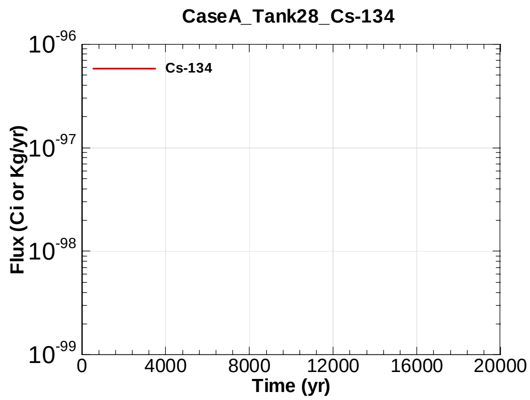

Figure A.1-1168 - Flux Leaving Liner for CaseA Tank28 Cs-134

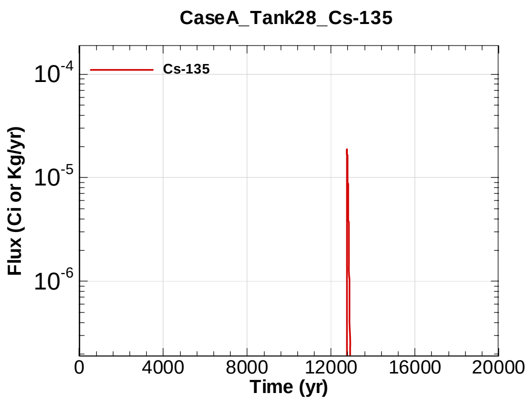

Figure A.1-1169 - Flux Leaving Liner for CaseA Tank28 Cs-135

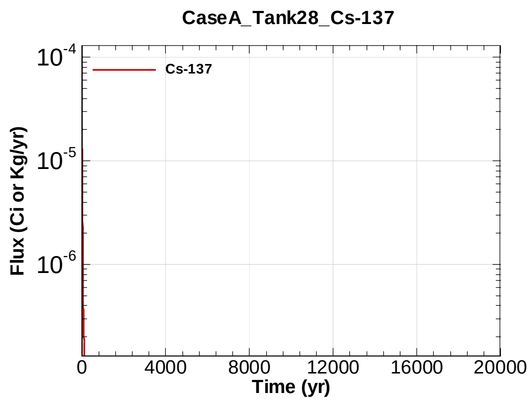

Figure A.1-1170 - Flux Leaving Liner for CaseA Tank28 Cs-137

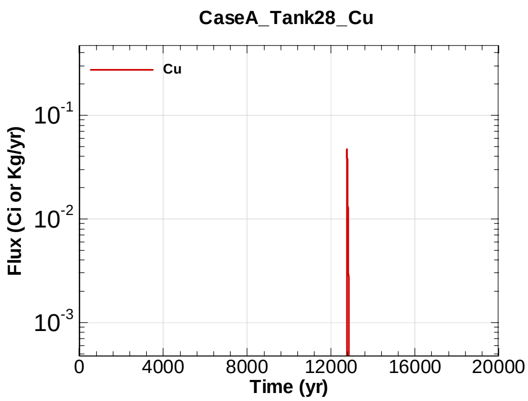

Figure A.1-1171 - Flux Leaving Liner for CaseA Tank28 Cu

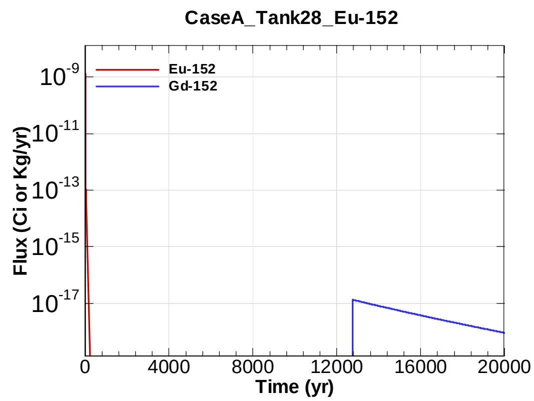

Figure A.1-1172 - Flux Leaving Liner for CaseA Tank28 Eu-152

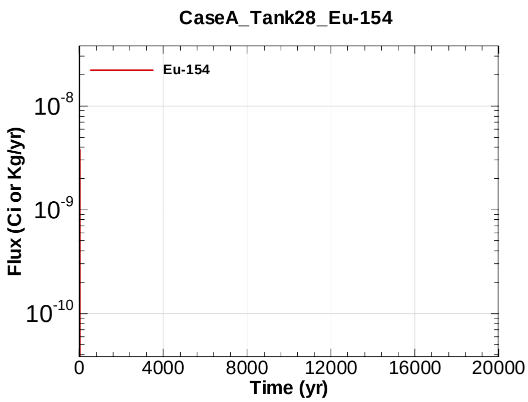

Figure A.1-1173 - Flux Leaving Liner for CaseA Tank28 Eu-154

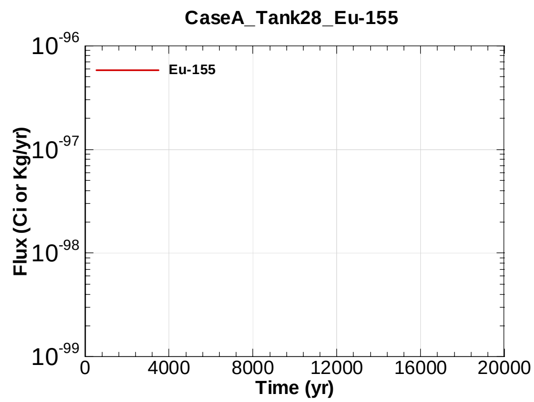

Figure A.1-1174 - Flux Leaving Liner for CaseA Tank28 Eu-155

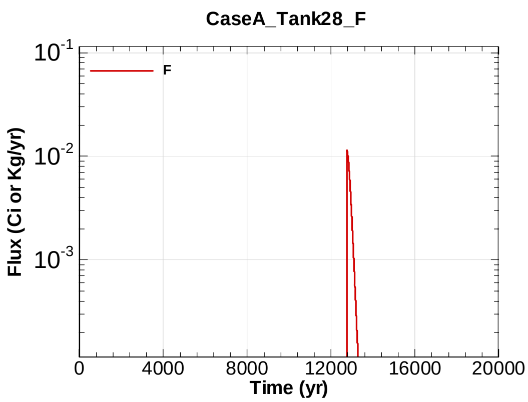

Figure A.1-1175 - Flux Leaving Liner for CaseA Tank28 F

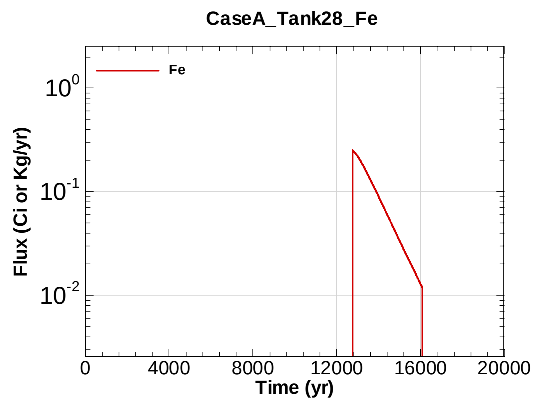

Figure A.1-1176 - Flux Leaving Liner for CaseA Tank28 Fe

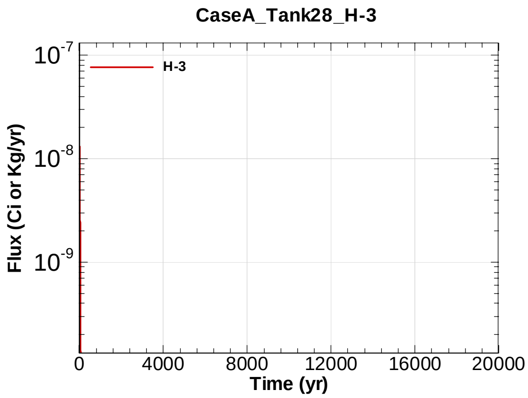

Figure A.1-1177 - Flux Leaving Liner for CaseA Tank28 H-3

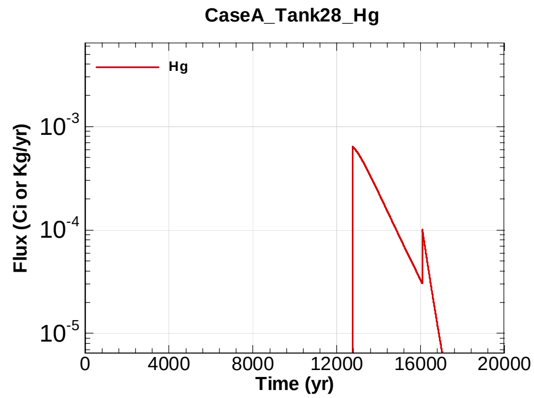

Figure A.1-1178 - Flux Leaving Liner for CaseA Tank28 Hg

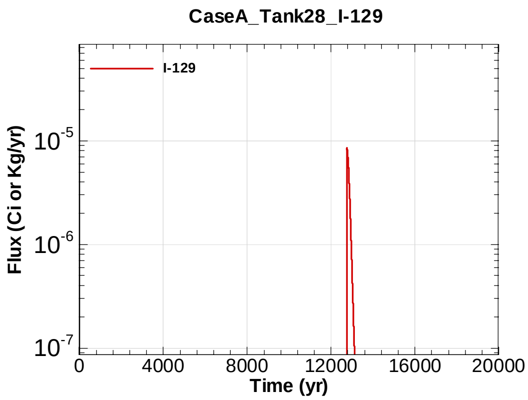

Figure A.1-1179 - Flux Leaving Liner for CaseA Tank28 I-129

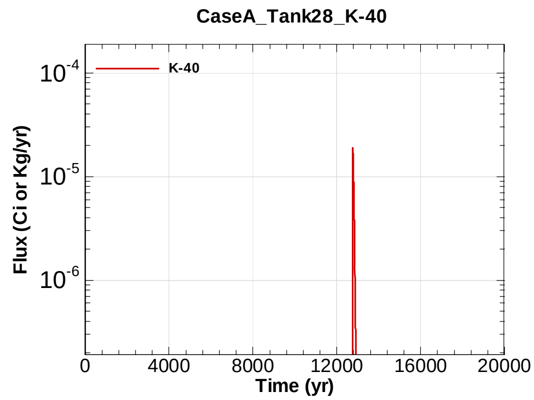

Figure A.1-1180 - Flux Leaving Liner for CaseA Tank28 K-40

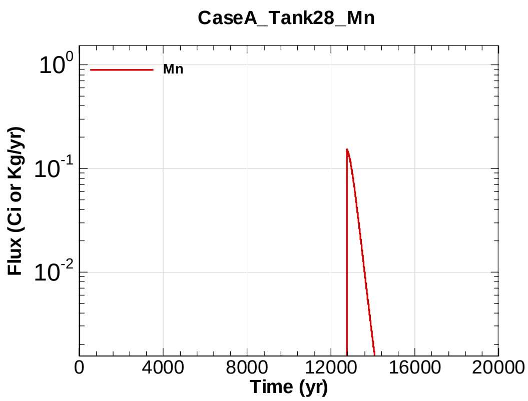

Figure A.1-1181 - Flux Leaving Liner for CaseA Tank28 Mn

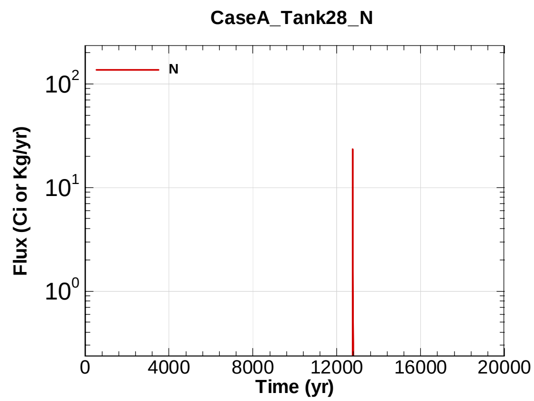

Figure A.1-1182 - Flux Leaving Liner for CaseA Tank28 N

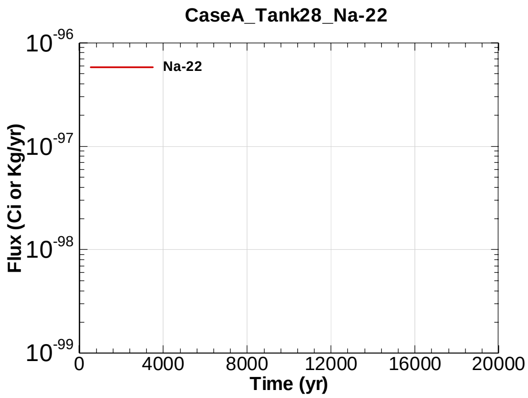

Figure A.1-1183 - Flux Leaving Liner for CaseA Tank28 Na-22

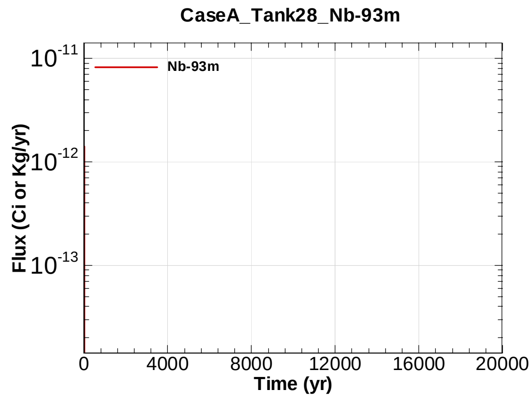

Figure A.1-1184 - Flux Leaving Liner for CaseA Tank28 Nb-93m

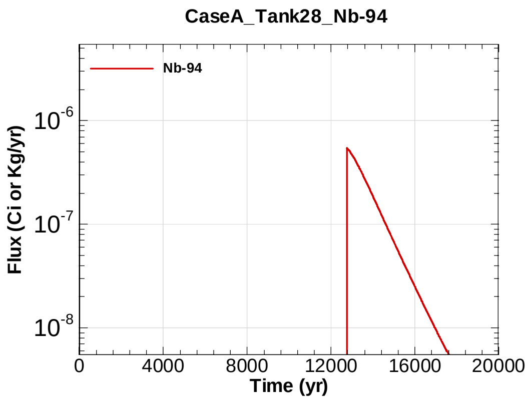

Figure A.1-1185 - Flux Leaving Liner for CaseA Tank28 Nb-94

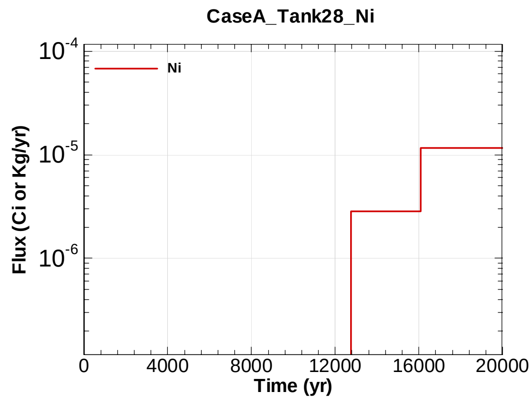

Figure A.1-1186 - Flux Leaving Liner for CaseA Tank28 Ni

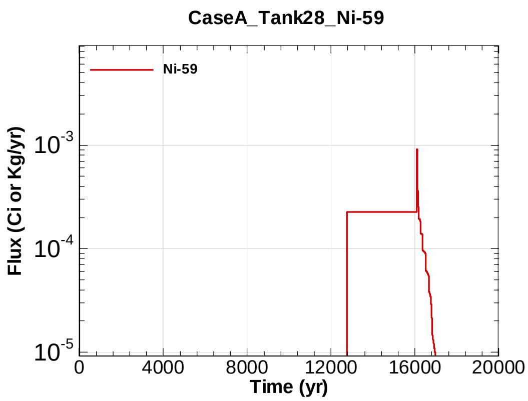

Figure A.1-1187 - Flux Leaving Liner for CaseA Tank28 Ni-59

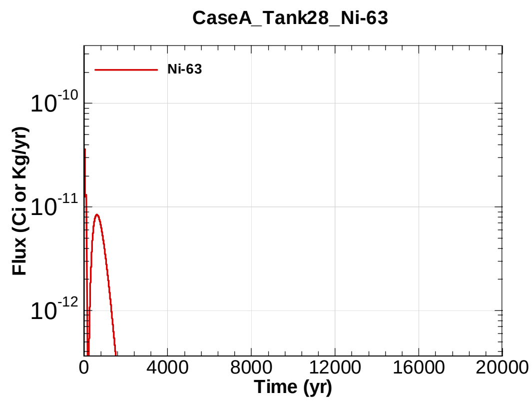

Figure A.1-1188 - Flux Leaving Liner for CaseA Tank28 Ni-63

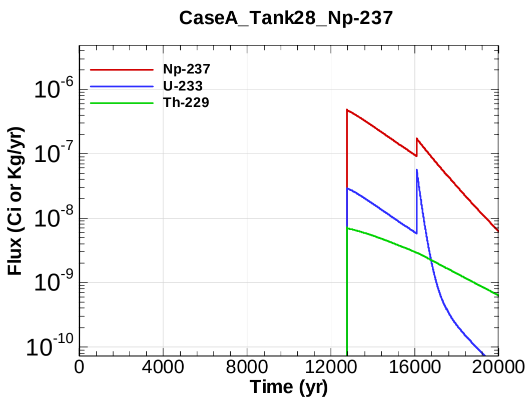

Figure A.1-1189 - Flux Leaving Liner for CaseA Tank28 Np-237

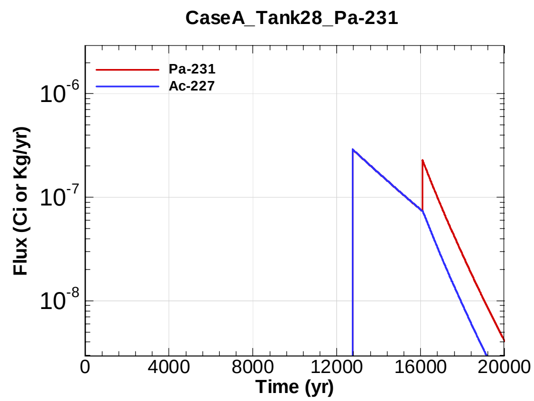

Figure A.1-1190 - Flux Leaving Liner for CaseA Tank28 Pa-231

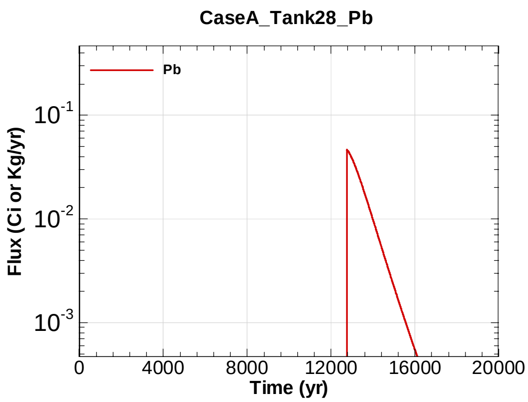

Figure A.1-1191 - Flux Leaving Liner for CaseA Tank28 Pb

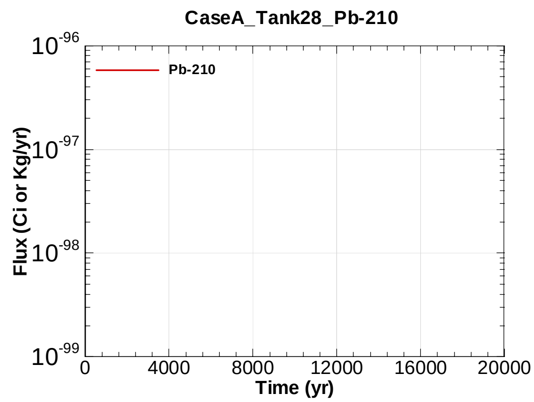

Figure A.1-1192 - Flux Leaving Liner for CaseA Tank28 Pb-210

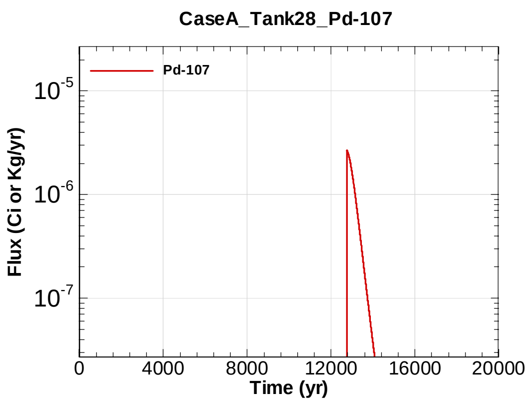

Figure A.1-1193 - Flux Leaving Liner for CaseA Tank28 Pd-107

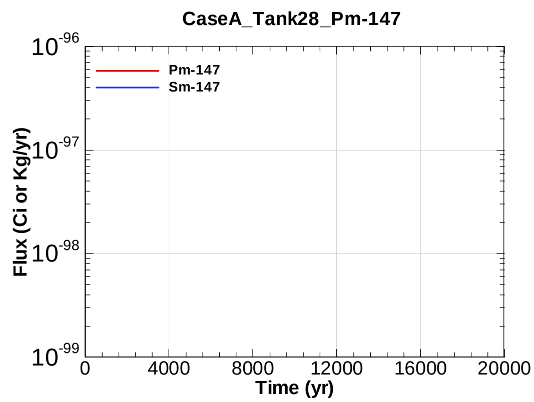

Figure A.1-1194 - Flux Leaving Liner for CaseA Tank28 Pm-147

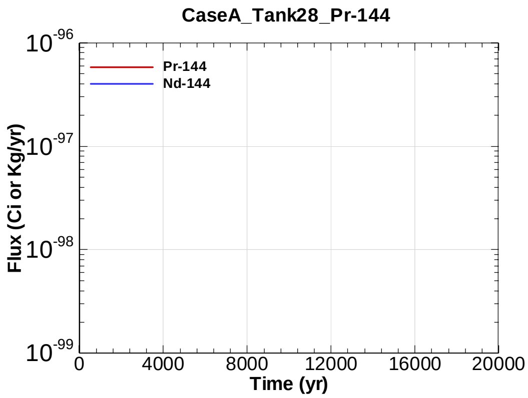

Figure A.1-1195 - Flux Leaving Liner for CaseA Tank28 Pr-144

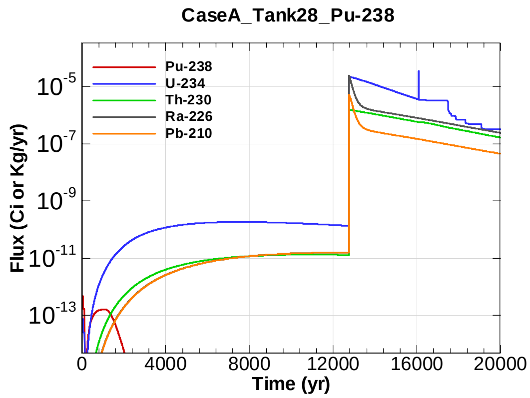

Figure A.1-1196 - Flux Leaving Liner for CaseA Tank28 Pu-238

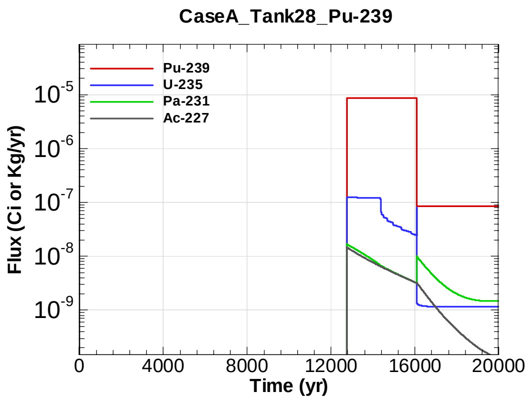

Figure A.1-1197 - Flux Leaving Liner for CaseA Tank28 Pu-239

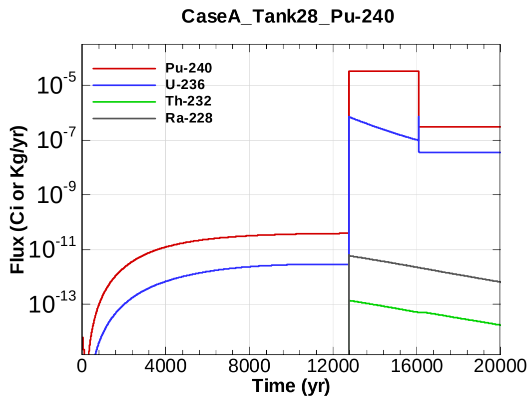

Figure A.1-1198 - Flux Leaving Liner for CaseA Tank28 Pu-240

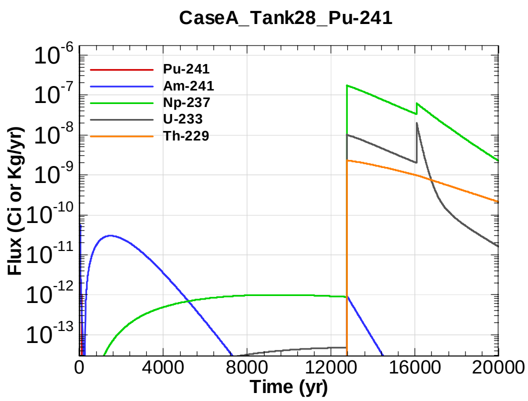

Figure A.1-1199 - Flux Leaving Liner for CaseA Tank28 Pu-241

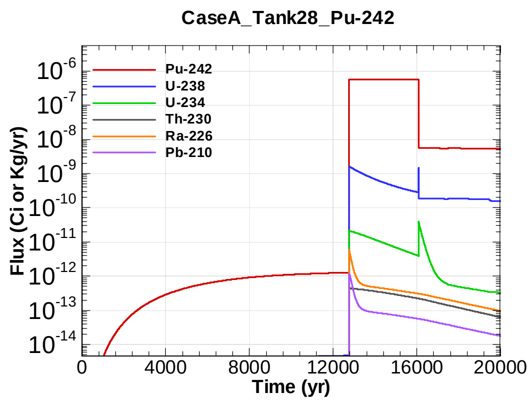

Figure A.1-1200 - Flux Leaving Liner for CaseA Tank28 Pu-242

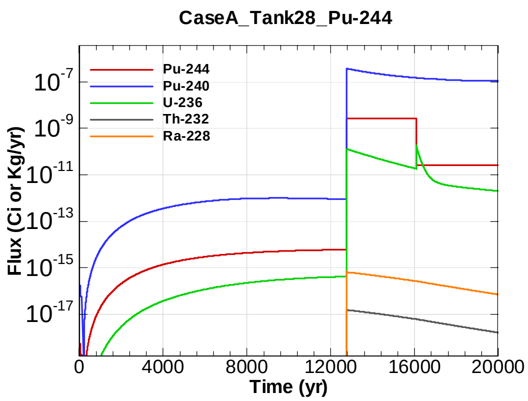

Figure A.1-1201 - Flux Leaving Liner for CaseA Tank28 Pu-244

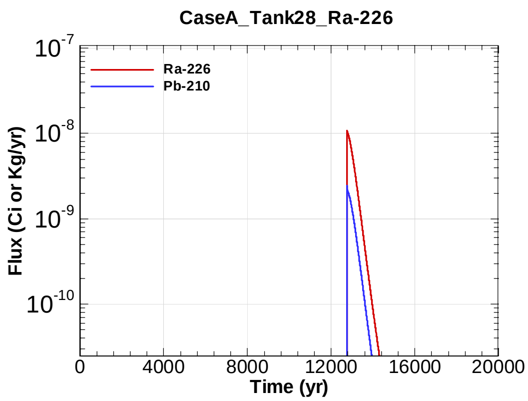

Figure A.1-1202 - Flux Leaving Liner for CaseA Tank28 Ra-226

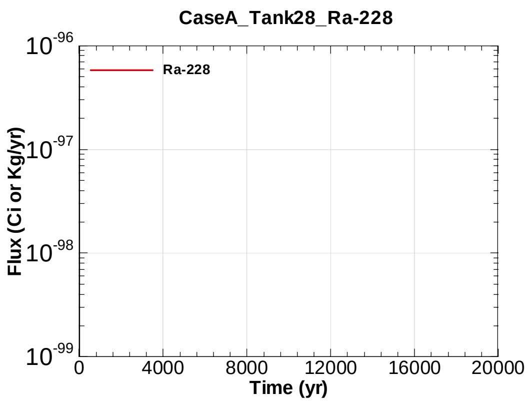

Figure A.1-1203 - Flux Leaving Liner for CaseA Tank28 Ra-228

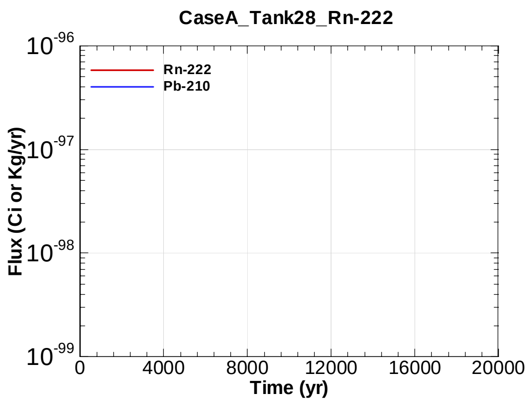

Figure A.1-1204 - Flux Leaving Liner for CaseA Tank28 Rn-222

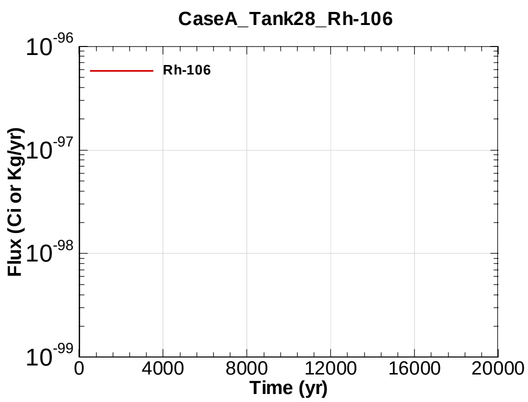

Figure A.1-1205 - Flux Leaving Liner for CaseA Tank28 Rh-106

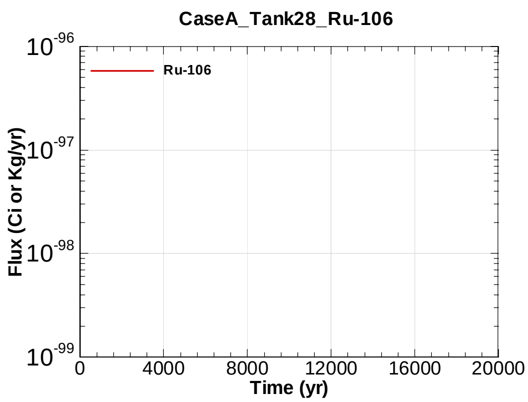

Figure A.1-1206 - Flux Leaving Liner for CaseA Tank28 Ru-106

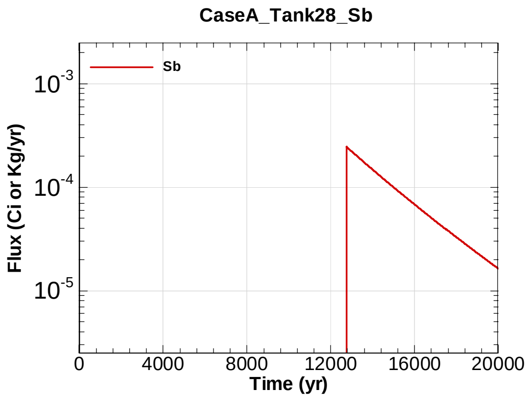

Figure A.1-1207 - Flux Leaving Liner for CaseA Tank28 Sb

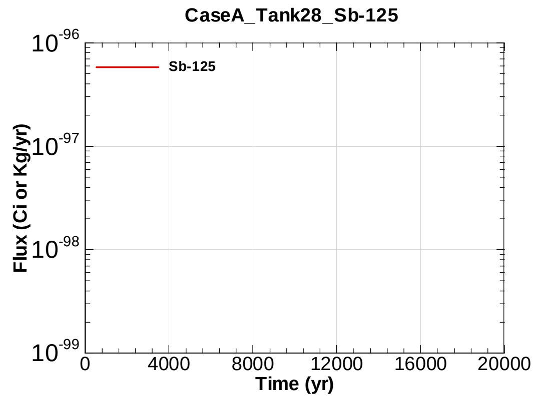

Figure A.1-1208 - Flux Leaving Liner for CaseA Tank28 Sb-125

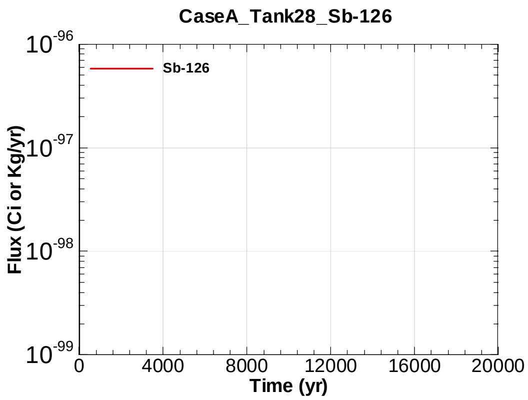

Figure A.1-1209 - Flux Leaving Liner for CaseA Tank28 Sb-126

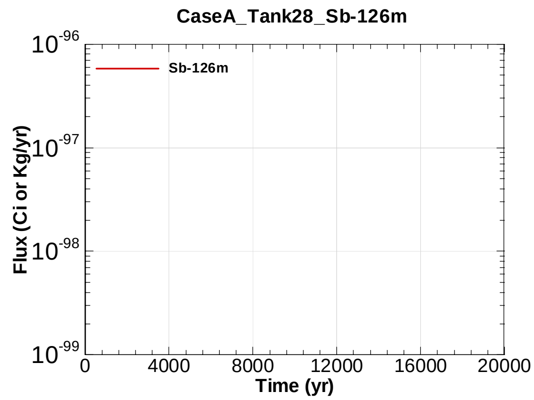

Figure A.1-1210 - Flux Leaving Liner for CaseA Tank28 Sb-126m

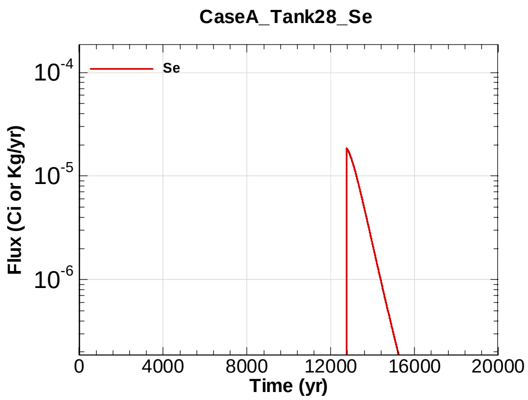

Figure A.1-1211 - Flux Leaving Liner for CaseA Tank28 Se

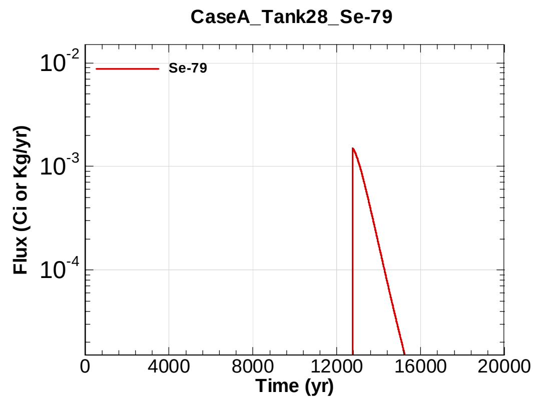

Figure A.1-1212 - Flux Leaving Liner for CaseA Tank28 Se-79

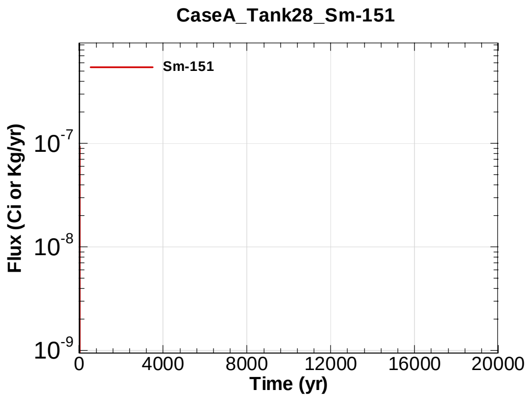

Figure A.1-1213 - Flux Leaving Liner for CaseA Tank28 Sm-151

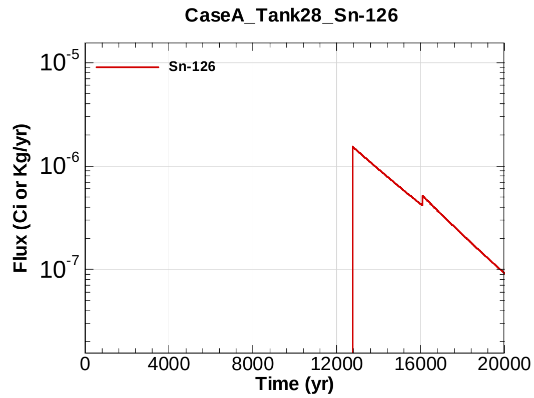

Figure A.1-1214 - Flux Leaving Liner for CaseA Tank28 Sn-126

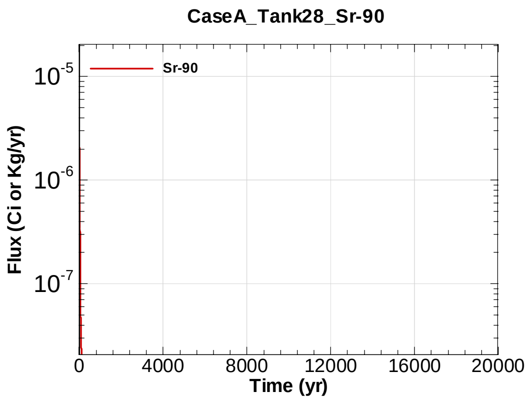

Figure A.1-1215 - Flux Leaving Liner for CaseA Tank28 Sr-90

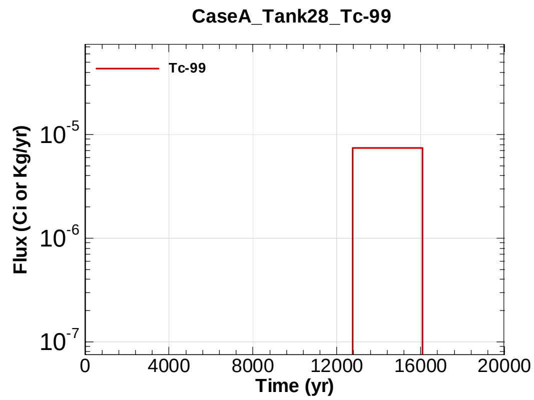

Figure A.1-1216 - Flux Leaving Liner for CaseA Tank28 Tc-99

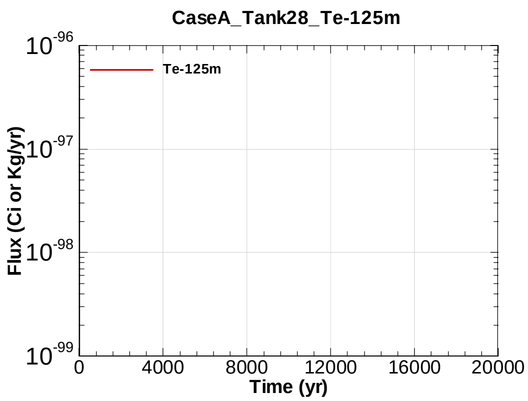

Figure A.1-1217 - Flux Leaving Liner for CaseA Tank28 Te-125m

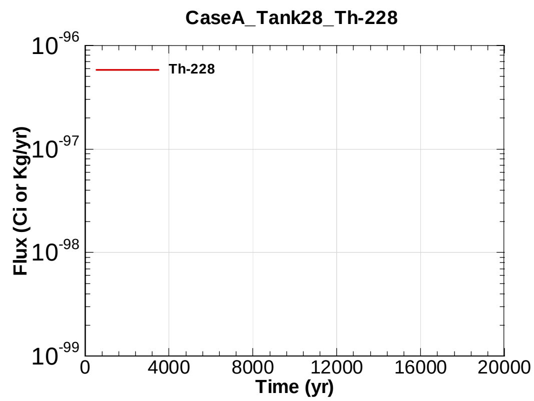

Figure A.1-1218 - Flux Leaving Liner for CaseA Tank28 Th-228

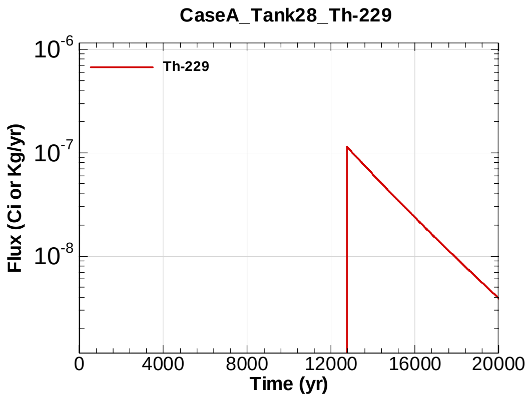

Figure A.1-1219 - Flux Leaving Liner for CaseA Tank28 Th-229

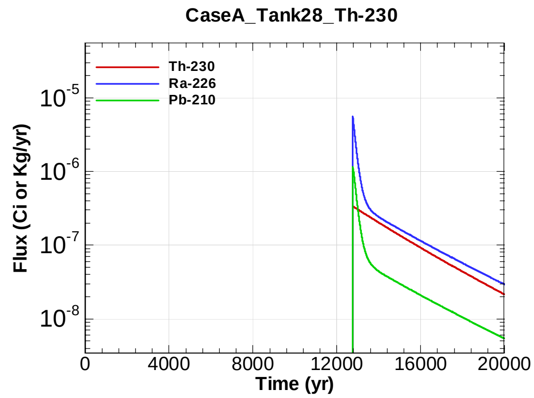

Figure A.1-1220 - Flux Leaving Liner for CaseA Tank28 Th-230

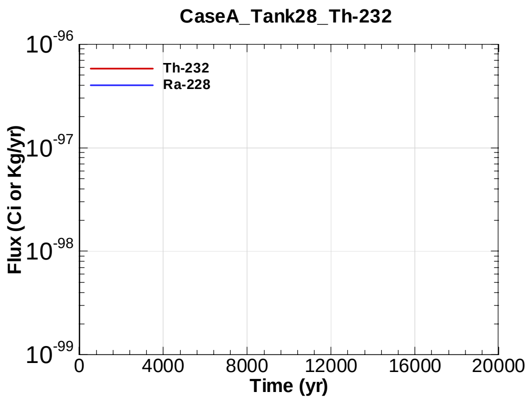

Figure A.1-1221 - Flux Leaving Liner for CaseA Tank28 Th-232

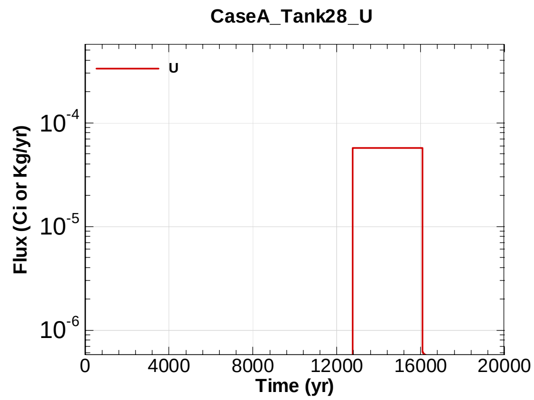

Figure A.1-1222 - Flux Leaving Liner for CaseA Tank28 U

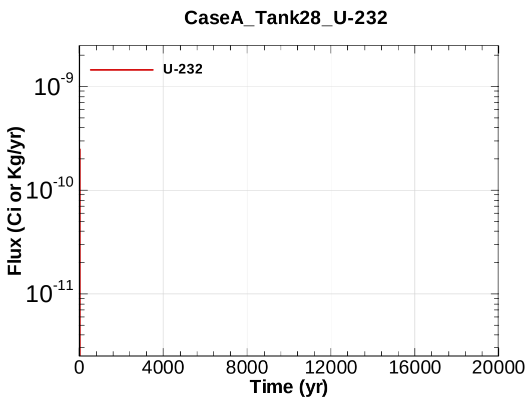

Figure A.1-1223 - Flux Leaving Liner for CaseA Tank28 U-232

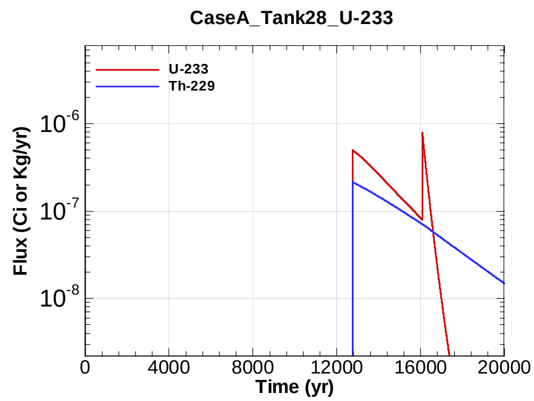

Figure A.1-1224 - Flux Leaving Liner for CaseA Tank28 U-233

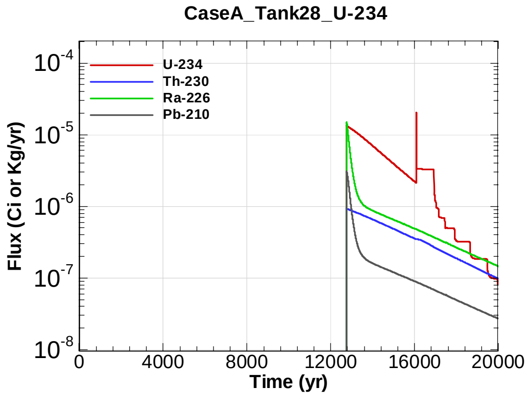

Figure A.1-1225 - Flux Leaving Liner for CaseA Tank28 U-234

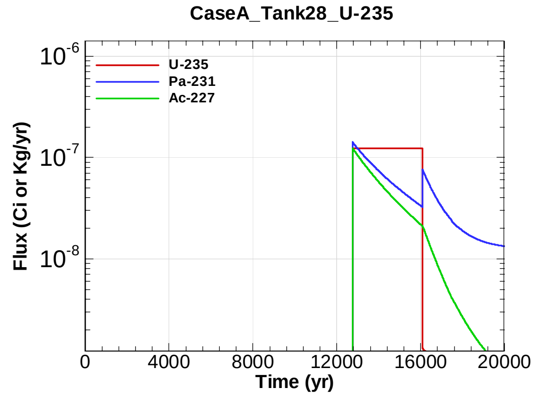

Figure A.1-1226 - Flux Leaving Liner for CaseA Tank28 U-235

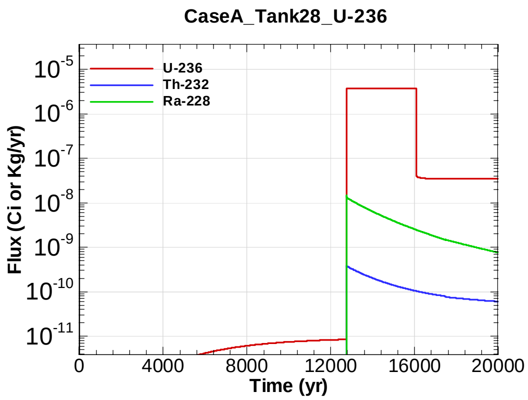

Figure A.1-1227 - Flux Leaving Liner for CaseA Tank28 U-236

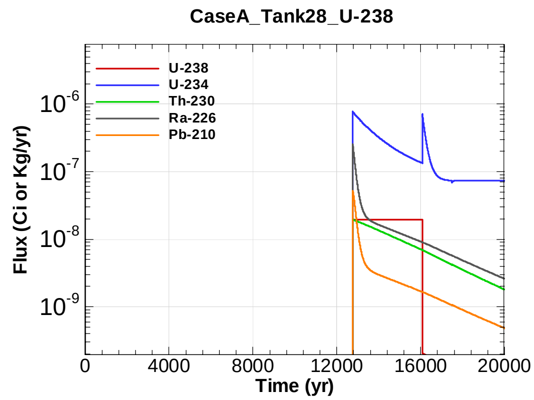

Figure A.1-1228 - Flux Leaving Liner for CaseA Tank28 U-238

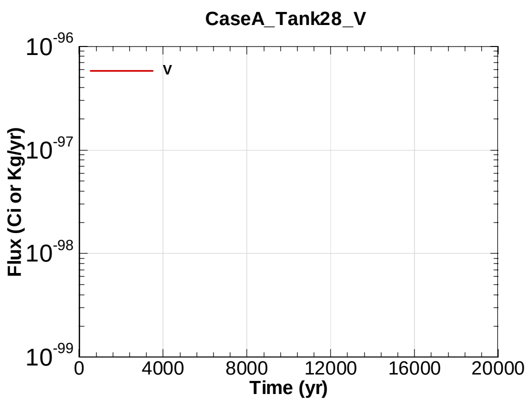

Figure A.1-1229 - Flux Leaving Liner for CaseA Tank28 V

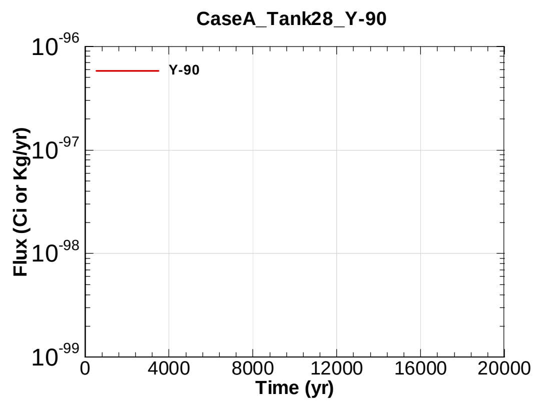

Figure A.1-1230 - Flux Leaving Liner for CaseA Tank28 Y-90

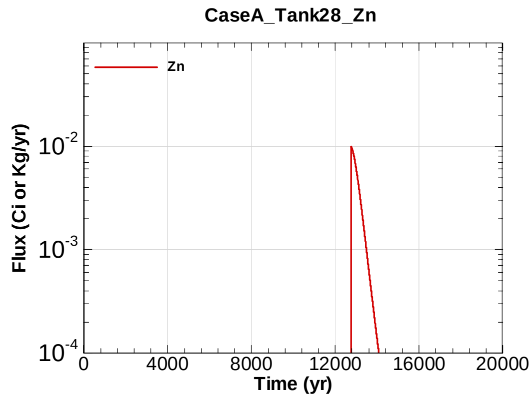

Figure A.1-1231 - Flux Leaving Liner for CaseA Tank28 Zn

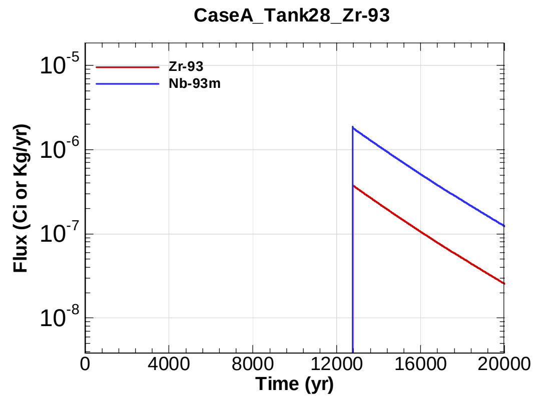

Figure A.1-1232 - Flux Leaving Liner for CaseA Tank28 Zr-93

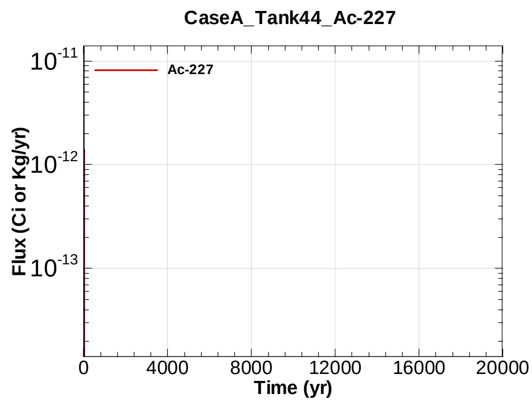

Figure A.1-1233 - Flux Leaving Liner for CaseA Tank44 Ac-227

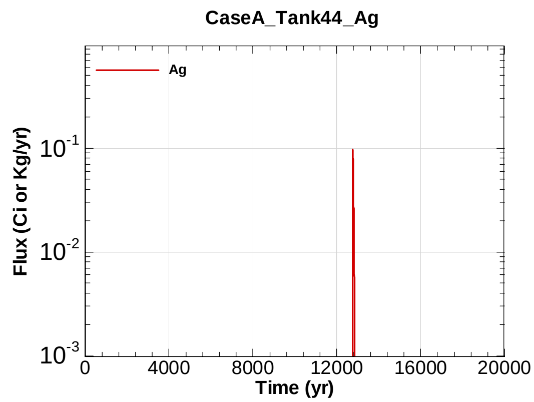

Figure A.1-1234 - Flux Leaving Liner for CaseA Tank44 Ag

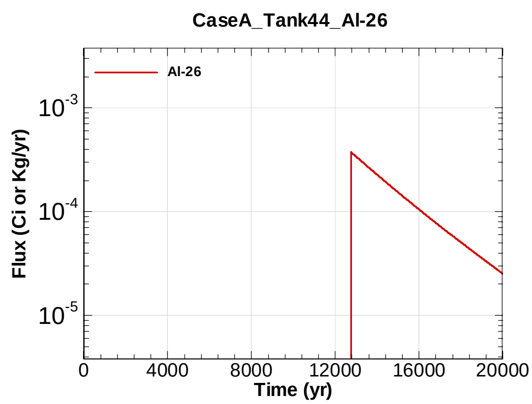

Figure A.1-1235 - Flux Leaving Liner for CaseA Tank44 Al-26

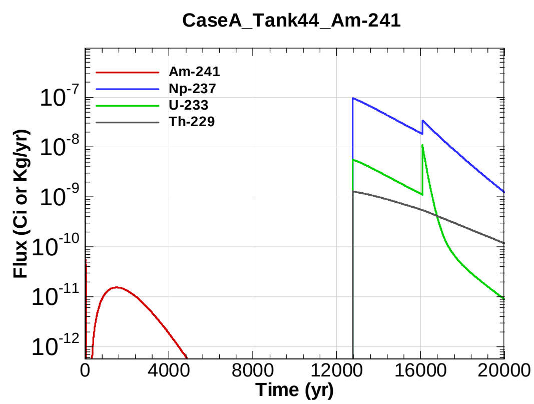

Figure A.1-1236 - Flux Leaving Liner for CaseA Tank44 Am-241

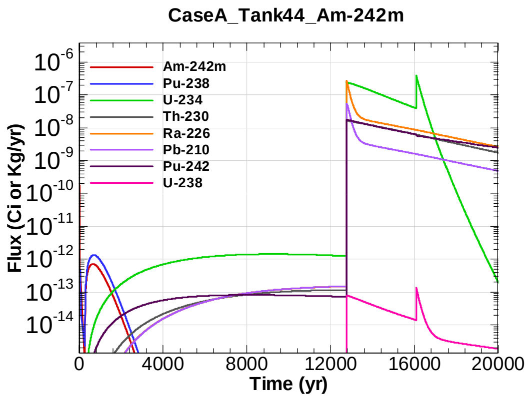

Figure A.1-1237 - Flux Leaving Liner for CaseA Tank44 Am-242m

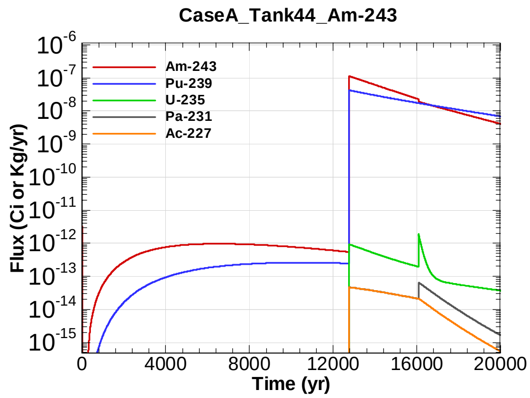

Figure A.1-1238 - Flux Leaving Liner for CaseA Tank44 Am-243

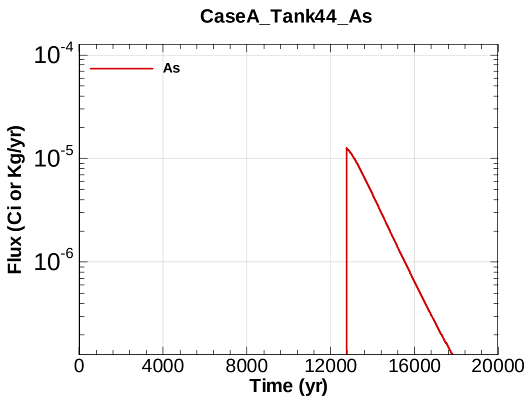

Figure A.1-1239 - Flux Leaving Liner for CaseA Tank44 As

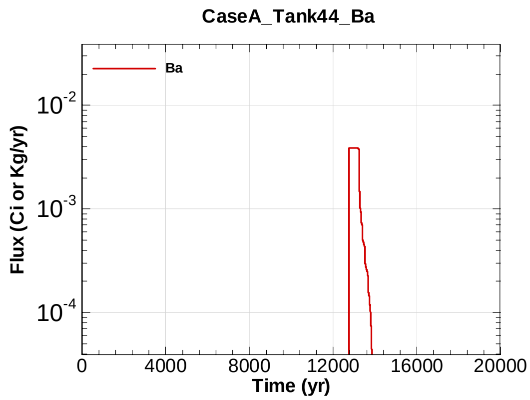

Figure A.1-1240 - Flux Leaving Liner for CaseA Tank44 Ba

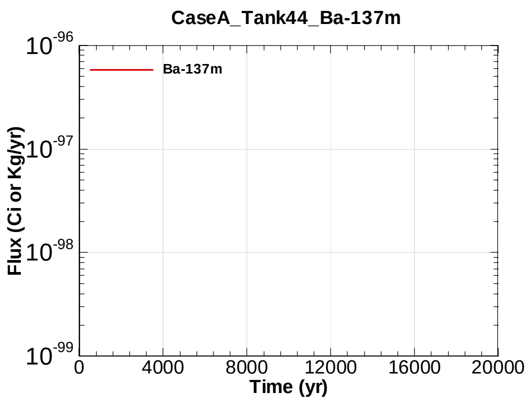

Figure A.1-1241 - Flux Leaving Liner for CaseA Tank44 Ba-137m

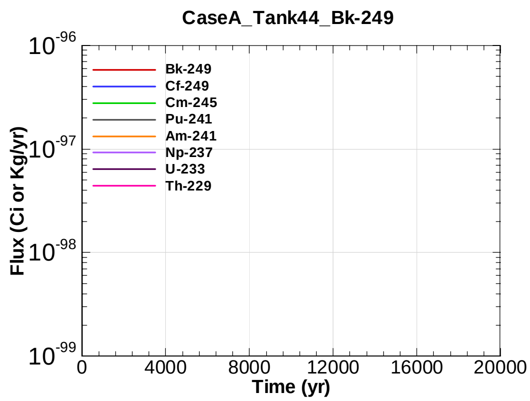

Figure A.1-1242 - Flux Leaving Liner for CaseA Tank44 Bk-249

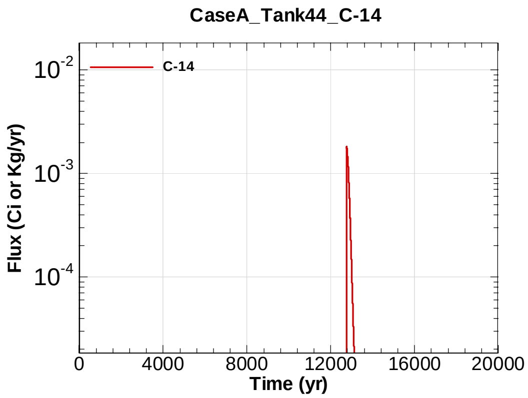

Figure A.1-1243 - Flux Leaving Liner for CaseA Tank44 C-14

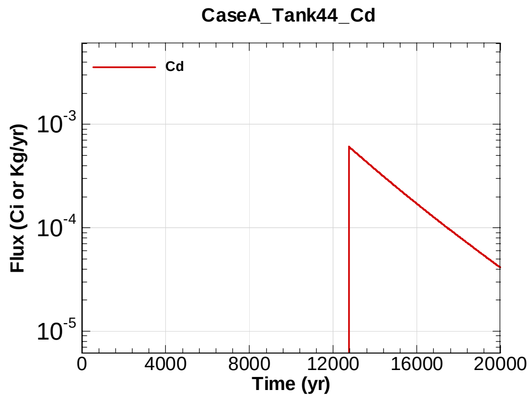

Figure A.1-1244 - Flux Leaving Liner for CaseA Tank44 Cd

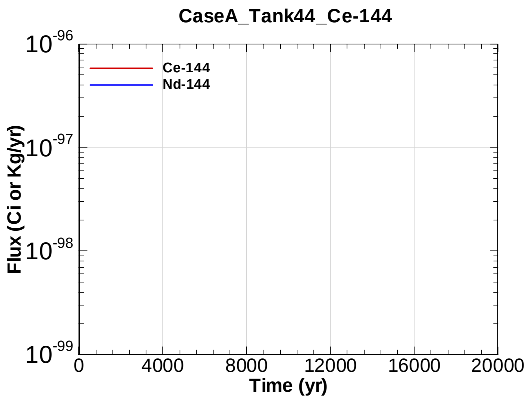

Figure A.1-1245 - Flux Leaving Liner for CaseA Tank44 Ce-144

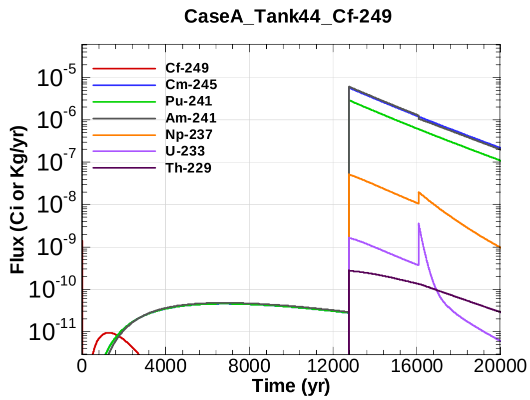

Figure A.1-1246 - Flux Leaving Liner for CaseA Tank44 Cf-249

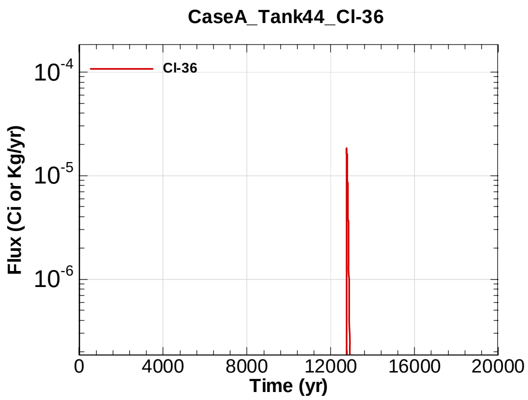

Figure A.1-1247 - Flux Leaving Liner for CaseA Tank44 Cl-36

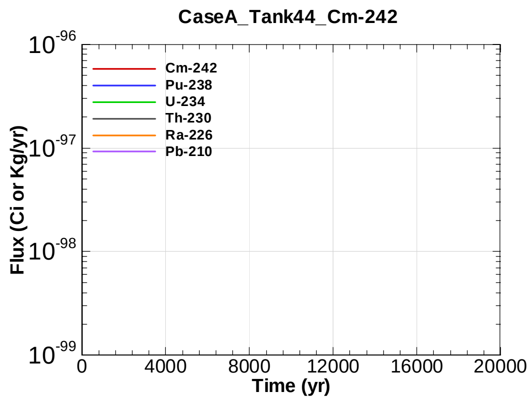

Figure A.1-1248 - Flux Leaving Liner for CaseA Tank44 Cm-242

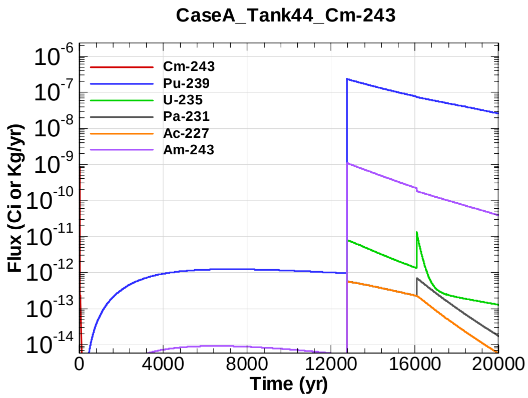

Figure A.1-1249 - Flux Leaving Liner for CaseA Tank44 Cm-243

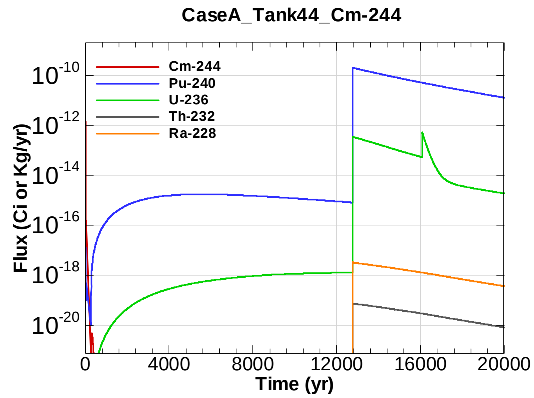

Figure A.1-1250 - Flux Leaving Liner for CaseA Tank44 Cm-244

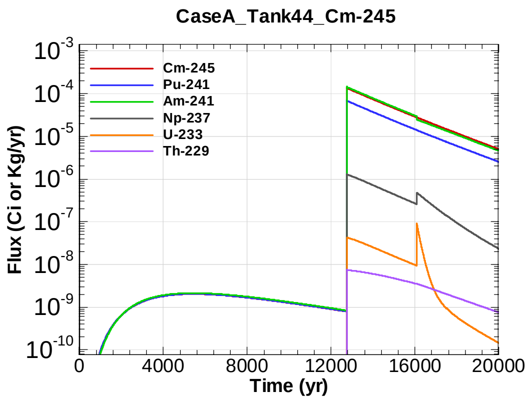

Figure A.1-1251 - Flux Leaving Liner for CaseA Tank44 Cm-245

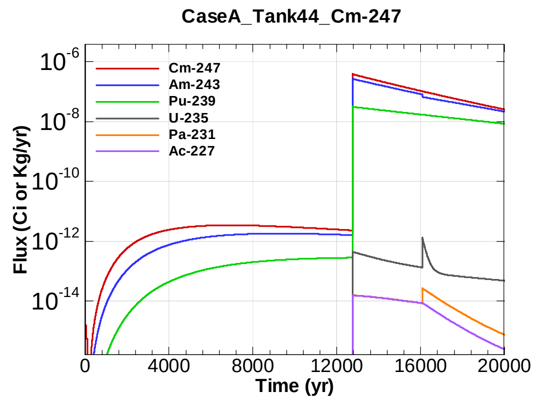

Figure A.1-1252 - Flux Leaving Liner for CaseA Tank44 Cm-247

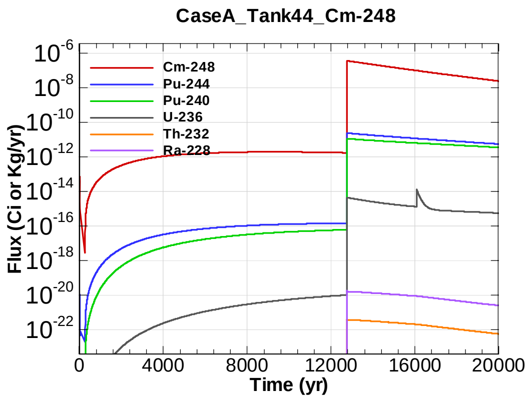

Figure A.1-1253 - Flux Leaving Liner for CaseA Tank44 Cm-248

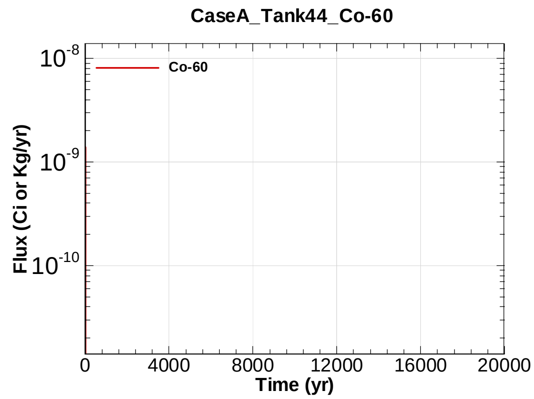

Figure A.1-1254 - Flux Leaving Liner for CaseA Tank44 Co-60

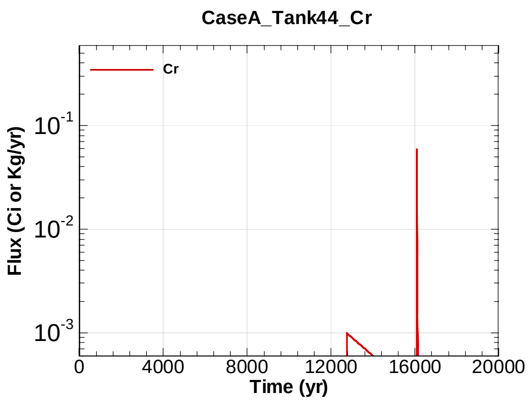

Figure A.1-1255 - Flux Leaving Liner for CaseA Tank44 Cr

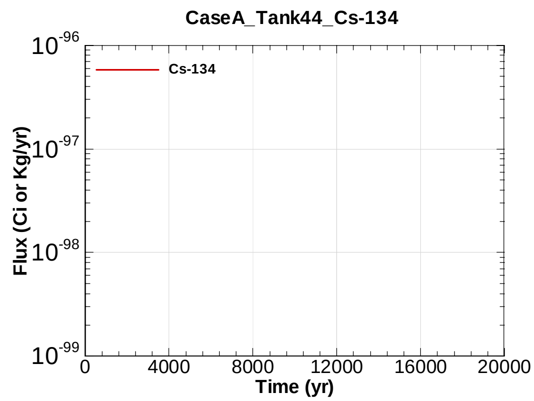

Figure A.1-1256 - Flux Leaving Liner for CaseA Tank44 Cs-134

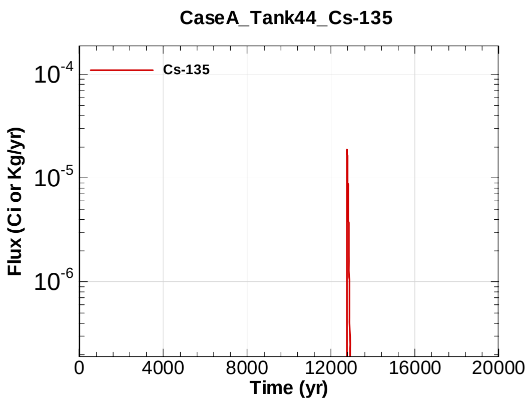

Figure A.1-1257 - Flux Leaving Liner for CaseA Tank44 Cs-135

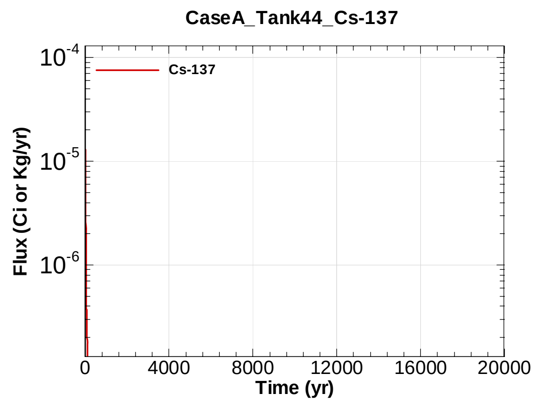

Figure A.1-1258 - Flux Leaving Liner for CaseA Tank44 Cs-137

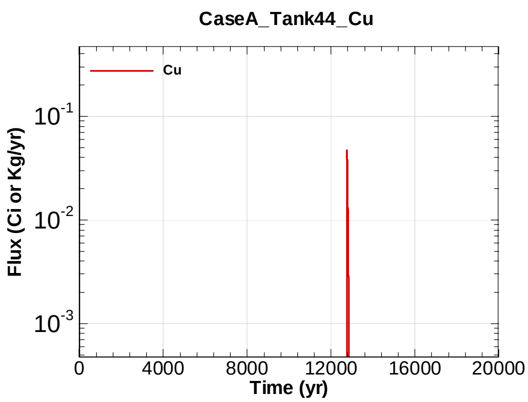

Figure A.1-1259 - Flux Leaving Liner for CaseA Tank44 Cu

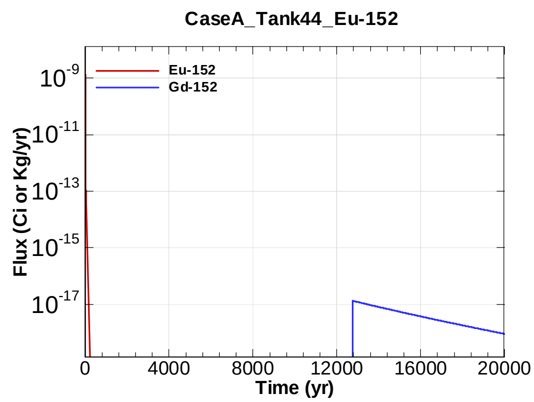

Figure A.1-1260 - Flux Leaving Liner for CaseA Tank44 Eu-152

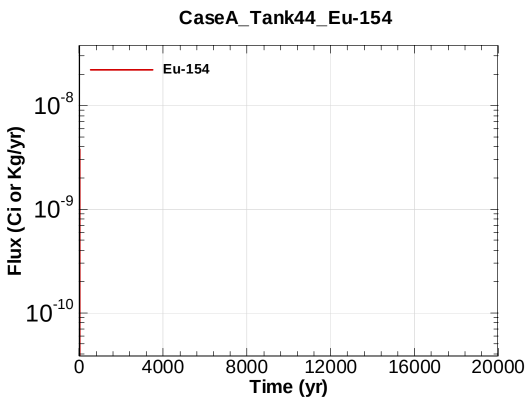

Figure A.1-1261 - Flux Leaving Liner for CaseA Tank44 Eu-154

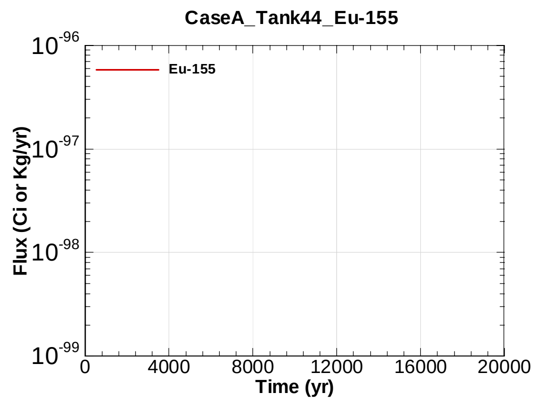

Figure A.1-1262 - Flux Leaving Liner for CaseA Tank44 Eu-155

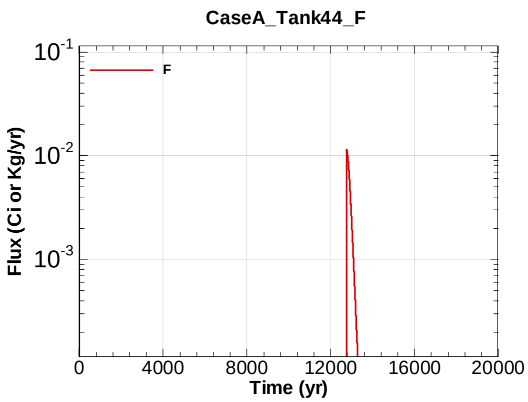

Figure A.1-1263 - Flux Leaving Liner for CaseA Tank44 F

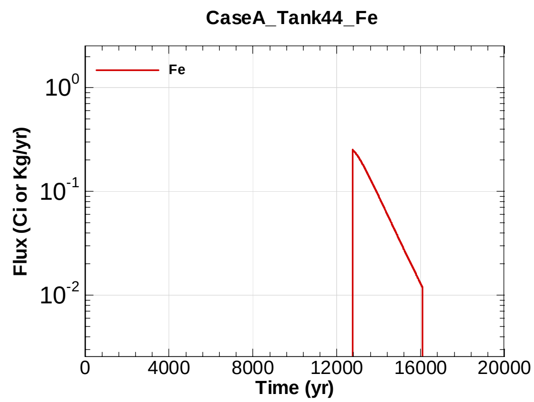

Figure A.1-1264 - Flux Leaving Liner for CaseA Tank44 Fe

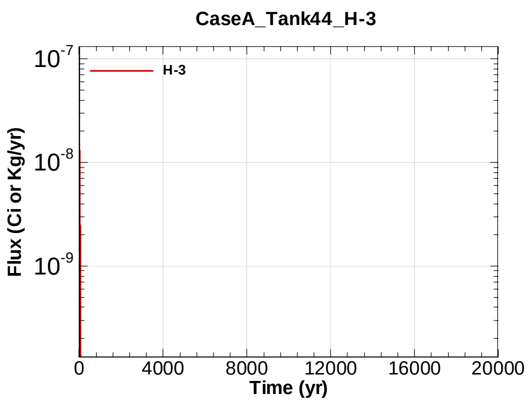

Figure A.1-1265 - Flux Leaving Liner for CaseA Tank44 H-3

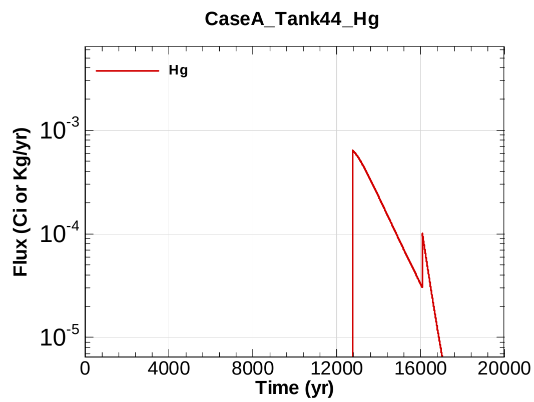

Figure A.1-1266 - Flux Leaving Liner for CaseA Tank44 Hg

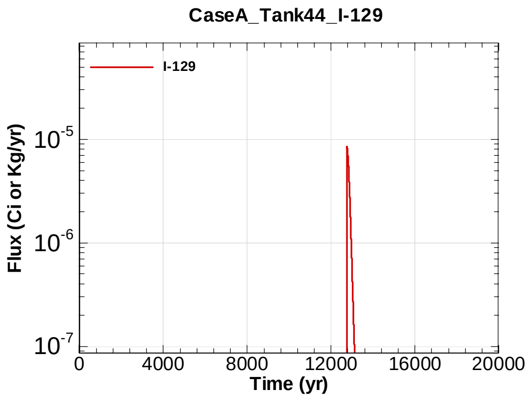

Figure A.1-1267 - Flux Leaving Liner for CaseA Tank44 I-129

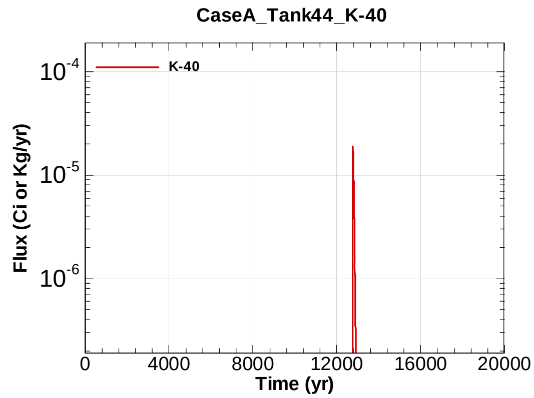

Figure A.1-1268 - Flux Leaving Liner for CaseA Tank44 K-40

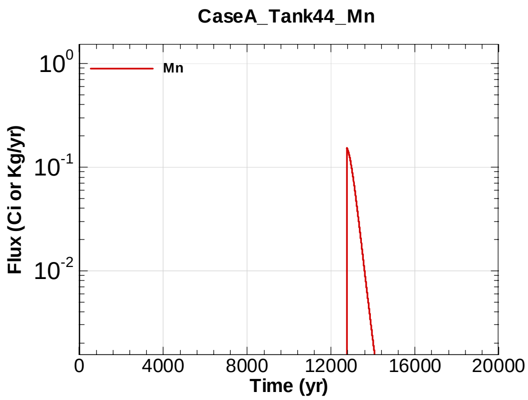

Figure A.1-1269 - Flux Leaving Liner for CaseA Tank44 Mn

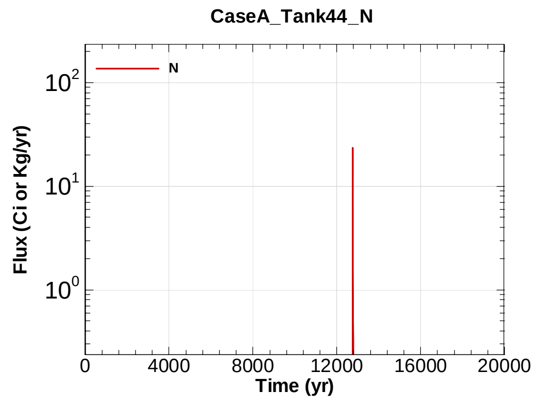

Figure A.1-1270 - Flux Leaving Liner for CaseA Tank44 N

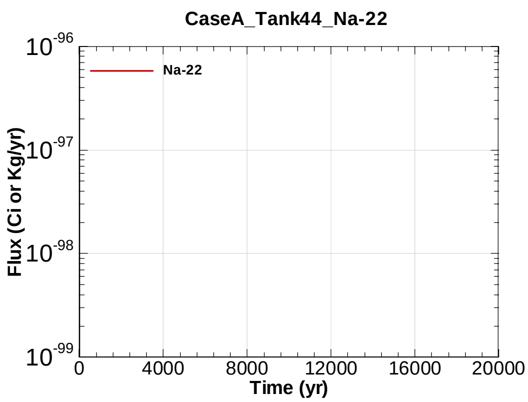

Figure A.1-1271 - Flux Leaving Liner for CaseA Tank44 Na-22

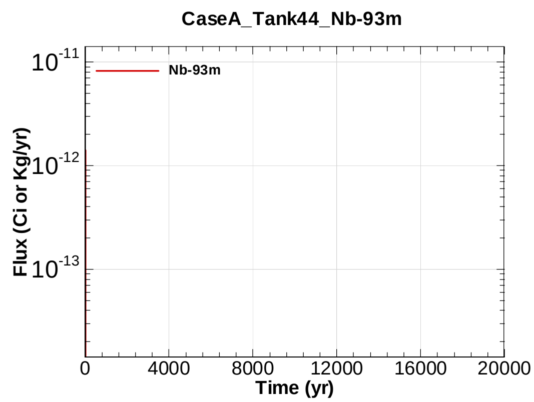

Figure A.1-1272 - Flux Leaving Liner for CaseA Tank44 Nb-93m

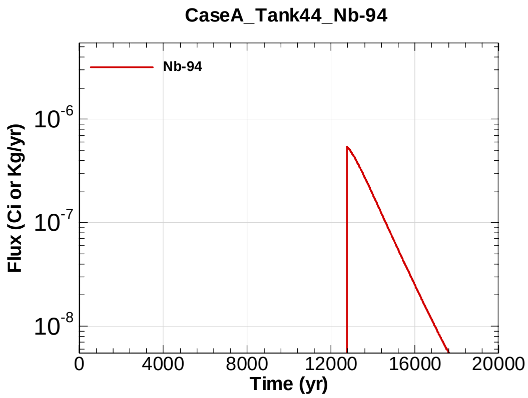

Figure A.1-1273 - Flux Leaving Liner for CaseA Tank44 Nb-94

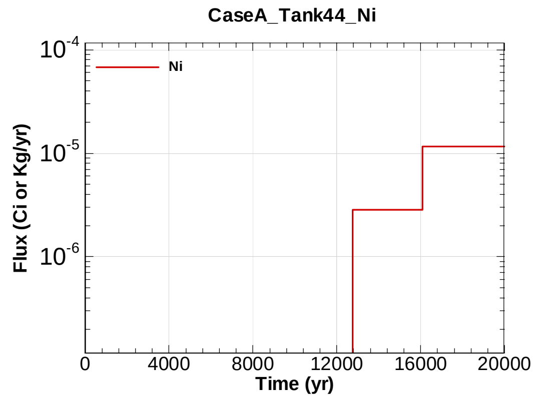

Figure A.1-1274 - Flux Leaving Liner for CaseA Tank44 Ni

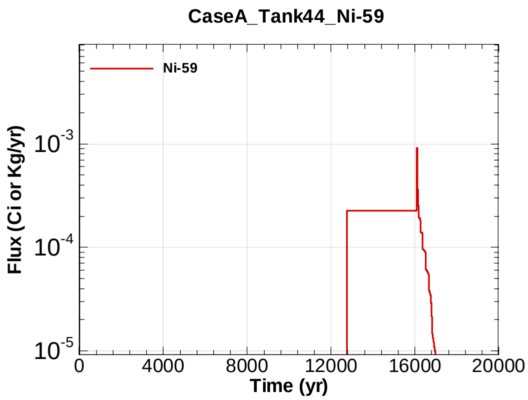

Figure A.1-1275 - Flux Leaving Liner for CaseA Tank44 Ni-59

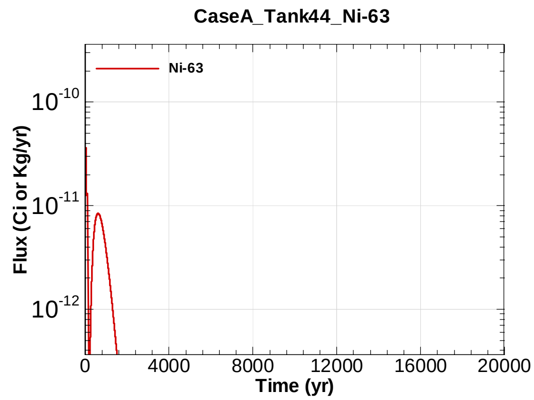

Figure A.1-1276 - Flux Leaving Liner for CaseA Tank44 Ni-63

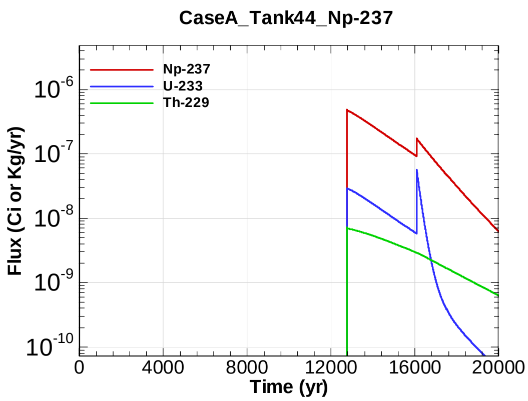

Figure A.1-1277 - Flux Leaving Liner for CaseA Tank44 Np-237

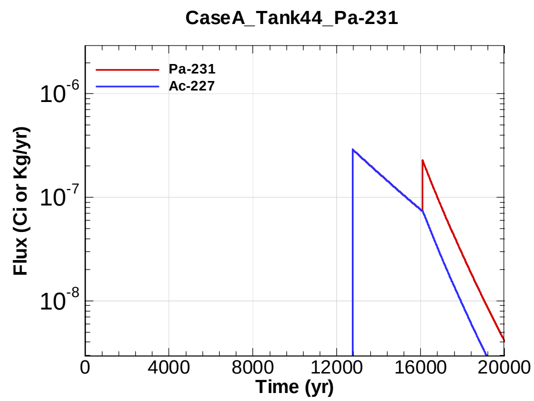

Figure A.1-1278 - Flux Leaving Liner for CaseA Tank44 Pa-231

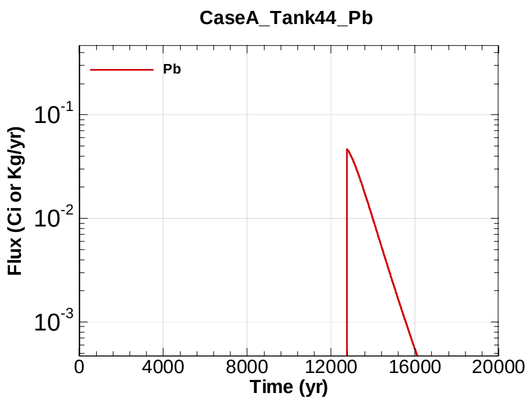

Figure A.1-1279 - Flux Leaving Liner for CaseA Tank44 Pb

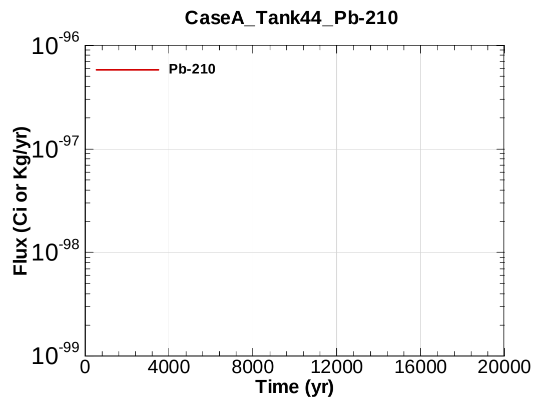

Figure A.1-1280 - Flux Leaving Liner for CaseA Tank44 Pb-210

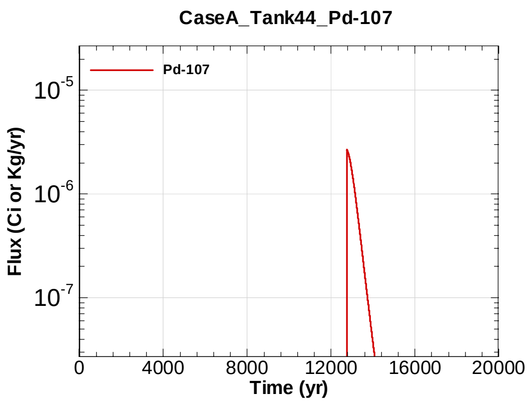

Figure A.1-1281 - Flux Leaving Liner for CaseA Tank44 Pd-107

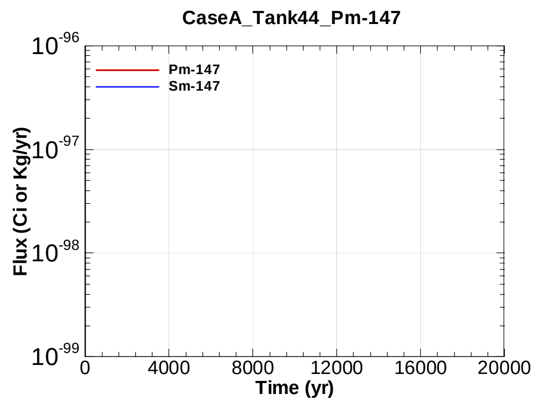

Figure A.1-1282 - Flux Leaving Liner for CaseA Tank44 Pm-147

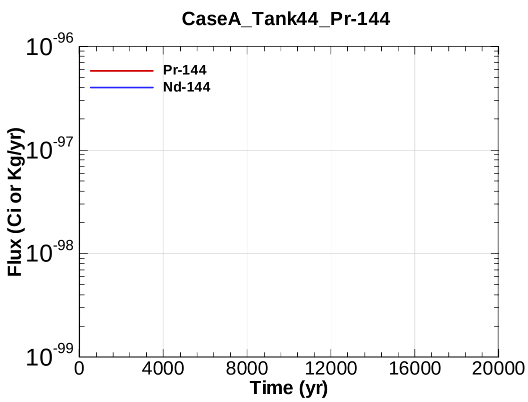

Figure A.1-1283 - Flux Leaving Liner for CaseA Tank44 Pr-144

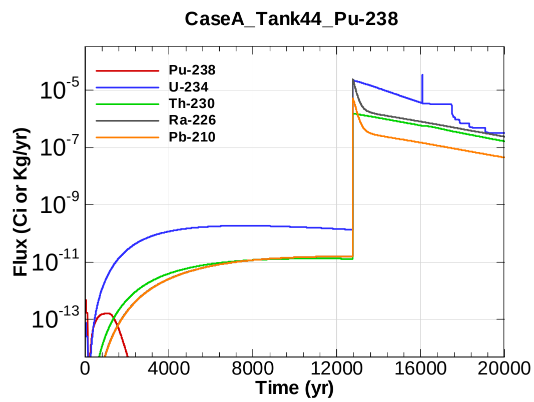

Figure A.1-1284 - Flux Leaving Liner for CaseA Tank44 Pu-238

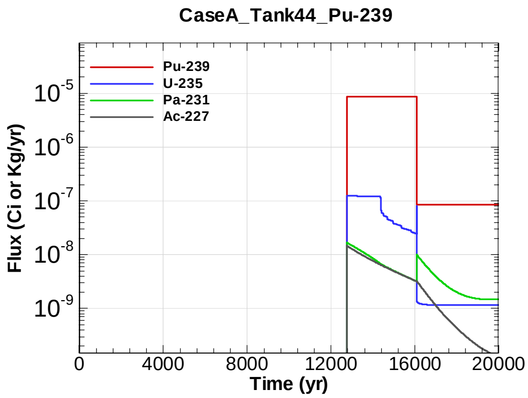

Figure A.1-1285 - Flux Leaving Liner for CaseA Tank44 Pu-239

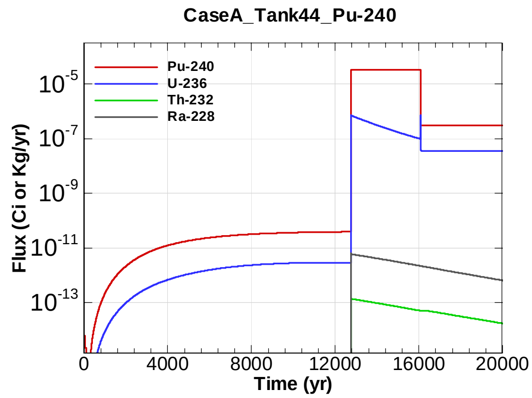

Figure A.1-1286 - Flux Leaving Liner for CaseA Tank44 Pu-240

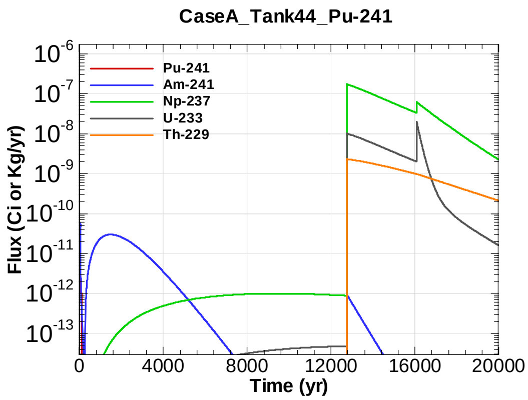

Figure A.1-1287 - Flux Leaving Liner for CaseA Tank44 Pu-241

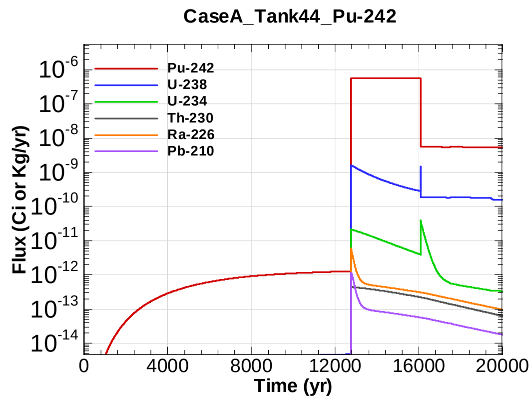

Figure A.1-1288 - Flux Leaving Liner for CaseA Tank44 Pu-242

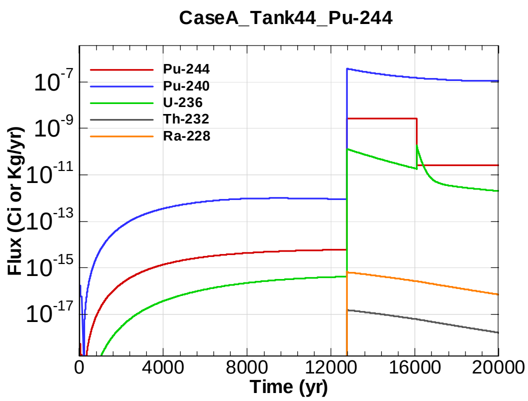

Figure A.1-1289 - Flux Leaving Liner for CaseA Tank44 Pu-244

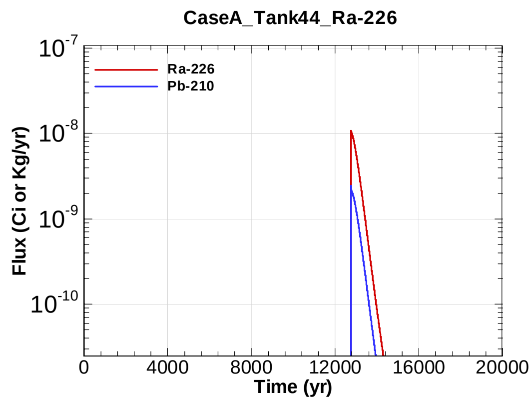

Figure A.1-1290 - Flux Leaving Liner for CaseA Tank44 Ra-226

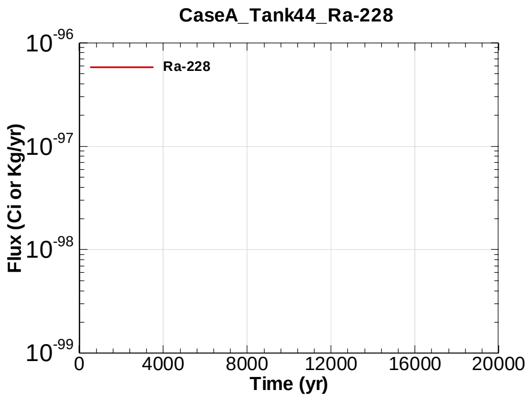

Figure A.1-1291 - Flux Leaving Liner for CaseA Tank44 Ra-228

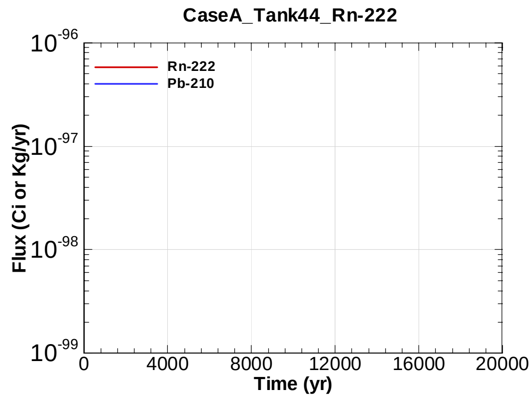

Figure A.1-1292 - Flux Leaving Liner for CaseA Tank44 Rn-222

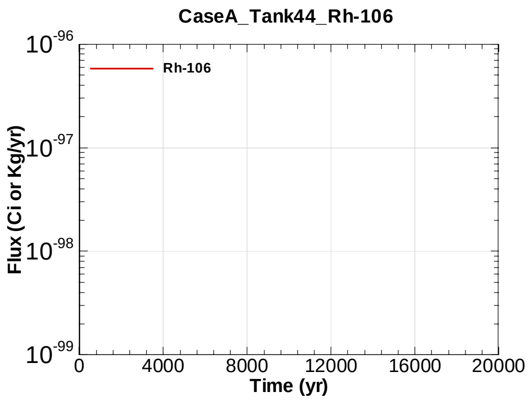

Figure A.1-1293 - Flux Leaving Liner for CaseA Tank44 Rh-106

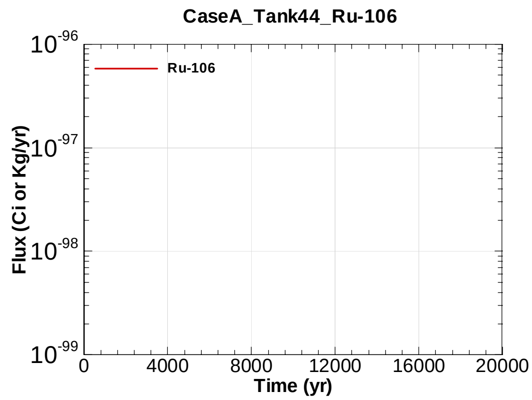

Figure A.1-1294 - Flux Leaving Liner for CaseA Tank44 Ru-106

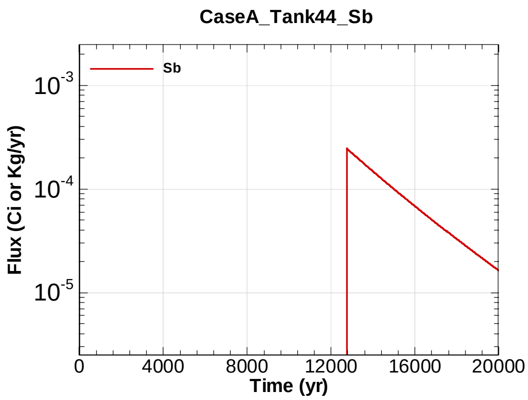

Figure A.1-1295 - Flux Leaving Liner for CaseA Tank44 Sb

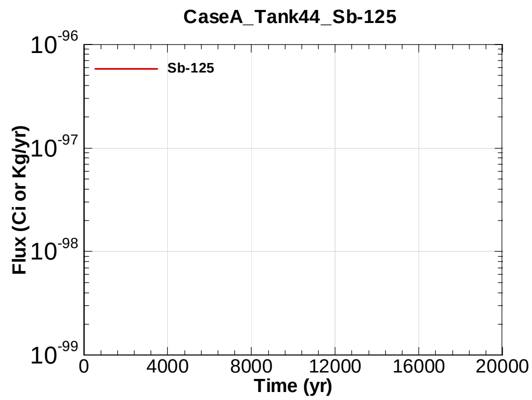

Figure A.1-1296 - Flux Leaving Liner for CaseA Tank44 Sb-125

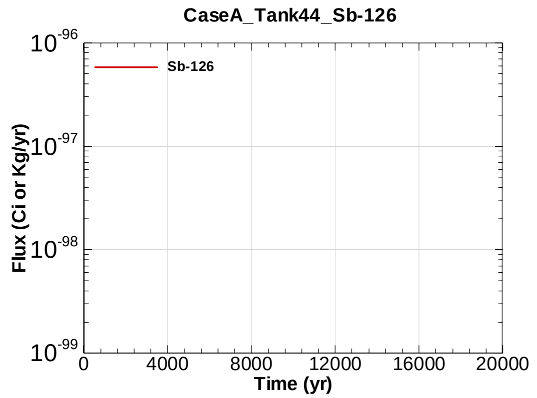

Figure A.1-1297 - Flux Leaving Liner for CaseA Tank44 Sb-126

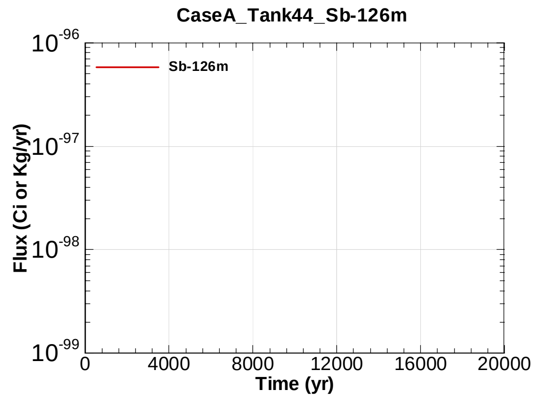

Figure A.1-1298 - Flux Leaving Liner for CaseA Tank44 Sb-126m

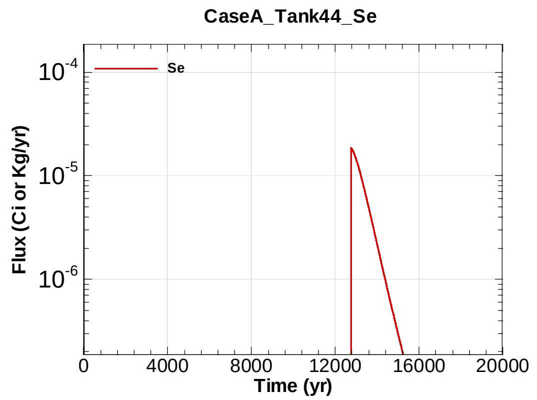

Figure A.1-1299 - Flux Leaving Liner for CaseA Tank44 Se

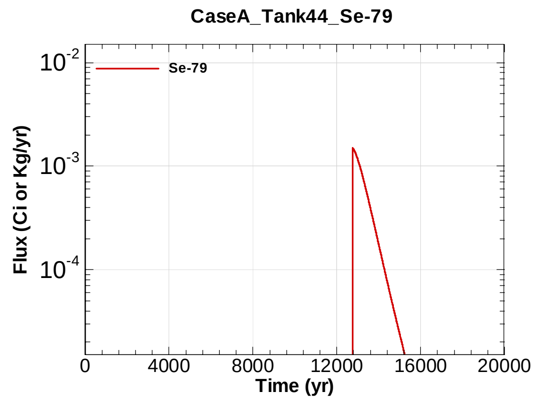

Figure A.1-1300 - Flux Leaving Liner for CaseA Tank44 Se-79

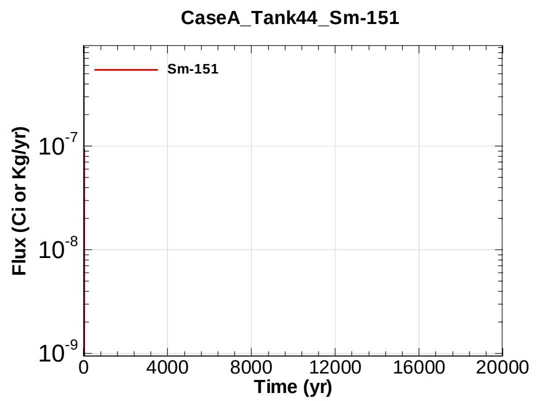

Figure A.1-1301 - Flux Leaving Liner for CaseA Tank44 Sm-151

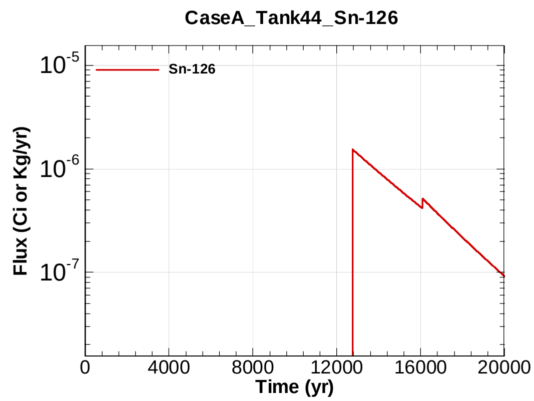

Figure A.1-1302 - Flux Leaving Liner for CaseA Tank44 Sn-126

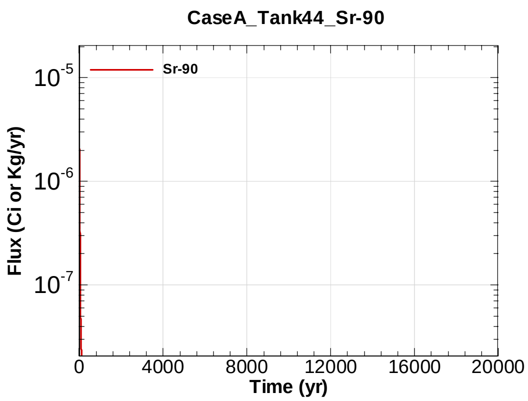

Figure A.1-1303 - Flux Leaving Liner for CaseA Tank44 Sr-90

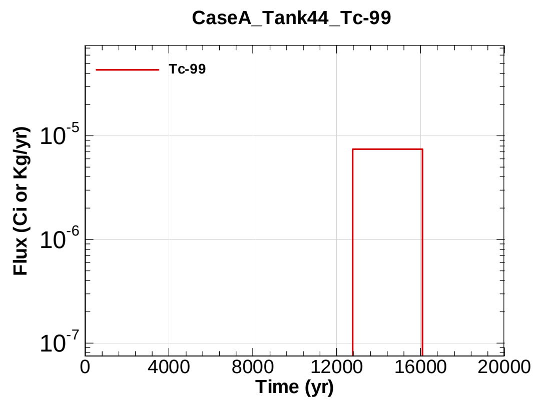

Figure A.1-1304 - Flux Leaving Liner for CaseA Tank44 Tc-99

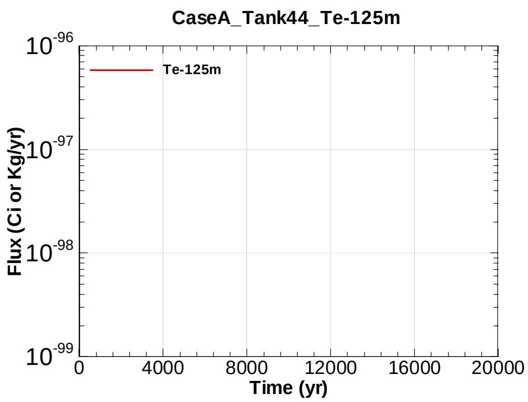

Figure A.1-1305 - Flux Leaving Liner for CaseA Tank44 Te-125m

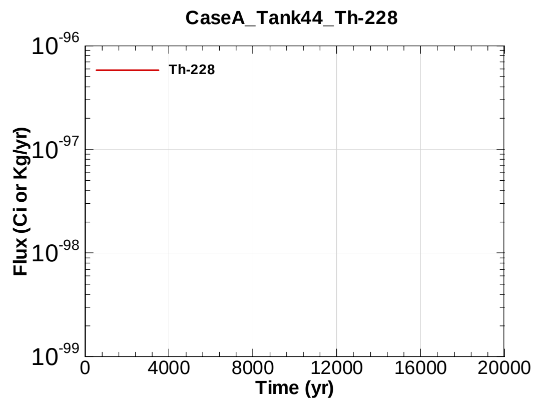

Figure A.1-1306 - Flux Leaving Liner for CaseA Tank44 Th-228

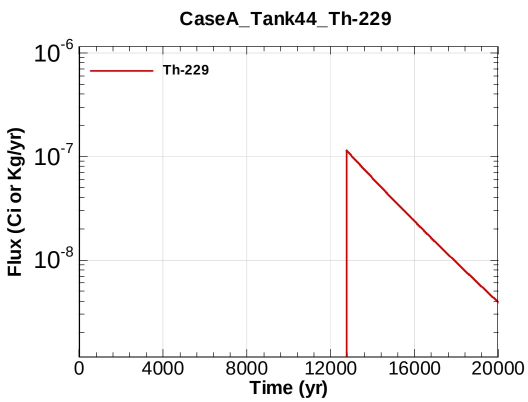

Figure A.1-1307 - Flux Leaving Liner for CaseA Tank44 Th-229

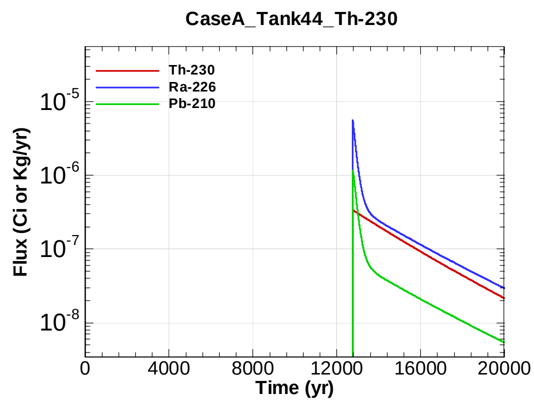

Figure A.1-1308 - Flux Leaving Liner for CaseA Tank44 Th-230

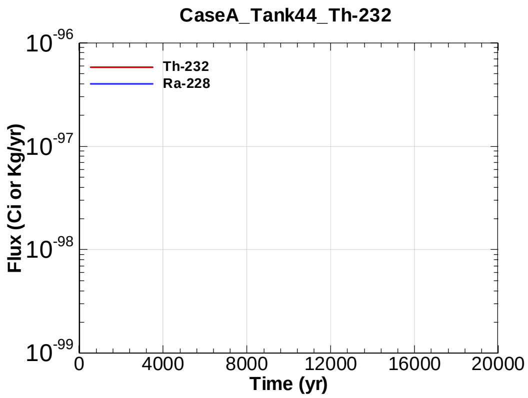

Figure A.1-1309 - Flux Leaving Liner for CaseA Tank44 Th-232

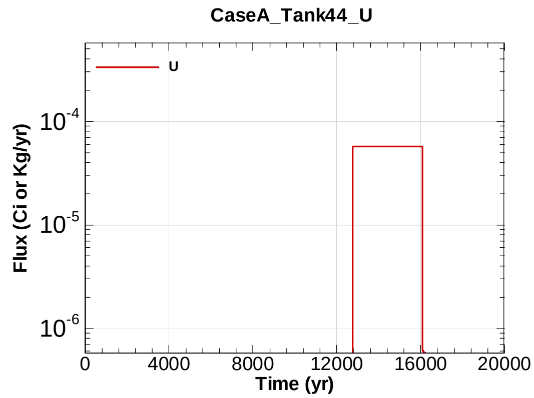

Figure A.1-1310 - Flux Leaving Liner for CaseA Tank44 U

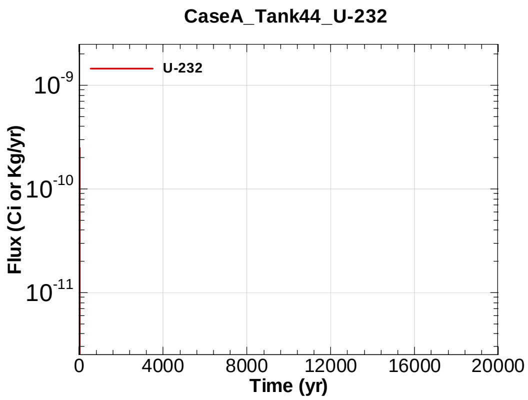

Figure A.1-1311 - Flux Leaving Liner for CaseA Tank44 U-232

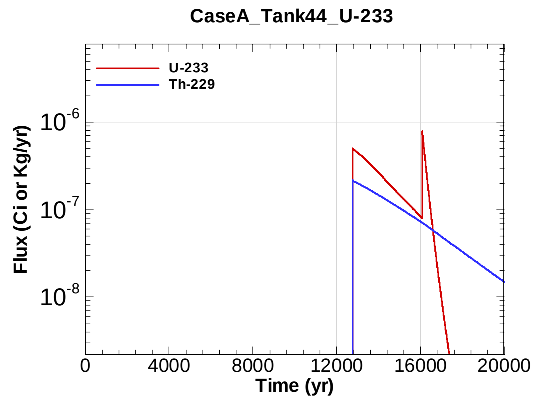

Figure A.1-1312 - Flux Leaving Liner for CaseA Tank44 U-233

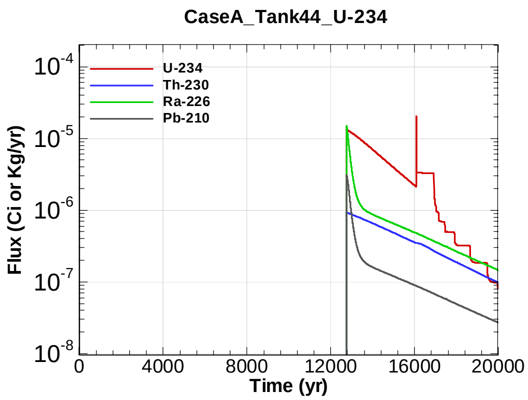

Figure A.1-1313 - Flux Leaving Liner for CaseA Tank44 U-234

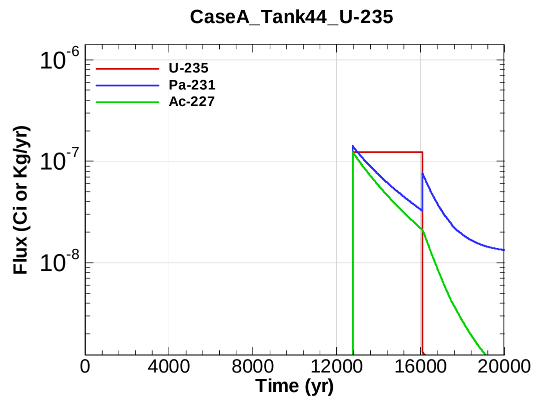

Figure A.1-1314 - Flux Leaving Liner for CaseA Tank44 U-235

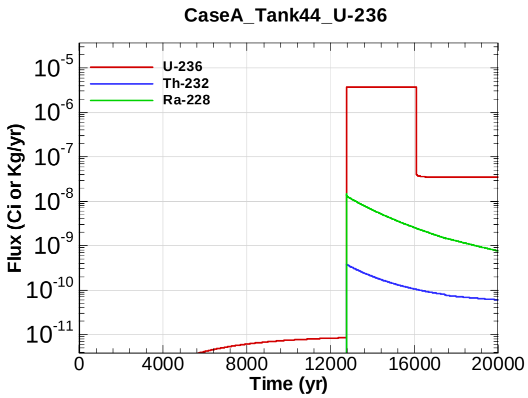

Figure A.1-1315 - Flux Leaving Liner for CaseA Tank44 U-236

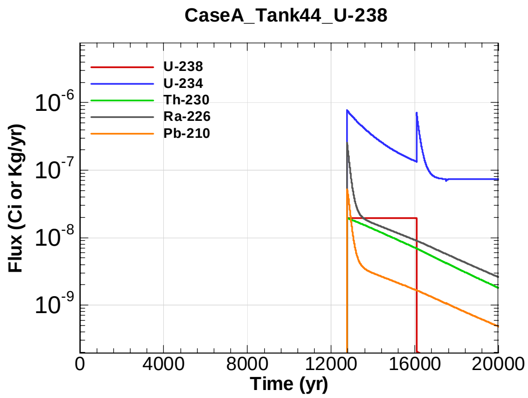

Figure A.1-1316 - Flux Leaving Liner for CaseA Tank44 U-238

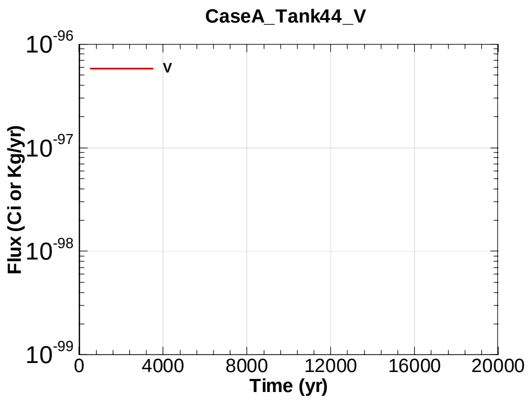

Figure A.1-1317 - Flux Leaving Liner for CaseA Tank44 V

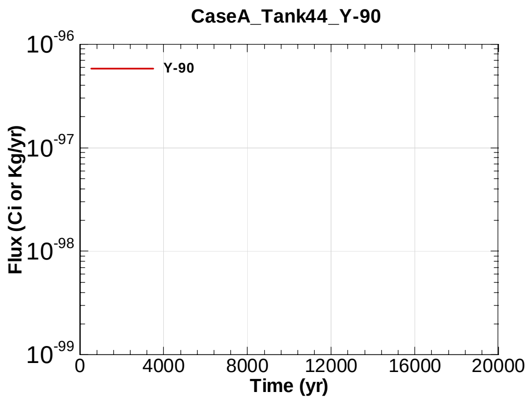

Figure A.1-1318 - Flux Leaving Liner for CaseA Tank44 Y-90

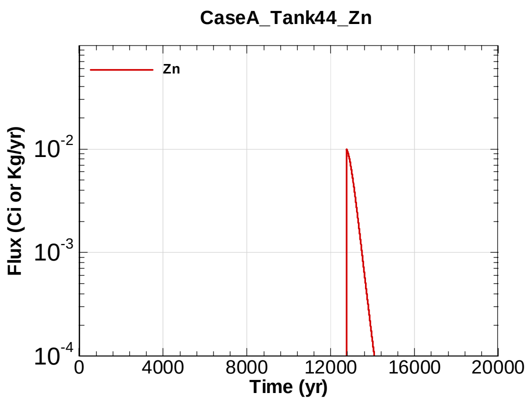

Figure A.1-1319 - Flux Leaving Liner for CaseA Tank44 Zn

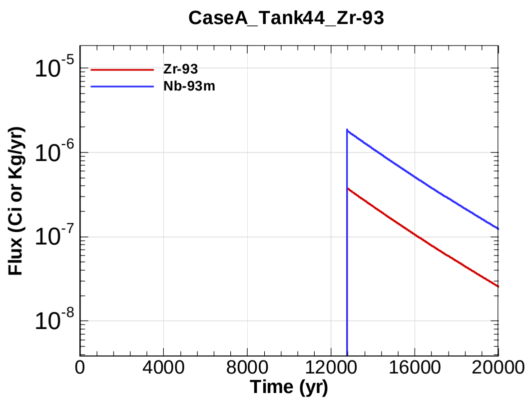

Figure A.1-1320 - Flux Leaving Liner for CaseA Tank44 Zr-93

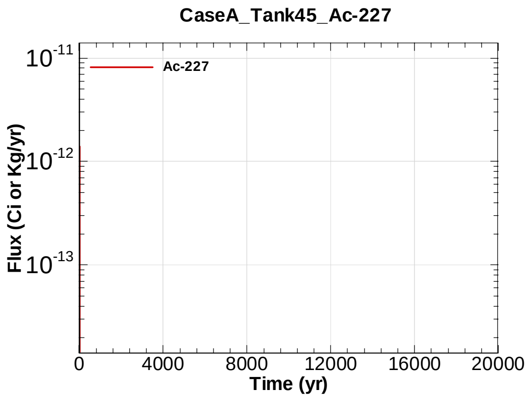

Figure A.1-1321 - Flux Leaving Liner for CaseA Tank45 Ac-227

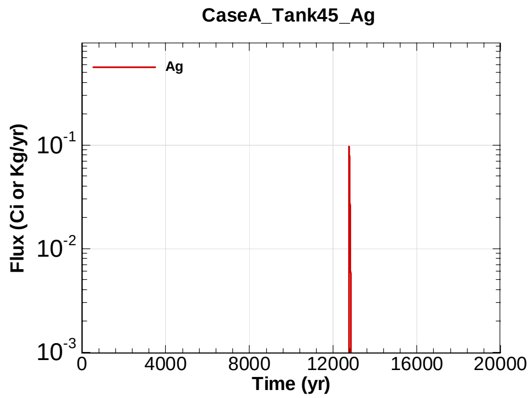

Figure A.1-1322 - Flux Leaving Liner for CaseA Tank45 Ag

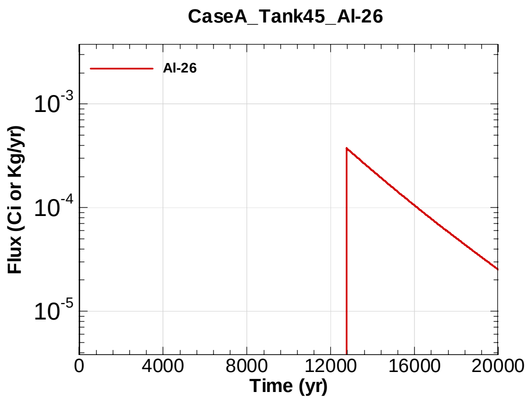

Figure A.1-1323 - Flux Leaving Liner for CaseA Tank45 Al-26

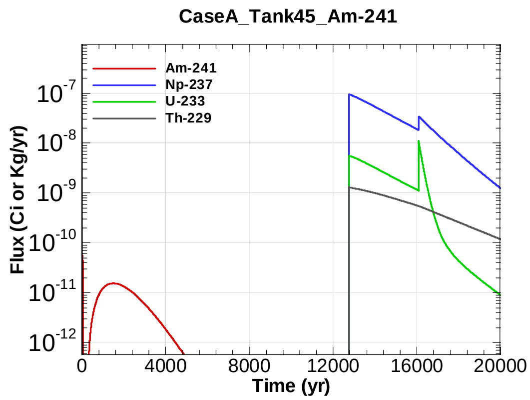

Figure A.1-1324 - Flux Leaving Liner for CaseA Tank45 Am-241

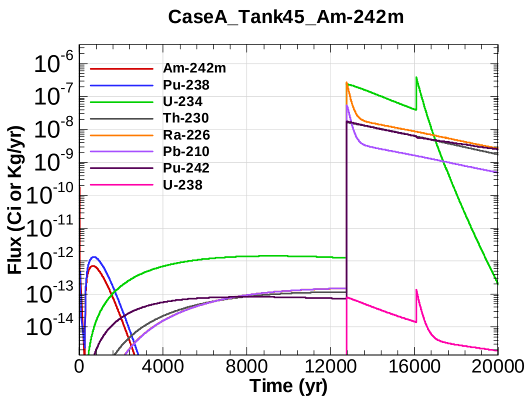

Figure A.1-1325 - Flux Leaving Liner for CaseA Tank45 Am-242m

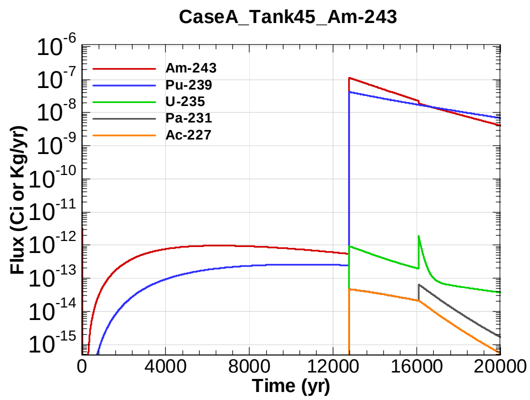

Figure A.1-1326 - Flux Leaving Liner for CaseA Tank45 Am-243

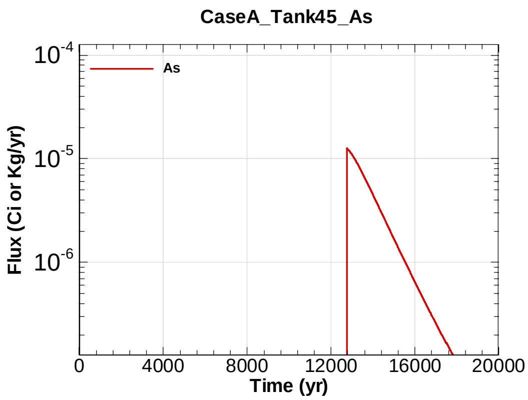

Figure A.1-1327 - Flux Leaving Liner for CaseA Tank45 As

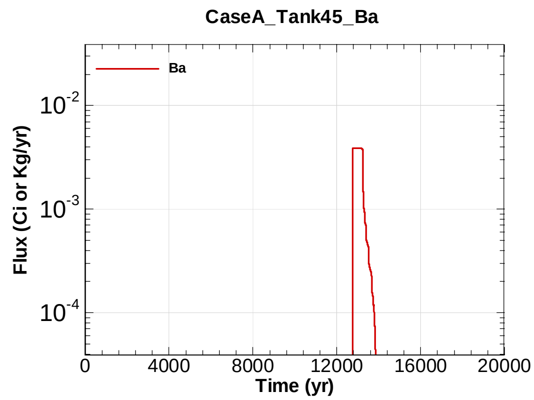

Figure A.1-1328 - Flux Leaving Liner for CaseA Tank45 Ba

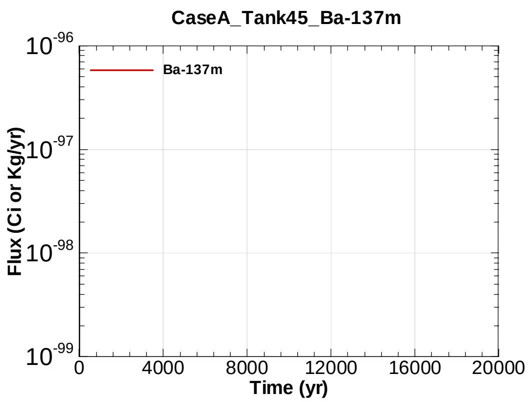

Figure A.1-1329 - Flux Leaving Liner for CaseA Tank45 Ba-137m

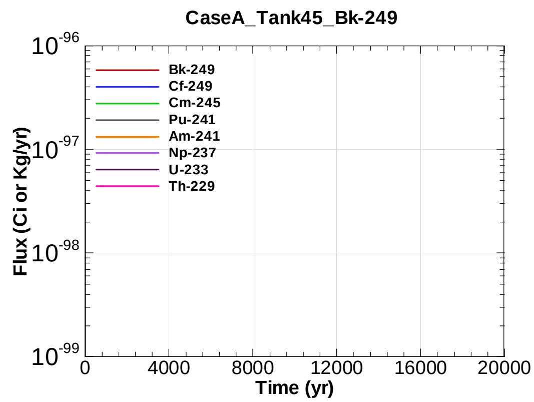

Figure A.1-1330 - Flux Leaving Liner for CaseA Tank45 Bk-249

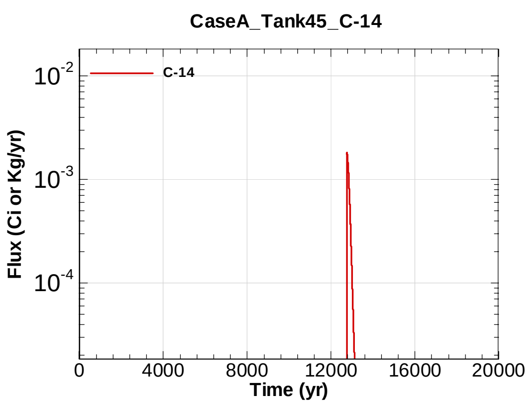

Figure A.1-1331 - Flux Leaving Liner for CaseA Tank45 C-14

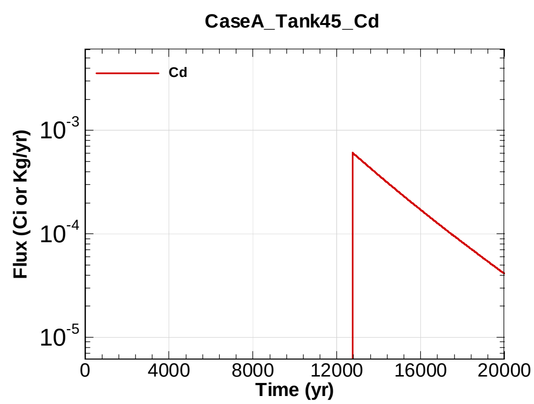

Figure A.1-1332 - Flux Leaving Liner for CaseA Tank45 Cd

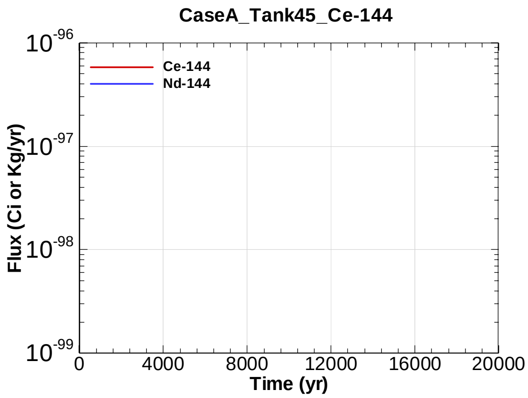

Figure A.1-1333 - Flux Leaving Liner for CaseA Tank45 Ce-144

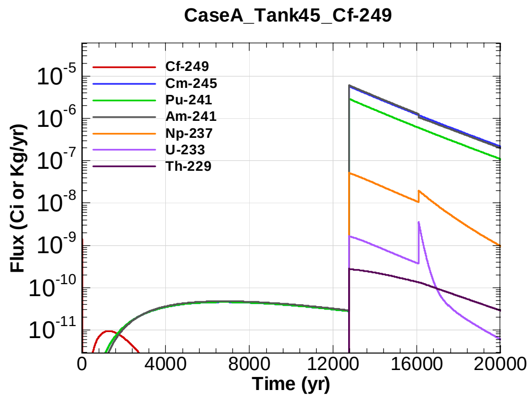

Figure A.1-1334 - Flux Leaving Liner for CaseA Tank45 Cf-249

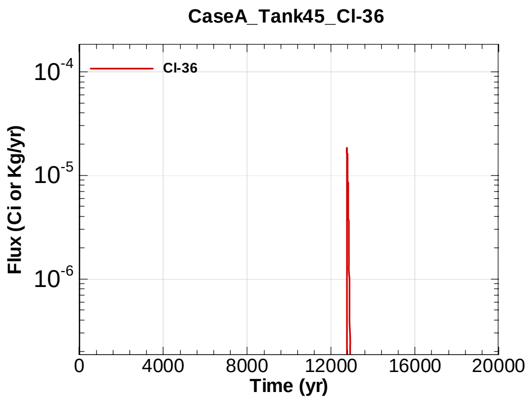

Figure A.1-1335 - Flux Leaving Liner for CaseA Tank45 Cl-36

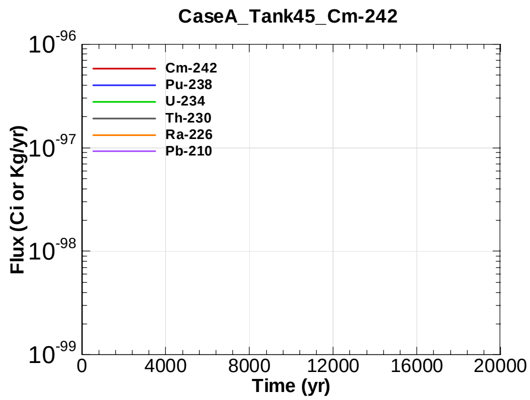

Figure A.1-1336 - Flux Leaving Liner for CaseA Tank45 Cm-242

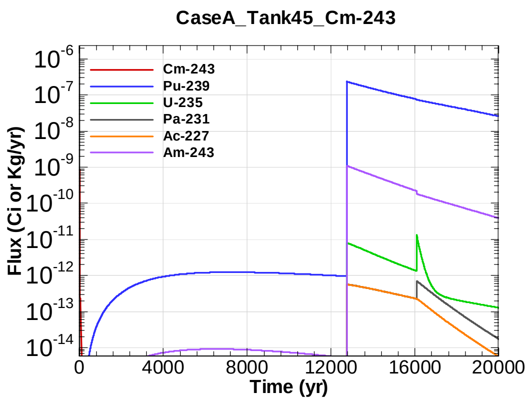

Figure A.1-1337 - Flux Leaving Liner for CaseA Tank45 Cm-243

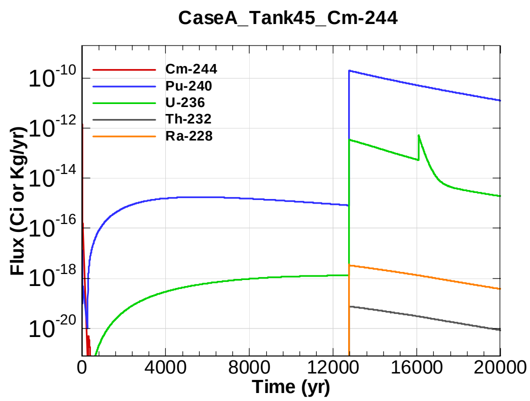

Figure A.1-1338 - Flux Leaving Liner for CaseA Tank45 Cm-244

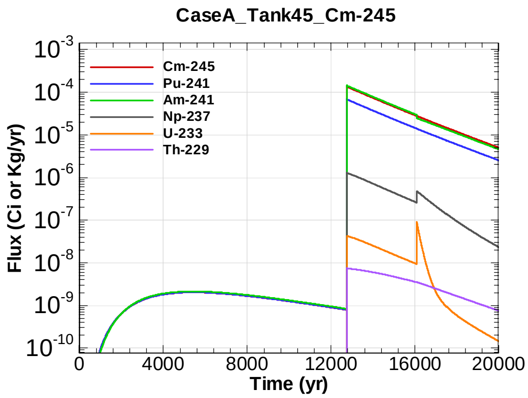

Figure A.1-1339 - Flux Leaving Liner for CaseA Tank45 Cm-245

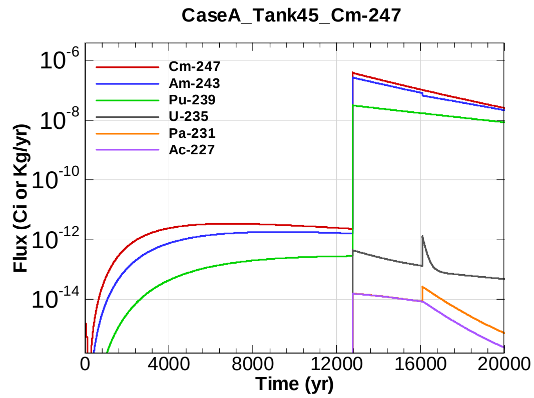

Figure A.1-1340 - Flux Leaving Liner for CaseA Tank45 Cm-247

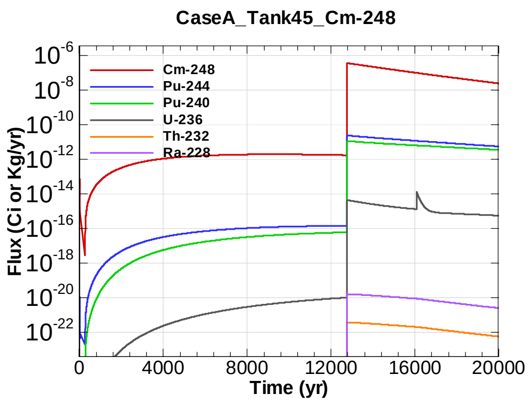

Figure A.1-1341 - Flux Leaving Liner for CaseA Tank45 Cm-248

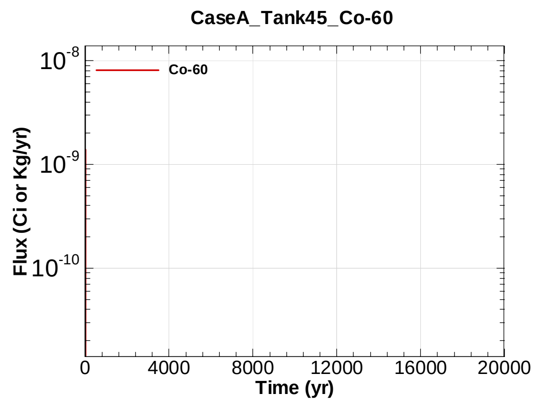

Figure A.1-1342 - Flux Leaving Liner for CaseA Tank45 Co-60

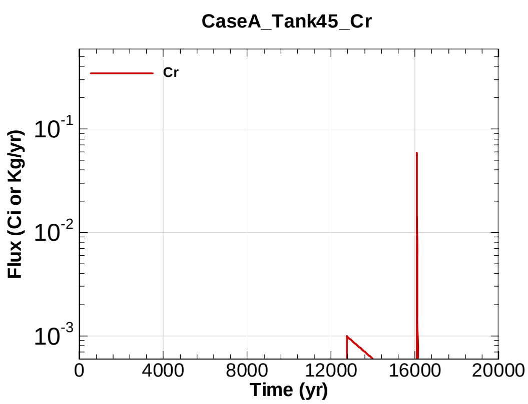

Figure A.1-1343 - Flux Leaving Liner for CaseA Tank45 Cr

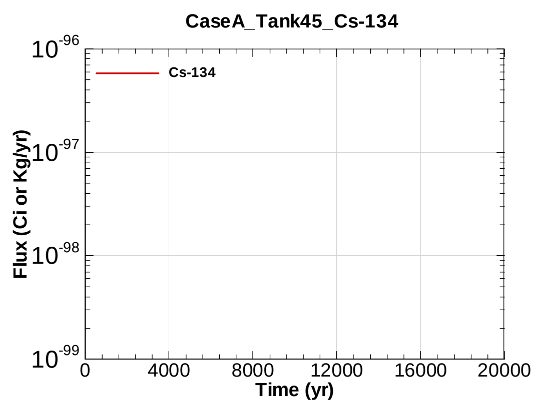

Figure A.1-1344 - Flux Leaving Liner for CaseA Tank45 Cs-134

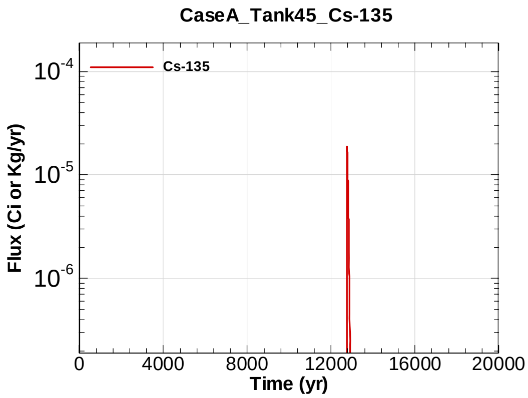

Figure A.1-1345 - Flux Leaving Liner for CaseA Tank45 Cs-135

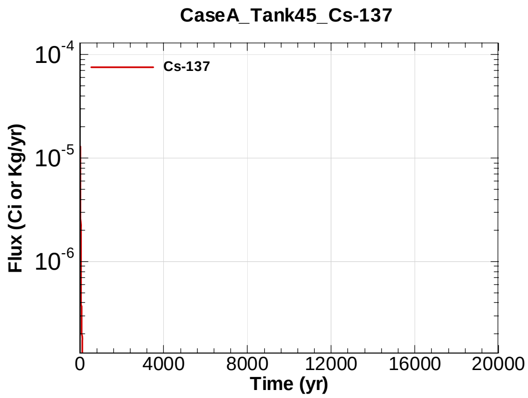

Figure A.1-1346 - Flux Leaving Liner for CaseA Tank45 Cs-137

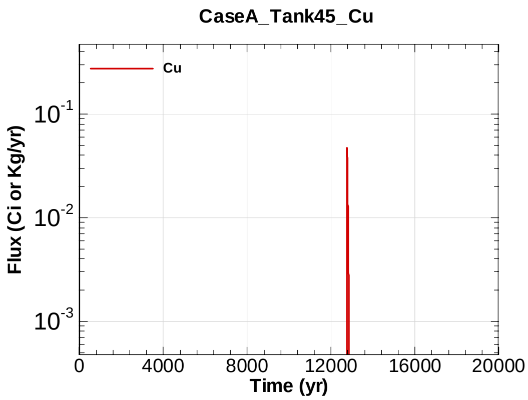

Figure A.1-1347 - Flux Leaving Liner for CaseA Tank45 Cu

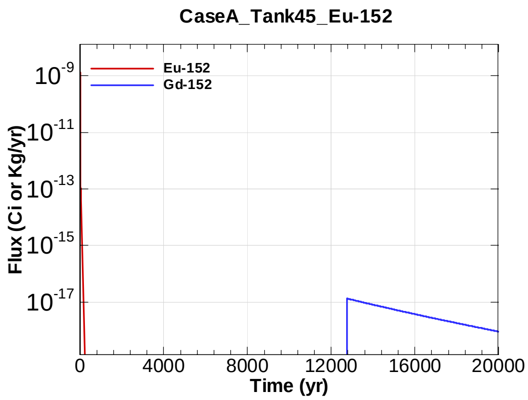

Figure A.1-1348 - Flux Leaving Liner for CaseA Tank45 Eu-152

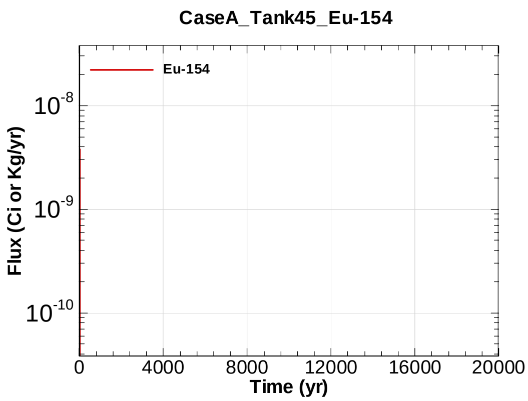

Figure A.1-1349 - Flux Leaving Liner for CaseA Tank45 Eu-154

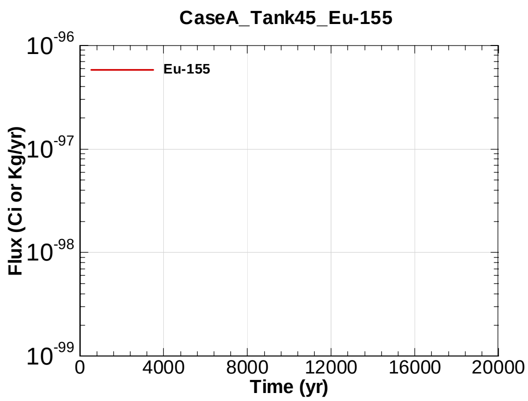

Figure A.1-1350 - Flux Leaving Liner for CaseA Tank45 Eu-155

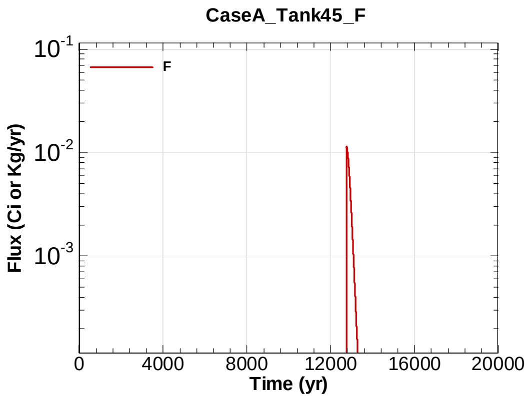

Figure A.1-1351 - Flux Leaving Liner for CaseA Tank45 F

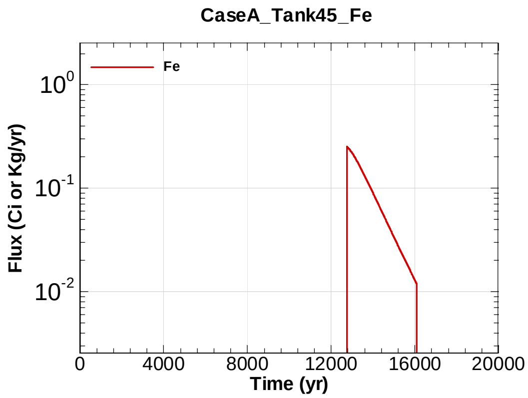

Figure A.1-1352 - Flux Leaving Liner for CaseA Tank45 Fe

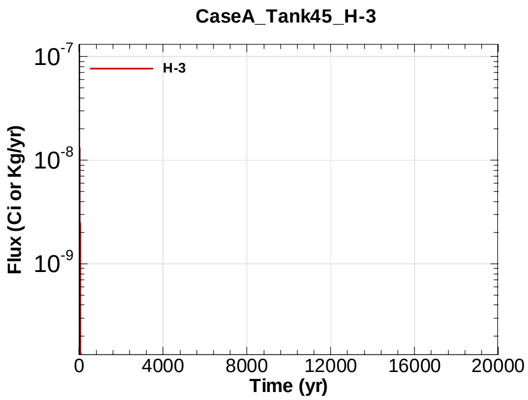

Figure A.1-1353 - Flux Leaving Liner for CaseA Tank45 H-3

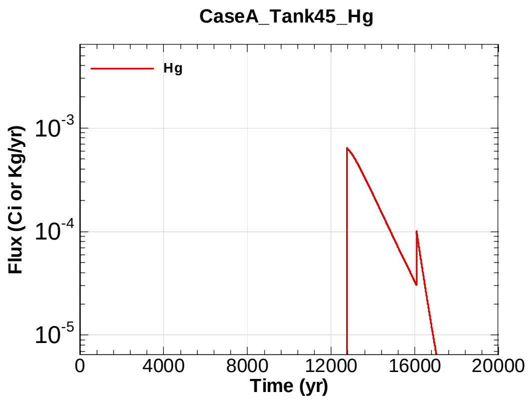

Figure A.1-1354 - Flux Leaving Liner for CaseA Tank45 Hg

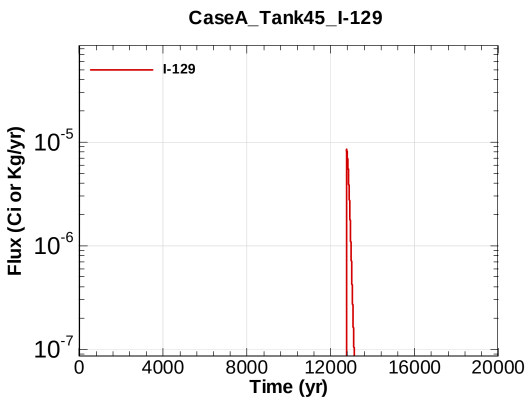

Figure A.1-1355 - Flux Leaving Liner for CaseA Tank45 I-129

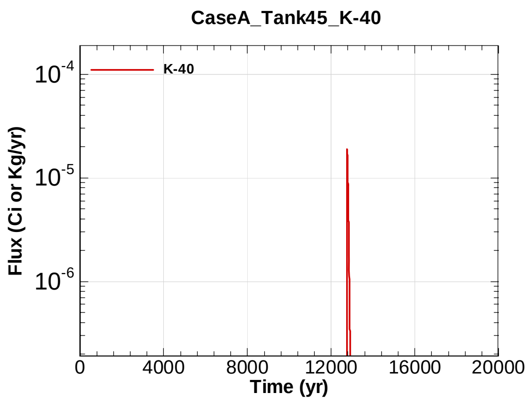

Figure A.1-1356 - Flux Leaving Liner for CaseA Tank45 K-40

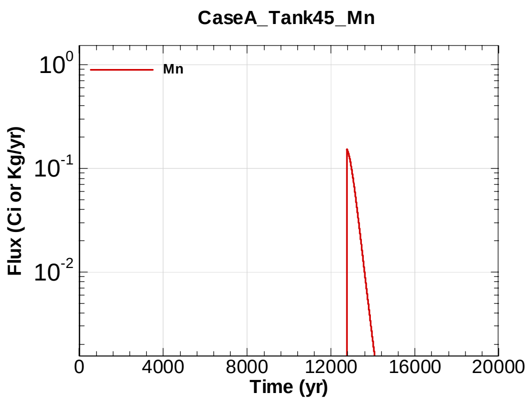

Figure A.1-1357 - Flux Leaving Liner for CaseA Tank45 Mn

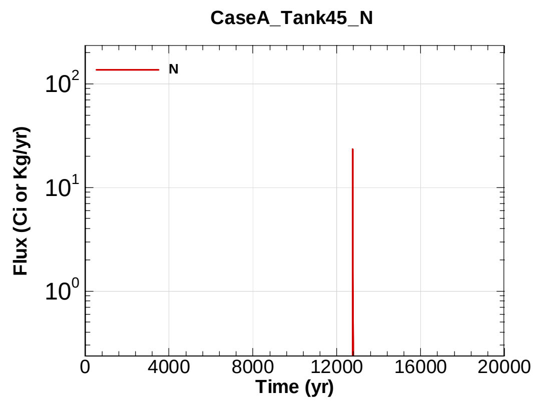

Figure A.1-1358 - Flux Leaving Liner for CaseA Tank45 N

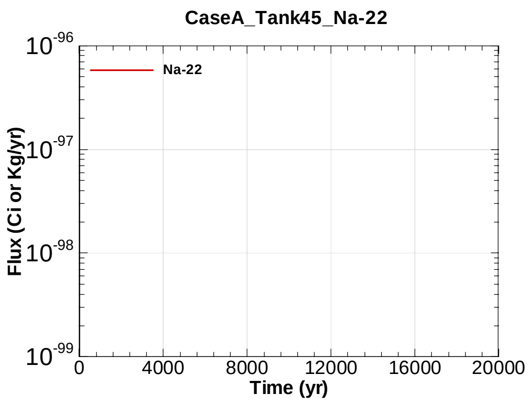

Figure A.1-1359 - Flux Leaving Liner for CaseA Tank45 Na-22

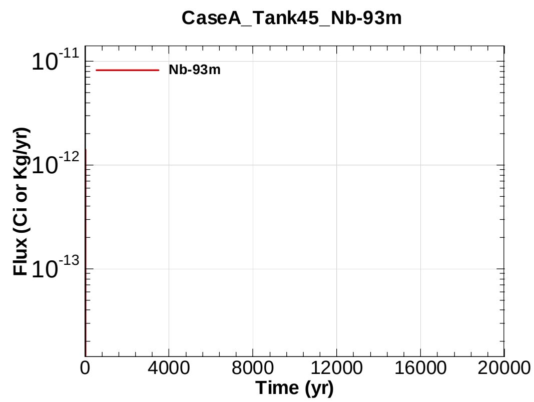

Figure A.1-1360 - Flux Leaving Liner for CaseA Tank45 Nb-93m

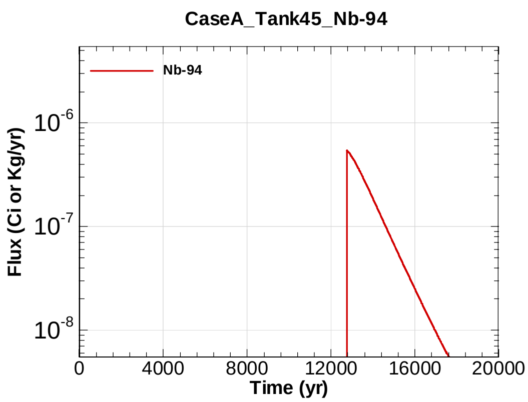

Figure A.1-1361 - Flux Leaving Liner for CaseA Tank45 Nb-94

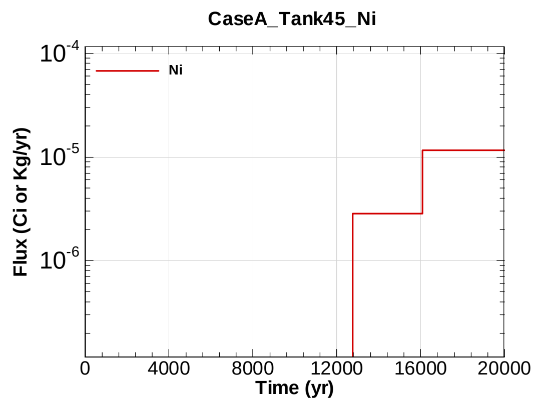

Figure A.1-1362 - Flux Leaving Liner for CaseA Tank45 Ni

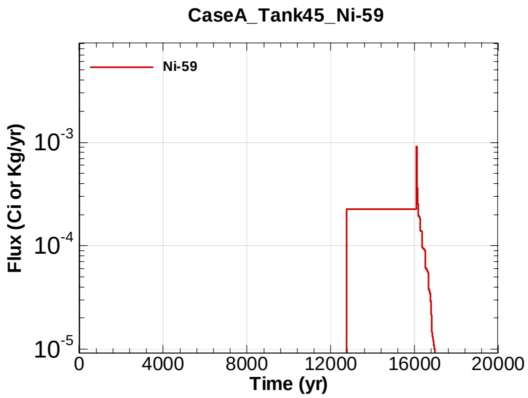

Figure A.1-1363 - Flux Leaving Liner for CaseA Tank45 Ni-59

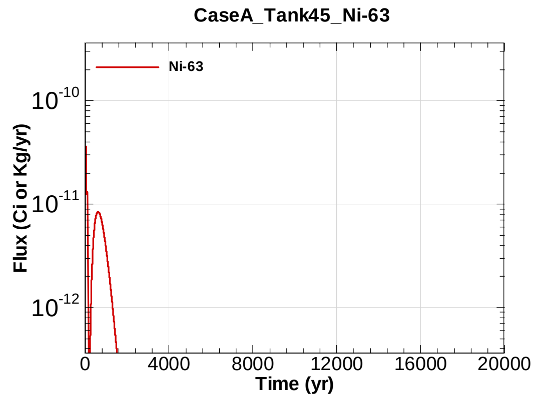

Figure A.1-1364 - Flux Leaving Liner for CaseA Tank45 Ni-63

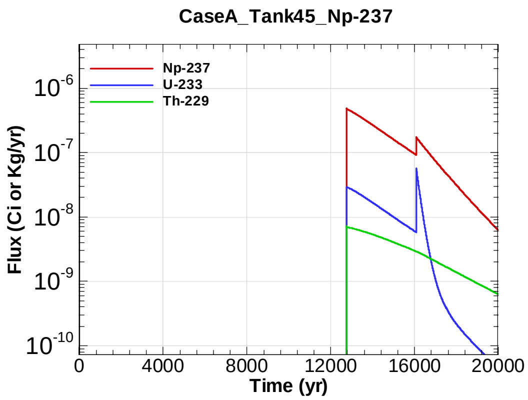

Figure A.1-1365 - Flux Leaving Liner for CaseA Tank45 Np-237

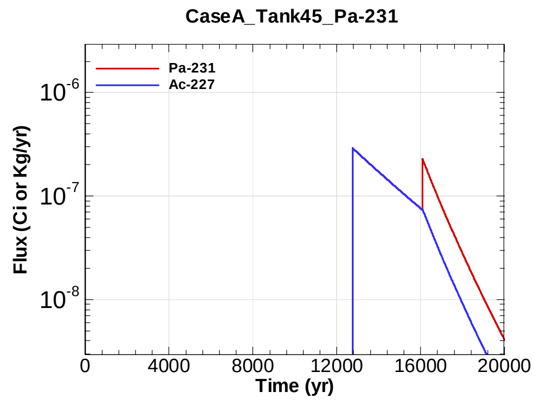

Figure A.1-1366 - Flux Leaving Liner for CaseA Tank45 Pa-231

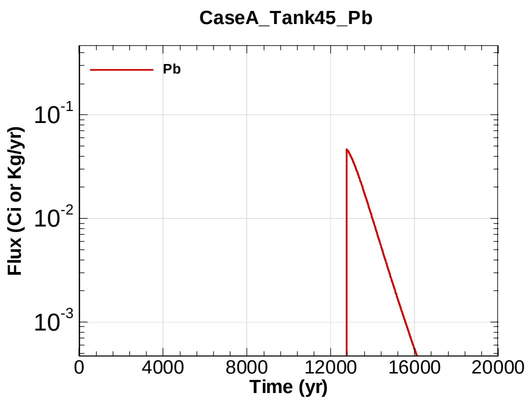

Figure A.1-1367 - Flux Leaving Liner for CaseA Tank45 Pb

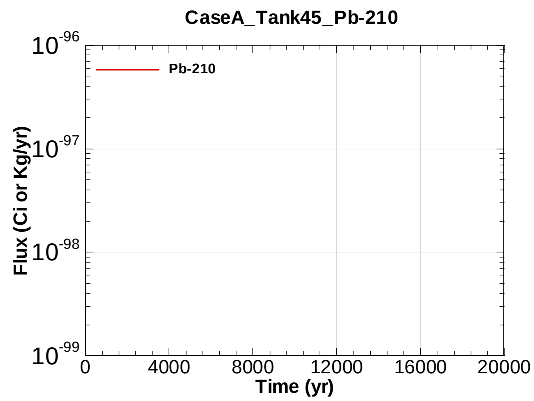

Figure A.1-1368 - Flux Leaving Liner for CaseA Tank45 Pb-210

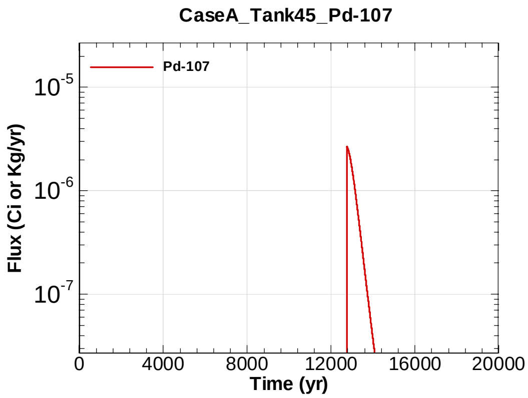

Figure A.1-1369 - Flux Leaving Liner for CaseA Tank45 Pd-107

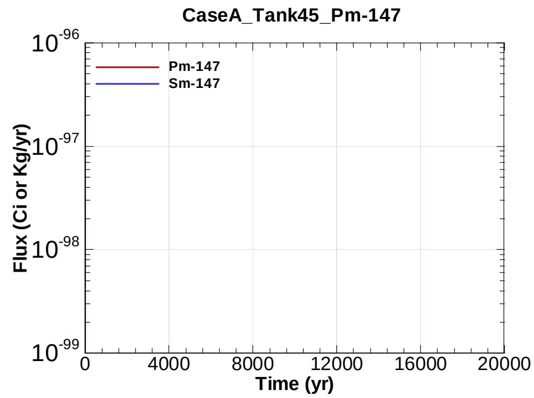

Figure A.1-1370 - Flux Leaving Liner for CaseA Tank45 Pm-147

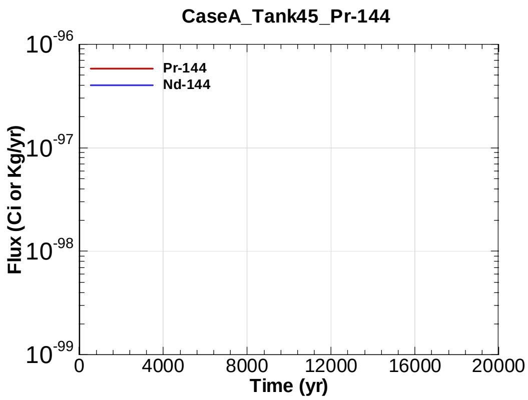

Figure A.1-1371 - Flux Leaving Liner for CaseA Tank45 Pr-144

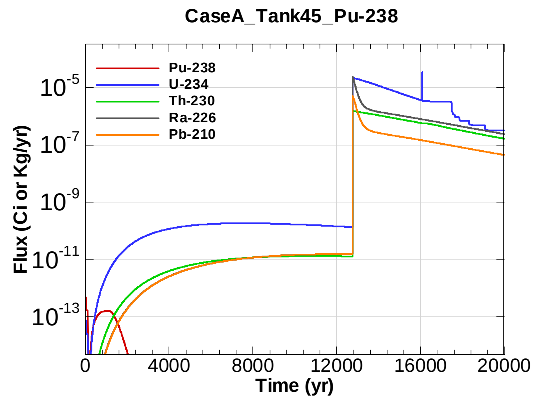

Figure A.1-1372 - Flux Leaving Liner for CaseA Tank45 Pu-238

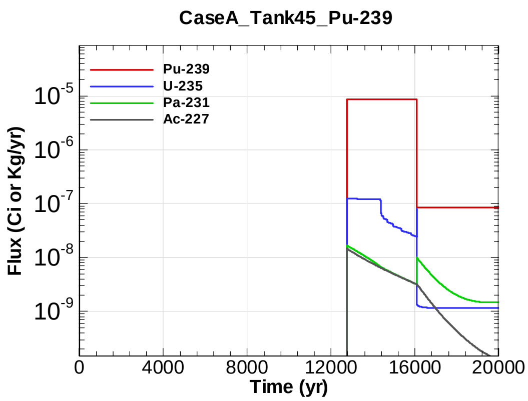

Figure A.1-1373 - Flux Leaving Liner for CaseA Tank45 Pu-239

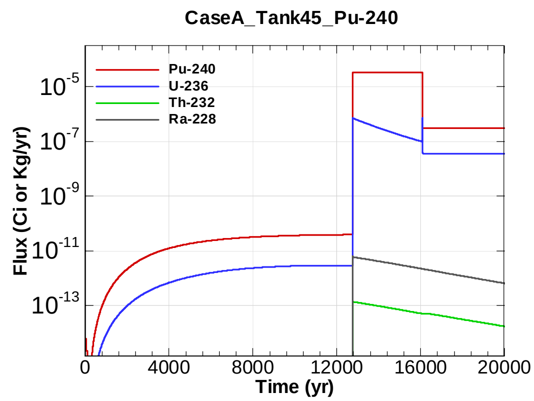

Figure A.1-1374 - Flux Leaving Liner for CaseA Tank45 Pu-240

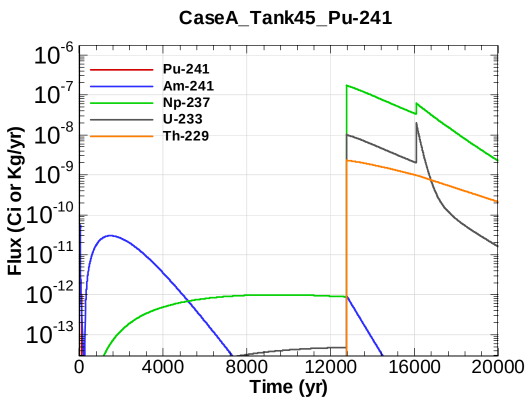

Figure A.1-1375 - Flux Leaving Liner for CaseA Tank45 Pu-241

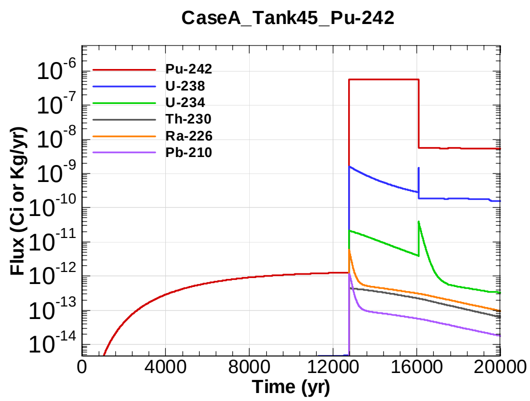

Figure A.1-1376 - Flux Leaving Liner for CaseA Tank45 Pu-242

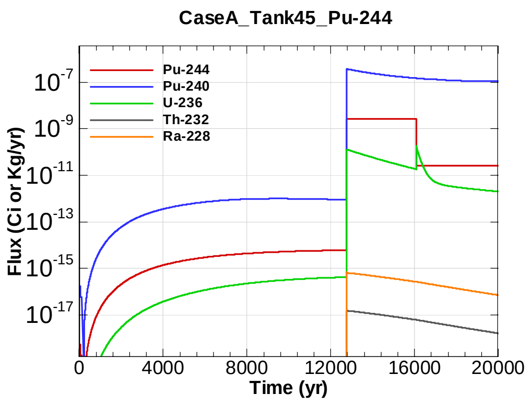

Figure A.1-1377 - Flux Leaving Liner for CaseA Tank45 Pu-244

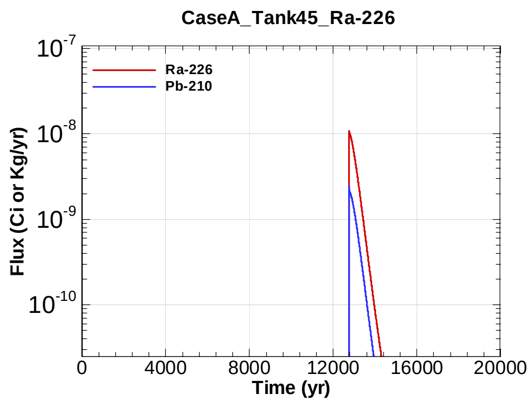

Figure A.1-1378 - Flux Leaving Liner for CaseA Tank45 Ra-226

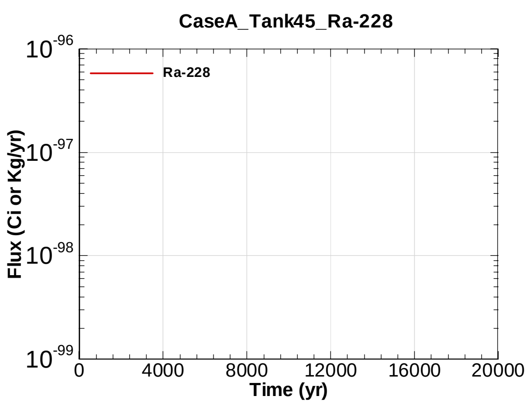

Figure A.1-1379 - Flux Leaving Liner for CaseA Tank45 Ra-228

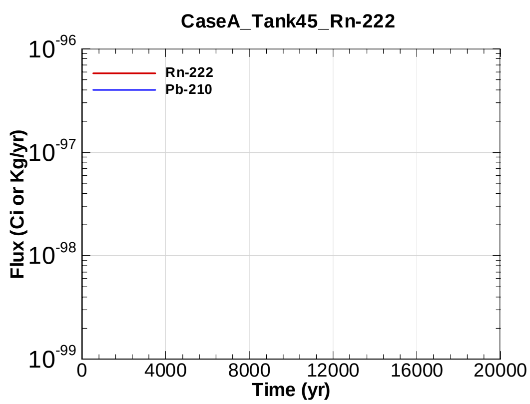

Figure A.1-1380 - Flux Leaving Liner for CaseA Tank45 Rn-222

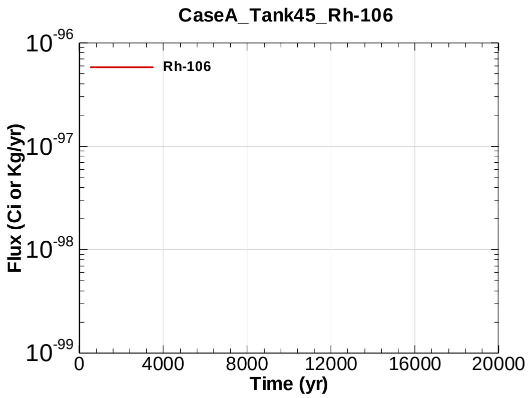

Figure A.1-1381 - Flux Leaving Liner for CaseA Tank45 Rh-106

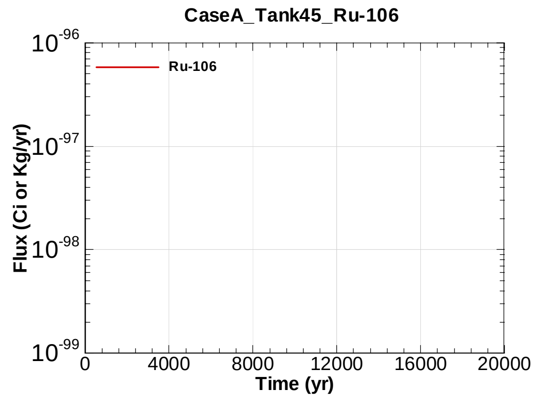

Figure A.1-1382 - Flux Leaving Liner for CaseA Tank45 Ru-106

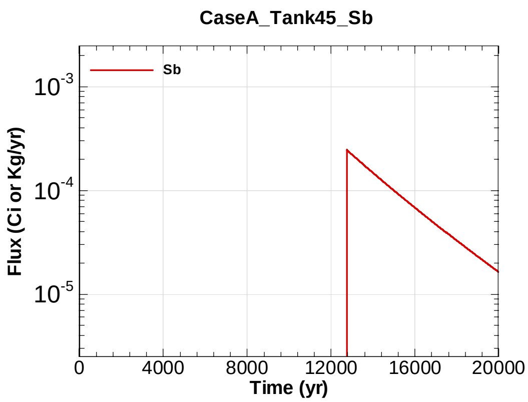

Figure A.1-1383 - Flux Leaving Liner for CaseA Tank45 Sb

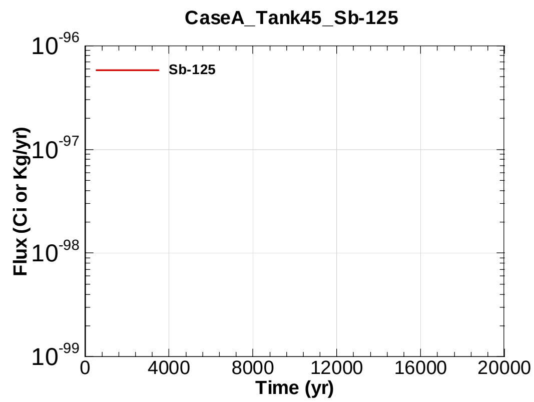

Figure A.1-1384 - Flux Leaving Liner for CaseA Tank45 Sb-125

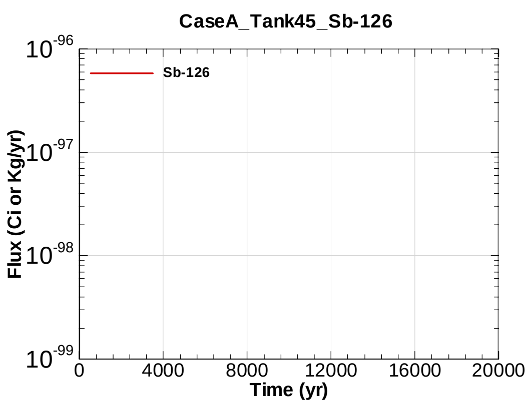

Figure A.1-1385 - Flux Leaving Liner for CaseA Tank45 Sb-126

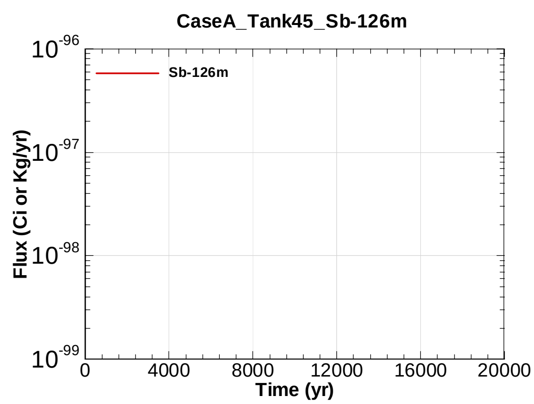

Figure A.1-1386 - Flux Leaving Liner for CaseA Tank45 Sb-126m

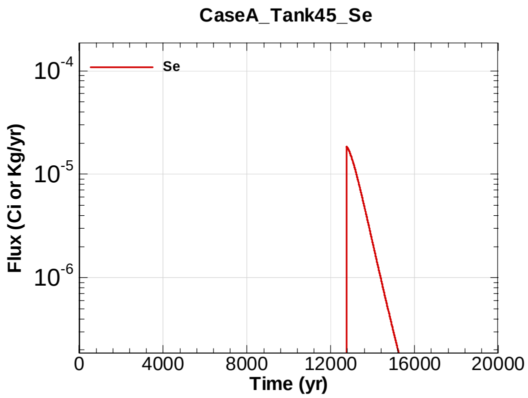

Figure A.1-1387 - Flux Leaving Liner for CaseA Tank45 Se

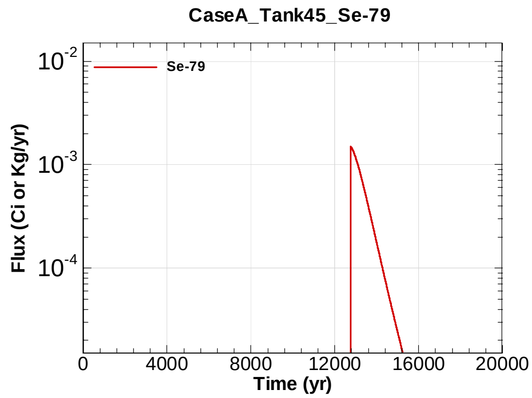

Figure A.1-1388 - Flux Leaving Liner for CaseA Tank45 Se-79

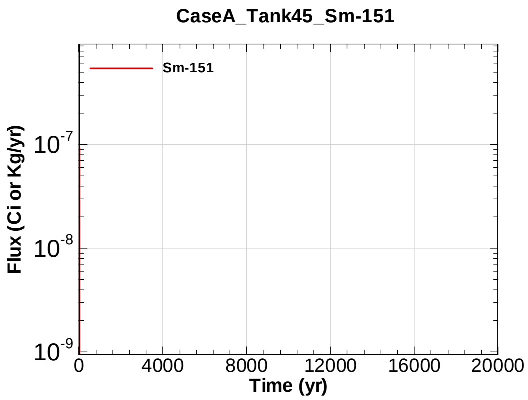

Figure A.1-1389 - Flux Leaving Liner for CaseA Tank45 Sm-151

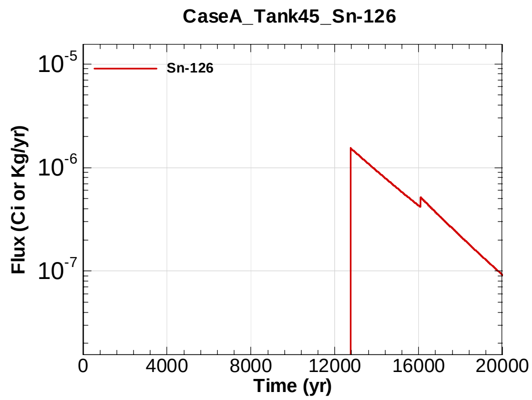

Figure A.1-1390 - Flux Leaving Liner for CaseA Tank45 Sn-126

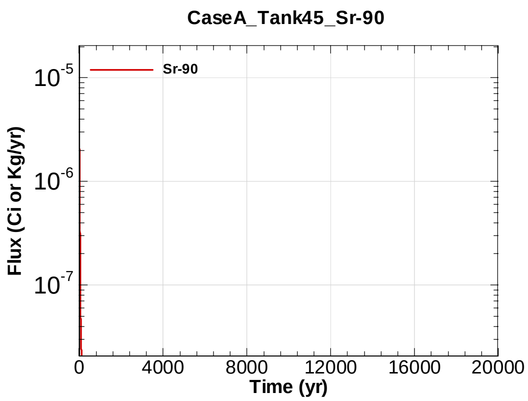

Figure A.1-1391 - Flux Leaving Liner for CaseA Tank45 Sr-90

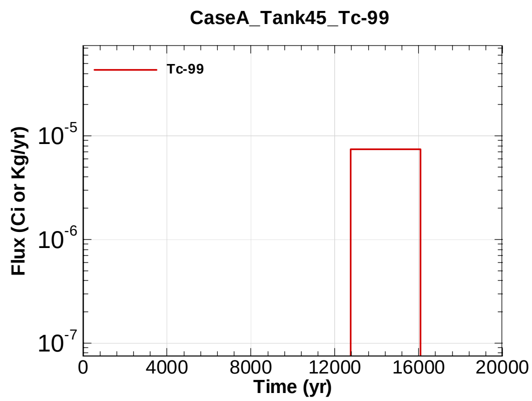

Figure A.1-1392 - Flux Leaving Liner for CaseA Tank45 Tc-99

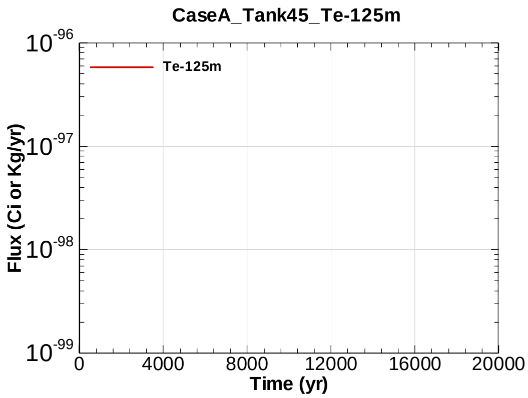

Figure A.1-1393 - Flux Leaving Liner for CaseA Tank45 Te-125m

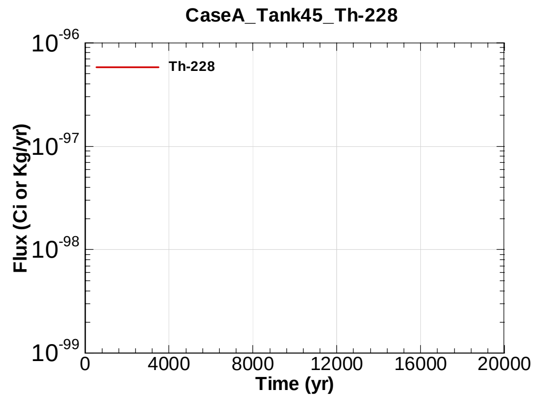

Figure A.1-1394 - Flux Leaving Liner for CaseA Tank45 Th-228

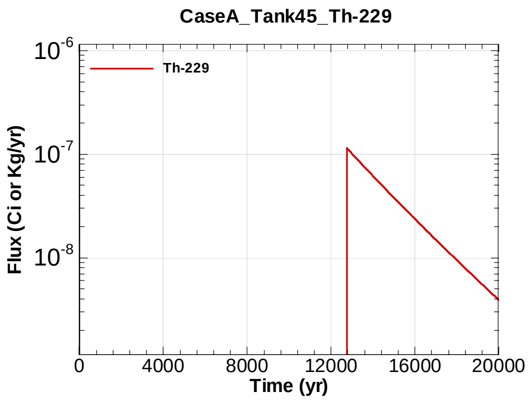

Figure A.1-1395 - Flux Leaving Liner for CaseA Tank45 Th-229

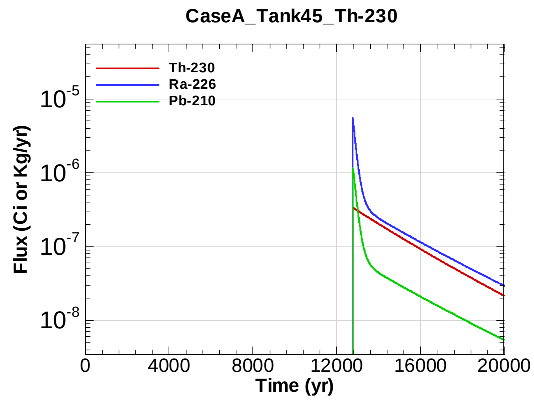

Figure A.1-1396 - Flux Leaving Liner for CaseA Tank45 Th-230

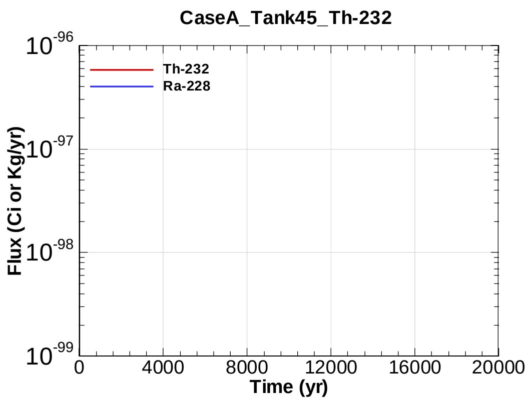

Figure A.1-1397 - Flux Leaving Liner for CaseA Tank45 Th-232

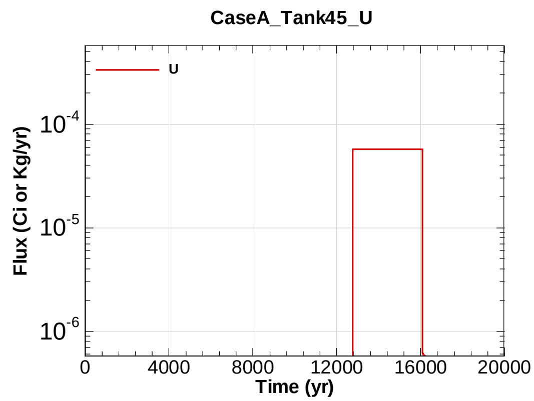

Figure A.1-1398 - Flux Leaving Liner for CaseA Tank45 U

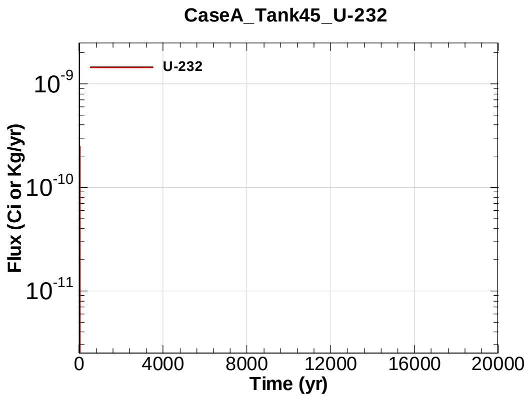

Figure A.1-1399 - Flux Leaving Liner for CaseA Tank45 U-232

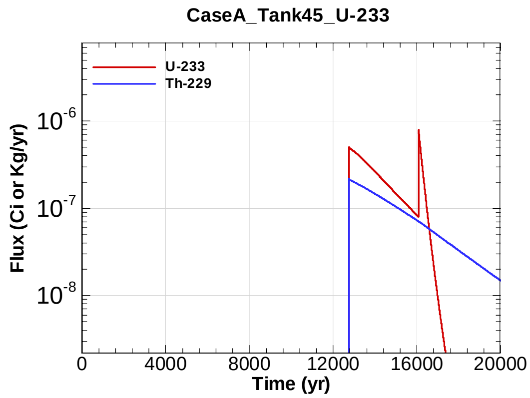

Figure A.1-1400 - Flux Leaving Liner for CaseA Tank45 U-233

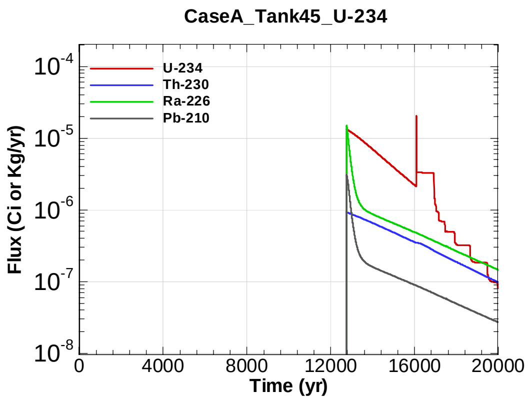

Figure A.1-1401 - Flux Leaving Liner for CaseA Tank45 U-234

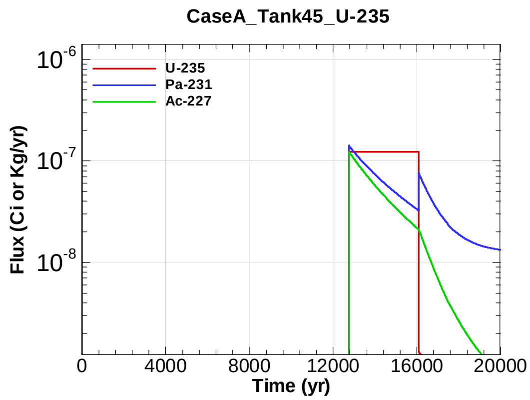

Figure A.1-1402 - Flux Leaving Liner for CaseA Tank45 U-235

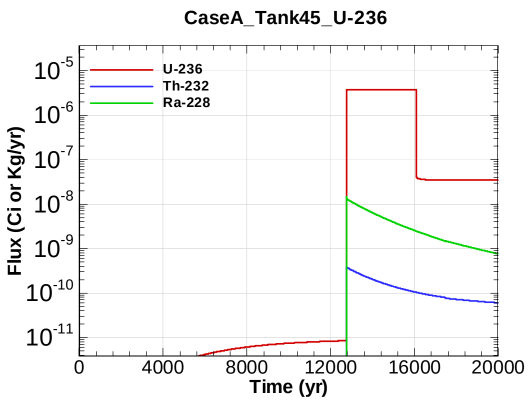

Figure A.1-1403 - Flux Leaving Liner for CaseA Tank45 U-236

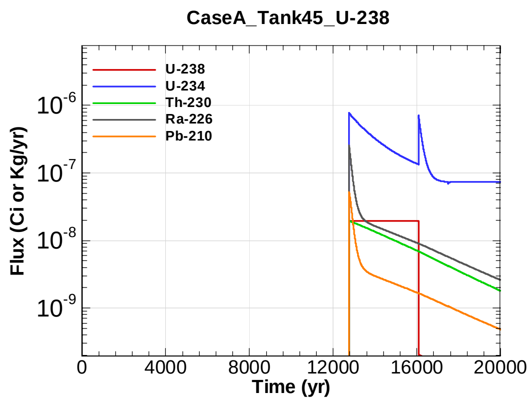

Figure A.1-1404 - Flux Leaving Liner for CaseA Tank45 U-238

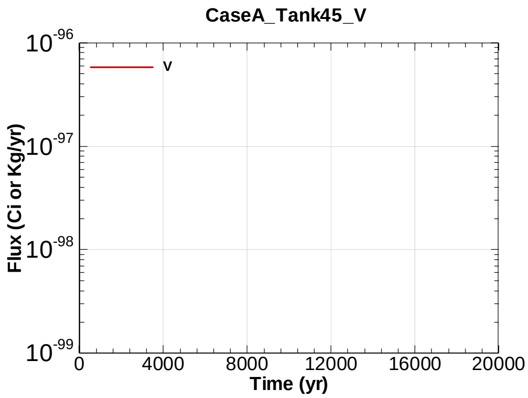

Figure A.1-1405 - Flux Leaving Liner for CaseA Tank45 V

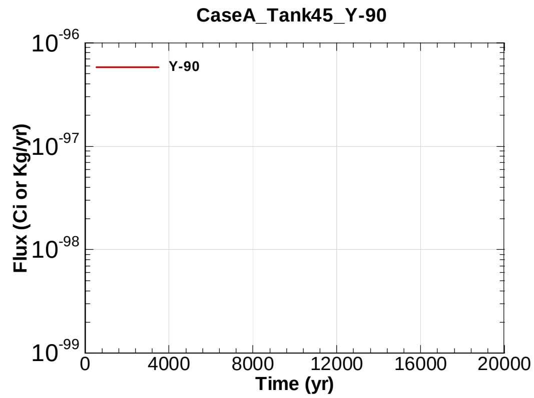

Figure A.1-1406 - Flux Leaving Liner for CaseA Tank45 Y-90

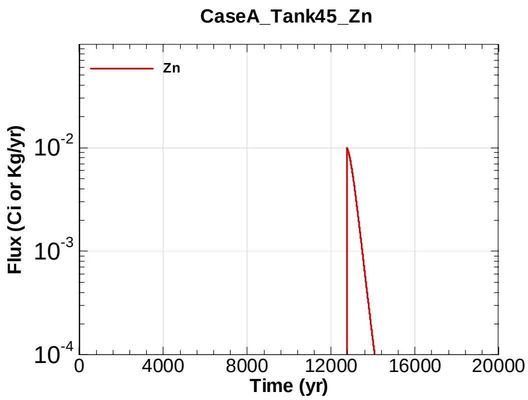

Figure A.1-1407 - Flux Leaving Liner for CaseA Tank45 Zn

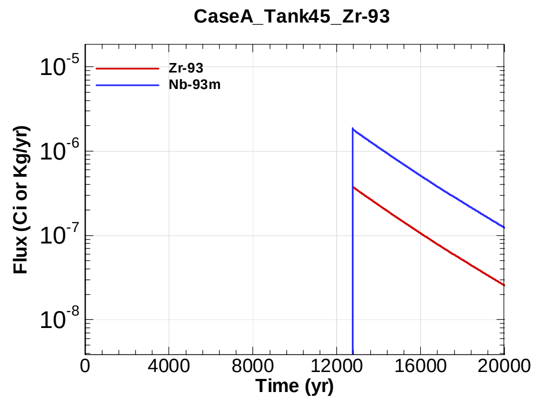

Figure A.1-1408 - Flux Leaving Liner for CaseA Tank45 Zr-93

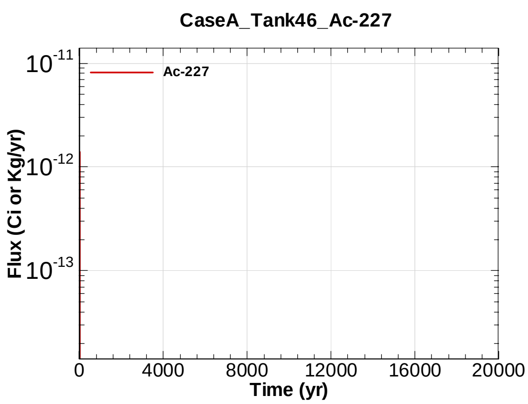

Figure A.1-1409 - Flux Leaving Liner for CaseA Tank46 Ac-227

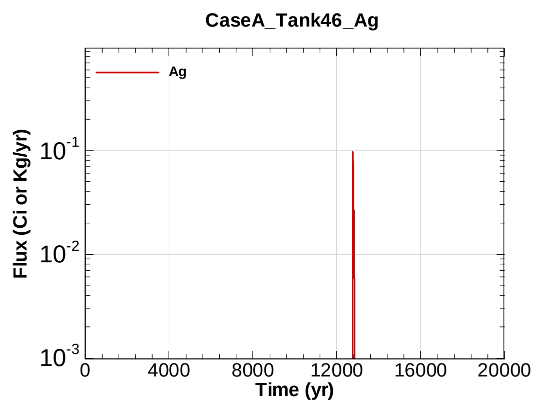

Figure A.1-1410 - Flux Leaving Liner for CaseA Tank46 Ag

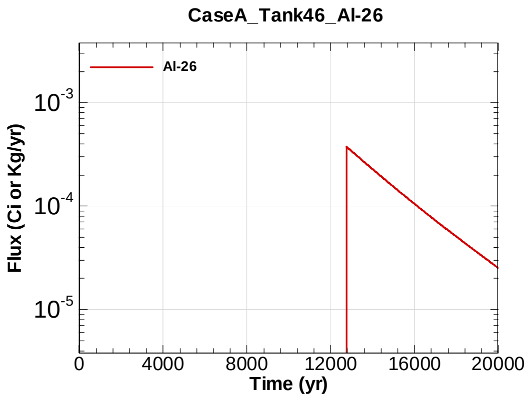

Figure A.1-1411 - Flux Leaving Liner for CaseA Tank46 Al-26

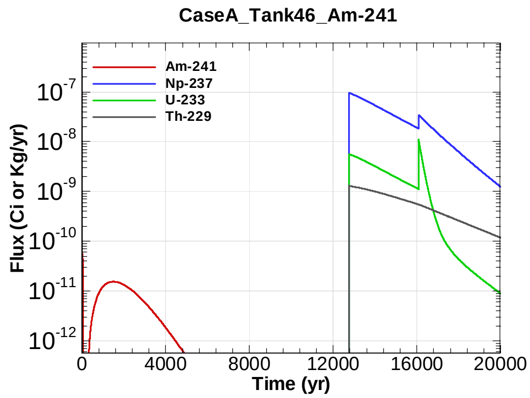

Figure A.1-1412 - Flux Leaving Liner for CaseA Tank46 Am-241

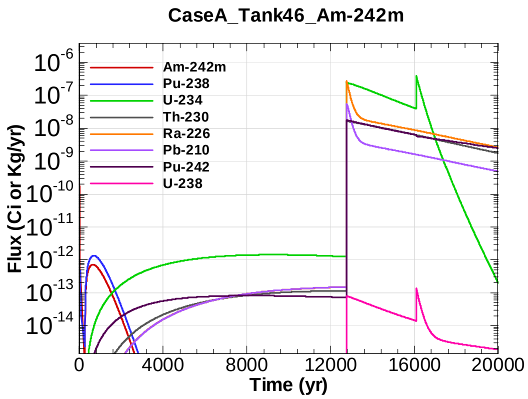

Figure A.1-1413 - Flux Leaving Liner for CaseA Tank46 Am-242m

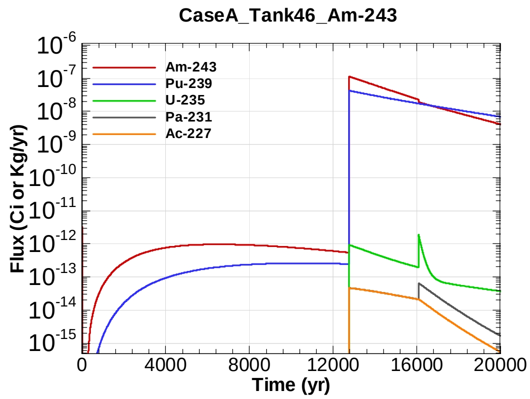

Figure A.1-1414 - Flux Leaving Liner for CaseA Tank46 Am-243

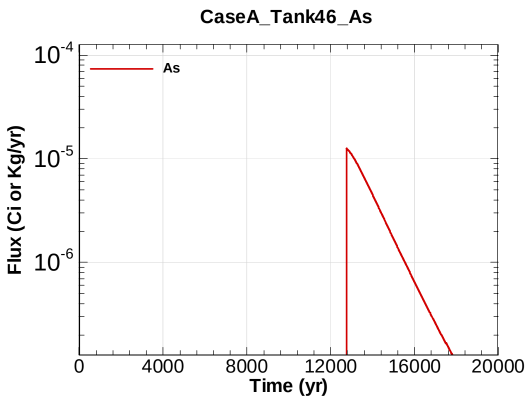

Figure A.1-1415 - Flux Leaving Liner for CaseA Tank46 As

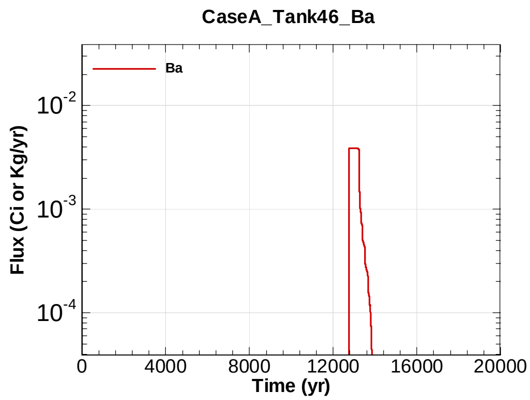

Figure A.1-1416 - Flux Leaving Liner for CaseA Tank46 Ba

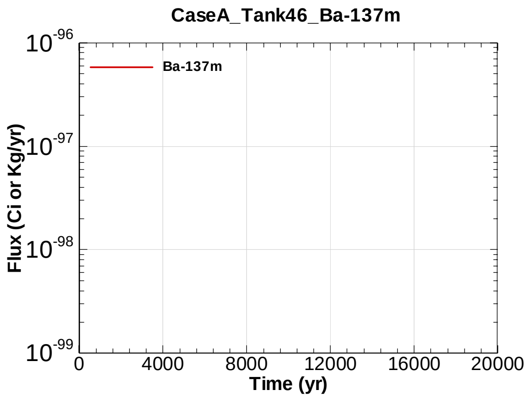

Figure A.1-1417 - Flux Leaving Liner for CaseA Tank46 Ba-137m

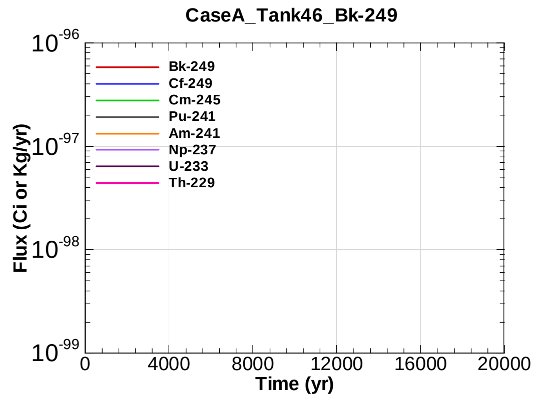

Figure A.1-1418 - Flux Leaving Liner for CaseA Tank46 Bk-249

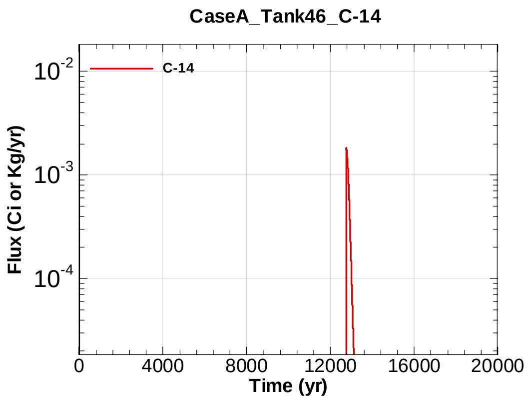

Figure A.1-1419 - Flux Leaving Liner for CaseA Tank46 C-14

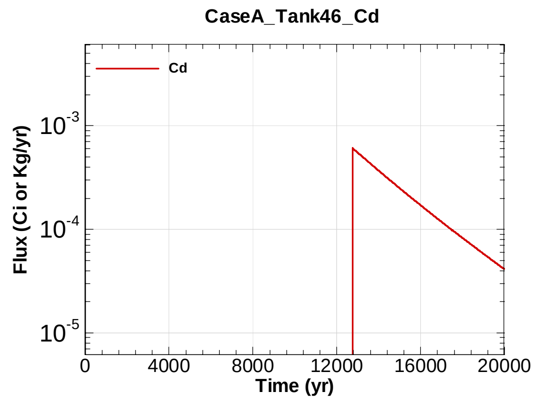

Figure A.1-1420 - Flux Leaving Liner for CaseA Tank46 Cd

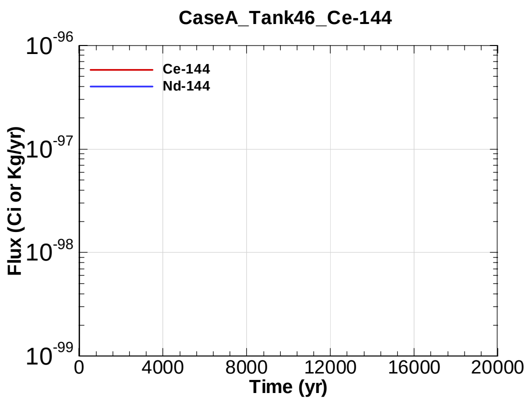

Figure A.1-1421 - Flux Leaving Liner for CaseA Tank46 Ce-144

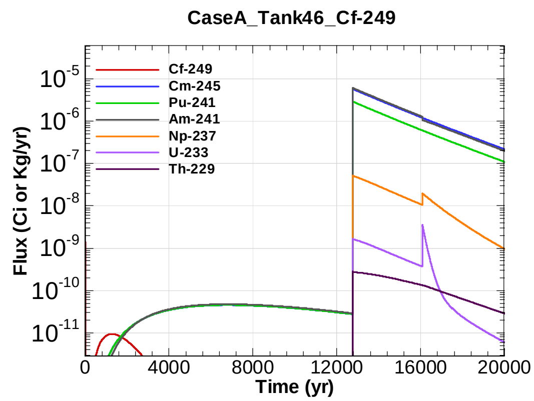

Figure A.1-1422 - Flux Leaving Liner for CaseA Tank46 Cf-249

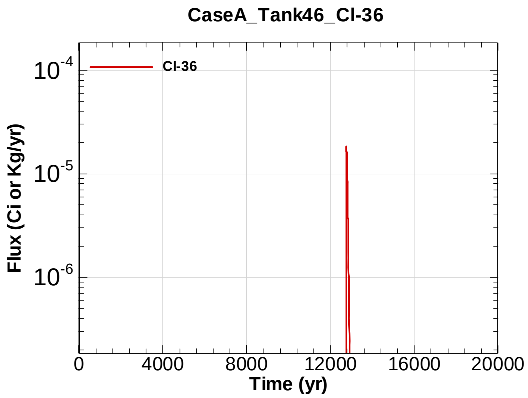

Figure A.1-1423 - Flux Leaving Liner for CaseA Tank46 Cl-36

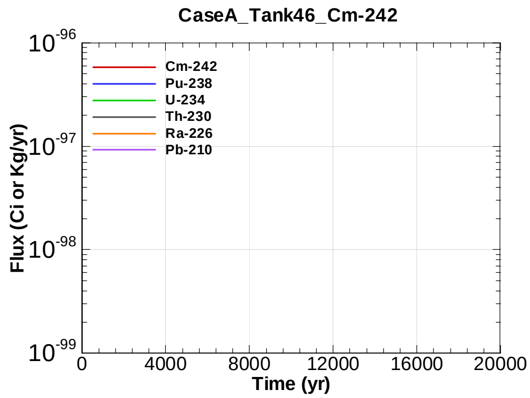

Figure A.1-1424 - Flux Leaving Liner for CaseA Tank46 Cm-242

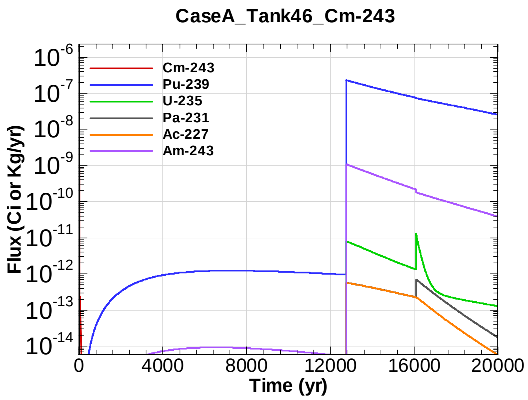

Figure A.1-1425 - Flux Leaving Liner for CaseA Tank46 Cm-243

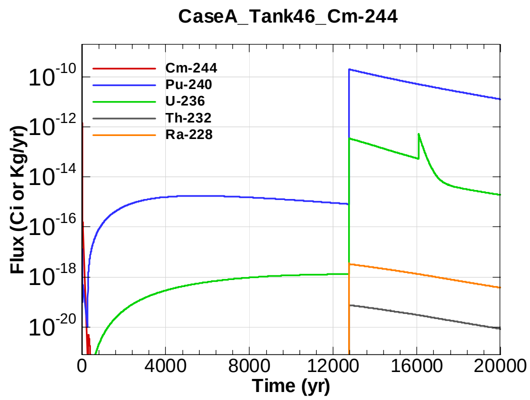

Figure A.1-1426 - Flux Leaving Liner for CaseA Tank46 Cm-244

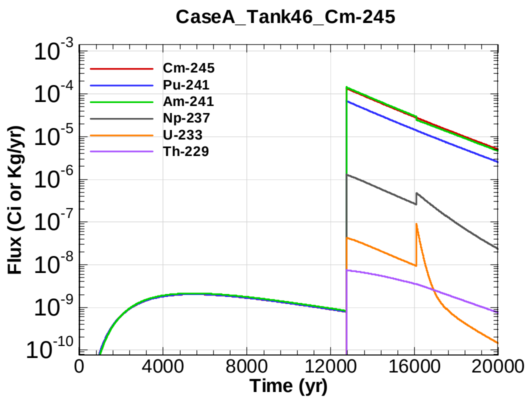

Figure A.1-1427 - Flux Leaving Liner for CaseA Tank46 Cm-245

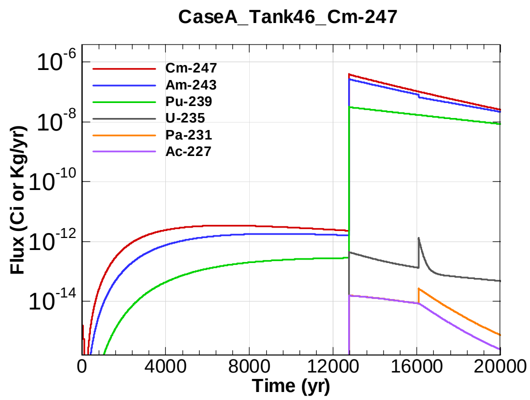

Figure A.1-1428 - Flux Leaving Liner for CaseA Tank46 Cm-247

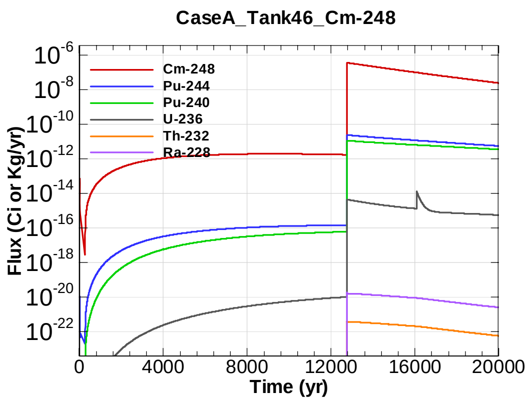

Figure A.1-1429 - Flux Leaving Liner for CaseA Tank46 Cm-248

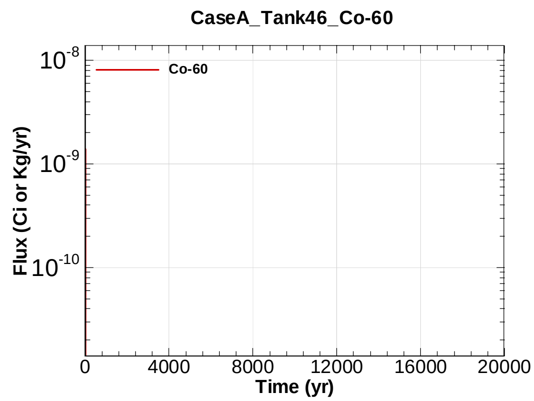

Figure A.1-1430 - Flux Leaving Liner for CaseA Tank46 Co-60

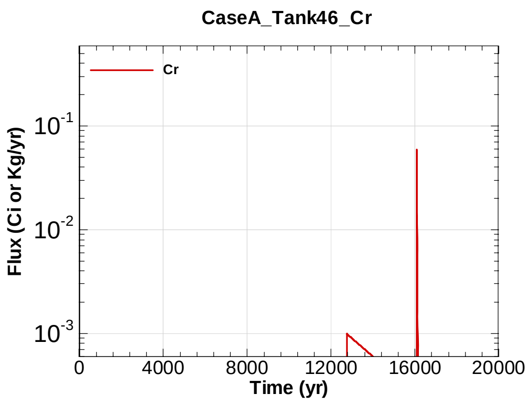

Figure A.1-1431 - Flux Leaving Liner for CaseA Tank46 Cr

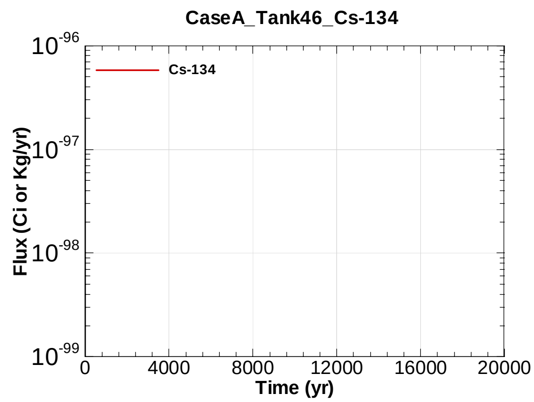

Figure A.1-1432 - Flux Leaving Liner for CaseA Tank46 Cs-134

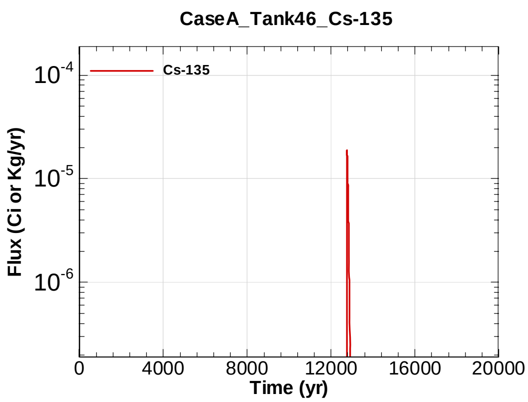

Figure A.1-1433 - Flux Leaving Liner for CaseA Tank46 Cs-135

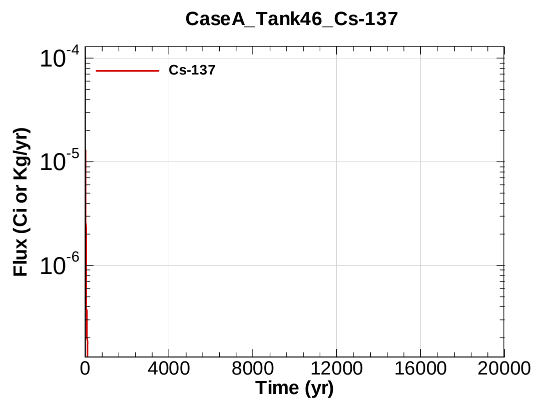

Figure A.1-1434 - Flux Leaving Liner for CaseA Tank46 Cs-137

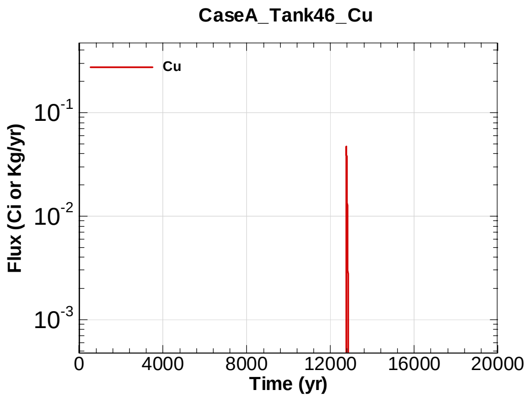

Figure A.1-1435 - Flux Leaving Liner for CaseA Tank46 Cu

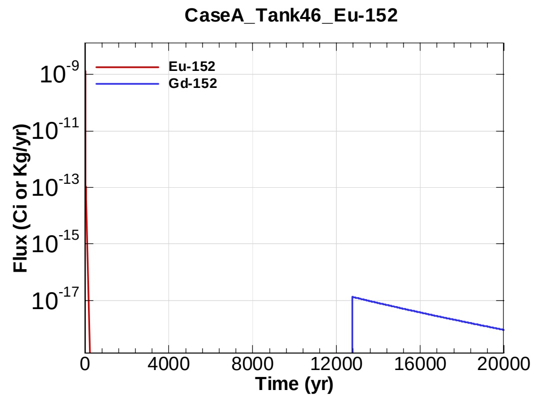

Figure A.1-1436 - Flux Leaving Liner for CaseA Tank46 Eu-152

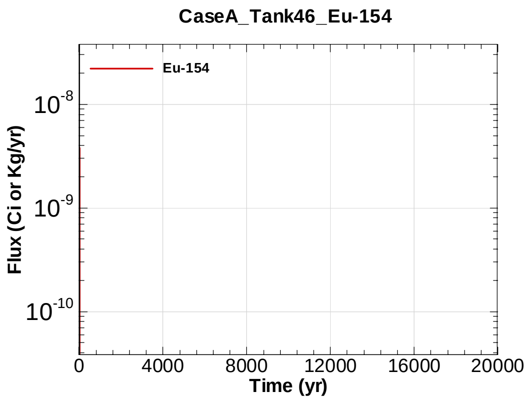

Figure A.1-1437 - Flux Leaving Liner for CaseA Tank46 Eu-154

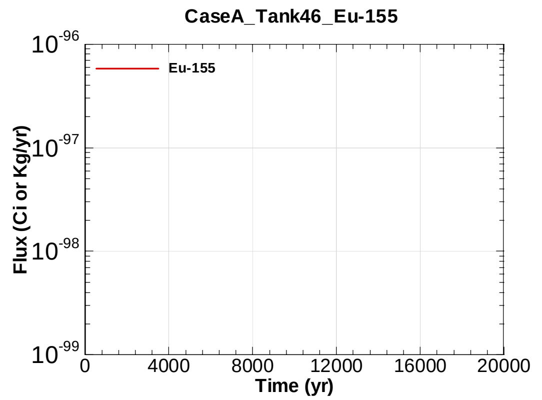

Figure A.1-1438 - Flux Leaving Liner for CaseA Tank46 Eu-155

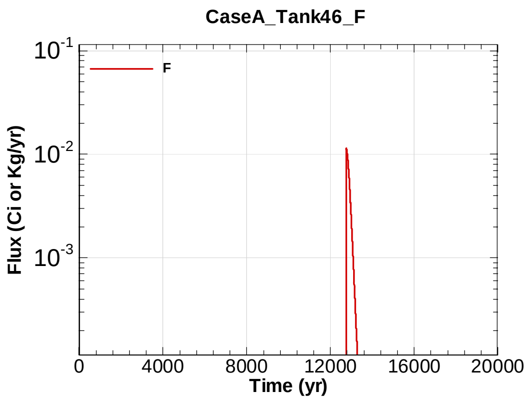

Figure A.1-1439 - Flux Leaving Liner for CaseA Tank46 F

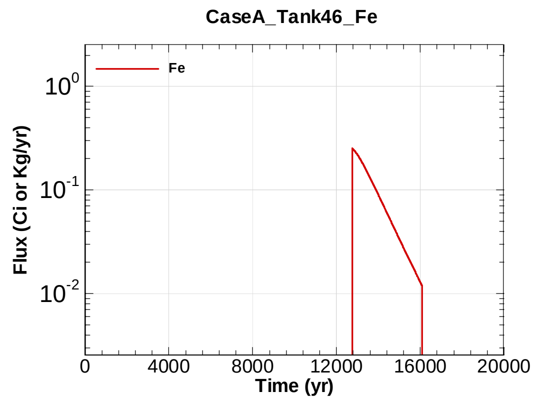

Figure A.1-1440 - Flux Leaving Liner for CaseA Tank46 Fe

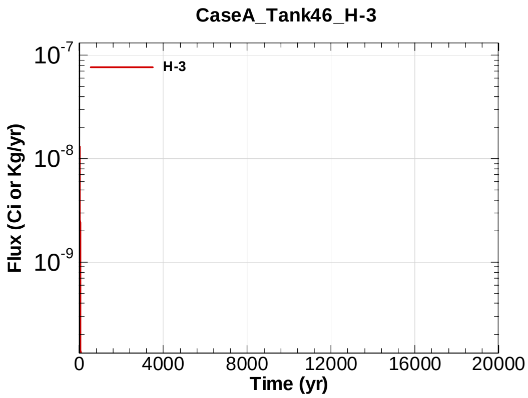

Figure A.1-1441 - Flux Leaving Liner for CaseA Tank46 H-3

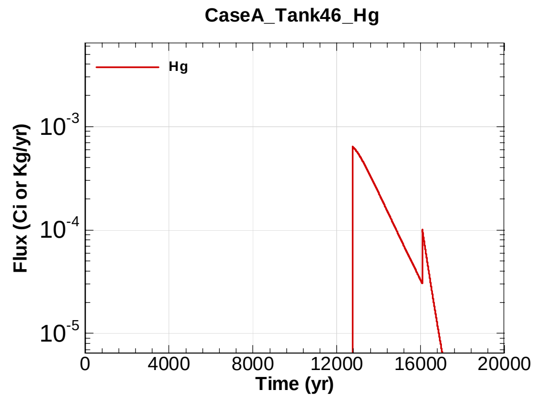

Figure A.1-1442 - Flux Leaving Liner for CaseA Tank46 Hg

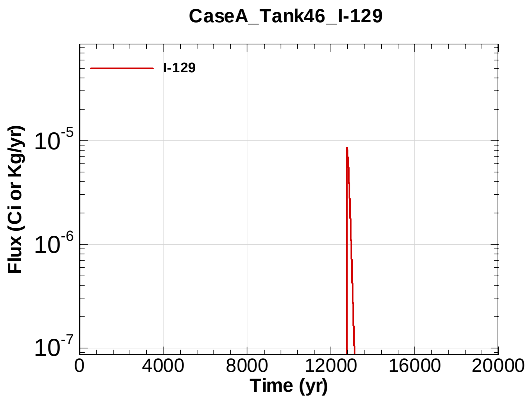

Figure A.1-1443 - Flux Leaving Liner for CaseA Tank46 I-129

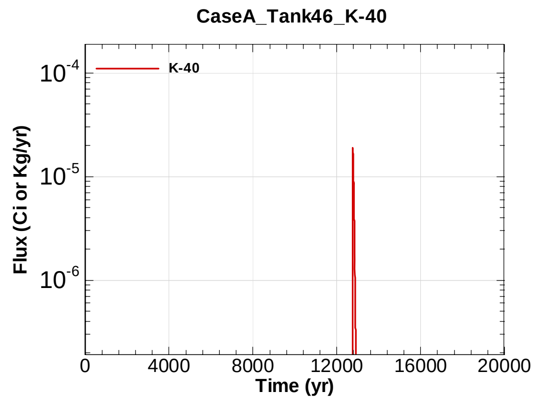

Figure A.1-1444 - Flux Leaving Liner for CaseA Tank46 K-40

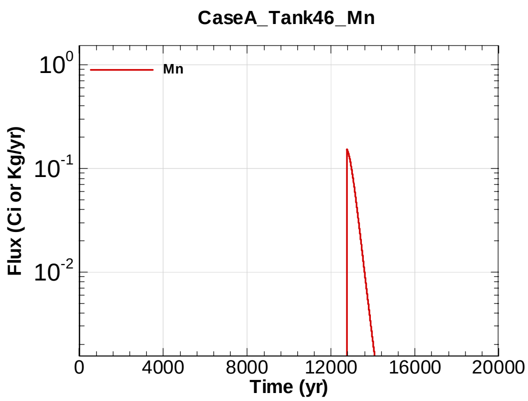

Figure A.1-1445 - Flux Leaving Liner for CaseA Tank46 Mn

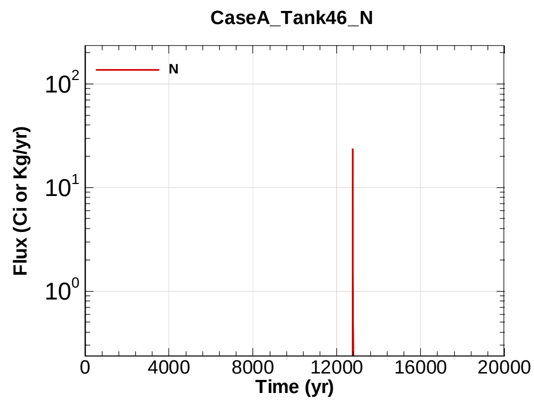

Figure A.1-1446 - Flux Leaving Liner for CaseA Tank46 N

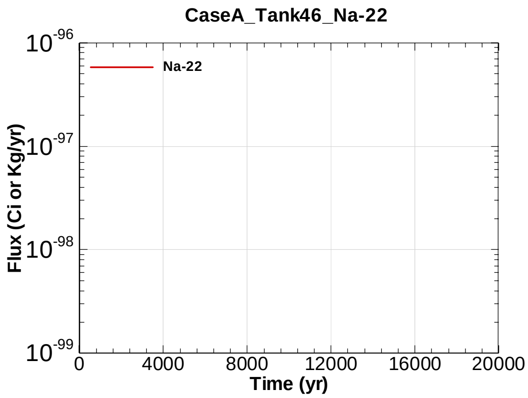

Figure A.1-1447 - Flux Leaving Liner for CaseA Tank46 Na-22

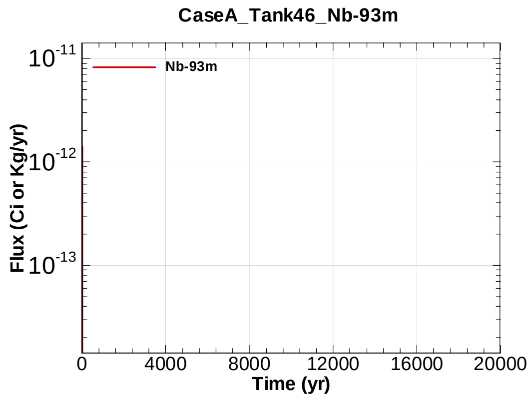

Figure A.1-1448 - Flux Leaving Liner for CaseA Tank46 Nb-93m

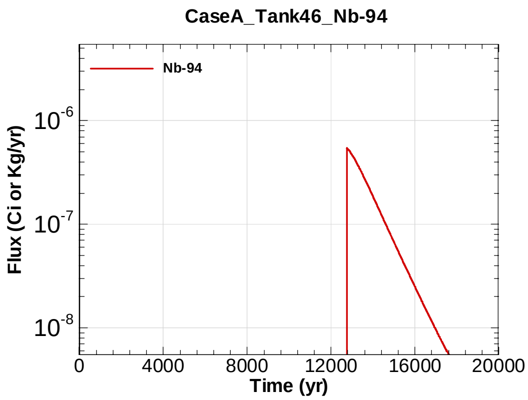

Figure A.1-1449 - Flux Leaving Liner for CaseA Tank46 Nb-94

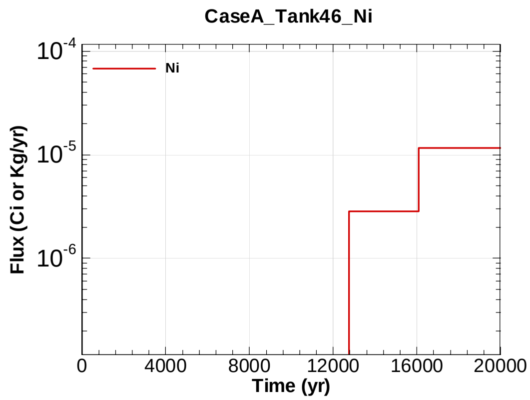

Figure A.1-1450 - Flux Leaving Liner for CaseA Tank46 Ni

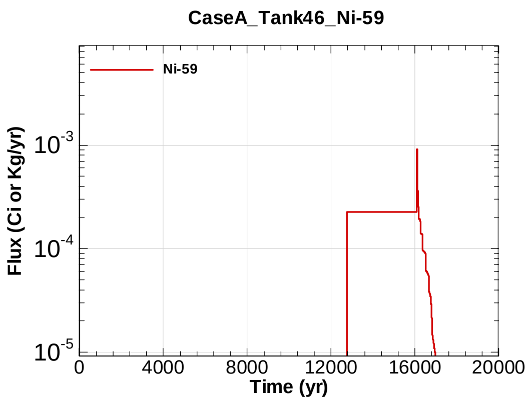

Figure A.1-1451 - Flux Leaving Liner for CaseA Tank46 Ni-59

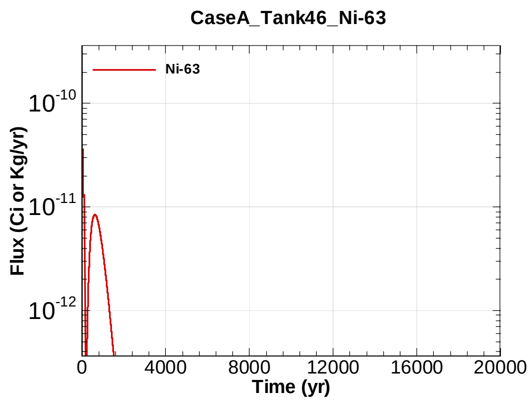

Figure A.1-1452 - Flux Leaving Liner for CaseA Tank46 Ni-63

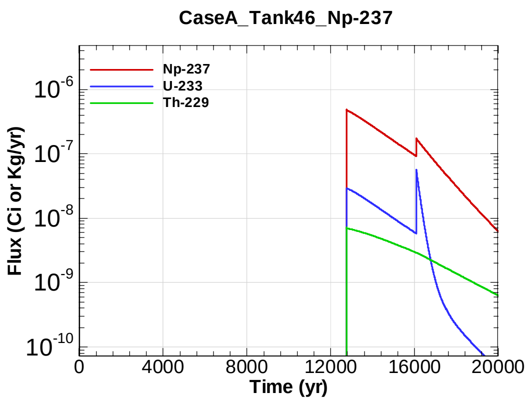

Figure A.1-1453 - Flux Leaving Liner for CaseA Tank46 Np-237

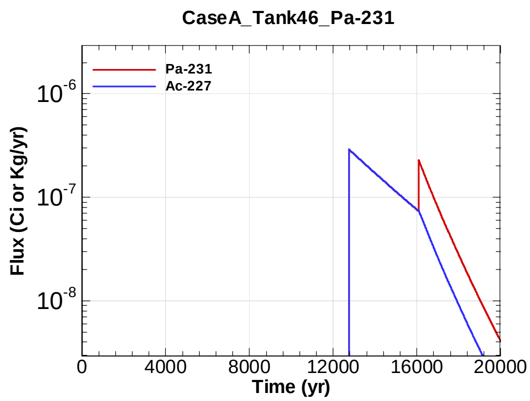

Figure A.1-1454 - Flux Leaving Liner for CaseA Tank46 Pa-231

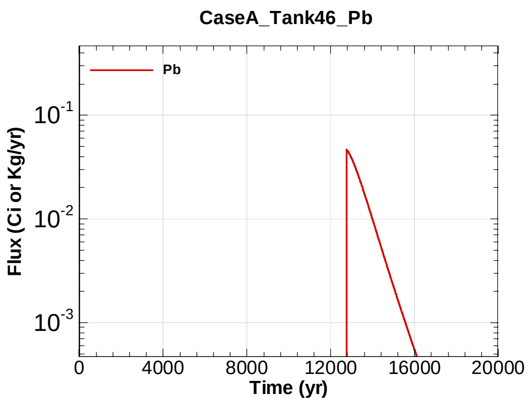

Figure A.1-1455 - Flux Leaving Liner for CaseA Tank46 Pb

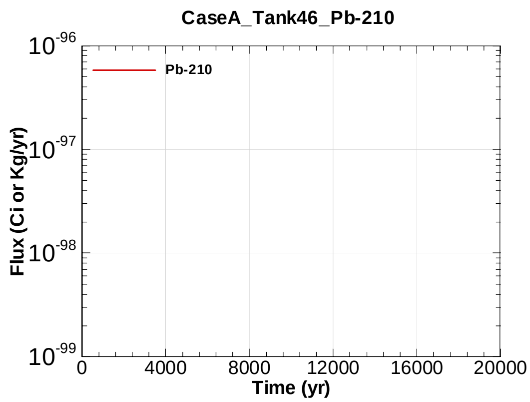

Figure A.1-1456 - Flux Leaving Liner for CaseA Tank46 Pb-210

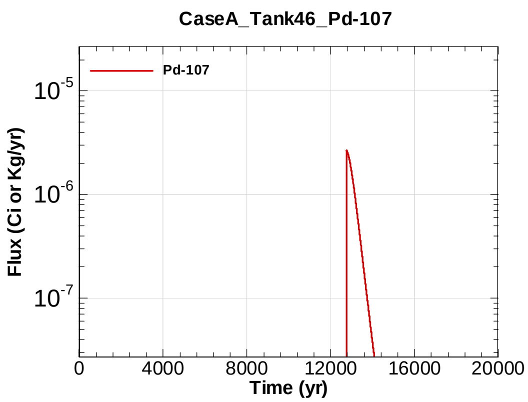

Figure A.1-1457 - Flux Leaving Liner for CaseA Tank46 Pd-107

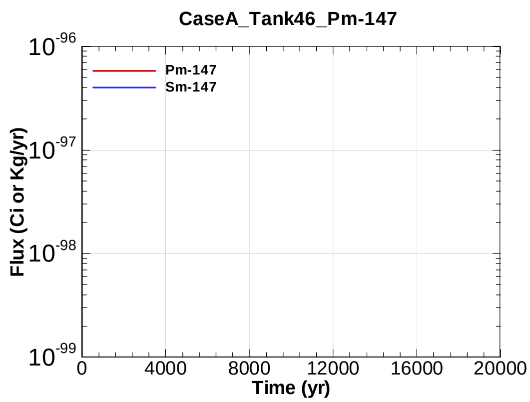

Figure A.1-1458 - Flux Leaving Liner for CaseA Tank46 Pm-147

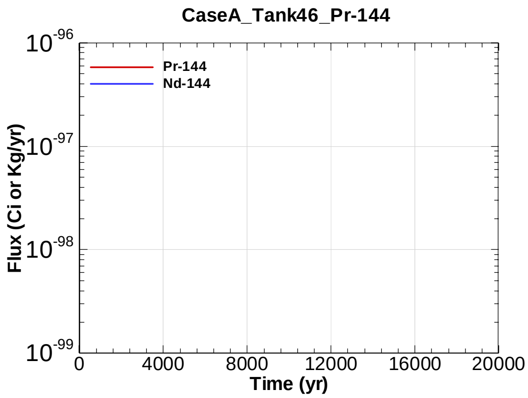

Figure A.1-1459 - Flux Leaving Liner for CaseA Tank46 Pr-144

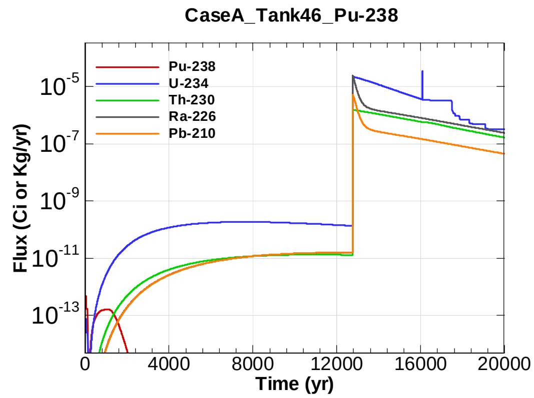

Figure A.1-1460 - Flux Leaving Liner for CaseA Tank46 Pu-238

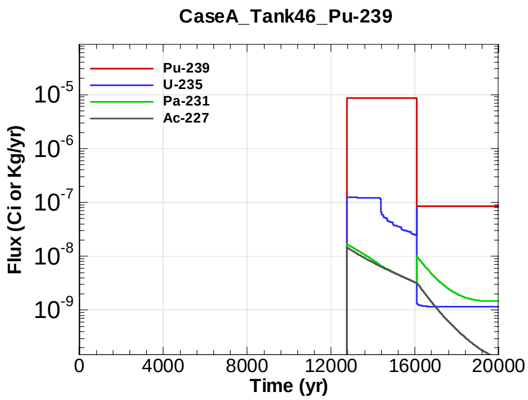

Figure A.1-1461 - Flux Leaving Liner for CaseA Tank46 Pu-239

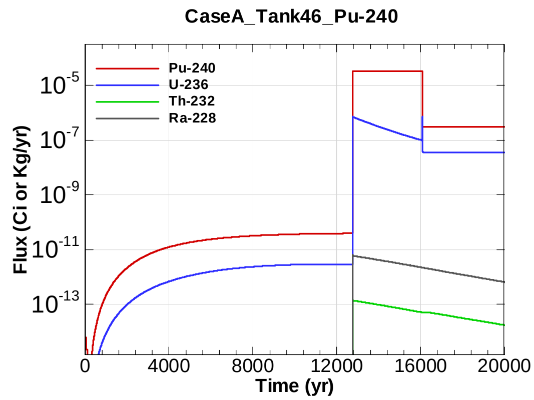

Figure A.1-1462 - Flux Leaving Liner for CaseA Tank46 Pu-240

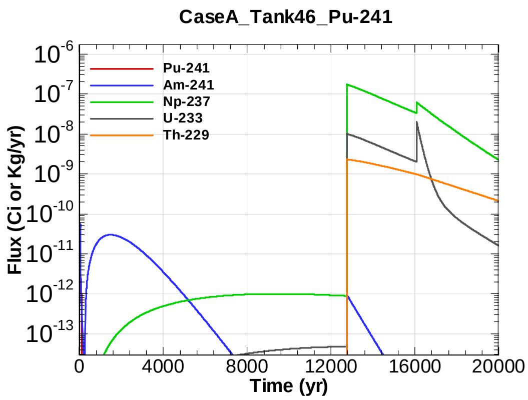

Figure A.1-1463 - Flux Leaving Liner for CaseA Tank46 Pu-241

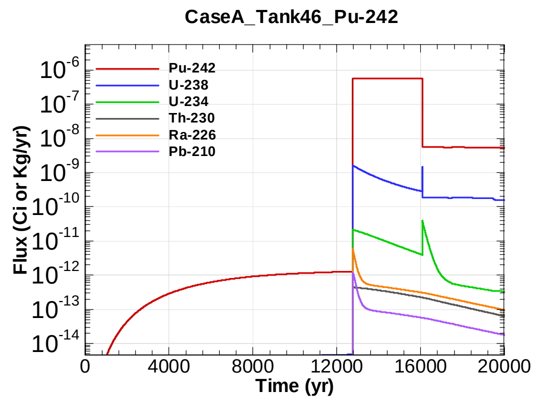

Figure A.1-1464 - Flux Leaving Liner for CaseA Tank46 Pu-242

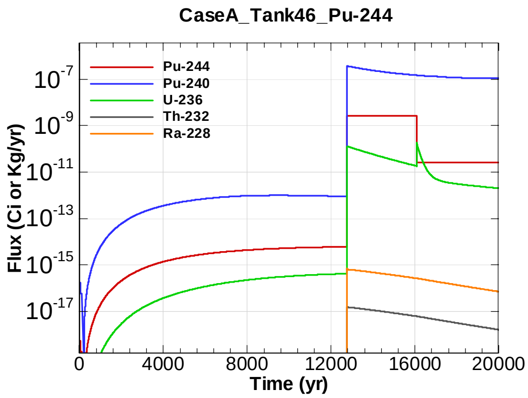

Figure A.1-1465 - Flux Leaving Liner for CaseA Tank46 Pu-244

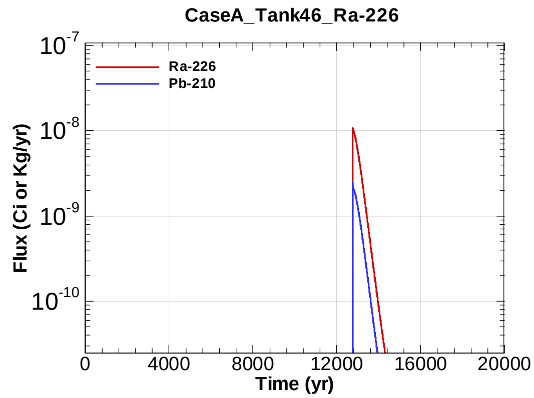

Figure A.1-1466 - Flux Leaving Liner for CaseA Tank46 Ra-226

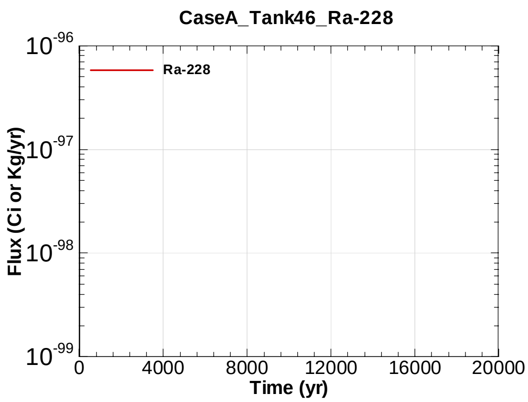

Figure A.1-1467 - Flux Leaving Liner for CaseA Tank46 Ra-228

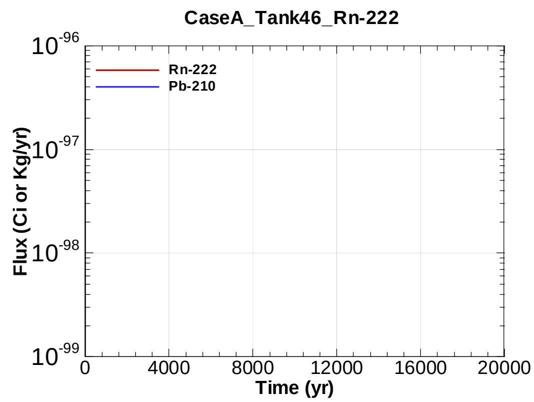

Figure A.1-1468 - Flux Leaving Liner for CaseA Tank46 Rn-222

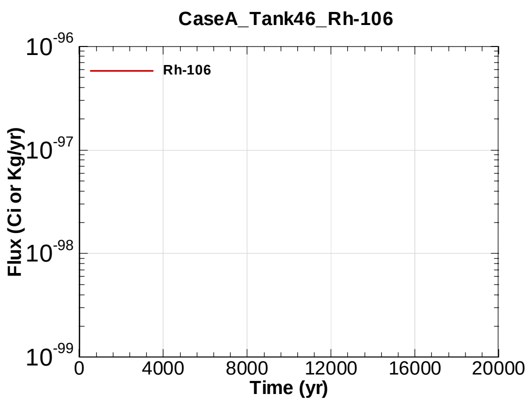

Figure A.1-1469 - Flux Leaving Liner for CaseA Tank46 Rh-106

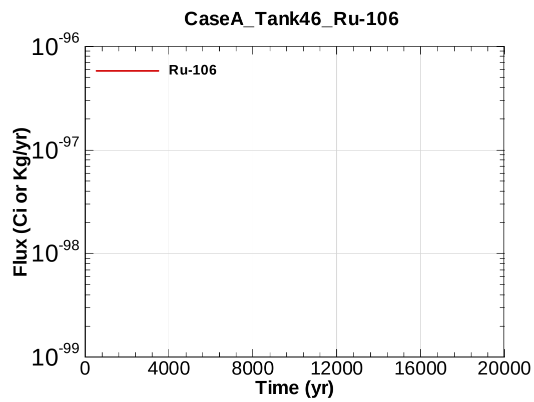

Figure A.1-1470 - Flux Leaving Liner for CaseA Tank46 Ru-106

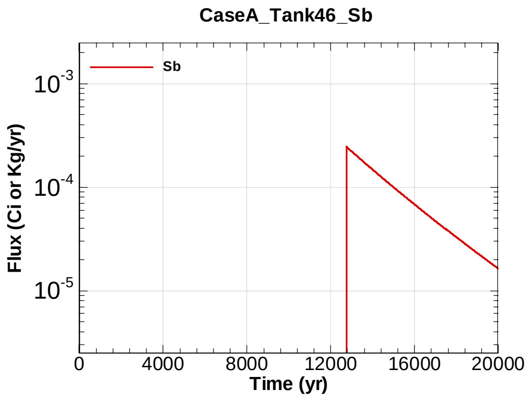

Figure A.1-1471 - Flux Leaving Liner for CaseA Tank46 Sb

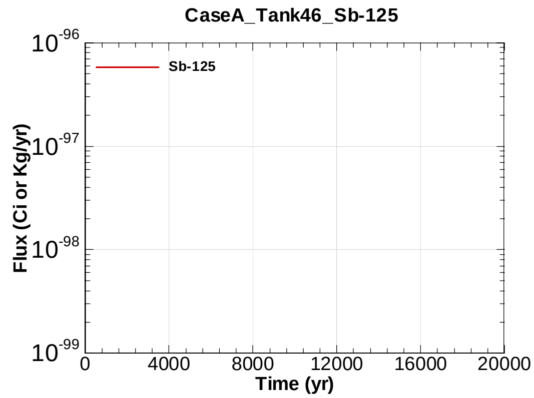

Figure A.1-1472 - Flux Leaving Liner for CaseA Tank46 Sb-125

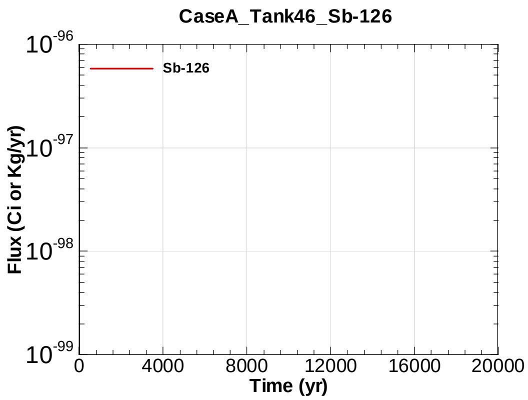

Figure A.1-1473 - Flux Leaving Liner for CaseA Tank46 Sb-126

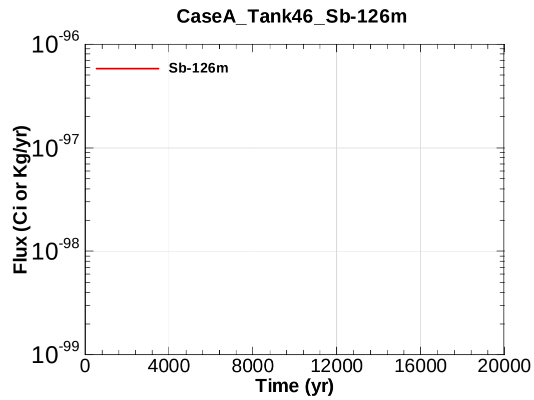

Figure A.1-1474 - Flux Leaving Liner for CaseA Tank46 Sb-126m

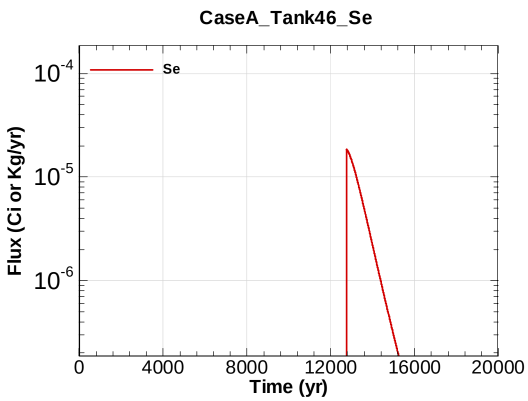

Figure A.1-1475 - Flux Leaving Liner for CaseA Tank46 Se

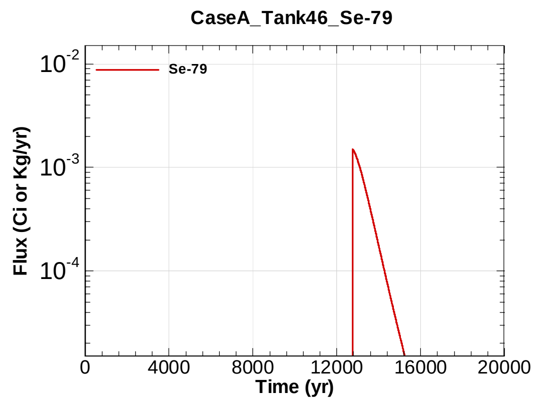

Figure A.1-1476 - Flux Leaving Liner for CaseA Tank46 Se-79

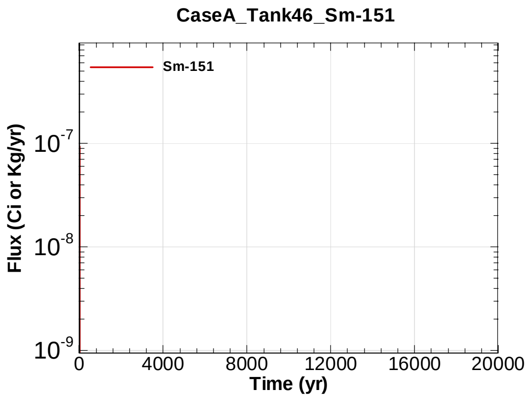

Figure A.1-1477 - Flux Leaving Liner for CaseA Tank46 Sm-151

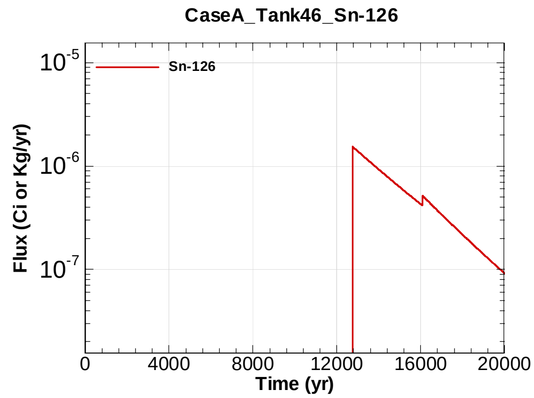

Figure A.1-1478 - Flux Leaving Liner for CaseA Tank46 Sn-126

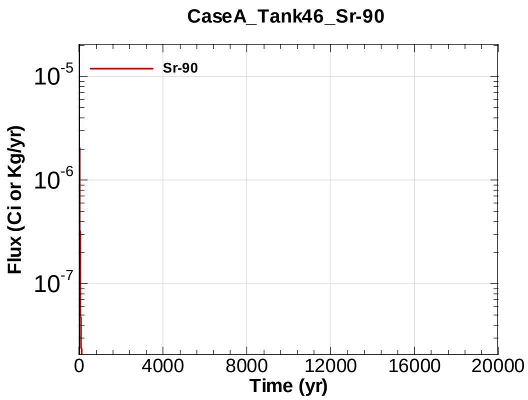

Figure A.1-1479 - Flux Leaving Liner for CaseA Tank46 Sr-90

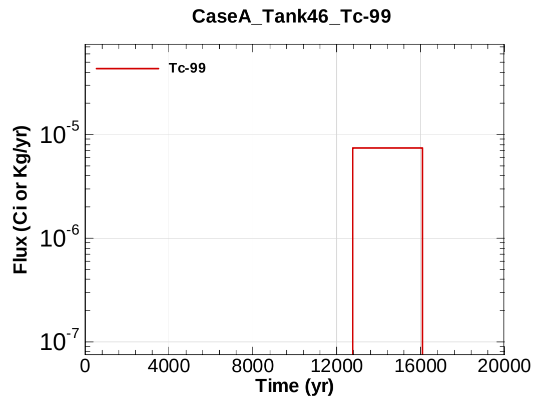

Figure A.1-1480 - Flux Leaving Liner for CaseA Tank46 Tc-99

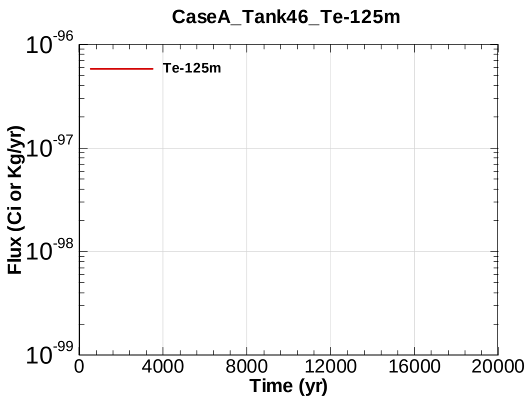

Figure A.1-1481 - Flux Leaving Liner for CaseA Tank46 Te-125m

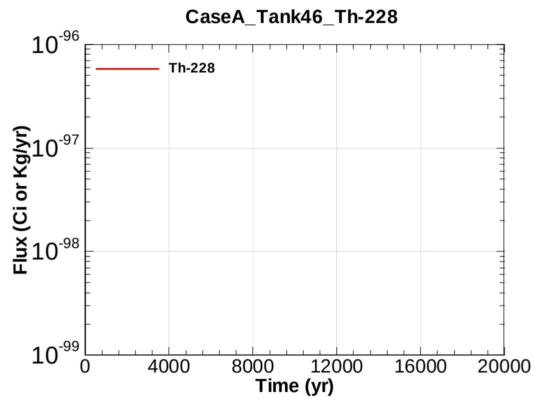

Figure A.1-1482 - Flux Leaving Liner for CaseA Tank46 Th-228

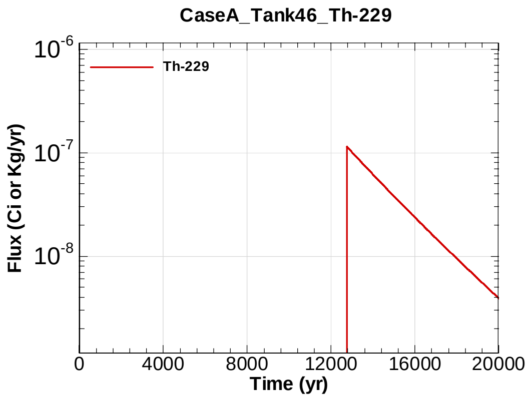

Figure A.1-1483 - Flux Leaving Liner for CaseA Tank46 Th-229

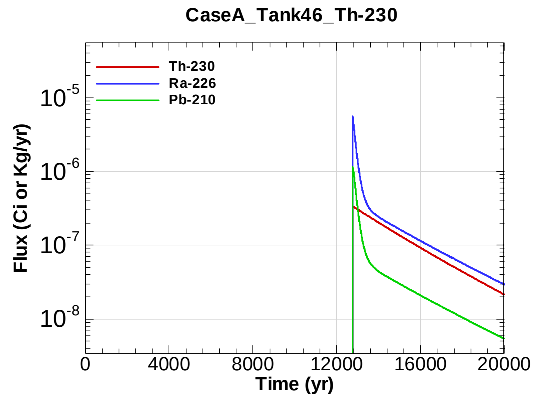

Figure A.1-1484 - Flux Leaving Liner for CaseA Tank46 Th-230

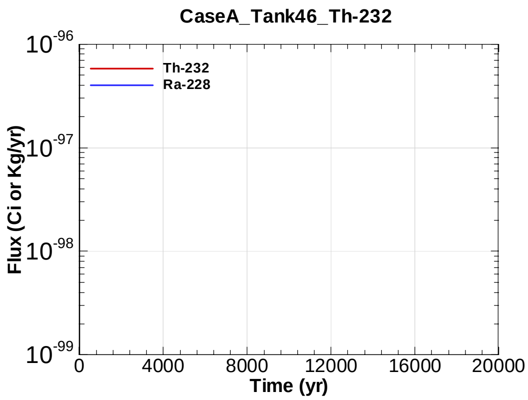

Figure A.1-1485 - Flux Leaving Liner for CaseA Tank46 Th-232

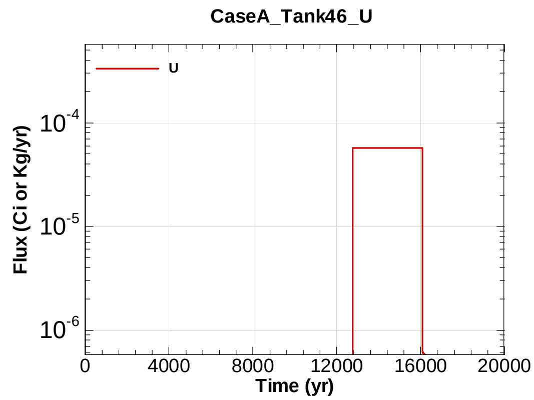

Figure A.1-1486 - Flux Leaving Liner for CaseA Tank46 U

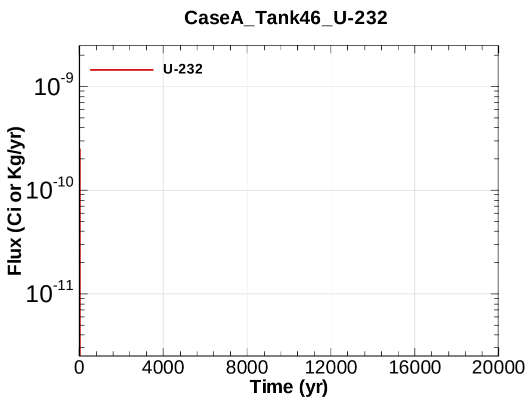

Figure A.1-1487 - Flux Leaving Liner for CaseA Tank46 U-232

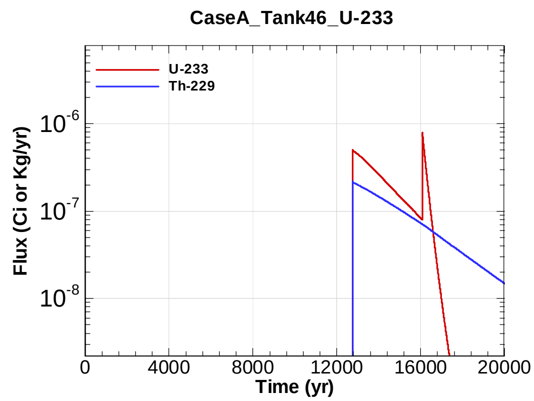

Figure A.1-1488 - Flux Leaving Liner for CaseA Tank46 U-233

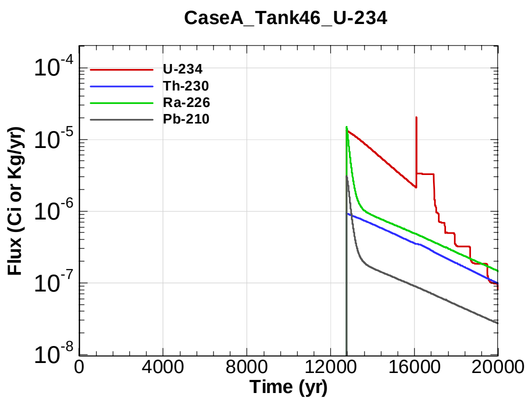

Figure A.1-1489 - Flux Leaving Liner for CaseA Tank46 U-234

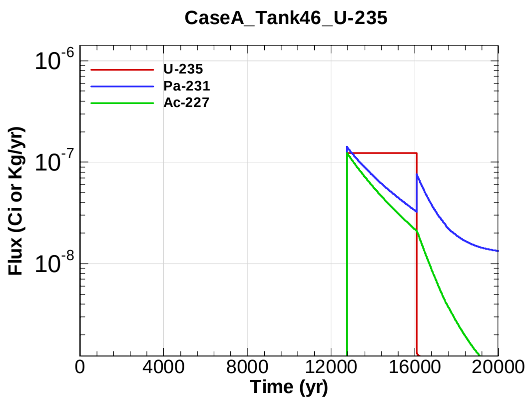

Figure A.1-1490 - Flux Leaving Liner for CaseA Tank46 U-235

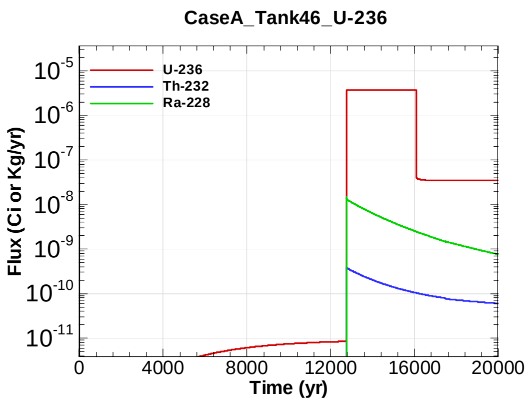

Figure A.1-1491 - Flux Leaving Liner for CaseA Tank46 U-236

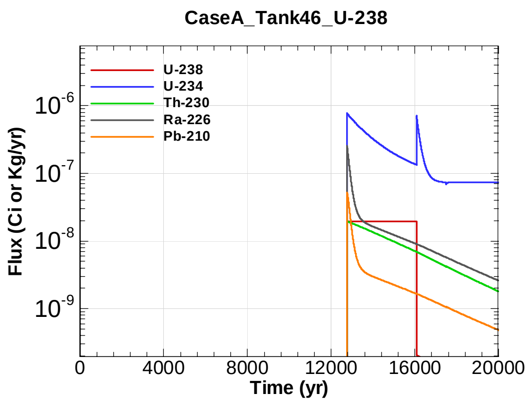

Figure A.1-1492 - Flux Leaving Liner for CaseA Tank46 U-238

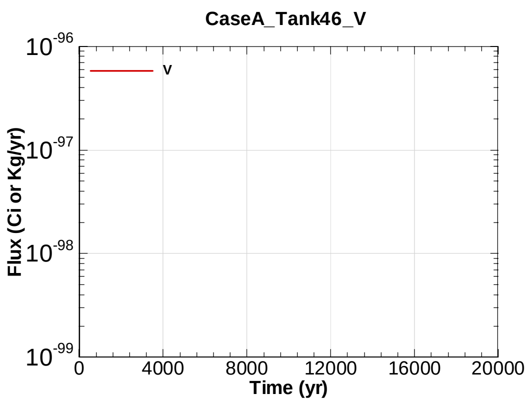

Figure A.1-1493 - Flux Leaving Liner for CaseA Tank46 V

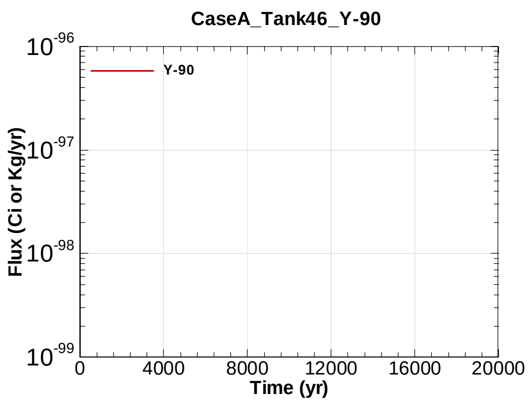

Figure A.1-1494 - Flux Leaving Liner for CaseA Tank46 Y-90

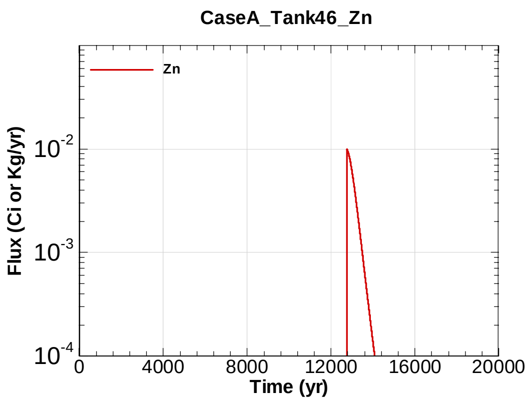

Figure A.1-1495 - Flux Leaving Liner for CaseA Tank46 Zn

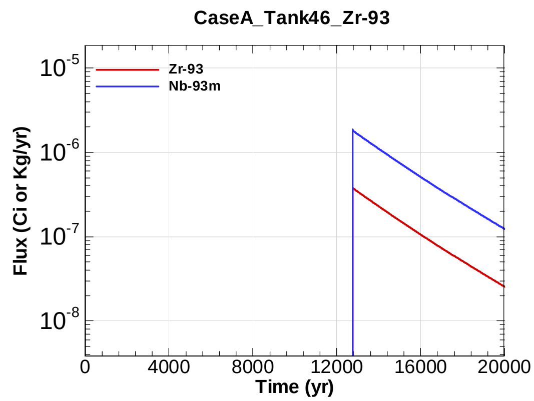

Figure A.1-1496 - Flux Leaving Liner for CaseA Tank46 Zr-93

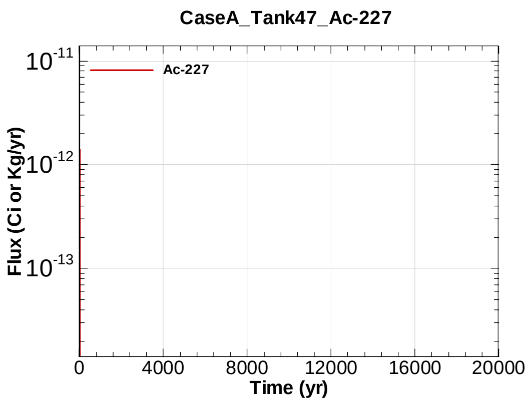

Figure A.1-1497 - Flux Leaving Liner for CaseA Tank47 Ac-227

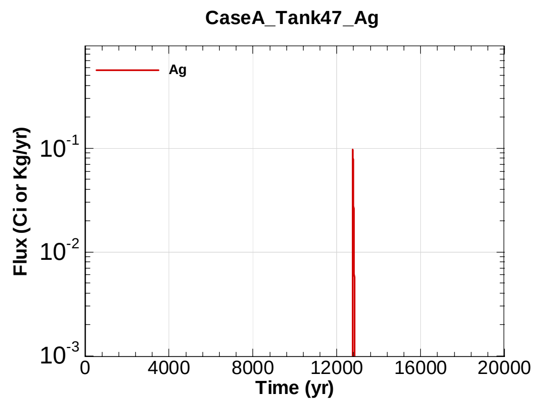

Figure A.1-1498 - Flux Leaving Liner for CaseA Tank47 Ag

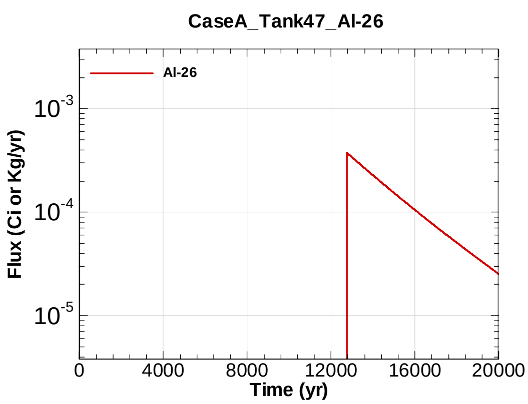

Figure A.1-1499 - Flux Leaving Liner for CaseA Tank47 Al-26

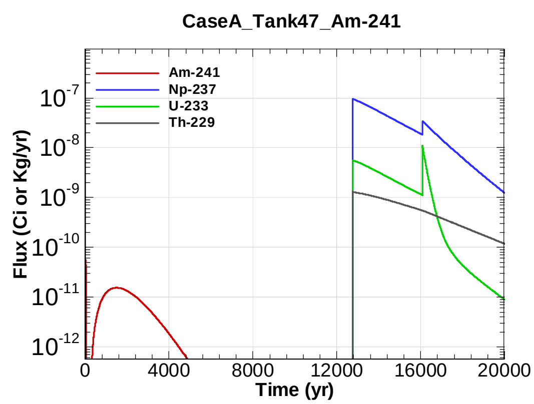

Figure A.1-1500 - Flux Leaving Liner for CaseA Tank47 Am-241

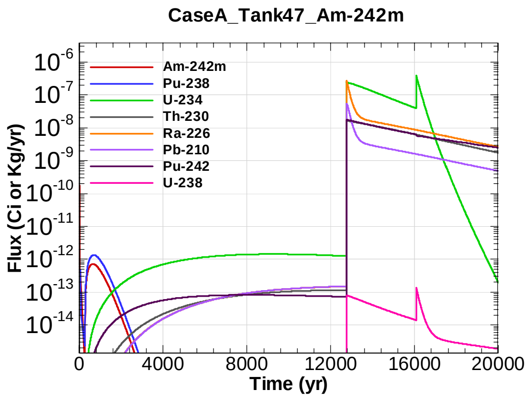

Figure A.1-1501 - Flux Leaving Liner for CaseA Tank47 Am-242m

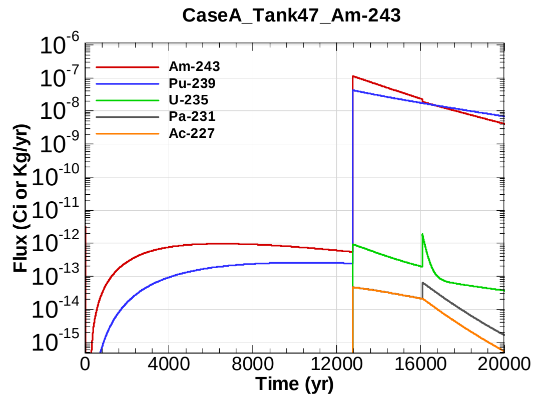

Figure A.1-1502 - Flux Leaving Liner for CaseA Tank47 Am-243

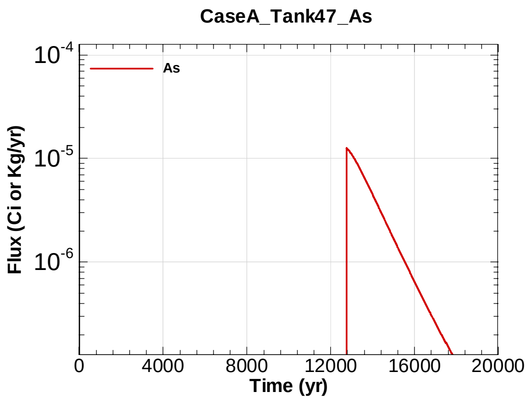

Figure A.1-1503 - Flux Leaving Liner for CaseA Tank47 As

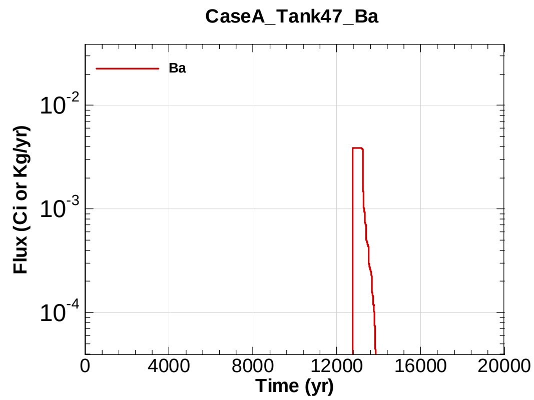

Figure A.1-1504 - Flux Leaving Liner for CaseA Tank47 Ba

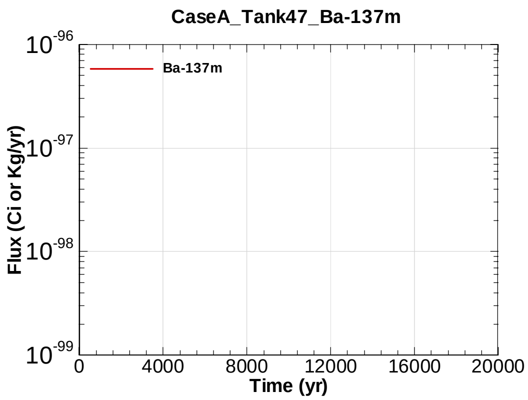

Figure A.1-1505 - Flux Leaving Liner for CaseA Tank47 Ba-137m

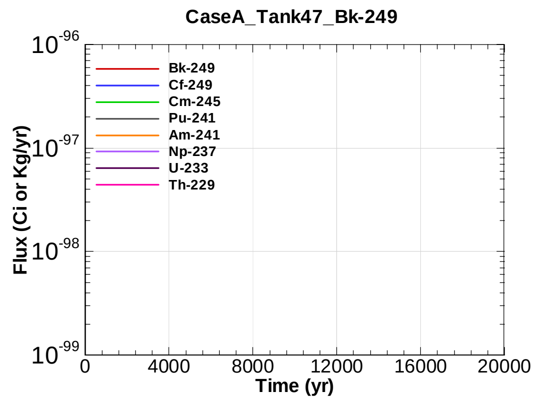

Figure A.1-1506 - Flux Leaving Liner for CaseA Tank47 Bk-249

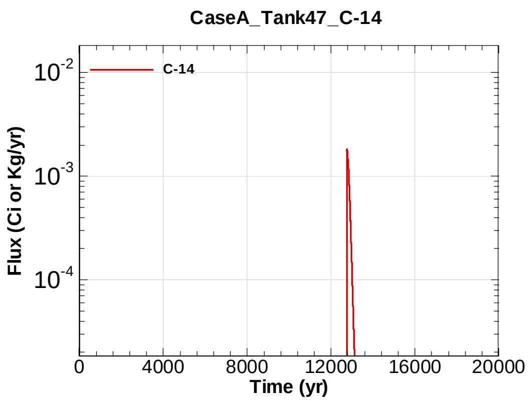

Figure A.1-1507 - Flux Leaving Liner for CaseA Tank47 C-14

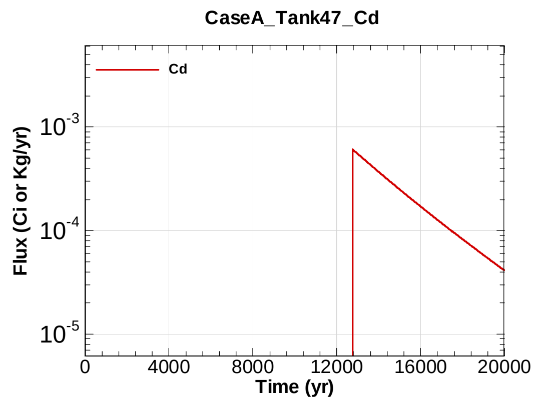

Figure A.1-1508 - Flux Leaving Liner for CaseA Tank47 Cd

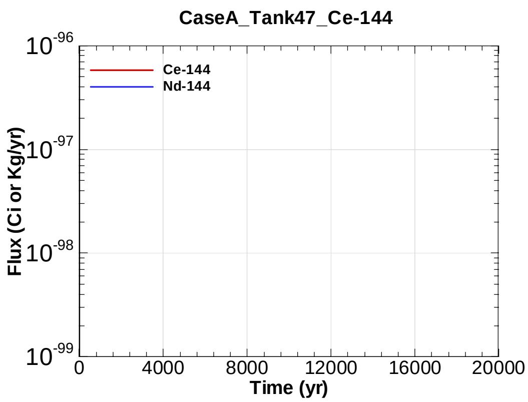

Figure A.1-1509 - Flux Leaving Liner for CaseA Tank47 Ce-144

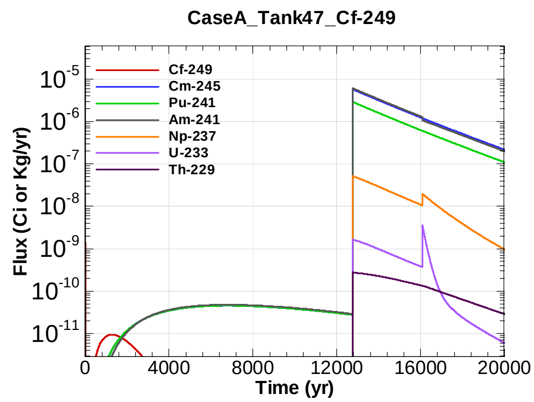

Figure A.1-1510 - Flux Leaving Liner for CaseA Tank47 Cf-249

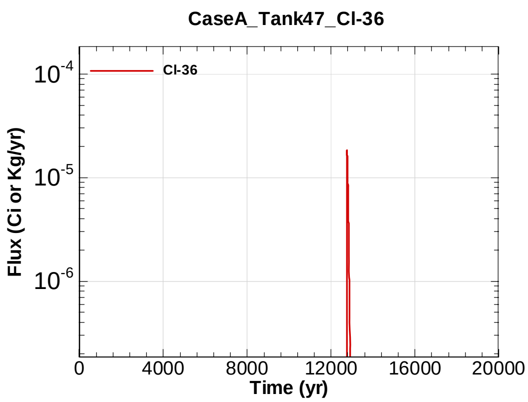

Figure A.1-1511 - Flux Leaving Liner for CaseA Tank47 Cl-36

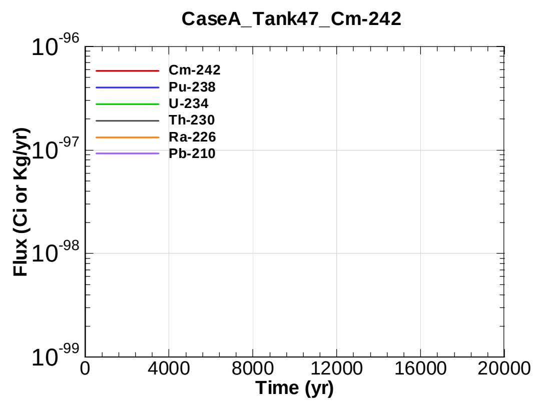

Figure A.1-1512 - Flux Leaving Liner for CaseA Tank47 Cm-242

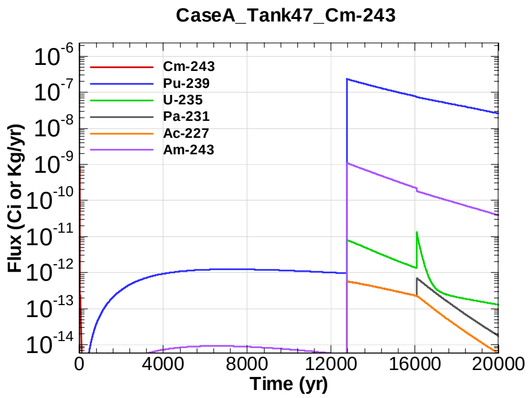

Figure A.1-1513 - Flux Leaving Liner for CaseA Tank47 Cm-243

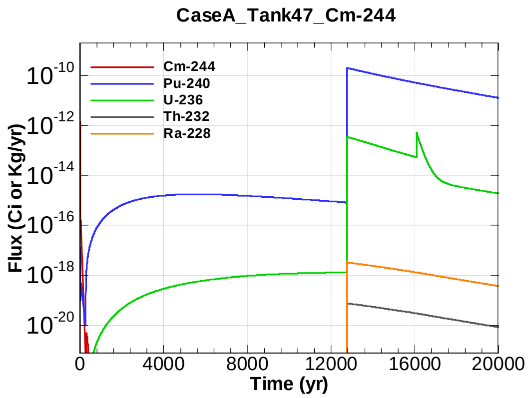

Figure A.1-1514 - Flux Leaving Liner for CaseA Tank47 Cm-244

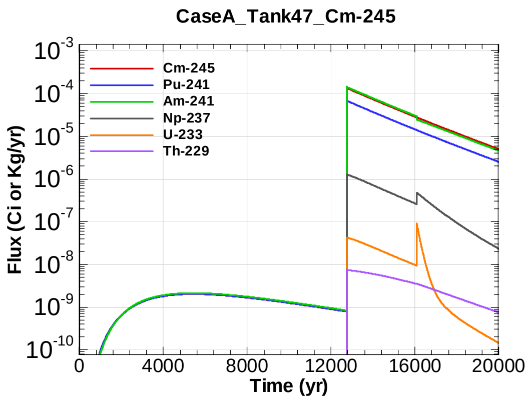

Figure A.1-1515 - Flux Leaving Liner for CaseA Tank47 Cm-245

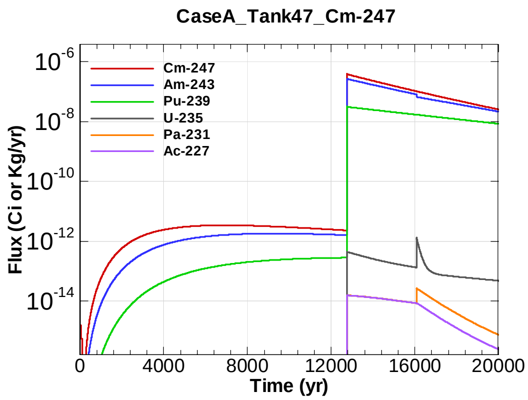

Figure A.1-1516 - Flux Leaving Liner for CaseA Tank47 Cm-247

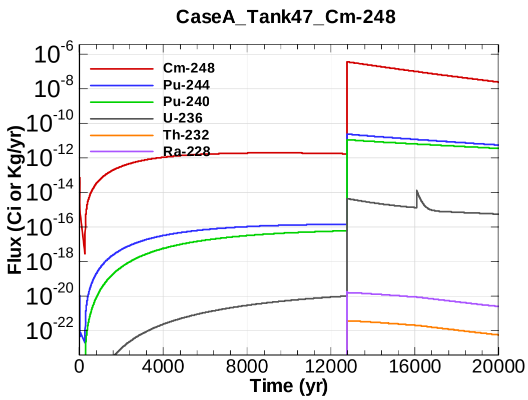

Figure A.1-1517 - Flux Leaving Liner for CaseA Tank47 Cm-248

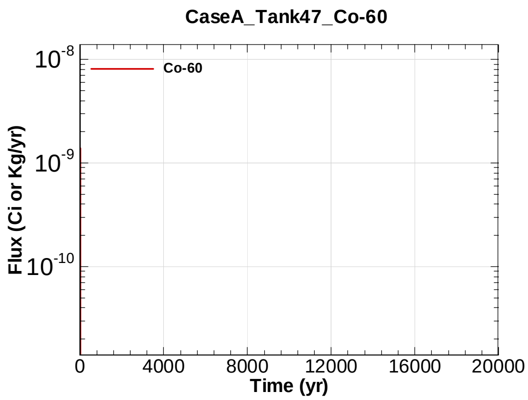

Figure A.1-1518 - Flux Leaving Liner for CaseA Tank47 Co-60

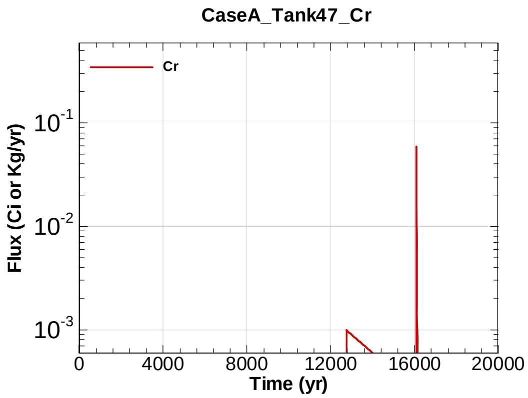

Figure A.1-1519 - Flux Leaving Liner for CaseA Tank47 Cr

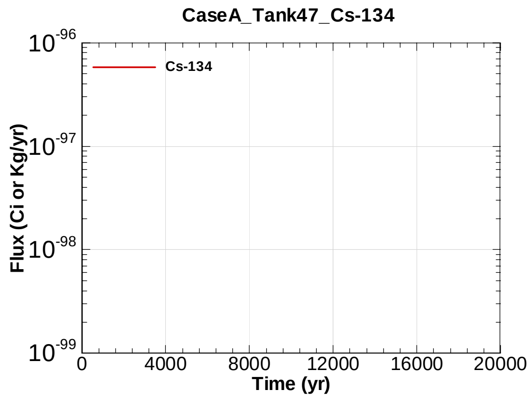

Figure A.1-1520 - Flux Leaving Liner for CaseA Tank47 Cs-134

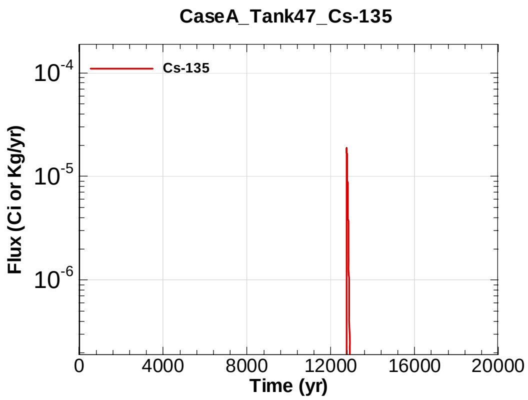

Figure A.1-1521 - Flux Leaving Liner for CaseA Tank47 Cs-135

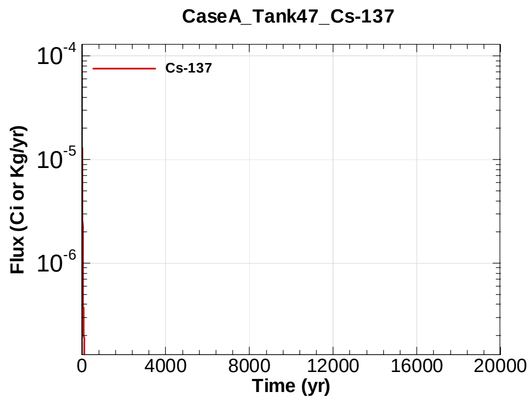

Figure A.1-1522 - Flux Leaving Liner for CaseA Tank47 Cs-137

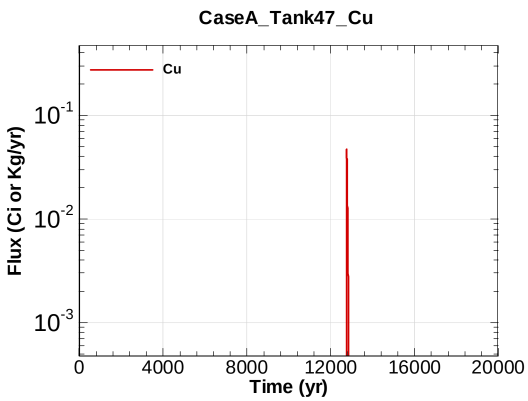

Figure A.1-1523 - Flux Leaving Liner for CaseA Tank47 Cu

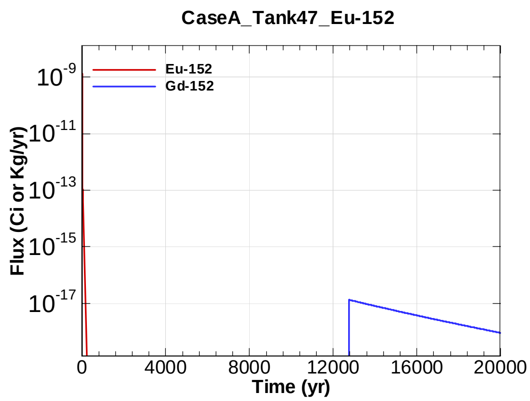

Figure A.1-1524 - Flux Leaving Liner for CaseA Tank47 Eu-152

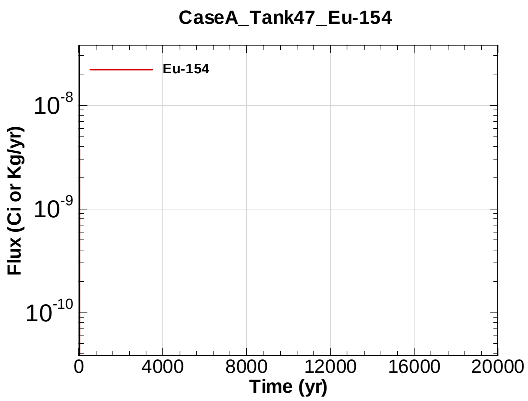

Figure A.1-1525 - Flux Leaving Liner for CaseA Tank47 Eu-154

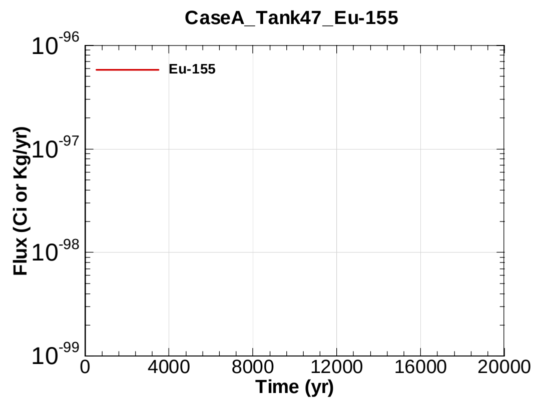

Figure A.1-1526 - Flux Leaving Liner for CaseA Tank47 Eu-155

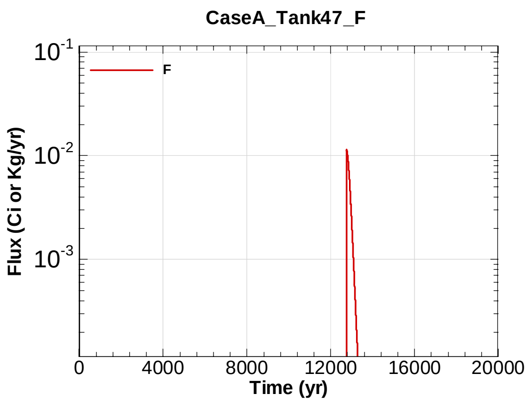

Figure A.1-1527 - Flux Leaving Liner for CaseA Tank47 F

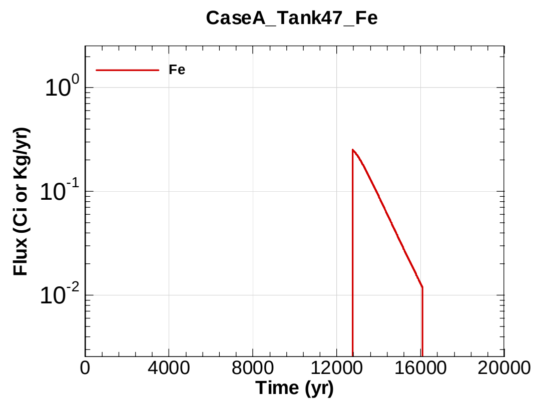

Figure A.1-1528 - Flux Leaving Liner for CaseA Tank47 Fe

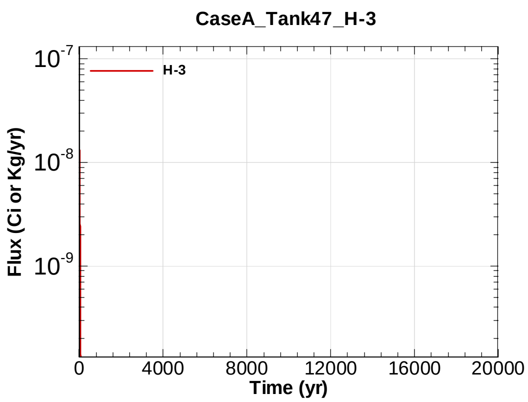

Figure A.1-1529 - Flux Leaving Liner for CaseA Tank47 H-3

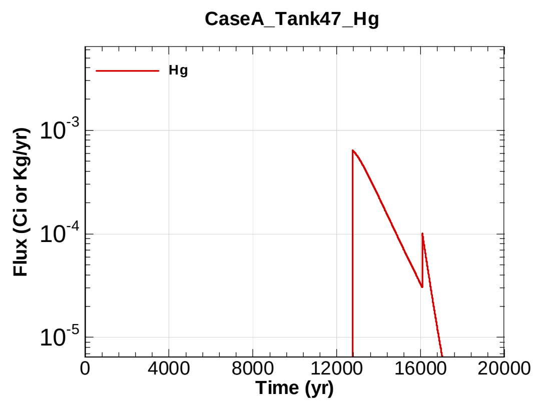

Figure A.1-1530 - Flux Leaving Liner for CaseA Tank47 Hg

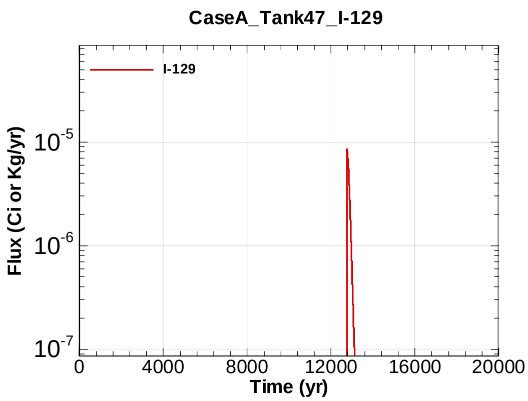

Figure A.1-1531 - Flux Leaving Liner for CaseA Tank47 I-129

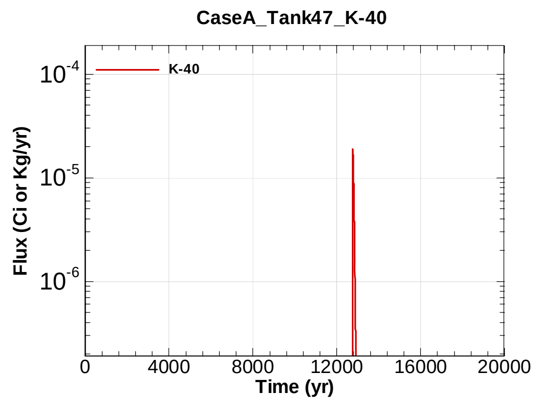

Figure A.1-1532 - Flux Leaving Liner for CaseA Tank47 K-40

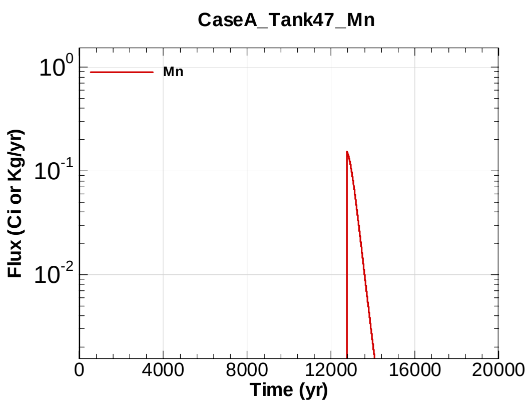

Figure A.1-1533 - Flux Leaving Liner for CaseA Tank47 Mn

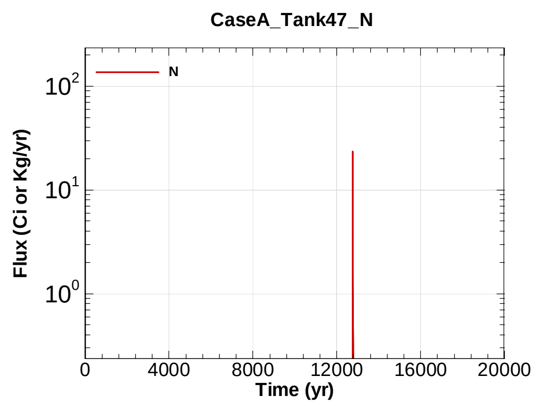

Figure A.1-1534 - Flux Leaving Liner for CaseA Tank47 N

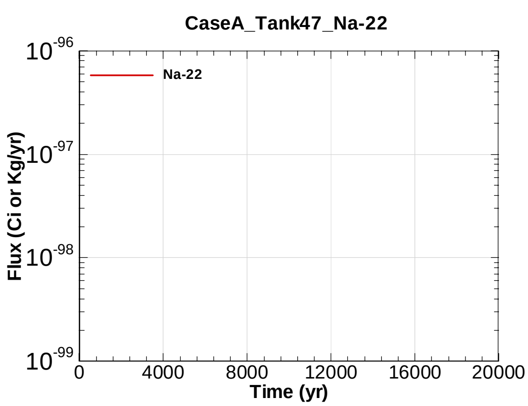

Figure A.1-1535 - Flux Leaving Liner for CaseA Tank47 Na-22

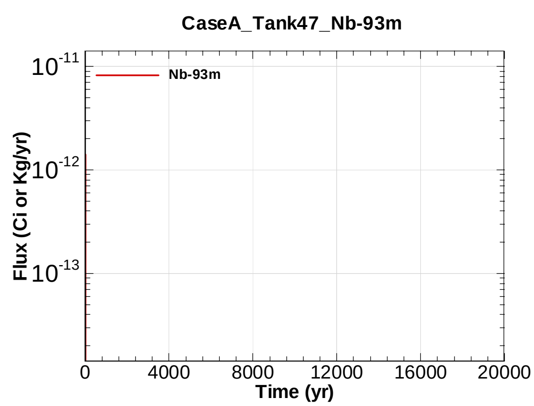

Figure A.1-1536 - Flux Leaving Liner for CaseA Tank47 Nb-93m

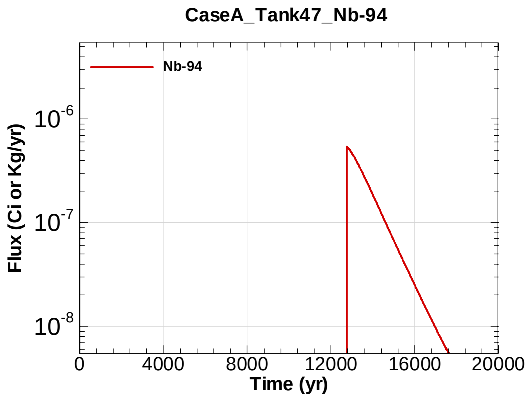

Figure A.1-1537 - Flux Leaving Liner for CaseA Tank47 Nb-94

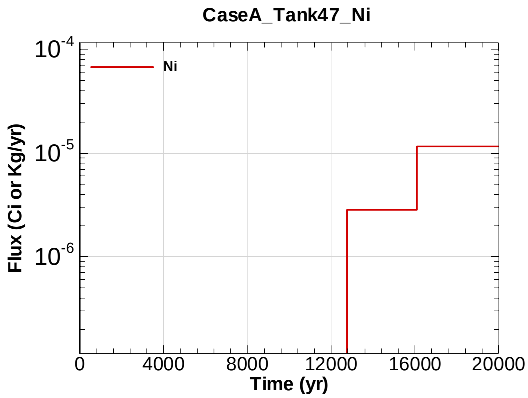

Figure A.1-1538 - Flux Leaving Liner for CaseA Tank47 Ni

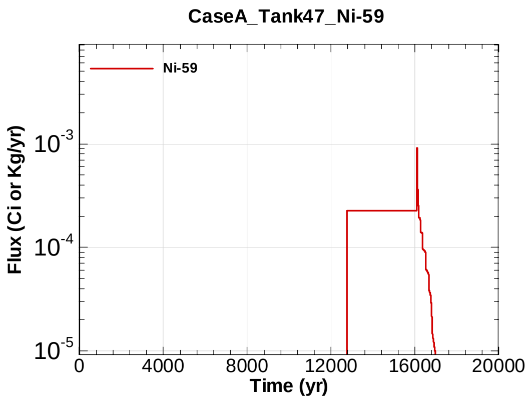

Figure A.1-1539 - Flux Leaving Liner for CaseA Tank47 Ni-59

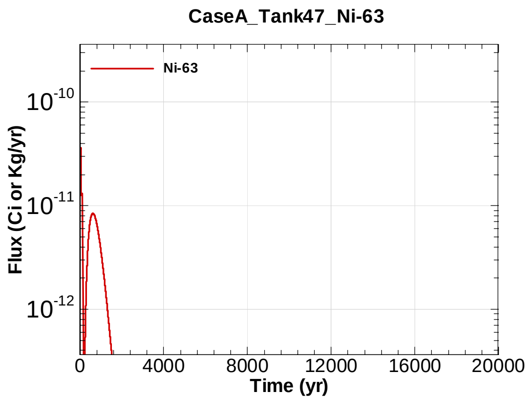

Figure A.1-1540 - Flux Leaving Liner for CaseA Tank47 Ni-63

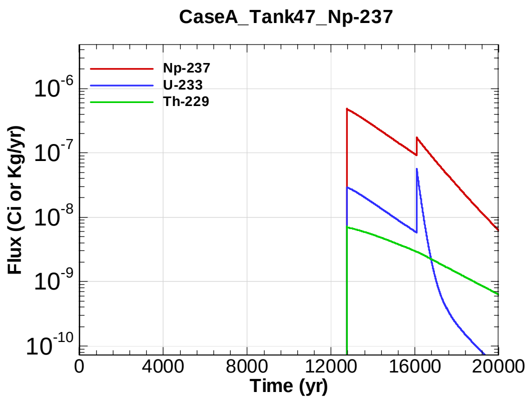

Figure A.1-1541 - Flux Leaving Liner for CaseA Tank47 Np-237

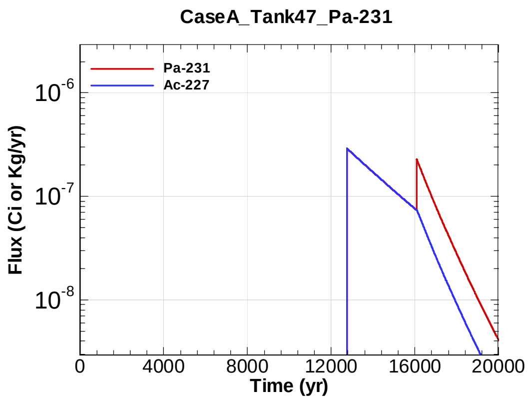

Figure A.1-1542 - Flux Leaving Liner for CaseA Tank47 Pa-231

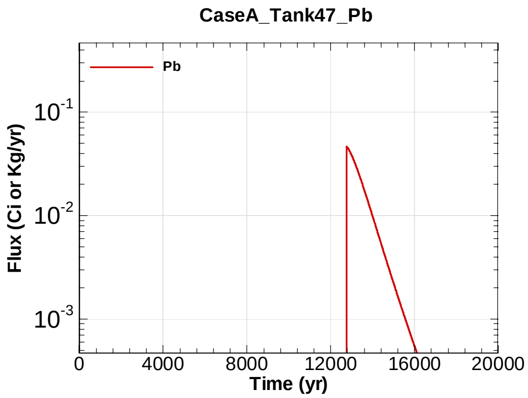

Figure A.1-1543 - Flux Leaving Liner for CaseA Tank47 Pb

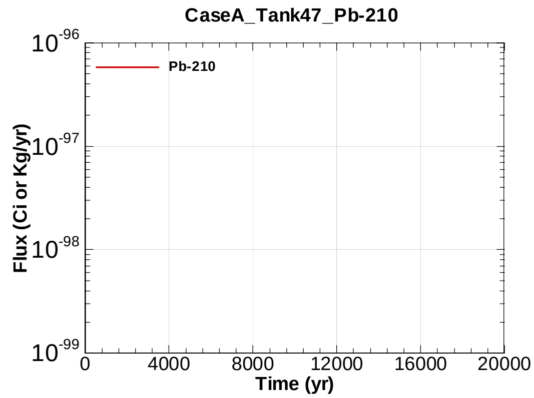

Figure A.1-1544 - Flux Leaving Liner for CaseA Tank47 Pb-210

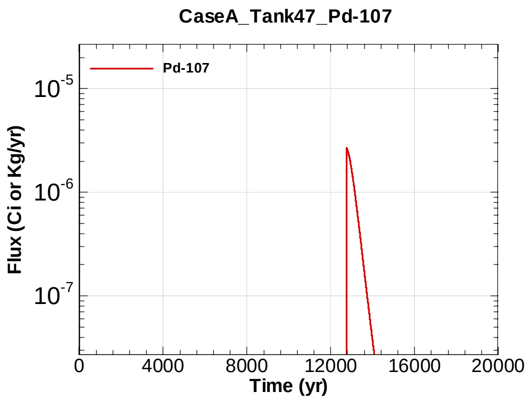

Figure A.1-1545 - Flux Leaving Liner for CaseA Tank47 Pd-107

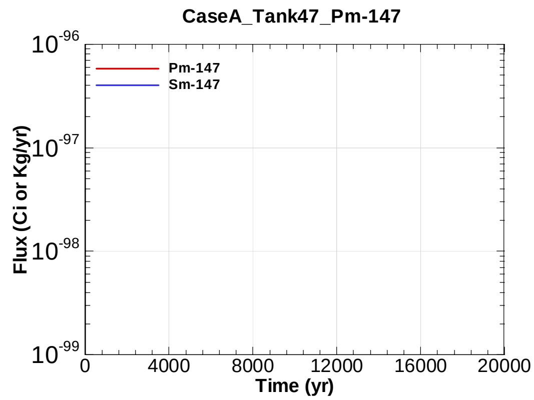

Figure A.1-1546 - Flux Leaving Liner for CaseA Tank47 Pm-147

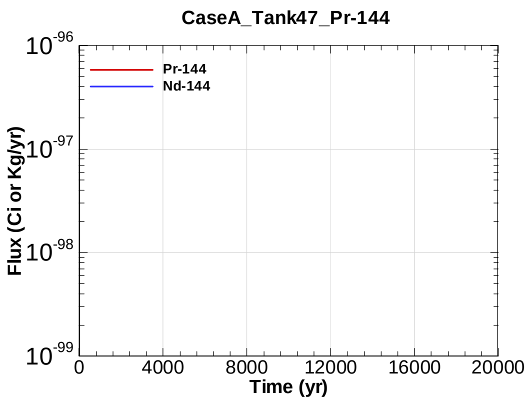

Figure A.1-1547 - Flux Leaving Liner for CaseA Tank47 Pr-144

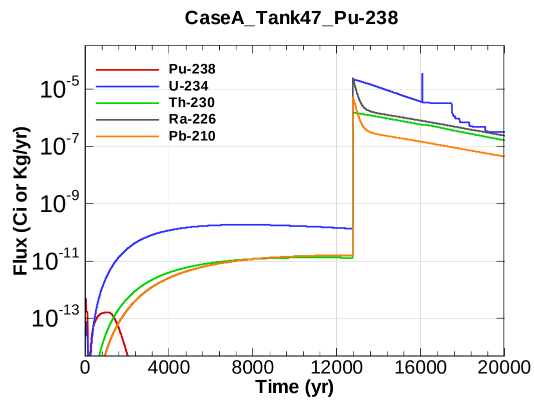

Figure A.1-1548 - Flux Leaving Liner for CaseA Tank47 Pu-238

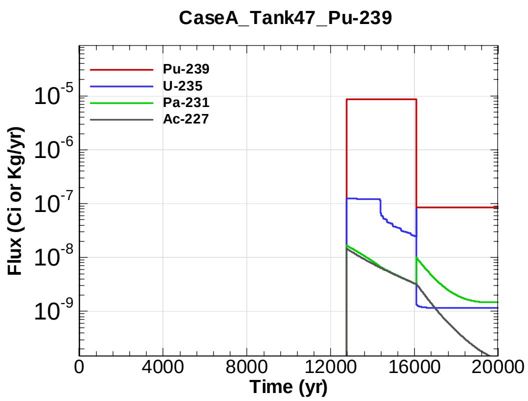

Figure A.1-1549 - Flux Leaving Liner for CaseA Tank47 Pu-239

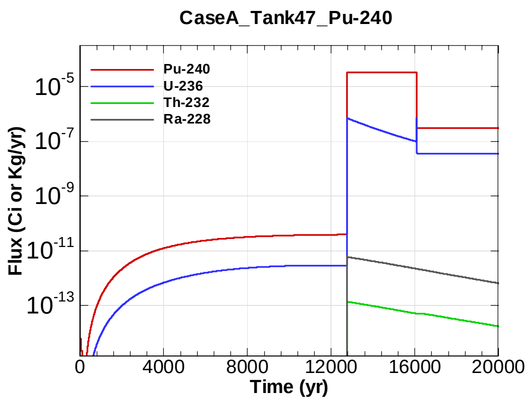

Figure A.1-1550 - Flux Leaving Liner for CaseA Tank47 Pu-240

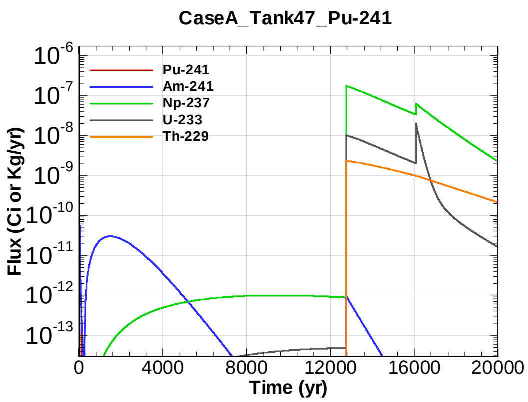

Figure A.1-1551 - Flux Leaving Liner for CaseA Tank47 Pu-241

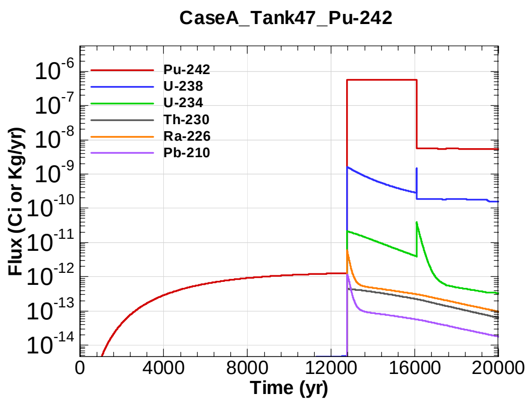

Figure A.1-1552 - Flux Leaving Liner for CaseA Tank47 Pu-242

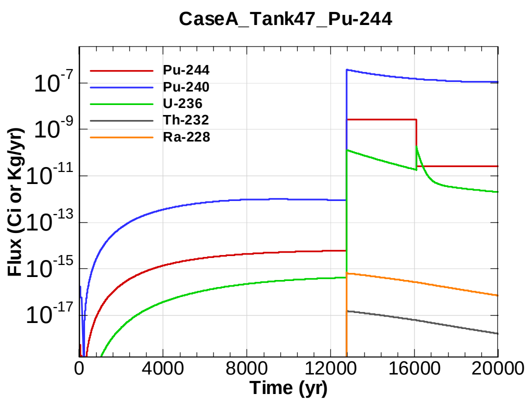

Figure A.1-1553 - Flux Leaving Liner for CaseA Tank47 Pu-244

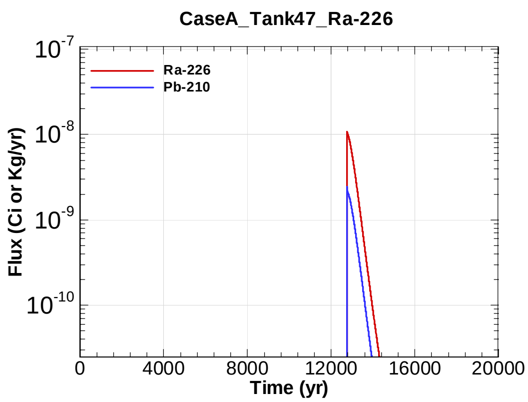

Figure A.1-1554 - Flux Leaving Liner for CaseA Tank47 Ra-226

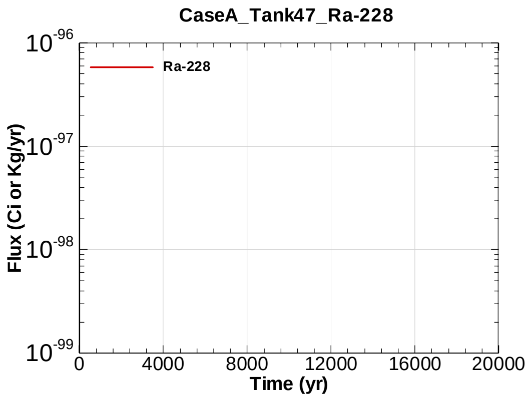

Figure A.1-1555 - Flux Leaving Liner for CaseA Tank47 Ra-228

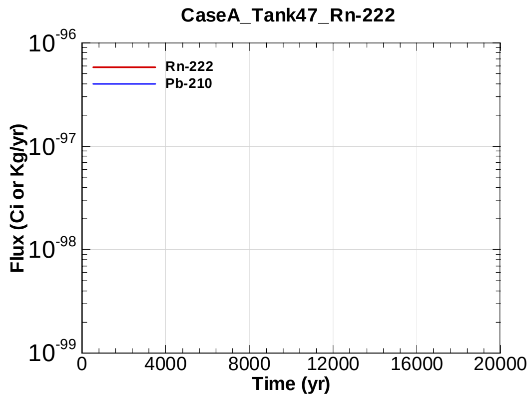

Figure A.1-1556 - Flux Leaving Liner for CaseA Tank47 Rn-222

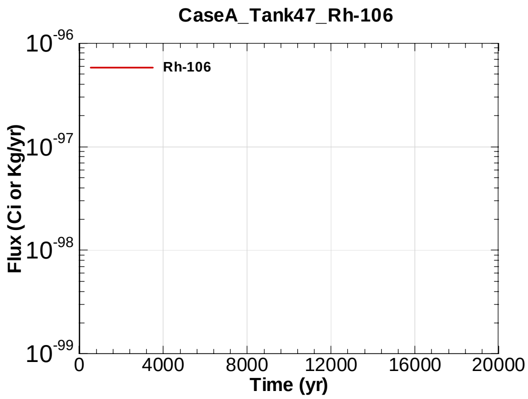

Figure A.1-1557 - Flux Leaving Liner for CaseA Tank47 Rh-106

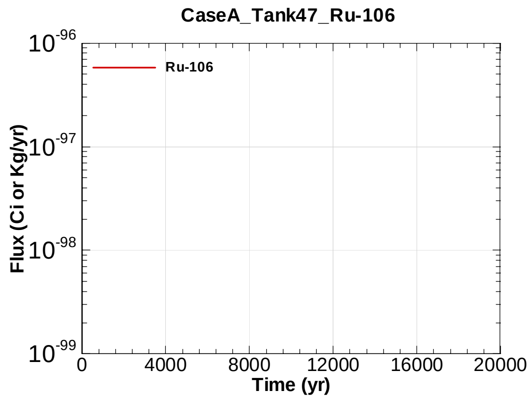

Figure A.1-1558 - Flux Leaving Liner for CaseA Tank47 Ru-106

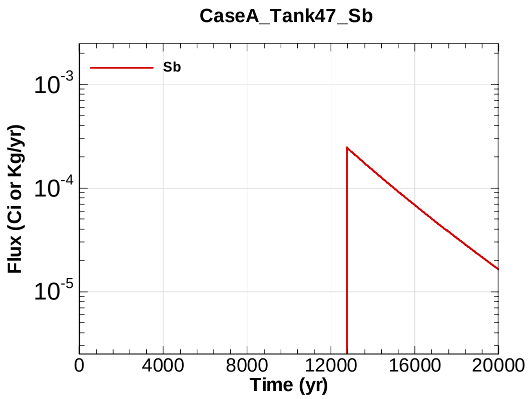

Figure A.1-1559 - Flux Leaving Liner for CaseA Tank47 Sb

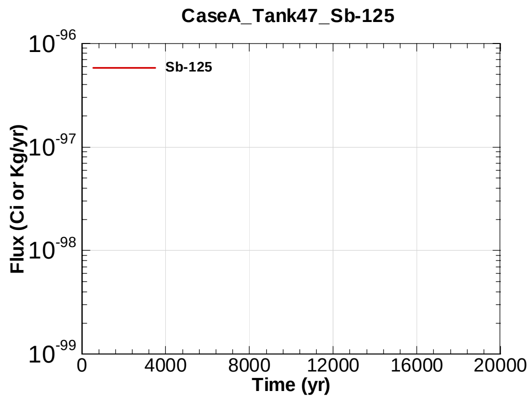

Figure A.1-1560 - Flux Leaving Liner for CaseA Tank47 Sb-125

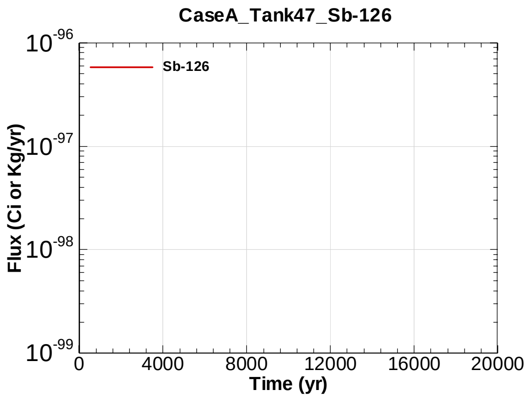

Figure A.1-1561 - Flux Leaving Liner for CaseA Tank47 Sb-126

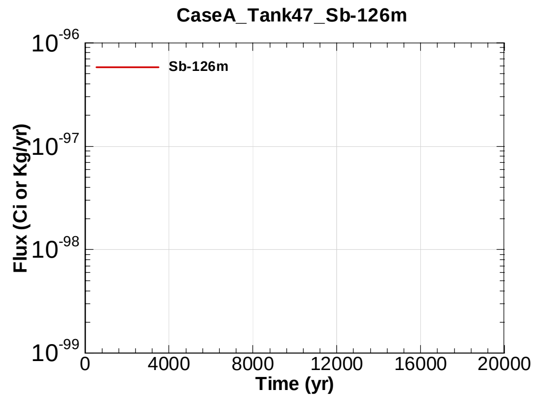

Figure A.1-1562 - Flux Leaving Liner for CaseA Tank47 Sb-126m

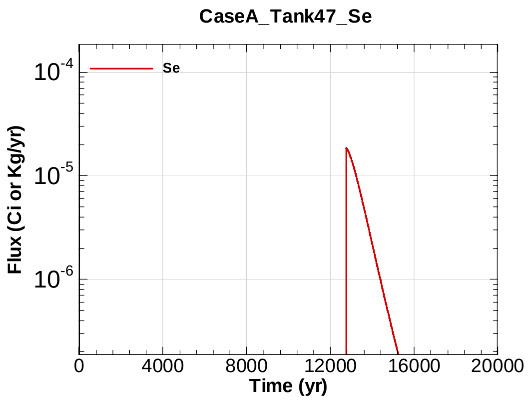

Figure A.1-1563 - Flux Leaving Liner for CaseA Tank47 Se

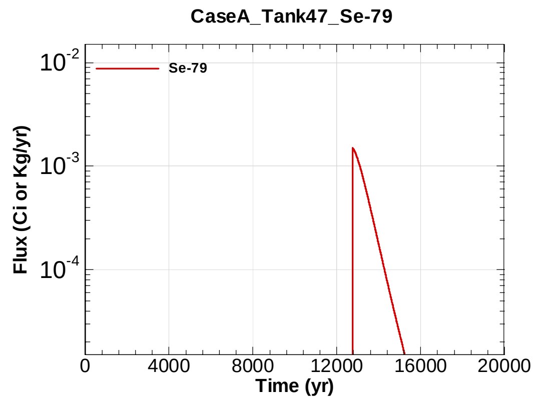

Figure A.1-1564 - Flux Leaving Liner for CaseA Tank47 Se-79

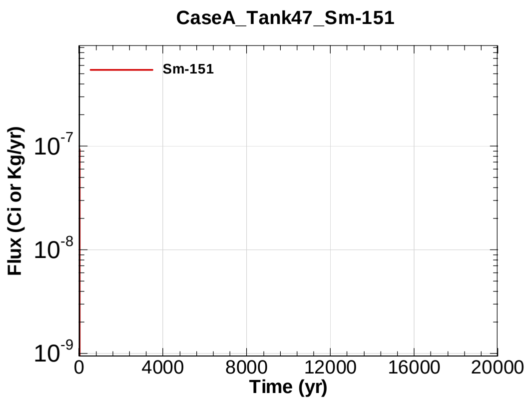

Figure A.1-1565 - Flux Leaving Liner for CaseA Tank47 Sm-151

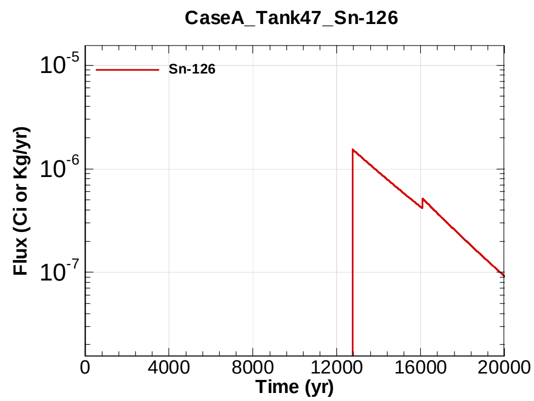

Figure A.1-1566 - Flux Leaving Liner for CaseA Tank47 Sn-126

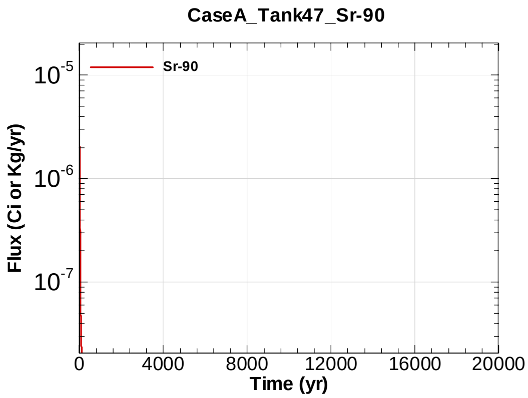

Figure A.1-1567 - Flux Leaving Liner for CaseA Tank47 Sr-90

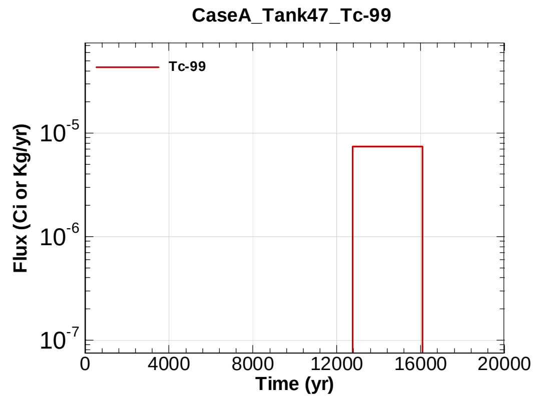

Figure A.1-1568 - Flux Leaving Liner for CaseA Tank47 Tc-99

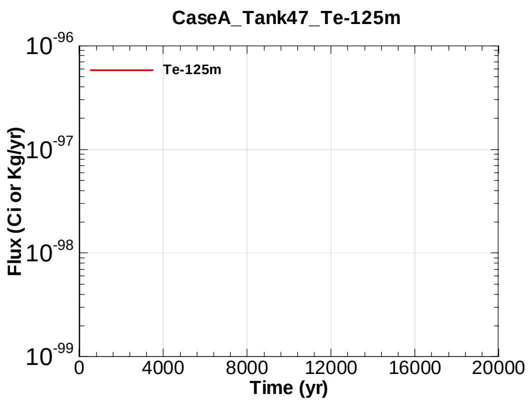

Figure A.1-1569 - Flux Leaving Liner for CaseA Tank47 Te-125m

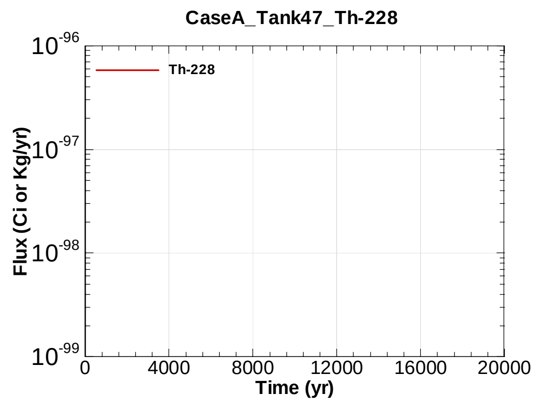

Figure A.1-1570 - Flux Leaving Liner for CaseA Tank47 Th-228

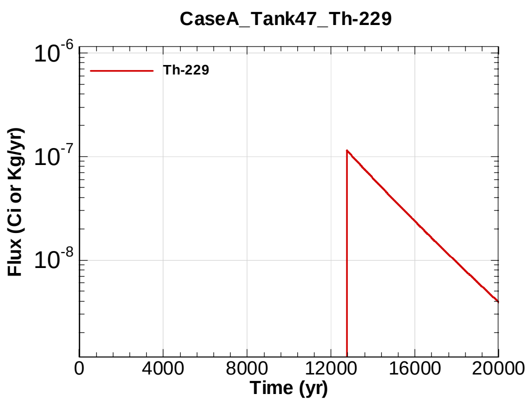

Figure A.1-1571 - Flux Leaving Liner for CaseA Tank47 Th-229

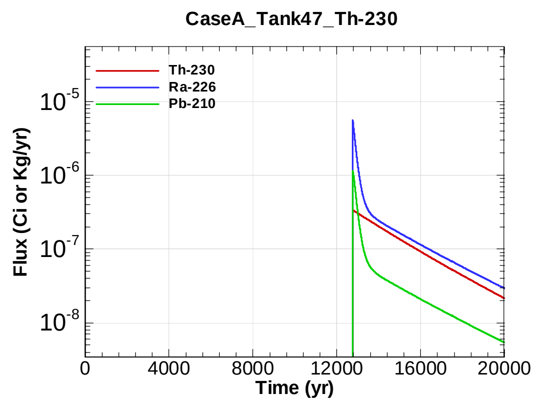

Figure A.1-1572 - Flux Leaving Liner for CaseA Tank47 Th-230

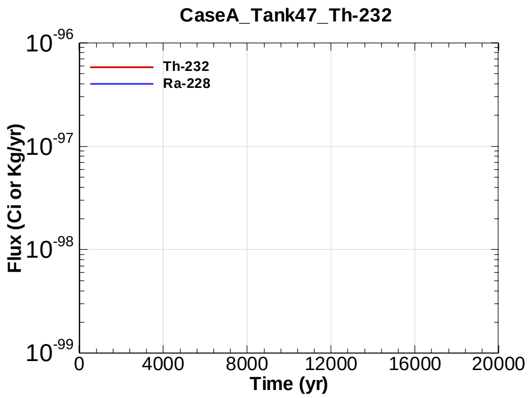

Figure A.1-1573 - Flux Leaving Liner for CaseA Tank47 Th-232

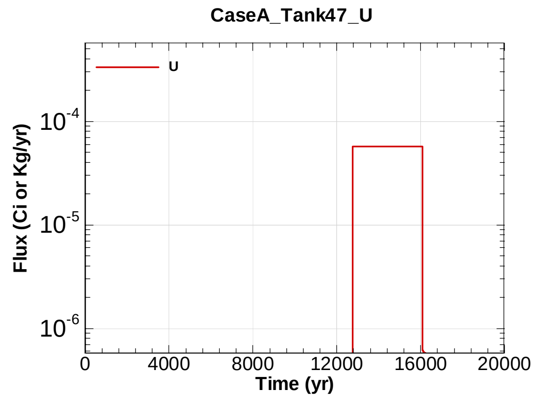

Figure A.1-1574 - Flux Leaving Liner for CaseA Tank47 U

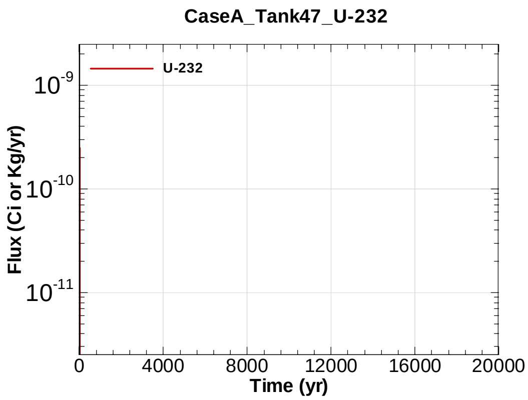

Figure A.1-1575 - Flux Leaving Liner for CaseA Tank47 U-232

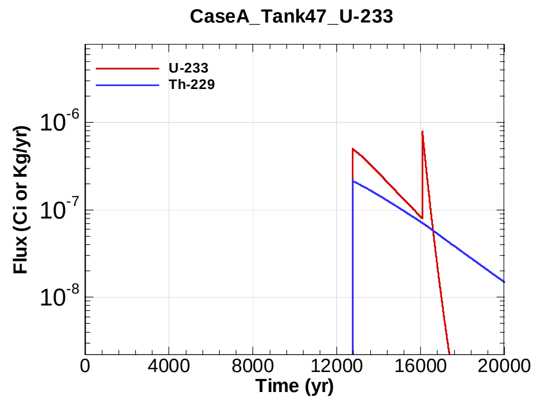

Figure A.1-1576 - Flux Leaving Liner for CaseA Tank47 U-233

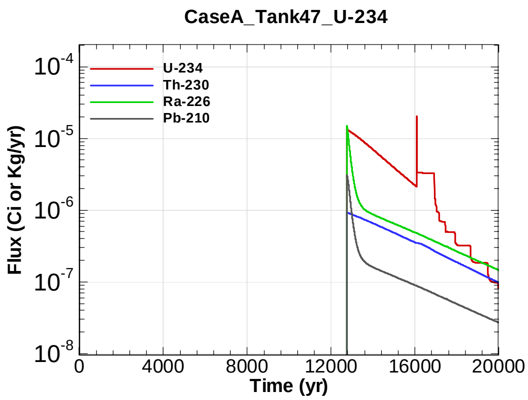

Figure A.1-1577 - Flux Leaving Liner for CaseA Tank47 U-234

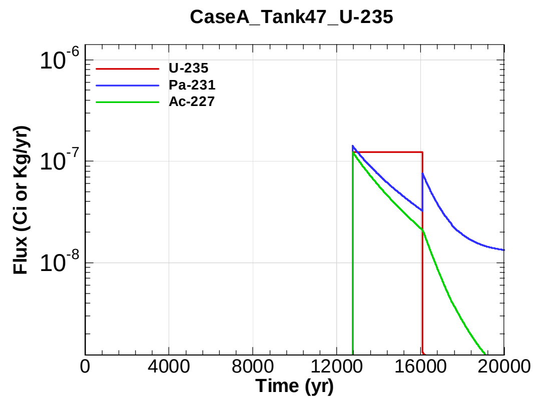

Figure A.1-1578 - Flux Leaving Liner for CaseA Tank47 U-235

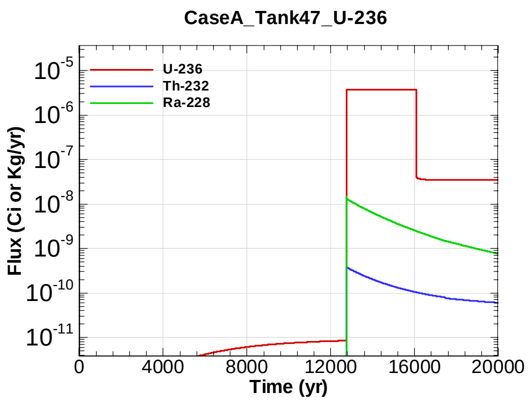

Figure A.1-1579 - Flux Leaving Liner for CaseA Tank47 U-236

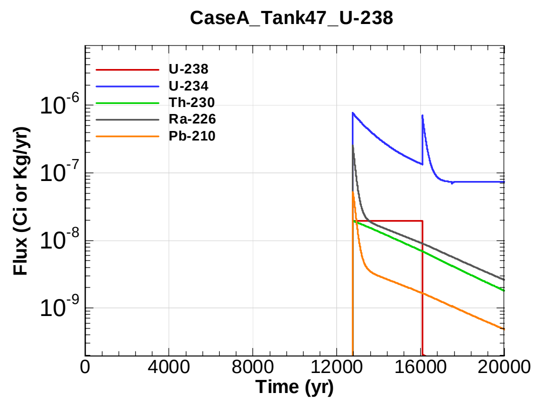

Figure A.1-1580 - Flux Leaving Liner for CaseA Tank47 U-238

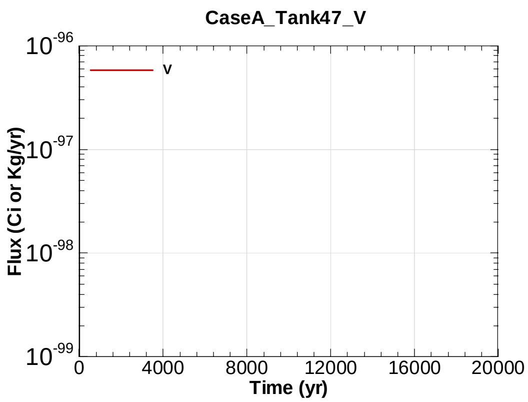

Figure A.1-1581 - Flux Leaving Liner for CaseA Tank47 V

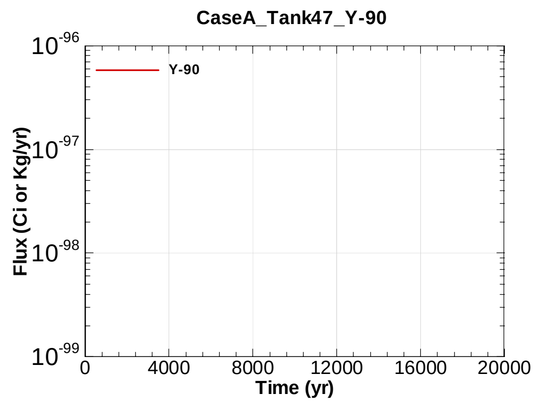

Figure A.1-1582 - Flux Leaving Liner for CaseA Tank47 Y-90

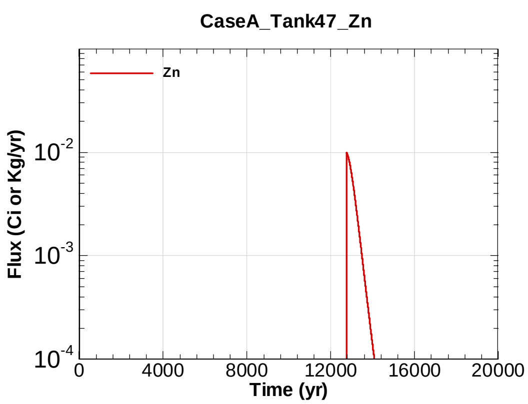

Figure A.1-1583 - Flux Leaving Liner for CaseA Tank47 Zn

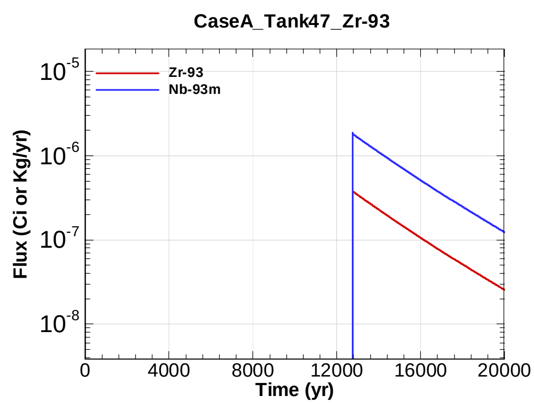

Figure A.1-1584 - Flux Leaving Liner for CaseA Tank47 Zr-93

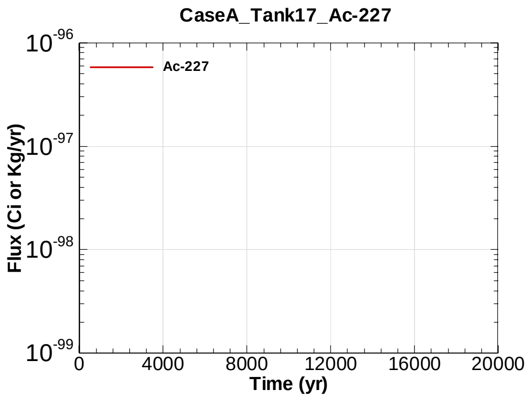

Figure A.1-1585 - Flux Leaving Liner for CaseA Tank17 Ac-227

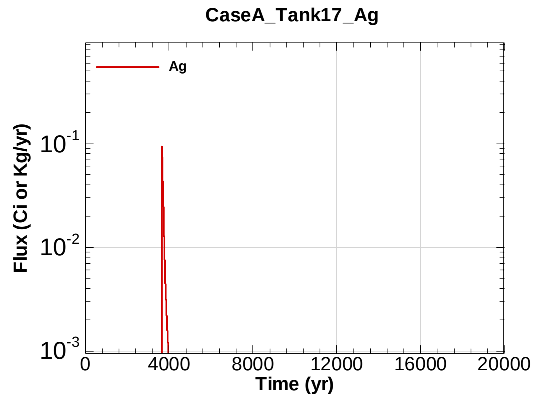

Figure A.1-1586 - Flux Leaving Liner for CaseA Tank17 Ag

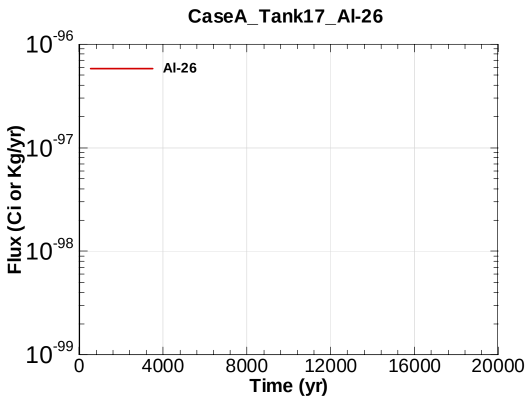

Figure A.1-1587 - Flux Leaving Liner for CaseA Tank17 Al-26

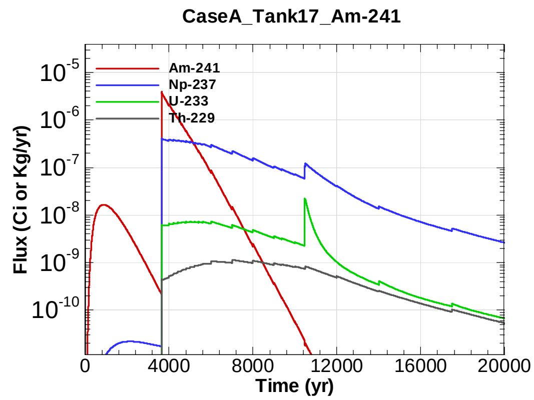

Figure A.1-1588 - Flux Leaving Liner for CaseA Tank17 Am-241

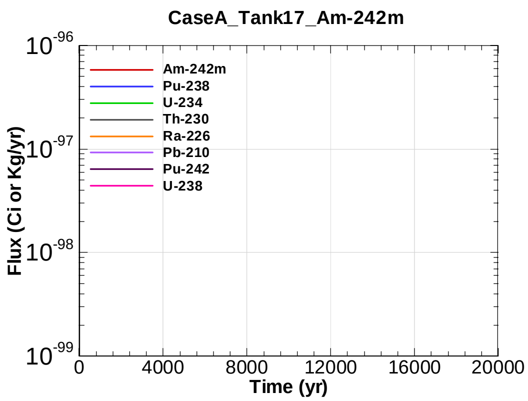

Figure A.1-1589 - Flux Leaving Liner for CaseA Tank17 Am-242m

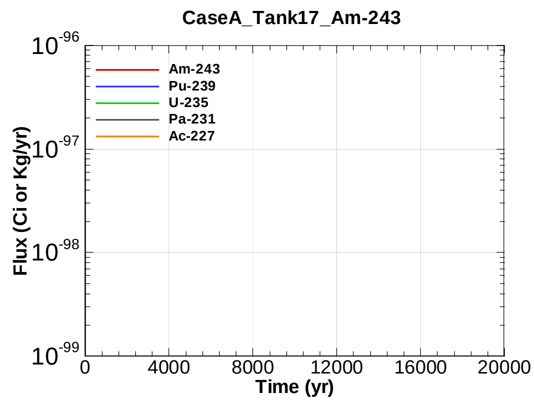

Figure A.1-1590 - Flux Leaving Liner for CaseA Tank17 Am-243

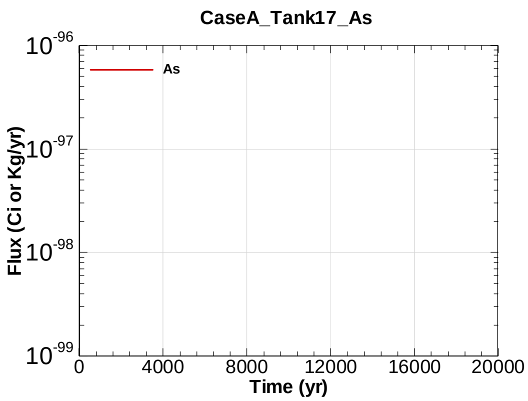

Figure A.1-1591 - Flux Leaving Liner for CaseA Tank17 As

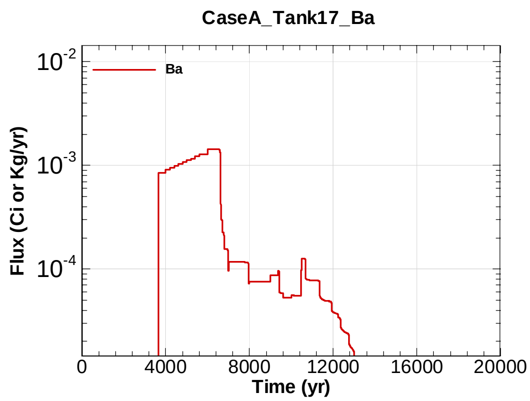

Figure A.1-1592 - Flux Leaving Liner for CaseA Tank17 Ba

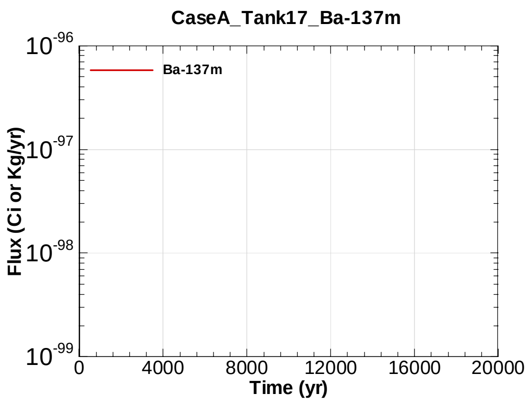

Figure A.1-1593 - Flux Leaving Liner for CaseA Tank17 Ba-137m

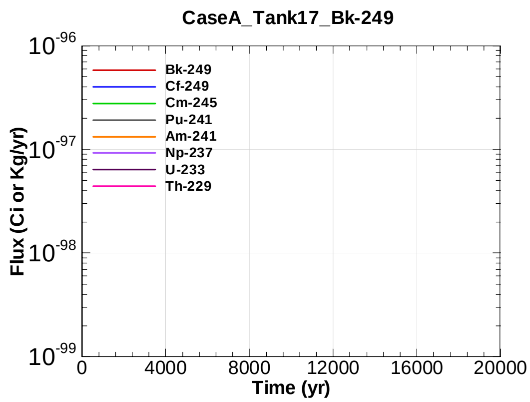

Figure A.1-1594 - Flux Leaving Liner for CaseA Tank17 Bk-249

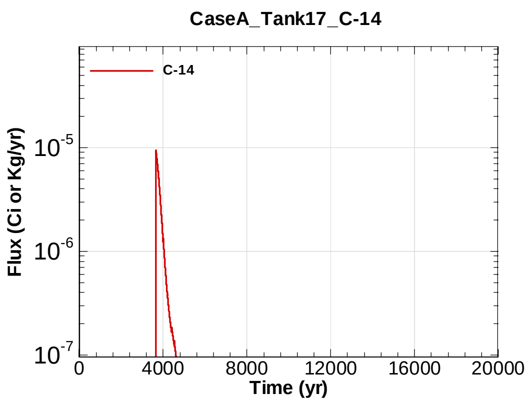

Figure A.1-1595 - Flux Leaving Liner for CaseA Tank17 C-14

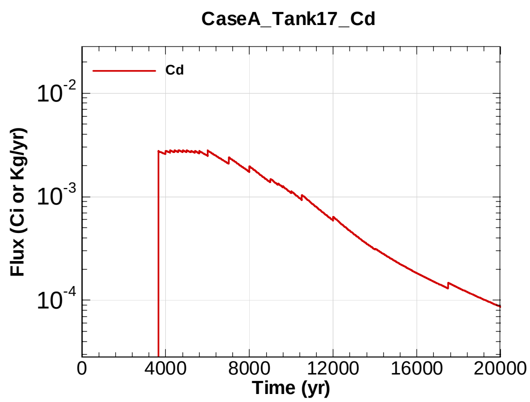

Figure A.1-1596 - Flux Leaving Liner for CaseA Tank17 Cd

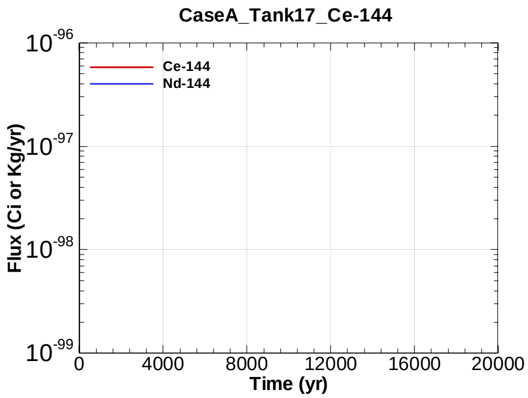

Figure A.1-1597 - Flux Leaving Liner for CaseA Tank17 Ce-144

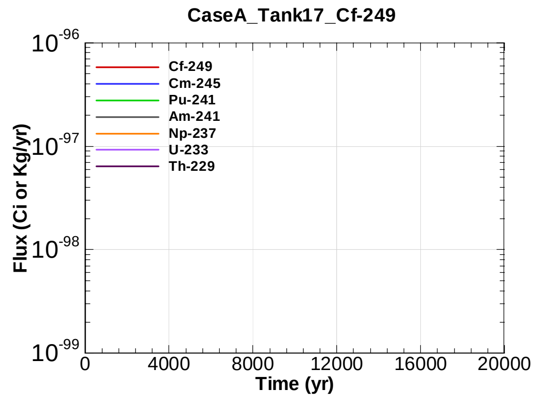

Figure A.1-1598 - Flux Leaving Liner for CaseA Tank17 Cf-249

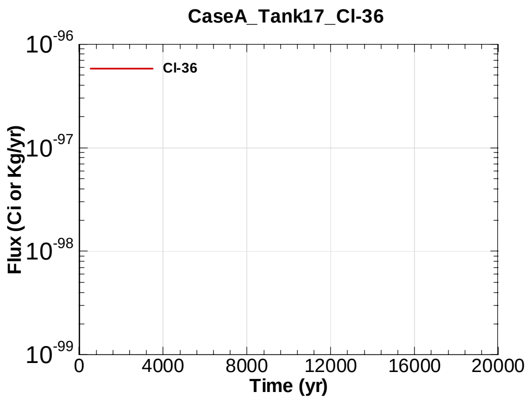

Figure A.1-1599 - Flux Leaving Liner for CaseA Tank17 Cl-36

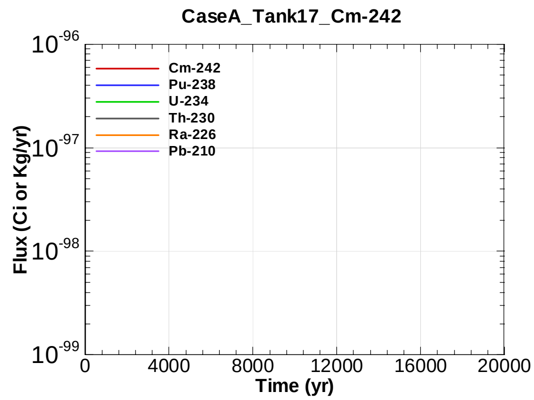

Figure A.1-1600 - Flux Leaving Liner for CaseA Tank17 Cm-242

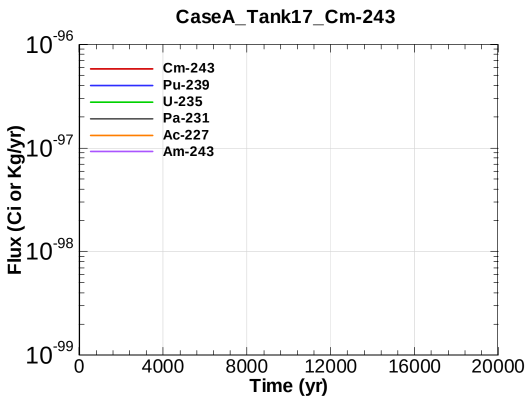

Figure A.1-1601 - Flux Leaving Liner for CaseA Tank17 Cm-243

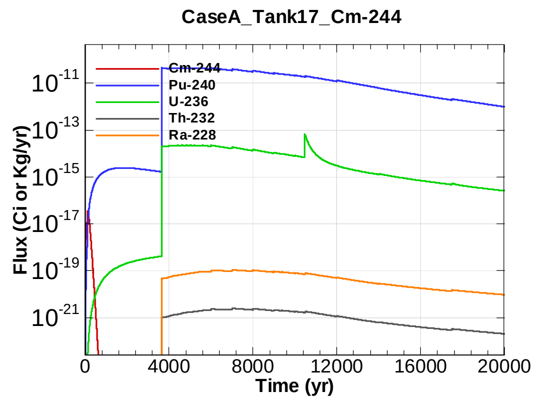

Figure A.1-1602 - Flux Leaving Liner for CaseA Tank17 Cm-244

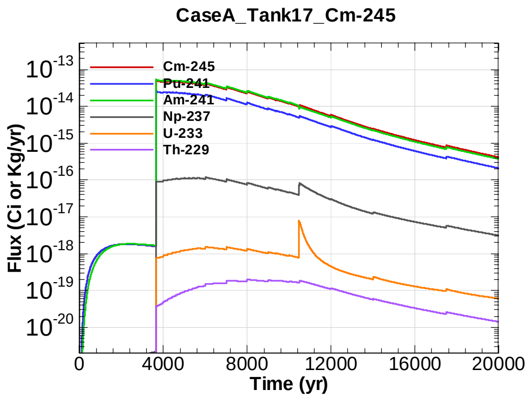

Figure A.1-1603 - Flux Leaving Liner for CaseA Tank17 Cm-245

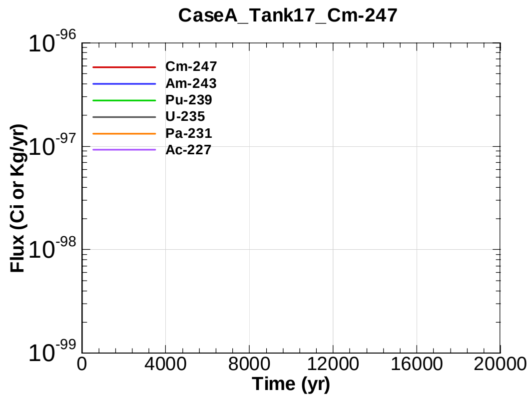

Figure A.1-1604 - Flux Leaving Liner for CaseA Tank17 Cm-247

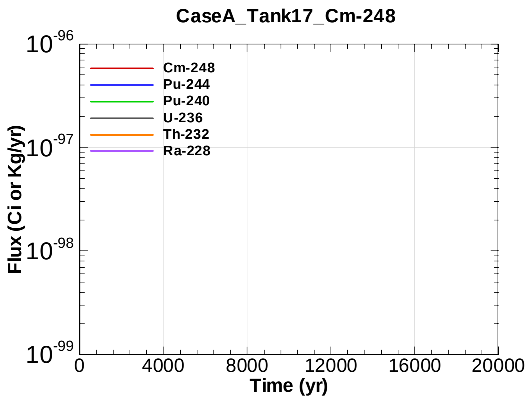

Figure A.1-1605 - Flux Leaving Liner for CaseA Tank17 Cm-248

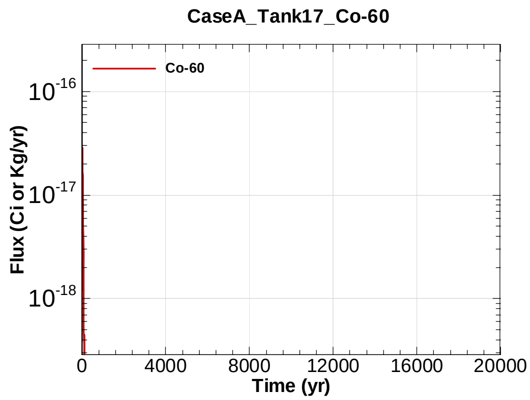

Figure A.1-1606 - Flux Leaving Liner for CaseA Tank17 Co-60

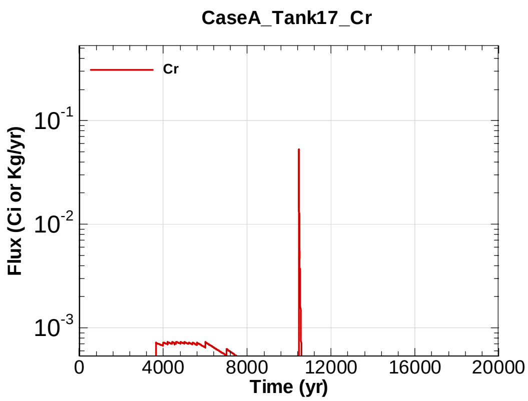

Figure A.1-1607 - Flux Leaving Liner for CaseA Tank17 Cr

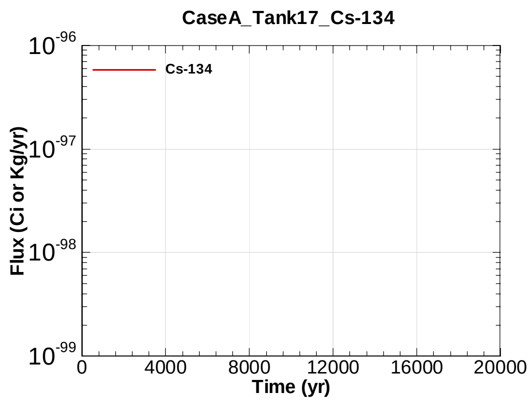

Figure A.1-1608 - Flux Leaving Liner for CaseA Tank17 Cs-134

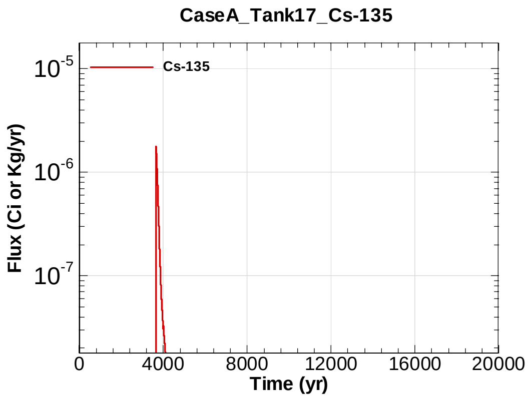

Figure A.1-1609 - Flux Leaving Liner for CaseA Tank17 Cs-135

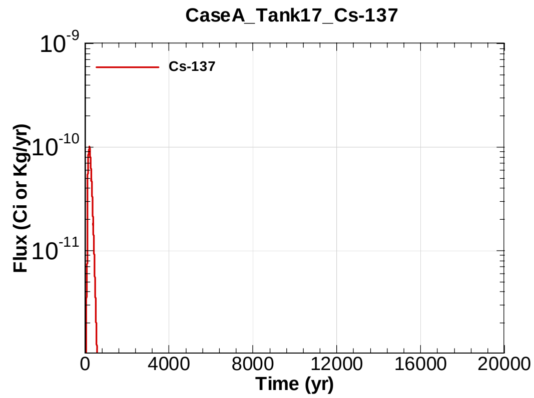

Figure A.1-1610 - Flux Leaving Liner for CaseA Tank17 Cs-137

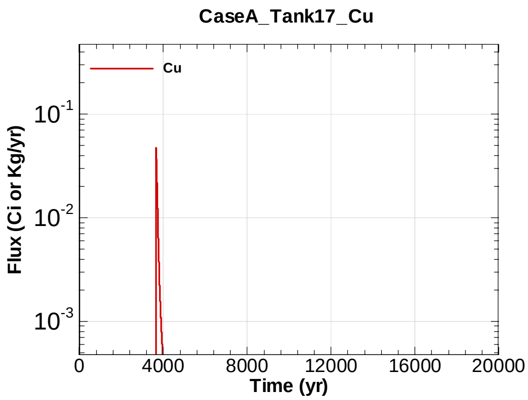

Figure A.1-1611 - Flux Leaving Liner for CaseA Tank17 Cu

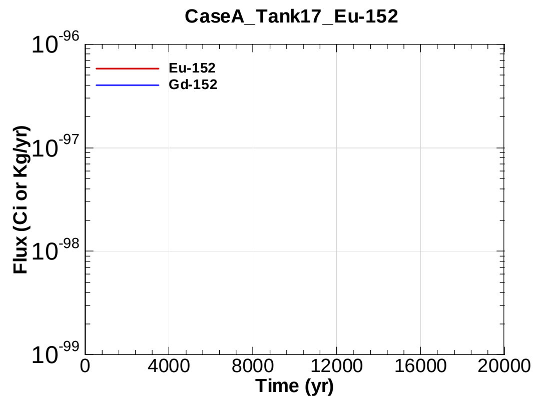

Figure A.1-1612 - Flux Leaving Liner for CaseA Tank17 Eu-152

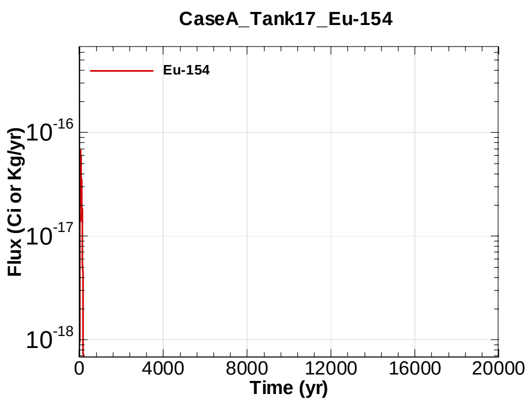

Figure A.1-1613 - Flux Leaving Liner for CaseA Tank17 Eu-154

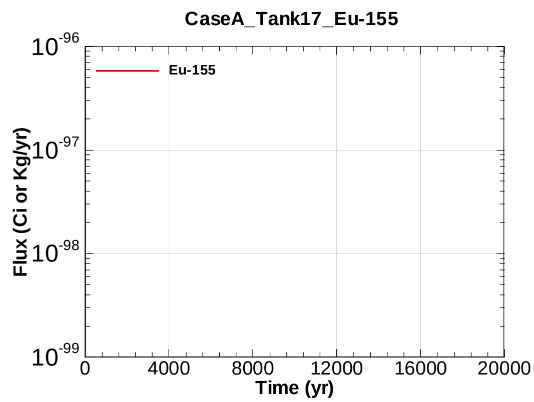

Figure A.1-1614 - Flux Leaving Liner for CaseA Tank17 Eu-155

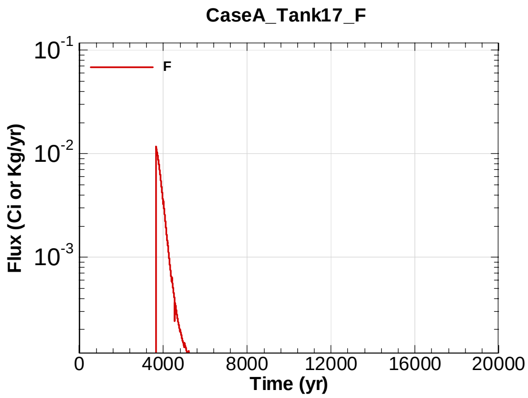

Figure A.1-1615 - Flux Leaving Liner for CaseA Tank17 F

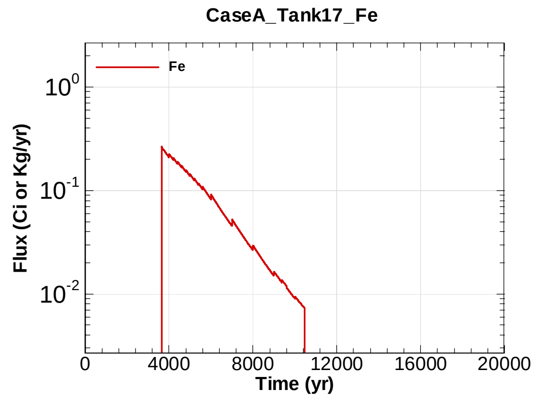

Figure A.1-1616 - Flux Leaving Liner for CaseA Tank17 Fe

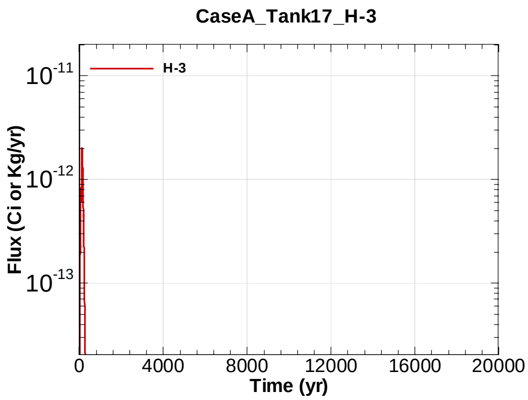

Figure A.1-1617 - Flux Leaving Liner for CaseA Tank17 H-3

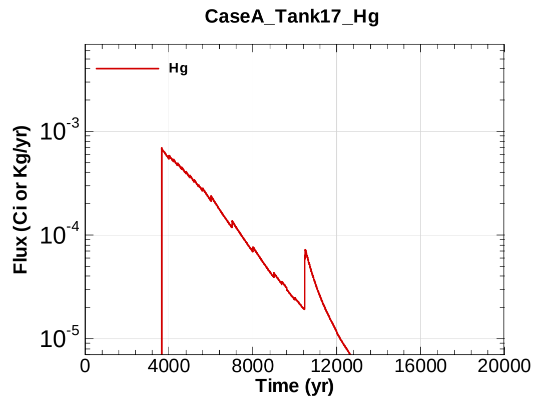

Figure A.1-1618 - Flux Leaving Liner for CaseA Tank17 Hg

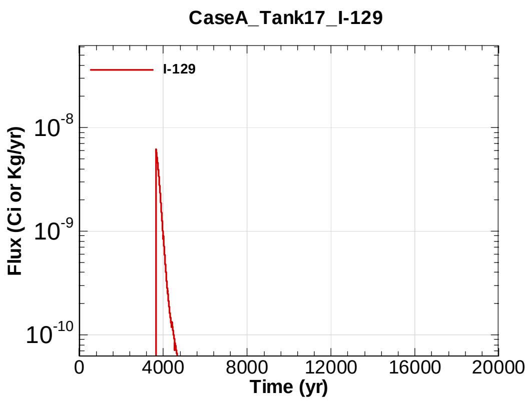

Figure A.1-1619 - Flux Leaving Liner for CaseA Tank17 I-129

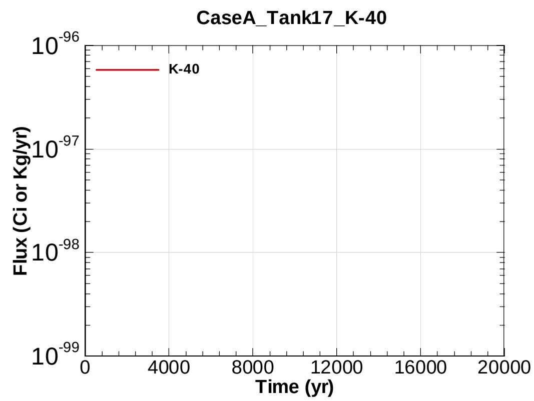

Figure A.1-1620 - Flux Leaving Liner for CaseA Tank17 K-40

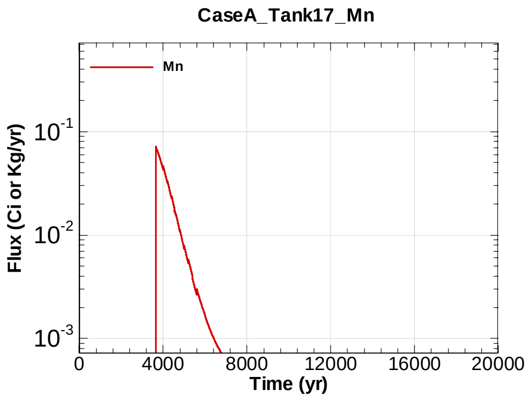

Figure A.1-1621 - Flux Leaving Liner for CaseA Tank17 Mn

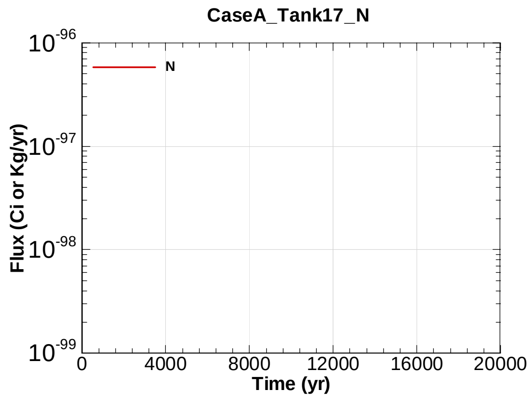

Figure A.1-1622 - Flux Leaving Liner for CaseA Tank17 N

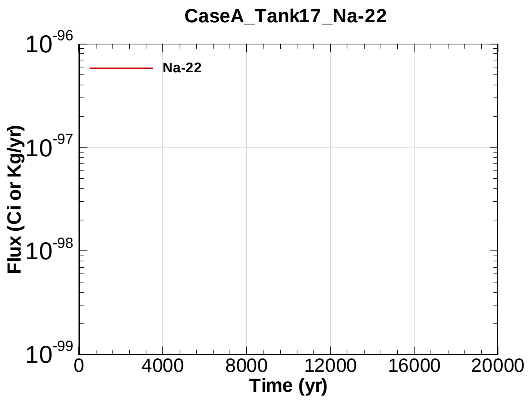

Figure A.1-1623 - Flux Leaving Liner for CaseA Tank17 Na-22

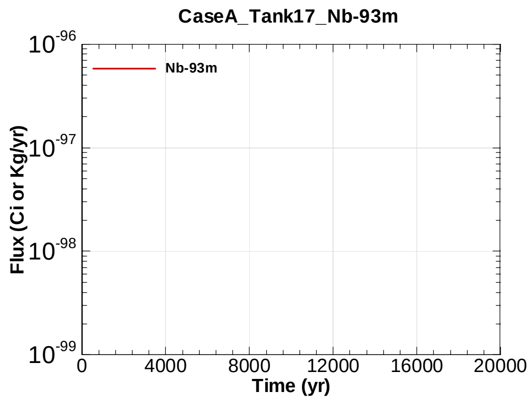

Figure A.1-1624 - Flux Leaving Liner for CaseA Tank17 Nb-93m

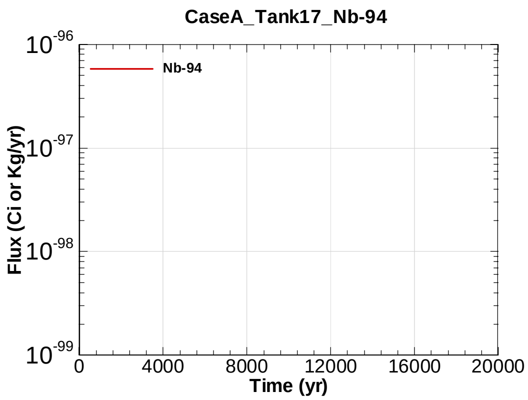

Figure A.1-1625 - Flux Leaving Liner for CaseA Tank17 Nb-94

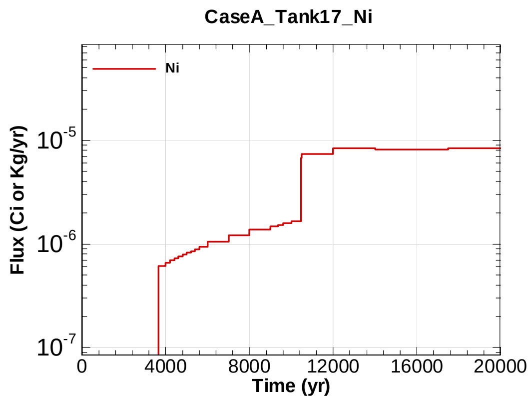

Figure A.1-1626 - Flux Leaving Liner for CaseA Tank17 Ni

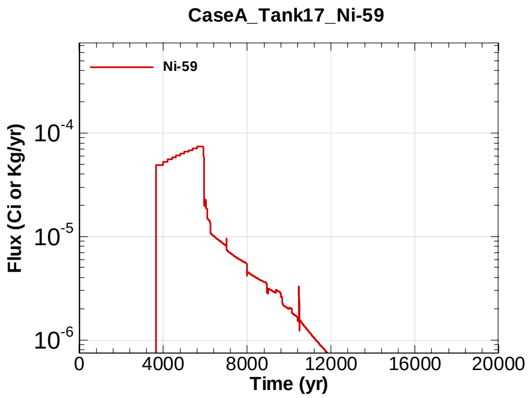

Figure A.1-1627 - Flux Leaving Liner for CaseA Tank17 Ni-59

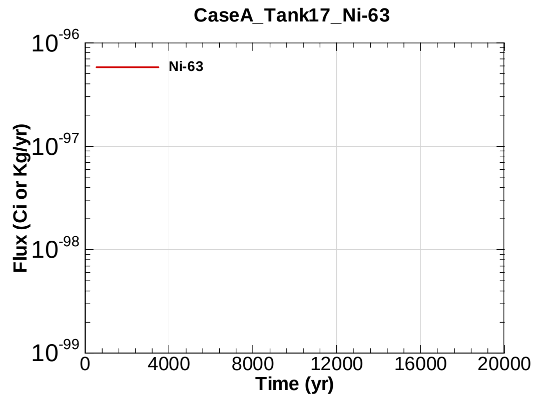

Figure A.1-1628 - Flux Leaving Liner for CaseA Tank17 Ni-63

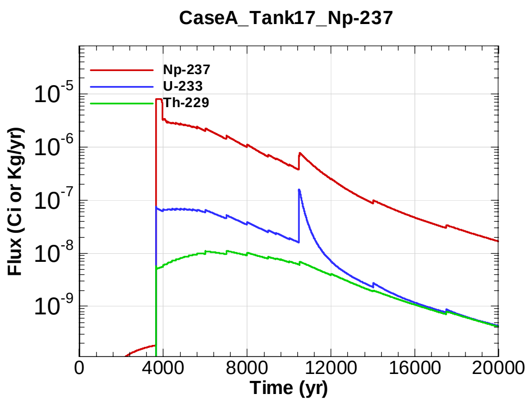

Figure A.1-1629 - Flux Leaving Liner for CaseA Tank17 Np-237

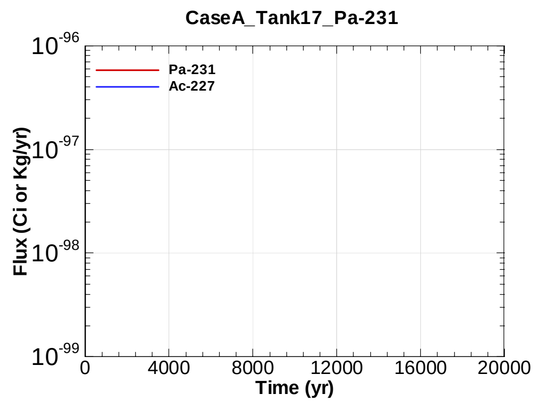

Figure A.1-1630 - Flux Leaving Liner for CaseA Tank17 Pa-231

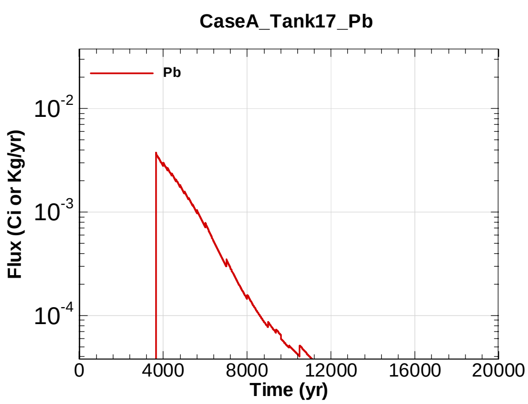

Figure A.1-1631 - Flux Leaving Liner for CaseA Tank17 Pb

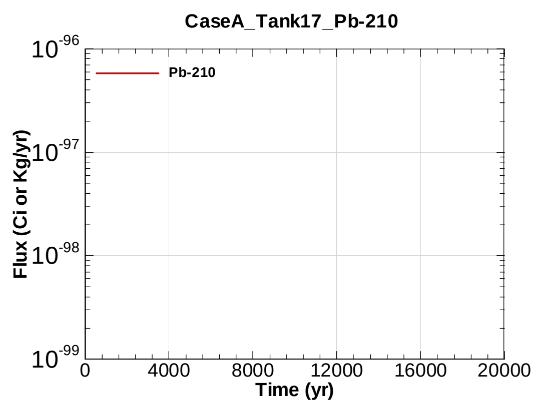

Figure A.1-1632 - Flux Leaving Liner for CaseA Tank17 Pb-210

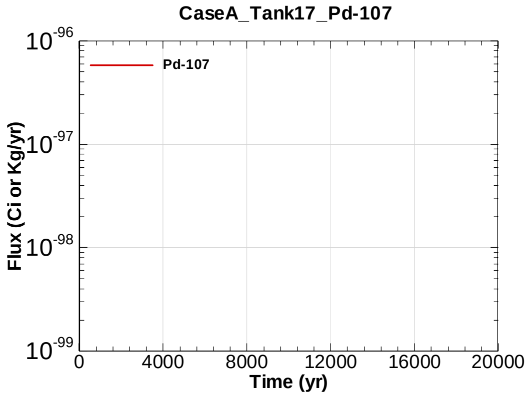

Figure A.1-1633 - Flux Leaving Liner for CaseA Tank17 Pd-107

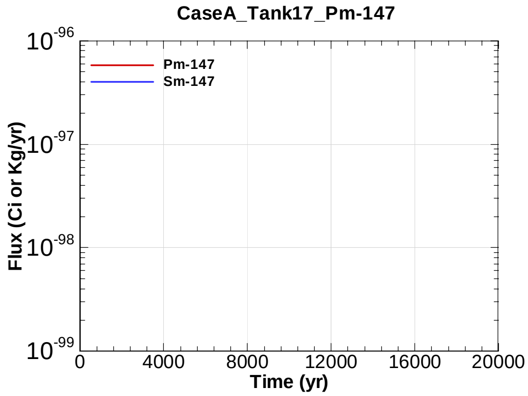

Figure A.1-1634 - Flux Leaving Liner for CaseA Tank17 Pm-147

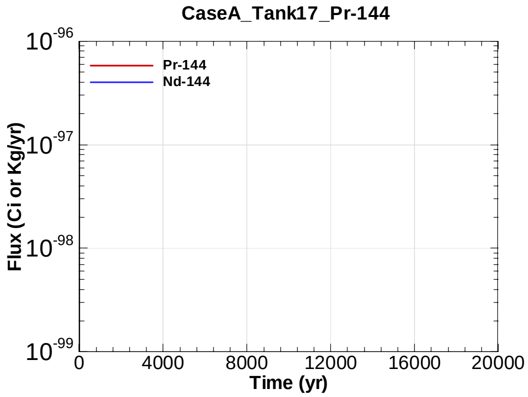

Figure A.1-1635 - Flux Leaving Liner for CaseA Tank17 Pr-144

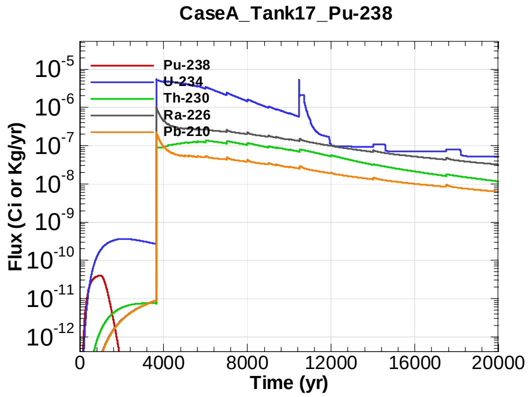

Figure A.1-1636 - Flux Leaving Liner for CaseA Tank17 Pu-238

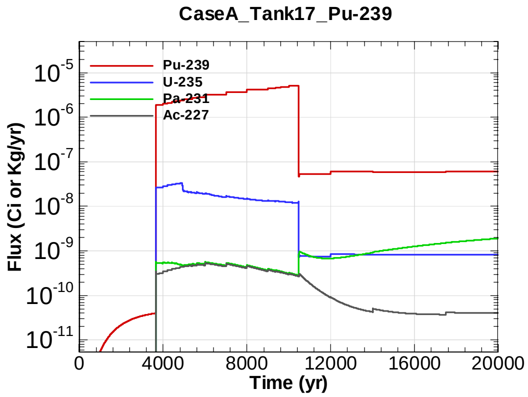

Figure A.1-1637 - Flux Leaving Liner for CaseA Tank17 Pu-239

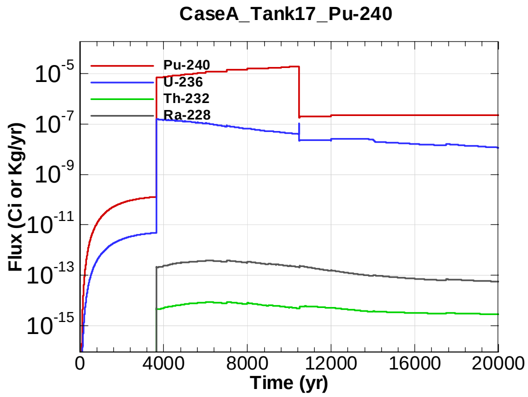

Figure A.1-1638 - Flux Leaving Liner for CaseA Tank17 Pu-240

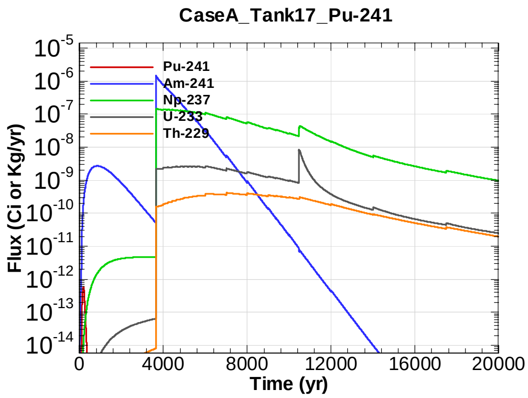

Figure A.1-1639 - Flux Leaving Liner for CaseA Tank17 Pu-241

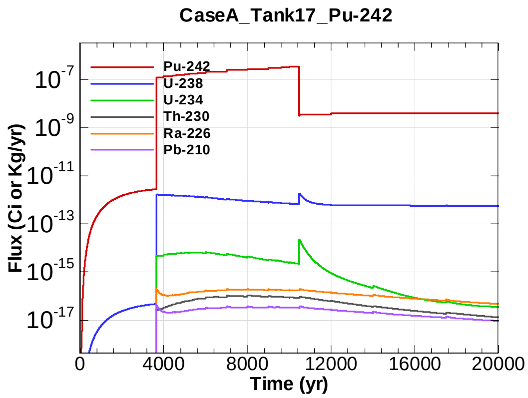

Figure A.1-1640 - Flux Leaving Liner for CaseA Tank17 Pu-242

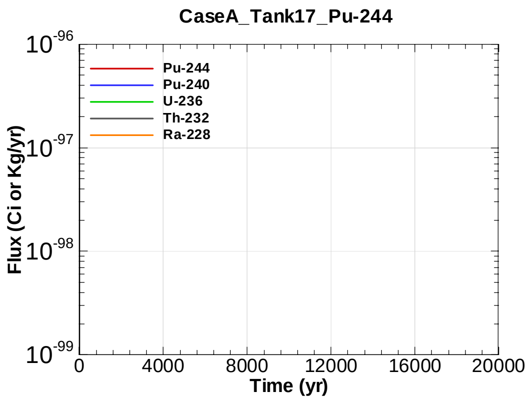

Figure A.1-1641 - Flux Leaving Liner for CaseA Tank17 Pu-244

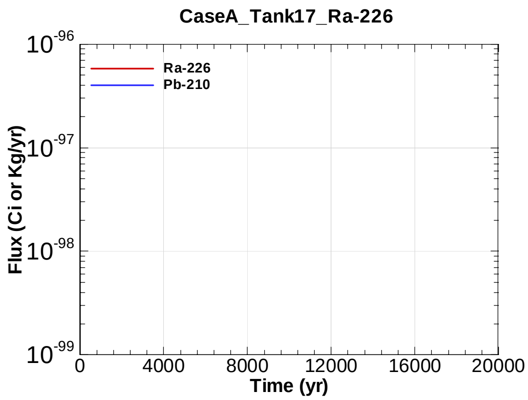

Figure A.1-1642 - Flux Leaving Liner for CaseA Tank17 Ra-226

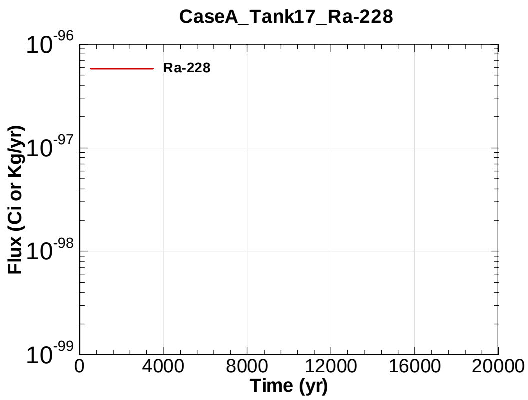

Figure A.1-1643 - Flux Leaving Liner for CaseA Tank17 Ra-228

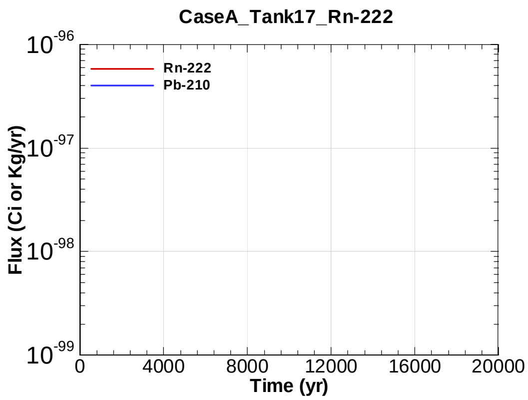

Figure A.1-1644 - Flux Leaving Liner for CaseA Tank17 Rn-222

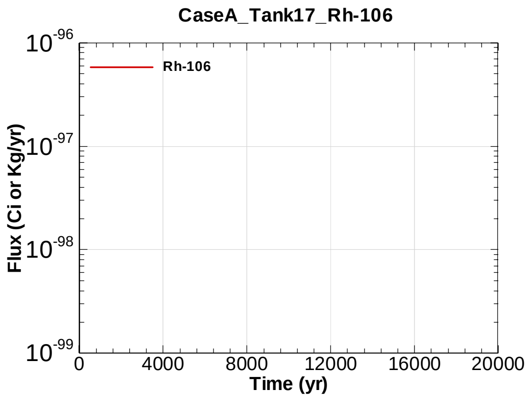

Figure A.1-1645 - Flux Leaving Liner for CaseA Tank17 Rh-106

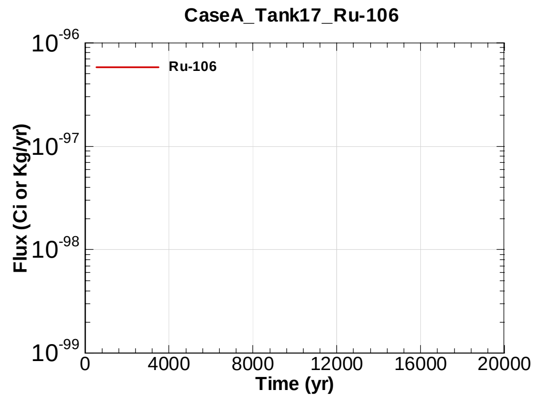

Figure A.1-1646 - Flux Leaving Liner for CaseA Tank17 Ru-106

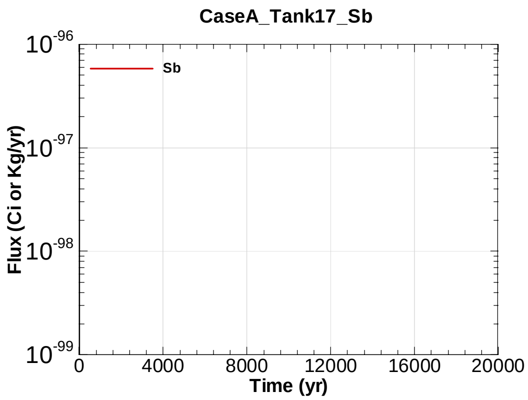

Figure A.1-1647 - Flux Leaving Liner for CaseA Tank17 Sb

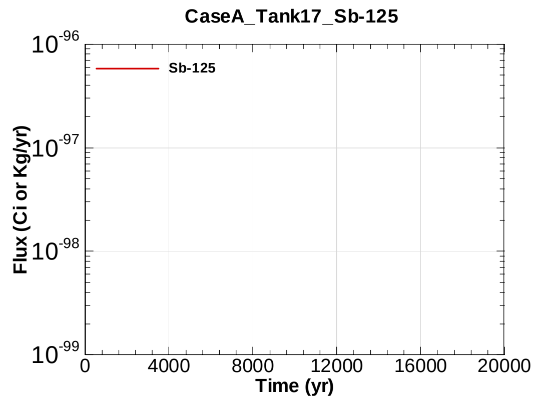

Figure A.1-1648 - Flux Leaving Liner for CaseA Tank17 Sb-125

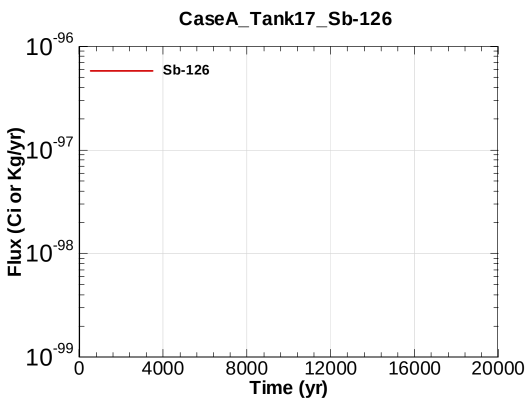

Figure A.1-1649 - Flux Leaving Liner for CaseA Tank17 Sb-126

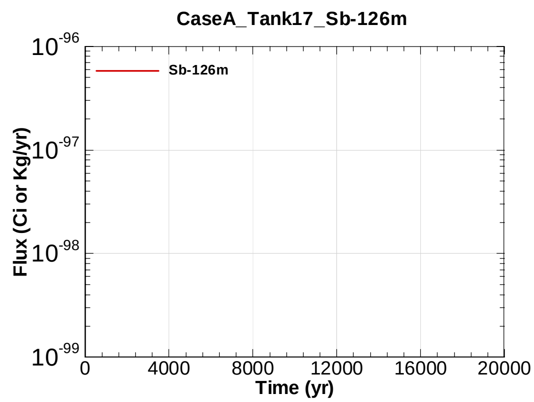

Figure A.1-1650 - Flux Leaving Liner for CaseA Tank17 Sb-126m

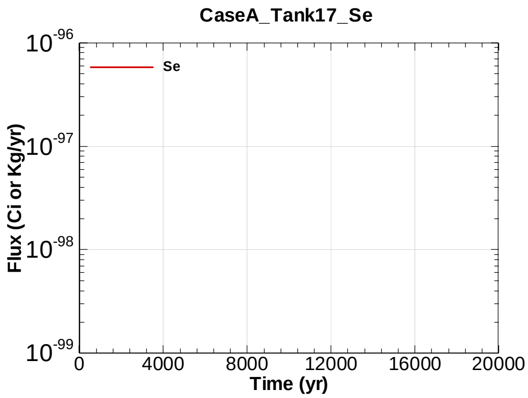

Figure A.1-1651 - Flux Leaving Liner for CaseA Tank17 Se

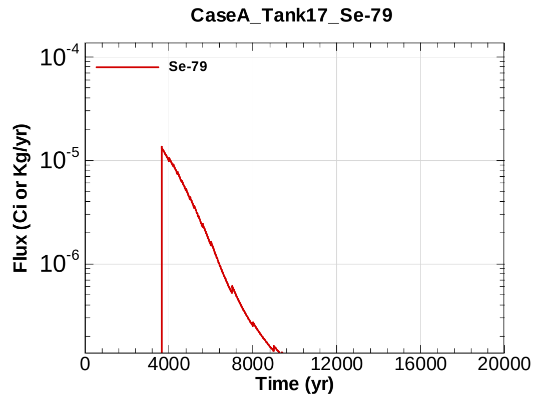

Figure A.1-1652 - Flux Leaving Liner for CaseA Tank17 Se-79

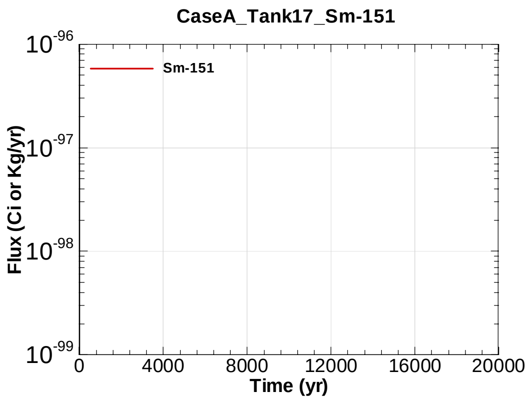

Figure A.1-1653 - Flux Leaving Liner for CaseA Tank17 Sm-151

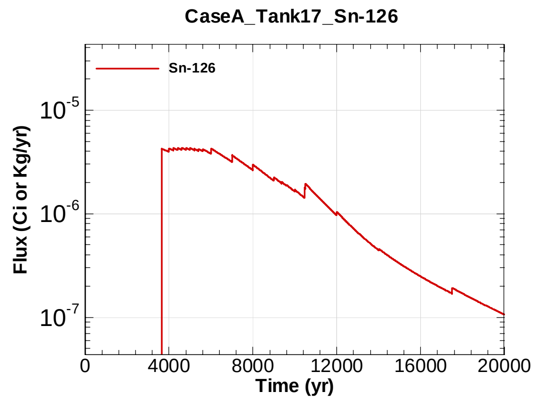

Figure A.1-1654 - Flux Leaving Liner for CaseA Tank17 Sn-126

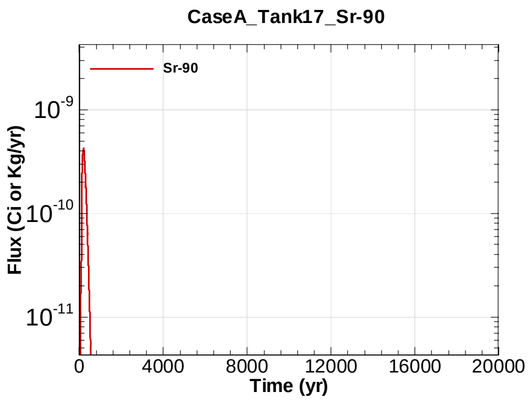

Figure A.1-1655 - Flux Leaving Liner for CaseA Tank17 Sr-90

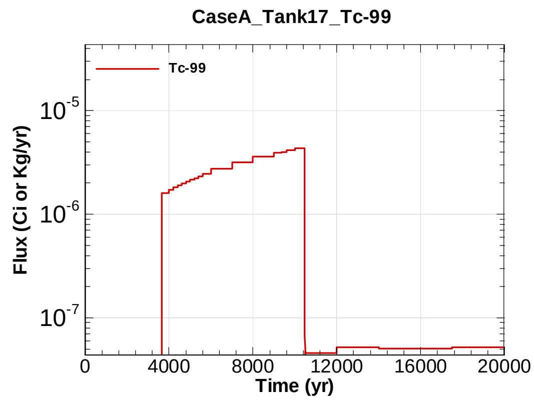

Figure A.1-1656 - Flux Leaving Liner for CaseA Tank17 Tc-99

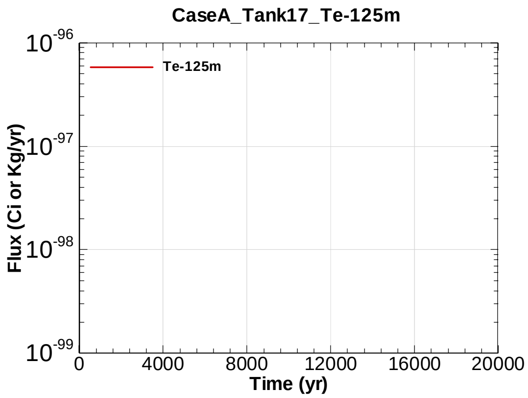

Figure A.1-1657 - Flux Leaving Liner for CaseA Tank17 Te-125m

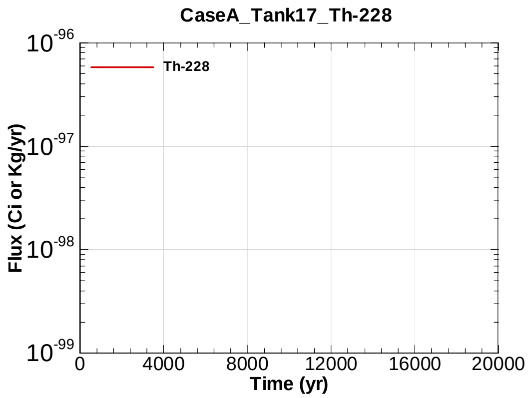

Figure A.1-1658 - Flux Leaving Liner for CaseA Tank17 Th-228

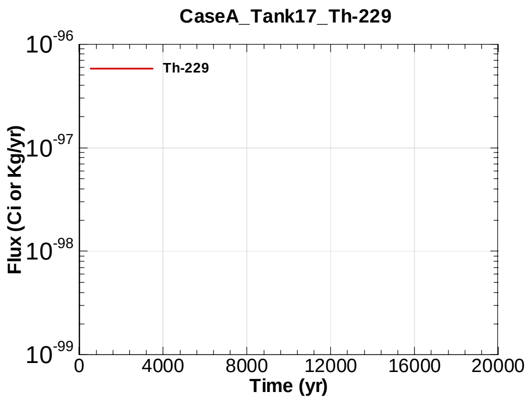

Figure A.1-1659 - Flux Leaving Liner for CaseA Tank17 Th-229

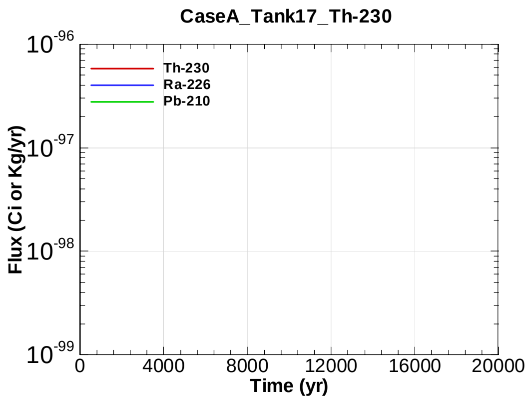

Figure A.1-1660 - Flux Leaving Liner for CaseA Tank17 Th-230

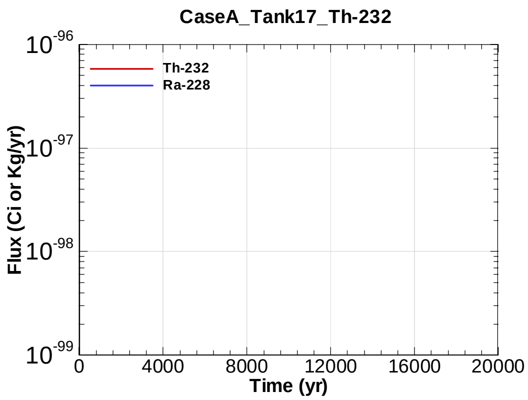

Figure A.1-1661 - Flux Leaving Liner for CaseA Tank17 Th-232

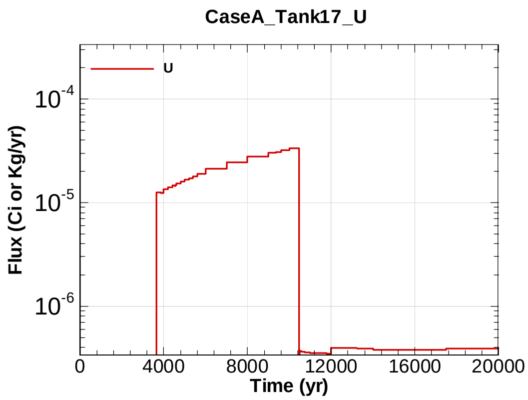

Figure A.1-1662 - Flux Leaving Liner for CaseA Tank17 U

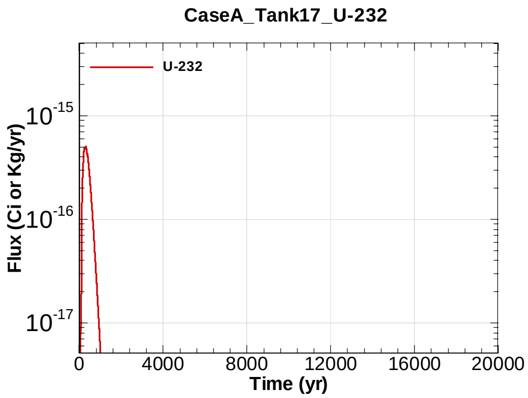

Figure A.1-1663 - Flux Leaving Liner for CaseA Tank17 U-232

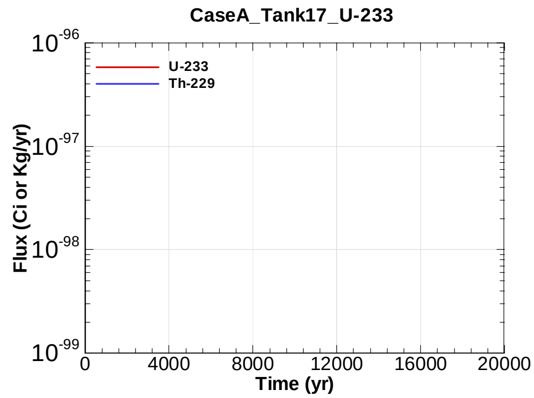

Figure A.1-1664 - Flux Leaving Liner for CaseA Tank17 U-233

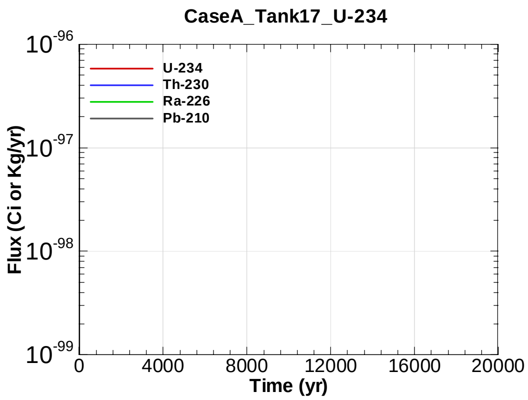

Figure A.1-1665 - Flux Leaving Liner for CaseA Tank17 U-234

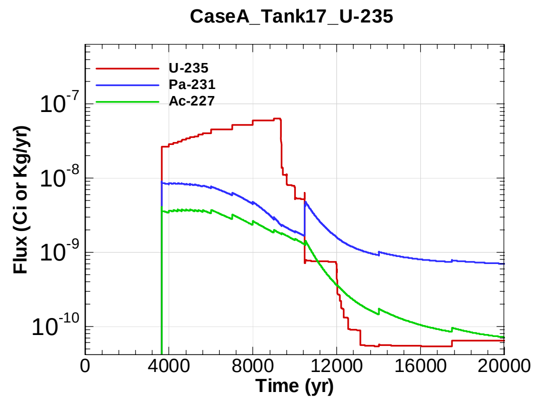

Figure A.1-1666 - Flux Leaving Liner for CaseA Tank17 U-235

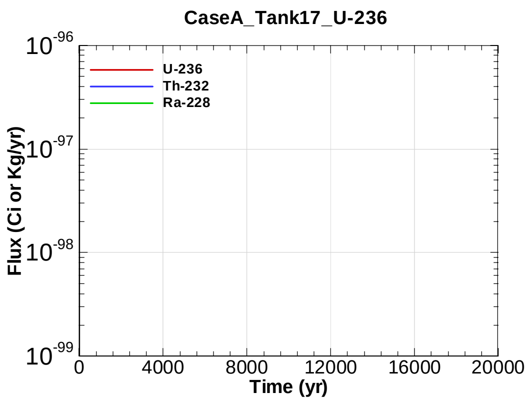

Figure A.1-1667 - Flux Leaving Liner for CaseA Tank17 U-236

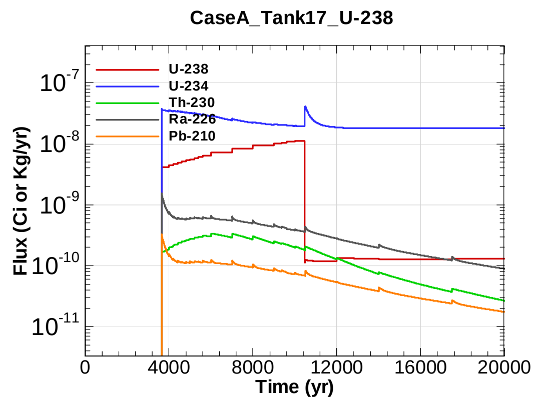

Figure A.1-1668 - Flux Leaving Liner for CaseA Tank17 U-238

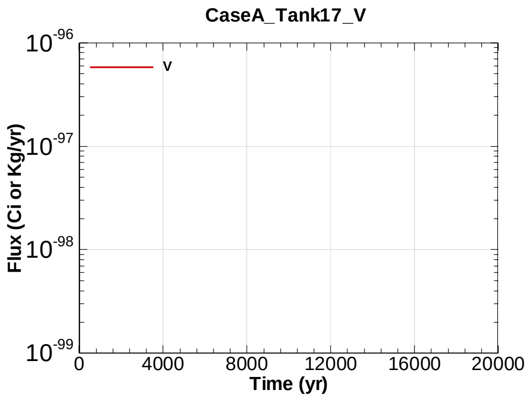

Figure A.1-1669 - Flux Leaving Liner for CaseA Tank17 V

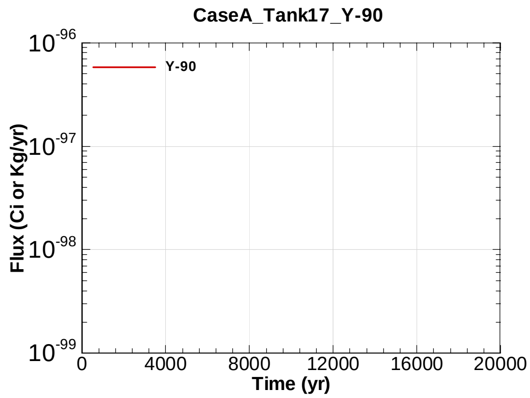

Figure A.1-1670 - Flux Leaving Liner for CaseA Tank17 Y-90

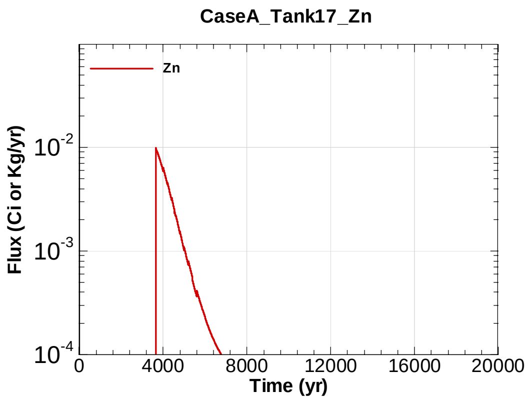

Figure A.1-1671 - Flux Leaving Liner for CaseA Tank17 Zn

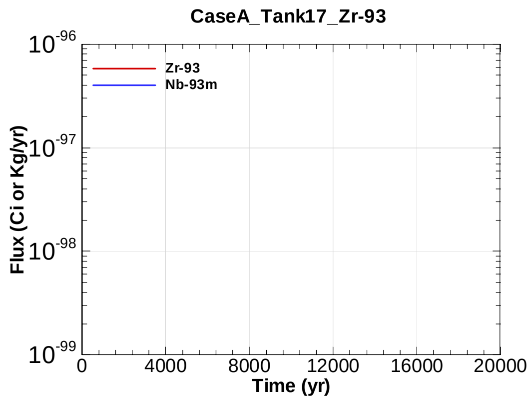

Figure A.1-1672 - Flux Leaving Liner for CaseA Tank17 Zr-93

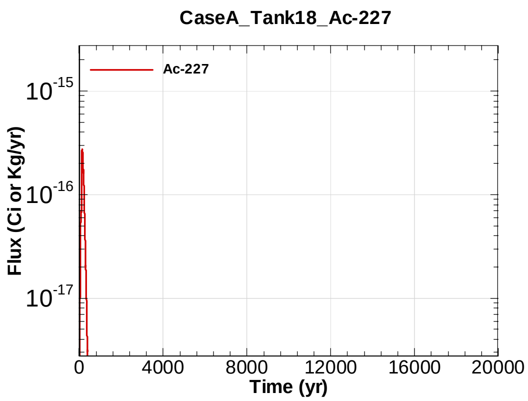

Figure A.1-1673 - Flux Leaving Liner for CaseA Tank18 Ac-227

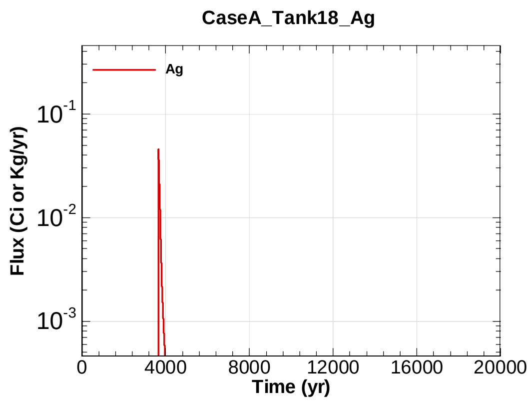

Figure A.1-1674 - Flux Leaving Liner for CaseA Tank18 Ag

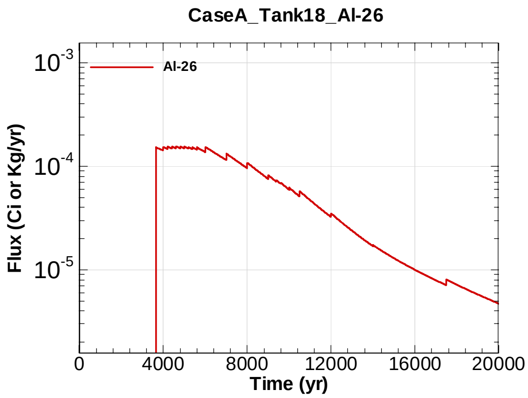

Figure A.1-1675 - Flux Leaving Liner for CaseA Tank18 Al-26

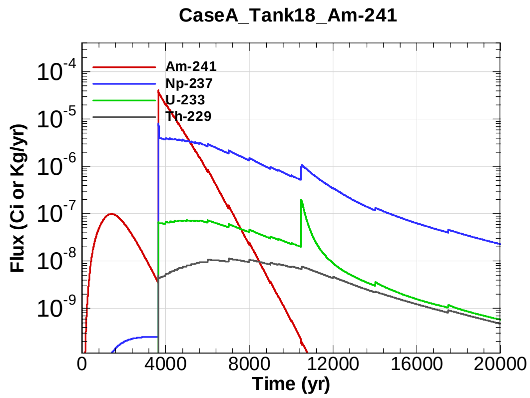

Figure A.1-1676 - Flux Leaving Liner for CaseA Tank18 Am-241

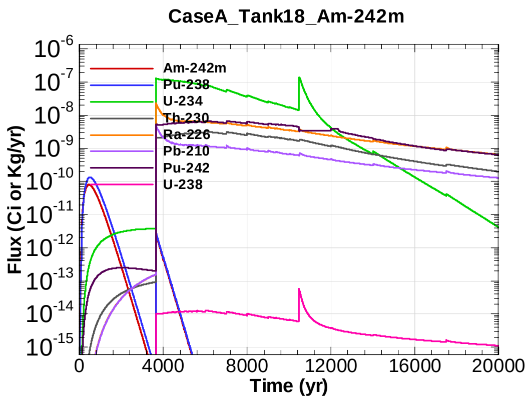

Figure A.1-1677 - Flux Leaving Liner for CaseA Tank18 Am-242m

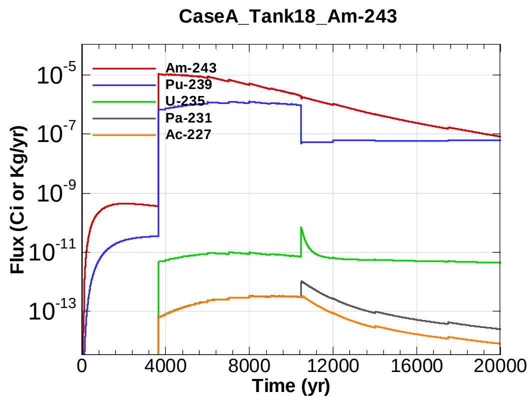

Figure A.1-1678 - Flux Leaving Liner for CaseA Tank18 Am-243

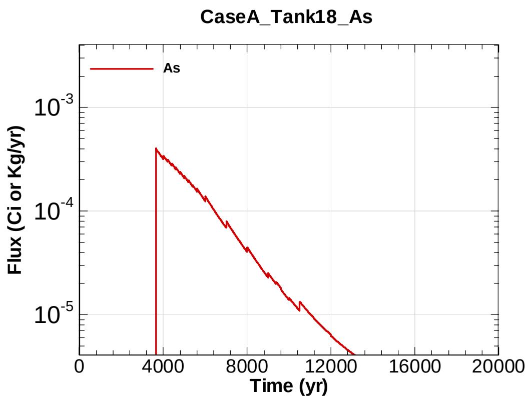

Figure A.1-1679 - Flux Leaving Liner for CaseA Tank18 As

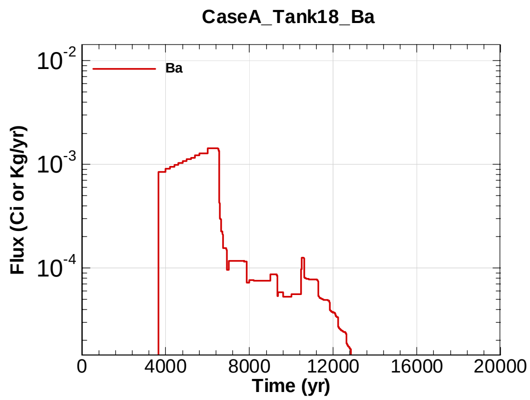

Figure A.1-1680 - Flux Leaving Liner for CaseA Tank18 Ba

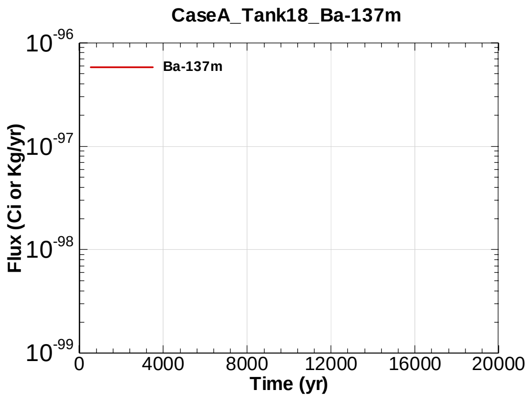

Figure A.1-1681 - Flux Leaving Liner for CaseA Tank18 Ba-137m

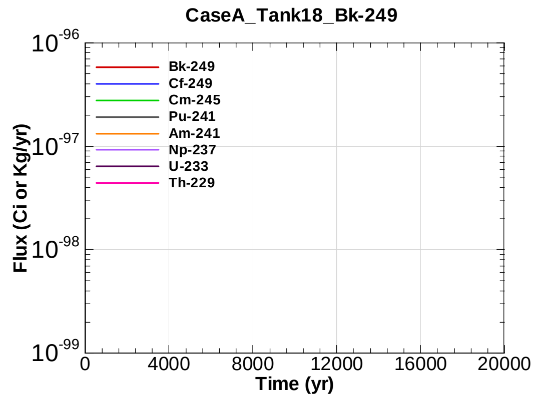

Figure A.1-1682 - Flux Leaving Liner for CaseA Tank18 Bk-249

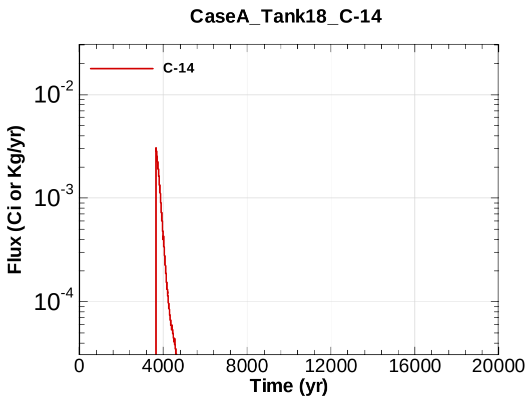

Figure A.1-1683 - Flux Leaving Liner for CaseA Tank18 C-14

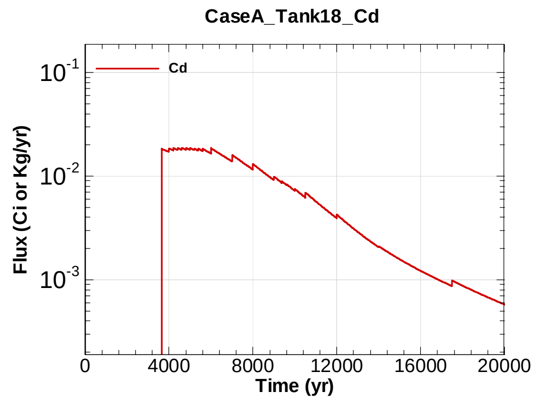

Figure A.1-1684 - Flux Leaving Liner for CaseA Tank18 Cd

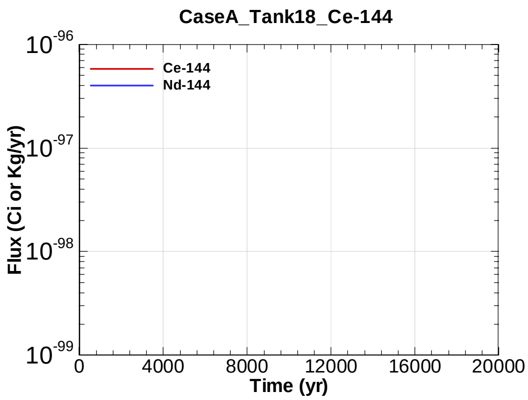

Figure A.1-1685 - Flux Leaving Liner for CaseA Tank18 Ce-144

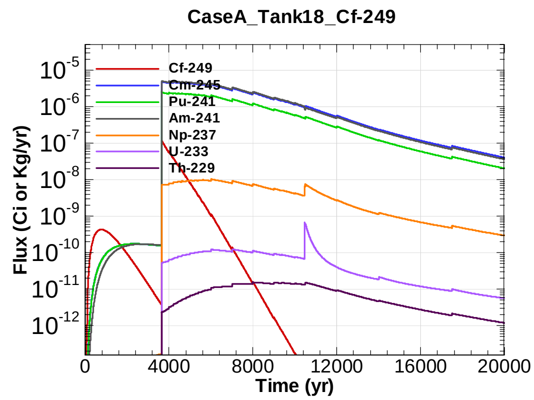

Figure A.1-1686 - Flux Leaving Liner for CaseA Tank18 Cf-249

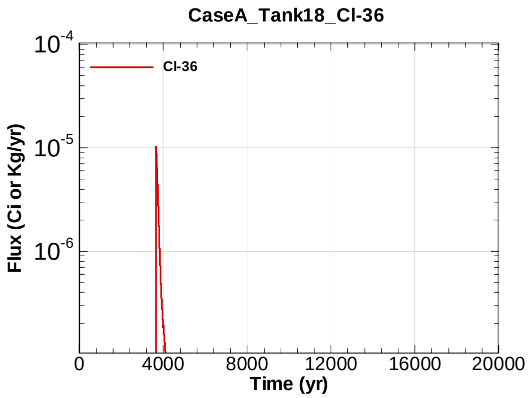

Figure A.1-1687 - Flux Leaving Liner for CaseA Tank18 Cl-36

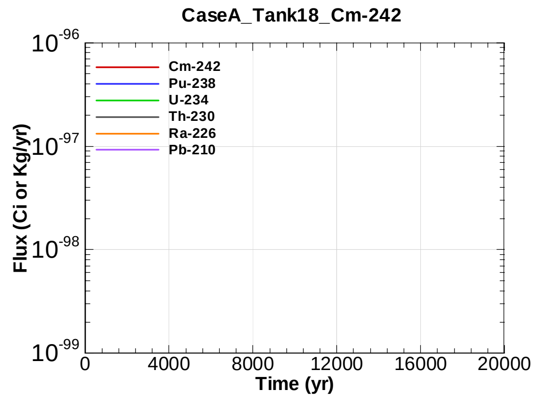

Figure A.1-1688 - Flux Leaving Liner for CaseA Tank18 Cm-242

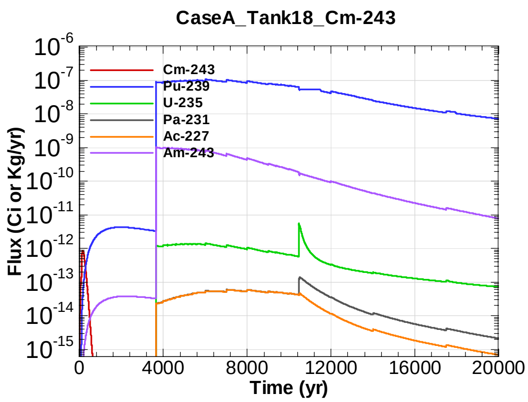

Figure A.1-1689 - Flux Leaving Liner for CaseA Tank18 Cm-243

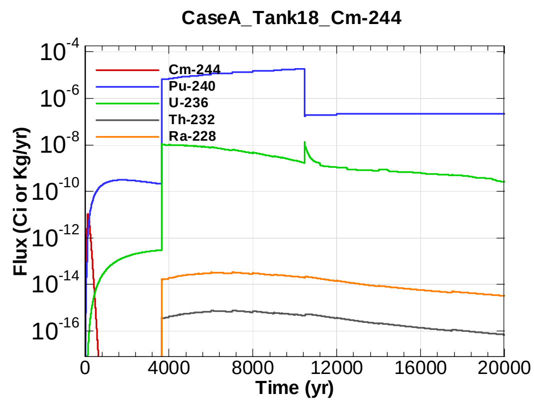

Figure A.1-1690 - Flux Leaving Liner for CaseA Tank18 Cm-244

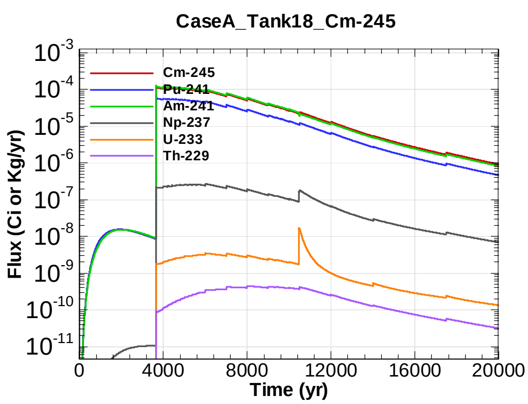

Figure A.1-1691 - Flux Leaving Liner for CaseA Tank18 Cm-245

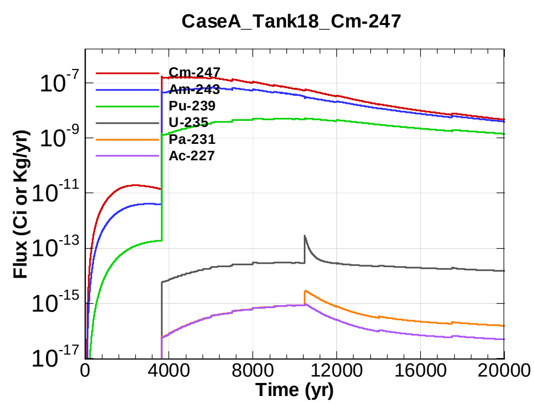

Figure A.1-1692 - Flux Leaving Liner for CaseA Tank18 Cm-247

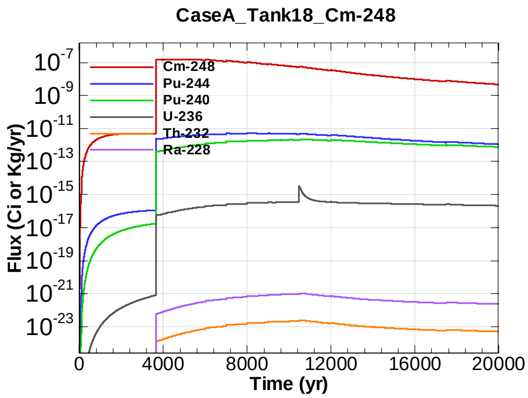

Figure A.1-1693 - Flux Leaving Liner for CaseA Tank18 Cm-248

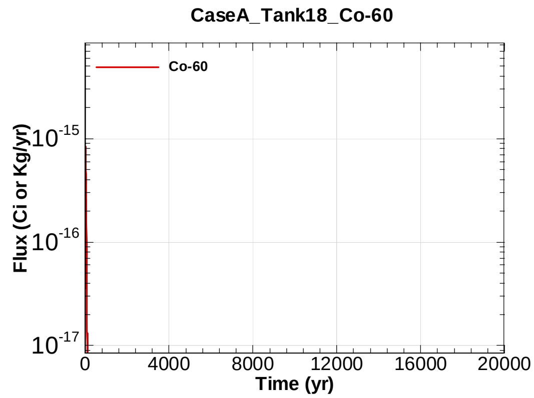

Figure A.1-1694 - Flux Leaving Liner for CaseA Tank18 Co-60

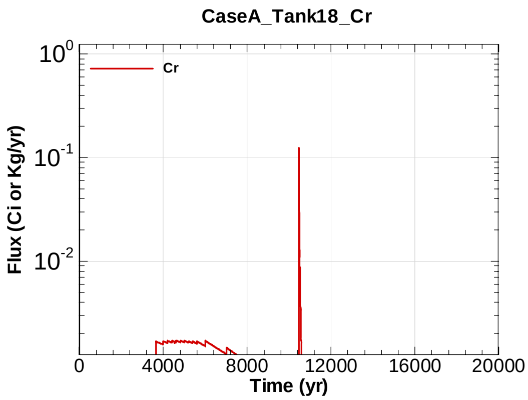

Figure A.1-1695 - Flux Leaving Liner for CaseA Tank18 Cr

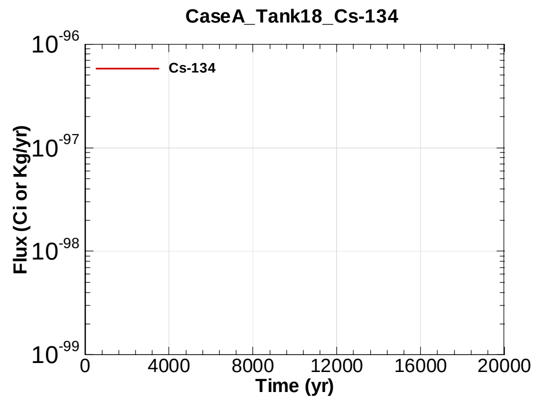

Figure A.1-1696 - Flux Leaving Liner for CaseA Tank18 Cs-134

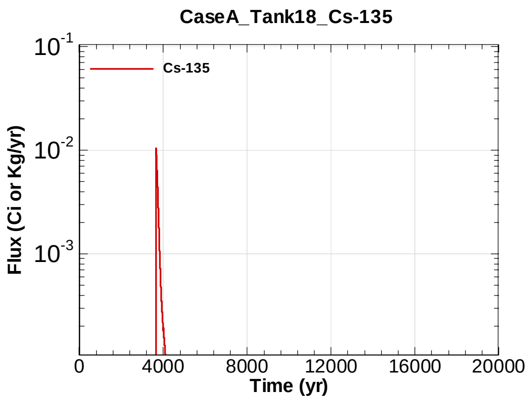

Figure A.1-1697 - Flux Leaving Liner for CaseA Tank18 Cs-135

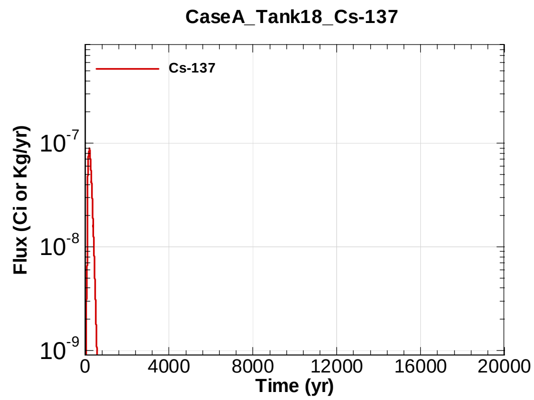

Figure A.1-1698 - Flux Leaving Liner for CaseA Tank18 Cs-137

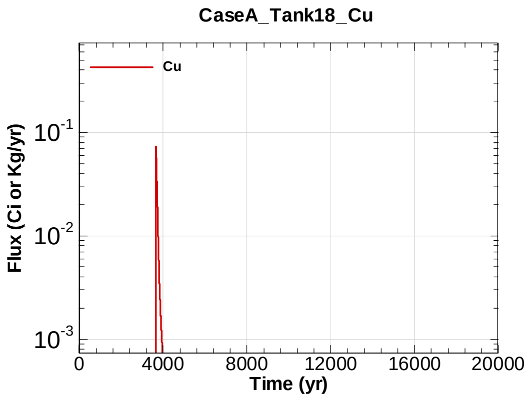

Figure A.1-1699 - Flux Leaving Liner for CaseA Tank18 Cu

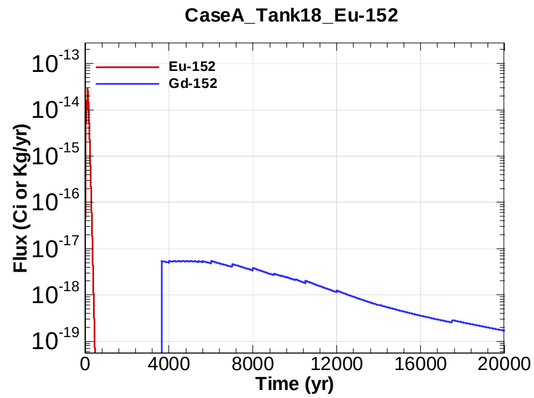

Figure A.1-1700 - Flux Leaving Liner for CaseA Tank18 Eu-152

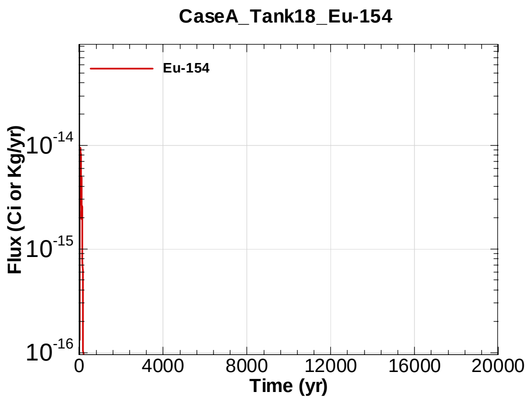

Figure A.1-1701 - Flux Leaving Liner for CaseA Tank18 Eu-154

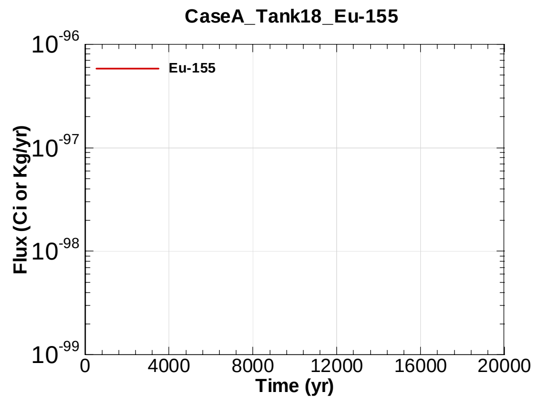

Figure A.1-1702 - Flux Leaving Liner for CaseA Tank18 Eu-155

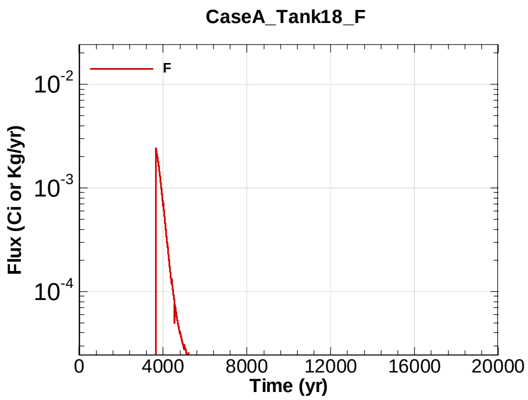

Figure A.1-1703 - Flux Leaving Liner for CaseA Tank18 F

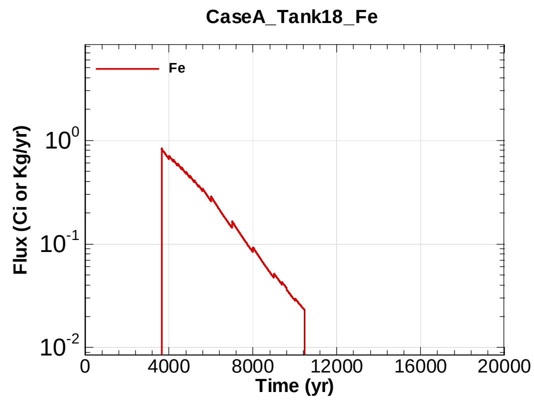

Figure A.1-1704 - Flux Leaving Liner for CaseA Tank18 Fe

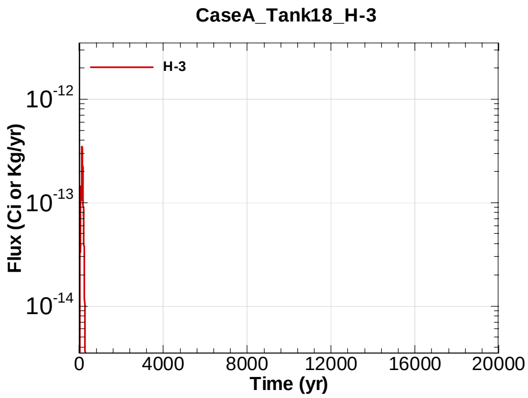

Figure A.1-1705 - Flux Leaving Liner for CaseA Tank18 H-3

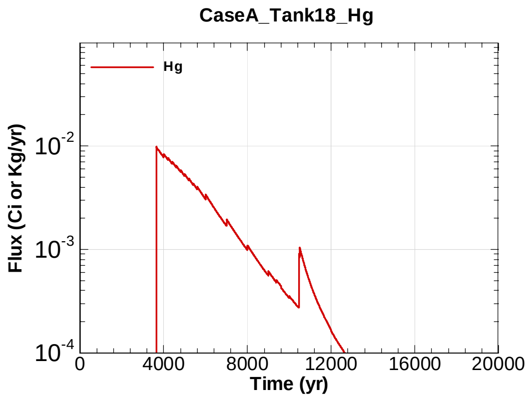

Figure A.1-1706 - Flux Leaving Liner for CaseA Tank18 Hg

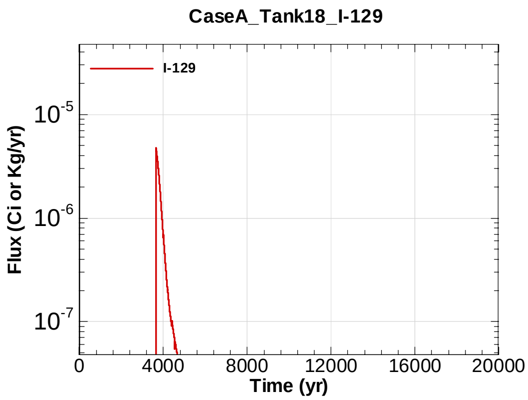

Figure A.1-1707 - Flux Leaving Liner for CaseA Tank18 I-129

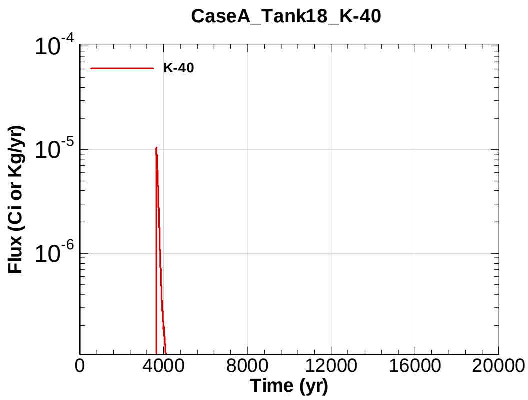

Figure A.1-1708 - Flux Leaving Liner for CaseA Tank18 K-40

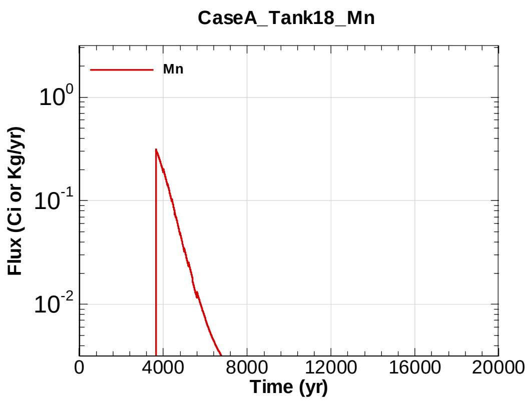

Figure A.1-1709 - Flux Leaving Liner for CaseA Tank18 Mn

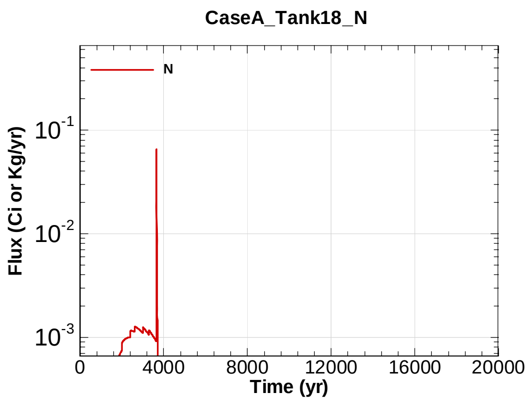

Figure A.1-1710 - Flux Leaving Liner for CaseA Tank18 N

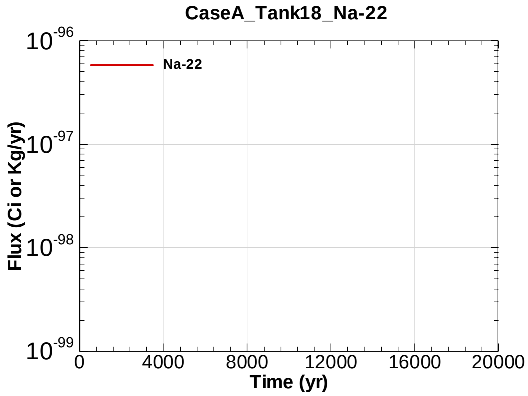

Figure A.1-1711 - Flux Leaving Liner for CaseA Tank18 Na-22

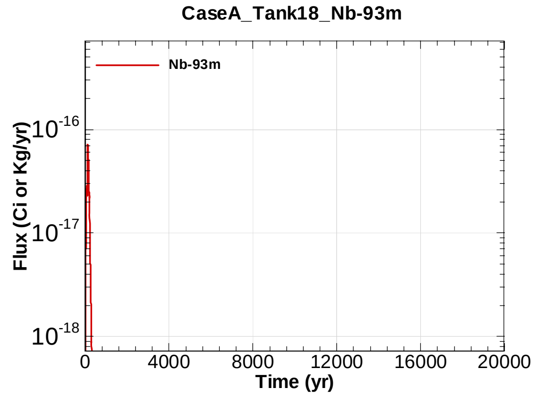

Figure A.1-1712 - Flux Leaving Liner for CaseA Tank18 Nb-93m

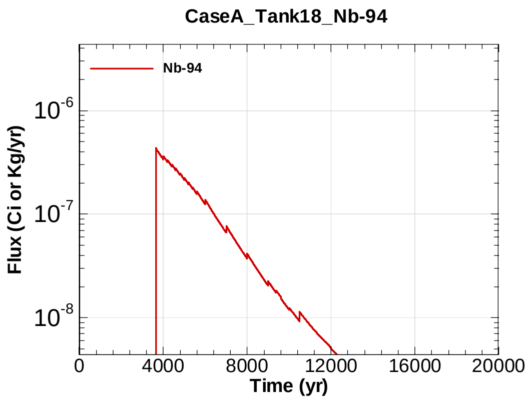

Figure A.1-1713 - Flux Leaving Liner for CaseA Tank18 Nb-94

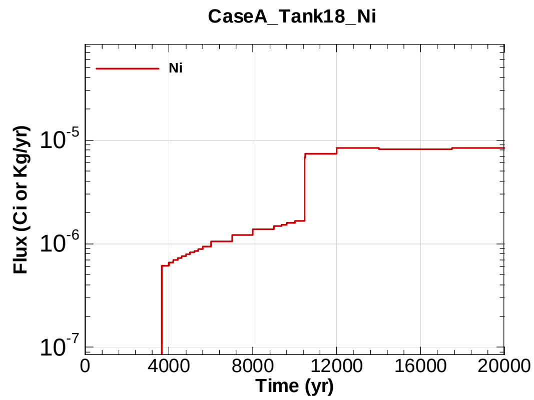

Figure A.1-1714 - Flux Leaving Liner for CaseA Tank18 Ni

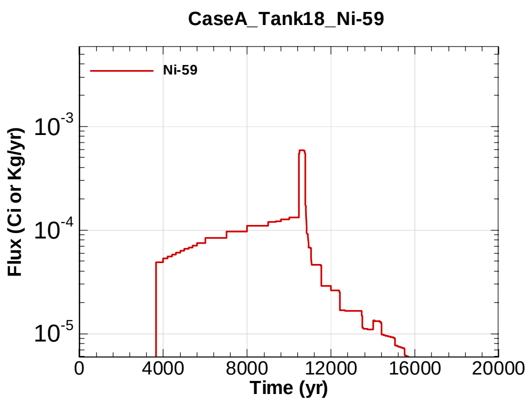

Figure A.1-1715 - Flux Leaving Liner for CaseA Tank18 Ni-59

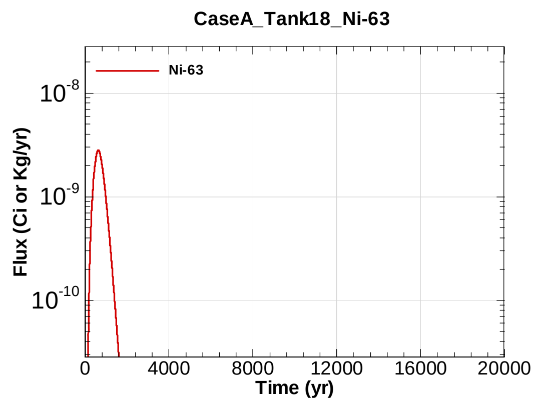

Figure A.1-1716 - Flux Leaving Liner for CaseA Tank18 Ni-63

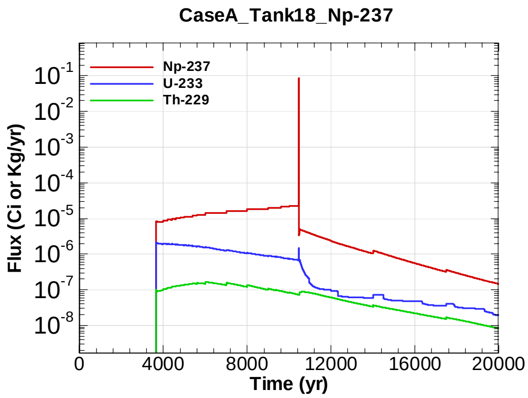

Figure A.1-1717 - Flux Leaving Liner for CaseA Tank18 Np-237

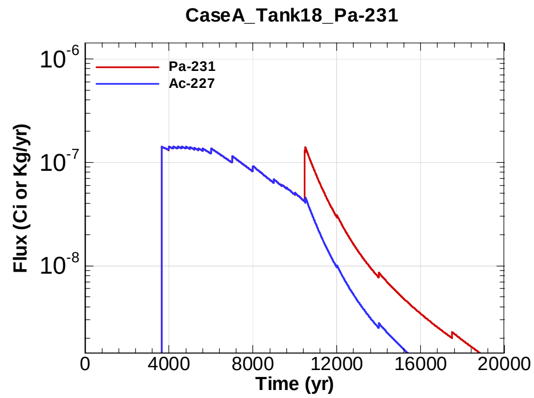

Figure A.1-1718 - Flux Leaving Liner for CaseA Tank18 Pa-231

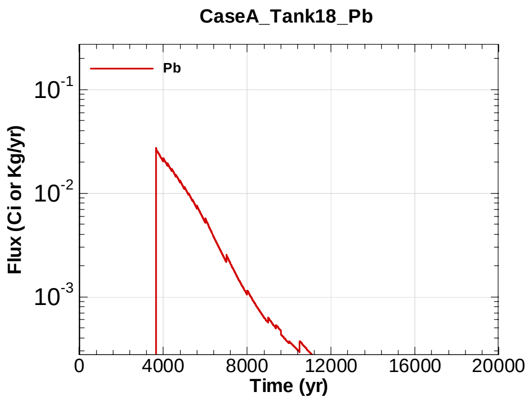

Figure A.1-1719 - Flux Leaving Liner for CaseA Tank18 Pb

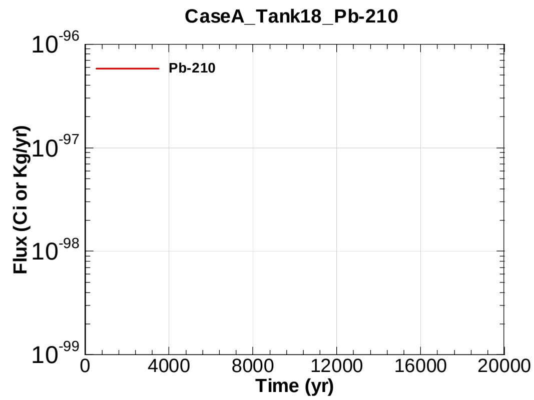

Figure A.1-1720 - Flux Leaving Liner for CaseA Tank18 Pb-210

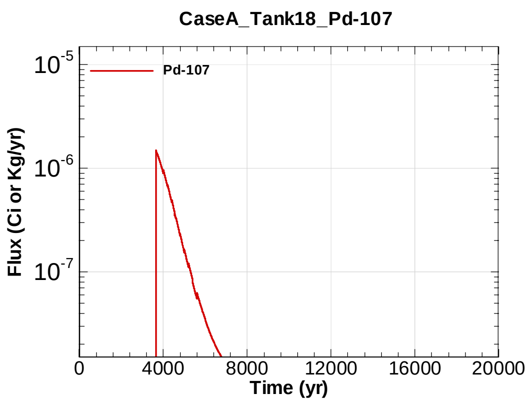

Figure A.1-1721 - Flux Leaving Liner for CaseA Tank18 Pd-107

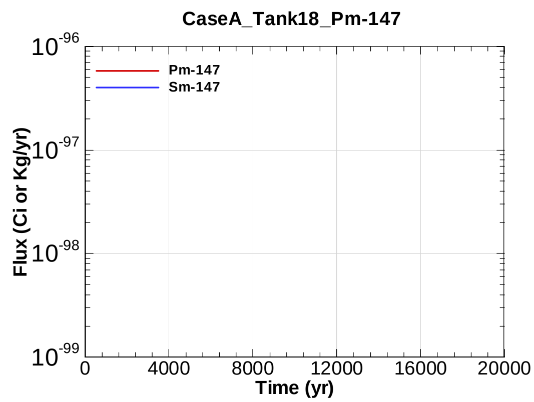

Figure A.1-1722 - Flux Leaving Liner for CaseA Tank18 Pm-147

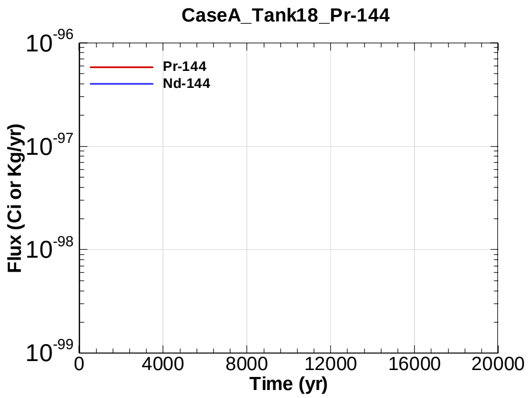

Figure A.1-1723 - Flux Leaving Liner for CaseA Tank18 Pr-144

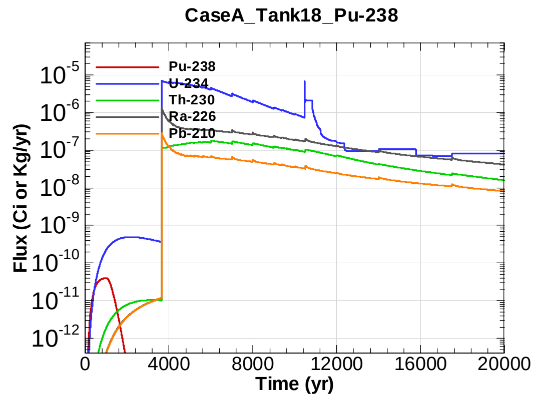

Figure A.1-1724 - Flux Leaving Liner for CaseA Tank18 Pu-238

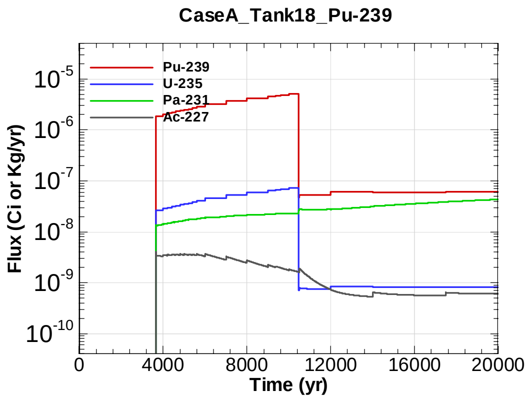

Figure A.1-1725 - Flux Leaving Liner for CaseA Tank18 Pu-239

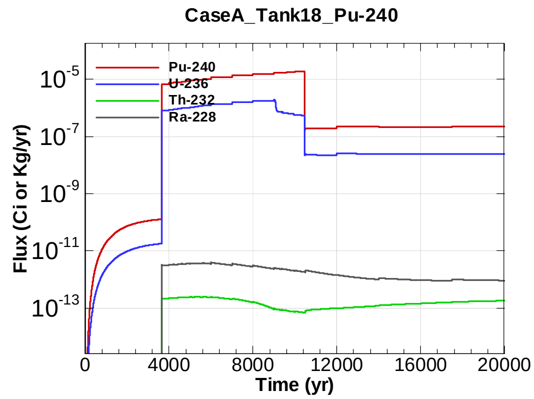

Figure A.1-1726 - Flux Leaving Liner for CaseA Tank18 Pu-240

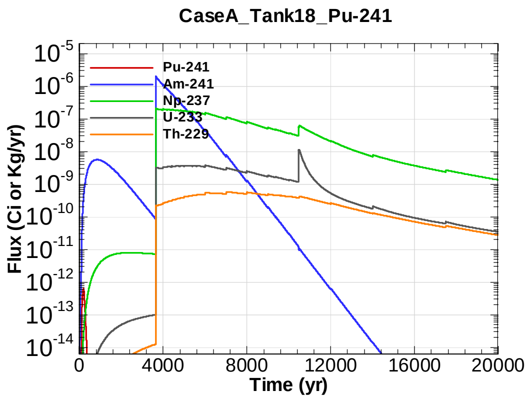

Figure A.1-1727 - Flux Leaving Liner for CaseA Tank18 Pu-241

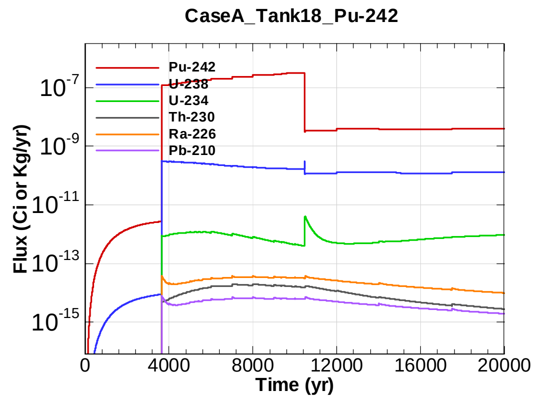

Figure A.1-1728 - Flux Leaving Liner for CaseA Tank18 Pu-242

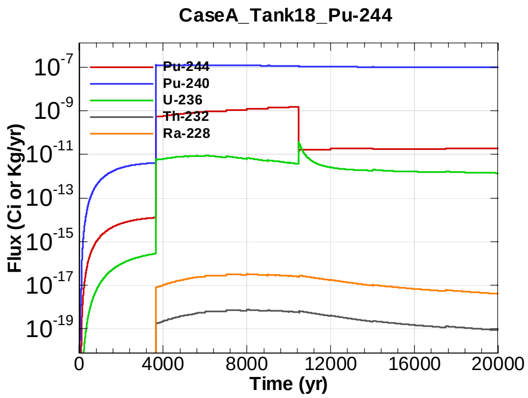

Figure A.1-1729 - Flux Leaving Liner for CaseA Tank18 Pu-244

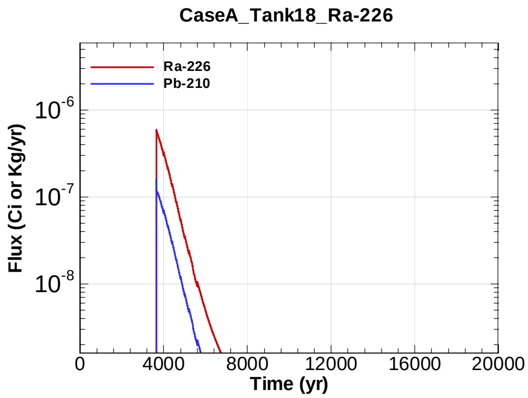

Figure A.1-1730 - Flux Leaving Liner for CaseA Tank18 Ra-226

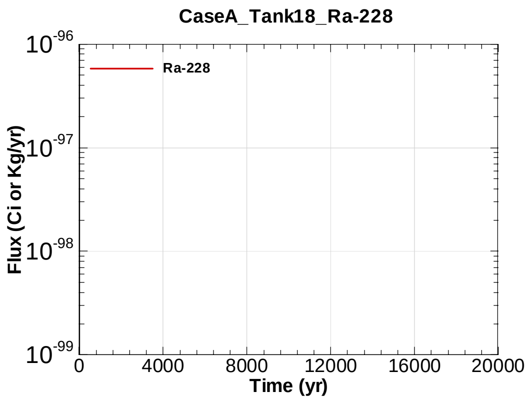

Figure A.1-1731 - Flux Leaving Liner for CaseA Tank18 Ra-228

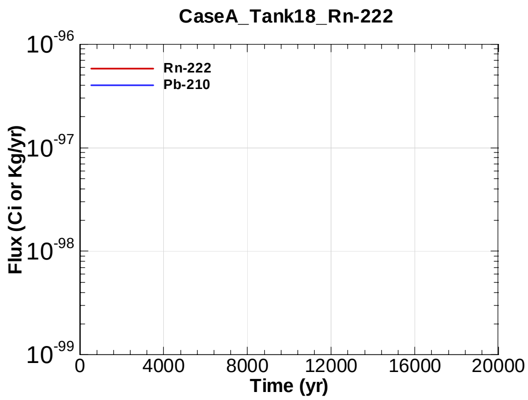

Figure A.1-1732 - Flux Leaving Liner for CaseA Tank18 Rn-222

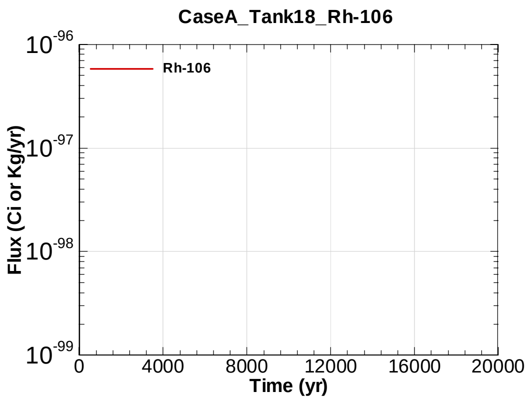

Figure A.1-1733 - Flux Leaving Liner for CaseA Tank18 Rh-106

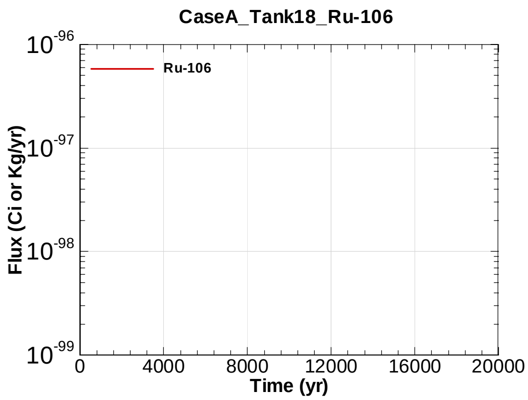

Figure A.1-1734 - Flux Leaving Liner for CaseA Tank18 Ru-106

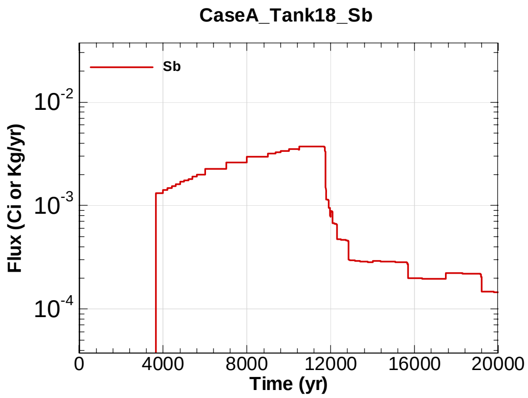

Figure A.1-1735 - Flux Leaving Liner for CaseA Tank18 Sb

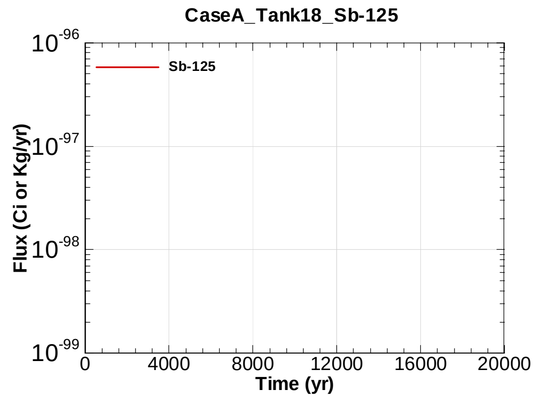

Figure A.1-1736 - Flux Leaving Liner for CaseA Tank18 Sb-125

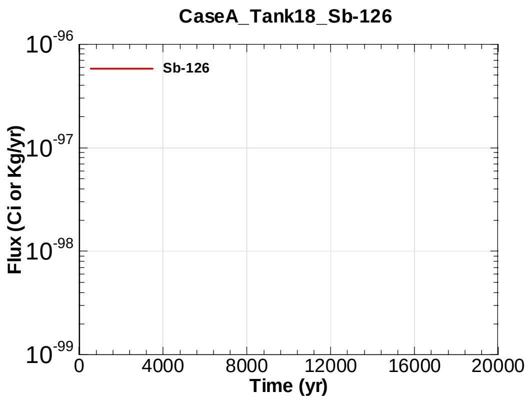

Figure A.1-1737 - Flux Leaving Liner for CaseA Tank18 Sb-126

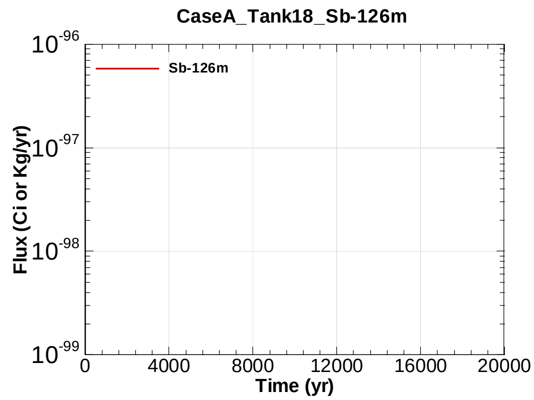

Figure A.1-1738 - Flux Leaving Liner for CaseA Tank18 Sb-126m

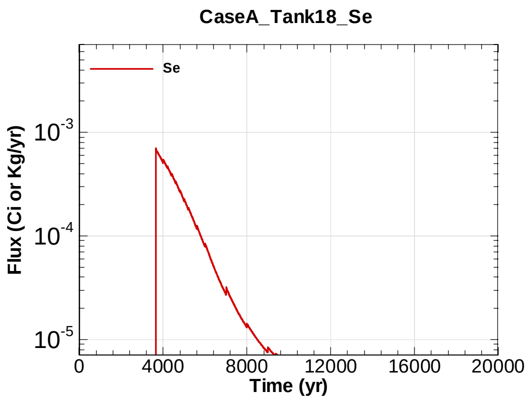

Figure A.1-1739 - Flux Leaving Liner for CaseA Tank18 Se

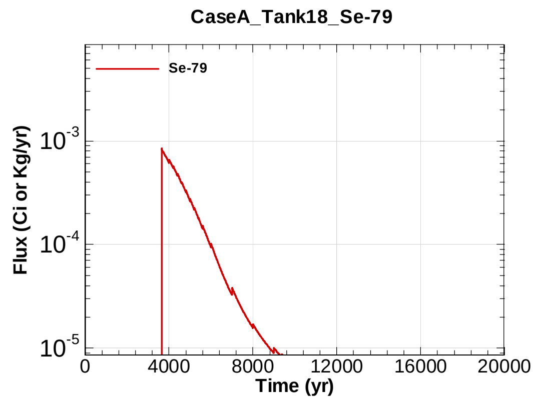

Figure A.1-1740 - Flux Leaving Liner for CaseA Tank18 Se-79

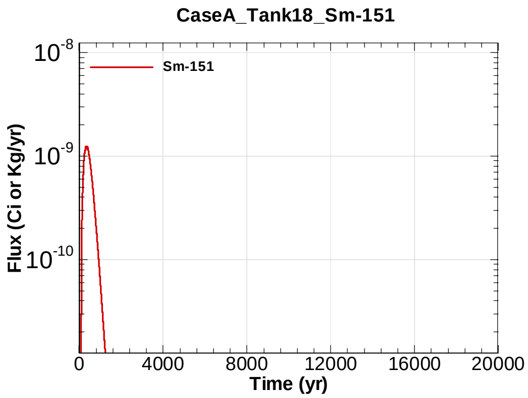

Figure A.1-1741 - Flux Leaving Liner for CaseA Tank18 Sm-151

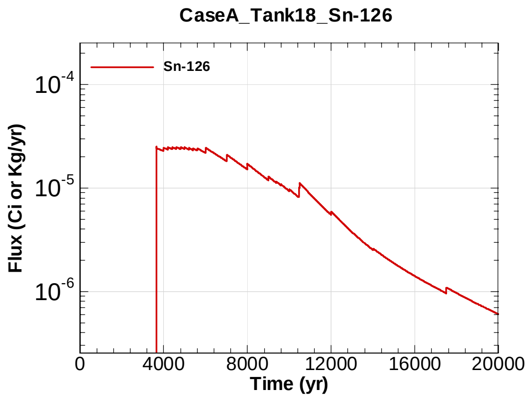

Figure A.1-1742 - Flux Leaving Liner for CaseA Tank18 Sn-126

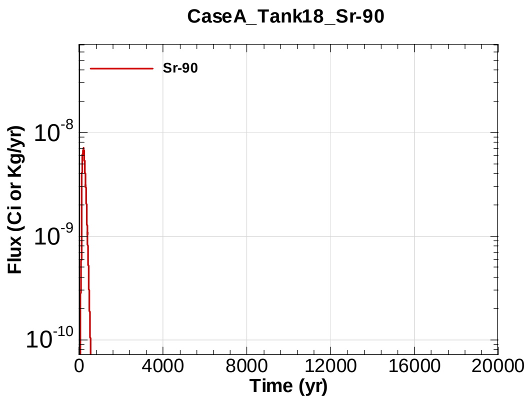

Figure A.1-1743 - Flux Leaving Liner for CaseA Tank18 Sr-90

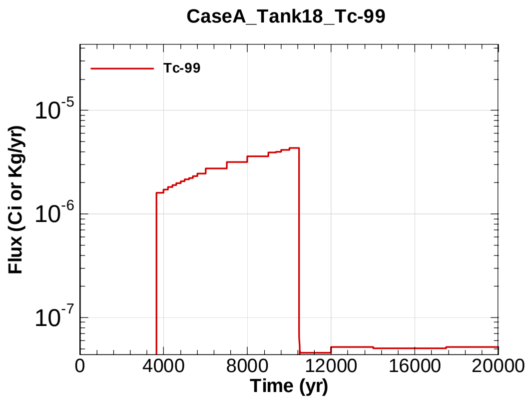

Figure A.1-1744 - Flux Leaving Liner for CaseA Tank18 Tc-99

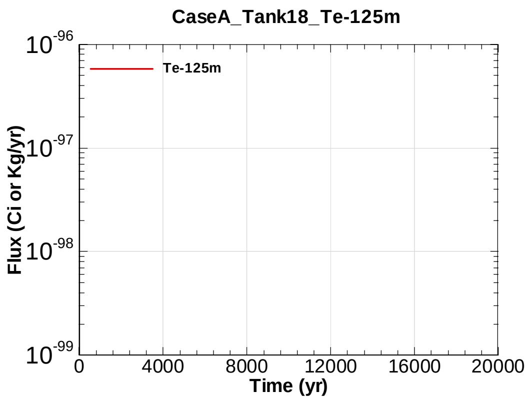

Figure A.1-1745 - Flux Leaving Liner for CaseA Tank18 Te-125m

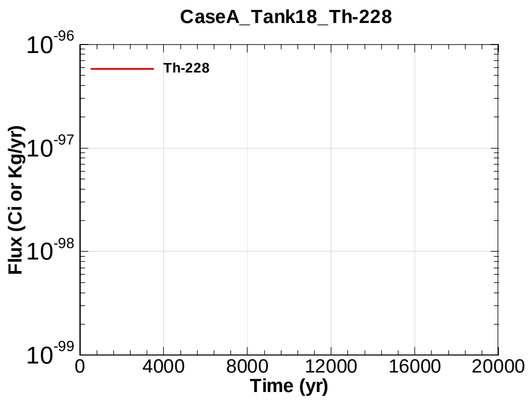

Figure A.1-1746 - Flux Leaving Liner for CaseA Tank18 Th-228

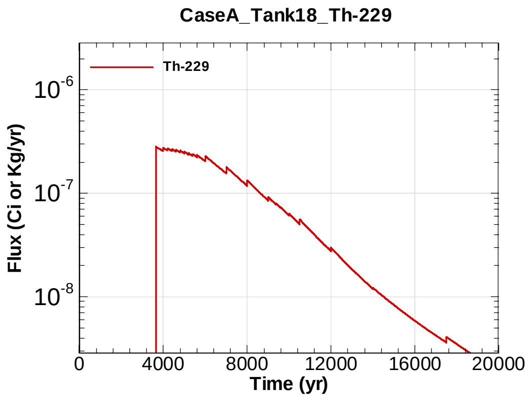

Figure A.1-1747 - Flux Leaving Liner for CaseA Tank18 Th-229

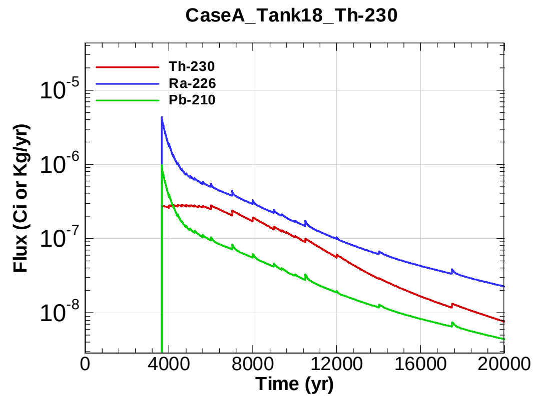

Figure A.1-1748 - Flux Leaving Liner for CaseA Tank18 Th-230

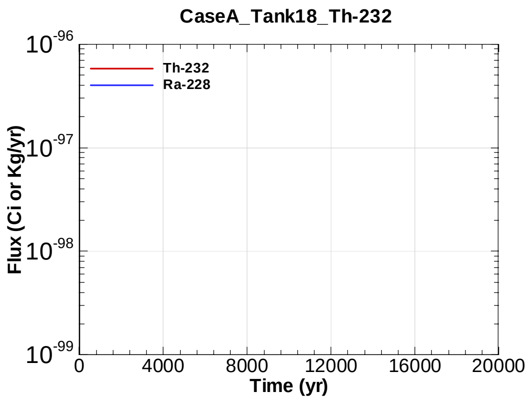

Figure A.1-1749 - Flux Leaving Liner for CaseA Tank18 Th-232

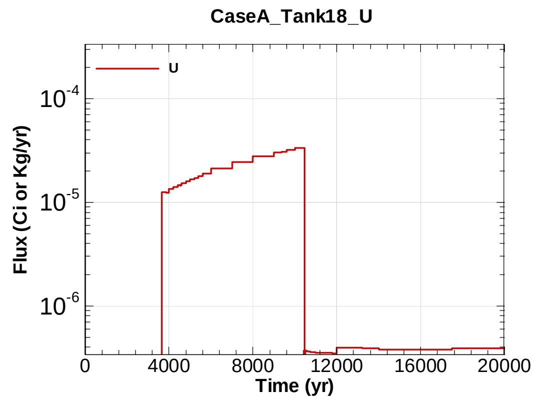

Figure A.1-1750 - Flux Leaving Liner for CaseA Tank18 U

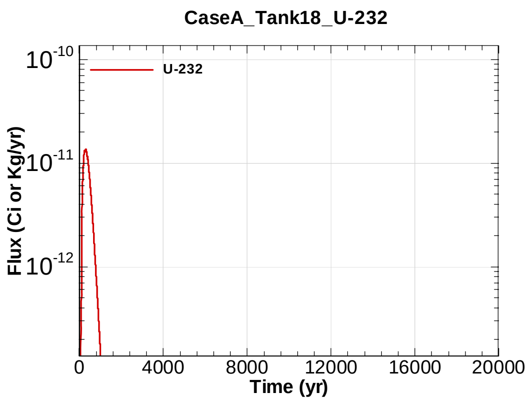

Figure A.1-1751 - Flux Leaving Liner for CaseA Tank18 U-232

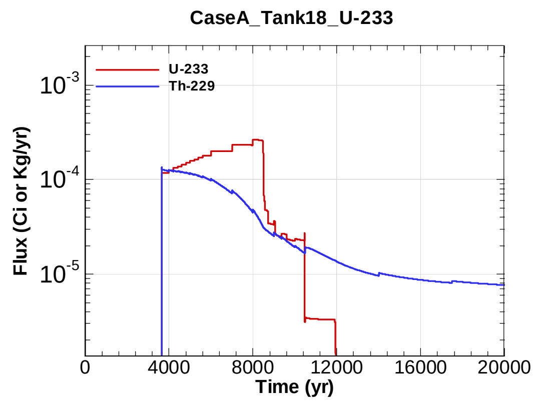

Figure A.1-1752 - Flux Leaving Liner for CaseA Tank18 U-233

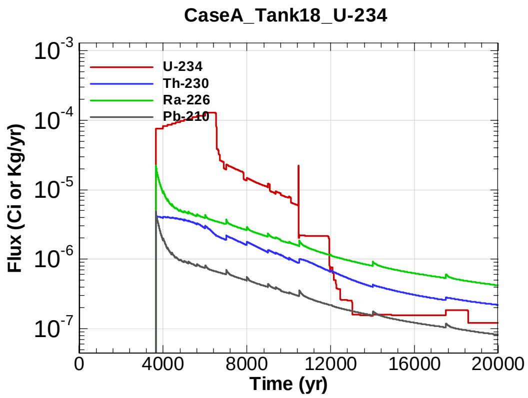

Figure A.1-1753 - Flux Leaving Liner for CaseA Tank18 U-234

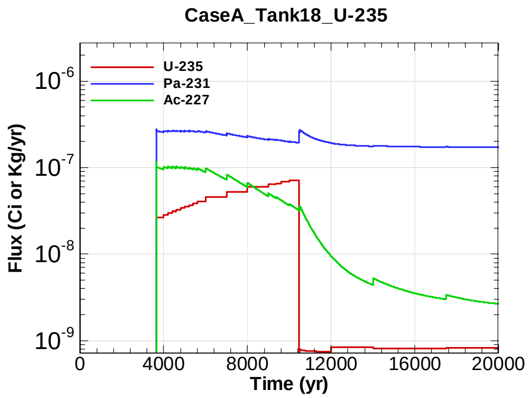

Figure A.1-1754 - Flux Leaving Liner for CaseA Tank18 U-235

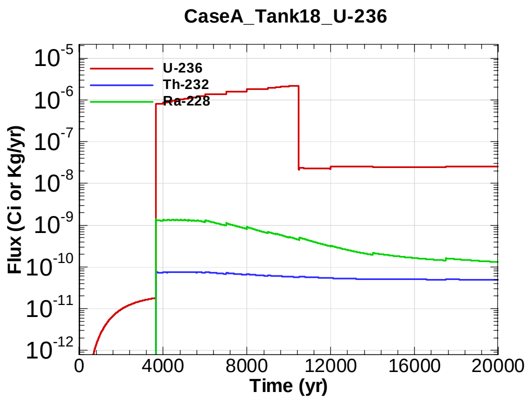

Figure A.1-1755 - Flux Leaving Liner for CaseA Tank18 U-236

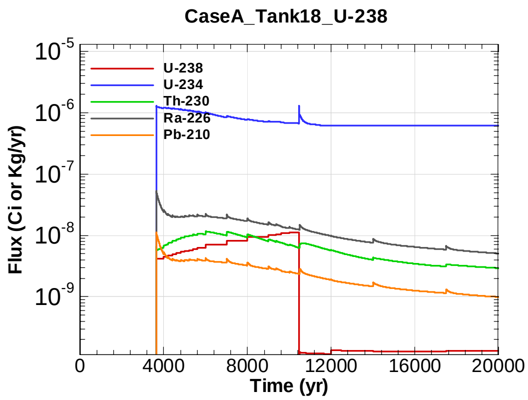

Figure A.1-1756 - Flux Leaving Liner for CaseA Tank18 U-238

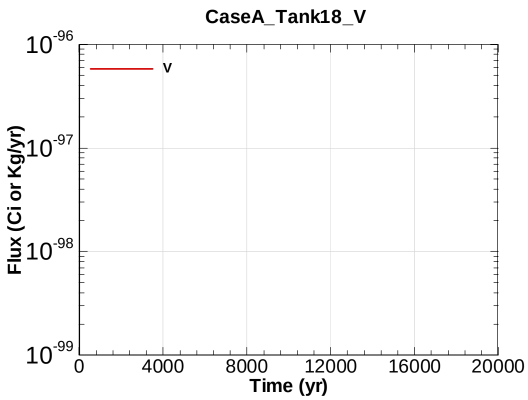

Figure A.1-1757 - Flux Leaving Liner for CaseA Tank18 V

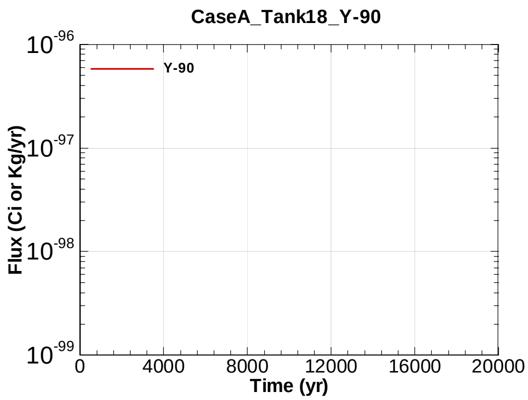

Figure A.1-1758 - Flux Leaving Liner for CaseA Tank18 Y-90

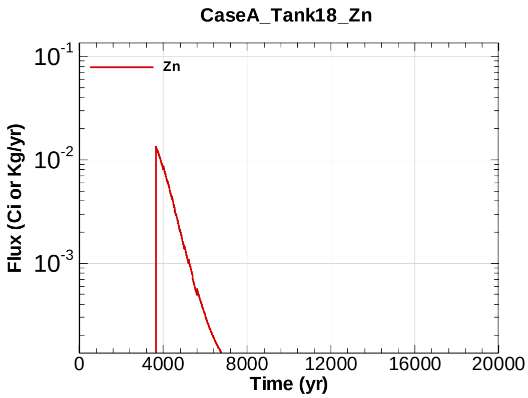

Figure A.1-1759 - Flux Leaving Liner for CaseA Tank18 Zn

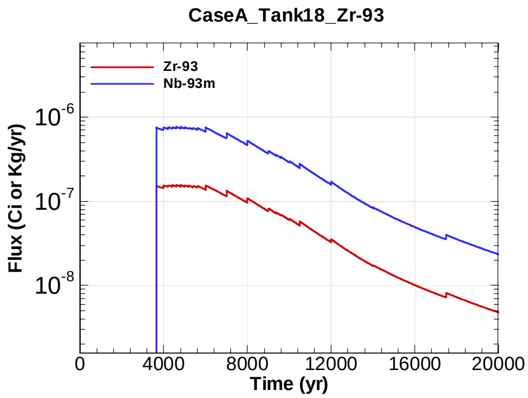

Figure A.1-1760 - Flux Leaving Liner for CaseA Tank18 Zr-93

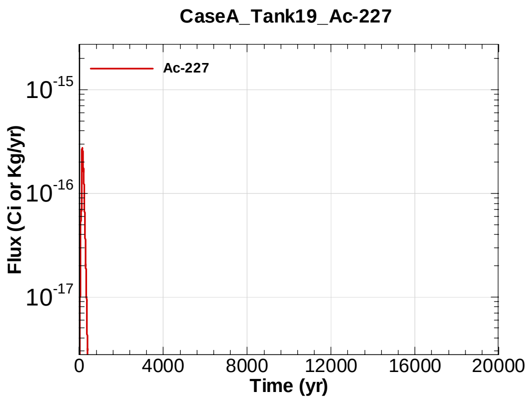

Figure A.1-1761 - Flux Leaving Liner for CaseA Tank19 Ac-227

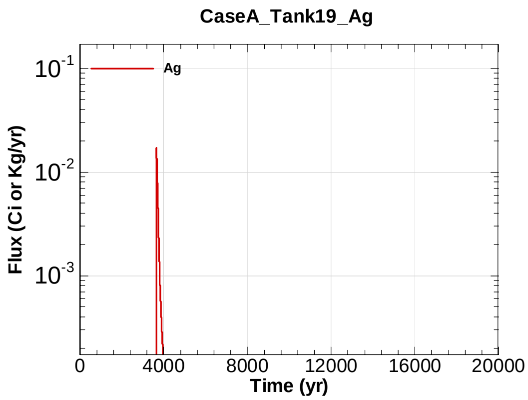

Figure A.1-1762 - Flux Leaving Liner for CaseA Tank19 Ag

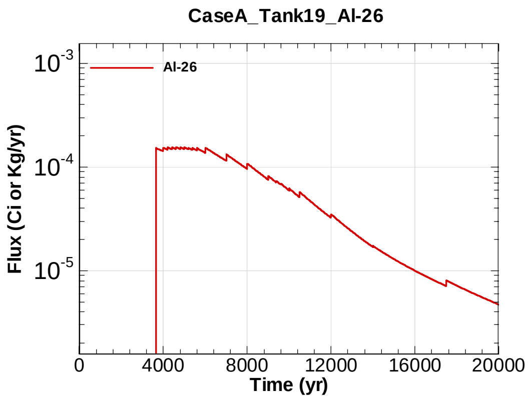

Figure A.1-1763 - Flux Leaving Liner for CaseA Tank19 Al-26

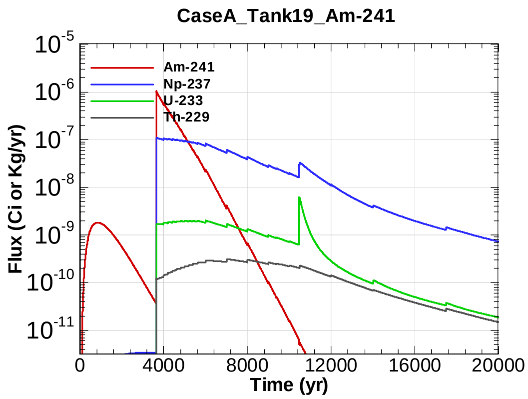

Figure A.1-1764 - Flux Leaving Liner for CaseA Tank19 Am-241

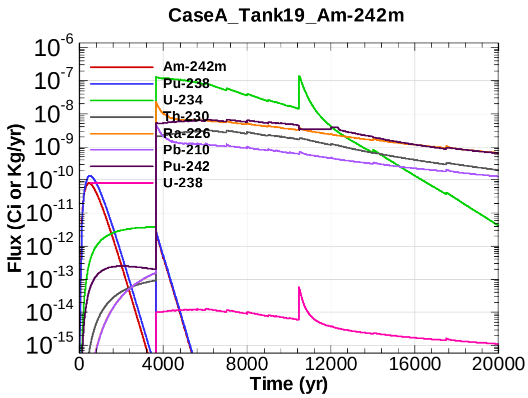

Figure A.1-1765 - Flux Leaving Liner for CaseA Tank19 Am-242m

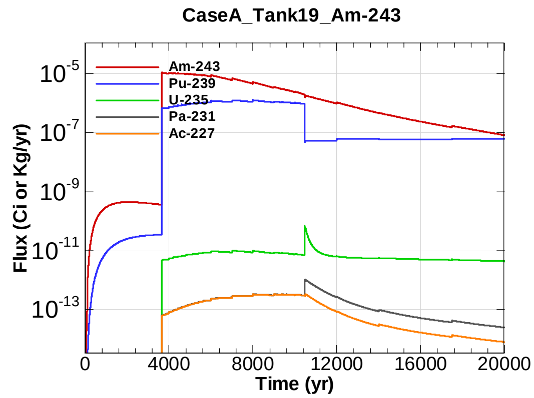

Figure A.1-1766 - Flux Leaving Liner for CaseA Tank19 Am-243

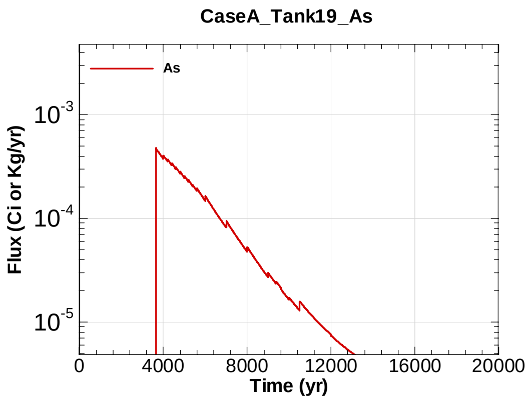

Figure A.1-1767 - Flux Leaving Liner for CaseA Tank19 As

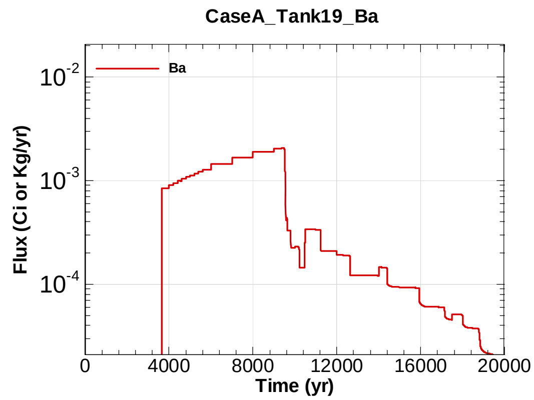

Figure A.1-1768 - Flux Leaving Liner for CaseA Tank19 Ba

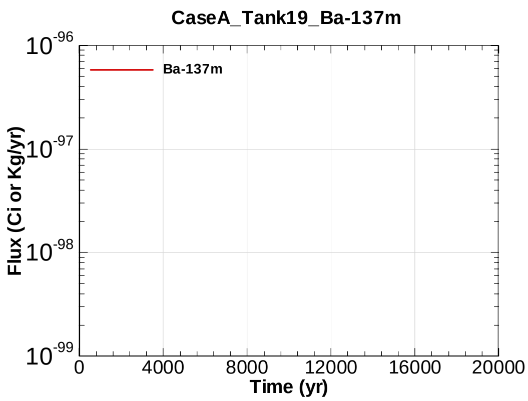

Figure A.1-1769 - Flux Leaving Liner for CaseA Tank19 Ba-137m

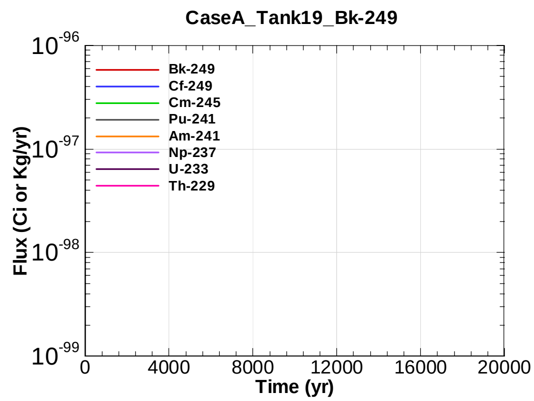

Figure A.1-1770 - Flux Leaving Liner for CaseA Tank19 Bk-249

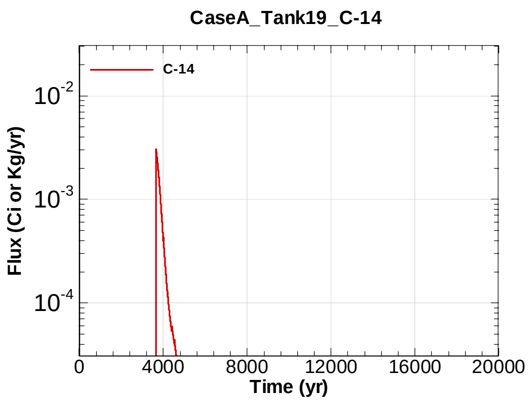

Figure A.1-1771 - Flux Leaving Liner for CaseA Tank19 C-14

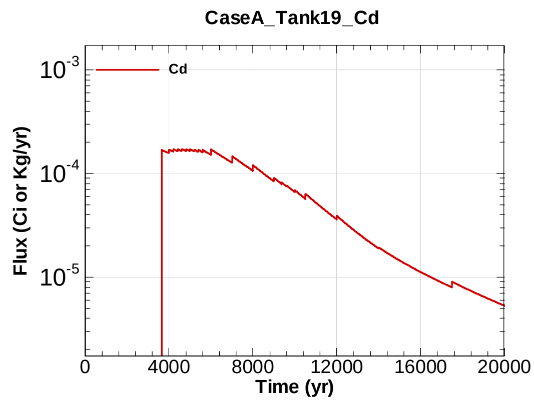

Figure A.1-1772 - Flux Leaving Liner for CaseA Tank19 Cd

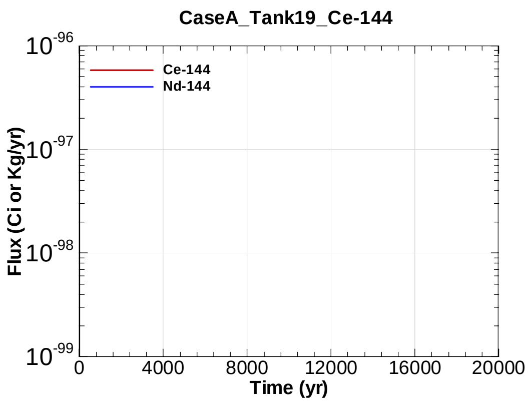

Figure A.1-1773 - Flux Leaving Liner for CaseA Tank19 Ce-144

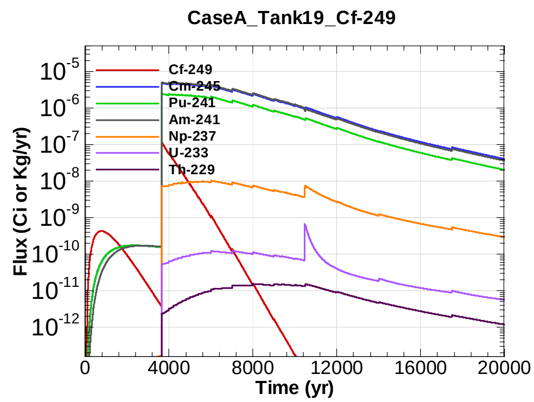

Figure A.1-1774 - Flux Leaving Liner for CaseA Tank19 Cf-249

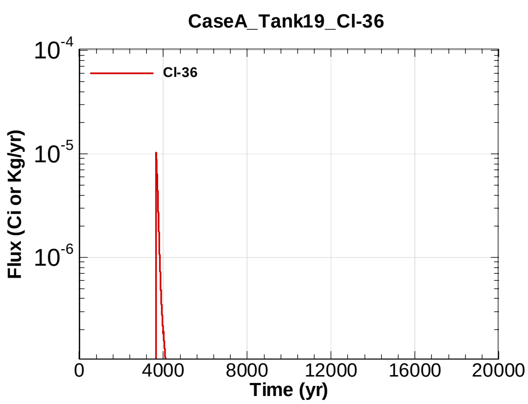

Figure A.1-1775 - Flux Leaving Liner for CaseA Tank19 Cl-36

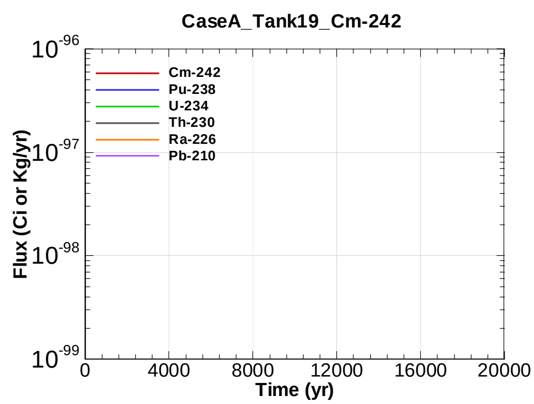

Figure A.1-1776 - Flux Leaving Liner for CaseA Tank19 Cm-242

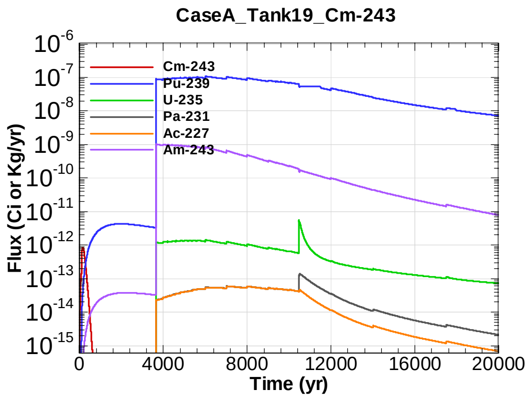

Figure A.1-1777 - Flux Leaving Liner for CaseA Tank19 Cm-243

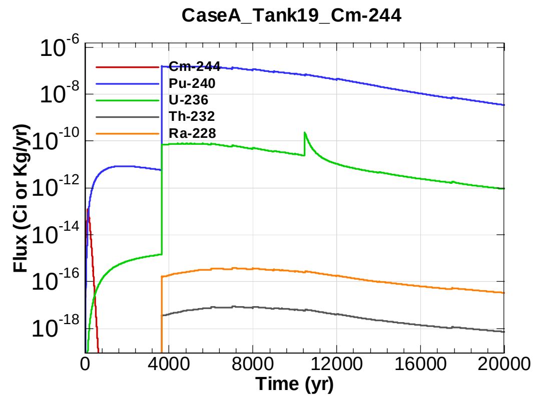

Figure A.1-1778 - Flux Leaving Liner for CaseA Tank19 Cm-244

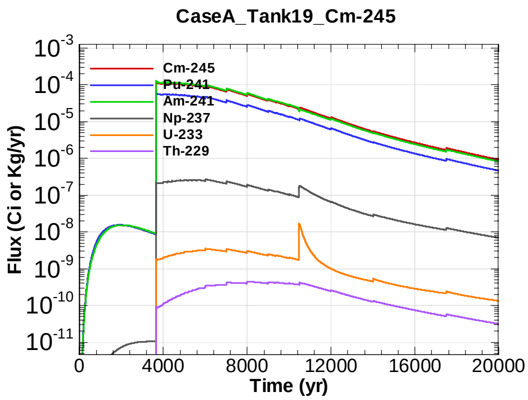

Figure A.1-1779 - Flux Leaving Liner for CaseA Tank19 Cm-245

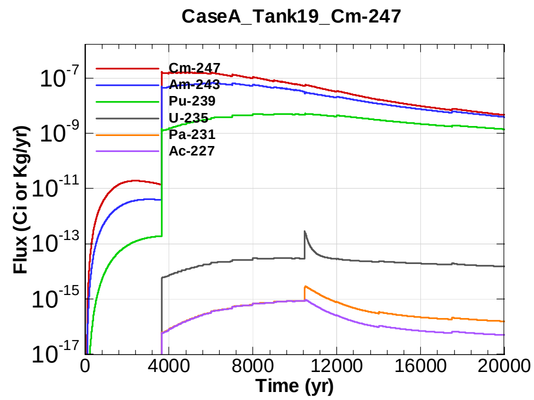

Figure A.1-1780 - Flux Leaving Liner for CaseA Tank19 Cm-247

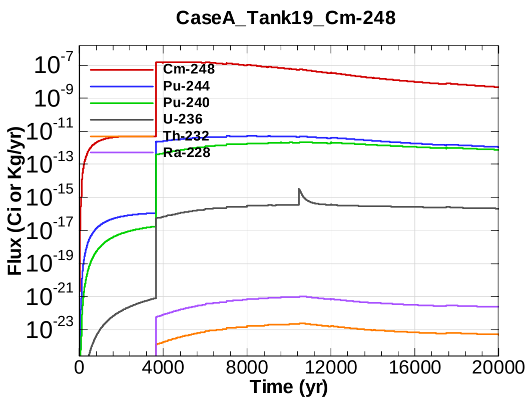

Figure A.1-1781 - Flux Leaving Liner for CaseA Tank19 Cm-248

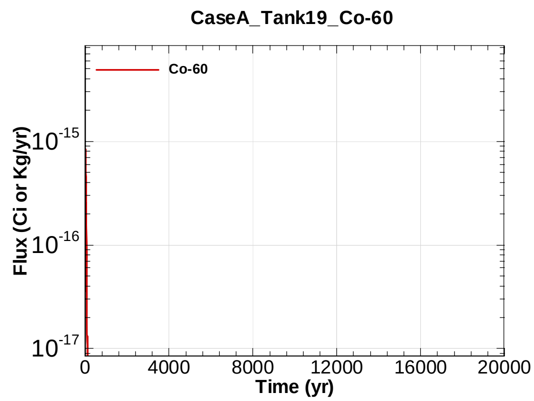

Figure A.1-1782 - Flux Leaving Liner for CaseA Tank19 Co-60

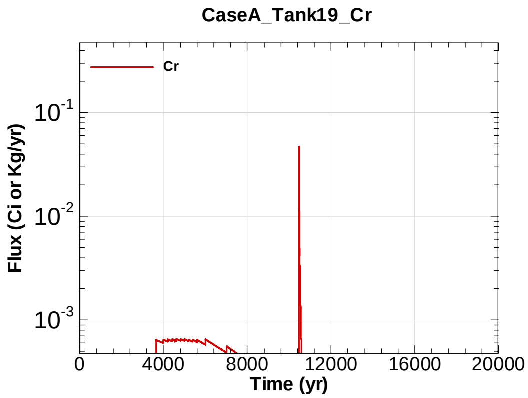

Figure A.1-1783 - Flux Leaving Liner for CaseA Tank19 Cr

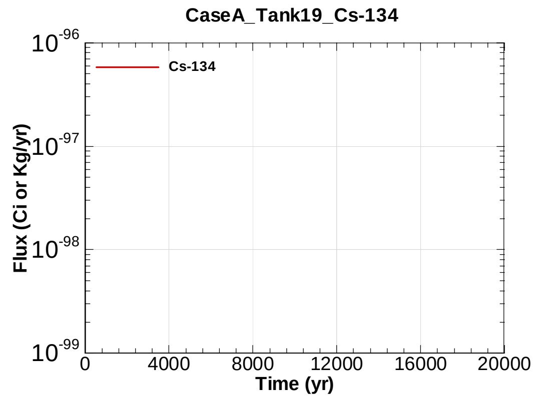

Figure A.1-1784 - Flux Leaving Liner for CaseA Tank19 Cs-134

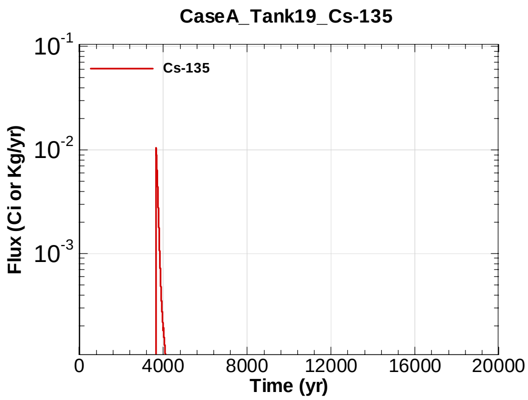

Figure A.1-1785 - Flux Leaving Liner for CaseA Tank19 Cs-135

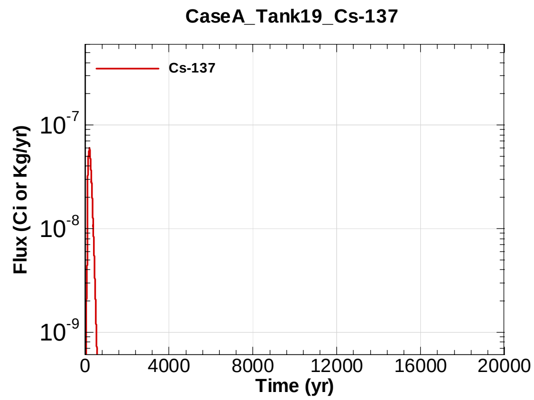

Figure A.1-1786 - Flux Leaving Liner for CaseA Tank19 Cs-137

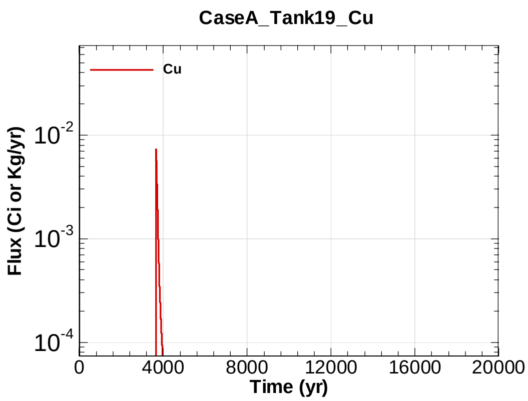

Figure A.1-1787 - Flux Leaving Liner for CaseA Tank19 Cu

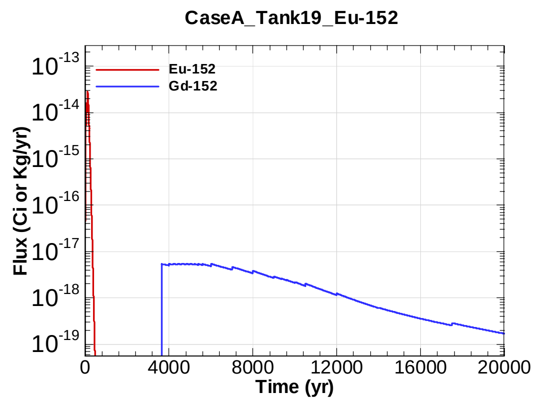

Figure A.1-1788 - Flux Leaving Liner for CaseA Tank19 Eu-152

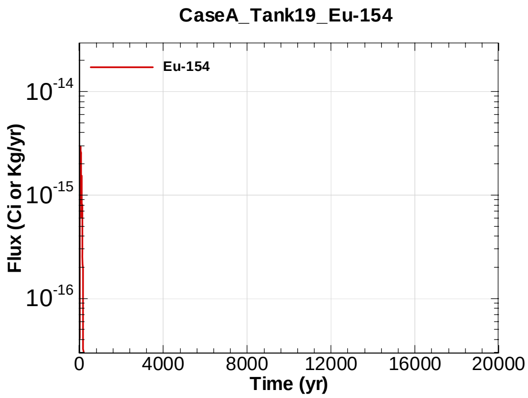

Figure A.1-1789 - Flux Leaving Liner for CaseA Tank19 Eu-154

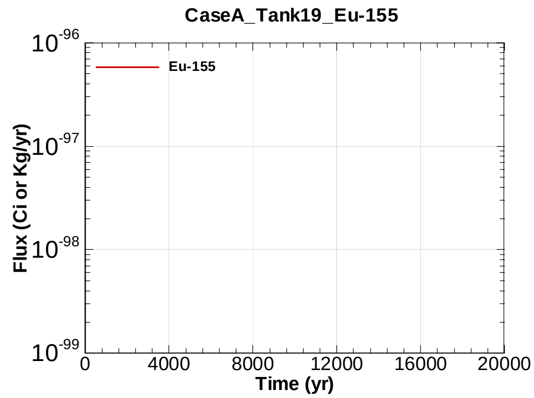

Figure A.1-1790 - Flux Leaving Liner for CaseA Tank19 Eu-155

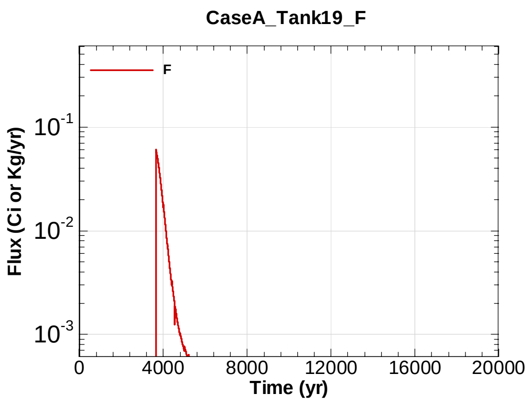

Figure A.1-1791 - Flux Leaving Liner for CaseA Tank19 F

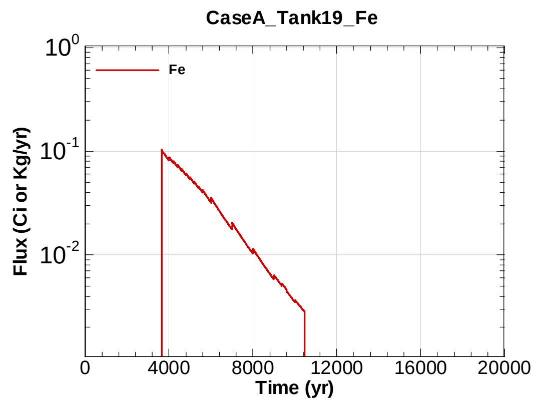

Figure A.1-1792 - Flux Leaving Liner for CaseA Tank19 Fe

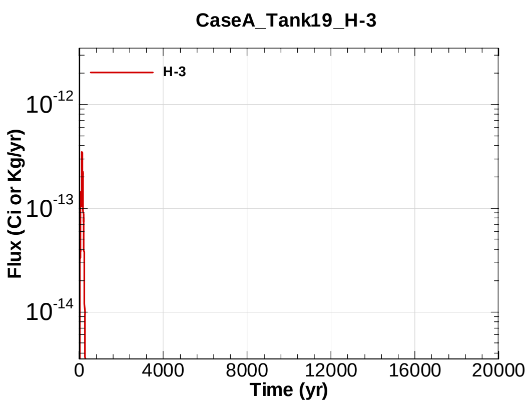

Figure A.1-1793 - Flux Leaving Liner for CaseA Tank19 H-3

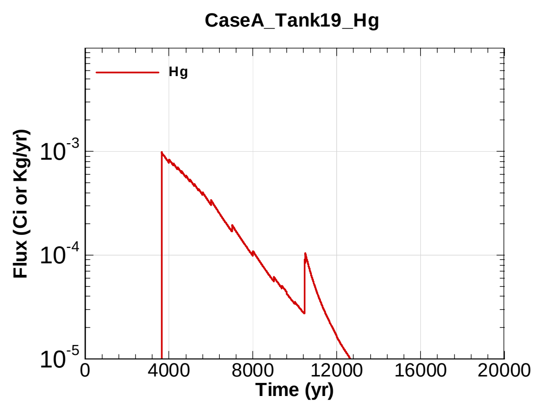

Figure A.1-1794 - Flux Leaving Liner for CaseA Tank19 Hg

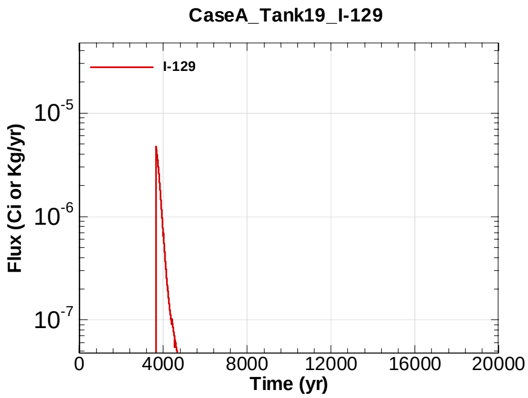

Figure A.1-1795 - Flux Leaving Liner for CaseA Tank19 I-129

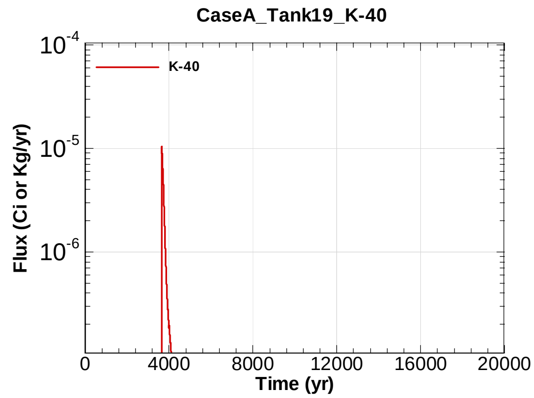

Figure A.1-1796 - Flux Leaving Liner for CaseA Tank19 K-40

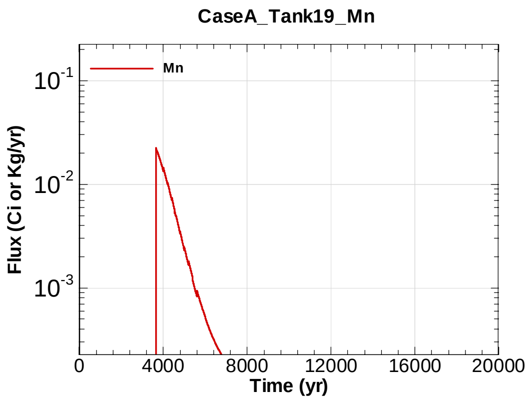

Figure A.1-1797 - Flux Leaving Liner for CaseA Tank19 Mn

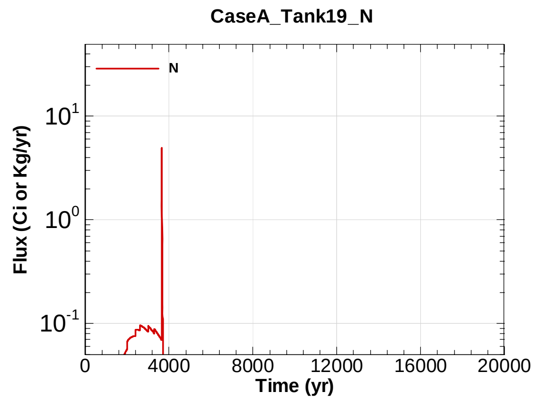

Figure A.1-1798 - Flux Leaving Liner for CaseA Tank19 N

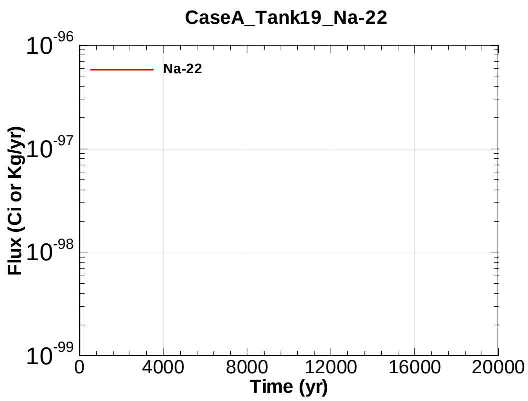

Figure A.1-1799 - Flux Leaving Liner for CaseA Tank19 Na-22

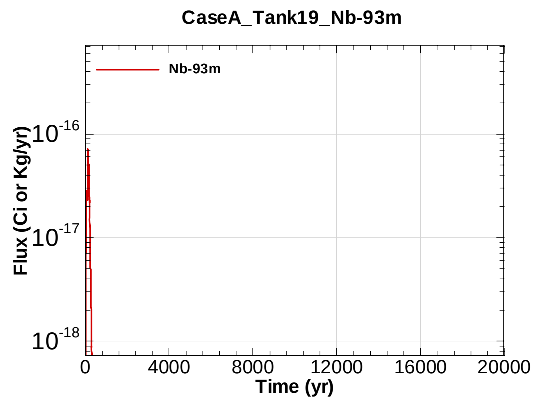

Figure A.1-1800 - Flux Leaving Liner for CaseA Tank19 Nb-93m

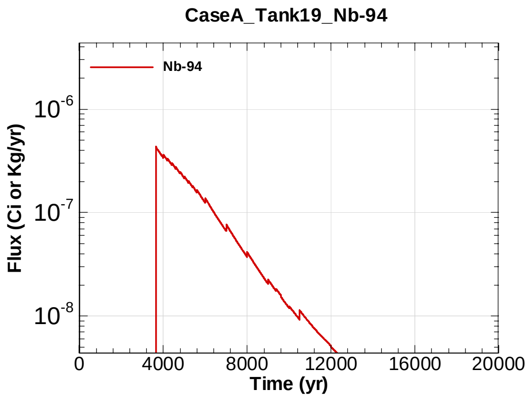

Figure A.1-1801 - Flux Leaving Liner for CaseA Tank19 Nb-94

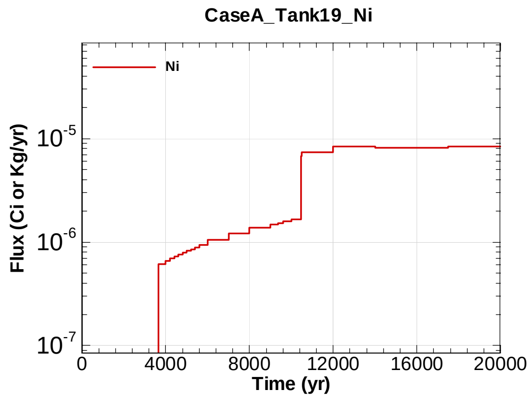

Figure A.1-1802 - Flux Leaving Liner for CaseA Tank19 Ni

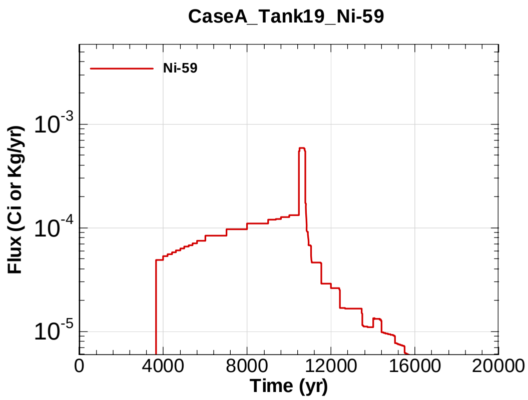

Figure A.1-1803 - Flux Leaving Liner for CaseA Tank19 Ni-59

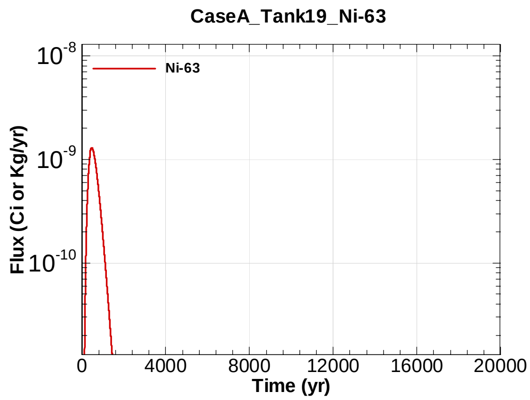

Figure A.1-1804 - Flux Leaving Liner for CaseA Tank19 Ni-63

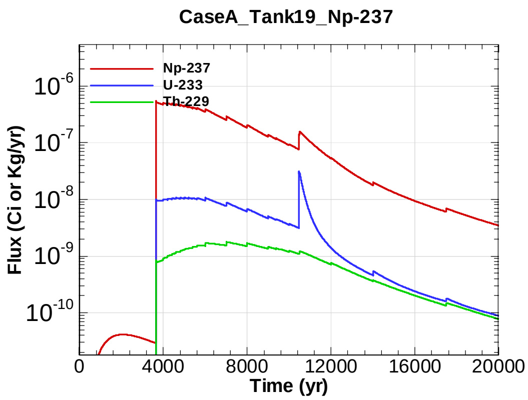

Figure A.1-1805 - Flux Leaving Liner for CaseA Tank19 Np-237

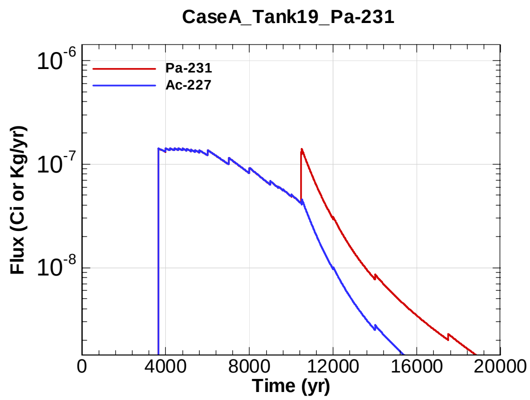

Figure A.1-1806 - Flux Leaving Liner for CaseA Tank19 Pa-231

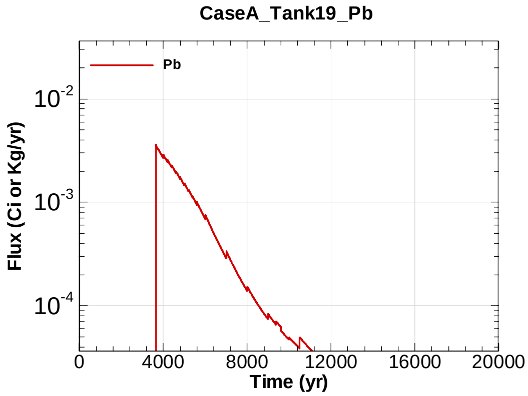

Figure A.1-1807 - Flux Leaving Liner for CaseA Tank19 Pb

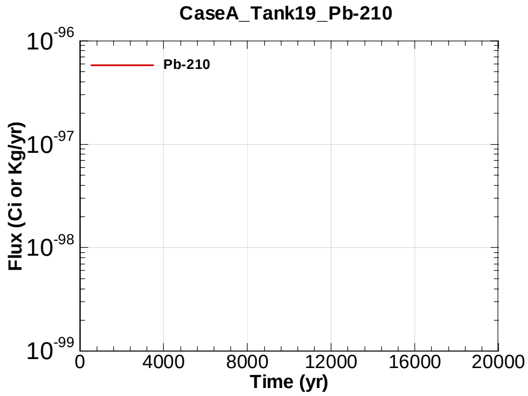

Figure A.1-1808 - Flux Leaving Liner for CaseA Tank19 Pb-210

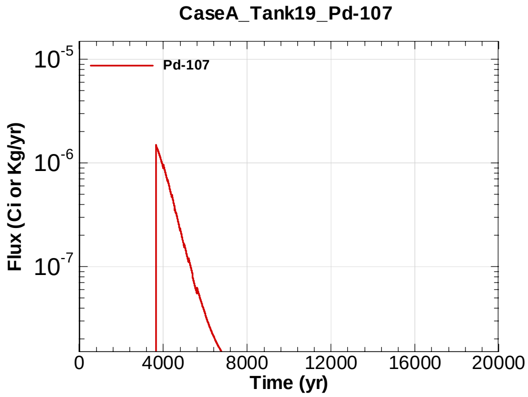

Figure A.1-1809 - Flux Leaving Liner for CaseA Tank19 Pd-107

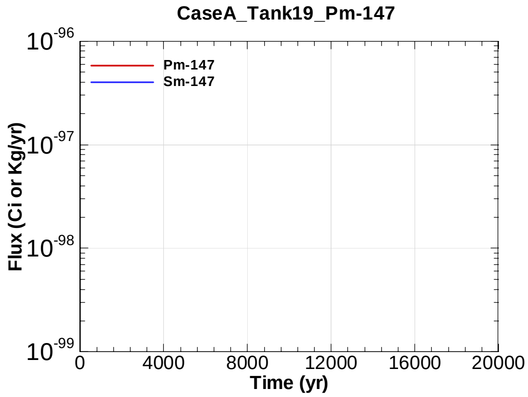

Figure A.1-1810 - Flux Leaving Liner for CaseA Tank19 Pm-147

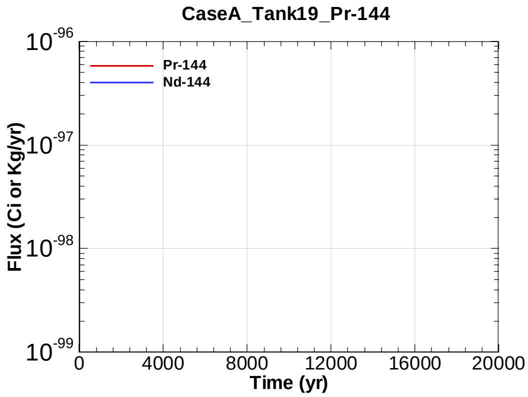

Figure A.1-1811 - Flux Leaving Liner for CaseA Tank19 Pr-144

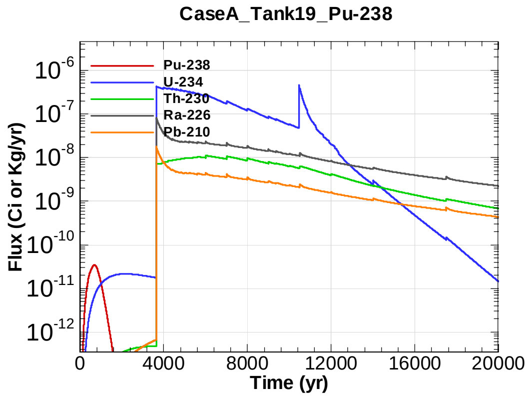

Figure A.1-1812 - Flux Leaving Liner for CaseA Tank19 Pu-238

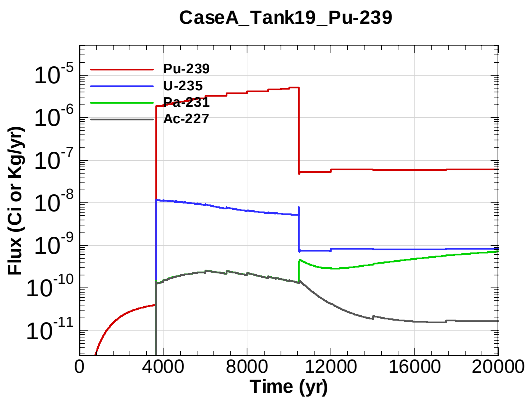

Figure A.1-1813 - Flux Leaving Liner for CaseA Tank19 Pu-239

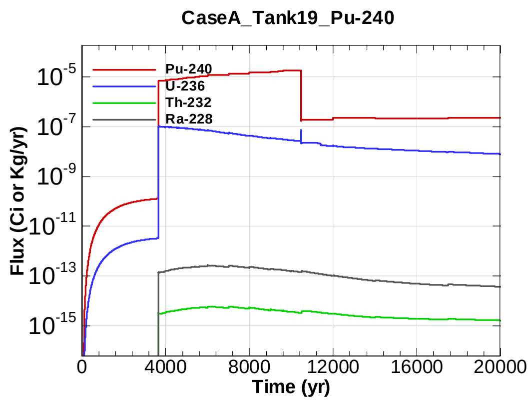

Figure A.1-1814 - Flux Leaving Liner for CaseA Tank19 Pu-240

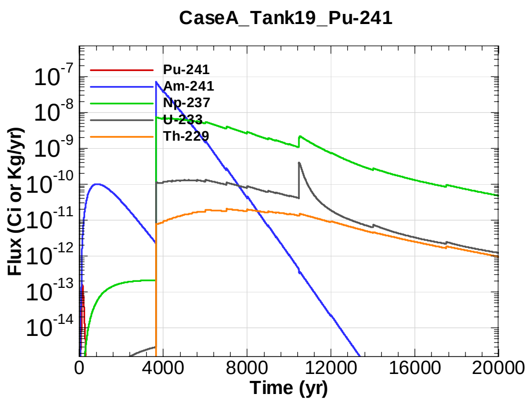

Figure A.1-1815 - Flux Leaving Liner for CaseA Tank19 Pu-241

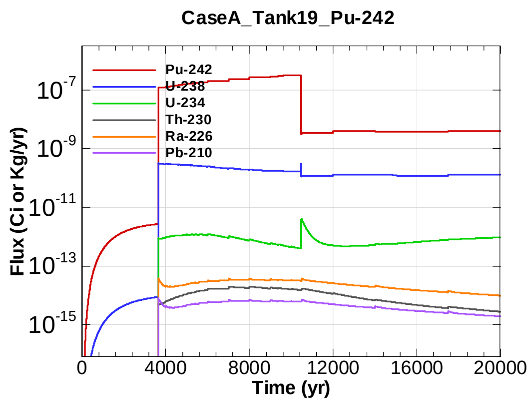

Figure A.1-1816 - Flux Leaving Liner for CaseA Tank19 Pu-242

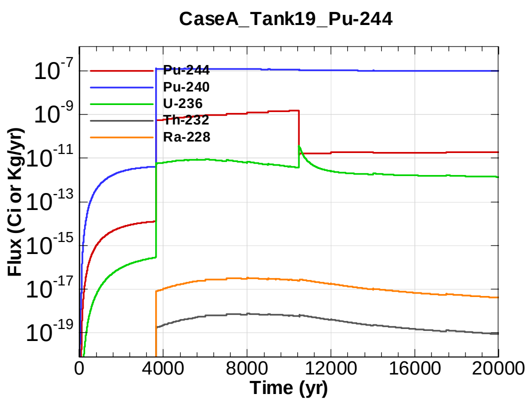

Figure A.1-1817 - Flux Leaving Liner for CaseA Tank19 Pu-244

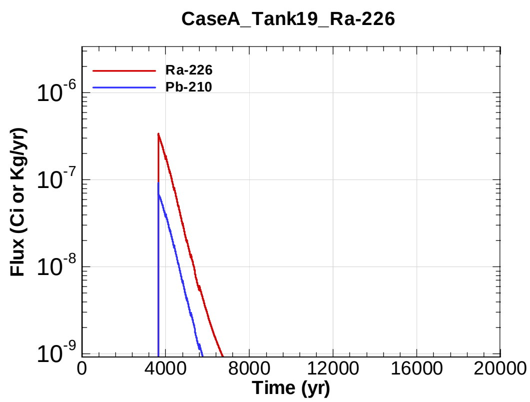

Figure A.1-1818 - Flux Leaving Liner for CaseA Tank19 Ra-226

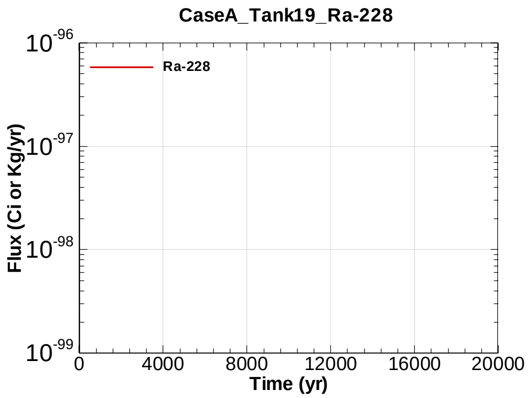

Figure A.1-1819 - Flux Leaving Liner for CaseA Tank19 Ra-228

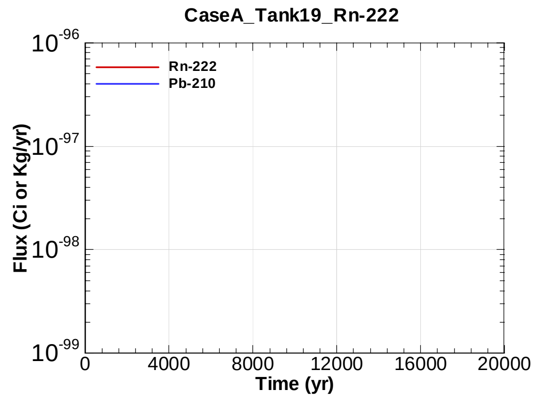

Figure A.1-1820 - Flux Leaving Liner for CaseA Tank19 Rn-222

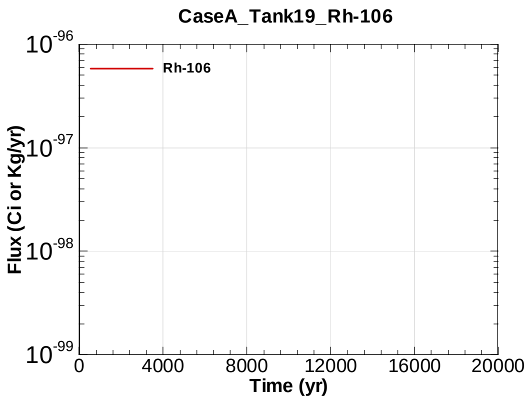

Figure A.1-1821 - Flux Leaving Liner for CaseA Tank19 Rh-106

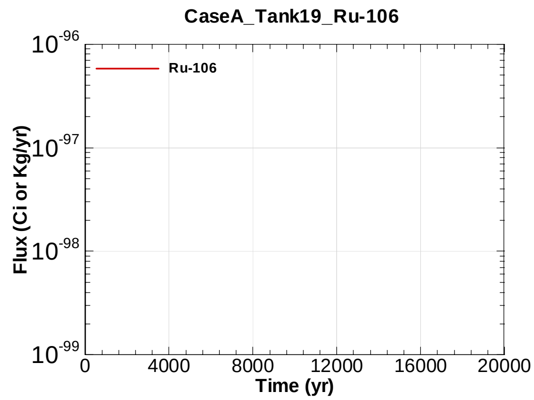

Figure A.1-1822 - Flux Leaving Liner for CaseA Tank19 Ru-106

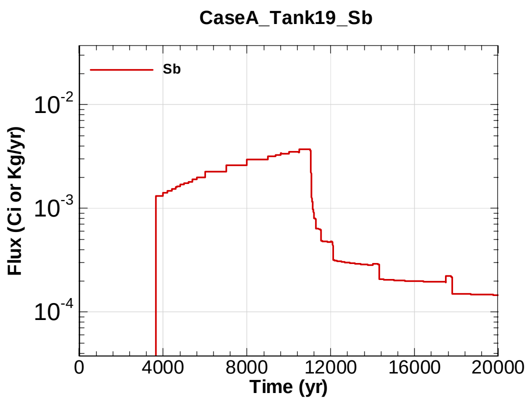

Figure A.1-1823 - Flux Leaving Liner for CaseA Tank19 Sb

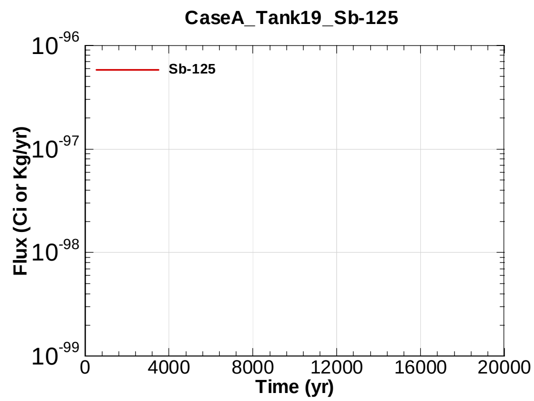

Figure A.1-1824 - Flux Leaving Liner for CaseA Tank19 Sb-125

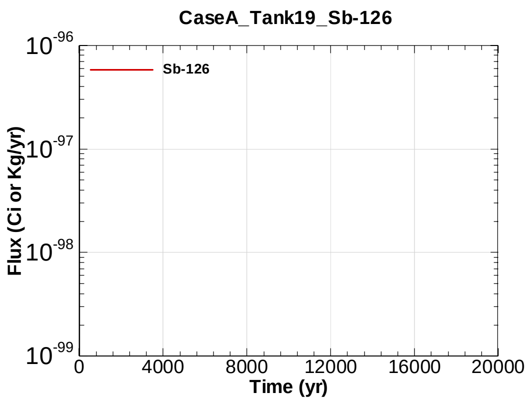

Figure A.1-1825 - Flux Leaving Liner for CaseA Tank19 Sb-126

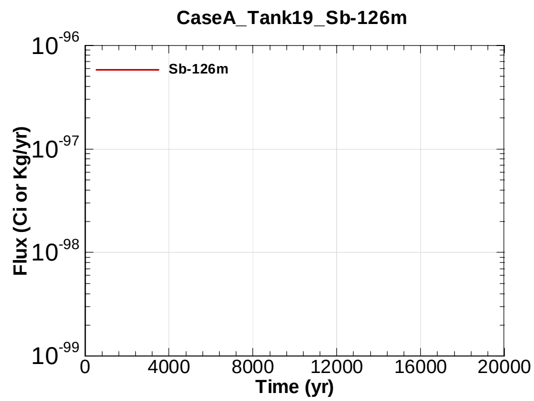

Figure A.1-1826 - Flux Leaving Liner for CaseA Tank19 Sb-126m

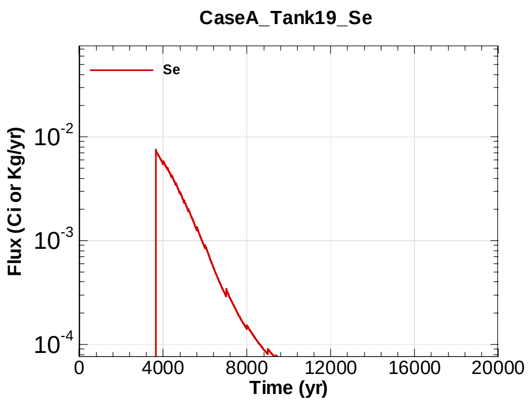

Figure A.1-1827 - Flux Leaving Liner for CaseA Tank19 Se

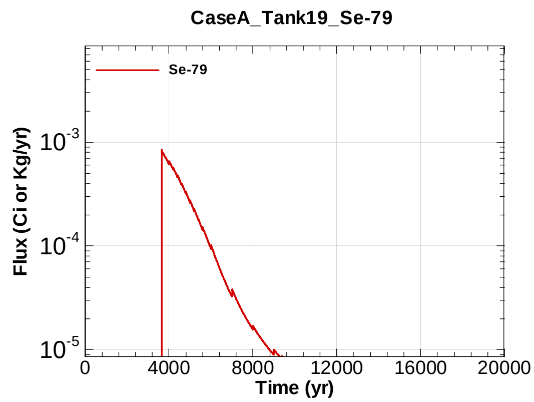

Figure A.1-1828 - Flux Leaving Liner for CaseA Tank19 Se-79

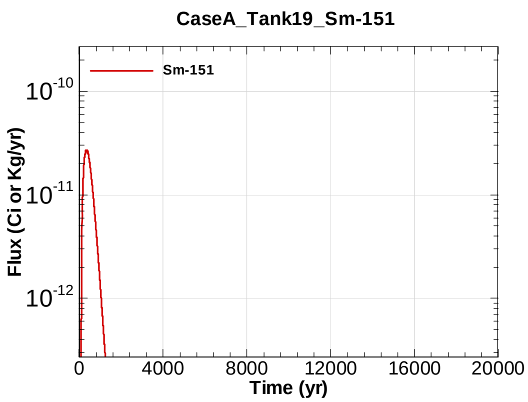

Figure A.1-1829 - Flux Leaving Liner for CaseA Tank19 Sm-151

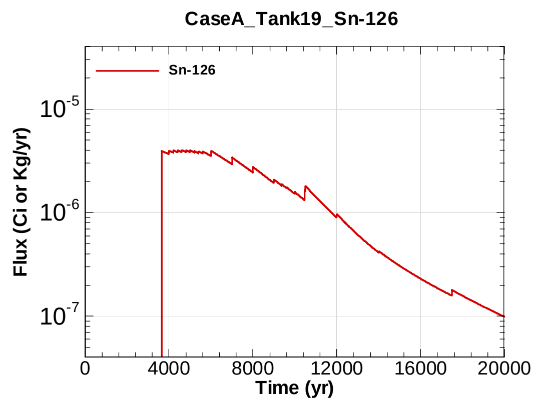

Figure A.1-1830 - Flux Leaving Liner for CaseA Tank19 Sn-126

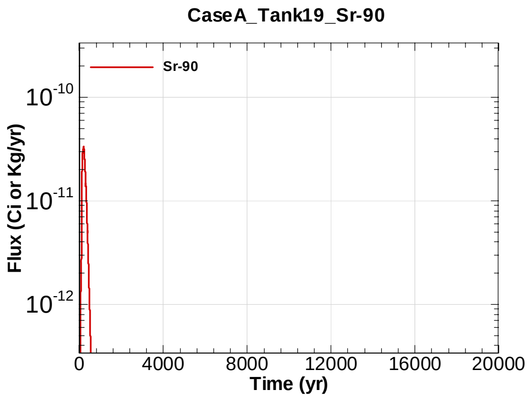

Figure A.1-1831 - Flux Leaving Liner for CaseA Tank19 Sr-90

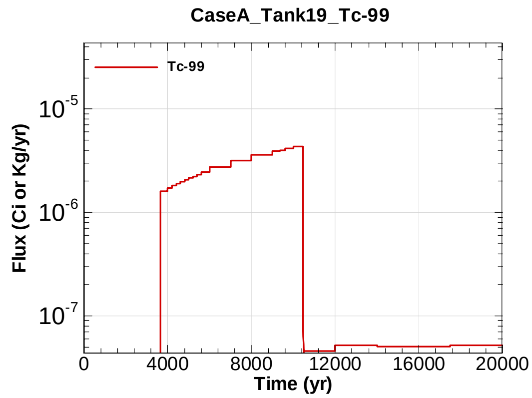

Figure A.1-1832 - Flux Leaving Liner for CaseA Tank19 Tc-99

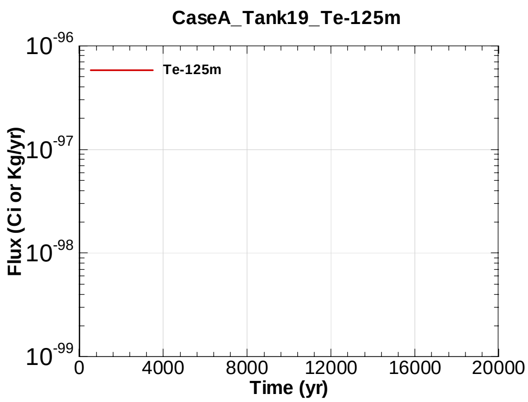

Figure A.1-1833 - Flux Leaving Liner for CaseA Tank19 Te-125m

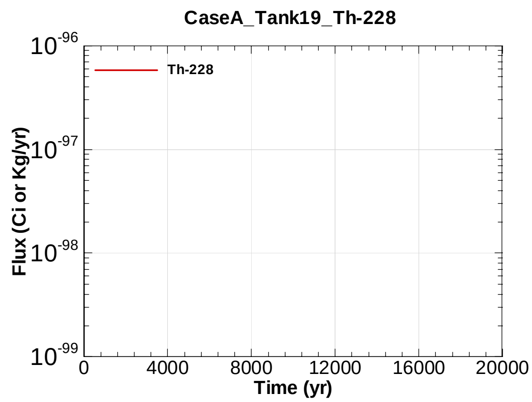

Figure A.1-1834 - Flux Leaving Liner for CaseA Tank19 Th-228

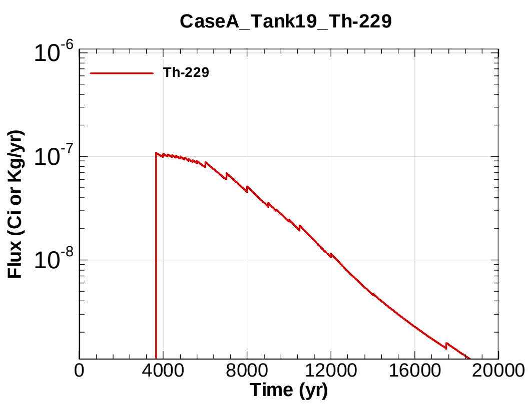

Figure A.1-1835 - Flux Leaving Liner for CaseA Tank19 Th-229

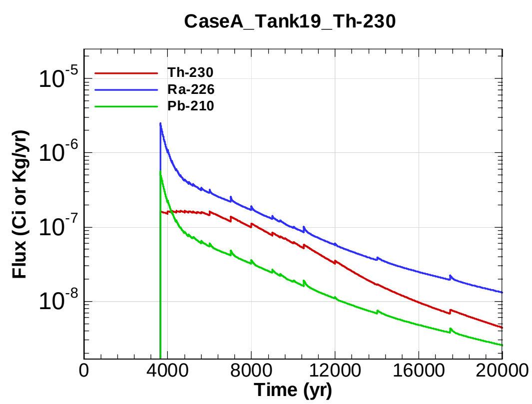

Figure A.1-1836 - Flux Leaving Liner for CaseA Tank19 Th-230

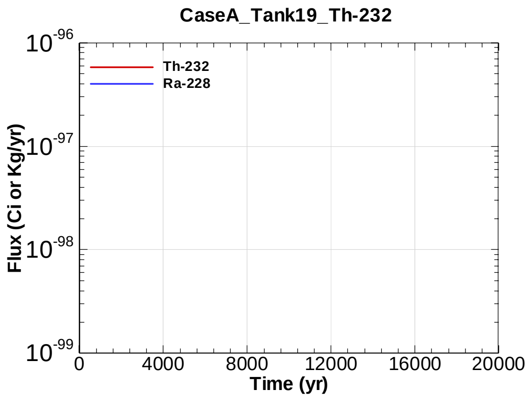

Figure A.1-1837 - Flux Leaving Liner for CaseA Tank19 Th-232

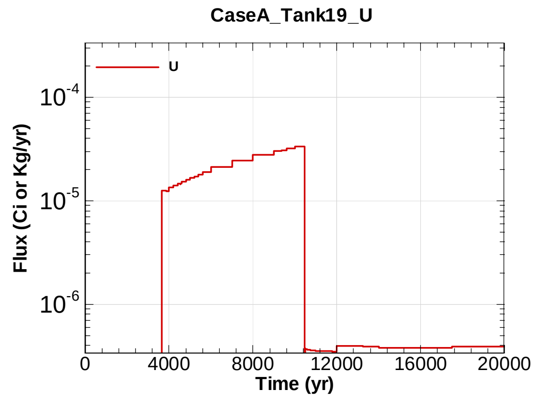

Figure A.1-1838 - Flux Leaving Liner for CaseA Tank19 U

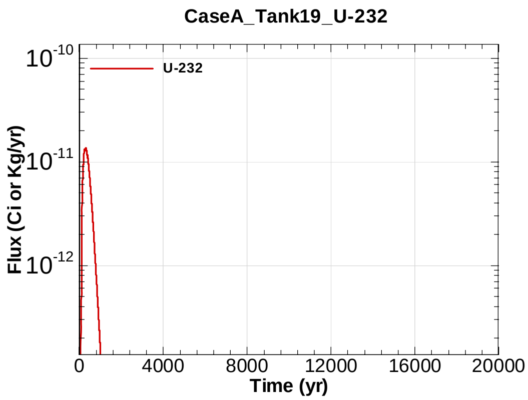

Figure A.1-1839 - Flux Leaving Liner for CaseA Tank19 U-232

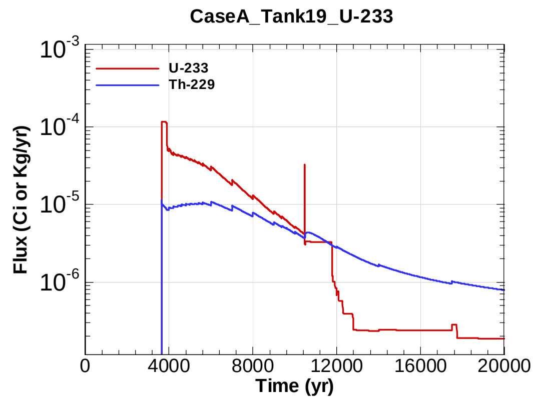

Figure A.1-1840 - Flux Leaving Liner for CaseA Tank19 U-233

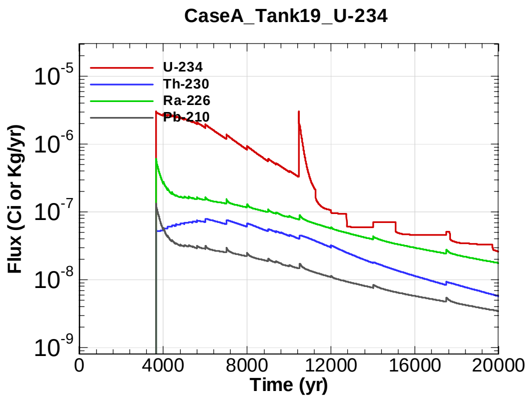

Figure A.1-1841 - Flux Leaving Liner for CaseA Tank19 U-234

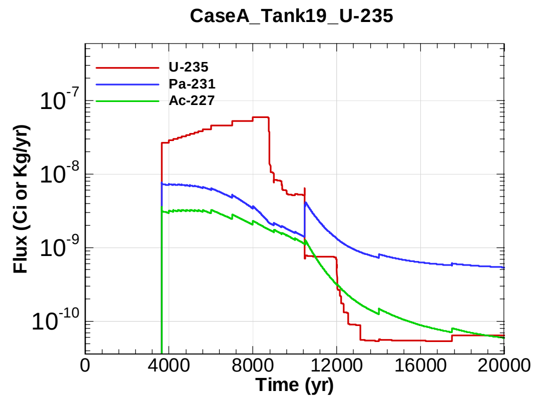

Figure A.1-1842 - Flux Leaving Liner for CaseA Tank19 U-235

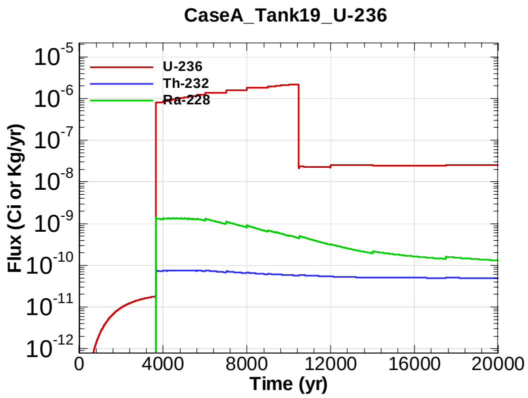

Figure A.1-1843 - Flux Leaving Liner for CaseA Tank19 U-236

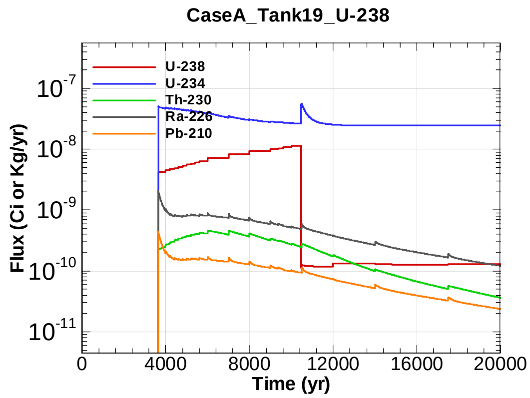

Figure A.1-1844 - Flux Leaving Liner for CaseA Tank19 U-238

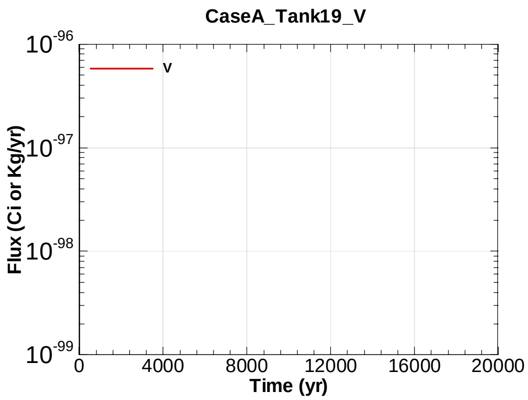

Figure A.1-1845 - Flux Leaving Liner for CaseA Tank19 V

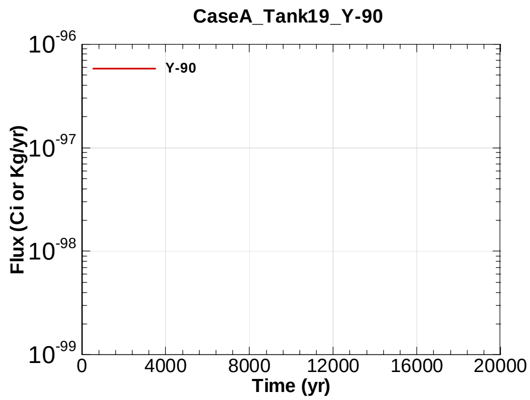

Figure A.1-1846 - Flux Leaving Liner for CaseA Tank19 Y-90

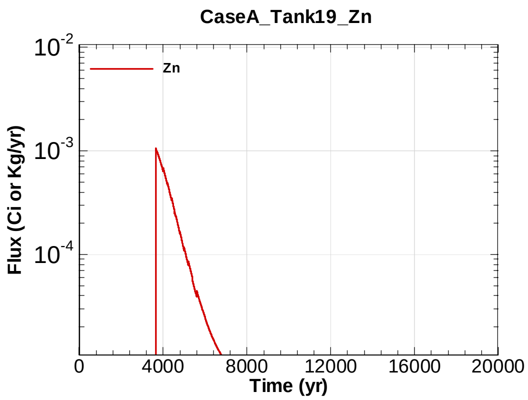

Figure A.1-1847 - Flux Leaving Liner for CaseA Tank19 Zn

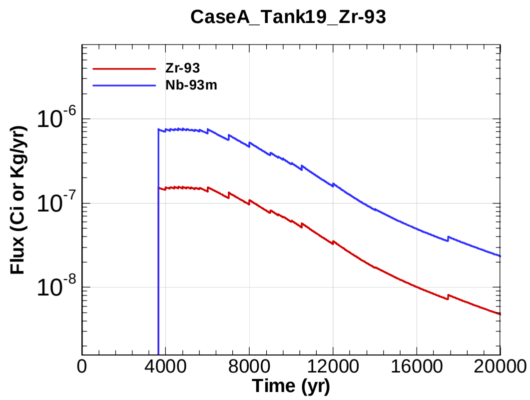

Figure A.1-1848 - Flux Leaving Liner for CaseA Tank19 Zr-93

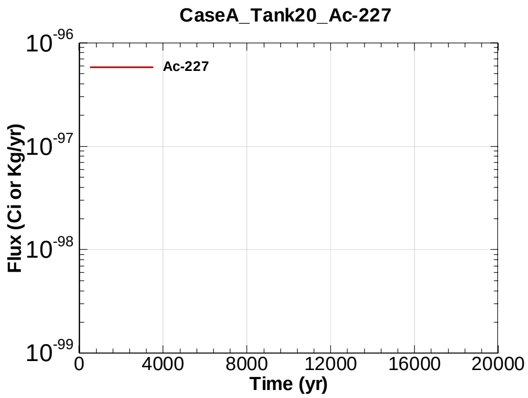

Figure A.1-1849 - Flux Leaving Liner for CaseA Tank20 Ac-227

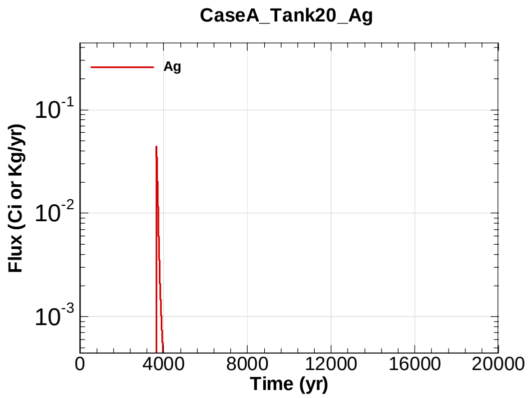

Figure A.1-1850 - Flux Leaving Liner for CaseA Tank20 Ag

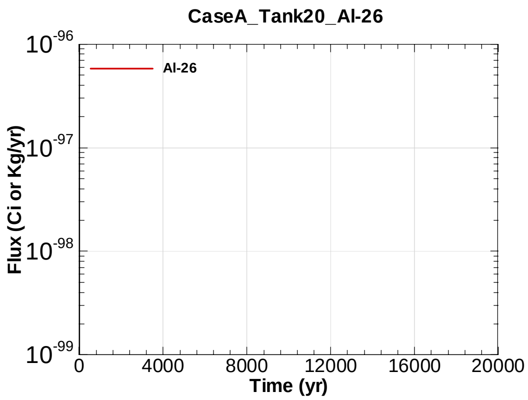

Figure A.1-1851 - Flux Leaving Liner for CaseA Tank20 Al-26

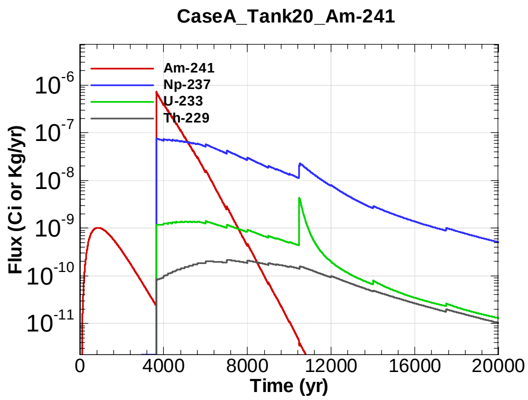

Figure A.1-1852 - Flux Leaving Liner for CaseA Tank20 Am-241

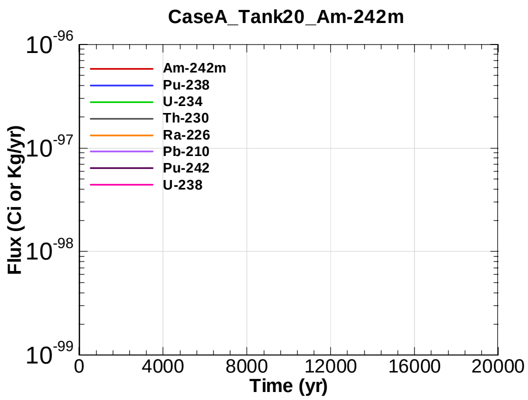

Figure A.1-1853 - Flux Leaving Liner for CaseA Tank20 Am-242m

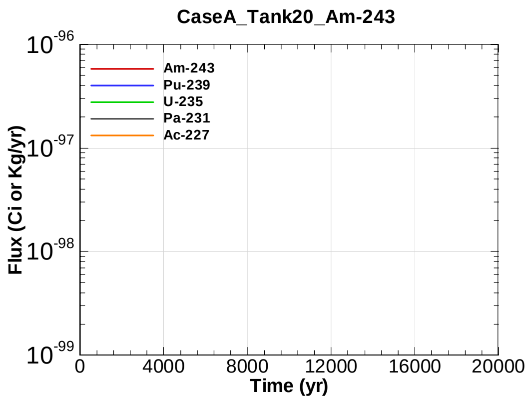

Figure A.1-1854 - Flux Leaving Liner for CaseA Tank20 Am-243

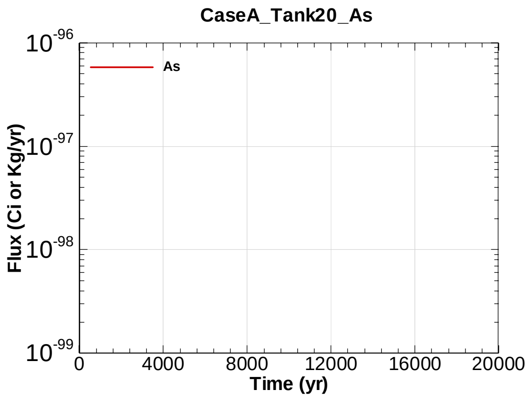

Figure A.1-1855 - Flux Leaving Liner for CaseA Tank20 As

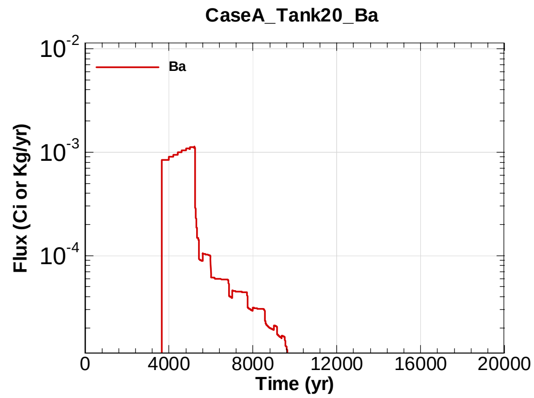

Figure A.1-1856 - Flux Leaving Liner for CaseA Tank20 Ba

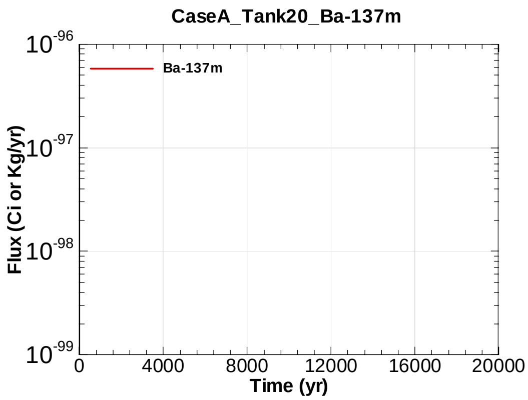

Figure A.1-1857 - Flux Leaving Liner for CaseA Tank20 Ba-137m

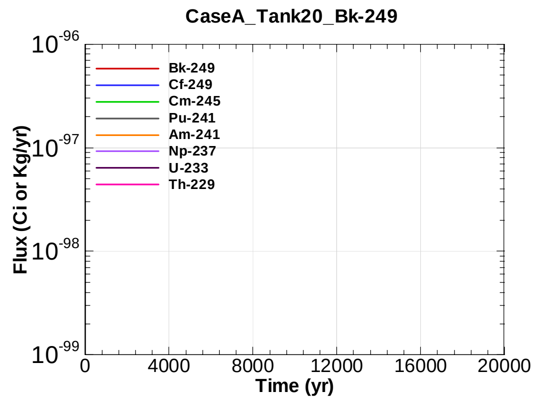

Figure A.1-1858 - Flux Leaving Liner for CaseA Tank20 Bk-249

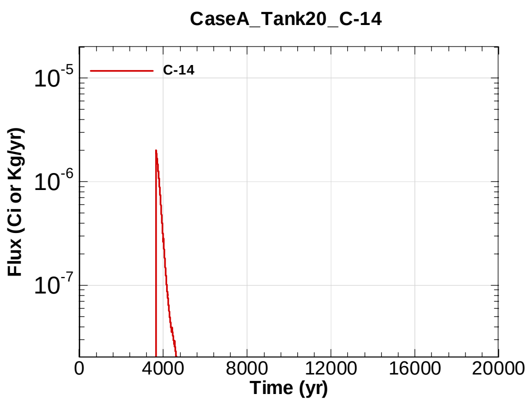

Figure A.1-1859 - Flux Leaving Liner for CaseA Tank20 C-14

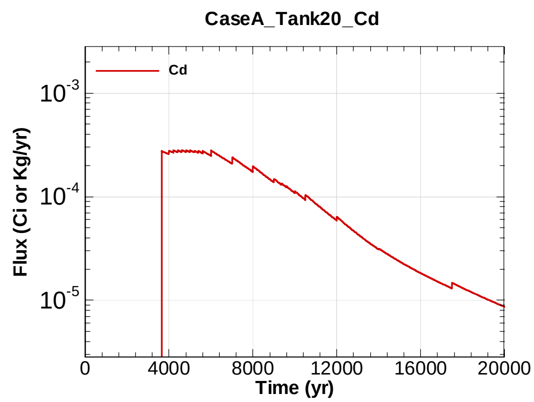

Figure A.1-1860 - Flux Leaving Liner for CaseA Tank20 Cd

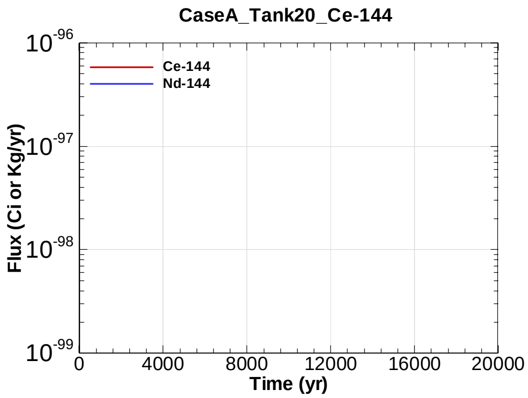

Figure A.1-1861 - Flux Leaving Liner for CaseA Tank20 Ce-144

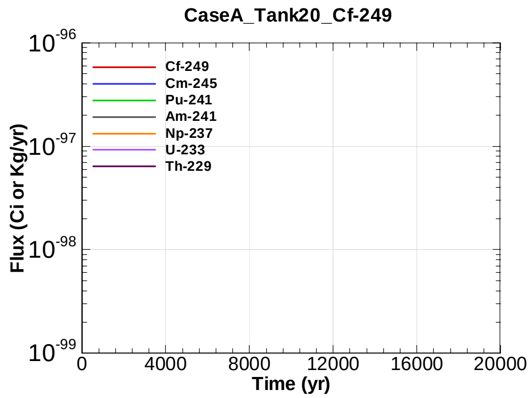

Figure A.1-1862 - Flux Leaving Liner for CaseA Tank20 Cf-249

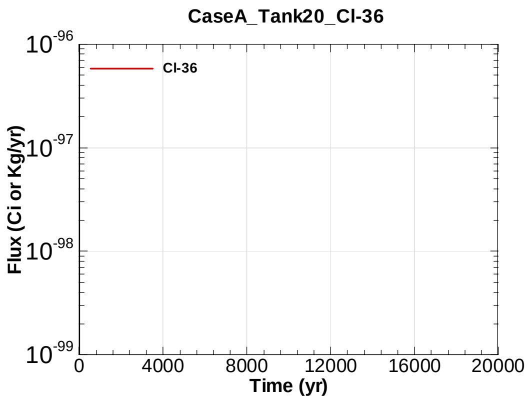

Figure A.1-1863 - Flux Leaving Liner for CaseA Tank20 Cl-36

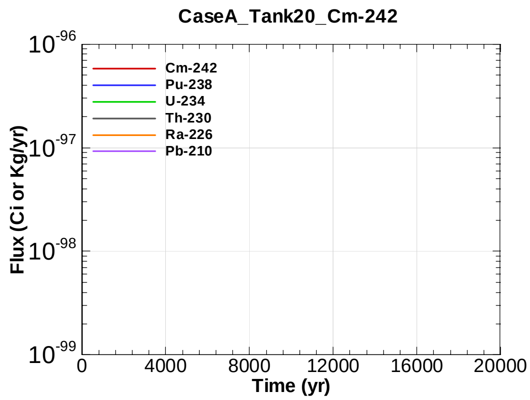

Figure A.1-1864 - Flux Leaving Liner for CaseA Tank20 Cm-242

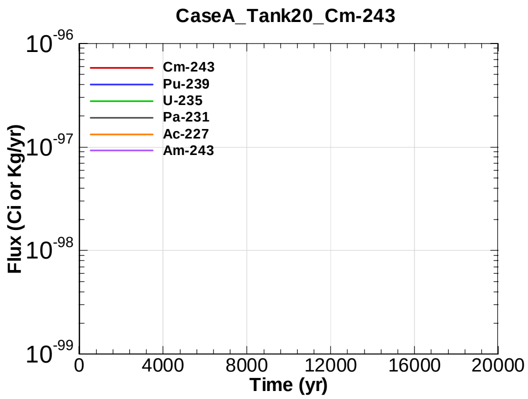

Figure A.1-1865 - Flux Leaving Liner for CaseA Tank20 Cm-243

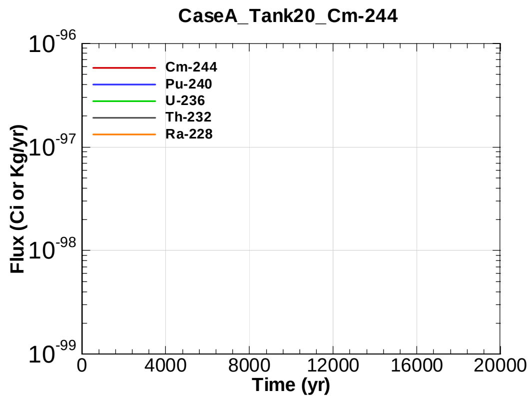

Figure A.1-1866 - Flux Leaving Liner for CaseA Tank20 Cm-244

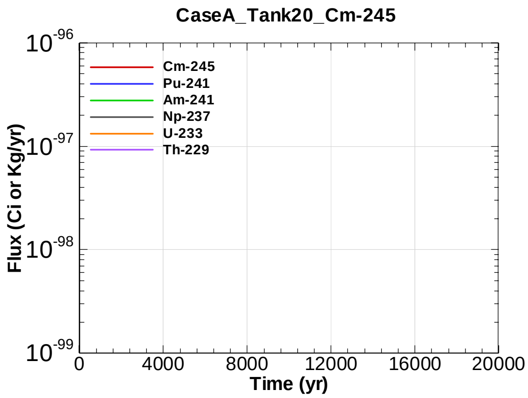

Figure A.1-1867 - Flux Leaving Liner for CaseA Tank20 Cm-245

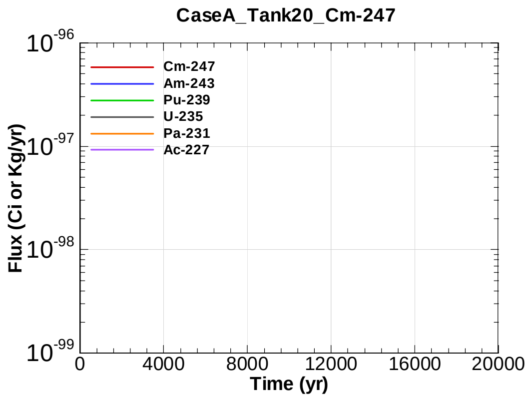

Figure A.1-1868 - Flux Leaving Liner for CaseA Tank20 Cm-247

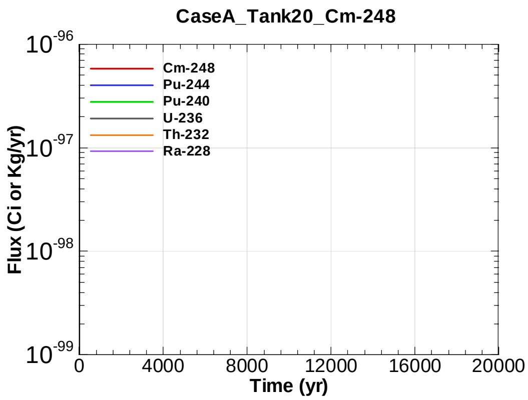

Figure A.1-1869 - Flux Leaving Liner for CaseA Tank20 Cm-248

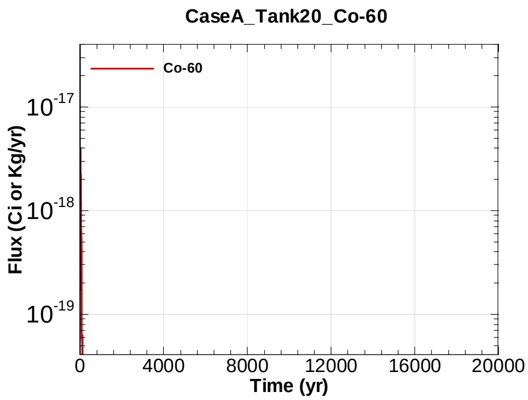

Figure A.1-1870 - Flux Leaving Liner for CaseA Tank20 Co-60

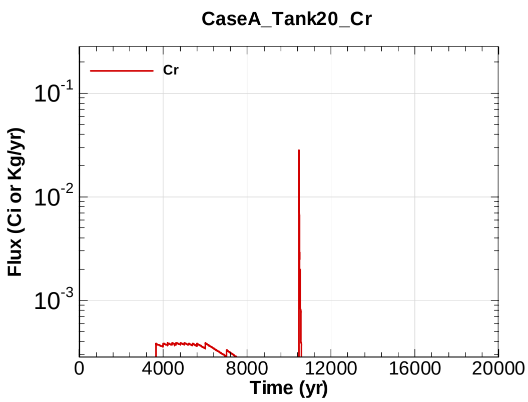

Figure A.1-1871 - Flux Leaving Liner for CaseA Tank20 Cr

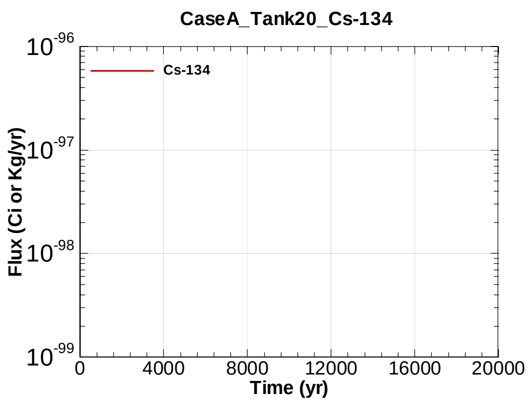

Figure A.1-1872 - Flux Leaving Liner for CaseA Tank20 Cs-134

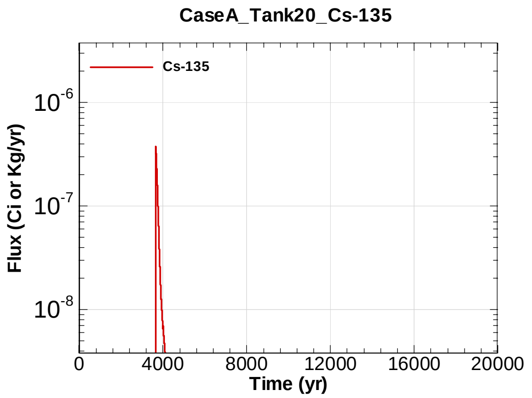

Figure A.1-1873 - Flux Leaving Liner for CaseA Tank20 Cs-135

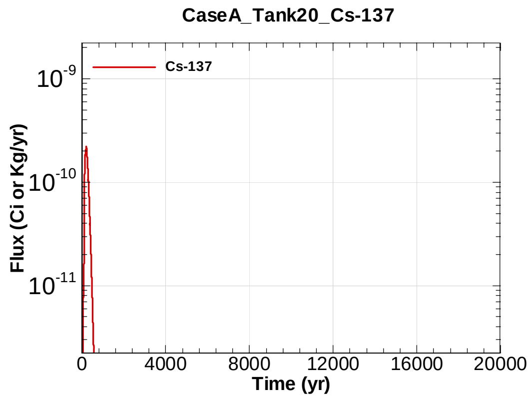

Figure A.1-1874 - Flux Leaving Liner for CaseA Tank20 Cs-137

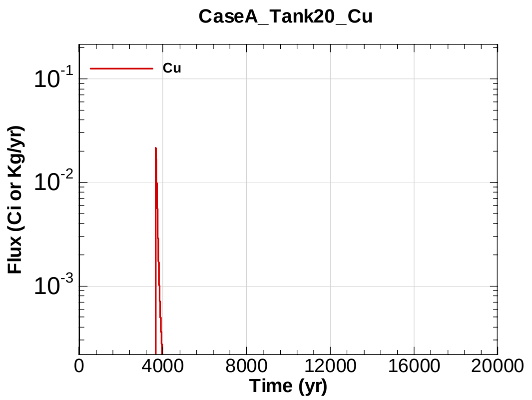

Figure A.1-1875 - Flux Leaving Liner for CaseA Tank20 Cu

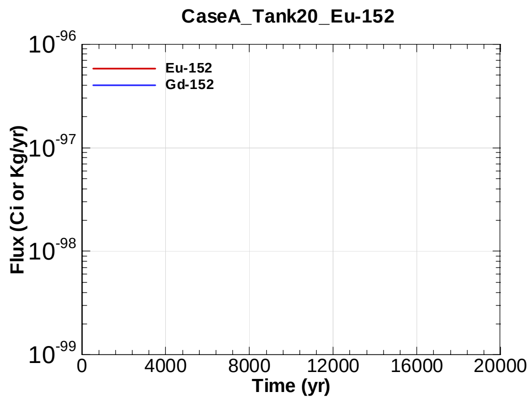

Figure A.1-1876 - Flux Leaving Liner for CaseA Tank20 Eu-152

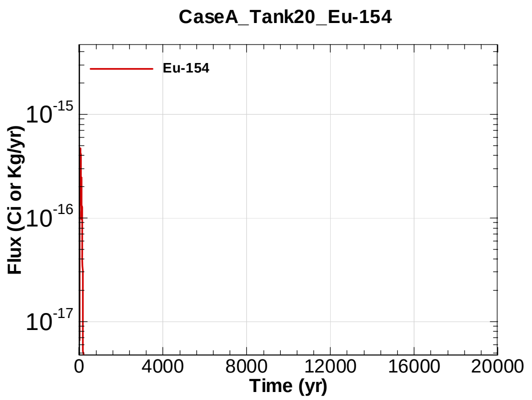

Figure A.1-1877 - Flux Leaving Liner for CaseA Tank20 Eu-154

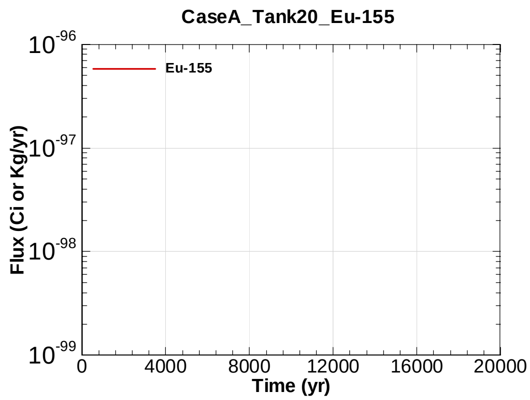

Figure A.1-1878 - Flux Leaving Liner for CaseA Tank20 Eu-155

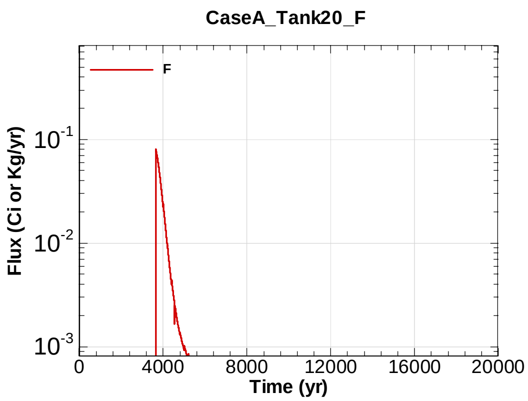

Figure A.1-1879 - Flux Leaving Liner for CaseA Tank20 F

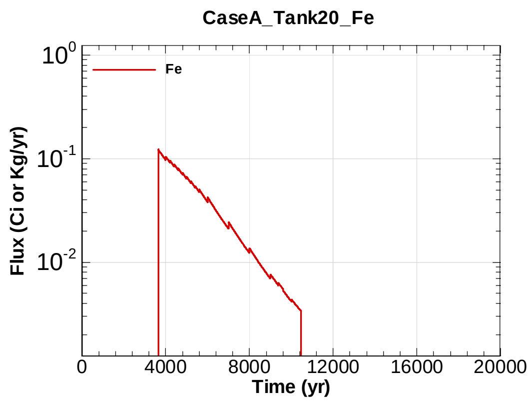

Figure A.1-1880 - Flux Leaving Liner for CaseA Tank20 Fe

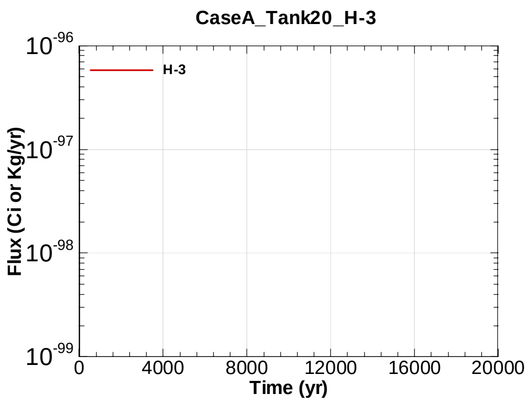

Figure A.1-1881 - Flux Leaving Liner for CaseA Tank20 H-3

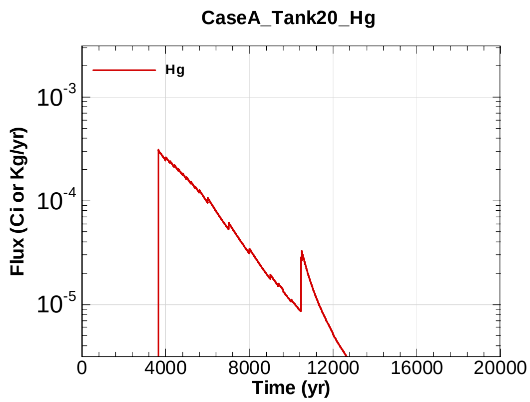

Figure A.1-1882 - Flux Leaving Liner for CaseA Tank20 Hg

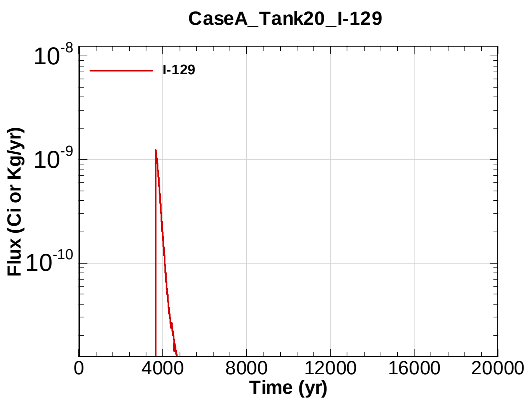

Figure A.1-1883 - Flux Leaving Liner for CaseA Tank20 I-129

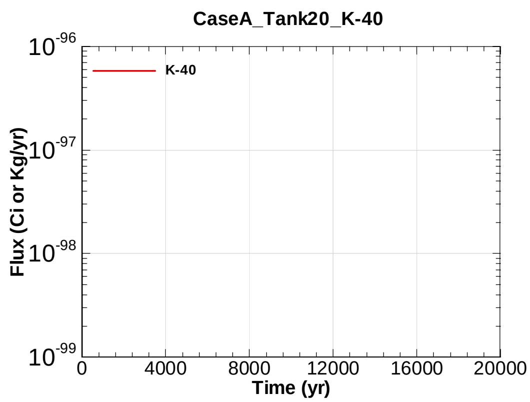

Figure A.1-1884 - Flux Leaving Liner for CaseA Tank20 K-40

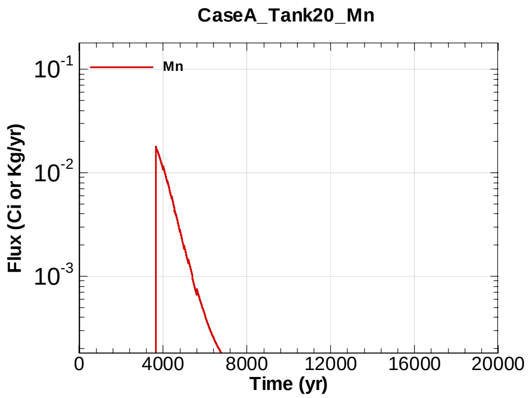

Figure A.1-1885 - Flux Leaving Liner for CaseA Tank20 Mn

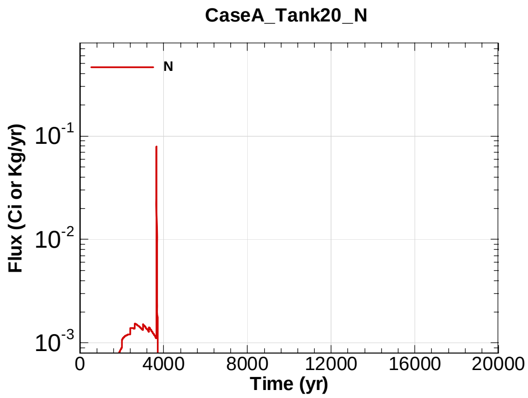

Figure A.1-1886 - Flux Leaving Liner for CaseA Tank20 N

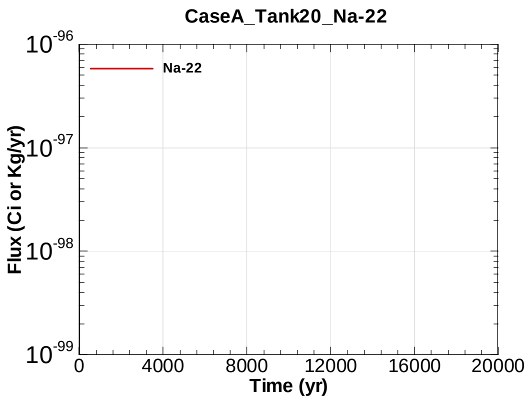

Figure A.1-1887 - Flux Leaving Liner for CaseA Tank20 Na-22

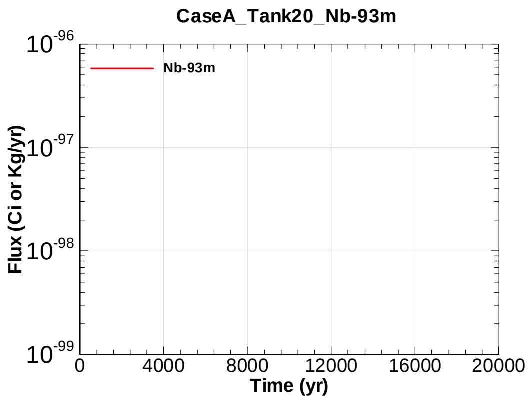

Figure A.1-1888 - Flux Leaving Liner for CaseA Tank20 Nb-93m

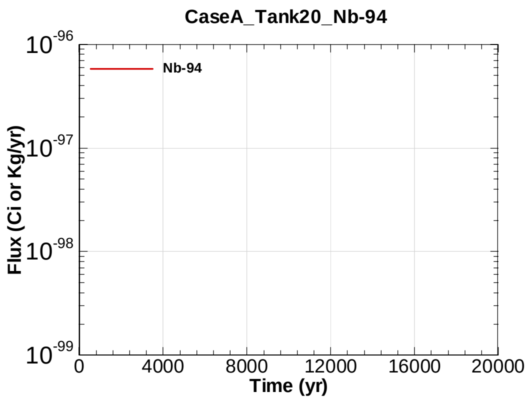

Figure A.1-1889 - Flux Leaving Liner for CaseA Tank20 Nb-94

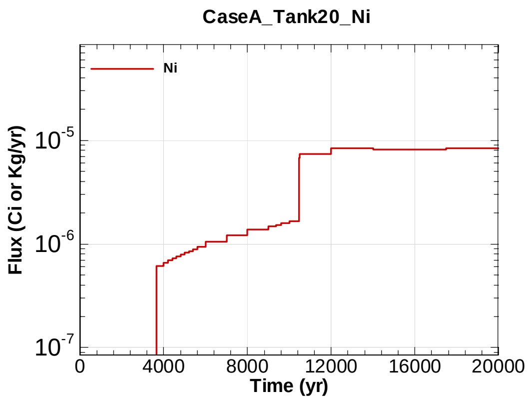

Figure A.1-1890 - Flux Leaving Liner for CaseA Tank20 Ni

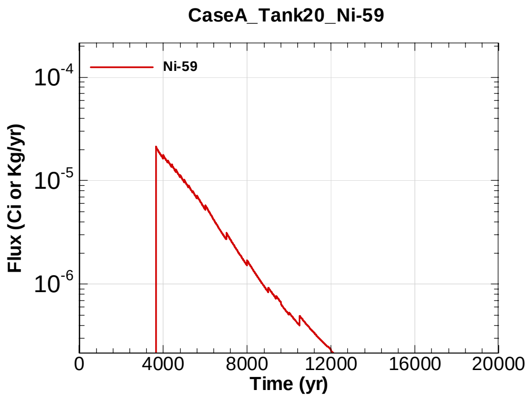

Figure A.1-1891 - Flux Leaving Liner for CaseA Tank20 Ni-59

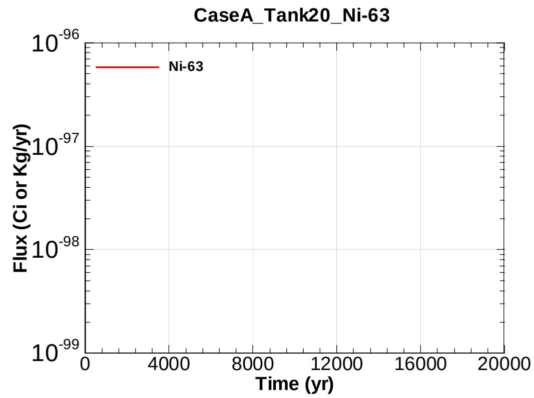

Figure A.1-1892 - Flux Leaving Liner for CaseA Tank20 Ni-63

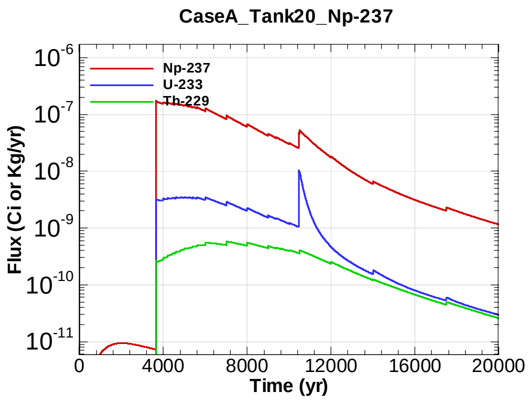

Figure A.1-1893 - Flux Leaving Liner for CaseA Tank20 Np-237

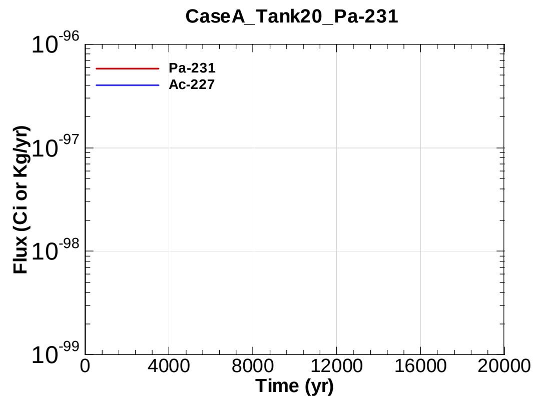

Figure A.1-1894 - Flux Leaving Liner for CaseA Tank20 Pa-231

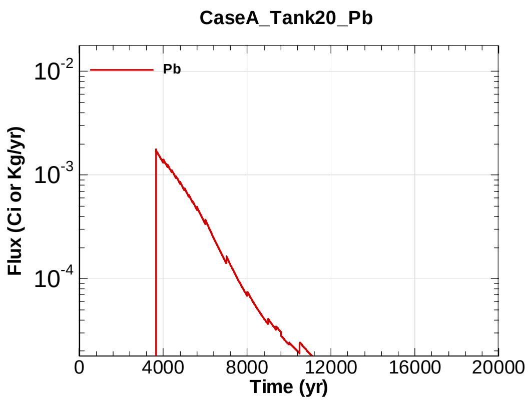

Figure A.1-1895 - Flux Leaving Liner for CaseA Tank20 Pb

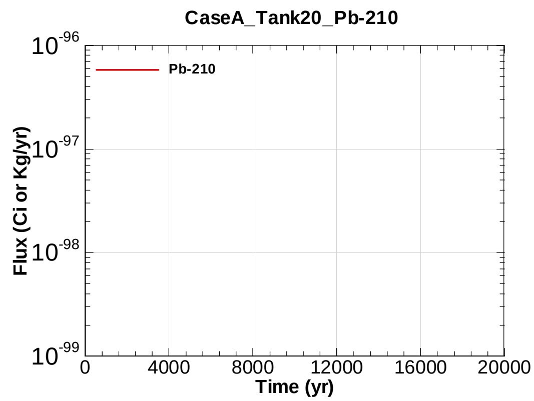

Figure A.1-1896 - Flux Leaving Liner for CaseA Tank20 Pb-210

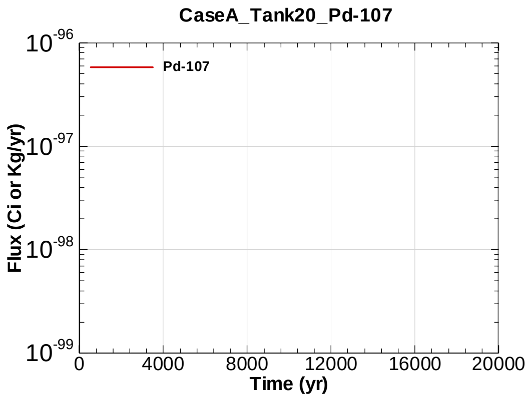

Figure A.1-1897 - Flux Leaving Liner for CaseA Tank20 Pd-107

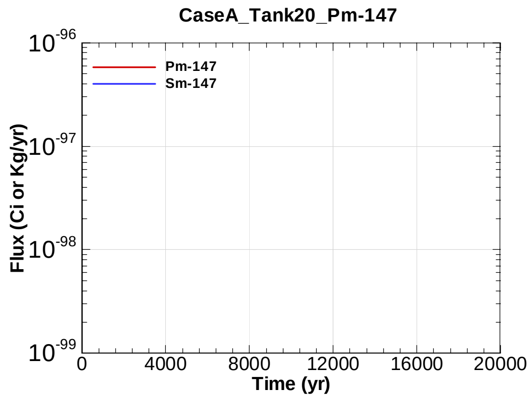

Figure A.1-1898 - Flux Leaving Liner for CaseA Tank20 Pm-147

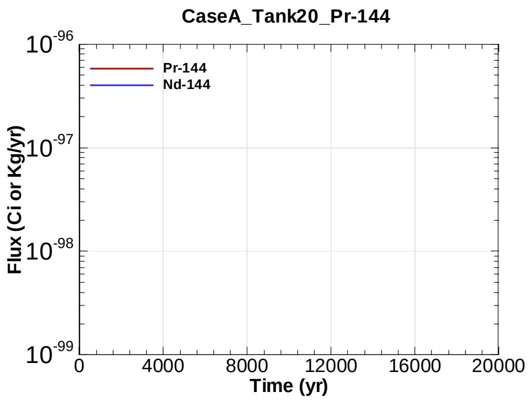

Figure A.1-1899 - Flux Leaving Liner for CaseA Tank20 Pr-144

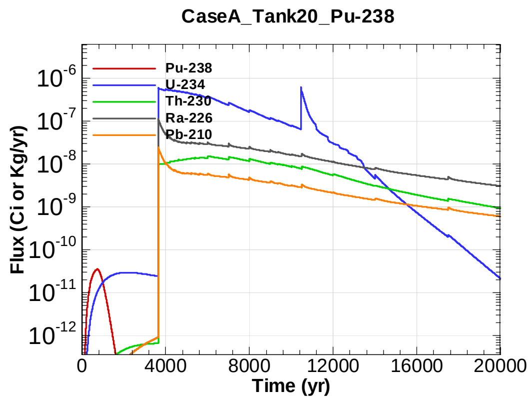

Figure A.1-1900 - Flux Leaving Liner for CaseA Tank20 Pu-238

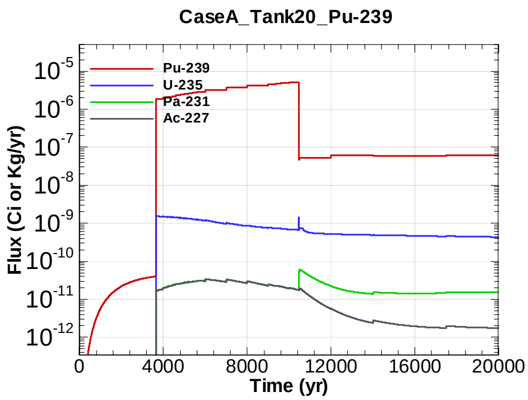

Figure A.1-1901 - Flux Leaving Liner for CaseA Tank20 Pu-239

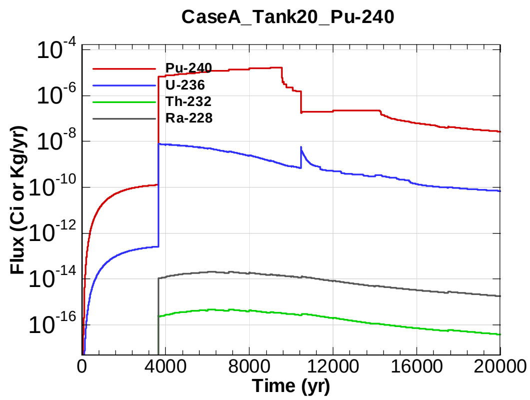

Figure A.1-1902 - Flux Leaving Liner for CaseA Tank20 Pu-240

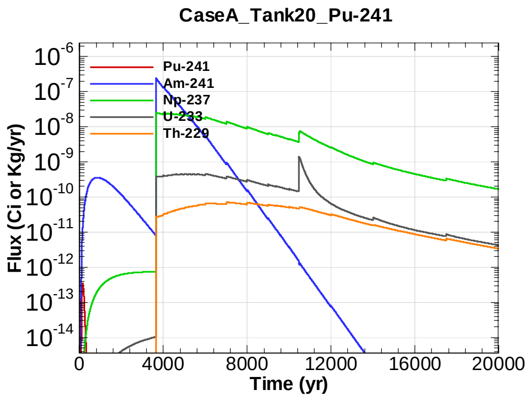

Figure A.1-1903 - Flux Leaving Liner for CaseA Tank20 Pu-241

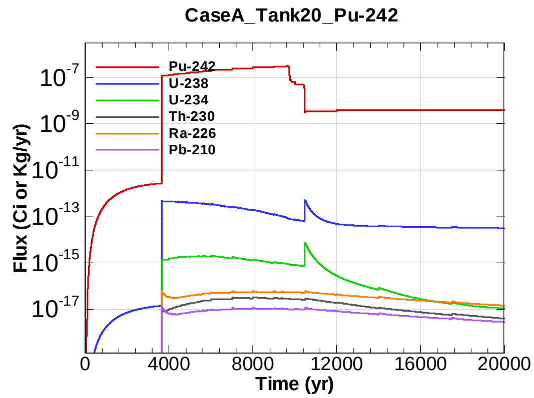

Figure A.1-1904 - Flux Leaving Liner for CaseA Tank20 Pu-242

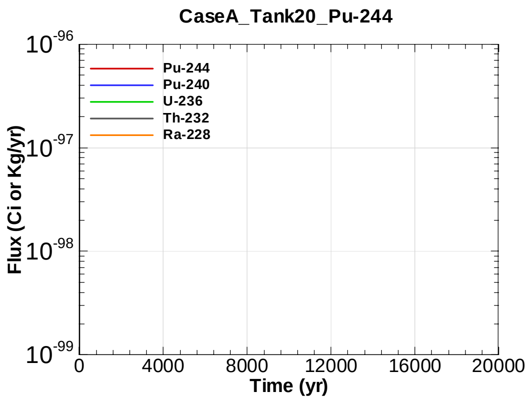

Figure A.1-1905 - Flux Leaving Liner for CaseA Tank20 Pu-244

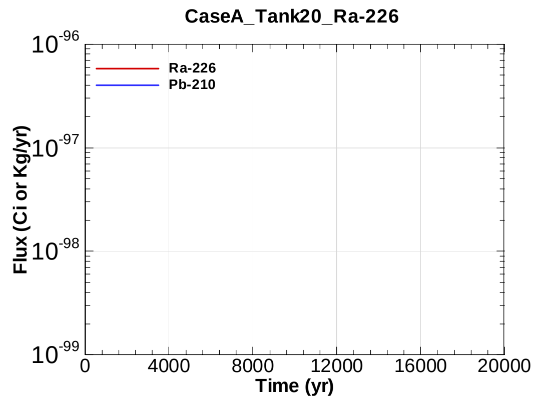

Figure A.1-1906 - Flux Leaving Liner for CaseA Tank20 Ra-226

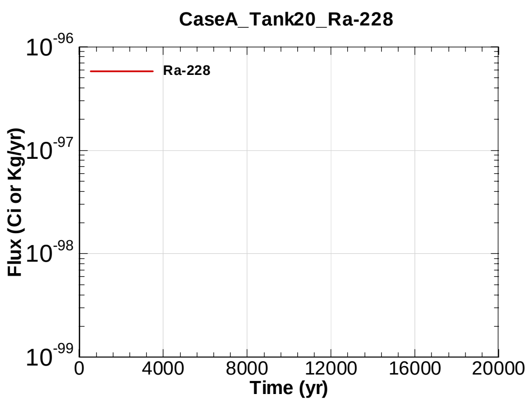

Figure A.1-1907 - Flux Leaving Liner for CaseA Tank20 Ra-228

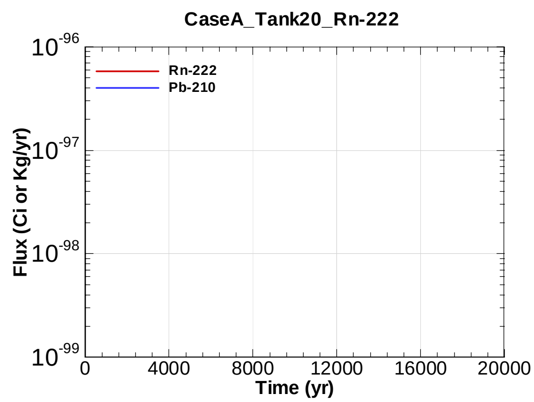

Figure A.1-1908 - Flux Leaving Liner for CaseA Tank20 Rn-222

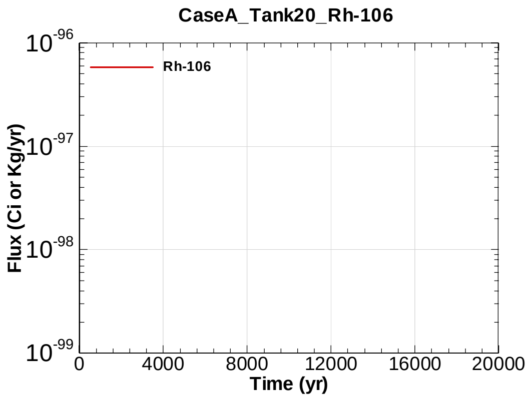

Figure A.1-1909 - Flux Leaving Liner for CaseA Tank20 Rh-106

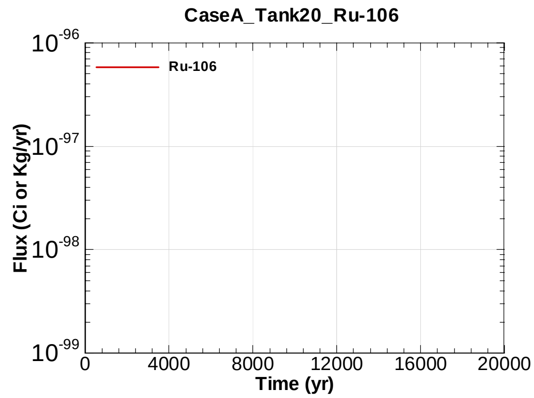

Figure A.1-1910 - Flux Leaving Liner for CaseA Tank20 Ru-106

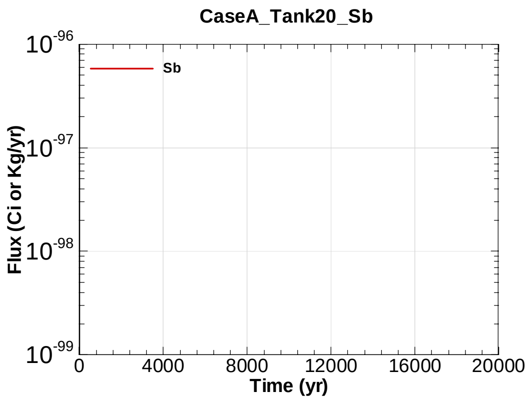

Figure A.1-1911 - Flux Leaving Liner for CaseA Tank20 Sb

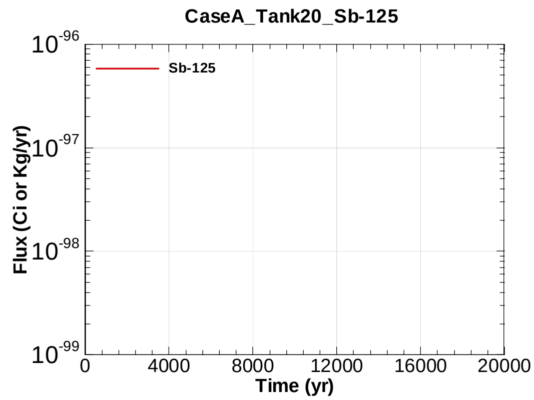

Figure A.1-1912 - Flux Leaving Liner for CaseA Tank20 Sb-125

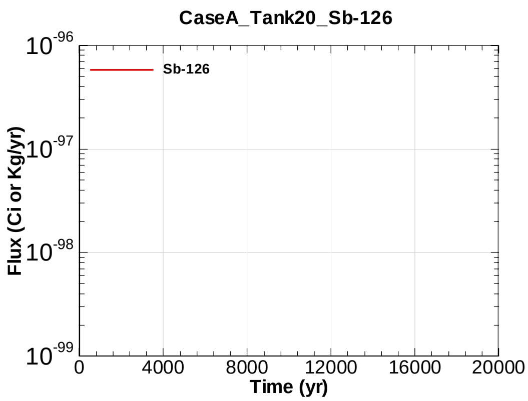

Figure A.1-1913 - Flux Leaving Liner for CaseA Tank20 Sb-126

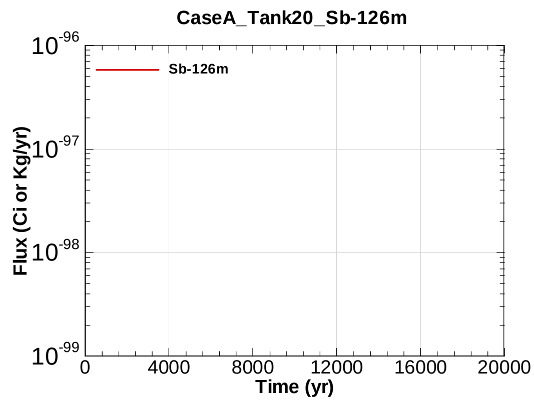

Figure A.1-1914 - Flux Leaving Liner for CaseA Tank20 Sb-126m

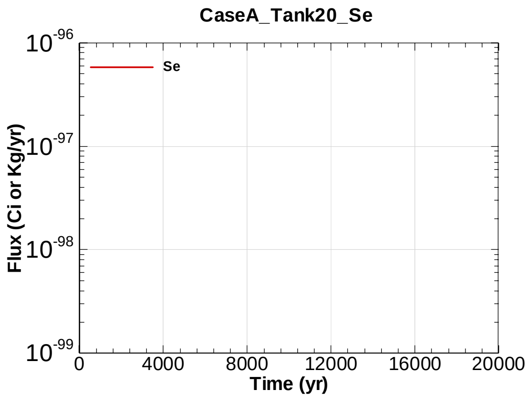

Figure A.1-1915 - Flux Leaving Liner for CaseA Tank20 Se

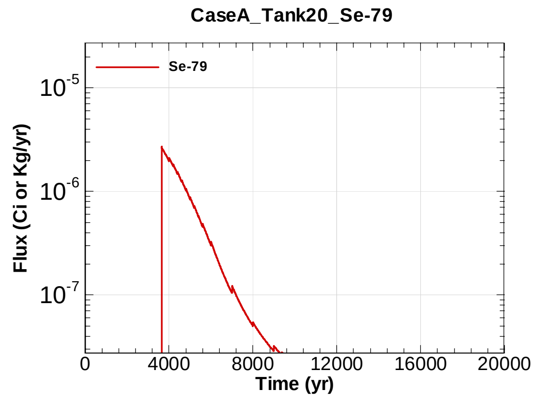

Figure A.1-1916 - Flux Leaving Liner for CaseA Tank20 Se-79

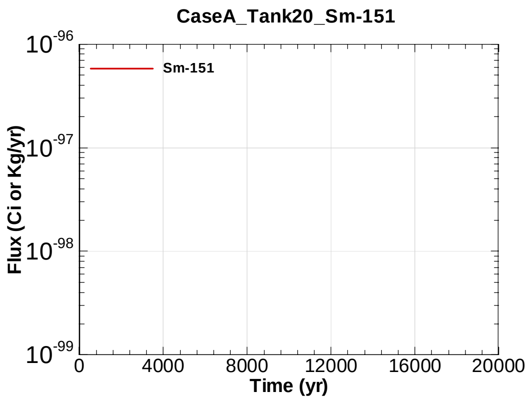

Figure A.1-1917 - Flux Leaving Liner for CaseA Tank20 Sm-151

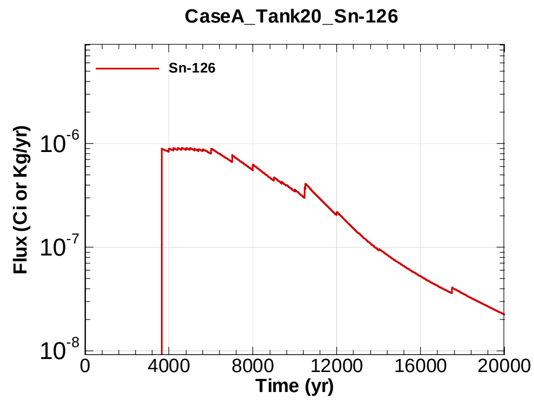

Figure A.1-1918 - Flux Leaving Liner for CaseA Tank20 Sn-126

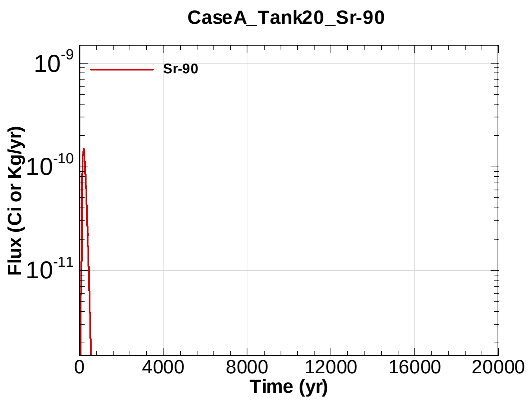

Figure A.1-1919 - Flux Leaving Liner for CaseA Tank20 Sr-90

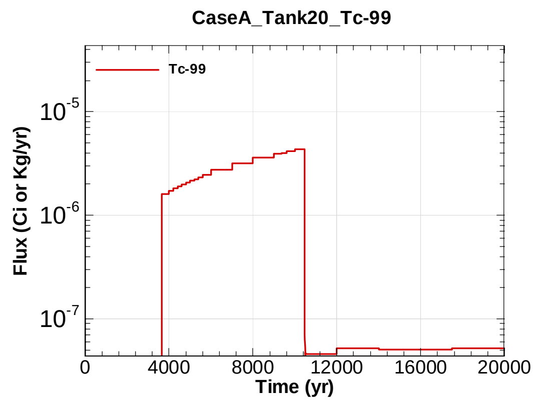

Figure A.1-1920 - Flux Leaving Liner for CaseA Tank20 Tc-99

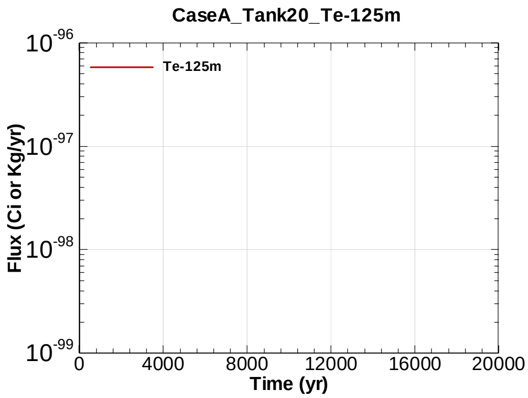

Figure A.1-1921 - Flux Leaving Liner for CaseA Tank20 Te-125m

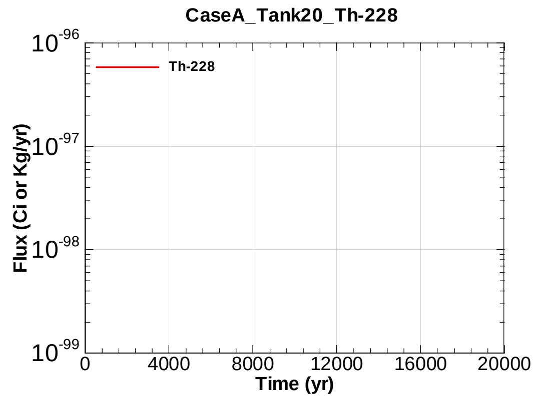

Figure A.1-1922 - Flux Leaving Liner for CaseA Tank20 Th-228

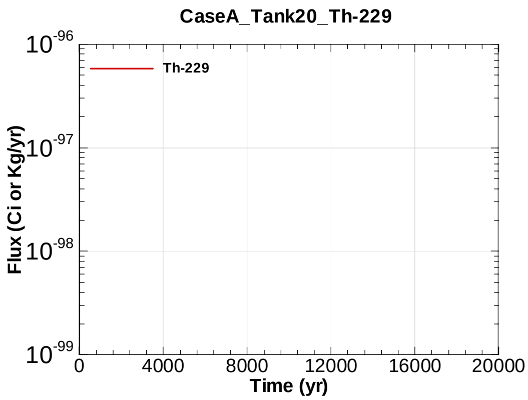

Figure A.1-1923 - Flux Leaving Liner for CaseA Tank20 Th-229

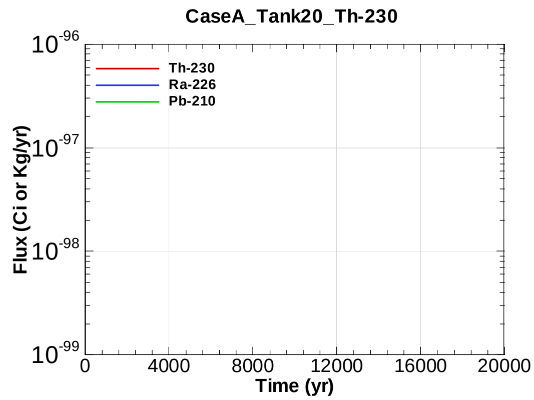

Figure A.1-1924 - Flux Leaving Liner for CaseA Tank20 Th-230

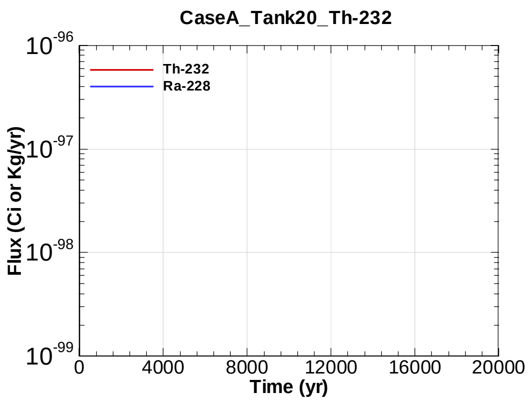

Figure A.1-1925 - Flux Leaving Liner for CaseA Tank20 Th-232

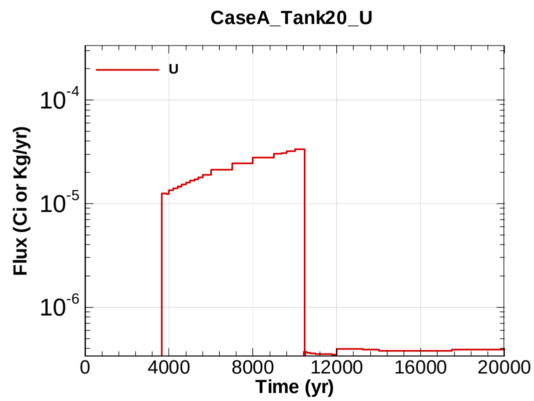

Figure A.1-1926 - Flux Leaving Liner for CaseA Tank20 U

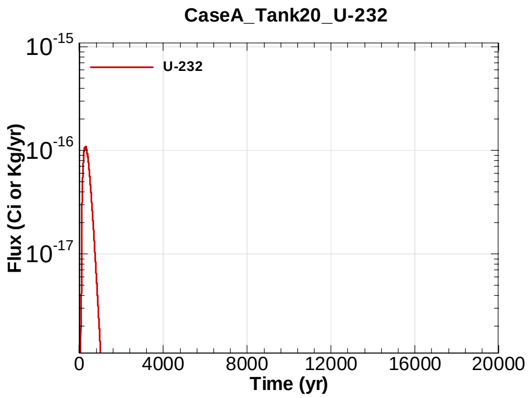

Figure A.1-1927 - Flux Leaving Liner for CaseA Tank20 U-232

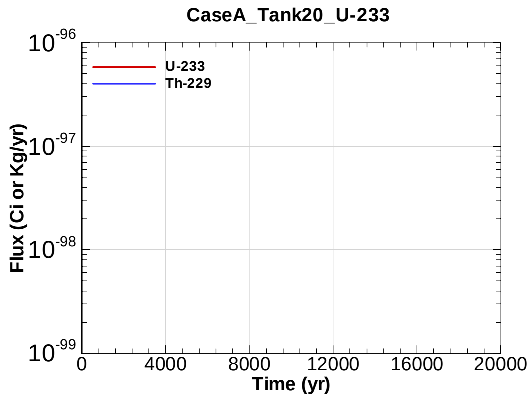

Figure A.1-1928 - Flux Leaving Liner for CaseA Tank20 U-233

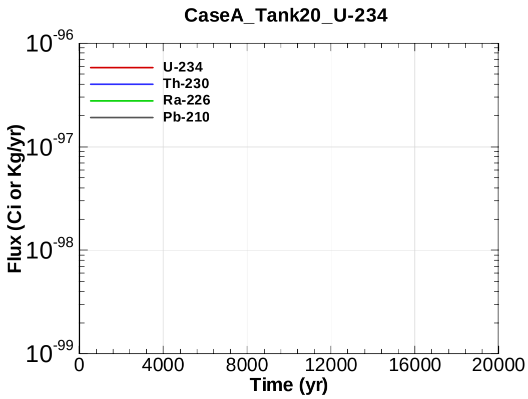

Figure A.1-1929 - Flux Leaving Liner for CaseA Tank20 U-234

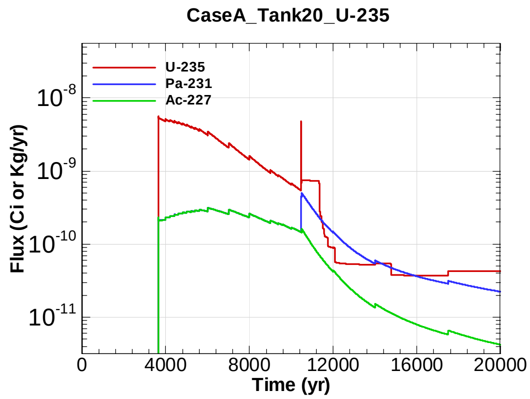

Figure A.1-1930 - Flux Leaving Liner for CaseA Tank20 U-235

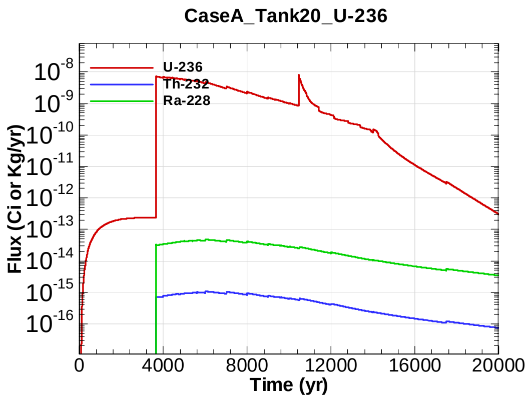

Figure A.1-1931 - Flux Leaving Liner for CaseA Tank20 U-236

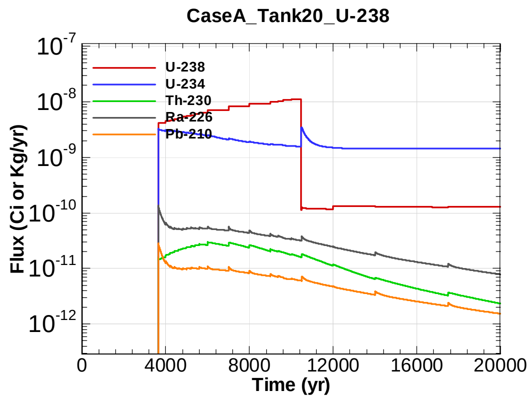

Figure A.1-1932 - Flux Leaving Liner for CaseA Tank20 U-238

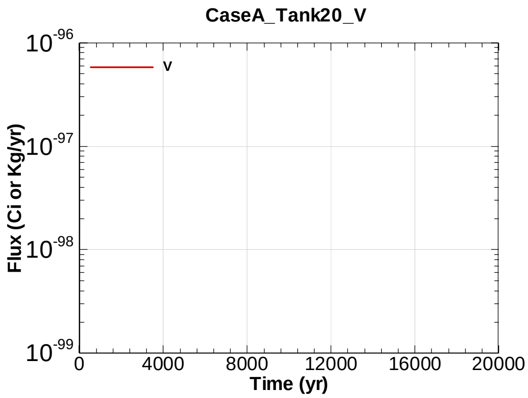

Figure A.1-1933 - Flux Leaving Liner for CaseA Tank20 V

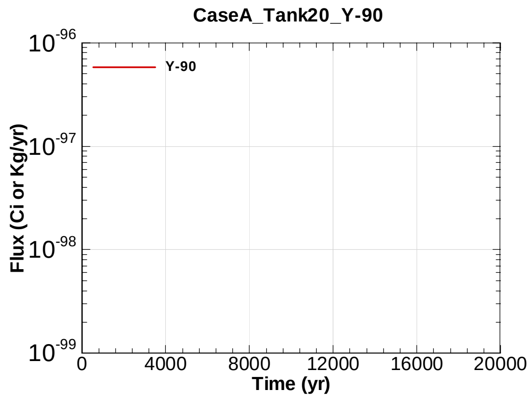

Figure A.1-1934 - Flux Leaving Liner for CaseA Tank20 Y-90

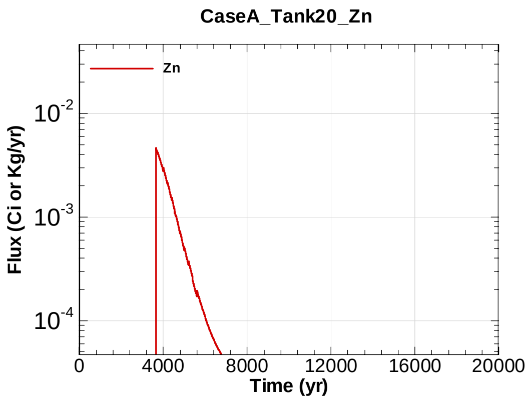

Figure A.1-1935 - Flux Leaving Liner for CaseA Tank20 Zn

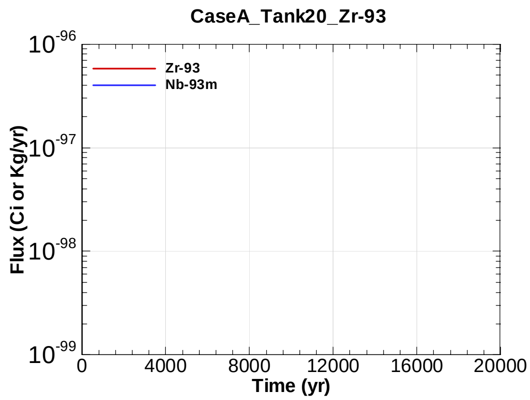

Figure A.1-1936 - Flux Leaving Liner for CaseA Tank20 Zr-93

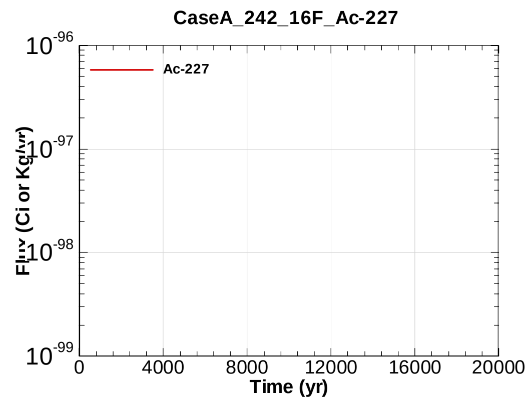

Figure A.1-1937 - Flux Leaving Liner for CaseA 242_16F Ac-227

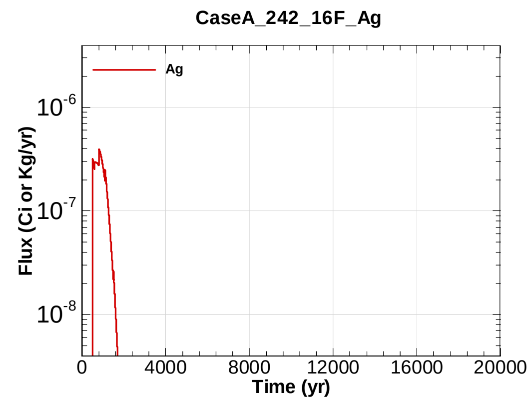

Figure A.1-1938 - Flux Leaving Liner for CaseA 242_16F Ag

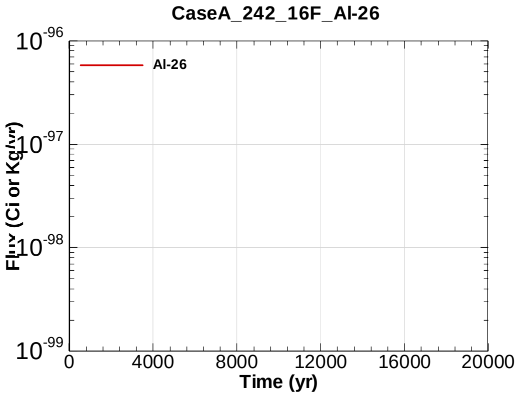

Figure A.1-1939 - Flux Leaving Liner for CaseA 242_16F Al-26

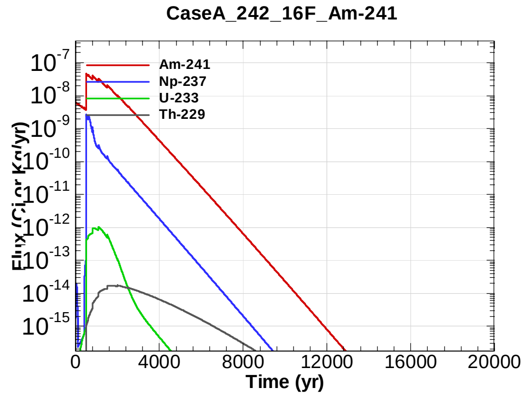

Figure A.1-1940 - Flux Leaving Liner for CaseA 242_16F Am-241

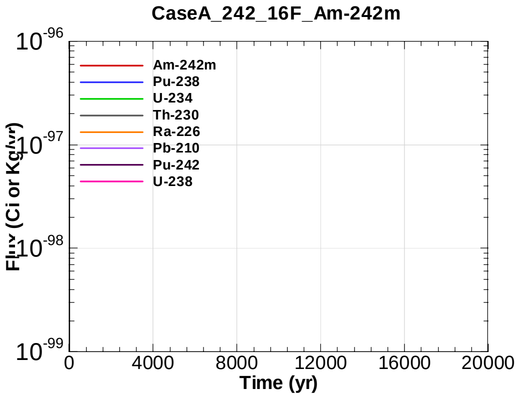

Figure A.1-1941 - Flux Leaving Liner for CaseA 242_16F Am-242m

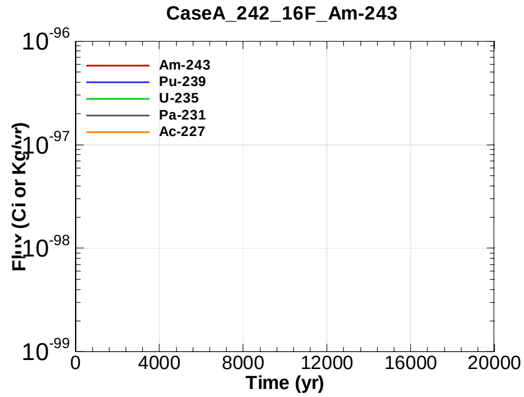

Figure A.1-1942 - Flux Leaving Liner for CaseA 242_16F Am-243

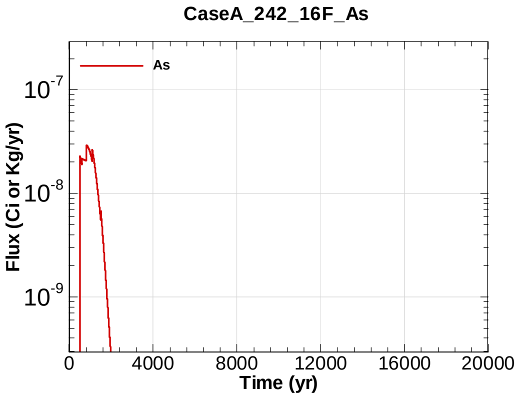

Figure A.1-1943 - Flux Leaving Liner for CaseA 242_16F As

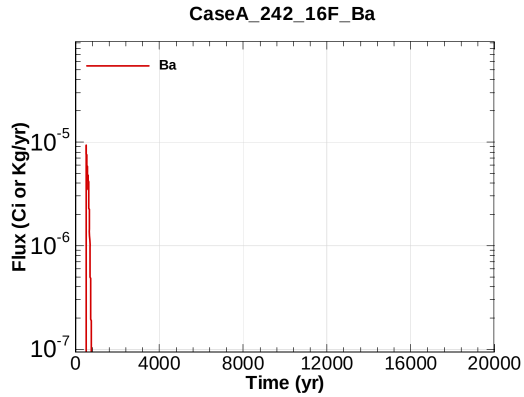

Figure A.1-1944 - Flux Leaving Liner for CaseA 242_16F Ba

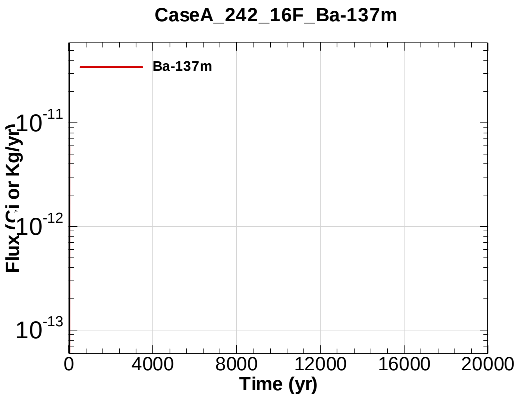

Figure A.1-1945 - Flux Leaving Liner for CaseA 242_16F Ba-137m

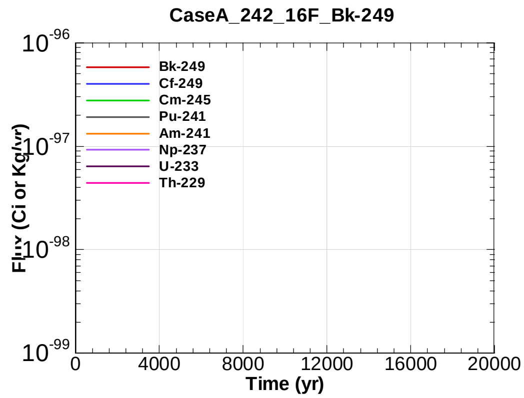

Figure A.1-1946 - Flux Leaving Liner for CaseA 242_16F Bk-249

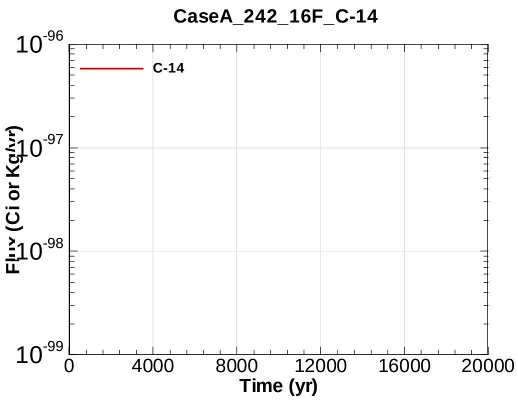

Figure A.1-1947 - Flux Leaving Liner for CaseA 242_16F C-14

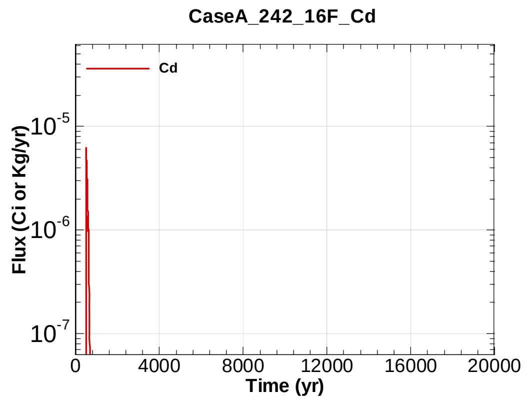

Figure A.1-1948 - Flux Leaving Liner for CaseA 242_16F Cd

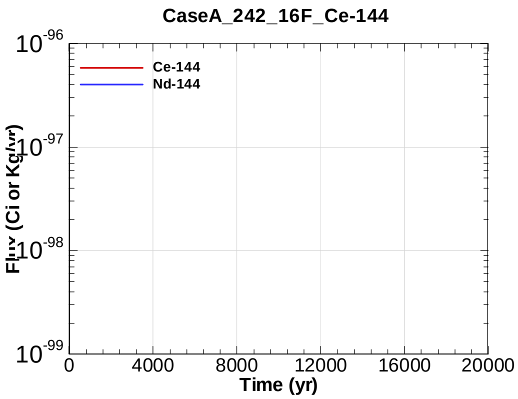

Figure A.1-1949 - Flux Leaving Liner for CaseA 242_16F Ce-144

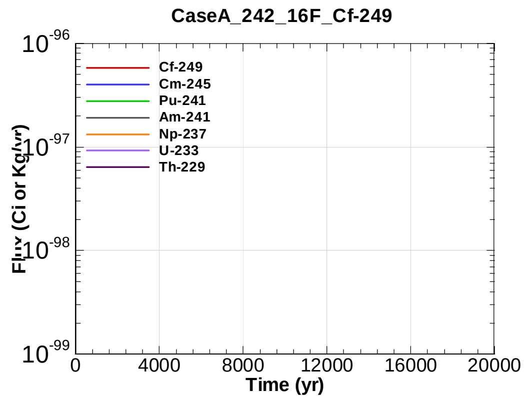

Figure A.1-1950 - Flux Leaving Liner for CaseA 242_16F Cf-249

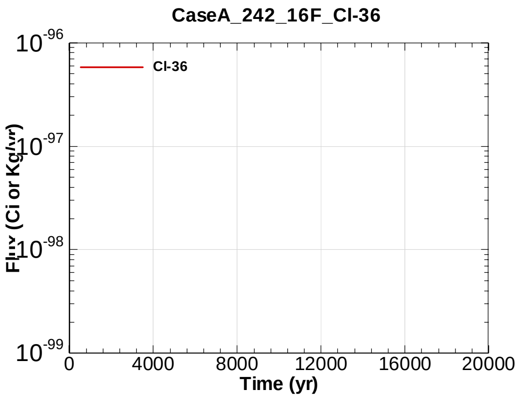

Figure A.1-1951 - Flux Leaving Liner for CaseA 242_16F Cl-36

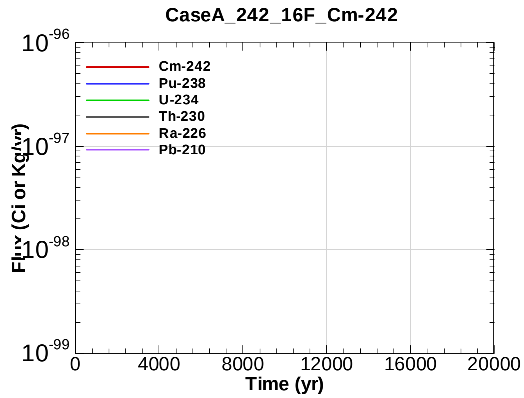

Figure A.1-1952 - Flux Leaving Liner for CaseA 242_16F Cm-242

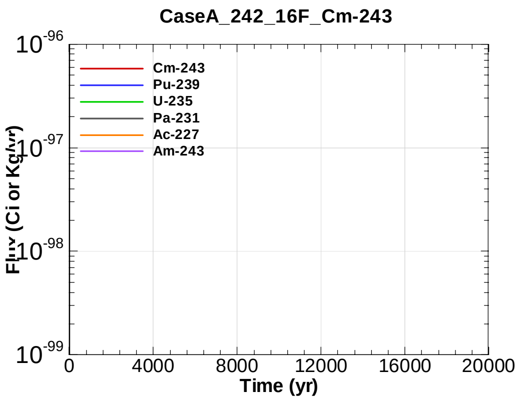

Figure A.1-1953 - Flux Leaving Liner for CaseA 242_16F Cm-243

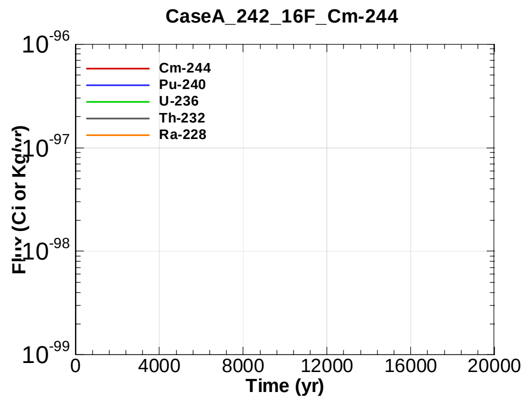

Figure A.1-1954 - Flux Leaving Liner for CaseA 242_16F Cm-244

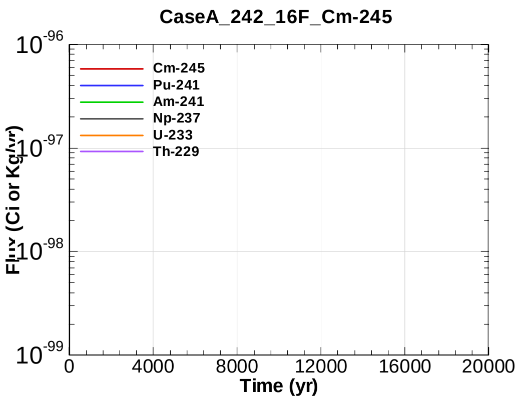

Figure A.1-1955 - Flux Leaving Liner for CaseA 242_16F Cm-245

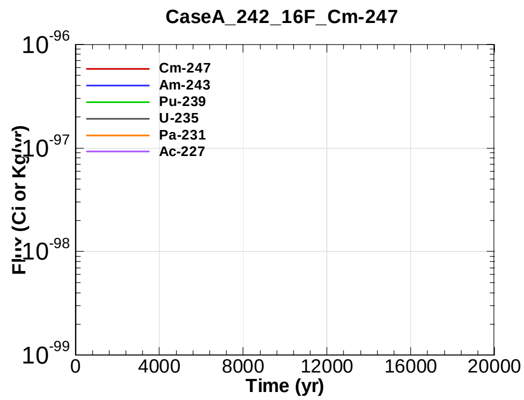

Figure A.1-1956 - Flux Leaving Liner for CaseA 242_16F Cm-247

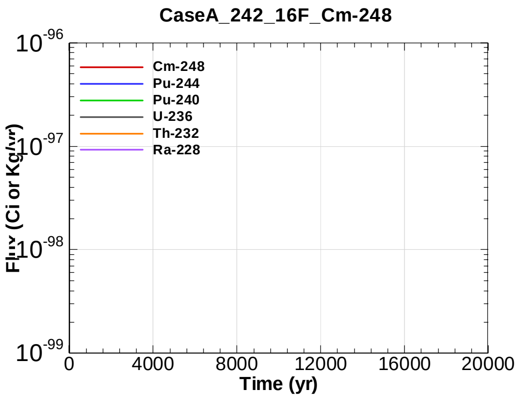

Figure A.1-1957 - Flux Leaving Liner for CaseA 242_16F Cm-248

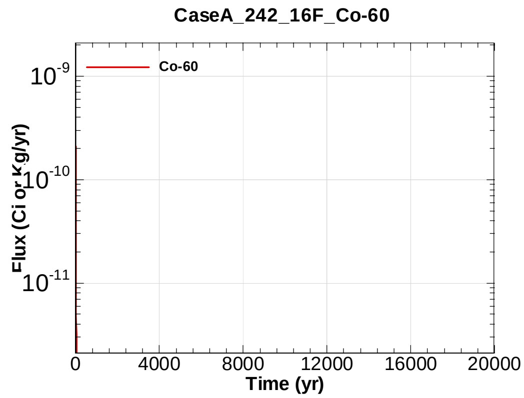

Figure A.1-1958 - Flux Leaving Liner for CaseA 242_16F Co-60

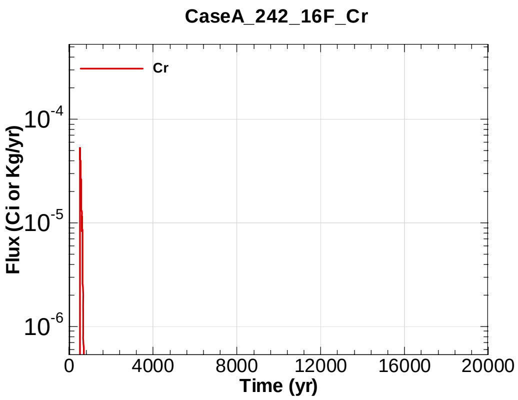

Figure A.1-1959 - Flux Leaving Liner for CaseA 242_16F Cr

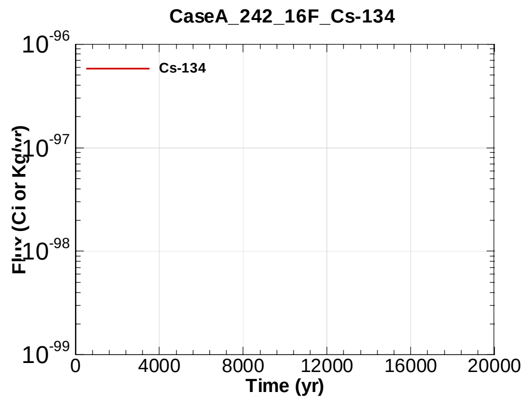

Figure A.1-1960 - Flux Leaving Liner for CaseA 242_16F Cs-134

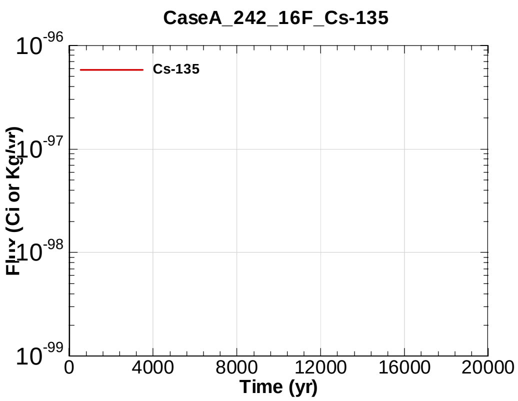

Figure A.1-1961 - Flux Leaving Liner for CaseA 242_16F Cs-135

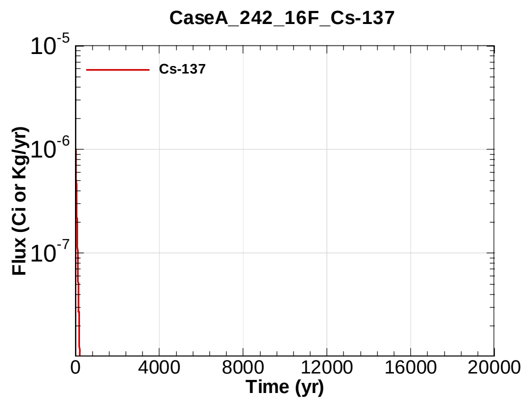

Figure A.1-1962 - Flux Leaving Liner for CaseA 242_16F Cs-137

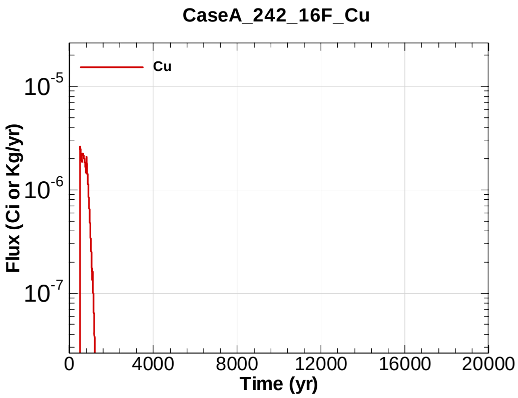

Figure A.1-1963 - Flux Leaving Liner for CaseA 242_16F Cu

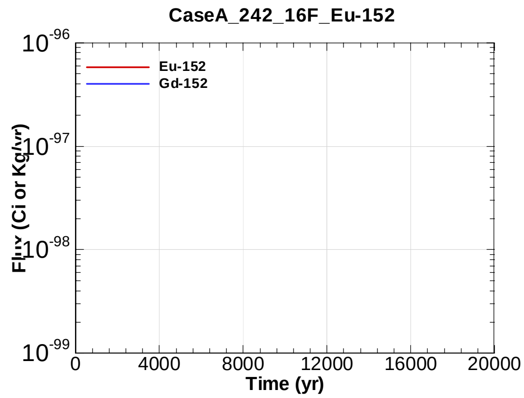

Figure A.1-1964 - Flux Leaving Liner for CaseA 242_16F Eu-152

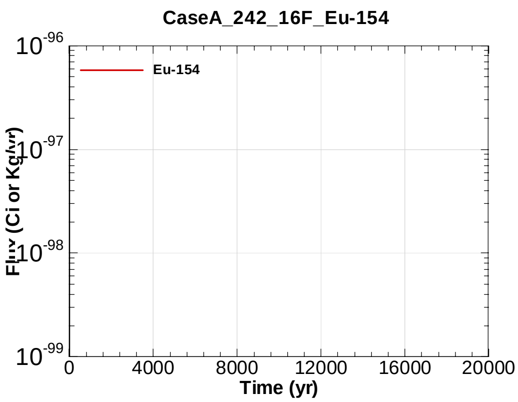

Figure A.1-1965 - Flux Leaving Liner for CaseA 242_16F Eu-154

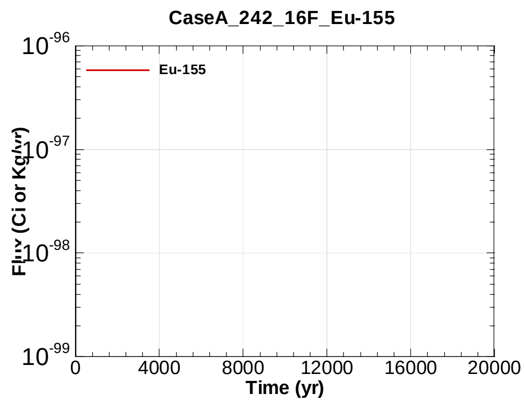

Figure A.1-1966 - Flux Leaving Liner for CaseA 242_16F Eu-155

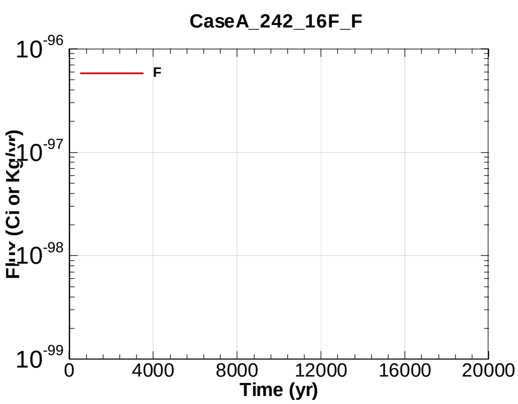

Figure A.1-1967 - Flux Leaving Liner for CaseA 242_16F F

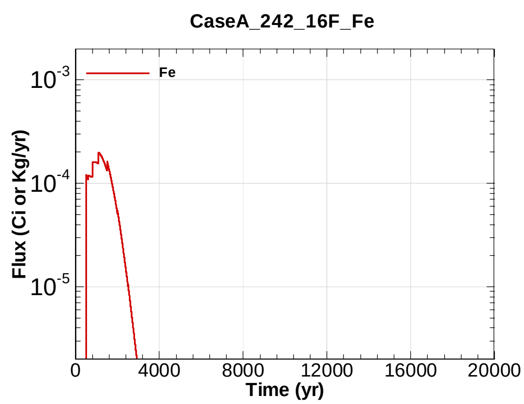

Figure A.1-1968 - Flux Leaving Liner for CaseA 242_16F Fe

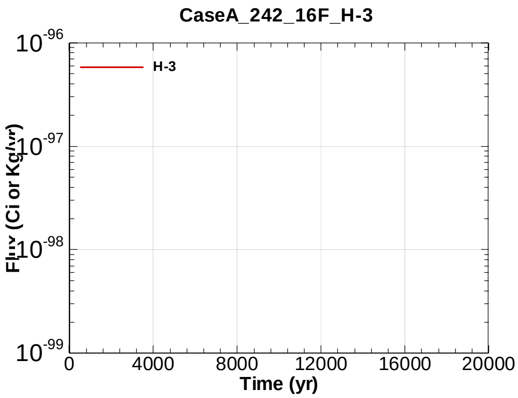

Figure A.1-1969 - Flux Leaving Liner for CaseA 242_16F H-3

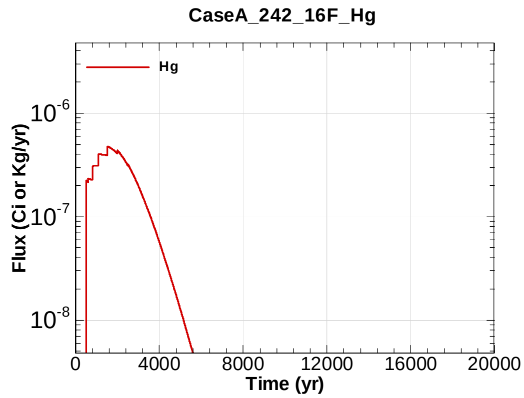

Figure A.1-1970 - Flux Leaving Liner for CaseA 242_16F Hg

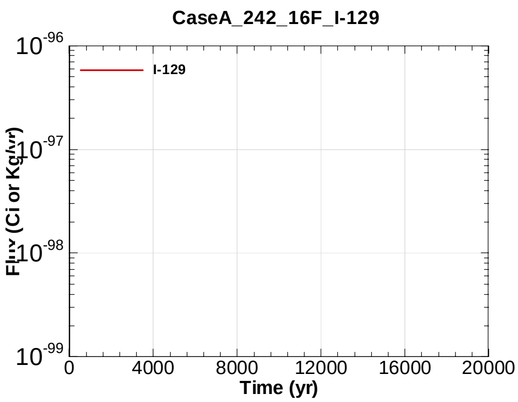

Figure A.1-1971 - Flux Leaving Liner for CaseA 242_16F I-129

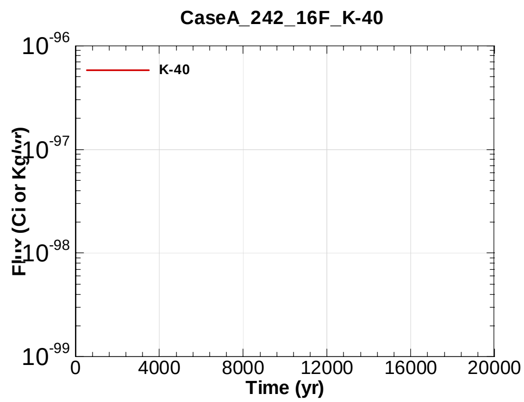

Figure A.1-1972 - Flux Leaving Liner for CaseA 242_16F K-40

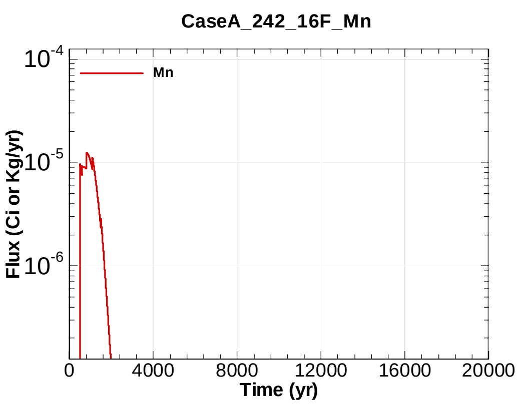

Figure A.1-1973 - Flux Leaving Liner for CaseA 242_16F Mn

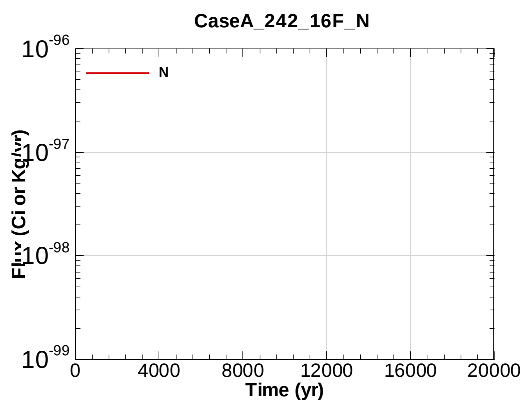

Figure A.1-1974 - Flux Leaving Liner for CaseA 242_16F N

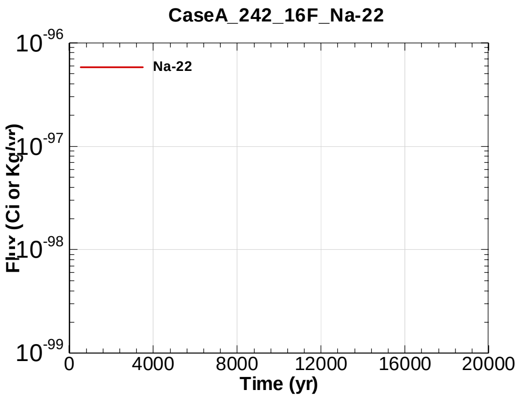

Figure A.1-1975 - Flux Leaving Liner for CaseA 242_16F Na-22

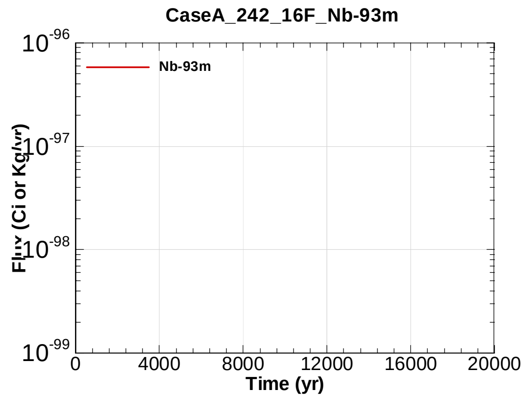

Figure A.1-1976 - Flux Leaving Liner for CaseA 242_16F Nb-93m

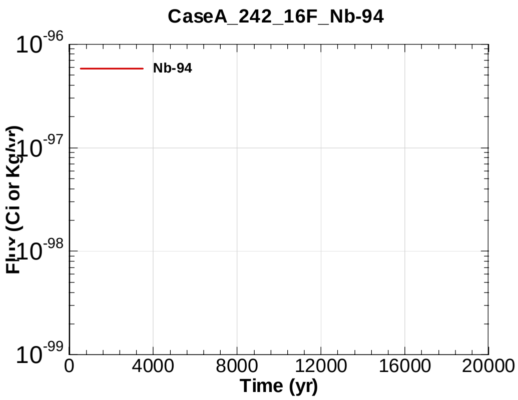

Figure A.1-1977 - Flux Leaving Liner for CaseA 242_16F Nb-94

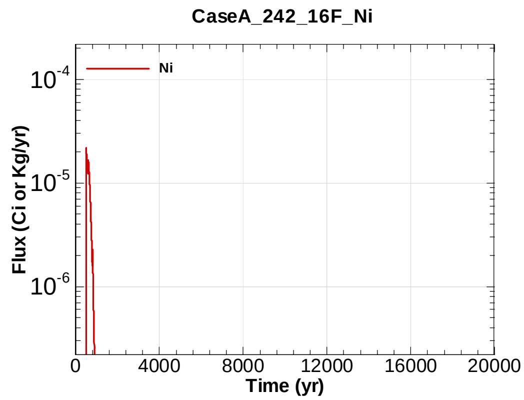

Figure A.1-1978 - Flux Leaving Liner for CaseA 242_16F Ni

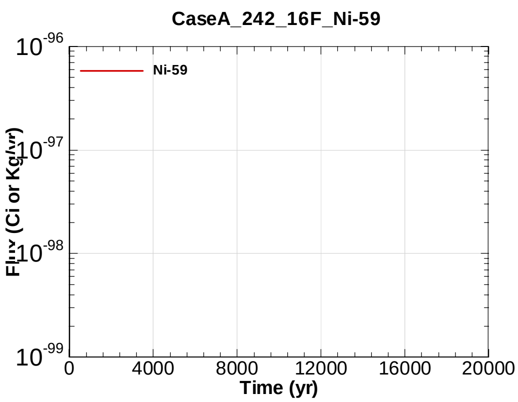

Figure A.1-1979 - Flux Leaving Liner for CaseA 242_16F Ni-59

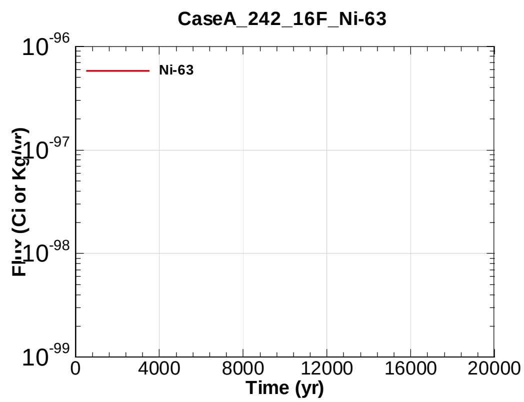

Figure A.1-1980 - Flux Leaving Liner for CaseA 242_16F Ni-63

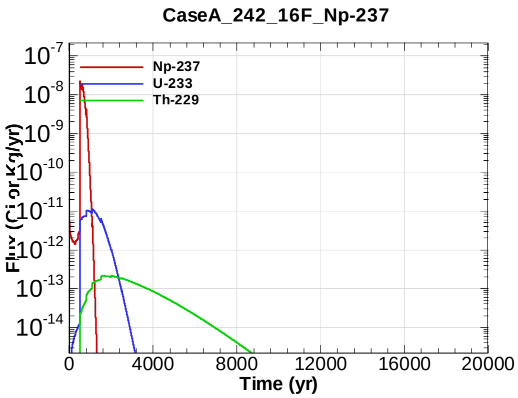

Figure A.1-1981 - Flux Leaving Liner for CaseA 242_16F Np-237

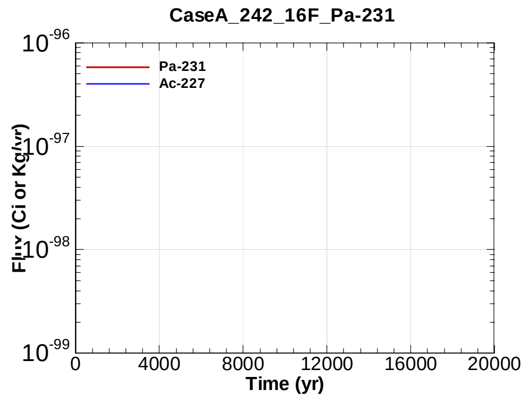

Figure A.1-1982 - Flux Leaving Liner for CaseA 242_16F Pa-231

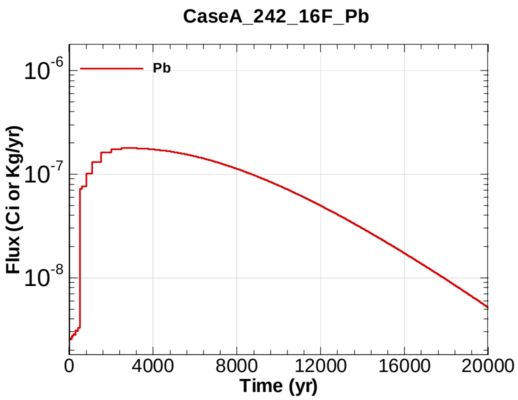

Figure A.1-1983 - Flux Leaving Liner for CaseA 242_16F Pb

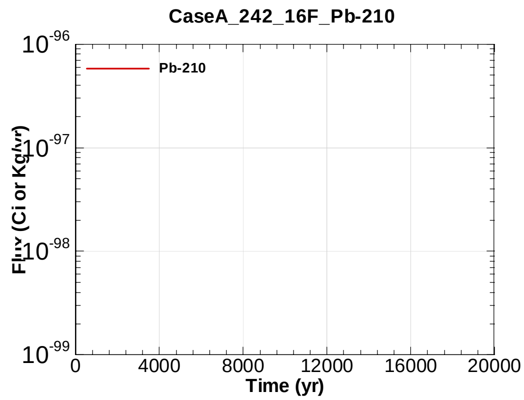

Figure A.1-1984 - Flux Leaving Liner for CaseA 242_16F Pb-210

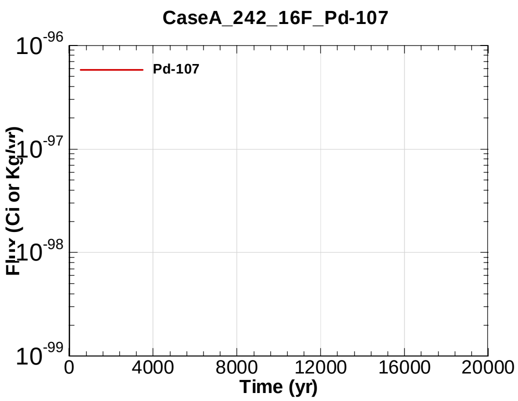

Figure A.1-1985 - Flux Leaving Liner for CaseA 242_16F Pd-107

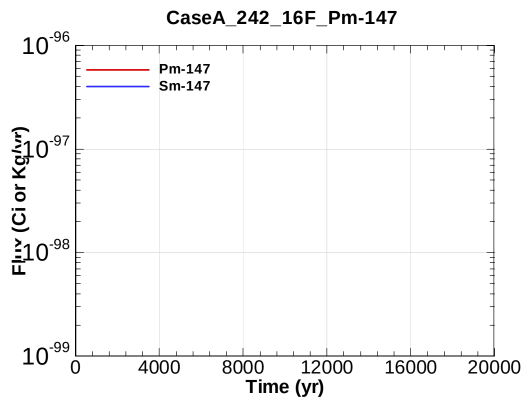

Figure A.1-1986 - Flux Leaving Liner for CaseA 242_16F Pm-147

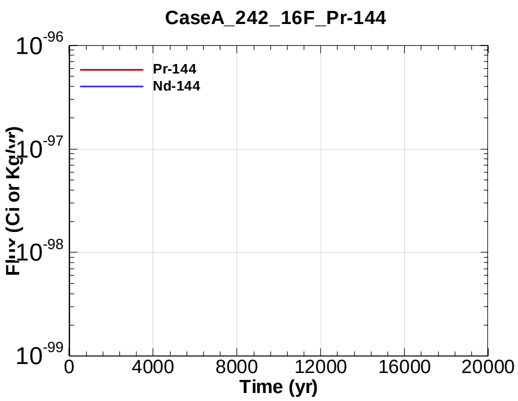

Figure A.1-1987 - Flux Leaving Liner for CaseA 242_16F Pr-144

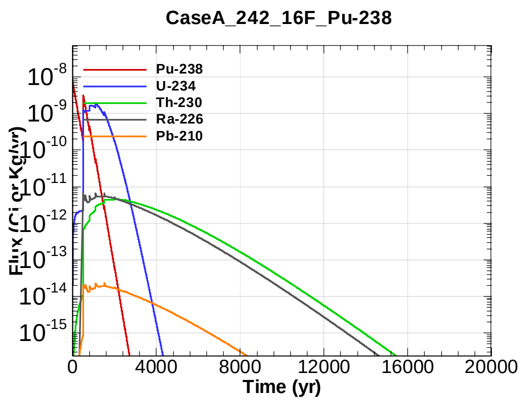

Figure A.1-1988 - Flux Leaving Liner for CaseA 242_16F Pu-238

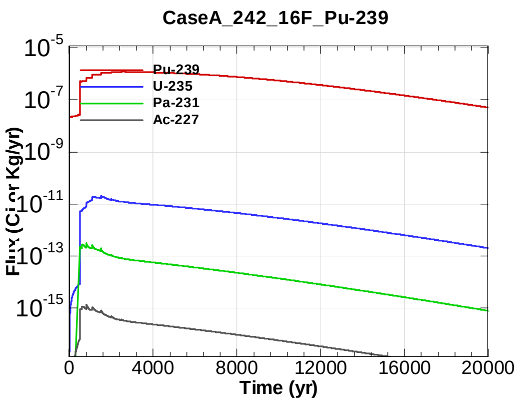

Figure A.1-1989 - Flux Leaving Liner for CaseA 242_16F Pu-239

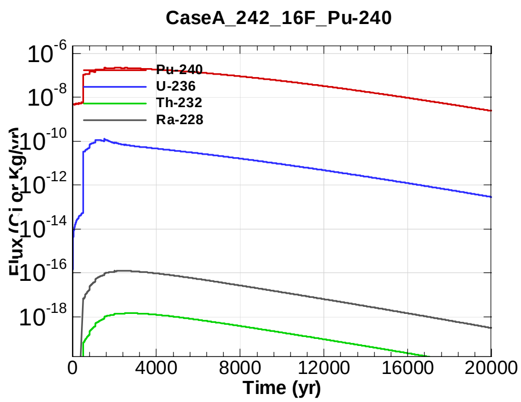

Figure A.1-1990 - Flux Leaving Liner for CaseA 242_16F Pu-240

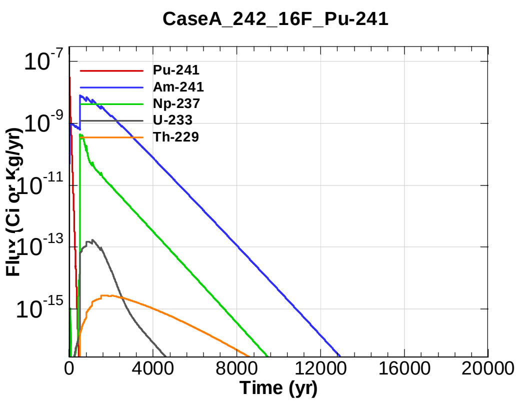

Figure A.1-1991 - Flux Leaving Liner for CaseA 242_16F Pu-241

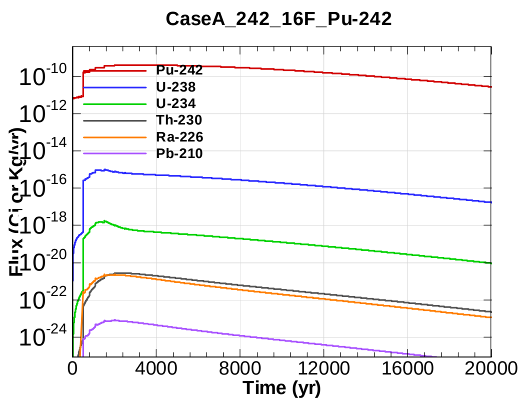

Figure A.1-1992 - Flux Leaving Liner for CaseA 242_16F Pu-242

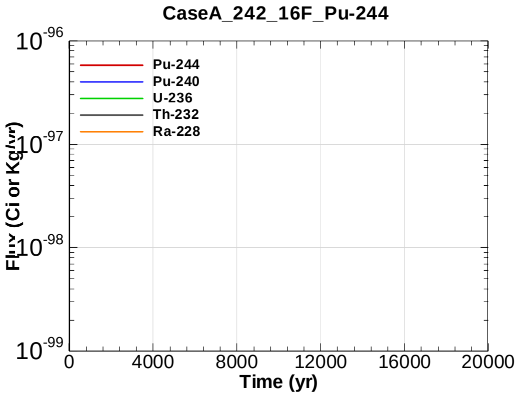

Figure A.1-1993 - Flux Leaving Liner for CaseA 242_16F Pu-244

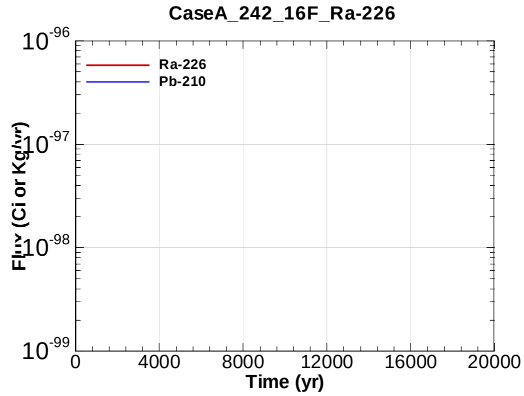

Figure A.1-1994 - Flux Leaving Liner for CaseA 242_16F Ra-226

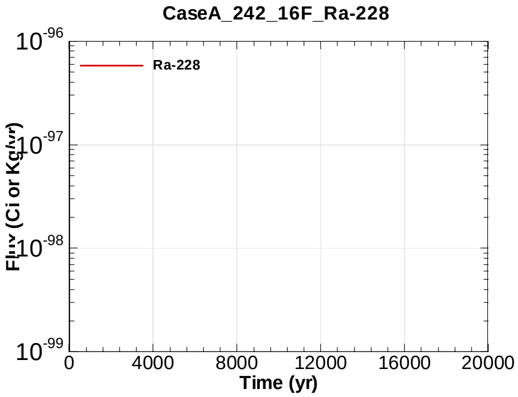

Figure A.1-1995 - Flux Leaving Liner for CaseA 242_16F Ra-228

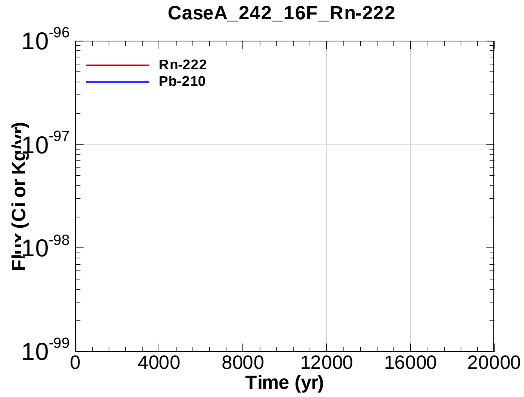

Figure A.1-1996 - Flux Leaving Liner for CaseA 242_16F Rn-222

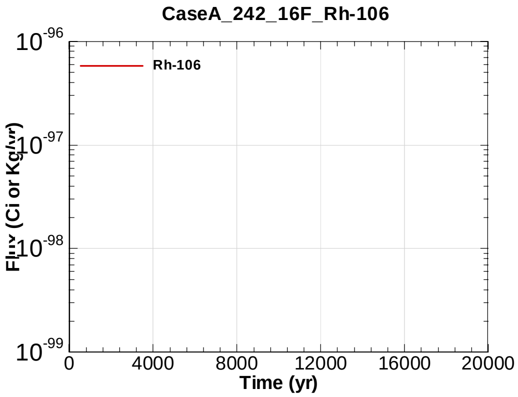

Figure A.1-1997 - Flux Leaving Liner for CaseA 242_16F Rh-106

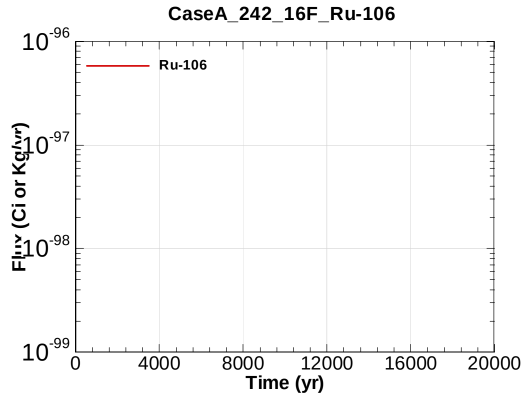

Figure A.1-1998 - Flux Leaving Liner for CaseA 242_16F Ru-106

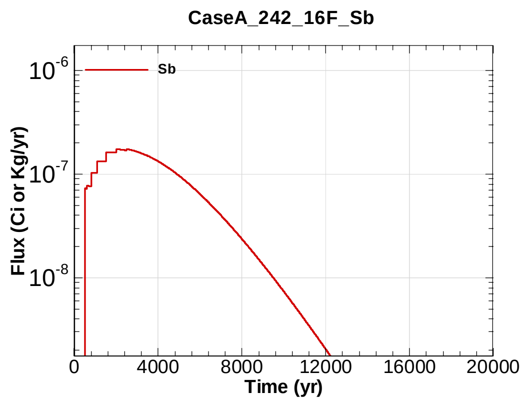

Figure A.1-1999 - Flux Leaving Liner for CaseA 242_16F Sb

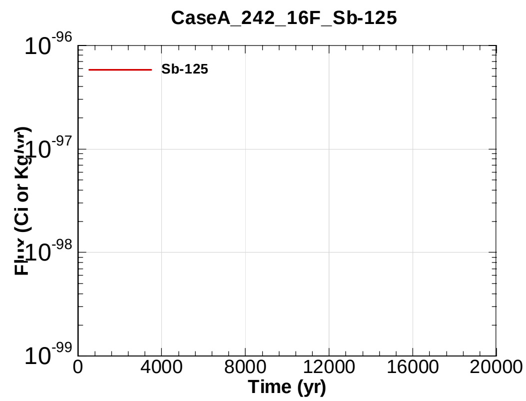

Figure A.1-2000 - Flux Leaving Liner for CaseA 242_16F Sb-125

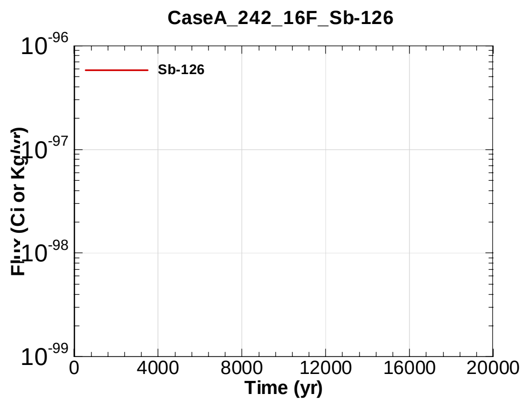

Figure A.1-2001 - Flux Leaving Liner for CaseA 242_16F Sb-126

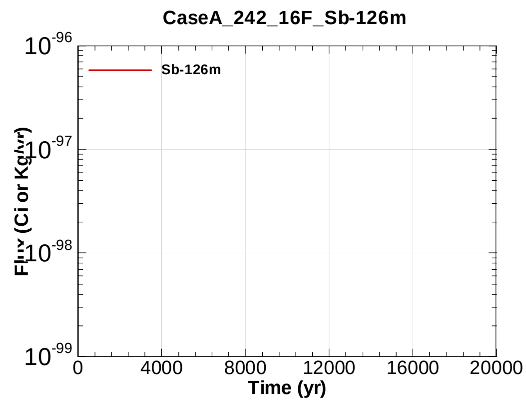

Figure A.1-2002 - Flux Leaving Liner for CaseA 242_16F Sb-126m

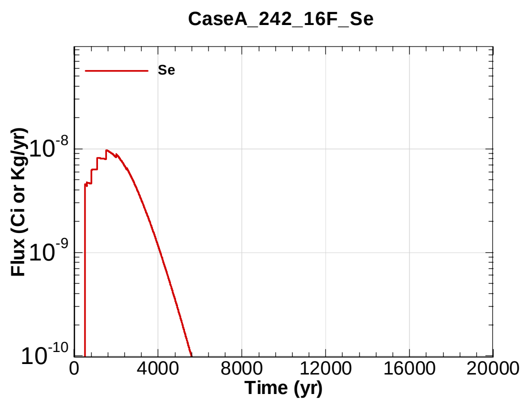

Figure A.1-2003 - Flux Leaving Liner for CaseA 242_16F Se

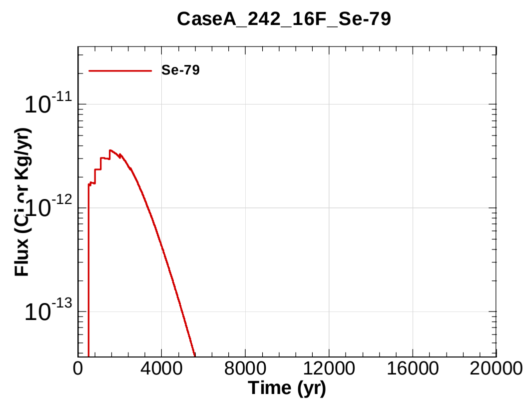

Figure A.1-2004 - Flux Leaving Liner for CaseA 242_16F Se-79

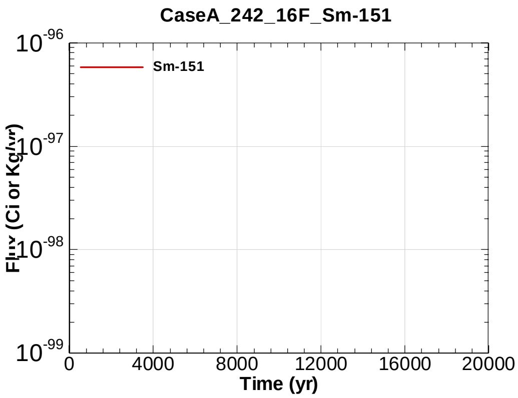

Figure A.1-2005 - Flux Leaving Liner for CaseA 242_16F Sm-151

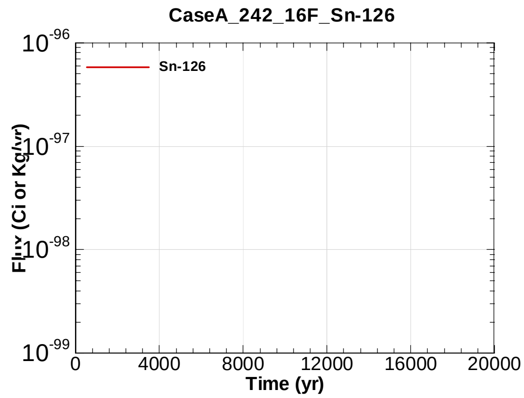

Figure A.1-2006 - Flux Leaving Liner for CaseA 242_16F Sn-126

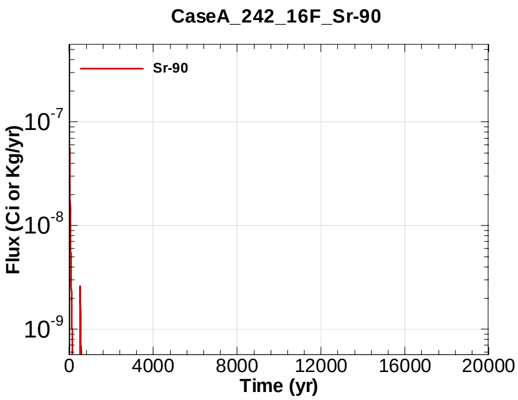

Figure A.1-2007 - Flux Leaving Liner for CaseA 242_16F Sr-90

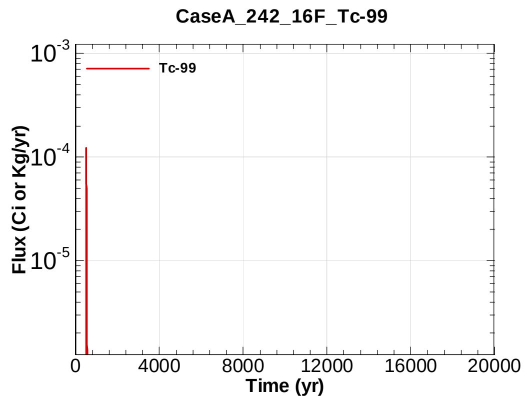

Figure A.1-2008 - Flux Leaving Liner for CaseA 242_16F Tc-99

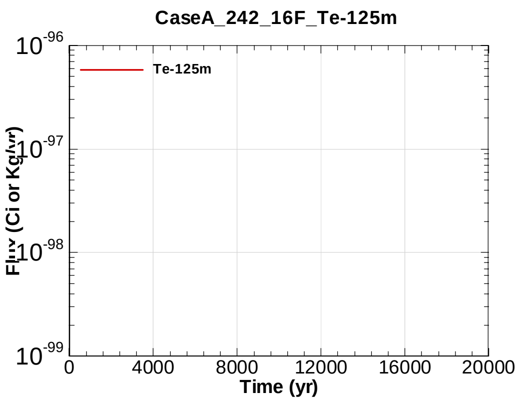

Figure A.1-2009 - Flux Leaving Liner for CaseA 242_16F Te-125m

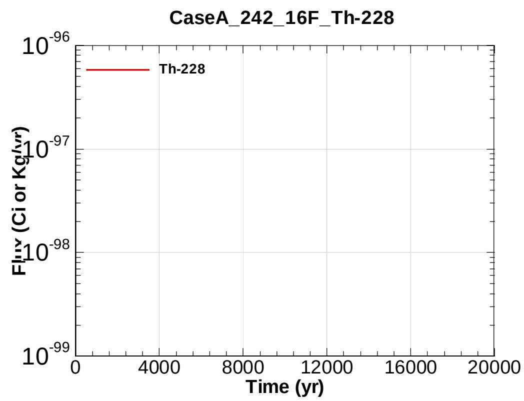

Figure A.1-2010 - Flux Leaving Liner for CaseA 242_16F Th-228

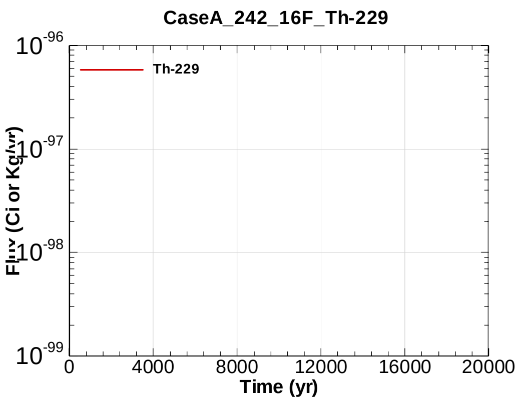

Figure A.1-2011 - Flux Leaving Liner for CaseA 242_16F Th-229

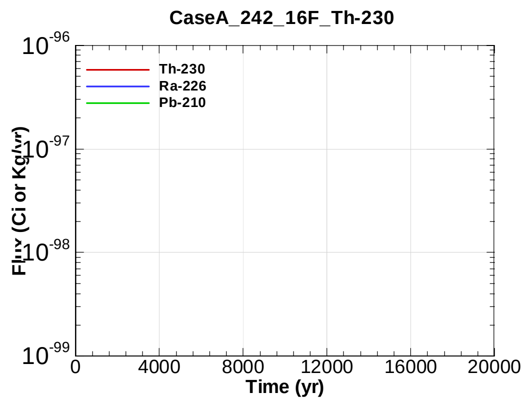

Figure A.1-2012 - Flux Leaving Liner for CaseA 242_16F Th-230

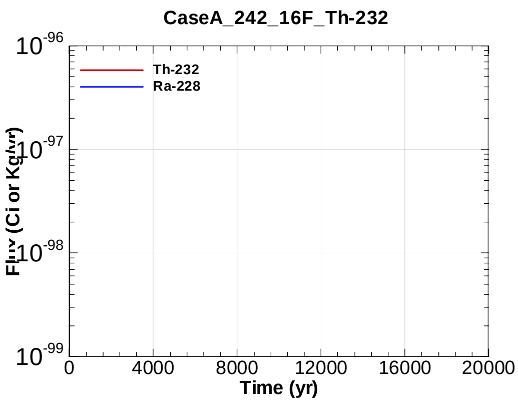

Figure A.1-2013 - Flux Leaving Liner for CaseA 242_16F Th-232

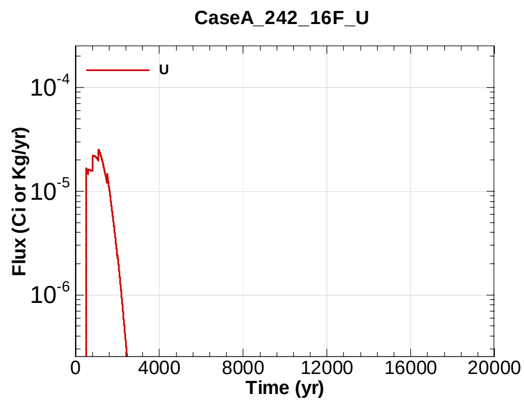

Figure A.1-2014 - Flux Leaving Liner for CaseA 242_16F U

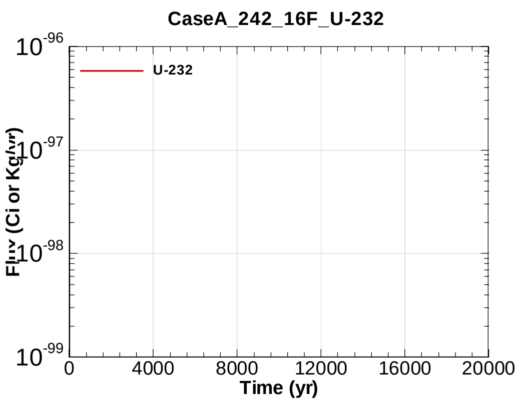

Figure A.1-2015 - Flux Leaving Liner for CaseA 242_16F U-232

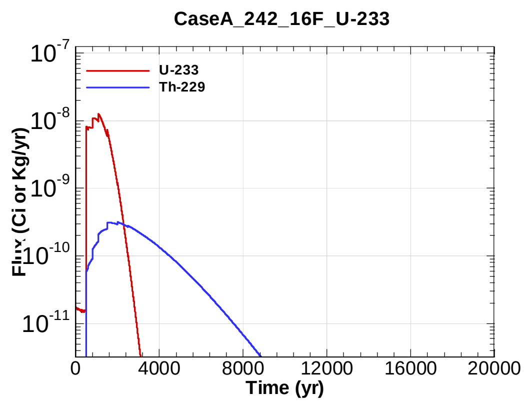

Figure A.1-2016 - Flux Leaving Liner for CaseA 242_16F U-233

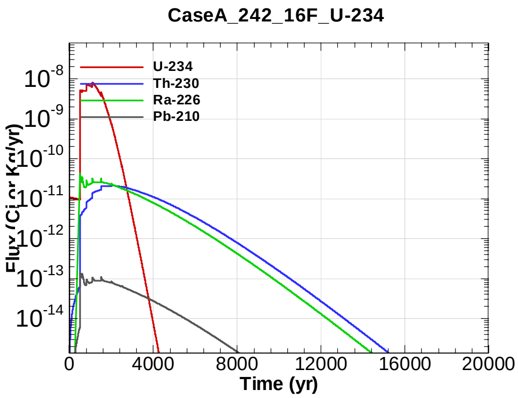

Figure A.1-2017 - Flux Leaving Liner for CaseA 242_16F U-234

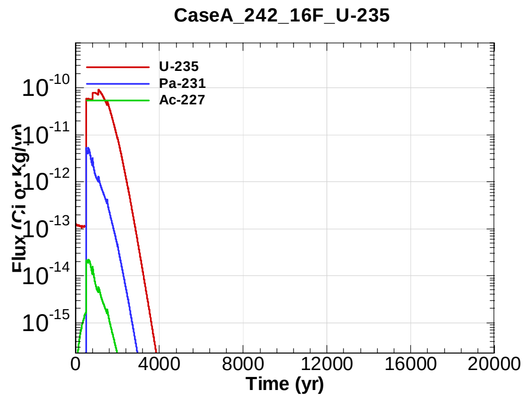

Figure A.1-2018 - Flux Leaving Liner for CaseA 242_16F U-235

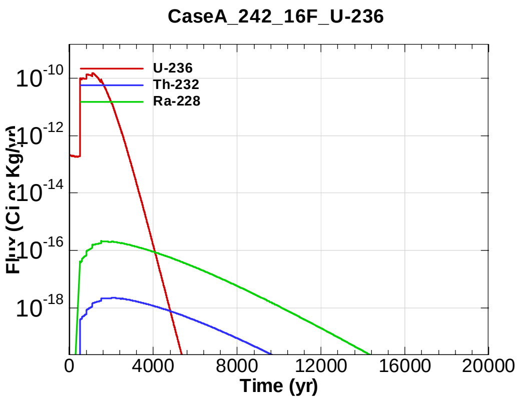

Figure A.1-2019 - Flux Leaving Liner for CaseA 242_16F U-236

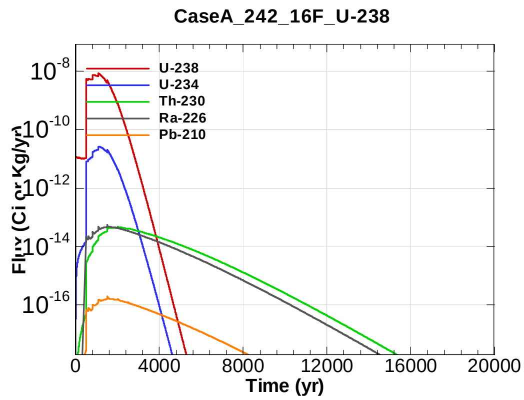

Figure A.1-2020 - Flux Leaving Liner for CaseA 242_16F U-238

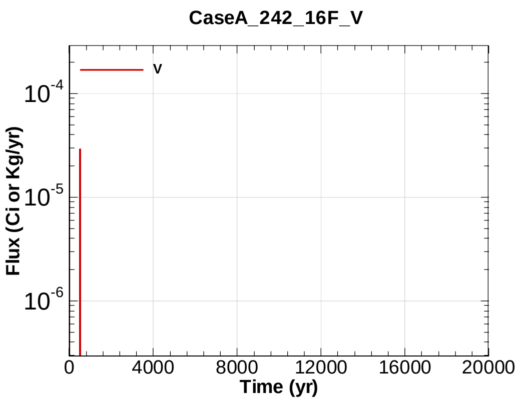

Figure A.1-2021 - Flux Leaving Liner for CaseA 242_16F V

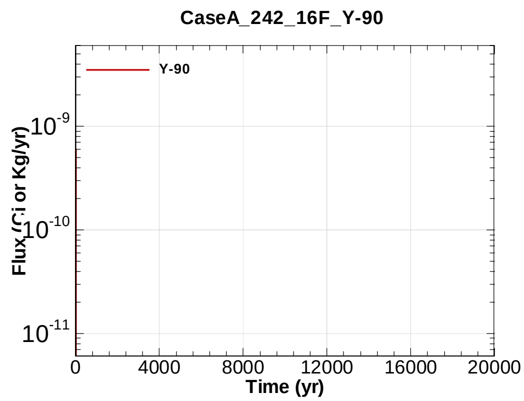

Figure A.1-2022 - Flux Leaving Liner for CaseA 242_16F Y-90

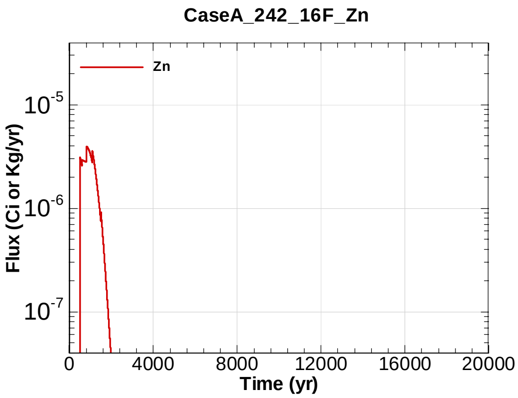

Figure A.1-2023 - Flux Leaving Liner for CaseA 242_16F Zn

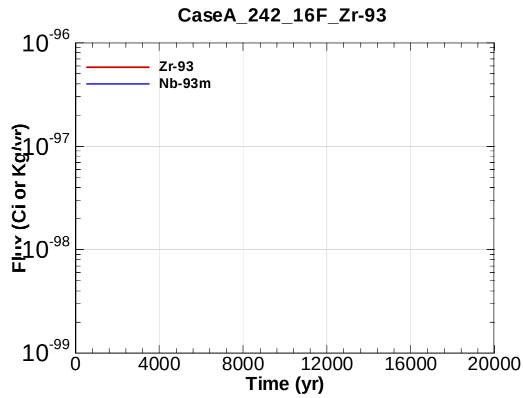

Figure A.1-2024 - Flux Leaving Liner for CaseA 242_16F Zr-93

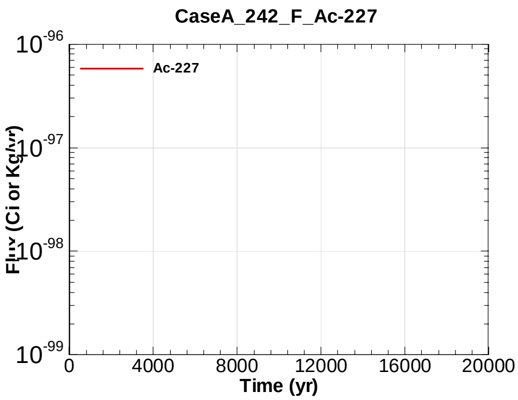

Figure A.1-2025 - Flux Leaving Liner for CaseA 242_F Ac-227

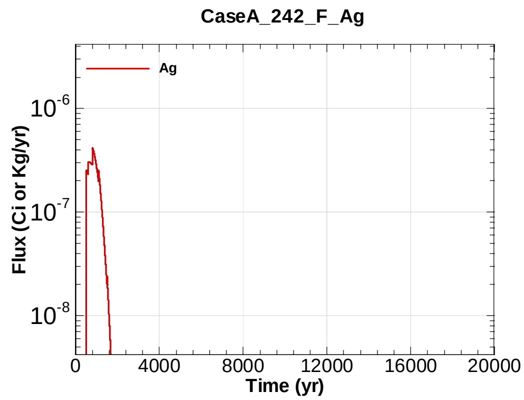

Figure A.1-2026 - Flux Leaving Liner for CaseA 242_F Ag

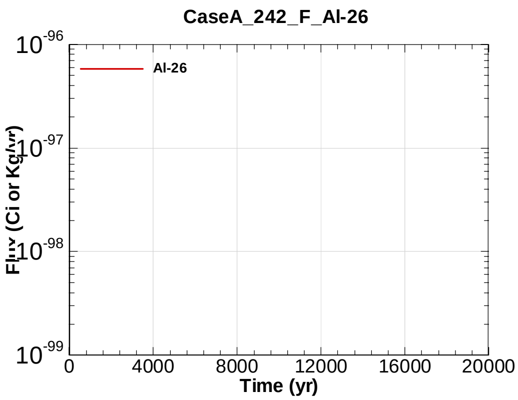

Figure A.1-2027 - Flux Leaving Liner for CaseA 242_F Al-26

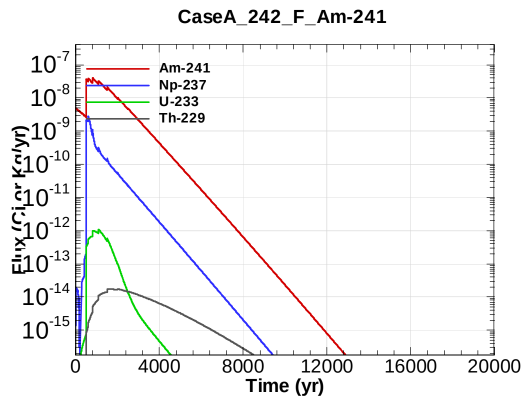

Figure A.1-2028 - Flux Leaving Liner for CaseA 242_F Am-241

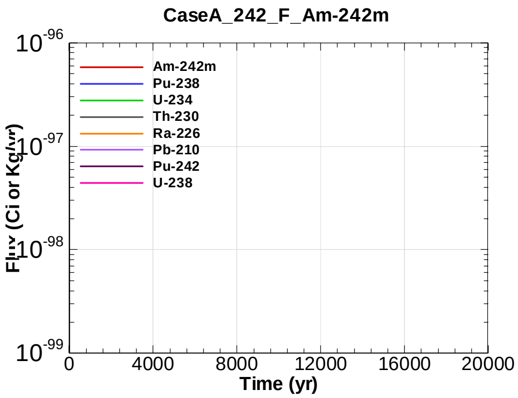

Figure A.1-2029 - Flux Leaving Liner for CaseA 242_F Am-242m

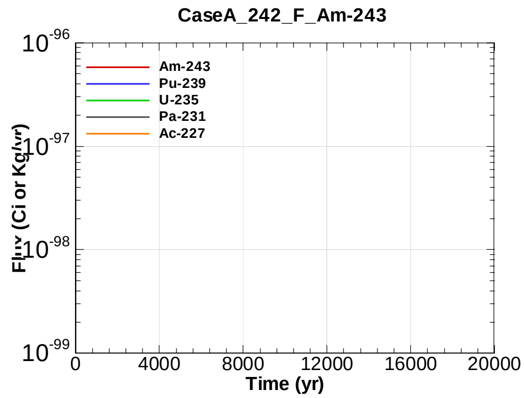

Figure A.1-2030 - Flux Leaving Liner for CaseA 242_F Am-243

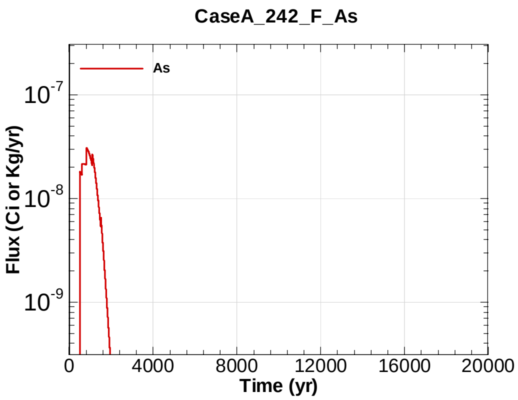

Figure A.1-2031 - Flux Leaving Liner for CaseA 242_F As

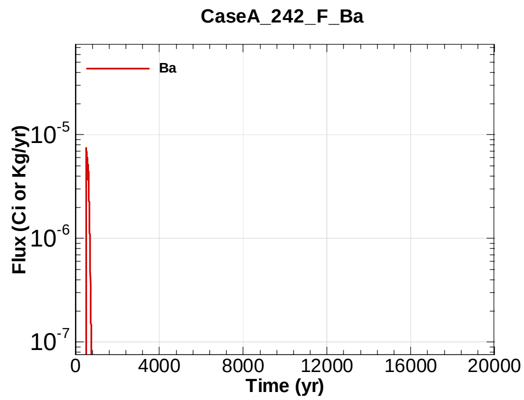

Figure A.1-2032 - Flux Leaving Liner for CaseA 242_F Ba

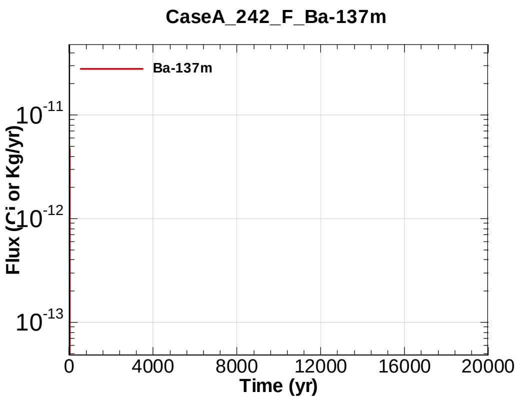

Figure A.1-2033 - Flux Leaving Liner for CaseA 242_F Ba-137m

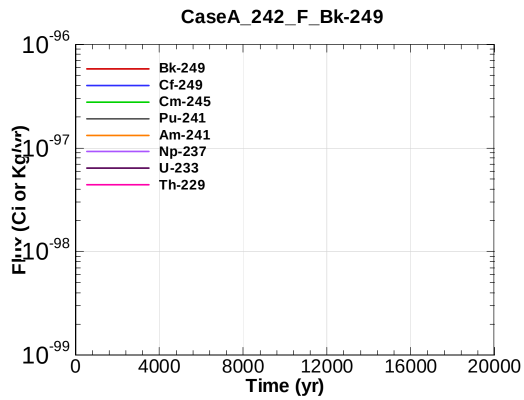

Figure A.1-2034 - Flux Leaving Liner for CaseA 242_F Bk-249

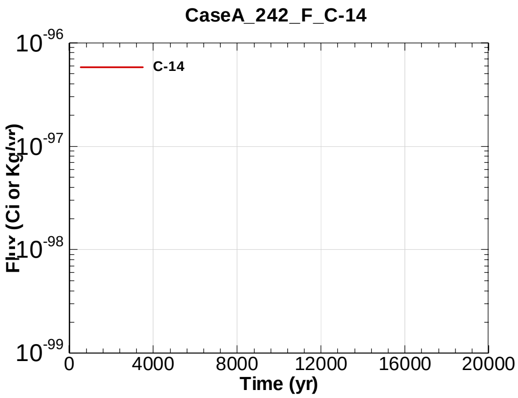

Figure A.1-2035 - Flux Leaving Liner for CaseA 242_F C-14

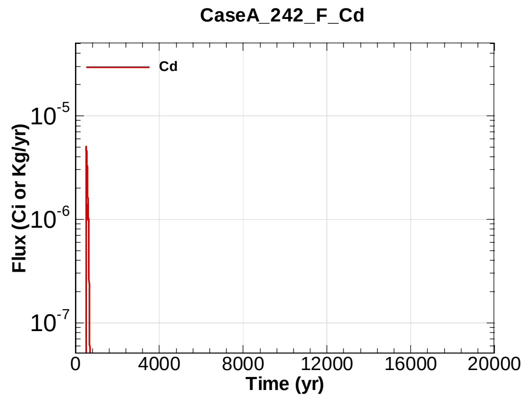

Figure A.1-2036 - Flux Leaving Liner for CaseA 242_F Cd

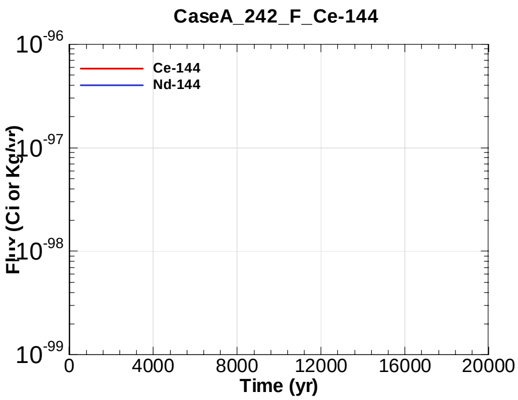

Figure A.1-2037 - Flux Leaving Liner for CaseA 242_F Ce-144

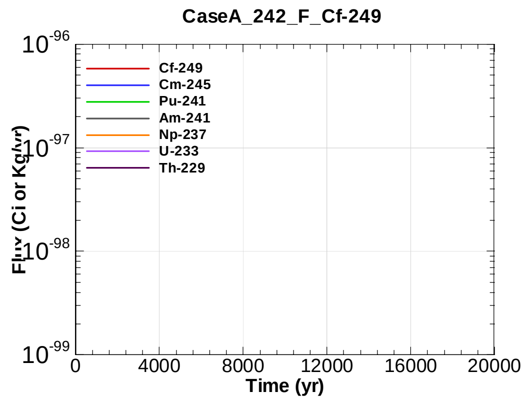

Figure A.1-2038 - Flux Leaving Liner for CaseA 242_F Cf-249

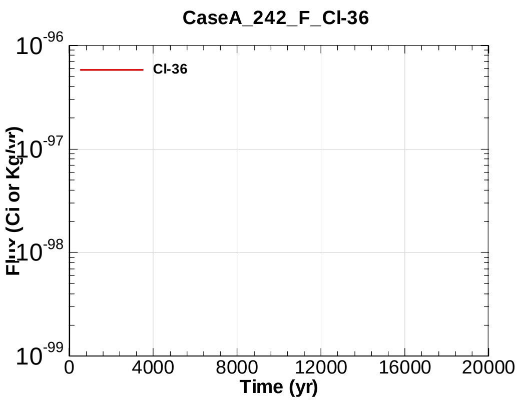

Figure A.1-2039 - Flux Leaving Liner for CaseA 242_F Cl-36

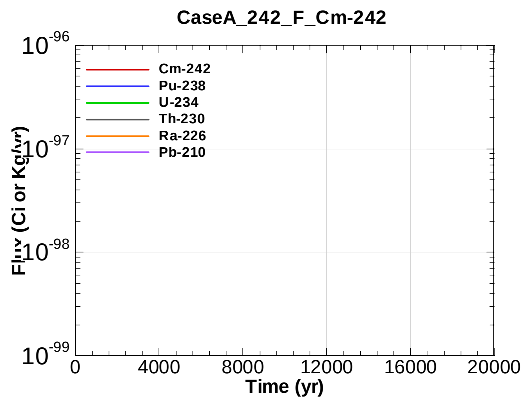

Figure A.1-2040 - Flux Leaving Liner for CaseA 242_F Cm-242

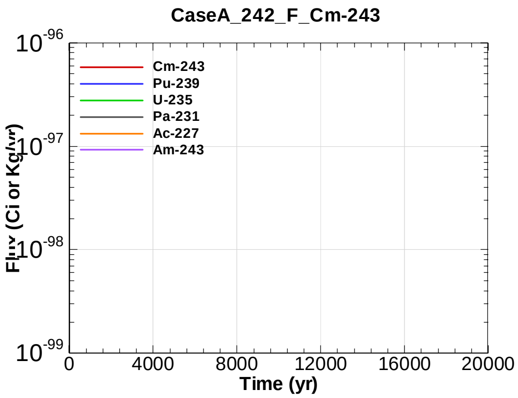

Figure A.1-2041 - Flux Leaving Liner for CaseA 242_F Cm-243

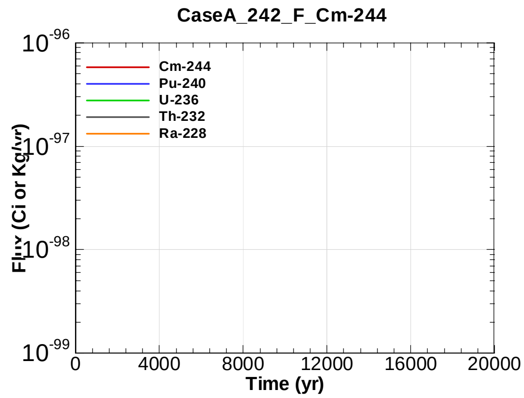

Figure A.1-2042 - Flux Leaving Liner for CaseA 242_F Cm-244

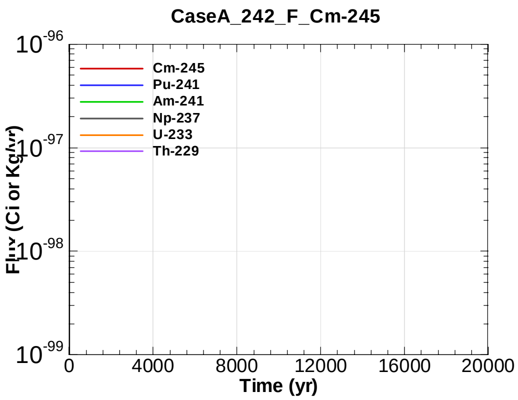

Figure A.1-2043 - Flux Leaving Liner for CaseA 242_F Cm-245

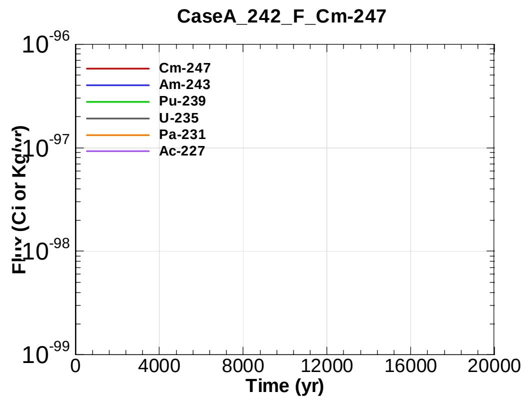

Figure A.1-2044 - Flux Leaving Liner for CaseA 242_F Cm-247

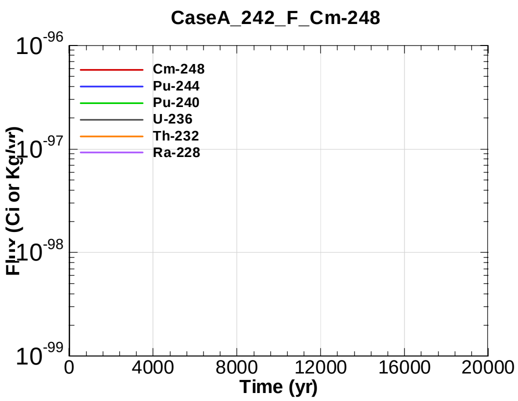

Figure A.1-2045 - Flux Leaving Liner for CaseA 242_F Cm-248

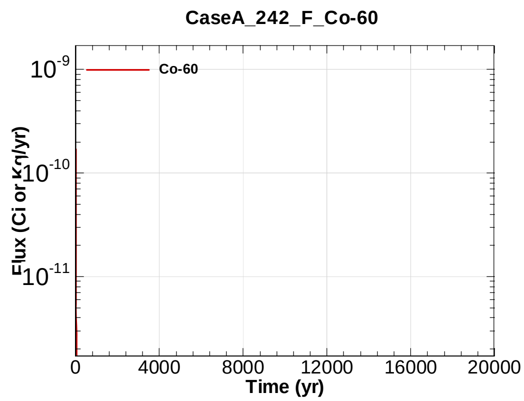

Figure A.1-2046 - Flux Leaving Liner for CaseA 242_F Co-60

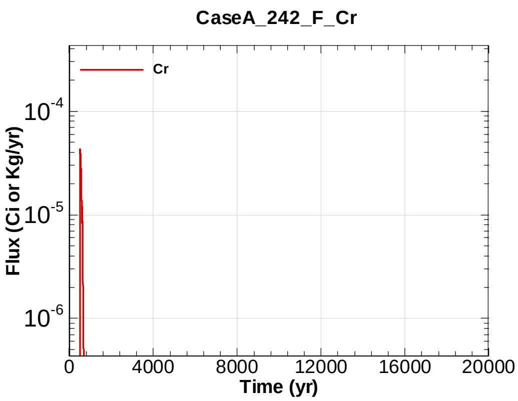

Figure A.1-2047 - Flux Leaving Liner for CaseA 242_F Cr

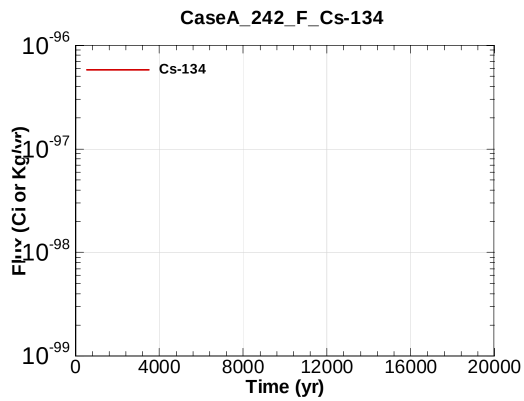

Figure A.1-2048 - Flux Leaving Liner for CaseA 242_F Cs-134

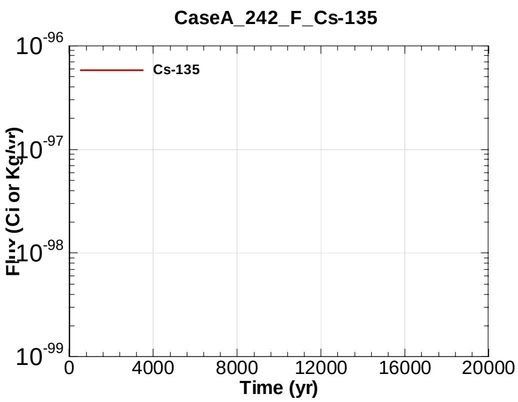

Figure A.1-2049 - Flux Leaving Liner for CaseA 242_F Cs-135

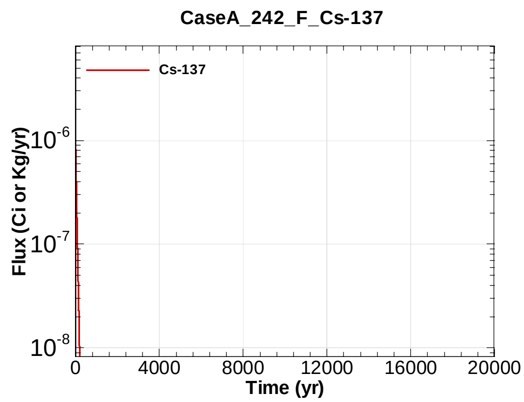

Figure A.1-2050 - Flux Leaving Liner for CaseA 242_F Cs-137

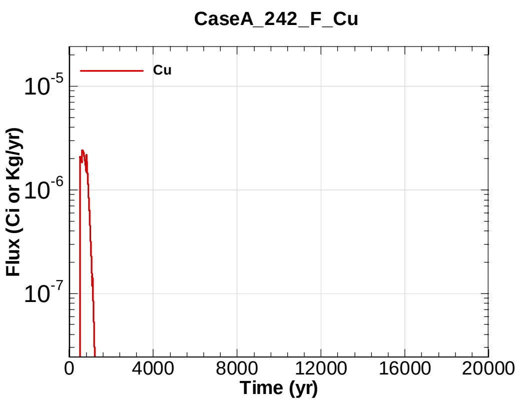

Figure A.1-2051 - Flux Leaving Liner for CaseA 242_F Cu

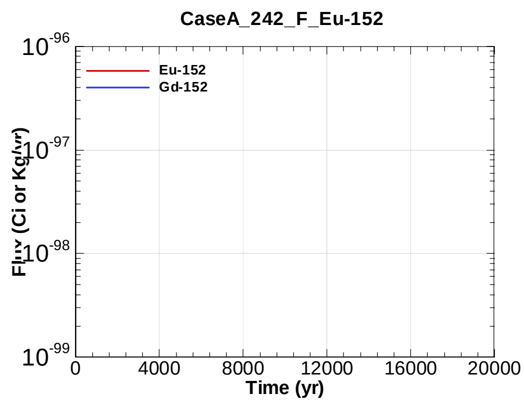

Figure A.1-2052 - Flux Leaving Liner for CaseA 242_F Eu-152

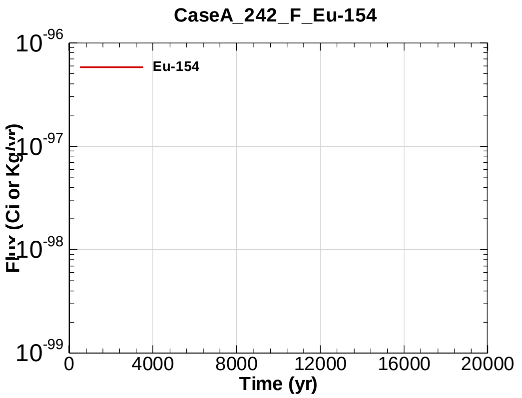

Figure A.1-2053 - Flux Leaving Liner for CaseA 242_F Eu-154

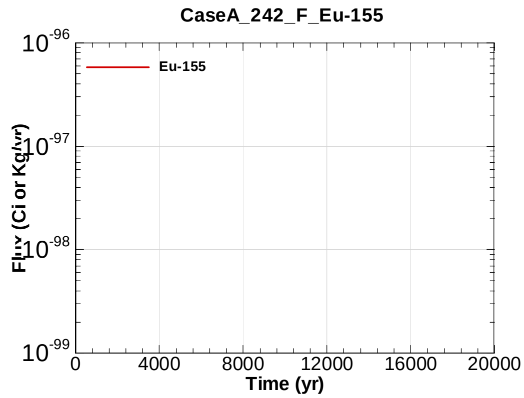

Figure A.1-2054 - Flux Leaving Liner for CaseA 242_F Eu-155

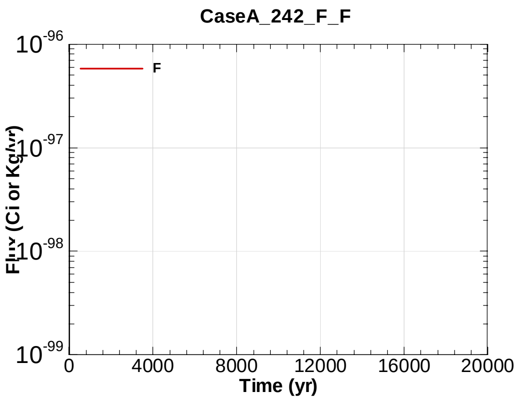

Figure A.1-2055 - Flux Leaving Liner for CaseA 242_F F

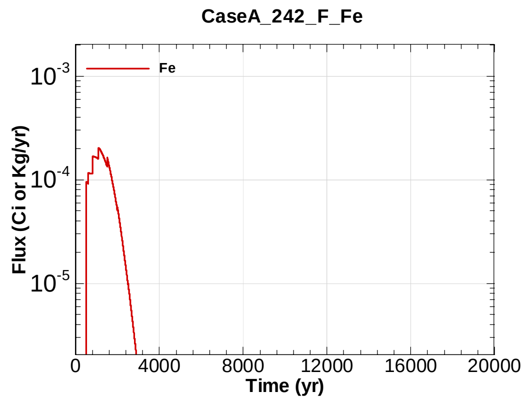

Figure A.1-2056 - Flux Leaving Liner for CaseA 242_F Fe

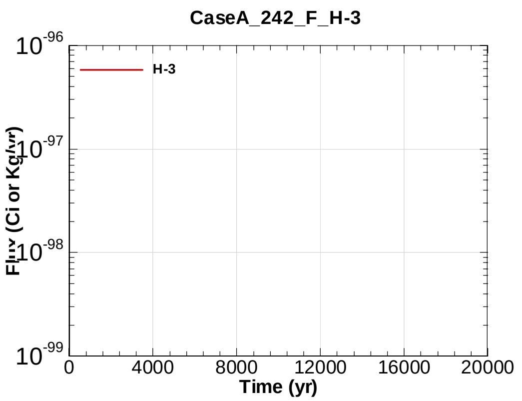

Figure A.1-2057 - Flux Leaving Liner for CaseA 242_F H-3

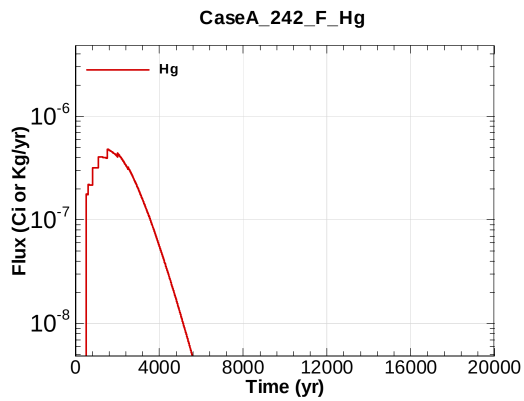

Figure A.1-2058 - Flux Leaving Liner for CaseA 242_F Hg

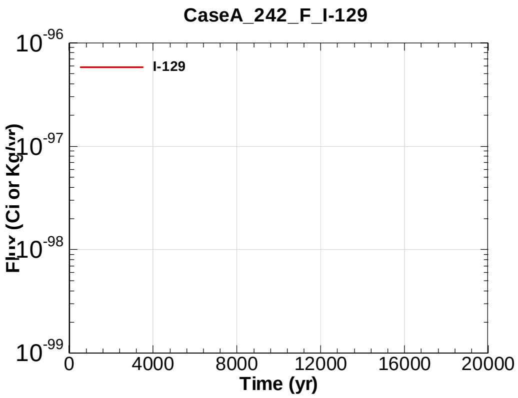

Figure A.1-2059 - Flux Leaving Liner for CaseA 242_F I-129

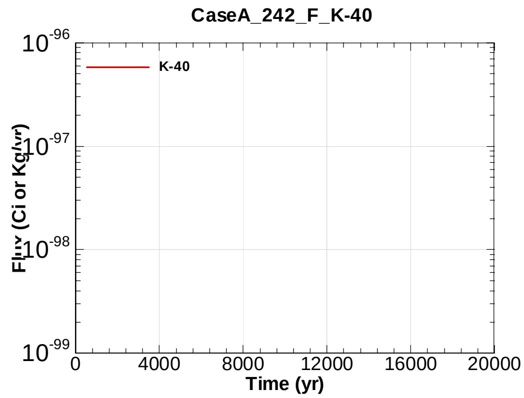

Figure A.1-2060 - Flux Leaving Liner for CaseA 242_F K-40

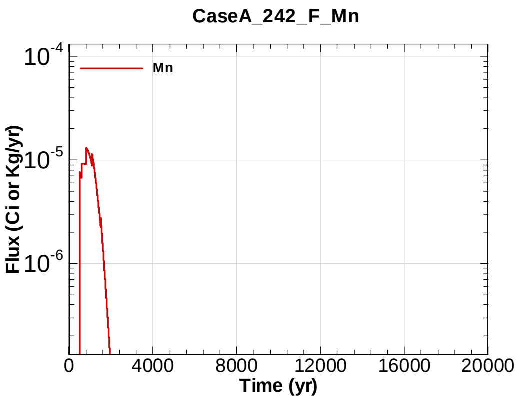

Figure A.1-2061 - Flux Leaving Liner for CaseA 242_F Mn

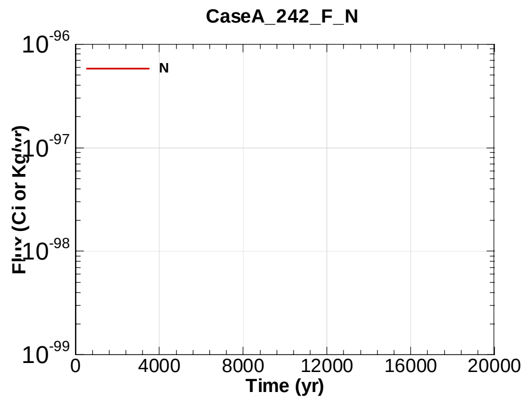

Figure A.1-2062 - Flux Leaving Liner for CaseA 242_F N

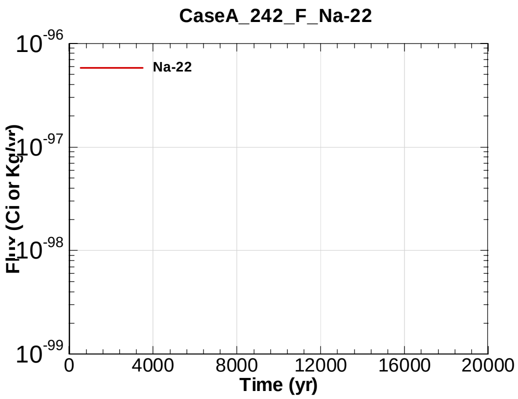

Figure A.1-2063 - Flux Leaving Liner for CaseA 242_F Na-22

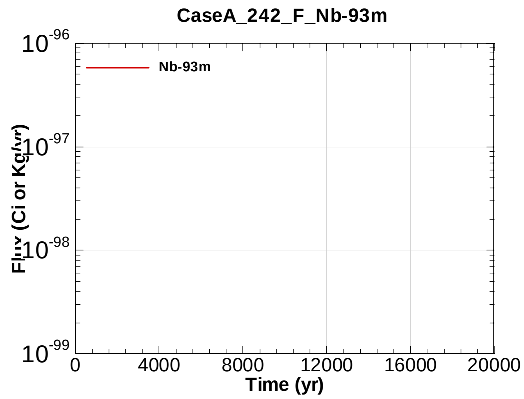

Figure A.1-2064 - Flux Leaving Liner for CaseA 242_F Nb-93m

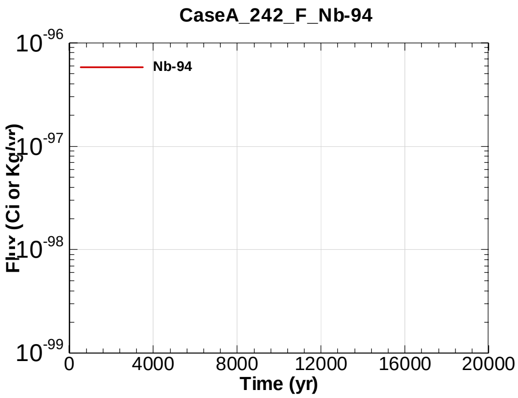

Figure A.1-2065 - Flux Leaving Liner for CaseA 242_F Nb-94

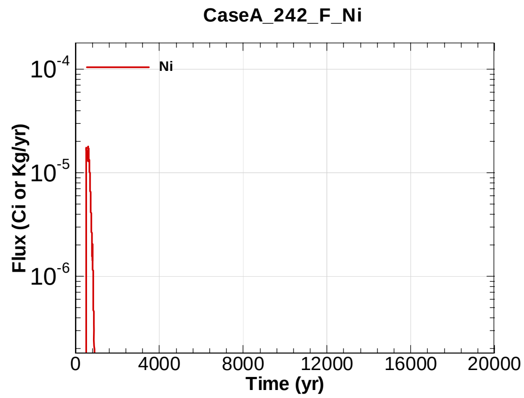

Figure A.1-2066 - Flux Leaving Liner for CaseA 242_F Ni

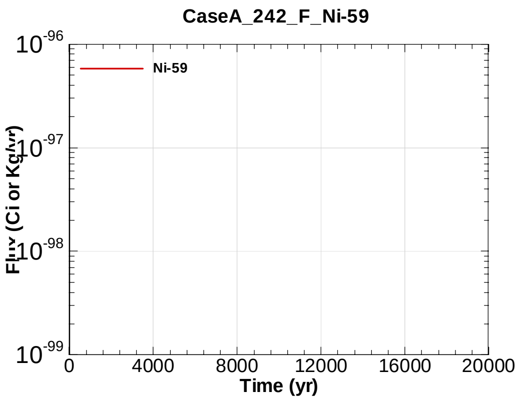

Figure A.1-2067 - Flux Leaving Liner for CaseA 242_F Ni-59

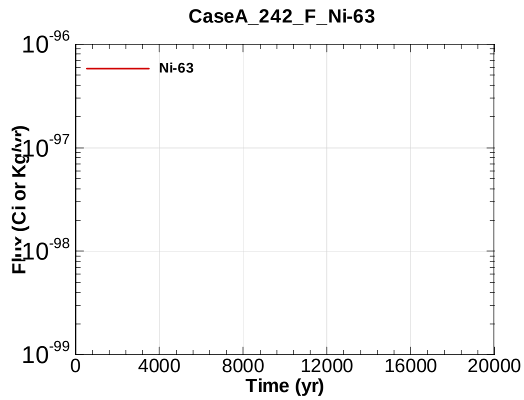

Figure A.1-2068 - Flux Leaving Liner for CaseA 242_F Ni-63

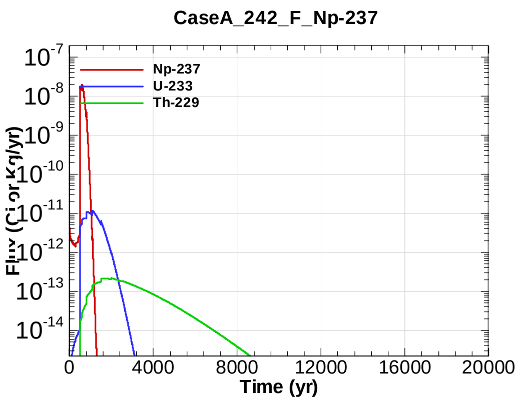

Figure A.1-2069 - Flux Leaving Liner for CaseA 242_F Np-237

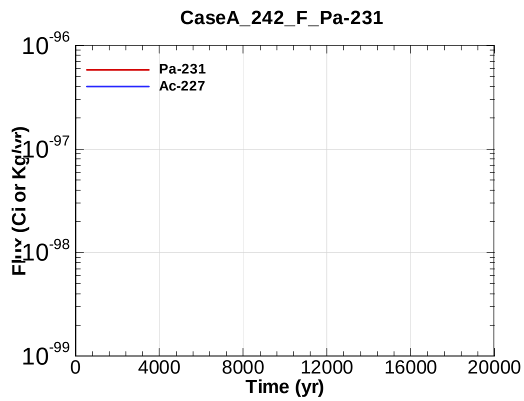

Figure A.1-2070 - Flux Leaving Liner for CaseA 242_F Pa-231

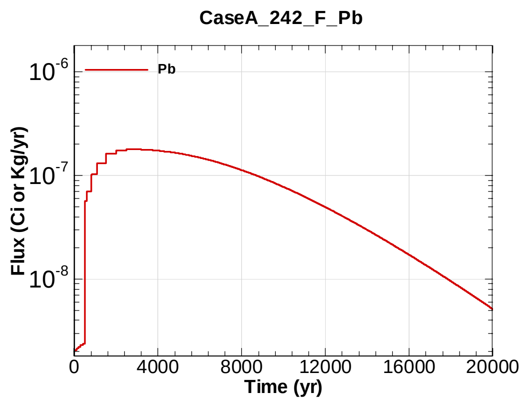

Figure A.1-2071 - Flux Leaving Liner for CaseA 242_F Pb

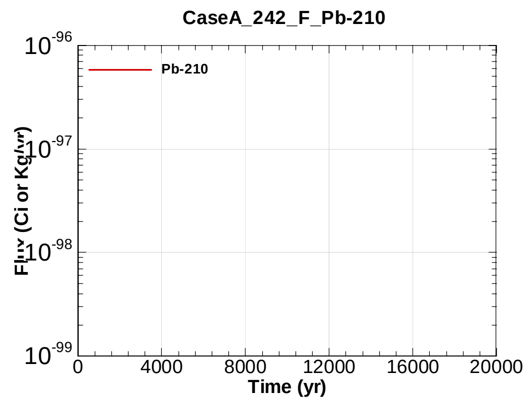

Figure A.1-2072 - Flux Leaving Liner for CaseA 242_F Pb-210

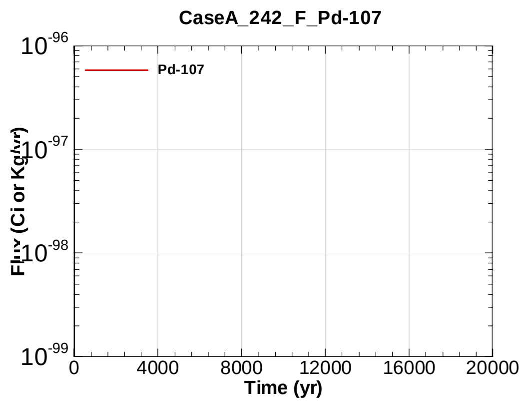

Figure A.1-2073 - Flux Leaving Liner for CaseA 242_F Pd-107

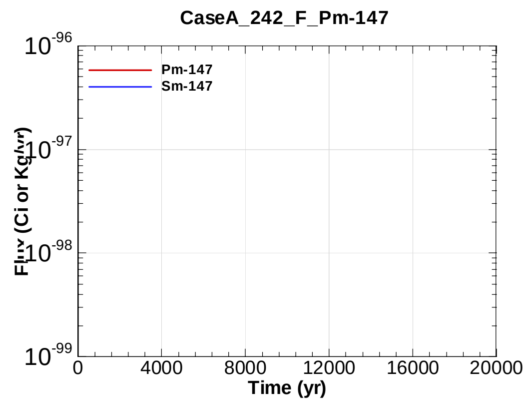

Figure A.1-2074 - Flux Leaving Liner for CaseA 242_F Pm-147

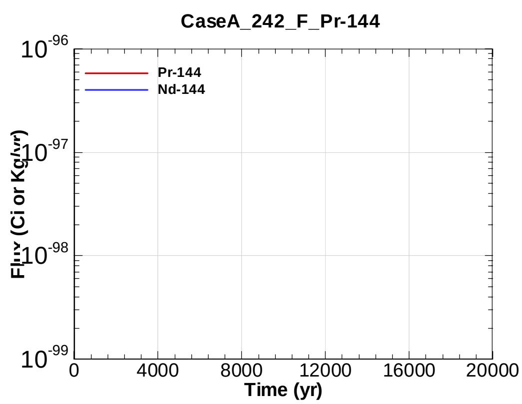

Figure A.1-2075 - Flux Leaving Liner for CaseA 242_F Pr-144

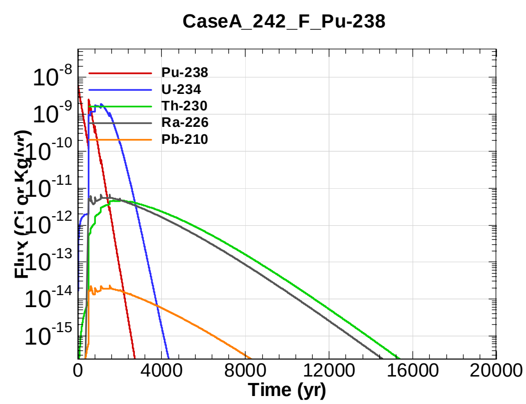

Figure A.1-2076 - Flux Leaving Liner for CaseA 242_F Pu-238

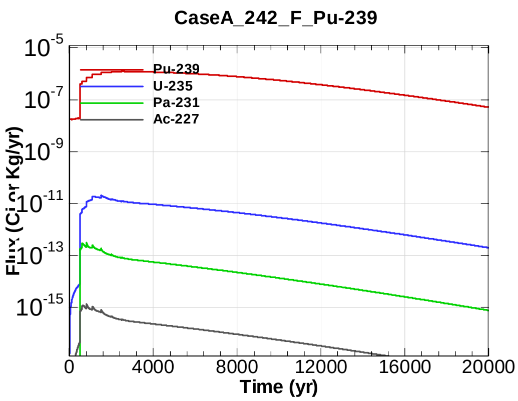

Figure A.1-2077 - Flux Leaving Liner for CaseA 242_F Pu-239

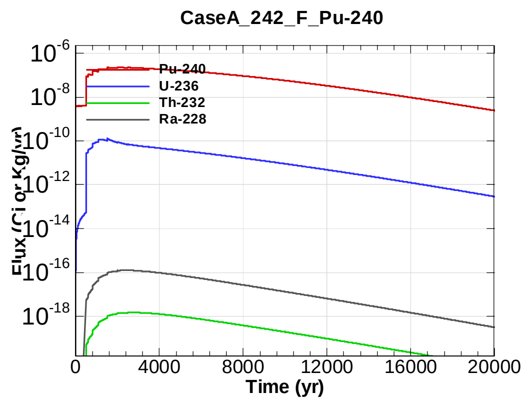

Figure A.1-2078 - Flux Leaving Liner for CaseA 242_F Pu-240

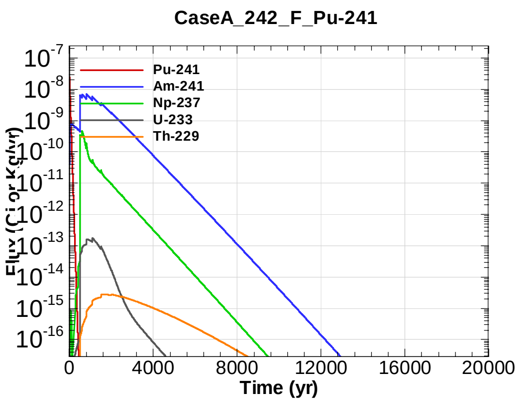

Figure A.1-2079 - Flux Leaving Liner for CaseA 242_F Pu-241

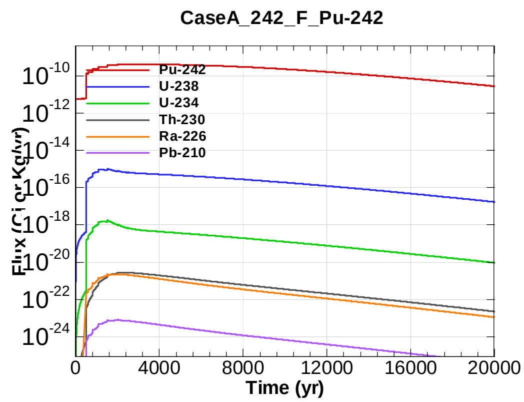

Figure A.1-2080 - Flux Leaving Liner for CaseA 242_F Pu-242

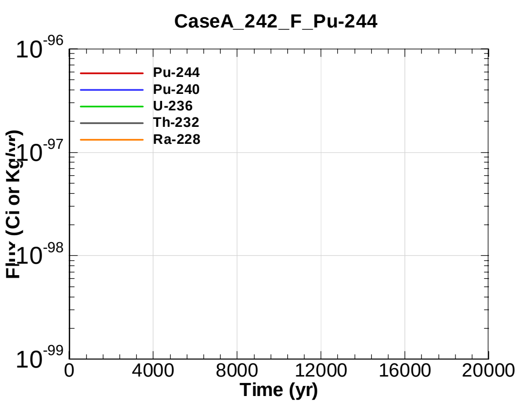

Figure A.1-2081 - Flux Leaving Liner for CaseA 242_F Pu-244

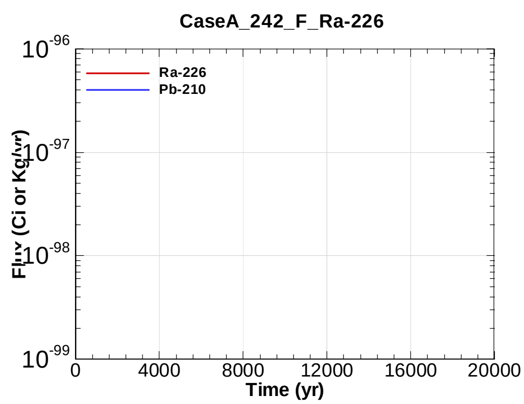

Figure A.1-2082 - Flux Leaving Liner for CaseA 242_F Ra-226

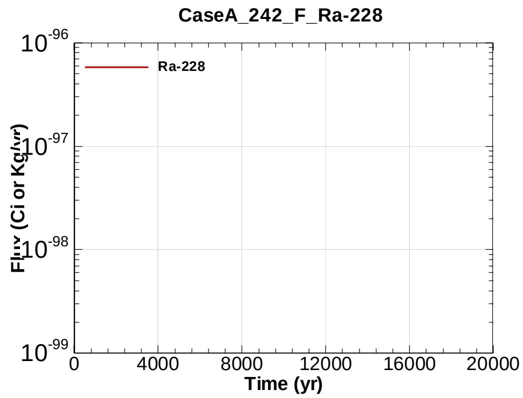

Figure A.1-2083 - Flux Leaving Liner for CaseA 242_F Ra-228

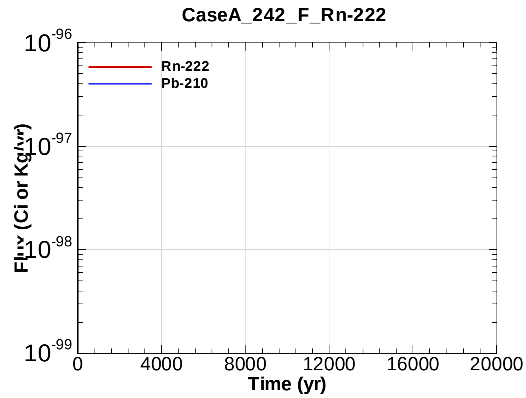

Figure A.1-2084 - Flux Leaving Liner for CaseA 242_F Rn-222

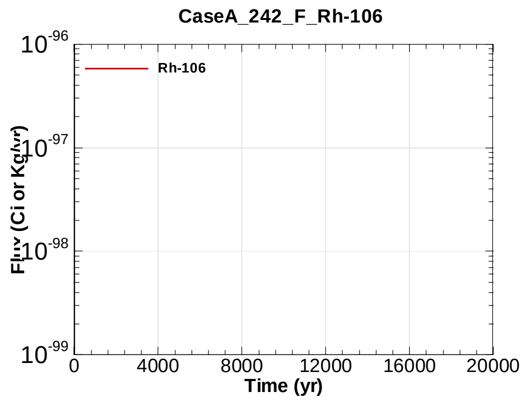

Figure A.1-2085 - Flux Leaving Liner for CaseA 242_F Rh-106

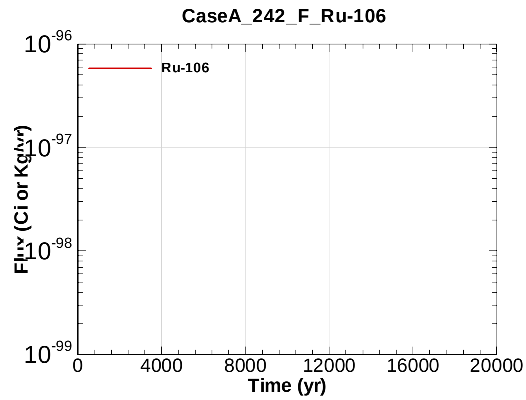

Figure A.1-2086 - Flux Leaving Liner for CaseA 242_F Ru-106

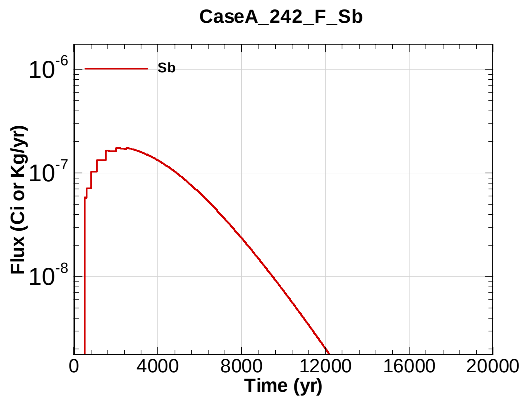

Figure A.1-2087 - Flux Leaving Liner for CaseA 242_F Sb

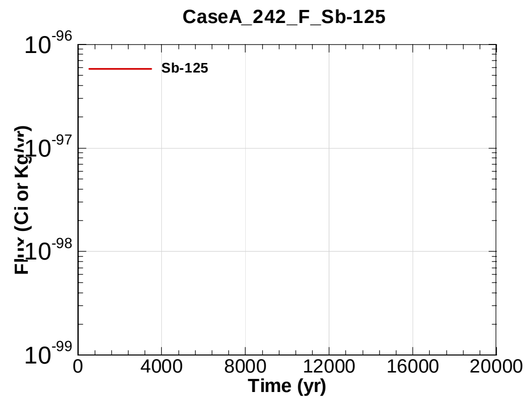

Figure A.1-2088 - Flux Leaving Liner for CaseA 242_F Sb-125

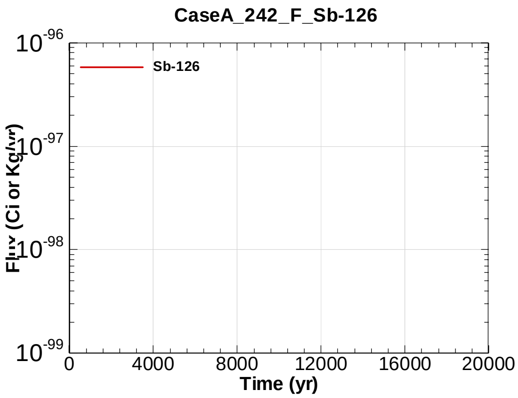

Figure A.1-2089 - Flux Leaving Liner for CaseA 242_F Sb-126

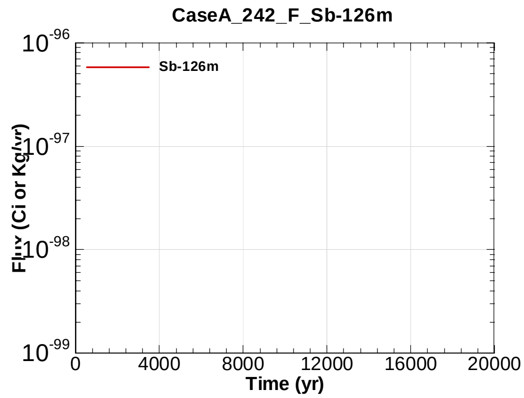

Figure A.1-2090 - Flux Leaving Liner for CaseA 242_F Sb-126m

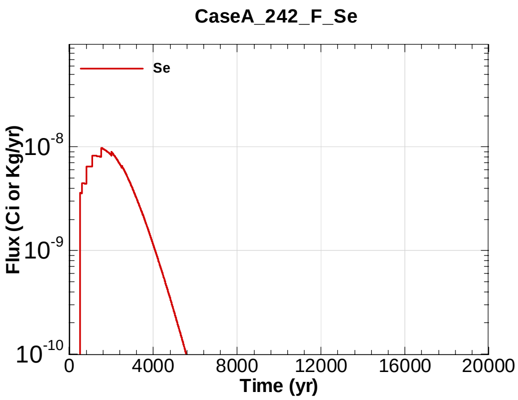

Figure A.1-2091 - Flux Leaving Liner for CaseA 242_F Se

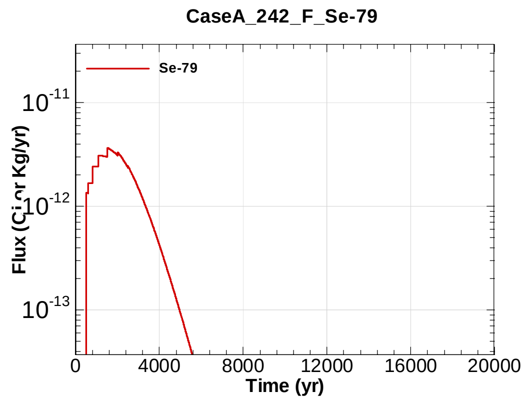

Figure A.1-2092 - Flux Leaving Liner for CaseA 242_F Se-79

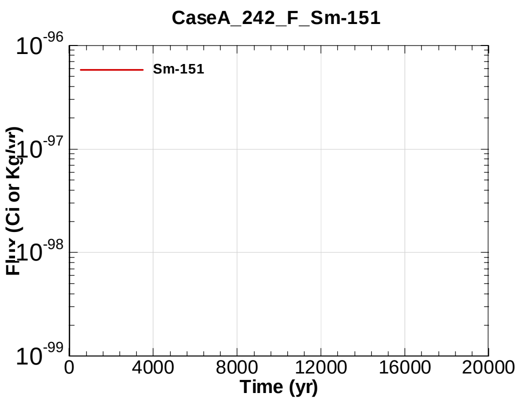

Figure A.1-2093 - Flux Leaving Liner for CaseA 242_F Sm-151

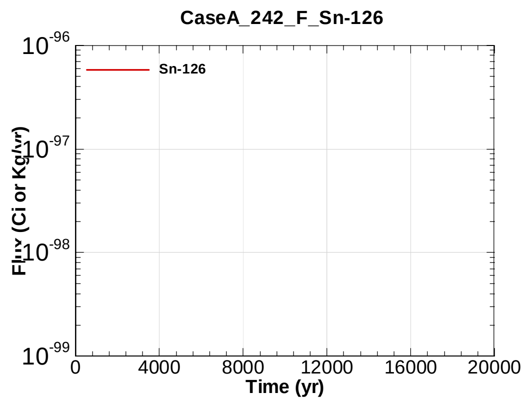

Figure A.1-2094 - Flux Leaving Liner for CaseA 242_F Sn-126

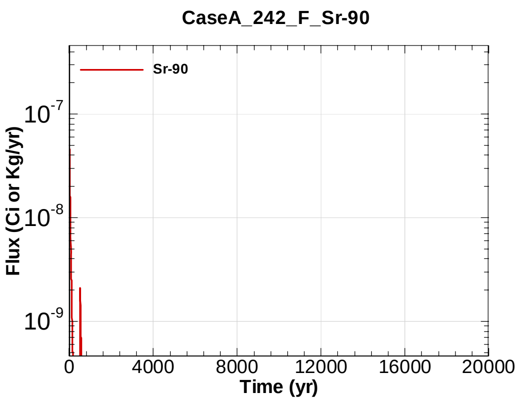

Figure A.1-2095 - Flux Leaving Liner for CaseA 242_F Sr-90

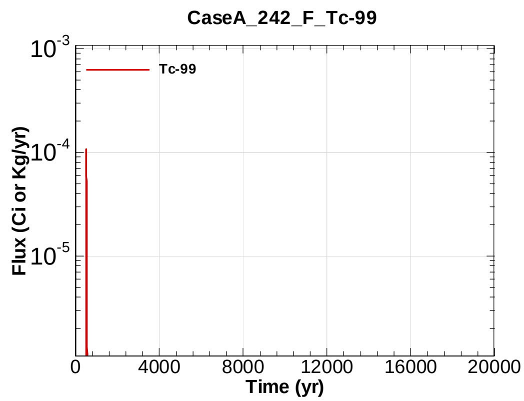

Figure A.1-2096 - Flux Leaving Liner for CaseA 242_F Tc-99

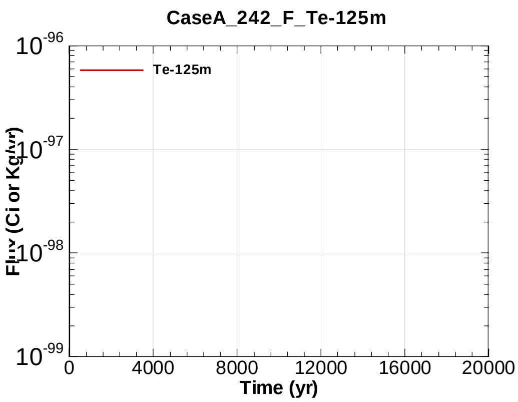

Figure A.1-2097 - Flux Leaving Liner for CaseA 242_F Te-125m

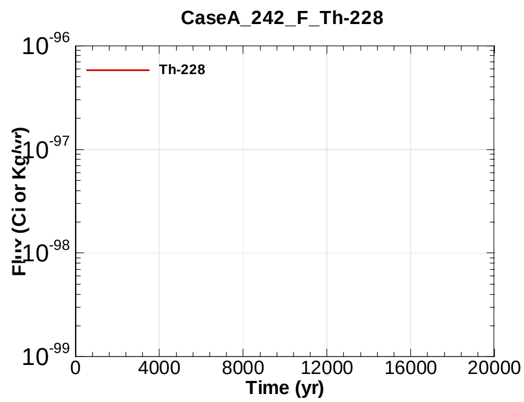

Figure A.1-2098 - Flux Leaving Liner for CaseA 242_F Th-228

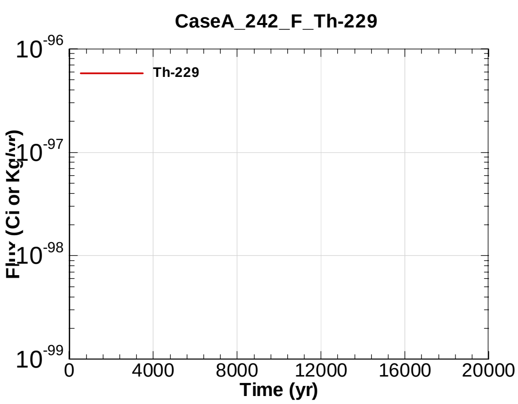

Figure A.1-2099 - Flux Leaving Liner for CaseA 242_F Th-229

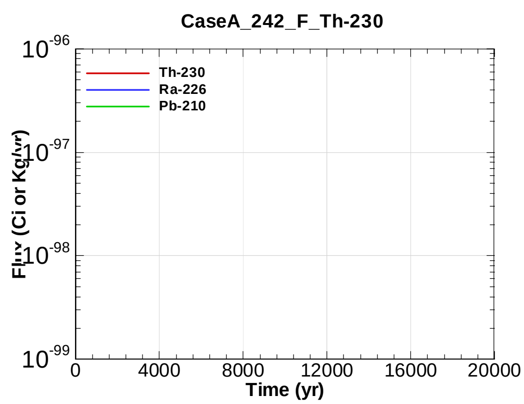

Figure A.1-2100 - Flux Leaving Liner for CaseA 242_F Th-230

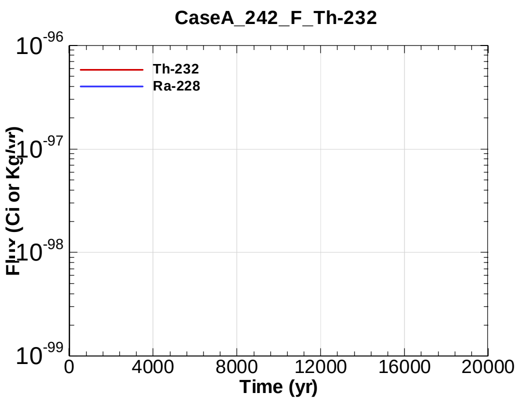

Figure A.1-2101 - Flux Leaving Liner for CaseA 242_F Th-232

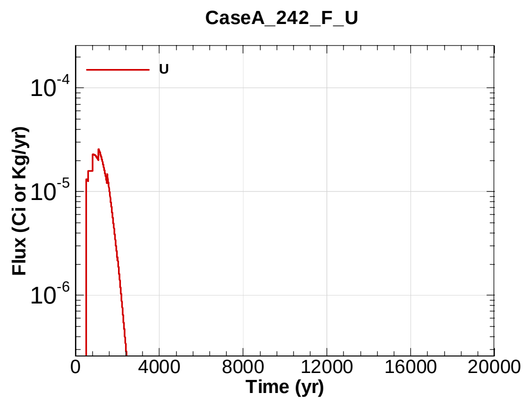

Figure A.1-2102 - Flux Leaving Liner for CaseA 242_F U

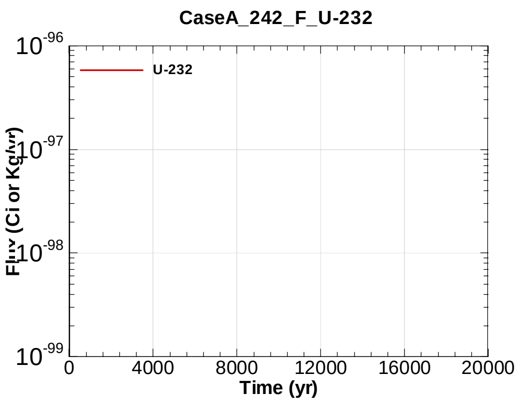

Figure A.1-2103 - Flux Leaving Liner for CaseA 242_F U-232

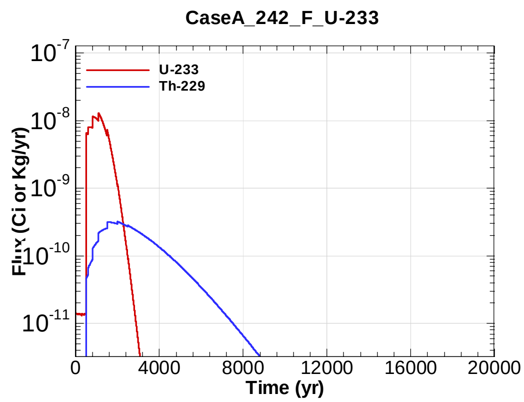

Figure A.1-2104 - Flux Leaving Liner for CaseA 242_F U-233

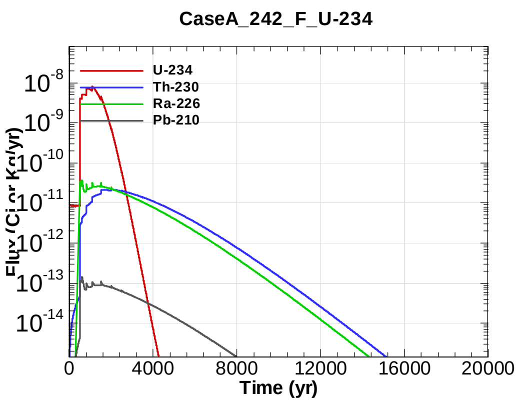

Figure A.1-2105 - Flux Leaving Liner for CaseA 242_F U-234

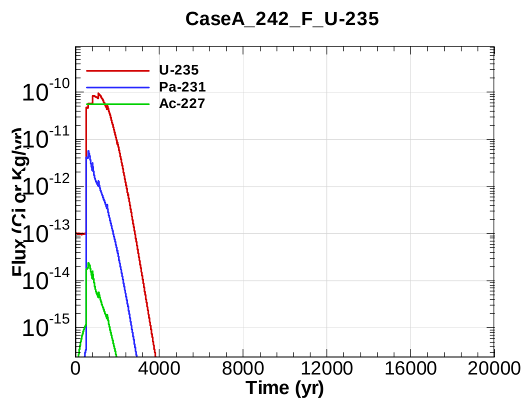

Figure A.1-2106 - Flux Leaving Liner for CaseA 242_F U-235

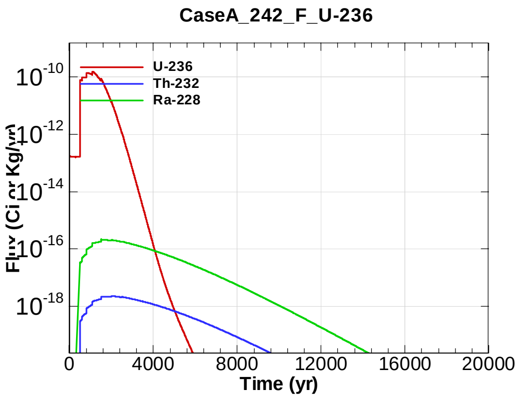

Figure A.1-2107 - Flux Leaving Liner for CaseA 242_F U-236

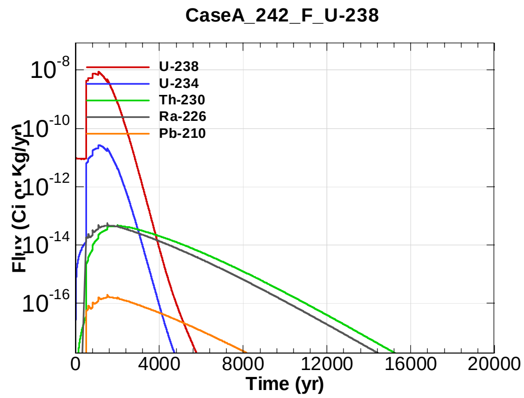

Figure A.1-2108 - Flux Leaving Liner for CaseA 242_F U-238

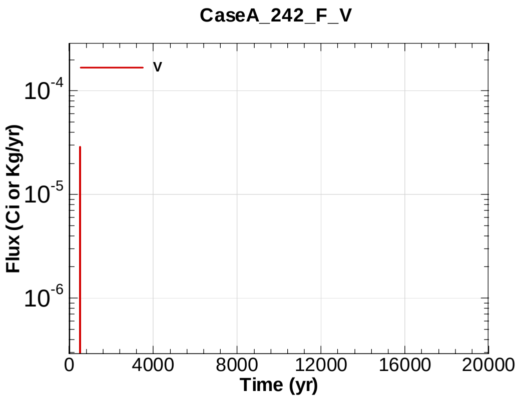

Figure A.1-2109 - Flux Leaving Liner for CaseA 242_F V

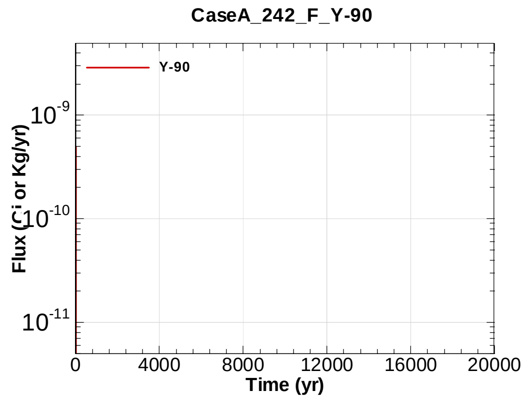

Figure A.1-2110 - Flux Leaving Liner for CaseA 242_F Y-90

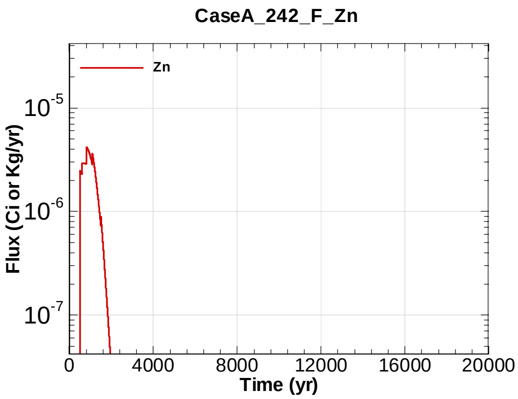

Figure A.1-2111 - Flux Leaving Liner for CaseA 242_F Zn

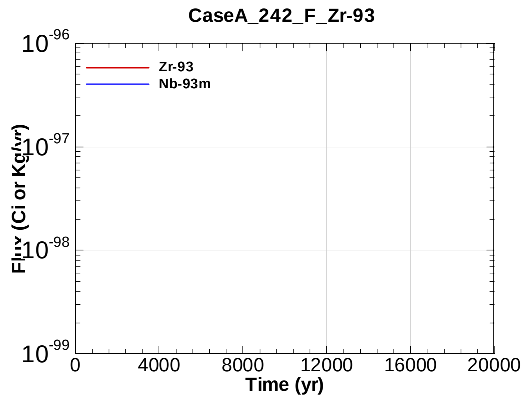

Figure A.1-2112 - Flux Leaving Liner for CaseA 242_F Zr-93

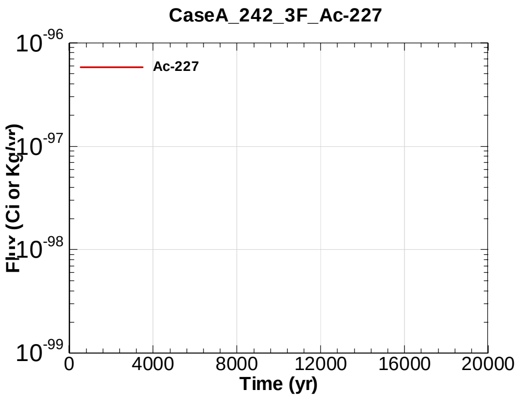

Figure A.1-2113 - Flux Leaving Liner for CaseA 242_3F Ac-227

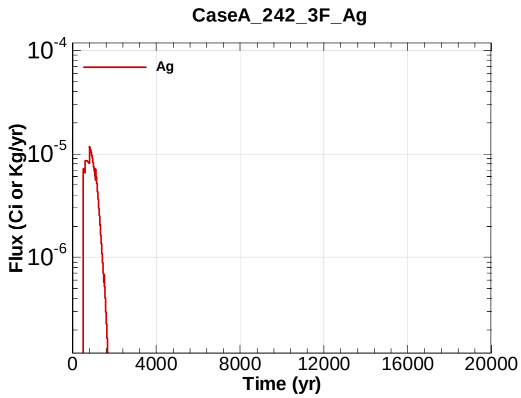

Figure A.1-2114 - Flux Leaving Liner for CaseA 242_3F Ag

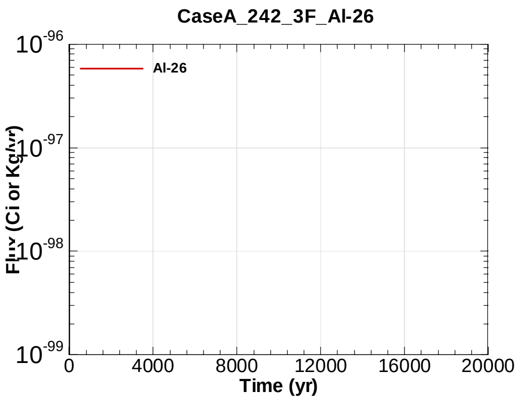

Figure A.1-2115 - Flux Leaving Liner for CaseA 242_3F Al-26

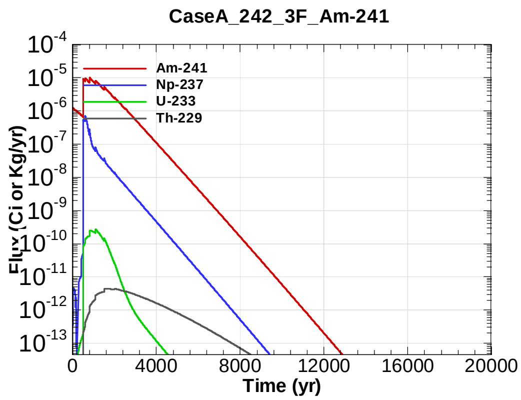

Figure A.1-2116 - Flux Leaving Liner for CaseA 242_3F Am-241

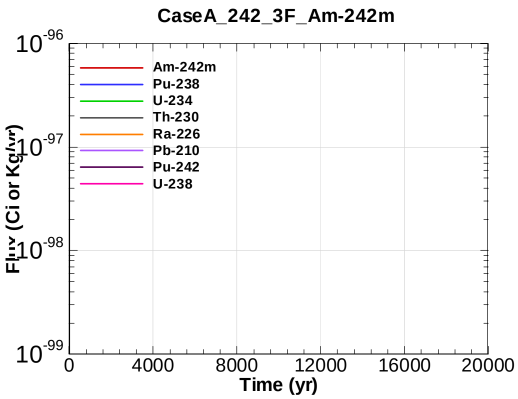

Figure A.1-2117 - Flux Leaving Liner for CaseA 242_3F Am-242m

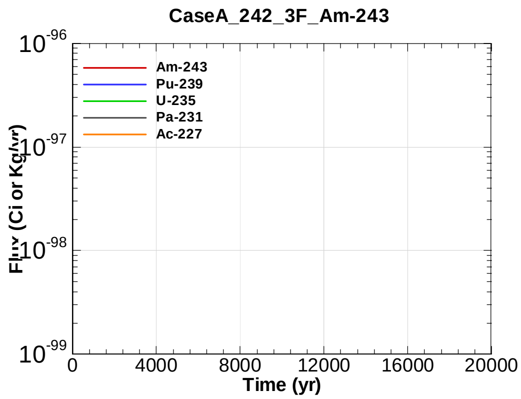

Figure A.1-2118 - Flux Leaving Liner for CaseA 242_3F Am-243

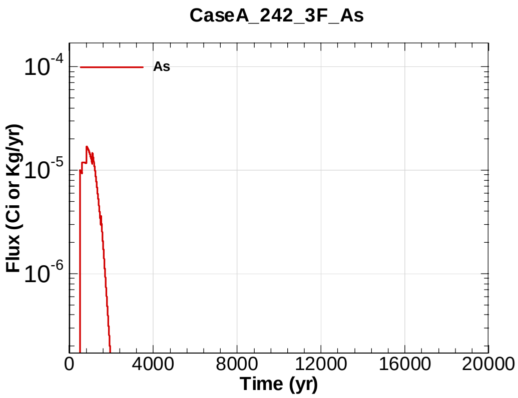

Figure A.1-2119 - Flux Leaving Liner for CaseA 242_3F As

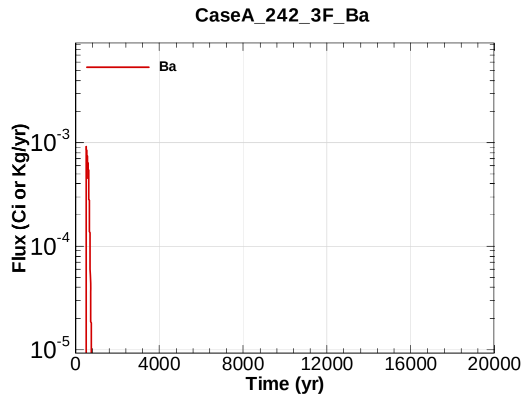

Figure A.1-2120 - Flux Leaving Liner for CaseA 242_3F Ba

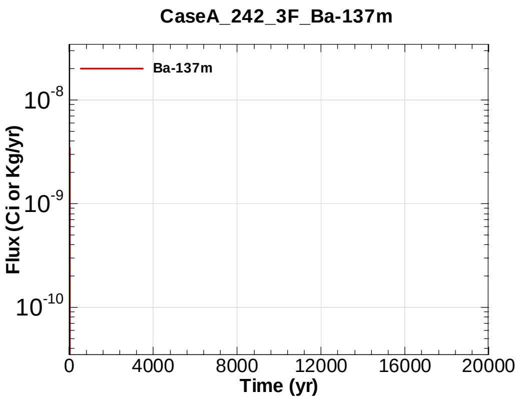

Figure A.1-2121 - Flux Leaving Liner for CaseA 242_3F Ba-137m

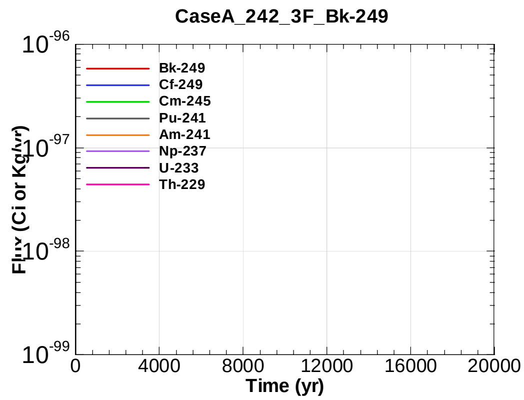

Figure A.1-2122 - Flux Leaving Liner for CaseA 242_3F Bk-249

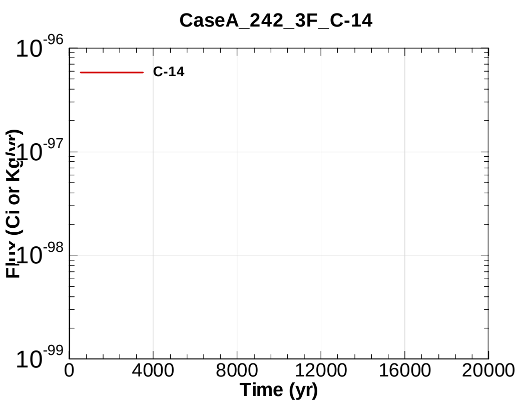

Figure A.1-2123 - Flux Leaving Liner for CaseA 242_3F C-14

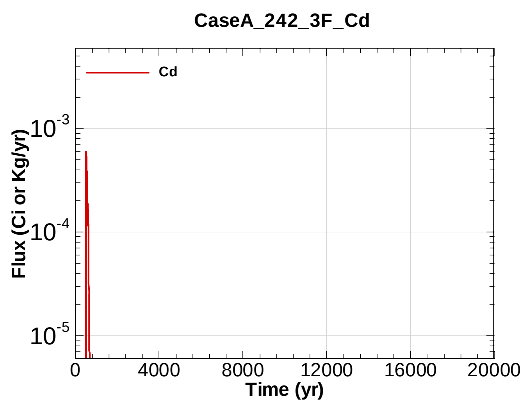

Figure A.1-2124 - Flux Leaving Liner for CaseA 242_3F Cd

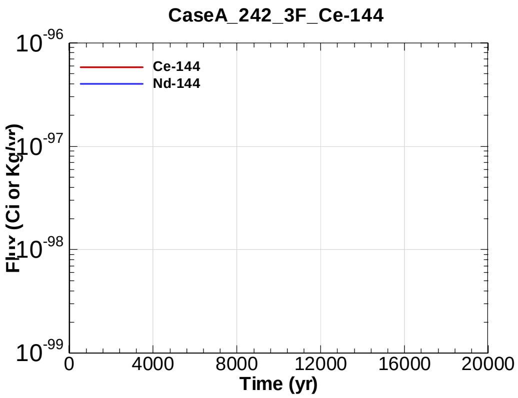

Figure A.1-2125 - Flux Leaving Liner for CaseA 242_3F Ce-144

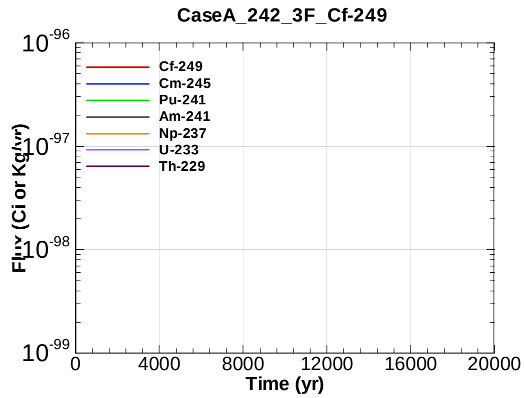

Figure A.1-2126 - Flux Leaving Liner for CaseA 242_3F Cf-249

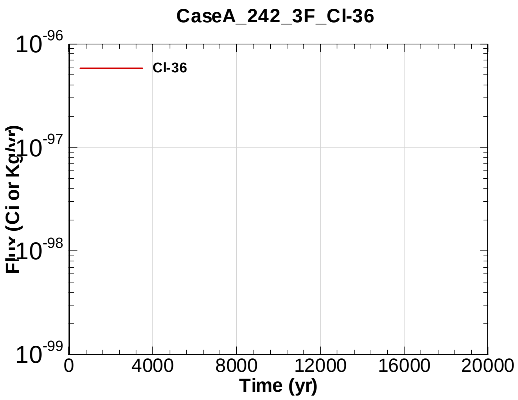

Figure A.1-2127 - Flux Leaving Liner for CaseA 242_3F Cl-36

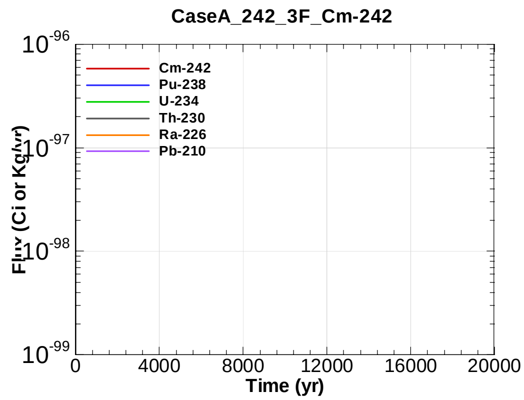

Figure A.1-2128 - Flux Leaving Liner for CaseA 242_3F Cm-242

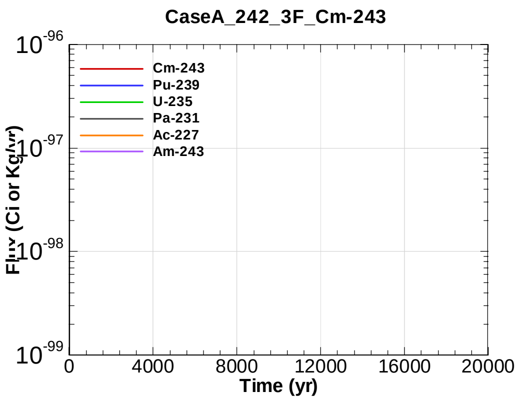

Figure A.1-2129 - Flux Leaving Liner for CaseA 242_3F Cm-243

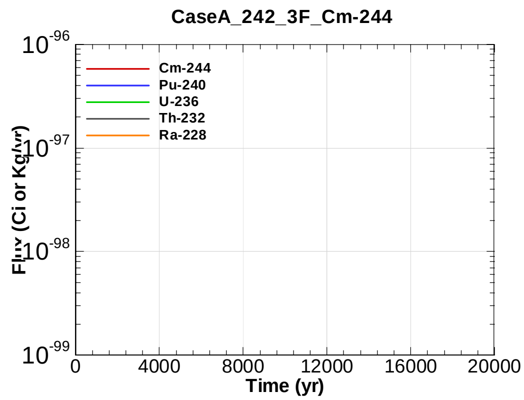

Figure A.1-2130 - Flux Leaving Liner for CaseA 242_3F Cm-244

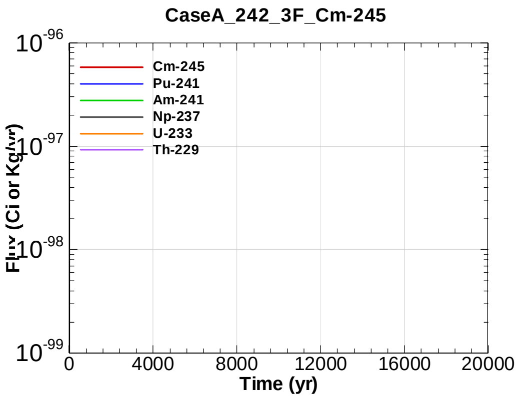

Figure A.1-2131 - Flux Leaving Liner for CaseA 242_3F Cm-245

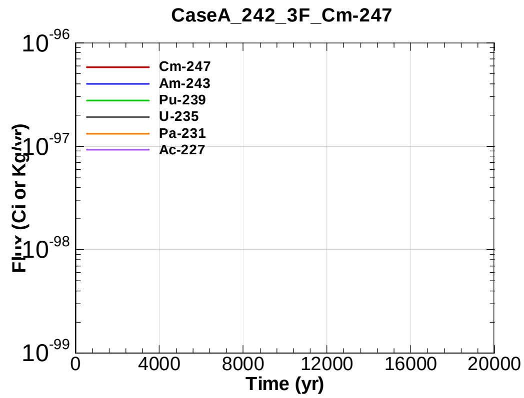

Figure A.1-2132 - Flux Leaving Liner for CaseA 242_3F Cm-247

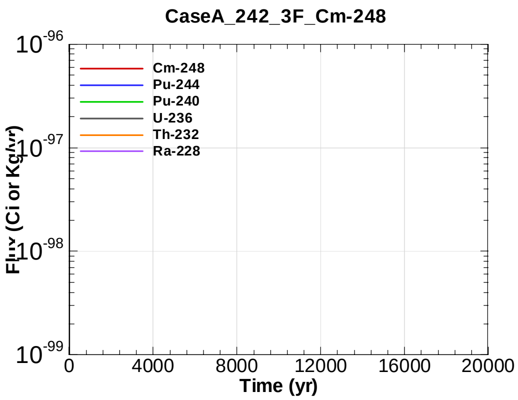

Figure A.1-2133 - Flux Leaving Liner for CaseA 242_3F Cm-248

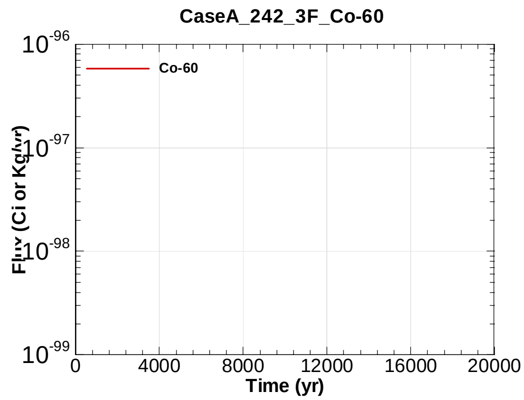

Figure A.1-2134 - Flux Leaving Liner for CaseA 242_3F Co-60

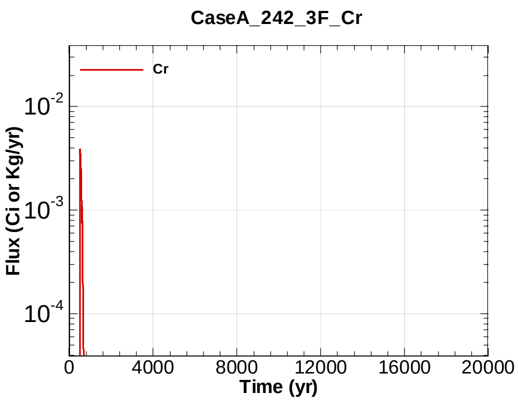

Figure A.1-2135 - Flux Leaving Liner for CaseA 242_3F Cr

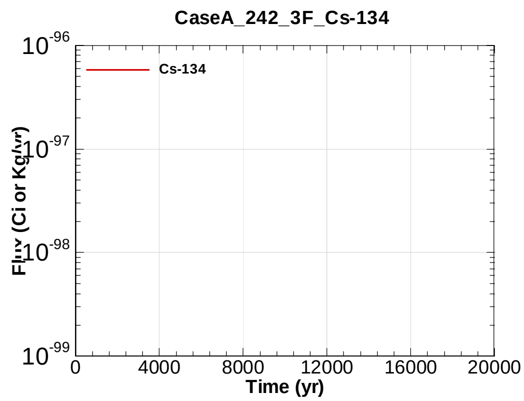

Figure A.1-2136 - Flux Leaving Liner for CaseA 242_3F Cs-134

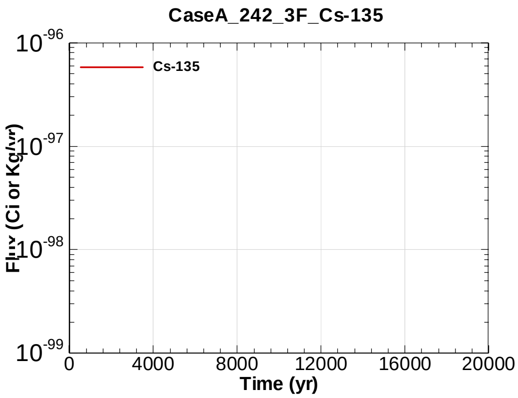

Figure A.1-2137 - Flux Leaving Liner for CaseA 242_3F Cs-135

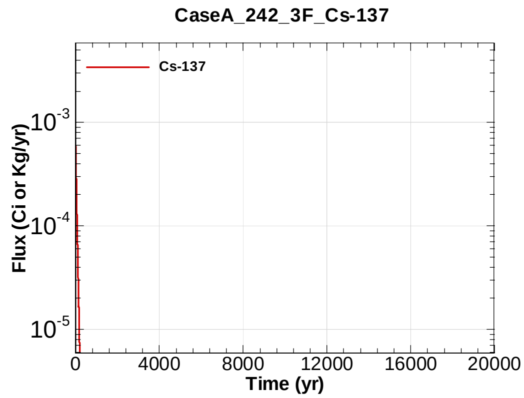

Figure A.1-2138 - Flux Leaving Liner for CaseA 242_3F Cs-137

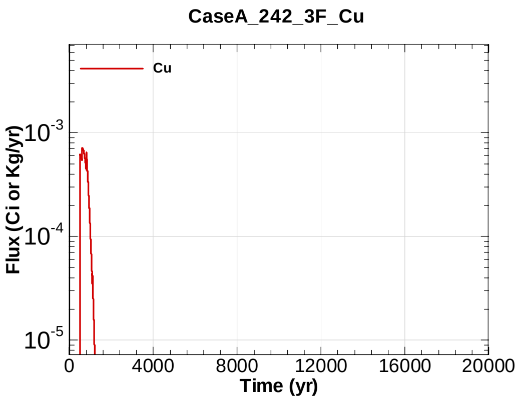

Figure A.1-2139 - Flux Leaving Liner for CaseA 242_3F Cu

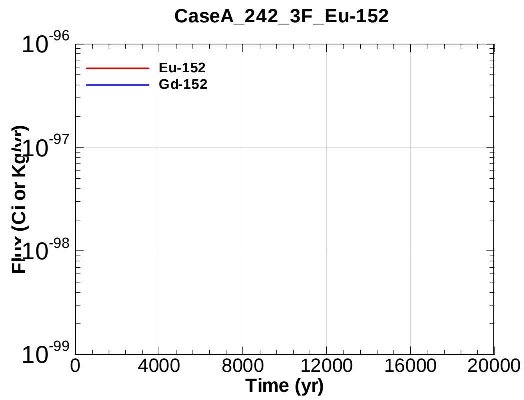

Figure A.1-2140 - Flux Leaving Liner for CaseA 242_3F Eu-152

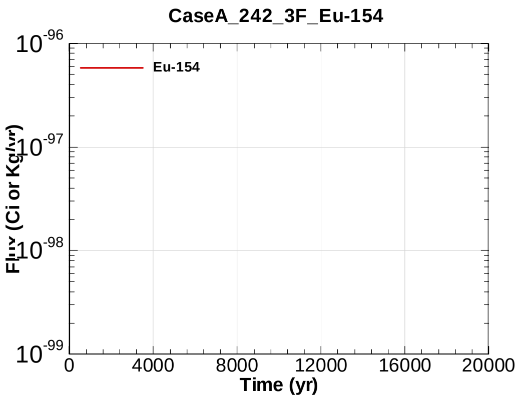

Figure A.1-2141 - Flux Leaving Liner for CaseA 242_3F Eu-154

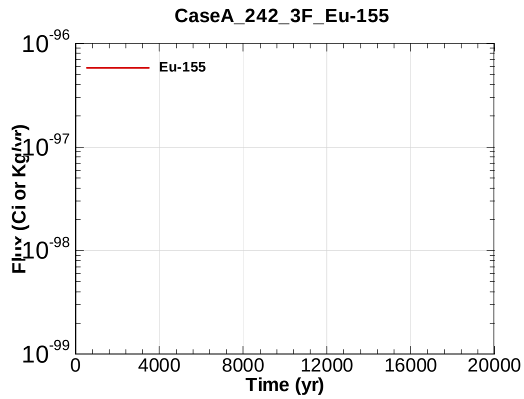

Figure A.1-2142 - Flux Leaving Liner for CaseA 242_3F Eu-155

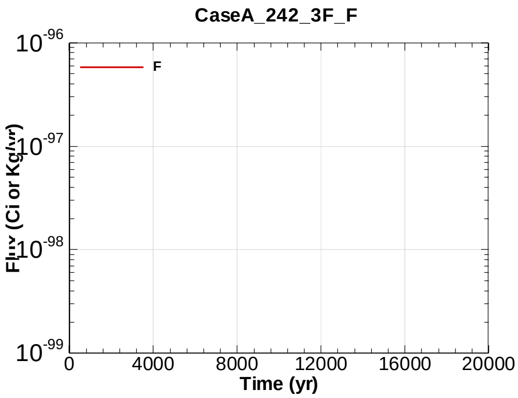

Figure A.1-2143 - Flux Leaving Liner for CaseA 242_3F F

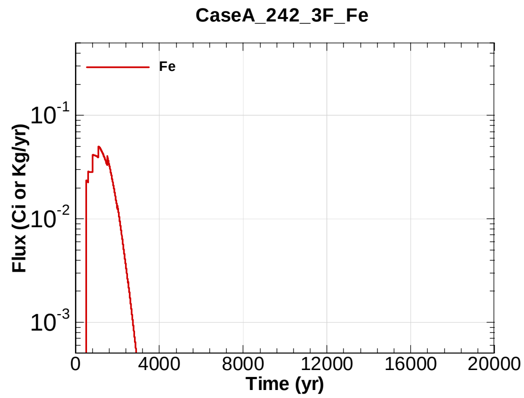

Figure A.1-2144 - Flux Leaving Liner for CaseA 242_3F Fe

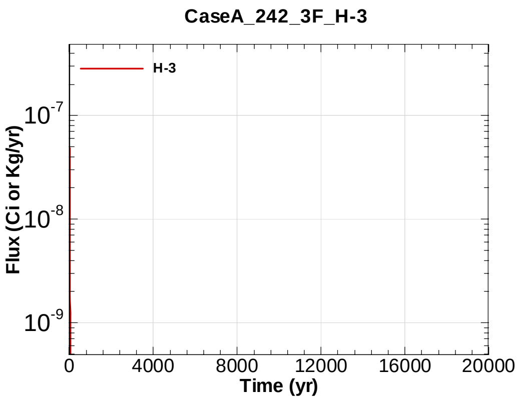

Figure A.1-2145 - Flux Leaving Liner for CaseA 242_3F H-3

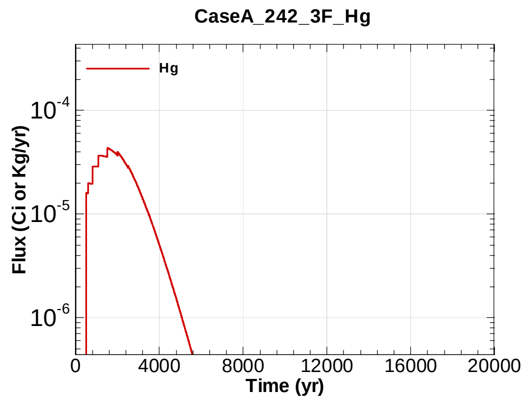

Figure A.1-2146 - Flux Leaving Liner for CaseA 242_3F Hg

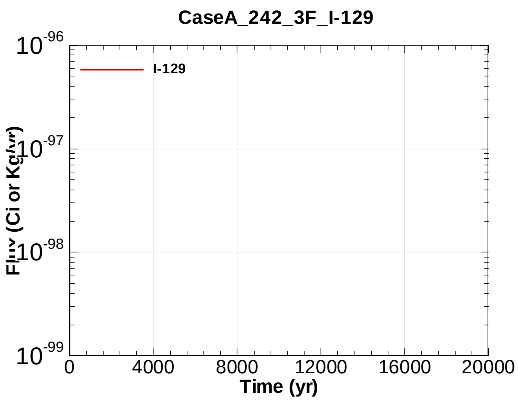

Figure A.1-2147 - Flux Leaving Liner for CaseA 242_3F I-129

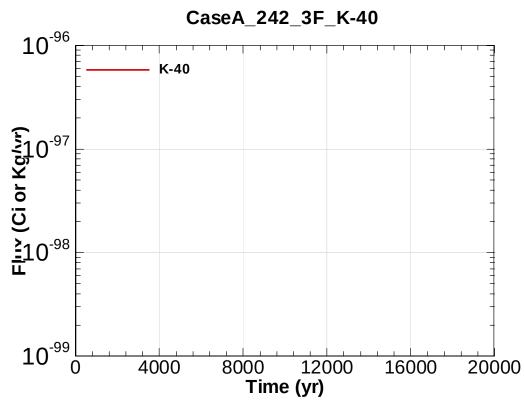

Figure A.1-2148 - Flux Leaving Liner for CaseA 242_3F K-40

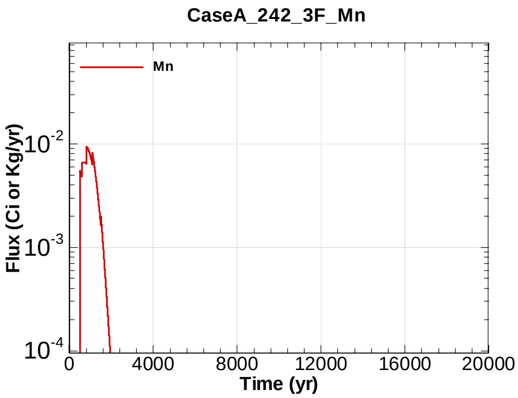

Figure A.1-2149 - Flux Leaving Liner for CaseA 242_3F Mn

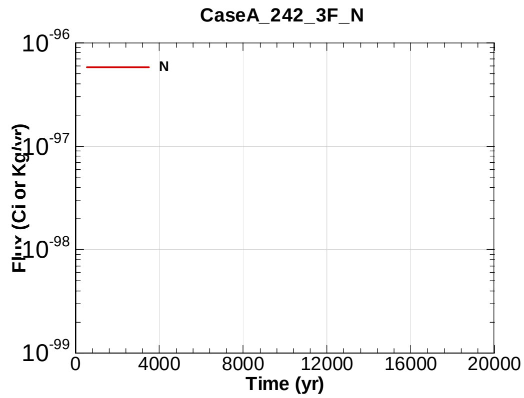

Figure A.1-2150 - Flux Leaving Liner for CaseA 242_3F N

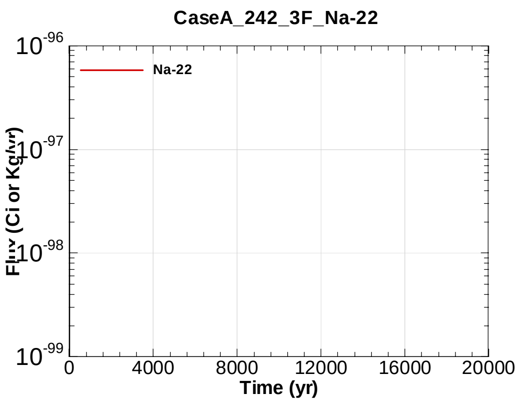

Figure A.1-2151 - Flux Leaving Liner for CaseA 242_3F Na-22

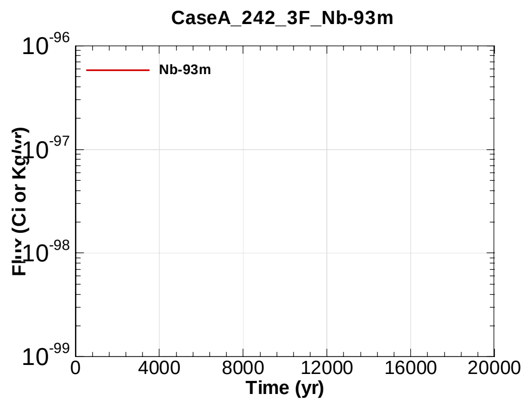

Figure A.1-2152 - Flux Leaving Liner for CaseA 242_3F Nb-93m

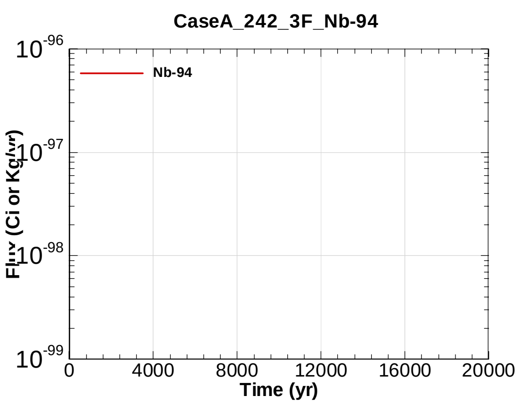

Figure A.1-2153 - Flux Leaving Liner for CaseA 242_3F Nb-94

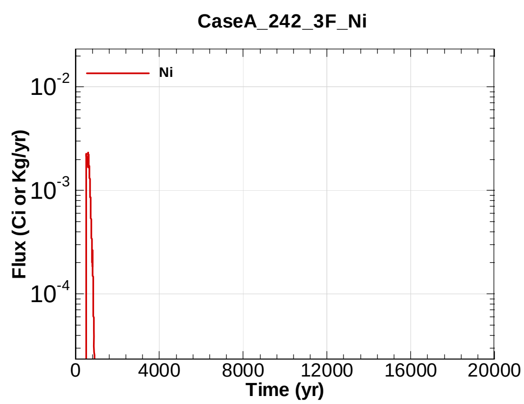

Figure A.1-2154 - Flux Leaving Liner for CaseA 242_3F Ni

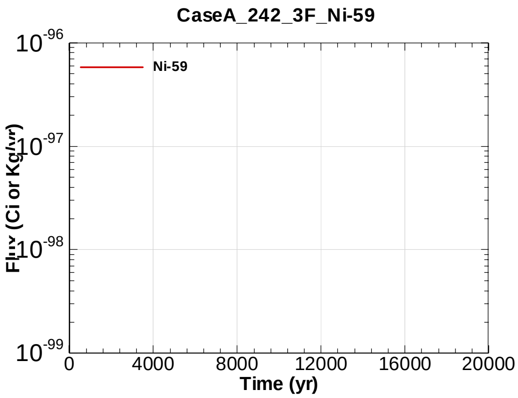

Figure A.1-2155 - Flux Leaving Liner for CaseA 242_3F Ni-59

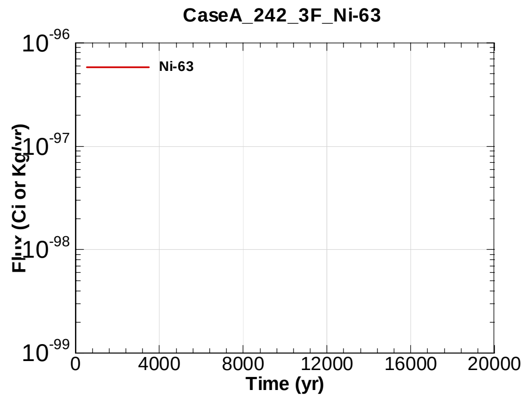

Figure A.1-2156 - Flux Leaving Liner for CaseA 242_3F Ni-63

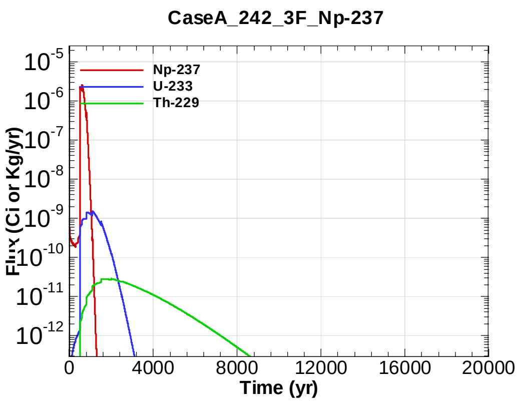

Figure A.1-2157 - Flux Leaving Liner for CaseA 242_3F Np-237

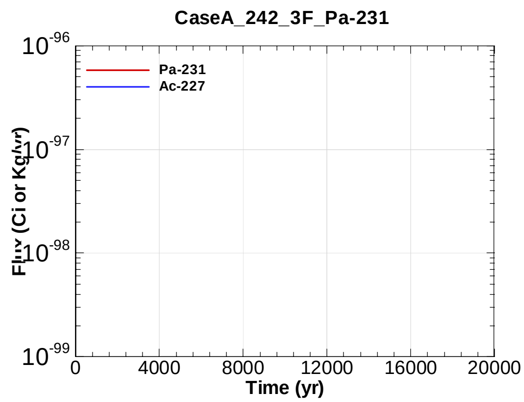

Figure A.1-2158 - Flux Leaving Liner for CaseA 242_3F Pa-231

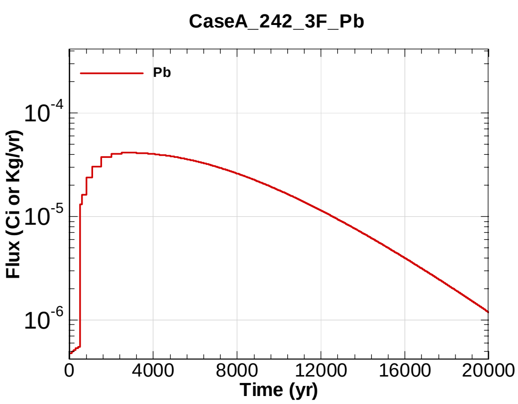

Figure A.1-2159 - Flux Leaving Liner for CaseA 242_3F Pb

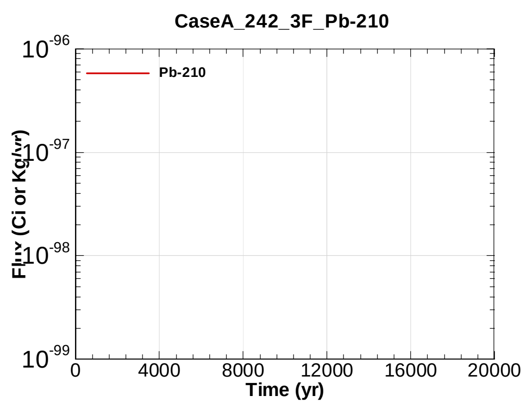

Figure A.1-2160 - Flux Leaving Liner for CaseA 242_3F Pb-210

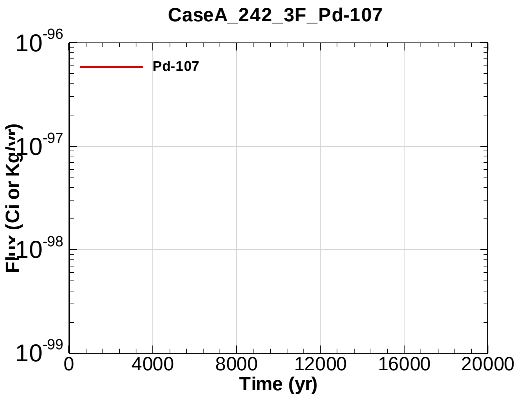

Figure A.1-2161 - Flux Leaving Liner for CaseA 242_3F Pd-107

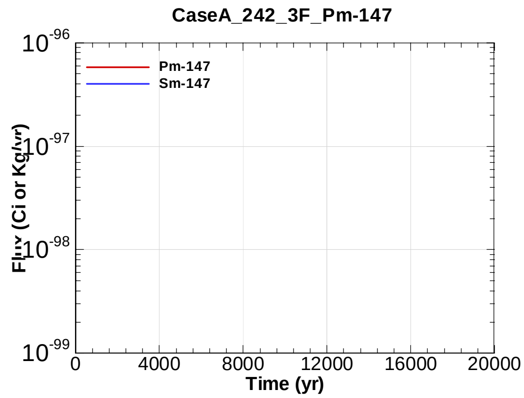

Figure A.1-2162 - Flux Leaving Liner for CaseA 242_3F Pm-147

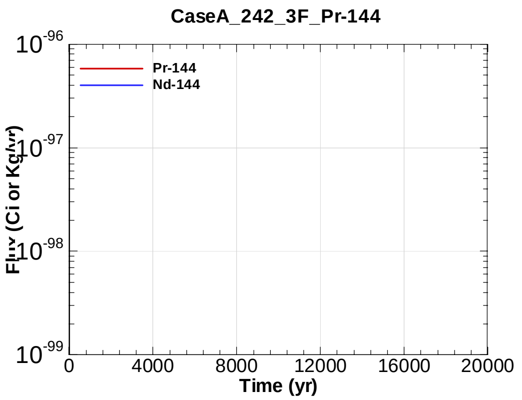

Figure A.1-2163 - Flux Leaving Liner for CaseA 242_3F Pr-144

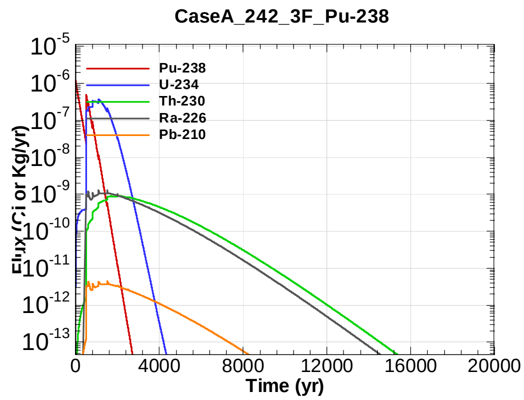

Figure A.1-2164 - Flux Leaving Liner for CaseA 242_3F Pu-238

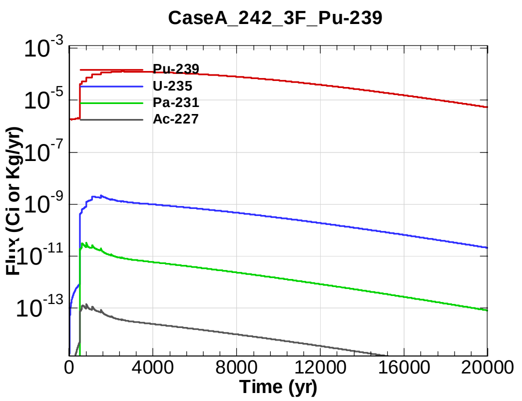

Figure A.1-2165 - Flux Leaving Liner for CaseA 242_3F Pu-239

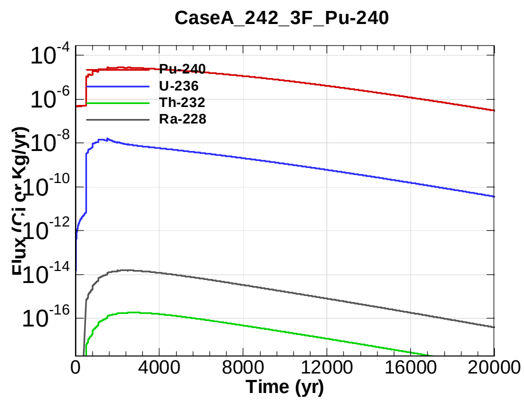

Figure A.1-2166 - Flux Leaving Liner for CaseA 242_3F Pu-240

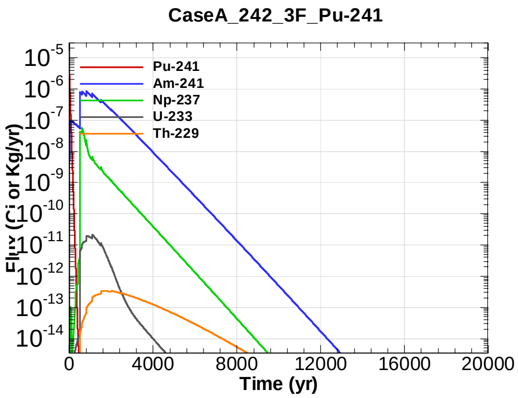

Figure A.1-2167 - Flux Leaving Liner for CaseA 242_3F Pu-241

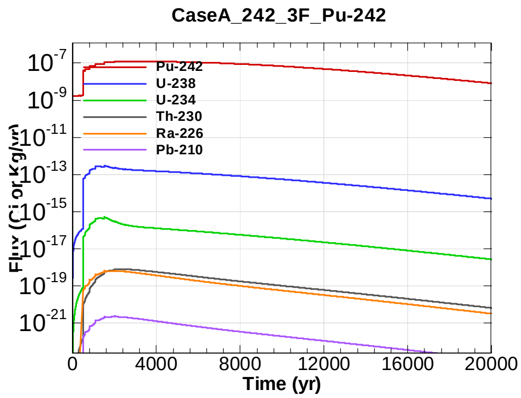

Figure A.1-2168 - Flux Leaving Liner for CaseA 242_3F Pu-242

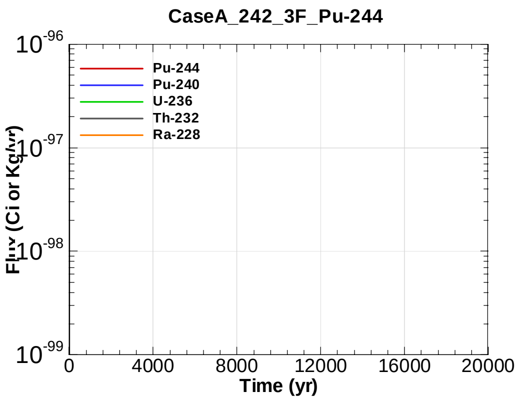

Figure A.1-2169 - Flux Leaving Liner for CaseA 242_3F Pu-244

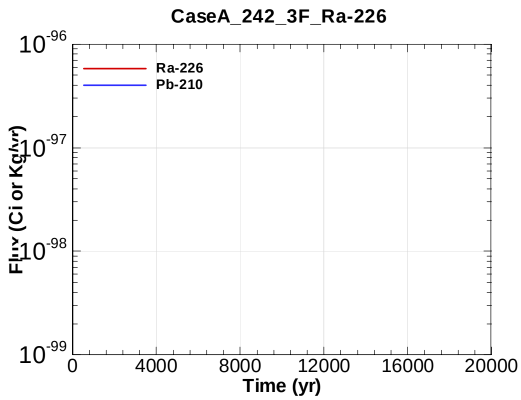

Figure A.1-2170 - Flux Leaving Liner for CaseA 242_3F Ra-226

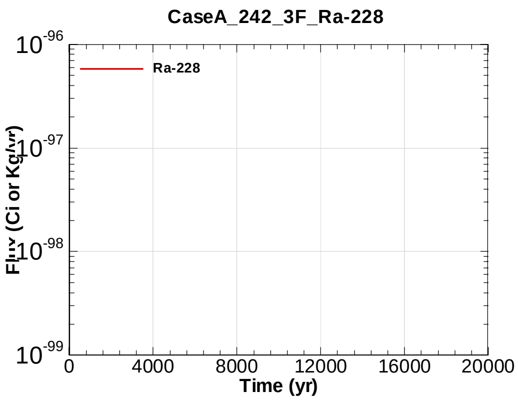

Figure A.1-2171 - Flux Leaving Liner for CaseA 242_3F Ra-228

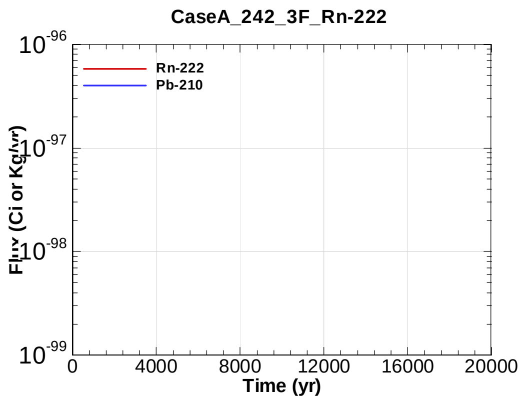

Figure A.1-2172 - Flux Leaving Liner for CaseA 242_3F Rn-222

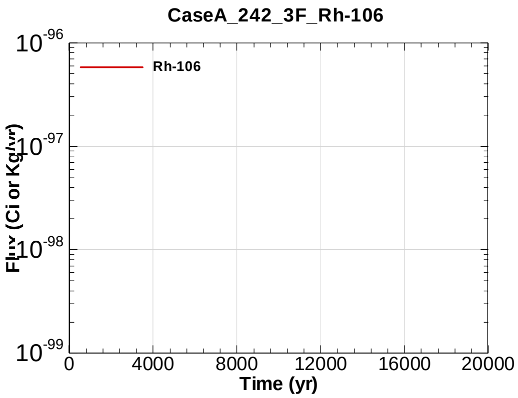

Figure A.1-2173 - Flux Leaving Liner for CaseA 242_3F Rh-106

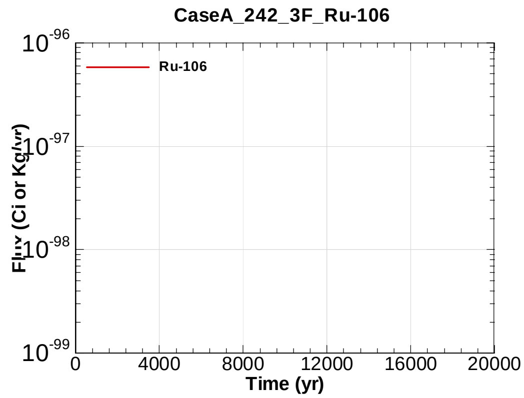

Figure A.1-2174 - Flux Leaving Liner for CaseA 242_3F Ru-106

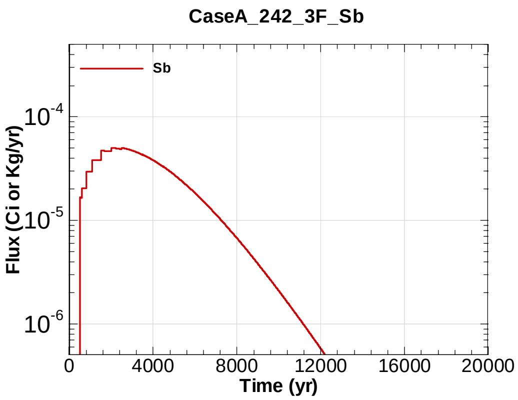

Figure A.1-2175 - Flux Leaving Liner for CaseA 242_3F Sb

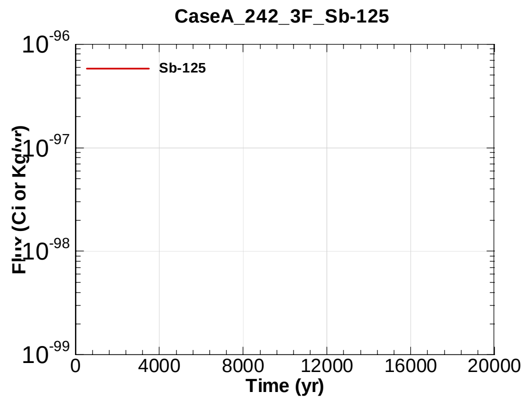

Figure A.1-2176 - Flux Leaving Liner for CaseA 242_3F Sb-125

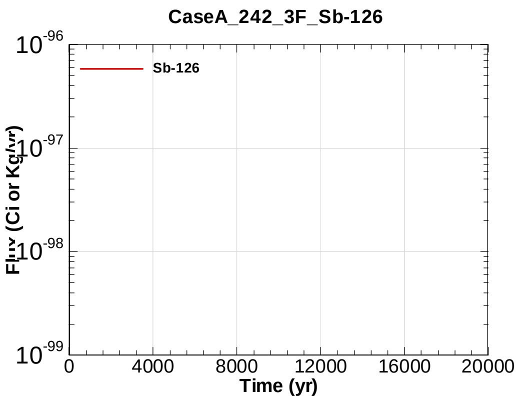

Figure A.1-2177 - Flux Leaving Liner for CaseA 242_3F Sb-126

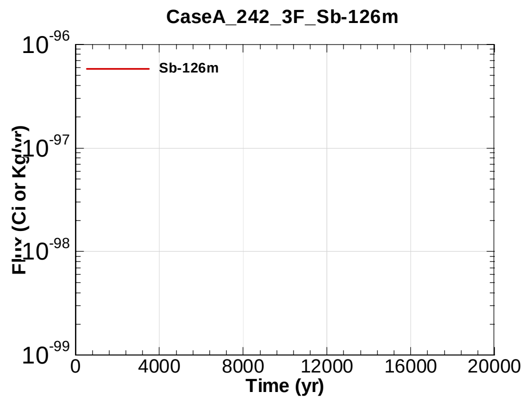

Figure A.1-2178 - Flux Leaving Liner for CaseA 242_3F Sb-126m

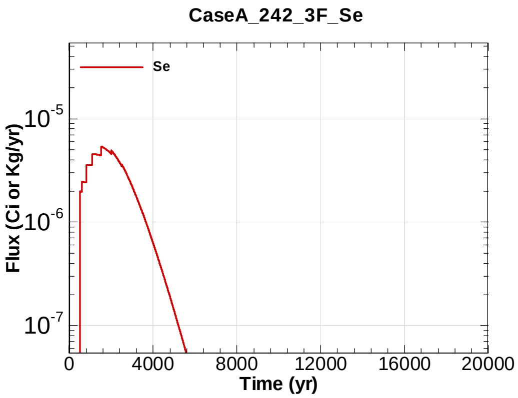

Figure A.1-2179 - Flux Leaving Liner for CaseA 242_3F Se

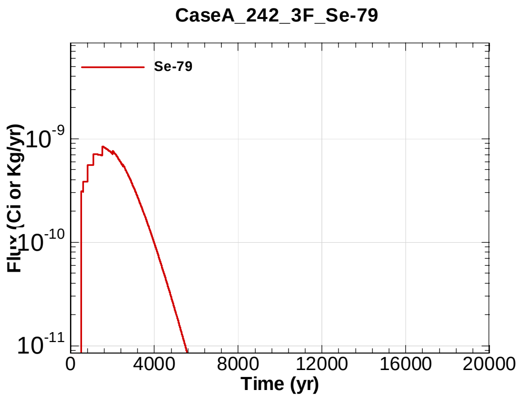

Figure A.1-2180 - Flux Leaving Liner for CaseA 242_3F Se-79

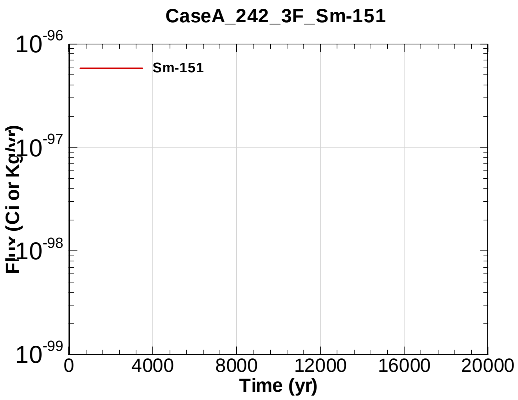

Figure A.1-2181 - Flux Leaving Liner for CaseA 242_3F Sm-151

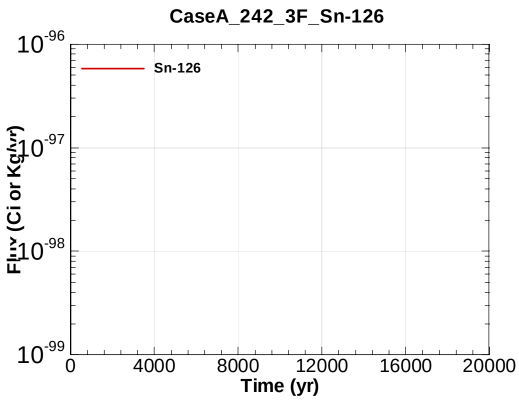

Figure A.1-2182 - Flux Leaving Liner for CaseA 242_3F Sn-126

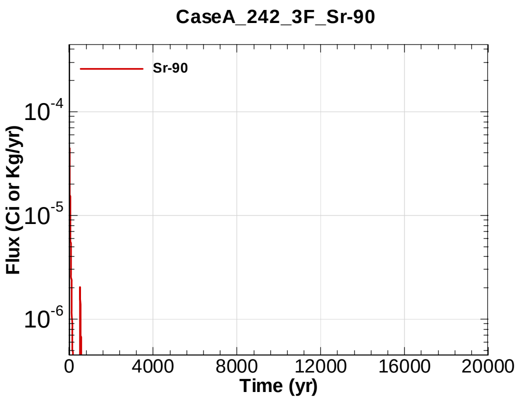

Figure A.1-2183 - Flux Leaving Liner for CaseA 242_3F Sr-90

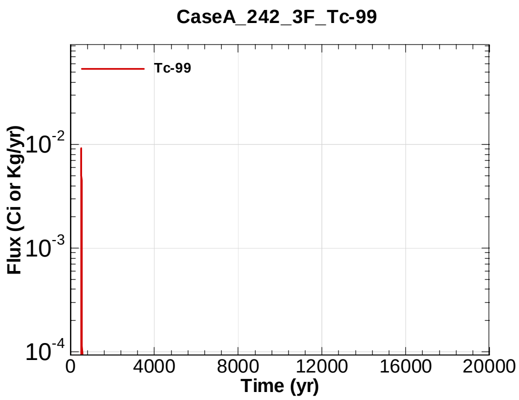

Figure A.1-2184 - Flux Leaving Liner for CaseA 242_3F Tc-99

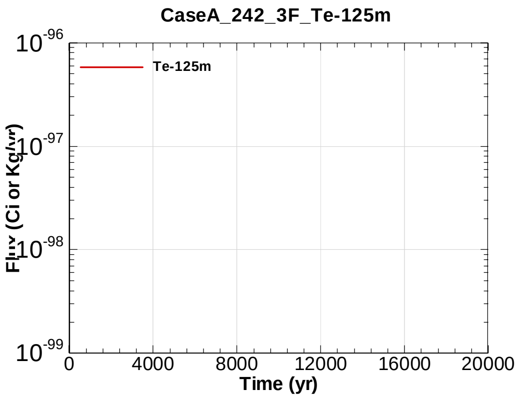

Figure A.1-2185 - Flux Leaving Liner for CaseA 242_3F Te-125m

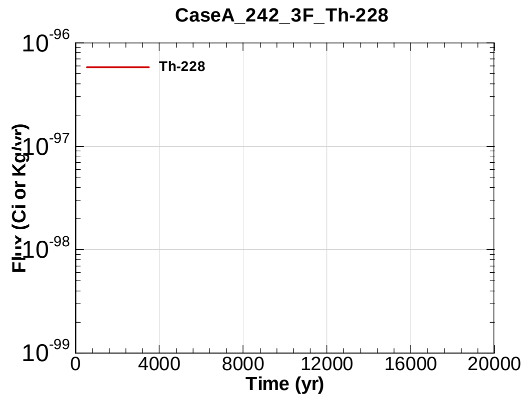

Figure A.1-2186 - Flux Leaving Liner for CaseA 242_3F Th-228

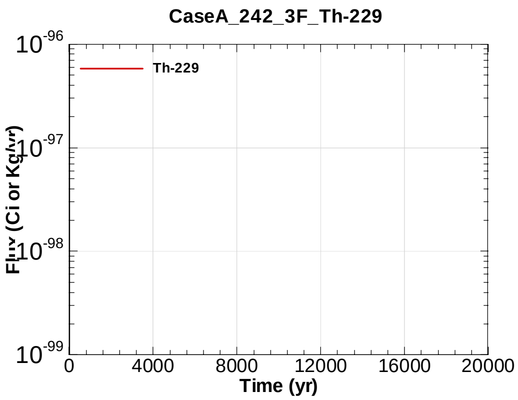

Figure A.1-2187 - Flux Leaving Liner for CaseA 242_3F Th-229

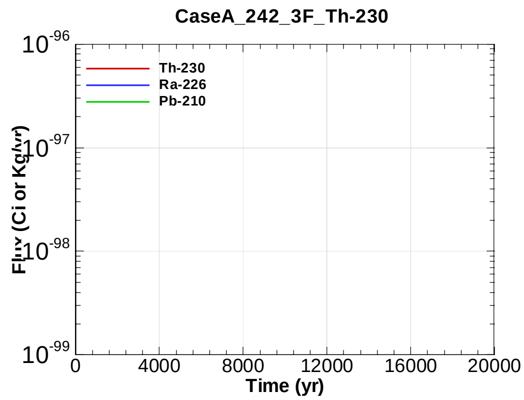

Figure A.1-2188 - Flux Leaving Liner for CaseA 242_3F Th-230

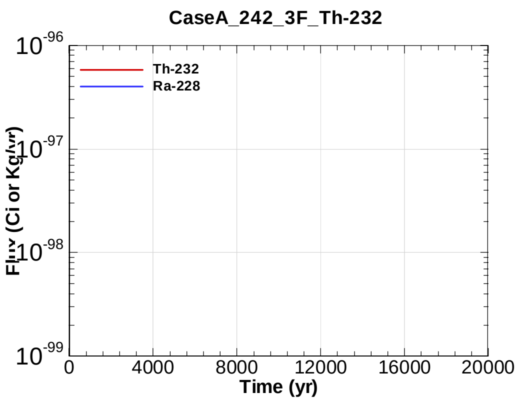

Figure A.1-2189 - Flux Leaving Liner for CaseA 242_3F Th-232

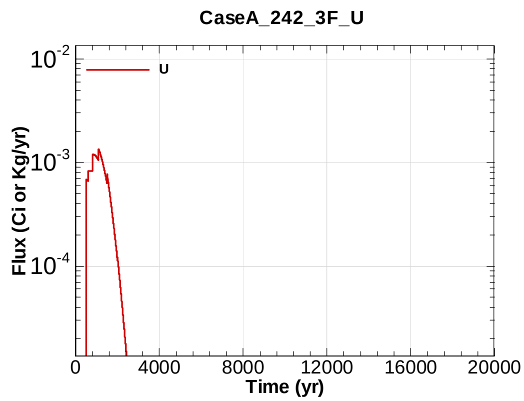

Figure A.1-2190 - Flux Leaving Liner for CaseA 242_3F U

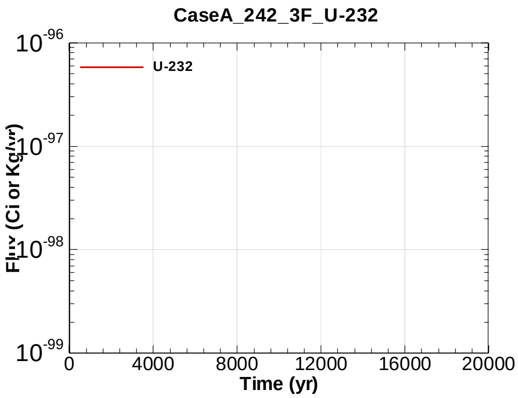

Figure A.1-2191 - Flux Leaving Liner for CaseA 242_3F U-232

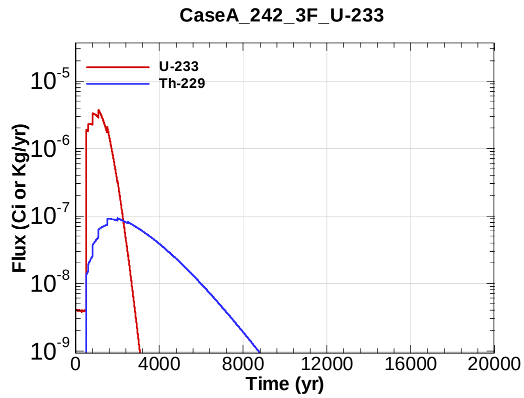

Figure A.1-2192 - Flux Leaving Liner for CaseA 242_3F U-233

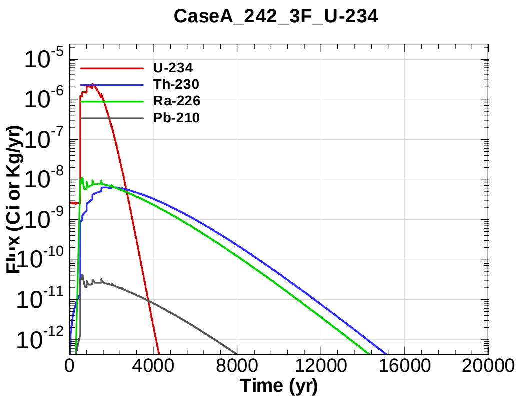

Figure A.1-2193 - Flux Leaving Liner for CaseA 242_3F U-234

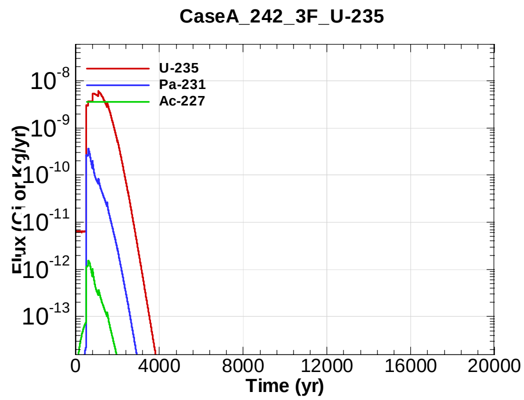

Figure A.1-2194 - Flux Leaving Liner for CaseA 242_3F U-235

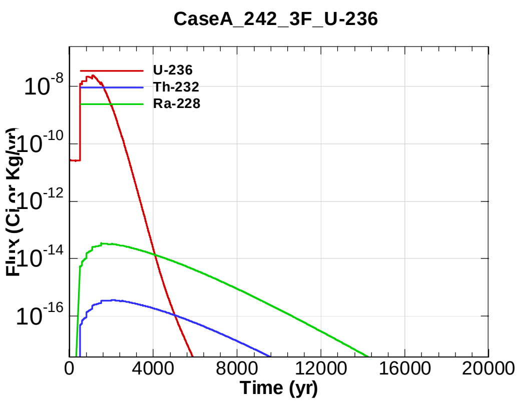

Figure A.1-2195 - Flux Leaving Liner for CaseA 242_3F U-236

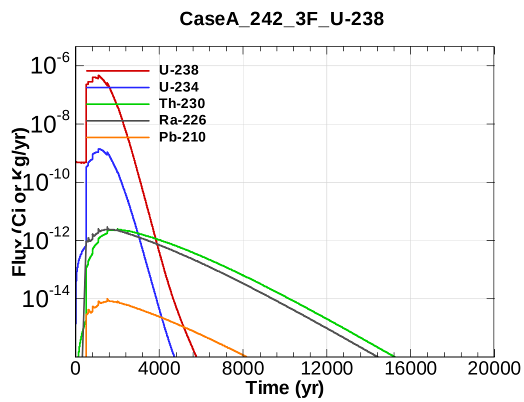

Figure A.1-2196 - Flux Leaving Liner for CaseA 242_3F U-238

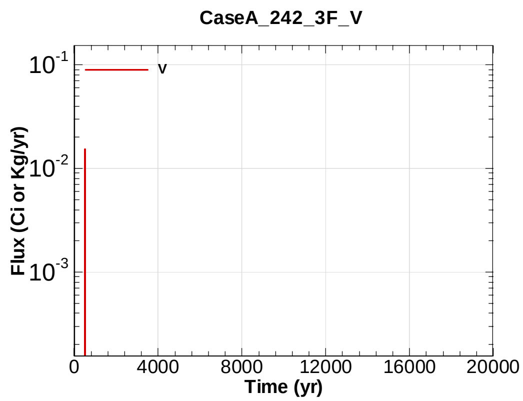

Figure A.1-2197 - Flux Leaving Liner for CaseA 242_3F V

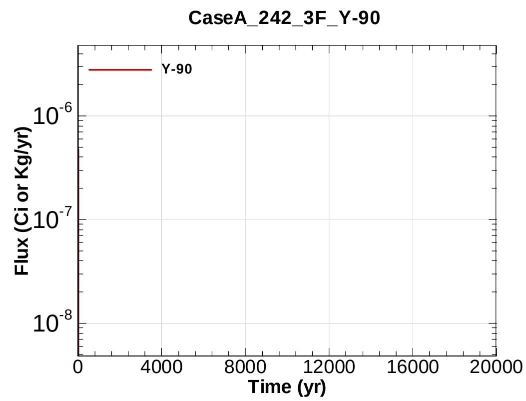

Figure A.1-2198 - Flux Leaving Liner for CaseA 242_3F Y-90

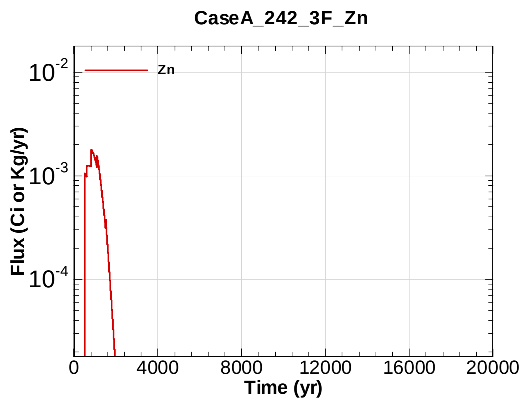

Figure A.1-2199 - Flux Leaving Liner for CaseA 242_3F Zn

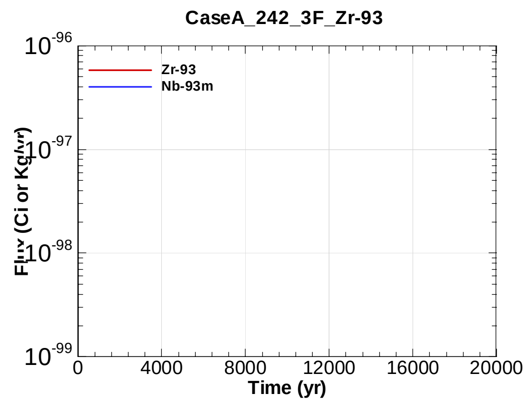

Figure A.1-2200 - Flux Leaving Liner for CaseA 242_3F Zr-93

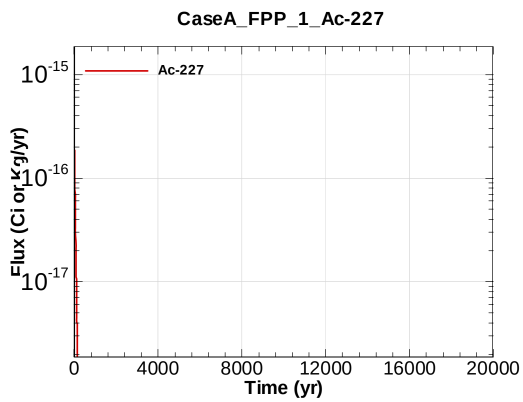

Figure A.1-2201 - Flux Leaving Liner for CaseA FPP_1 Ac-227

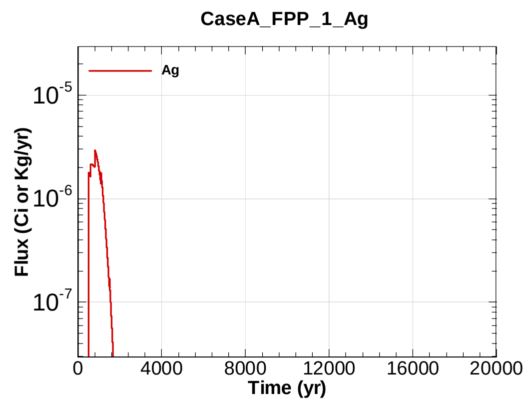

Figure A.1-2202 - Flux Leaving Liner for CaseA FPP_1 Ag

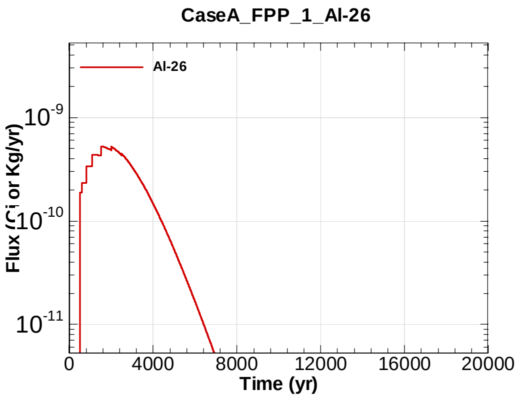

Figure A.1-2203 - Flux Leaving Liner for CaseA FPP_1 Al-26

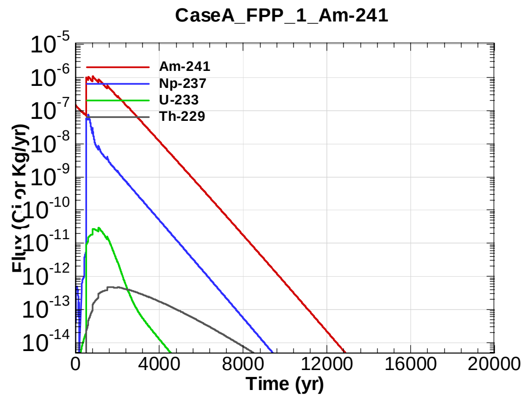

Figure A.1-2204 - Flux Leaving Liner for CaseA FPP_1 Am-241

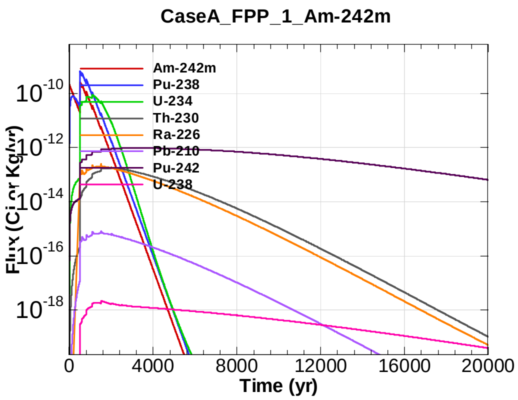

Figure A.1-2205 - Flux Leaving Liner for CaseA FPP_1 Am-242m

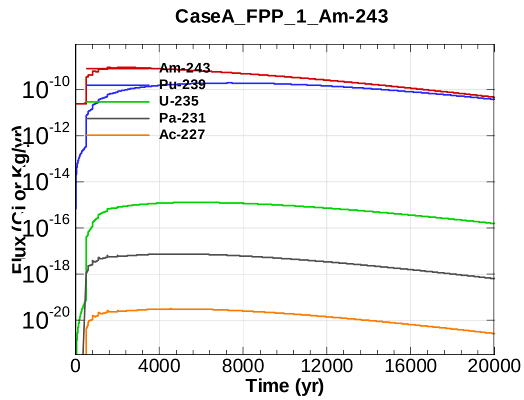

Figure A.1-2206 - Flux Leaving Liner for CaseA FPP_1 Am-243

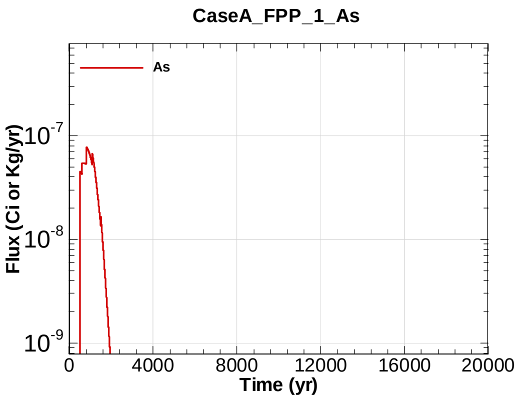

Figure A.1-2207 - Flux Leaving Liner for CaseA FPP_1 As

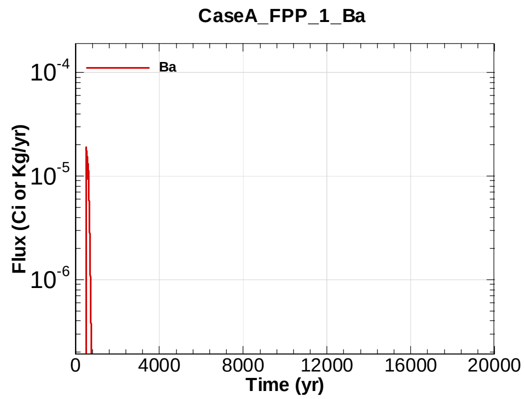

Figure A.1-2208 - Flux Leaving Liner for CaseA FPP_1 Ba

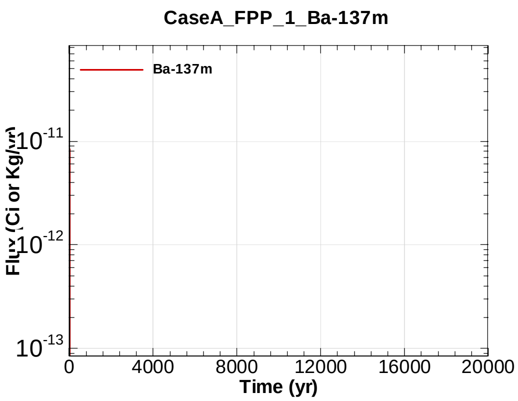

Figure A.1-2209 - Flux Leaving Liner for CaseA FPP_1 Ba-137m

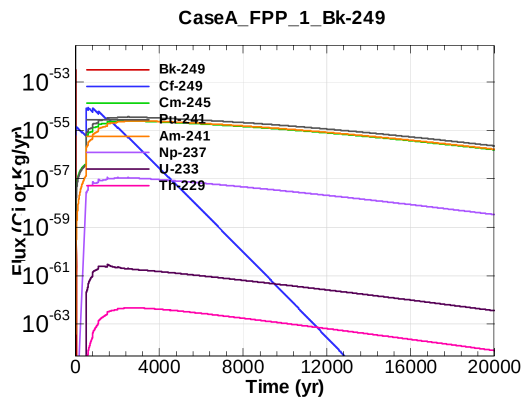

Figure A.1-2210 - Flux Leaving Liner for CaseA FPP_1 Bk-249

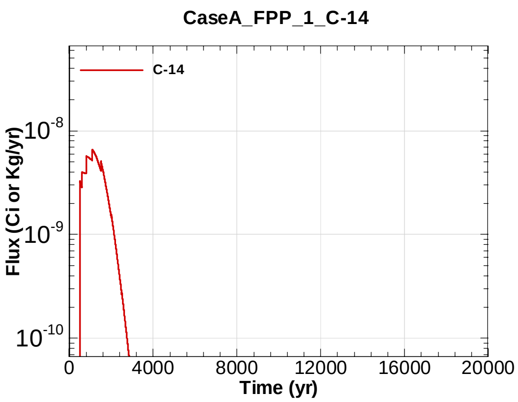

Figure A.1-2211 - Flux Leaving Liner for CaseA FPP_1 C-14

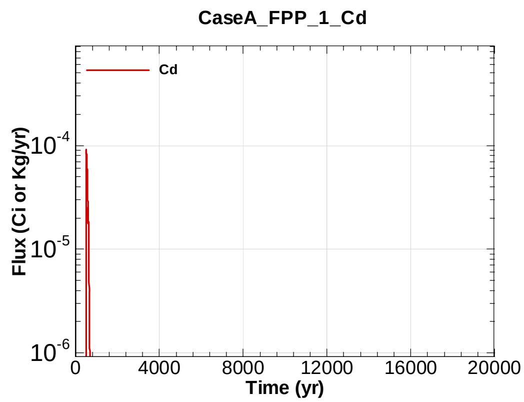

Figure A.1-2212 - Flux Leaving Liner for CaseA FPP_1 Cd

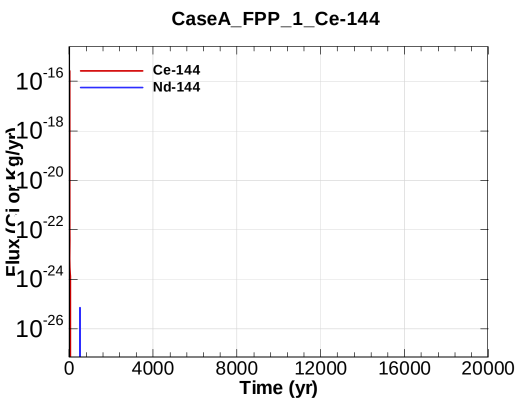

Figure A.1-2213 - Flux Leaving Liner for CaseA FPP_1 Ce-144

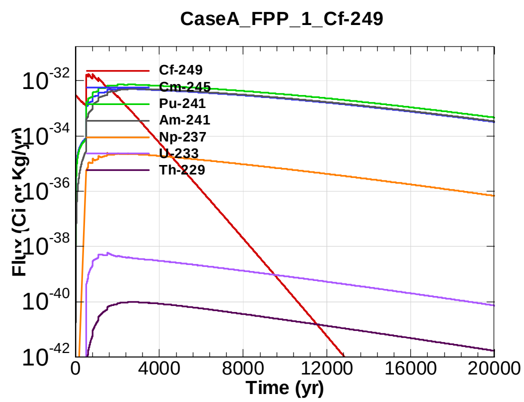

Figure A.1-2214 - Flux Leaving Liner for CaseA FPP_1 Cf-249

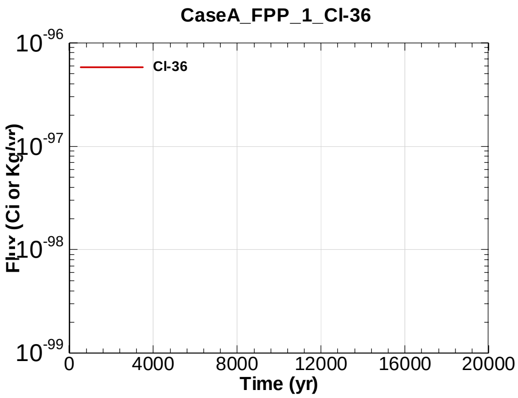

Figure A.1-2215 - Flux Leaving Liner for CaseA FPP_1 Cl-36

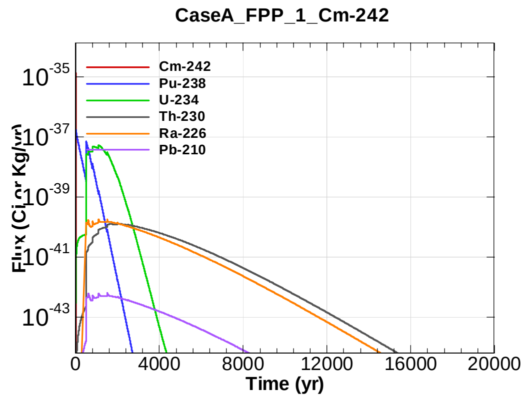

Figure A.1-2216 - Flux Leaving Liner for CaseA FPP_1 Cm-242

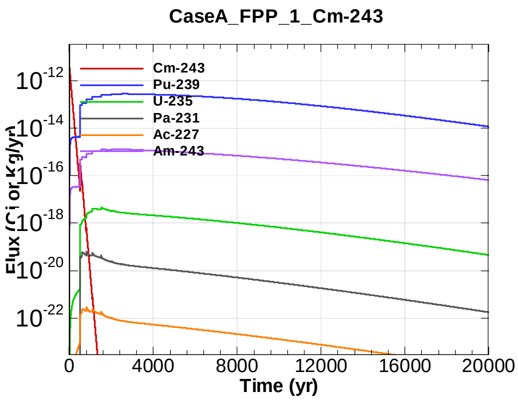

Figure A.1-2217 - Flux Leaving Liner for CaseA FPP_1 Cm-243

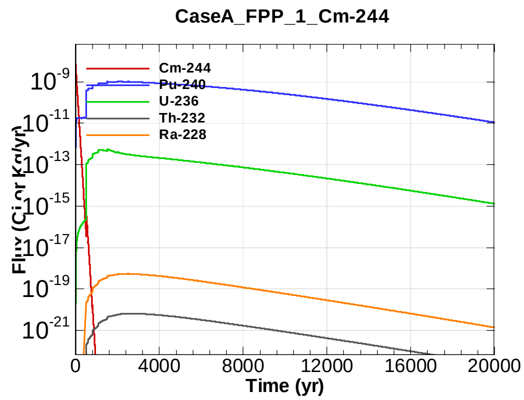

Figure A.1-2218 - Flux Leaving Liner for CaseA FPP_1 Cm-244

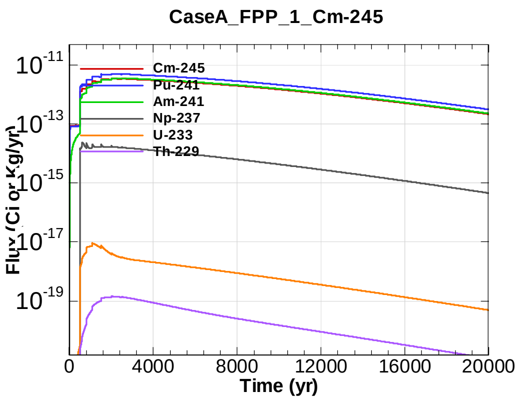

Figure A.1-2219 - Flux Leaving Liner for CaseA FPP_1 Cm-245

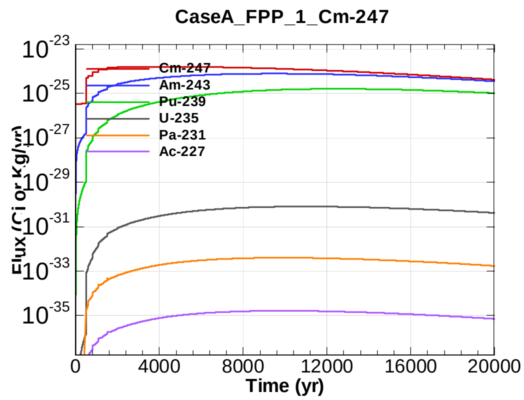

Figure A.1-2220 - Flux Leaving Liner for CaseA FPP_1 Cm-247

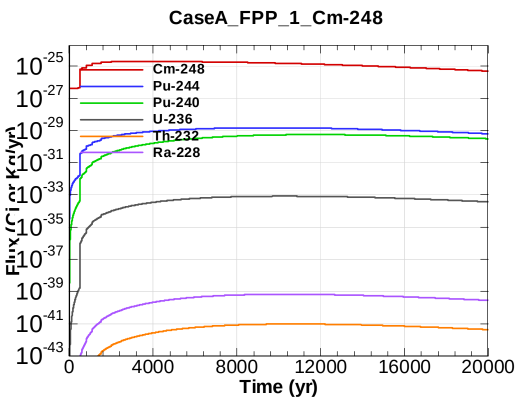

Figure A.1-2221 - Flux Leaving Liner for CaseA FPP_1 Cm-248

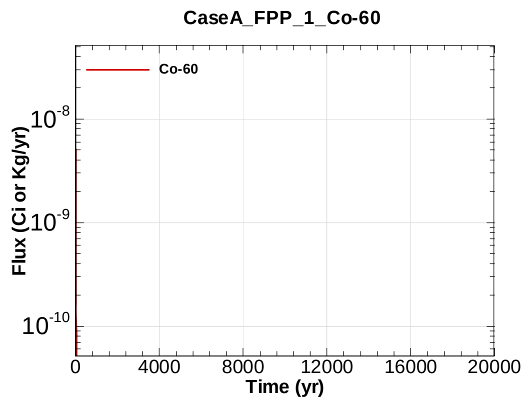

Figure A.1-2222 - Flux Leaving Liner for CaseA FPP_1 Co-60

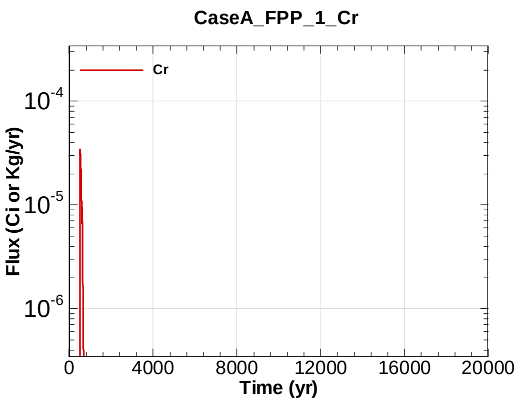

Figure A.1-2223 - Flux Leaving Liner for CaseA FPP_1 Cr

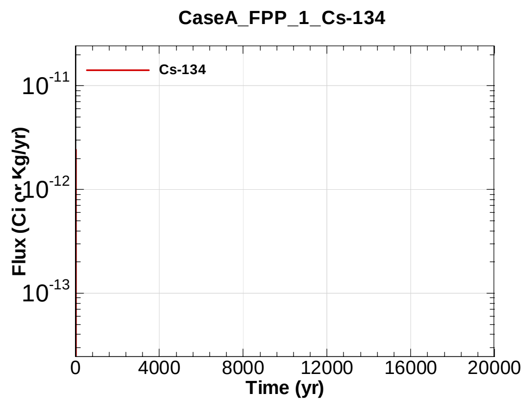

Figure A.1-2224 - Flux Leaving Liner for CaseA FPP_1 Cs-134

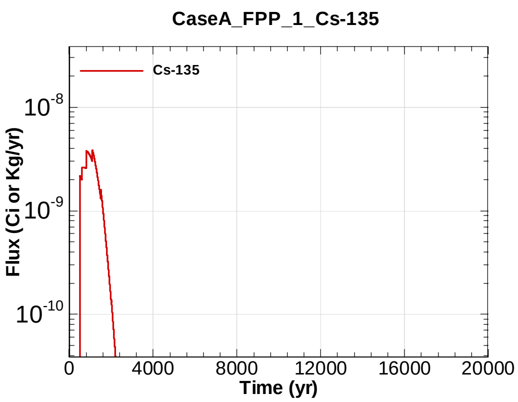

Figure A.1-2225 - Flux Leaving Liner for CaseA FPP_1 Cs-135

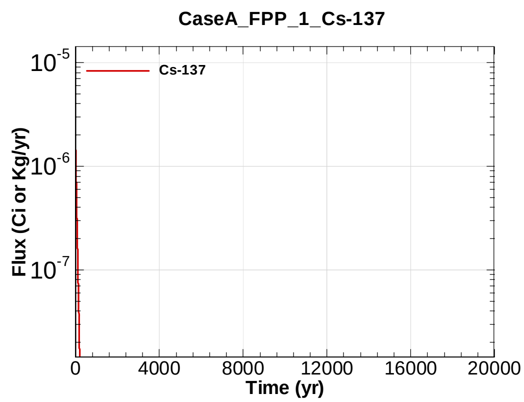

Figure A.1-2226 - Flux Leaving Liner for CaseA FPP_1 Cs-137

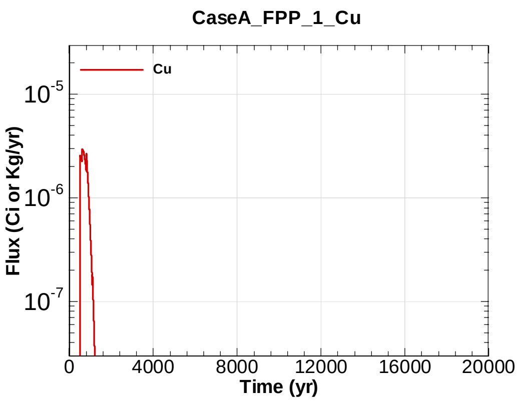

Figure A.1-2227 - Flux Leaving Liner for CaseA FPP_1 Cu

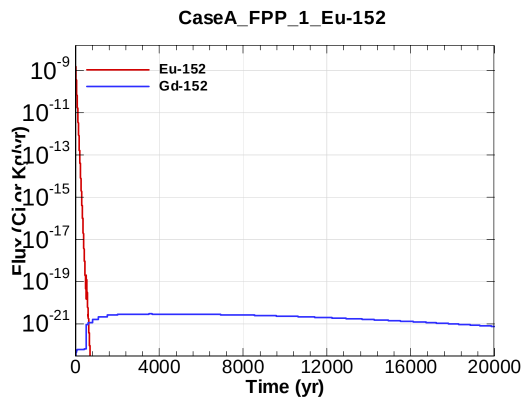

Figure A.1-2228 - Flux Leaving Liner for CaseA FPP_1 Eu-152

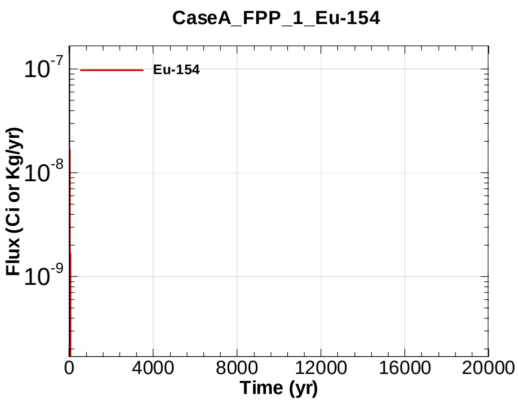

Figure A.1-2229 - Flux Leaving Liner for CaseA FPP_1 Eu-154

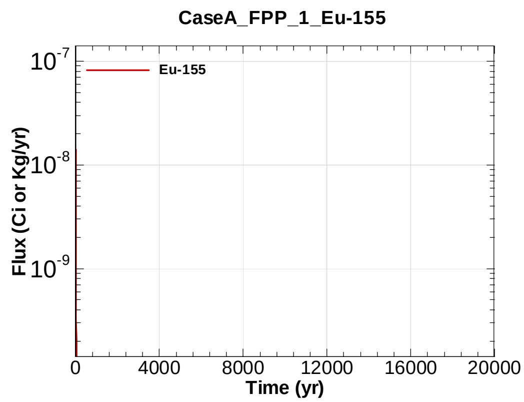

Figure A.1-2230 - Flux Leaving Liner for CaseA FPP_1 Eu-155

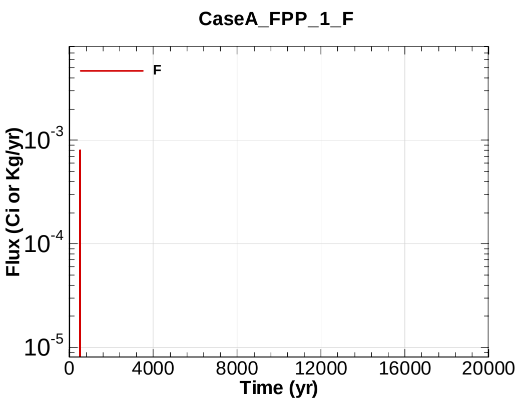

Figure A.1-2231 - Flux Leaving Liner for CaseA FPP_1 F

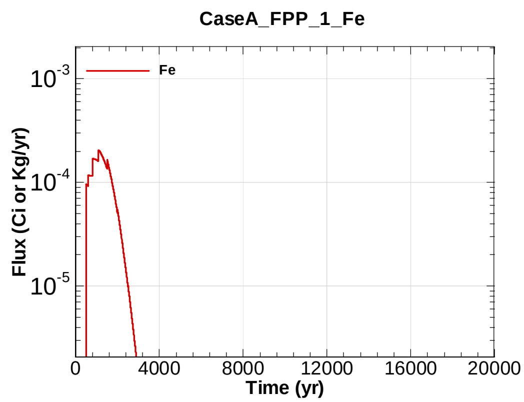

Figure A.1-2232 - Flux Leaving Liner for CaseA FPP_1 Fe

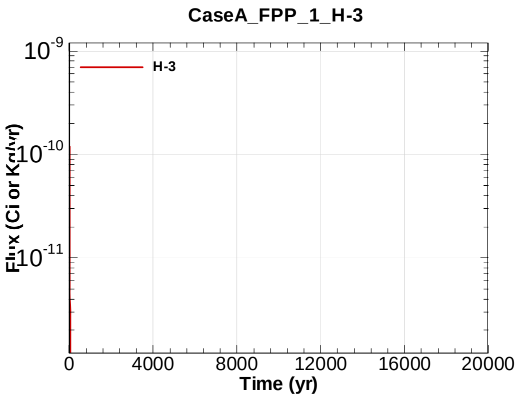

Figure A.1-2233 - Flux Leaving Liner for CaseA FPP_1 H-3

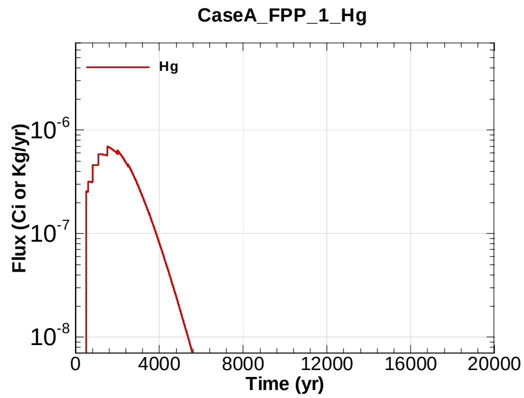

Figure A.1-2234 - Flux Leaving Liner for CaseA FPP_1 Hg

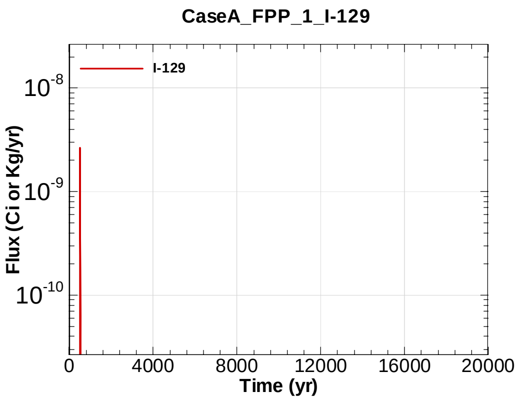

Figure A.1-2235 - Flux Leaving Liner for CaseA FPP_1 I-129

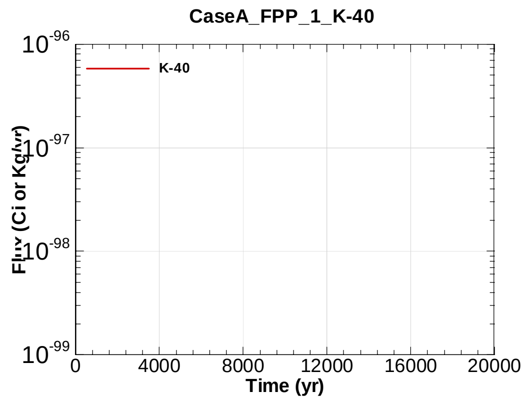

Figure A.1-2236 - Flux Leaving Liner for CaseA FPP_1 K-40

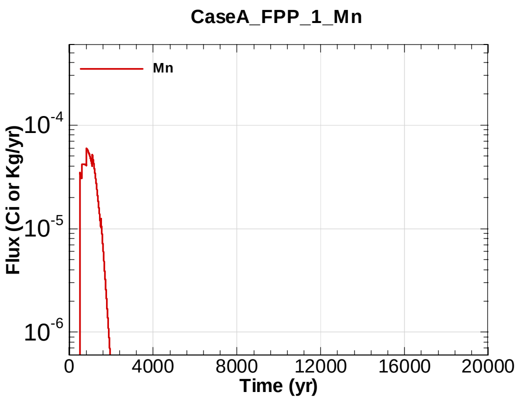

Figure A.1-2237 - Flux Leaving Liner for CaseA FPP_1 Mn

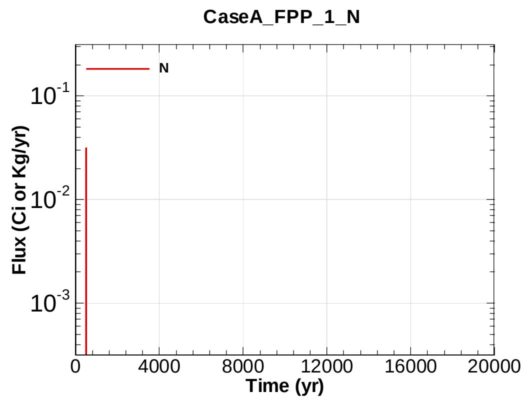

Figure A.1-2238 - Flux Leaving Liner for CaseA FPP_1 N

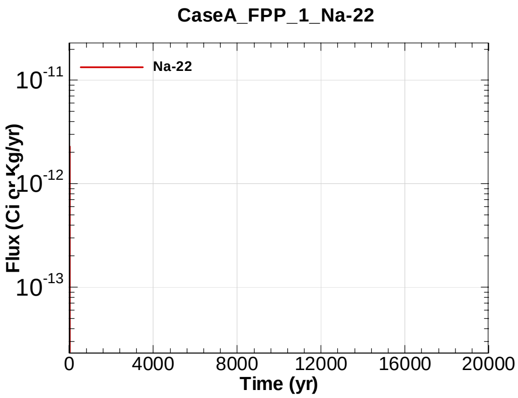

Figure A.1-2239 - Flux Leaving Liner for CaseA FPP_1 Na-22

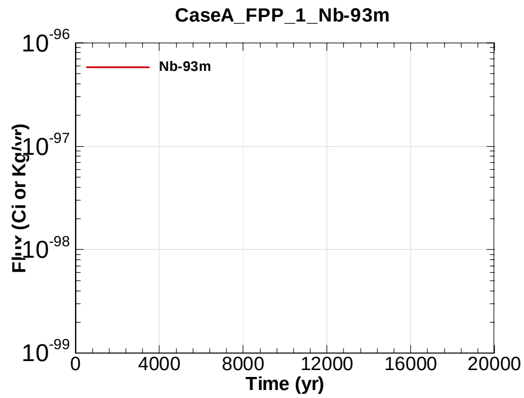

Figure A.1-2240 - Flux Leaving Liner for CaseA FPP_1 Nb-93m

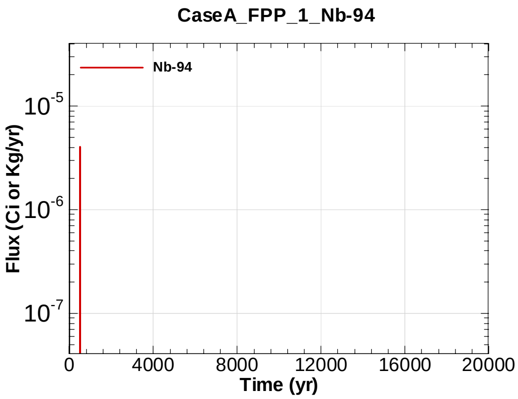

Figure A.1-2241 - Flux Leaving Liner for CaseA FPP_1 Nb-94

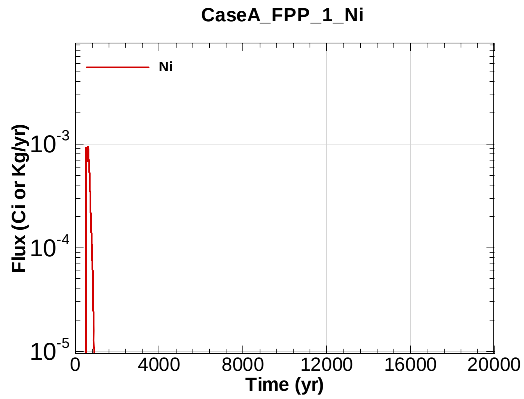

Figure A.1-2242 - Flux Leaving Liner for CaseA FPP_1 Ni

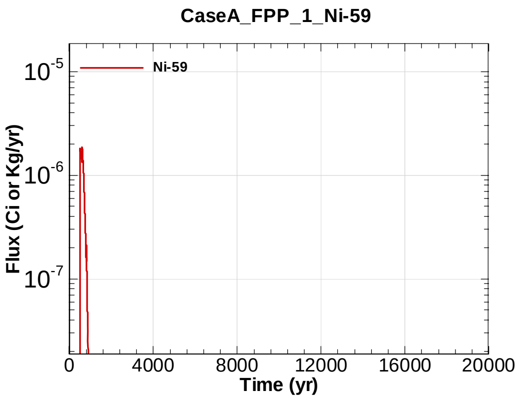

Figure A.1-2243 - Flux Leaving Liner for CaseA FPP_1 Ni-59

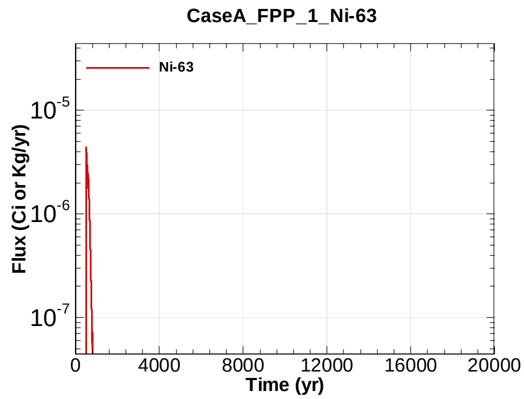

Figure A.1-2244 - Flux Leaving Liner for CaseA FPP_1 Ni-63

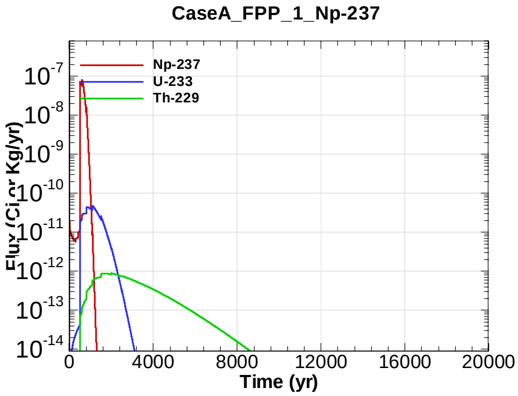

Figure A.1-2245 - Flux Leaving Liner for CaseA FPP_1 Np-237

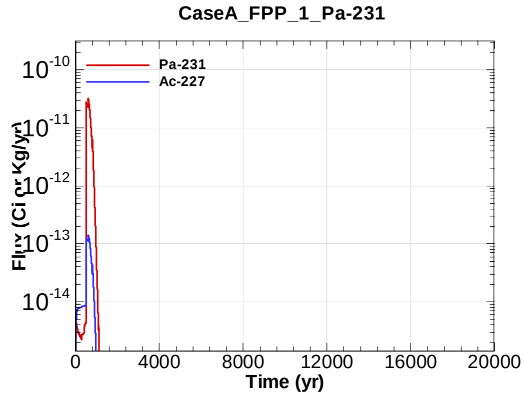

Figure A.1-2246 - Flux Leaving Liner for CaseA FPP_1 Pa-231

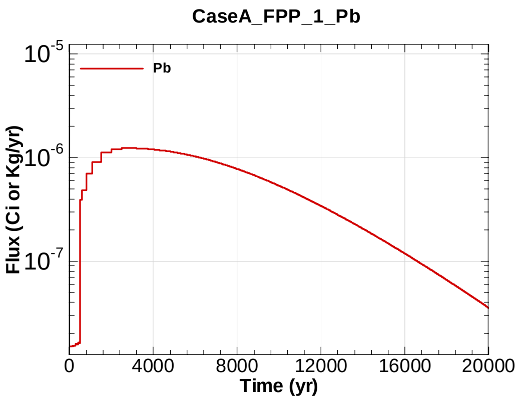

Figure A.1-2247 - Flux Leaving Liner for CaseA FPP_1 Pb

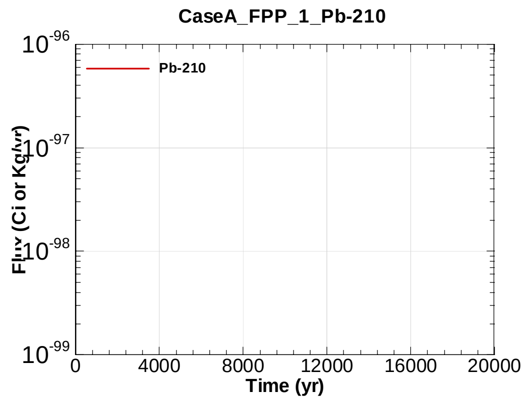

Figure A.1-2248 - Flux Leaving Liner for CaseA FPP_1 Pb-210

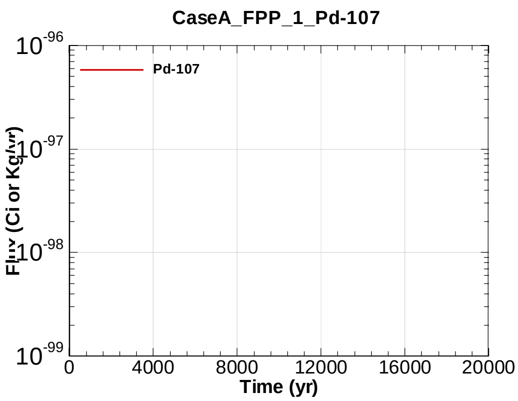

Figure A.1-2249 - Flux Leaving Liner for CaseA FPP_1 Pd-107

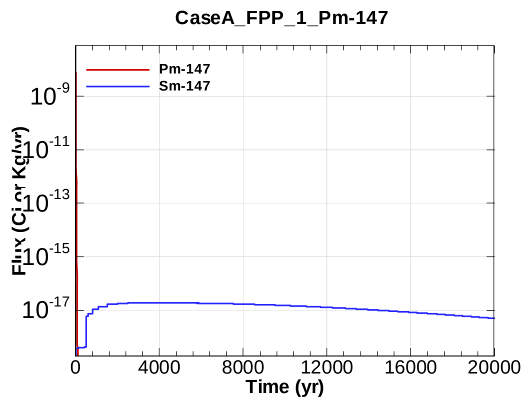

Figure A.1-2250 - Flux Leaving Liner for CaseA FPP_1 Pm-147

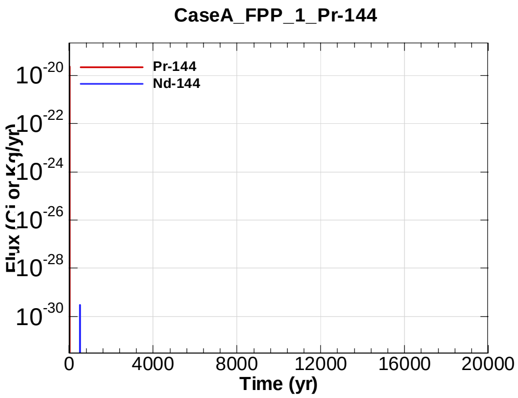

Figure A.1-2251 - Flux Leaving Liner for CaseA FPP_1 Pr-144

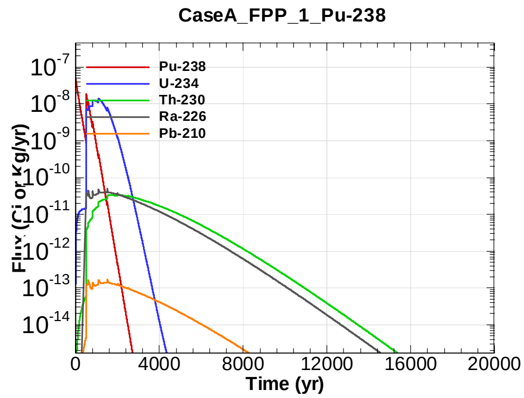

Figure A.1-2252 - Flux Leaving Liner for CaseA FPP_1 Pu-238

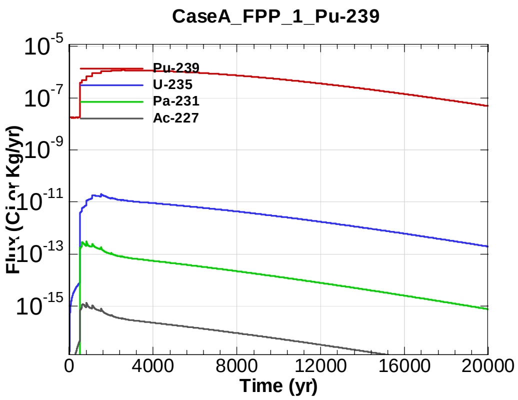

Figure A.1-2253 - Flux Leaving Liner for CaseA FPP_1 Pu-239

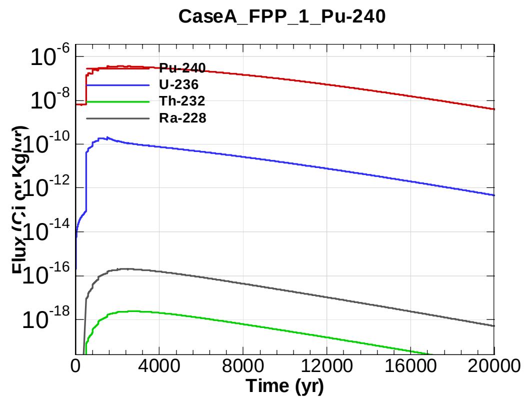

Figure A.1-2254 - Flux Leaving Liner for CaseA FPP_1 Pu-240

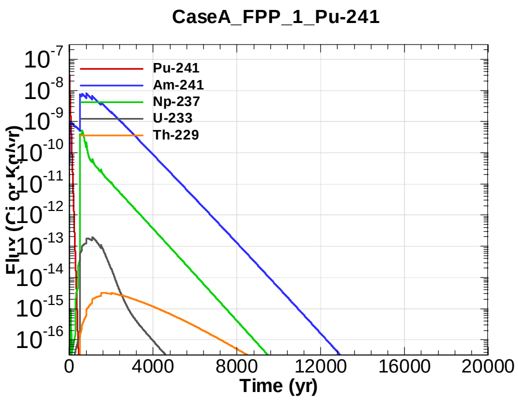

Figure A.1-2255 - Flux Leaving Liner for CaseA FPP_1 Pu-241

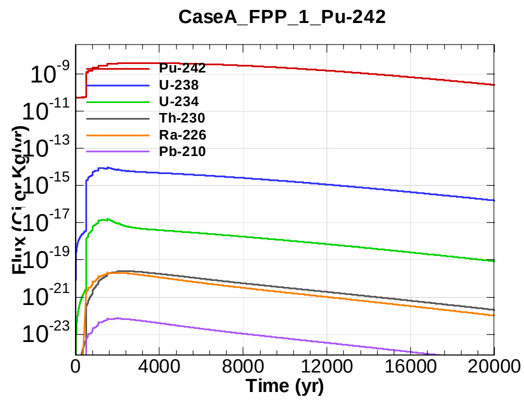

Figure A.1-2256 - Flux Leaving Liner for CaseA FPP_1 Pu-242

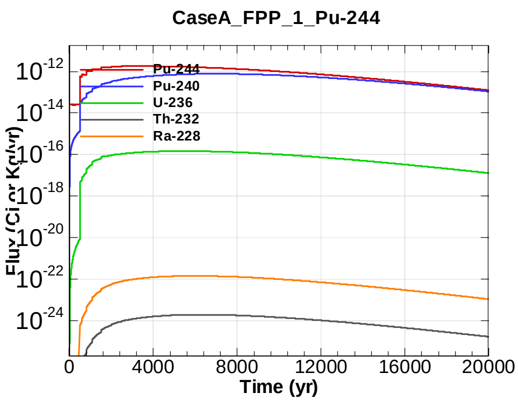

Figure A.1-2257 - Flux Leaving Liner for CaseA FPP_1 Pu-244

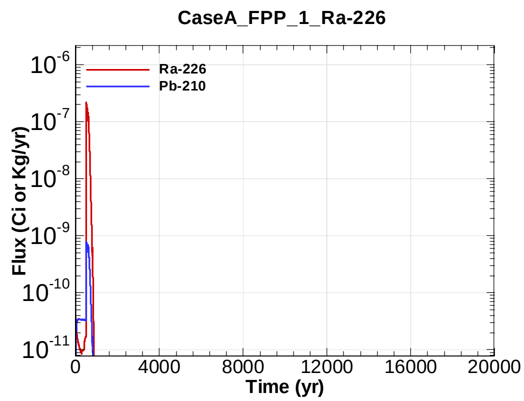

Figure A.1-2258 - Flux Leaving Liner for CaseA FPP_1 Ra-226

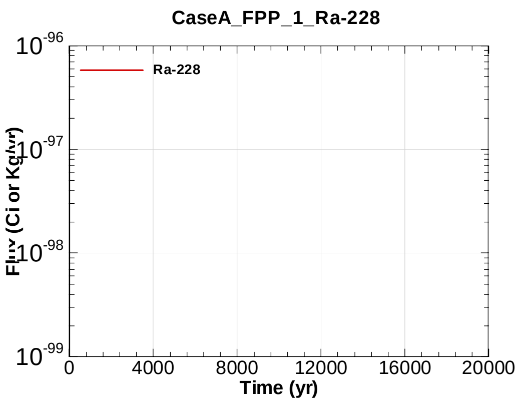

Figure A.1-2259 - Flux Leaving Liner for CaseA FPP_1 Ra-228

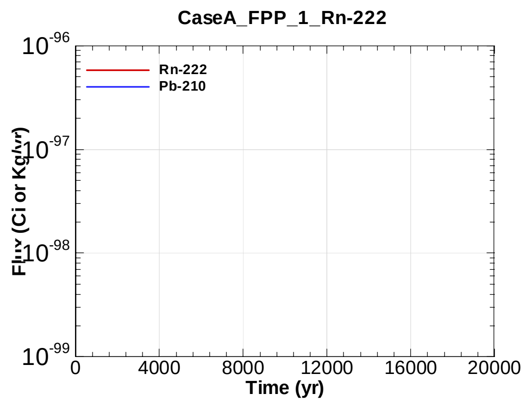

Figure A.1-2260 - Flux Leaving Liner for CaseA FPP_1 Rn-222

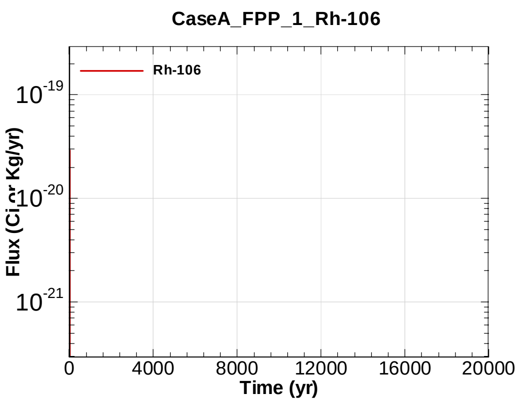

Figure A.1-2261 - Flux Leaving Liner for CaseA FPP_1 Rh-106

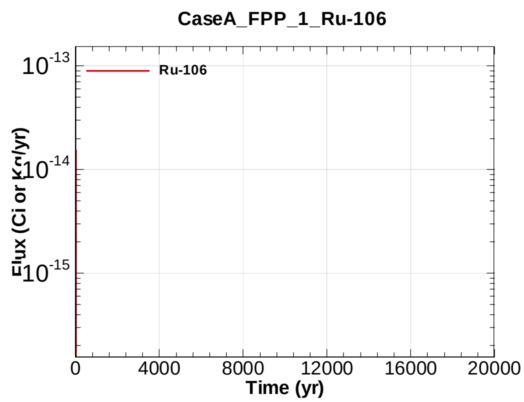

Figure A.1-2262 - Flux Leaving Liner for CaseA FPP_1 Ru-106

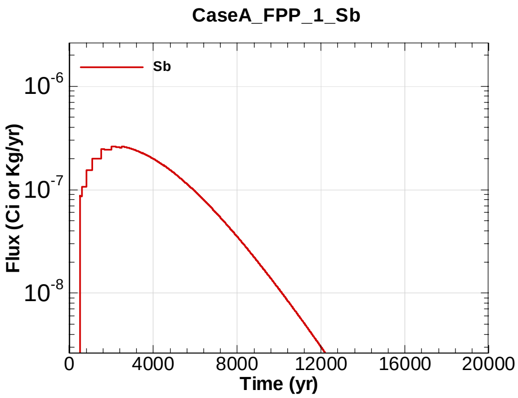

Figure A.1-2263 - Flux Leaving Liner for CaseA FPP_1 Sb

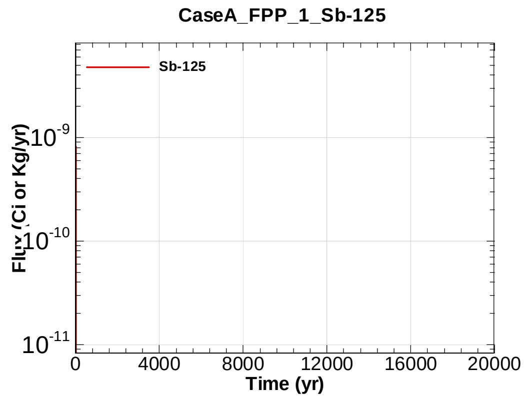

Figure A.1-2264 - Flux Leaving Liner for CaseA FPP_1 Sb-125

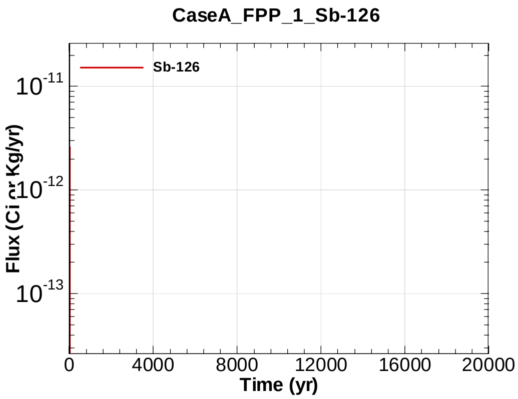

Figure A.1-2265 - Flux Leaving Liner for CaseA FPP_1 Sb-126

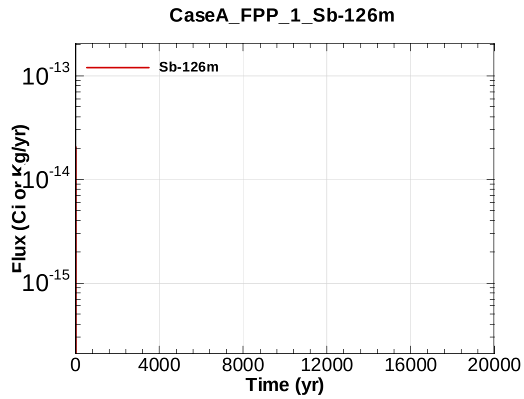

Figure A.1-2266 - Flux Leaving Liner for CaseA FPP_1 Sb-126m

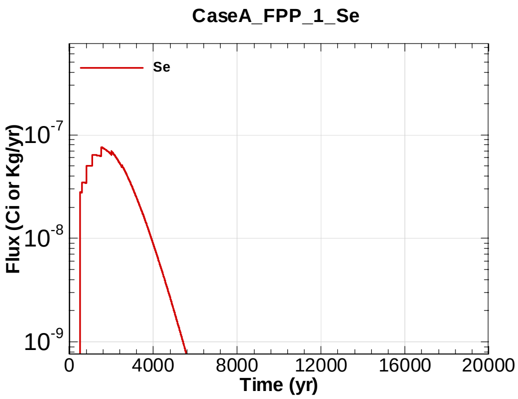

Figure A.1-2267 - Flux Leaving Liner for CaseA FPP_1 Se

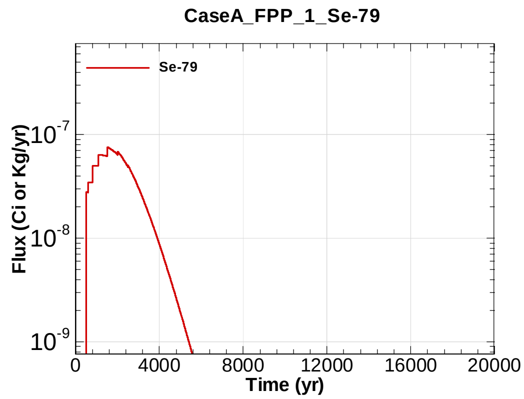

Figure A.1-2268 - Flux Leaving Liner for CaseA FPP_1 Se-79

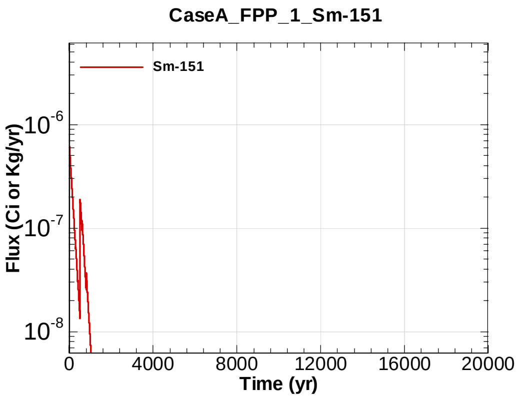

Figure A.1-2269 - Flux Leaving Liner for CaseA FPP_1 Sm-151

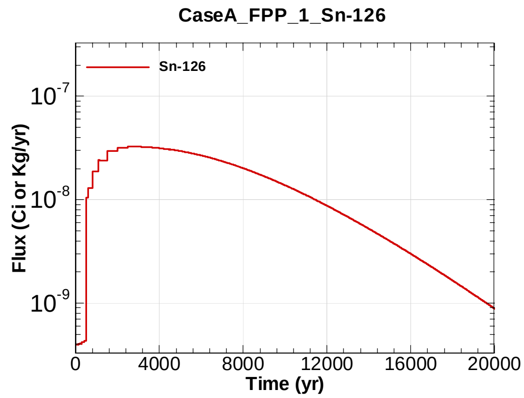

Figure A.1-2270 - Flux Leaving Liner for CaseA FPP_1 Sn-126

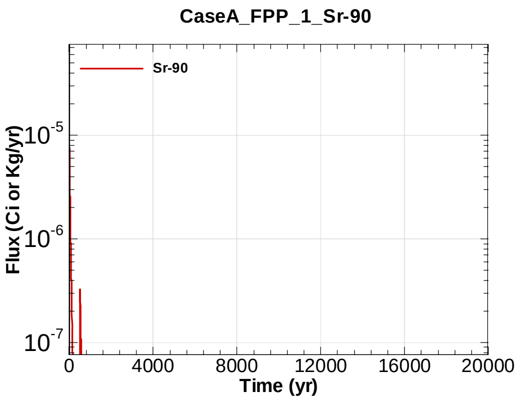

Figure A.1-2271 - Flux Leaving Liner for CaseA FPP_1 Sr-90

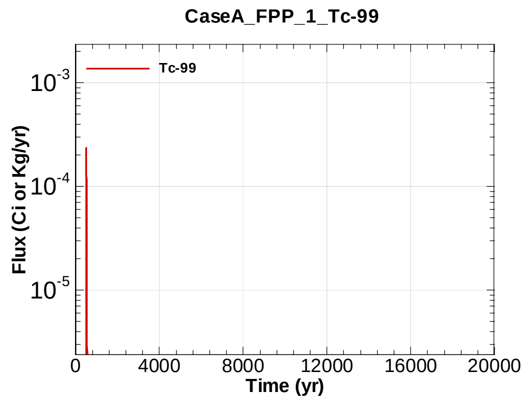

Figure A.1-2272 - Flux Leaving Liner for CaseA FPP_1 Tc-99

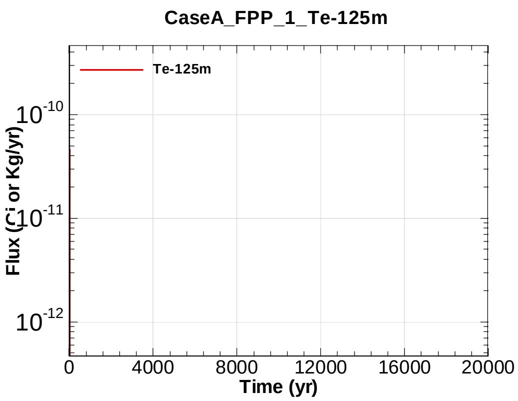

Figure A.1-2273 - Flux Leaving Liner for CaseA FPP_1 Te-125m

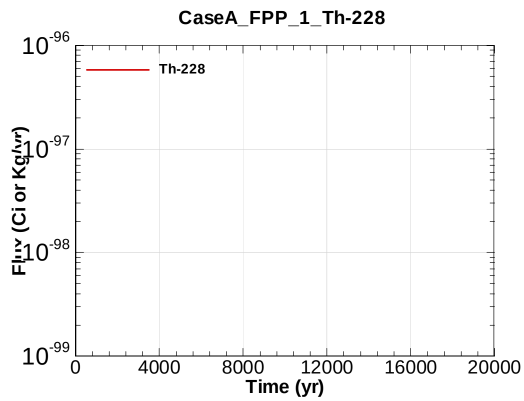

Figure A.1-2274 - Flux Leaving Liner for CaseA FPP_1 Th-228

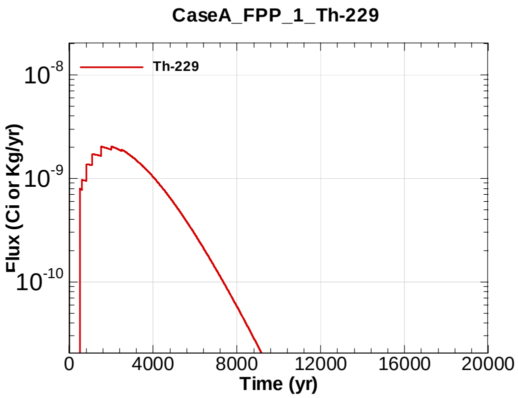

Figure A.1-2275 - Flux Leaving Liner for CaseA FPP_1 Th-229

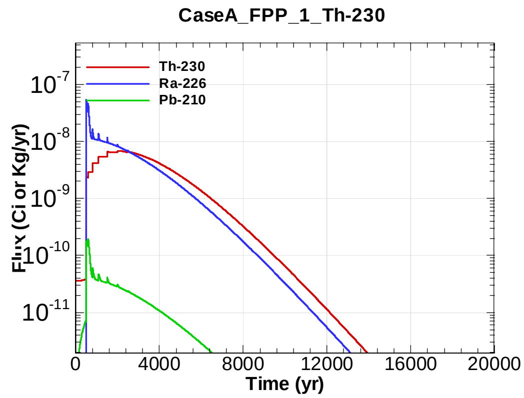

Figure A.1-2276 - Flux Leaving Liner for CaseA FPP_1 Th-230

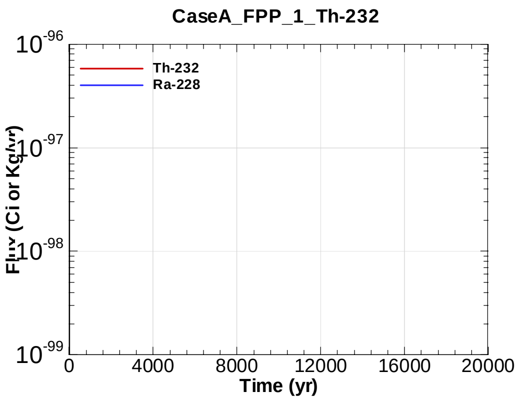

Figure A.1-2277 - Flux Leaving Liner for CaseA FPP_1 Th-232

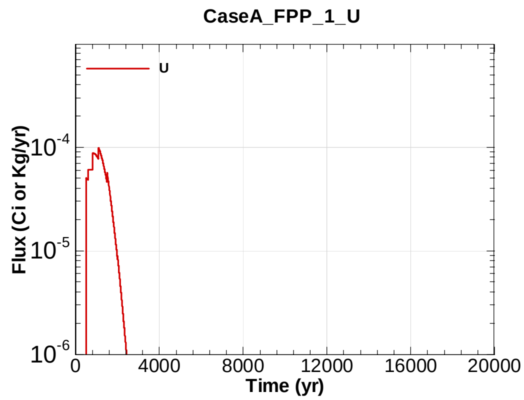

Figure A.1-2278 - Flux Leaving Liner for CaseA FPP_1 U

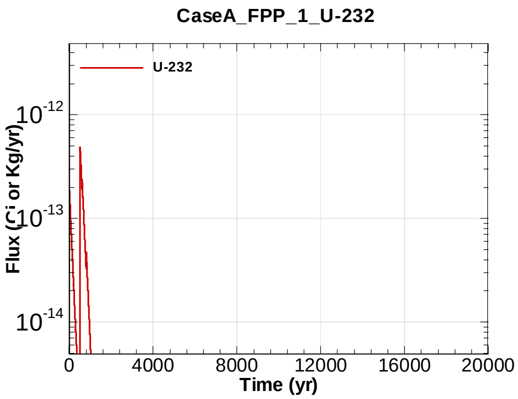

Figure A.1-2279 - Flux Leaving Liner for CaseA FPP_1 U-232

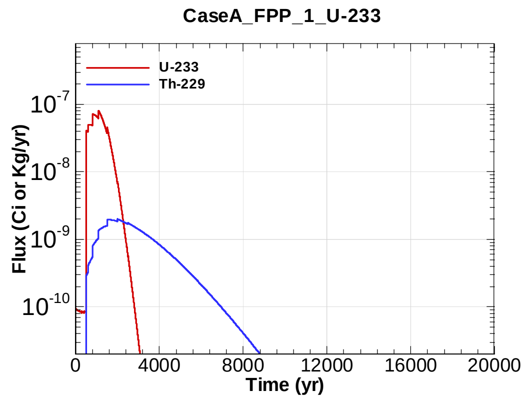

Figure A.1-2280 - Flux Leaving Liner for CaseA FPP_1 U-233

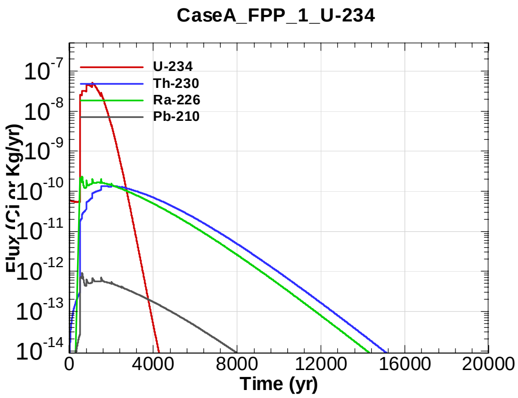

Figure A.1-2281 - Flux Leaving Liner for CaseA FPP_1 U-234

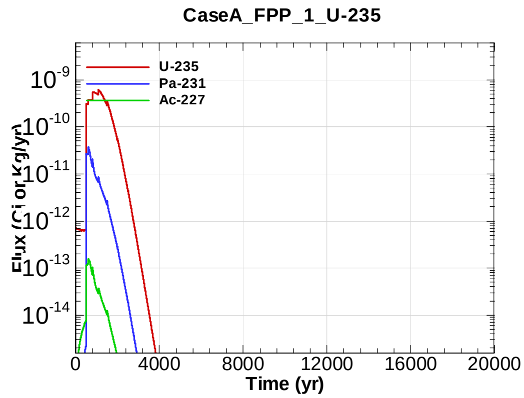

Figure A.1-2282 - Flux Leaving Liner for CaseA FPP_1 U-235

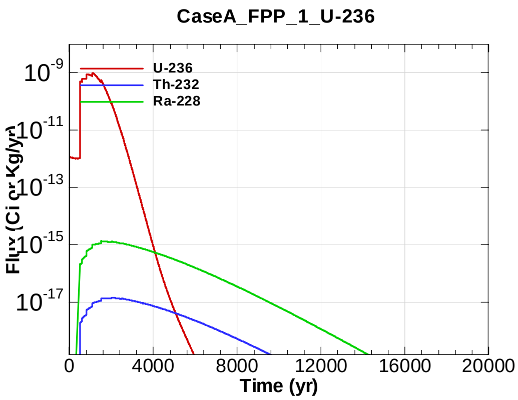

Figure A.1-2283 - Flux Leaving Liner for CaseA FPP_1 U-236

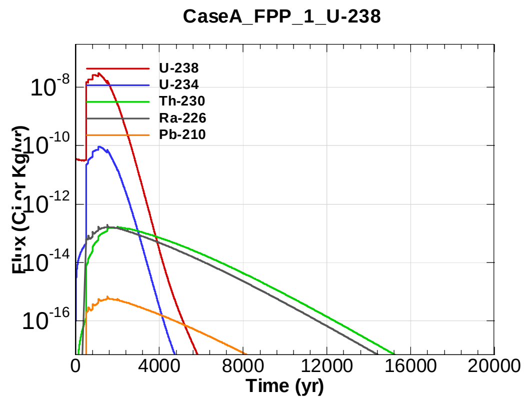

Figure A.1-2284 - Flux Leaving Liner for CaseA FPP_1 U-238

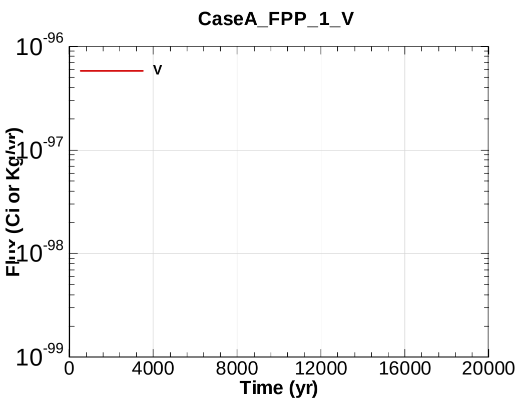

Figure A.1-2285 - Flux Leaving Liner for CaseA FPP_1 V

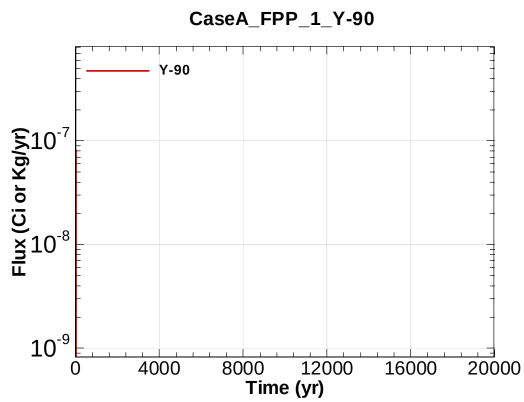

Figure A.1-2286 - Flux Leaving Liner for CaseA FPP_1 Y-90

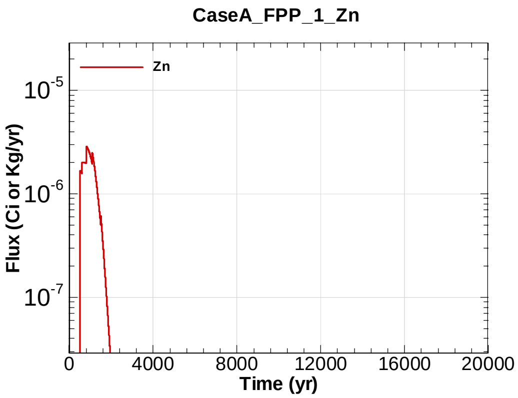

Figure A.1-2287 - Flux Leaving Liner for CaseA FPP_1 Zn

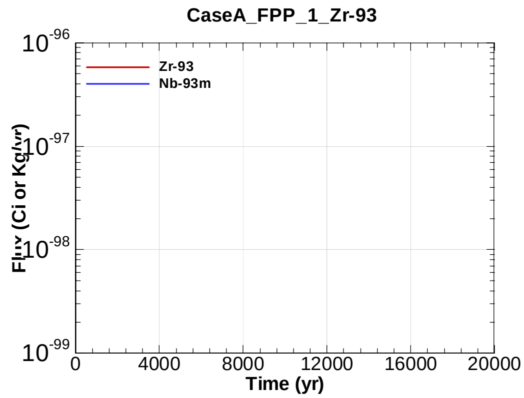

Figure A.1-2288 - Flux Leaving Liner for CaseA FPP_1 Zr-93

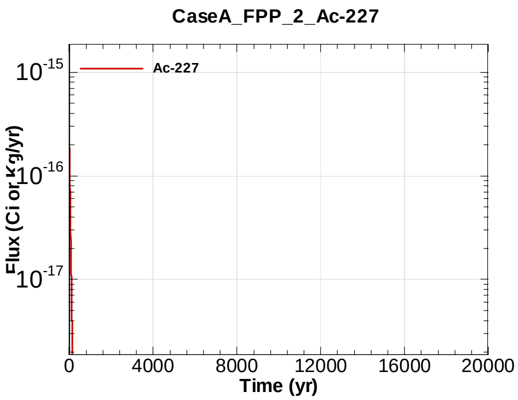

Figure A.1-2289 - Flux Leaving Liner for CaseA FPP_2 Ac-227

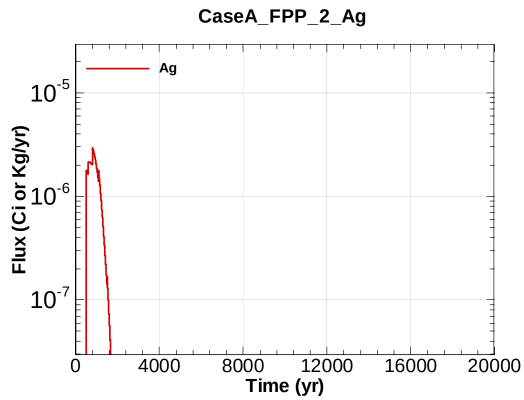

Figure A.1-2290 - Flux Leaving Liner for CaseA FPP_2 Ag

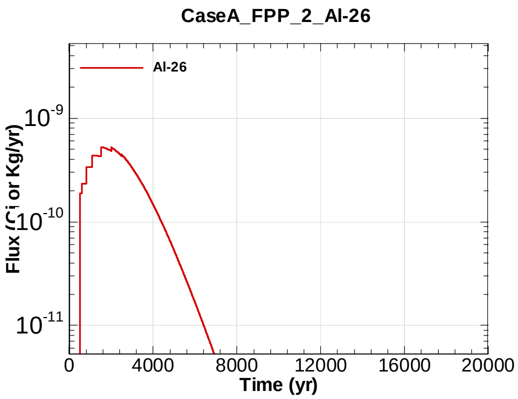

Figure A.1-2291 - Flux Leaving Liner for CaseA FPP_2 Al-26

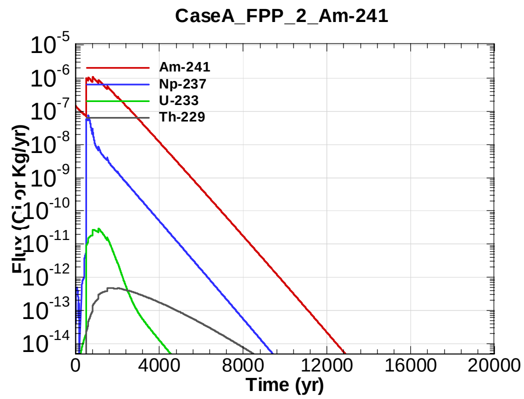

Figure A.1-2292 - Flux Leaving Liner for CaseA FPP_2 Am-241

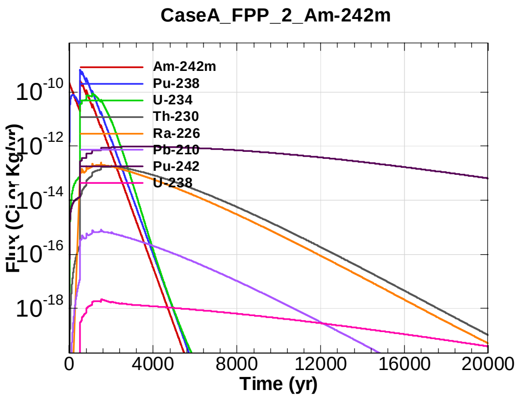

Figure A.1-2293 - Flux Leaving Liner for CaseA FPP_2 Am-242m

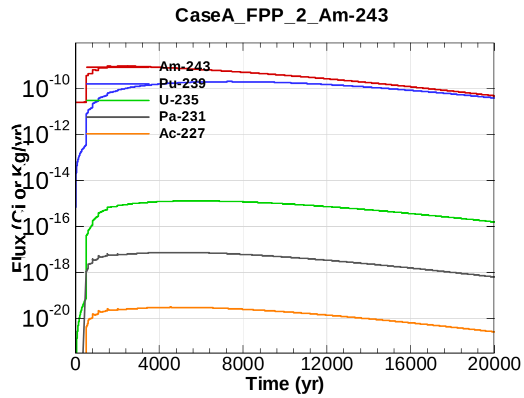

Figure A.1-2294 - Flux Leaving Liner for CaseA FPP_2 Am-243

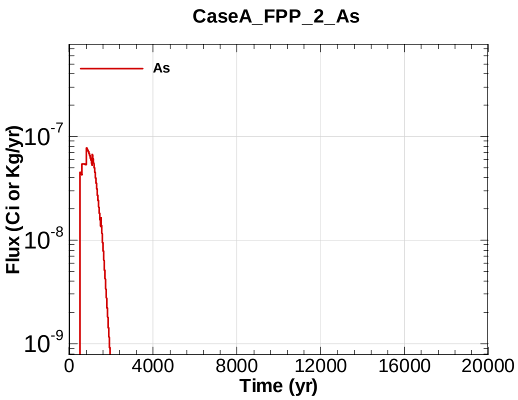

Figure A.1-2295 - Flux Leaving Liner for CaseA FPP_2 As

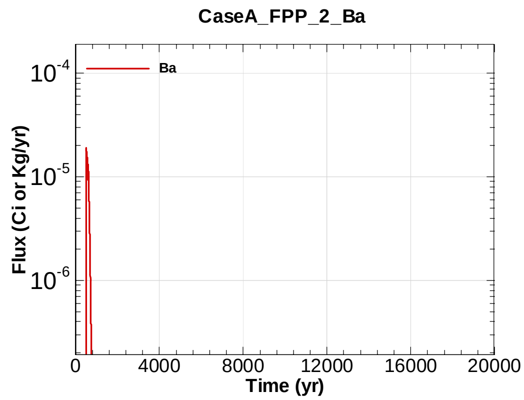

Figure A.1-2296 - Flux Leaving Liner for CaseA FPP_2 Ba

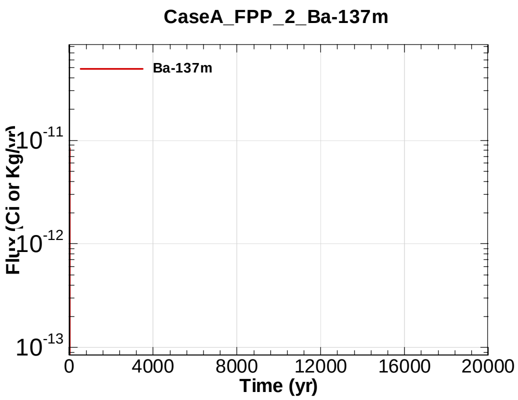

Figure A.1-2297 - Flux Leaving Liner for CaseA FPP_2 Ba-137m

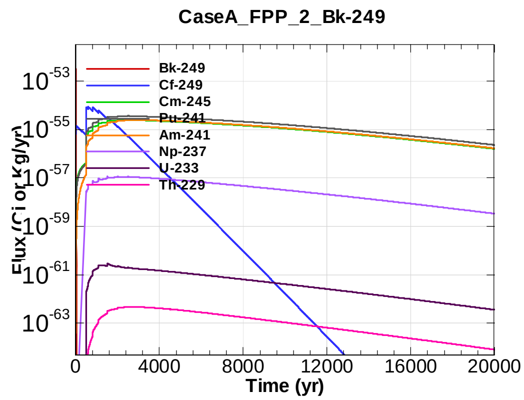

Figure A.1-2298 - Flux Leaving Liner for CaseA FPP_2 Bk-249

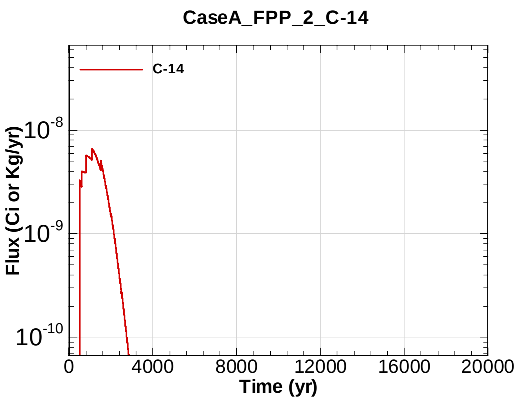

Figure A.1-2299 - Flux Leaving Liner for CaseA FPP_2 C-14

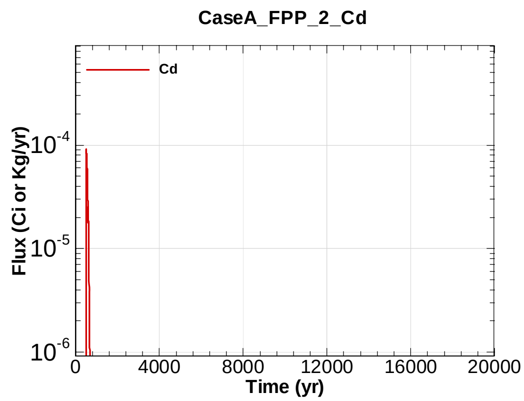

Figure A.1-2300 - Flux Leaving Liner for CaseA FPP_2 Cd

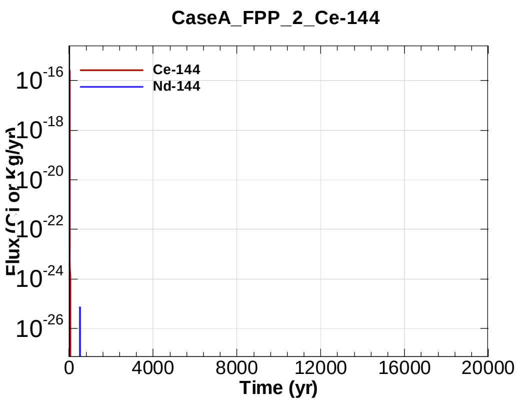

Figure A.1-2301 - Flux Leaving Liner for CaseA FPP_2 Ce-144

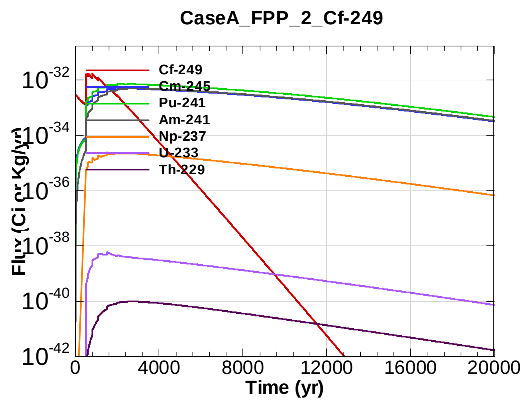

Figure A.1-2302 - Flux Leaving Liner for CaseA FPP_2 Cf-249

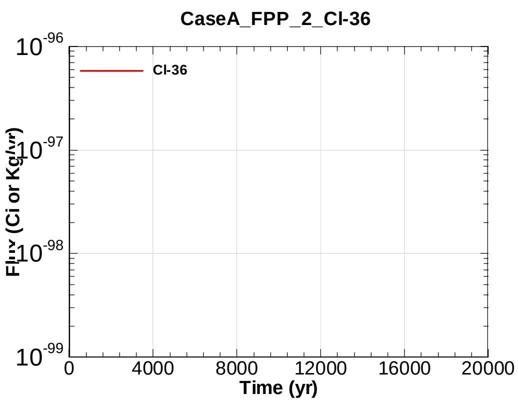

Figure A.1-2303 - Flux Leaving Liner for CaseA FPP_2 Cl-36

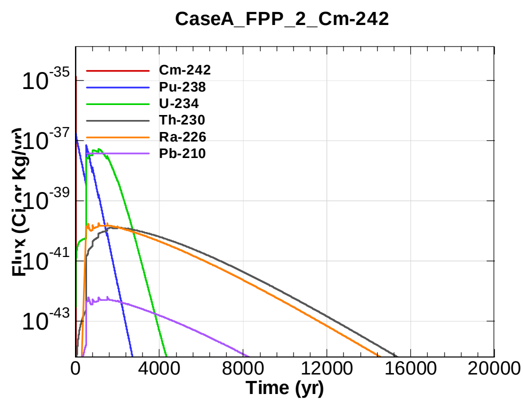

Figure A.1-2304 - Flux Leaving Liner for CaseA FPP_2 Cm-242

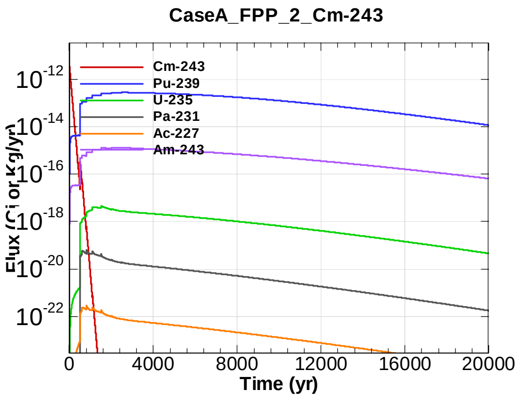

Figure A.1-2305 - Flux Leaving Liner for CaseA FPP_2 Cm-243

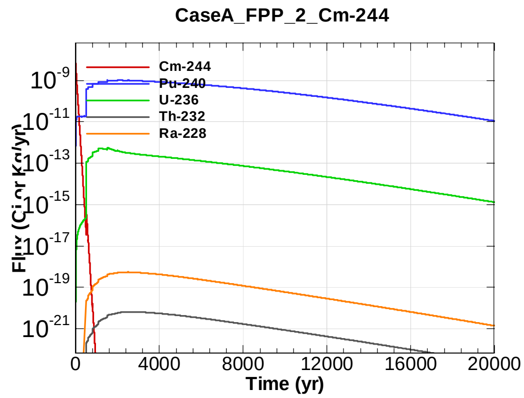

Figure A.1-2306 - Flux Leaving Liner for CaseA FPP_2 Cm-244

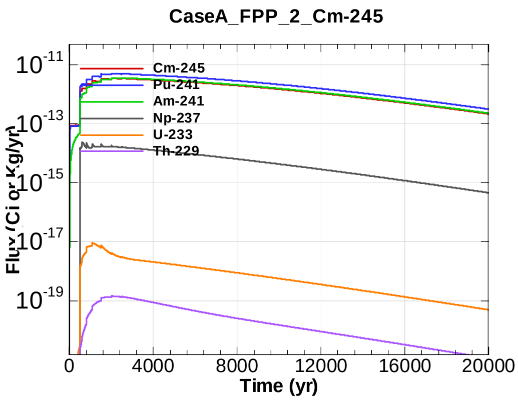

Figure A.1-2307 - Flux Leaving Liner for CaseA FPP_2 Cm-245

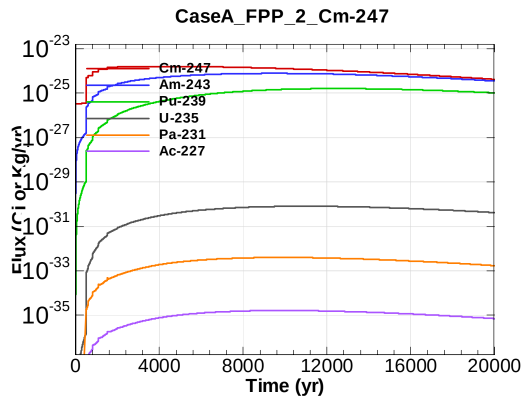

Figure A.1-2308 - Flux Leaving Liner for CaseA FPP_2 Cm-247

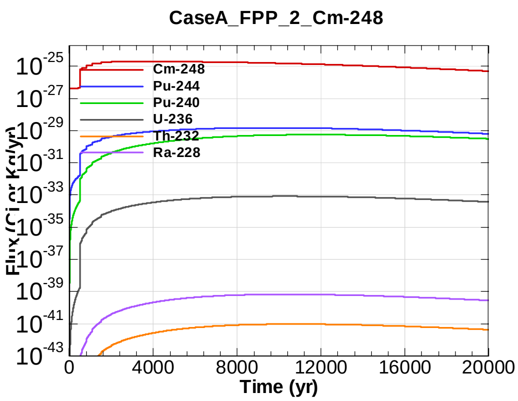

Figure A.1-2309 - Flux Leaving Liner for CaseA FPP_2 Cm-248

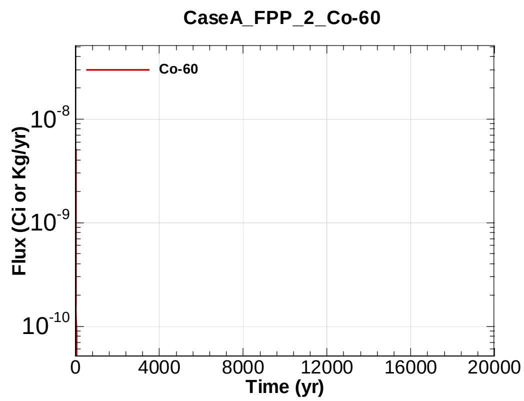

Figure A.1-2310 - Flux Leaving Liner for CaseA FPP_2 Co-60

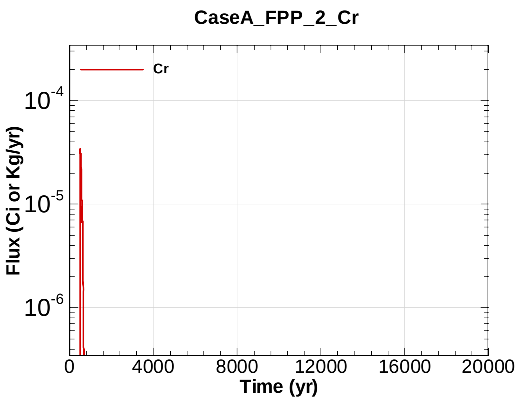

Figure A.1-2311 - Flux Leaving Liner for CaseA FPP_2 Cr

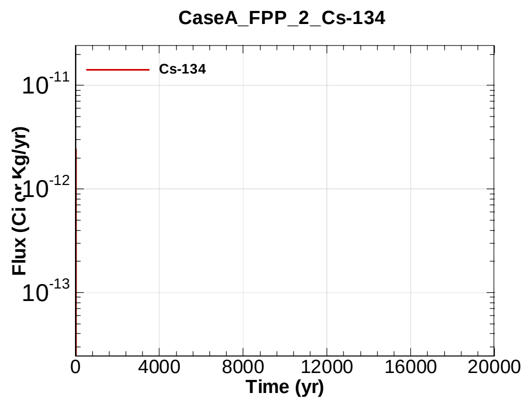

Figure A.1-2312 - Flux Leaving Liner for CaseA FPP_2 Cs-134

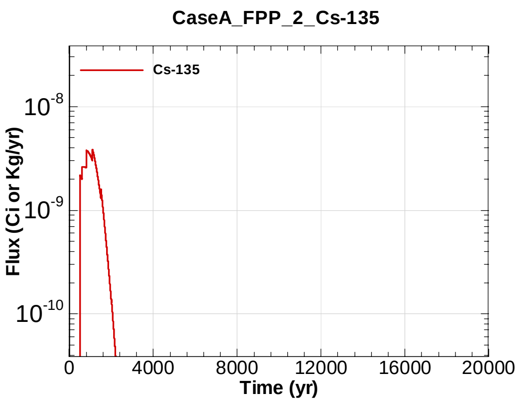

Figure A.1-2313 - Flux Leaving Liner for CaseA FPP_2 Cs-135

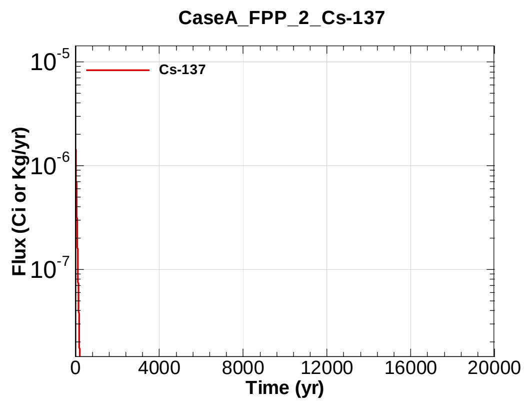

Figure A.1-2314 - Flux Leaving Liner for CaseA FPP_2 Cs-137

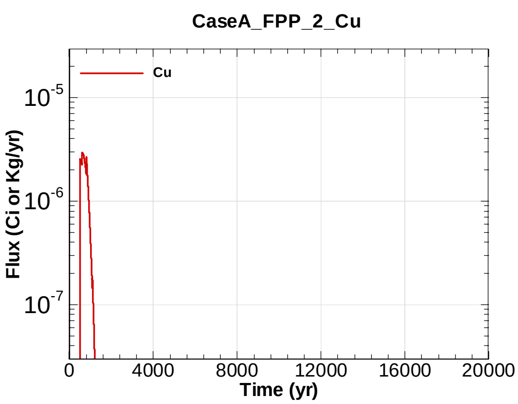

Figure A.1-2315 - Flux Leaving Liner for CaseA FPP_2 Cu

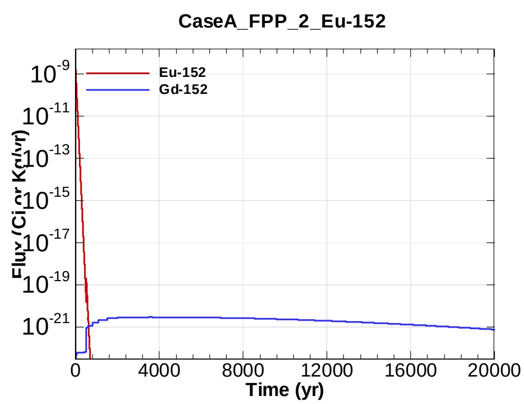

Figure A.1-2316 - Flux Leaving Liner for CaseA FPP_2 Eu-152

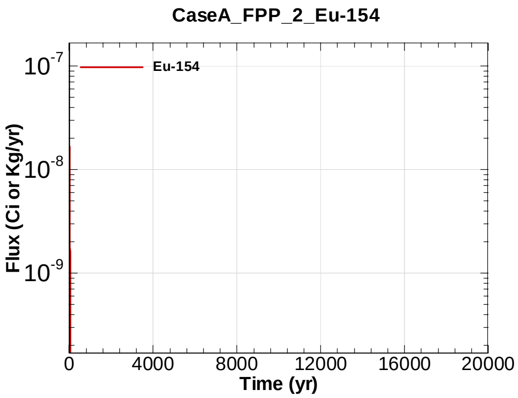

Figure A.1-2317 - Flux Leaving Liner for CaseA FPP_2 Eu-154

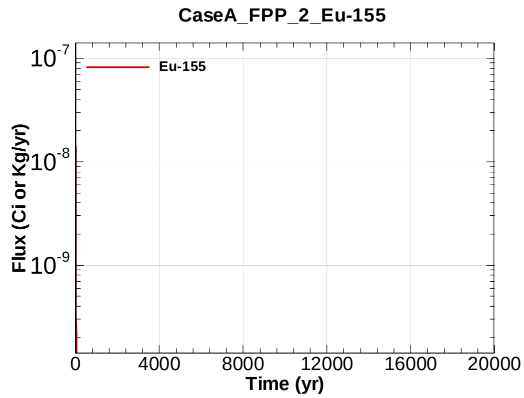

Figure A.1-2318 - Flux Leaving Liner for CaseA FPP_2 Eu-155

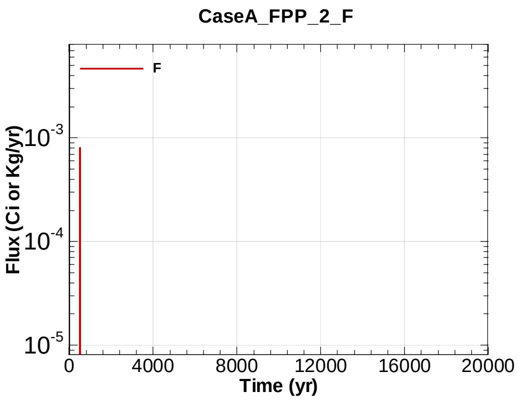

Figure A.1-2319 - Flux Leaving Liner for CaseA FPP_2 F

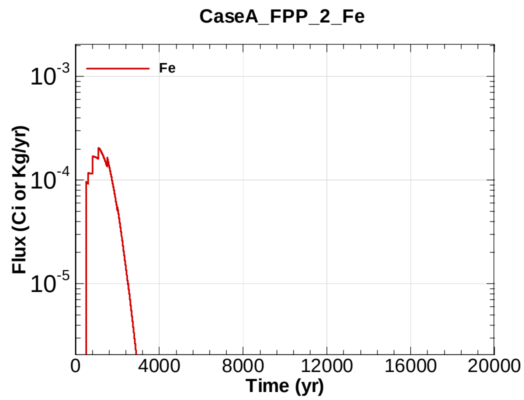

Figure A.1-2320 - Flux Leaving Liner for CaseA FPP_2 Fe

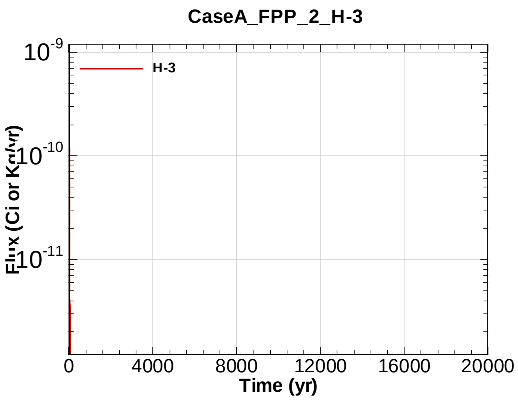

Figure A.1-2321 - Flux Leaving Liner for CaseA FPP_2 H-3

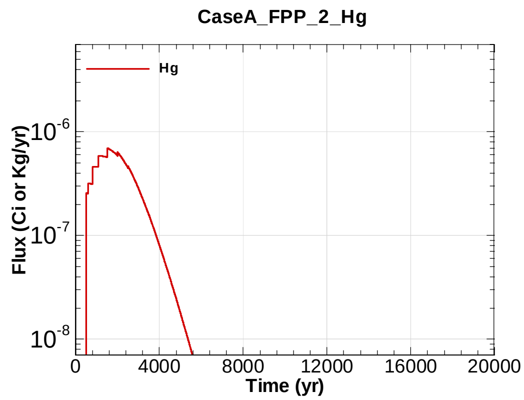

Figure A.1-2322 - Flux Leaving Liner for CaseA FPP_2 Hg

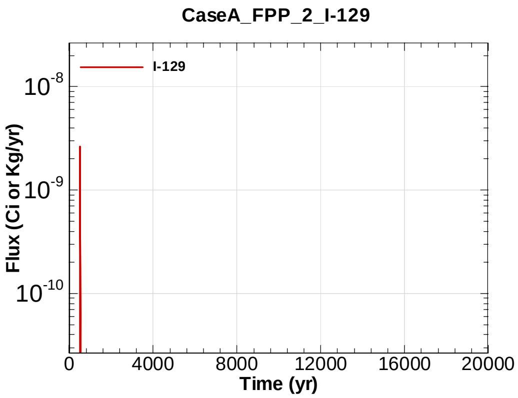

Figure A.1-2323 - Flux Leaving Liner for CaseA FPP_2 I-129

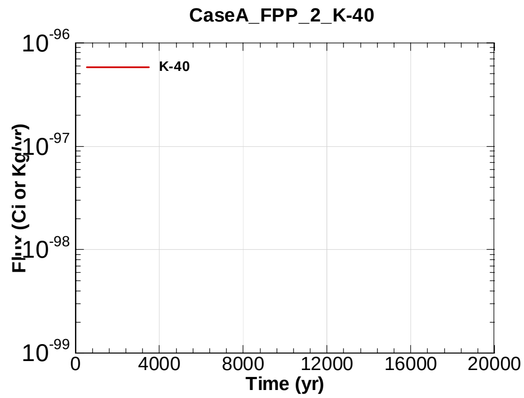

Figure A.1-2324 - Flux Leaving Liner for CaseA FPP_2 K-40

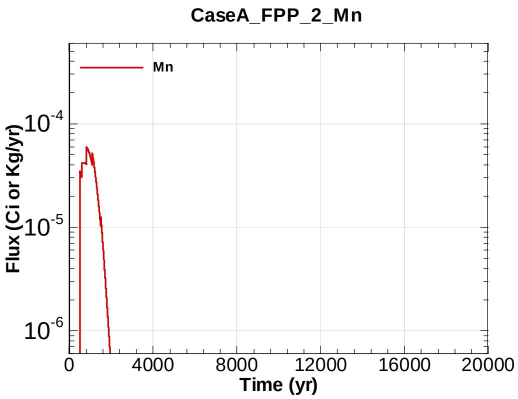

Figure A.1-2325 - Flux Leaving Liner for CaseA FPP_2 Mn

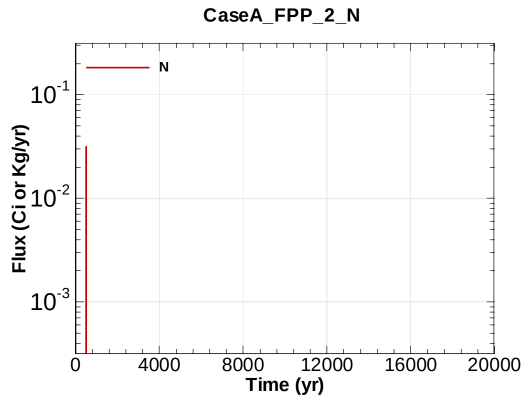

Figure A.1-2326 - Flux Leaving Liner for CaseA FPP_2 N

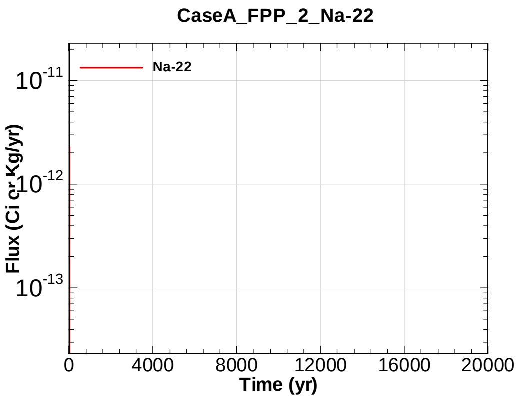

Figure A.1-2327 - Flux Leaving Liner for CaseA FPP_2 Na-22

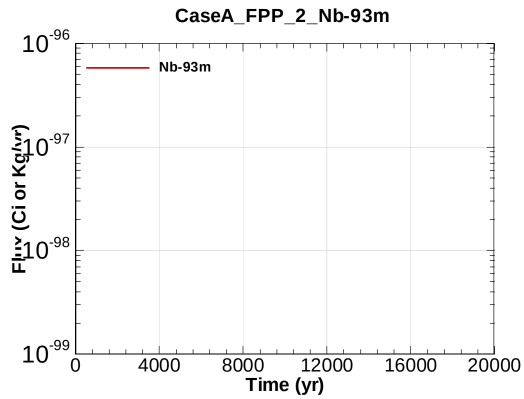

Figure A.1-2328 - Flux Leaving Liner for CaseA FPP_2 Nb-93m

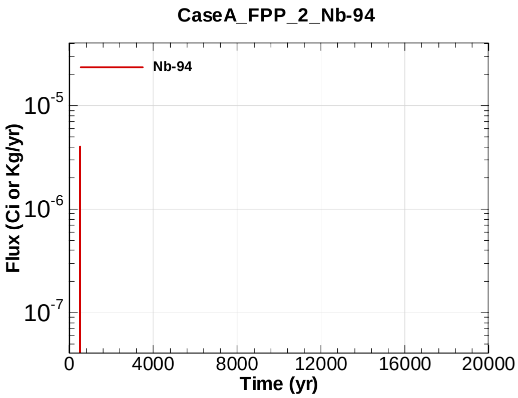

Figure A.1-2329 - Flux Leaving Liner for CaseA FPP_2 Nb-94

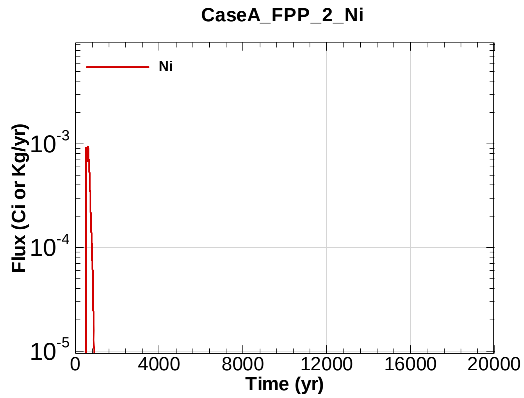

Figure A.1-2330 - Flux Leaving Liner for CaseA FPP_2 Ni

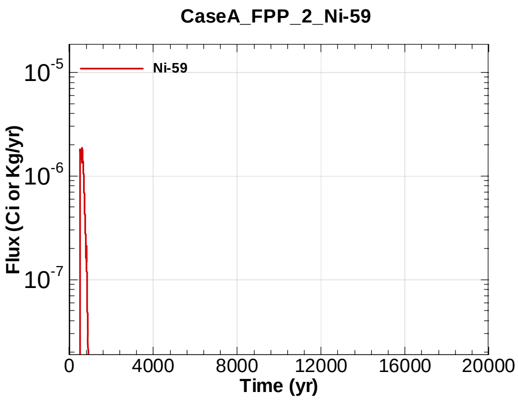

Figure A.1-2331 - Flux Leaving Liner for CaseA FPP_2 Ni-59

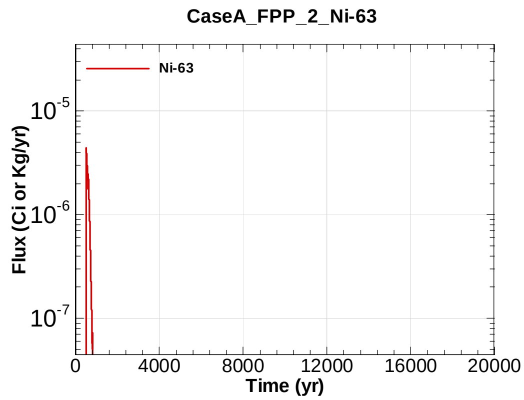

Figure A.1-2332 - Flux Leaving Liner for CaseA FPP_2 Ni-63

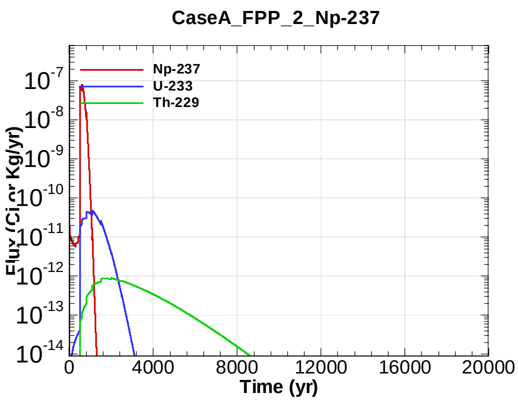

Figure A.1-2333 - Flux Leaving Liner for CaseA FPP_2 Np-237

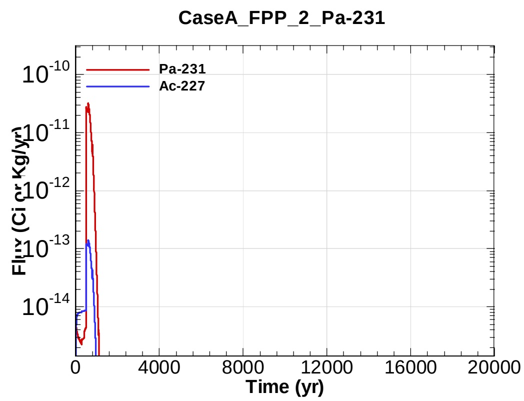

Figure A.1-2334 - Flux Leaving Liner for CaseA FPP_2 Pa-231

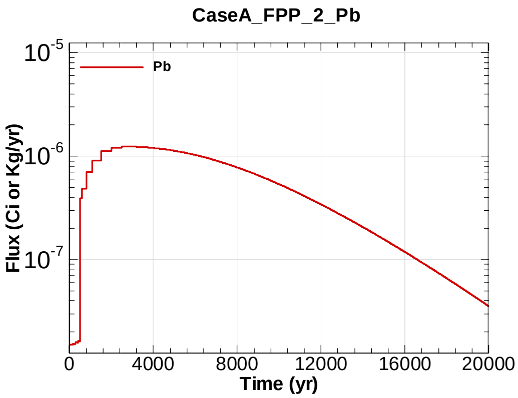

Figure A.1-2335 - Flux Leaving Liner for CaseA FPP_2 Pb

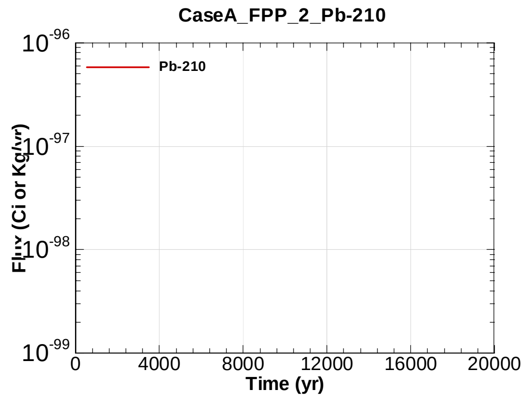

Figure A.1-2336 - Flux Leaving Liner for CaseA FPP_2 Pb-210

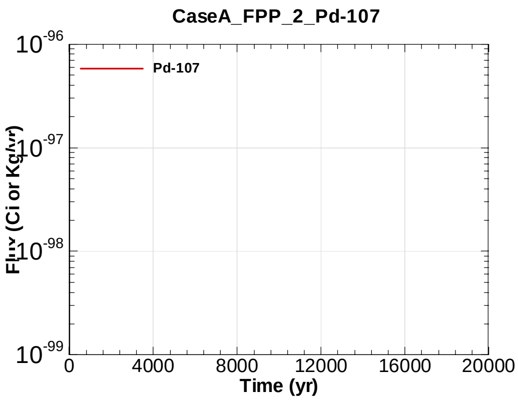

Figure A.1-2337 - Flux Leaving Liner for CaseA FPP_2 Pd-107

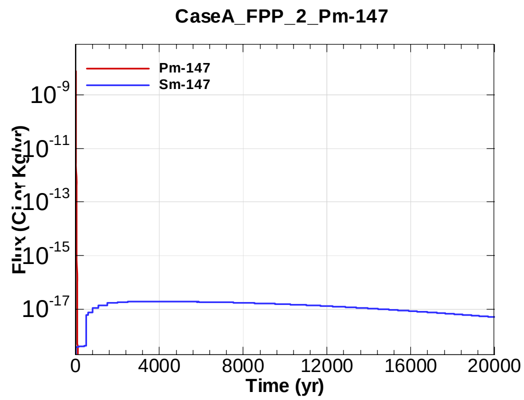

Figure A.1-2338 - Flux Leaving Liner for CaseA FPP_2 Pm-147

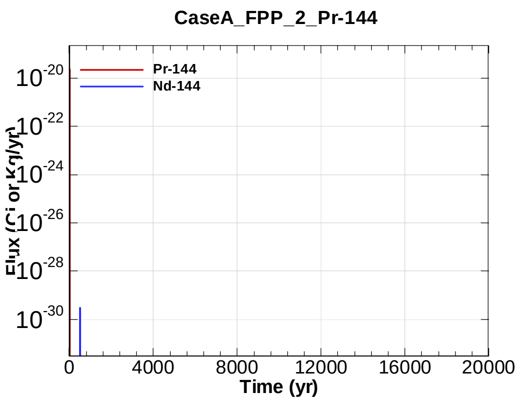

Figure A.1-2339 - Flux Leaving Liner for CaseA FPP_2 Pr-144

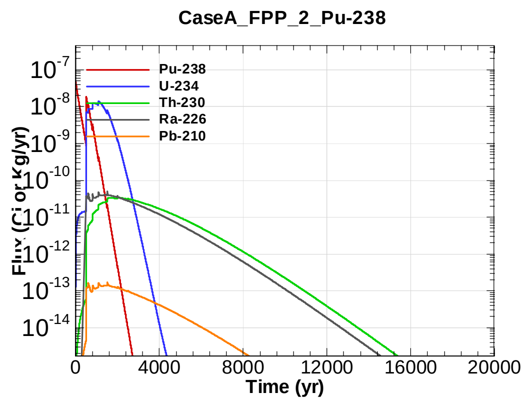

Figure A.1-2340 - Flux Leaving Liner for CaseA FPP_2 Pu-238

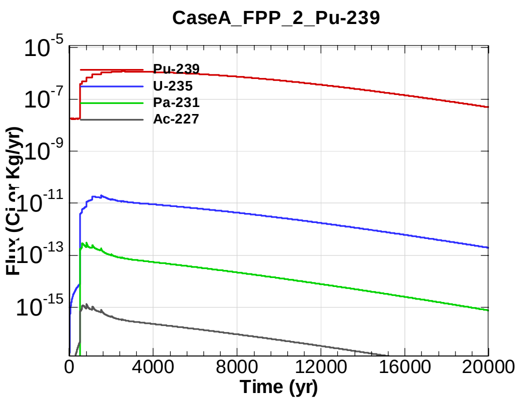

Figure A.1-2341 - Flux Leaving Liner for CaseA FPP_2 Pu-239

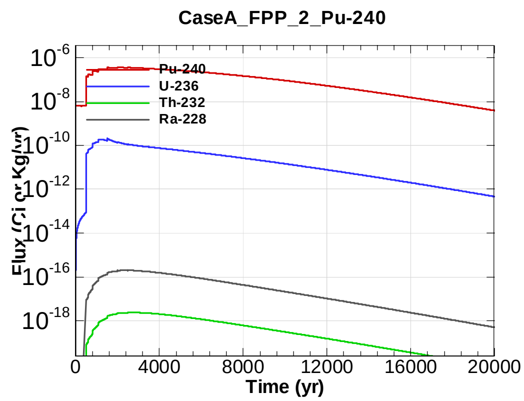

Figure A.1-2342 - Flux Leaving Liner for CaseA FPP_2 Pu-240

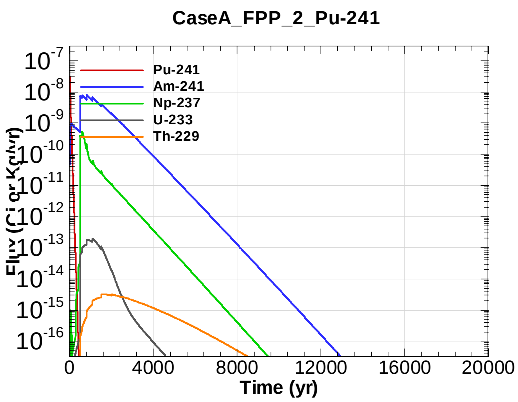

Figure A.1-2343 - Flux Leaving Liner for CaseA FPP_2 Pu-241

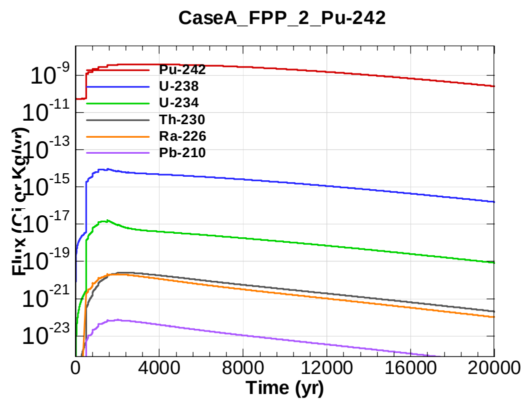

Figure A.1-2344 - Flux Leaving Liner for CaseA FPP_2 Pu-242

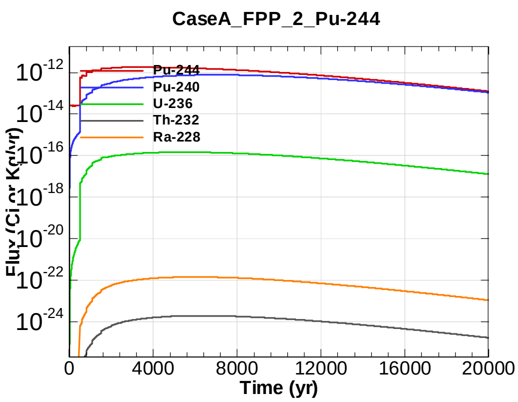

Figure A.1-2345 - Flux Leaving Liner for CaseA FPP_2 Pu-244

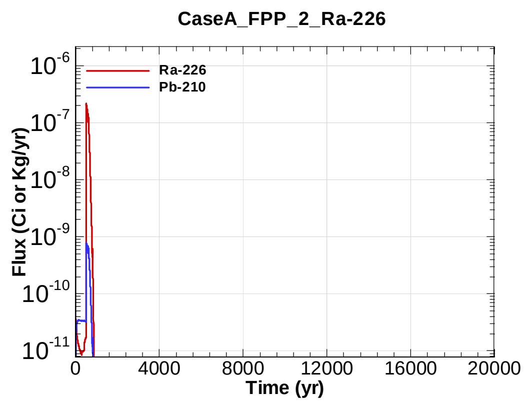

Figure A.1-2346 - Flux Leaving Liner for CaseA FPP_2 Ra-226

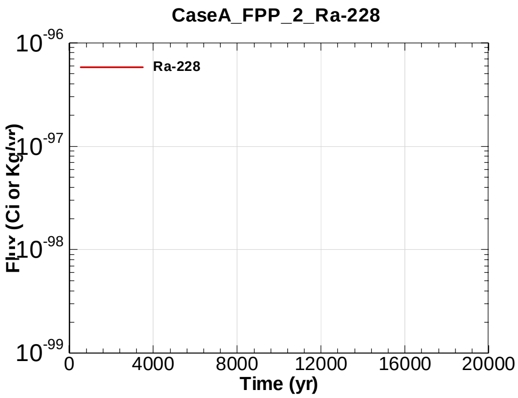

Figure A.1-2347 - Flux Leaving Liner for CaseA FPP_2 Ra-228

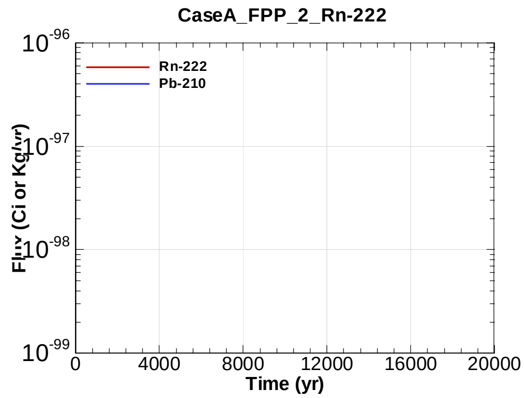

Figure A.1-2348 - Flux Leaving Liner for CaseA FPP_2 Rn-222

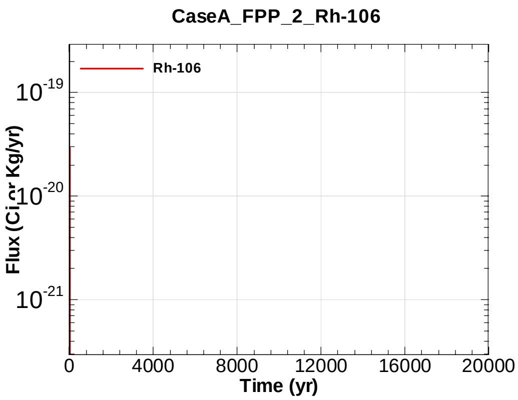

Figure A.1-2349 - Flux Leaving Liner for CaseA FPP_2 Rh-106

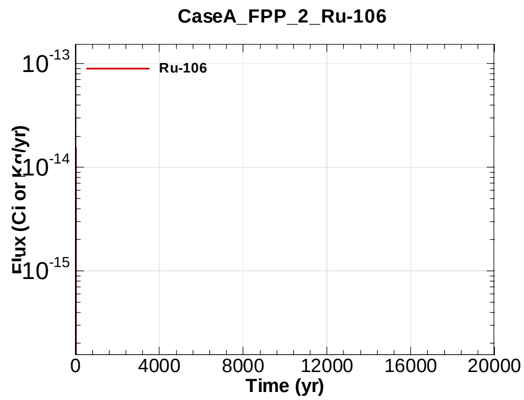

Figure A.1-2350 - Flux Leaving Liner for CaseA FPP_2 Ru-106

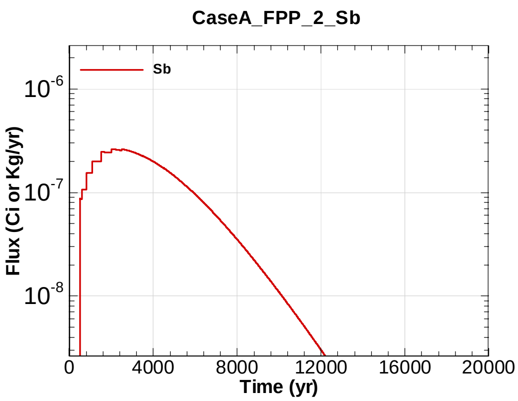

Figure A.1-2351 - Flux Leaving Liner for CaseA FPP_2 Sb

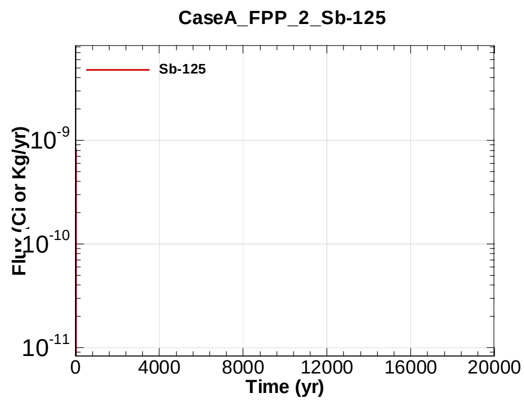

Figure A.1-2352 - Flux Leaving Liner for CaseA FPP_2 Sb-125

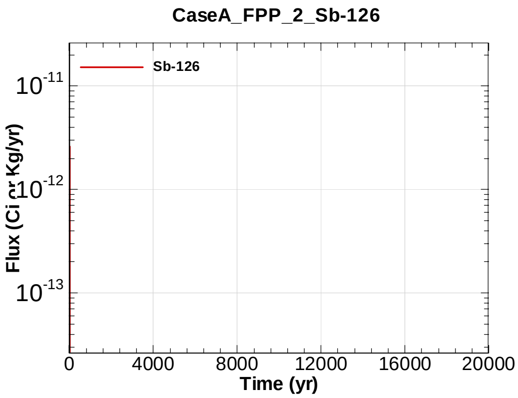

Figure A.1-2353 - Flux Leaving Liner for CaseA FPP_2 Sb-126

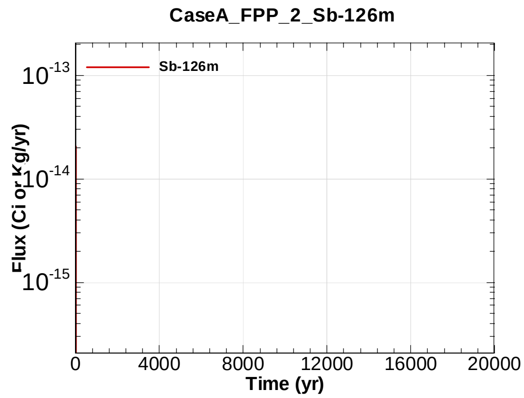

Figure A.1-2354 - Flux Leaving Liner for CaseA FPP_2 Sb-126m

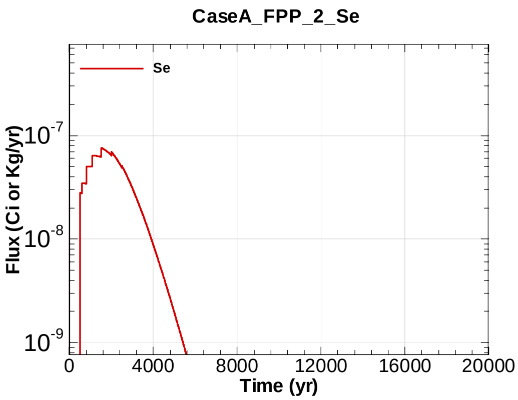

Figure A.1-2355 - Flux Leaving Liner for CaseA FPP_2 Se

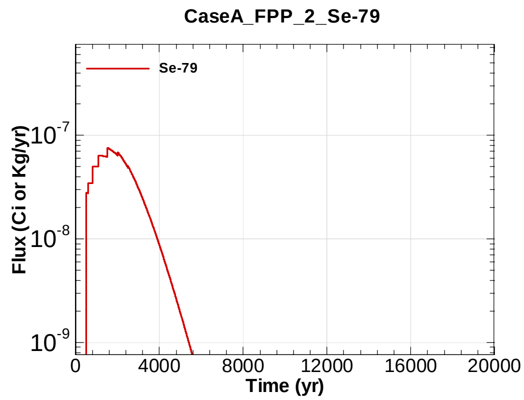

Figure A.1-2356 - Flux Leaving Liner for CaseA FPP_2 Se-79

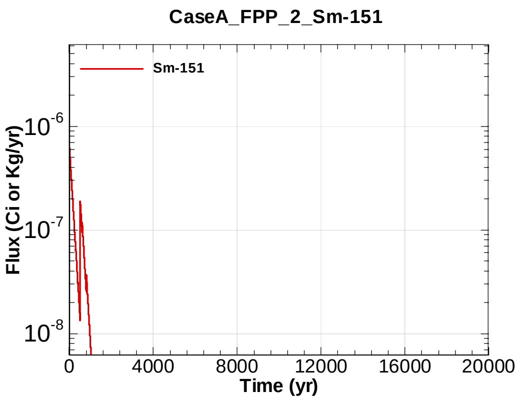

Figure A.1-2357 - Flux Leaving Liner for CaseA FPP_2 Sm-151

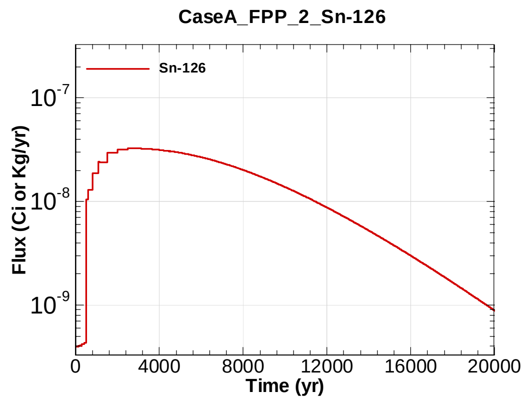

Figure A.1-2358 - Flux Leaving Liner for CaseA FPP_2 Sn-126

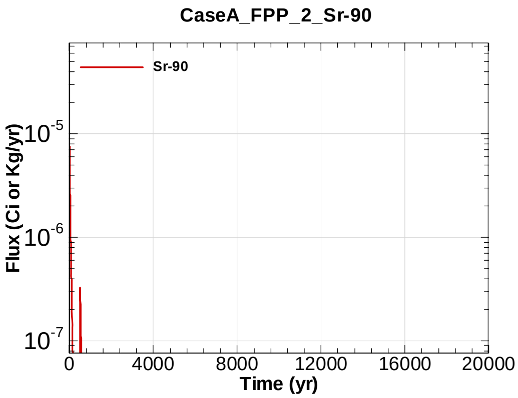

Figure A.1-2359 - Flux Leaving Liner for CaseA FPP_2 Sr-90

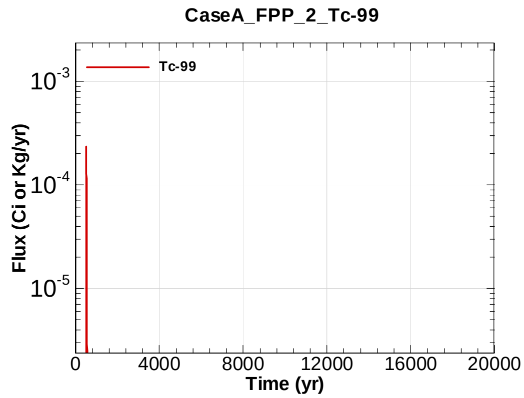

Figure A.1-2360 - Flux Leaving Liner for CaseA FPP_2 Tc-99

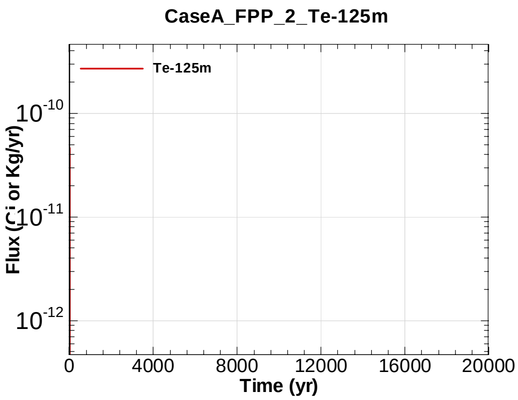

Figure A.1-2361 - Flux Leaving Liner for CaseA FPP_2 Te-125m

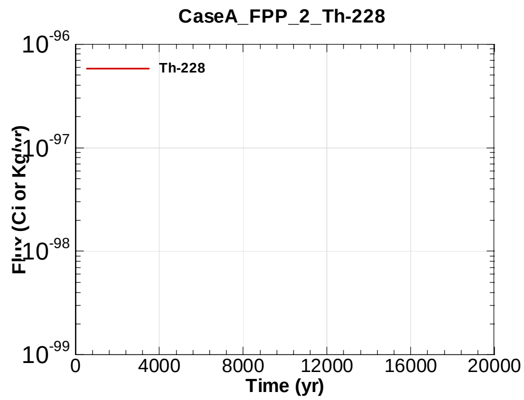

Figure A.1-2362 - Flux Leaving Liner for CaseA FPP_2 Th-228

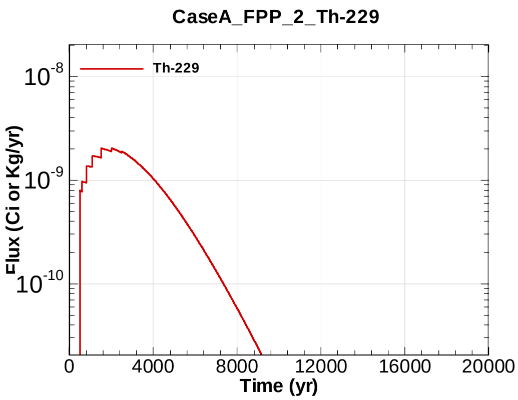

Figure A.1-2363 - Flux Leaving Liner for CaseA FPP_2 Th-229

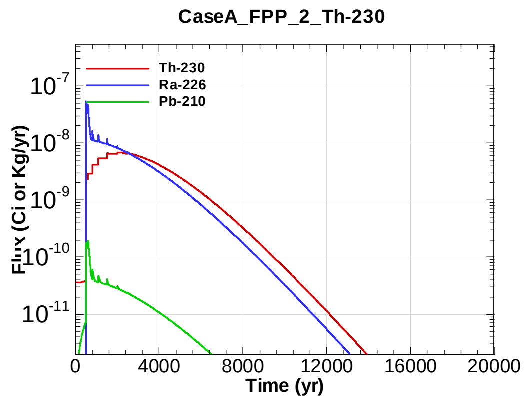

Figure A.1-2364 - Flux Leaving Liner for CaseA FPP_2 Th-230

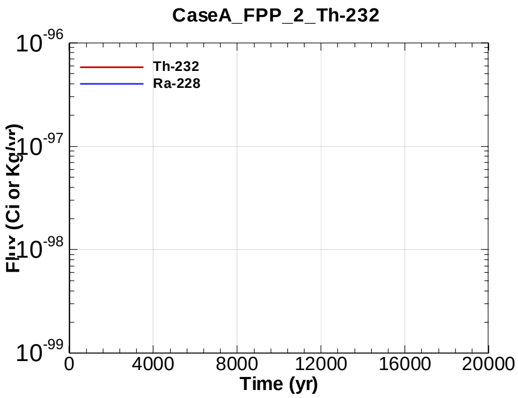

Figure A.1-2365 - Flux Leaving Liner for CaseA FPP_2 Th-232

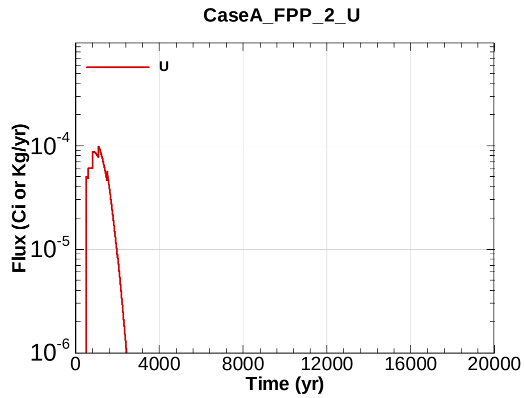

Figure A.1-2366 - Flux Leaving Liner for CaseA FPP_2 U

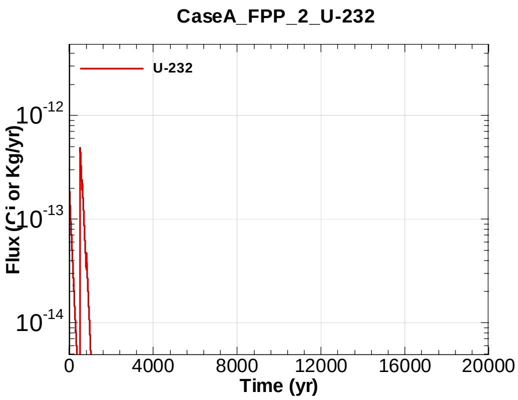

Figure A.1-2367 - Flux Leaving Liner for CaseA FPP_2 U-232

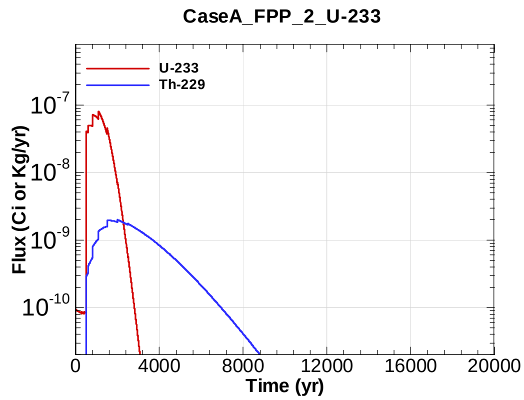

Figure A.1-2368 - Flux Leaving Liner for CaseA FPP_2 U-233

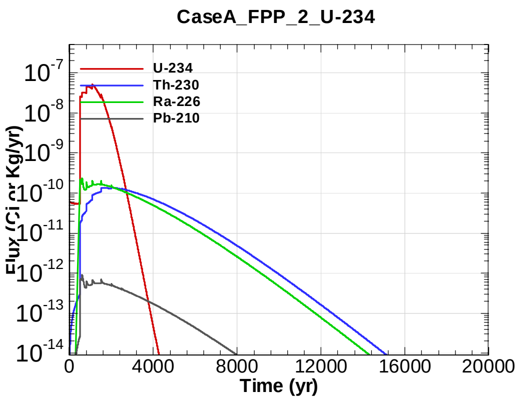

Figure A.1-2369 - Flux Leaving Liner for CaseA FPP_2 U-234

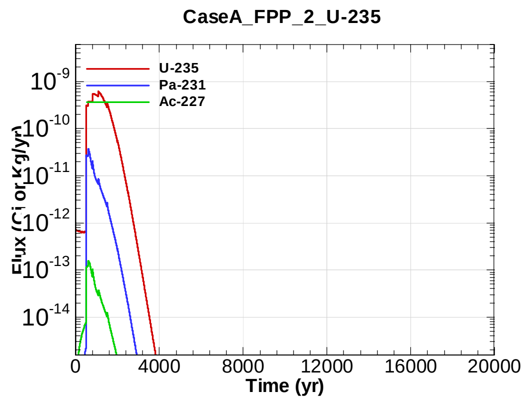

Figure A.1-2370 - Flux Leaving Liner for CaseA FPP_2 U-235

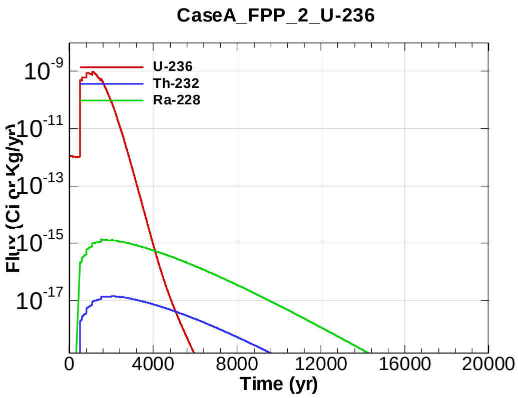

Figure A.1-2371 - Flux Leaving Liner for CaseA FPP_2 U-236

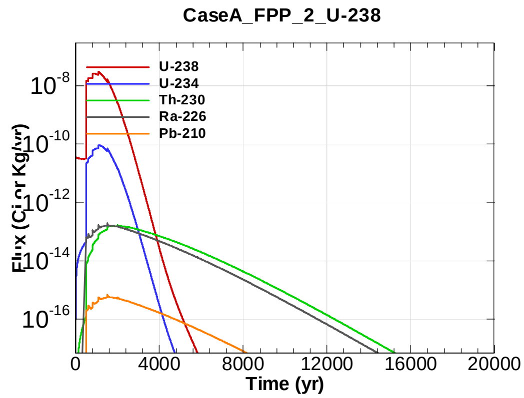

Figure A.1-2372 - Flux Leaving Liner for CaseA FPP_2 U-238

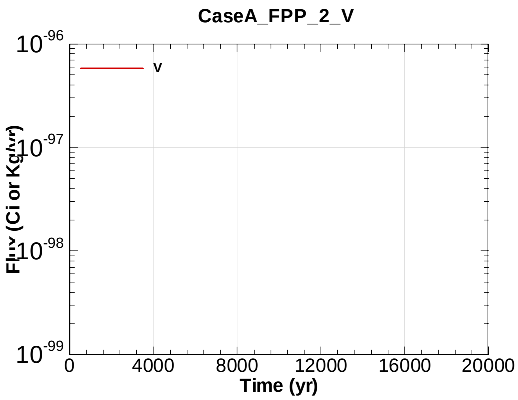

Figure A.1-2373 - Flux Leaving Liner for CaseA FPP_2 V

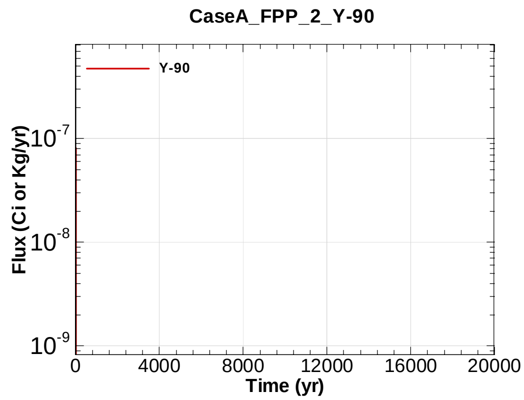

Figure A.1-2374 - Flux Leaving Liner for CaseA FPP_2 Y-90

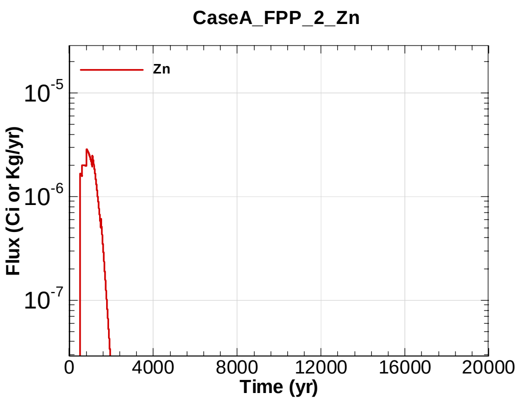

Figure A.1-2375 - Flux Leaving Liner for CaseA FPP_2 Zn

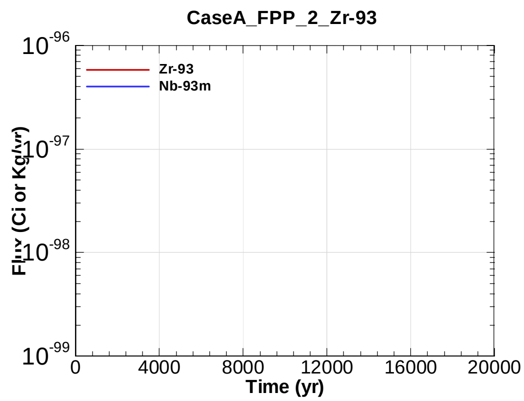

Figure A.1-2376 - Flux Leaving Liner for CaseA FPP_2 Zr-93

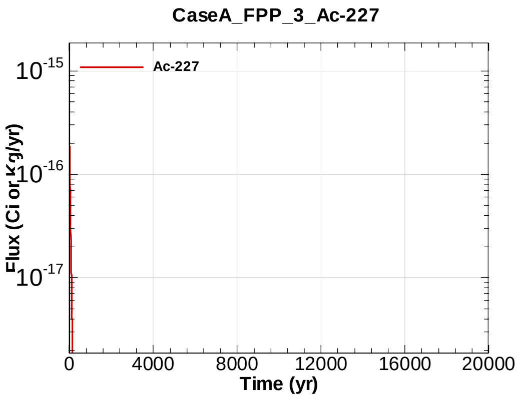

Figure A.1-2377 - Flux Leaving Liner for CaseA FPP_3 Ac-227

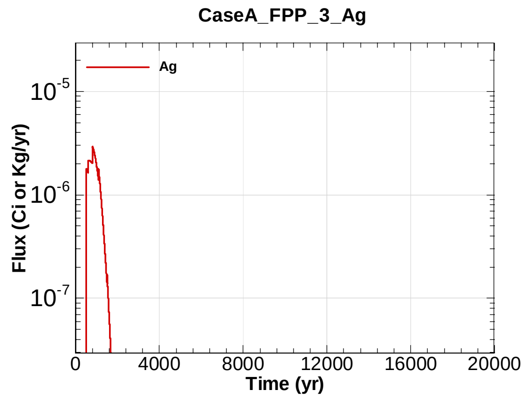

Figure A.1-2378 - Flux Leaving Liner for CaseA FPP_3 Ag

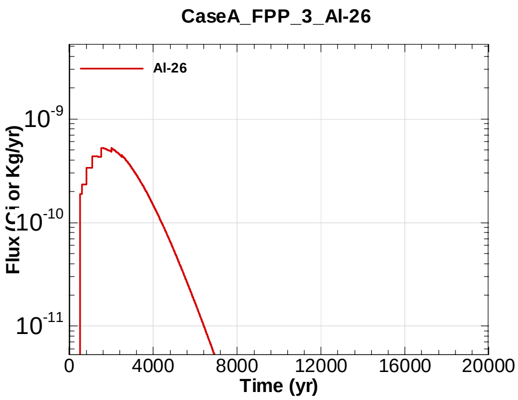

Figure A.1-2379 - Flux Leaving Liner for CaseA FPP_3 Al-26

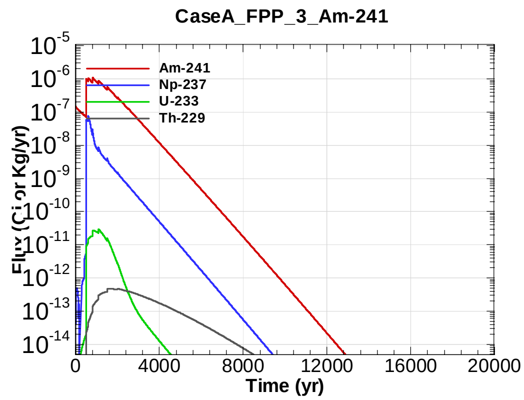

Figure A.1-2380 - Flux Leaving Liner for CaseA FPP_3 Am-241

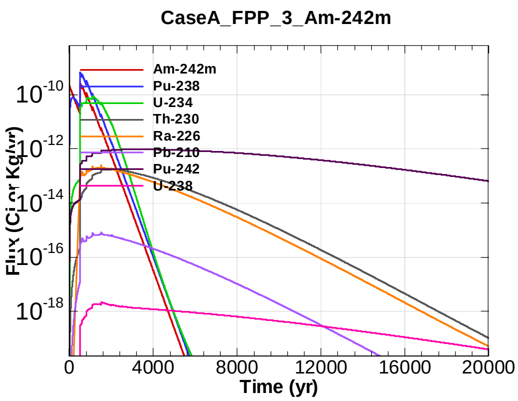

Figure A.1-2381 - Flux Leaving Liner for CaseA FPP_3 Am-242m

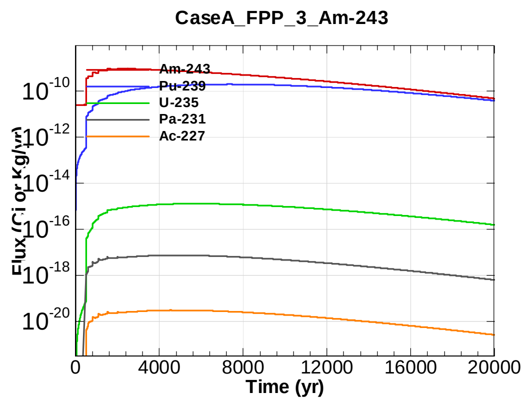

Figure A.1-2382 - Flux Leaving Liner for CaseA FPP_3 Am-243

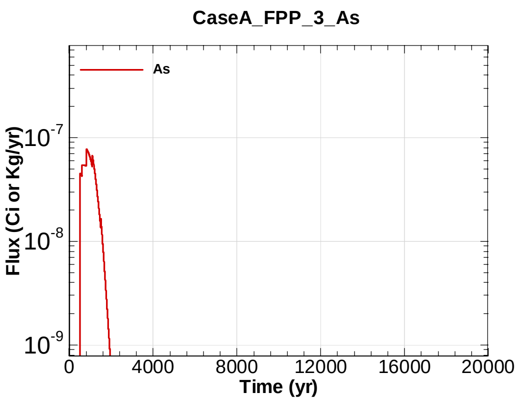

Figure A.1-2383 - Flux Leaving Liner for CaseA FPP_3 As

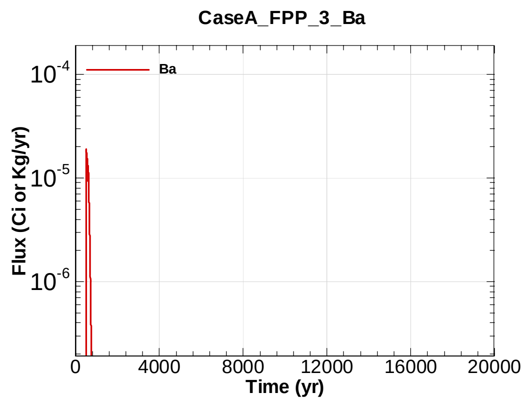

Figure A.1-2384 - Flux Leaving Liner for CaseA FPP_3 Ba

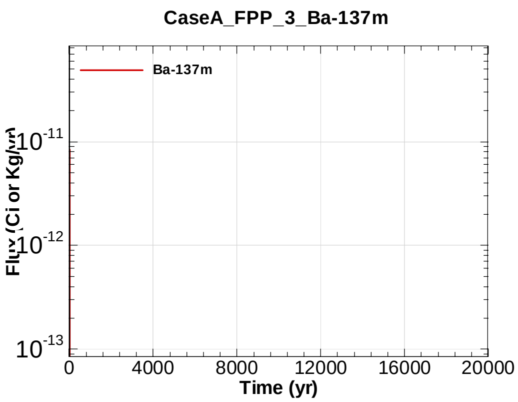

Figure A.1-2385 - Flux Leaving Liner for CaseA FPP_3 Ba-137m

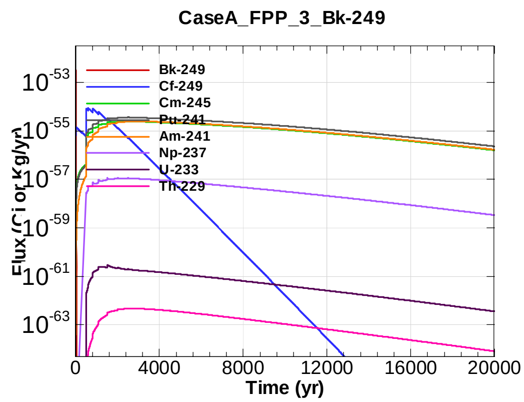

Figure A.1-2386 - Flux Leaving Liner for CaseA FPP_3 Bk-249

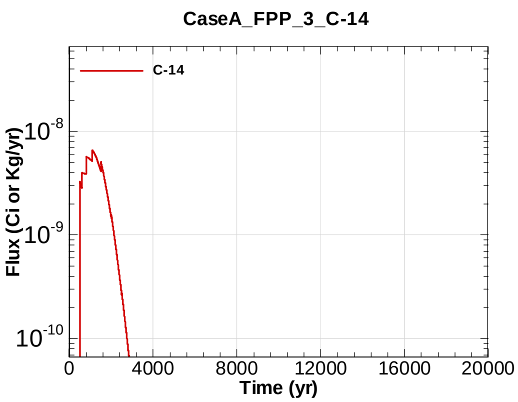

Figure A.1-2387 - Flux Leaving Liner for CaseA FPP_3 C-14

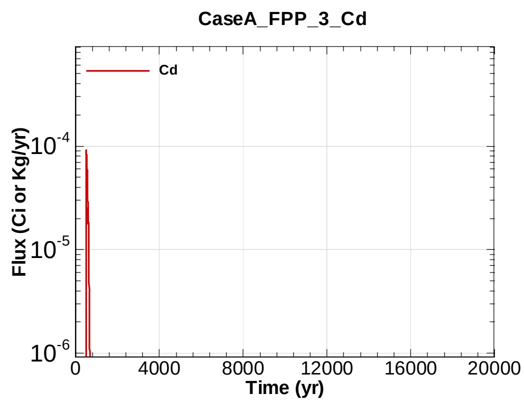

Figure A.1-2388 - Flux Leaving Liner for CaseA FPP_3 Cd

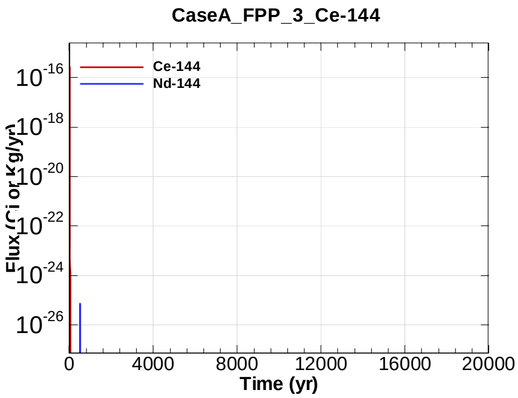

Figure A.1-2389 - Flux Leaving Liner for CaseA FPP_3 Ce-144

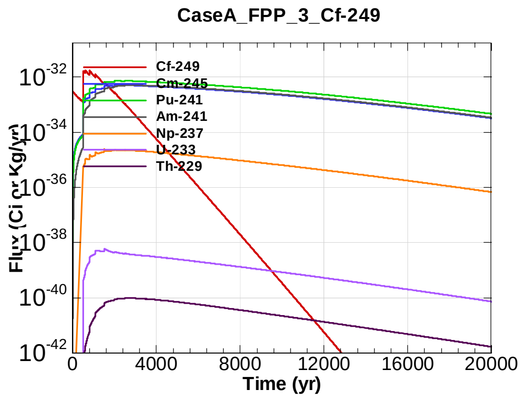

Figure A.1-2390 - Flux Leaving Liner for CaseA FPP_3 Cf-249

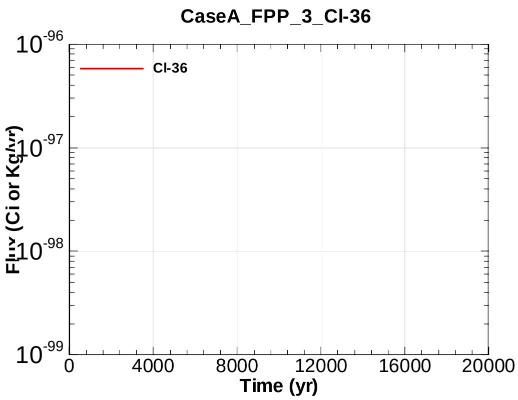

Figure A.1-2391 - Flux Leaving Liner for CaseA FPP_3 Cl-36

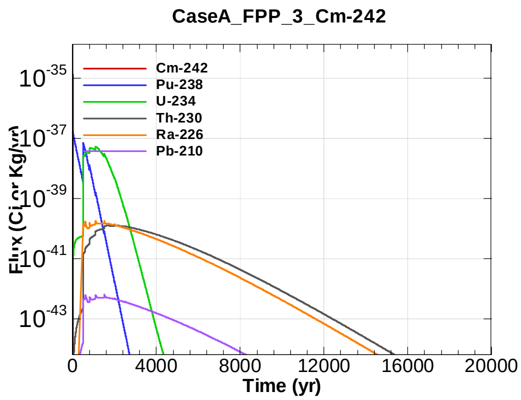

Figure A.1-2392 - Flux Leaving Liner for CaseA FPP_3 Cm-242

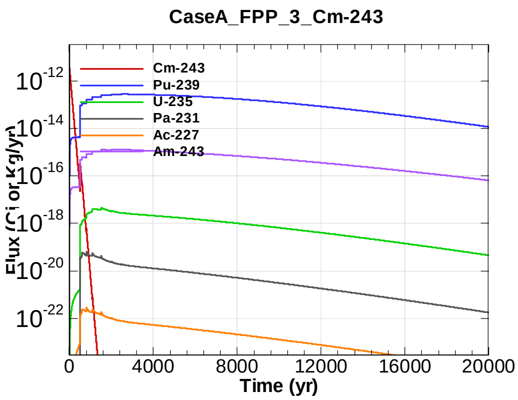

Figure A.1-2393 - Flux Leaving Liner for CaseA FPP_3 Cm-243

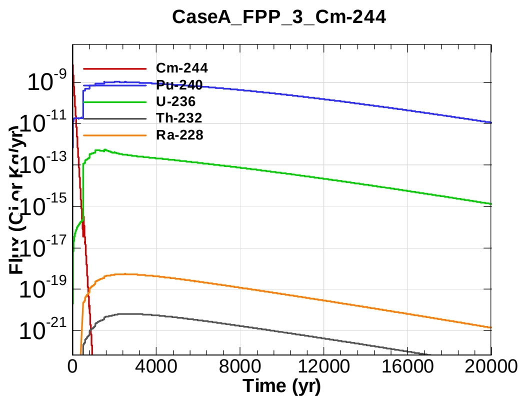

Figure A.1-2394 - Flux Leaving Liner for CaseA FPP_3 Cm-244

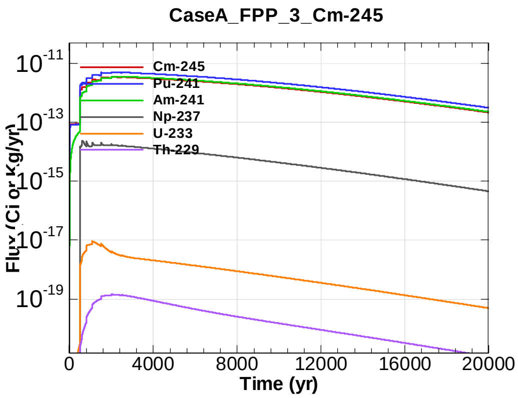

Figure A.1-2395 - Flux Leaving Liner for CaseA FPP_3 Cm-245

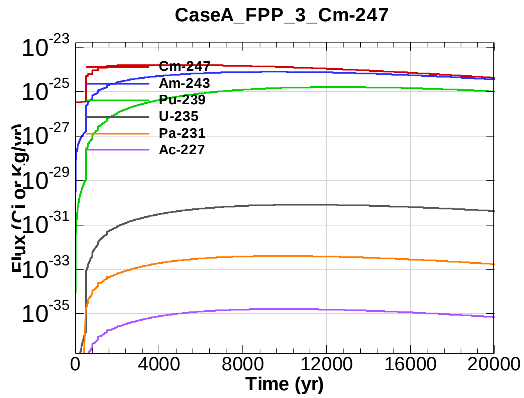

Figure A.1-2396 - Flux Leaving Liner for CaseA FPP_3 Cm-247

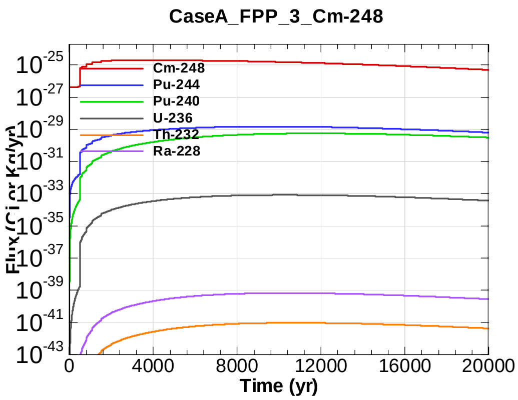

Figure A.1-2397 - Flux Leaving Liner for CaseA FPP_3 Cm-248

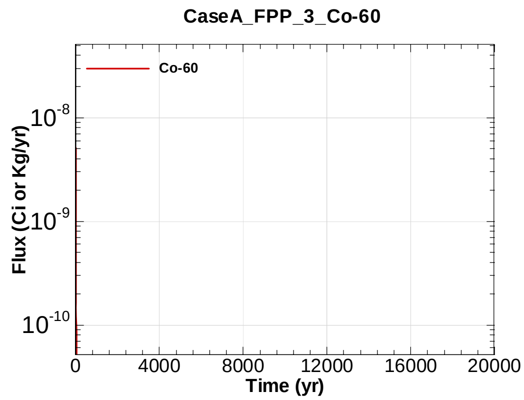

Figure A.1-2398 - Flux Leaving Liner for CaseA FPP_3 Co-60

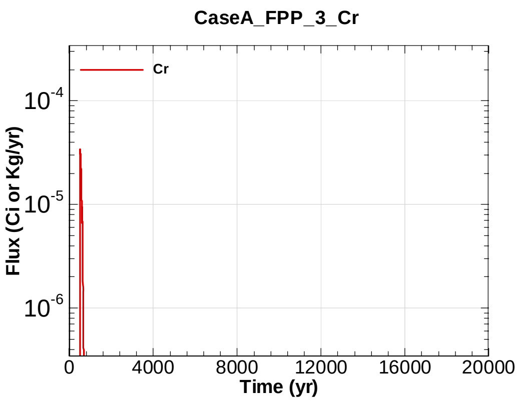

Figure A.1-2399 - Flux Leaving Liner for CaseA FPP_3 Cr

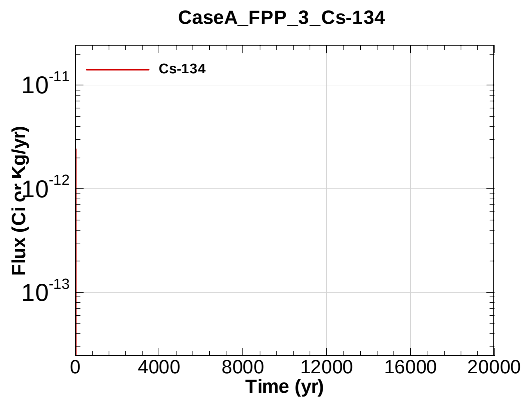

Figure A.1-2400 - Flux Leaving Liner for CaseA FPP_3 Cs-134

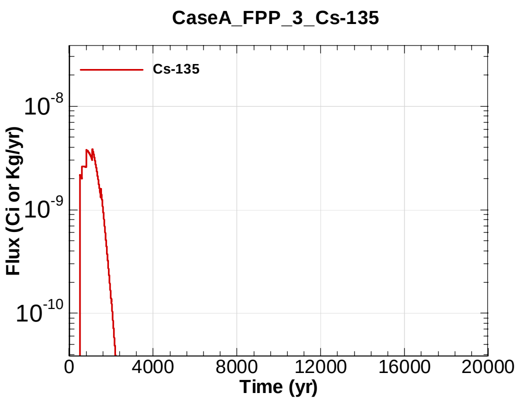

Figure A.1-2401 - Flux Leaving Liner for CaseA FPP_3 Cs-135

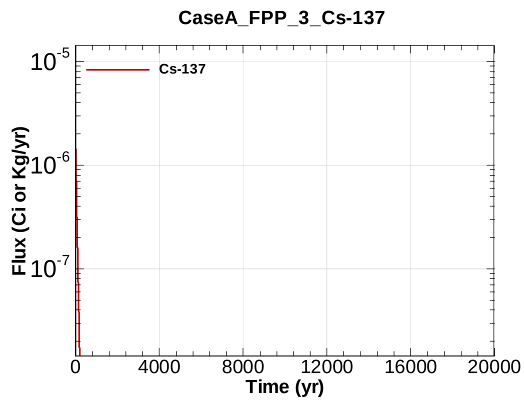

Figure A.1-2402 - Flux Leaving Liner for CaseA FPP_3 Cs-137

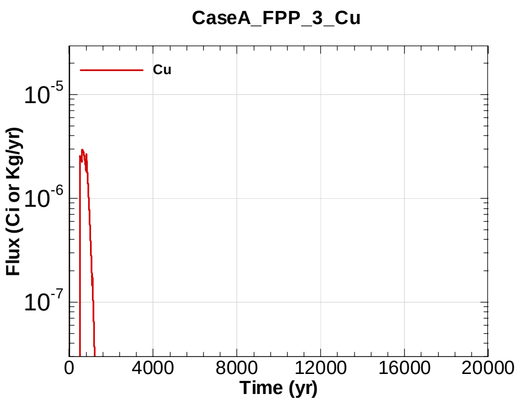

Figure A.1-2403 - Flux Leaving Liner for CaseA FPP_3 Cu

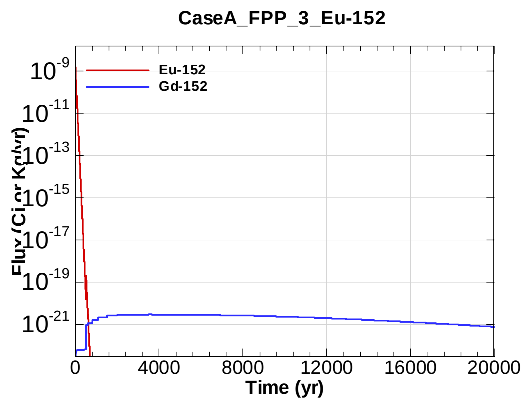

Figure A.1-2404 - Flux Leaving Liner for CaseA FPP_3 Eu-152

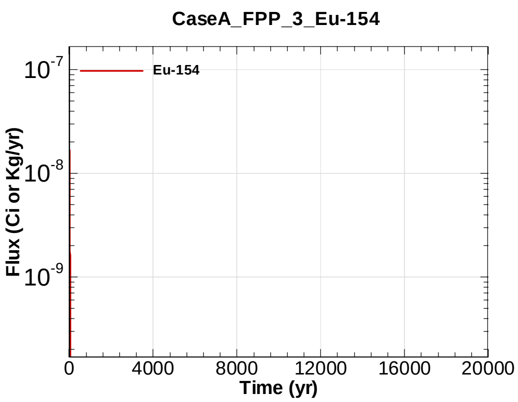

Figure A.1-2405 - Flux Leaving Liner for CaseA FPP_3 Eu-154

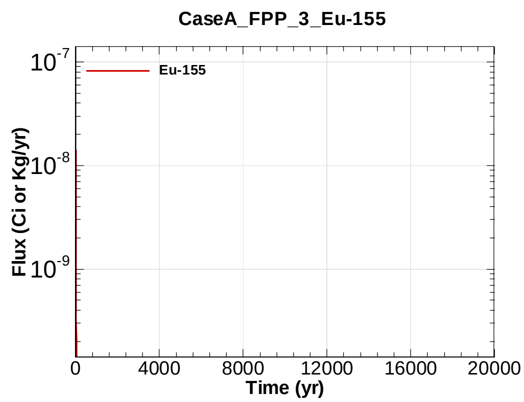

Figure A.1-2406 - Flux Leaving Liner for CaseA FPP_3 Eu-155

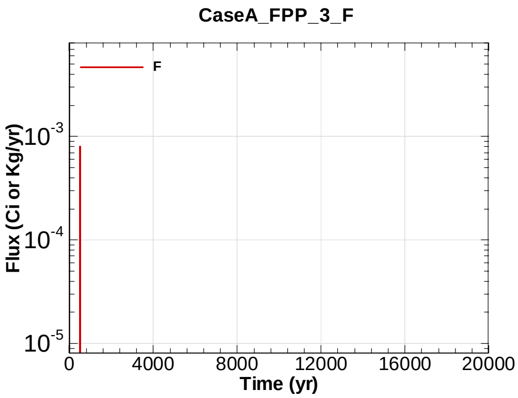

Figure A.1-2407 - Flux Leaving Liner for CaseA FPP_3 F

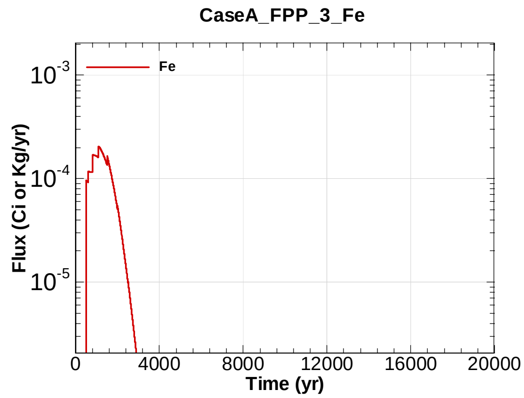

Figure A.1-2408 - Flux Leaving Liner for CaseA FPP_3 Fe

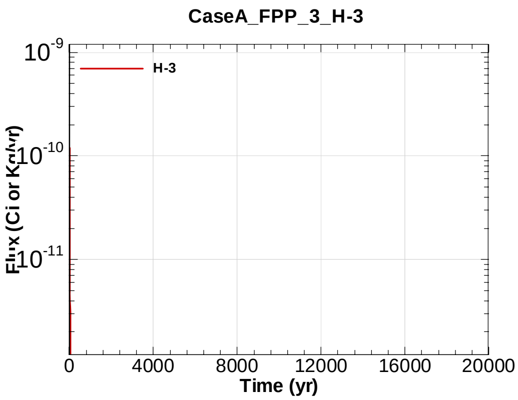

Figure A.1-2409 - Flux Leaving Liner for CaseA FPP_3 H-3

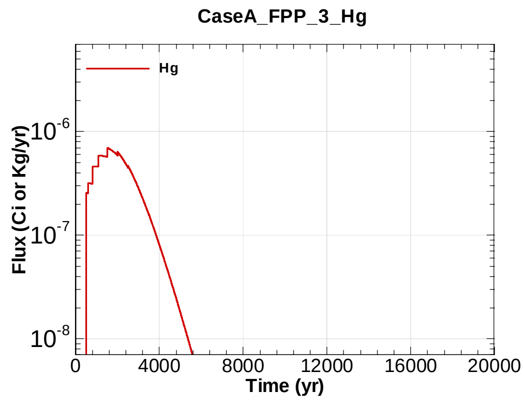

Figure A.1-2410 - Flux Leaving Liner for CaseA FPP_3 Hg

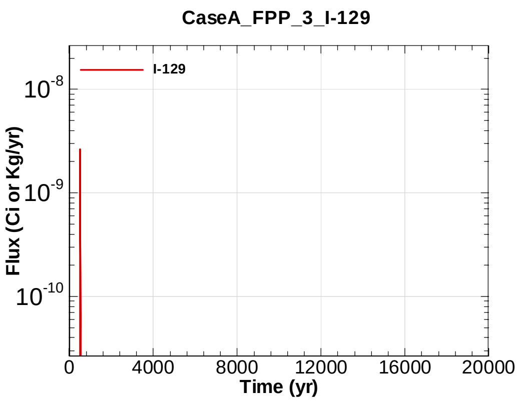

Figure A.1-2411 - Flux Leaving Liner for CaseA FPP_3 I-129

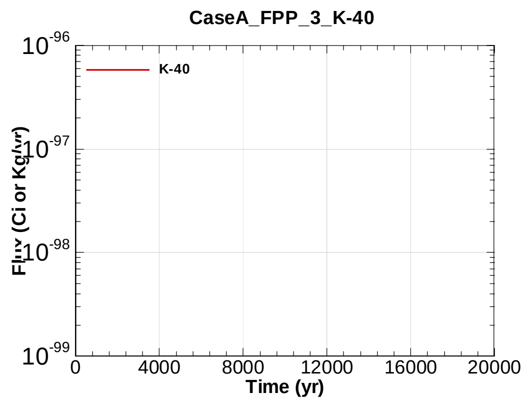

Figure A.1-2412 - Flux Leaving Liner for CaseA FPP_3 K-40

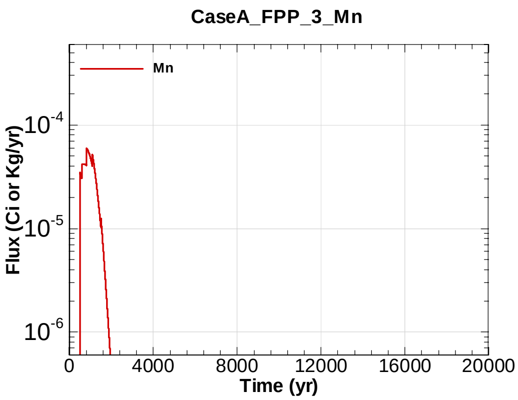

Figure A.1-2413 - Flux Leaving Liner for CaseA FPP_3 Mn

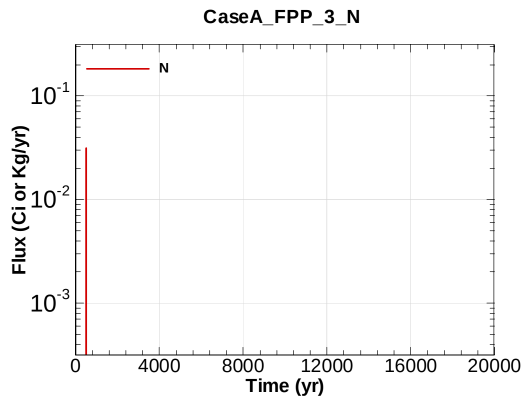

Figure A.1-2414 - Flux Leaving Liner for CaseA FPP_3 N

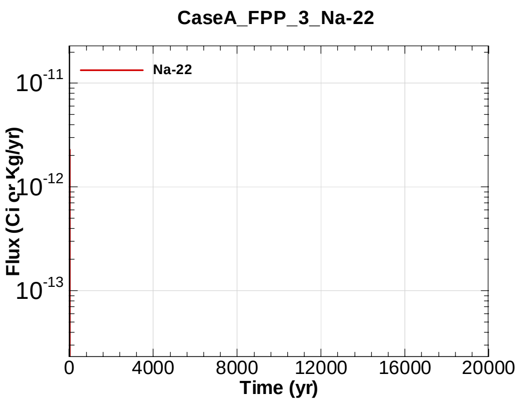

Figure A.1-2415 - Flux Leaving Liner for CaseA FPP_3 Na-22

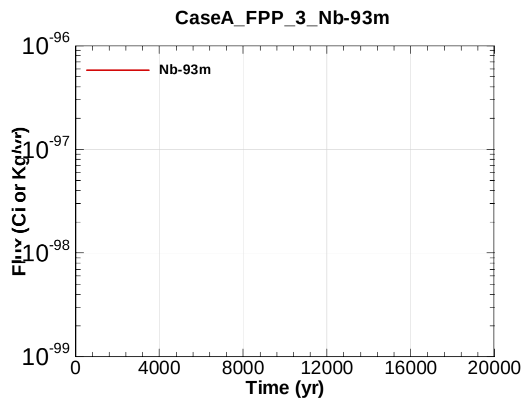

Figure A.1-2416 - Flux Leaving Liner for CaseA FPP_3 Nb-93m

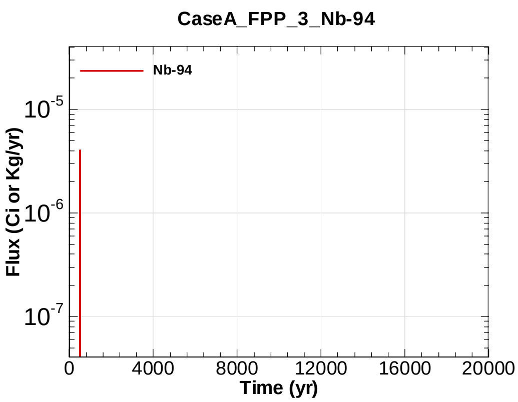

Figure A.1-2417 - Flux Leaving Liner for CaseA FPP_3 Nb-94

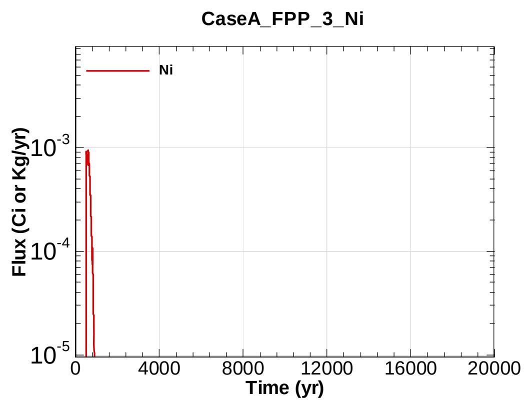

Figure A.1-2418 - Flux Leaving Liner for CaseA FPP_3 Ni

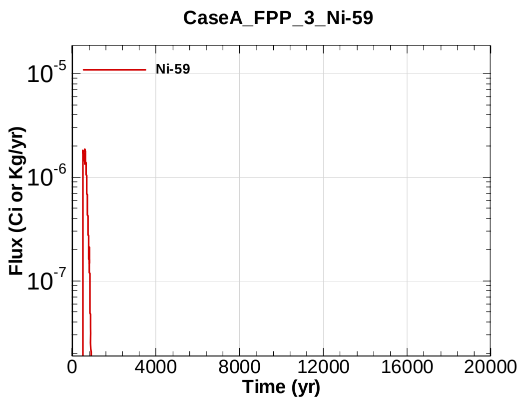

Figure A.1-2419 - Flux Leaving Liner for CaseA FPP_3 Ni-59

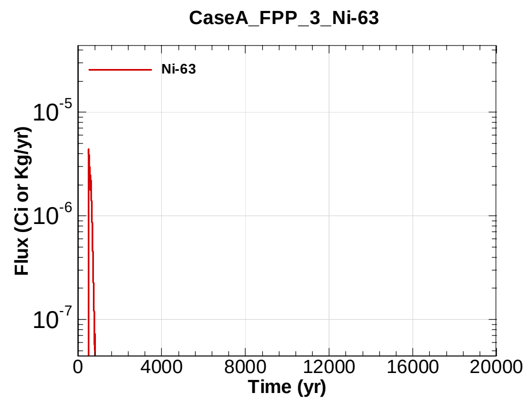

Figure A.1-2420 - Flux Leaving Liner for CaseA FPP_3 Ni-63

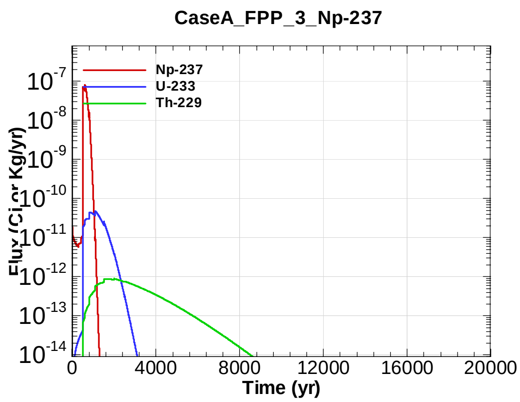

Figure A.1-2421 - Flux Leaving Liner for CaseA FPP_3 Np-237

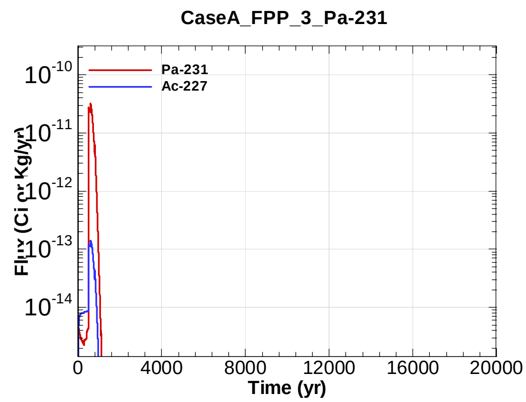

Figure A.1-2422 - Flux Leaving Liner for CaseA FPP_3 Pa-231

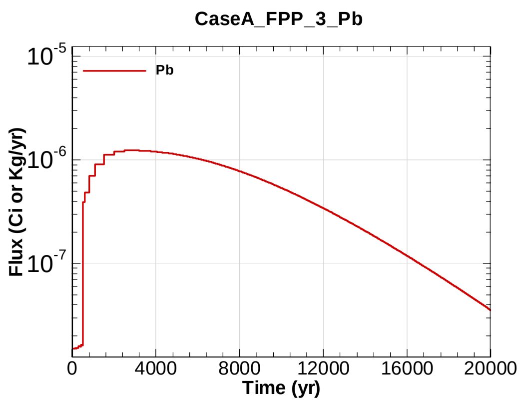

Figure A.1-2423 - Flux Leaving Liner for CaseA FPP_3 Pb

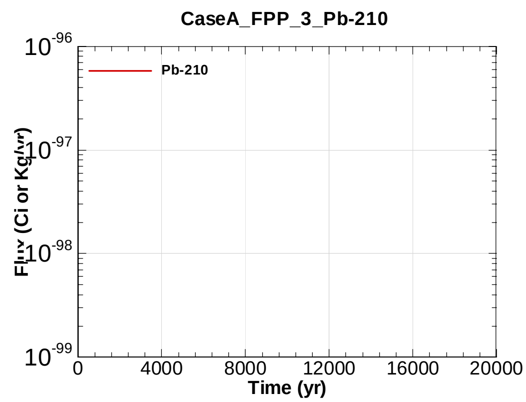

Figure A.1-2424 - Flux Leaving Liner for CaseA FPP_3 Pb-210

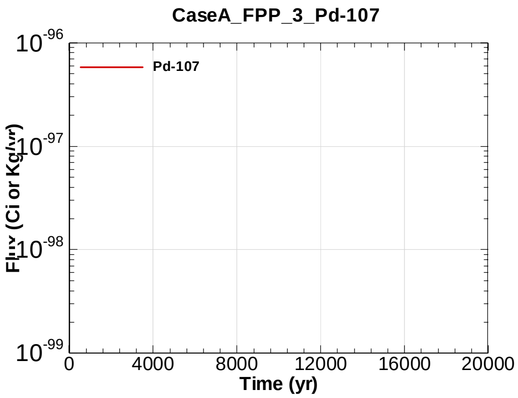

Figure A.1-2425 - Flux Leaving Liner for CaseA FPP_3 Pd-107

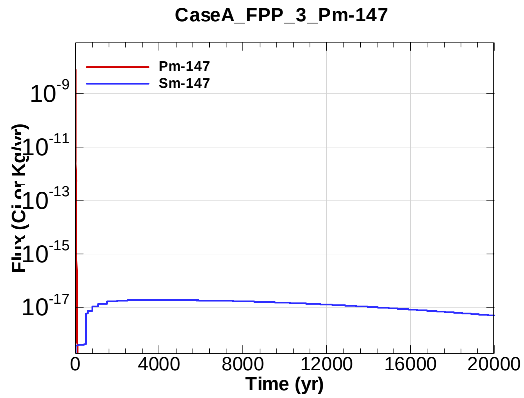

Figure A.1-2426 - Flux Leaving Liner for CaseA FPP_3 Pm-147

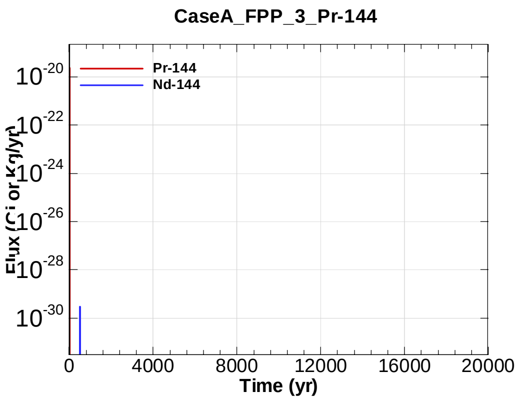

Figure A.1-2427 - Flux Leaving Liner for CaseA FPP_3 Pr-144

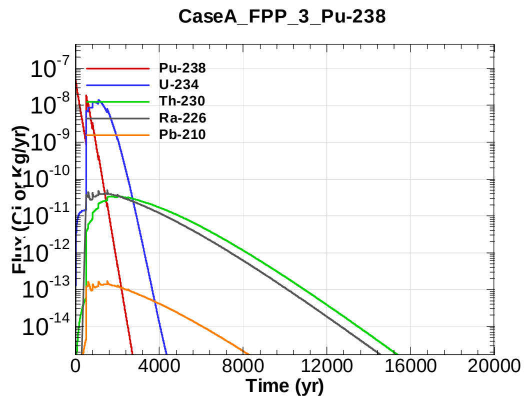

Figure A.1-2428 - Flux Leaving Liner for CaseA FPP_3 Pu-238

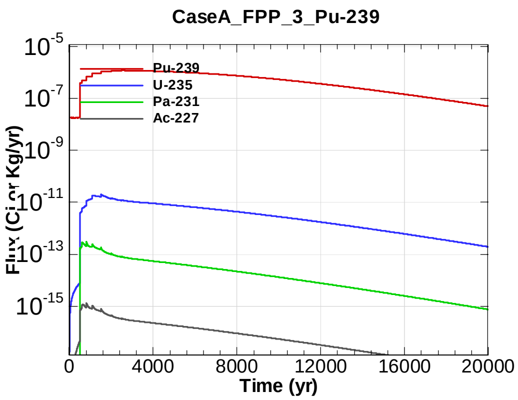

Figure A.1-2429 - Flux Leaving Liner for CaseA FPP_3 Pu-239

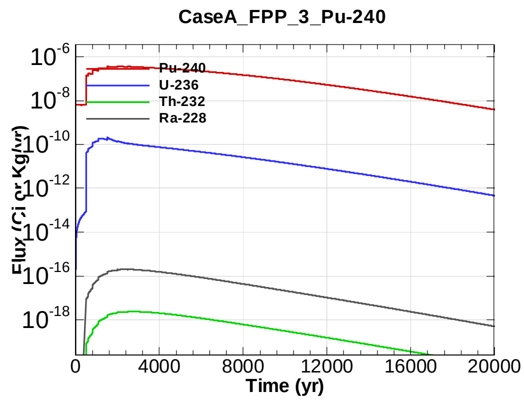

Figure A.1-2430 - Flux Leaving Liner for CaseA FPP_3 Pu-240

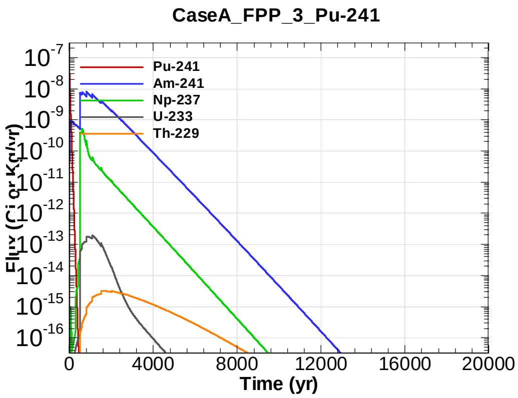

Figure A.1-2431 - Flux Leaving Liner for CaseA FPP_3 Pu-241

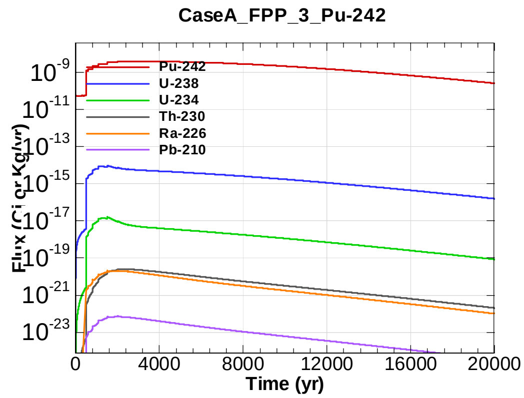

Figure A.1-2432 - Flux Leaving Liner for CaseA FPP_3 Pu-242

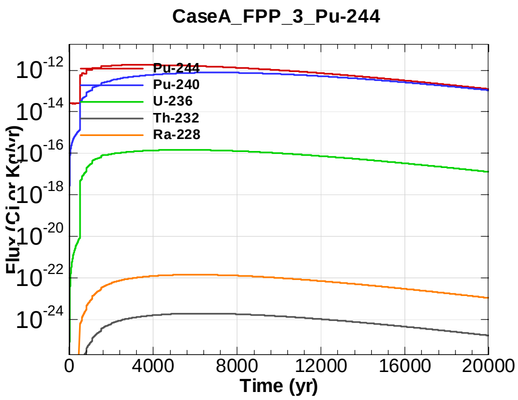

Figure A.1-2433 - Flux Leaving Liner for CaseA FPP_3 Pu-244

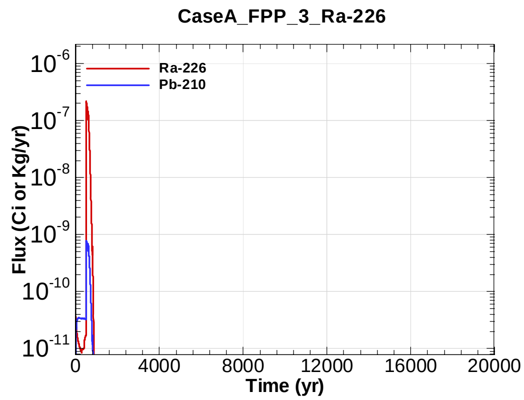

Figure A.1-2434 - Flux Leaving Liner for CaseA FPP_3 Ra-226

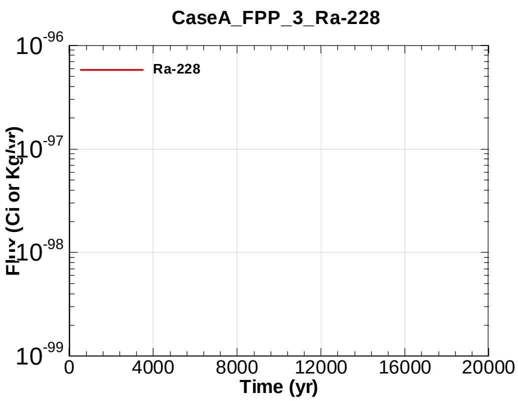

Figure A.1-2435 - Flux Leaving Liner for CaseA FPP_3 Ra-228

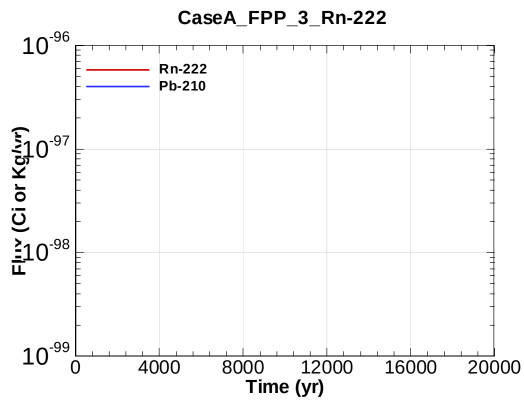

Figure A.1-2436 - Flux Leaving Liner for CaseA FPP_3 Rn-222

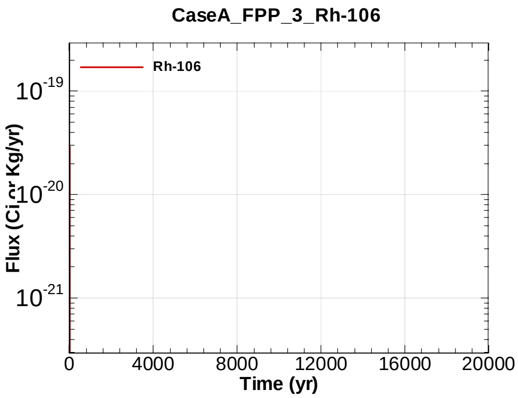

Figure A.1-2437 - Flux Leaving Liner for CaseA FPP_3 Rh-106

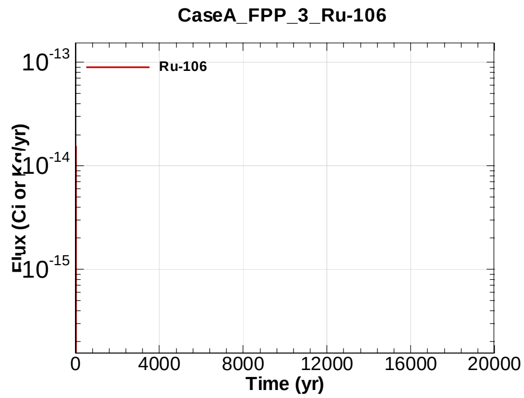

Figure A.1-2438 - Flux Leaving Liner for CaseA FPP_3 Ru-106

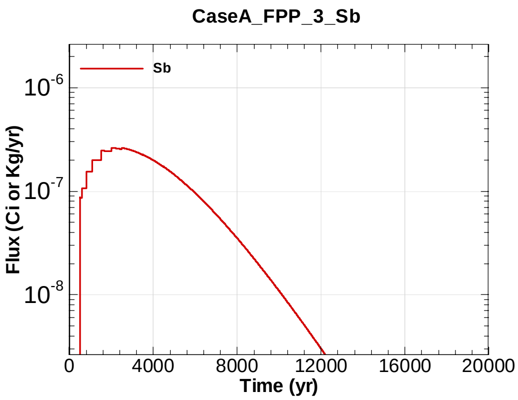

Figure A.1-2439 - Flux Leaving Liner for CaseA FPP_3 Sb

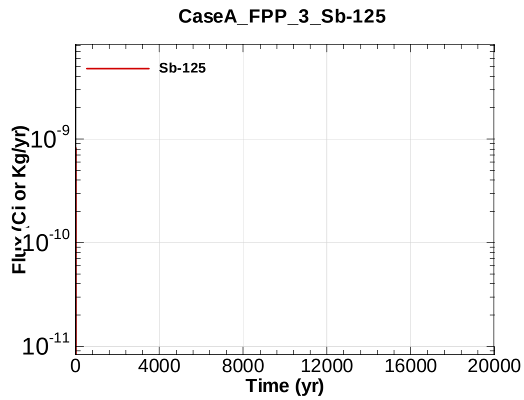

Figure A.1-2440 - Flux Leaving Liner for CaseA FPP_3 Sb-125

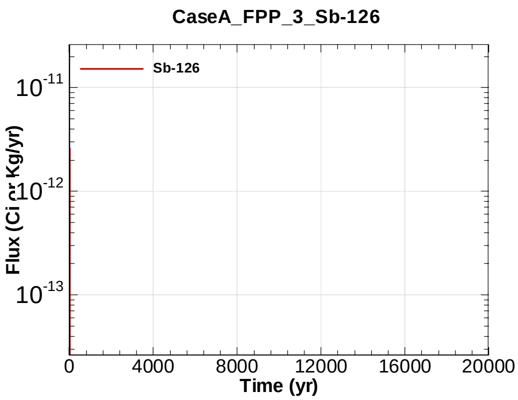

Figure A.1-2441 - Flux Leaving Liner for CaseA FPP_3 Sb-126

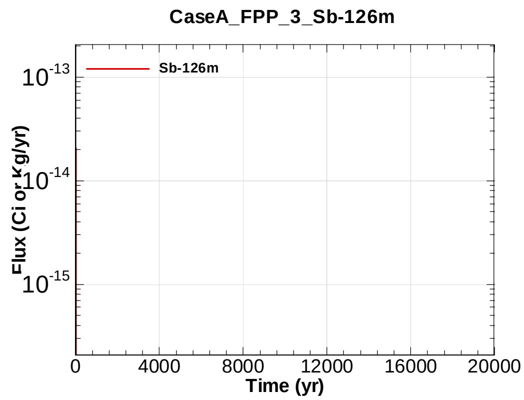

Figure A.1-2442 - Flux Leaving Liner for CaseA FPP_3 Sb-126m

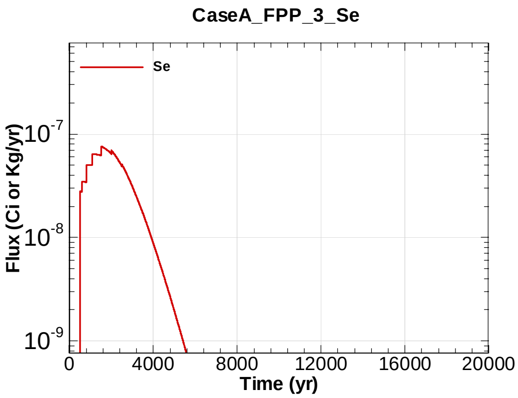

Figure A.1-2443 - Flux Leaving Liner for CaseA FPP_3 Se

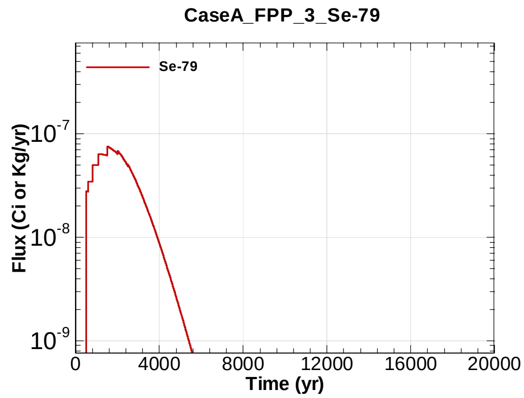

Figure A.1-2444 - Flux Leaving Liner for CaseA FPP_3 Se-79

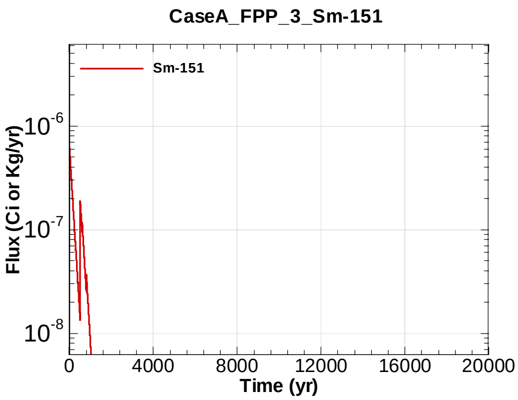

Figure A.1-2445 - Flux Leaving Liner for CaseA FPP_3 Sm-151

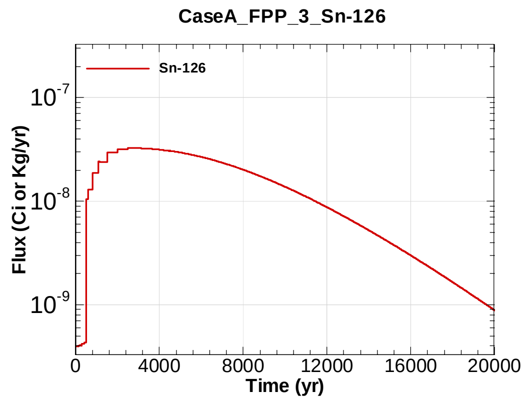

Figure A.1-2446 - Flux Leaving Liner for CaseA FPP_3 Sn-126

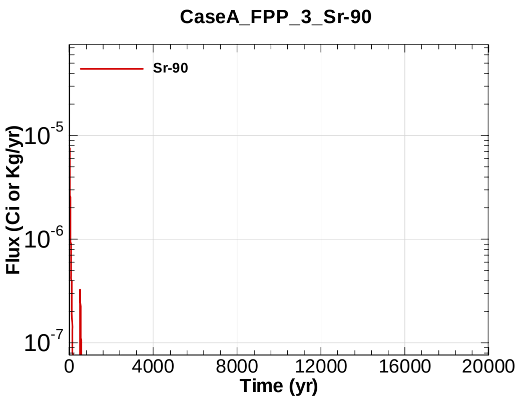

Figure A.1-2447 - Flux Leaving Liner for CaseA FPP_3 Sr-90

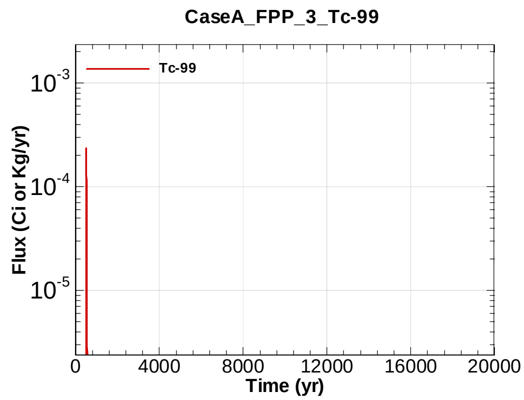

Figure A.1-2448 - Flux Leaving Liner for CaseA FPP_3 Tc-99

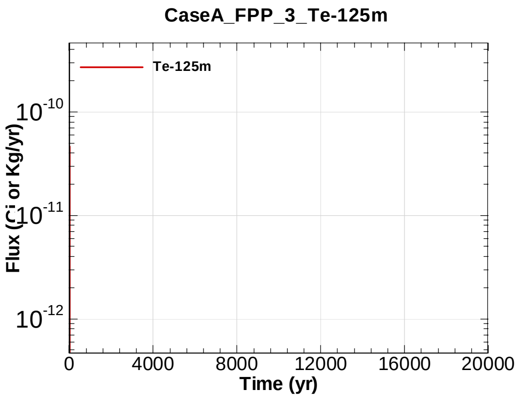

Figure A.1-2449 - Flux Leaving Liner for CaseA FPP_3 Te-125m

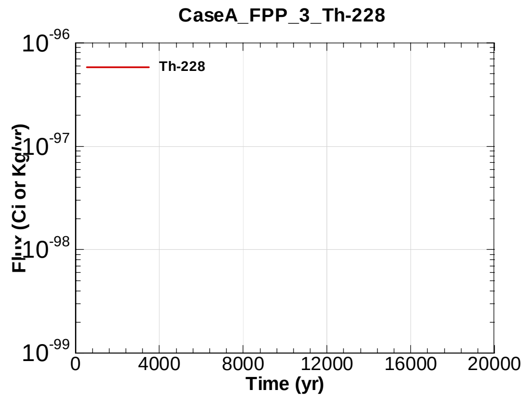

Figure A.1-2450 - Flux Leaving Liner for CaseA FPP_3 Th-228

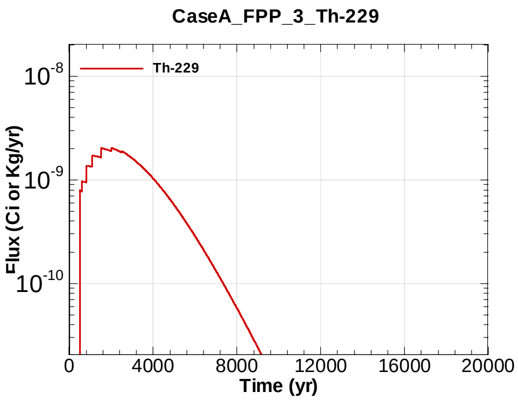

Figure A.1-2451 - Flux Leaving Liner for CaseA FPP_3 Th-229

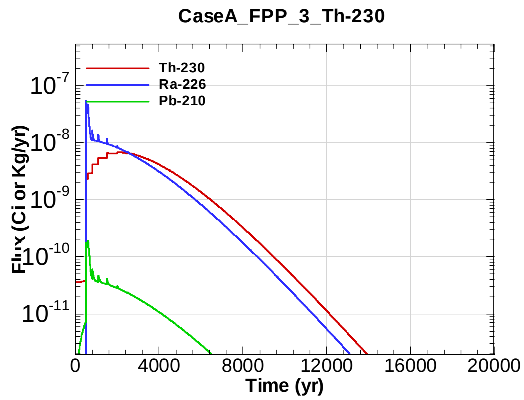

Figure A.1-2452 - Flux Leaving Liner for CaseA FPP_3 Th-230

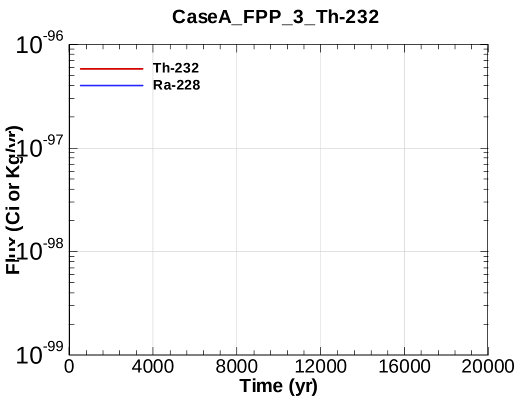

Figure A.1-2453 - Flux Leaving Liner for CaseA FPP_3 Th-232

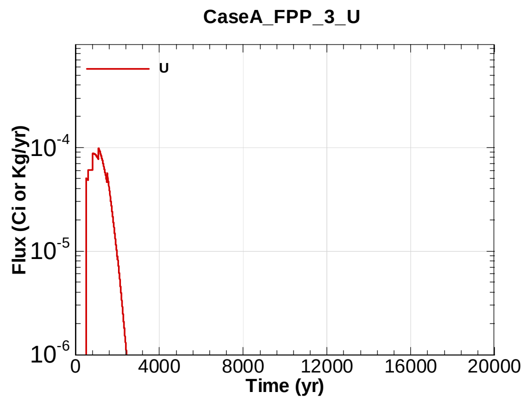

Figure A.1-2454 - Flux Leaving Liner for CaseA FPP_3 U

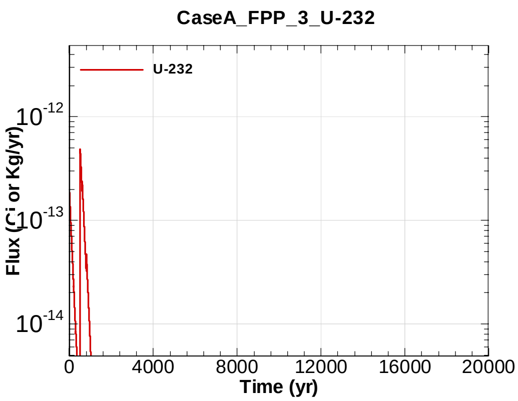

Figure A.1-2455 - Flux Leaving Liner for CaseA FPP_3 U-232

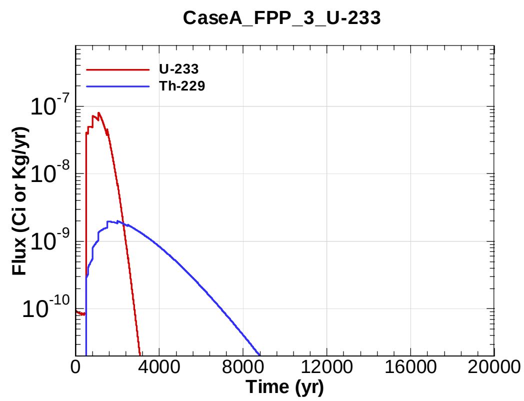

Figure A.1-2456 - Flux Leaving Liner for CaseA FPP_3 U-233

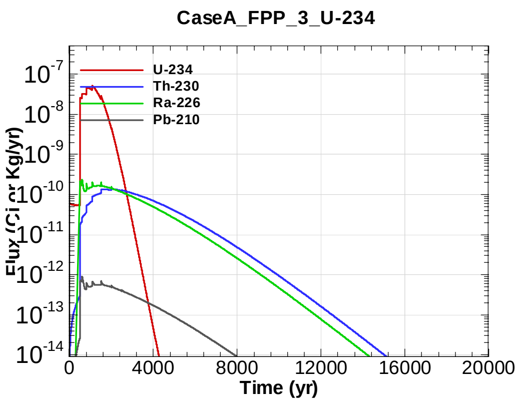

Figure A.1-2457 - Flux Leaving Liner for CaseA FPP_3 U-234

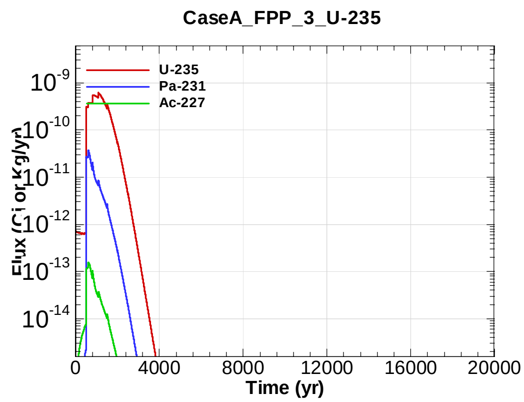

Figure A.1-2458 - Flux Leaving Liner for CaseA FPP_3 U-235

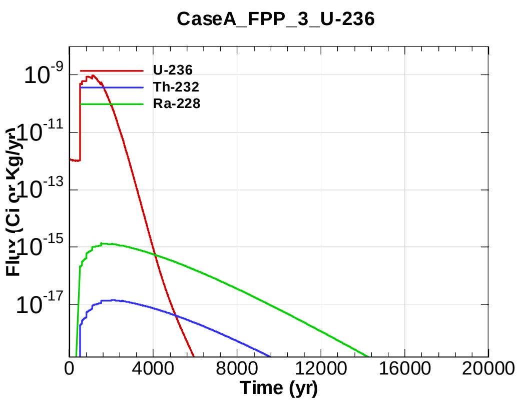

Figure A.1-2459 - Flux Leaving Liner for CaseA FPP_3 U-236

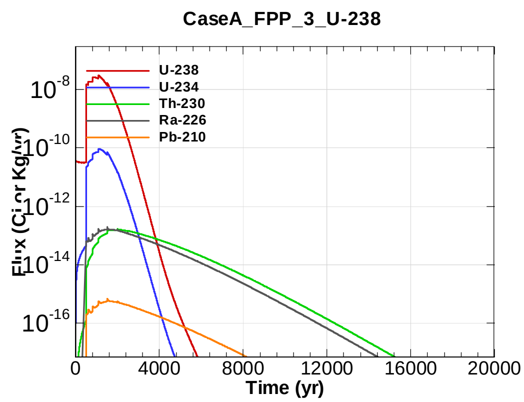

Figure A.1-2460 - Flux Leaving Liner for CaseA FPP_3 U-238

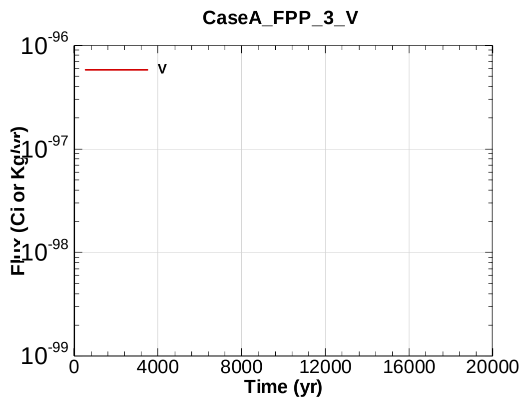

Figure A.1-2461 - Flux Leaving Liner for CaseA FPP_3 V

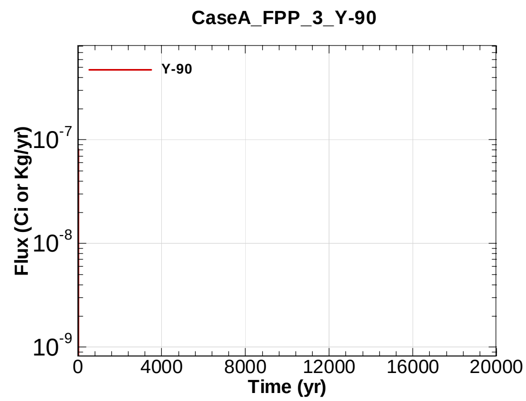

Figure A.1-2462 - Flux Leaving Liner for CaseA FPP_3 Y-90

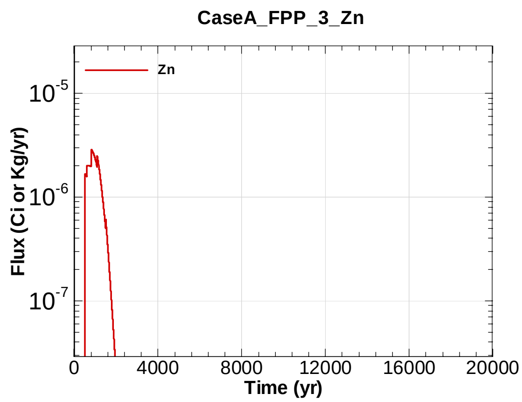

Figure A.1-2463 - Flux Leaving Liner for CaseA FPP_3 Zn

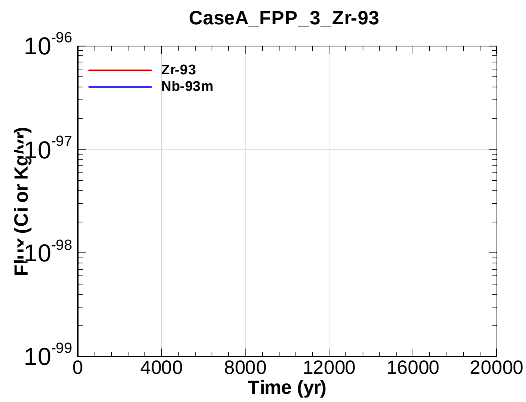

Figure A.1-2464 - Flux Leaving Liner for CaseA FPP_3 Zr-93

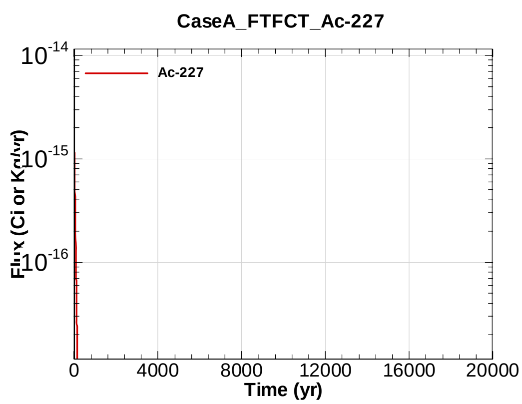

Figure A.1-2465 - Flux Leaving Liner for CaseA FTFCT Ac-227

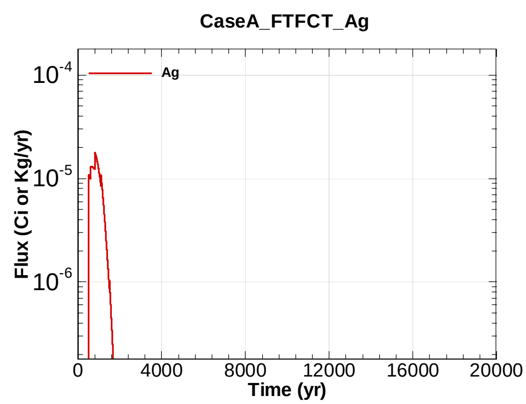

Figure A.1-2466 - Flux Leaving Liner for CaseA FTFCT Ag

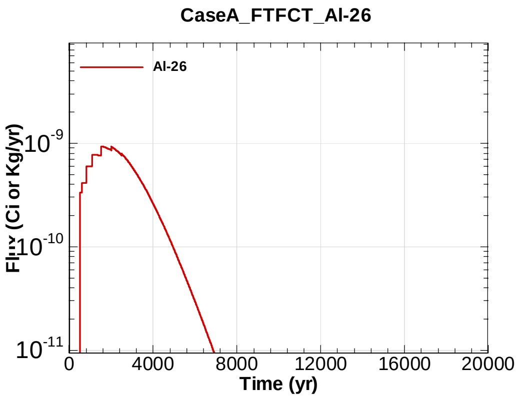

Figure A.1-2467 - Flux Leaving Liner for CaseA FTFCT Al-26

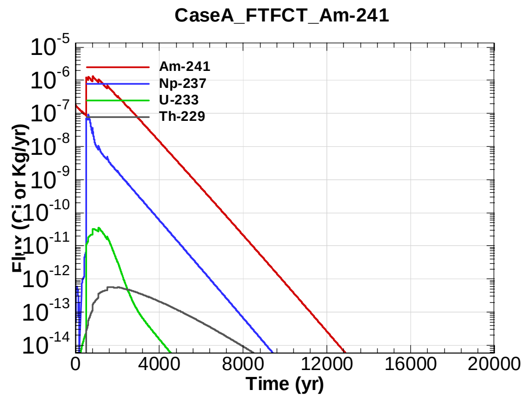

Figure A.1-2468 - Flux Leaving Liner for CaseA FTFCT Am-241

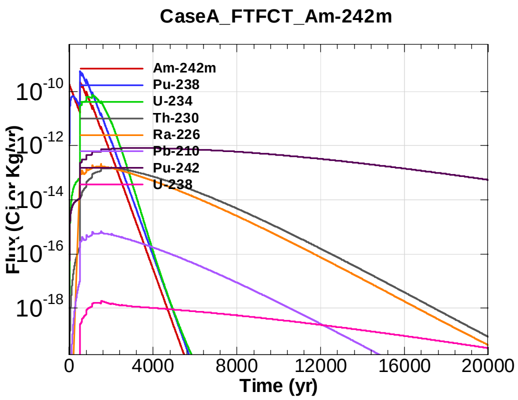

Figure A.1-2469 - Flux Leaving Liner for CaseA FTFCT Am-242m

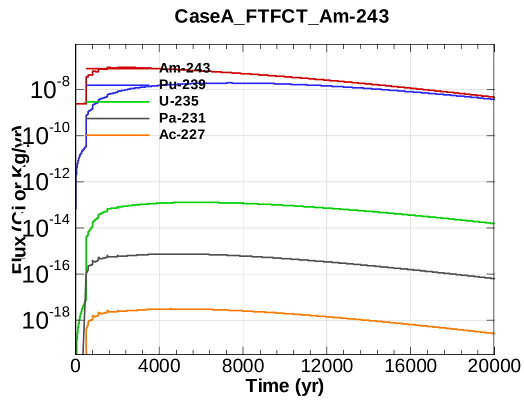

Figure A.1-2470 - Flux Leaving Liner for CaseA FTFCT Am-243

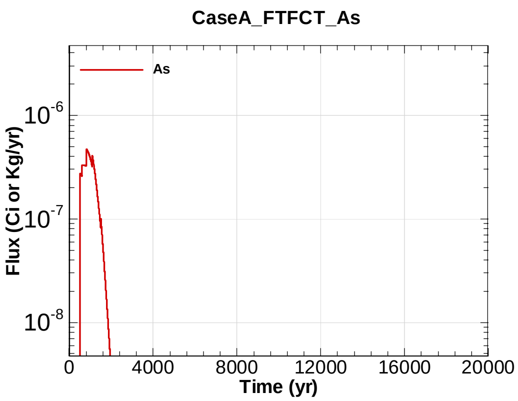

Figure A.1-2471 - Flux Leaving Liner for CaseA FTFCT As

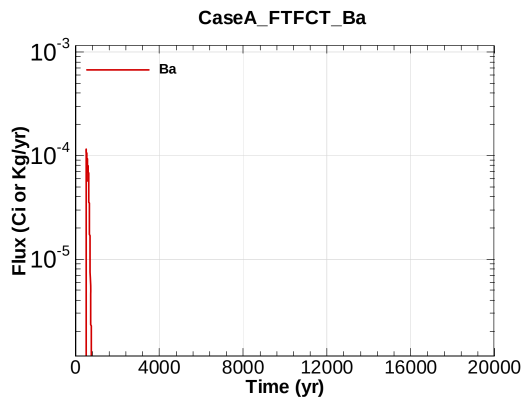

Figure A.1-2472 - Flux Leaving Liner for CaseA FTFCT Ba

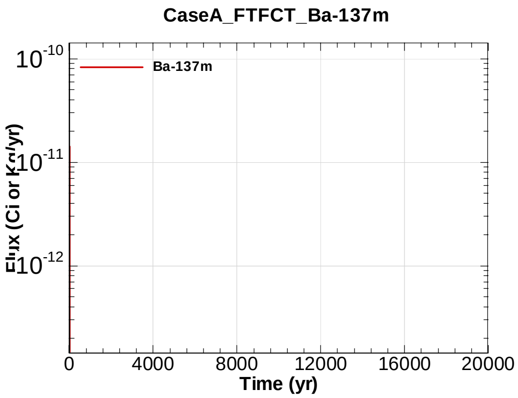

Figure A.1-2473 - Flux Leaving Liner for CaseA FTFCT Ba-137m

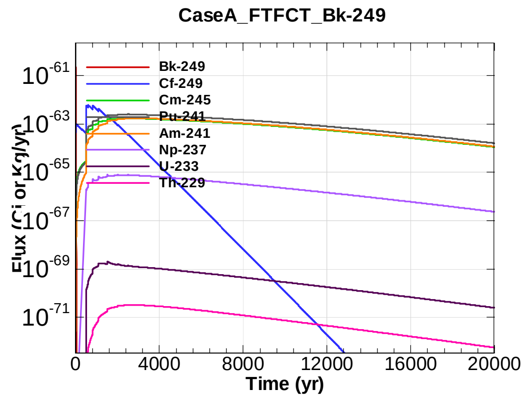

Figure A.1-2474 - Flux Leaving Liner for CaseA FTFCT Bk-249

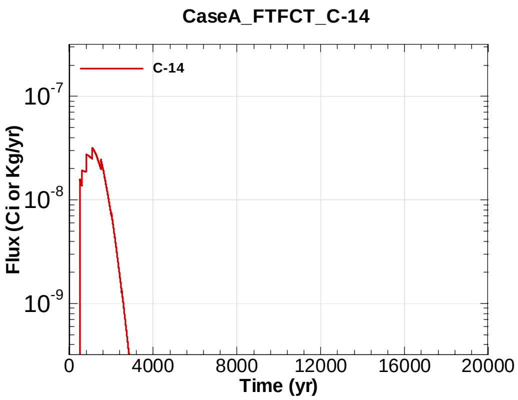

Figure A.1-2475 - Flux Leaving Liner for CaseA FTFCT C-14

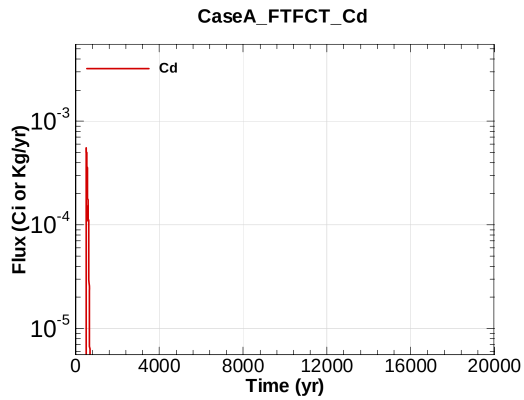

Figure A.1-2476 - Flux Leaving Liner for CaseA FTFCT Cd

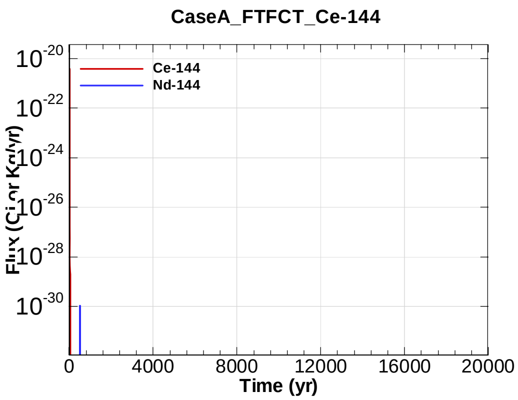

Figure A.1-2477 - Flux Leaving Liner for CaseA FTFCT Ce-144

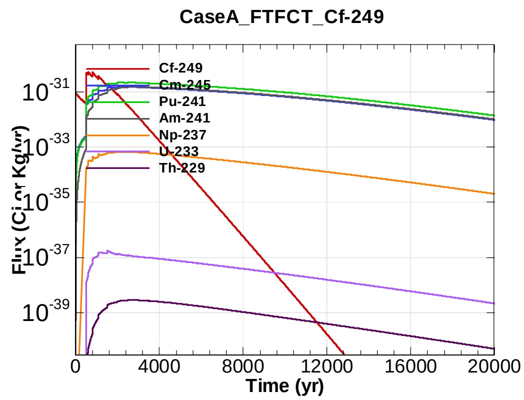

Figure A.1-2478 - Flux Leaving Liner for CaseA FTFCT Cf-249

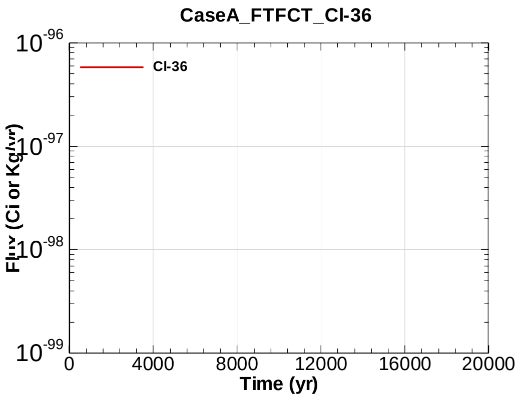

Figure A.1-2479 - Flux Leaving Liner for CaseA FTFCT Cl-36

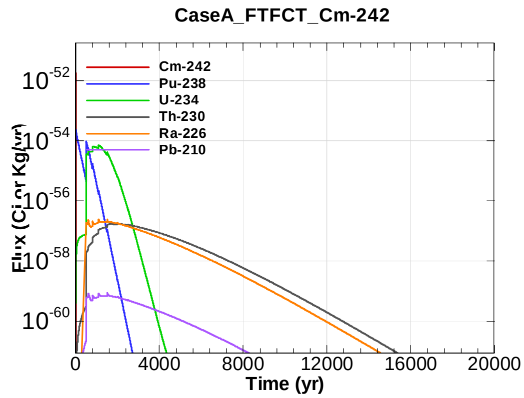

Figure A.1-2480 - Flux Leaving Liner for CaseA FTFCT Cm-242

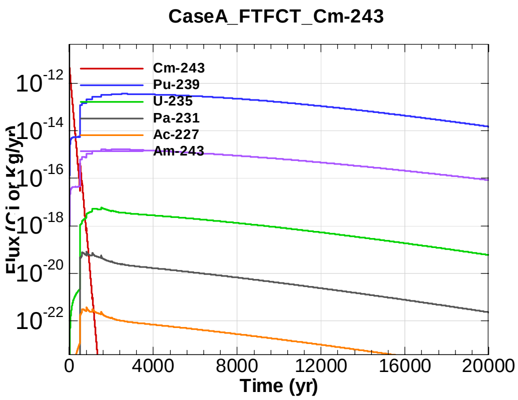

Figure A.1-2481 - Flux Leaving Liner for CaseA FTFCT Cm-243

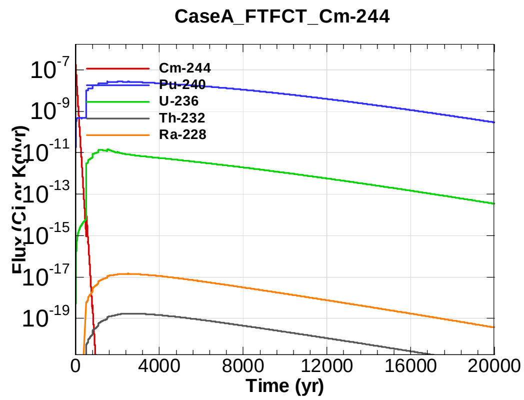

Figure A.1-2482 - Flux Leaving Liner for CaseA FTFCT Cm-244

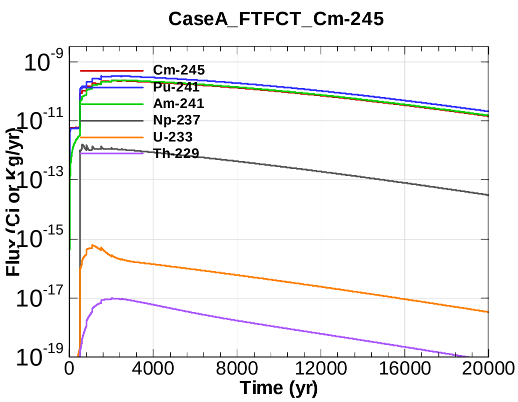

Figure A.1-2483 - Flux Leaving Liner for CaseA FTFCT Cm-245

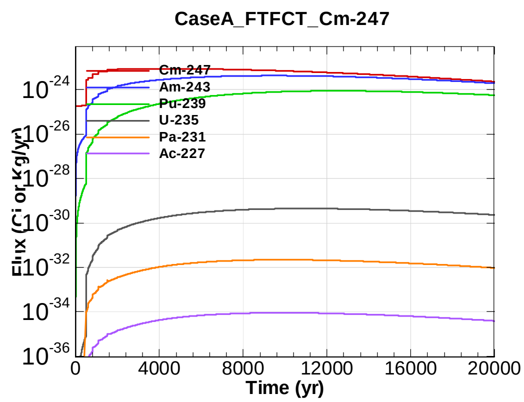

Figure A.1-2484 - Flux Leaving Liner for CaseA FTFCT Cm-247

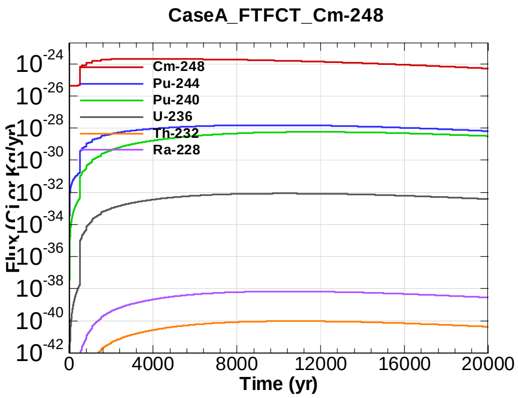

Figure A.1-2485 - Flux Leaving Liner for CaseA FTFCT Cm-248

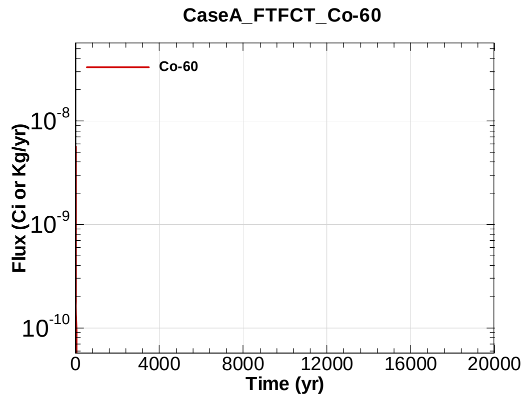

Figure A.1-2486 - Flux Leaving Liner for CaseA FTFCT Co-60

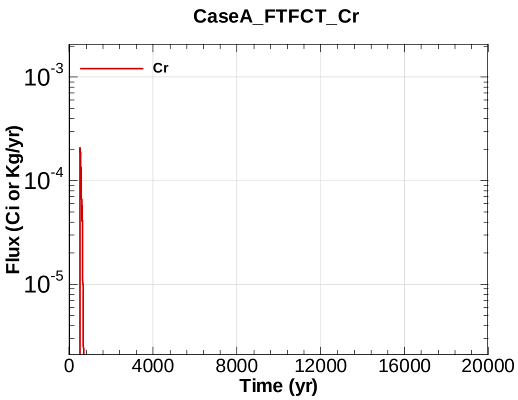

Figure A.1-2487 - Flux Leaving Liner for CaseA FTFCT Cr

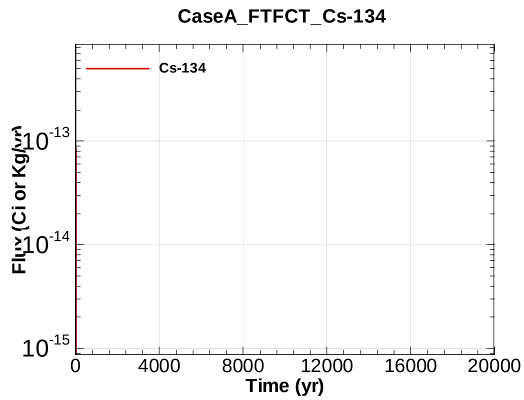

Figure A.1-2488 - Flux Leaving Liner for CaseA FTFCT Cs-134

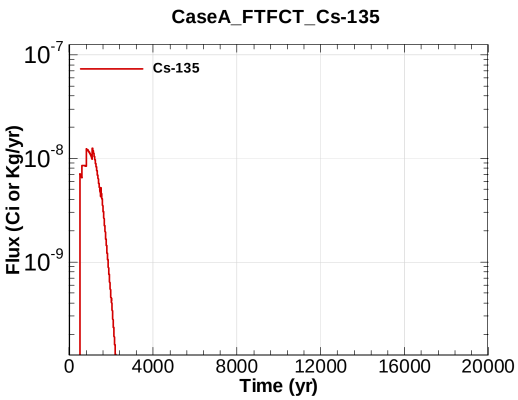

Figure A.1-2489 - Flux Leaving Liner for CaseA FTFCT Cs-135

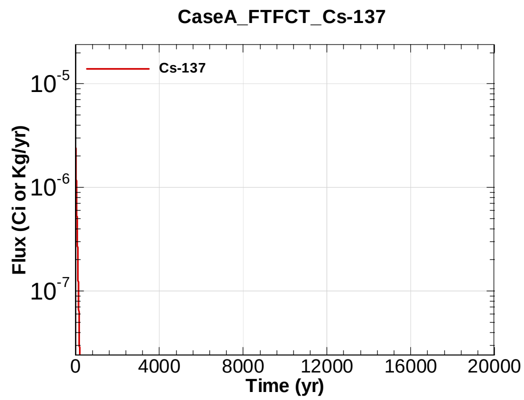

Figure A.1-2490 - Flux Leaving Liner for CaseA FTFCT Cs-137

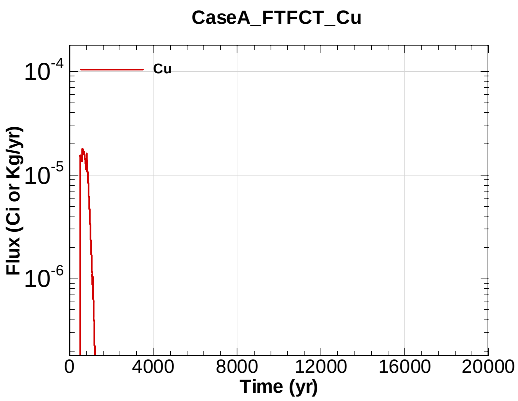

Figure A.1-2491 - Flux Leaving Liner for CaseA FTFCT Cu

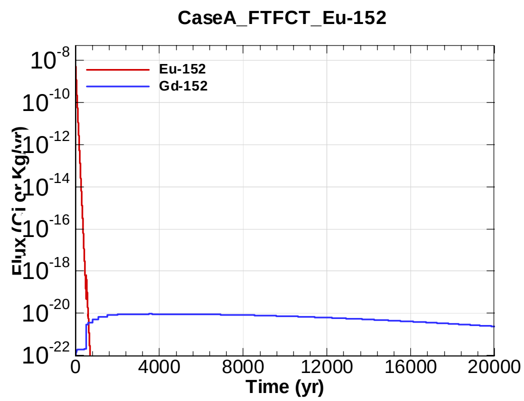

Figure A.1-2492 - Flux Leaving Liner for CaseA FTFCT Eu-152

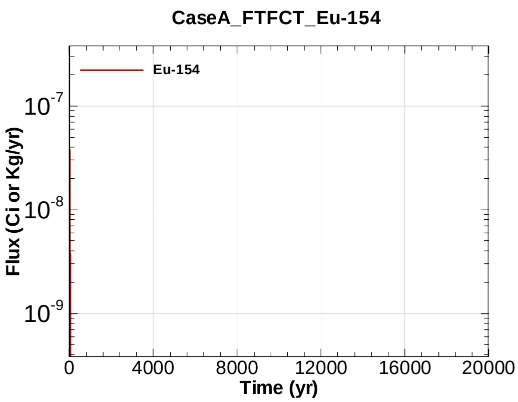

Figure A.1-2493 - Flux Leaving Liner for CaseA FTFCT Eu-154

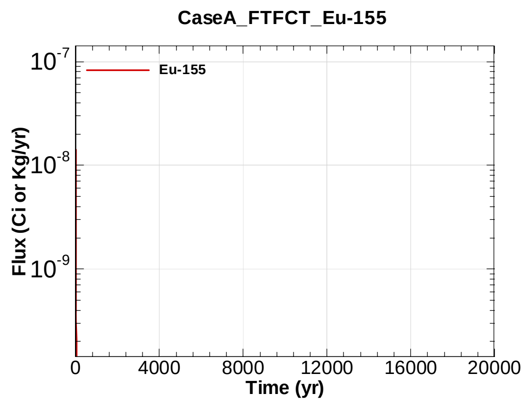

Figure A.1-2494 - Flux Leaving Liner for CaseA FTFCT Eu-155

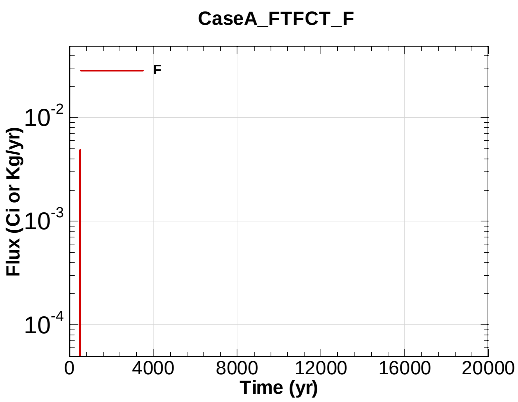

Figure A.1-2495 - Flux Leaving Liner for CaseA FTFCT F

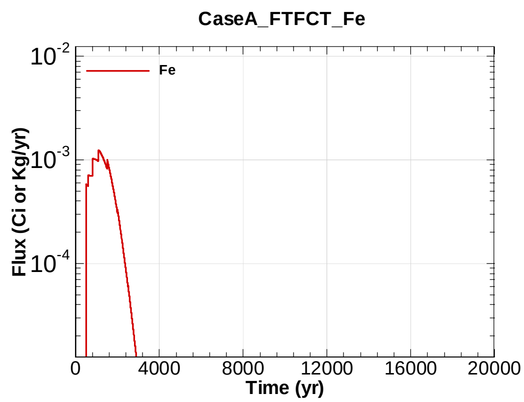

Figure A.1-2496 - Flux Leaving Liner for CaseA FTFCT Fe

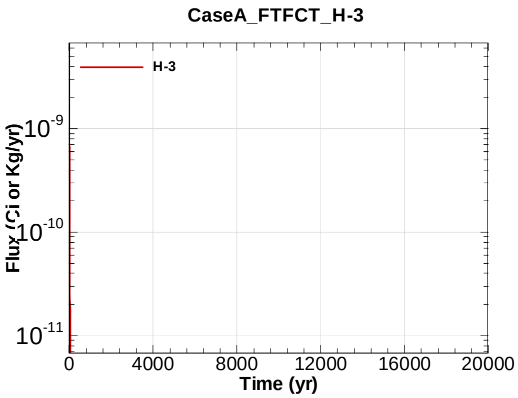

Figure A.1-2497 - Flux Leaving Liner for CaseA FTFCT H-3

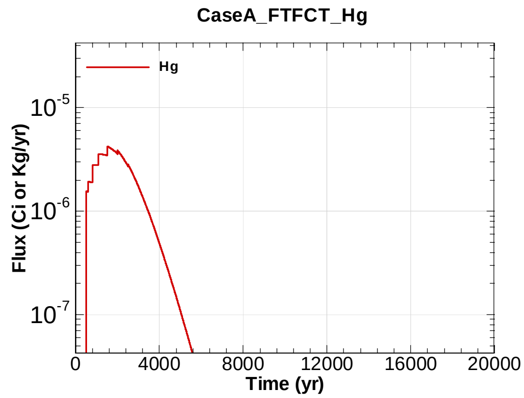

Figure A.1-2498 - Flux Leaving Liner for CaseA FTFCT Hg

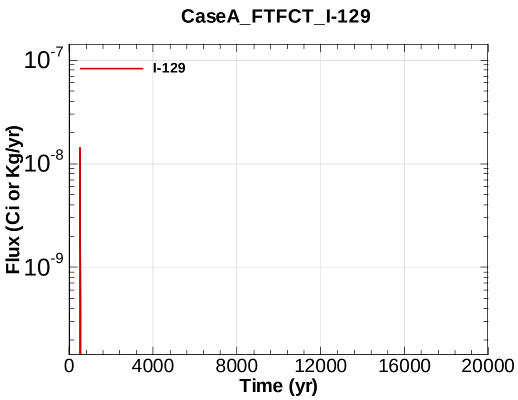

Figure A.1-2499 - Flux Leaving Liner for CaseA FTFCT I-129

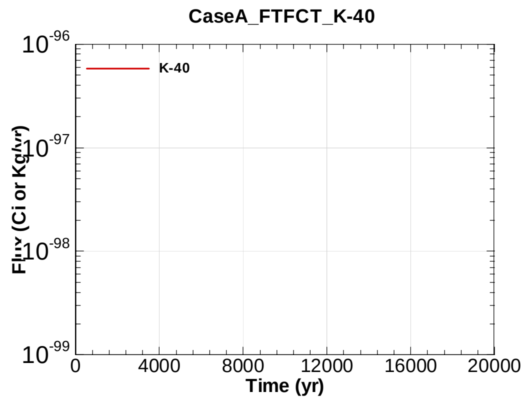

Figure A.1-2500 - Flux Leaving Liner for CaseA FTFCT K-40

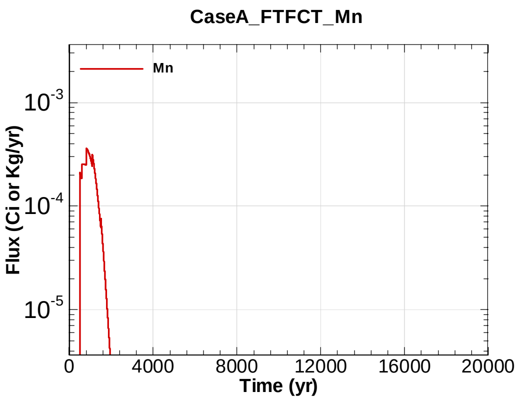

Figure A.1-2501 - Flux Leaving Liner for CaseA FTFCT Mn

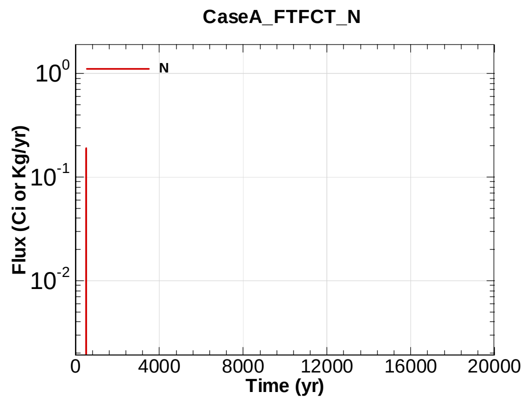

Figure A.1-2502 - Flux Leaving Liner for CaseA FTFCT N

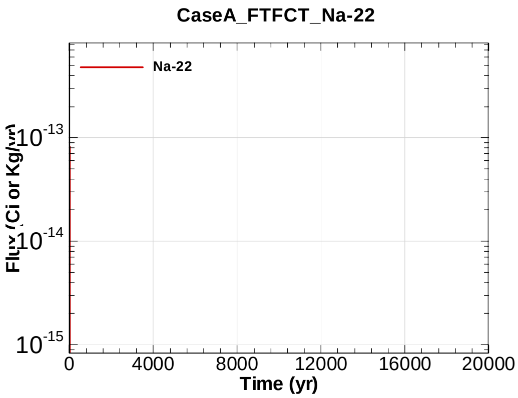

Figure A.1-2503 - Flux Leaving Liner for CaseA FTFCT Na-22

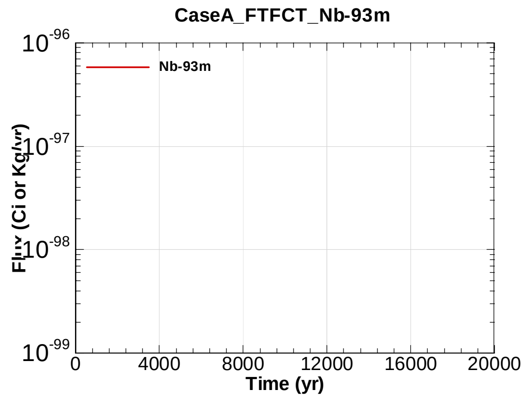

Figure A.1-2504 - Flux Leaving Liner for CaseA FTFCT Nb-93m

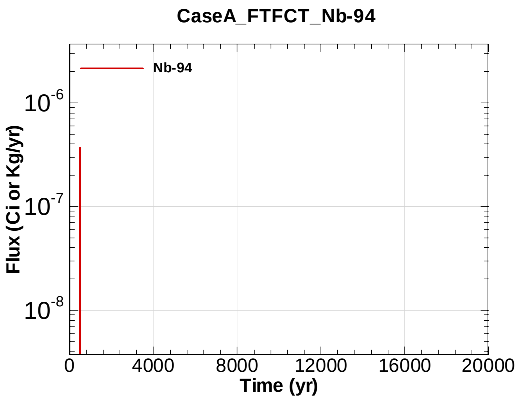

Figure A.1-2505 - Flux Leaving Liner for CaseA FTFCT Nb-94

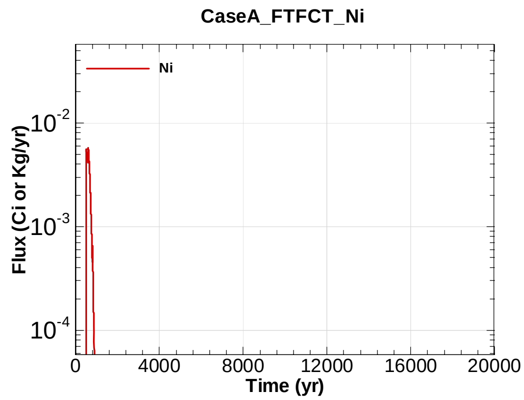

Figure A.1-2506 - Flux Leaving Liner for CaseA FTFCT Ni

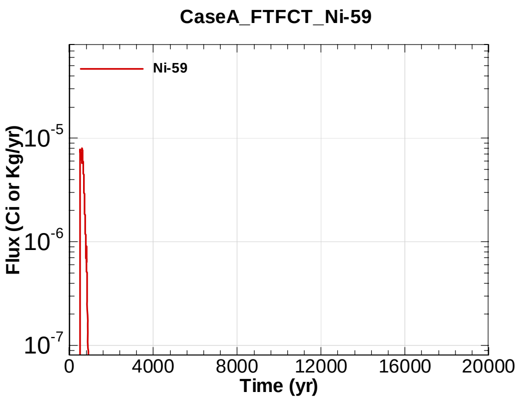

Figure A.1-2507 - Flux Leaving Liner for CaseA FTFCT Ni-59

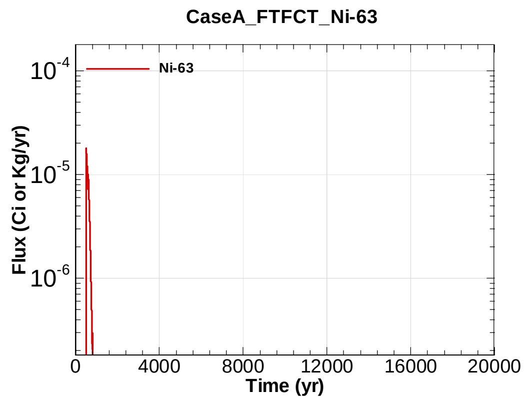

Figure A.1-2508 - Flux Leaving Liner for CaseA FTFCT Ni-63

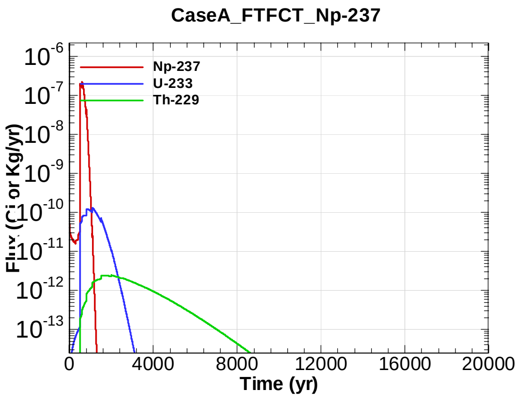

Figure A.1-2509 - Flux Leaving Liner for CaseA FTFCT Np-237

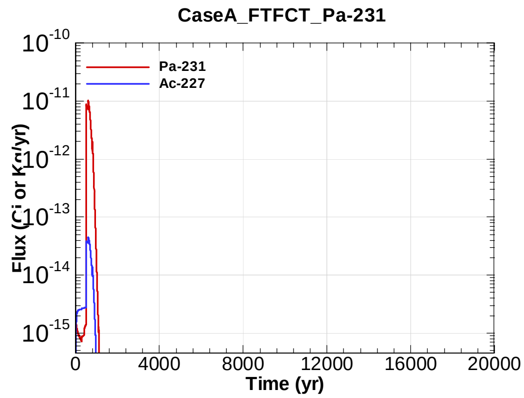

Figure A.1-2510 - Flux Leaving Liner for CaseA FTFCT Pa-231

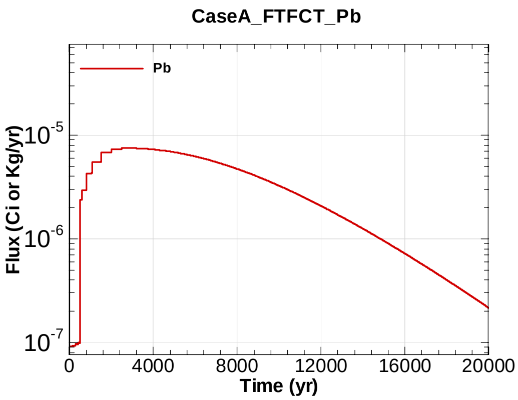

Figure A.1-2511 - Flux Leaving Liner for CaseA FTFCT Pb

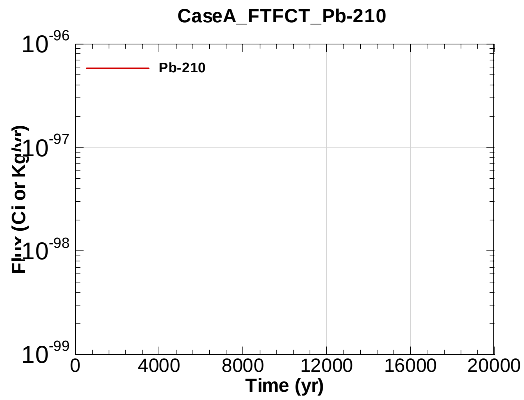

Figure A.1-2512 - Flux Leaving Liner for CaseA FTFCT Pb-210

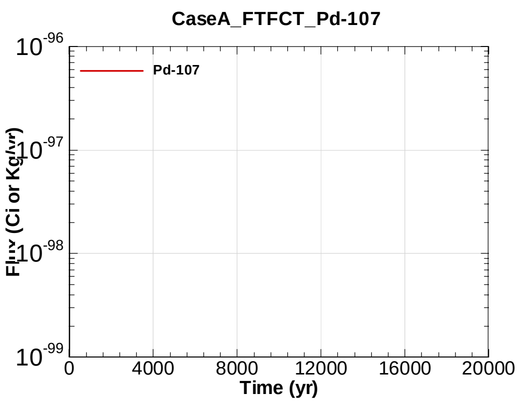

Figure A.1-2513 - Flux Leaving Liner for CaseA FTFCT Pd-107

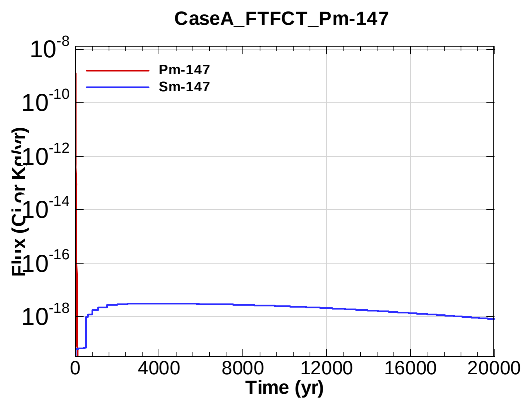

Figure A.1-2514 - Flux Leaving Liner for CaseA FTFCT Pm-147

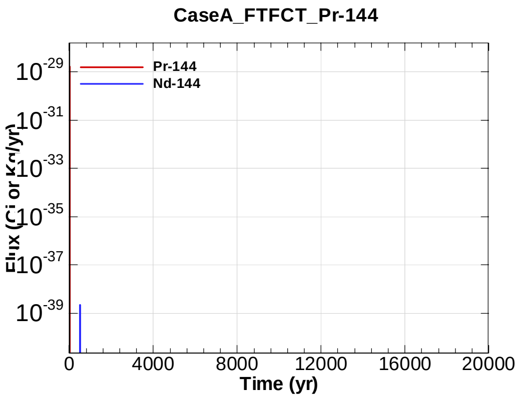

Figure A.1-2515 - Flux Leaving Liner for CaseA FTFCT Pr-144

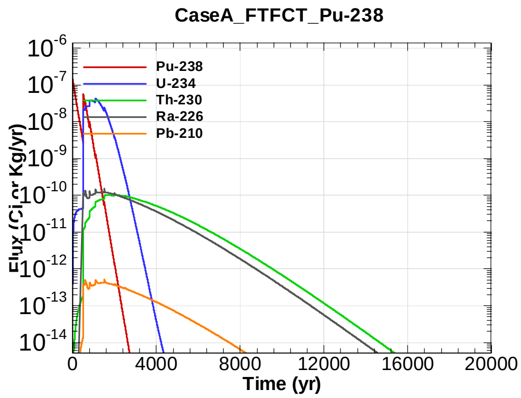

Figure A.1-2516 - Flux Leaving Liner for CaseA FTFCT Pu-238

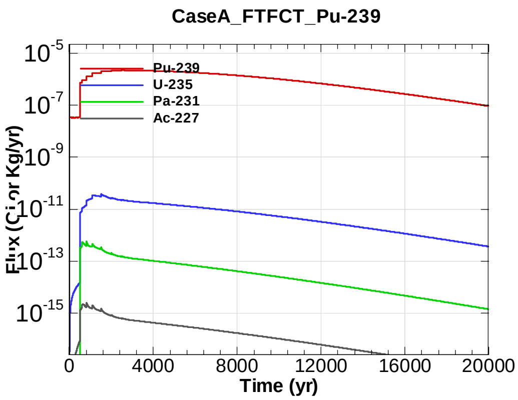

Figure A.1-2517 - Flux Leaving Liner for CaseA FTFCT Pu-239

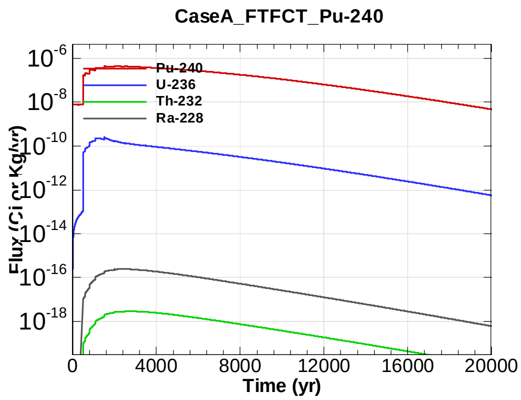

Figure A.1-2518 - Flux Leaving Liner for CaseA FTFCT Pu-240

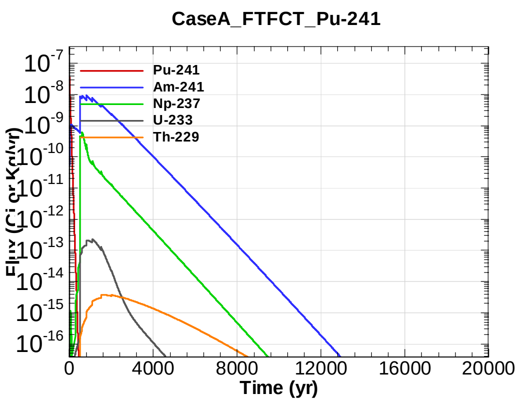

Figure A.1-2519 - Flux Leaving Liner for CaseA FTFCT Pu-241

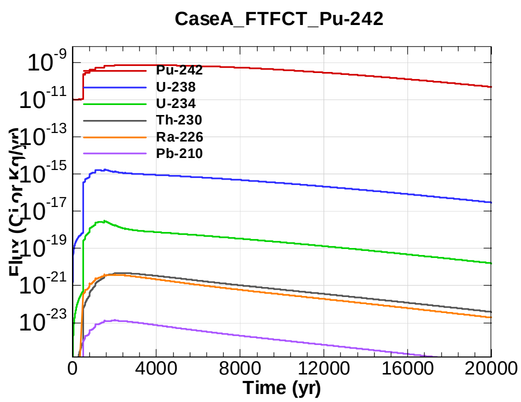

Figure A.1-2520 - Flux Leaving Liner for CaseA FTFCT Pu-242

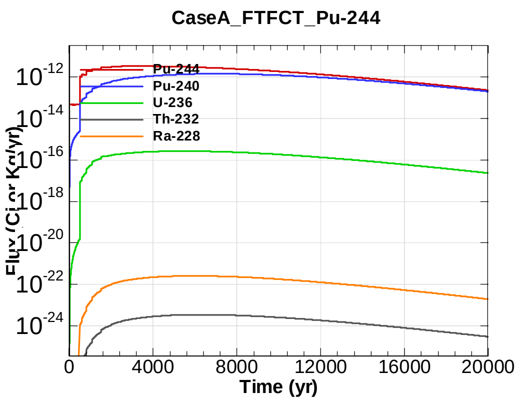

Figure A.1-2521 - Flux Leaving Liner for CaseA FTFCT Pu-244

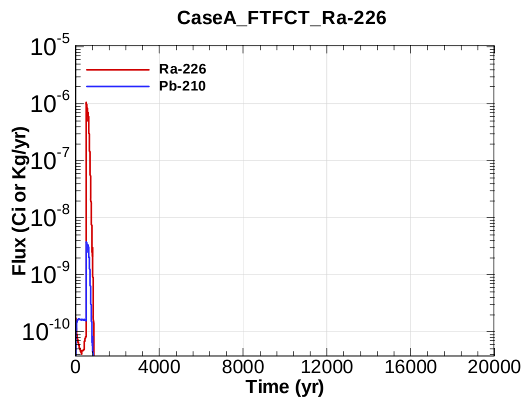

Figure A.1-2522 - Flux Leaving Liner for CaseA FTFCT Ra-226

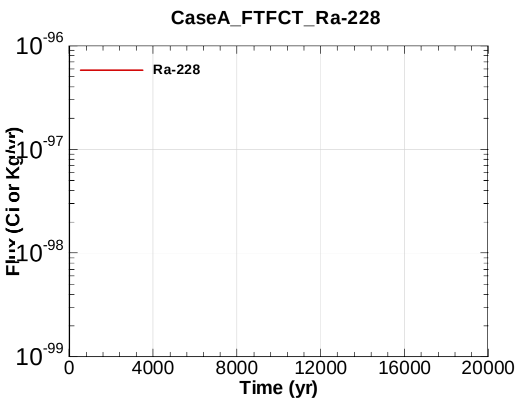

Figure A.1-2523 - Flux Leaving Liner for CaseA FTFCT Ra-228

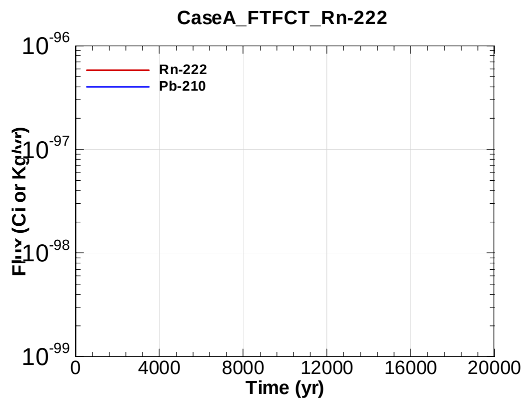

Figure A.1-2524 - Flux Leaving Liner for CaseA FTFCT Rn-222

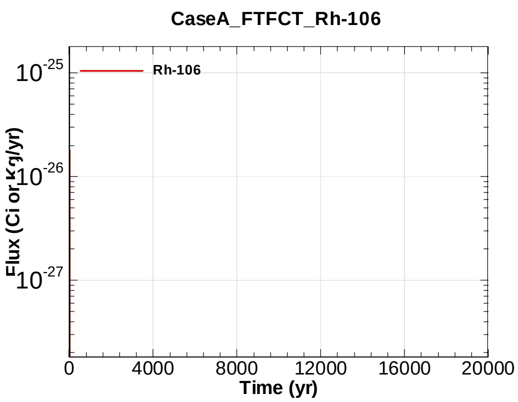

Figure A.1-2525 - Flux Leaving Liner for CaseA FTFCT Rh-106

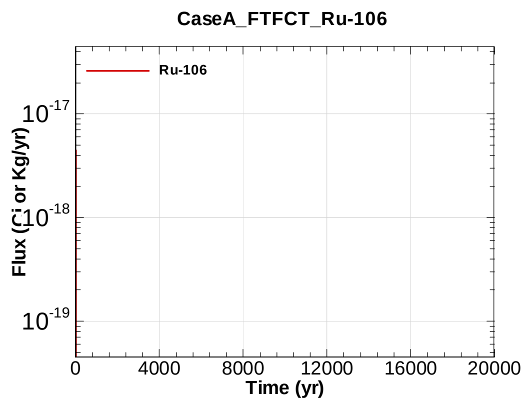

Figure A.1-2526 - Flux Leaving Liner for CaseA FTFCT Ru-106

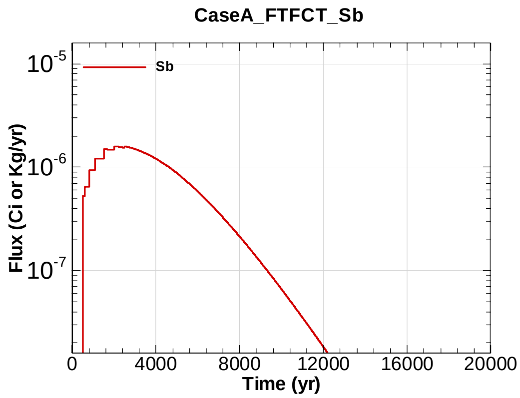

Figure A.1-2527 - Flux Leaving Liner for CaseA FTFCT Sb

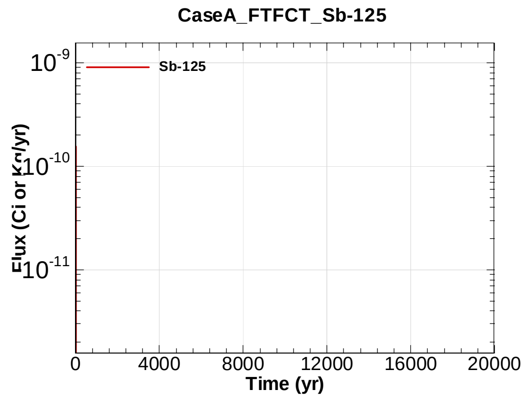

Figure A.1-2528 - Flux Leaving Liner for CaseA FTFCT Sb-125

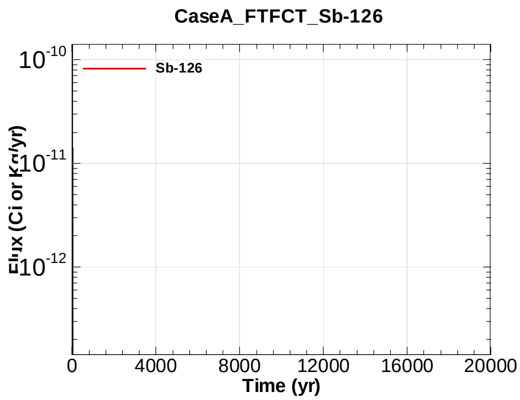

Figure A.1-2529 - Flux Leaving Liner for CaseA FTFCT Sb-126

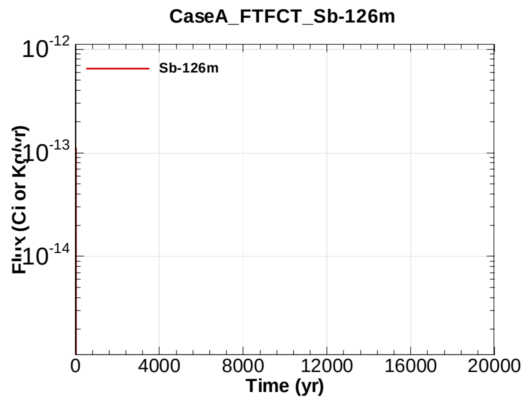

Figure A.1-2530 - Flux Leaving Liner for CaseA FTFCT Sb-126m

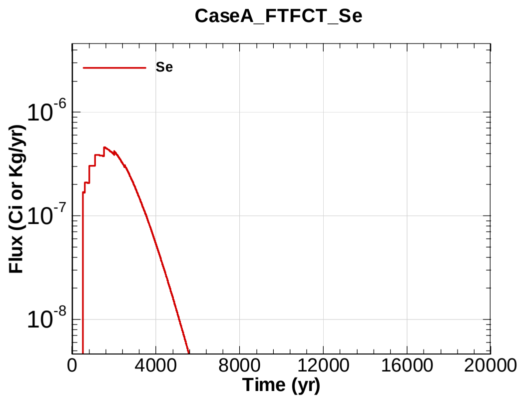

Figure A.1-2531 - Flux Leaving Liner for CaseA FTFCT Se

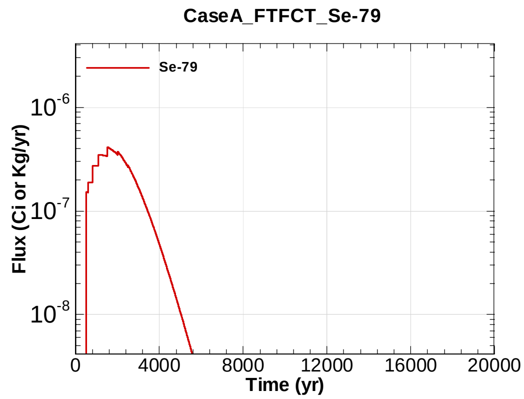

Figure A.1-2532 - Flux Leaving Liner for CaseA FTFCT Se-79

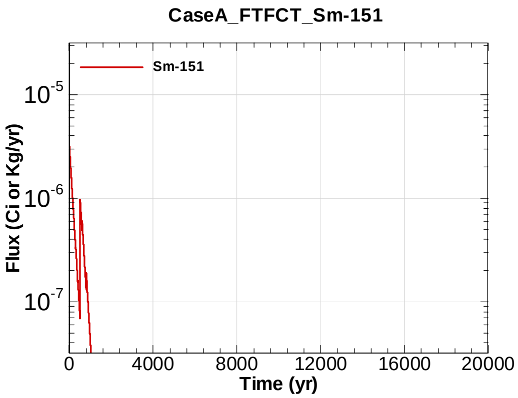

Figure A.1-2533 - Flux Leaving Liner for CaseA FTFCT Sm-151

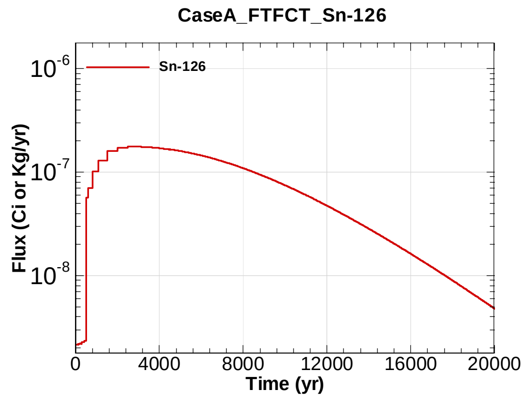

Figure A.1-2534 - Flux Leaving Liner for CaseA FTFCT Sn-126

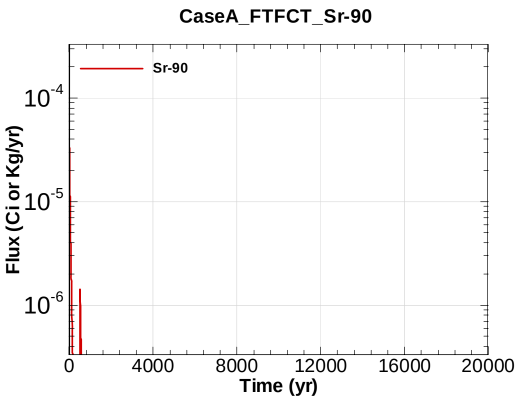

Figure A.1-2535 - Flux Leaving Liner for CaseA FTFCT Sr-90

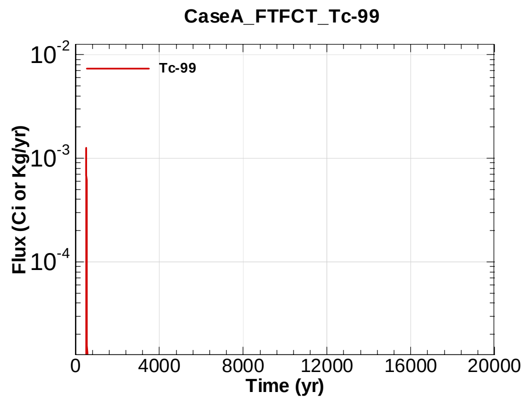

Figure A.1-2536 - Flux Leaving Liner for CaseA FTFCT Tc-99

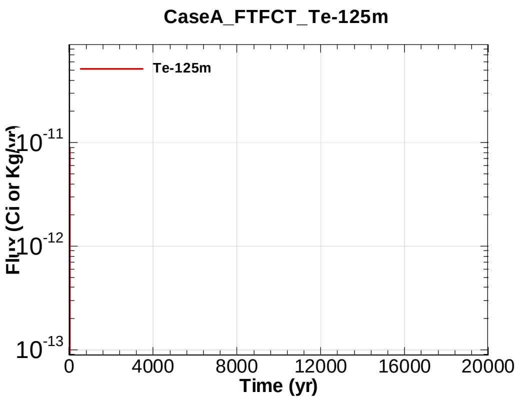

Figure A.1-2537 - Flux Leaving Liner for CaseA FTFCT Te-125m

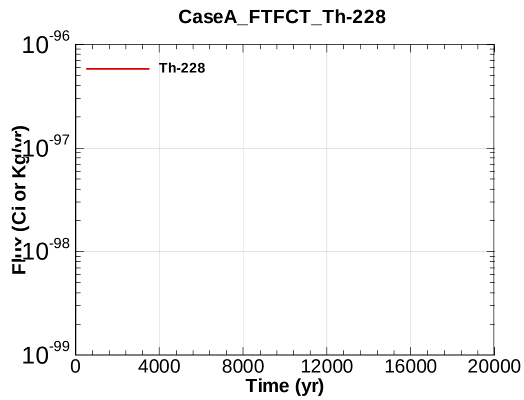

Figure A.1-2538 - Flux Leaving Liner for CaseA FTFCT Th-228

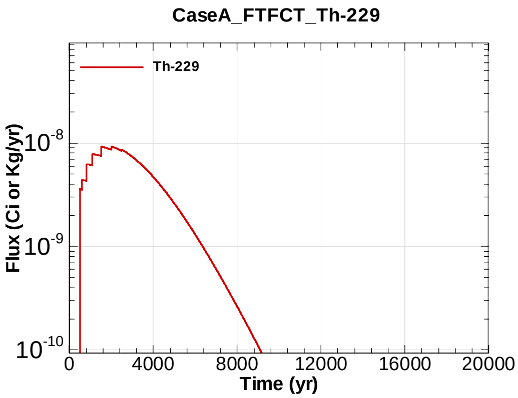

Figure A.1-2539 - Flux Leaving Liner for CaseA FTFCT Th-229

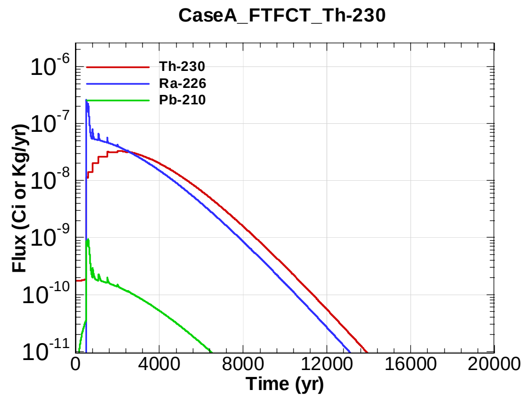

Figure A.1-2540 - Flux Leaving Liner for CaseA FTFCT Th-230

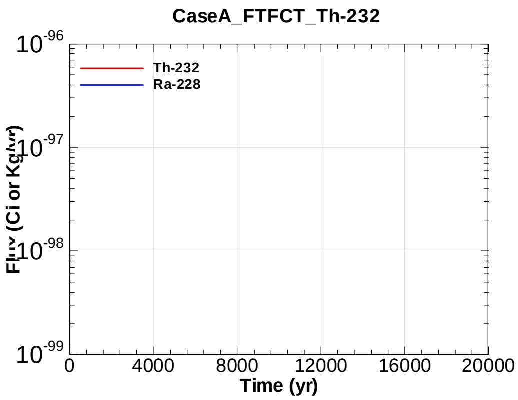

Figure A.1-2541 - Flux Leaving Liner for CaseA FTFCT Th-232

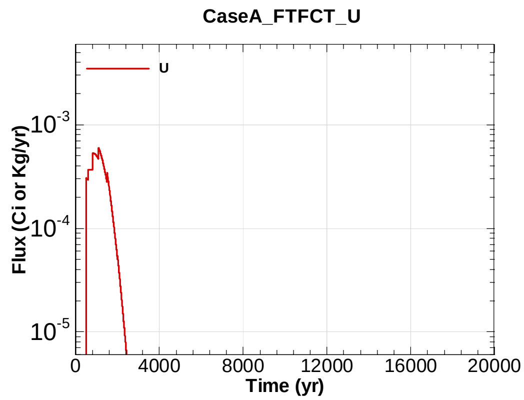

Figure A.1-2542 - Flux Leaving Liner for CaseA FTFCT U

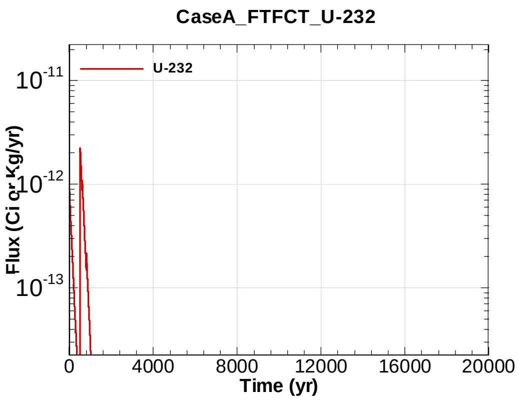

Figure A.1-2543 - Flux Leaving Liner for CaseA FTFCT U-232

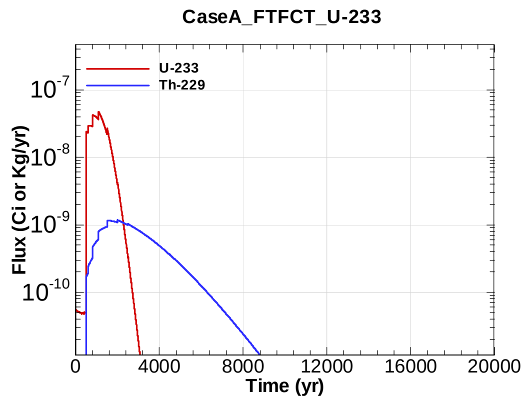

Figure A.1-2544 - Flux Leaving Liner for CaseA FTFCT U-233

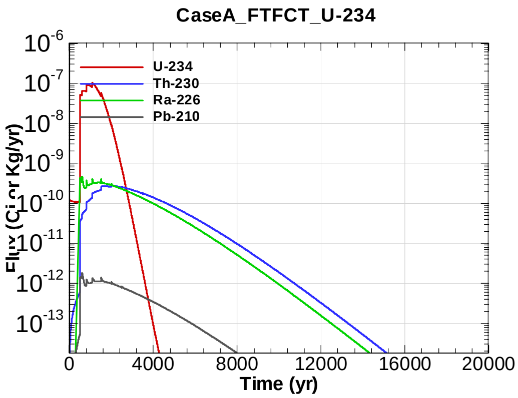

Figure A.1-2545 - Flux Leaving Liner for CaseA FTFCT U-234

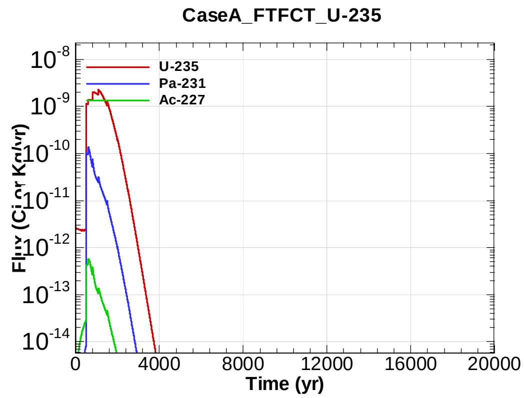

Figure A.1-2546 - Flux Leaving Liner for CaseA FTFCT U-235

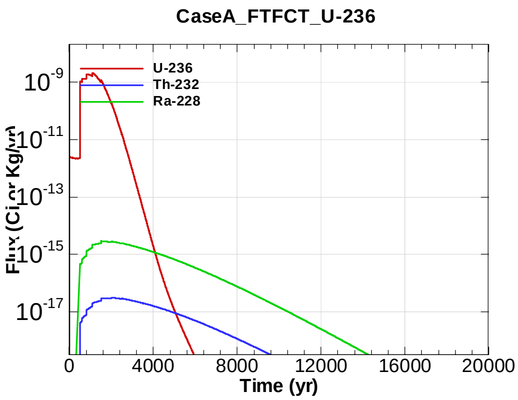

Figure A.1-2547 - Flux Leaving Liner for CaseA FTFCT U-236

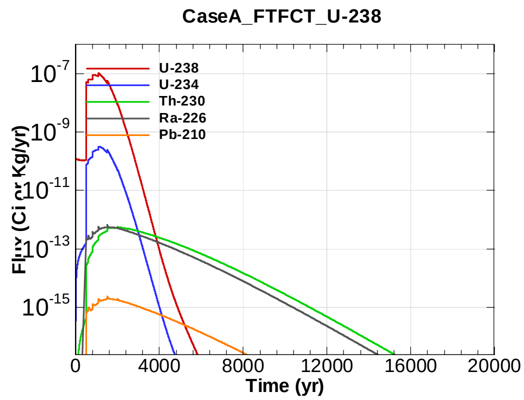

Figure A.1-2548 - Flux Leaving Liner for CaseA FTFCT U-238

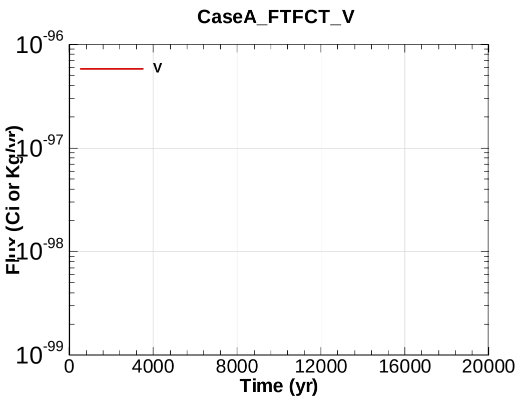

Figure A.1-2549 - Flux Leaving Liner for CaseA FTFCT V

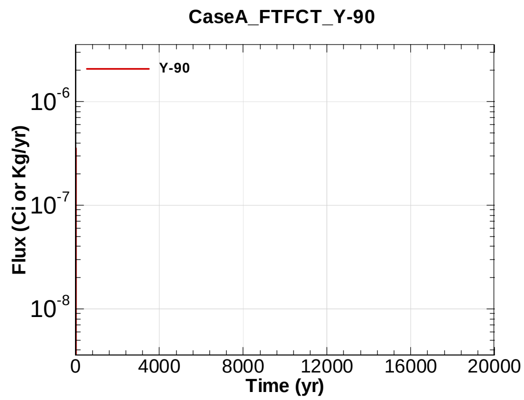

Figure A.1-2550 - Flux Leaving Liner for CaseA FTFCT Y-90

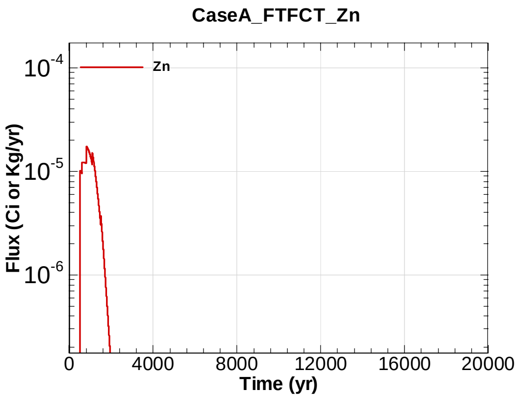

Figure A.1-2551 - Flux Leaving Liner for CaseA FTFCT Zn

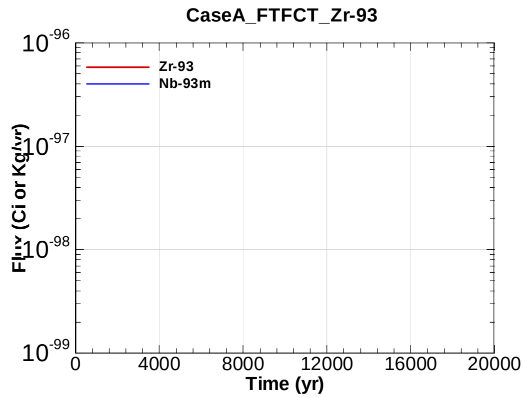

Figure A.1-2552 - Flux Leaving Liner for CaseA FTFCT Zr-93

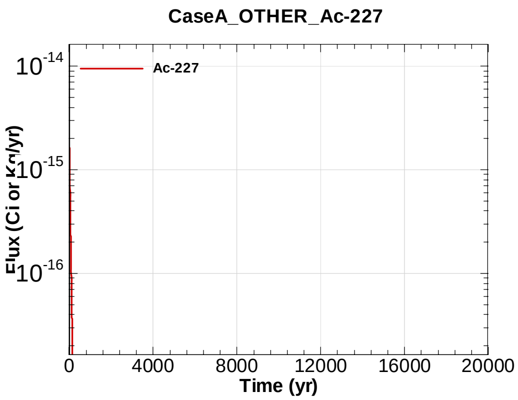

Figure A.1-2553 - Flux Leaving Liner for CaseA OTHER Ac-227

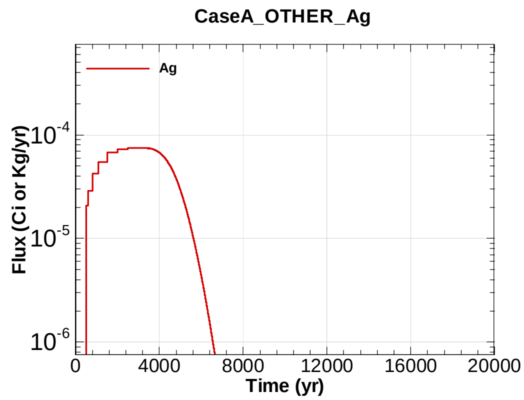

Figure A.1-2554 - Flux Leaving Liner for CaseA OTHER Ag

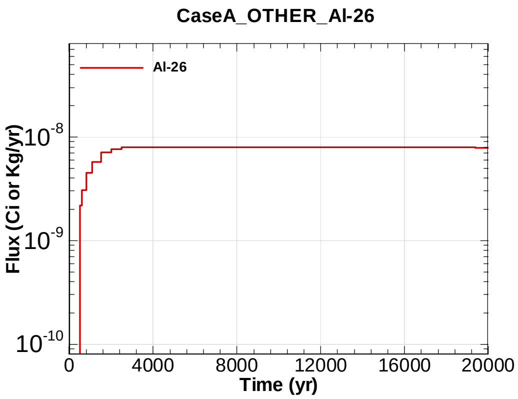

Figure A.1-2555 - Flux Leaving Liner for CaseA OTHER Al-26

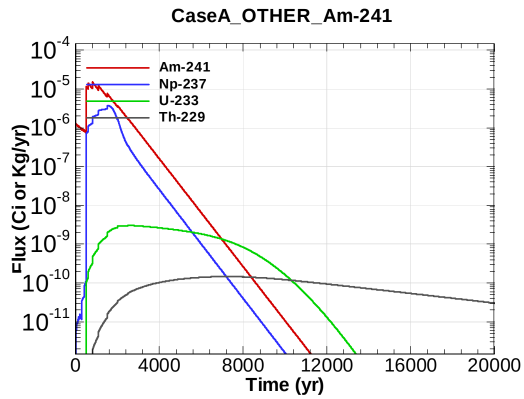

Figure A.1-2556 - Flux Leaving Liner for CaseA OTHER Am-241

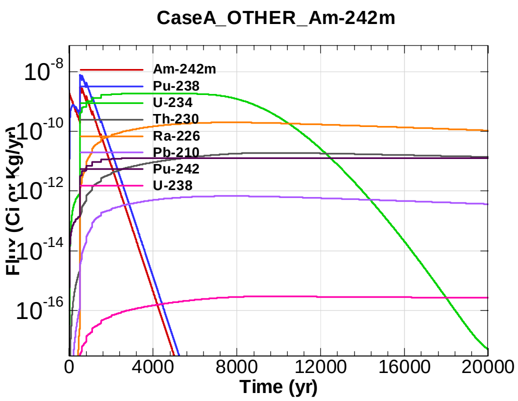

Figure A.1-2557 - Flux Leaving Liner for CaseA OTHER Am-242m

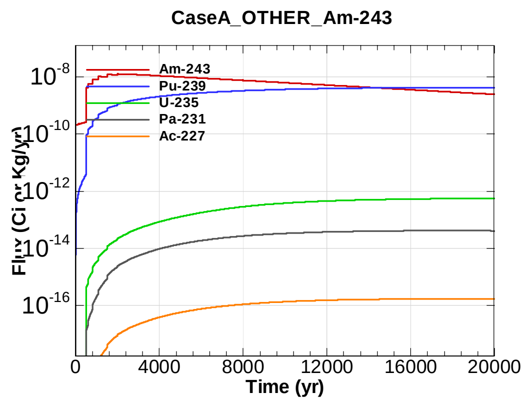

Figure A.1-2558 - Flux Leaving Liner for CaseA OTHER Am-243

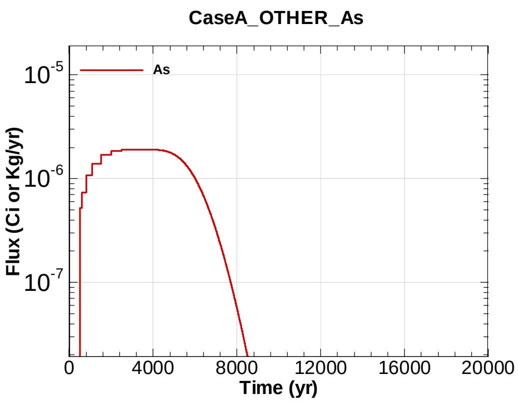

Figure A.1-2559 - Flux Leaving Liner for CaseA OTHER As

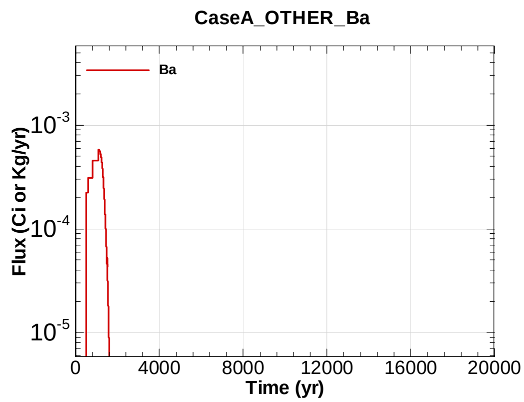

Figure A.1-2560 - Flux Leaving Liner for CaseA OTHER Ba

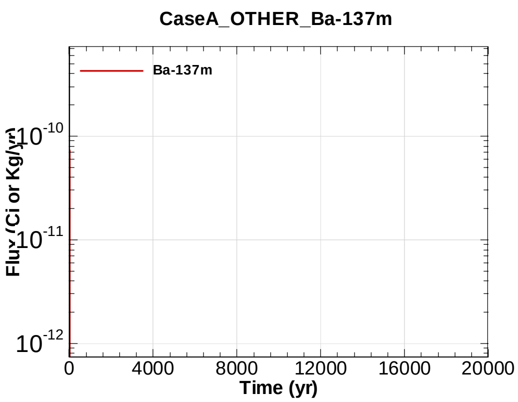

Figure A.1-2561 - Flux Leaving Liner for CaseA OTHER Ba-137m

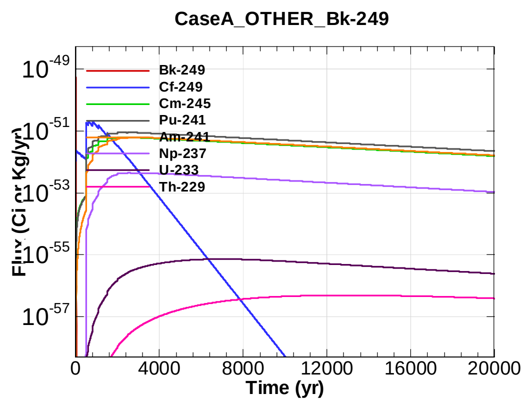

Figure A.1-2562 - Flux Leaving Liner for CaseA OTHER Bk-249

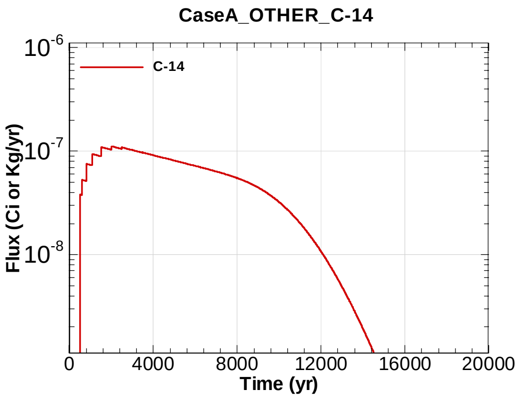

Figure A.1-2563 - Flux Leaving Liner for CaseA OTHER C-14

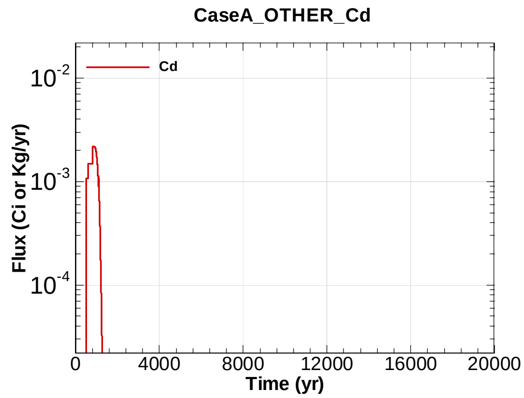

Figure A.1-2564 - Flux Leaving Liner for CaseA OTHER Cd

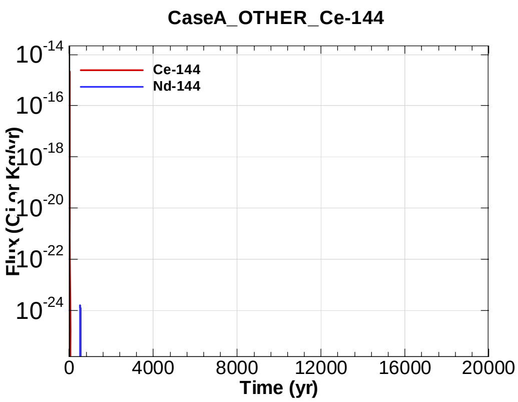

Figure A.1-2565 - Flux Leaving Liner for CaseA OTHER Ce-144

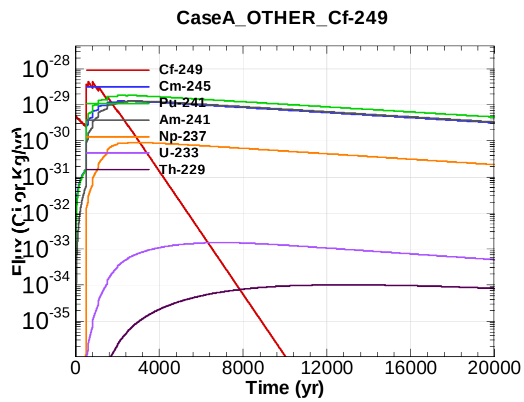

Figure A.1-2566 - Flux Leaving Liner for CaseA OTHER Cf-249

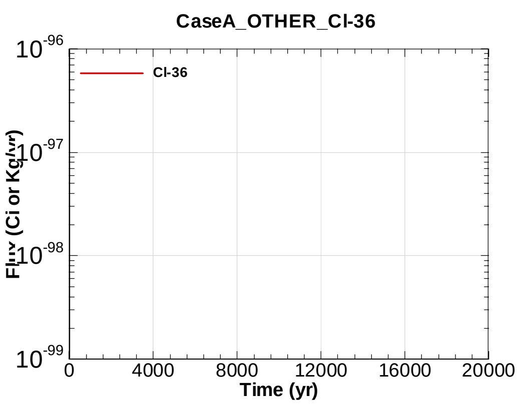

Figure A.1-2567 - Flux Leaving Liner for CaseA OTHER Cl-36

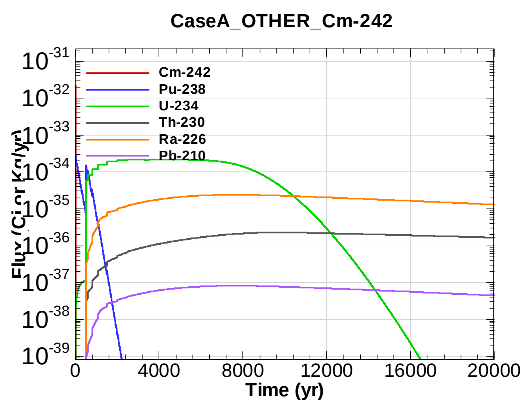

Figure A.1-2568 - Flux Leaving Liner for CaseA OTHER Cm-242

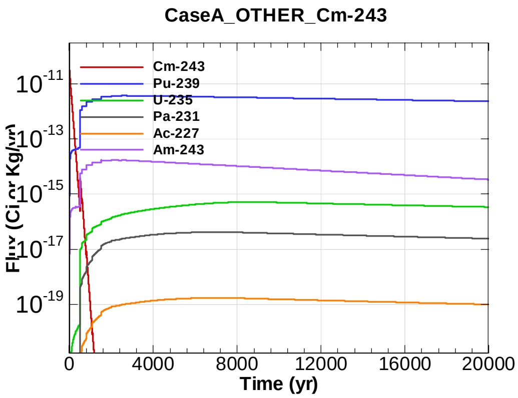

Figure A.1-2569 - Flux Leaving Liner for CaseA OTHER Cm-243

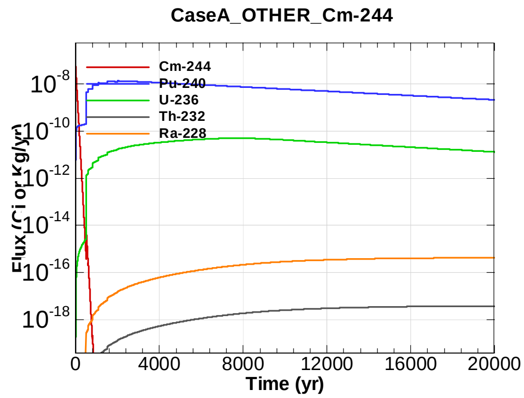

Figure A.1-2570 - Flux Leaving Liner for CaseA OTHER Cm-244

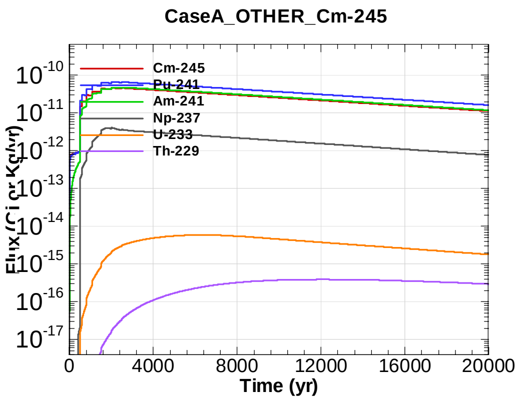

Figure A.1-2571 - Flux Leaving Liner for CaseA OTHER Cm-245

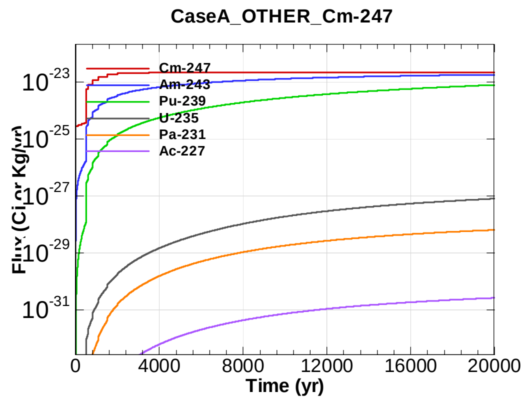

Figure A.1-2572 - Flux Leaving Liner for CaseA OTHER Cm-247

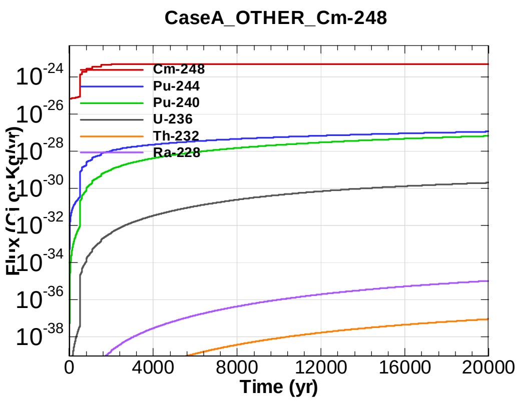

Figure A.1-2573 - Flux Leaving Liner for CaseA OTHER Cm-248

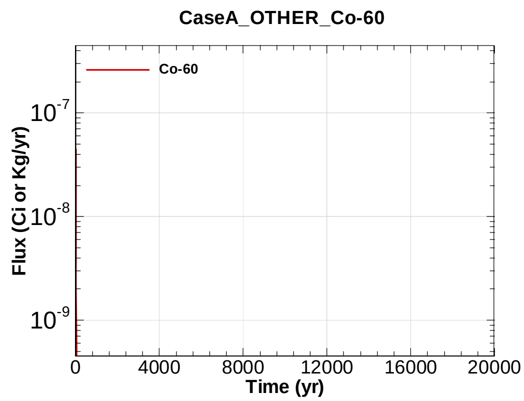

Figure A.1-2574 - Flux Leaving Liner for CaseA OTHER Co-60

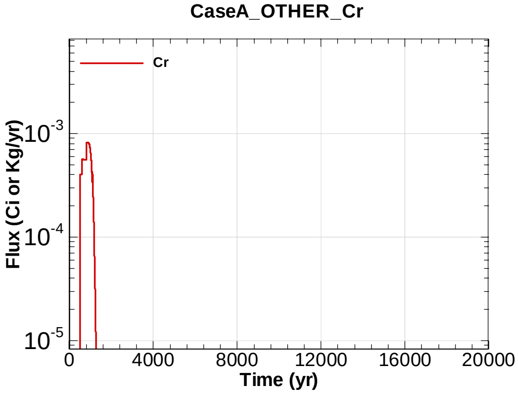

Figure A.1-2575 - Flux Leaving Liner for CaseA OTHER Cr

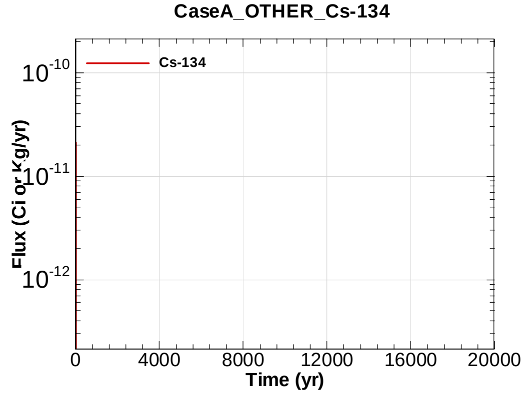

Figure A.1-2576 - Flux Leaving Liner for CaseA OTHER Cs-134

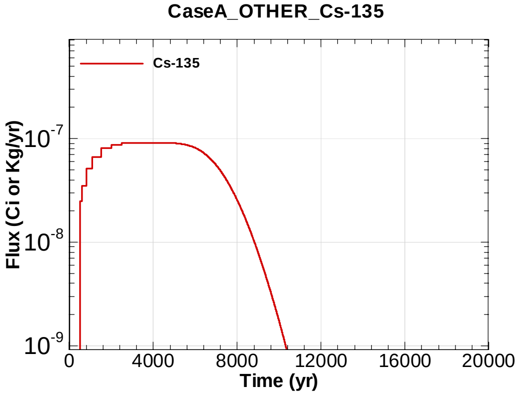

Figure A.1-2577 - Flux Leaving Liner for CaseA OTHER Cs-135

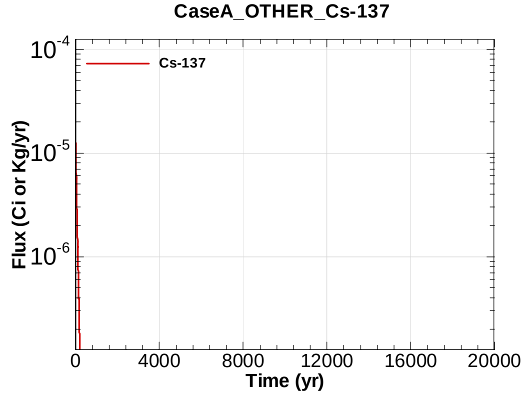

Figure A.1-2578 - Flux Leaving Liner for CaseA OTHER Cs-137

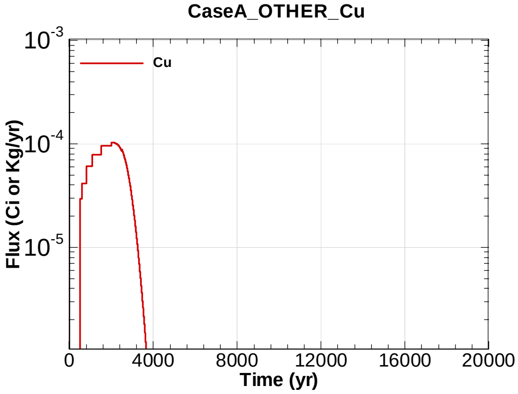

Figure A.1-2579 - Flux Leaving Liner for CaseA OTHER Cu

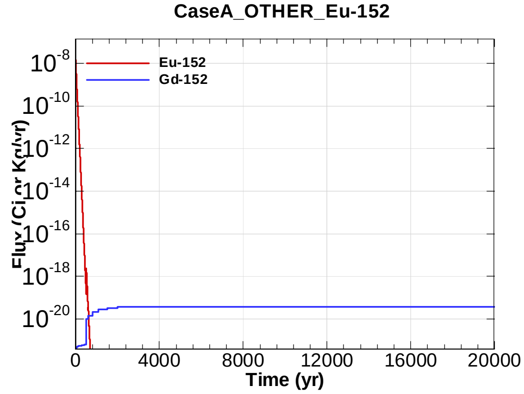

Figure A.1-2580 - Flux Leaving Liner for CaseA OTHER Eu-152

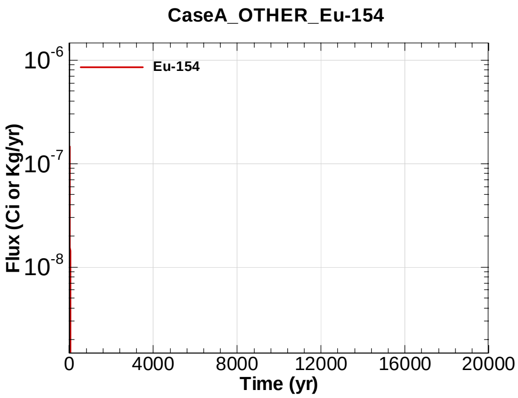

Figure A.1-2581 - Flux Leaving Liner for CaseA OTHER Eu-154

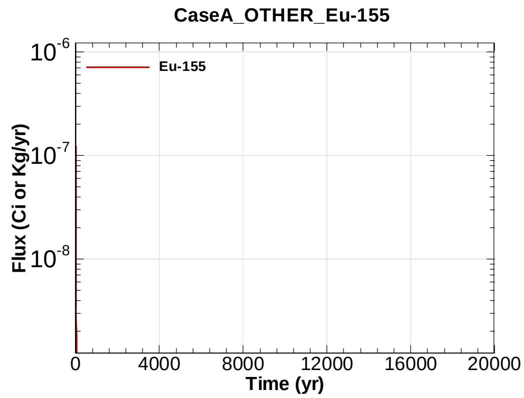

Figure A.1-2582 - Flux Leaving Liner for CaseA OTHER Eu-155

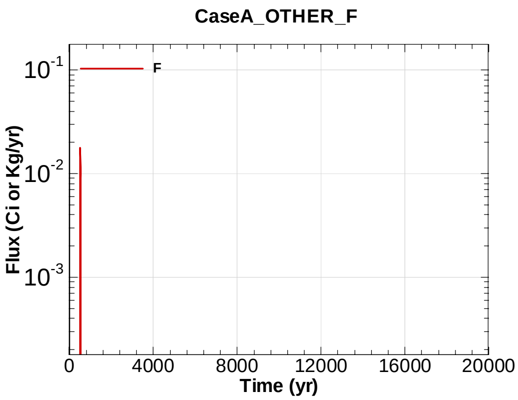

Figure A.1-2583 - Flux Leaving Liner for CaseA OTHER F

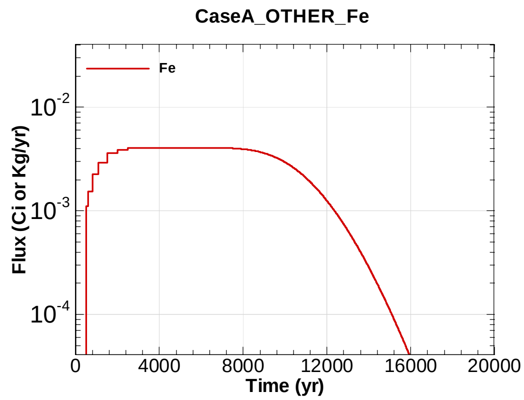

Figure A.1-2584 - Flux Leaving Liner for CaseA OTHER Fe

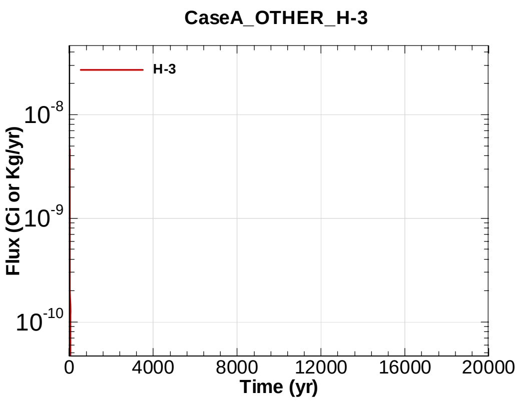

Figure A.1-2585 - Flux Leaving Liner for CaseA OTHER H-3

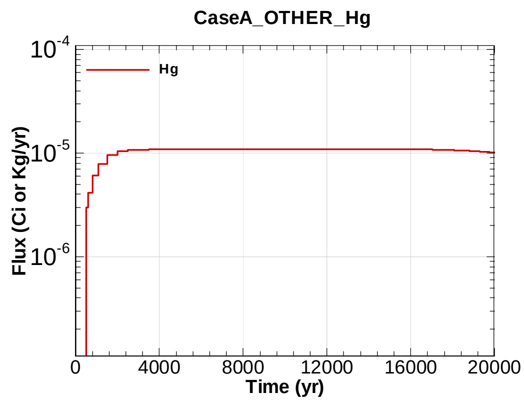

Figure A.1-2586 - Flux Leaving Liner for CaseA OTHER Hg

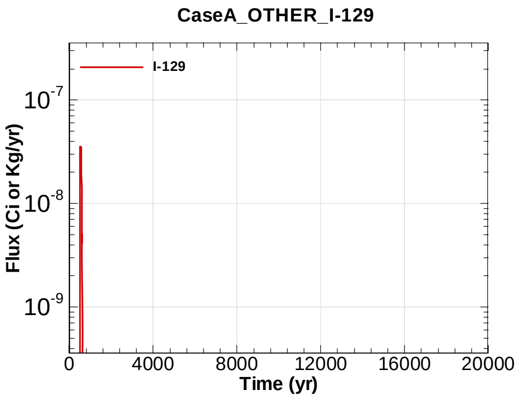

Figure A.1-2587 - Flux Leaving Liner for CaseA OTHER I-129

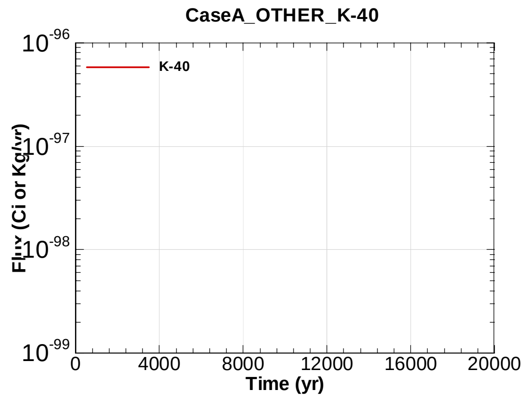

Figure A.1-2588 - Flux Leaving Liner for CaseA OTHER K-40

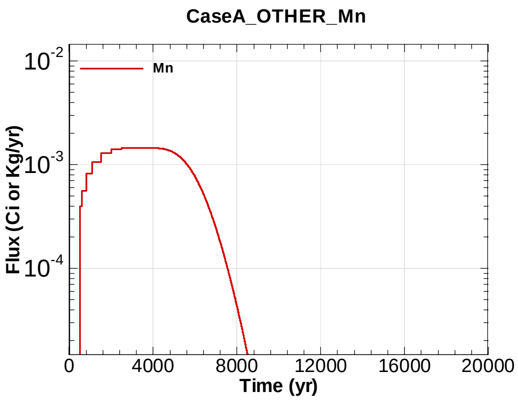

Figure A.1-2589 - Flux Leaving Liner for CaseA OTHER Mn

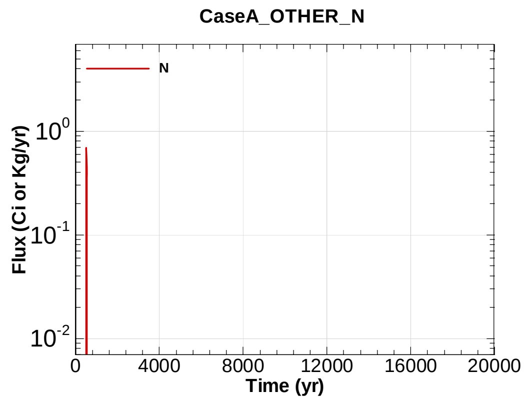

Figure A.1-2590 - Flux Leaving Liner for CaseA OTHER N

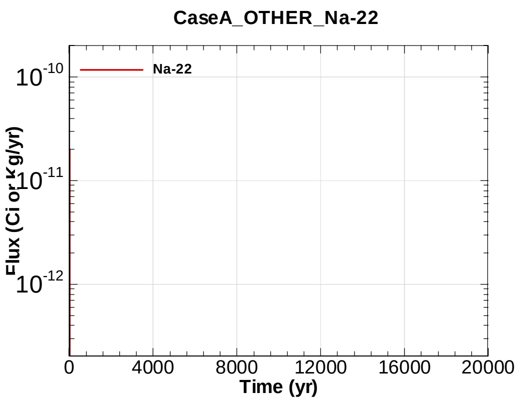

Figure A.1-2591 - Flux Leaving Liner for CaseA OTHER Na-22

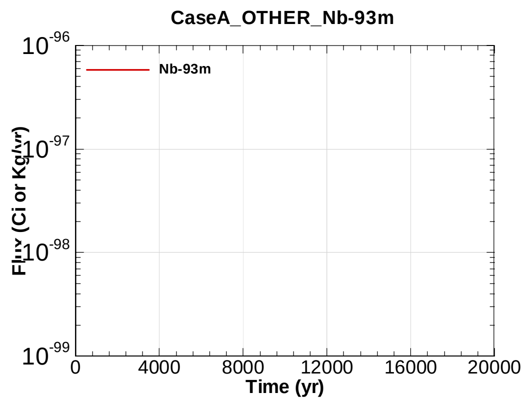

Figure A.1-2592 - Flux Leaving Liner for CaseA OTHER Nb-93m

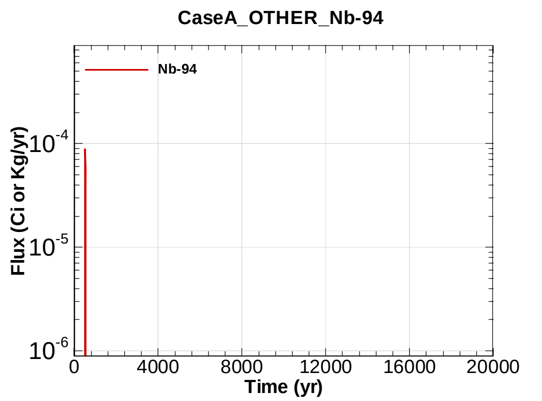

Figure A.1-2593 - Flux Leaving Liner for CaseA OTHER Nb-94

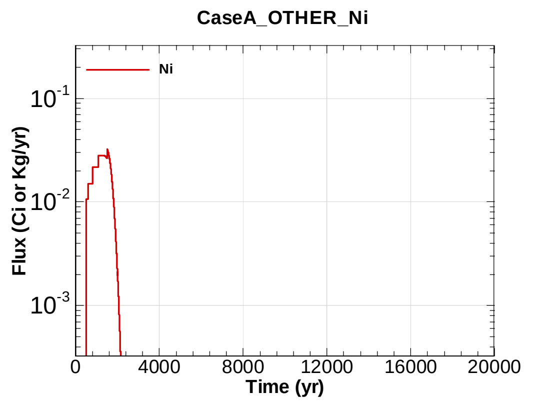

Figure A.1-2594 - Flux Leaving Liner for CaseA OTHER Ni

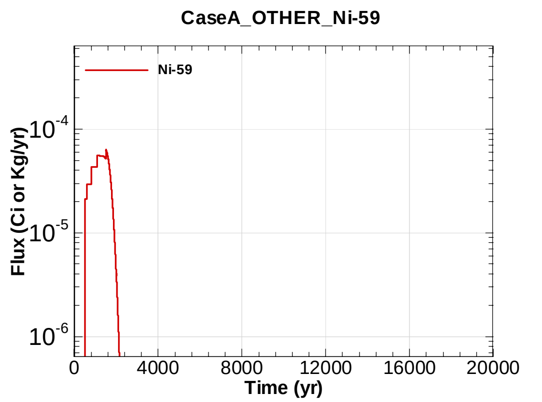

Figure A.1-2595 - Flux Leaving Liner for CaseA OTHER Ni-59

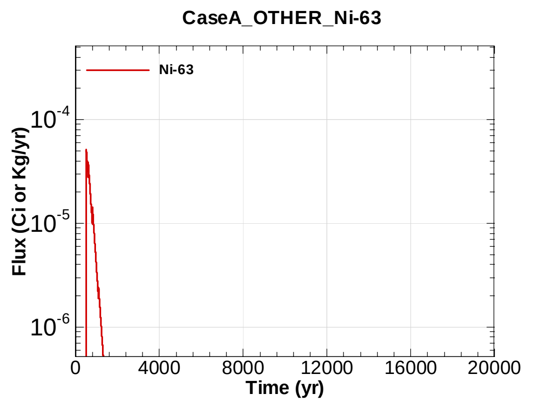

Figure A.1-2596 - Flux Leaving Liner for CaseA OTHER Ni-63

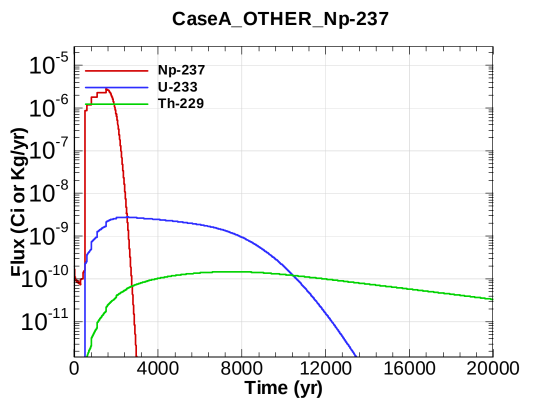

Figure A.1-2597 - Flux Leaving Liner for CaseA OTHER Np-237

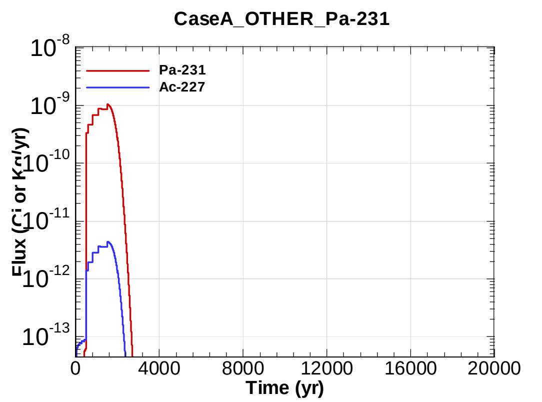

Figure A.1-2598 - Flux Leaving Liner for CaseA OTHER Pa-231

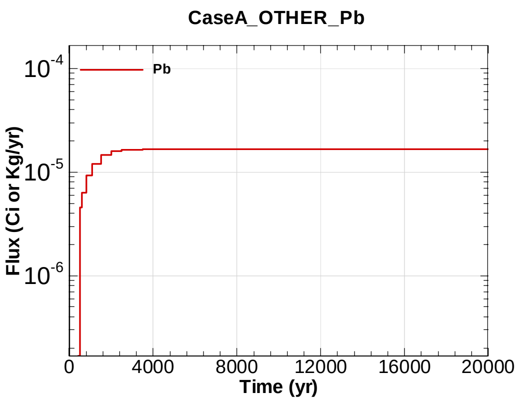

Figure A.1-2599 - Flux Leaving Liner for CaseA OTHER Pb

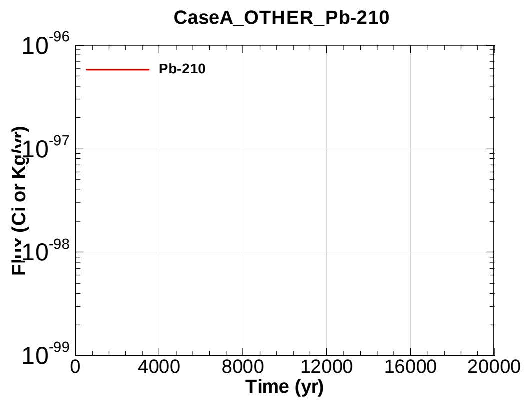

Figure A.1-2600 - Flux Leaving Liner for CaseA OTHER Pb-210

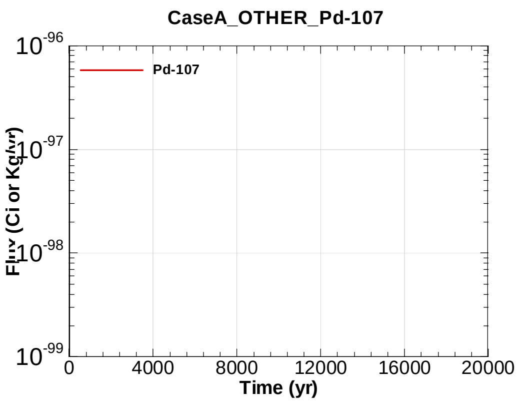

Figure A.1-2601 - Flux Leaving Liner for CaseA OTHER Pd-107

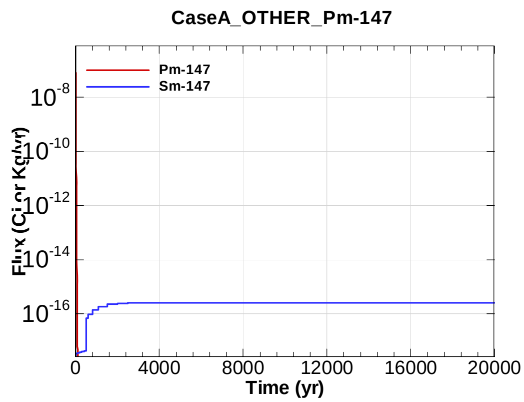

Figure A.1-2602 - Flux Leaving Liner for CaseA OTHER Pm-147

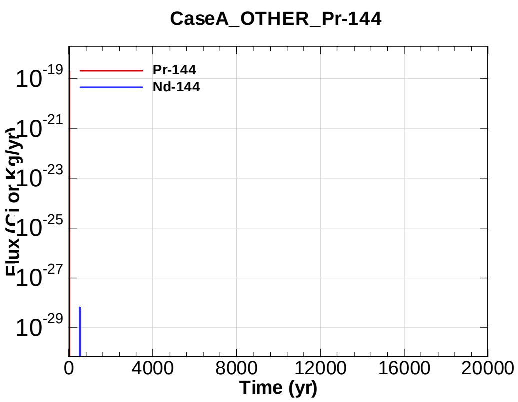

Figure A.1-2603 - Flux Leaving Liner for CaseA OTHER Pr-144

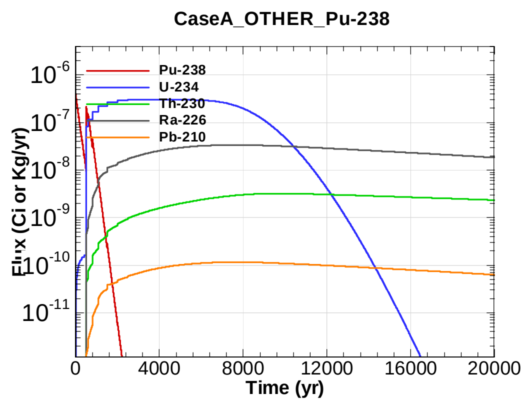

Figure A.1-2604 - Flux Leaving Liner for CaseA OTHER Pu-238

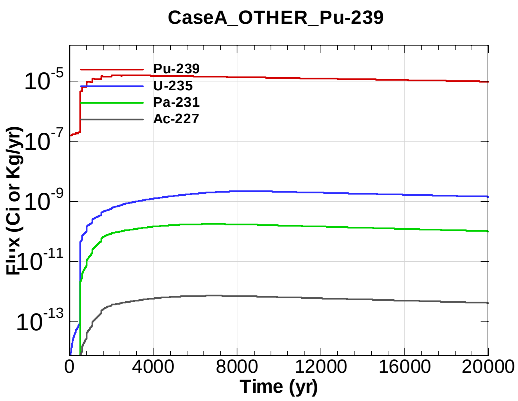

Figure A.1-2605 - Flux Leaving Liner for CaseA OTHER Pu-239

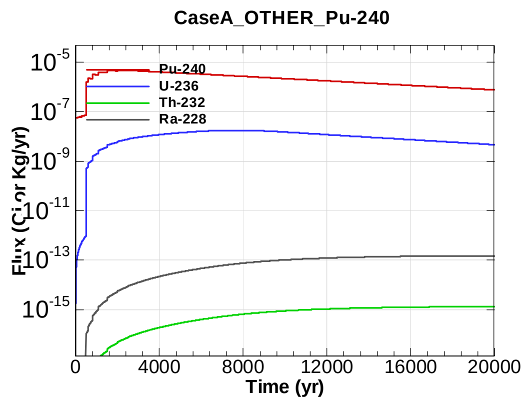

Figure A.1-2606 - Flux Leaving Liner for CaseA OTHER Pu-240

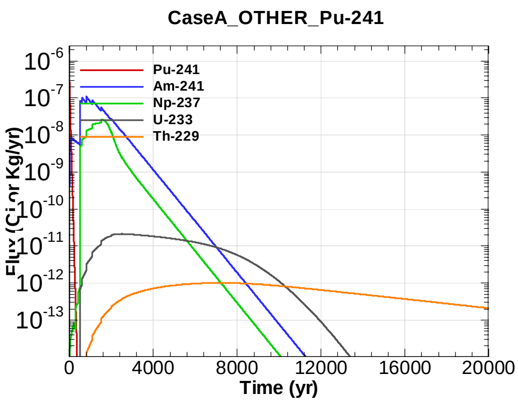

Figure A.1-2607 - Flux Leaving Liner for CaseA OTHER Pu-241

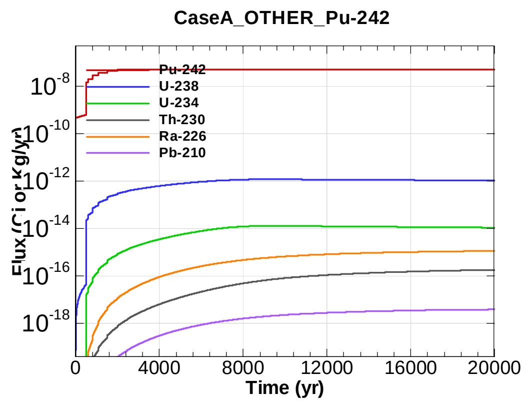

Figure A.1-2608 - Flux Leaving Liner for CaseA OTHER Pu-242

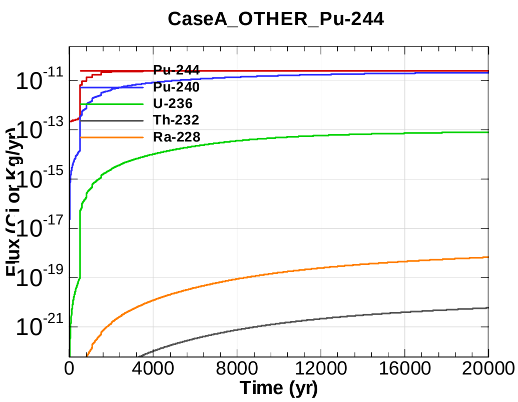

Figure A.1-2609 - Flux Leaving Liner for CaseA OTHER Pu-244

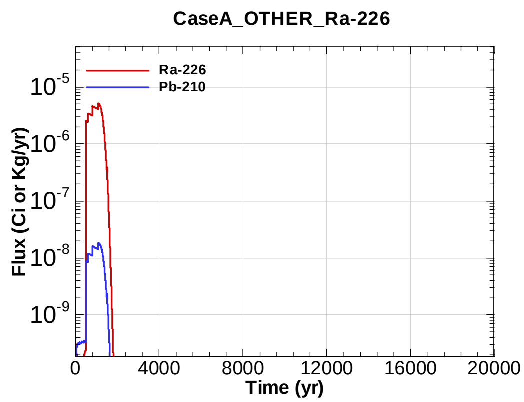

Figure A.1-2610 - Flux Leaving Liner for CaseA OTHER Ra-226

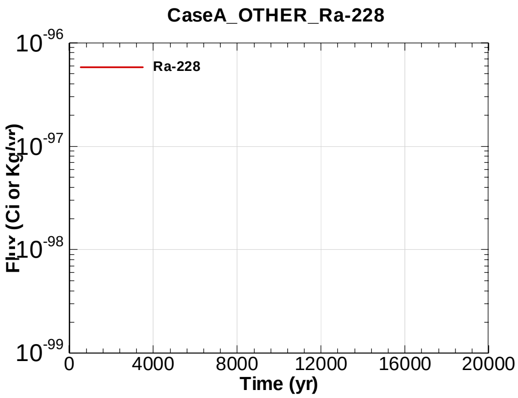

Figure A.1-2611 - Flux Leaving Liner for CaseA OTHER Ra-228

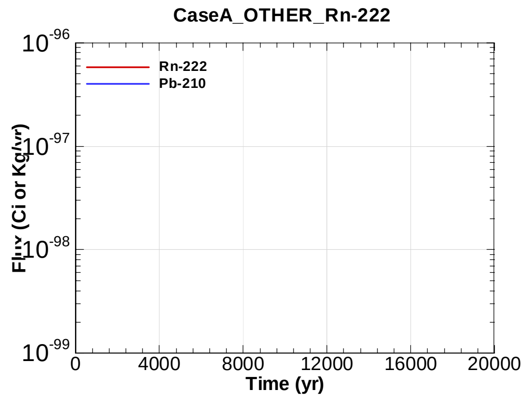

Figure A.1-2612 - Flux Leaving Liner for CaseA OTHER Rn-222

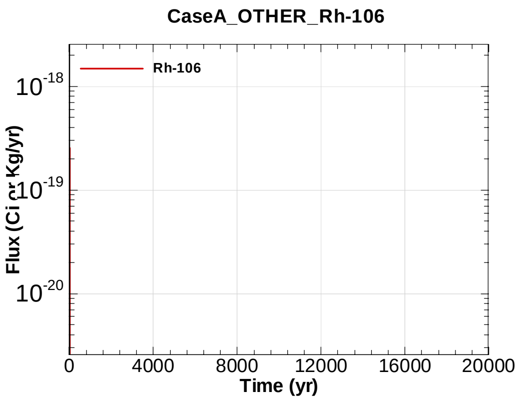

Figure A.1-2613 - Flux Leaving Liner for CaseA OTHER Rh-106

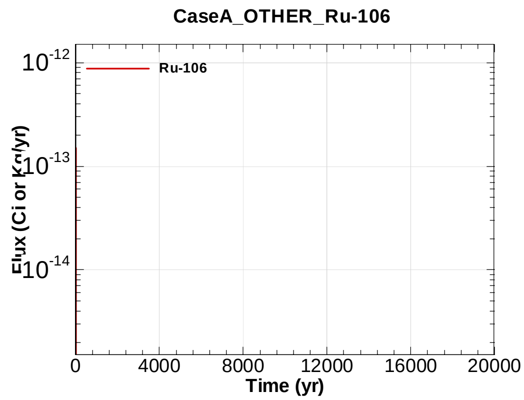

Figure A.1-2614 - Flux Leaving Liner for CaseA OTHER Ru-106

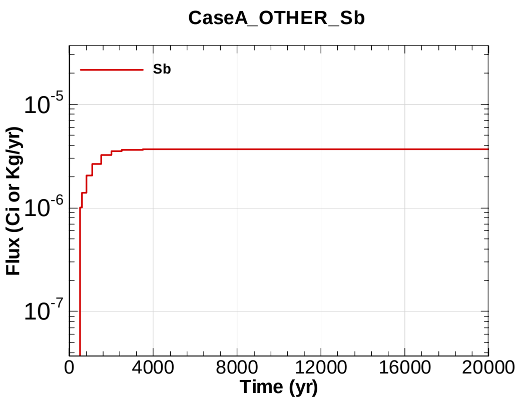

Figure A.1-2615 - Flux Leaving Liner for CaseA OTHER Sb

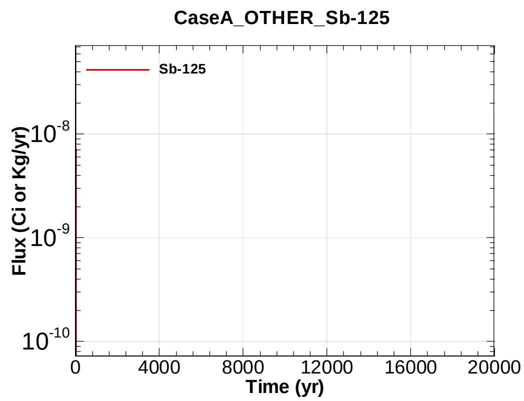

Figure A.1-2616 - Flux Leaving Liner for CaseA OTHER Sb-125

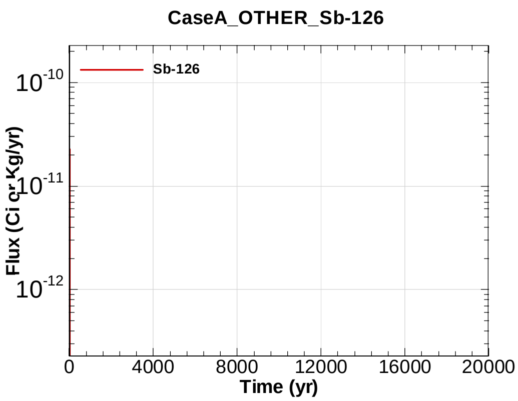

Figure A.1-2617 - Flux Leaving Liner for CaseA OTHER Sb-126

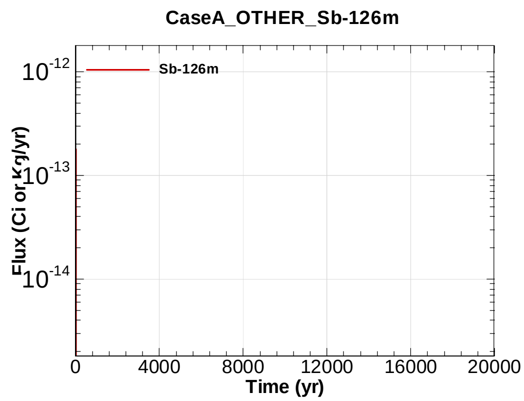

Figure A.1-2618 - Flux Leaving Liner for CaseA OTHER Sb-126m

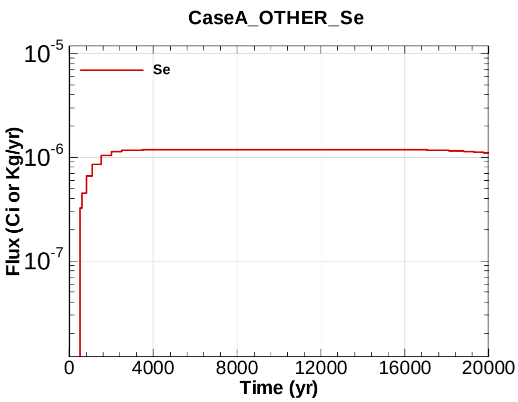

Figure A.1-2619 - Flux Leaving Liner for CaseA OTHER Se

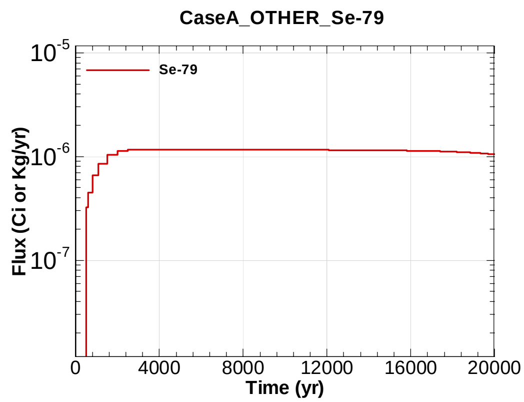

Figure A.1-2620 - Flux Leaving Liner for CaseA OTHER Se-79

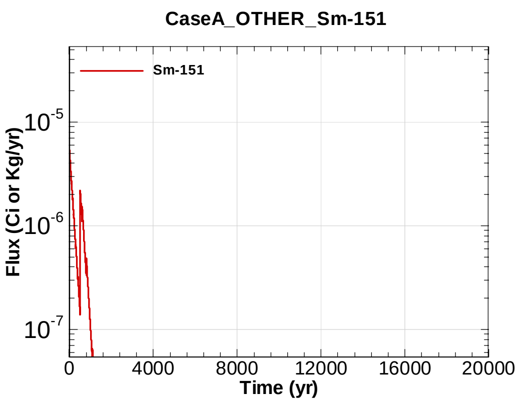

Figure A.1-2621 - Flux Leaving Liner for CaseA OTHER Sm-151

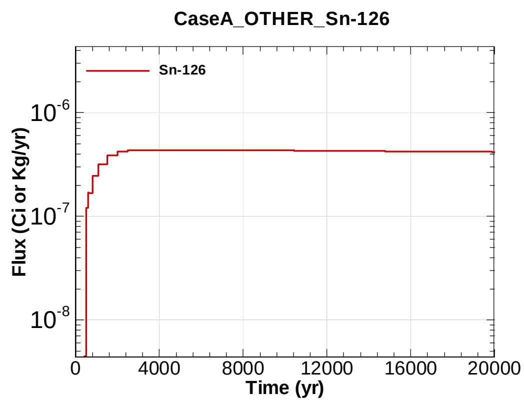

Figure A.1-2622 - Flux Leaving Liner for CaseA OTHER Sn-126

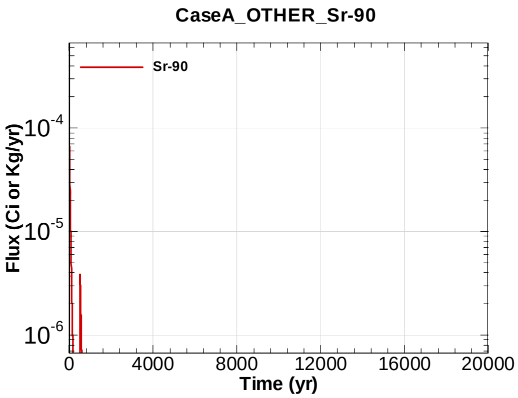

Figure A.1-2623 - Flux Leaving Liner for CaseA OTHER Sr-90

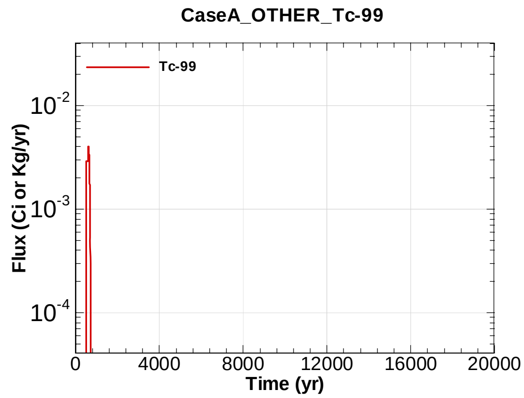

Figure A.1-2624 - Flux Leaving Liner for CaseA OTHER Tc-99

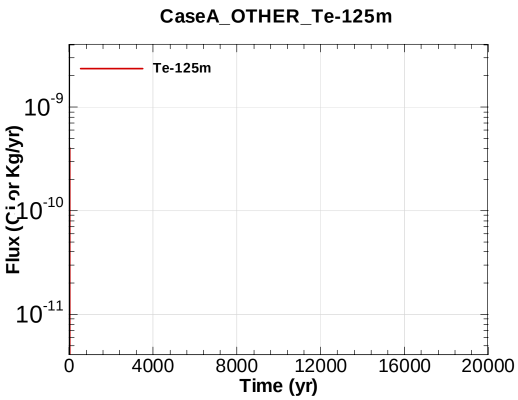

Figure A.1-2625 - Flux Leaving Liner for CaseA OTHER Te-125m

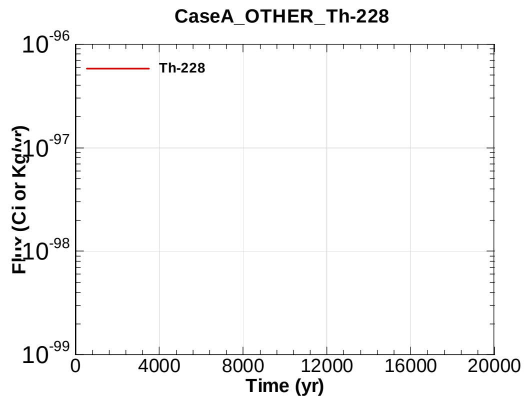

Figure A.1-2626 - Flux Leaving Liner for CaseA OTHER Th-228

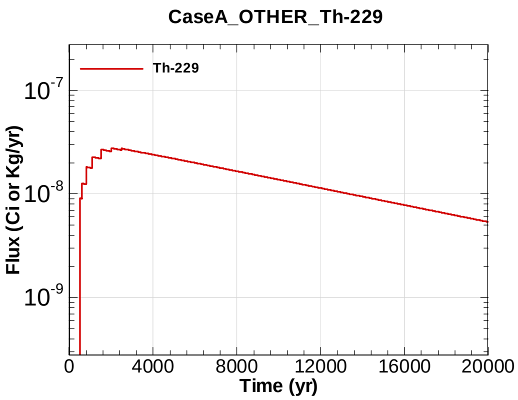

Figure A.1-2627 - Flux Leaving Liner for CaseA OTHER Th-229

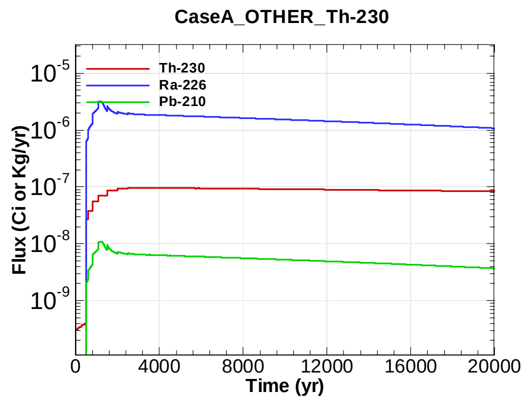

Figure A.1-2628 - Flux Leaving Liner for CaseA OTHER Th-230

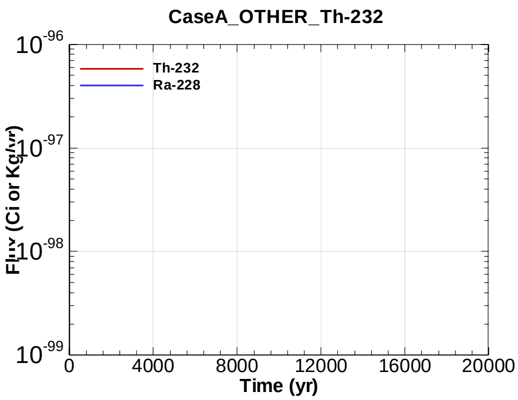

Figure A.1-2629 - Flux Leaving Liner for CaseA OTHER Th-232

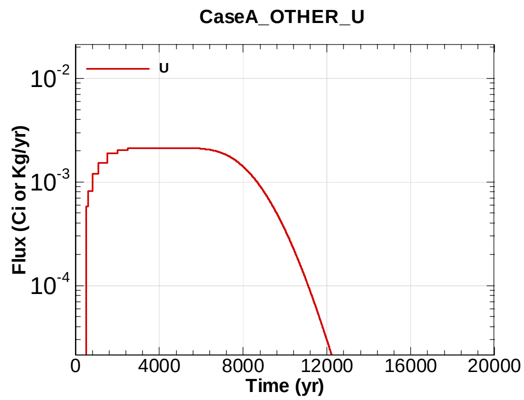

Figure A.1-2630 - Flux Leaving Liner for CaseA OTHER U

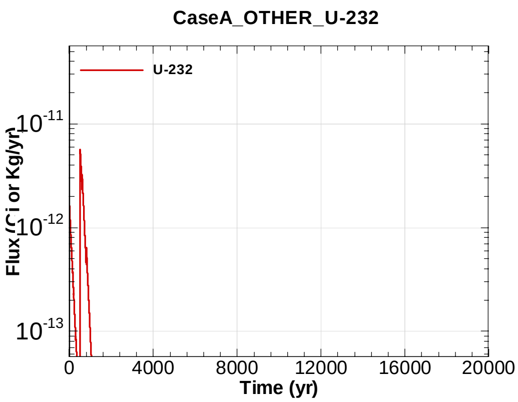

Figure A.1-2631 - Flux Leaving Liner for CaseA OTHER U-232

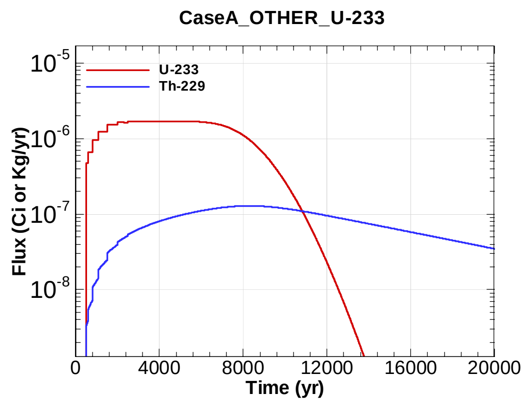

Figure A.1-2632 - Flux Leaving Liner for CaseA OTHER U-233

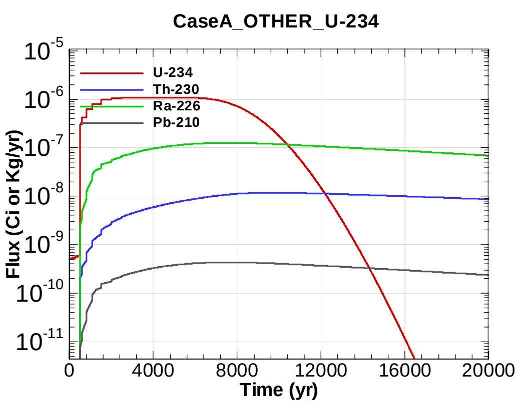

Figure A.1-2633 - Flux Leaving Liner for CaseA OTHER U-234

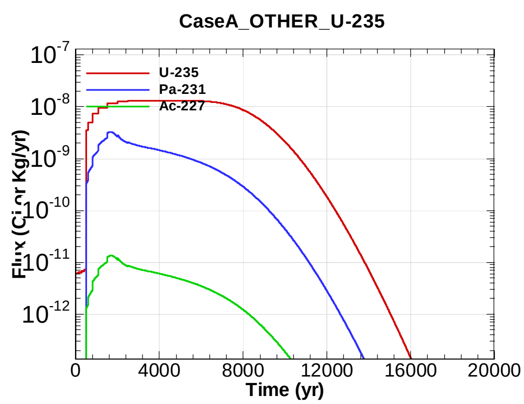

Figure A.1-2634 - Flux Leaving Liner for CaseA OTHER U-235

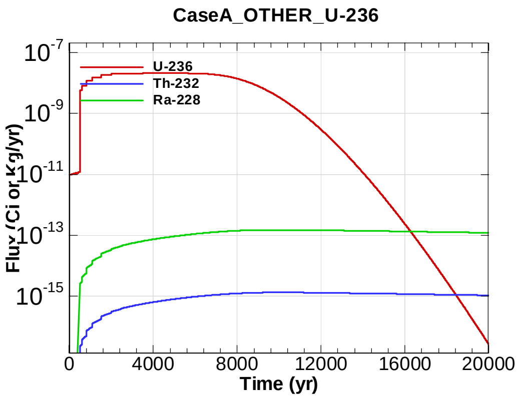

Figure A.1-2635 - Flux Leaving Liner for CaseA OTHER U-236

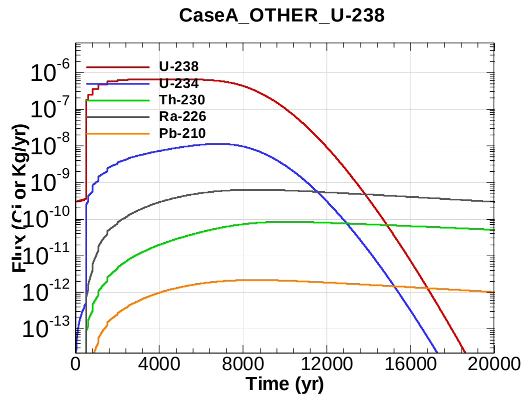

Figure A.1-2636 - Flux Leaving Liner for CaseA OTHER U-238

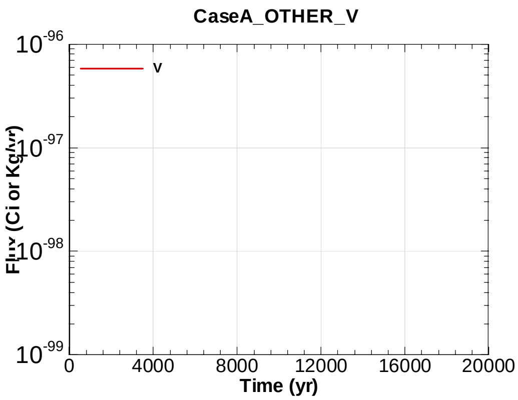

Figure A.1-2637 - Flux Leaving Liner for CaseA OTHER V

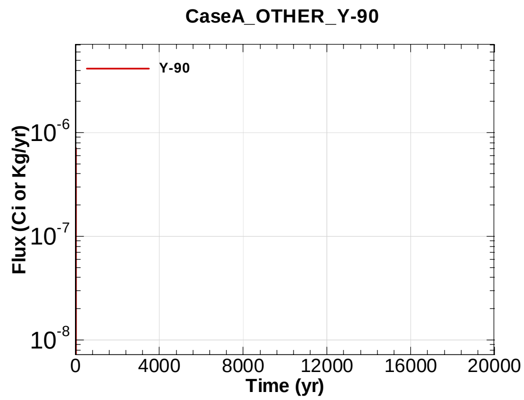

Figure A.1-2638 - Flux Leaving Liner for CaseA OTHER Y-90

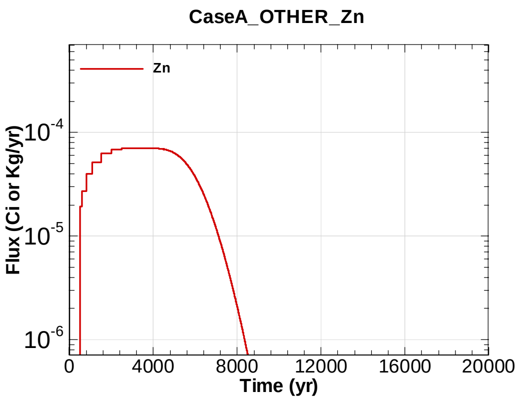

Figure A.1-2639 - Flux Leaving Liner for CaseA OTHER Zn

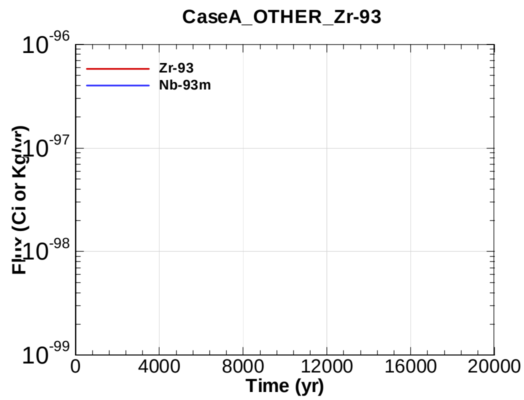

Figure A.1-2640 - Flux Leaving Liner for CaseA OTHER Zr-93

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Appendix A.2
WASTE FLUX ENTERING UPPER AQUIFER

Appendix A.2 contains curves showing the contaminant flux (in Ci or Kg/year) entering the Upper Three Runs – Upper Zone (i.e., water table) for the individual tanks and ancillary equipment for 20,000 years. The flux is provided for all radionuclides and chemicals.

Graph heading example "CaseA Tank01 Ac-227"

Key

CaseA = scenario case/configuration
Tank01 = Inventory source is Tank 01
Ac-227 = radionuclide or chemical of concern

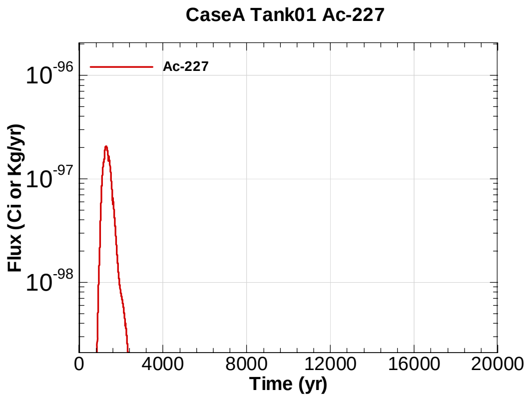

Figure A.2-1 - Water Table Flux for CaseA Tank01 Ac-227

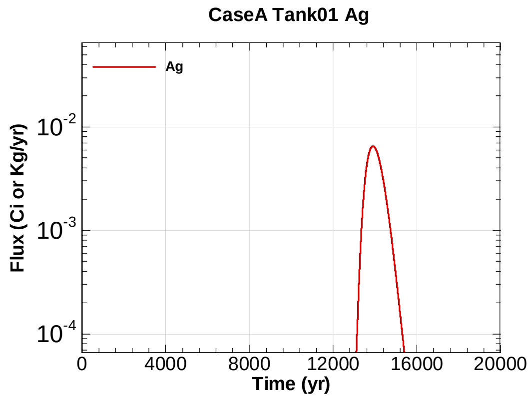

Figure A.2-2 - Water Table Flux for CaseA Tank01 Ag

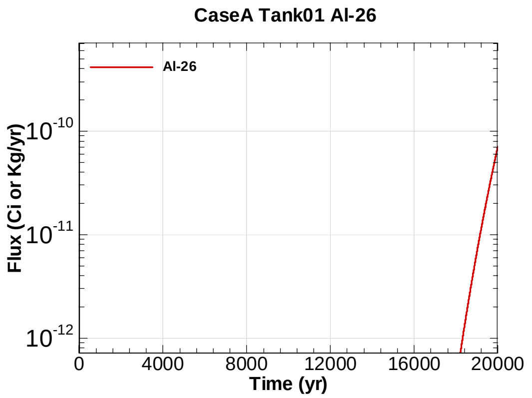

Figure A.2-3 - Water Table Flux for CaseA Tank01 Al-26

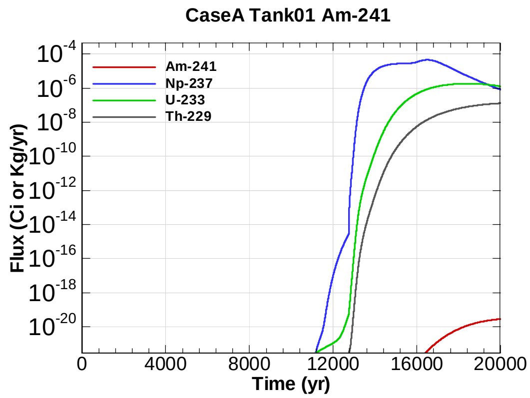

Figure A.2-4 - Water Table Flux for CaseA Tank01 Am-241

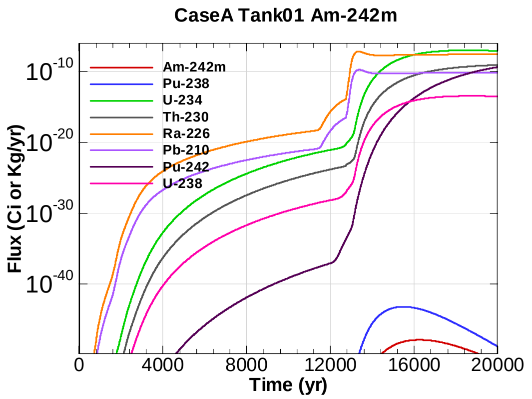

Figure A.2-5 - Water Table Flux for CaseA Tank01 Am-242m

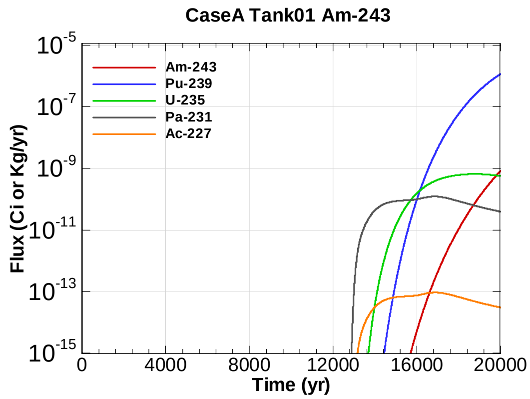

Figure A.2-6 - Water Table Flux for CaseA Tank01 Am-243

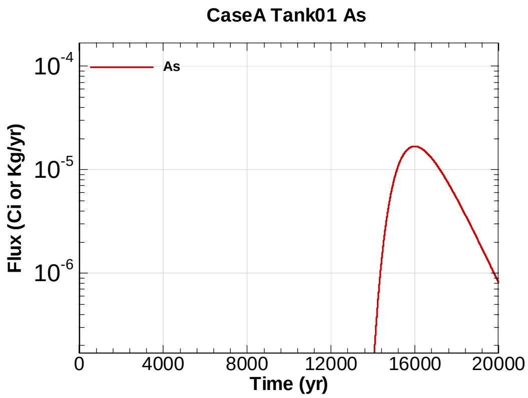

Figure A.2-7 - Water Table Flux for CaseA Tank01 As

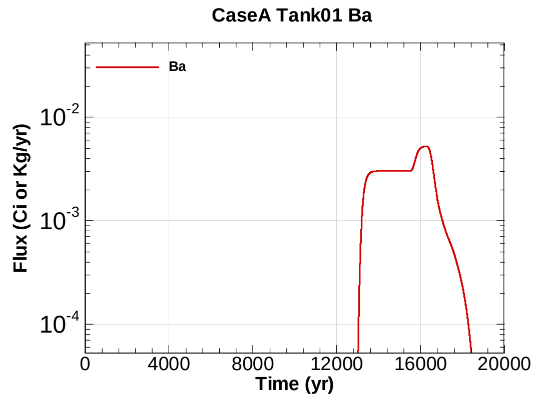

Figure A.2-8 - Water Table Flux for CaseA Tank01 Ba

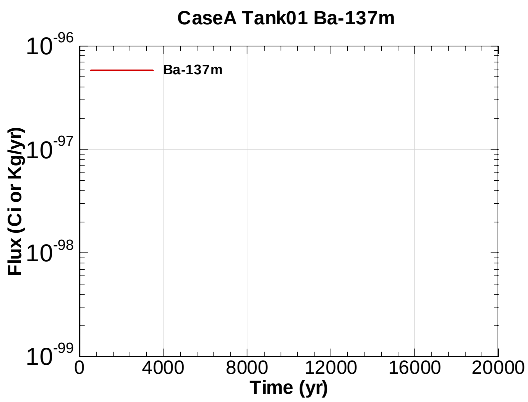

Figure A.2-9 - Water Table Flux for CaseA Tank01 Ba-137m

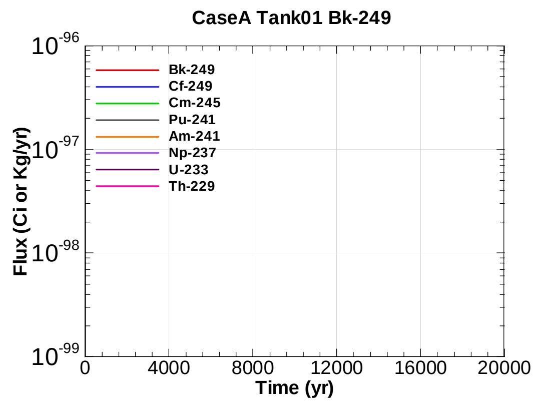

Figure A.2-10 - Water Table Flux for CaseA Tank01 Bk-249

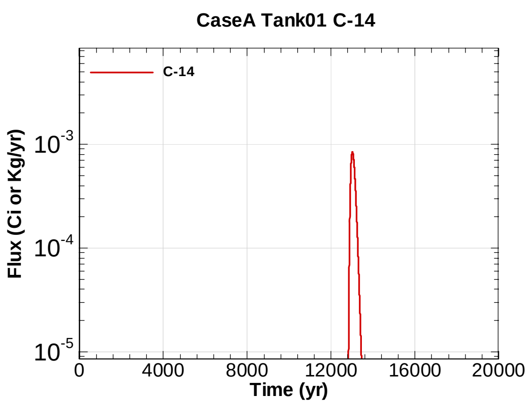

Figure A.2-11 - Water Table Flux for CaseA Tank01 C-14

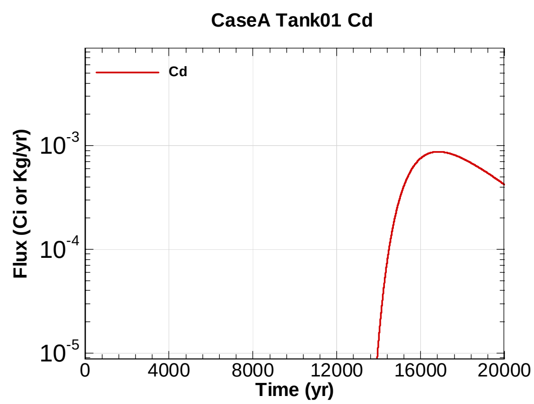

Figure A.2-12 - Water Table Flux for CaseA Tank01 Cd

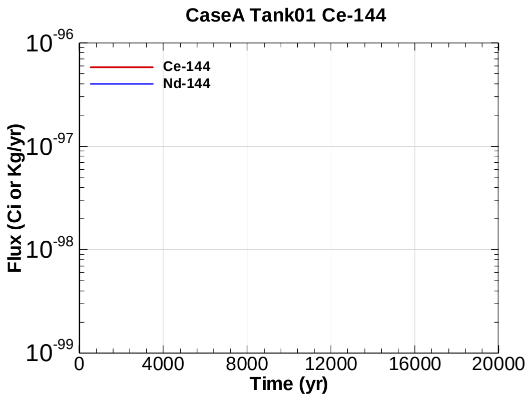

Figure A.2-13 - Water Table Flux for CaseA Tank01 Ce-144

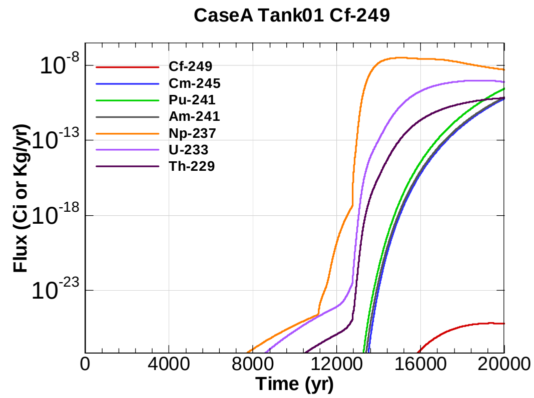

Figure A.2-14 - Water Table Flux for CaseA Tank01 Cf-249

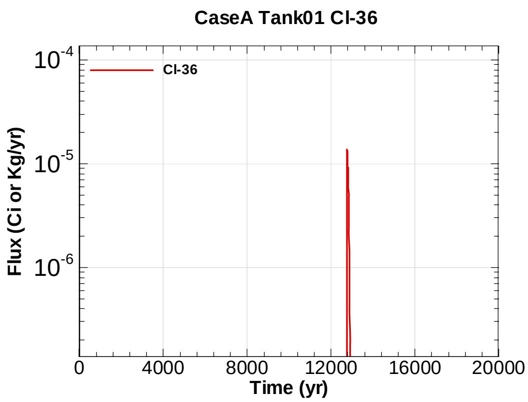

Figure A.2-15 - Water Table Flux for CaseA Tank01 Cl-36

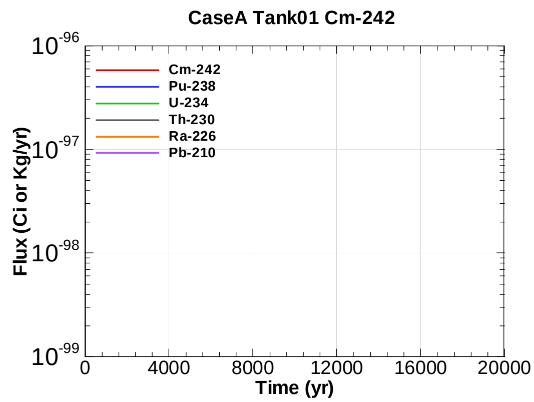

Figure A.2-16 - Water Table Flux for CaseA Tank01 Cm-242

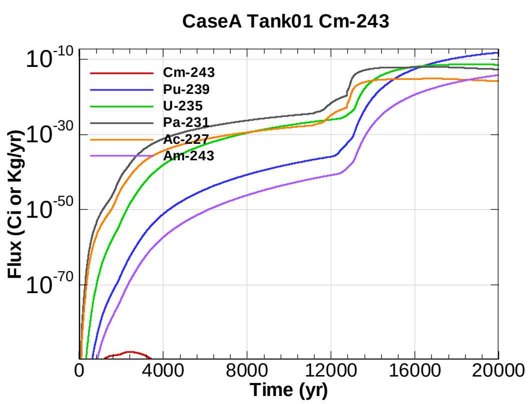

Figure A.2-17 - Water Table Flux for CaseA Tank01 Cm-243

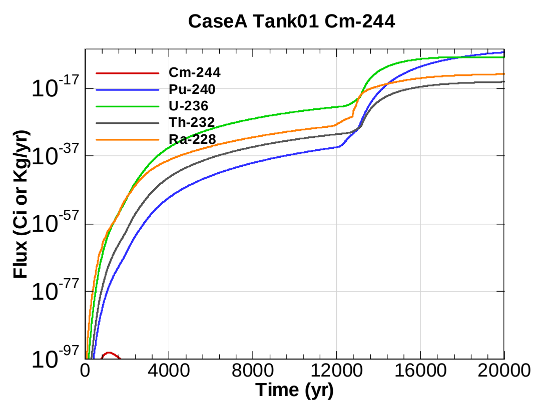

Figure A.2-18 - Water Table Flux for CaseA Tank01 Cm-244

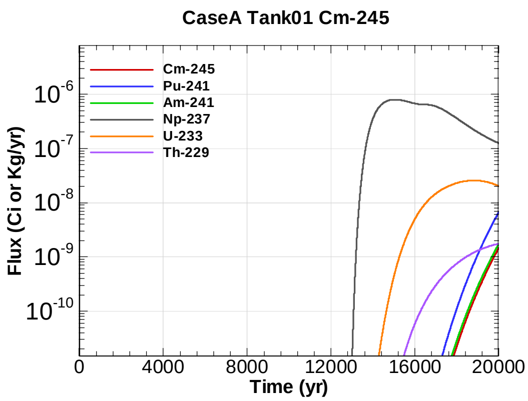

Figure A.2-19 - Water Table Flux for CaseA Tank01 Cm-245

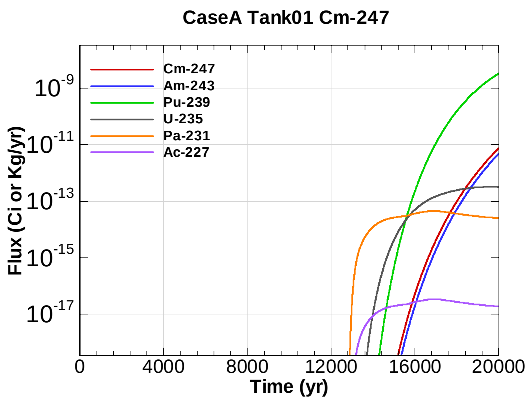

Figure A.2-20 - Water Table Flux for CaseA Tank01 Cm-247

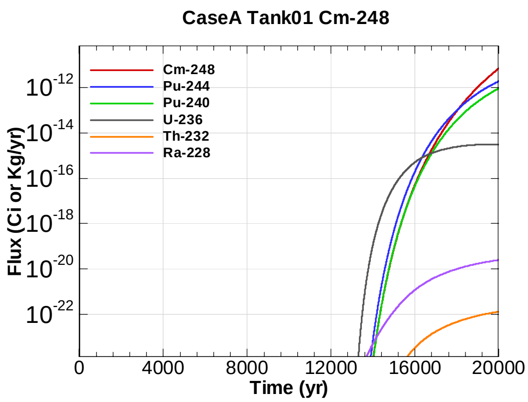

Figure A.2-21 - Water Table Flux for CaseA Tank01 Cm-248

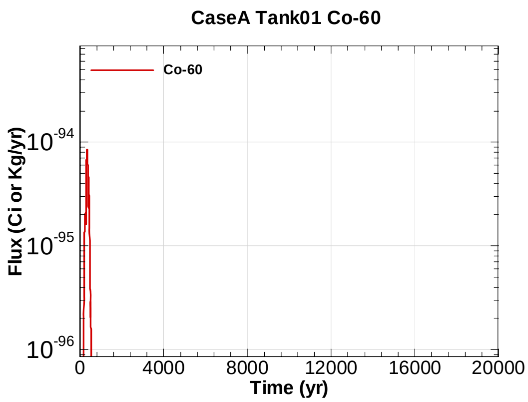

Figure A.2-22 - Water Table Flux for CaseA Tank01 Co-60

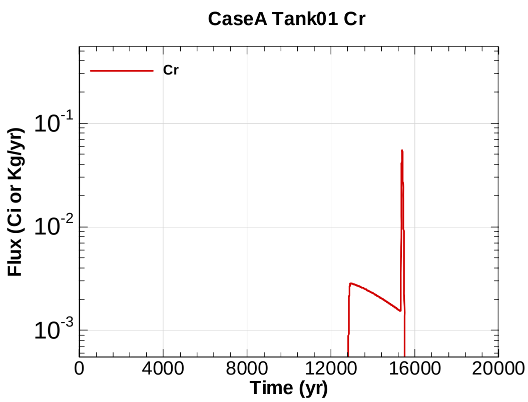

Figure A.2-23 - Water Table Flux for CaseA Tank01 Cr

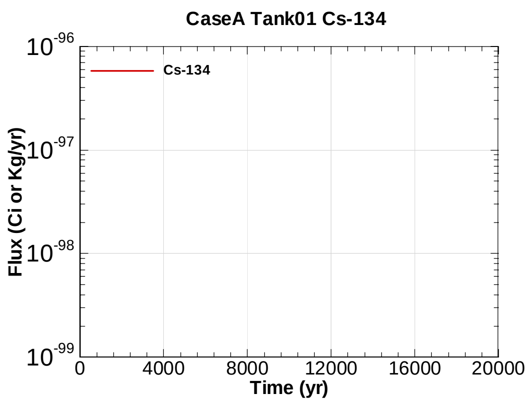

Figure A.2-24 - Water Table Flux for CaseA Tank01 Cs-134

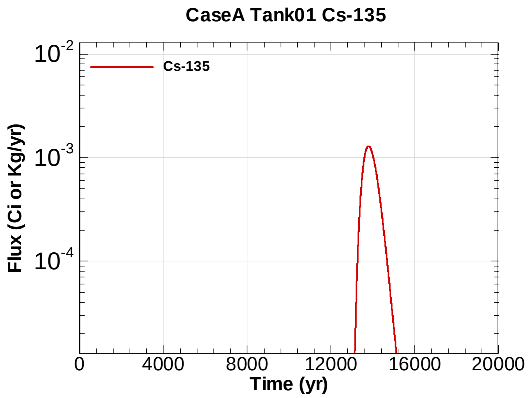

Figure A.2-25 - Water Table Flux for CaseA Tank01 Cs-135

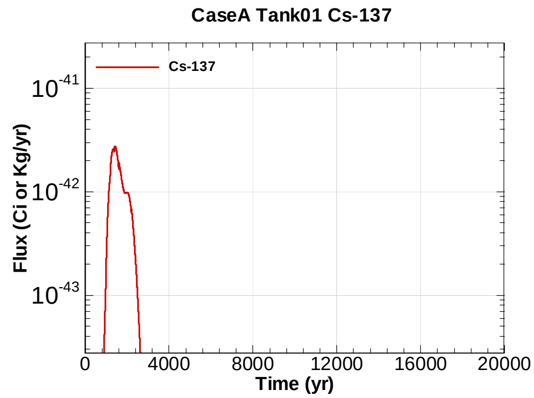

Figure A.2-26 - Water Table Flux for CaseA Tank01 Cs-137

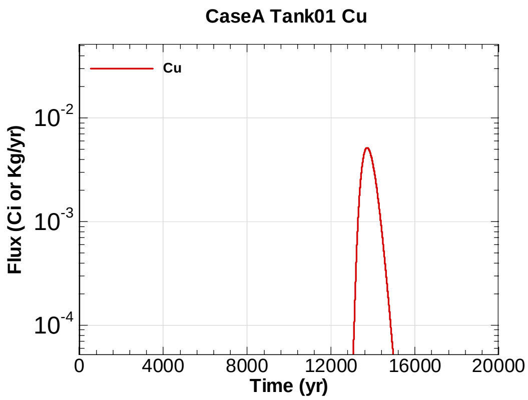

Figure A.2-27 - Water Table Flux for CaseA Tank01 Cu

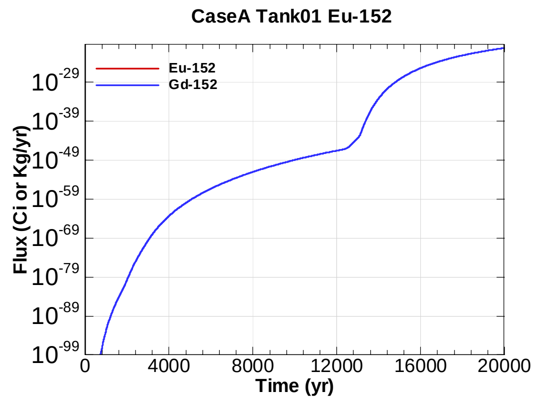

Figure A.2-28 - Water Table Flux for CaseA Tank01 Eu-152

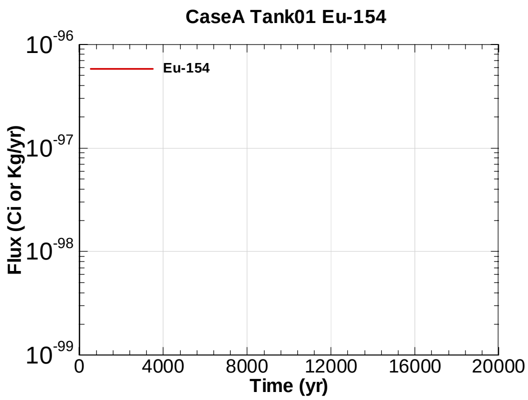

Figure A.2-29 - Water Table Flux for CaseA Tank01 Eu-154

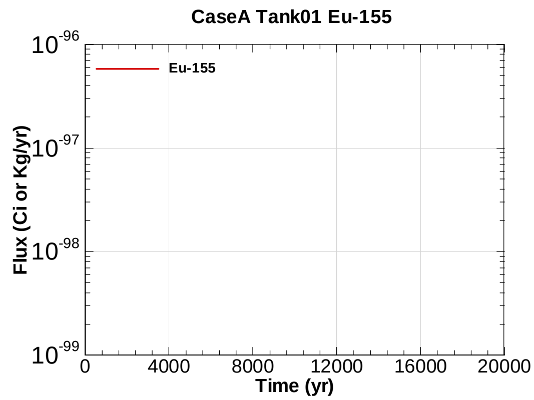

Figure A.2-30 - Water Table Flux for CaseA Tank01 Eu-155

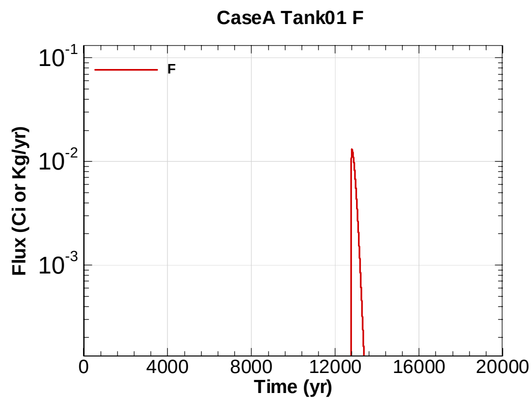

Figure A.2-31 - Water Table Flux for CaseA Tank01 F

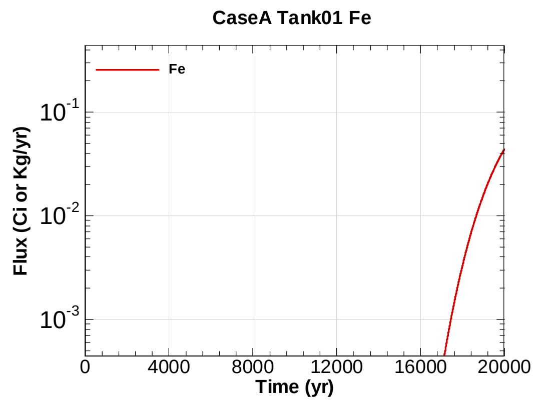

Figure A.2-32 - Water Table Flux for CaseA Tank01 Fe

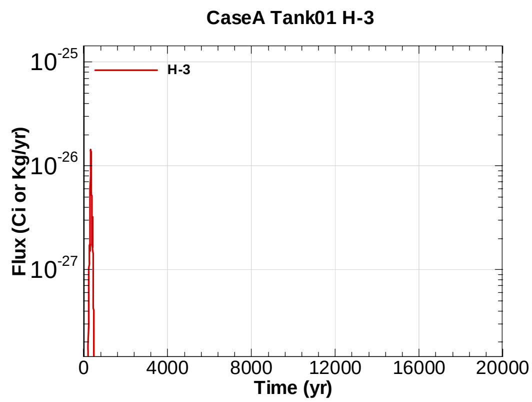

Figure A.2-33 - Water Table Flux for CaseA Tank01 H-3

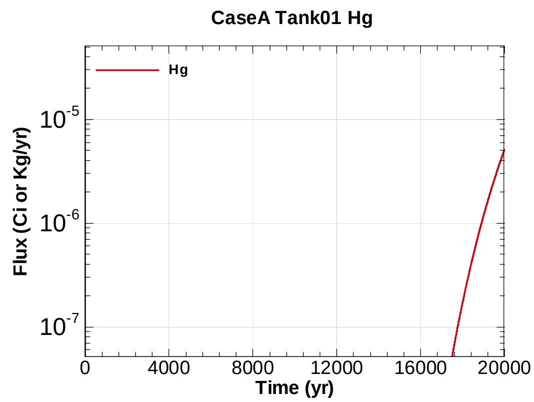

Figure A.2-34 - Water Table Flux for CaseA Tank01 Hg

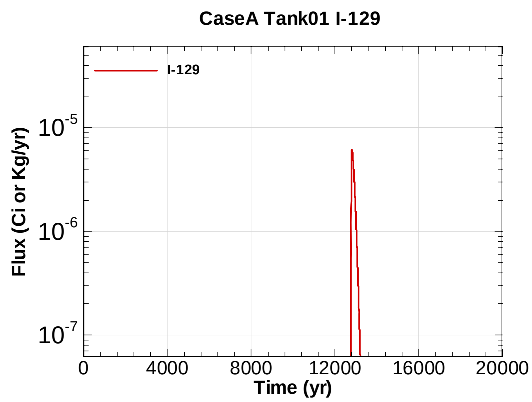

Figure A.2-35 - Water Table Flux for CaseA Tank01 I-129

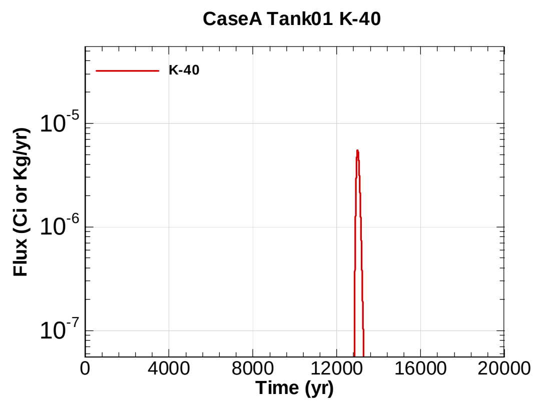

Figure A.2-36 - Water Table Flux for CaseA Tank01 K-40

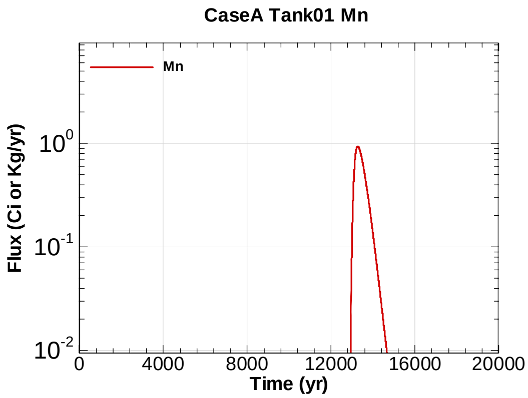

Figure A.2-37 - Water Table Flux for CaseA Tank01 Mn

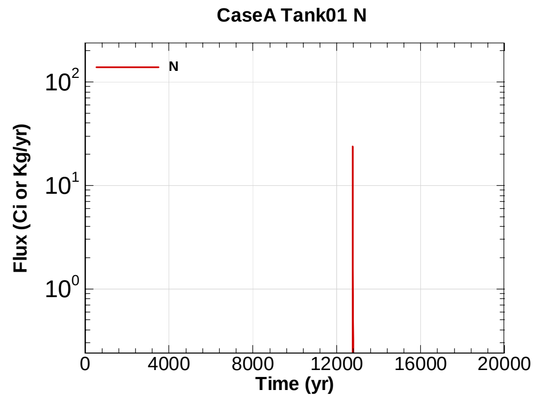

Figure A.2-38 - Water Table Flux for CaseA Tank01 N

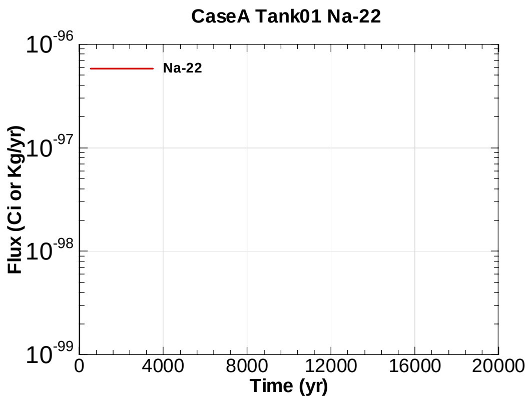

Figure A.2-39 - Water Table Flux for CaseA Tank01 Na-22

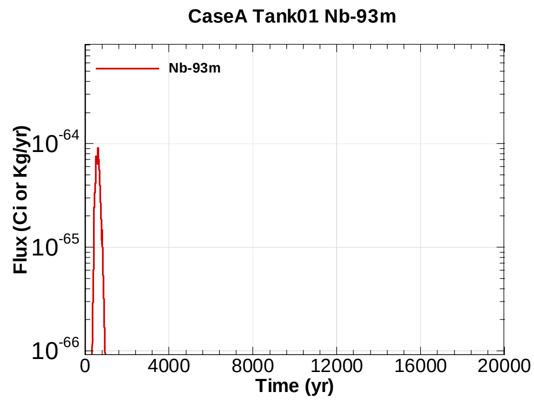

Figure A.2-40 - Water Table Flux for CaseA Tank01 Nb-93m

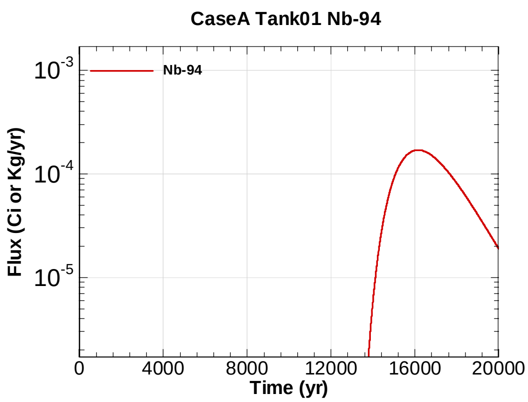

Figure A.2-41 - Water Table Flux for CaseA Tank01 Nb-94

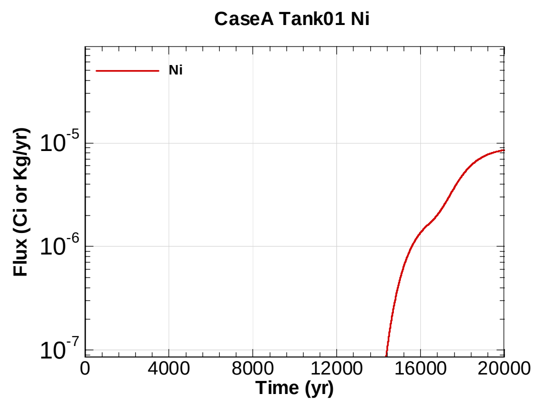

Figure A.2-42 - Water Table Flux for CaseA Tank01 Ni

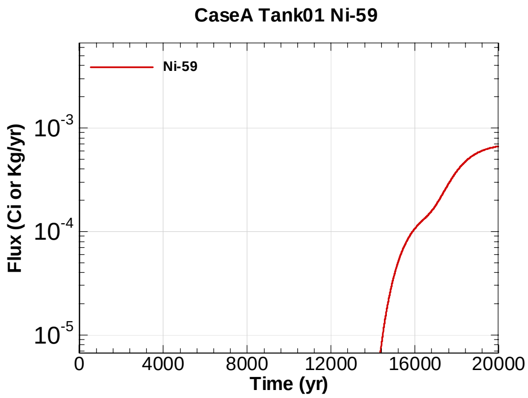

Figure A.2-43 - Water Table Flux for CaseA Tank01 Ni-59

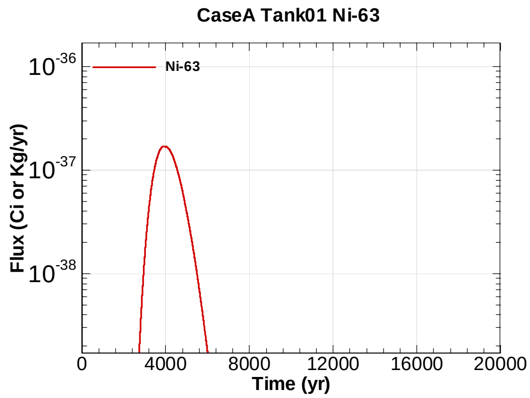

Figure A.2-44 - Water Table Flux for CaseA Tank01 Ni-63

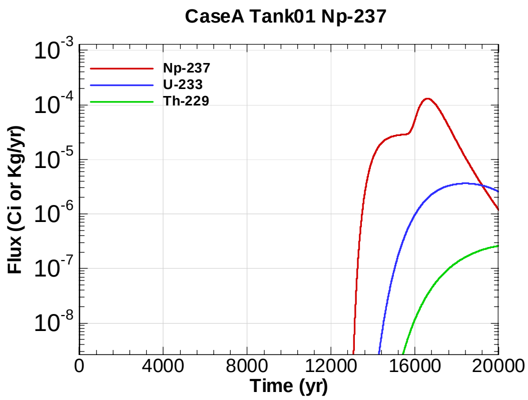

Figure A.2-45 - Water Table Flux for CaseA Tank01 Np-237

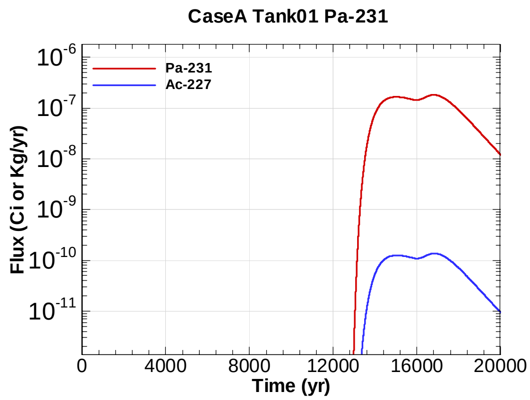

Figure A.2-46 - Water Table Flux for CaseA Tank01 Pa-231

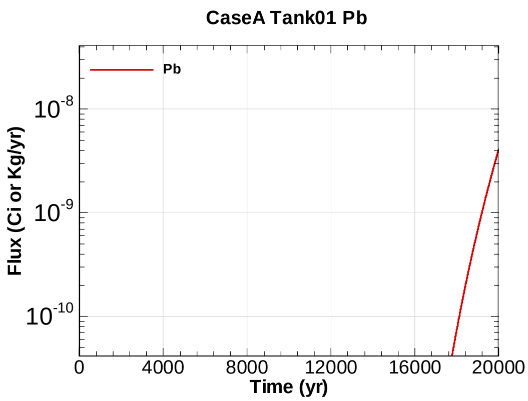

Figure A.2-47 - Water Table Flux for CaseA Tank01 Pb

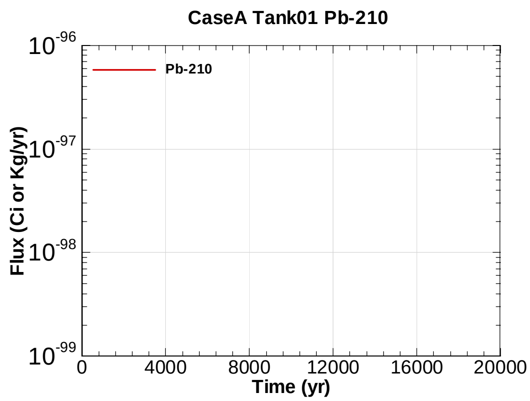

Figure A.2-48 - Water Table Flux for CaseA Tank01 Pb-210

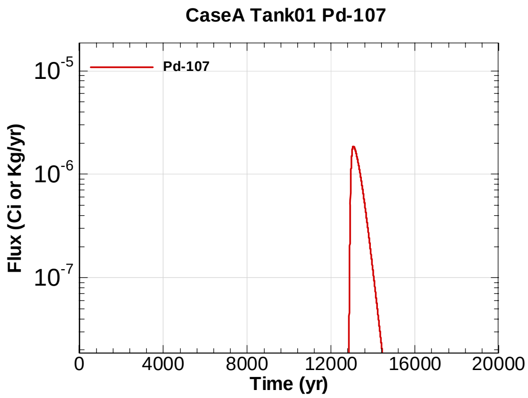

Figure A.2-49 - Water Table Flux for CaseA Tank01 Pd-107

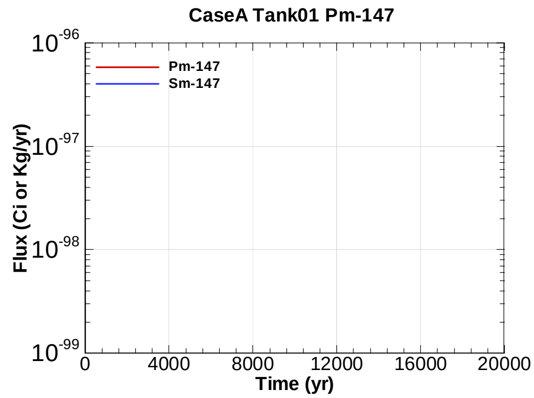

Figure A.2-50 - Water Table Flux for CaseA Tank01 Pm-147

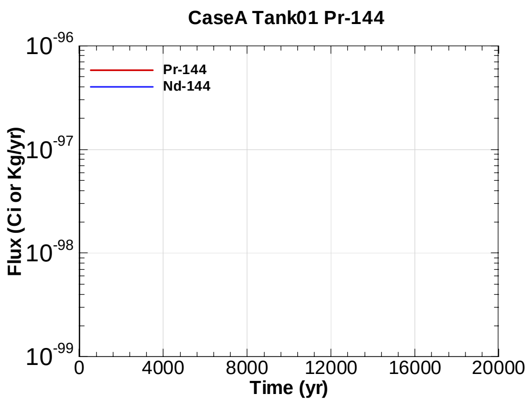

Figure A.2-51 - Water Table Flux for CaseA Tank01 Pr-144

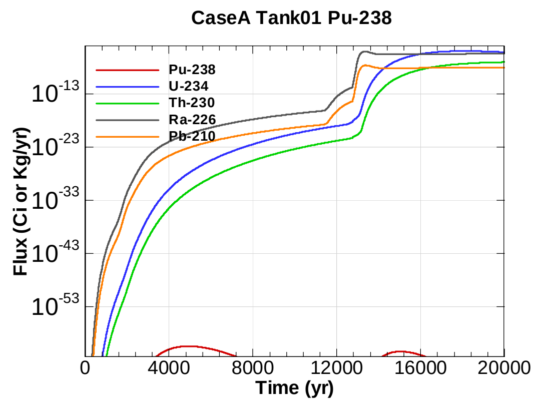

Figure A.2-52 - Water Table Flux for CaseA Tank01 Pu-238

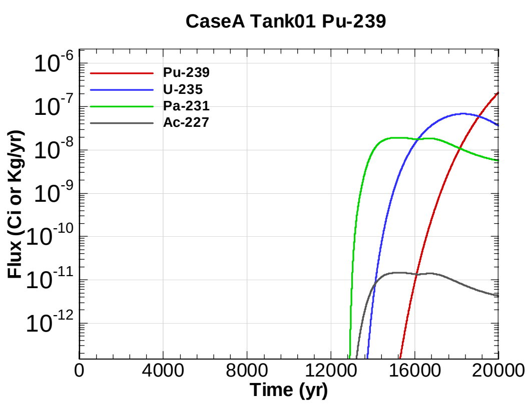

Figure A.2-53 - Water Table Flux for CaseA Tank01 Pu-239

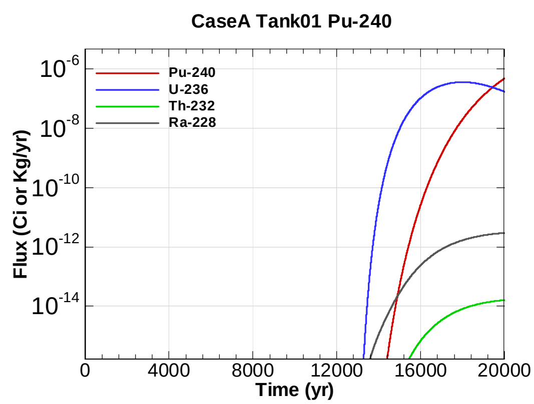

Figure A.2-54 - Water Table Flux for CaseA Tank01 Pu-240

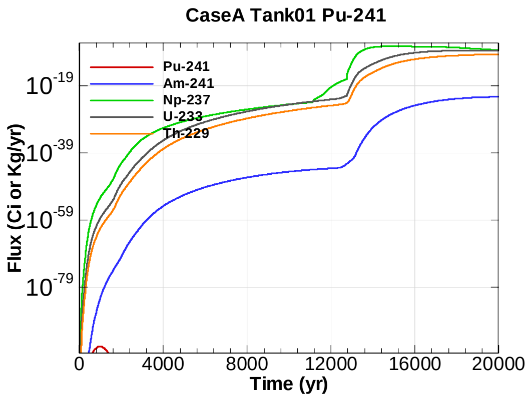

Figure A.2-55 - Water Table Flux for CaseA Tank01 Pu-241

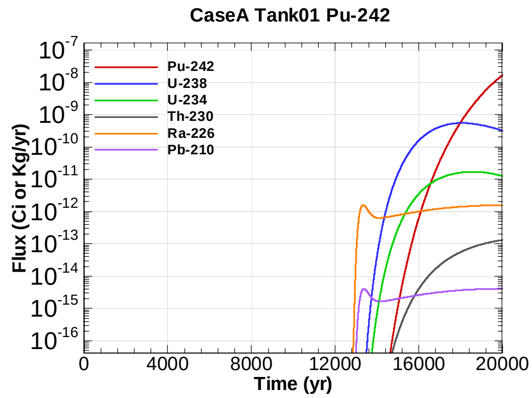

Figure A.2-56 - Water Table Flux for CaseA Tank01 Pu-242

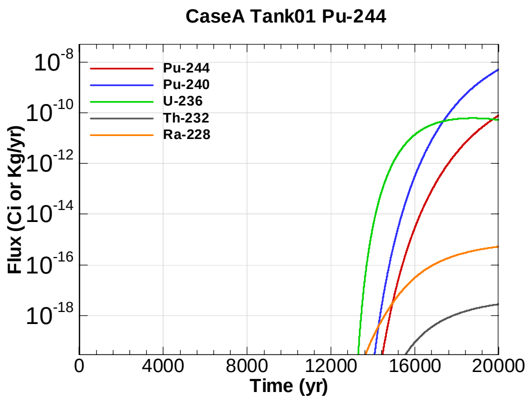

Figure A.2-57 - Water Table Flux for CaseA Tank01 Pu-244

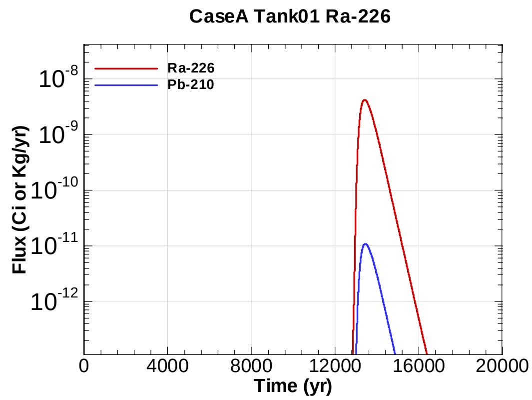

Figure A.2-58 - Water Table Flux for CaseA Tank01 Ra-226

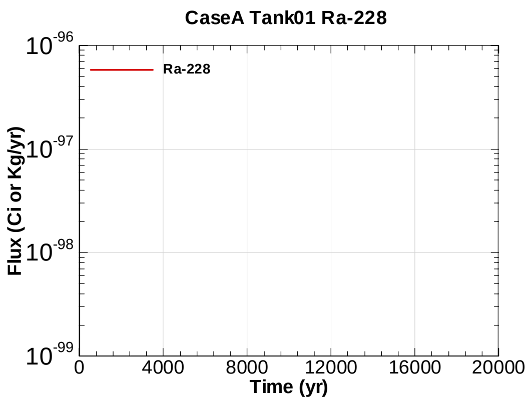

Figure A.2-59 - Water Table Flux for CaseA Tank01 Ra-228

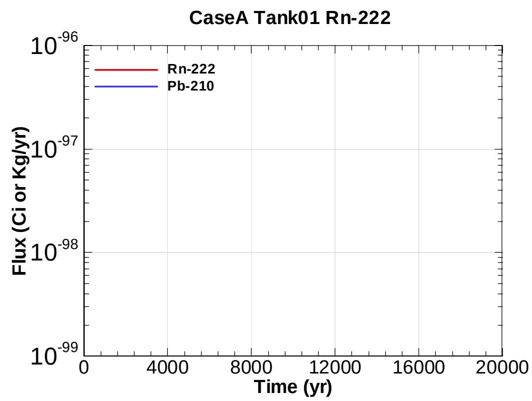

Figure A.2-60 - Water Table Flux for CaseA Tank01 Rn-222

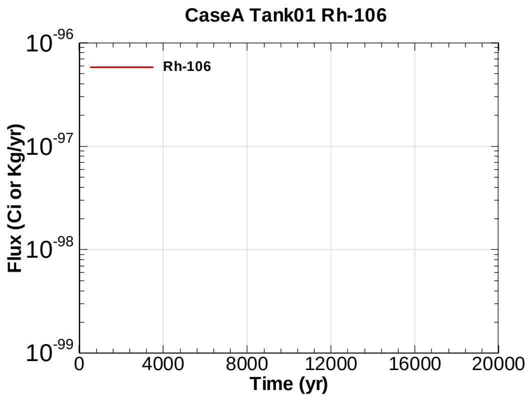

Figure A.2-61 - Water Table Flux for CaseA Tank01 Rh-106

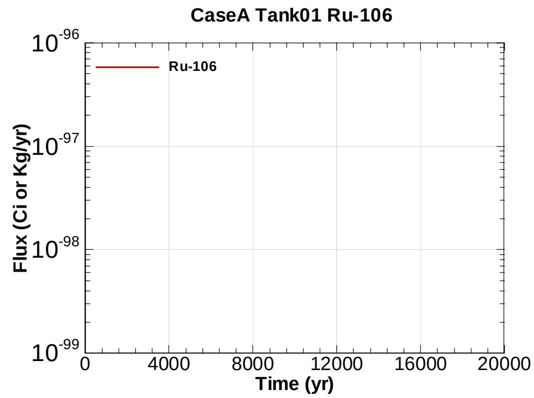

Figure A.2-62 - Water Table Flux for CaseA Tank01 Ru-106

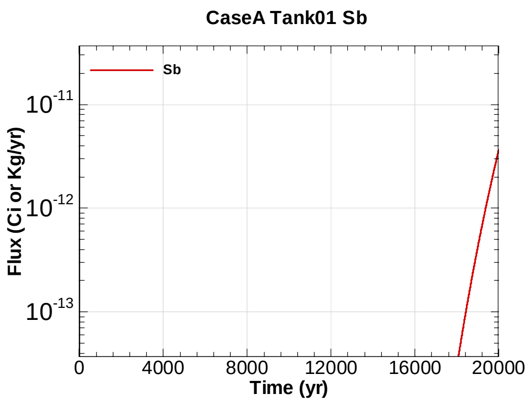

Figure A.2-63 - Water Table Flux for CaseA Tank01 Sb

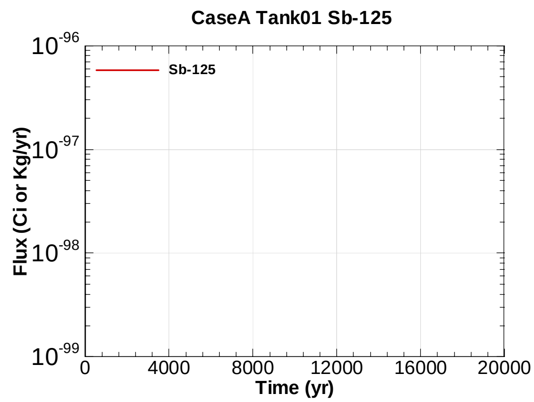

Figure A.2-64 - Water Table Flux for CaseA Tank01 Sb-125

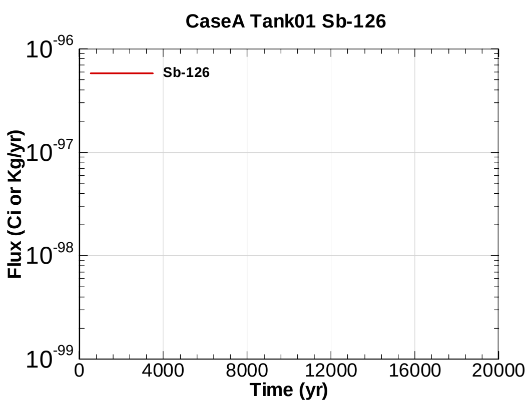

Figure A.2-65 - Water Table Flux for CaseA Tank01 Sb-126

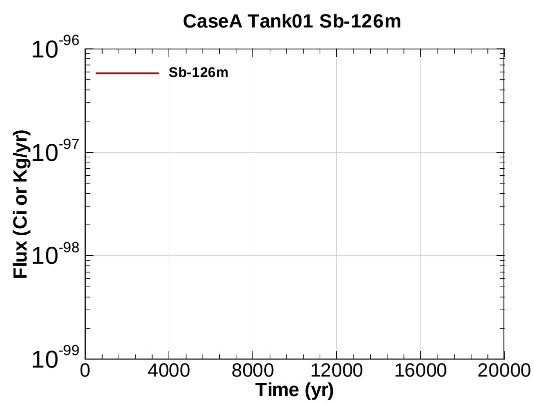

Figure A.2-66 - Water Table Flux for CaseA Tank01 Sb-126m

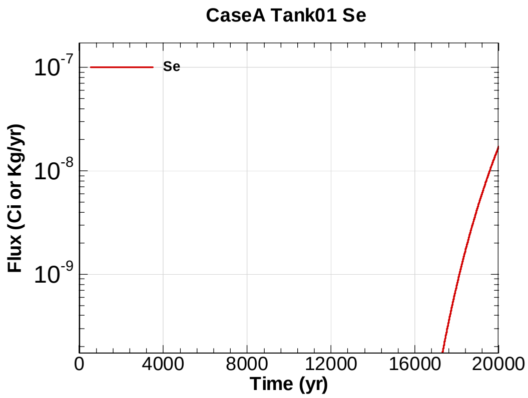

Figure A.2-67 - Water Table Flux for CaseA Tank01 Se

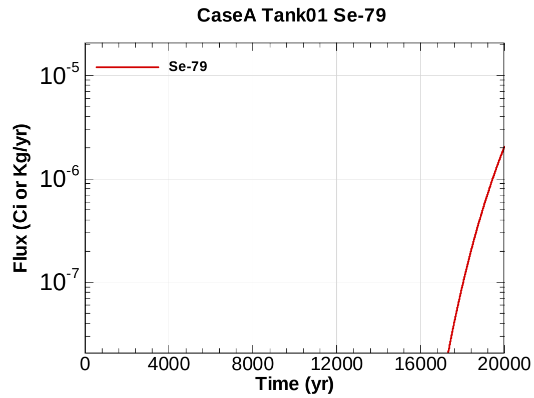

Figure A.2-68 - Water Table Flux for CaseA Tank01 Se-79

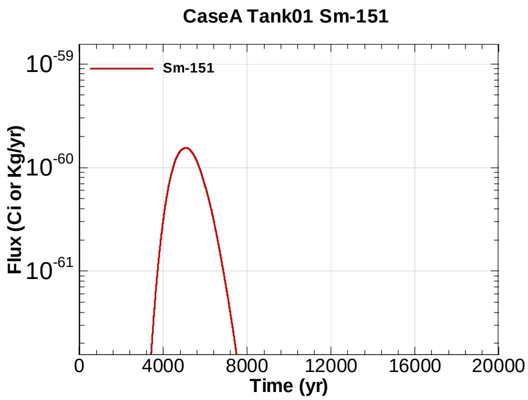

Figure A.2-69 - Water Table Flux for CaseA Tank01 Sm-151

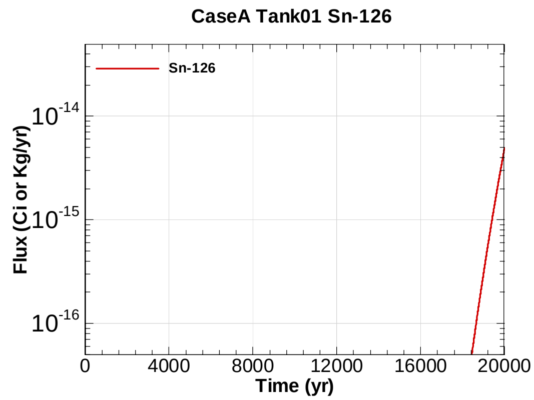

Figure A.2-70 - Water Table Flux for CaseA Tank01 Sn-126

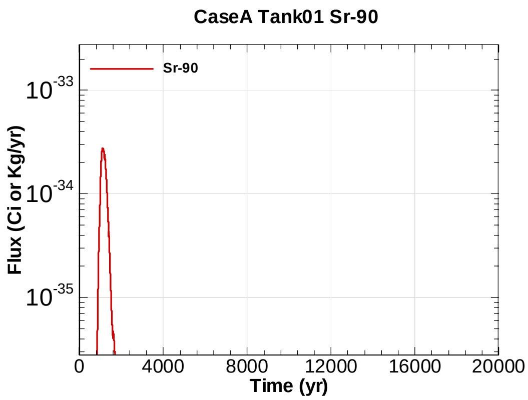

Figure A.2-71 - Water Table Flux for CaseA Tank01 Sr-90

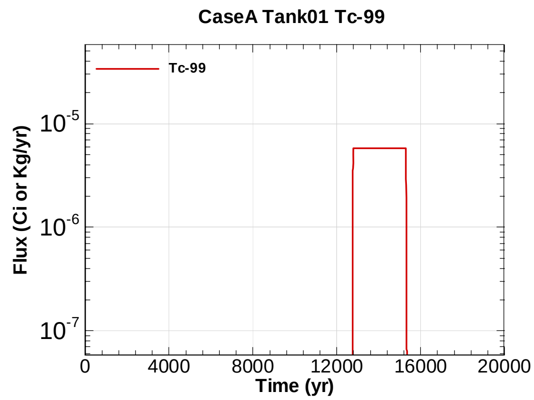

Figure A.2-72 - Water Table Flux for CaseA Tank01 Tc-99

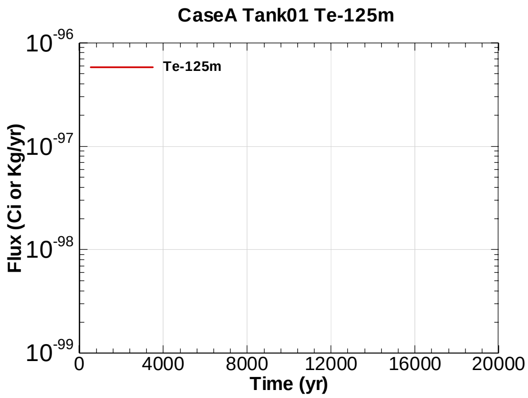

Figure A.2-73 - Water Table Flux for CaseA Tank01 Te-125m

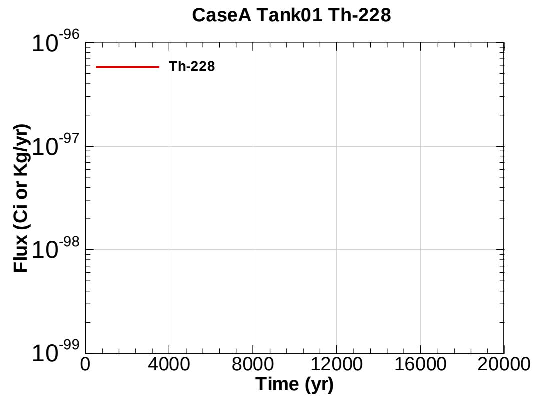

Figure A.2-74 - Water Table Flux for CaseA Tank01 Th-228

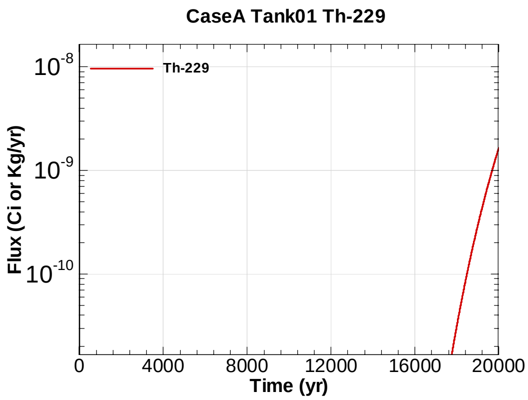

Figure A.2-75 - Water Table Flux for CaseA Tank01 Th-229

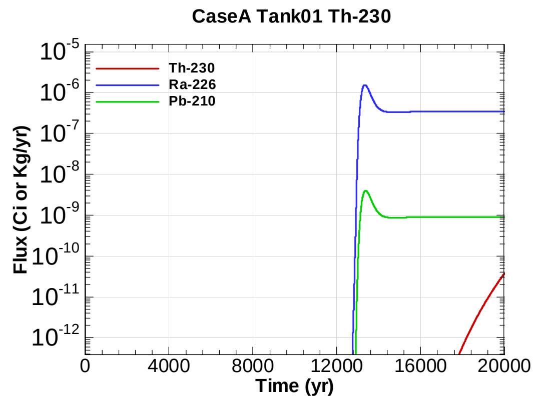

Figure A.2-76 - Water Table Flux for CaseA Tank01 Th-230

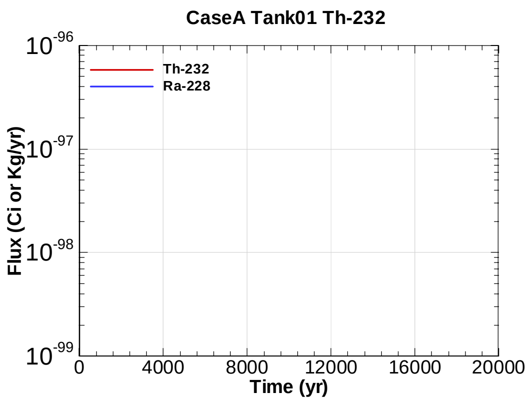

Figure A.2-77 - Water Table Flux for CaseA Tank01 Th-232

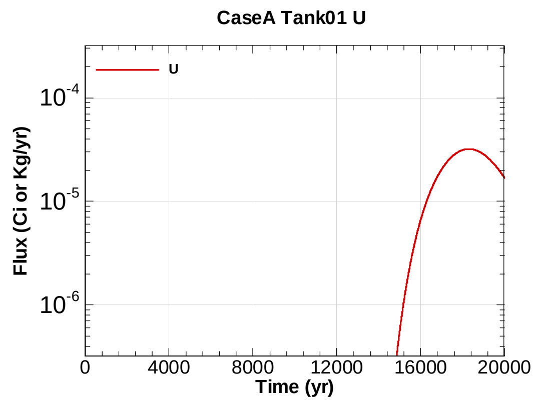

Figure A.2-78 - Water Table Flux for CaseA Tank01 U

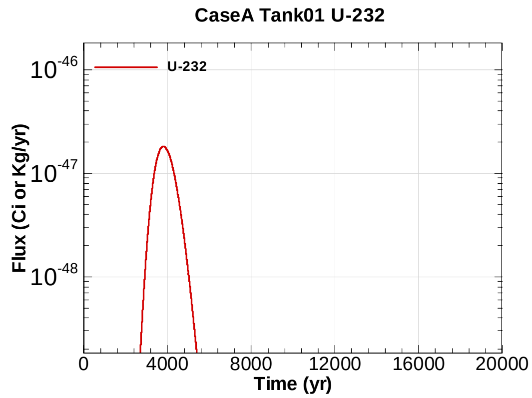

Figure A.2-79 - Water Table Flux for CaseA Tank01 U-232

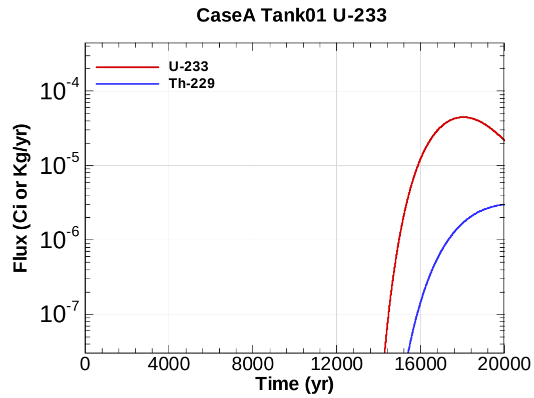

Figure A.2-80 - Water Table Flux for CaseA Tank01 U-233

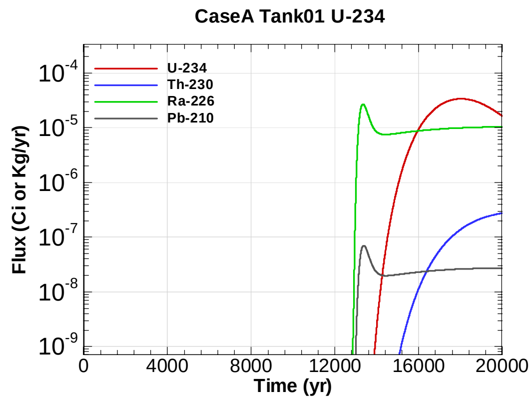

Figure A.2-81 - Water Table Flux for CaseA Tank01 U-234

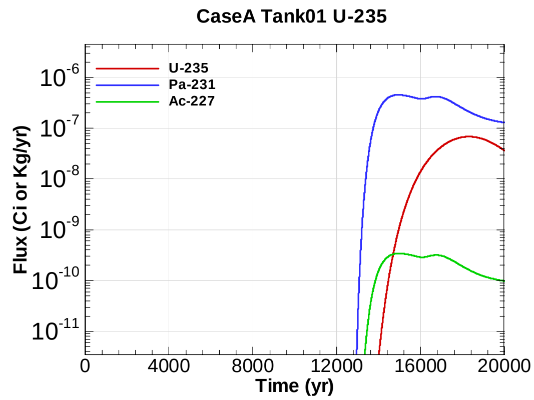

Figure A.2-82 - Water Table Flux for CaseA Tank01 U-235

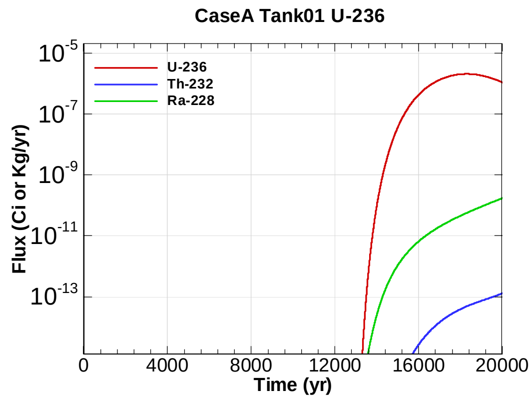

Figure A.2-83 - Water Table Flux for CaseA Tank01 U-236

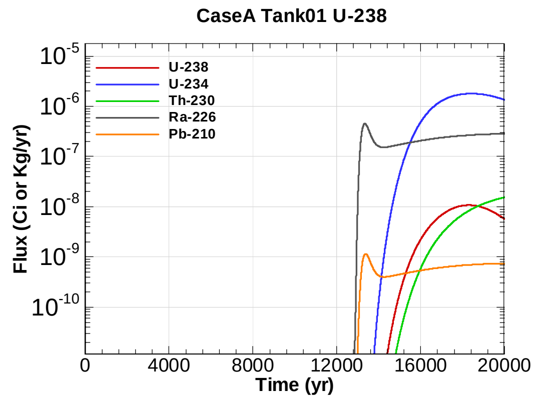

Figure A.2-84 - Water Table Flux for CaseA Tank01 U-238

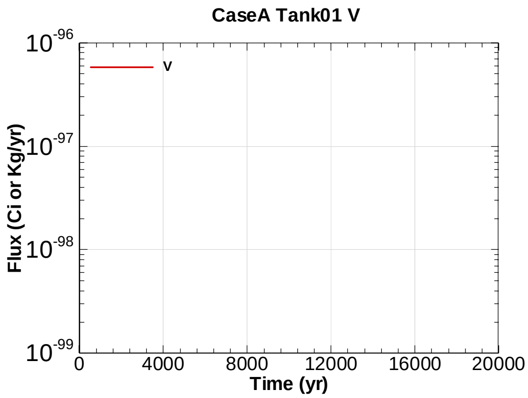

Figure A.2-85 - Water Table Flux for CaseA Tank01 V

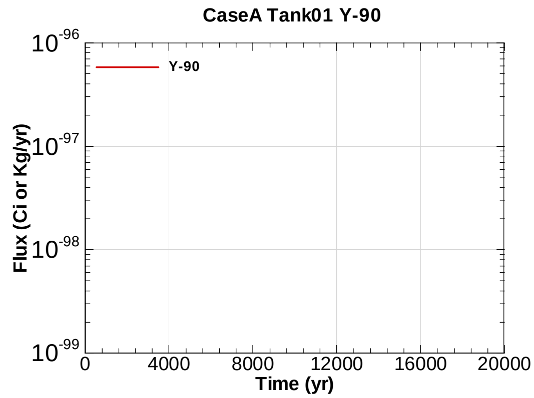

Figure A.2-86 - Water Table Flux for CaseA Tank01 Y-90

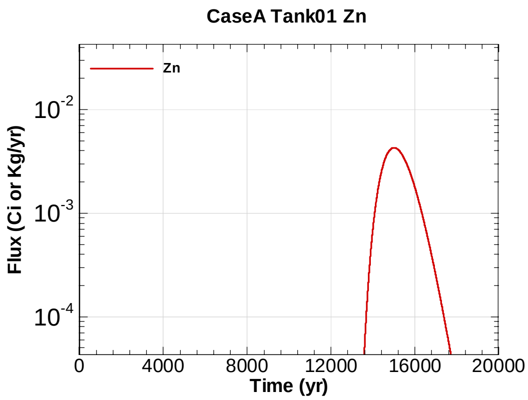

Figure A.2-87 - Water Table Flux for CaseA Tank01 Zn

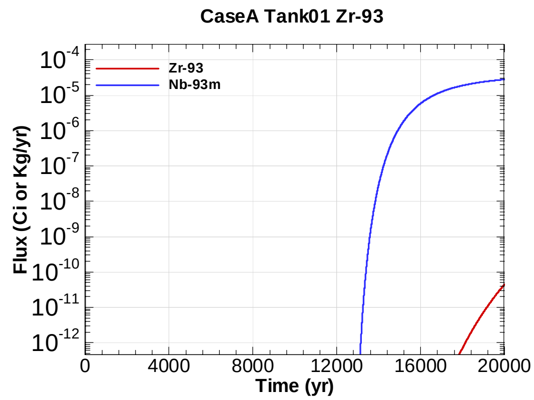

Figure A.2-88 - Water Table Flux for CaseA Tank01 Zr-93

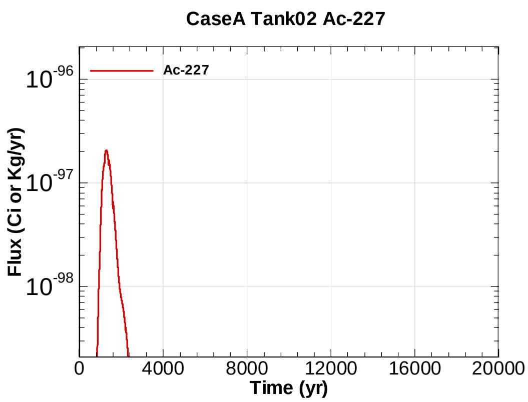

Figure A.1-89 - Water Table Flux for CaseA Tank02 Ac-227

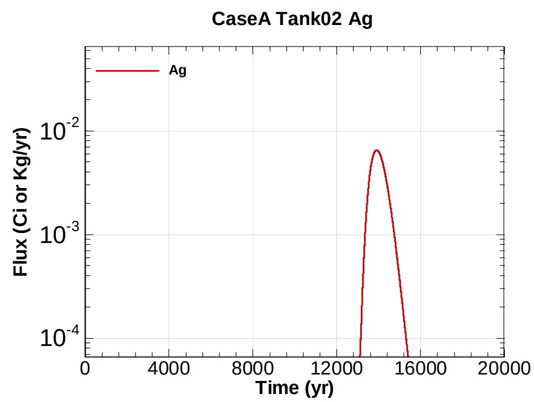

Figure A.1-90 - Water Table Flux for CaseA Tank02 Ag

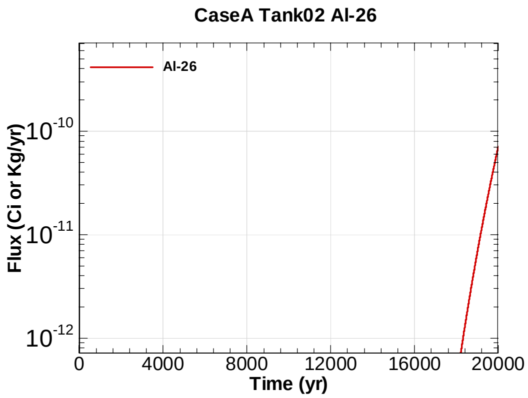

Figure A.1-91 - Water Table Flux for CaseA Tank02 Al-26

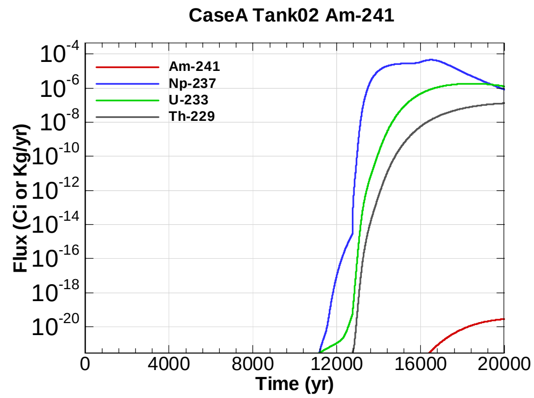

Figure A.1-92 - Water Table Flux for CaseA Tank02 Am-241

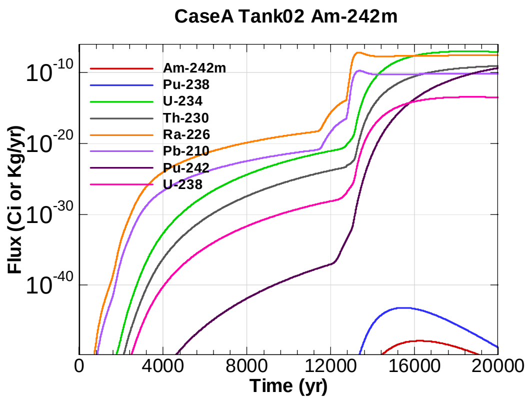

Figure A.1-93 - Water Table Flux for CaseA Tank02 Am-242m

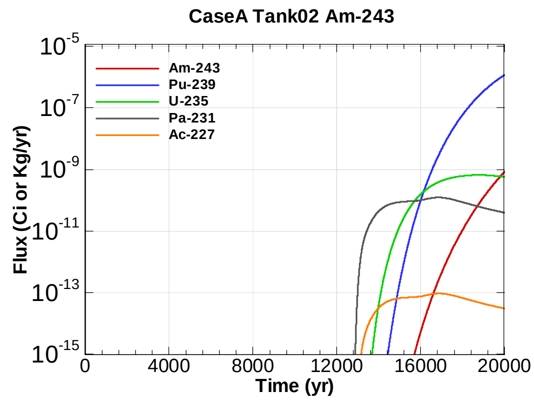

Figure A.1-94 - Water Table Flux for CaseA Tank02 Am-243

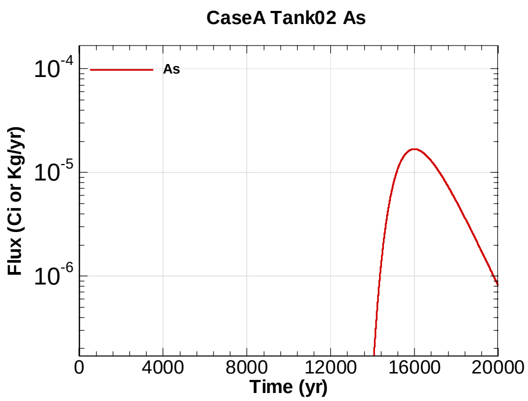

Figure A.1-95 - Water Table Flux for CaseA Tank02 As

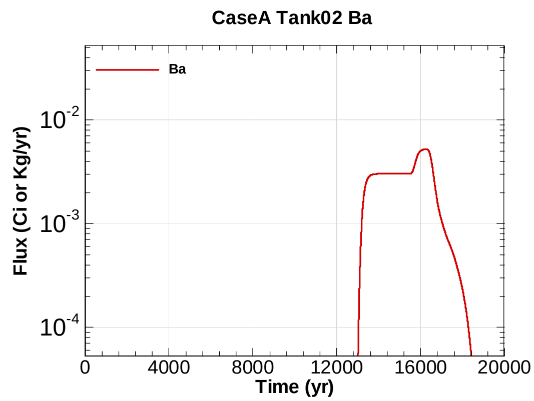

Figure A.1-96 - Water Table Flux for CaseA Tank02 Ba

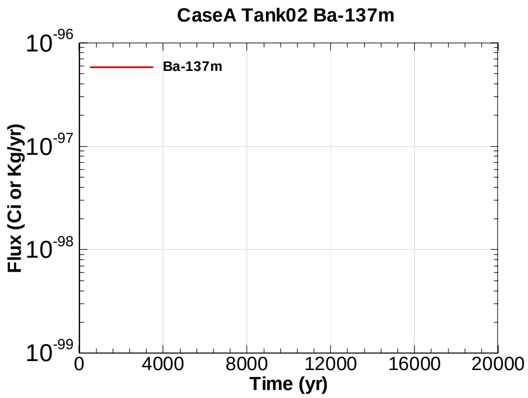

Figure A.1-97 - Water Table Flux for CaseA Tank02 Ba-137m

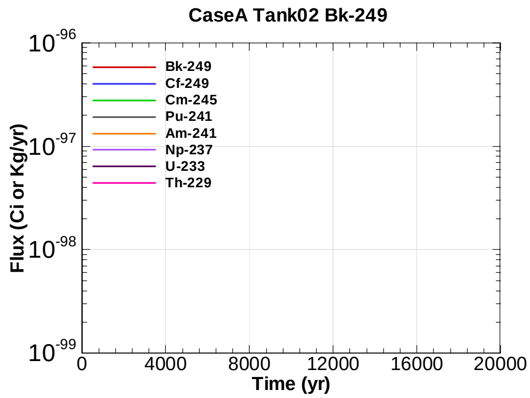

Figure A.1-98 - Water Table Flux for CaseA Tank02 Bk-249

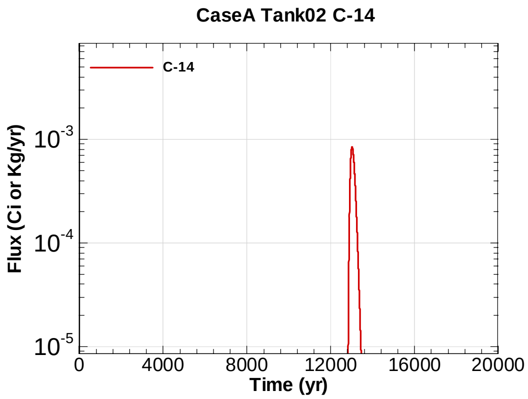

Figure A.1-99 - Water Table Flux for CaseA Tank02 C-14

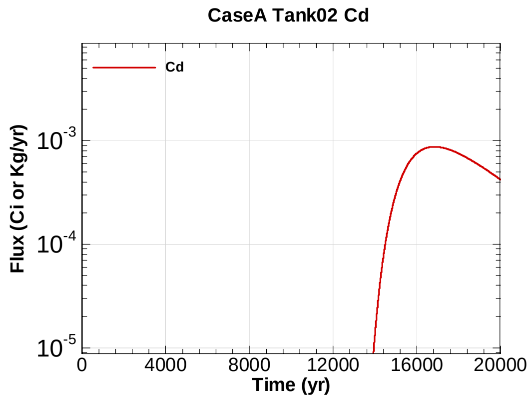

Figure A.1-100 - Water Table Flux for CaseA Tank02 Cd

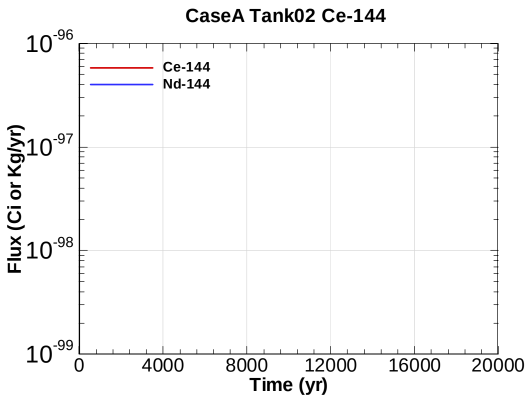

Figure A.1-101 - Water Table Flux for CaseA Tank02 Ce-144

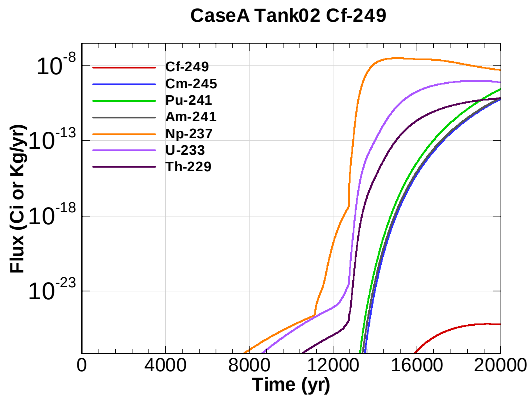

Figure A.1-102 - Water Table Flux for CaseA Tank02 Cf-249

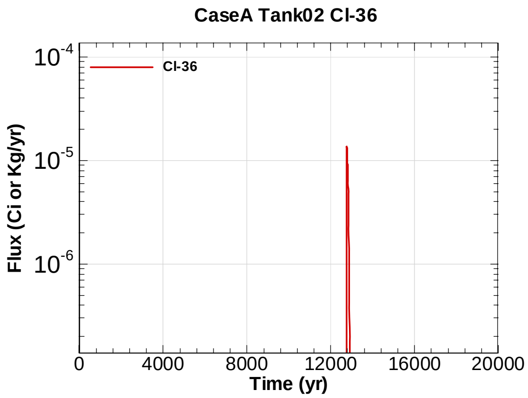

Figure A.1-103 - Water Table Flux for CaseA Tank02 Cl-36

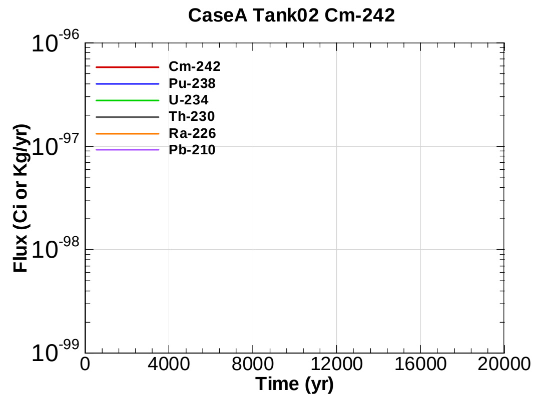

Figure A.1-104 - Water Table Flux for CaseA Tank02 Cm-242

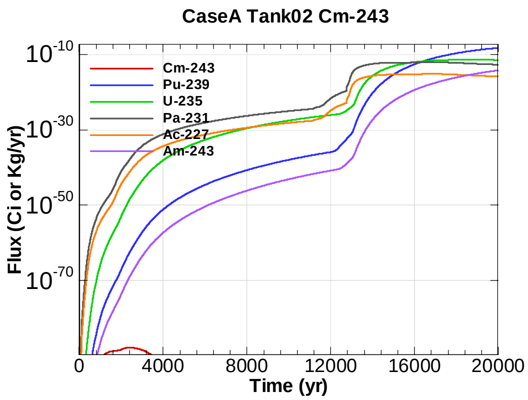

Figure A.1-105 - Water Table Flux for CaseA Tank02 Cm-243

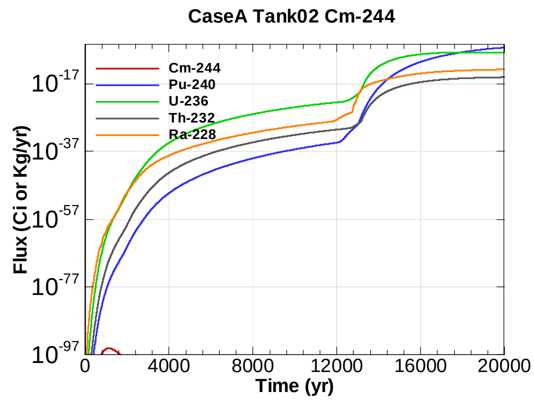

Figure A.1-106 - Water Table Flux for CaseA Tank02 Cm-244

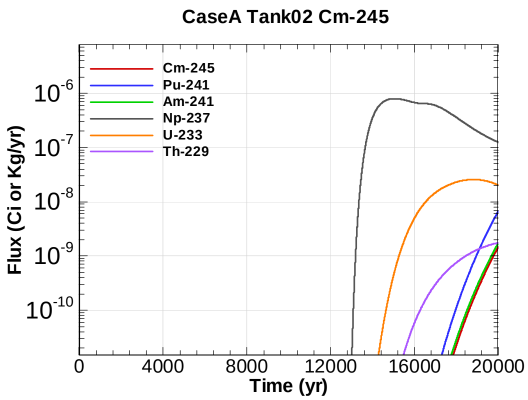

Figure A.1-107 - Water Table Flux for CaseA Tank02 Cm-245

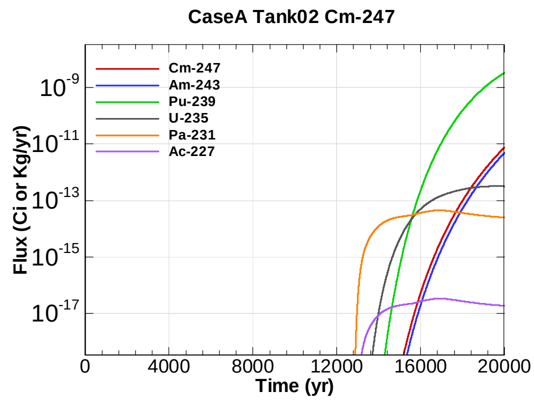

Figure A.1-108 - Water Table Flux for CaseA Tank02 Cm-247

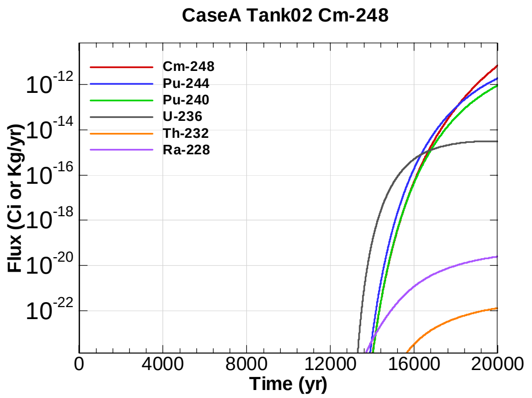

Figure A.1-109 - Water Table Flux for CaseA Tank02 Cm-248

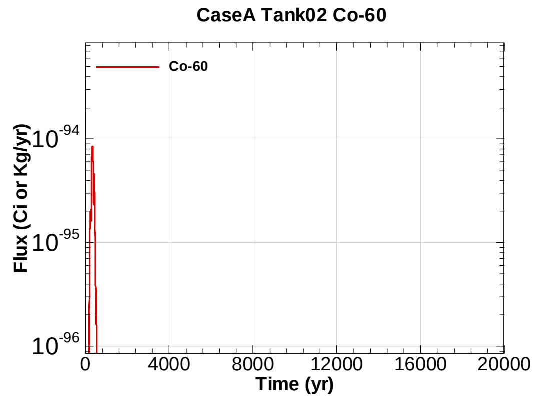

Figure A.1-110 - Water Table Flux for CaseA Tank02 Co-60

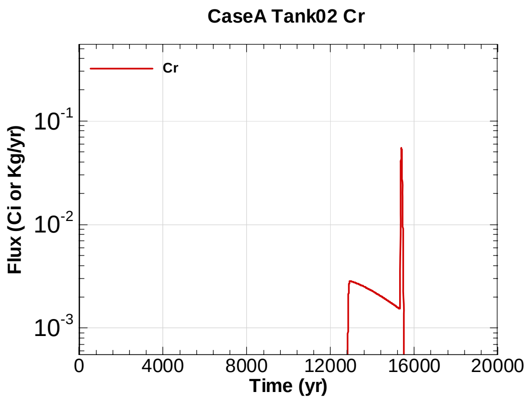

Figure A.1-111 - Water Table Flux for CaseA Tank02 Cr

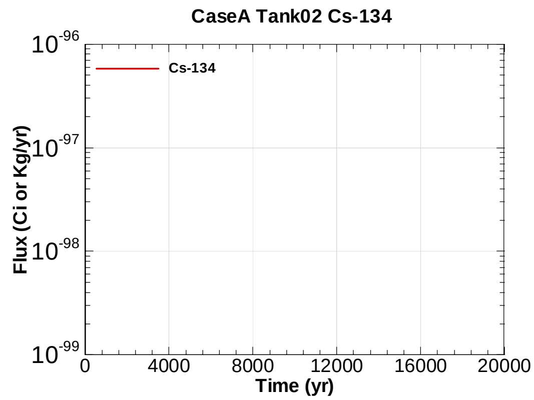

Figure A.1-112 - Water Table Flux for CaseA Tank02 Cs-134

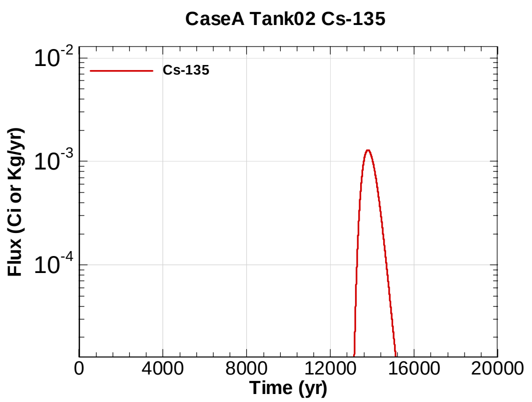

Figure A.1-113 - Water Table Flux for CaseA Tank02 Cs-135

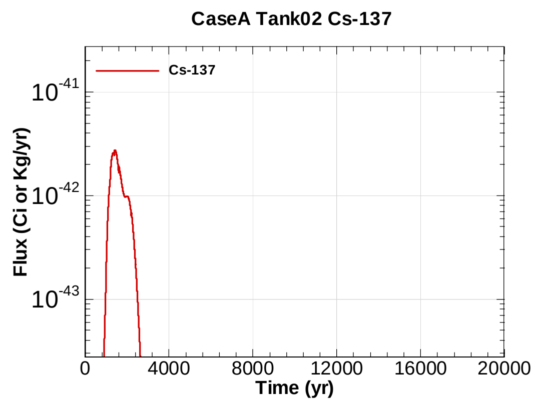

Figure A.1-114 - Water Table Flux for CaseA Tank02 Cs-137

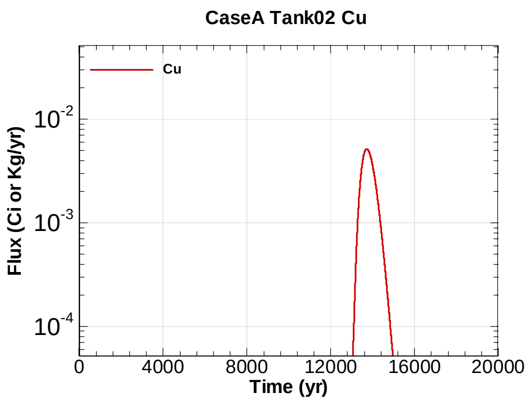

Figure A.1-115 - Water Table Flux for CaseA Tank02 Cu

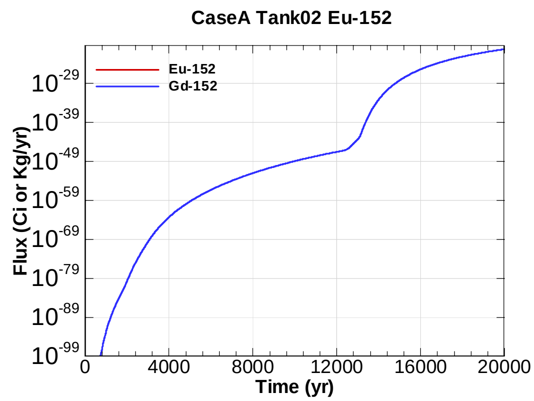

Figure A.1-116 - Water Table Flux for CaseA Tank02 Eu-152

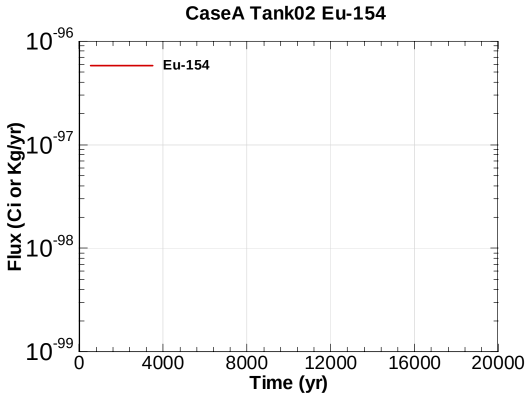

Figure A.1-117 - Water Table Flux for CaseA Tank02 Eu-154

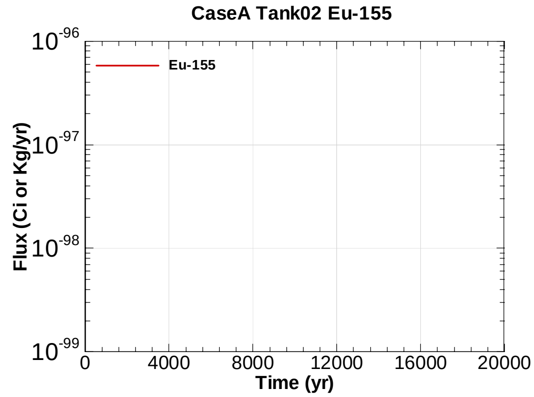

Figure A.1-118 - Water Table Flux for CaseA Tank02 Eu-155

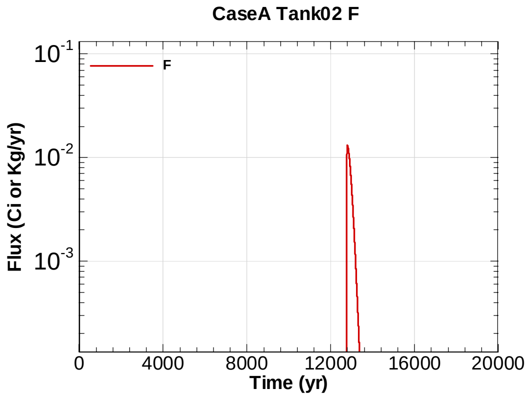

Figure A.1-119 - Water Table Flux for CaseA Tank02 F

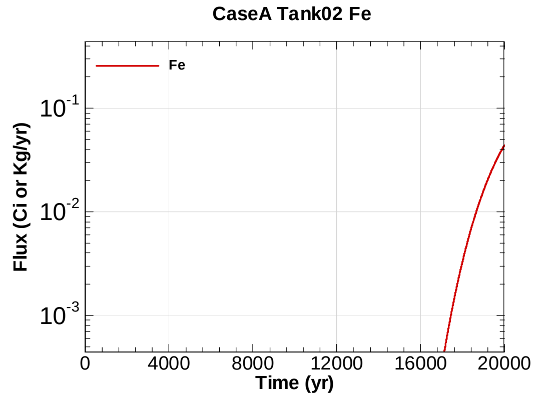

Figure A.1-120 - Water Table Flux for CaseA Tank02 Fe

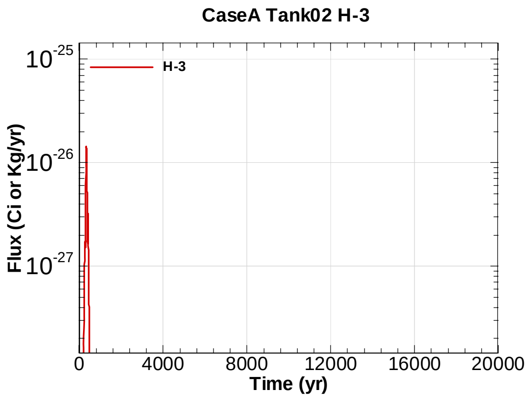

Figure A.1-121 - Water Table Flux for CaseA Tank02 H-3

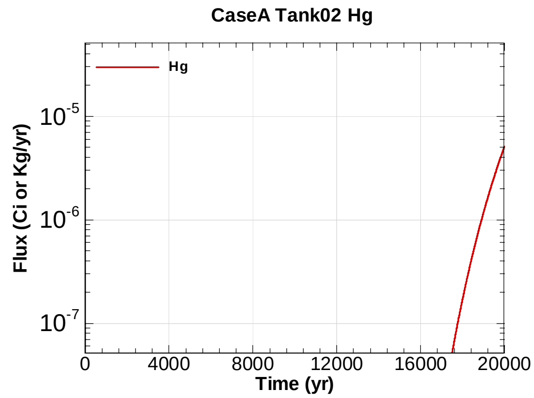

Figure A.1-122 - Water Table Flux for CaseA Tank02 Hg

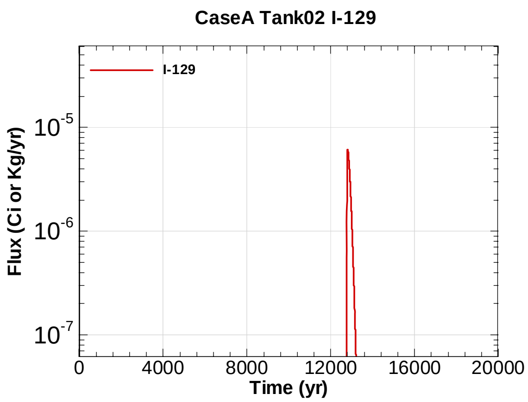

Figure A.1-123 - Water Table Flux for CaseA Tank02 I-129

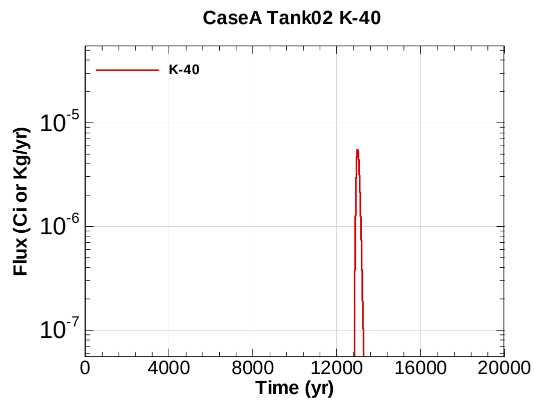

Figure A.1-124 - Water Table Flux for CaseA Tank02 K-40

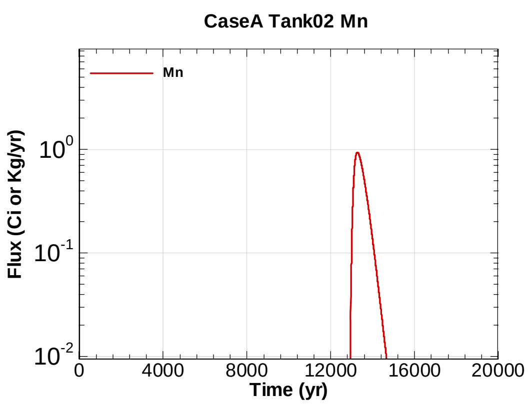

Figure A.1-125 - Water Table Flux for CaseA Tank02 Mn

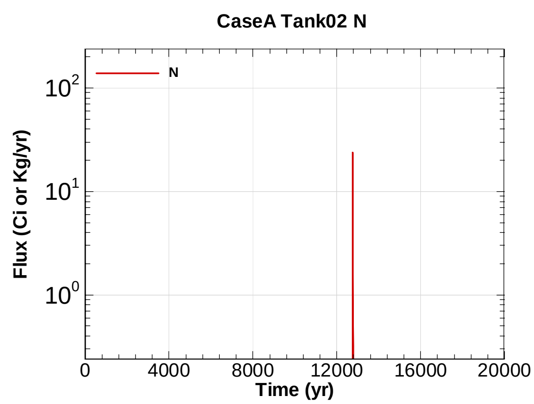

Figure A.1-126 - Water Table Flux for CaseA Tank02 N

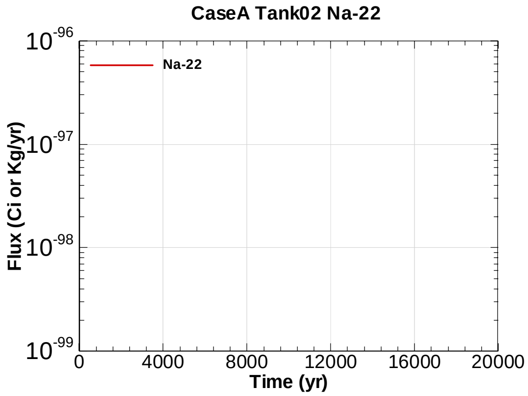

Figure A.1-127 - Water Table Flux for CaseA Tank02 Na-22

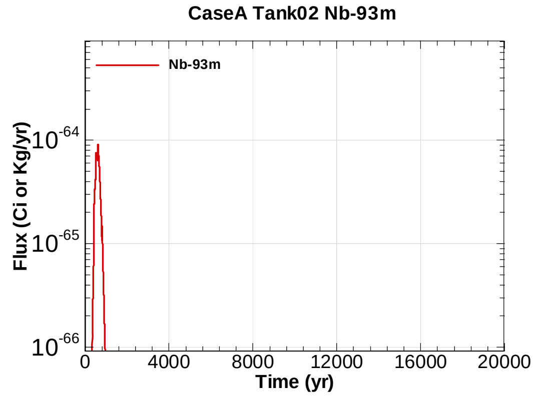

Figure A.1-128 - Water Table Flux for CaseA Tank02 Nb-93m

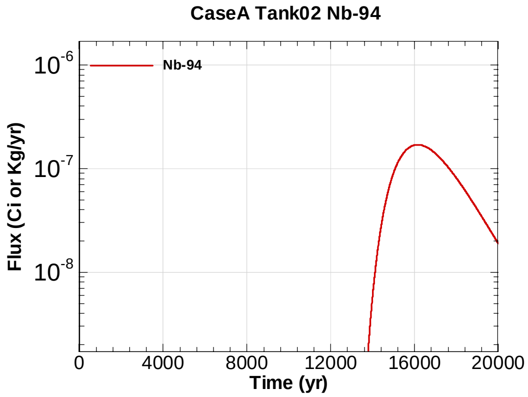

Figure A.1-129 - Water Table Flux for CaseA Tank02 Nb-94

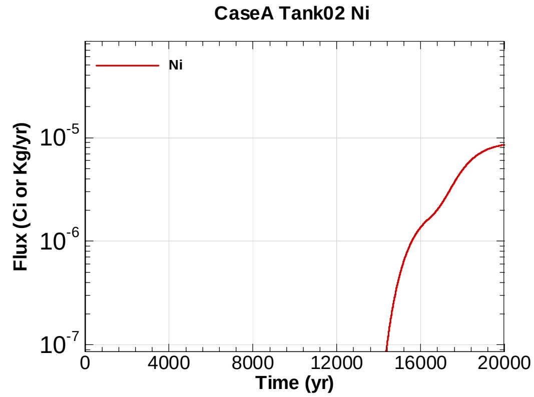

Figure A.1-130 - Water Table Flux for CaseA Tank02 Ni

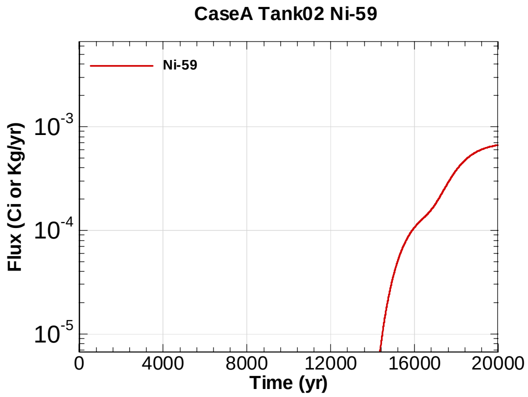

Figure A.1-131 - Water Table Flux for CaseA Tank02 Ni-59

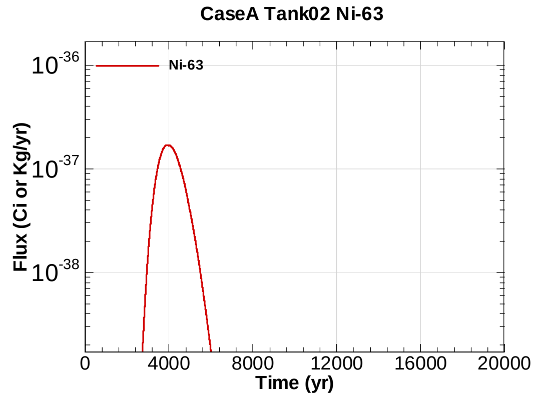

Figure A.1-132 - Water Table Flux for CaseA Tank02 Ni-63

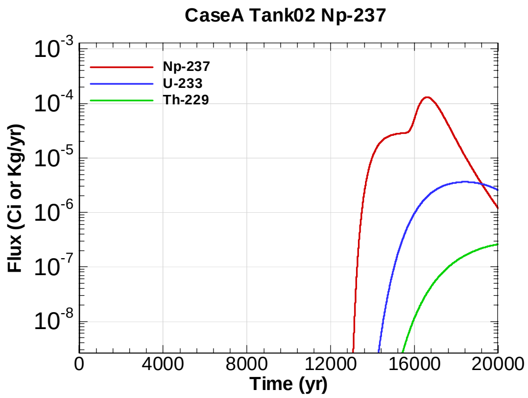

Figure A.1-133 - Water Table Flux for CaseA Tank02 Np-237

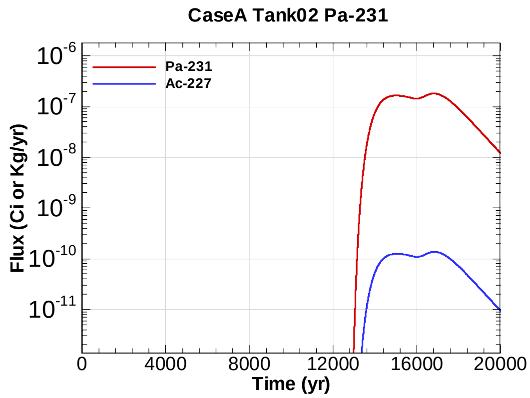

Figure A.1-134 - Water Table Flux for CaseA Tank02 Pa-231

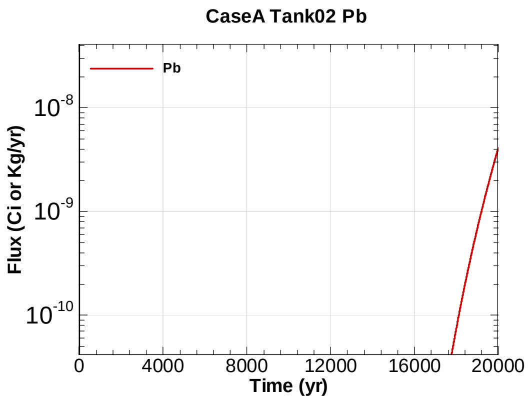

Figure A.1-135 - Water Table Flux for CaseA Tank02 Pb

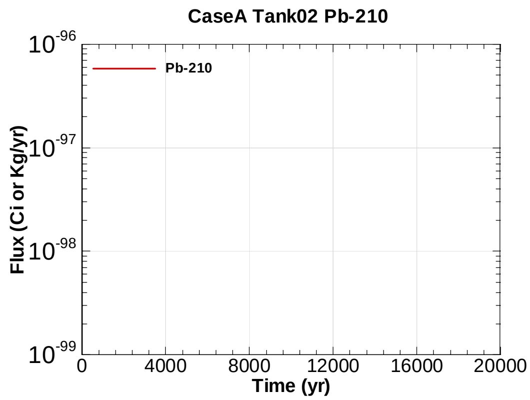

Figure A.1-136 - Water Table Flux for CaseA Tank02 Pb-210

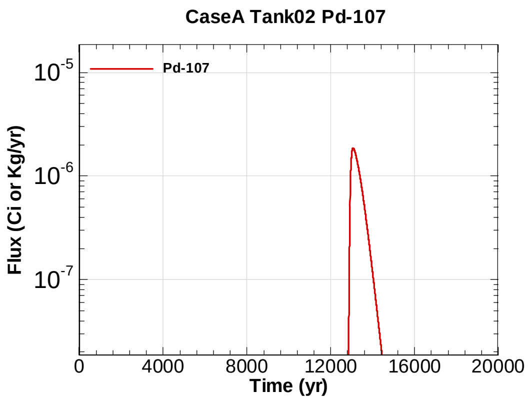

Figure A.1-137 - Water Table Flux for CaseA Tank02 Pd-107

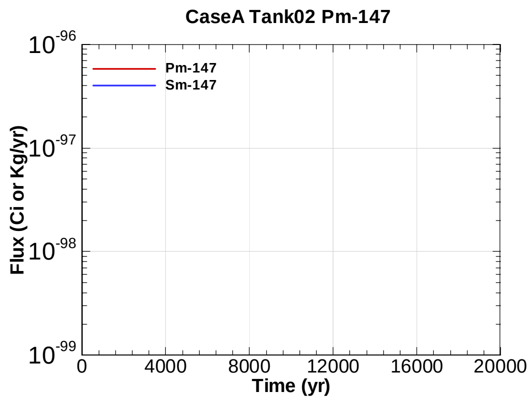

Figure A.1-138 - Water Table Flux for CaseA Tank02 Pm-147

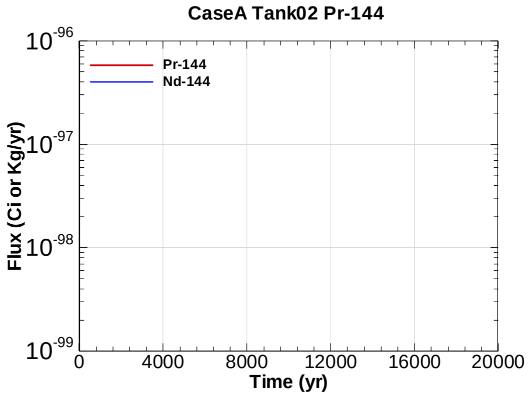

Figure A.1-139 - Water Table Flux for CaseA Tank02 Pr-144

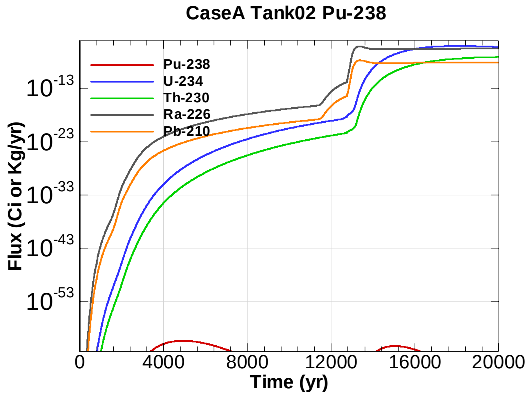

Figure A.1-140 - Water Table Flux for CaseA Tank02 Pu-238

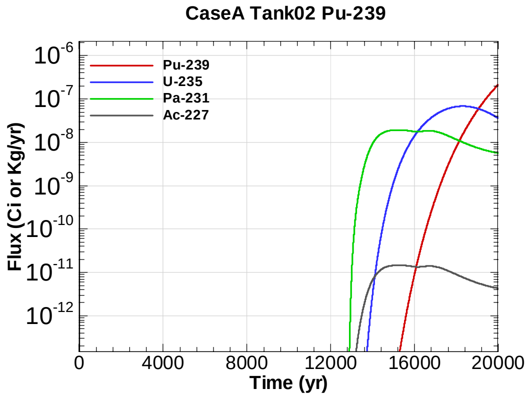

Figure A.1-141 - Water Table Flux for CaseA Tank02 Pu-239

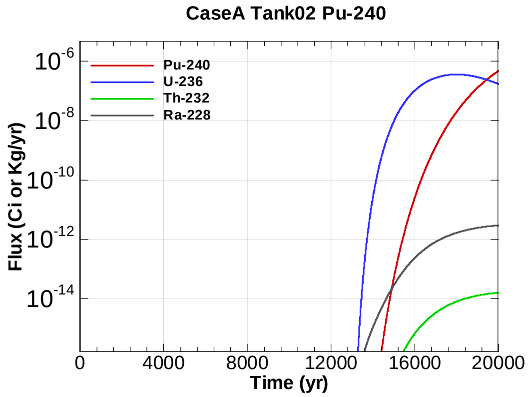

Figure A.1-142 - Water Table Flux for CaseA Tank02 Pu-240

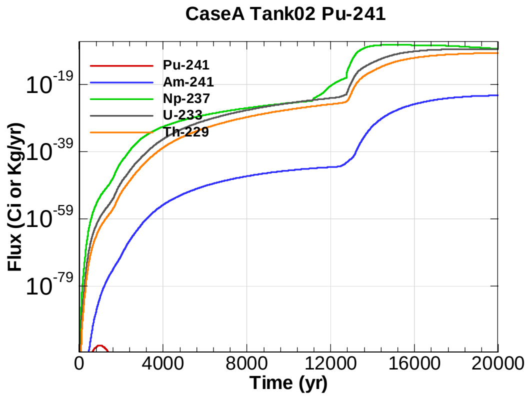

Figure A.1-143 - Water Table Flux for CaseA Tank02 Pu-241

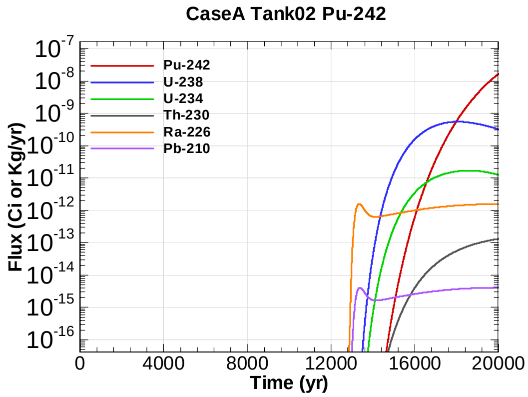

Figure A.1-144 - Water Table Flux for CaseA Tank02 Pu-242

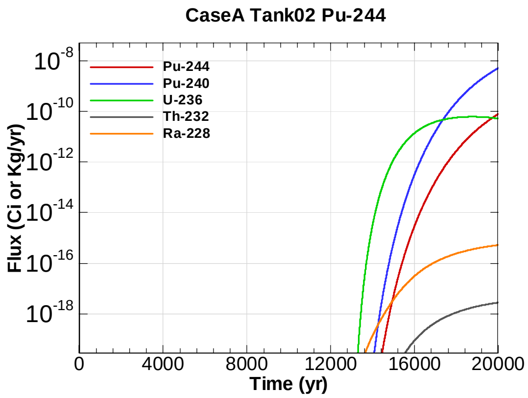

Figure A.1-145 - Water Table Flux for CaseA Tank02 Pu-244

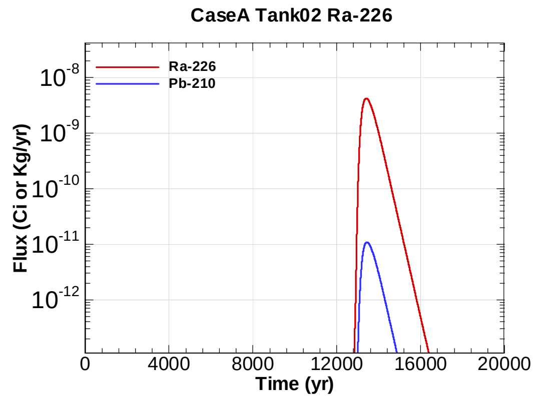

Figure A.1-146 - Water Table Flux for CaseA Tank02 Ra-226

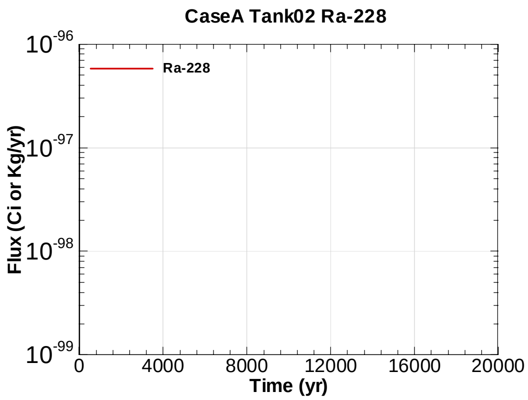

Figure A.1-147 - Water Table Flux for CaseA Tank02 Ra-228

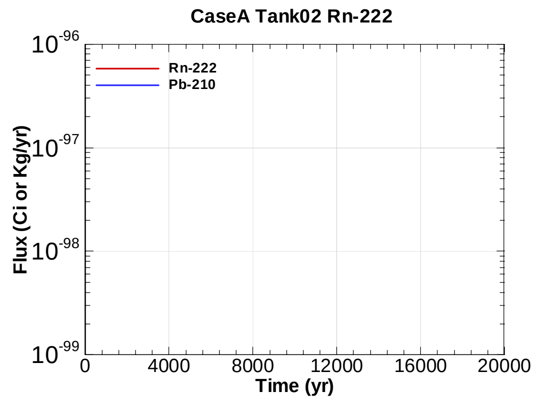

Figure A.1-148 - Water Table Flux for CaseA Tank02 Rn-222

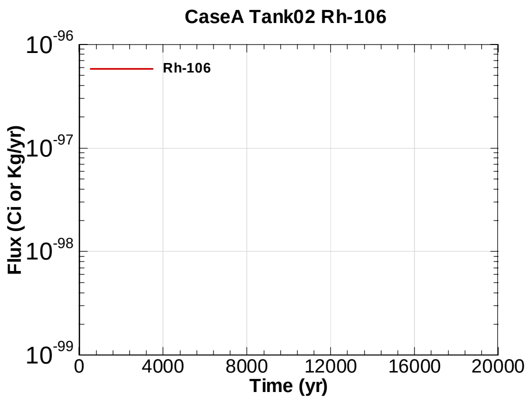

Figure A.1-149 - Water Table Flux for CaseA Tank02 Rh-106

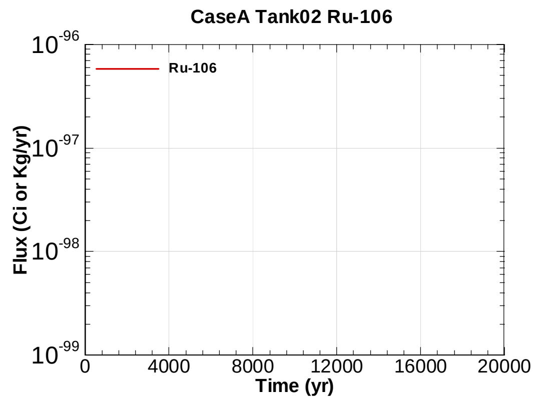

Figure A.1-150 - Water Table Flux for CaseA Tank02 Ru-106

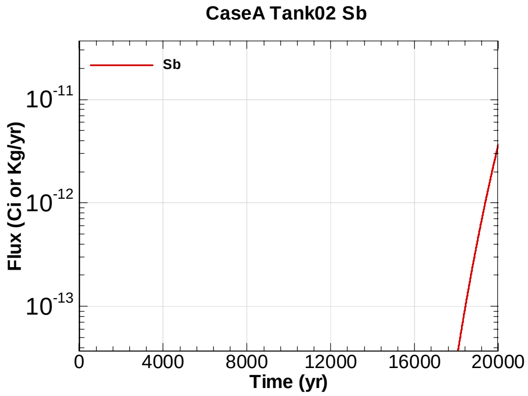

Figure A.1-151 - Water Table Flux for CaseA Tank02 Sb

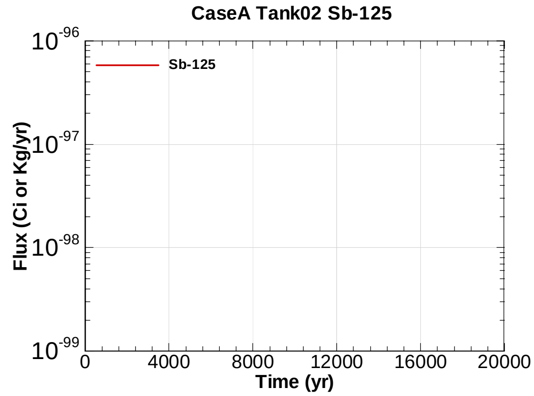

Figure A.1-152 - Water Table Flux for CaseA Tank02 Sb-125

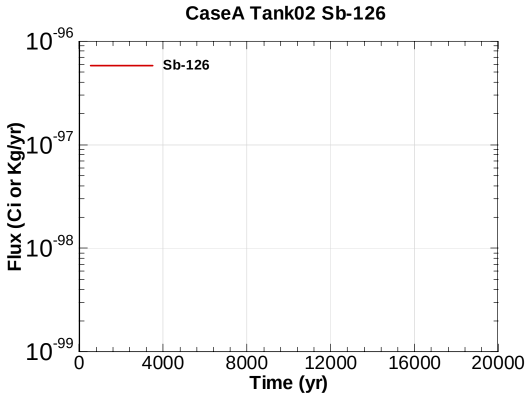

Figure A.1-153 - Water Table Flux for CaseA Tank02 Sb-126

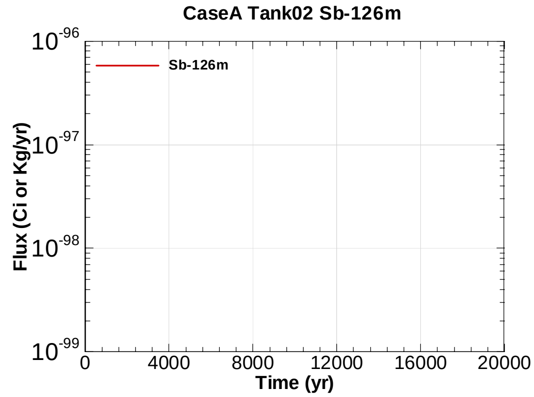

Figure A.1-154 - Water Table Flux for CaseA Tank02 Sb-126m

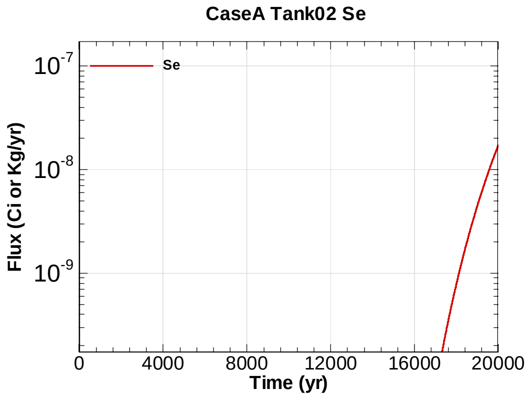

Figure A.1-155 - Water Table Flux for CaseA Tank02 Se

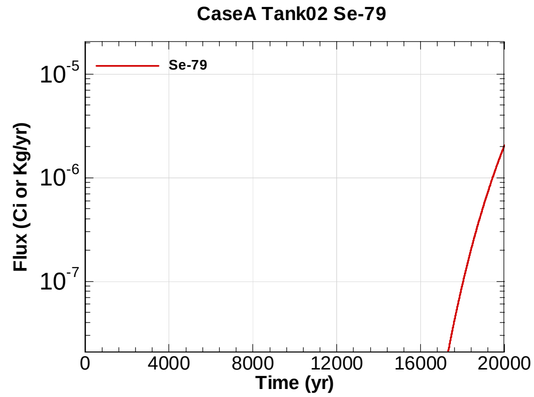

Figure A.1-156 - Water Table Flux for CaseA Tank02 Se-79

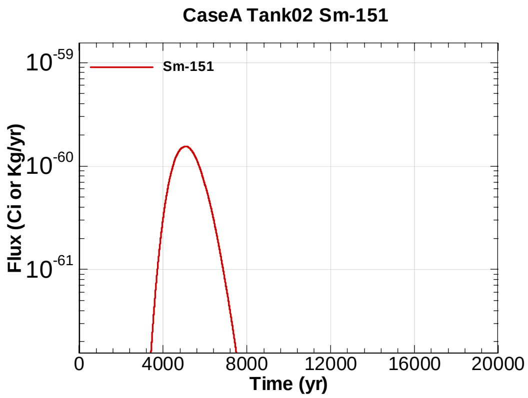

Figure A.1-157 - Water Table Flux for CaseA Tank02 Sm-151

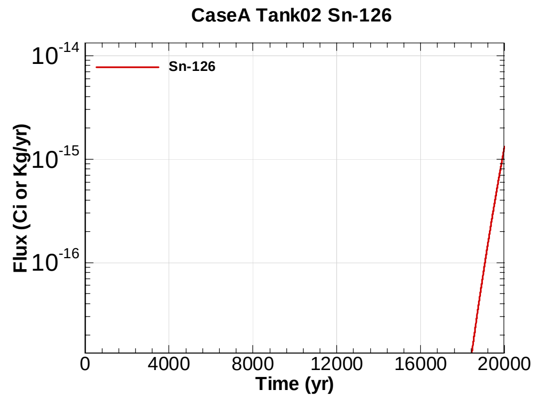

Figure A.1-158 - Water Table Flux for CaseA Tank02 Sn-126

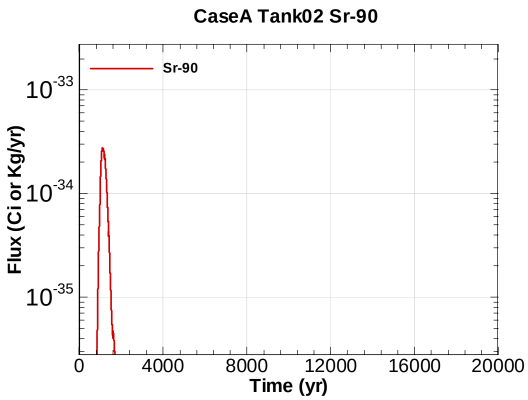

Figure A.1-159 - Water Table Flux for CaseA Tank02 Sr-90

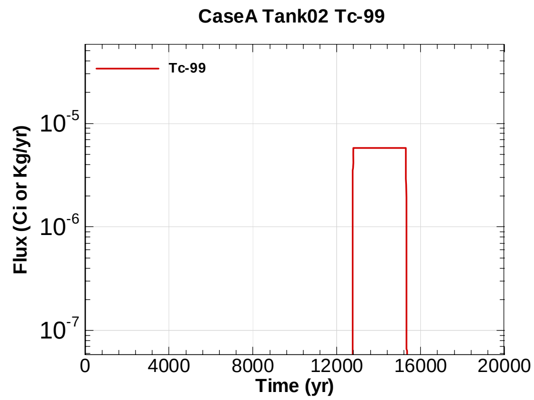

Figure A.1-160 - Water Table Flux for CaseA Tank02 Tc-99

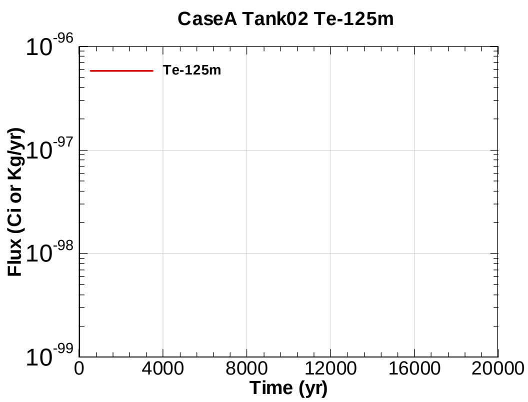

Figure A.1-161 - Water Table Flux for CaseA Tank02 Te-125m

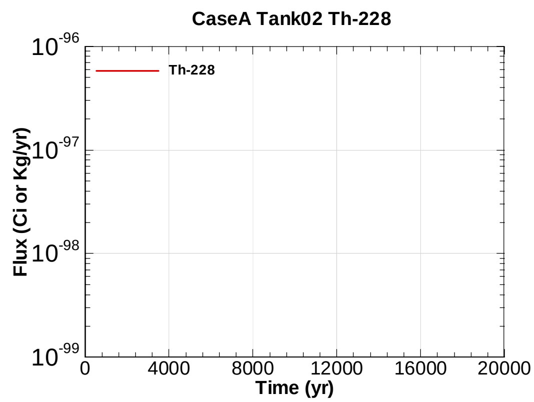

Figure A.1-162 - Water Table Flux for CaseA Tank02 Th-228

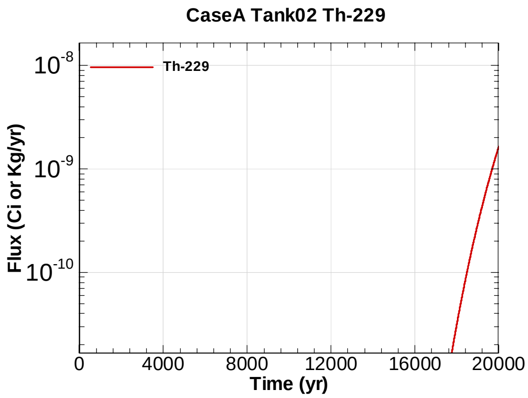

Figure A.1-163 - Water Table Flux for CaseA Tank02 Th-229

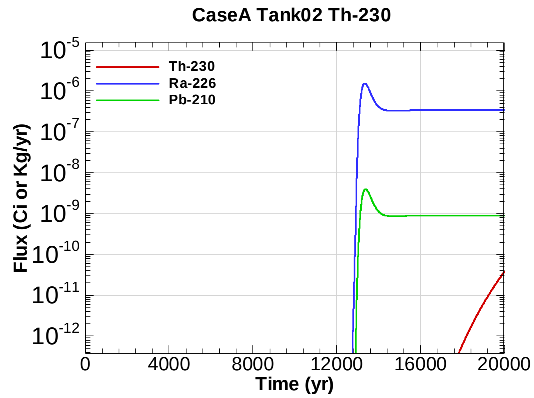

Figure A.1-164 - Water Table Flux for CaseA Tank02 Th-230

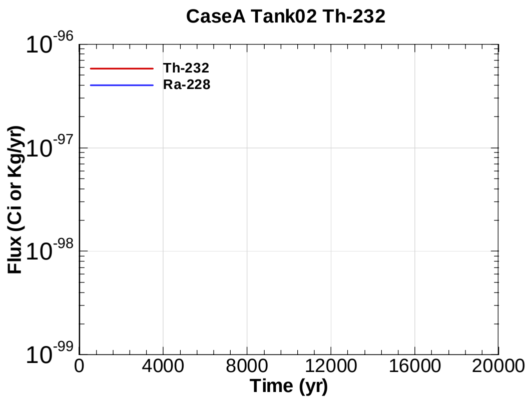

Figure A.1-165 - Water Table Flux for CaseA Tank02 Th-232

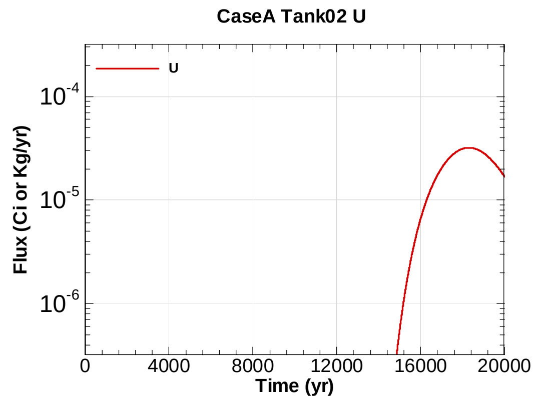

Figure A.1-166 - Water Table Flux for CaseA Tank02 U

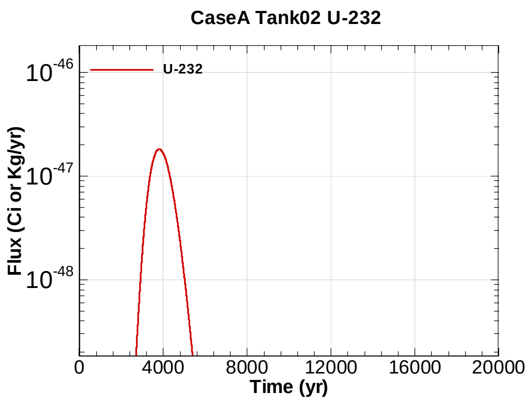

Figure A.1-167 - Water Table Flux for CaseA Tank02 U-232

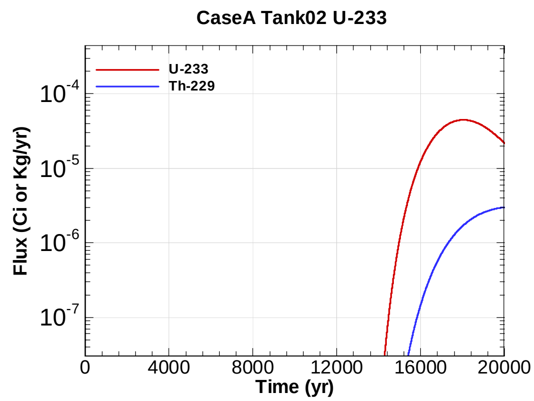

Figure A.1-168 - Water Table Flux for CaseA Tank02 U-233

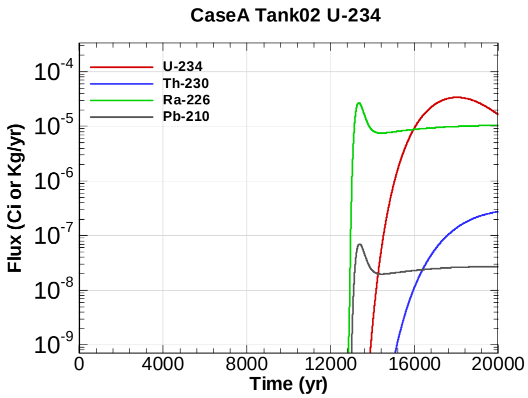

Figure A.1-169 - Water Table Flux for CaseA Tank02 U-234

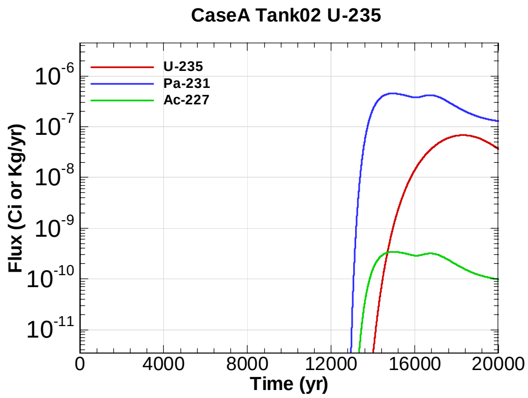

Figure A.1-170 - Water Table Flux for CaseA Tank02 U-235

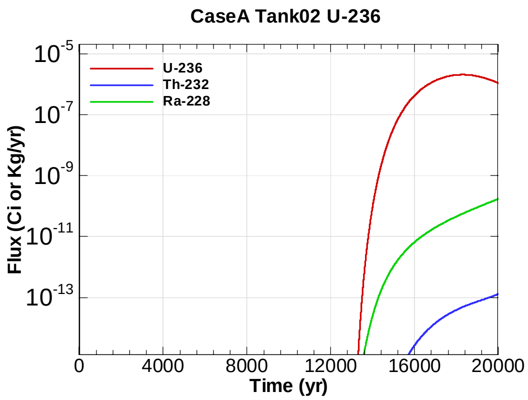

Figure A.1-171 - Water Table Flux for CaseA Tank02 U-236

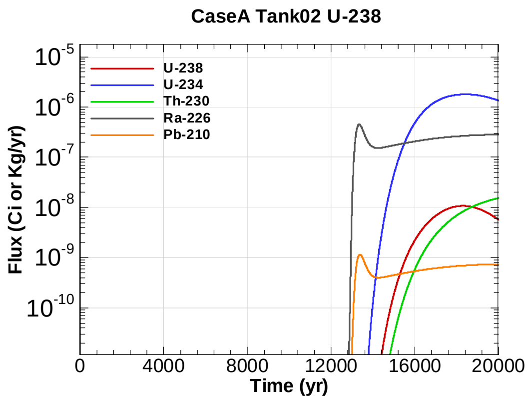

Figure A.1-172 - Water Table Flux for CaseA Tank02 U-238

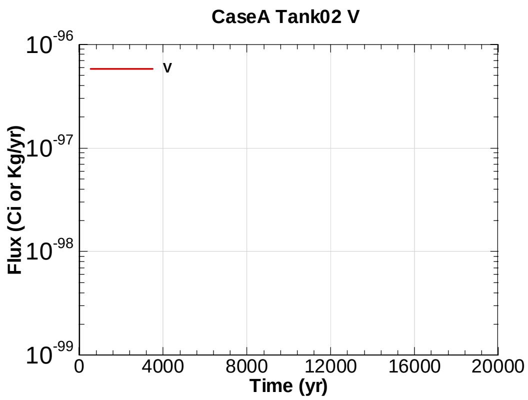

Figure A.1-173 - Water Table Flux for CaseA Tank02 V

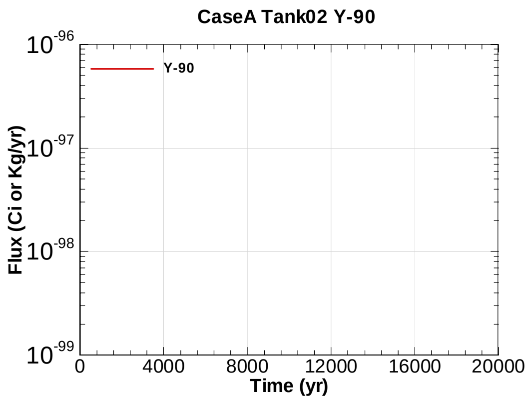

Figure A.1-174 - Water Table Flux for CaseA Tank02 Y-90

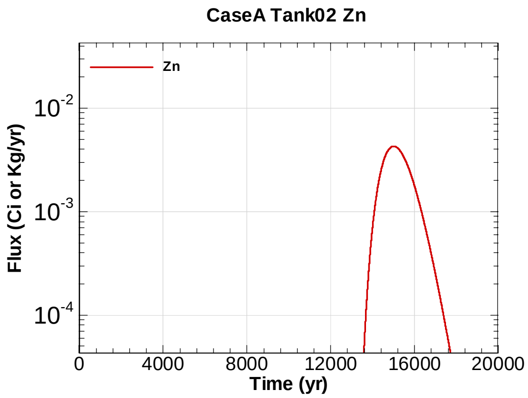

Figure A.1-175 - Water Table Flux for CaseA Tank02 Zn

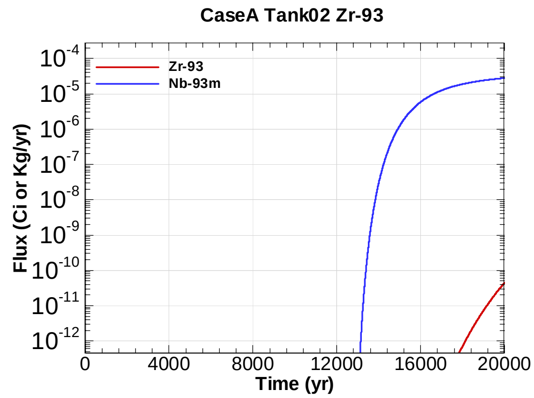

Figure A.1-176 - Water Table Flux for CaseA Tank02 Zr-93

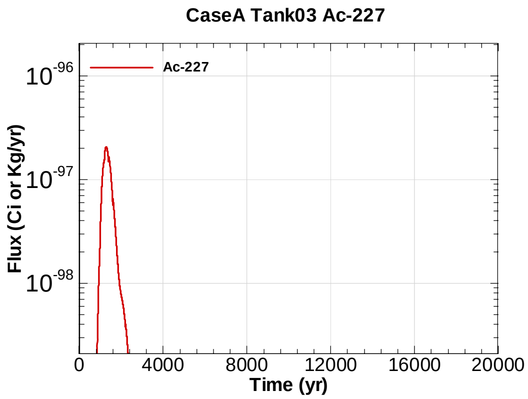

Figure A.2-177 - Water Table Flux for CaseA Tank03 Ac-227

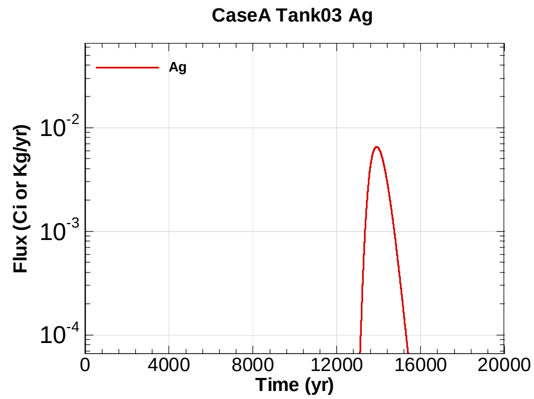

Figure A.2-178 - Water Table Flux for CaseA Tank03 Ag

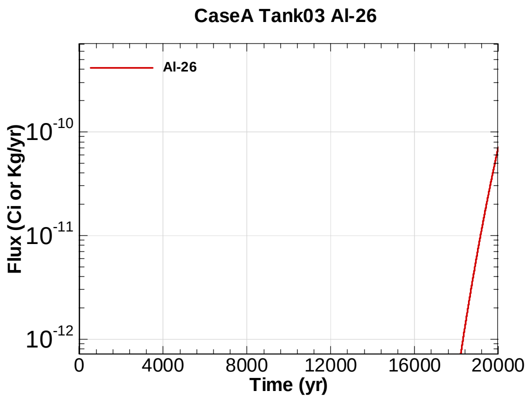

Figure A.2-179 - Water Table Flux for CaseA Tank03 Al-26

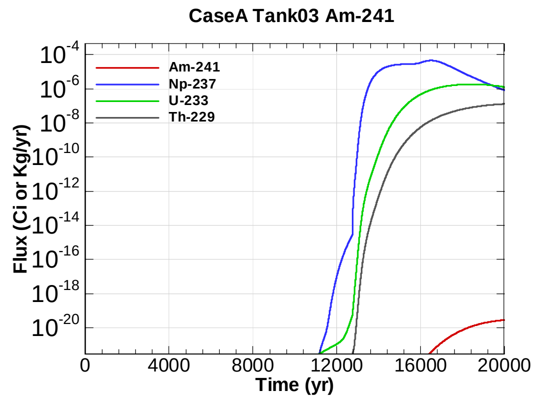

Figure A.2-180 - Water Table Flux for CaseA Tank03 Am-241

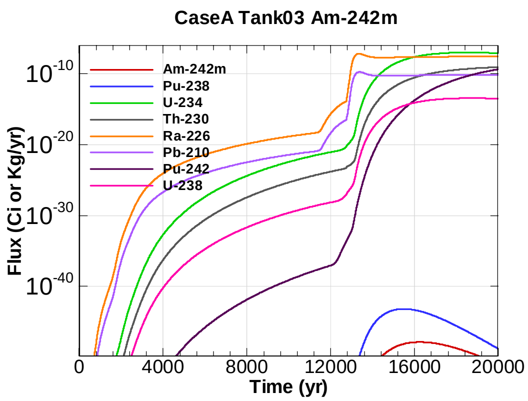

Figure A.2-181 - Water Table Flux for CaseA Tank03 Am-242m

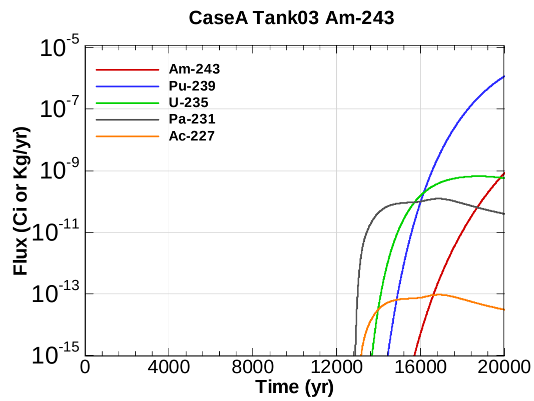

Figure A.2-182 - Water Table Flux for CaseA Tank03 Am-243

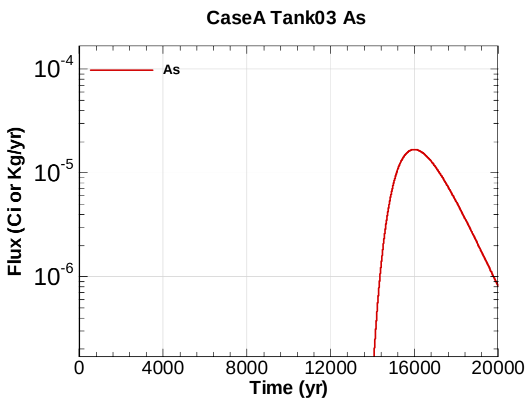

Figure A.2-183 - Water Table Flux for CaseA Tank03 As

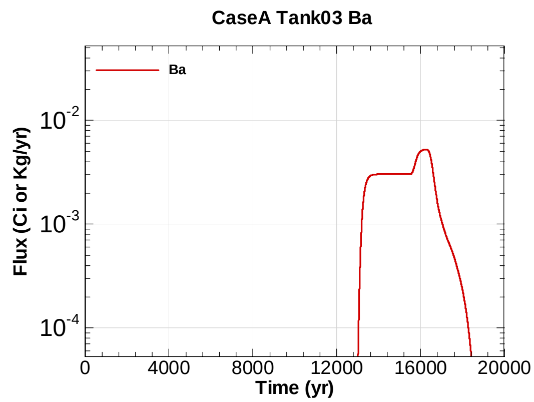

Figure A.2-184 - Water Table Flux for CaseA Tank03 Ba

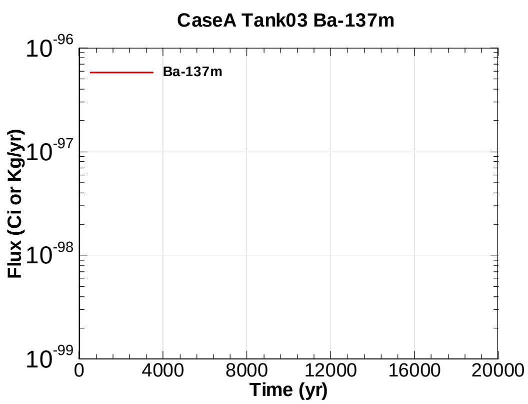

Figure A.2-185 - Water Table Flux for CaseA Tank03 Ba-137m

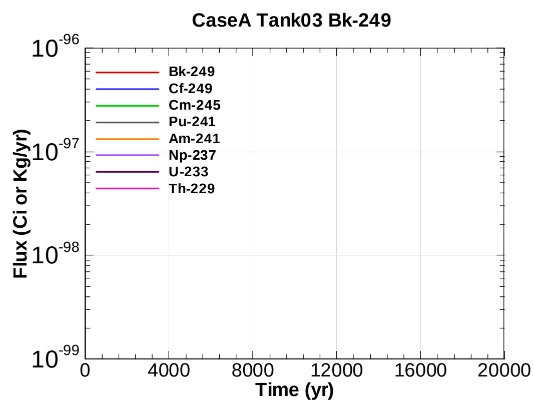

Figure A.2-186 - Water Table Flux for CaseA Tank03 Bk-249

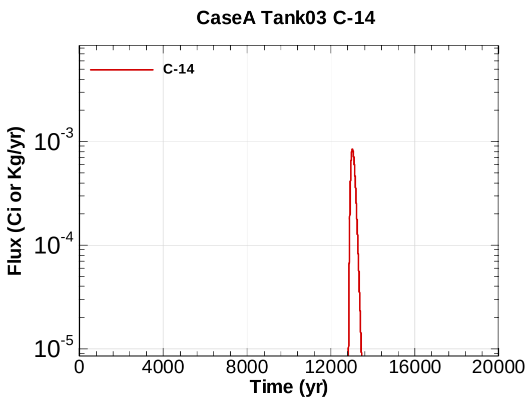

Figure A.2-187 - Water Table Flux for CaseA Tank03 C-14

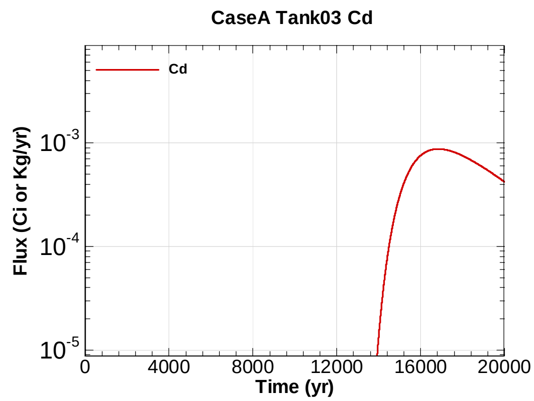

Figure A.2-188 - Water Table Flux for CaseA Tank03 Cd

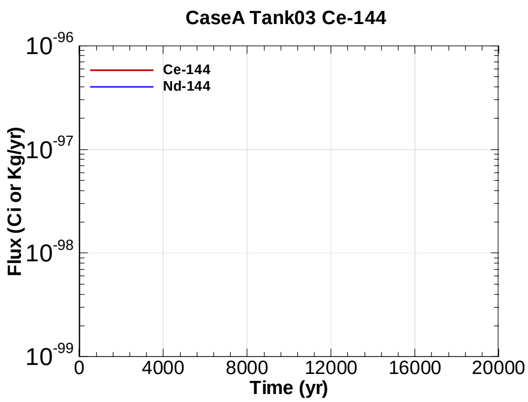

Figure A.2-189 - Water Table Flux for CaseA Tank03 Ce-144

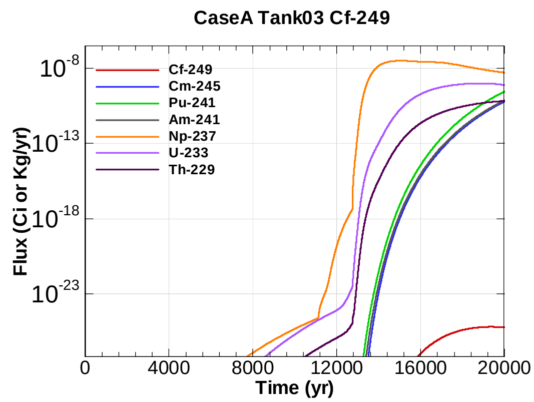

Figure A.2-190 - Water Table Flux for CaseA Tank03 Cf-249

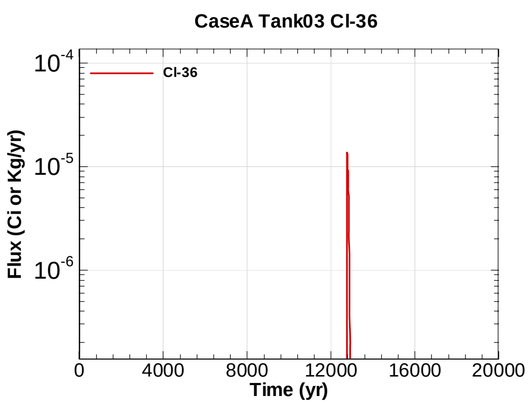

Figure A.2-191 - Water Table Flux for CaseA Tank03 Cl-36

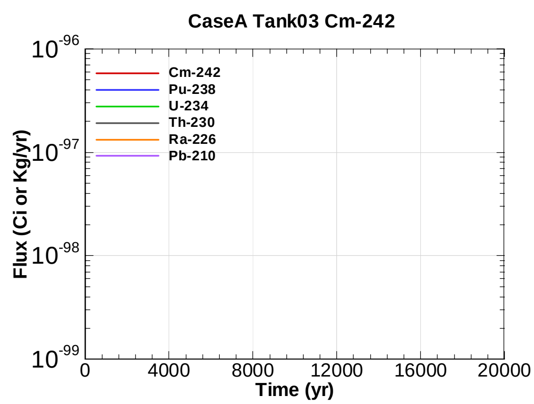

Figure A.2-192 - Water Table Flux for CaseA Tank03 Cm-242

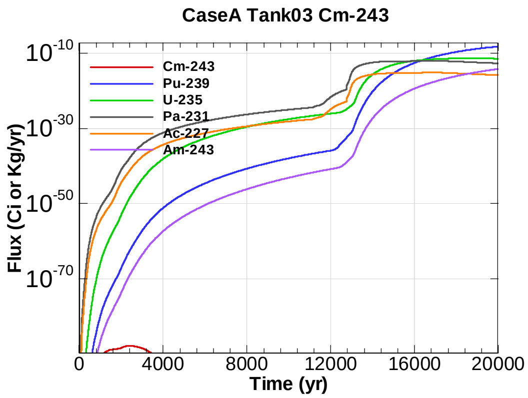

Figure A.2-193 - Water Table Flux for CaseA Tank03 Cm-243

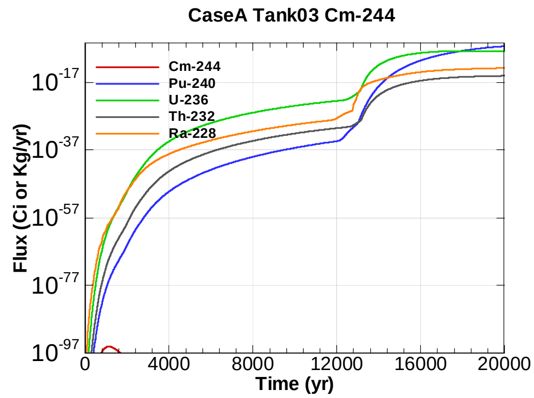

Figure A.2-194 - Water Table Flux for CaseA Tank03 Cm-244

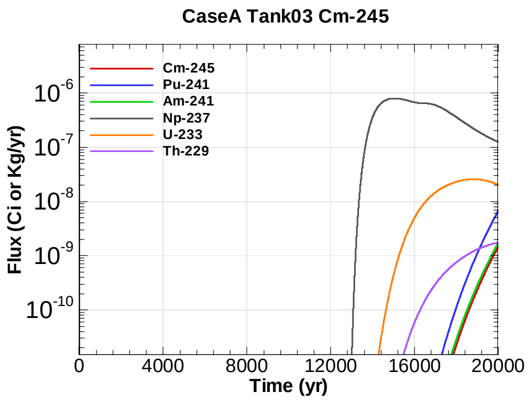

Figure A.2-195 - Water Table Flux for CaseA Tank03 Cm-245

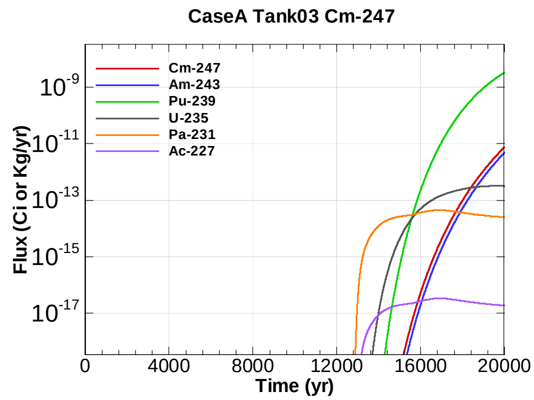

Figure A.2-196 - Water Table Flux for CaseA Tank03 Cm-247

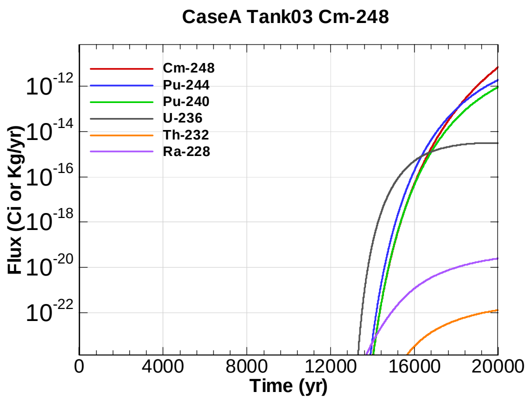

Figure A.2-197 - Water Table Flux for CaseA Tank03 Cm-248

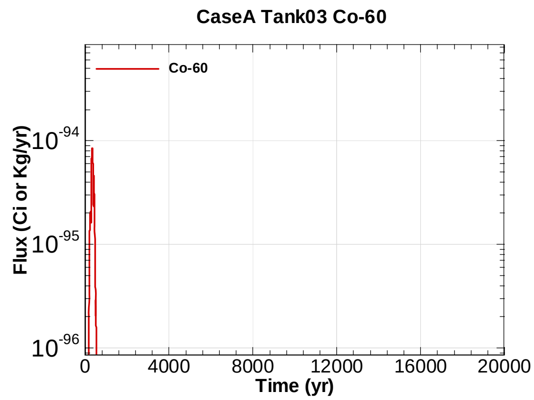

Figure A.2-198 - Water Table Flux for CaseA Tank03 Co-60

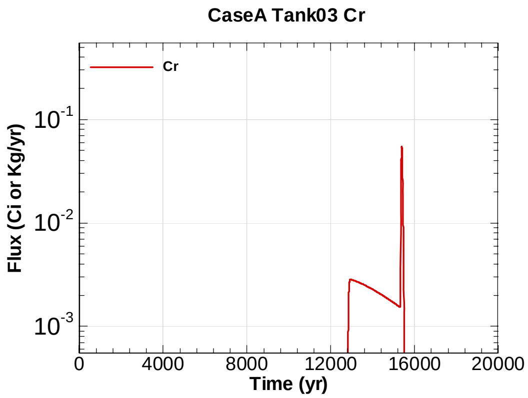

Figure A.2-199 - Water Table Flux for CaseA Tank03 Cr

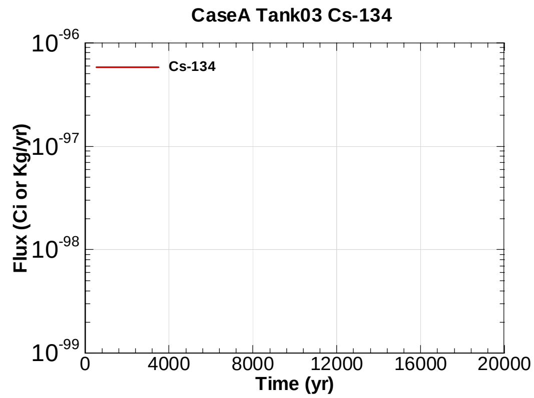

Figure A.2-200 - Water Table Flux for CaseA Tank03 Cs-134

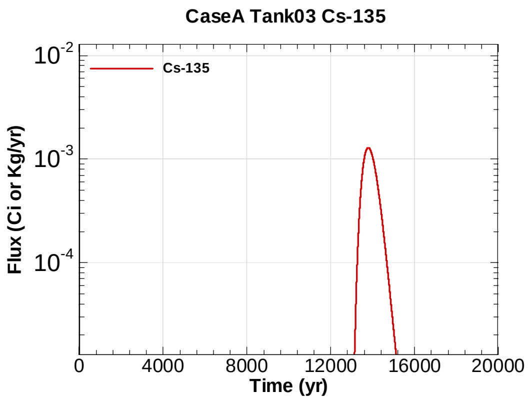

Figure A.2-201 - Water Table Flux for CaseA Tank03 Cs-135

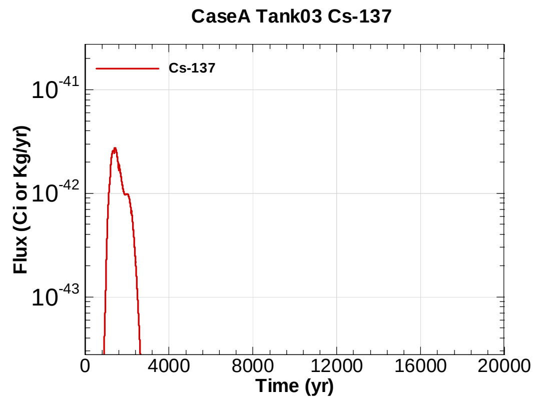

Figure A.2-202 - Water Table Flux for CaseA Tank03 Cs-137

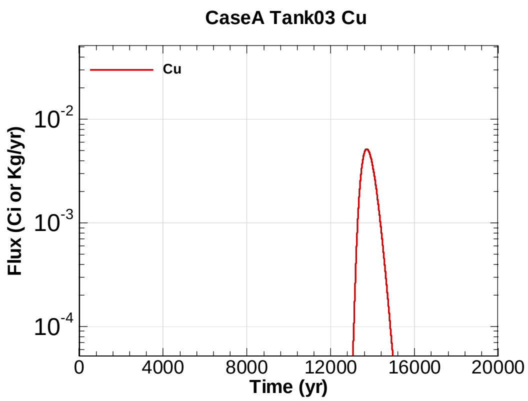

Figure A.2-203 - Water Table Flux for CaseA Tank03 Cu

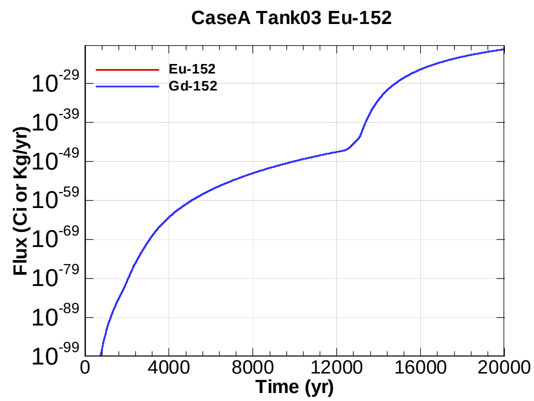

Figure A.2-204 - Water Table Flux for CaseA Tank03 Eu-152

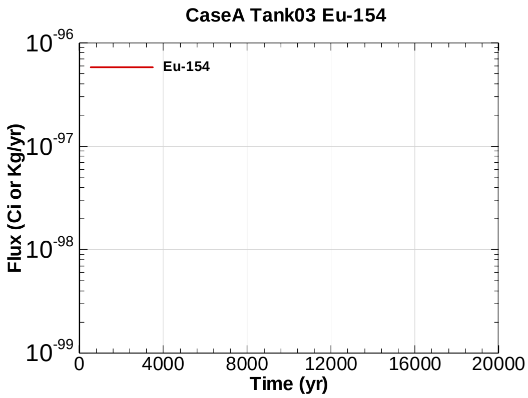

Figure A.2-205 - Water Table Flux for CaseA Tank03 Eu-154

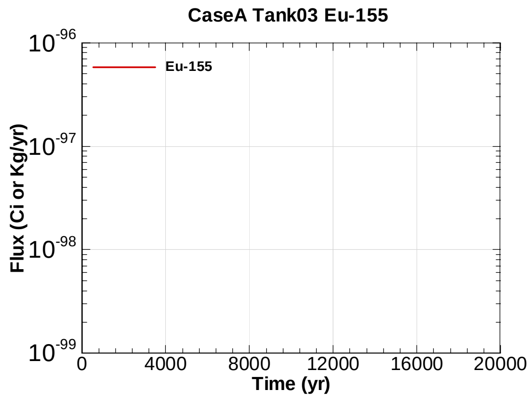

Figure A.2-206 - Water Table Flux for CaseA Tank03 Eu-155

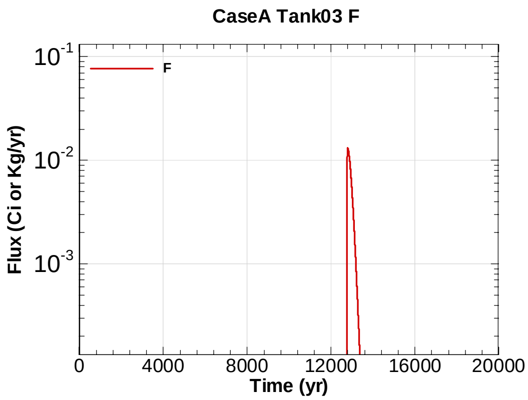

Figure A.2-207 - Water Table Flux for CaseA Tank03 F

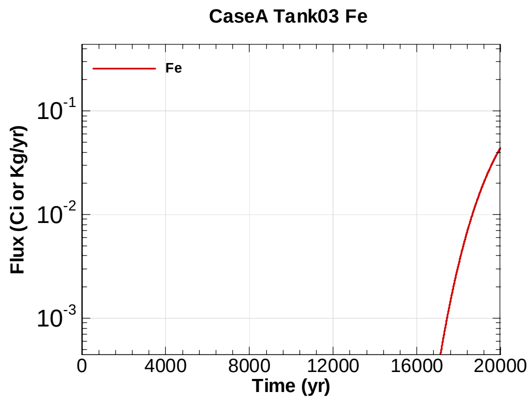

Figure A.2-208 - Water Table Flux for CaseA Tank03 Fe

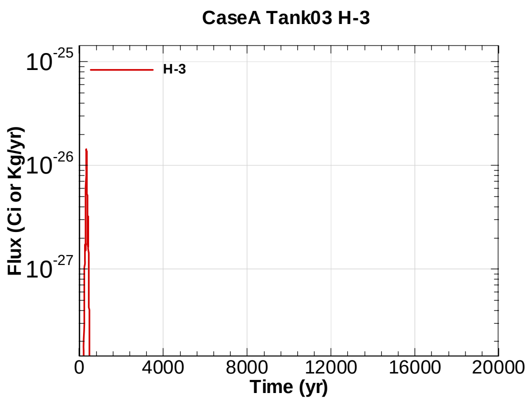

Figure A.2-209 - Water Table Flux for CaseA Tank03 H-3

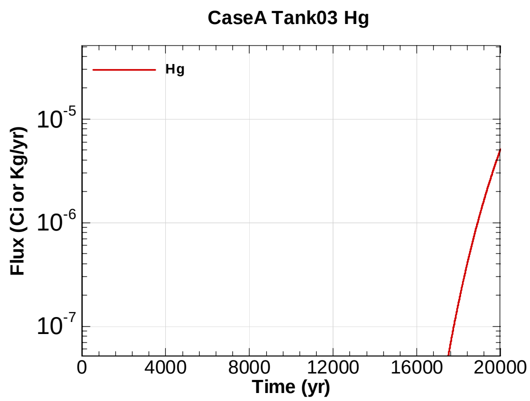

Figure A.2-210 - Water Table Flux for CaseA Tank03 Hg

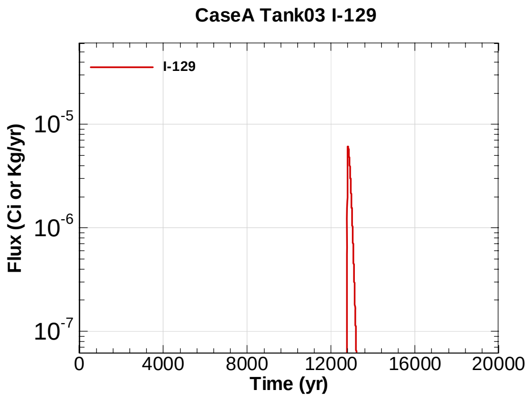

Figure A.2-211 - Water Table Flux for CaseA Tank03 I-129

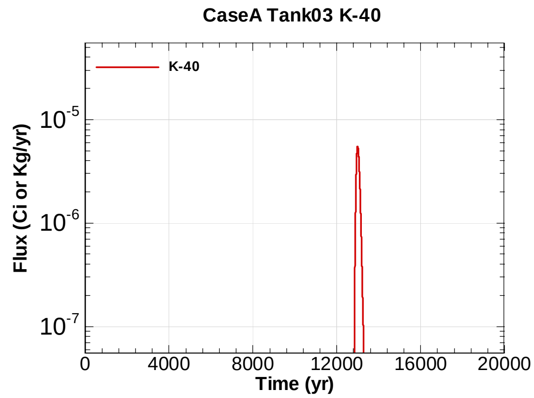

Figure A.2-212 - Water Table Flux for CaseA Tank03 K-40

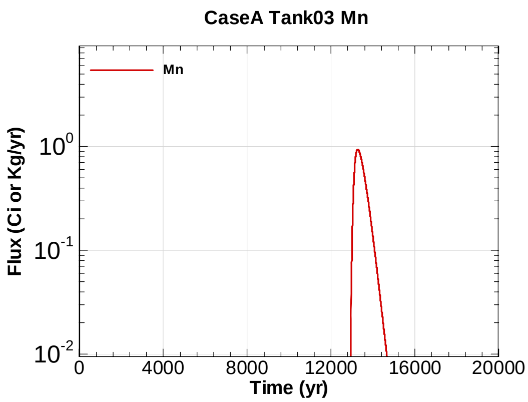

Figure A.2-213 - Water Table Flux for CaseA Tank03 Mn

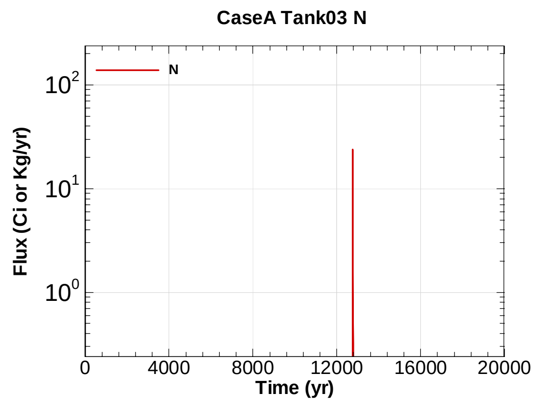

Figure A.2-214 - Water Table Flux for CaseA Tank03 N

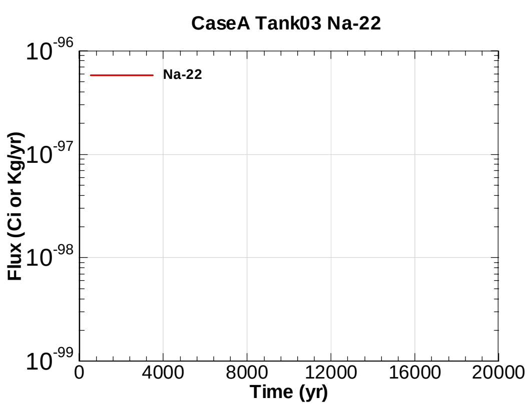

Figure A.2-215 - Water Table Flux for CaseA Tank03 Na-22

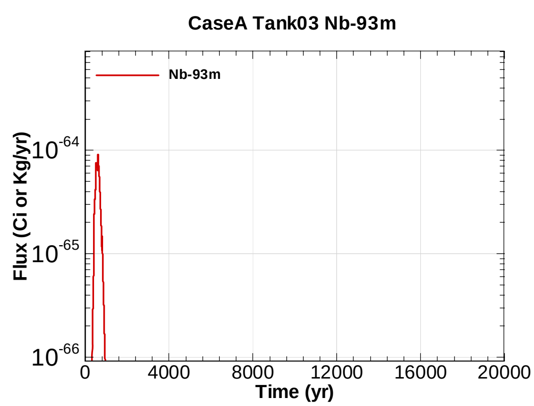

Figure A.2-216 - Water Table Flux for CaseA Tank03 Nb-93m

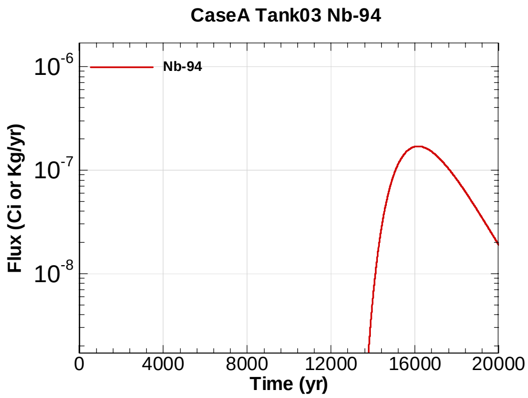

Figure A.2-217 - Water Table Flux for CaseA Tank03 Nb-94

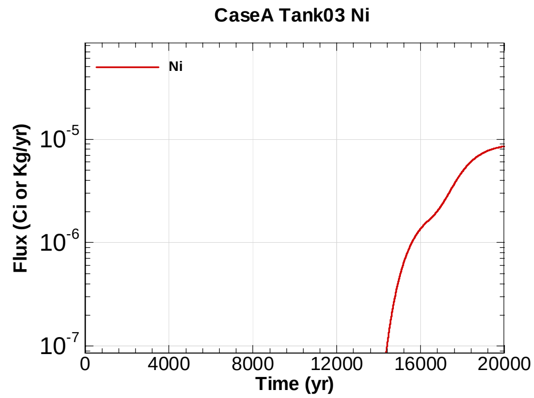

Figure A.2-218 - Water Table Flux for CaseA Tank03 Ni

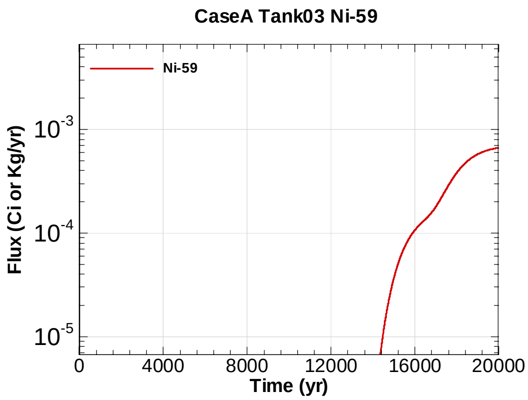

Figure A.2-219 - Water Table Flux for CaseA Tank03 Ni-59

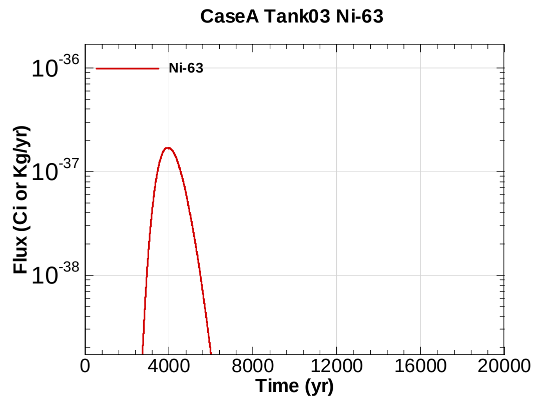

Figure A.2-220 - Water Table Flux for CaseA Tank03 Ni-63

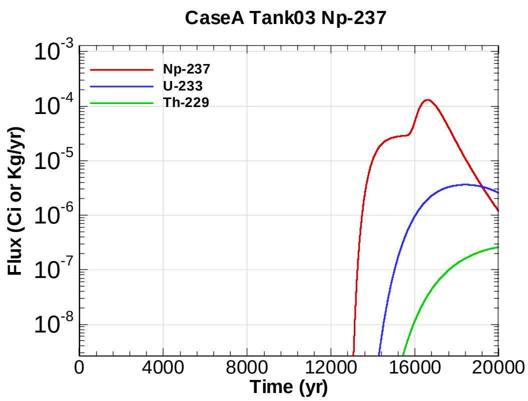

Figure A.2-221 - Water Table Flux for CaseA Tank03 Np-237

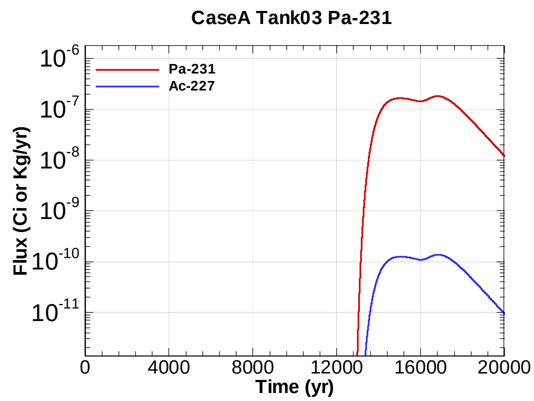

Figure A.2-222 - Water Table Flux for CaseA Tank03 Pa-231

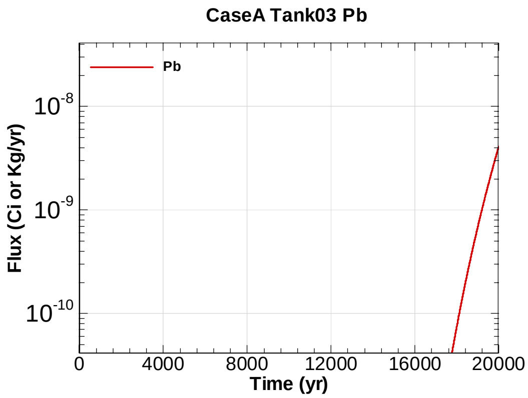

Figure A.2-223 - Water Table Flux for CaseA Tank03 Pb

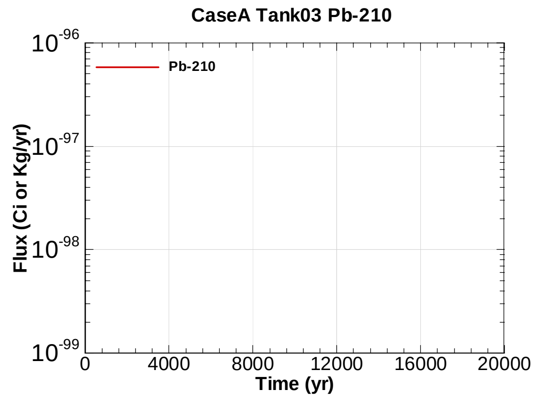

Figure A.2-224 - Water Table Flux for CaseA Tank03 Pb-210

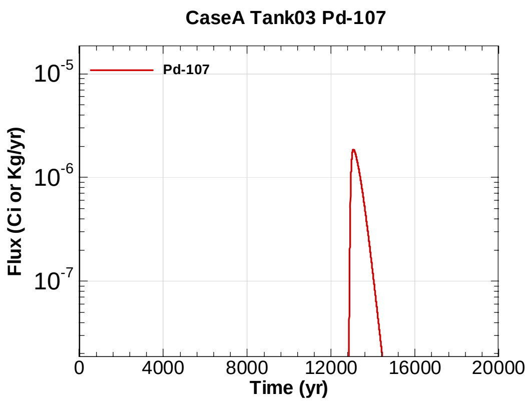

Figure A.2-225 - Water Table Flux for CaseA Tank03 Pd-107

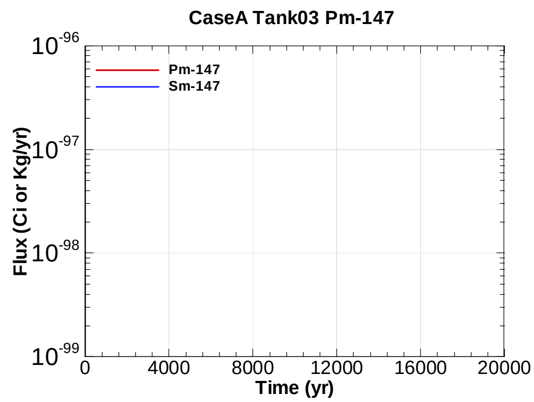

Figure A.2-226 - Water Table Flux for CaseA Tank03 Pm-147

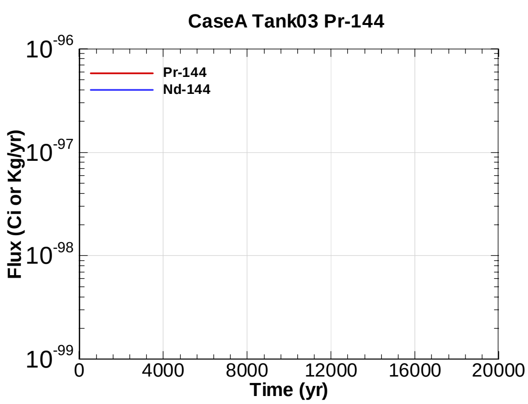

Figure A.2-227 - Water Table Flux for CaseA Tank03 Pr-144

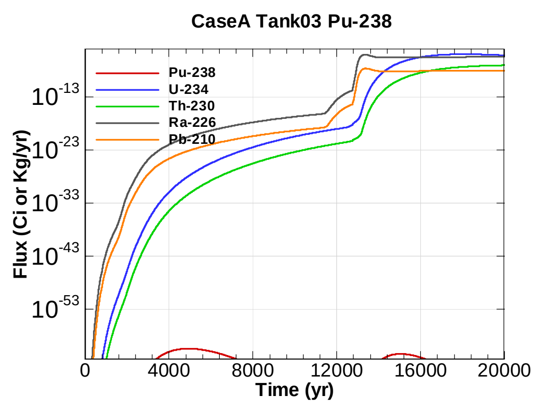

Figure A.2-228 - Water Table Flux for CaseA Tank03 Pu-238

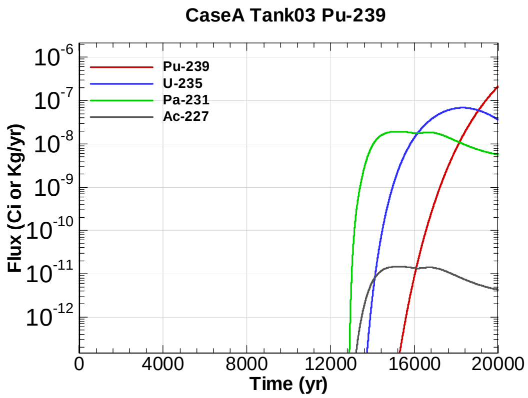

Figure A.2-229 - Water Table Flux for CaseA Tank03 Pu-239

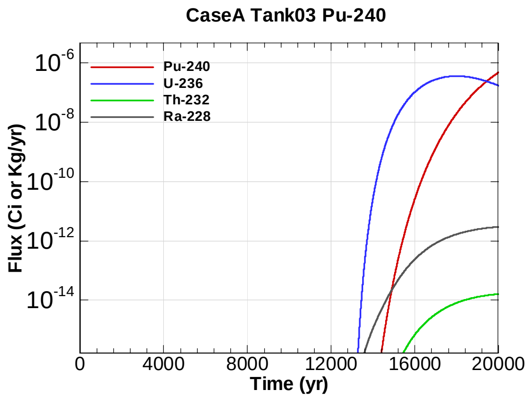

Figure A.2-230 - Water Table Flux for CaseA Tank03 Pu-240

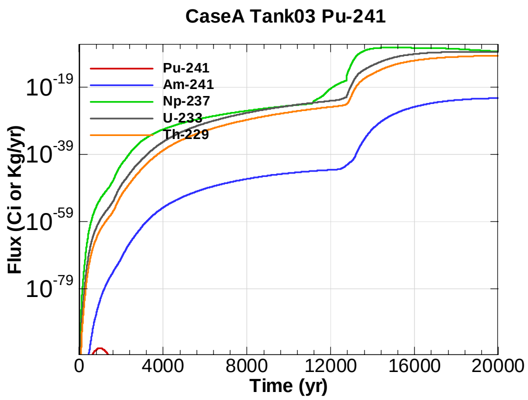

Figure A.2-231 - Water Table Flux for CaseA Tank03 Pu-241

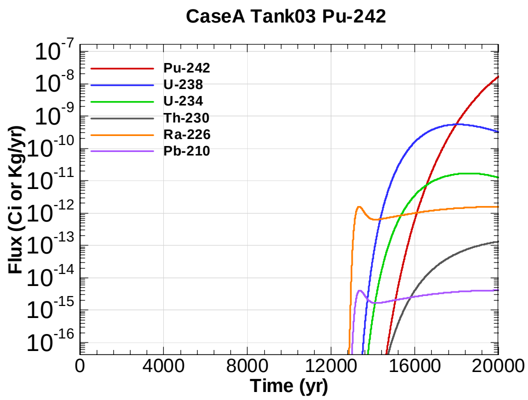

Figure A.2-232 - Water Table Flux for CaseA Tank03 Pu-242

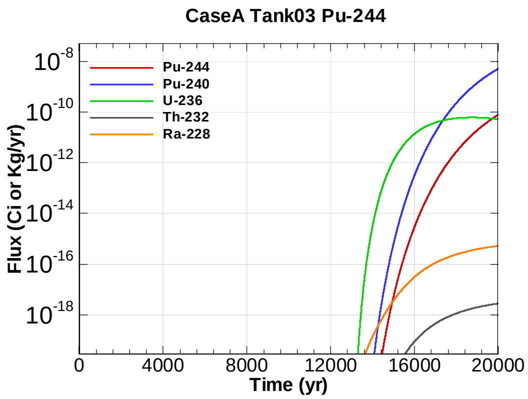

Figure A.2-233 - Water Table Flux for CaseA Tank03 Pu-244

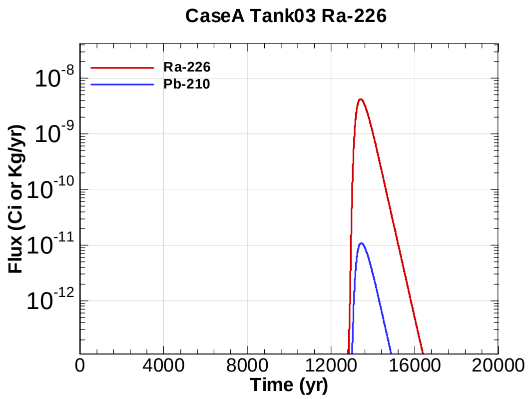

Figure A.2-234 - Water Table Flux for CaseA Tank03 Ra-226

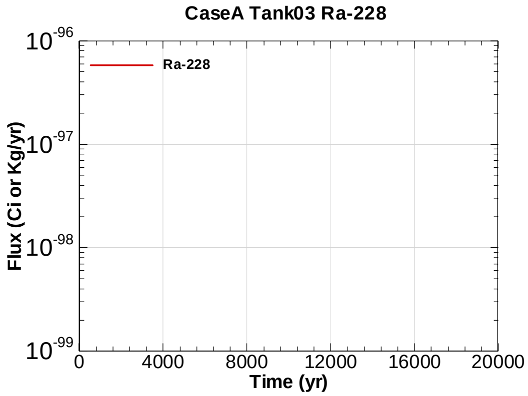

Figure A.2-235 - Water Table Flux for CaseA Tank03 Ra-228

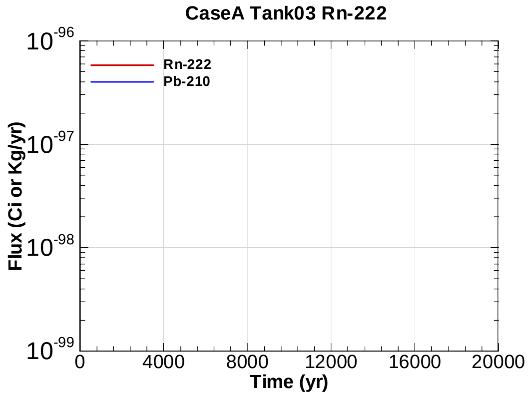

Figure A.2-236 - Water Table Flux for CaseA Tank03 Rn-222

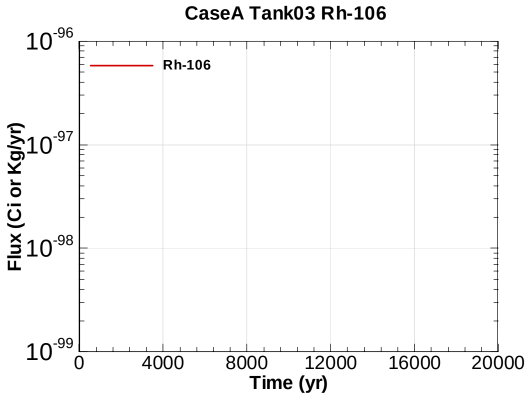

Figure A.2-237 - Water Table Flux for CaseA Tank03 Rh-106

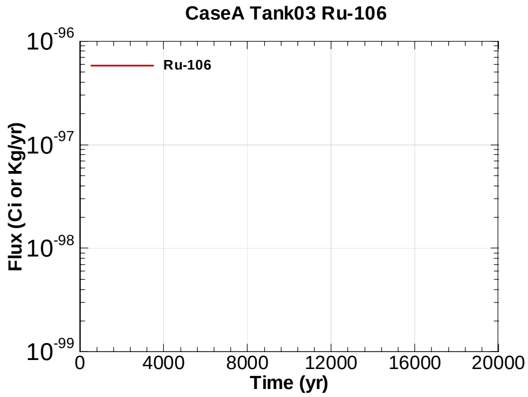

Figure A.2-238 - Water Table Flux for CaseA Tank03 Ru-106

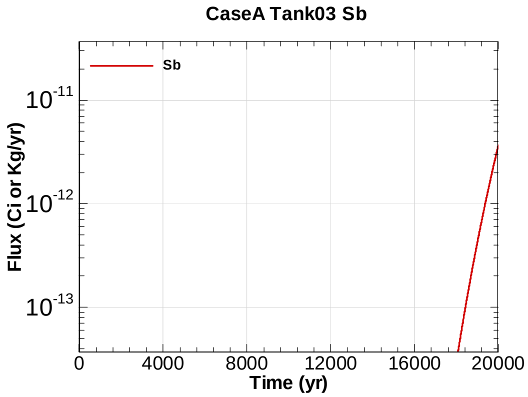

Figure A.2-239 - Water Table Flux for CaseA Tank03 Sb

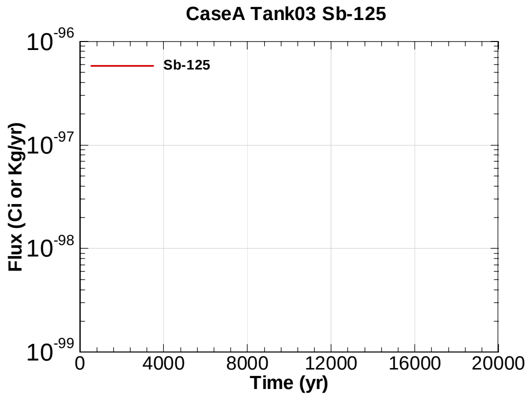

Figure A.2-240 - Water Table Flux for CaseA Tank03 Sb-125

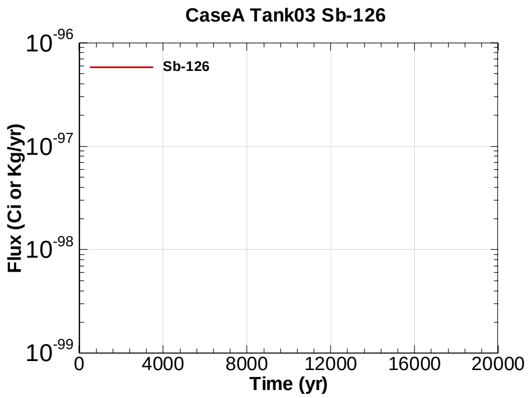

Figure A.2-241 - Water Table Flux for CaseA Tank03 Sb-126

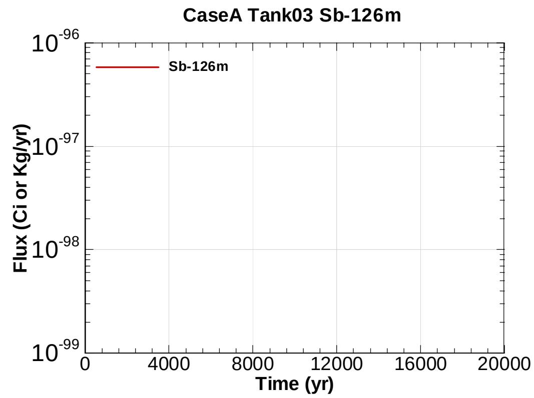

Figure A.2-242 - Water Table Flux for CaseA Tank03 Sb-126m

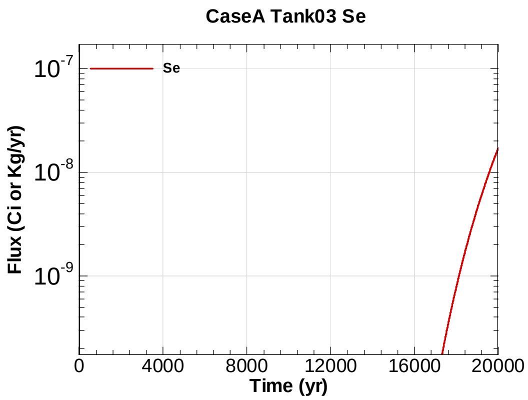

Figure A.2-243 - Water Table Flux for CaseA Tank03 Se

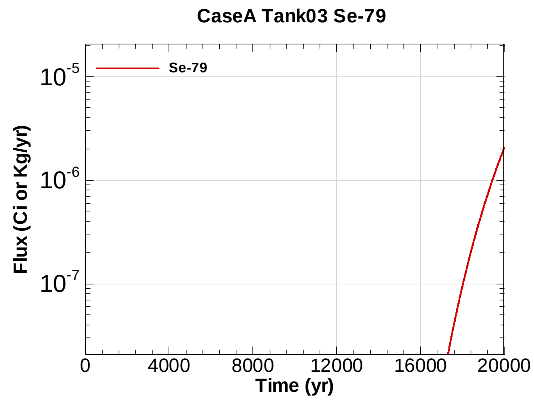

Figure A.2-244 - Water Table Flux for CaseA Tank03 Se-79

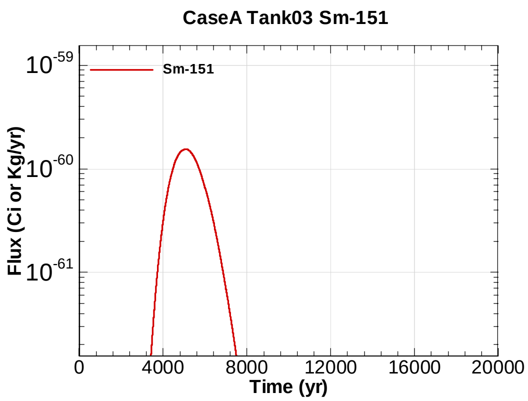

Figure A.2-245 - Water Table Flux for CaseA Tank03 Sm-151

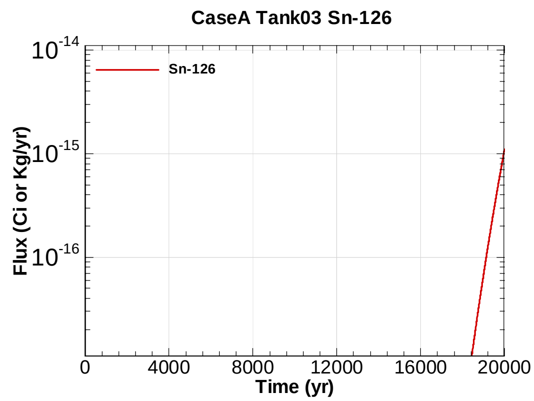

Figure A.2-246 - Water Table Flux for CaseA Tank03 Sn-126

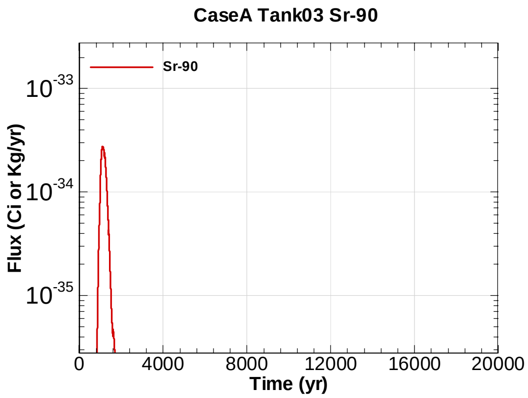

Figure A.2-247 - Water Table Flux for CaseA Tank03 Sr-90

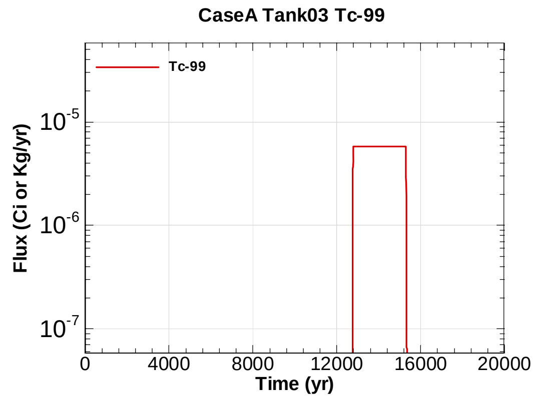

Figure A.2-248 - Water Table Flux for CaseA Tank03 Tc-99

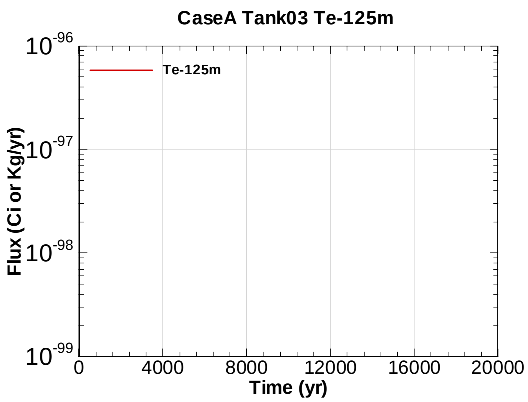

Figure A.2-249 - Water Table Flux for CaseA Tank03 Te-125m

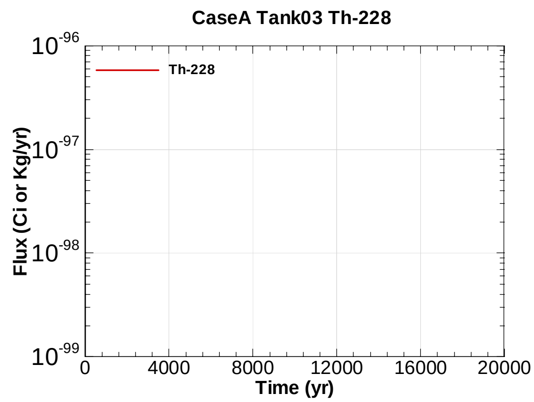

Figure A.2-250 - Water Table Flux for CaseA Tank03 Th-228

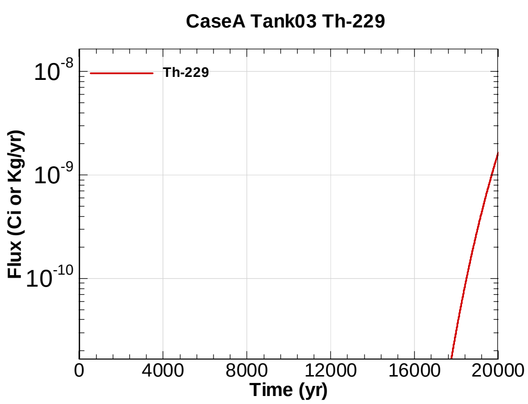

Figure A.2-251 - Water Table Flux for CaseA Tank03 Th-229

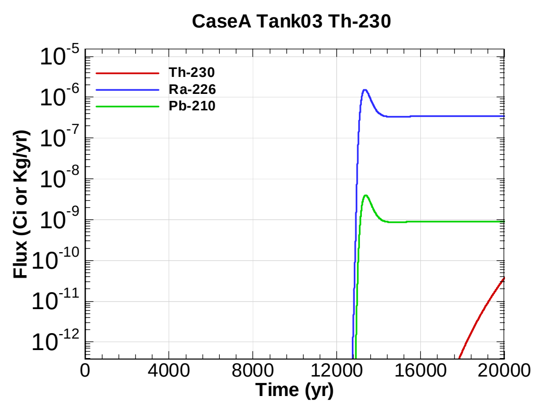

Figure A.2-252 - Water Table Flux for CaseA Tank03 Th-230

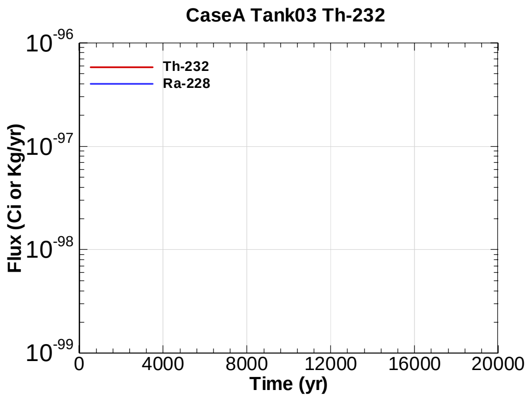

Figure A.2-253 - Water Table Flux for CaseA Tank03 Th-232

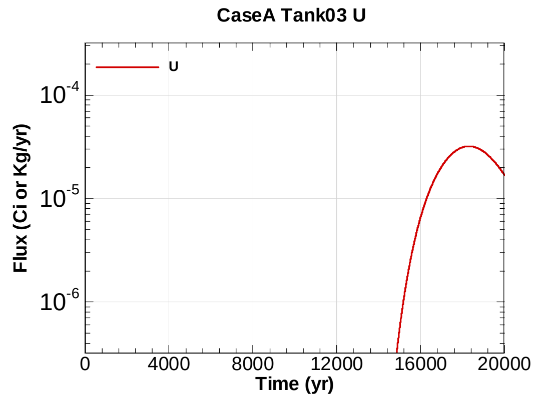

Figure A.2-254 - Water Table Flux for CaseA Tank03 U

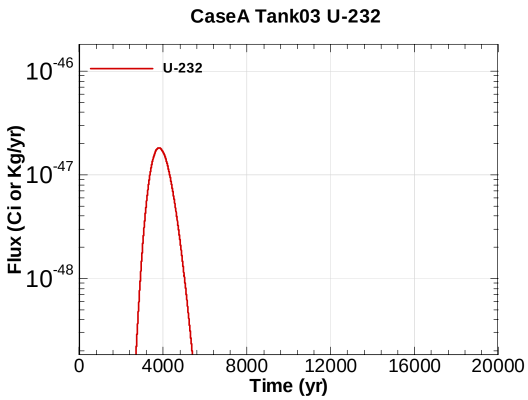

Figure A.2-255 - Water Table Flux for CaseA Tank03 U-232

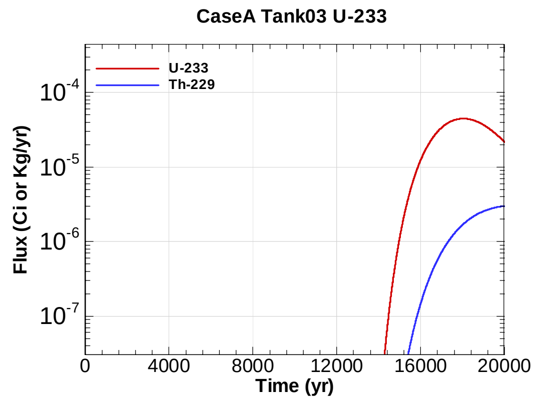

Figure A.2-256 - Water Table Flux for CaseA Tank03 U-233

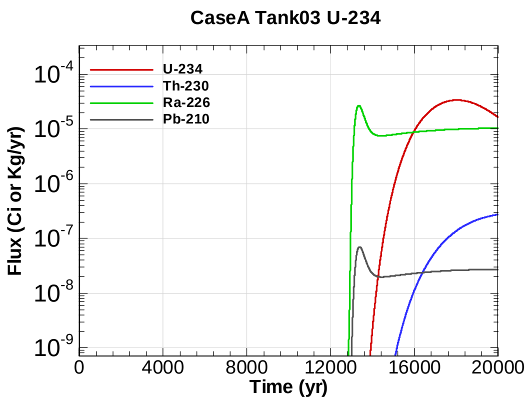

Figure A.2-257 - Water Table Flux for CaseA Tank03 U-234

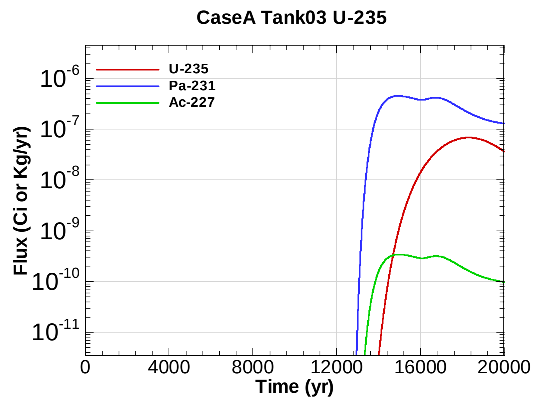

Figure A.2-258 - Water Table Flux for CaseA Tank03 U-235

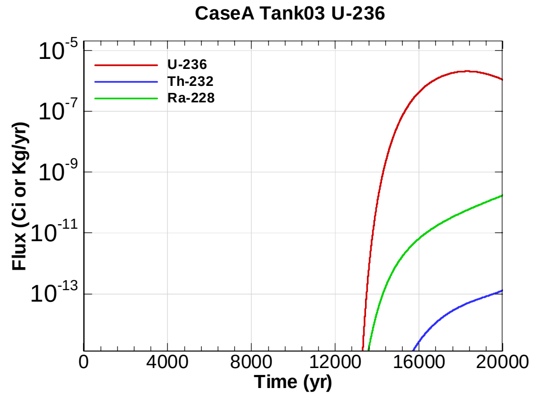

Figure A.2-259 - Water Table Flux for CaseA Tank03 U-236

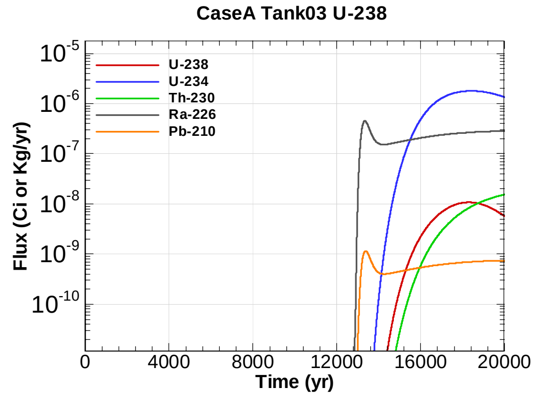

Figure A.2-260 - Water Table Flux for CaseA Tank03 U-238

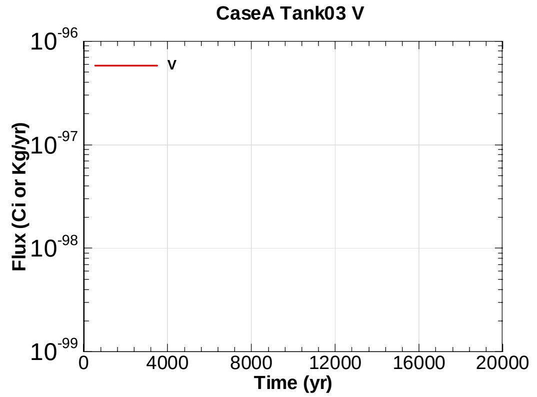

Figure A.2-261 - Water Table Flux for CaseA Tank03 V

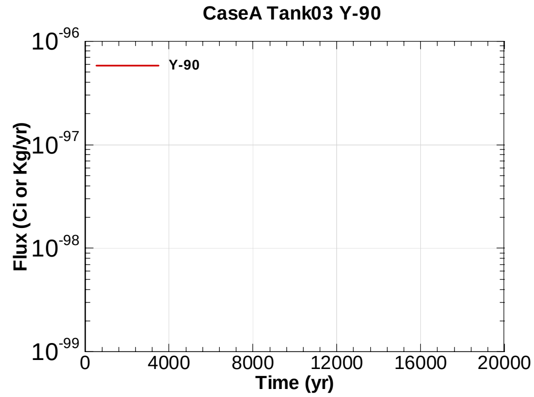

Figure A.2-262 - Water Table Flux for CaseA Tank03 Y-90

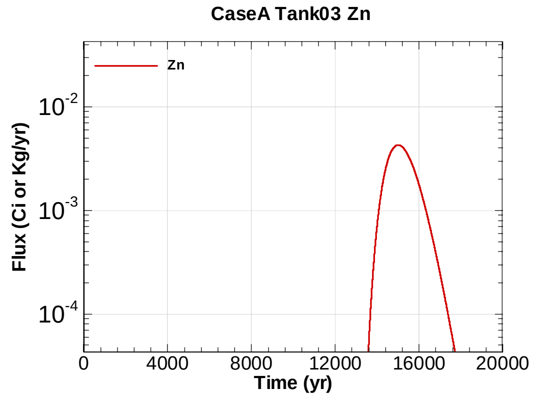

Figure A.2-263 - Water Table Flux for CaseA Tank03 Zn

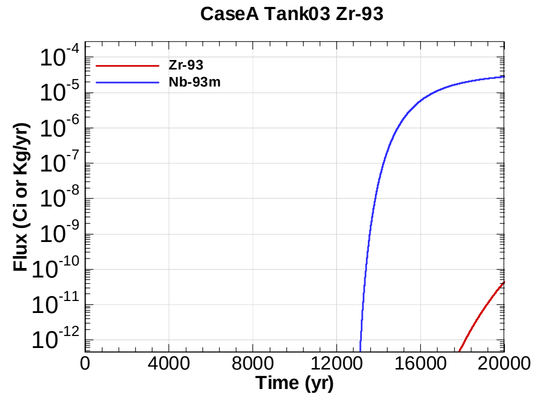

Figure A.2-264 - Water Table Flux for CaseA Tank03 Zr-93

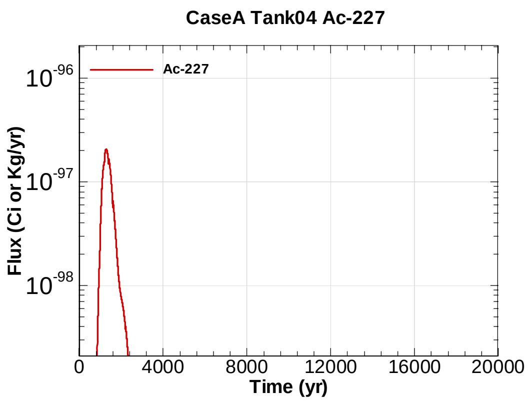

Figure A.2-265 - Water Table Flux for CaseA Tank04 Ac-227

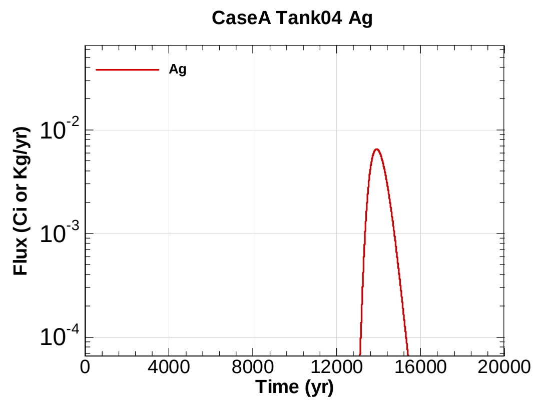

Figure A.2-266 - Water Table Flux for CaseA Tank04 Ag

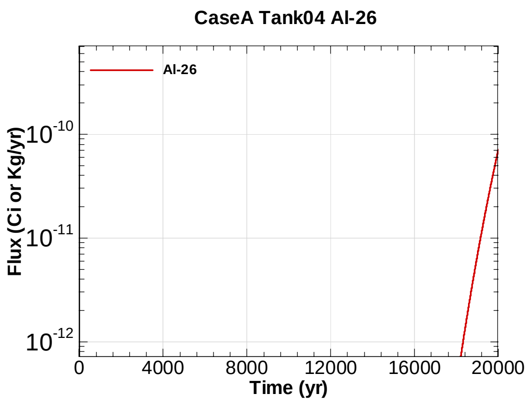

Figure A.2-267 - Water Table Flux for CaseA Tank04 Al-26

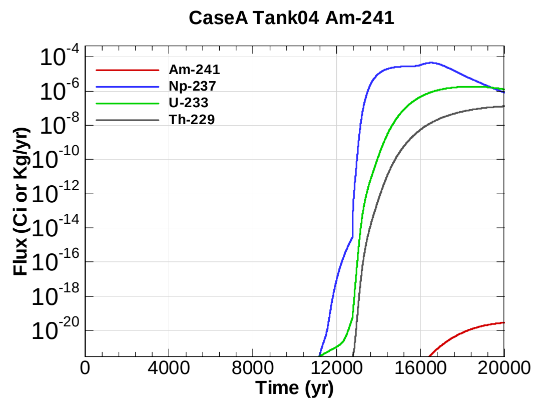

Figure A.2-268 - Water Table Flux for CaseA Tank04 Am-241

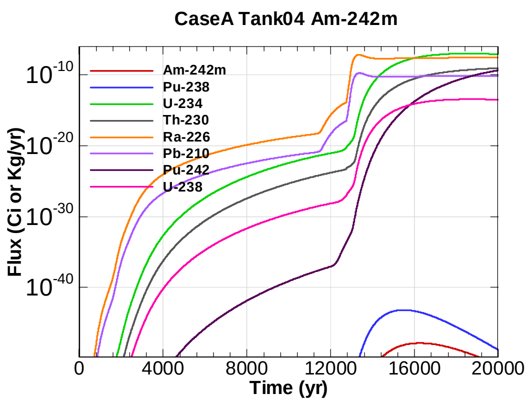

Figure A.2-269 - Water Table Flux for CaseA Tank04 Am-242m

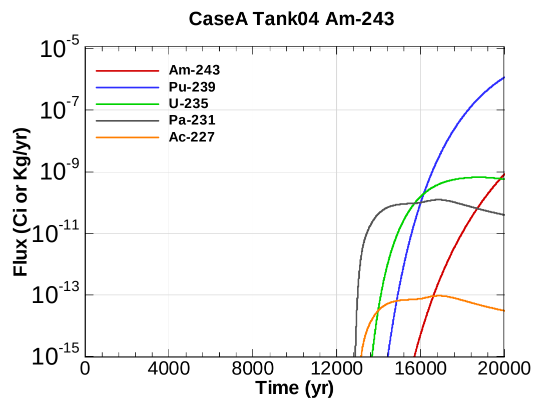

Figure A.2-270 - Water Table Flux for CaseA Tank04 Am-243

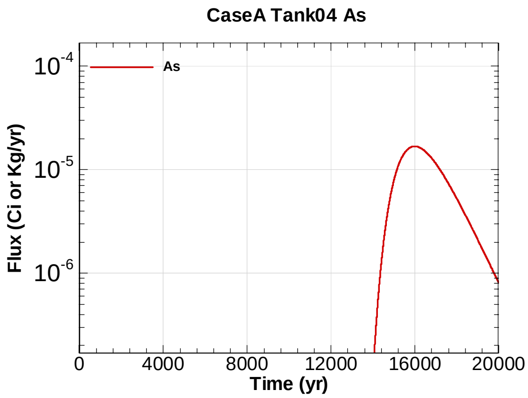

Figure A.2-271 - Water Table Flux for CaseA Tank04 As

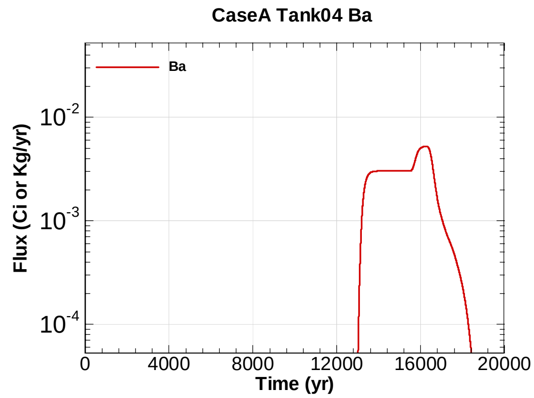

Figure A.2-272 - Water Table Flux for CaseA Tank04 Ba

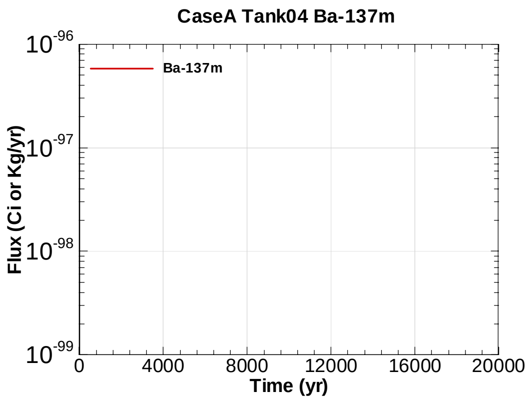

Figure A.2-273 - Water Table Flux for CaseA Tank04 Ba-137m

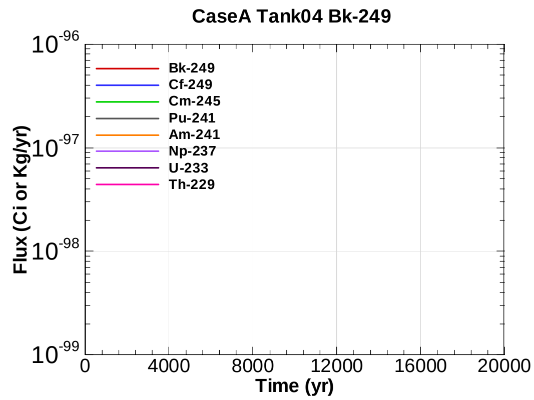

Figure A.2-274 - Water Table Flux for CaseA Tank04 Bk-249

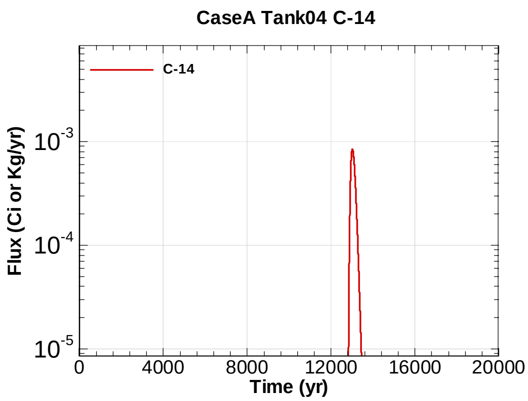

Figure A.2-275 - Water Table Flux for CaseA Tank04 C-14

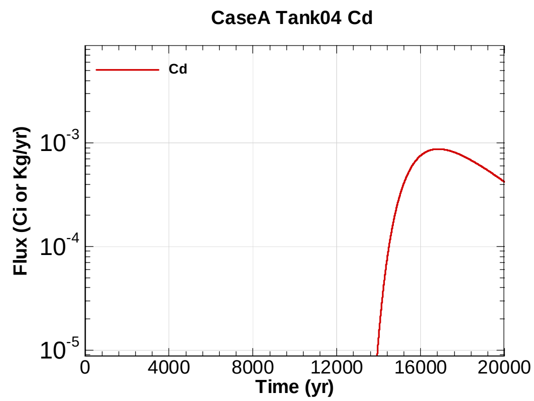

Figure A.2-276 - Water Table Flux for CaseA Tank04 Cd

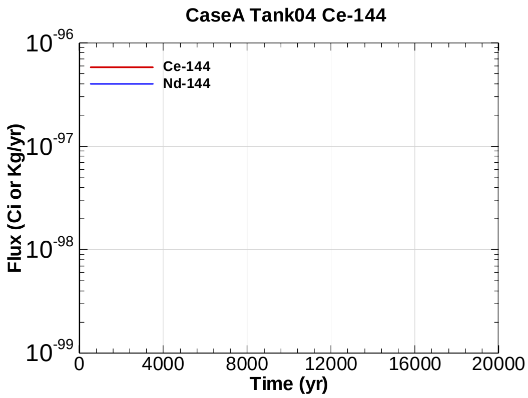

Figure A.2-277 - Water Table Flux for CaseA Tank04 Ce-144

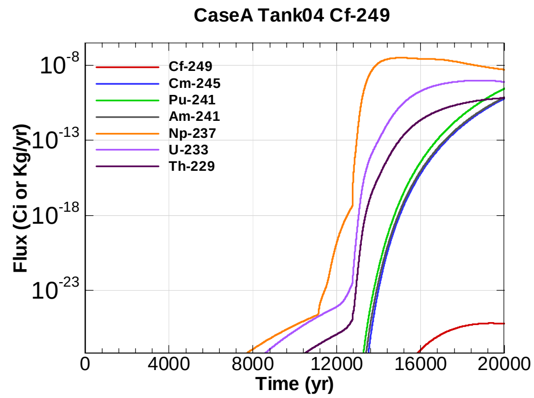

Figure A.2-278 - Water Table Flux for CaseA Tank04 Cf-249

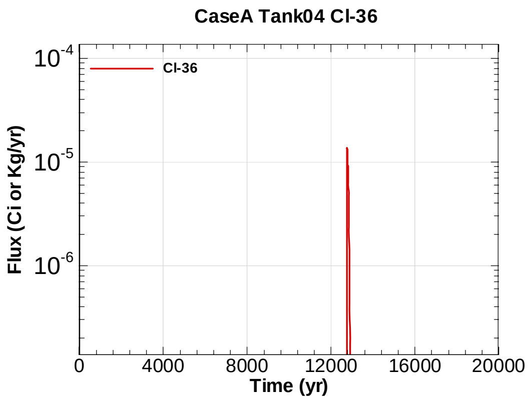

Figure A.2-279 - Water Table Flux for CaseA Tank04 Cl-36

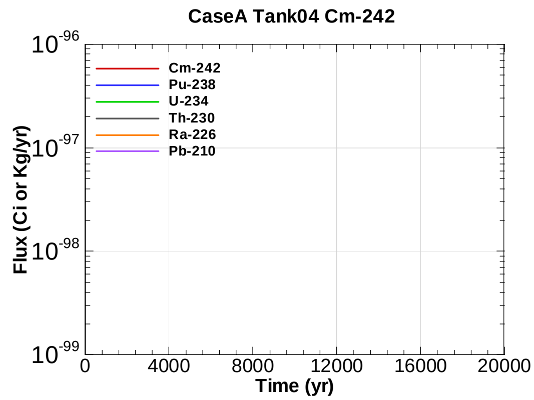

Figure A.2-280 - Water Table Flux for CaseA Tank04 Cm-242

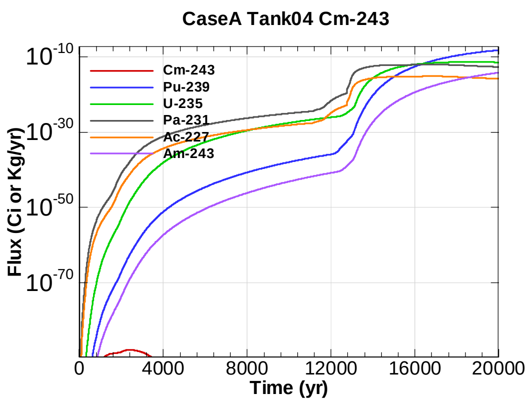

Figure A.2-281 - Water Table Flux for CaseA Tank04 Cm-243

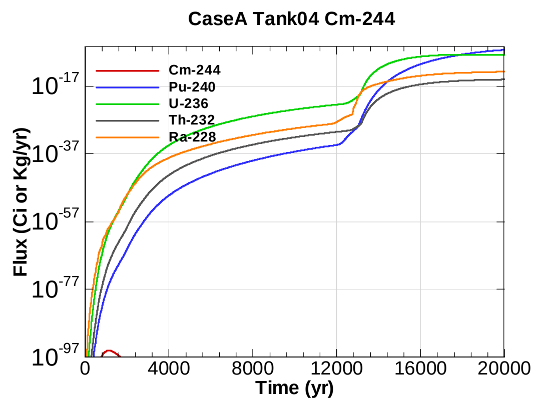

Figure A.2-282 - Water Table Flux for CaseA Tank04 Cm-244

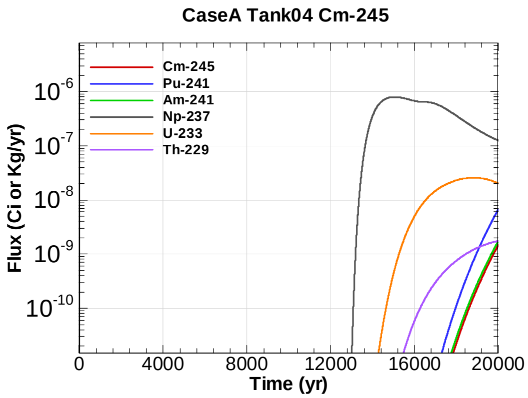

Figure A.2-283 - Water Table Flux for CaseA Tank04 Cm-245

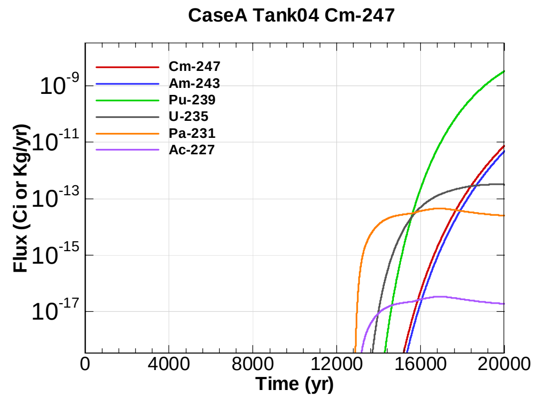

Figure A.2-284 - Water Table Flux for CaseA Tank04 Cm-247

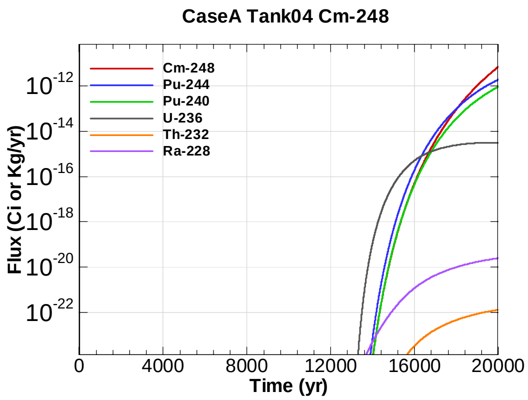

Figure A.2-285 - Water Table Flux for CaseA Tank04 Cm-248

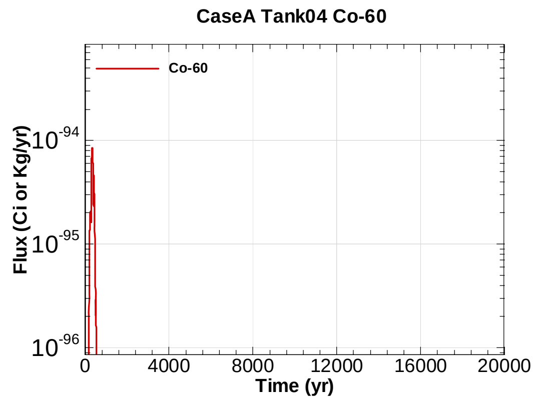

Figure A.2-286 - Water Table Flux for CaseA Tank04 Co-60

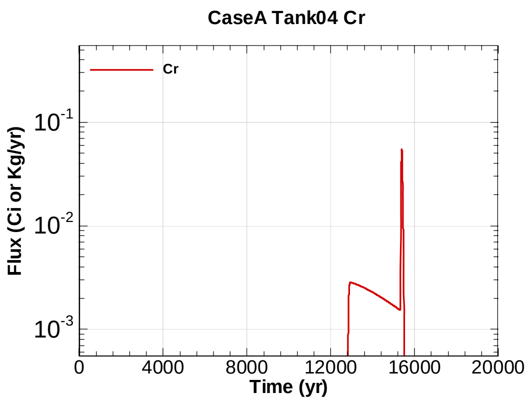

Figure A.2-287 - Water Table Flux for CaseA Tank04 Cr

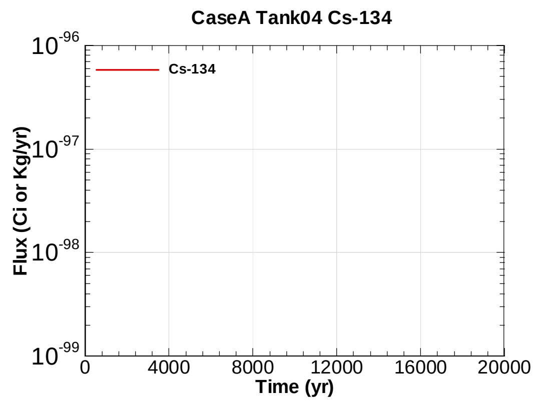

Figure A.2-288 - Water Table Flux for CaseA Tank04 Cs-134

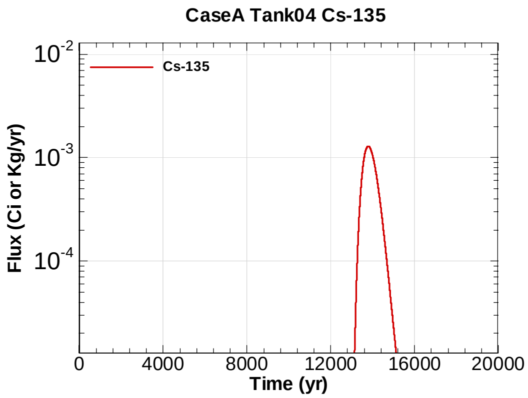

Figure A.2-289 - Water Table Flux for CaseA Tank04 Cs-135

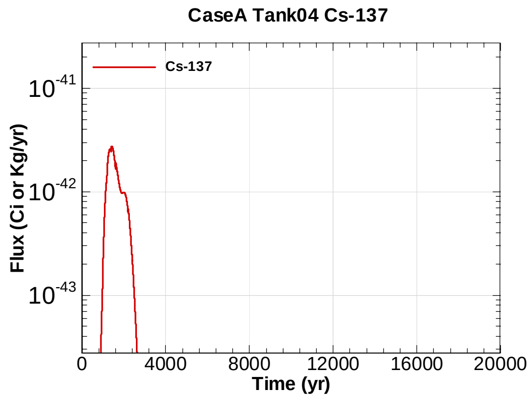

Figure A.2-290 - Water Table Flux for CaseA Tank04 Cs-137

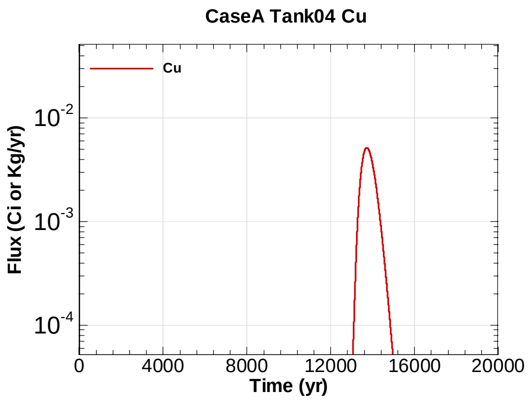

Figure A.2-291 - Water Table Flux for CaseA Tank04 Cu

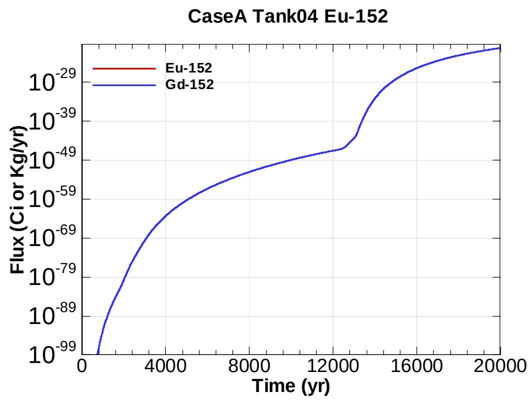

Figure A.2-292 - Water Table Flux for CaseA Tank04 Eu-152

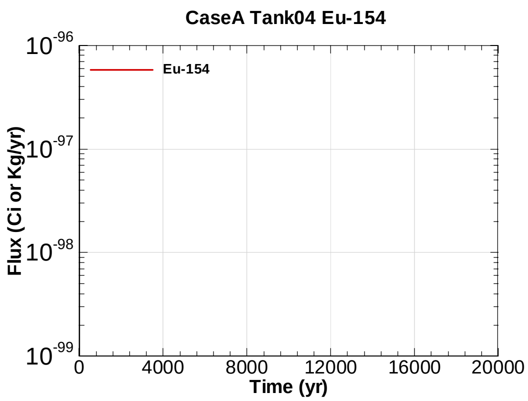

Figure A.2-293 - Water Table Flux for CaseA Tank04 Eu-154

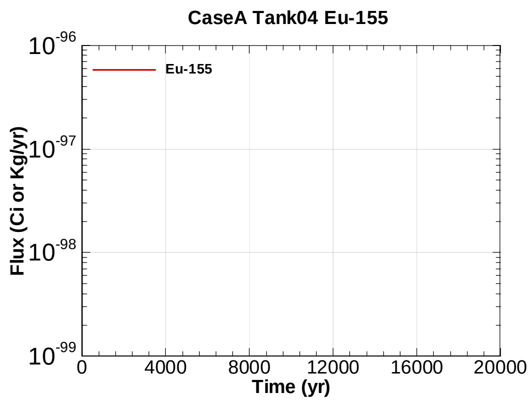

Figure A.2-294 - Water Table Flux for CaseA Tank04 Eu-155

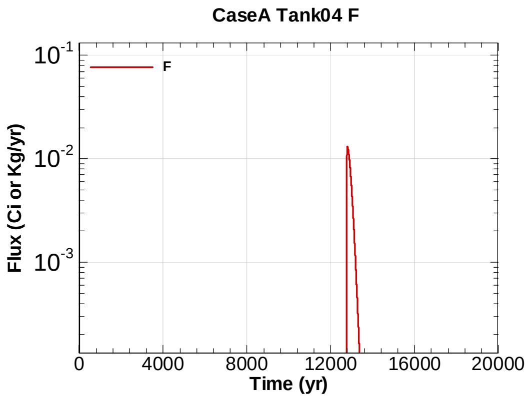

Figure A.2-295 - Water Table Flux for CaseA Tank04 F

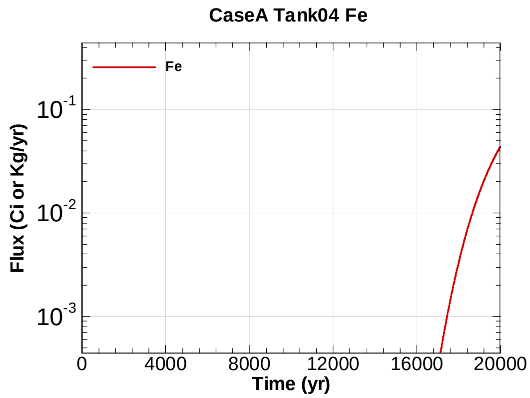

Figure A.2-296 - Water Table Flux for CaseA Tank04 Fe

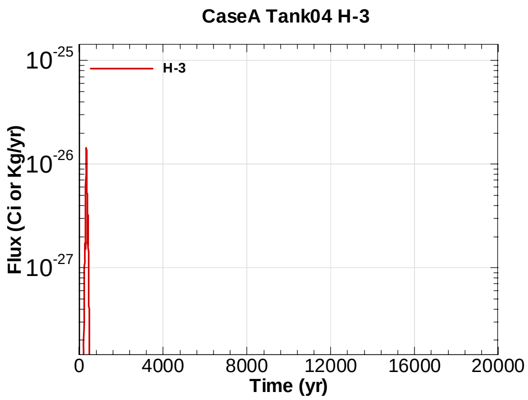

Figure A.2-297 - Water Table Flux for CaseA Tank04 H-3

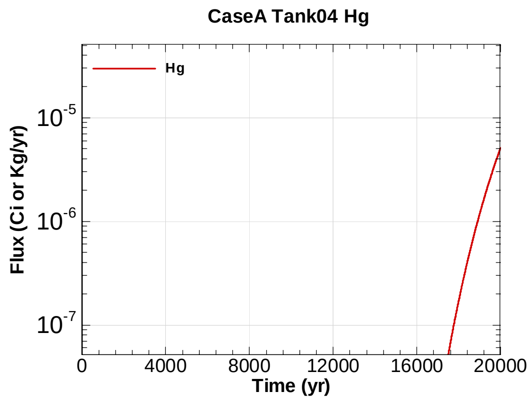

Figure A.2-298 - Water Table Flux for CaseA Tank04 Hg

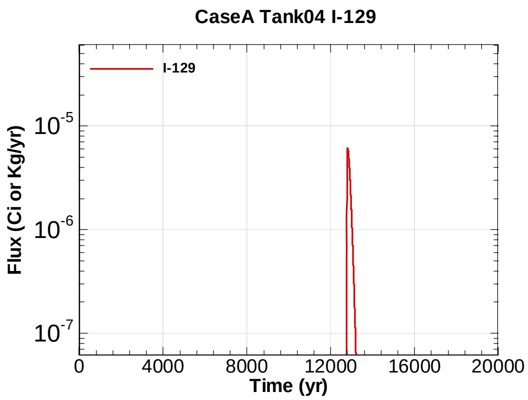

Figure A.2-299 - Water Table Flux for CaseA Tank04 I-129

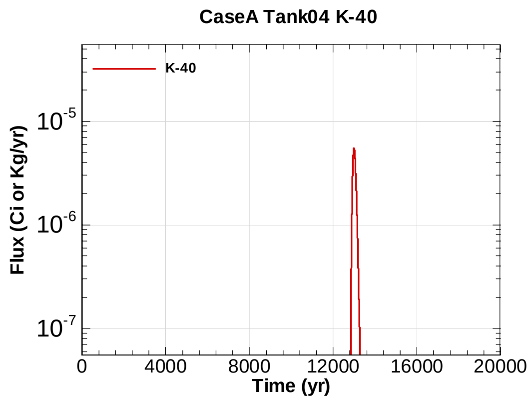

Figure A.2-300 - Water Table Flux for CaseA Tank04 K-40

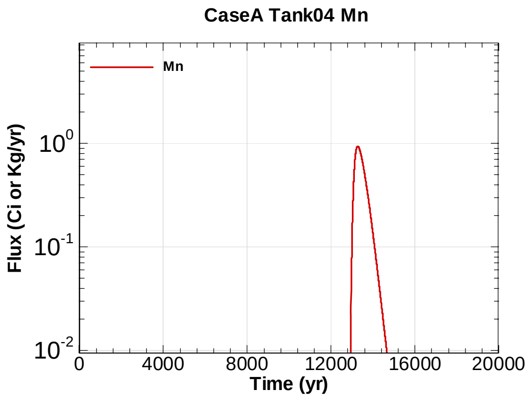

Figure A.2-301 - Water Table Flux for CaseA Tank04 Mn

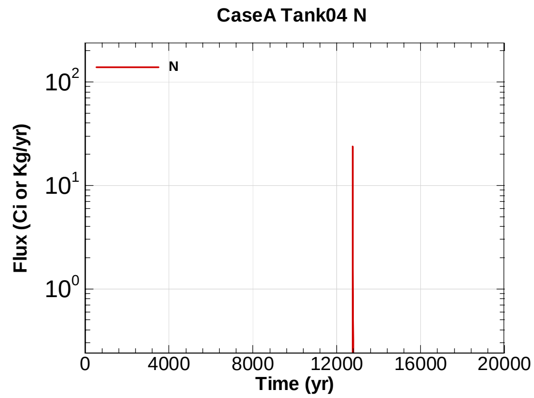

Figure A.2-302 - Water Table Flux for CaseA Tank04 N

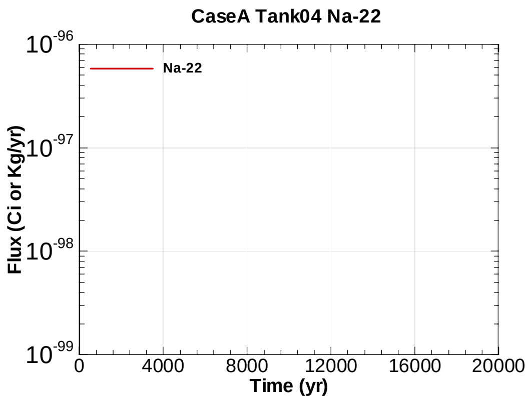

Figure A.2-303 - Water Table Flux for CaseA Tank04 Na-22

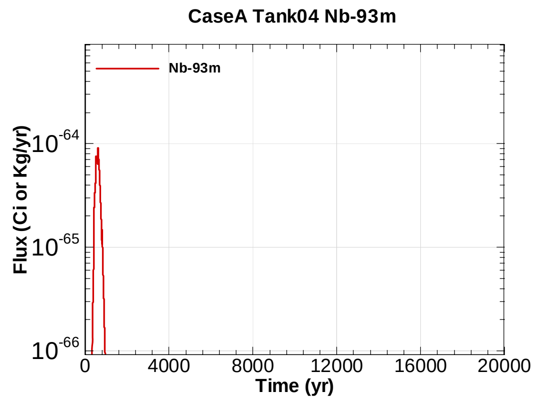

Figure A.2-304 - Water Table Flux for CaseA Tank04 Nb-93m

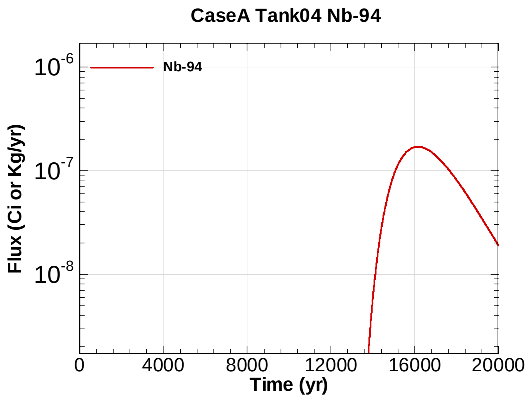

Figure A.2-305 - Water Table Flux for CaseA Tank04 Nb-94

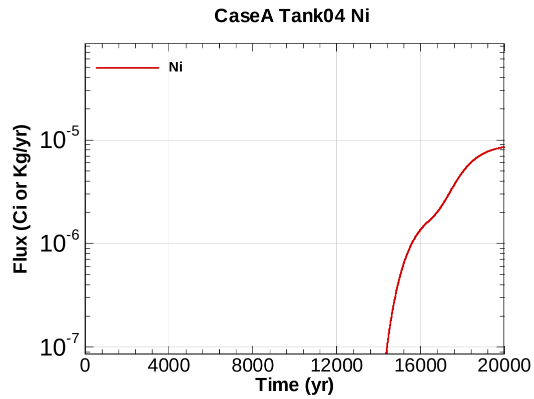

Figure A.2-306 - Water Table Flux for CaseA Tank04 Ni

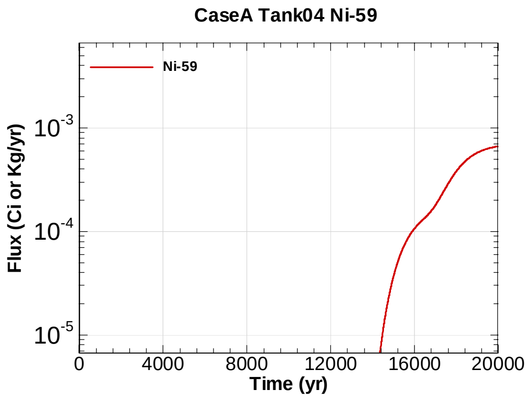

Figure A.2-307 - Water Table Flux for CaseA Tank04 Ni-59

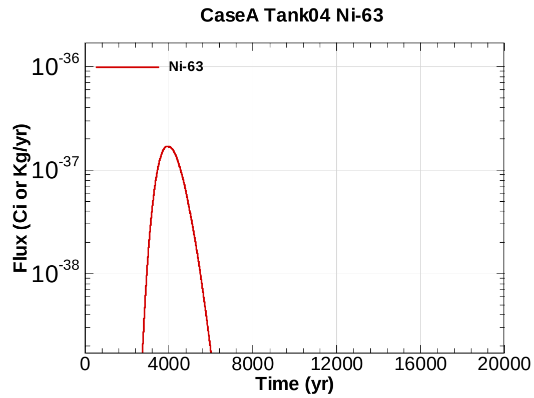

Figure A.2-308 - Water Table Flux for CaseA Tank04 Ni-63

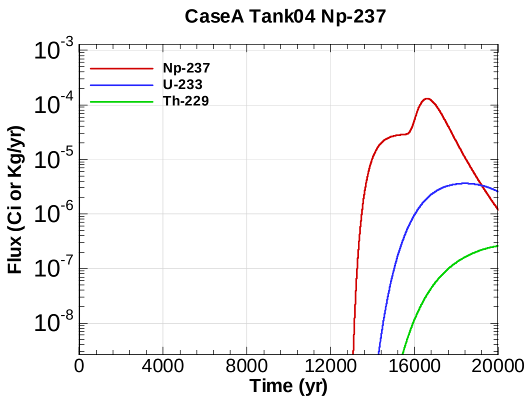

Figure A.2-309 - Water Table Flux for CaseA Tank04 Np-237

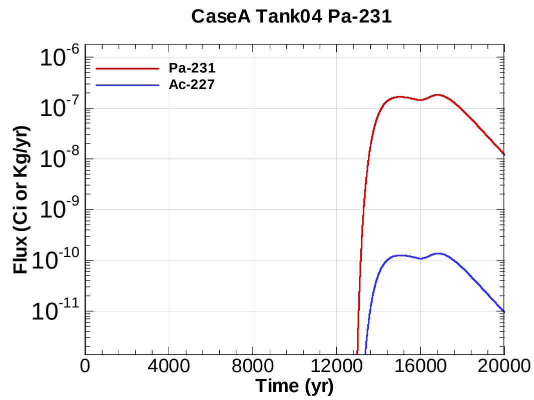

Figure A.2-310 - Water Table Flux for CaseA Tank04 Pa-231

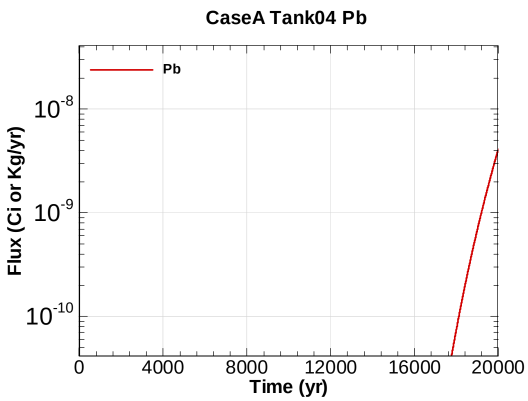

Figure A.2-311 - Water Table Flux for CaseA Tank04 Pb

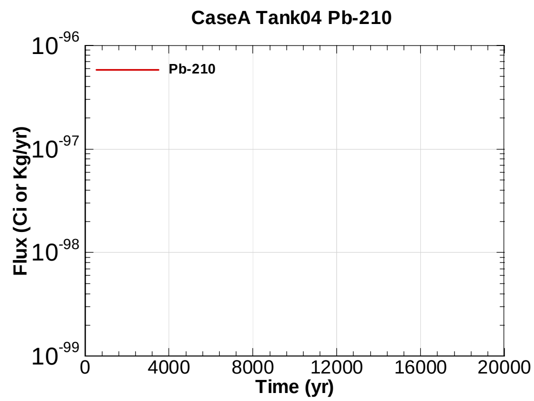

Figure A.2-312 - Water Table Flux for CaseA Tank04 Pb-210

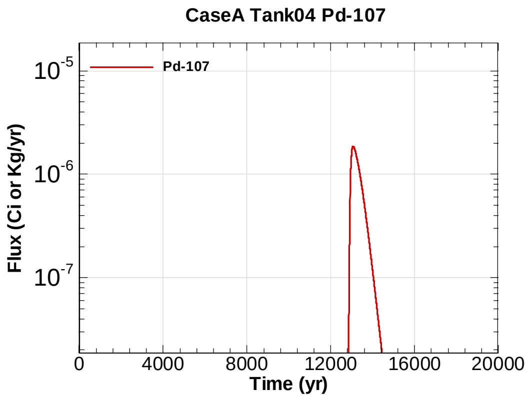

Figure A.2-313 - Water Table Flux for CaseA Tank04 Pd-107

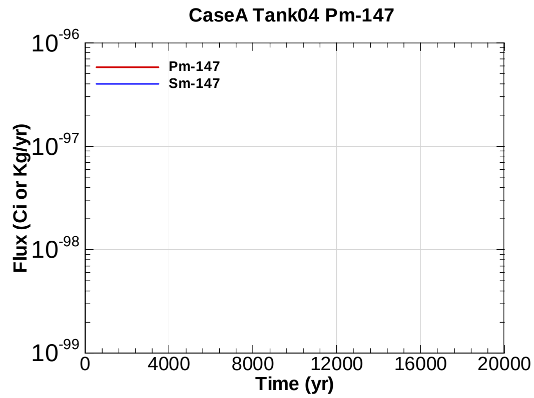

Figure A.2-314 - Water Table Flux for CaseA Tank04 Pm-147

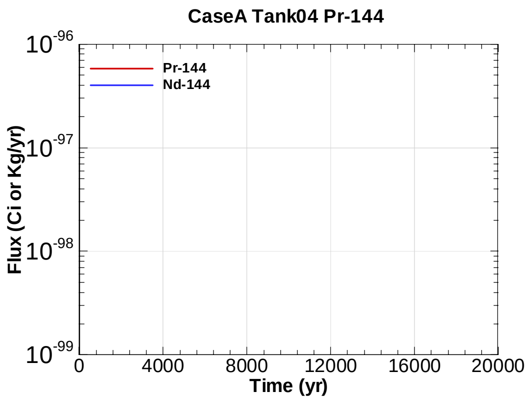

Figure A.2-315 - Water Table Flux for CaseA Tank04 Pr-144

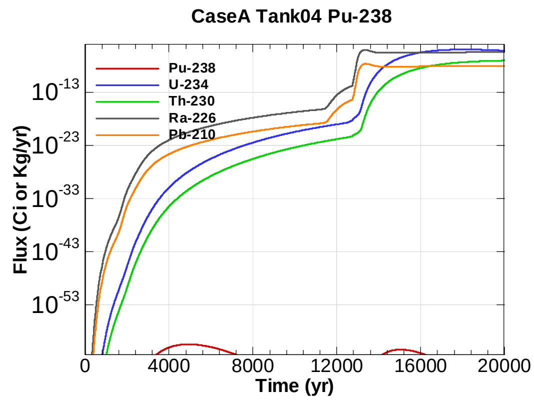

Figure A.2-316 - Water Table Flux for CaseA Tank04 Pu-238

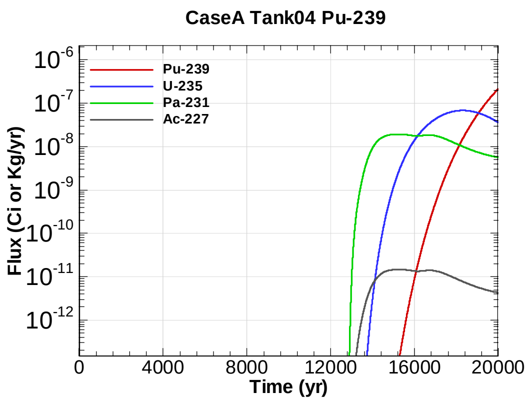

Figure A.2-317 - Water Table Flux for CaseA Tank04 Pu-239

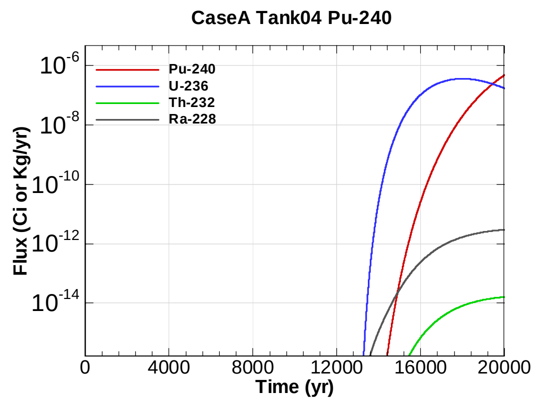

Figure A.2-318 - Water Table Flux for CaseA Tank04 Pu-240

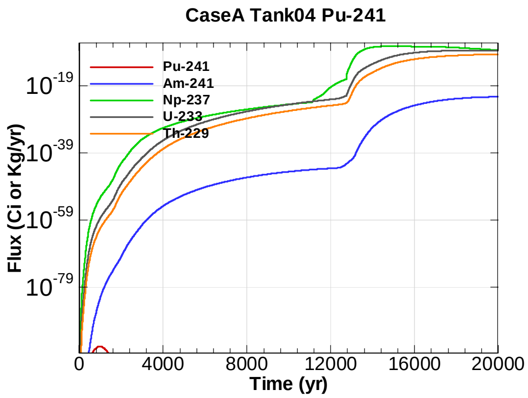

Figure A.2-319 - Water Table Flux for CaseA Tank04 Pu-241

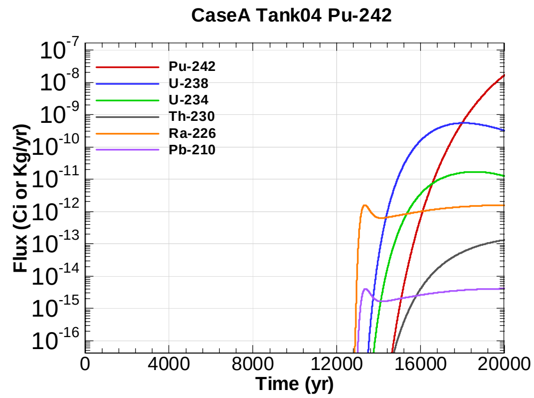

Figure A.2-320 - Water Table Flux for CaseA Tank04 Pu-242

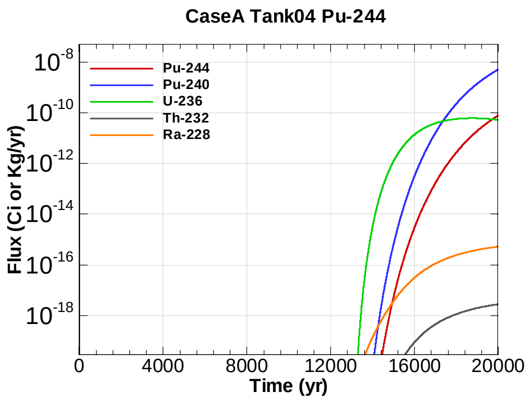

Figure A.2-321 - Water Table Flux for CaseA Tank04 Pu-244

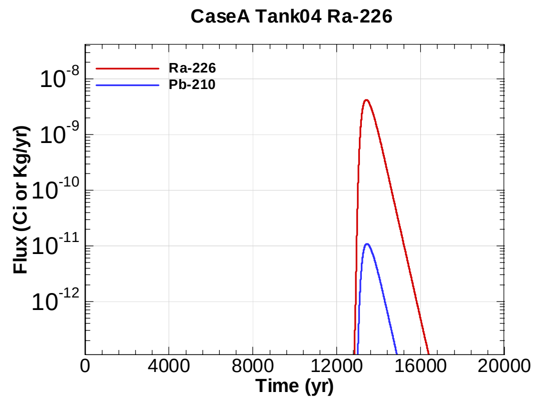

Figure A.2-322 - Water Table Flux for CaseA Tank04 Ra-226

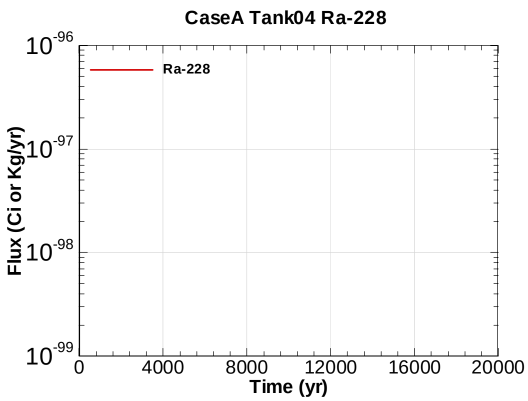

Figure A.2-323 - Water Table Flux for CaseA Tank04 Ra-228

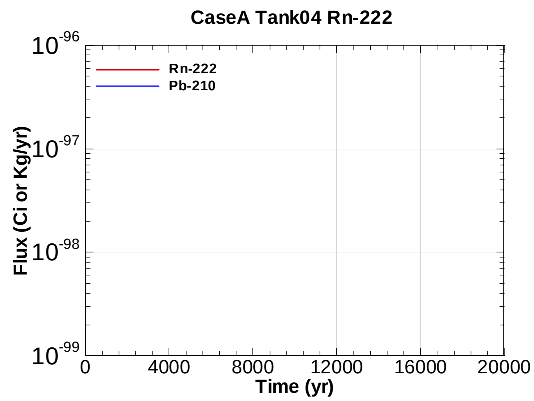

Figure A.2-324 - Water Table Flux for CaseA Tank04 Rn-222

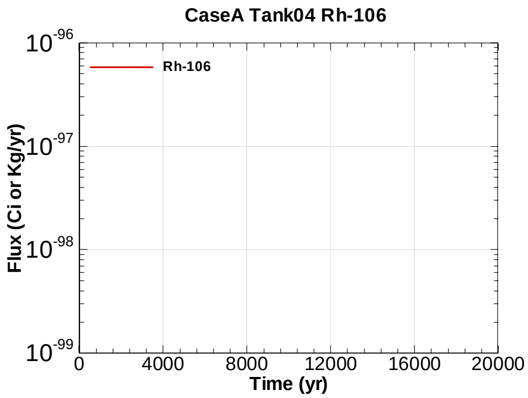

Figure A.2-325 - Water Table Flux for CaseA Tank04 Rh-106

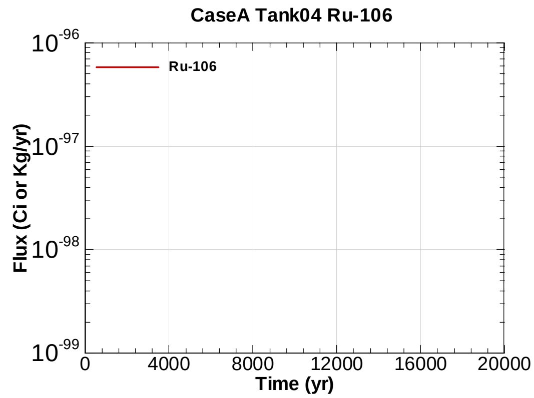

Figure A.2-326 - Water Table Flux for CaseA Tank04 Ru-106

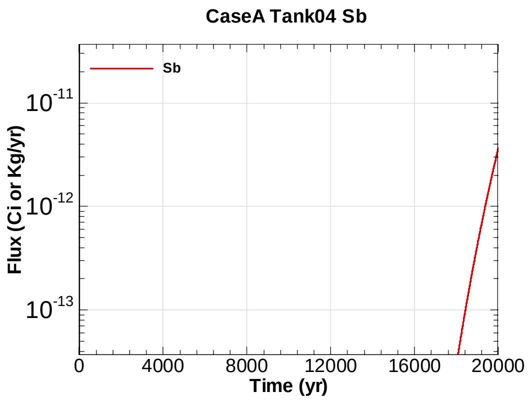

Figure A.2-327 - Water Table Flux for CaseA Tank04 Sb

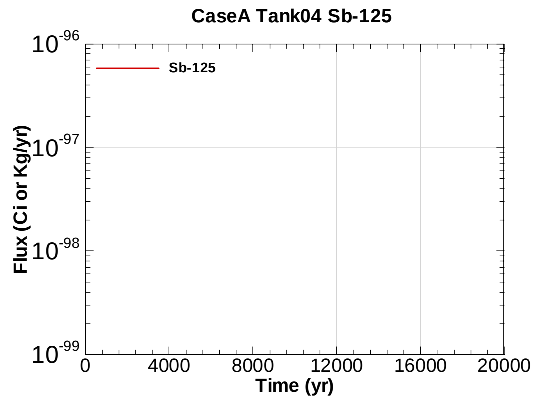

Figure A.2-328 - Water Table Flux for CaseA Tank04 Sb-125

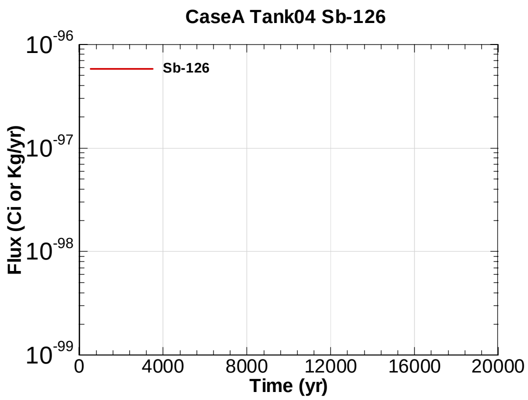

Figure A.2-329 - Water Table Flux for CaseA Tank04 Sb-126

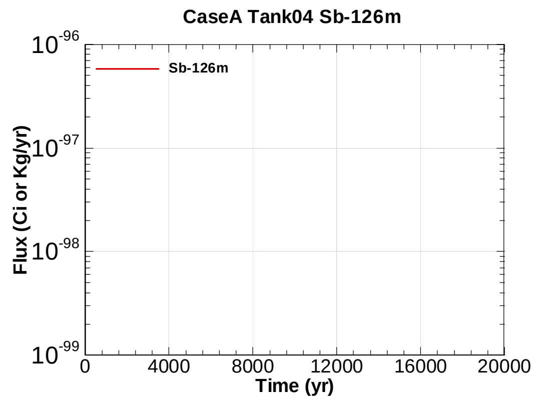

Figure A.2-330 - Water Table Flux for CaseA Tank04 Sb-126m

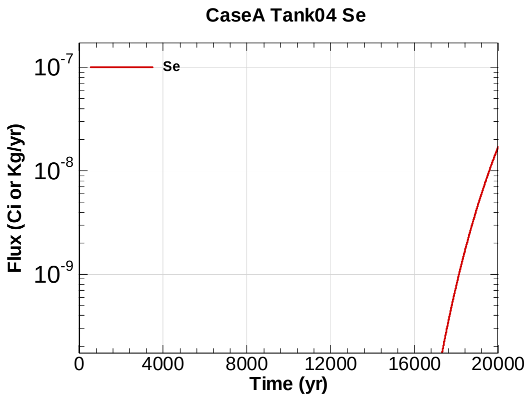

Figure A.2-331 - Water Table Flux for CaseA Tank04 Se

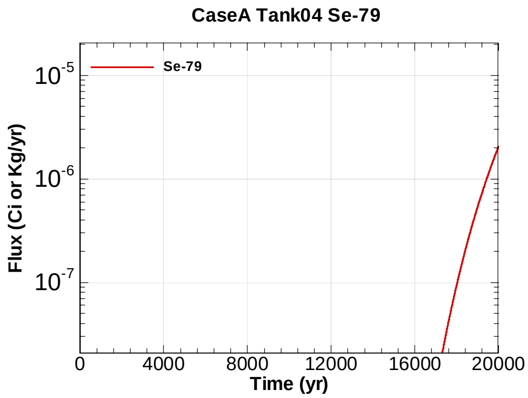

Figure A.2-332 - Water Table Flux for CaseA Tank04 Se-79

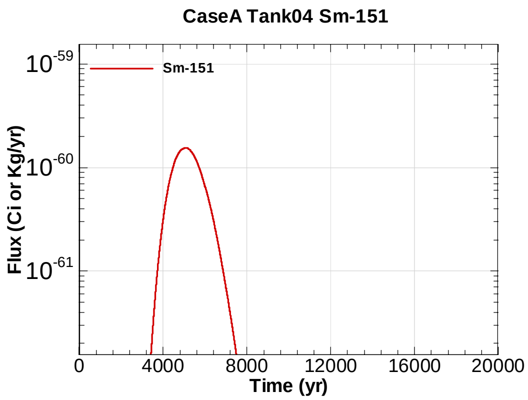

Figure A.2-333 - Water Table Flux for CaseA Tank04 Sm-151

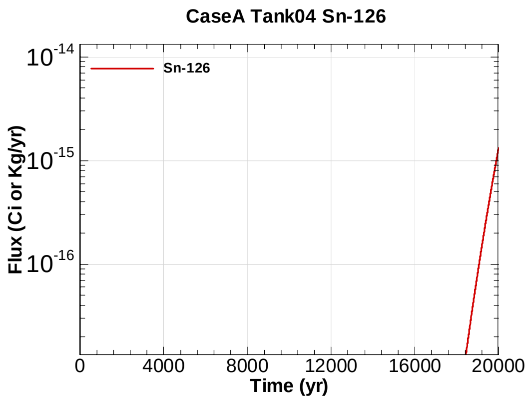

Figure A.2-334 - Water Table Flux for CaseA Tank04 Sn-126

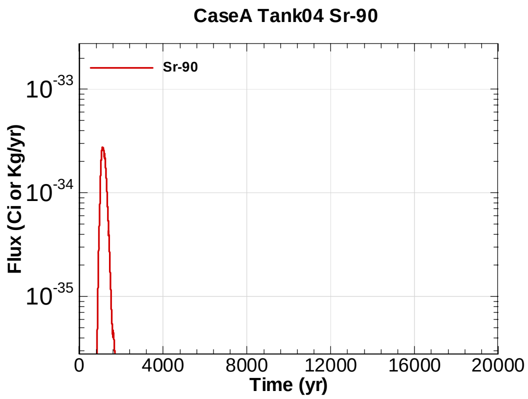

Figure A.2-335 - Water Table Flux for CaseA Tank04 Sr-90

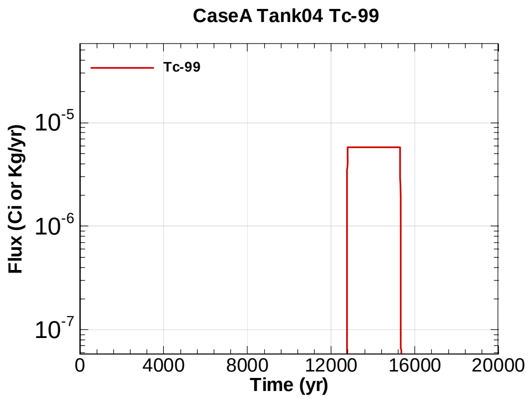

Figure A.2-336 - Water Table Flux for CaseA Tank04 Tc-99

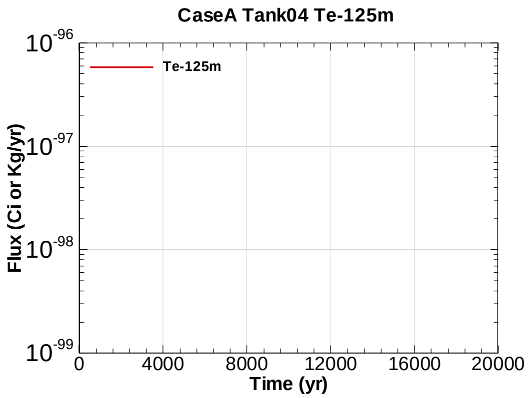

Figure A.2-337 - Water Table Flux for CaseA Tank04 Te-125m

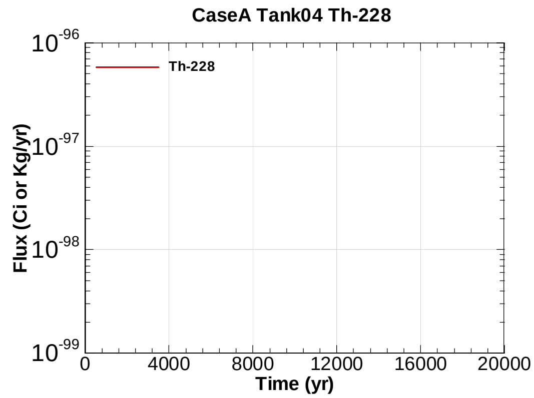

Figure A.2-338 - Water Table Flux for CaseA Tank04 Th-228

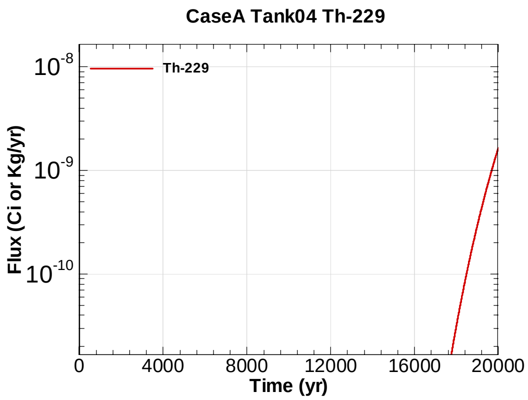

Figure A.2-339 - Water Table Flux for CaseA Tank04 Th-229

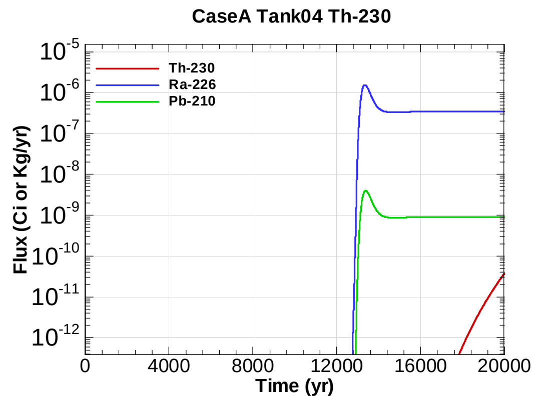

Figure A.2-340 - Water Table Flux for CaseA Tank04 Th-230

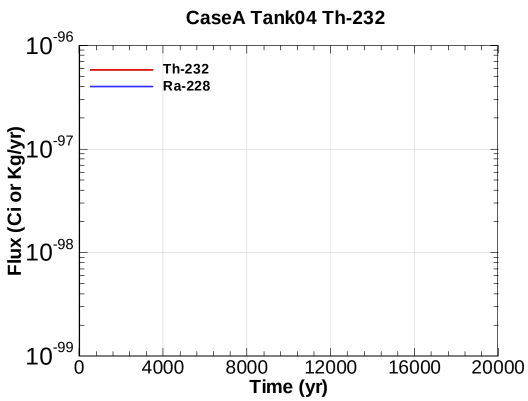

Figure A.2-341 - Water Table Flux for CaseA Tank04 Th-232

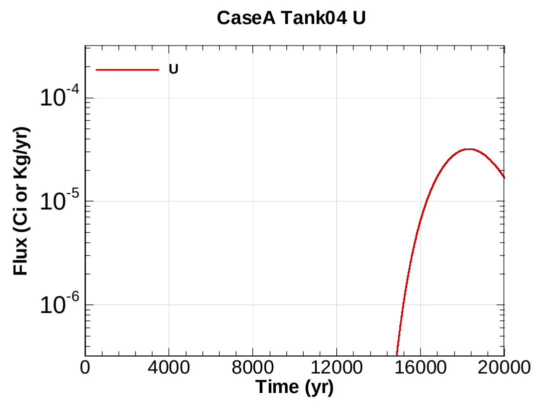

Figure A.2-342 - Water Table Flux for CaseA Tank04 U

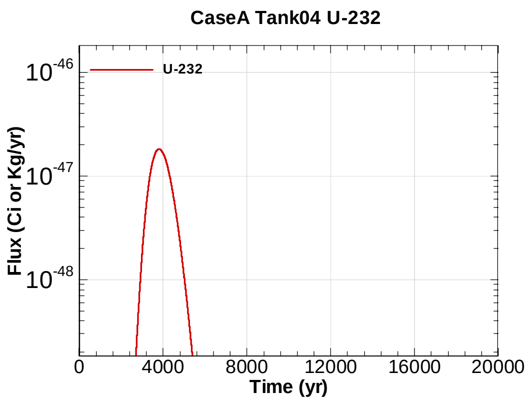

Figure A.2-343 - Water Table Flux for CaseA Tank04 U-232

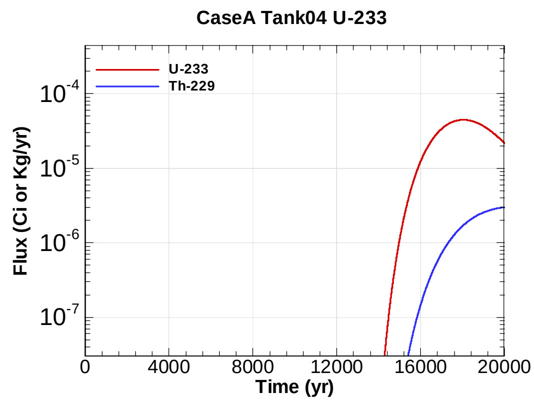

Figure A.2-344 - Water Table Flux for CaseA Tank04 U-233

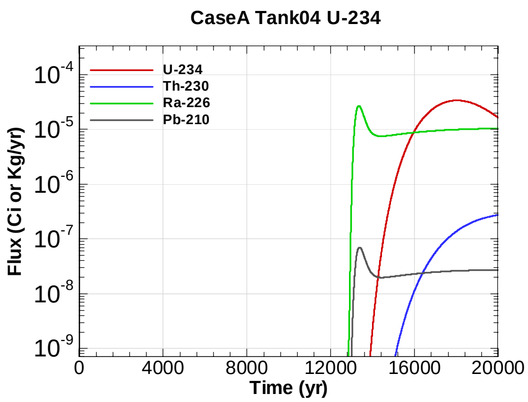

Figure A.2-345 - Water Table Flux for CaseA Tank04 U-234

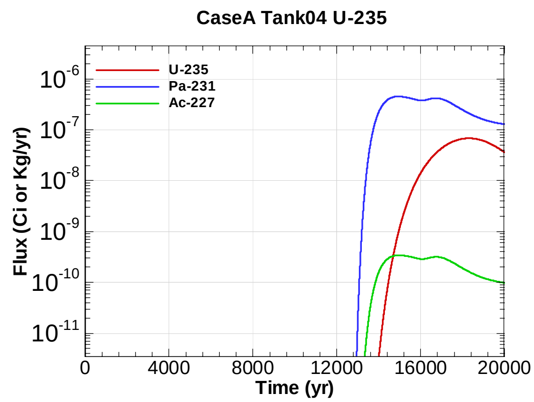

Figure A.2-346 - Water Table Flux for CaseA Tank04 U-235

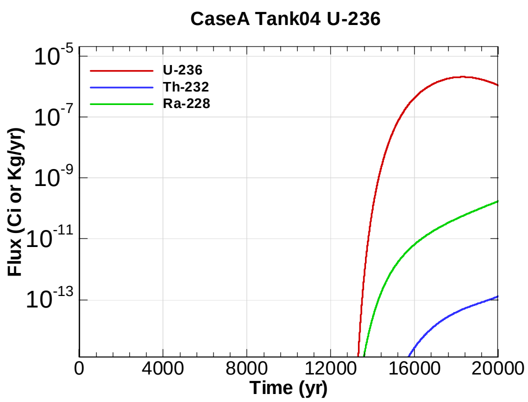

Figure A.2-347 - Water Table Flux for CaseA Tank04 U-236

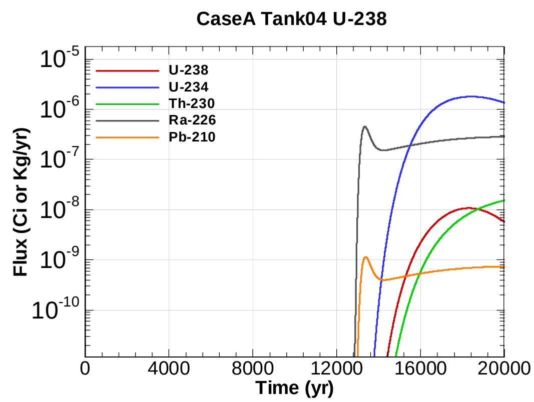

Figure A.2-348 - Water Table Flux for CaseA Tank04 U-238

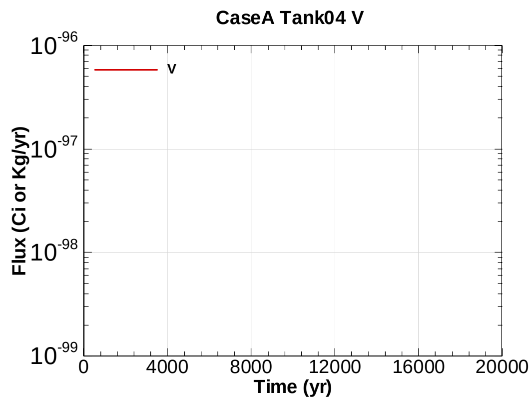

Figure A.2-349 - Water Table Flux for CaseA Tank04 V

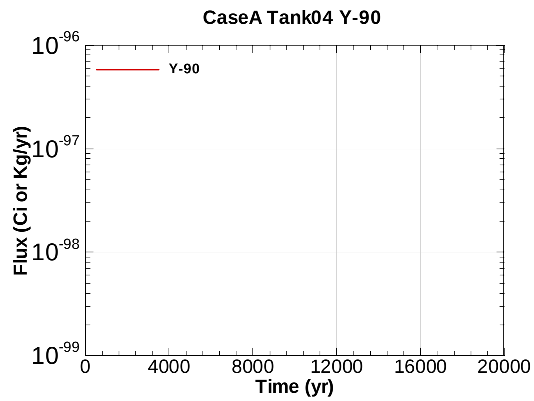

Figure A.2-350 - Water Table Flux for CaseA Tank04 Y-90

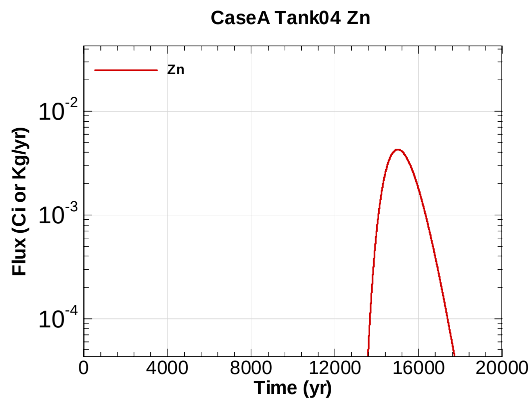

Figure A.2-351 - Water Table Flux for CaseA Tank04 Zn

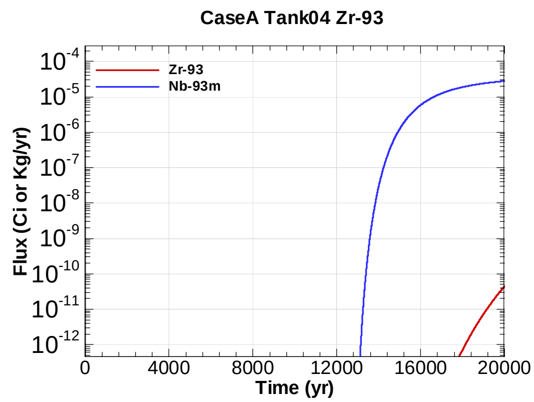

Figure A.2-352 - Water Table Flux for CaseA Tank04 Zr-93

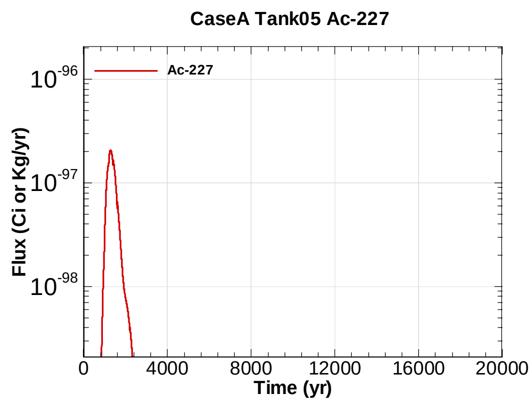

Figure A.2-353 - Water Table Flux for CaseA Tank05 Ac-227

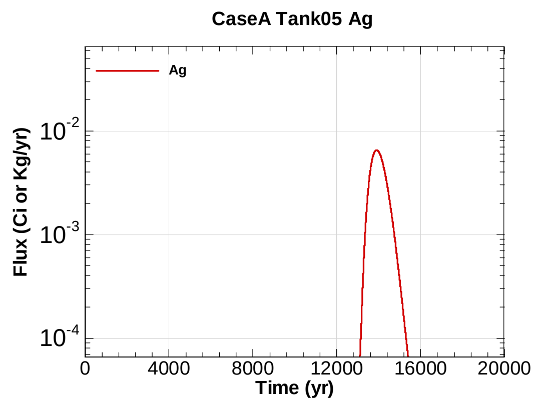

Figure A.2-354 - Water Table Flux for CaseA Tank05 Ag

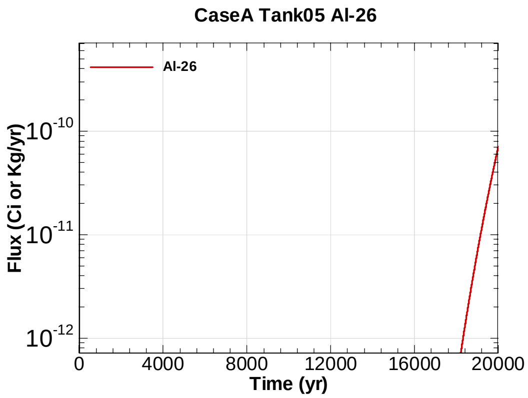

Figure A.2-355 - Water Table Flux for CaseA Tank05 Al-26

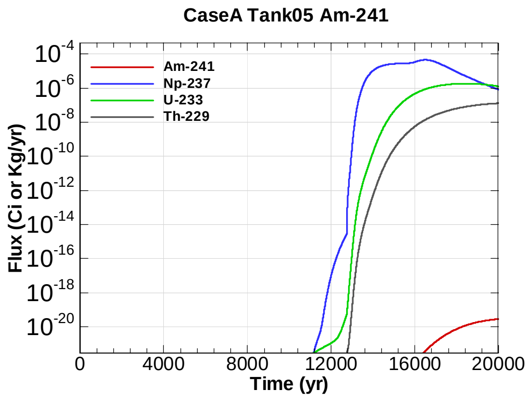

Figure A.2-356 - Water Table Flux for CaseA Tank05 Am-241

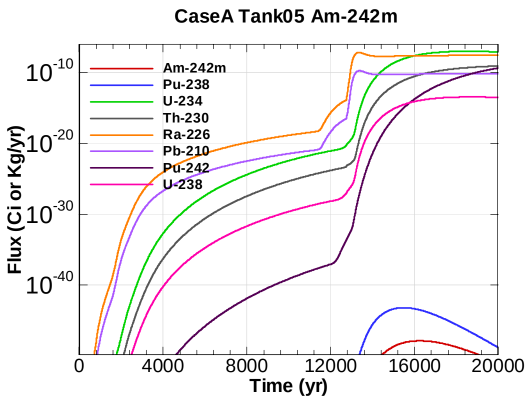

Figure A.2-357 - Water Table Flux for CaseA Tank05 Am-242m

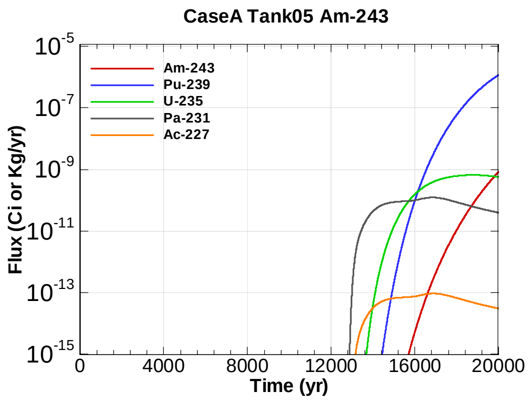

Figure A.2-358 - Water Table Flux for CaseA Tank05 Am-243

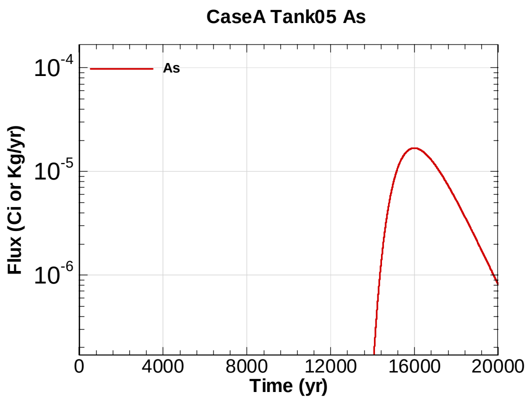

Figure A.2-359 - Water Table Flux for CaseA Tank05 As

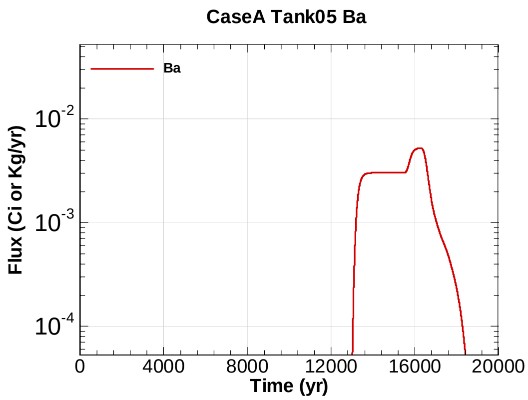

Figure A.2-360 - Water Table Flux for CaseA Tank05 Ba

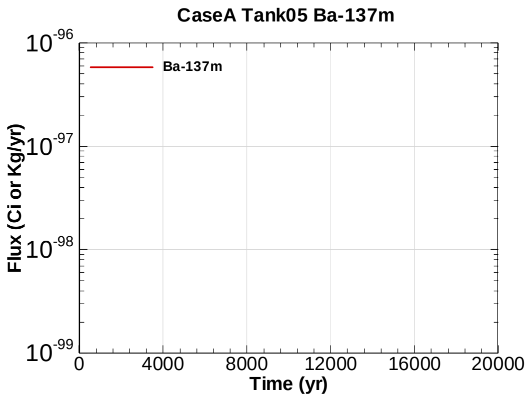

Figure A.2-361 - Water Table Flux for CaseA Tank05 Ba-137m

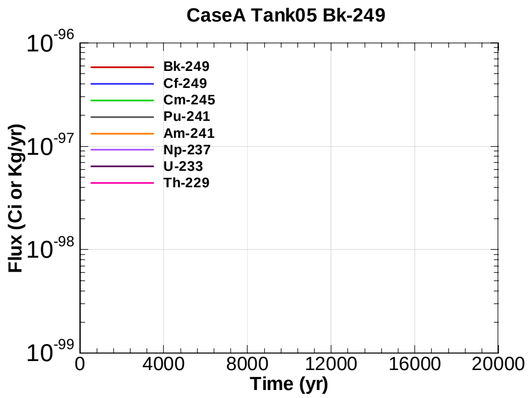

Figure A.2-362 - Water Table Flux for CaseA Tank05 Bk-249

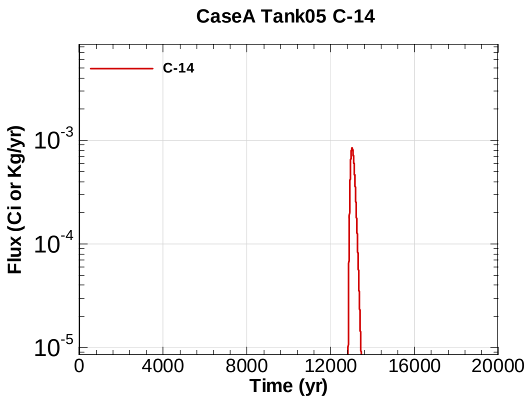

Figure A.2-363 - Water Table Flux for CaseA Tank05 C-14

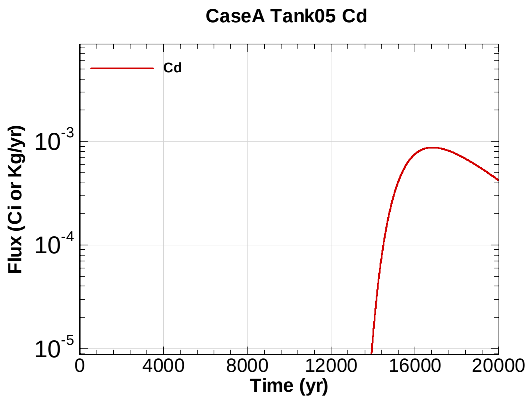

Figure A.2-364 - Water Table Flux for CaseA Tank05 Cd

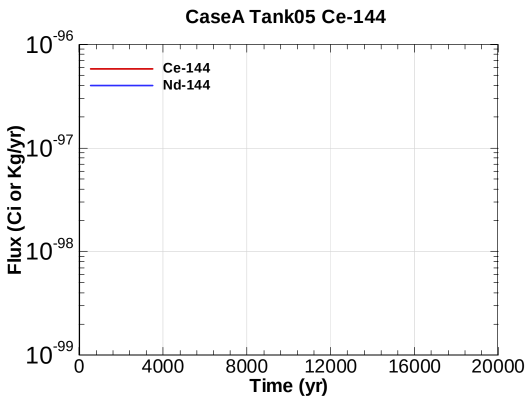

Figure A.2-365 - Water Table Flux for CaseA Tank05 Ce-144

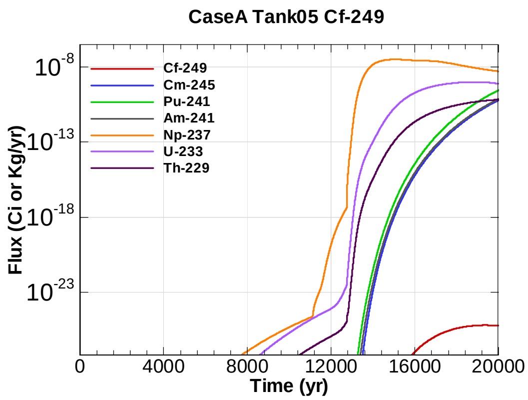

Figure A.2-366 - Water Table Flux for CaseA Tank05 Cf-249

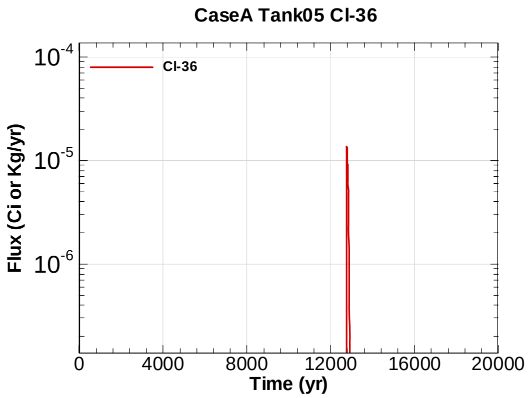

Figure A.2-367 - Water Table Flux for CaseA Tank05 Cl-36

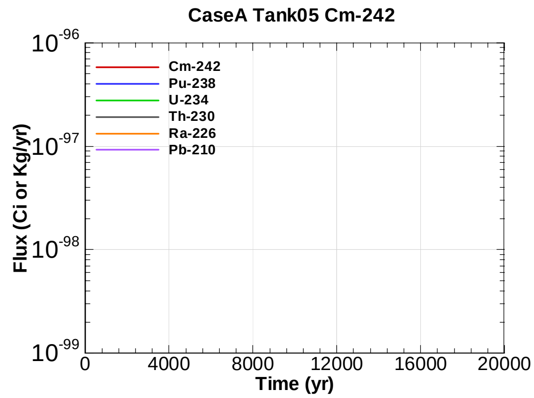

Figure A.2-368 - Water Table Flux for CaseA Tank05 Cm-242

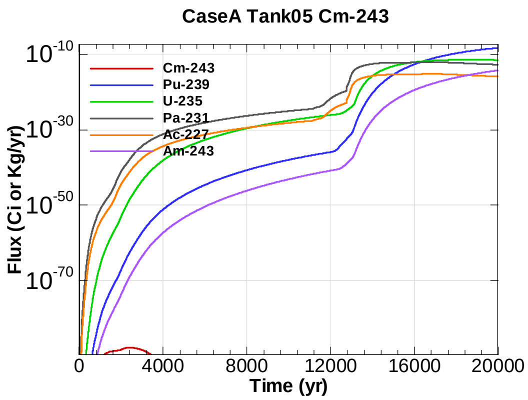

Figure A.2-369 - Water Table Flux for CaseA Tank05 Cm-243

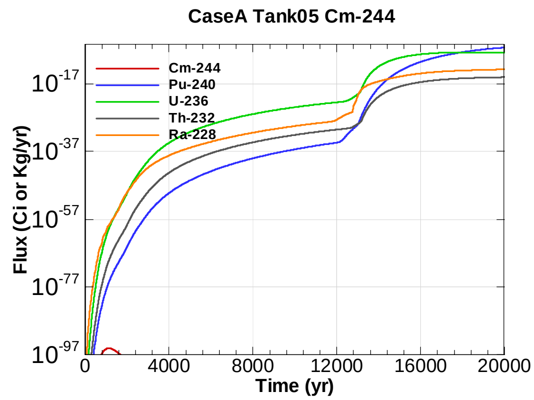

Figure A.2-370 - Water Table Flux for CaseA Tank05 Cm-244

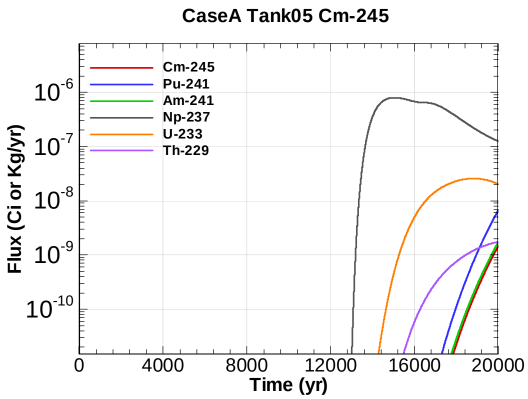

Figure A.2-371 - Water Table Flux for CaseA Tank05 Cm-245

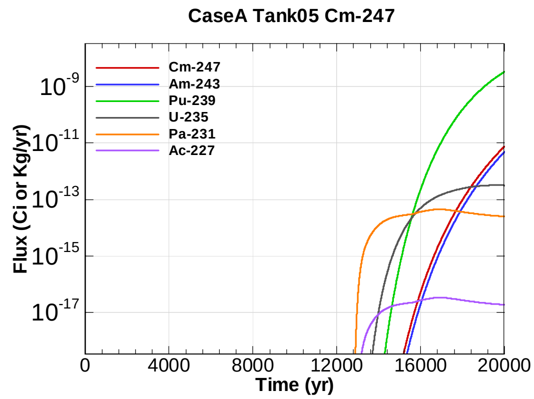

Figure A.2-372 - Water Table Flux for CaseA Tank05 Cm-247

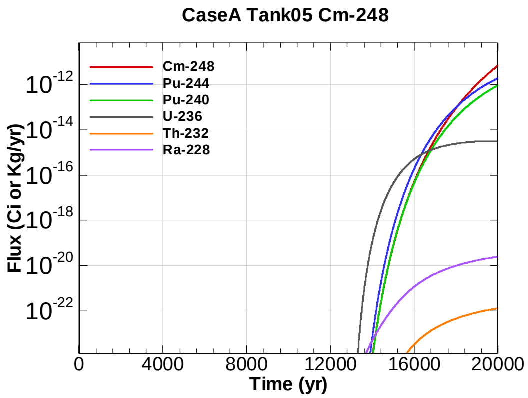

Figure A.2-373 - Water Table Flux for CaseA Tank05 Cm-248

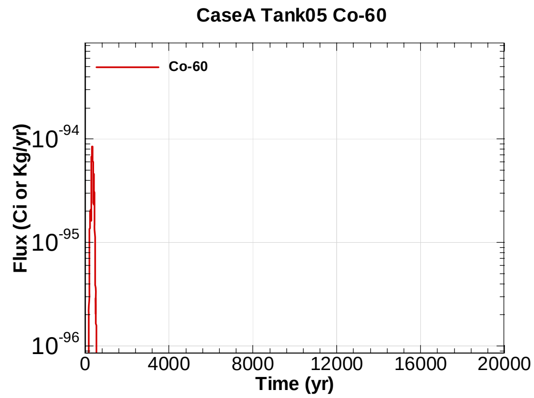

Figure A.2-374 - Water Table Flux for CaseA Tank05 Co-60

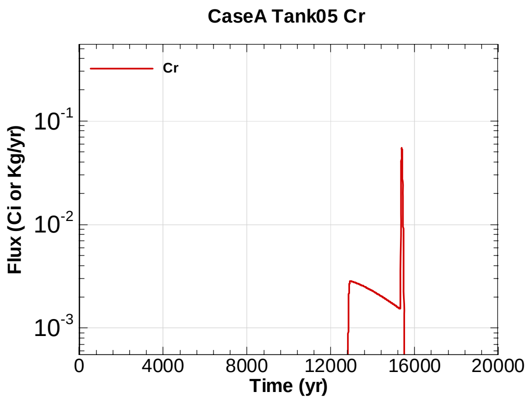

Figure A.2-375 - Water Table Flux for CaseA Tank05 Cr

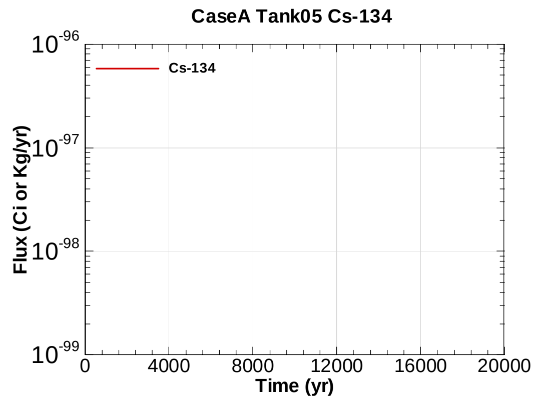

Figure A.2-376 - Water Table Flux for CaseA Tank05 Cs-134

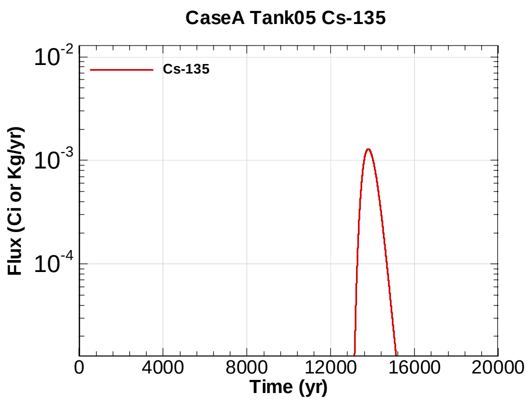

Figure A.2-377 - Water Table Flux for CaseA Tank05 Cs-135

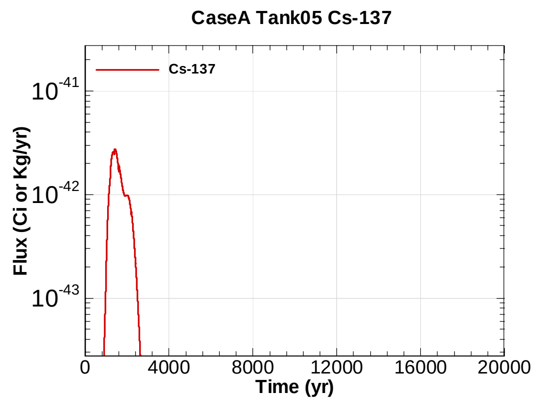

Figure A.2-378 - Water Table Flux for CaseA Tank05 Cs-137

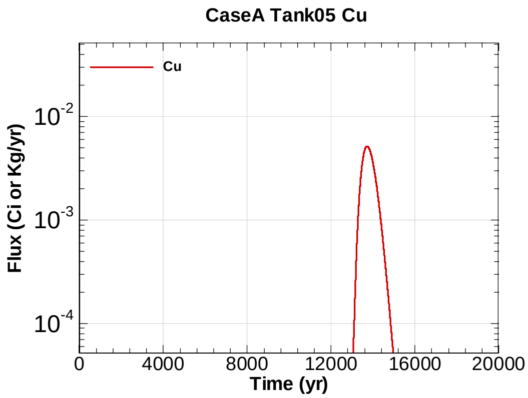

Figure A.2-379 - Water Table Flux for CaseA Tank05 Cu

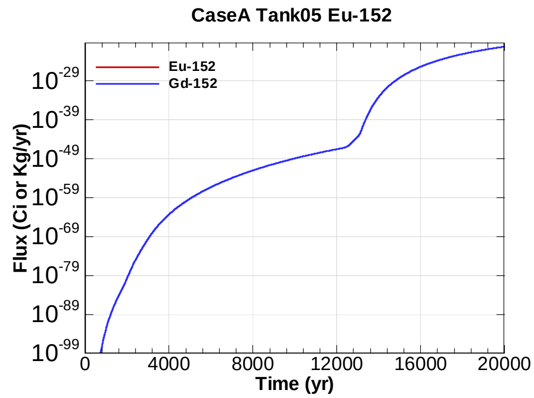

Figure A.2-380 - Water Table Flux for CaseA Tank05 Eu-152

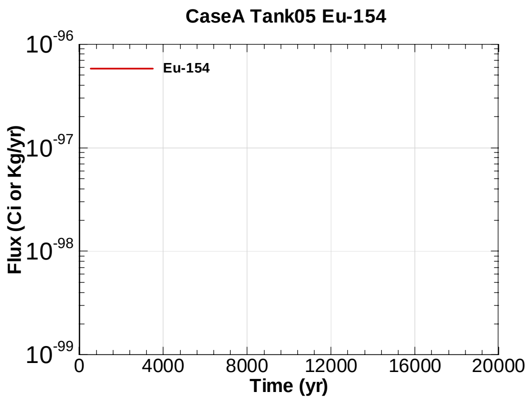

Figure A.2-381 - Water Table Flux for CaseA Tank05 Eu-154

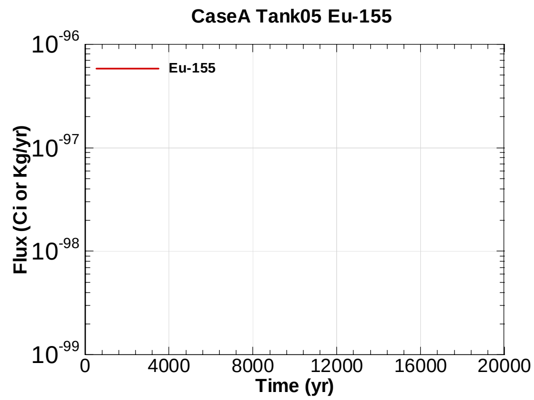

Figure A.2-382 - Water Table Flux for CaseA Tank05 Eu-155

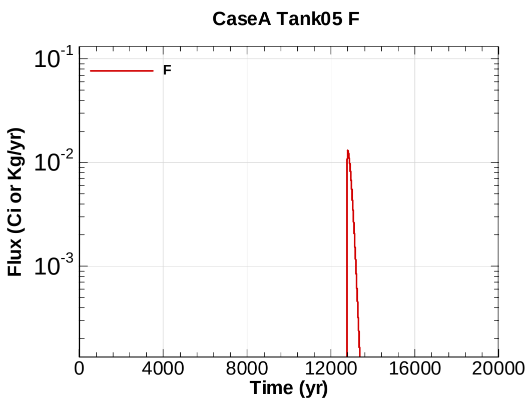

Figure A.2-383 - Water Table Flux for CaseA Tank05 F

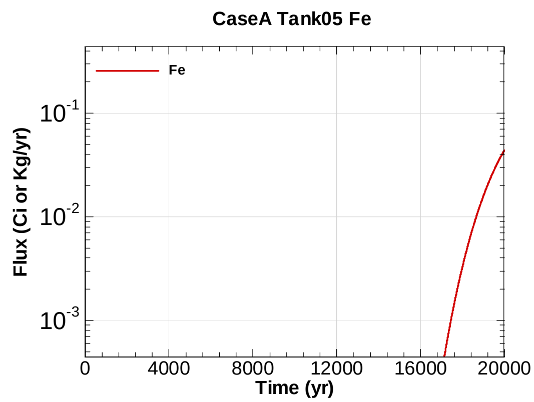

Figure A.2-384 - Water Table Flux for CaseA Tank05 Fe

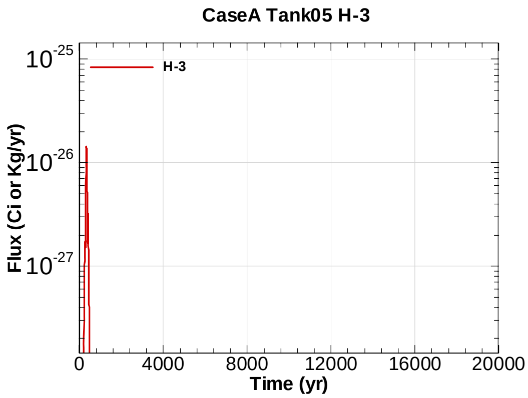

Figure A.2-385 - Water Table Flux for CaseA Tank05 H-3

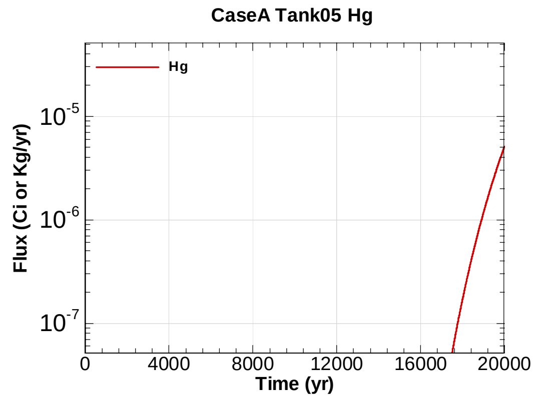

Figure A.2-386 - Water Table Flux for CaseA Tank05 Hg

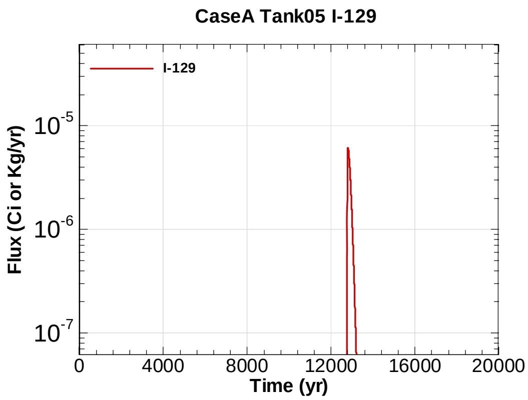

Figure A.2-387 - Water Table Flux for CaseA Tank05 I-129

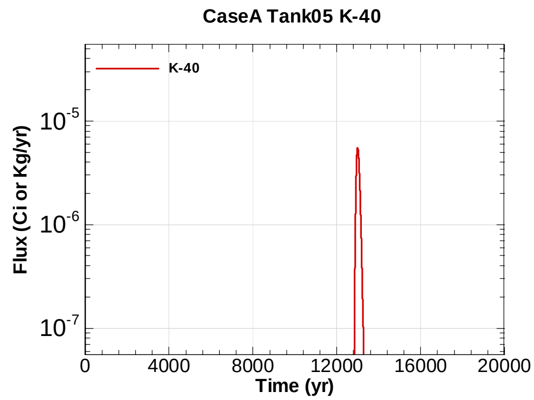

Figure A.2-388 - Water Table Flux for CaseA Tank05 K-40

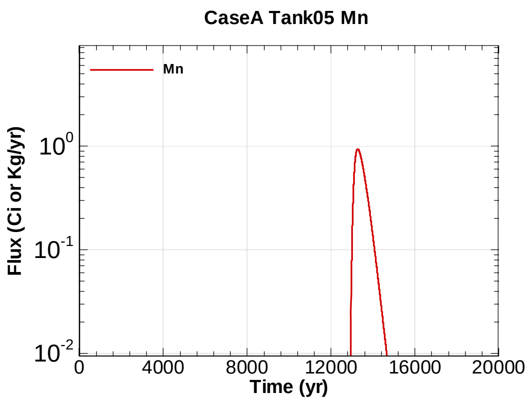

Figure A.2-389 - Water Table Flux for CaseA Tank05 Mn

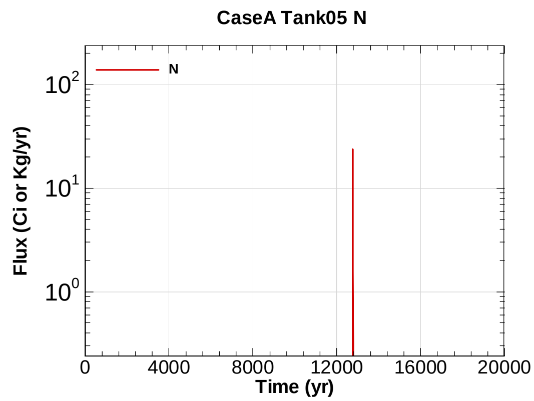

Figure A.2-390 - Water Table Flux for CaseA Tank05 N

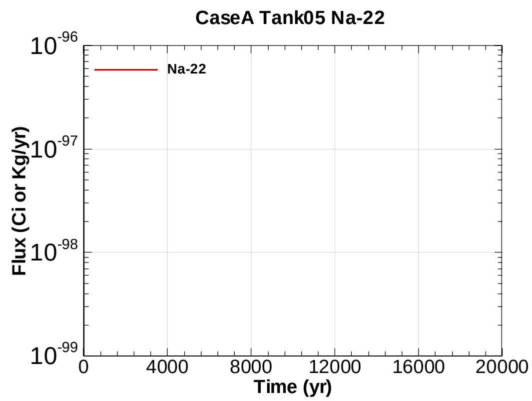

Figure A.2-391 - Water Table Flux for CaseA Tank05 Na-22

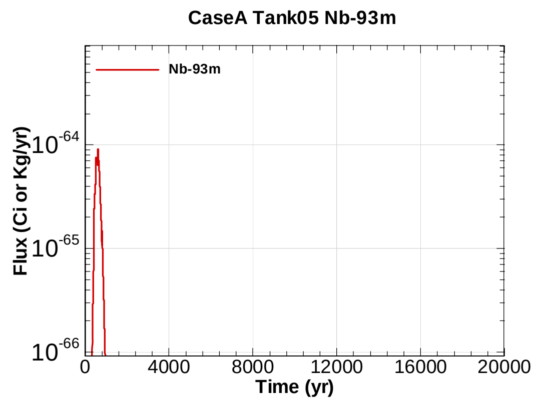

Figure A.2-392 - Water Table Flux for CaseA Tank05 Nb-93m

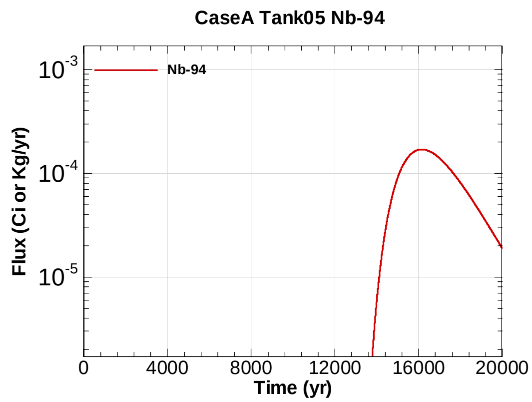

Figure A.2-393 - Water Table Flux for CaseA Tank05 Nb-94

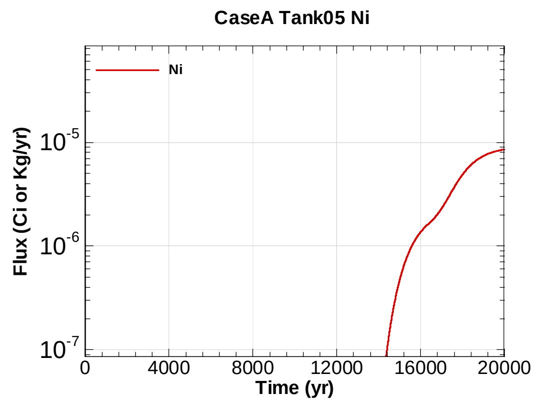

Figure A.2-394 - Water Table Flux for CaseA Tank05 Ni

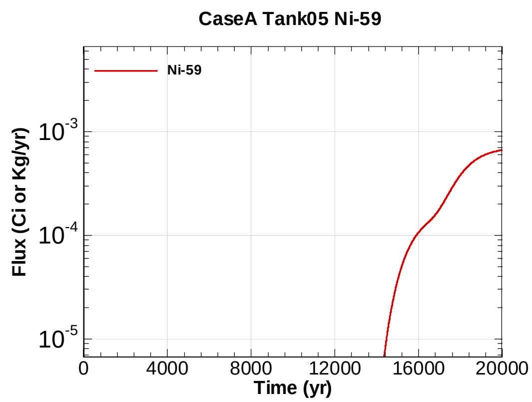

Figure A.2-395 - Water Table Flux for CaseA Tank05 Ni-59

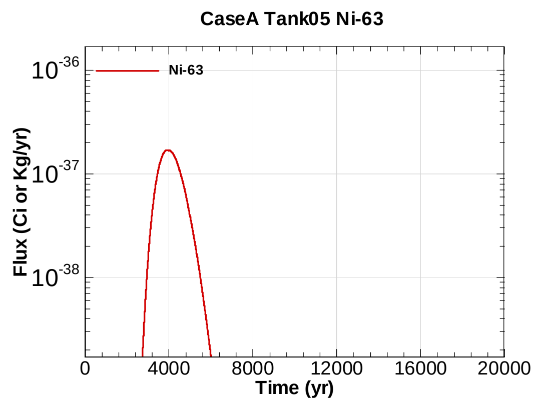

Figure A.2-396 - Water Table Flux for CaseA Tank05 Ni-63

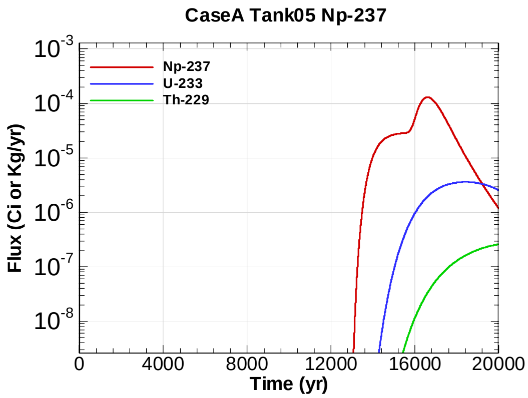

Figure A.2-397 - Water Table Flux for CaseA Tank05 Np-237

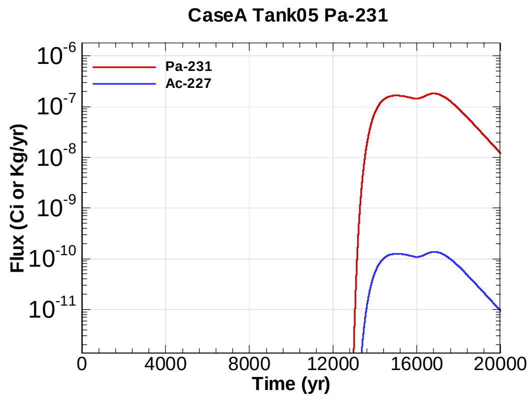

Figure A.2-398 - Water Table Flux for CaseA Tank05 Pa-231

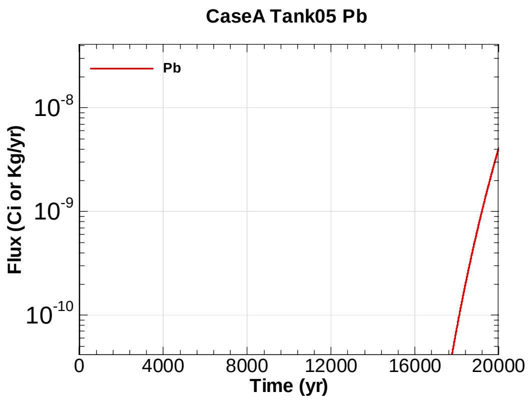

Figure A.2-399 - Water Table Flux for CaseA Tank05 Pb

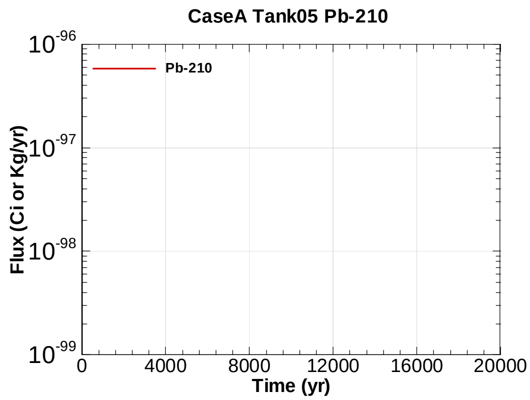

Figure A.2-400 - Water Table Flux for CaseA Tank05 Pb-210

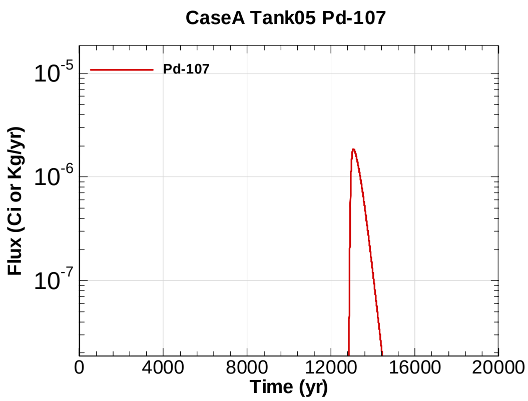

Figure A.2-401 - Water Table Flux for CaseA Tank05 Pd-107

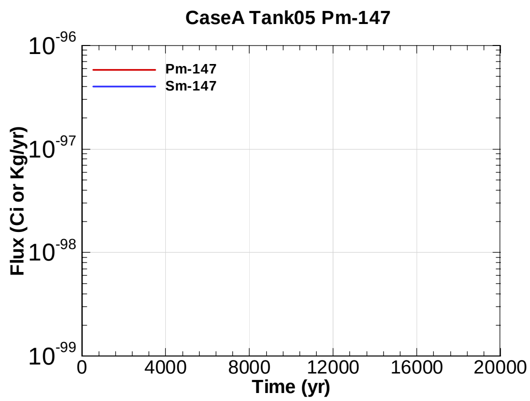

Figure A.2-402 - Water Table Flux for CaseA Tank05 Pm-147

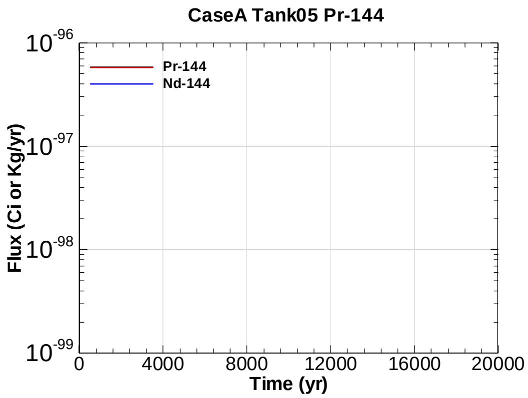

Figure A.2-403 - Water Table Flux for CaseA Tank05 Pr-144

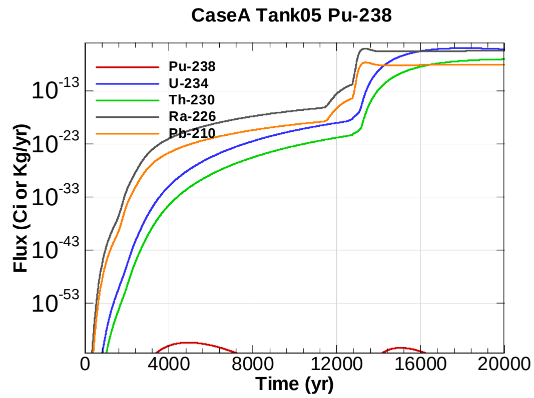

Figure A.2-404 - Water Table Flux for CaseA Tank05 Pu-238

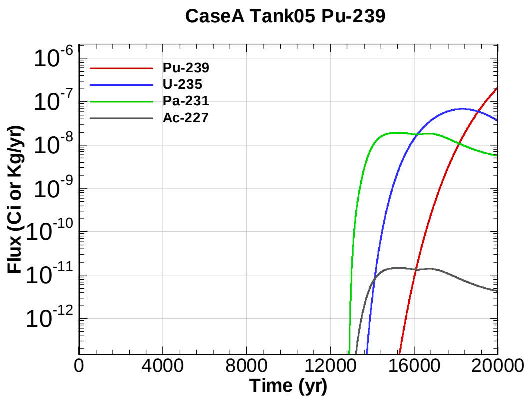

Figure A.2-405 - Water Table Flux for CaseA Tank05 Pu-239

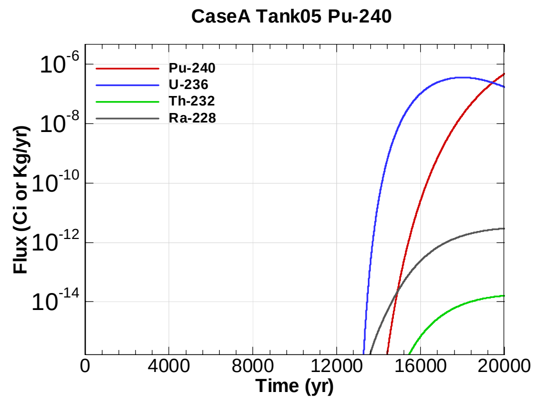

Figure A.2-406 - Water Table Flux for CaseA Tank05 Pu-240

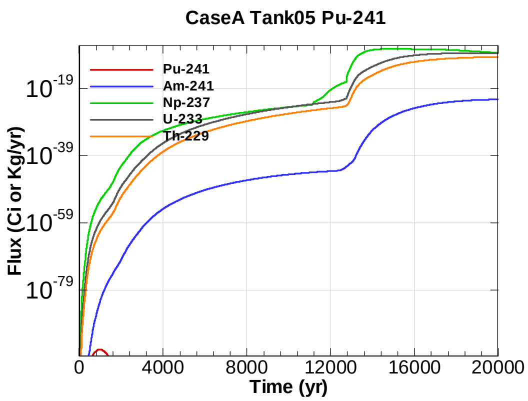

Figure A.2-407 - Water Table Flux for CaseA Tank05 Pu-241

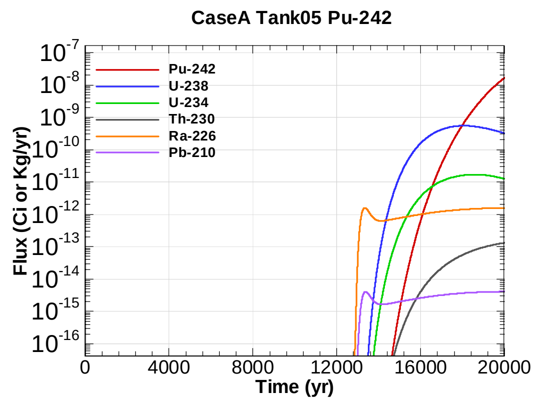

Figure A.2-408 - Water Table Flux for CaseA Tank05 Pu-242

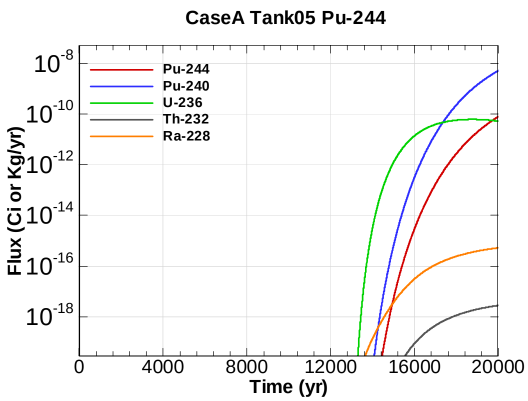

Figure A.2-409 - Water Table Flux for CaseA Tank05 Pu-244

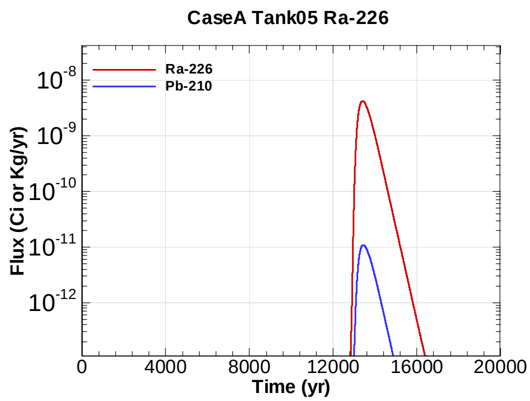

Figure A.2-410 - Water Table Flux for CaseA Tank05 Ra-226

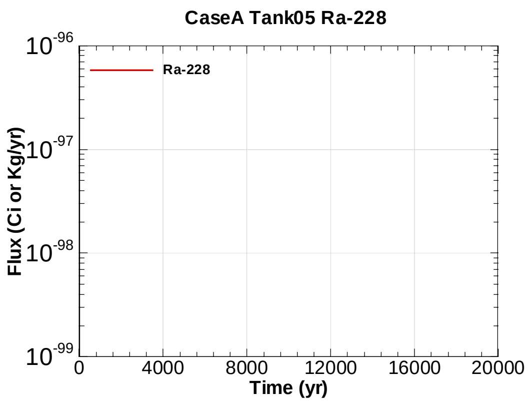

Figure A.2-411 - Water Table Flux for CaseA Tank05 Ra-228

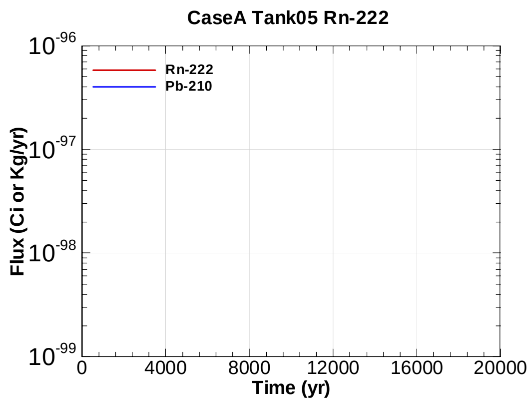

Figure A.2-412 - Water Table Flux for CaseA Tank05 Rn-222

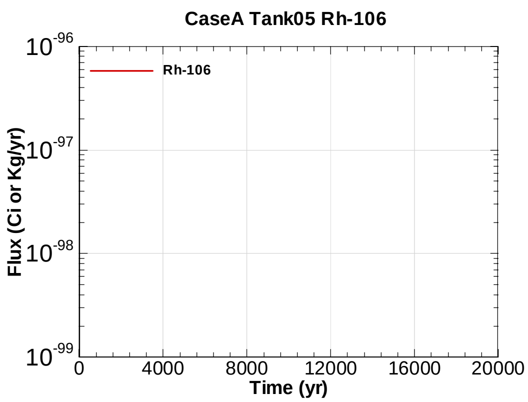

Figure A.2-413 - Water Table Flux for CaseA Tank05 Rh-106

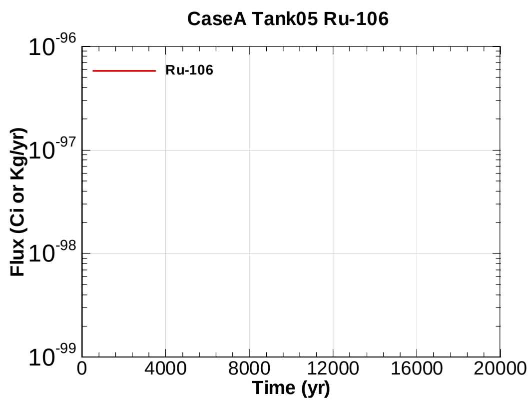

Figure A.2-414 - Water Table Flux for CaseA Tank05 Ru-106

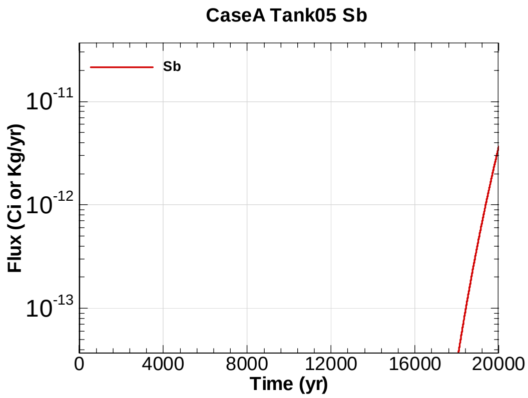

Figure A.2-415 - Water Table Flux for CaseA Tank05 Sb

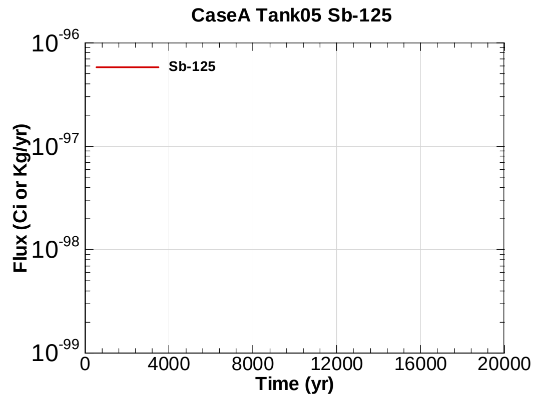

Figure A.2-416 - Water Table Flux for CaseA Tank05 Sb-125

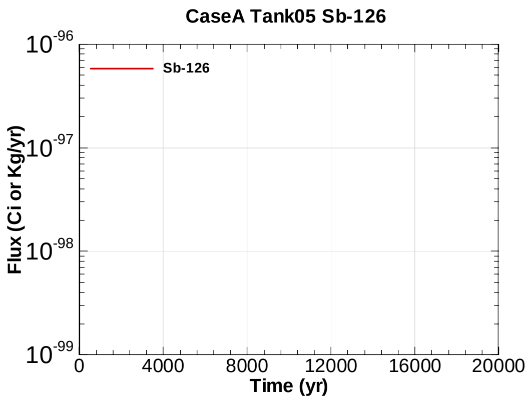

Figure A.2-417 - Water Table Flux for CaseA Tank05 Sb-126

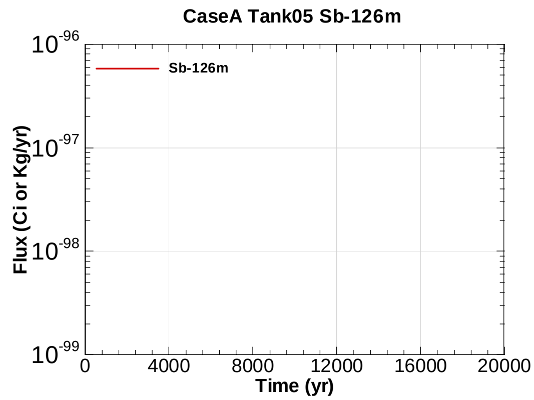

Figure A.2-418 - Water Table Flux for CaseA Tank05 Sb-126m

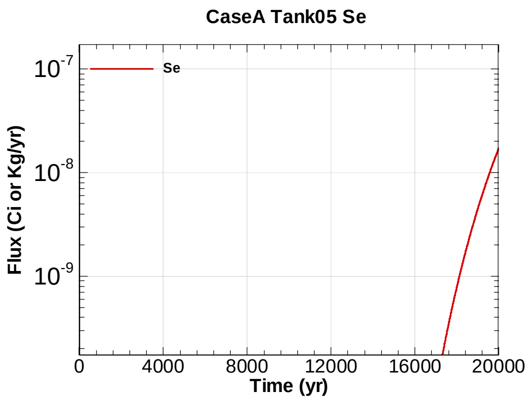

Figure A.2-419 - Water Table Flux for CaseA Tank05 Se

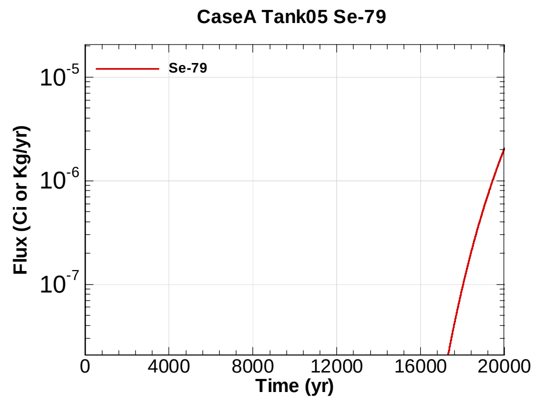

Figure A.2-420 - Water Table Flux for CaseA Tank05 Se-79

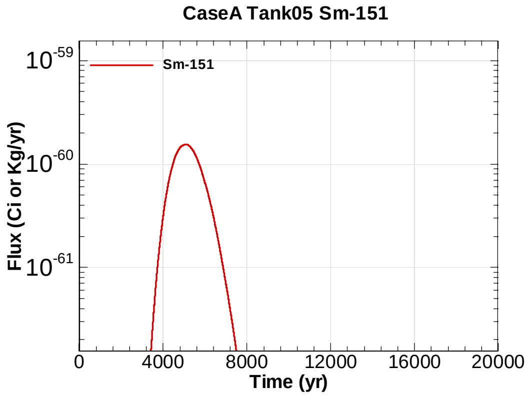

Figure A.2-421 - Water Table Flux for CaseA Tank05 Sm-151

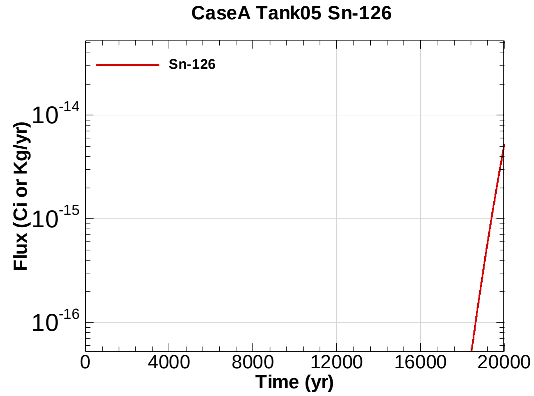

Figure A.2-422 - Water Table Flux for CaseA Tank05 Sn-126

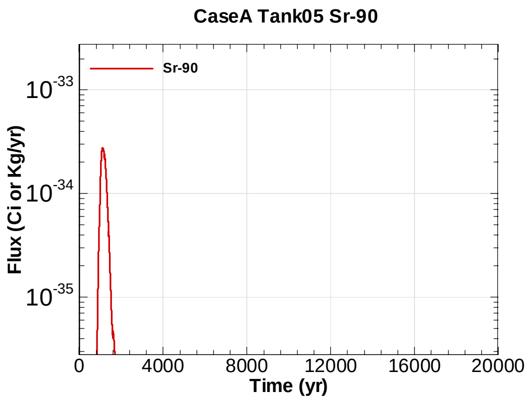

Figure A.2-423 - Water Table Flux for CaseA Tank05 Sr-90

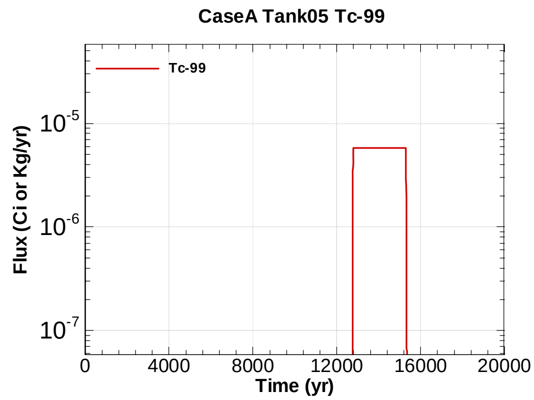

Figure A.2-424 - Water Table Flux for CaseA Tank05 Tc-99

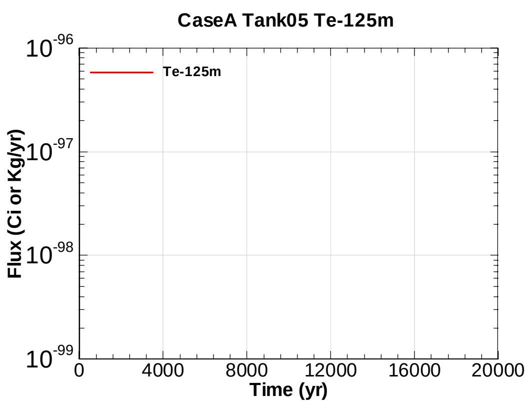

Figure A.2-425 - Water Table Flux for CaseA Tank05 Te-125m

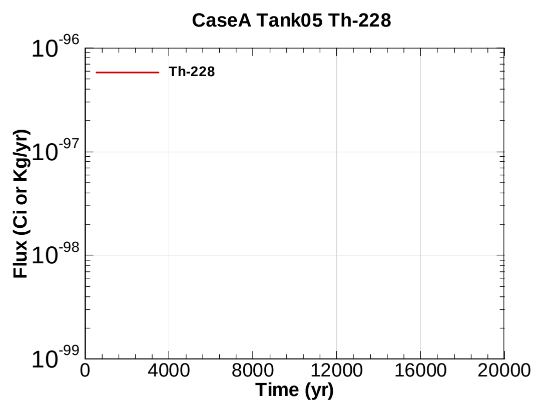

Figure A.2-426 - Water Table Flux for CaseA Tank05 Th-228

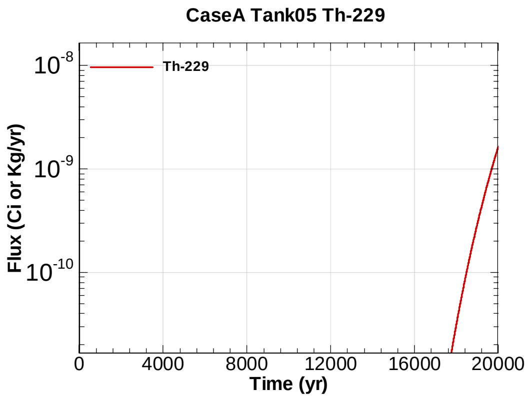

Figure A.2-427 - Water Table Flux for CaseA Tank05 Th-229

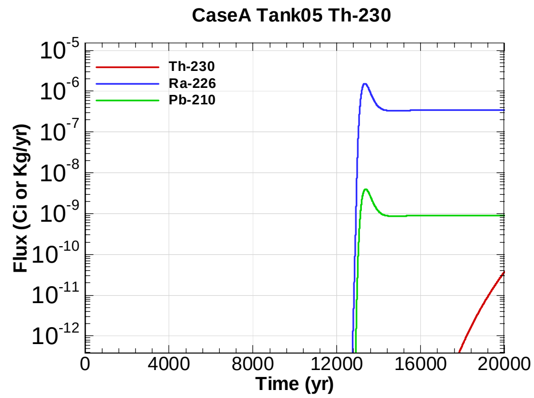

Figure A.2-428 - Water Table Flux for CaseA Tank05 Th-230

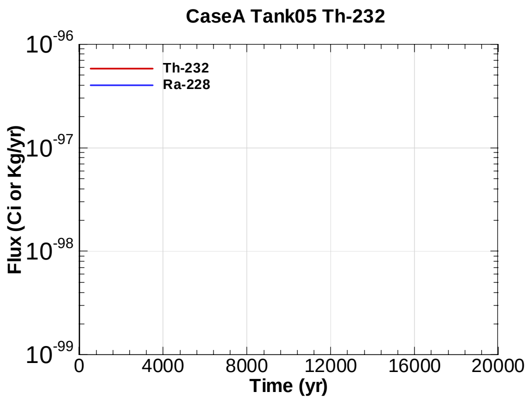

Figure A.2-429 - Water Table Flux for CaseA Tank05 Th-232

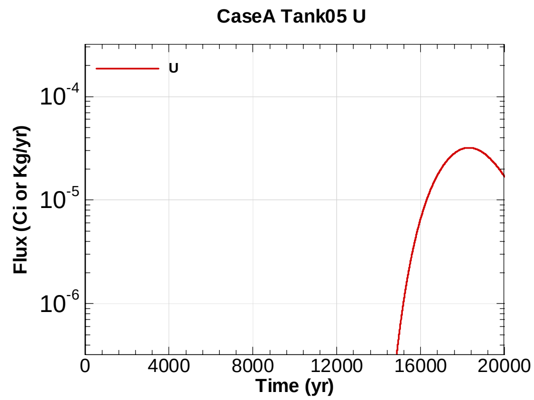

Figure A.2-430 - Water Table Flux for CaseA Tank05 U

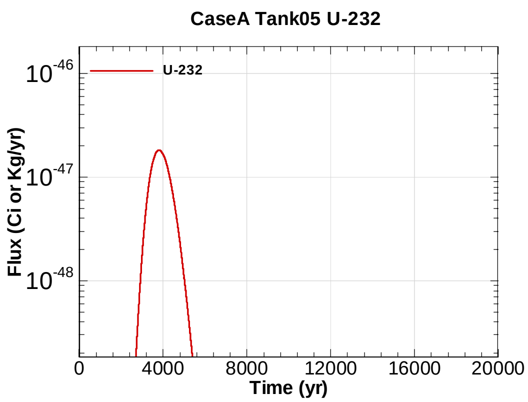

Figure A.2-431 - Water Table Flux for CaseA Tank05 U-232

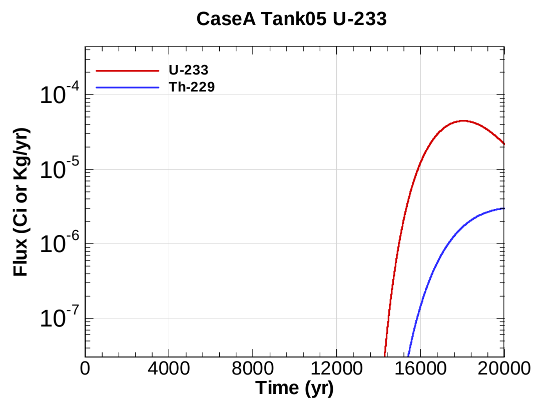

Figure A.2-432 - Water Table Flux for CaseA Tank05 U-233

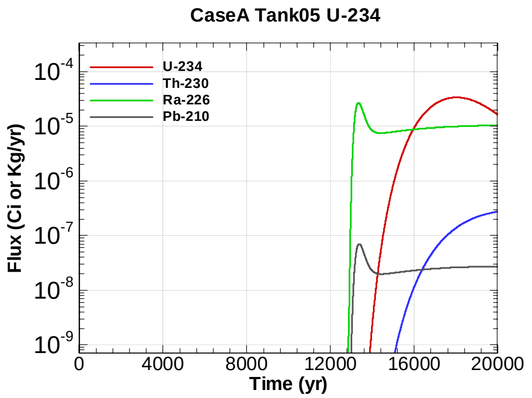

Figure A.2-433 - Water Table Flux for CaseA Tank05 U-234

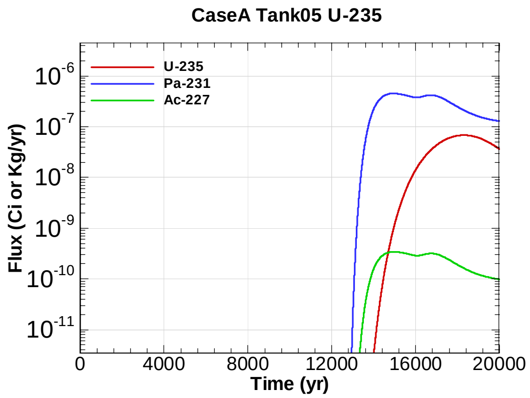

Figure A.2-434 - Water Table Flux for CaseA Tank05 U-235

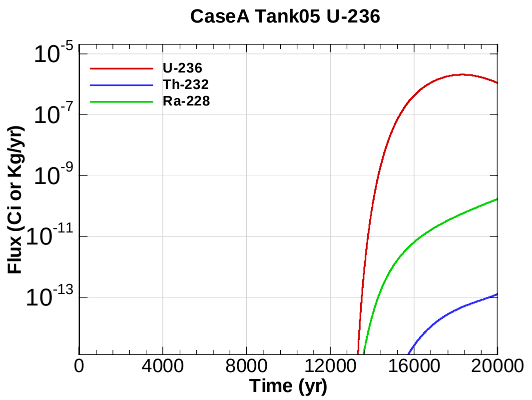

Figure A.2-435 - Water Table Flux for CaseA Tank05 U-236

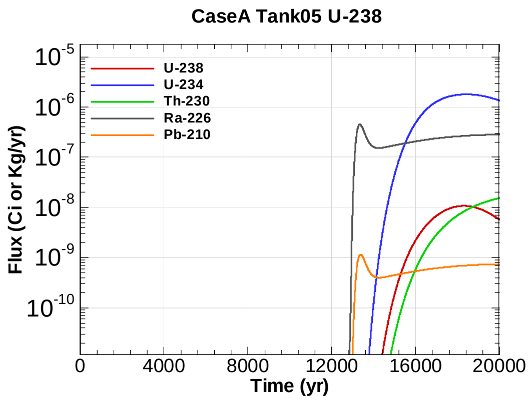

Figure A.2-436 - Water Table Flux for CaseA Tank05 U-238

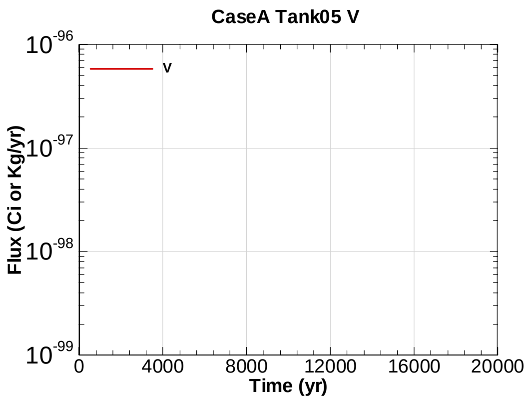

Figure A.2-437 - Water Table Flux for CaseA Tank05 V

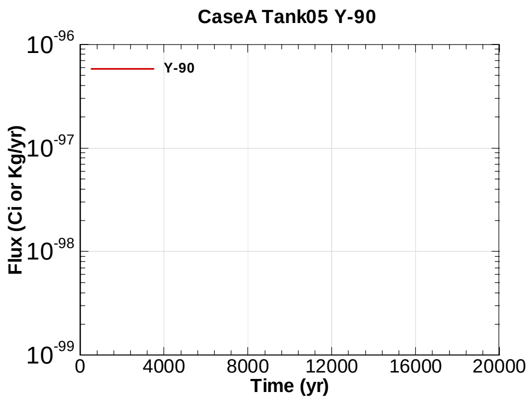

Figure A.2-438 - Water Table Flux for CaseA Tank05 Y-90

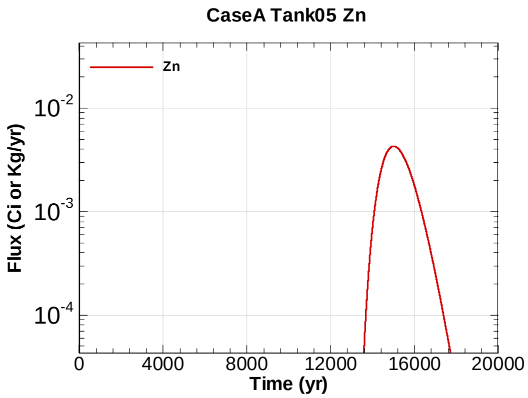

Figure A.2-439 - Water Table Flux for CaseA Tank05 Zn

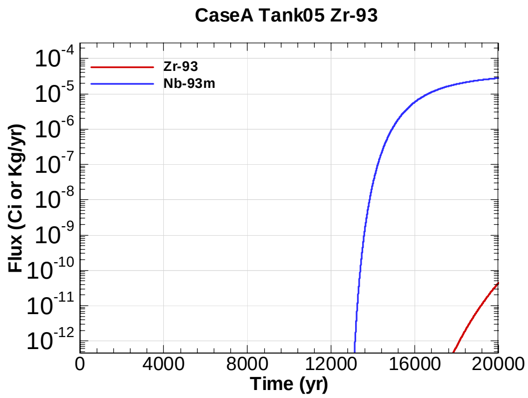

Figure A.2-440 - Water Table Flux for CaseA Tank05 Zr-93

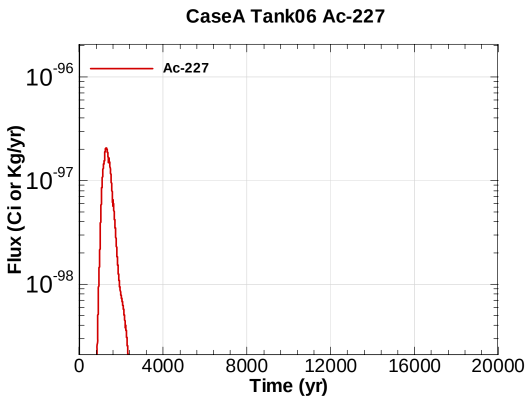

Figure A.2-441 - Water Table Flux for CaseA Tank06 Ac-227

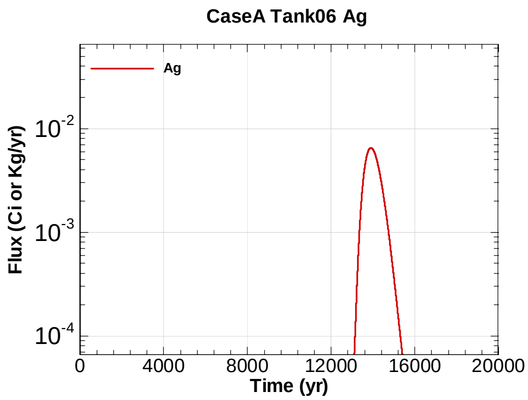

Figure A.2-442 - Water Table Flux for CaseA Tank06 Ag

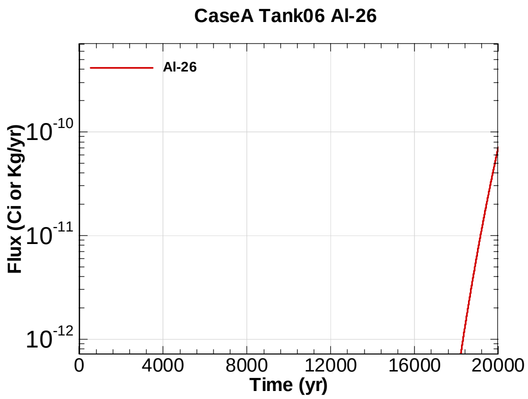

Figure A.2-443 - Water Table Flux for CaseA Tank06 Al-26

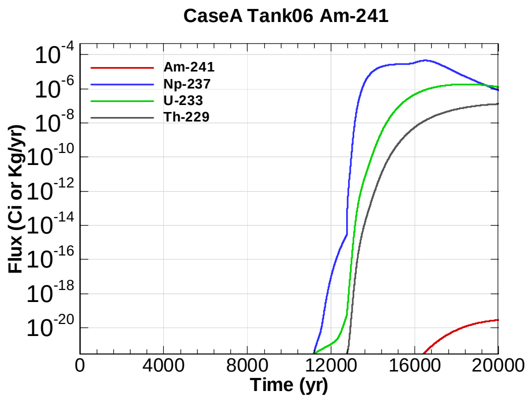

Figure A.2-444 - Water Table Flux for CaseA Tank06 Am-241

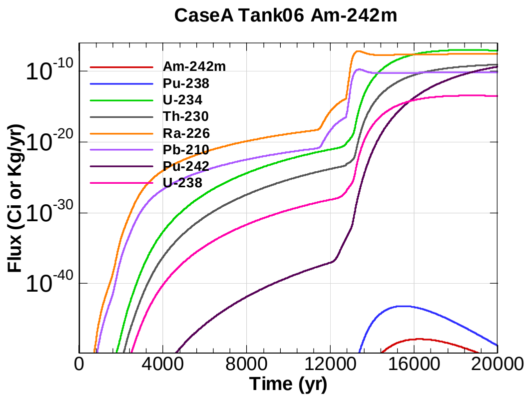

Figure A.2-445 - Water Table Flux for CaseA Tank06 Am-242m

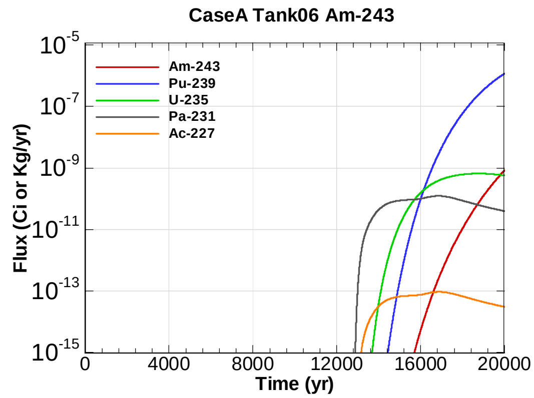

Figure A.2-446 - Water Table Flux for CaseA Tank06 Am-243

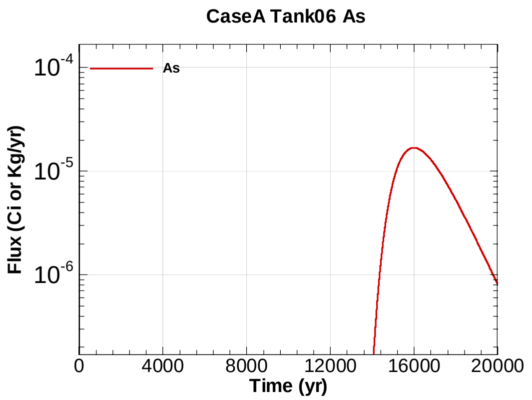

Figure A.2-447 - Water Table Flux for CaseA Tank06 As

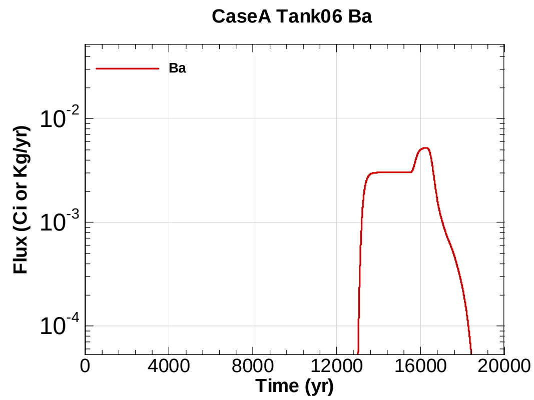

Figure A.2-448 - Water Table Flux for CaseA Tank06 Ba

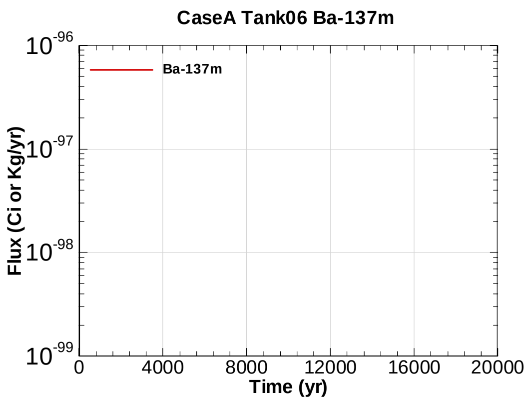

Figure A.2-449 - Water Table Flux for CaseA Tank06 Ba-137m

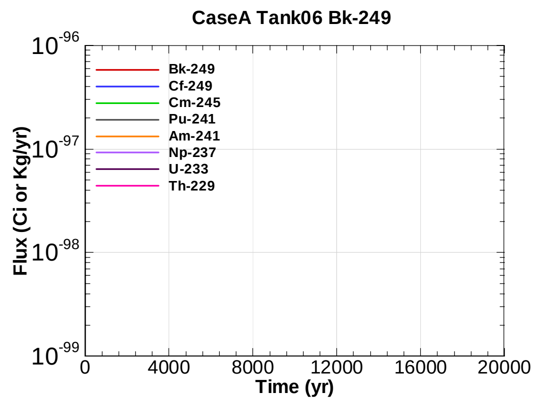

Figure A.2-450 - Water Table Flux for CaseA Tank06 Bk-249

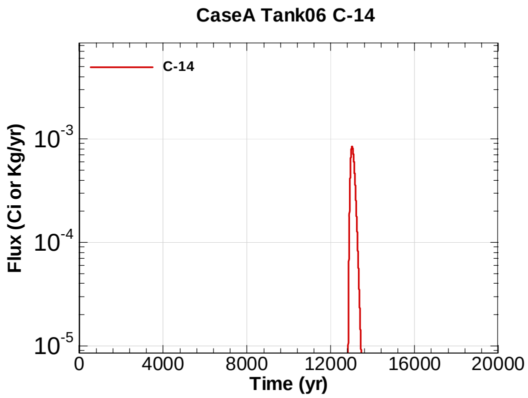

Figure A.2-451 - Water Table Flux for CaseA Tank06 C-14

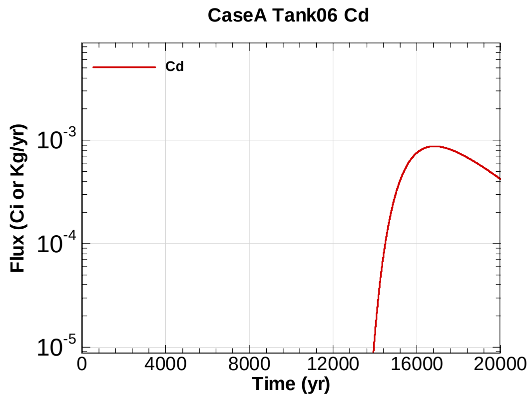

Figure A.2-452 - Water Table Flux for CaseA Tank06 Cd

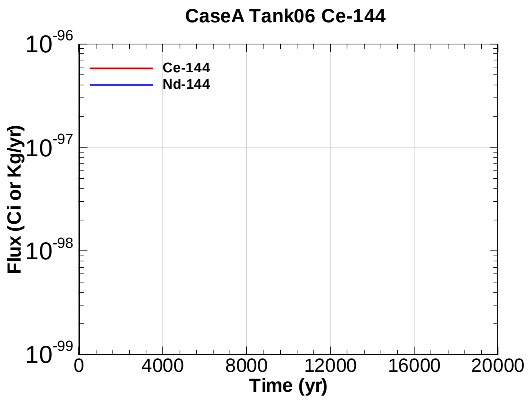

Figure A.2-453 - Water Table Flux for CaseA Tank06 Ce-144

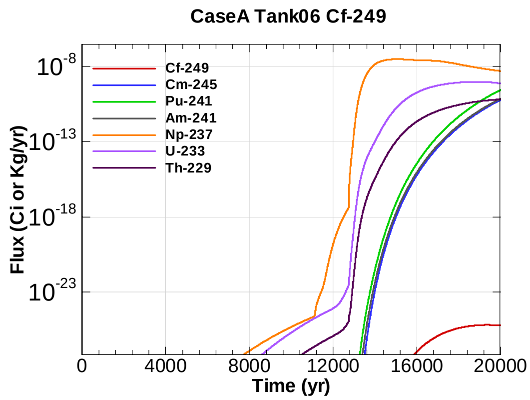

Figure A.2-454 - Water Table Flux for CaseA Tank06 Cf-249

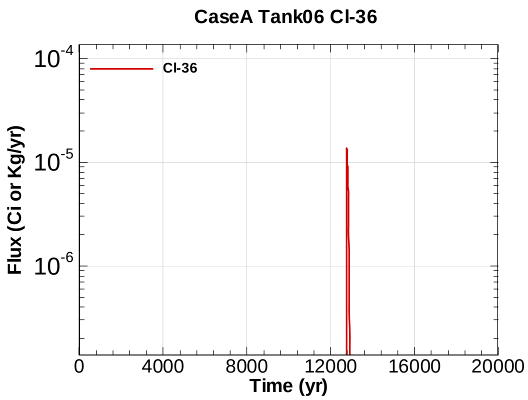

Figure A.2-455 - Water Table Flux for CaseA Tank06 Cl-36

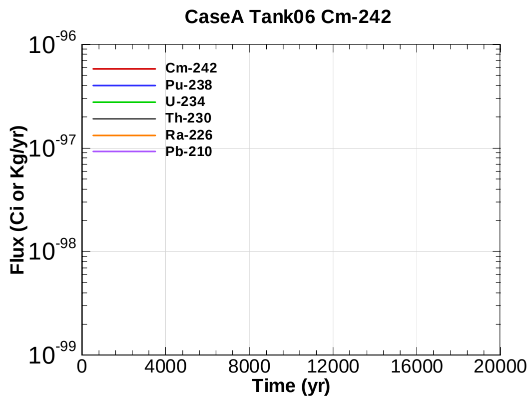

Figure A.2-456 - Water Table Flux for CaseA Tank06 Cm-242

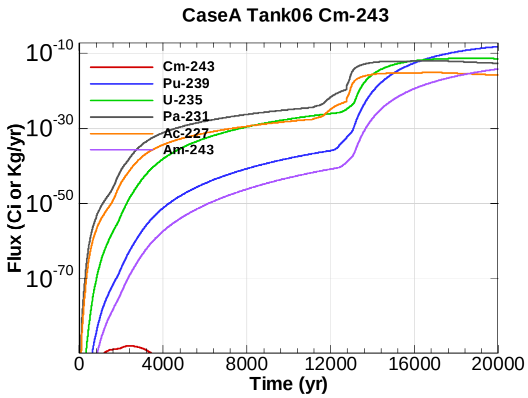

Figure A.2-457 - Water Table Flux for CaseA Tank06 Cm-243

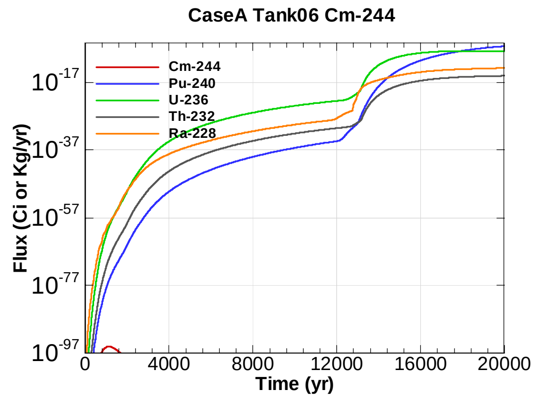

Figure A.2-458 - Water Table Flux for CaseA Tank06 Cm-244

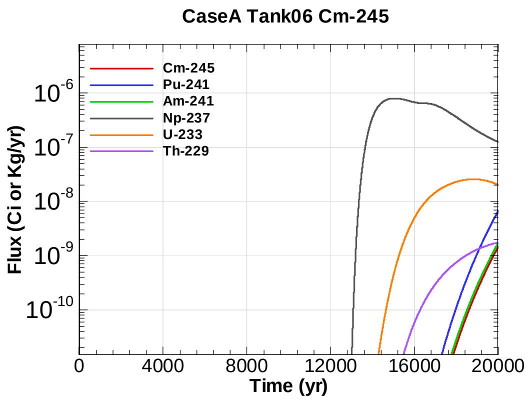

Figure A.2-459 - Water Table Flux for CaseA Tank06 Cm-245

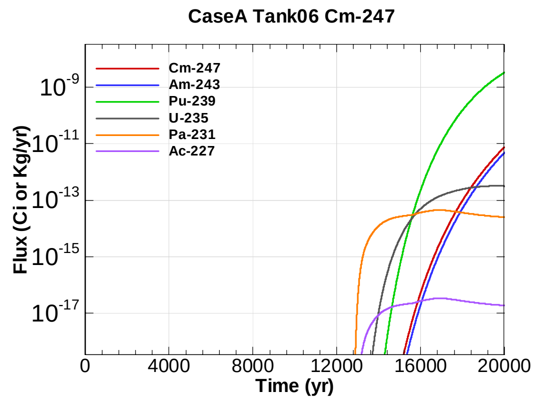

Figure A.2-460 - Water Table Flux for CaseA Tank06 Cm-247

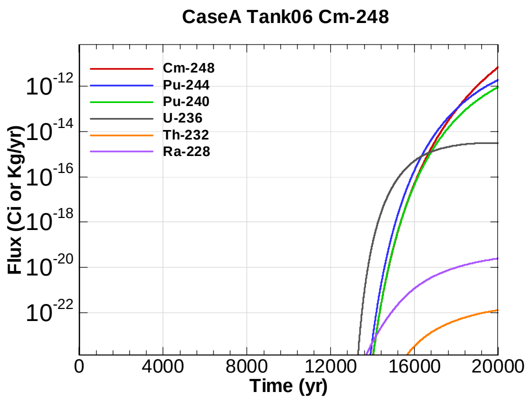

Figure A.2-461 - Water Table Flux for CaseA Tank06 Cm-248

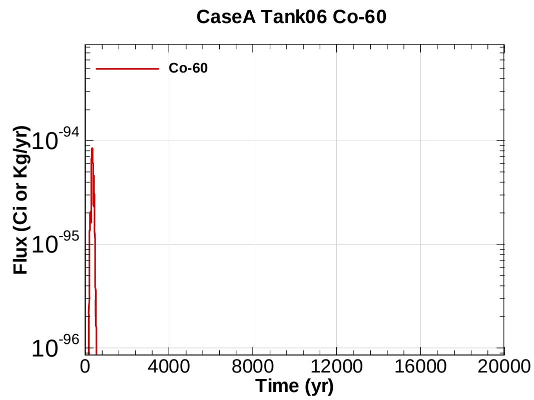

Figure A.2-462 - Water Table Flux for CaseA Tank06 Co-60

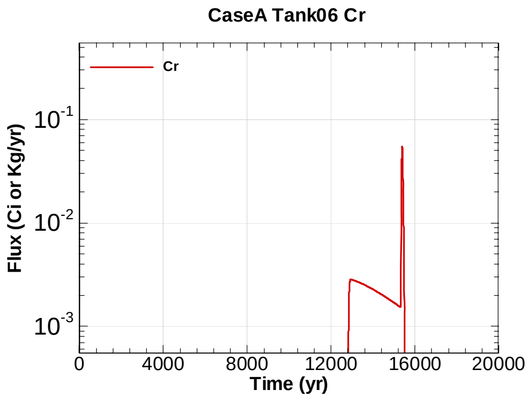

Figure A.2-463 - Water Table Flux for CaseA Tank06 Cr

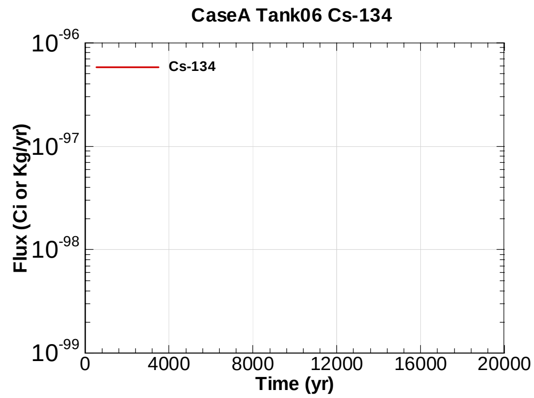

Figure A.2-464 - Water Table Flux for CaseA Tank06 Cs-134

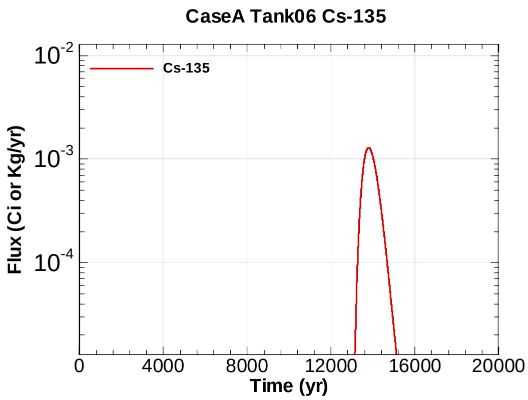

Figure A.2-465 - Water Table Flux for CaseA Tank06 Cs-135

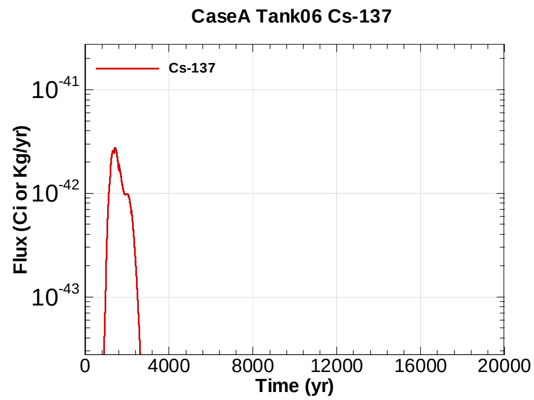

Figure A.2-466 - Water Table Flux for CaseA Tank06 Cs-137

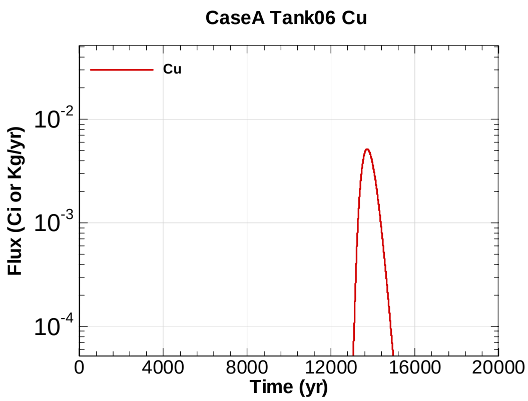

Figure A.2-467 - Water Table Flux for CaseA Tank06 Cu

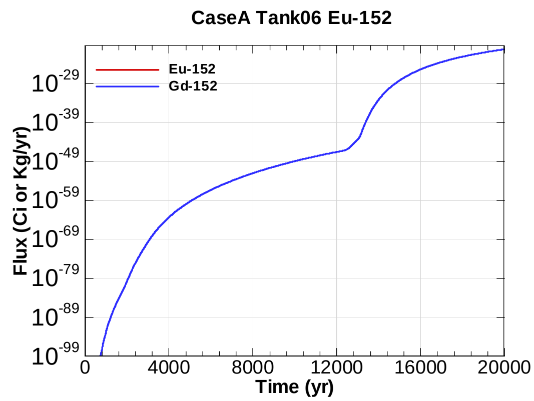

Figure A.2-468 - Water Table Flux for CaseA Tank06 Eu-152

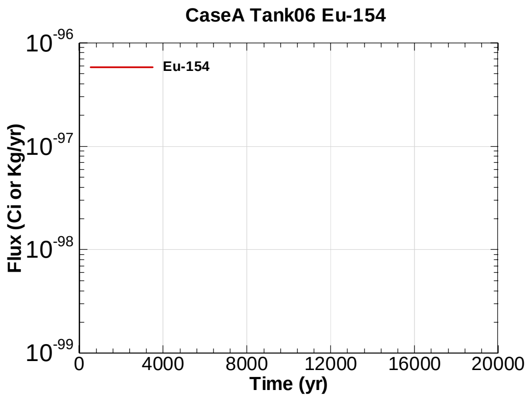

Figure A.2-469 - Water Table Flux for CaseA Tank06 Eu-154

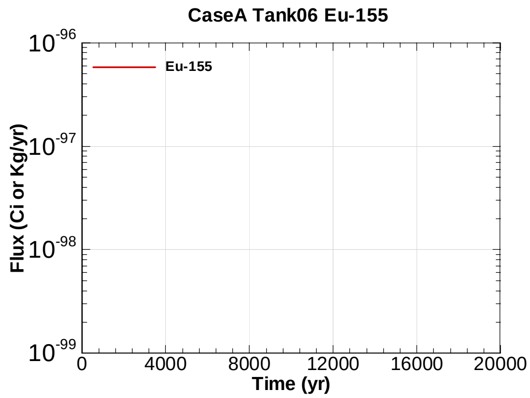

Figure A.2-470 - Water Table Flux for CaseA Tank06 Eu-155

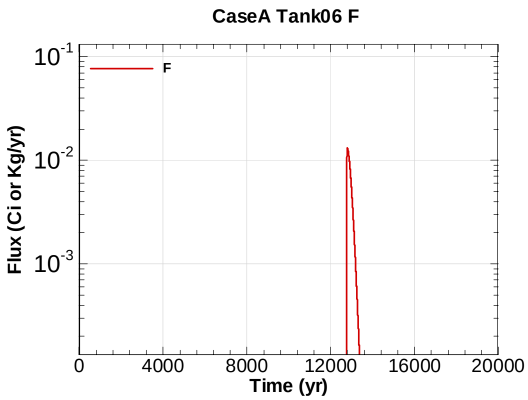

Figure A.2-471 - Water Table Flux for CaseA Tank06 F

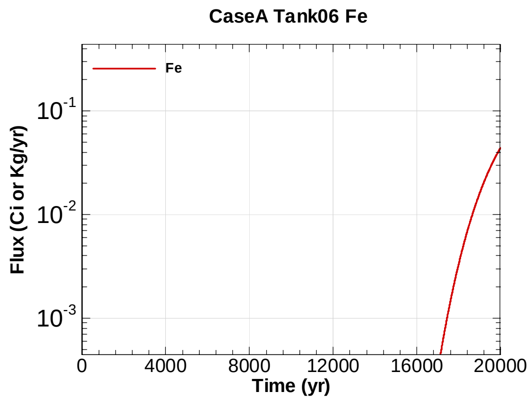

Figure A.2-472 - Water Table Flux for CaseA Tank06 Fe

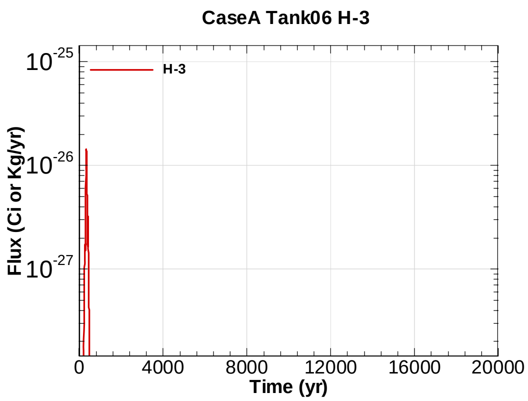

Figure A.2-473 - Water Table Flux for CaseA Tank06 H-3

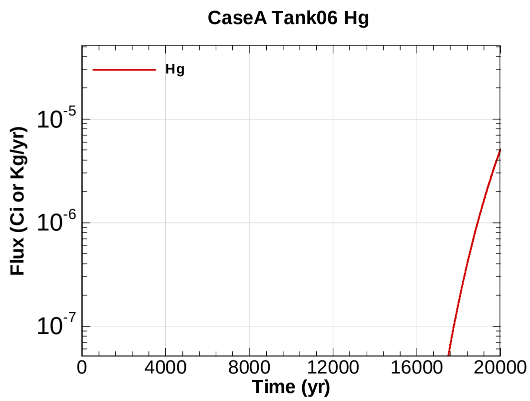

Figure A.2-474 - Water Table Flux for CaseA Tank06 Hg

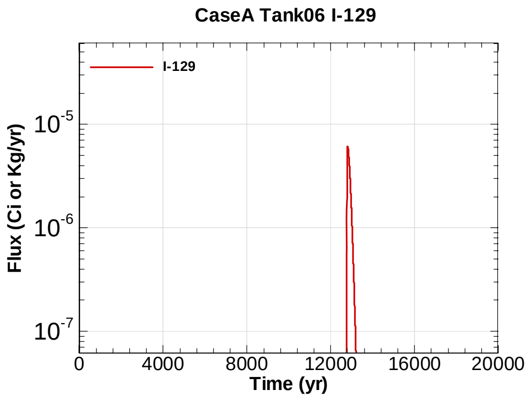

Figure A.2-475 - Water Table Flux for CaseA Tank06 I-129

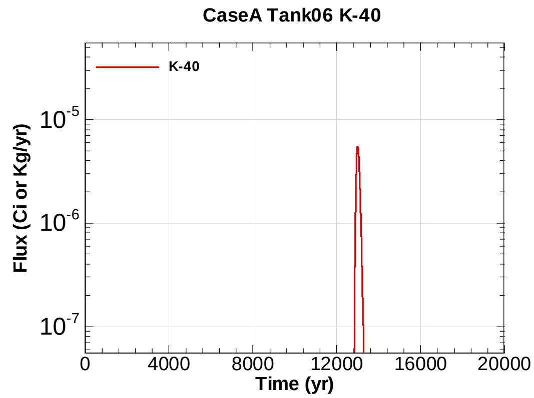

Figure A.2-476 - Water Table Flux for CaseA Tank06 K-40

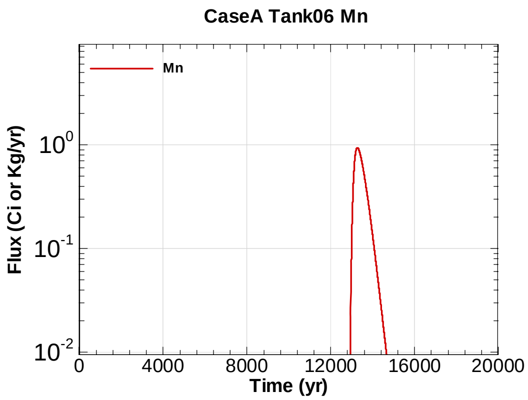

Figure A.2-477 - Water Table Flux for CaseA Tank06 Mn

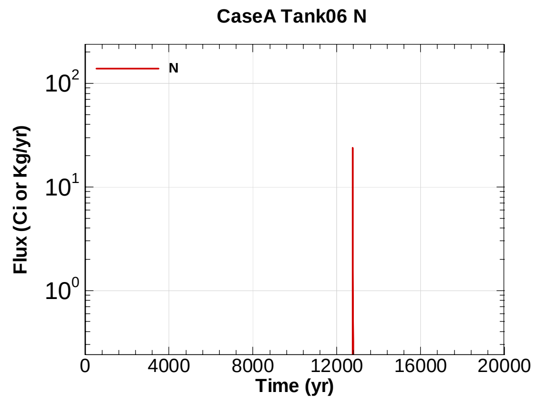

Figure A.2-478 - Water Table Flux for CaseA Tank06 N

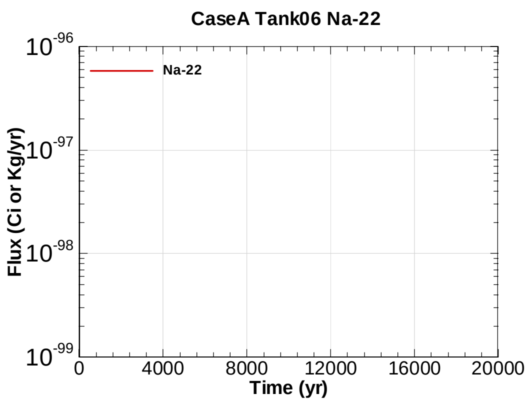

Figure A.2-479 - Water Table Flux for CaseA Tank06 Na-22

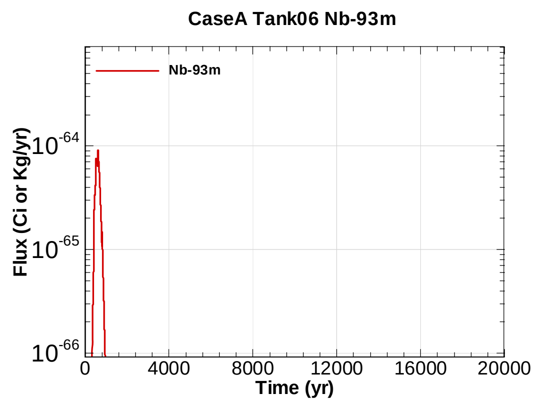

Figure A.2-480 - Water Table Flux for CaseA Tank06 Nb-93m

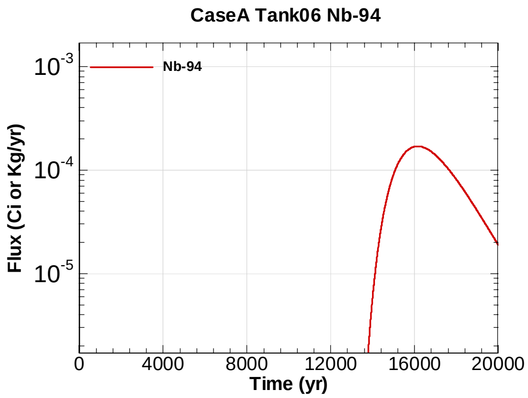

Figure A.2-481 - Water Table Flux for CaseA Tank06 Nb-94

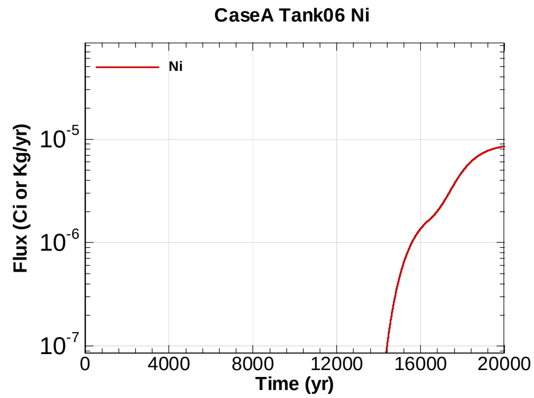

Figure A.2-482 - Water Table Flux for CaseA Tank06 Ni

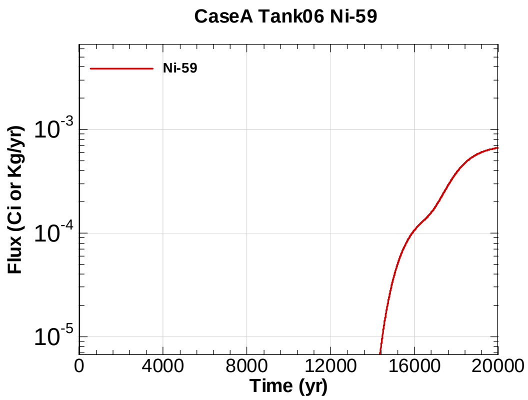

Figure A.2-483 - Water Table Flux for CaseA Tank06 Ni-59

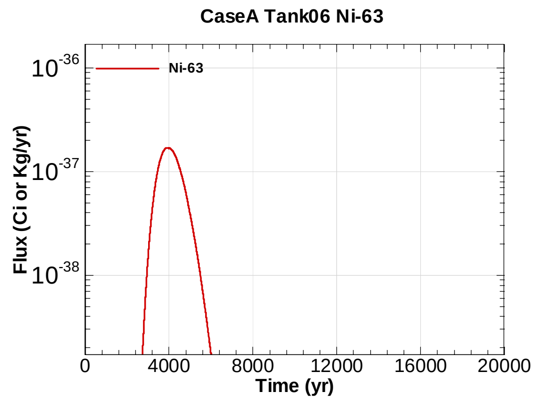

Figure A.2-484 - Water Table Flux for CaseA Tank06 Ni-63

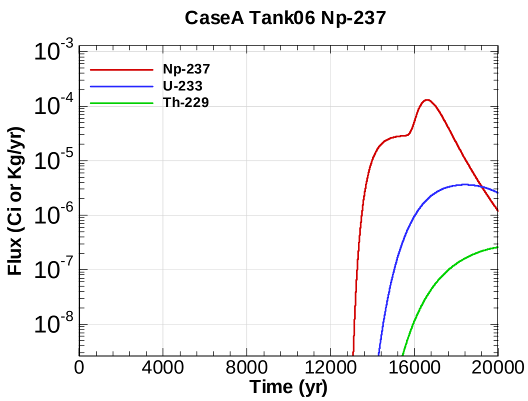

Figure A.2-485 - Water Table Flux for CaseA Tank06 Np-237

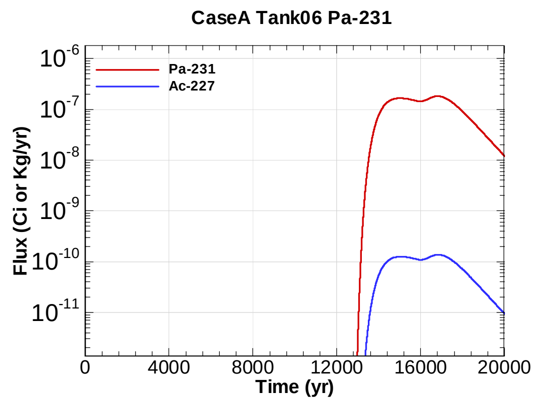

Figure A.2-486 - Water Table Flux for CaseA Tank06 Pa-231

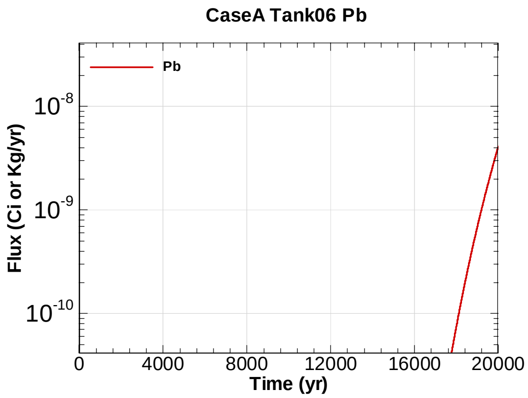

Figure A.2-487 - Water Table Flux for CaseA Tank06 Pb

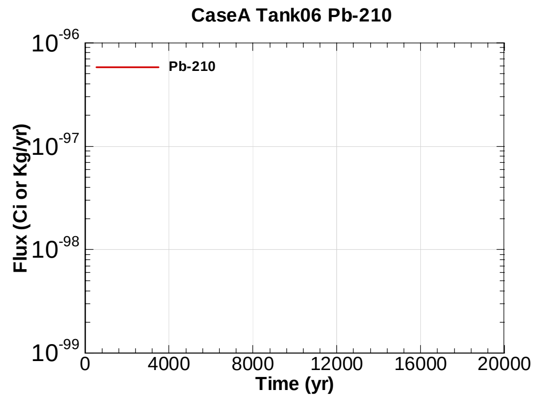

Figure A.2-488 - Water Table Flux for CaseA Tank06 Pb-210

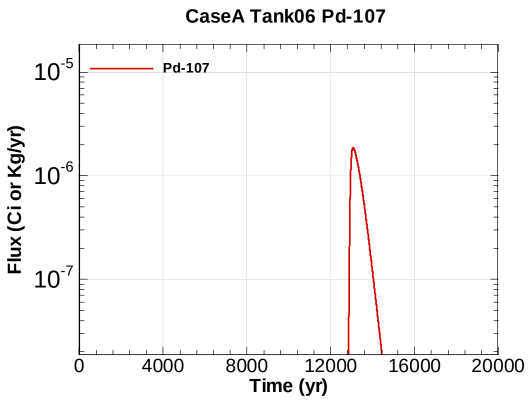

Figure A.2-489 - Water Table Flux for CaseA Tank06 Pd-107

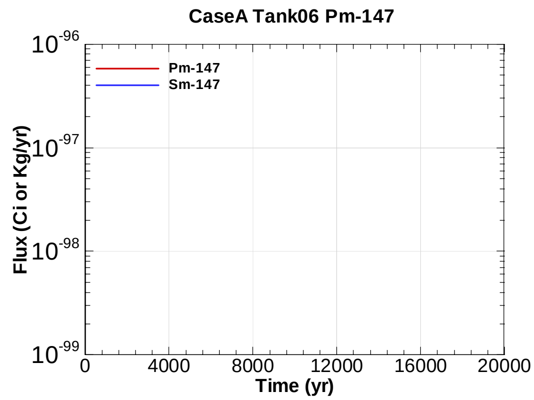

Figure A.2-490 - Water Table Flux for CaseA Tank06 Pm-147

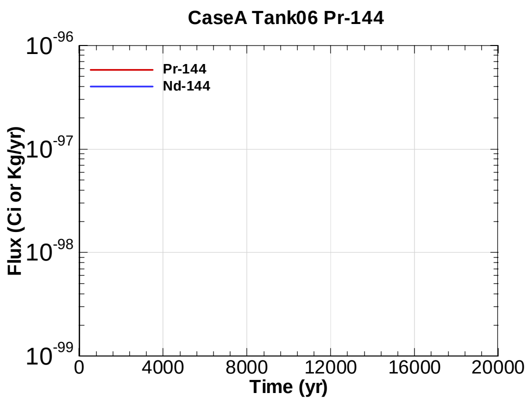

Figure A.2-491 - Water Table Flux for CaseA Tank06 Pr-144

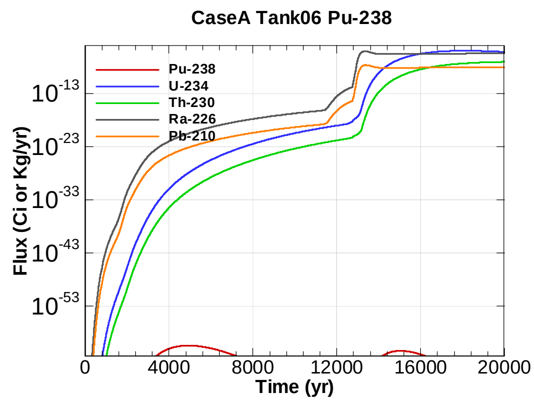

Figure A.2-492 - Water Table Flux for CaseA Tank06 Pu-238

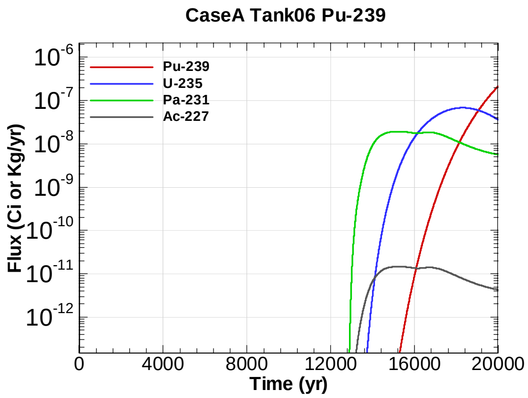

Figure A.2-493 - Water Table Flux for CaseA Tank06 Pu-239

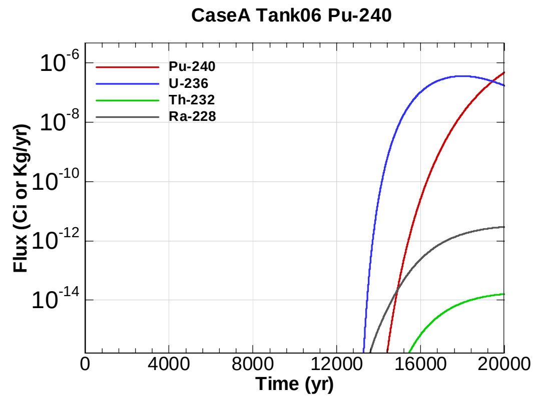

Figure A.2-494 - Water Table Flux for CaseA Tank06 Pu-240

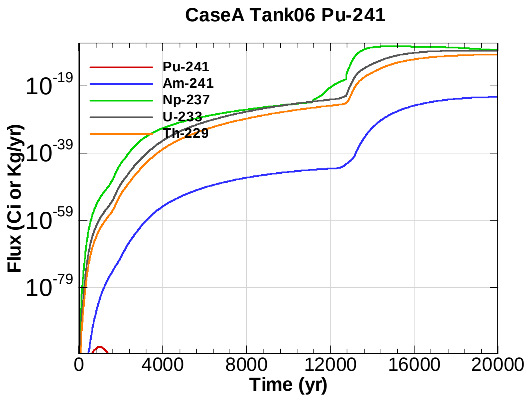

Figure A.2-495 - Water Table Flux for CaseA Tank06 Pu-241

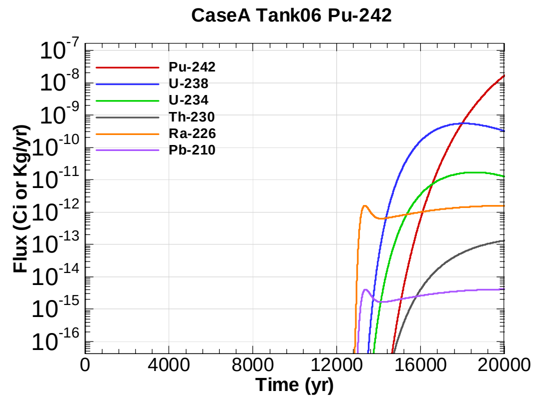

Figure A.2-496 - Water Table Flux for CaseA Tank06 Pu-242

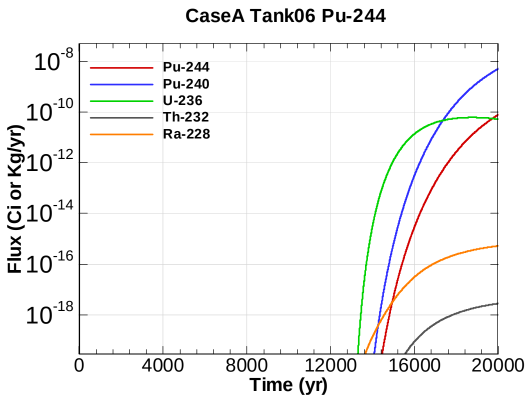

Figure A.2-497 - Water Table Flux for CaseA Tank06 Pu-244

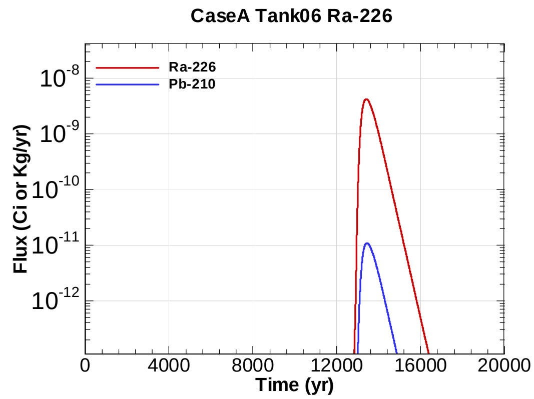

Figure A.2-498 - Water Table Flux for CaseA Tank06 Ra-226

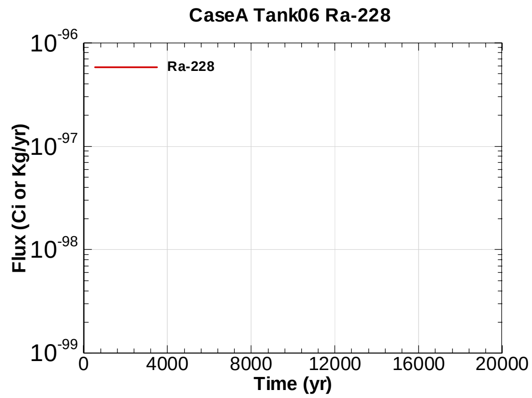

Figure A.2-499 - Water Table Flux for CaseA Tank06 Ra-228

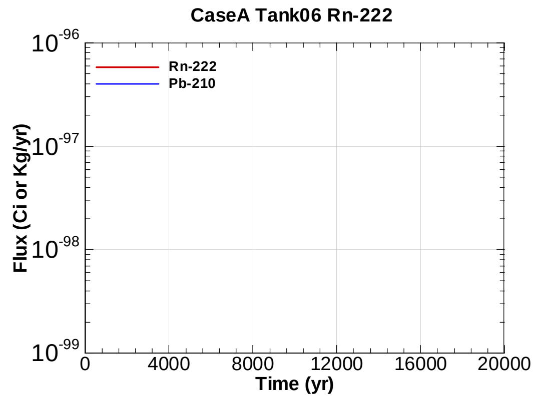

Figure A.2-500 - Water Table Flux for CaseA Tank06 Rn-222

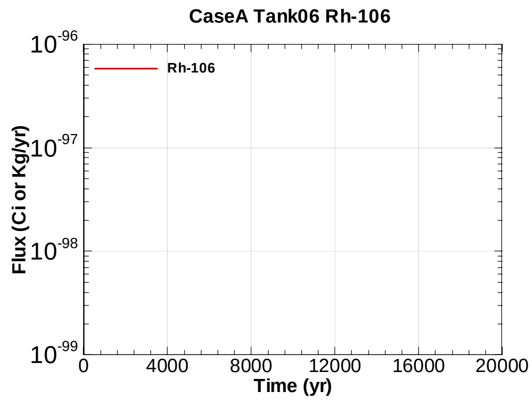

Figure A.2-501 - Water Table Flux for CaseA Tank06 Rh-106

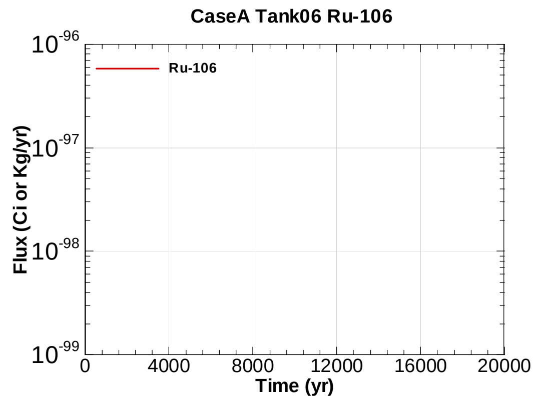

Figure A.2-502 - Water Table Flux for CaseA Tank06 Ru-106

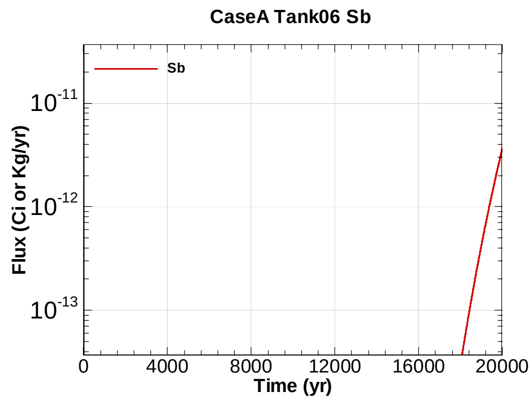

Figure A.2-503 - Water Table Flux for CaseA Tank06 Sb

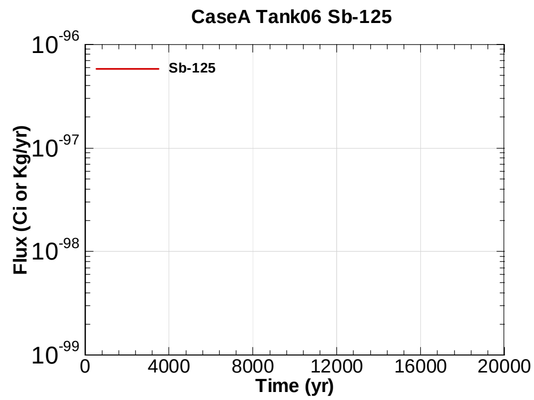

Figure A.2-504 - Water Table Flux for CaseA Tank06 Sb-125

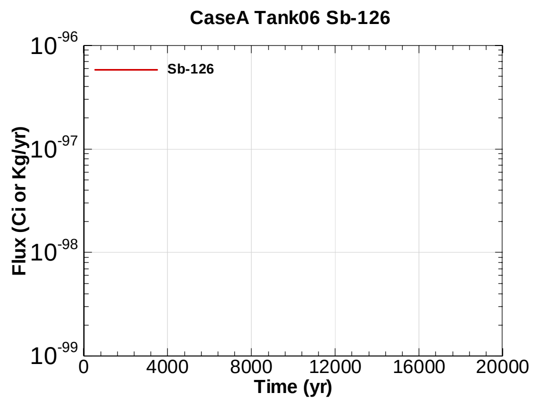

Figure A.2-505 - Water Table Flux for CaseA Tank06 Sb-126

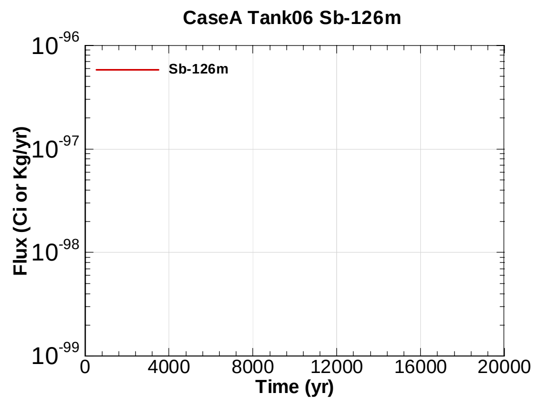

Figure A.2-506 - Water Table Flux for CaseA Tank06 Sb-126m

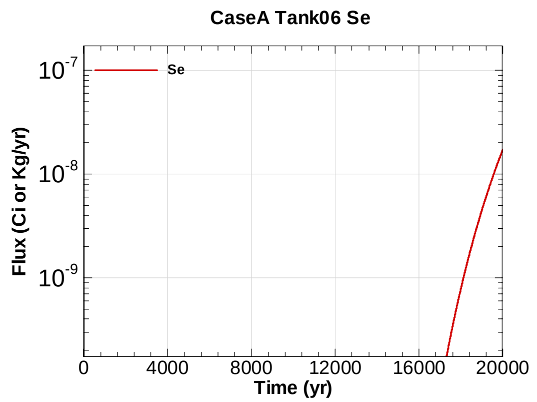

Figure A.2-507 - Water Table Flux for CaseA Tank06 Se

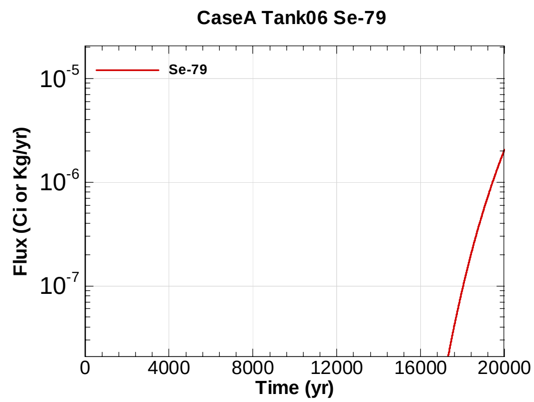

Figure A.2-508 - Water Table Flux for CaseA Tank06 Se-79

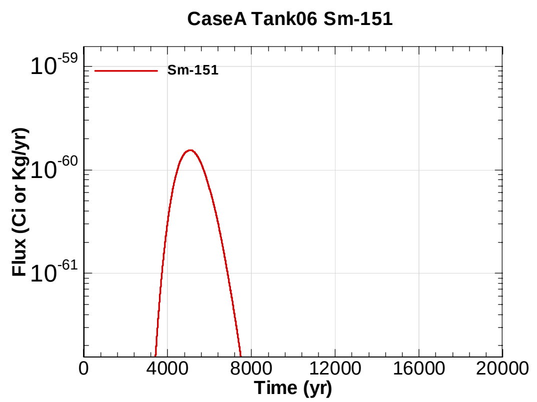

Figure A.2-509 - Water Table Flux for CaseA Tank06 Sm-151

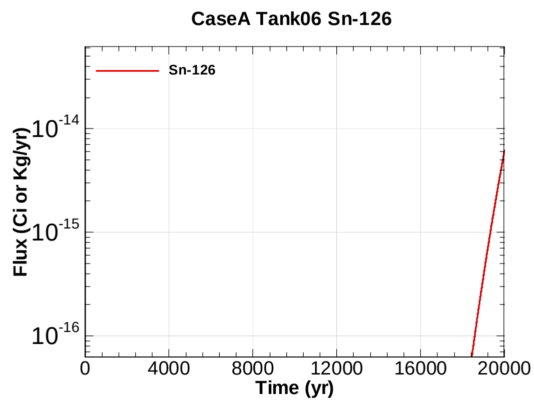

Figure A.2-510 - Water Table Flux for CaseA Tank06 Sn-126

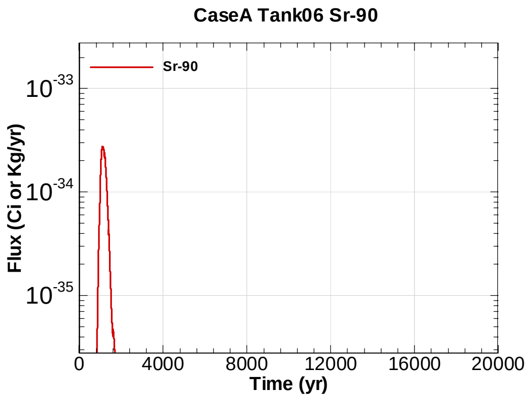

Figure A.2-511 - Water Table Flux for CaseA Tank06 Sr-90

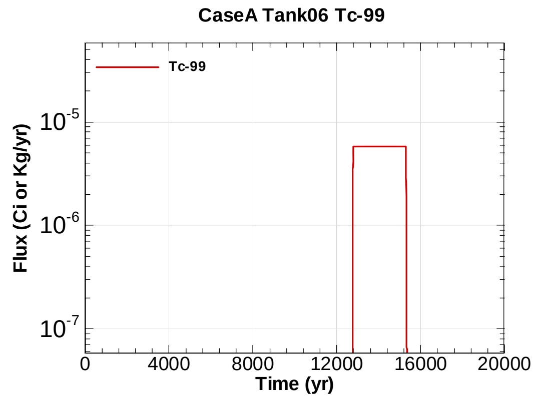

Figure A.2-512 - Water Table Flux for CaseA Tank06 Tc-99

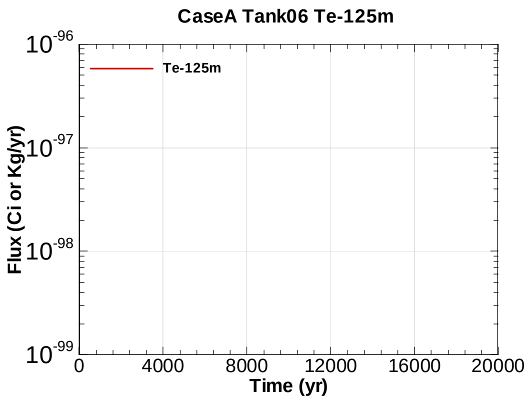

Figure A.2-513 - Water Table Flux for CaseA Tank06 Te-125m

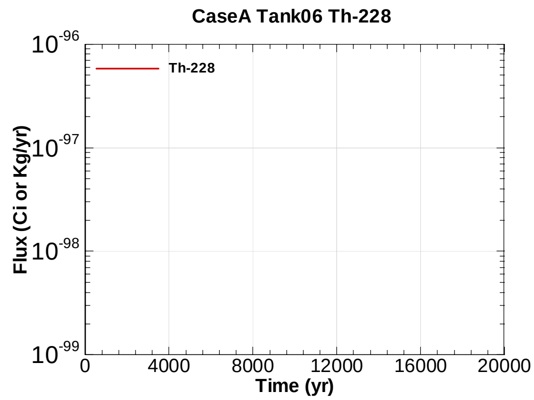

Figure A.2-514 - Water Table Flux for CaseA Tank06 Th-228

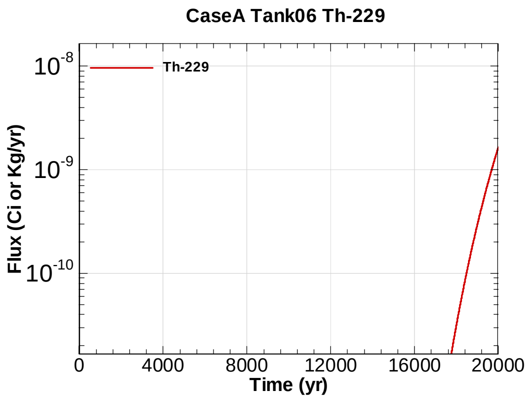

Figure A.2-515 - Water Table Flux for CaseA Tank06 Th-229

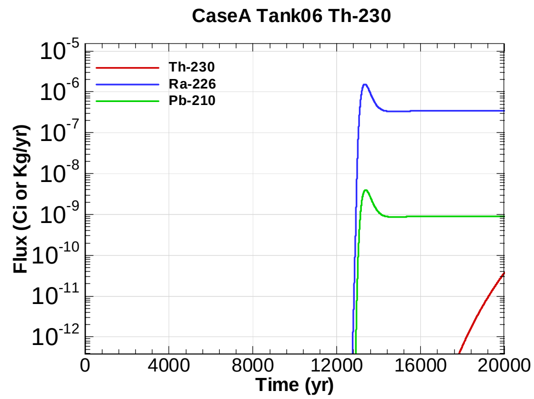

Figure A.2-516 - Water Table Flux for CaseA Tank06 Th-230

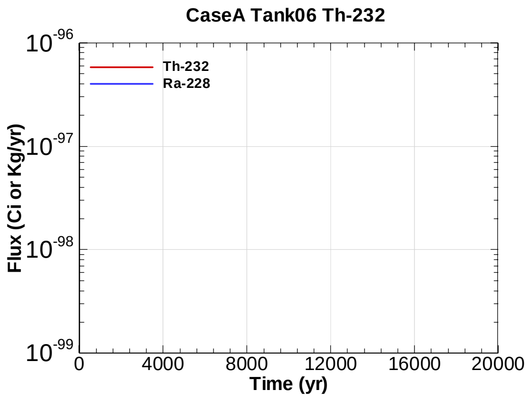

Figure A.2-517 - Water Table Flux for CaseA Tank06 Th-232

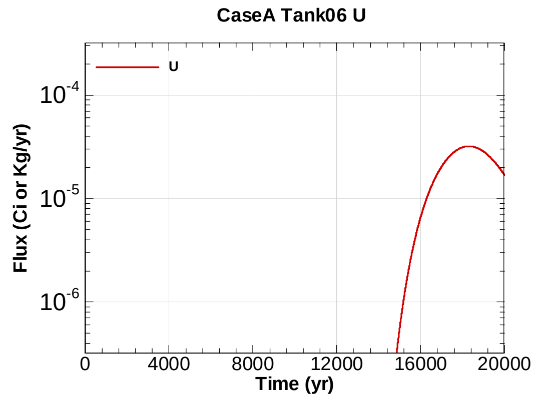

Figure A.2-518 - Water Table Flux for CaseA Tank06 U

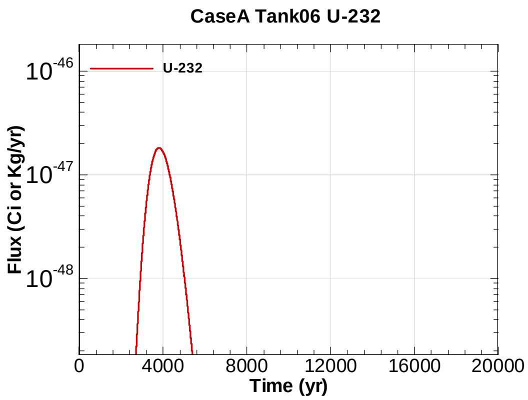

Figure A.2-519 - Water Table Flux for CaseA Tank06 U-232

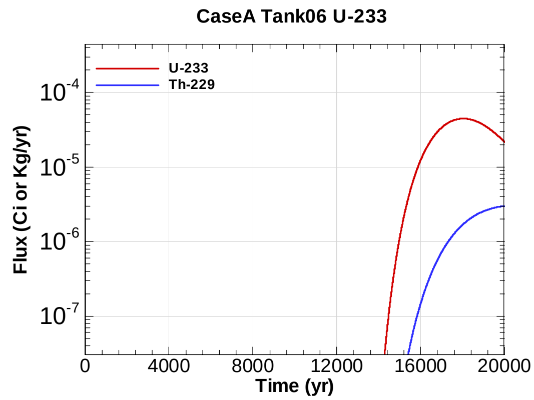

Figure A.2-520 - Water Table Flux for CaseA Tank06 U-233

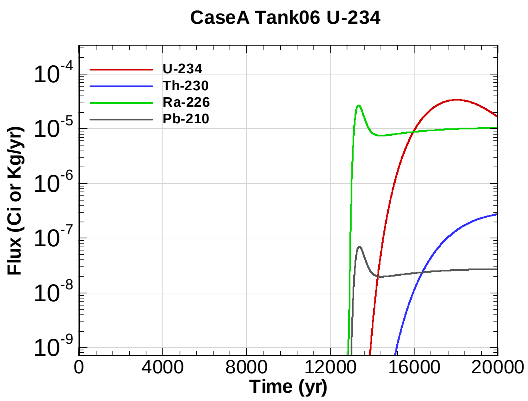

Figure A.2-521 - Water Table Flux for CaseA Tank06 U-234

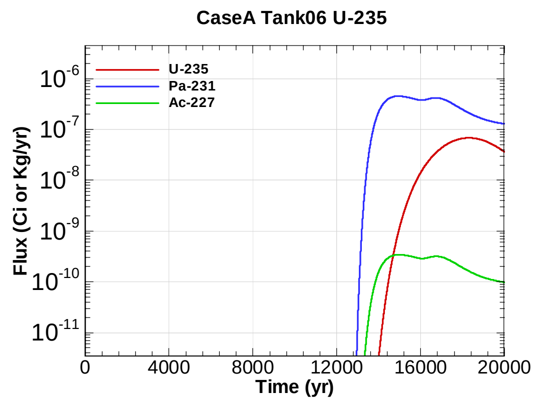

Figure A.2-522 - Water Table Flux for CaseA Tank06 U-235

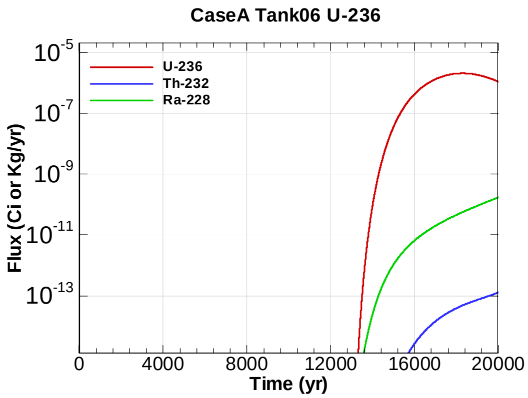

Figure A.2-523 - Water Table Flux for CaseA Tank06 U-236

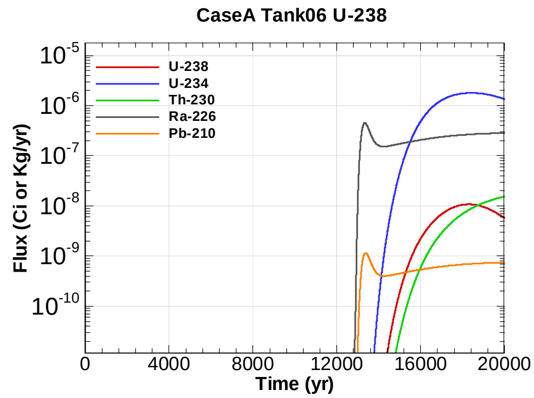

Figure A.2-524 - Water Table Flux for CaseA Tank06 U-238

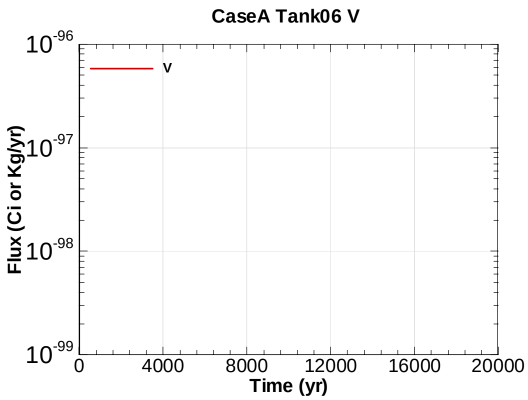

Figure A.2-525 - Water Table Flux for CaseA Tank06 V

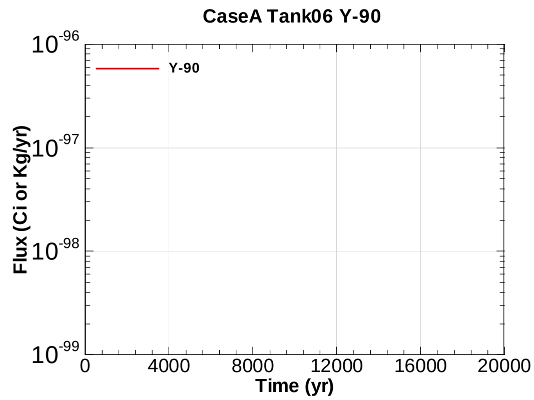

Figure A.2-526 - Water Table Flux for CaseA Tank06 Y-90

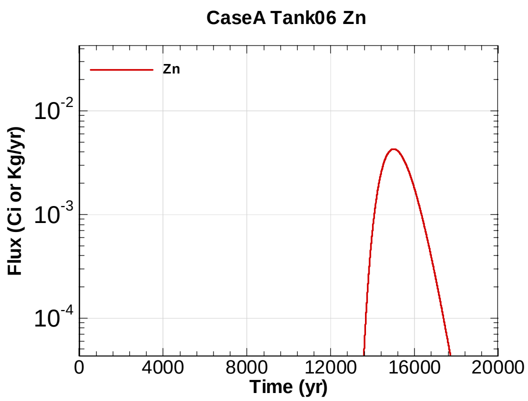

Figure A.2-527 - Water Table Flux for CaseA Tank06 Zn

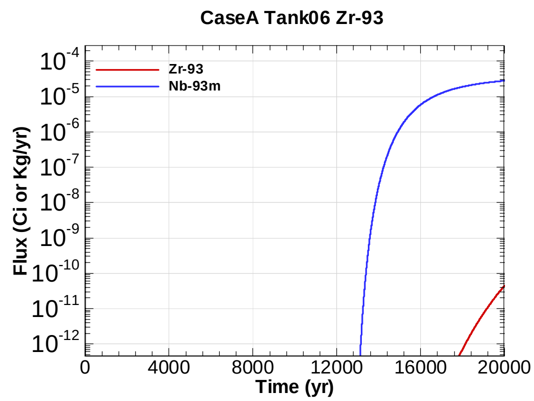

Figure A.2-528 - Water Table Flux for CaseA Tank06 Zr-93

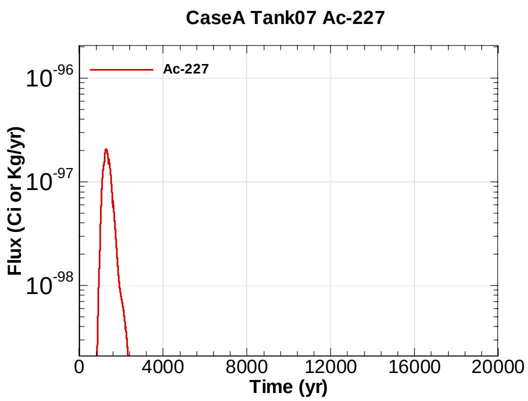

Figure A.2-529 - Water Table Flux for CaseA Tank07 Ac-227

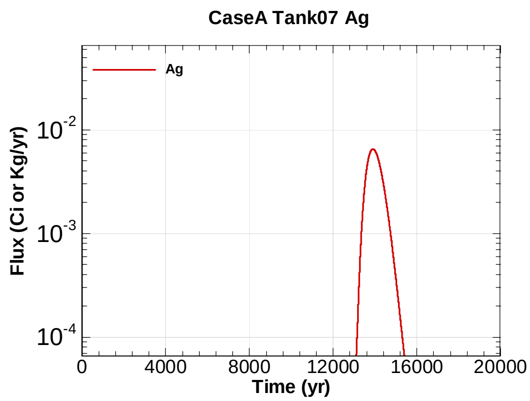

Figure A.2-530 - Water Table Flux for CaseA Tank07 Ag

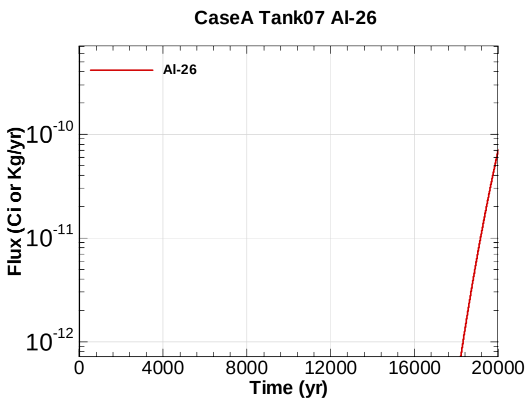

Figure A.2-531 - Water Table Flux for CaseA Tank07 Al-26

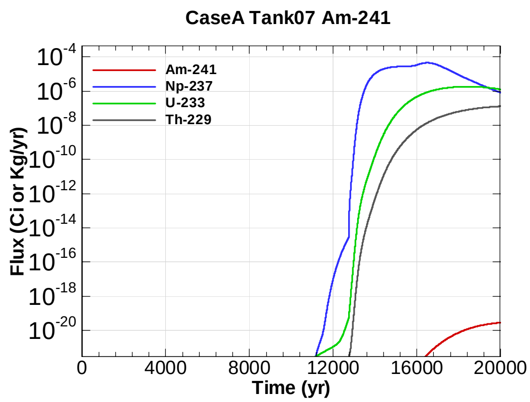

Figure A.2-532 - Water Table Flux for CaseA Tank07 Am-241

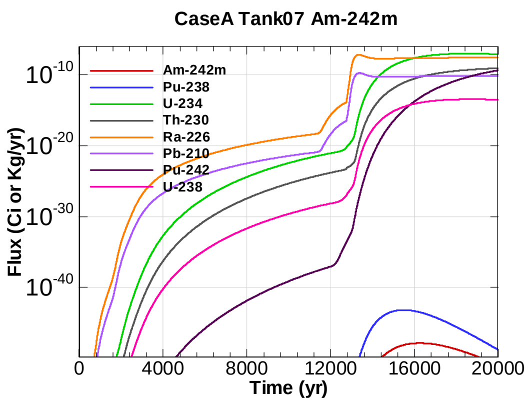

Figure A.2-533 - Water Table Flux for CaseA Tank07 Am-242m

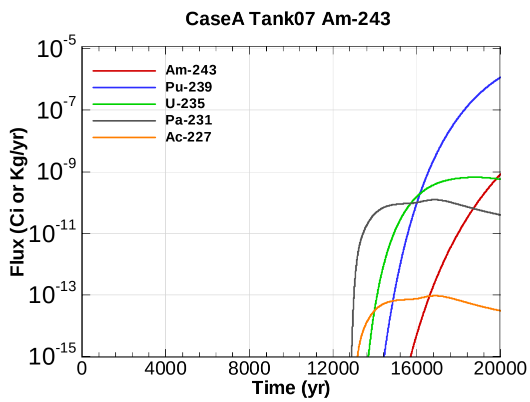

Figure A.2-534 - Water Table Flux for CaseA Tank07 Am-243

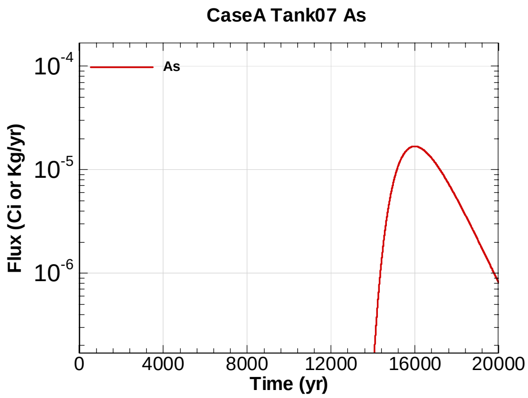

Figure A.2-535 - Water Table Flux for CaseA Tank07 As

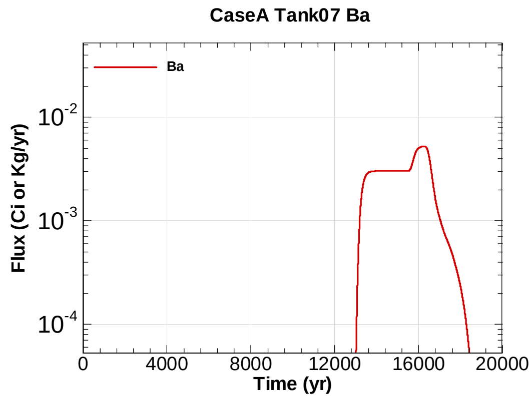

Figure A.2-536 - Water Table Flux for CaseA Tank07 Ba

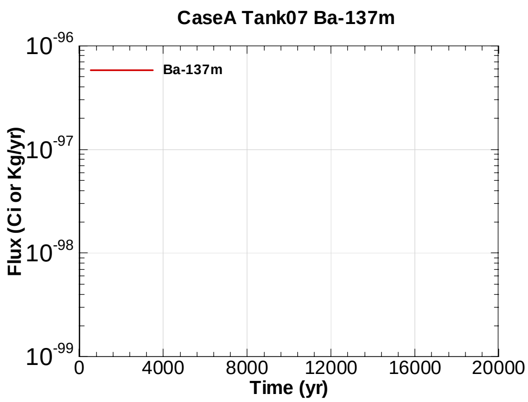

Figure A.2-537 - Water Table Flux for CaseA Tank07 Ba-137m

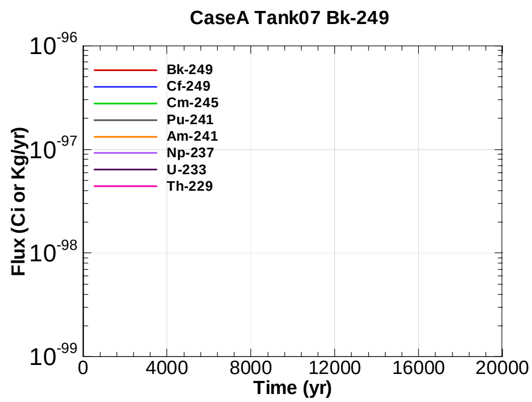

Figure A.2-538 - Water Table Flux for CaseA Tank07 Bk-249

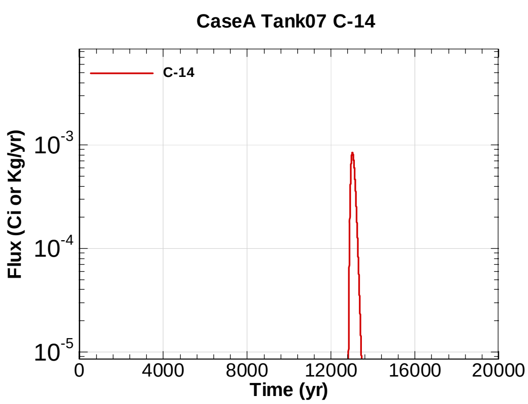

Figure A.2-539 - Water Table Flux for CaseA Tank07 C-14

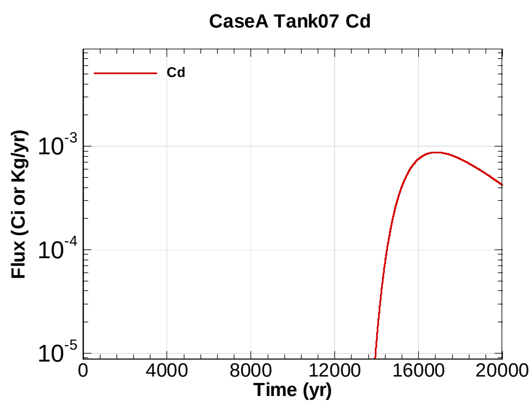

Figure A.2-540 - Water Table Flux for CaseA Tank07 Cd

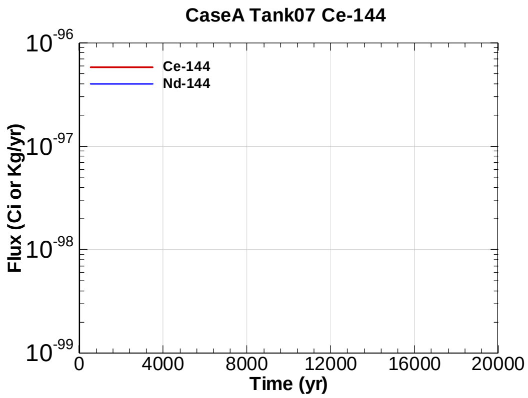

Figure A.2-541 - Water Table Flux for CaseA Tank07 Ce-144

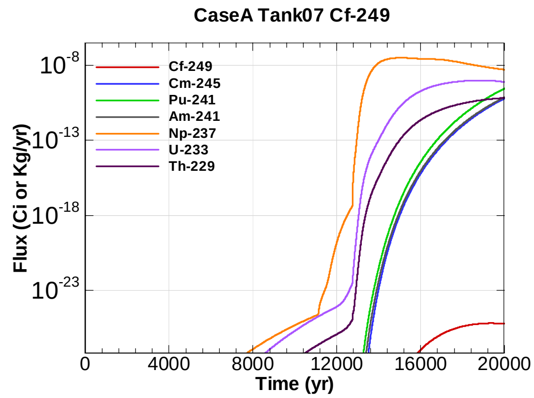

Figure A.2-542 - Water Table Flux for CaseA Tank07 Cf-249

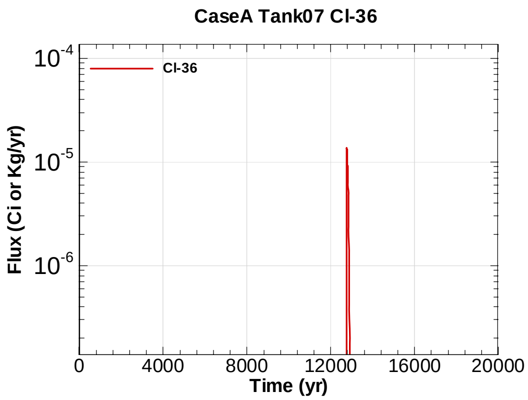

Figure A.2-543 - Water Table Flux for CaseA Tank07 Cl-36

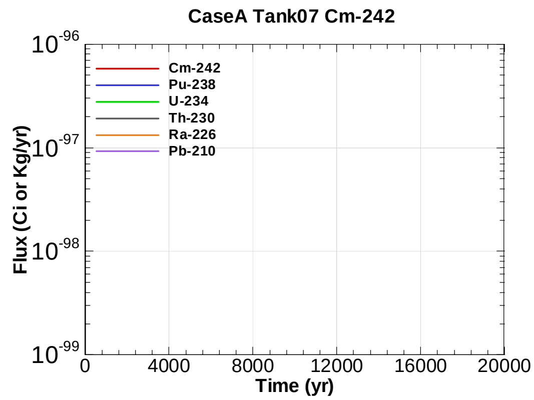

Figure A.2-544 - Water Table Flux for CaseA Tank07 Cm-242

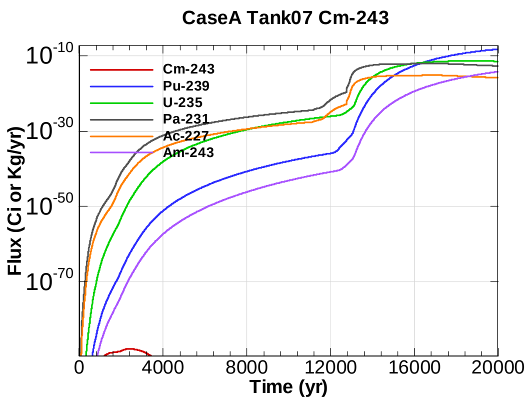

Figure A.2-545 - Water Table Flux for CaseA Tank07 Cm-243

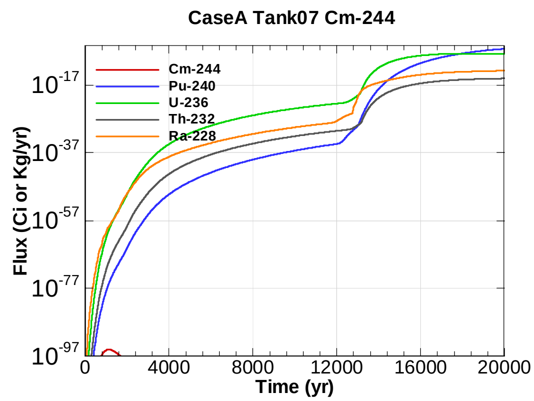

Figure A.2-546 - Water Table Flux for CaseA Tank07 Cm-244

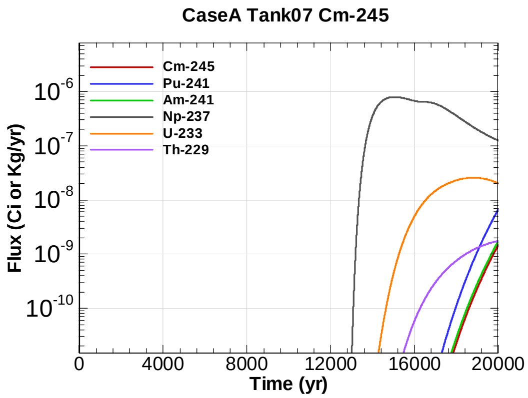

Figure A.2-547 - Water Table Flux for CaseA Tank07 Cm-245

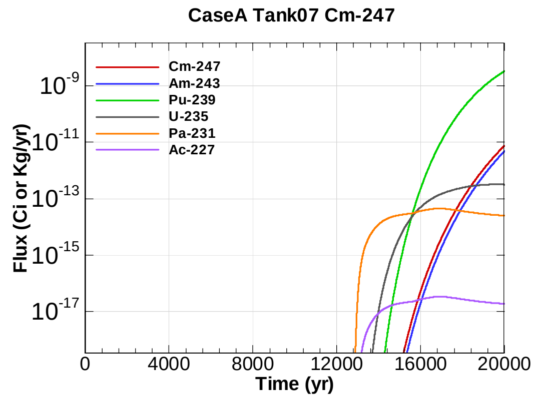

Figure A.2-548 - Water Table Flux for CaseA Tank07 Cm-247

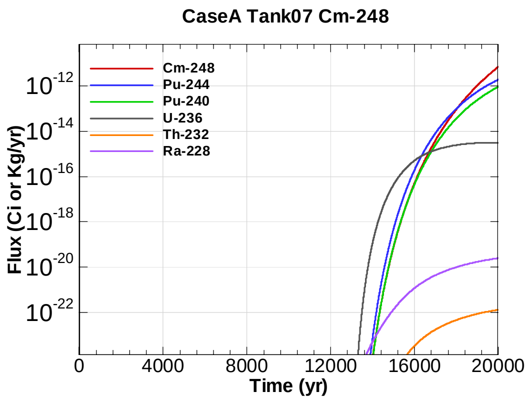

Figure A.2-549 - Water Table Flux for CaseA Tank07 Cm-248

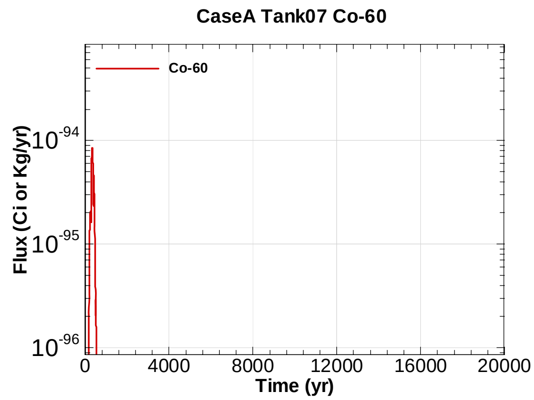

Figure A.2-550 - Water Table Flux for CaseA Tank07 Co-60

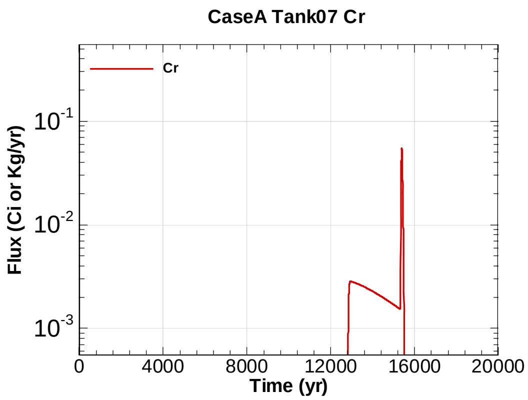

Figure A.2-551 - Water Table Flux for CaseA Tank07 Cr

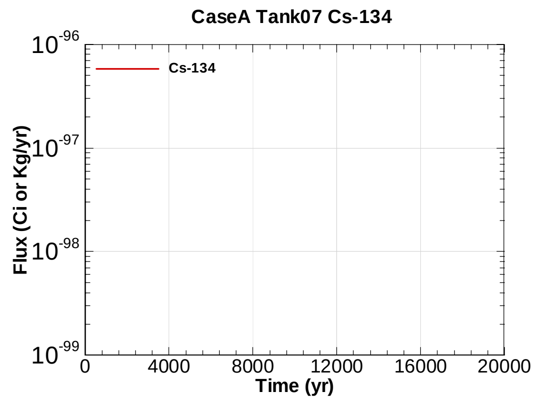

Figure A.2-552 - Water Table Flux for CaseA Tank07 Cs-134

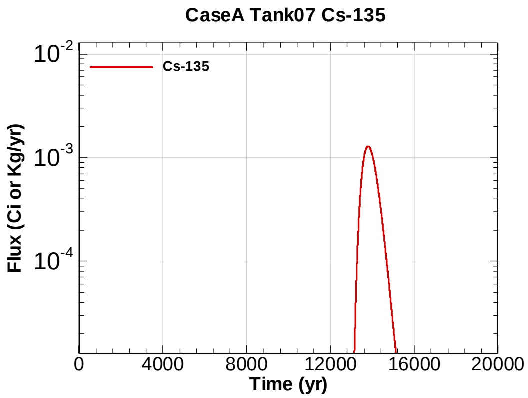

Figure A.2-553 - Water Table Flux for CaseA Tank07 Cs-135

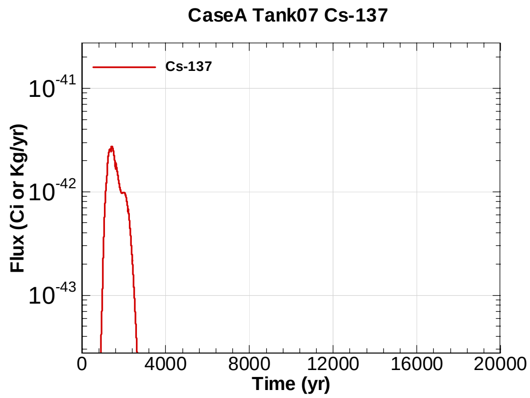

Figure A.2-554 - Water Table Flux for CaseA Tank07 Cs-137

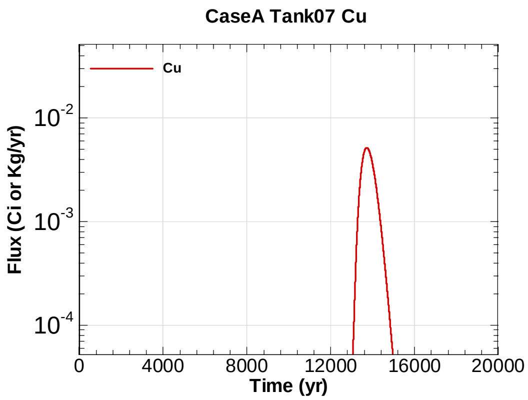

Figure A.2-555 - Water Table Flux for CaseA Tank07 Cu

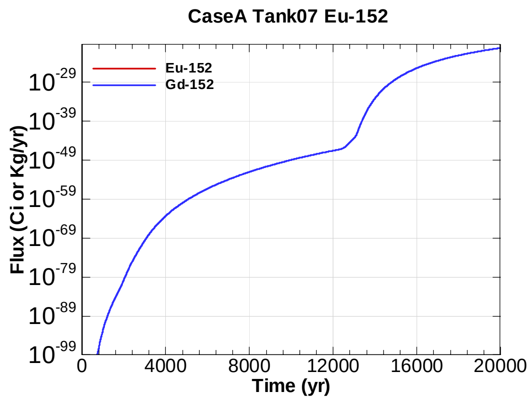

Figure A.2-556 - Water Table Flux for CaseA Tank07 Eu-152

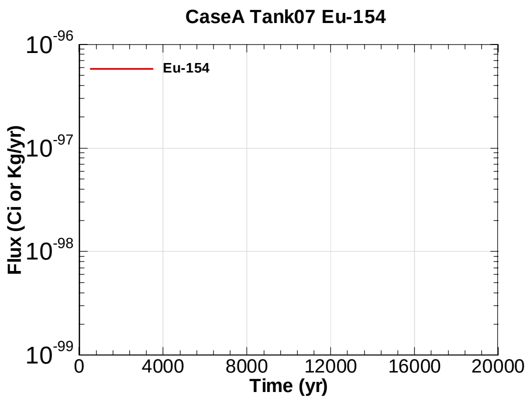

Figure A.2-557 - Water Table Flux for CaseA Tank07 Eu-154

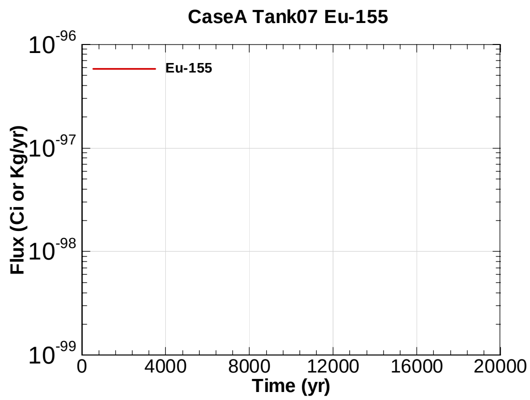

Figure A.2-558 - Water Table Flux for CaseA Tank07 Eu-155

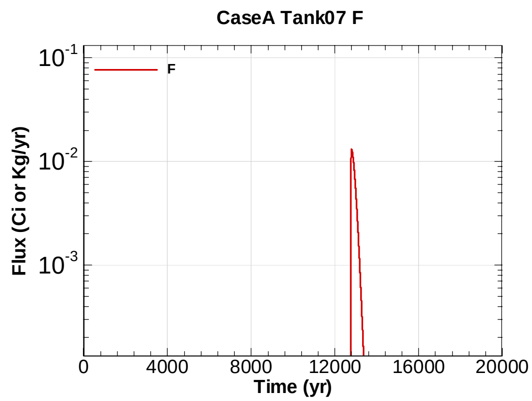

Figure A.2-559 - Water Table Flux for CaseA Tank07 F

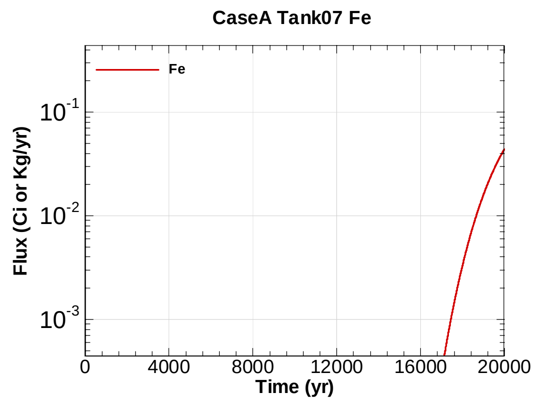

Figure A.2-560 - Water Table Flux for CaseA Tank07 Fe

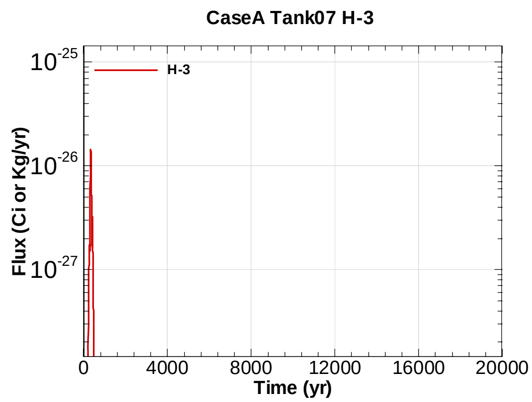

Figure A.2-561 - Water Table Flux for CaseA Tank07 H-3

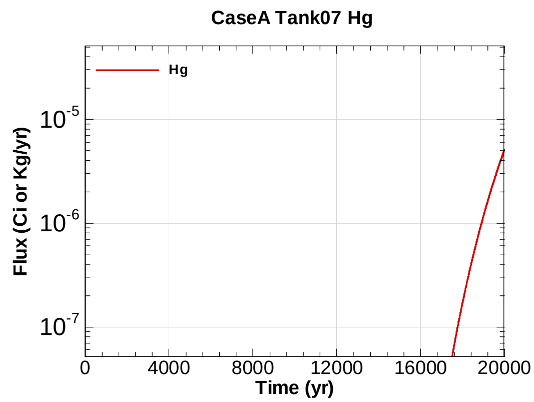

Figure A.2-562 - Water Table Flux for CaseA Tank07 Hg

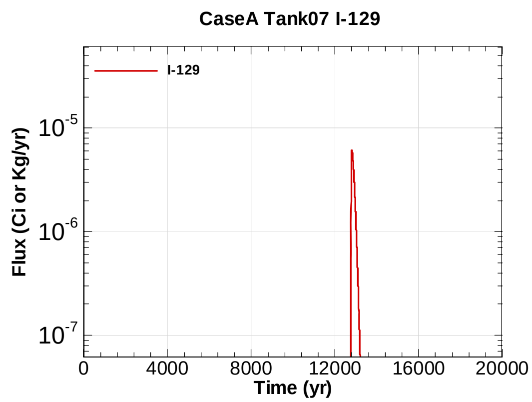

Figure A.2-563 - Water Table Flux for CaseA Tank07 I-129

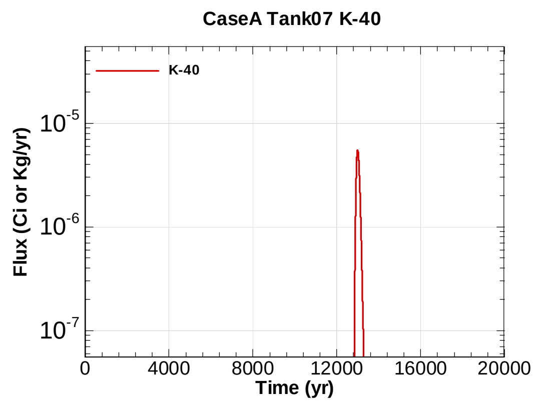

Figure A.2-564 - Water Table Flux for CaseA Tank07 K-40

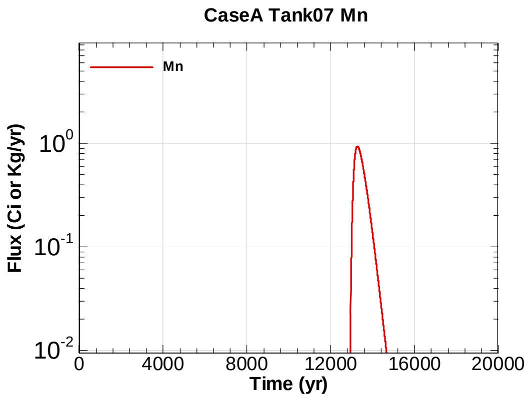

Figure A.2-565 - Water Table Flux for CaseA Tank07 Mn

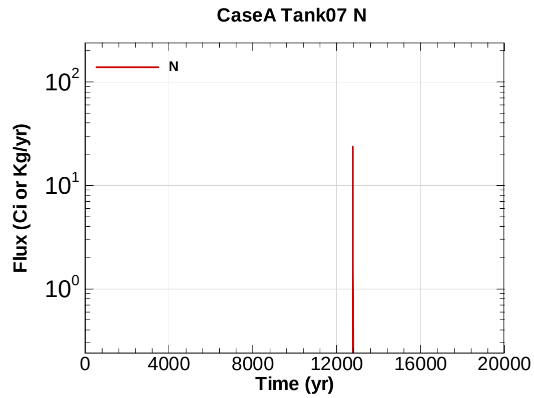

Figure A.2-566 - Water Table Flux for CaseA Tank07 N

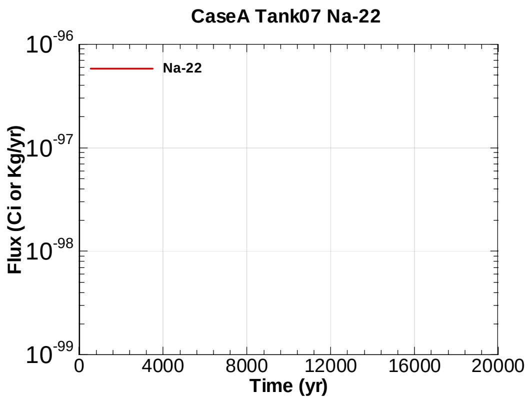

Figure A.2-567 - Water Table Flux for CaseA Tank07 Na-22

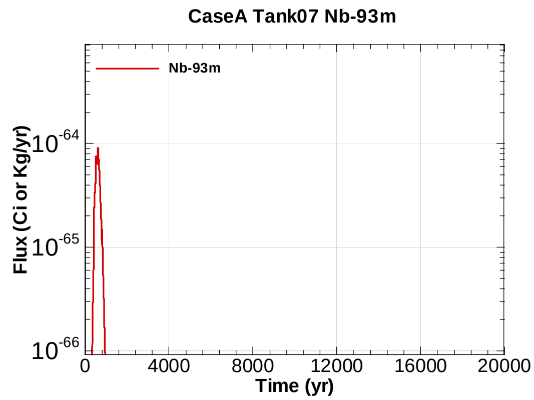

Figure A.2-568 - Water Table Flux for CaseA Tank07 Nb-93m

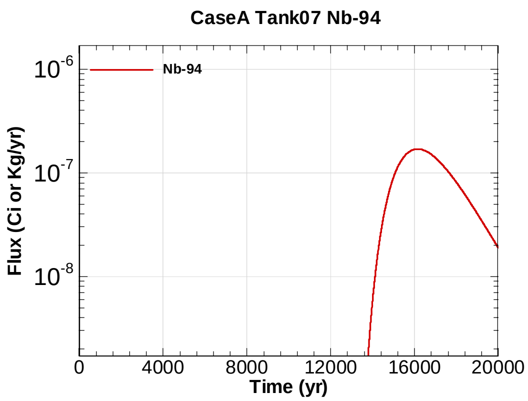

Figure A.2-569 - Water Table Flux for CaseA Tank07 Nb-94

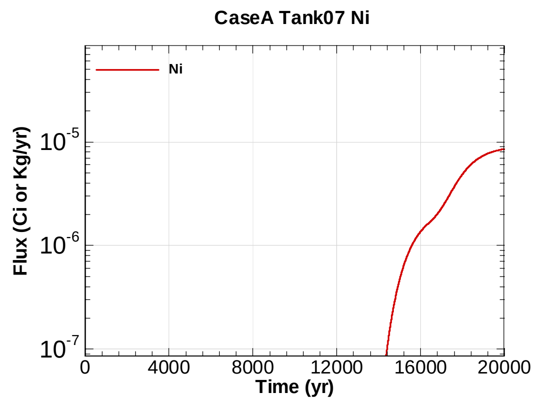

Figure A.2-570 - Water Table Flux for CaseA Tank07 Ni

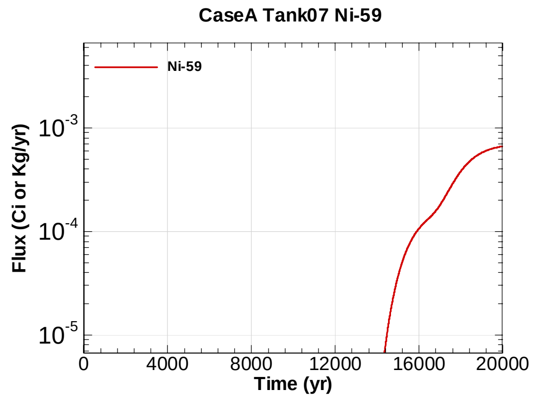

Figure A.2-571 - Water Table Flux for CaseA Tank07 Ni-59

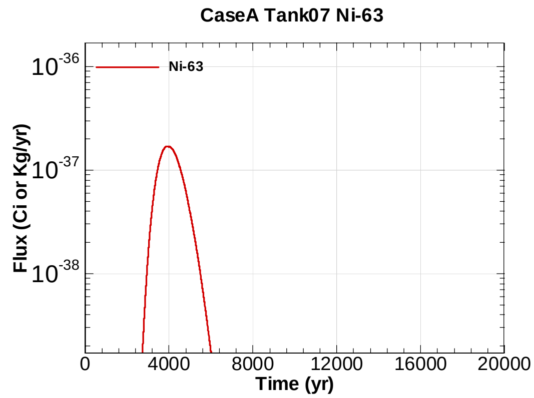

Figure A.2-572 - Water Table Flux for CaseA Tank07 Ni-63

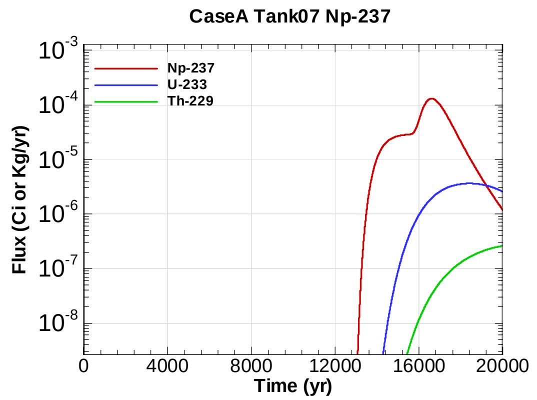

Figure A.2-573 - Water Table Flux for CaseA Tank07 Np-237

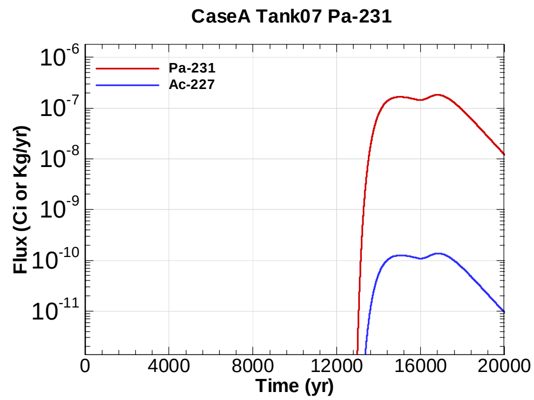

Figure A.2-574 - Water Table Flux for CaseA Tank07 Pa-231

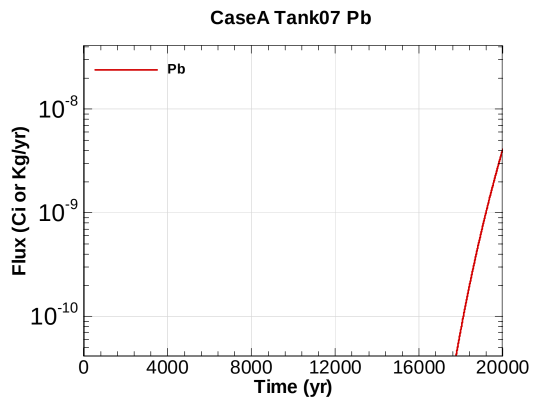

Figure A.2-575 - Water Table Flux for CaseA Tank07 Pb

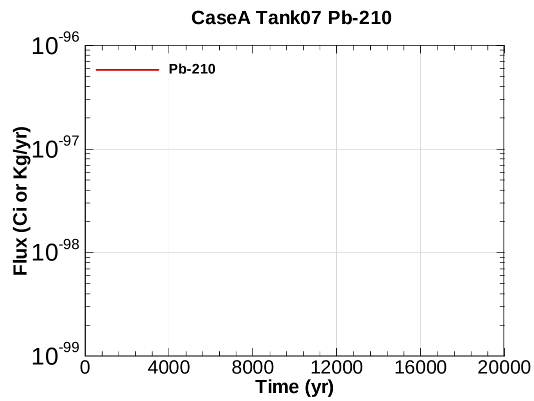

Figure A.2-576 - Water Table Flux for CaseA Tank07 Pb-210

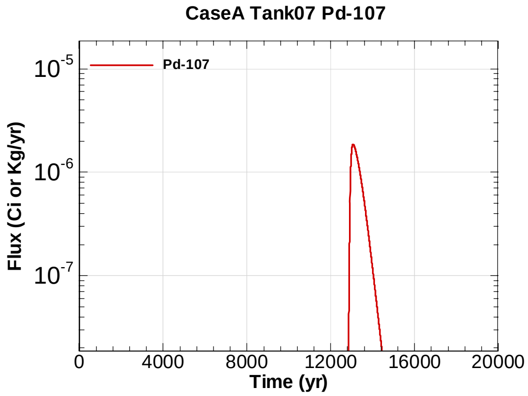

Figure A.2-577 - Water Table Flux for CaseA Tank07 Pd-107

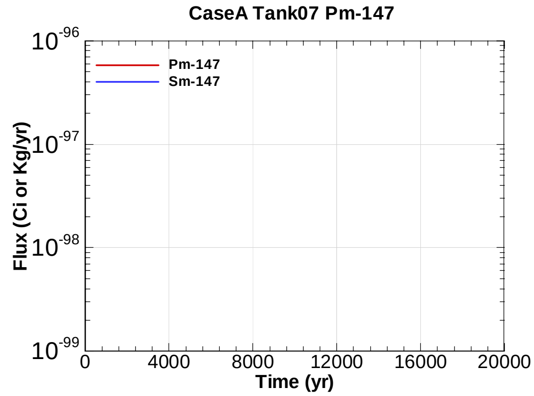

Figure A.2-578 - Water Table Flux for CaseA Tank07 Pm-147

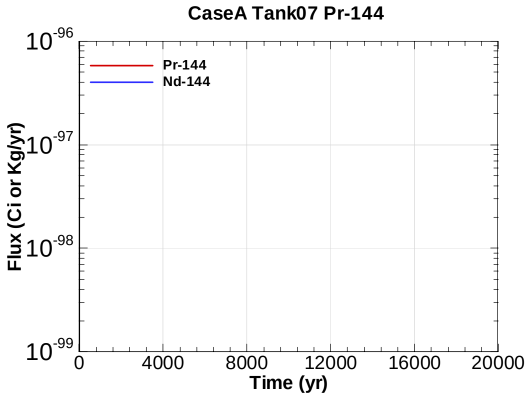

Figure A.2-579 - Water Table Flux for CaseA Tank07 Pr-144

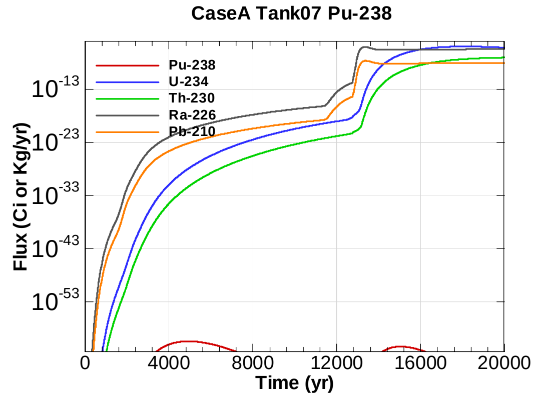

Figure A.2-580 - Water Table Flux for CaseA Tank07 Pu-238

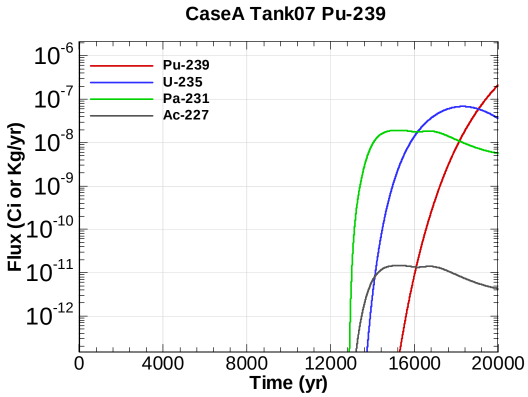

Figure A.2-581 - Water Table Flux for CaseA Tank07 Pu-239

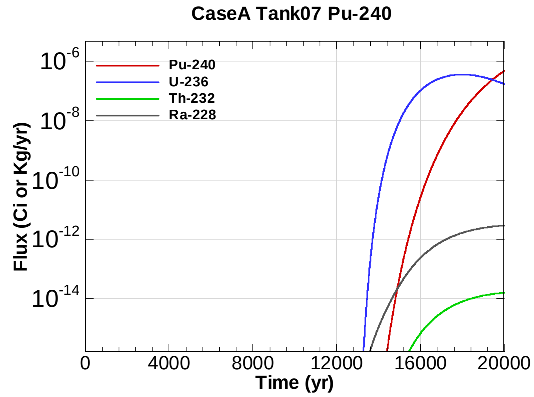

Figure A.2-582 - Water Table Flux for CaseA Tank07 Pu-240

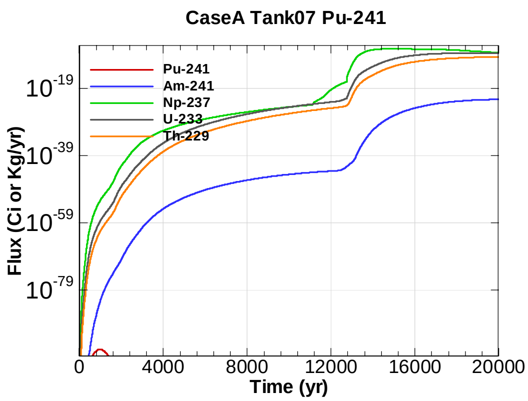

Figure A.2-583 - Water Table Flux for CaseA Tank07 Pu-241

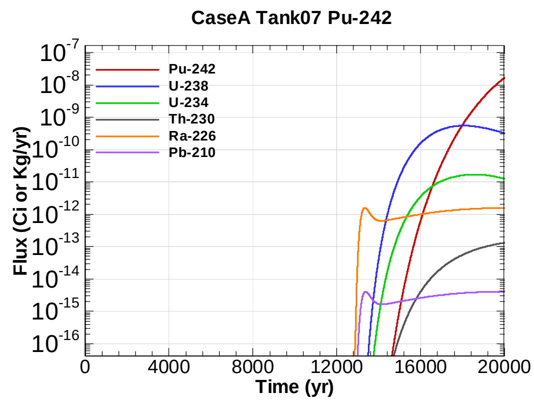

Figure A.2-584 - Water Table Flux for CaseA Tank07 Pu-242

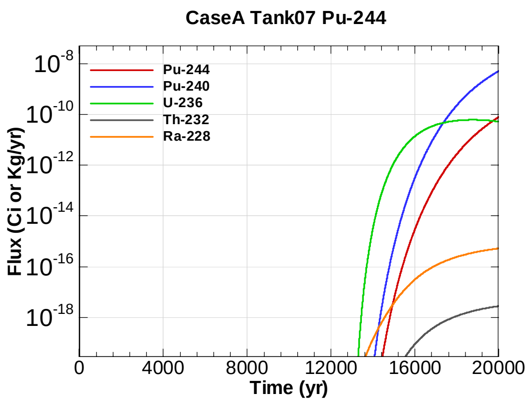

Figure A.2-585 - Water Table Flux for CaseA Tank07 Pu-244

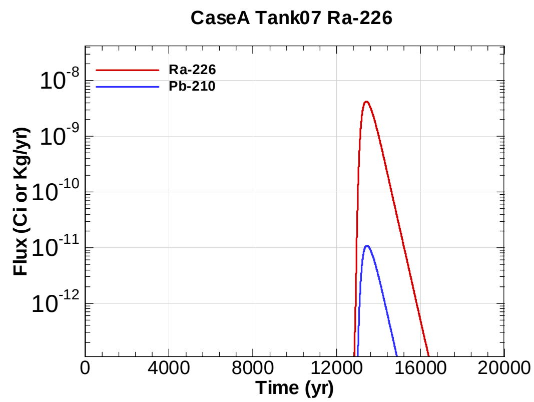

Figure A.2-586 - Water Table Flux for CaseA Tank07 Ra-226

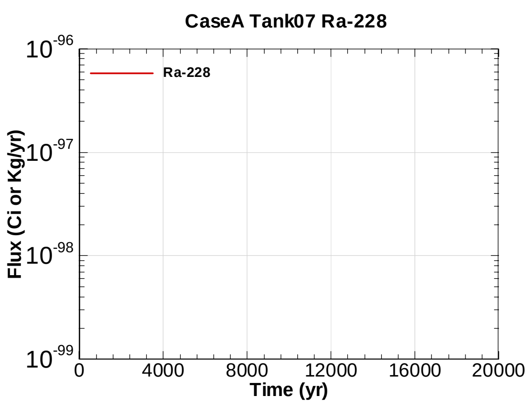

Figure A.2-587 - Water Table Flux for CaseA Tank07 Ra-228

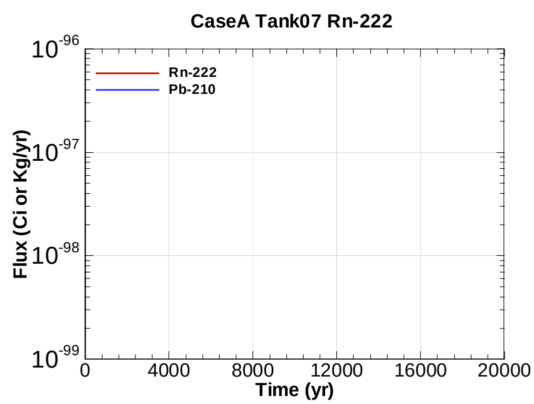

Figure A.2-588 - Water Table Flux for CaseA Tank07 Rn-222

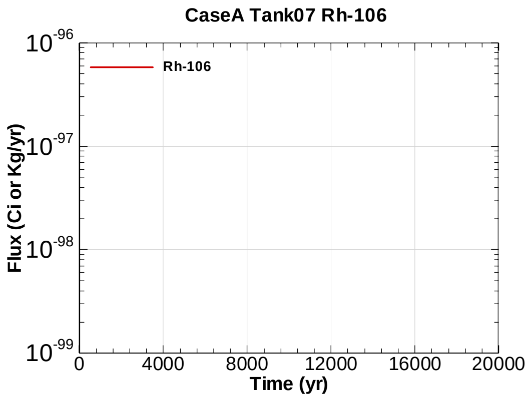

Figure A.2-589 - Water Table Flux for CaseA Tank07 Rh-106

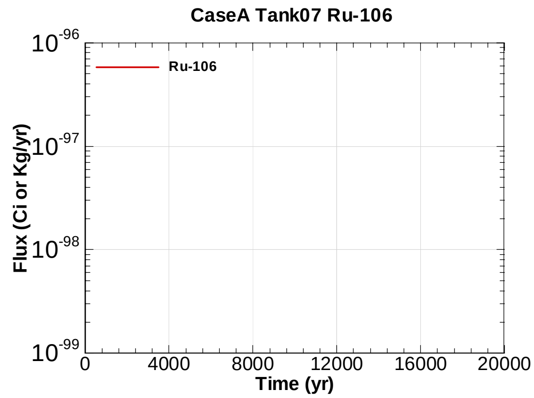

Figure A.2-590 - Water Table Flux for CaseA Tank07 Ru-106

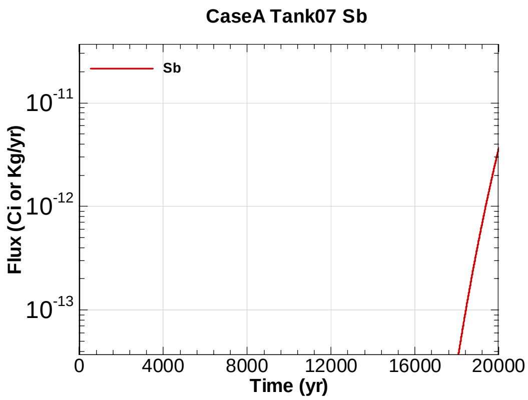

Figure A.2-591 - Water Table Flux for CaseA Tank07 Sb

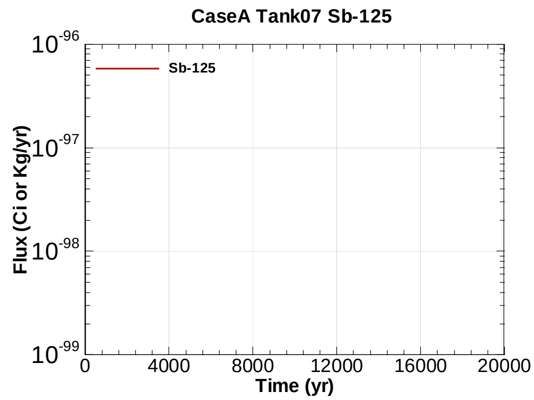

Figure A.2-592 - Water Table Flux for CaseA Tank07 Sb-125

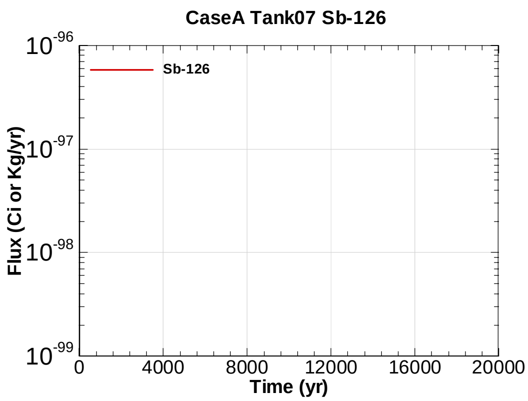

Figure A.2-593 - Water Table Flux for CaseA Tank07 Sb-126

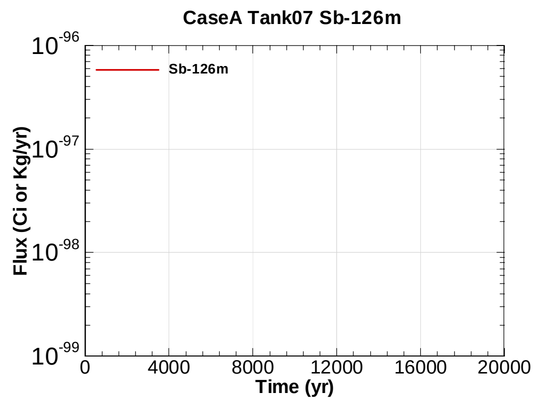

Figure A.2-594 - Water Table Flux for CaseA Tank07 Sb-126m

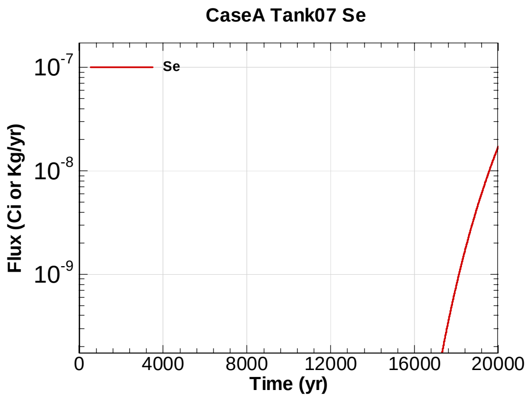

Figure A.2-595 - Water Table Flux for CaseA Tank07 Se

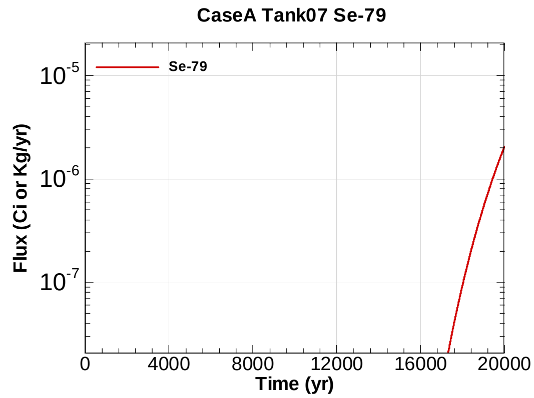

Figure A.2-596 - Water Table Flux for CaseA Tank07 Se-79

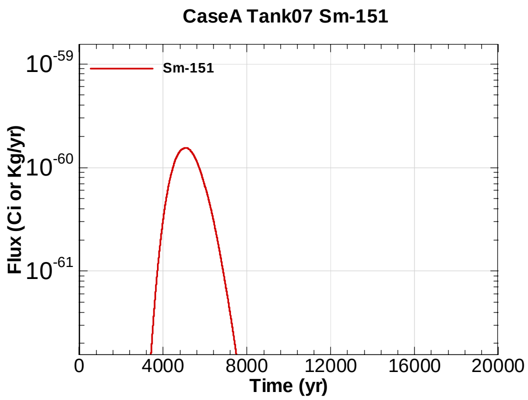

Figure A.2-597 - Water Table Flux for CaseA Tank07 Sm-151

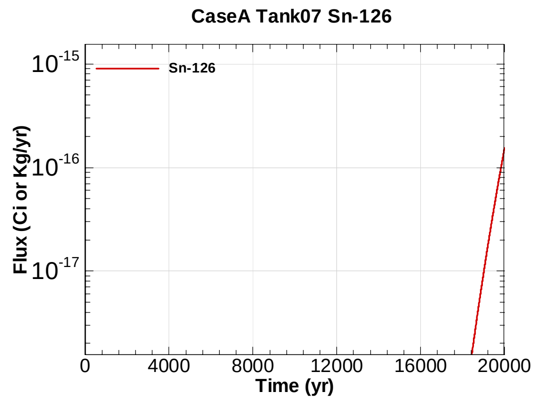

Figure A.2-598 - Water Table Flux for CaseA Tank07 Sn-126

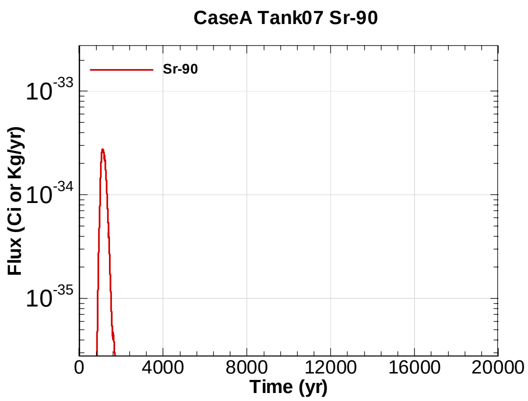

Figure A.2-599 - Water Table Flux for CaseA Tank07 Sr-90

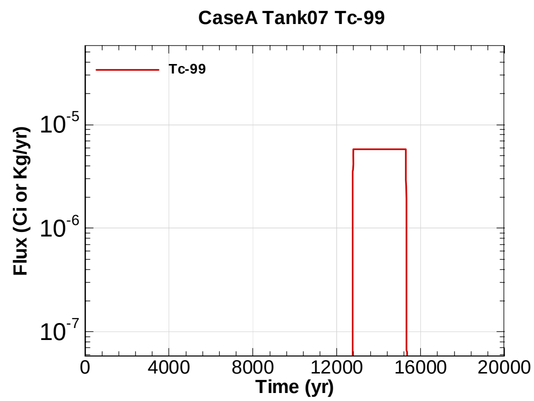

Figure A.2-600 - Water Table Flux for CaseA Tank07 Tc-99

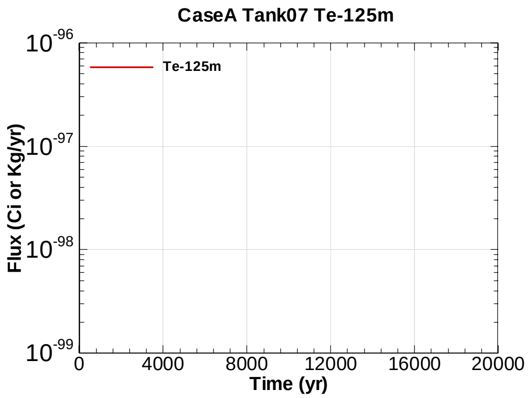

Figure A.2-601 - Water Table Flux for CaseA Tank07 Te-125m

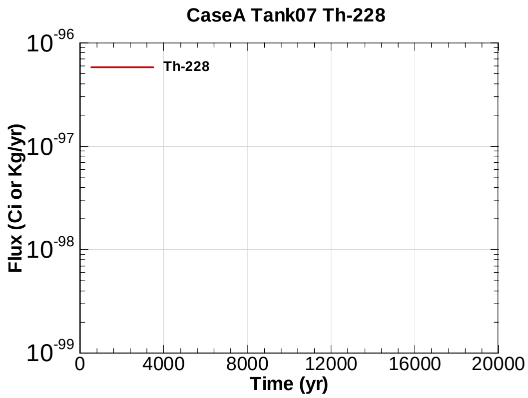

Figure A.2-602 - Water Table Flux for CaseA Tank07 Th-228

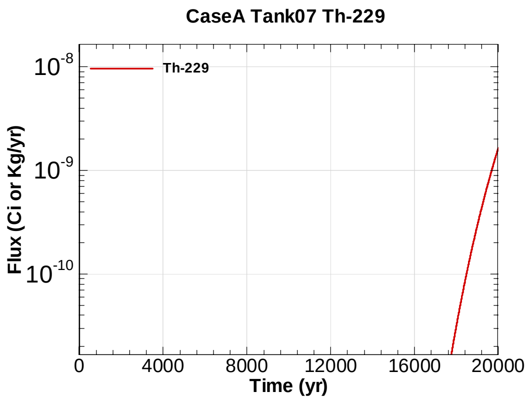

Figure A.2-603 - Water Table Flux for CaseA Tank07 Th-229

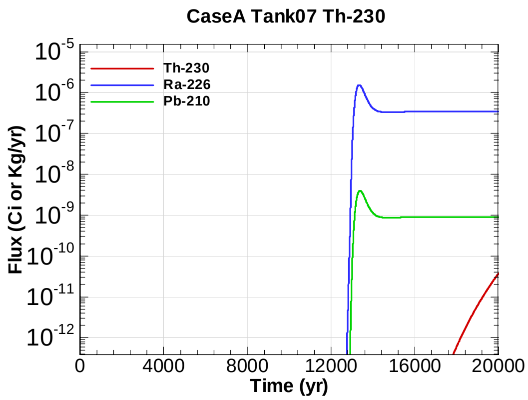

Figure A.2-604 - Water Table Flux for CaseA Tank07 Th-230

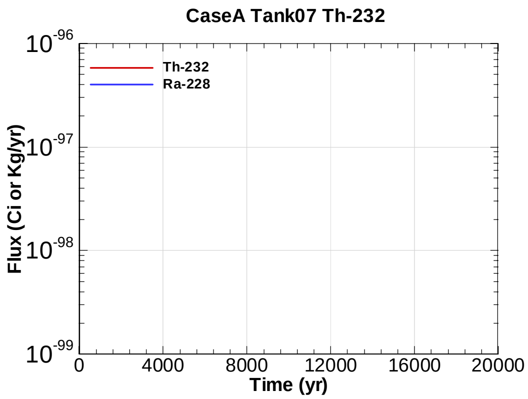

Figure A.2-605 - Water Table Flux for CaseA Tank07 Th-232

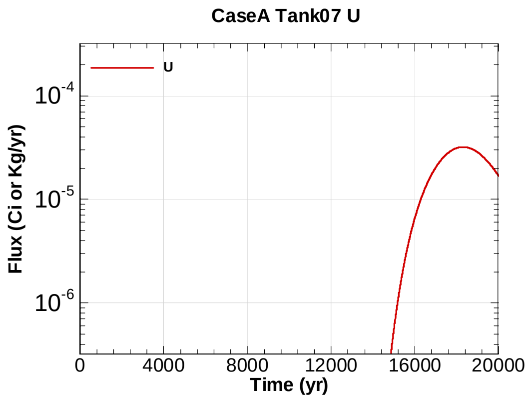

Figure A.2-606 - Water Table Flux for CaseA Tank07 U

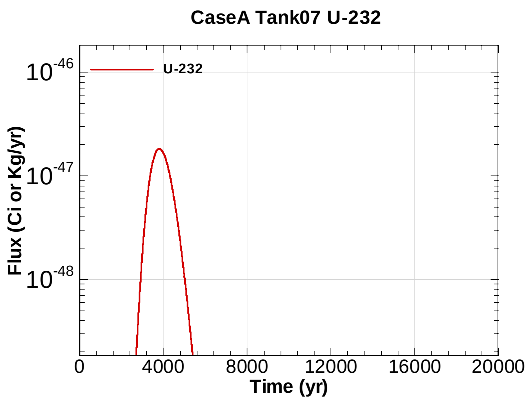

Figure A.2-607 - Water Table Flux for CaseA Tank07 U-232

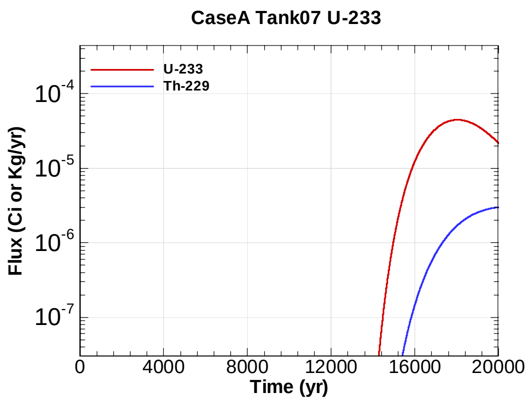

Figure A.2-608 - Water Table Flux for CaseA Tank07 U-233

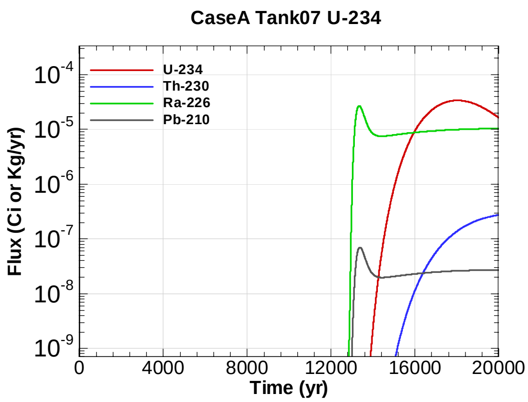

Figure A.2-609 - Water Table Flux for CaseA Tank07 U-234

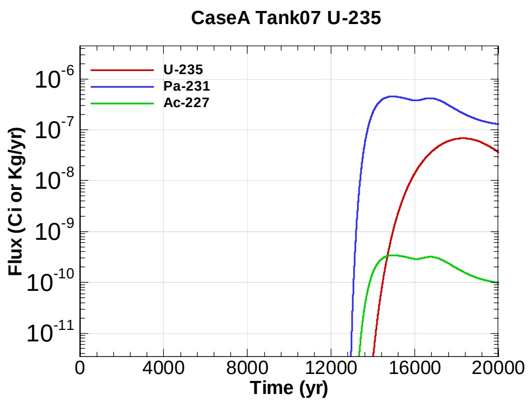

Figure A.2-610 - Water Table Flux for CaseA Tank07 U-235

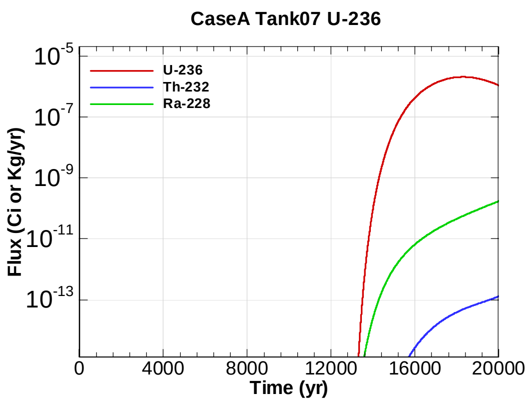

Figure A.2-611 - Water Table Flux for CaseA Tank07 U-236

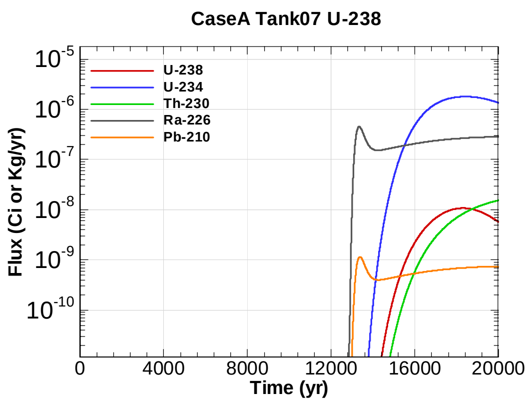

Figure A.2-612 - Water Table Flux for CaseA Tank07 U-238

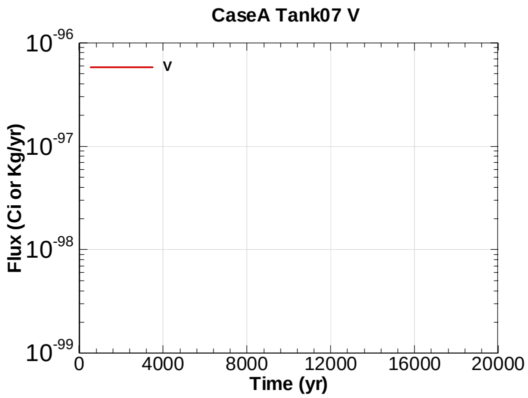

Figure A.2-613 - Water Table Flux for CaseA Tank07 V

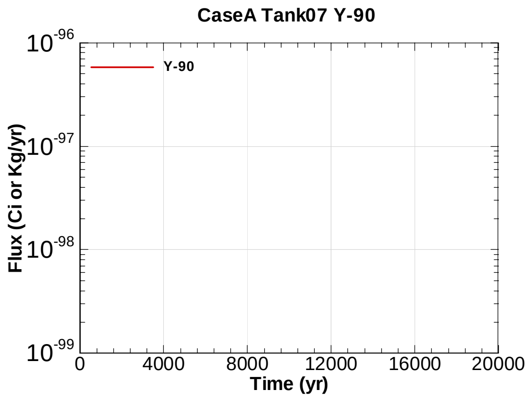

Figure A.2-614 - Water Table Flux for CaseA Tank07 Y-90

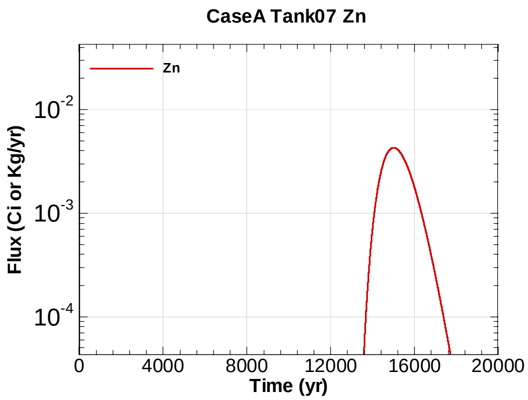

Figure A.2-615 - Water Table Flux for CaseA Tank07 Zn

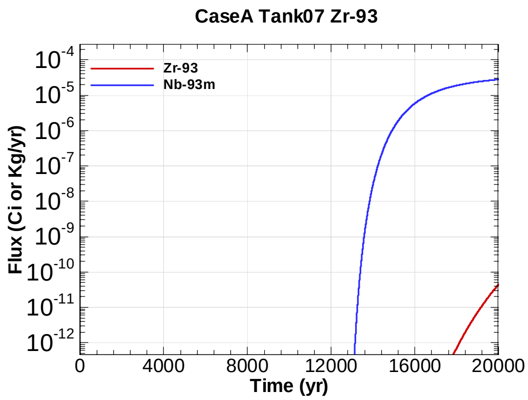

Figure A.2-616 - Water Table Flux for CaseA Tank07 Zr-93

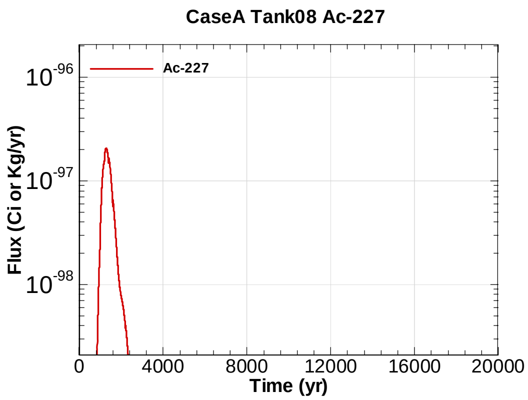

Figure A.2-617 - Water Table Flux for CaseA Tank08 Ac-227

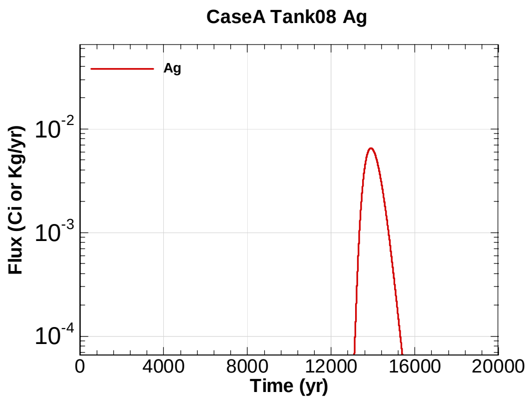

Figure A.2-618 - Water Table Flux for CaseA Tank08 Ag

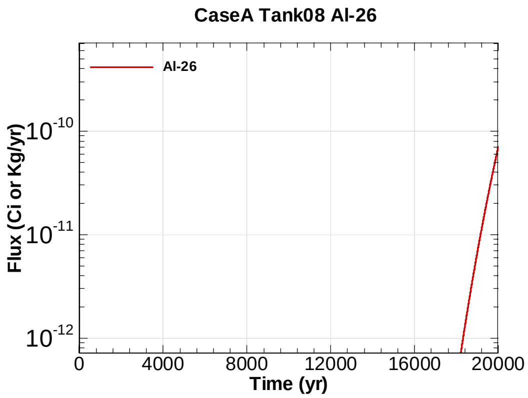

Figure A.2-619 - Water Table Flux for CaseA Tank08 Al-26

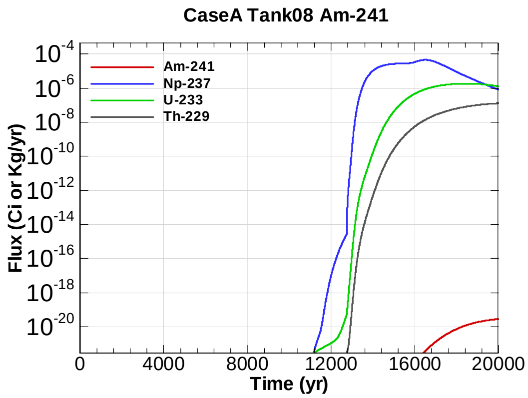

Figure A.2-620 - Water Table Flux for CaseA Tank08 Am-241

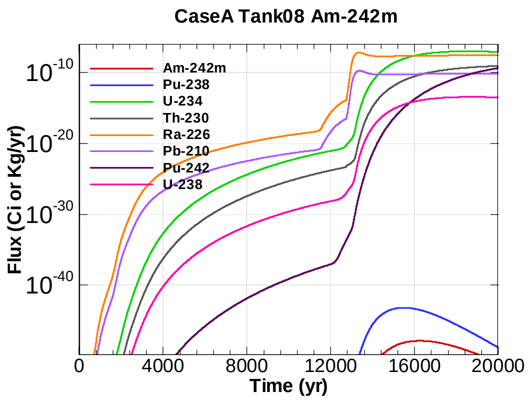

Figure A.2-621 - Water Table Flux for CaseA Tank08 Am-242m

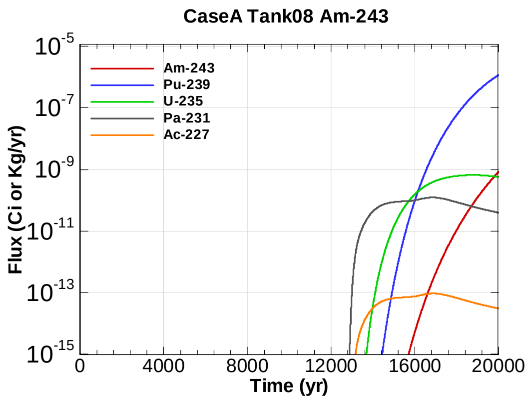

Figure A.2-622 - Water Table Flux for CaseA Tank08 Am-243

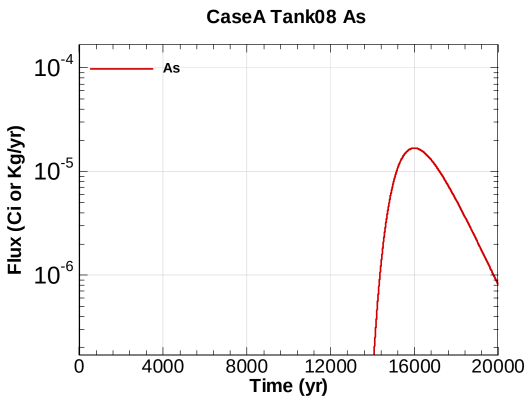

Figure A.2-623 - Water Table Flux for CaseA Tank08 As

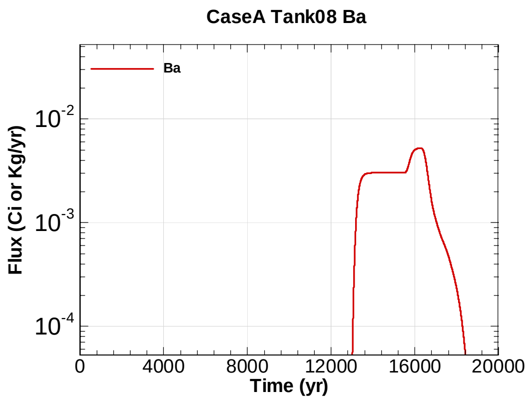

Figure A.2-624 - Water Table Flux for CaseA Tank08 Ba

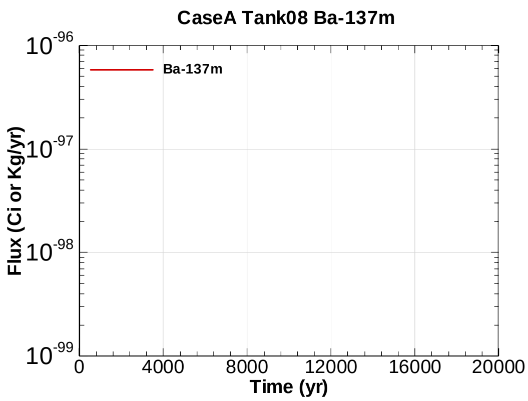

Figure A.2-625 - Water Table Flux for CaseA Tank08 Ba-137m

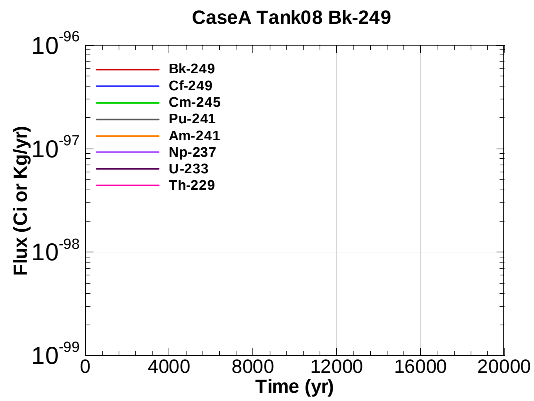

Figure A.2-626 - Water Table Flux for CaseA Tank08 Bk-249

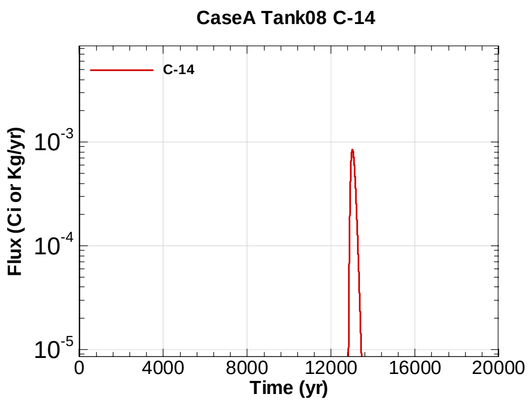

Figure A.2-627 - Water Table Flux for CaseA Tank08 C-14

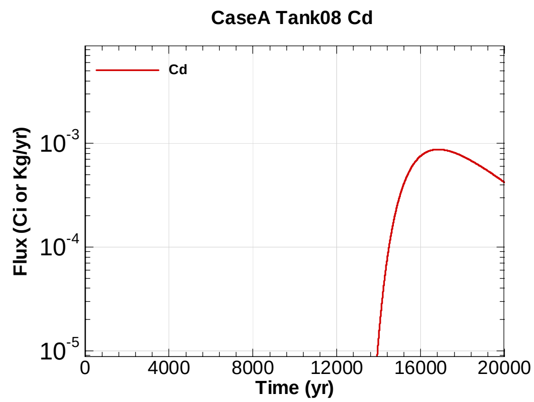

Figure A.2-628 - Water Table Flux for CaseA Tank08 Cd

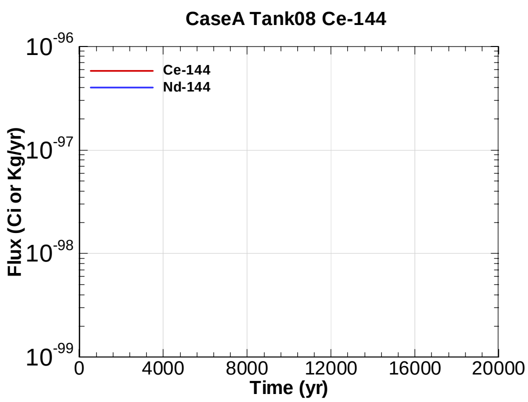

Figure A.2-629 - Water Table Flux for CaseA Tank08 Ce-144

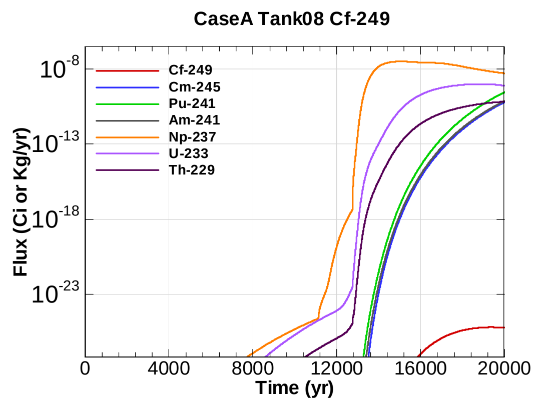

Figure A.2-630 - Water Table Flux for CaseA Tank08 Cf-249

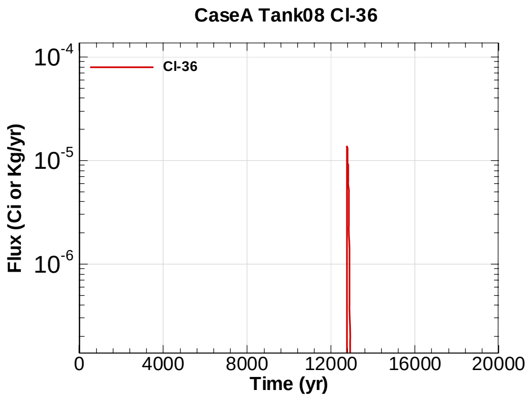

Figure A.2-631 - Water Table Flux for CaseA Tank08 Cl-36

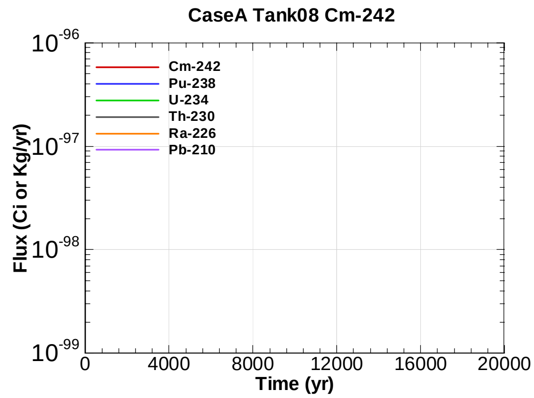

Figure A.2-632 - Water Table Flux for CaseA Tank08 Cm-242

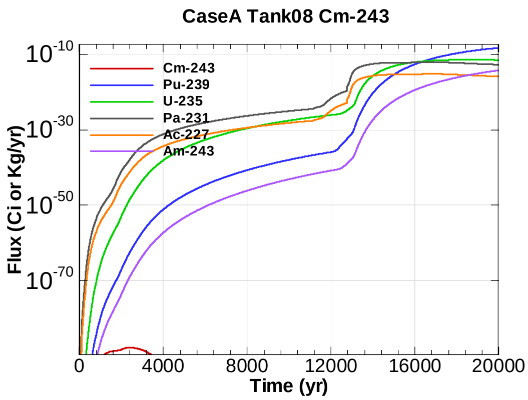

Figure A.2-633 - Water Table Flux for CaseA Tank08 Cm-243

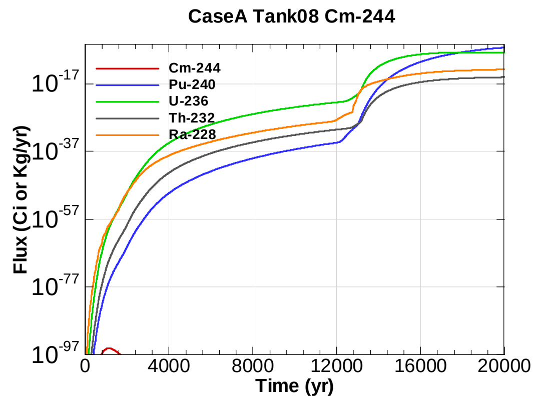

Figure A.2-634 - Water Table Flux for CaseA Tank08 Cm-244

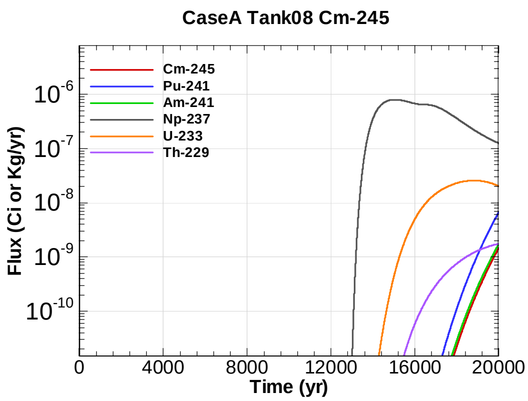

Figure A.2-635 - Water Table Flux for CaseA Tank08 Cm-245

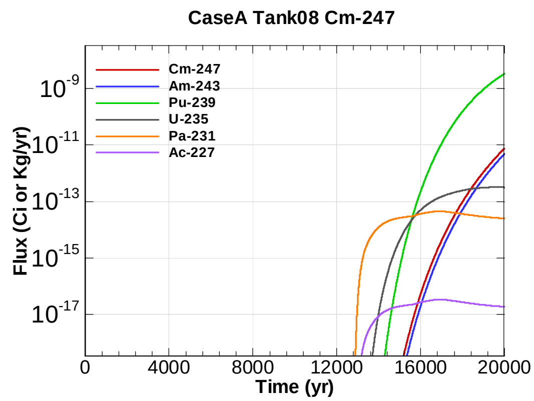

Figure A.2-636 - Water Table Flux for CaseA Tank08 Cm-247

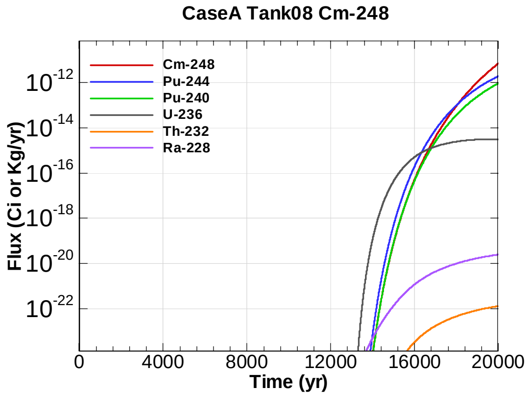

Figure A.2-637 - Water Table Flux for CaseA Tank08 Cm-248

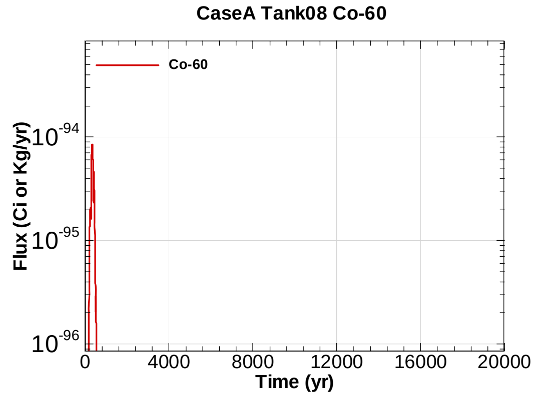

Figure A.2-638 - Water Table Flux for CaseA Tank08 Co-60

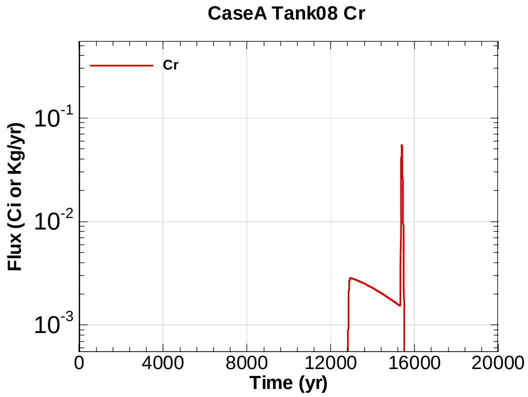

Figure A.2-639 - Water Table Flux for CaseA Tank08 Cr

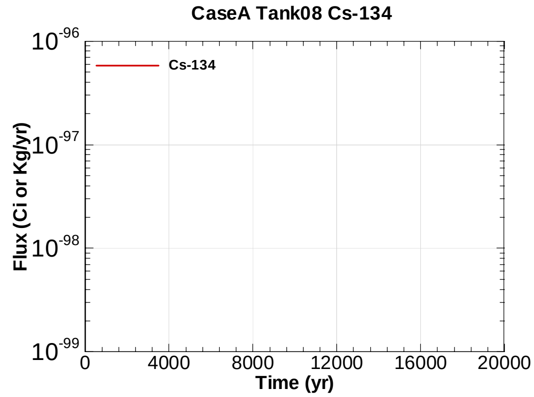

Figure A.2-640 - Water Table Flux for CaseA Tank08 Cs-134

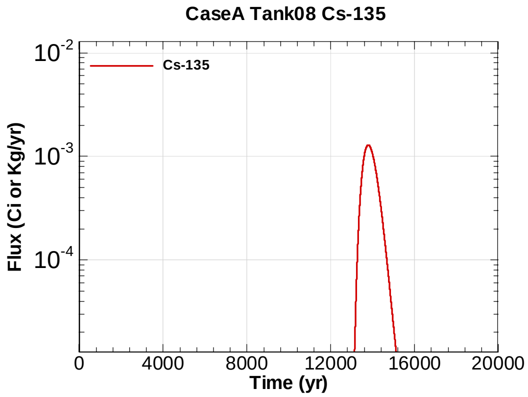

Figure A.2-641 - Water Table Flux for CaseA Tank08 Cs-135

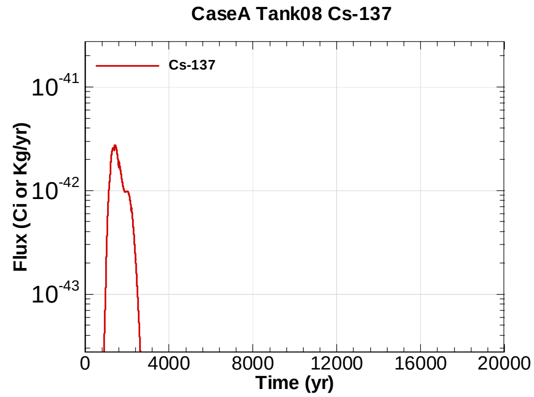

Figure A.2-642 - Water Table Flux for CaseA Tank08 Cs-137

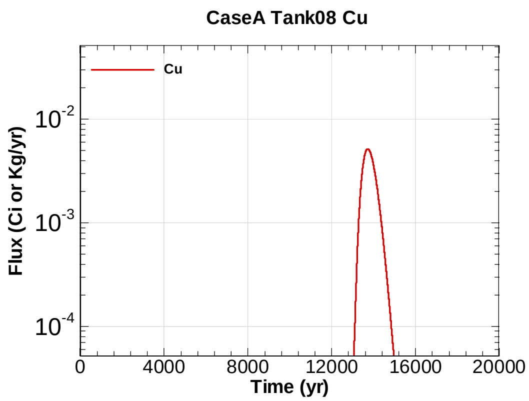

Figure A.2-643 - Water Table Flux for CaseA Tank08 Cu

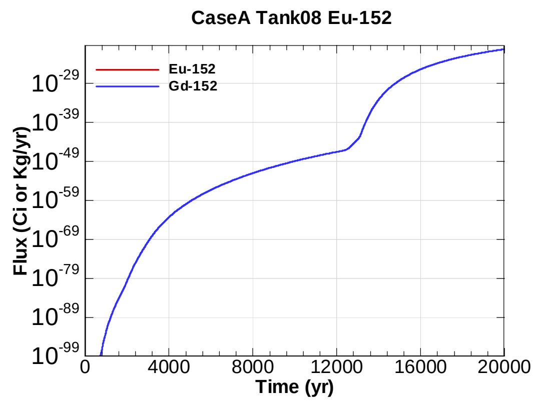

Figure A.2-644 - Water Table Flux for CaseA Tank08 Eu-152

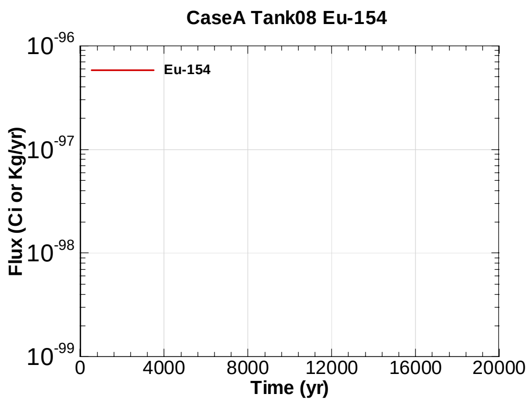

Figure A.2-645 - Water Table Flux for CaseA Tank08 Eu-154

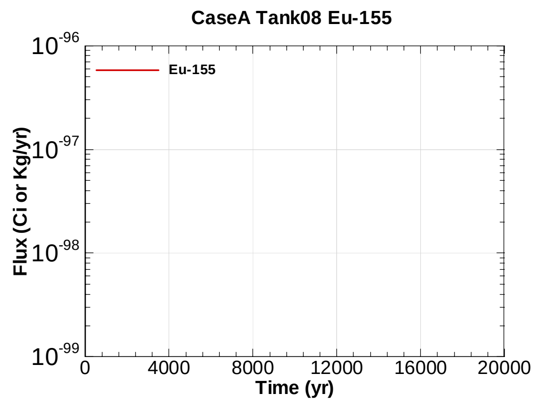

Figure A.2-646 - Water Table Flux for CaseA Tank08 Eu-155

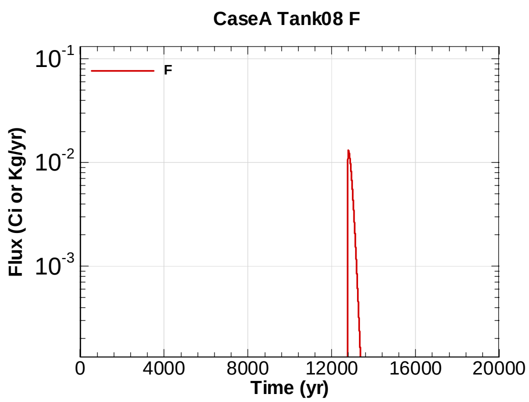

Figure A.2-647 - Water Table Flux for CaseA Tank08 F

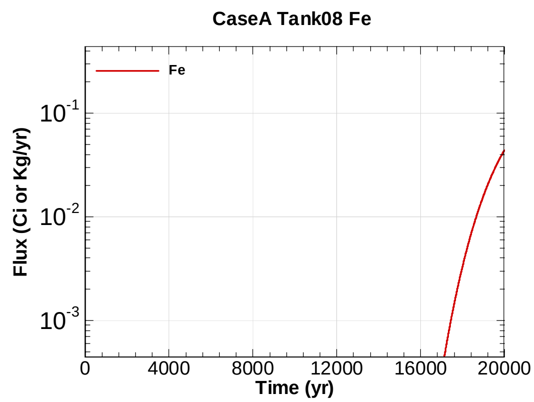

Figure A.2-648 - Water Table Flux for CaseA Tank08 Fe

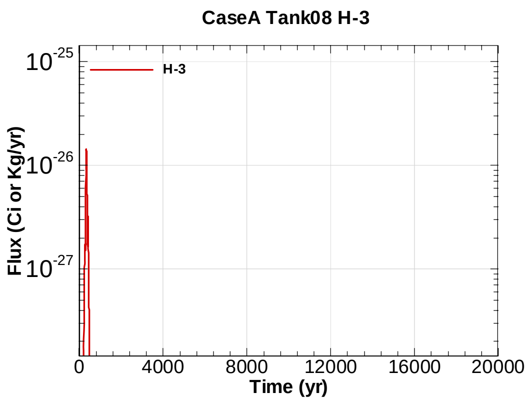

Figure A.2-649 - Water Table Flux for CaseA Tank08 H-3

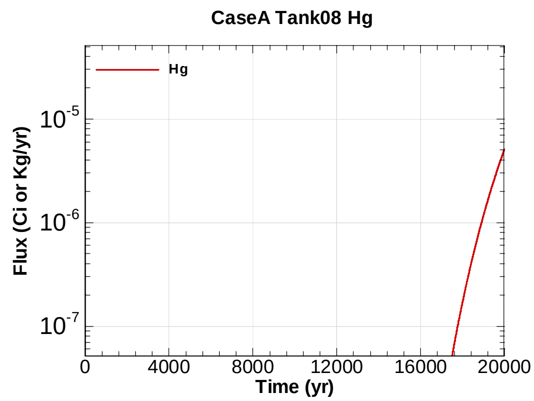

Figure A.2-650 - Water Table Flux for CaseA Tank08 Hg

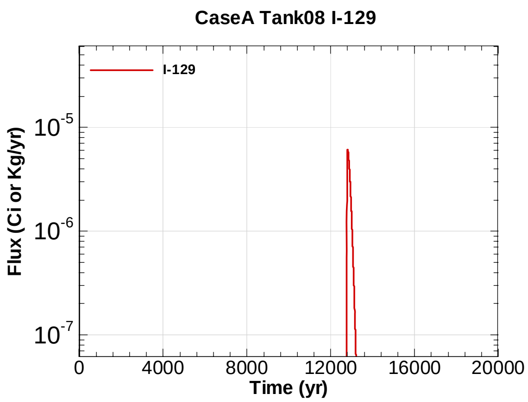

Figure A.2-651 - Water Table Flux for CaseA Tank08 I-129

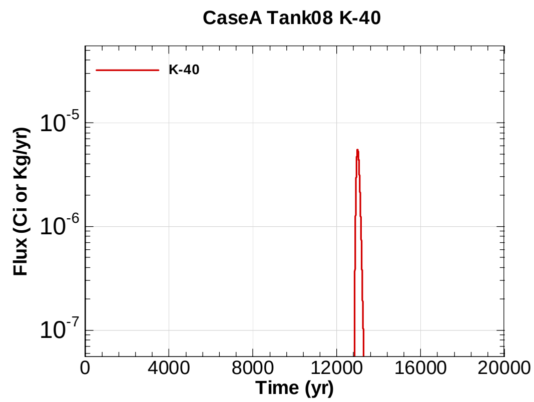

Figure A.2-652 - Water Table Flux for CaseA Tank08 K-40

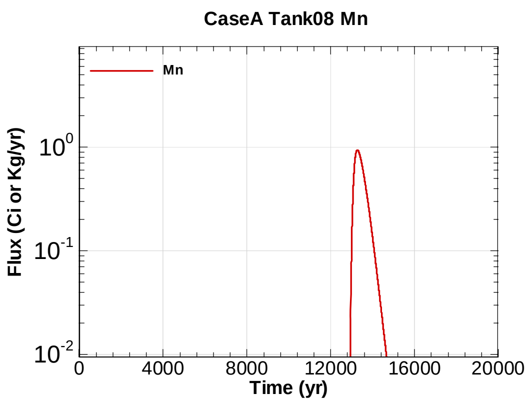

Figure A.2-653 - Water Table Flux for CaseA Tank08 Mn

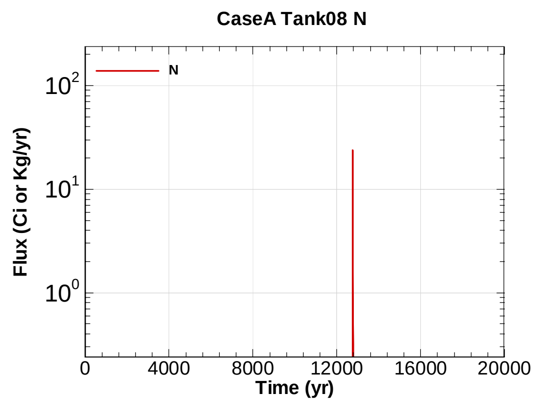

Figure A.2-654 - Water Table Flux for CaseA Tank08 N

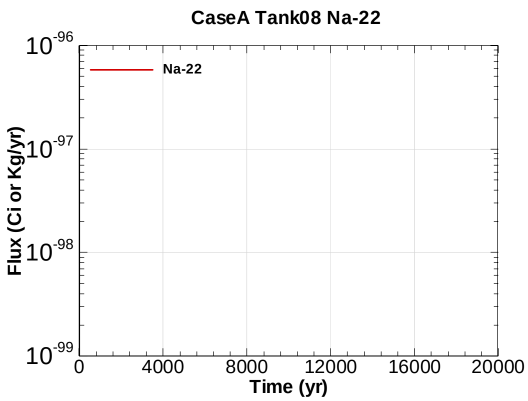

Figure A.2-655 - Water Table Flux for CaseA Tank08 Na-22

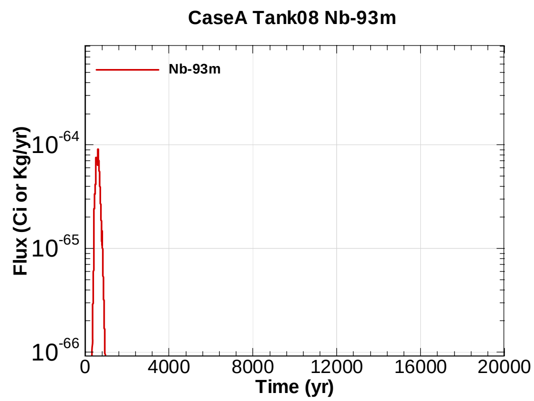

Figure A.2-656 - Water Table Flux for CaseA Tank08 Nb-93m

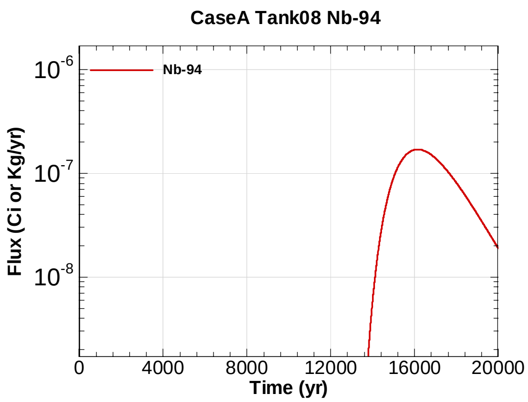

Figure A.2-657 - Water Table Flux for CaseA Tank08 Nb-94

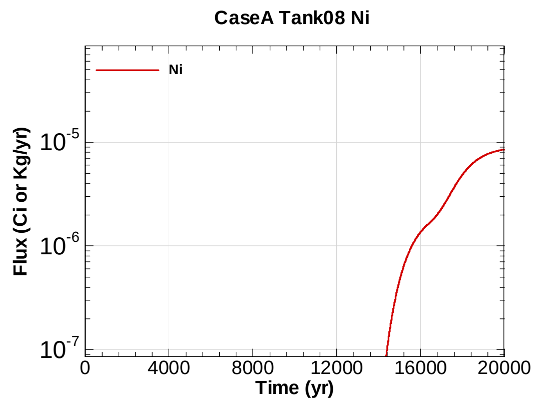

Figure A.2-658 - Water Table Flux for CaseA Tank08 Ni

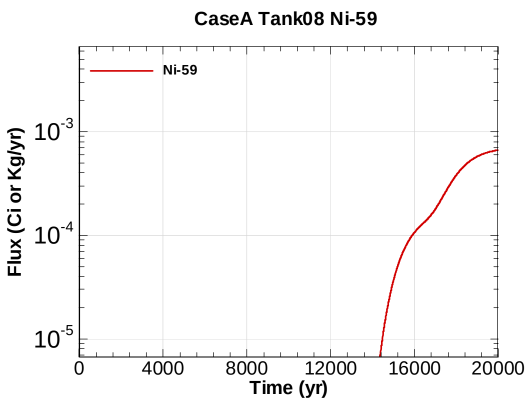

Figure A.2-659 - Water Table Flux for CaseA Tank08 Ni-59

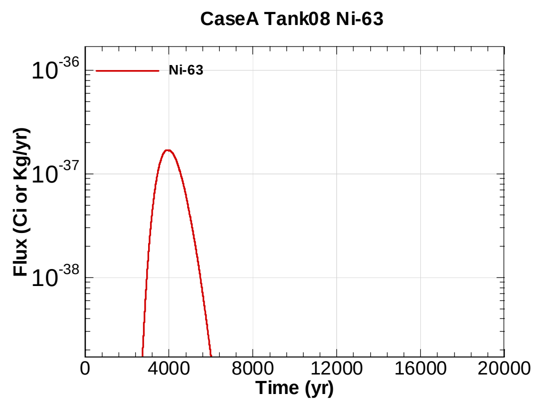

Figure A.2-660 - Water Table Flux for CaseA Tank08 Ni-63

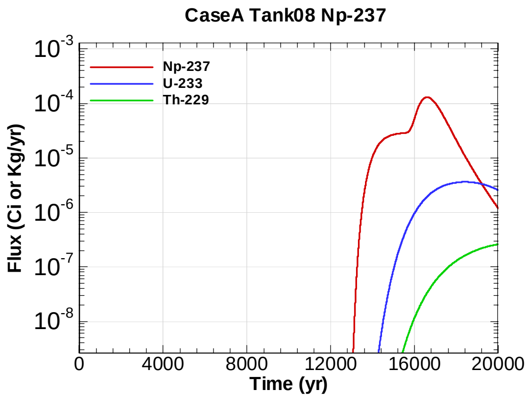

Figure A.2-661 - Water Table Flux for CaseA Tank08 Np-237

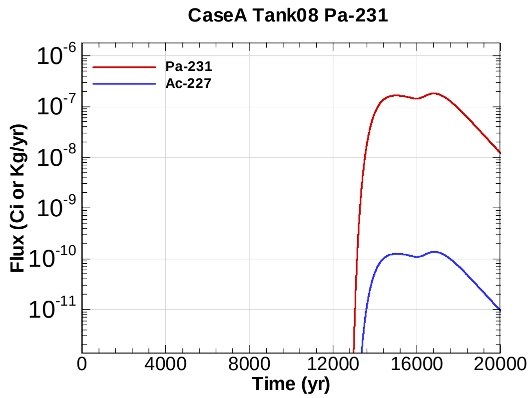

Figure A.2-662 - Water Table Flux for CaseA Tank08 Pa-231

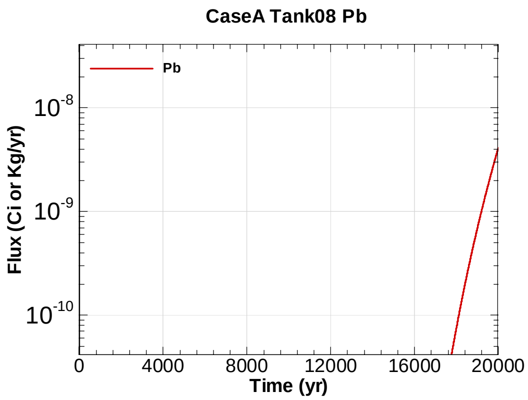

Figure A.2-663 - Water Table Flux for CaseA Tank08 Pb

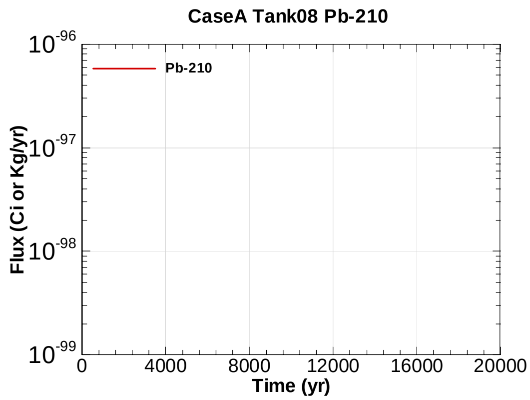

Figure A.2-664 - Water Table Flux for CaseA Tank08 Pb-210

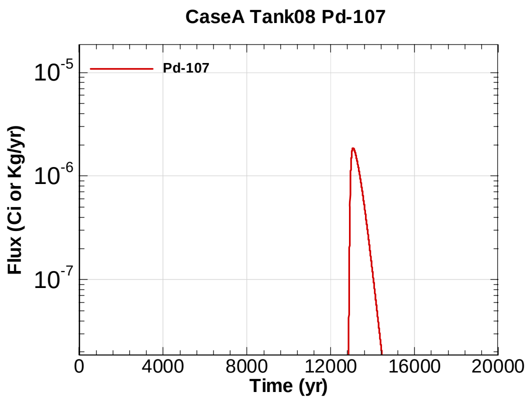

Figure A.2-665 - Water Table Flux for CaseA Tank08 Pd-107

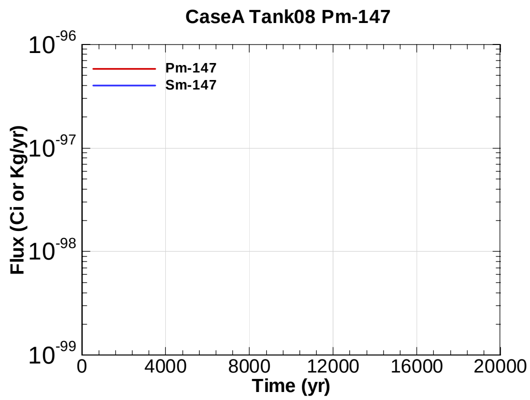

Figure A.2-666 - Water Table Flux for CaseA Tank08 Pm-147

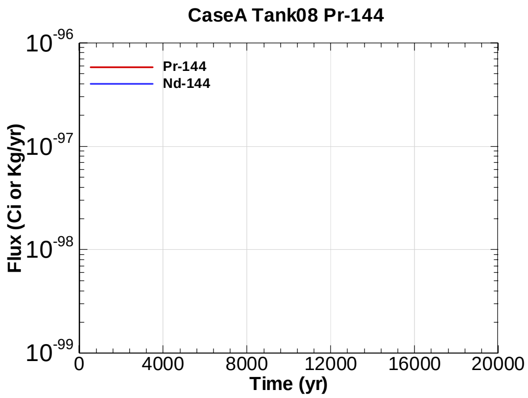

Figure A.2-667 - Water Table Flux for CaseA Tank08 Pr-144

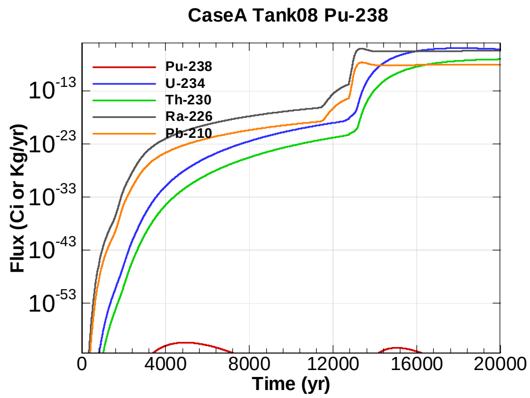

Figure A.2-668 - Water Table Flux for CaseA Tank08 Pu-238

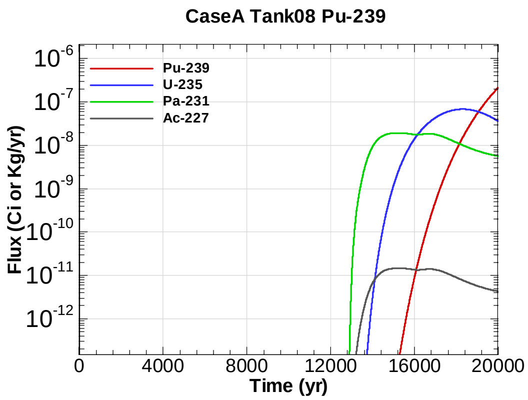

Figure A.2-669 - Water Table Flux for CaseA Tank08 Pu-239

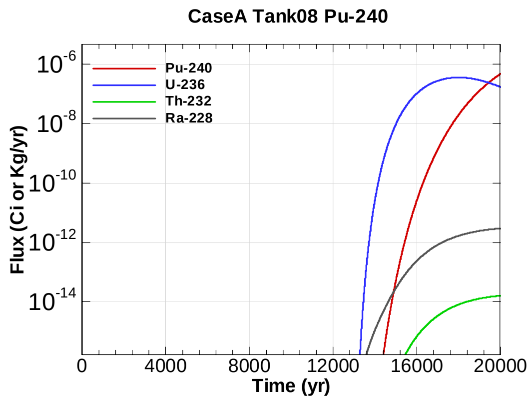

Figure A.2-670 - Water Table Flux for CaseA Tank08 Pu-240

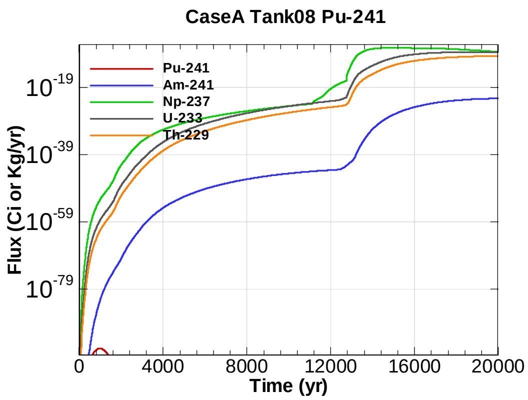

Figure A.2-671 - Water Table Flux for CaseA Tank08 Pu-241

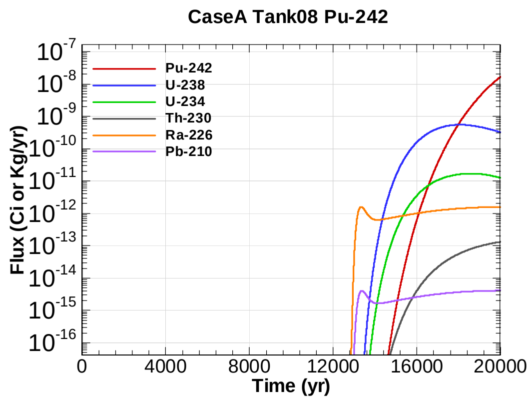

Figure A.2-672 - Water Table Flux for CaseA Tank08 Pu-242

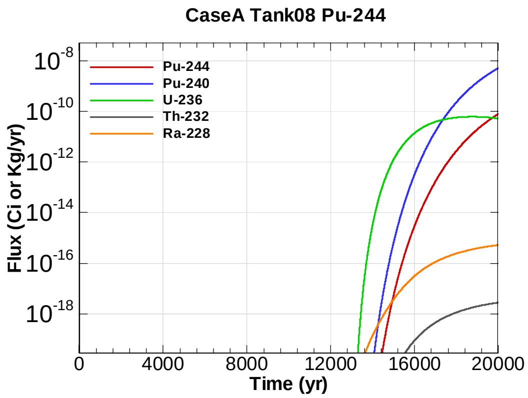

Figure A.2-673 - Water Table Flux for CaseA Tank08 Pu-244

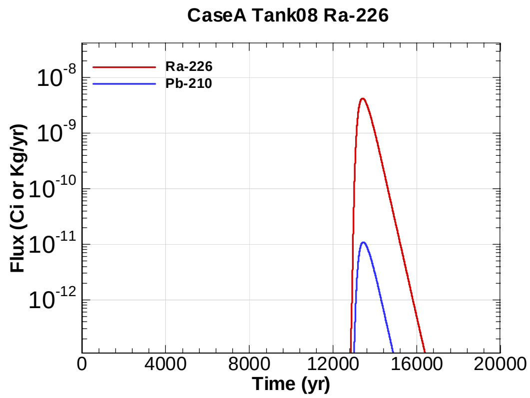

Figure A.2-674 - Water Table Flux for CaseA Tank08 Ra-226

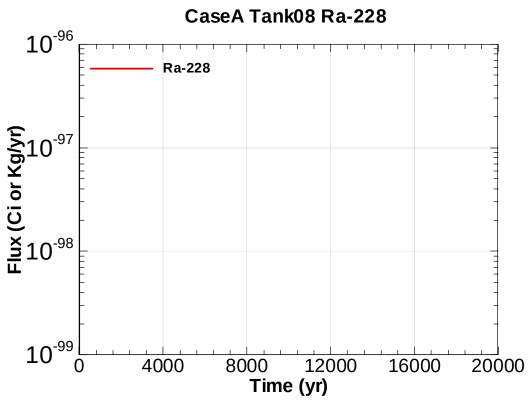

Figure A.2-675 - Water Table Flux for CaseA Tank08 Ra-228

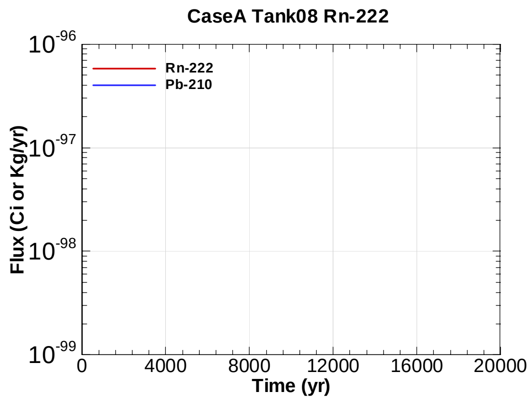

Figure A.2-676 - Water Table Flux for CaseA Tank08 Rn-222

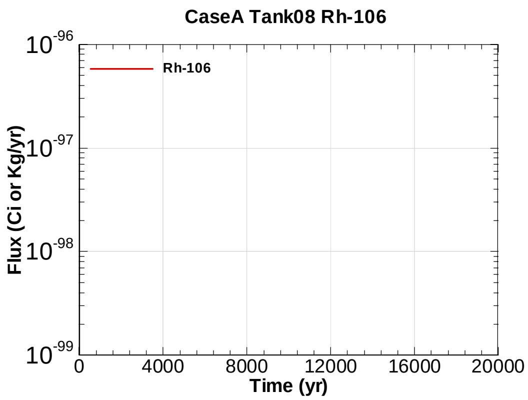

Figure A.2-677 - Water Table Flux for CaseA Tank08 Rh-106

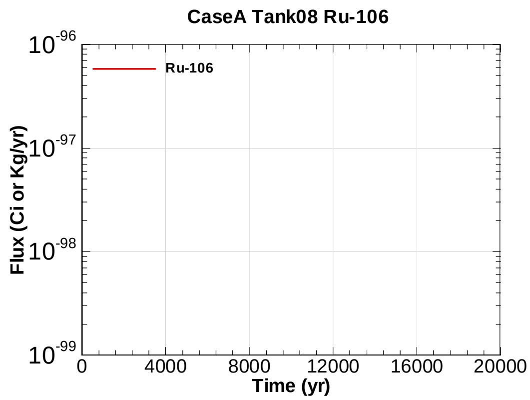

Figure A.2-678 - Water Table Flux for CaseA Tank08 Ru-106

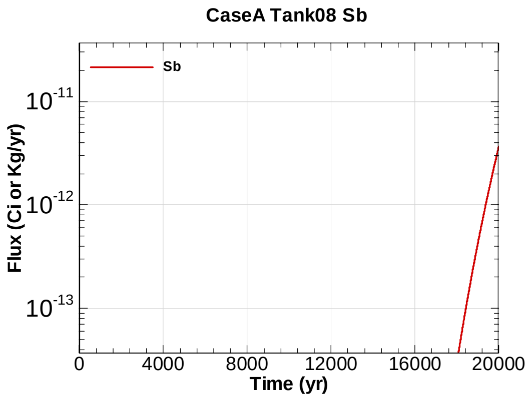

Figure A.2-679 - Water Table Flux for CaseA Tank08 Sb

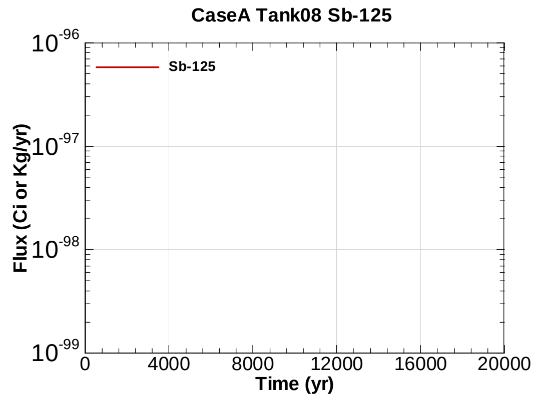

Figure A.2-680 - Water Table Flux for CaseA Tank08 Sb-125

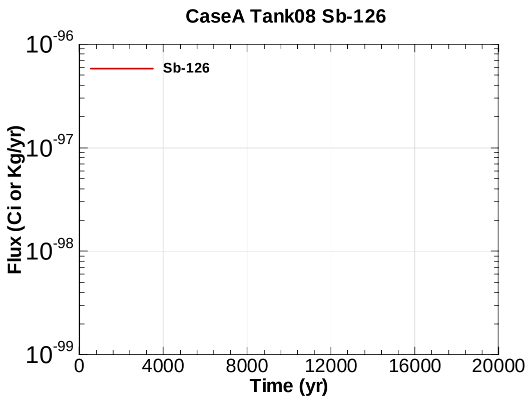

Figure A.2-681 - Water Table Flux for CaseA Tank08 Sb-126

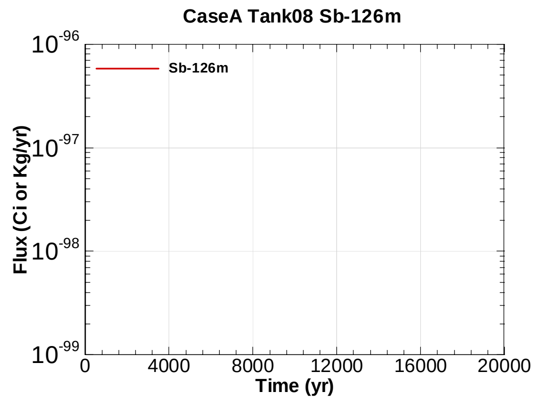

Figure A.2-682 - Water Table Flux for CaseA Tank08 Sb-126m

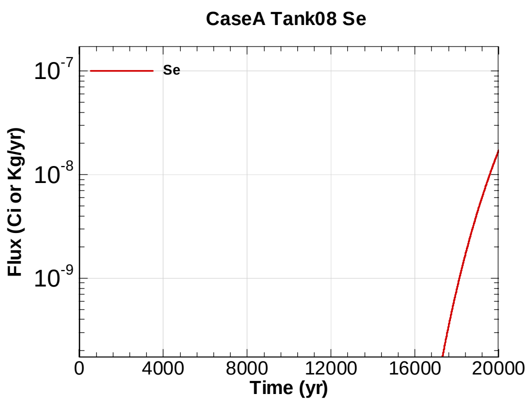

Figure A.2-683 - Water Table Flux for CaseA Tank08 Se

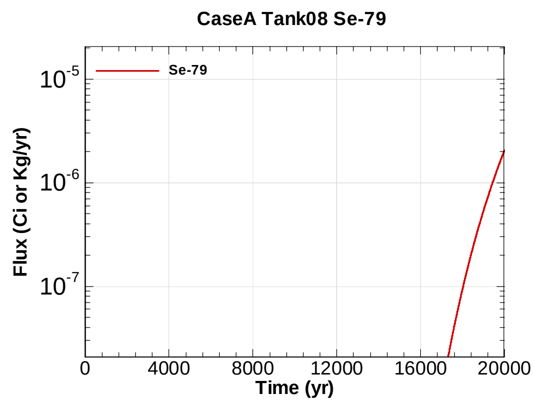

Figure A.2-684 - Water Table Flux for CaseA Tank08 Se-79

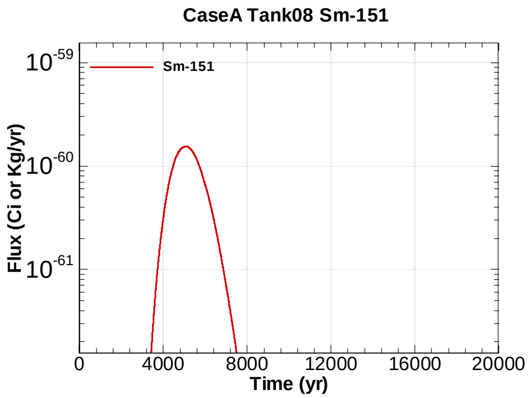

Figure A.2-685 - Water Table Flux for CaseA Tank08 Sm-151

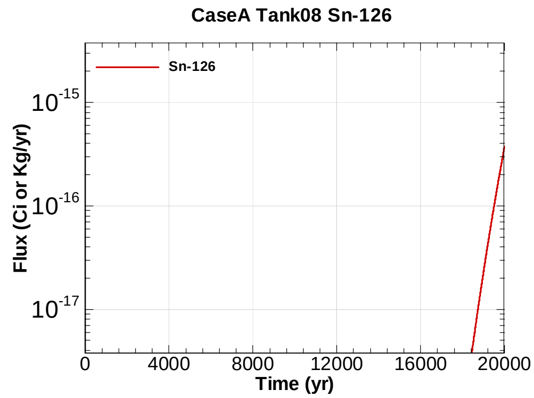

Figure A.2-686 - Water Table Flux for CaseA Tank08 Sn-126

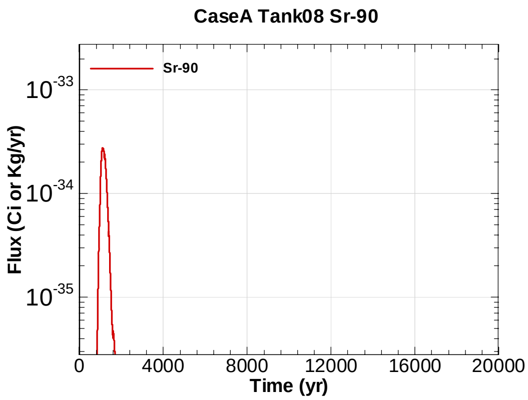

Figure A.2-687 - Water Table Flux for CaseA Tank08 Sr-90

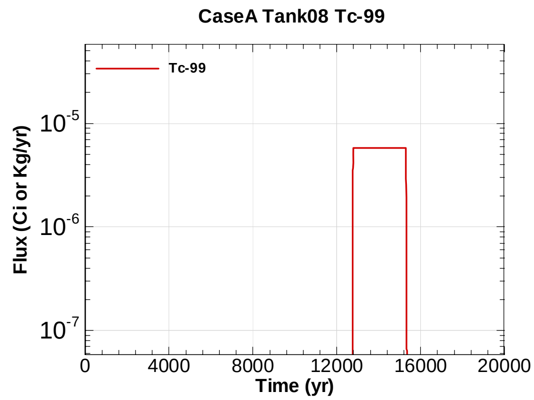

Figure A.2-688 - Water Table Flux for CaseA Tank08 Tc-99

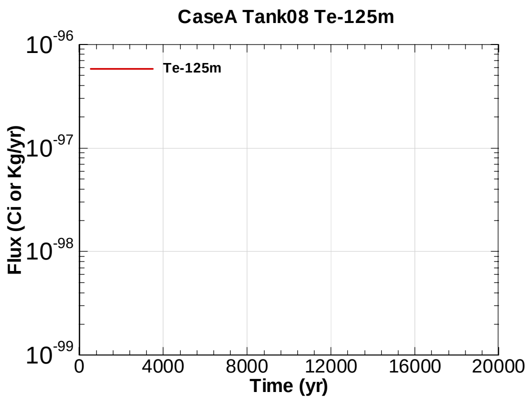

Figure A.2-689 - Water Table Flux for CaseA Tank08 Te-125m

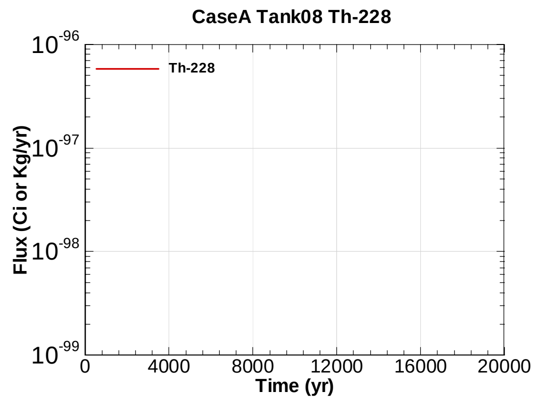

Figure A.2-690 - Water Table Flux for CaseA Tank08 Th-228

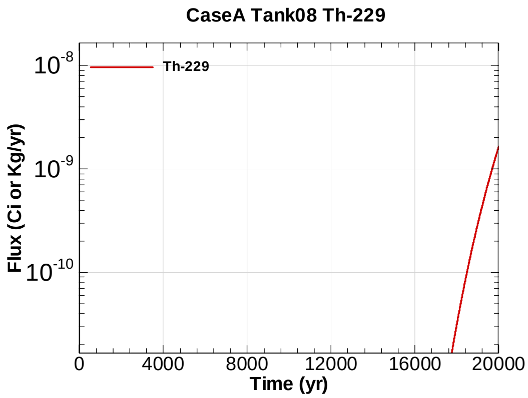

Figure A.2-691 - Water Table Flux for CaseA Tank08 Th-229

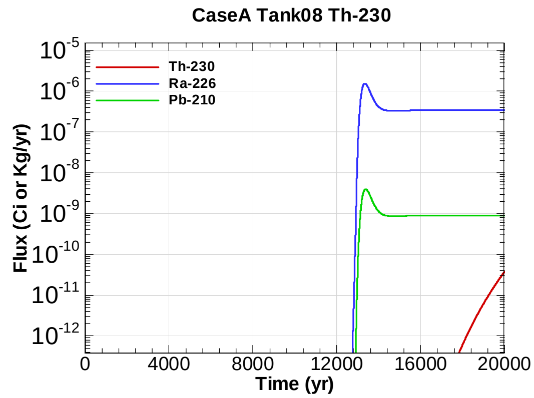

Figure A.2-692 - Water Table Flux for CaseA Tank08 Th-230

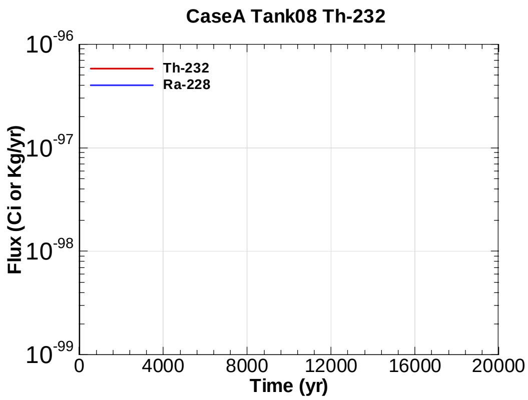

Figure A.2-693 - Water Table Flux for CaseA Tank08 Th-232

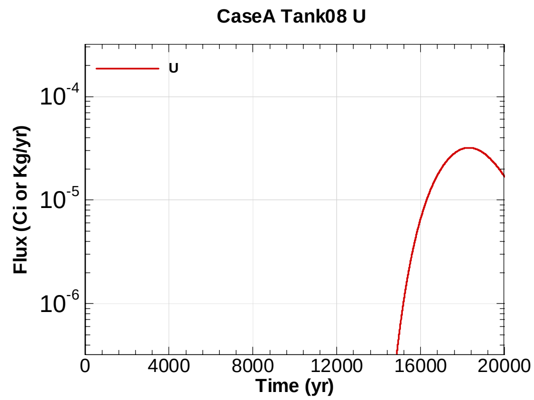

Figure A.2-694 - Water Table Flux for CaseA Tank08 U

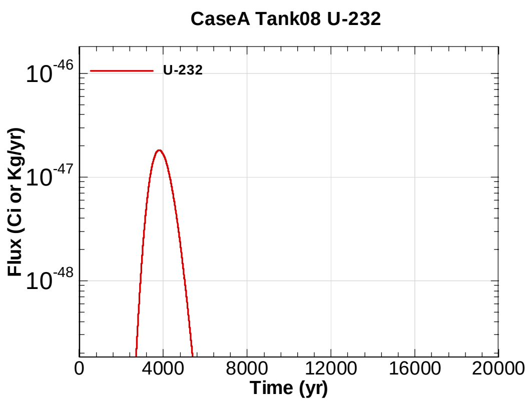

Figure A.2-695 - Water Table Flux for CaseA Tank08 U-232

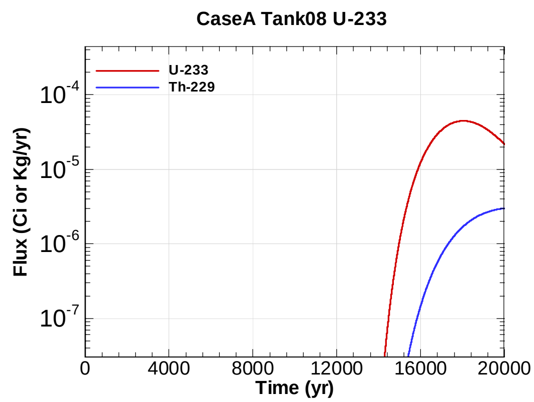

Figure A.2-696 - Water Table Flux for CaseA Tank08 U-233

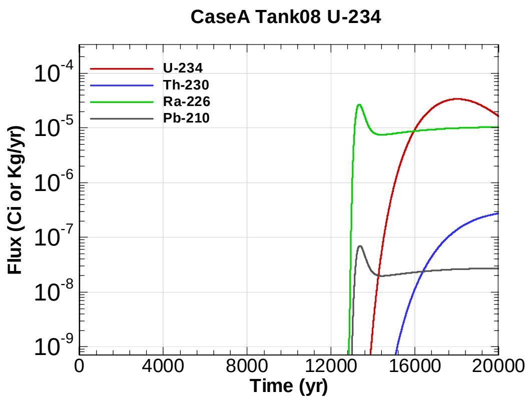

Figure A.2-697 - Water Table Flux for CaseA Tank08 U-234

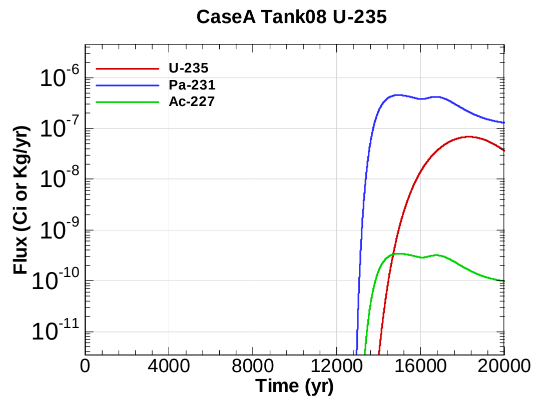

Figure A.2-698 - Water Table Flux for CaseA Tank08 U-235

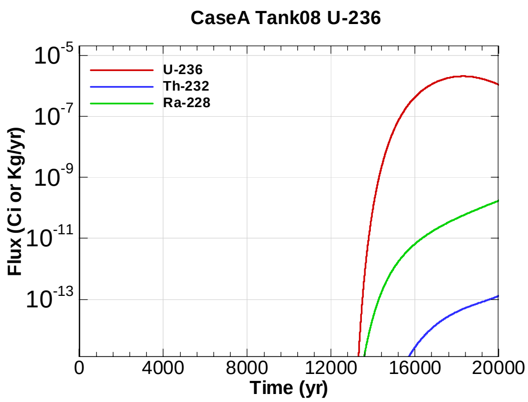

Figure A.2-699 - Water Table Flux for CaseA Tank08 U-236

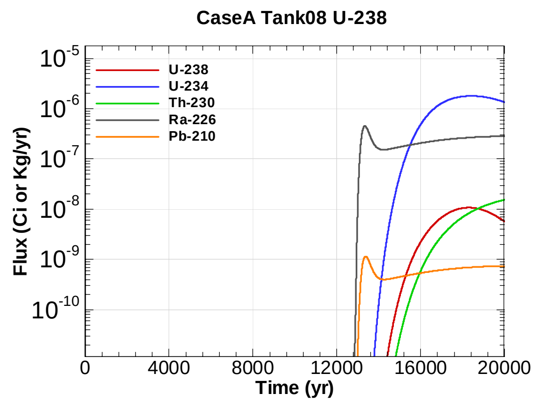

Figure A.2-700 - Water Table Flux for CaseA Tank08 U-238

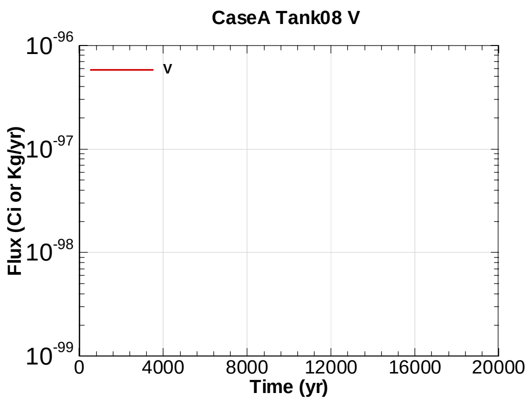

Figure A.2-701 - Water Table Flux for CaseA Tank08 V

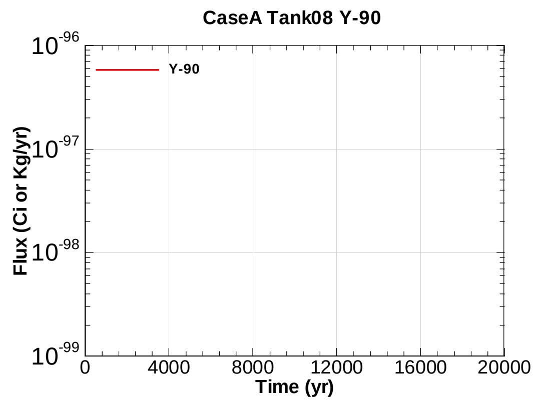

Figure A.2-702 - Water Table Flux for CaseA Tank08 Y-90

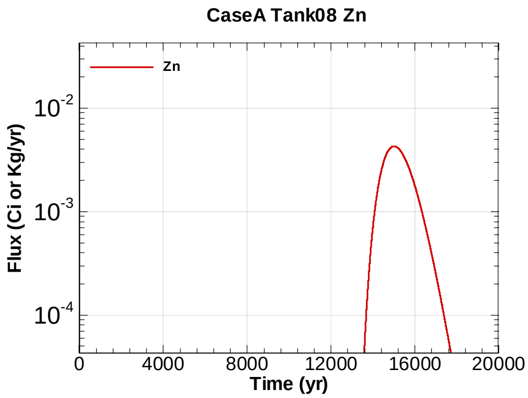

Figure A.2-703 - Water Table Flux for CaseA Tank08 Zn

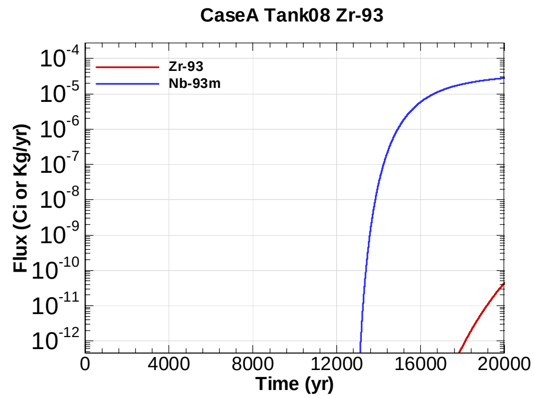

Figure A.2-704 - Water Table Flux for CaseA Tank08 Zr-93

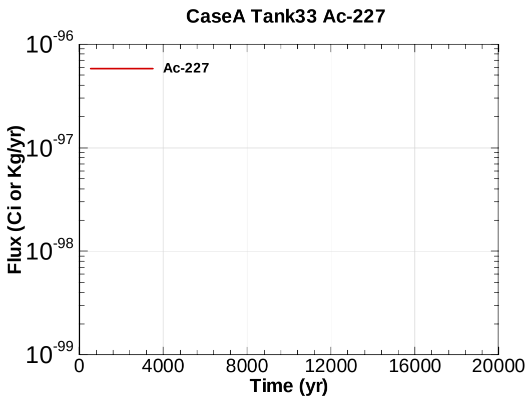

Figure A.2-705 - Water Table Flux for CaseA Tank33 Ac-227

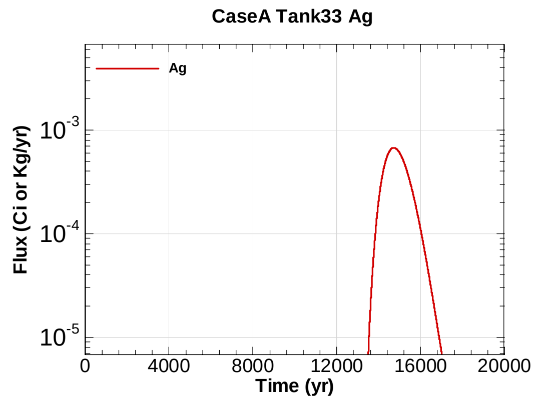

Figure A.2-706 - Water Table Flux for CaseA Tank33 Ag

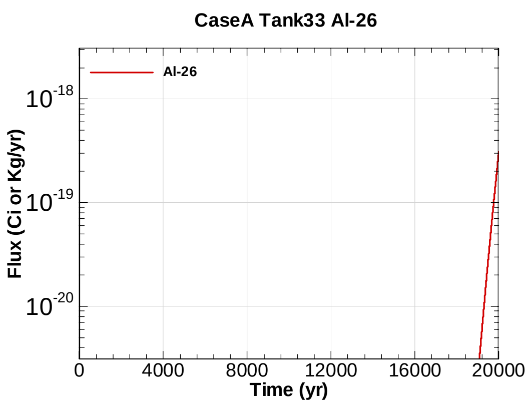

Figure A.2-707 - Water Table Flux for CaseA Tank33 Al-26

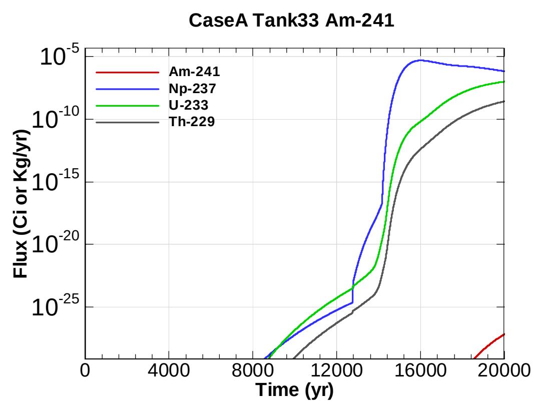

Figure A.2-708 - Water Table Flux for CaseA Tank33 Am-241

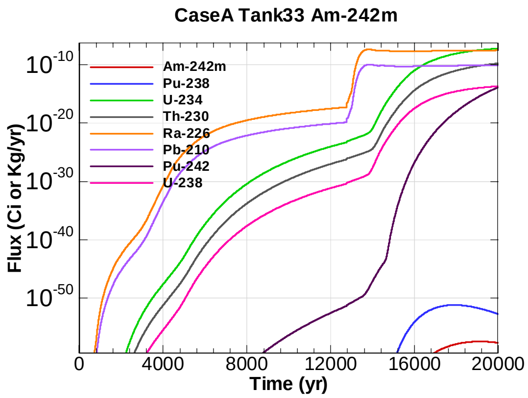

Figure A.2-709 - Water Table Flux for CaseA Tank33 Am-242m

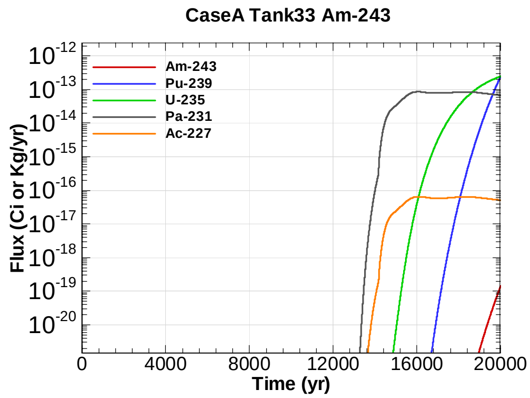

Figure A.2-710 - Water Table Flux for CaseA Tank33 Am-243

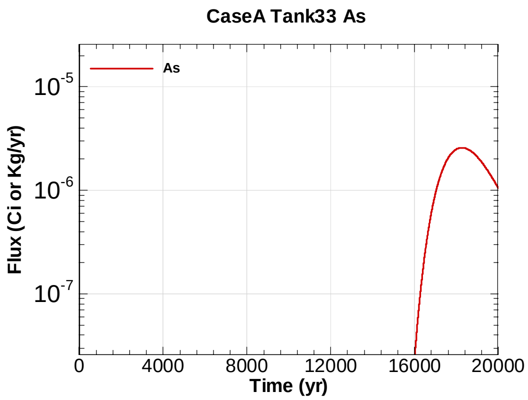

Figure A.2-711 - Water Table Flux for CaseA Tank33 As

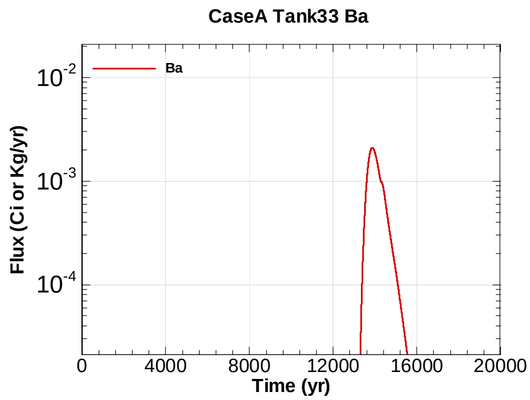

Figure A.2-712 - Water Table Flux for CaseA Tank33 Ba

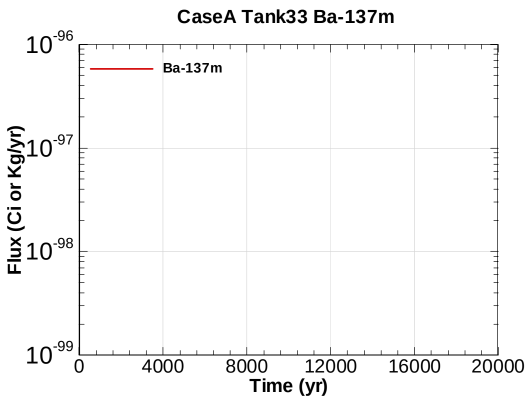

Figure A.2-713 - Water Table Flux for CaseA Tank33 Ba-137m

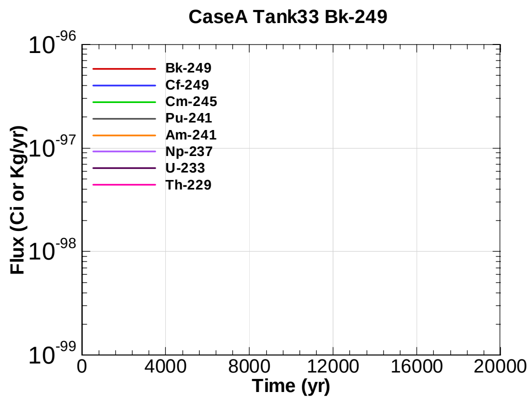

Figure A.2-714 - Water Table Flux for CaseA Tank33 Bk-249

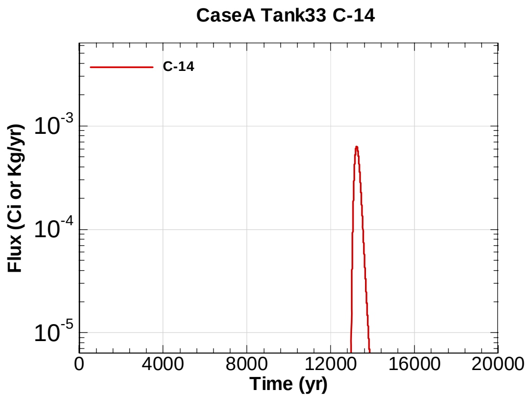

Figure A.2-715 - Water Table Flux for CaseA Tank33 C-14

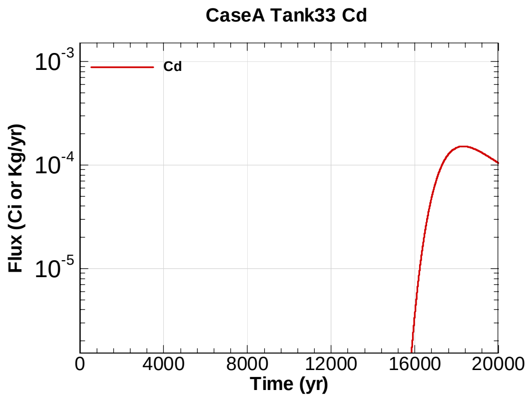

Figure A.2-716 - Water Table Flux for CaseA Tank33 Cd

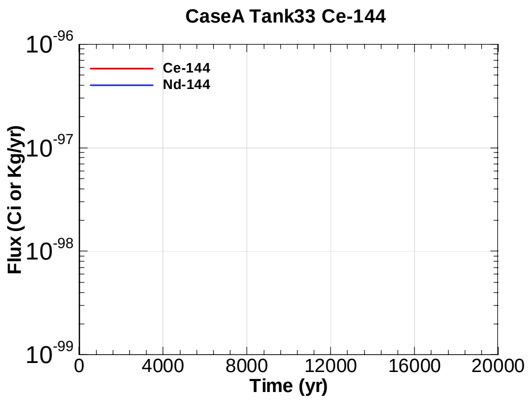

Figure A.2-717 - Water Table Flux for CaseA Tank33 Ce-144

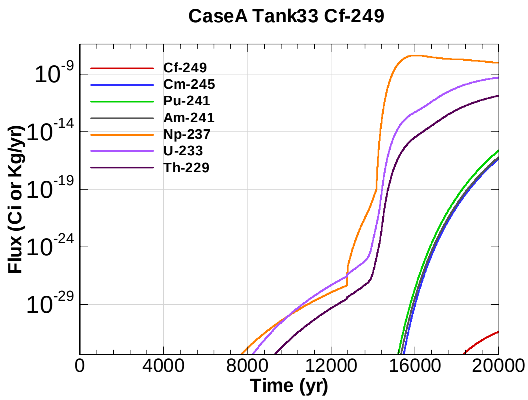

Figure A.2-718 - Water Table Flux for CaseA Tank33 Cf-249

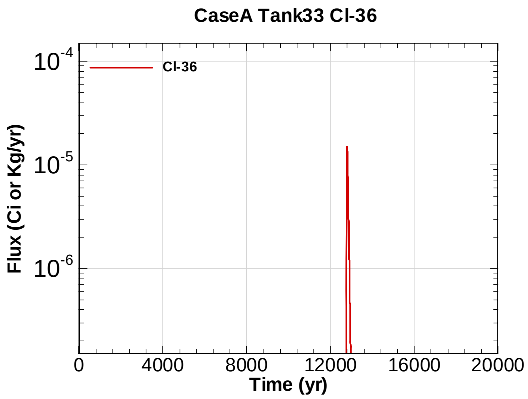

Figure A.2-719 - Water Table Flux for CaseA Tank33 Cl-36

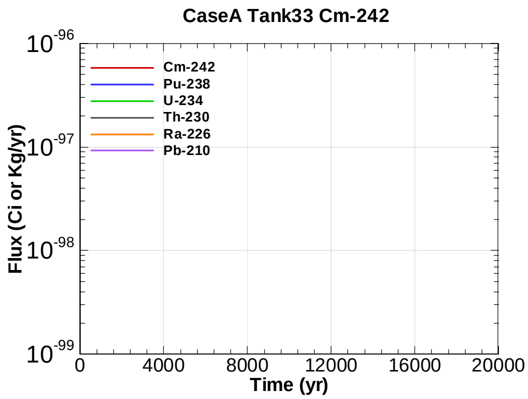

Figure A.2-720 - Water Table Flux for CaseA Tank33 Cm-242

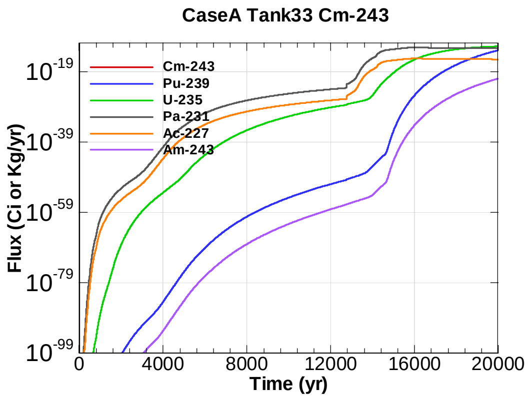

Figure A.2-721 - Water Table Flux for CaseA Tank33 Cm-243

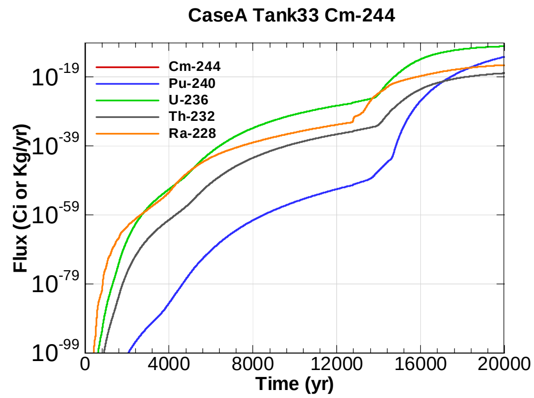

Figure A.2-722 - Water Table Flux for CaseA Tank33 Cm-244

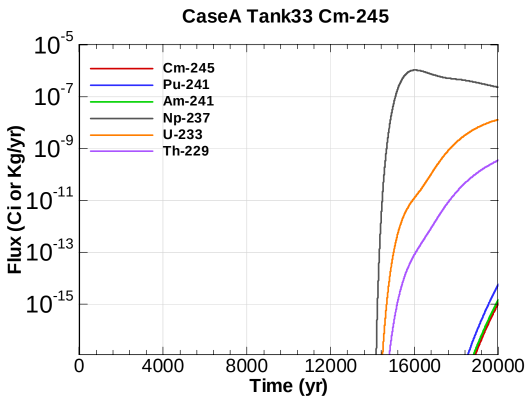

Figure A.2-723 - Water Table Flux for CaseA Tank33 Cm-245

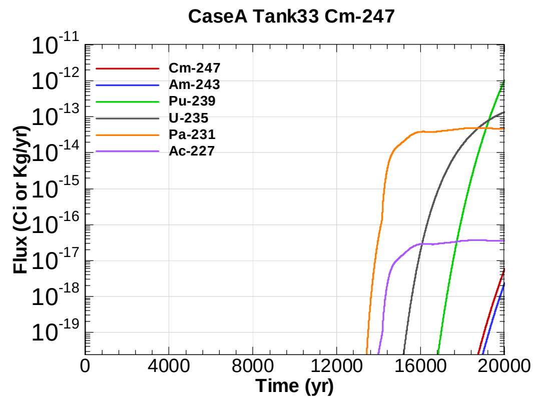

Figure A.2-724 - Water Table Flux for CaseA Tank33 Cm-247

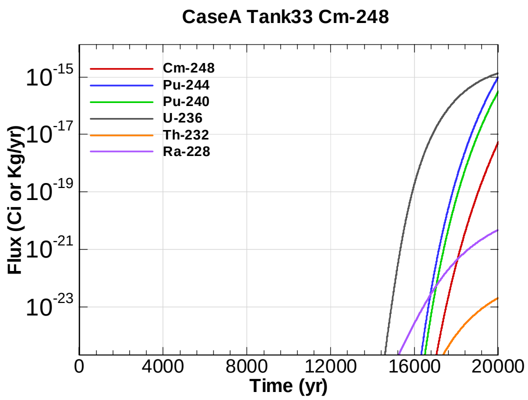

Figure A.2-725 - Water Table Flux for CaseA Tank33 Cm-248

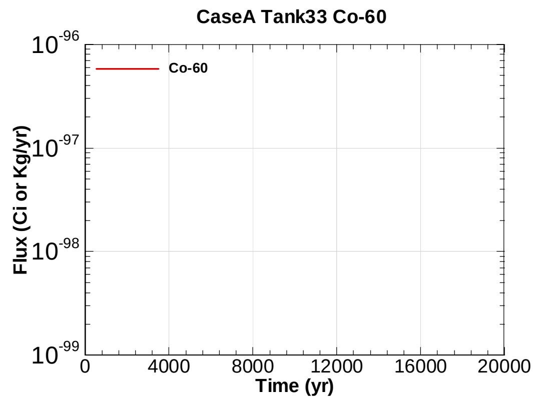

Figure A.2-726 - Water Table Flux for CaseA Tank33 Co-60

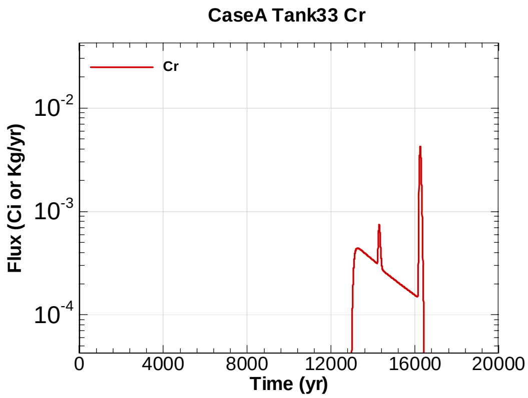

Figure A.2-727 - Water Table Flux for CaseA Tank33 Cr

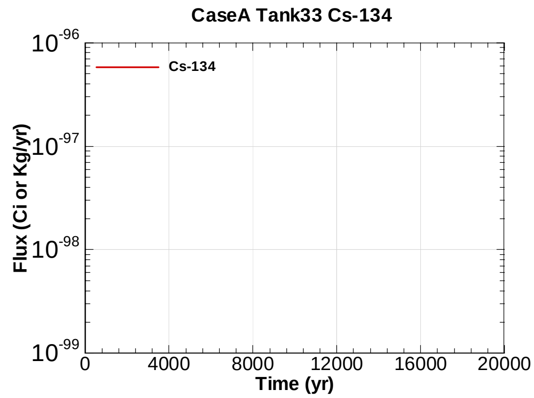

Figure A.2-728 - Water Table Flux for CaseA Tank33 Cs-134

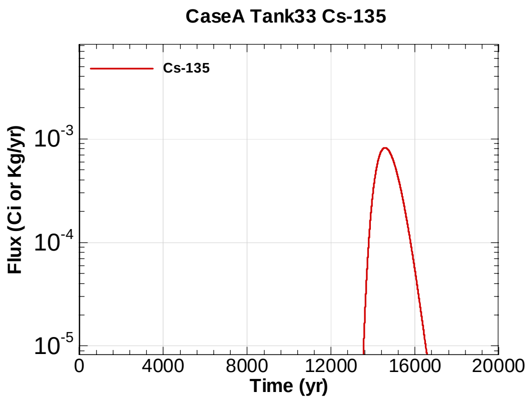

Figure A.2-729 - Water Table Flux for CaseA Tank33 Cs-135

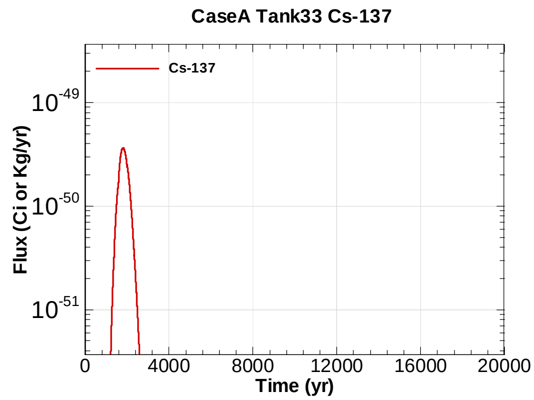

Figure A.2-730 - Water Table Flux for CaseA Tank33 Cs-137

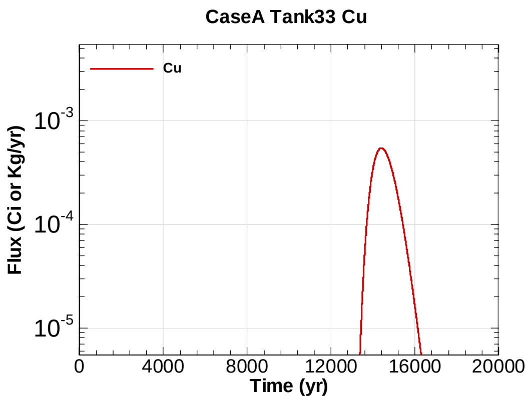

Figure A.2-731 - Water Table Flux for CaseA Tank33 Cu

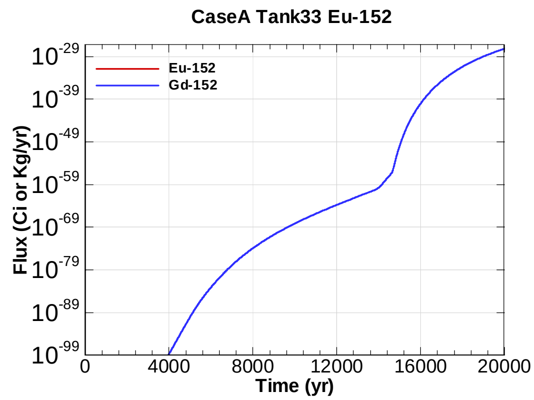

Figure A.2-732 - Water Table Flux for CaseA Tank33 Eu-152

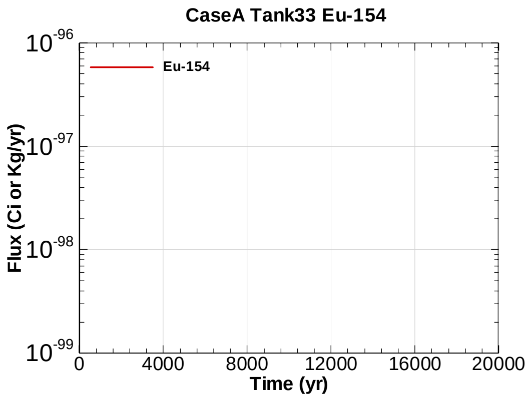

Figure A.2-733 - Water Table Flux for CaseA Tank33 Eu-154

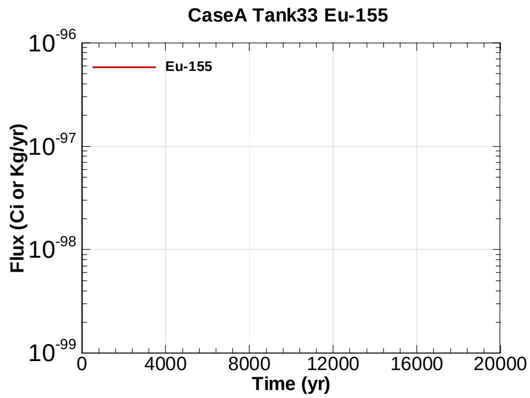

Figure A.2-734 - Water Table Flux for CaseA Tank33 Eu-155

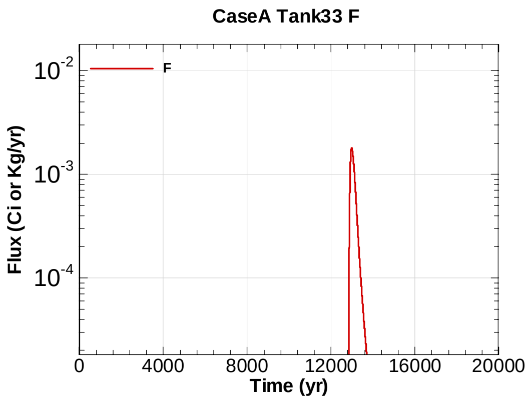

Figure A.2-735 - Water Table Flux for CaseA Tank33 F

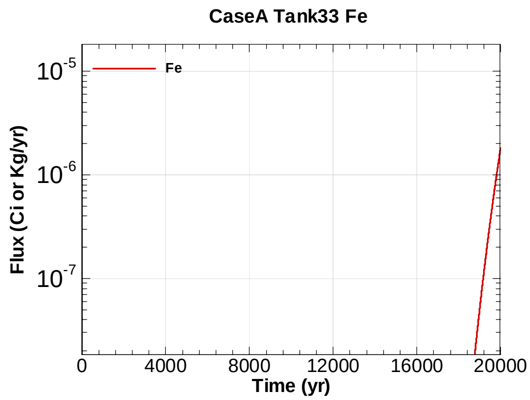

Figure A.2-736 - Water Table Flux for CaseA Tank33 Fe

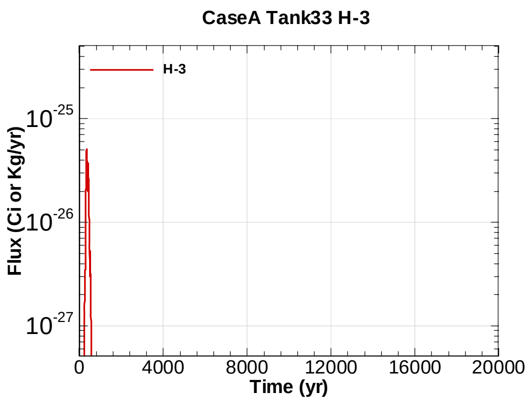

Figure A.2-737 - Water Table Flux for CaseA Tank33 H-3

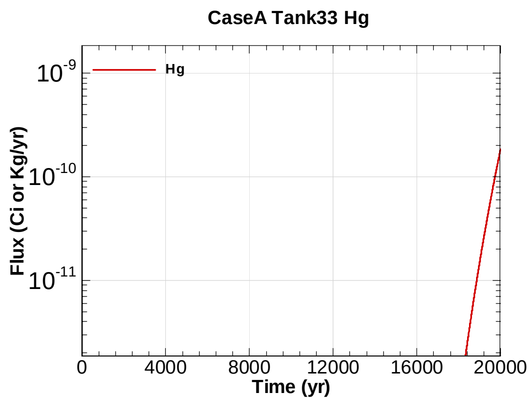

Figure A.2-738 - Water Table Flux for CaseA Tank33 Hg

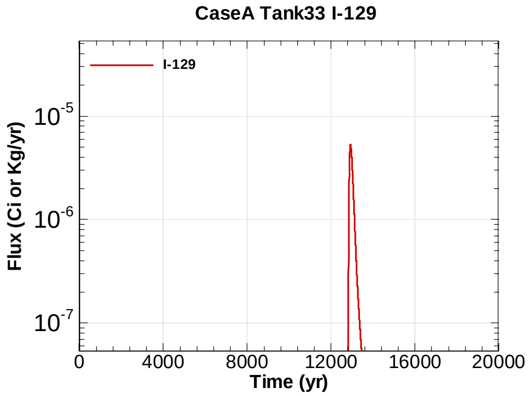

Figure A.2-739 - Water Table Flux for CaseA Tank33 I-129

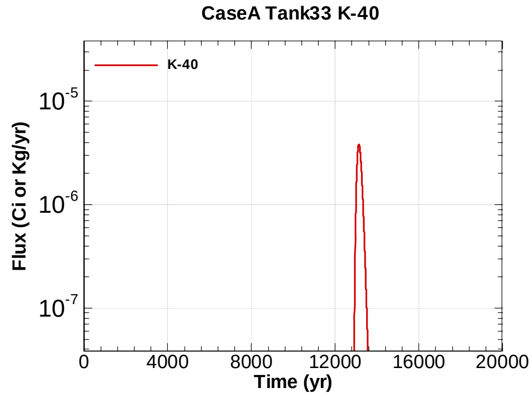

Figure A.2-740 - Water Table Flux for CaseA Tank33 K-40

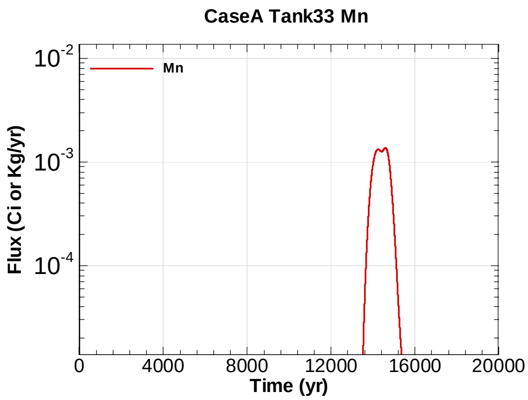

Figure A.2-741 - Water Table Flux for CaseA Tank33 Mn

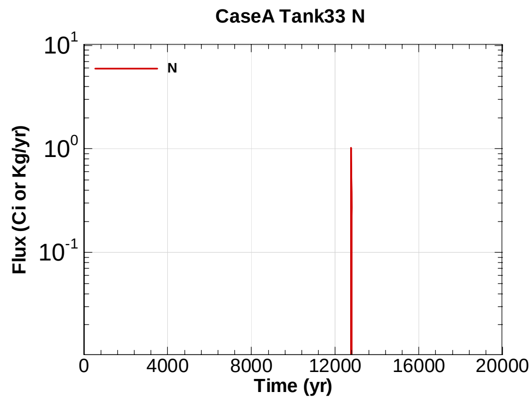

Figure A.2-742 - Water Table Flux for CaseA Tank33 N

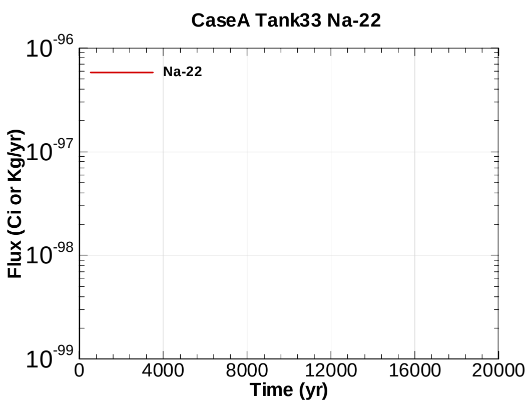

Figure A.2-743 - Water Table Flux for CaseA Tank33 Na-22

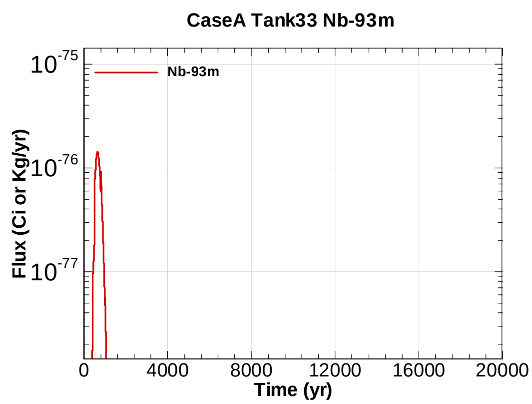

Figure A.2-744 - Water Table Flux for CaseA Tank33 Nb-93m

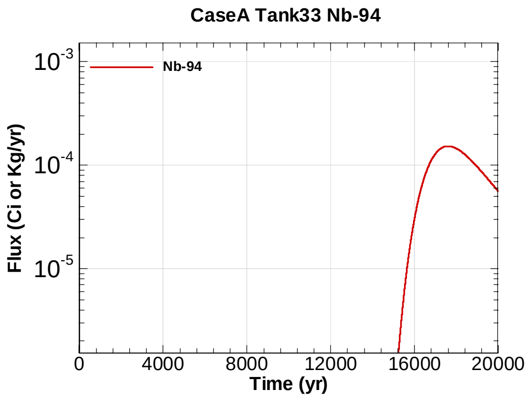

Figure A.2-745 - Water Table Flux for CaseA Tank33 Nb-94

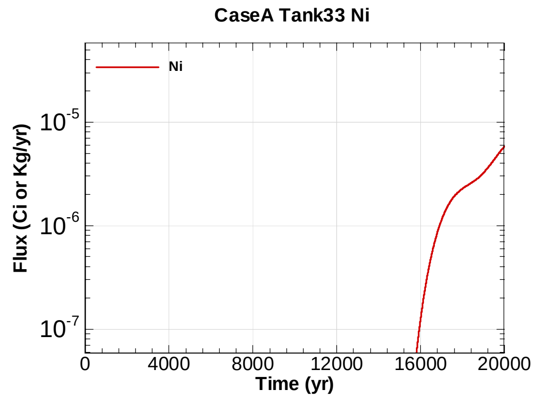

Figure A.2-746 - Water Table Flux for CaseA Tank33 Ni

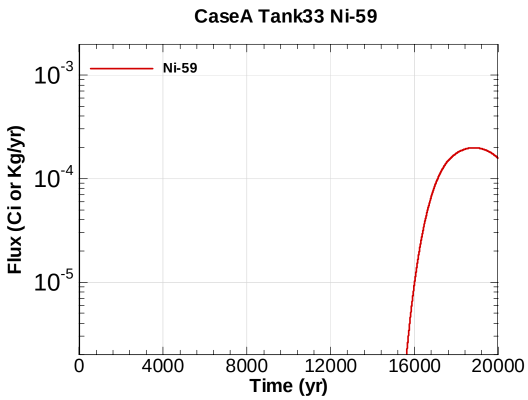

Figure A.2-747 - Water Table Flux for CaseA Tank33 Ni-59

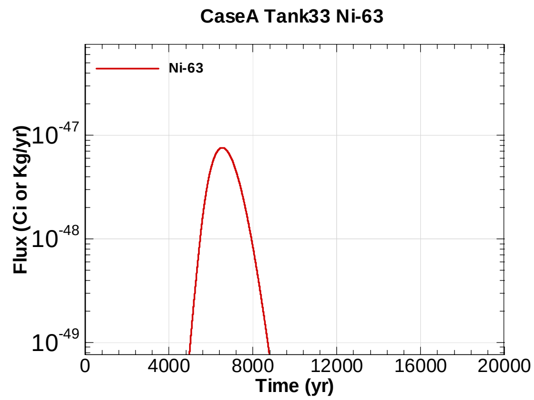

Figure A.2-748 - Water Table Flux for CaseA Tank33 Ni-63

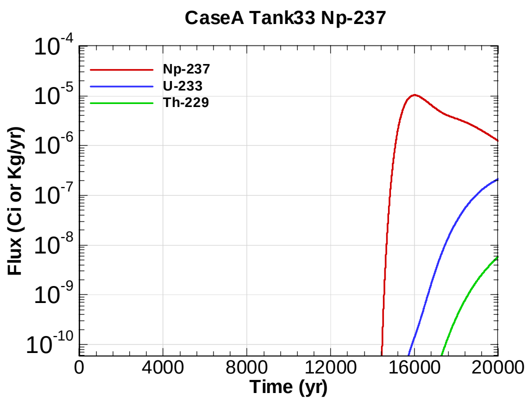

Figure A.2-749 - Water Table Flux for CaseA Tank33 Np-237

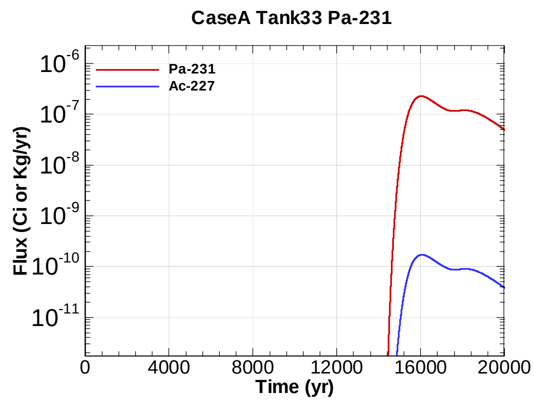

Figure A.2-750 - Water Table Flux for CaseA Tank33 Pa-231

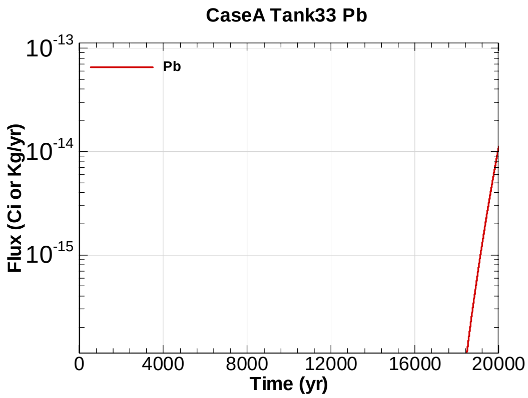

Figure A.2-751 - Water Table Flux for CaseA Tank33 Pb

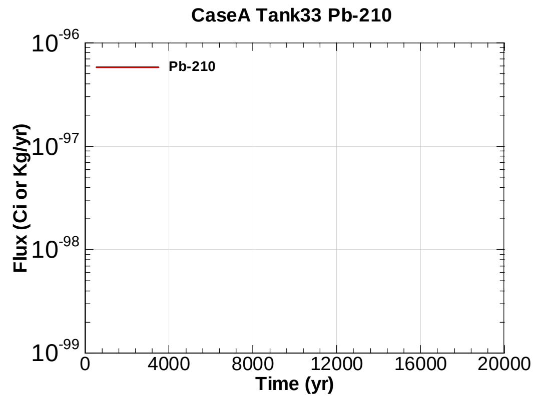

Figure A.2-752 - Water Table Flux for CaseA Tank33 Pb-210

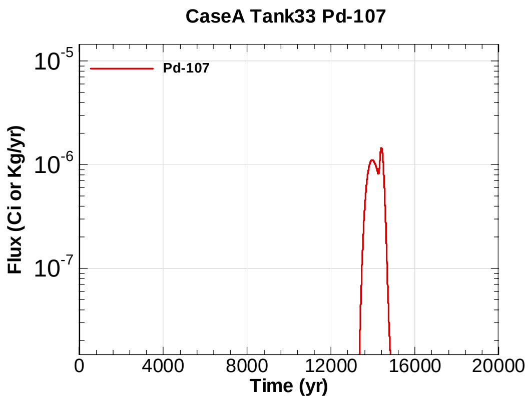

Figure A.2-753 - Water Table Flux for CaseA Tank33 Pd-107

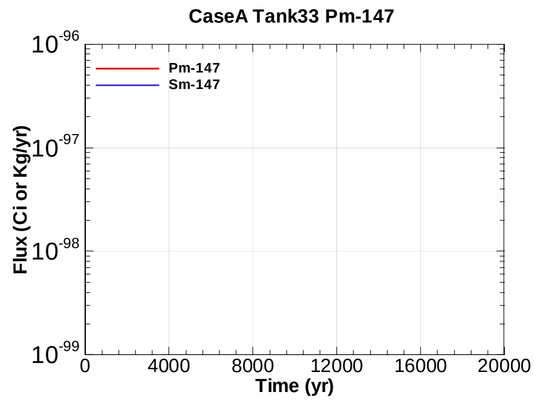

Figure A.2-754 - Water Table Flux for CaseA Tank33 Pm-147

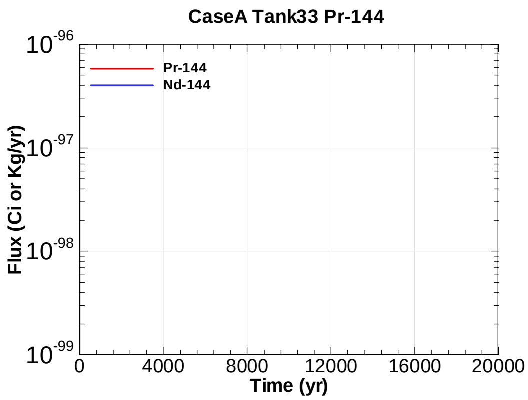

Figure A.2-755 - Water Table Flux for CaseA Tank33 Pr-144

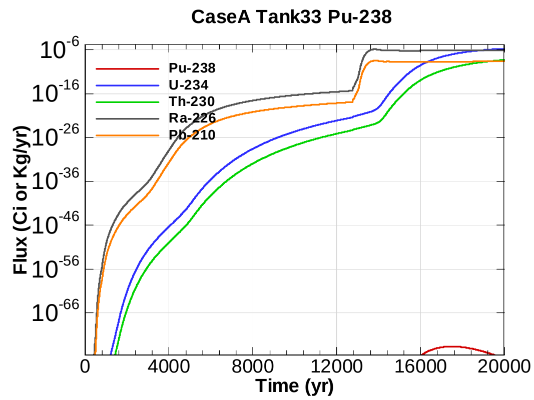

Figure A.2-756 - Water Table Flux for CaseA Tank33 Pu-238

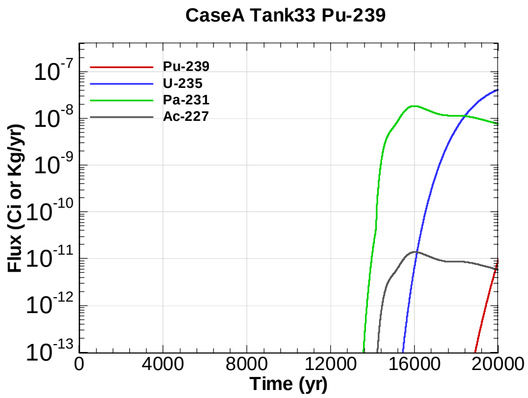

Figure A.2-757 - Water Table Flux for CaseA Tank33 Pu-239

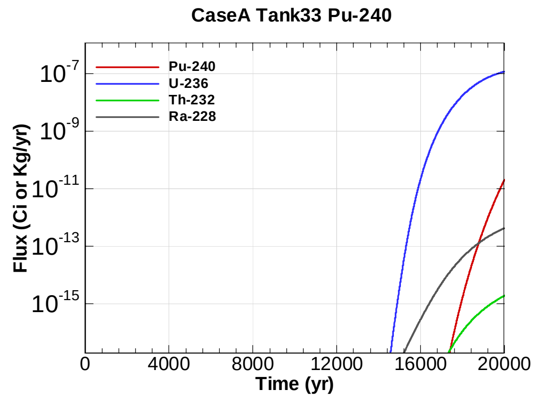

Figure A.2-758 - Water Table Flux for CaseA Tank33 Pu-240

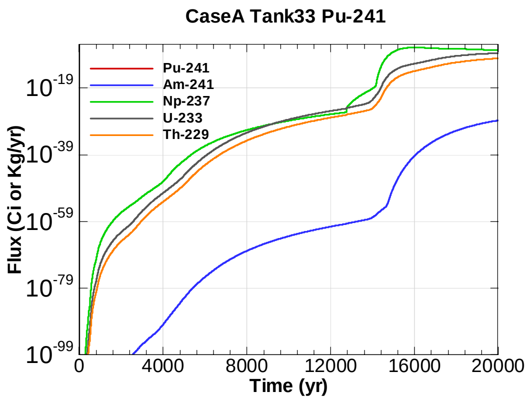

Figure A.2-759 - Water Table Flux for CaseA Tank33 Pu-241

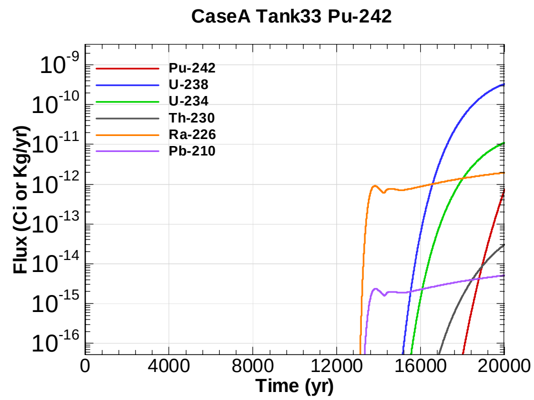

Figure A.2-760 - Water Table Flux for CaseA Tank33 Pu-242

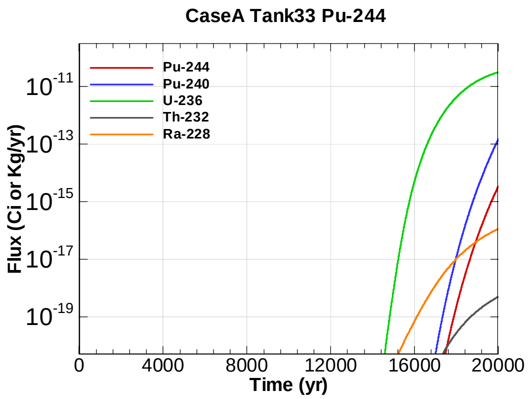

Figure A.2-761 - Water Table Flux for CaseA Tank33 Pu-244

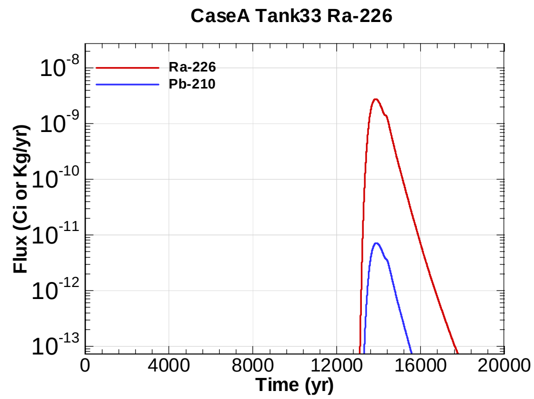

Figure A.2-762 - Water Table Flux for CaseA Tank33 Ra-226

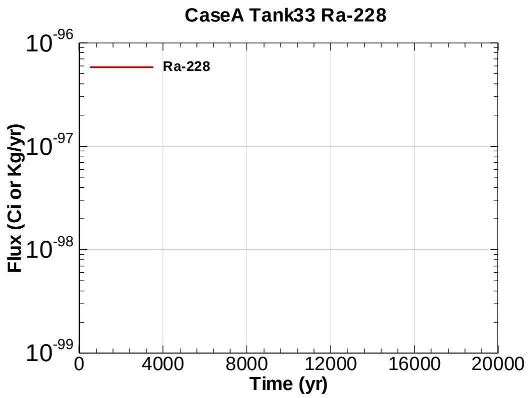

Figure A.2-763 - Water Table Flux for CaseA Tank33 Ra-228

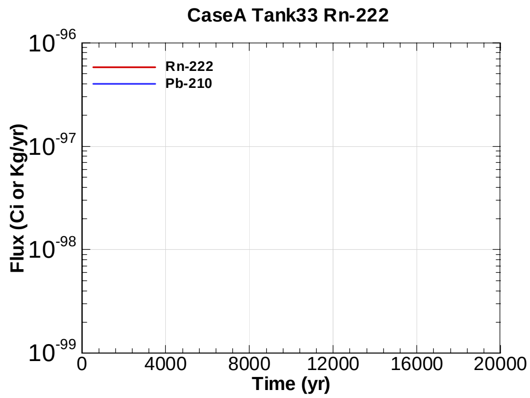

Figure A.2-764 - Water Table Flux for CaseA Tank33 Rn-222

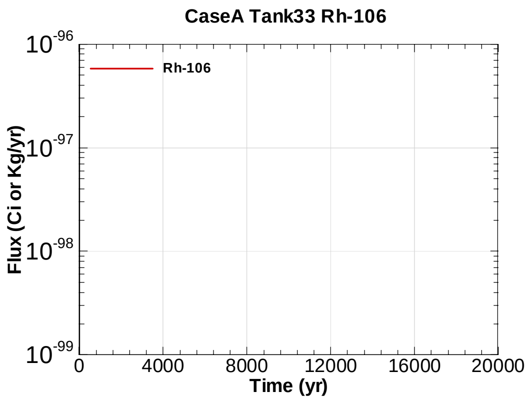

Figure A.2-765 - Water Table Flux for CaseA Tank33 Rh-106

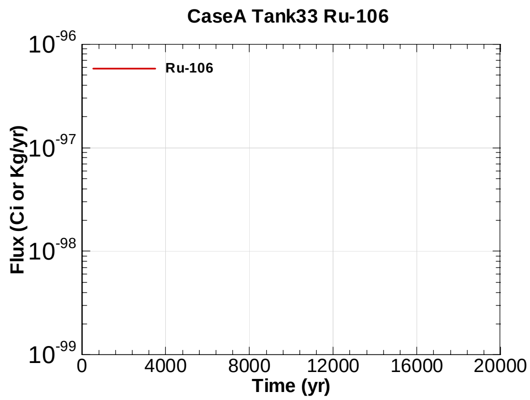

Figure A.2-766 - Water Table Flux for CaseA Tank33 Ru-106

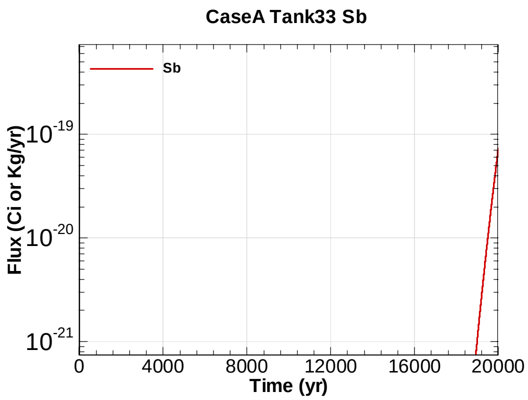

Figure A.2-767 - Water Table Flux for CaseA Tank33 Sb

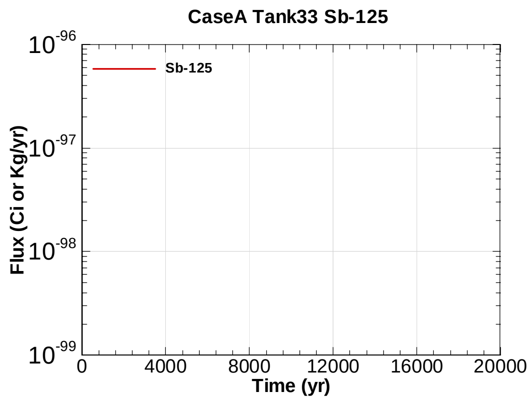

Figure A.2-768 - Water Table Flux for CaseA Tank33 Sb-125

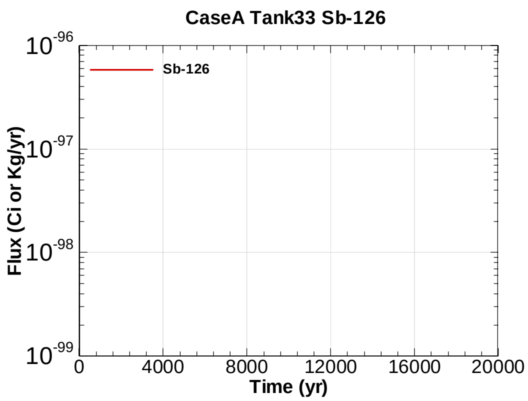

Figure A.2-769 - Water Table Flux for CaseA Tank33 Sb-126

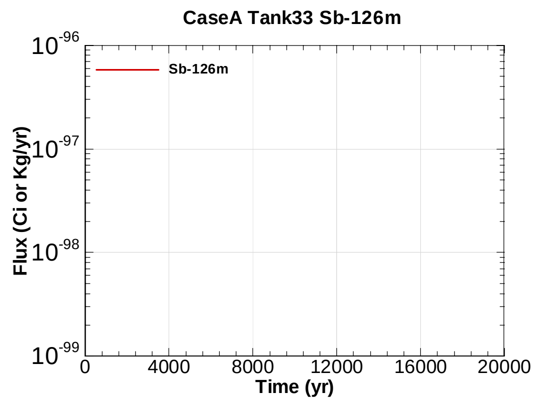

Figure A.2-770 - Water Table Flux for CaseA Tank33 Sb-126m

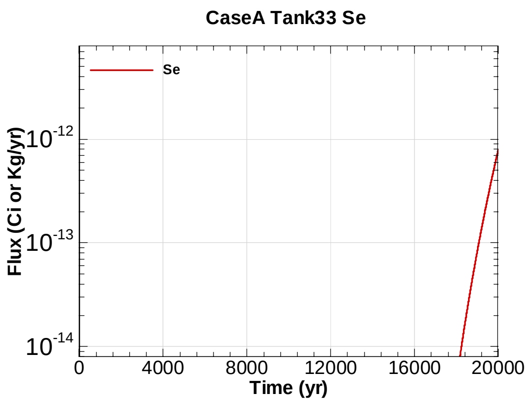

Figure A.2-771 - Water Table Flux for CaseA Tank33 Se

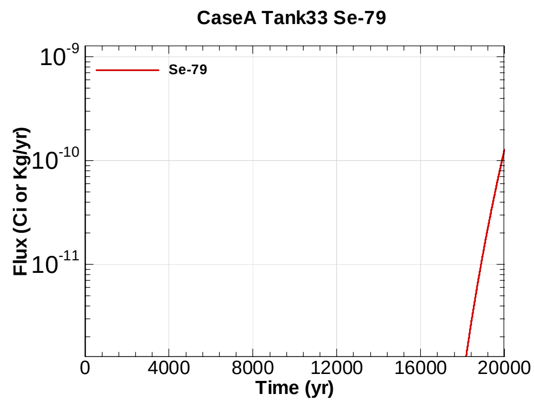

Figure A.2-772 - Water Table Flux for CaseA Tank33 Se-79

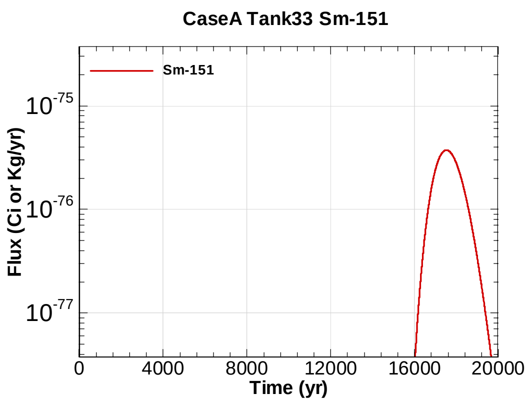

Figure A.2-773 - Water Table Flux for CaseA Tank33 Sm-151

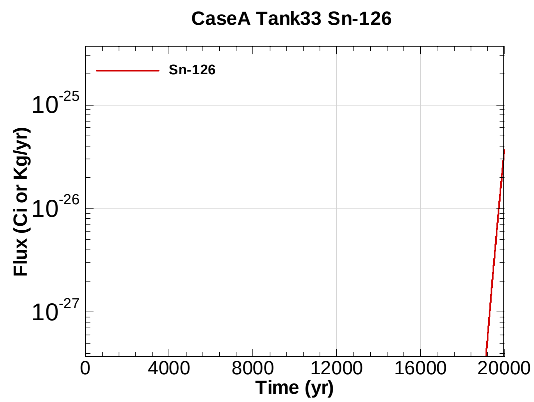

Figure A.2-774 - Water Table Flux for CaseA Tank33 Sn-126

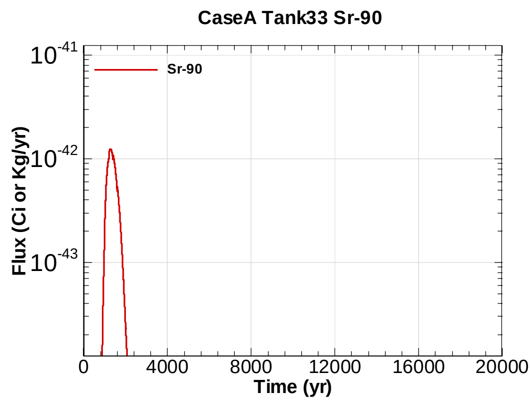

Figure A.2-775 - Water Table Flux for CaseA Tank33 Sr-90

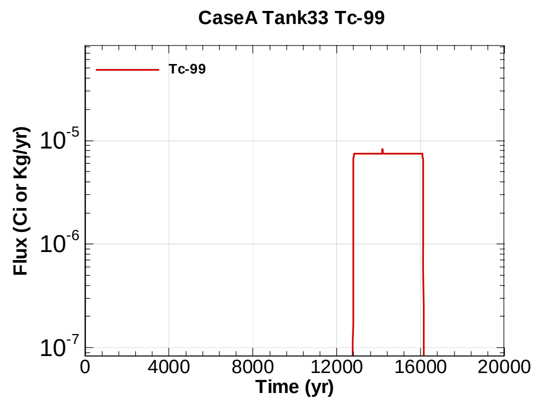

Figure A.2-776 - Water Table Flux for CaseA Tank33 Tc-99

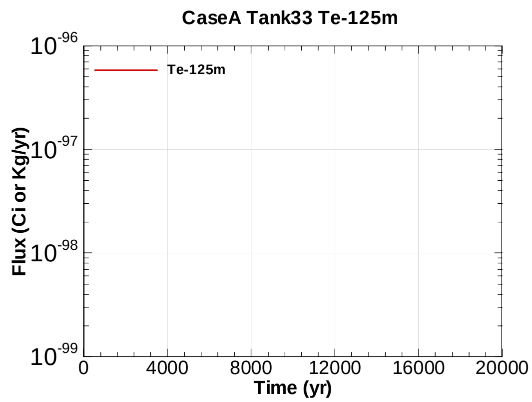

Figure A.2-777 - Water Table Flux for CaseA Tank33 Te-125m

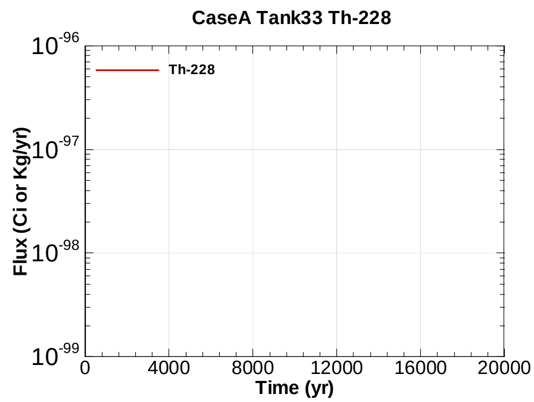

Figure A.2-778 - Water Table Flux for CaseA Tank33 Th-228

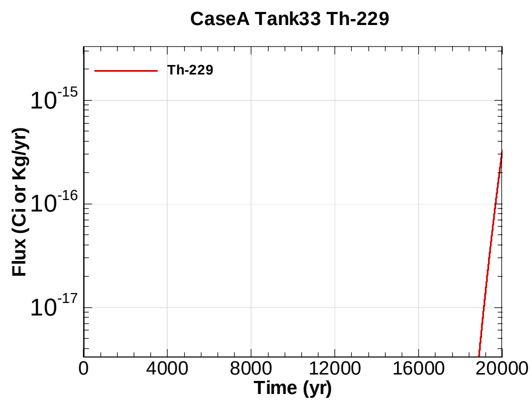

Figure A.2-779 - Water Table Flux for CaseA Tank33 Th-229

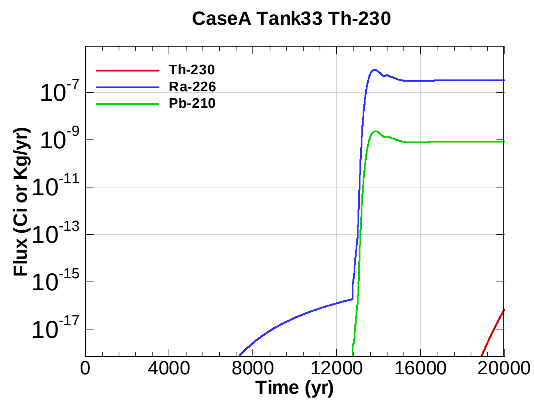

Figure A.2-780 - Water Table Flux for CaseA Tank33 Th-230

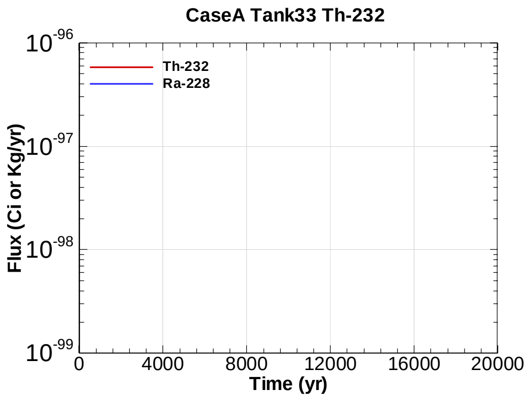

Figure A.2-781 - Water Table Flux for CaseA Tank33 Th-232

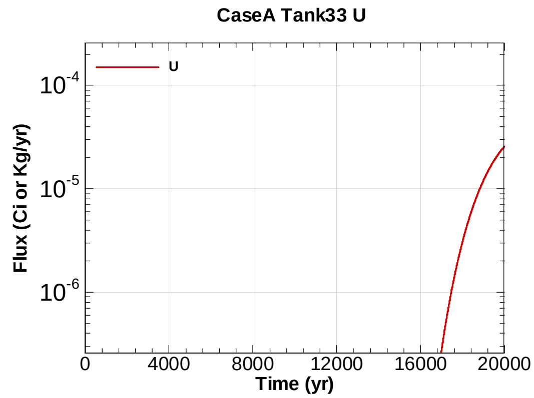

Figure A.2-782 - Water Table Flux for CaseA Tank33 U

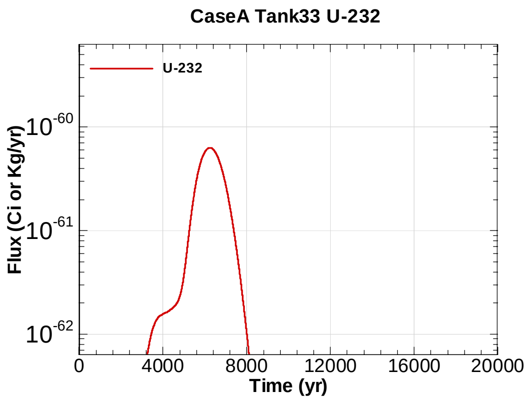

Figure A.2-783 - Water Table Flux for CaseA Tank33 U-232

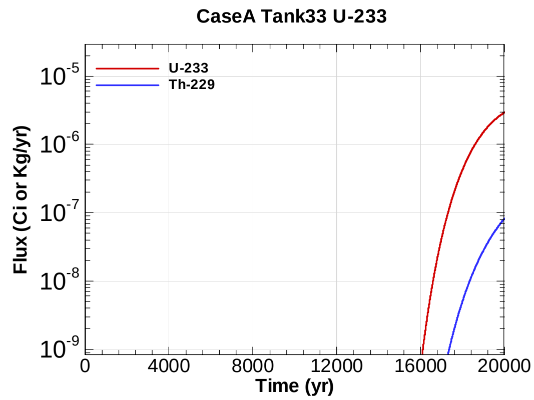

Figure A.2-784 - Water Table Flux for CaseA Tank33 U-233

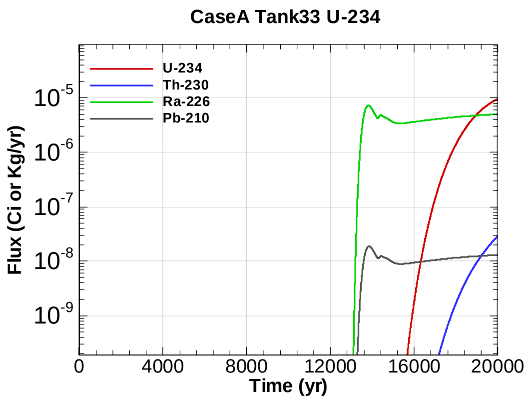

Figure A.2-785 - Water Table Flux for CaseA Tank33 U-234

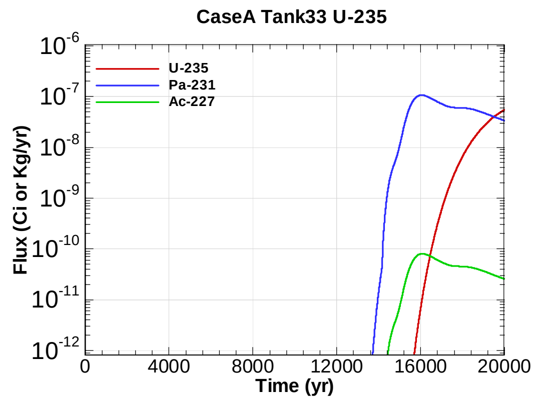

Figure A.2-786 - Water Table Flux for CaseA Tank33 U-235

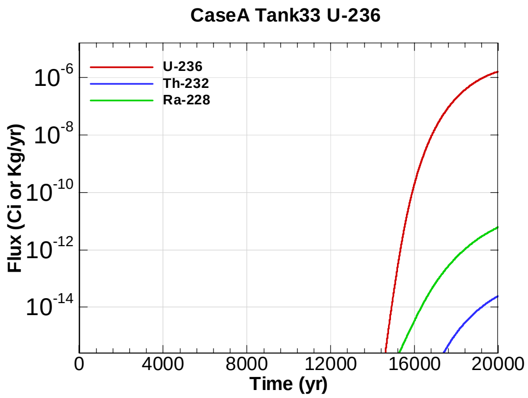

Figure A.2-787 - Water Table Flux for CaseA Tank33 U-236

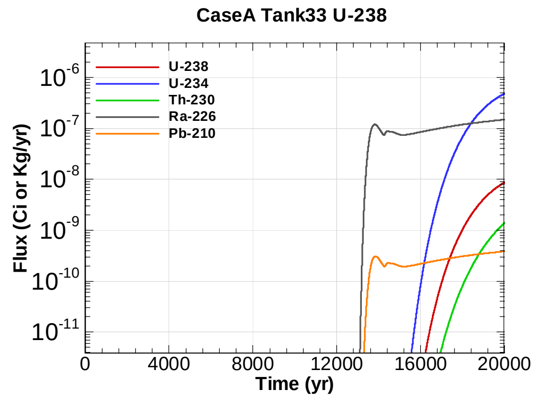

Figure A.2-788 - Water Table Flux for CaseA Tank33 U-238

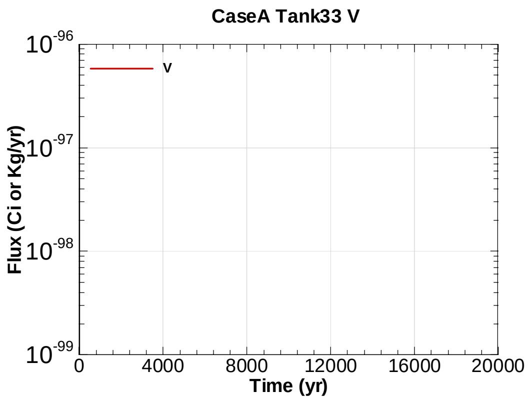

Figure A.2-789 - Water Table Flux for CaseA Tank33 V

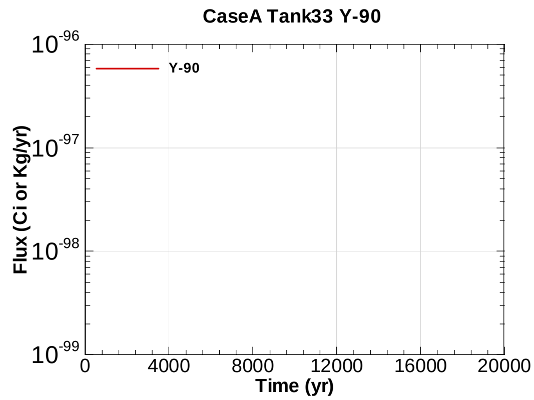

Figure A.2-790 - Water Table Flux for CaseA Tank33 Y-90

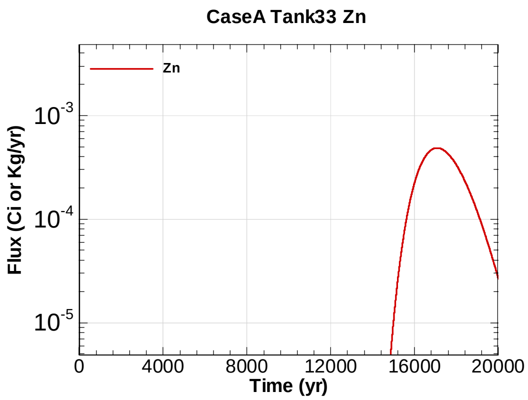

Figure A.2-791 - Water Table Flux for CaseA Tank33 Zn

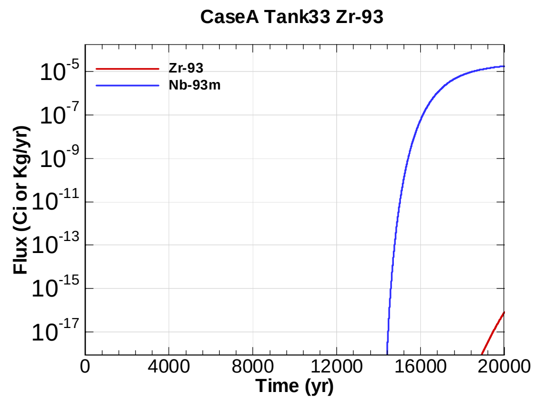

Figure A.2-792 - Water Table Flux for CaseA Tank33 Zr-93

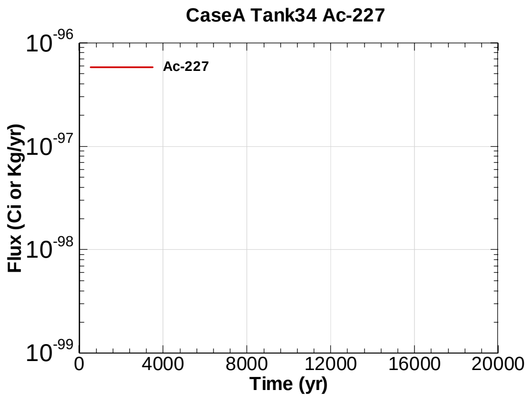

Figure A.2-793 - Water Table Flux for CaseA Tank34 Ac-227

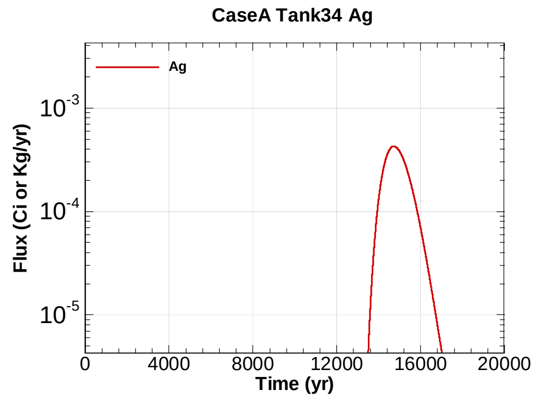

Figure A.2-794 - Water Table Flux for CaseA Tank34 Ag

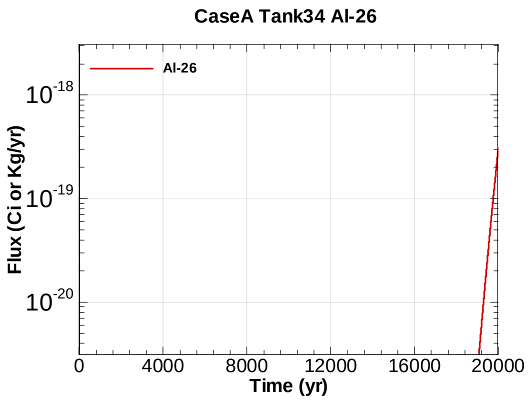

Figure A.2-795 - Water Table Flux for CaseA Tank34 Al-26

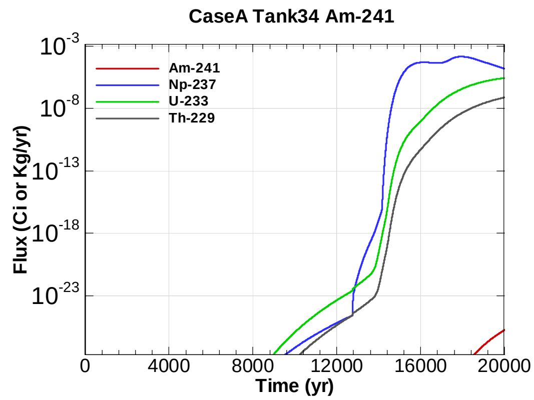

Figure A.2-796 - Water Table Flux for CaseA Tank34 Am-241

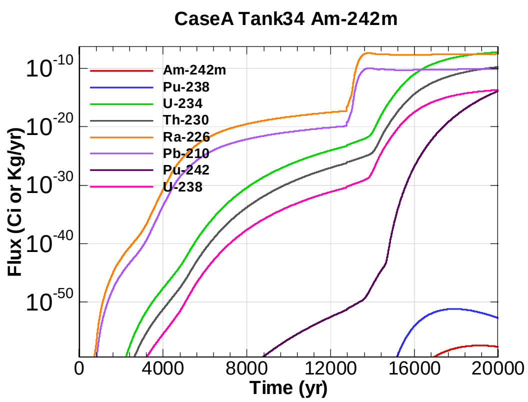

Figure A.2-797 - Water Table Flux for CaseA Tank34 Am-242m

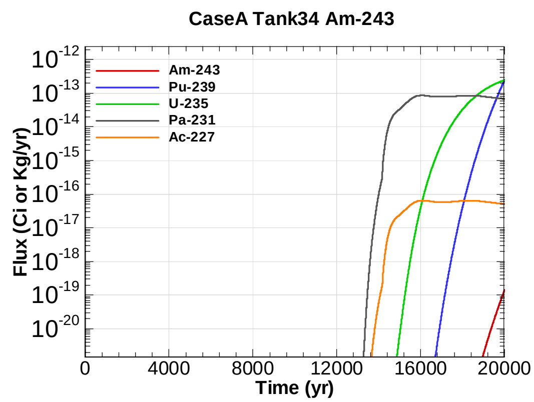

Figure A.2-798 - Water Table Flux for CaseA Tank34 Am-243

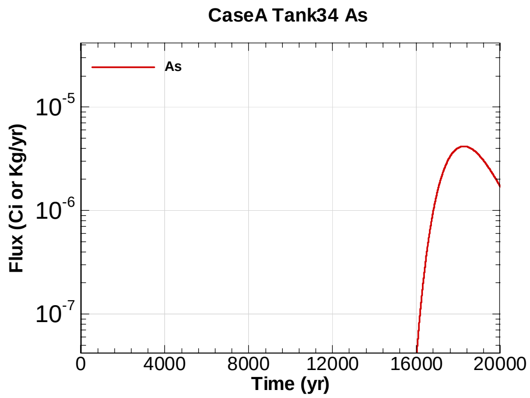

Figure A.2-799 - Water Table Flux for CaseA Tank34 As

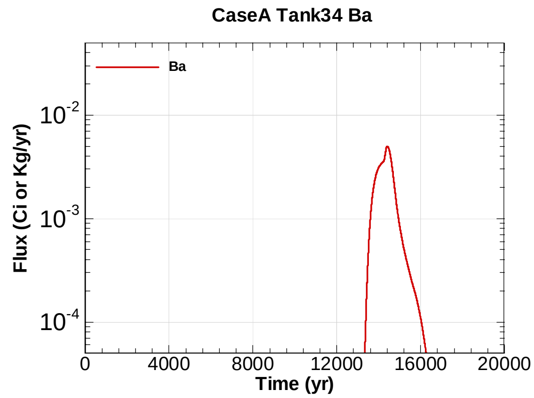

Figure A.2-800 - Water Table Flux for CaseA Tank34 Ba

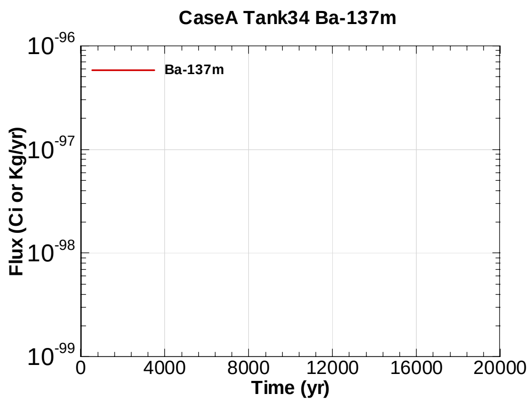

Figure A.2-801 - Water Table Flux for CaseA Tank34 Ba-137m

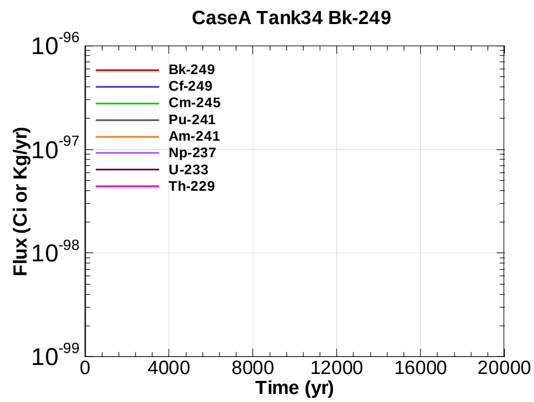

Figure A.2-802 - Water Table Flux for CaseA Tank34 Bk-249

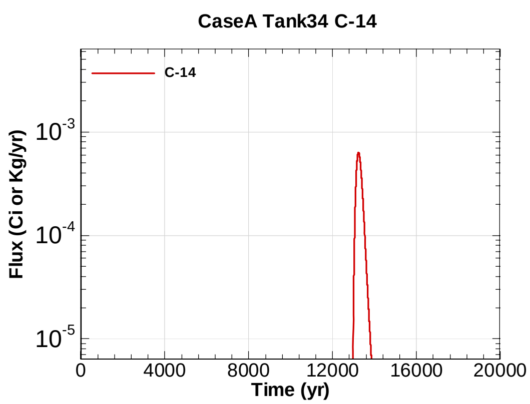

Figure A.2-803 - Water Table Flux for CaseA Tank34 C-14

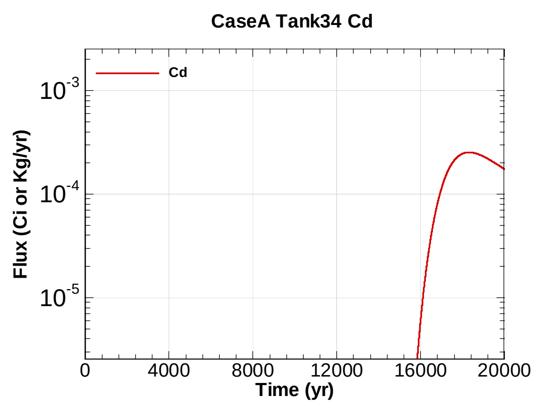

Figure A.2-804 - Water Table Flux for CaseA Tank34 Cd

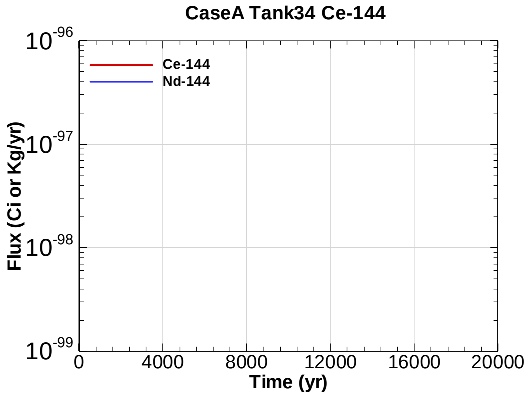

Figure A.2-805 - Water Table Flux for CaseA Tank34 Ce-144

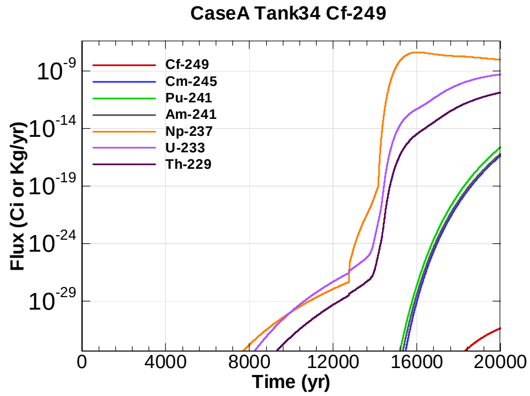

Figure A.2-806 - Water Table Flux for CaseA Tank34 Cf-249

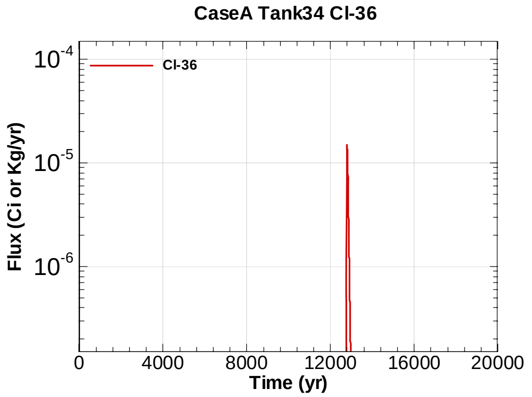

Figure A.2-807 - Water Table Flux for CaseA Tank34 Cl-36

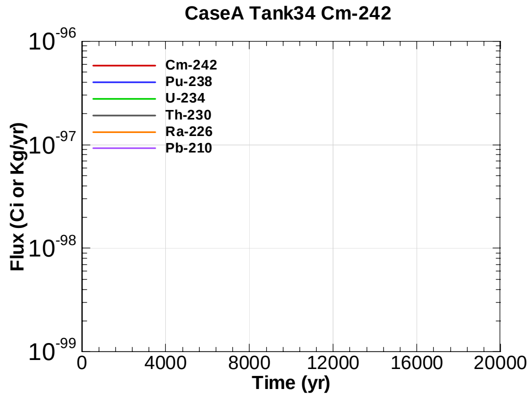

Figure A.2-808 - Water Table Flux for CaseA Tank34 Cm-242

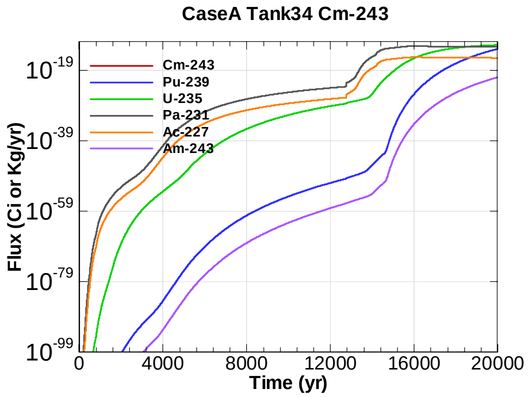

Figure A.2-809 - Water Table Flux for CaseA Tank34 Cm-243

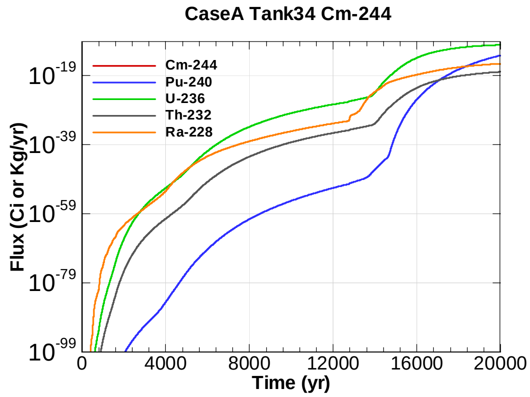

Figure A.2-810 - Water Table Flux for CaseA Tank34 Cm-244

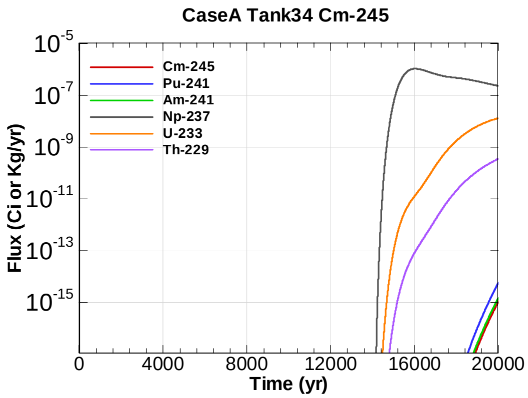

Figure A.2-811 - Water Table Flux for CaseA Tank34 Cm-245

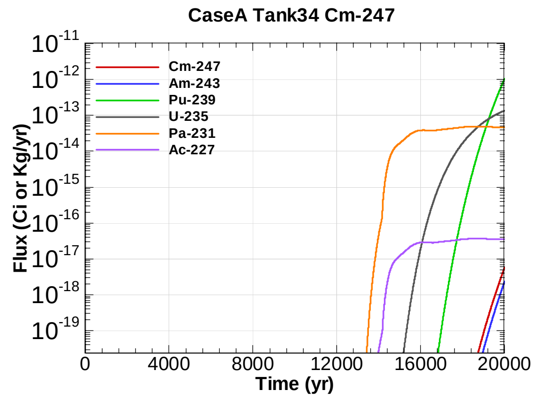

Figure A.2-812 - Water Table Flux for CaseA Tank34 Cm-247

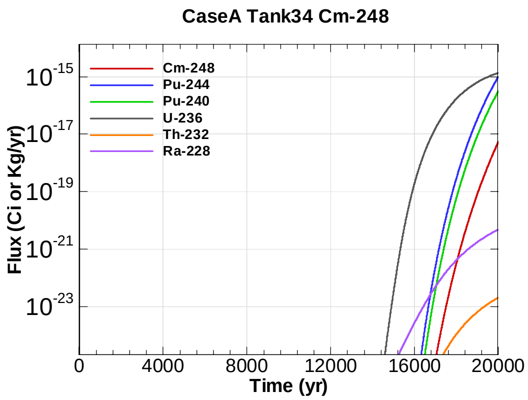

Figure A.2-813 - Water Table Flux for CaseA Tank34 Cm-248

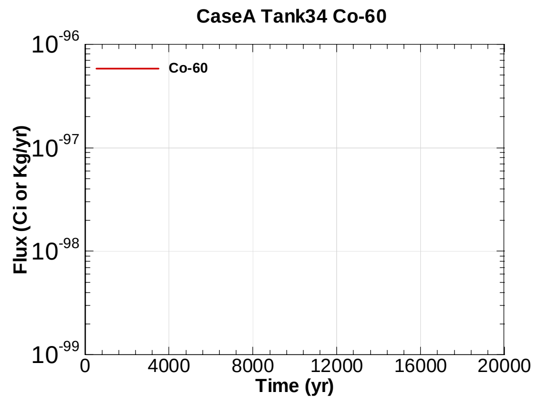

Figure A.2-814 - Water Table Flux for CaseA Tank34 Co-60

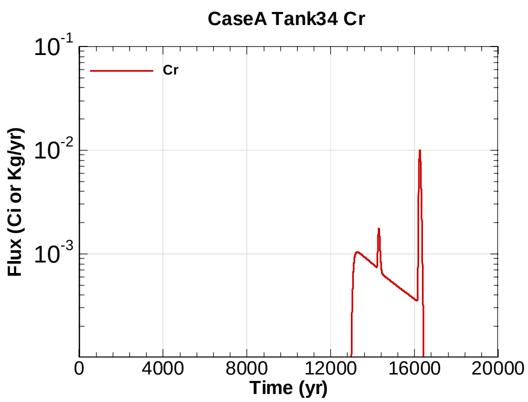

Figure A.2-815 - Water Table Flux for CaseA Tank34 Cr

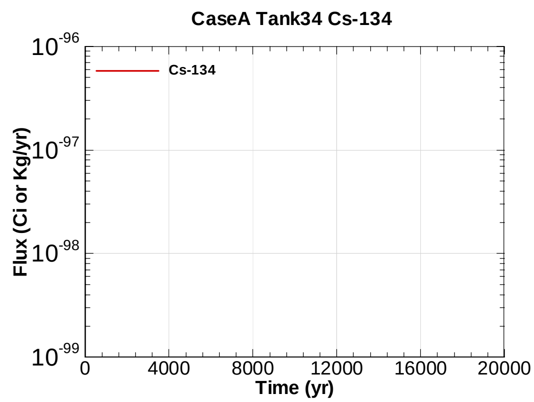

Figure A.2-816 - Water Table Flux for CaseA Tank34 Cs-134

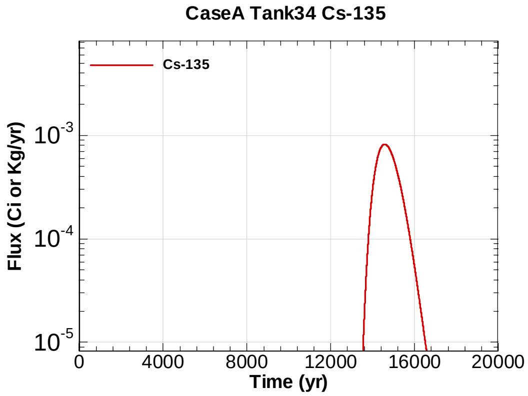

Figure A.2-817 - Water Table Flux for CaseA Tank34 Cs-135

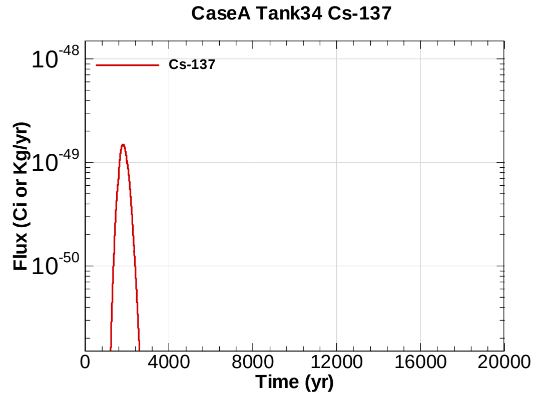

Figure A.2-818 - Water Table Flux for CaseA Tank34 Cs-137

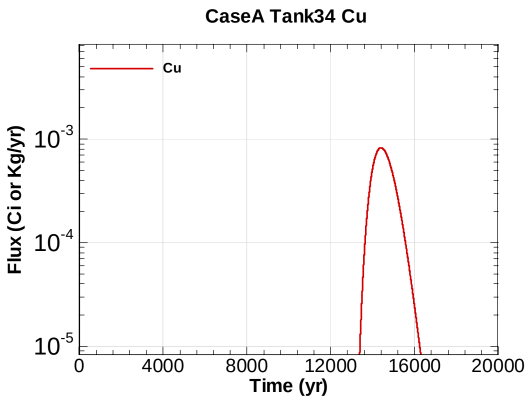

Figure A.2-819 - Water Table Flux for CaseA Tank34 Cu

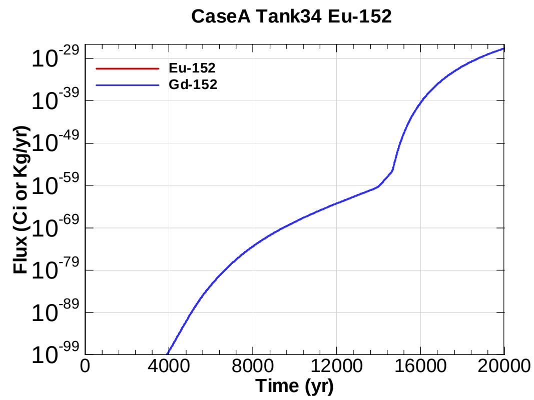

Figure A.2-820 - Water Table Flux for CaseA Tank34 Eu-152

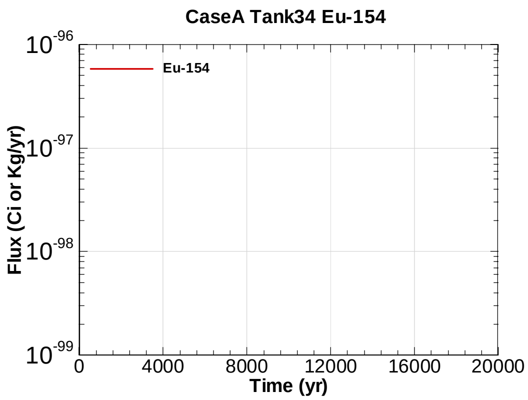

Figure A.2-821 - Water Table Flux for CaseA Tank34 Eu-154

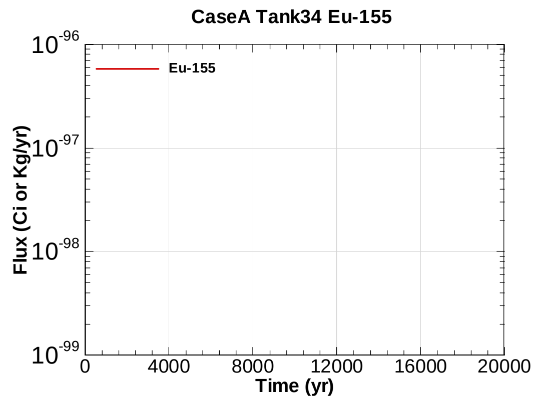

Figure A.2-822 - Water Table Flux for CaseA Tank34 Eu-155

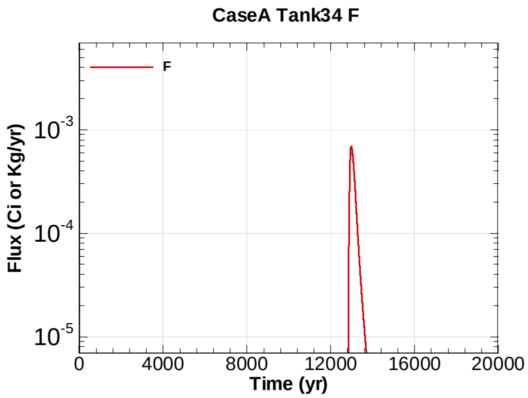

Figure A.2-823 - Water Table Flux for CaseA Tank34 F

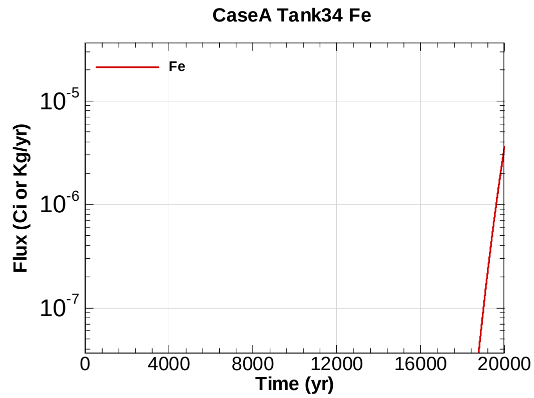

Figure A.2-824 - Water Table Flux for CaseA Tank34 Fe

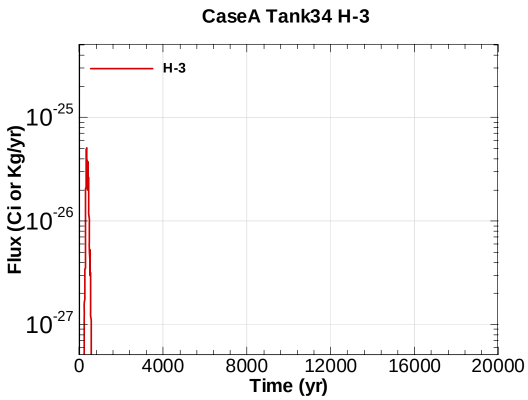

Figure A.2-825 - Water Table Flux for CaseA Tank34 H-3

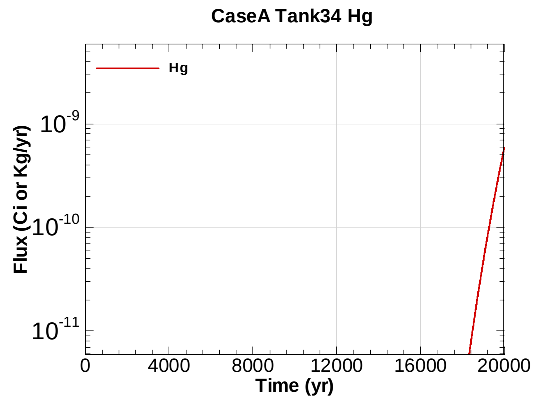

Figure A.2-826 - Water Table Flux for CaseA Tank34 Hg

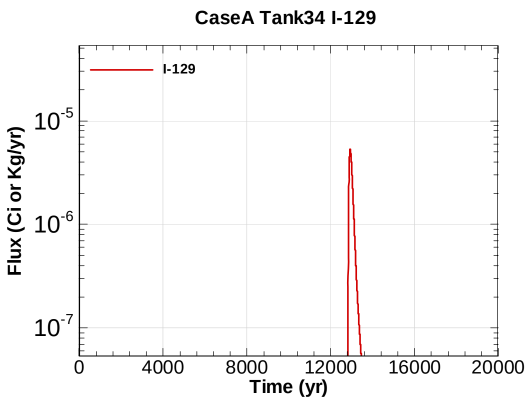

Figure A.2-827 - Water Table Flux for CaseA Tank34 I-129

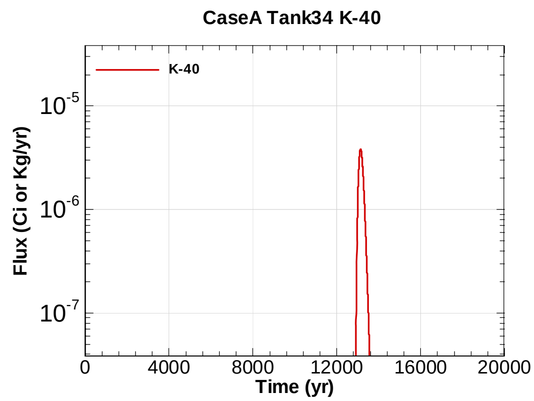

Figure A.2-828 - Water Table Flux for CaseA Tank34 K-40

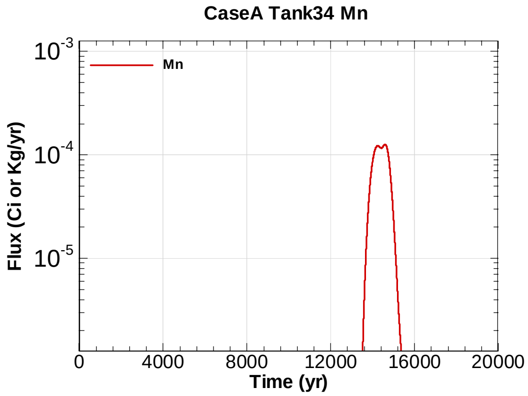

Figure A.2-829 - Water Table Flux for CaseA Tank34 Mn

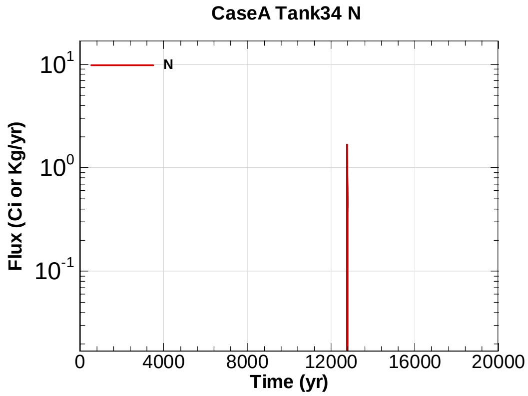

Figure A.2-830 - Water Table Flux for CaseA Tank34 N

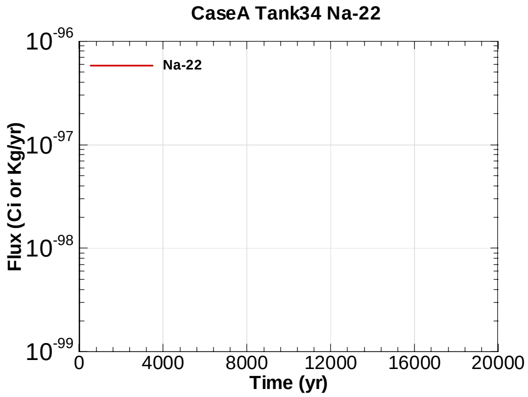

Figure A.2-831 - Water Table Flux for CaseA Tank34 Na-22

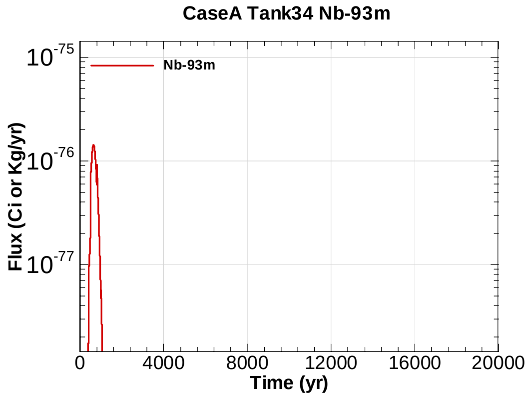

Figure A.2-832 - Water Table Flux for CaseA Tank34 Nb-93m

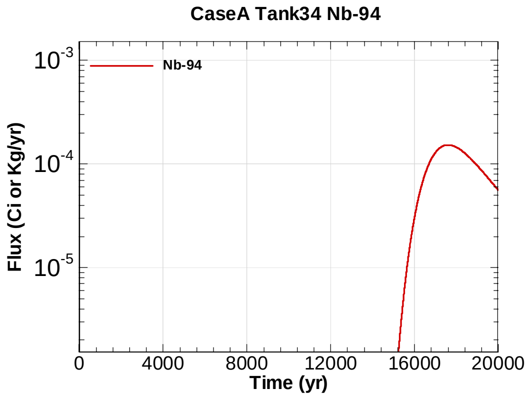

Figure A.2-833 - Water Table Flux for CaseA Tank34 Nb-94

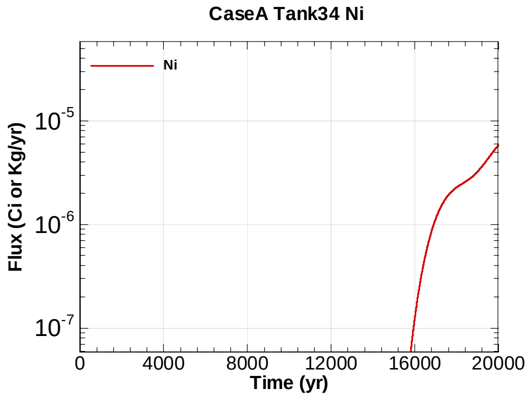

Figure A.2-834 - Water Table Flux for CaseA Tank34 Ni

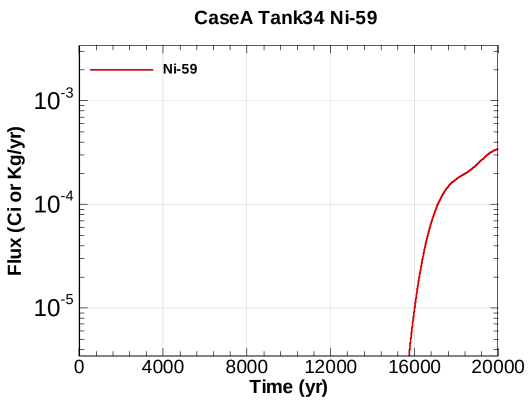

Figure A.2-835 - Water Table Flux for CaseA Tank34 Ni-59

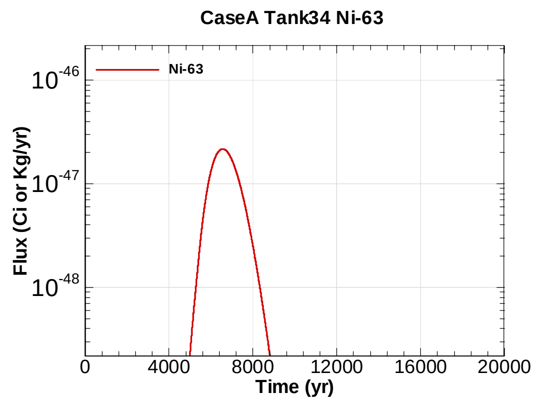

Figure A.2-836 - Water Table Flux for CaseA Tank34 Ni-63

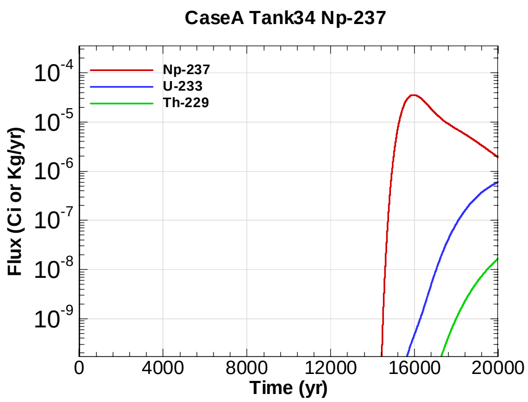

Figure A.2-837 - Water Table Flux for CaseA Tank34 Np-237

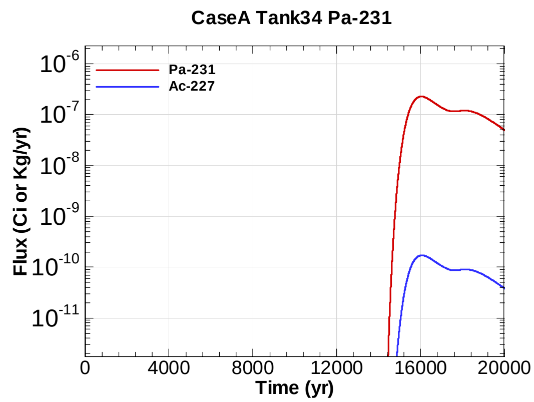

Figure A.2-838 - Water Table Flux for CaseA Tank34 Pa-231

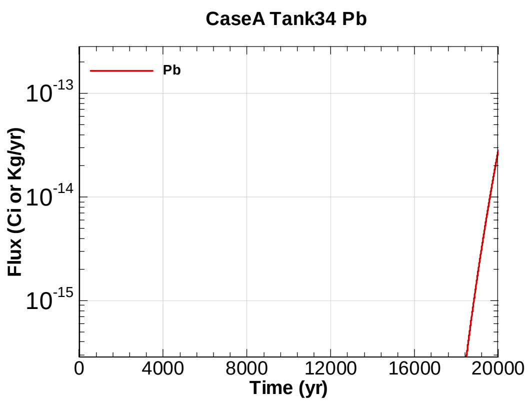

Figure A.2-839 - Water Table Flux for CaseA Tank34 Pb

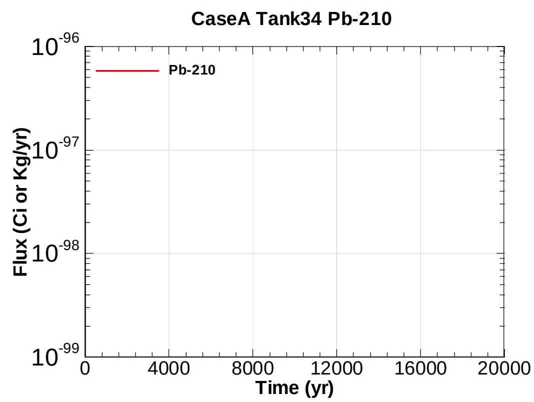

Figure A.2-840 - Water Table Flux for CaseA Tank34 Pb-210

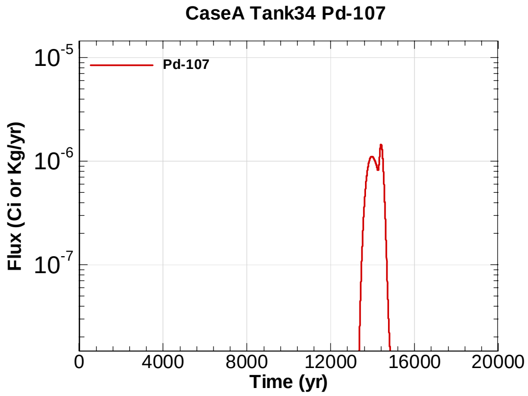

Figure A.2-841 - Water Table Flux for CaseA Tank34 Pd-107

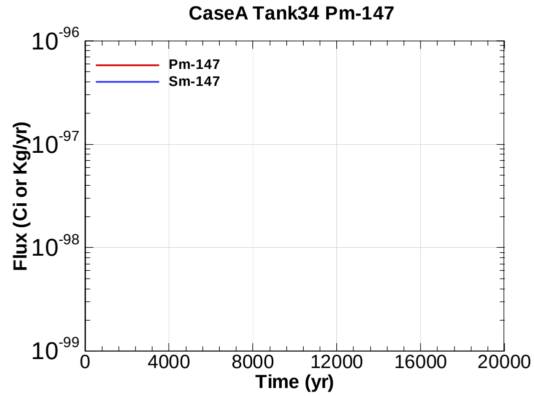

Figure A.2-842 - Water Table Flux for CaseA Tank34 Pm-147

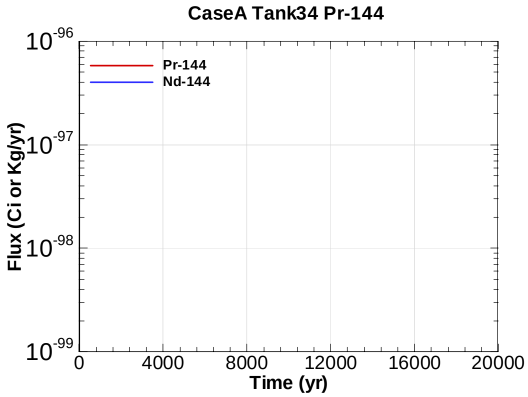

Figure A.2-843 - Water Table Flux for CaseA Tank34 Pr-144

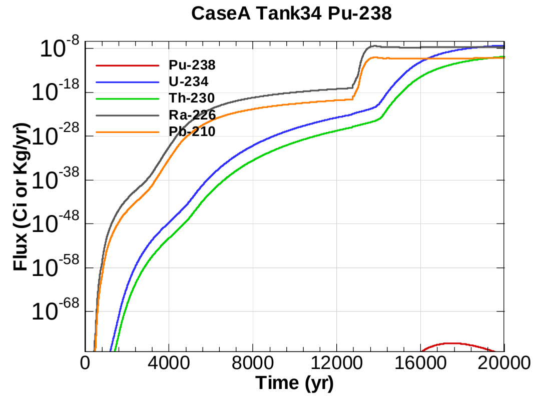

Figure A.2-844 - Water Table Flux for CaseA Tank34 Pu-238

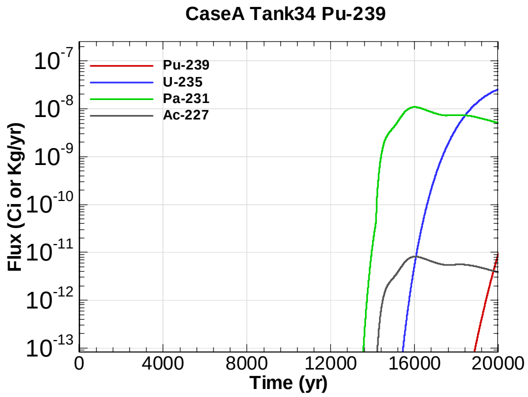

Figure A.2-845 - Water Table Flux for CaseA Tank34 Pu-239

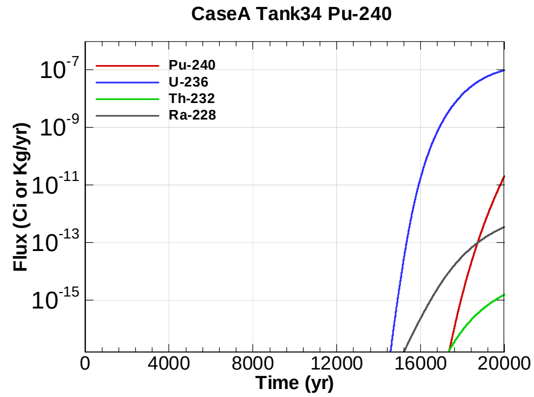

Figure A.2-846 - Water Table Flux for CaseA Tank34 Pu-240

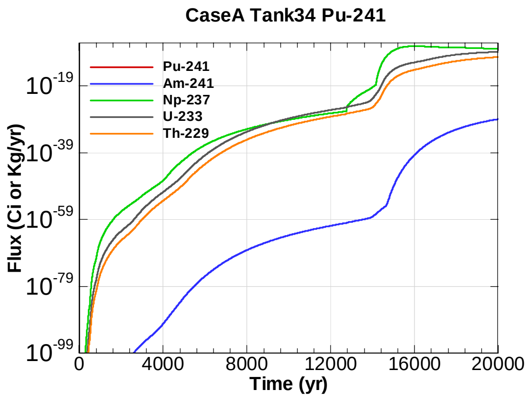

Figure A.2-847 - Water Table Flux for CaseA Tank34 Pu-241

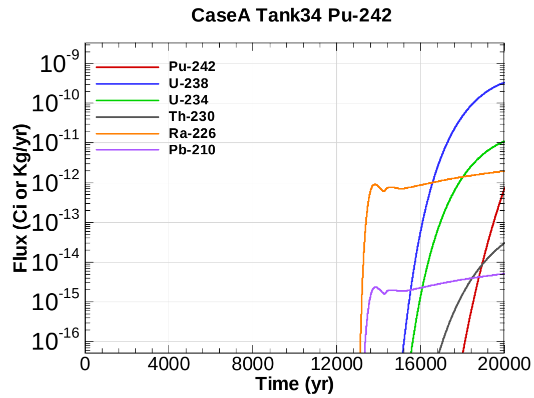

Figure A.2-848 - Water Table Flux for CaseA Tank34 Pu-242

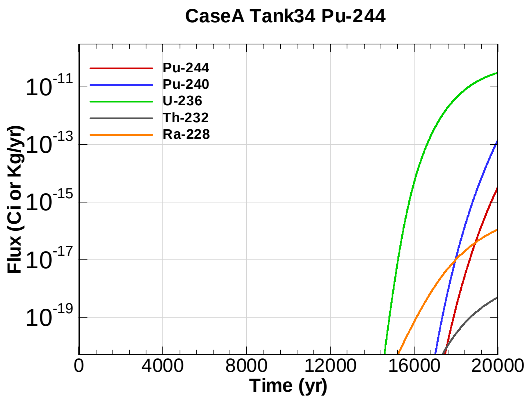

Figure A.2-849 - Water Table Flux for CaseA Tank34 Pu-244

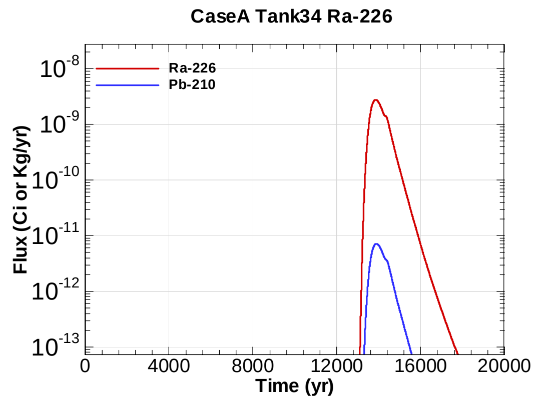

Figure A.2-850 - Water Table Flux for CaseA Tank34 Ra-226

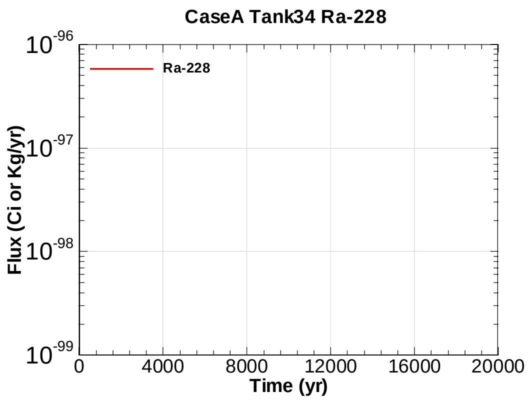

Figure A.2-851 - Water Table Flux for CaseA Tank34 Ra-228

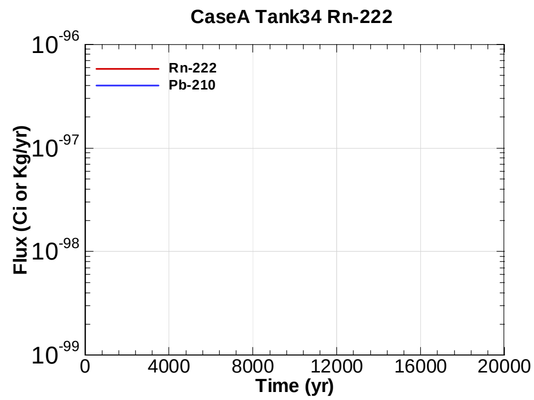

Figure A.2-852 - Water Table Flux for CaseA Tank34 Rn-222

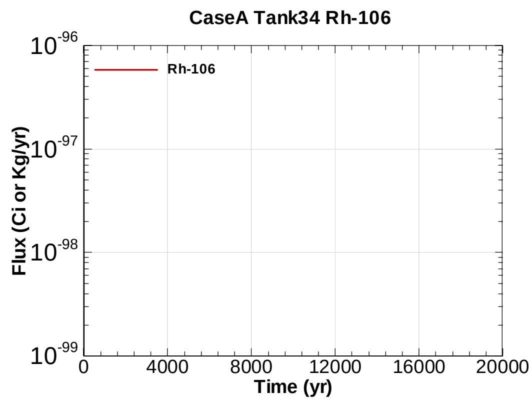

Figure A.2-853 - Water Table Flux for CaseA Tank34 Rh-106

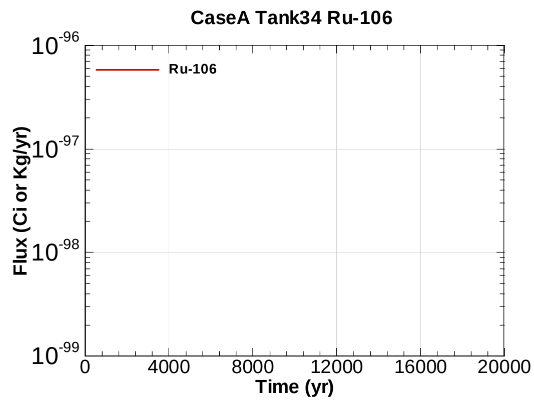

Figure A.2-854 - Water Table Flux for CaseA Tank34 Ru-106

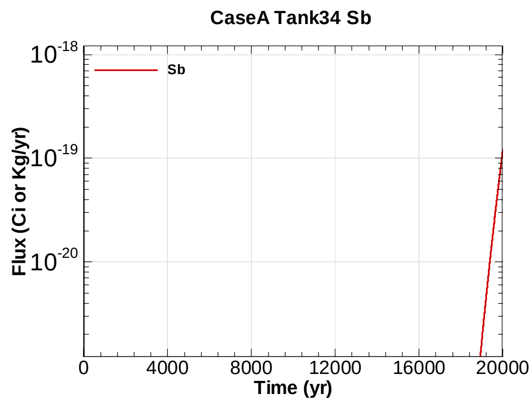

Figure A.2-855 - Water Table Flux for CaseA Tank34 Sb

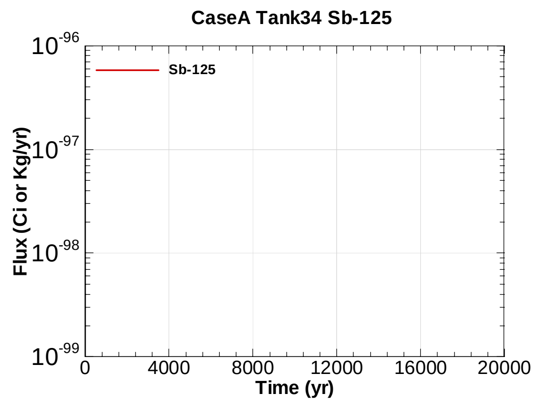

Figure A.2-856 - Water Table Flux for CaseA Tank34 Sb-125

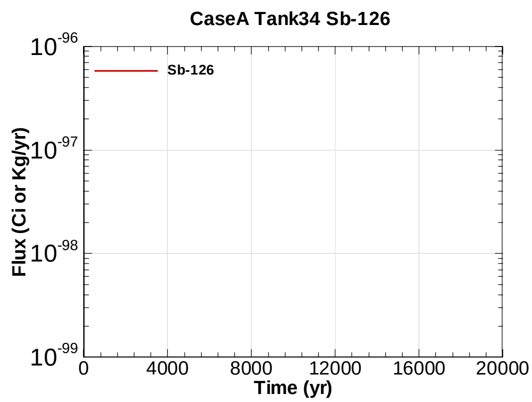

Figure A.2-857 - Water Table Flux for CaseA Tank34 Sb-126

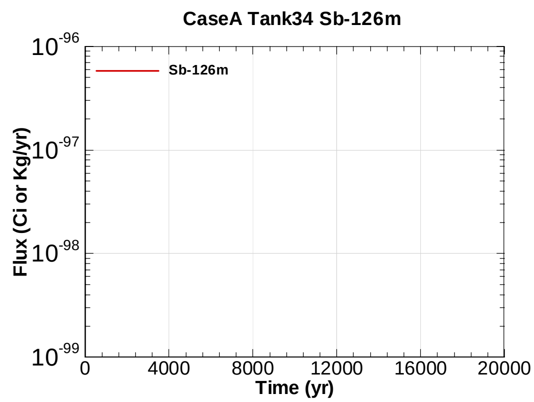

Figure A.2-858 - Water Table Flux for CaseA Tank34 Sb-126m

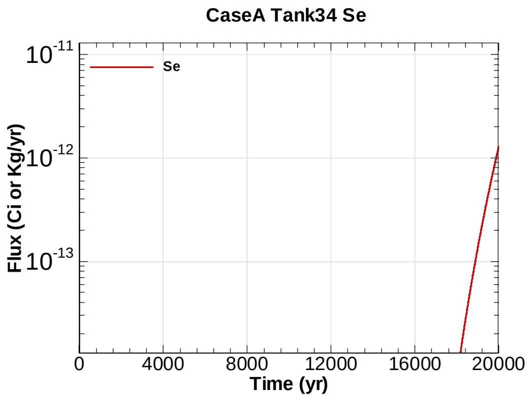

Figure A.2-859 - Water Table Flux for CaseA Tank34 Se

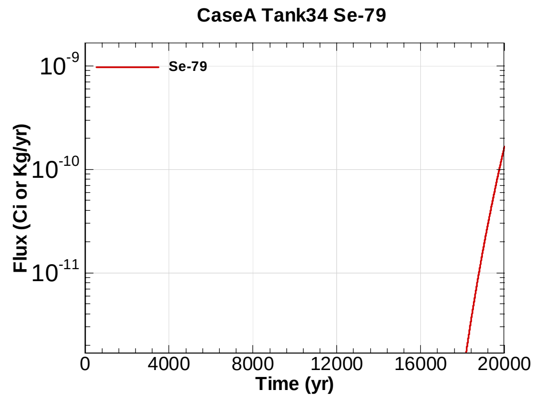

Figure A.2-860 - Water Table Flux for CaseA Tank34 Se-79

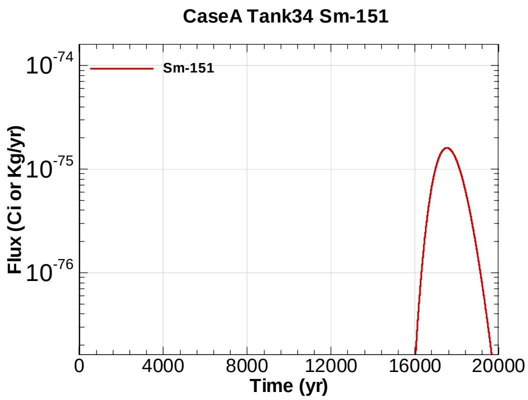

Figure A.2-861 - Water Table Flux for CaseA Tank34 Sm-151

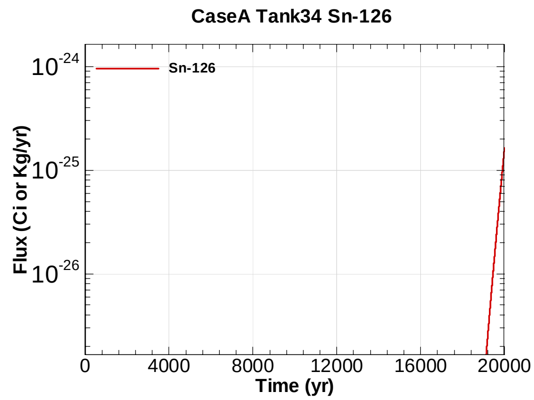

Figure A.2-862 - Water Table Flux for CaseA Tank34 Sn-126

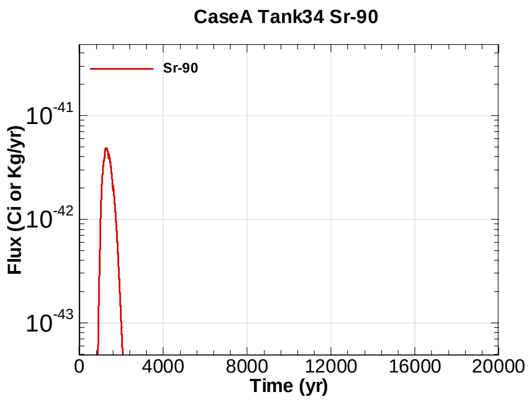

Figure A.2-863 - Water Table Flux for CaseA Tank34 Sr-90

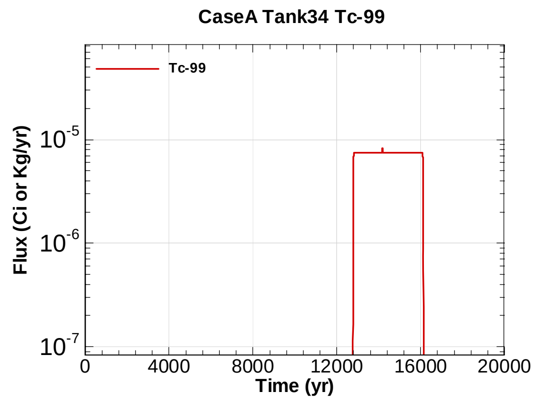

Figure A.2-864 - Water Table Flux for CaseA Tank34 Tc-99

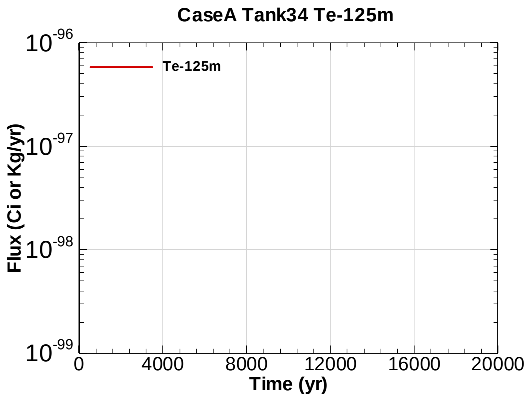

Figure A.2-865 - Water Table Flux for CaseA Tank34 Te-125m

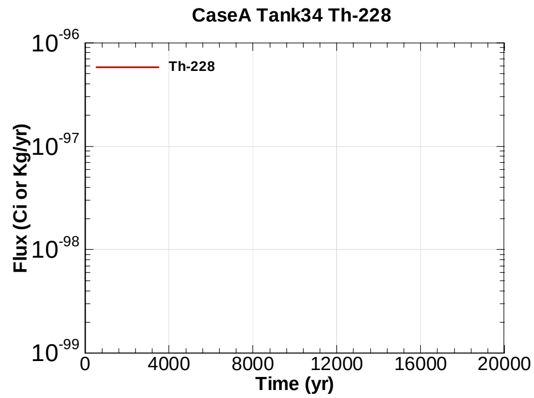

Figure A.2-866 - Water Table Flux for CaseA Tank34 Th-228

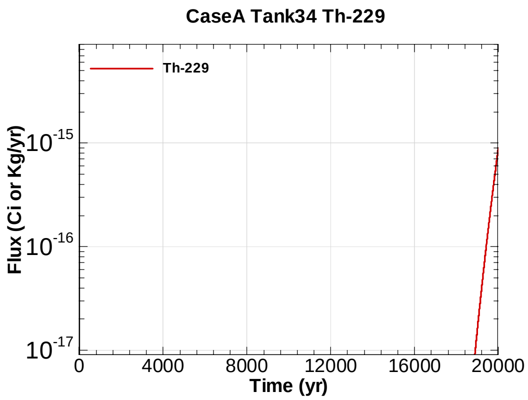

Figure A.2-867 - Water Table Flux for CaseA Tank34 Th-229

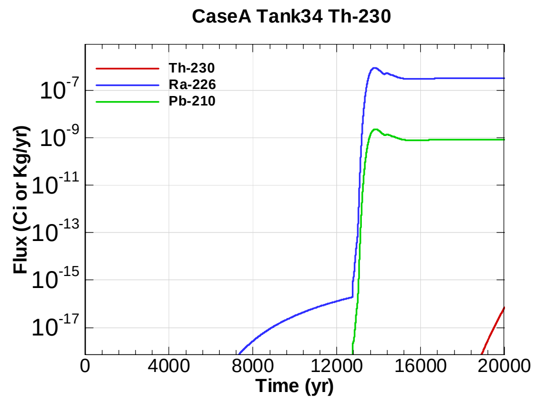

Figure A.2-868 - Water Table Flux for CaseA Tank34 Th-230

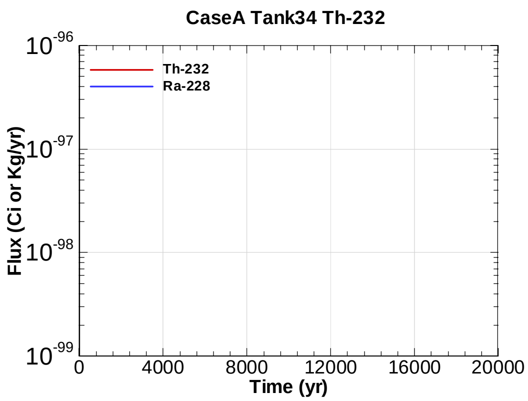

Figure A.2-869 - Water Table Flux for CaseA Tank34 Th-232

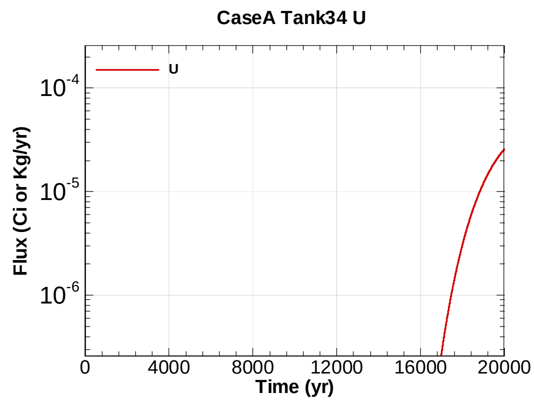

Figure A.2-870 - Water Table Flux for CaseA Tank34 U

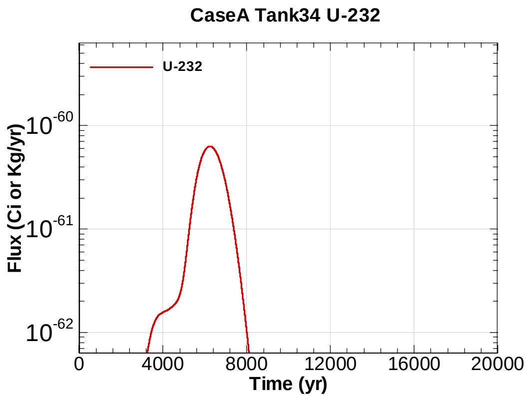

Figure A.2-871 - Water Table Flux for CaseA Tank34 U-232

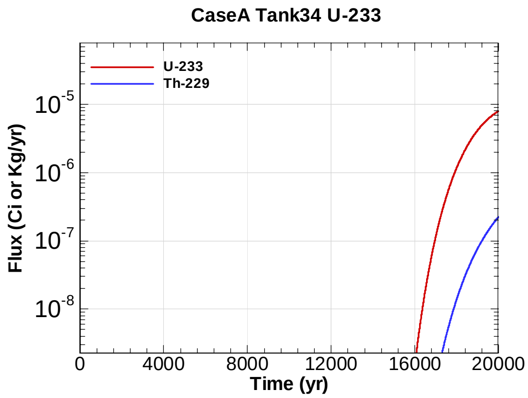

Figure A.2-872 - Water Table Flux for CaseA Tank34 U-233

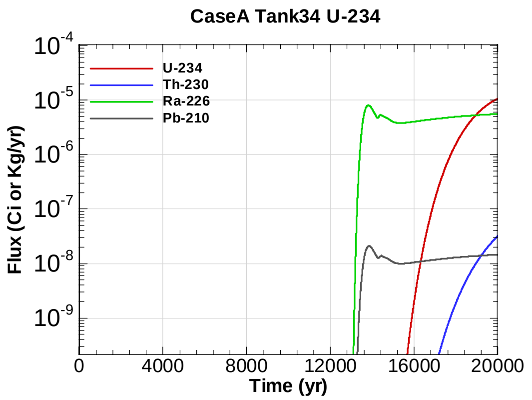

Figure A.2-873 - Water Table Flux for CaseA Tank34 U-234

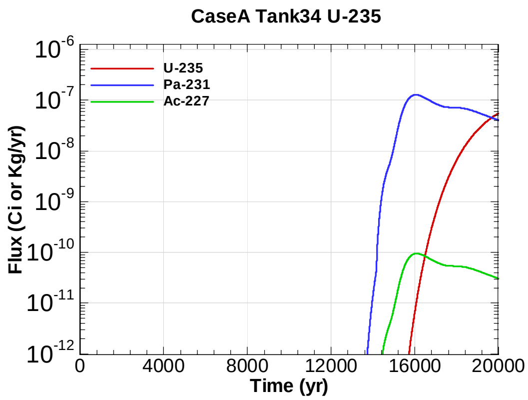

Figure A.2-874 - Water Table Flux for CaseA Tank34 U-235

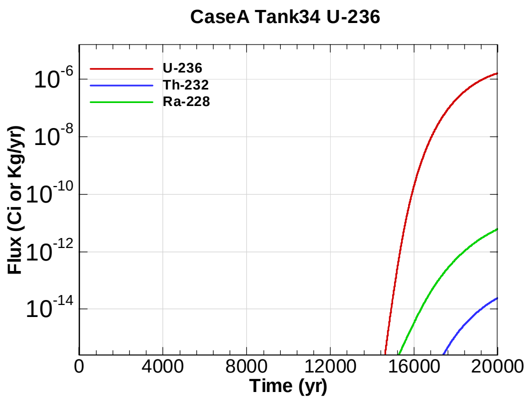

Figure A.2-875 - Water Table Flux for CaseA Tank34 U-236

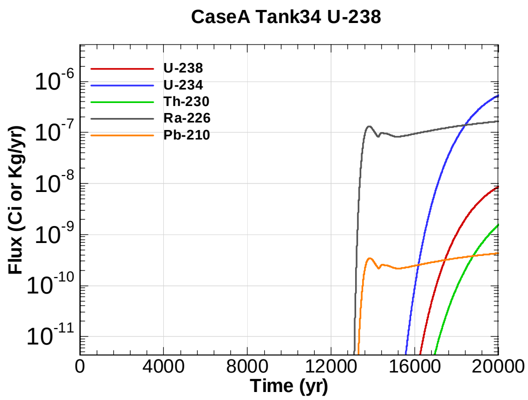

Figure A.2-876 - Water Table Flux for CaseA Tank34 U-238

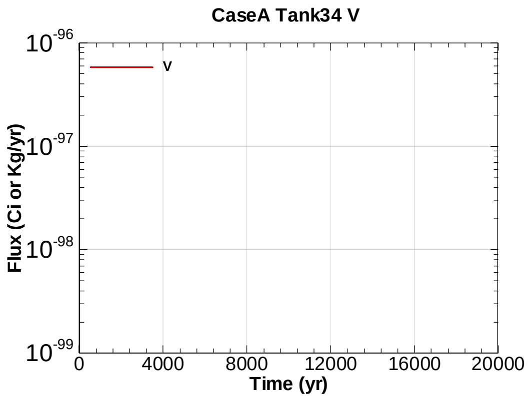

Figure A.2-877 - Water Table Flux for CaseA Tank34 V

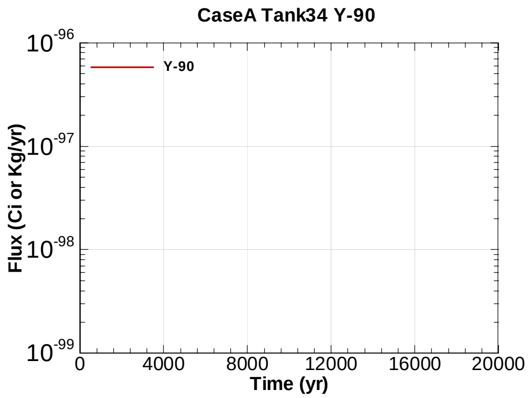

Figure A.2-878 - Water Table Flux for CaseA Tank34 Y-90

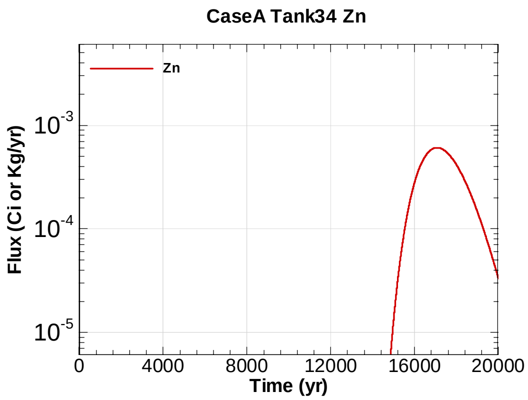

Figure A.2-879 - Water Table Flux for CaseA Tank34 Zn

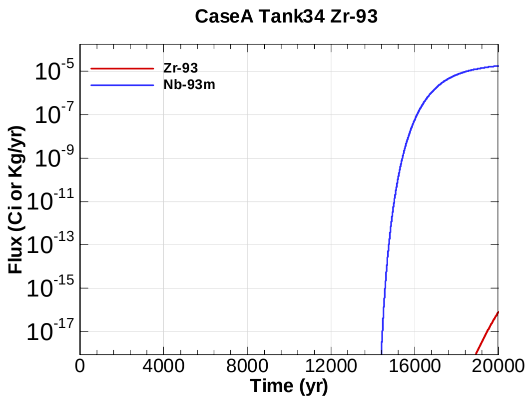

Figure A.2-880 - Water Table Flux for CaseA Tank34 Zr-93

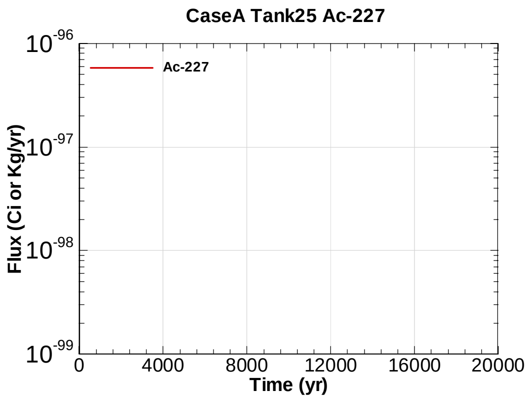

Figure A.2-881 - Water Table Flux for CaseA Tank25 Ac-227

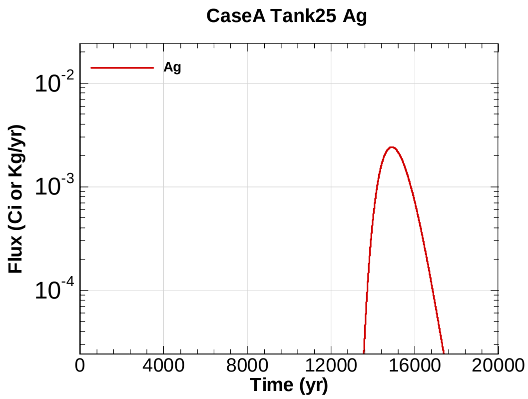

Figure A.2-882 - Water Table Flux for CaseA Tank25 Ag

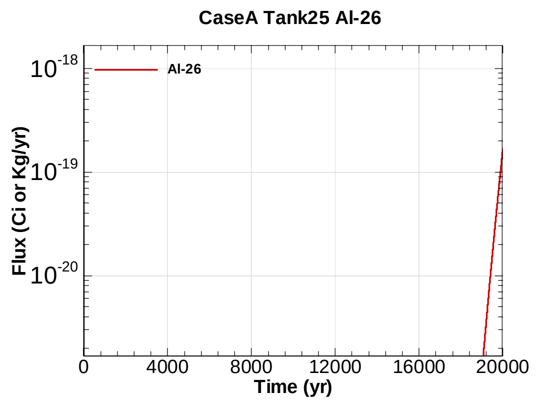

Figure A.2-883 - Water Table Flux for CaseA Tank25 Al-26

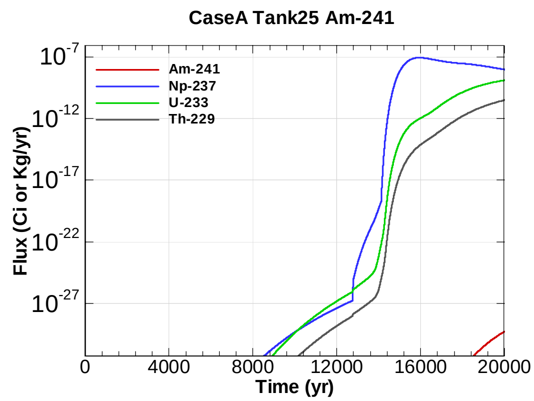

Figure A.2-884 - Water Table Flux for CaseA Tank25 Am-241

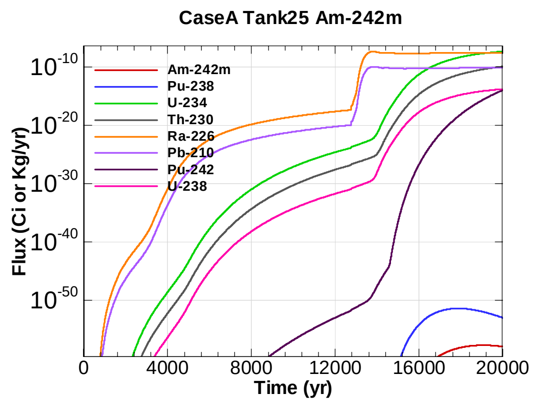

Figure A.2-885 - Water Table Flux for CaseA Tank25 Am-242m

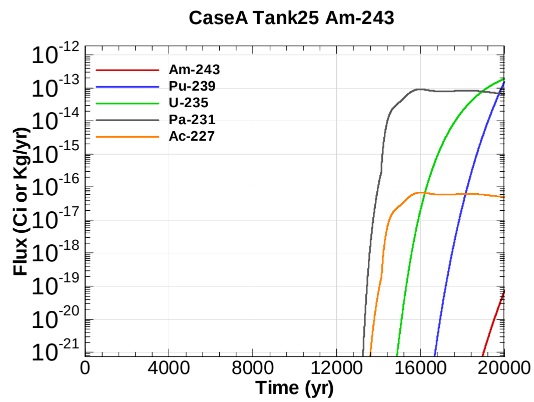

Figure A.2-886 - Water Table Flux for CaseA Tank25 Am-243

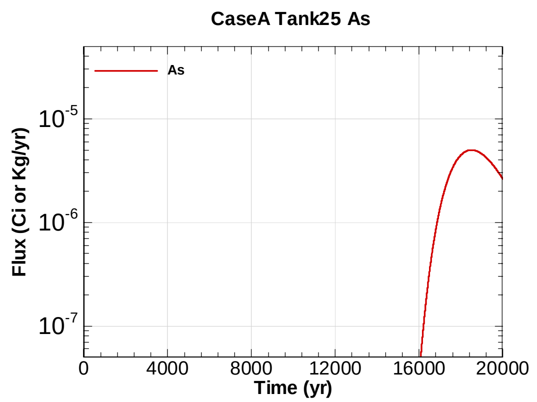

Figure A.2-887 - Water Table Flux for CaseA Tank25 As

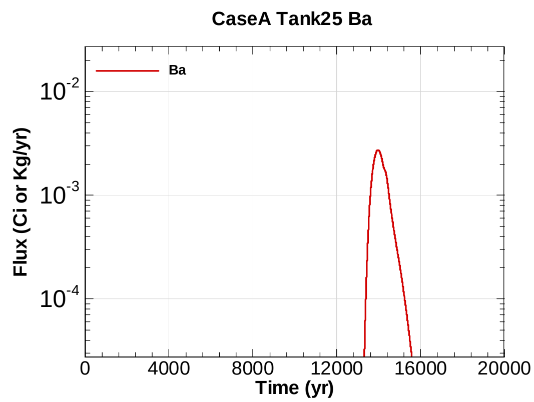

Figure A.2-888 - Water Table Flux for CaseA Tank25 Ba

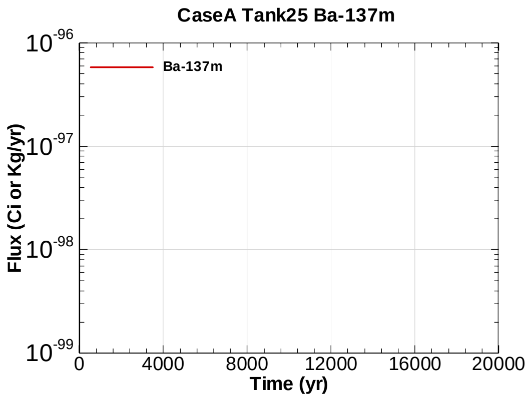

Figure A.2-889 - Water Table Flux for CaseA Tank25 Ba-137m

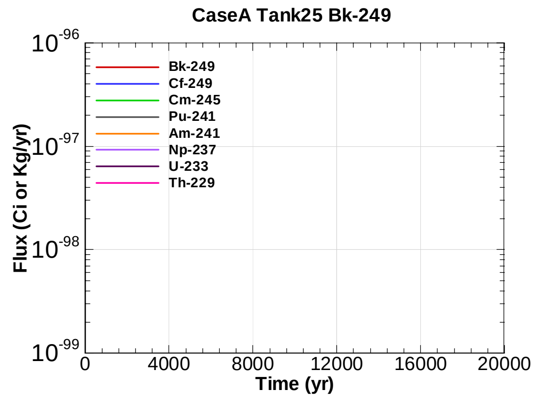

Figure A.2-890 - Water Table Flux for CaseA Tank25 Bk-249

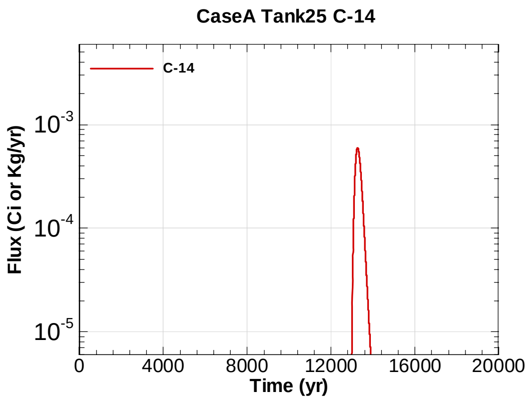

Figure A.2-891 - Water Table Flux for CaseA Tank25 C-14

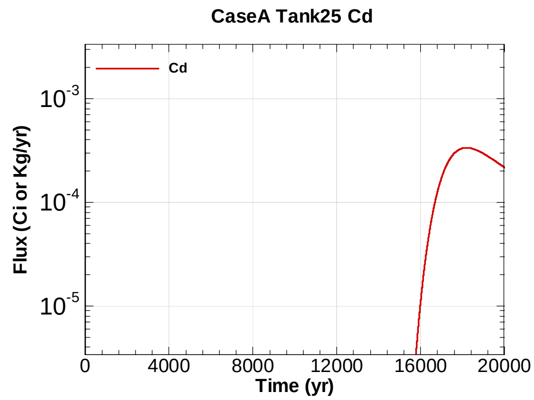

Figure A.2-892 - Water Table Flux for CaseA Tank25 Cd

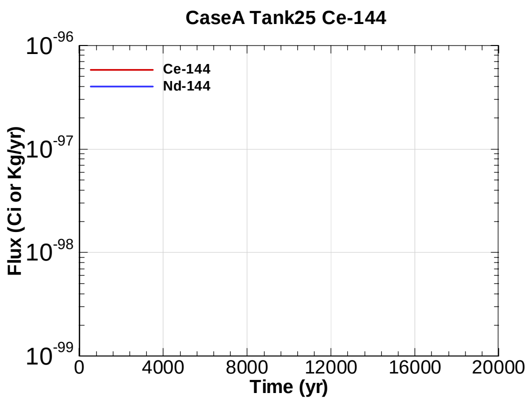

Figure A.2-893 - Water Table Flux for CaseA Tank25 Ce-144

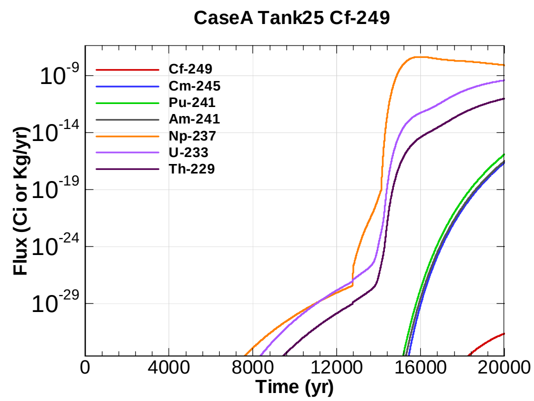

Figure A.2-894 - Water Table Flux for CaseA Tank25 Cf-249

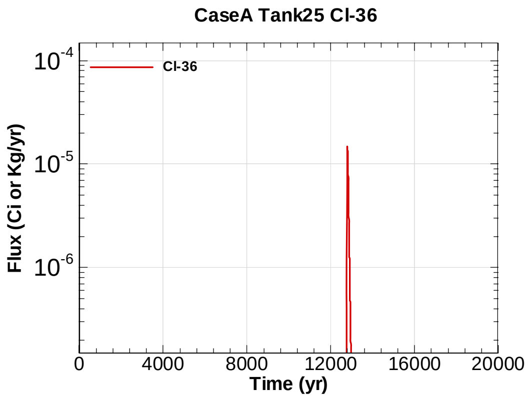

Figure A.2-895 - Water Table Flux for CaseA Tank25 Cl-36

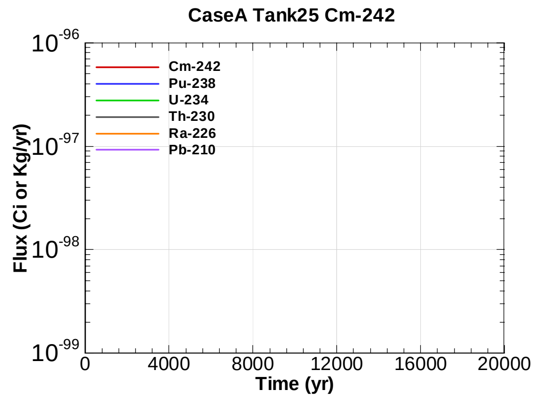

Figure A.2-896 - Water Table Flux for CaseA Tank25 Cm-242

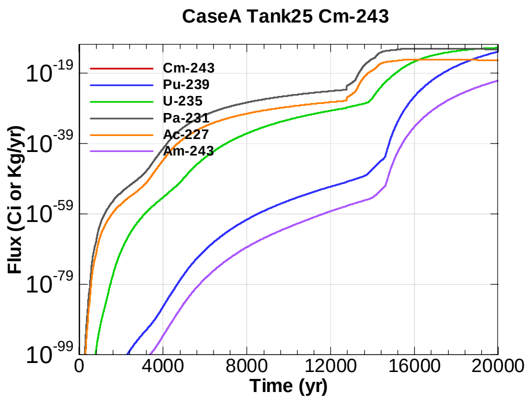

Figure A.2-897 - Water Table Flux for CaseA Tank25 Cm-243

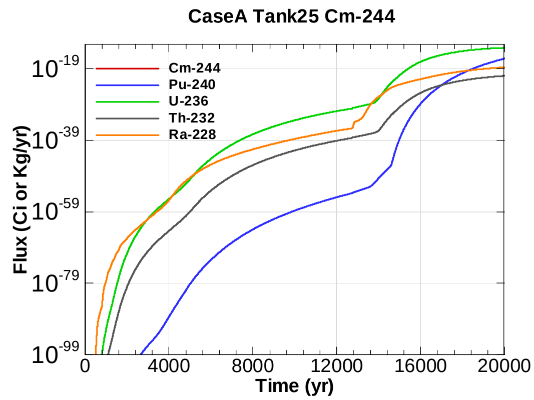

Figure A.2-898 - Water Table Flux for CaseA Tank25 Cm-244

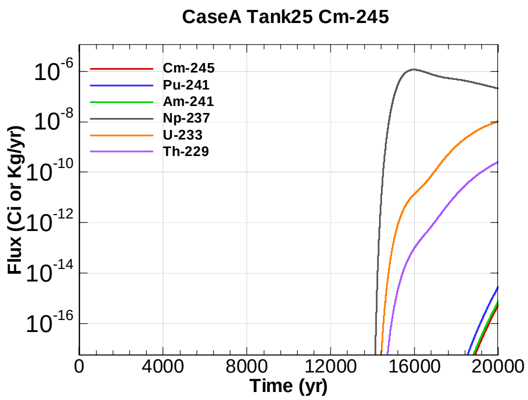

Figure A.2-899 - Water Table Flux for CaseA Tank25 Cm-245

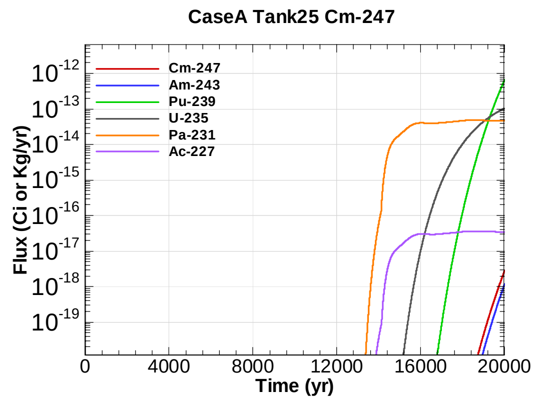

Figure A.2-900 - Water Table Flux for CaseA Tank25 Cm-247

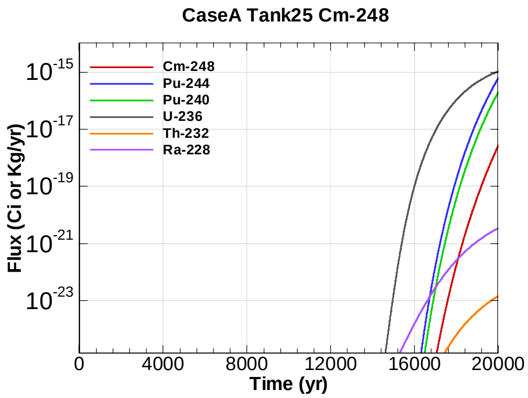

Figure A.2-901 - Water Table Flux for CaseA Tank25 Cm-248

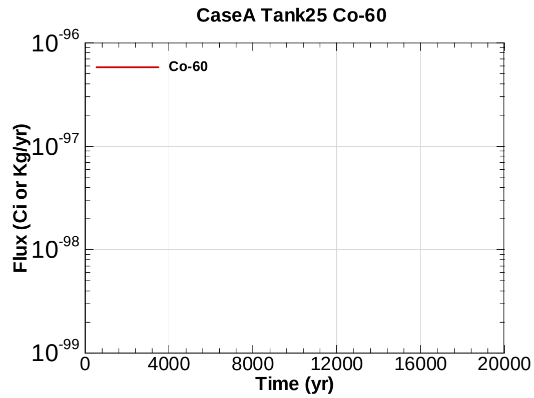

Figure A.2-902 - Water Table Flux for CaseA Tank25 Co-60

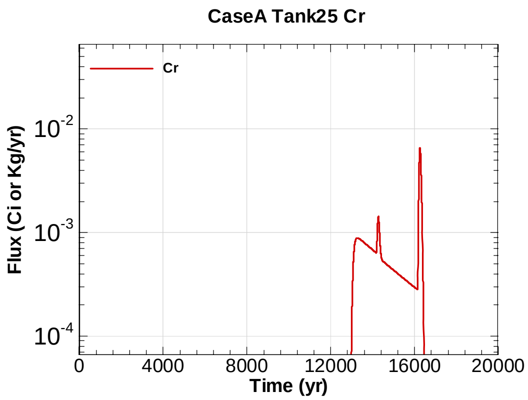

Figure A.2-903 - Water Table Flux for CaseA Tank25 Cr

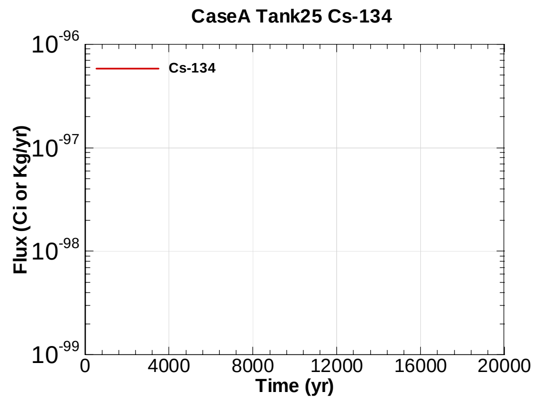

Figure A.2-904 - Water Table Flux for CaseA Tank25 Cs-134

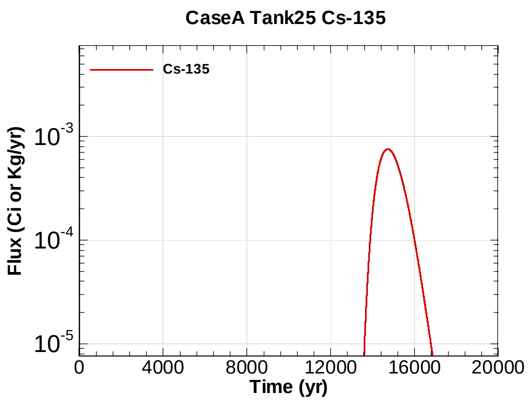

Figure A.2-905 - Water Table Flux for CaseA Tank25 Cs-135

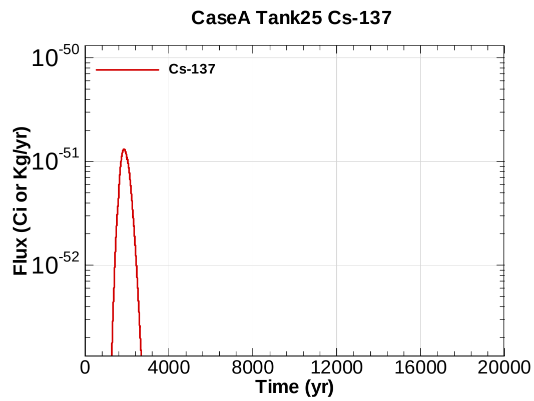

Figure A.2-906 - Water Table Flux for CaseA Tank25 Cs-137

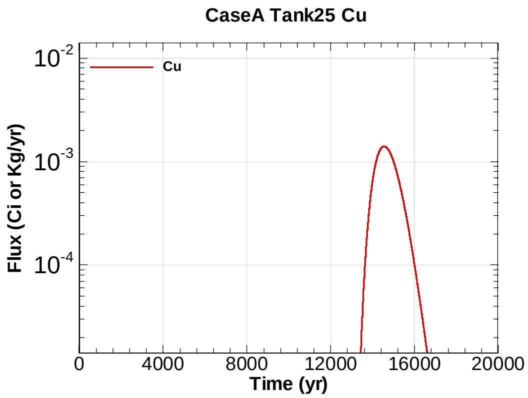

Figure A.2-907 - Water Table Flux for CaseA Tank25 Cu

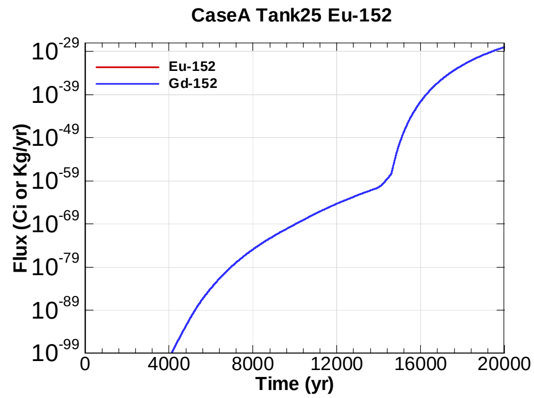

Figure A.2-908 - Water Table Flux for CaseA Tank25 Eu-152

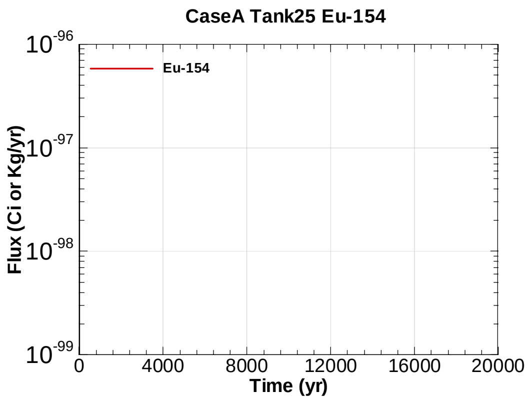

Figure A.2-909 - Water Table Flux for CaseA Tank25 Eu-154

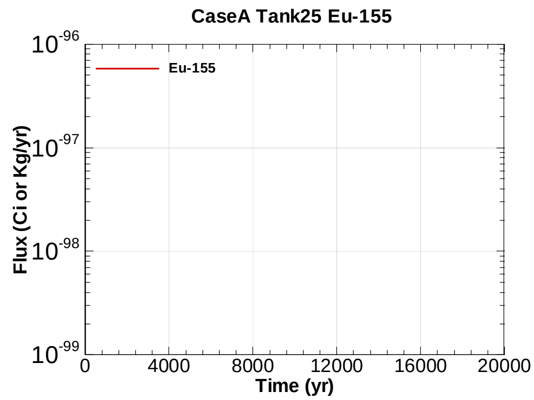

Figure A.2-910 - Water Table Flux for CaseA Tank25 Eu-155

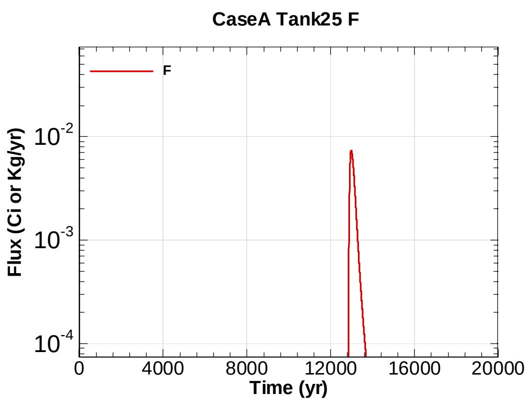

Figure A.2-911 - Water Table Flux for CaseA Tank25 F

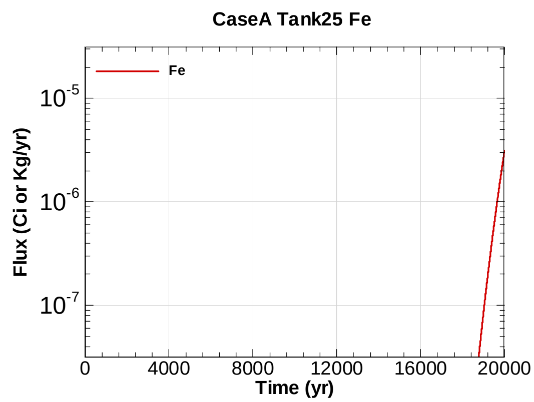

Figure A.2-912 - Water Table Flux for CaseA Tank25 Fe

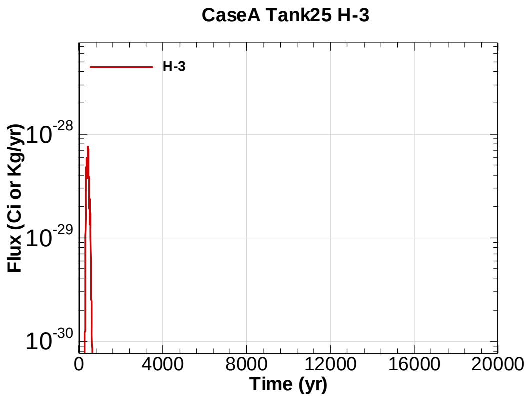

Figure A.2-913 - Water Table Flux for CaseA Tank25 H-3

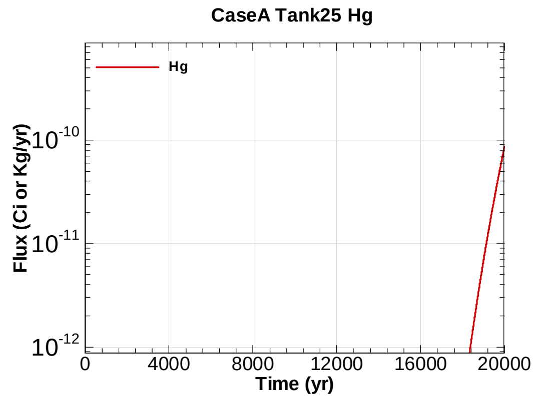

Figure A.2-914 - Water Table Flux for CaseA Tank25 Hg

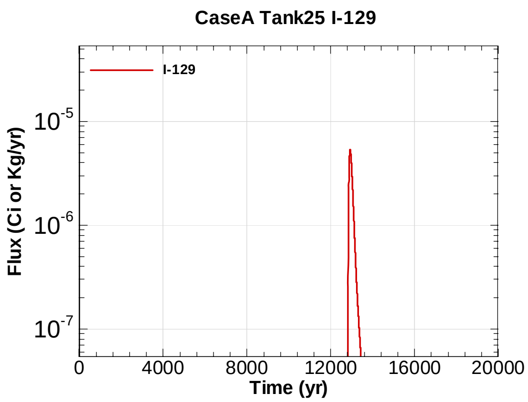

Figure A.2-915 - Water Table Flux for CaseA Tank25 I-129

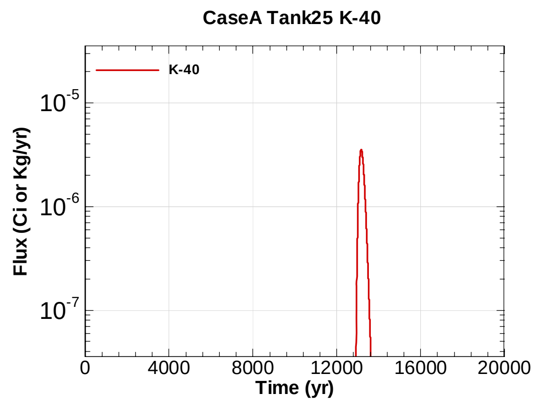

Figure A.2-916 - Water Table Flux for CaseA Tank25 K-40

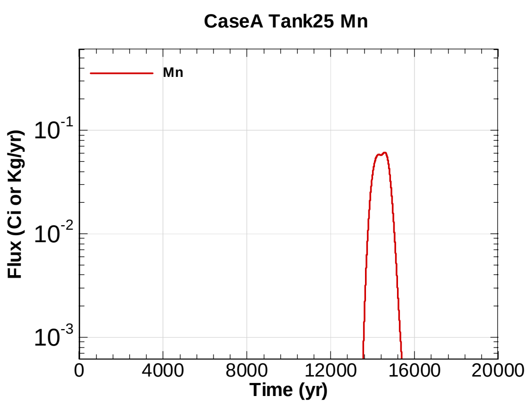

Figure A.2-917 - Water Table Flux for CaseA Tank25 Mn

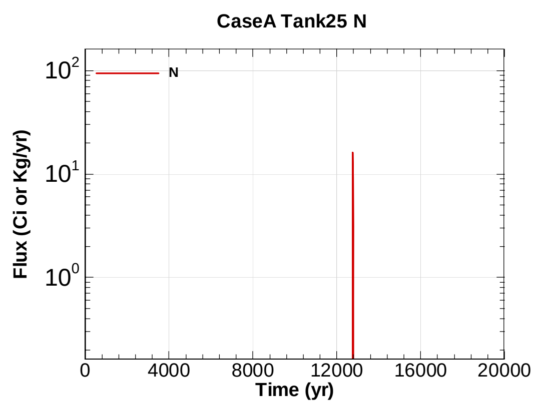

Figure A.2-918 - Water Table Flux for CaseA Tank25 N

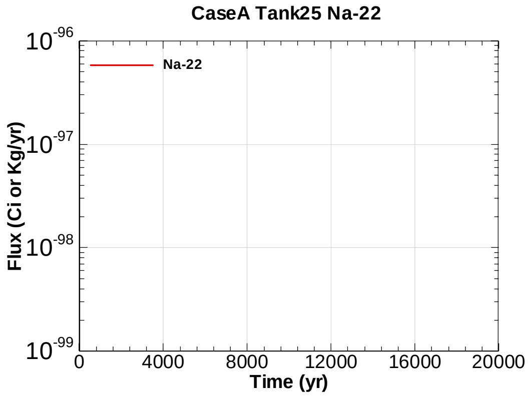

Figure A.2-919 - Water Table Flux for CaseA Tank25 Na-22

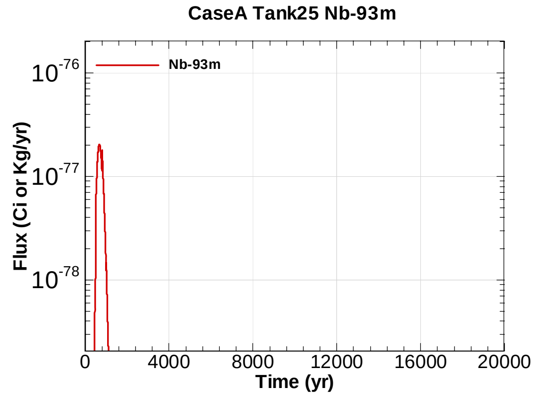

Figure A.2-920 - Water Table Flux for CaseA Tank25 Nb-93m

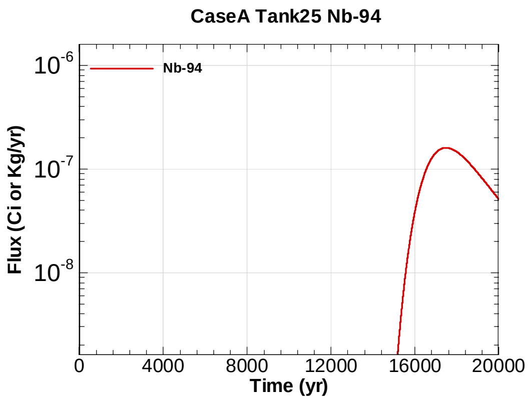

Figure A.2-921 - Water Table Flux for CaseA Tank25 Nb-94

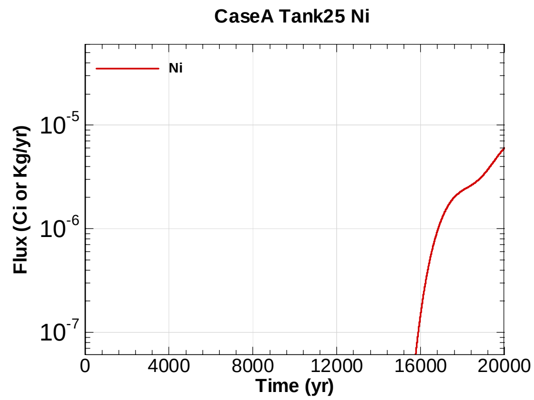

Figure A.2-922 - Water Table Flux for CaseA Tank25 Ni

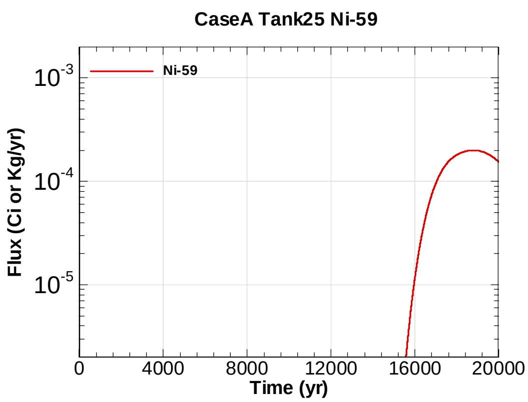

Figure A.2-923 - Water Table Flux for CaseA Tank25 Ni-59

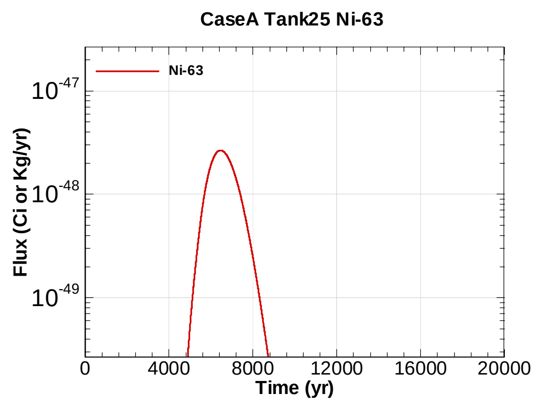

Figure A.2-924 - Water Table Flux for CaseA Tank25 Ni-63

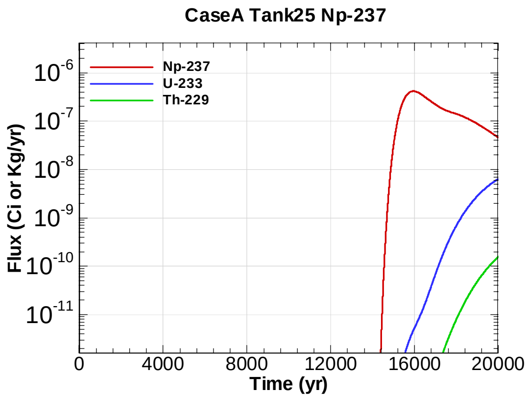

Figure A.2-925 - Water Table Flux for CaseA Tank25 Np-237

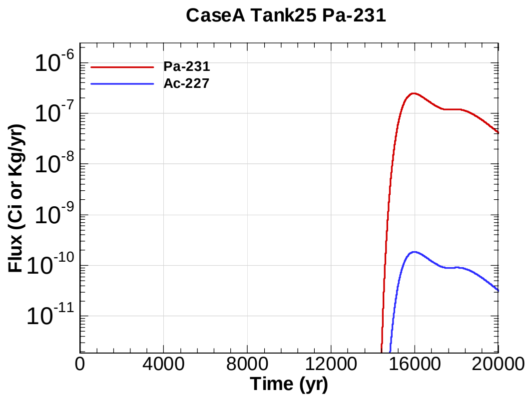

Figure A.2-926 - Water Table Flux for CaseA Tank25 Pa-231

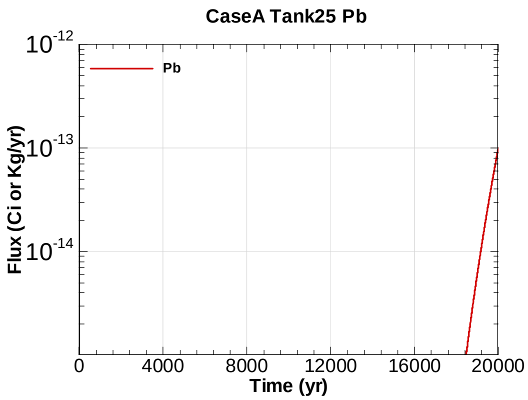

Figure A.2-927 - Water Table Flux for CaseA Tank25 Pb

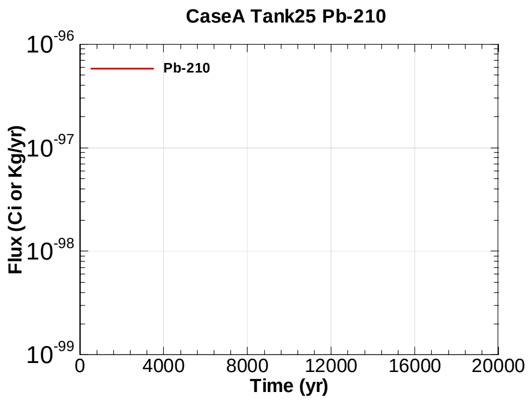

Figure A.2-928 - Water Table Flux for CaseA Tank25 Pb-210

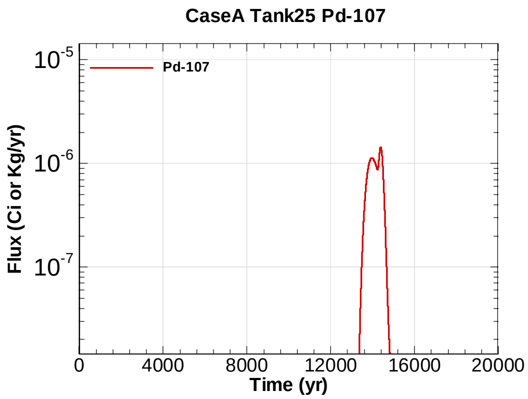

Figure A.2-929 - Water Table Flux for CaseA Tank25 Pd-107

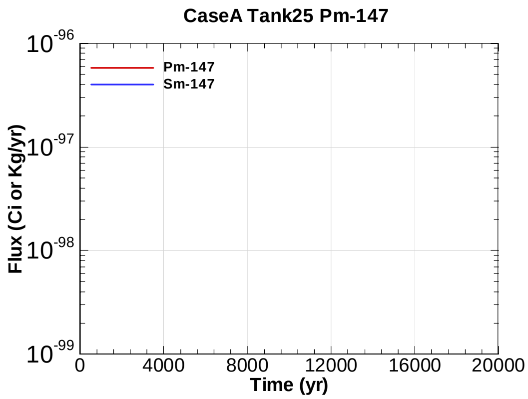

Figure A.2-930 - Water Table Flux for CaseA Tank25 Pm-147

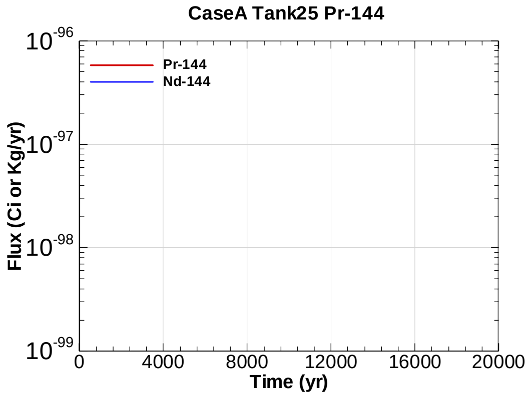

Figure A.2-931 - Water Table Flux for CaseA Tank25 Pr-144

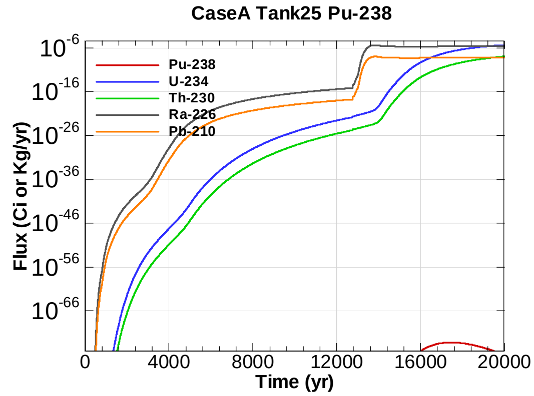

Figure A.2-932 - Water Table Flux for CaseA Tank25 Pu-238

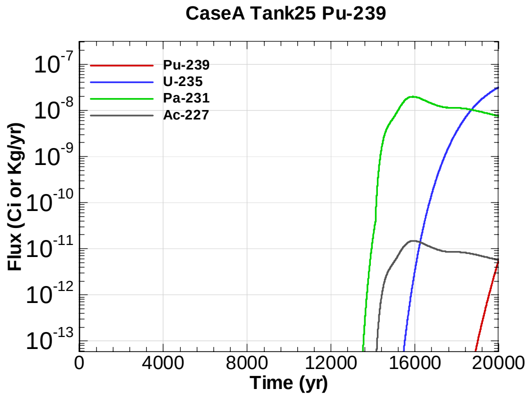

Figure A.2-933 - Water Table Flux for CaseA Tank25 Pu-239

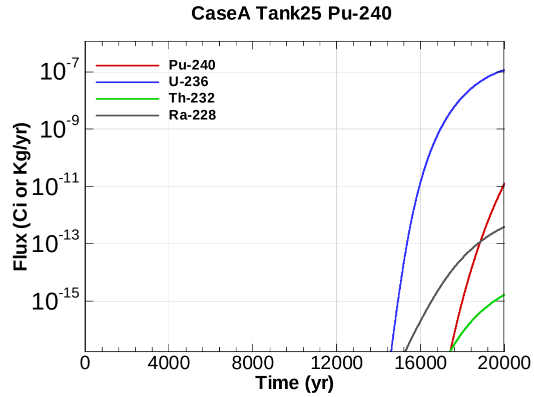

Figure A.2-934 - Water Table Flux for CaseA Tank25 Pu-240

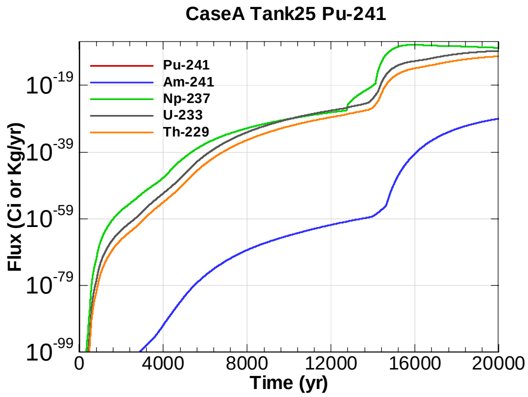

Figure A.2-935 - Water Table Flux for CaseA Tank25 Pu-241

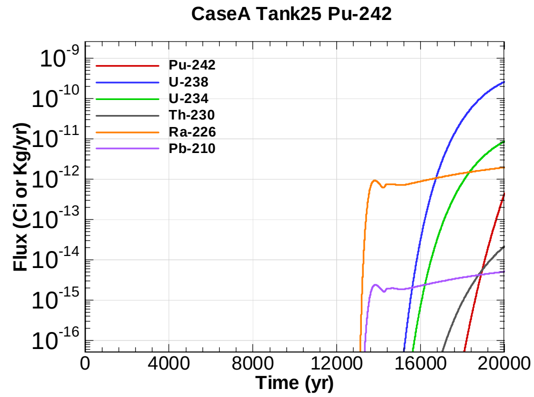

Figure A.2-936 - Water Table Flux for CaseA Tank25 Pu-242

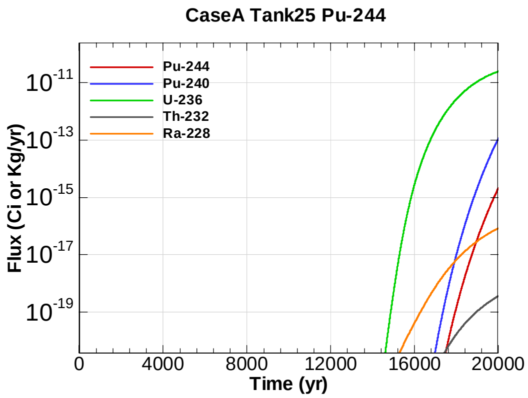

Figure A.2-937 - Water Table Flux for CaseA Tank25 Pu-244

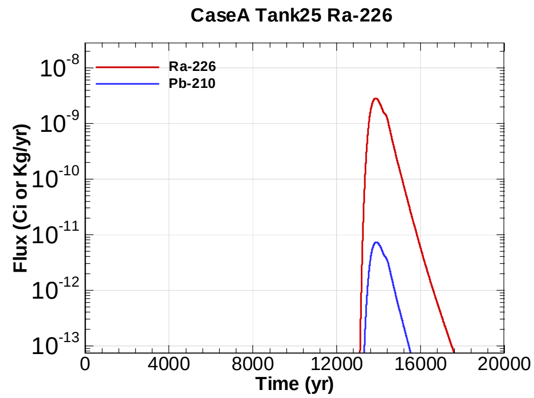

Figure A.2-938 - Water Table Flux for CaseA Tank25 Ra-226

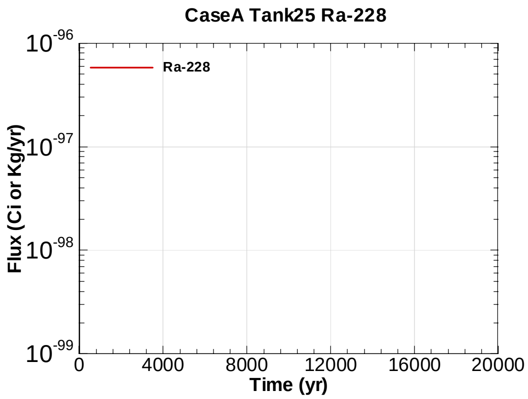

Figure A.2-939 - Water Table Flux for CaseA Tank25 Ra-228

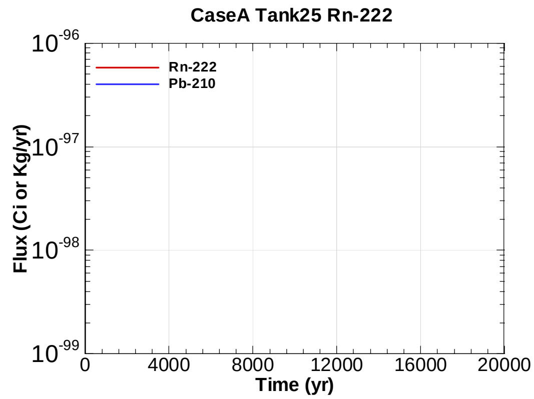

Figure A.2-940 - Water Table Flux for CaseA Tank25 Rn-222

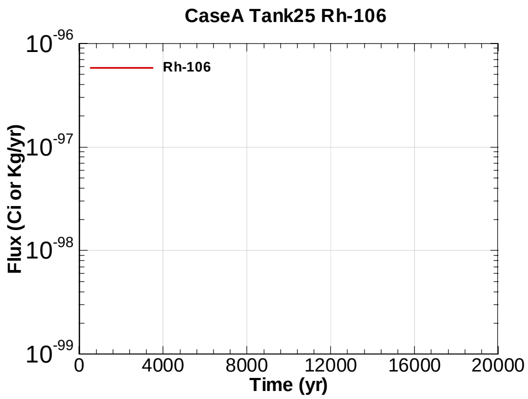

Figure A.2-941 - Water Table Flux for CaseA Tank25 Rh-106

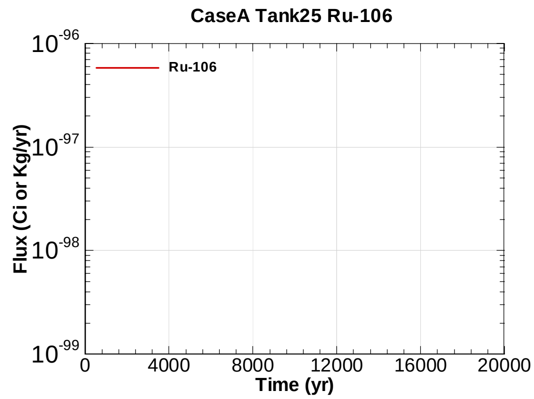

Figure A.2-942 - Water Table Flux for CaseA Tank25 Ru-106

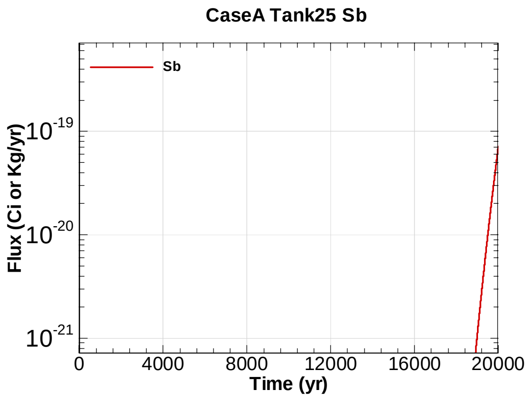

Figure A.2-943 - Water Table Flux for CaseA Tank25 Sb

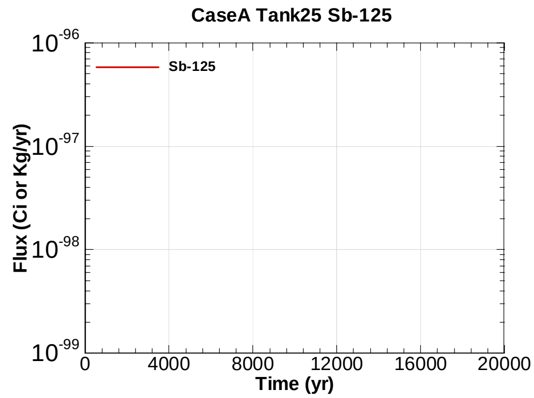

Figure A.2-944 - Water Table Flux for CaseA Tank25 Sb-125

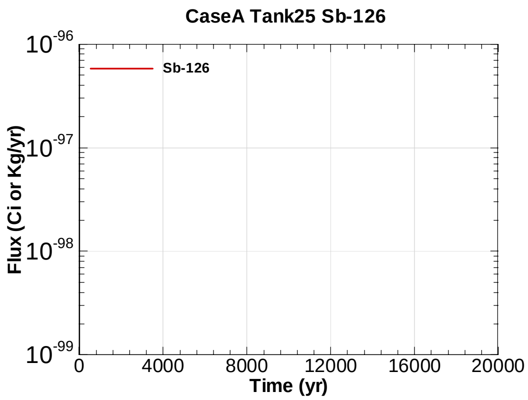

Figure A.2-945 - Water Table Flux for CaseA Tank25 Sb-126

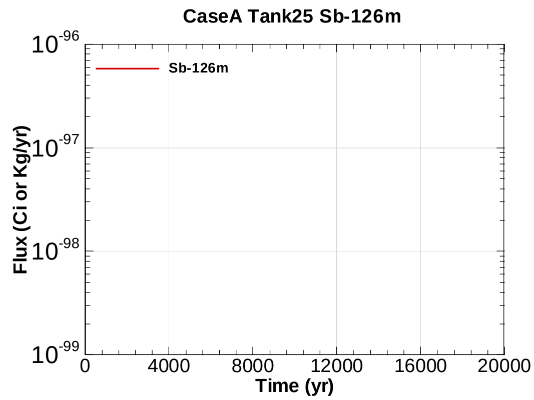

Figure A.2-946 - Water Table Flux for CaseA Tank25 Sb-126m

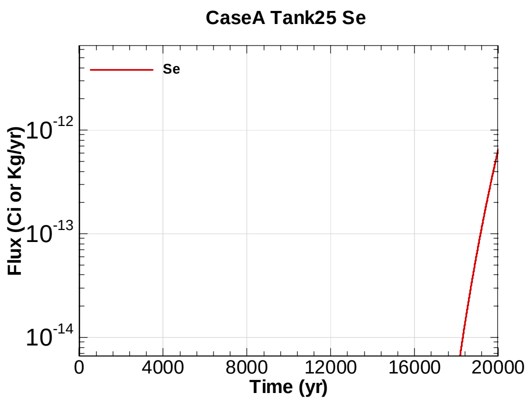

Figure A.2-947 - Water Table Flux for CaseA Tank25 Se

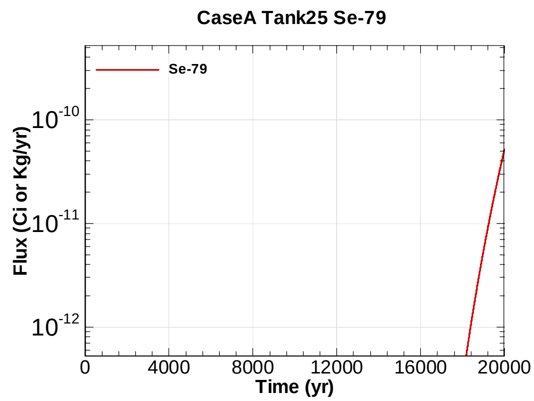

Figure A.2-948 - Water Table Flux for CaseA Tank25 Se-79

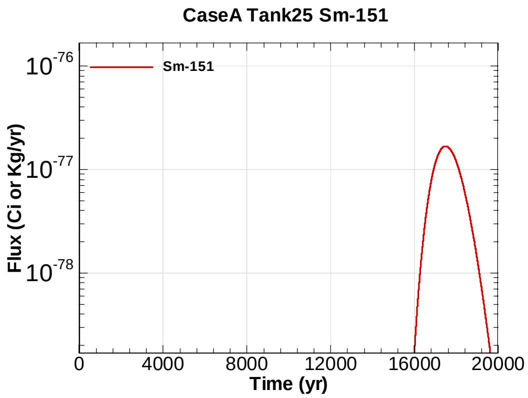

Figure A.2-949 - Water Table Flux for CaseA Tank25 Sm-151

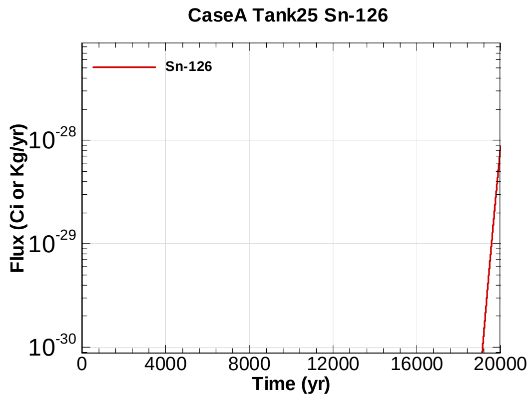

Figure A.2-950 - Water Table Flux for CaseA Tank25 Sn-126

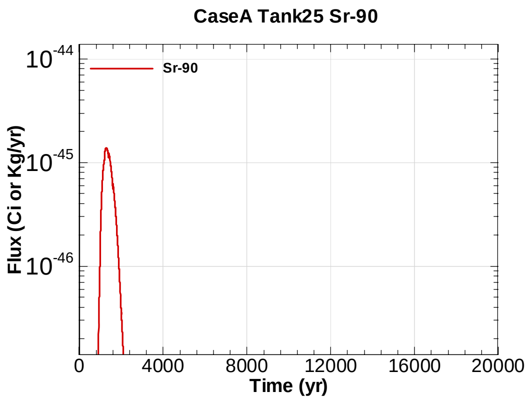

Figure A.2-951 - Water Table Flux for CaseA Tank25 Sr-90

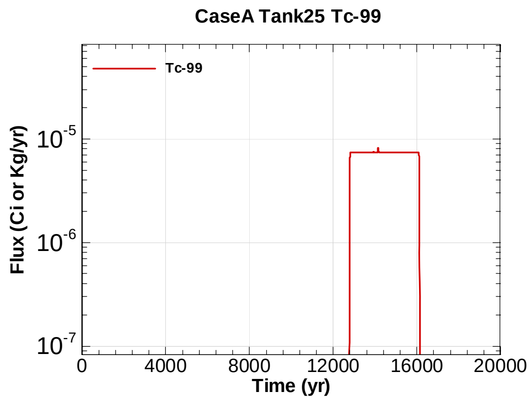

Figure A.2-952 - Water Table Flux for CaseA Tank25 Tc-99

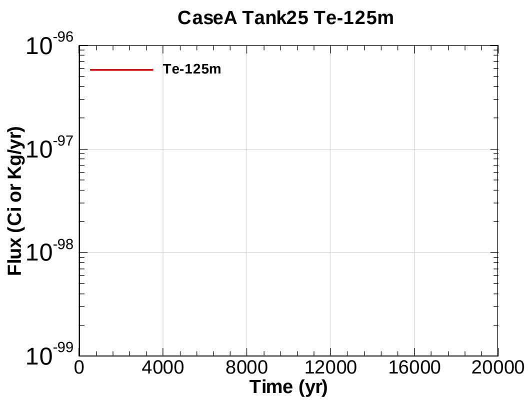

Figure A.2-953 - Water Table Flux for CaseA Tank25 Te-125m

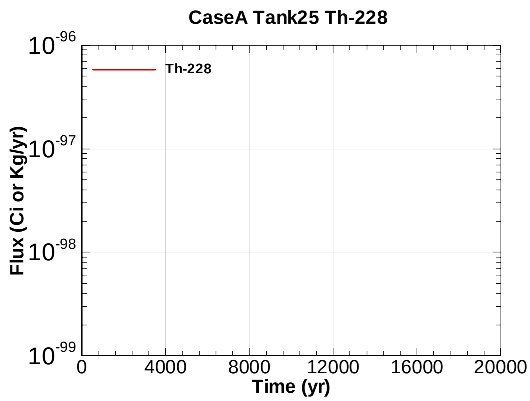

Figure A.2-954 - Water Table Flux for CaseA Tank25 Th-228

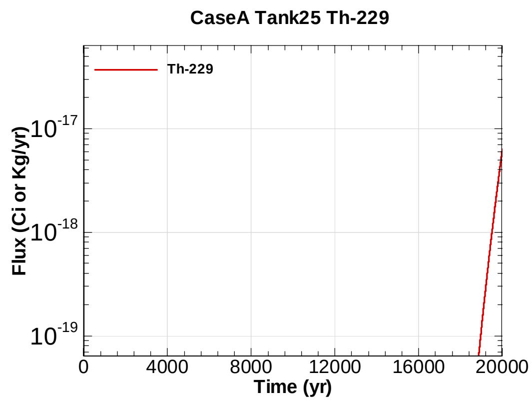

Figure A.2-955 - Water Table Flux for CaseA Tank25 Th-229

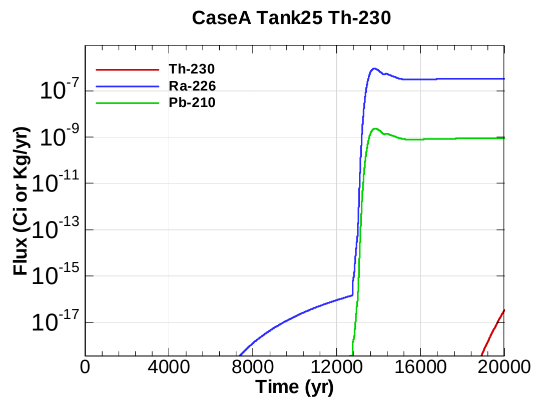

Figure A.2-956 - Water Table Flux for CaseA Tank25 Th-230

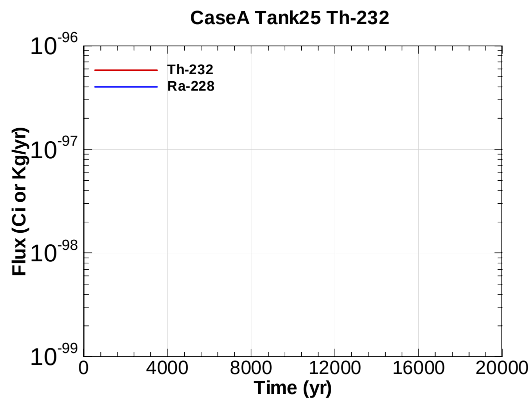

Figure A.2-957 - Water Table Flux for CaseA Tank25 Th-232

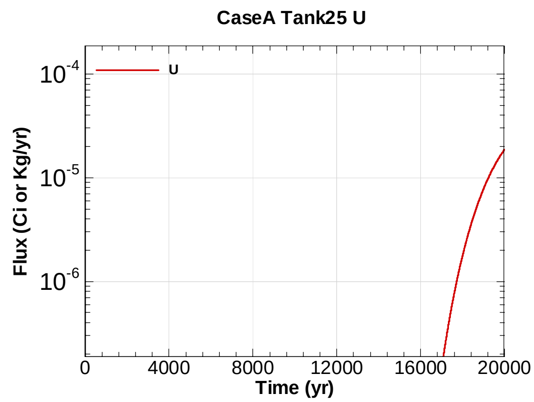

Figure A.2-958 - Water Table Flux for CaseA Tank25 U

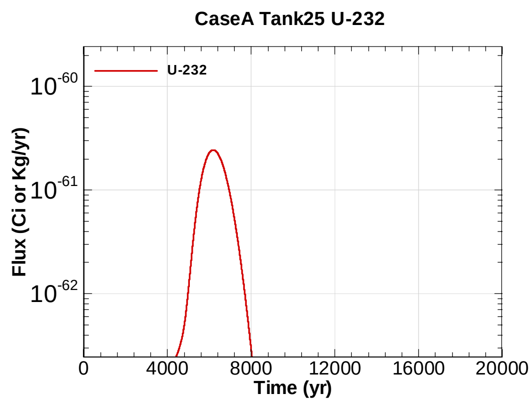

Figure A.2-959 - Water Table Flux for CaseA Tank25 U-232

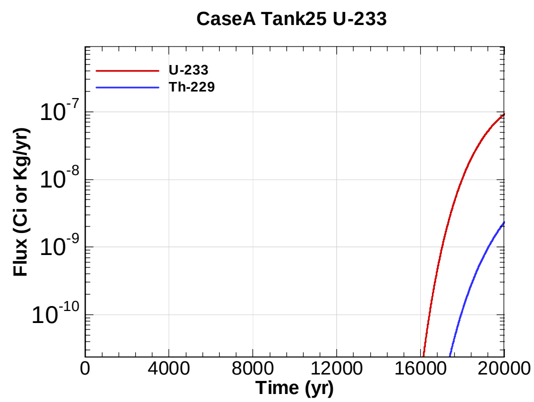

Figure A.2-960 - Water Table Flux for CaseA Tank25 U-233

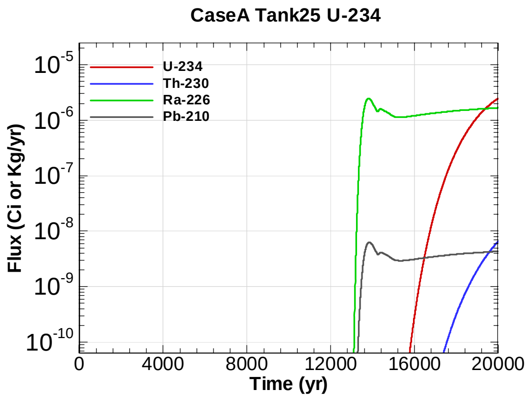

Figure A.2-961 - Water Table Flux for CaseA Tank25 U-234

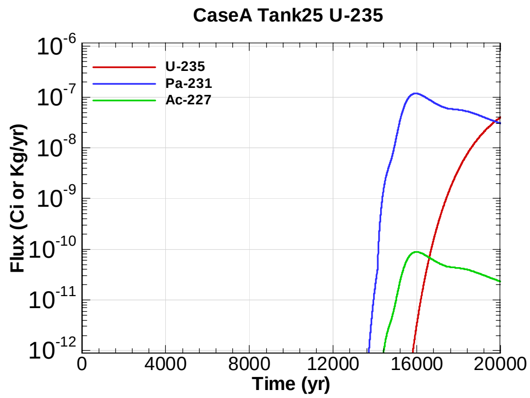

Figure A.2-962 - Water Table Flux for CaseA Tank25 U-235

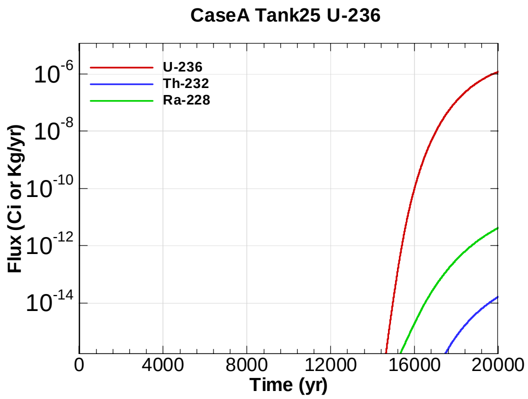

Figure A.2-963 - Water Table Flux for CaseA Tank25 U-236

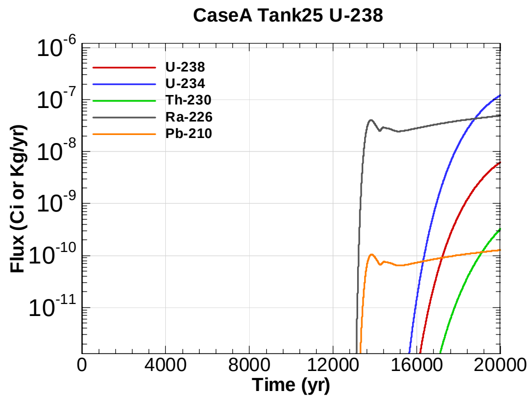

Figure A.2-964 - Water Table Flux for CaseA Tank25 U-238

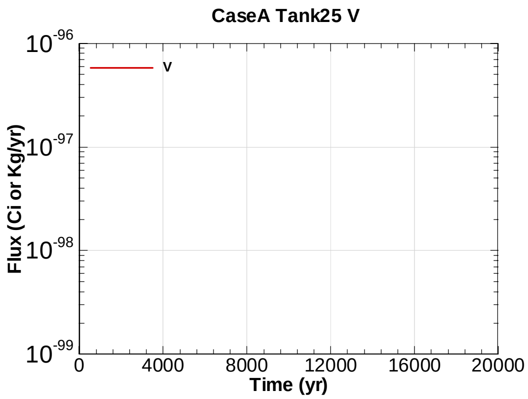

Figure A.2-965 - Water Table Flux for CaseA Tank25 V

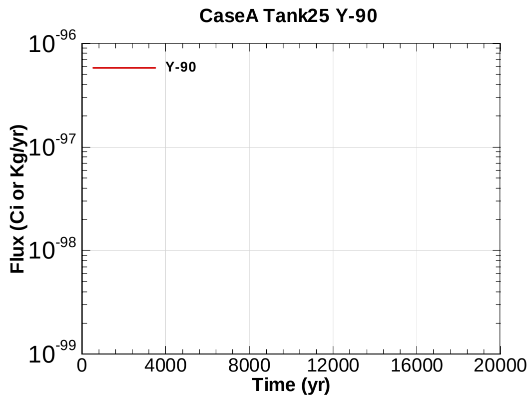

Figure A.2-966 - Water Table Flux for CaseA Tank25 Y-90

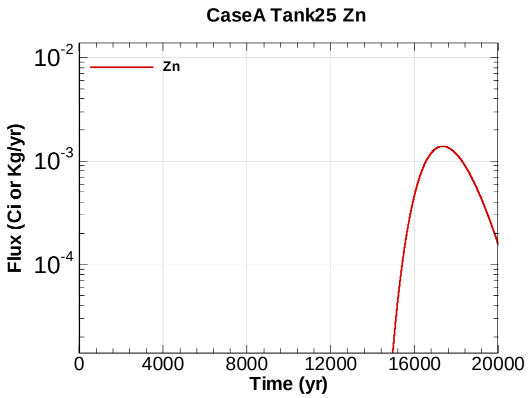

Figure A.2-967 - Water Table Flux for CaseA Tank25 Zn

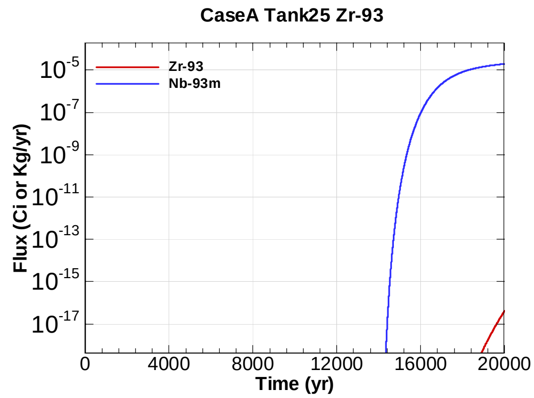

Figure A.2-968 - Water Table Flux for CaseA Tank25 Zr-93

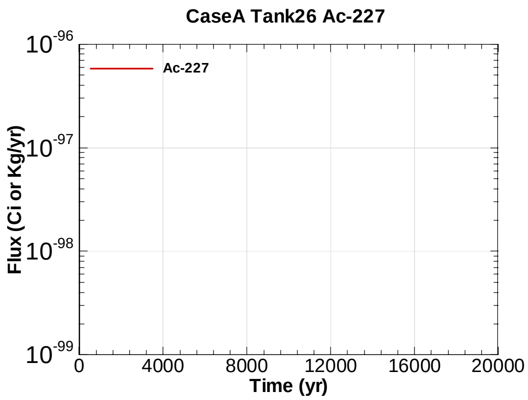

Figure A.2-969 - Water Table Flux for CaseA Tank26 Ac-227

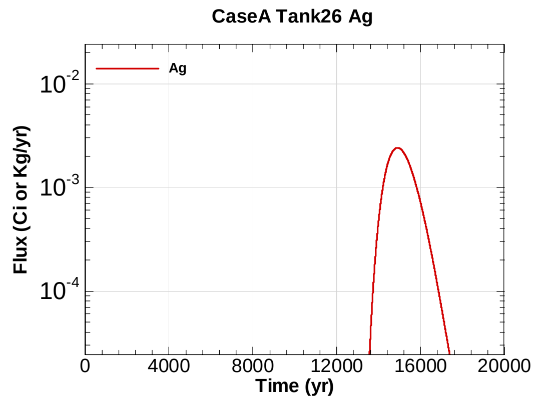

Figure A.2-970 - Water Table Flux for CaseA Tank26 Ag

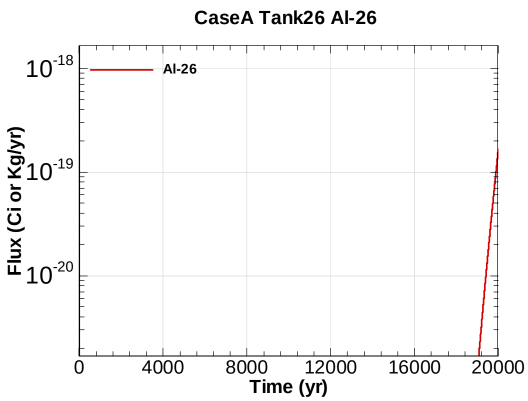

Figure A.2-971 - Water Table Flux for CaseA Tank26 Al-26

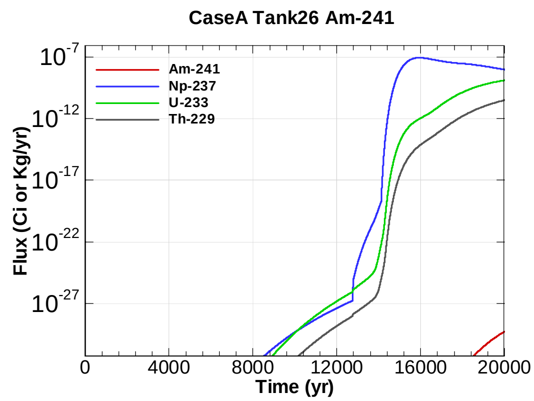

Figure A.2-972 - Water Table Flux for CaseA Tank26 Am-241

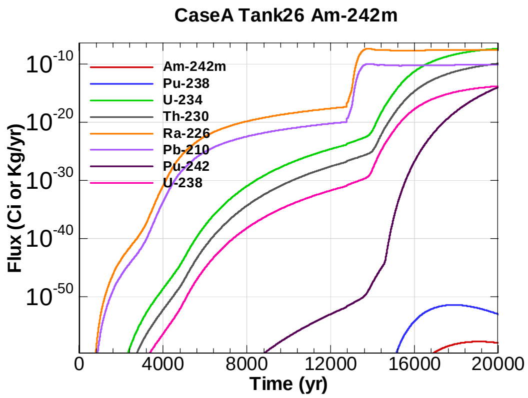

Figure A.2-973 - Water Table Flux for CaseA Tank26 Am-242m

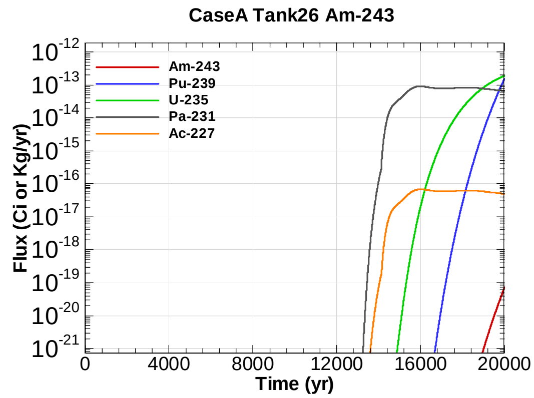

Figure A.2-974 - Water Table Flux for CaseA Tank26 Am-243

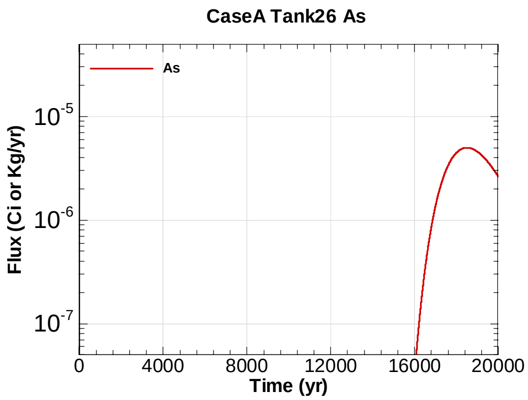

Figure A.2-975 - Water Table Flux for CaseA Tank26 As

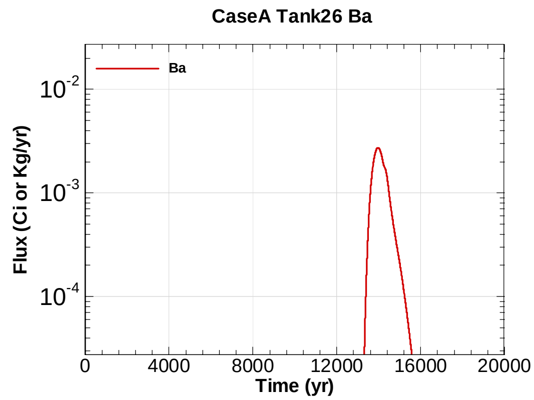

Figure A.2-976 - Water Table Flux for CaseA Tank26 Ba

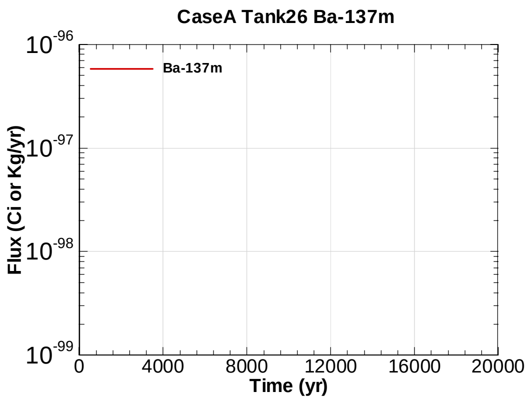

Figure A.2-977 - Water Table Flux for CaseA Tank26 Ba-137m

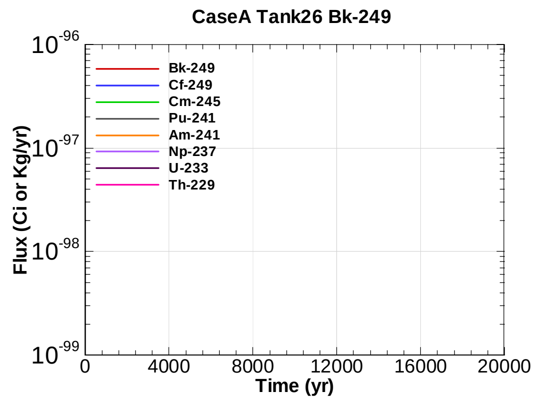

Figure A.2-978 - Water Table Flux for CaseA Tank26 Bk-249

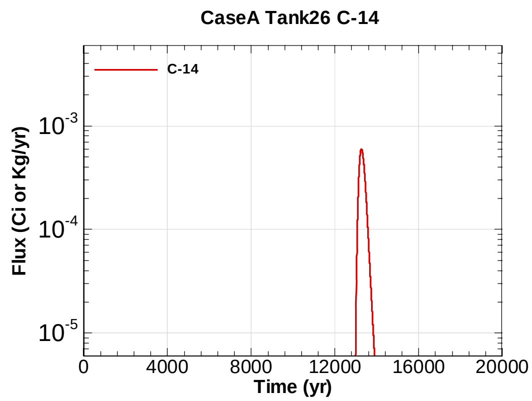

Figure A.2-979 - Water Table Flux for CaseA Tank26 C-14

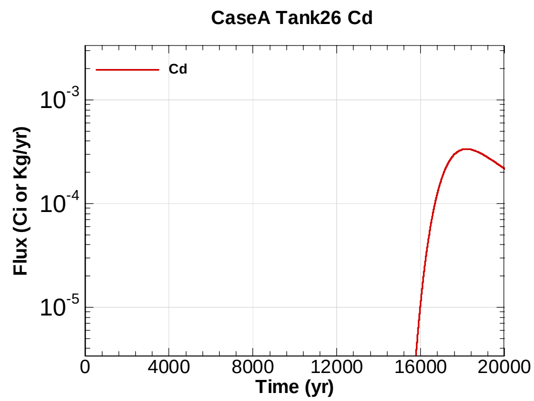

Figure A.2-980 - Water Table Flux for CaseA Tank26 Cd

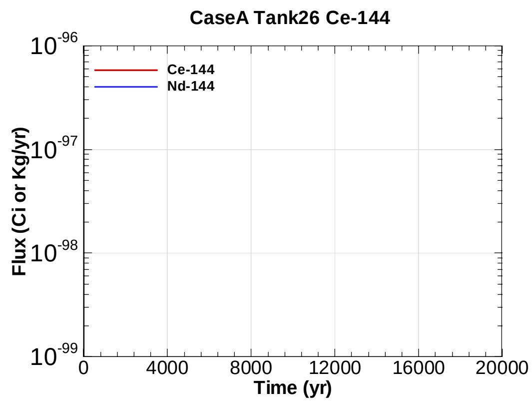

Figure A.2-981 - Water Table Flux for CaseA Tank26 Ce-144

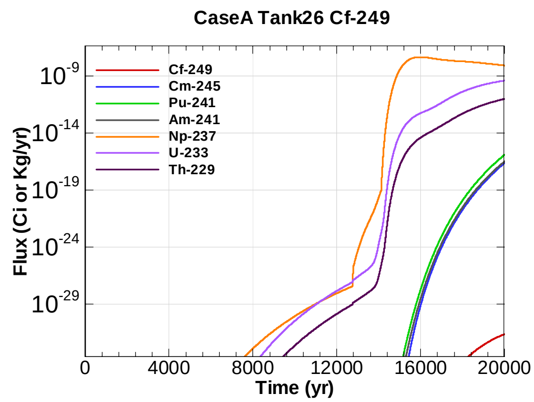

Figure A.2-982 - Water Table Flux for CaseA Tank26 Cf-249

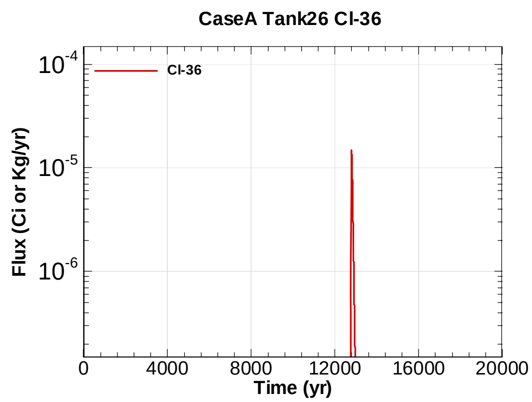

Figure A.2-983 - Water Table Flux for CaseA Tank26 Cl-36

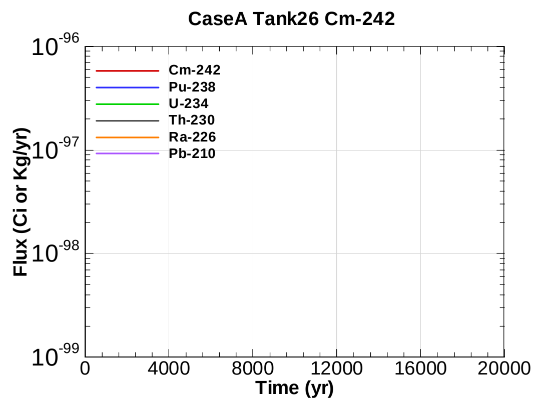

Figure A.2-984 - Water Table Flux for CaseA Tank26 Cm-242

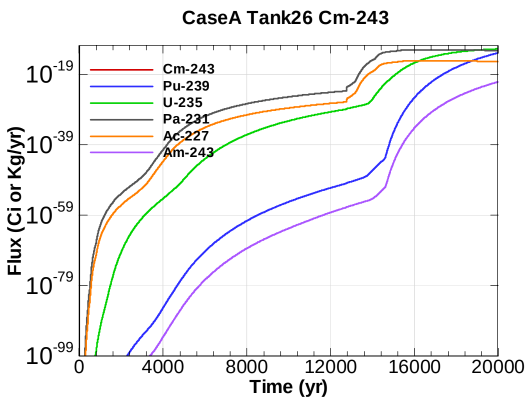

Figure A.2-985 - Water Table Flux for CaseA Tank26 Cm-243

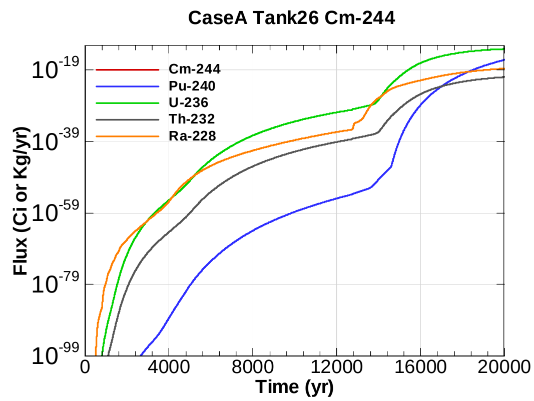

Figure A.2-986 - Water Table Flux for CaseA Tank26 Cm-244

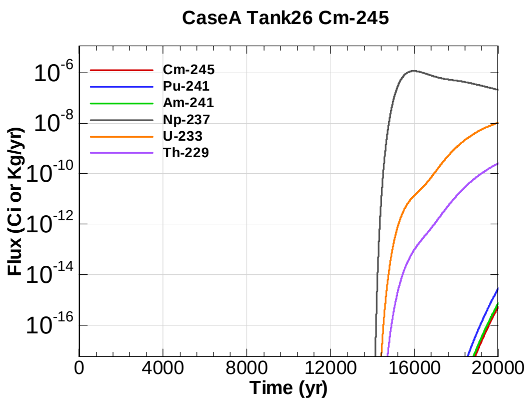

Figure A.2-987 - Water Table Flux for CaseA Tank26 Cm-245

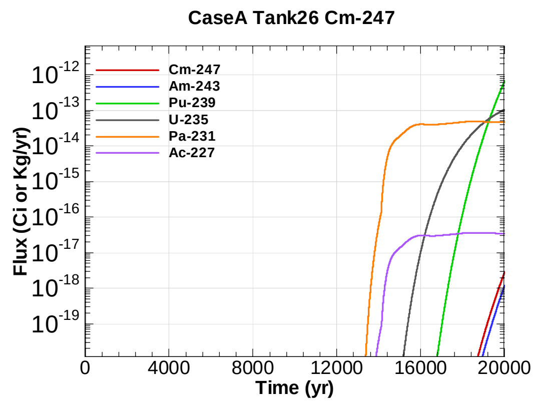

Figure A.2-988 - Water Table Flux for CaseA Tank26 Cm-247

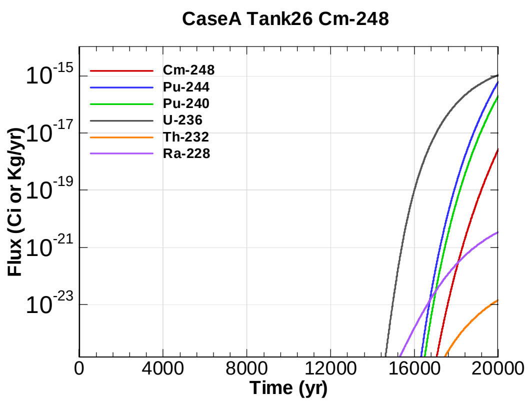

Figure A.2-989 - Water Table Flux for CaseA Tank26 Cm-248

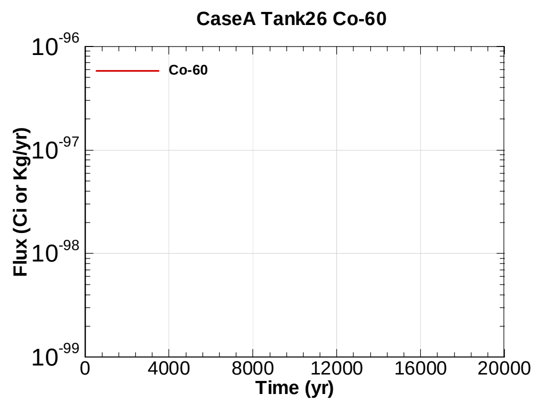

Figure A.2-990 - Water Table Flux for CaseA Tank26 Co-60

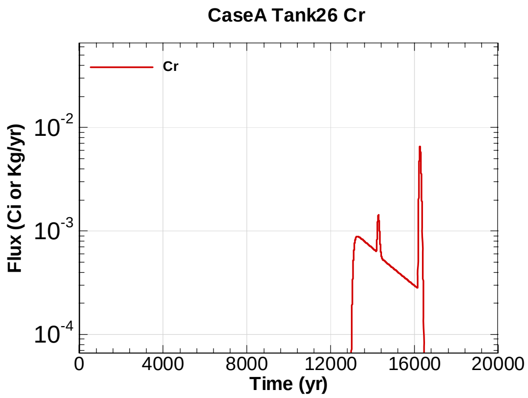

Figure A.2-991 - Water Table Flux for CaseA Tank26 Cr

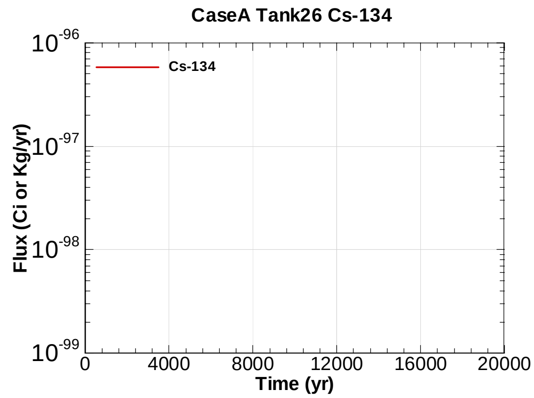

Figure A.2-992 - Water Table Flux for CaseA Tank26 Cs-134

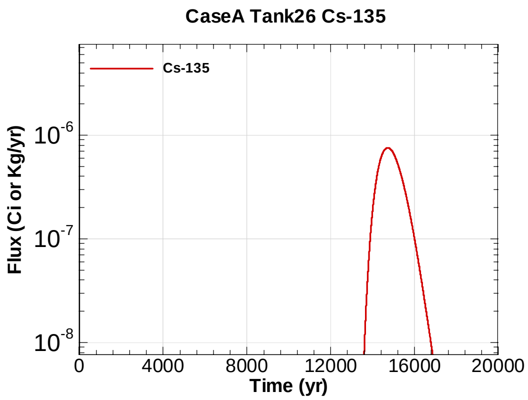

Figure A.2-993 - Water Table Flux for CaseA Tank26 Cs-135

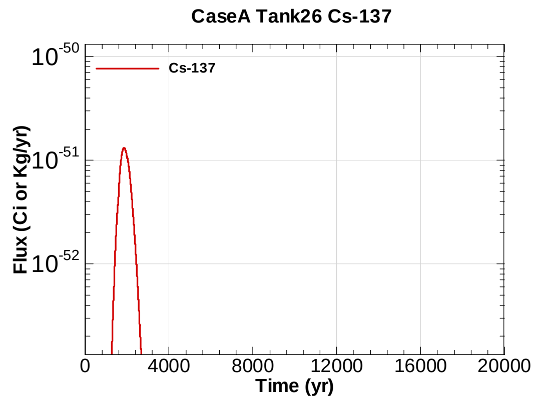

Figure A.2-994 - Water Table Flux for CaseA Tank26 Cs-137

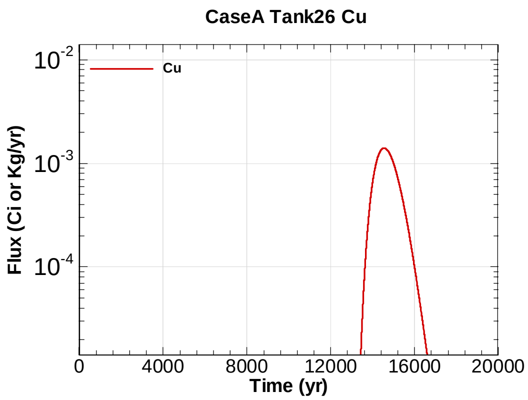

Figure A.2-995 - Water Table Flux for CaseA Tank26 Cu

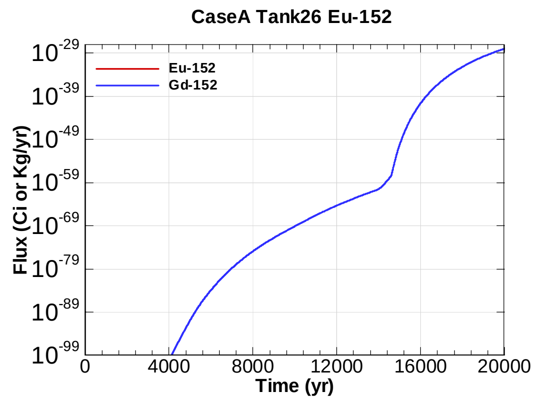

Figure A.2-996 - Water Table Flux for CaseA Tank26 Eu-152

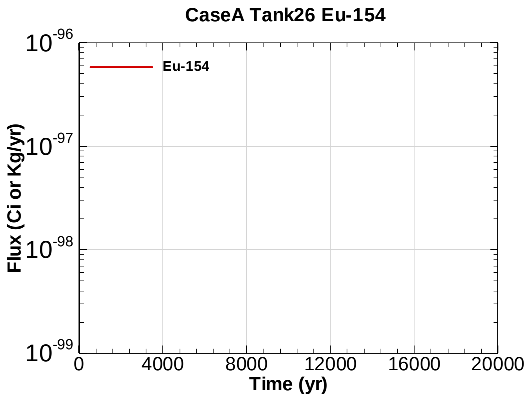

Figure A.2-997 - Water Table Flux for CaseA Tank26 Eu-154

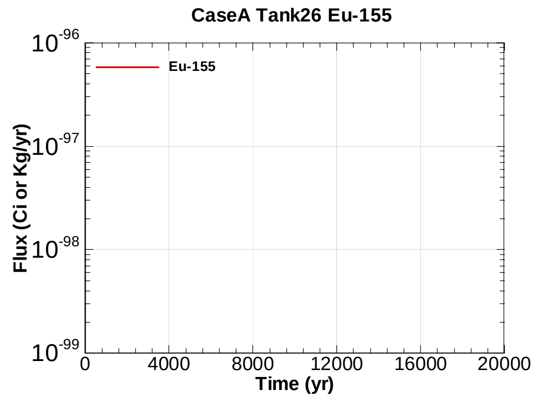

Figure A.2-998 - Water Table Flux for CaseA Tank26 Eu-155

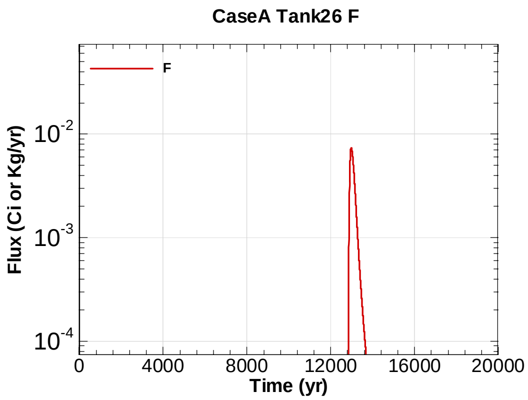

Figure A.2-999 - Water Table Flux for CaseA Tank26 F

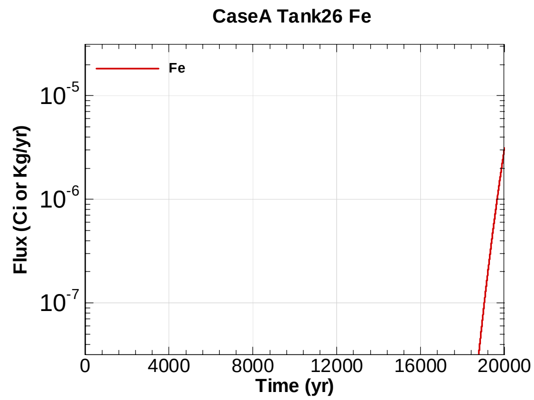

Figure A.2-1000 - Water Table Flux for CaseA Tank26 Fe

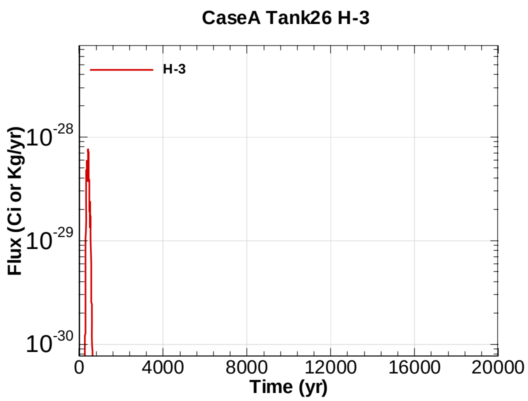

Figure A.2-1001 - Water Table Flux for CaseA Tank26 H-3

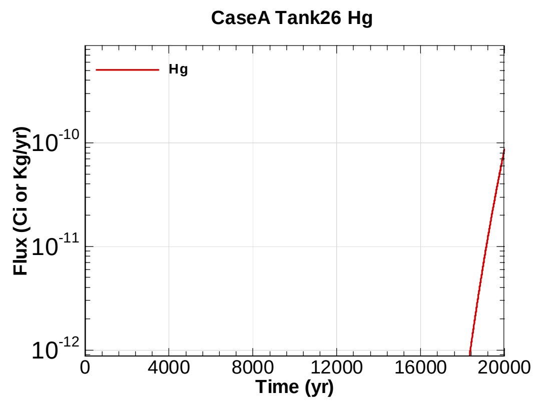

Figure A.2-1002 - Water Table Flux for CaseA Tank26 Hg

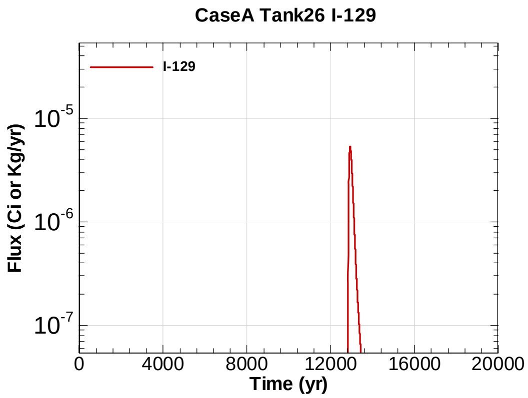

Figure A.2-1003 - Water Table Flux for CaseA Tank26 I-129

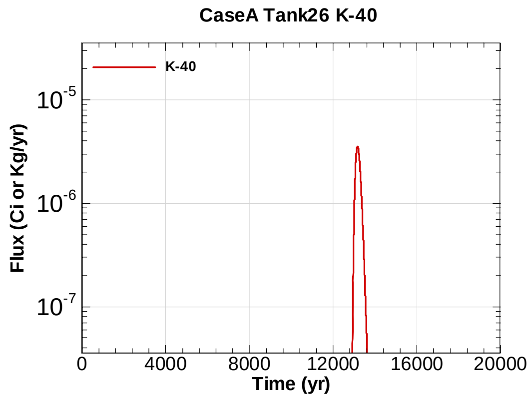

Figure A.2-1004 - Water Table Flux for CaseA Tank26 K-40

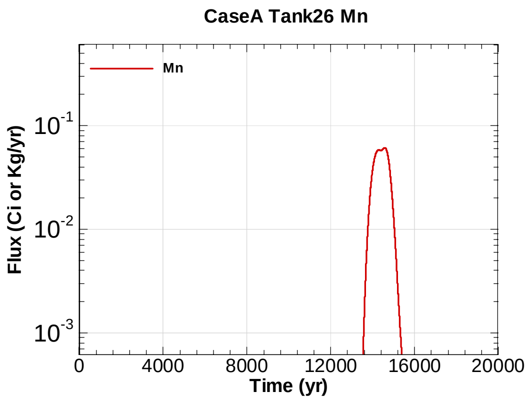

Figure A.2-1005 - Water Table Flux for CaseA Tank26 Mn

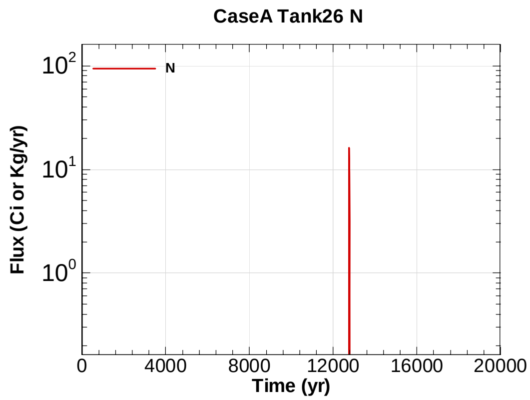

Figure A.2-1006 - Water Table Flux for CaseA Tank26 N

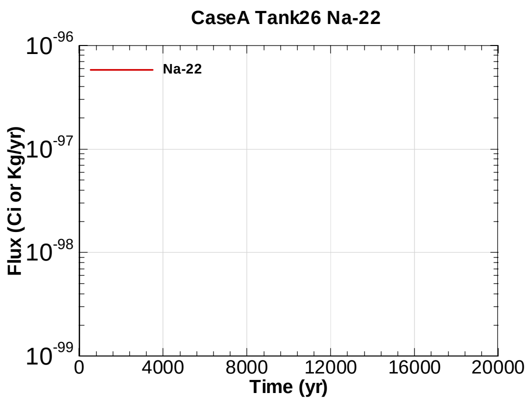

Figure A.2-1007 - Water Table Flux for CaseA Tank26 Na-22

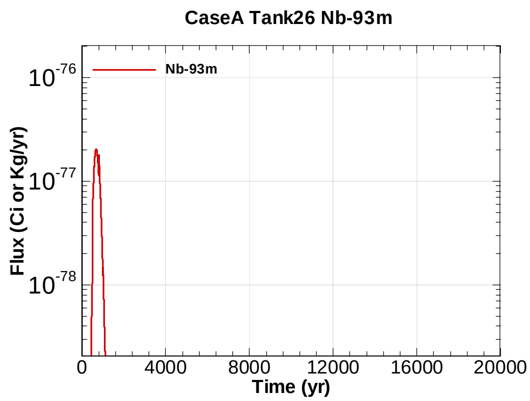

Figure A.2-1008 - Water Table Flux for CaseA Tank26 Nb-93m

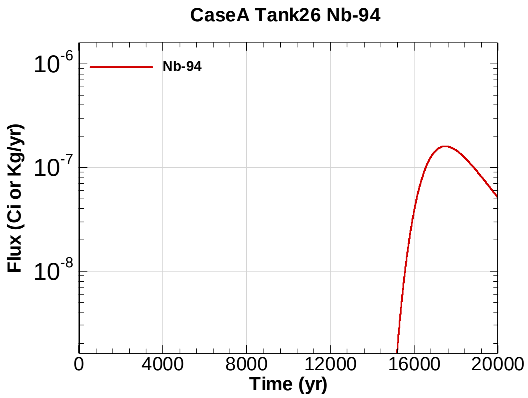

Figure A.2-1009 - Water Table Flux for CaseA Tank26 Nb-94

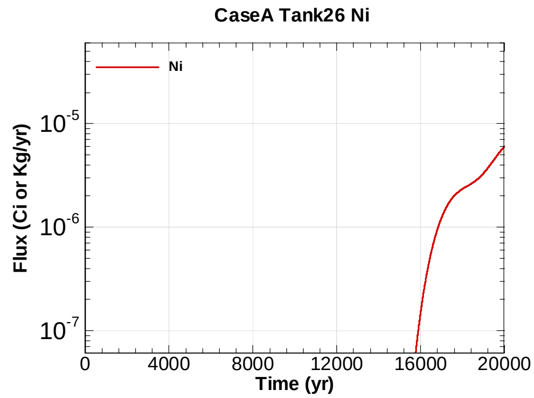

Figure A.2-1010 - Water Table Flux for CaseA Tank26 Ni

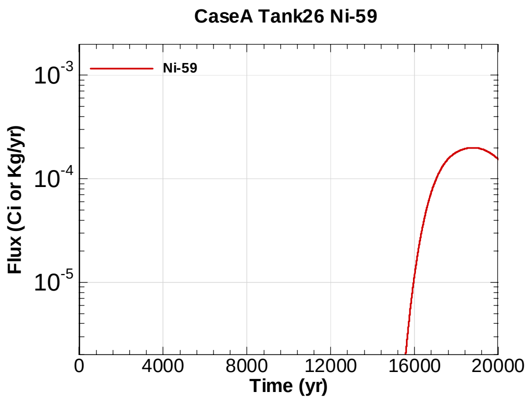

Figure A.2-1011 - Water Table Flux for CaseA Tank26 Ni-59

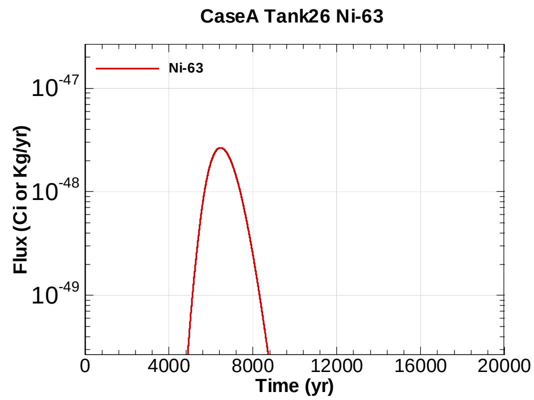

Figure A.2-1012 - Water Table Flux for CaseA Tank26 Ni-63

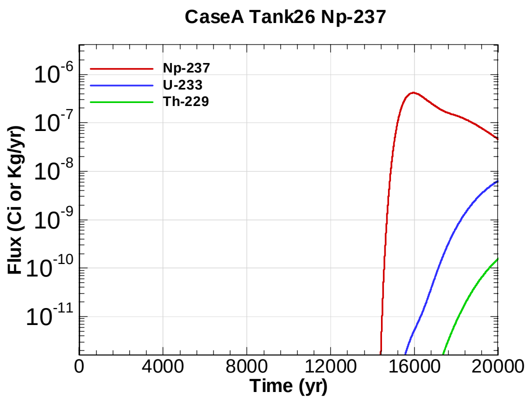

Figure A.2-1013 - Water Table Flux for CaseA Tank26 Np-237

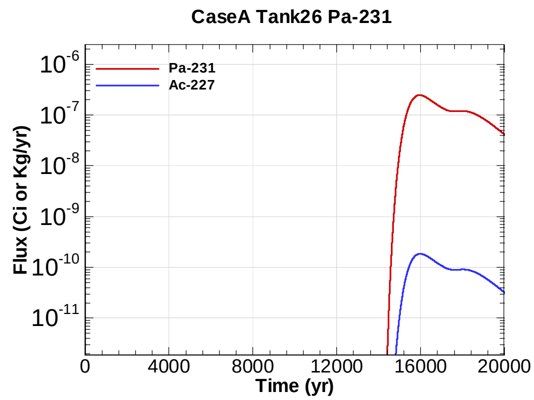

Figure A.2-1014 - Water Table Flux for CaseA Tank26 Pa-231

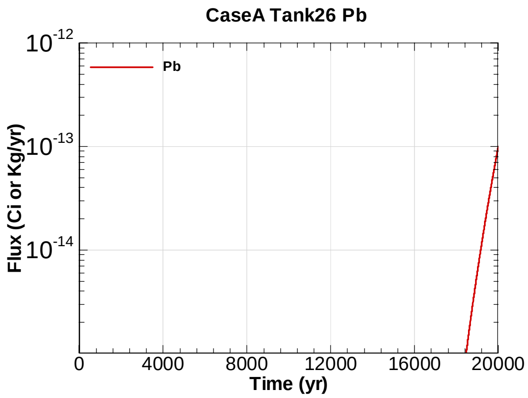

Figure A.2-1015 - Water Table Flux for CaseA Tank26 Pb

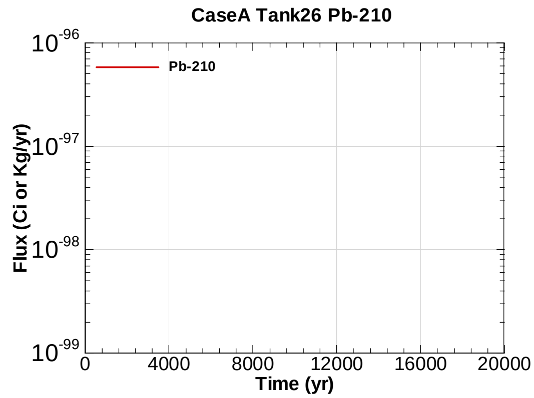

Figure A.2-1016 - Water Table Flux for CaseA Tank26 Pb-210

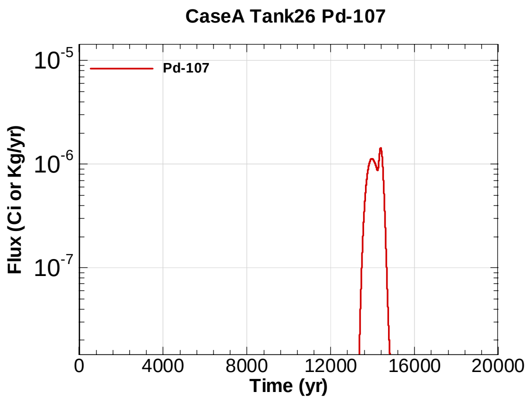

Figure A.2-1017 - Water Table Flux for CaseA Tank26 Pd-107

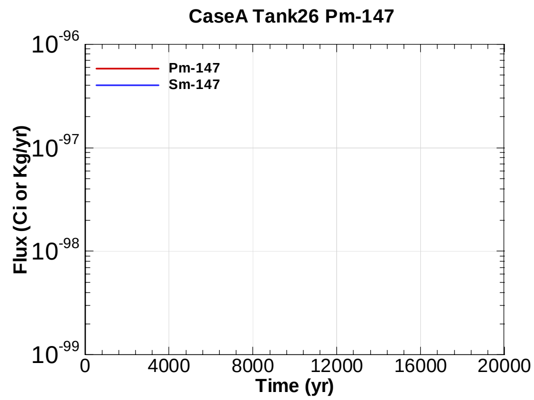

Figure A.2-1018 - Water Table Flux for CaseA Tank26 Pm-147

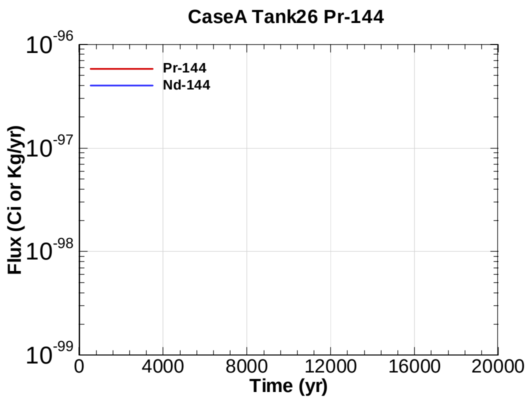

Figure A.2-1019 - Water Table Flux for CaseA Tank26 Pr-144

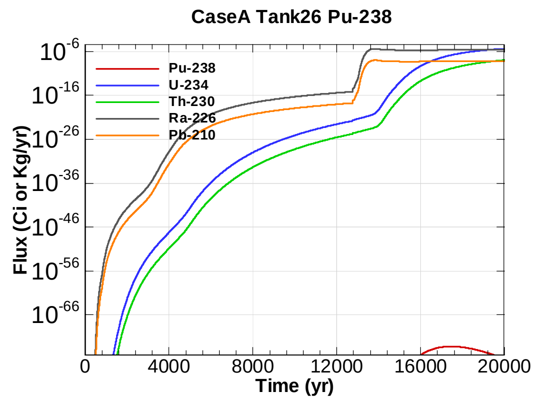

Figure A.2-1020 - Water Table Flux for CaseA Tank26 Pu-238

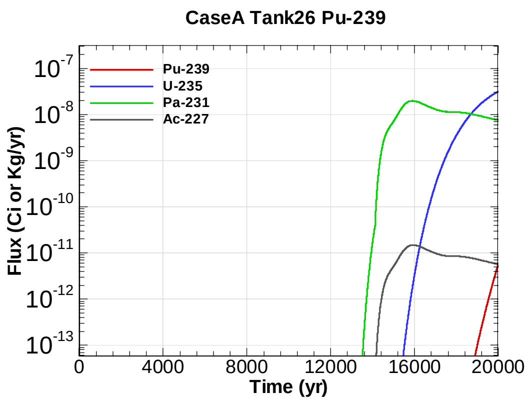

Figure A.2-1021 - Water Table Flux for CaseA Tank26 Pu-239

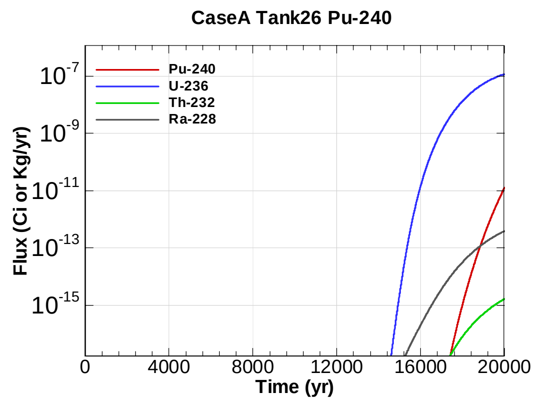

Figure A.2-1022 - Water Table Flux for CaseA Tank26 Pu-240

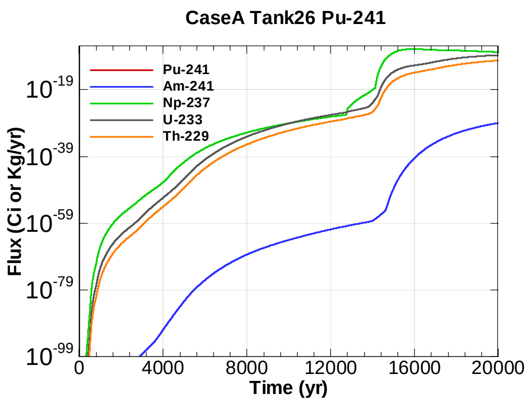

Figure A.2-1023 - Water Table Flux for CaseA Tank26 Pu-241

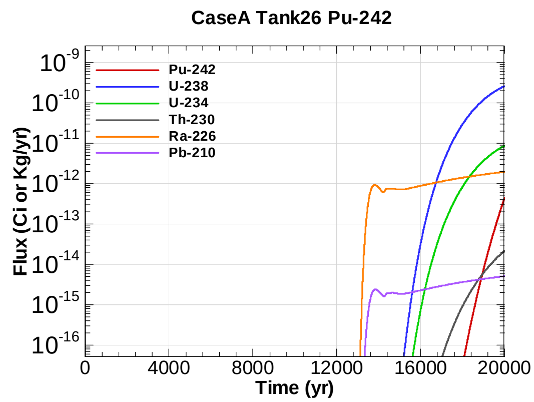

Figure A.2-1024 - Water Table Flux for CaseA Tank26 Pu-242

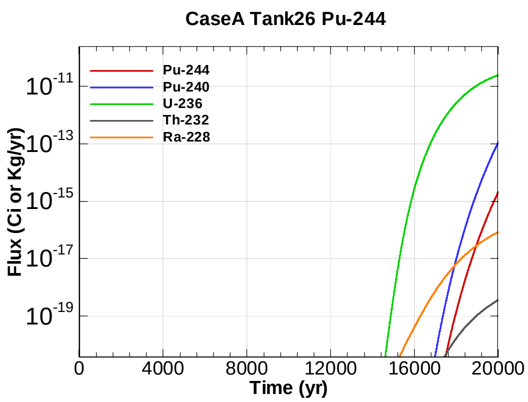

Figure A.2-1025 - Water Table Flux for CaseA Tank26 Pu-244

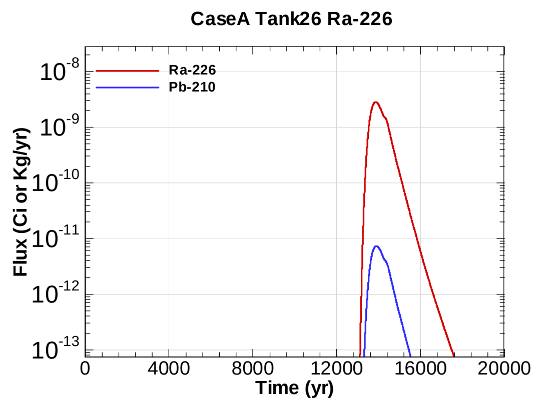

Figure A.2-1026 - Water Table Flux for CaseA Tank26 Ra-226

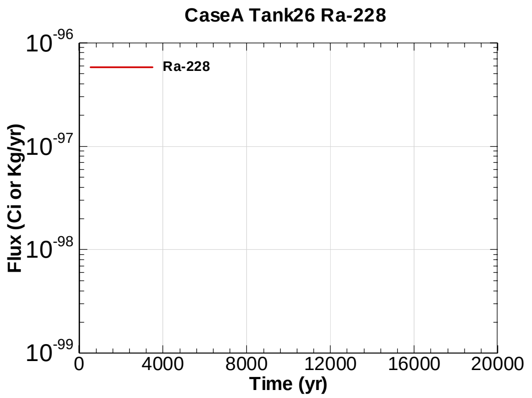

Figure A.2-1027 - Water Table Flux for CaseA Tank26 Ra-228

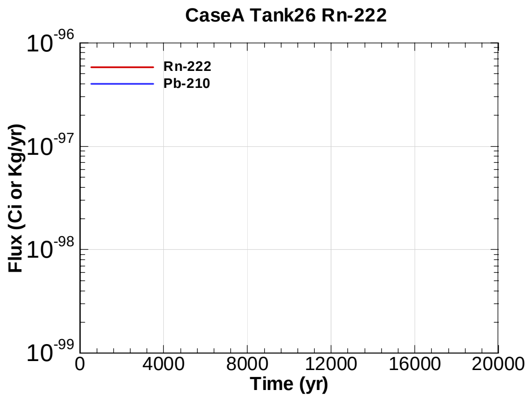

Figure A.2-1028 - Water Table Flux for CaseA Tank26 Rn-222

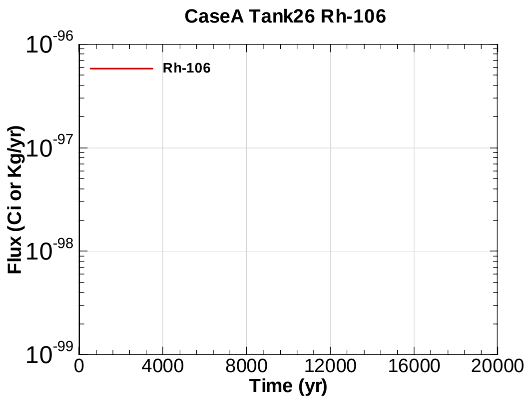

Figure A.2-1029 - Water Table Flux for CaseA Tank26 Rh-106

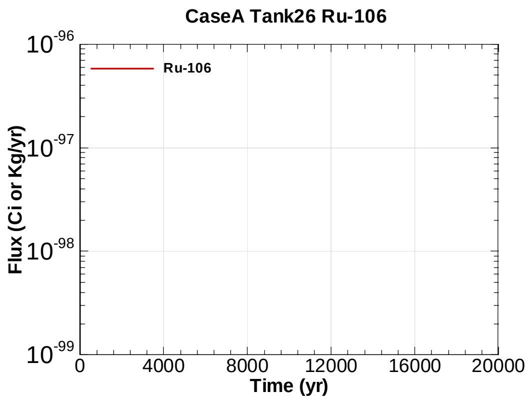

Figure A.2-1030 - Water Table Flux for CaseA Tank26 Ru-106

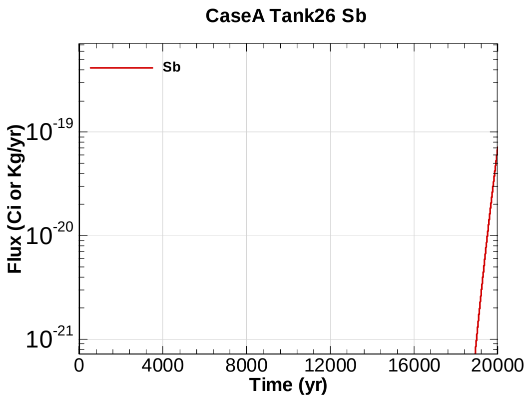

Figure A.2-1031 - Water Table Flux for CaseA Tank26 Sb

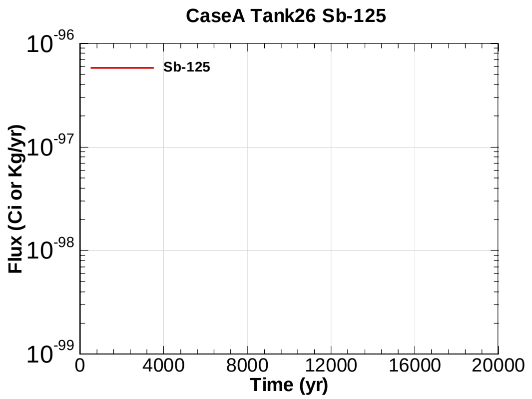

Figure A.2-1032 - Water Table Flux for CaseA Tank26 Sb-125

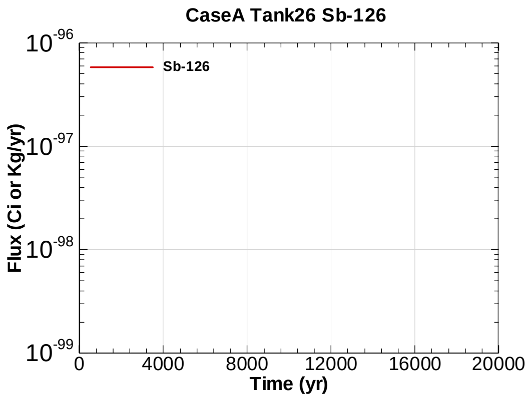

Figure A.2-1033 - Water Table Flux for CaseA Tank26 Sb-126

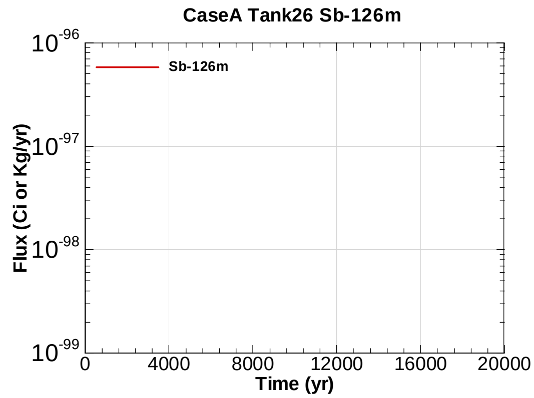

Figure A.2-1034 - Water Table Flux for CaseA Tank26 Sb-126m

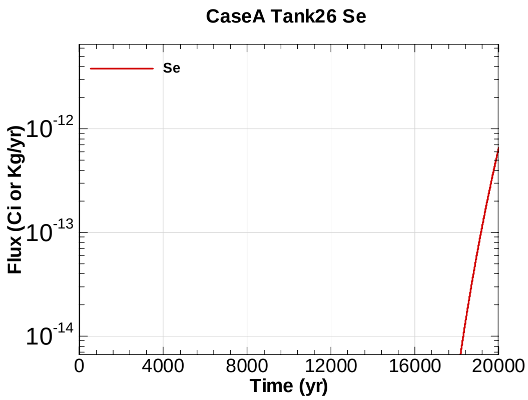

Figure A.2-1035 - Water Table Flux for CaseA Tank26 Se

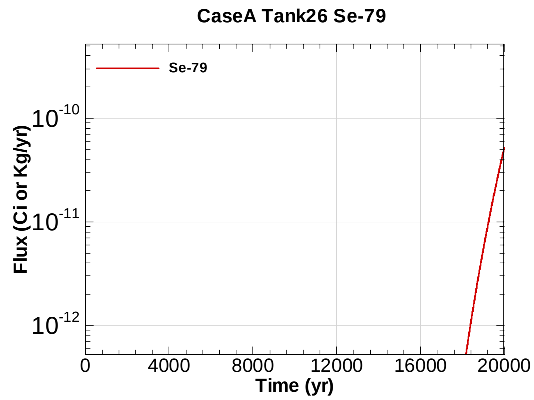

Figure A.2-1036 - Water Table Flux for CaseA Tank26 Se-79

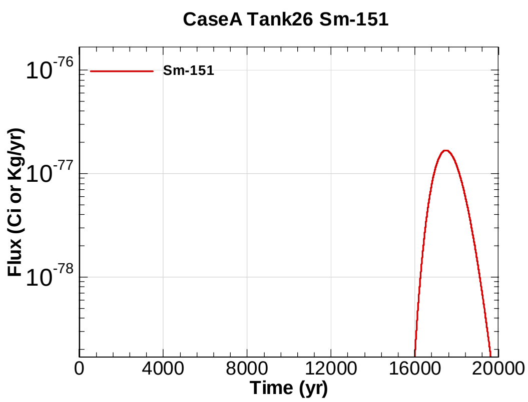

Figure A.2-1037 - Water Table Flux for CaseA Tank26 Sm-151

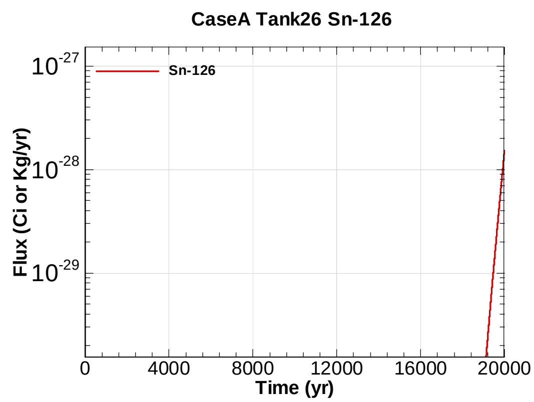

Figure A.2-1038 - Water Table Flux for CaseA Tank26 Sn-126

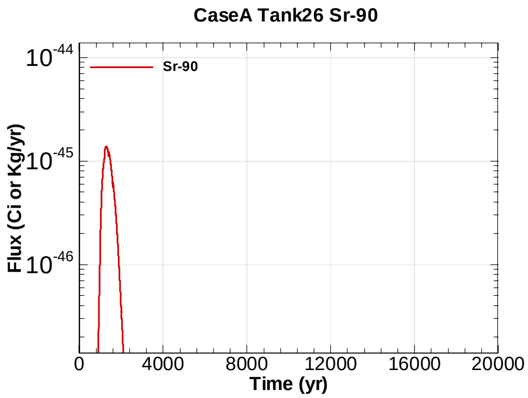

Figure A.2-1039 - Water Table Flux for CaseA Tank26 Sr-90

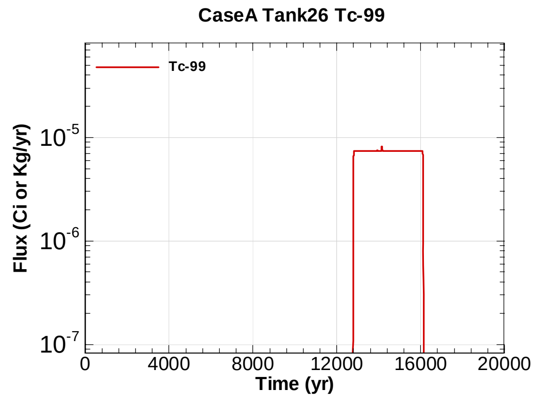

Figure A.2-1040 - Water Table Flux for CaseA Tank26 Tc-99

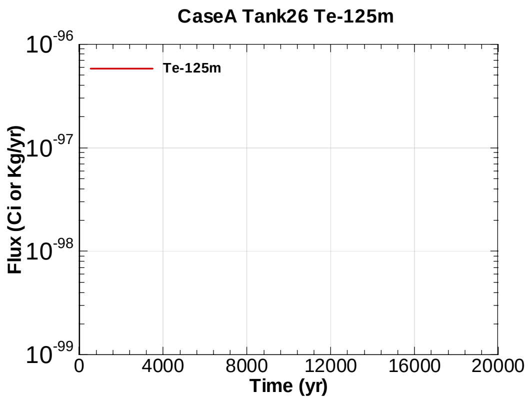

Figure A.2-1041 - Water Table Flux for CaseA Tank26 Te-125m

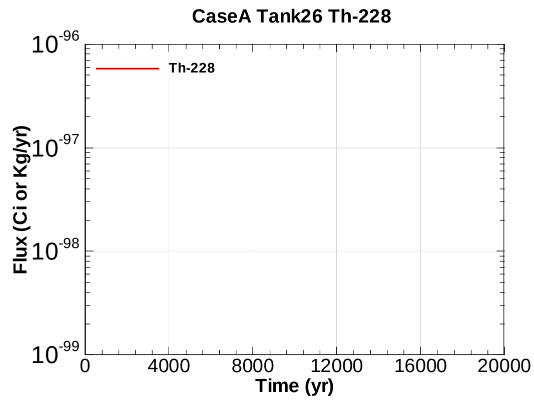

Figure A.2-1042 - Water Table Flux for CaseA Tank26 Th-228

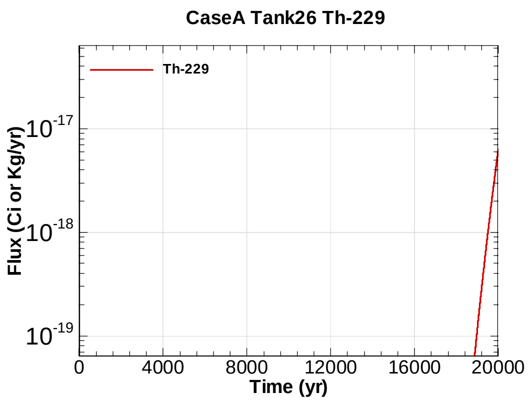

Figure A.2-1043 - Water Table Flux for CaseA Tank26 Th-229

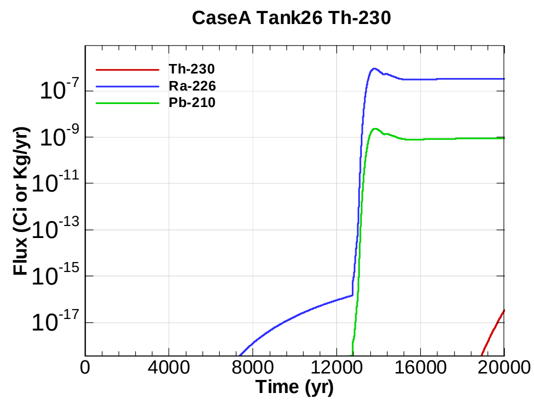

Figure A.2-1044 - Water Table Flux for CaseA Tank26 Th-230

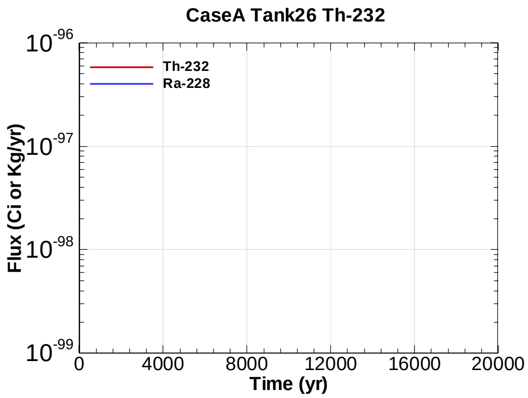

Figure A.2-1045 - Water Table Flux for CaseA Tank26 Th-232

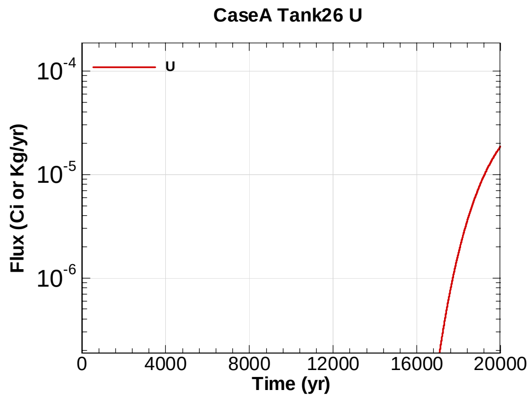

Figure A.2-1046 - Water Table Flux for CaseA Tank26 U

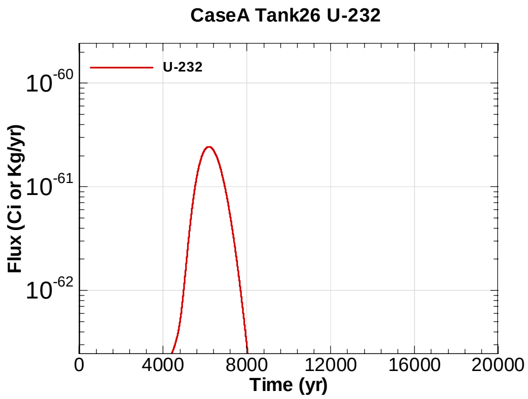

Figure A.2-1047 - Water Table Flux for CaseA Tank26 U-232

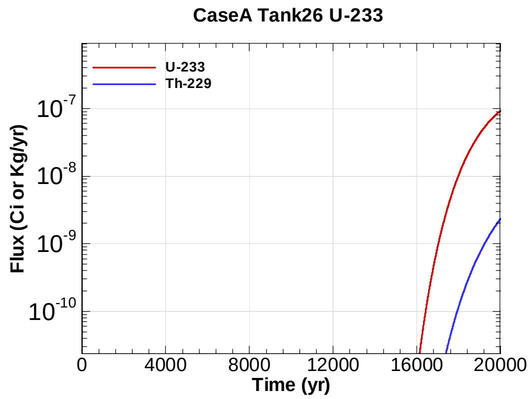

Figure A.2-1048 - Water Table Flux for CaseA Tank26 U-233

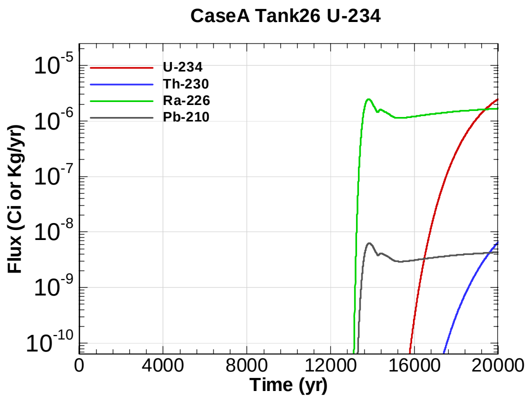

Figure A.2-1049 - Water Table Flux for CaseA Tank26 U-234

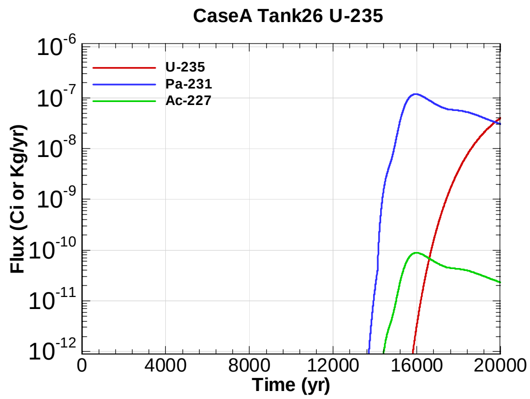

Figure A.2-1050 - Water Table Flux for CaseA Tank26 U-235

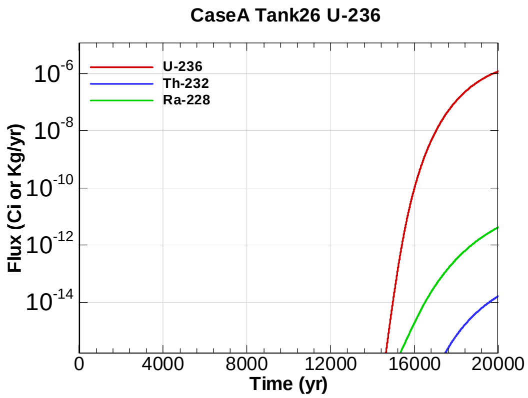

Figure A.2-1051 - Water Table Flux for CaseA Tank26 U-236

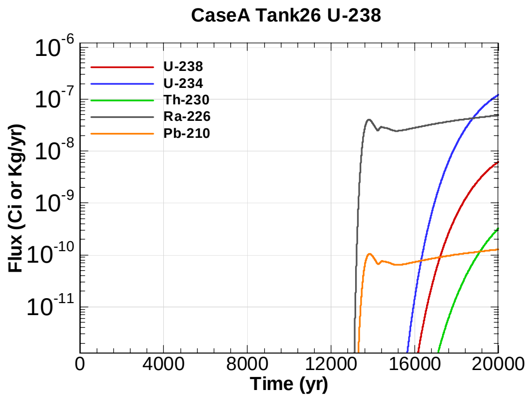

Figure A.2-1052 - Water Table Flux for CaseA Tank26 U-238

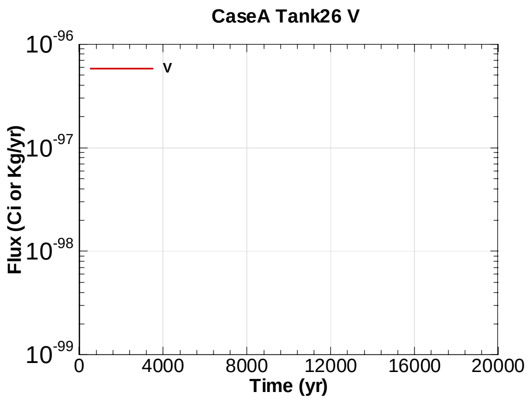

Figure A.2-1053 - Water Table Flux for CaseA Tank26 V

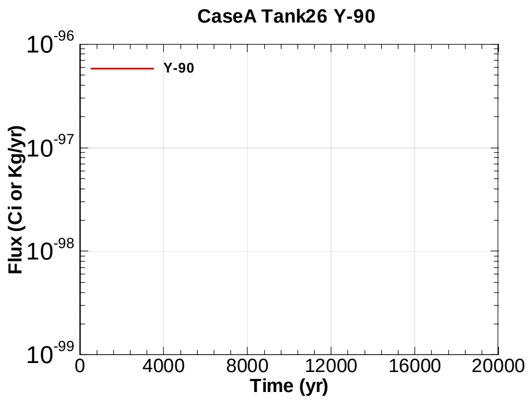

Figure A.2-1054 - Water Table Flux for CaseA Tank26 Y-90

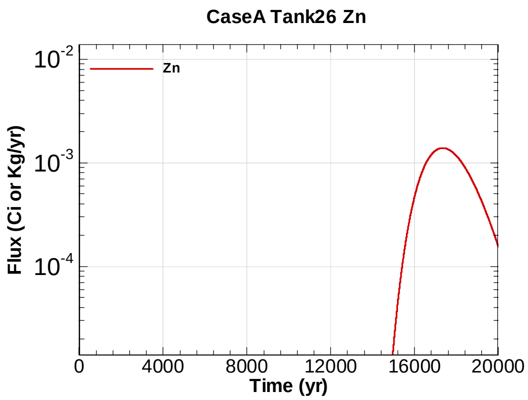

Figure A.2-1055 - Water Table Flux for CaseA Tank26 Zn

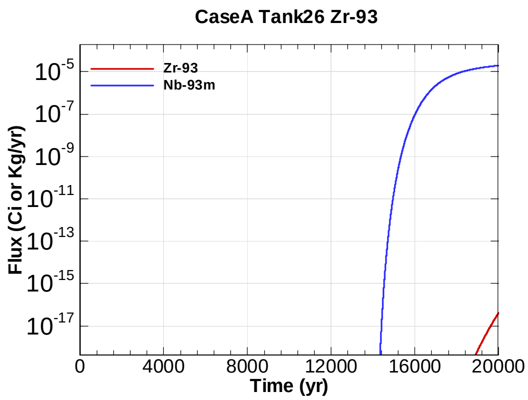

Figure A.2-1056 - Water Table Flux for CaseA Tank26 Zr-93

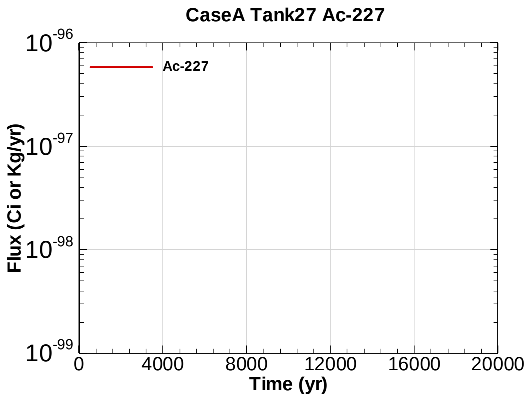

Figure A.2-1057 - Water Table Flux for CaseA Tank27 Ac-227

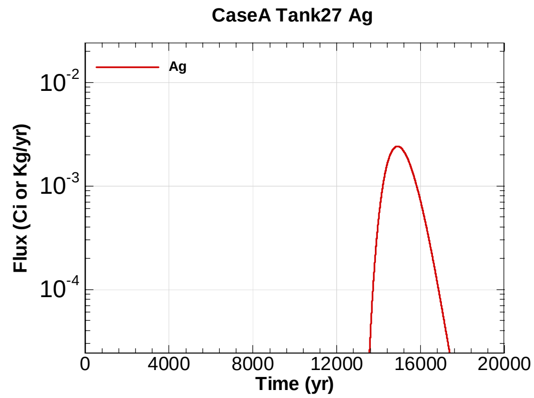

Figure A.2-1058 - Water Table Flux for CaseA Tank27 Ag

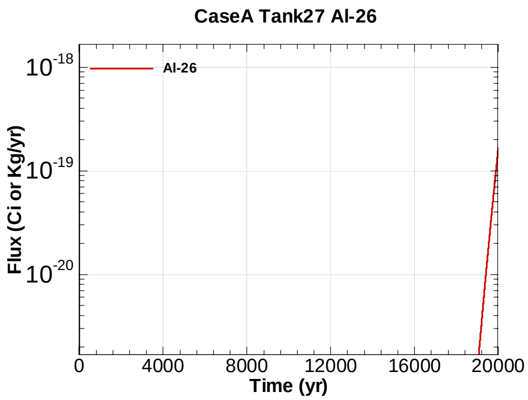

Figure A.2-1059 - Water Table Flux for CaseA Tank27 Al-26

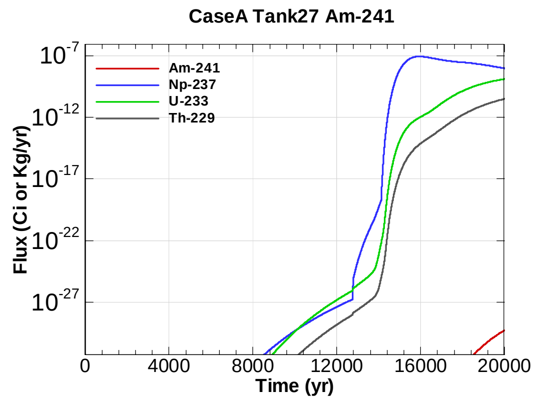

Figure A.2-1060 - Water Table Flux for CaseA Tank27 Am-241

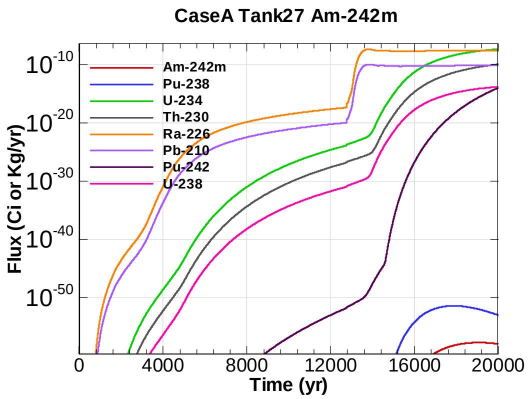

Figure A.2-1061 - Water Table Flux for CaseA Tank27 Am-242m

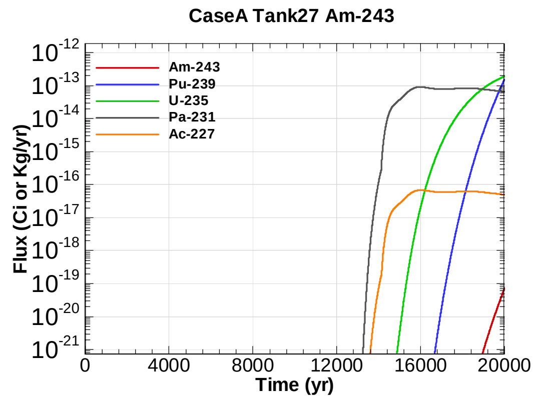

Figure A.2-1062 - Water Table Flux for CaseA Tank27 Am-243

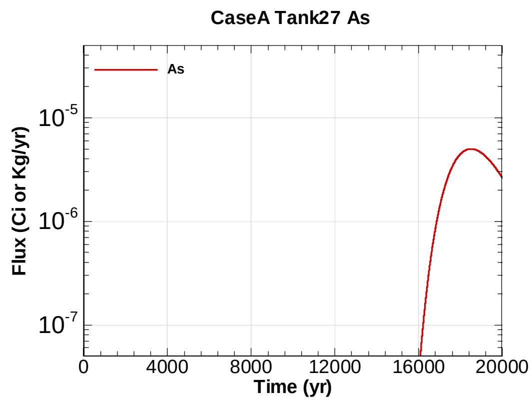

Figure A.2-1063 - Water Table Flux for CaseA Tank27 As

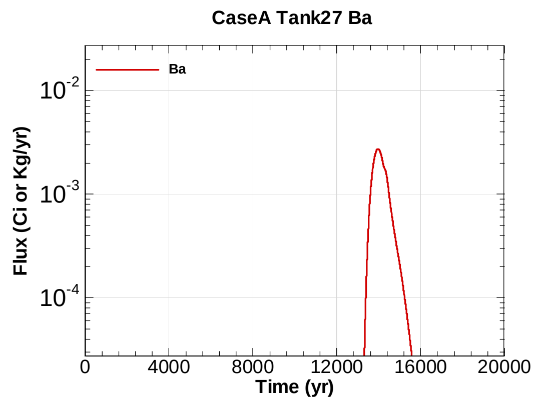

Figure A.2-1064 - Water Table Flux for CaseA Tank27 Ba

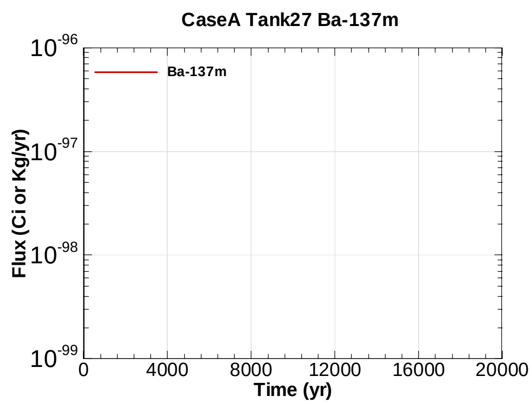

Figure A.2-1065 - Water Table Flux for CaseA Tank27 Ba-137m

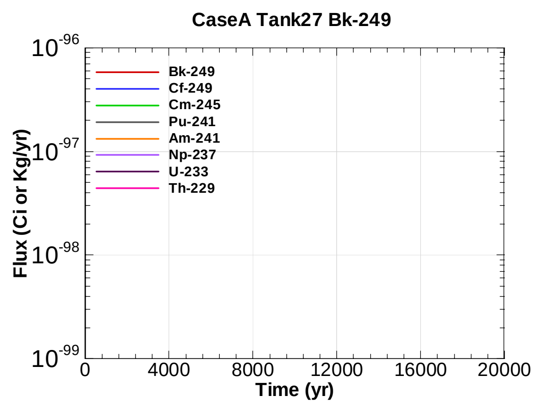

Figure A.2-1066 - Water Table Flux for CaseA Tank27 Bk-249

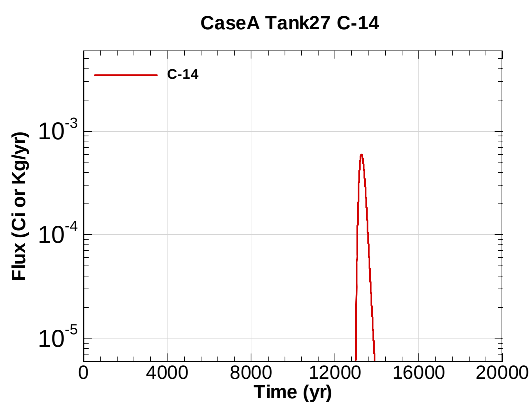

Figure A.2-1067 - Water Table Flux for CaseA Tank27 C-14

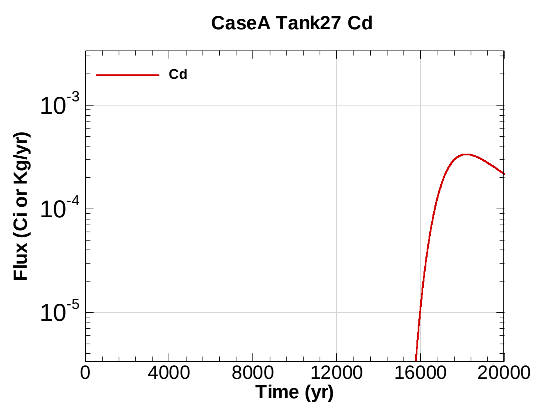

Figure A.2-1068 - Water Table Flux for CaseA Tank27 Cd

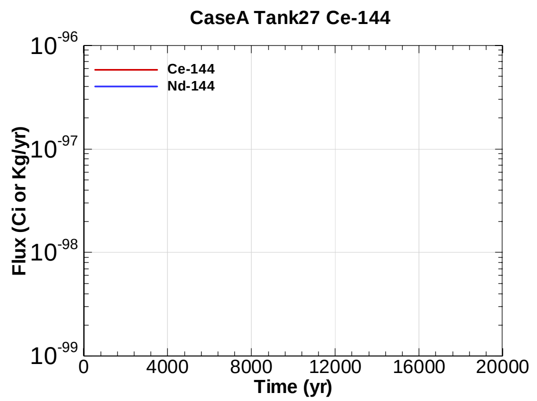

Figure A.2-1069 - Water Table Flux for CaseA Tank27 Ce-144

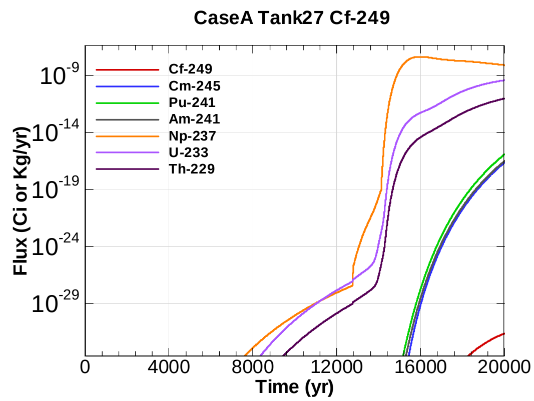

Figure A.2-1070 - Water Table Flux for CaseA Tank27 Cf-249

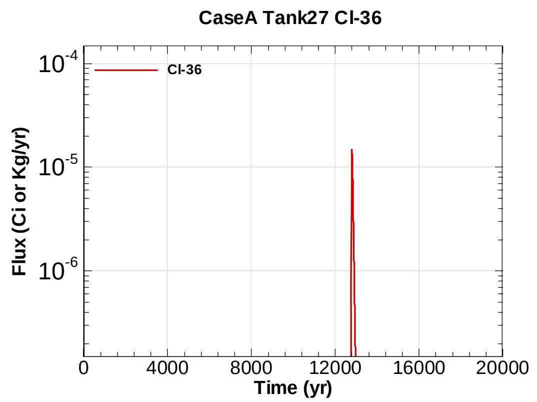

Figure A.2-1071 - Water Table Flux for CaseA Tank27 Cl-36

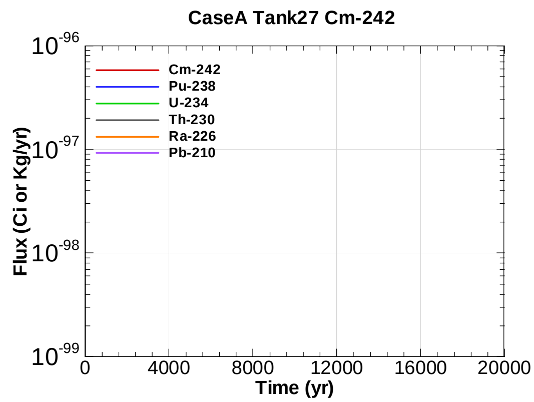

Figure A.2-1072 - Water Table Flux for CaseA Tank27 Cm-242

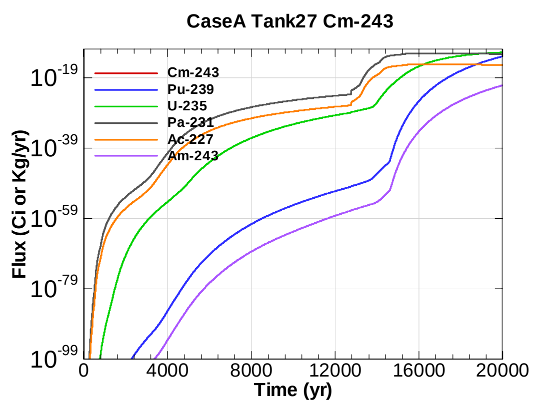

Figure A.2-1073 - Water Table Flux for CaseA Tank27 Cm-243

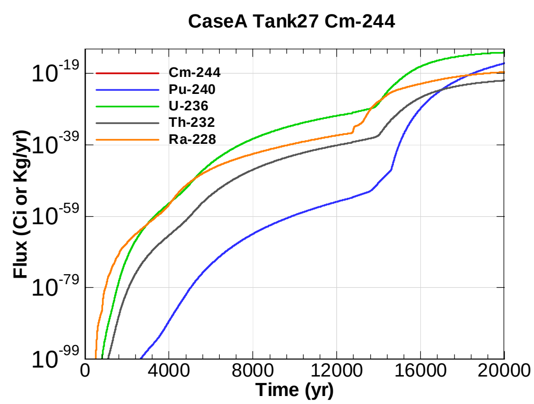

Figure A.2-1074 - Water Table Flux for CaseA Tank27 Cm-244

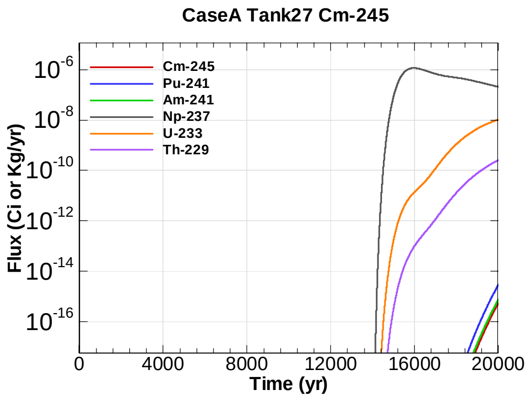

Figure A.2-1075 - Water Table Flux for CaseA Tank27 Cm-245

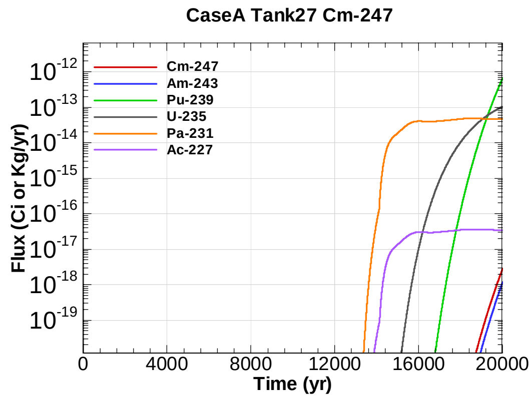

Figure A.2-1076 - Water Table Flux for CaseA Tank27 Cm-247

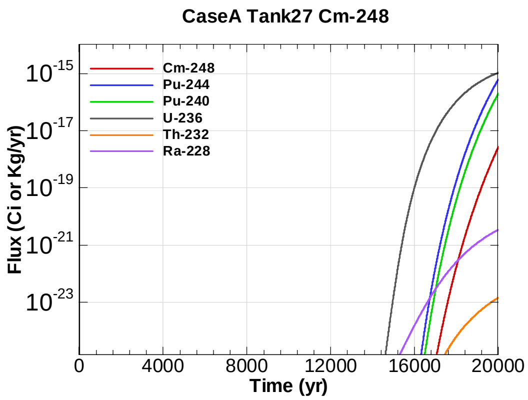

Figure A.2-1077 - Water Table Flux for CaseA Tank27 Cm-248

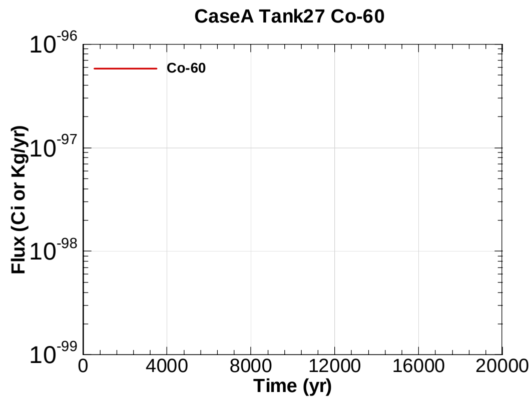

Figure A.2-1078 - Water Table Flux for CaseA Tank27 Co-60

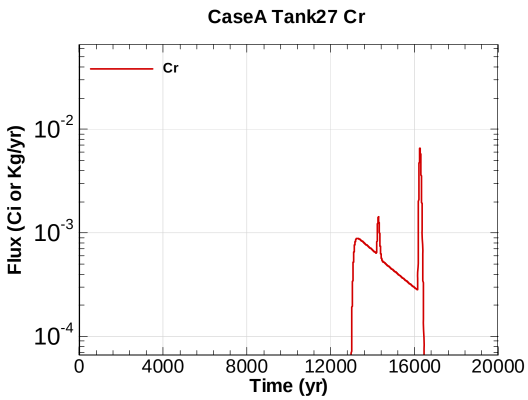

Figure A.2-1079 - Water Table Flux for CaseA Tank27 Cr

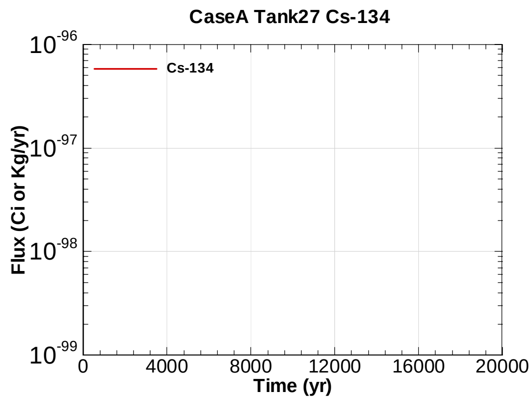

Figure A.2-1080 - Water Table Flux for CaseA Tank27 Cs-134

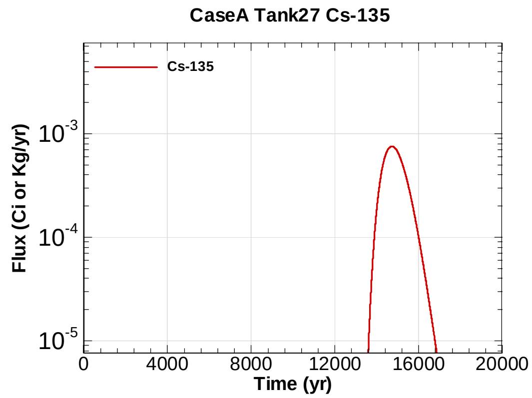

Figure A.2-1081 - Water Table Flux for CaseA Tank27 Cs-135

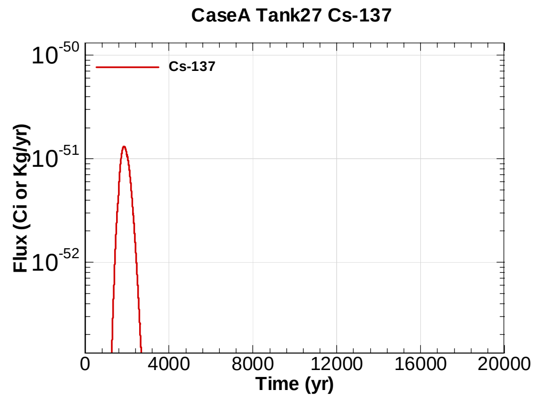

Figure A.2-1082 - Water Table Flux for CaseA Tank27 Cs-137

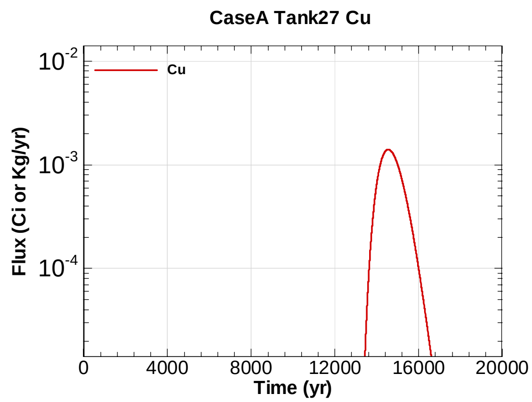

Figure A.2-1083 - Water Table Flux for CaseA Tank27 Cu

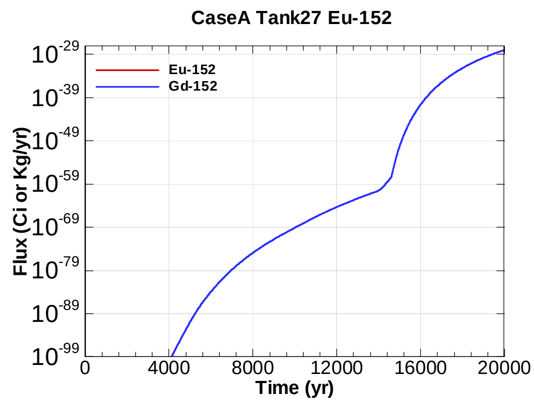

Figure A.2-1084 - Water Table Flux for CaseA Tank27 Eu-152

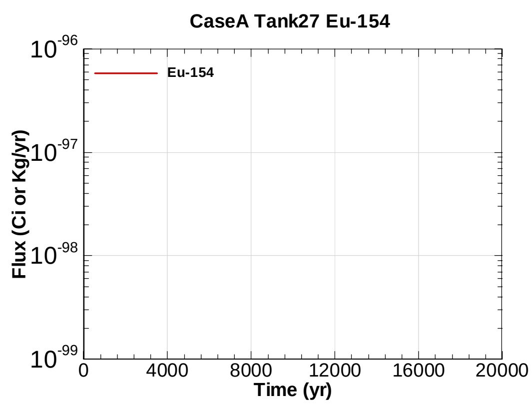

Figure A.2-1085 - Water Table Flux for CaseA Tank27 Eu-154

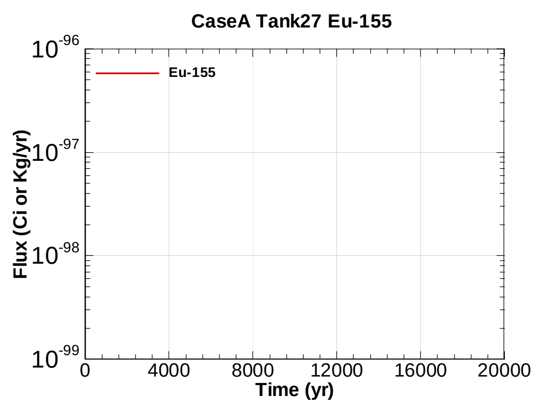

Figure A.2-1086 - Water Table Flux for CaseA Tank27 Eu-155

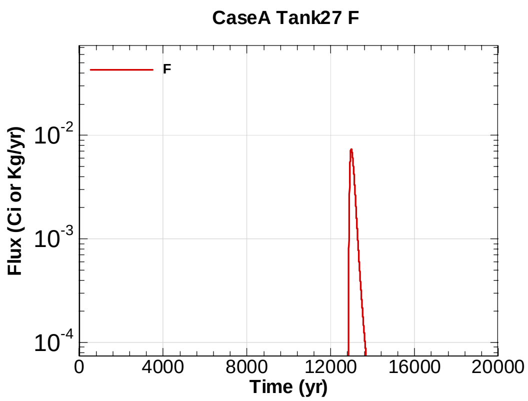

Figure A.2-1087 - Water Table Flux for CaseA Tank27 F

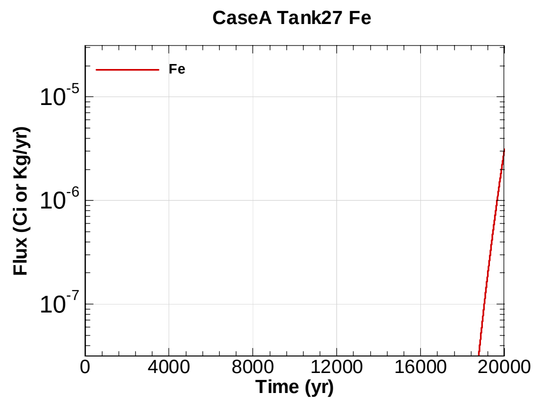

Figure A.2-1088 - Water Table Flux for CaseA Tank27 Fe

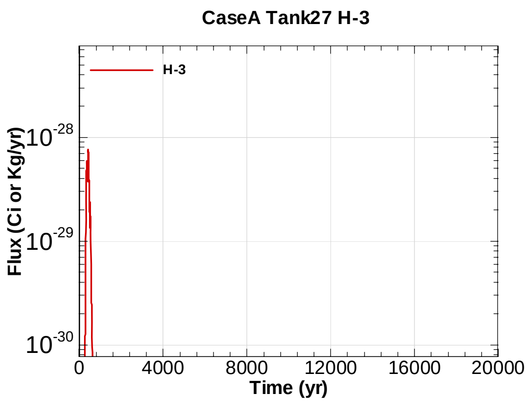

Figure A.2-1089 - Water Table Flux for CaseA Tank27 H-3

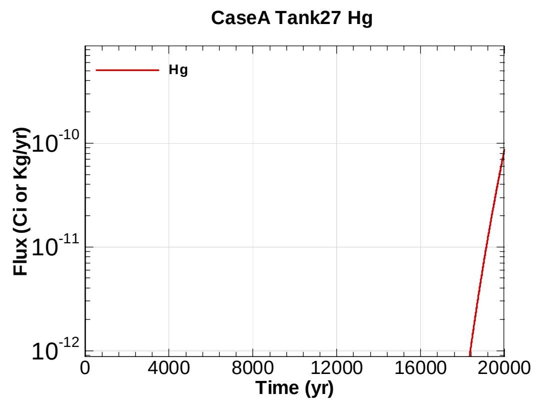

Figure A.2-1090 - Water Table Flux for CaseA Tank27 Hg

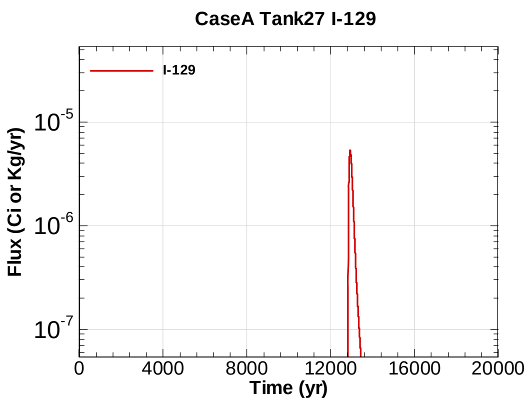

Figure A.2-1091 - Water Table Flux for CaseA Tank27 I-129

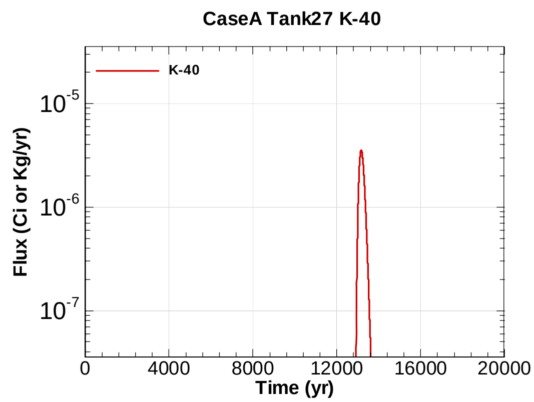

Figure A.2-1092 - Water Table Flux for CaseA Tank27 K-40

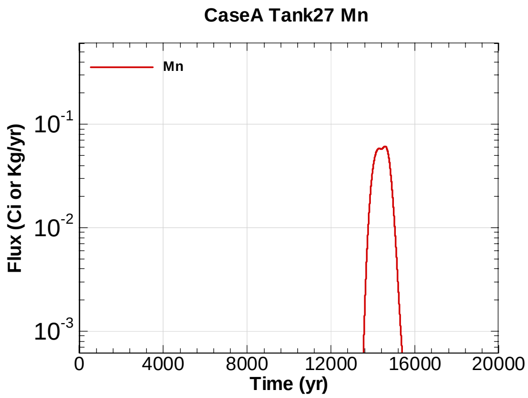

Figure A.2-1093 - Water Table Flux for CaseA Tank27 Mn

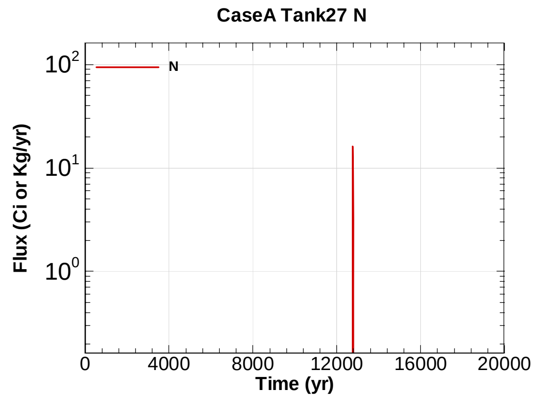

Figure A.2-1094 - Water Table Flux for CaseA Tank27 N

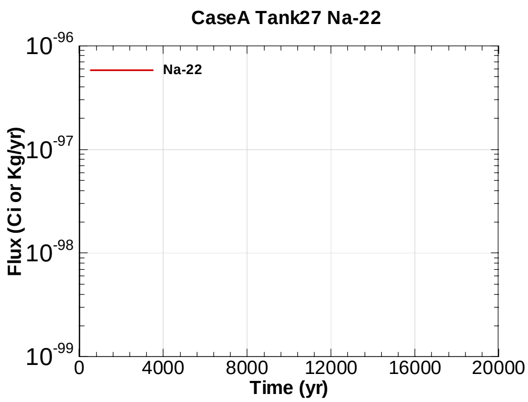

Figure A.2-1095 - Water Table Flux for CaseA Tank27 Na-22

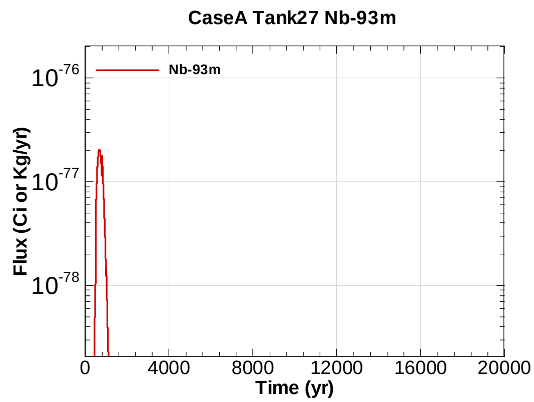

Figure A.2-1096 - Water Table Flux for CaseA Tank27 Nb-93m

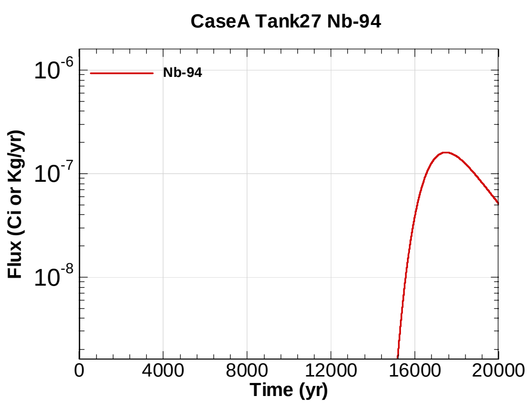

Figure A.2-1097 - Water Table Flux for CaseA Tank27 Nb-94

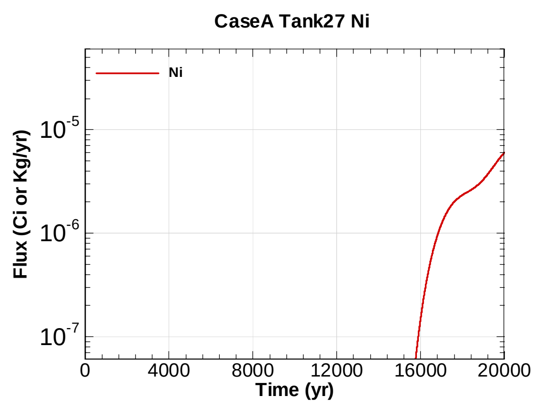

Figure A.2-1098 - Water Table Flux for CaseA Tank27 Ni

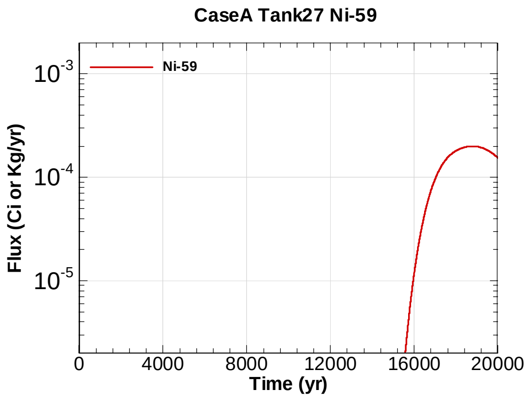

Figure A.2-1099 - Water Table Flux for CaseA Tank27 Ni-59

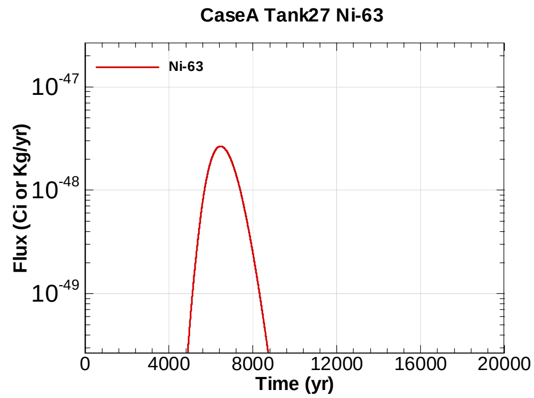

Figure A.2-1100 - Water Table Flux for CaseA Tank27 Ni-63

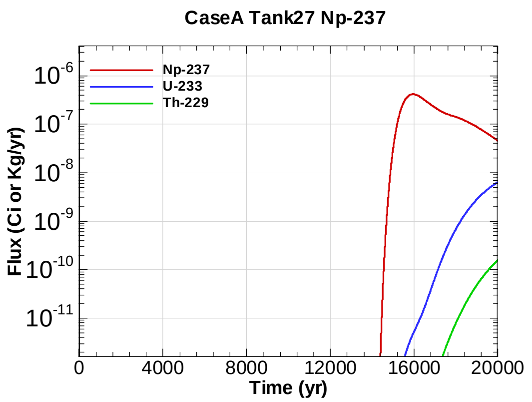

Figure A.2-1101 - Water Table Flux for CaseA Tank27 Np-237

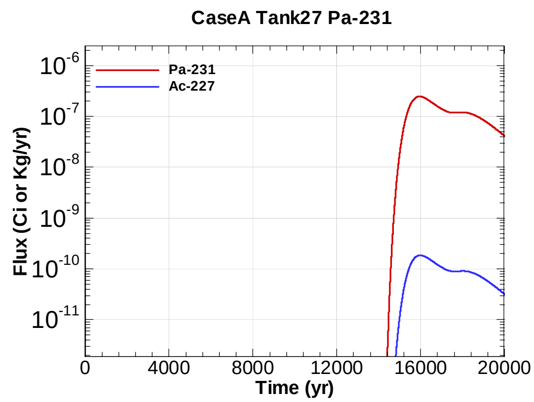

Figure A.2-1102 - Water Table Flux for CaseA Tank27 Pa-231

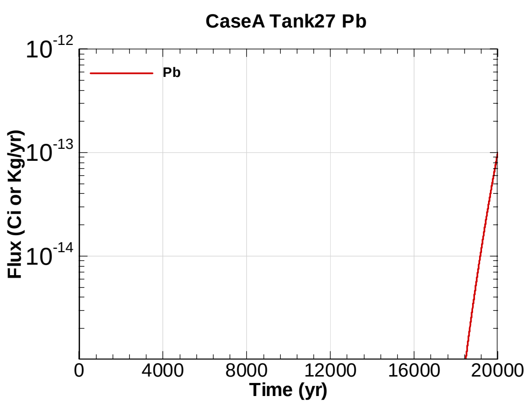

Figure A.2-1103 - Water Table Flux for CaseA Tank27 Pb

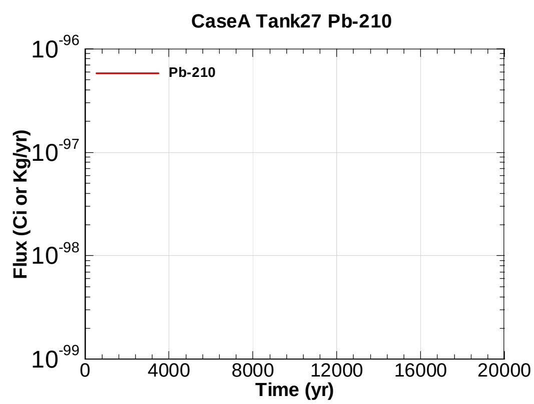

Figure A.2-1104 - Water Table Flux for CaseA Tank27 Pb-210

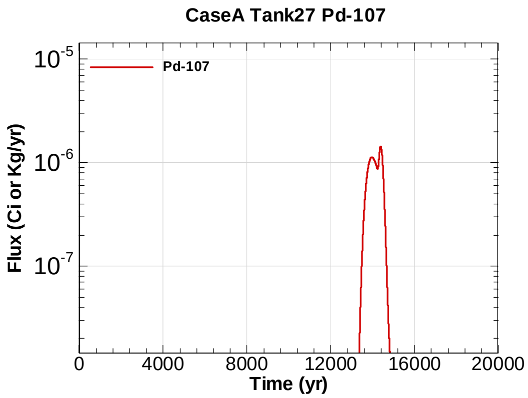

Figure A.2-1105 - Water Table Flux for CaseA Tank27 Pd-107

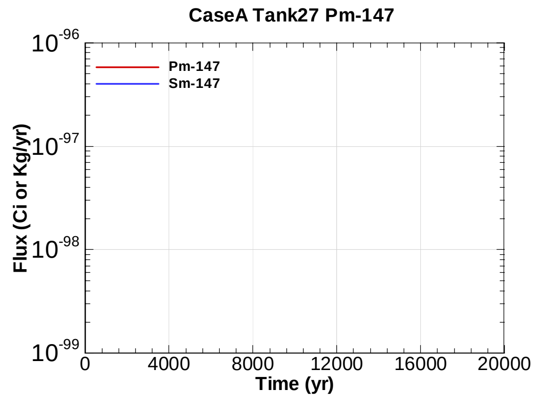

Figure A.2-1106 - Water Table Flux for CaseA Tank27 Pm-147

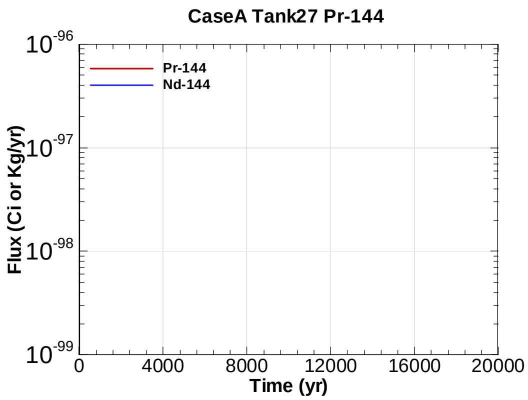

Figure A.2-1107 - Water Table Flux for CaseA Tank27 Pr-144

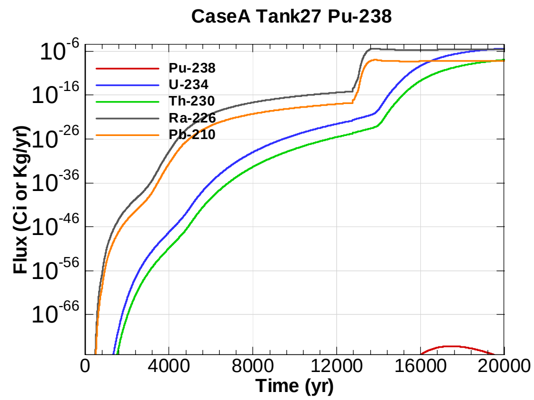

Figure A.2-1108 - Water Table Flux for CaseA Tank27 Pu-238

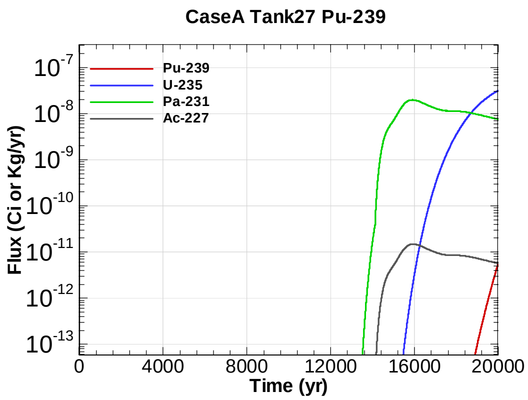

Figure A.2-1109 - Water Table Flux for CaseA Tank27 Pu-239

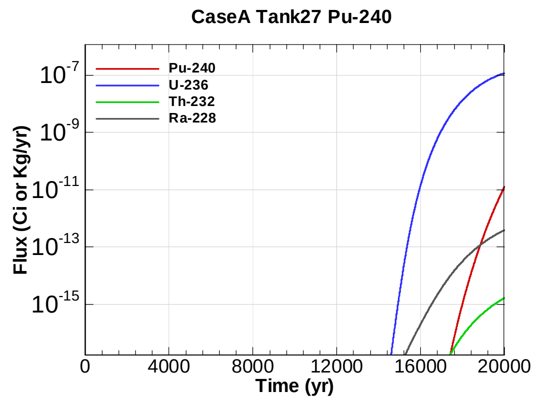

Figure A.2-1110 - Water Table Flux for CaseA Tank27 Pu-240

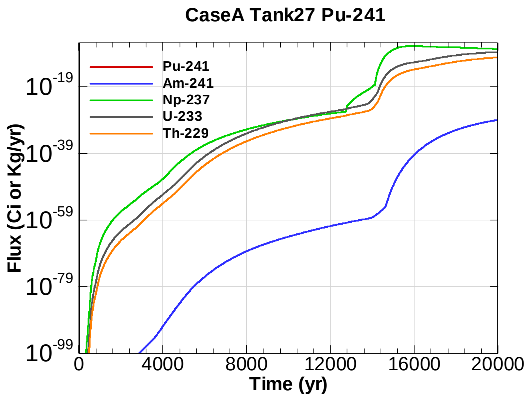

Figure A.2-1111 - Water Table Flux for CaseA Tank27 Pu-241

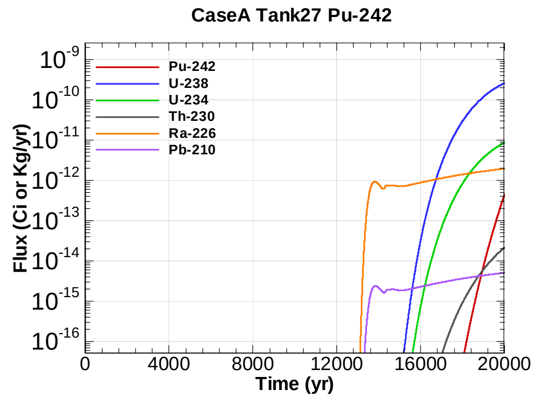

Figure A.2-1112 - Water Table Flux for CaseA Tank27 Pu-242

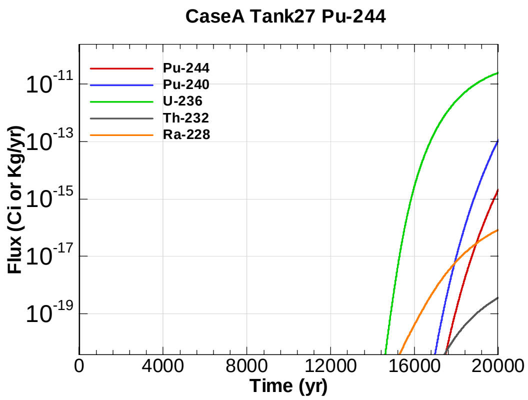

Figure A.2-1113 - Water Table Flux for CaseA Tank27 Pu-244

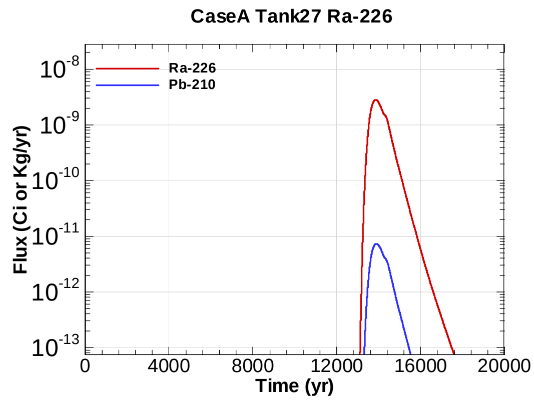

Figure A.2-1114 - Water Table Flux for CaseA Tank27 Ra-226

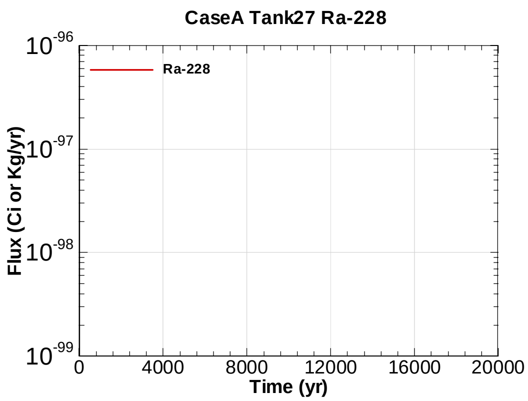

Figure A.2-1115 - Water Table Flux for CaseA Tank27 Ra-228

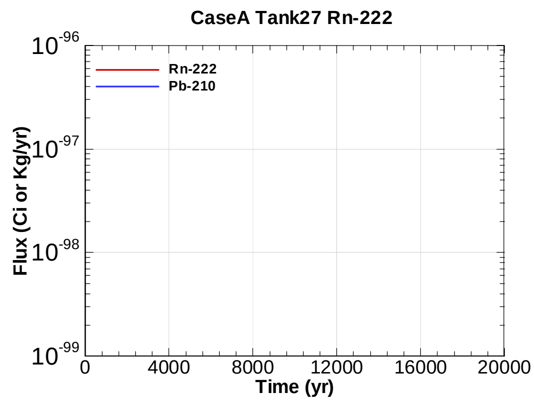

Figure A.2-1116 - Water Table Flux for CaseA Tank27 Rn-222

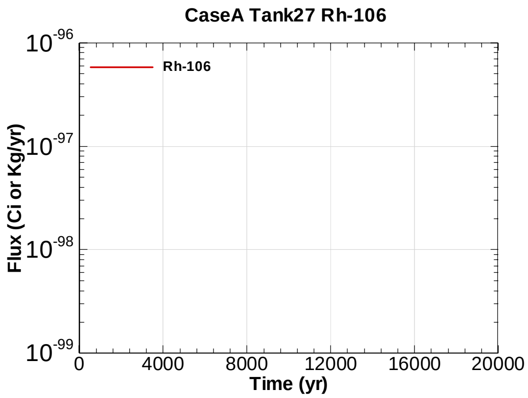

Figure A.2-1117 - Water Table Flux for CaseA Tank27 Rh-106

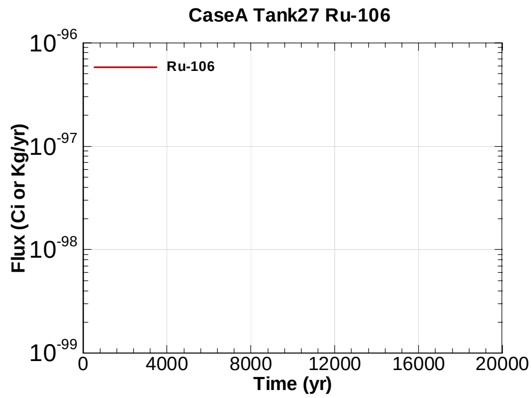

Figure A.2-1118 - Water Table Flux for CaseA Tank27 Ru-106

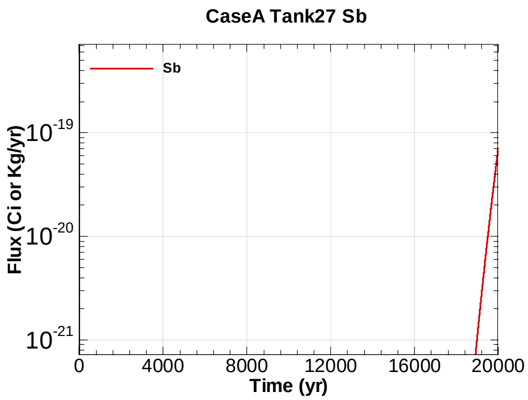

Figure A.2-1119 - Water Table Flux for CaseA Tank27 Sb

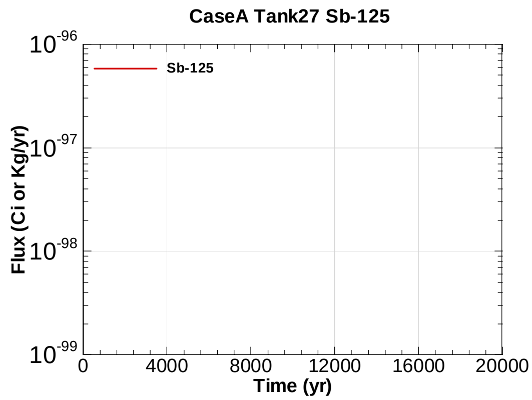

Figure A.2-1120 - Water Table Flux for CaseA Tank27 Sb-125

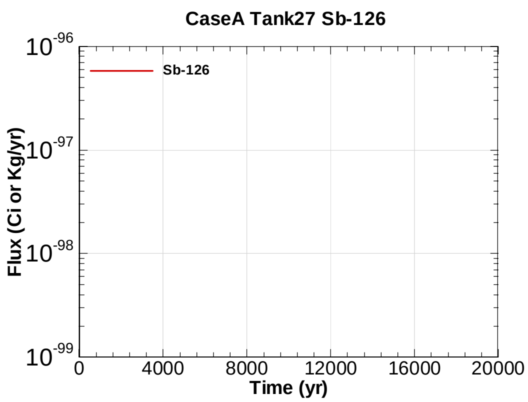

Figure A.2-1121 - Water Table Flux for CaseA Tank27 Sb-126

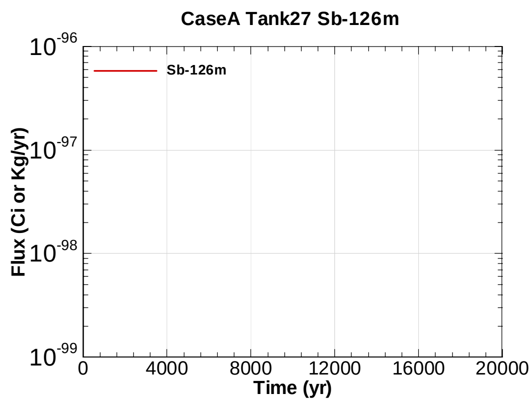

Figure A.2-1122 - Water Table Flux for CaseA Tank27 Sb-126m

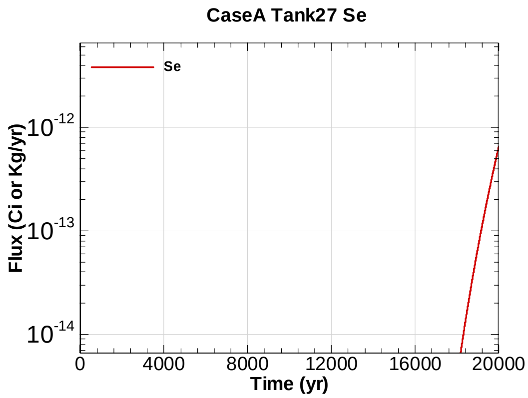

Figure A.2-1123 - Water Table Flux for CaseA Tank27 Se

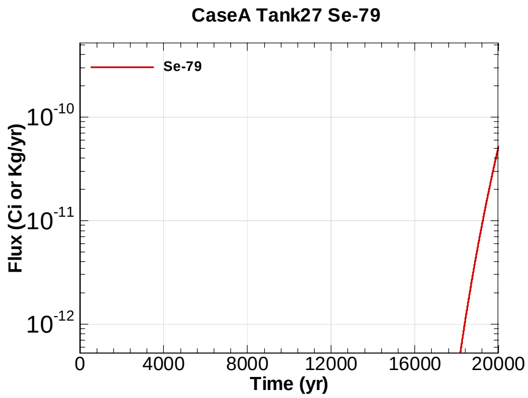

Figure A.2-1124 - Water Table Flux for CaseA Tank27 Se-79

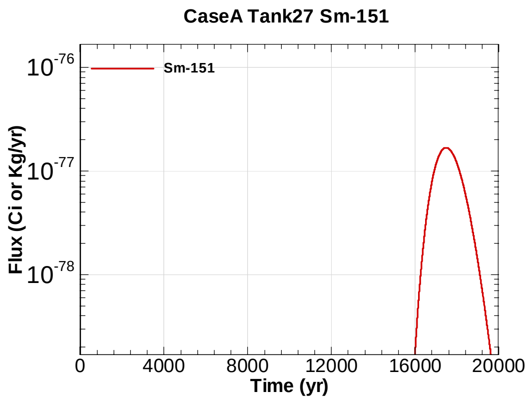

Figure A.2-1125 - Water Table Flux for CaseA Tank27 Sm-151

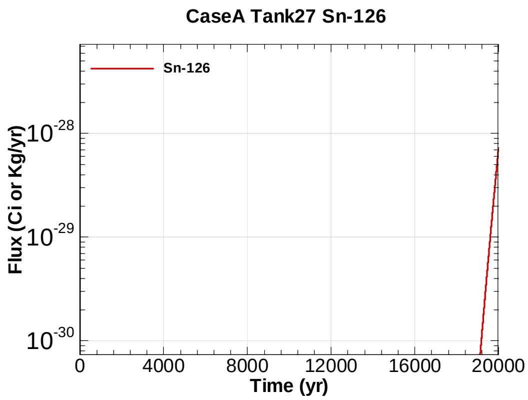

Figure A.2-1126 - Water Table Flux for CaseA Tank27 Sn-126

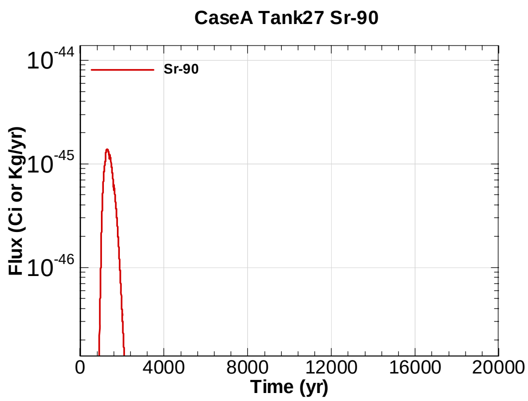

Figure A.2-1127 - Water Table Flux for CaseA Tank27 Sr-90

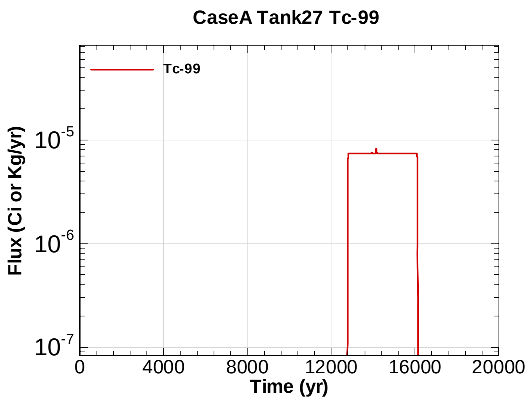

Figure A.2-1128 - Water Table Flux for CaseA Tank27 Tc-99

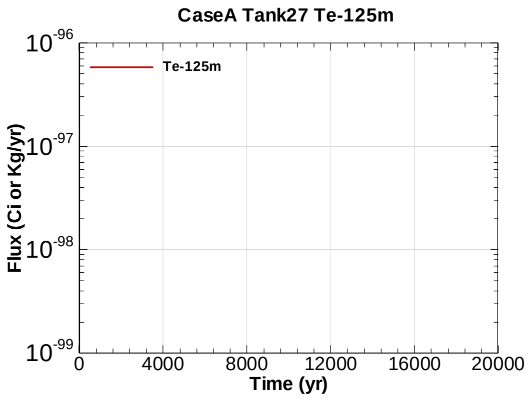

Figure A.2-1129 - Water Table Flux for CaseA Tank27 Te-125m

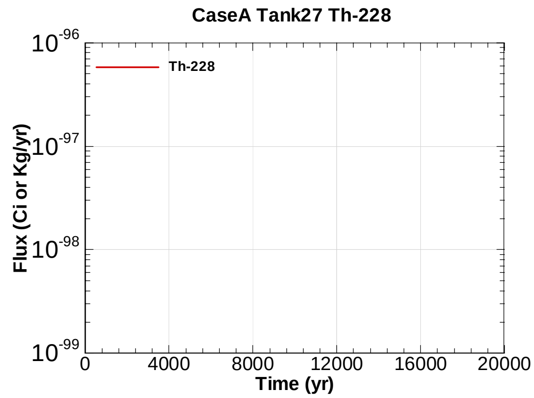

Figure A.2-1130 - Water Table Flux for CaseA Tank27 Th-228

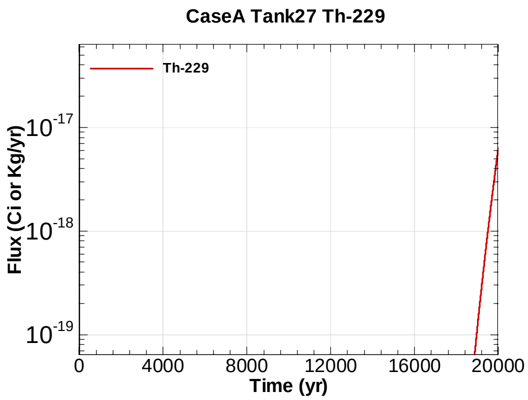

Figure A.2-1131 - Water Table Flux for CaseA Tank27 Th-229

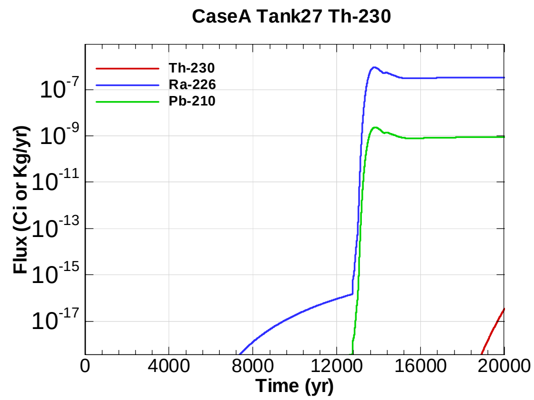

Figure A.2-1132 - Water Table Flux for CaseA Tank27 Th-230

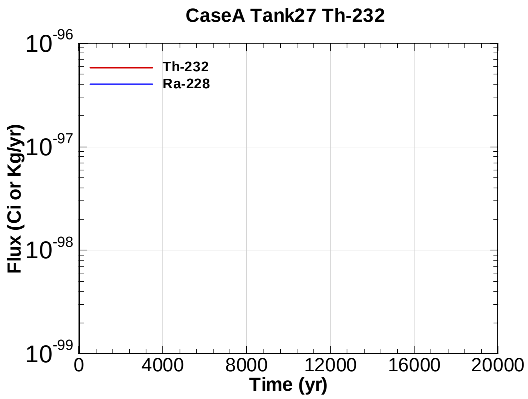

Figure A.2-1133 - Water Table Flux for CaseA Tank27 Th-232

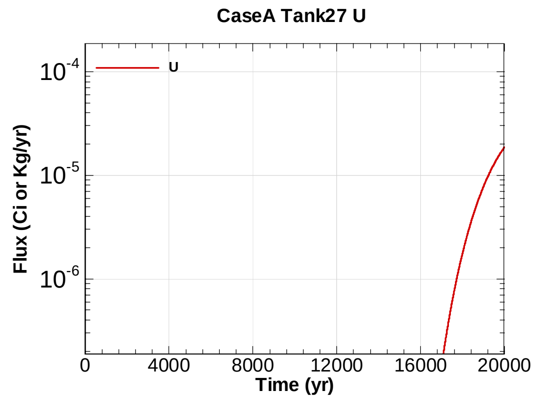

Figure A.2-1134 - Water Table Flux for CaseA Tank27 U

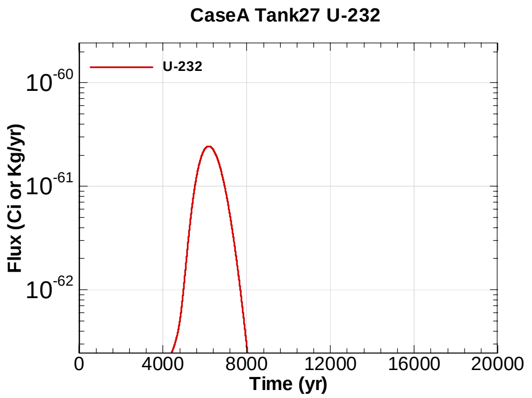

Figure A.2-1135 - Water Table Flux for CaseA Tank27 U-232

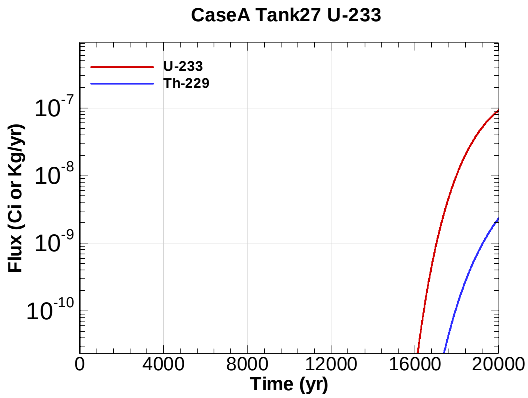

Figure A.2-1136 - Water Table Flux for CaseA Tank27 U-233

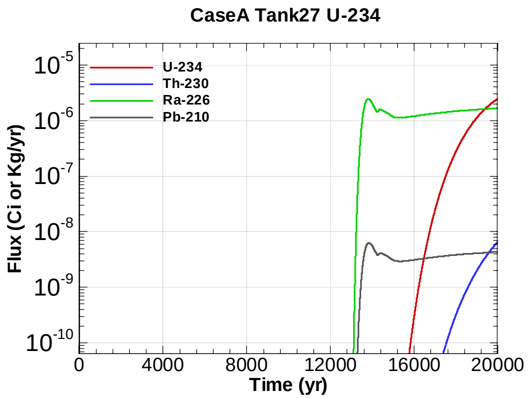

Figure A.2-1137 - Water Table Flux for CaseA Tank27 U-234

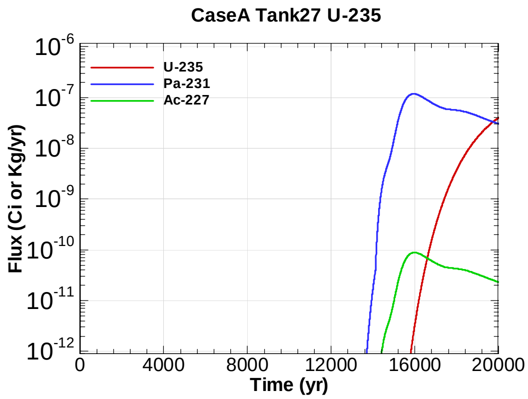

Figure A.2-1138 - Water Table Flux for CaseA Tank27 U-235

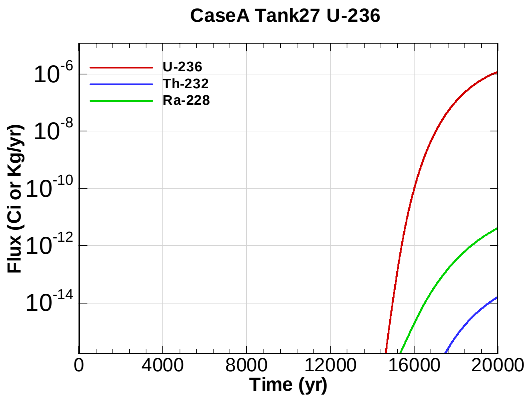

Figure A.2-1139 - Water Table Flux for CaseA Tank27 U-236

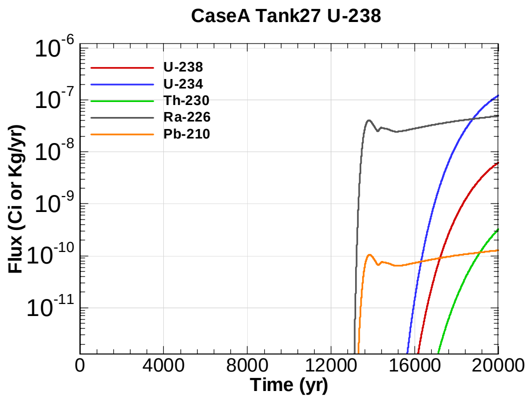

Figure A.2-1140 - Water Table Flux for CaseA Tank27 U-238

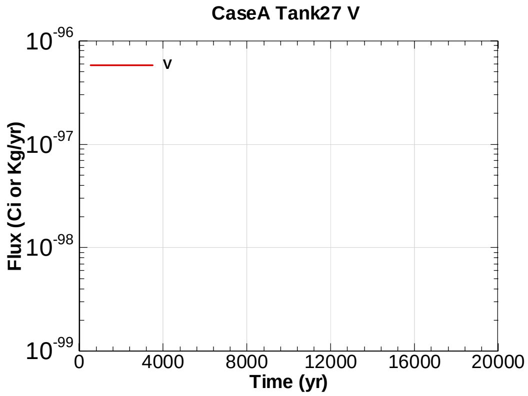

Figure A.2-1141 - Water Table Flux for CaseA Tank27 V

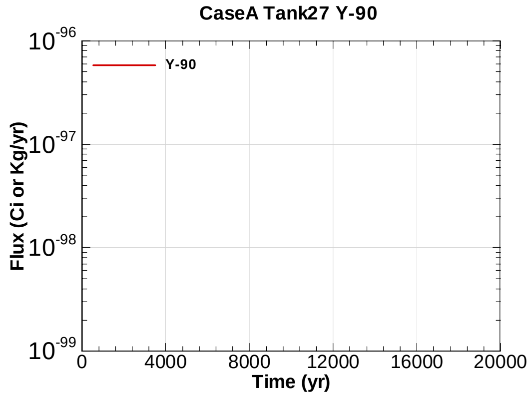

Figure A.2-1142 - Water Table Flux for CaseA Tank27 Y-90

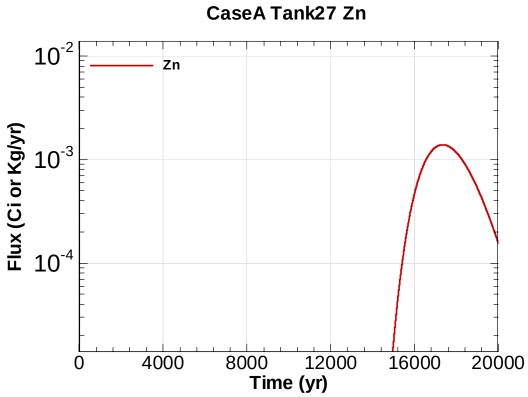

Figure A.2-1143 - Water Table Flux for CaseA Tank27 Zn

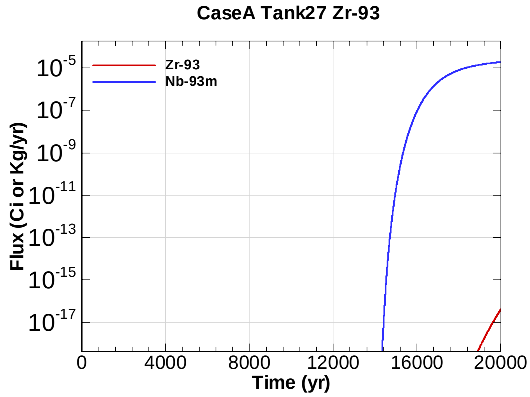

Figure A.2-1144 - Water Table Flux for CaseA Tank27 Zr-93

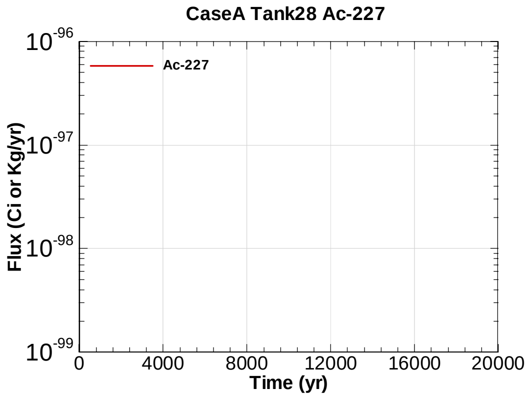

Figure A.2-1145 - Water Table Flux for CaseA Tank28 Ac-227

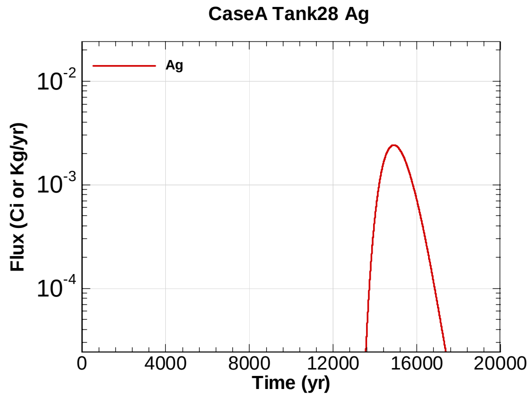

Figure A.2-1146 - Water Table Flux for CaseA Tank28 Ag

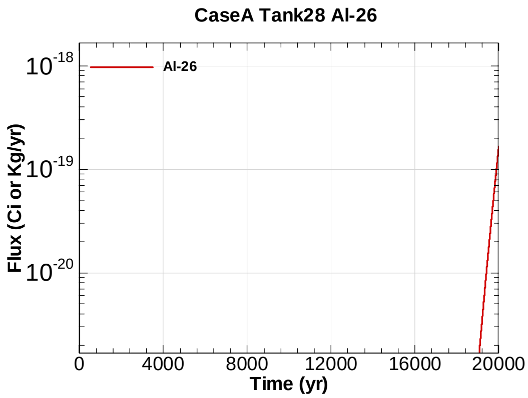

Figure A.2-1147 - Water Table Flux for CaseA Tank28 Al-26

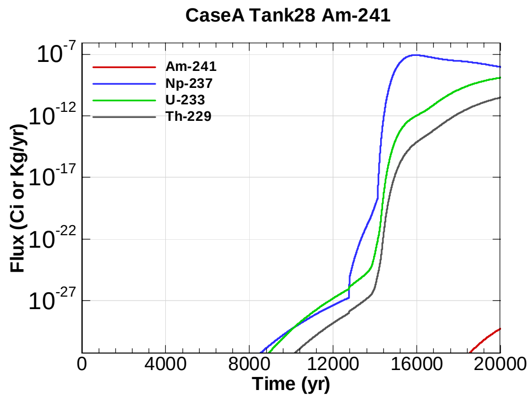

Figure A.2-1148 - Water Table Flux for CaseA Tank28 Am-241

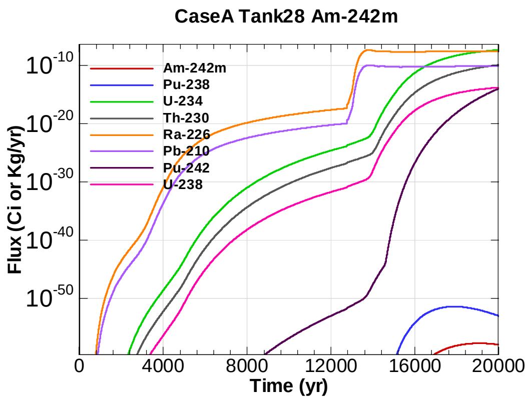

Figure A.2-1149 - Water Table Flux for CaseA Tank28 Am-242m

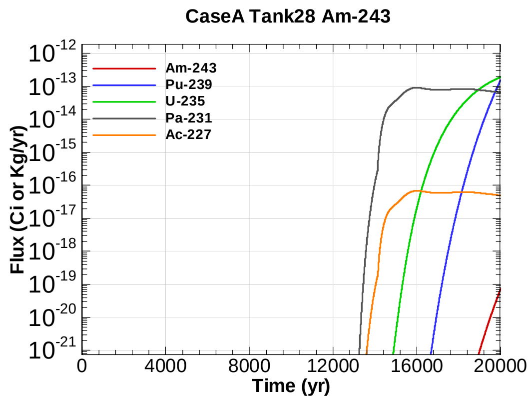

Figure A.2-1150 - Water Table Flux for CaseA Tank28 Am-243

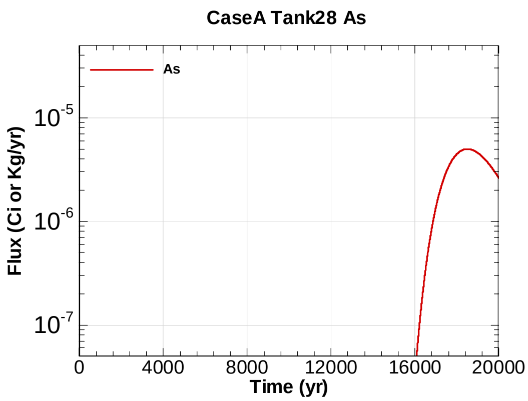

Figure A.2-1151 - Water Table Flux for CaseA Tank28 As

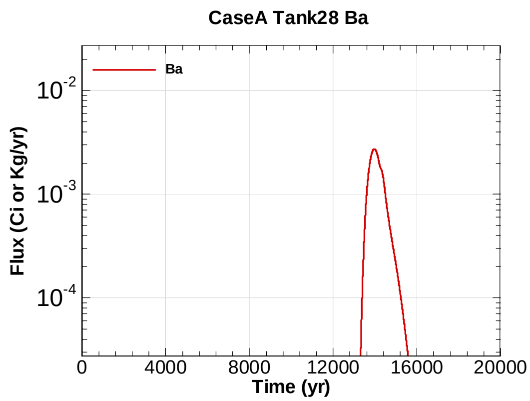

Figure A.2-1152 - Water Table Flux for CaseA Tank28 Ba

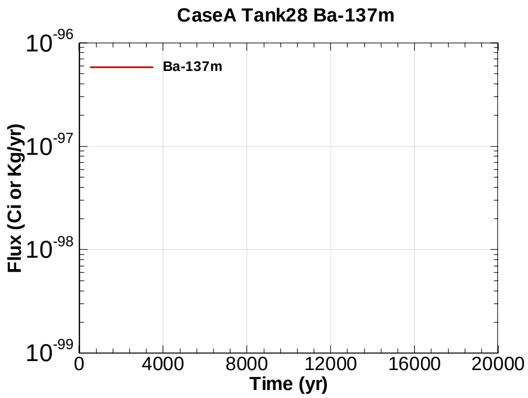

Figure A.2-1153 - Water Table Flux for CaseA Tank28 Ba-137m

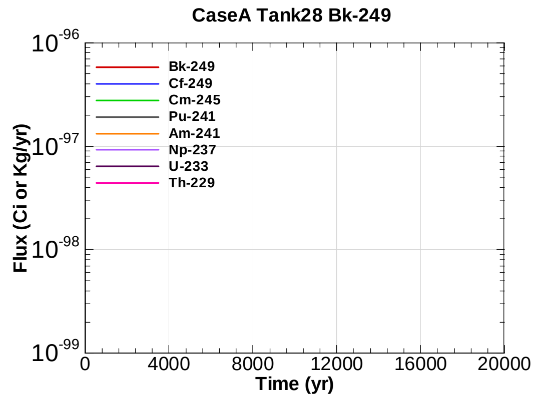

Figure A.2-1154 - Water Table Flux for CaseA Tank28 Bk-249

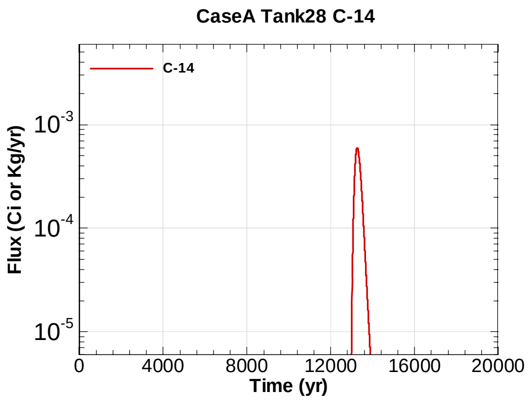

Figure A.2-1155 - Water Table Flux for CaseA Tank28 C-14

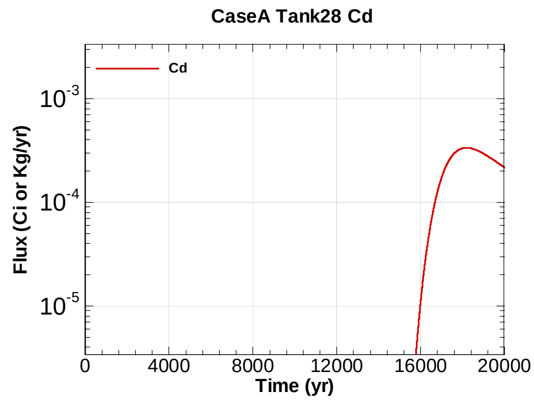

Figure A.2-1156 - Water Table Flux for CaseA Tank28 Cd

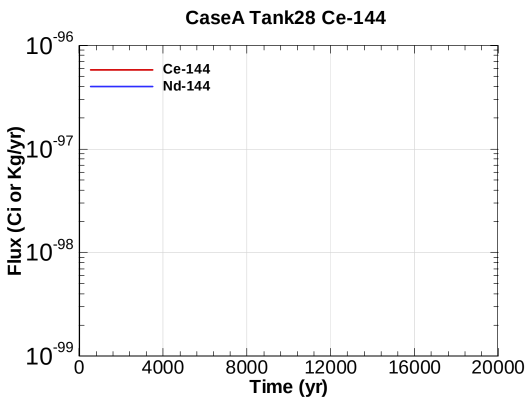

Figure A.2-1157 - Water Table Flux for CaseA Tank28 Ce-144

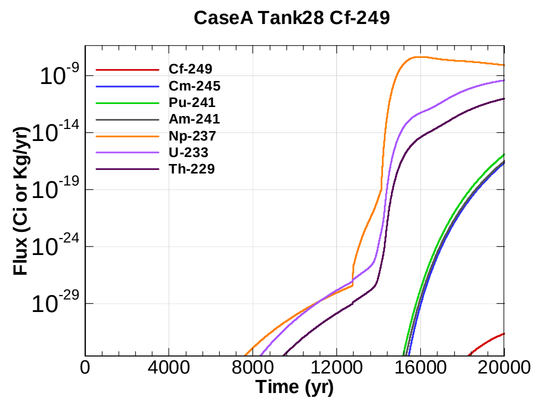

Figure A.2-1158 - Water Table Flux for CaseA Tank28 Cf-249

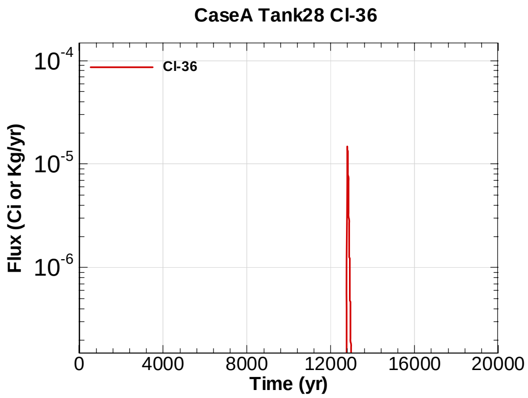

Figure A.2-1159 - Water Table Flux for CaseA Tank28 Cl-36

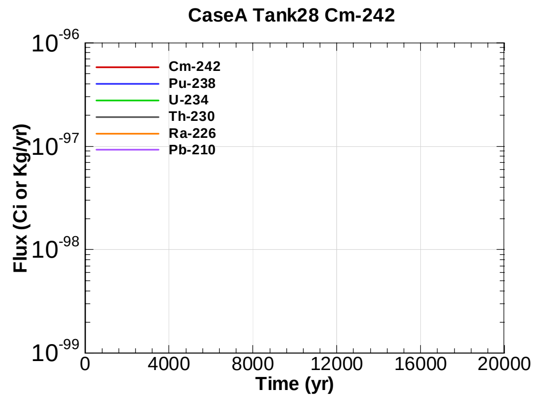

Figure A.2-1160 - Water Table Flux for CaseA Tank28 Cm-242

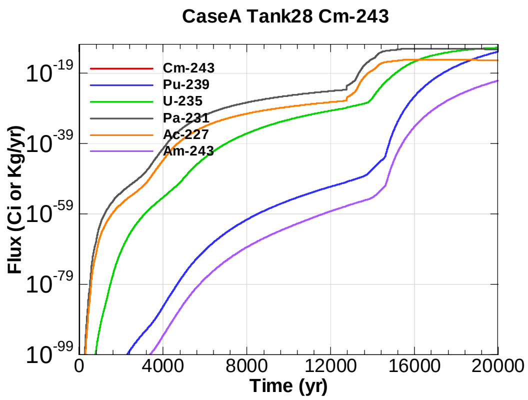

Figure A.2-1161 - Water Table Flux for CaseA Tank28 Cm-243

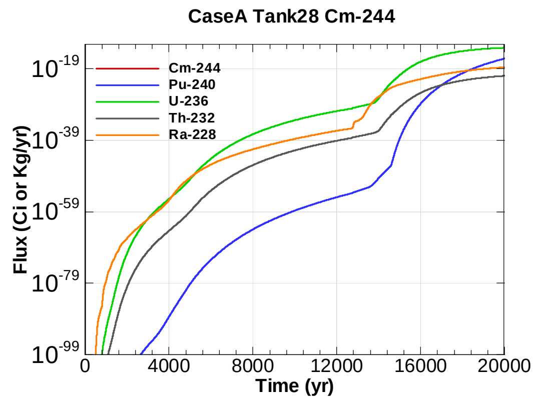

Figure A.2-1162 - Water Table Flux for CaseA Tank28 Cm-244

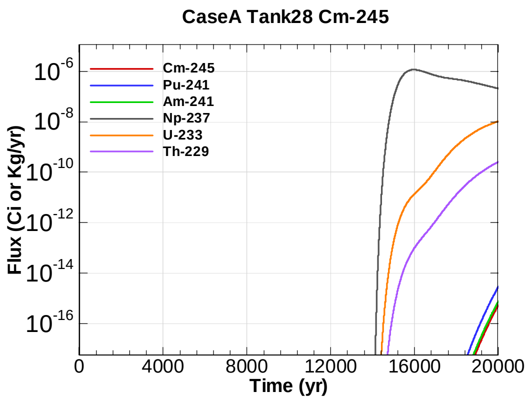

Figure A.2-1163 - Water Table Flux for CaseA Tank28 Cm-245

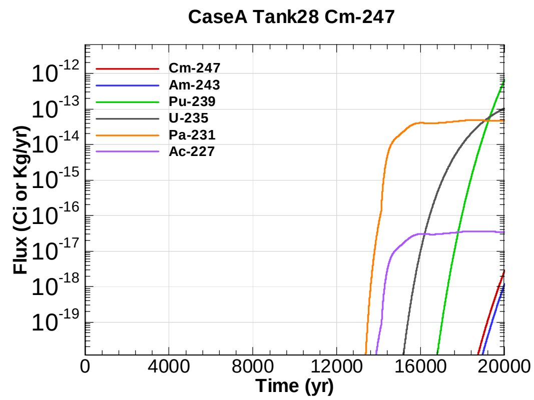

Figure A.2-1164 - Water Table Flux for CaseA Tank28 Cm-247

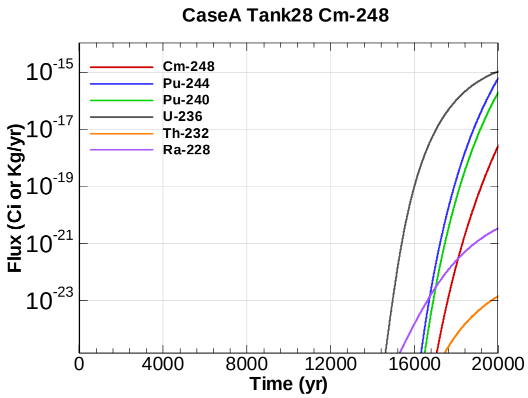

Figure A.2-1165 - Water Table Flux for CaseA Tank28 Cm-248

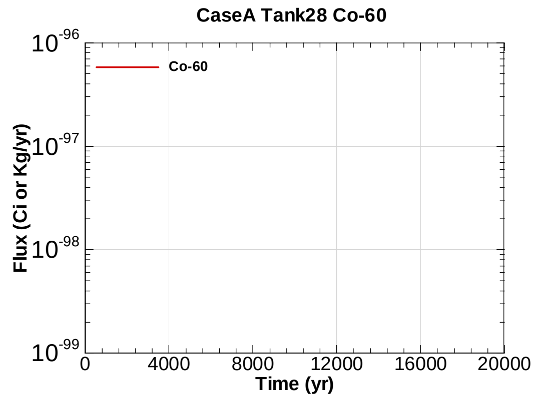

Figure A.2-1166 - Water Table Flux for CaseA Tank28 Co-60

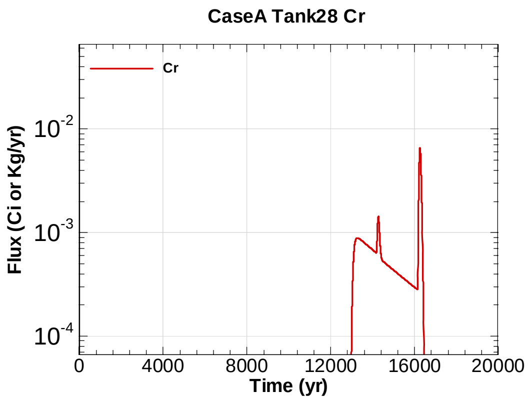

Figure A.2-1167 - Water Table Flux for CaseA Tank28 Cr

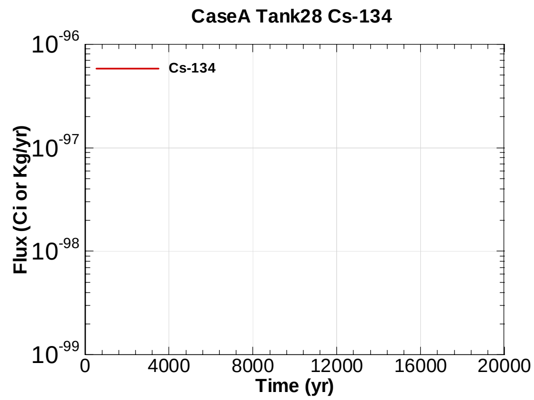

Figure A.2-1168 - Water Table Flux for CaseA Tank28 Cs-134

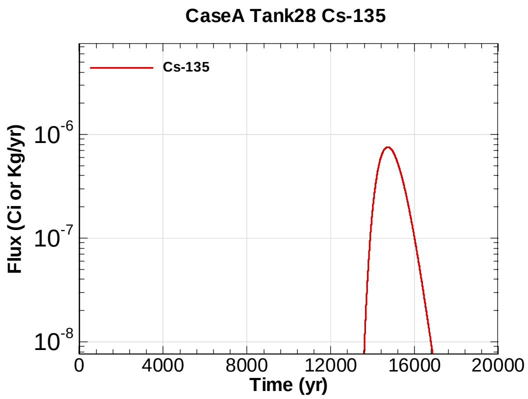

Figure A.2-1169 - Water Table Flux for CaseA Tank28 Cs-135

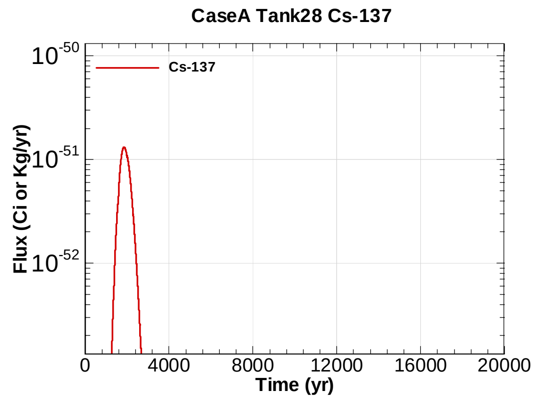

Figure A.2-1170 - Water Table Flux for CaseA Tank28 Cs-137

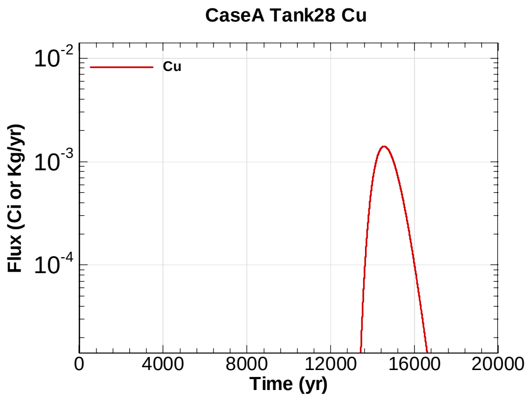

Figure A.2-1171 - Water Table Flux for CaseA Tank28 Cu

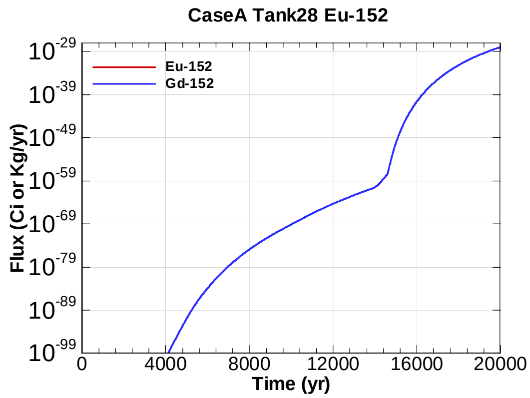

Figure A.2-1172 - Water Table Flux for CaseA Tank28 Eu-152

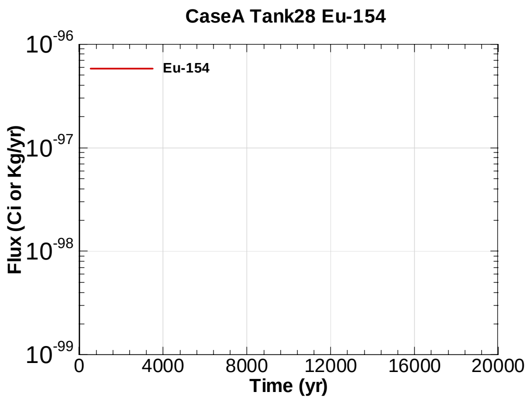

Figure A.2-1173 - Water Table Flux for CaseA Tank28 Eu-154

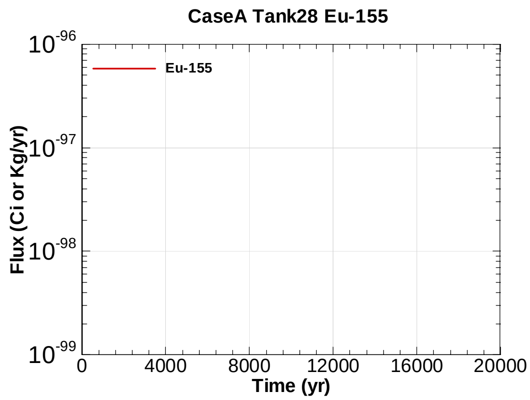

Figure A.2-1174 - Water Table Flux for CaseA Tank28 Eu-155

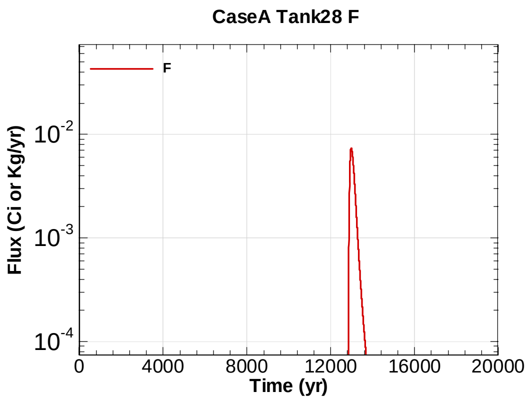

Figure A.2-1175 - Water Table Flux for CaseA Tank28 F

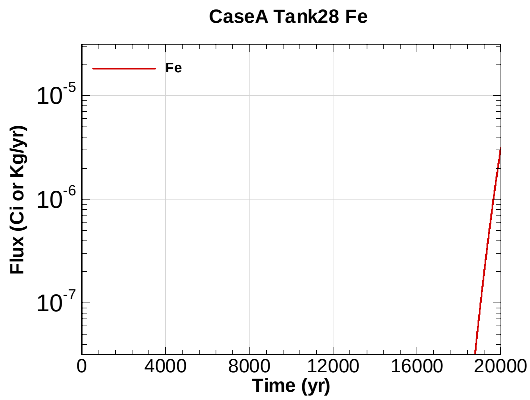

Figure A.2-1176 - Water Table Flux for CaseA Tank28 Fe

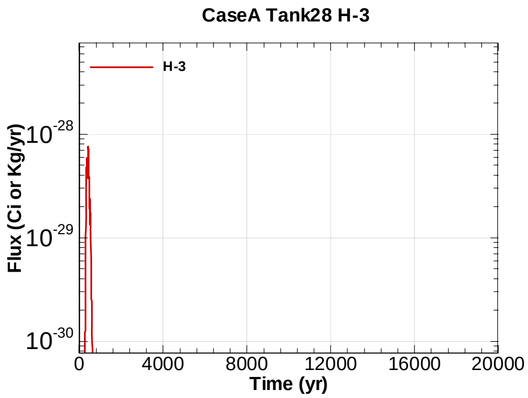

Figure A.2-1177 - Water Table Flux for CaseA Tank28 H-3

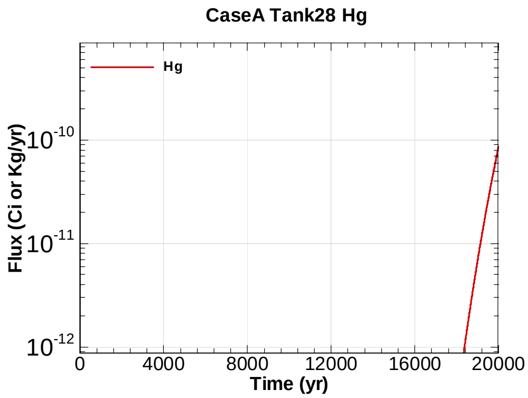

Figure A.2-1178 - Water Table Flux for CaseA Tank28 Hg

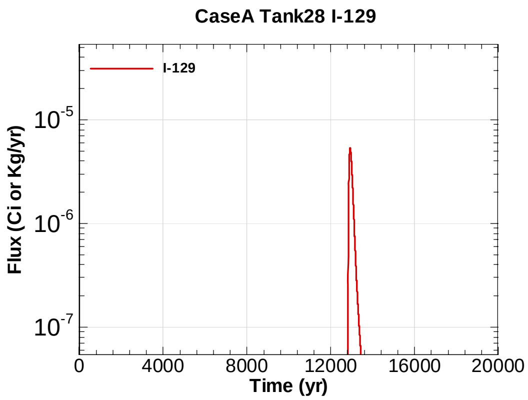

Figure A.2-1179 - Water Table Flux for CaseA Tank28 I-129

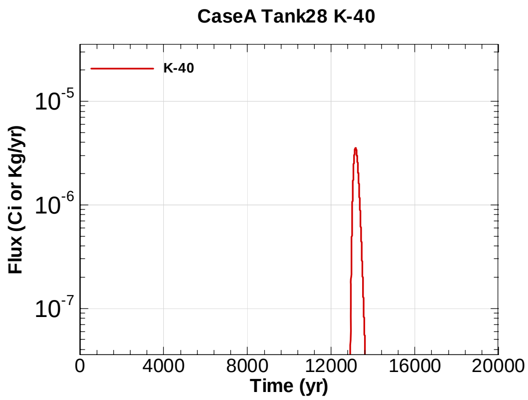

Figure A.2-1180 - Water Table Flux for CaseA Tank28 K-40

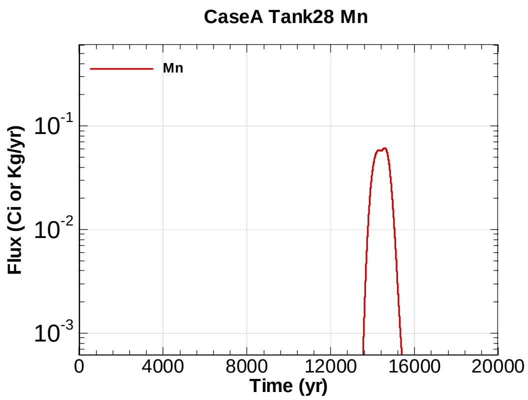

Figure A.2-1181 - Water Table Flux for CaseA Tank28 Mn

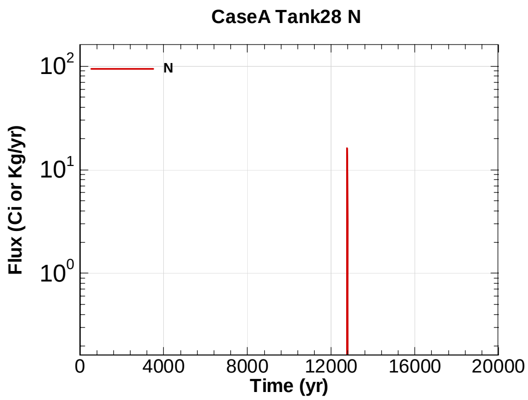

Figure A.2-1182 - Water Table Flux for CaseA Tank28 N

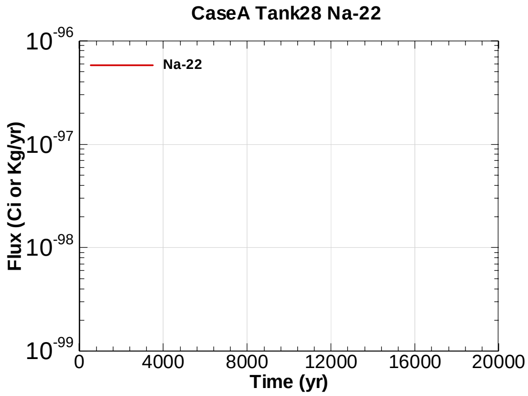

Figure A.2-1183 - Water Table Flux for CaseA Tank28 Na-22

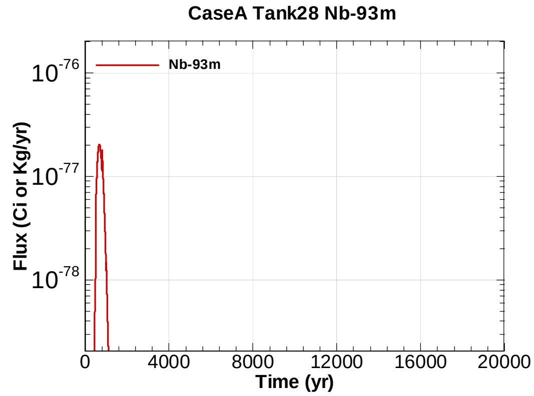

Figure A.2-1184 - Water Table Flux for CaseA Tank28 Nb-93m

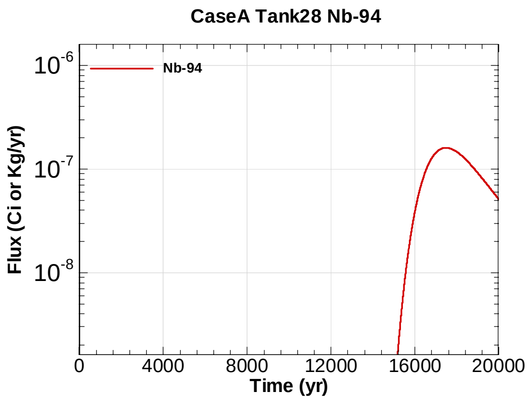

Figure A.2-1185 - Water Table Flux for CaseA Tank28 Nb-94

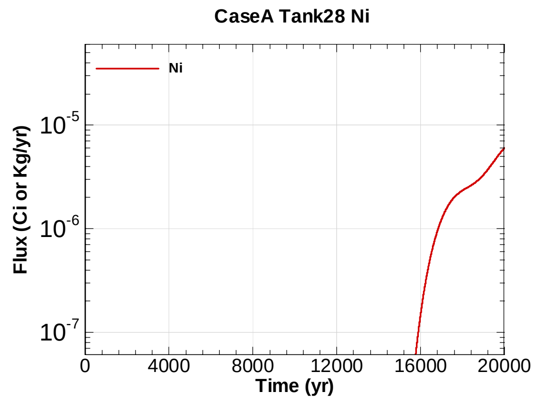

Figure A.2-1186 - Water Table Flux for CaseA Tank28 Ni

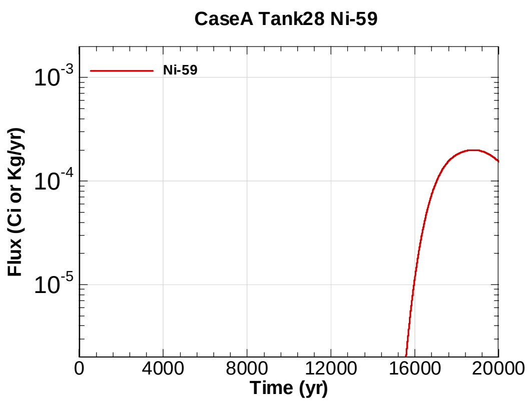

Figure A.2-1187 - Water Table Flux for CaseA Tank28 Ni-59

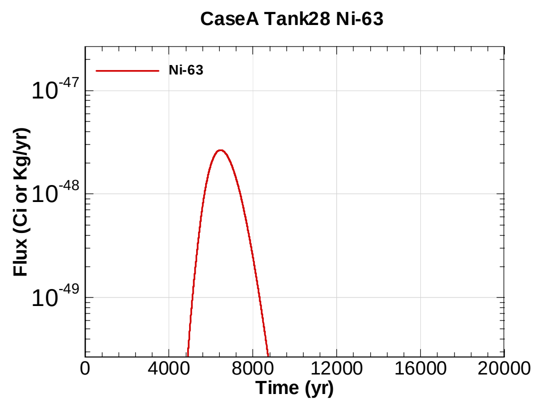

Figure A.2-1188 - Water Table Flux for CaseA Tank28 Ni-63

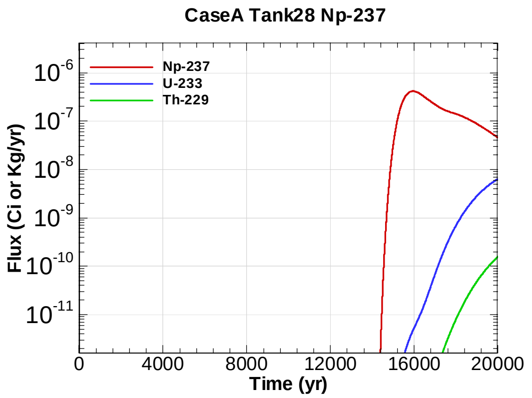

Figure A.2-1189 - Water Table Flux for CaseA Tank28 Np-237

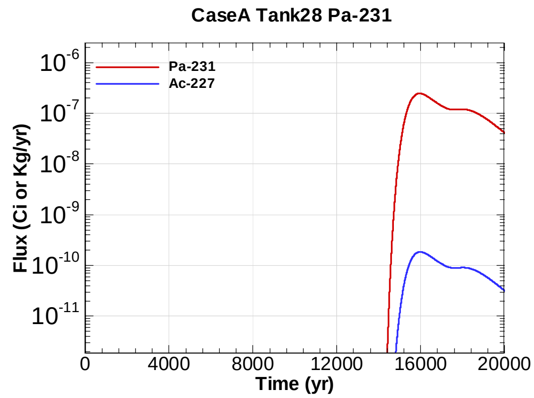

Figure A.2-1190 - Water Table Flux for CaseA Tank28 Pa-231

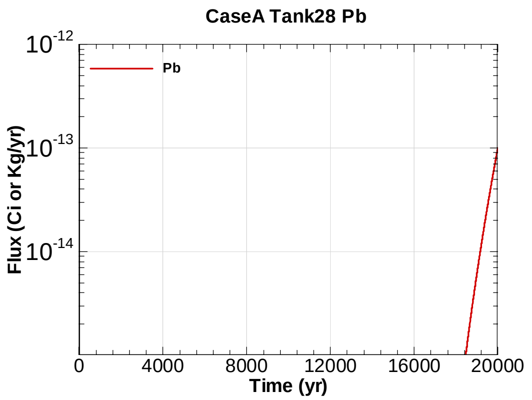

Figure A.2-1191 - Water Table Flux for CaseA Tank28 Pb

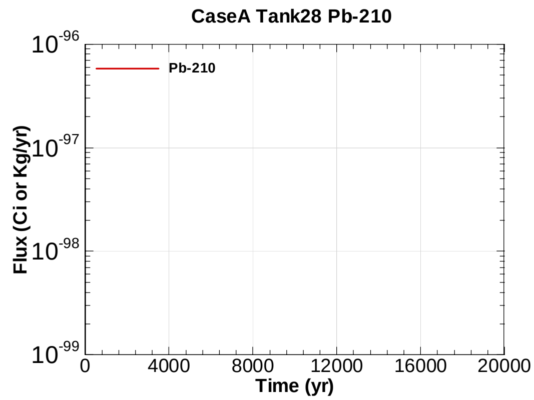

Figure A.2-1192 - Water Table Flux for CaseA Tank28 Pb-210

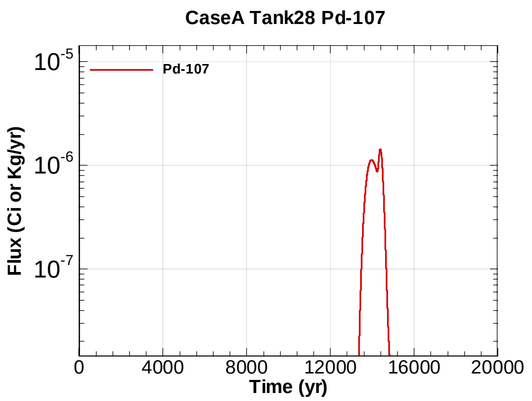

Figure A.2-1193 - Water Table Flux for CaseA Tank28 Pd-107

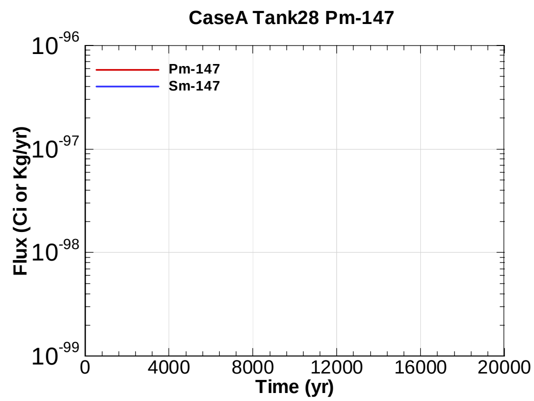

Figure A.2-1194 - Water Table Flux for CaseA Tank28 Pm-147

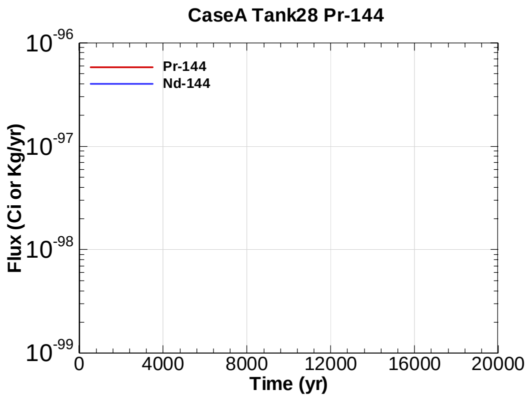

Figure A.2-1195 - Water Table Flux for CaseA Tank28 Pr-144

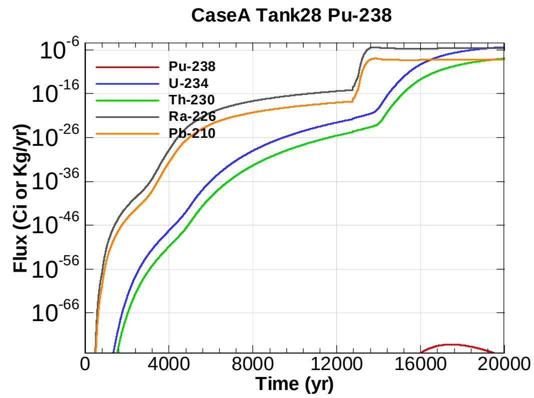

Figure A.2-1196 - Water Table Flux for CaseA Tank28 Pu-238

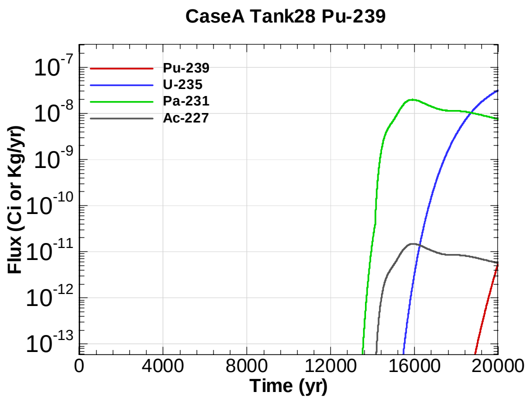

Figure A.2-1197 - Water Table Flux for CaseA Tank28 Pu-239

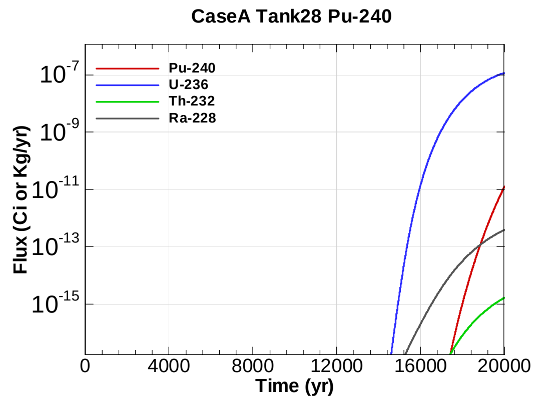

Figure A.2-1198 - Water Table Flux for CaseA Tank28 Pu-240

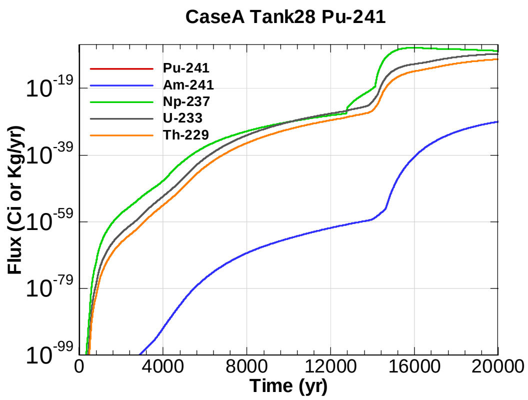

Figure A.2-1199 - Water Table Flux for CaseA Tank28 Pu-241

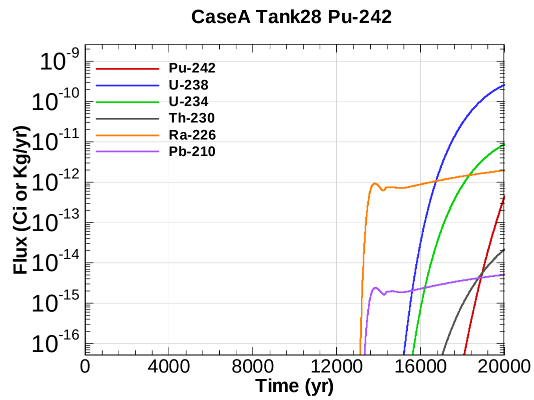

Figure A.2-1200 - Water Table Flux for CaseA Tank28 Pu-242

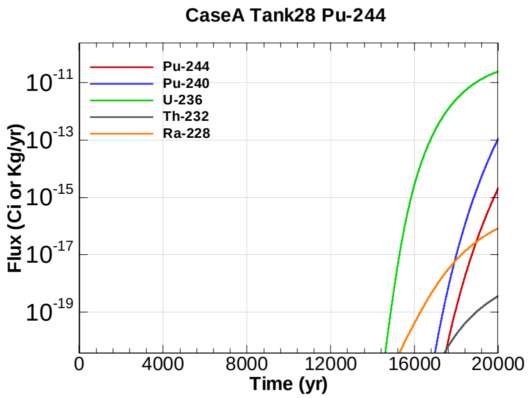

Figure A.2-1201 - Water Table Flux for CaseA Tank28 Pu-244

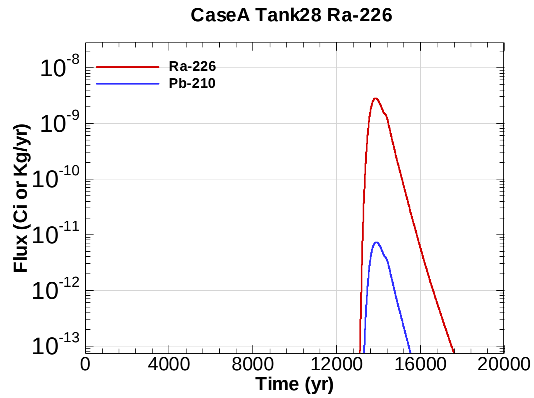

Figure A.2-1202 - Water Table Flux for CaseA Tank28 Ra-226

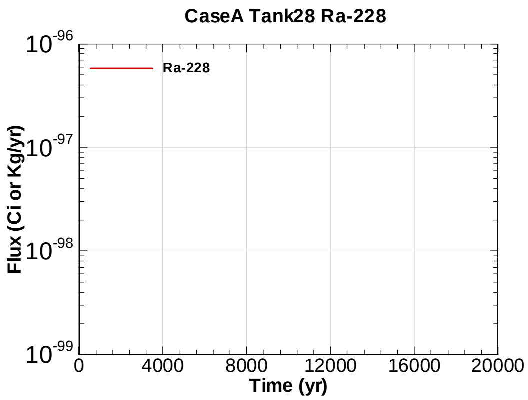

Figure A.2-1203 - Water Table Flux for CaseA Tank28 Ra-228

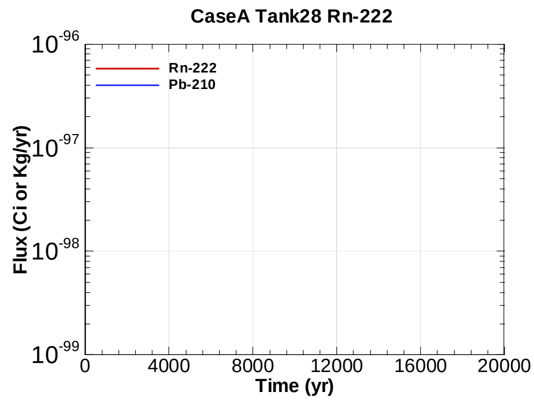

Figure A.2-1204 - Water Table Flux for CaseA Tank28 Rn-222

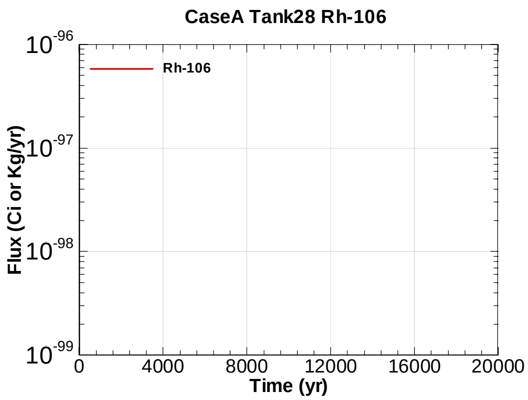

Figure A.2-1205 - Water Table Flux for CaseA Tank28 Rh-106

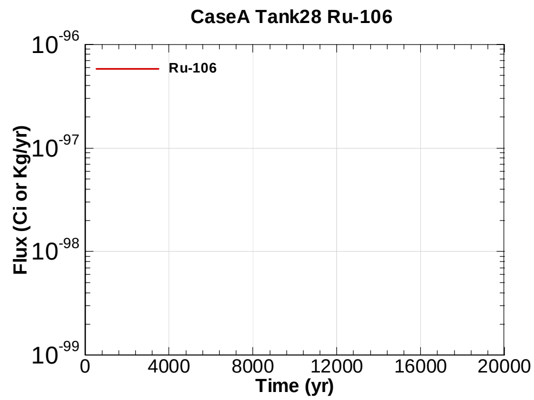

Figure A.2-1206 - Water Table Flux for CaseA Tank28 Ru-106

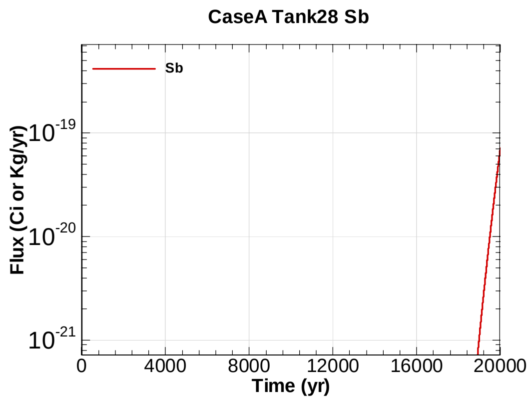

Figure A.2-1207 - Water Table Flux for CaseA Tank28 Sb

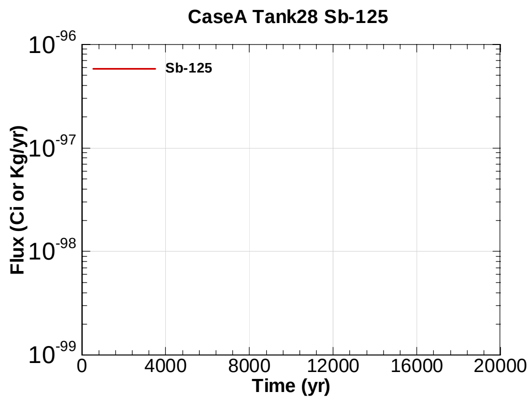

Figure A.2-1208 - Water Table Flux for CaseA Tank28 Sb-125

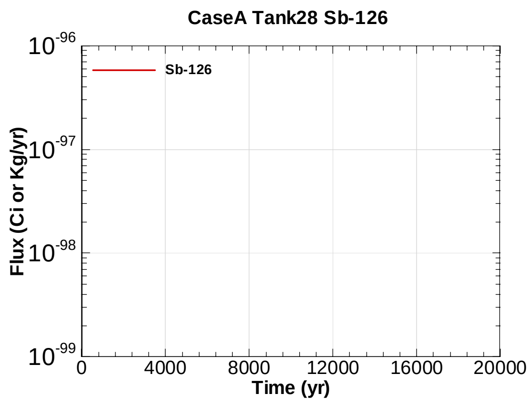

Figure A.2-1209 - Water Table Flux for CaseA Tank28 Sb-126

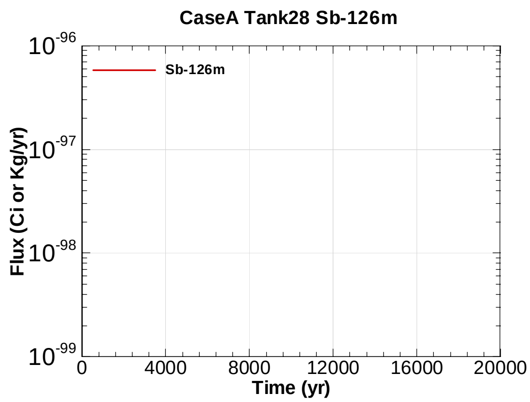

Figure A.2-1210 - Water Table Flux for CaseA Tank28 Sb-126m

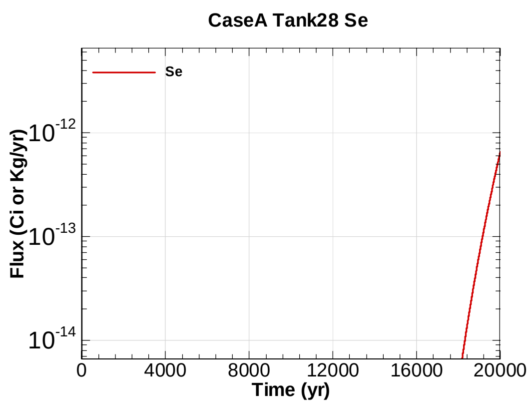

Figure A.2-1211 - Water Table Flux for CaseA Tank28 Se

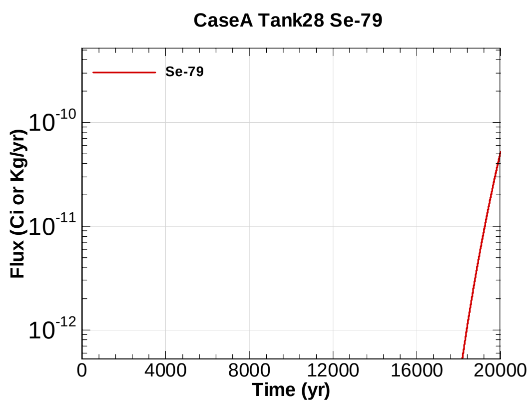

Figure A.2-1212 - Water Table Flux for CaseA Tank28 Se-79

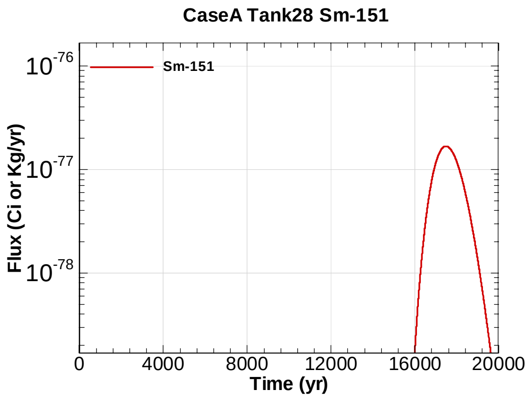

Figure A.2-1213 - Water Table Flux for CaseA Tank28 Sm-151

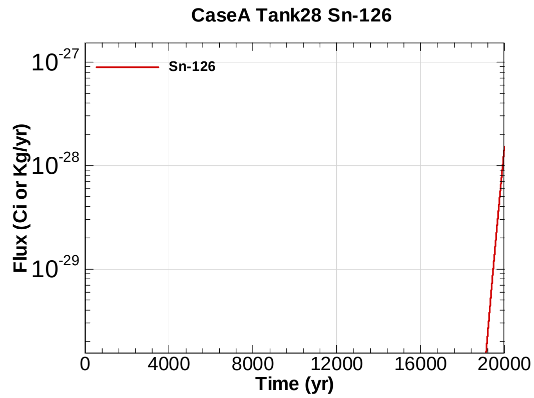

Figure A.2-1214 - Water Table Flux for CaseA Tank28 Sn-126

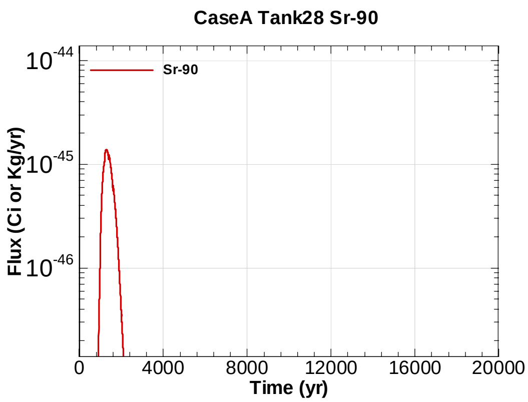

Figure A.2-1215 - Water Table Flux for CaseA Tank28 Sr-90

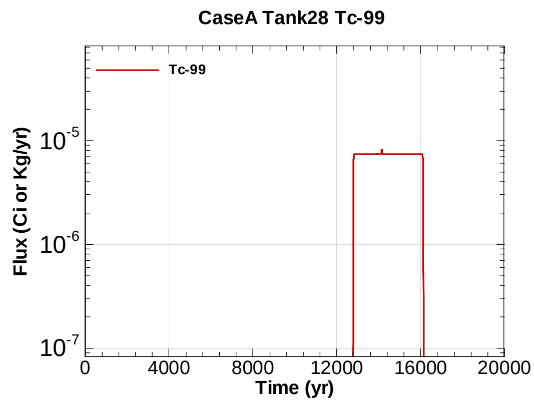

Figure A.2-1216 - Water Table Flux for CaseA Tank28 Tc-99

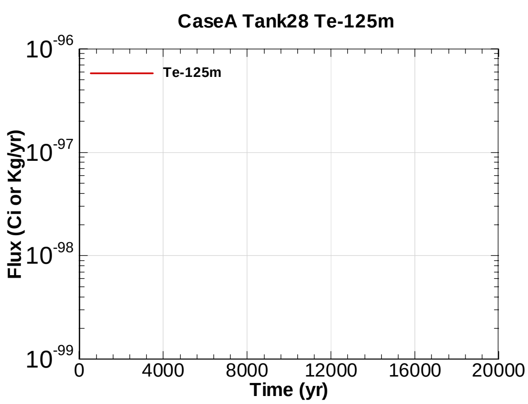

Figure A.2-1217 - Water Table Flux for CaseA Tank28 Te-125m

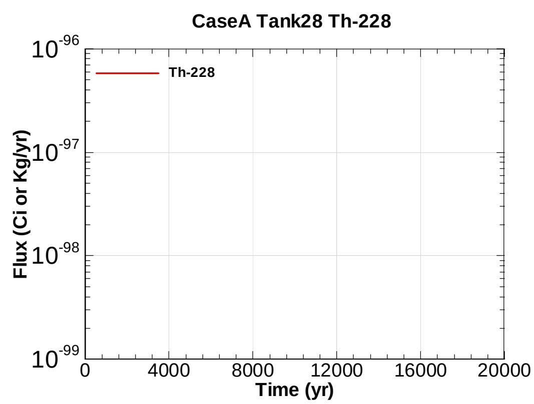

Figure A.2-1218 - Water Table Flux for CaseA Tank28 Th-228

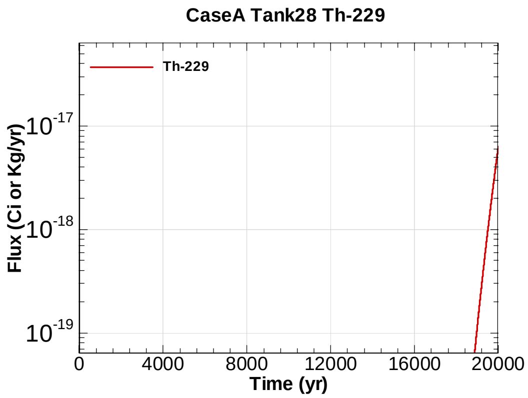

Figure A.2-1219 - Water Table Flux for CaseA Tank28 Th-229

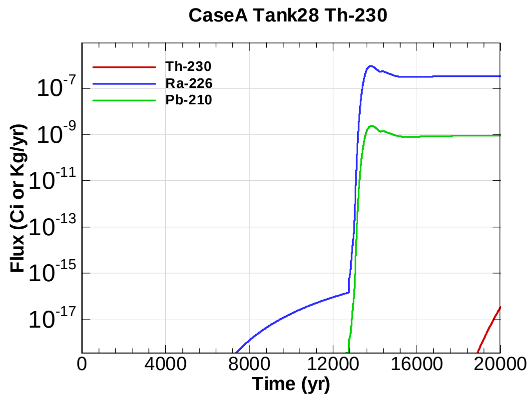

Figure A.2-1220 - Water Table Flux for CaseA Tank28 Th-230

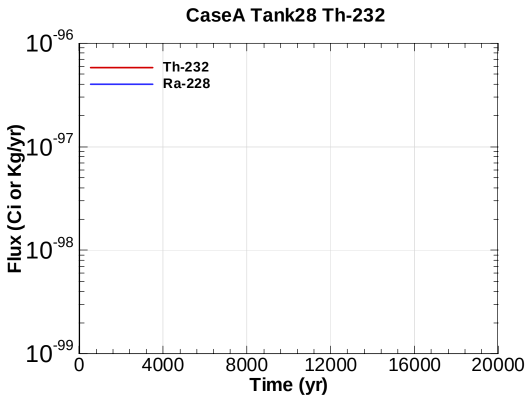

Figure A.2-1221 - Water Table Flux for CaseA Tank28 Th-232

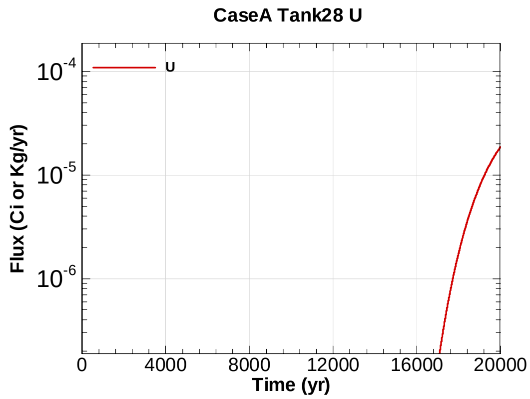

Figure A.2-1222 - Water Table Flux for CaseA Tank28 U

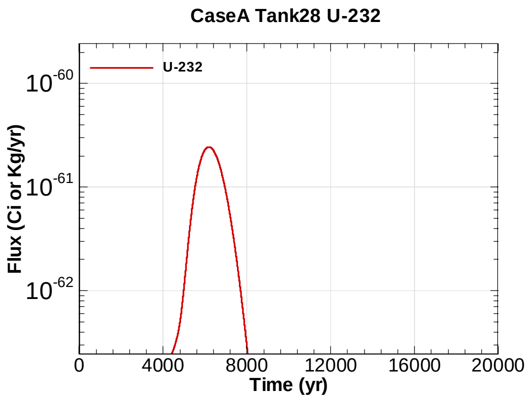

Figure A.2-1223 - Water Table Flux for CaseA Tank28 U-232

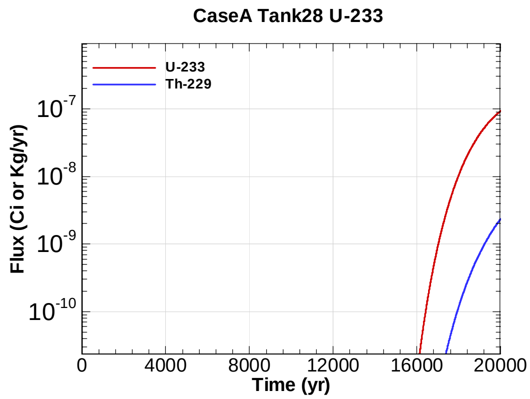

Figure A.2-1224 - Water Table Flux for CaseA Tank28 U-233

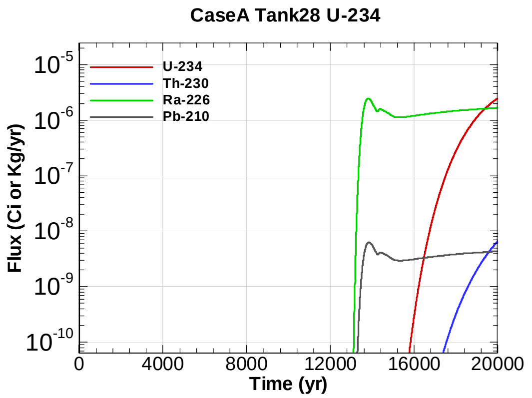

Figure A.2-1225 - Water Table Flux for CaseA Tank28 U-234

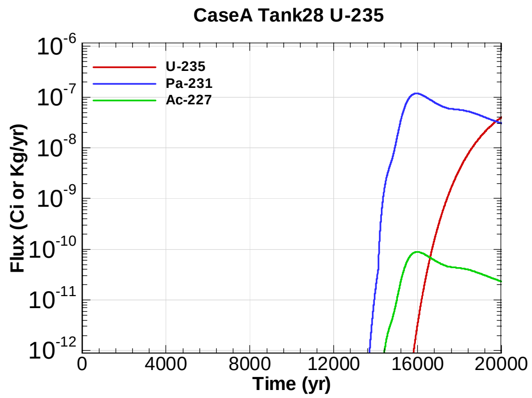

Figure A.2-1226 - Water Table Flux for CaseA Tank28 U-235

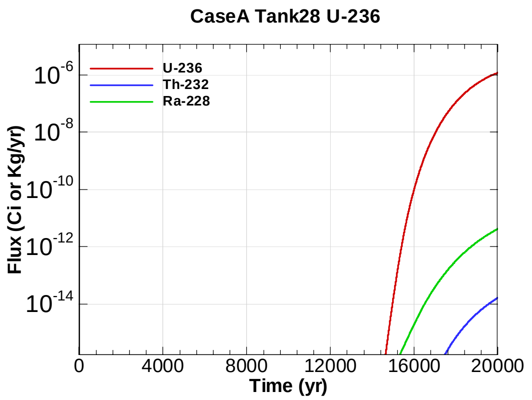

Figure A.2-1227 - Water Table Flux for CaseA Tank28 U-236

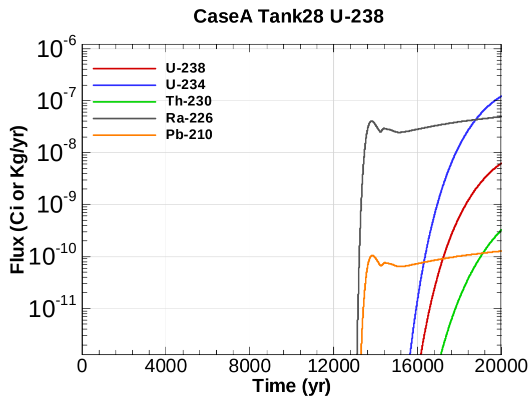

Figure A.2-1228 - Water Table Flux for CaseA Tank28 U-238

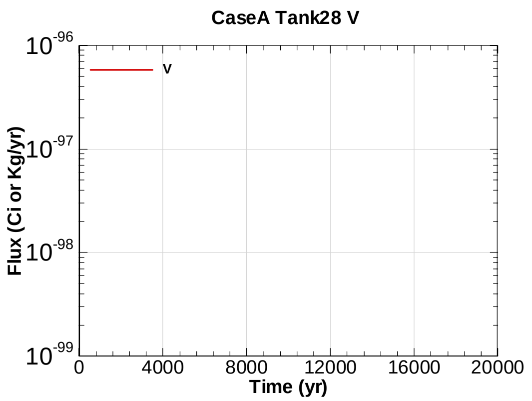

Figure A.2-1229 - Water Table Flux for CaseA Tank28 V

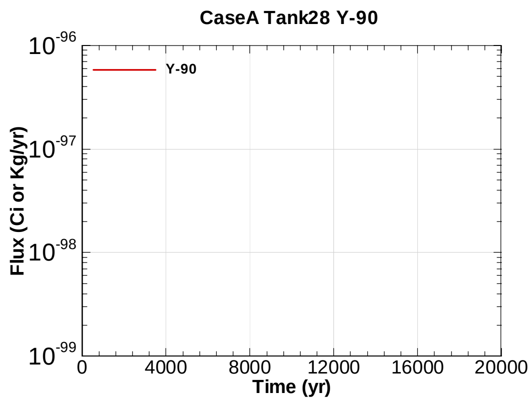

Figure A.2-1230 - Water Table Flux for CaseA Tank28 Y-90

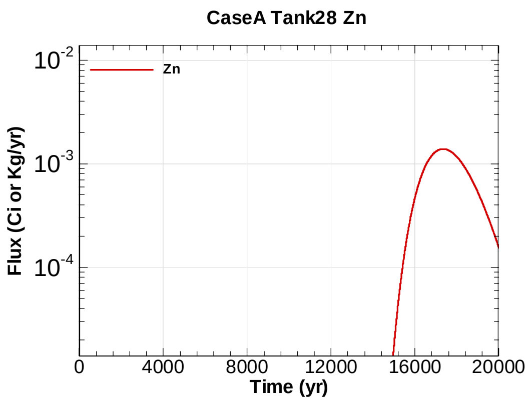

Figure A.2-1231 - Water Table Flux for CaseA Tank28 Zn

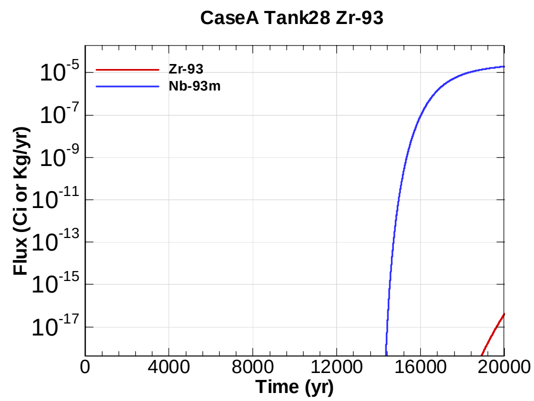

Figure A.2-1232 - Water Table Flux for CaseA Tank28 Zr-93

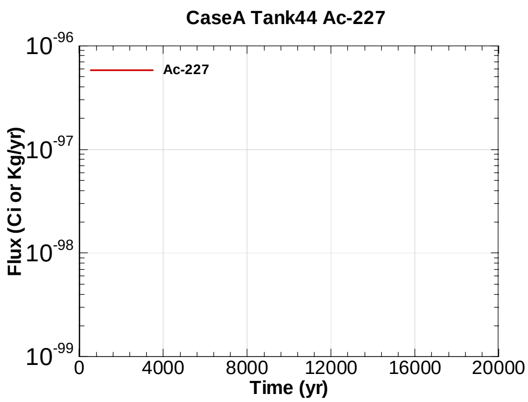

Figure A.2-1233 - Water Table Flux for CaseA Tank44 Ac-227

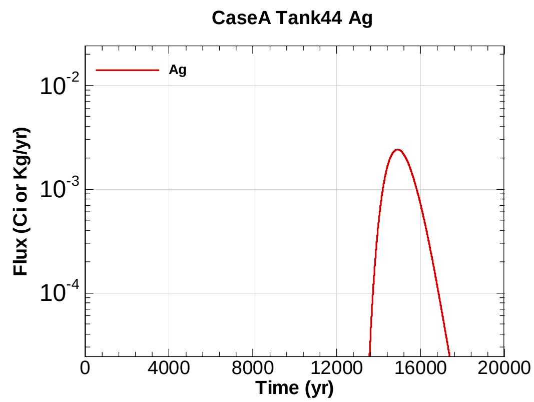

Figure A.2-1234 - Water Table Flux for CaseA Tank44 Ag

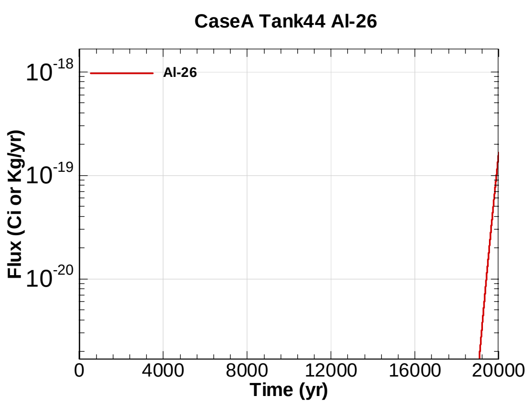

Figure A.2-1235 - Water Table Flux for CaseA Tank44 Al-26

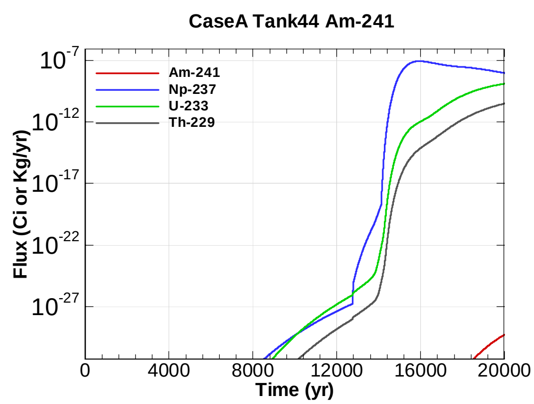

Figure A.2-1236 - Water Table Flux for CaseA Tank44 Am-241

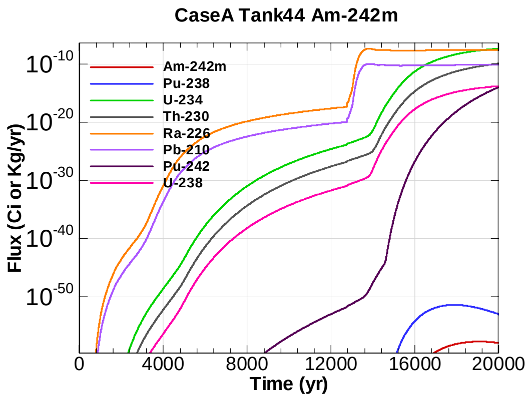

Figure A.2-1237 - Water Table Flux for CaseA Tank44 Am-242m

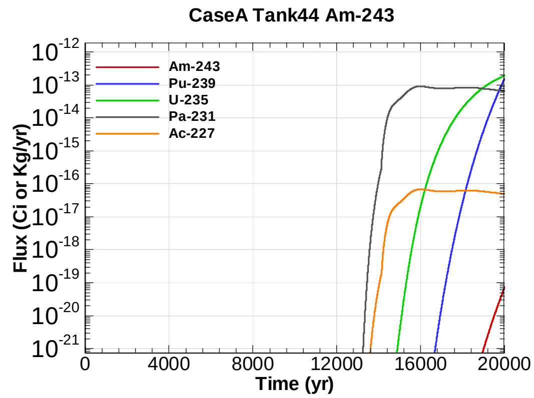

Figure A.2-1238 - Water Table Flux for CaseA Tank44 Am-243

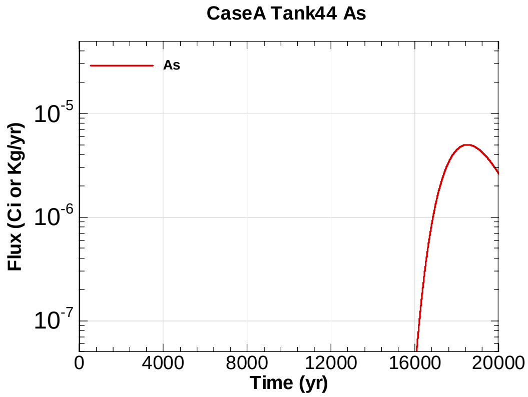

Figure A.2-1239 - Water Table Flux for CaseA Tank44 As

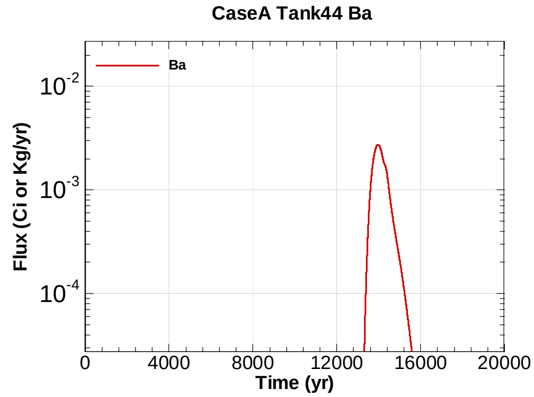

Figure A.2-1240 - Water Table Flux for CaseA Tank44 Ba

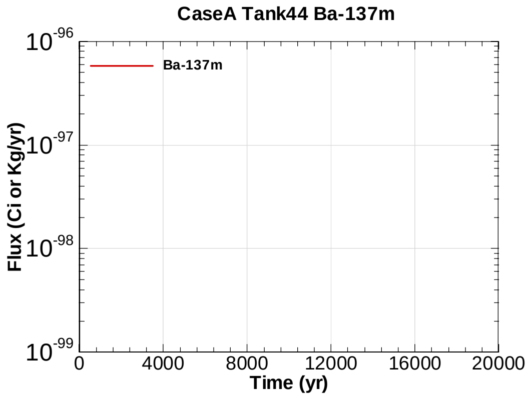

Figure A.2-1241 - Water Table Flux for CaseA Tank44 Ba-137m

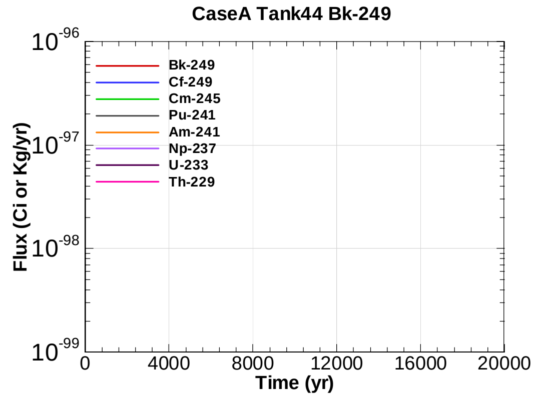

Figure A.2-1242 - Water Table Flux for CaseA Tank44 Bk-249

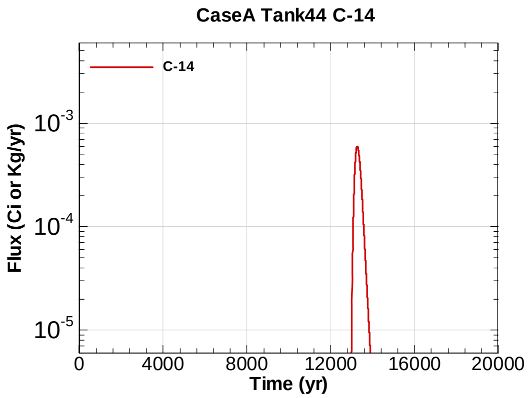

Figure A.2-1243 - Water Table Flux for CaseA Tank44 C-14

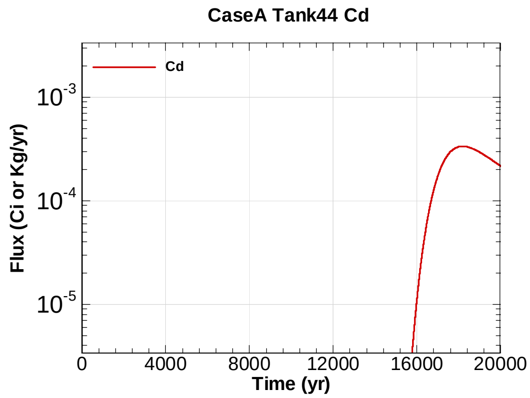

Figure A.2-1244 - Water Table Flux for CaseA Tank44 Cd

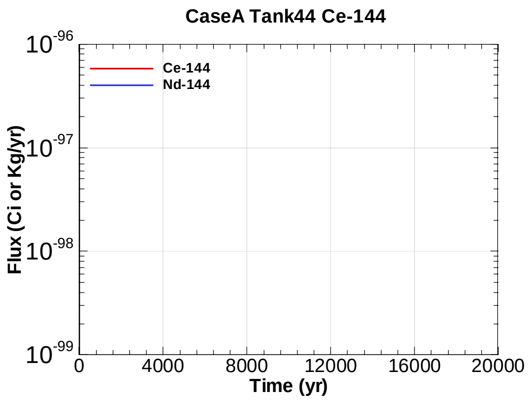

Figure A.2-1245 - Water Table Flux for CaseA Tank44 Ce-144

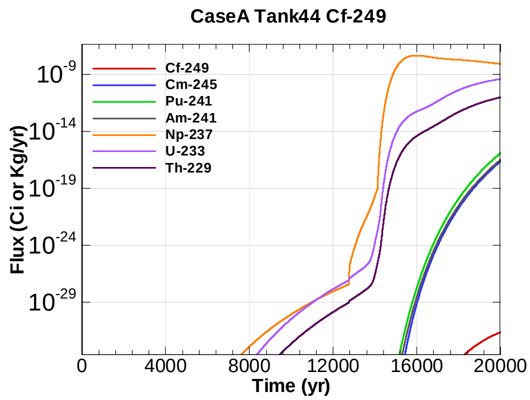

Figure A.2-1246 - Water Table Flux for CaseA Tank44 Cf-249

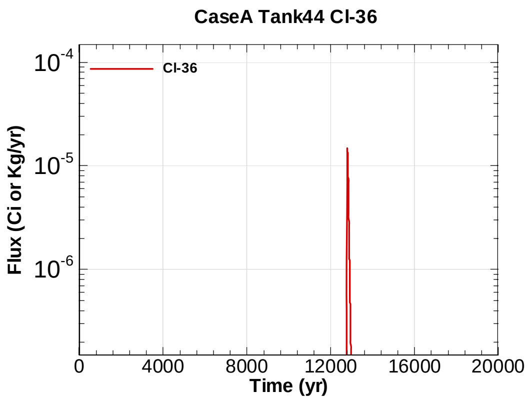

Figure A.2-1247 - Water Table Flux for CaseA Tank44 Cl-36

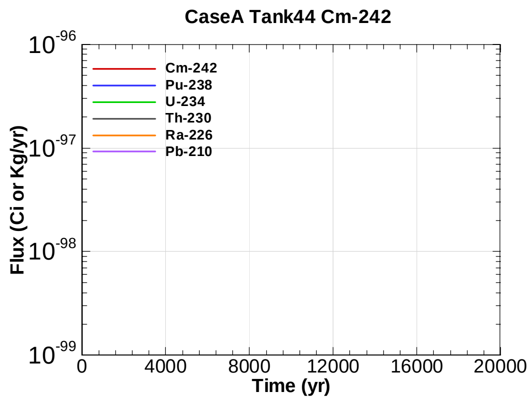

Figure A.2-1248 - Water Table Flux for CaseA Tank44 Cm-242

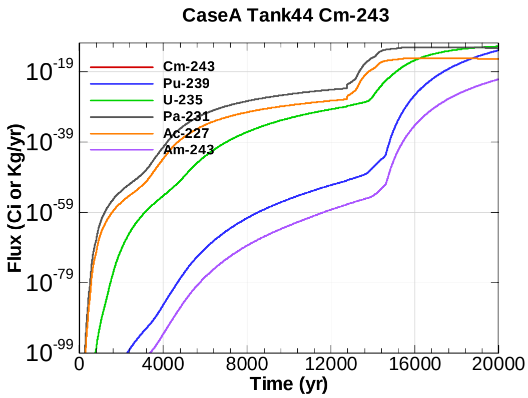

Figure A.2-1249 - Water Table Flux for CaseA Tank44 Cm-243

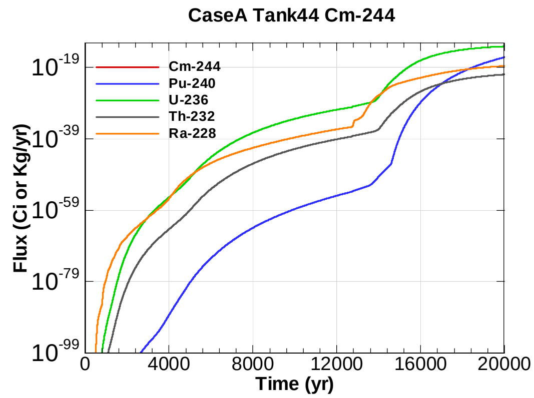

Figure A.2-1250 - Water Table Flux for CaseA Tank44 Cm-244

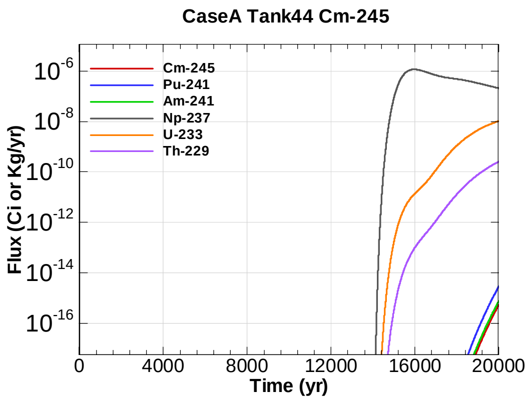

Figure A.2-1251 - Water Table Flux for CaseA Tank44 Cm-245

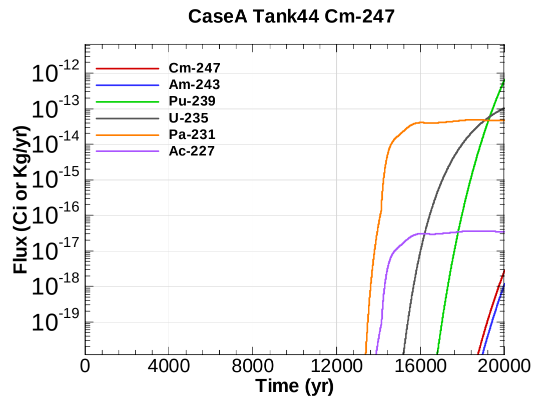

Figure A.2-1252 - Water Table Flux for CaseA Tank44 Cm-247

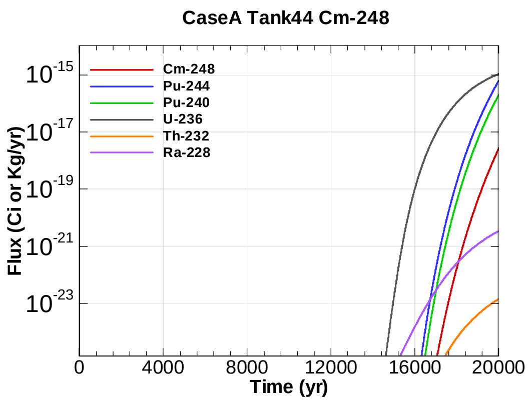

Figure A.2-1253 - Water Table Flux for CaseA Tank44 Cm-248

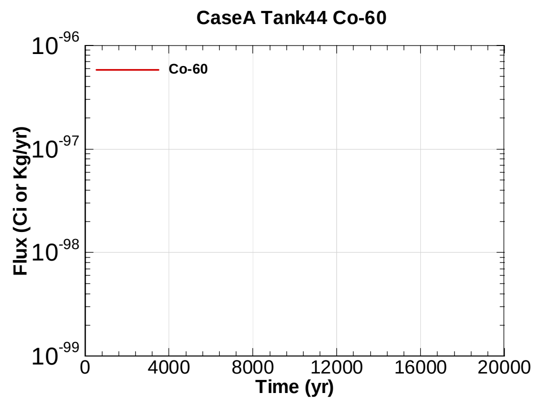

Figure A.2-1254 - Water Table Flux for CaseA Tank44 Co-60

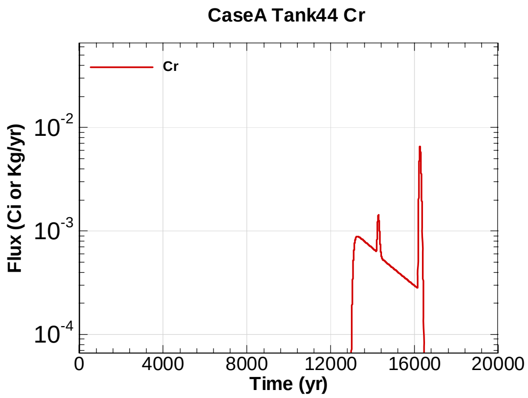

Figure A.2-1255 - Water Table Flux for CaseA Tank44 Cr

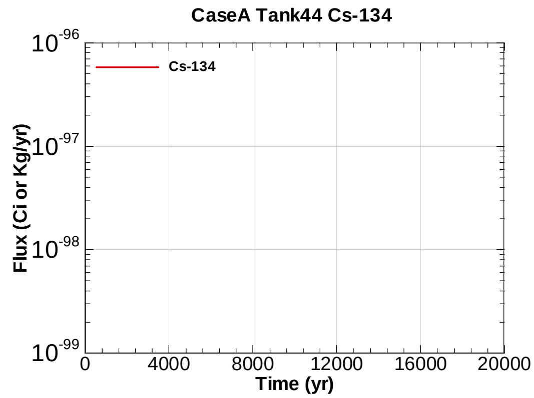

Figure A.2-1256 - Water Table Flux for CaseA Tank44 Cs-134

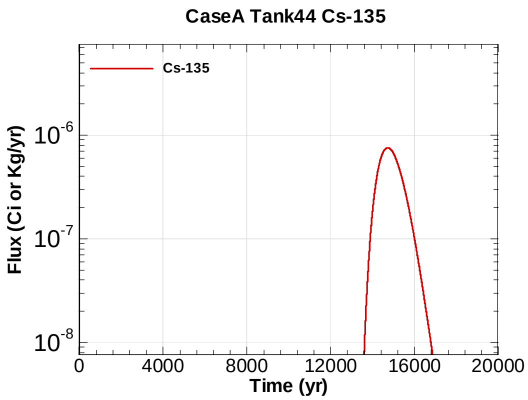

Figure A.2-1257 - Water Table Flux for CaseA Tank44 Cs-135

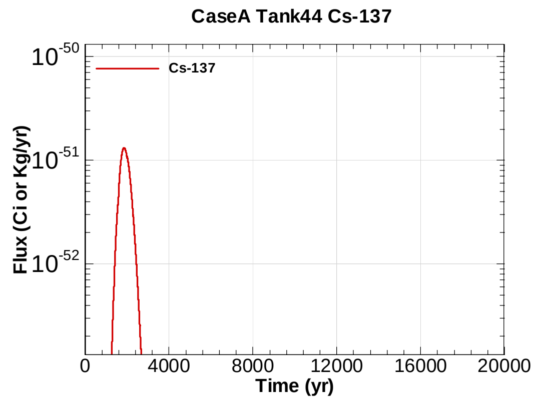

Figure A.2-1258 - Water Table Flux for CaseA Tank44 Cs-137

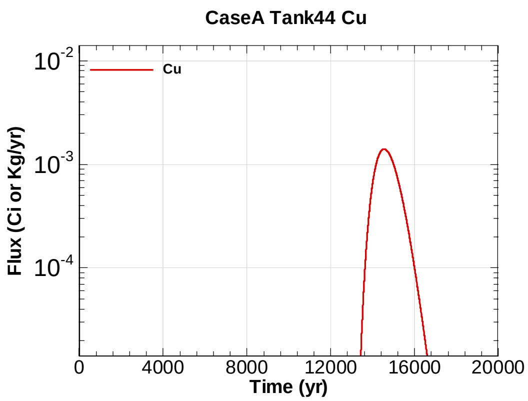

Figure A.2-1259 - Water Table Flux for CaseA Tank44 Cu

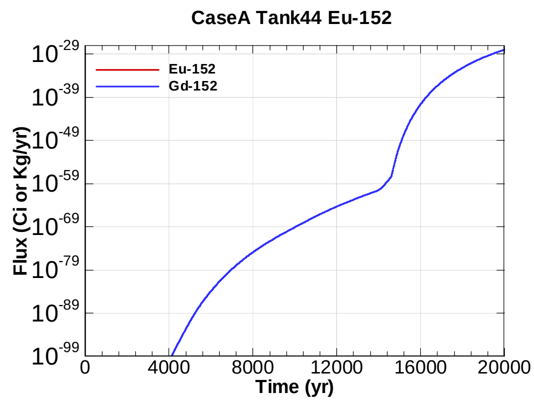

Figure A.2-1260 - Water Table Flux for CaseA Tank44 Eu-152

CaseA Tank44 Eu-154

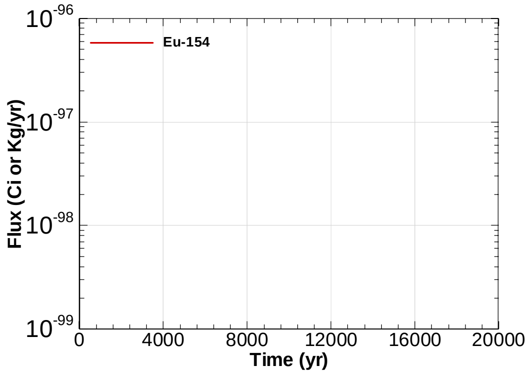

Figure A.2-1261 - Water Table Flux for CaseA Tank44 Eu-154

CaseA Tank44 Eu-155

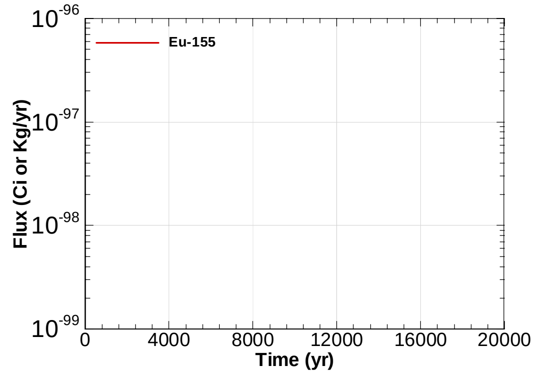

Figure A.2-1262 - Water Table Flux for CaseA Tank44 Eu-155

CaseA Tank44 F

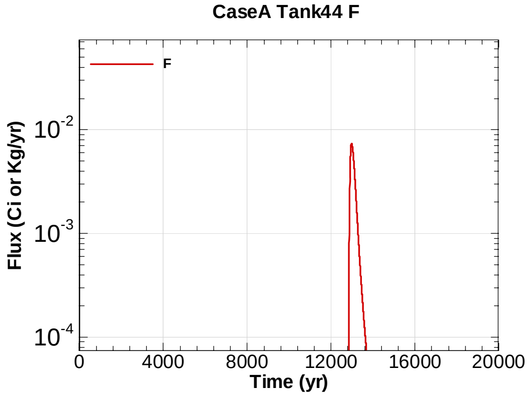

Figure A.2-1263 - Water Table Flux for CaseA Tank44 F

CaseA Tank44 Fe

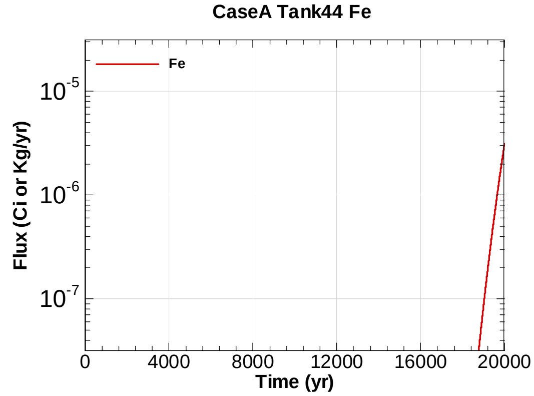

Figure A.2-1264 - Water Table Flux for CaseA Tank44 Fe

CaseA Tank44 H-3

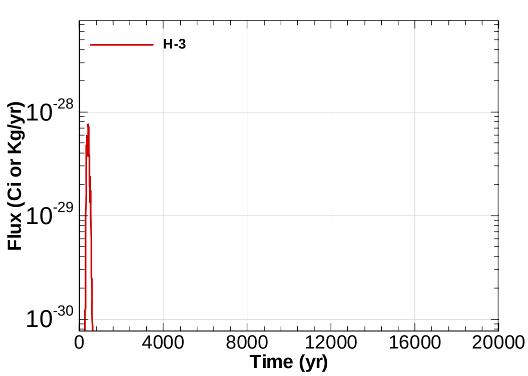

Figure A.2-1265 - Water Table Flux for CaseA Tank44 H-3

CaseA Tank44 Hg

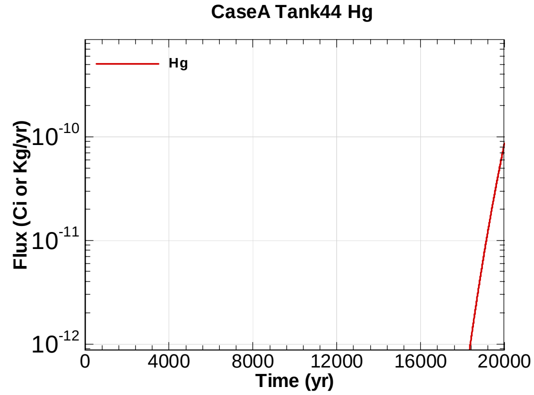

Figure A.2-1266 - Water Table Flux for CaseA Tank44 Hg

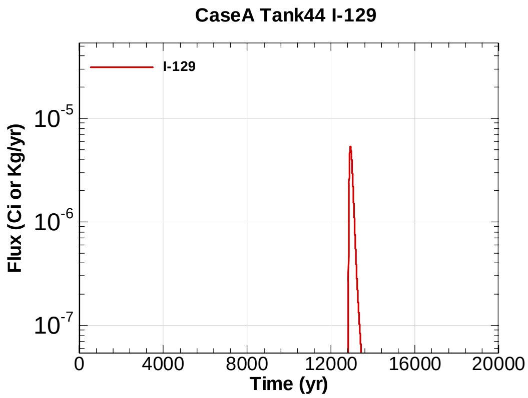

Figure A.2-1267 - Water Table Flux for CaseA Tank44 I-129

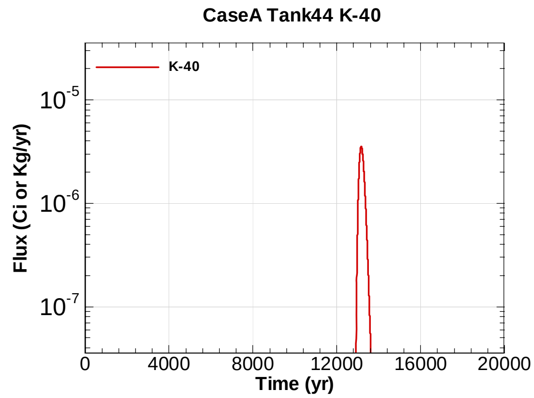

Figure A.2-1268 - Water Table Flux for CaseA Tank44 K-40

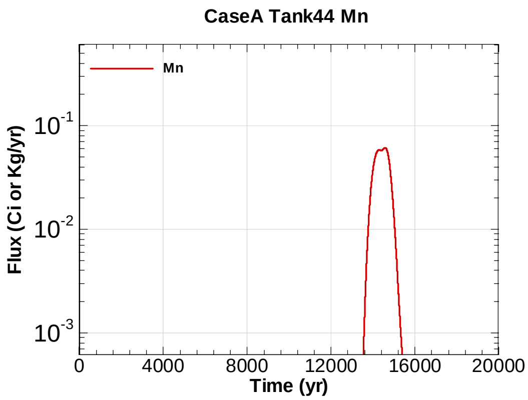

Figure A.2-1269 - Water Table Flux for CaseA Tank44 Mn

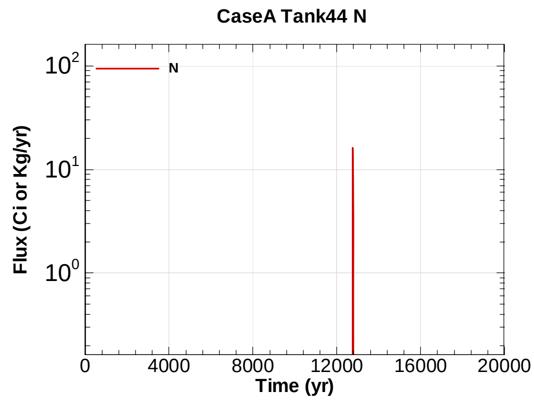

Figure A.2-1270 - Water Table Flux for CaseA Tank44 N

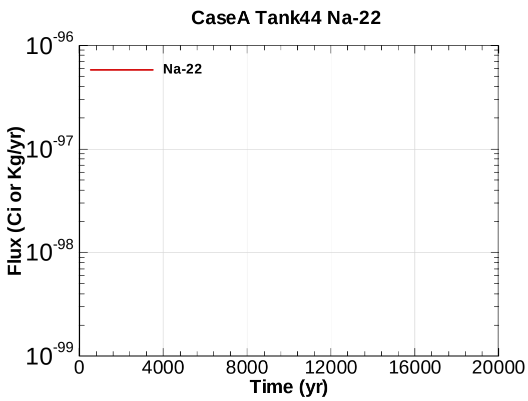

Figure A.2-1271 - Water Table Flux for CaseA Tank44 Na-22

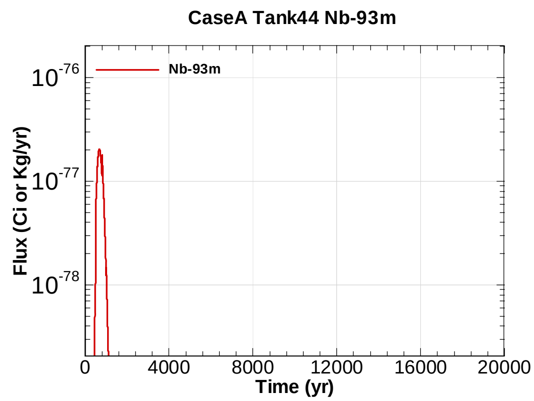

Figure A.2-1272 - Water Table Flux for CaseA Tank44 Nb-93m

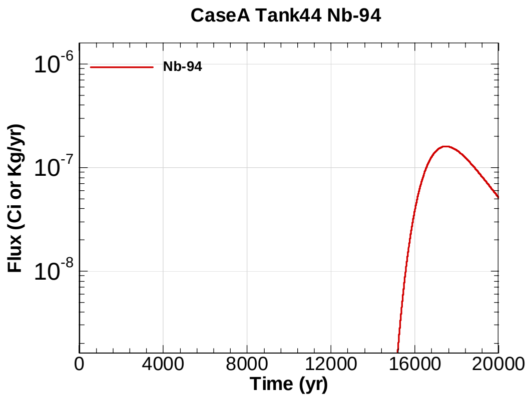

Figure A.2-1273 - Water Table Flux for CaseA Tank44 Nb-94

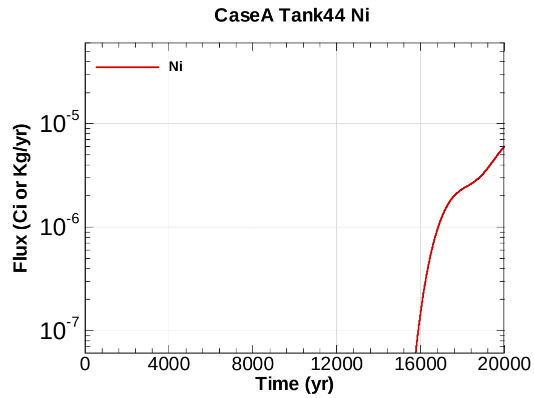

Figure A.2-1274 - Water Table Flux for CaseA Tank44 Ni

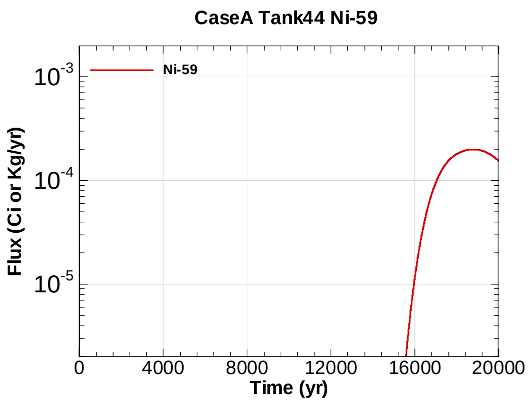

Figure A.2-1275 - Water Table Flux for CaseA Tank44 Ni-59

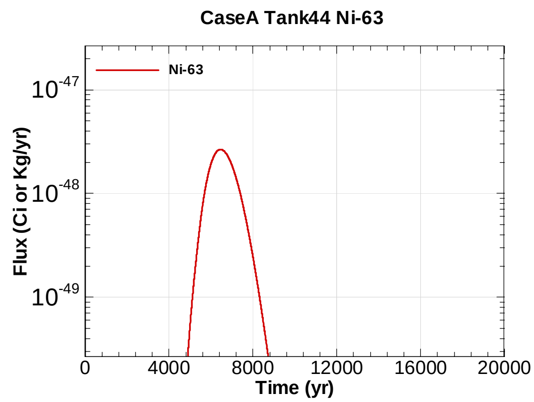

Figure A.2-1276 - Water Table Flux for CaseA Tank44 Ni-63

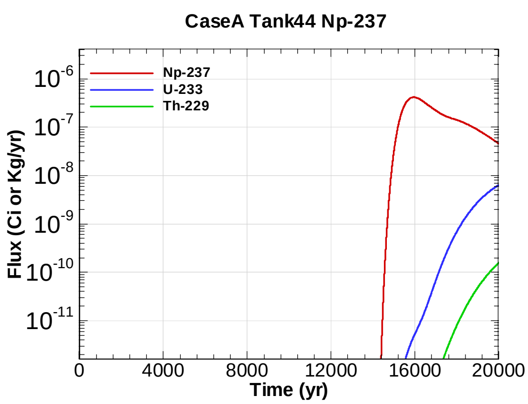

Figure A.2-1277 - Water Table Flux for CaseA Tank44 Np-237

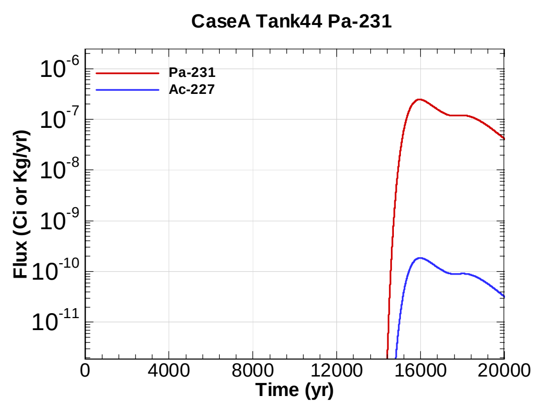

Figure A.2-1278 - Water Table Flux for CaseA Tank44 Pa-231

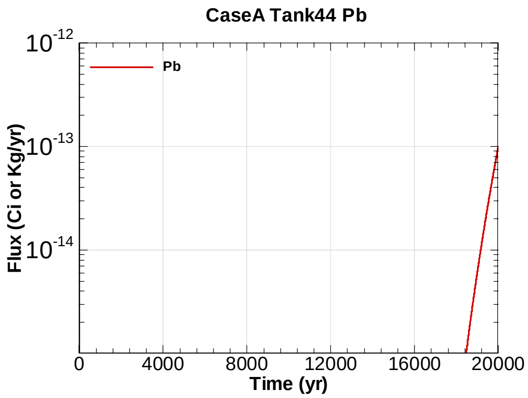

Figure A.2-1279 - Water Table Flux for CaseA Tank44 Pb

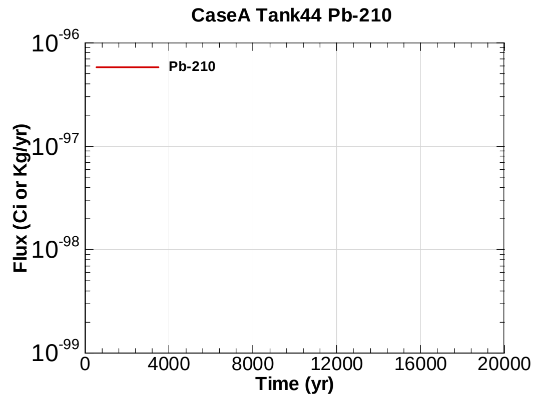

Figure A.2-1280 - Water Table Flux for CaseA Tank44 Pb-210

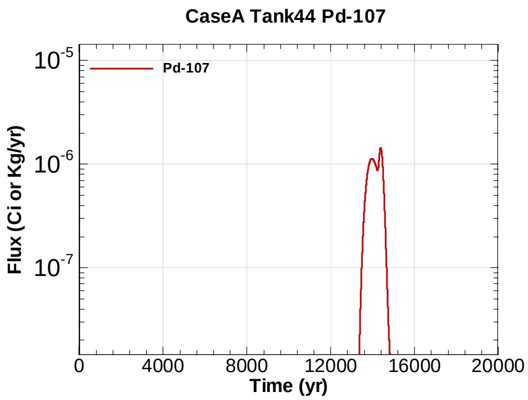

Figure A.2-1281 - Water Table Flux for CaseA Tank44 Pd-107

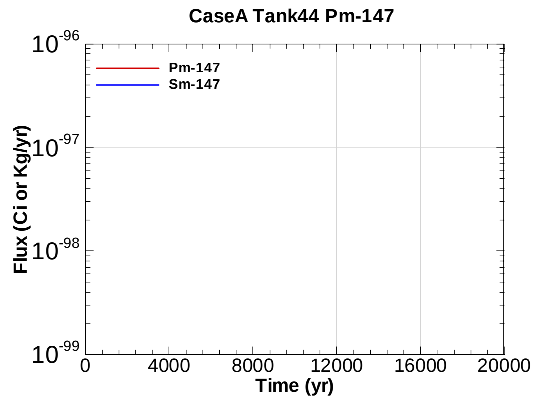

Figure A.2-1282 - Water Table Flux for CaseA Tank44 Pm-147

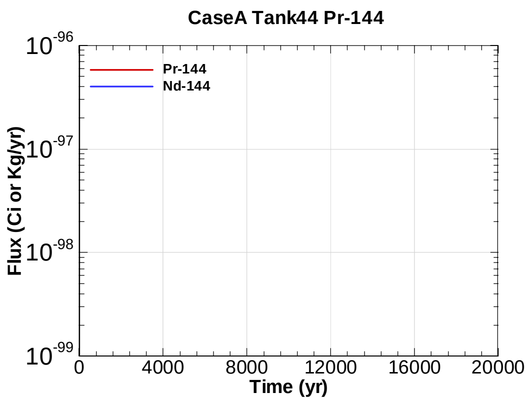

Figure A.2-1283 - Water Table Flux for CaseA Tank44 Pr-144

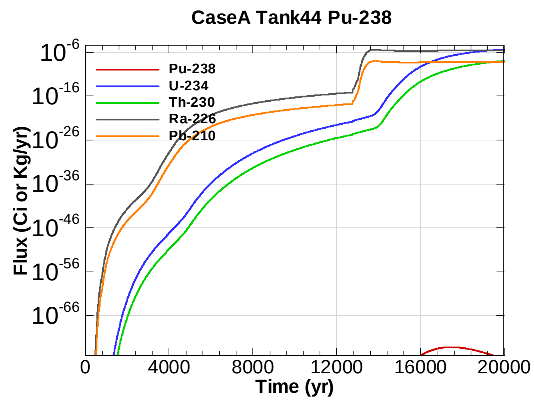

Figure A.2-1284 - Water Table Flux for CaseA Tank44 Pu-238

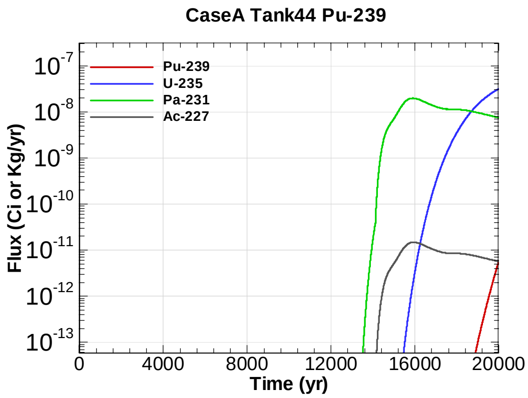

Figure A.2-1285 - Water Table Flux for CaseA Tank44 Pu-239

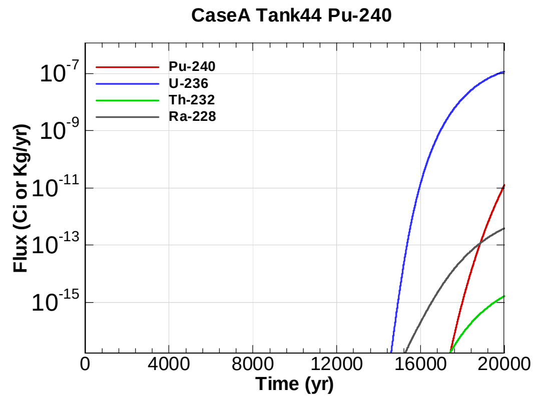

Figure A.2-1286 - Water Table Flux for CaseA Tank44 Pu-240

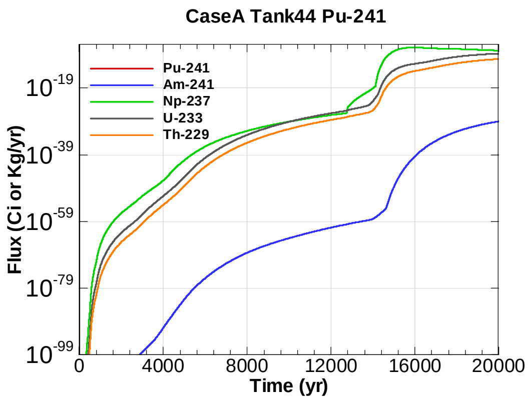

Figure A.2-1287 - Water Table Flux for CaseA Tank44 Pu-241

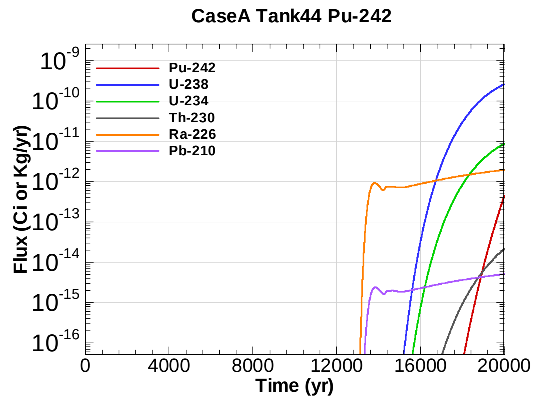

Figure A.2-1288 - Water Table Flux for CaseA Tank44 Pu-242

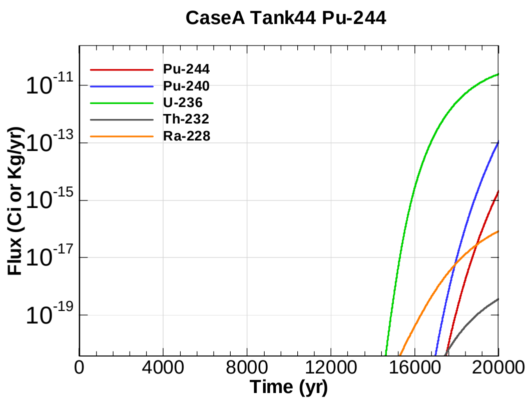

Figure A.2-1289 - Water Table Flux for CaseA Tank44 Pu-244

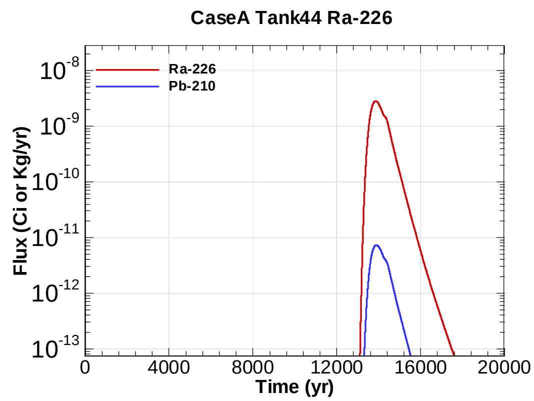

Figure A.2-1290 - Water Table Flux for CaseA Tank44 Ra-226

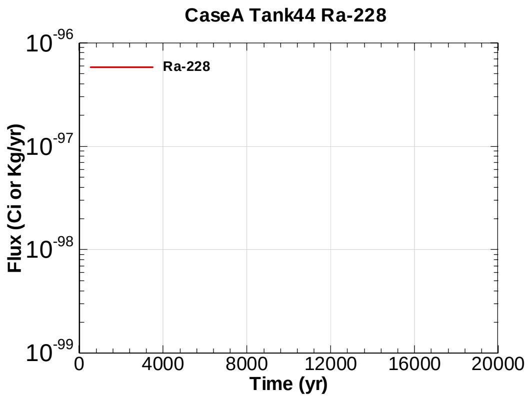

Figure A.2-1291 - Water Table Flux for CaseA Tank44 Ra-228

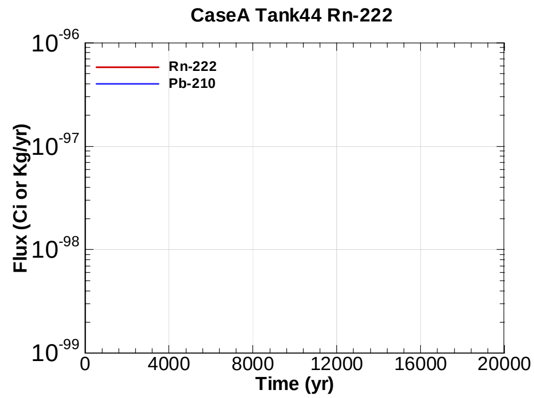

Figure A.2-1292 - Water Table Flux for CaseA Tank44 Rn-222

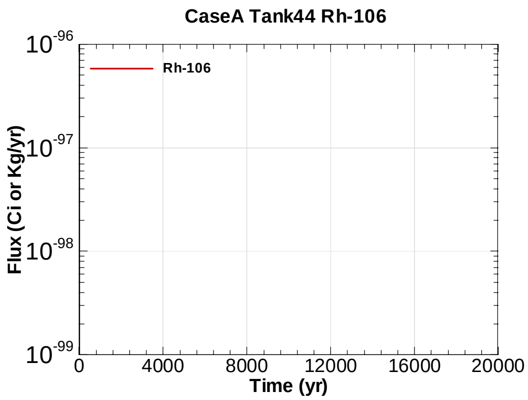

Figure A.2-1293 - Water Table Flux for CaseA Tank44 Rh-106

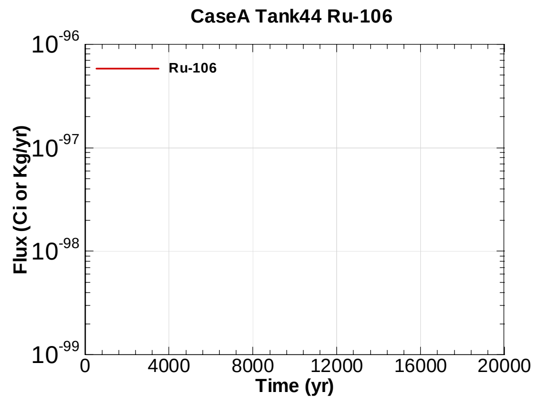

Figure A.2-1294 - Water Table Flux for CaseA Tank44 Ru-106

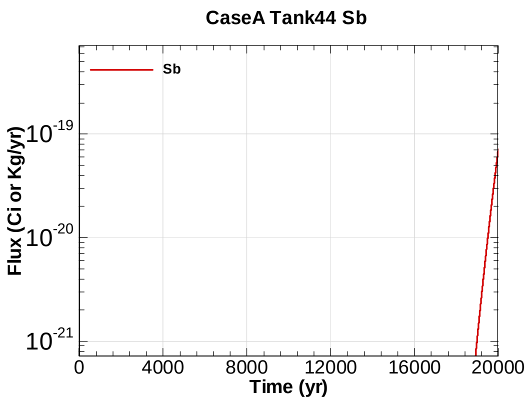

Figure A.2-1295 - Water Table Flux for CaseA Tank44 Sb

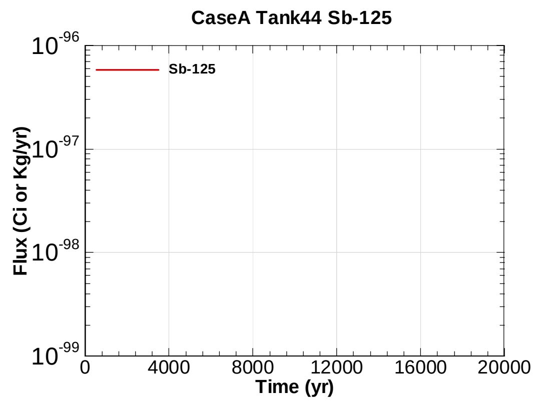

Figure A.2-1296 - Water Table Flux for CaseA Tank44 Sb-125

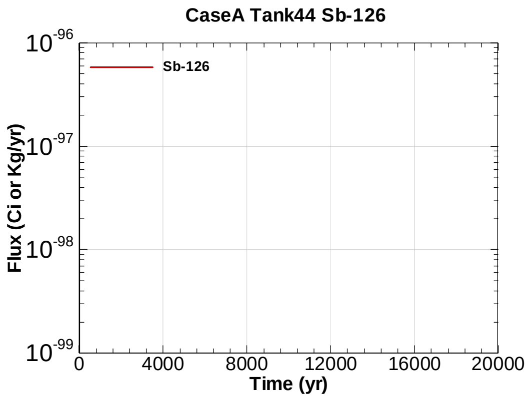

Figure A.2-1297 - Water Table Flux for CaseA Tank44 Sb-126

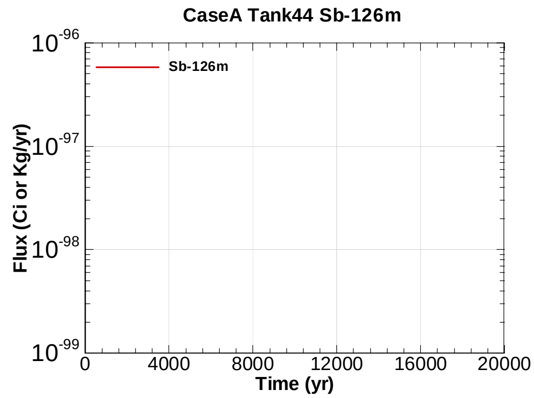

Figure A.2-1298 - Water Table Flux for CaseA Tank44 Sb-126m

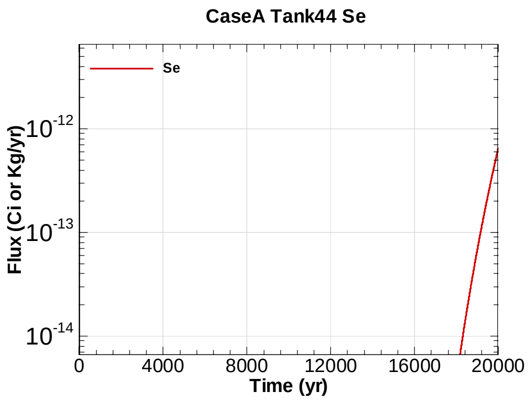

Figure A.2-1299 - Water Table Flux for CaseA Tank44 Se

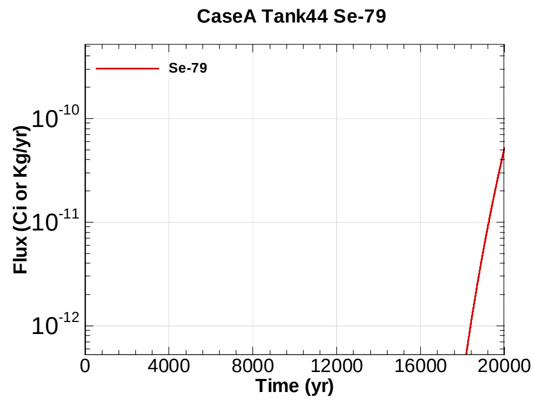

Figure A.2-1300 - Water Table Flux for CaseA Tank44 Se-79

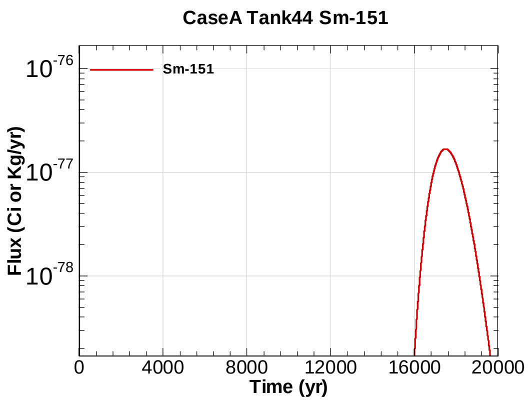

Figure A.2-1301 - Water Table Flux for CaseA Tank44 Sm-151

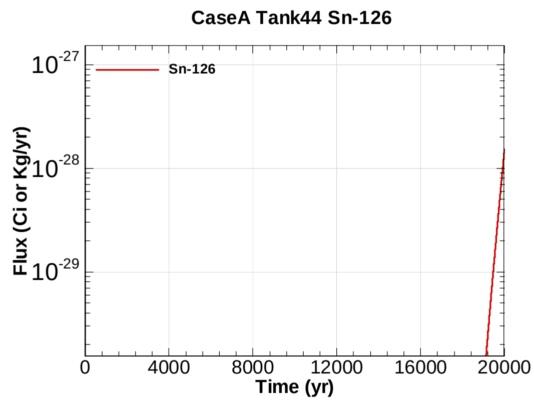

Figure A.2-1302 - Water Table Flux for CaseA Tank44 Sn-126

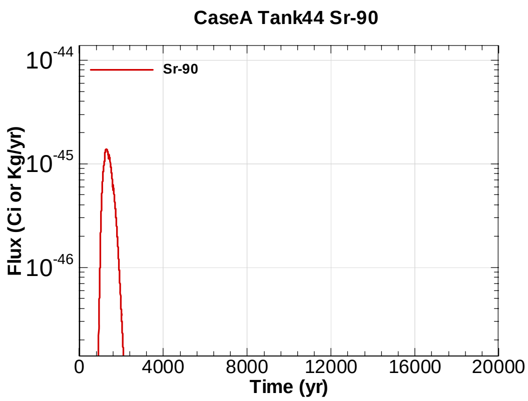

Figure A.2-1303 - Water Table Flux for CaseA Tank44 Sr-90

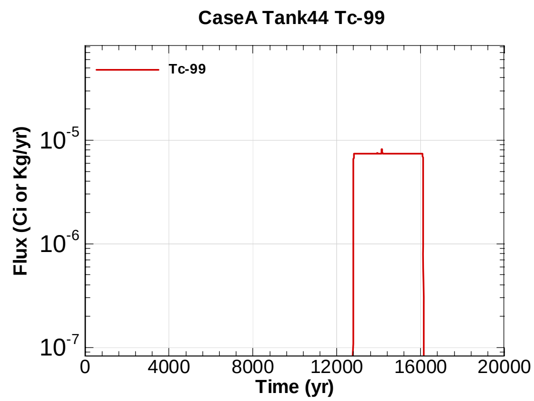

Figure A.2-1304 - Water Table Flux for CaseA Tank44 Tc-99

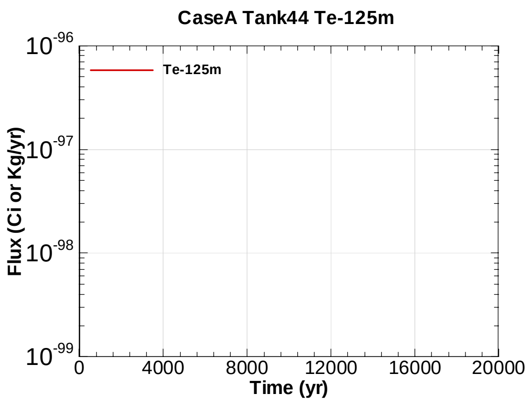

Figure A.2-1305 - Water Table Flux for CaseA Tank44 Te-125m

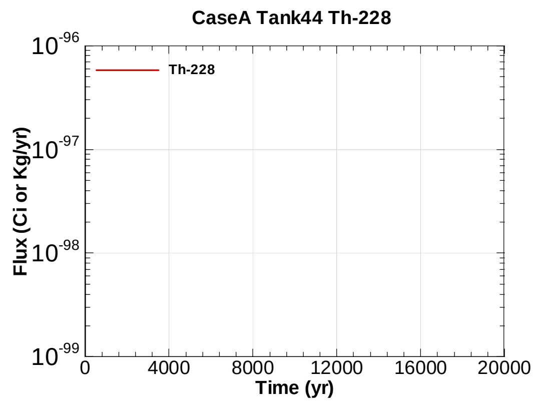

Figure A.2-1306 - Water Table Flux for CaseA Tank44 Th-228

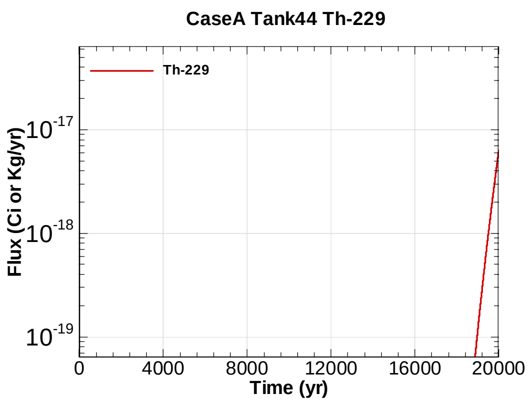

Figure A.2-1307 - Water Table Flux for CaseA Tank44 Th-229

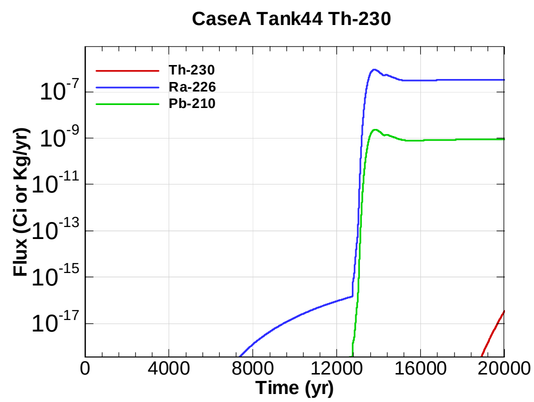

Figure A.2-1308 - Water Table Flux for CaseA Tank44 Th-230

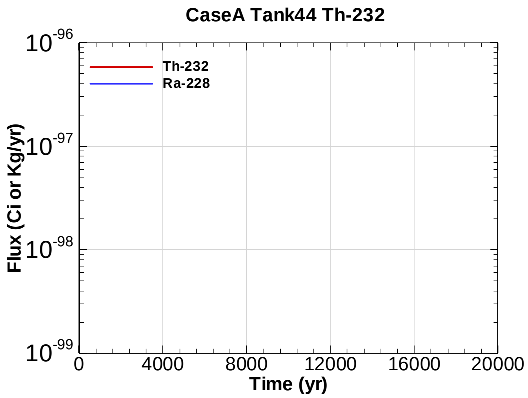

Figure A.2-1309 - Water Table Flux for CaseA Tank44 Th-232

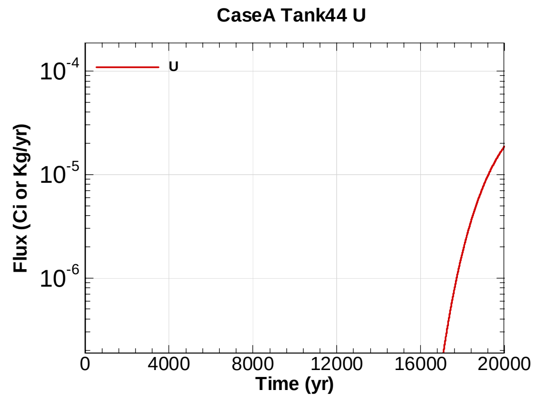

Figure A.2-1310 - Water Table Flux for CaseA Tank44 U

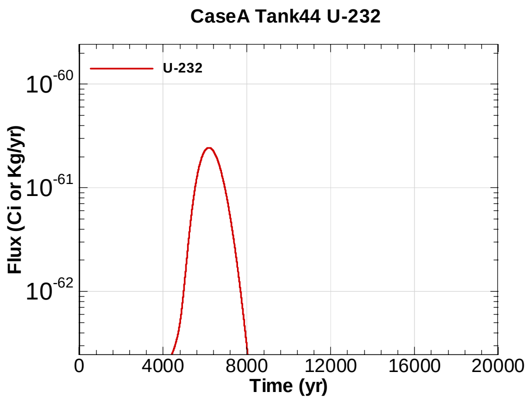

Figure A.2-1311 - Water Table Flux for CaseA Tank44 U-232

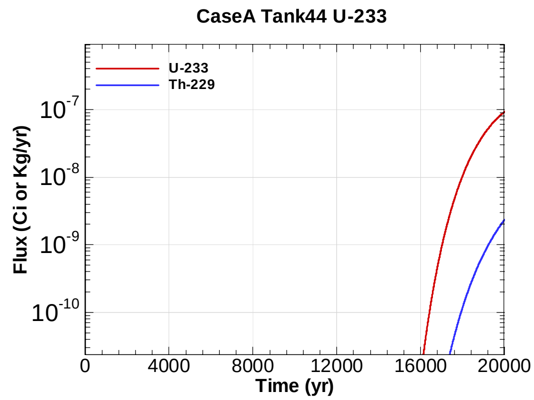

Figure A.2-1312 - Water Table Flux for CaseA Tank44 U-233

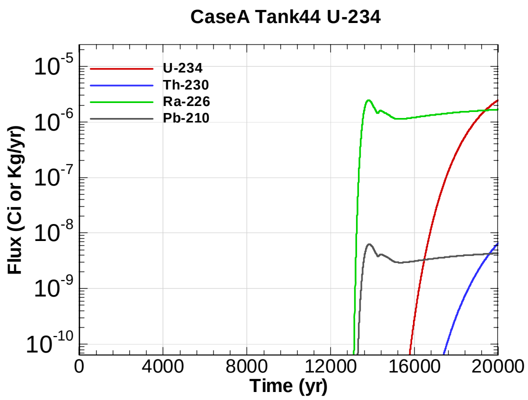

Figure A.2-1313 - Water Table Flux for CaseA Tank44 U-234

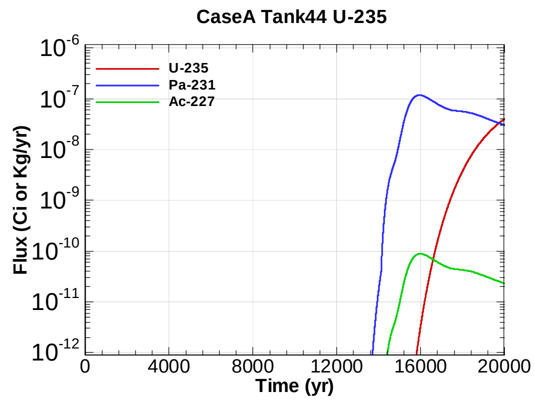

Figure A.2-1314 - Water Table Flux for CaseA Tank44 U-235

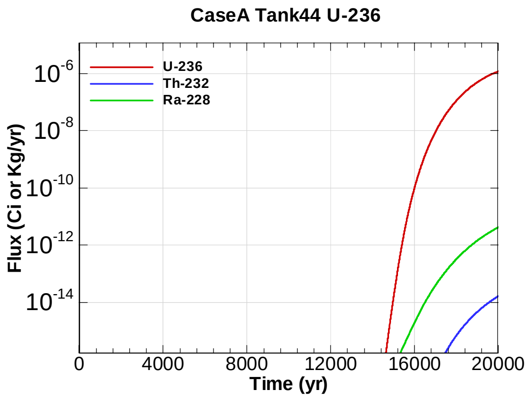

Figure A.2-1315 - Water Table Flux for CaseA Tank44 U-236

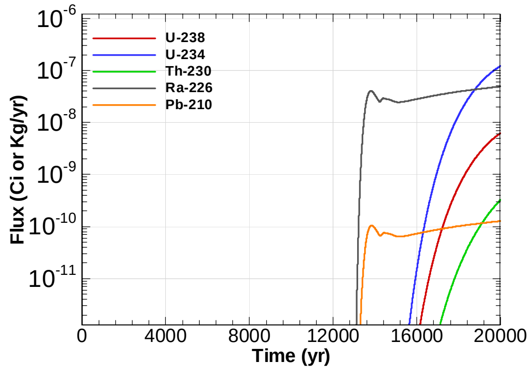

Figure A.2-1316 - Water Table Flux for CaseA Tank44 U-238

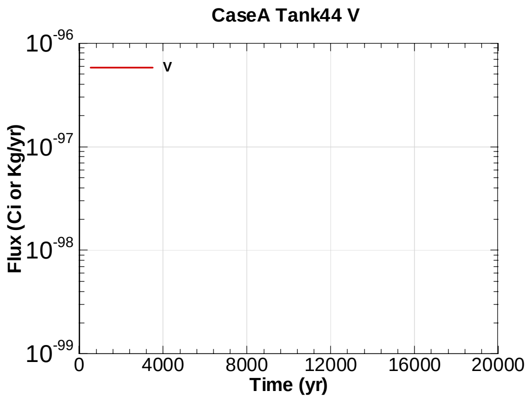

Figure A.2-1317 - Water Table Flux for CaseA Tank44 V

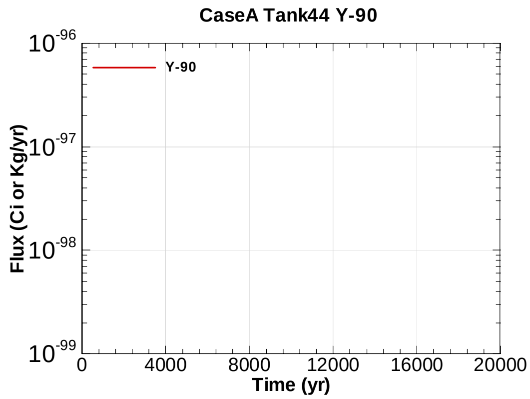

Figure A.2-1318 - Water Table Flux for CaseA Tank44 Y-90

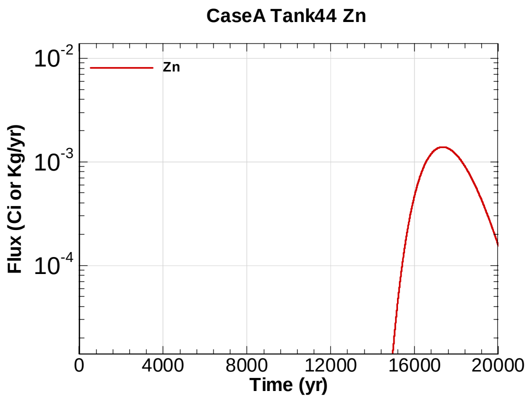

Figure A.2-1319 - Water Table Flux for CaseA Tank44 Zn

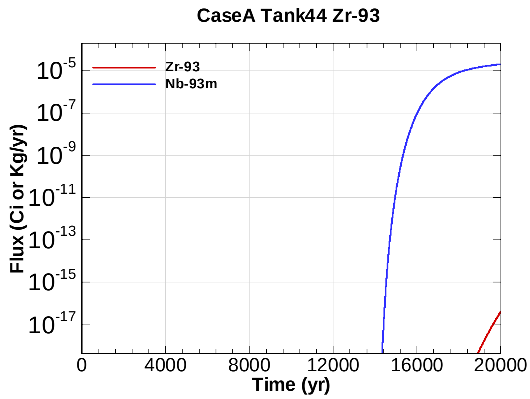

Figure A.2-1320 - Water Table Flux for CaseA Tank44 Zr-93

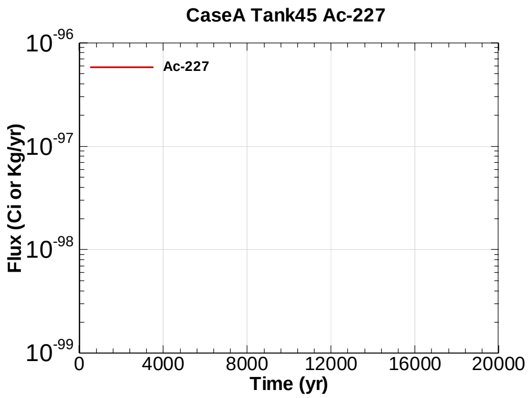

Figure A.2-1321 - Water Table Flux for CaseA Tank45 Ac-227

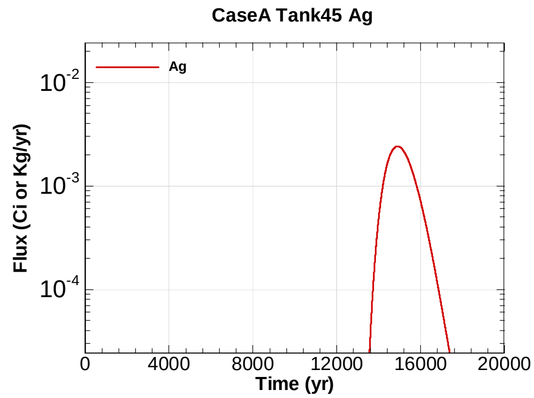

Figure A.2-1322 - Water Table Flux for CaseA Tank45 Ag

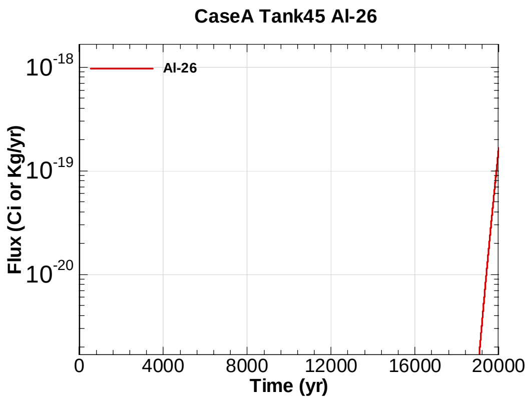

Figure A.2-1323 - Water Table Flux for CaseA Tank45 Al-26

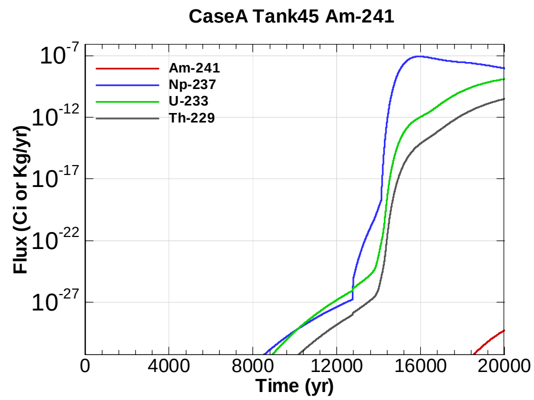

Figure A.2-1324 - Water Table Flux for CaseA Tank45 Am-241

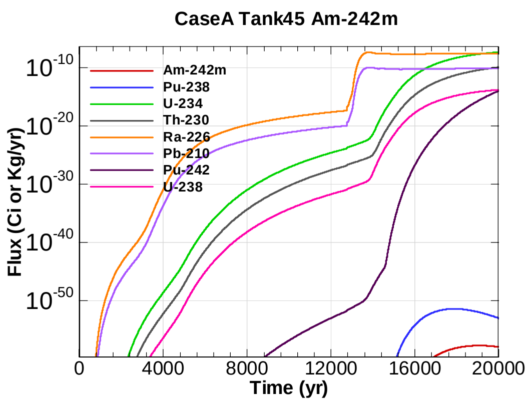

Figure A.2-1325 - Water Table Flux for CaseA Tank45 Am-242m

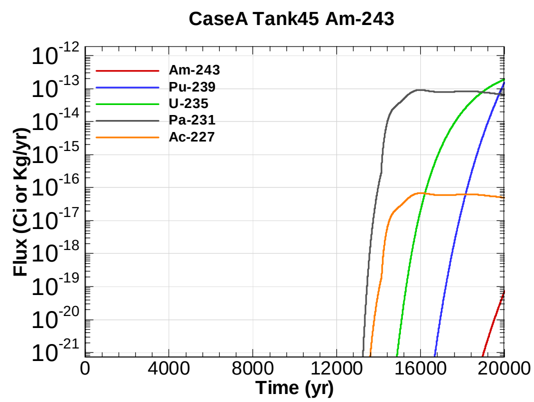

Figure A.2-1326 - Water Table Flux for CaseA Tank45 Am-243

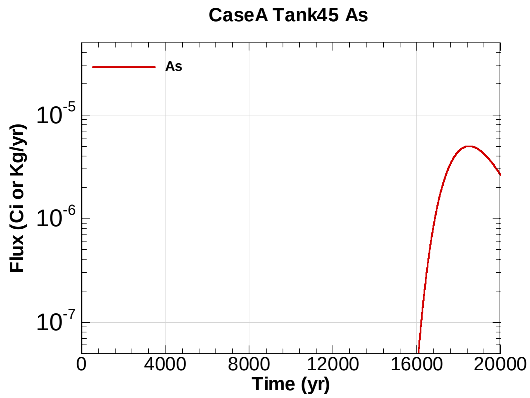

Figure A.2-1327 - Water Table Flux for CaseA Tank45 As

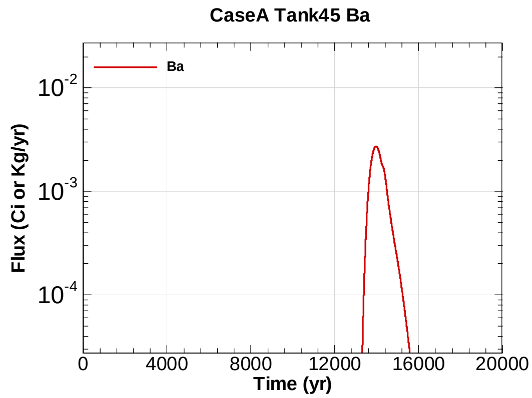

Figure A.2-1328 - Water Table Flux for CaseA Tank45 Ba

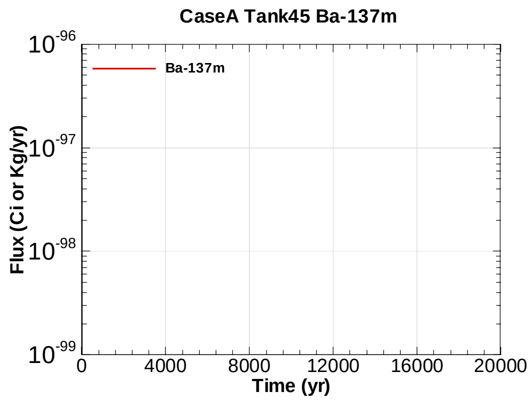

Figure A.2-1329 - Water Table Flux for CaseA Tank45 Ba-137m

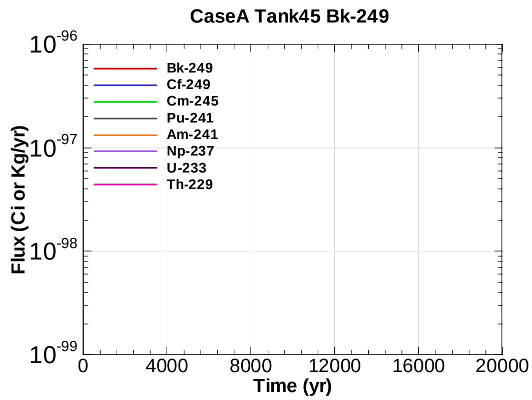

Figure A.2-1330 - Water Table Flux for CaseA Tank45 Bk-249

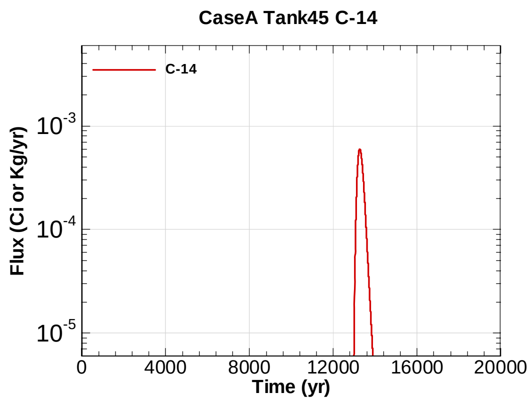

Figure A.2-1331 - Water Table Flux for CaseA Tank45 C-14

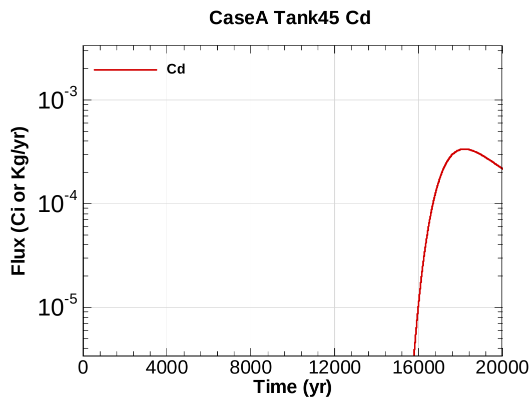

Figure A.2-1332 - Water Table Flux for CaseA Tank45 Cd

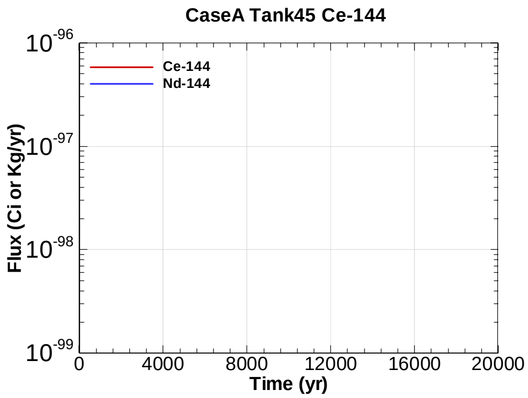

Figure A.2-1333 - Water Table Flux for CaseA Tank45 Ce-144

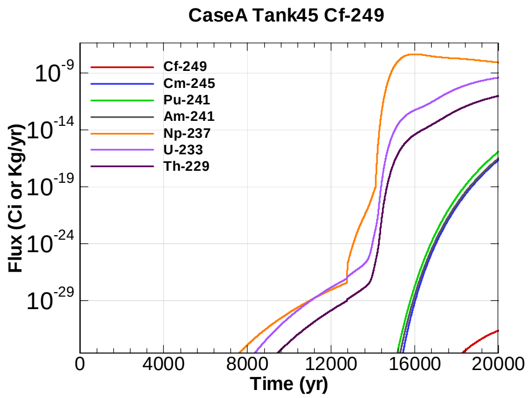

Figure A.2-1334 - Water Table Flux for CaseA Tank45 Cf-249

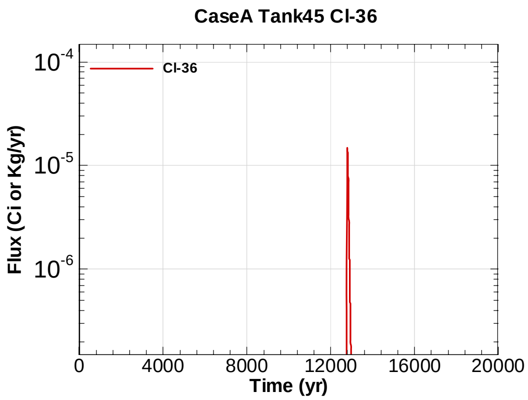

Figure A.2-1335 - Water Table Flux for CaseA Tank45 Cl-36

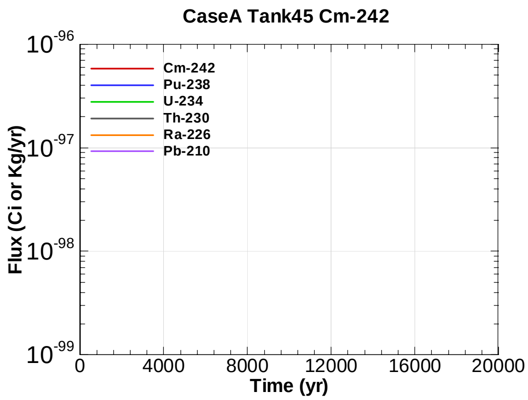

Figure A.2-1336 - Water Table Flux for CaseA Tank45 Cm-242

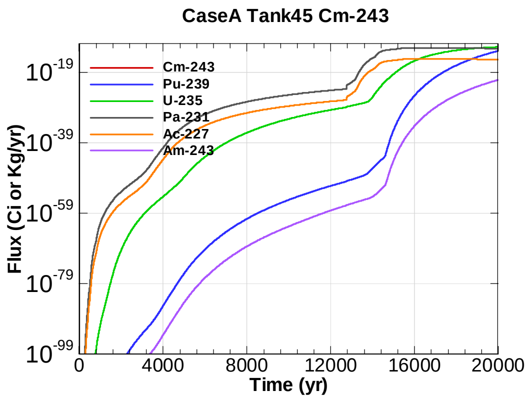

Figure A.2-1337 - Water Table Flux for CaseA Tank45 Cm-243

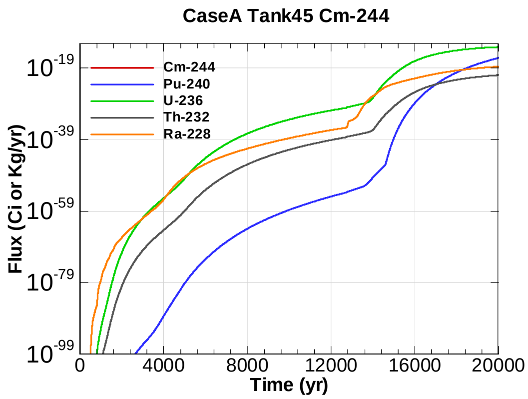

Figure A.2-1338 - Water Table Flux for CaseA Tank45 Cm-244

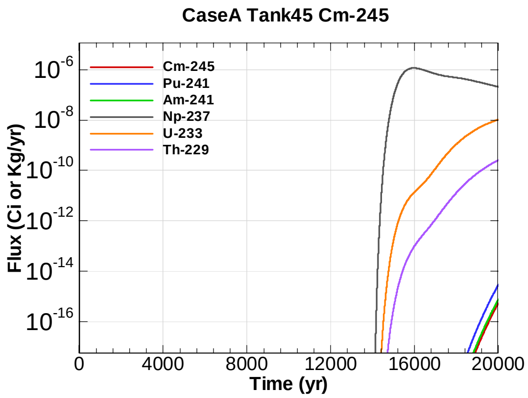

Figure A.2-1339 - Water Table Flux for CaseA Tank45 Cm-245

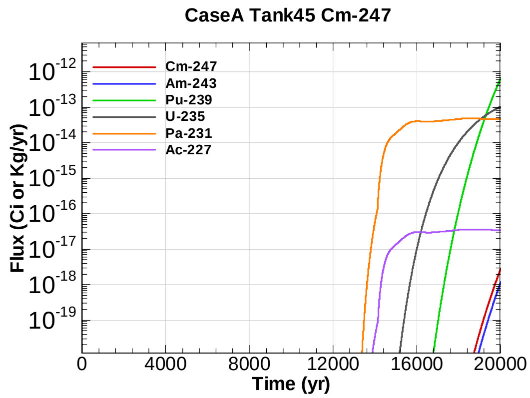

Figure A.2-1340 - Water Table Flux for CaseA Tank45 Cm-247

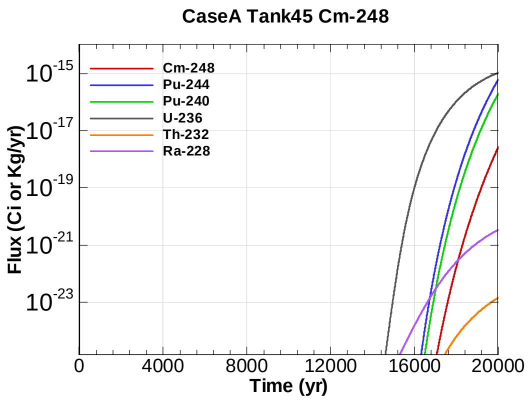

Figure A.2-1341 - Water Table Flux for CaseA Tank45 Cm-248

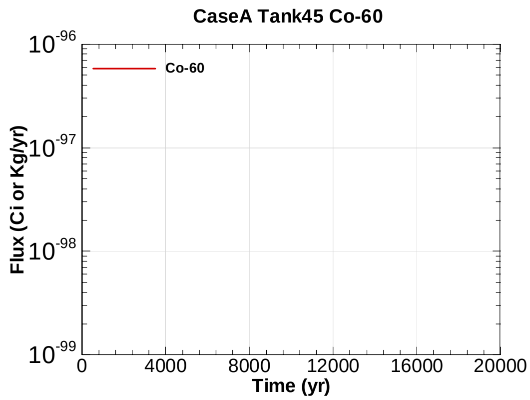

Figure A.2-1342 - Water Table Flux for CaseA Tank45 Co-60

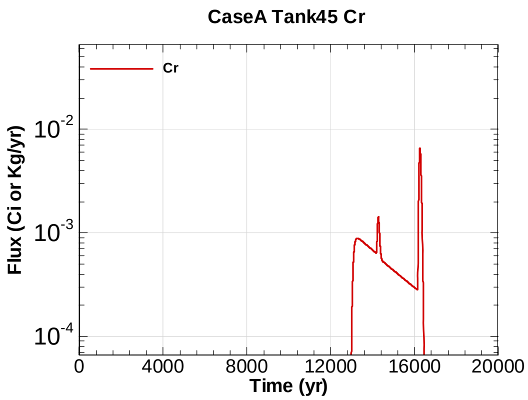

Figure A.2-1343 - Water Table Flux for CaseA Tank45 Cr

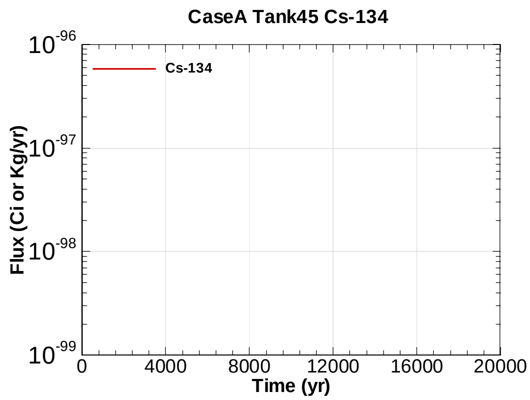

Figure A.2-1344 - Water Table Flux for CaseA Tank45 Cs-134

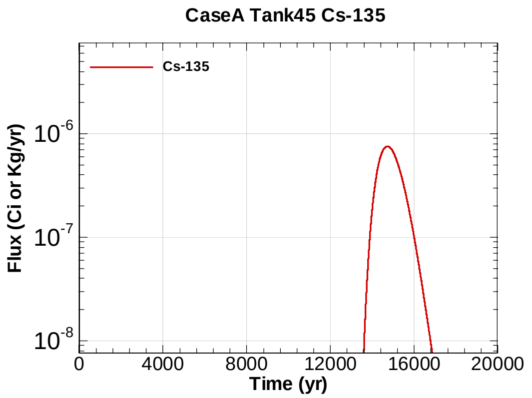

Figure A.2-1345 - Water Table Flux for CaseA Tank45 Cs-135

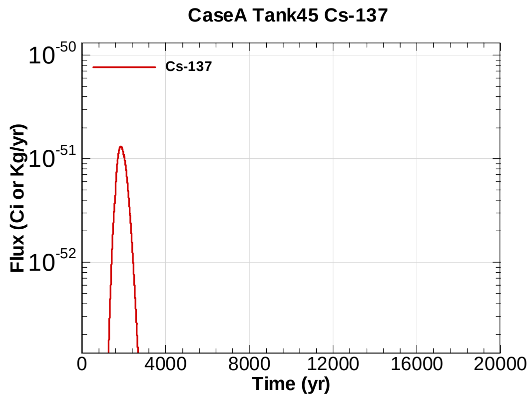

Figure A.2-1346 - Water Table Flux for CaseA Tank45 Cs-137

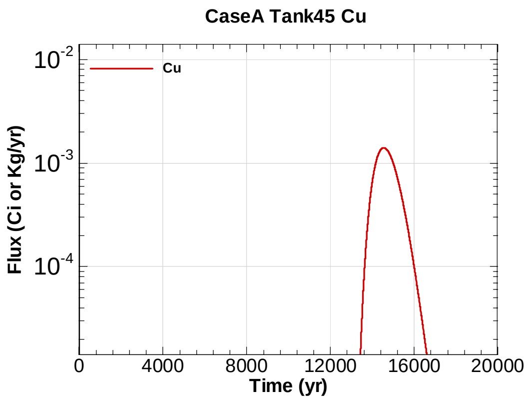

Figure A.2-1347 - Water Table Flux for CaseA Tank45 Cu

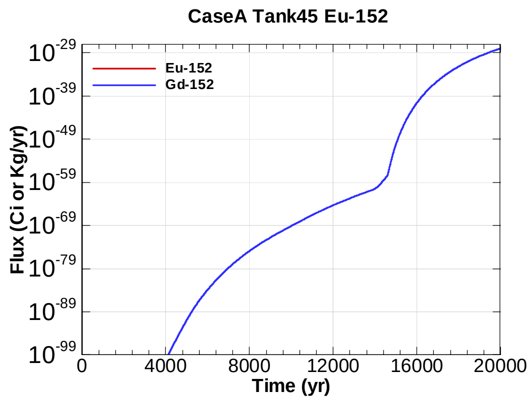

Figure A.2-1348 - Water Table Flux for CaseA Tank45 Eu-152

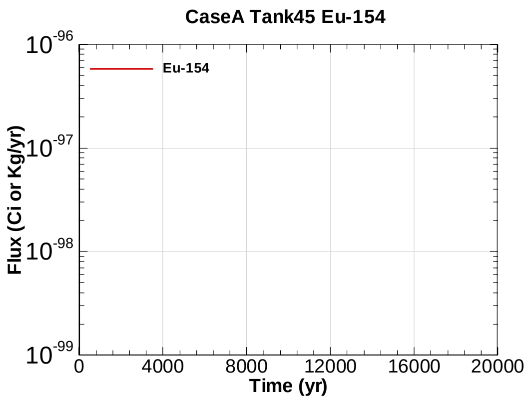

Figure A.2-1349 - Water Table Flux for CaseA Tank45 Eu-154

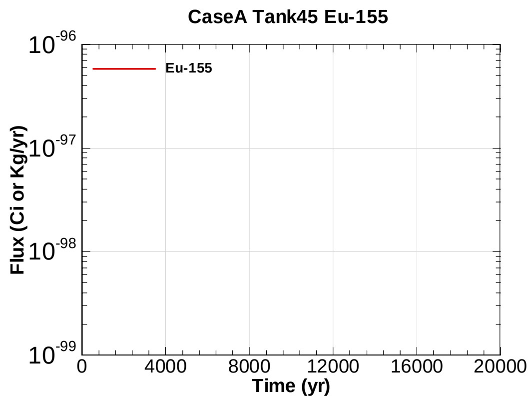

Figure A.2-1350 - Water Table Flux for CaseA Tank45 Eu-155

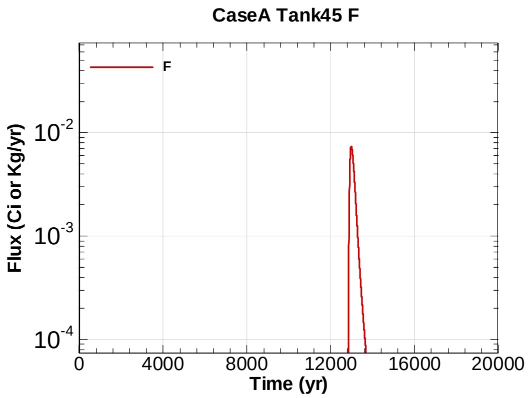

Figure A.2-1351 - Water Table Flux for CaseA Tank45 F

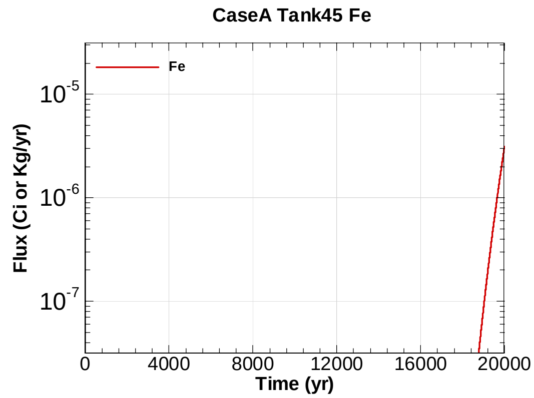

Figure A.2-1352 - Water Table Flux for CaseA Tank45 Fe

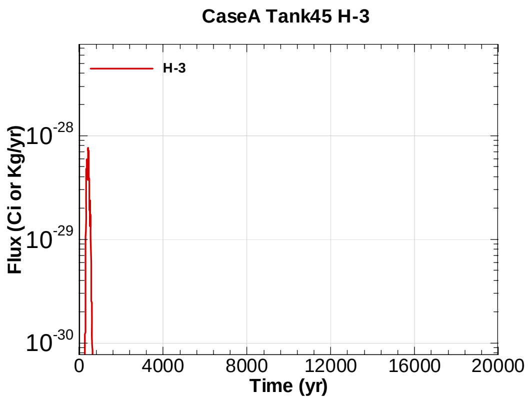

Figure A.2-1353 - Water Table Flux for CaseA Tank45 H-3

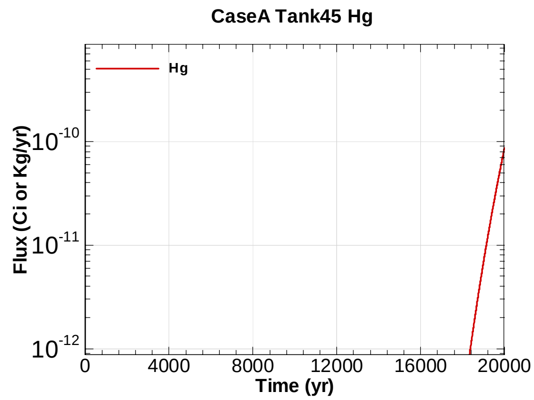

Figure A.2-1354 - Water Table Flux for CaseA Tank45 Hg

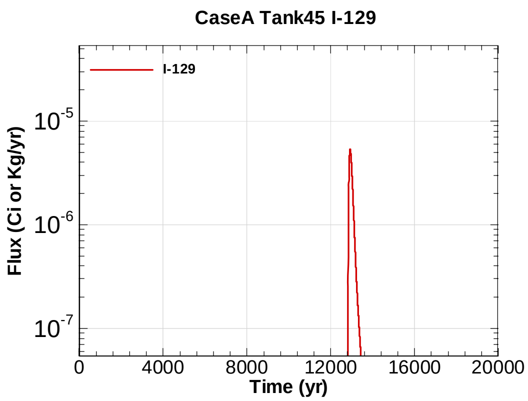

Figure A.2-1355 - Water Table Flux for CaseA Tank45 I-129

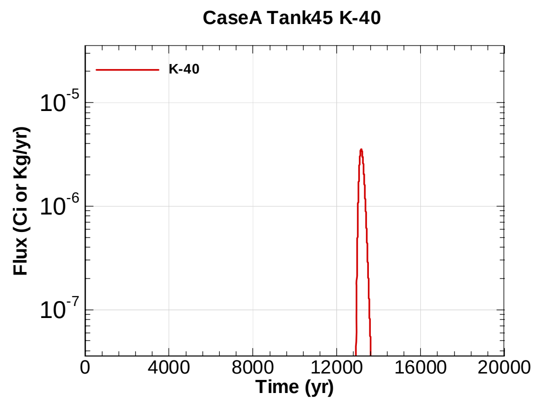

Figure A.2-1356 - Water Table Flux for CaseA Tank45 K-40

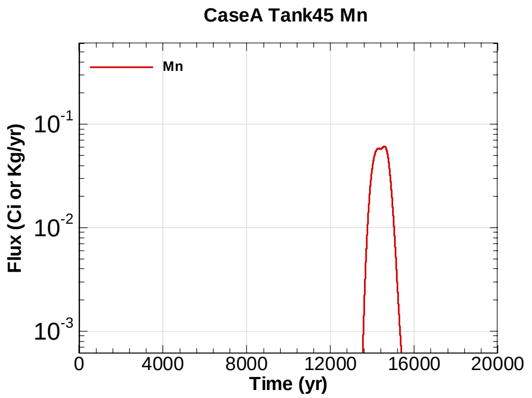

Figure A.2-1357 - Water Table Flux for CaseA Tank45 Mn

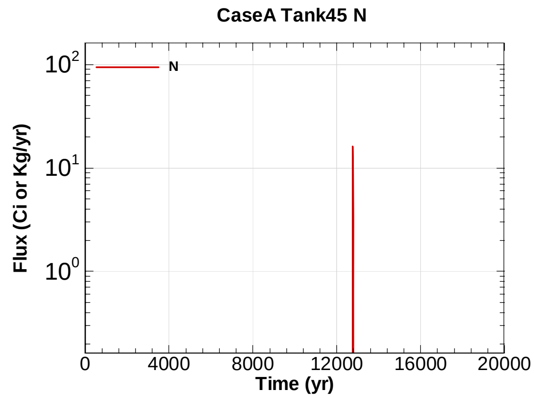

Figure A.2-1358 - Water Table Flux for CaseA Tank45 N

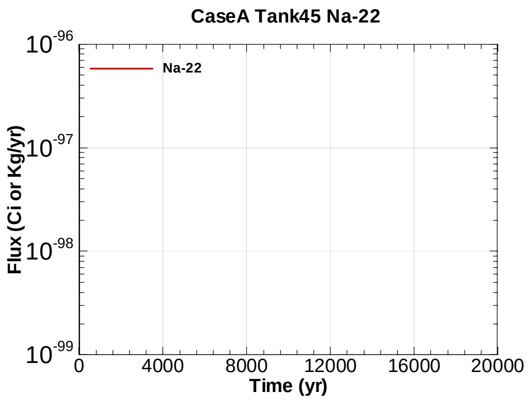

Figure A.2-1359 - Water Table Flux for CaseA Tank45 Na-22

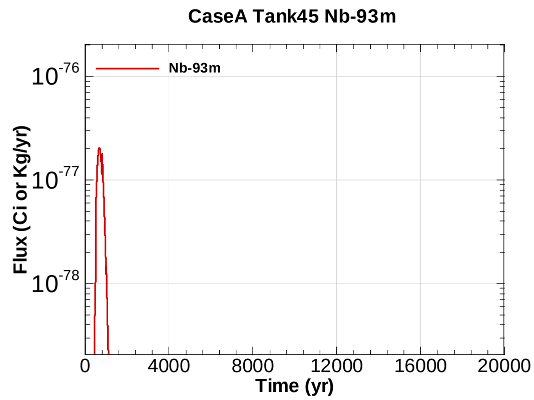

Figure A.2-1360 - Water Table Flux for CaseA Tank45 Nb-93m

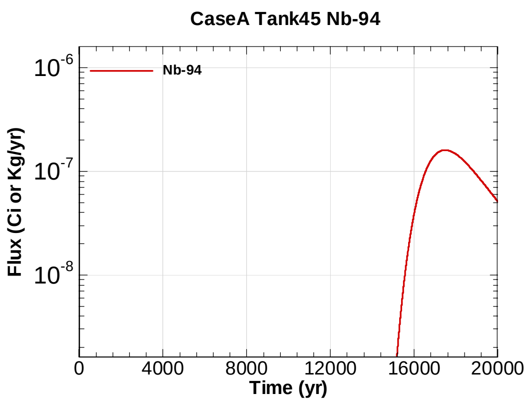

Figure A.2-1361 - Water Table Flux for CaseA Tank45 Nb-94

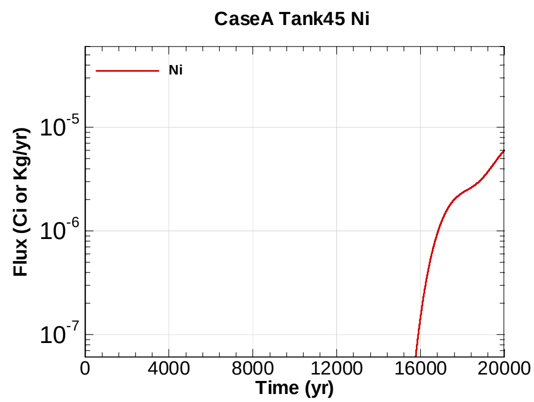

Figure A.2-1362 - Water Table Flux for CaseA Tank45 Ni

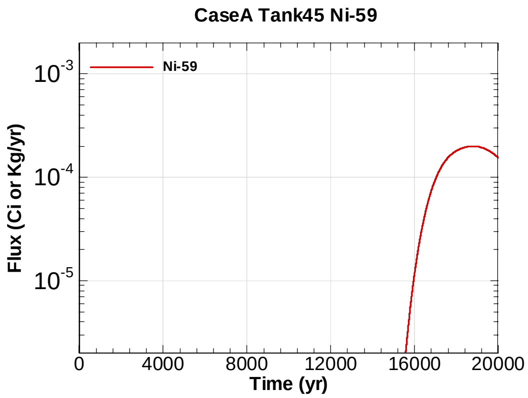

Figure A.2-1363 - Water Table Flux for CaseA Tank45 Ni-59

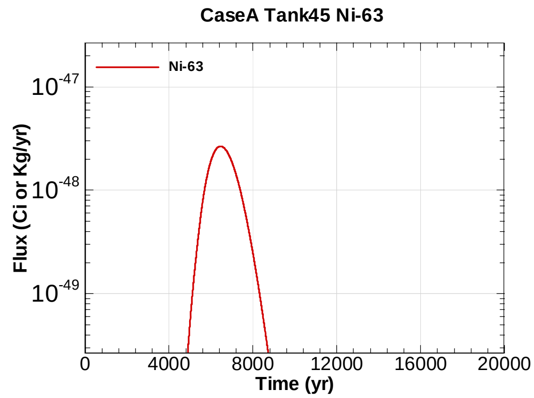

Figure A.2-1364 - Water Table Flux for CaseA Tank45 Ni-63

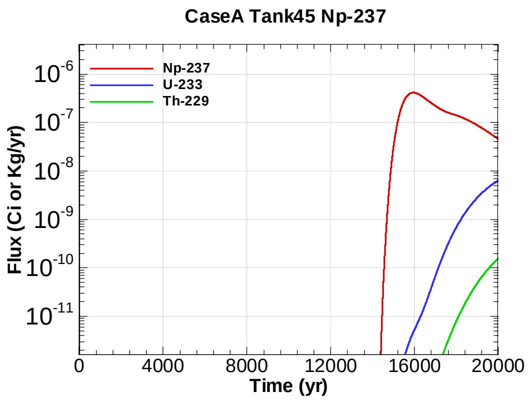

Figure A.2-1365 - Water Table Flux for CaseA Tank45 Np-237

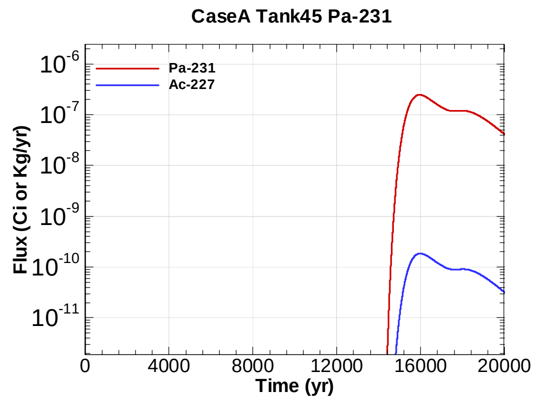

Figure A.2-1366 - Water Table Flux for CaseA Tank45 Pa-231

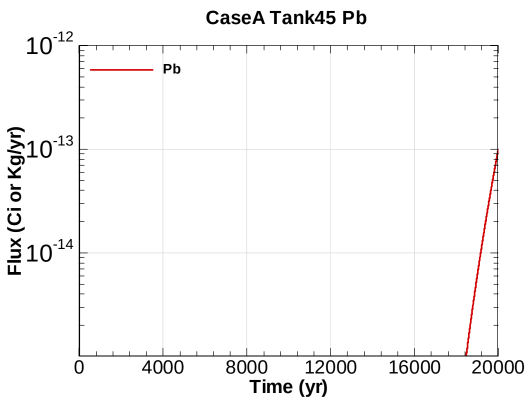

Figure A.2-1367 - Water Table Flux for CaseA Tank45 Pb

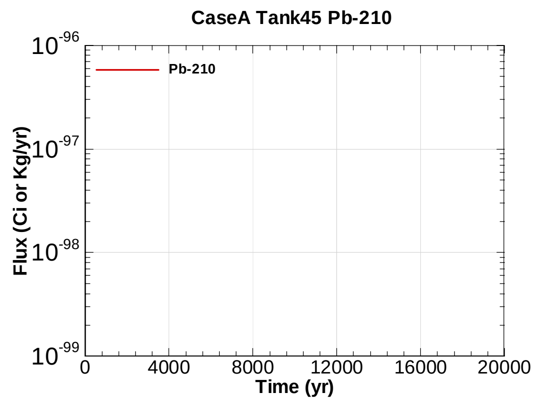

Figure A.2-1368 - Water Table Flux for CaseA Tank45 Pb-210

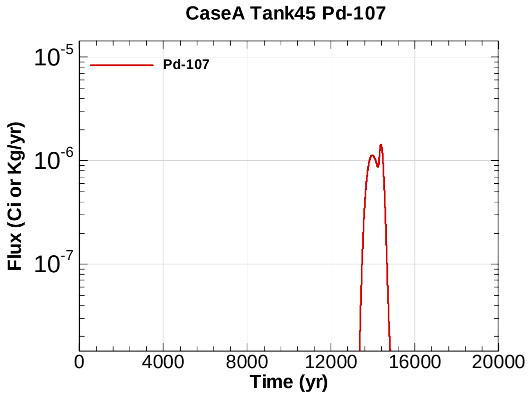

Figure A.2-1369 - Water Table Flux for CaseA Tank45 Pd-107

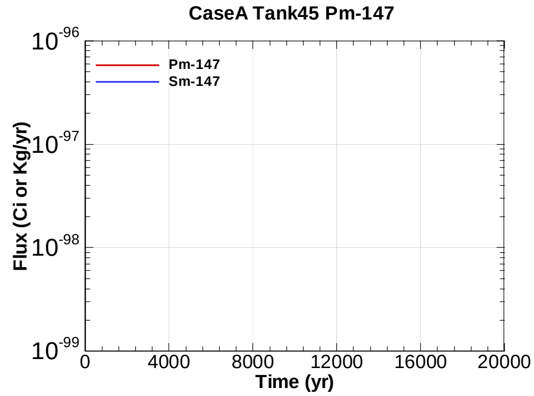

Figure A.2-1370 - Water Table Flux for CaseA Tank45 Pm-147

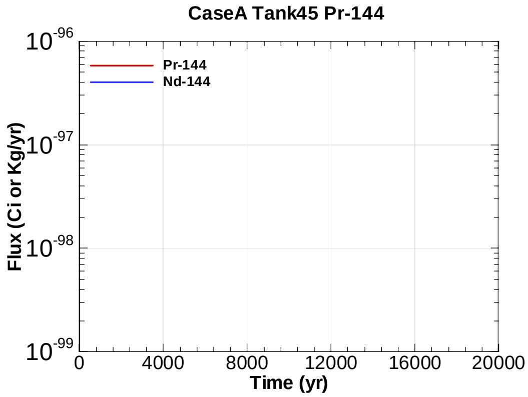

Figure A.2-1371 - Water Table Flux for CaseA Tank45 Pr-144

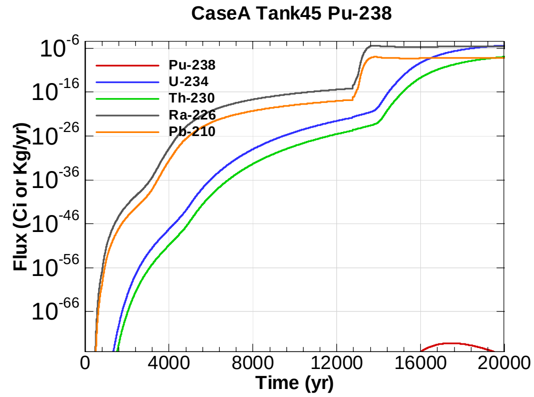

Figure A.2-1372 - Water Table Flux for CaseA Tank45 Pu-238

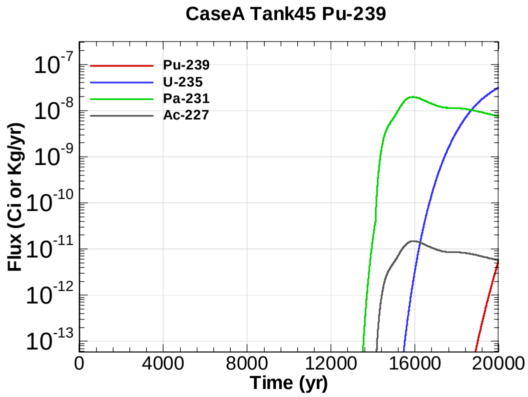

Figure A.2-1373 - Water Table Flux for CaseA Tank45 Pu-239

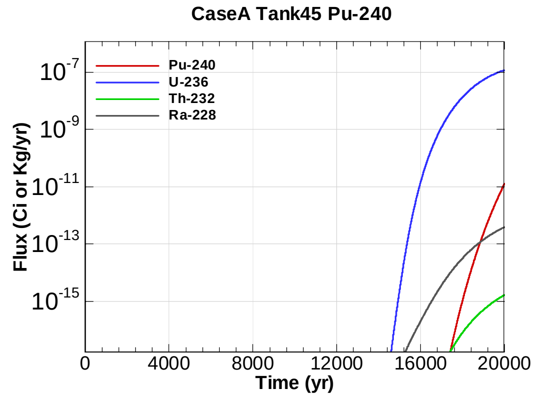

Figure A.2-1374 - Water Table Flux for CaseA Tank45 Pu-240

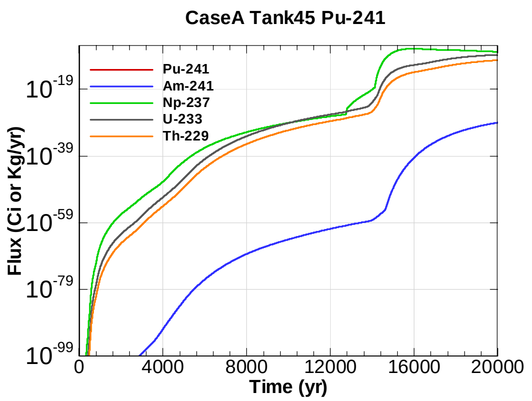

Figure A.2-1375 - Water Table Flux for CaseA Tank45 Pu-241

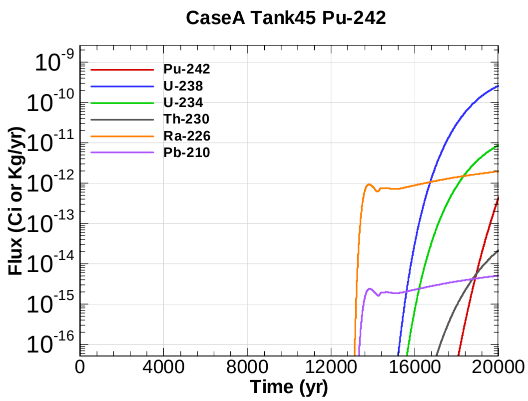

Figure A.2-1376 - Water Table Flux for CaseA Tank45 Pu-242

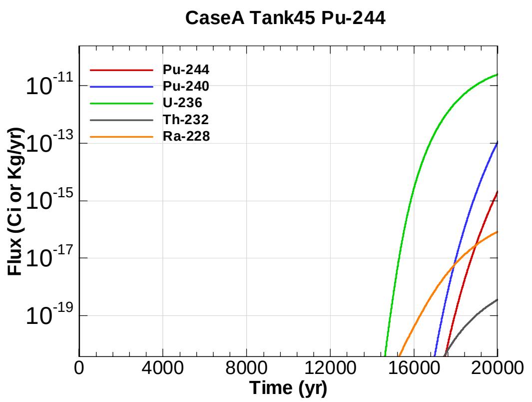

Figure A.2-1377 - Water Table Flux for CaseA Tank45 Pu-244

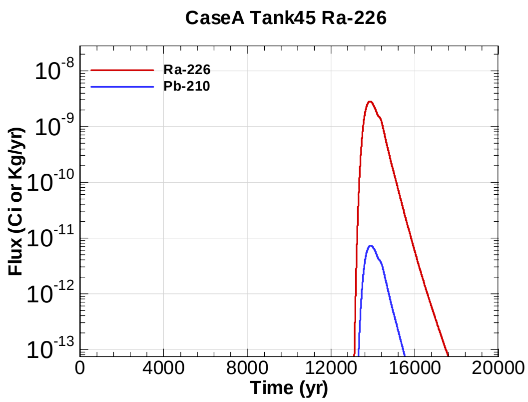

Figure A.2-1378 - Water Table Flux for CaseA Tank45 Ra-226

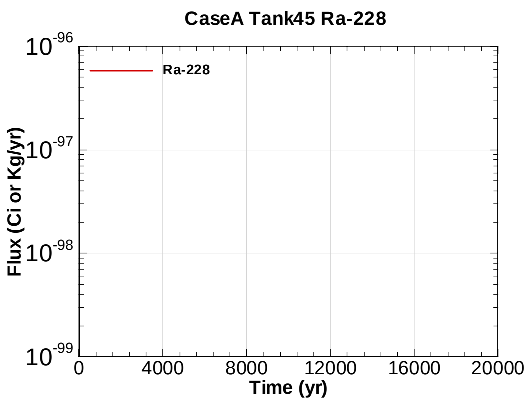

Figure A.2-1379 - Water Table Flux for CaseA Tank45 Ra-228

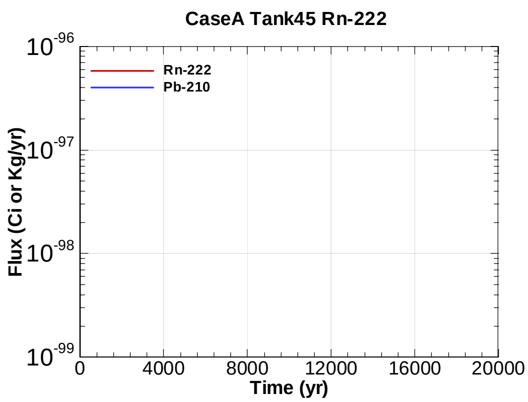

Figure A.2-1380 - Water Table Flux for CaseA Tank45 Rn-222

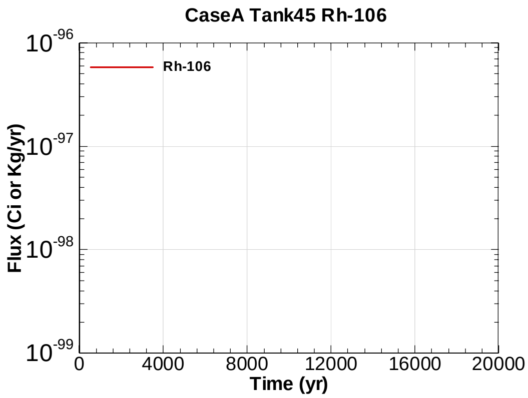

Figure A.2-1381 - Water Table Flux for CaseA Tank45 Rh-106

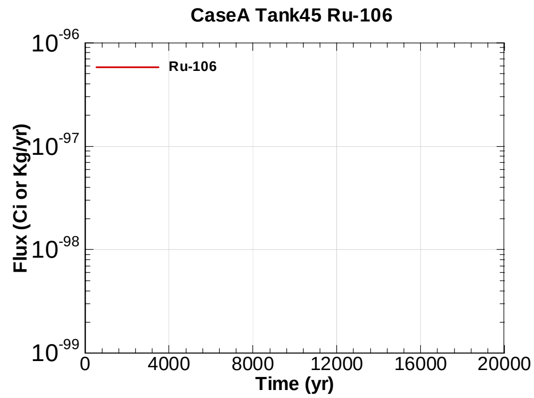

Figure A.2-1382 - Water Table Flux for CaseA Tank45 Ru-106

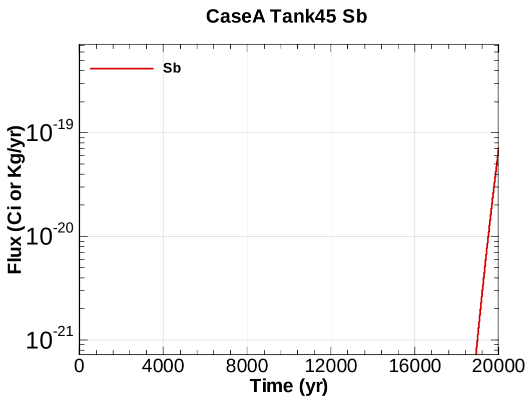

Figure A.2-1383 - Water Table Flux for CaseA Tank45 Sb

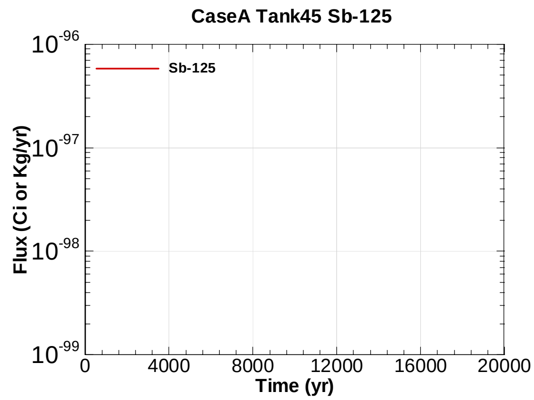

Figure A.2-1384 - Water Table Flux for CaseA Tank45 Sb-125

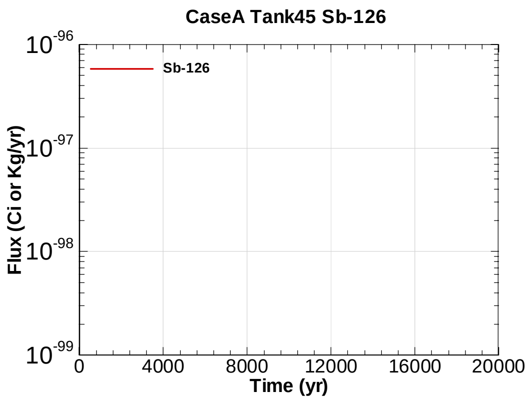

Figure A.2-1385 - Water Table Flux for CaseA Tank45 Sb-126

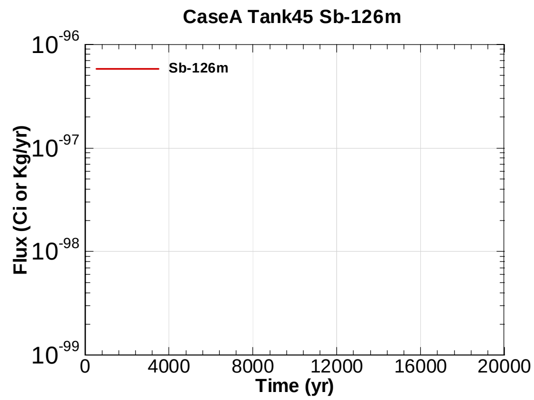

Figure A.2-1386 - Water Table Flux for CaseA Tank45 Sb-126m

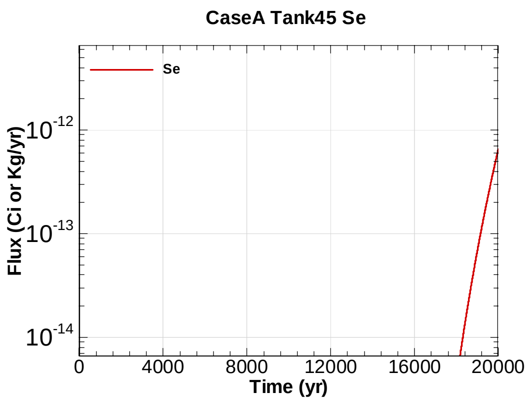

Figure A.2-1387 - Water Table Flux for CaseA Tank45 Se

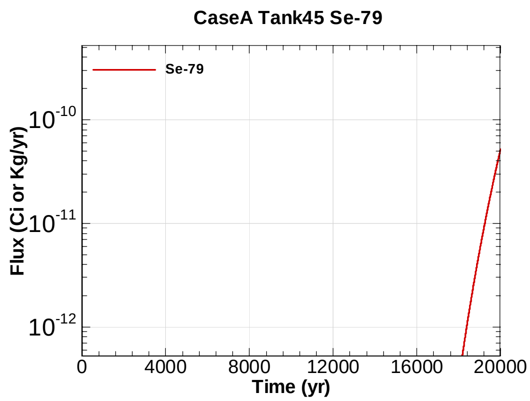

Figure A.2-1388 - Water Table Flux for CaseA Tank45 Se-79

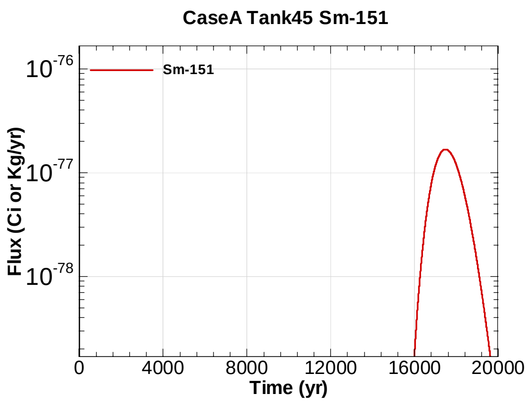

Figure A.2-1389 - Water Table Flux for CaseA Tank45 Sm-151

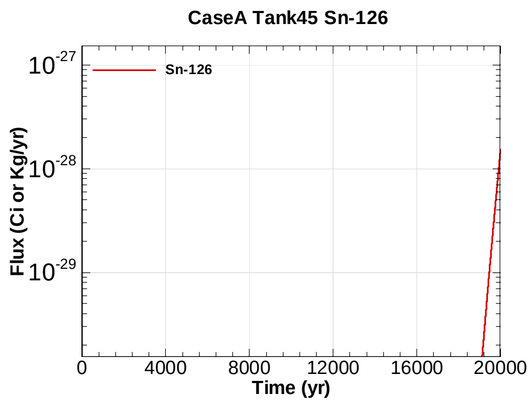

Figure A.2-1390 - Water Table Flux for CaseA Tank45 Sn-126

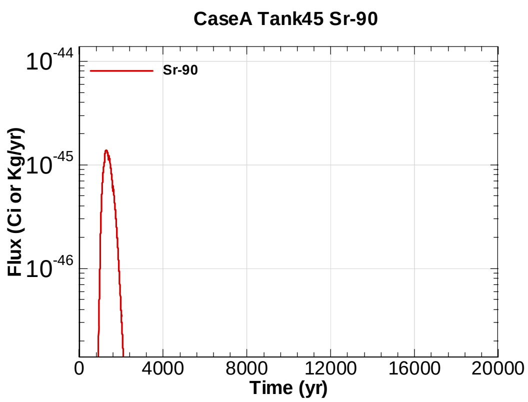

Figure A.2-1391 - Water Table Flux for CaseA Tank45 Sr-90

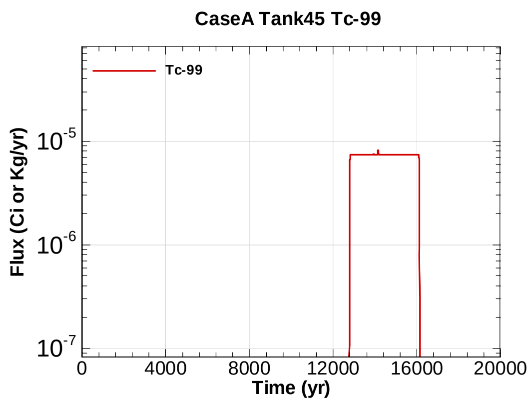

Figure A.2-1392 - Water Table Flux for CaseA Tank45 Tc-99

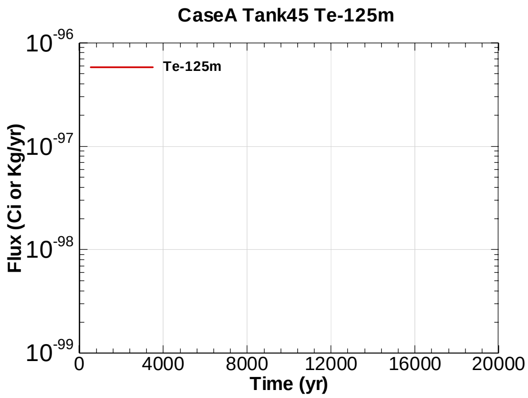

Figure A.2-1393 - Water Table Flux for CaseA Tank45 Te-125m

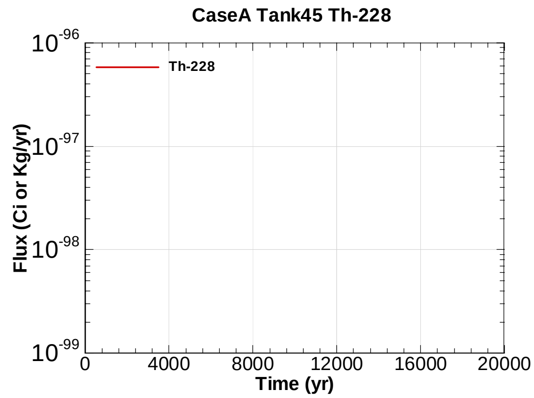

Figure A.2-1394 - Water Table Flux for CaseA Tank45 Th-228

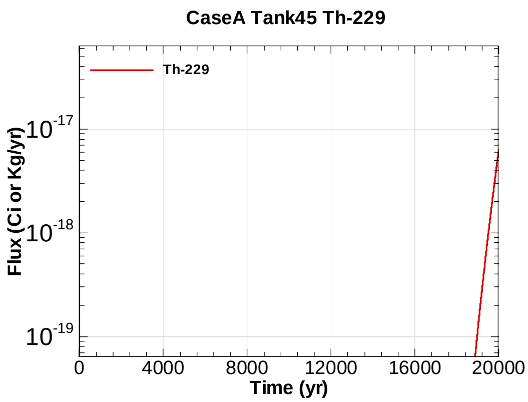

Figure A.2-1395 - Water Table Flux for CaseA Tank45 Th-229

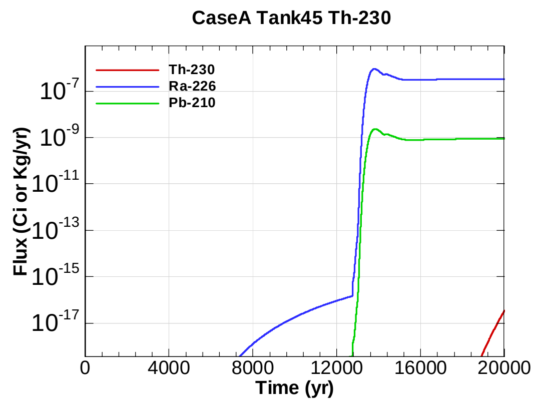

Figure A.2-1396 - Water Table Flux for CaseA Tank45 Th-230

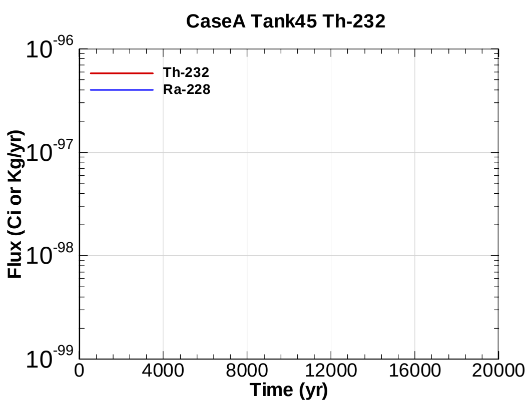

Figure A.2-1397 - Water Table Flux for CaseA Tank45 Th-232

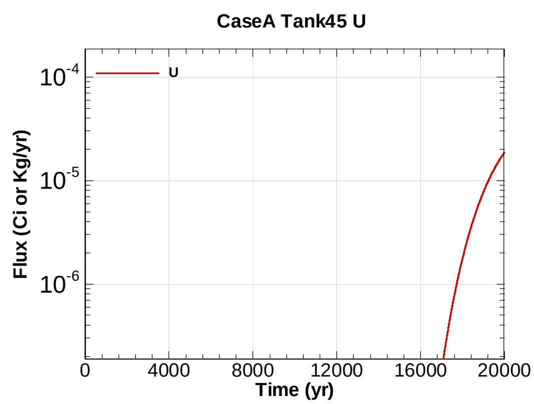

Figure A.2-1398 - Water Table Flux for CaseA Tank45 U

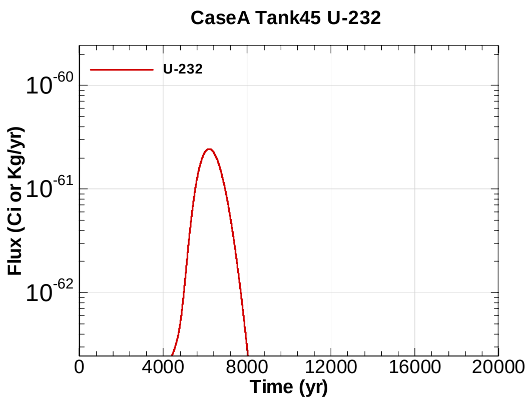

Figure A.2-1399 - Water Table Flux for CaseA Tank45 U-232

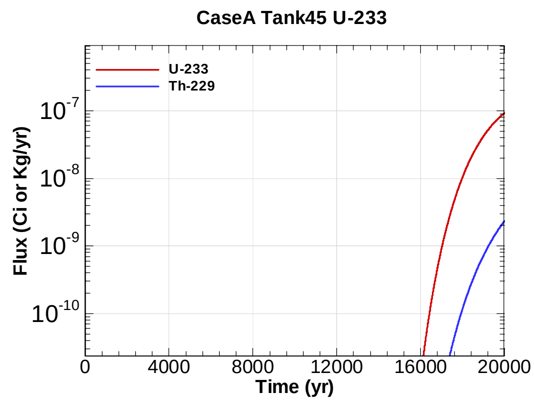

Figure A.2-1400 - Water Table Flux for CaseA Tank45 U-233

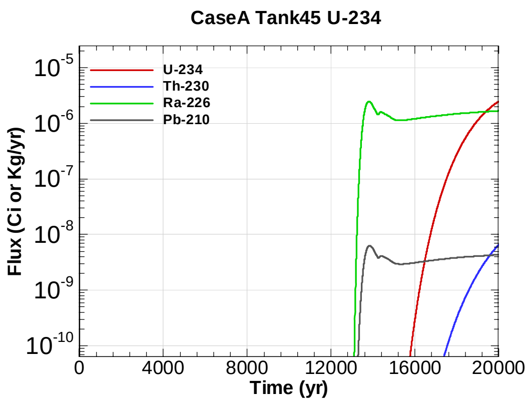

Figure A.2-1401 - Water Table Flux for CaseA Tank45 U-234

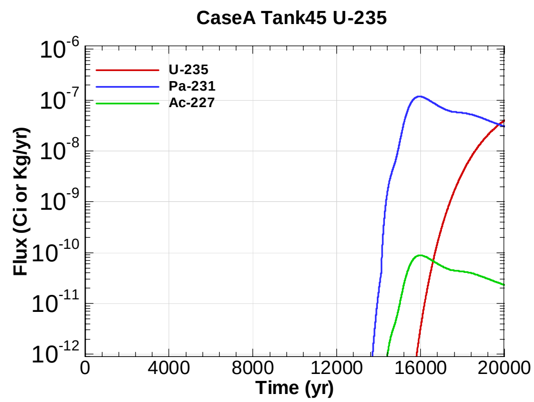

Figure A.2-1402 - Water Table Flux for CaseA Tank45 U-235

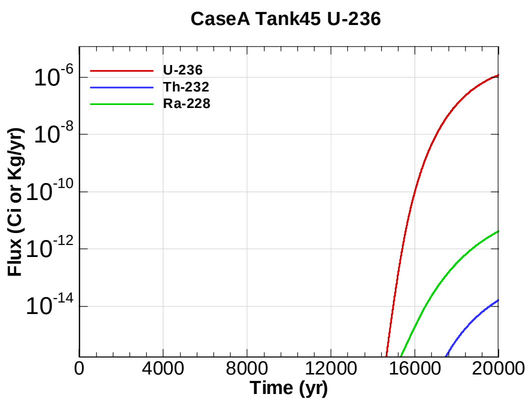

Figure A.2-1403 - Water Table Flux for CaseA Tank45 U-236

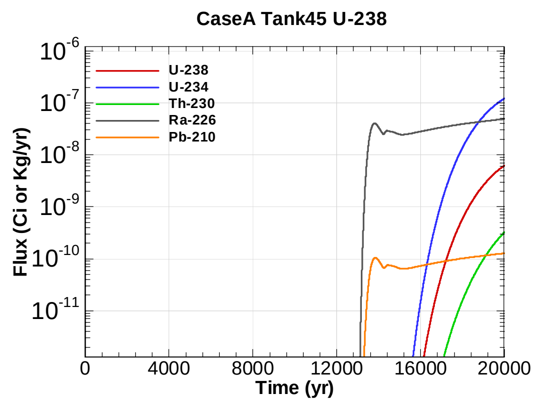

Figure A.2-1404 - Water Table Flux for CaseA Tank45 U-238

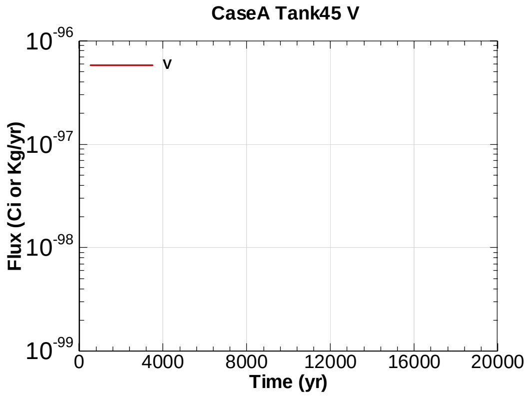

Figure A.2-1405 - Water Table Flux for CaseA Tank45 V

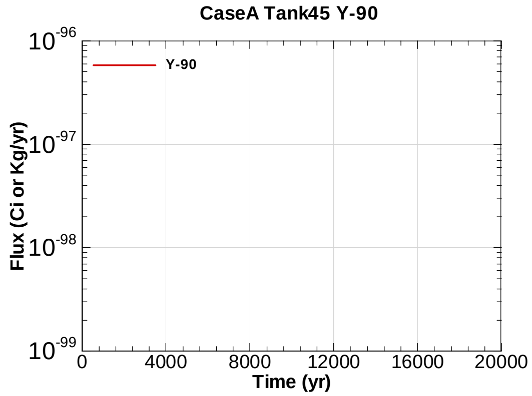

Figure A.2-1406 - Water Table Flux for CaseA Tank45 Y-90

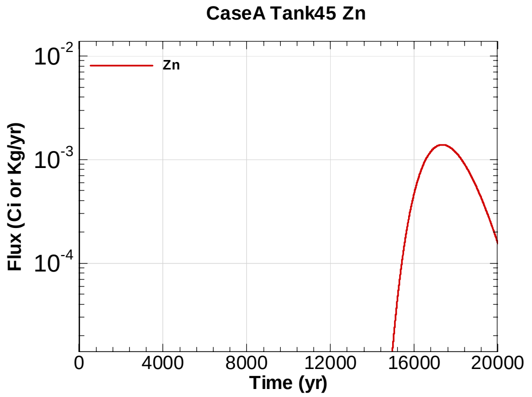

Figure A.2-1407 - Water Table Flux for CaseA Tank45 Zn

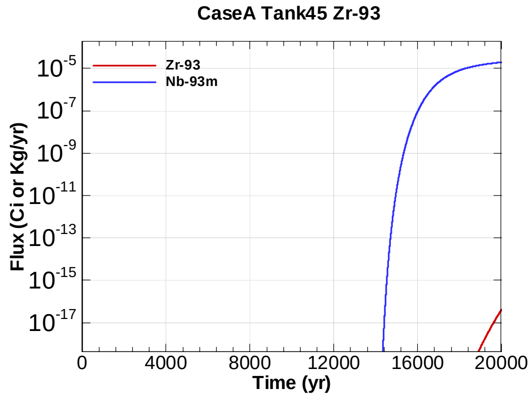

Figure A.2-1408 - Water Table Flux for CaseA Tank45 Zr-93

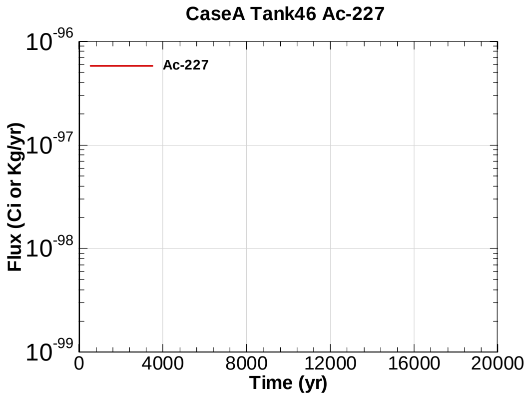

Figure A.2-1409 - Water Table Flux for CaseA Tank46 Ac-227

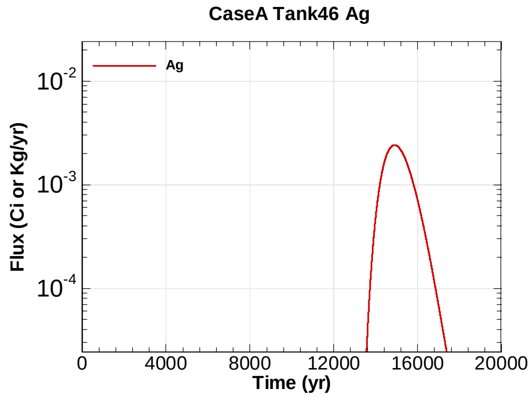

Figure A.2-1410 - Water Table Flux for CaseA Tank46 Ag

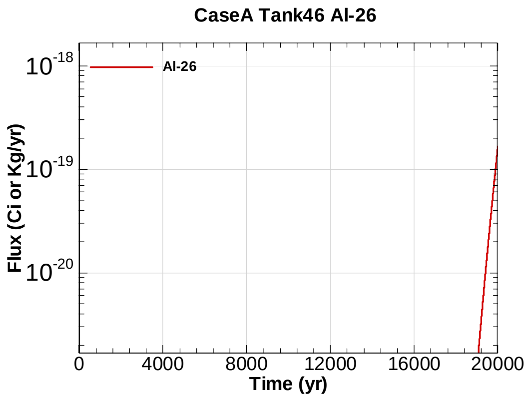

Figure A.2-1411 - Water Table Flux for CaseA Tank46 Al-26

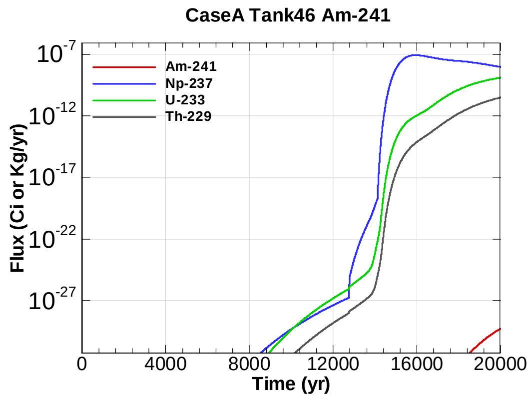

Figure A.2-1412 - Water Table Flux for CaseA Tank46 Am-241

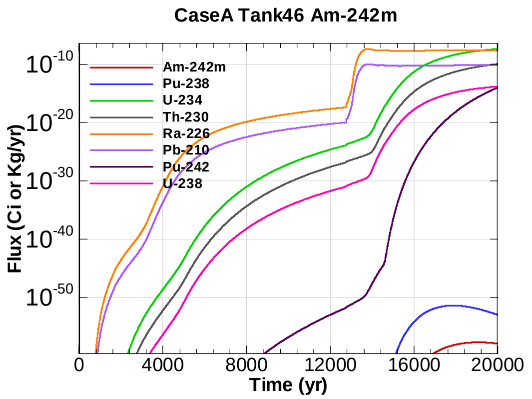

Figure A.2-1413 - Water Table Flux for CaseA Tank46 Am-242m

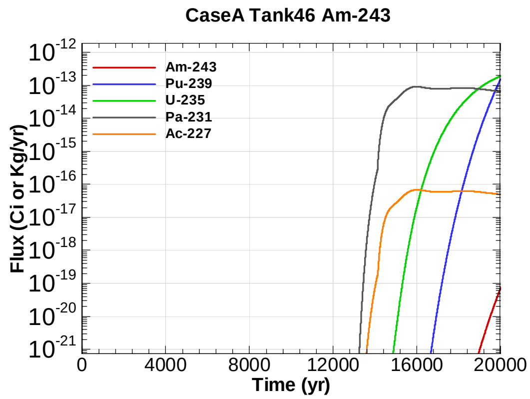

Figure A.2-1414 - Water Table Flux for CaseA Tank46 Am-243

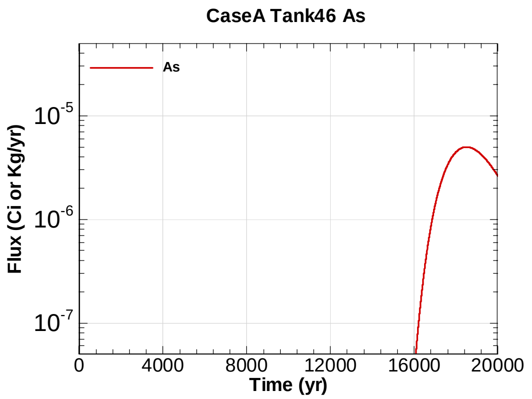

Figure A.2-1415 - Water Table Flux for CaseA Tank46 As

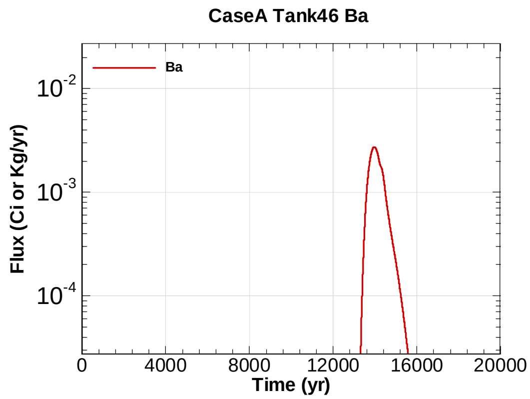

Figure A.2-1416 - Water Table Flux for CaseA Tank46 Ba

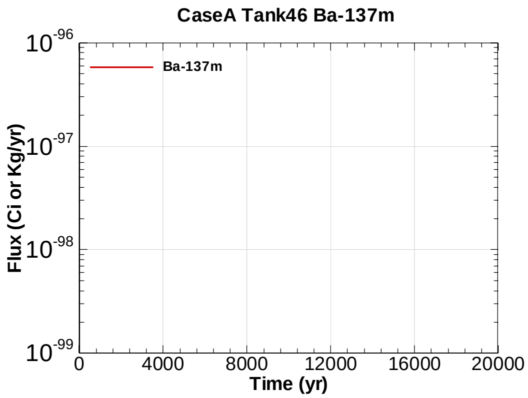

Figure A.2-1417 - Water Table Flux for CaseA Tank46 Ba-137m

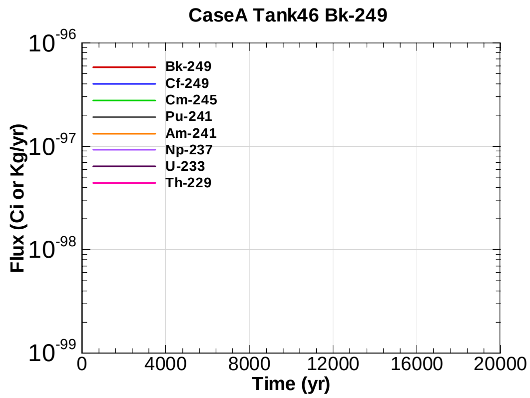

Figure A.2-1418 - Water Table Flux for CaseA Tank46 Bk-249

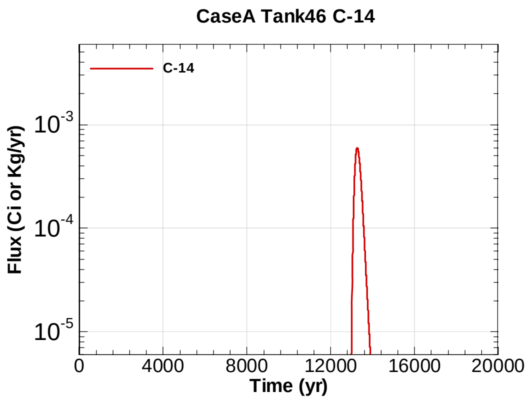

Figure A.2-1419 - Water Table Flux for CaseA Tank46 C-14

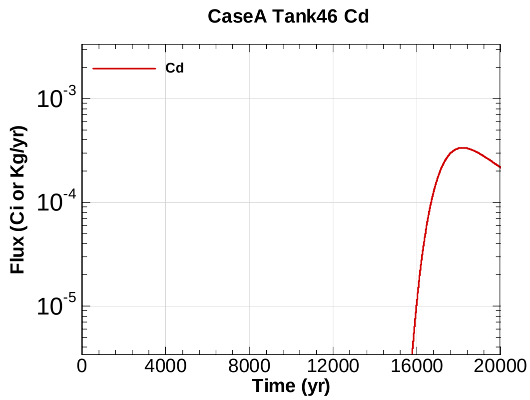

Figure A.2-1420 - Water Table Flux for CaseA Tank46 Cd

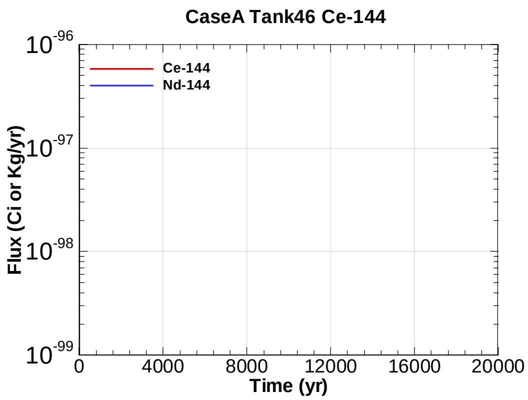

Figure A.2-1421 - Water Table Flux for CaseA Tank46 Ce-144

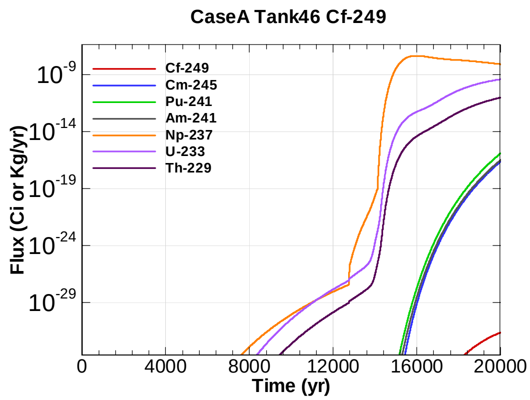

Figure A.2-1422 - Water Table Flux for CaseA Tank46 Cf-249

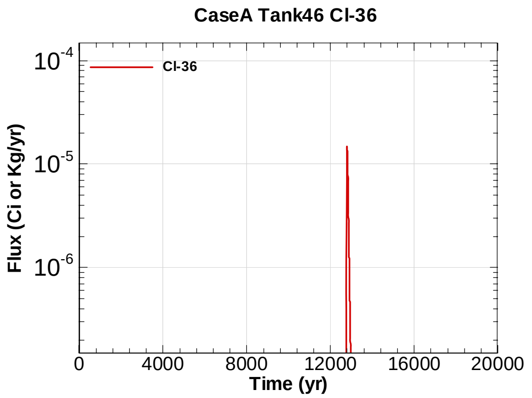

Figure A.2-1423 - Water Table Flux for CaseA Tank46 Cl-36

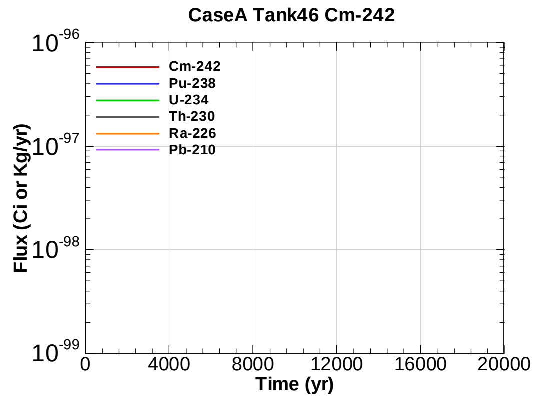

Figure A.2-1424 - Water Table Flux for CaseA Tank46 Cm-242

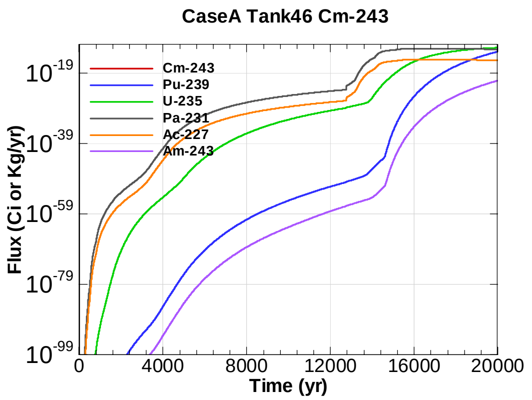

Figure A.2-1425 - Water Table Flux for CaseA Tank46 Cm-243

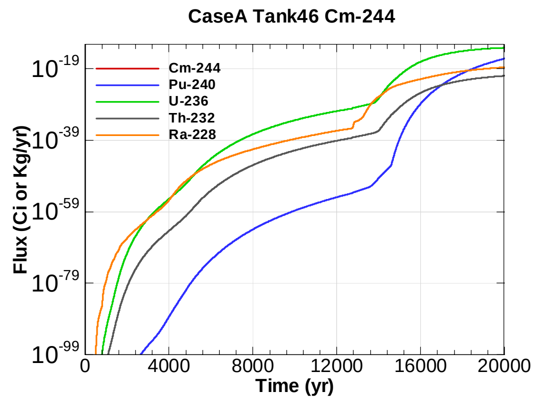

Figure A.2-1426 - Water Table Flux for CaseA Tank46 Cm-244

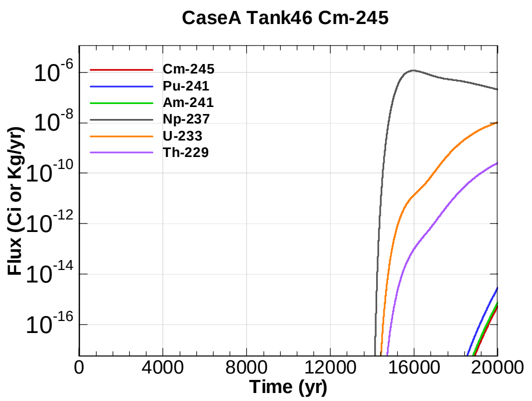

Figure A.2-1427 - Water Table Flux for CaseA Tank46 Cm-245

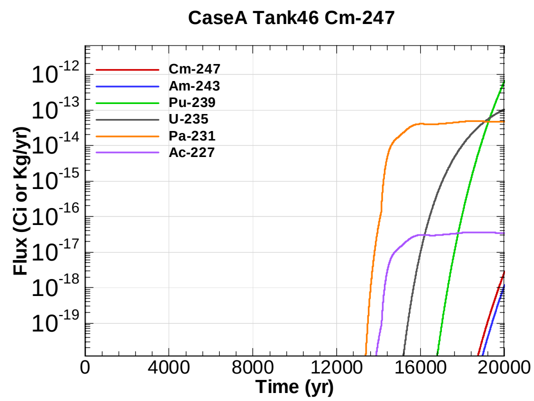

Figure A.2-1428 - Water Table Flux for CaseA Tank46 Cm-247

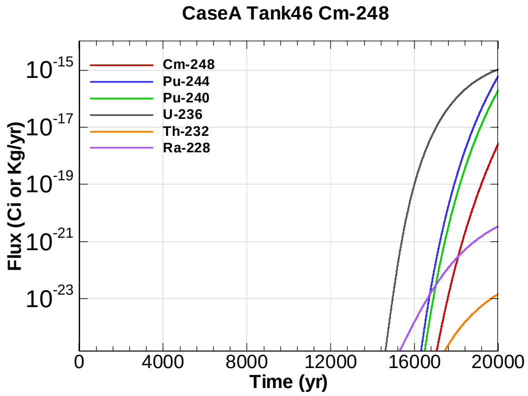

Figure A.2-1429 - Water Table Flux for CaseA Tank46 Cm-248

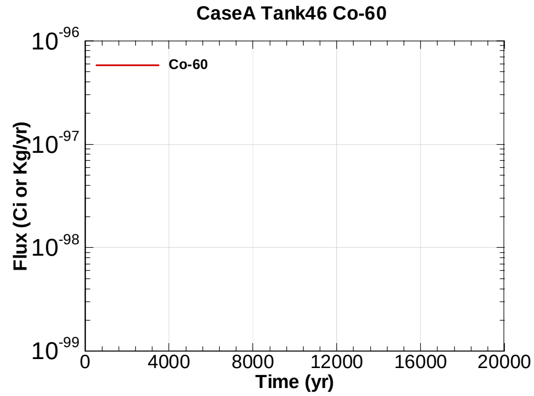

Figure A.2-1430 - Water Table Flux for CaseA Tank46 Co-60

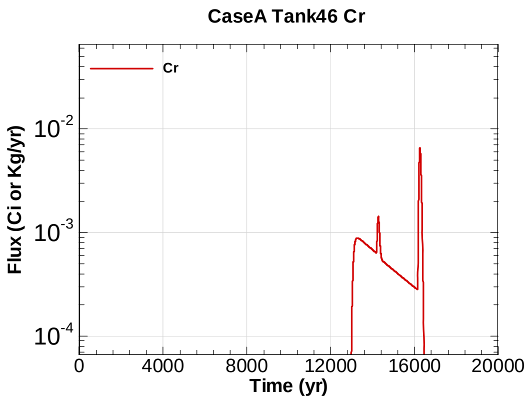

Figure A.2-1431 - Water Table Flux for CaseA Tank46 Cr

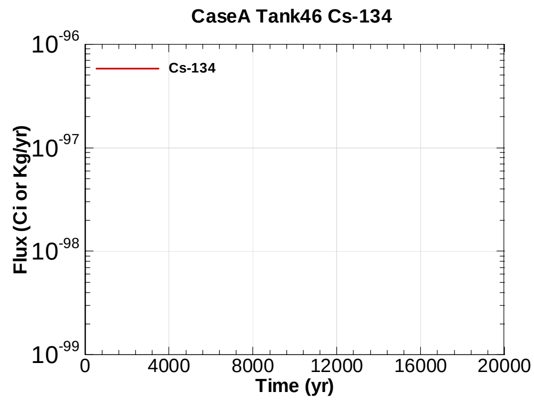

Figure A.2-1432 - Water Table Flux for CaseA Tank46 Cs-134

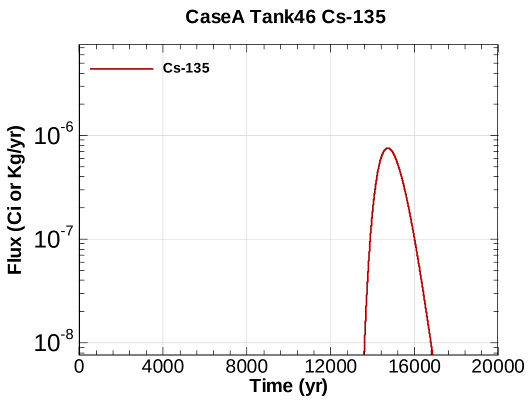

Figure A.2-1433 - Water Table Flux for CaseA Tank46 Cs-135

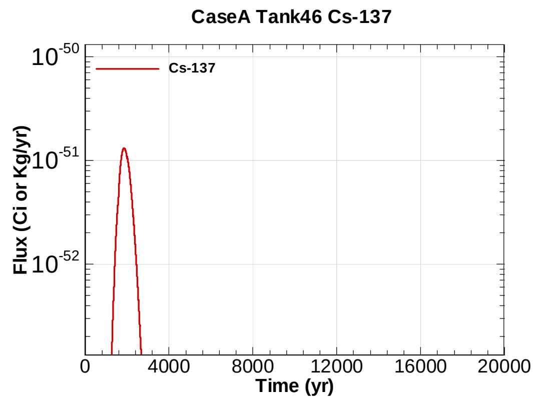

Figure A.2-1434 - Water Table Flux for CaseA Tank46 Cs-137

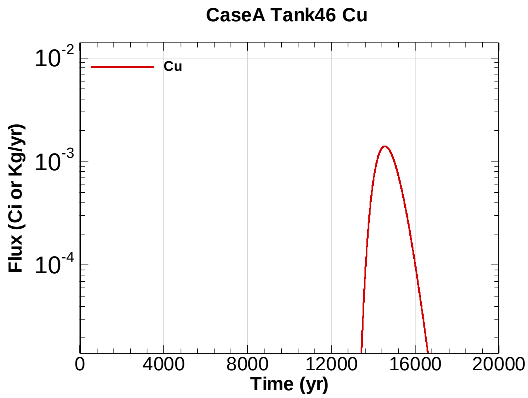

Figure A.2-1435 - Water Table Flux for CaseA Tank46 Cu

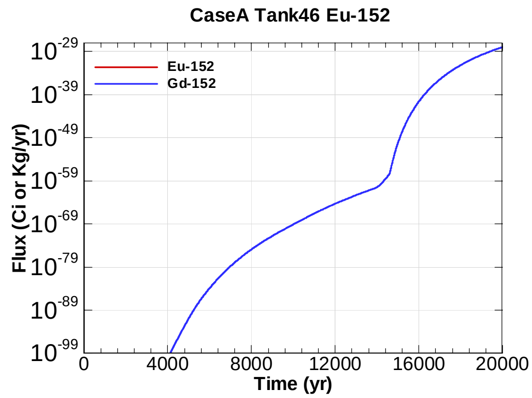

Figure A.2-1436 - Water Table Flux for CaseA Tank46 Eu-152

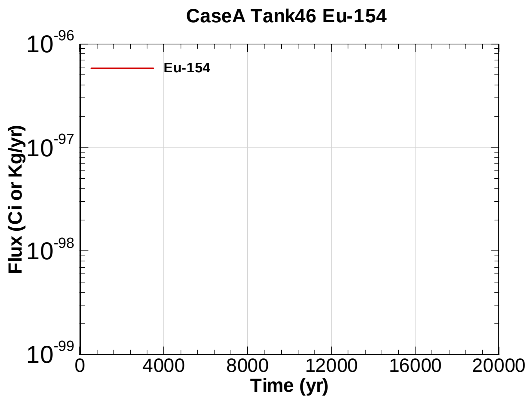

Figure A.2-1437 - Water Table Flux for CaseA Tank46 Eu-154

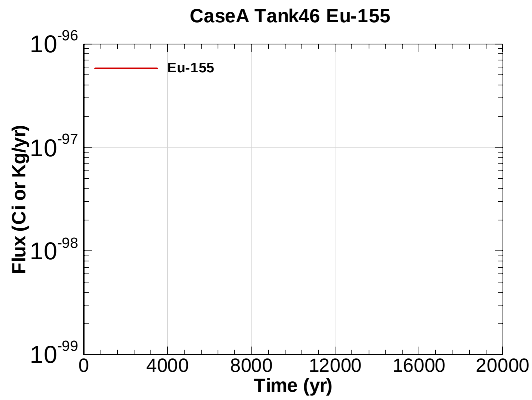

Figure A.2-1438 - Water Table Flux for CaseA Tank46 Eu-155

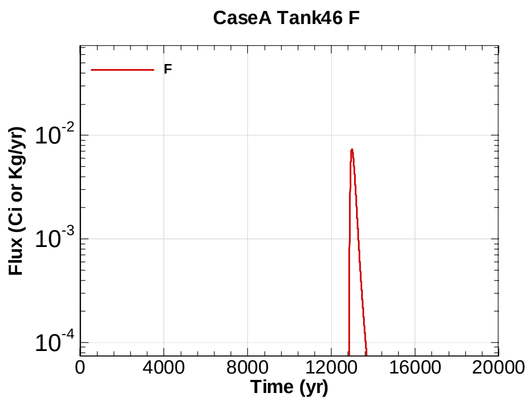

Figure A.2-1439 - Water Table Flux for CaseA Tank46 F

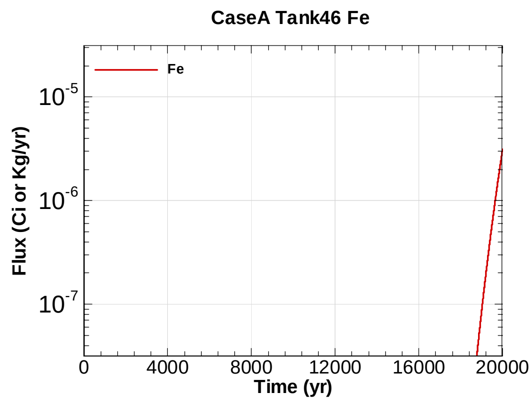

Figure A.2-1440 - Water Table Flux for CaseA Tank46 Fe

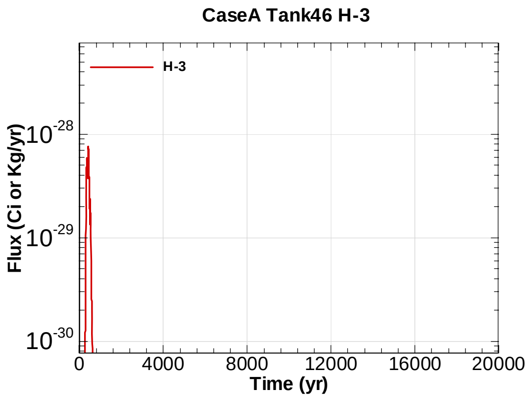

Figure A.2-1441 - Water Table Flux for CaseA Tank46 H-3

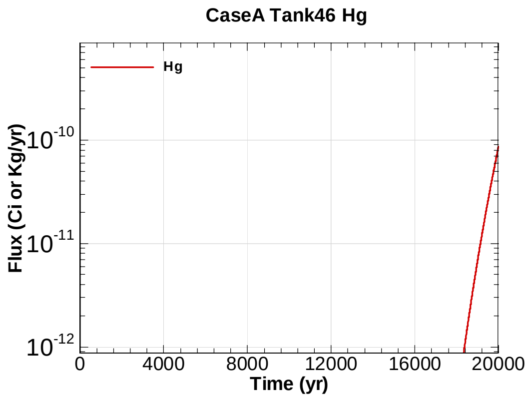

Figure A.2-1442 - Water Table Flux for CaseA Tank46 Hg

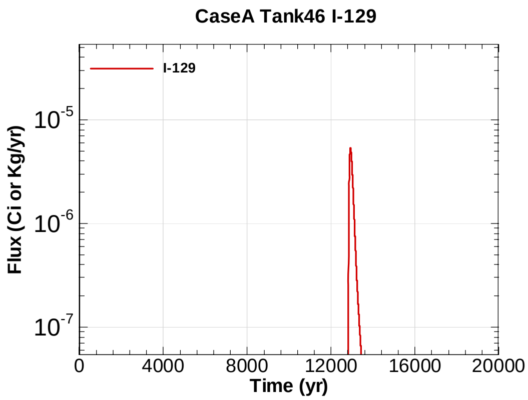

Figure A.2-1443 - Water Table Flux for CaseA Tank46 I-129

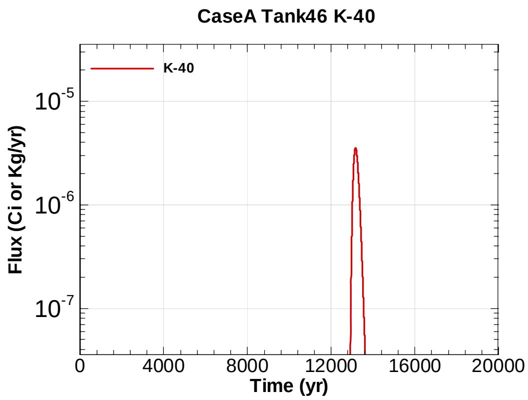

Figure A.2-1444 - Water Table Flux for CaseA Tank46 K-40

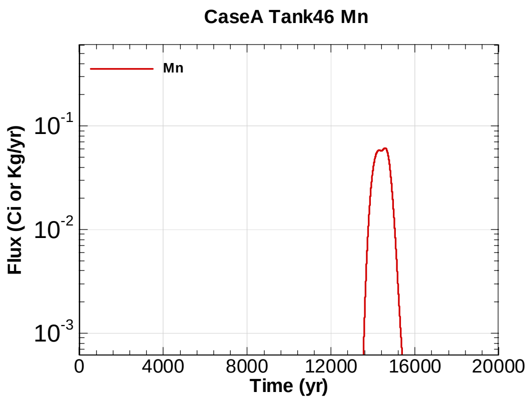

Figure A.2-1445 - Water Table Flux for CaseA Tank46 Mn

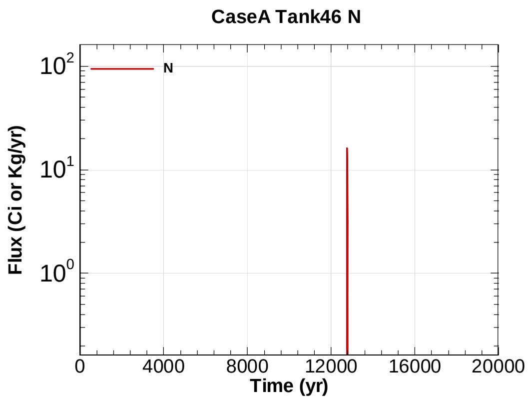

Figure A.2-1446 - Water Table Flux for CaseA Tank46 N

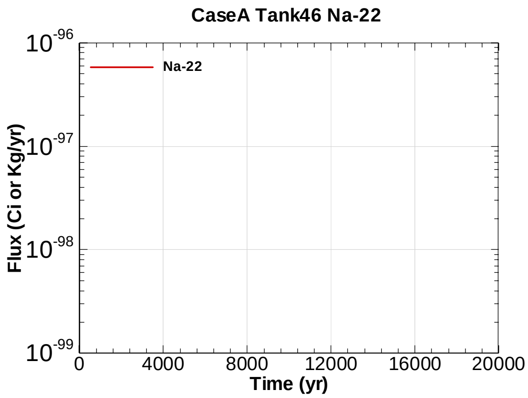

Figure A.2-1447 - Water Table Flux for CaseA Tank46 Na-22

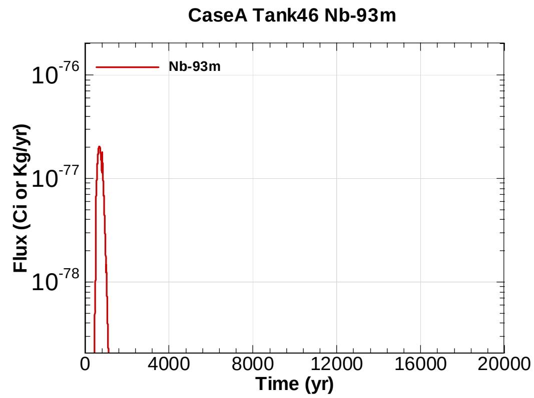

Figure A.2-1448 - Water Table Flux for CaseA Tank46 Nb-93m

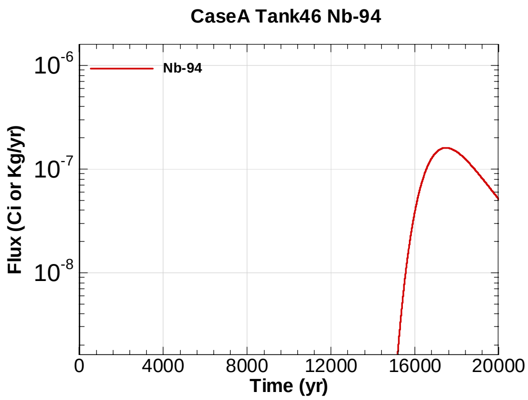

Figure A.2-1449 - Water Table Flux for CaseA Tank46 Nb-94

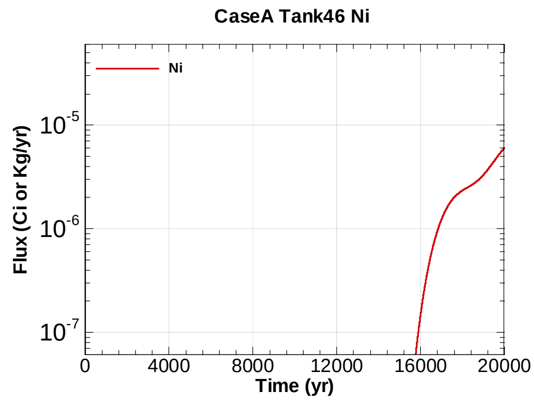

Figure A.2-1450 - Water Table Flux for CaseA Tank46 Ni

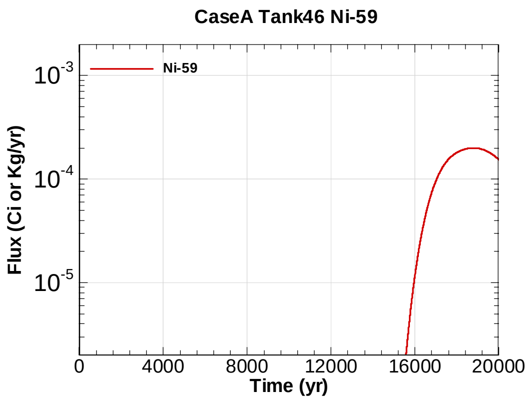

Figure A.2-1451 - Water Table Flux for CaseA Tank46 Ni-59

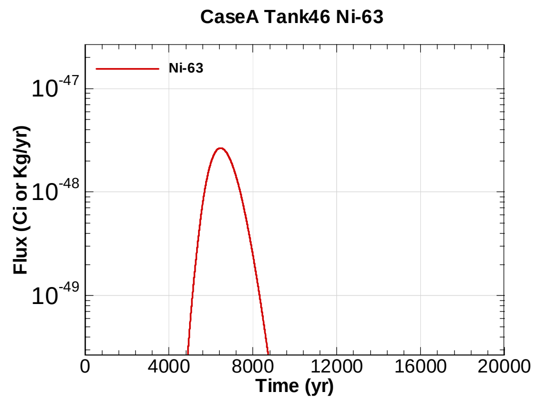

Figure A.2-1452 - Water Table Flux for CaseA Tank46 Ni-63

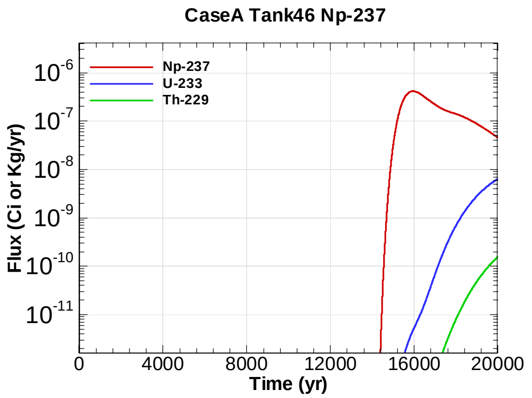

Figure A.2-1453 - Water Table Flux for CaseA Tank46 Np-237

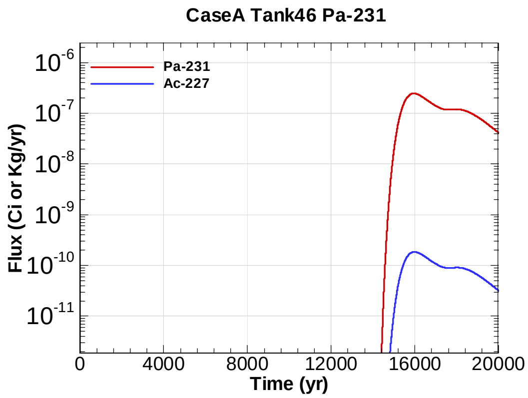

Figure A.2-1454 - Water Table Flux for CaseA Tank46 Pa-231

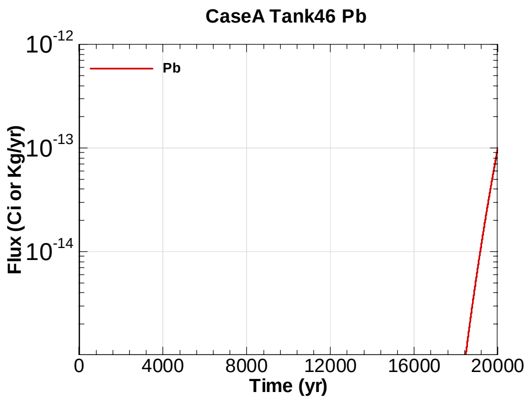

Figure A.2-1455 - Water Table Flux for CaseA Tank46 Pb

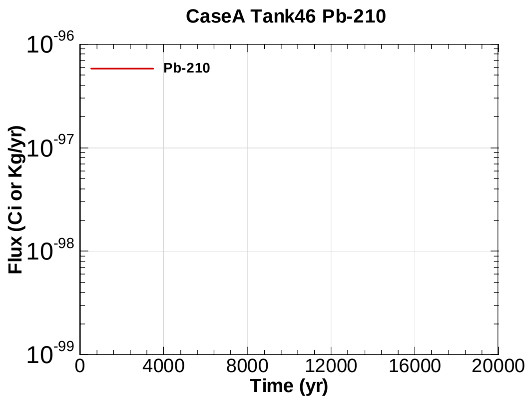

Figure A.2-1456 - Water Table Flux for CaseA Tank46 Pb-210

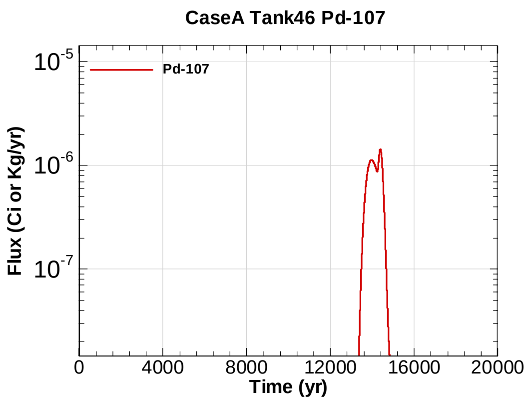

Figure A.2-1457 - Water Table Flux for CaseA Tank46 Pd-107

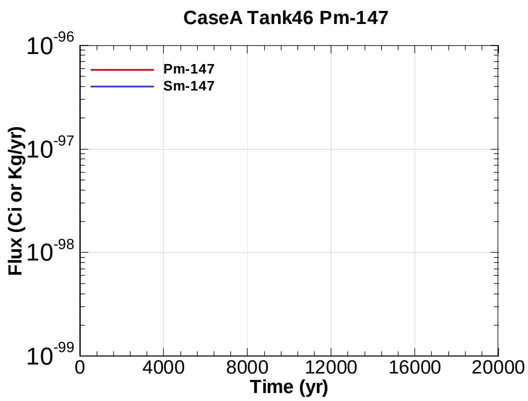

Figure A.2-1458 - Water Table Flux for CaseA Tank46 Pm-147

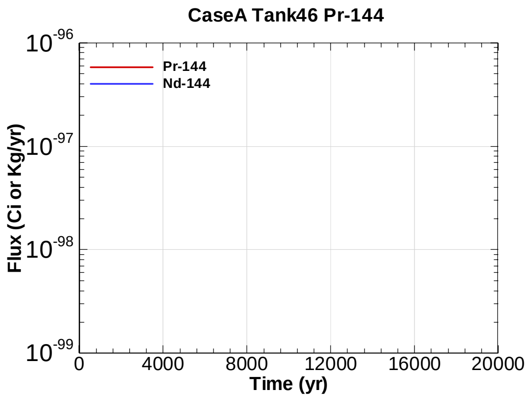

Figure A.2-1459 - Water Table Flux for CaseA Tank46 Pr-144

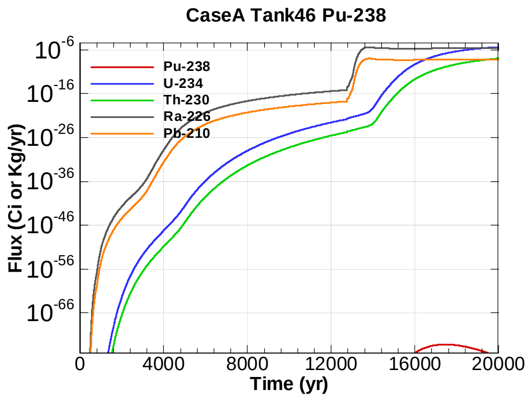

Figure A.2-1460 - Water Table Flux for CaseA Tank46 Pu-238

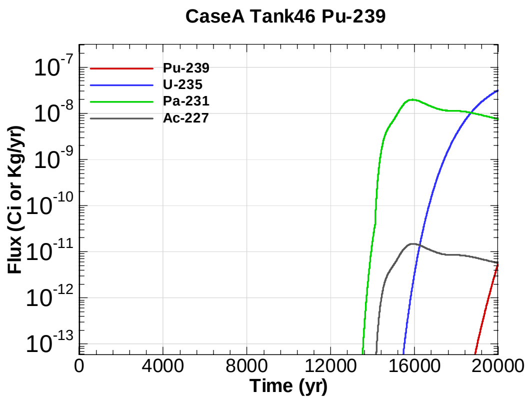

Figure A.2-1461 - Water Table Flux for CaseA Tank46 Pu-239

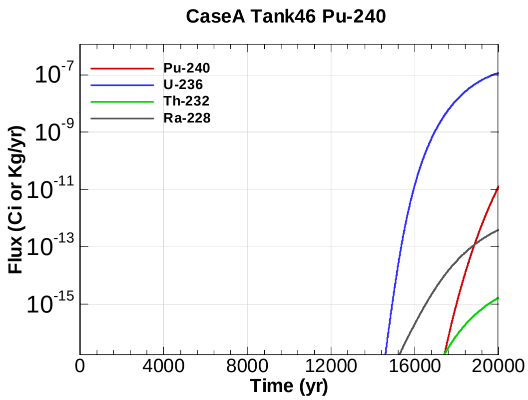

Figure A.2-1462 - Water Table Flux for CaseA Tank46 Pu-240

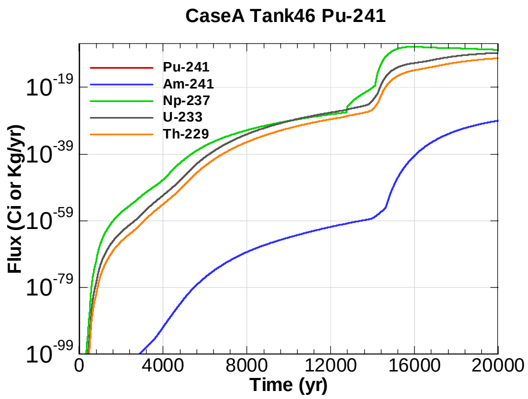

Figure A.2-1463 - Water Table Flux for CaseA Tank46 Pu-241

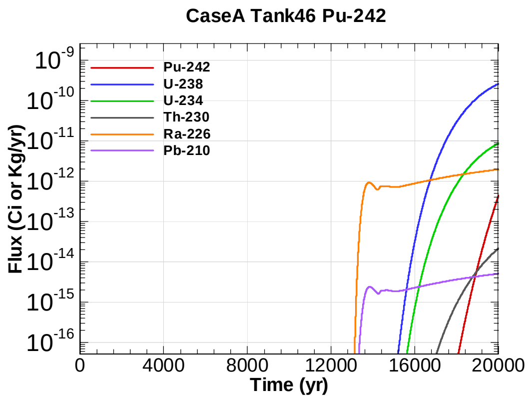

Figure A.2-1464 - Water Table Flux for CaseA Tank46 Pu-242

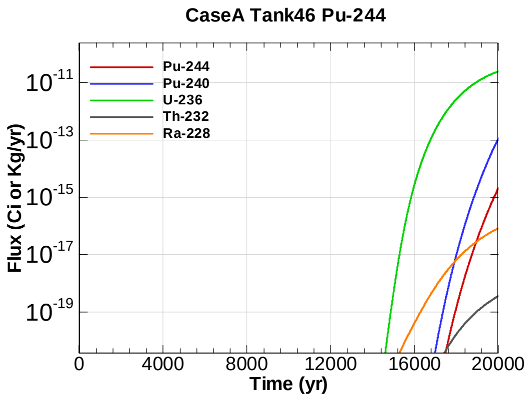

Figure A.2-1465 - Water Table Flux for CaseA Tank46 Pu-244

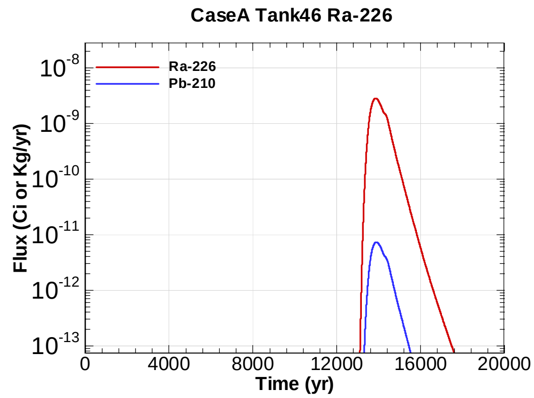

Figure A.2-1466 - Water Table Flux for CaseA Tank46 Ra-226

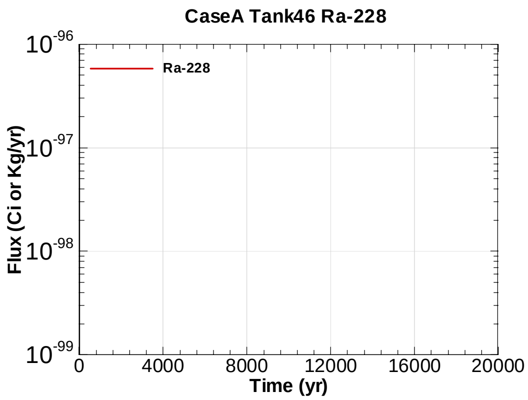

Figure A.2-1467 - Water Table Flux for CaseA Tank46 Ra-228

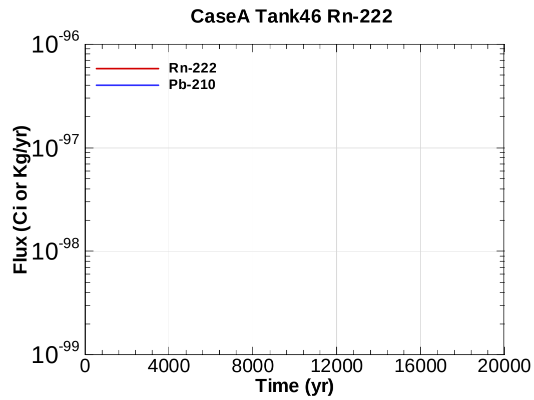

Figure A.2-1468 - Water Table Flux for CaseA Tank46 Rn-222

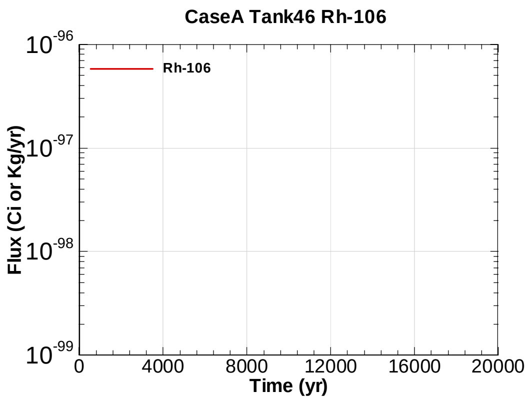

Figure A.2-1469 - Water Table Flux for CaseA Tank46 Rh-106

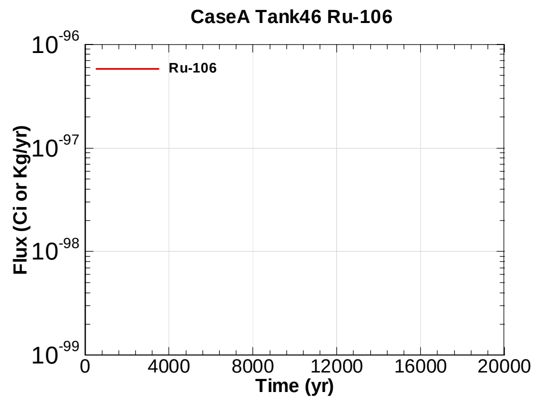

Figure A.2-1470 - Water Table Flux for CaseA Tank46 Ru-106

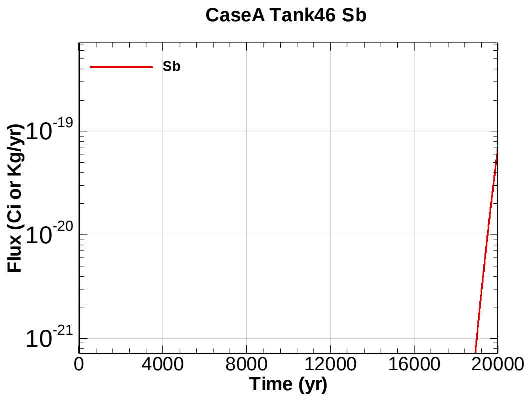

Figure A.2-1471 - Water Table Flux for CaseA Tank46 Sb

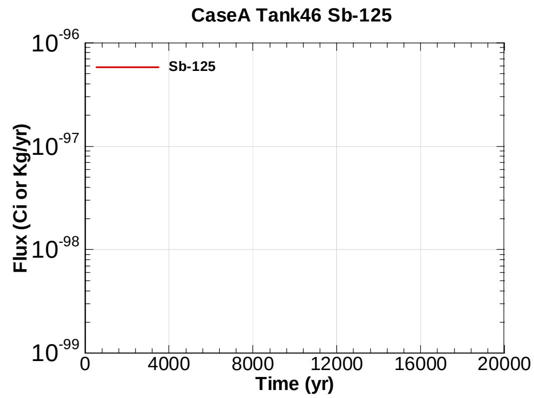

Figure A.2-1472 - Water Table Flux for CaseA Tank46 Sb-125

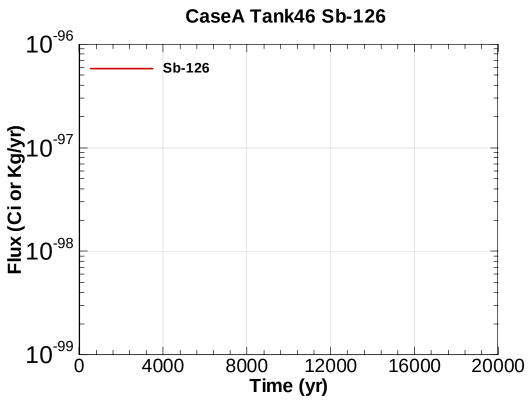

Figure A.2-1473 - Water Table Flux for CaseA Tank46 Sb-126

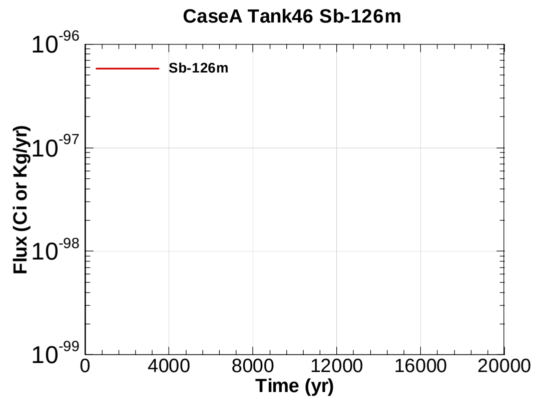

Figure A.2-1474 - Water Table Flux for CaseA Tank46 Sb-126m

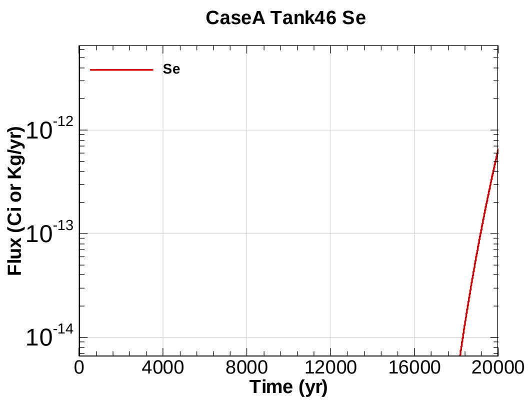

Figure A.2-1475 - Water Table Flux for CaseA Tank46 Se

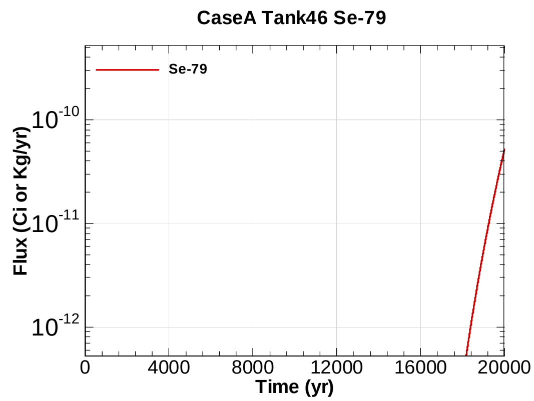

Figure A.2-1476 - Water Table Flux for CaseA Tank46 Se-79

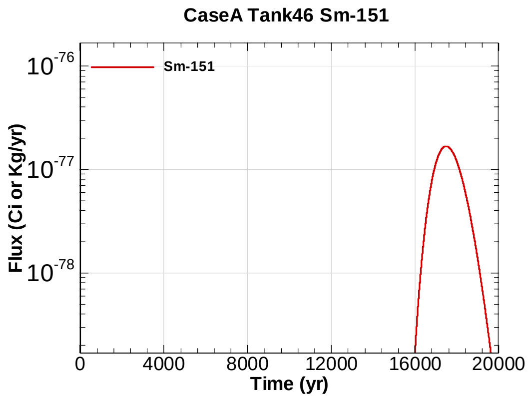

Figure A.2-1477 - Water Table Flux for CaseA Tank46 Sm-151

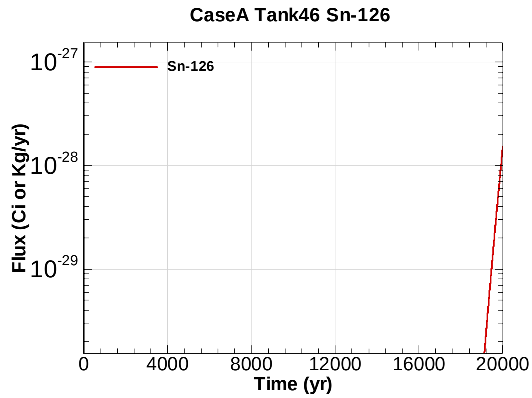

Figure A.2-1478 - Water Table Flux for CaseA Tank46 Sn-126

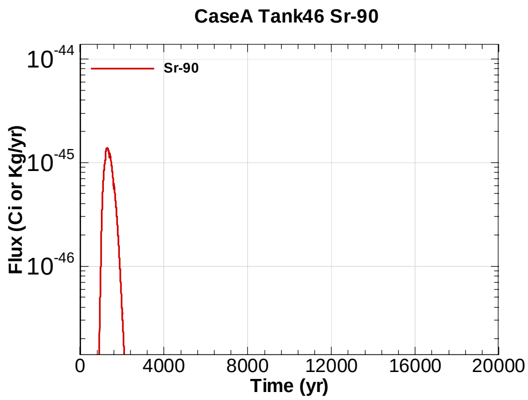

Figure A.2-1479 - Water Table Flux for CaseA Tank46 Sr-90

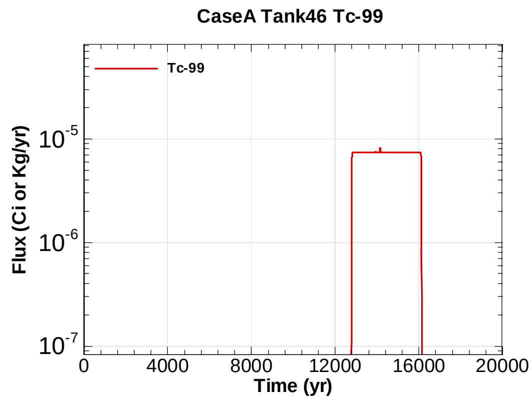

Figure A.2-1480 - Water Table Flux for CaseA Tank46 Tc-99

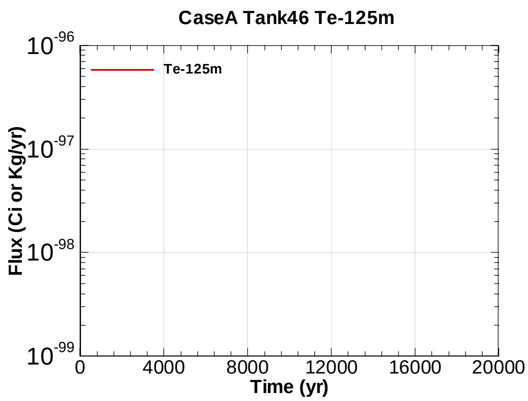

Figure A.2-1481 - Water Table Flux for CaseA Tank46 Te-125m

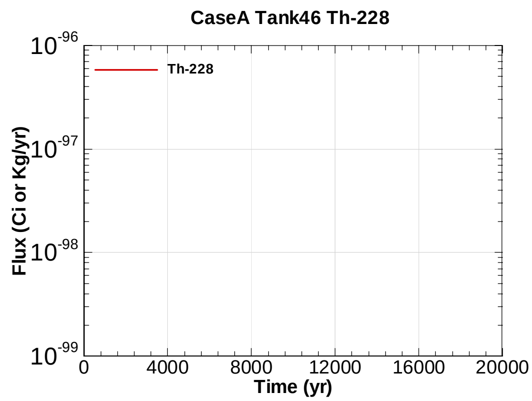

Figure A.2-1482 - Water Table Flux for CaseA Tank46 Th-228

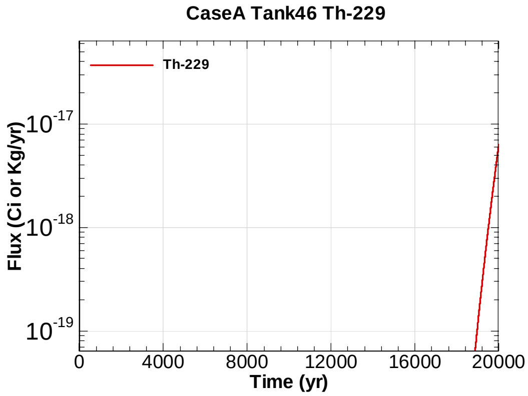

Figure A.2-1483 - Water Table Flux for CaseA Tank46 Th-229

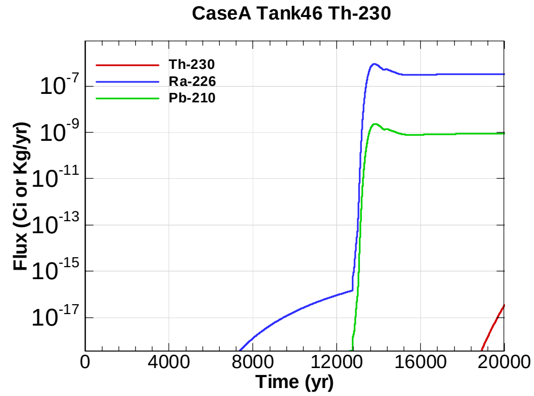

Figure A.2-1484 - Water Table Flux for CaseA Tank46 Th-230

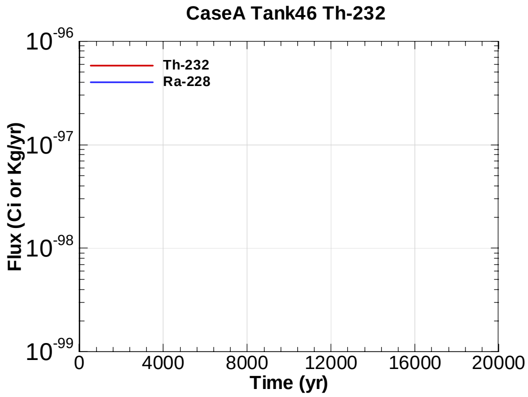

Figure A.2-1485 - Water Table Flux for CaseA Tank46 Th-232

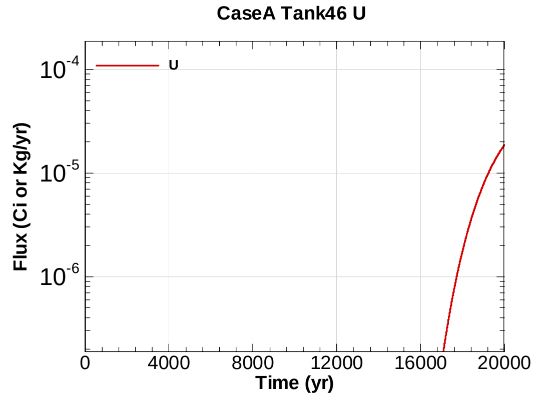

Figure A.2-1486 - Water Table Flux for CaseA Tank46 U

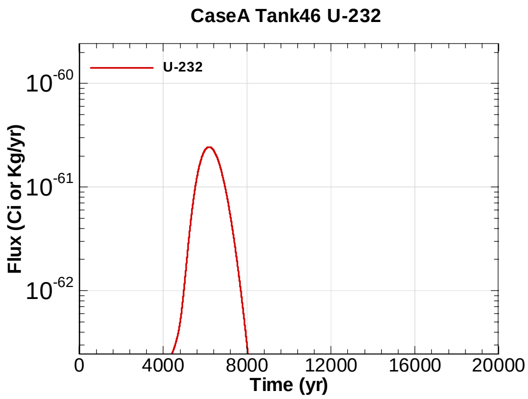

Figure A.2-1487 - Water Table Flux for CaseA Tank46 U-232

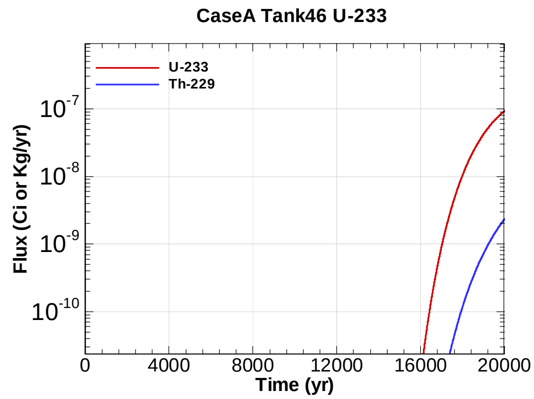

Figure A.2-1488 - Water Table Flux for CaseA Tank46 U-233

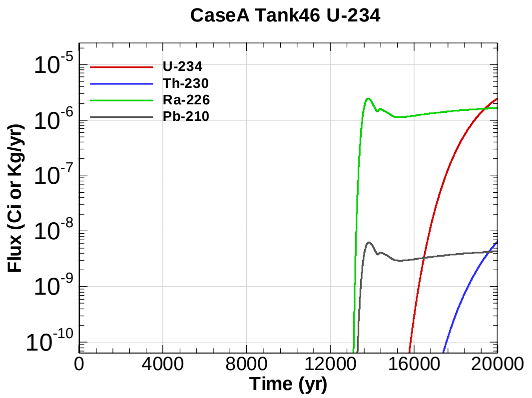

Figure A.2-1489 - Water Table Flux for CaseA Tank46 U-234

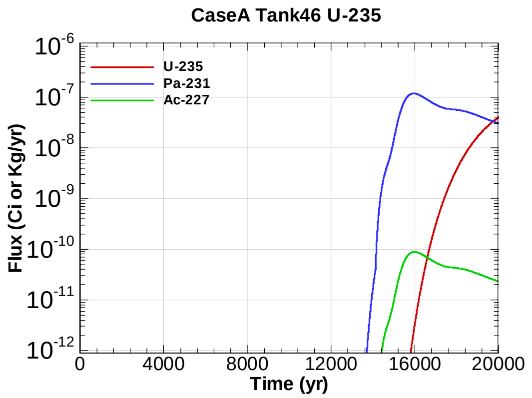

Figure A.2-1490 - Water Table Flux for CaseA Tank46 U-235

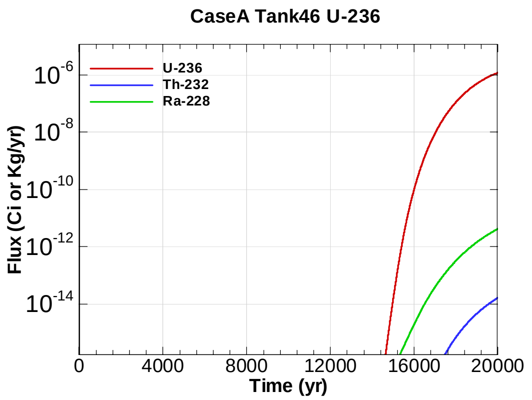

Figure A.2-1491 - Water Table Flux for CaseA Tank46 U-236

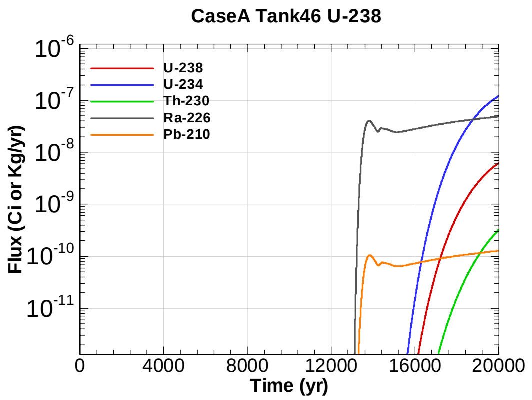

Figure A.2-1492 - Water Table Flux for CaseA Tank46 U-238

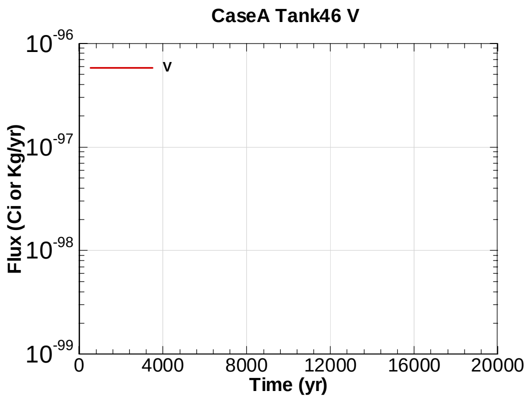

Figure A.2-1493 - Water Table Flux for CaseA Tank46 V

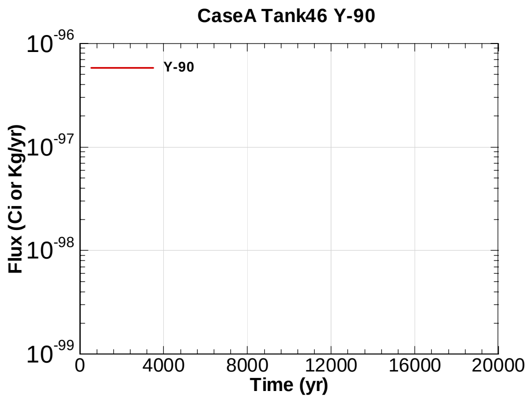

Figure A.2-1494 - Water Table Flux for CaseA Tank46 Y-90

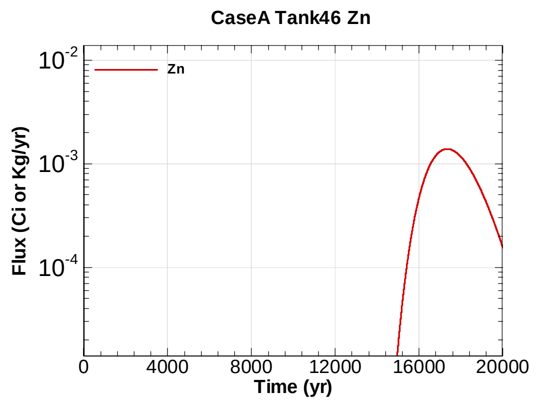

Figure A.2-1495 - Water Table Flux for CaseA Tank46 Zn

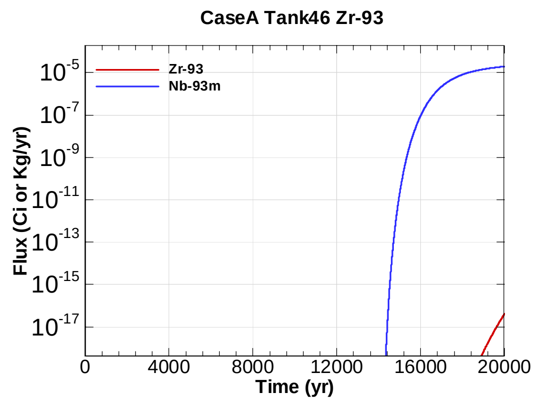

Figure A.2-1496 - Water Table Flux for CaseA Tank46 Zr-93

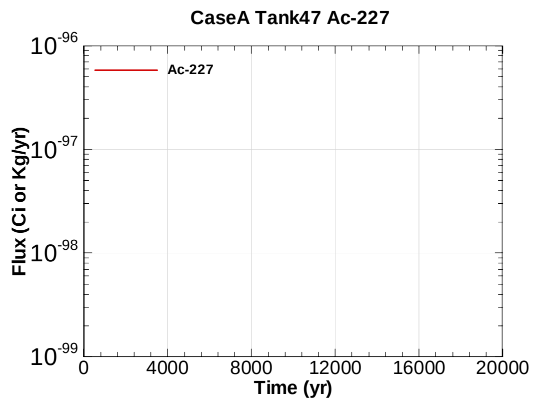

Figure A.2-1497 - Water Table Flux for CaseA Tank47 Ac-227

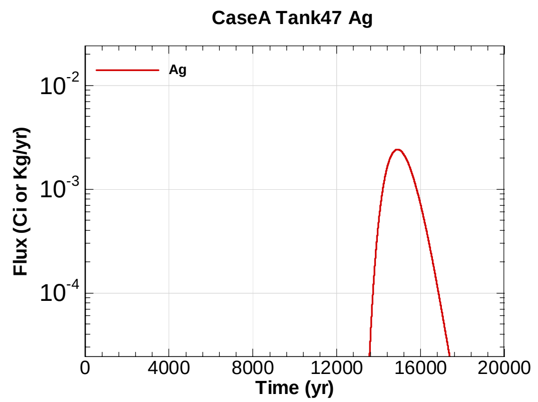

Figure A.2-1498 - Water Table Flux for CaseA Tank47 Ag

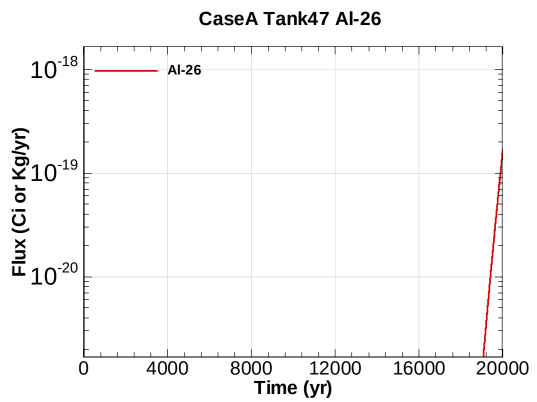

Figure A.2-1499 - Water Table Flux for CaseA Tank47 Al-26

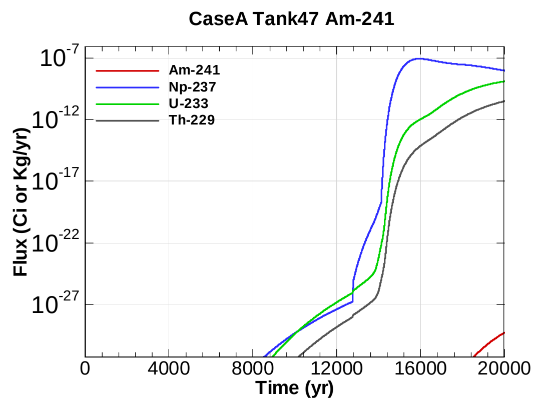

Figure A.2-1500 - Water Table Flux for CaseA Tank47 Am-241

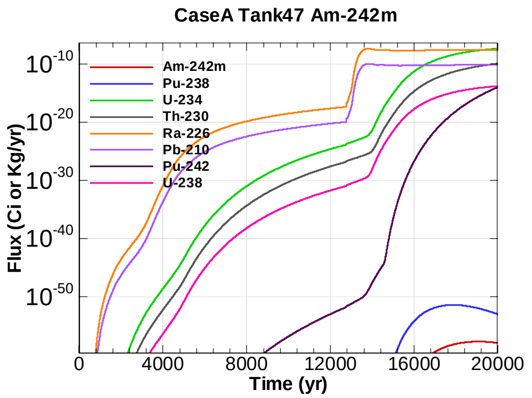

Figure A.2-1501 - Water Table Flux for CaseA Tank47 Am-242m

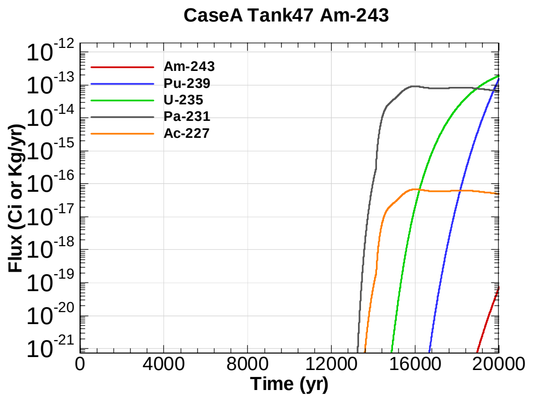

Figure A.2-1502 - Water Table Flux for CaseA Tank47 Am-243

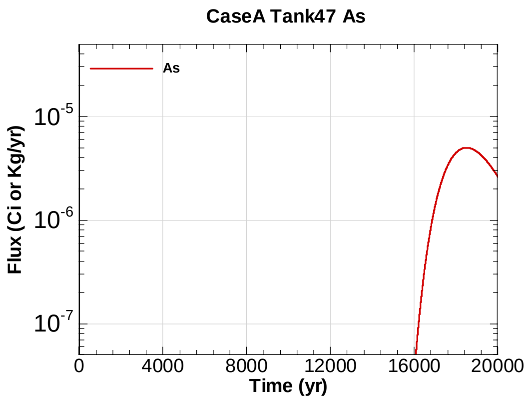

Figure A.2-1503 - Water Table Flux for CaseA Tank47 As

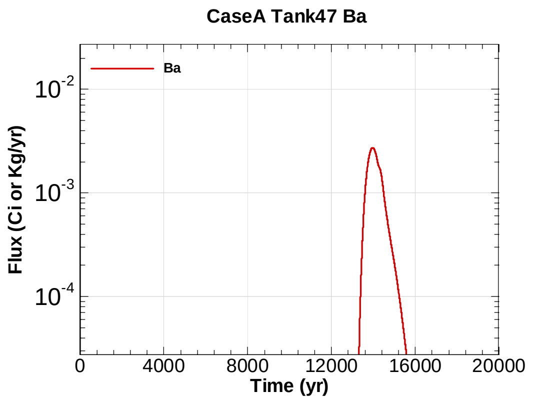

Figure A.2-1504 - Water Table Flux for CaseA Tank47 Ba

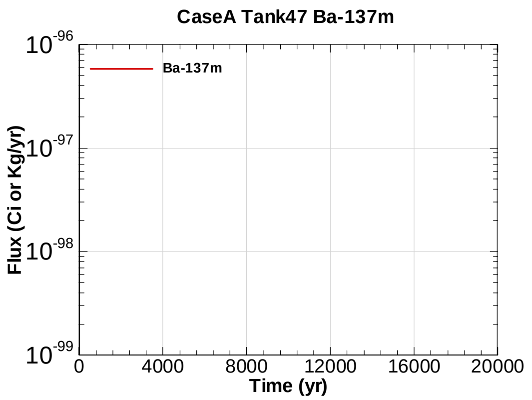

Figure A.2-1505 - Water Table Flux for CaseA Tank47 Ba-137m

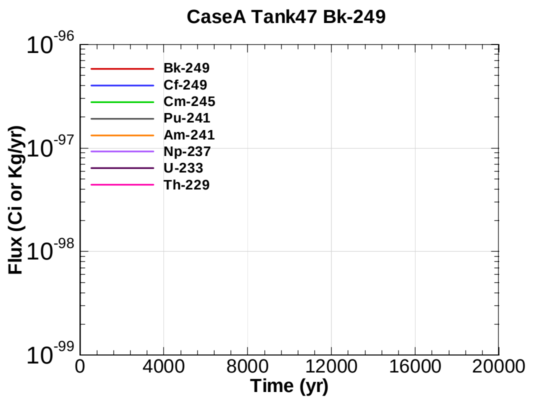

Figure A.2-1506 - Water Table Flux for CaseA Tank47 Bk-249

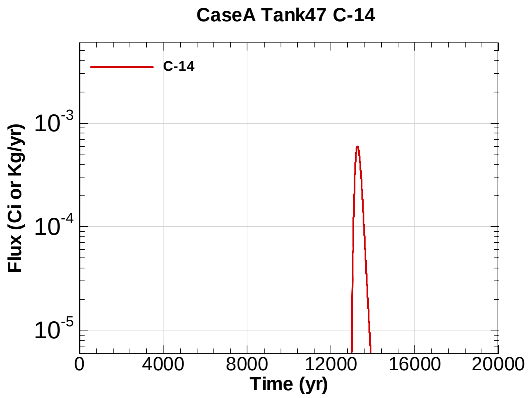

Figure A.2-1507 - Water Table Flux for CaseA Tank47 C-14

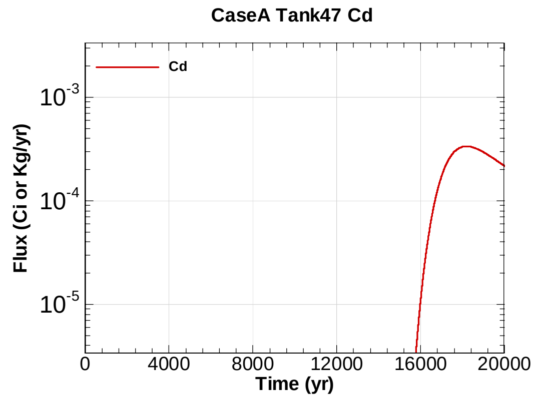

Figure A.2-1508 - Water Table Flux for CaseA Tank47 Cd

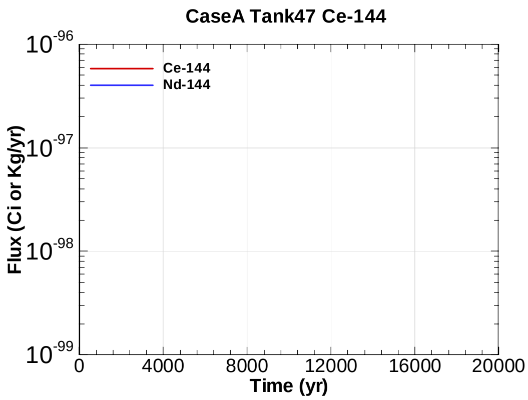

Figure A.2-1509 - Water Table Flux for CaseA Tank47 Ce-144

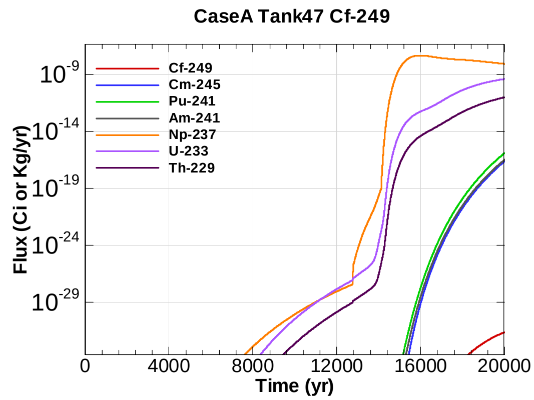

Figure A.2-1510 - Water Table Flux for CaseA Tank47 Cf-249

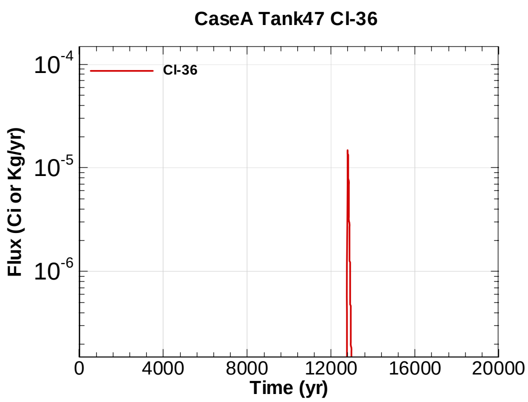

Figure A.2-1511 - Water Table Flux for CaseA Tank47 Cl-36

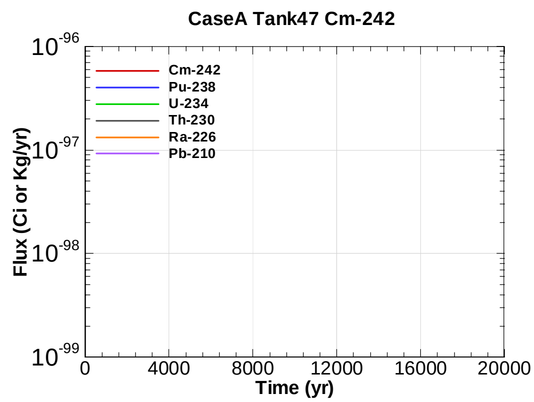

Figure A.2-1512 - Water Table Flux for CaseA Tank47 Cm-242

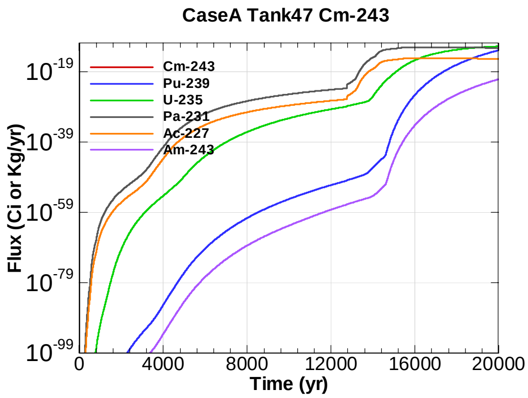

Figure A.2-1513 - Water Table Flux for CaseA Tank47 Cm-243

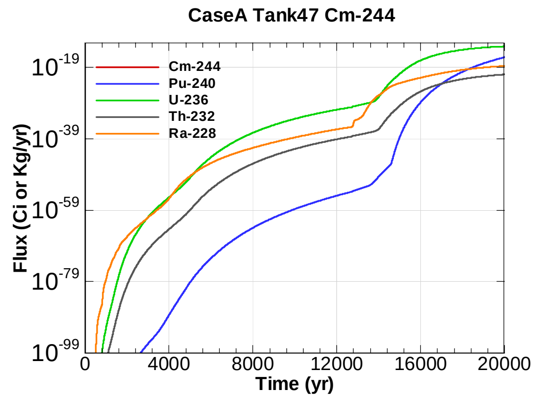

Figure A.2-1514 - Water Table Flux for CaseA Tank47 Cm-244

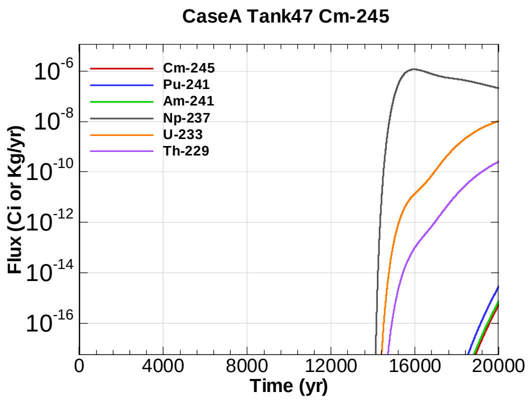

Figure A.2-1515 - Water Table Flux for CaseA Tank47 Cm-245

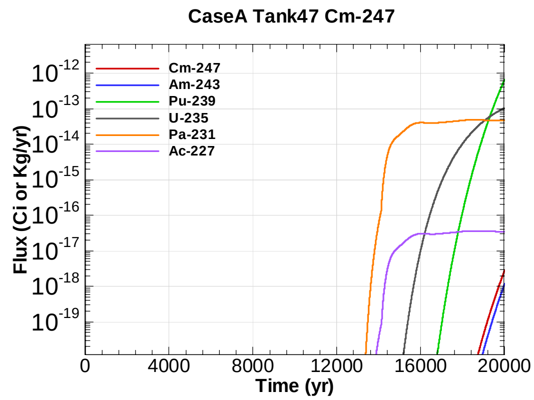

Figure A.2-1516 - Water Table Flux for CaseA Tank47 Cm-247

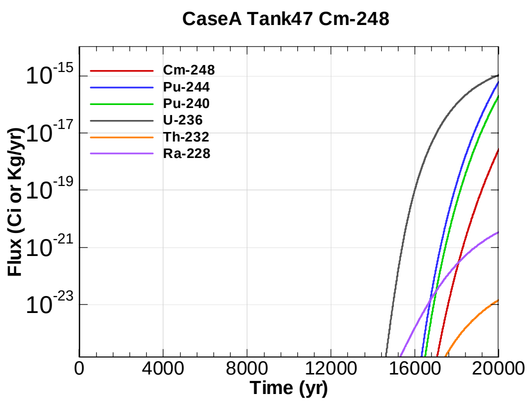

Figure A.2-1517 - Water Table Flux for CaseA Tank47 Cm-248

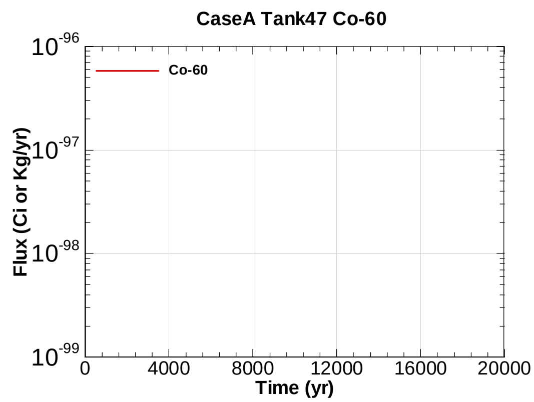

Figure A.2-1518 - Water Table Flux for CaseA Tank47 Co-60

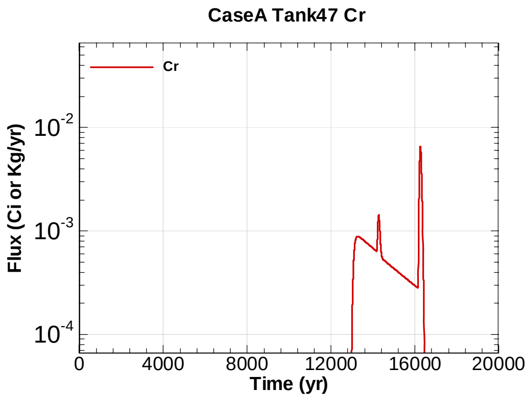

Figure A.2-1519 - Water Table Flux for CaseA Tank47 Cr

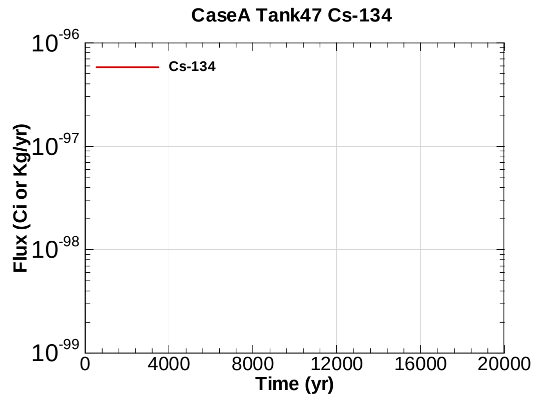

Figure A.2-1520 - Water Table Flux for CaseA Tank47 Cs-134

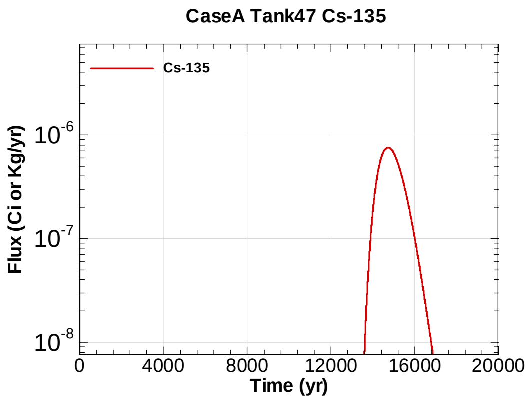

Figure A.2-1521 - Water Table Flux for CaseA Tank47 Cs-135

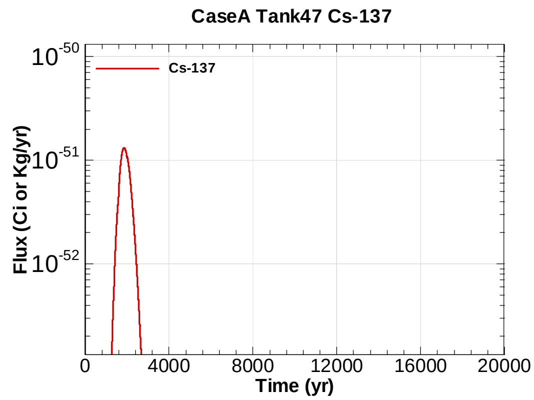

Figure A.2-1522 - Water Table Flux for CaseA Tank47 Cs-137

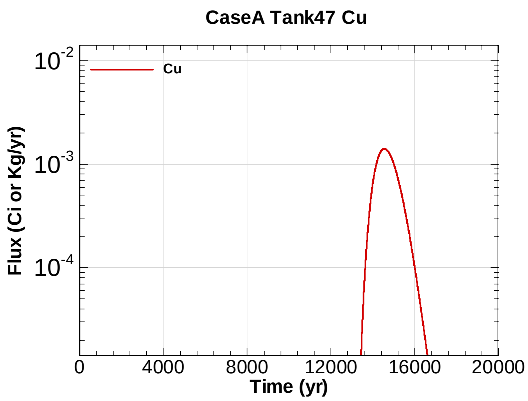

Figure A.2-1523 - Water Table Flux for CaseA Tank47 Cu

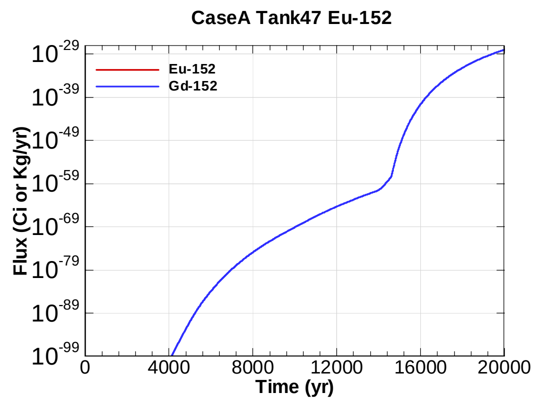

Figure A.2-1524 - Water Table Flux for CaseA Tank47 Eu-152

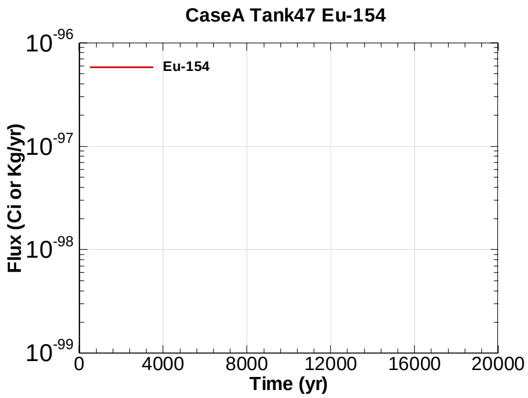

Figure A.2-1525 - Water Table Flux for CaseA Tank47 Eu-154

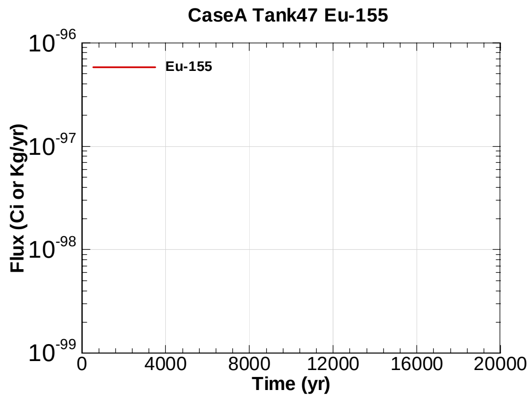

Figure A.2-1526 - Water Table Flux for CaseA Tank47 Eu-155

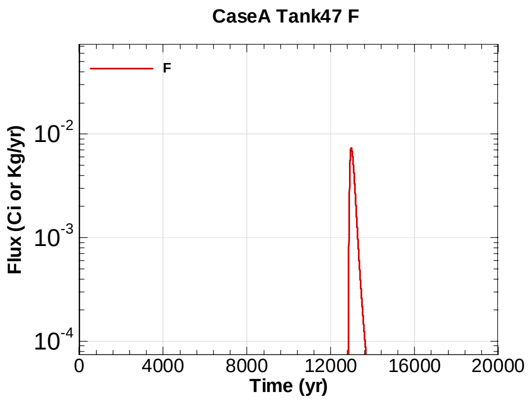

Figure A.2-1527 - Water Table Flux for CaseA Tank47 F

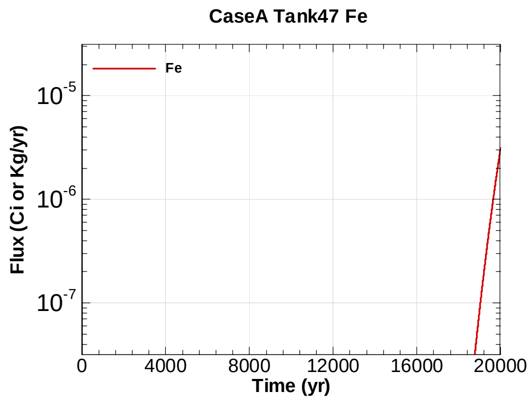

Figure A.2-1528 - Water Table Flux for CaseA Tank47 Fe

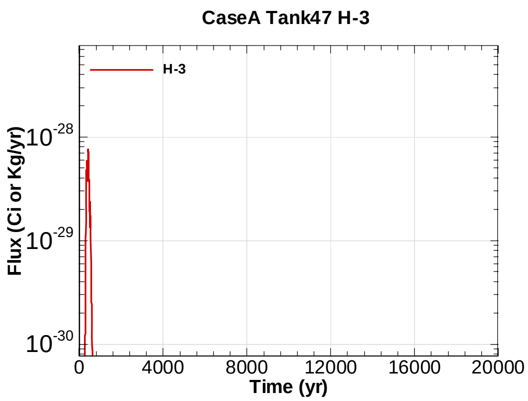

Figure A.2-1529 - Water Table Flux for CaseA Tank47 H-3

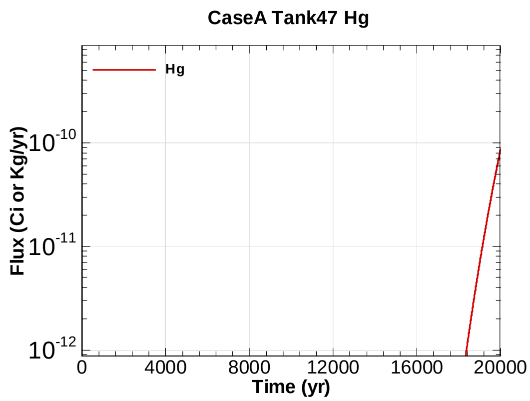

Figure A.2-1530 - Water Table Flux for CaseA Tank47 Hg

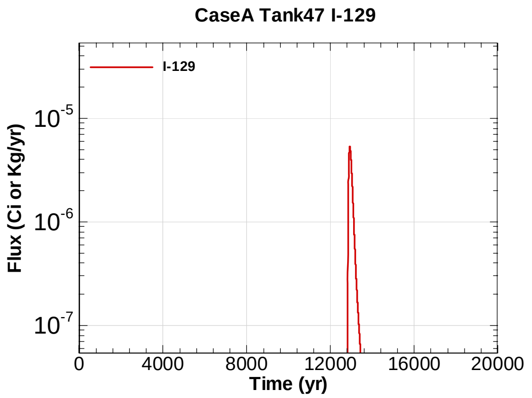

Figure A.2-1531 - Water Table Flux for CaseA Tank47 I-129

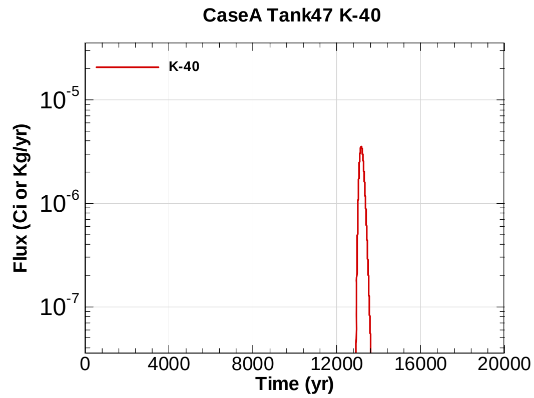

Figure A.2-1532 - Water Table Flux for CaseA Tank47 K-40

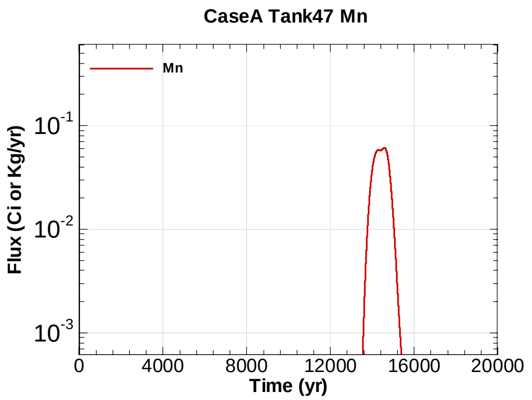

Figure A.2-1533 - Water Table Flux for CaseA Tank47 Mn

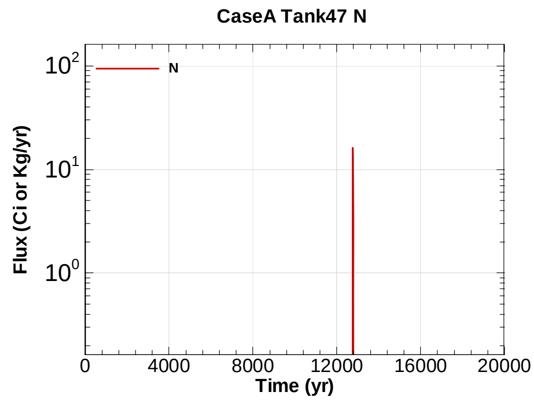

Figure A.2-1534 - Water Table Flux for CaseA Tank47 N

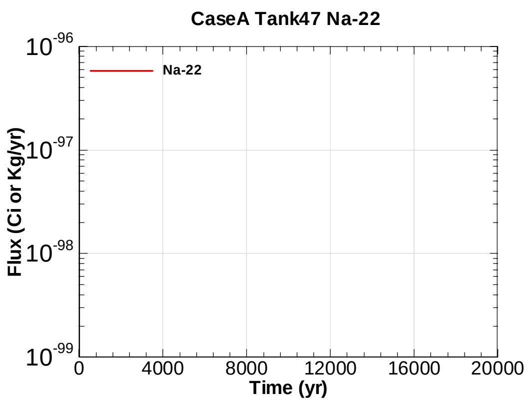

Figure A.2-1535 - Water Table Flux for CaseA Tank47 Na-22

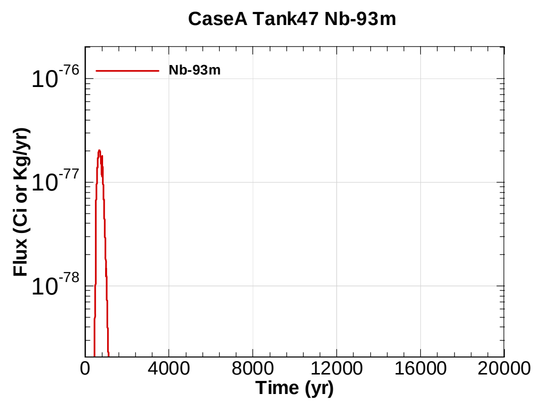

Figure A.2-1536 - Water Table Flux for CaseA Tank47 Nb-93m

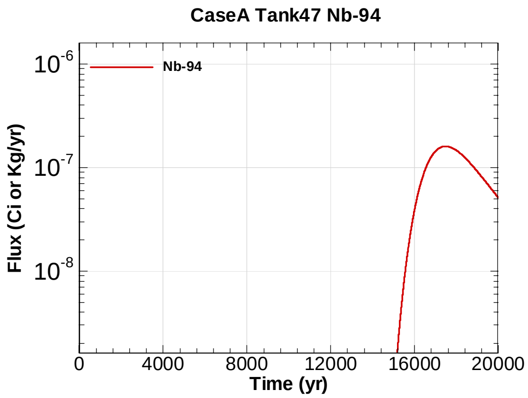

Figure A.2-1537 - Water Table Flux for CaseA Tank47 Nb-94

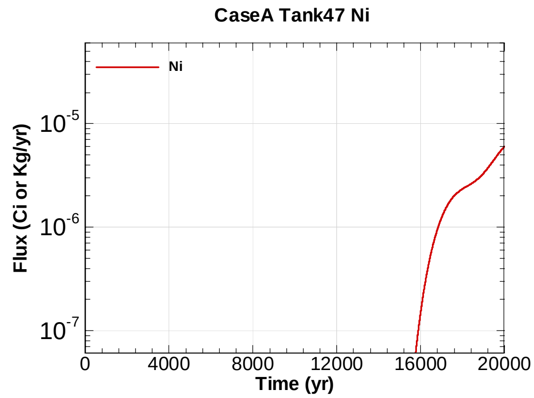

Figure A.2-1538 - Water Table Flux for CaseA Tank47 Ni

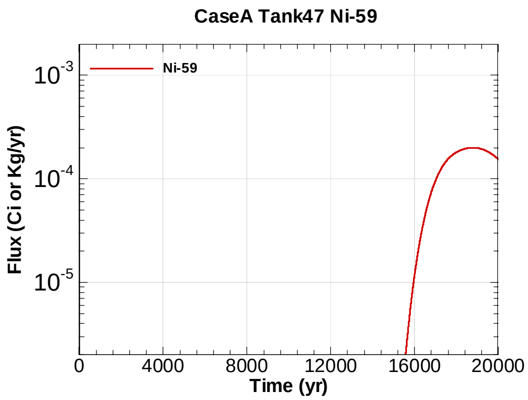

Figure A.2-1539 - Water Table Flux for CaseA Tank47 Ni-59

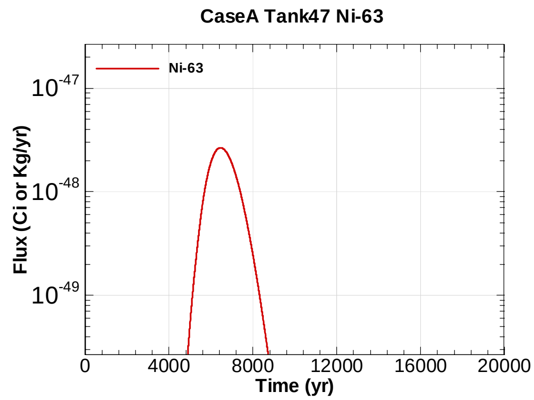

Figure A.2-1540 - Water Table Flux for CaseA Tank47 Ni-63

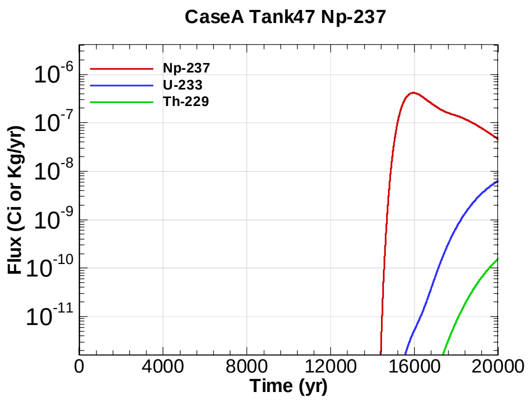

Figure A.2-1541 - Water Table Flux for CaseA Tank47 Np-237

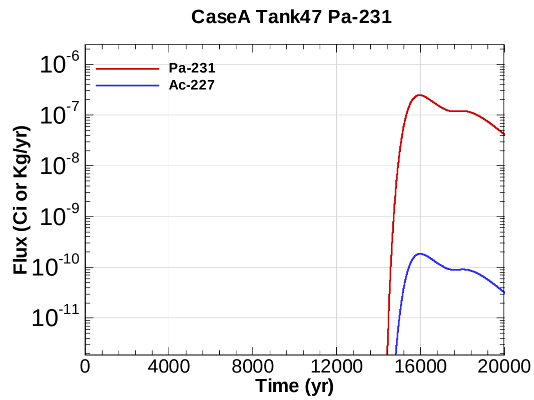

Figure A.2-1542 - Water Table Flux for CaseA Tank47 Pa-231

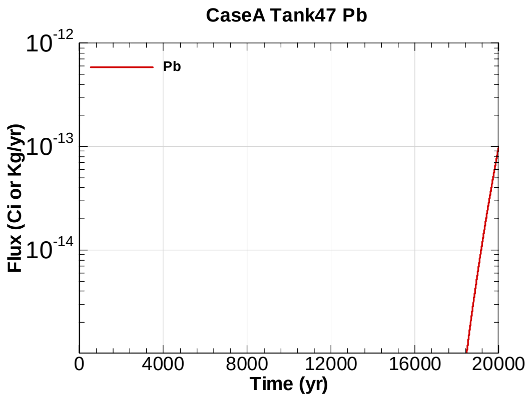

Figure A.2-1543 - Water Table Flux for CaseA Tank47 Pb

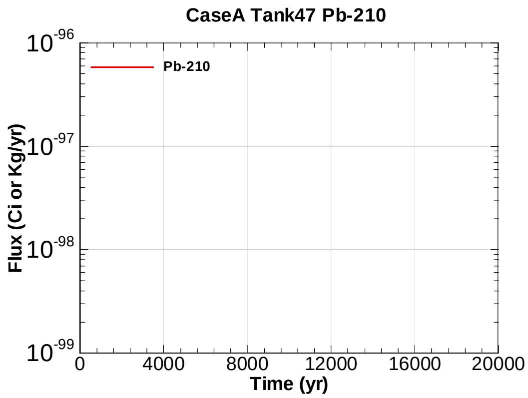

Figure A.2-1544 - Water Table Flux for CaseA Tank47 Pb-210

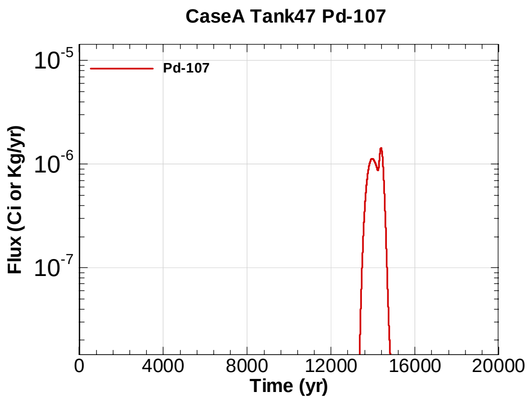

Figure A.2-1545 - Water Table Flux for CaseA Tank47 Pd-107

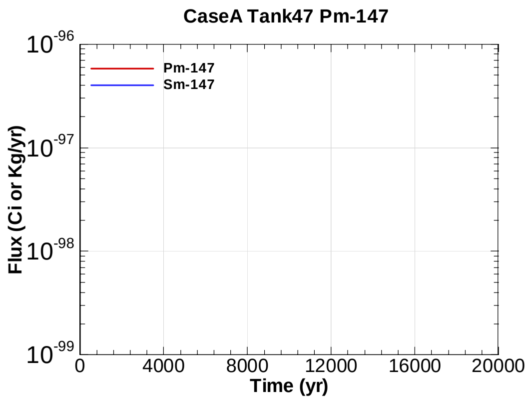

Figure A.2-1546 - Water Table Flux for CaseA Tank47 Pm-147

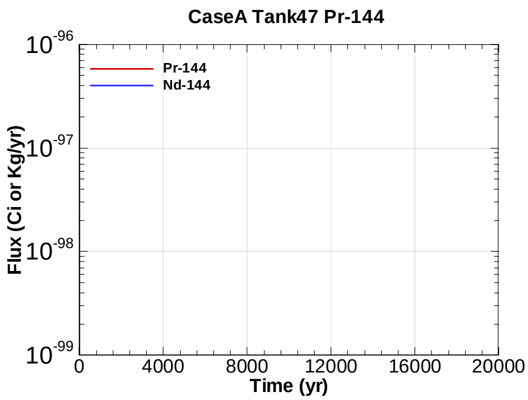

Figure A.2-1547 - Water Table Flux for CaseA Tank47 Pr-144

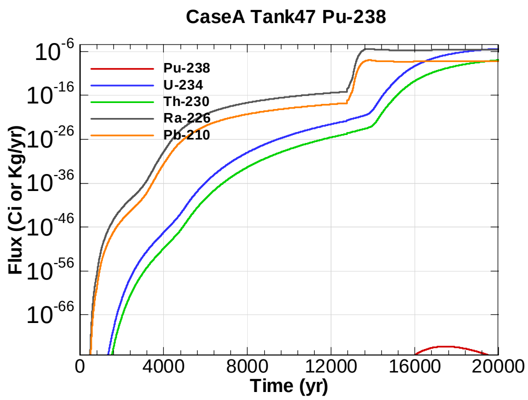

Figure A.2-1548 - Water Table Flux for CaseA Tank47 Pu-238

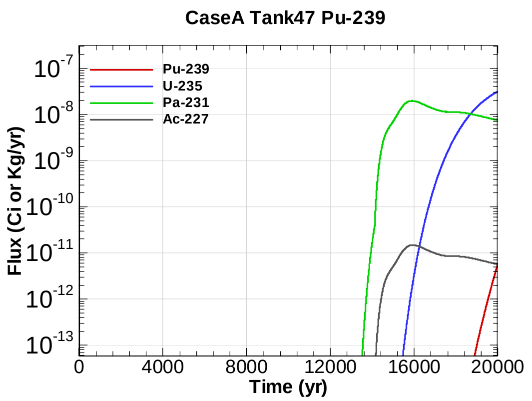

Figure A.2-1549 - Water Table Flux for CaseA Tank47 Pu-239

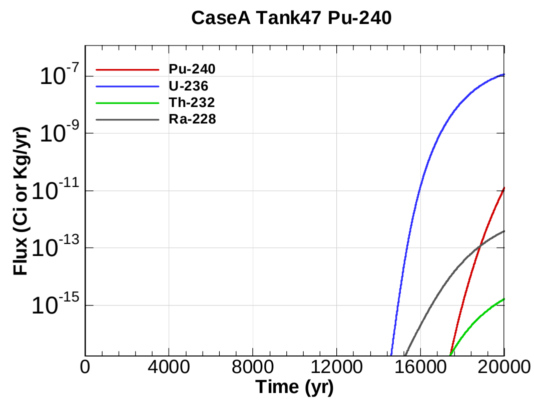

Figure A.2-1550 - Water Table Flux for CaseA Tank47 Pu-240

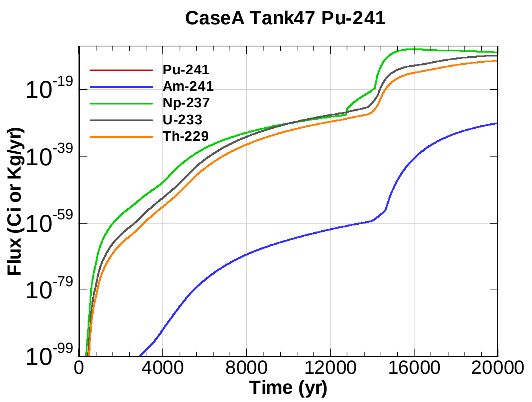

Figure A.2-1551 - Water Table Flux for CaseA Tank47 Pu-241

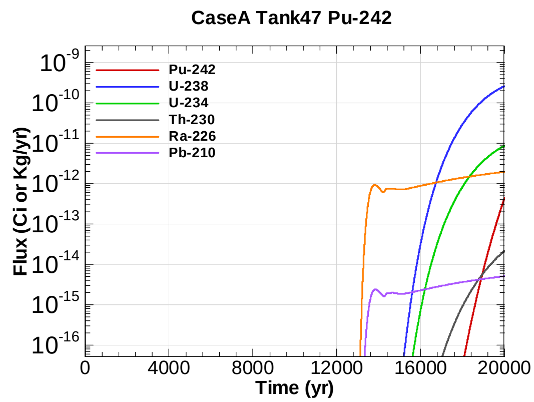

Figure A.2-1552 - Water Table Flux for CaseA Tank47 Pu-242

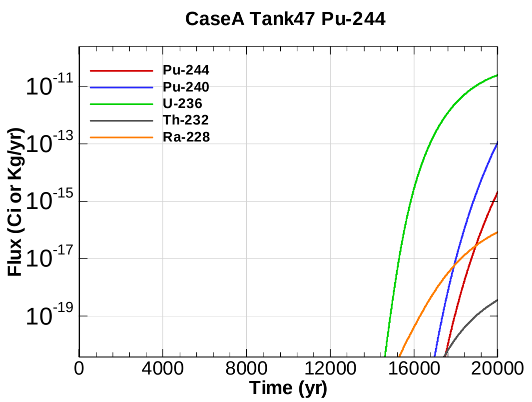

Figure A.2-1553 - Water Table Flux for CaseA Tank47 Pu-244

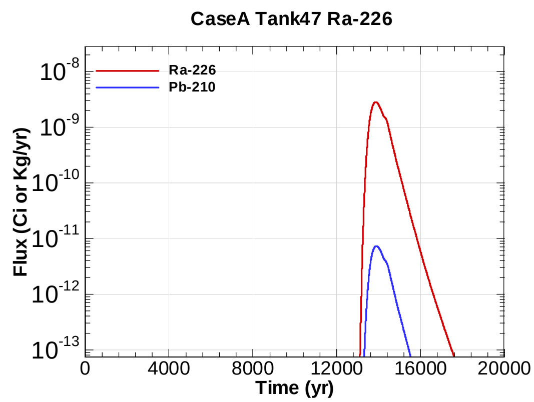

Figure A.2-1554 - Water Table Flux for CaseA Tank47 Ra-226

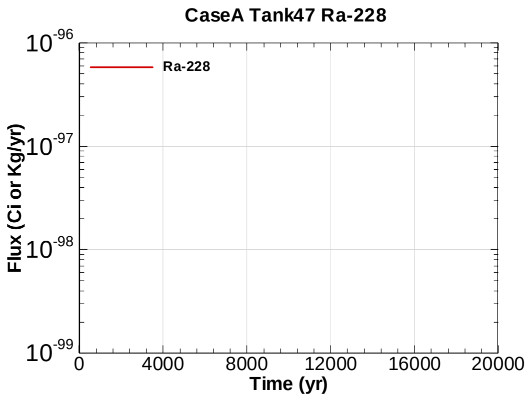

Figure A.2-1555 - Water Table Flux for CaseA Tank47 Ra-228

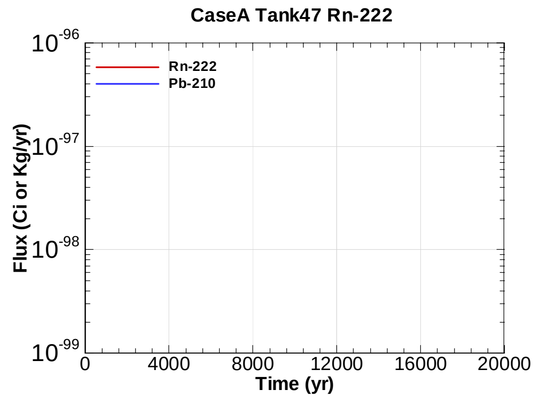

Figure A.2-1556 - Water Table Flux for CaseA Tank47 Rn-222

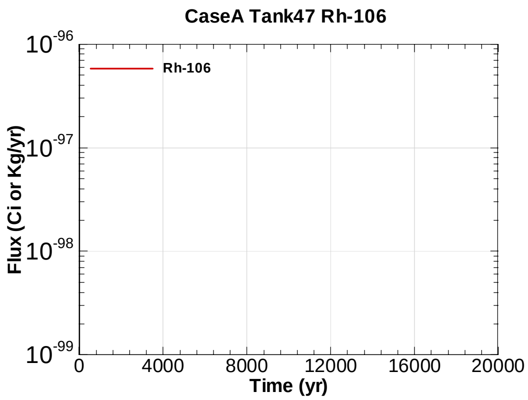

Figure A.2-1557 - Water Table Flux for CaseA Tank47 Rh-106

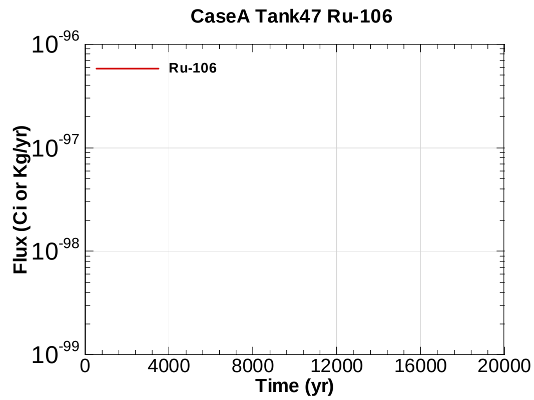

Figure A.2-1558 - Water Table Flux for CaseA Tank47 Ru-106

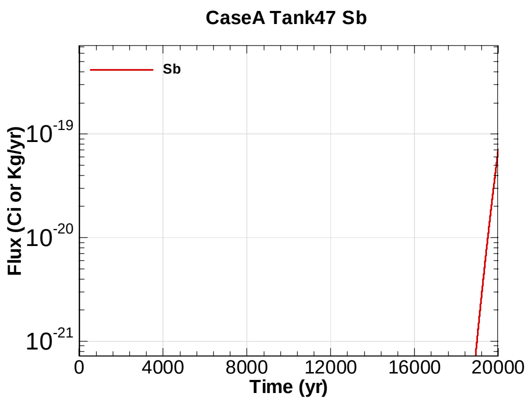

Figure A.2-1559 - Water Table Flux for CaseA Tank47 Sb

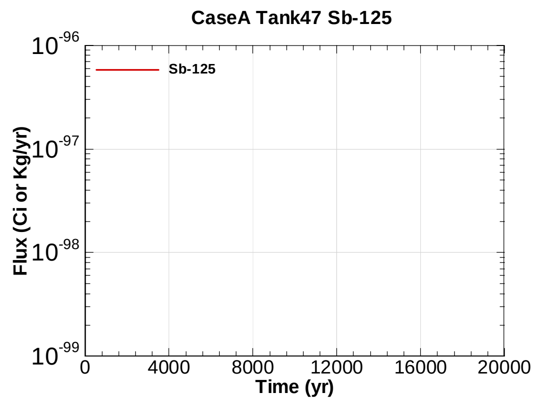

Figure A.2-1560 - Water Table Flux for CaseA Tank47 Sb-125

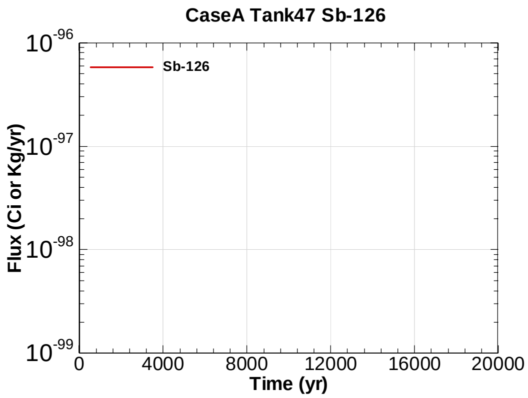

Figure A.2-1561 - Water Table Flux for CaseA Tank47 Sb-126

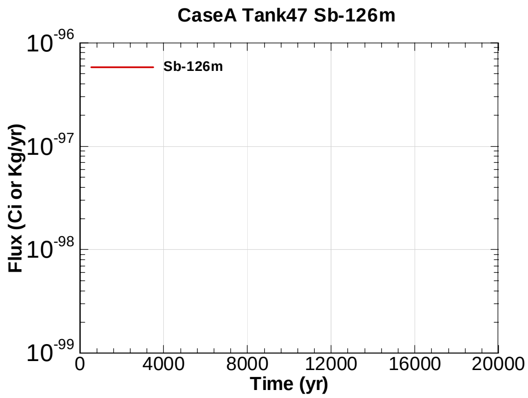

Figure A.2-1562 - Water Table Flux for CaseA Tank47 Sb-126m

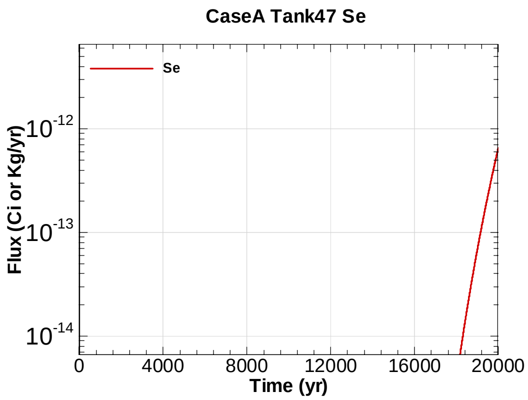

Figure A.2-1563 - Water Table Flux for CaseA Tank47 Se

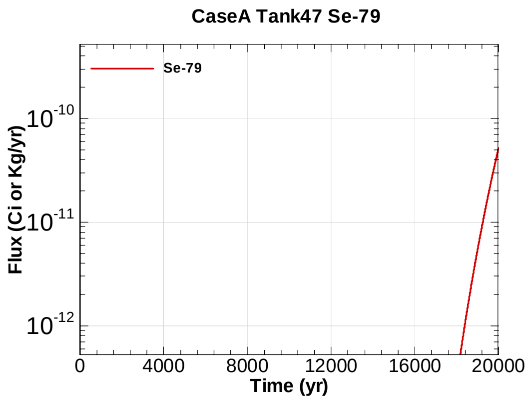

Figure A.2-1564 - Water Table Flux for CaseA Tank47 Se-79

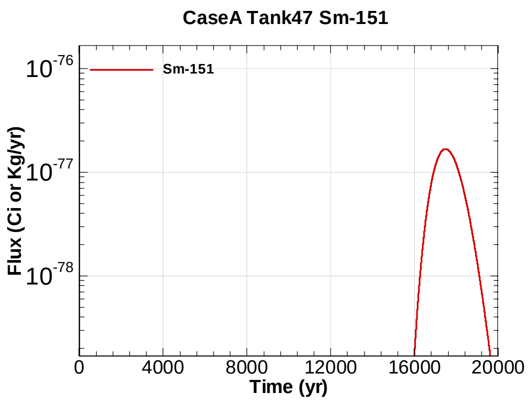

Figure A.2-1565 - Water Table Flux for CaseA Tank47 Sm-151

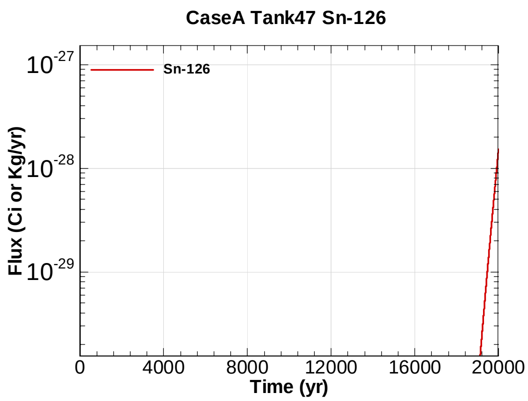

Figure A.2-1566 - Water Table Flux for CaseA Tank47 Sn-126

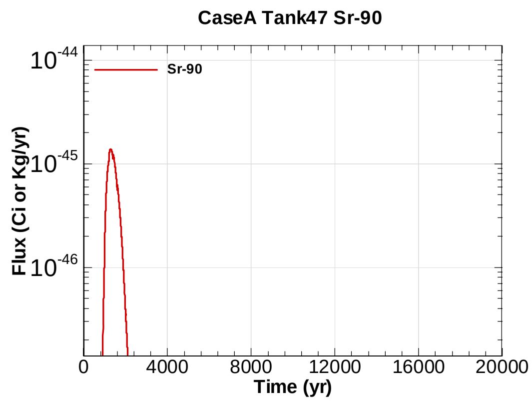

Figure A.2-1567 - Water Table Flux for CaseA Tank47 Sr-90

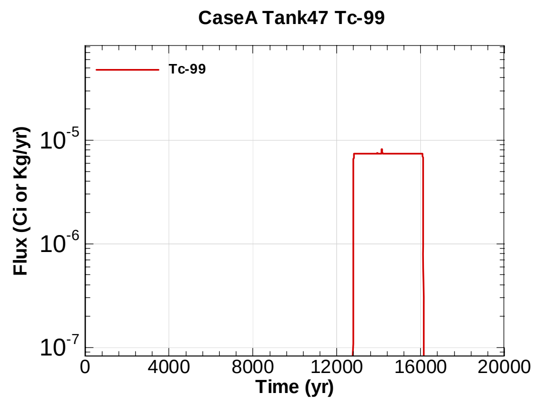

Figure A.2-1568 - Water Table Flux for CaseA Tank47 Tc-99

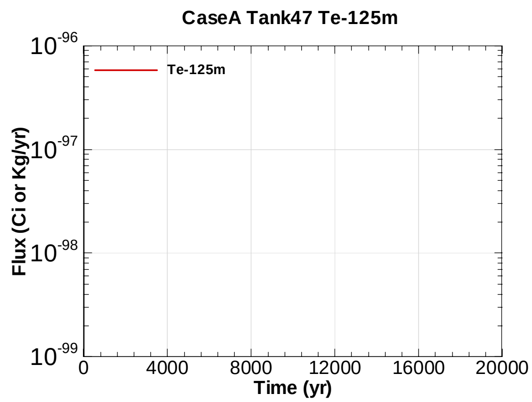

Figure A.2-1569 - Water Table Flux for CaseA Tank47 Te-125m

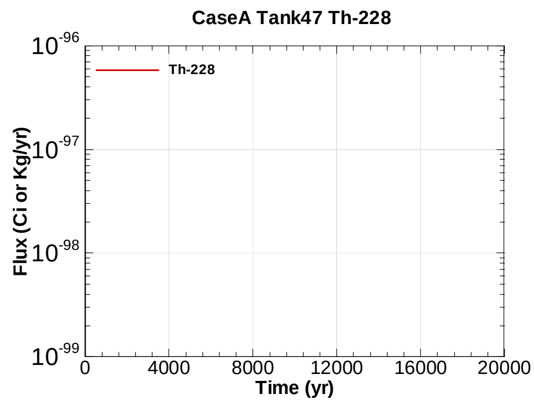

Figure A.2-1570 - Water Table Flux for CaseA Tank47 Th-228

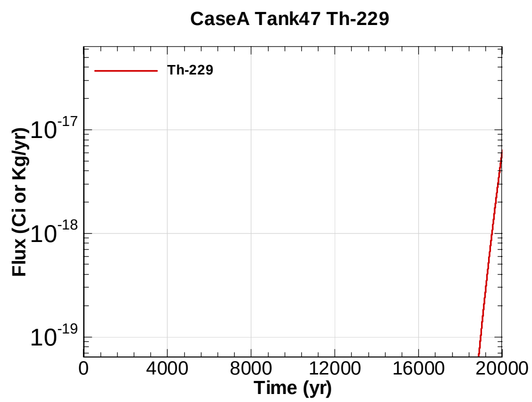

Figure A.2-1571 - Water Table Flux for CaseA Tank47 Th-229

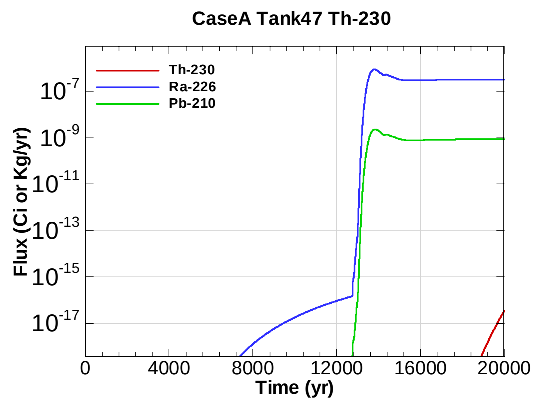

Figure A.2-1572 - Water Table Flux for CaseA Tank47 Th-230

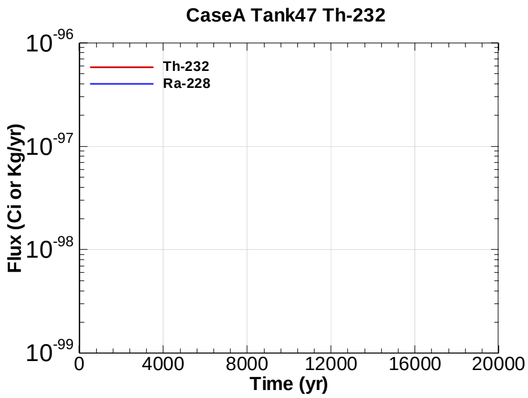

Figure A.2-1573 - Water Table Flux for CaseA Tank47 Th-232

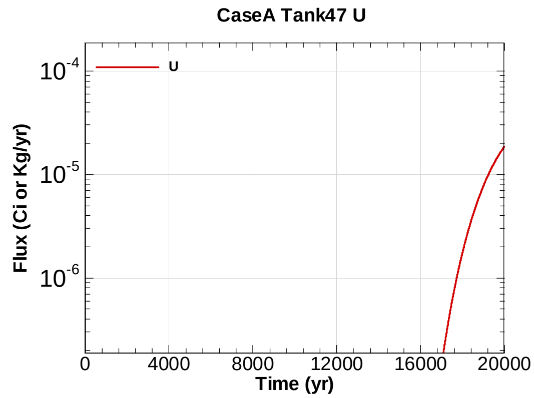

Figure A.2-1574 - Water Table Flux for CaseA Tank47 U

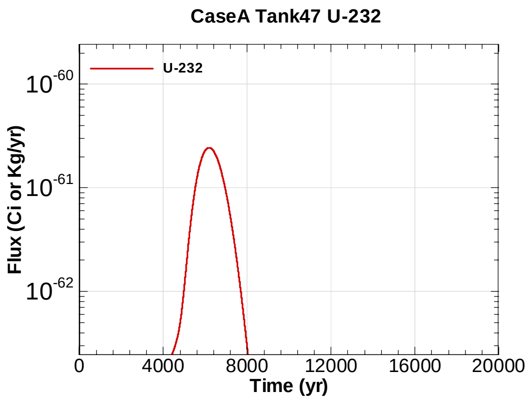

Figure A.2-1575 - Water Table Flux for CaseA Tank47 U-232

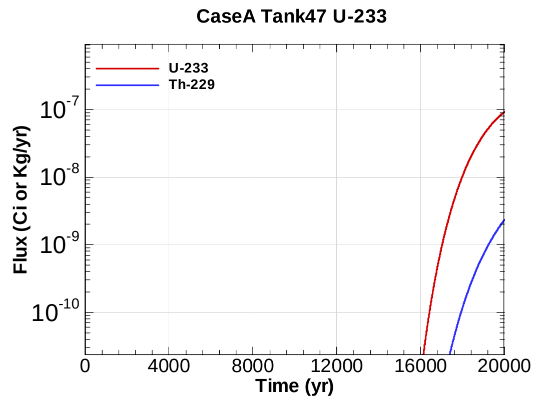

Figure A.2-1576 - Water Table Flux for CaseA Tank47 U-233

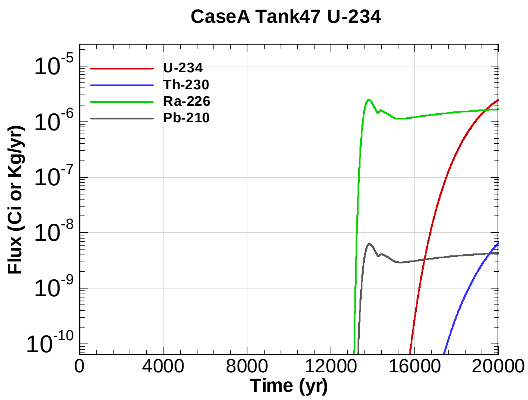

Figure A.2-1577 - Water Table Flux for CaseA Tank47 U-234

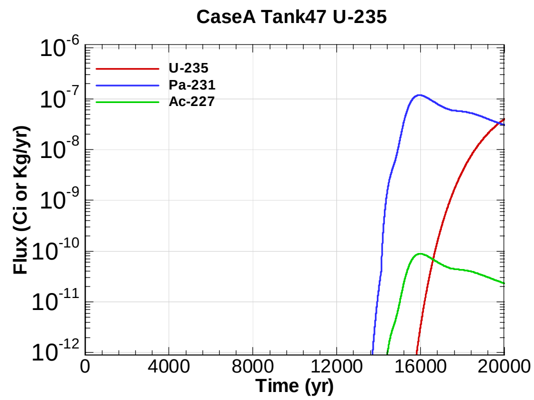

Figure A.2-1578 - Water Table Flux for CaseA Tank47 U-235

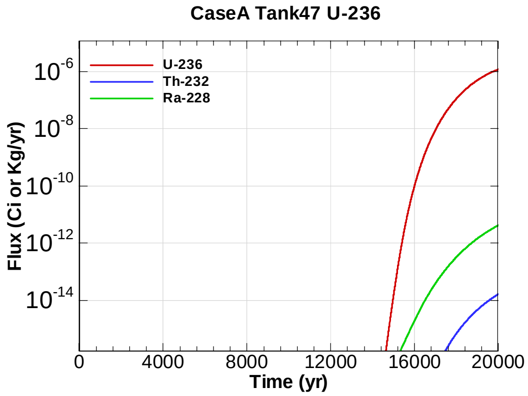

Figure A.2-1579 - Water Table Flux for CaseA Tank47 U-236

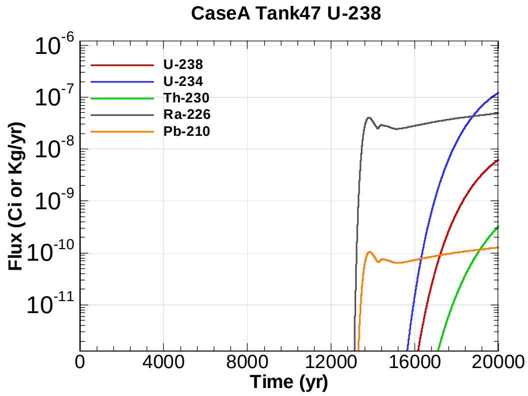

Figure A.2-1580 - Water Table Flux for CaseA Tank47 U-238

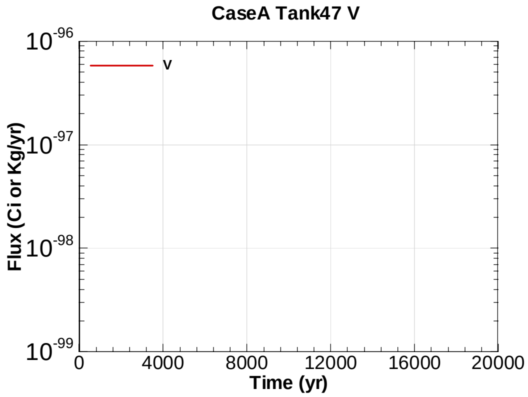

Figure A.2-1581 - Water Table Flux for CaseA Tank47 V

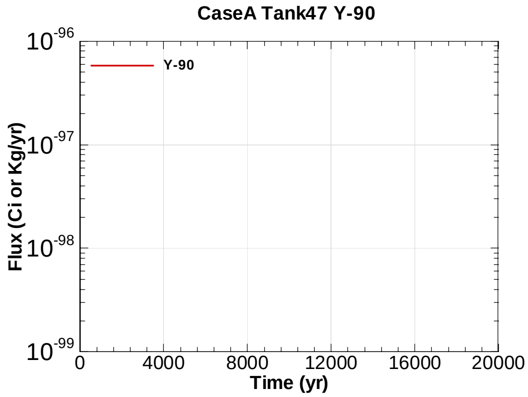

Figure A.2-1582 - Water Table Flux for CaseA Tank47 Y-90

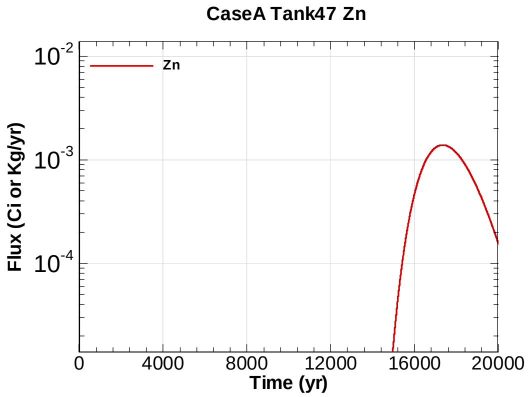

Figure A.2-1583 - Water Table Flux for CaseA Tank47 Zn

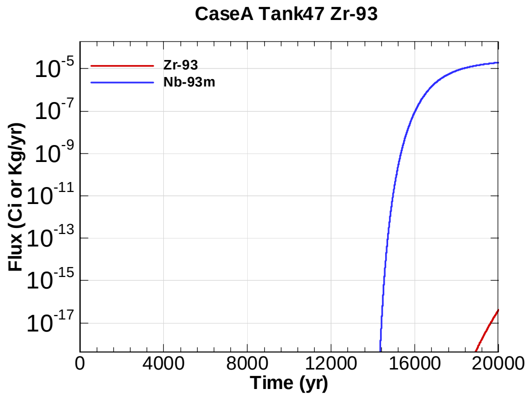

Figure A.2-1584 - Water Table Flux for CaseA Tank47 Zr-93

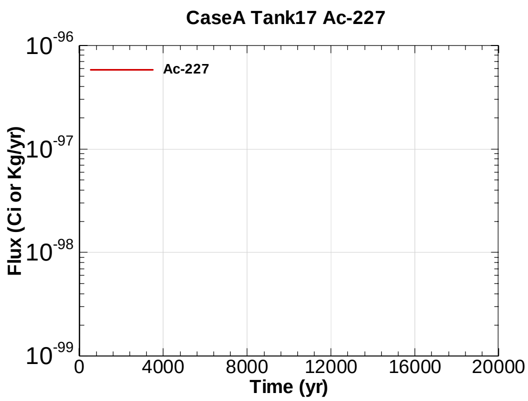

Figure A.2-1585 - Water Table Flux for CaseA Tank17 Ac-227

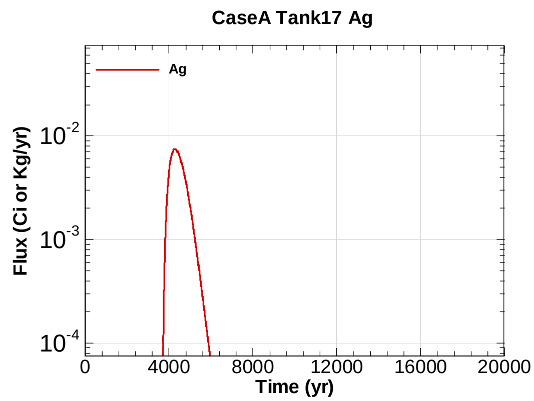

Figure A.2-1586 - Water Table Flux for CaseA Tank17 Ag

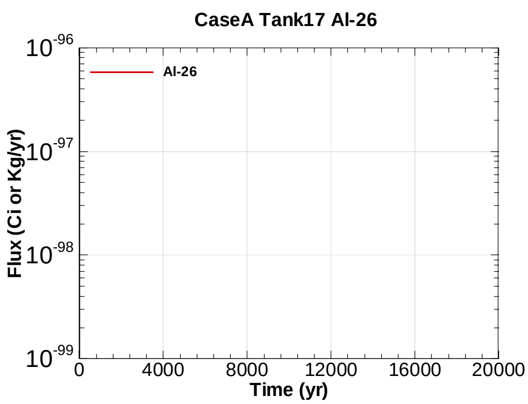

Figure A.2-1587 - Water Table Flux for CaseA Tank17 Al-26

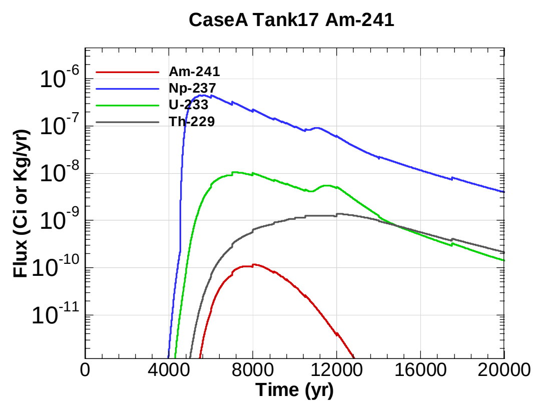

Figure A.2-1588 - Water Table Flux for CaseA Tank17 Am-241

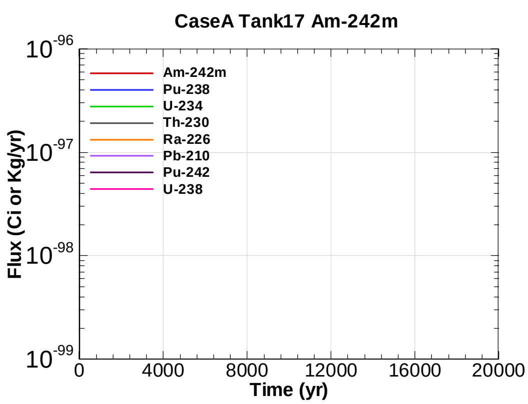

Figure A.2-1589 - Water Table Flux for CaseA Tank17 Am-242m

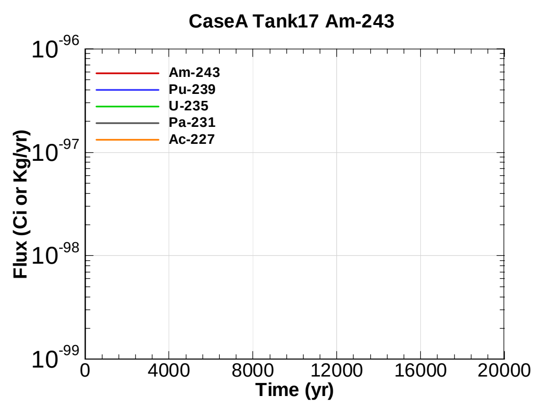

Figure A.2-1590 - Water Table Flux for CaseA Tank17 Am-243

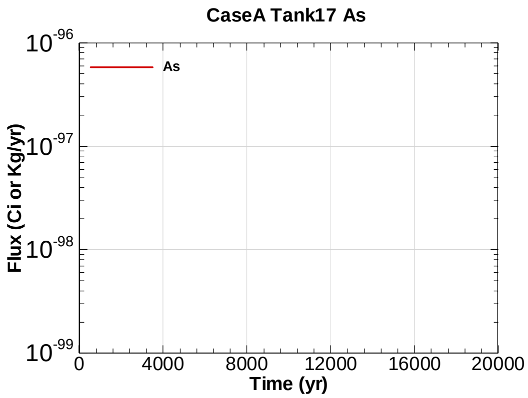

Figure A.2-1591 - Water Table Flux for CaseA Tank17 As

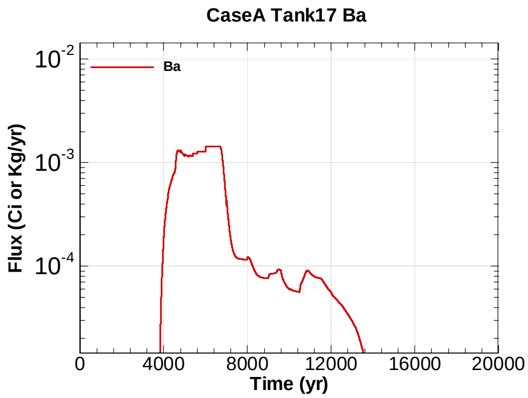

Figure A.2-1592 - Water Table Flux for CaseA Tank17 Ba

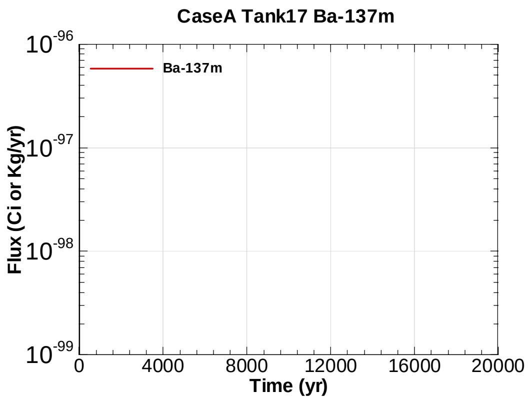

Figure A.2-1593 - Water Table Flux for CaseA Tank17 Ba-137m

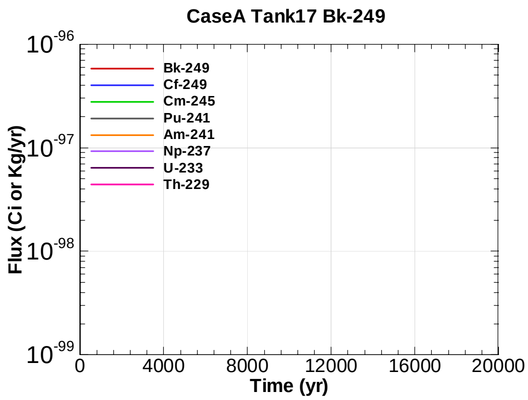

Figure A.2-1594 - Water Table Flux for CaseA Tank17 Bk-249

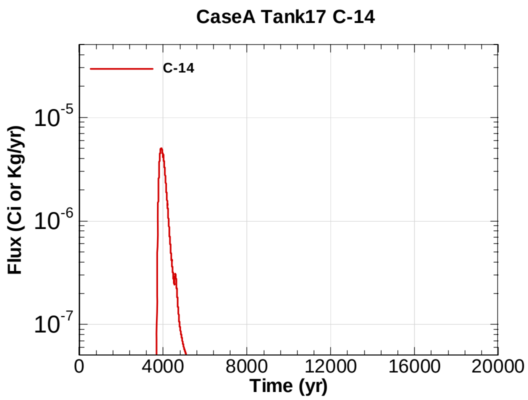

Figure A.2-1595 - Water Table Flux for CaseA Tank17 C-14

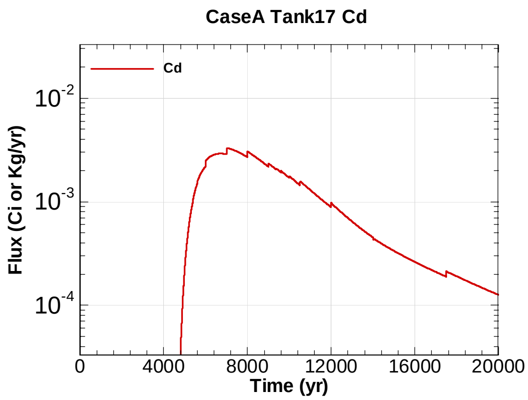

Figure A.2-1596 - Water Table Flux for CaseA Tank17 Cd

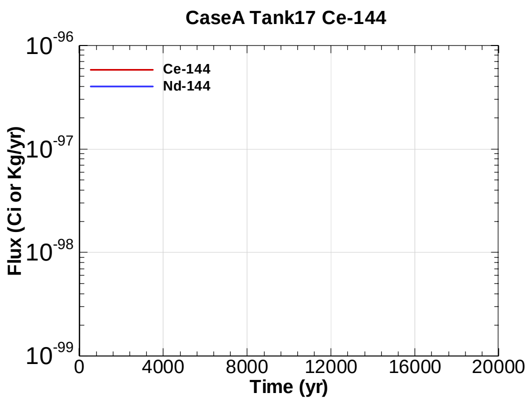

Figure A.2-1597 - Water Table Flux for CaseA Tank17 Ce-144

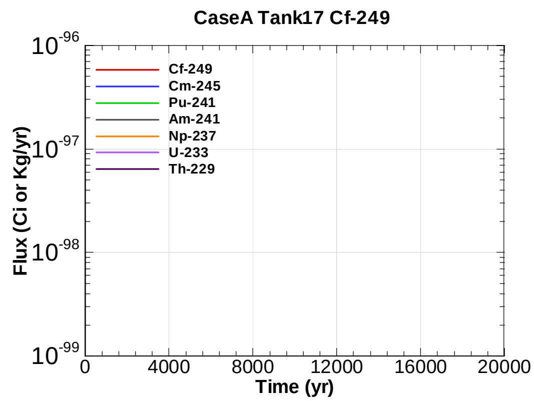

Figure A.2-1598 - Water Table Flux for CaseA Tank17 Cf-249

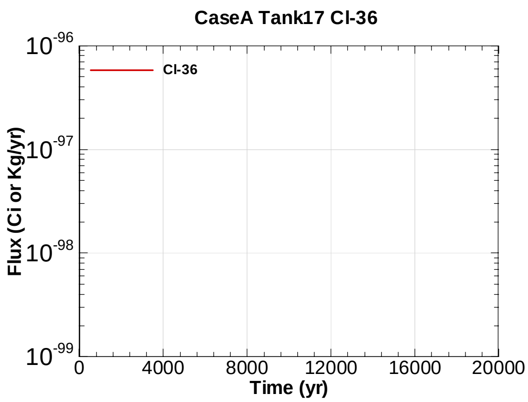

Figure A.2-1599 - Water Table Flux for CaseA Tank17 Cl-36

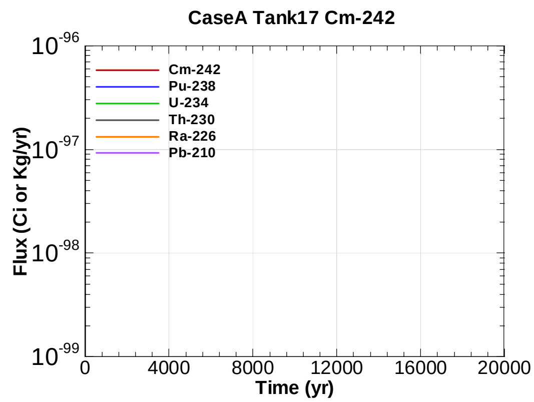

Figure A.2-1600 - Water Table Flux for CaseA Tank17 Cm-242

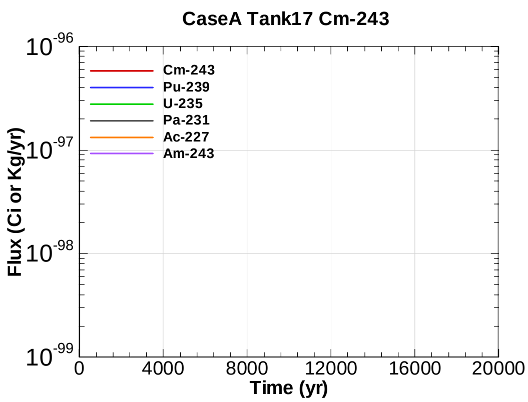

Figure A.2-1601 - Water Table Flux for CaseA Tank17 Cm-243

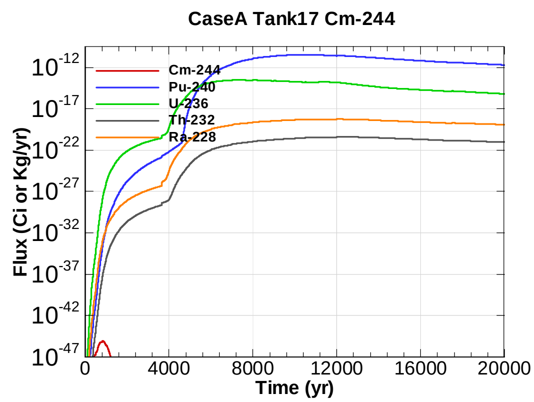

Figure A.2-1602 - Water Table Flux for CaseA Tank17 Cm-244

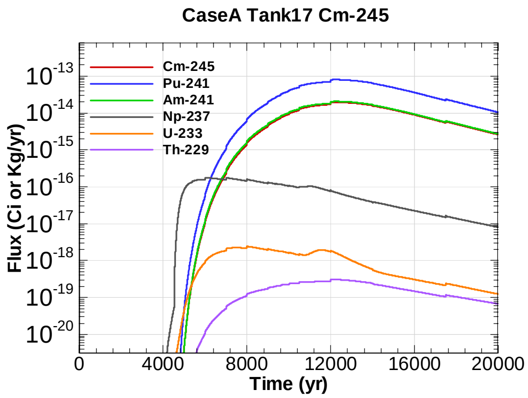

Figure A.2-1603 - Water Table Flux for CaseA Tank17 Cm-245

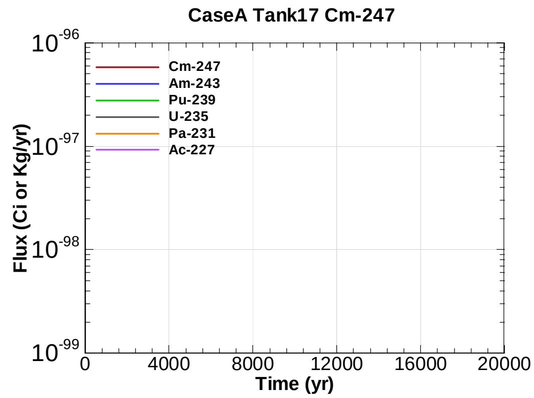

Figure A.2-1604 - Water Table Flux for CaseA Tank17 Cm-247

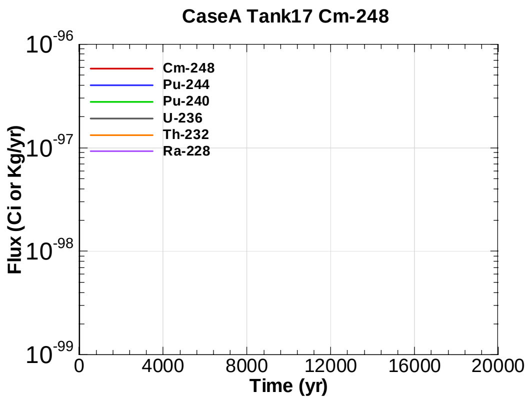

Figure A.2-1605 - Water Table Flux for CaseA Tank17 Cm-248

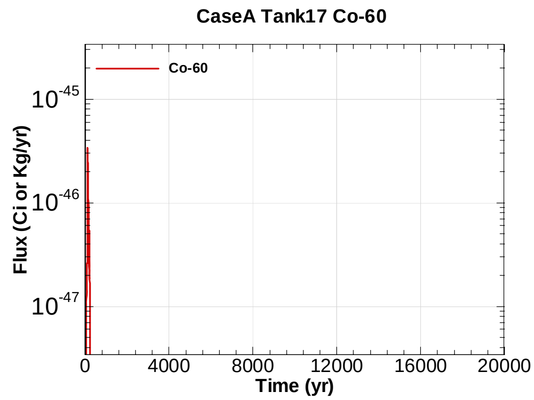

Figure A.2-1606 - Water Table Flux for CaseA Tank17 Co-60

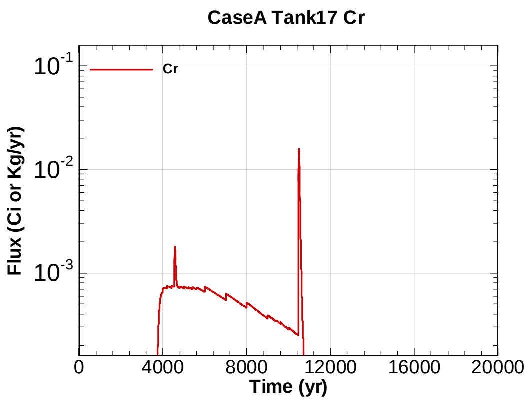

Figure A.2-1607 - Water Table Flux for CaseA Tank17 Cr

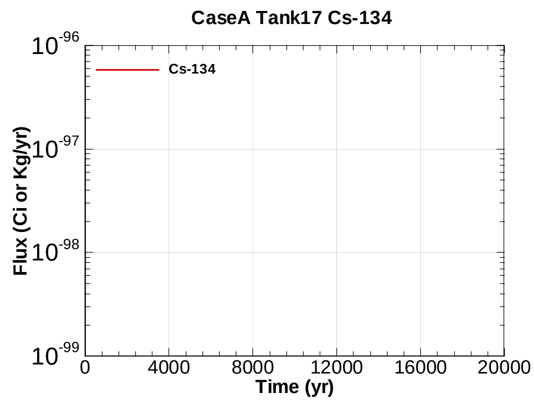

Figure A.2-1608 - Water Table Flux for CaseA Tank17 Cs-134

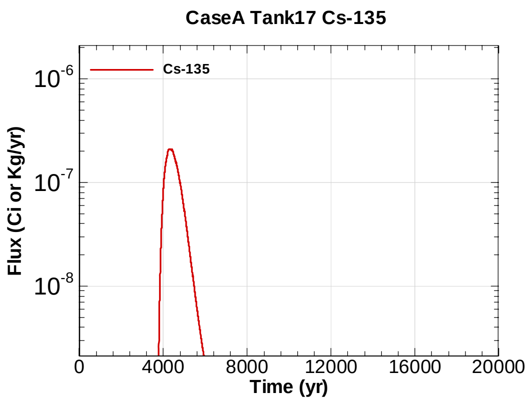

Figure A.2-1609 - Water Table Flux for CaseA Tank17 Cs-135

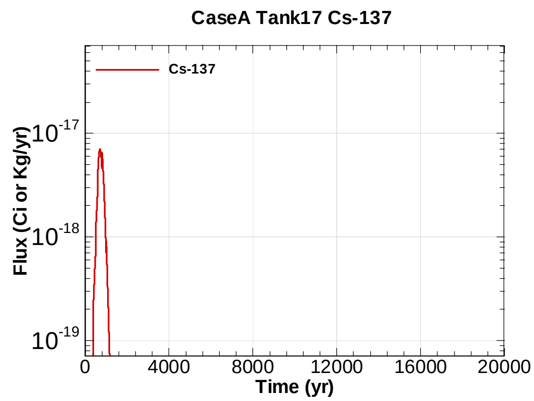

Figure A.2-1610 - Water Table Flux for CaseA Tank17 Cs-137

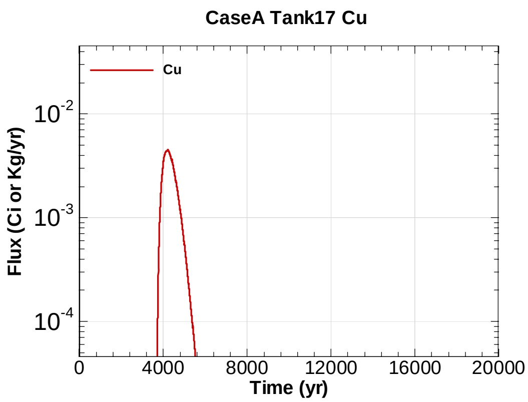

Figure A.2-1611 - Water Table Flux for CaseA Tank17 Cu

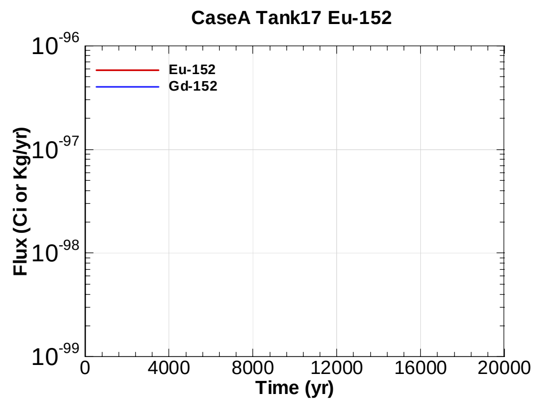

Figure A.2-1612 - Water Table Flux for CaseA Tank17 Eu-152

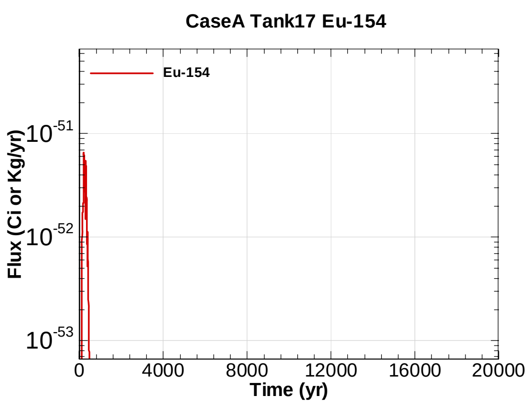

Figure A.2-1613 - Water Table Flux for CaseA Tank17 Eu-154

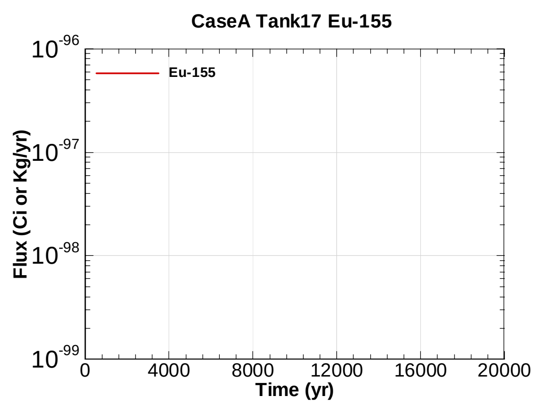

Figure A.2-1614 - Water Table Flux for CaseA Tank17 Eu-155

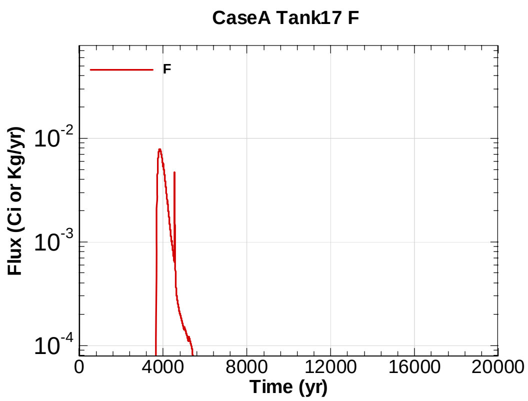

Figure A.2-1615 - Water Table Flux for CaseA Tank17 F

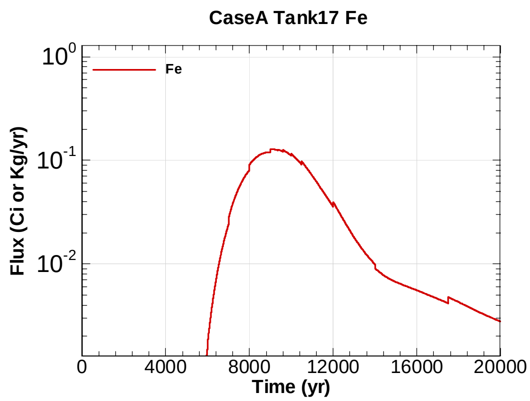

Figure A.2-1616 - Water Table Flux for CaseA Tank17 Fe

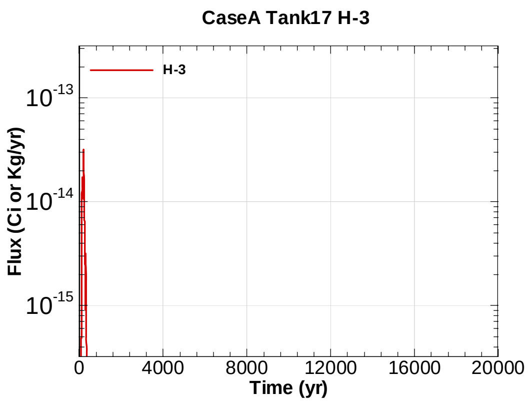

Figure A.2-1617 - Water Table Flux for CaseA Tank17 H-3

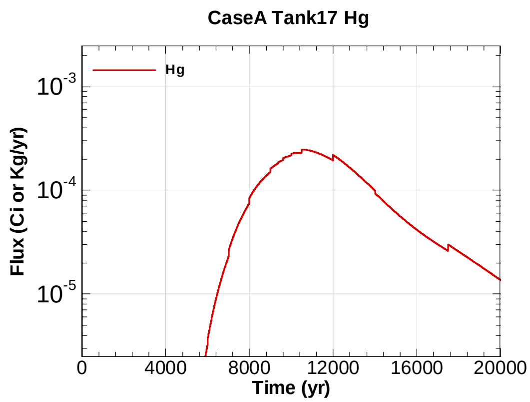

Figure A.2-1618 - Water Table Flux for CaseA Tank17 Hg

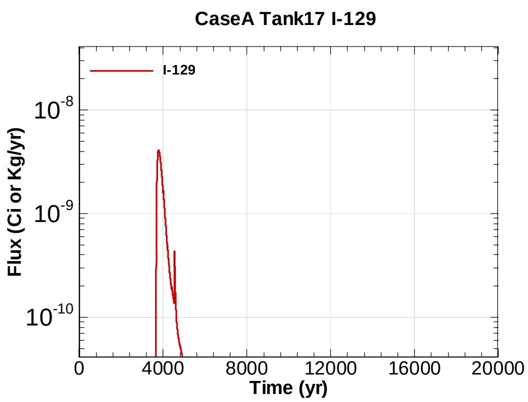

Figure A.2-1619 - Water Table Flux for CaseA Tank17 I-129

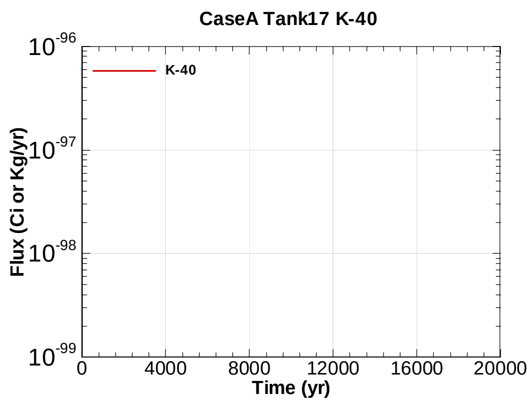

Figure A.2-1620 - Water Table Flux for CaseA Tank17 K-40

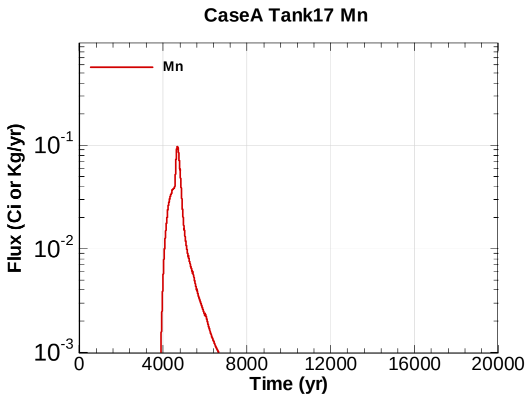

Figure A.2-1621 - Water Table Flux for CaseA Tank17 Mn

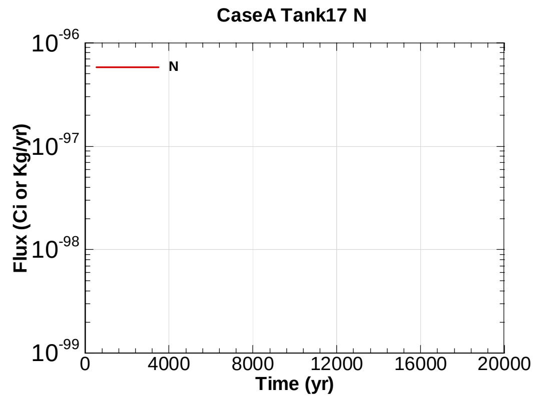

Figure A.2-1622 - Water Table Flux for CaseA Tank17 N

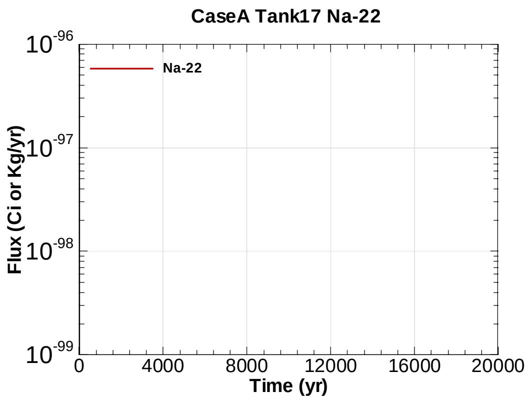

Figure A.2-1623 - Water Table Flux for CaseA Tank17 Na-22

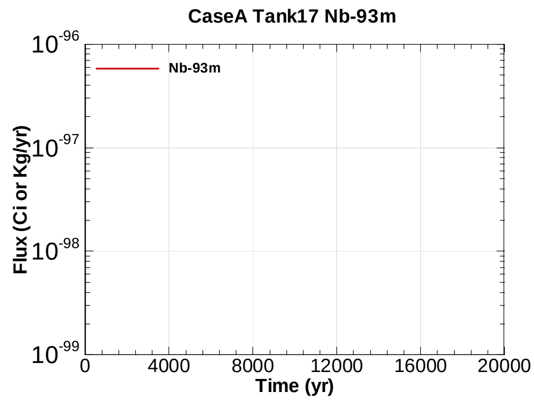

Figure A.2-1624 - Water Table Flux for CaseA Tank17 Nb-93m

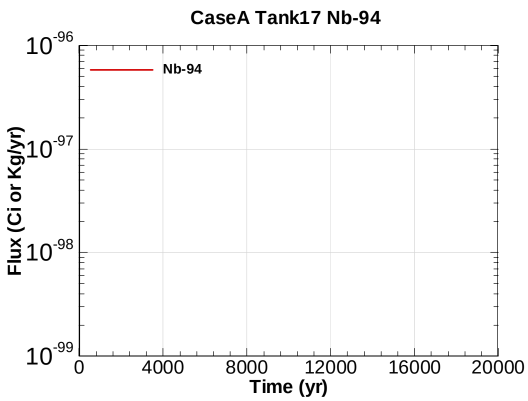

Figure A.2-1625 - Water Table Flux for CaseA Tank17 Nb-94

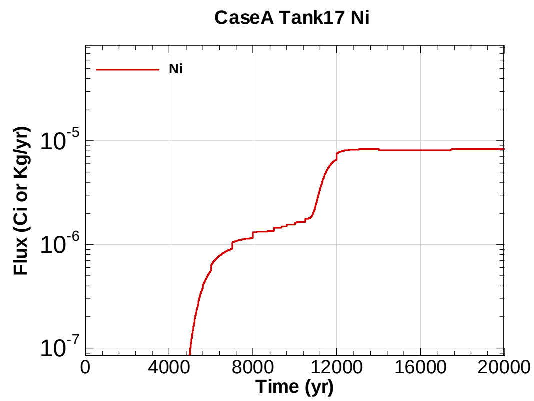

Figure A.2-1626 - Water Table Flux for CaseA Tank17 Ni

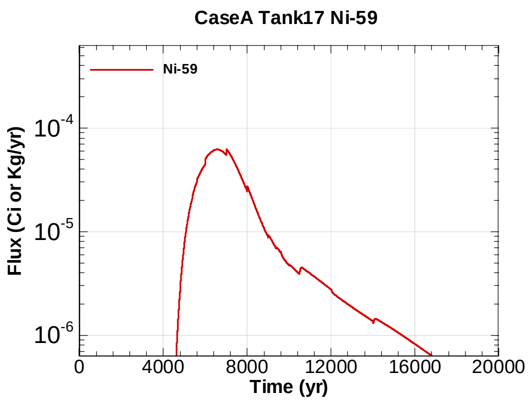

Figure A.2-1627 - Water Table Flux for CaseA Tank17 Ni-59

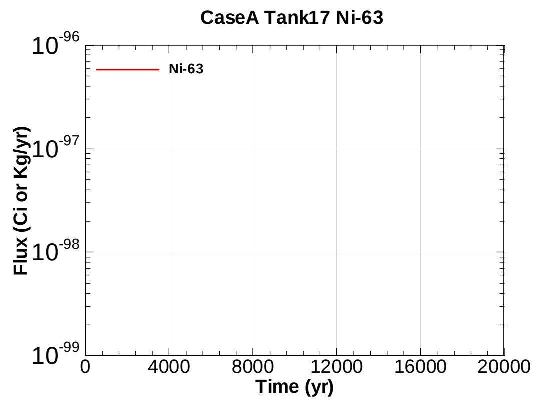

Figure A.2-1628 - Water Table Flux for CaseA Tank17 Ni-63

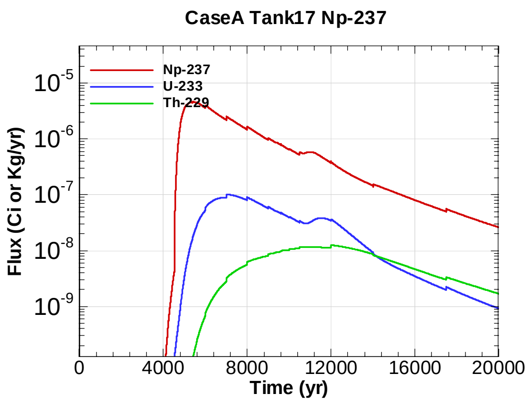

Figure A.2-1629 - Water Table Flux for CaseA Tank17 Np-237

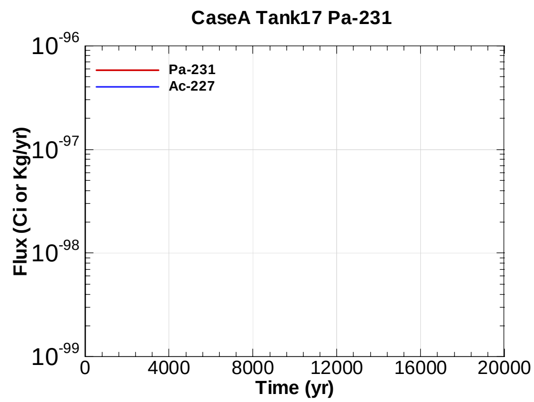

Figure A.2-1630 - Water Table Flux for CaseA Tank17 Pa-231

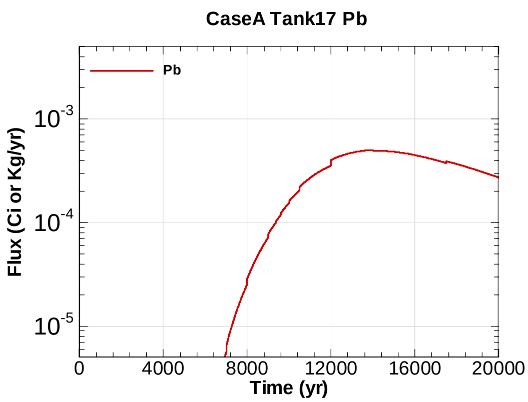

Figure A.2-1631 - Water Table Flux for CaseA Tank17 Pb

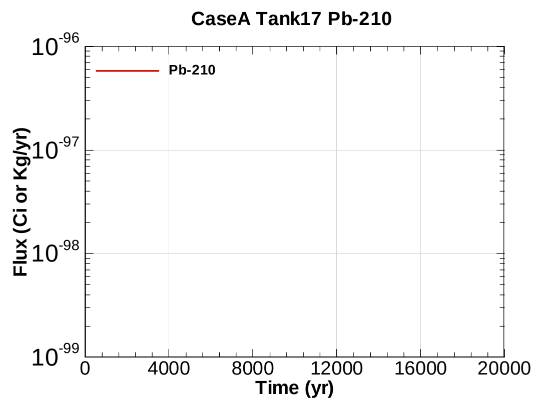

Figure A.2-1632 - Water Table Flux for CaseA Tank17 Pb-210

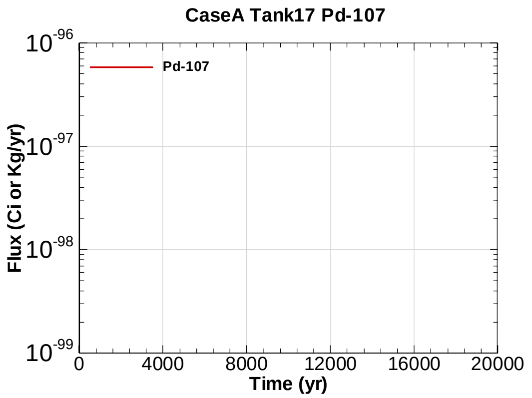

Figure A.2-1633 - Water Table Flux for CaseA Tank17 Pd-107

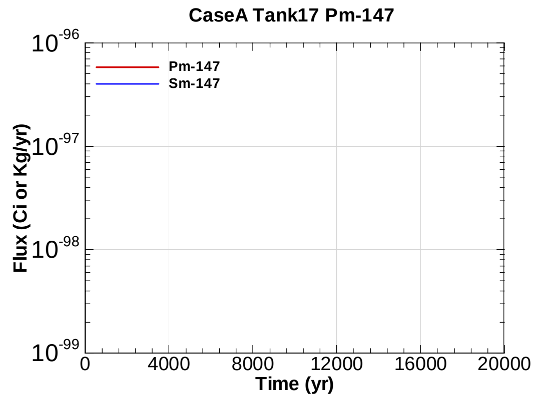

Figure A.2-1634 - Water Table Flux for CaseA Tank17 Pm-147

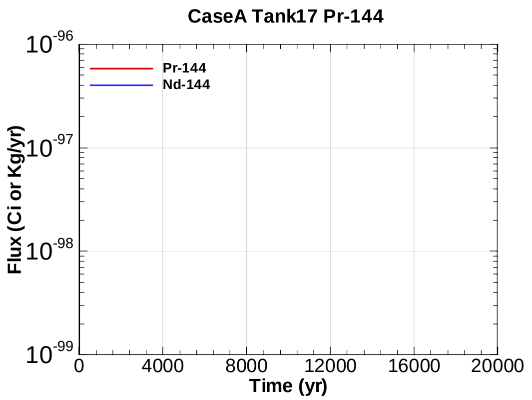

Figure A.2-1635 - Water Table Flux for CaseA Tank17 Pr-144

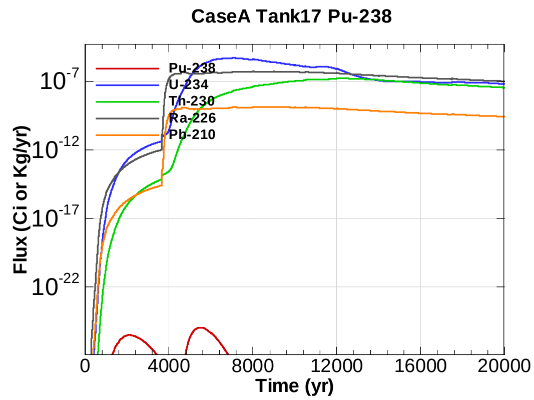

Figure A.2-1636 - Water Table Flux for CaseA Tank17 Pu-238

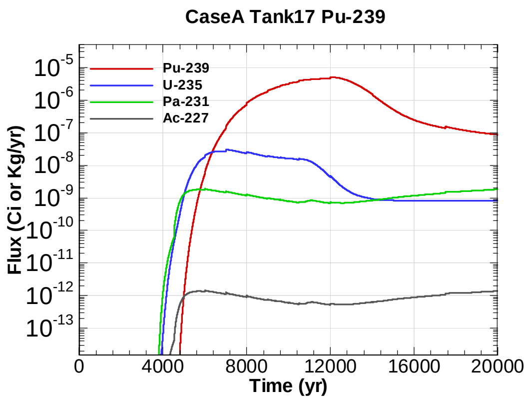

Figure A.2-1637 - Water Table Flux for CaseA Tank17 Pu-239

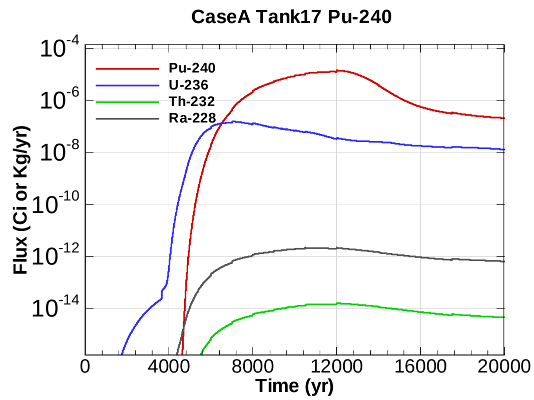

Figure A.2-1638 - Water Table Flux for CaseA Tank17 Pu-240

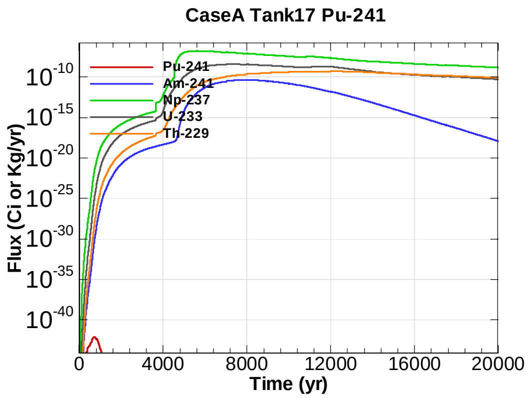

Figure A.2-1639 - Water Table Flux for CaseA Tank17 Pu-241

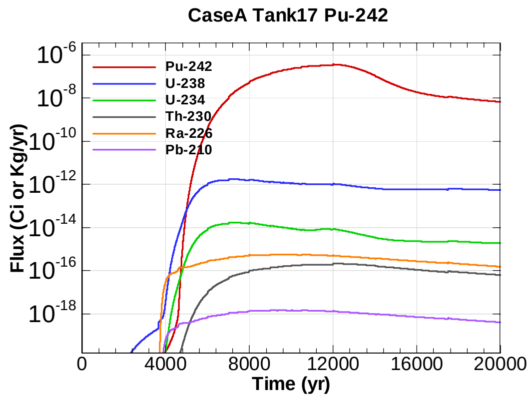

Figure A.2-1640 - Water Table Flux for CaseA Tank17 Pu-242

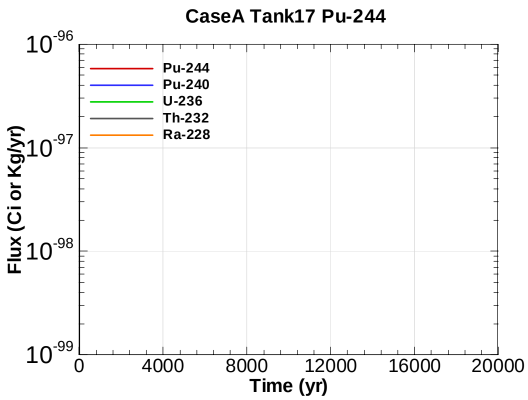

Figure A.2-1641 - Water Table Flux for CaseA Tank17 Pu-244

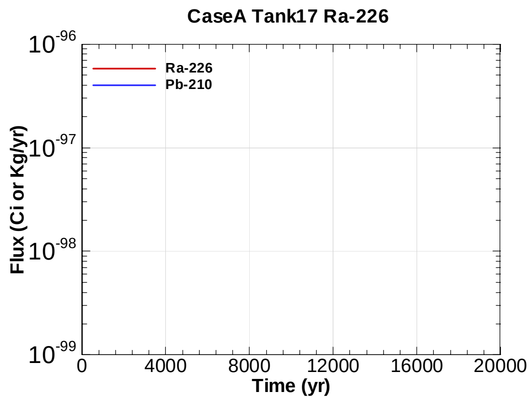

Figure A.2-1642 - Water Table Flux for CaseA Tank17 Ra-226

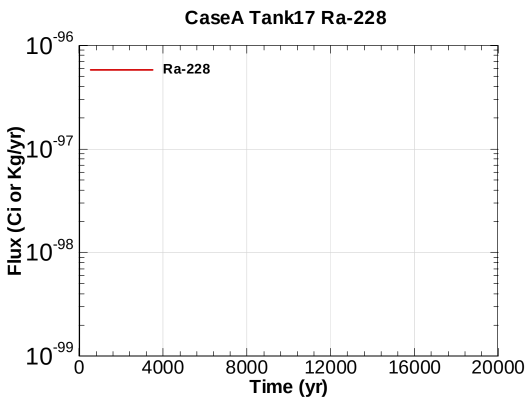

Figure A.2-1643 - Water Table Flux for CaseA Tank17 Ra-228

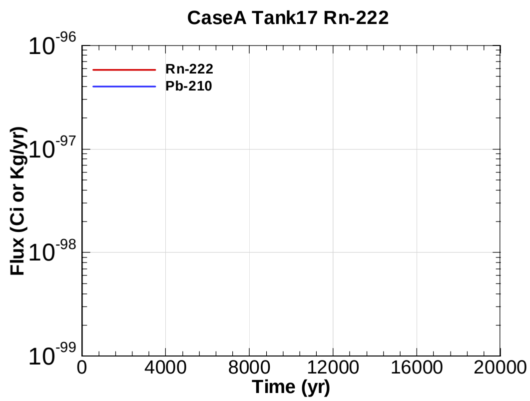

Figure A.2-1644 - Water Table Flux for CaseA Tank17 Rn-222

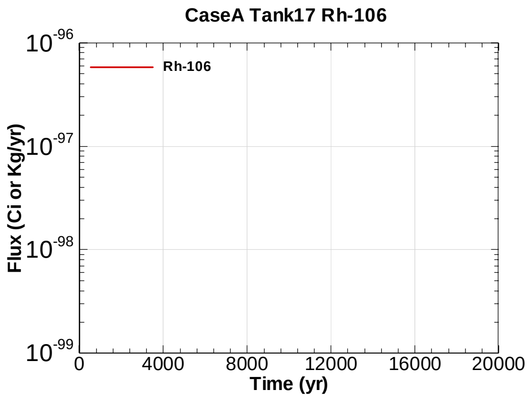

Figure A.2-1645 - Water Table Flux for CaseA Tank17 Rh-106

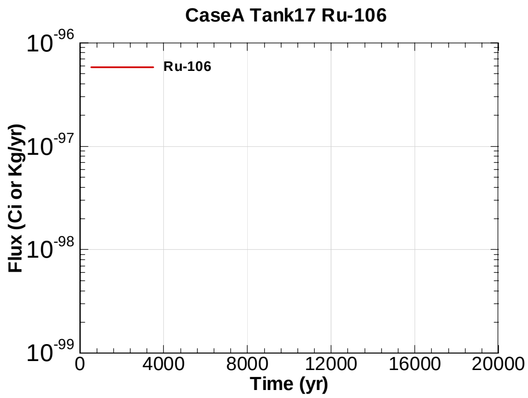

Figure A.2-1646 - Water Table Flux for CaseA Tank17 Ru-106

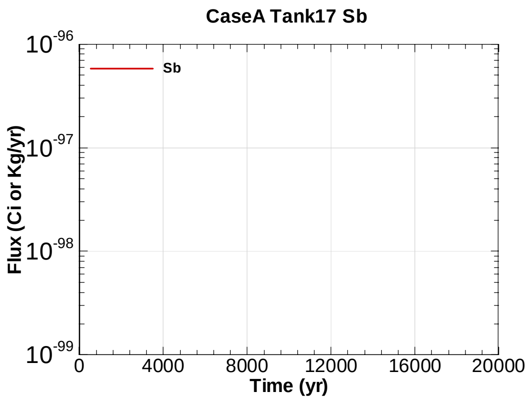

Figure A.2-1647 - Water Table Flux for CaseA Tank17 Sb

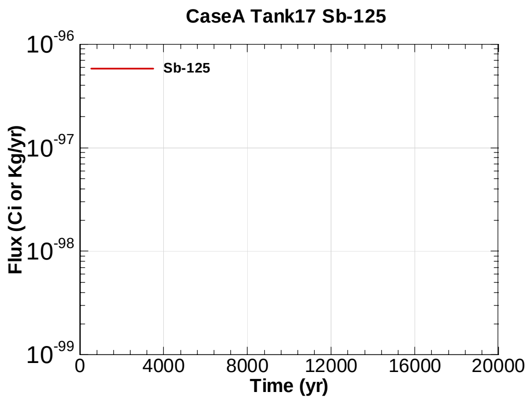

Figure A.2-1648 - Water Table Flux for CaseA Tank17 Sb-125

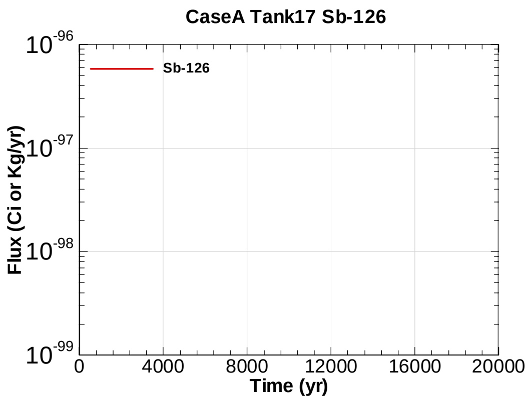

Figure A.2-1649 - Water Table Flux for CaseA Tank17 Sb-126

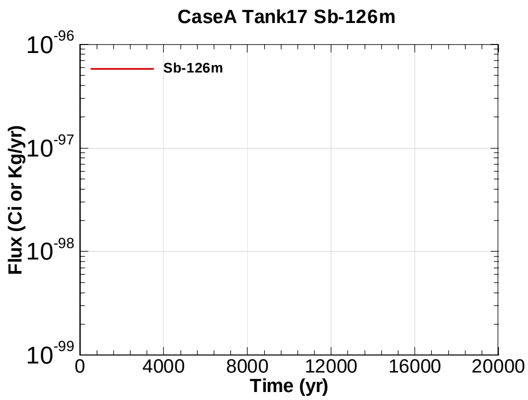

Figure A.2-1650 - Water Table Flux for CaseA Tank17 Sb-126m

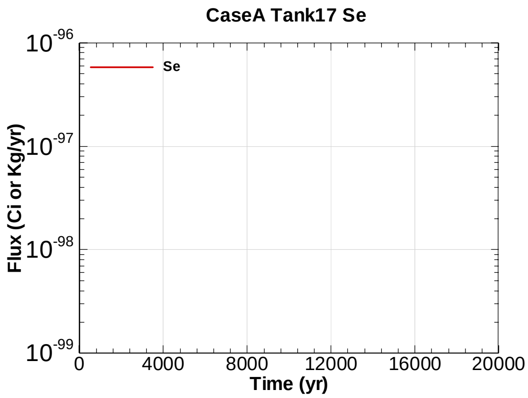

Figure A.2-1651 - Water Table Flux for CaseA Tank17 Se

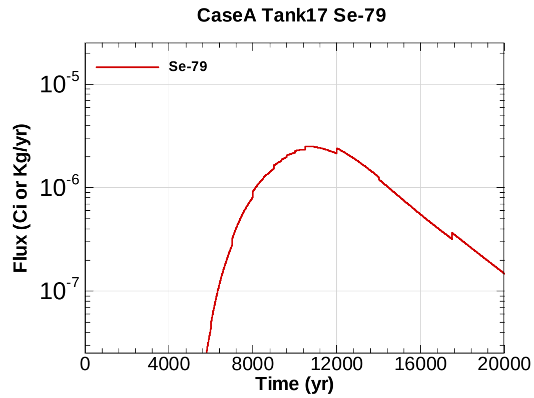

Figure A.2-1652 - Water Table Flux for CaseA Tank17 Se-79

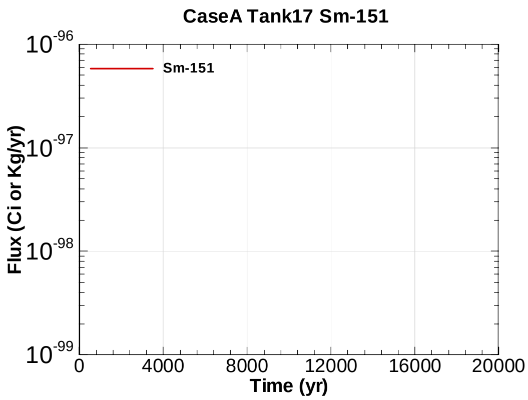

Figure A.2-1653 - Water Table Flux for CaseA Tank17 Sm-151

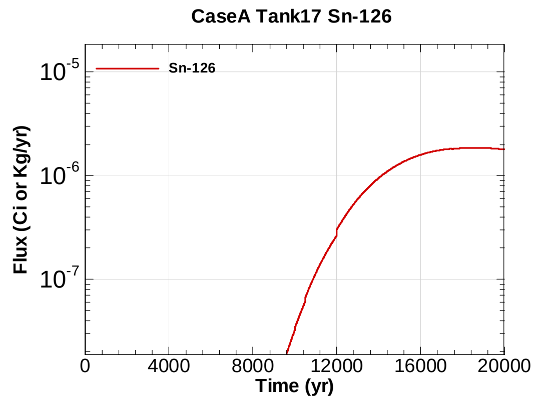

Figure A.2-1654 - Water Table Flux for CaseA Tank17 Sn-126

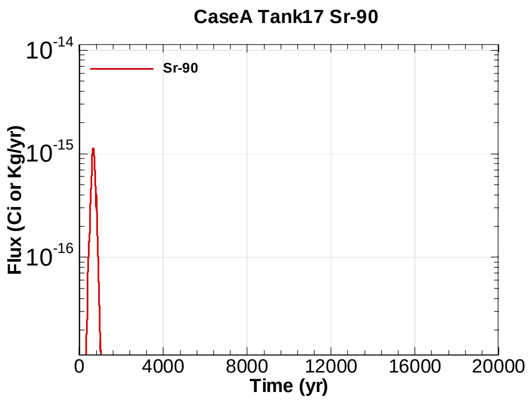

Figure A.2-1655 - Water Table Flux for CaseA Tank17 Sr-90

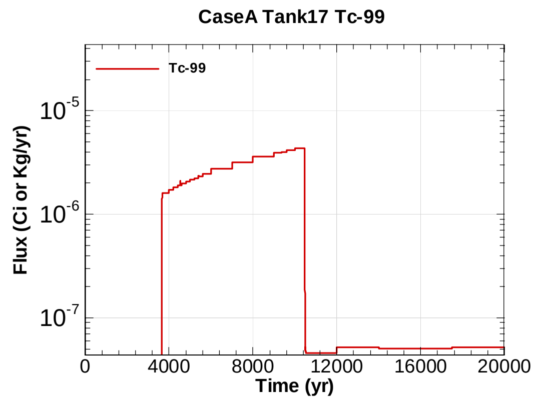

Figure A.2-1656 - Water Table Flux for CaseA Tank17 Tc-99

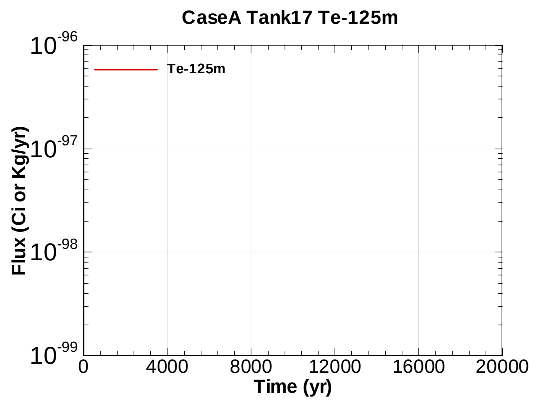

Figure A.2-1657 - Water Table Flux for CaseA Tank17 Te-125m

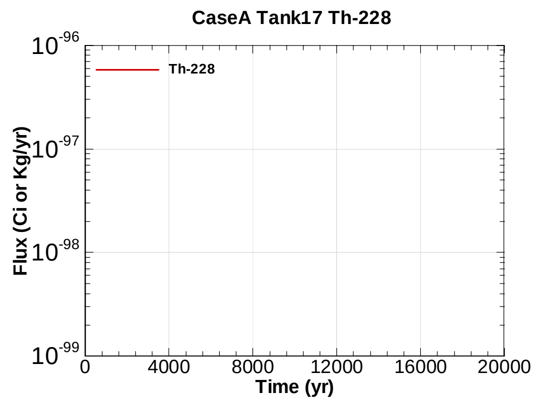

Figure A.2-1658 - Water Table Flux for CaseA Tank17 Th-228

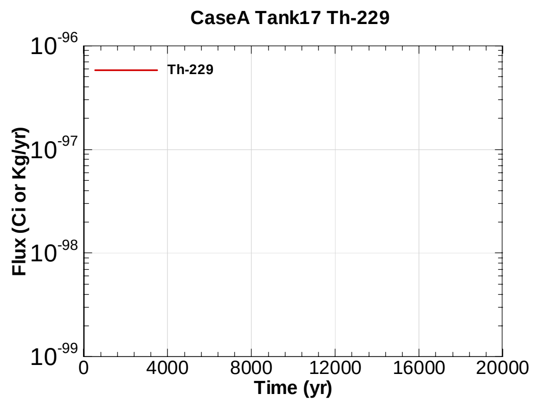

Figure A.2-1659 - Water Table Flux for CaseA Tank17 Th-229

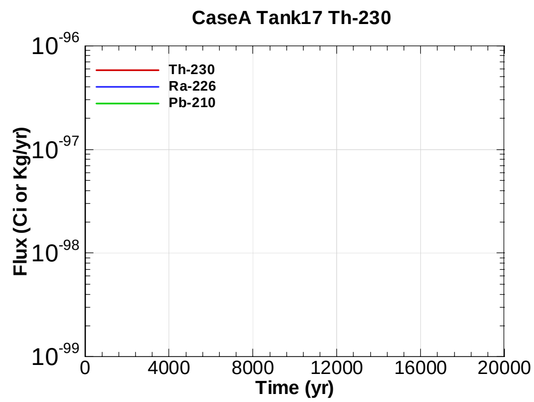

Figure A.2-1660 - Water Table Flux for CaseA Tank17 Th-230

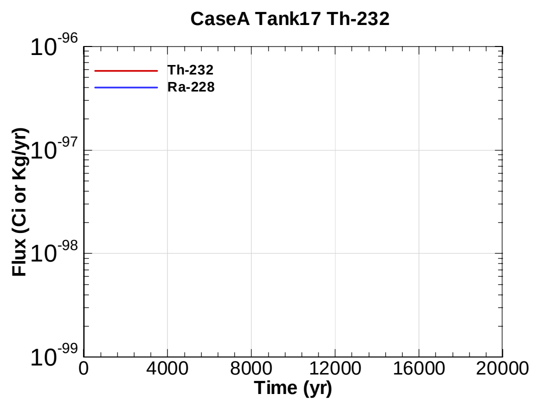

Figure A.2-1661 - Water Table Flux for CaseA Tank17 Th-232

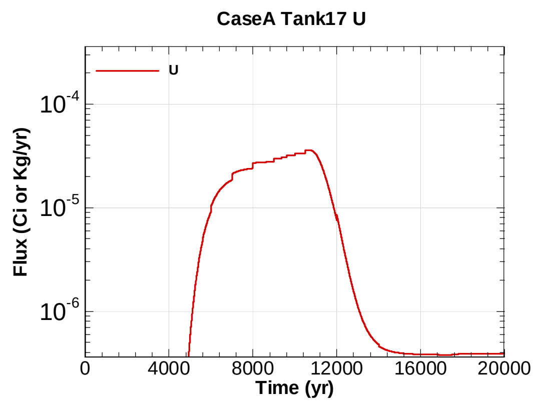

Figure A.2-1662 - Water Table Flux for CaseA Tank17 U

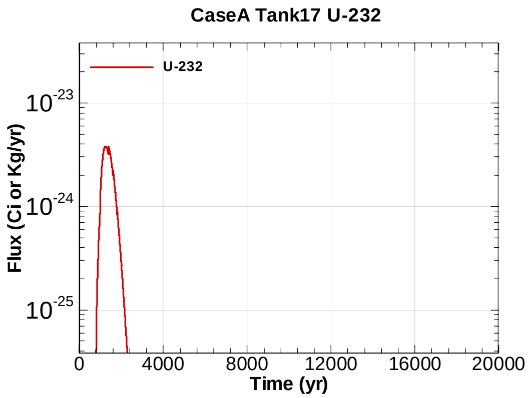

Figure A.2-1663 - Water Table Flux for CaseA Tank17 U-232

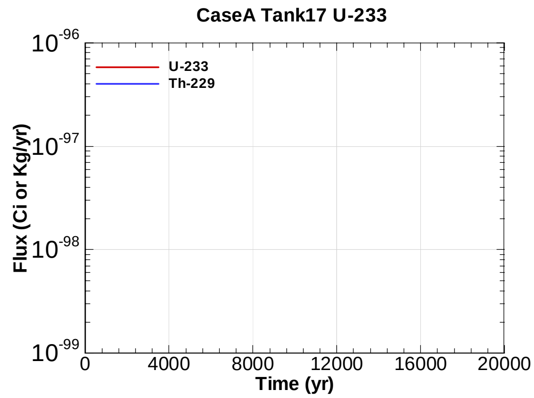

Figure A.2-1664 - Water Table Flux for CaseA Tank17 U-233

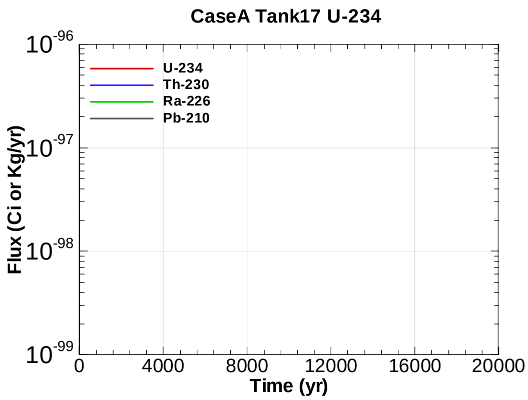

Figure A.2-1665 - Water Table Flux for CaseA Tank17 U-234

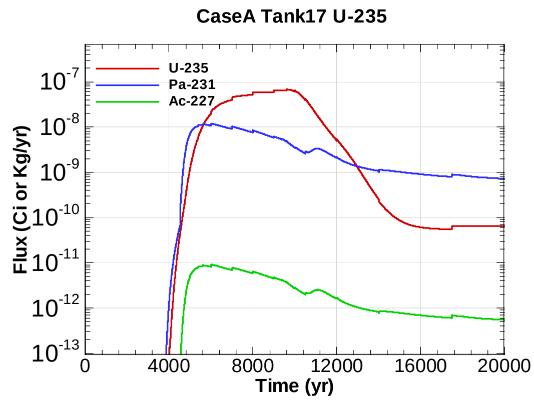

Figure A.2-1666 - Water Table Flux for CaseA Tank17 U-235

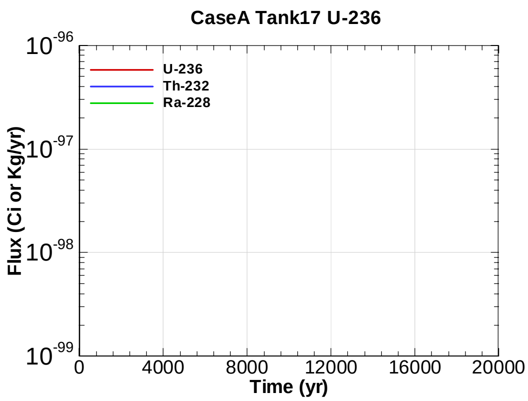

Figure A.2-1667 - Water Table Flux for CaseA Tank17 U-236

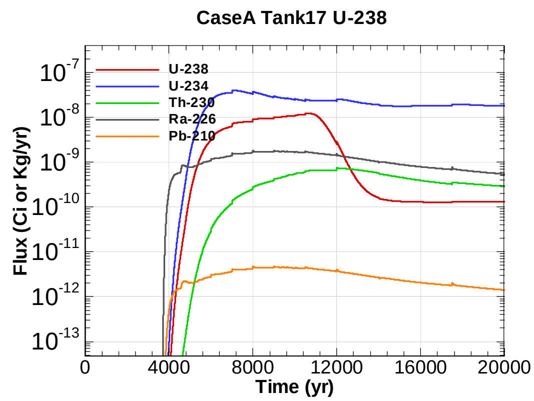

Figure A.2-1668 - Water Table Flux for CaseA Tank17 U-238

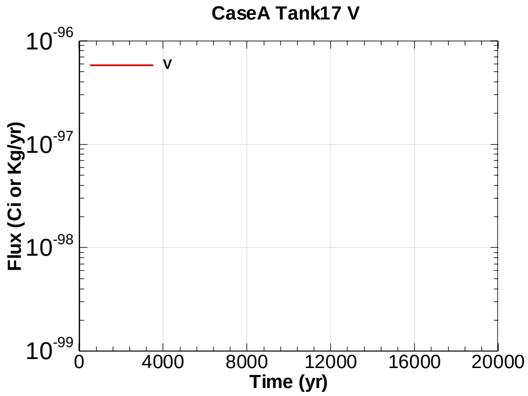

Figure A.2-1669 - Water Table Flux for CaseA Tank17 V

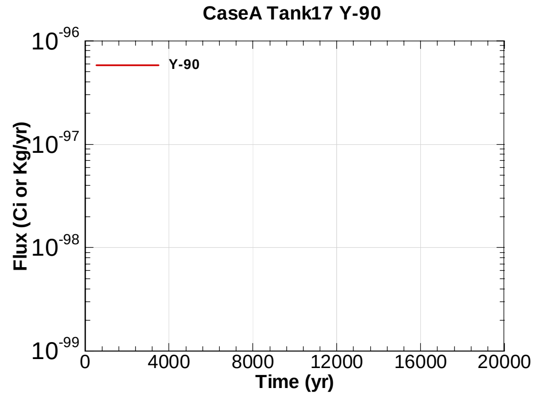

Figure A.2-1670 - Water Table Flux for CaseA Tank17 Y-90

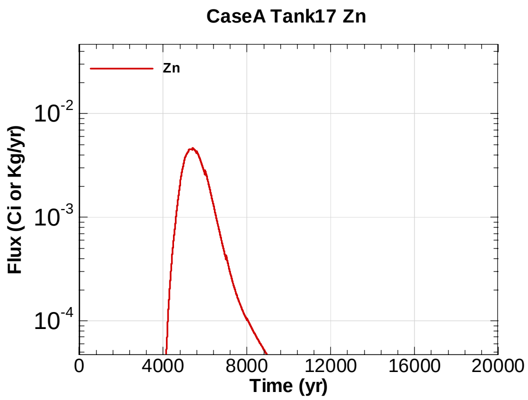

Figure A.2-1671 - Water Table Flux for CaseA Tank17 Zn

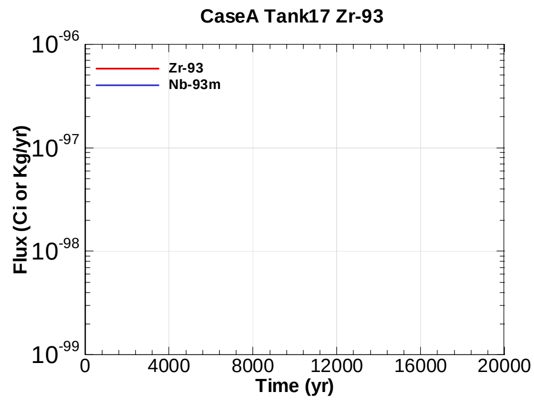

Figure A.2-1672 - Water Table Flux for CaseA Tank17 Zr-93

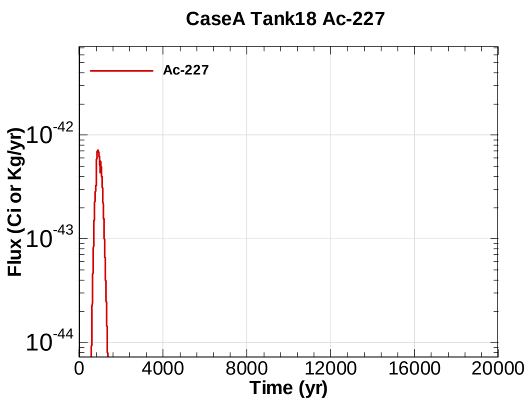

Figure A.2-1673 - Water Table Flux for CaseA Tank18 Ac-227

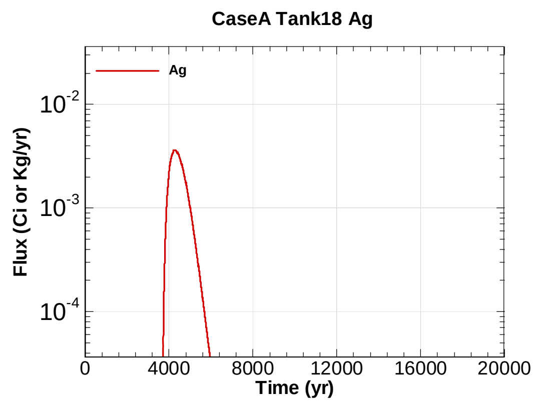

Figure A.2-1674 - Water Table Flux for CaseA Tank18 Ag

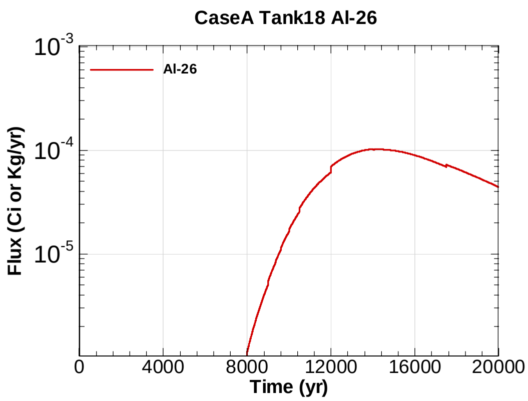

Figure A.2-1675 - Water Table Flux for CaseA Tank18 Al-26

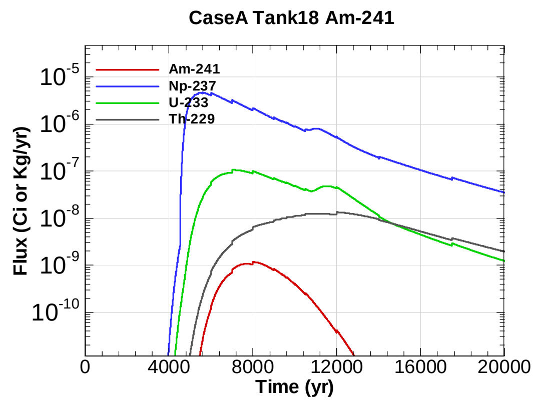

Figure A.2-1676 - Water Table Flux for CaseA Tank18 Am-241

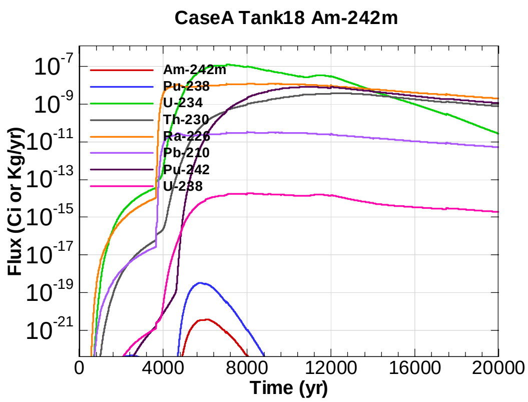

Figure A.2-1677 - Water Table Flux for CaseA Tank18 Am-242m

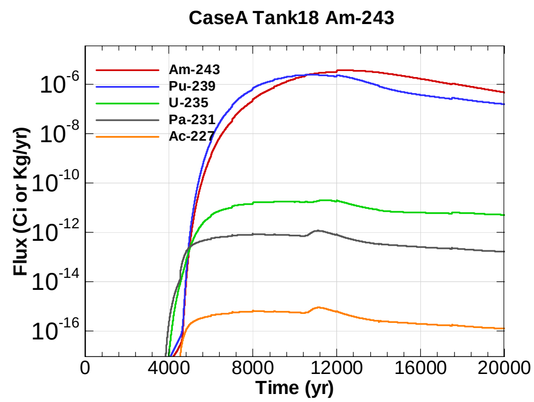

Figure A.2-1678 - Water Table Flux for CaseA Tank18 Am-243

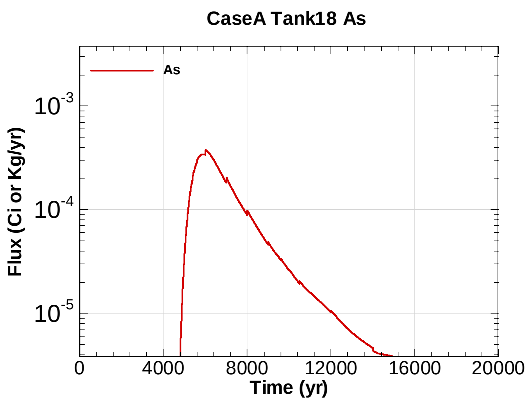

Figure A.2-1679 - Water Table Flux for CaseA Tank18 As

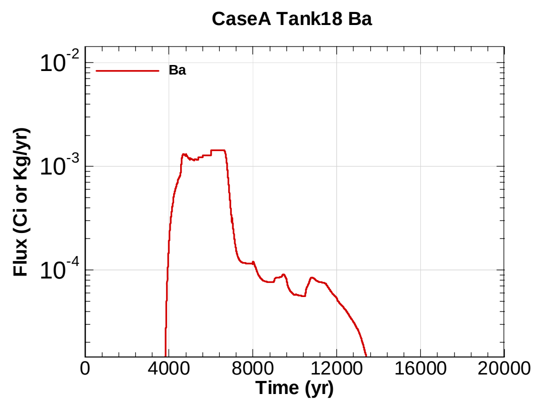

Figure A.2-1680 - Water Table Flux for CaseA Tank18 Ba

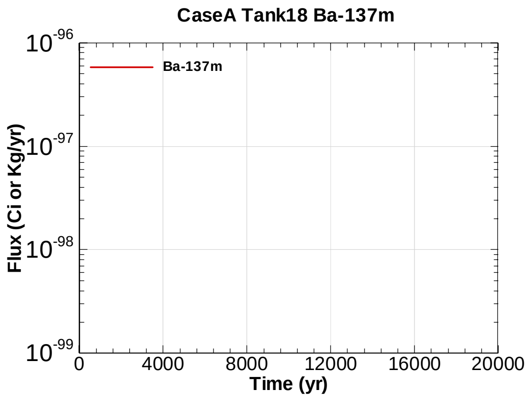

Figure A.2-1681 - Water Table Flux for CaseA Tank18 Ba-137m

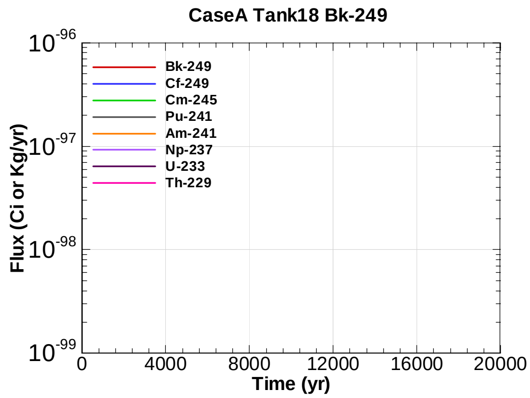

Figure A.2-1682 - Water Table Flux for CaseA Tank18 Bk-249

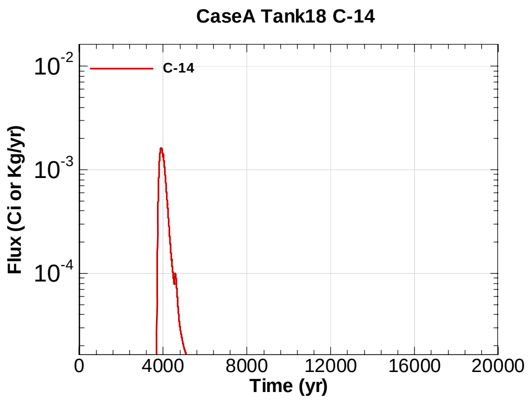

Figure A.2-1683 - Water Table Flux for CaseA Tank18 C-14

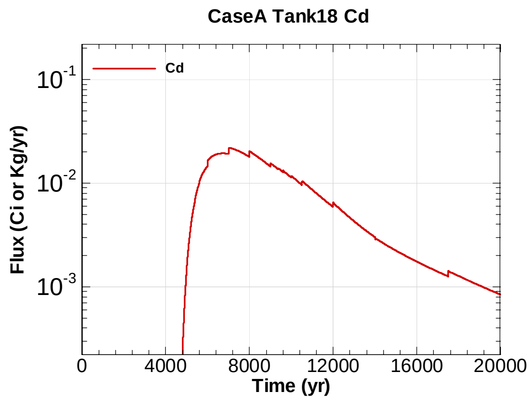

Figure A.2-1684 - Water Table Flux for CaseA Tank18 Cd

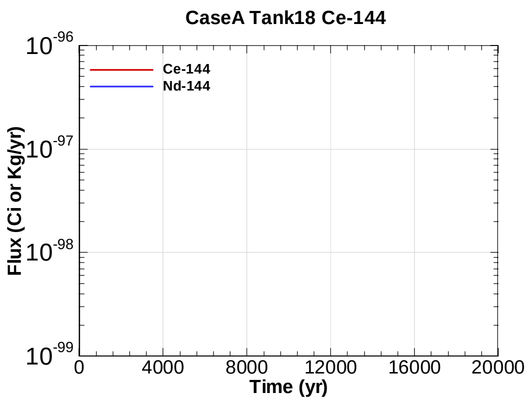

Figure A.2-1685 - Water Table Flux for CaseA Tank18 Ce-144

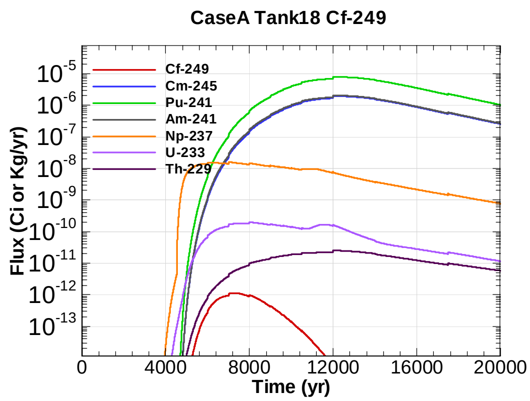

Figure A.2-1686 - Water Table Flux for CaseA Tank18 Cf-249

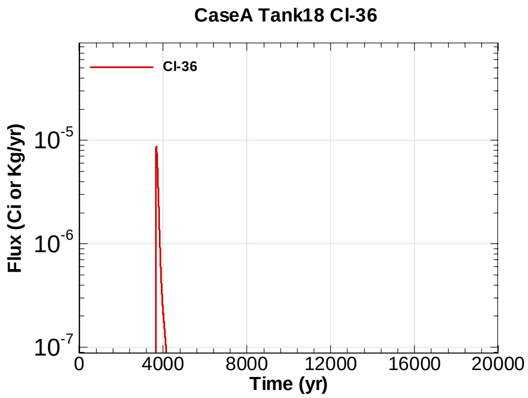

Figure A.2-1687 - Water Table Flux for CaseA Tank18 Cl-36

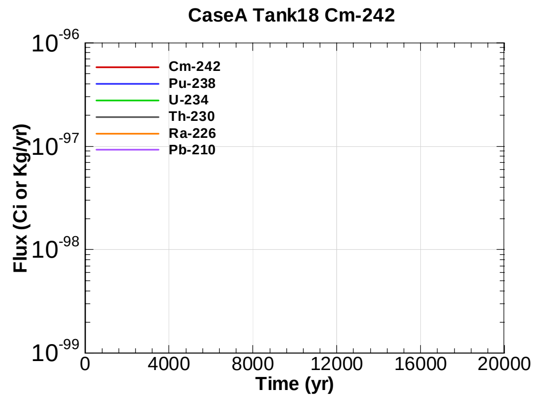

Figure A.2-1688 - Water Table Flux for CaseA Tank18 Cm-242

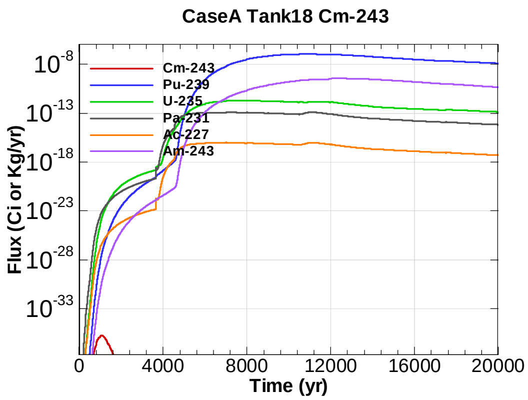

Figure A.2-1689 - Water Table Flux for CaseA Tank18 Cm-243

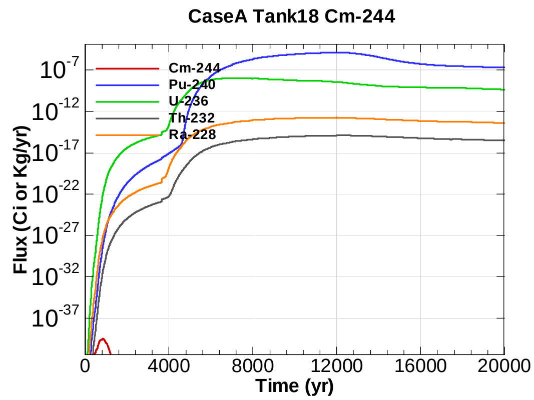

Figure A.2-1690 - Water Table Flux for CaseA Tank18 Cm-244

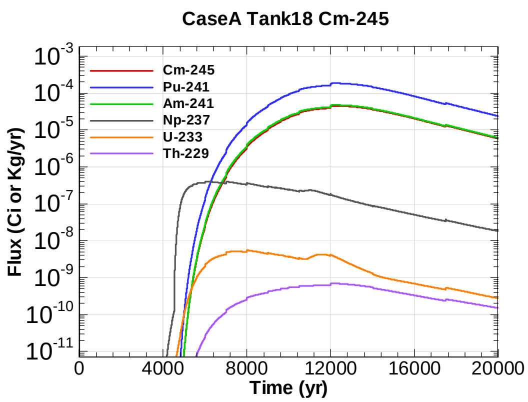

Figure A.2-1691 - Water Table Flux for CaseA Tank18 Cm-245

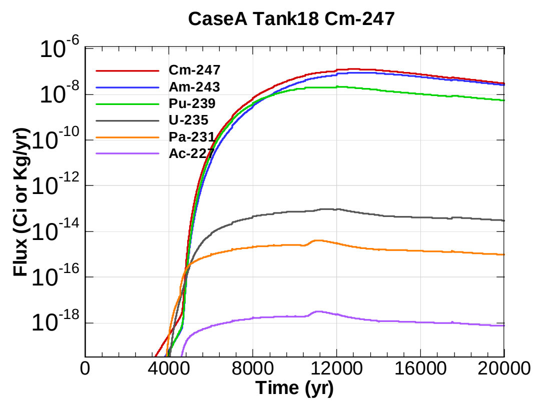

Figure A.2-1692 - Water Table Flux for CaseA Tank18 Cm-247

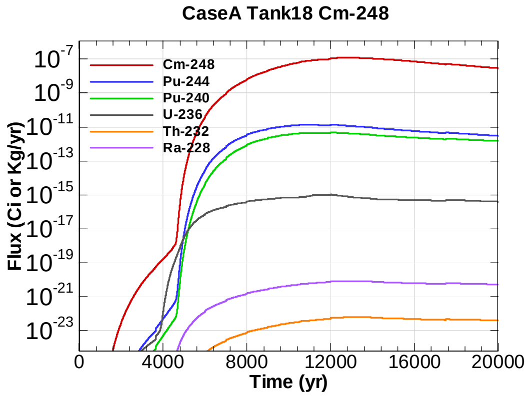

Figure A.2-1693 - Water Table Flux for CaseA Tank18 Cm-248

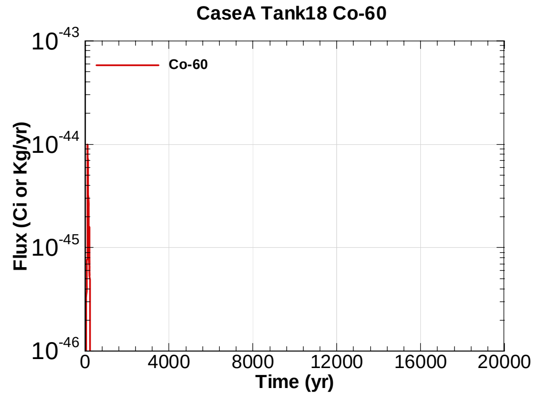

Figure A.2-1694 - Water Table Flux for CaseA Tank18 Co-60

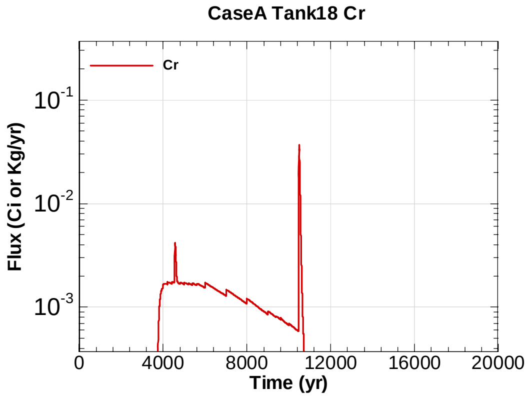

Figure A.2-1695 - Water Table Flux for CaseA Tank18 Cr

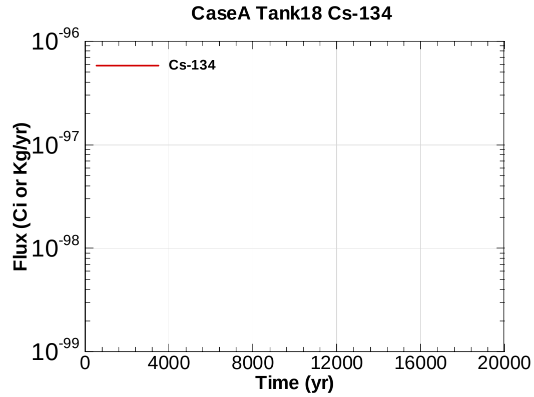

Figure A.2-1696 - Water Table Flux for CaseA Tank18 Cs-134

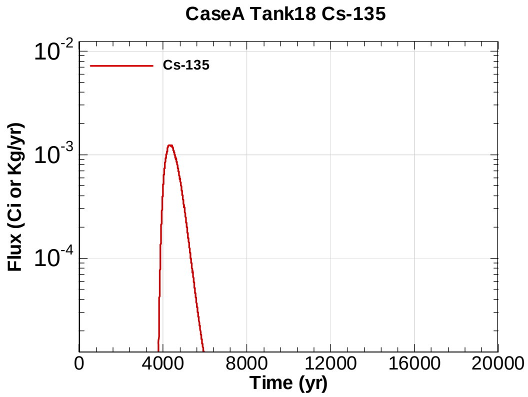

Figure A.2-1697 - Water Table Flux for CaseA Tank18 Cs-135

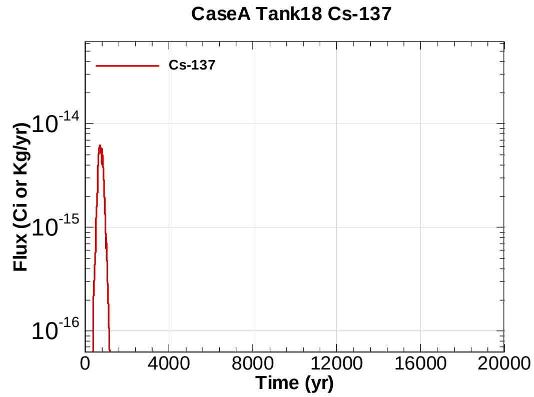

Figure A.2-1698 - Water Table Flux for CaseA Tank18 Cs-137

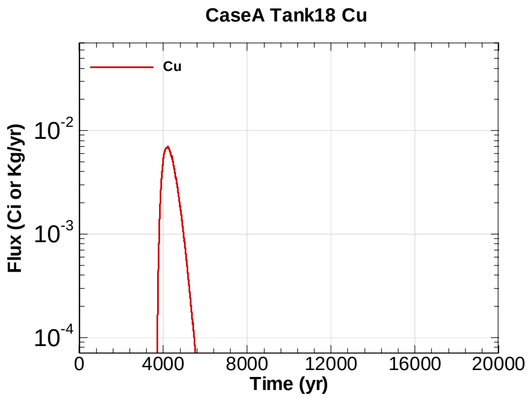

Figure A.2-1699 - Water Table Flux for CaseA Tank18 Cu

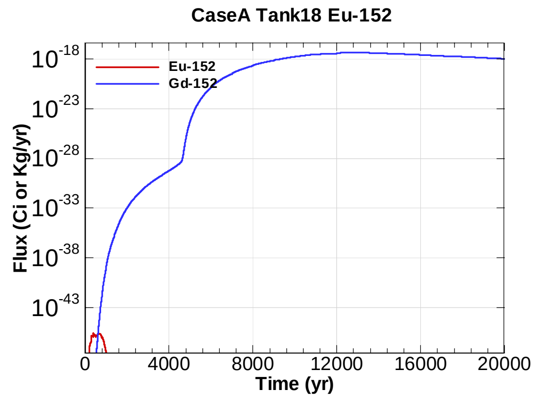

Figure A.2-1700 - Water Table Flux for CaseA Tank18 Eu-152

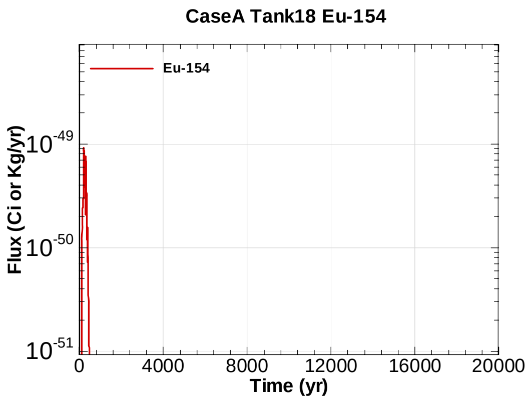

Figure A.2-1701 - Water Table Flux for CaseA Tank18 Eu-154

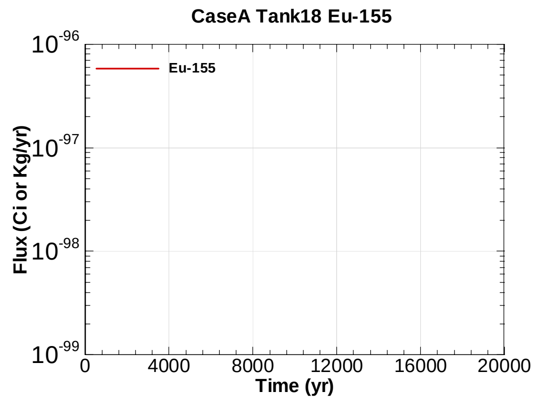

Figure A.2-1702 - Water Table Flux for CaseA Tank18 Eu-155

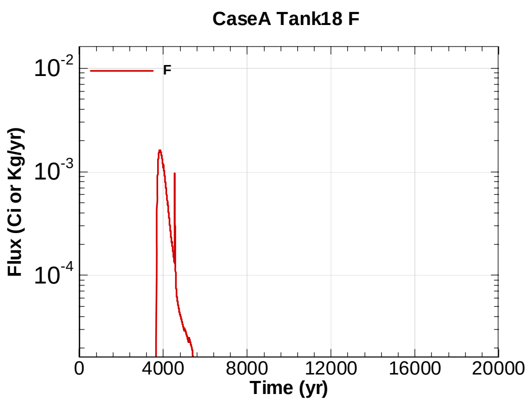

Figure A.2-1703 - Water Table Flux for CaseA Tank18 F

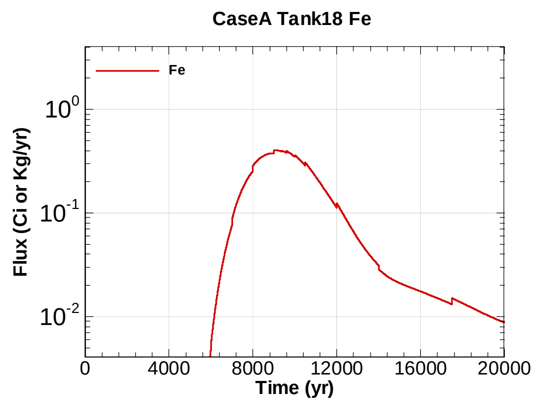

Figure A.2-1704 - Water Table Flux for CaseA Tank18 Fe

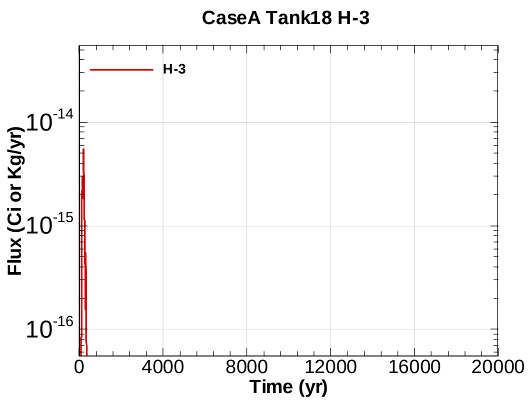

Figure A.2-1705 - Water Table Flux for CaseA Tank18 H-3

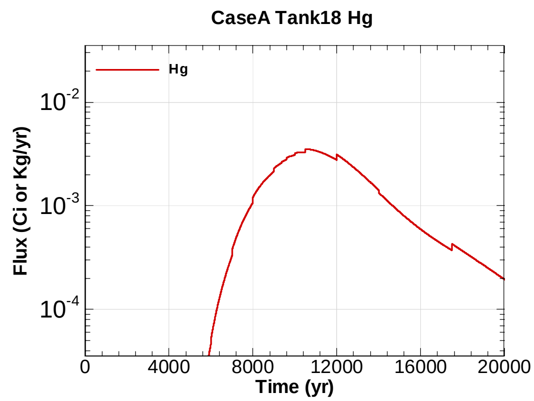

Figure A.2-1706 - Water Table Flux for CaseA Tank18 Hg

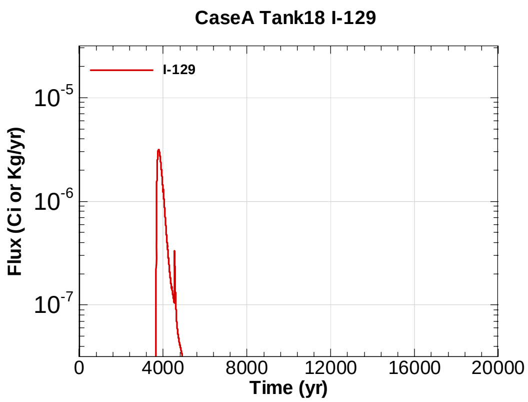

Figure A.2-1707 - Water Table Flux for CaseA Tank18 I-129

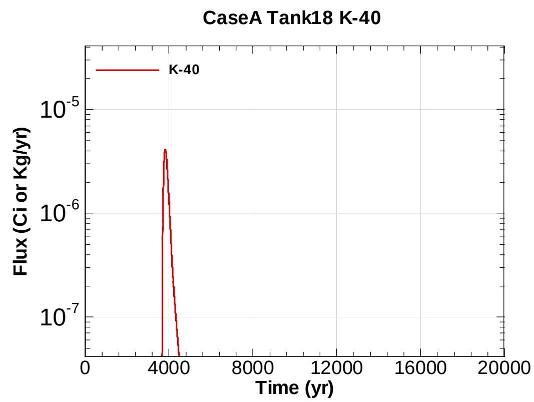

Figure A.2-1708 - Water Table Flux for CaseA Tank18 K-40

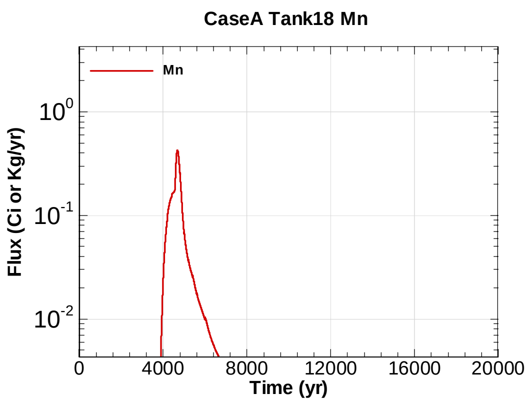

Figure A.2-1709 - Water Table Flux for CaseA Tank18 Mn

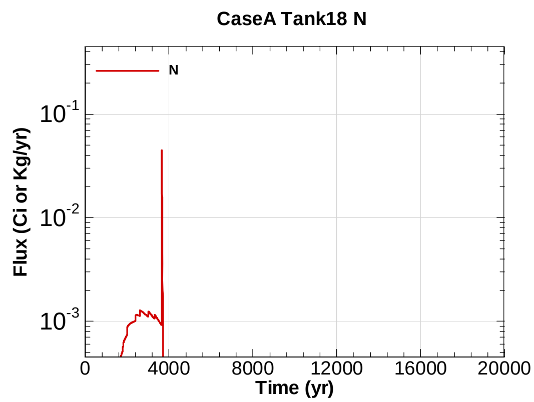

Figure A.2-1710 - Water Table Flux for CaseA Tank18 N

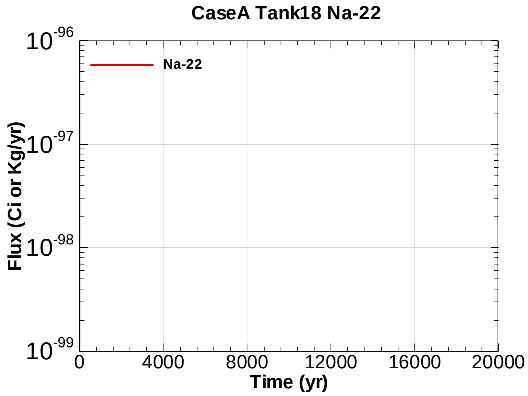

Figure A.2-1711 - Water Table Flux for CaseA Tank18 Na-22

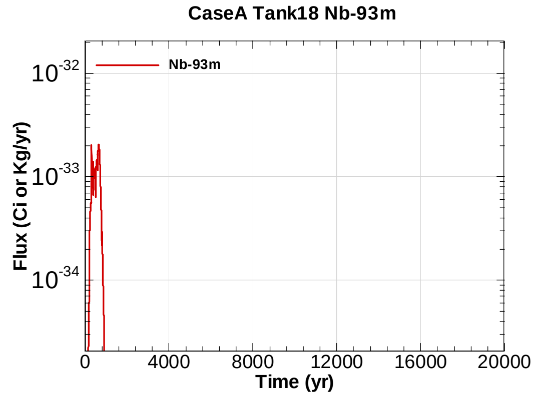

Figure A.2-1712 - Water Table Flux for CaseA Tank18 Nb-93m

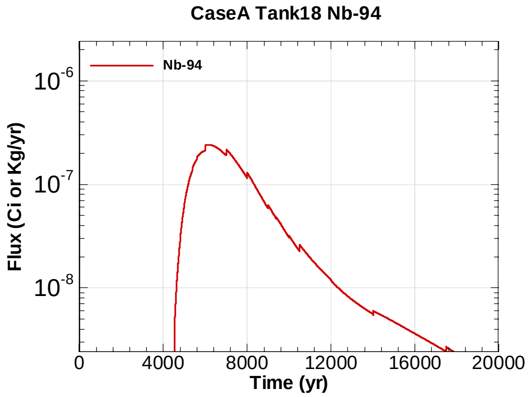

Figure A.2-1713 - Water Table Flux for CaseA Tank18 Nb-94

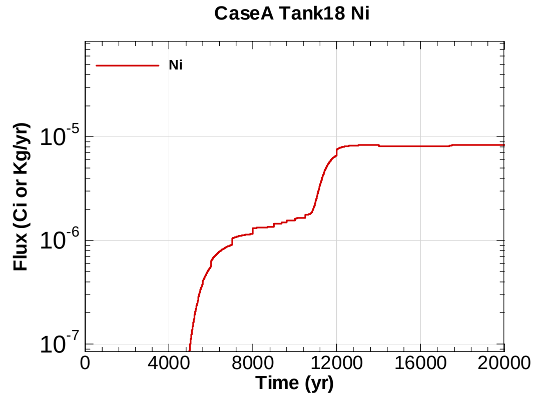

Figure A.2-1714 - Water Table Flux for CaseA Tank18 Ni

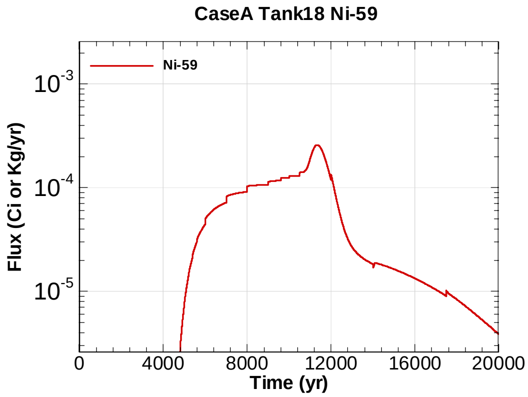

Figure A.2-1715 - Water Table Flux for CaseA Tank18 Ni-59

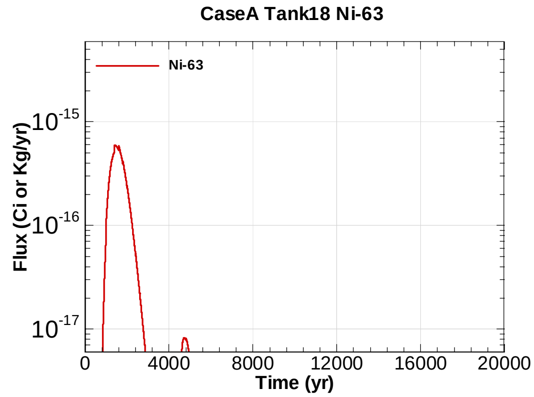

Figure A.2-1716 - Water Table Flux for CaseA Tank18 Ni-63

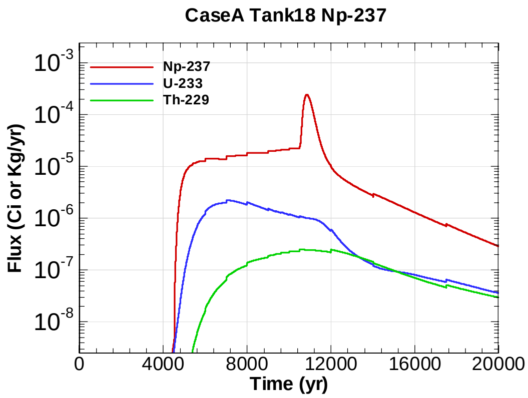

Figure A.2-1717 - Water Table Flux for CaseA Tank18 Np-237

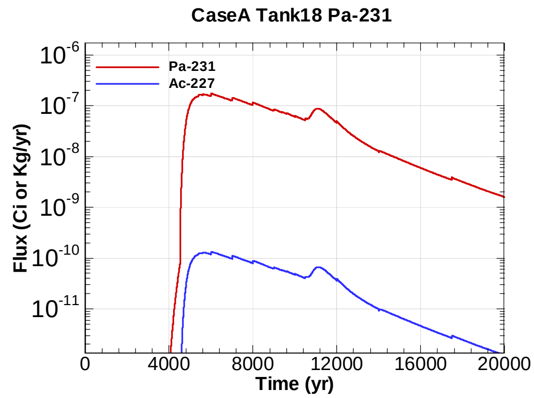

Figure A.2-1718 - Water Table Flux for CaseA Tank18 Pa-231

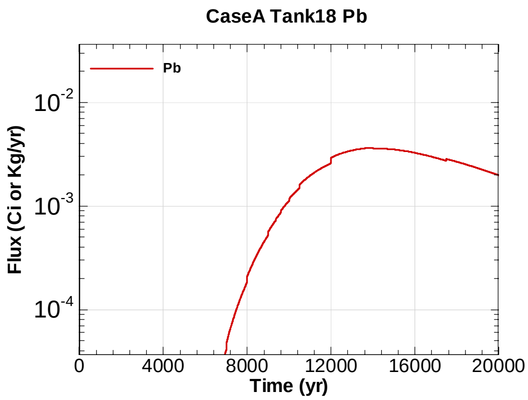

Figure A.2-1719 - Water Table Flux for CaseA Tank18 Pb

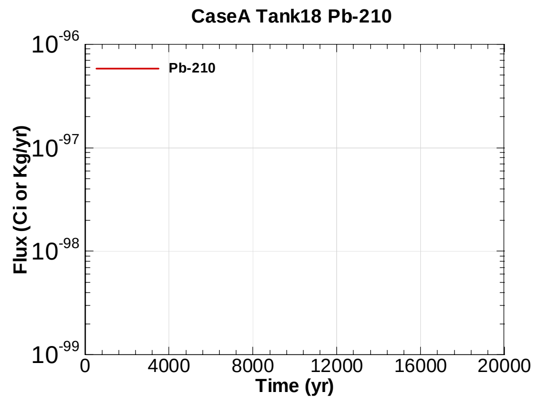

Figure A.2-1720 - Water Table Flux for CaseA Tank18 Pb-210

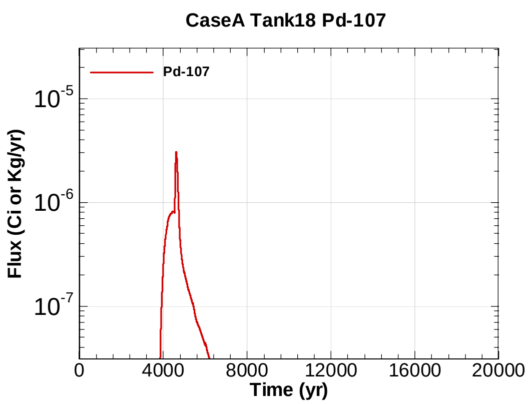

Figure A.2-1721 - Water Table Flux for CaseA Tank18 Pd-107

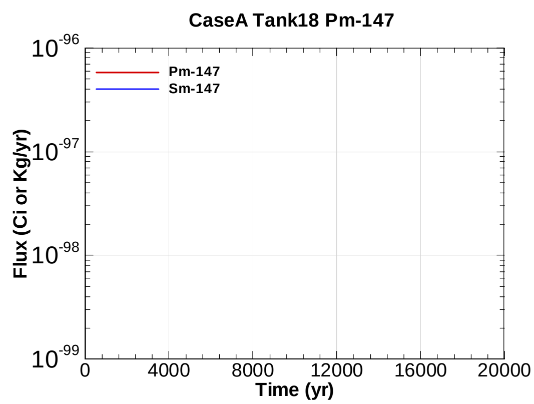

Figure A.2-1722 - Water Table Flux for CaseA Tank18 Pm-147

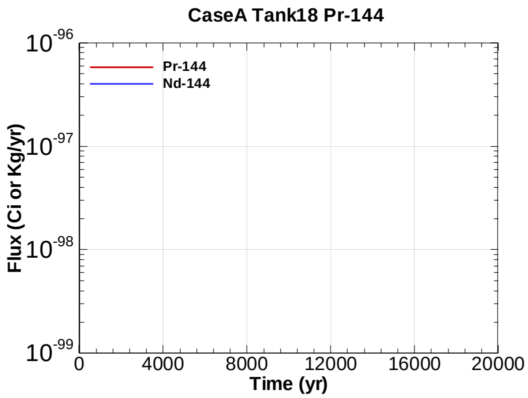

Figure A.2-1723 - Water Table Flux for CaseA Tank18 Pr-144

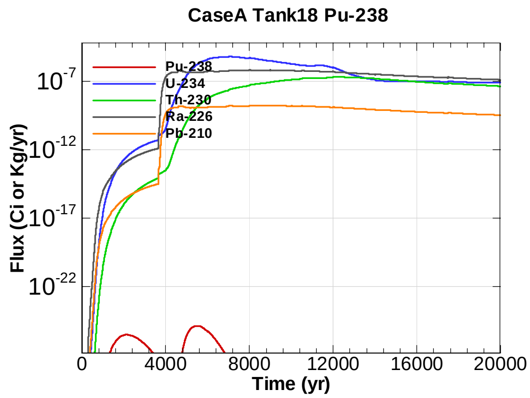

Figure A.2-1724 - Water Table Flux for CaseA Tank18 Pu-238

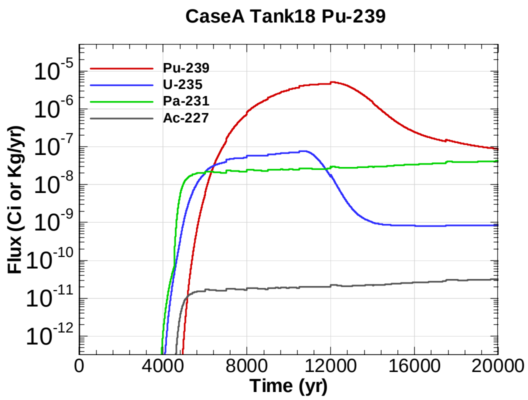

Figure A.2-1725 - Water Table Flux for CaseA Tank18 Pu-239

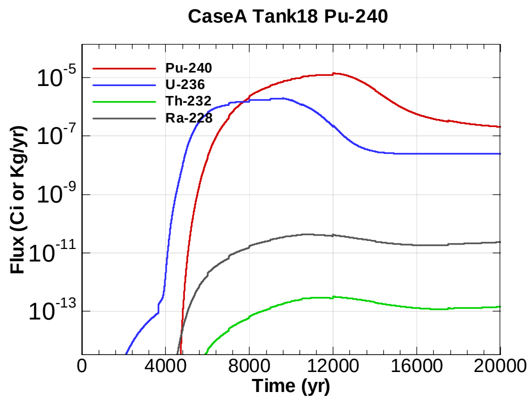

Figure A.2-1726 - Water Table Flux for CaseA Tank18 Pu-240

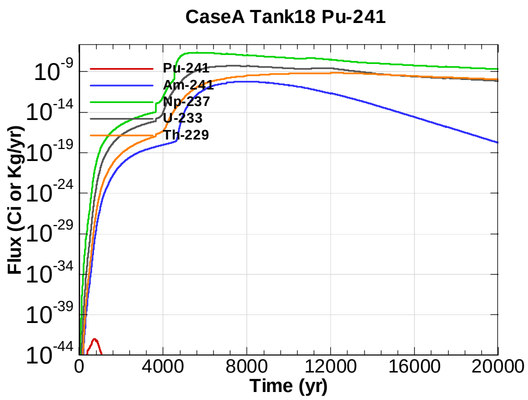

Figure A.2-1727 - Water Table Flux for CaseA Tank18 Pu-241

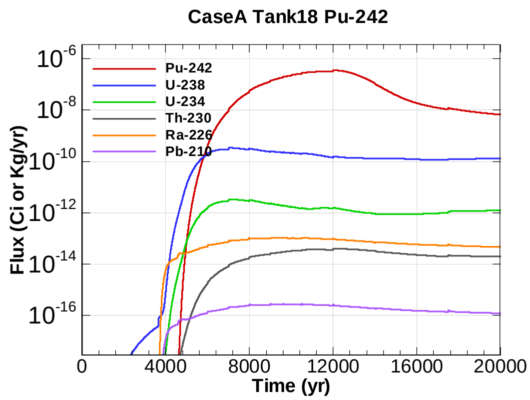

Figure A.2-1728 - Water Table Flux for CaseA Tank18 Pu-242

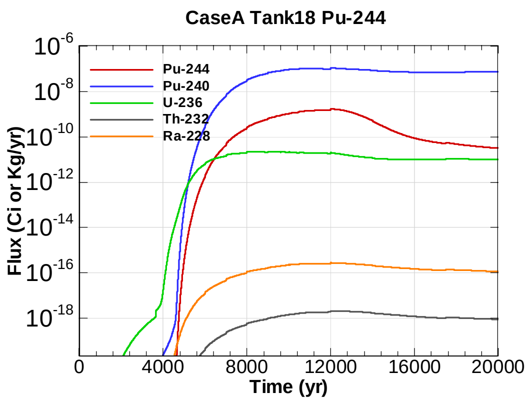

Figure A.2-1729 - Water Table Flux for CaseA Tank18 Pu-244

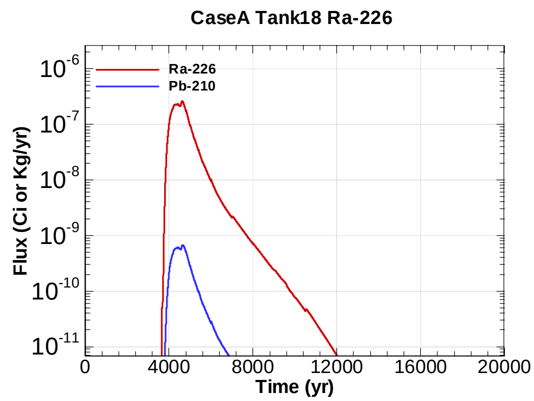

Figure A.2-1730 - Water Table Flux for CaseA Tank18 Ra-226

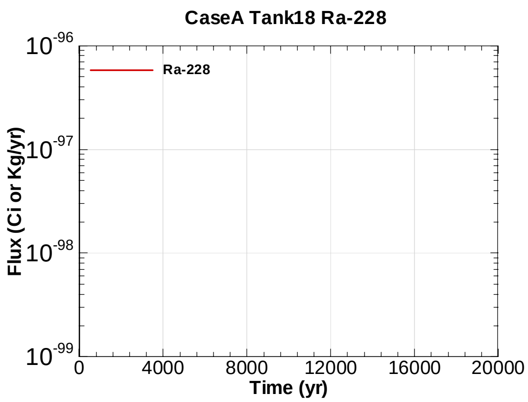

Figure A.2-1731 - Water Table Flux for CaseA Tank18 Ra-228

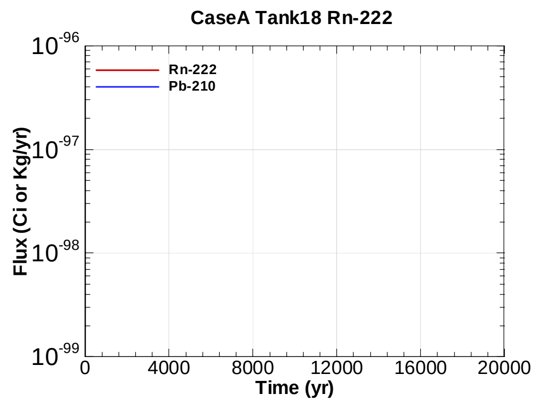

Figure A.2-1732 - Water Table Flux for CaseA Tank18 Rn-222

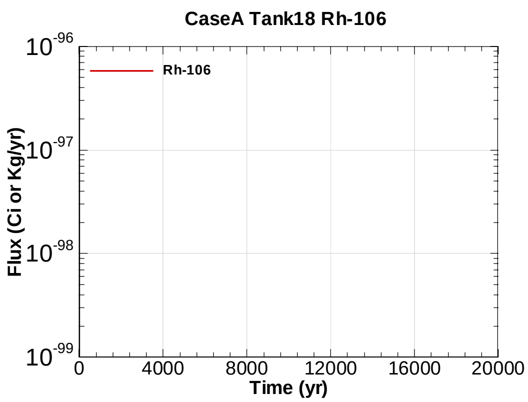

Figure A.2-1733 - Water Table Flux for CaseA Tank18 Rh-106

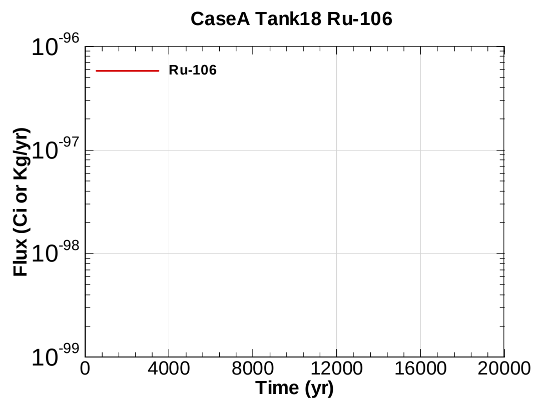

Figure A.2-1734 - Water Table Flux for CaseA Tank18 Ru-106

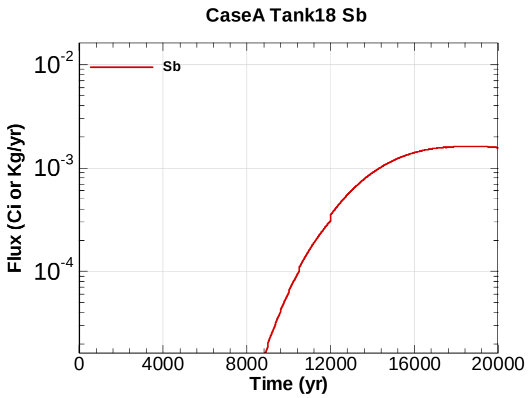

Figure A.2-1735 - Water Table Flux for CaseA Tank18 Sb

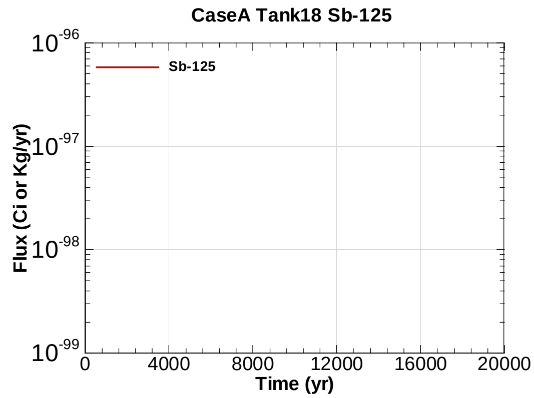

Figure A.2-1736 - Water Table Flux for CaseA Tank18 Sb-125

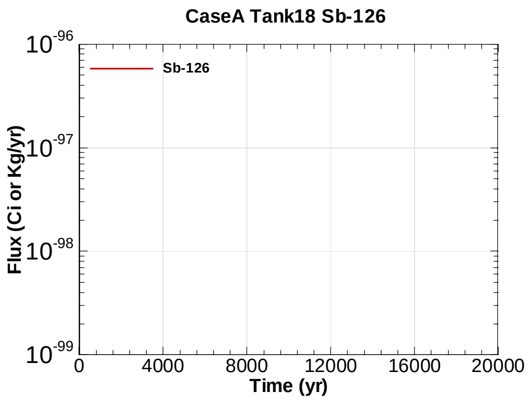

Figure A.2-1737 - Water Table Flux for CaseA Tank18 Sb-126

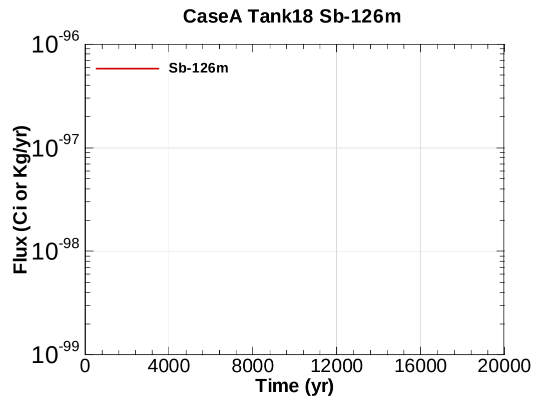

Figure A.2-1738 - Water Table Flux for CaseA Tank18 Sb-126m

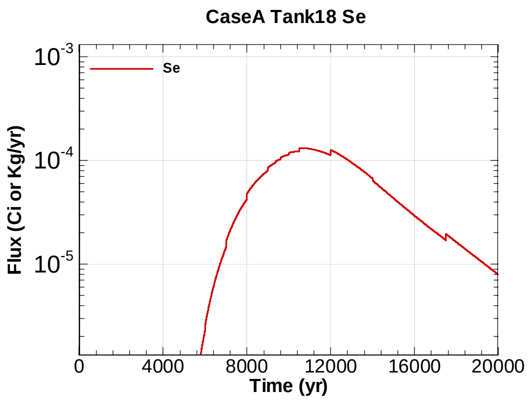

Figure A.2-1739 - Water Table Flux for CaseA Tank18 Se

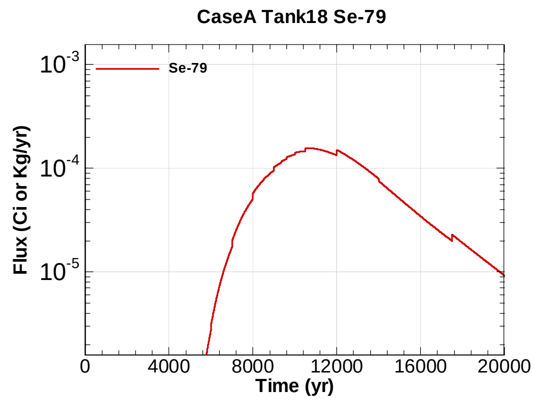

Figure A.2-1740 - Water Table Flux for CaseA Tank18 Se-79

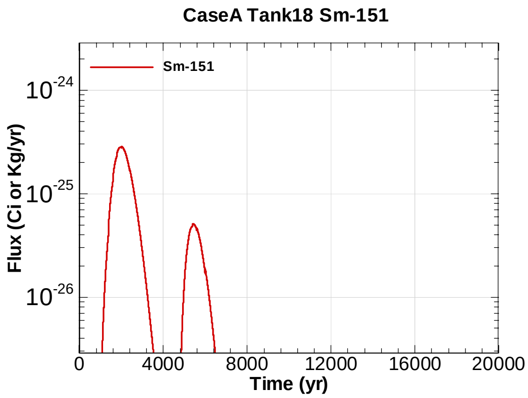

Figure A.2-1741 - Water Table Flux for CaseA Tank18 Sm-151

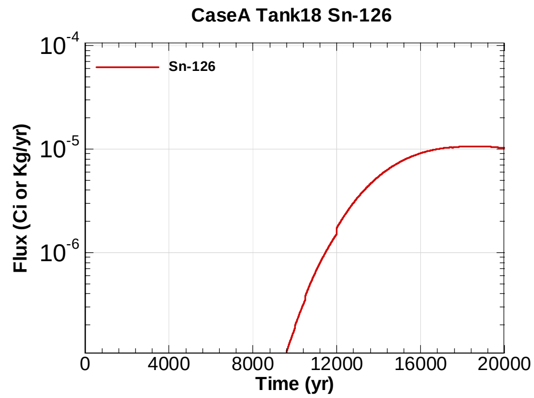

Figure A.2-1742 - Water Table Flux for CaseA Tank18 Sn-126

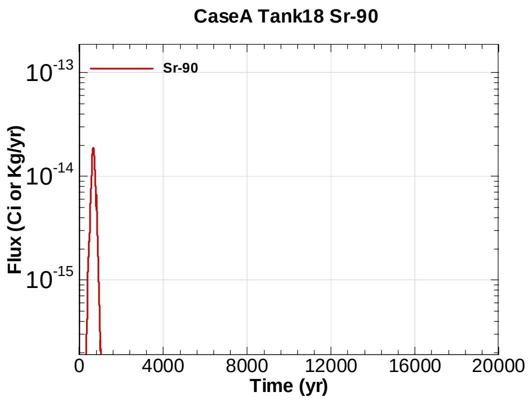

Figure A.2-1743 - Water Table Flux for CaseA Tank18 Sr-90

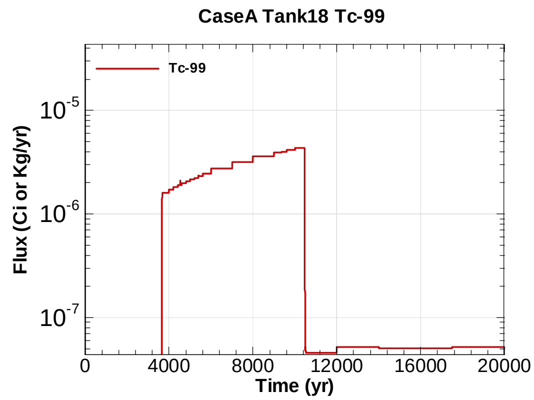

Figure A.2-1744 - Water Table Flux for CaseA Tank18 Tc-99

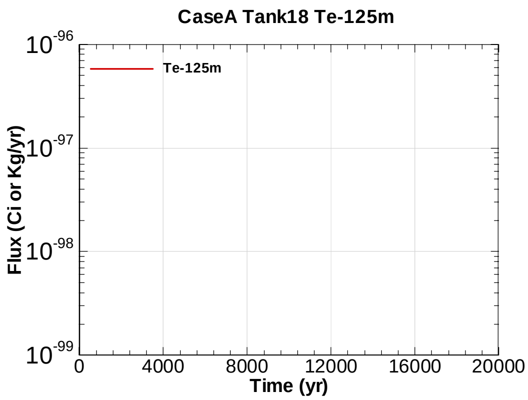

Figure A.2-1745 - Water Table Flux for CaseA Tank18 Te-125m

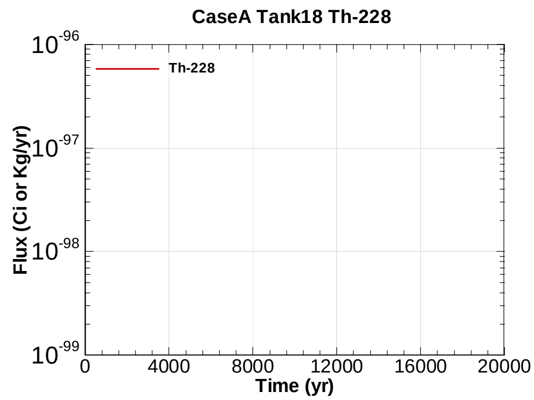

Figure A.2-1746 - Water Table Flux for CaseA Tank18 Th-228

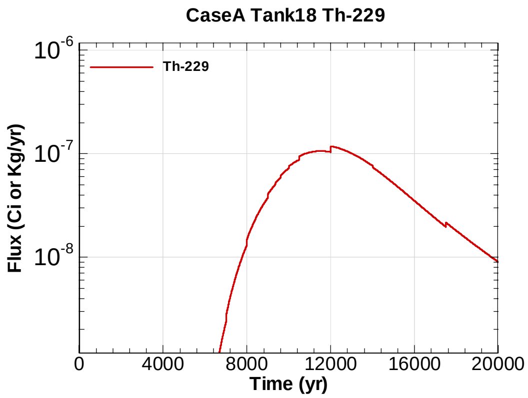

Figure A.2-1747 - Water Table Flux for CaseA Tank18 Th-229

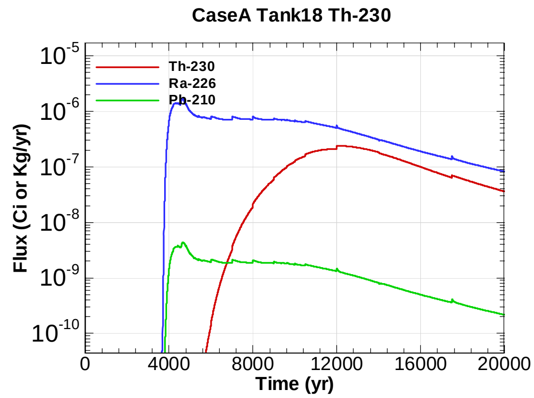

Figure A.2-1748 - Water Table Flux for CaseA Tank18 Th-230

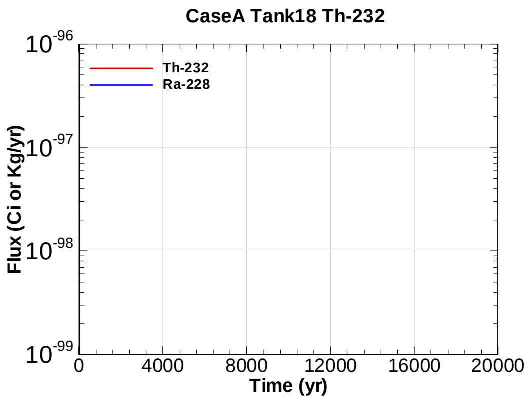

Figure A.2-1749 - Water Table Flux for CaseA Tank18 Th-232

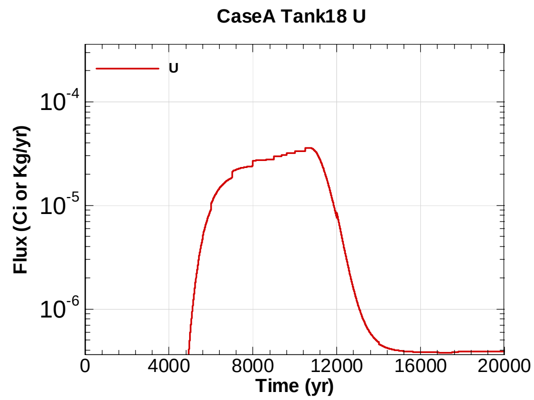

Figure A.2-1750 - Water Table Flux for CaseA Tank18 U

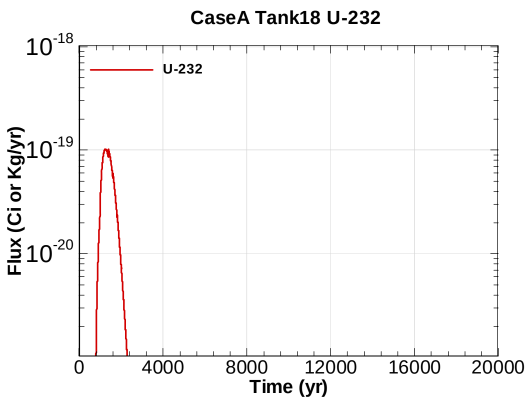

Figure A.2-1751 - Water Table Flux for CaseA Tank18 U-232

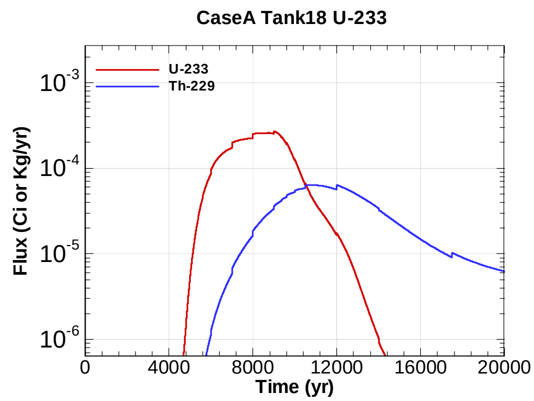

Figure A.2-1752 - Water Table Flux for CaseA Tank18 U-233

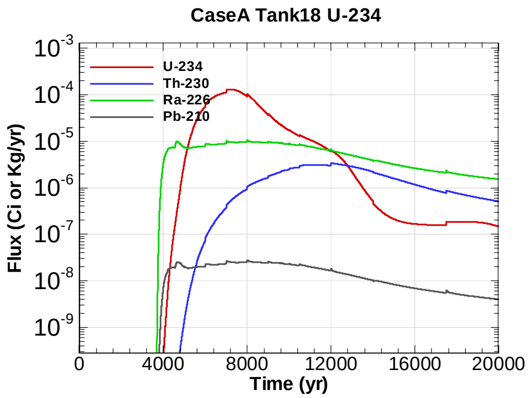

Figure A.2-1753 - Water Table Flux for CaseA Tank18 U-234

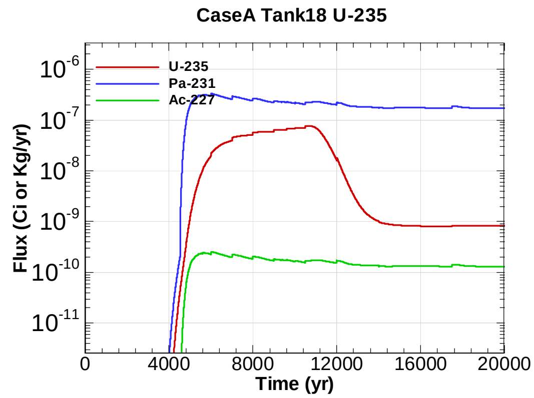

Figure A.2-1754 - Water Table Flux for CaseA Tank18 U-235

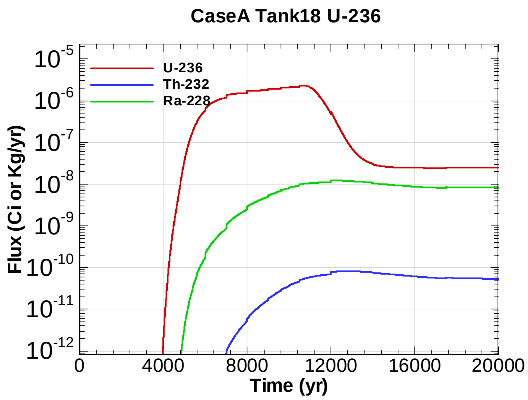

Figure A.2-1755 - Water Table Flux for CaseA Tank18 U-236

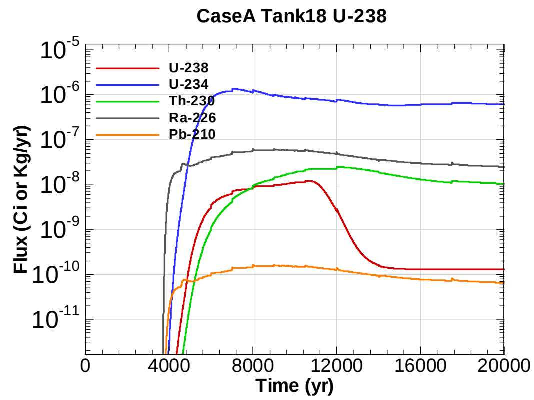

Figure A.2-1756 - Water Table Flux for CaseA Tank18 U-238

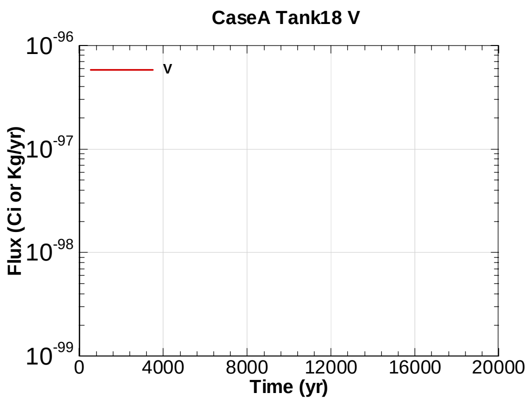

Figure A.2-1757 - Water Table Flux for CaseA Tank18 V

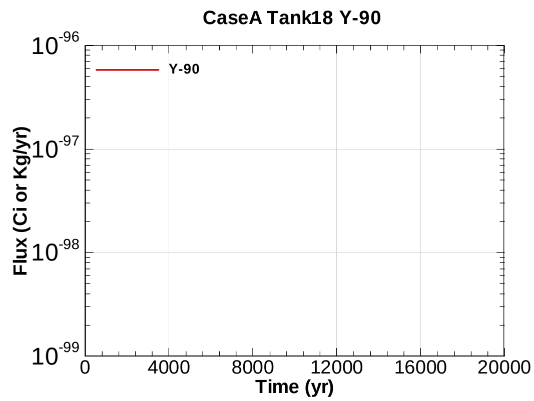

Figure A.2-1758 - Water Table Flux for CaseA Tank18 Y-90

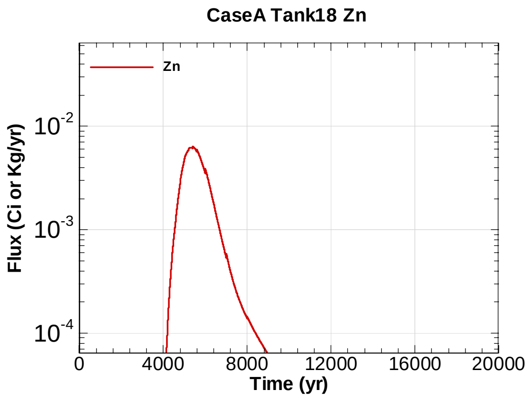

Figure A.2-1759 - Water Table Flux for CaseA Tank18 Zn

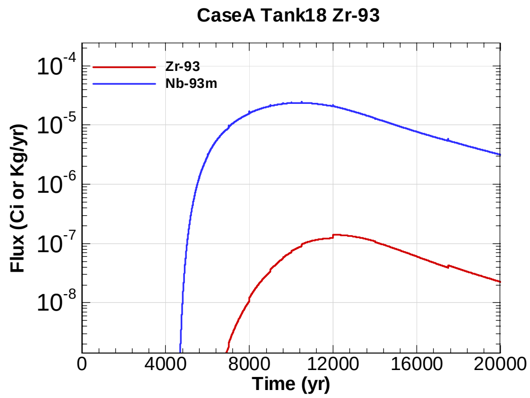

Figure A.2-1760 - Water Table Flux for CaseA Tank18 Zr-93

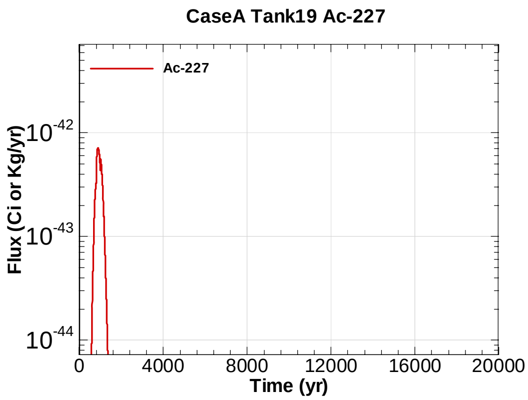

Figure A.2-1761 - Water Table Flux for CaseA Tank19 Ac-227

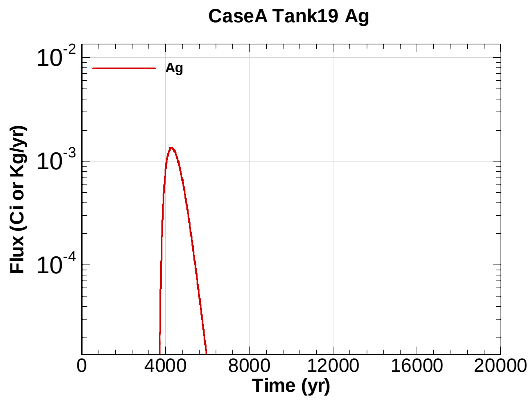

Figure A.2-1762 - Water Table Flux for CaseA Tank19 Ag

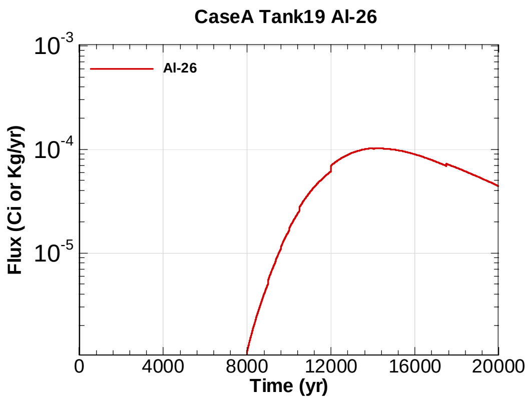

Figure A.2-1763 - Water Table Flux for CaseA Tank19 Al-26

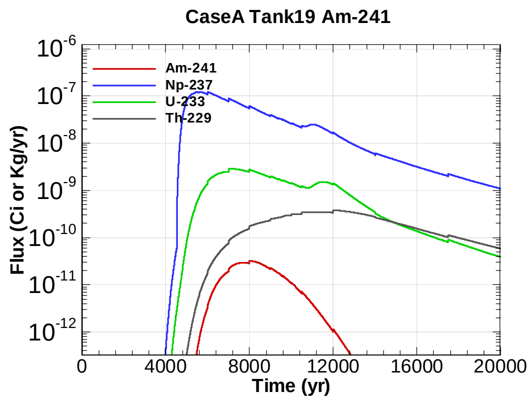

Figure A.2-1764 - Water Table Flux for CaseA Tank19 Am-241

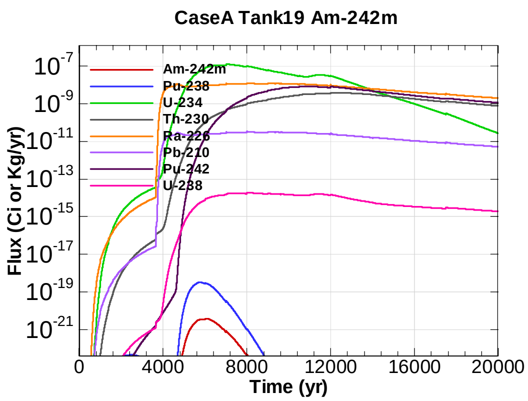

Figure A.2-1765 - Water Table Flux for CaseA Tank19 Am-242m

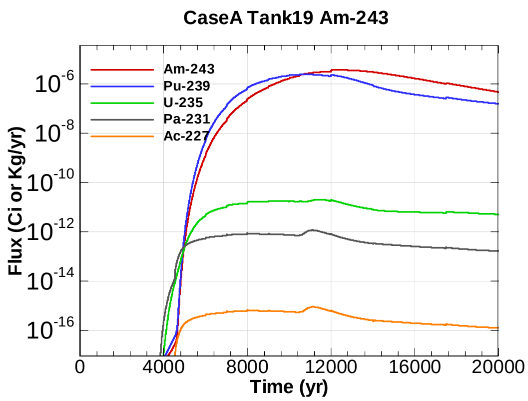

Figure A.2-1766 - Water Table Flux for CaseA Tank19 Am-243

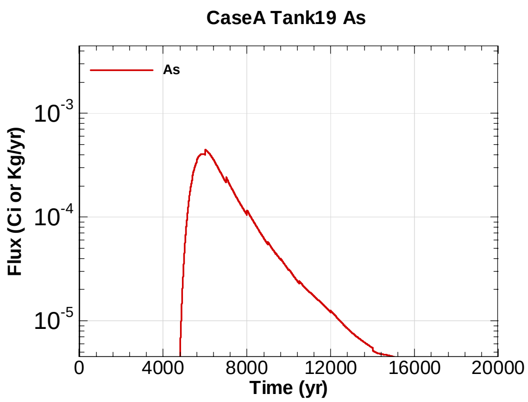

Figure A.2-1767 - Water Table Flux for CaseA Tank19 As

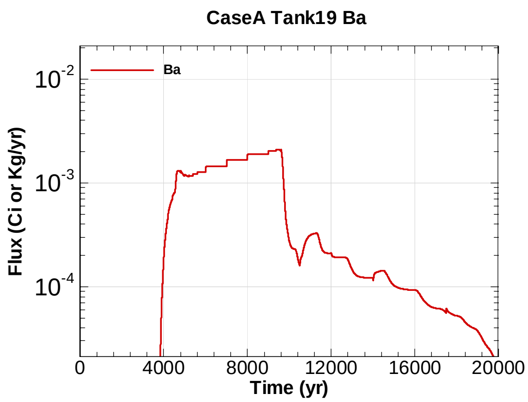

Figure A.2-1768 - Water Table Flux for CaseA Tank19 Ba

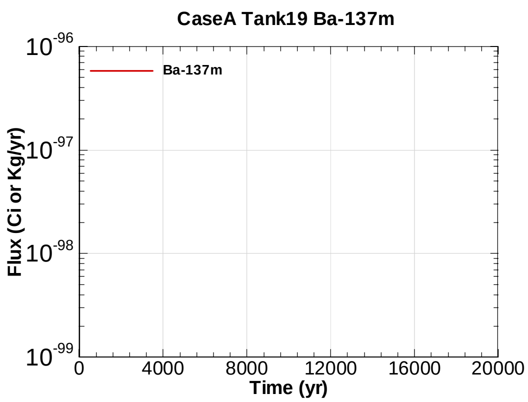

Figure A.2-1769 - Water Table Flux for CaseA Tank19 Ba-137m

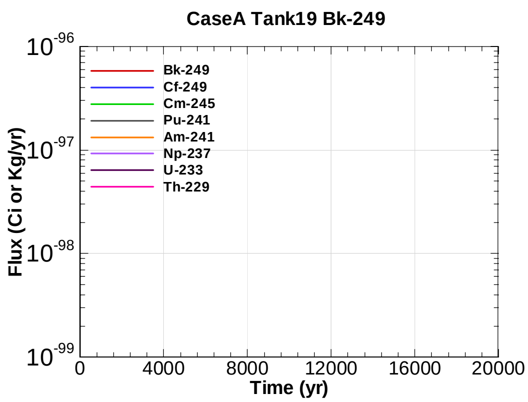

Figure A.2-1770 - Water Table Flux for CaseA Tank19 Bk-249

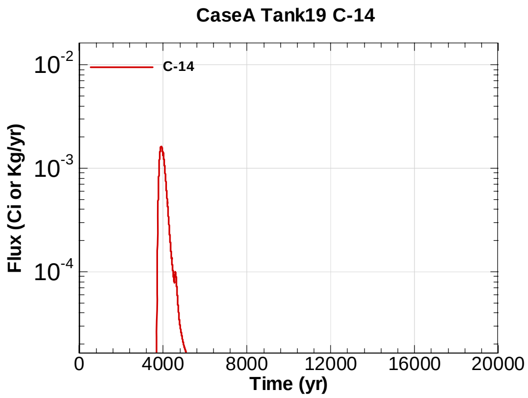

Figure A.2-1771 - Water Table Flux for CaseA Tank19 C-14

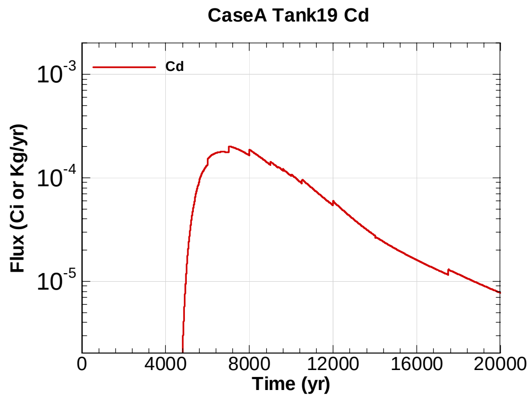

Figure A.2-1772 - Water Table Flux for CaseA Tank19 Cd

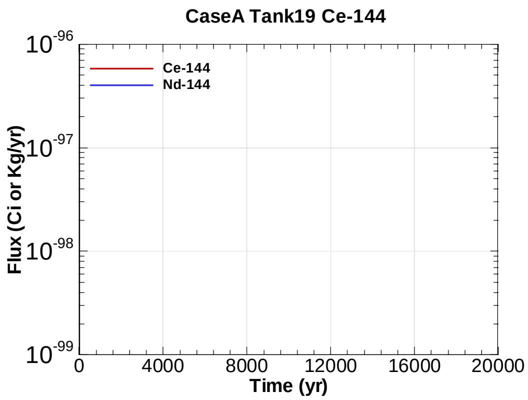

Figure A.2-1773 - Water Table Flux for CaseA Tank19 Ce-144

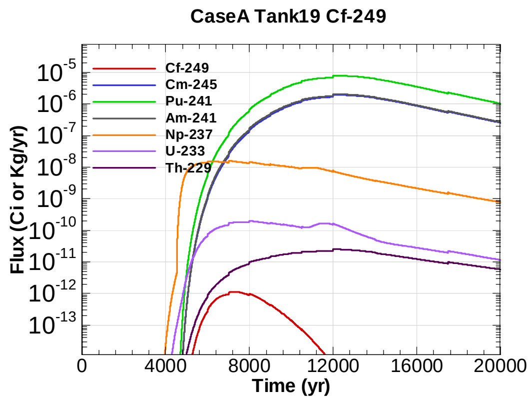

Figure A.2-1774 - Water Table Flux for CaseA Tank19 Cf-249

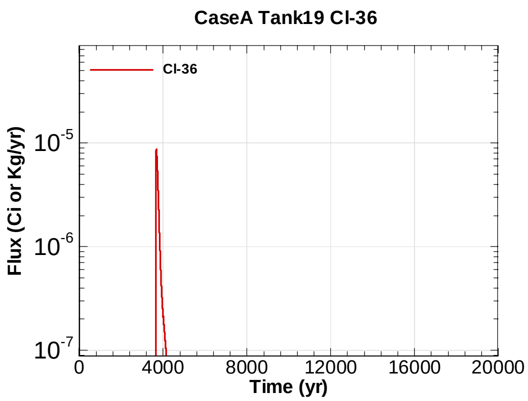

Figure A.2-1775 - Water Table Flux for CaseA Tank19 Cl-36

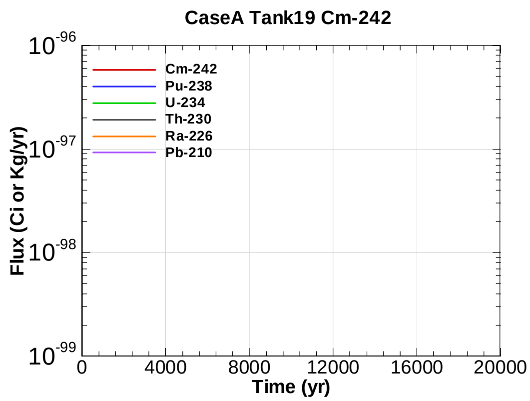

Figure A.2-1776 - Water Table Flux for CaseA Tank19 Cm-242

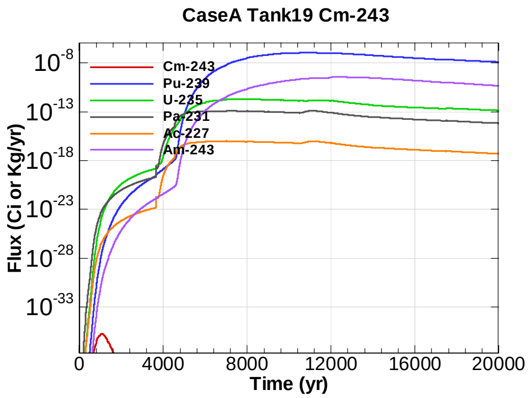

Figure A.2-1777 - Water Table Flux for CaseA Tank19 Cm-243

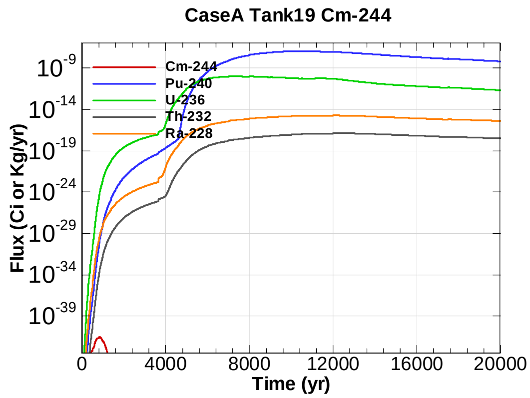

Figure A.2-1778 - Water Table Flux for CaseA Tank19 Cm-244

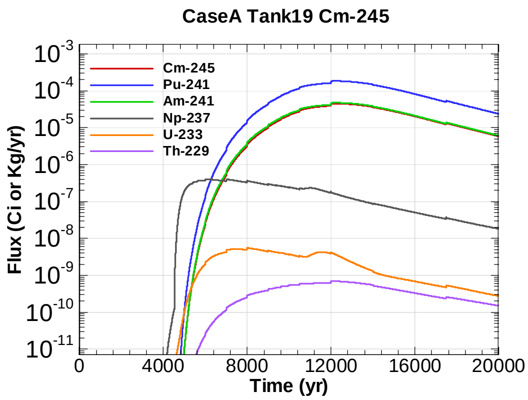

Figure A.2-1779 - Water Table Flux for CaseA Tank19 Cm-245

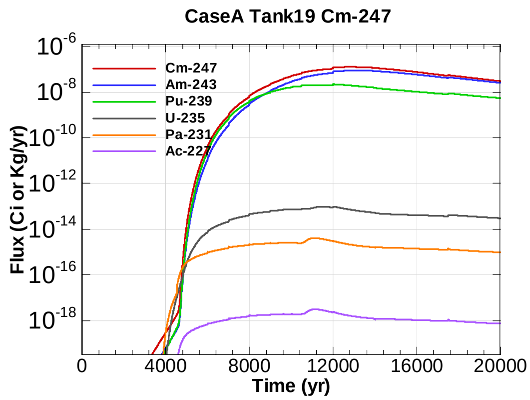

Figure A.2-1780 - Water Table Flux for CaseA Tank19 Cm-247

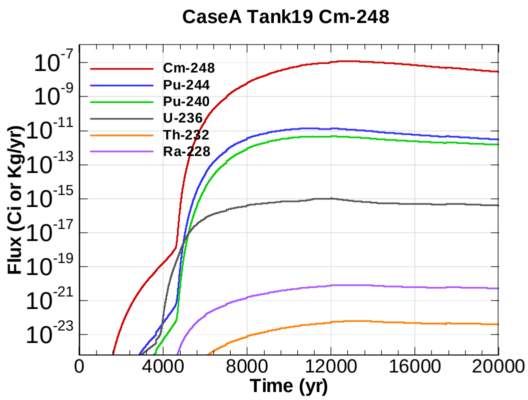

Figure A.2-1781 - Water Table Flux for CaseA Tank19 Cm-248

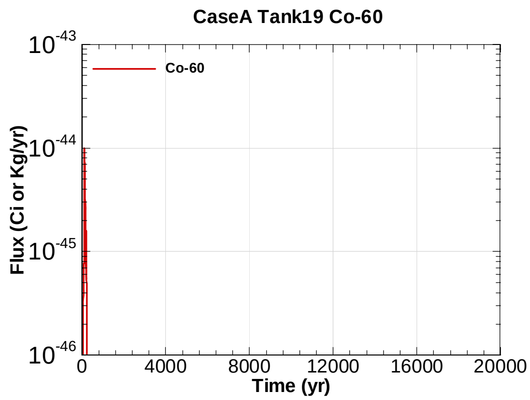

Figure A.2-1782 - Water Table Flux for CaseA Tank19 Co-60

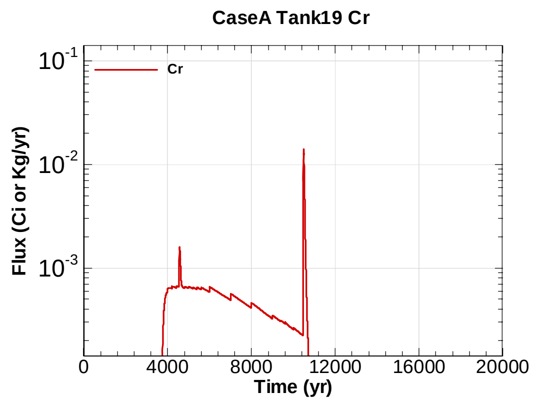

Figure A.2-1783 - Water Table Flux for CaseA Tank19 Cr

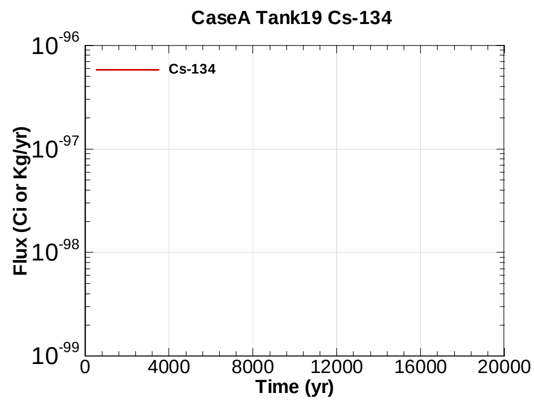

Figure A.2-1784 - Water Table Flux for CaseA Tank19 Cs-134

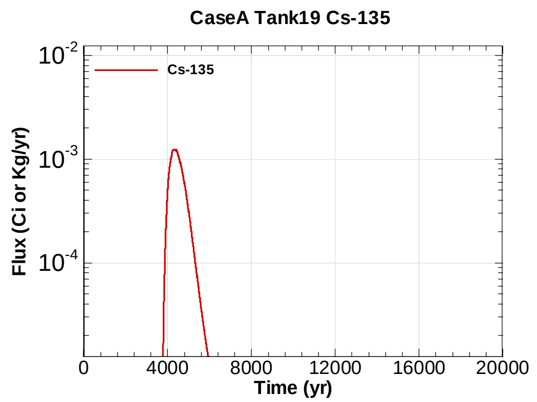

Figure A.2-1785 - Water Table Flux for CaseA Tank19 Cs-135

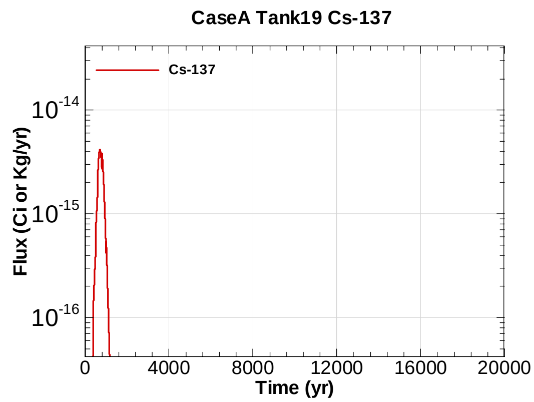

Figure A.2-1786 - Water Table Flux for CaseA Tank19 Cs-137

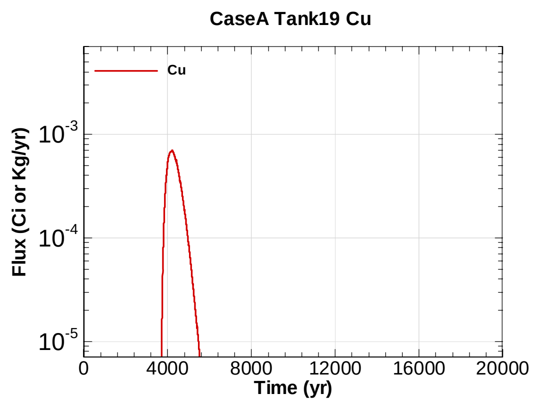

Figure A.2-1787 - Water Table Flux for CaseA Tank19 Cu

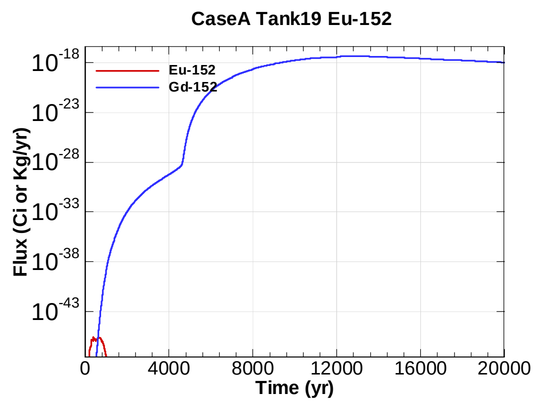

Figure A.2-1788 - Water Table Flux for CaseA Tank19 Eu-152

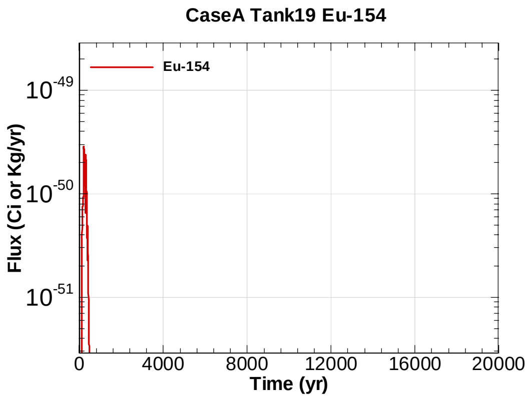

Figure A.2-1789 - Water Table Flux for CaseA Tank19 Eu-154

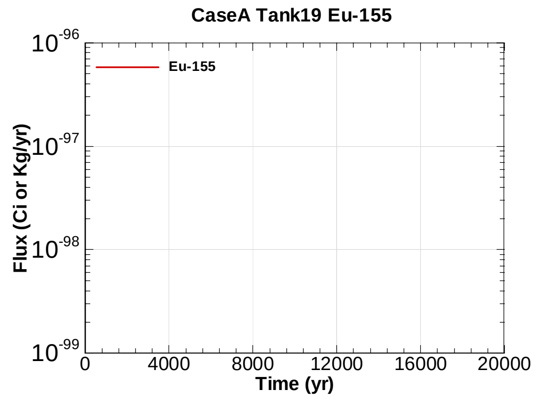

Figure A.2-1790 - Water Table Flux for CaseA Tank19 Eu-155

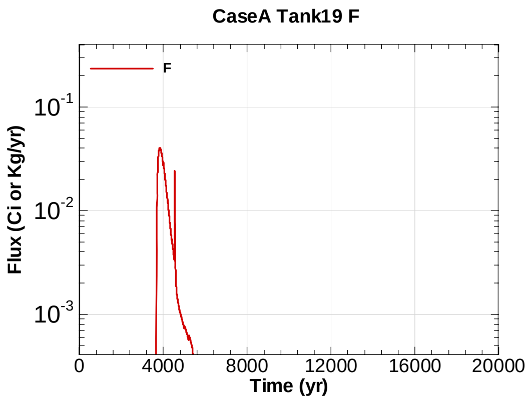

Figure A.2-1791 - Water Table Flux for CaseA Tank19 F

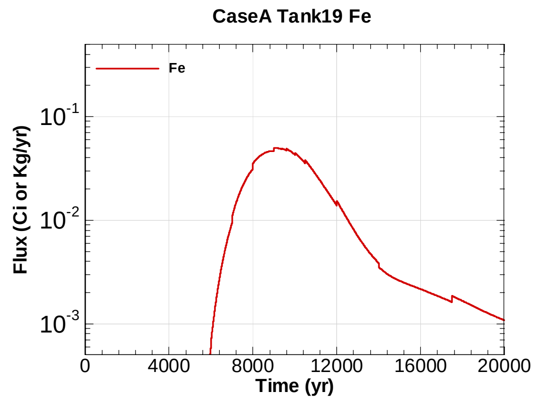

Figure A.2-1792 - Water Table Flux for CaseA Tank19 Fe

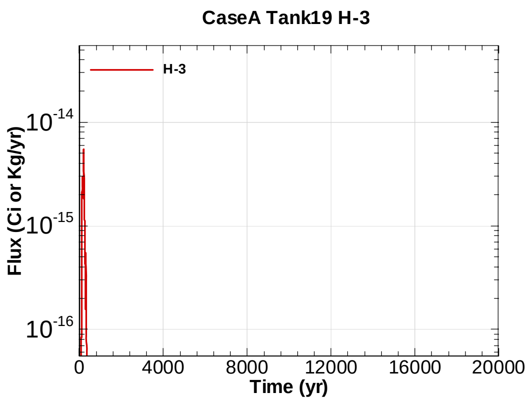

Figure A.2-1793 - Water Table Flux for CaseA Tank19 H-3

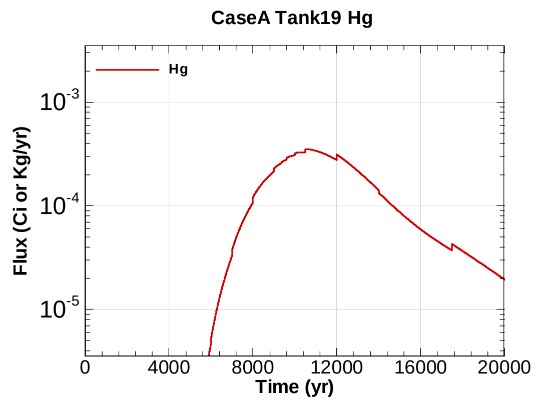

Figure A.2-1794 - Water Table Flux for CaseA Tank19 Hg

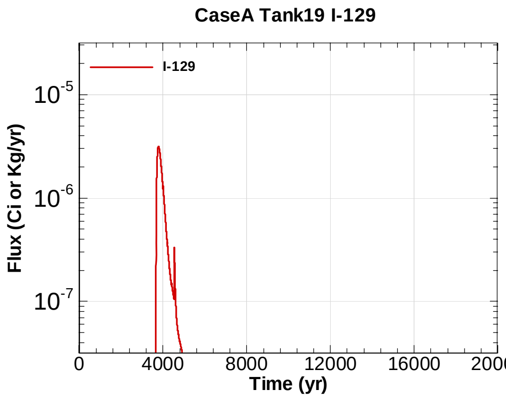

Figure A.2-1795 - Water Table Flux for CaseA Tank19 I-129

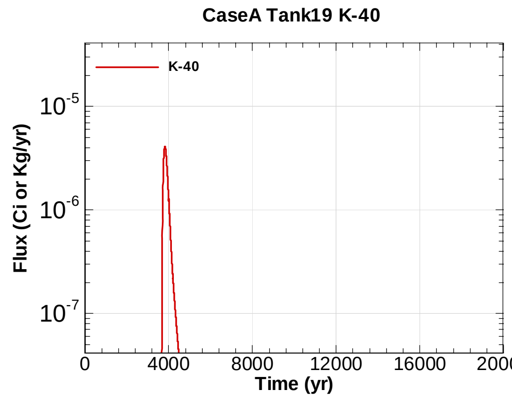

Figure A.2-1796 - Water Table Flux for CaseA Tank19 K-40

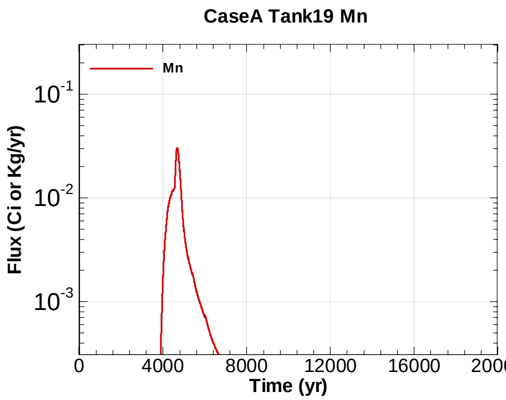

Figure A.2-1797 - Water Table Flux for CaseA Tank19 Mn

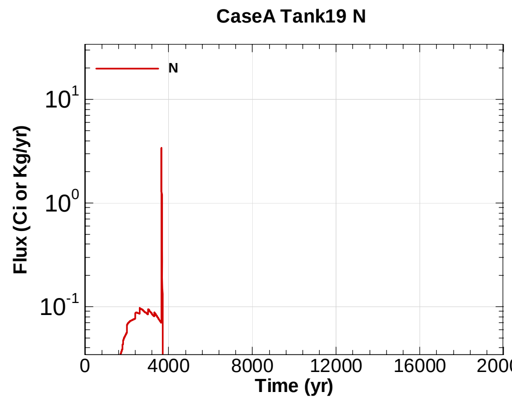

Figure A.2-1798 - Water Table Flux for CaseA Tank19 N

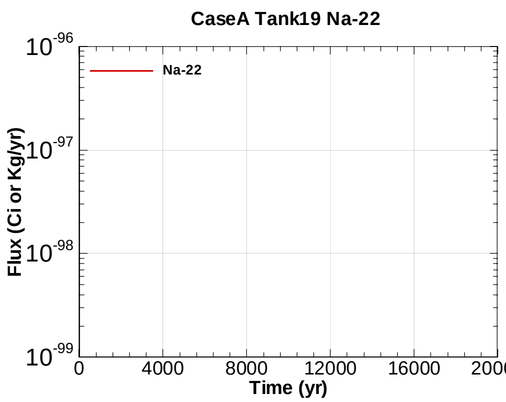

Figure A.2-1799 - Water Table Flux for CaseA Tank19 Na-22

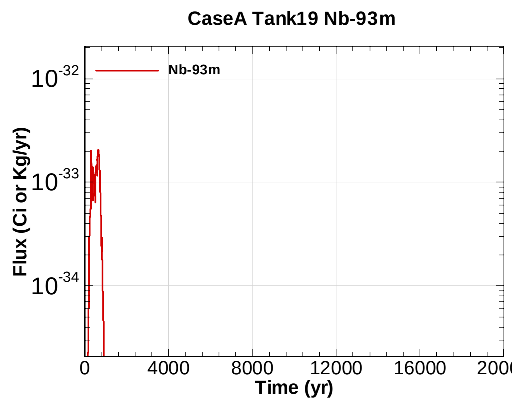

Figure A.2-1800 - Water Table Flux for CaseA Tank19 Nb-93m

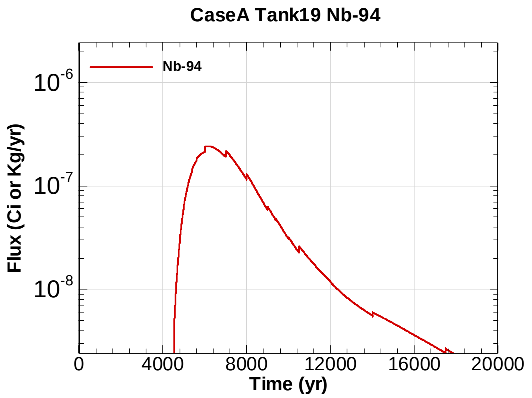

Figure A.2-1801 - Water Table Flux for CaseA Tank19 Nb-94

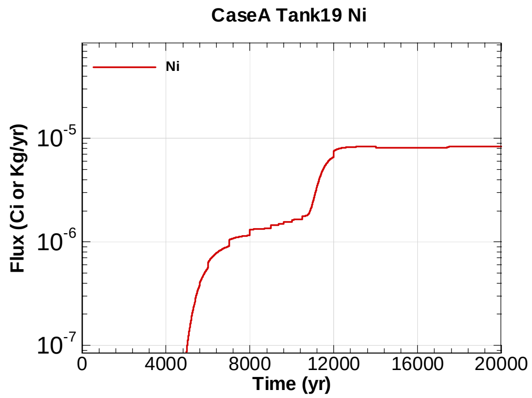

Figure A.2-1802 - Water Table Flux for CaseA Tank19 Ni

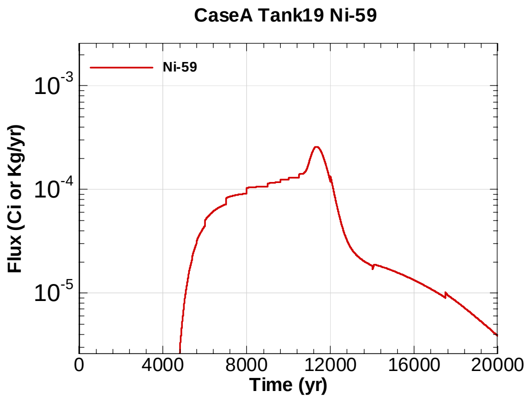

Figure A.2-1803 - Water Table Flux for CaseA Tank19 Ni-59

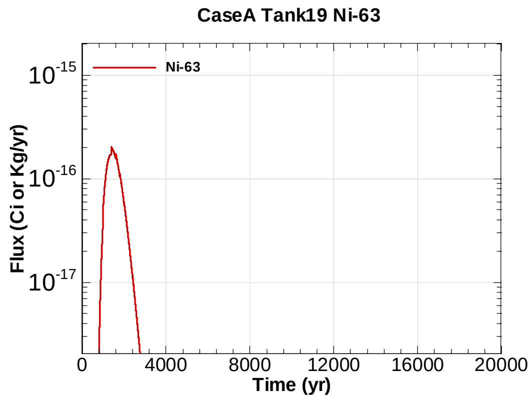

Figure A.2-1804 - Water Table Flux for CaseA Tank19 Ni-63

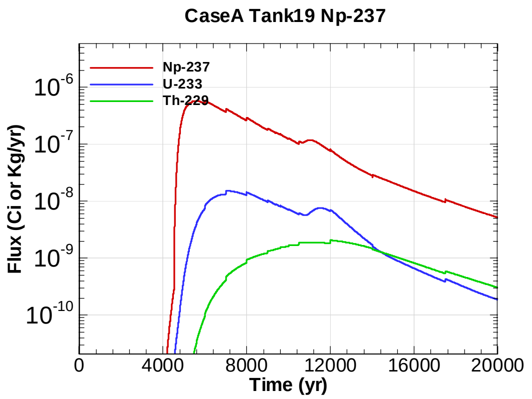

Figure A.2-1805 - Water Table Flux for CaseA Tank19 Np-237

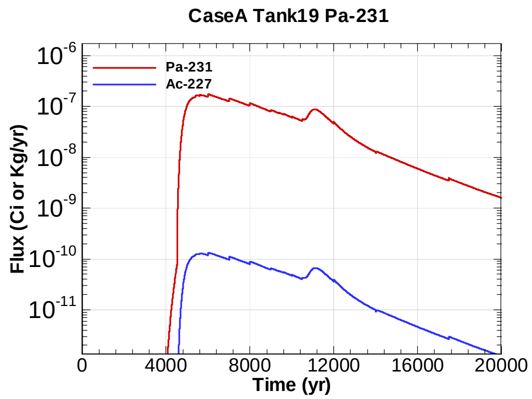

Figure A.2-1806 - Water Table Flux for CaseA Tank19 Pa-231

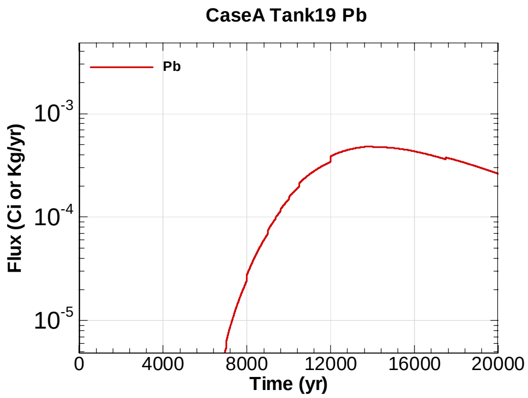

Figure A.2-1807 - Water Table Flux for CaseA Tank19 Pb

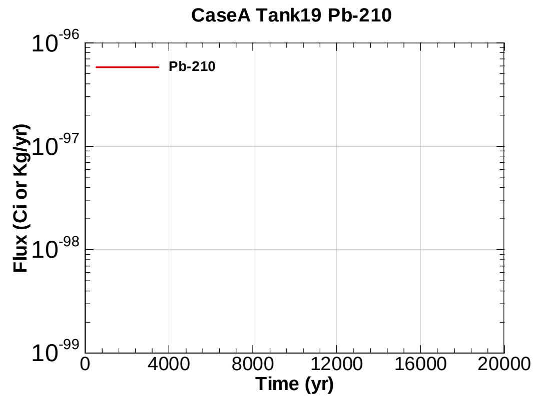

Figure A.2-1808 - Water Table Flux for CaseA Tank19 Pb-210

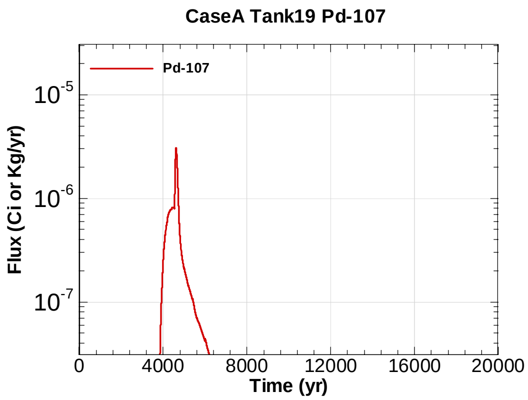

Figure A.2-1809 - Water Table Flux for CaseA Tank19 Pd-107

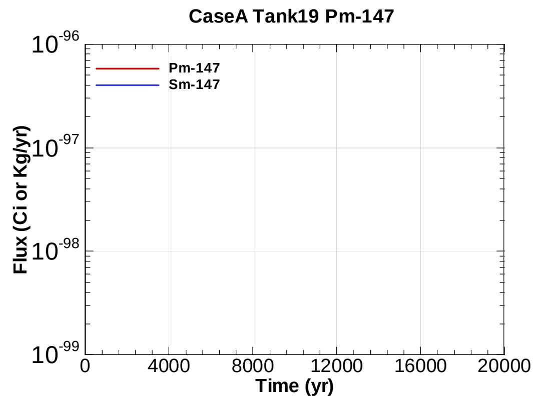

Figure A.2-1810 - Water Table Flux for CaseA Tank19 Pm-147

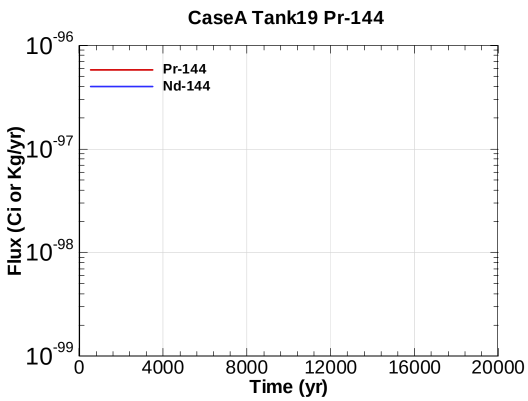

Figure A.2-1811 - Water Table Flux for CaseA Tank19 Pr-144

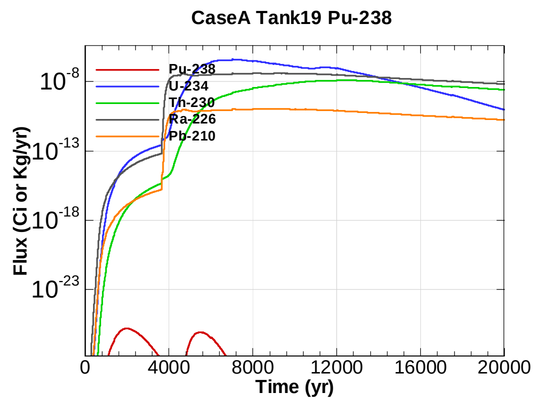

Figure A.2-1812 - Water Table Flux for CaseA Tank19 Pu-238

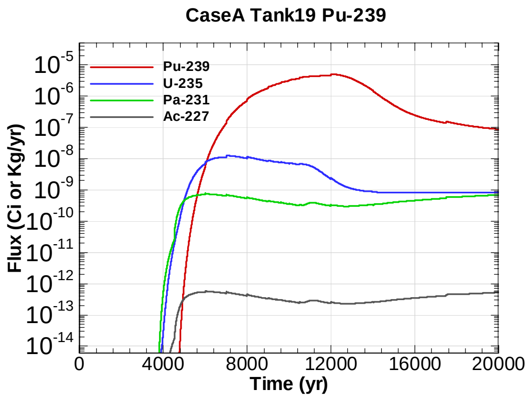

Figure A.2-1813 - Water Table Flux for CaseA Tank19 Pu-239

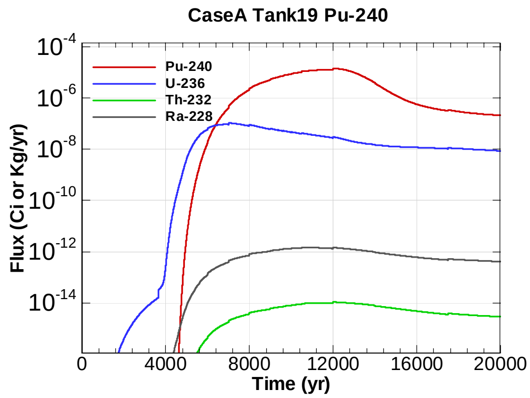

Figure A.2-1814 - Water Table Flux for CaseA Tank19 Pu-240

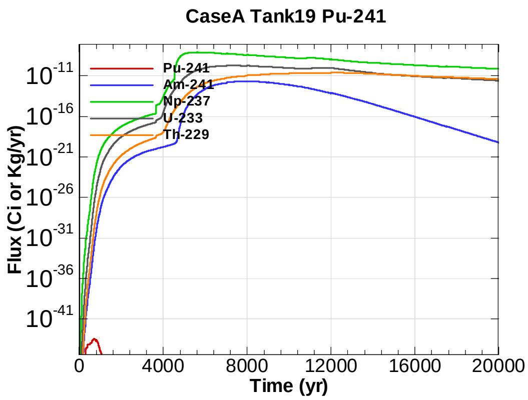

Figure A.2-1815 - Water Table Flux for CaseA Tank19 Pu-241

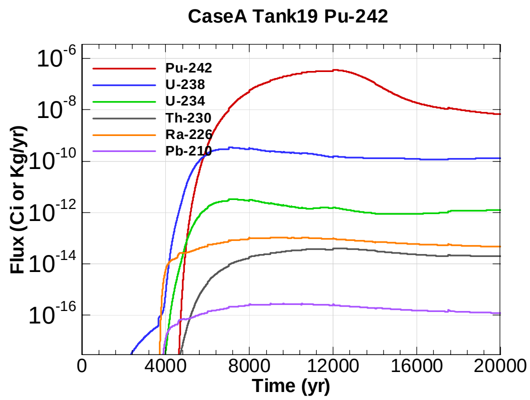

Figure A.2-1816 - Water Table Flux for CaseA Tank19 Pu-242

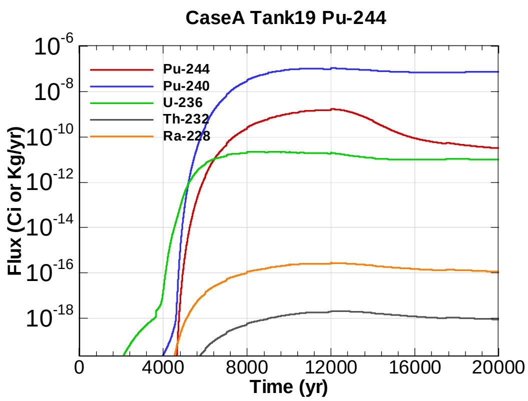

Figure A.2-1817 - Water Table Flux for CaseA Tank19 Pu-244

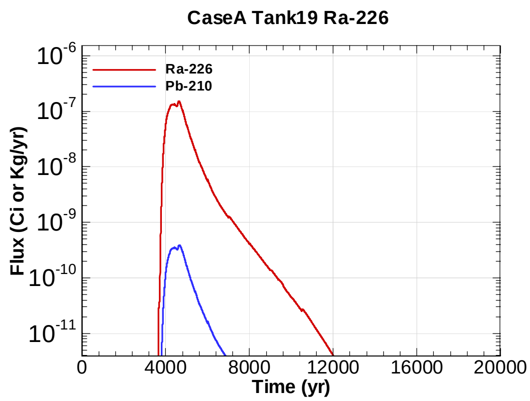

Figure A.2-1818 - Water Table Flux for CaseA Tank19 Ra-226

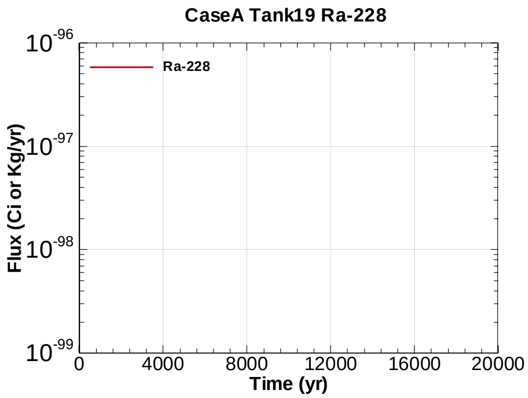

Figure A.2-1819 - Water Table Flux for CaseA Tank19 Ra-228

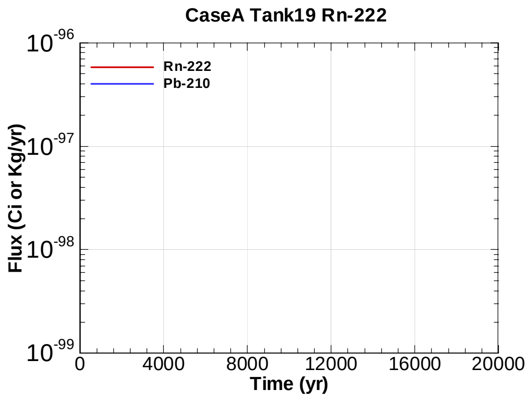

Figure A.2-1820 - Water Table Flux for CaseA Tank19 Rn-222

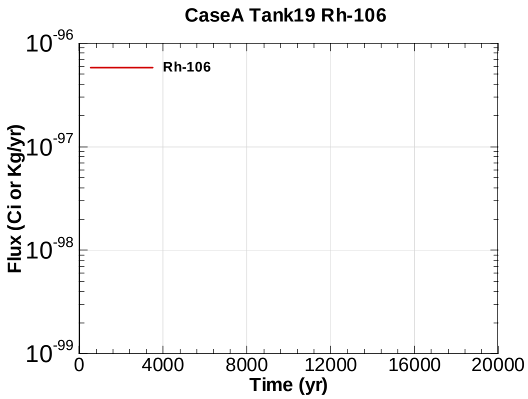

Figure A.2-1821 - Water Table Flux for CaseA Tank19 Rh-106

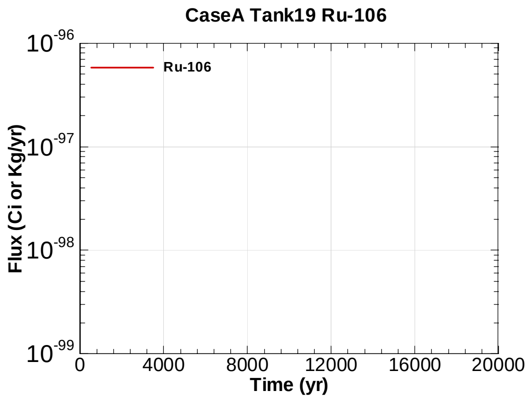

Figure A.2-1822 - Water Table Flux for CaseA Tank19 Ru-106

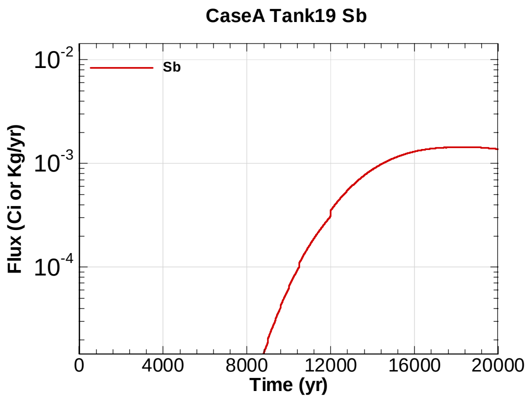

Figure A.2-1823 - Water Table Flux for CaseA Tank19 Sb

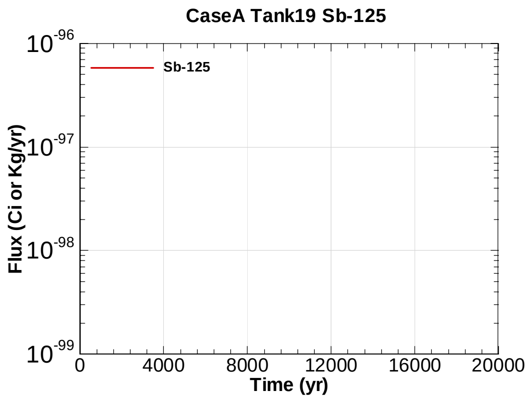

Figure A.2-1824 - Water Table Flux for CaseA Tank19 Sb-125

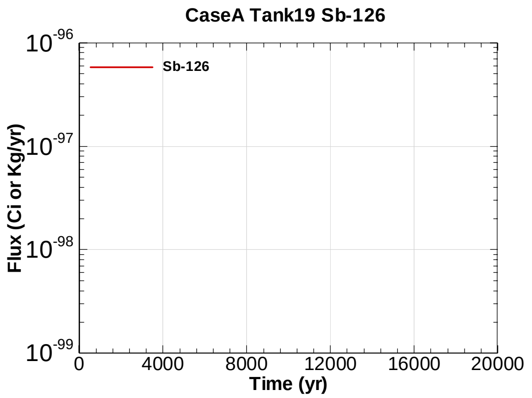

Figure A.2-1825 - Water Table Flux for CaseA Tank19 Sb-126

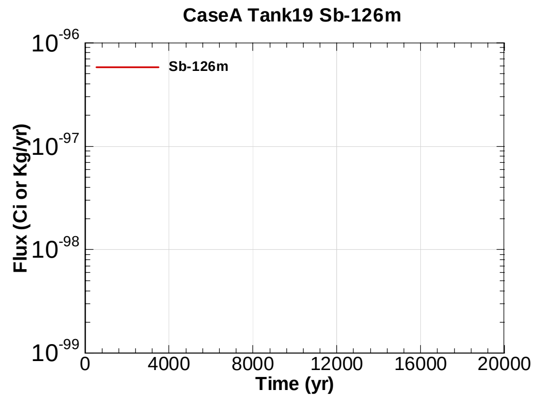

Figure A.2-1826 - Water Table Flux for CaseA Tank19 Sb-126m

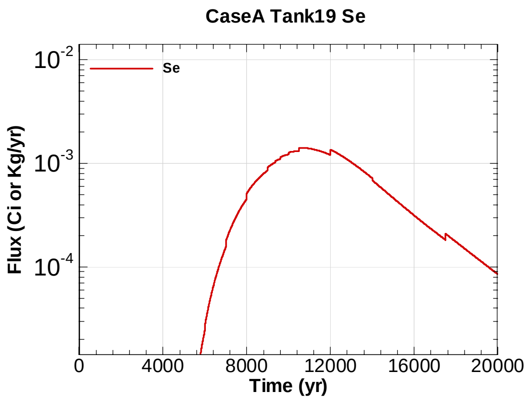

Figure A.2-1827 - Water Table Flux for CaseA Tank19 Se

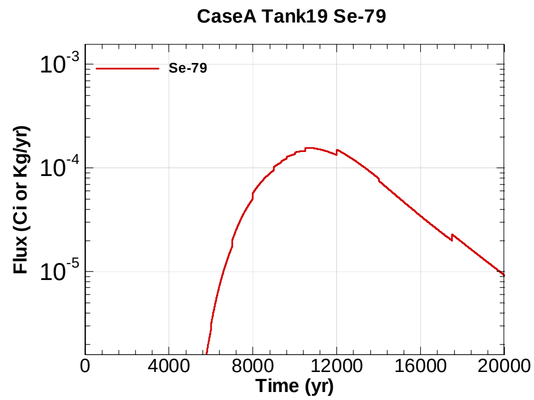

Figure A.2-1828 - Water Table Flux for CaseA Tank19 Se-79

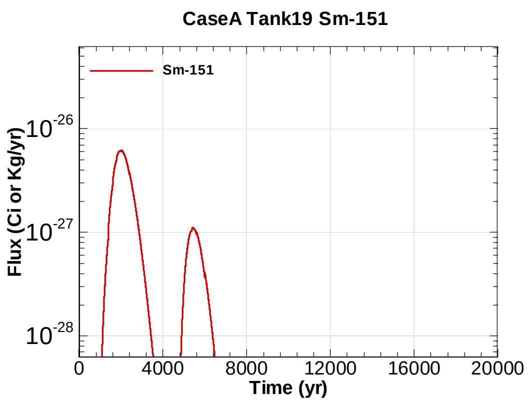

Figure A.2-1829 - Water Table Flux for CaseA Tank19 Sm-151

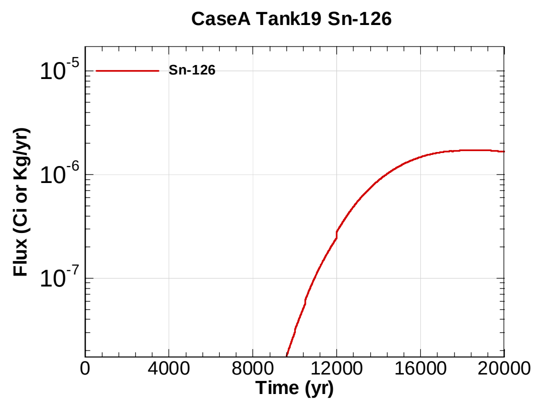

Figure A.2-1830 - Water Table Flux for CaseA Tank19 Sn-126

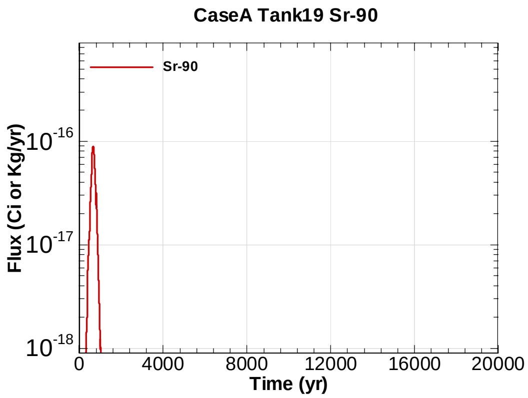

Figure A.2-1831 - Water Table Flux for CaseA Tank19 Sr-90

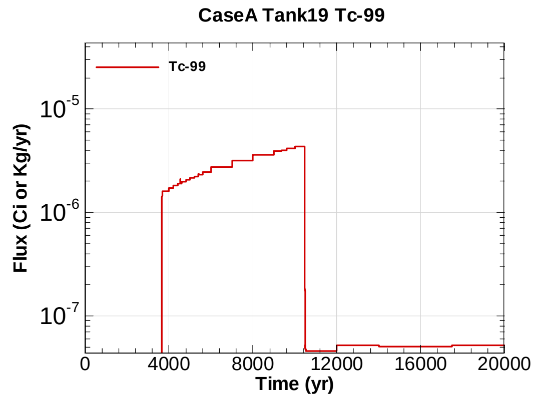

Figure A.2-1832 - Water Table Flux for CaseA Tank19 Tc-99

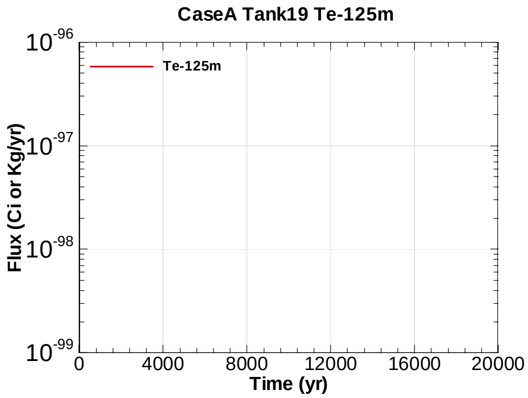

Figure A.2-1833 - Water Table Flux for CaseA Tank19 Te-125m

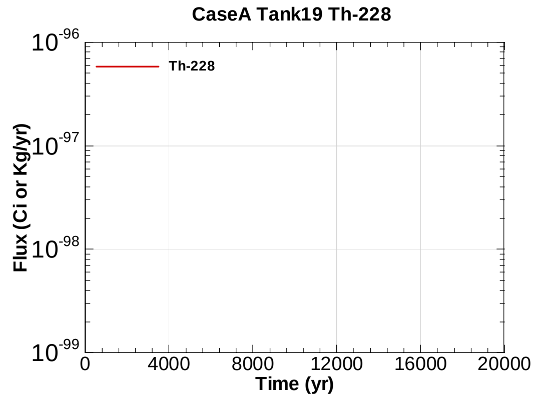

Figure A.2-1834 - Water Table Flux for CaseA Tank19 Th-228

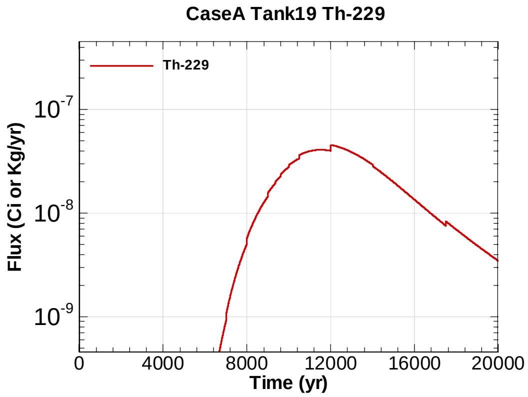

Figure A.2-1835 - Water Table Flux for CaseA Tank19 Th-229

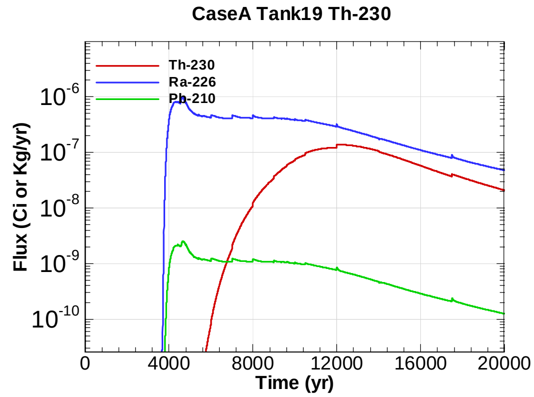

Figure A.2-1836 - Water Table Flux for CaseA Tank19 Th-230

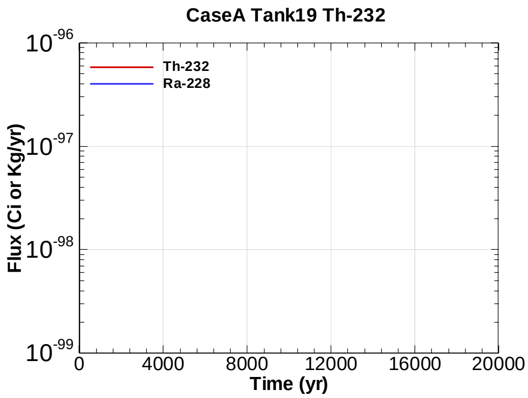

Figure A.2-1837 - Water Table Flux for CaseA Tank19 Th-232

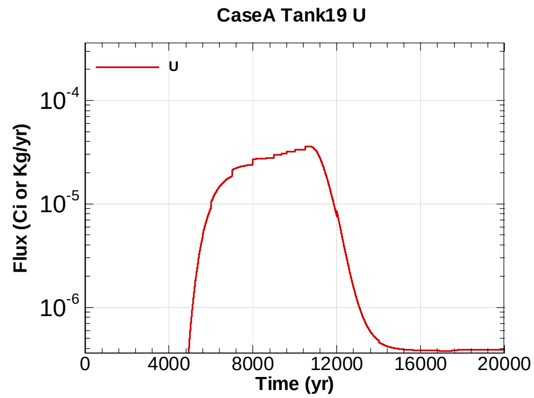

Figure A.2-1838 - Water Table Flux for CaseA Tank19 U

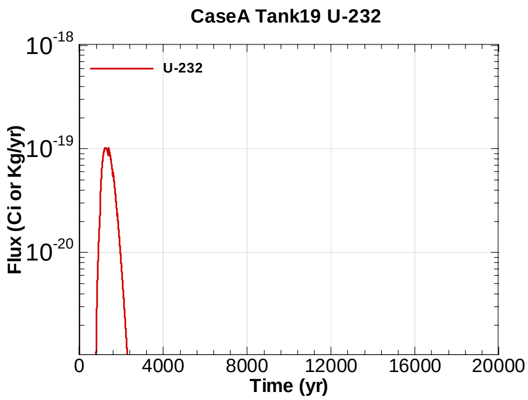

Figure A.2-1839 - Water Table Flux for CaseA Tank19 U-232

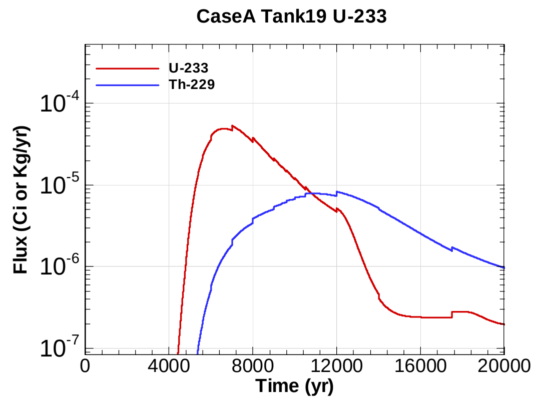

Figure A.2-1840 - Water Table Flux for CaseA Tank19 U-233

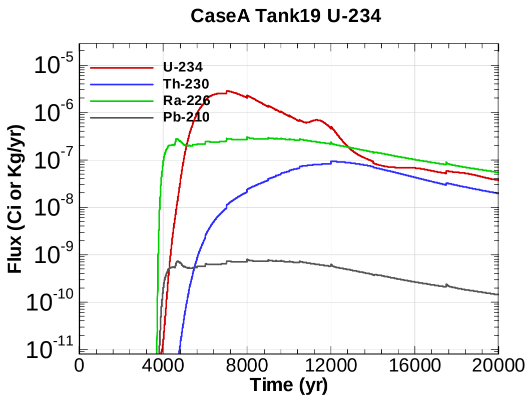

Figure A.2-1841 - Water Table Flux for CaseA Tank19 U-234

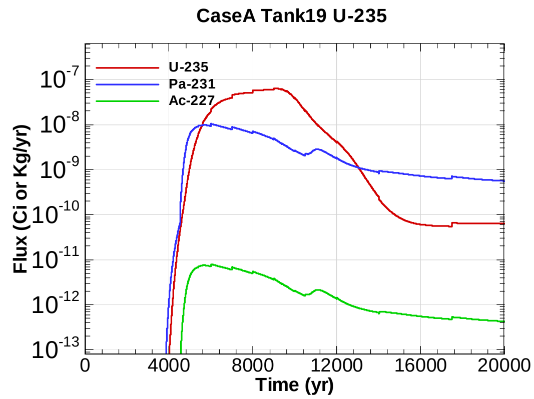

Figure A.2-1842 - Water Table Flux for CaseA Tank19 U-235

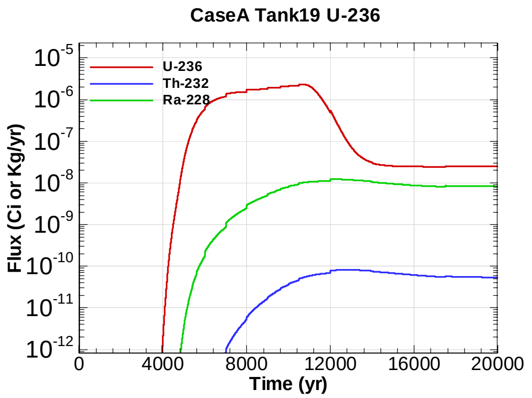

Figure A.2-1843 - Water Table Flux for CaseA Tank19 U-236

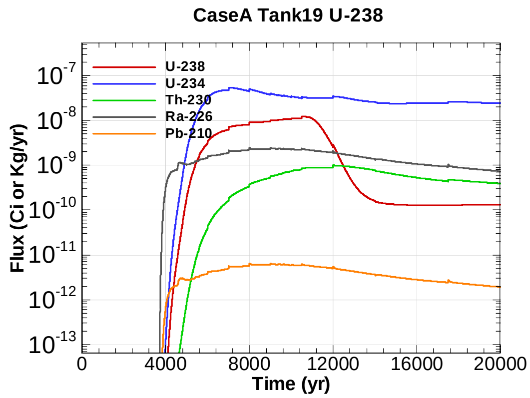

Figure A.2-1844 - Water Table Flux for CaseA Tank19 U-238

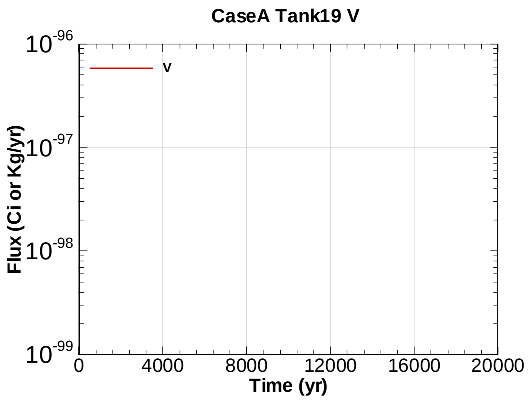

Figure A.2-1845 - Water Table Flux for CaseA Tank19 V

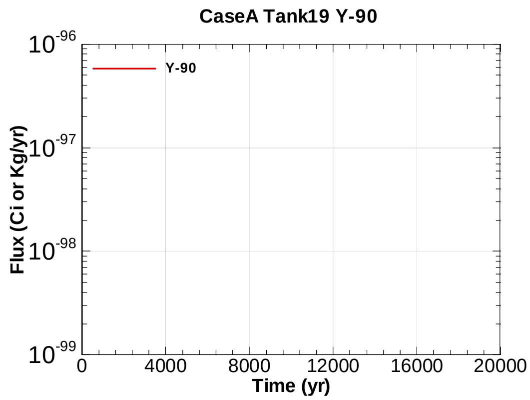

Figure A.2-1846 - Water Table Flux for CaseA Tank19 Y-90

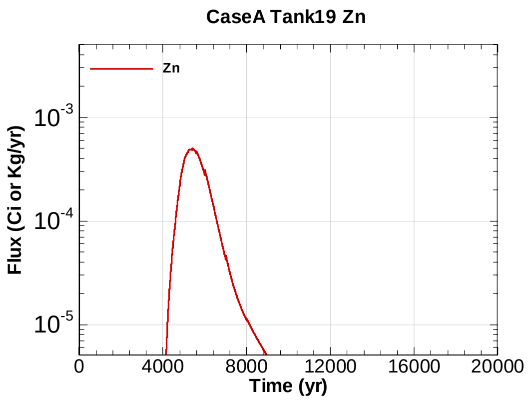

Figure A.2-1847 - Water Table Flux for CaseA Tank19 Zn

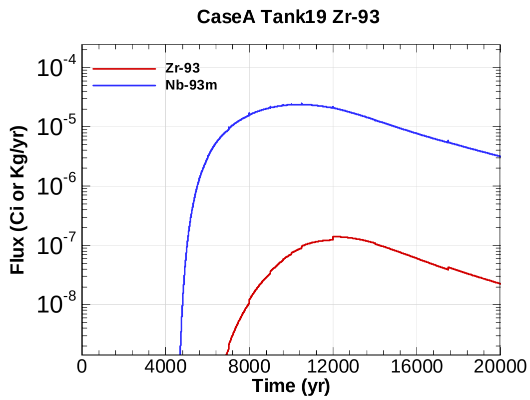

Figure A.2-1848 - Water Table Flux for CaseA Tank19 Zr-93

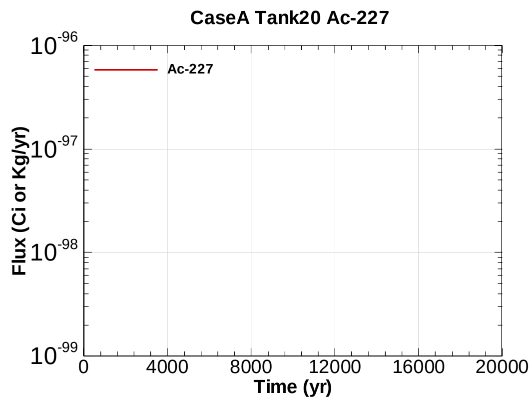

Figure A.2-1849 - Water Table Flux for CaseA Tank20 Ac-227

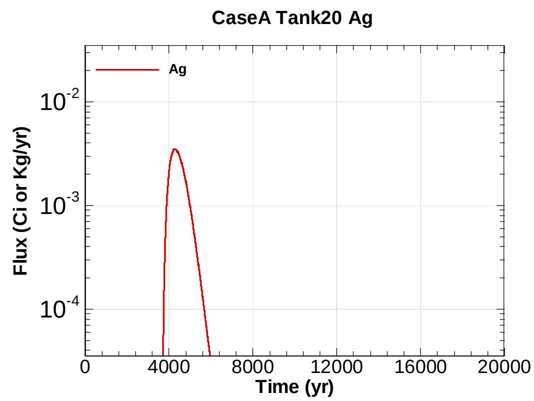

Figure A.2-1850 - Water Table Flux for CaseA Tank20 Ag

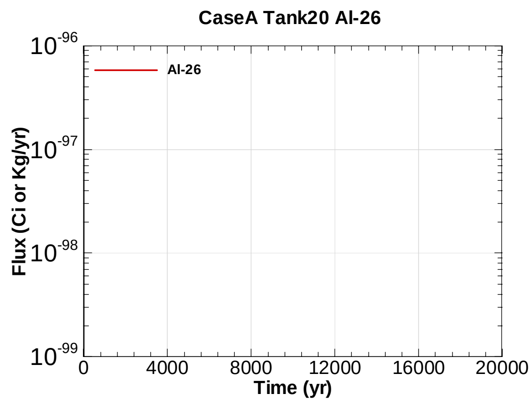

Figure A.2-1851 - Water Table Flux for CaseA Tank20 Al-26

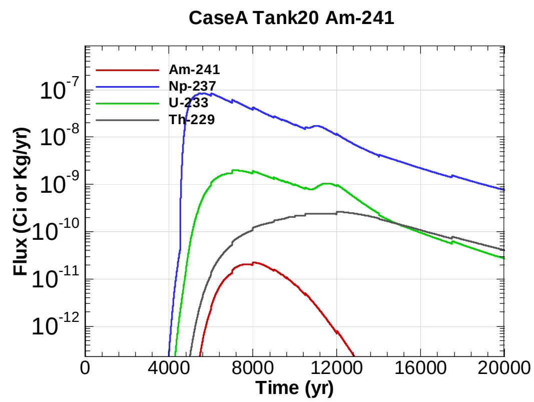

Figure A.2-1852 - Water Table Flux for CaseA Tank20 Am-241

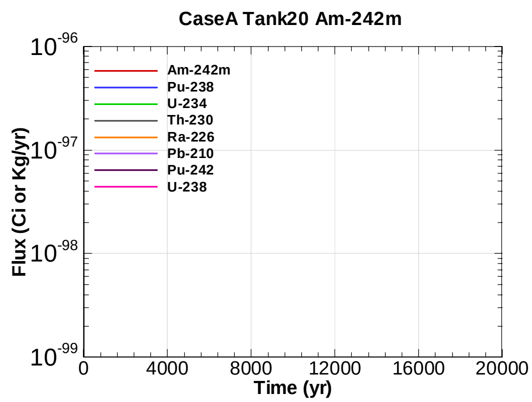

Figure A.2-1853 - Water Table Flux for CaseA Tank20 Am-242m

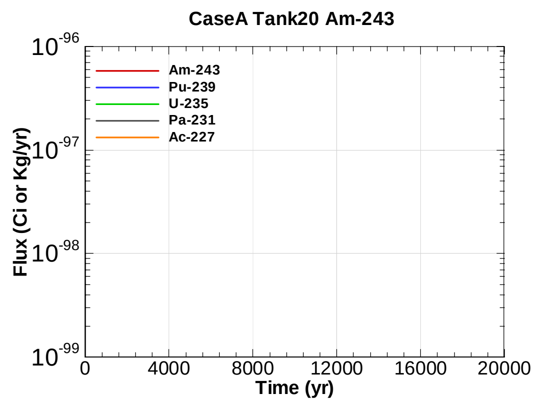

Figure A.2-1854 - Water Table Flux for CaseA Tank20 Am-243

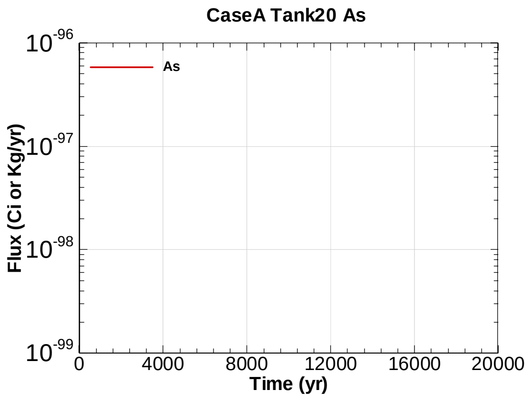

Figure A.2-1855 - Water Table Flux for CaseA Tank20 As

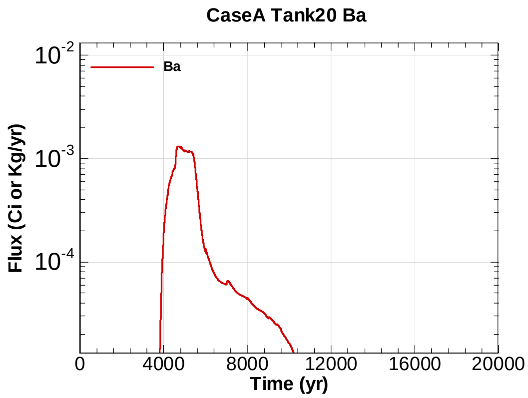

Figure A.2-1856 - Water Table Flux for CaseA Tank20 Ba

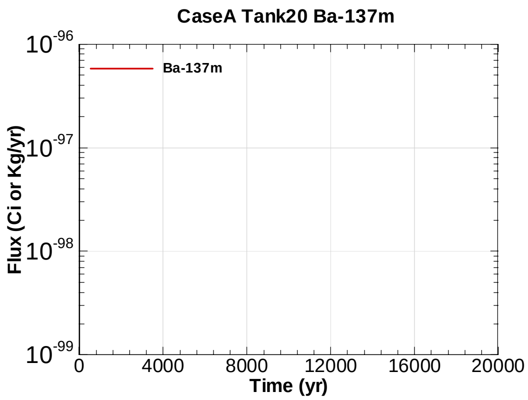

Figure A.2-1857 - Water Table Flux for CaseA Tank20 Ba-137m

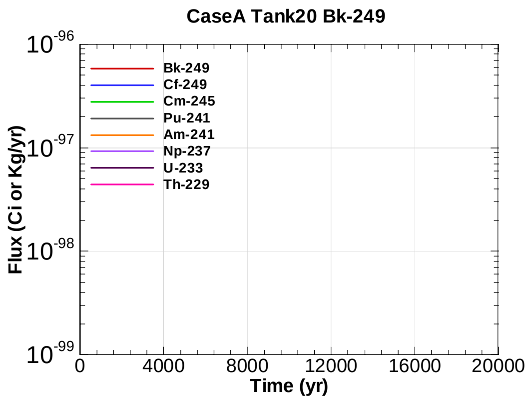

Figure A.2-1858 - Water Table Flux for CaseA Tank20 Bk-249

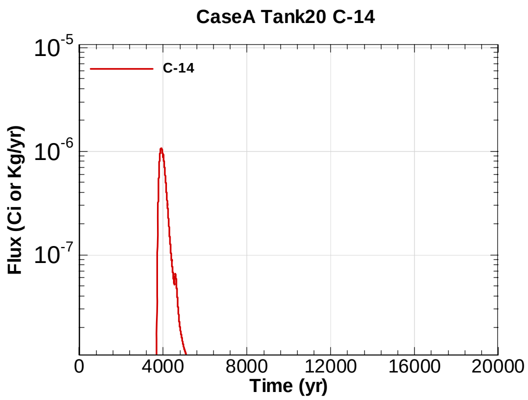

Figure A.2-1859 - Water Table Flux for CaseA Tank20 C-14

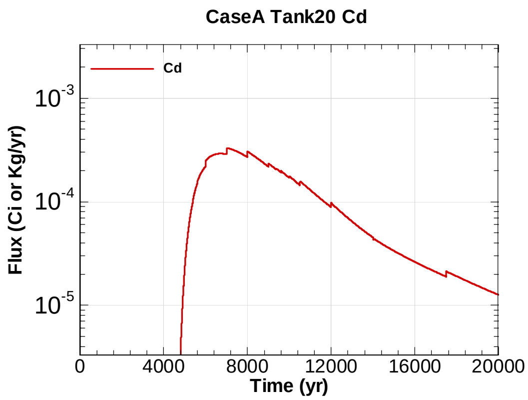

Figure A.2-1860 - Water Table Flux for CaseA Tank20 Cd

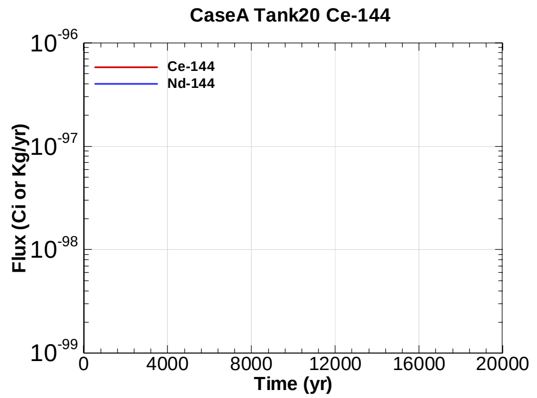

Figure A.2-1861 - Water Table Flux for CaseA Tank20 Ce-144

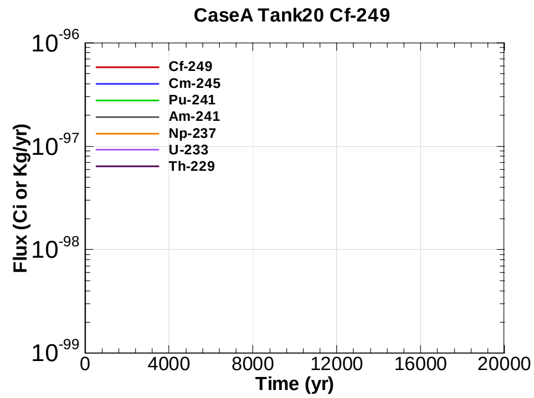

Figure A.2-1862 - Water Table Flux for CaseA Tank20 Cf-249

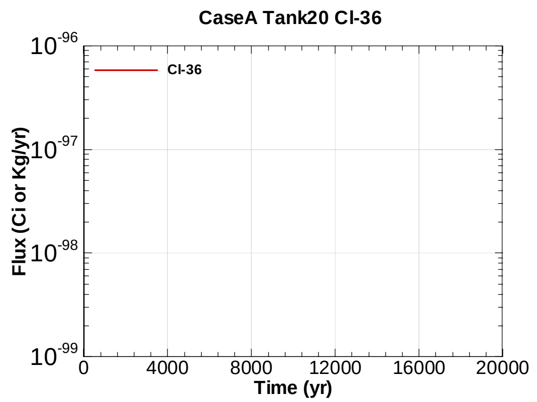

Figure A.2-1863 - Water Table Flux for CaseA Tank20 Cl-36

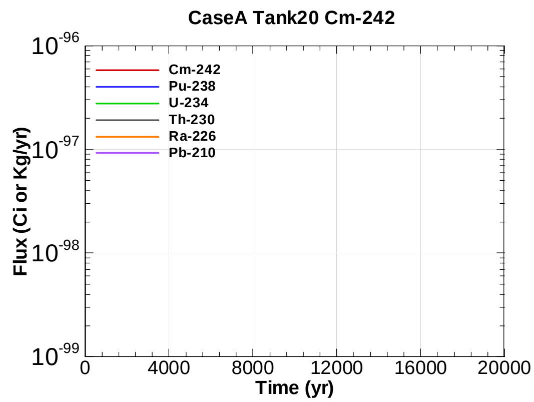

Figure A.2-1864 - Water Table Flux for CaseA Tank20 Cm-242

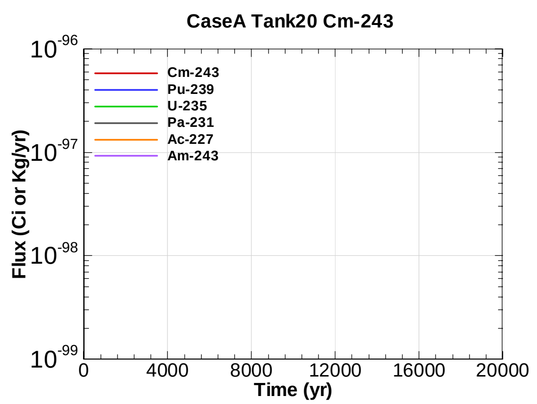

Figure A.2-1865 - Water Table Flux for CaseA Tank20 Cm-243

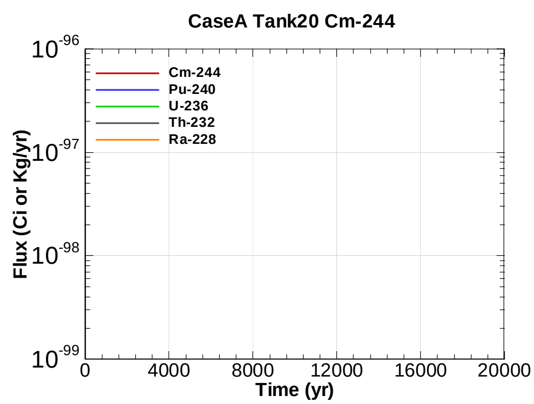

Figure A.2-1866 - Water Table Flux for CaseA Tank20 Cm-244

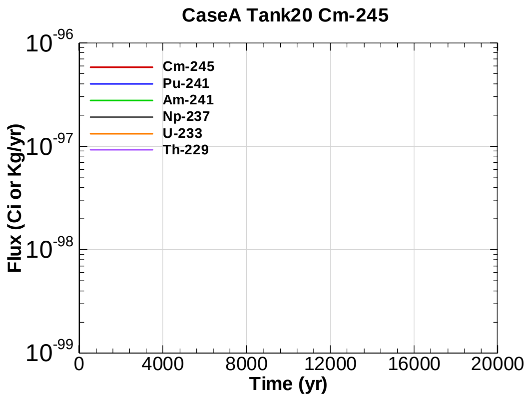

Figure A.2-1867 - Water Table Flux for CaseA Tank20 Cm-245

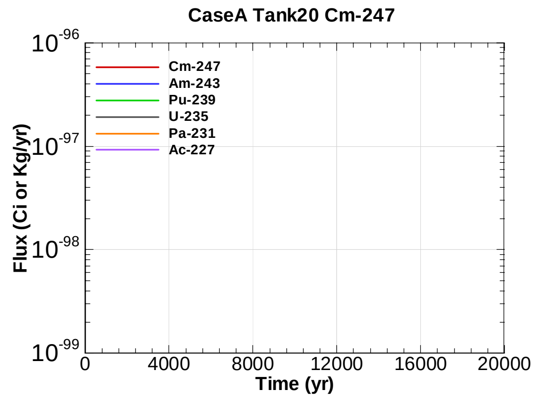

Figure A.2-1868 - Water Table Flux for CaseA Tank20 Cm-247

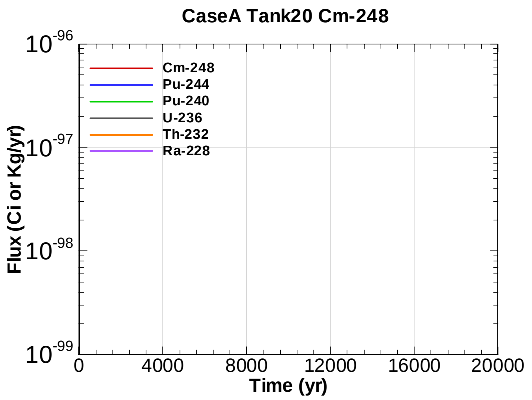

Figure A.2-1869 - Water Table Flux for CaseA Tank20 Cm-248

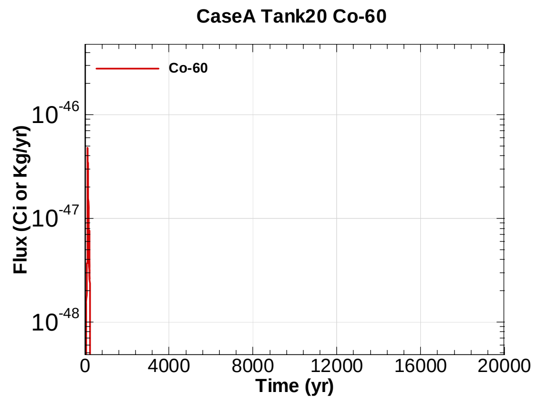

Figure A.2-1870 - Water Table Flux for CaseA Tank20 Co-60

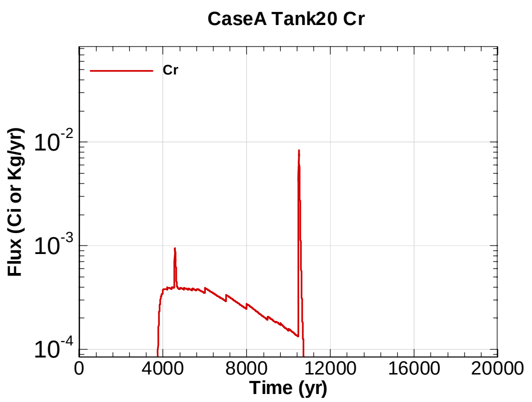

Figure A.2-1871 - Water Table Flux for CaseA Tank20 Cr

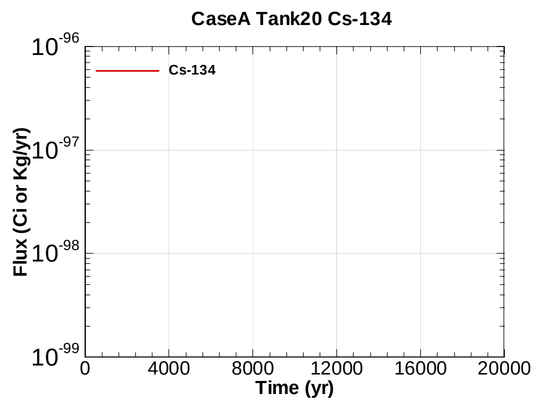

Figure A.2-1872 - Water Table Flux for CaseA Tank20 Cs-134

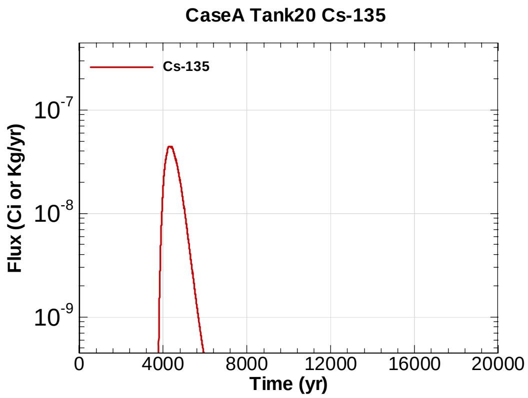

Figure A.2-1873 - Water Table Flux for CaseA Tank20 Cs-135

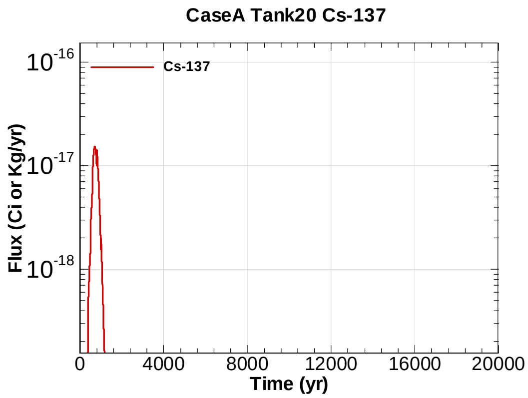

Figure A.2-1874 - Water Table Flux for CaseA Tank20 Cs-137

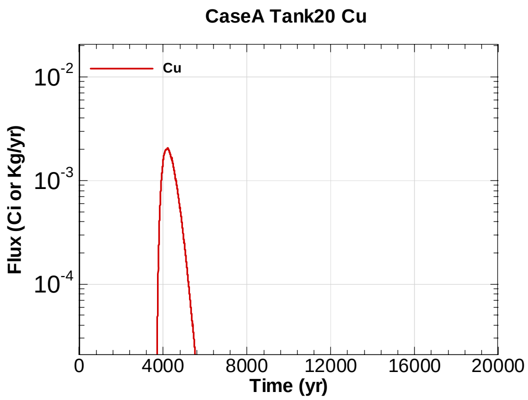

Figure A.2-1875 - Water Table Flux for CaseA Tank20 Cu

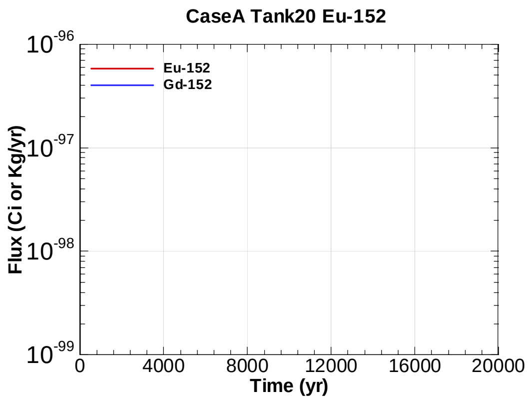

Figure A.2-1876 - Water Table Flux for CaseA Tank20 Eu-152

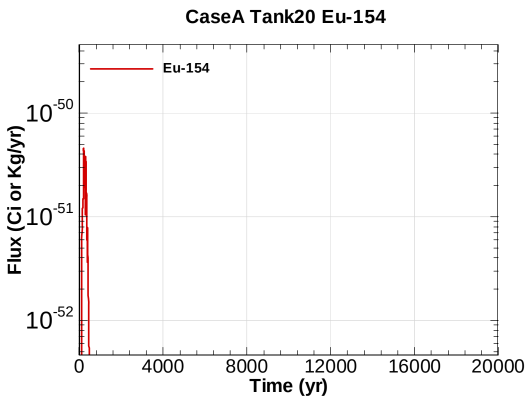

Figure A.2-1877 - Water Table Flux for CaseA Tank20 Eu-154

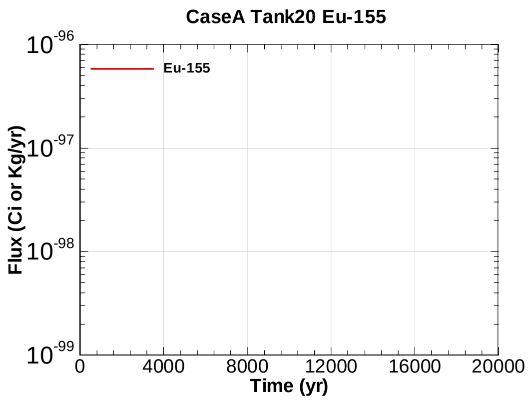

Figure A.2-1878 - Water Table Flux for CaseA Tank20 Eu-155

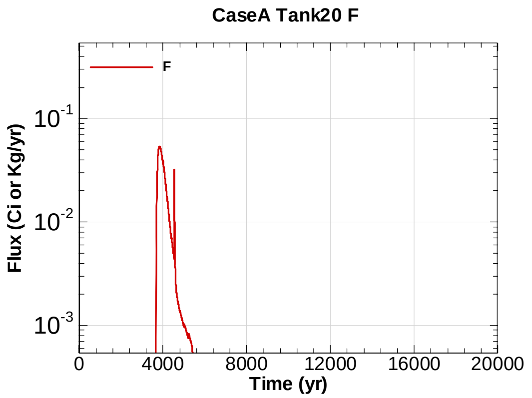

Figure A.2-1879 - Water Table Flux for CaseA Tank20 F

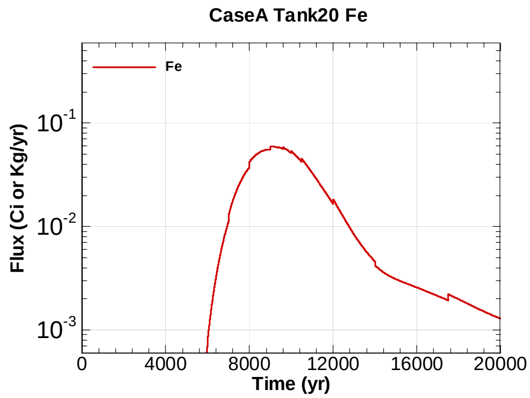

Figure A.2-1880 - Water Table Flux for CaseA Tank20 Fe

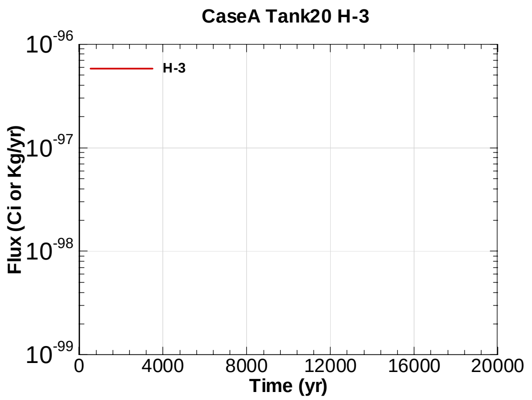

Figure A.2-1881 - Water Table Flux for CaseA Tank20 H-3

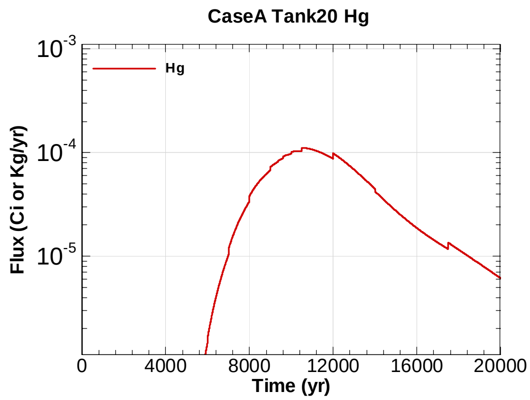

Figure A.2-1882 - Water Table Flux for CaseA Tank20 Hg

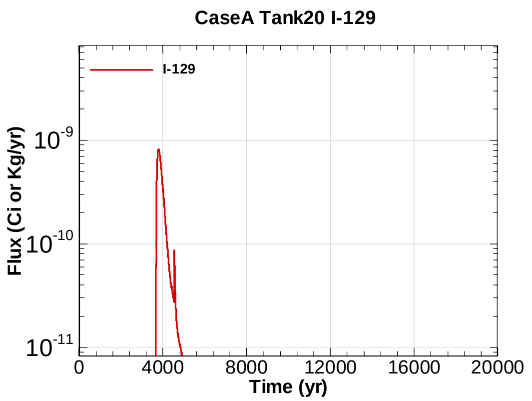

Figure A.2-1883 - Water Table Flux for CaseA Tank20 I-129

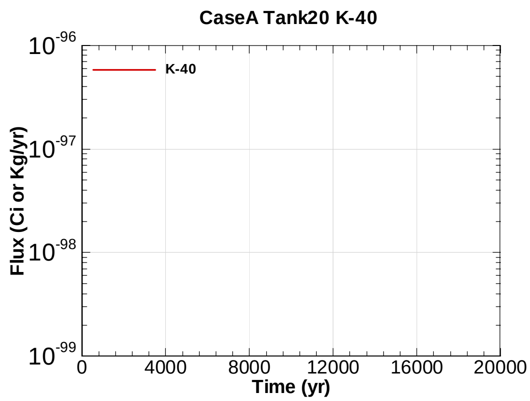

Figure A.2-1884 - Water Table Flux for CaseA Tank20 K-40

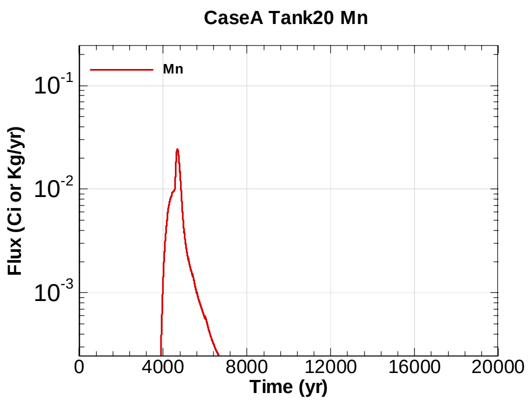

Figure A.2-1885 - Water Table Flux for CaseA Tank20 Mn

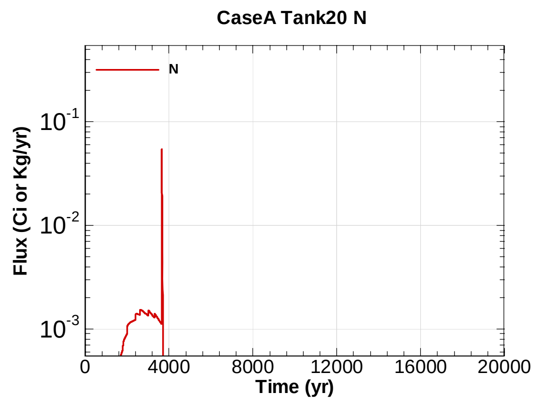

Figure A.2-1886 - Water Table Flux for CaseA Tank20 N

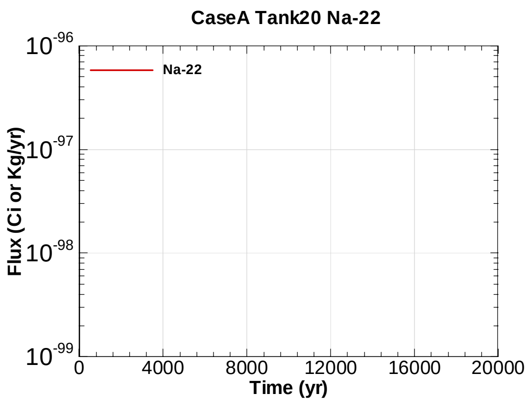

Figure A.2-1887 - Water Table Flux for CaseA Tank20 Na-22

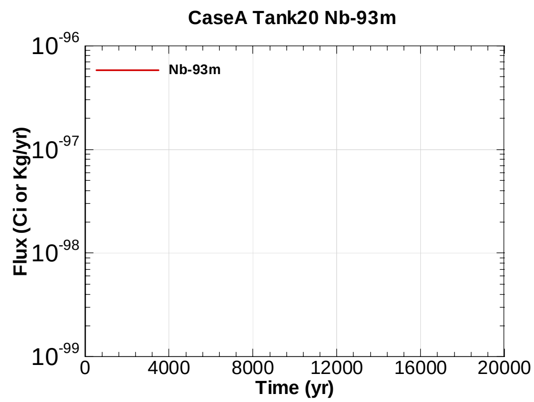

Figure A.2-1888 - Water Table Flux for CaseA Tank20 Nb-93m

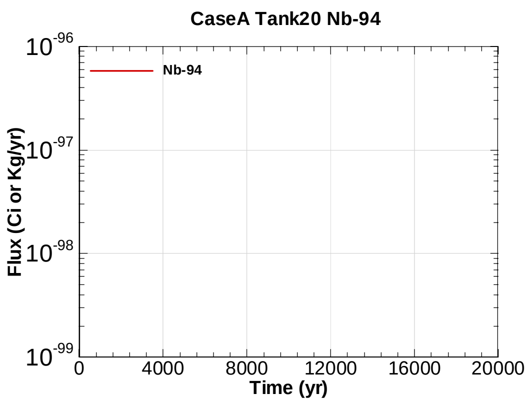

Figure A.2-1889 - Water Table Flux for CaseA Tank20 Nb-94

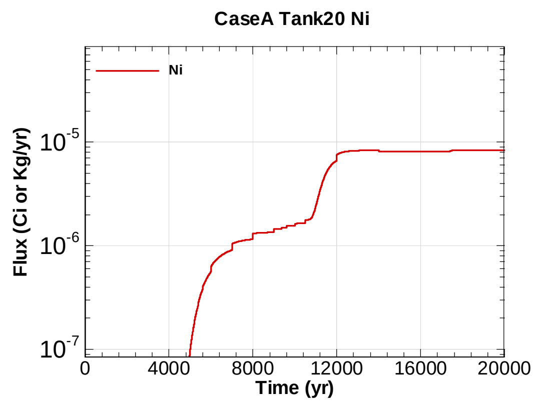

Figure A.2-1890 - Water Table Flux for CaseA Tank20 Ni

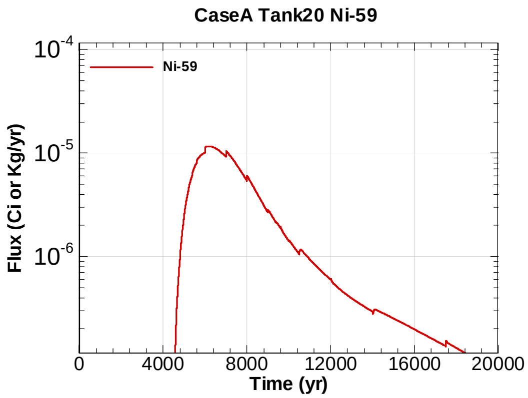

Figure A.2-1891 - Water Table Flux for CaseA Tank20 Ni-59

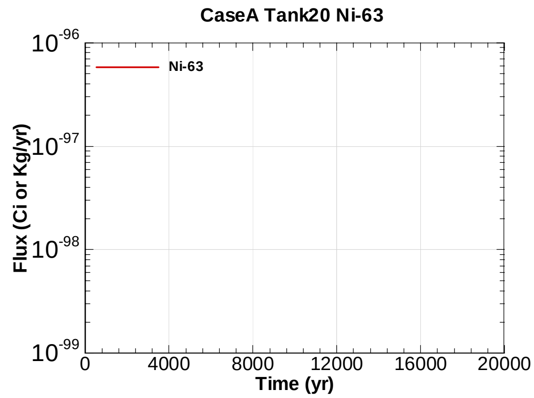

Figure A.2-1892 - Water Table Flux for CaseA Tank20 Ni-63

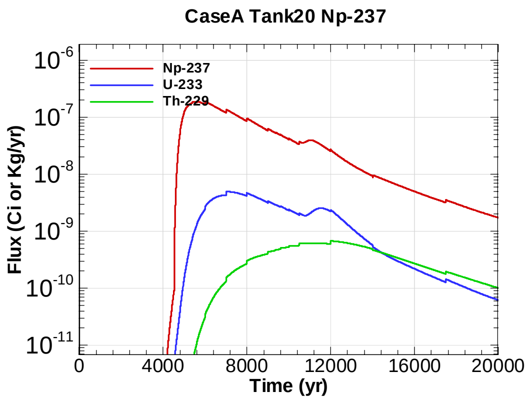

Figure A.2-1893 - Water Table Flux for CaseA Tank20 Np-237

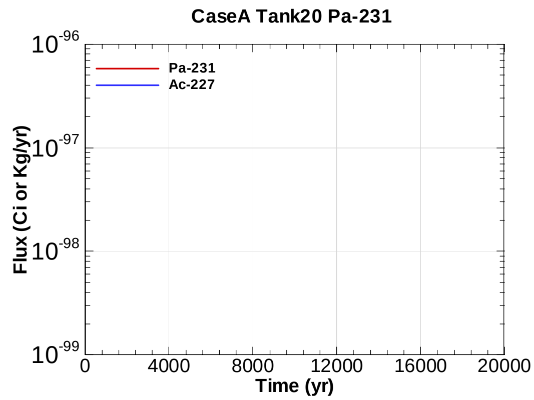

Figure A.2-1894 - Water Table Flux for CaseA Tank20 Pa-231

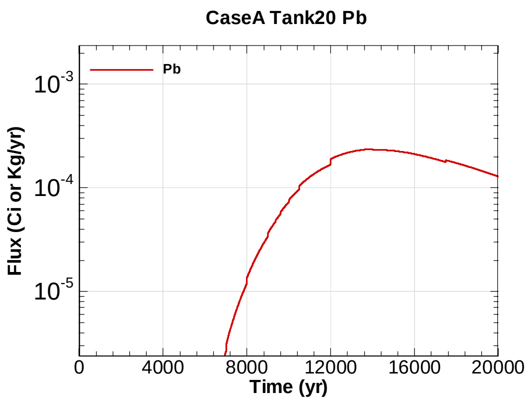

Figure A.2-1895 - Water Table Flux for CaseA Tank20 Pb

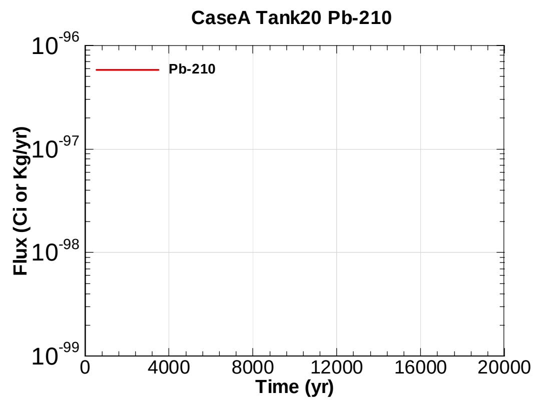

Figure A.2-1896 - Water Table Flux for CaseA Tank20 Pb-210

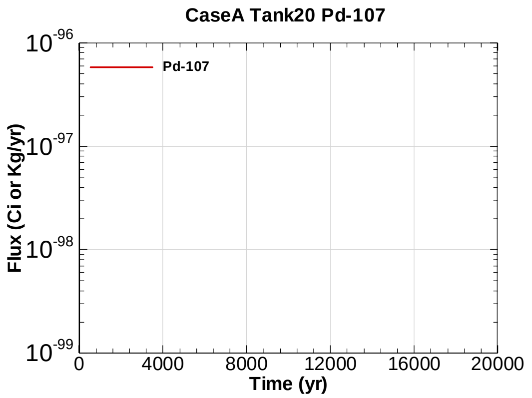

Figure A.2-1897 - Water Table Flux for CaseA Tank20 Pd-107

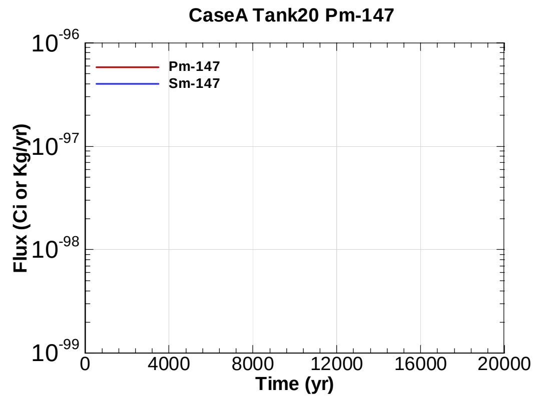

Figure A.2-1898 - Water Table Flux for CaseA Tank20 Pm-147

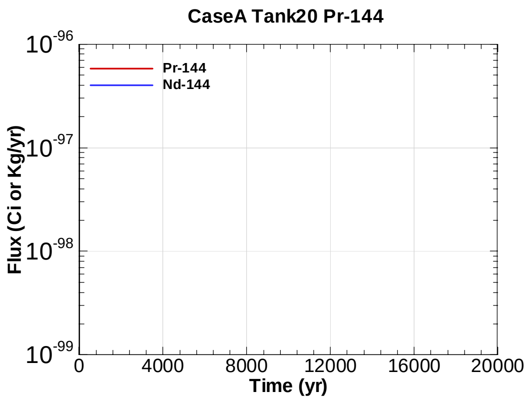

Figure A.2-1899 - Water Table Flux for CaseA Tank20 Pr-144

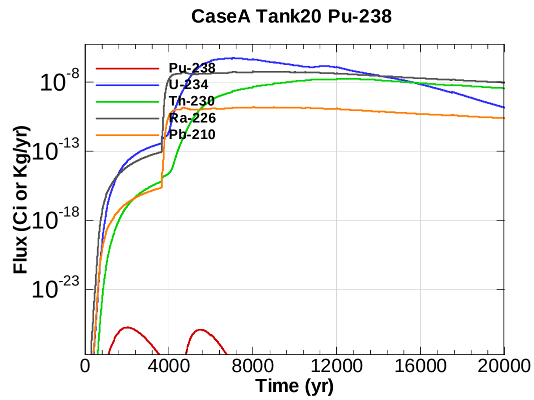

Figure A.2-1900 - Water Table Flux for CaseA Tank20 Pu-238

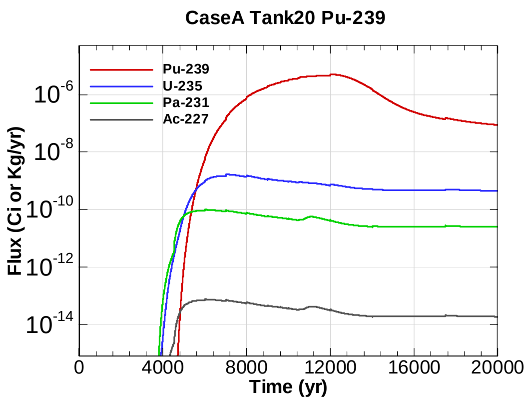

Figure A.2-1901 - Water Table Flux for CaseA Tank20 Pu-239

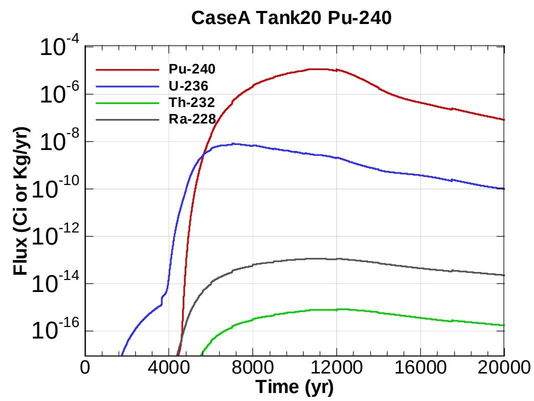

Figure A.2-1902 - Water Table Flux for CaseA Tank20 Pu-240

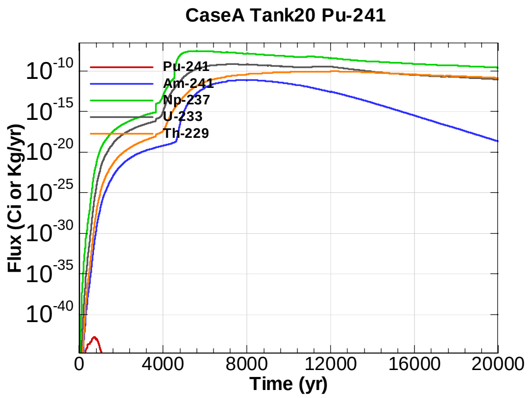

Figure A.2-1903 - Water Table Flux for CaseA Tank20 Pu-241

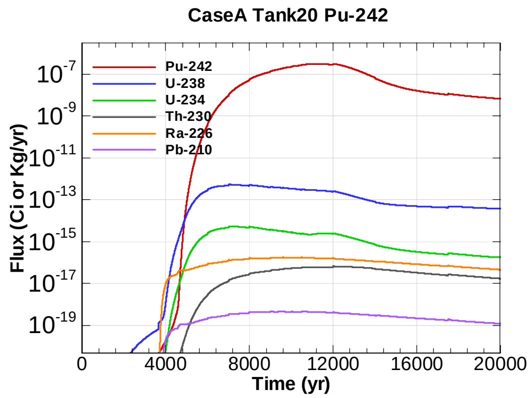

Figure A.2-1904 - Water Table Flux for CaseA Tank20 Pu-242

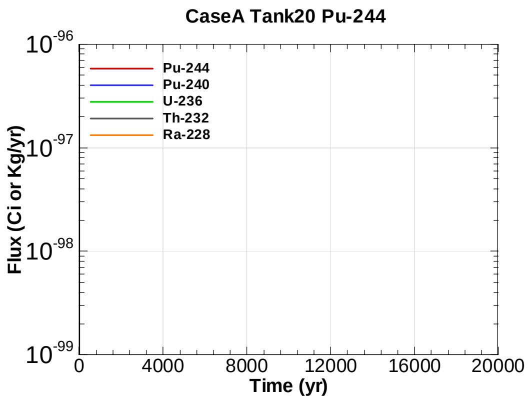

Figure A.2-1905 - Water Table Flux for CaseA Tank20 Pu-244

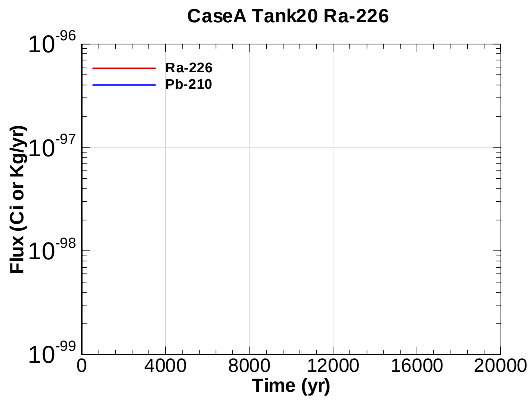

Figure A.2-1906 - Water Table Flux for CaseA Tank20 Ra-226

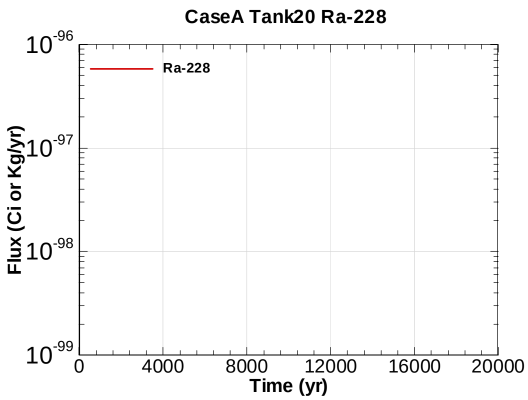

Figure A.2-1907 - Water Table Flux for CaseA Tank20 Ra-228

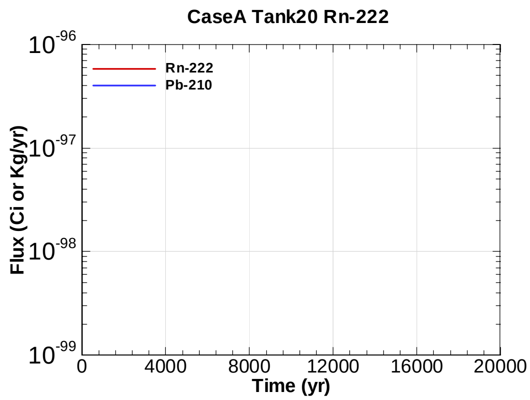

Figure A.2-1908 - Water Table Flux for CaseA Tank20 Rn-222

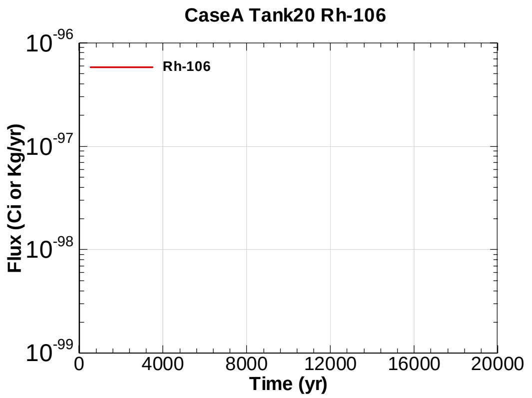

Figure A.2-1909 - Water Table Flux for CaseA Tank20 Rh-106

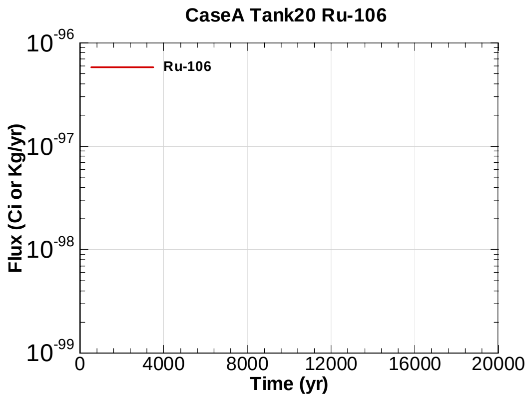

Figure A.2-1910 - Water Table Flux for CaseA Tank20 Ru-106

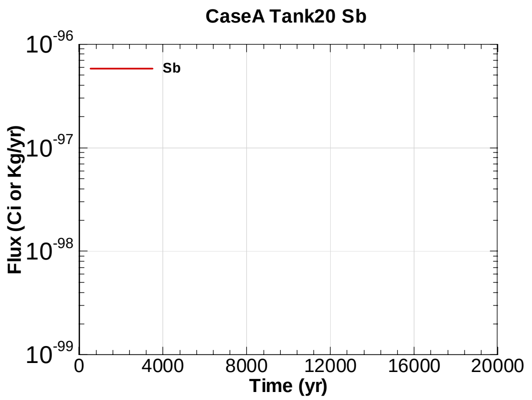

Figure A.2-1911 - Water Table Flux for CaseA Tank20 Sb

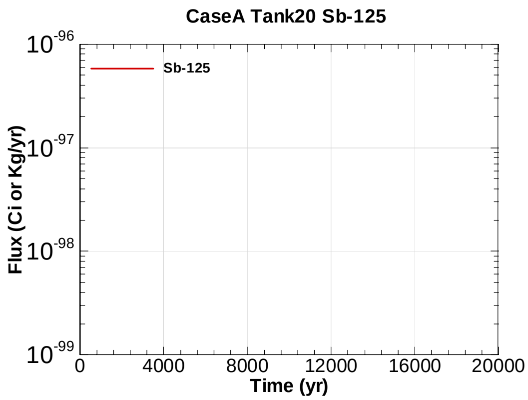

Figure A.2-1912 - Water Table Flux for CaseA Tank20 Sb-125

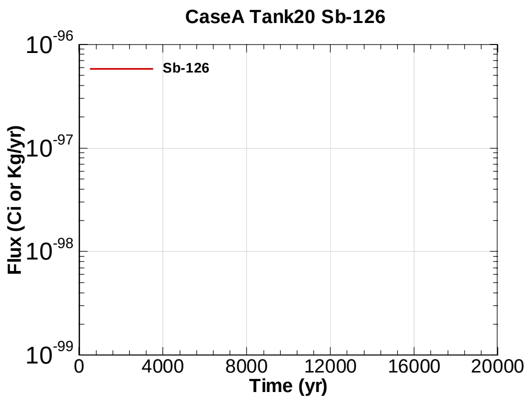

Figure A.2-1913 - Water Table Flux for CaseA Tank20 Sb-126

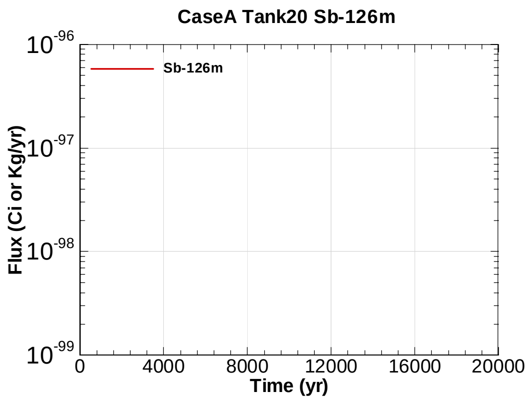

Figure A.2-1914 - Water Table Flux for CaseA Tank20 Sb-126m

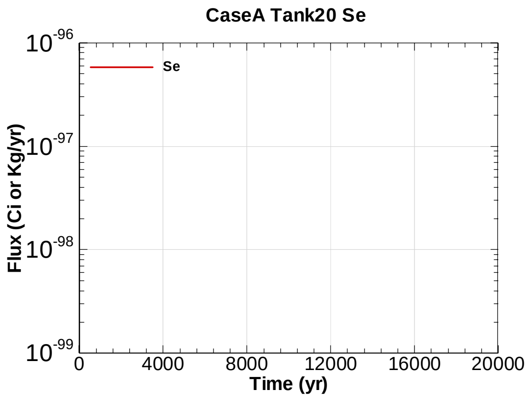

Figure A.2-1915 - Water Table Flux for CaseA Tank20 Se

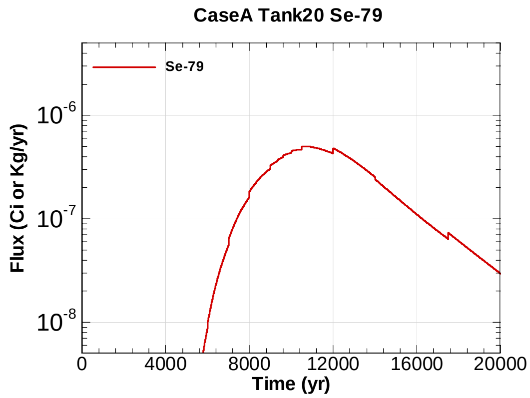

Figure A.2-1916 - Water Table Flux for CaseA Tank20 Se-79

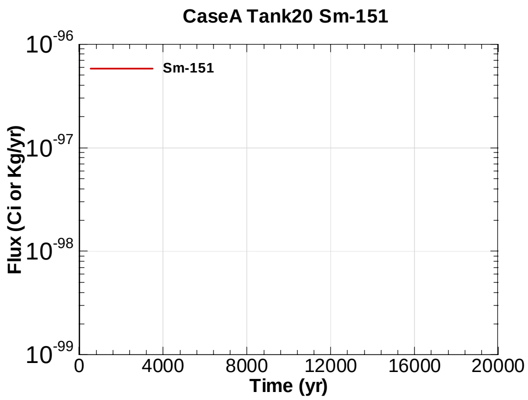

Figure A.2-1917 - Water Table Flux for CaseA Tank20 Sm-151

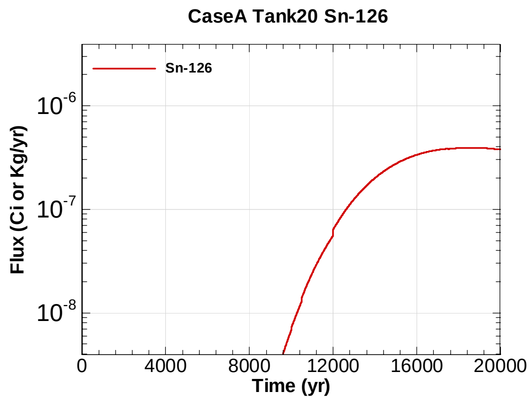

Figure A.2-1918 - Water Table Flux for CaseA Tank20 Sn-126

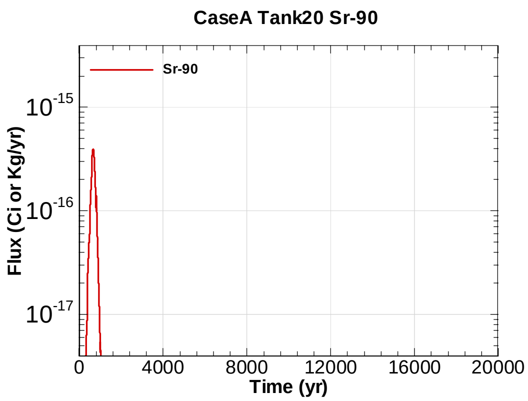

Figure A.2-1919 - Water Table Flux for CaseA Tank20 Sr-90

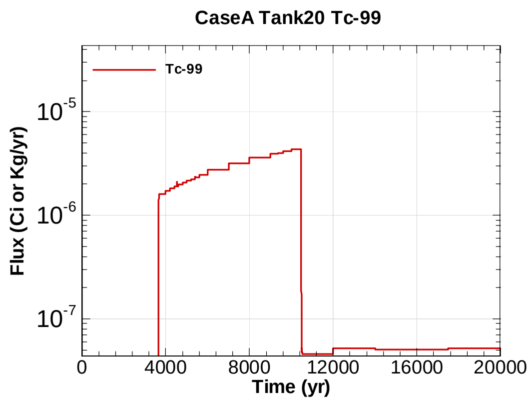

Figure A.2-1920 - Water Table Flux for CaseA Tank20 Tc-99

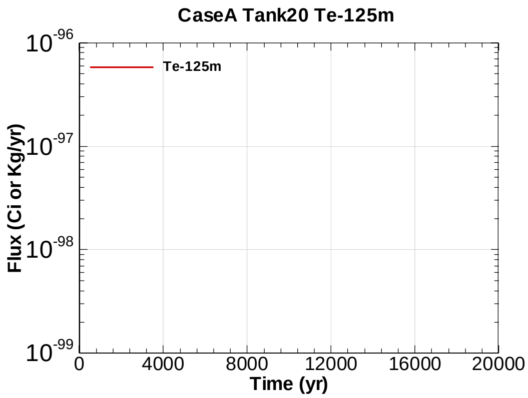

Figure A.2-1921 - Water Table Flux for CaseA Tank20 Te-125m

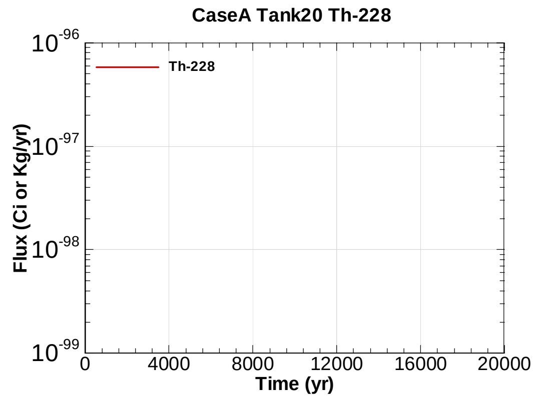

Figure A.2-1922 - Water Table Flux for CaseA Tank20 Th-228

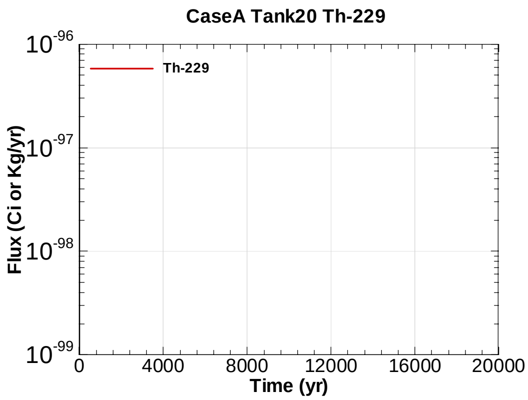

Figure A.2-1923 - Water Table Flux for CaseA Tank20 Th-229

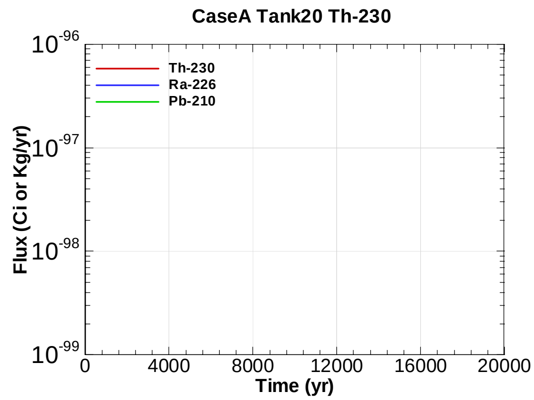

Figure A.2-1924 - Water Table Flux for CaseA Tank20 Th-230

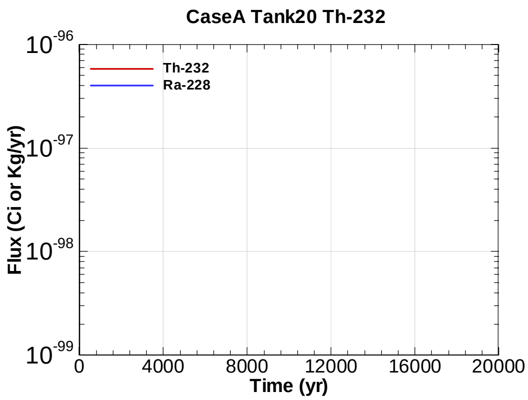

Figure A.2-1925 - Water Table Flux for CaseA Tank20 Th-232

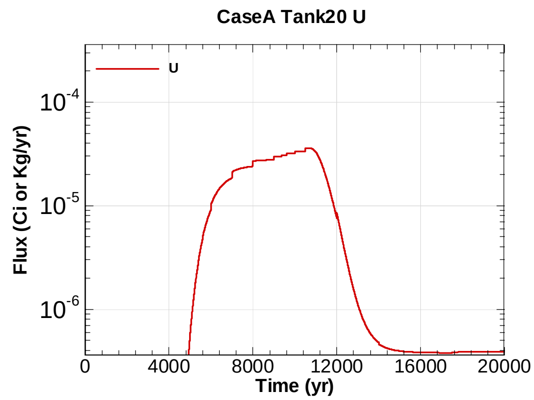

Figure A.2-1926 - Water Table Flux for CaseA Tank20 U

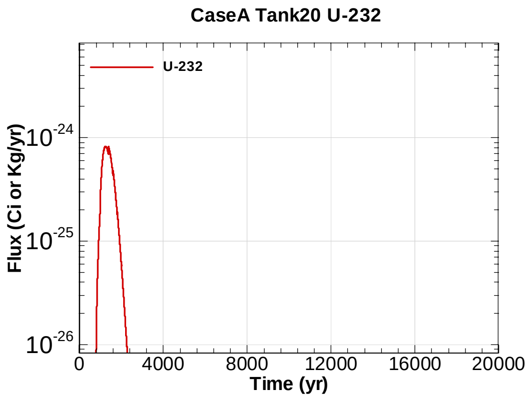

Figure A.2-1927 - Water Table Flux for CaseA Tank20 U-232

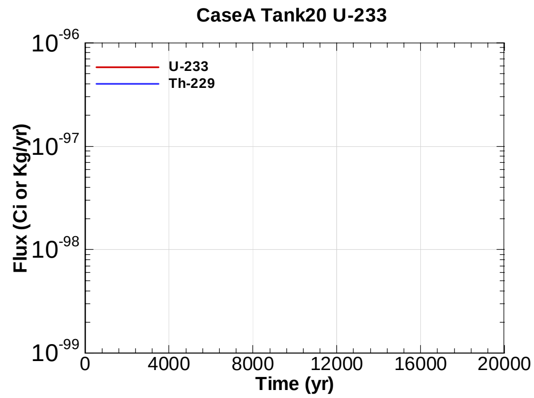

Figure A.2-1928 - Water Table Flux for CaseA Tank20 U-233

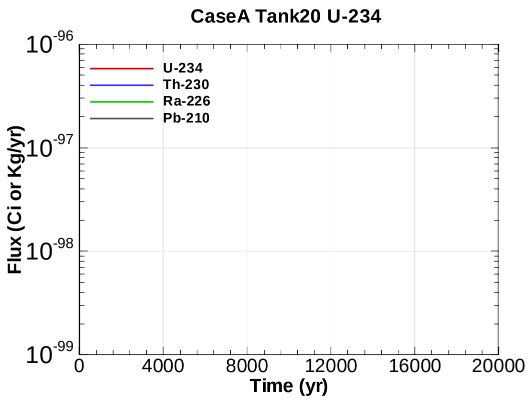

Figure A.2-1929 - Water Table Flux for CaseA Tank20 U-234

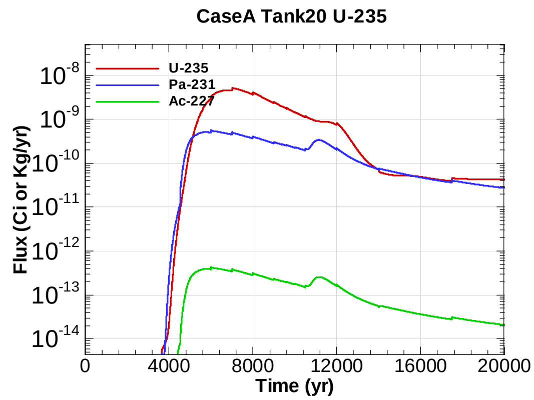

Figure A.2-1930 - Water Table Flux for CaseA Tank20 U-235

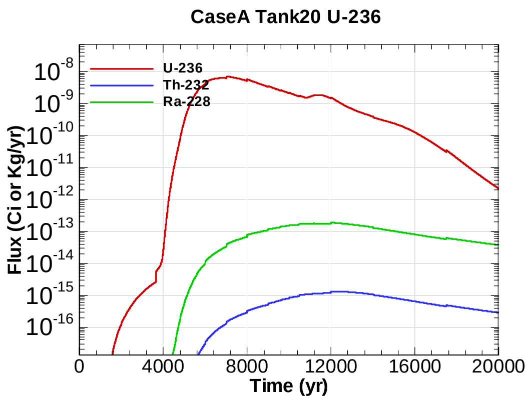

Figure A.2-1931 - Water Table Flux for CaseA Tank20 U-236

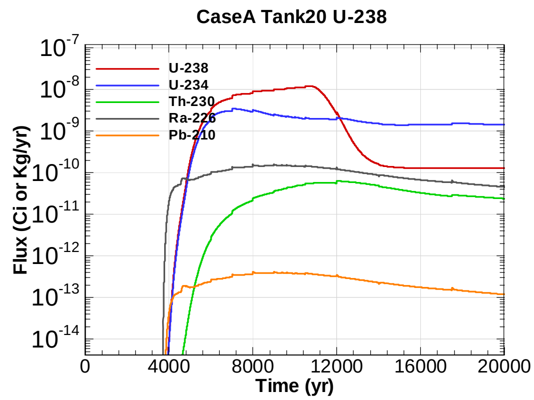

Figure A.2-1932 - Water Table Flux for CaseA Tank20 U-238

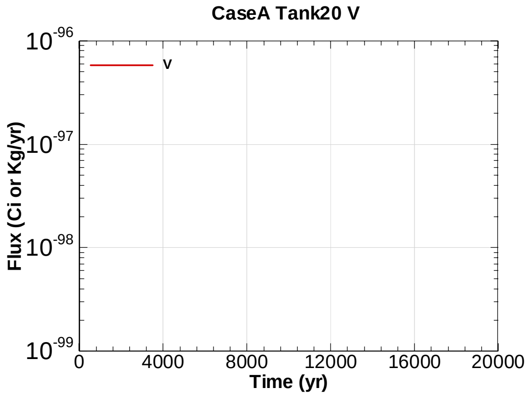

Figure A.2-1933 - Water Table Flux for CaseA Tank20 V

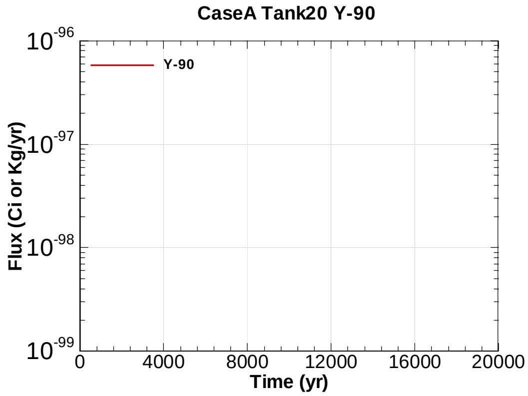

Figure A.2-1934 - Water Table Flux for CaseA Tank20 Y-90

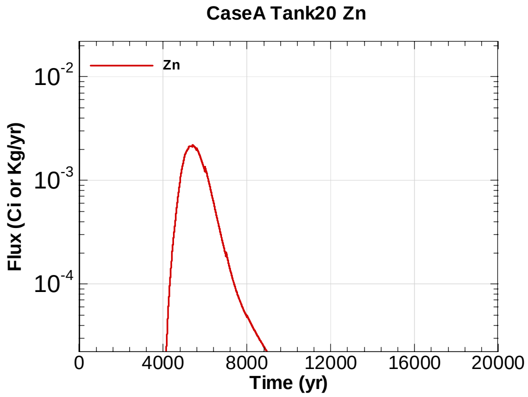

Figure A.2-1935 - Water Table Flux for CaseA Tank20 Zn

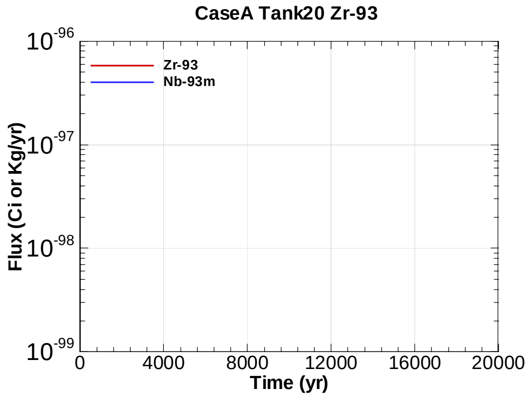

Figure A.2-1936 - Water Table Flux for CaseA Tank20 Zr-93

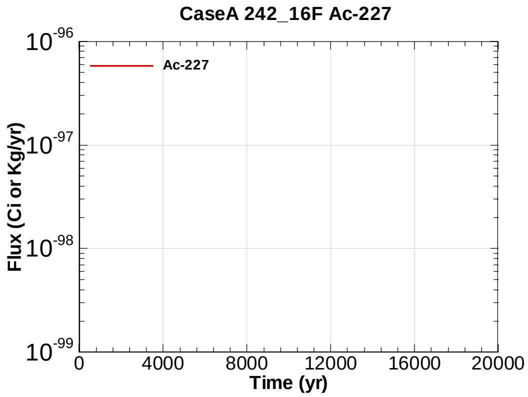

Figure A.2-1937 - Water Table Flux for CaseA 242_16F Ac-227

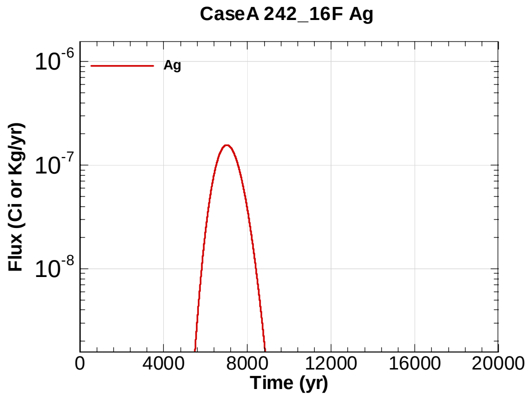

Figure A.2-1938 - Water Table Flux for CaseA 242_16F Ag

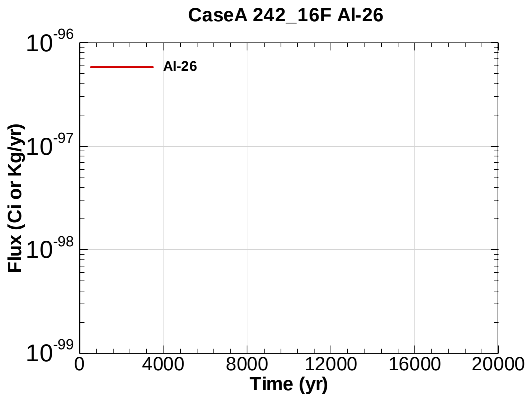

Figure A.2-1939 - Water Table Flux for CaseA 242_16F Al-26

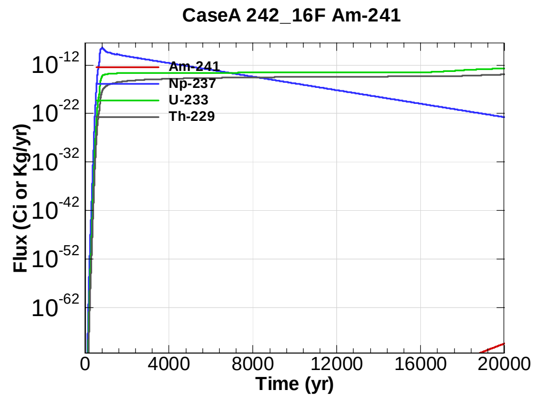

Figure A.2-1940 - Water Table Flux for CaseA 242_16F Am-241

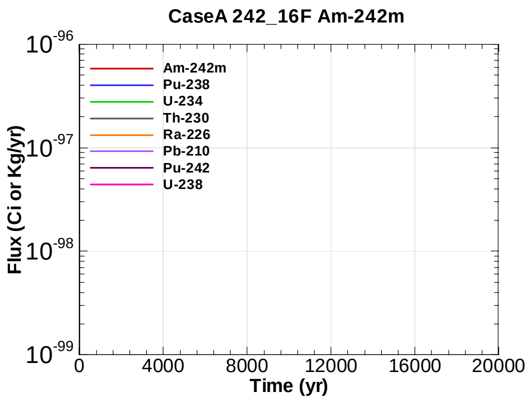

Figure A.2-1941 - Water Table Flux for CaseA 242_16F Am-242m

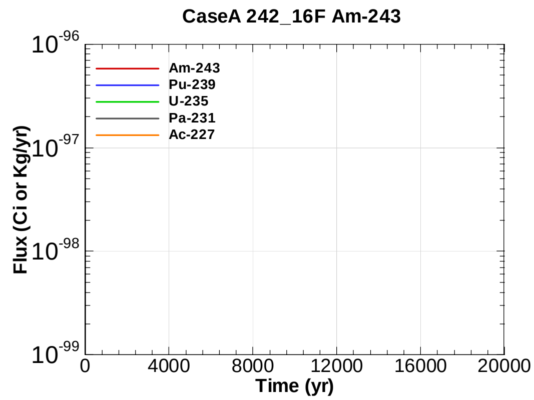

Figure A.2-1942 - Water Table Flux for CaseA 242_16F Am-243

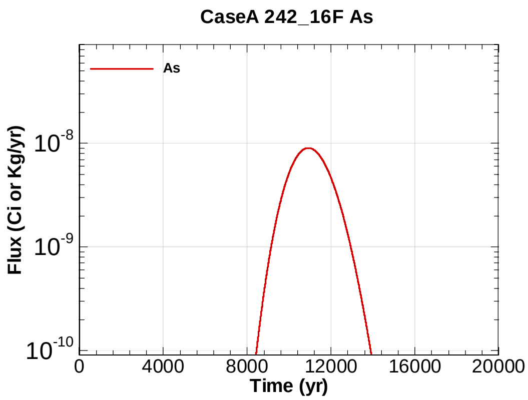

Figure A.2-1943 - Water Table Flux for CaseA 242_16F As

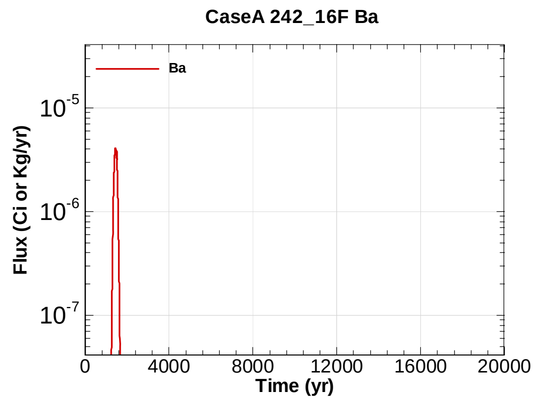

Figure A.2-1944 - Water Table Flux for CaseA 242_16F Ba

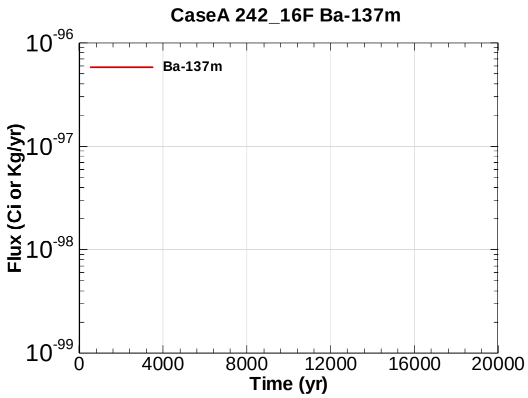

Figure A.2-1945 - Water Table Flux for CaseA 242_16F Ba-137m

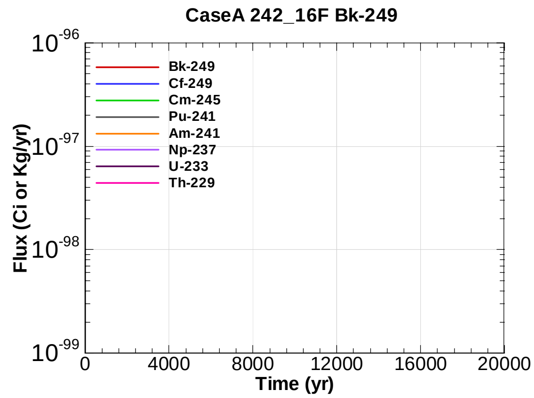

Figure A.2-1946 - Water Table Flux for CaseA 242_16F Bk-249

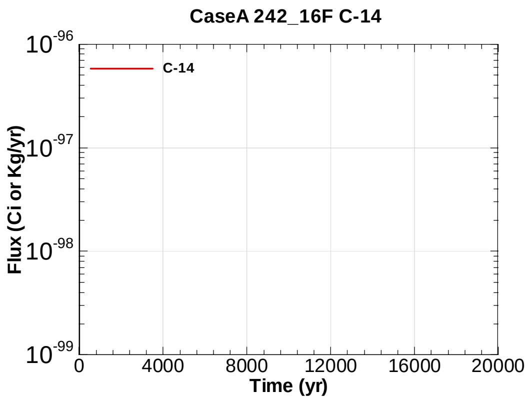

Figure A.2-1947 - Water Table Flux for CaseA 242_16F C-14

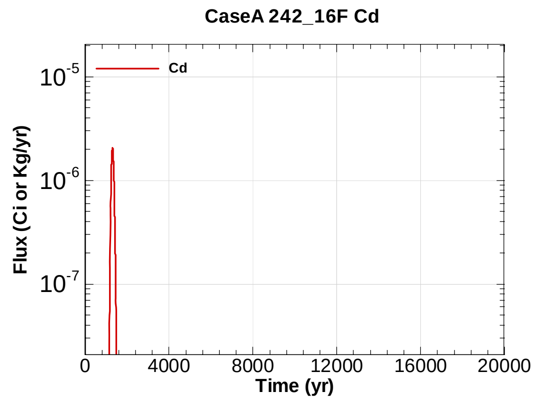

Figure A.2-1948 - Water Table Flux for CaseA 242_16F Cd

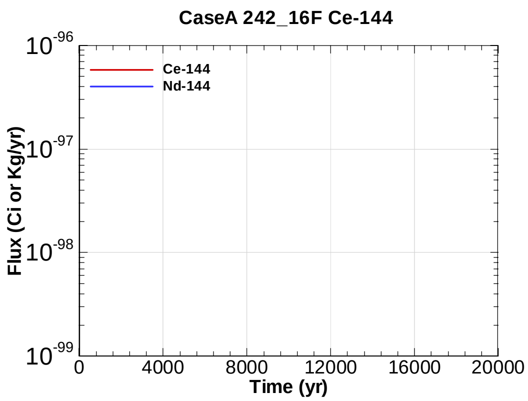

Figure A.2-1949 - Water Table Flux for CaseA 242_16F Ce-144

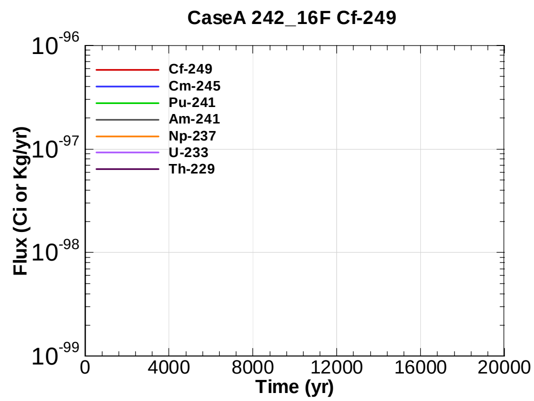

Figure A.2-1950 - Water Table Flux for CaseA 242_16F Cf-249

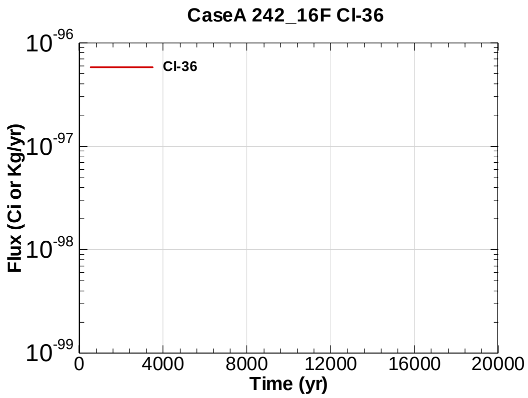

Figure A.2-1951 - Water Table Flux for CaseA 242_16F Cl-36

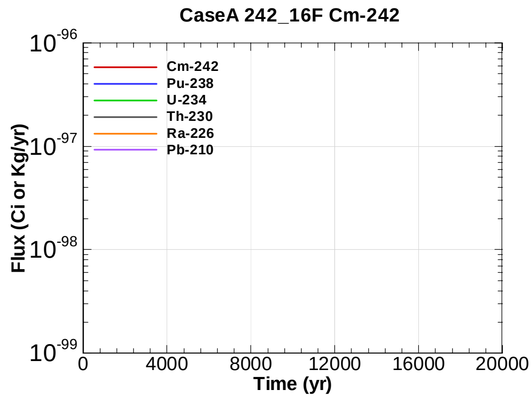

Figure A.2-1952 - Water Table Flux for CaseA 242_16F Cm-242

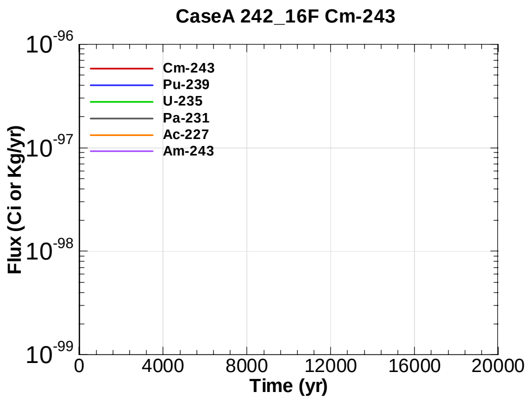

Figure A.2-1953 - Water Table Flux for CaseA 242_16F Cm-243

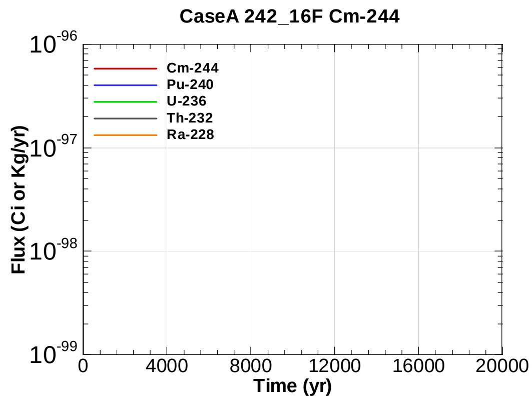

Figure A.2-1954 - Water Table Flux for CaseA 242_16F Cm-244

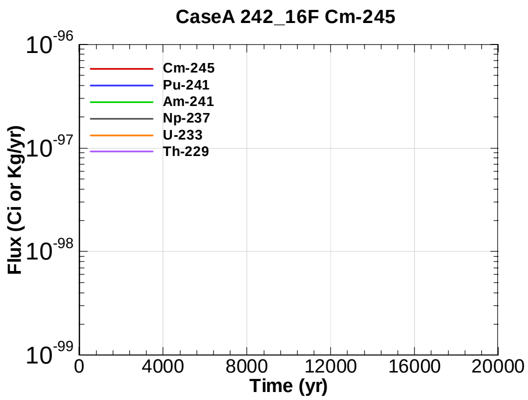

Figure A.2-1955 - Water Table Flux for CaseA 242_16F Cm-245

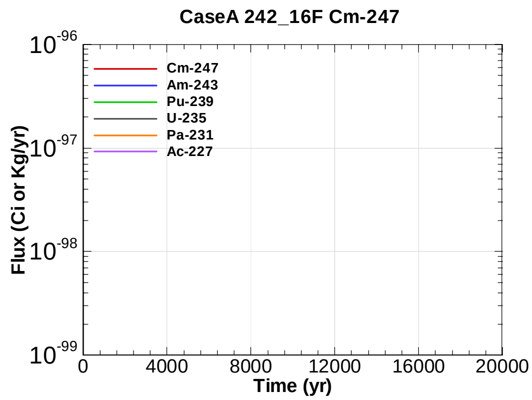

Figure A.2-1956 - Water Table Flux for CaseA 242_16F Cm-247

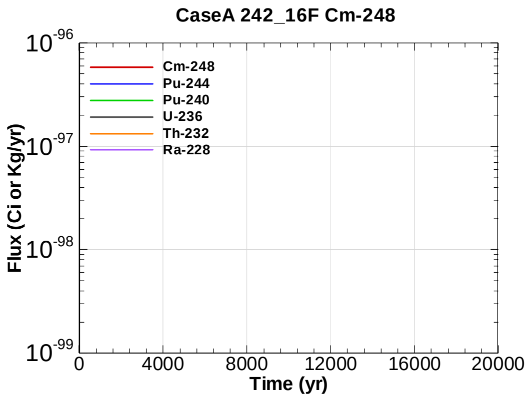

Figure A.2-1957 - Water Table Flux for CaseA 242_16F Cm-248

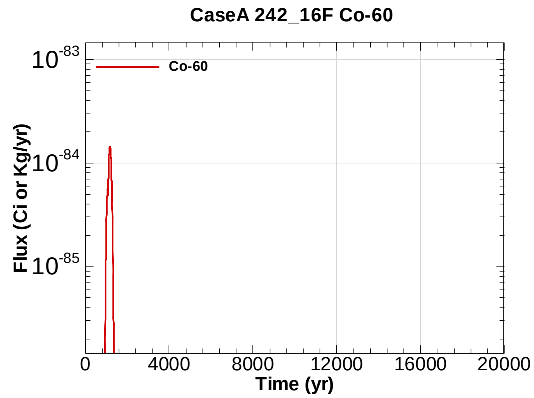

Figure A.2-1958 - Water Table Flux for CaseA 242_16F Co-60

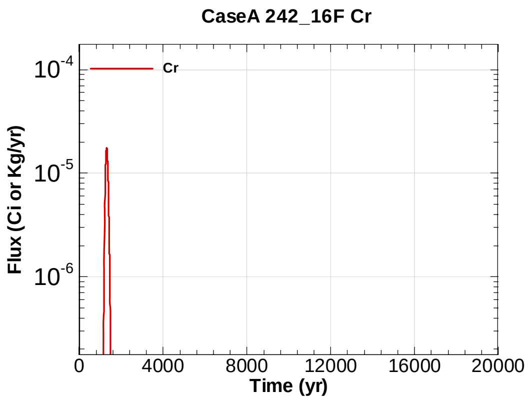

Figure A.2-1959 - Water Table Flux for CaseA 242_16F Cr

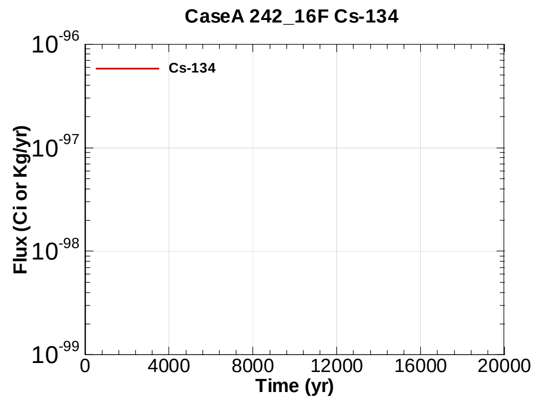

Figure A.2-1960 - Water Table Flux for CaseA 242_16F Cs-134

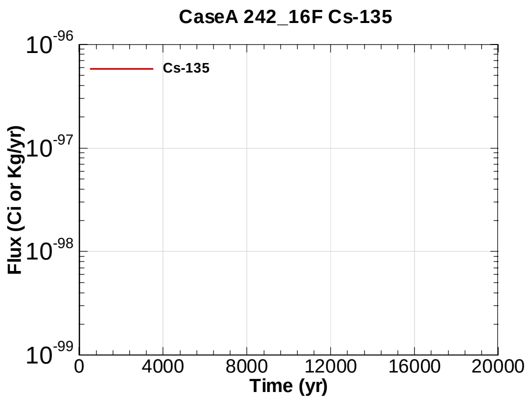

Figure A.2-1961 - Water Table Flux for CaseA 242_16F Cs-135

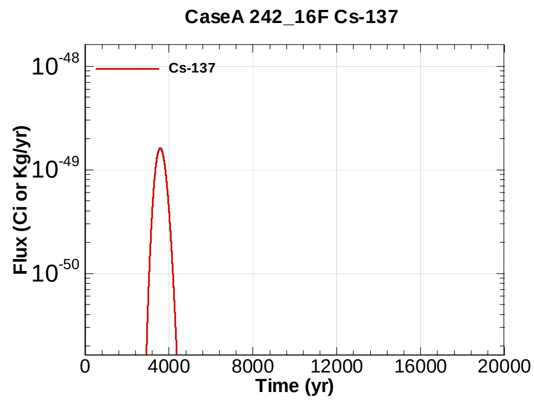

Figure A.2-1962 - Water Table Flux for CaseA 242_16F Cs-137

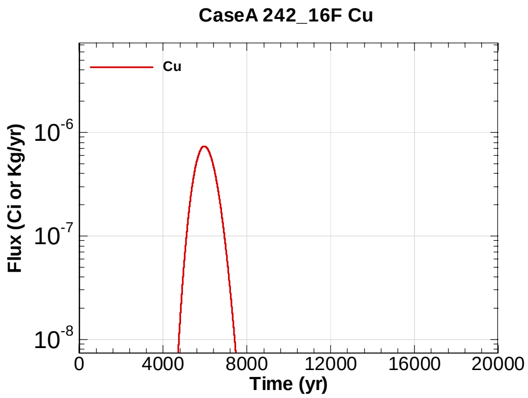

Figure A.2-1963 - Water Table Flux for CaseA 242_16F Cu

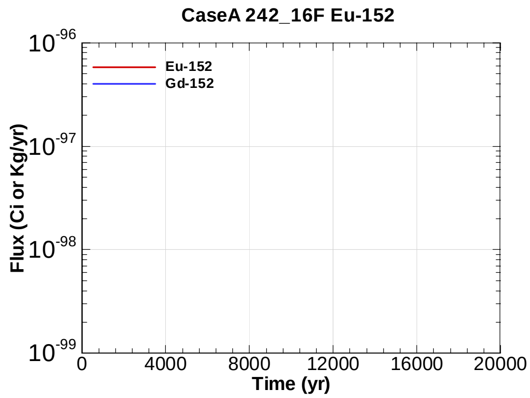

Figure A.2-1964 - Water Table Flux for CaseA 242_16F Eu-152

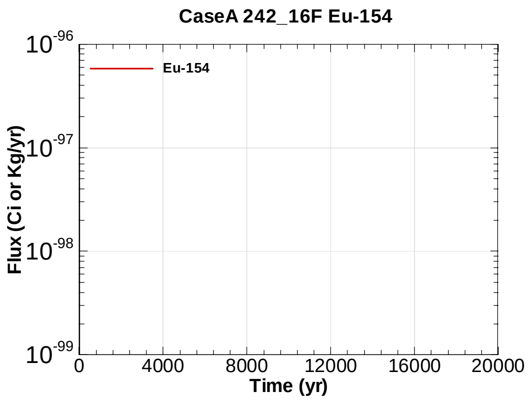

Figure A.2-1965 - Water Table Flux for CaseA 242_16F Eu-154

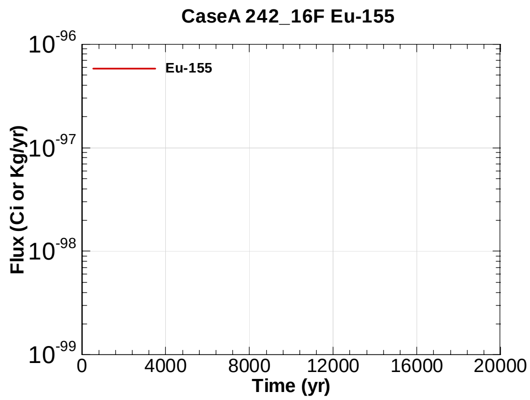

Figure A.2-1966 - Water Table Flux for CaseA 242_16F Eu-155

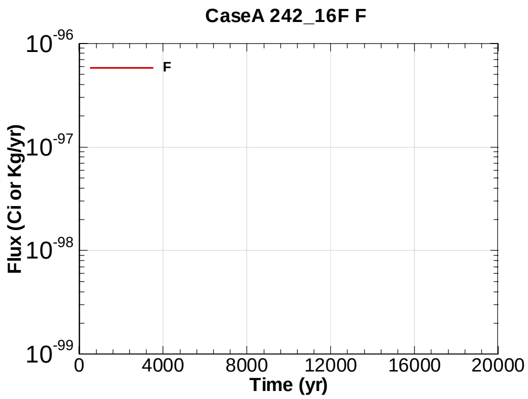

Figure A.2-1967 - Water Table Flux for CaseA 242_16F F

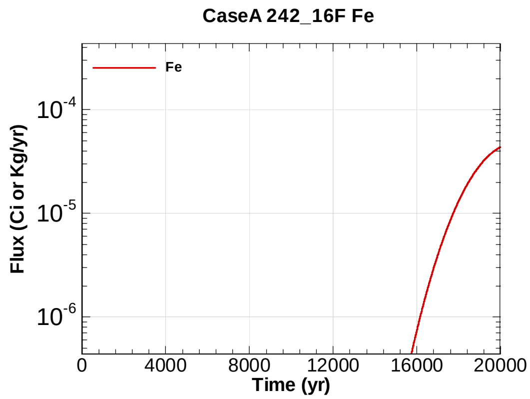

Figure A.2-1968 - Water Table Flux for CaseA 242_16F Fe

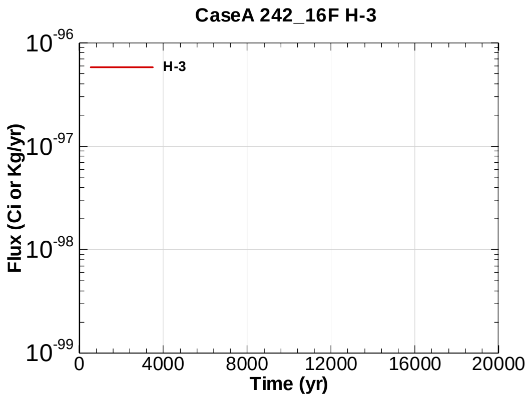

Figure A.2-1969 - Water Table Flux for CaseA 242_16F H-3

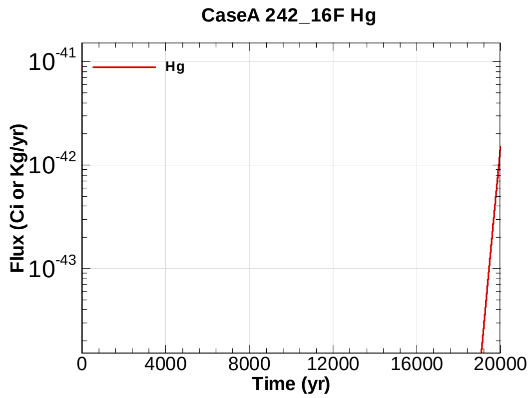

Figure A.2-1970 - Water Table Flux for CaseA 242_16F Hg

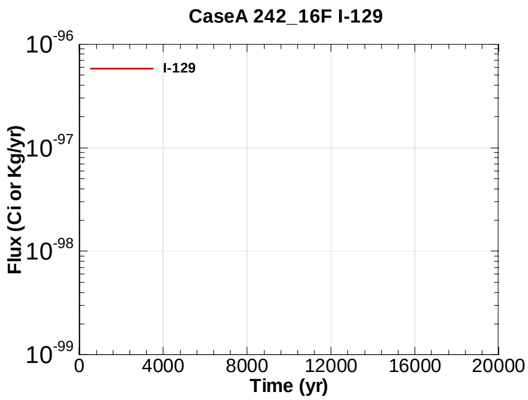

Figure A.2-1971 - Water Table Flux for CaseA 242_16F I-129

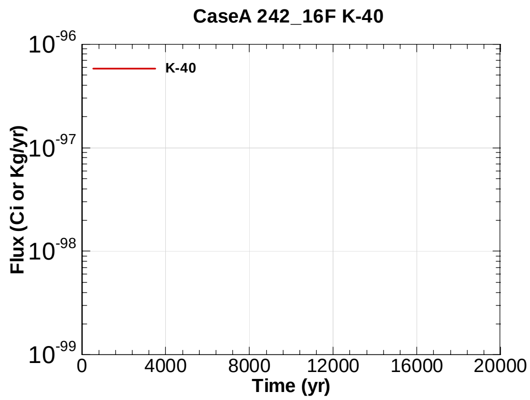

Figure A.2-1972 - Water Table Flux for CaseA 242_16F K-40

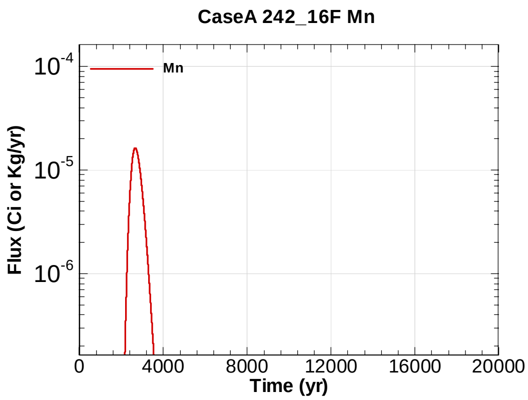

Figure A.2-1973 - Water Table Flux for CaseA 242_16F Mn

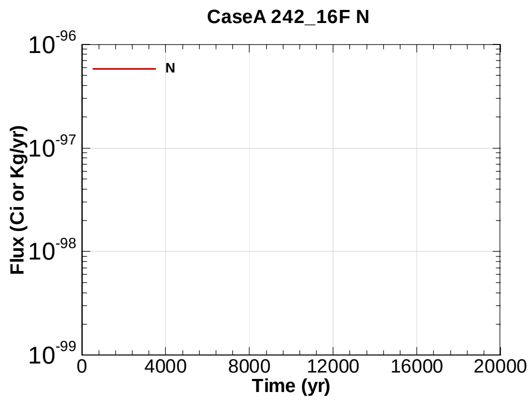

Figure A.2-1974 - Water Table Flux for CaseA 242_16F N

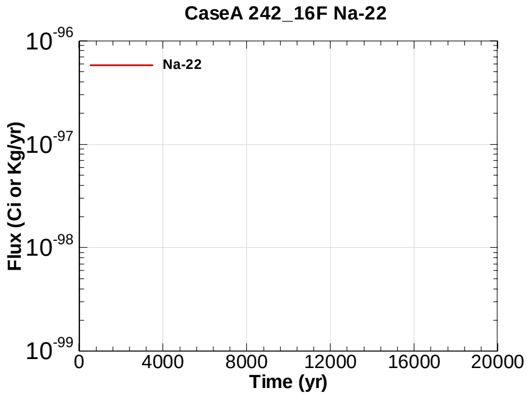

Figure A.2-1975 - Water Table Flux for CaseA 242_16F Na-22

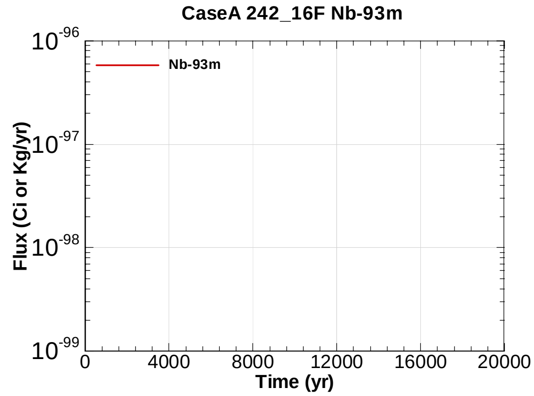

Figure A.2-1976 - Water Table Flux for CaseA 242_16F Nb-93m

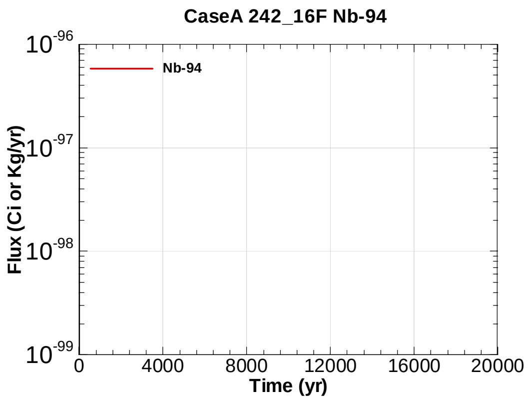

Figure A.2-1977 - Water Table Flux for CaseA 242_16F Nb-94

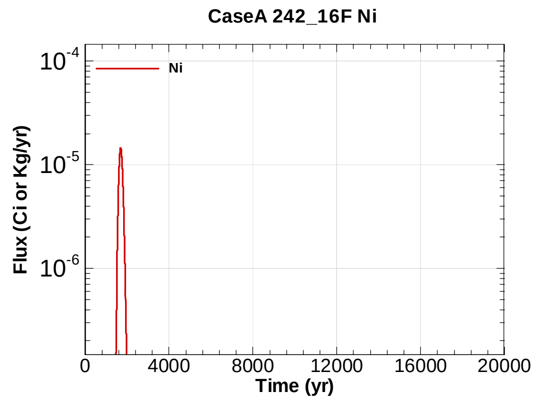

Figure A.2-1978 - Water Table Flux for CaseA 242_16F Ni

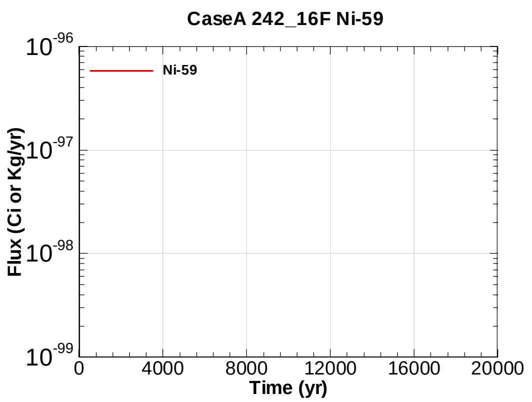

Figure A.2-1979 - Water Table Flux for CaseA 242_16F Ni-59

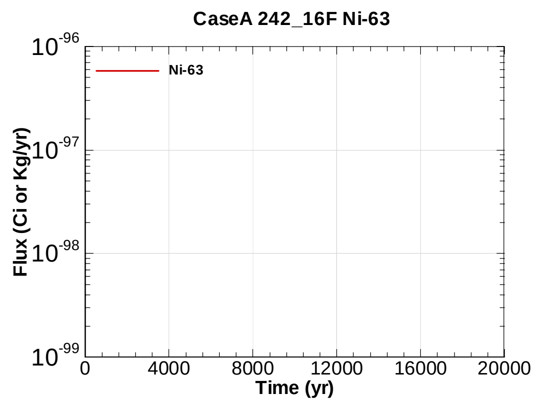

Figure A.2-1980 - Water Table Flux for CaseA 242_16F Ni-63

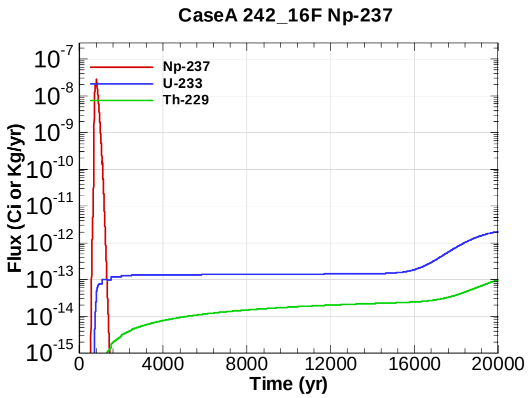

Figure A.2-1981 - Water Table Flux for CaseA 242_16F Np-237

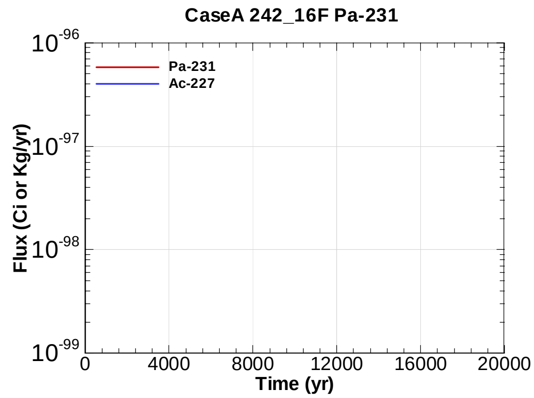

Figure A.2-1982 - Water Table Flux for CaseA 242_16F Pa-231

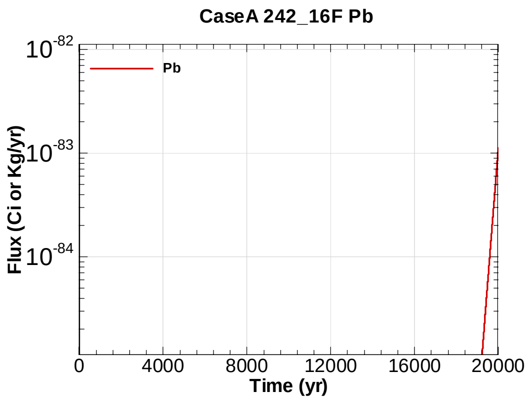

Figure A.2-1983 - Water Table Flux for CaseA 242_16F Pb

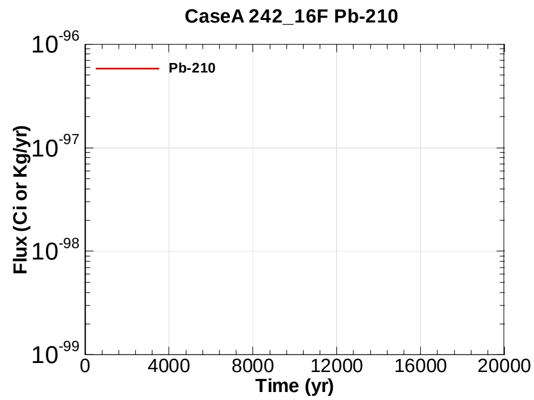

Figure A.2-1984 - Water Table Flux for CaseA 242_16F Pb-210

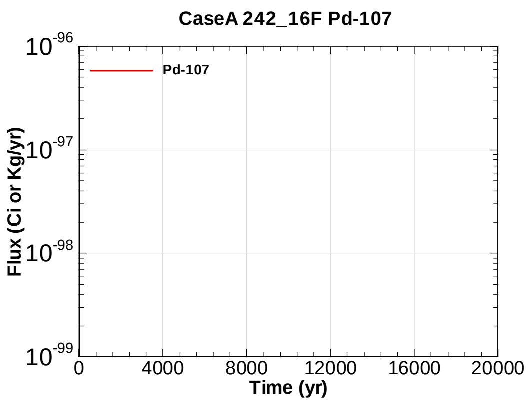

Figure A.2-1985 - Water Table Flux for CaseA 242_16F Pd-107

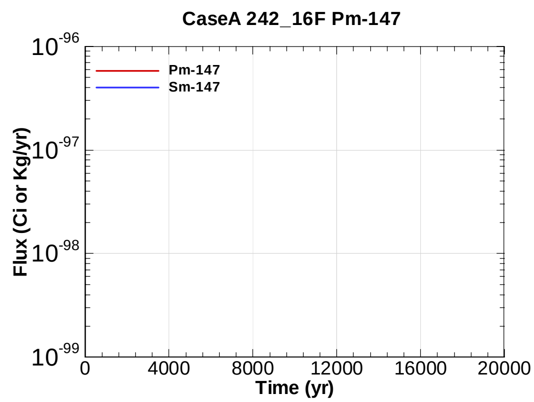

Figure A.2-1986 - Water Table Flux for CaseA 242_16F Pm-147

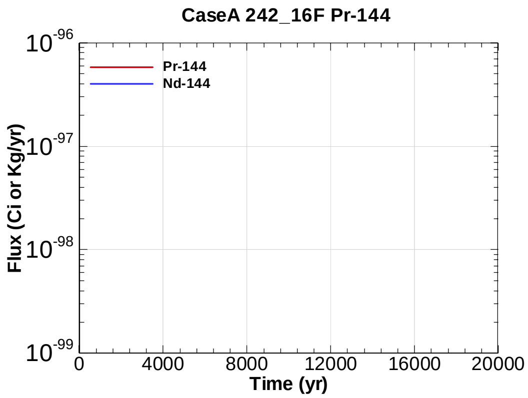

Figure A.2-1987 - Water Table Flux for CaseA 242_16F Pr-144

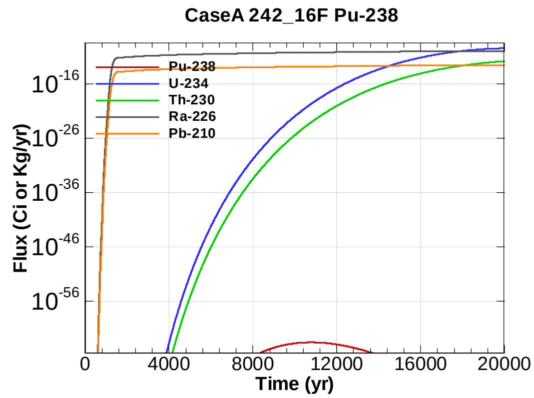

Figure A.2-1988 - Water Table Flux for CaseA 242_16F Pu-238

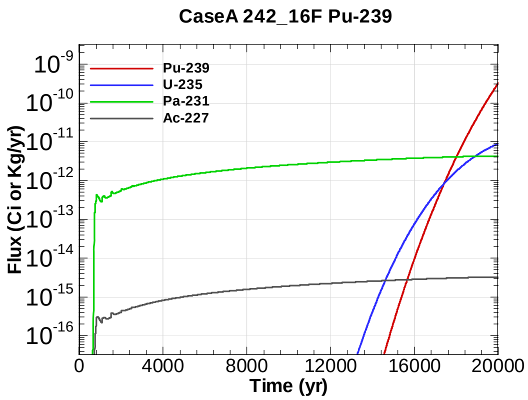

Figure A.2-1989 - Water Table Flux for CaseA 242_16F Pu-239

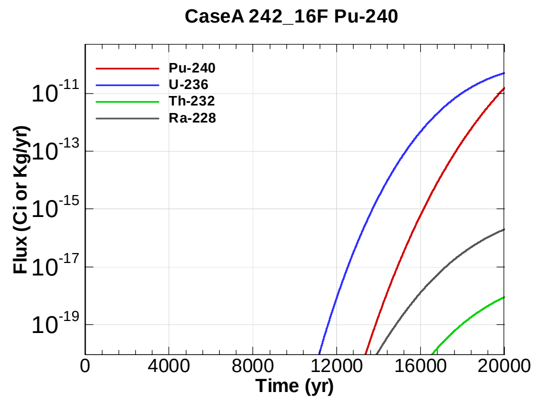

Figure A.2-1990 - Water Table Flux for CaseA 242_16F Pu-240

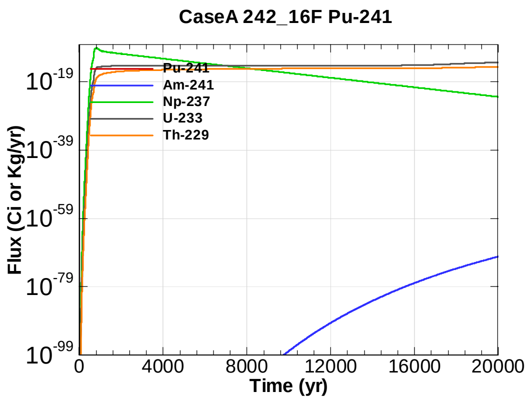

Figure A.2-1991 - Water Table Flux for CaseA 242_16F Pu-241

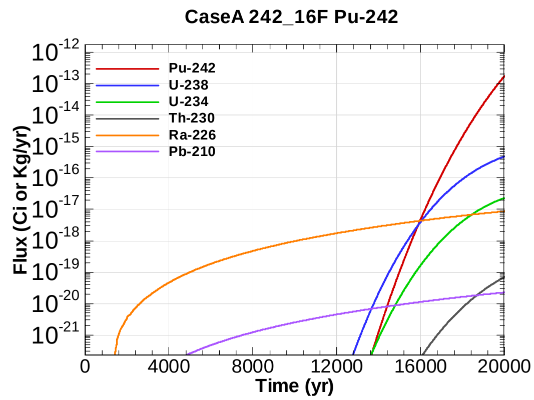

Figure A.2-1992 - Water Table Flux for CaseA 242_16F Pu-242

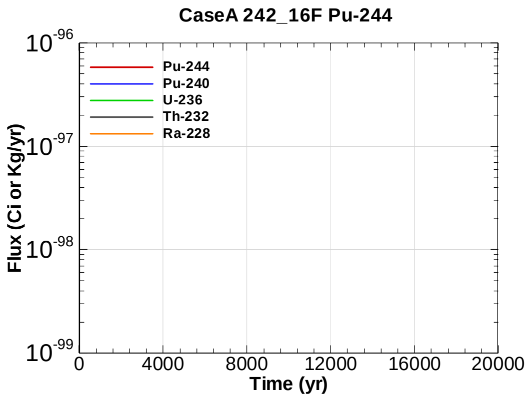

Figure A.2-1993 - Water Table Flux for CaseA 242_16F Pu-244

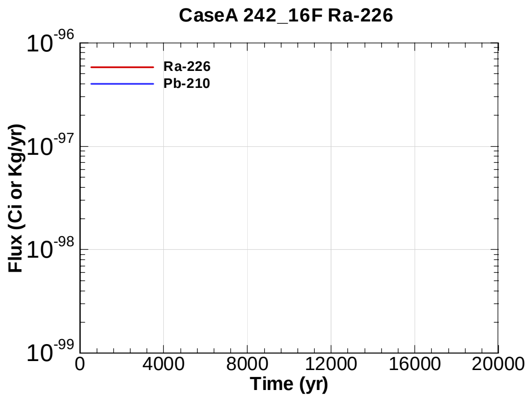

Figure A.2-1994 - Water Table Flux for CaseA 242_16F Ra-226

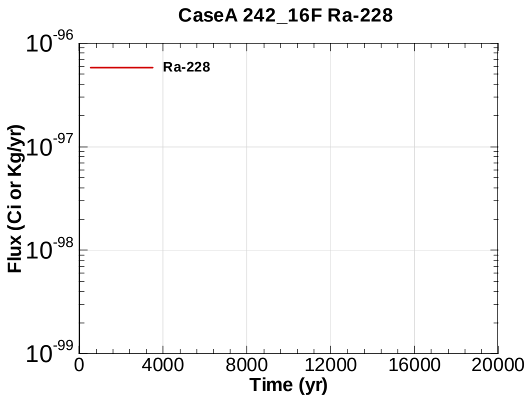

Figure A.2-1995 - Water Table Flux for CaseA 242_16F Ra-228

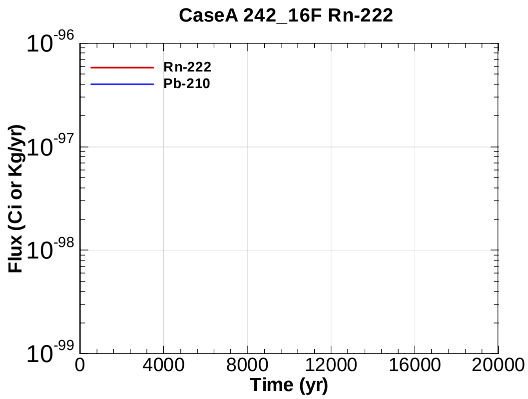

Figure A.2-1996 - Water Table Flux for CaseA 242_16F Rn-222

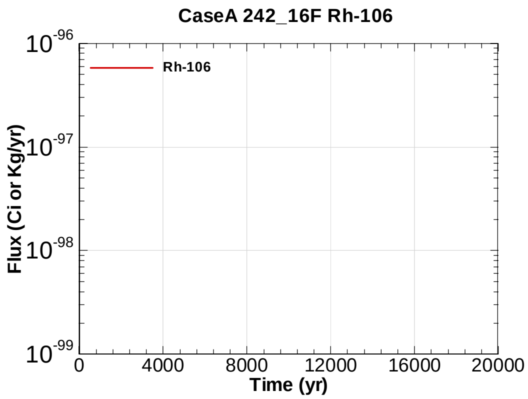

Figure A.2-1997 - Water Table Flux for CaseA 242_16F Rh-106

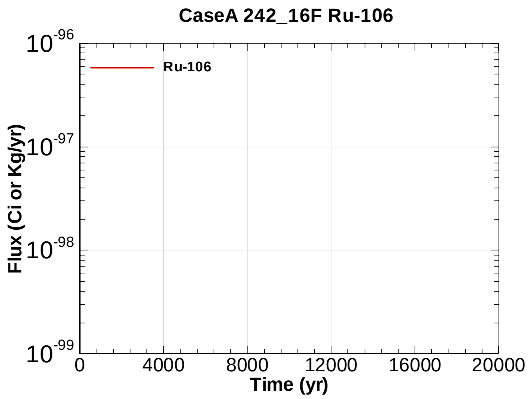

Figure A.2-1998 - Water Table Flux for CaseA 242_16F Ru-106

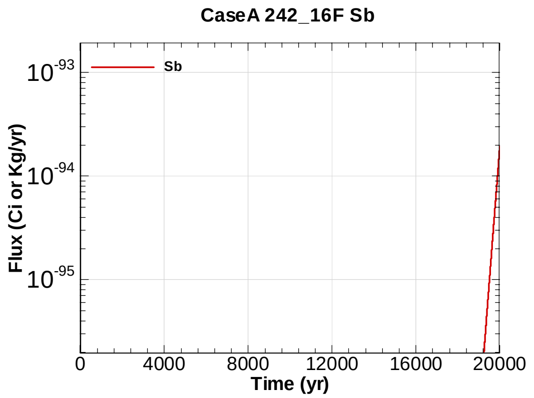

Figure A.2-1999 - Water Table Flux for CaseA 242_16F Sb

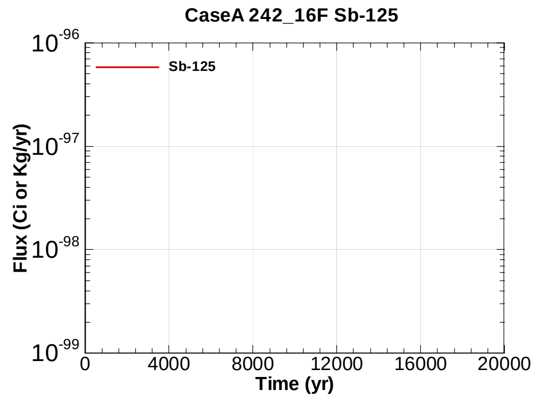

Figure A.2-2000 - Water Table Flux for CaseA 242_16F Sb-125

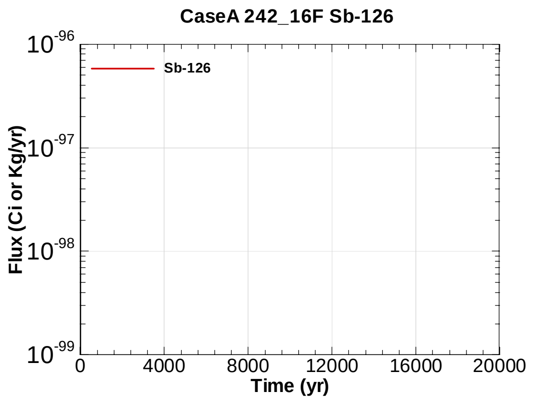

Figure A.2-2001 - Water Table Flux for CaseA 242_16F Sb-126

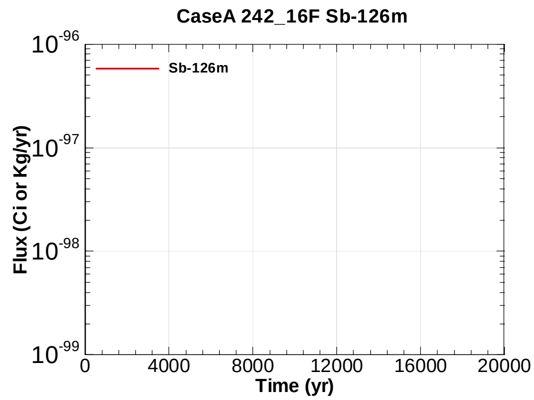

Figure A.2-2002 - Water Table Flux for CaseA 242_16F Sb-126m

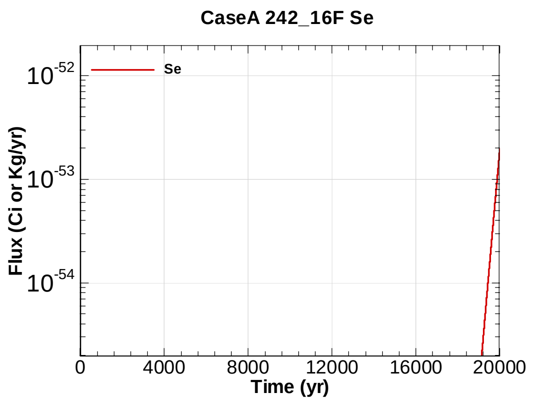

Figure A.2-2003 - Water Table Flux for CaseA 242_16F Se

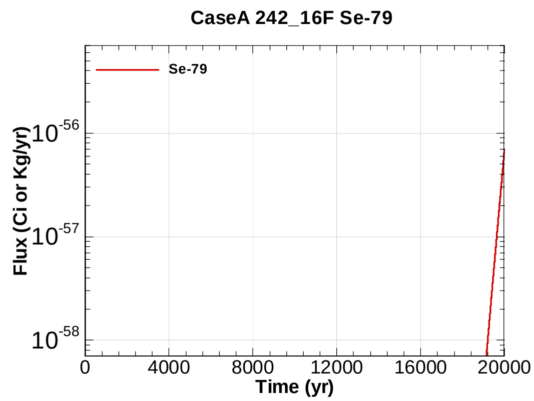

Figure A.2-2004 - Water Table Flux for CaseA 242_16F Se-79

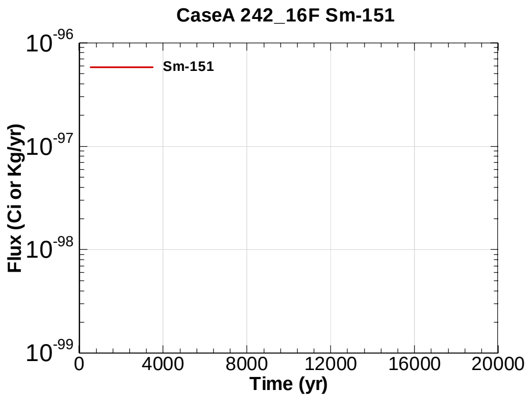

Figure A.2-2005 - Water Table Flux for CaseA 242_16F Sm-151

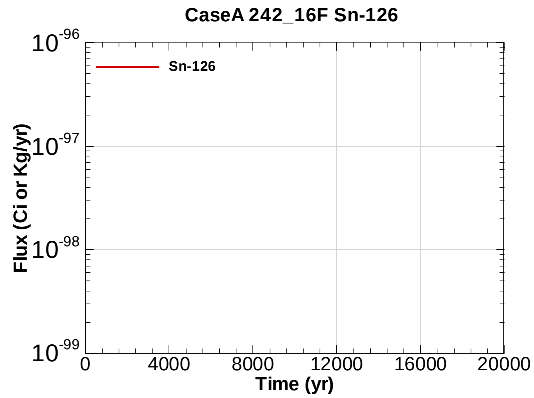

Figure A.2-2006 - Water Table Flux for CaseA 242_16F Sn-126

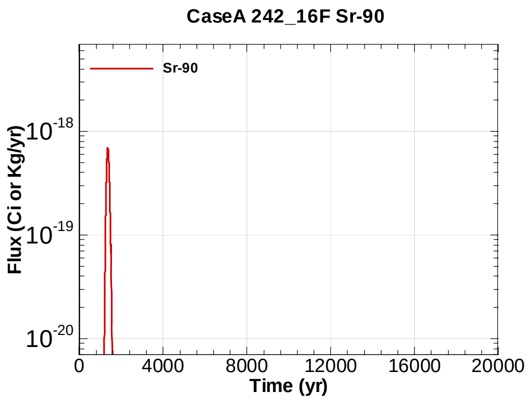

Figure A.2-2007 - Water Table Flux for CaseA 242_16F Sr-90

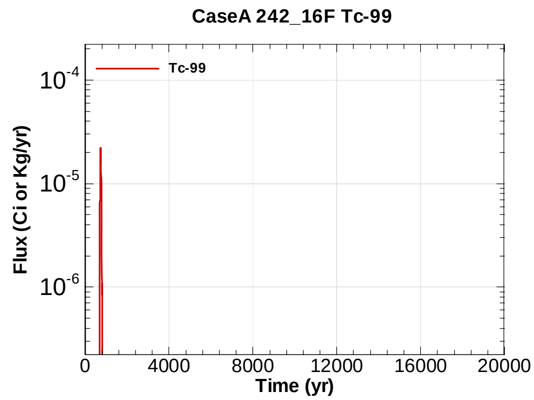

Figure A.2-2008 - Water Table Flux for CaseA 242_16F Tc-99

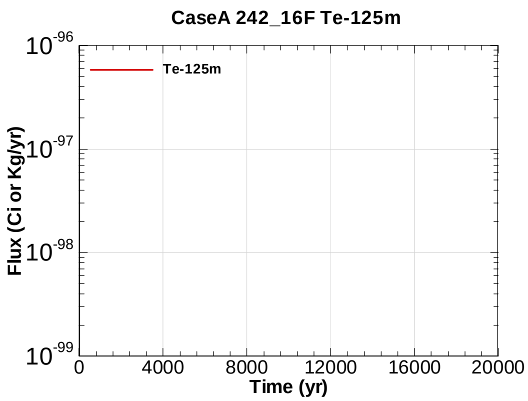

Figure A.2-2009 - Water Table Flux for CaseA 242_16F Te-125m

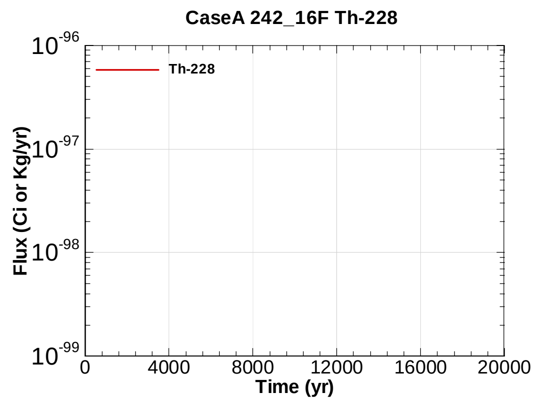

Figure A.2-2010 - Water Table Flux for CaseA 242_16F Th-228

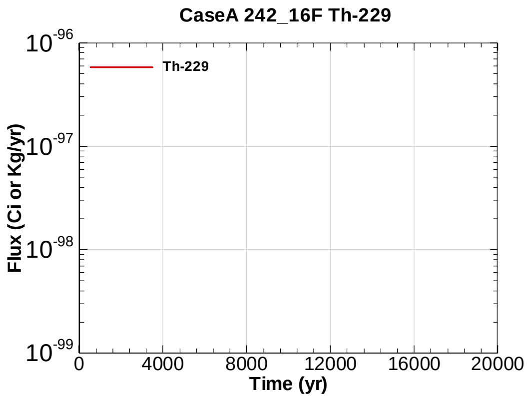

Figure A.2-2011 - Water Table Flux for CaseA 242_16F Th-229

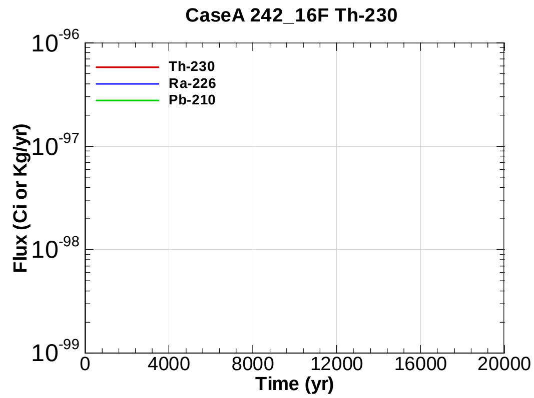

Figure A.2-2012 - Water Table Flux for CaseA 242_16F Th-230

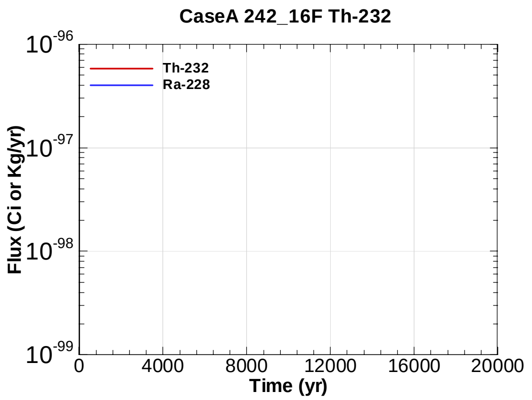

Figure A.2-2013 - Water Table Flux for CaseA 242_16F Th-232

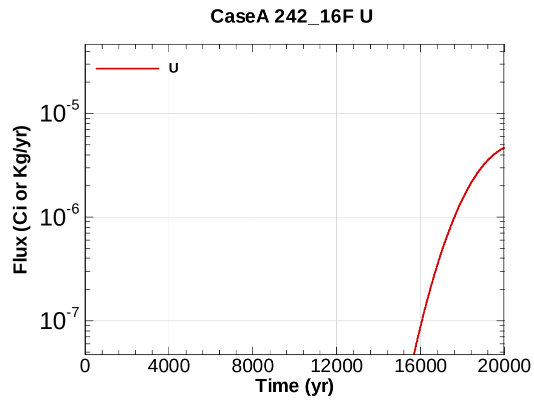

Figure A.2-2014 - Water Table Flux for CaseA 242_16F U

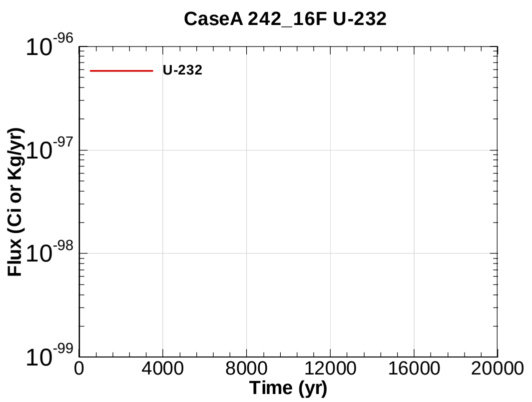

Figure A.2-2015 - Water Table Flux for CaseA 242_16F U-232

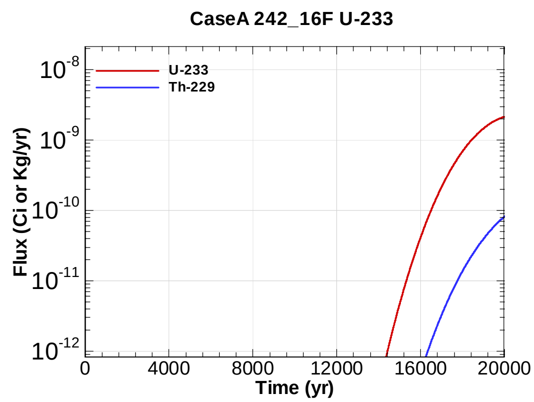

Figure A.2-2016 - Water Table Flux for CaseA 242_16F U-233

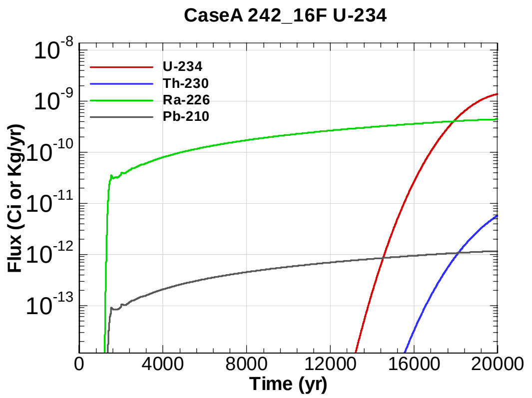

Figure A.2-2017 - Water Table Flux for CaseA 242_16F U-234

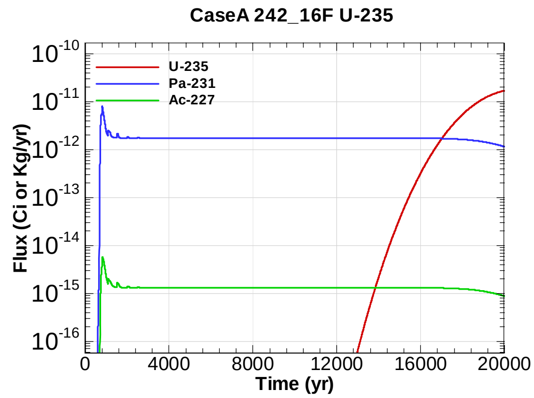

Figure A.2-2018 - Water Table Flux for CaseA 242_16F U-235

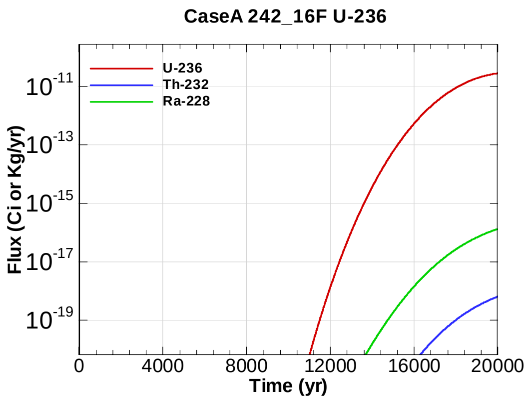

Figure A.2-2019 - Water Table Flux for CaseA 242_16F U-236

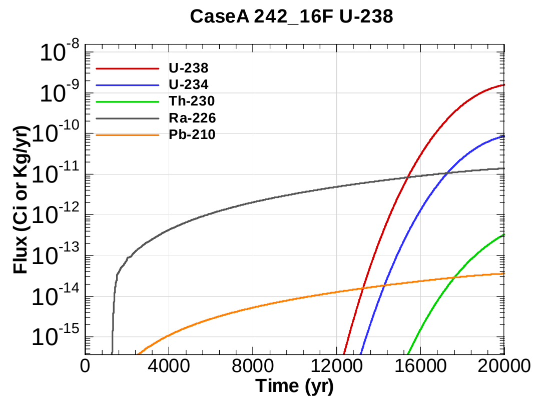

Figure A.2-2020 - Water Table Flux for CaseA 242_16F U-238

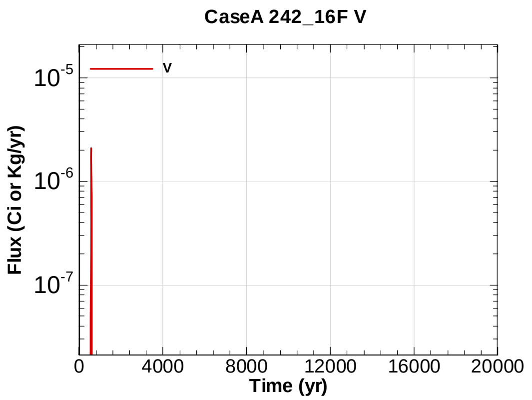

Figure A.2-2021 - Water Table Flux for CaseA 242_16F V

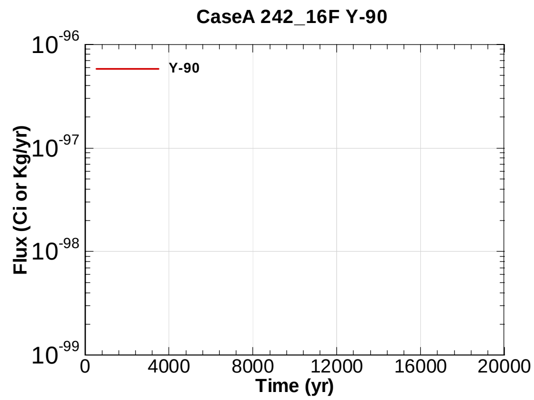

Figure A.2-2022 - Water Table Flux for CaseA 242_16F Y-90

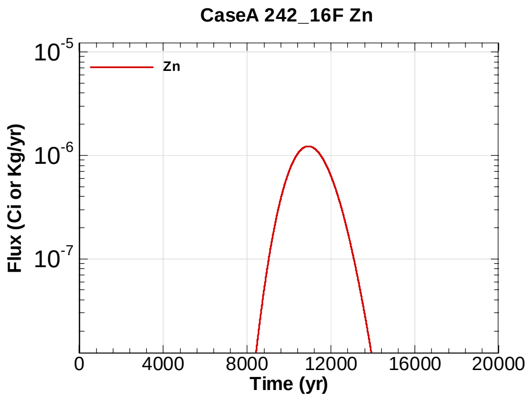

Figure A.2-2023 - Water Table Flux for CaseA 242_16F Zn

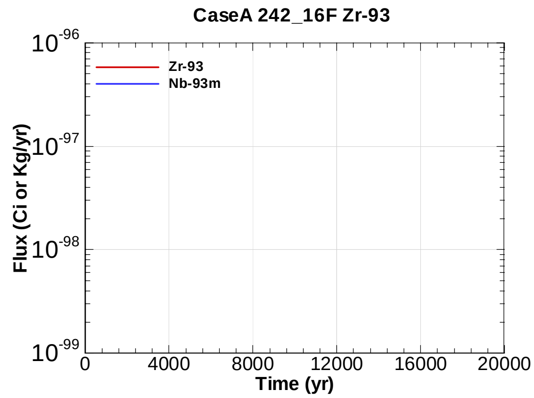

Figure A.2-2024 - Water Table Flux for CaseA 242_16F Zr-93

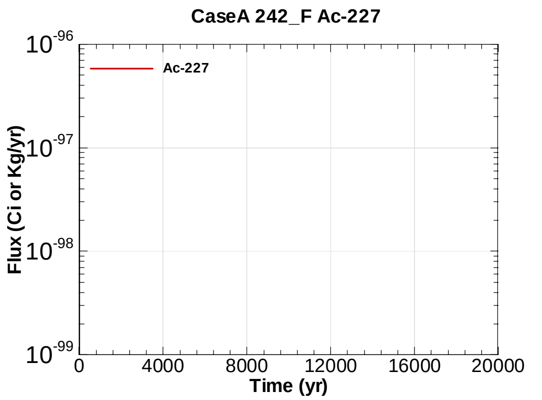

Figure A.2-2025 - Water Table Flux for CaseA 242_F Ac-227

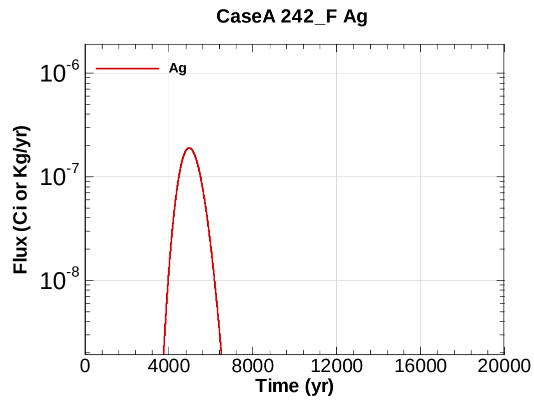

Figure A.2-2026 - Water Table Flux for CaseA 242_F Ag

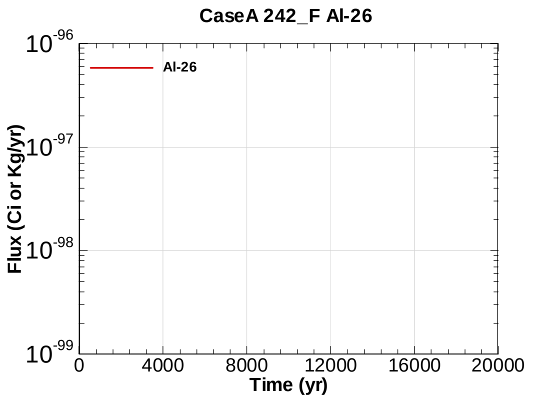

Figure A.2-2027 - Water Table Flux for CaseA 242_F Al-26

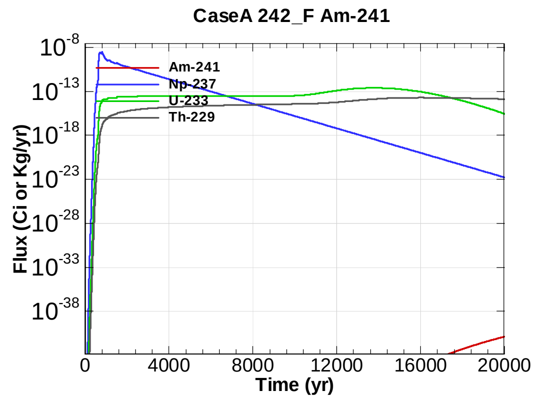

Figure A.2-2028 - Water Table Flux for CaseA 242_F Am-241

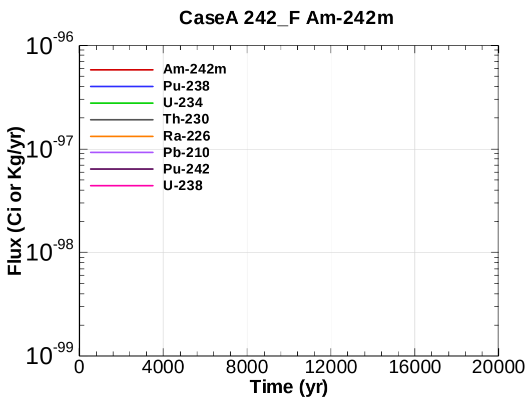

Figure A.2-2029 - Water Table Flux for CaseA 242_F Am-242m

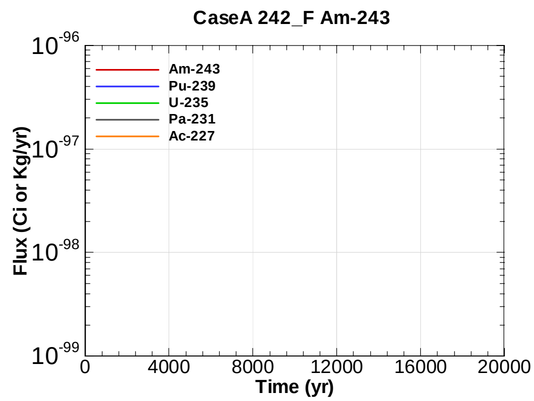

Figure A.2-2030 - Water Table Flux for CaseA 242_F Am-243

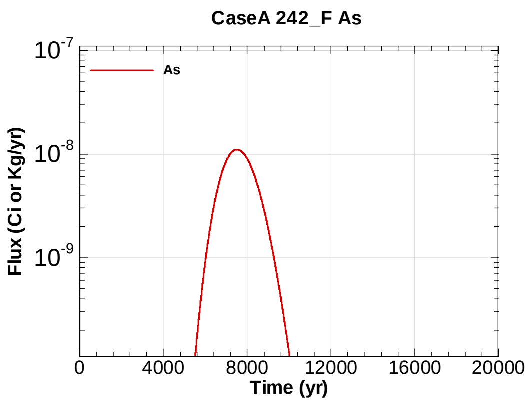

Figure A.2-2031 - Water Table Flux for CaseA 242_F As

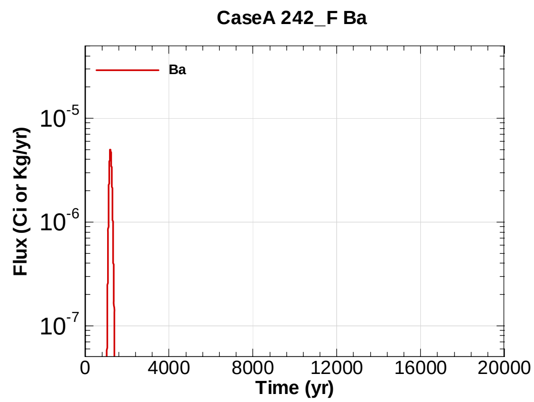

Figure A.2-2032 - Water Table Flux for CaseA 242_F Ba

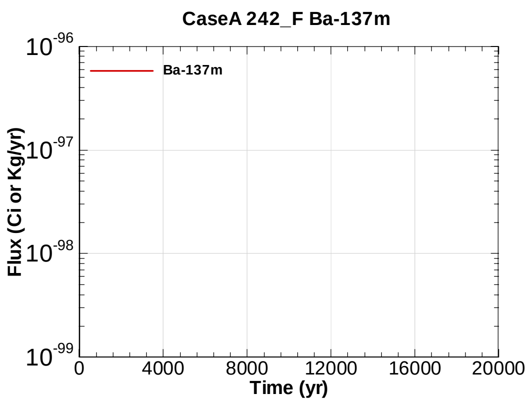

Figure A.2-2033 - Water Table Flux for CaseA 242_F Ba-137m

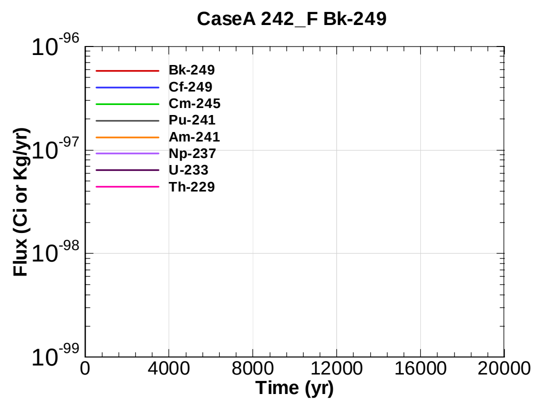

Figure A.2-2034 - Water Table Flux for CaseA 242_F Bk-249

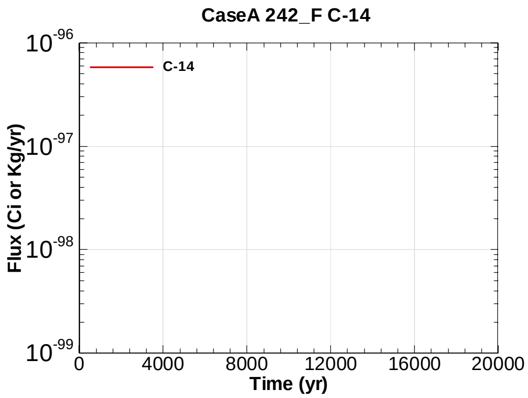

Figure A.2-2035 - Water Table Flux for CaseA 242_F C-14

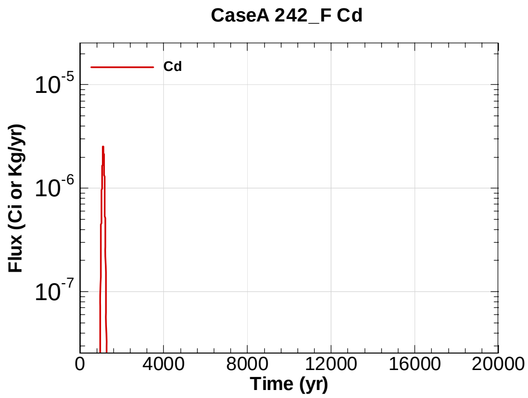

Figure A.2-2036 - Water Table Flux for CaseA 242_F Cd

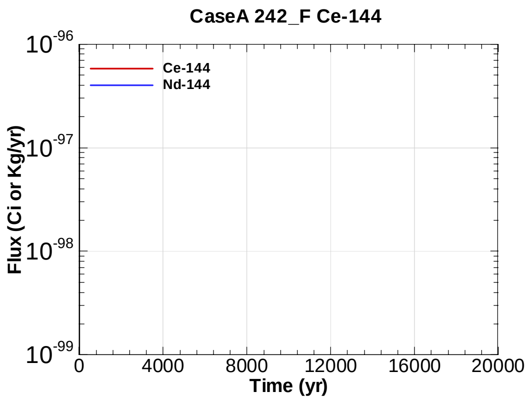

Figure A.2-2037 - Water Table Flux for CaseA 242_F Ce-144

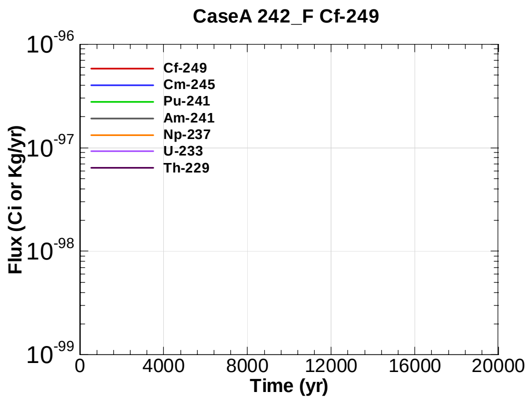

Figure A.2-2038 - Water Table Flux for CaseA 242_F Cf-249

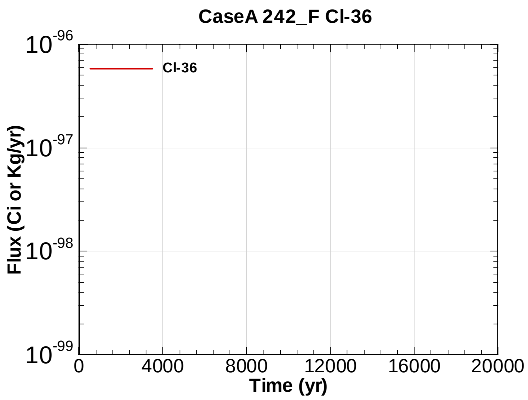

Figure A.2-2039 - Water Table Flux for CaseA 242_F Cl-36

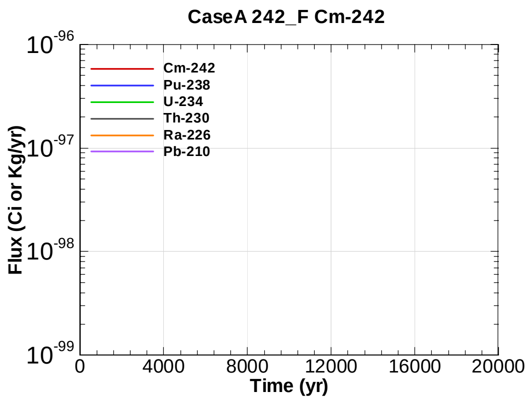

Figure A.2-2040 - Water Table Flux for CaseA 242_F Cm-242

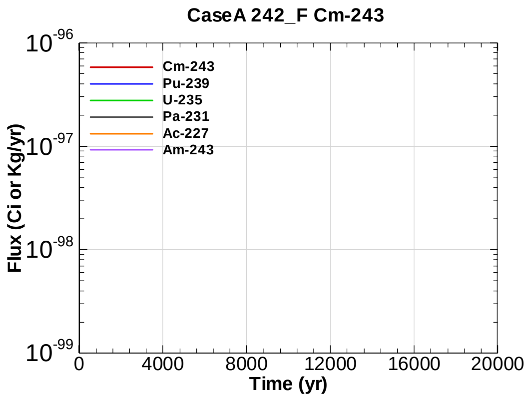

Figure A.2-2041 - Water Table Flux for CaseA 242_F Cm-243

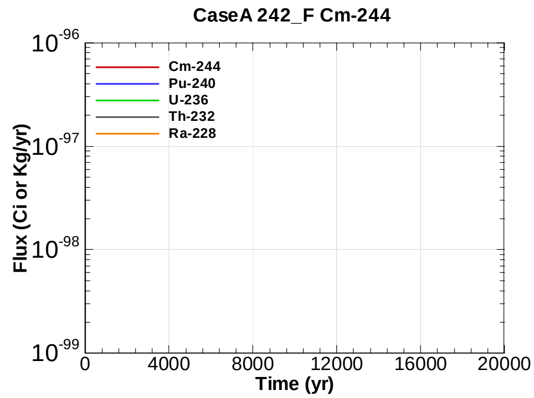

Figure A.2-2042 - Water Table Flux for CaseA 242_F Cm-244

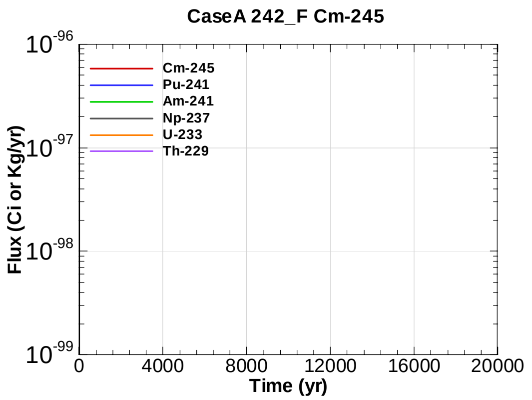

Figure A.2-2043 - Water Table Flux for CaseA 242_F Cm-245

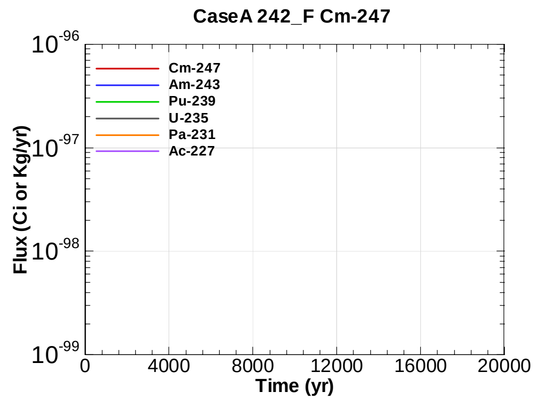

Figure A.2-2044 - Water Table Flux for CaseA 242_F Cm-247

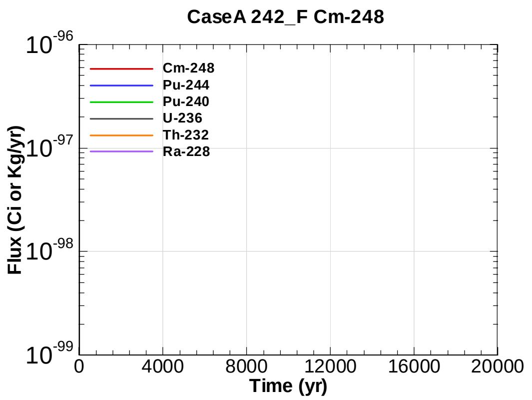

Figure A.2-2045 - Water Table Flux for CaseA 242_F Cm-248

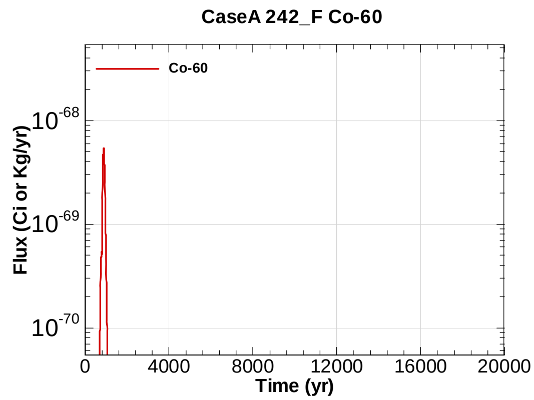

Figure A.2-2046 - Water Table Flux for CaseA 242_F Co-60

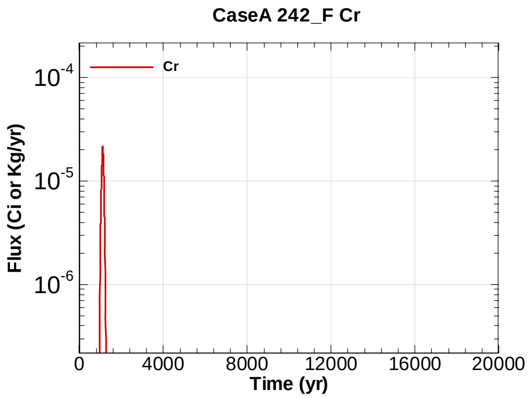

Figure A.2-2047 - Water Table Flux for CaseA 242_F Cr

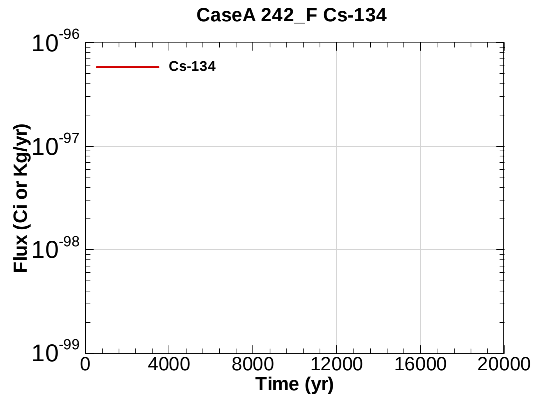

Figure A.2-2048 - Water Table Flux for CaseA 242_F Cs-134

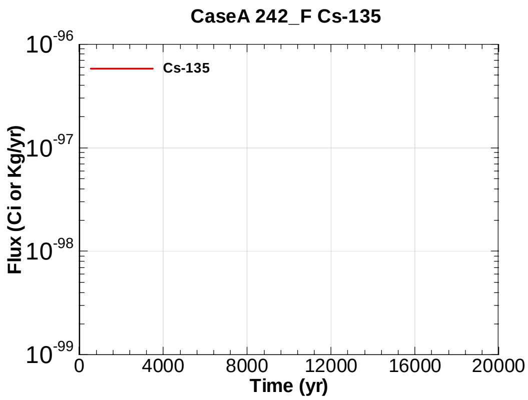

Figure A.2-2049 - Water Table Flux for CaseA 242_F Cs-135

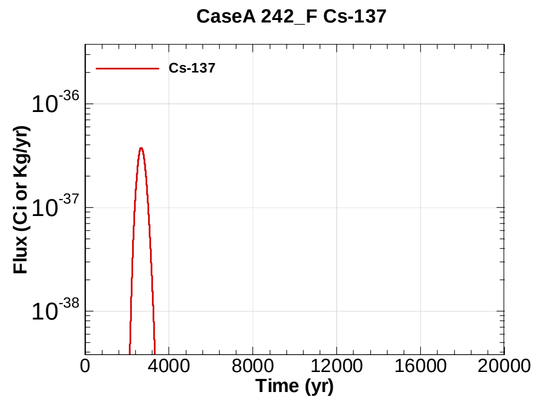

Figure A.2-2050 - Water Table Flux for CaseA 242_F Cs-137

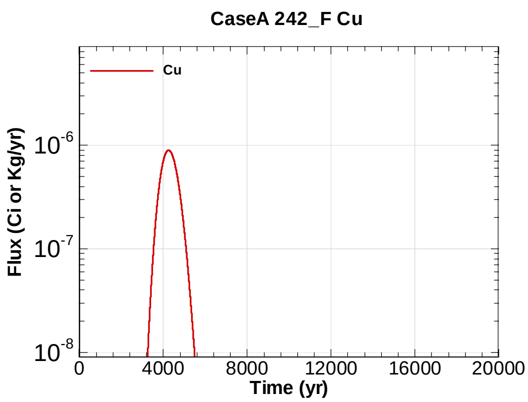

Figure A.2-2051 - Water Table Flux for CaseA 242_F Cu

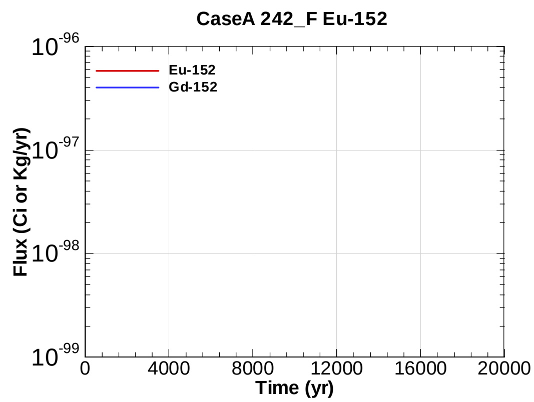

Figure A.2-2052 - Water Table Flux for CaseA 242_F Eu-152

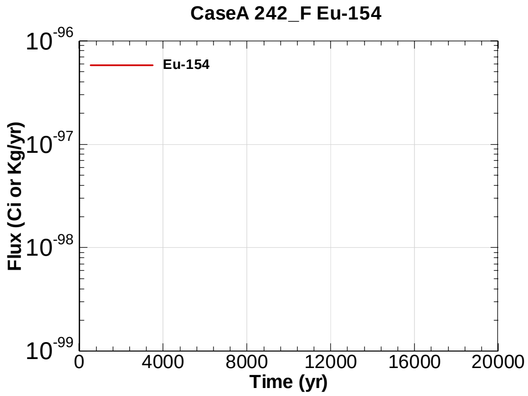

Figure A.2-2053 - Water Table Flux for CaseA 242_F Eu-154

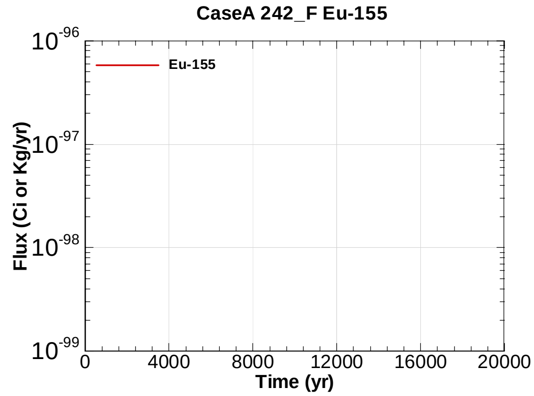

Figure A.2-2054 - Water Table Flux for CaseA 242_F Eu-155

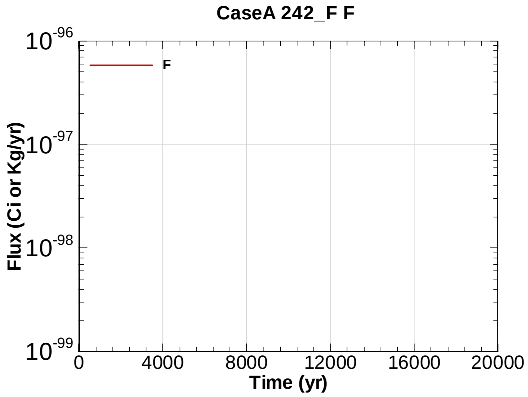

Figure A.2-2055 - Water Table Flux for CaseA 242_F F

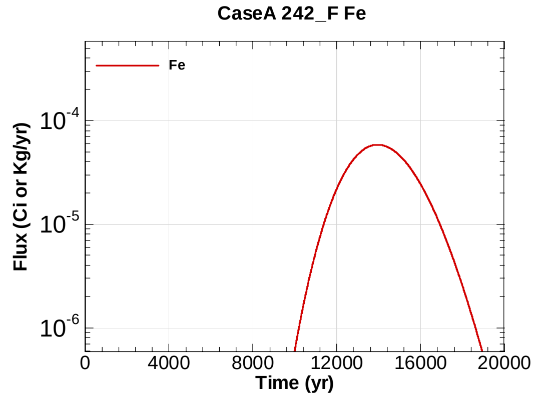

Figure A.2-2056 - Water Table Flux for CaseA 242_F Fe

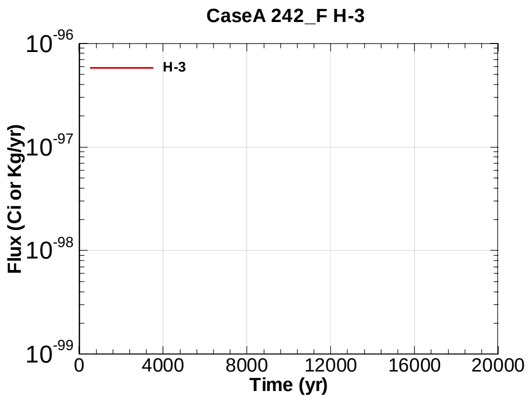

Figure A.2-2057 - Water Table Flux for CaseA 242_F H-3

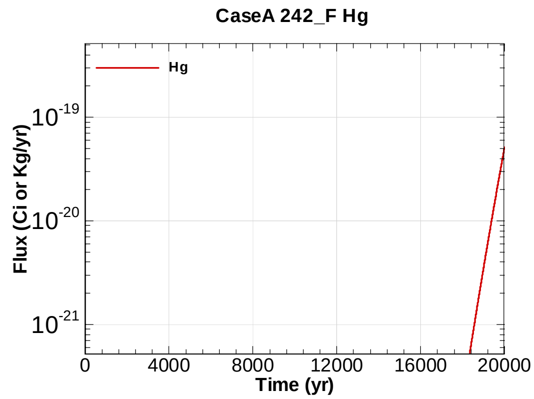

Figure A.2-2058 - Water Table Flux for CaseA 242_F Hg

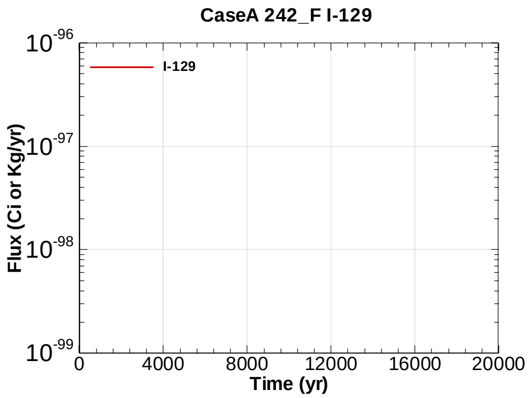

Figure A.2-2059 - Water Table Flux for CaseA 242_F I-129

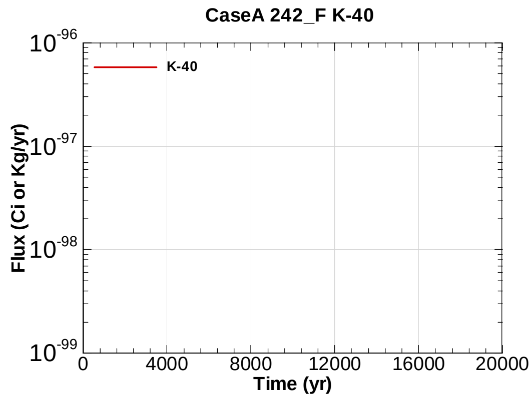

Figure A.2-2060 - Water Table Flux for CaseA 242_F K-40

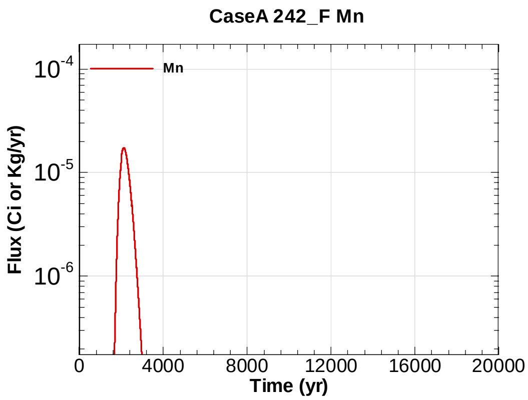

Figure A.2-2061 - Water Table Flux for CaseA 242_F Mn

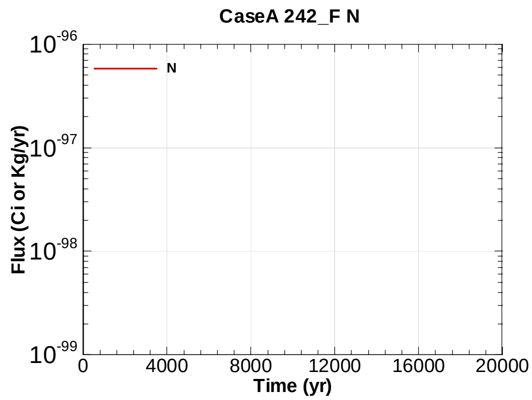

Figure A.2-2062 - Water Table Flux for CaseA 242_F N

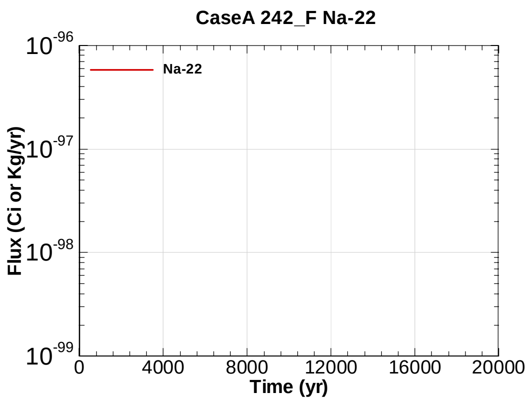

Figure A.2-2063 - Water Table Flux for CaseA 242_F Na-22

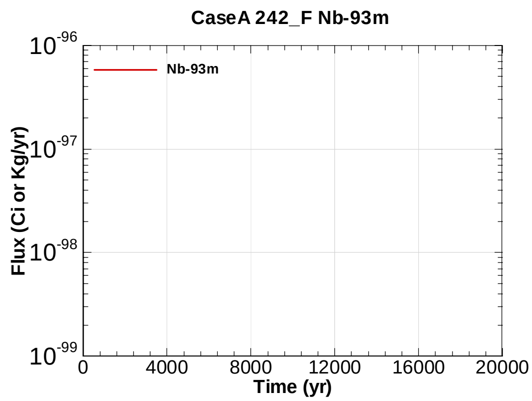

Figure A.2-2064 - Water Table Flux for CaseA 242_F Nb-93m

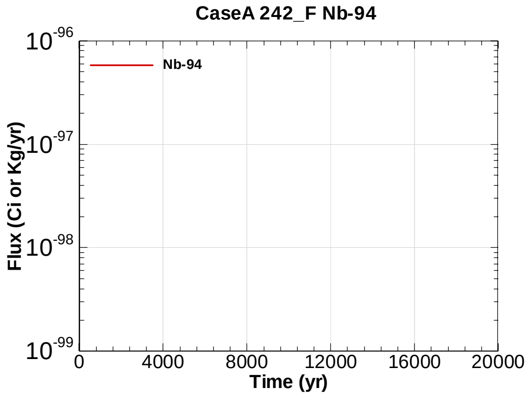

Figure A.2-2065 - Water Table Flux for CaseA 242_F Nb-94

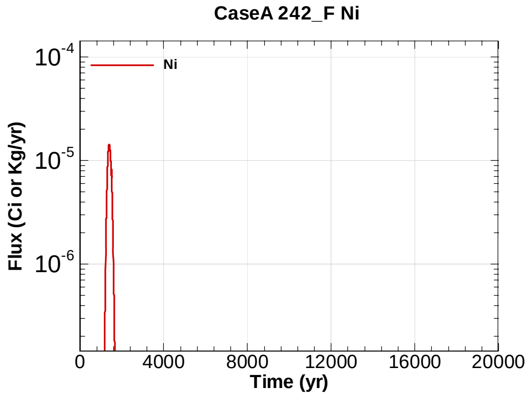

Figure A.2-2066 - Water Table Flux for CaseA 242_F Ni

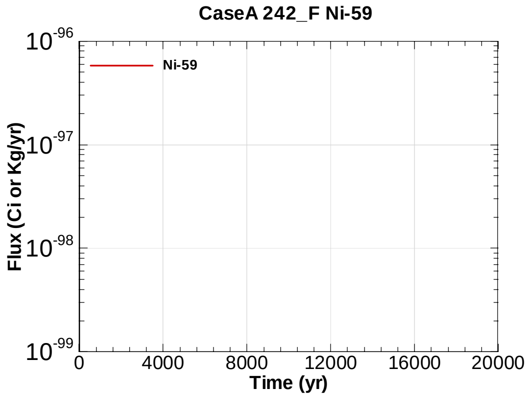

Figure A.2-2067 - Water Table Flux for CaseA 242_F Ni-59

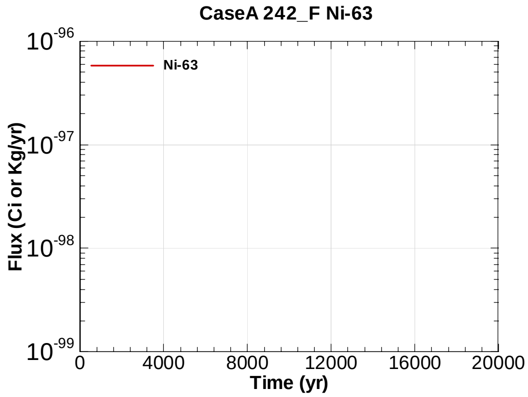

Figure A.2-2068 - Water Table Flux for CaseA 242_F Ni-63

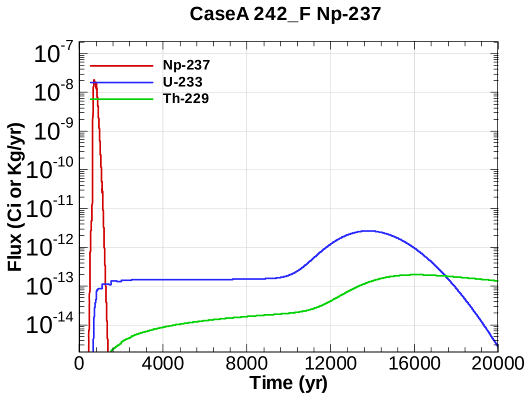

Figure A.2-2069 - Water Table Flux for CaseA 242_F Np-237

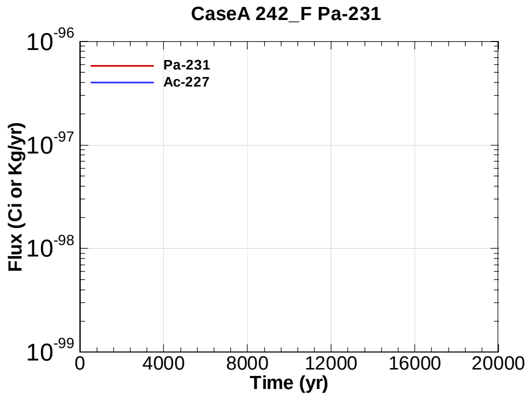

Figure A.2-2070 - Water Table Flux for CaseA 242_F Pa-231

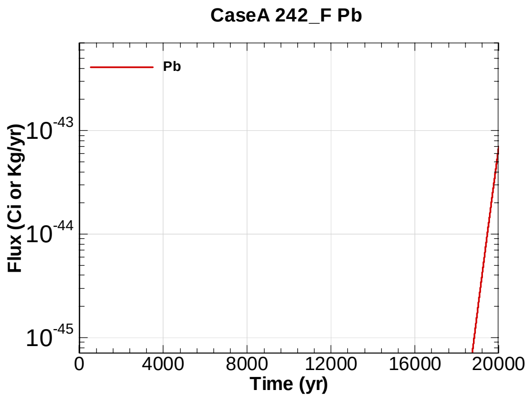

Figure A.2-2071 - Water Table Flux for CaseA 242_F Pb

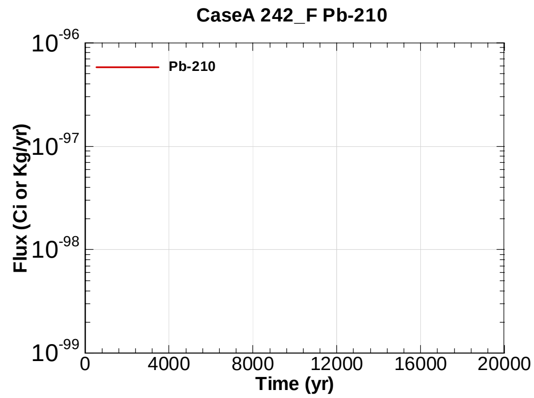

Figure A.2-2072 - Water Table Flux for CaseA 242_F Pb-210

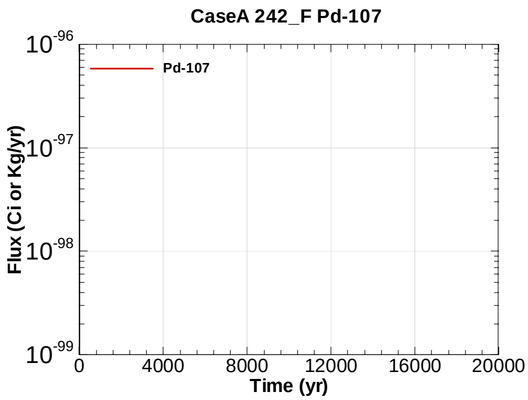

Figure A.2-2073 - Water Table Flux for CaseA 242_F Pd-107

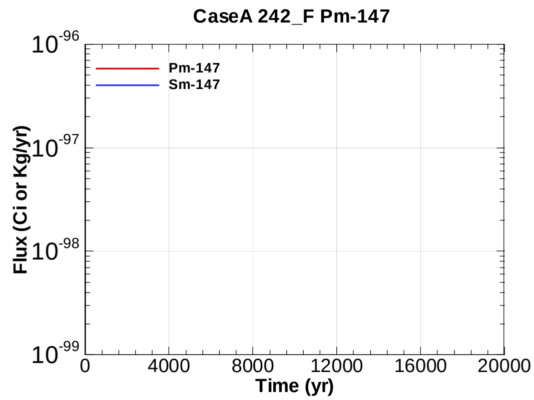

Figure A.2-2074 - Water Table Flux for CaseA 242_F Pm-147

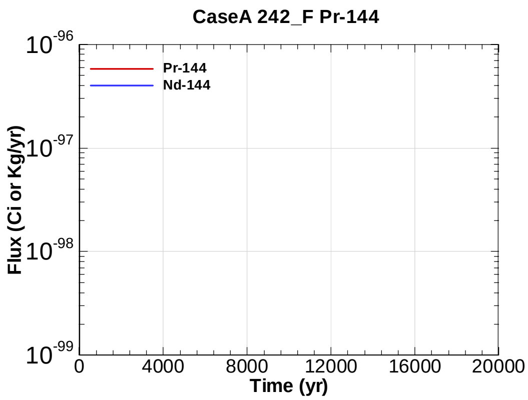

Figure A.2-2075 - Water Table Flux for CaseA 242_F Pr-144

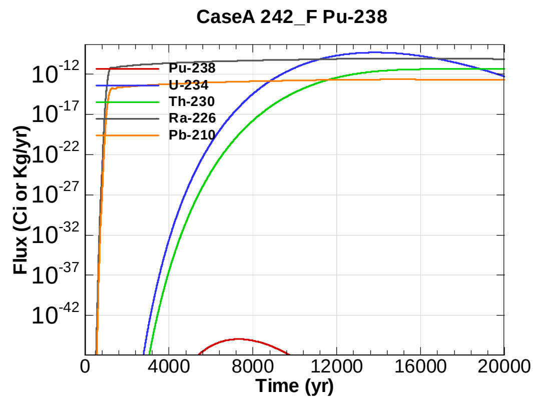

Figure A.2-2076 - Water Table Flux for CaseA 242_F Pu-238

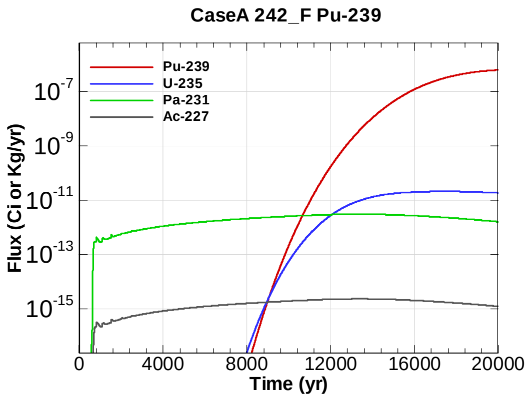

Figure A.2-2077 - Water Table Flux for CaseA 242_F Pu-239

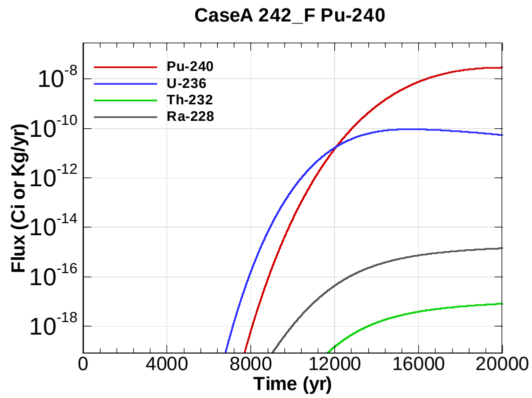

Figure A.2-2078 - Water Table Flux for CaseA 242_F Pu-240

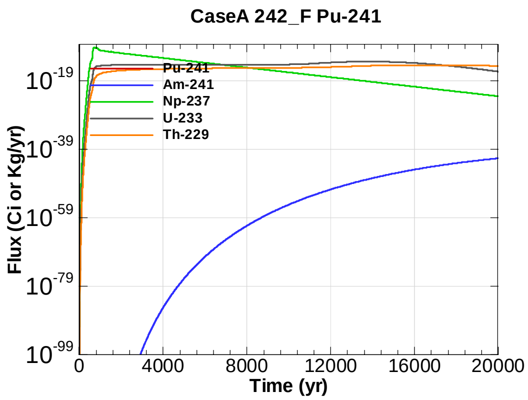

Figure A.2-2079 - Water Table Flux for CaseA 242_F Pu-241

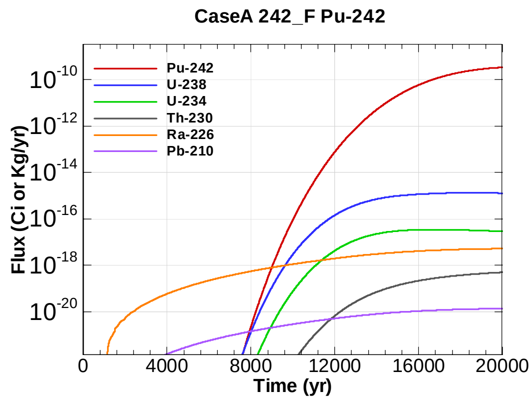

Figure A.2-2080 - Water Table Flux for CaseA 242_F Pu-242

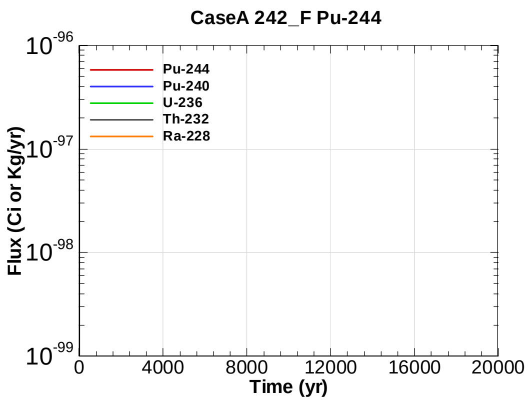

Figure A.2-2081 - Water Table Flux for CaseA 242_F Pu-244

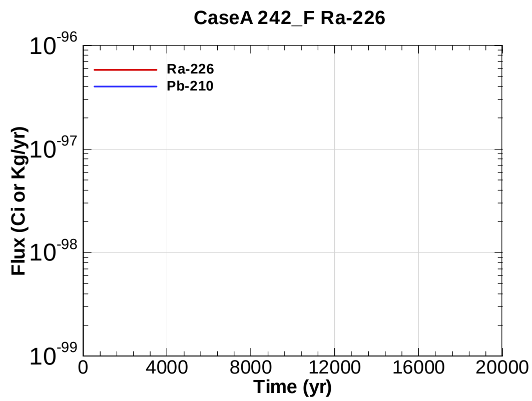

Figure A.2-2082 - Water Table Flux for CaseA 242_F Ra-226

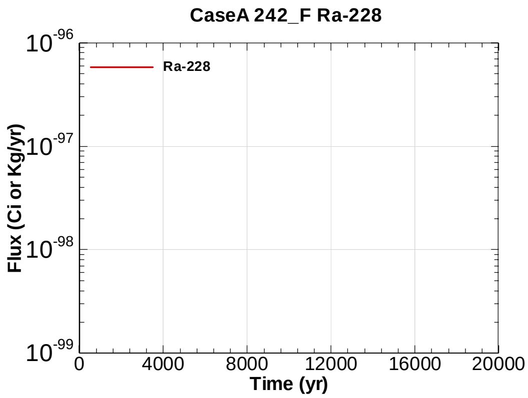

Figure A.2-2083 - Water Table Flux for CaseA 242_F Ra-228

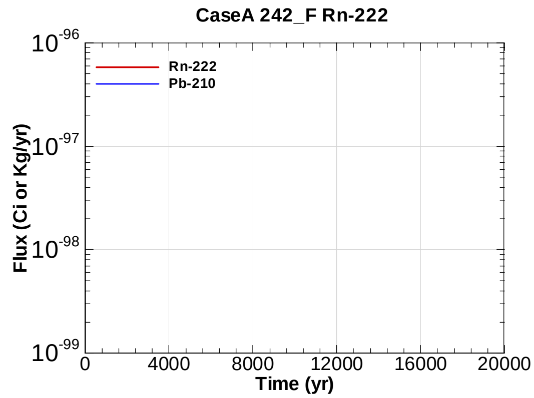

Figure A.2-2084 - Water Table Flux for CaseA 242_F Rn-222

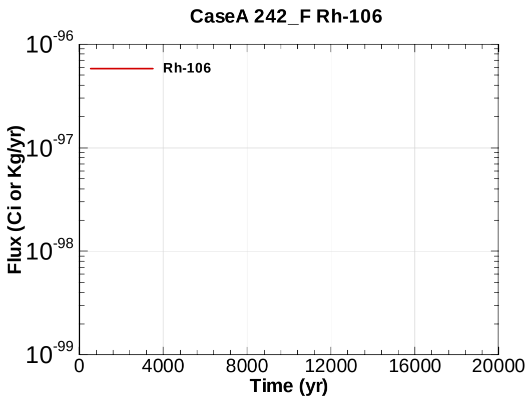

Figure A.2-2085 - Water Table Flux for CaseA 242_F Rh-106

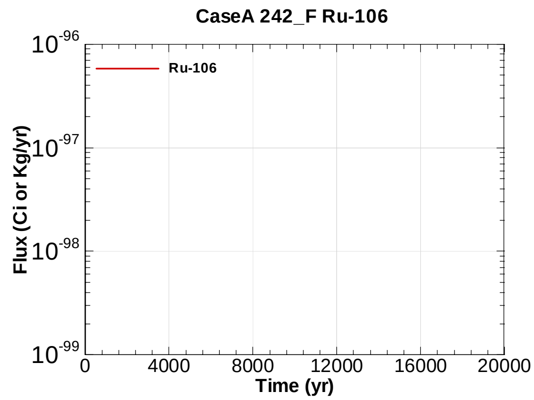

Figure A.2-2086 - Water Table Flux for CaseA 242_F Ru-106

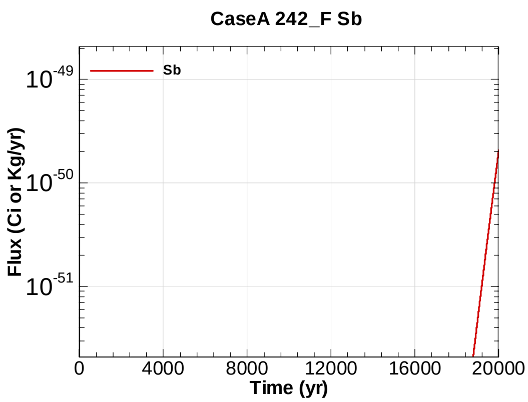

Figure A.2-2087 - Water Table Flux for CaseA 242_F Sb

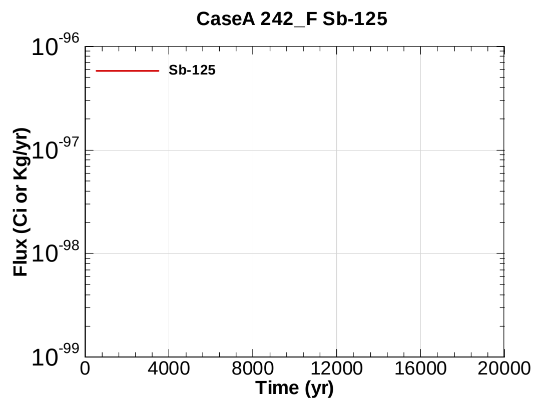

Figure A.2-2088 - Water Table Flux for CaseA 242_F Sb-125

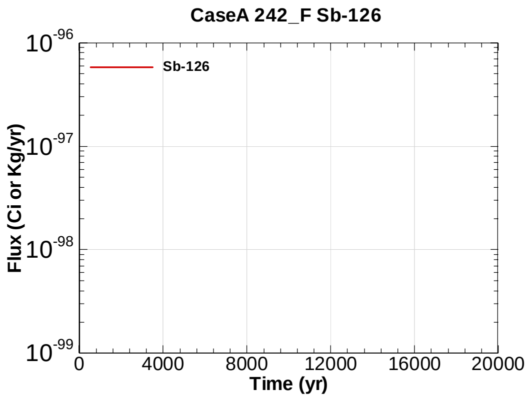

Figure A.2-2089 - Water Table Flux for CaseA 242_F Sb-126

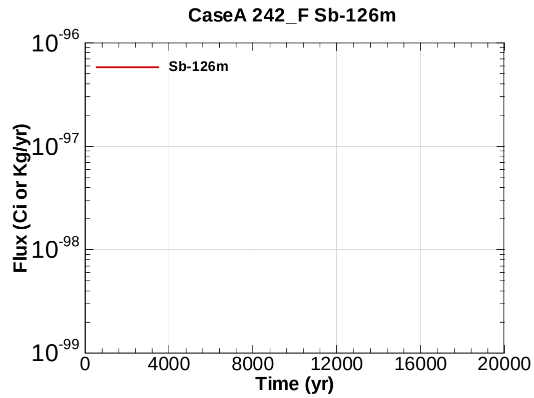

Figure A.2-2090 - Water Table Flux for CaseA 242_F Sb-126m

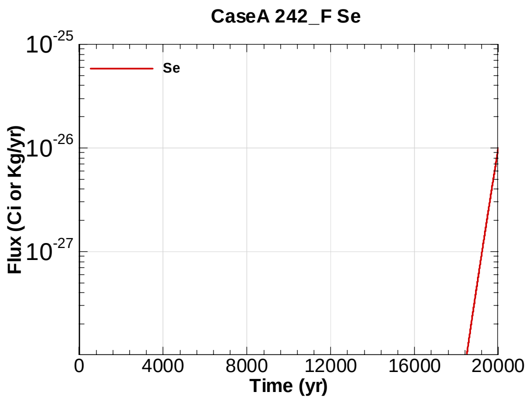

Figure A.2-2091 - Water Table Flux for CaseA 242_F Se

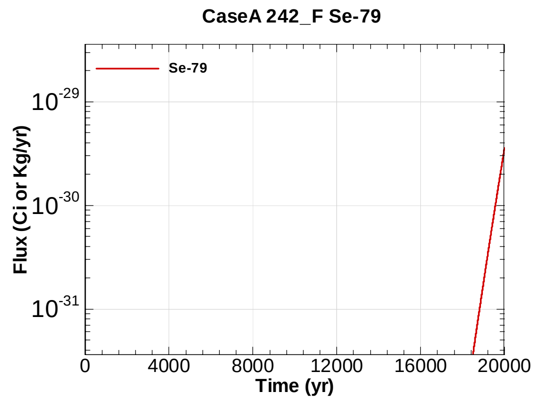

Figure A.2-2092 - Water Table Flux for CaseA 242_F Se-79

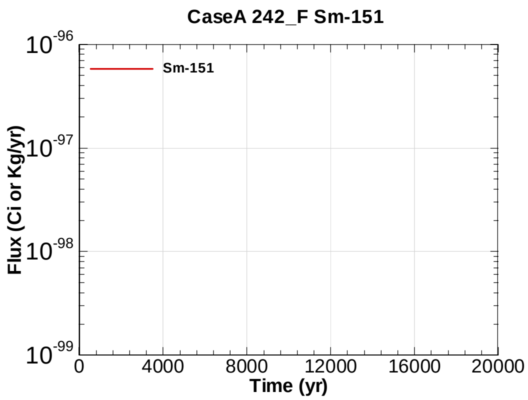

Figure A.2-2093 - Water Table Flux for CaseA 242_F Sm-151

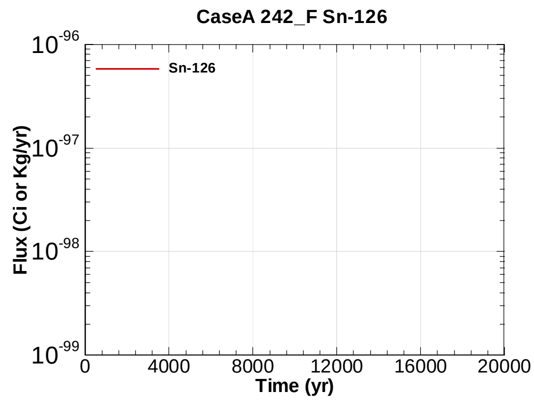

Figure A.2-2094 - Water Table Flux for CaseA 242_F Sn-126

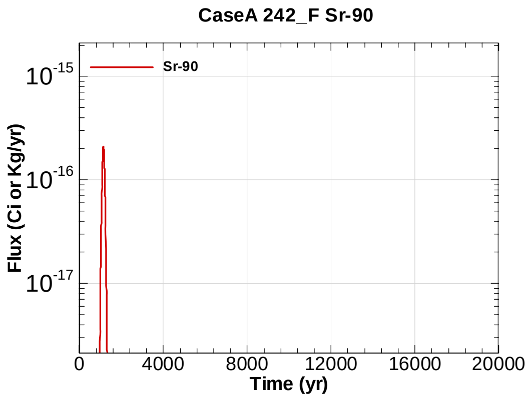

Figure A.2-2095 - Water Table Flux for CaseA 242_F Sr-90

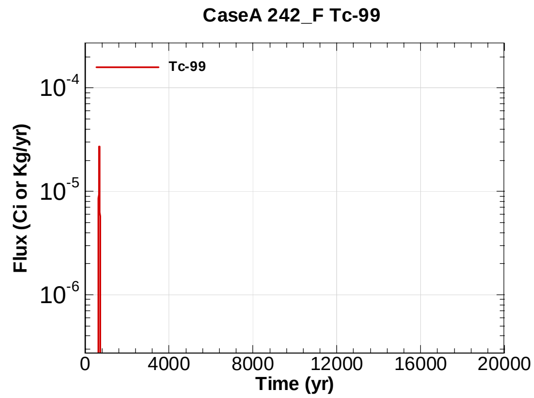

Figure A.2-2096 - Water Table Flux for CaseA 242_F Tc-99

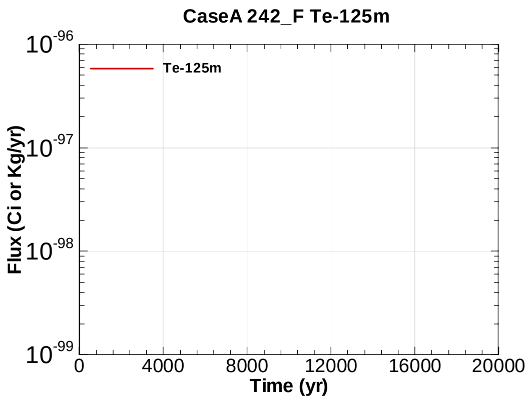

Figure A.2-2097 - Water Table Flux for CaseA 242_F Te-125m

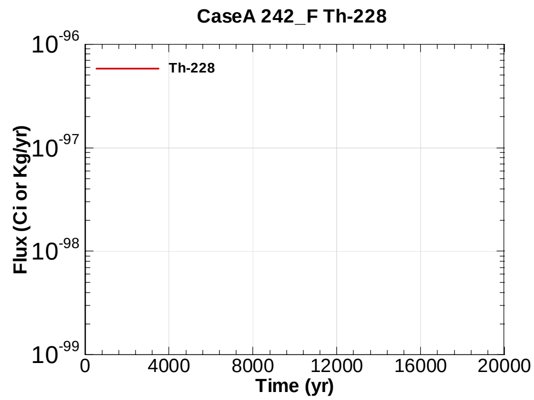

Figure A.2-2098 - Water Table Flux for CaseA 242_F Th-228

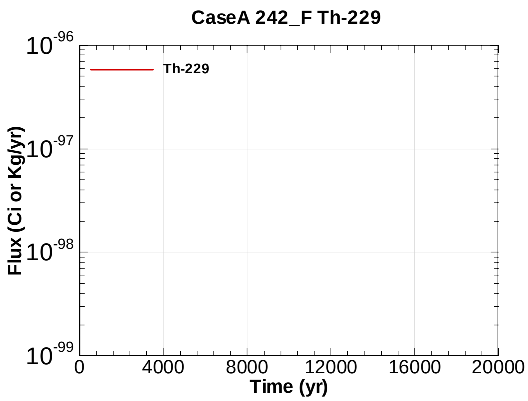

Figure A.2-2099 - Water Table Flux for CaseA 242_F Th-229

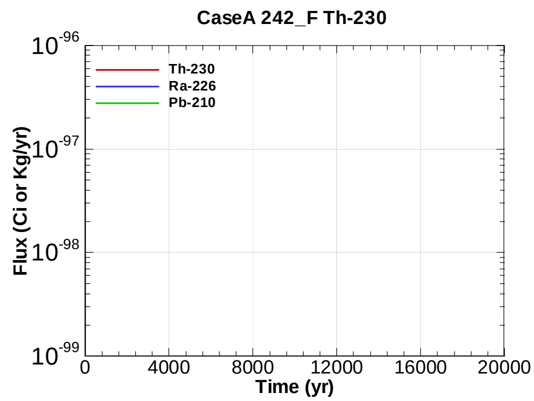

Figure A.2-2100 - Water Table Flux for CaseA 242_F Th-230

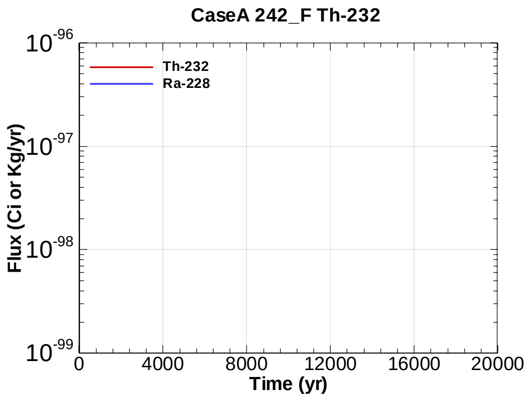

Figure A.2-2101 - Water Table Flux for CaseA 242_F Th-232

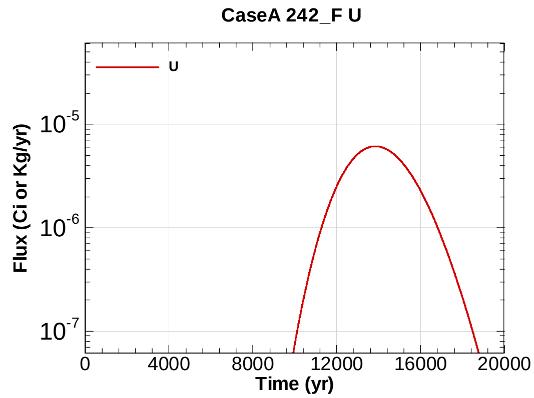

Figure A.2-2102 - Water Table Flux for CaseA 242_F U

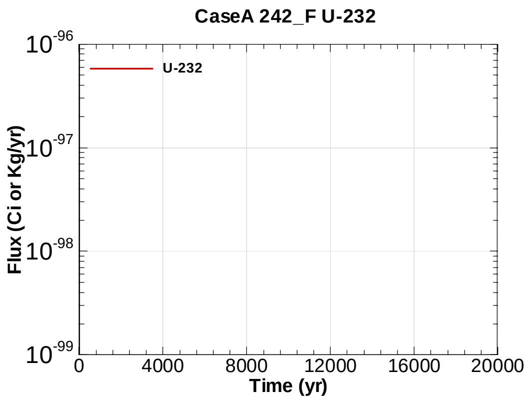

Figure A.2-2103 - Water Table Flux for CaseA 242_F U-232

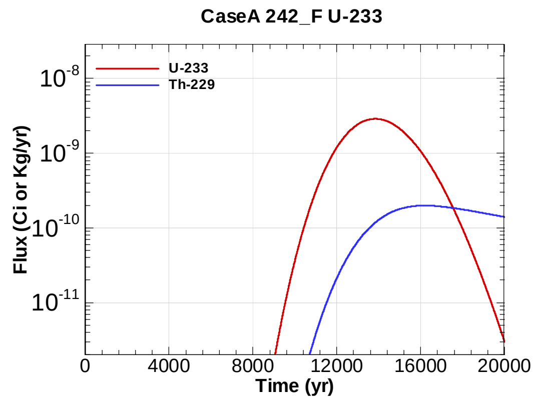

Figure A.2-2104 - Water Table Flux for CaseA 242_F U-233

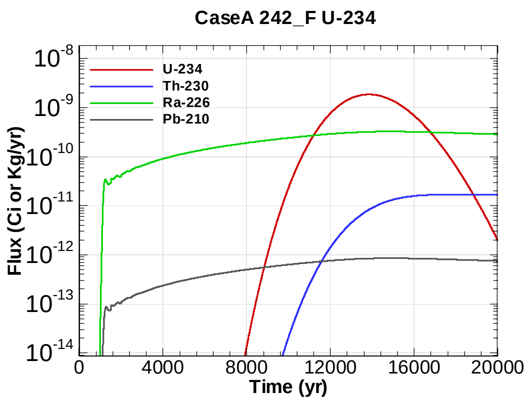

Figure A.2-2105 - Water Table Flux for CaseA 242_F U-234

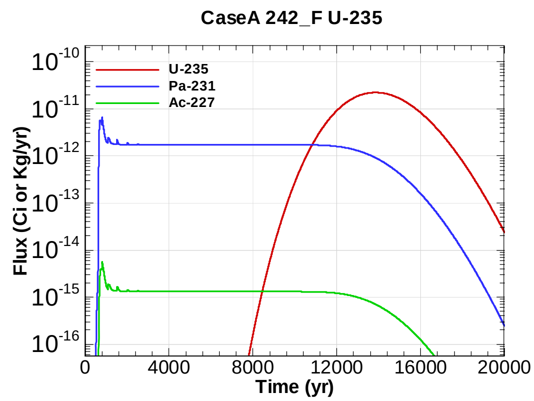

Figure A.2-2106 - Water Table Flux for CaseA 242_F U-235

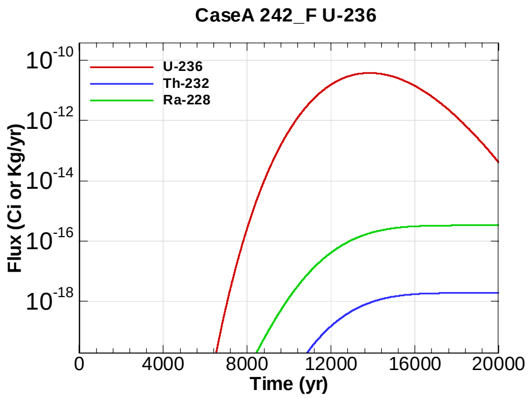

Figure A.2-2107 - Water Table Flux for CaseA 242_F U-236

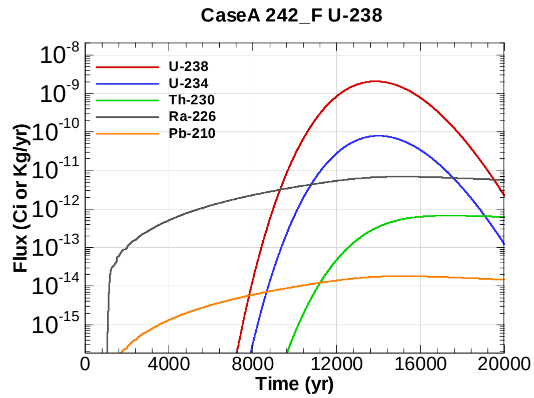

Figure A.2-2108 - Water Table Flux for CaseA 242_F U-238

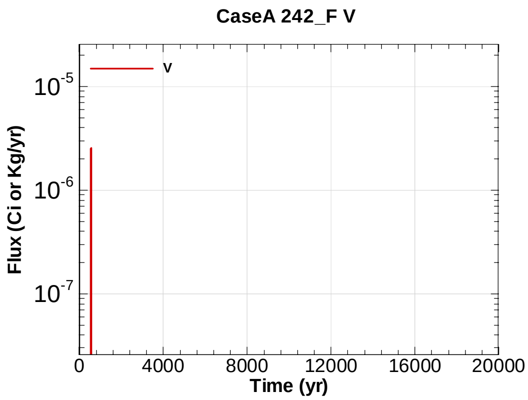

Figure A.2-2109 - Water Table Flux for CaseA 242_F V

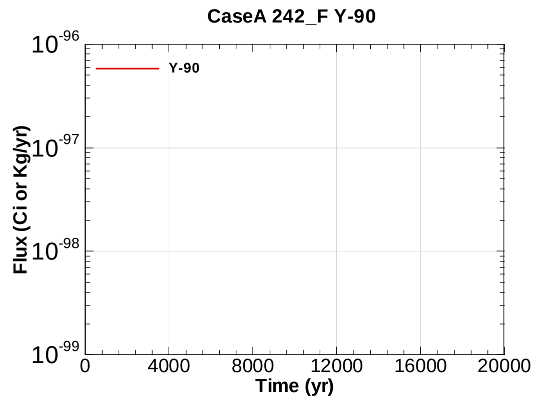

Figure A.2-2110 - Water Table Flux for CaseA 242_F Y-90

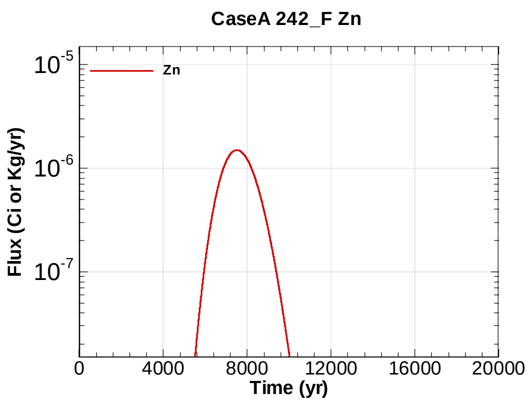

Figure A.2-2111 - Water Table Flux for CaseA 242_F Zn

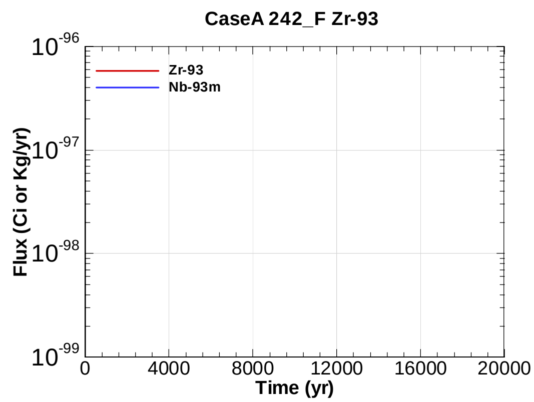

Figure A.2-2112 - Water Table Flux for CaseA 242_F Zr-93

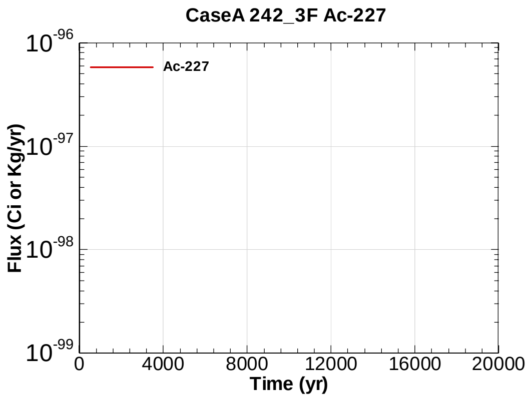

Figure A.2-2113 - Water Table Flux for CaseA 242_3F Ac-227

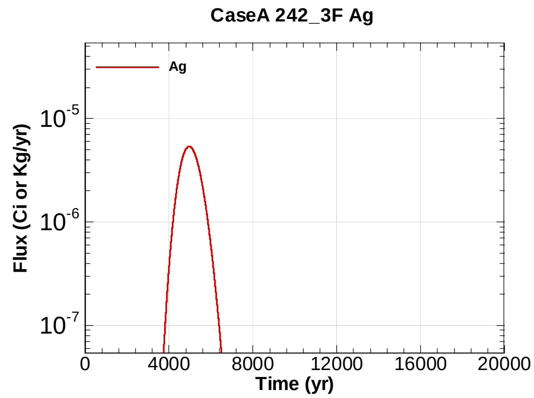

Figure A.2-2114 - Water Table Flux for CaseA 242_3F Ag

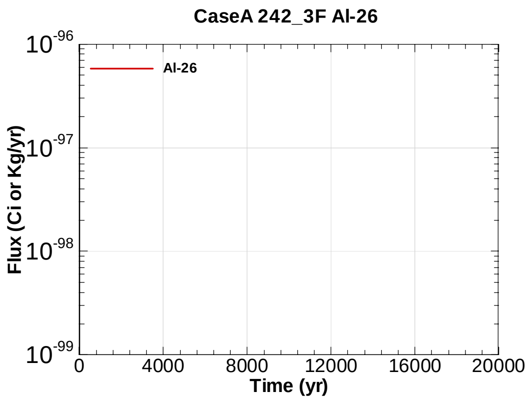

Figure A.2-2115 - Water Table Flux for CaseA 242_3F Al-26

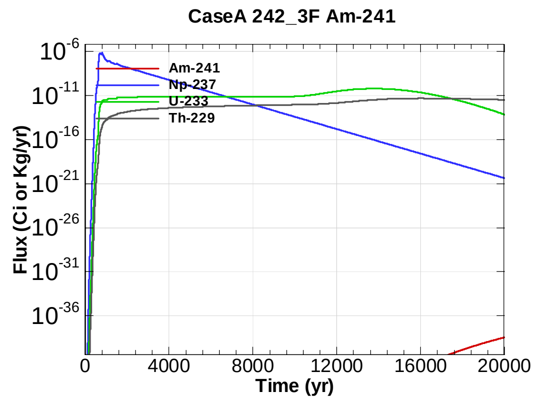

Figure A.2-2116 - Water Table Flux for CaseA 242_3F Am-241

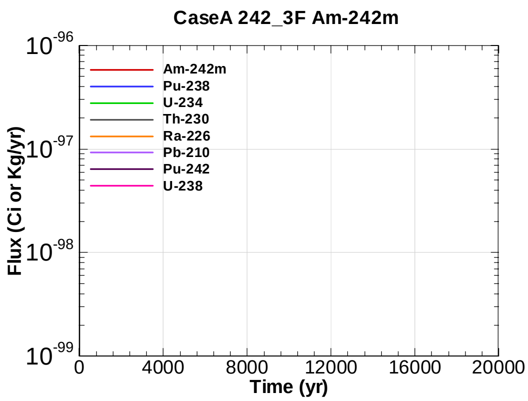

Figure A.2-2117 - Water Table Flux for CaseA 242_3F Am-242m

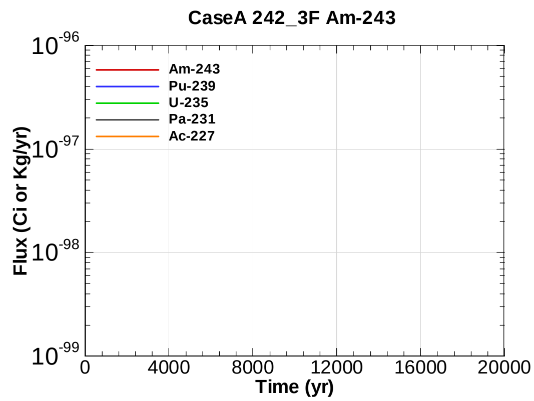

Figure A.2-2118 - Water Table Flux for CaseA 242_3F Am-243

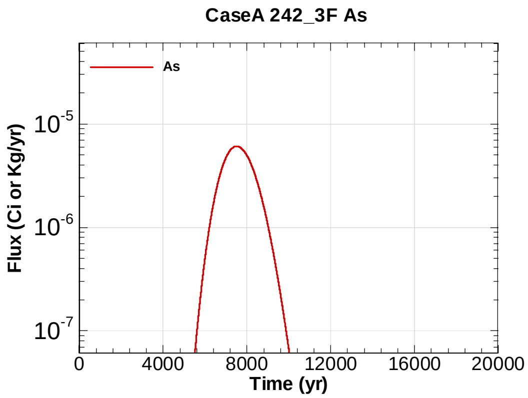

Figure A.2-2119 - Water Table Flux for CaseA 242_3F As

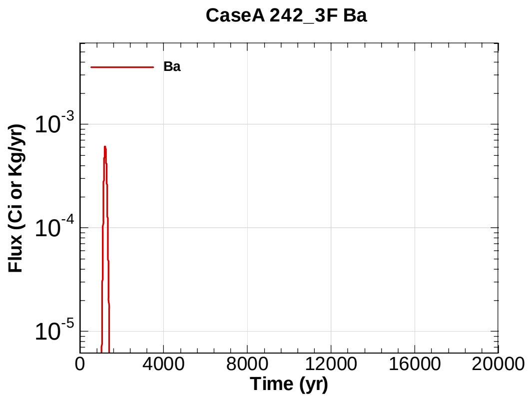

Figure A.2-2120 - Water Table Flux for CaseA 242_3F Ba

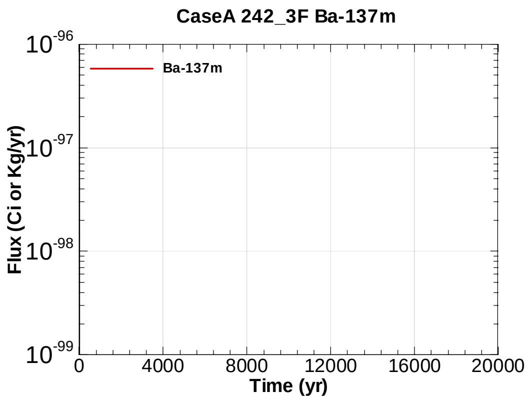

Figure A.2-2121 - Water Table Flux for CaseA 242_3F Ba-137m

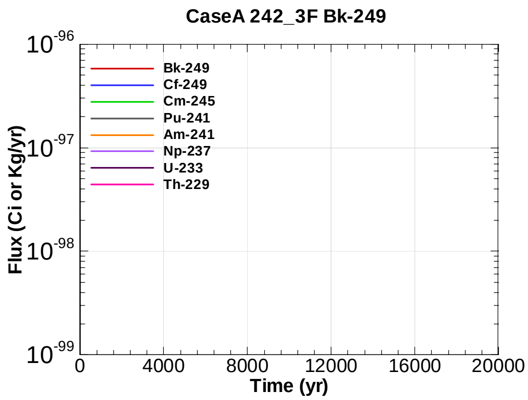

Figure A.2-2122 - Water Table Flux for CaseA 242_3F Bk-249

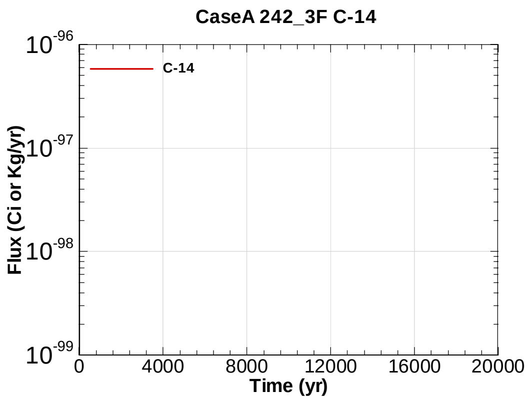

Figure A.2-2123 - Water Table Flux for CaseA 242_3F C-14

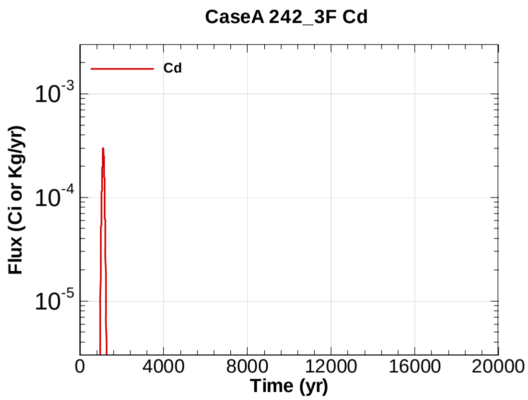

Figure A.2-2124 - Water Table Flux for CaseA 242_3F Cd

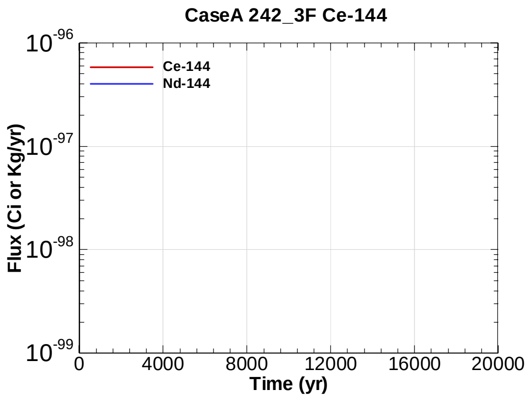

Figure A.2-2125 - Water Table Flux for CaseA 242_3F Ce-144

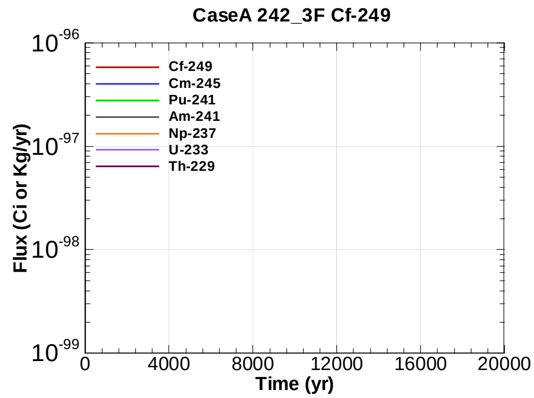

Figure A.2-2126 - Water Table Flux for CaseA 242_3F Cf-249

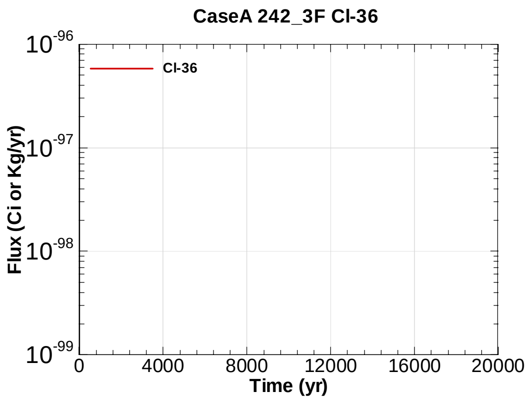

Figure A.2-2127 - Water Table Flux for CaseA 242_3F Cl-36

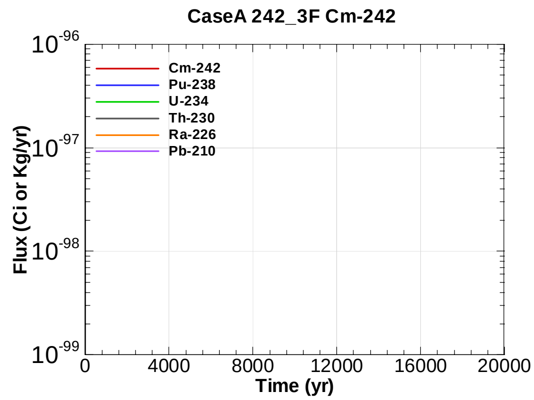

Figure A.2-2128 - Water Table Flux for CaseA 242_3F Cm-242

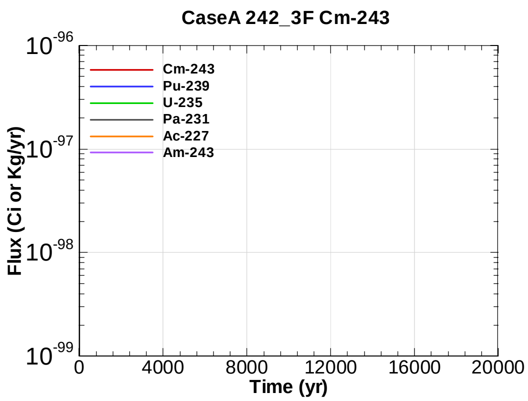

Figure A.2-2129 - Water Table Flux for CaseA 242_3F Cm-243

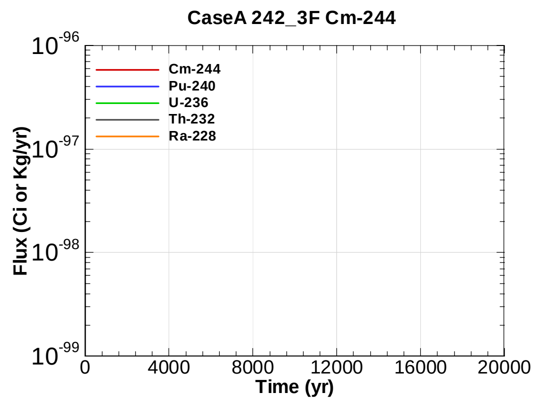

Figure A.2-2130 - Water Table Flux for CaseA 242_3F Cm-244

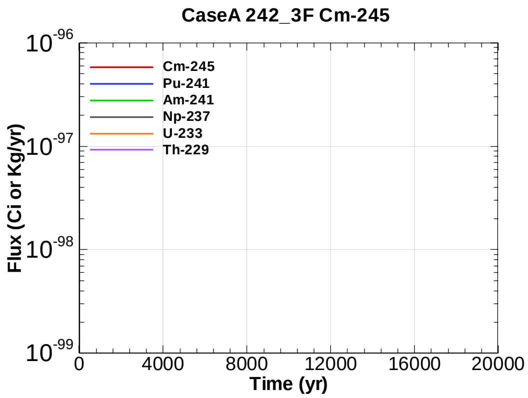

Figure A.2-2131 - Water Table Flux for CaseA 242_3F Cm-245

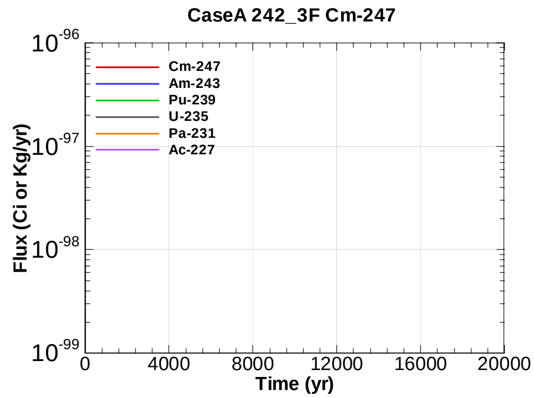

Figure A.2-2132 - Water Table Flux for CaseA 242_3F Cm-247

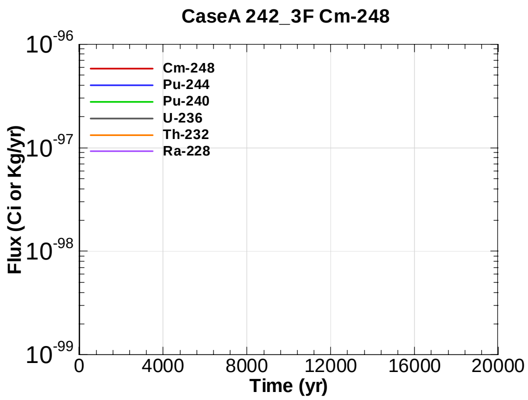

Figure A.2-2133 - Water Table Flux for CaseA 242_3F Cm-248

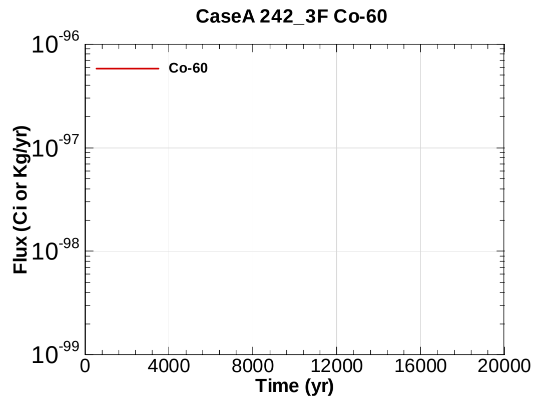

Figure A.2-2134 - Water Table Flux for CaseA 242_3F Co-60

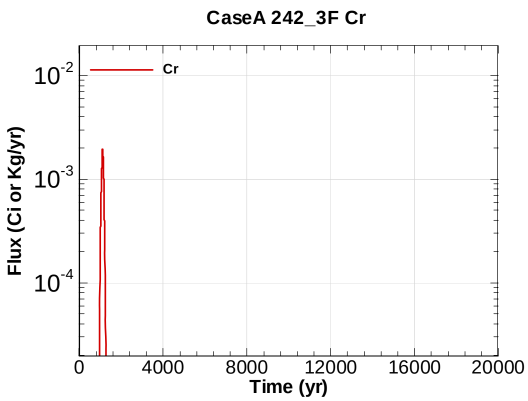

Figure A.2-2135 - Water Table Flux for CaseA 242_3F Cr

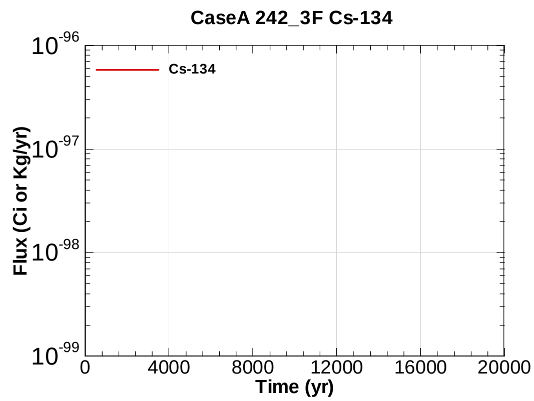

Figure A.2-2136 - Water Table Flux for CaseA 242_3F Cs-134

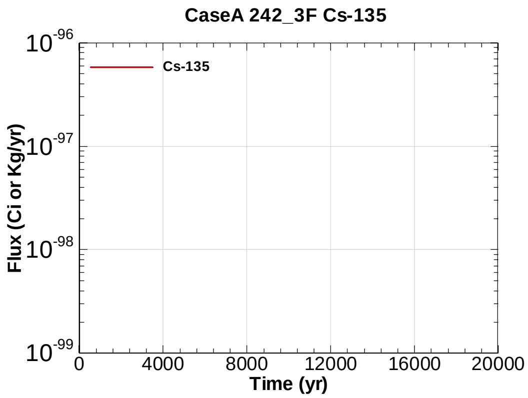

Figure A.2-2137 - Water Table Flux for CaseA 242_3F Cs-135

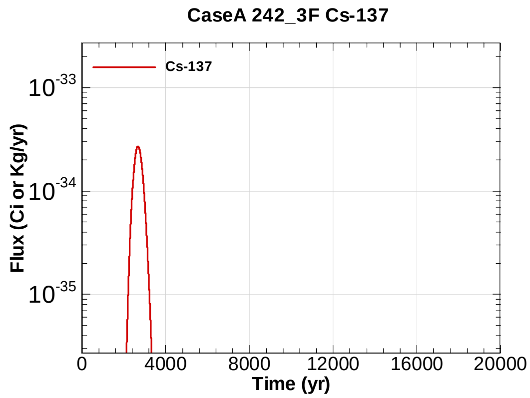

Figure A.2-2138 - Water Table Flux for CaseA 242_3F Cs-137

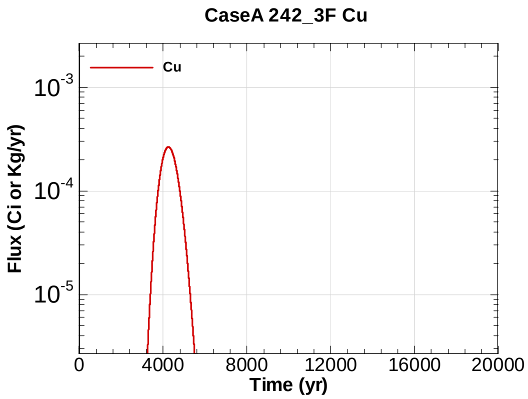

Figure A.2-2139 - Water Table Flux for CaseA 242_3F Cu

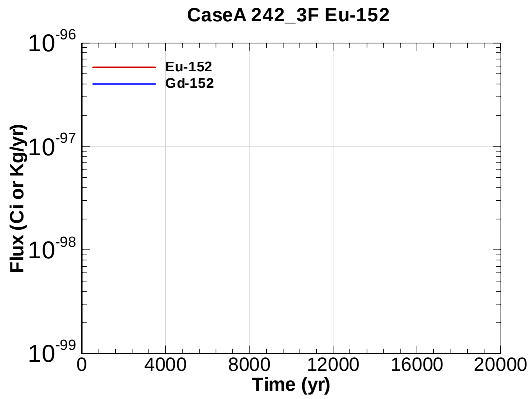

Figure A.2-2140 - Water Table Flux for CaseA 242_3F Eu-152

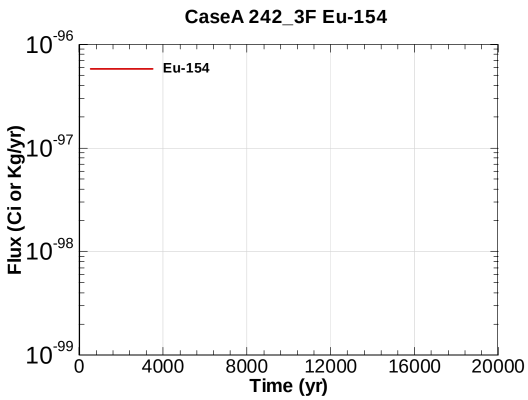

Figure A.2-2141 - Water Table Flux for CaseA 242_3F Eu-154

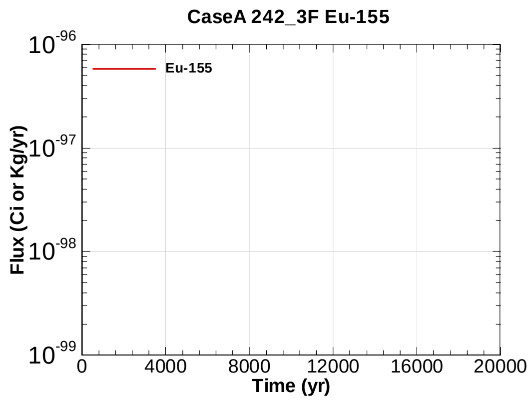

Figure A.2-2142 - Water Table Flux for CaseA 242_3F Eu-155

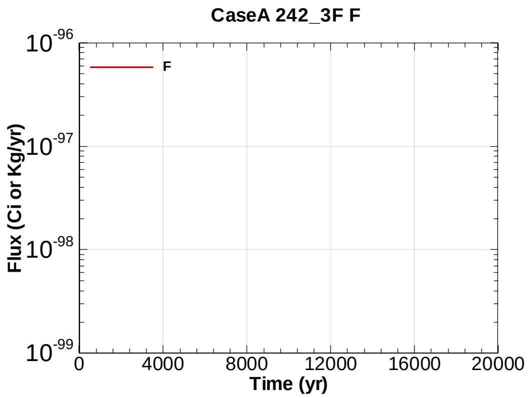

Figure A.2-2143 - Water Table Flux for CaseA 242_3F F

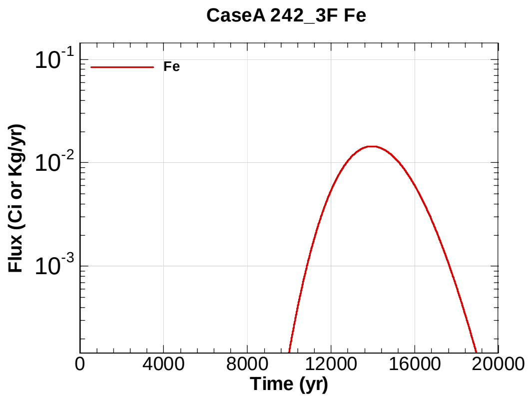

Figure A.2-2144 - Water Table Flux for CaseA 242_3F Fe

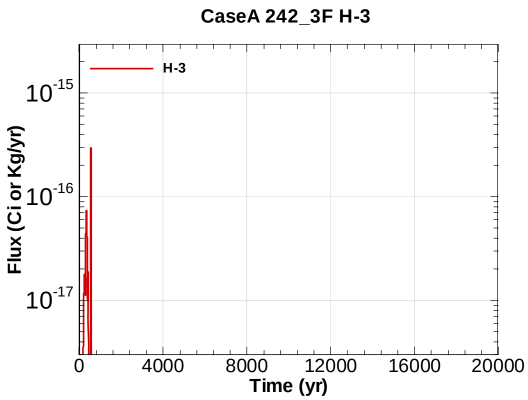

Figure A.2-2145 - Water Table Flux for CaseA 242_3F H-3

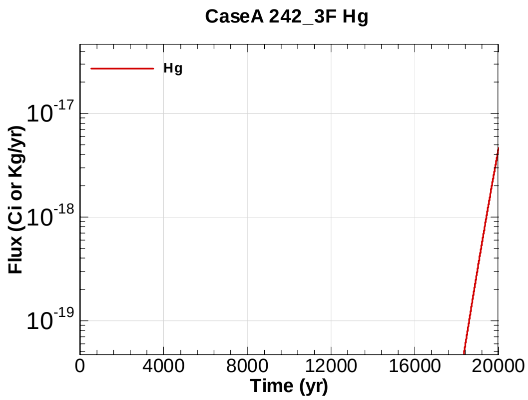

Figure A.2-2146 - Water Table Flux for CaseA 242_3F Hg

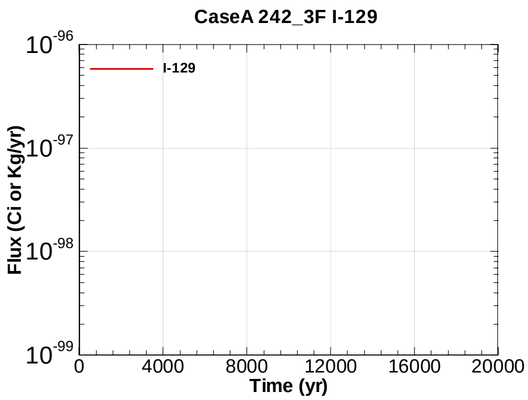

Figure A.2-2147 - Water Table Flux for CaseA 242_3F I-129

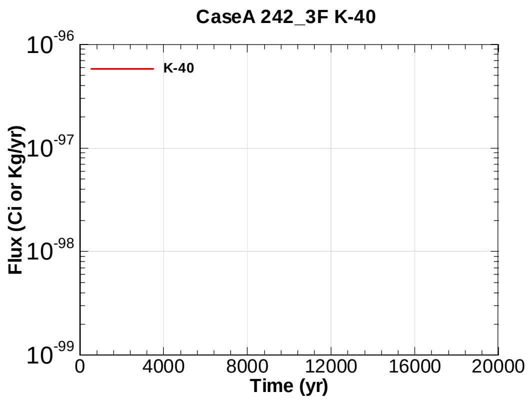

Figure A.2-2148 - Water Table Flux for CaseA 242_3F K-40

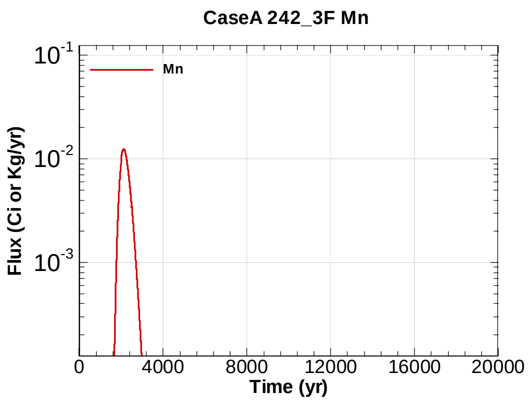

Figure A.2-2149 - Water Table Flux for CaseA 242_3F Mn

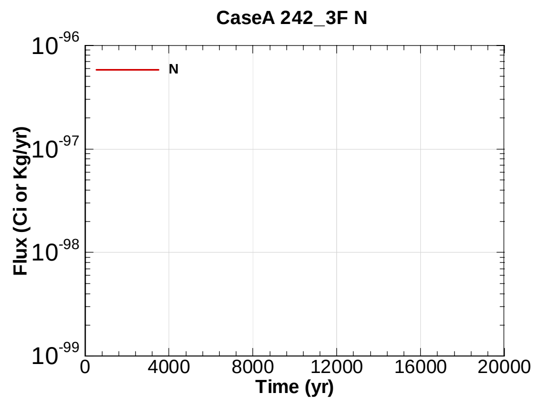

Figure A.2-2150 - Water Table Flux for CaseA 242_3F N

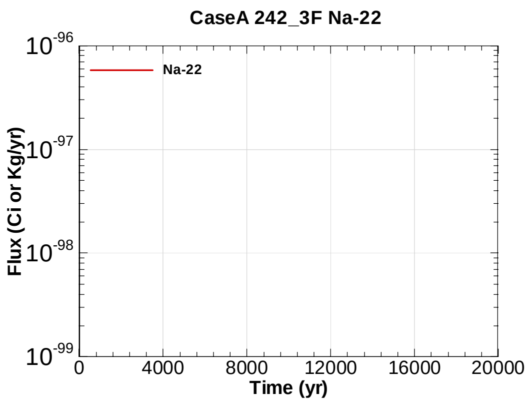

Figure A.2-2151 - Water Table Flux for CaseA 242_3F Na-22

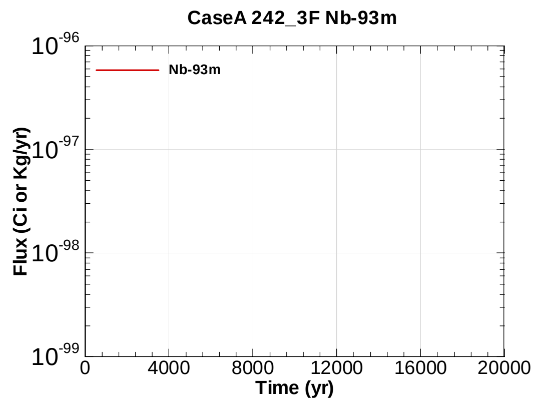

Figure A.2-2152 - Water Table Flux for CaseA 242_3F Nb-93m

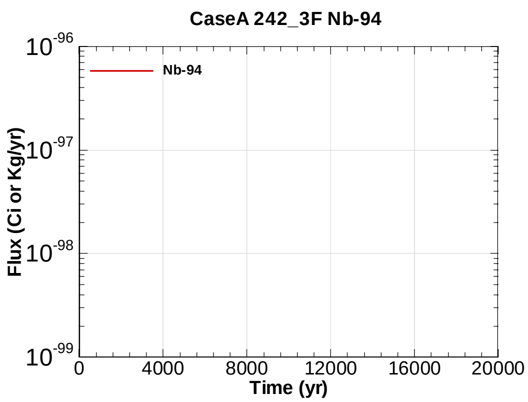

Figure A.2-2153 - Water Table Flux for CaseA 242_3F Nb-94

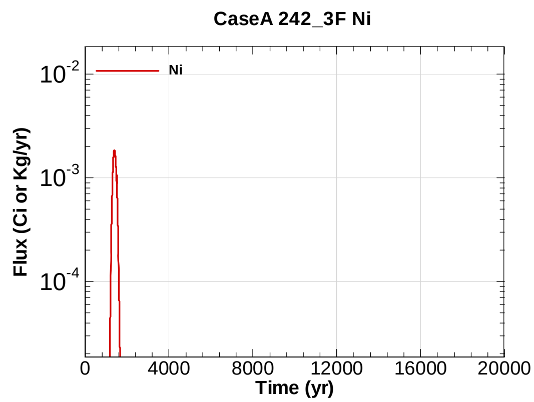

Figure A.2-2154 - Water Table Flux for CaseA 242_3F Ni

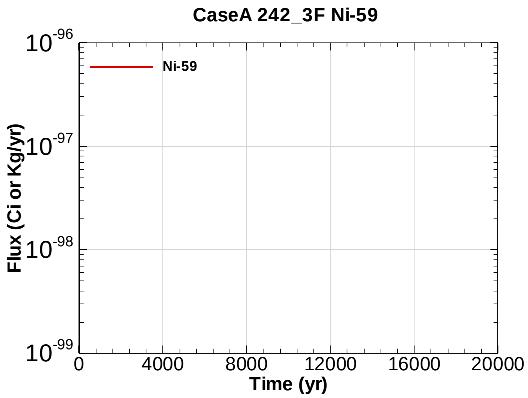

Figure A.2-2155 - Water Table Flux for CaseA 242_3F Ni-59

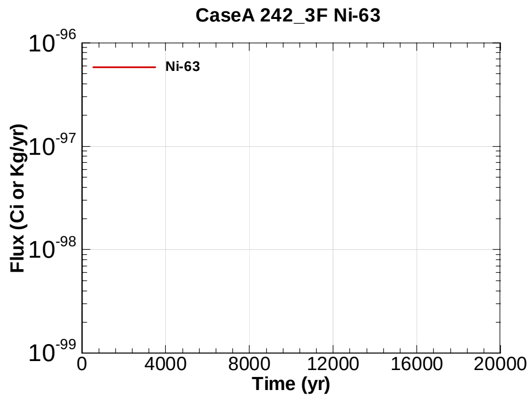

Figure A.2-2156 - Water Table Flux for CaseA 242_3F Ni-63

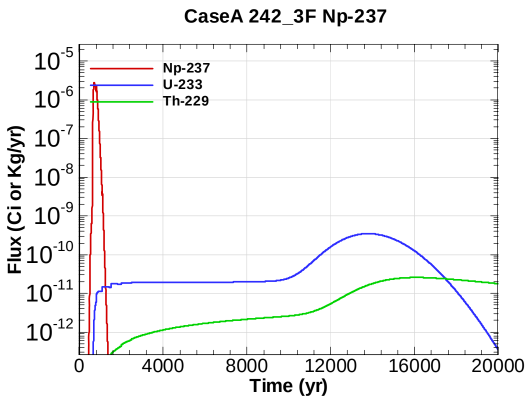

Figure A.2-2157 - Water Table Flux for CaseA 242_3F Np-237

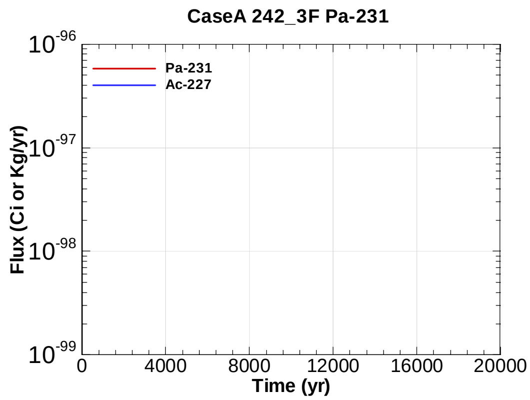

Figure A.2-2158 - Water Table Flux for CaseA 242_3F Pa-231

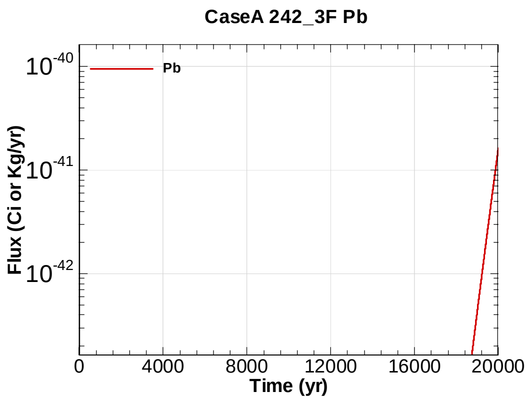

Figure A.2-2159 - Water Table Flux for CaseA 242_3F Pb

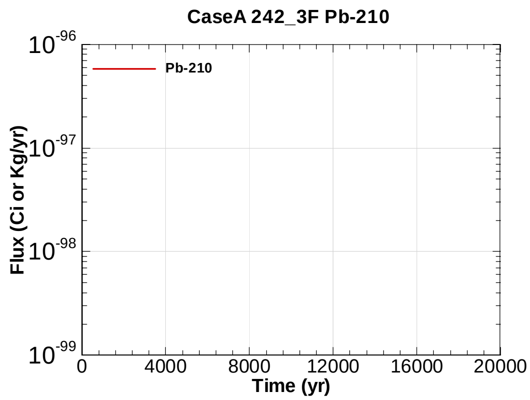

Figure A.2-2160 - Water Table Flux for CaseA 242_3F Pb-210

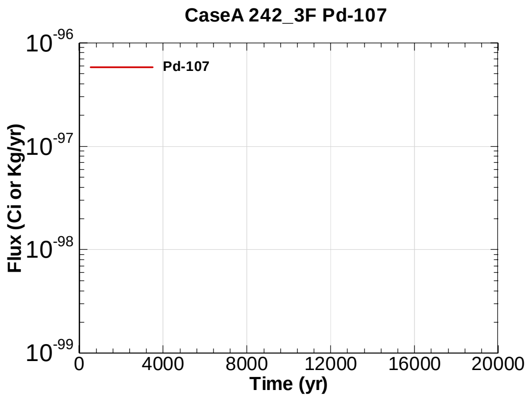

Figure A.2-2161 - Water Table Flux for CaseA 242_3F Pd-107

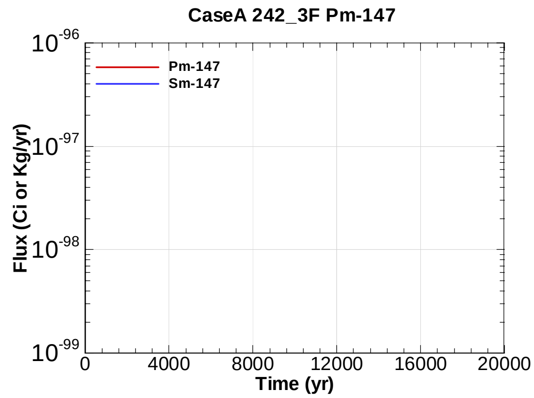

Figure A.2-2162 - Water Table Flux for CaseA 242_3F Pm-147

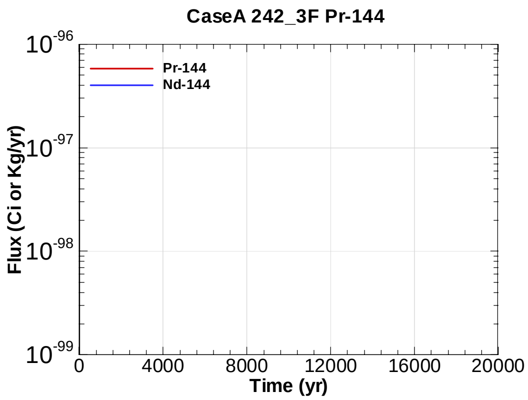

Figure A.2-2163 - Water Table Flux for CaseA 242_3F Pr-144

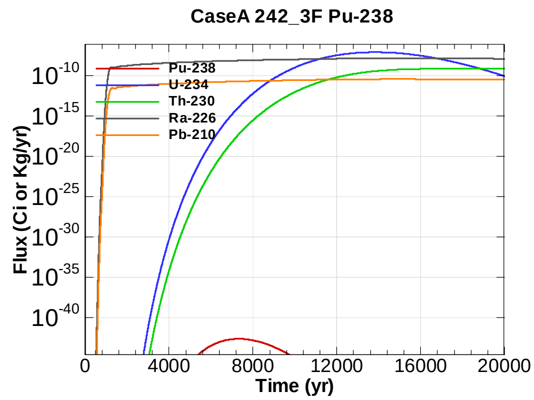

Figure A.2-2164 - Water Table Flux for CaseA 242_3F Pu-238

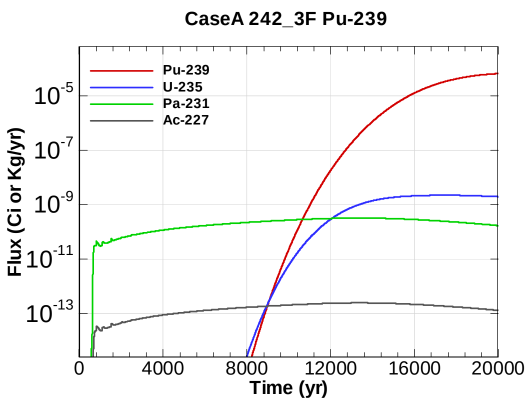

Figure A.2-2165 - Water Table Flux for CaseA 242_3F Pu-239

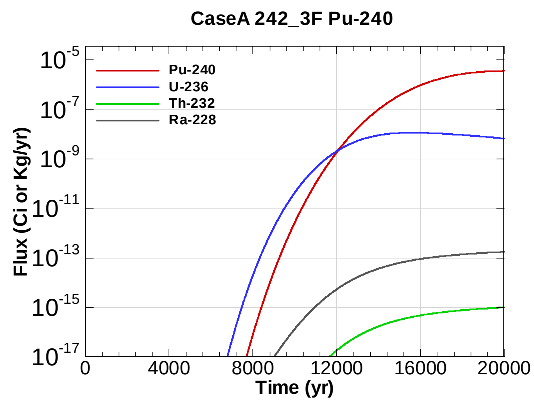

Figure A.2-2166 - Water Table Flux for CaseA 242_3F Pu-240

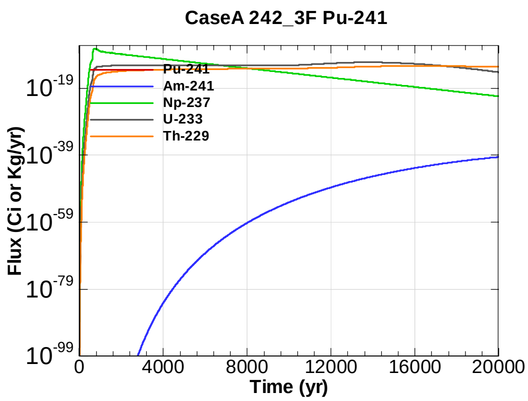

Figure A.2-2167 - Water Table Flux for CaseA 242_3F Pu-241

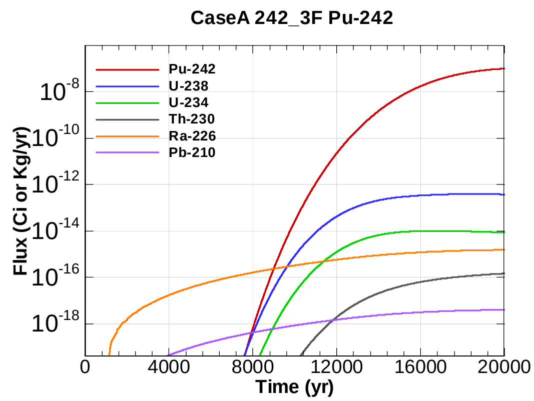

Figure A.2-2168 - Water Table Flux for CaseA 242_3F Pu-242

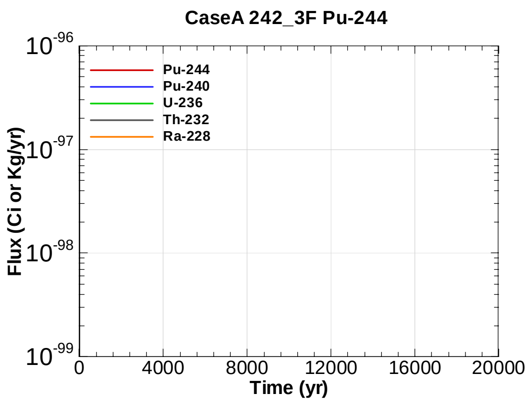

Figure A.2-2169 - Water Table Flux for CaseA 242_3F Pu-244

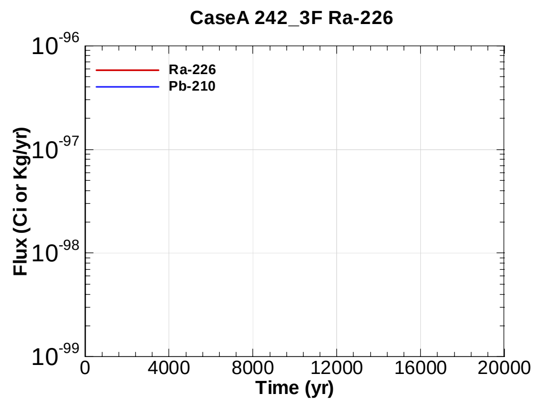

Figure A.2-2170 - Water Table Flux for CaseA 242_3F Ra-226

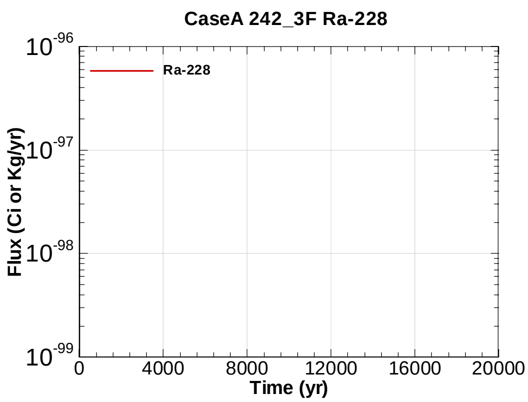

Figure A.2-2171 - Water Table Flux for CaseA 242_3F Ra-228

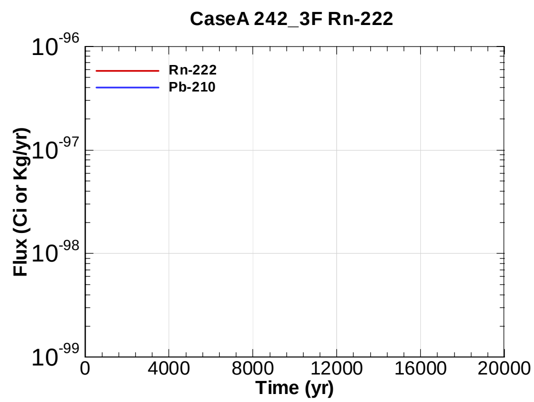

Figure A.2-2172 - Water Table Flux for CaseA 242_3F Rn-222

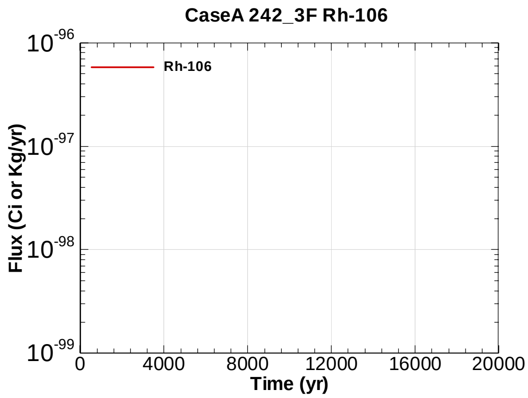

Figure A.2-2173 - Water Table Flux for CaseA 242_3F Rh-106

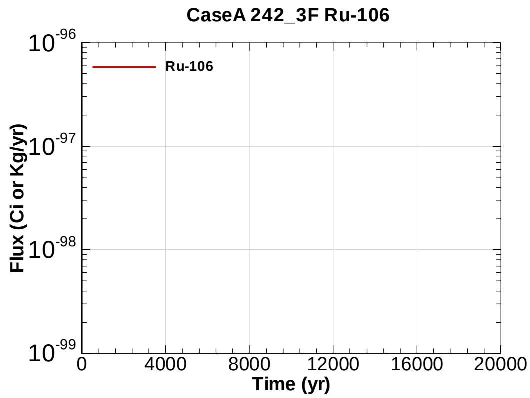

Figure A.2-2174 - Water Table Flux for CaseA 242_3F Ru-106

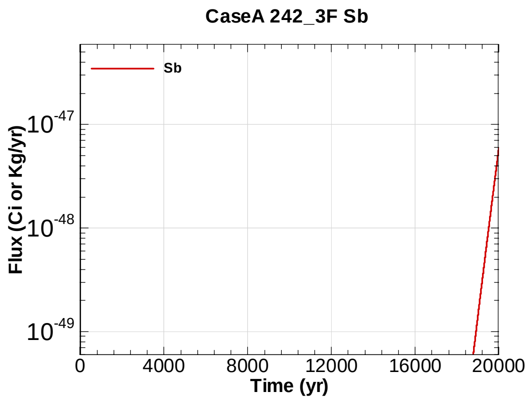

Figure A.2-2175 - Water Table Flux for CaseA 242_3F Sb

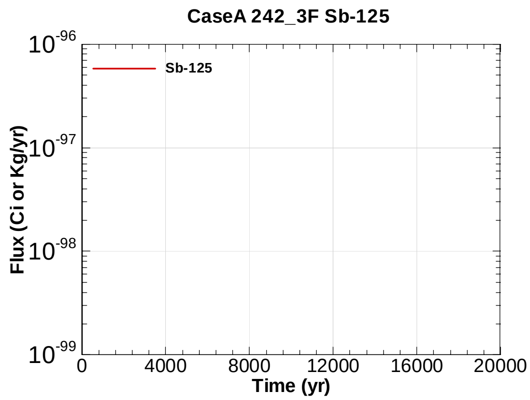

Figure A.2-2176 - Water Table Flux for CaseA 242_3F Sb-125

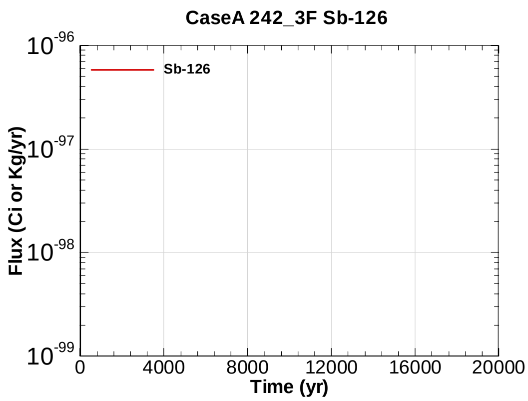

Figure A.2-2177 - Water Table Flux for CaseA 242_3F Sb-126

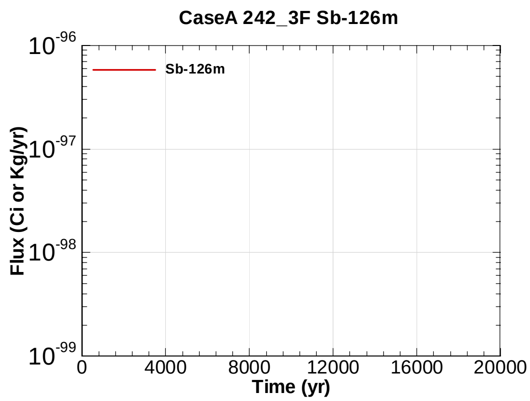

Figure A.2-2178 - Water Table Flux for CaseA 242_3F Sb-126m

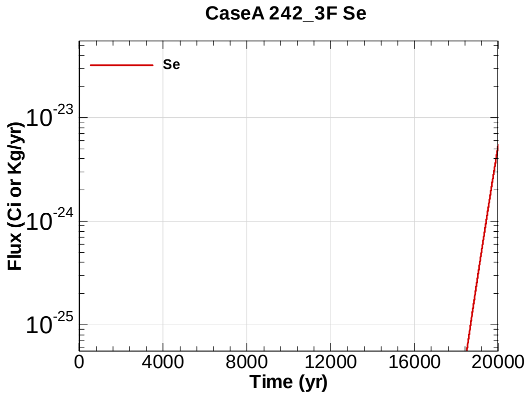

Figure A.2-2179 - Water Table Flux for CaseA 242_3F Se

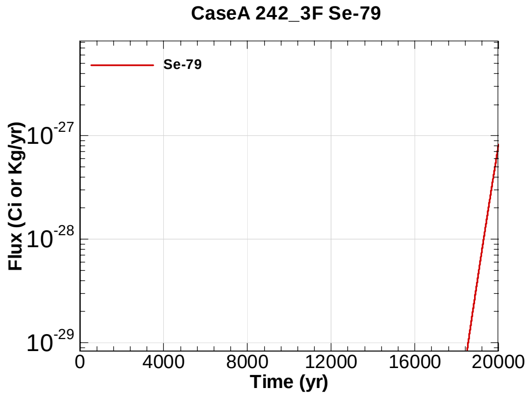

Figure A.2-2180 - Water Table Flux for CaseA 242_3F Se-79

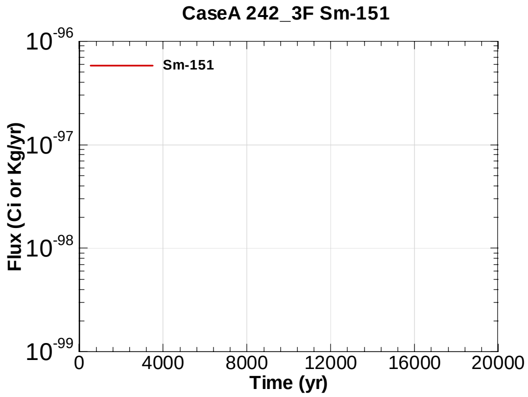

Figure A.2-2181 - Water Table Flux for CaseA 242_3F Sm-151

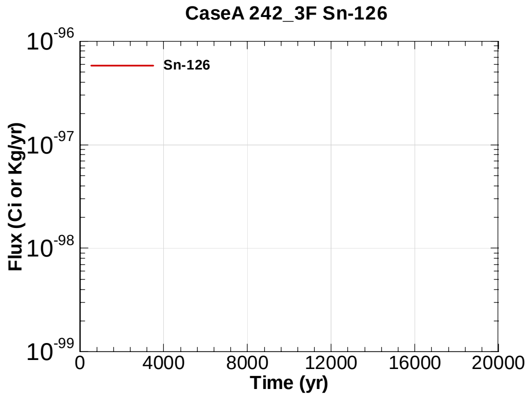

Figure A.2-2182 - Water Table Flux for CaseA 242_3F Sn-126

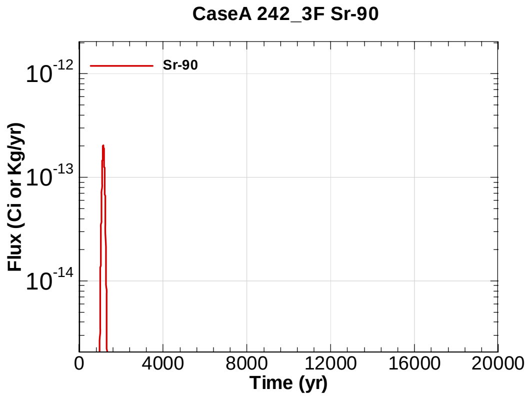

Figure A.2-2183 - Water Table Flux for CaseA 242_3F Sr-90

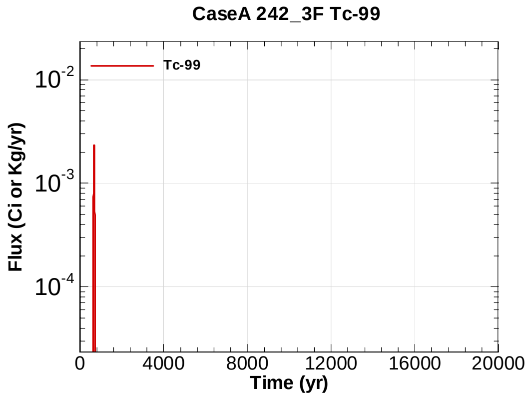

Figure A.2-2184 - Water Table Flux for CaseA 242_3F Tc-99

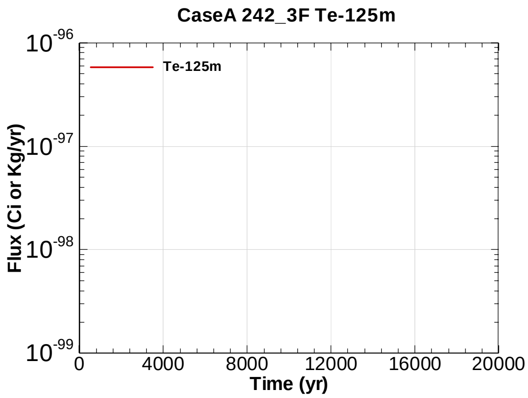

Figure A.2-2185 - Water Table Flux for CaseA 242_3F Te-125m

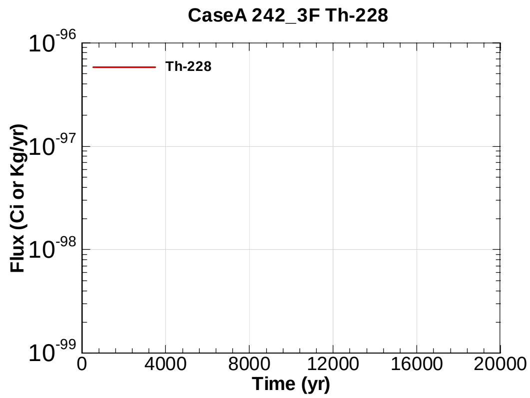

Figure A.2-2186 - Water Table Flux for CaseA 242_3F Th-228

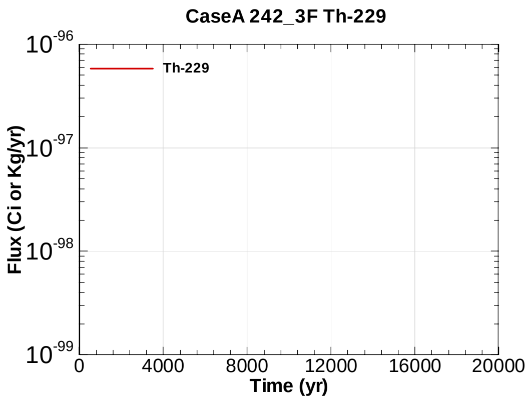

Figure A.2-2187 - Water Table Flux for CaseA 242_3F Th-229

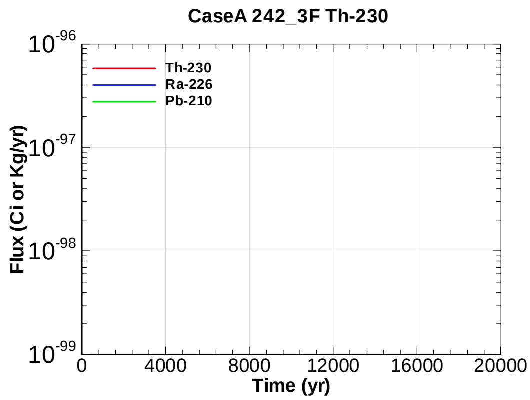

Figure A.2-2188 - Water Table Flux for CaseA 242_3F Th-230

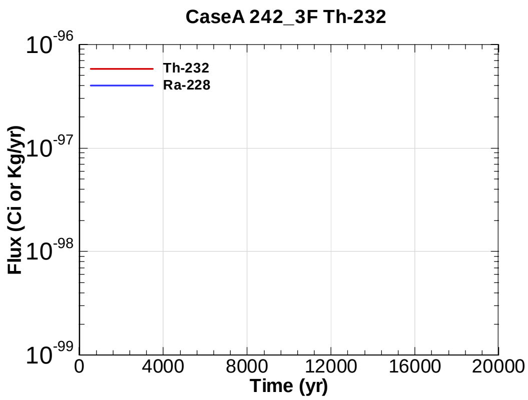

Figure A.2-2189 - Water Table Flux for CaseA 242_3F Th-232

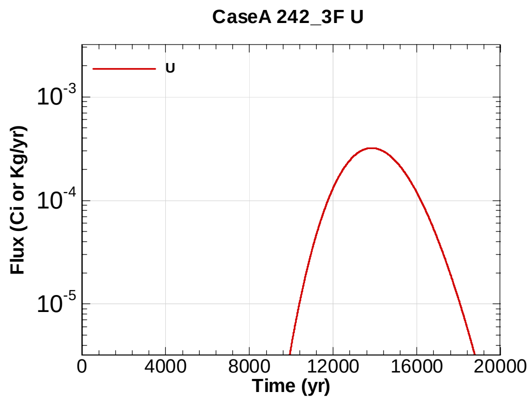

Figure A.2-2190 - Water Table Flux for CaseA 242_3F U

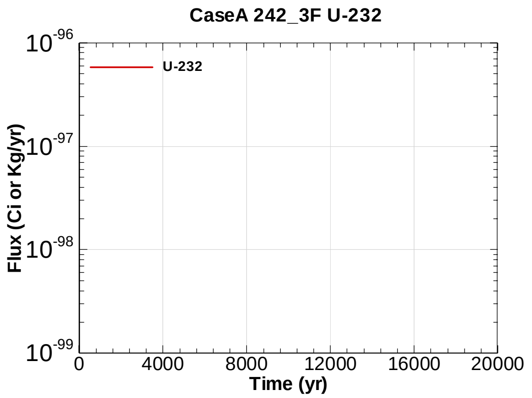

Figure A.2-2191 - Water Table Flux for CaseA 242_3F U-232

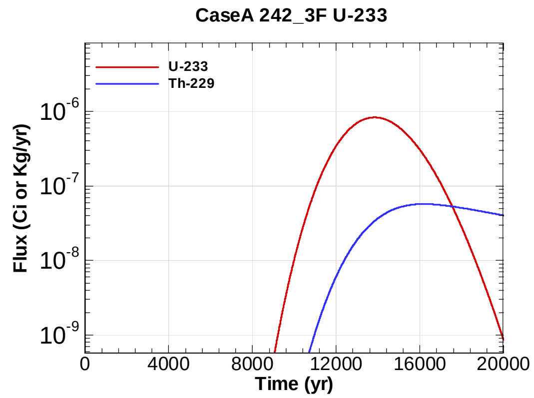

Figure A.2-2192 - Water Table Flux for CaseA 242_3F U-233

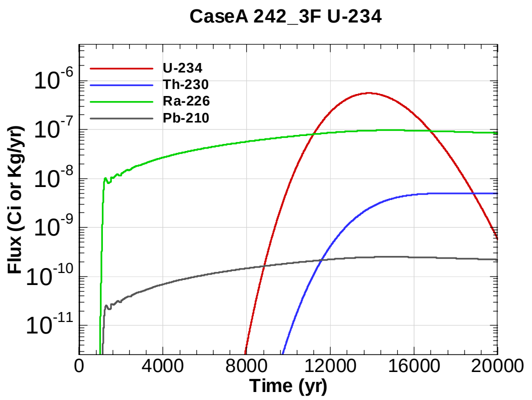

Figure A.2-2193 - Water Table Flux for CaseA 242_3F U-234

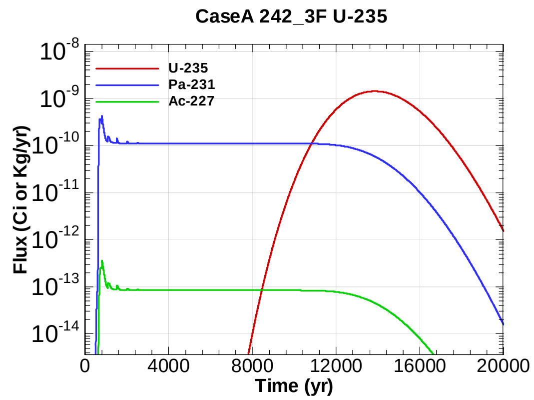

Figure A.2-2194 - Water Table Flux for CaseA 242_3F U-235

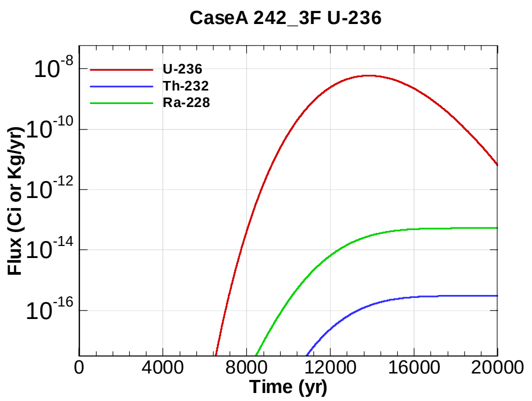

Figure A.2-2195 - Water Table Flux for CaseA 242_3F U-236

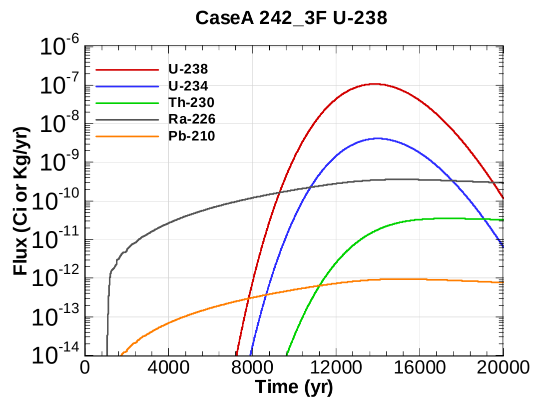

Figure A.2-2196 - Water Table Flux for CaseA 242_3F U-238

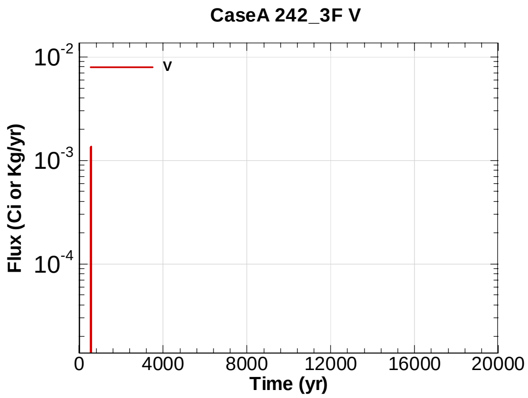

Figure A.2-2197 - Water Table Flux for CaseA 242_3F V

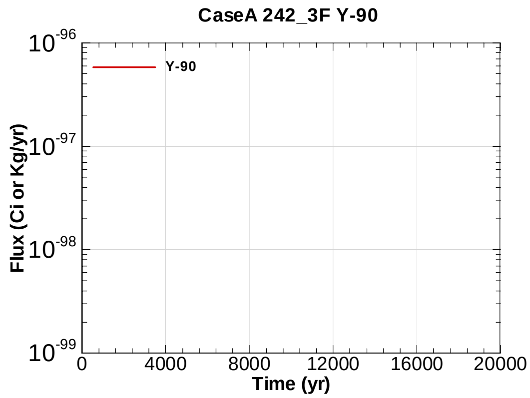

Figure A.2-2198 - Water Table Flux for CaseA 242_3F Y-90

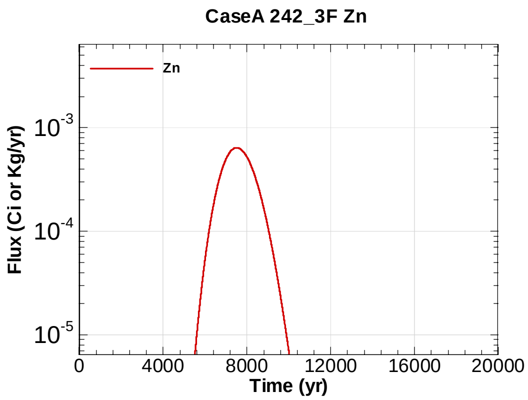

Figure A.2-2199 - Water Table Flux for CaseA 242_3F Zn

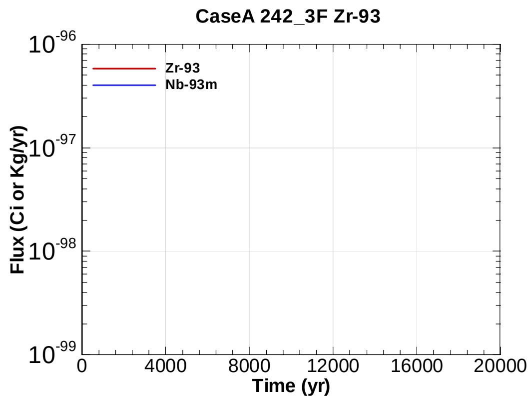

Figure A.2-2200 - Water Table Flux for CaseA 242_3F Zr-93

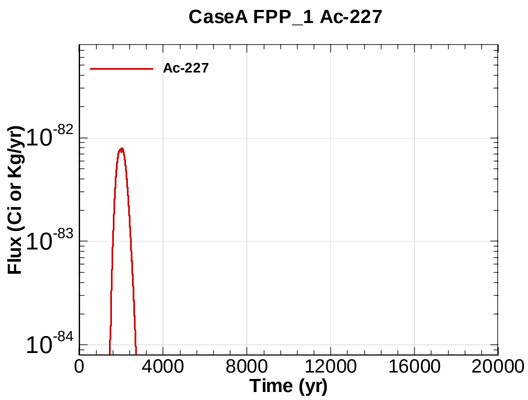

Figure A.2-2201 - Water Table Flux for CaseA FPP_1 Ac-227

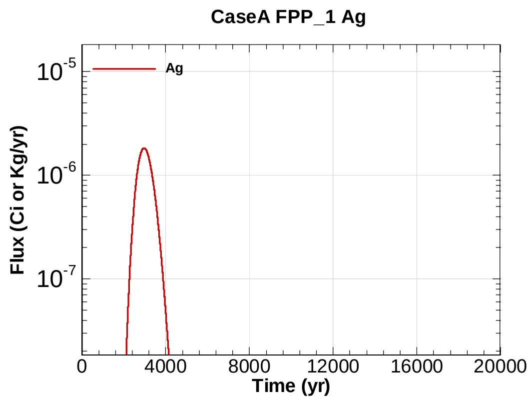

Figure A.2-2202 - Water Table Flux for CaseA FPP_1 Ag

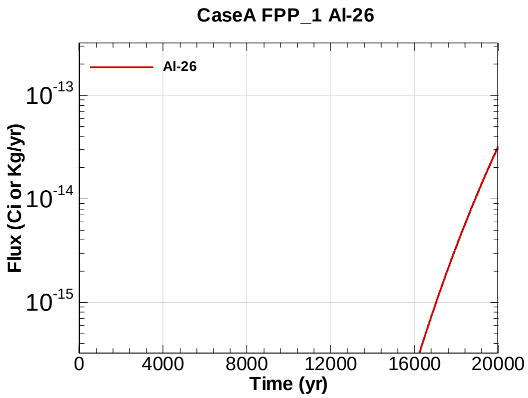

Figure A.2-2203 - Water Table Flux for CaseA FPP_1 Al-26

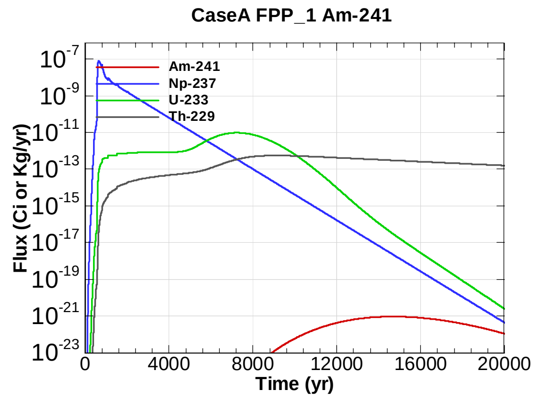

Figure A.2-2204 - Water Table Flux for CaseA FPP_1 Am-241

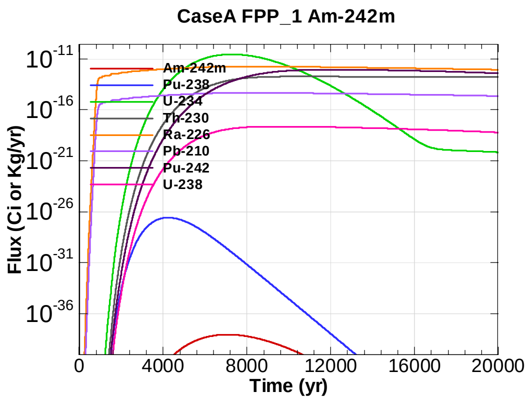

Figure A.2-2205 - Water Table Flux for CaseA FPP_1 Am-242m

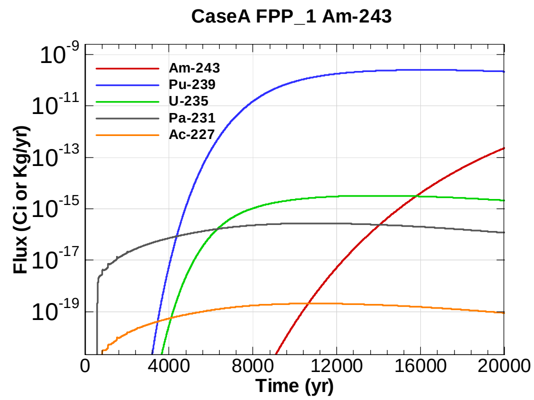

Figure A.2-2206 - Water Table Flux for CaseA FPP_1 Am-243

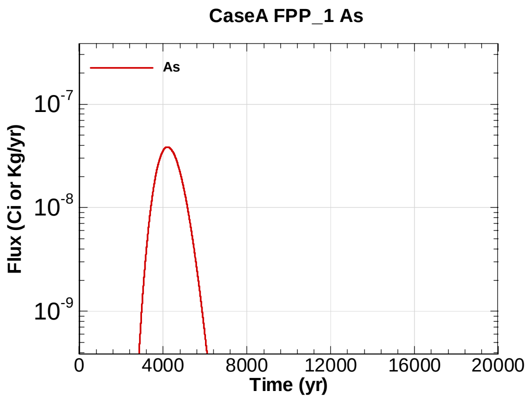

Figure A.2-2207 - Water Table Flux for CaseA FPP_1 As

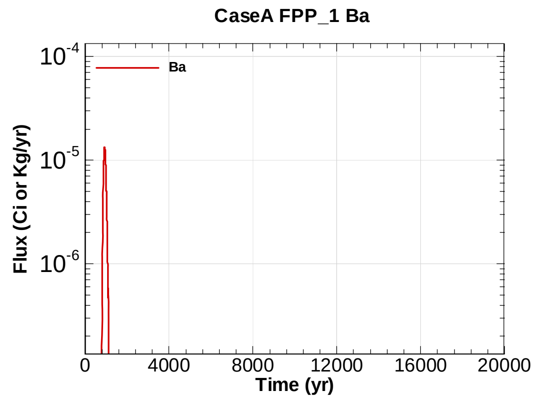

Figure A.2-2208 - Water Table Flux for CaseA FPP_1 Ba

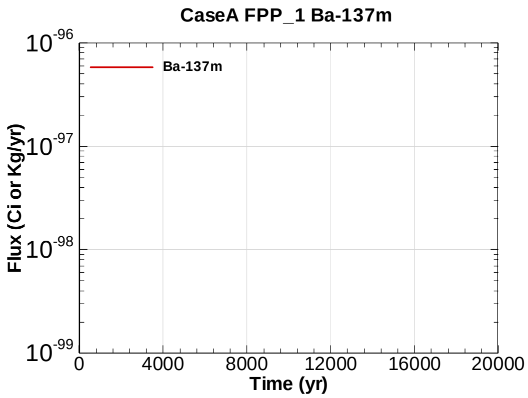

Figure A.2-2209 - Water Table Flux for CaseA FPP_1 Ba-137m

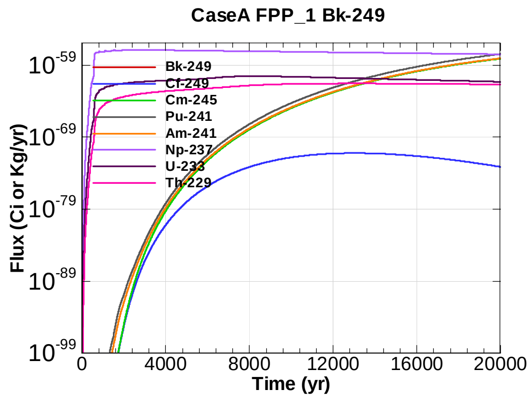

Figure A.2-2210 - Water Table Flux for CaseA FPP_1 Bk-249

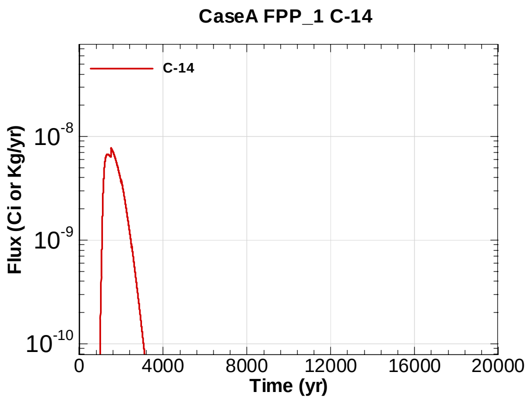

Figure A.2-2211 - Water Table Flux for CaseA FPP_1 C-14

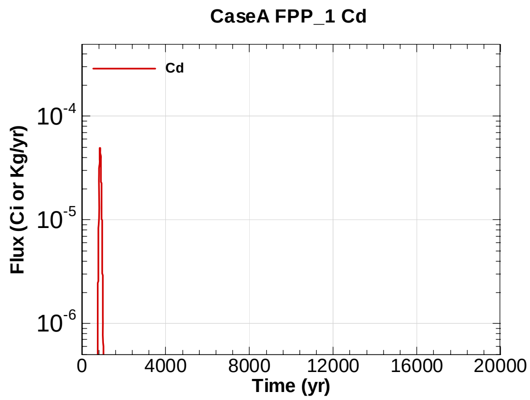

Figure A.2-2212 - Water Table Flux for CaseA FPP_1 Cd

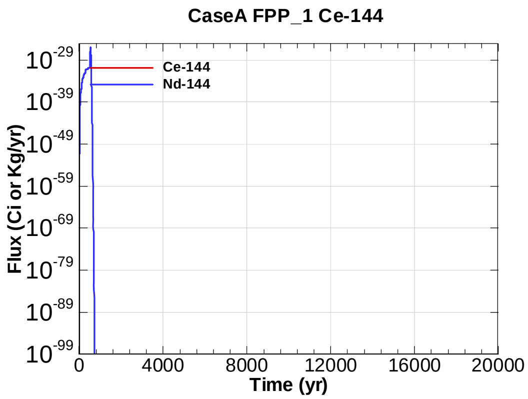

Figure A.2-2213 - Water Table Flux for CaseA FPP_1 Ce-144

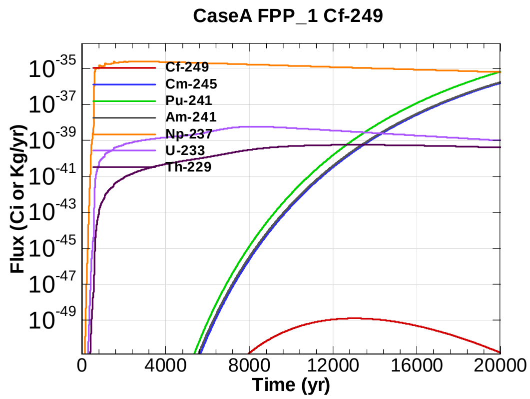

Figure A.2-2214 - Water Table Flux for CaseA FPP_1 Cf-249

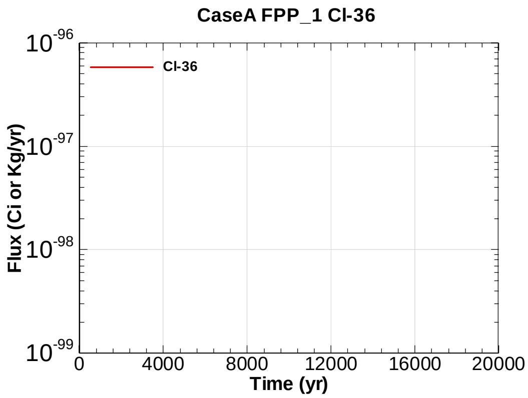

Figure A.2-2215 - Water Table Flux for CaseA FPP_1 Cl-36

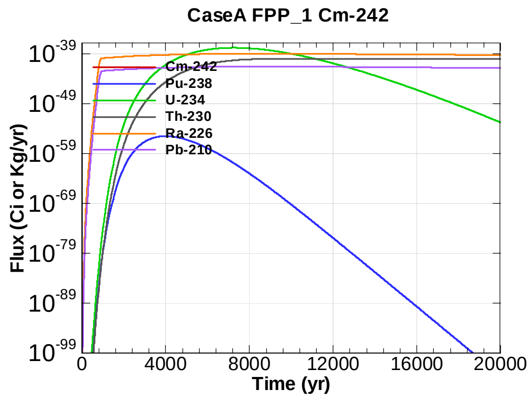

Figure A.2-2216 - Water Table Flux for CaseA FPP_1 Cm-242

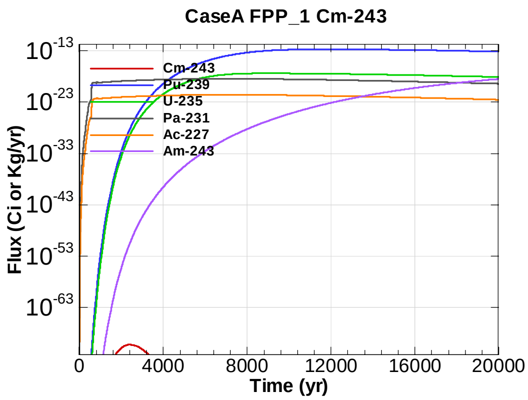

Figure A.2-2217 - Water Table Flux for CaseA FPP_1 Cm-243

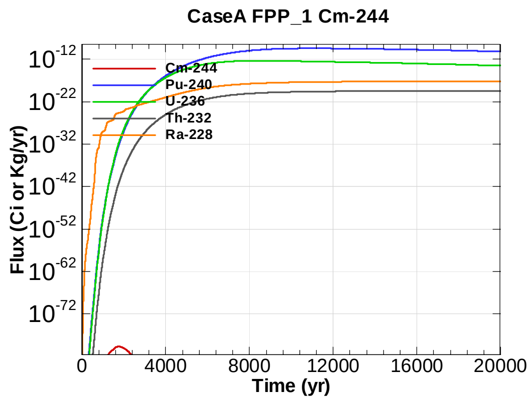

Figure A.2-2218 - Water Table Flux for CaseA FPP_1 Cm-244

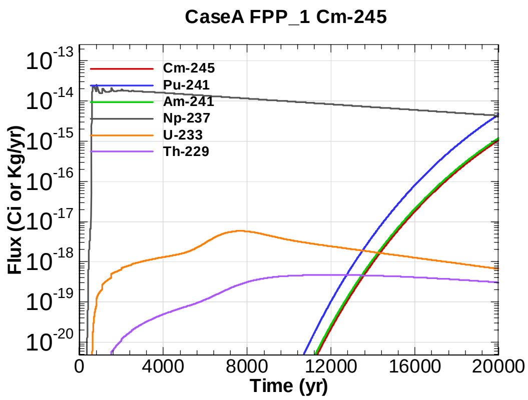

Figure A.2-2219 - Water Table Flux for CaseA FPP_1 Cm-245

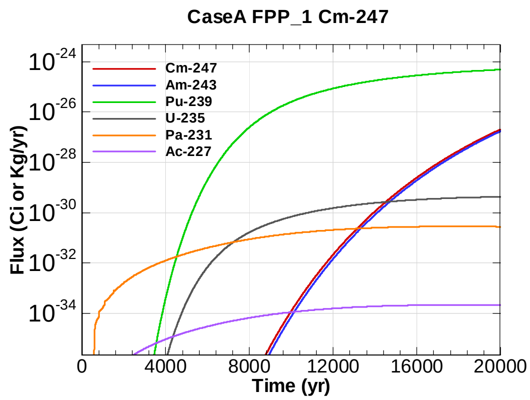

Figure A.2-2220 - Water Table Flux for CaseA FPP_1 Cm-247

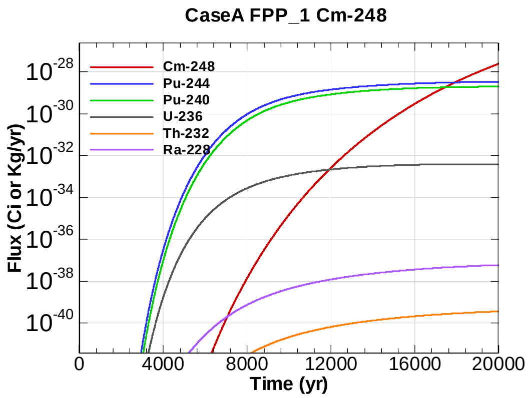

Figure A.2-2221 - Water Table Flux for CaseA FPP_1 Cm-248

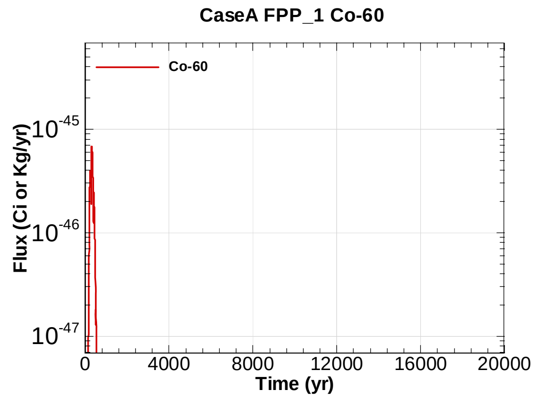

Figure A.2-2222 - Water Table Flux for CaseA FPP_1 Co-60

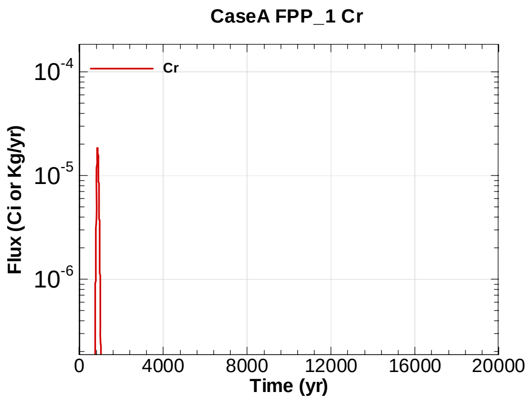

Figure A.2-2223 - Water Table Flux for CaseA FPP_1 Cr

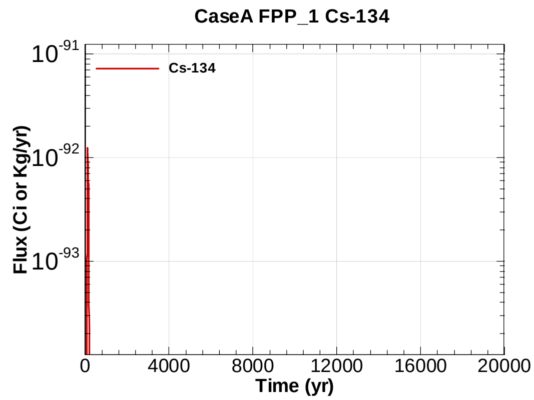

Figure A.2-2224 - Water Table Flux for CaseA FPP_1 Cs-134

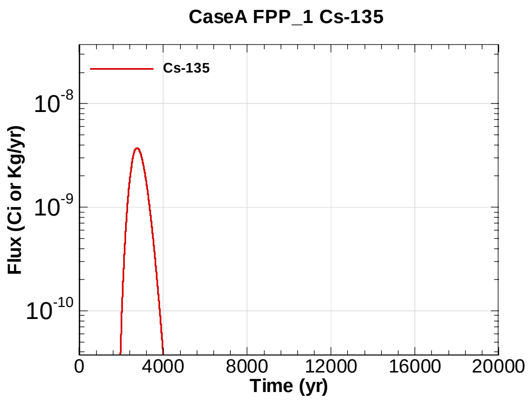

Figure A.2-2225 - Water Table Flux for CaseA FPP_1 Cs-135

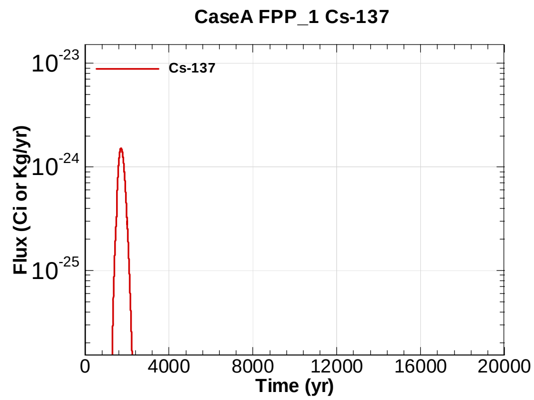

Figure A.2-2226 - Water Table Flux for CaseA FPP_1 Cs-137

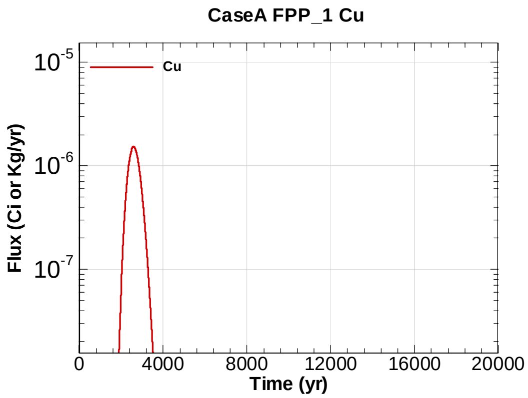

Figure A.2-2227 - Water Table Flux for CaseA FPP_1 Cu

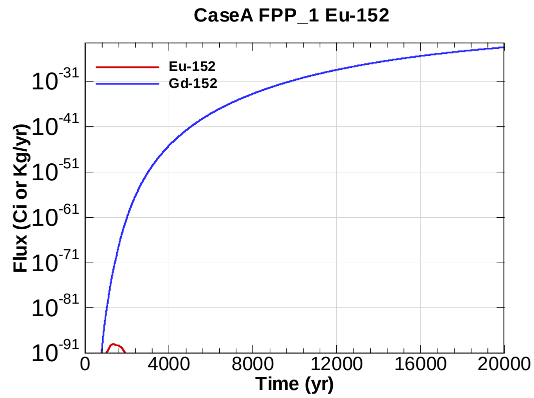

Figure A.2-2228 - Water Table Flux for CaseA FPP_1 Eu-152

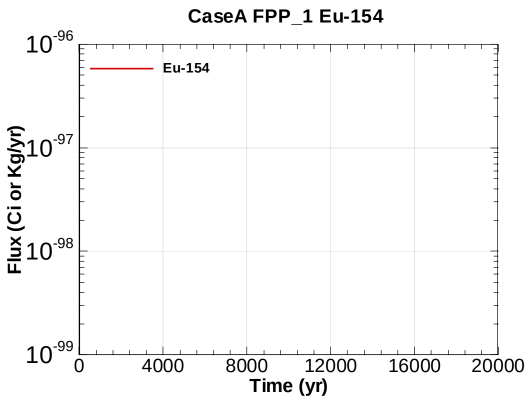

Figure A.2-2229 - Water Table Flux for CaseA FPP_1 Eu-154

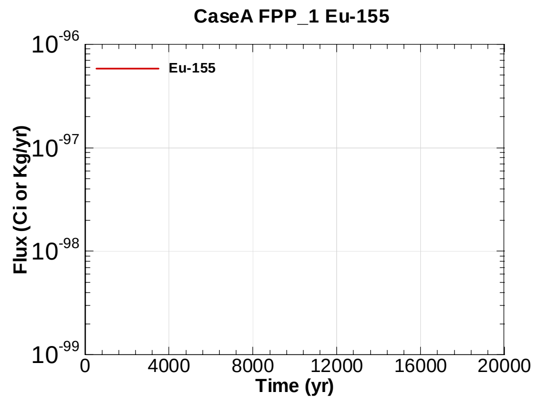

Figure A.2-2230 - Water Table Flux for CaseA FPP_1 Eu-155

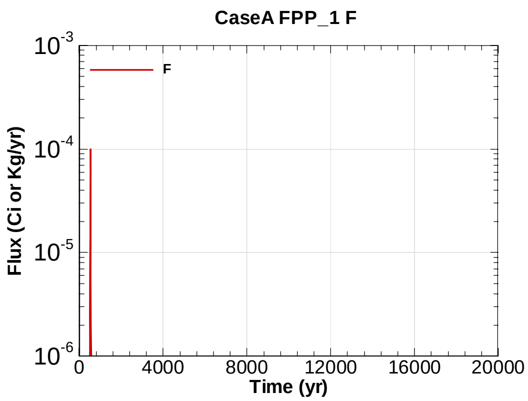

Figure A.2-2231 - Water Table Flux for CaseA FPP_1 F

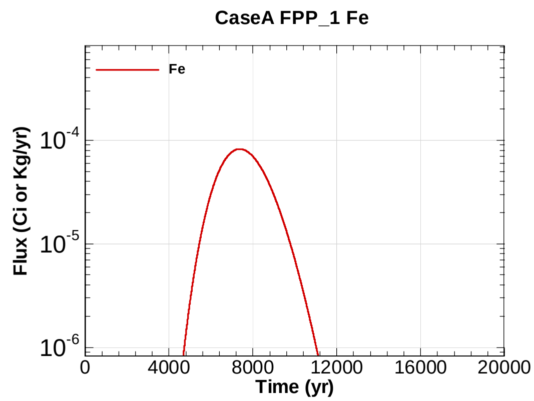

Figure A.2-2232 - Water Table Flux for CaseA FPP_1 Fe

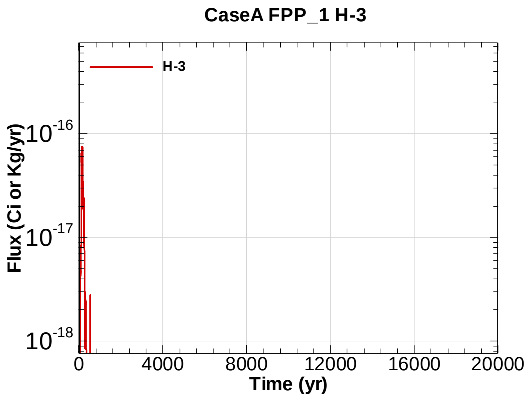

Figure A.2-2233 - Water Table Flux for CaseA FPP_1 H-3

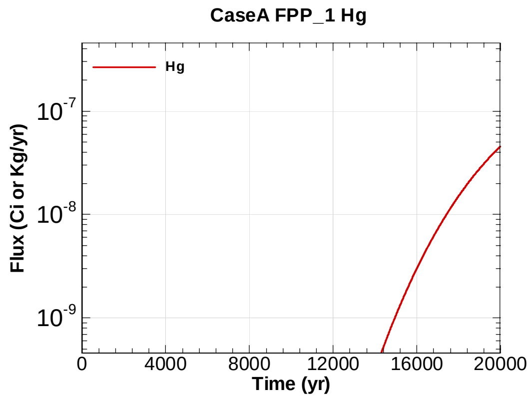

Figure A.2-2234 - Water Table Flux for CaseA FPP_1 Hg

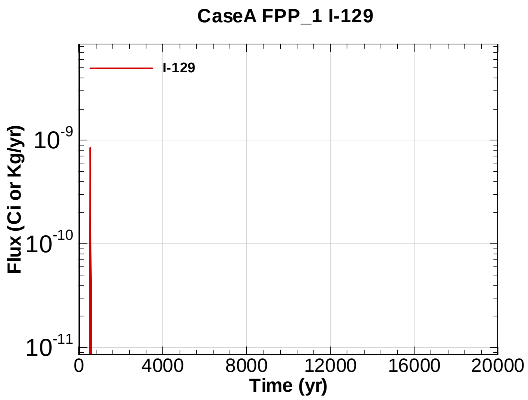

Figure A.2-2235 - Water Table Flux for CaseA FPP_1 I-129

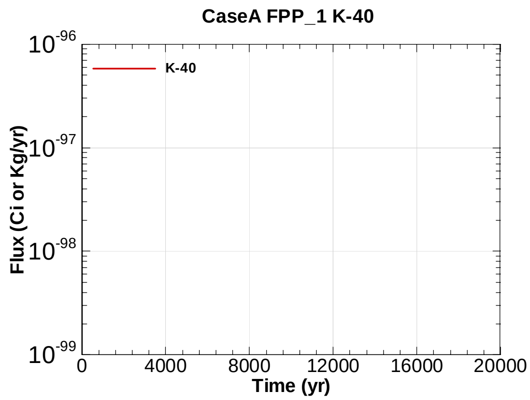

Figure A.2-2236 - Water Table Flux for CaseA FPP_1 K-40

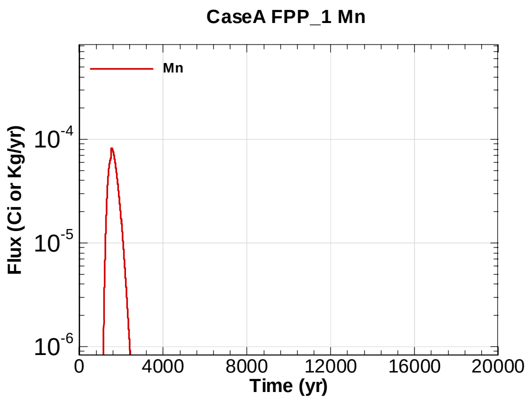

Figure A.2-2237 - Water Table Flux for CaseA FPP_1 Mn

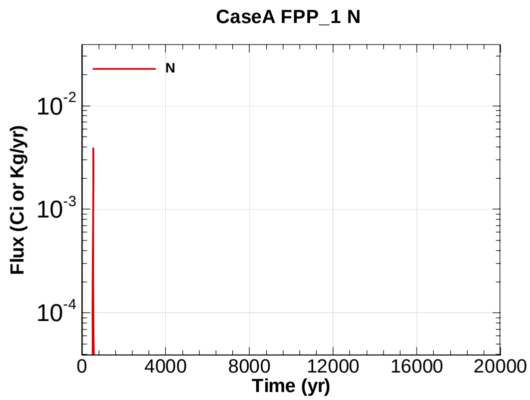

Figure A.2-2238 - Water Table Flux for CaseA FPP_1 N

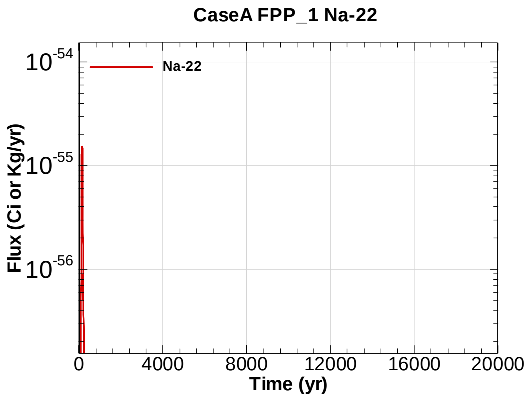

Figure A.2-2239 - Water Table Flux for CaseA FPP_1 Na-22

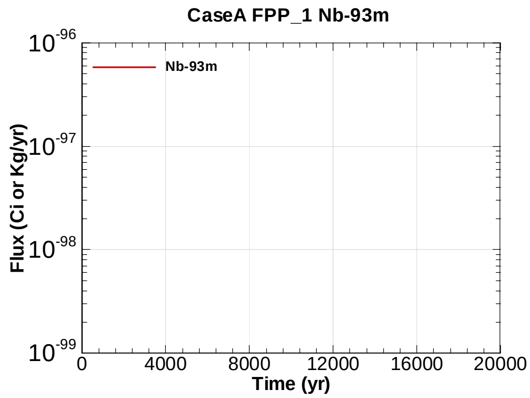

Figure A.2-2240 - Water Table Flux for CaseA FPP_1 Nb-93m

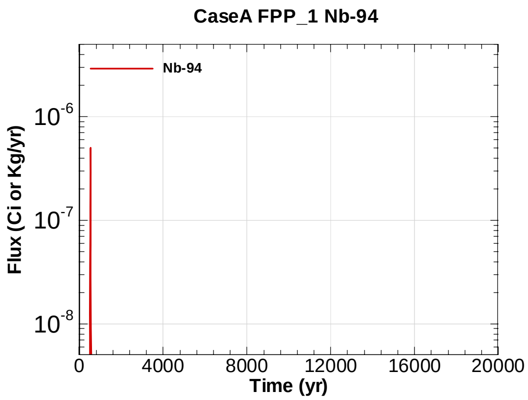

Figure A.2-2241 - Water Table Flux for CaseA FPP_1 Nb-94

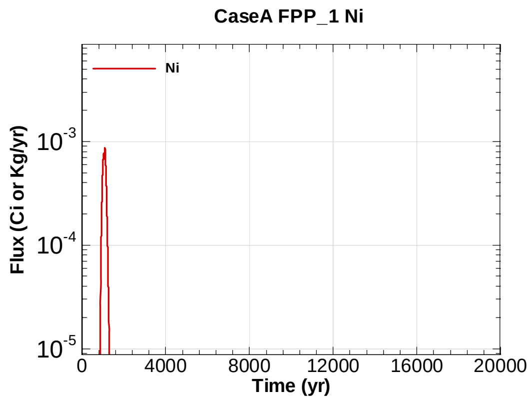

Figure A.2-2242 - Water Table Flux for CaseA FPP_1 Ni

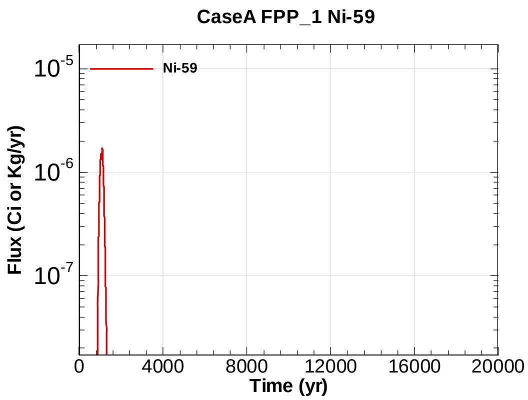

Figure A.2-2243 - Water Table Flux for CaseA FPP_1 Ni-59

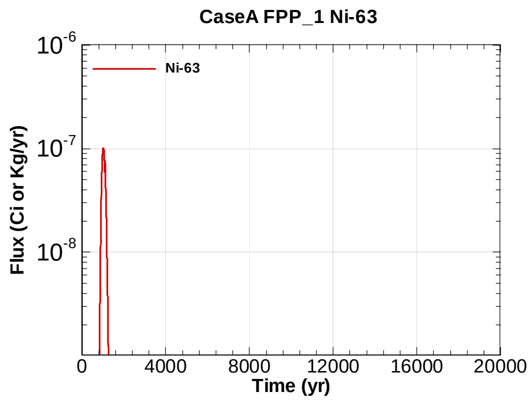

Figure A.2-2244 - Water Table Flux for CaseA FPP_1 Ni-63

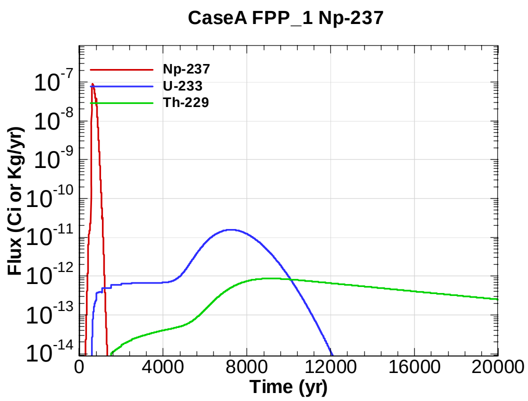

Figure A.2-2245 - Water Table Flux for CaseA FPP_1 Np-237

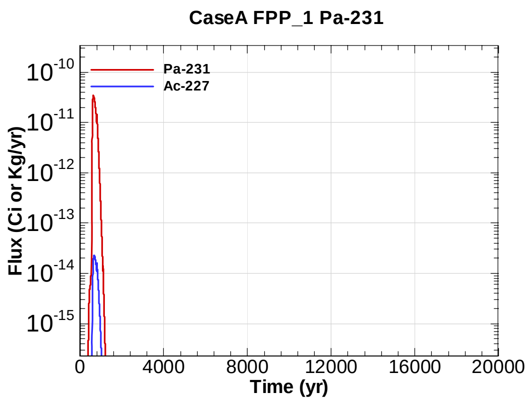

Figure A.2-2246 - Water Table Flux for CaseA FPP_1 Pa-231

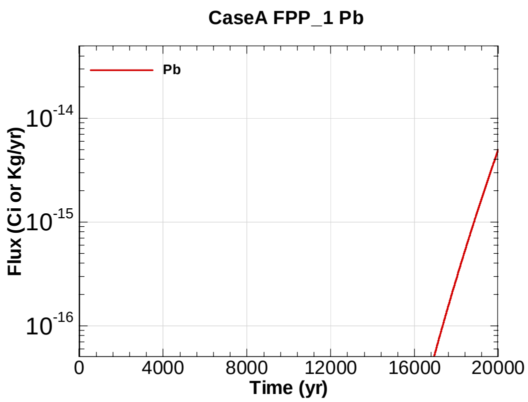

Figure A.2-2247 - Water Table Flux for CaseA FPP_1 Pb

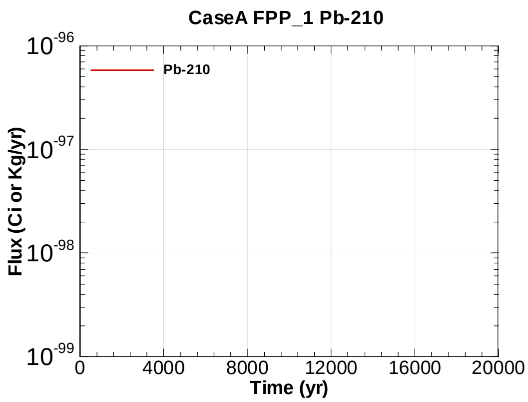

Figure A.2-2248 - Water Table Flux for CaseA FPP_1 Pb-210

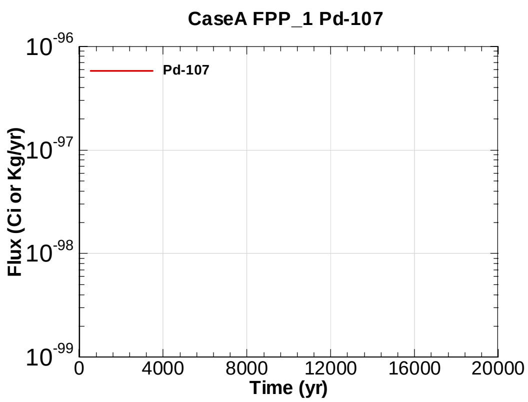

Figure A.2-2249 - Water Table Flux for CaseA FPP_1 Pd-107

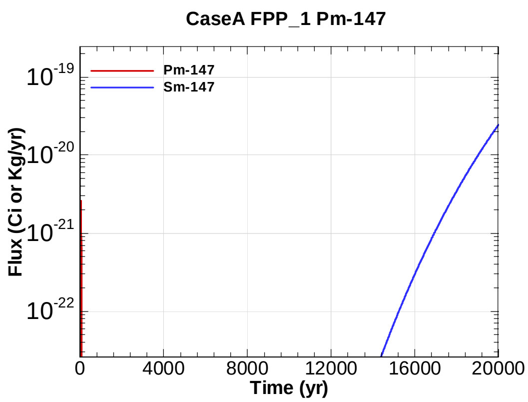

Figure A.2-2250 - Water Table Flux for CaseA FPP_1 Pm-147

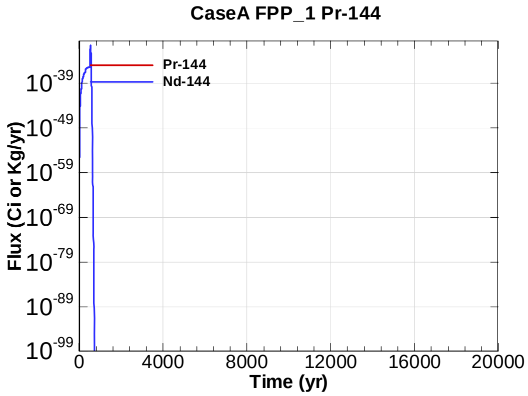

Figure A.2-2251 - Water Table Flux for CaseA FPP_1 Pr-144

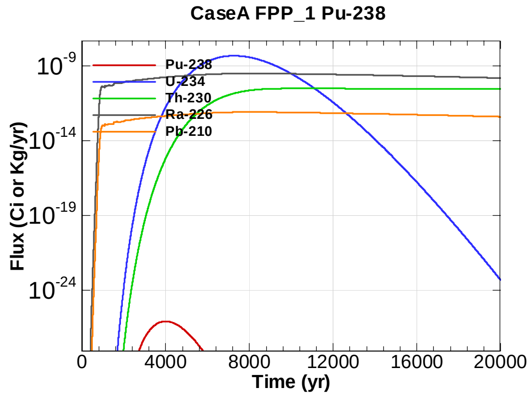

Figure A.2-2252 - Water Table Flux for CaseA FPP_1 Pu-238

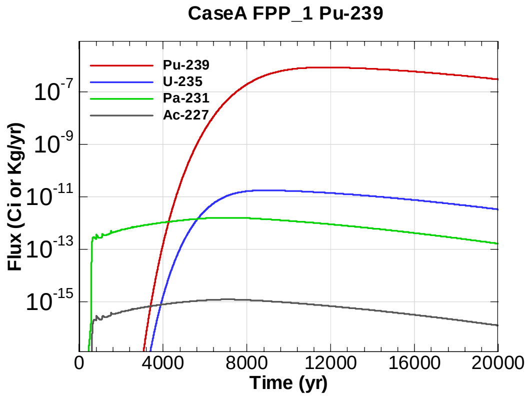

Figure A.2-2253 - Water Table Flux for CaseA FPP_1 Pu-239

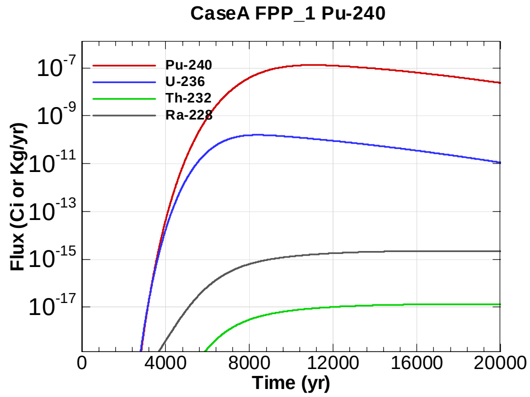

Figure A.2-2254 - Water Table Flux for CaseA FPP_1 Pu-240

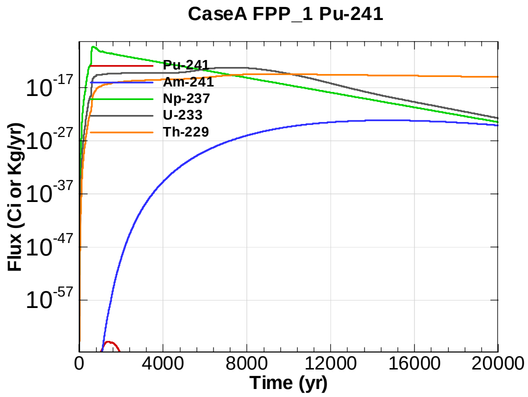

Figure A.2-2255 - Water Table Flux for CaseA FPP_1 Pu-241

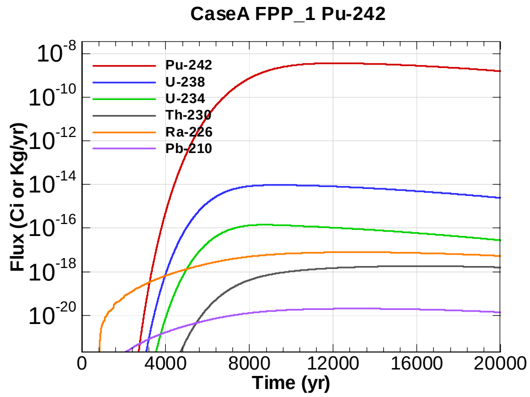

Figure A.2-2256 - Water Table Flux for CaseA FPP_1 Pu-242

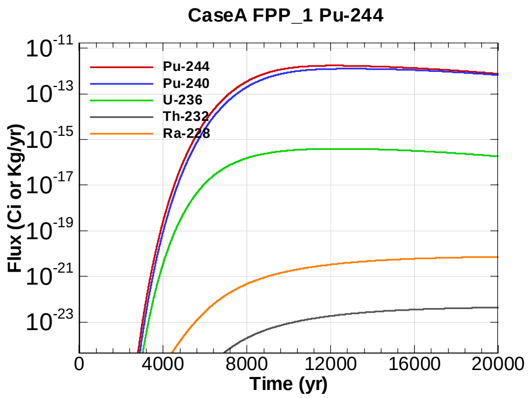

Figure A.2-2257 - Water Table Flux for CaseA FPP_1 Pu-244

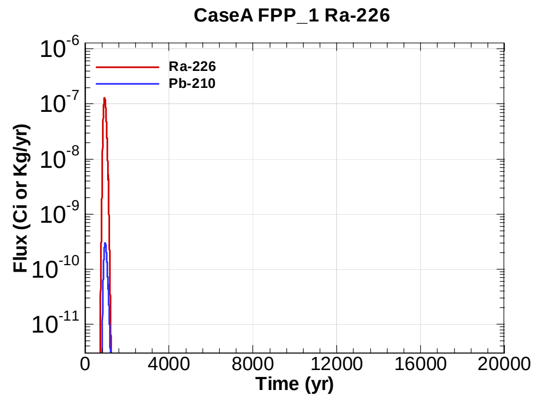

Figure A.2-2258 - Water Table Flux for CaseA FPP_1 Ra-226

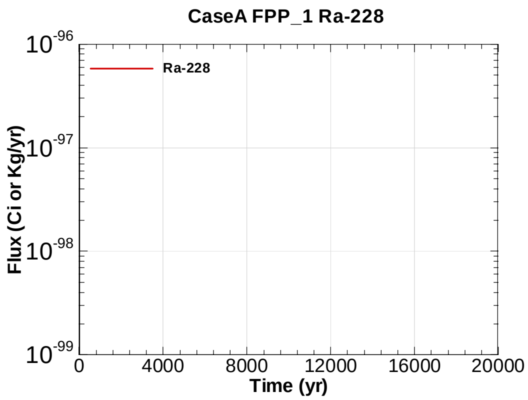

Figure A.2-2259 - Water Table Flux for CaseA FPP_1 Ra-228

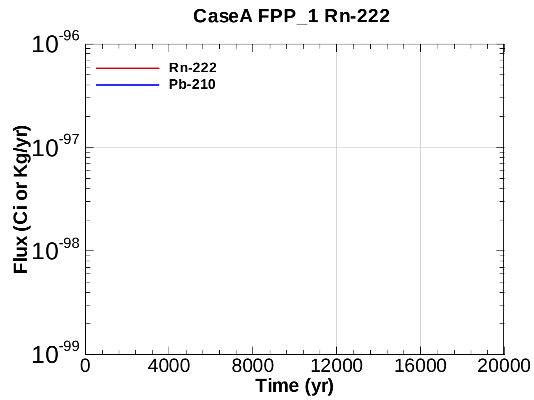

Figure A.2-2260 - Water Table Flux for CaseA FPP_1 Rn-222

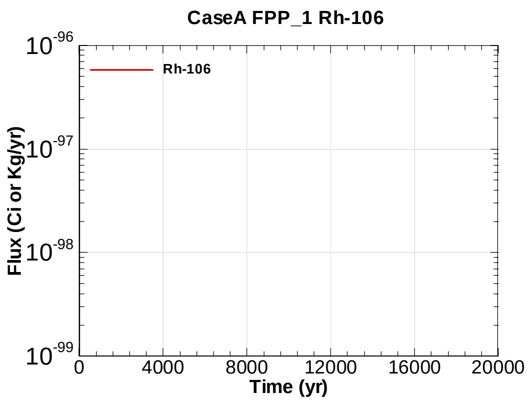

Figure A.2-2261 - Water Table Flux for CaseA FPP_1 Rh-106

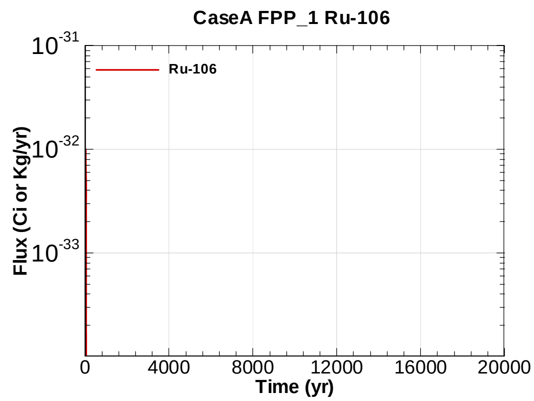

Figure A.2-2262 - Water Table Flux for CaseA FPP_1 Ru-106

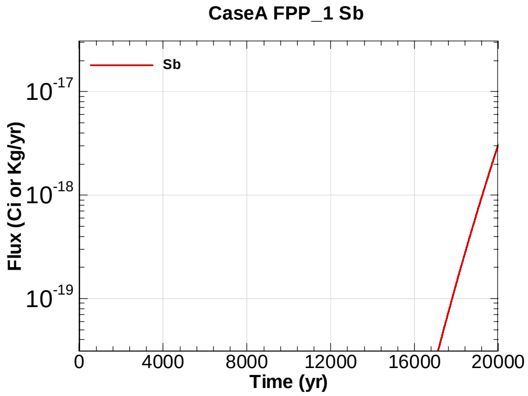

Figure A.2-2263 - Water Table Flux for CaseA FPP_1 Sb

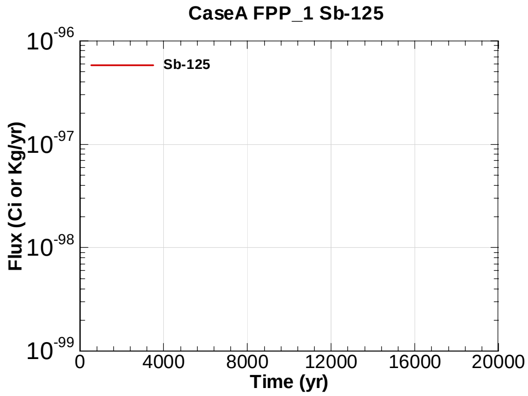

Figure A.2-2264 - Water Table Flux for CaseA FPP_1 Sb-125

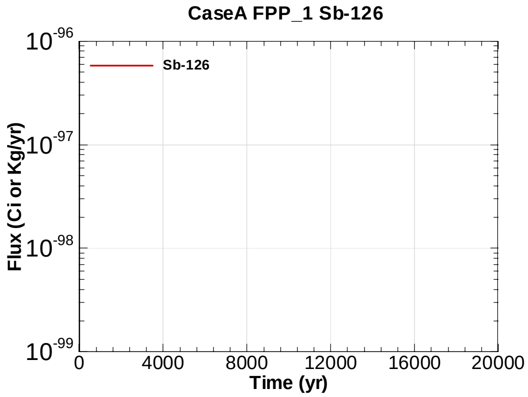

Figure A.2-2265 - Water Table Flux for CaseA FPP_1 Sb-126

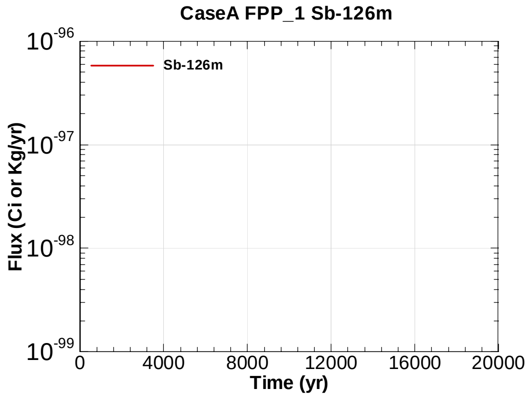

Figure A.2-2266 - Water Table Flux for CaseA FPP_1 Sb-126m

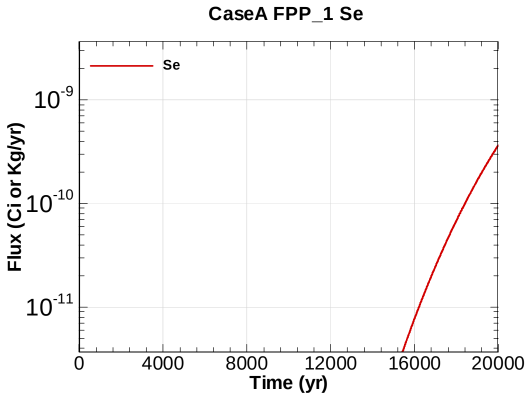

Figure A.2-2267 - Water Table Flux for CaseA FPP_1 Se

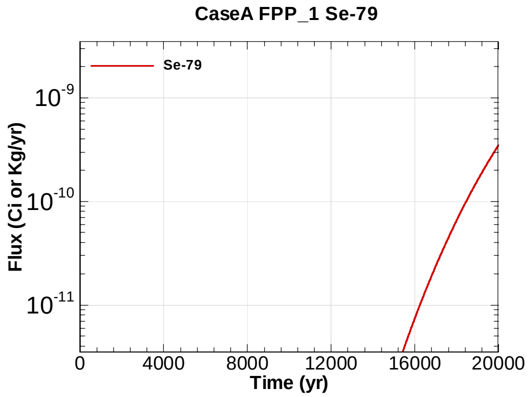

Figure A.2-2268 - Water Table Flux for CaseA FPP_1 Se-79

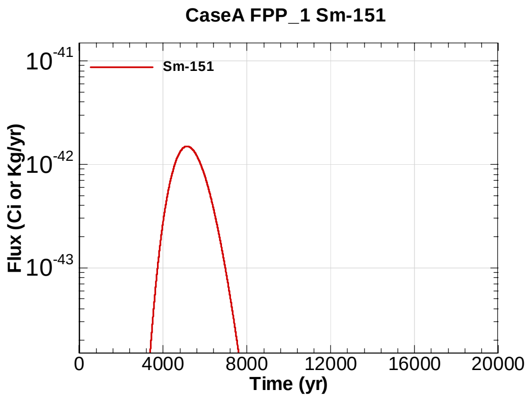

Figure A.2-2269 - Water Table Flux for CaseA FPP_1 Sm-151

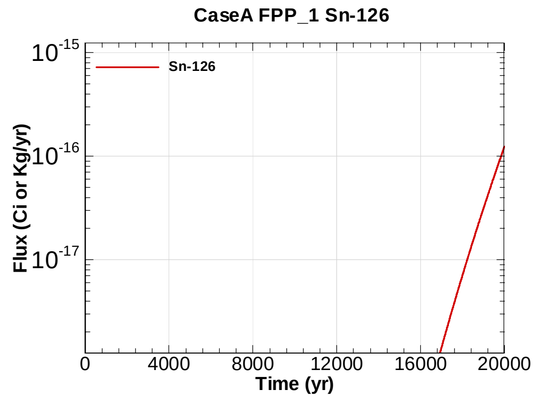

Figure A.2-2270 - Water Table Flux for CaseA FPP_1 Sn-126

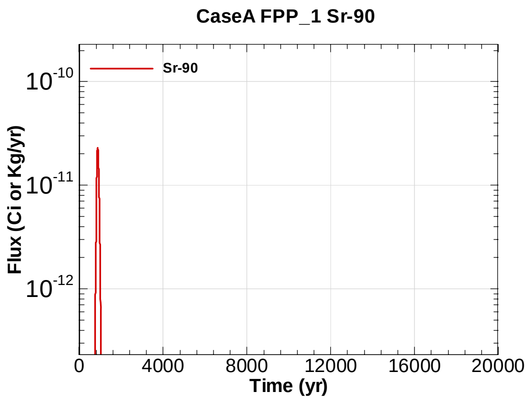

Figure A.2-2271 - Water Table Flux for CaseA FPP_1 Sr-90

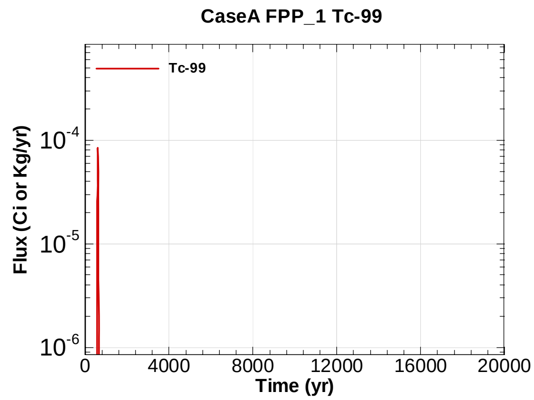

Figure A.2-2272 - Water Table Flux for CaseA FPP_1 Tc-99

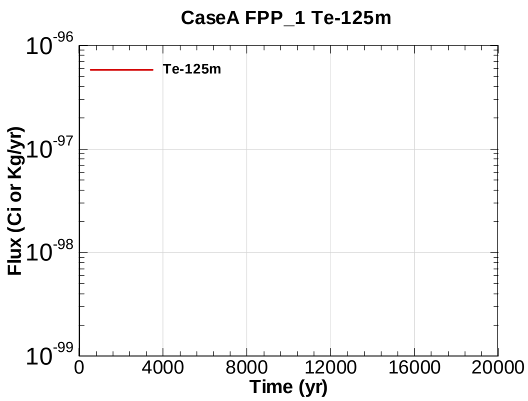

Figure A.2-2273 - Water Table Flux for CaseA FPP_1 Te-125m

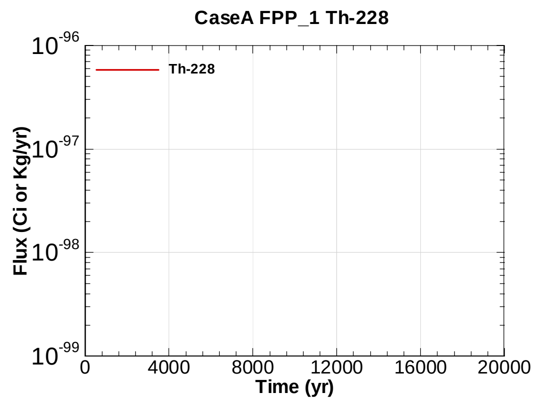

Figure A.2-2274 - Water Table Flux for CaseA FPP_1 Th-228

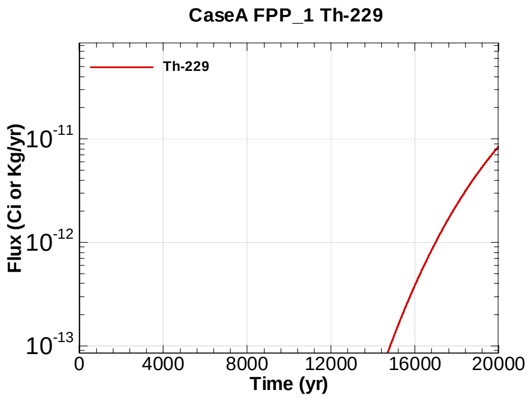

Figure A.2-2275 - Water Table Flux for CaseA FPP_1 Th-229

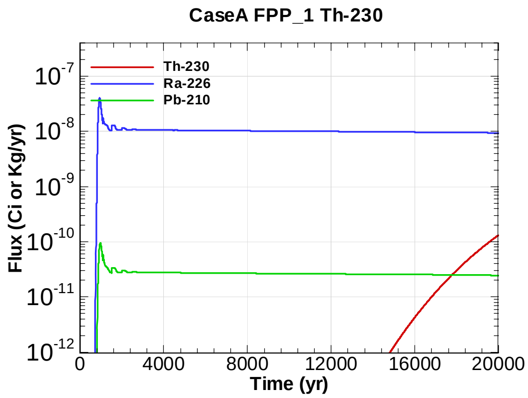

Figure A.2-2276 - Water Table Flux for CaseA FPP_1 Th-230

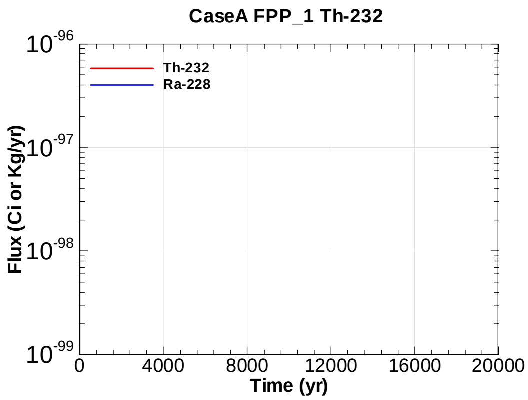

Figure A.2-2277 - Water Table Flux for CaseA FPP_1 Th-232

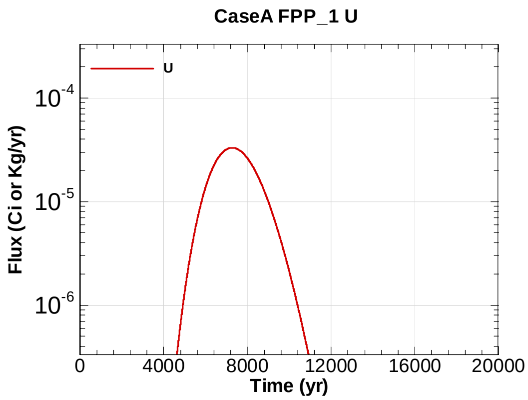

Figure A.2-2278 - Water Table Flux for CaseA FPP_1 U

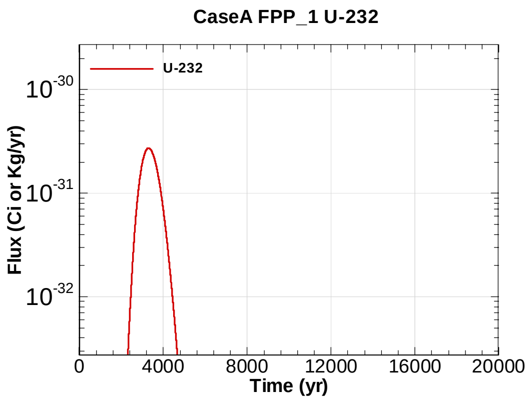

Figure A.2-2279 - Water Table Flux for CaseA FPP_1 U-232

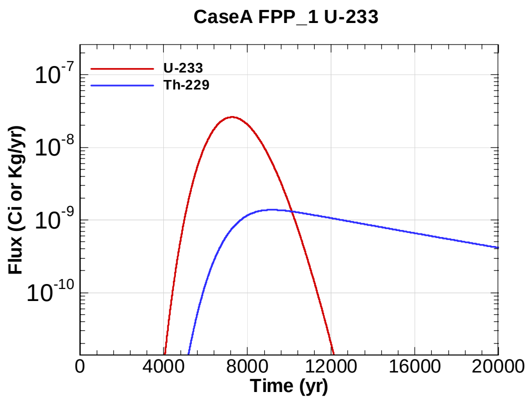

Figure A.2-2280 - Water Table Flux for CaseA FPP_1 U-233

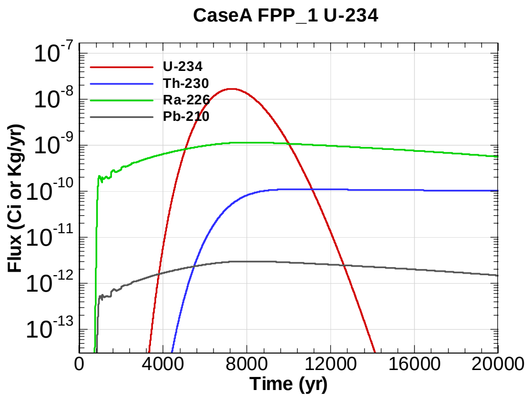

Figure A.2-2281 - Water Table Flux for CaseA FPP_1 U-234

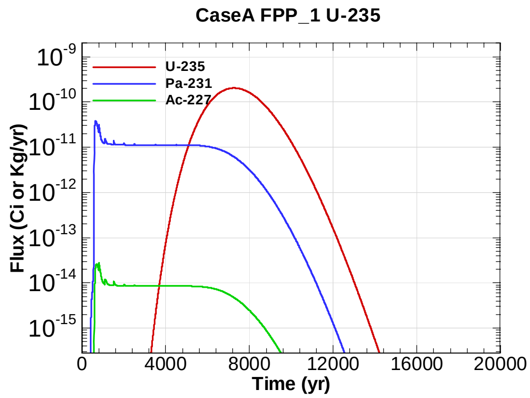

Figure A.2-2282 - Water Table Flux for CaseA FPP_1 U-235

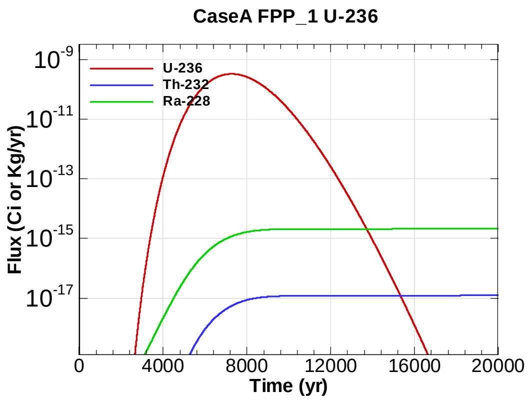

Figure A.2-2283 - Water Table Flux for CaseA FPP_1 U-236

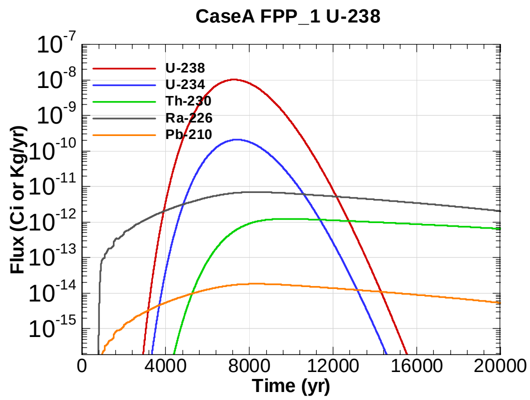

Figure A.2-2284 - Water Table Flux for CaseA FPP_1 U-238

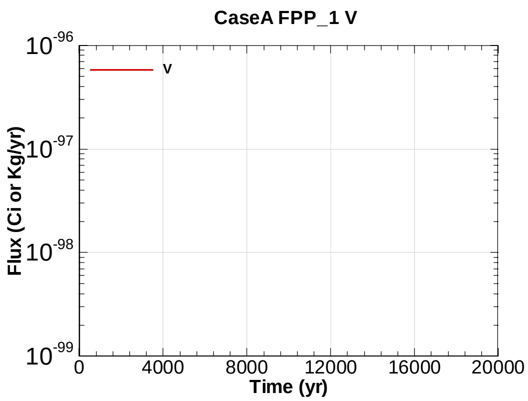

Figure A.2-2285 - Water Table Flux for CaseA FPP_1 V

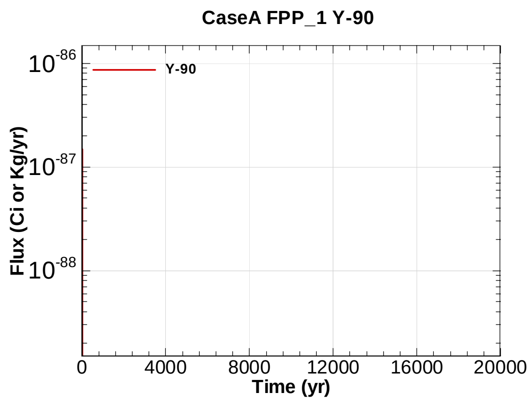

Figure A.2-2286 - Water Table Flux for CaseA FPP_1 Y-90

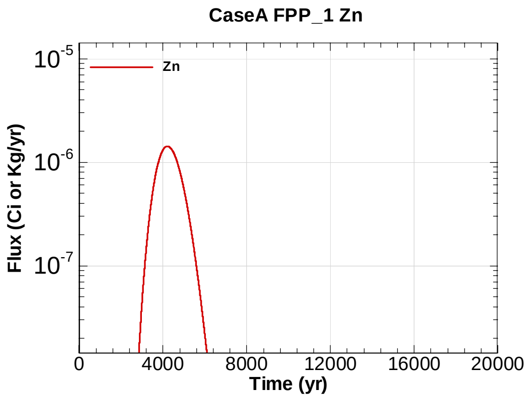

Figure A.2-2287 - Water Table Flux for CaseA FPP_1 Zn

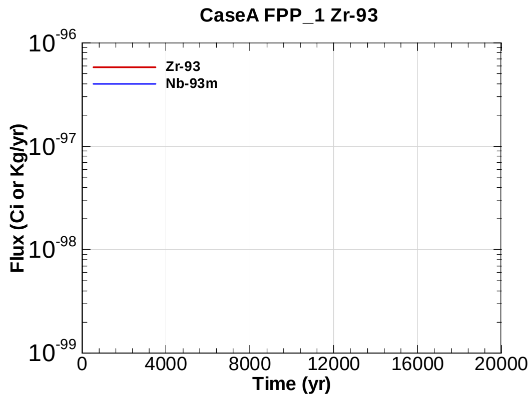

Figure A.2-2288 - Water Table Flux for CaseA FPP_1 Zr-93

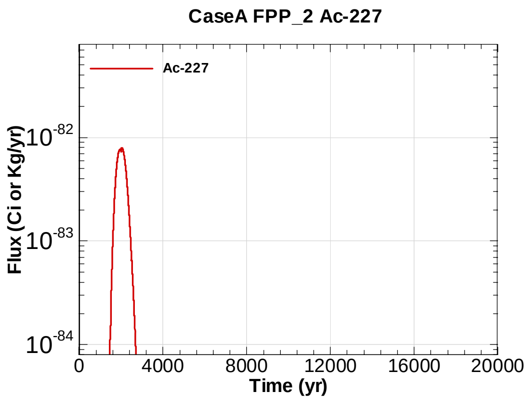

Figure A.2-2289 - Water Table Flux for CaseA FPP_2 Ac-227

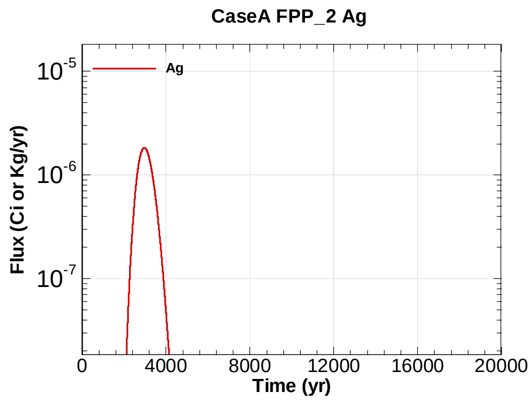

Figure A.2-2290 - Water Table Flux for CaseA FPP_2 Ag

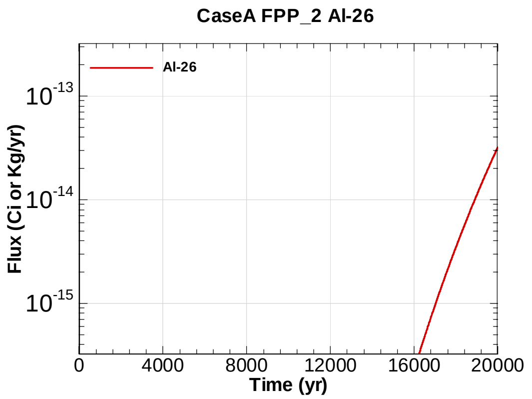

Figure A.2-2291 - Water Table Flux for CaseA FPP_2 Al-26

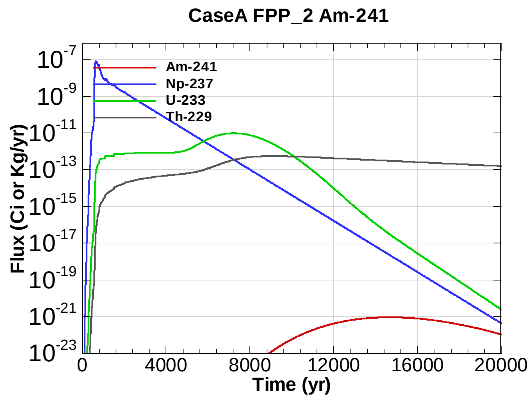

Figure A.2-2292 - Water Table Flux for CaseA FPP_2 Am-241

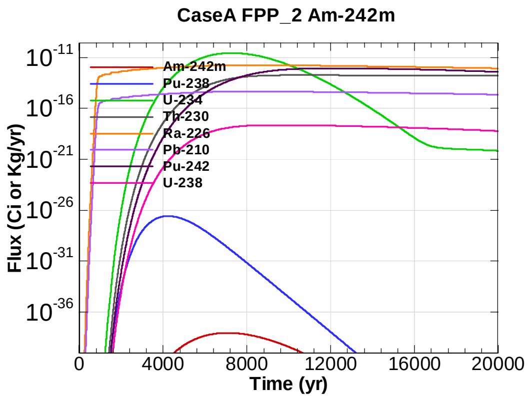

Figure A.2-2293 - Water Table Flux for CaseA FPP_2 Am-242m

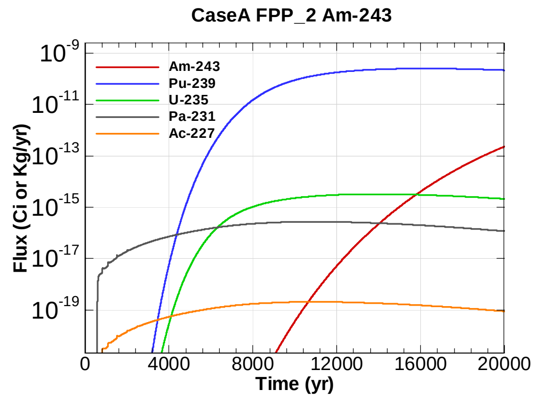

Figure A.2-2294 - Water Table Flux for CaseA FPP_2 Am-243

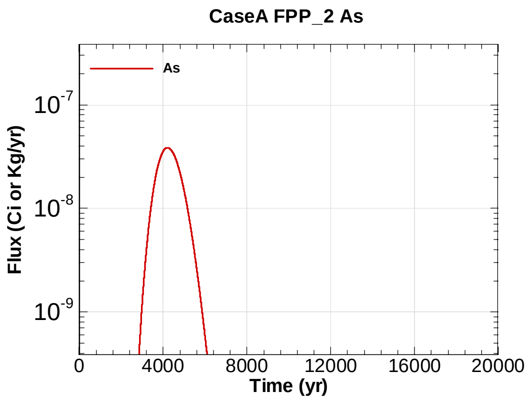

Figure A.2-2295 - Water Table Flux for CaseA FPP_2 As

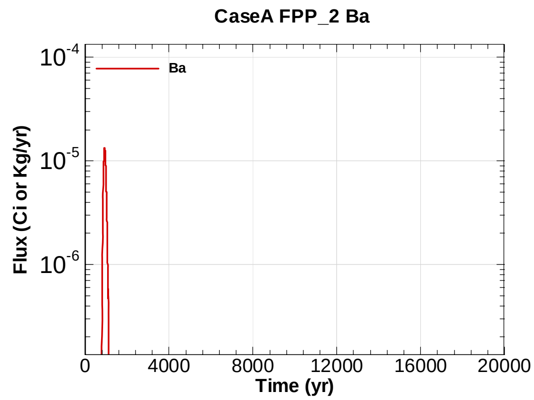

Figure A.2-2296 - Water Table Flux for CaseA FPP_2 Ba

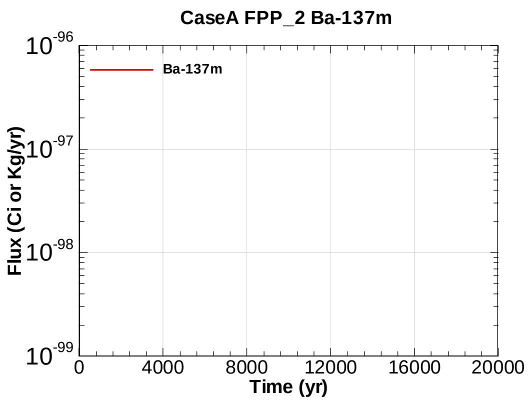

Figure A.2-2297 - Water Table Flux for CaseA FPP_2 Ba-137m

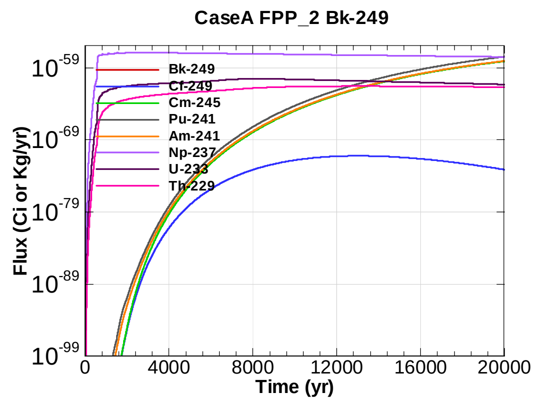

Figure A.2-2298 - Water Table Flux for CaseA FPP_2 Bk-249

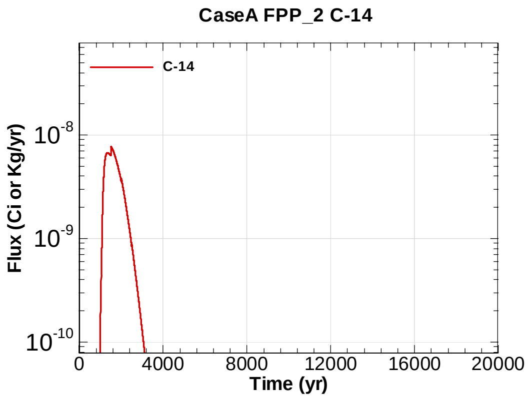

Figure A.2-2299 - Water Table Flux for CaseA FPP_2 C-14

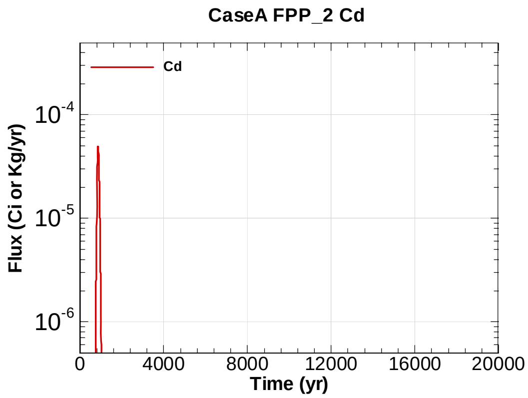

Figure A.2-2300 - Water Table Flux for CaseA FPP_2 Cd

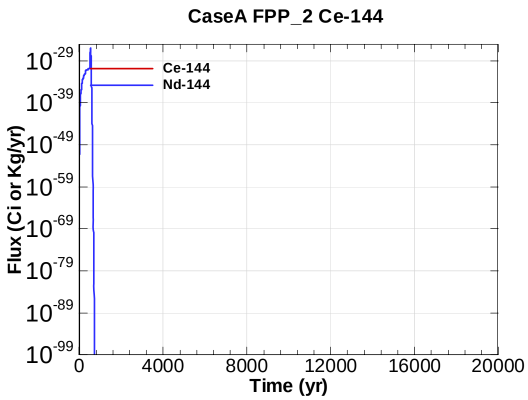

Figure A.2-2301 - Water Table Flux for CaseA FPP_2 Ce-144

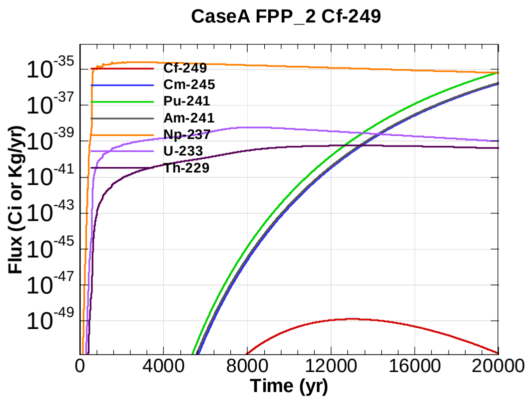

Figure A.2-2302 - Water Table Flux for CaseA FPP_2 Cf-249

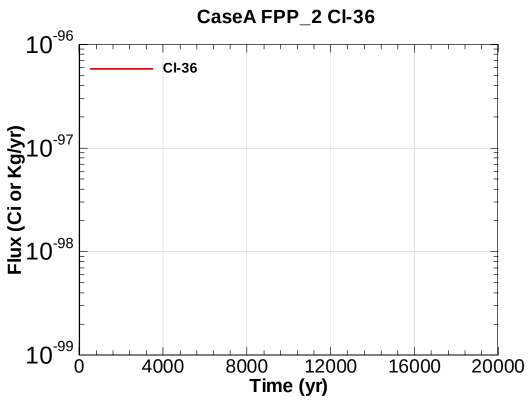

Figure A.2-2303 - Water Table Flux for CaseA FPP_2 Cl-36

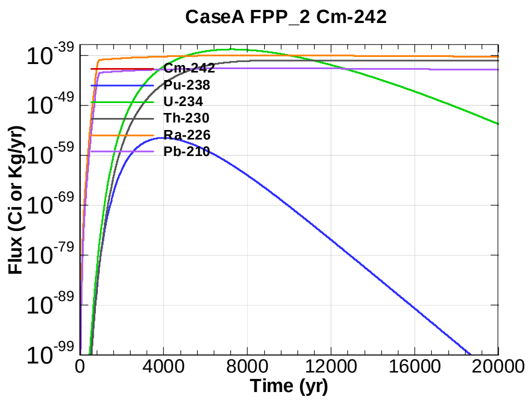

Figure A.2-2304 - Water Table Flux for CaseA FPP_2 Cm-242

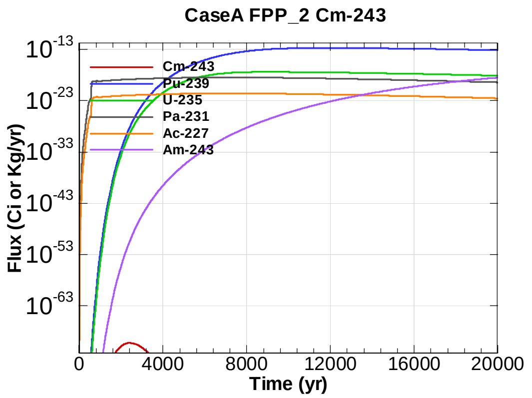

Figure A.2-2305 - Water Table Flux for CaseA FPP_2 Cm-243

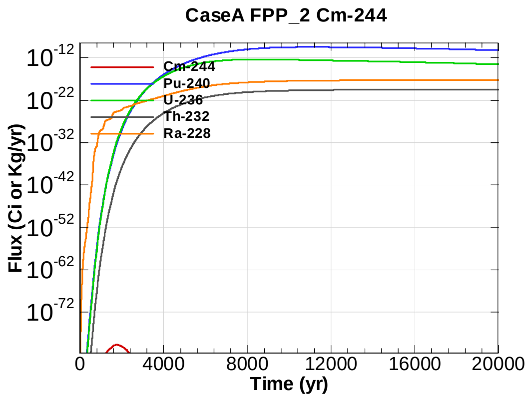

Figure A.2-2306 - Water Table Flux for CaseA FPP_2 Cm-244

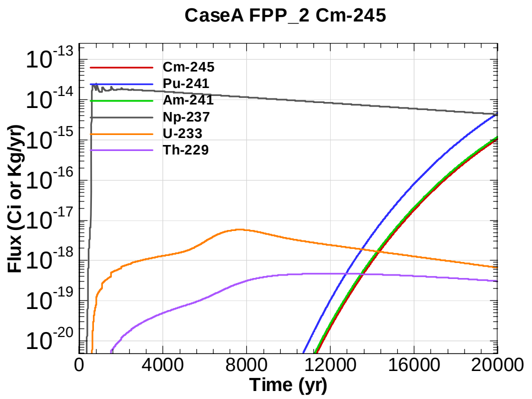

Figure A.2-2307 - Water Table Flux for CaseA FPP_2 Cm-245

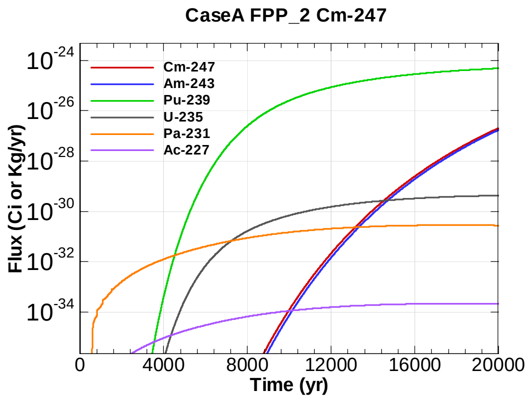

Figure A.2-2308 - Water Table Flux for CaseA FPP_2 Cm-247

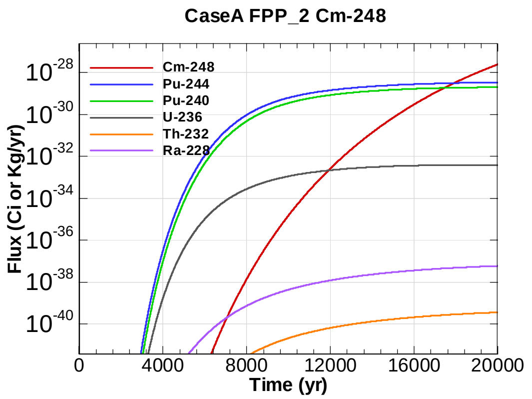

Figure A.2-2309 - Water Table Flux for CaseA FPP_2 Cm-248

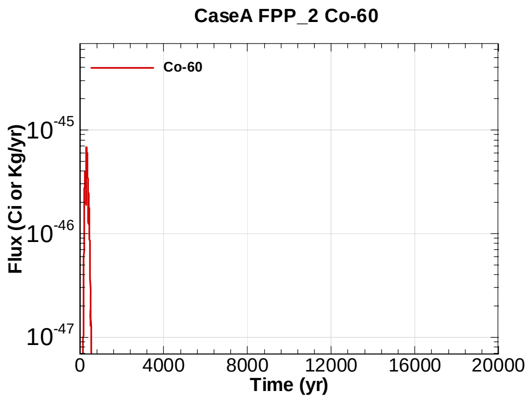

Figure A.2-2310 - Water Table Flux for CaseA FPP_2 Co-60

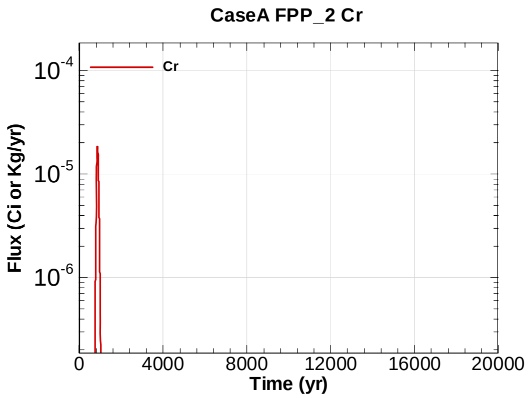

Figure A.2-2311 - Water Table Flux for CaseA FPP_2 Cr

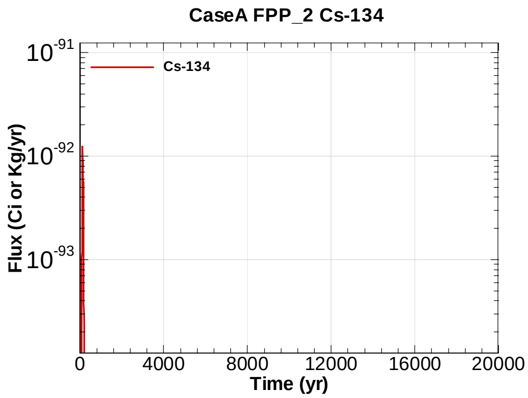

Figure A.2-2312 - Water Table Flux for CaseA FPP_2 Cs-134

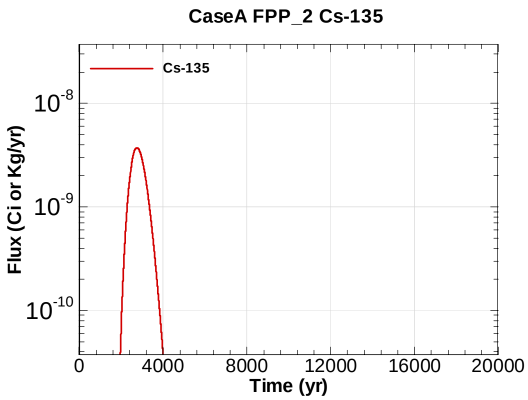

Figure A.2-2313 - Water Table Flux for CaseA FPP_2 Cs-135

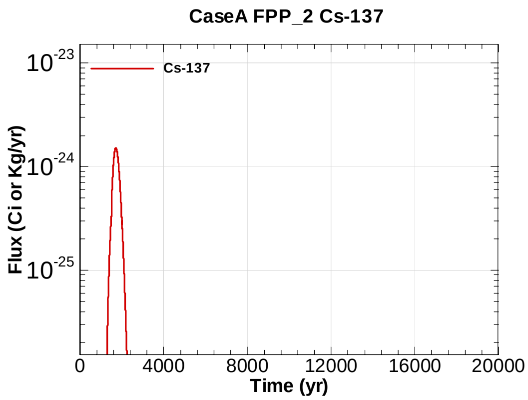

Figure A.2-2314 - Water Table Flux for CaseA FPP_2 Cs-137

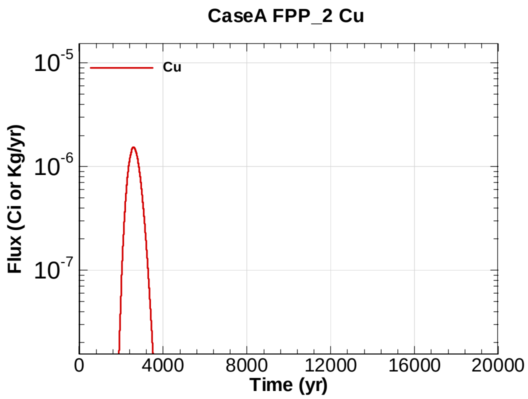

Figure A.2-2315 - Water Table Flux for CaseA FPP_2 Cu

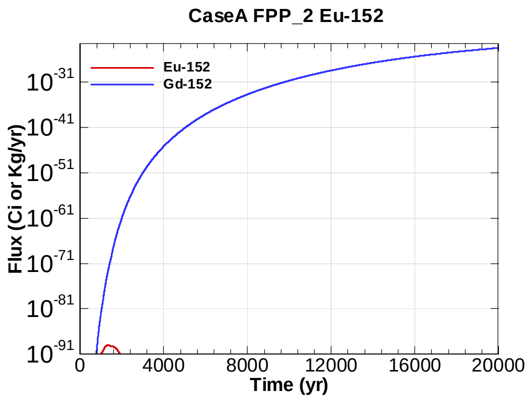

Figure A.2-2316 - Water Table Flux for CaseA FPP_2 Eu-152

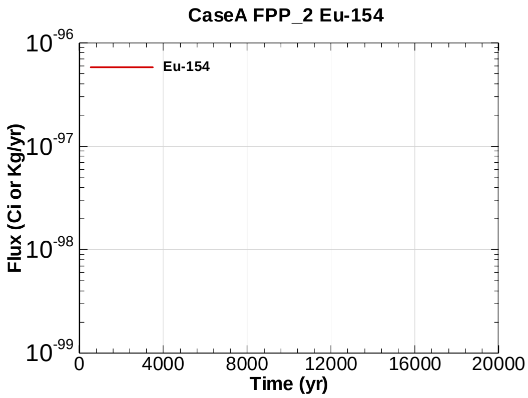

Figure A.2-2317 - Water Table Flux for CaseA FPP_2 Eu-154

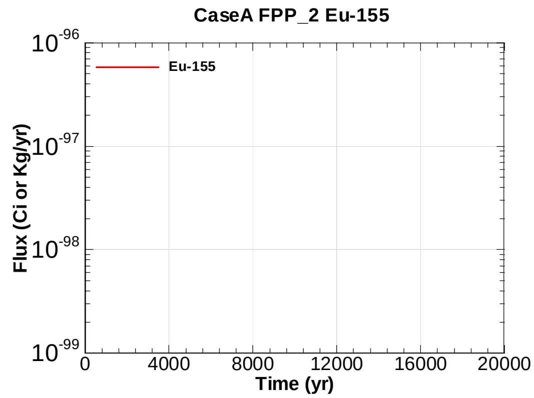

Figure A.2-2318 - Water Table Flux for CaseA FPP_2 Eu-155

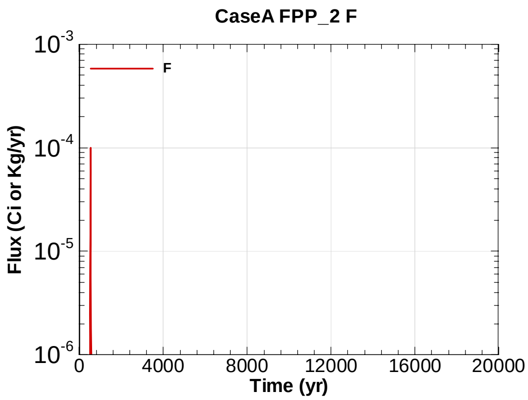

Figure A.2-2319 - Water Table Flux for CaseA FPP_2 F

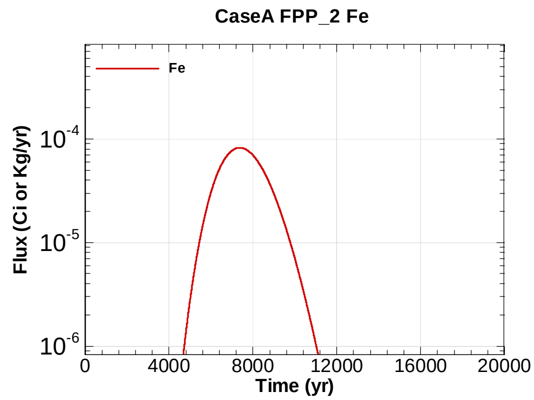

Figure A.2-2320 - Water Table Flux for CaseA FPP_2 Fe

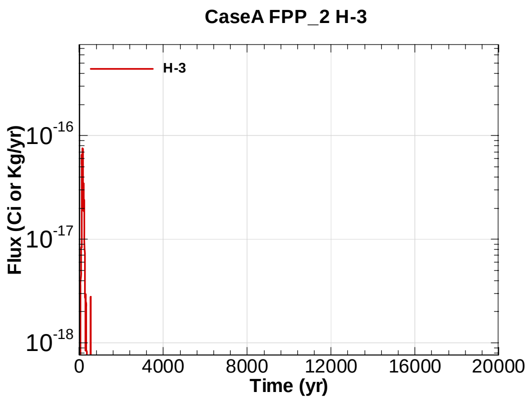

Figure A.2-2321 - Water Table Flux for CaseA FPP_2 H-3

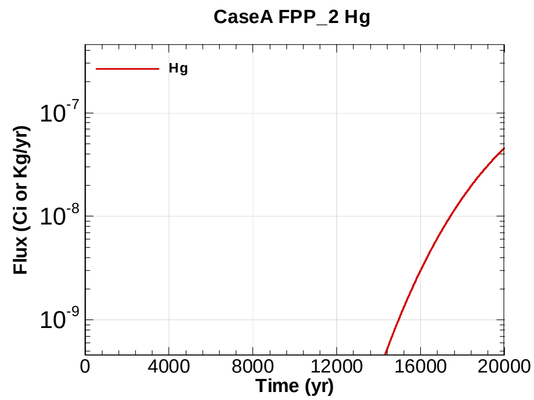

Figure A.2-2322 - Water Table Flux for CaseA FPP_2 Hg

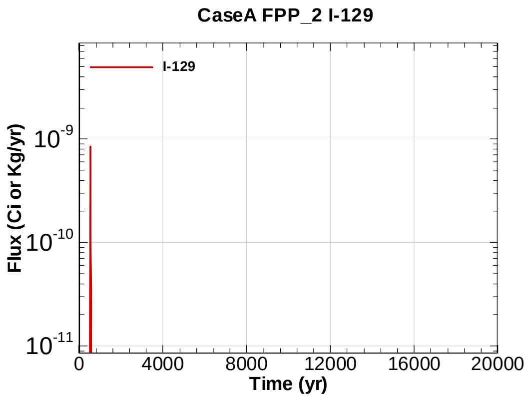

Figure A.2-2323 - Water Table Flux for CaseA FPP_2 I-129

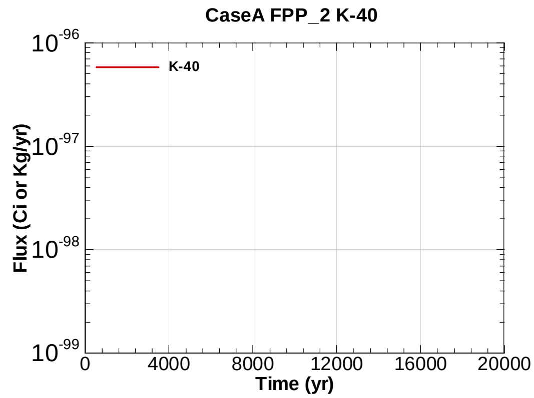

Figure A.2-2324 - Water Table Flux for CaseA FPP_2 K-40

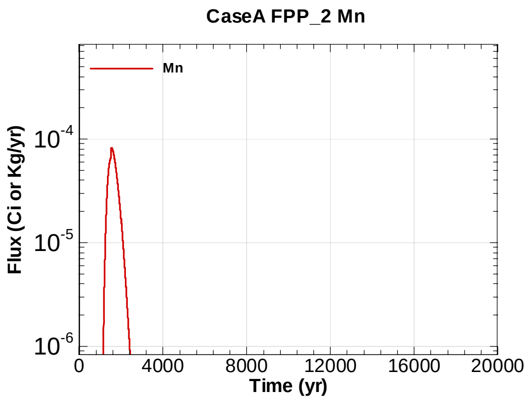

Figure A.2-2325 - Water Table Flux for CaseA FPP_2 Mn

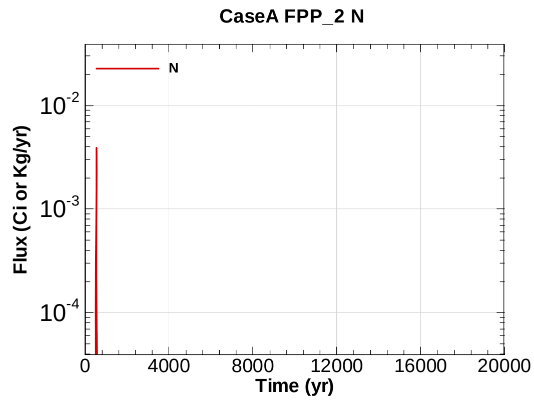

Figure A.2-2326 - Water Table Flux for CaseA FPP_2 N

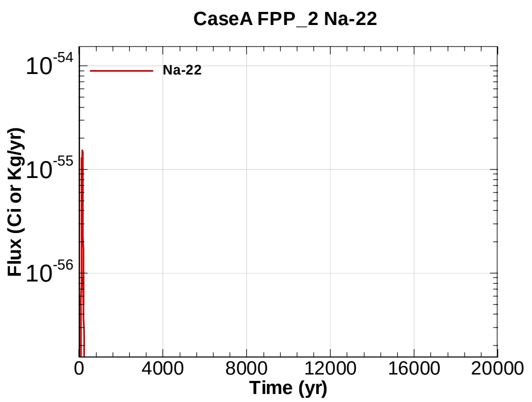

Figure A.2-2327 - Water Table Flux for CaseA FPP_2 Na-22

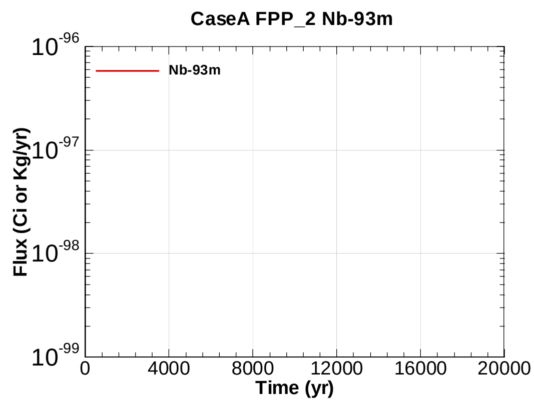

Figure A.2-2328 - Water Table Flux for CaseA FPP_2 Nb-93m

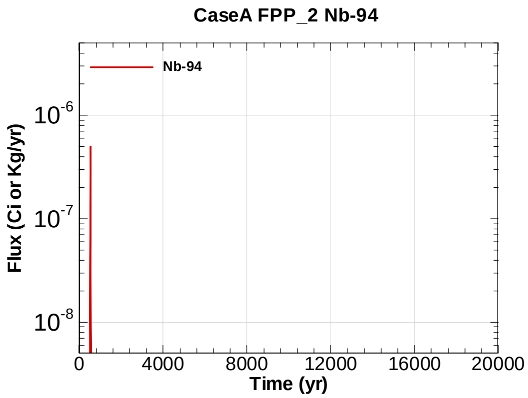

Figure A.2-2329 - Water Table Flux for CaseA FPP_2 Nb-94

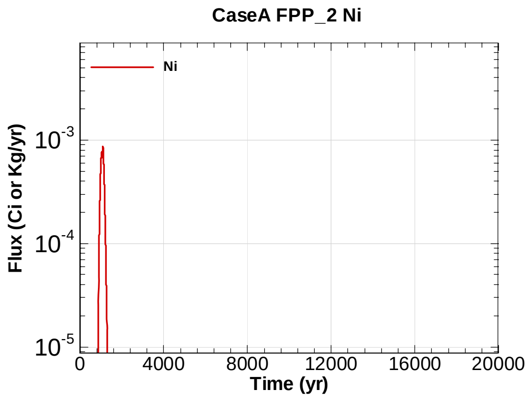

Figure A.2-2330 - Water Table Flux for CaseA FPP_2 Ni

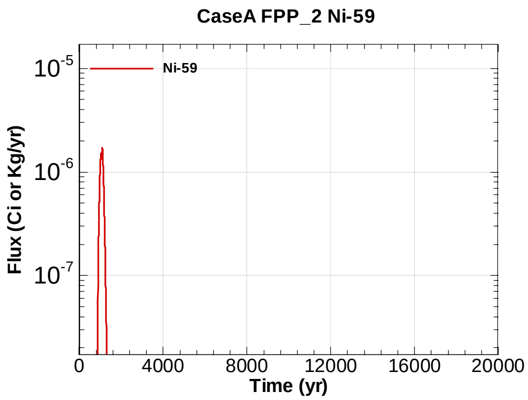

Figure A.2-2331 - Water Table Flux for CaseA FPP_2 Ni-59

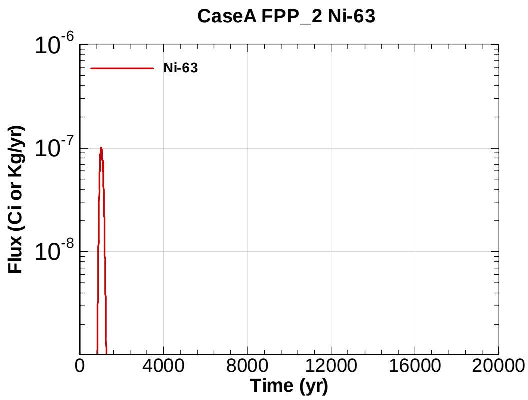

Figure A.2-2332 - Water Table Flux for CaseA FPP_2 Ni-63

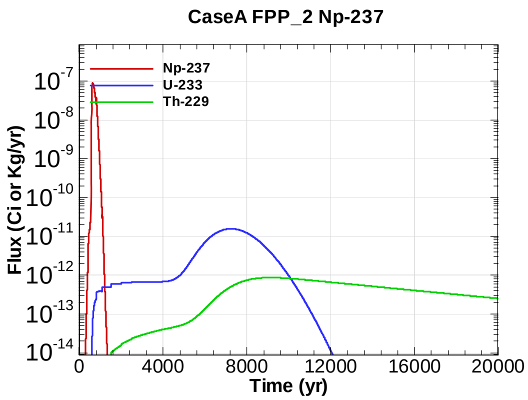

Figure A.2-2333 - Water Table Flux for CaseA FPP_2 Np-237

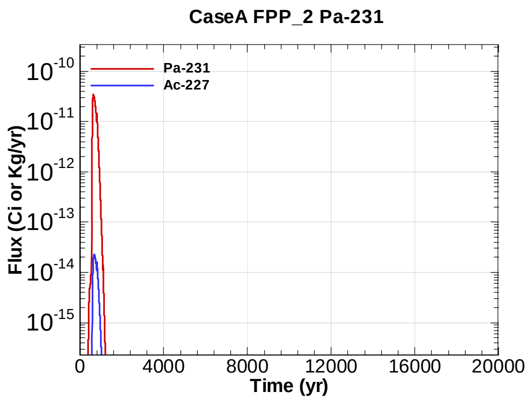

Figure A.2-2334 - Water Table Flux for CaseA FPP_2 Pa-231

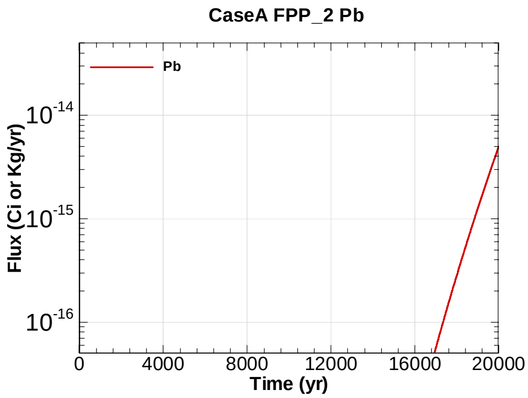

Figure A.2-2335 - Water Table Flux for CaseA FPP_2 Pb

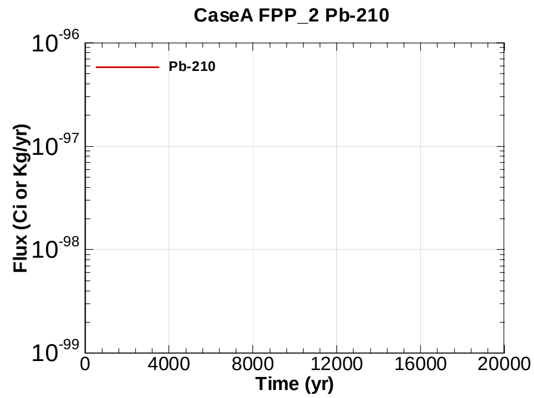

Figure A.2-2336 - Water Table Flux for CaseA FPP_2 Pb-210

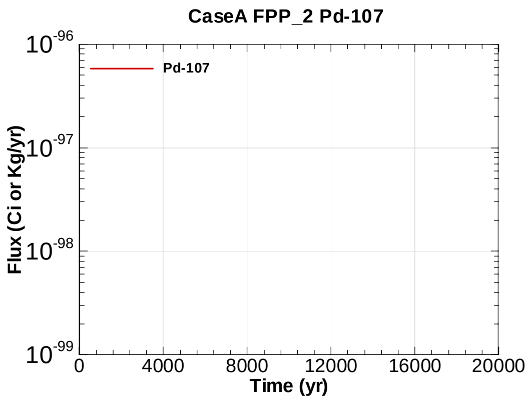

Figure A.2-2337 - Water Table Flux for CaseA FPP_2 Pd-107

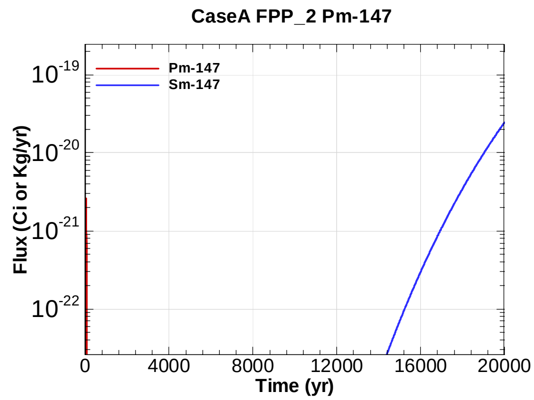

Figure A.2-2338 - Water Table Flux for CaseA FPP_2 Pm-147

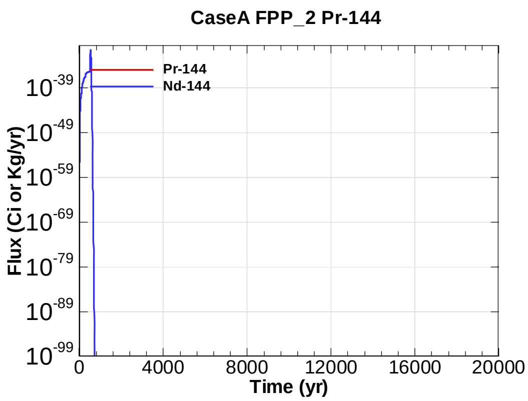

Figure A.2-2339 - Water Table Flux for CaseA FPP_2 Pr-144

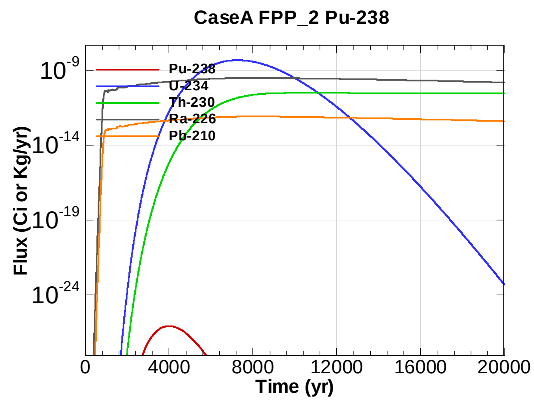

Figure A.2-2340 - Water Table Flux for CaseA FPP_2 Pu-238

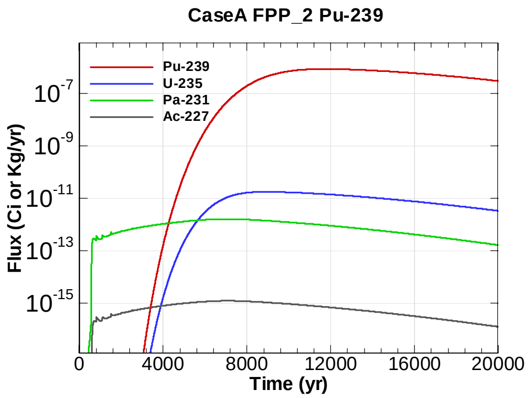

Figure A.2-2341 - Water Table Flux for CaseA FPP_2 Pu-239

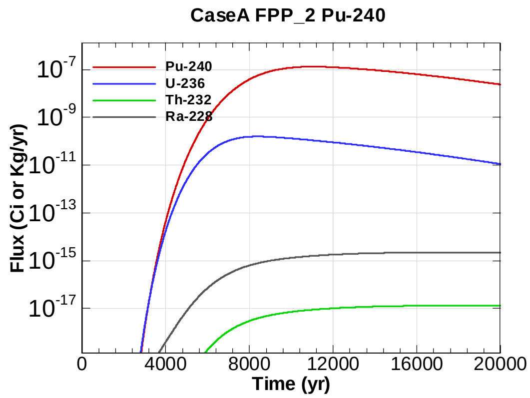

Figure A.2-2342 - Water Table Flux for CaseA FPP_2 Pu-240

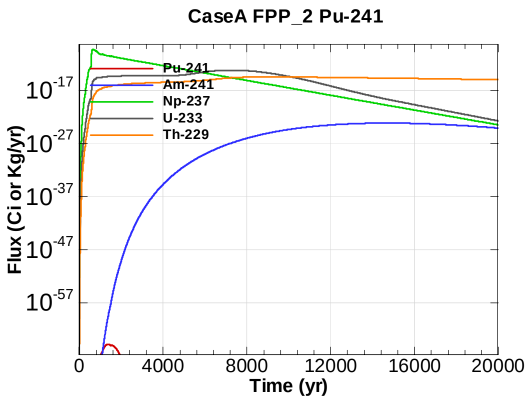

Figure A.2-2343 - Water Table Flux for CaseA FPP_2 Pu-241

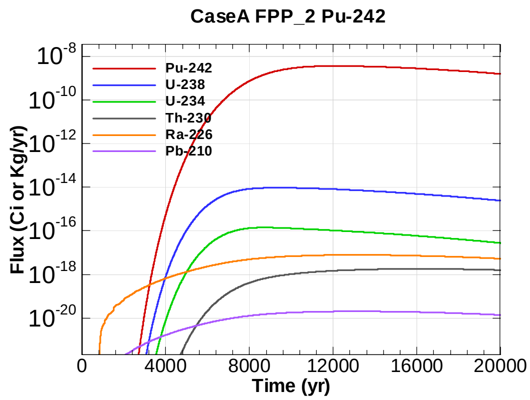

Figure A.2-2344 - Water Table Flux for CaseA FPP_2 Pu-242

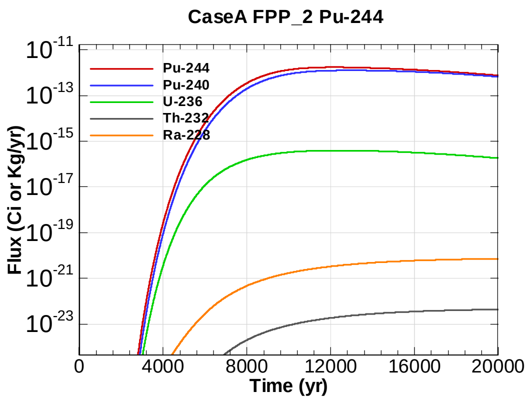

Figure A.2-2345 - Water Table Flux for CaseA FPP_2 Pu-244

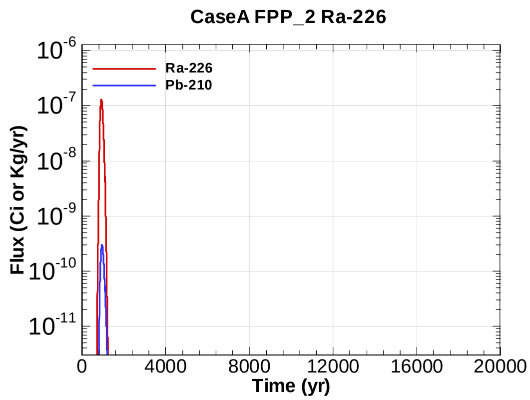

Figure A.2-2346 - Water Table Flux for CaseA FPP_2 Ra-226

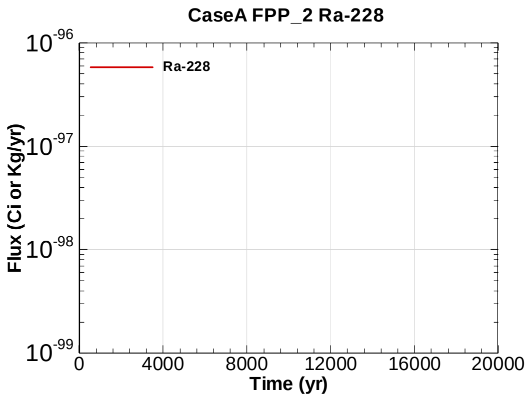

Figure A.2-2347 - Water Table Flux for CaseA FPP_2 Ra-228

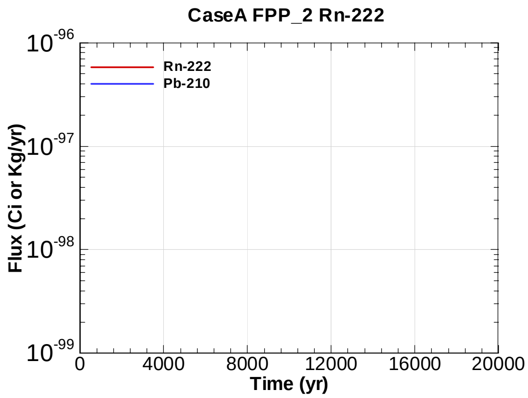

Figure A.2-2348 - Water Table Flux for CaseA FPP_2 Rn-222

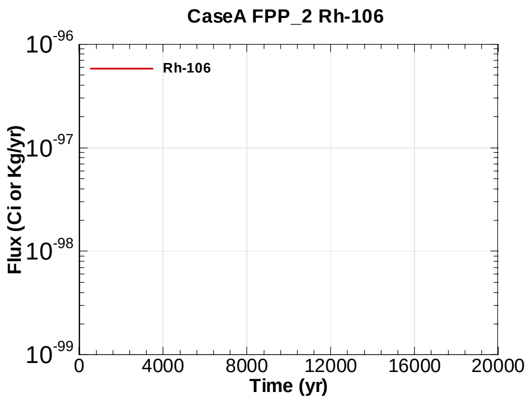

Figure A.2-2349 - Water Table Flux for CaseA FPP_2 Rh-106

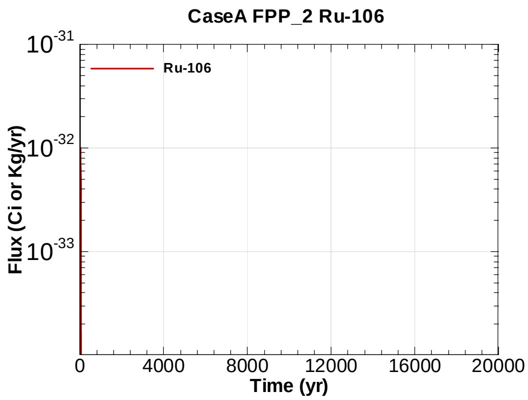

Figure A.2-2350 - Water Table Flux for CaseA FPP_2 Ru-106

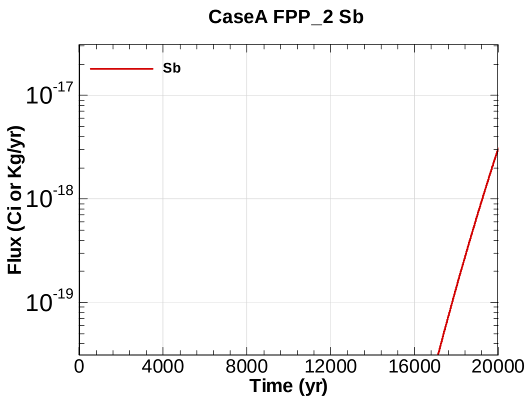

Figure A.2-2351 - Water Table Flux for CaseA FPP_2 Sb

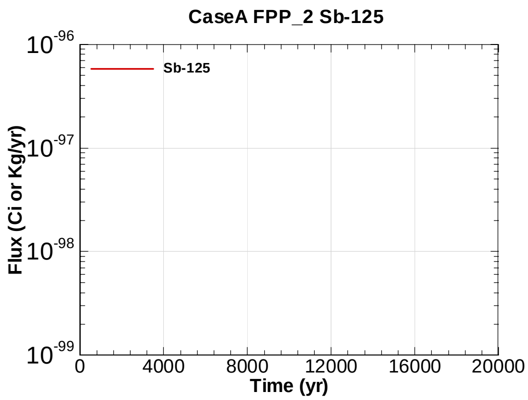

Figure A.2-2352 - Water Table Flux for CaseA FPP_2 Sb-125

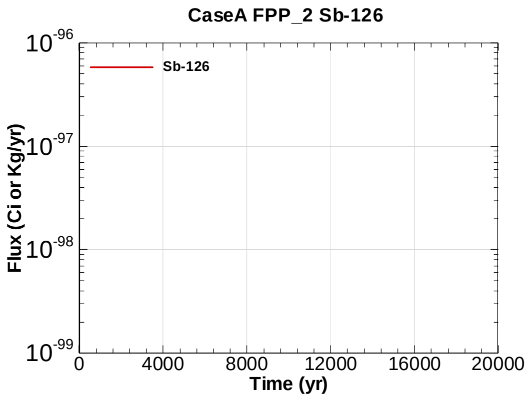

Figure A.2-2353 - Water Table Flux for CaseA FPP_2 Sb-126

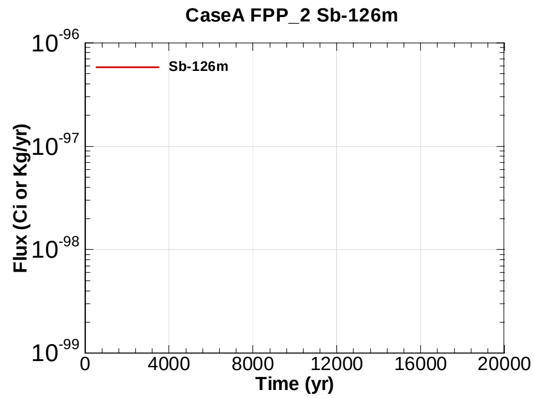

Figure A.2-2354 - Water Table Flux for CaseA FPP_2 Sb-126m

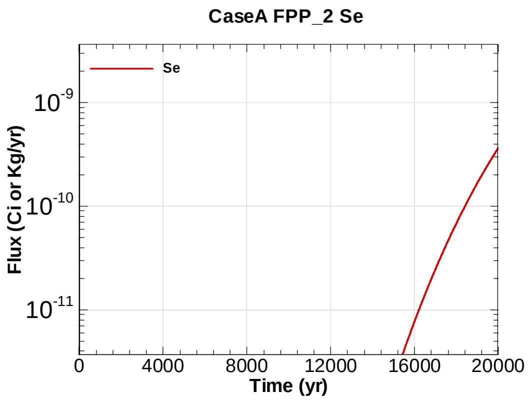

Figure A.2-2355 - Water Table Flux for CaseA FPP_2 Se

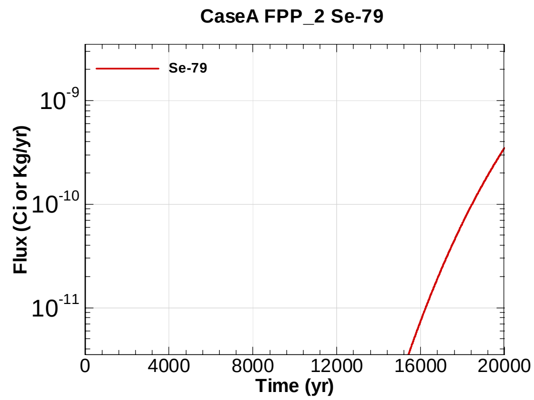

Figure A.2-2356 - Water Table Flux for CaseA FPP_2 Se-79

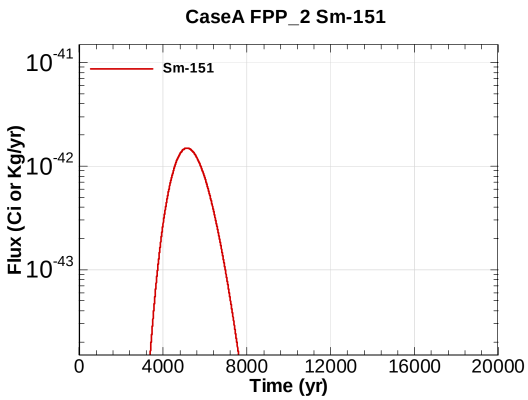

Figure A.2-2357 - Water Table Flux for CaseA FPP_2 Sm-151

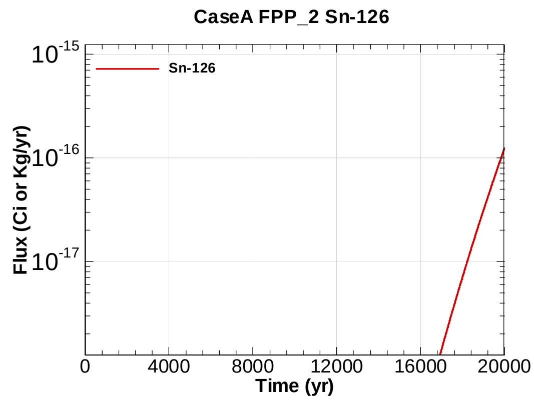

Figure A.2-2358 - Water Table Flux for CaseA FPP_2 Sn-126

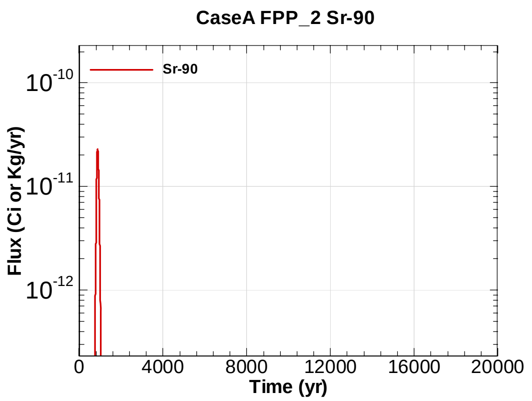

Figure A.2-2359 - Water Table Flux for CaseA FPP_2 Sr-90

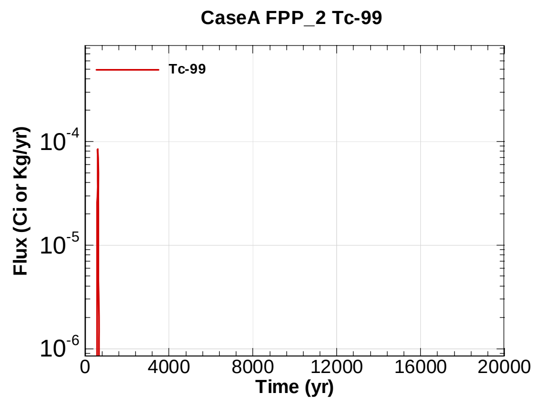

Figure A.2-2360 - Water Table Flux for CaseA FPP_2 Tc-99

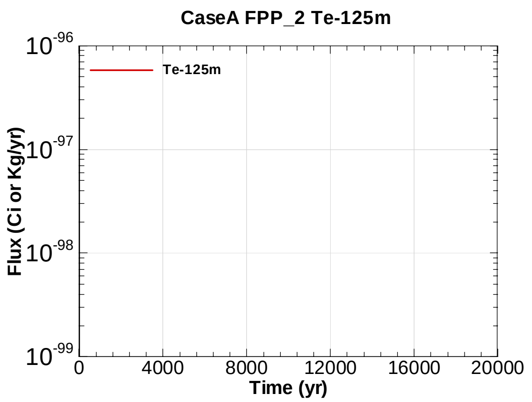

Figure A.2-2361 - Water Table Flux for CaseA FPP_2 Te-125m

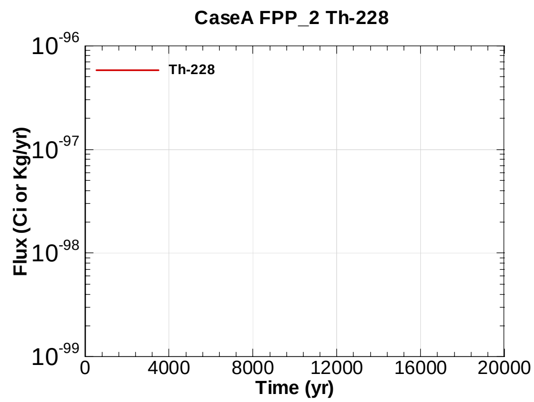

Figure A.2-2362 - Water Table Flux for CaseA FPP_2 Th-228

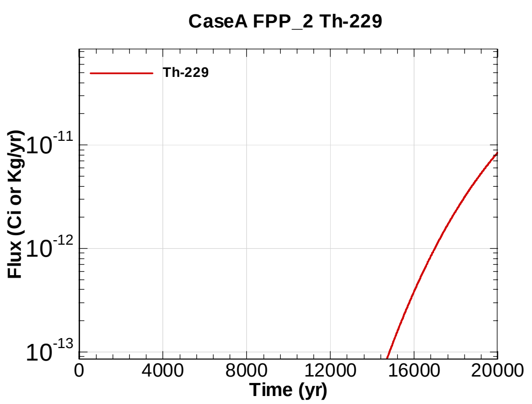

Figure A.2-2363 - Water Table Flux for CaseA FPP_2 Th-229

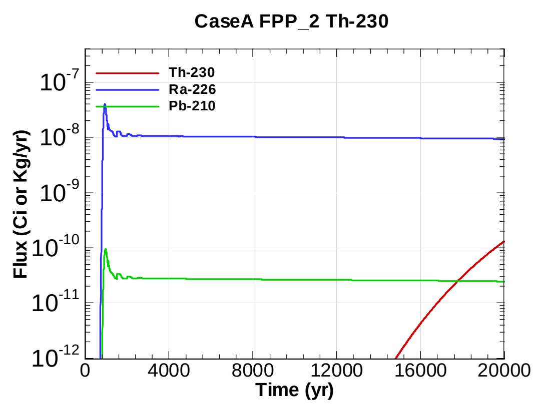

Figure A.2-2364 - Water Table Flux for CaseA FPP_2 Th-230

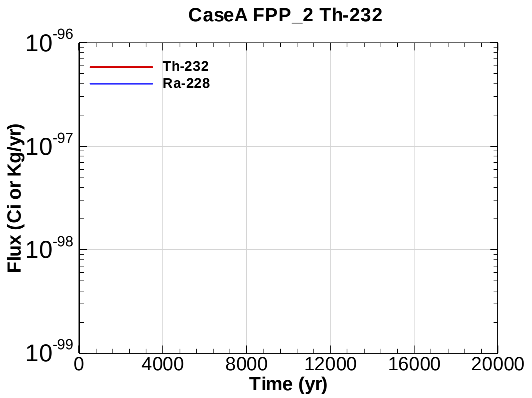

Figure A.2-2365 - Water Table Flux for CaseA FPP_2 Th-232

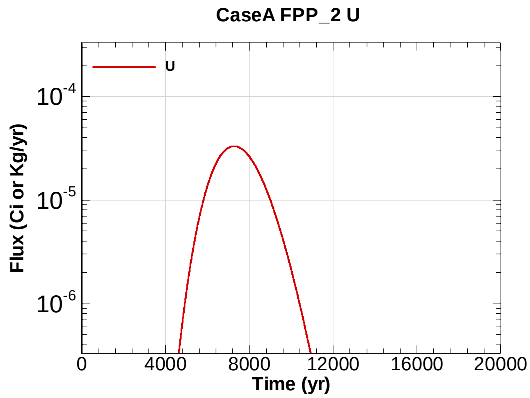

Figure A.2-2366 - Water Table Flux for CaseA FPP_2 U

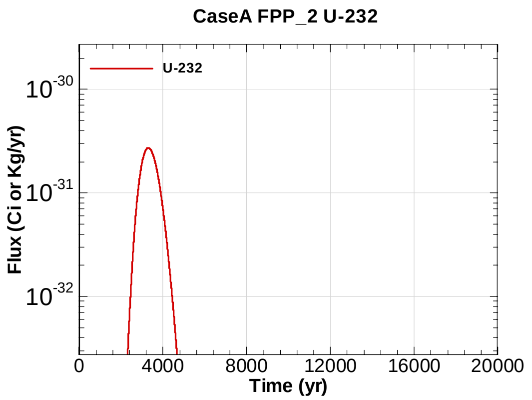

Figure A.2-2367 - Water Table Flux for CaseA FPP_2 U-232

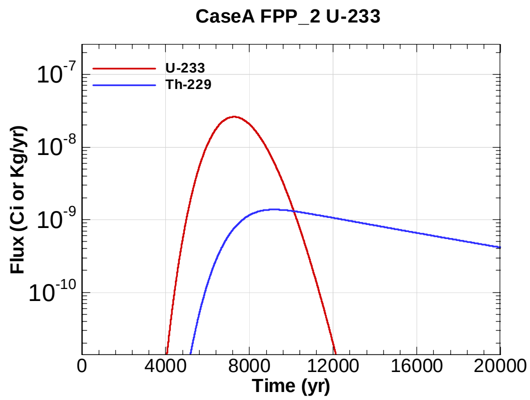

Figure A.2-2368 - Water Table Flux for CaseA FPP_2 U-233

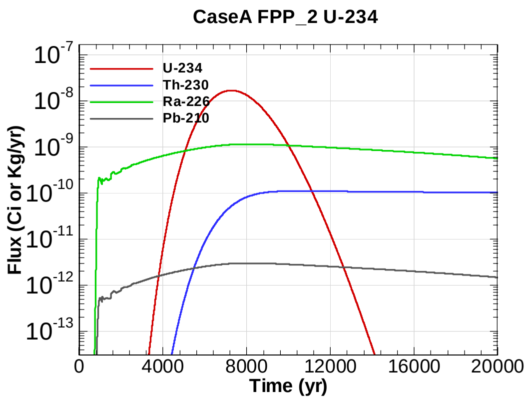

Figure A.2-2369 - Water Table Flux for CaseA FPP_2 U-234

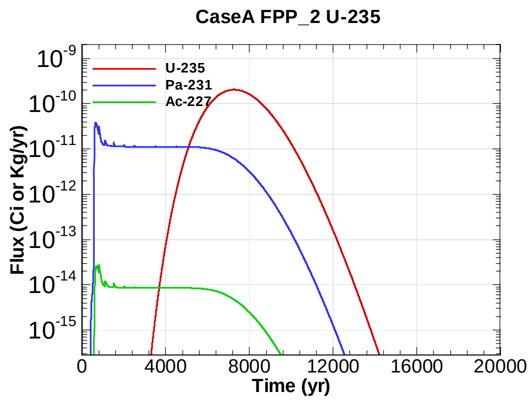

Figure A.2-2370 - Water Table Flux for CaseA FPP_2 U-235

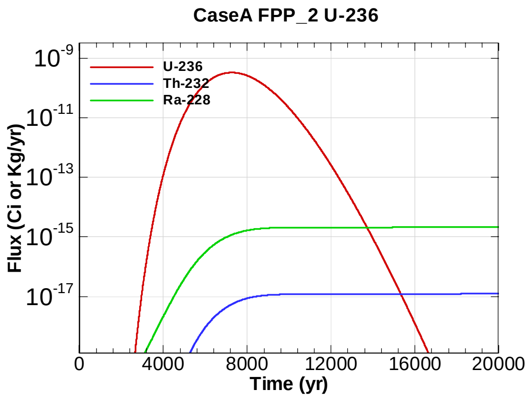

Figure A.2-2371 - Water Table Flux for CaseA FPP_2 U-236

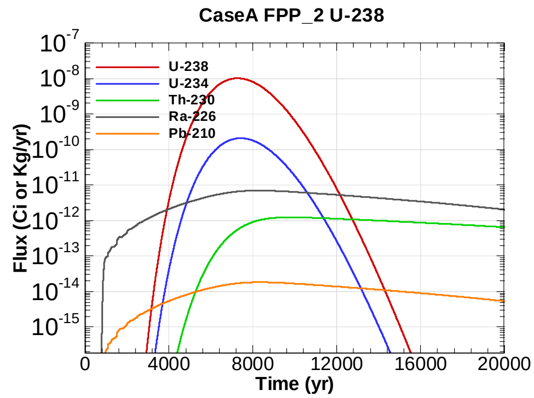

Figure A.2-2372 - Water Table Flux for CaseA FPP_2 U-238

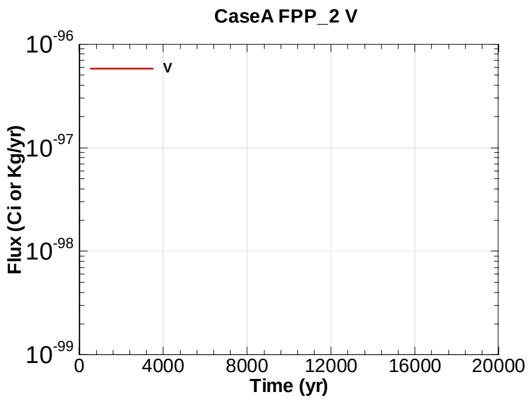

Figure A.2-2373 - Water Table Flux for CaseA FPP_2 V

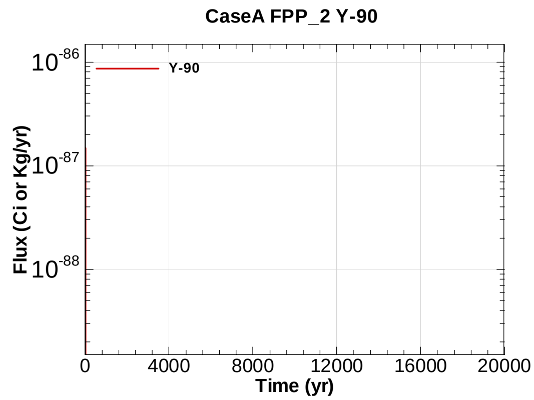

Figure A.2-2374 - Water Table Flux for CaseA FPP_2 Y-90

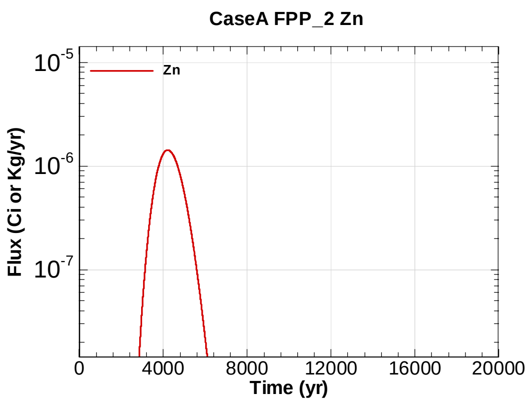

Figure A.2-2375 - Water Table Flux for CaseA FPP_2 Zn

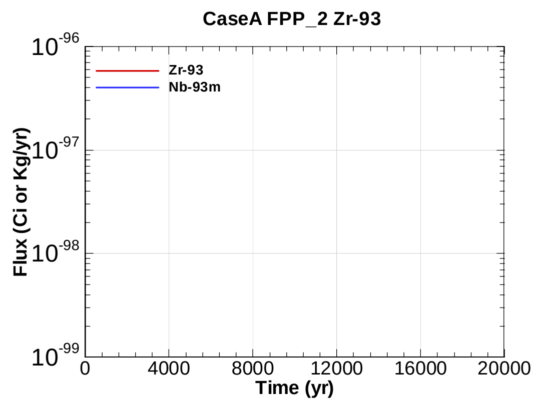

Figure A.2-2376 - Water Table Flux for CaseA FPP_2 Zr-93

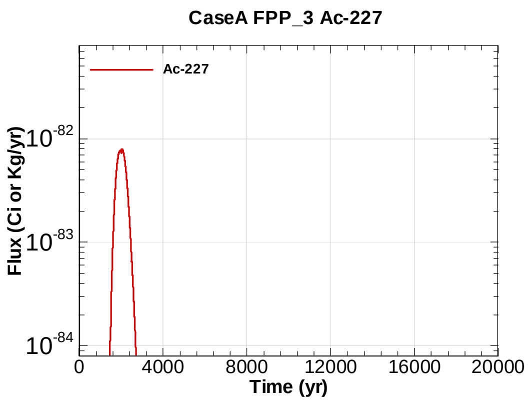

Figure A.2-2377 - Water Table Flux for CaseA FPP_3 Ac-227

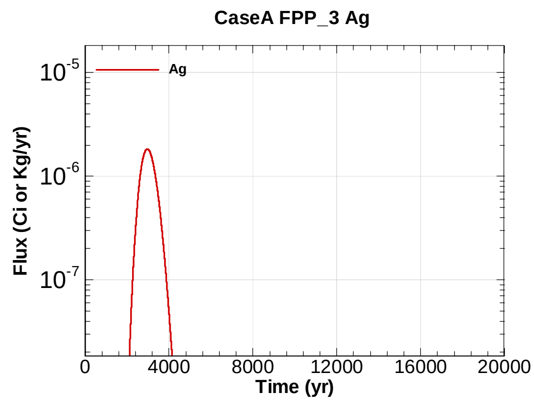

Figure A.2-2378 - Water Table Flux for CaseA FPP_3 Ag

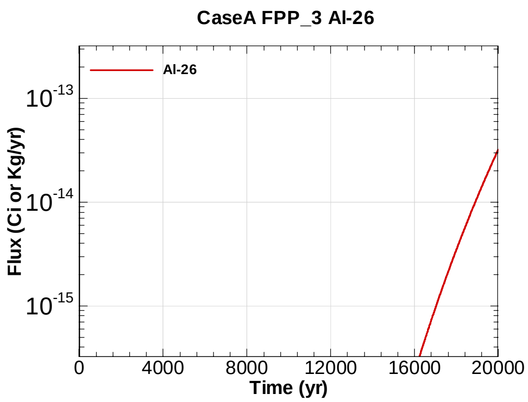

Figure A.2-2379 - Water Table Flux for CaseA FPP_3 Al-26

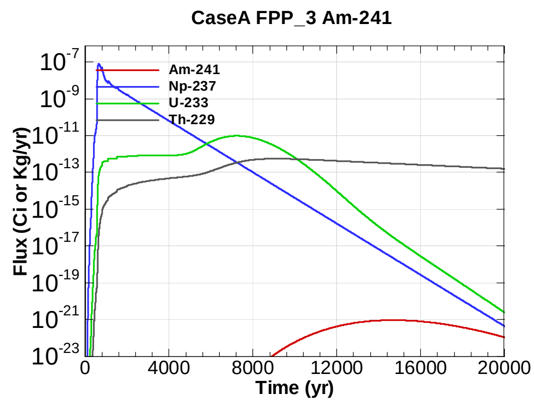

Figure A.2-2380 - Water Table Flux for CaseA FPP_3 Am-241

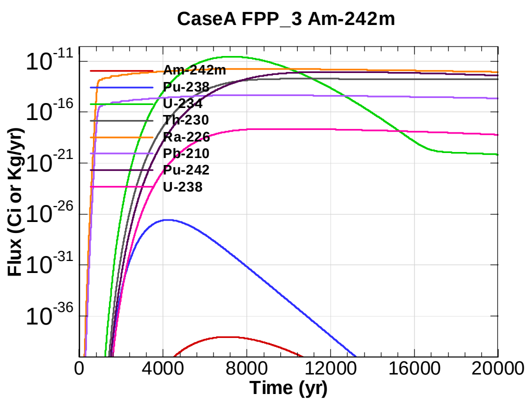

Figure A.2-2381 - Water Table Flux for CaseA FPP_3 Am-242m

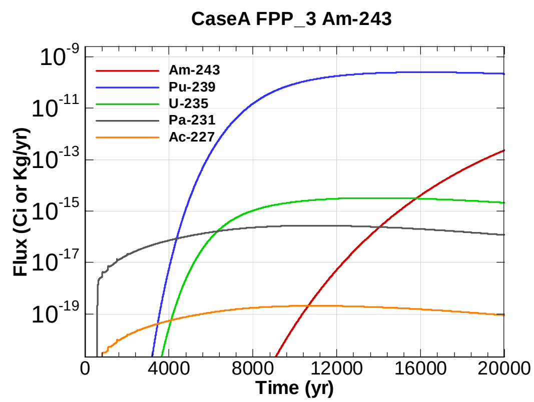

Figure A.2-2382 - Water Table Flux for CaseA FPP_3 Am-243

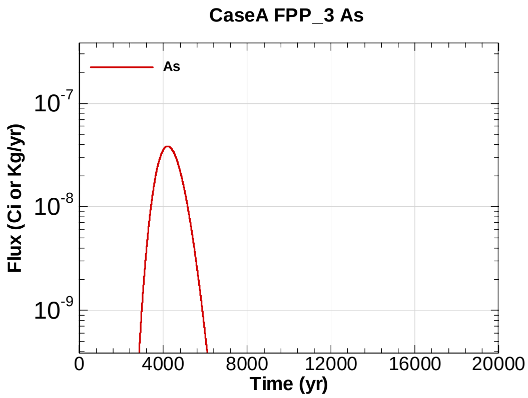

Figure A.2-2383 - Water Table Flux for CaseA FPP_3 As

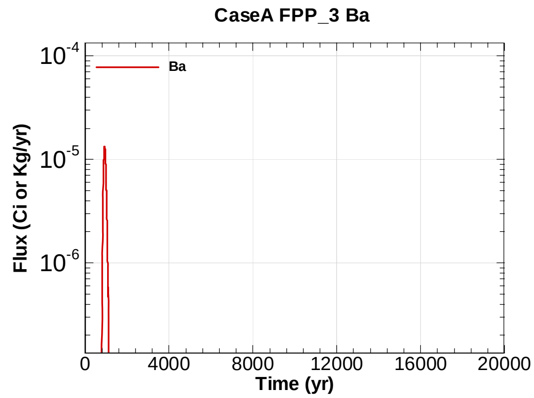

Figure A.2-2384 - Water Table Flux for CaseA FPP_3 Ba

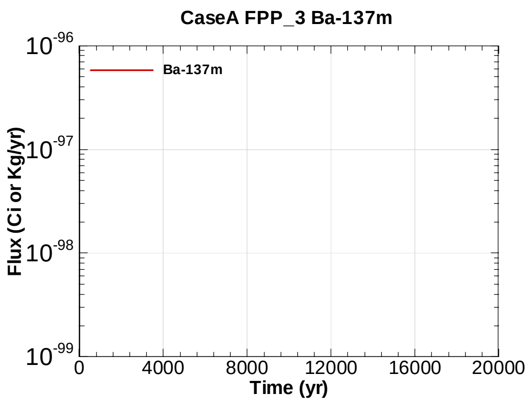

Figure A.2-2385 - Water Table Flux for CaseA FPP_3 Ba-137m

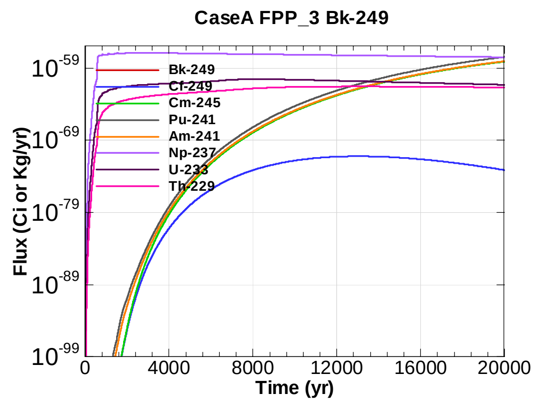

Figure A.2-2386 - Water Table Flux for CaseA FPP_3 Bk-249

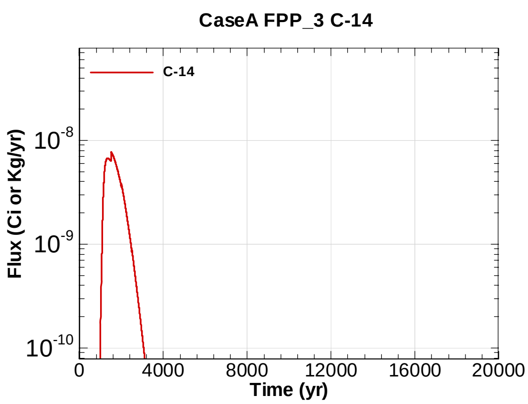

Figure A.2-2387 - Water Table Flux for CaseA FPP_3 C-14

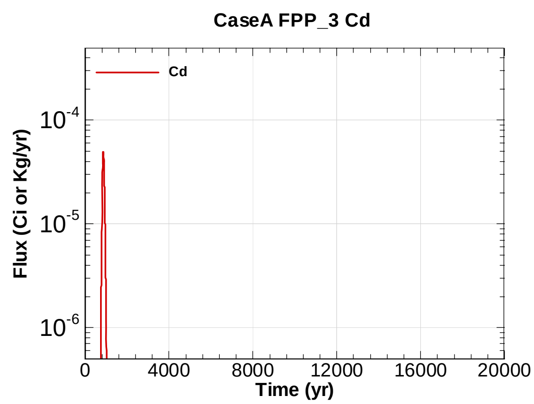

Figure A.2-2388 - Water Table Flux for CaseA FPP_3 Cd

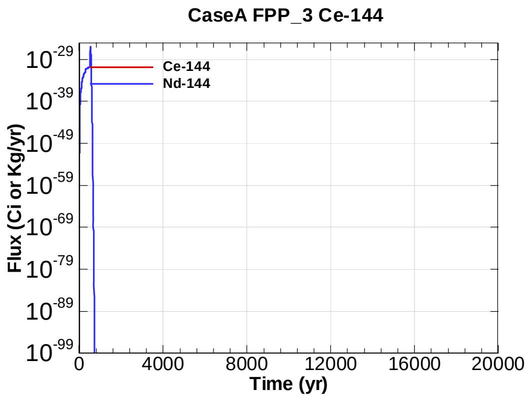

Figure A.2-2389 - Water Table Flux for CaseA FPP_3 Ce-144

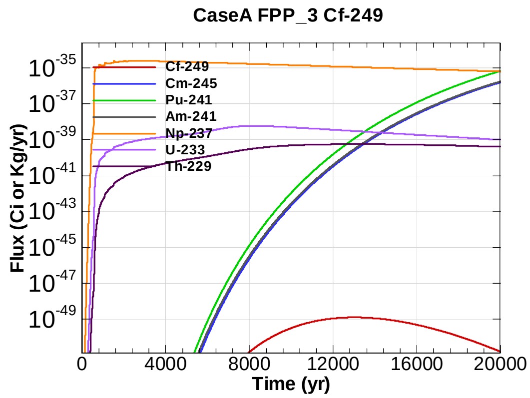

Figure A.2-2390 - Water Table Flux for CaseA FPP_3 Cf-249

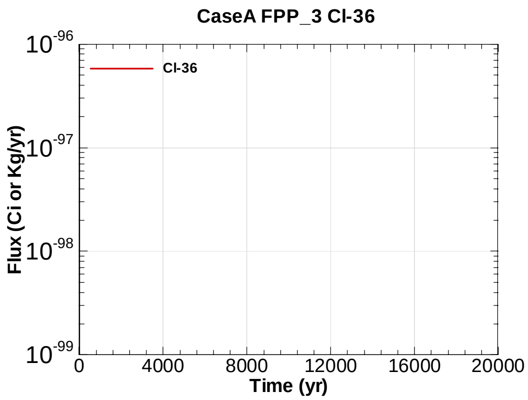

Figure A.2-2391 - Water Table Flux for CaseA FPP_3 Cl-36

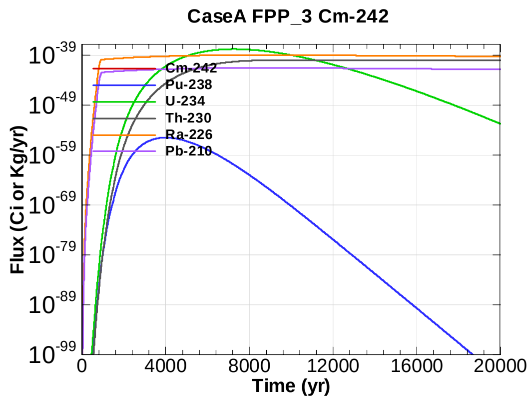

Figure A.2-2392 - Water Table Flux for CaseA FPP_3 Cm-242

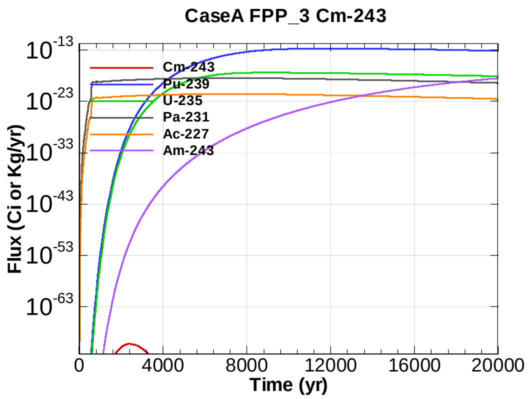

Figure A.2-2393 - Water Table Flux for CaseA FPP_3 Cm-243

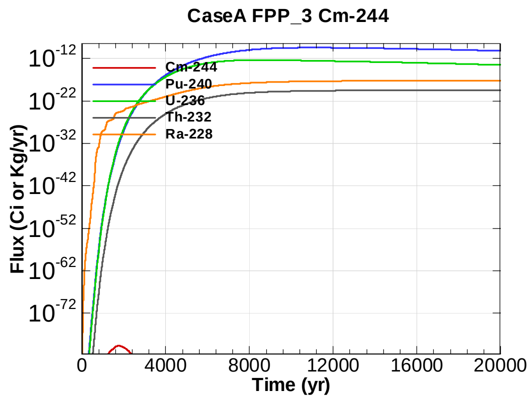

Figure A.2-2394 - Water Table Flux for CaseA FPP_3 Cm-244

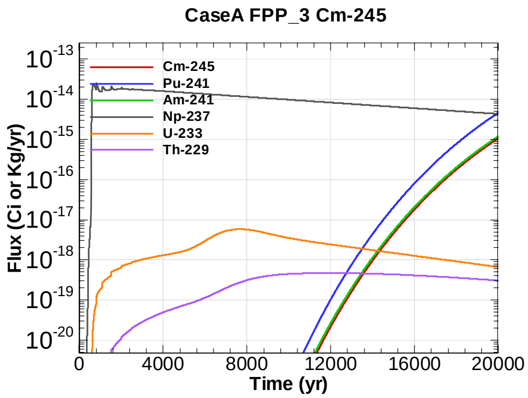

Figure A.2-2395 - Water Table Flux for CaseA FPP_3 Cm-245

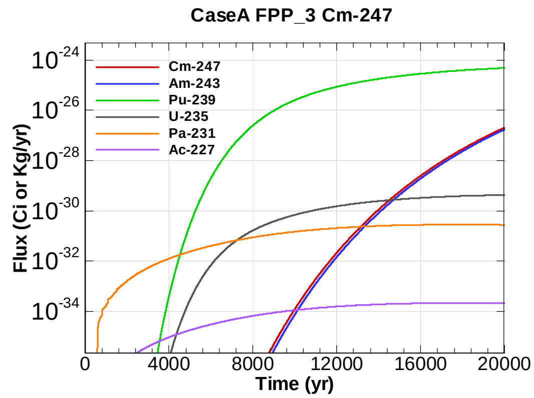

Figure A.2-2396 - Water Table Flux for CaseA FPP_3 Cm-247

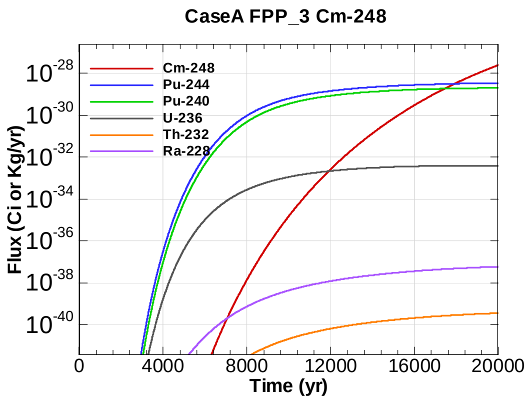

Figure A.2-2397 - Water Table Flux for CaseA FPP_3 Cm-248

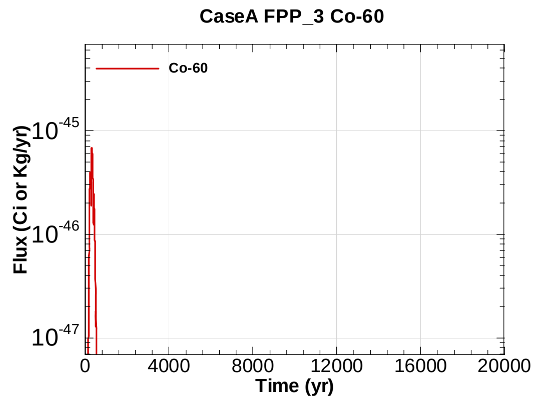

Figure A.2-2398 - Water Table Flux for CaseA FPP_3 Co-60

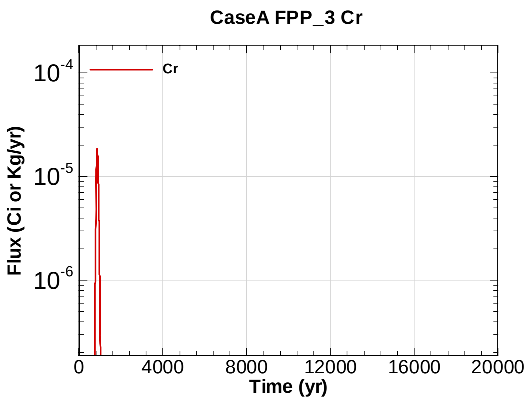

Figure A.2-2399 - Water Table Flux for CaseA FPP_3 Cr

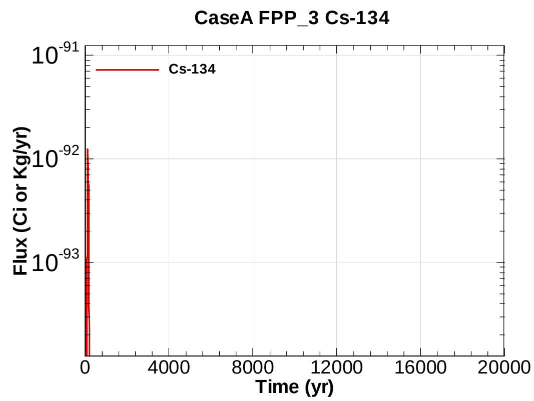

Figure A.2-2400 - Water Table Flux for CaseA FPP_3 Cs-134

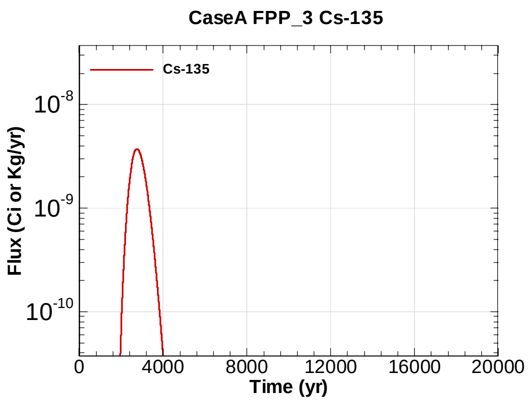

Figure A.2-2401 - Water Table Flux for CaseA FPP_3 Cs-135

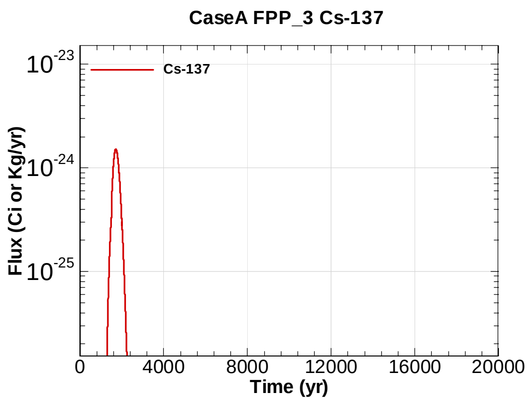

Figure A.2-2402 - Water Table Flux for CaseA FPP_3 Cs-137

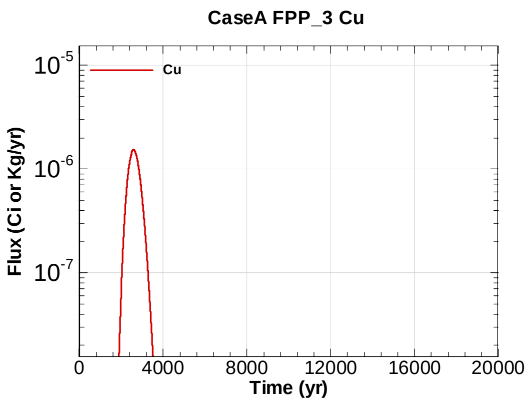

Figure A.2-2403 - Water Table Flux for CaseA FPP_3 Cu

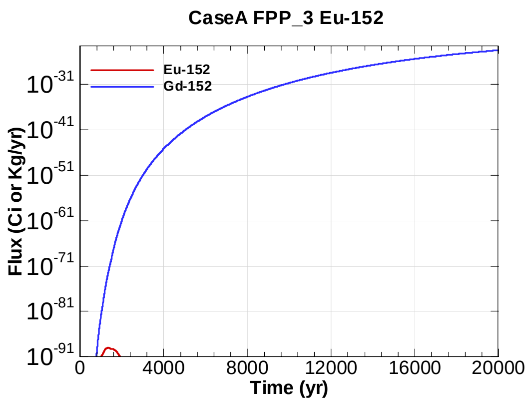

Figure A.2-2404 - Water Table Flux for CaseA FPP_3 Eu-152

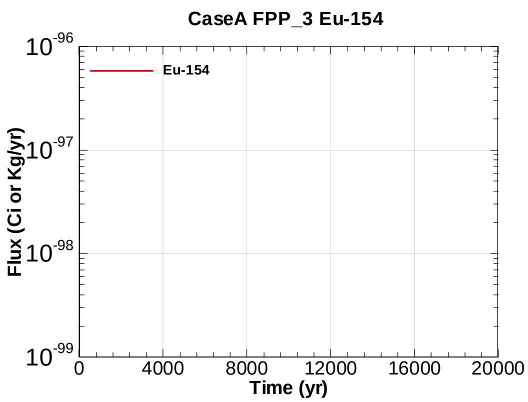

Figure A.2-2405 - Water Table Flux for CaseA FPP_3 Eu-154

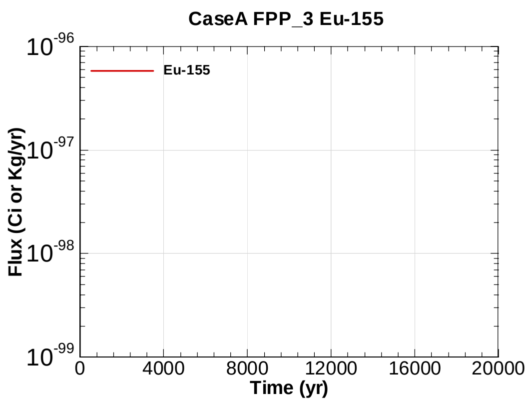

Figure A.2-2406 - Water Table Flux for CaseA FPP_3 Eu-155

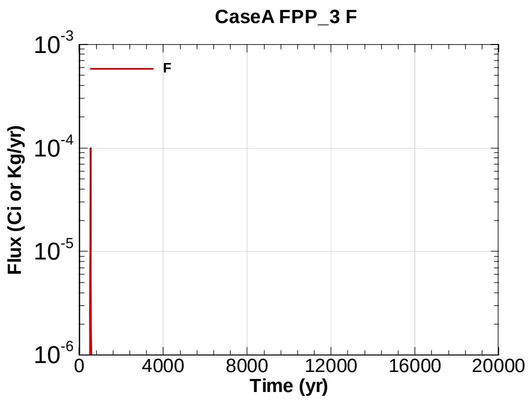

Figure A.2-2407 - Water Table Flux for CaseA FPP_3 F

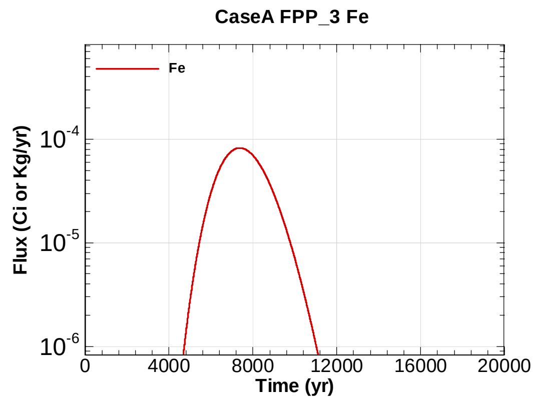

Figure A.2-2408 - Water Table Flux for CaseA FPP_3 Fe

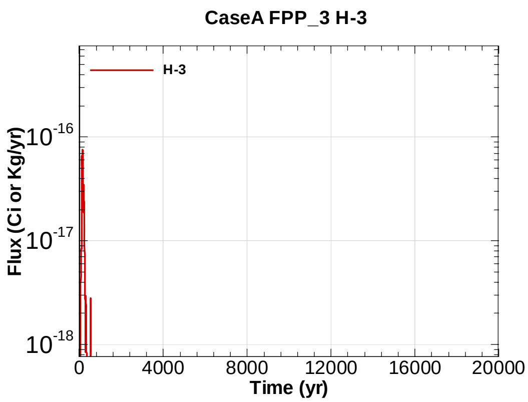

Figure A.2-2409 - Water Table Flux for CaseA FPP_3 H-3

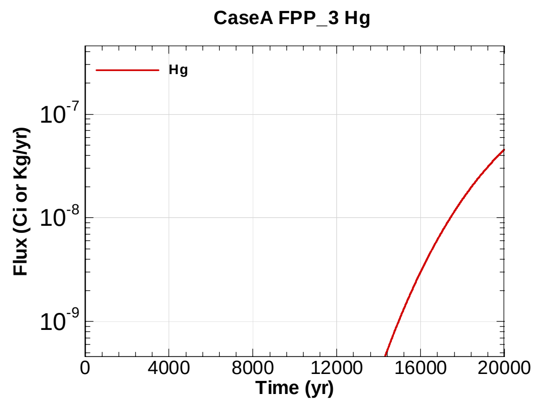

Figure A.2-2410 - Water Table Flux for CaseA FPP_3 Hg

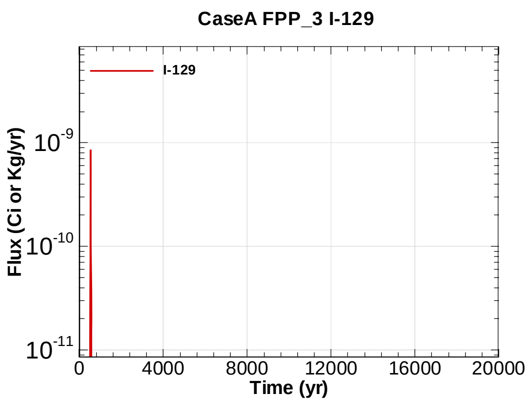

Figure A.2-2411 - Water Table Flux for CaseA FPP_3 I-129

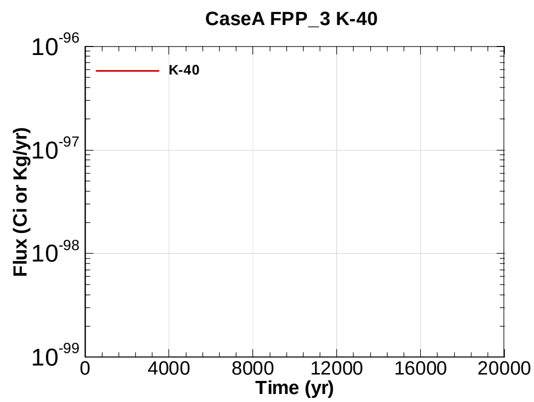

Figure A.2-2412 - Water Table Flux for CaseA FPP_3 K-40

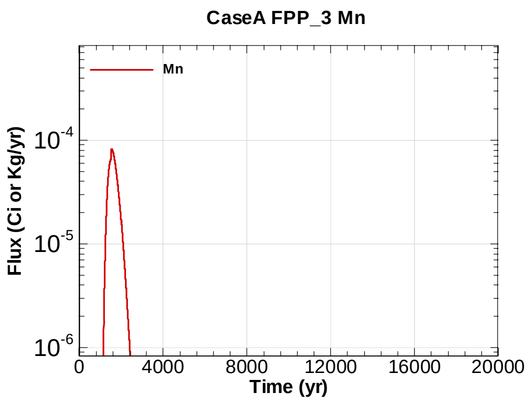

Figure A.2-2413 - Water Table Flux for CaseA FPP_3 Mn

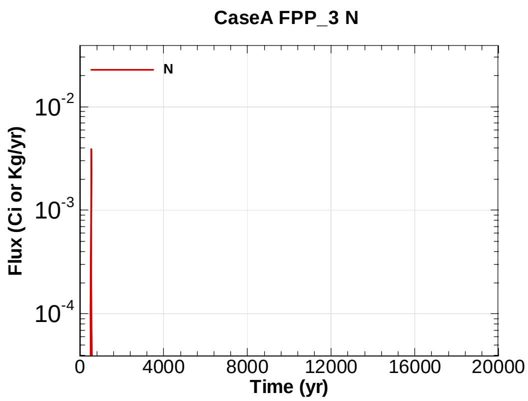

Figure A.2-2414 - Water Table Flux for CaseA FPP_3 N

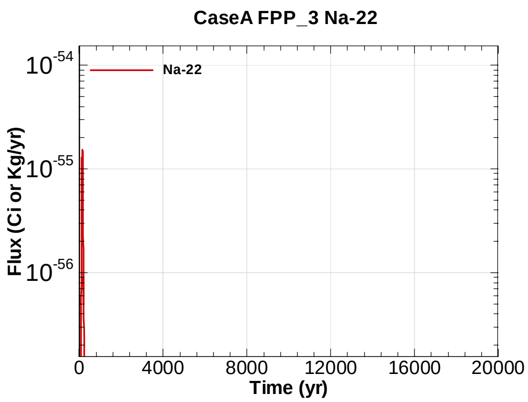

Figure A.2-2415 - Water Table Flux for CaseA FPP_3 Na-22

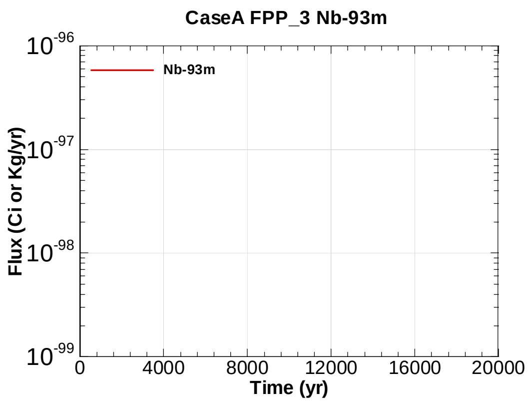

Figure A.2-2416 - Water Table Flux for CaseA FPP_3 Nb-93m

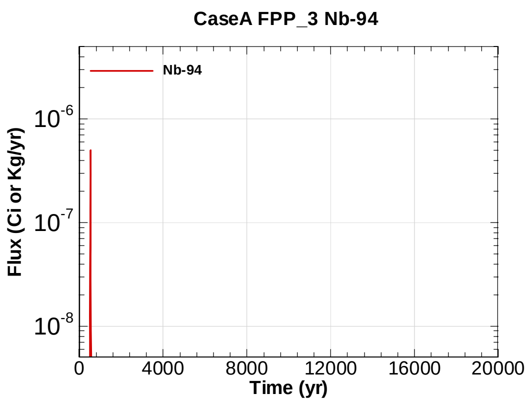

Figure A.2-2417 - Water Table Flux for CaseA FPP_3 Nb-94

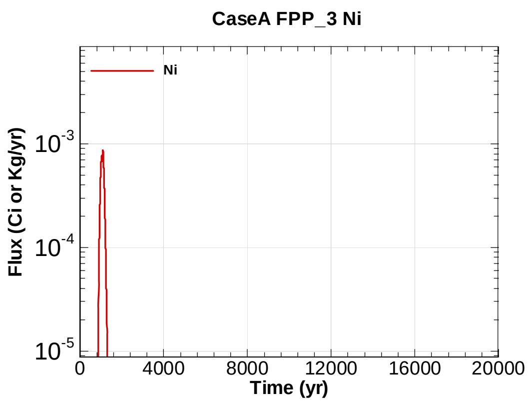

Figure A.2-2418 - Water Table Flux for CaseA FPP_3 Ni

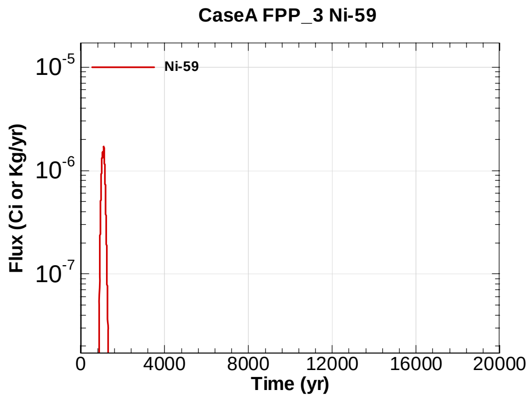

Figure A.2-2419 - Water Table Flux for CaseA FPP_3 Ni-59

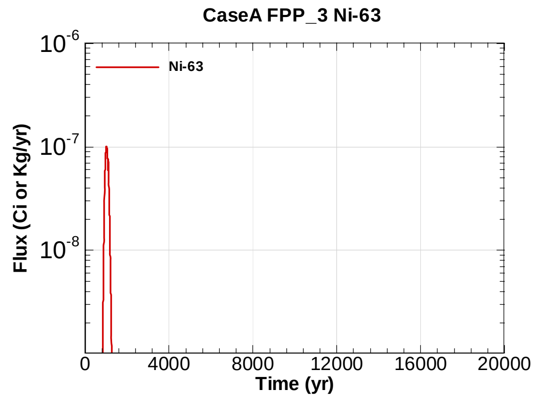

Figure A.2-2420 - Water Table Flux for CaseA FPP_3 Ni-63

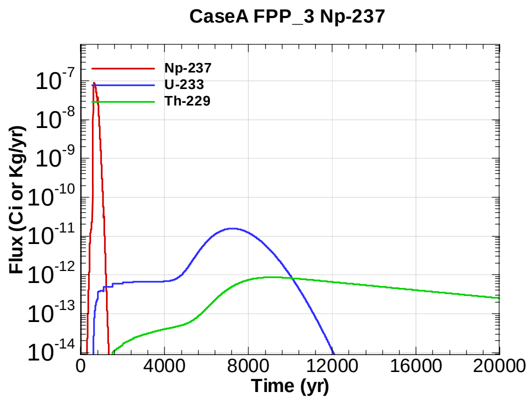

Figure A.2-2421 - Water Table Flux for CaseA FPP_3 Np-237

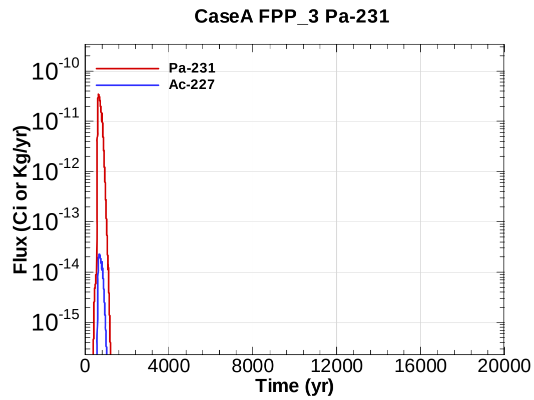

Figure A.2-2422 - Water Table Flux for CaseA FPP_3 Pa-231

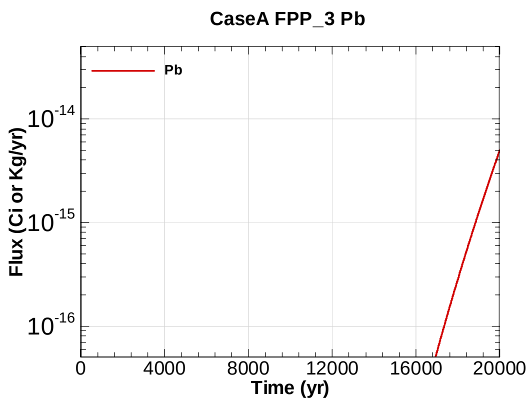

Figure A.2-2423 - Water Table Flux for CaseA FPP_3 Pb

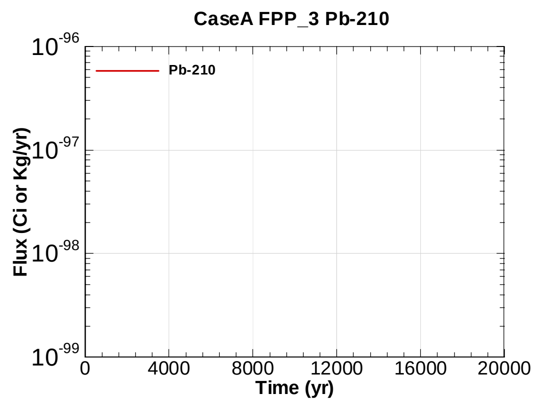

Figure A.2-2424 - Water Table Flux for CaseA FPP_3 Pb-210

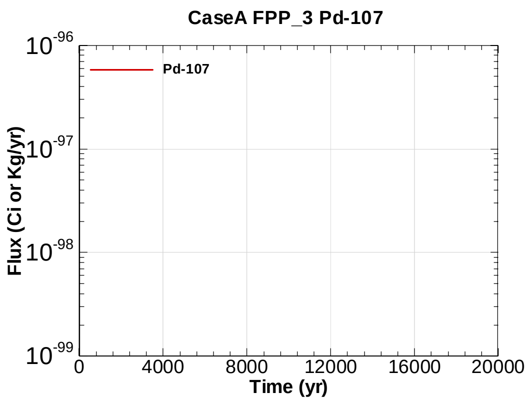

Figure A.2-2425 - Water Table Flux for CaseA FPP_3 Pd-107

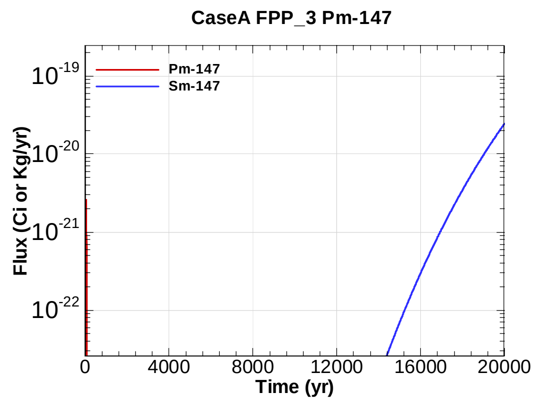

Figure A.2-2426 - Water Table Flux for CaseA FPP_3 Pm-147

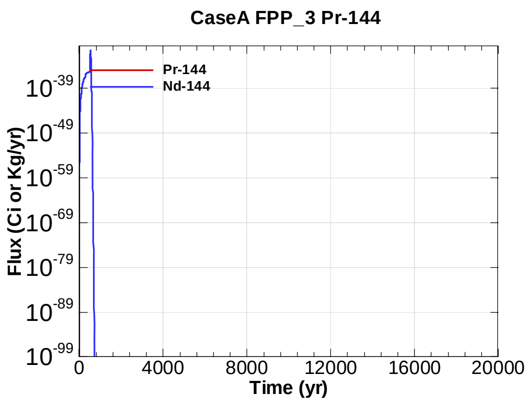

Figure A.2-2427 - Water Table Flux for CaseA FPP_3 Pr-144

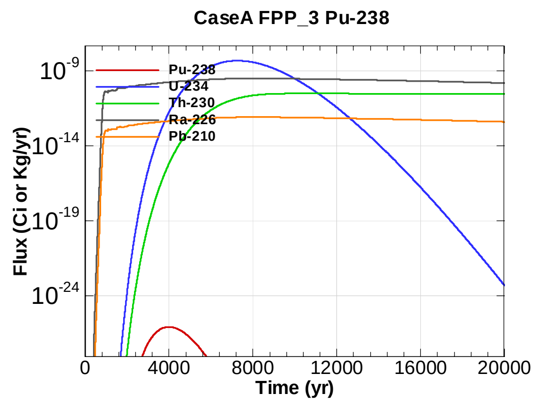

Figure A.2-2428 - Water Table Flux for CaseA FPP_3 Pu-238

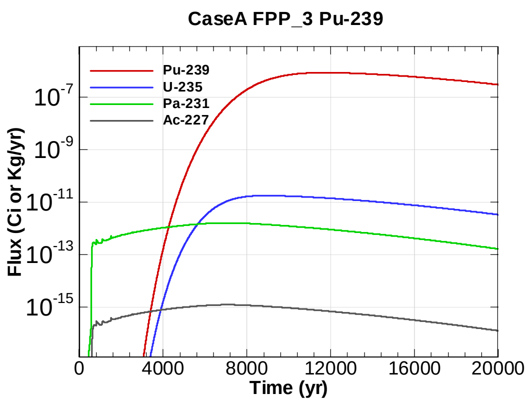

Figure A.2-2429 - Water Table Flux for CaseA FPP_3 Pu-239

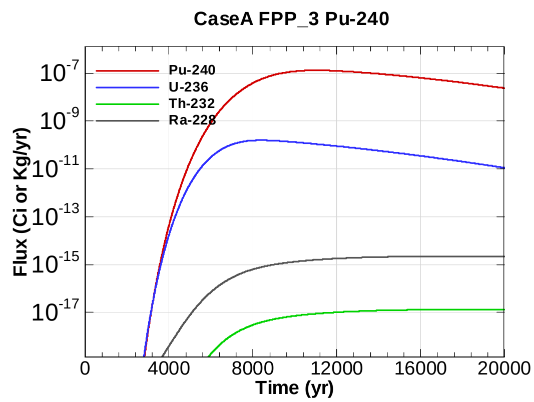

Figure A.2-2430 - Water Table Flux for CaseA FPP_3 Pu-240

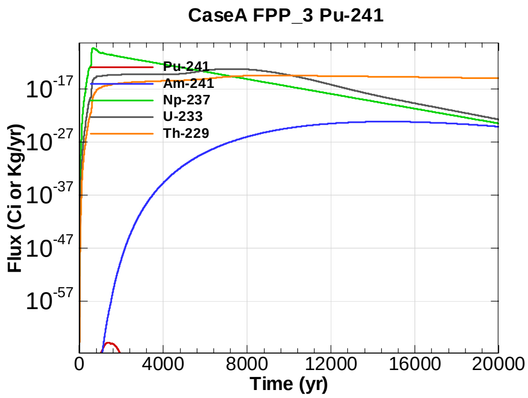

Figure A.2-2431 - Water Table Flux for CaseA FPP_3 Pu-241

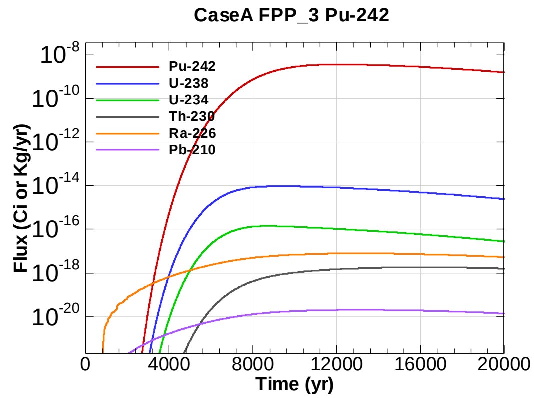

Figure A.2-2432 - Water Table Flux for CaseA FPP_3 Pu-242

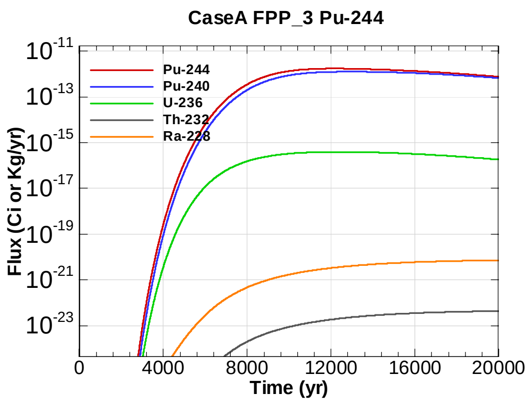

Figure A.2-2433 - Water Table Flux for CaseA FPP_3 Pu-244

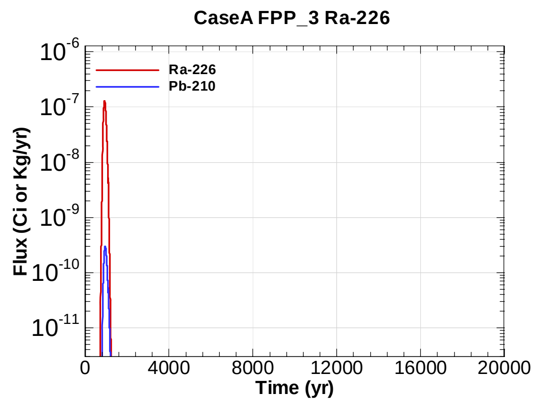

Figure A.2-2434 - Water Table Flux for CaseA FPP_3 Ra-226

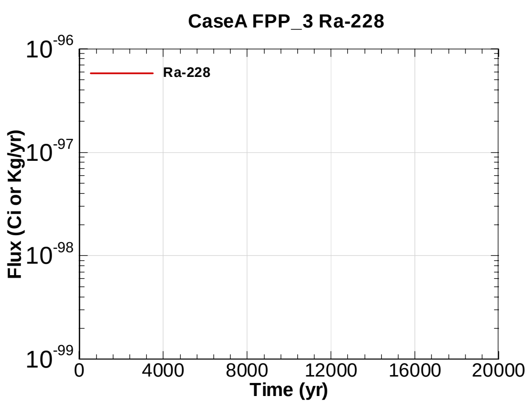

Figure A.2-2435 - Water Table Flux for CaseA FPP_3 Ra-228

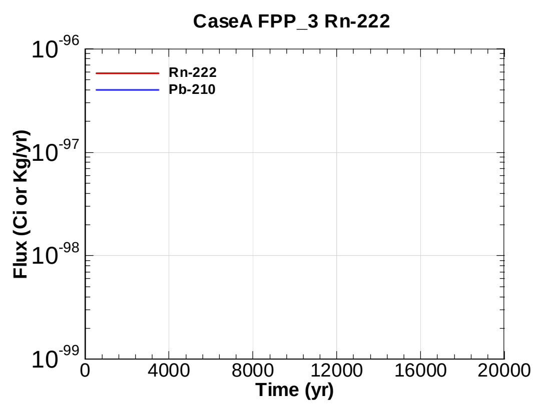

Figure A.2-2436 - Water Table Flux for CaseA FPP_3 Rn-222

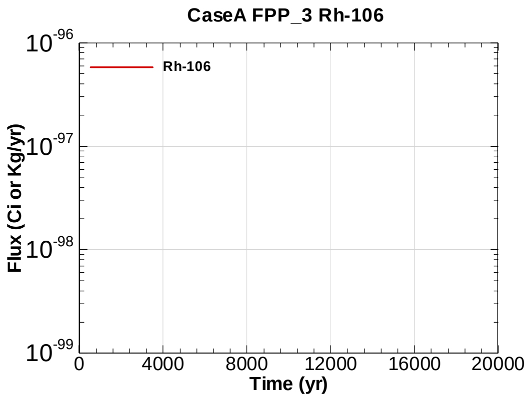

Figure A.2-2437 - Water Table Flux for CaseA FPP_3 Rh-106

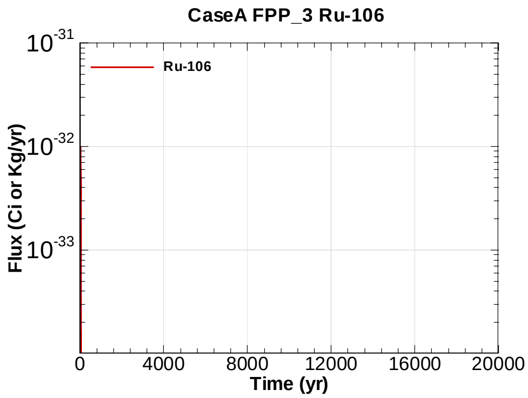

Figure A.2-2438 - Water Table Flux for CaseA FPP_3 Ru-106

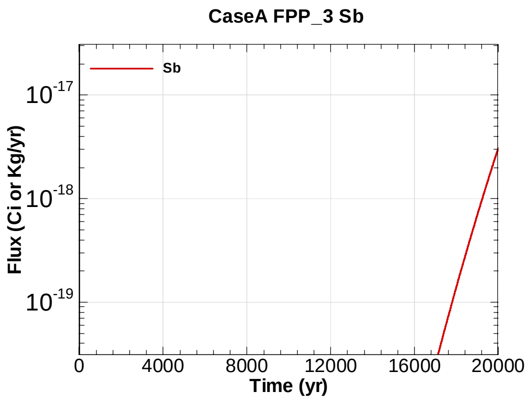

Figure A.2-2439 - Water Table Flux for CaseA FPP_3 Sb

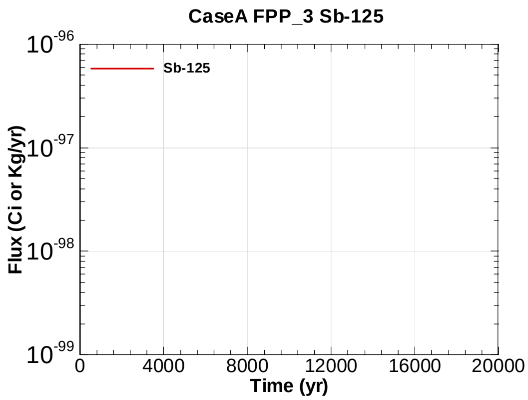

Figure A.2-2440 - Water Table Flux for CaseA FPP_3 Sb-125

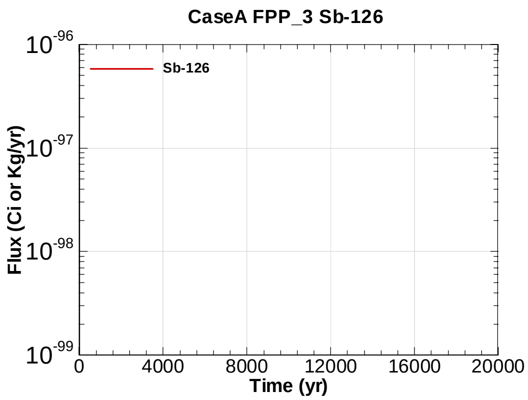

Figure A.2-2441 - Water Table Flux for CaseA FPP_3 Sb-126

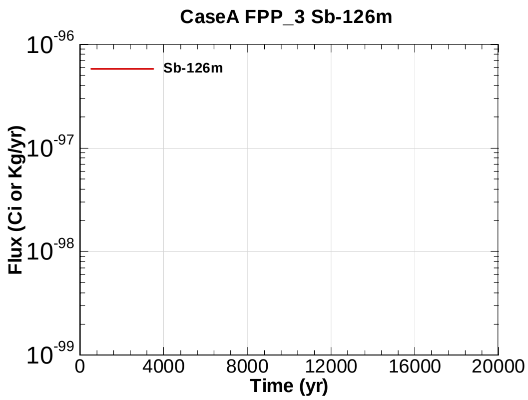

Figure A.2-2442 - Water Table Flux for CaseA FPP_3 Sb-126m

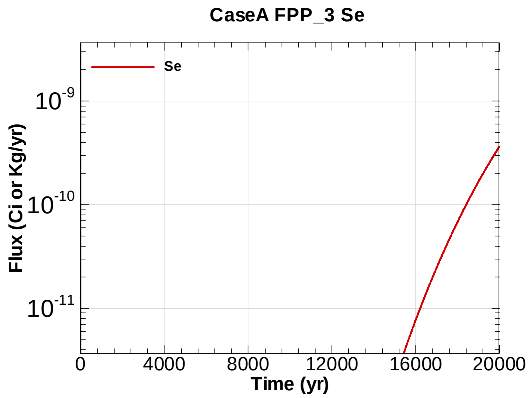

Figure A.2-2443 - Water Table Flux for CaseA FPP_3 Se

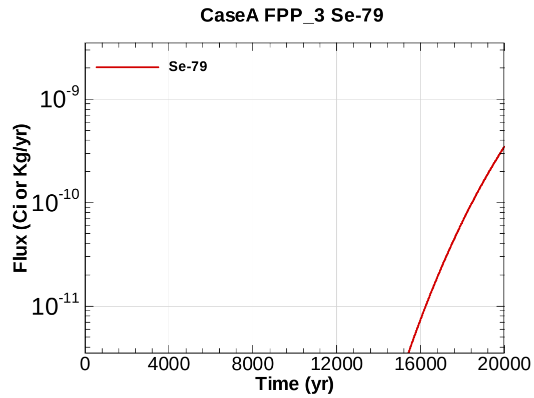

Figure A.2-2444 - Water Table Flux for CaseA FPP_3 Se-79

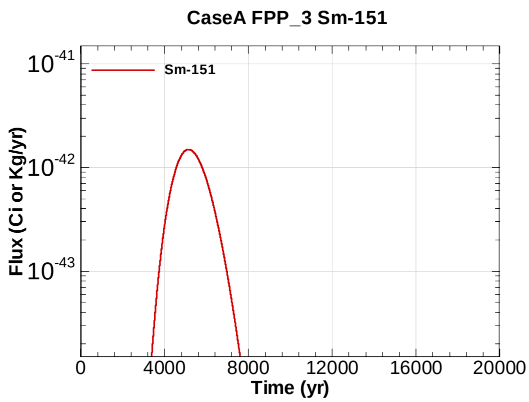

Figure A.2-2445 - Water Table Flux for CaseA FPP_3 Sm-151

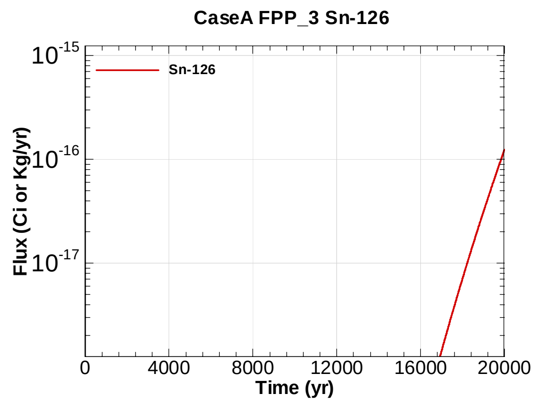

Figure A.2-2446 - Water Table Flux for CaseA FPP_3 Sn-126

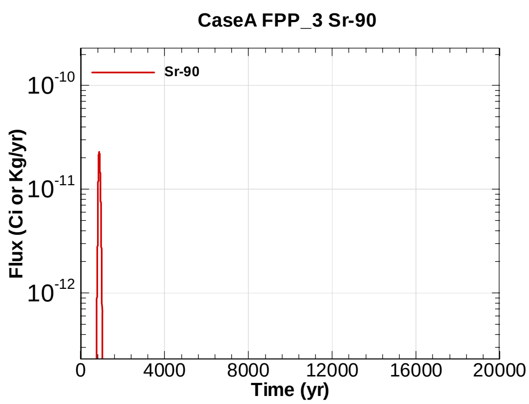

Figure A.2-2447 - Water Table Flux for CaseA FPP_3 Sr-90

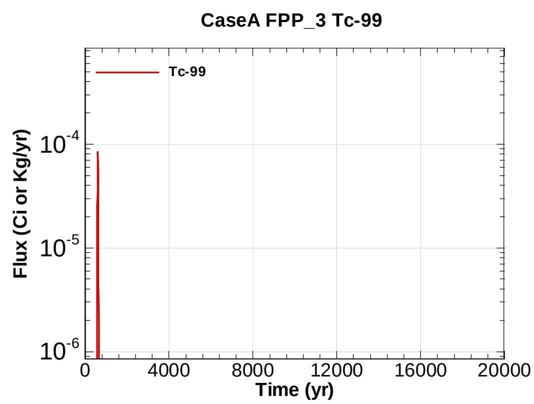

Figure A.2-2448 - Water Table Flux for CaseA FPP_3 Tc-99

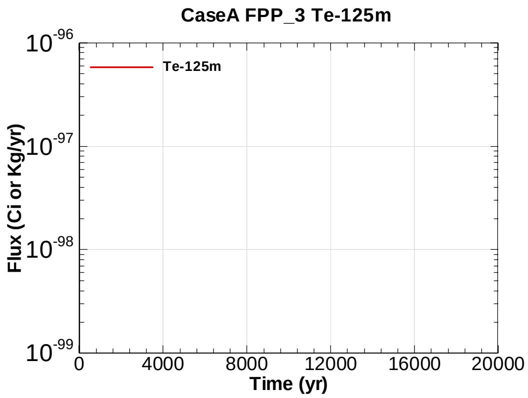

Figure A.2-2449 - Water Table Flux for CaseA FPP_3 Te-125m

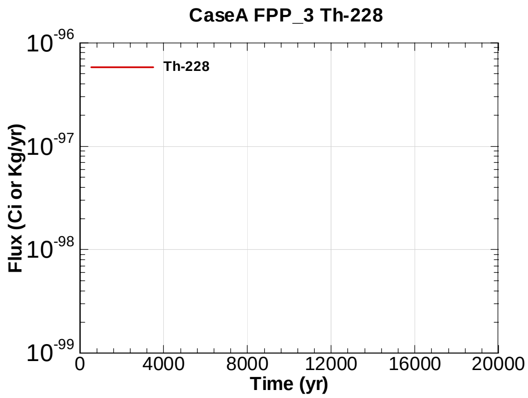

Figure A.2-2450 - Water Table Flux for CaseA FPP_3 Th-228

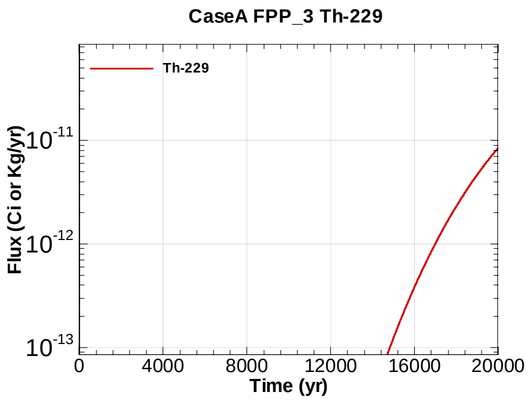

Figure A.2-2451 - Water Table Flux for CaseA FPP_3 Th-229

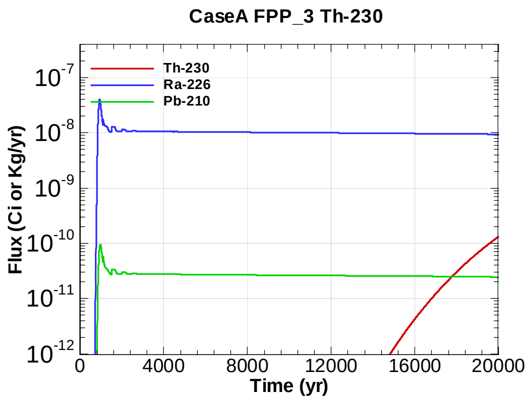

Figure A.2-2452 - Water Table Flux for CaseA FPP_3 Th-230

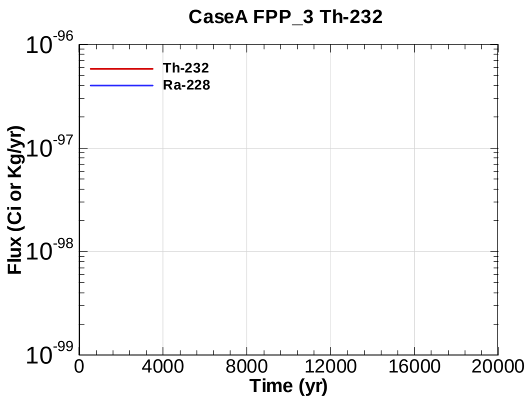

Figure A.2-2453 - Water Table Flux for CaseA FPP_3 Th-232

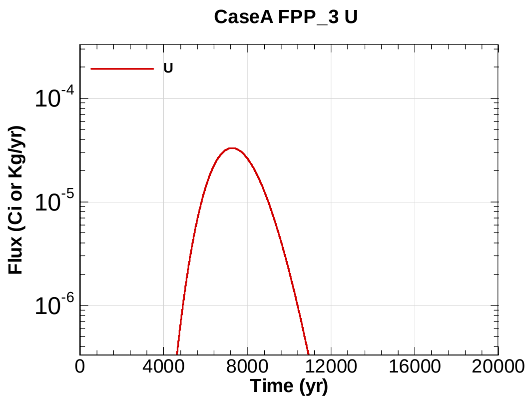

Figure A.2-2454 - Water Table Flux for CaseA FPP_3 U

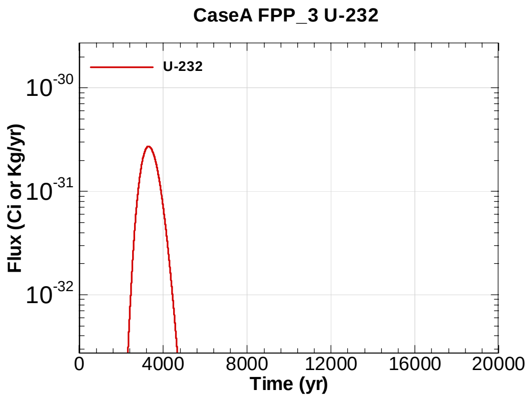

Figure A.2-2455 - Water Table Flux for CaseA FPP_3 U-232

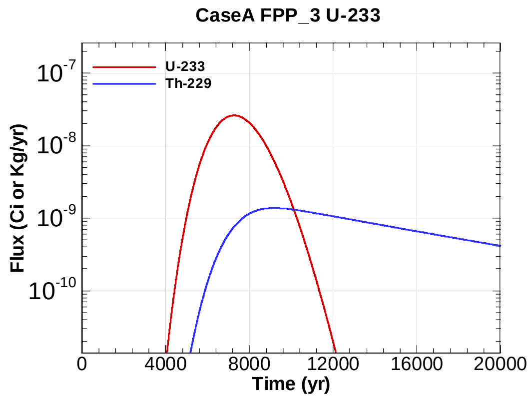

Figure A.2-2456 - Water Table Flux for CaseA FPP_3 U-233

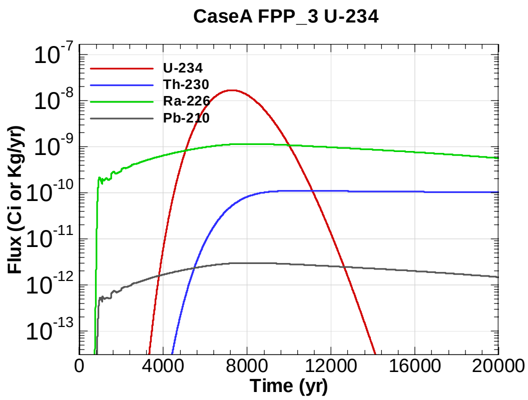

Figure A.2-2457 - Water Table Flux for CaseA FPP_3 U-234

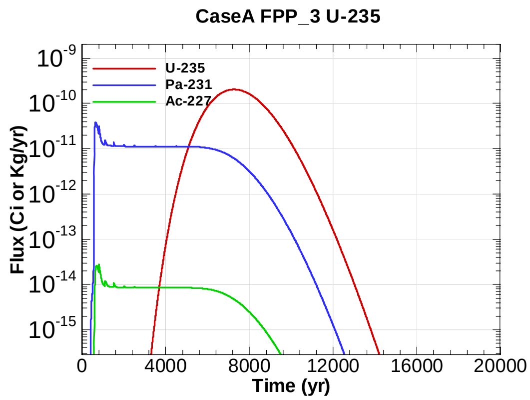

Figure A.2-2458 - Water Table Flux for CaseA FPP_3 U-235

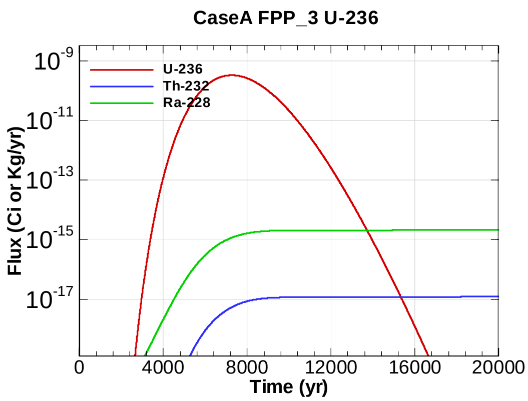

Figure A.2-2459 - Water Table Flux for CaseA FPP_3 U-236

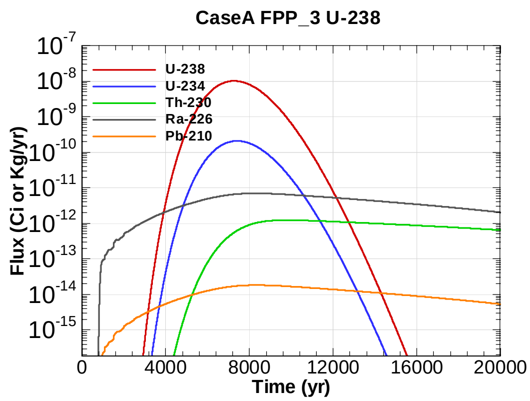

Figure A.2-2460 - Water Table Flux for CaseA FPP_3 U-238

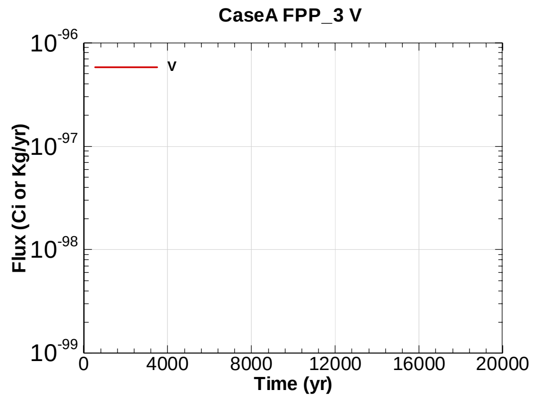

Figure A.2-2461 - Water Table Flux for CaseA FPP_3 V

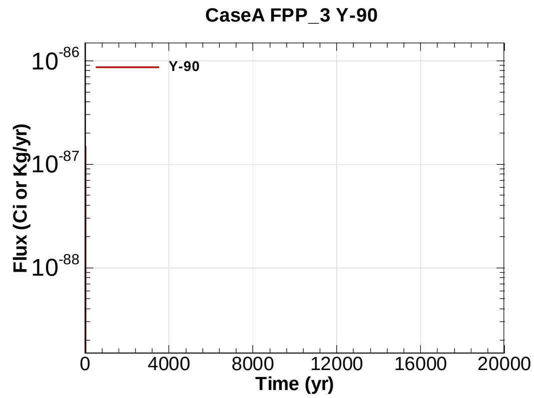

Figure A.2-2462 - Water Table Flux for CaseA FPP_3 Y-90

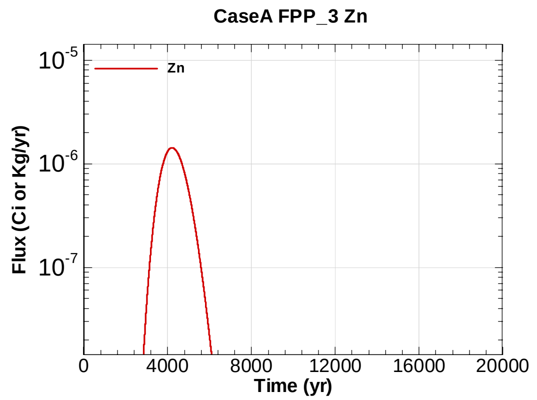

Figure A.2-2463 - Water Table Flux for CaseA FPP_3 Zn

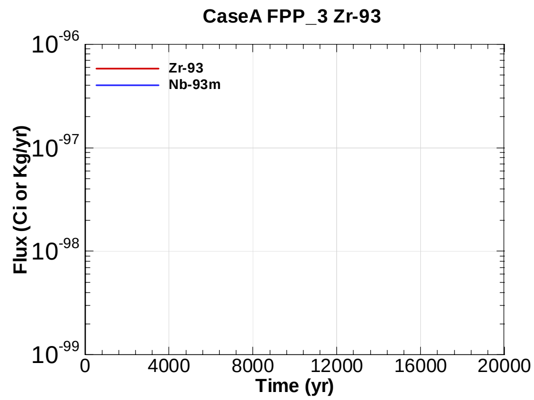

Figure A.2-2464 - Water Table Flux for CaseA FPP_3 Zr-93

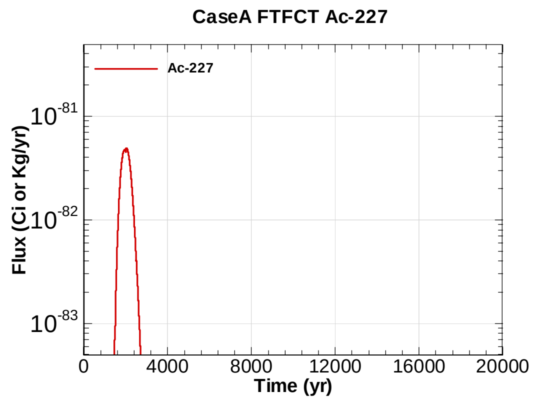

Figure A.2-2465 - Water Table Flux for CaseA FTFCT Ac-227

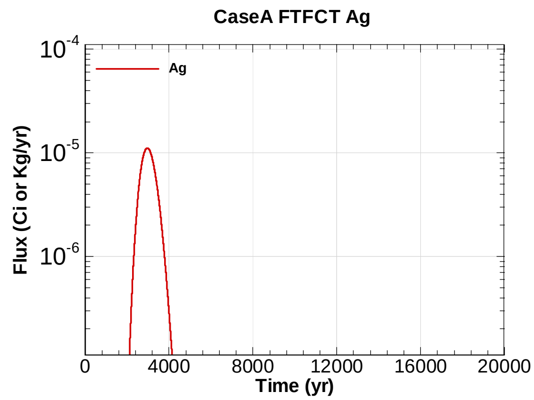

Figure A.2-2466 - Water Table Flux for CaseA FTFCT Ag

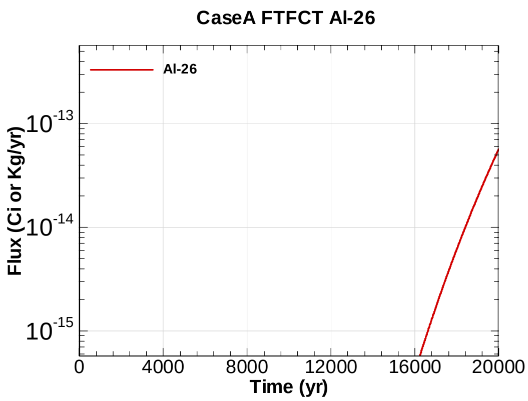

Figure A.2-2467 - Water Table Flux for CaseA FTFCT Al-26

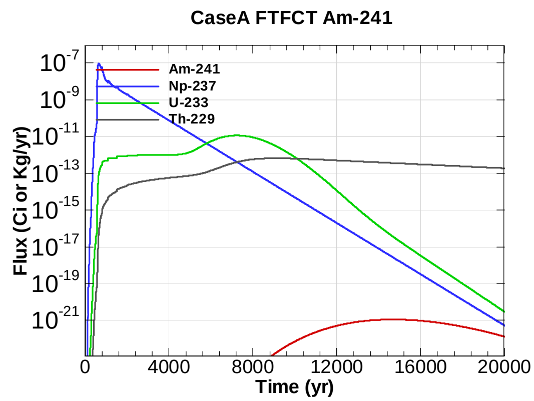

Figure A.2-2468 - Water Table Flux for CaseA FTFCT Am-241

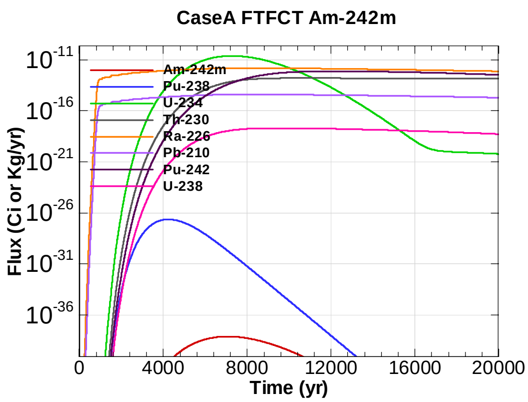

Figure A.2-2469 - Water Table Flux for CaseA FTFCT Am-242m

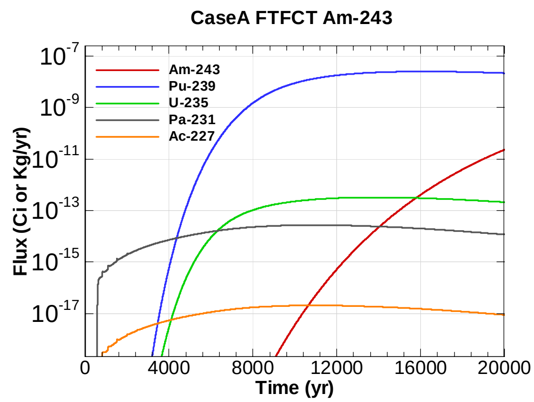

Figure A.2-2470 - Water Table Flux for CaseA FTFCT Am-243

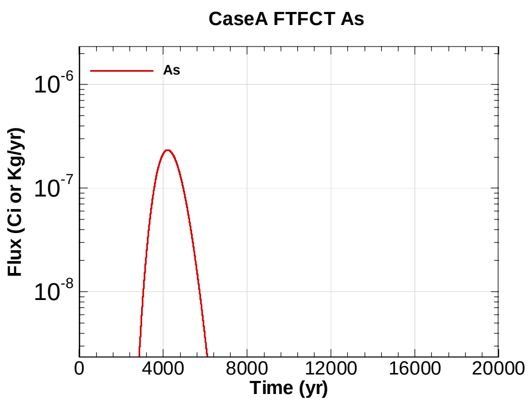

Figure A.2-2471 - Water Table Flux for CaseA FTFCT As

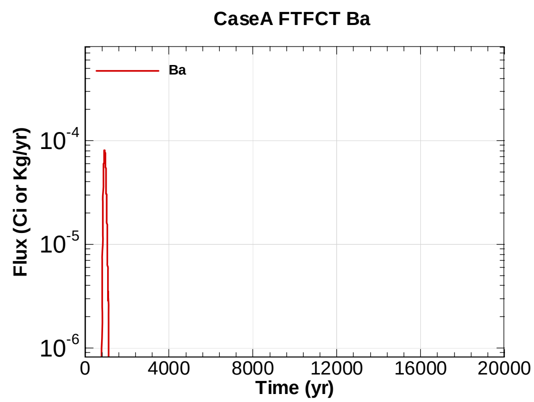

Figure A.2-2472 - Water Table Flux for CaseA FTFCT Ba

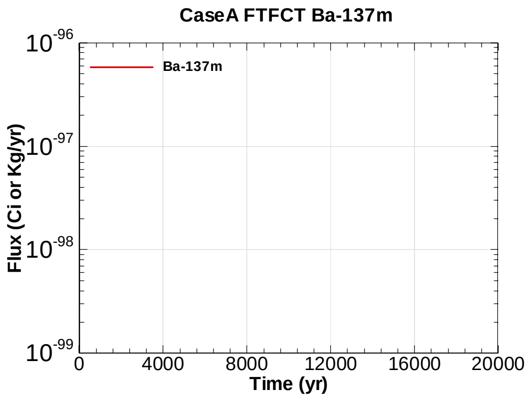

Figure A.2-2473 - Water Table Flux for CaseA FTFCT Ba-137m

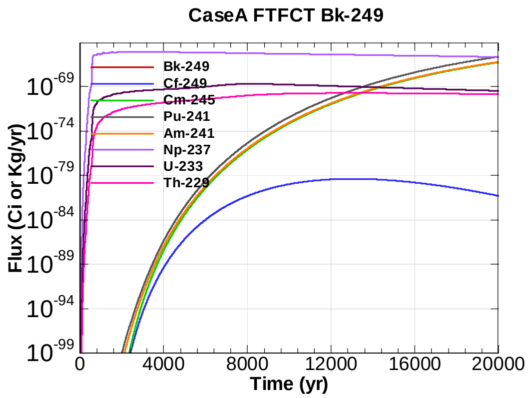

Figure A.2-2474 - Water Table Flux for CaseA FTFCT Bk-249

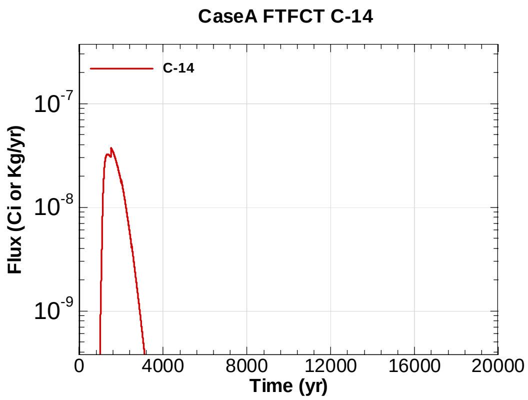

Figure A.2-2475 - Water Table Flux for CaseA FTFCT C-14

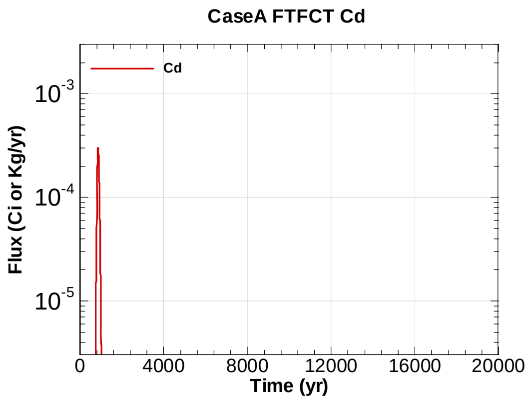

Figure A.2-2476 - Water Table Flux for CaseA FTFCT Cd

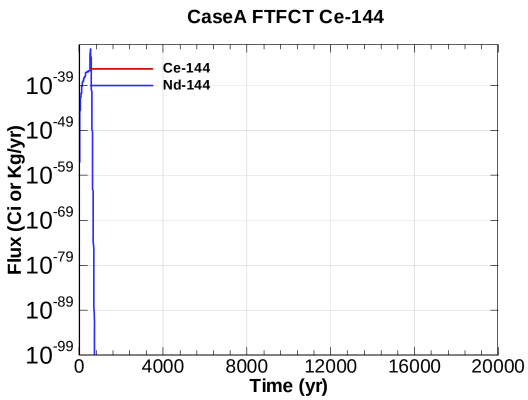

Figure A.2-2477 - Water Table Flux for CaseA FTFCT Ce-144

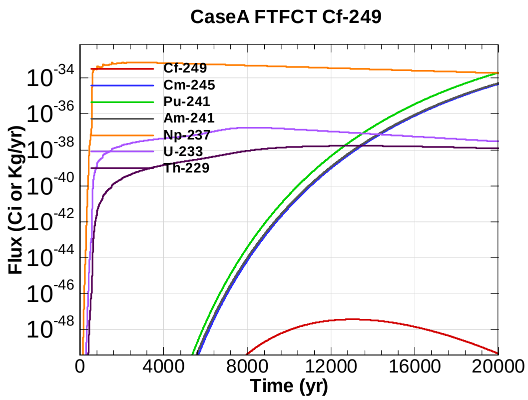

Figure A.2-2478 - Water Table Flux for CaseA FTFCT Cf-249

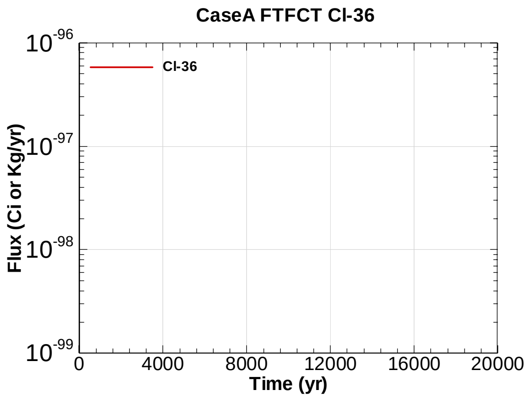

Figure A.2-2479 - Water Table Flux for CaseA FTFCT Cl-36

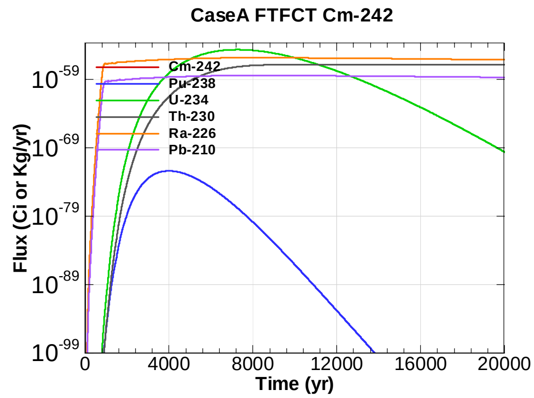

Figure A.2-2480 - Water Table Flux for CaseA FTFCT Cm-242

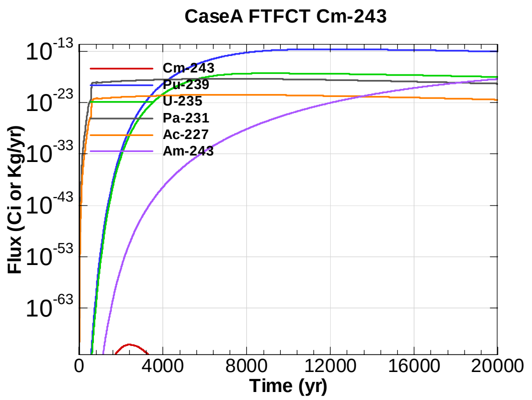

Figure A.2-2481 - Water Table Flux for CaseA FTFCT Cm-243

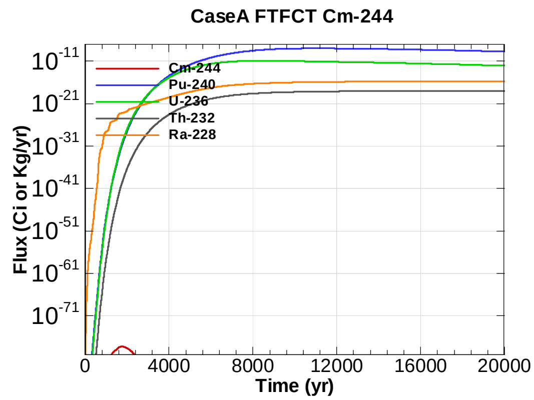

Figure A.2-2482 - Water Table Flux for CaseA FTFCT Cm-244

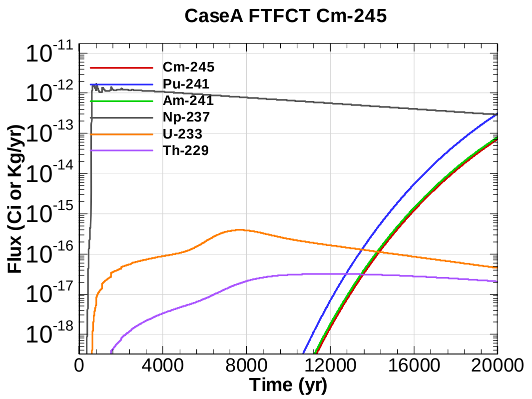

Figure A.2-2483 - Water Table Flux for CaseA FTFCT Cm-245

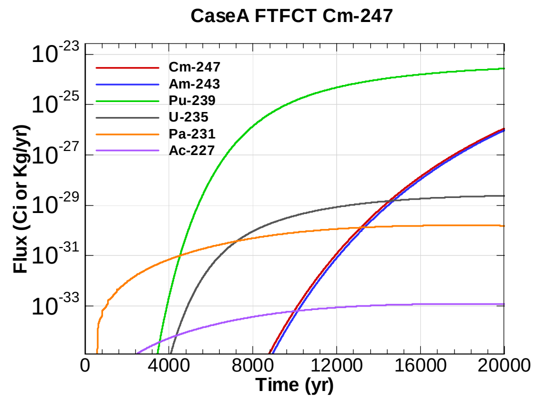

Figure A.2-2484 - Water Table Flux for CaseA FTFCT Cm-247

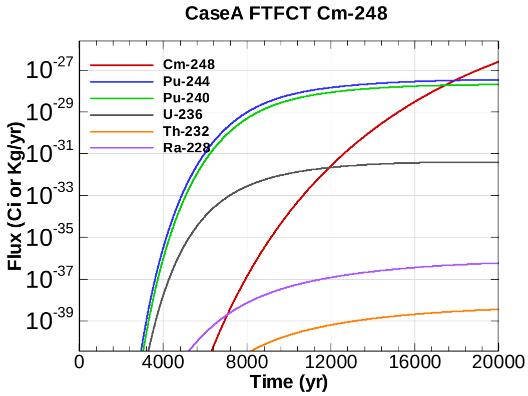

Figure A.2-2485 - Water Table Flux for CaseA FTFCT Cm-248

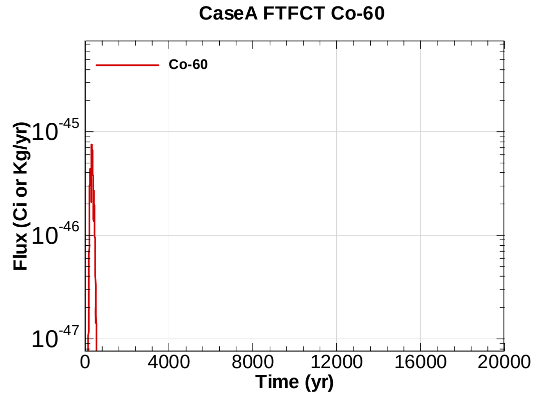

Figure A.2-2486 - Water Table Flux for CaseA FTFCT Co-60

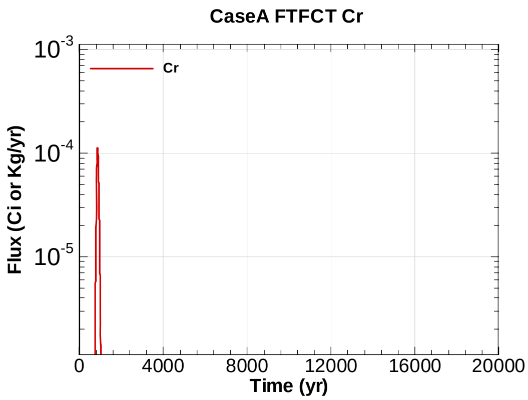

Figure A.2-2487 - Water Table Flux for CaseA FTFCT Cr

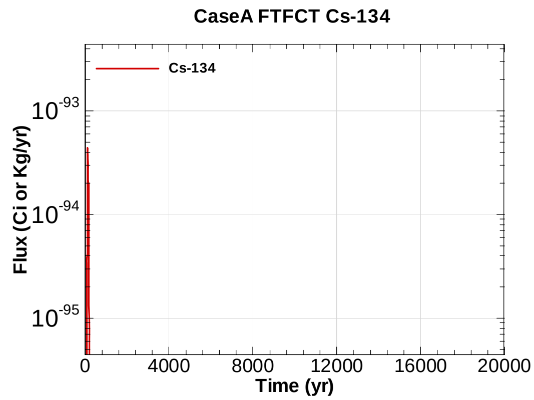

Figure A.2-2488 - Water Table Flux for CaseA FTFCT Cs-134

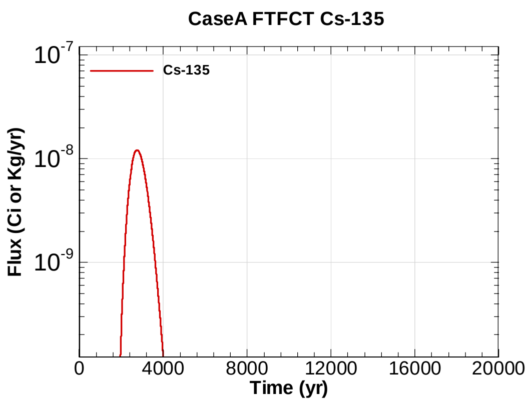

Figure A.2-2489 - Water Table Flux for CaseA FTFCT Cs-135

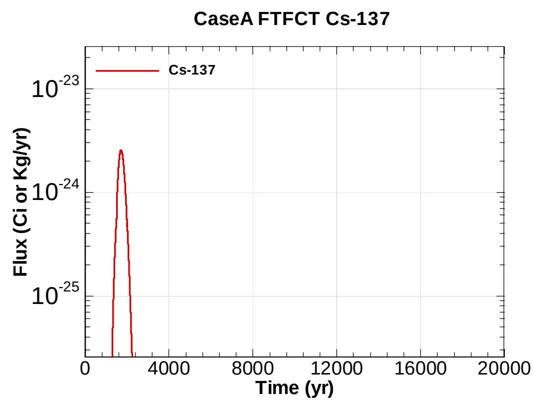

Figure A.2-2490 - Water Table Flux for CaseA FTFCT Cs-137

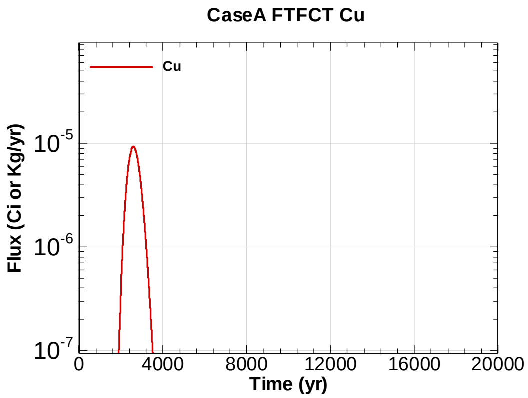

Figure A.2-2491 - Water Table Flux for CaseA FTFCT Cu

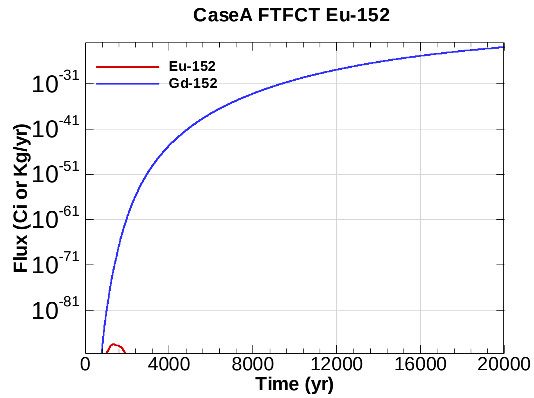

Figure A.2-2492 - Water Table Flux for CaseA FTFCT Eu-152

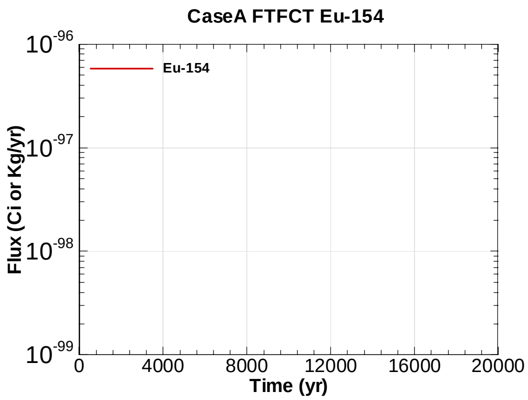

Figure A.2-2493 - Water Table Flux for CaseA FTFCT Eu-154

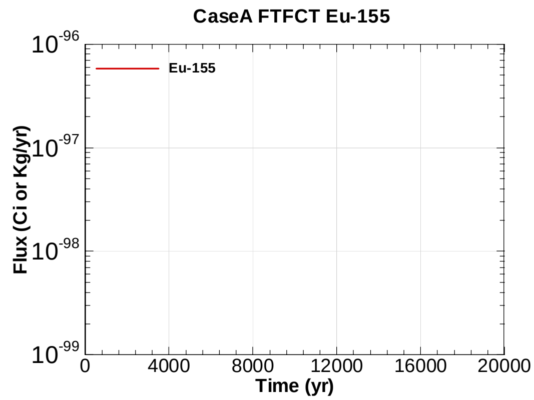

Figure A.2-2494 - Water Table Flux for CaseA FTFCT Eu-155

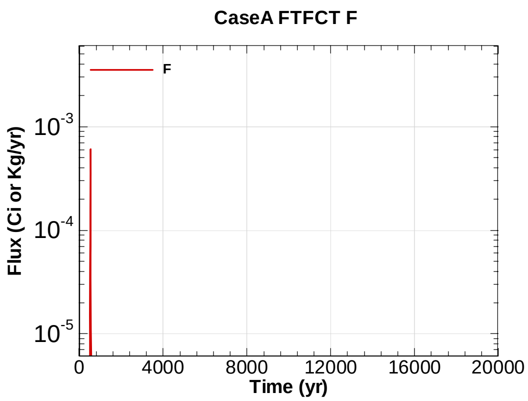

Figure A.2-2495 - Water Table Flux for CaseA FTFCT F

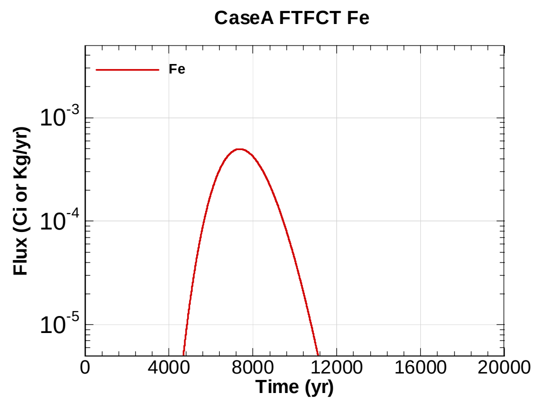

Figure A.2-2496 - Water Table Flux for CaseA FTFCT Fe

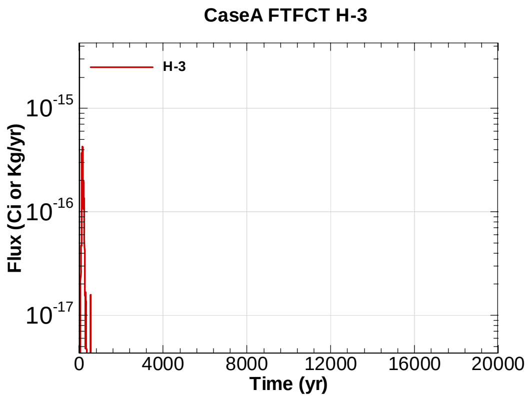

Figure A.2-2497 - Water Table Flux for CaseA FTFCT H-3

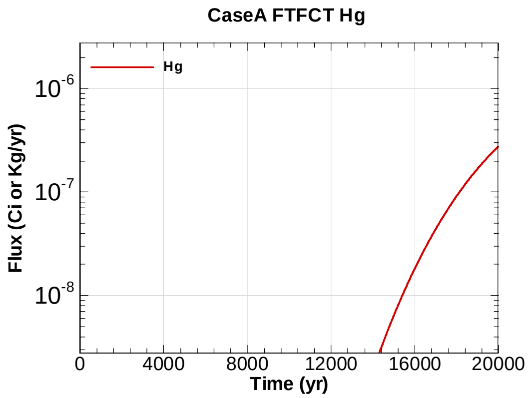

Figure A.2-2498 - Water Table Flux for CaseA FTFCT Hg

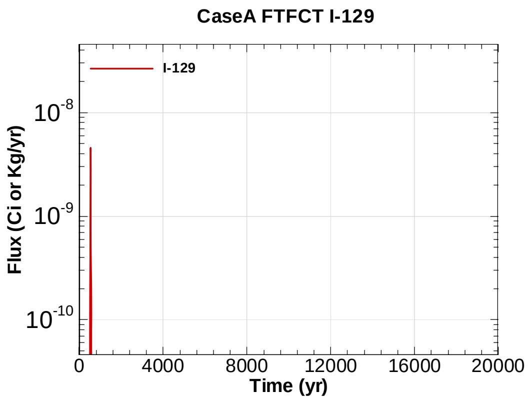

Figure A.2-2499 - Water Table Flux for CaseA FTFCT I-129

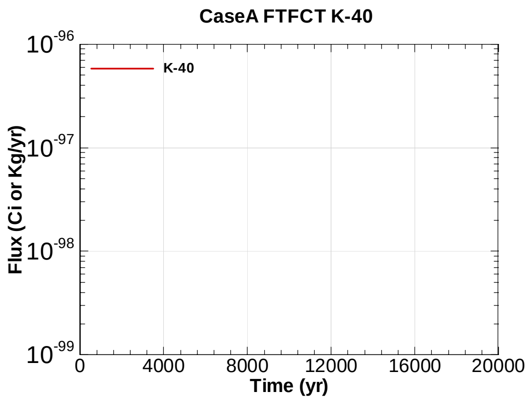

Figure A.2-2500 - Water Table Flux for CaseA FTFCT K-40

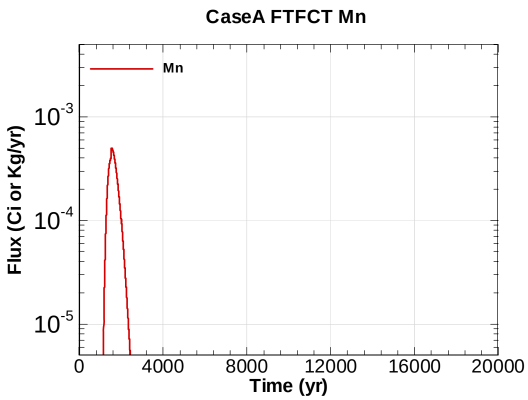

Figure A.2-2501 - Water Table Flux for CaseA FTFCT Mn

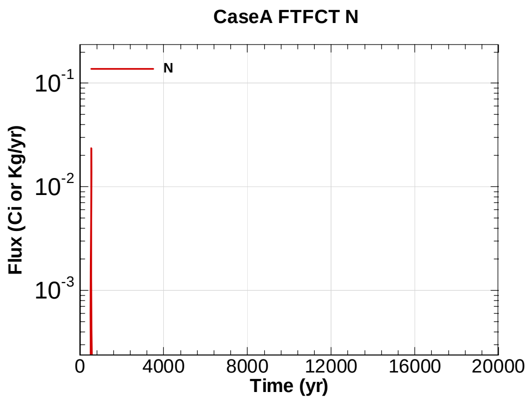

Figure A.2-2502 - Water Table Flux for CaseA FTFCT N

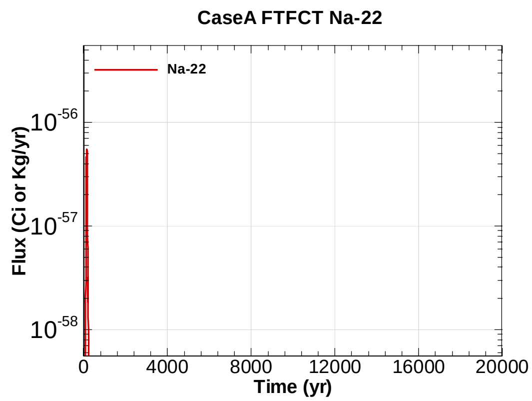

Figure A.2-2503 - Water Table Flux for CaseA FTFCT Na-22

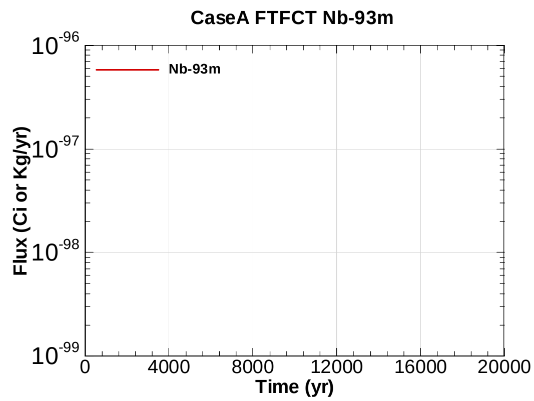

Figure A.2-2504 - Water Table Flux for CaseA FTFCT Nb-93m

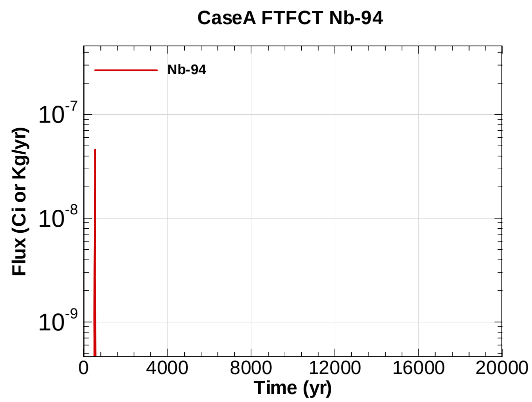

Figure A.2-2505 - Water Table Flux for CaseA FTFCT Nb-94

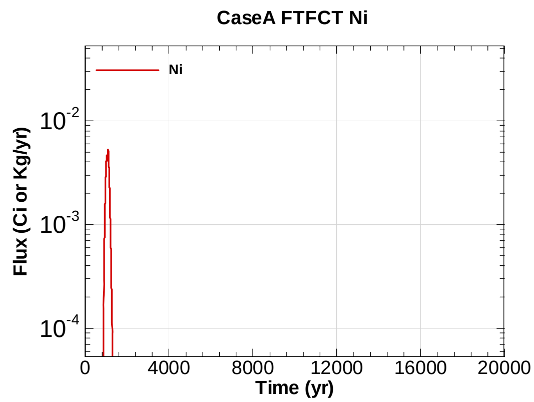

Figure A.2-2506 - Water Table Flux for CaseA FTFCT Ni

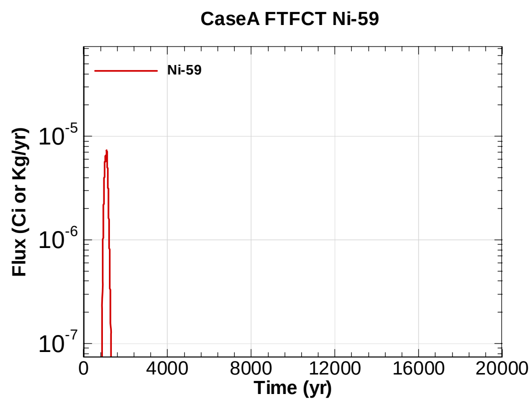

Figure A.2-2507 - Water Table Flux for CaseA FTFCT Ni-59

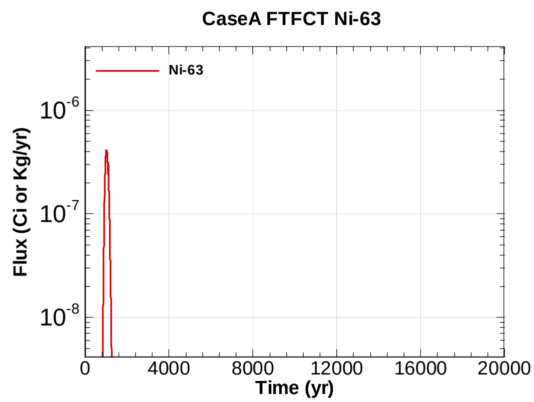

Figure A.2-2508 - Water Table Flux for CaseA FTFCT Ni-63

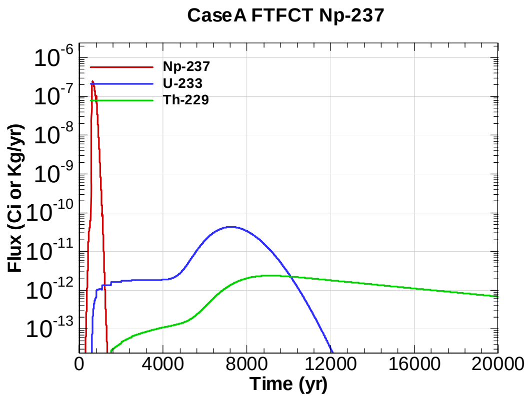

Figure A.2-2509 - Water Table Flux for CaseA FTFCT Np-237

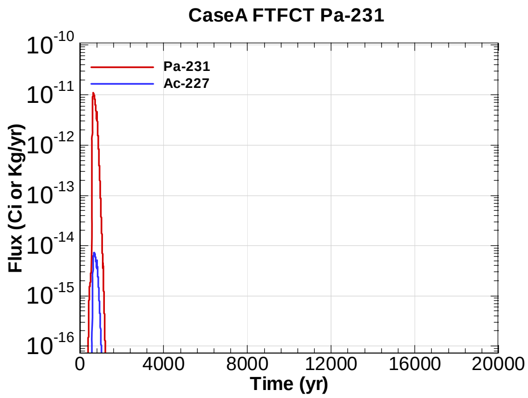

Figure A.2-2510 - Water Table Flux for CaseA FTFCT Pa-231

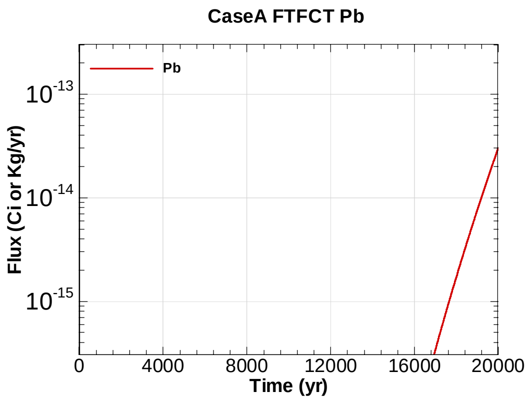

Figure A.2-2511 - Water Table Flux for CaseA FTFCT Pb

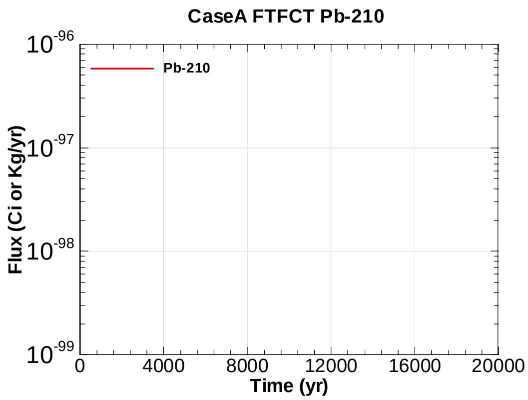

Figure A.2-2512 - Water Table Flux for CaseA FTFCT Pb-210

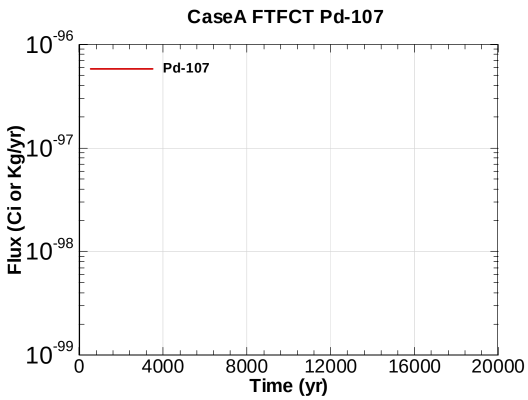

Figure A.2-2513 - Water Table Flux for CaseA FTFCT Pd-107

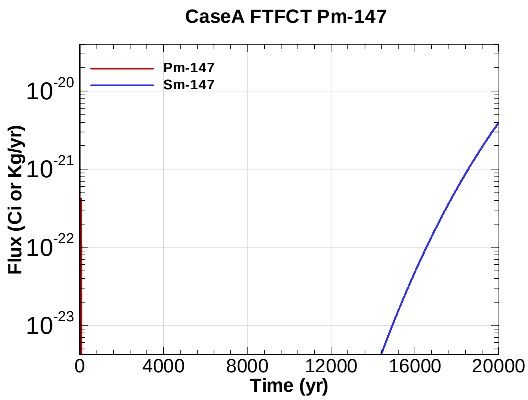

Figure A.2-2514 - Water Table Flux for CaseA FTFCT Pm-147

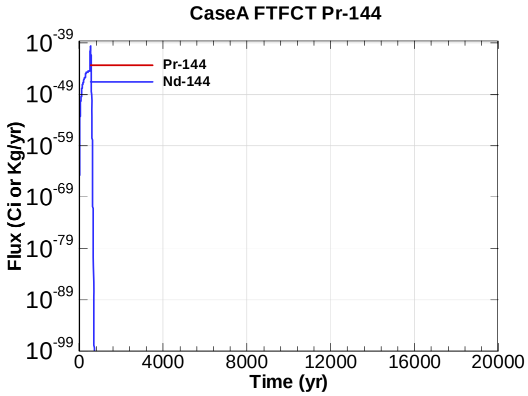

Figure A.2-2515 - Water Table Flux for CaseA FTFCT Pr-144

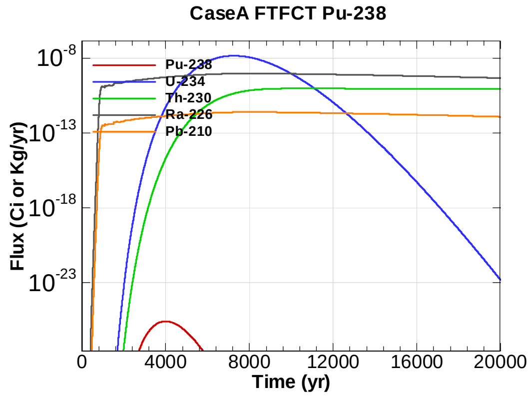

Figure A.2-2516 - Water Table Flux for CaseA FTFCT Pu-238

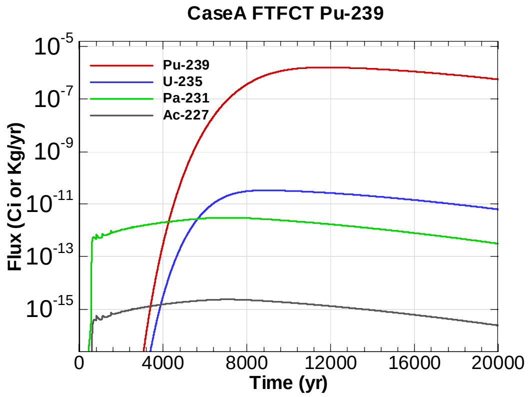

Figure A.2-2517 - Water Table Flux for CaseA FTFCT Pu-239

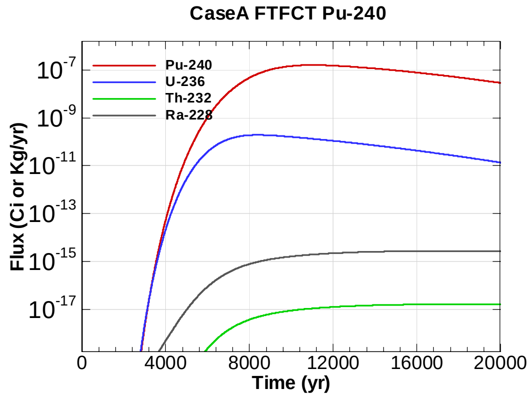

Figure A.2-2518 - Water Table Flux for CaseA FTFCT Pu-240

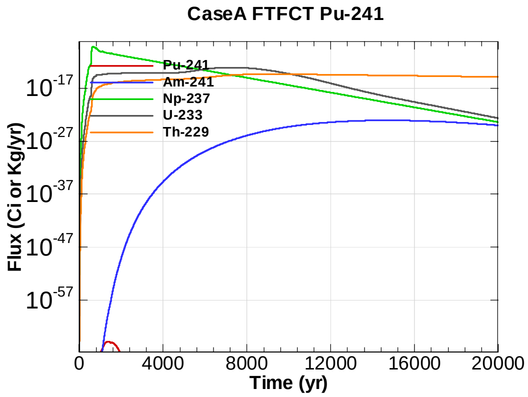

Figure A.2-2519 - Water Table Flux for CaseA FTFCT Pu-241

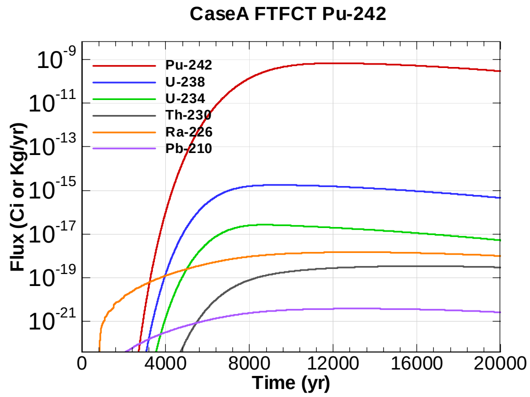

Figure A.2-2520 - Water Table Flux for CaseA FTFCT Pu-242

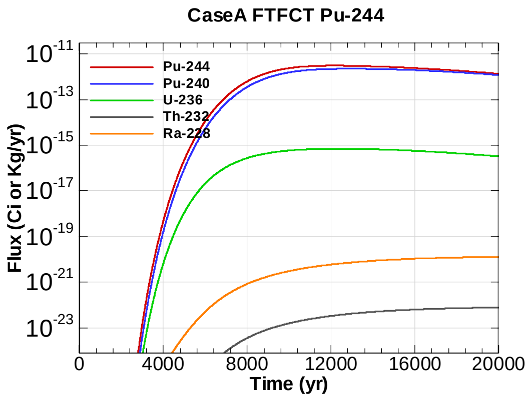

Figure A.2-2521 - Water Table Flux for CaseA FTFCT Pu-244

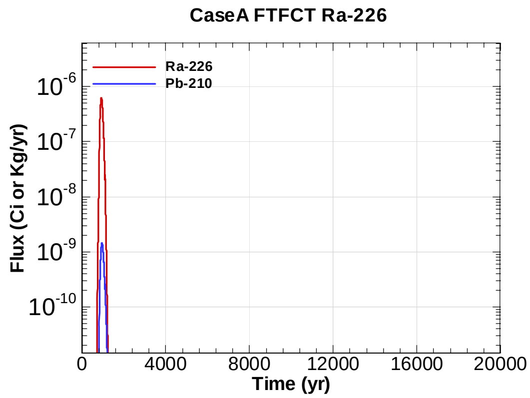

Figure A.2-2522 - Water Table Flux for CaseA FTFCT Ra-226

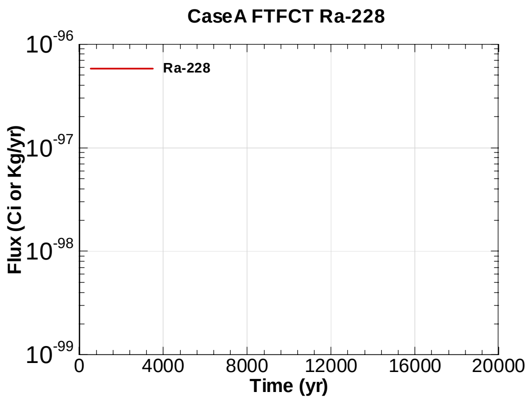

Figure A.2-2523 - Water Table Flux for CaseA FTFCT Ra-228

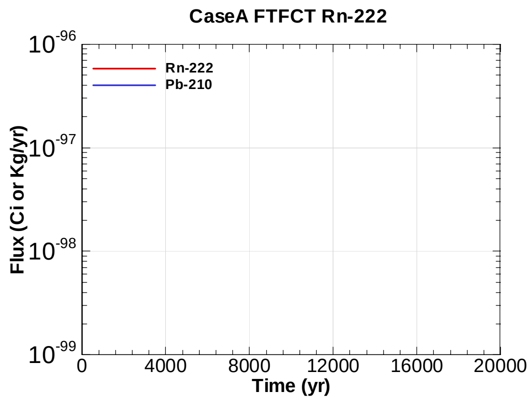

Figure A.2-2524 - Water Table Flux for CaseA FTFCT Rn-222

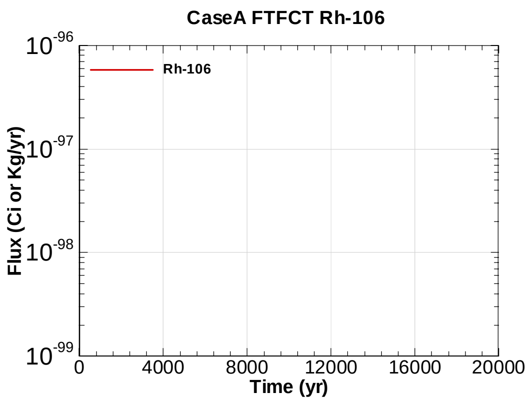

Figure A.2-2525 - Water Table Flux for CaseA FTFCT Rh-106

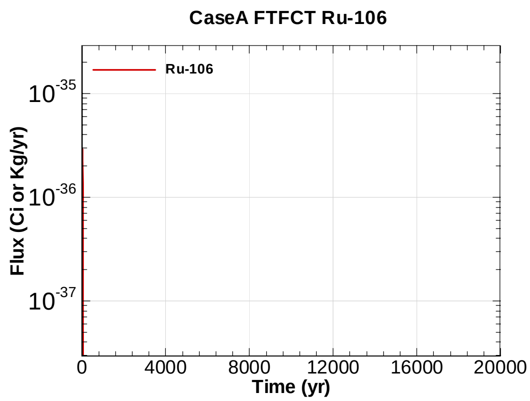

Figure A.2-2526 - Water Table Flux for CaseA FTFCT Ru-106

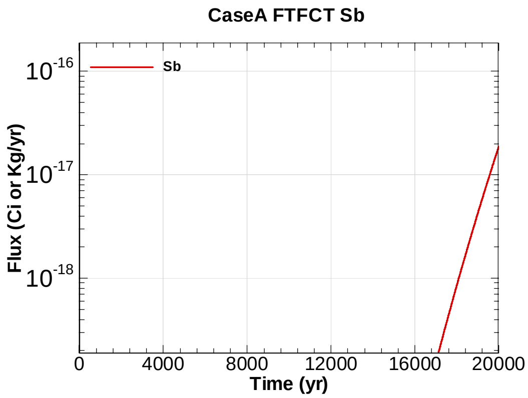

Figure A.2-2527 - Water Table Flux for CaseA FTFCT Sb

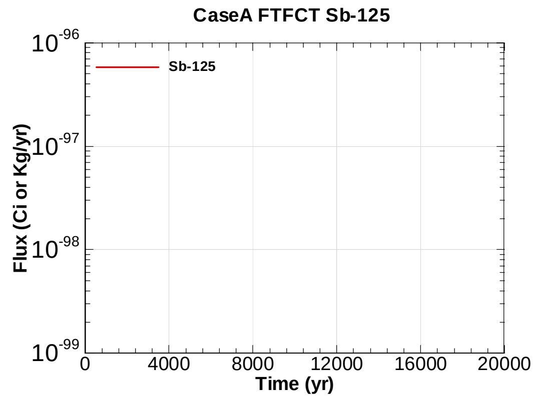

Figure A.2-2528 - Water Table Flux for CaseA FTFCT Sb-125

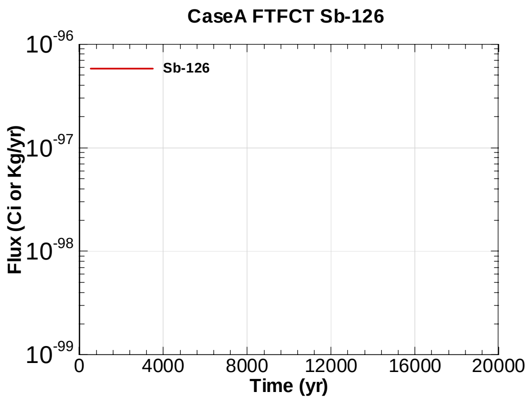

Figure A.2-2529 - Water Table Flux for CaseA FTFCT Sb-126

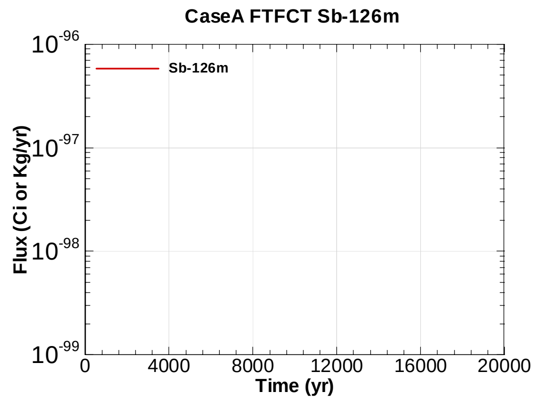

Figure A.2-2530 - Water Table Flux for CaseA FTFCT Sb-126m

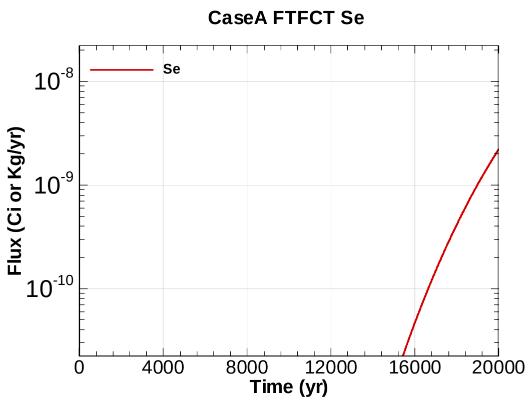

Figure A.2-2531 - Water Table Flux for CaseA FTFCT Se

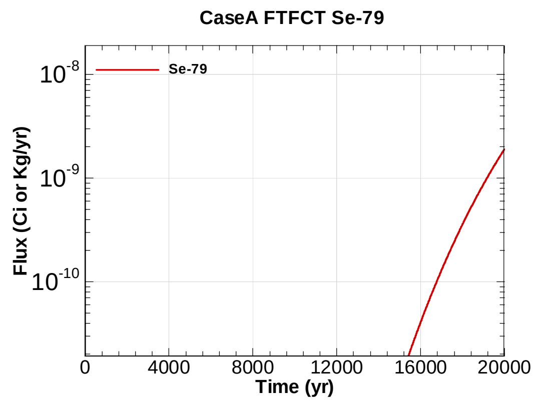

Figure A.2-2532 - Water Table Flux for CaseA FTFCT Se-79

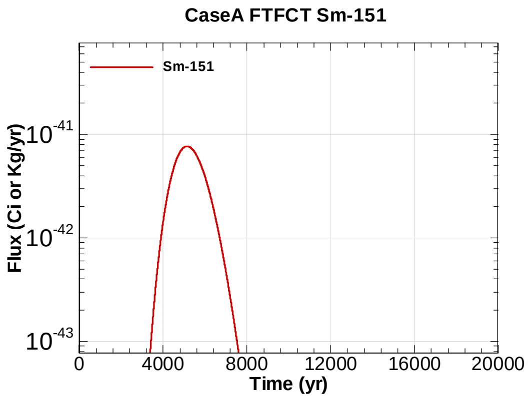

Figure A.2-2533 - Water Table Flux for CaseA FTFCT Sm-151

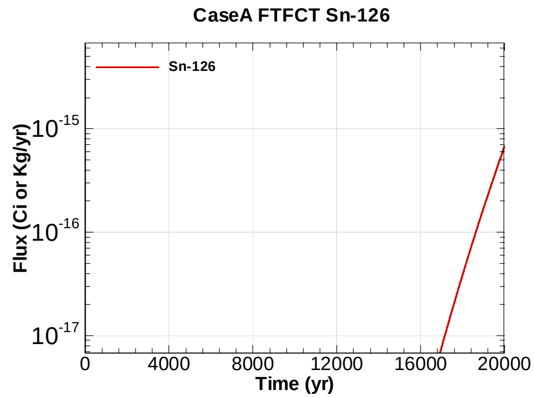

Figure A.2-2534 - Water Table Flux for CaseA FTFCT Sn-126

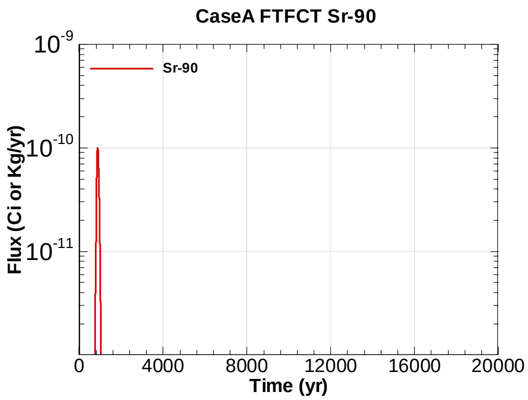

Figure A.2-2535 - Water Table Flux for CaseA FTFCT Sr-90

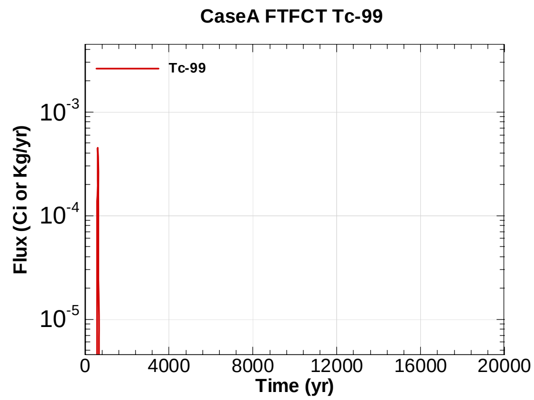

Figure A.2-2536 - Water Table Flux for CaseA FTFCT Tc-99

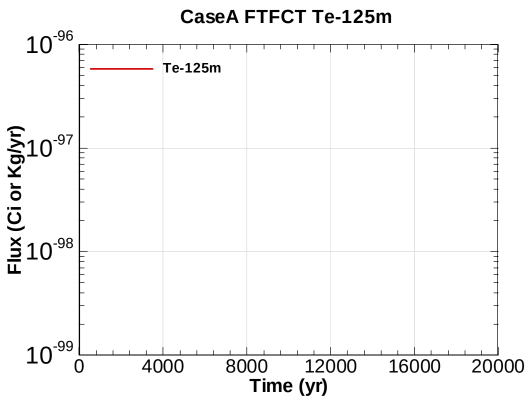

Figure A.2-2537 - Water Table Flux for CaseA FTFCT Te-125m

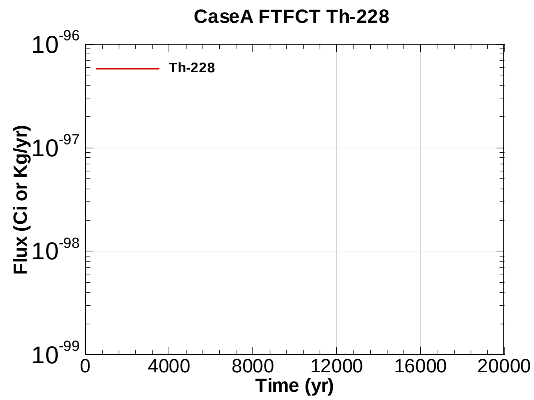

Figure A.2-2538 - Water Table Flux for CaseA FTFCT Th-228

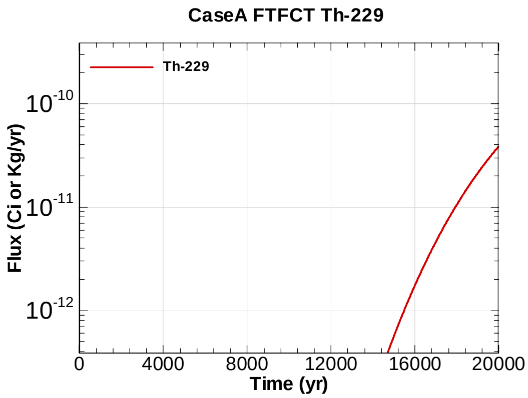

Figure A.2-2539 - Water Table Flux for CaseA FTFCT Th-229

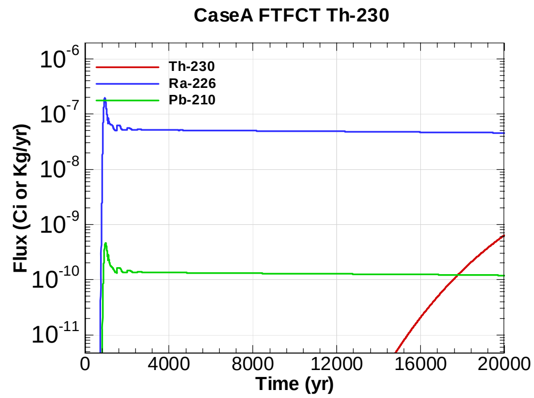

Figure A.2-2540 - Water Table Flux for CaseA FTFCT Th-230

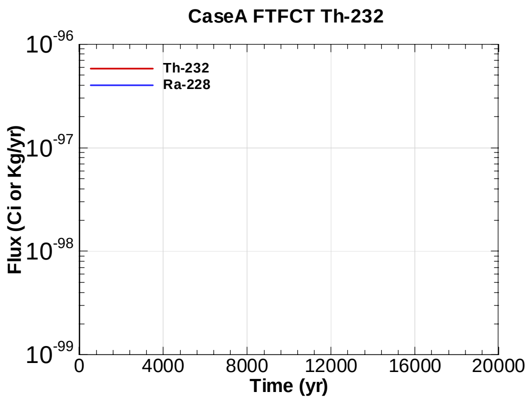

Figure A.2-2541 - Water Table Flux for CaseA FTFCT Th-232

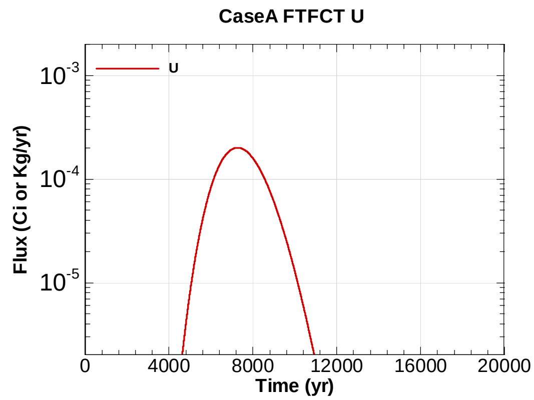

Figure A.2-2542 - Water Table Flux for CaseA FTFCT U

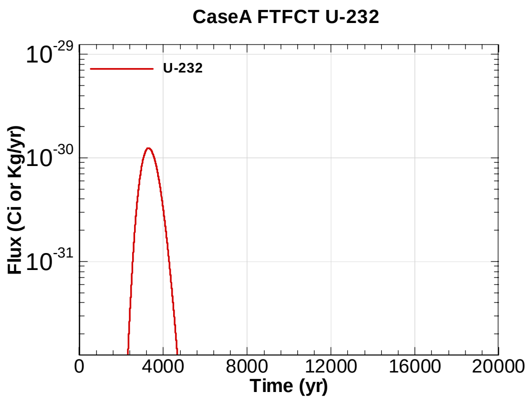

Figure A.2-2543 - Water Table Flux for CaseA FTFCT U-232

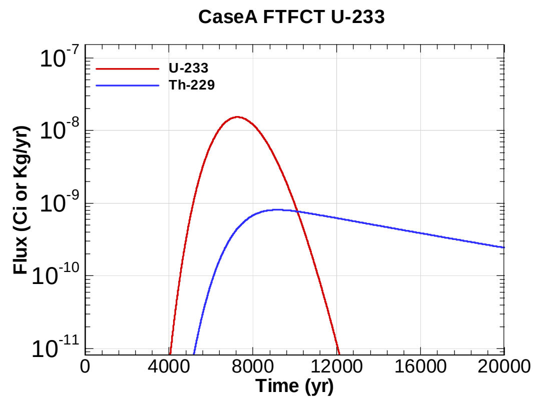

Figure A.2-2544 - Water Table Flux for CaseA FTFCT U-233

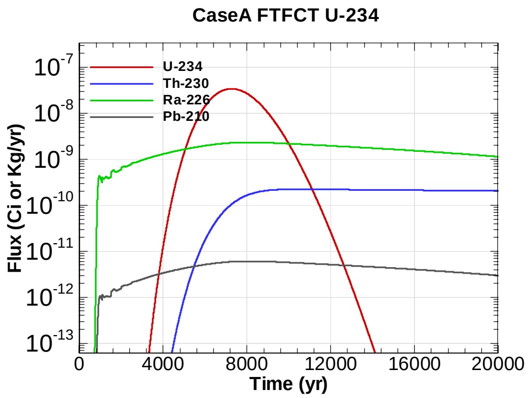

Figure A.2-2545 - Water Table Flux for CaseA FTFCT U-234

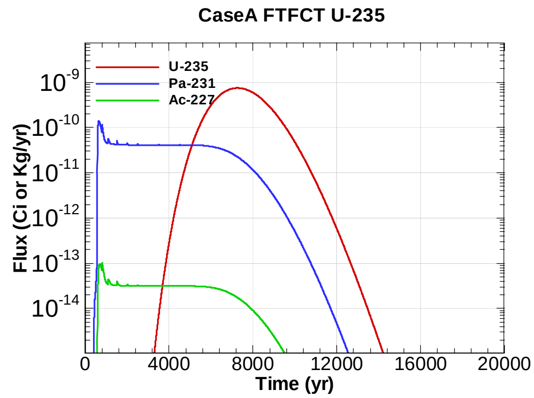

Figure A.2-2546 - Water Table Flux for CaseA FTFCT U-235

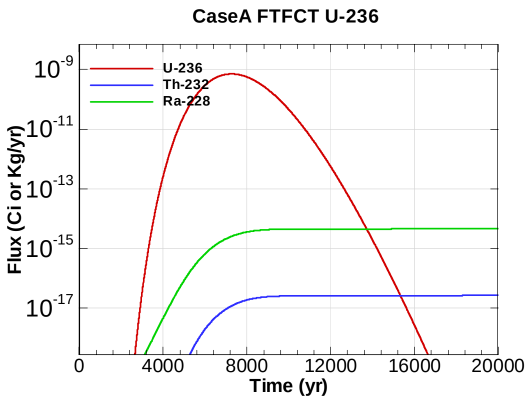

Figure A.2-2547 - Water Table Flux for CaseA FTFCT U-236

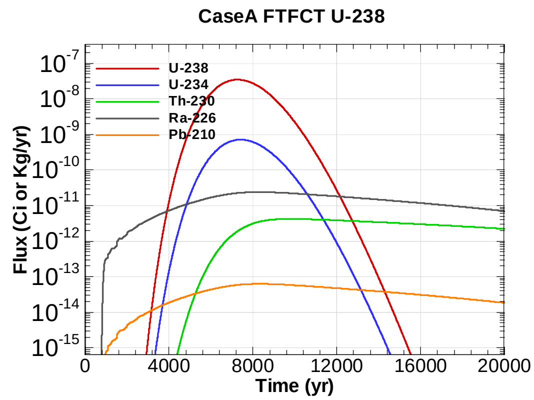

Figure A.2-2548 - Water Table Flux for CaseA FTFCT U-238

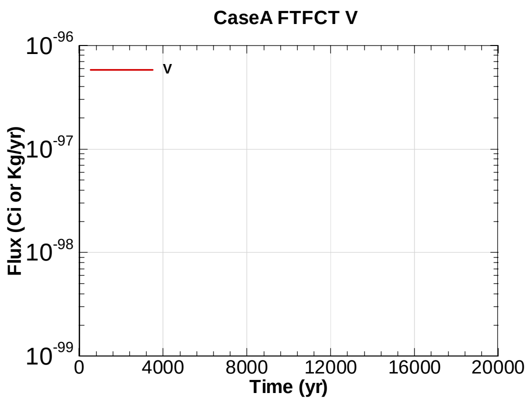

Figure A.2-2549 - Water Table Flux for CaseA FTFCT V

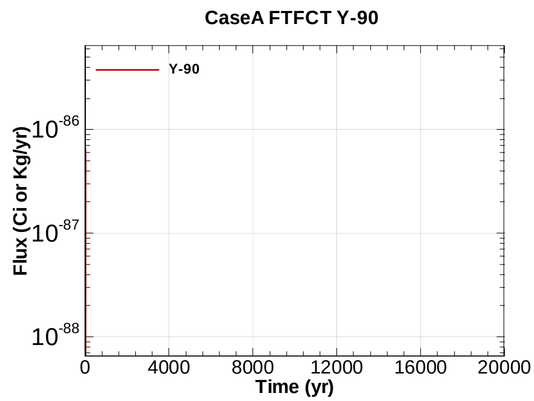

Figure A.2-2550 - Water Table Flux for CaseA FTFCT Y-90

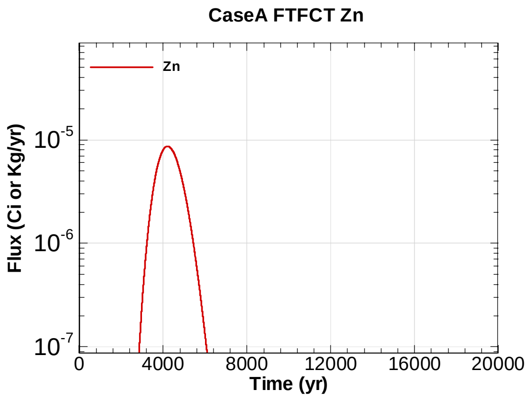

Figure A.2-2551 - Water Table Flux for CaseA FTFCT Zn

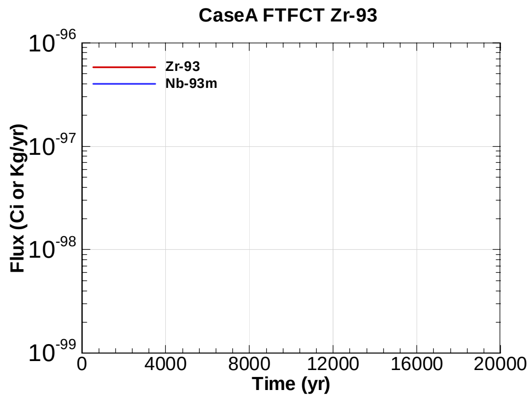

Figure A.2-2552 - Water Table Flux for CaseA FTFCT Zr-93

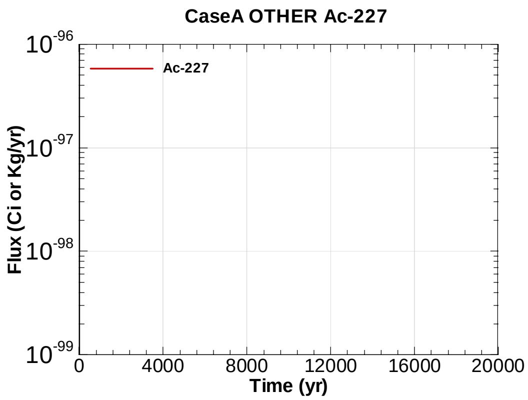

Figure A.2-2553 - Water Table Flux for CaseA OTHER Ac-227

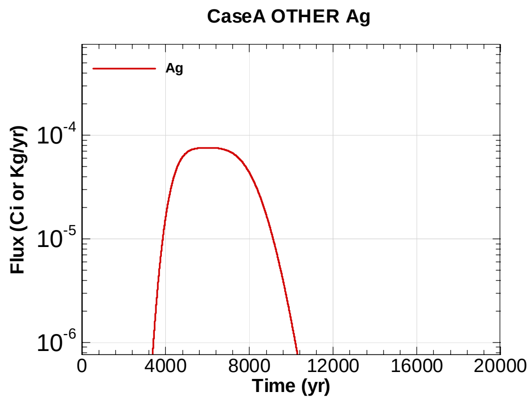

Figure A.2-2554 - Water Table Flux for CaseA OTHER Ag

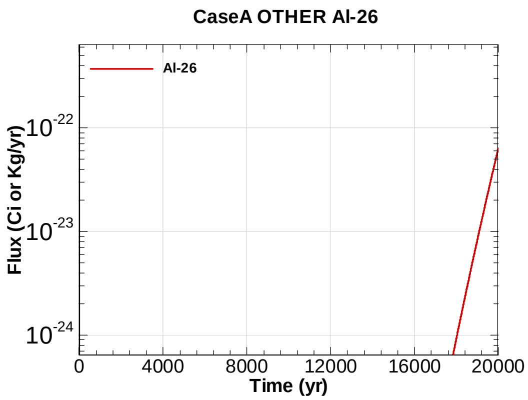

Figure A.2-2555 - Water Table Flux for CaseA OTHER Al-26

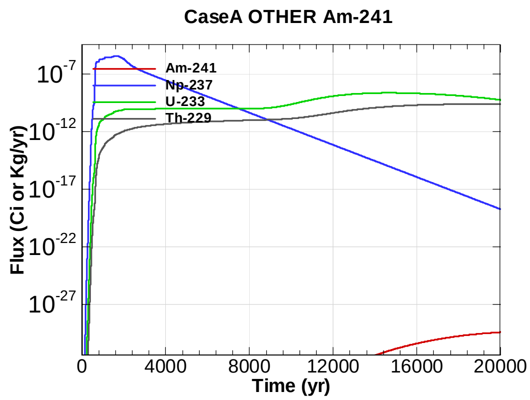

Figure A.2-2556 - Water Table Flux for CaseA OTHER Am-241

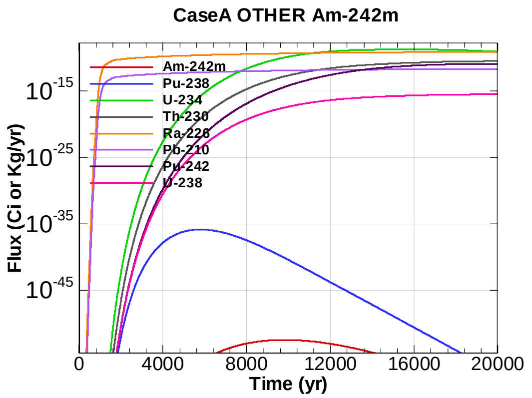

Figure A.2-2557 - Water Table Flux for CaseA OTHER Am-242m

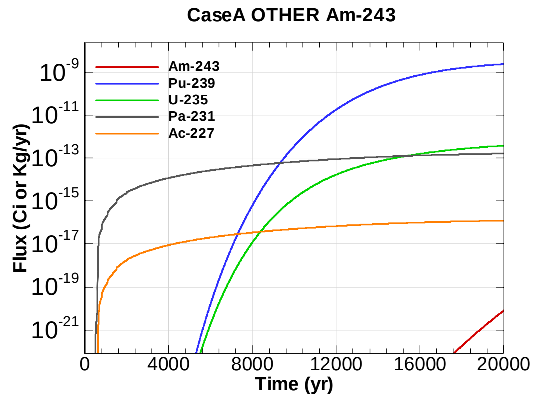

Figure A.2-2558 - Water Table Flux for CaseA OTHER Am-243

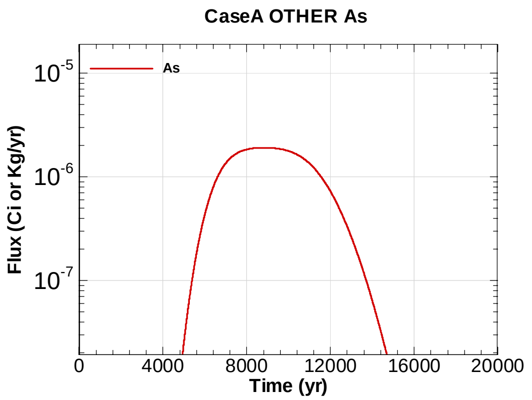

Figure A.2-2559 - Water Table Flux for CaseA OTHER As

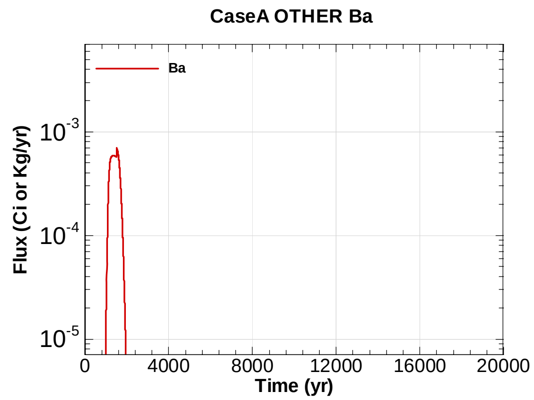

Figure A.2-2560 - Water Table Flux for CaseA OTHER Ba

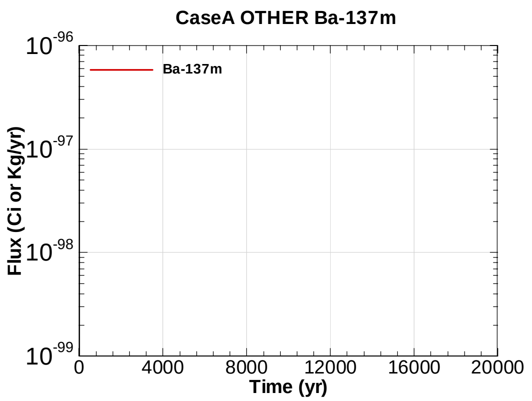

Figure A.2-2561 - Water Table Flux for CaseA OTHER Ba-137m

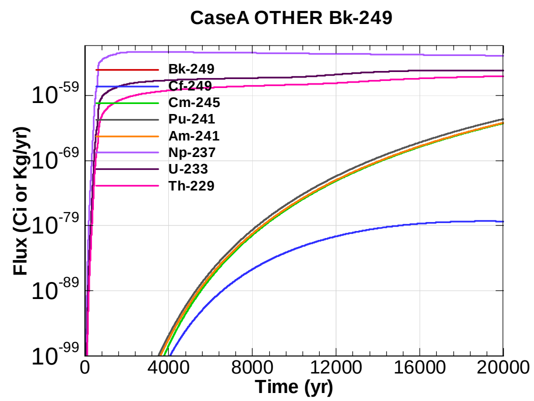

Figure A.2-2562 - Water Table Flux for CaseA OTHER Bk-249

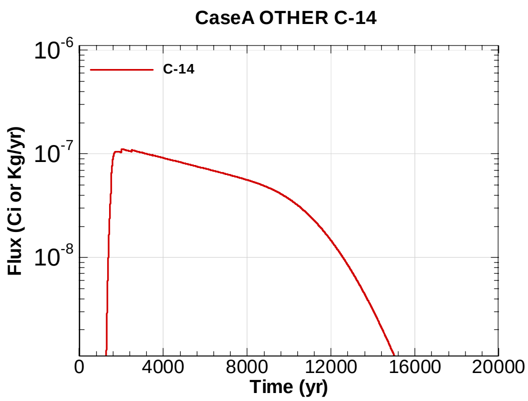

Figure A.2-2563 - Water Table Flux for CaseA OTHER C-14

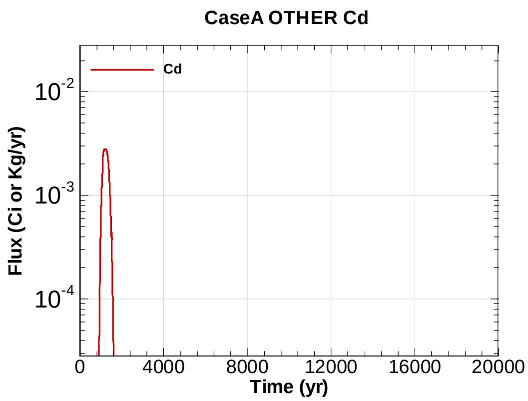

Figure A.2-2564 - Water Table Flux for CaseA OTHER Cd

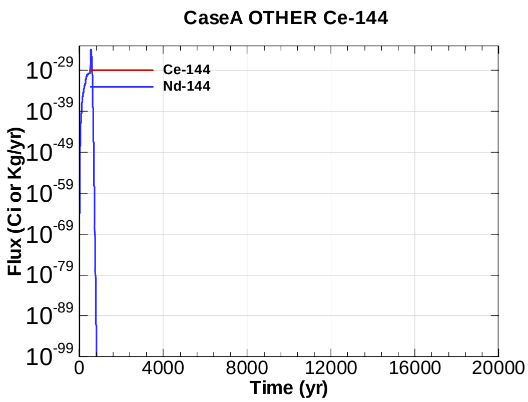

Figure A.2-2565 - Water Table Flux for CaseA OTHER Ce-144

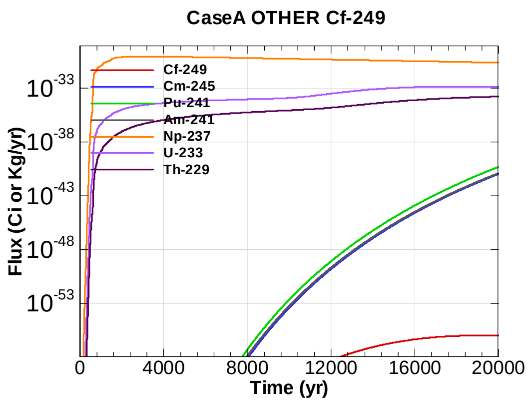

Figure A.2-2566 - Water Table Flux for CaseA OTHER Cf-249

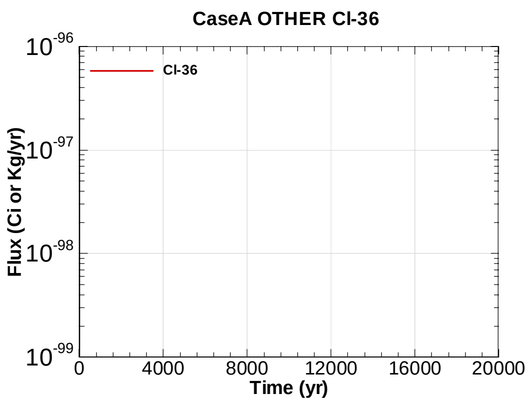

Figure A.2-2567 - Water Table Flux for CaseA OTHER Cl-36

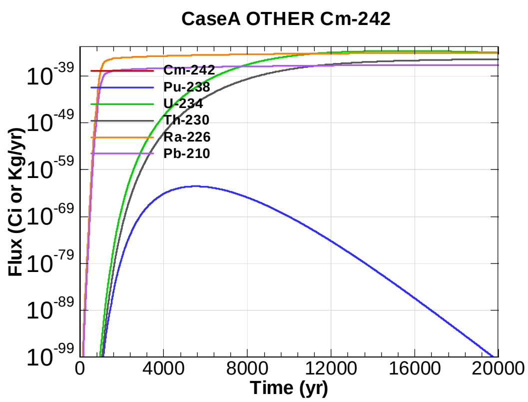

Figure A.2-2568 - Water Table Flux for CaseA OTHER Cm-242

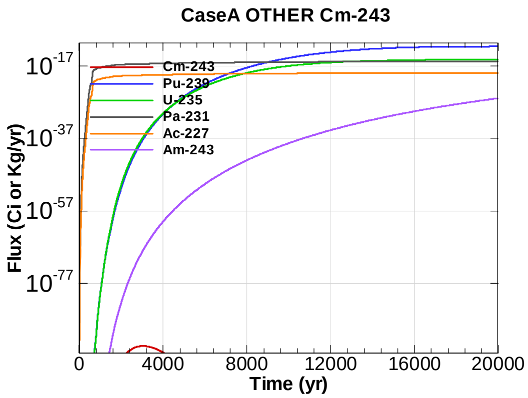

Figure A.2-2569 - Water Table Flux for CaseA OTHER Cm-243

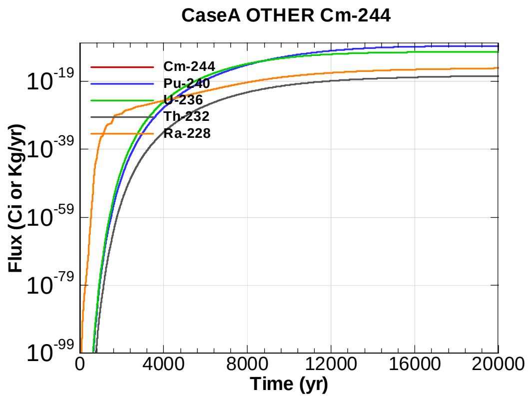

Figure A.2-2570 - Water Table Flux for CaseA OTHER Cm-244

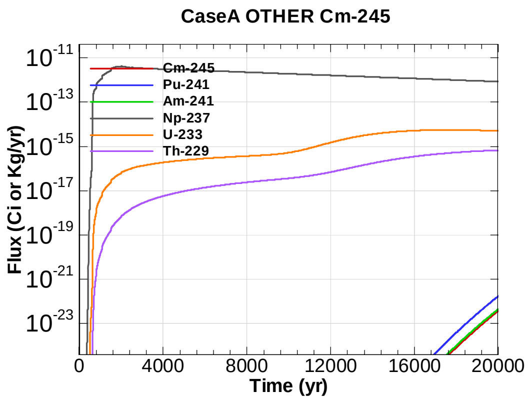

Figure A.2-2571 - Water Table Flux for CaseA OTHER Cm-245

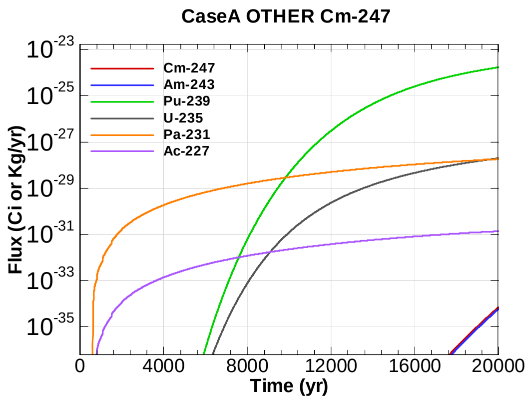

Figure A.2-2572 - Water Table Flux for CaseA OTHER Cm-247

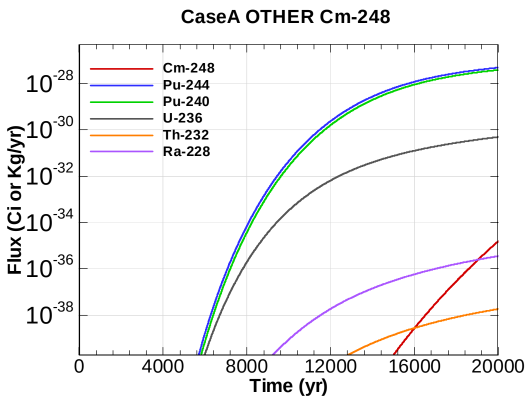

Figure A.2-2573 - Water Table Flux for CaseA OTHER Cm-248

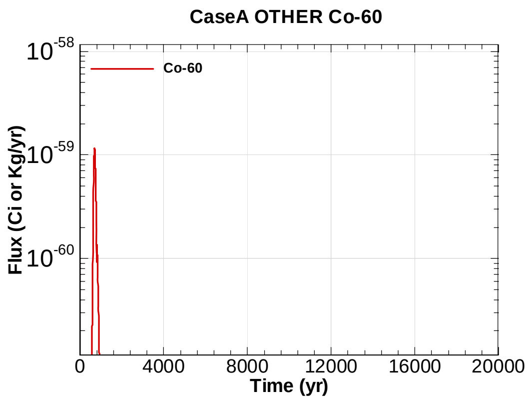

Figure A.2-2574 - Water Table Flux for CaseA OTHER Co-60

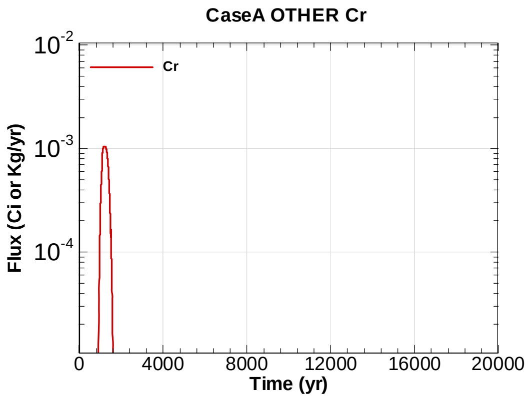

Figure A.2-2575 - Water Table Flux for CaseA OTHER Cr

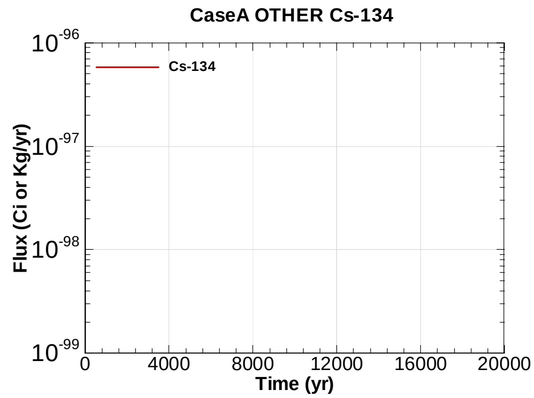

Figure A.2-2576 - Water Table Flux for CaseA OTHER Cs-134

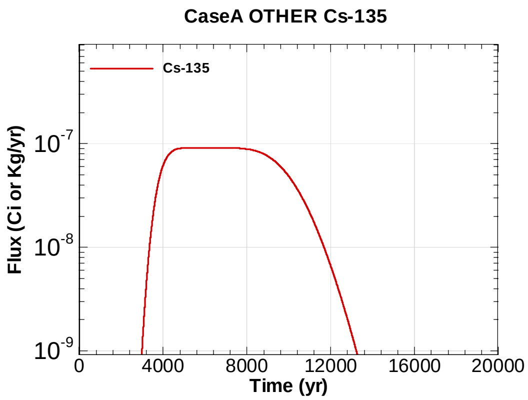

Figure A.2-2577 - Water Table Flux for CaseA OTHER Cs-135

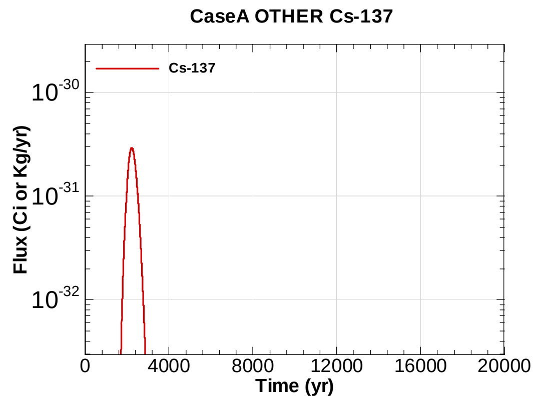

Figure A.2-2578 - Water Table Flux for CaseA OTHER Cs-137

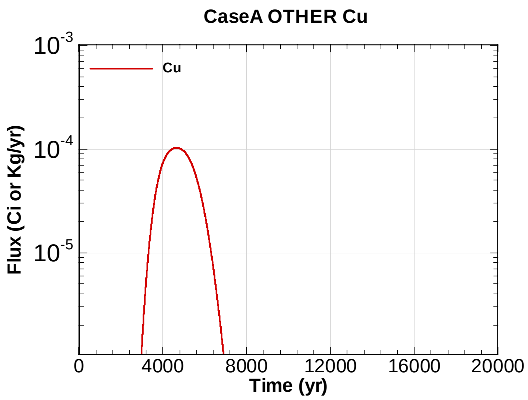

Figure A.2-2579 - Water Table Flux for CaseA OTHER Cu

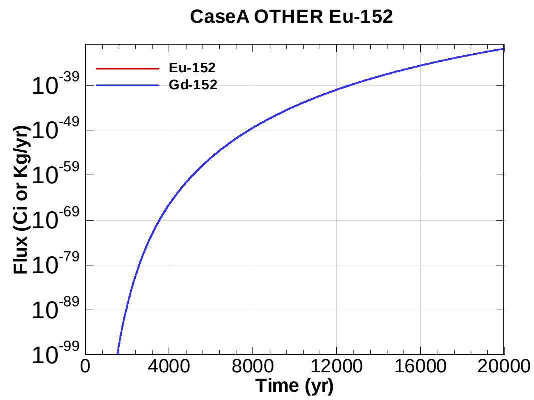

Figure A.2-2580 - Water Table Flux for CaseA OTHER Eu-152

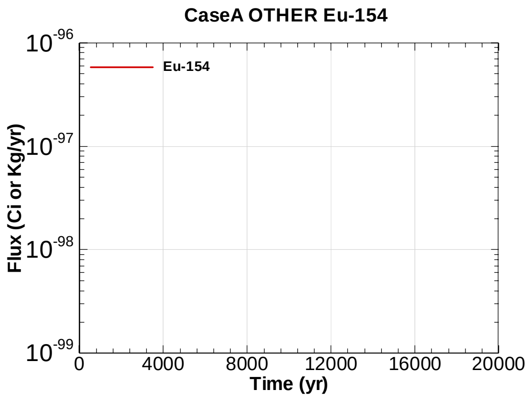

Figure A.2-2581 - Water Table Flux for CaseA OTHER Eu-154

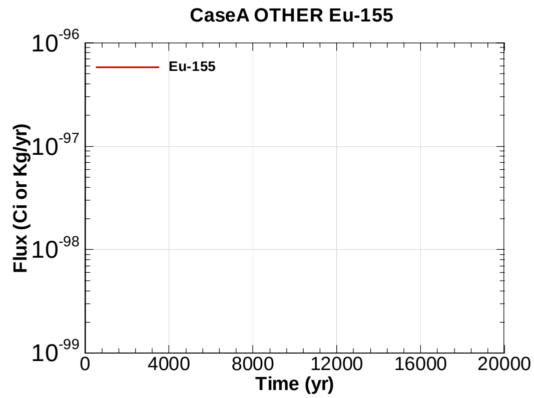

Figure A.2-2582 - Water Table Flux for CaseA OTHER Eu-155

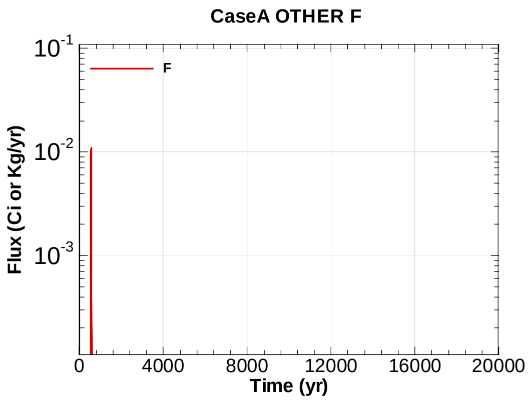

Figure A.2-2583 - Water Table Flux for CaseA OTHER F

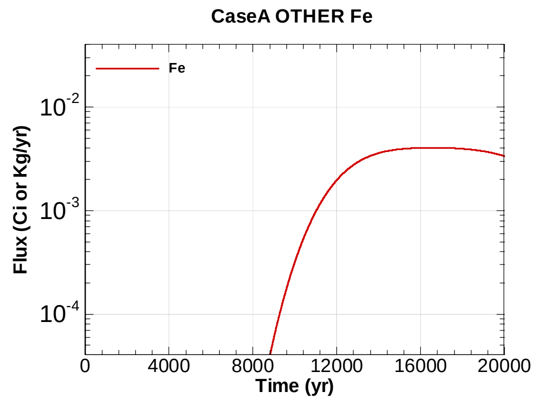

Figure A.2-2584 - Water Table Flux for CaseA OTHER Fe

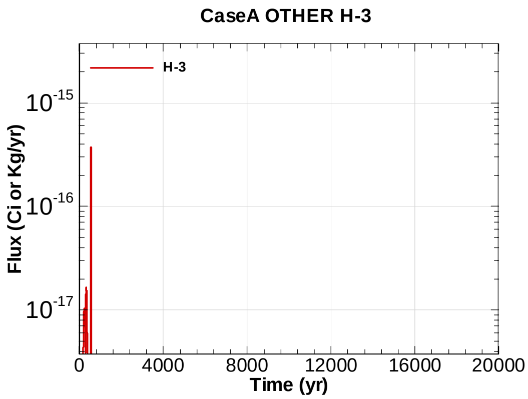

Figure A.2-2585 - Water Table Flux for CaseA OTHER H-3

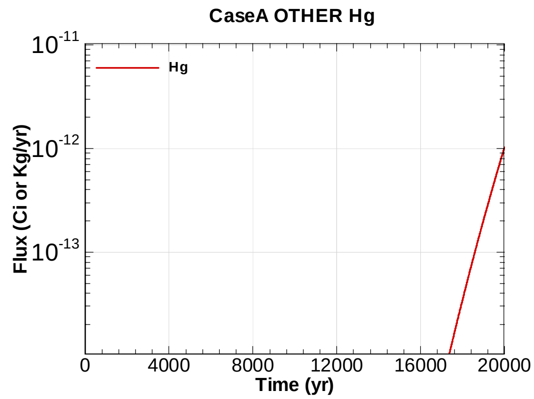

Figure A.2-2586 - Water Table Flux for CaseA OTHER Hg

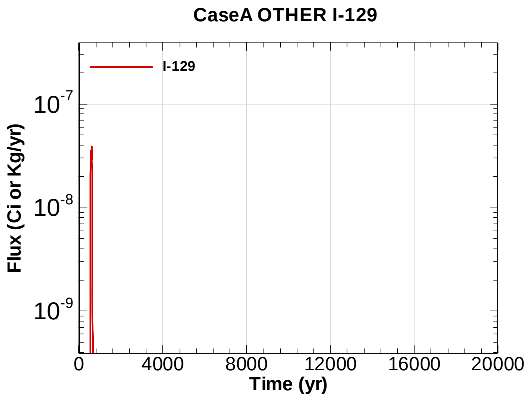

Figure A.2-2587 - Water Table Flux for CaseA OTHER I-129

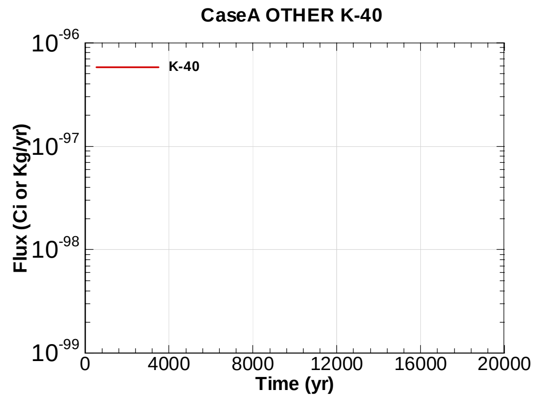

Figure A.2-2588 - Water Table Flux for CaseA OTHER K-40

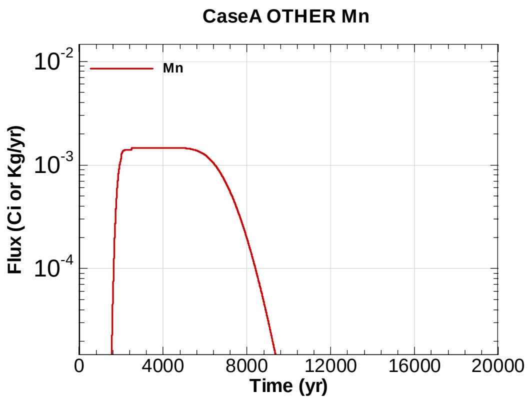

Figure A.2-2589 - Water Table Flux for CaseA OTHER Mn

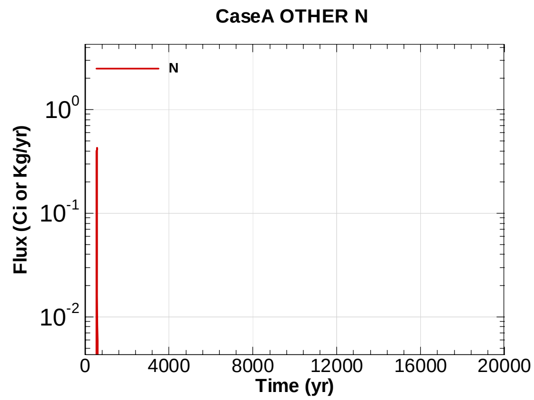

Figure A.2-2590 - Water Table Flux for CaseA OTHER N

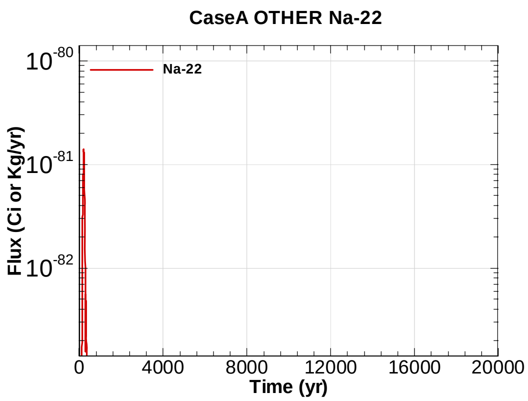

Figure A.2-2591 - Water Table Flux for CaseA OTHER Na-22

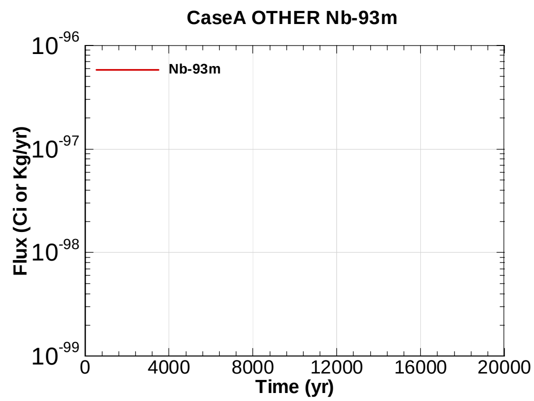

Figure A.2-2592 - Water Table Flux for CaseA OTHER Nb-93m

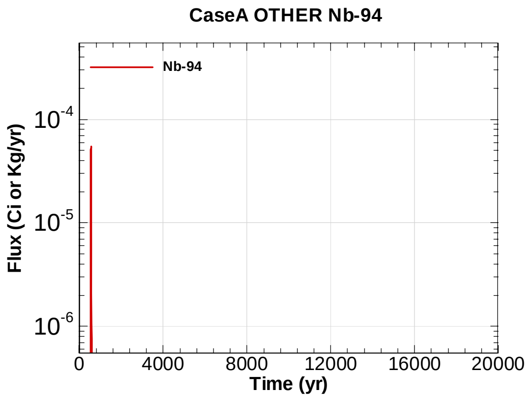

Figure A.2-2593 - Water Table Flux for CaseA OTHER Nb-94

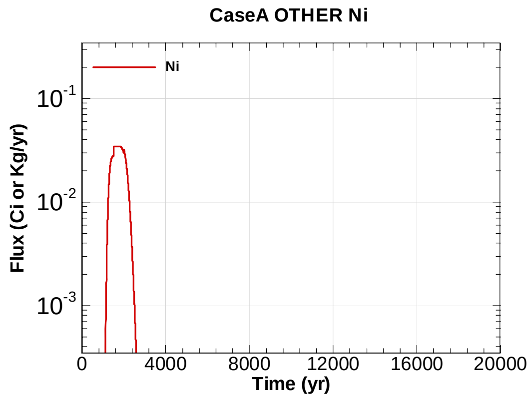

Figure A.2-2594 - Water Table Flux for CaseA OTHER Ni

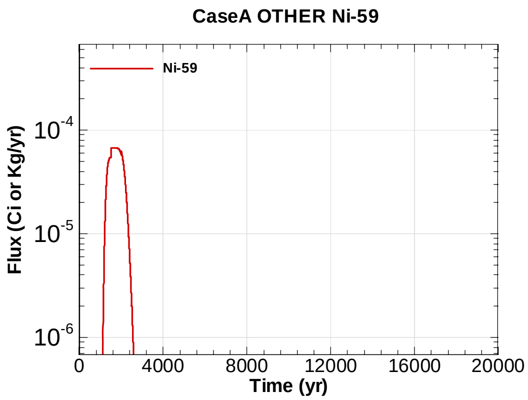

Figure A.2-2595 - Water Table Flux for CaseA OTHER Ni-59

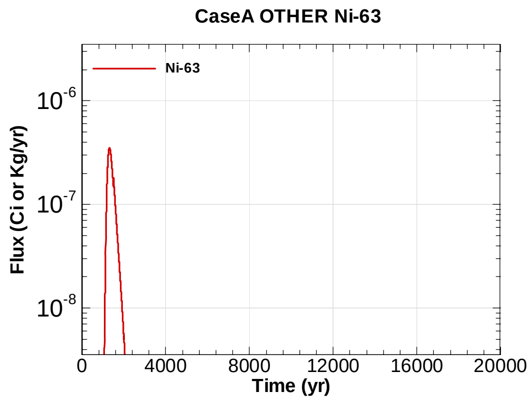

Figure A.2-2596 - Water Table Flux for CaseA OTHER Ni-63

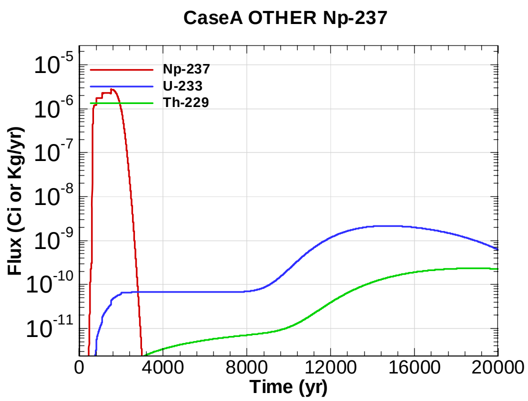

Figure A.2-2597 - Water Table Flux for CaseA OTHER Np-237

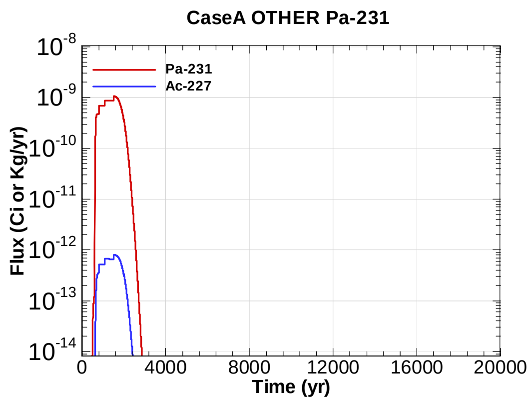

Figure A.2-2598 - Water Table Flux for CaseA OTHER Pa-231

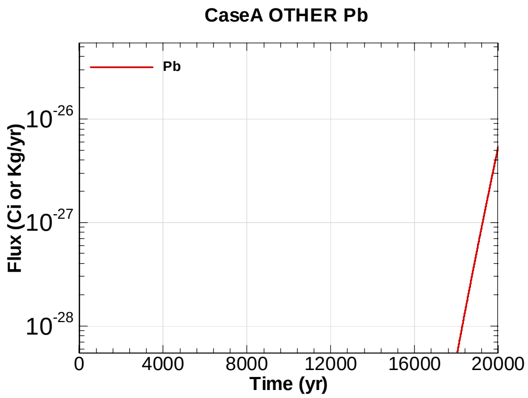

Figure A.2-2599 - Water Table Flux for CaseA OTHER Pb

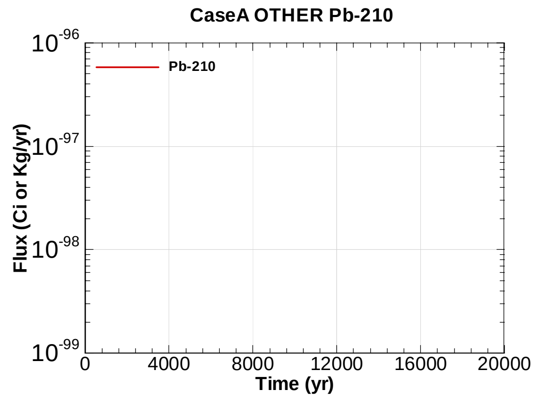

Figure A.2-2600 - Water Table Flux for CaseA OTHER Pb-210

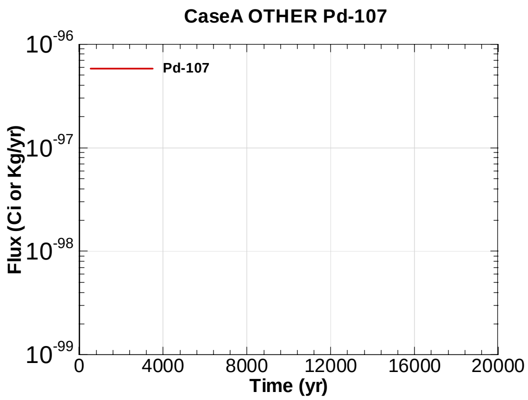

Figure A.2-2601 - Water Table Flux for CaseA OTHER Pd-107

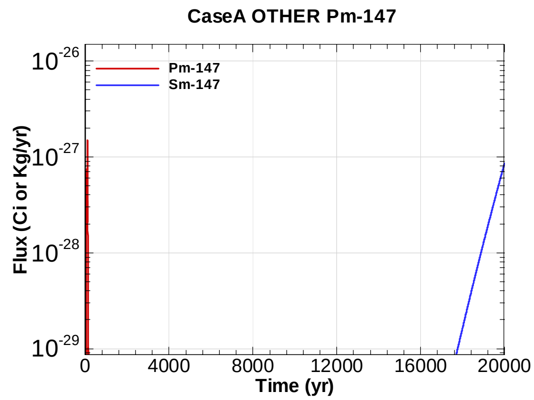

Figure A.2-2602 - Water Table Flux for CaseA OTHER Pm-147

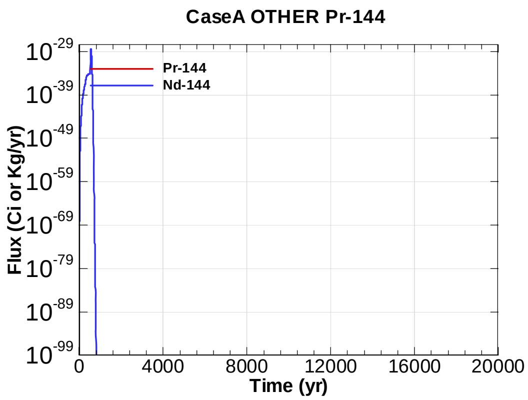

Figure A.2-2603 - Water Table Flux for CaseA OTHER Pr-144

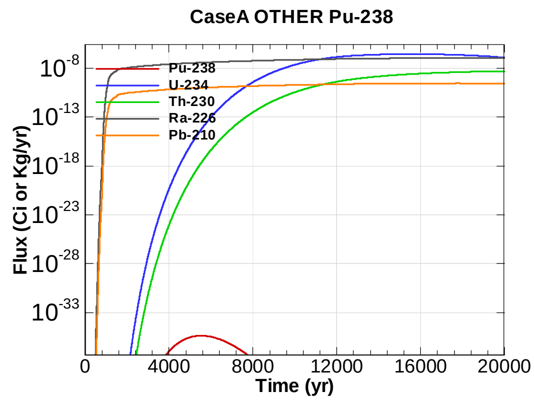

Figure A.2-2604 - Water Table Flux for CaseA OTHER Pu-238

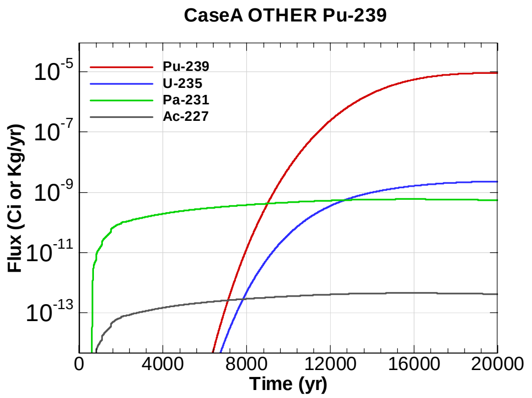

Figure A.2-2605 - Water Table Flux for CaseA OTHER Pu-239

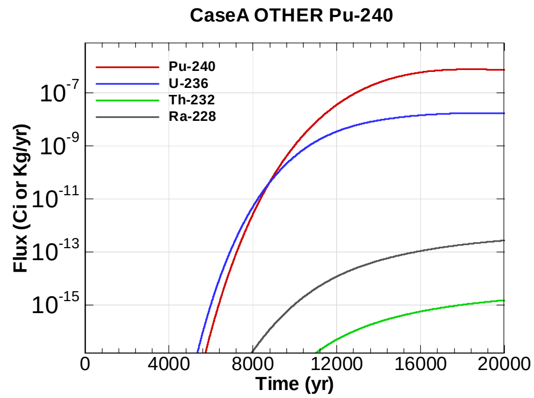

Figure A.2-2606 - Water Table Flux for CaseA OTHER Pu-240

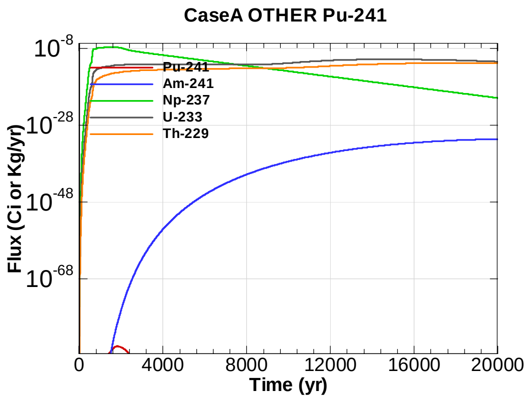

Figure A.2-2607 - Water Table Flux for CaseA OTHER Pu-241

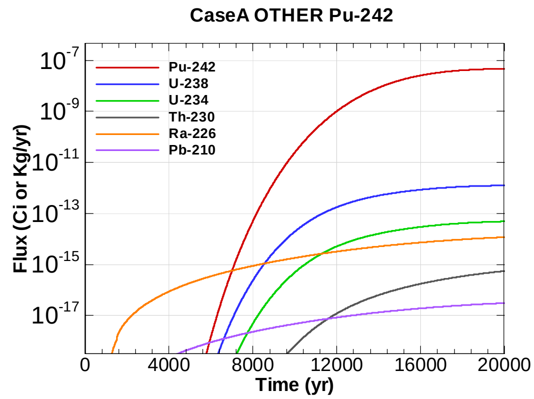

Figure A.2-2608 - Water Table Flux for CaseA OTHER Pu-242

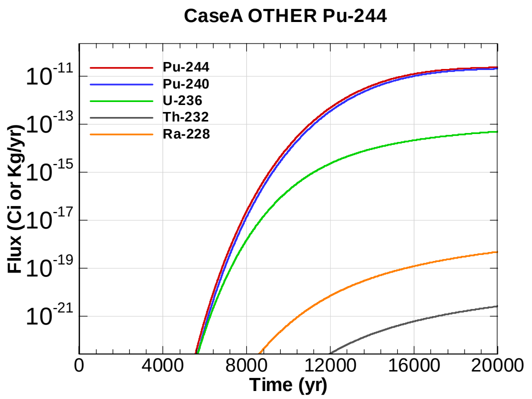

Figure A.2-2609 - Water Table Flux for CaseA OTHER Pu-244

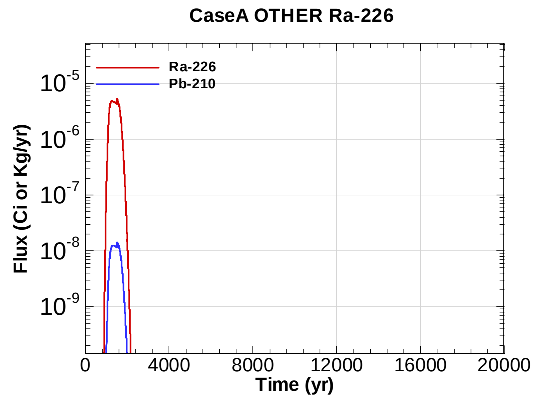

Figure A.2-2610 - Water Table Flux for CaseA OTHER Ra-226

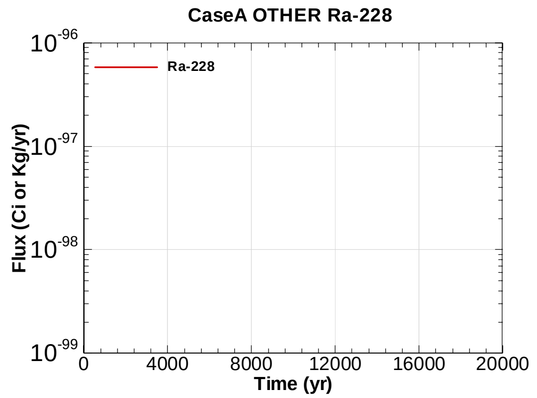

Figure A.2-2611 - Water Table Flux for CaseA OTHER Ra-228

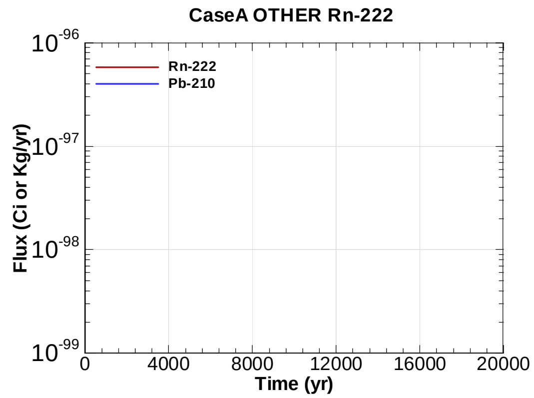

Figure A.2-2612 - Water Table Flux for CaseA OTHER Rn-222

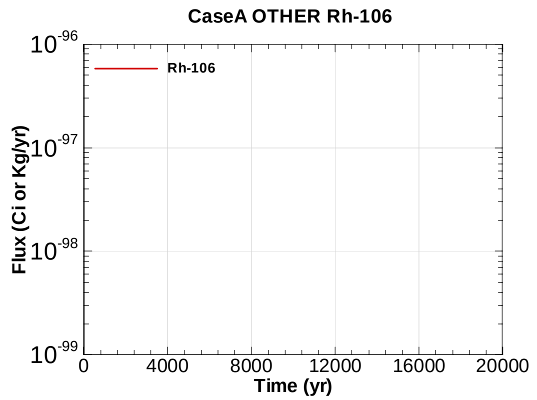

Figure A.2-2613 - Water Table Flux for CaseA OTHER Rh-106

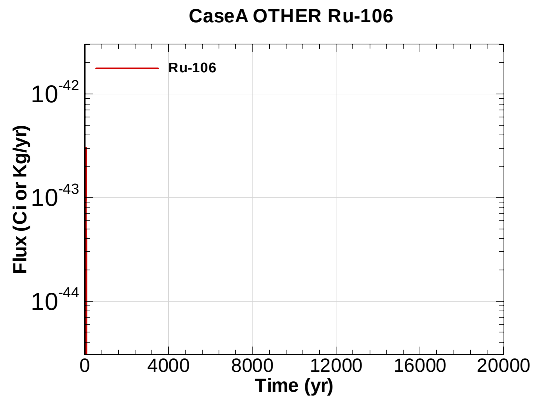

Figure A.2-2614 - Water Table Flux for CaseA OTHER Ru-106

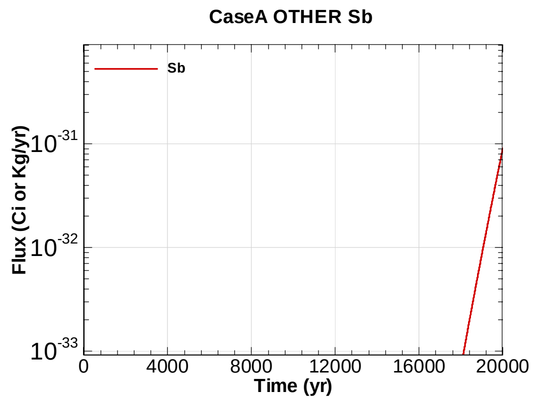

Figure A.2-2615 - Water Table Flux for CaseA OTHER Sb

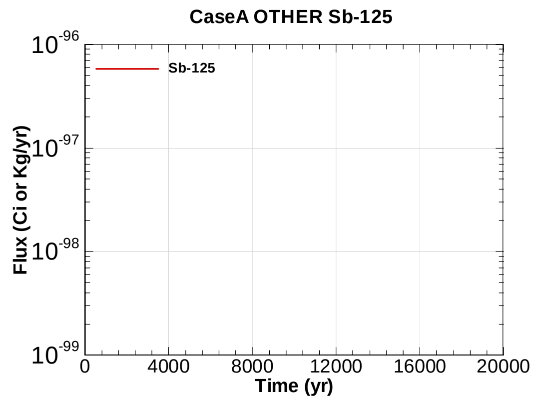

Figure A.2-2616 - Water Table Flux for CaseA OTHER Sb-125

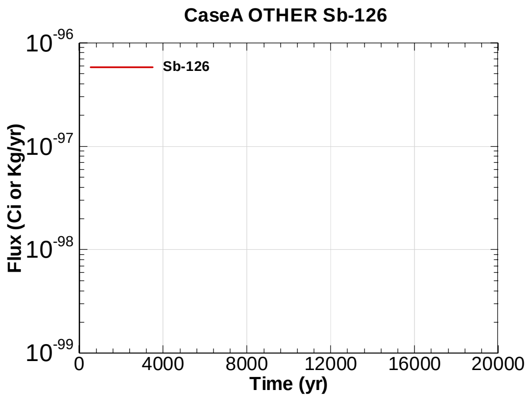

Figure A.2-2617 - Water Table Flux for CaseA OTHER Sb-126

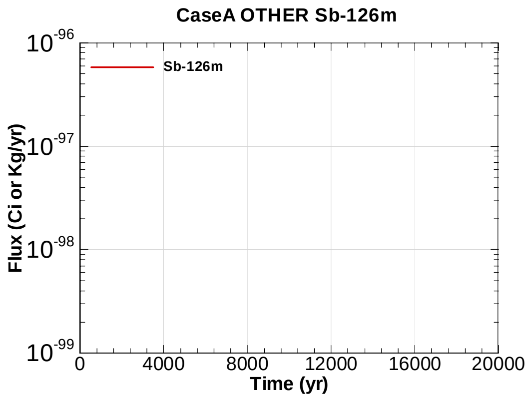

Figure A.2-2618 - Water Table Flux for CaseA OTHER Sb-126m

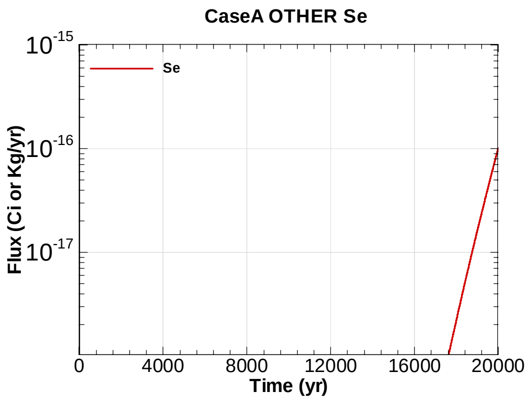

Figure A.2-2619 - Water Table Flux for CaseA OTHER Se

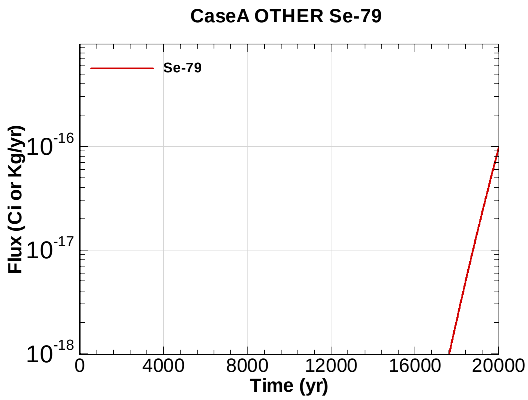

Figure A.2-2620 - Water Table Flux for CaseA OTHER Se-79

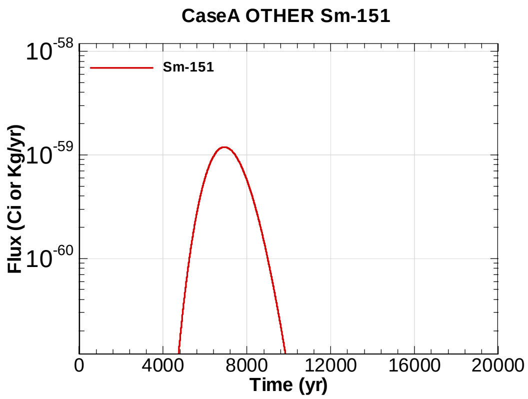

Figure A.2-2621 - Water Table Flux for CaseA OTHER Sm-151

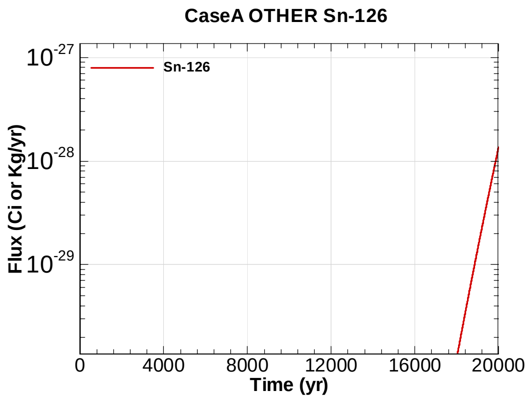

Figure A.2-2622 - Water Table Flux for CaseA OTHER Sn-126

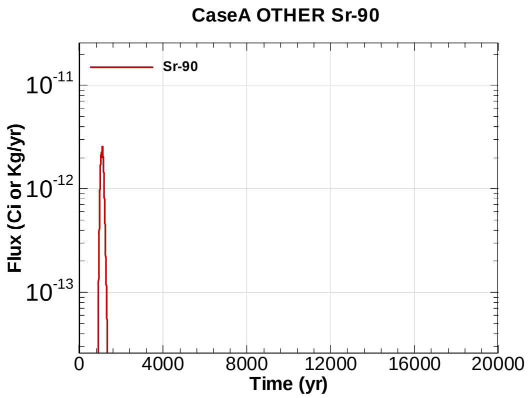

Figure A.2-2623 - Water Table Flux for CaseA OTHER Sr-90

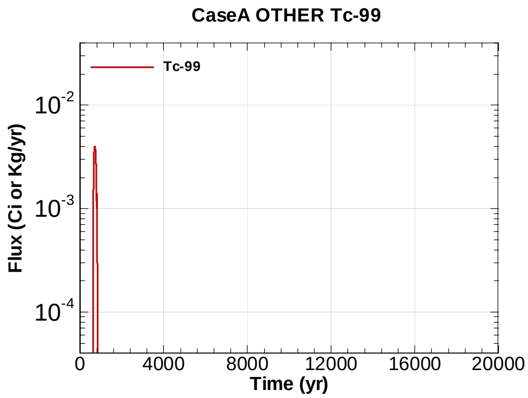

Figure A.2-2624 - Water Table Flux for CaseA OTHER Tc-99

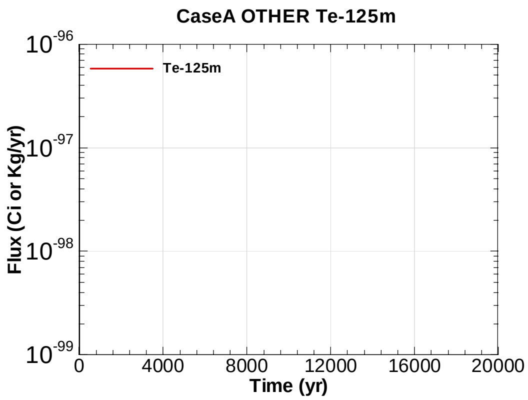

Figure A.2-2625 - Water Table Flux for CaseA OTHER Te-125m

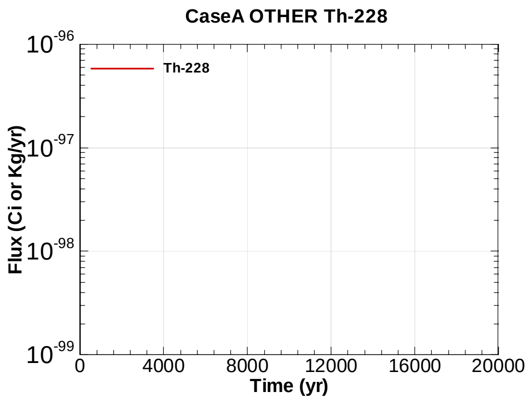

Figure A.2-2626 - Water Table Flux for CaseA OTHER Th-228

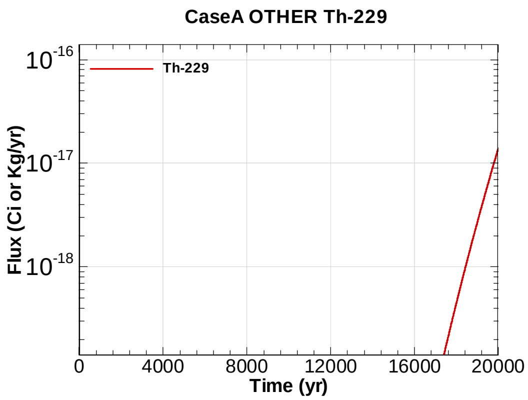

Figure A.2-2627 - Water Table Flux for CaseA OTHER Th-229

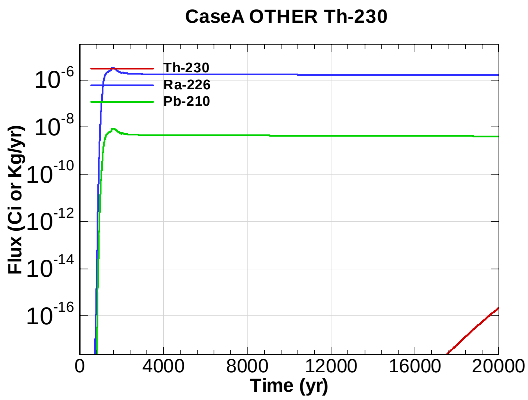

Figure A.2-2628 - Water Table Flux for CaseA OTHER Th-230

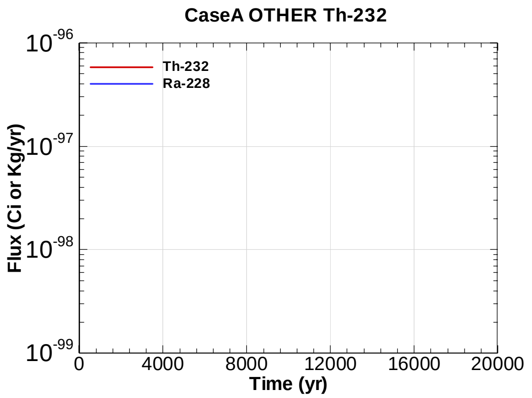

Figure A.2-2629 - Water Table Flux for CaseA OTHER Th-232

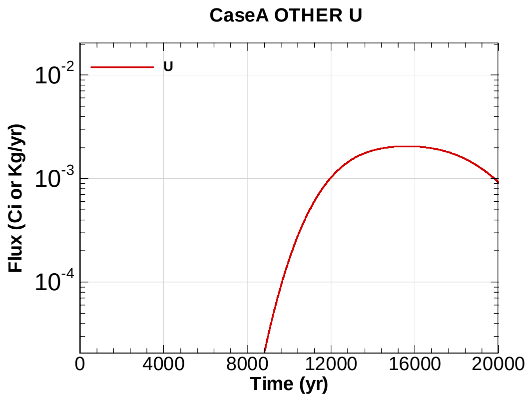

Figure A.2-2630 - Water Table Flux for CaseA OTHER U

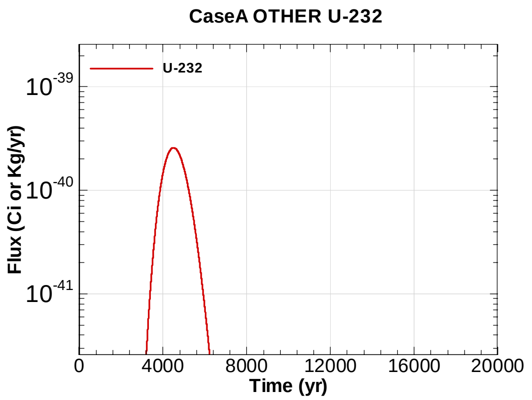

Figure A.2-2631 - Water Table Flux for CaseA OTHER U-232

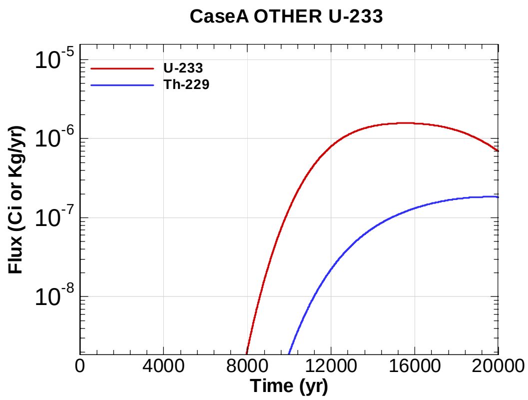

Figure A.2-2632 - Water Table Flux for CaseA OTHER U-233

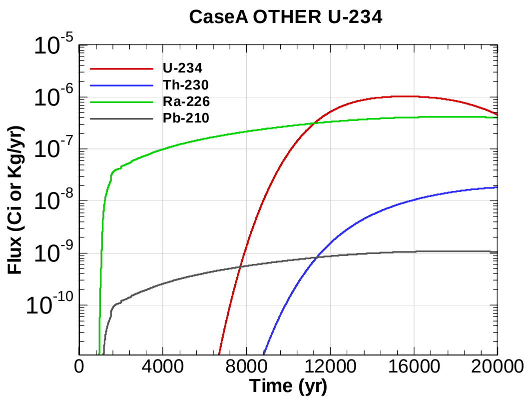

Figure A.2-2633 - Water Table Flux for CaseA OTHER U-234

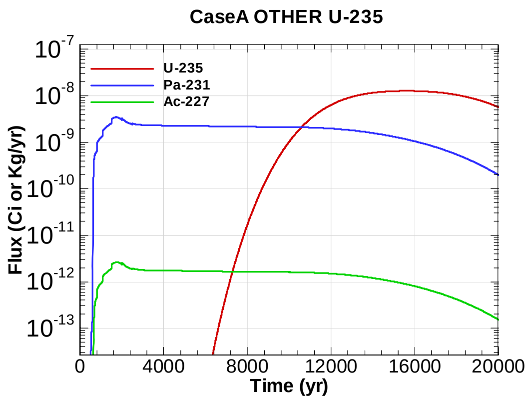

Figure A.2-2634 - Water Table Flux for CaseA OTHER U-235

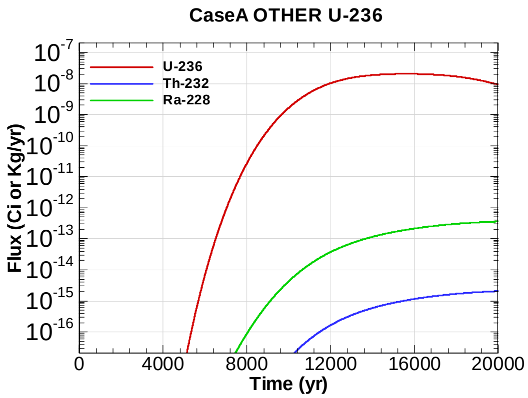

Figure A.2-2635 - Water Table Flux for CaseA OTHER U-236

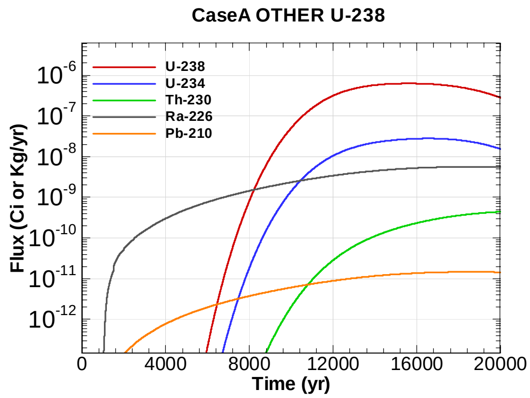

Figure A.2-2636 - Water Table Flux for CaseA OTHER U-238

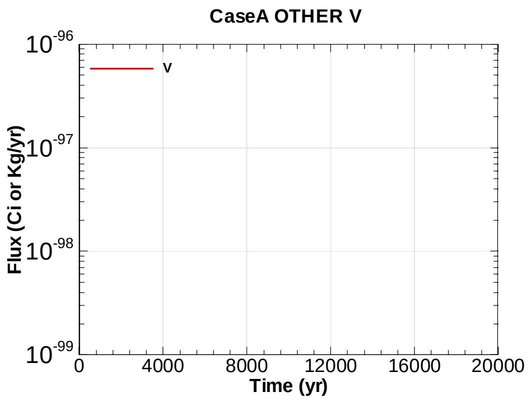

Figure A.2-2637 - Water Table Flux for CaseA OTHER V

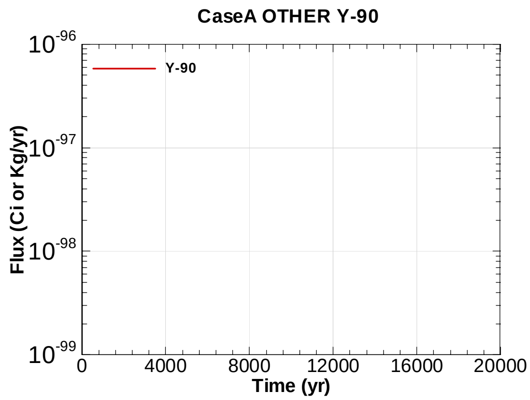

Figure A.2-2638 - Water Table Flux for CaseA OTHER Y-90

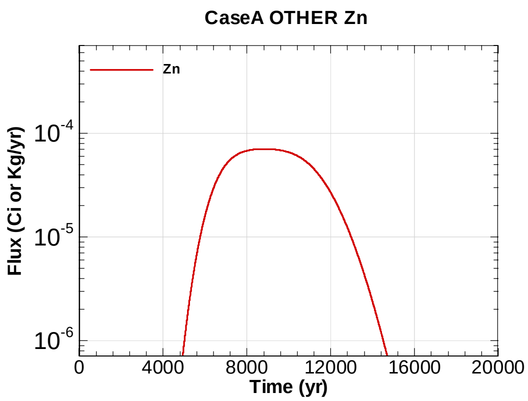

Figure A.2-2639 - Water Table Flux for CaseA OTHER Zn

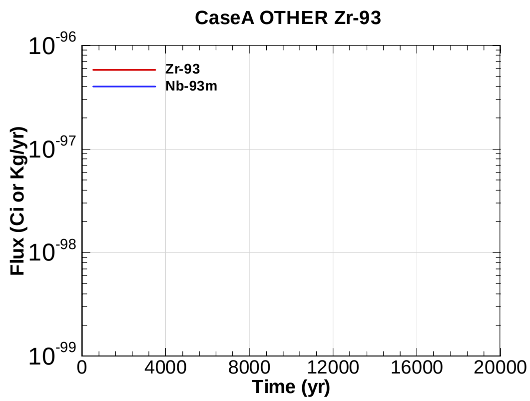

Figure A.2-2640 - Water Table Flux for CaseA OTHER Zr-93

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Appendix B.1
100-METER RADIOLOGICAL AND CHEMICAL CONCENTRATIONS AT THE UPPER THREE RUNS AQUIFER - UPPER

Appendix B.1 contains curves showing the one-hundred meter radiological and chemical concentrations for all of FTF (tank and ancillary inventories) for the Base Case (Case/Configuration A). 20,000 year concentration results are presented from the Upper Three Runs Aquifer-Upper Zone for Sectors A through E.

Graph heading example "CaseA All Ac-227 A_UA"

Key

CaseA = scenario case/configuration
All = all FTF inventory source
Ac-227 = radionuclide or chemical of concern
A = Sector of concern (see sector map with stream traces)
UA = aquifer of concern
- UA = Upper Three Runs – Upper Zone
- LA = Upper Three Runs – Lower Zone
- GA = Gordon

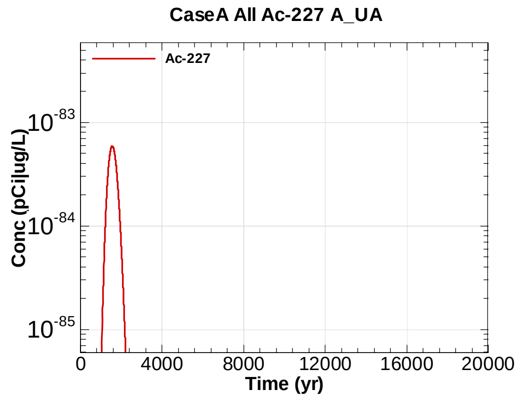

Figure B.1-1 - 100m Aquifer Concentration for CaseA All Ac-227 A_UA

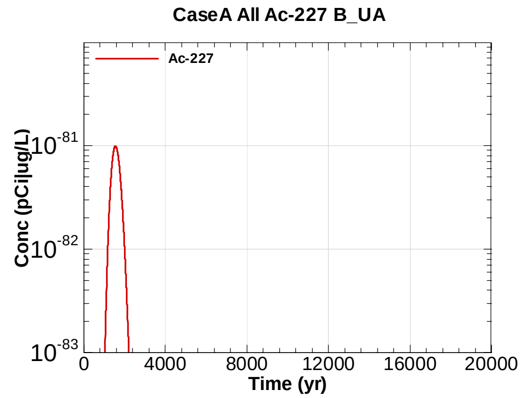

Figure B.1-2 - 100m Aquifer Concentration for CaseA All Ac-227 B_UA

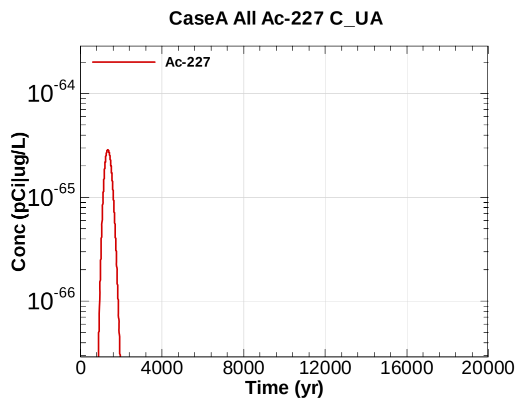

Figure B.1-3 - 100m Aquifer Concentration for CaseA All Ac-227 C_UA

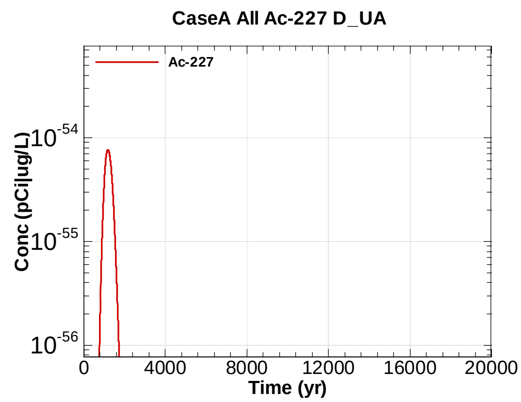

Figure B.1-4 - 100m Aquifer Concentration for CaseA All Ac-227 D_UA

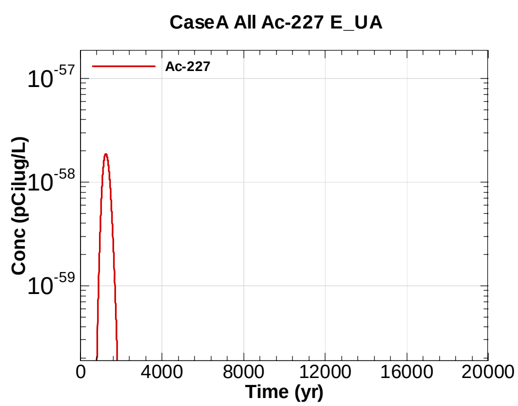

Figure B.1-5 - 100m Aquifer Concentration for CaseA All Ac-227 E_UA

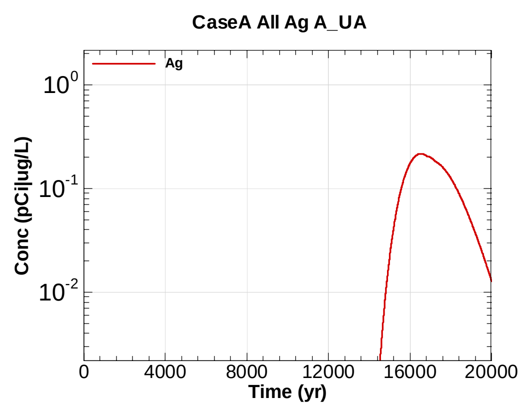

Figure B.1-6 - 100m Aquifer Concentration for CaseA All Ag A_UA

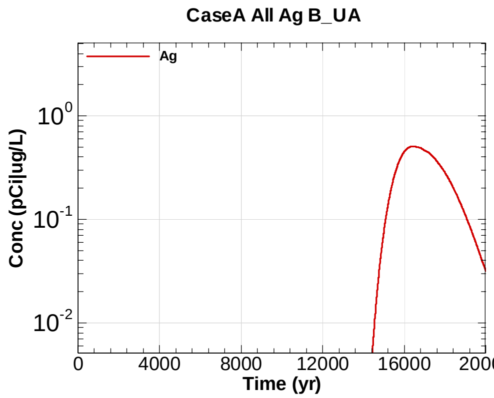

Figure B.1-7 - 100m Aquifer Concentration for CaseA All Ag B_UA

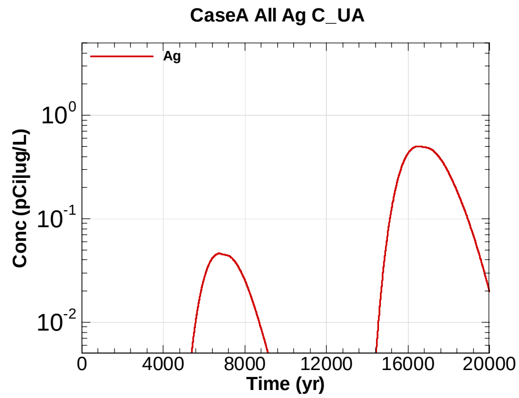

Figure B.1-8 - 100m Aquifer Concentration for CaseA All Ag C_UA

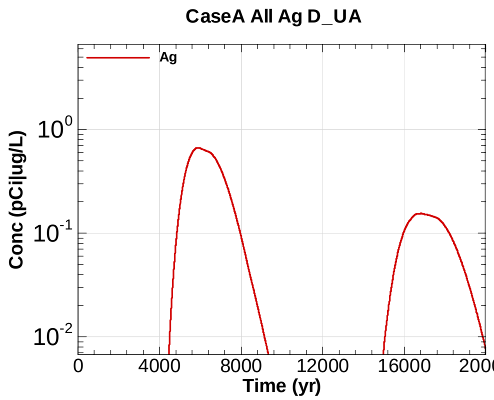

Figure B.1-9 - 100m Aquifer Concentration for CaseA All Ag D_UA

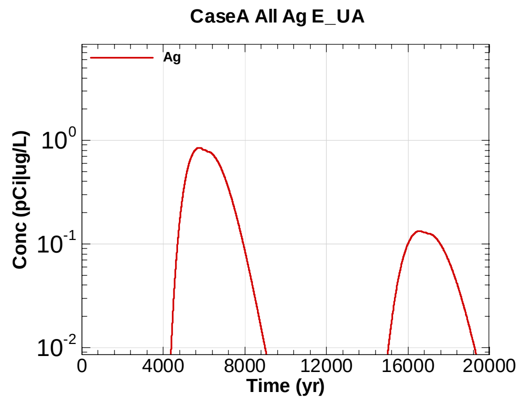

Figure B.1-10 - 100m Aquifer Concentration for CaseA All Ag E_UA

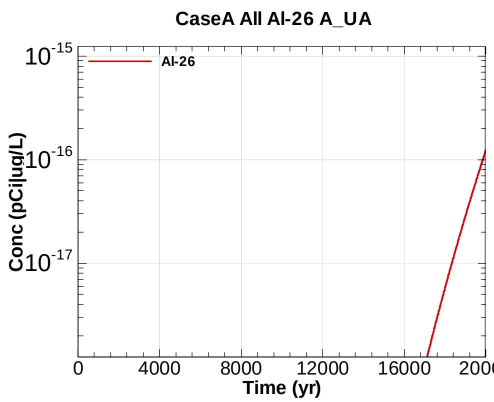

Figure B.1-11 - 100m Aquifer Concentration for CaseA All Al-26 A_UA

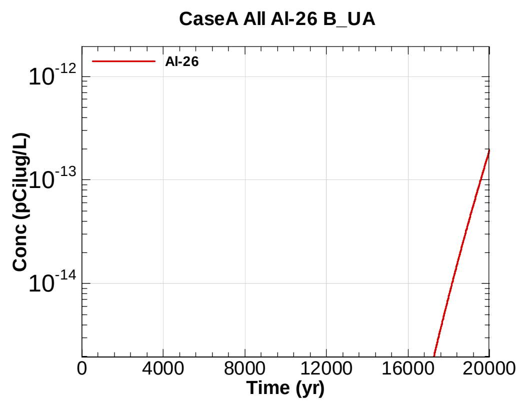

Figure B.1-12 - 100m Aquifer Concentration for CaseA All Al-26 B_UA

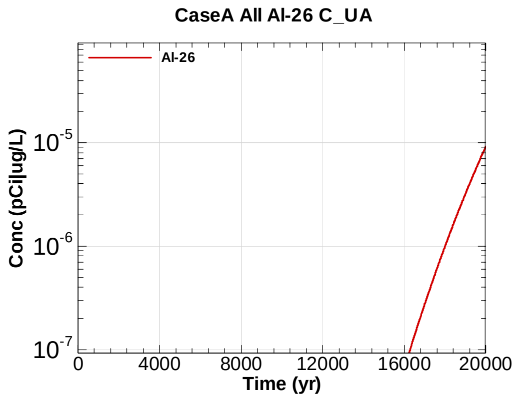

Figure B.1-13 - 100m Aquifer Concentration for CaseA All Al-26 C_UA

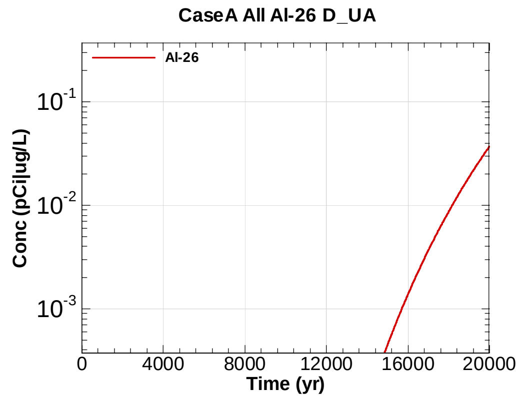

Figure B.1-14 - 100m Aquifer Concentration for CaseA All Al-26 D_UA

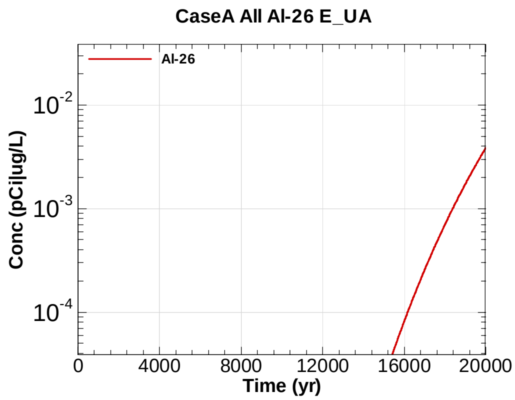

Figure B.1-15 - 100m Aquifer Concentration for CaseA All Al-26 E_UA

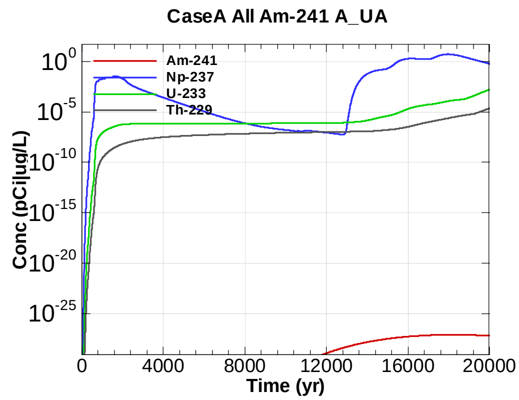

Figure B.1-16 - 100m Aquifer Concentration for CaseA All Am-241 A_UA

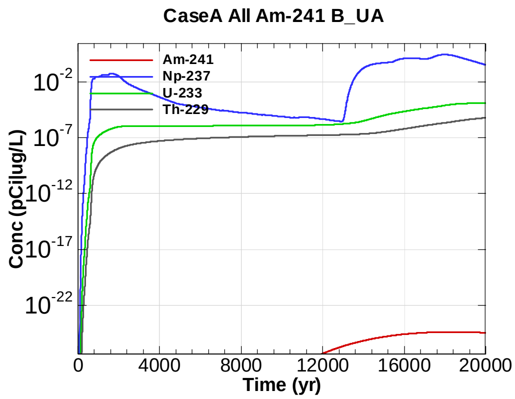

Figure B.1-17 - 100m Aquifer Concentration for CaseA All Am-241 B_UA

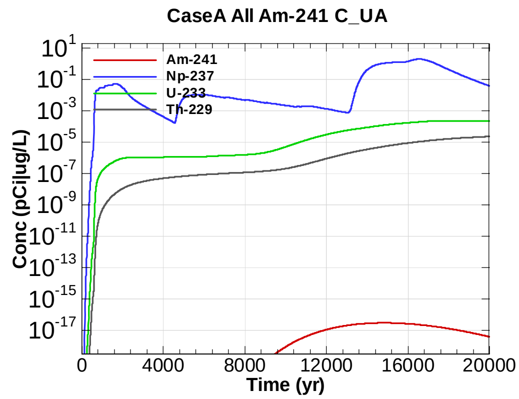

Figure B.1-18 - 100m Aquifer Concentration for CaseA All Am-241 C_UA

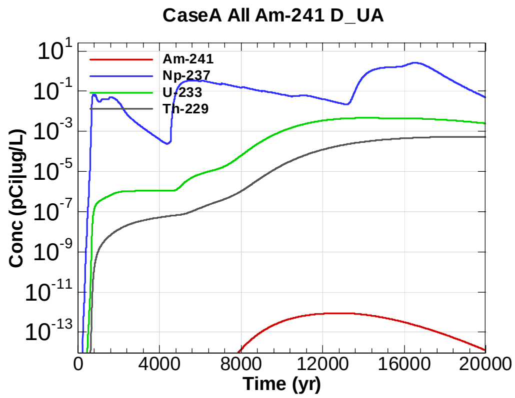

Figure B.1-19 - 100m Aquifer Concentration for CaseA All Am-241 D_UA

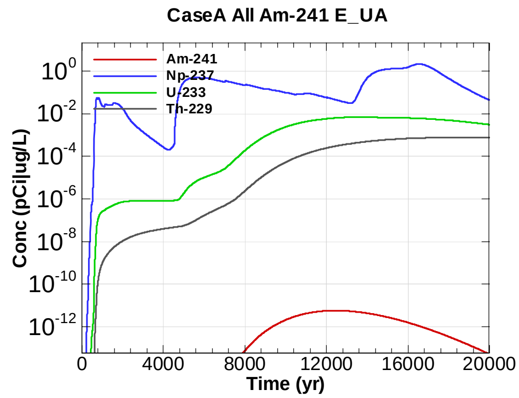

Figure B.1-20 - 100m Aquifer Concentration for CaseA All Am-241 E_UA

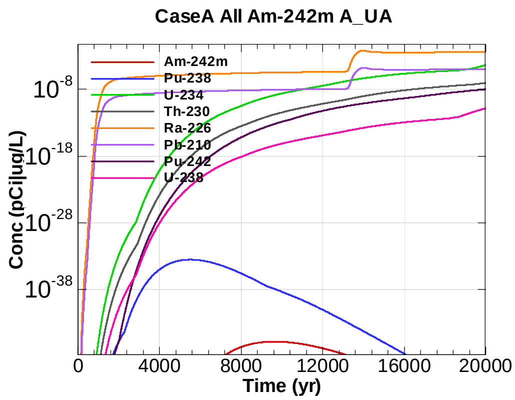

Figure B.1-21 - 100m Aquifer Concentration for CaseA All Am-242m A_UA

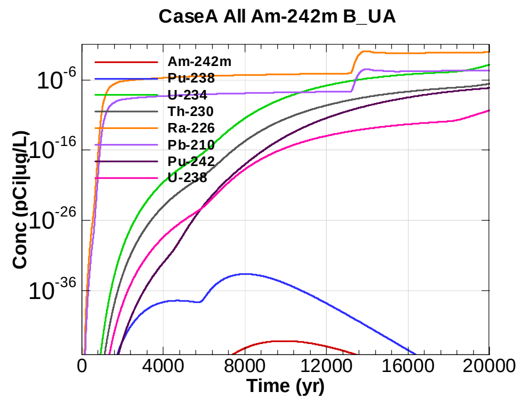

Figure B.1-22 - 100m Aquifer Concentration for CaseA All Am-242m B_UA

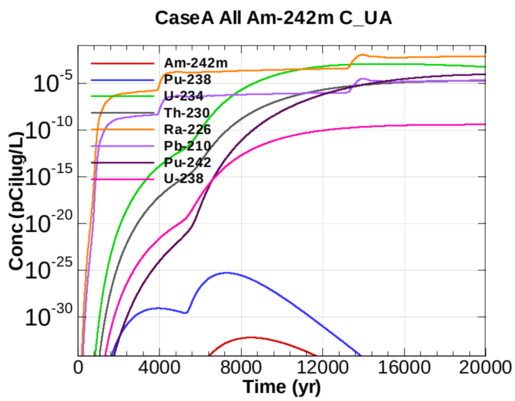

Figure B.1-23 - 100m Aquifer Concentration for CaseA All Am-242m C_UA

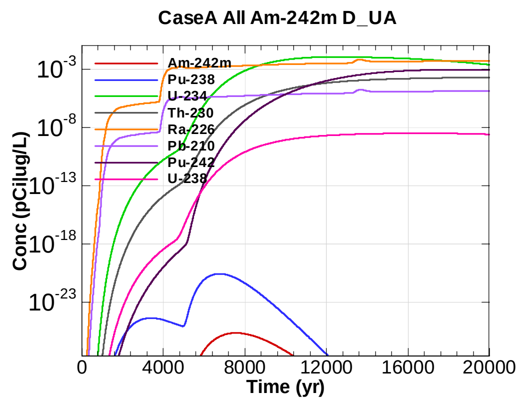

Figure B.1-24 - 100m Aquifer Concentration for CaseA All Am-242m D_UA

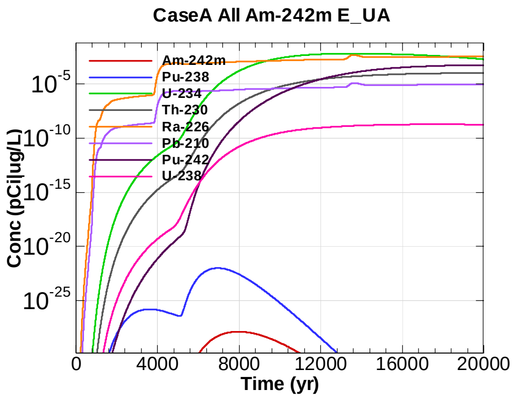

Figure B.1-25 - 100m Aquifer Concentration for CaseA All Am-242m E_UA

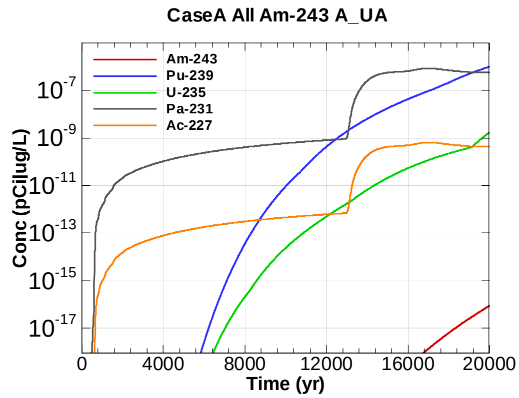

Figure B.1-26 - 100m Aquifer Concentration for CaseA All Am-243 A_UA

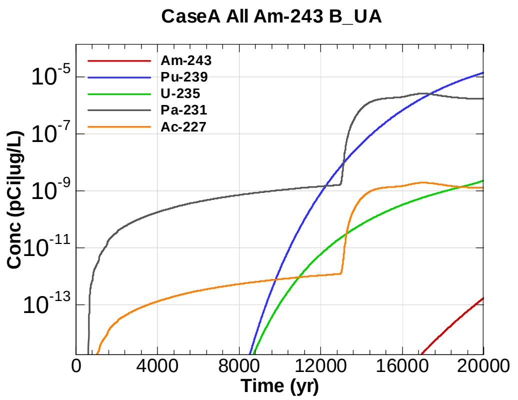

Figure B.1-27 - 100m Aquifer Concentration for CaseA All Am-243 B_UA

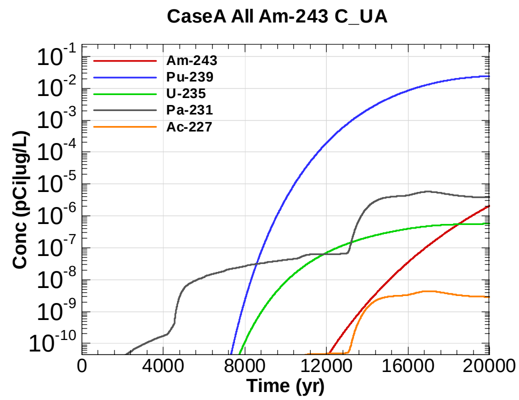

Figure B.1-28 - 100m Aquifer Concentration for CaseA All Am-243 C_UA

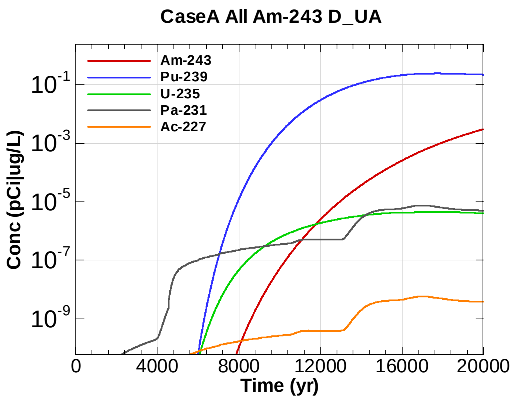

Figure B.1-29 - 100m Aquifer Concentration for CaseA All Am-243 D_UA

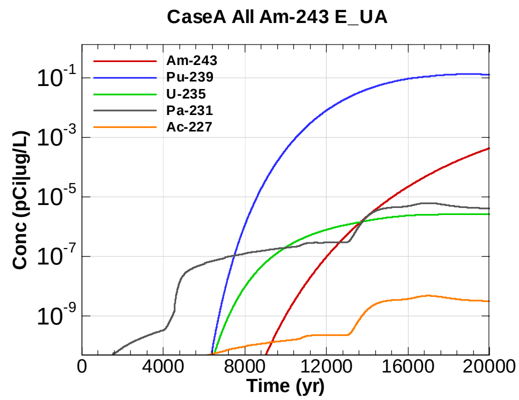

Figure B.1-30 - 100m Aquifer Concentration for CaseA All Am-243 E_UA

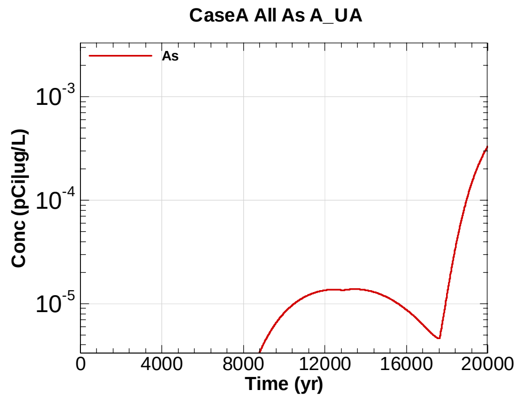

Figure B.1-31 - 100m Aquifer Concentration for CaseA All As A_UA

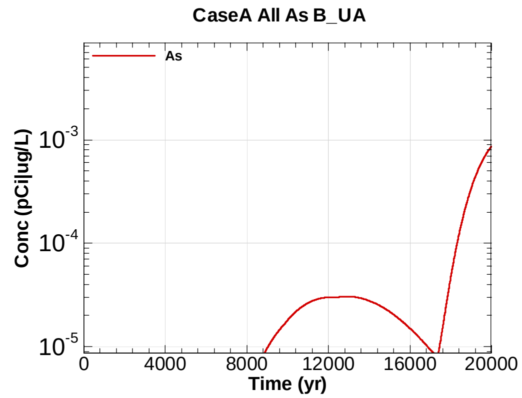

Figure B.1-32 - 100m Aquifer Concentration for CaseA All As B_UA

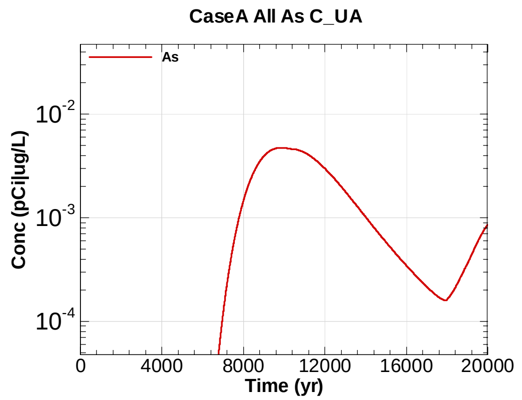

Figure B.1-33 - 100m Aquifer Concentration for CaseA All As C_UA

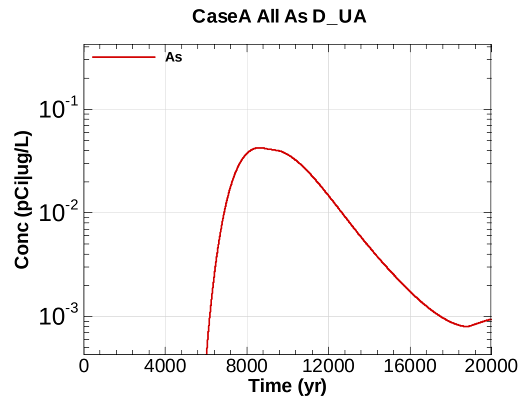

Figure B.1-34 - 100m Aquifer Concentration for CaseA All As D_UA

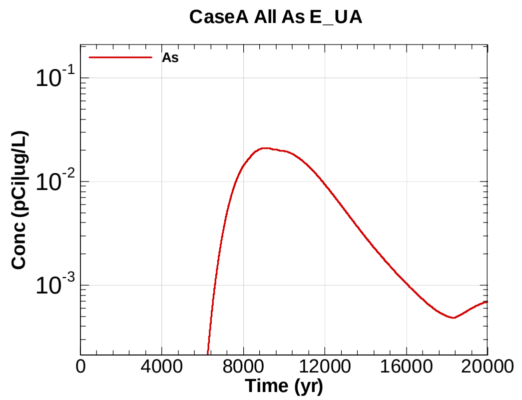

Figure B.1-35 - 100m Aquifer Concentration for CaseA All As E_UA

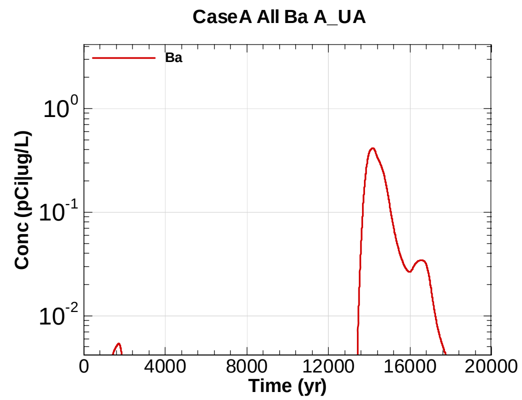

Figure B.1-36 - 100m Aquifer Concentration for CaseA All Ba A_UA

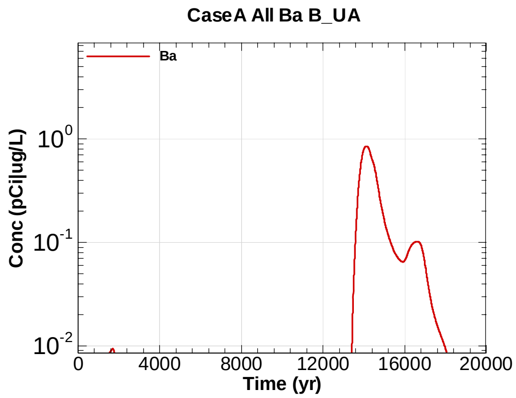

Figure B.1-37 - 100m Aquifer Concentration for CaseA All Ba B_UA

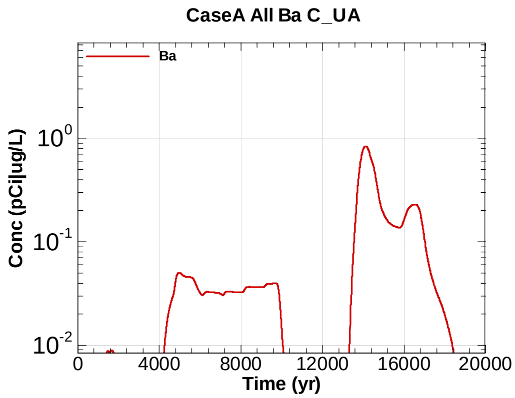

Figure B.1-38 - 100m Aquifer Concentration for CaseA All Ba C_UA

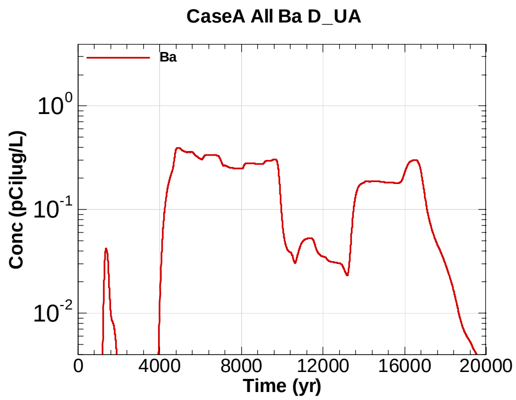

Figure B.1-39 - 100m Aquifer Concentration for CaseA All Ba D_UA

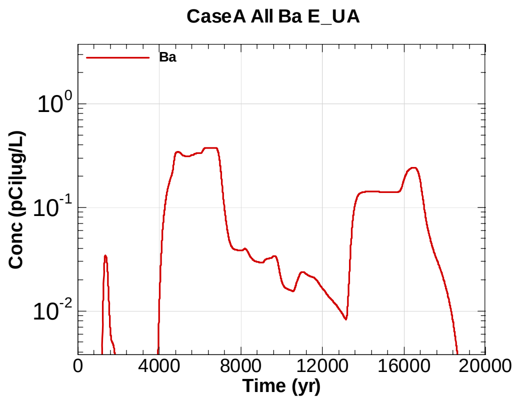

Figure B.1-40 - 100m Aquifer Concentration for CaseA All Ba E_UA

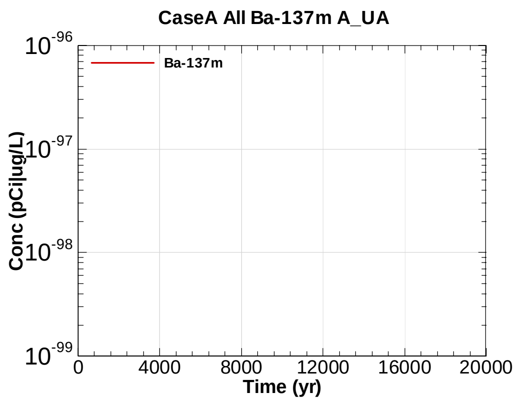

Figure B.1-41 - 100m Aquifer Concentration for CaseA All Ba-137m A_UA

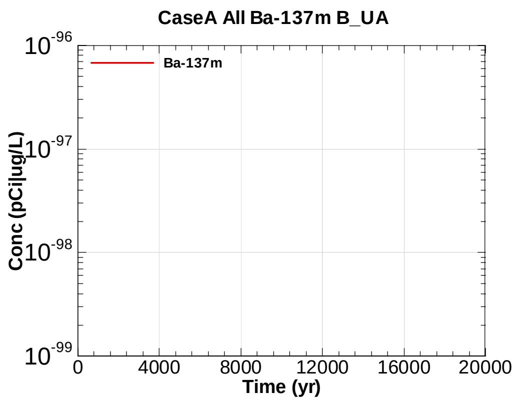

Figure B.1-42 - 100m Aquifer Concentration for CaseA All Ba-137m B_UA

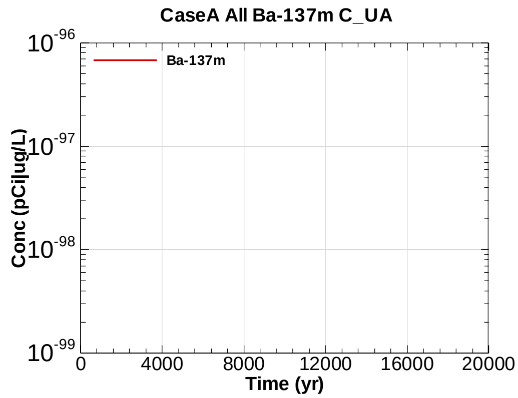

Figure B.1-43 - 100m Aquifer Concentration for CaseA All Ba-137m C_UA

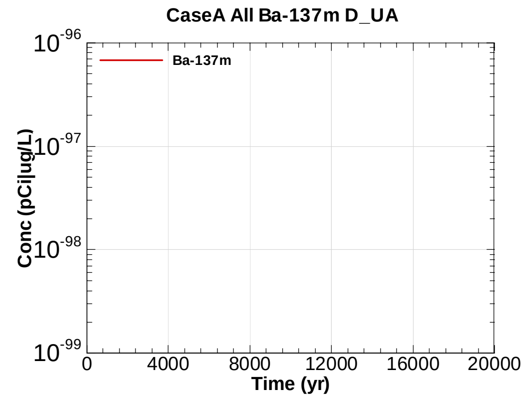

Figure B.1-44 - 100m Aquifer Concentration for CaseA All Ba-137m D_UA

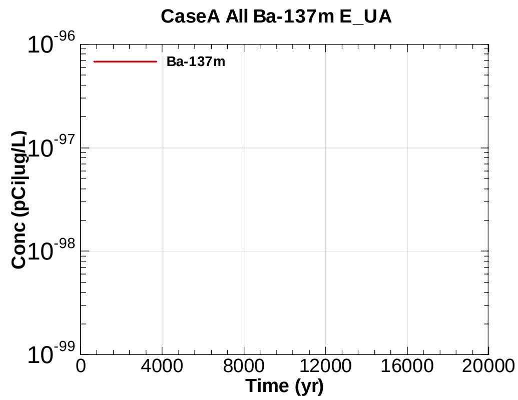

Figure B.1-45 - 100m Aquifer Concentration for CaseA All Ba-137m E_UA

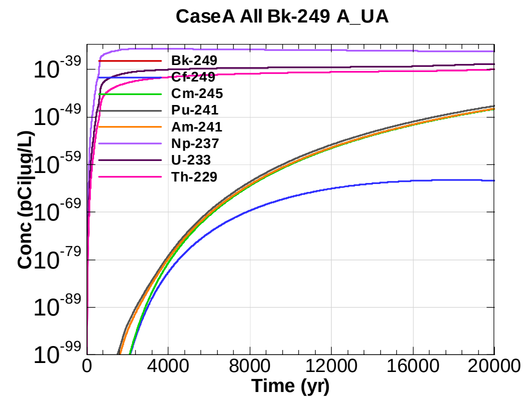

Figure B.1-46 - 100m Aquifer Concentration for CaseA All Bk-249 A_UA

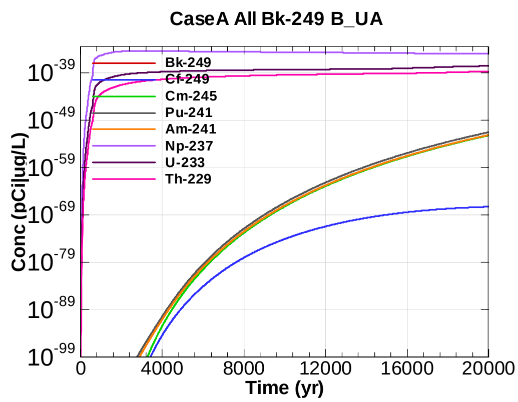

Figure B.1-47 - 100m Aquifer Concentration for CaseA All Bk-249 B_UA

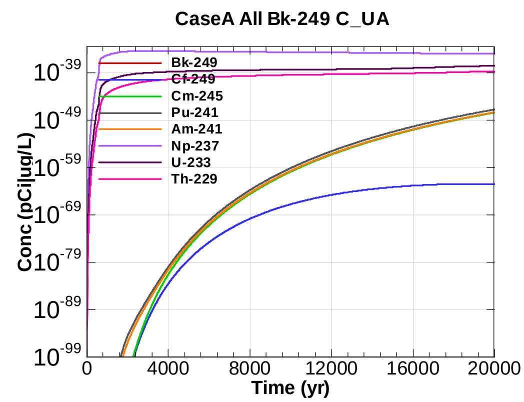

Figure B.1-48 - 100m Aquifer Concentration for CaseA All Bk-249 C_UA

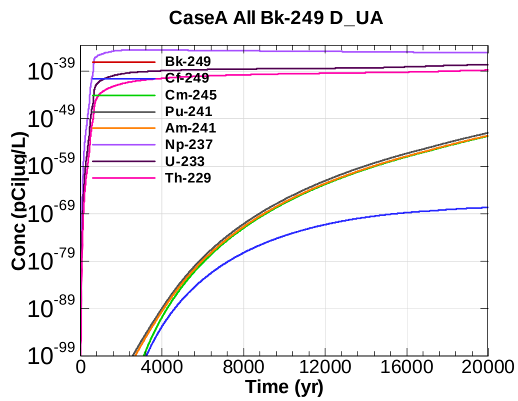

Figure B.1-49 - 100m Aquifer Concentration for CaseA All Bk-249 D_UA

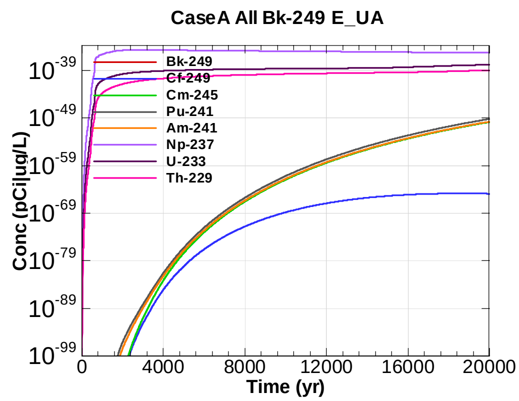

Figure B.1-50 - 100m Aquifer Concentration for CaseA All Bk-249 E_UA

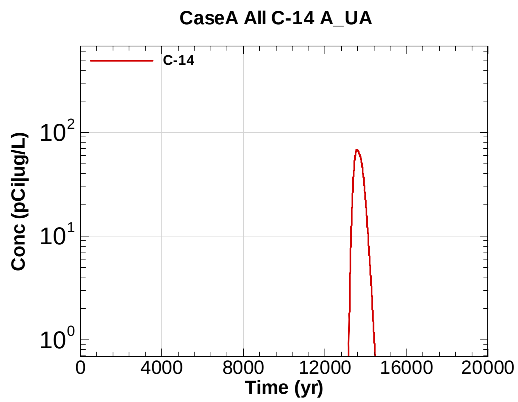

Figure B.1-51 - 100m Aquifer Concentration for CaseA All C-14 A_UA

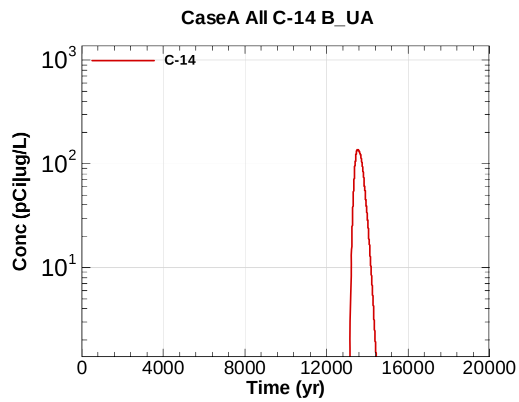

Figure B.1-52 - 100m Aquifer Concentration for CaseA All C-14 B_UA

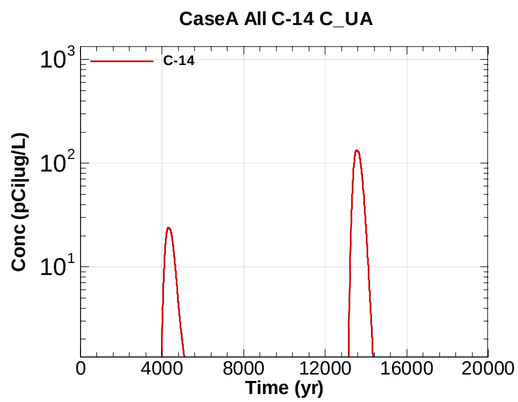

Figure B.1-53 - 100m Aquifer Concentration for CaseA All C-14 C_UA

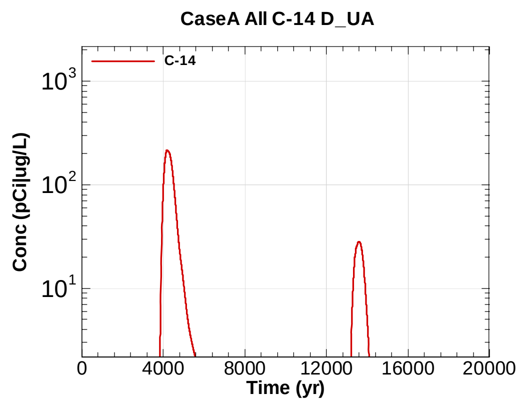

Figure B.1-54 - 100m Aquifer Concentration for CaseA All C-14 D_UA

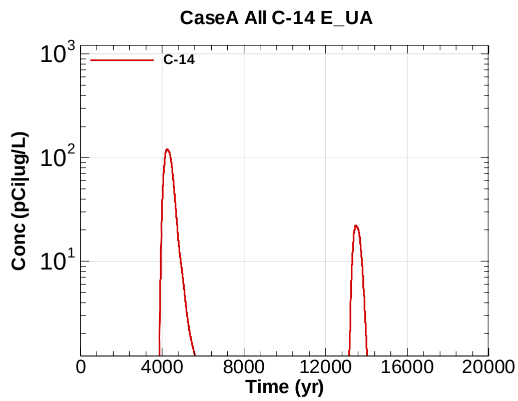

Figure B.1-55 - 100m Aquifer Concentration for CaseA All C-14 E_UA

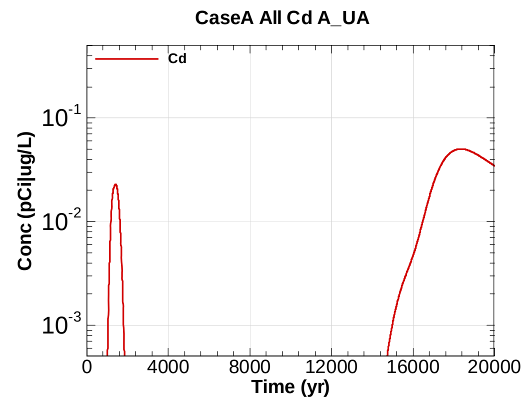

Figure B.1-56 - 100m Aquifer Concentration for CaseA All Cd A_UA

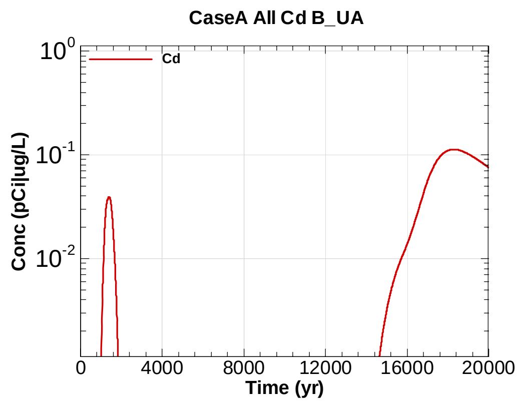

Figure B.1-57 - 100m Aquifer Concentration for CaseA All Cd B_UA

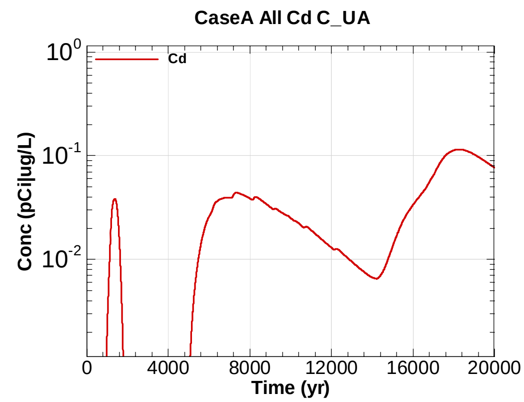

Figure B.1-58 - 100m Aquifer Concentration for CaseA All Cd C_UA

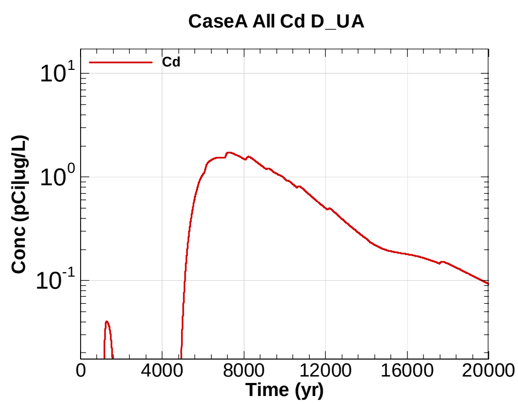

Figure B.1-59 - 100m Aquifer Concentration for CaseA All Cd D_UA

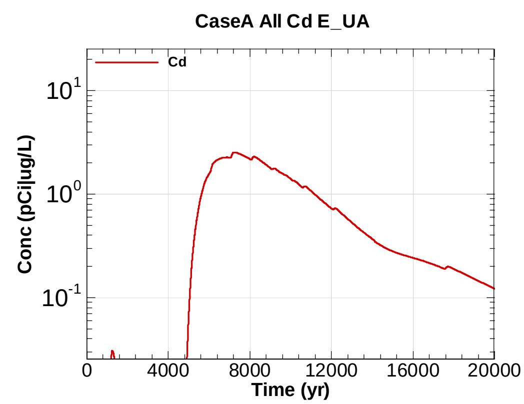

Figure B.1-60 - 100m Aquifer Concentration for CaseA All Cd E_UA

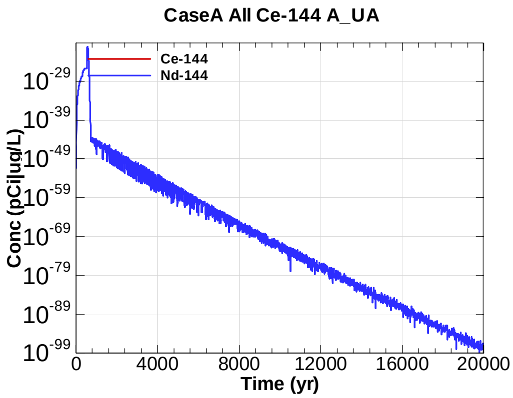

Figure B.1-61 - 100m Aquifer Concentration for CaseA All Ce-144 A_UA

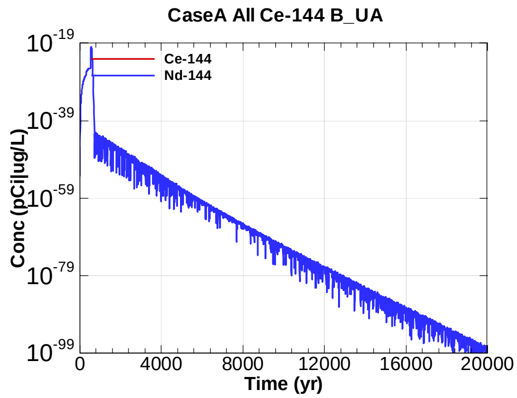

Figure B.1-62 - 100m Aquifer Concentration for CaseA All Ce-144 B_UA

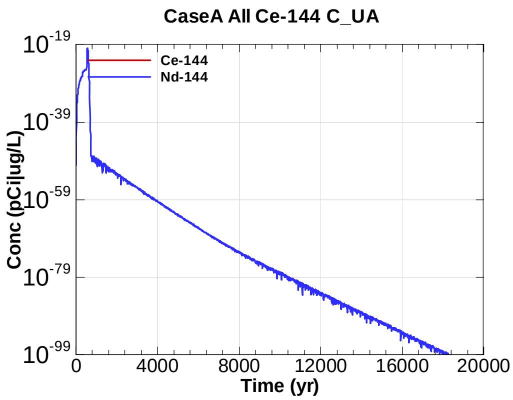

Figure B.1-63 - 100m Aquifer Concentration for CaseA All Ce-144 C_UA

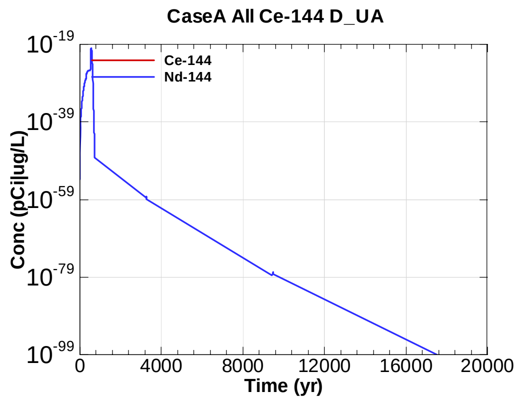

Figure B.1-64 - 100m Aquifer Concentration for CaseA All Ce-144 D_UA

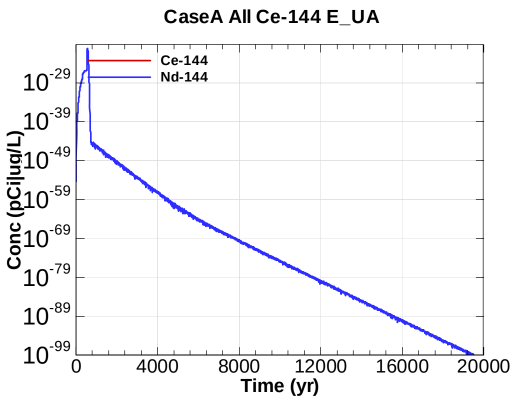

Figure B.1-65 - 100m Aquifer Concentration for CaseA All Ce-144 E_UA

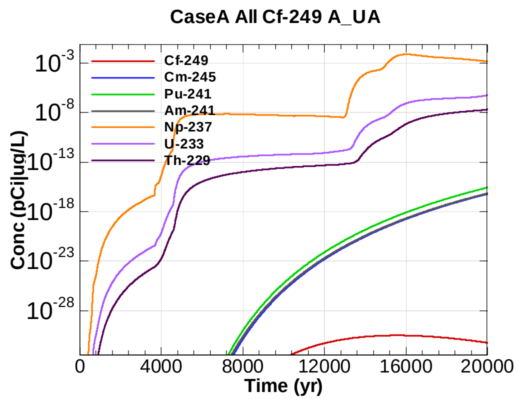

Figure B.1-66 - 100m Aquifer Concentration for CaseA All Cf-249 A_UA

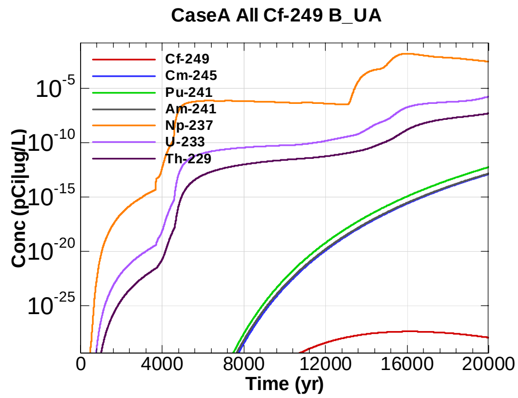

Figure B.1-67 - 100m Aquifer Concentration for CaseA All Cf-249 B_UA

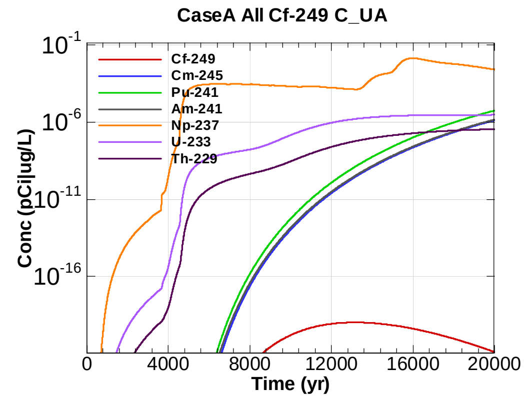

Figure B.1-68 - 100m Aquifer Concentration for CaseA All Cf-249 C_UA

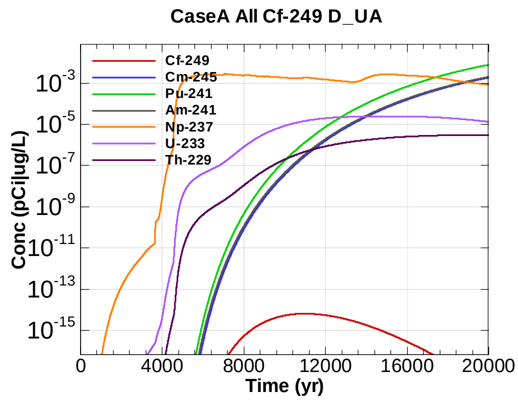

Figure B.1-69 - 100m Aquifer Concentration for CaseA All Cf-249 D_UA

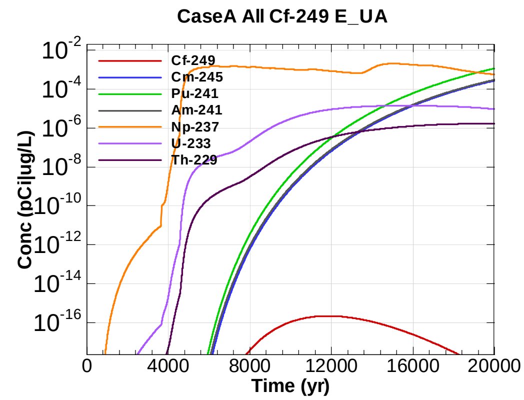

Figure B.1-70 - 100m Aquifer Concentration for CaseA All Cf-249 E_UA

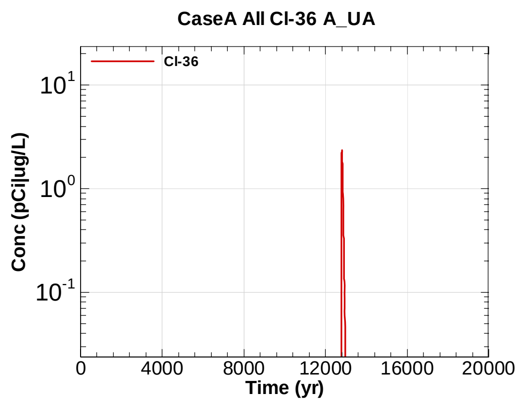

Figure B.1-71 - 100m Aquifer Concentration for CaseA All Cl-36 A_UA

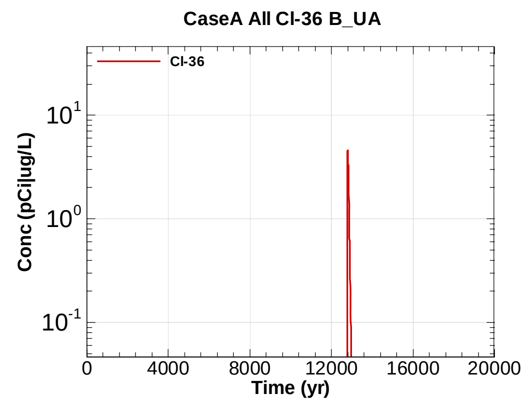

Figure B.1-72 - 100m Aquifer Concentration for CaseA All Cl-36 B_UA

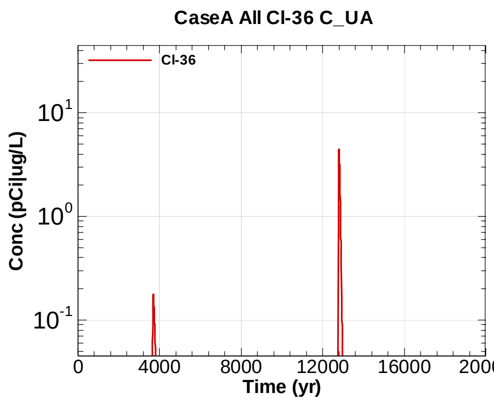

Figure B.1-73 - 100m Aquifer Concentration for CaseA All Cl-36 C_UA

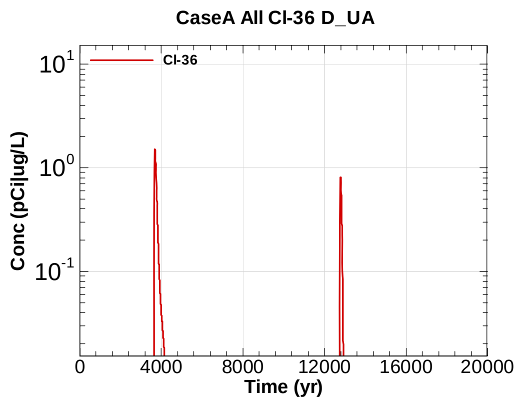

Figure B.1-74 - 100m Aquifer Concentration for CaseA All Cl-36 D_UA

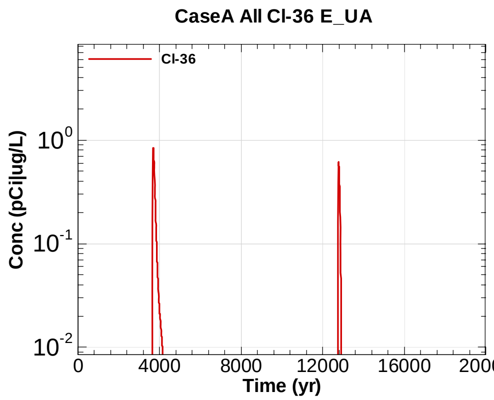

Figure B.1-75 - 100m Aquifer Concentration for CaseA All Cl-36 E_UA

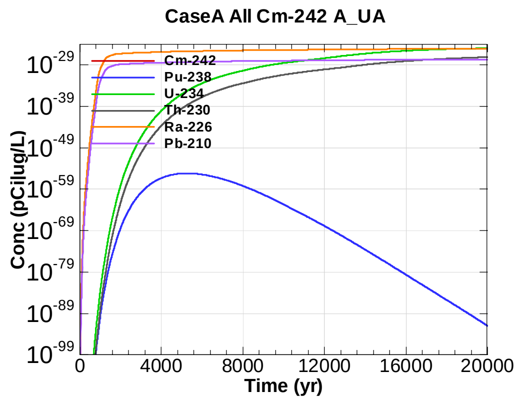

Figure B.1-76 - 100m Aquifer Concentration for CaseA All Cm-242 A_UA

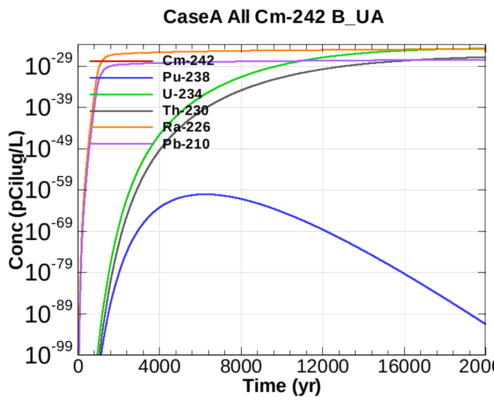

Figure B.1-77 - 100m Aquifer Concentration for CaseA All Cm-242 B_UA

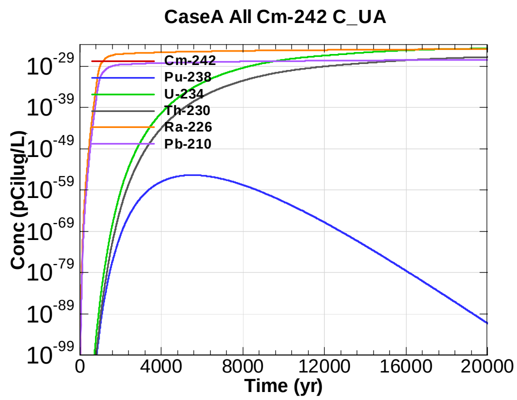

Figure B.1-78 - 100m Aquifer Concentration for CaseA All Cm-242 C_UA

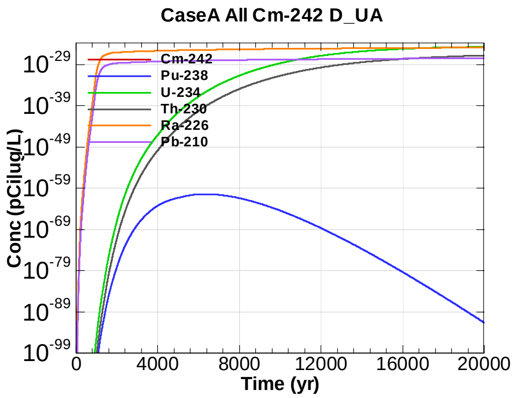

Figure B.1-79 - 100m Aquifer Concentration for CaseA All Cm-242 D_UA

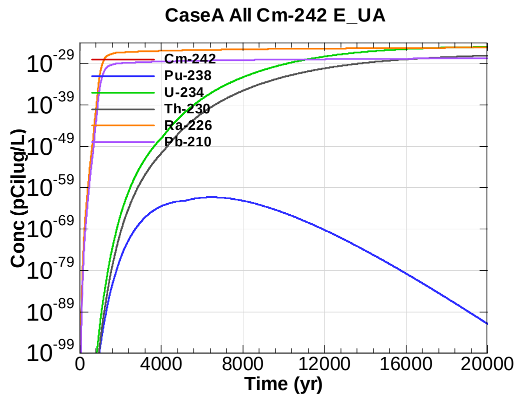

Figure B.1-80 - 100m Aquifer Concentration for CaseA All Cm-242 E_UA

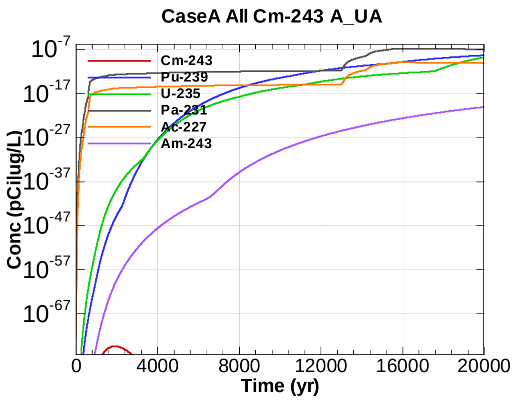

Figure B.1-81 - 100m Aquifer Concentration for CaseA All Cm-243 A_UA

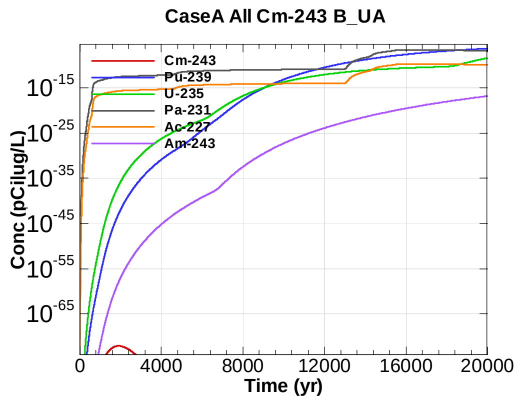

Figure B.1-82 - 100m Aquifer Concentration for CaseA All Cm-243 B_UA

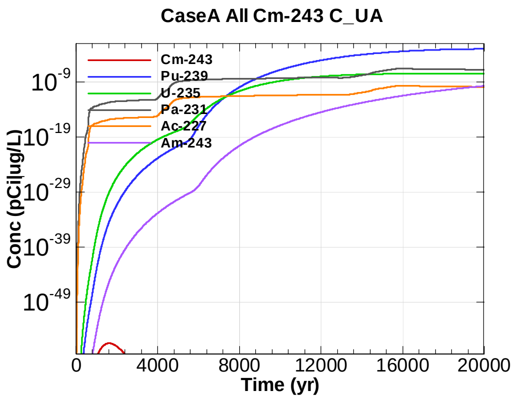

Figure B.1-83 - 100m Aquifer Concentration for CaseA All Cm-243 C_UA

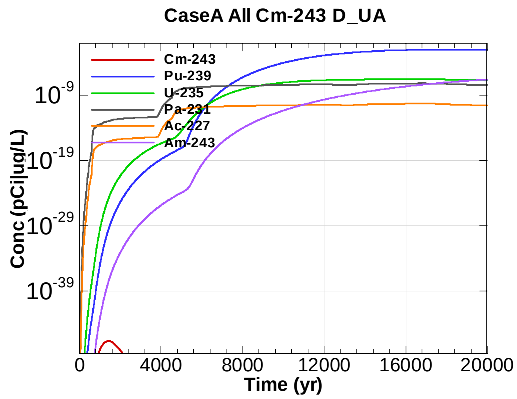

Figure B.1-84 - 100m Aquifer Concentration for CaseA All Cm-243 D_UA

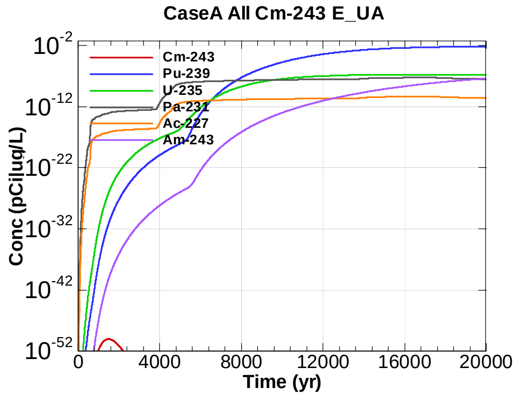

Figure B.1-85 - 100m Aquifer Concentration for CaseA All Cm-243 E_UA

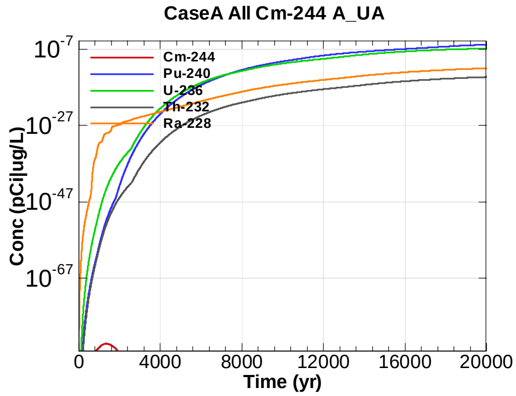

Figure B.1-86 - 100m Aquifer Concentration for CaseA All Cm-244 A_UA

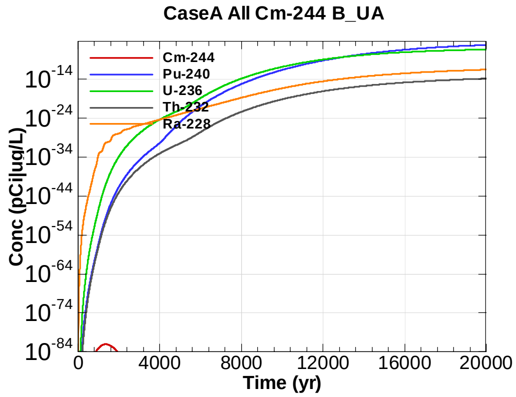

Figure B.1-87 - 100m Aquifer Concentration for CaseA All Cm-244 B_UA

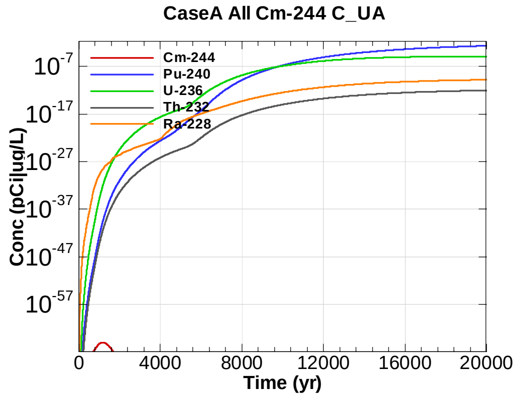

Figure B.1-88 - 100m Aquifer Concentration for CaseA All Cm-244 C_UA

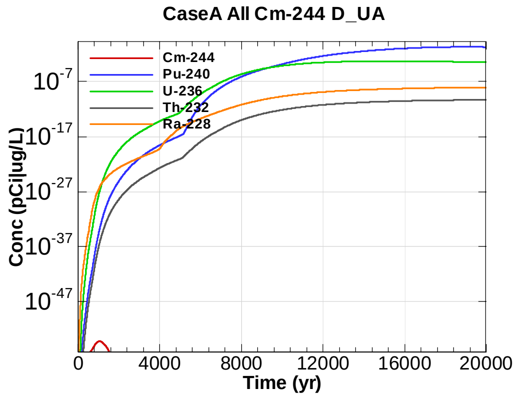

Figure B.1-89 - 100m Aquifer Concentration for CaseA All Cm-244 D_UA

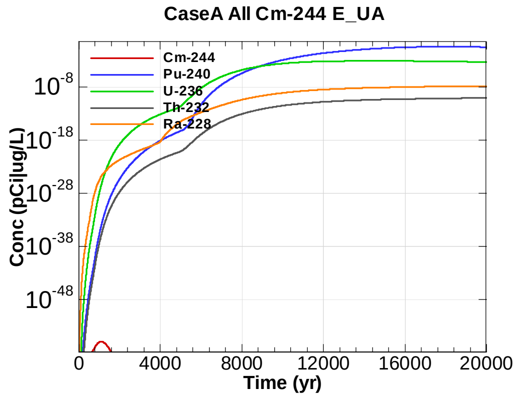

Figure B.1-90 - 100m Aquifer Concentration for CaseA All Cm-244 E_UA

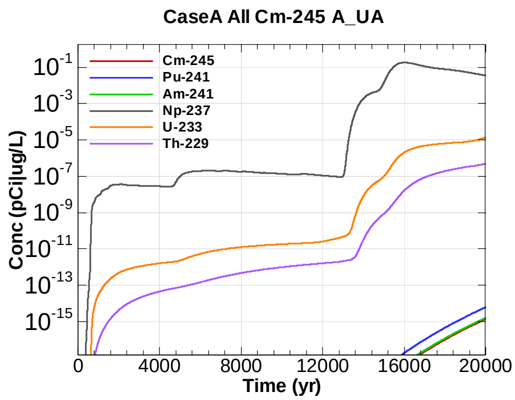

Figure B.1-91 - 100m Aquifer Concentration for CaseA All Cm-245 A_UA

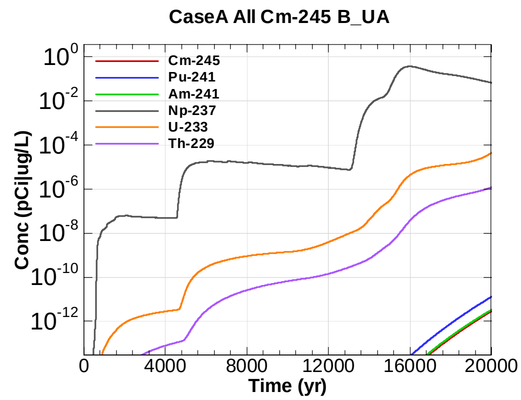

Figure B.1-92 - 100m Aquifer Concentration for CaseA All Cm-245 B_UA

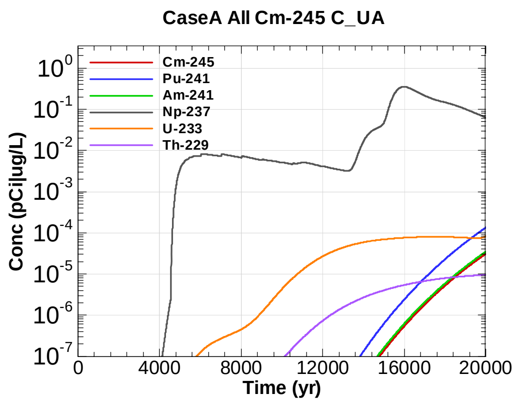

Figure B.1-93 - 100m Aquifer Concentration for CaseA All Cm-245 C_UA

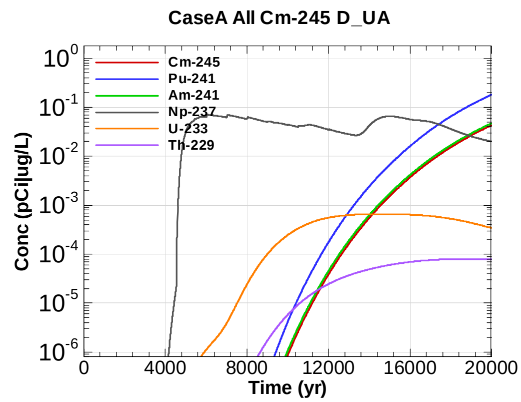

Figure B.1-94 - 100m Aquifer Concentration for CaseA All Cm-245 D_UA

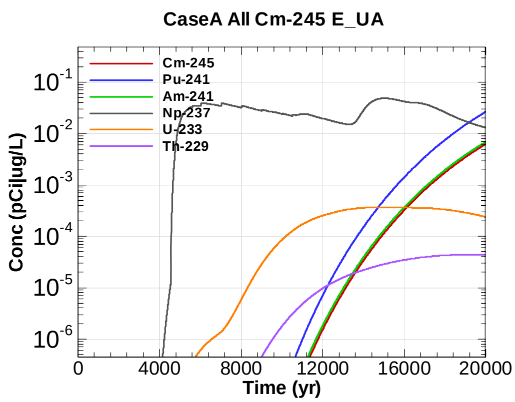

Figure B.1-95 - 100m Aquifer Concentration for CaseA All Cm-245 E_UA

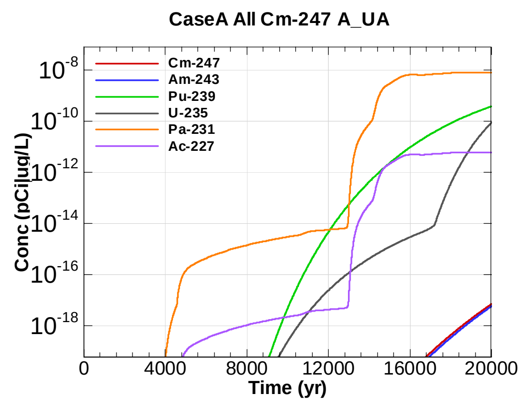

Figure B.1-96 - 100m Aquifer Concentration for CaseA All Cm-247 A_UA

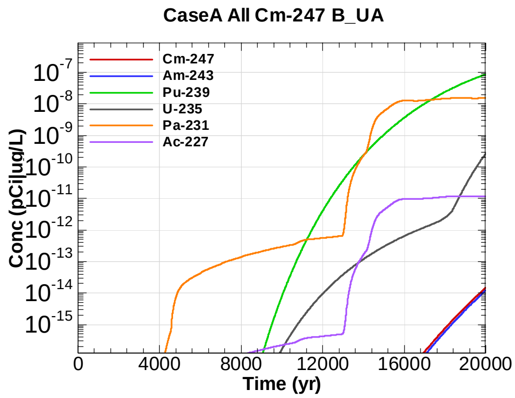

Figure B.1-97 - 100m Aquifer Concentration for CaseA All Cm-247 B_UA

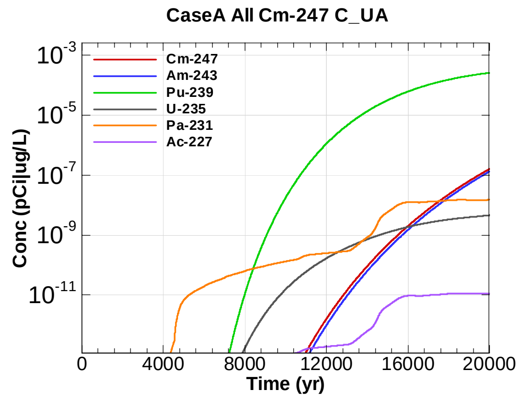

Figure B.1-98 - 100m Aquifer Concentration for CaseA All Cm-247 C_UA

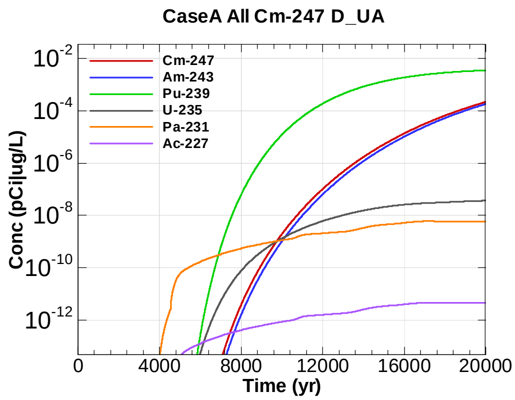

Figure B.1-99 - 100m Aquifer Concentration for CaseA All Cm-247 D_UA

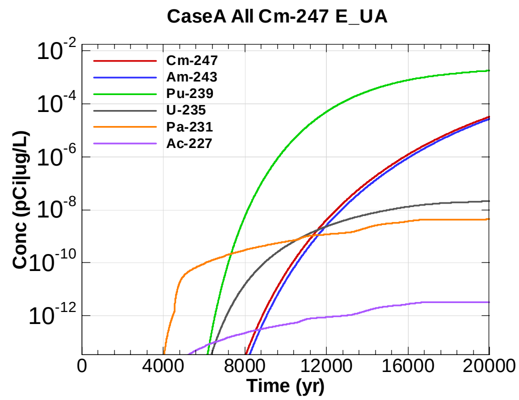

Figure B.1-100 - 100m Aquifer Concentration for CaseA All Cm-247 E_UA

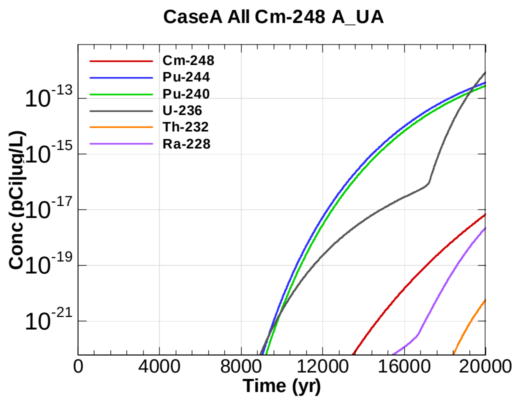

Figure B.1-101 - 100m Aquifer Concentration for CaseA All Cm-248 A_UA

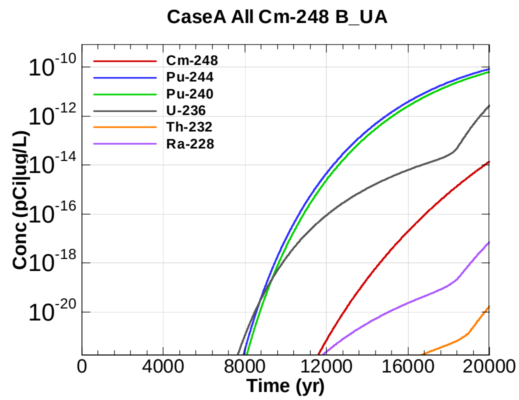

Figure B.1-102 - 100m Aquifer Concentration for CaseA All Cm-248 B_UA

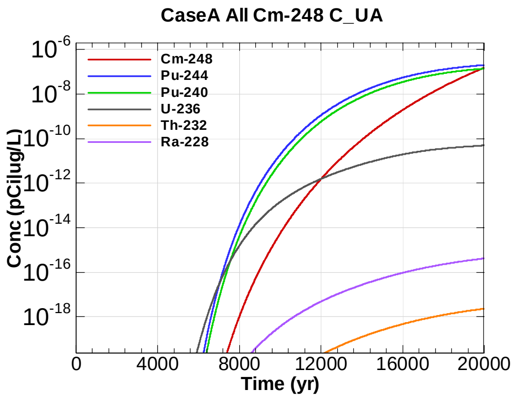

Figure B.1-103 - 100m Aquifer Concentration for CaseA All Cm-248 C_UA

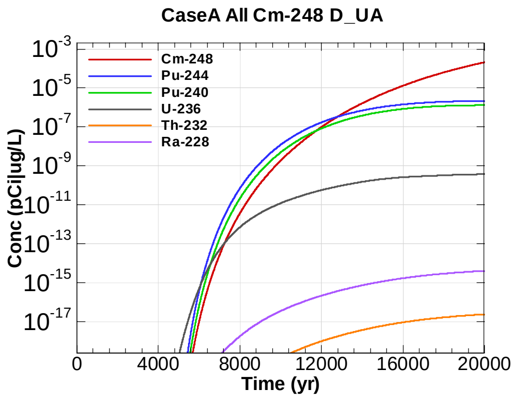

Figure B.1-104 - 100m Aquifer Concentration for CaseA All Cm-248 D_UA

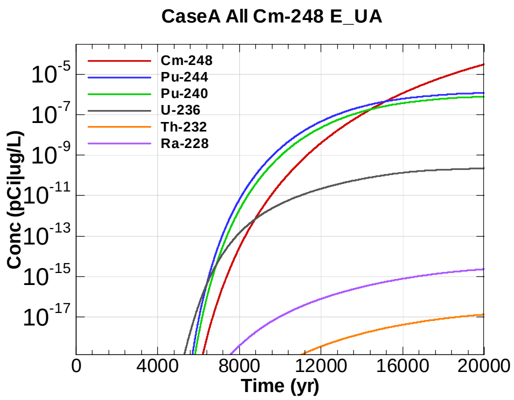

Figure B.1-105 - 100m Aquifer Concentration for CaseA All Cm-248 E_UA

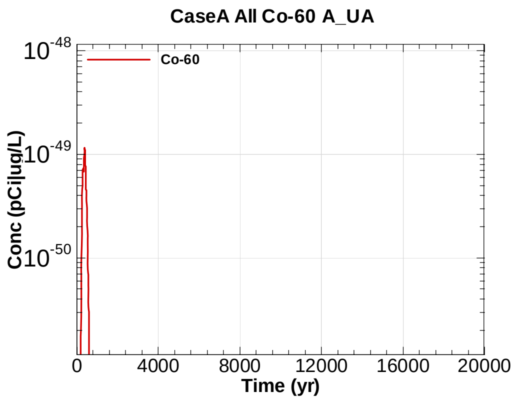

Figure B.1-106 - 100m Aquifer Concentration for CaseA All Co-60 A_UA

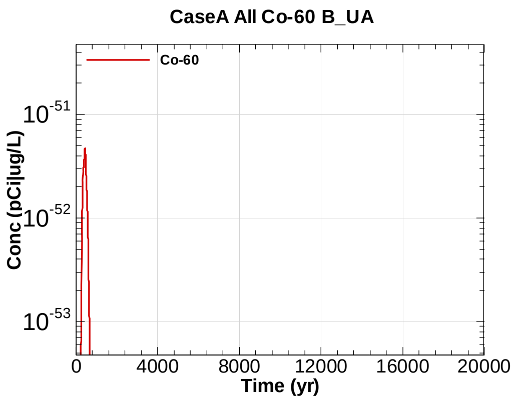

Figure B.1-107 - 100m Aquifer Concentration for CaseA All Co-60 B_UA

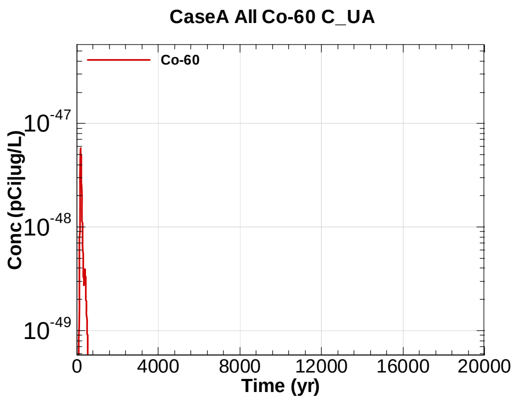

Figure B.1-108 - 100m Aquifer Concentration for CaseA All Co-60 C_UA

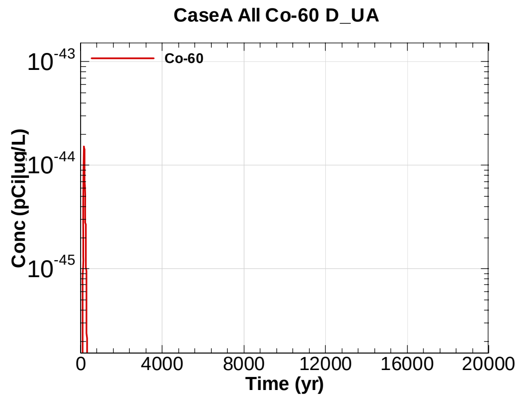

Figure B.1-109 - 100m Aquifer Concentration for CaseA All Co-60 D_UA

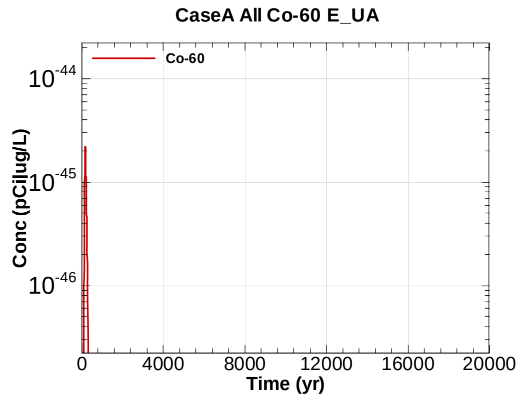

Figure B.1-110 - 100m Aquifer Concentration for CaseA All Co-60 E_UA

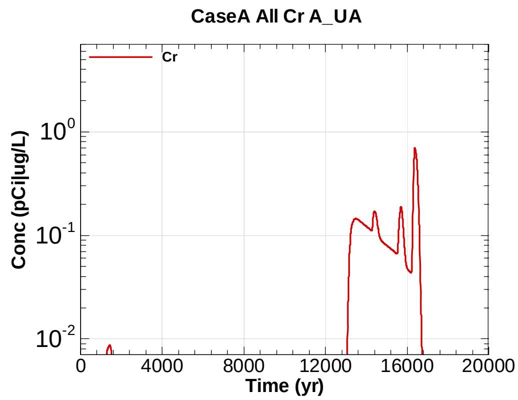

Figure B.1-111 - 100m Aquifer Concentration for CaseA All Cr A_UA

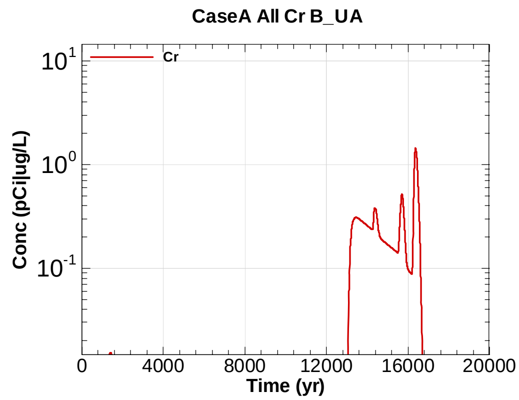

Figure B.1-112 - 100m Aquifer Concentration for CaseA All Cr B_UA

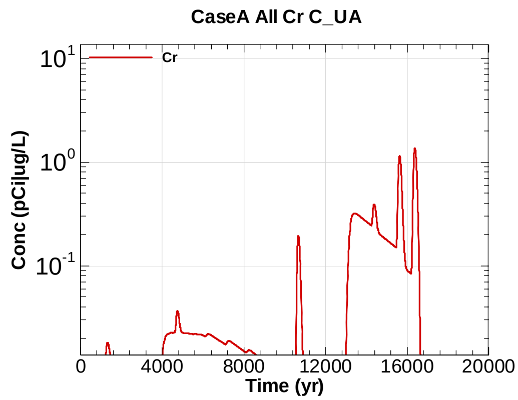

Figure B.1-113 - 100m Aquifer Concentration for CaseA All Cr C_UA

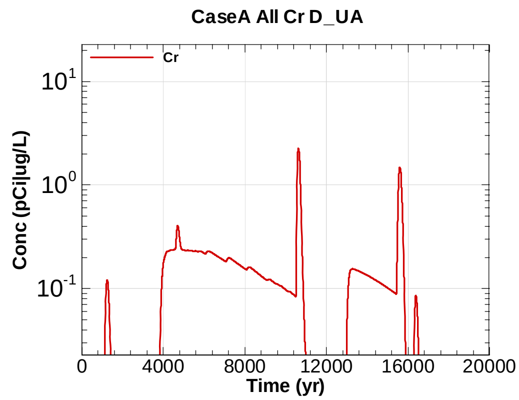

Figure B.1-114 - 100m Aquifer Concentration for CaseA All Cr D_UA

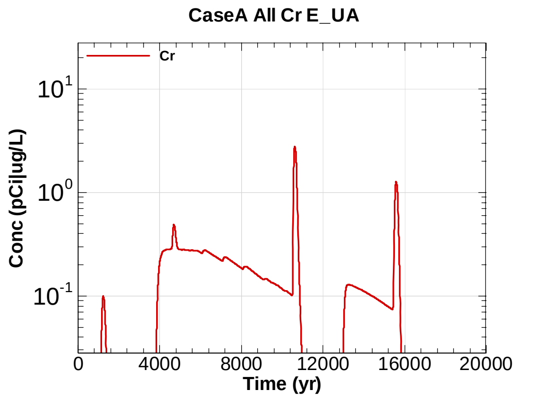

Figure B.1-115 - 100m Aquifer Concentration for CaseA All Cr E_UA

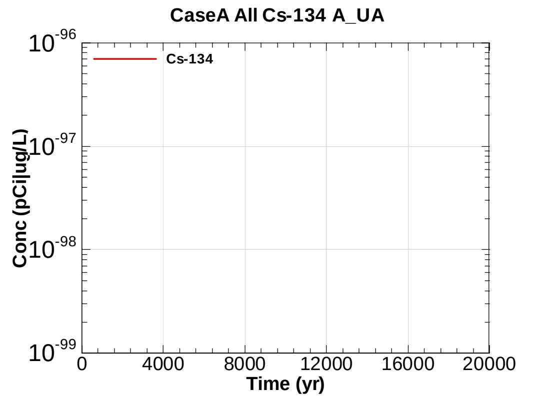

Figure B.1-116 - 100m Aquifer Concentration for CaseA All Cs-134 A_UA

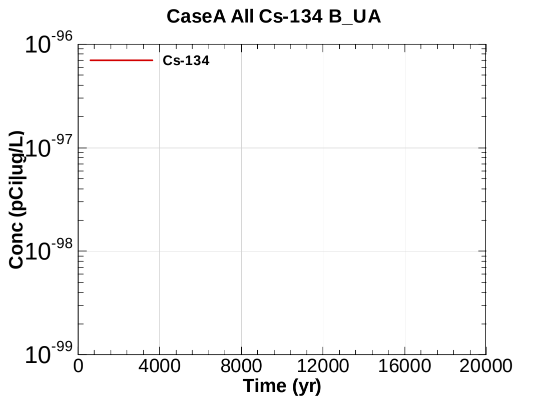

Figure B.1-117 - 100m Aquifer Concentration for CaseA All Cs-134 B_UA

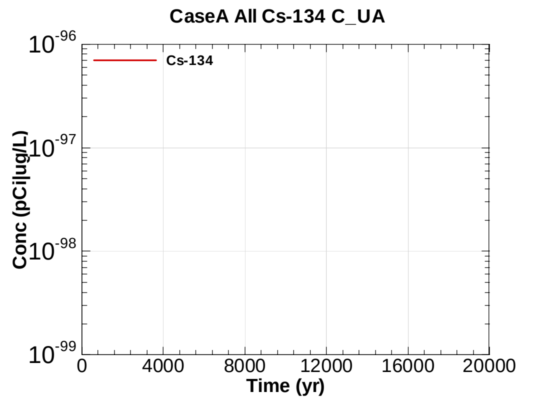

Figure B.1-118 - 100m Aquifer Concentration for CaseA All Cs-134 C_UA

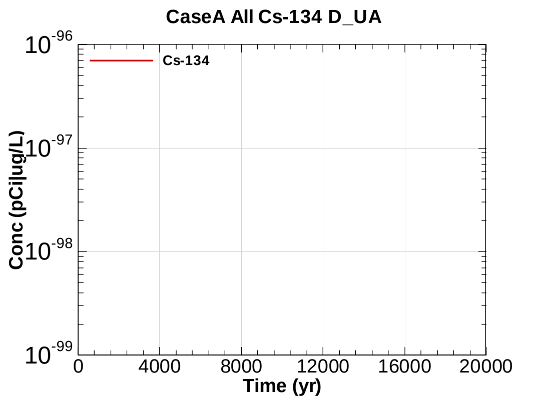

Figure B.1-119 - 100m Aquifer Concentration for CaseA All Cs-134 D_UA

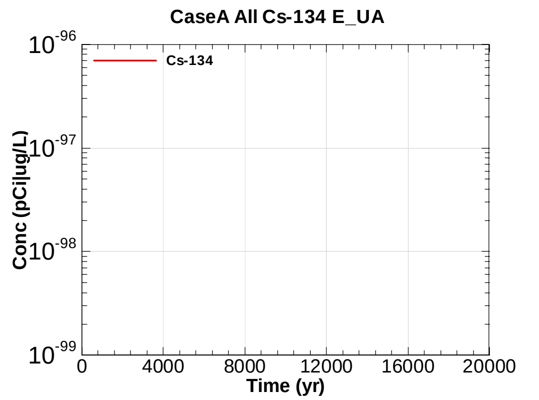

Figure B.1-120 - 100m Aquifer Concentration for CaseA All Cs-134 E_UA

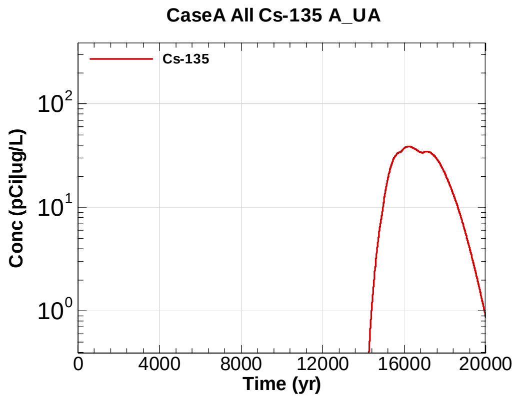

Figure B.1-121 - 100m Aquifer Concentration for CaseA All Cs-135 A_UA

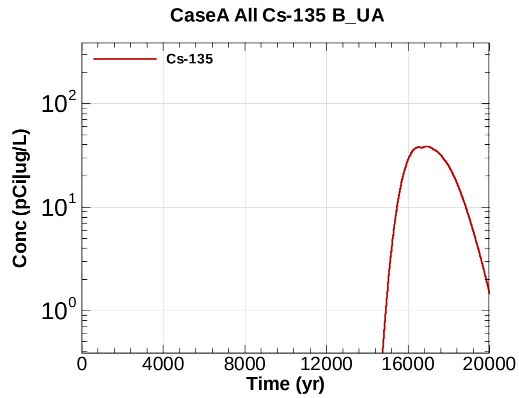

Figure B.1-122 - 100m Aquifer Concentration for CaseA All Cs-135 B_UA

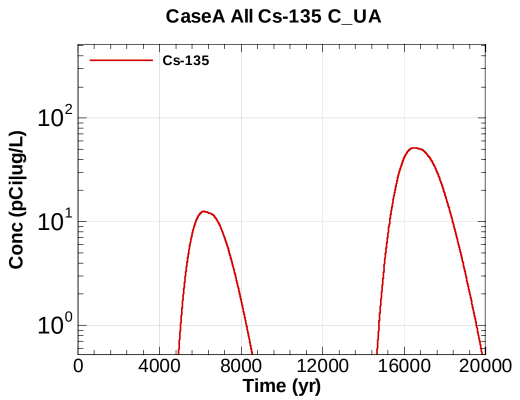

Figure B.1-123 - 100m Aquifer Concentration for CaseA All Cs-135 C_UA

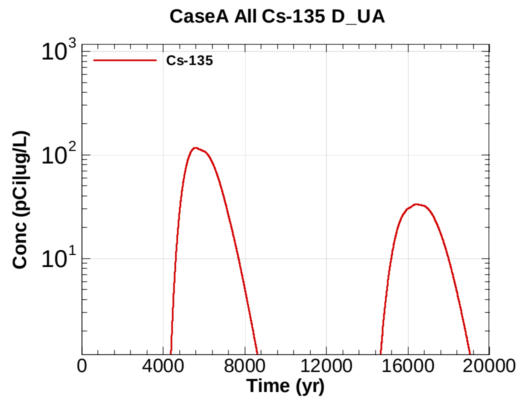

Figure B.1-124 - 100m Aquifer Concentration for CaseA All Cs-135 D_UA

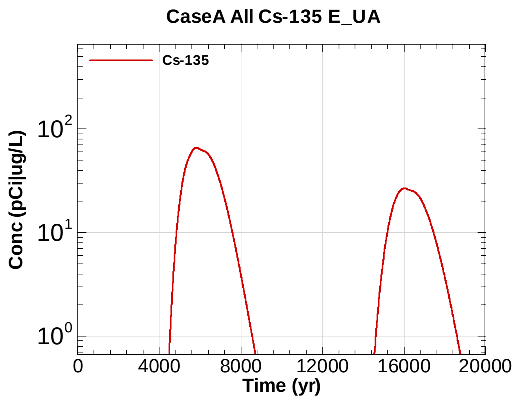

Figure B.1-125 - 100m Aquifer Concentration for CaseA All Cs-135 E_UA

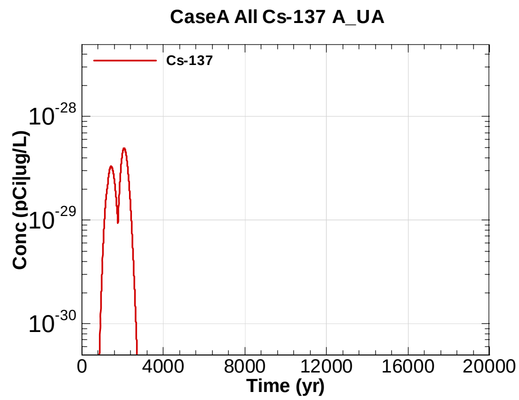

Figure B.1-126 - 100m Aquifer Concentration for CaseA All Cs-137 A_UA

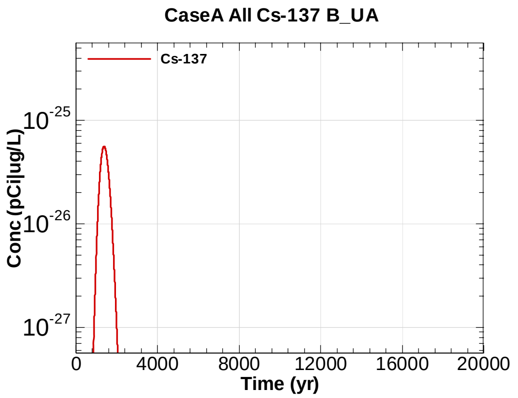

Figure B.1-127 - 100m Aquifer Concentration for CaseA All Cs-137 B_UA

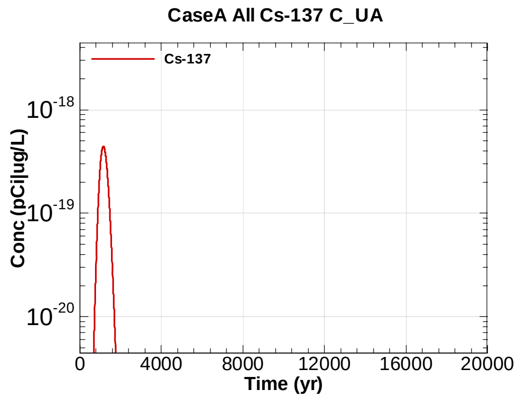

Figure B.1-128 - 100m Aquifer Concentration for CaseA All Cs-137 C_UA

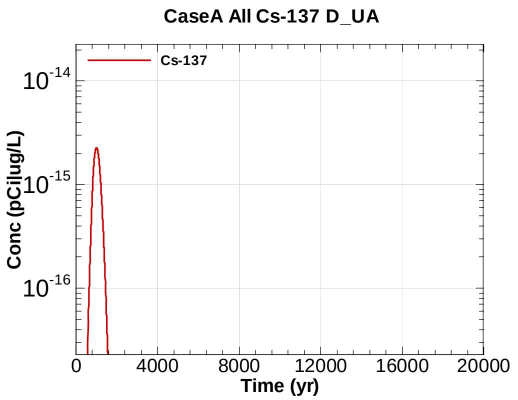

Figure B.1-129 - 100m Aquifer Concentration for CaseA All Cs-137 D_UA

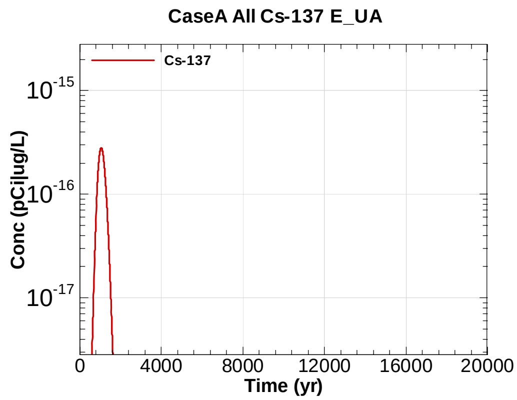

Figure B.1-130 - 100m Aquifer Concentration for CaseA All Cs-137 E_UA

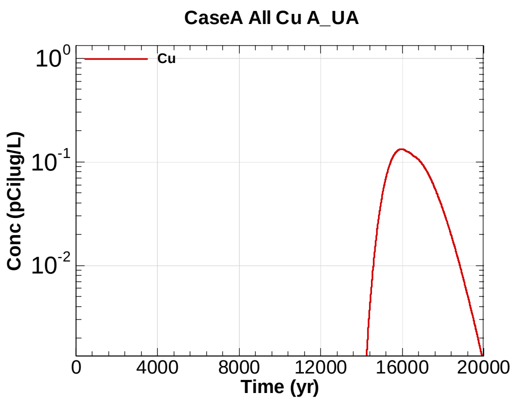

Figure B.1-131 - 100m Aquifer Concentration for CaseA All Cu A_UA

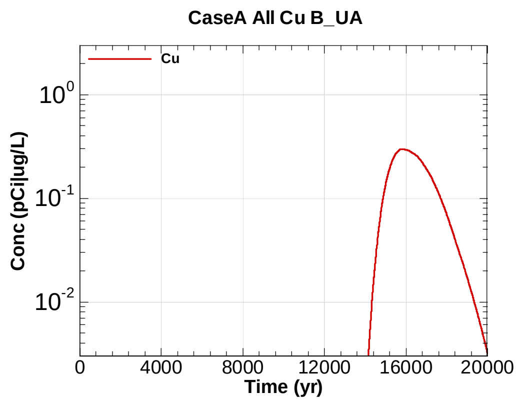

Figure B.1-132 - 100m Aquifer Concentration for CaseA All Cu B_UA

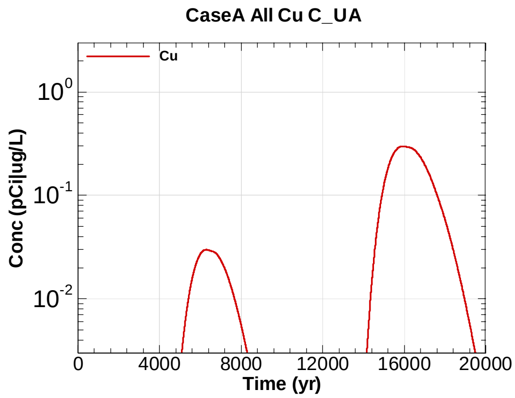

Figure B.1-133 - 100m Aquifer Concentration for CaseA All Cu C_UA

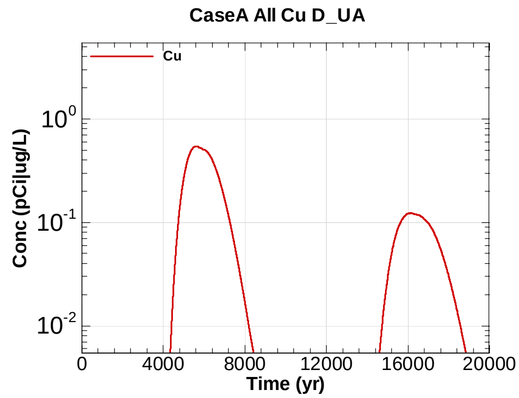

Figure B.1-134 - 100m Aquifer Concentration for CaseA All Cu D_UA

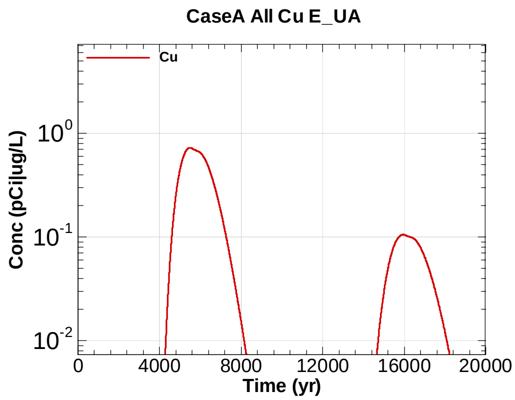

Figure B.1-135 - 100m Aquifer Concentration for CaseA All Cu E_UA

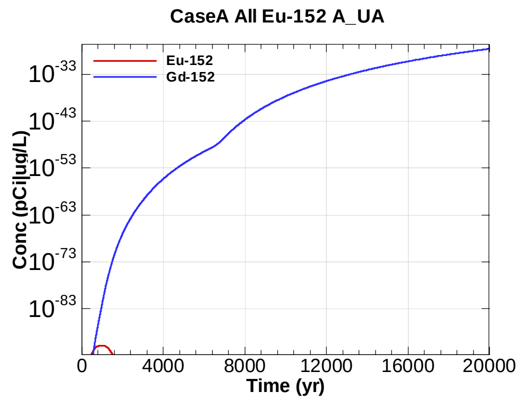

Figure B.1-136 - 100m Aquifer Concentration for CaseA All Eu-152 A_UA

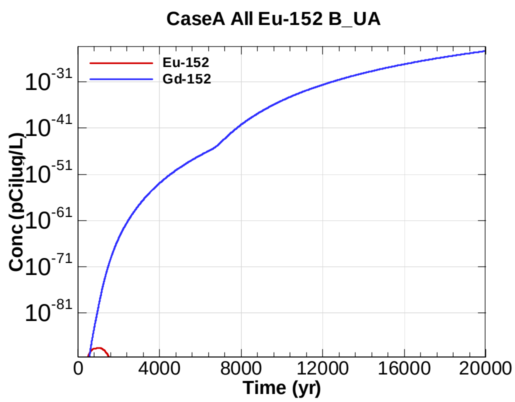

Figure B.1-137 - 100m Aquifer Concentration for CaseA All Eu-152 B_UA

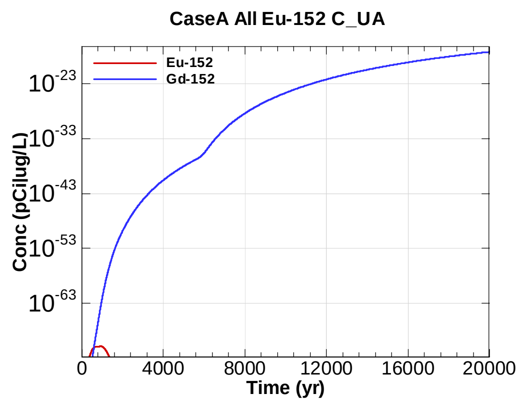

Figure B.1-138 - 100m Aquifer Concentration for CaseA All Eu-152 C_UA

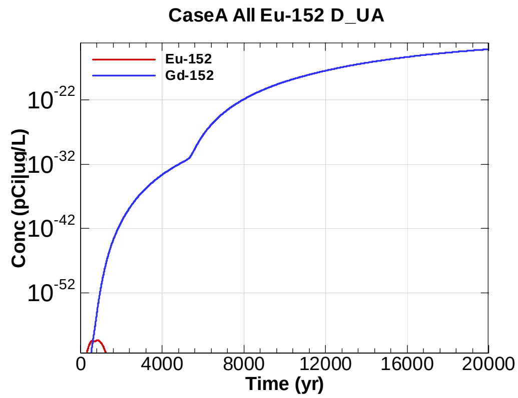

Figure B.1-139 - 100m Aquifer Concentration for CaseA All Eu-152 D_UA

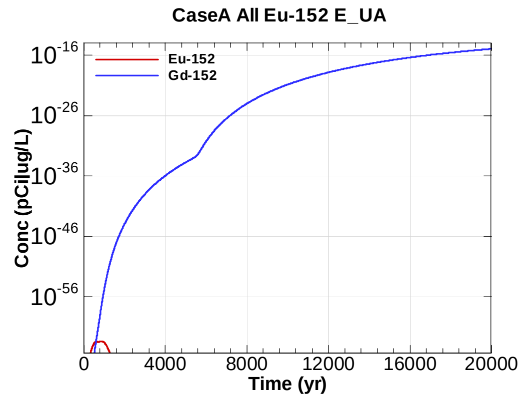

Figure B.1-140 - 100m Aquifer Concentration for CaseA All Eu-152 E_UA

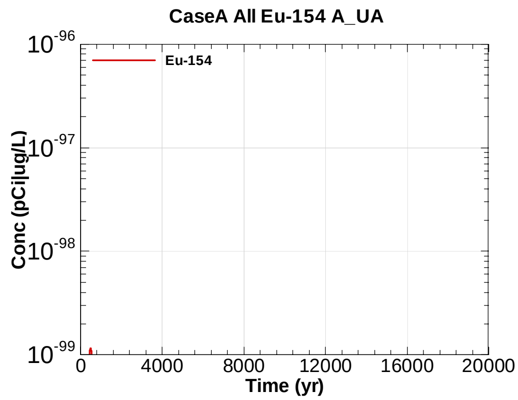

Figure B.1-141 - 100m Aquifer Concentration for CaseA All Eu-154 A_UA

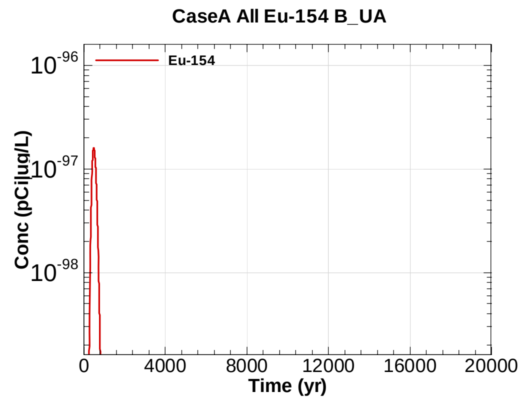

Figure B.1-142 - 100m Aquifer Concentration for CaseA All Eu-154 B_UA

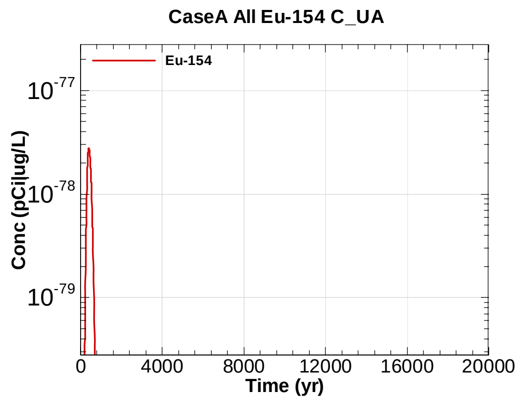

Figure B.1-143 - 100m Aquifer Concentration for CaseA All Eu-154 C_UA

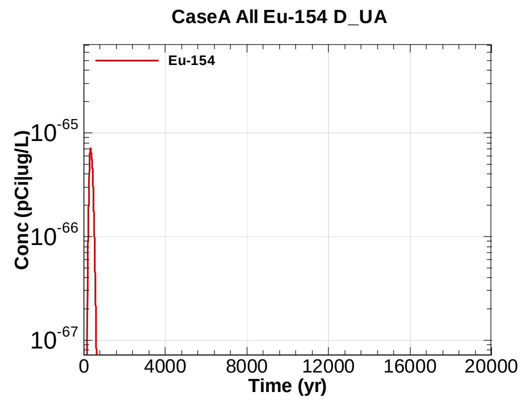

Figure B.1-144 - 100m Aquifer Concentration for CaseA All Eu-154 D_UA

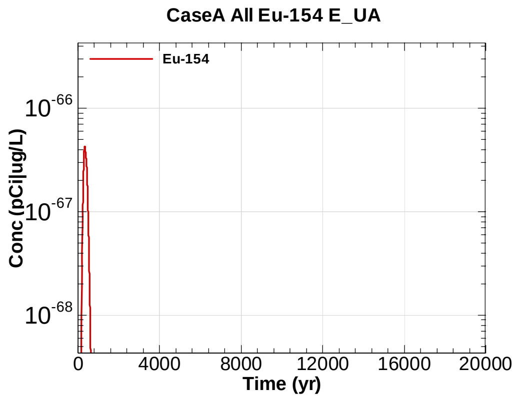

Figure B.1-145 - 100m Aquifer Concentration for CaseA All Eu-154 E_UA

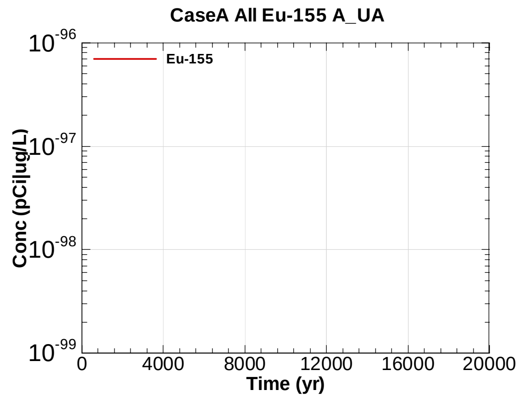

Figure B.1-146 - 100m Aquifer Concentration for CaseA All Eu-155 A_UA

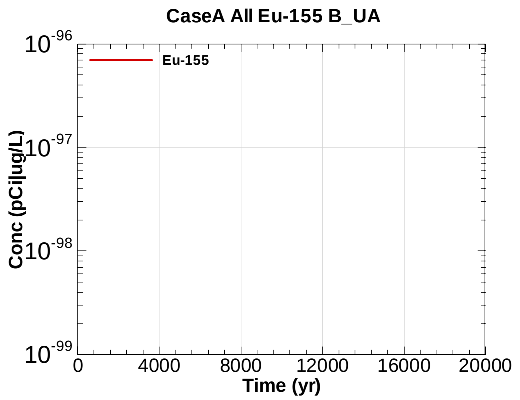

Figure B.1-147 - 100m Aquifer Concentration for CaseA All Eu-155 B_UA

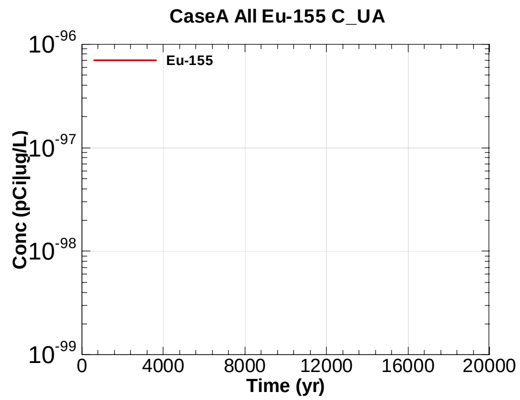

Figure B.1-148 - 100m Aquifer Concentration for CaseA All Eu-155 C_UA

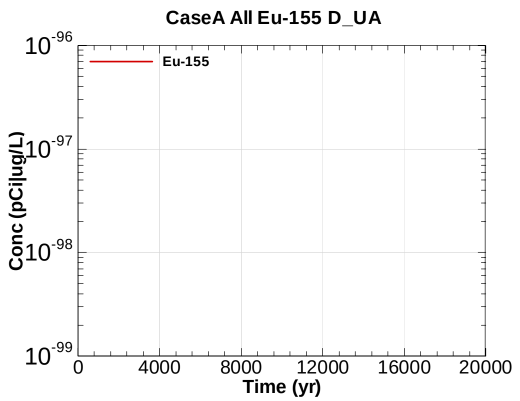

Figure B.1-149 - 100m Aquifer Concentration for CaseA All Eu-155 D_UA

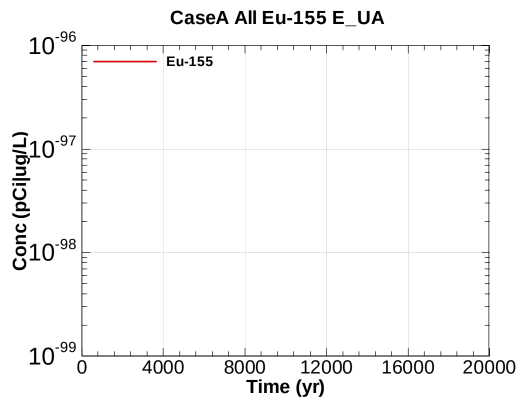

Figure B.1-150 - 100m Aquifer Concentration for CaseA All Eu-155 E_UA

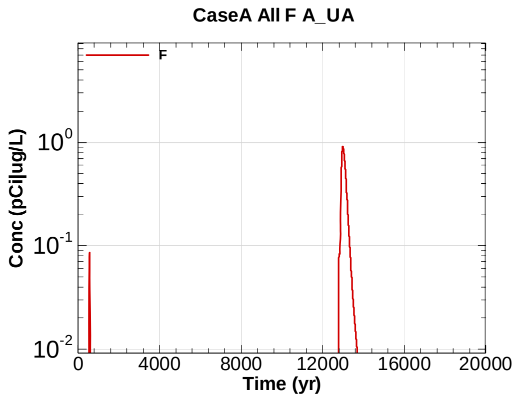

Figure B.1-151 - 100m Aquifer Concentration for CaseA All F A_UA

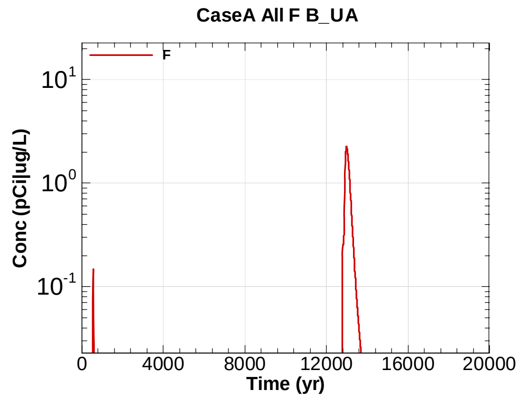

Figure B.1-152 - 100m Aquifer Concentration for CaseA All F B_UA

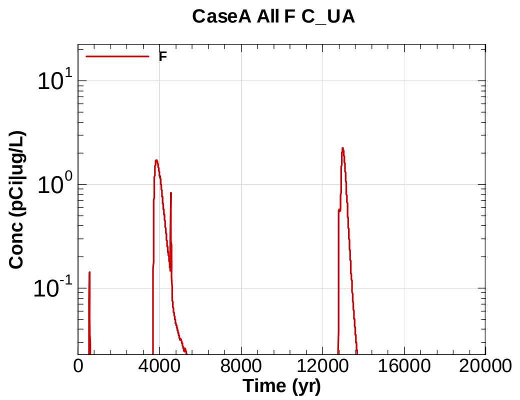

Figure B.1-153 - 100m Aquifer Concentration for CaseA All F C_UA

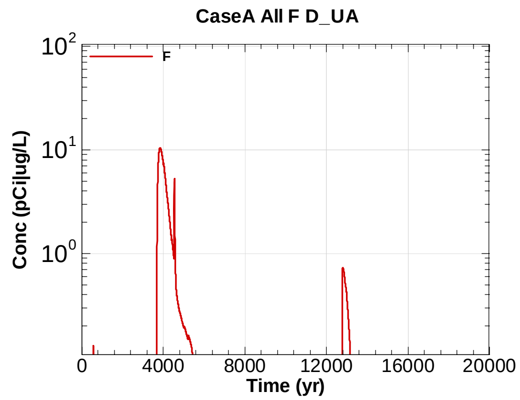

Figure B.1-154 - 100m Aquifer Concentration for CaseA All F D_UA

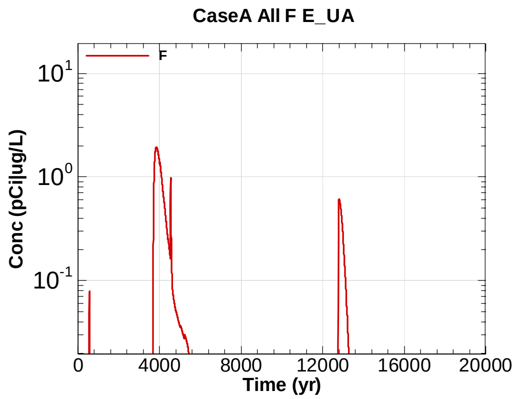

Figure B.1-155 - 100m Aquifer Concentration for CaseA All F E_UA

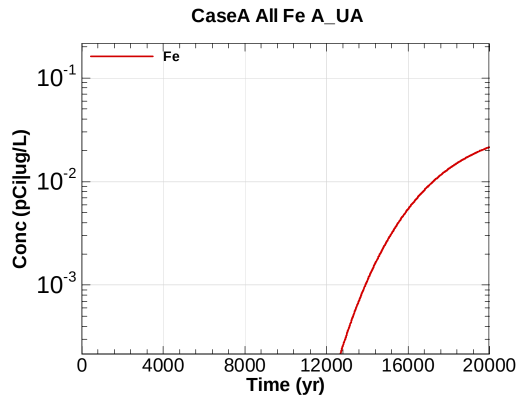

Figure B.1-156 - 100m Aquifer Concentration for CaseA All Fe A_UA

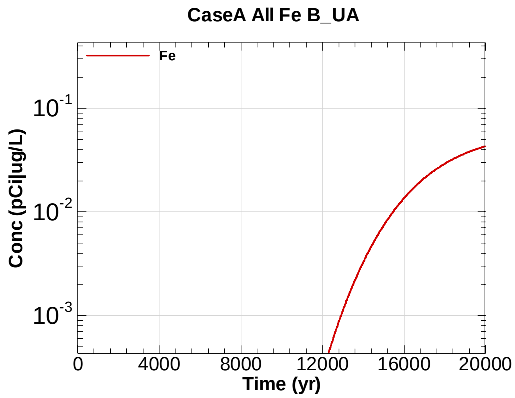

Figure B.1-157 - 100m Aquifer Concentration for CaseA All Fe B_UA

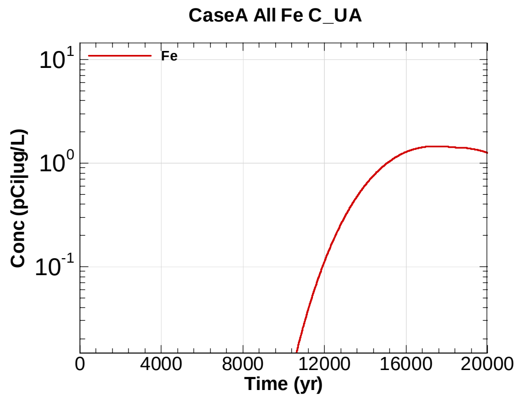

Figure B.1-158 - 100m Aquifer Concentration for CaseA All Fe C_UA

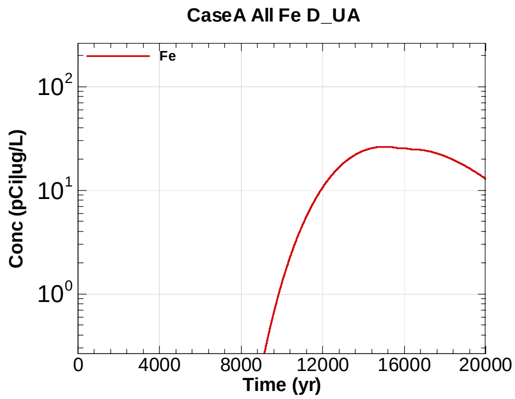

Figure B.1-159 - 100m Aquifer Concentration for CaseA All Fe D_UA

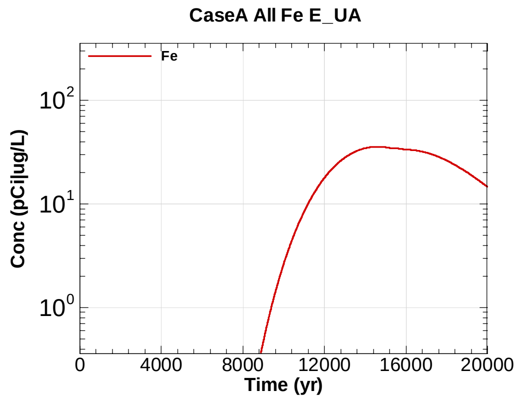

Figure B.1-160 - 100m Aquifer Concentration for CaseA All Fe E_UA

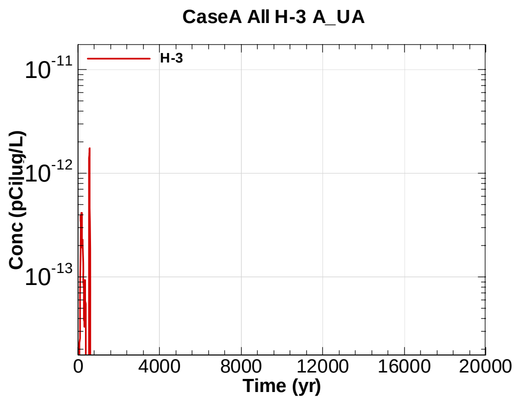

Figure B.1-161 - 100m Aquifer Concentration for CaseA All H-3 A_UA

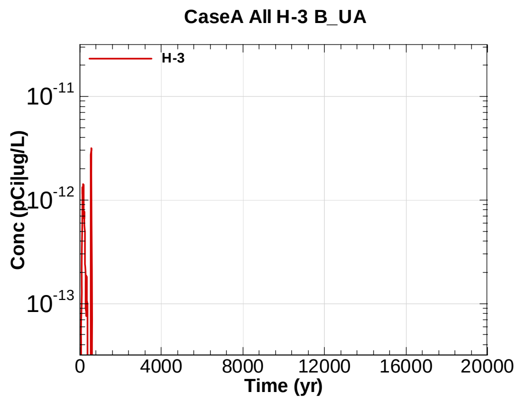

Figure B.1-162 - 100m Aquifer Concentration for CaseA All H-3 B_UA

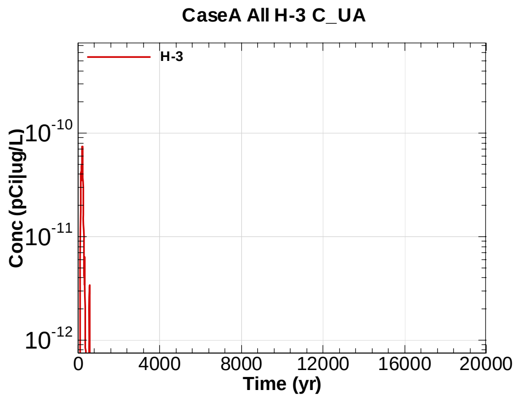

Figure B.1-163 - 100m Aquifer Concentration for CaseA All H-3 C_UA

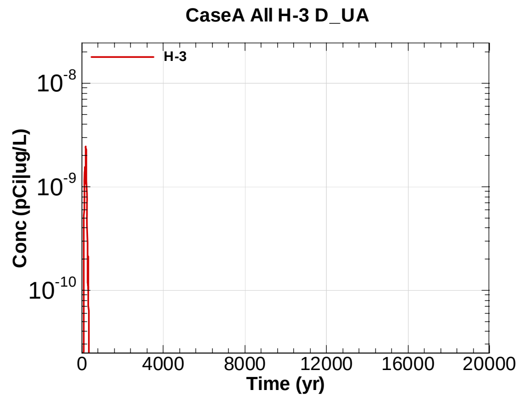

Figure B.1-164 - 100m Aquifer Concentration for CaseA All H-3 D_UA

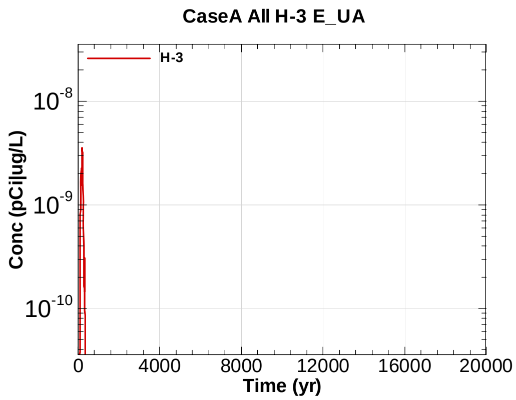

Figure B.1-165 - 100m Aquifer Concentration for CaseA All H-3 E_UA

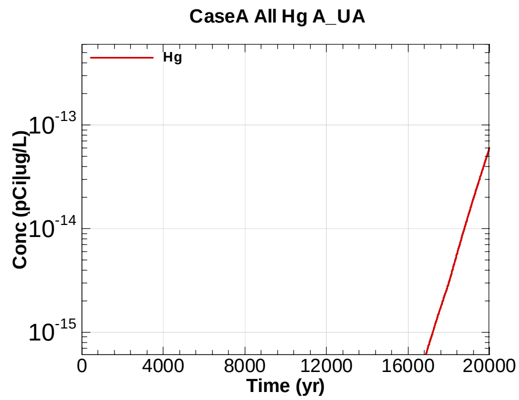

Figure B.1-166 - 100m Aquifer Concentration for CaseA All Hg A_UA

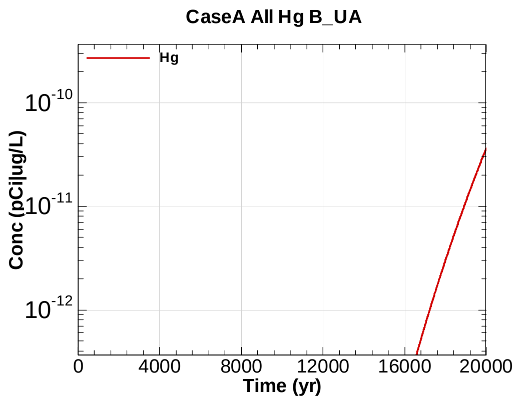

Figure B.1-167 - 100m Aquifer Concentration for CaseA All Hg B_UA

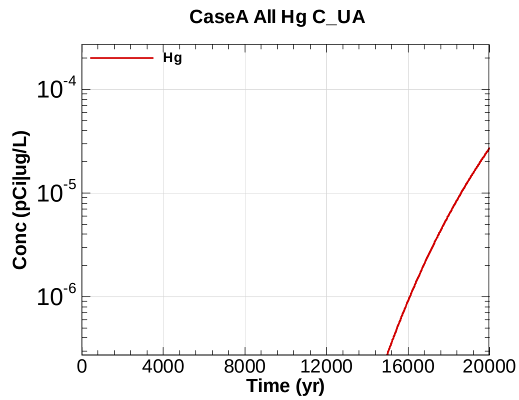

Figure B.1-168 - 100m Aquifer Concentration for CaseA All Hg C_UA

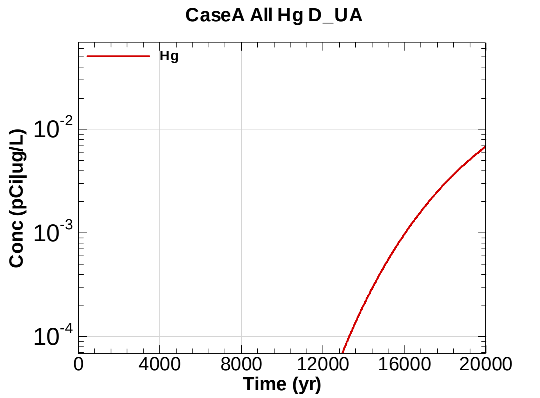

Figure B.1-169 - 100m Aquifer Concentration for CaseA All Hg D_UA

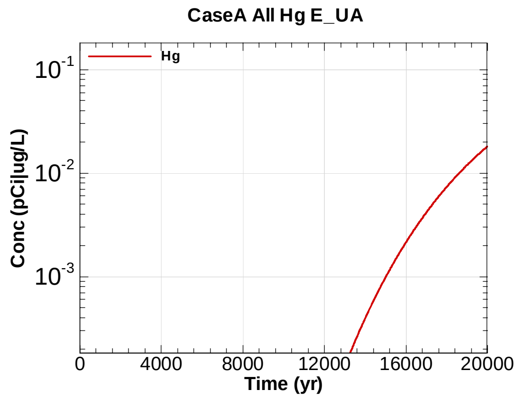

Figure B.1-170 - 100m Aquifer Concentration for CaseA All Hg E_UA

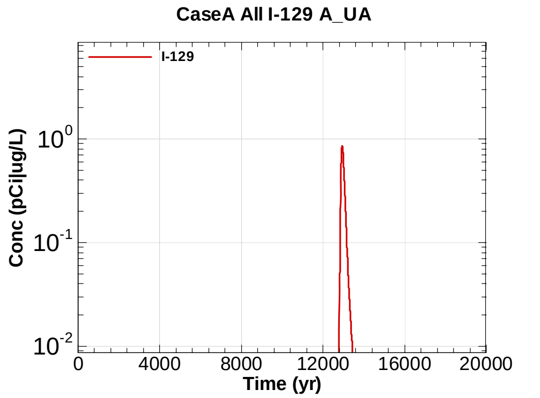

Figure B.1-171 - 100m Aquifer Concentration for CaseA All I-129 A_UA

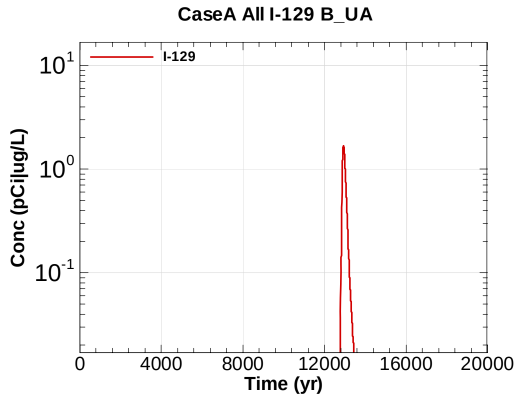

Figure B.1-172 - 100m Aquifer Concentration for CaseA All I-129 B_UA

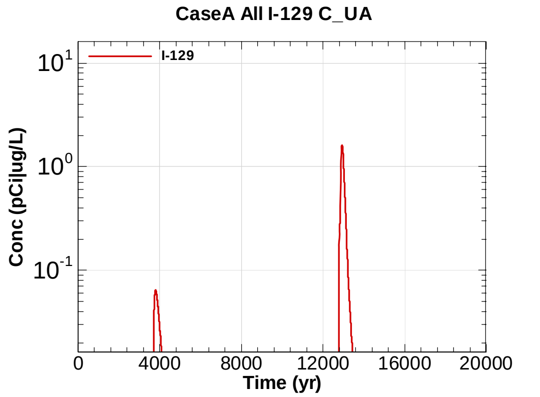

Figure B.1-173 - 100m Aquifer Concentration for CaseA All I-129 C_UA

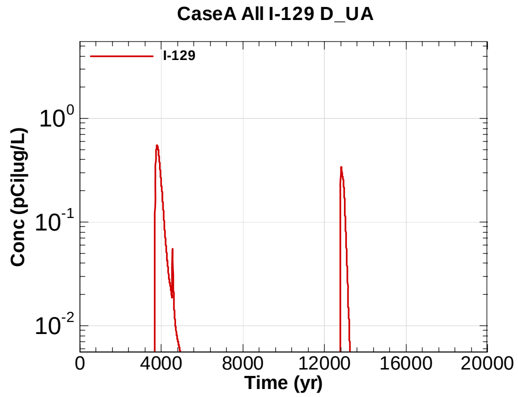

Figure B.1-174 - 100m Aquifer Concentration for CaseA All I-129 D_UA

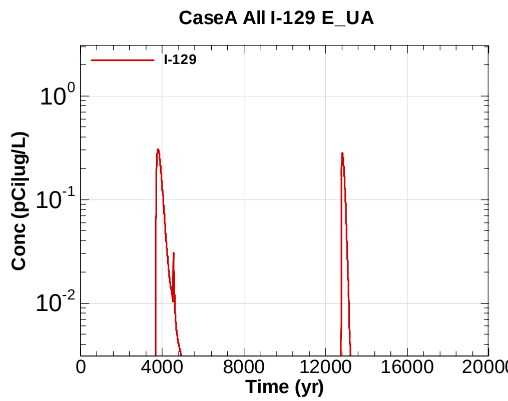

Figure B.1-175 - 100m Aquifer Concentration for CaseA All I-129 E_UA

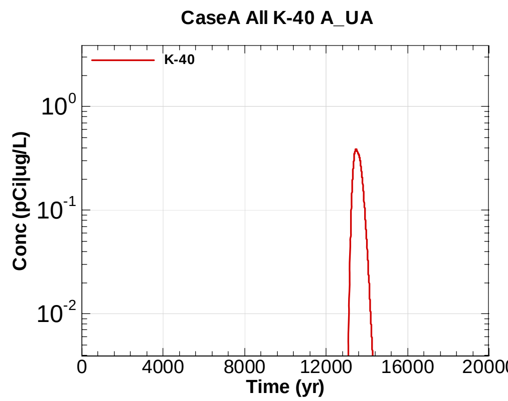

Figure B.1-176 - 100m Aquifer Concentration for CaseA All K-40 A_UA

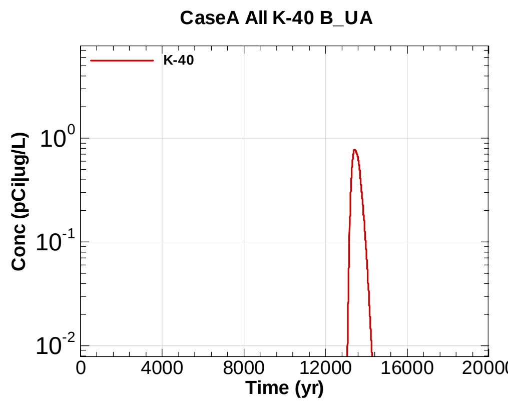

Figure B.1-177 - 100m Aquifer Concentration for CaseA All K-40 B_UA

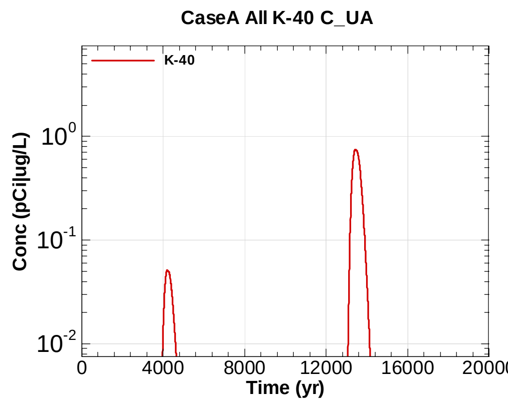

Figure B.1-178 - 100m Aquifer Concentration for CaseA All K-40 C_UA

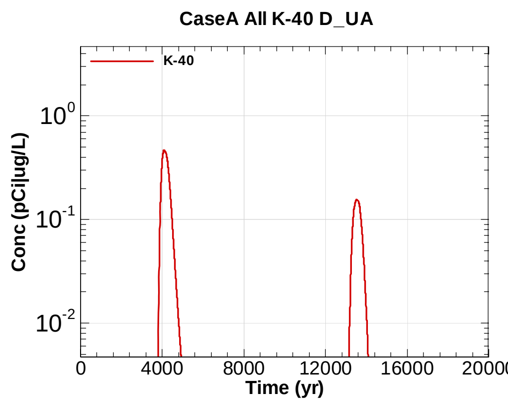

Figure B.1-179 - 100m Aquifer Concentration for CaseA All K-40 D_UA

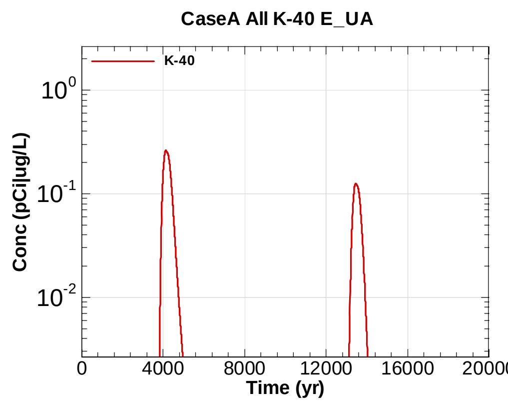

Figure B.1-180 - 100m Aquifer Concentration for CaseA All K-40 E_UA

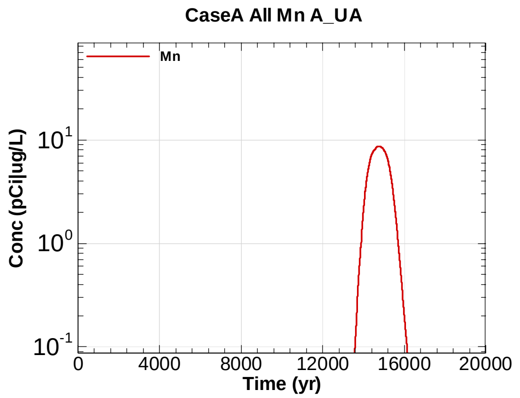

Figure B.1-181 - 100m Aquifer Concentration for CaseA All Mn A_UA

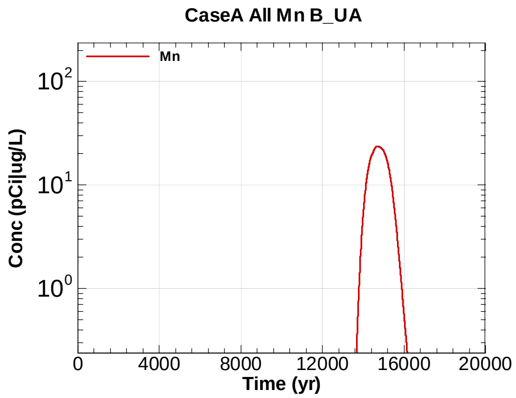

Figure B.1-182 - 100m Aquifer Concentration for CaseA All Mn B_UA

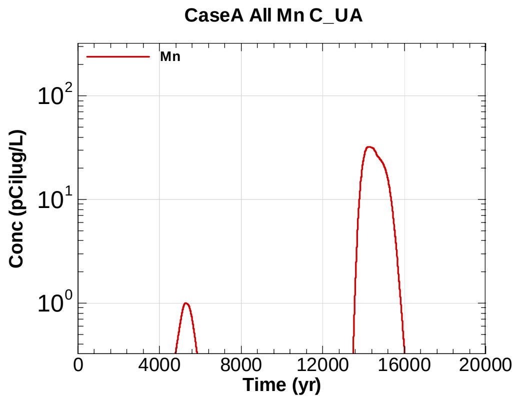

Figure B.1-183 - 100m Aquifer Concentration for CaseA All Mn C_UA

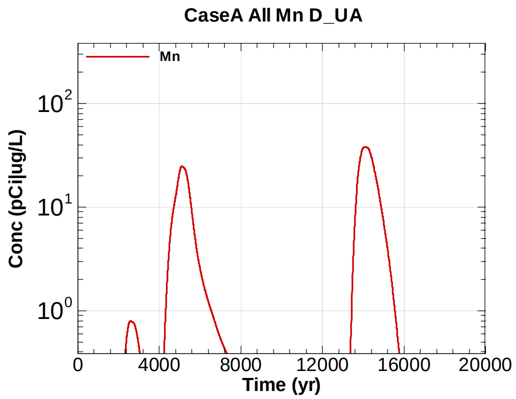

Figure B.1-184 - 100m Aquifer Concentration for CaseA All Mn D_UA

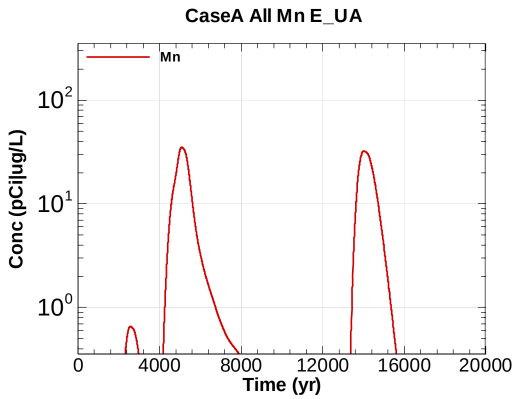

Figure B.1-185 - 100m Aquifer Concentration for CaseA All Mn E_UA

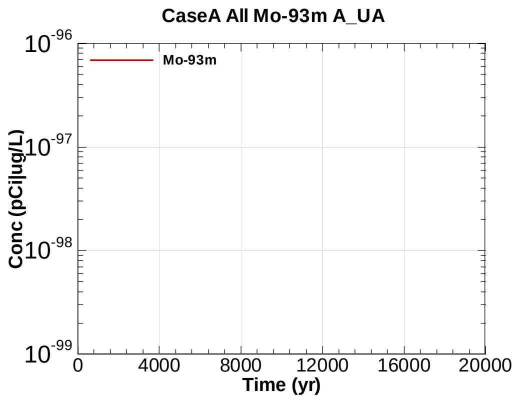

Figure B.1-186 - 100m Aquifer Concentration for CaseA All Mo-93m A_UA

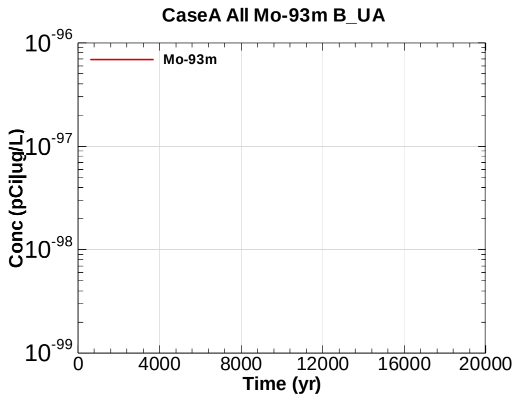

Figure B.1-187 - 100m Aquifer Concentration for CaseA All Mo-93m B_UA

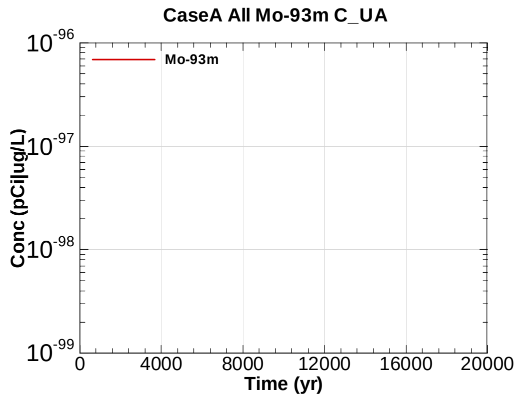

Figure B.1-188 - 100m Aquifer Concentration for CaseA All Mo-93m C_UA

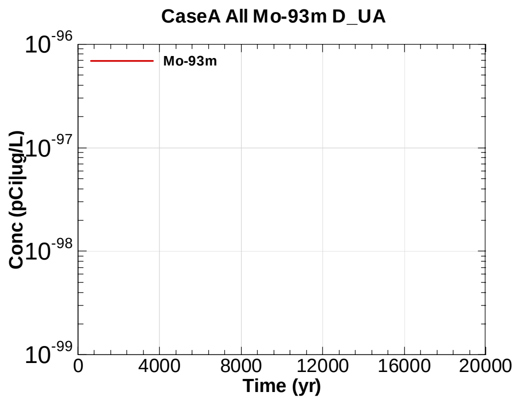

Figure B.1-189 - 100m Aquifer Concentration for CaseA All Mo-93m D_UA

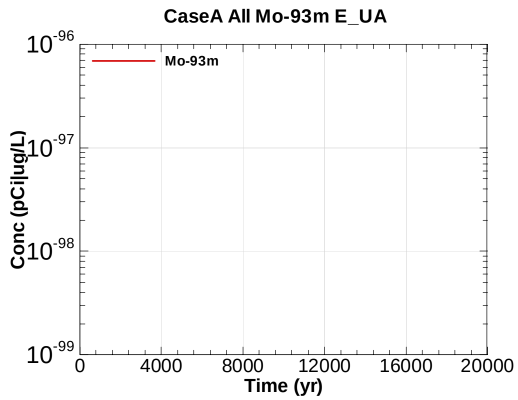

Figure B.1-190 - 100m Aquifer Concentration for CaseA All Mo-93m E_UA

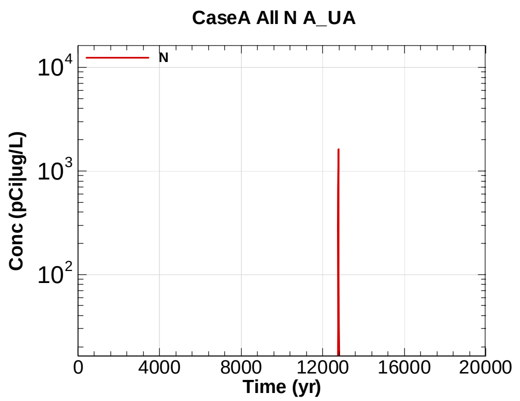

Figure B.1-191 - 100m Aquifer Concentration for CaseA All N A_UA

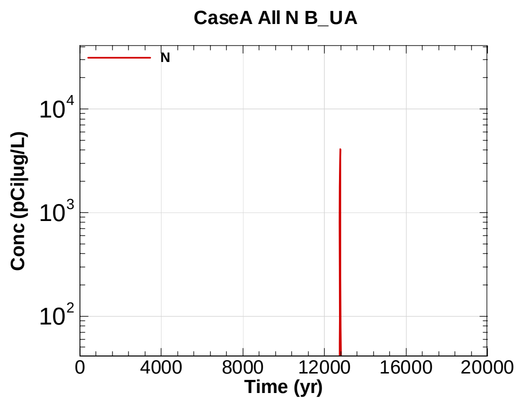

Figure B.1-192 - 100m Aquifer Concentration for CaseA All N B_UA

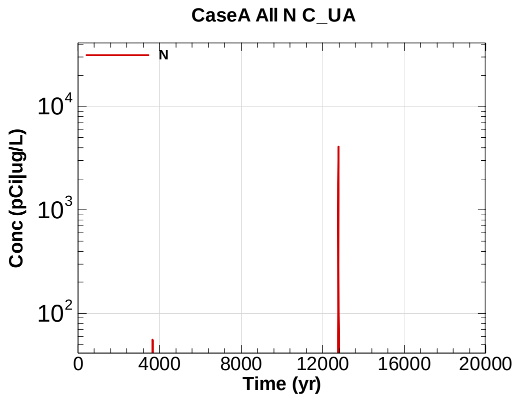

Figure B.1-193 - 100m Aquifer Concentration for CaseA All N C_UA

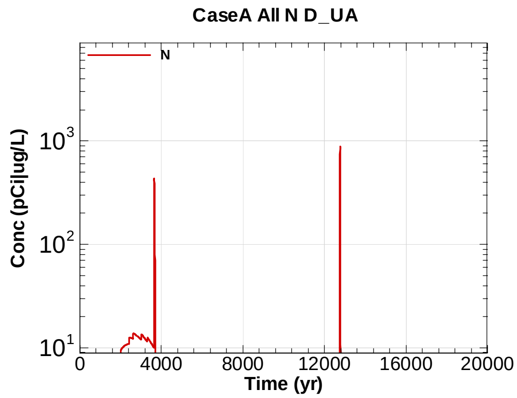

Figure B.1-194 - 100m Aquifer Concentration for CaseA All N D_UA

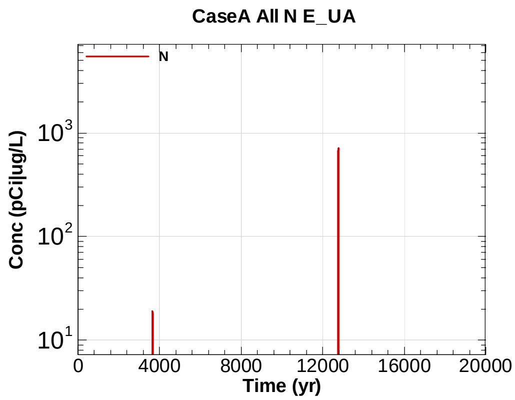

Figure B.1-195 - 100m Aquifer Concentration for CaseA All N E_UA

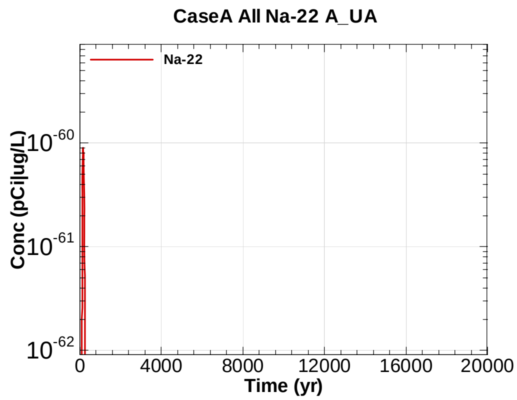

Figure B.1-196 - 100m Aquifer Concentration for CaseA All Na-22 A_UA

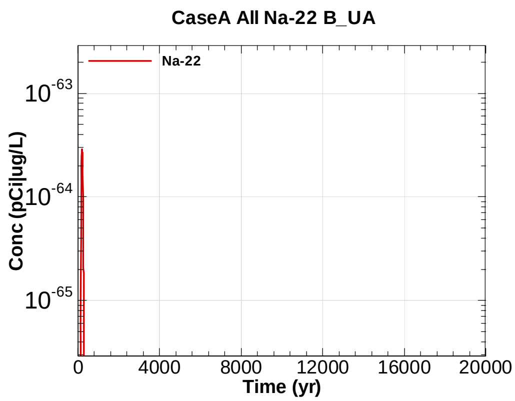

Figure B.1-197 - 100m Aquifer Concentration for CaseA All Na-22 B_UA

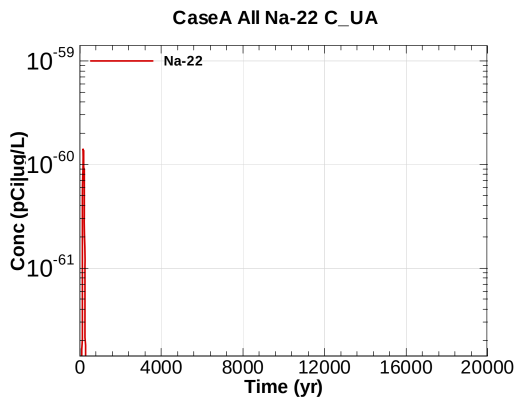

Figure B.1-198 - 100m Aquifer Concentration for CaseA All Na-22 C_UA

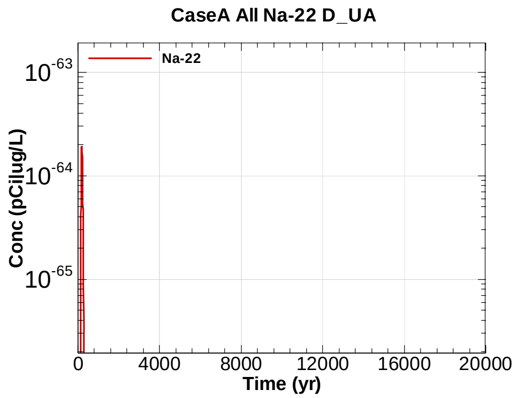

Figure B.1-199 - 100m Aquifer Concentration for CaseA All Na-22 D_UA

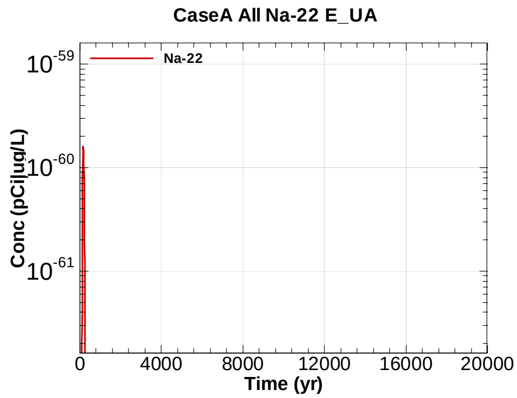

Figure B.1-200 - 100m Aquifer Concentration for CaseA All Na-22 E_UA

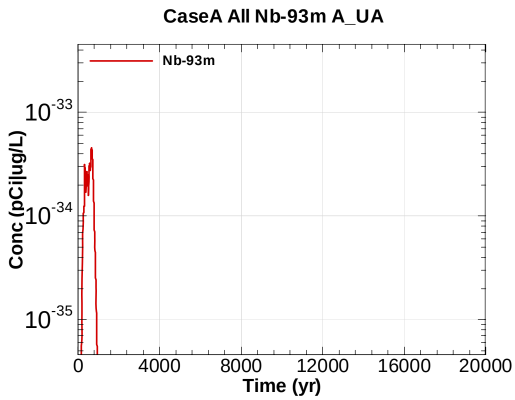

Figure B.1-201 - 100m Aquifer Concentration for CaseA All Nb-93m A_UA

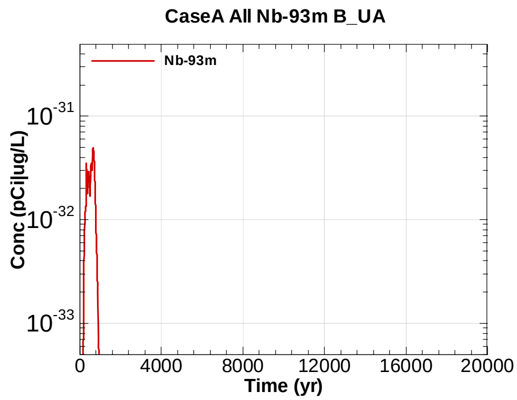

Figure B.1-202 - 100m Aquifer Concentration for CaseA All Nb-93m B_UA

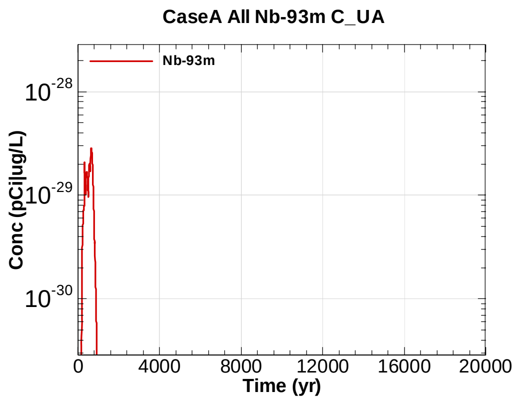

Figure B.1-203 - 100m Aquifer Concentration for CaseA All Nb-93m C_UA

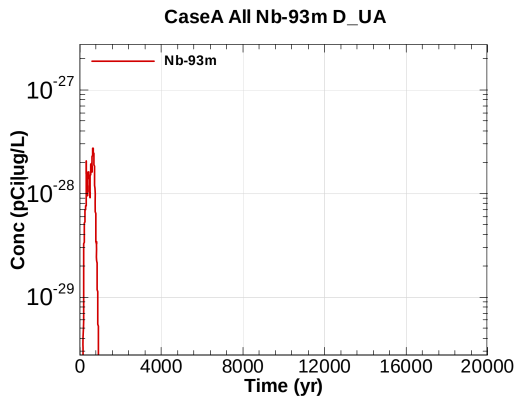

Figure B.1-204 - 100m Aquifer Concentration for CaseA All Nb-93m D_UA

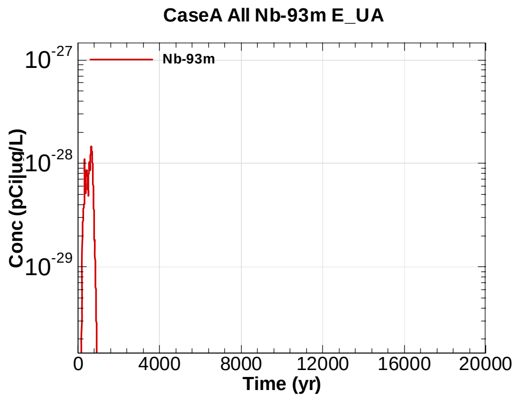

Figure B.1-205 - 100m Aquifer Concentration for CaseA All Nb-93m E_UA

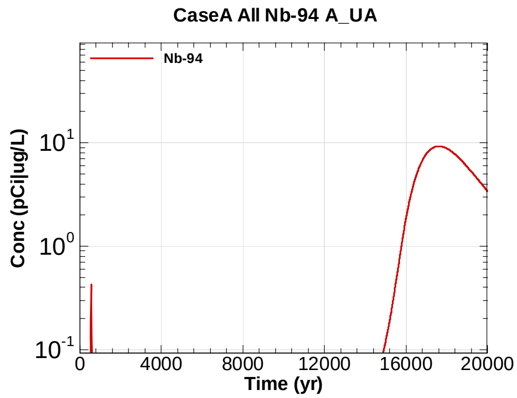

Figure B.1-206 - 100m Aquifer Concentration for CaseA All Nb-94 A_UA

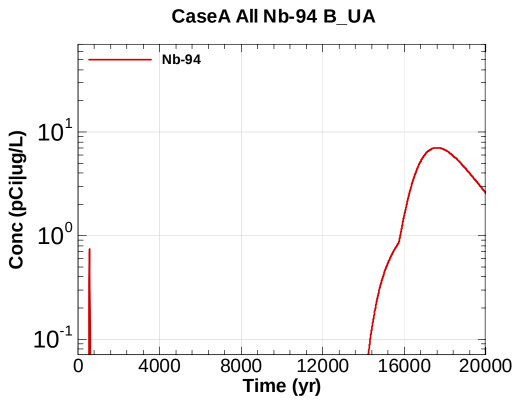

Figure B.1-207 - 100m Aquifer Concentration for CaseA All Nb-94 B_UA

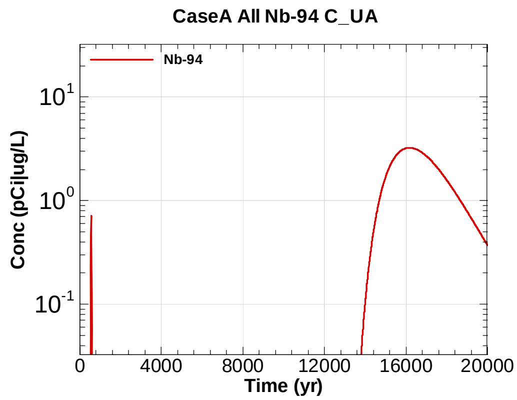

Figure B.1-208 - 100m Aquifer Concentration for CaseA All Nb-94 C_UA

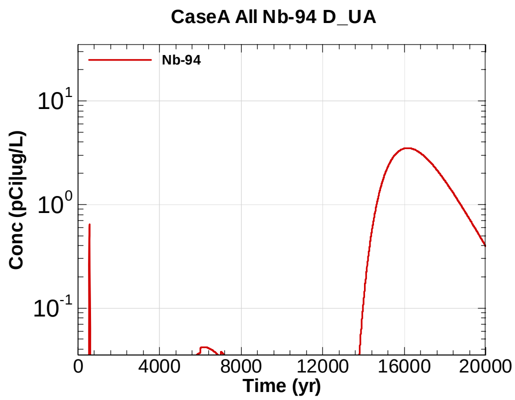

Figure B.1-209 - 100m Aquifer Concentration for CaseA All Nb-94 D_UA

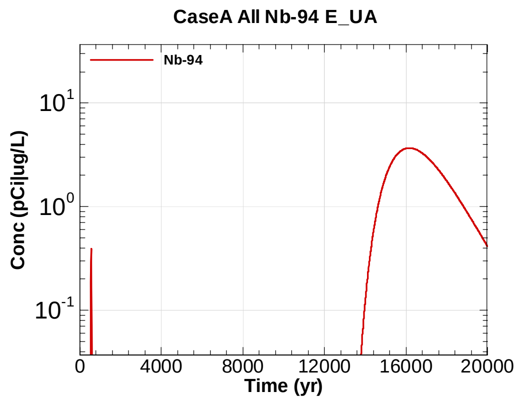

Figure B.1-210 - 100m Aquifer Concentration for CaseA All Nb-94 E_UA

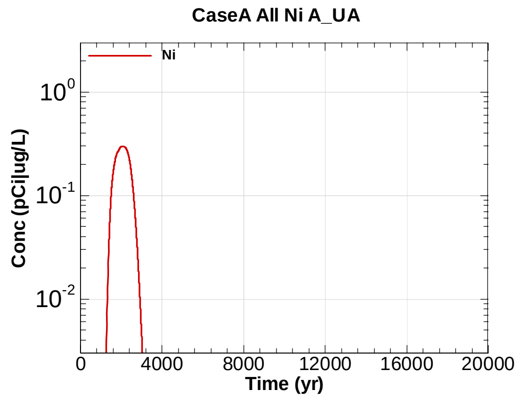

Figure B.1-211 - 100m Aquifer Concentration for CaseA All Ni A_UA

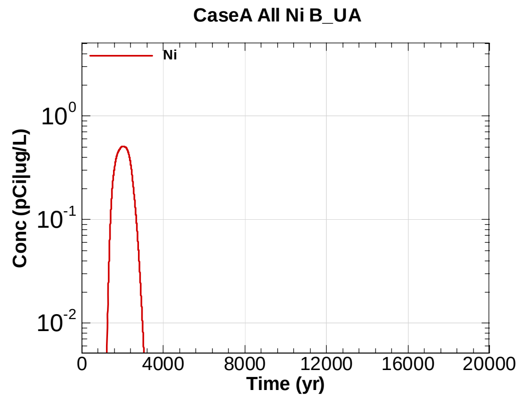

Figure B.1-212 - 100m Aquifer Concentration for CaseA All Ni B_UA

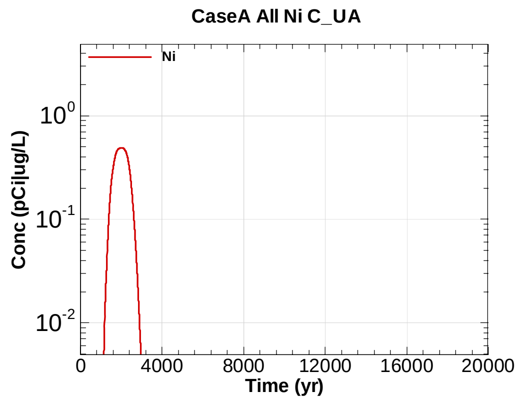

Figure B.1-213 - 100m Aquifer Concentration for CaseA All Ni C_UA

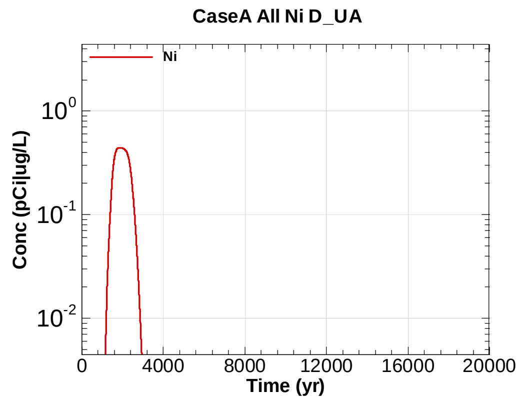

Figure B.1-214 - 100m Aquifer Concentration for CaseA All Ni D_UA

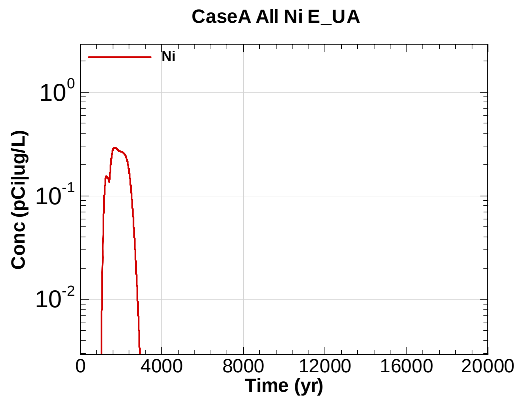

Figure B.1-215 - 100m Aquifer Concentration for CaseA All Ni E_UA

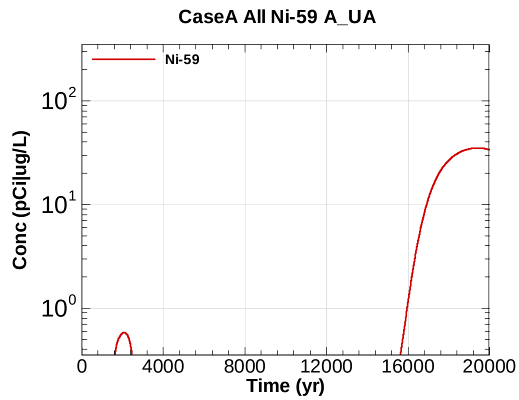

Figure B.1-216 - 100m Aquifer Concentration for CaseA All Ni-59 A_UA

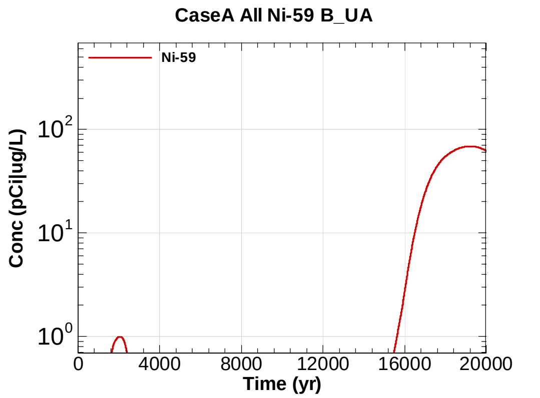

Figure B.1-217 - 100m Aquifer Concentration for CaseA All Ni-59 B_UA

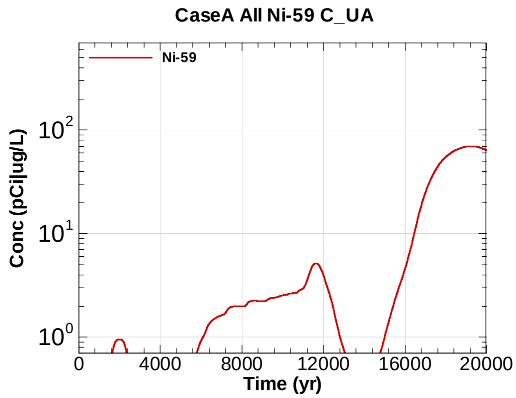

Figure B.1-218 - 100m Aquifer Concentration for CaseA All Ni-59 C_UA

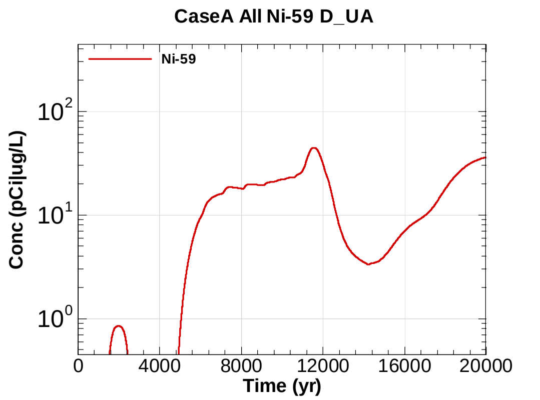

Figure B.1-219 - 100m Aquifer Concentration for CaseA All Ni-59 D_UA

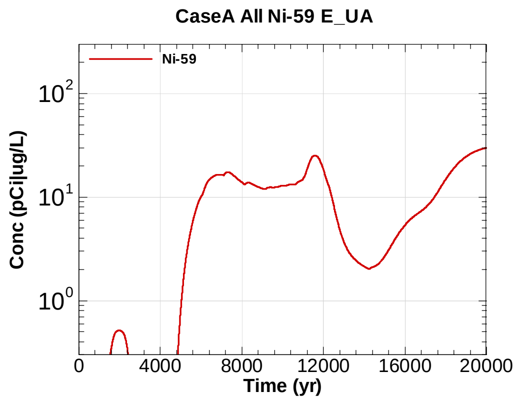

Figure B.1-220 - 100m Aquifer Concentration for CaseA All Ni-59 E_UA

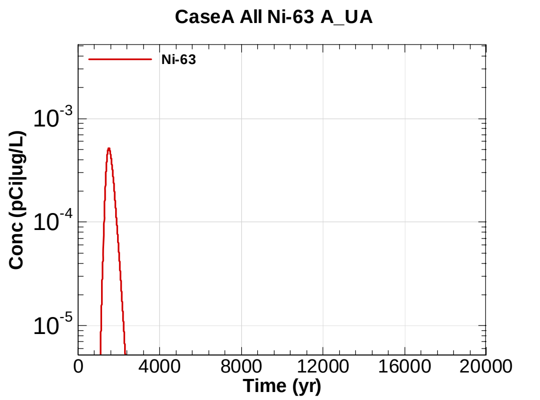

Figure B.1-221 - 100m Aquifer Concentration for CaseA All Ni-63 A_UA

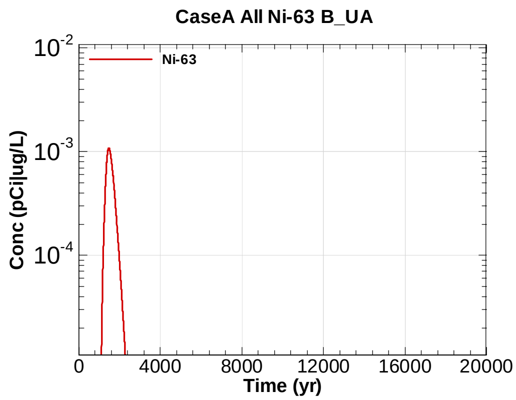

Figure B.1-222 - 100m Aquifer Concentration for CaseA All Ni-63 B_UA

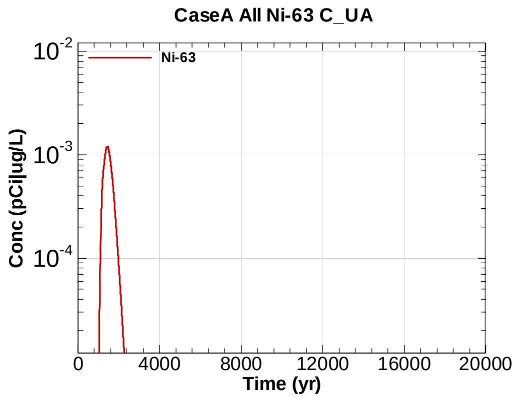

Figure B.1-223 - 100m Aquifer Concentration for CaseA All Ni-63 C_UA

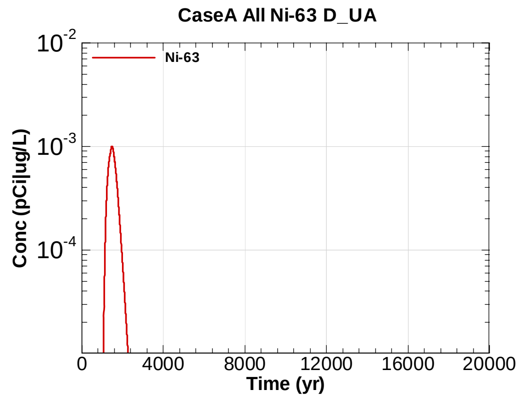

Figure B.1-224 - 100m Aquifer Concentration for CaseA All Ni-63 D_UA

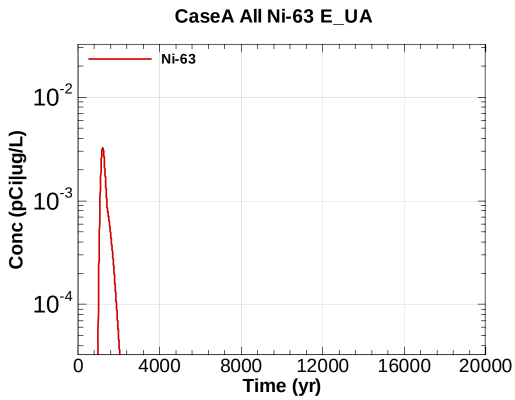

Figure B.1-225 - 100m Aquifer Concentration for CaseA All Ni-63 E_UA

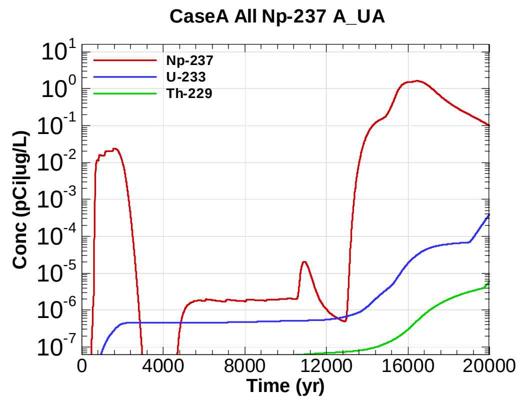

Figure B.1-226 - 100m Aquifer Concentration for CaseA All Np-237 A_UA

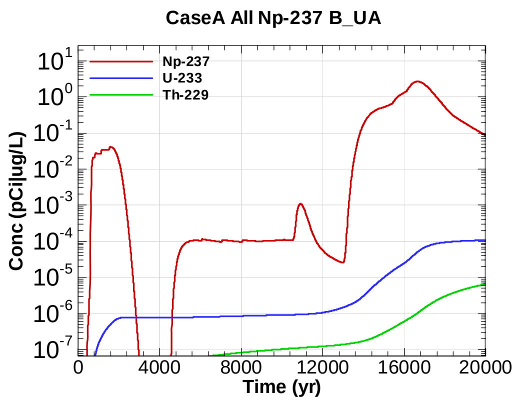

Figure B.1-227 - 100m Aquifer Concentration for CaseA All Np-237 B_UA

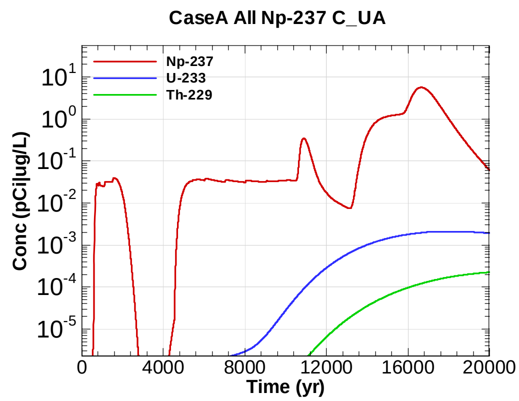

Figure B.1-228 - 100m Aquifer Concentration for CaseA All Np-237 C_UA

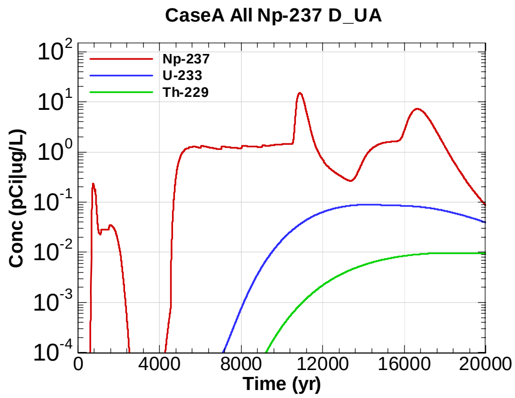

Figure B.1-229 - 100m Aquifer Concentration for CaseA All Np-237 D_UA

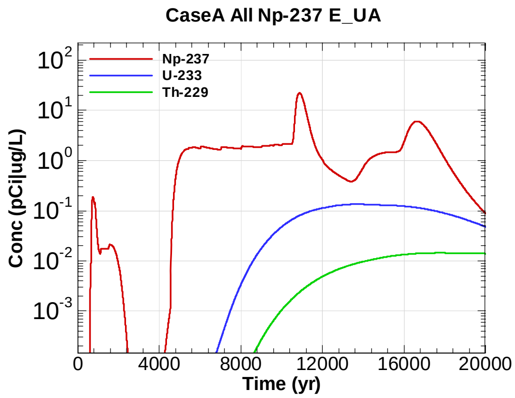

Figure B.1-230 - 100m Aquifer Concentration for CaseA All Np-237 E_UA

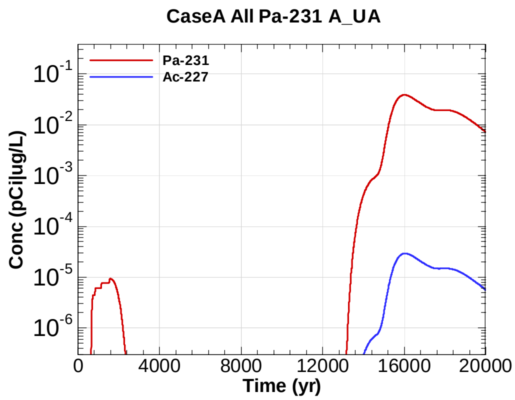

Figure B.1-231 - 100m Aquifer Concentration for CaseA All Pa-231 A_UA

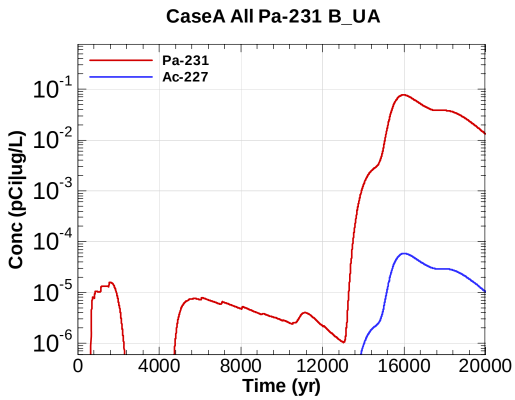

Figure B.1-232 - 100m Aquifer Concentration for CaseA All Pa-231 B_UA

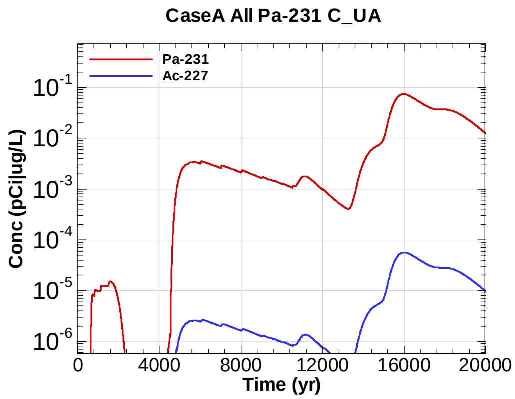

Figure B.1-233 - 100m Aquifer Concentration for CaseA All Pa-231 C_UA

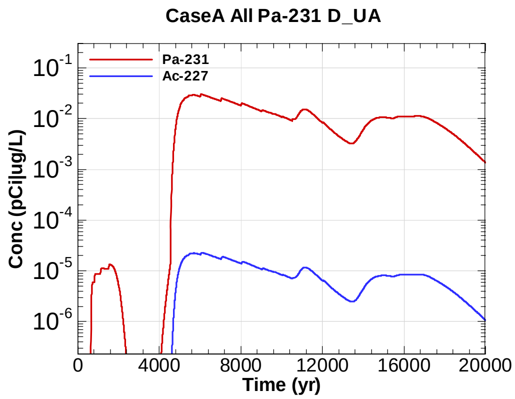

Figure B.1-234 - 100m Aquifer Concentration for CaseA All Pa-231 D_UA

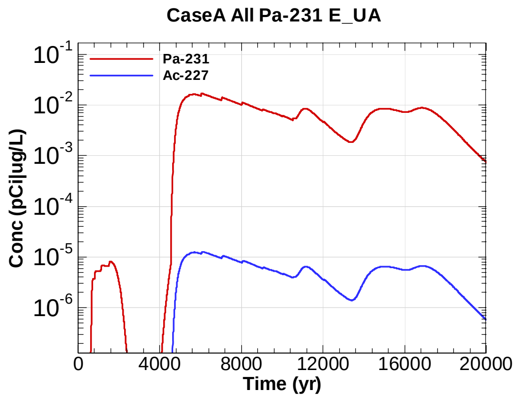

Figure B.1-235 - 100m Aquifer Concentration for CaseA All Pa-231 E_UA

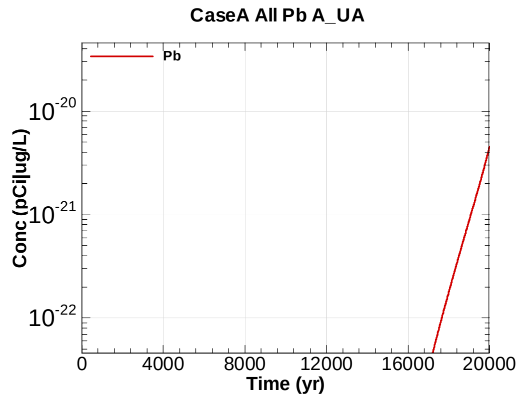

Figure B.1-236 - 100m Aquifer Concentration for CaseA All Pb A_UA

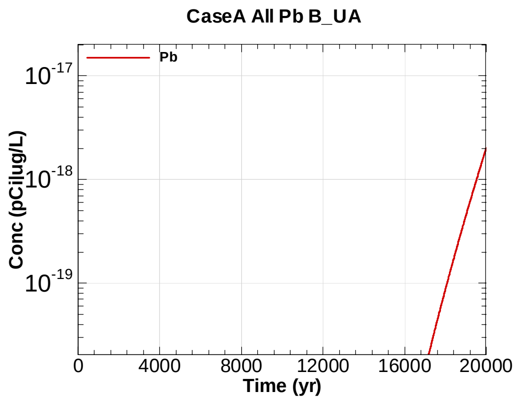

Figure B.1-237 - 100m Aquifer Concentration for CaseA All Pb B_UA

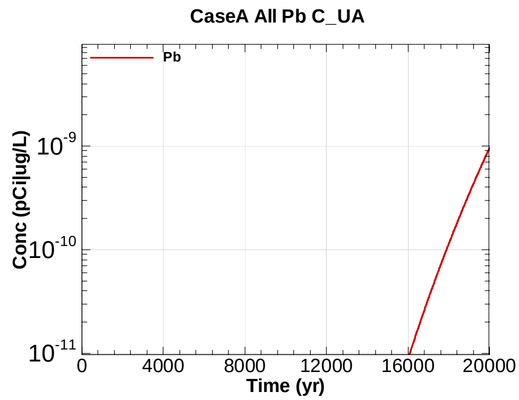

Figure B.1-238 - 100m Aquifer Concentration for CaseA All Pb C_UA

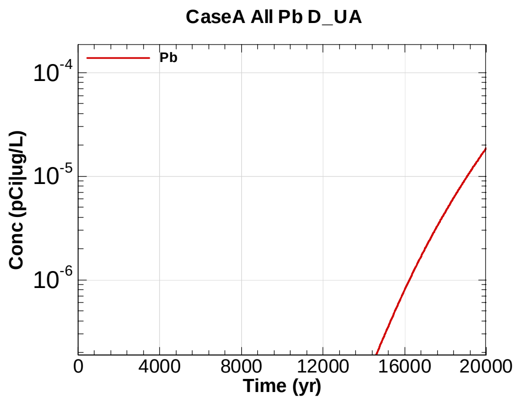

Figure B.1-239 - 100m Aquifer Concentration for CaseA All Pb D_UA

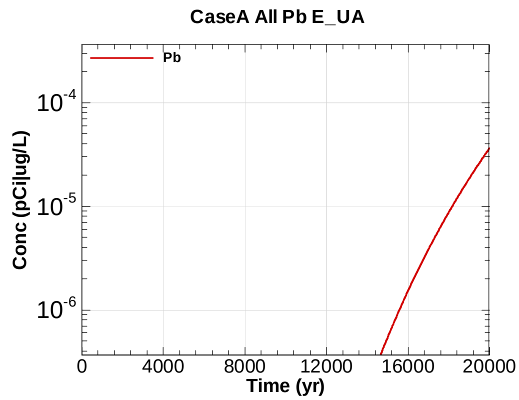

Figure B.1-240 - 100m Aquifer Concentration for CaseA All Pb E_UA

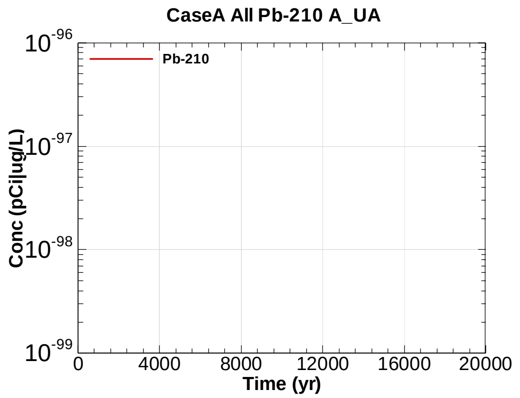

Figure B.1-241 - 100m Aquifer Concentration for CaseA All Pb-210 A_UA

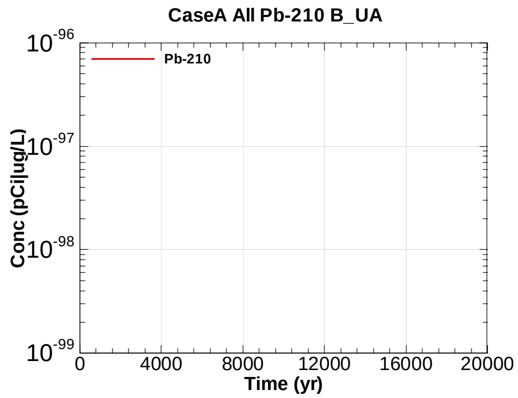

Figure B.1-242 - 100m Aquifer Concentration for CaseA All Pb-210 B_UA

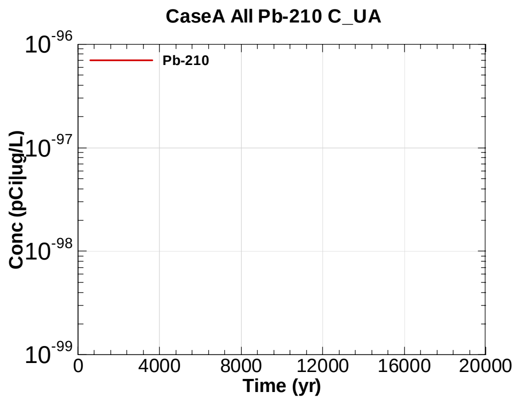

Figure B.1-243 - 100m Aquifer Concentration for CaseA All Pb-210 C_UA

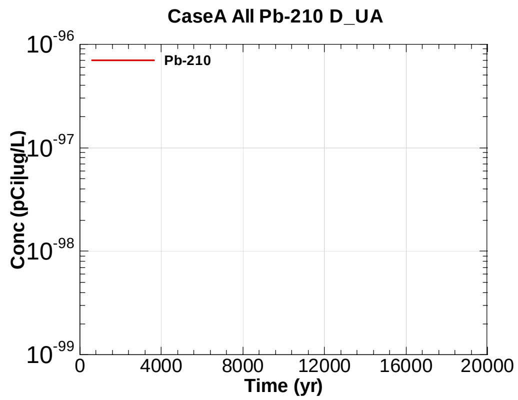

Figure B.1-244 - 100m Aquifer Concentration for CaseA All Pb-210 D_UA

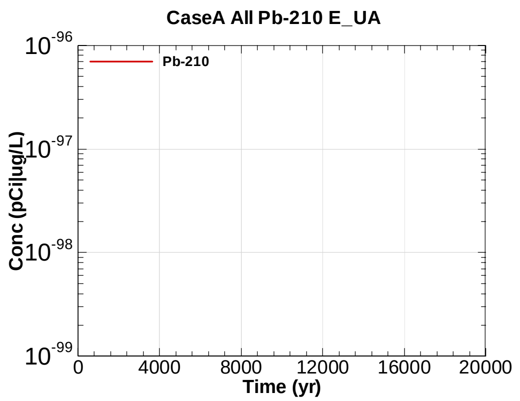

Figure B.1-245 - 100m Aquifer Concentration for CaseA All Pb-210 E_UA

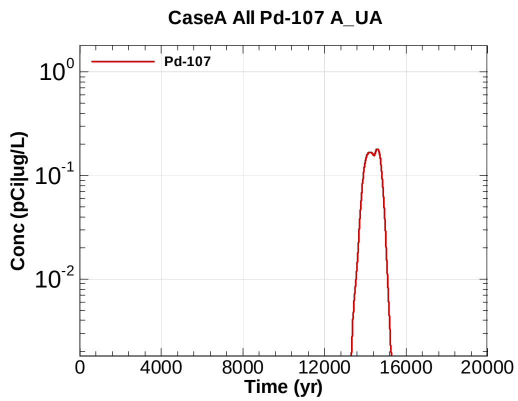

Figure B.1-246 - 100m Aquifer Concentration for CaseA All Pd-107 A_UA

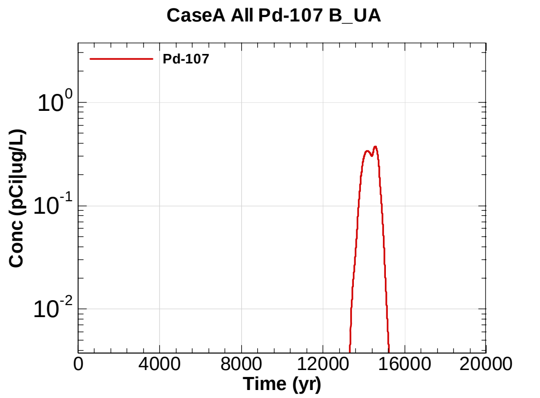

Figure B.1-247 - 100m Aquifer Concentration for CaseA All Pd-107 B_UA

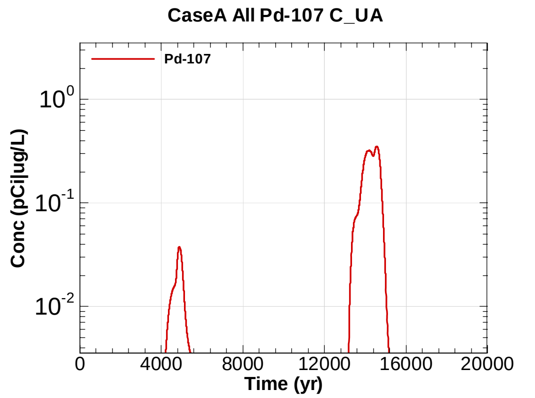

Figure B.1-248 - 100m Aquifer Concentration for CaseA All Pd-107 C_UA

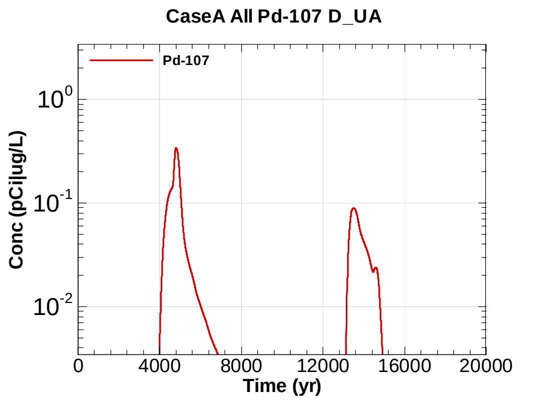

Figure B.1-249 - 100m Aquifer Concentration for CaseA All Pd-107 D_UA

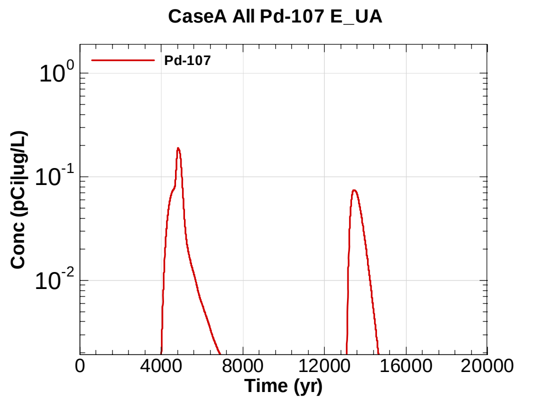

Figure B.1-250 - 100m Aquifer Concentration for CaseA All Pd-107 E_UA

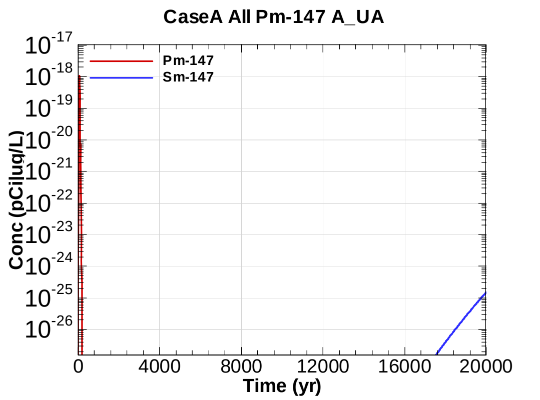

Figure B.1-251 - 100m Aquifer Concentration for CaseA All Pm-147 A_UA

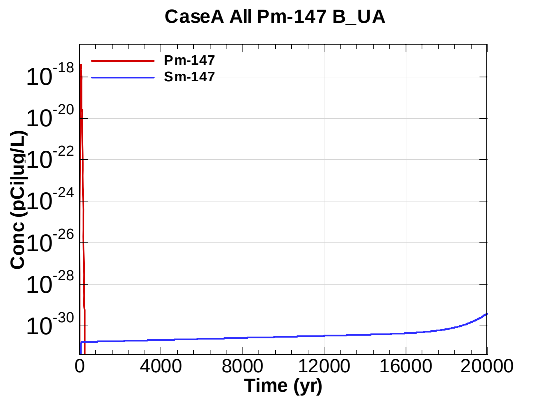

Figure B.1-252 - 100m Aquifer Concentration for CaseA All Pm-147 B_UA

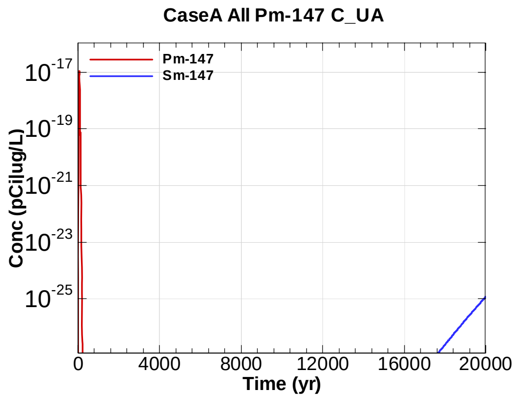

Figure B.1-253 - 100m Aquifer Concentration for CaseA All Pm-147 C_UA

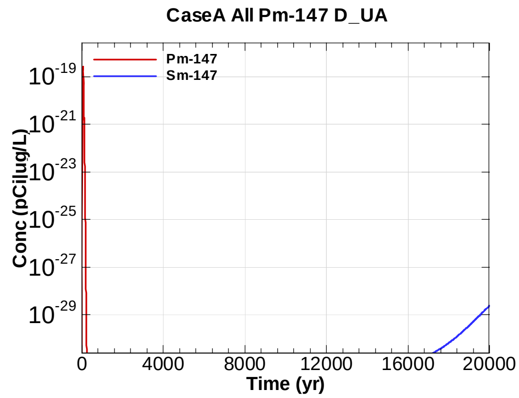

Figure B.1-254 - 100m Aquifer Concentration for CaseA All Pm-147 D_UA

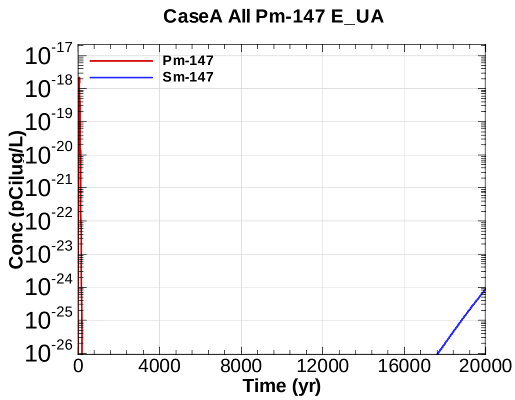

Figure B.1-255 - 100m Aquifer Concentration for CaseA All Pm-147 E_UA

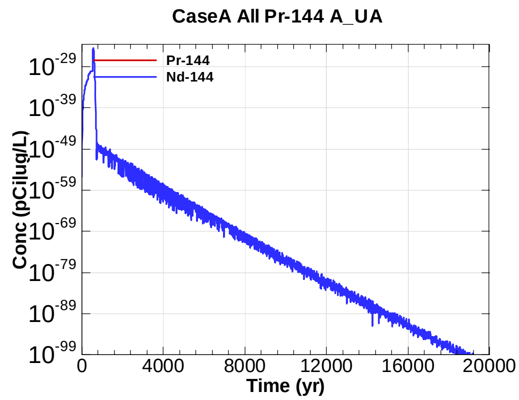

Figure B.1-256 - 100m Aquifer Concentration for CaseA All Pr-144 A_UA

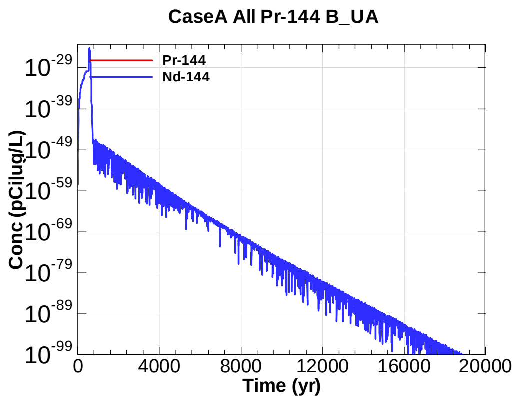

Figure B.1-257 - 100m Aquifer Concentration for CaseA All Pr-144 B_UA

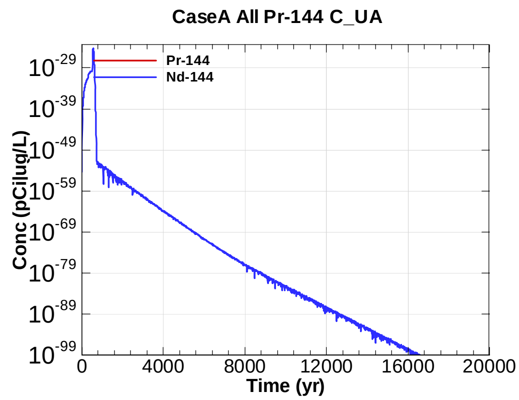

Figure B.1-258 - 100m Aquifer Concentration for CaseA All Pr-144 C_UA

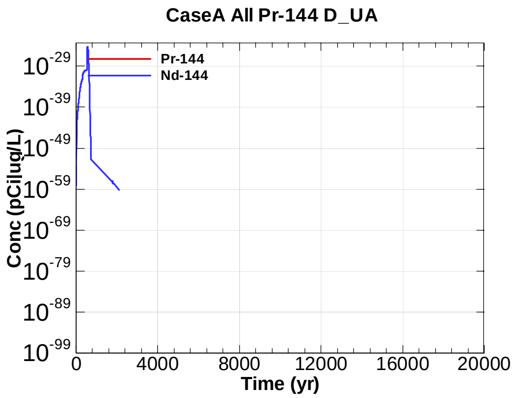

Figure B.1-259 - 100m Aquifer Concentration for CaseA All Pr-144 D_UA

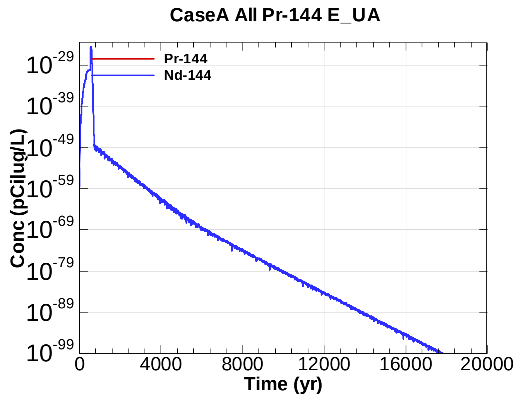

Figure B.1-260 - 100m Aquifer Concentration for CaseA All Pr-144 E_UA

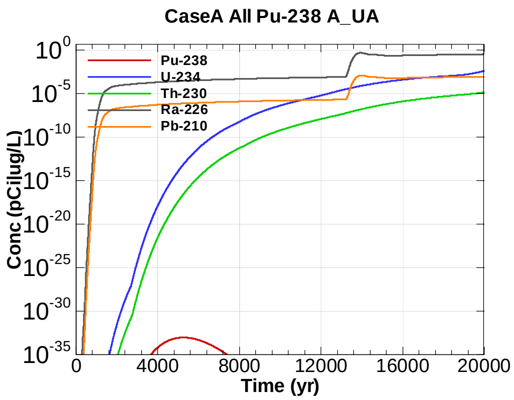

Figure B.1-261 - 100m Aquifer Concentration for CaseA All Pu-238 A_UA

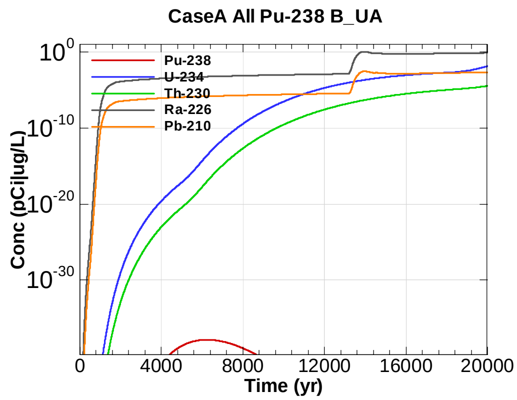

Figure B.1-262 - 100m Aquifer Concentration for CaseA All Pu-238 B_UA

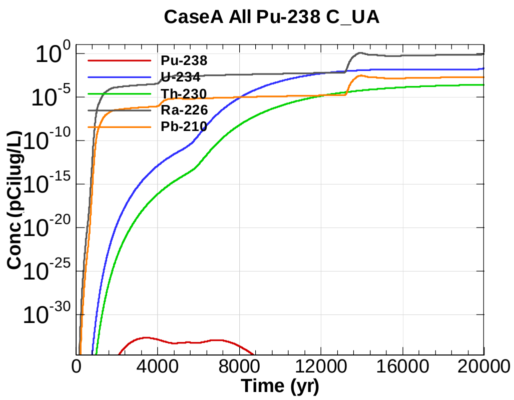

Figure B.1-263 - 100m Aquifer Concentration for CaseA All Pu-238 C_UA

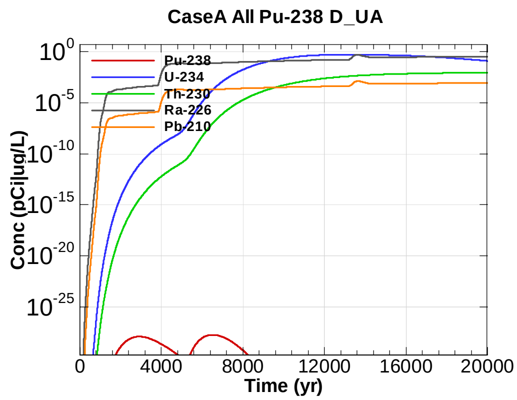

Figure B.1-264 - 100m Aquifer Concentration for CaseA All Pu-238 D_UA

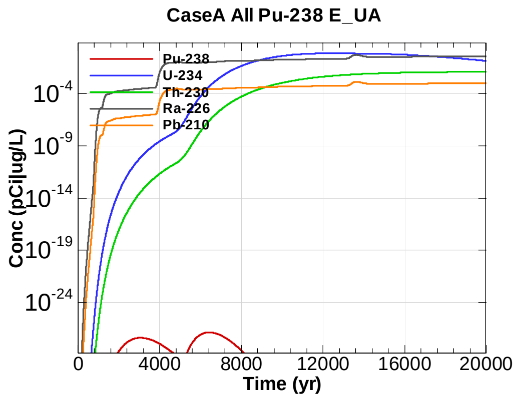

Figure B.1-265 - 100m Aquifer Concentration for CaseA All Pu-238 E_UA

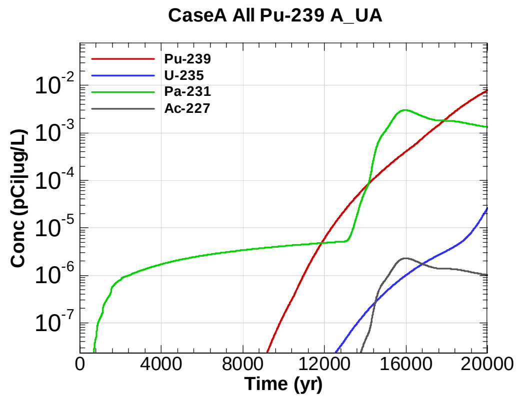

Figure B.1-266 - 100m Aquifer Concentration for CaseA All Pu-239 A_UA

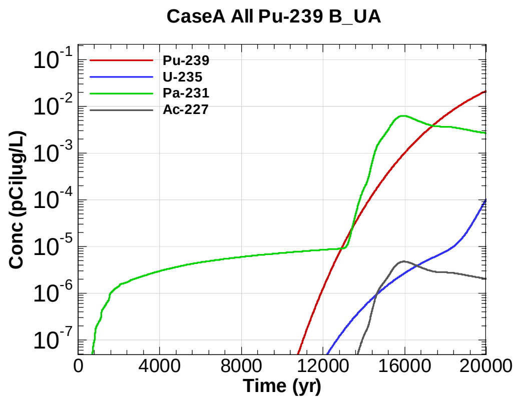

Figure B.1-267 - 100m Aquifer Concentration for CaseA All Pu-239 B_UA

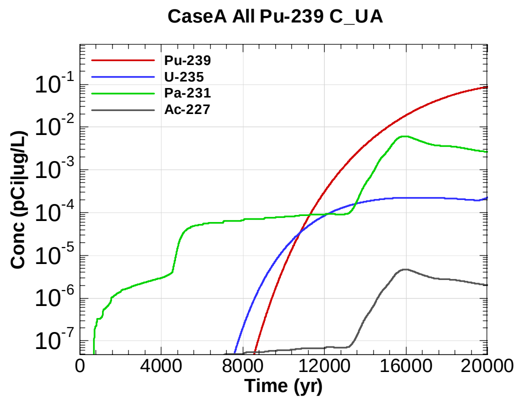

Figure B.1-268 - 100m Aquifer Concentration for CaseA All Pu-239 C_UA

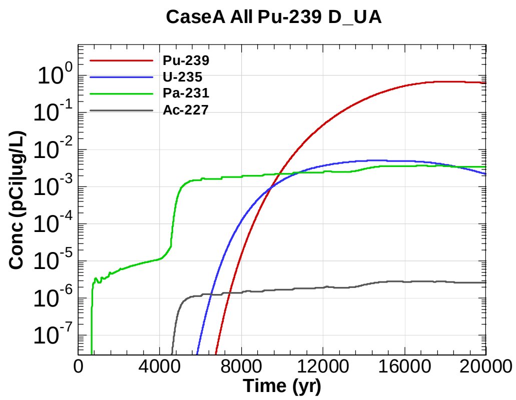

Figure B.1-269 - 100m Aquifer Concentration for CaseA All Pu-239 D_UA

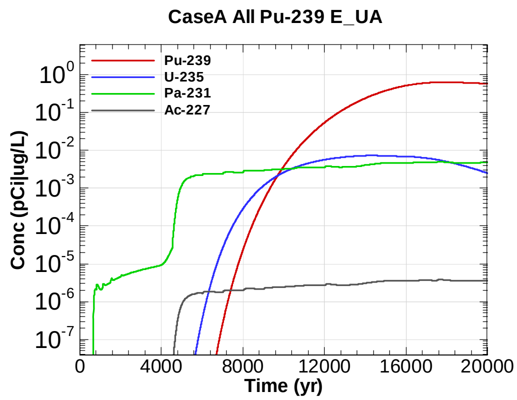

Figure B.1-270 - 100m Aquifer Concentration for CaseA All Pu-239 E_UA

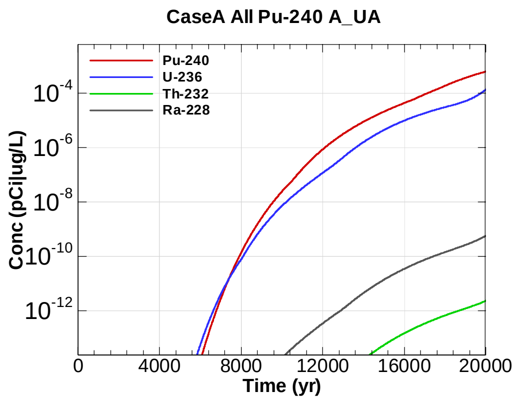

Figure B.1-271 - 100m Aquifer Concentration for CaseA All Pu-240 A_UA

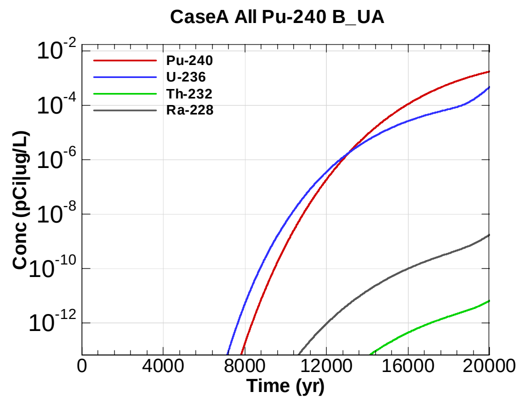

Figure B.1-272 - 100m Aquifer Concentration for CaseA All Pu-240 B_UA

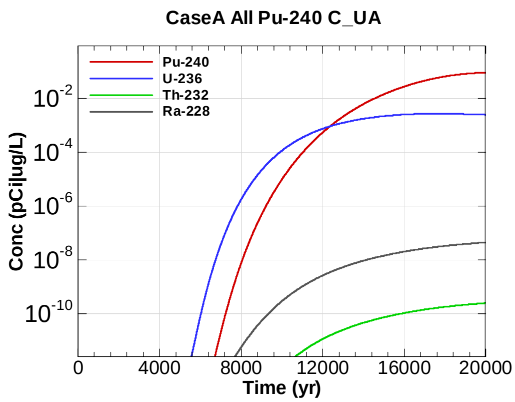

Figure B.1-273 - 100m Aquifer Concentration for CaseA All Pu-240 C_UA

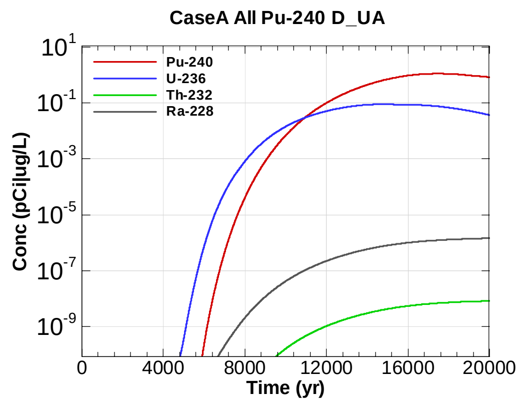

Figure B.1-274 - 100m Aquifer Concentration for CaseA All Pu-240 D_UA

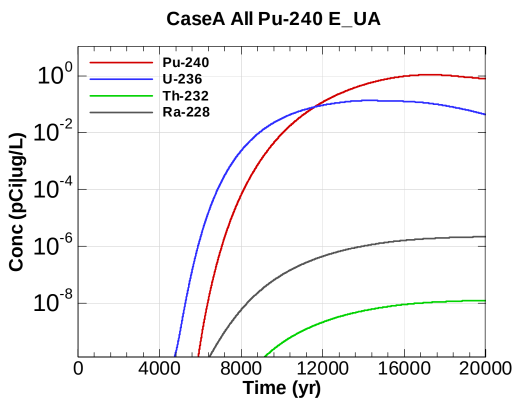

Figure B.1-275 - 100m Aquifer Concentration for CaseA All Pu-240 E_UA

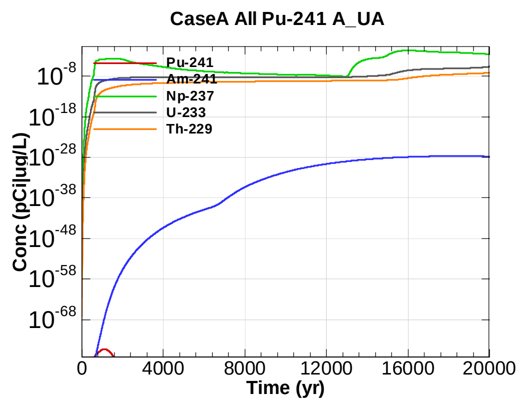

Figure B.1-276 - 100m Aquifer Concentration for CaseA All Pu-241 A_UA

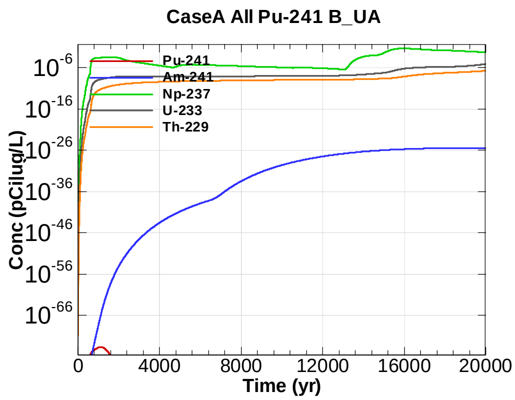

Figure B.1-277 - 100m Aquifer Concentration for CaseA All Pu-241 B_UA

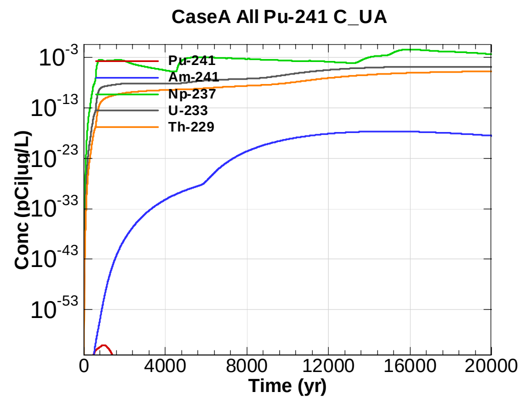

Figure B.1-278 - 100m Aquifer Concentration for CaseA All Pu-241 C_UA

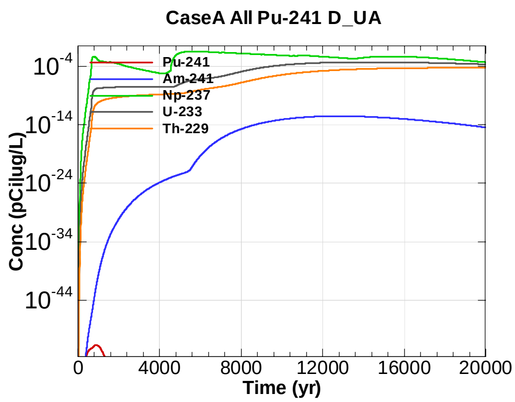

Figure B.1-279 - 100m Aquifer Concentration for CaseA All Pu-241 D_UA

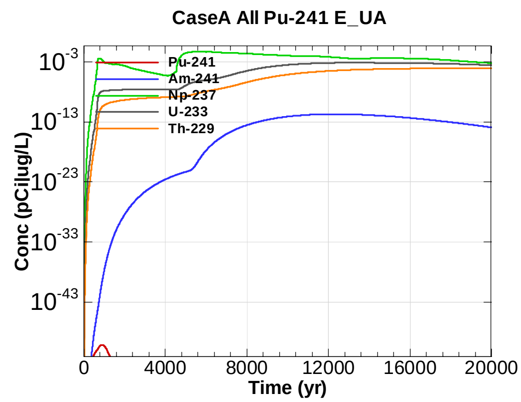

Figure B.1-280 - 100m Aquifer Concentration for CaseA All Pu-241 E_UA

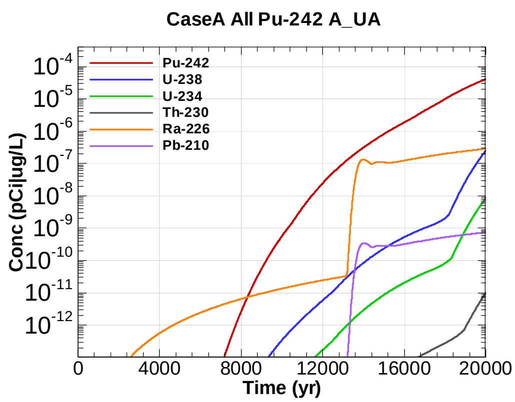

Figure B.1-281 - 100m Aquifer Concentration for CaseA All Pu-242 A_UA

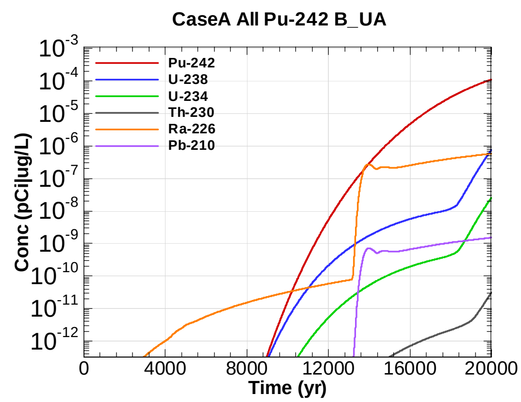

Figure B.1-282 - 100m Aquifer Concentration for CaseA All Pu-242 B_UA

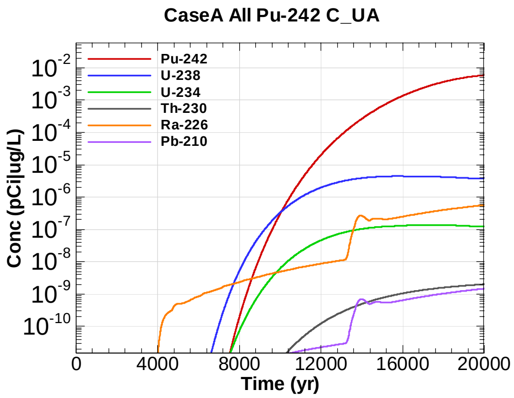

Figure B.1-283 - 100m Aquifer Concentration for CaseA All Pu-242 C_UA

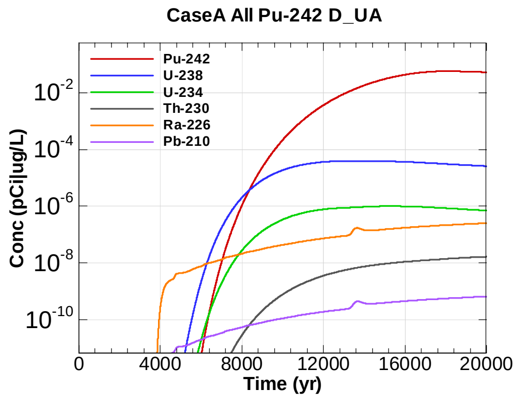

Figure B.1-284 - 100m Aquifer Concentration for CaseA All Pu-242 D_UA

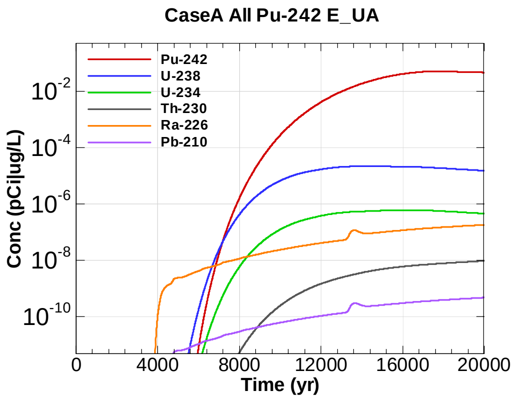

Figure B.1-285 - 100m Aquifer Concentration for CaseA All Pu-242 E_UA

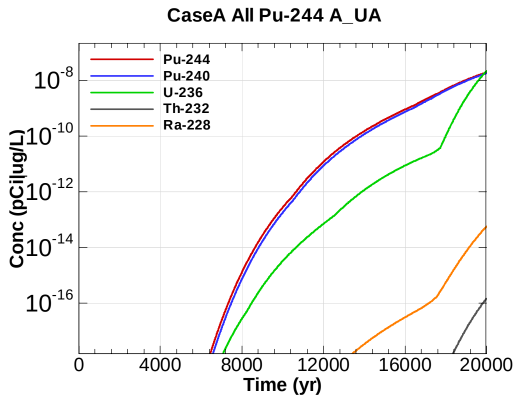

Figure B.1-286 - 100m Aquifer Concentration for CaseA All Pu-244 A_UA

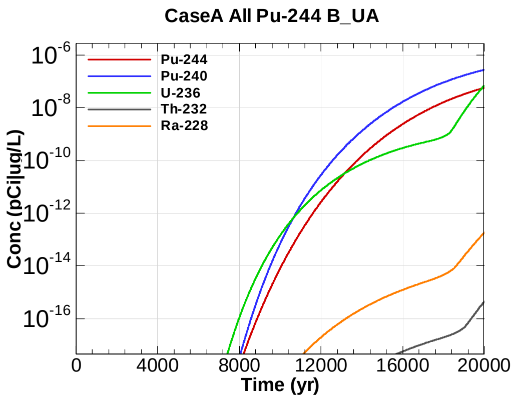

Figure B.1-287 - 100m Aquifer Concentration for CaseA All Pu-244 B_UA

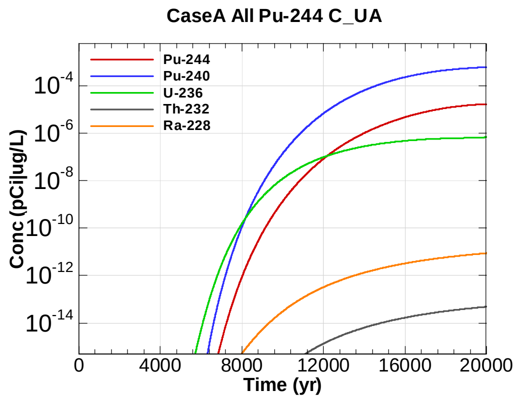

Figure B.1-288 - 100m Aquifer Concentration for CaseA All Pu-244 C_UA

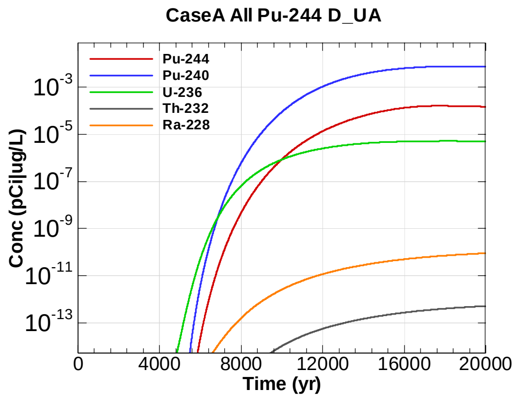

Figure B.1-289 - 100m Aquifer Concentration for CaseA All Pu-244 D_UA

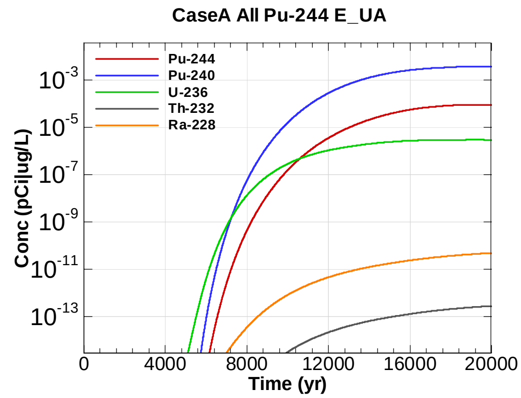

Figure B.1-290 - 100m Aquifer Concentration for CaseA All Pu-244 E_UA

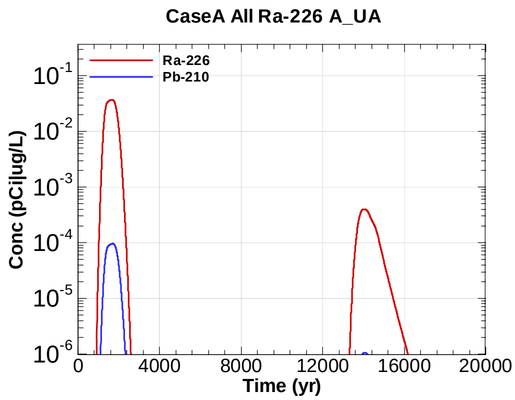

Figure B.1-291 - 100m Aquifer Concentration for CaseA All Ra-226 A_UA

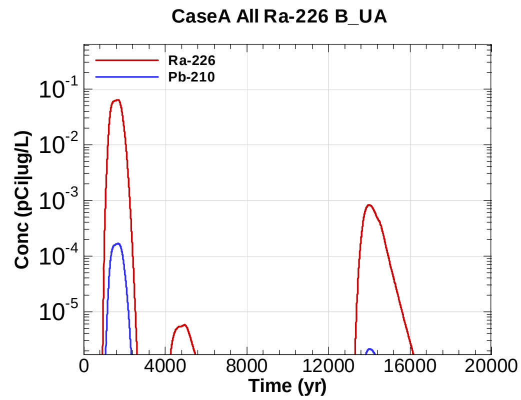

Figure B.1-292 - 100m Aquifer Concentration for CaseA All Ra-226 B_UA

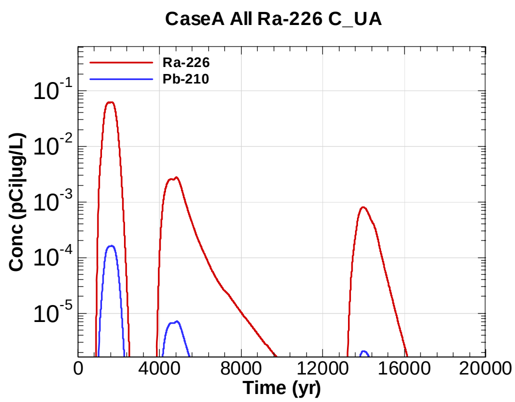

Figure B.1-293 - 100m Aquifer Concentration for CaseA All Ra-226 C_UA

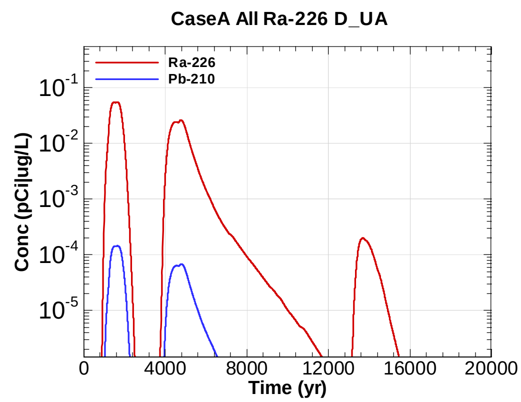

Figure B.1-294 - 100m Aquifer Concentration for CaseA All Ra-226 D_UA

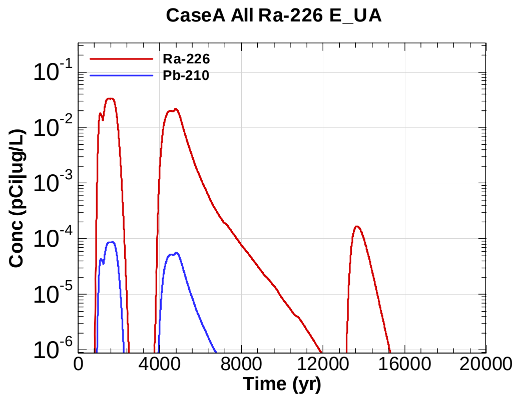

Figure B.1-295 - 100m Aquifer Concentration for CaseA All Ra-226 E_UA

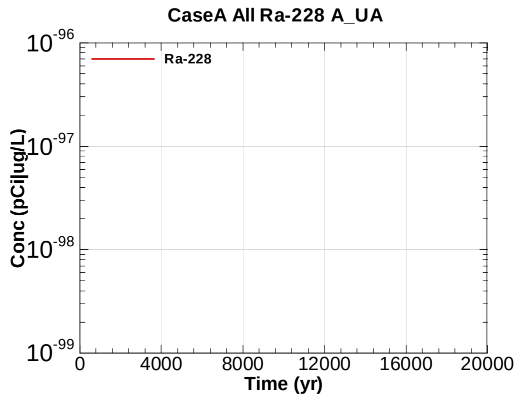

Figure B.1-296 - 100m Aquifer Concentration for CaseA All Ra-228 A_UA

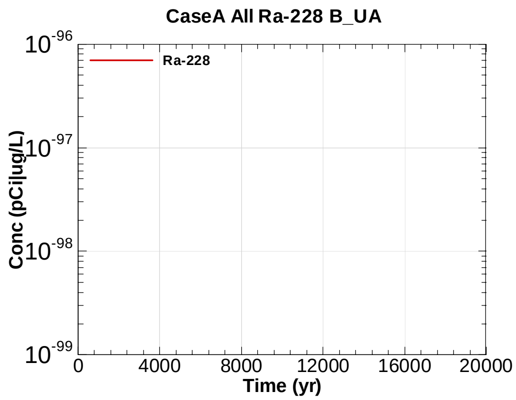

Figure B.1-297 - 100m Aquifer Concentration for CaseA All Ra-228 B_UA

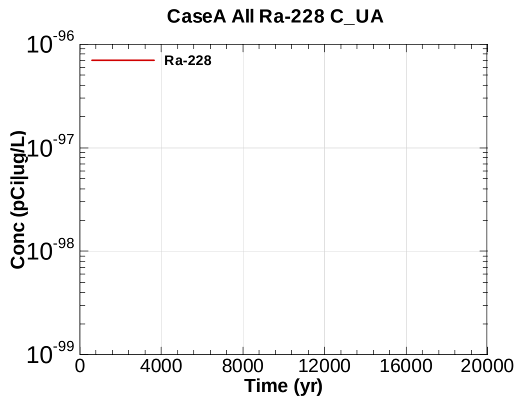

Figure B.1-298 - 100m Aquifer Concentration for CaseA All Ra-228 C_UA

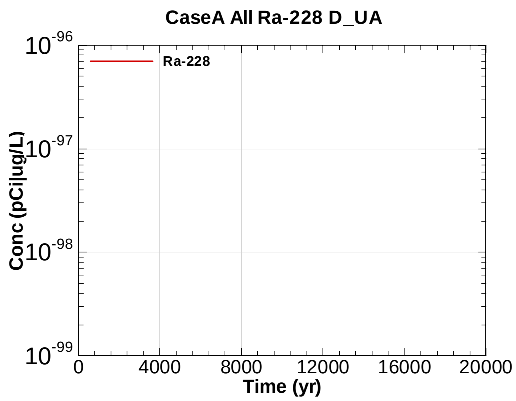

Figure B.1-299 - 100m Aquifer Concentration for CaseA All Ra-228 D_UA

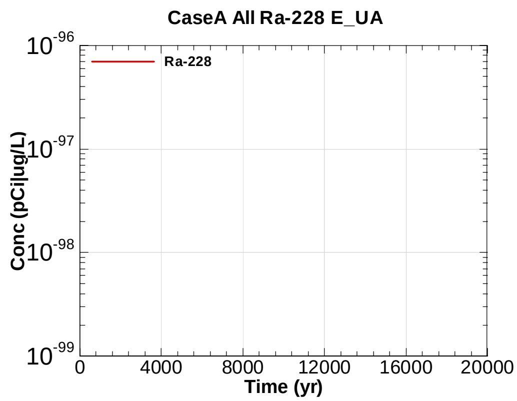

Figure B.1-300 - 100m Aquifer Concentration for CaseA All Ra-228 E_UA

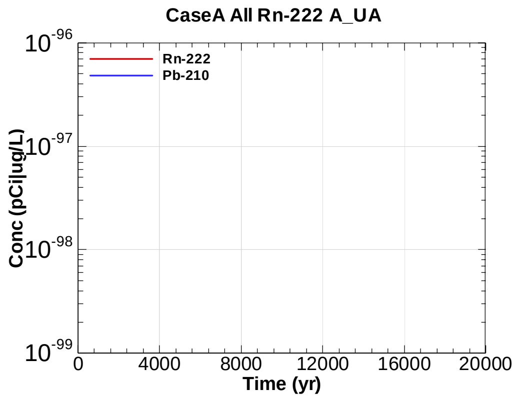

Figure B.1-301 - 100m Aquifer Concentration for CaseA All Rn-222 A_UA

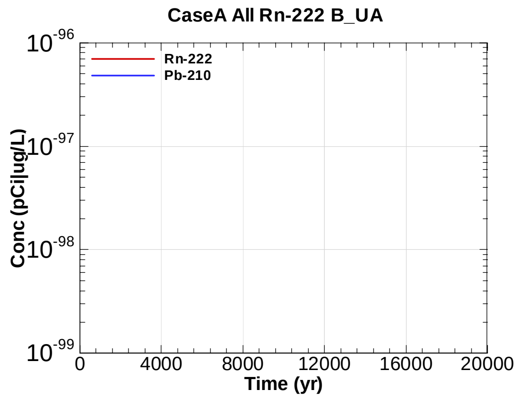

Figure B.1-302 - 100m Aquifer Concentration for CaseA All Rn-222 B_UA

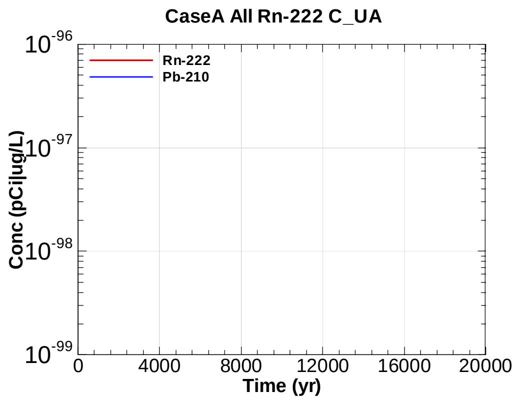

Figure B.1-303 - 100m Aquifer Concentration for CaseA All Rn-222 C_UA

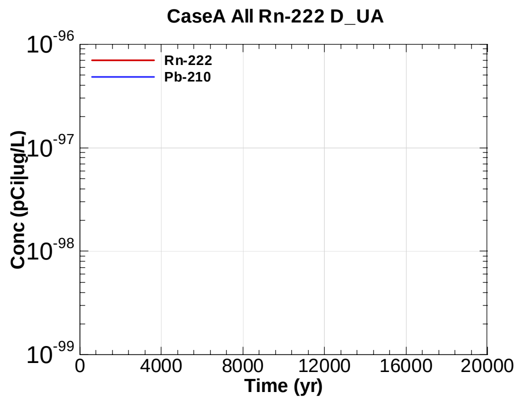

Figure B.1-304 - 100m Aquifer Concentration for CaseA All Rn-222 D_UA

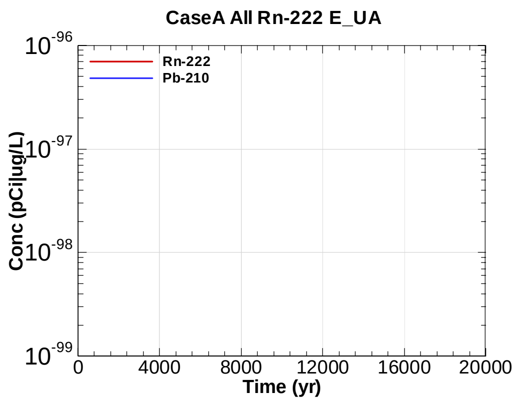

Figure B.1-305 - 100m Aquifer Concentration for CaseA All Rn-222 E_UA

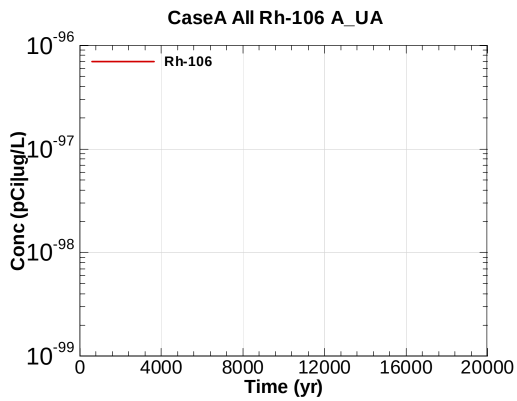

Figure B.1-306 - 100m Aquifer Concentration for CaseA All Rh-106 A_UA

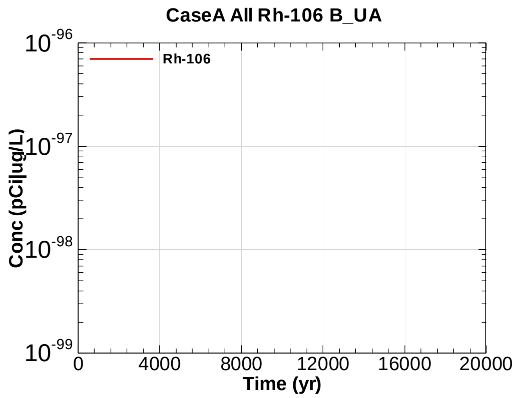

Figure B.1-307 - 100m Aquifer Concentration for CaseA All Rh-106 B_UA

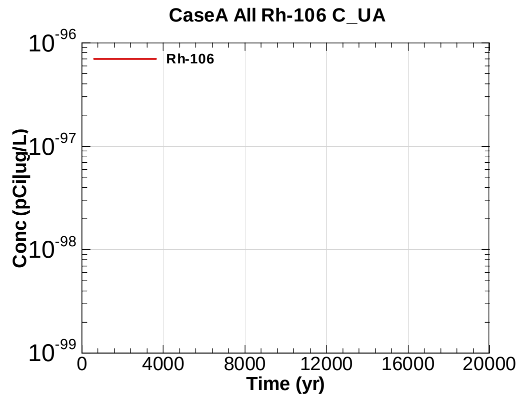

Figure B.1-308 - 100m Aquifer Concentration for CaseA All Rh-106 C_UA

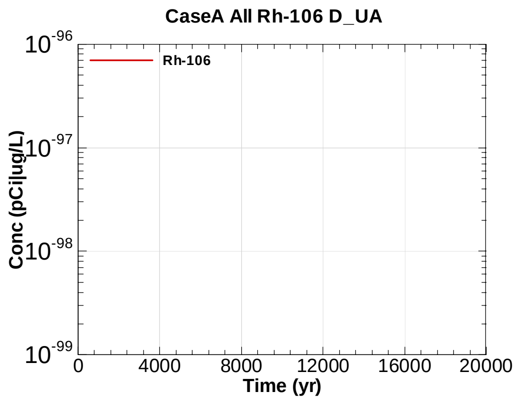

Figure B.1-309 - 100m Aquifer Concentration for CaseA All Rh-106 D_UA

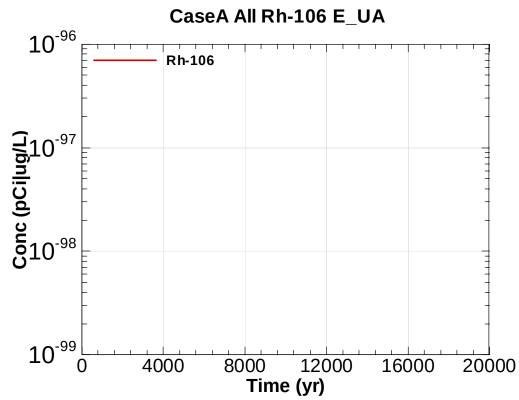

Figure B.1-310 - 100m Aquifer Concentration for CaseA All Rh-106 E_UA

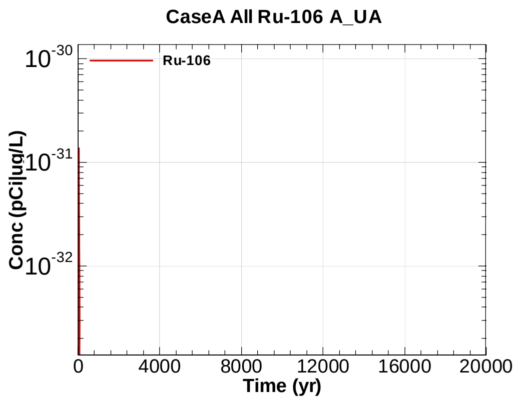

Figure B.1-311 - 100m Aquifer Concentration for CaseA All Ru-106 A_UA

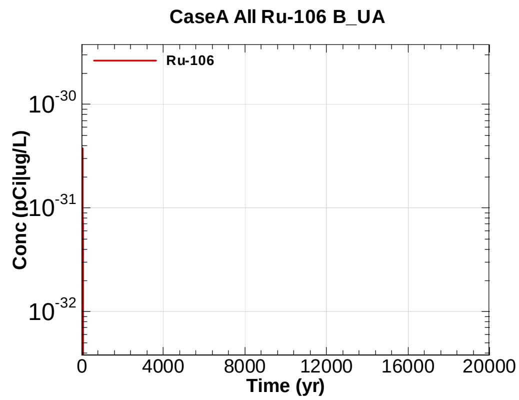

Figure B.1-312 - 100m Aquifer Concentration for CaseA All Ru-106 B_UA

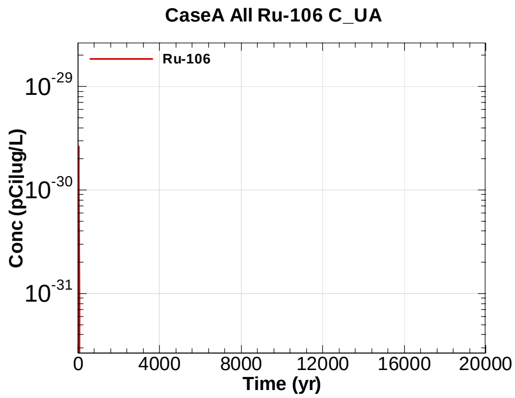

Figure B.1-313 - 100m Aquifer Concentration for CaseA All Ru-106 C_UA

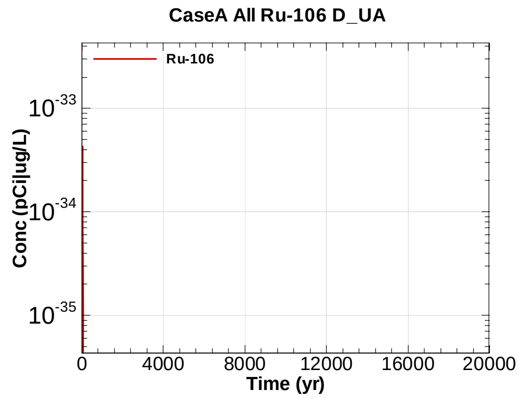

Figure B.1-314 - 100m Aquifer Concentration for CaseA All Ru-106 D_UA

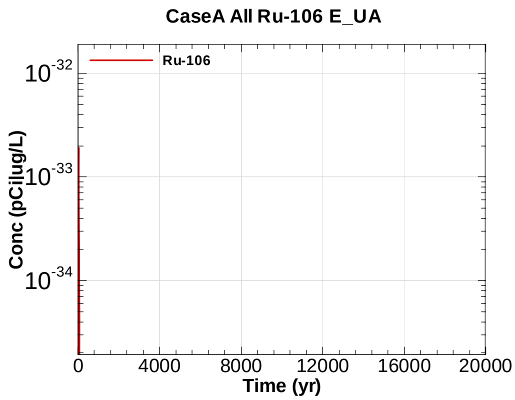

Figure B.1-315 - 100m Aquifer Concentration for CaseA All Ru-106 E_UA

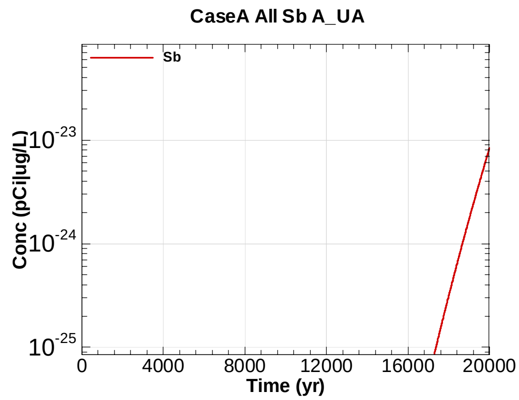

Figure B.1-316 - 100m Aquifer Concentration for CaseA All Sb A_UA

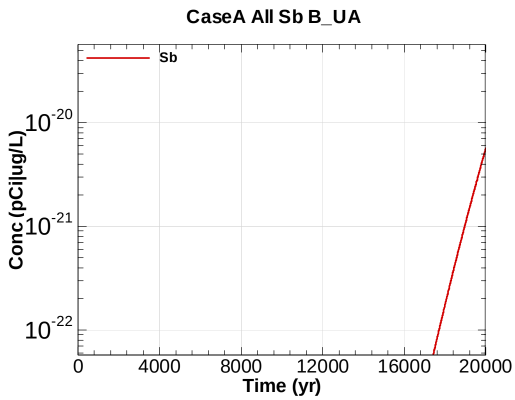

Figure B.1-317 - 100m Aquifer Concentration for CaseA All Sb B_UA

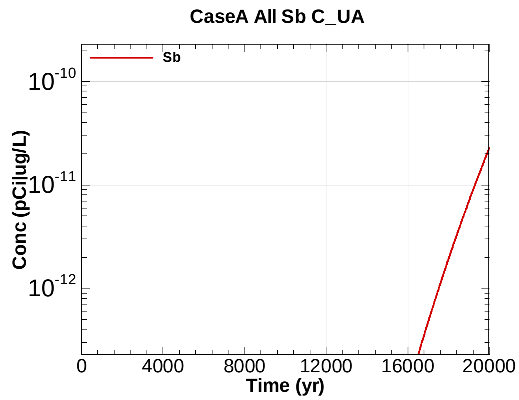

Figure B.1-318 - 100m Aquifer Concentration for CaseA All Sb C_UA

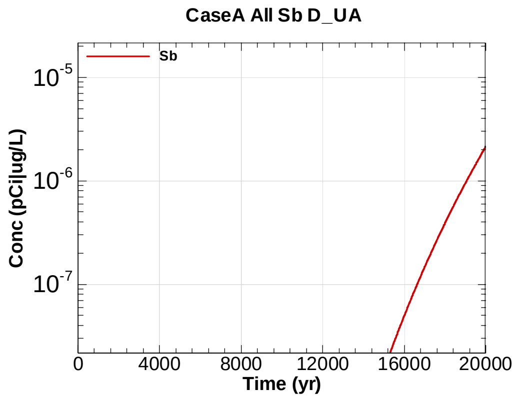

Figure B.1-319 - 100m Aquifer Concentration for CaseA All Sb D_UA

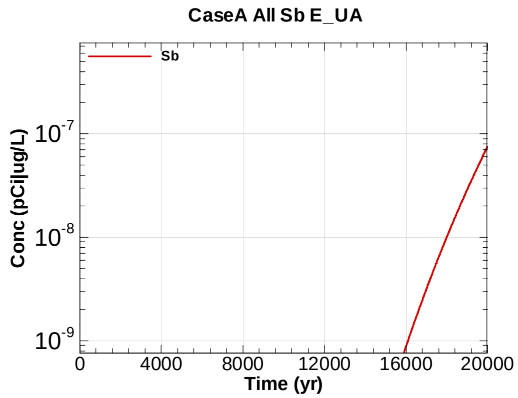

Figure B.1-320 - 100m Aquifer Concentration for CaseA All Sb E_UA

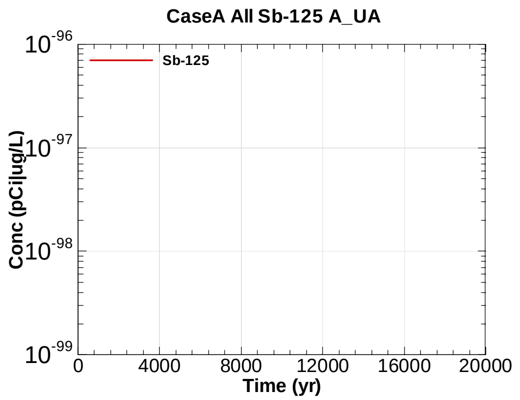

Figure B.1-321 - 100m Aquifer Concentration for CaseA All Sb-125 A_UA

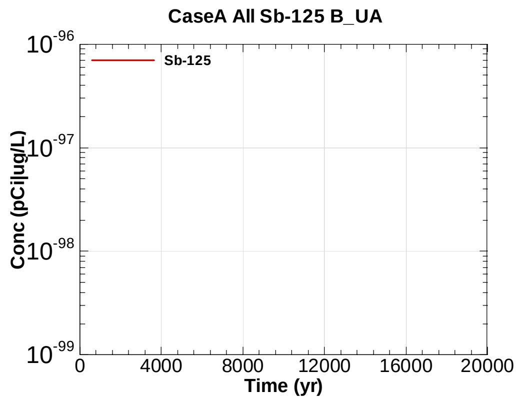

Figure B.1-322 - 100m Aquifer Concentration for CaseA All Sb-125 B_UA

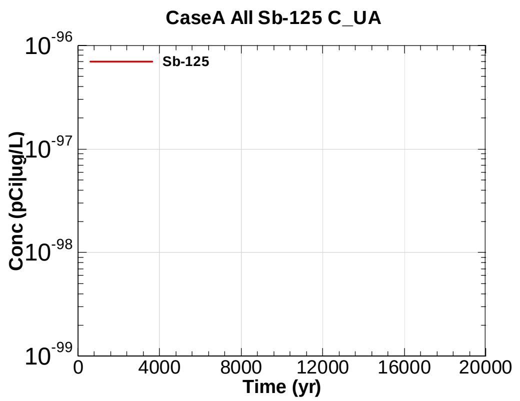

Figure B.1-323 - 100m Aquifer Concentration for CaseA All Sb-125 C_UA

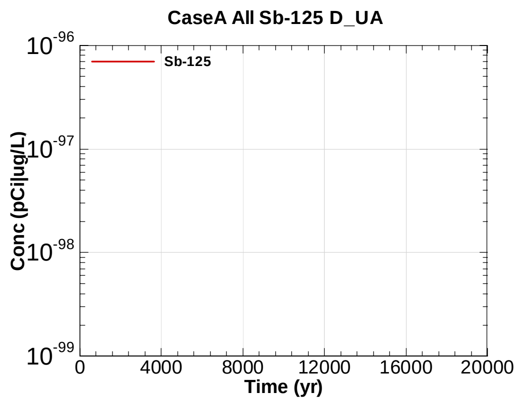

Figure B.1-324 - 100m Aquifer Concentration for CaseA All Sb-125 D_UA

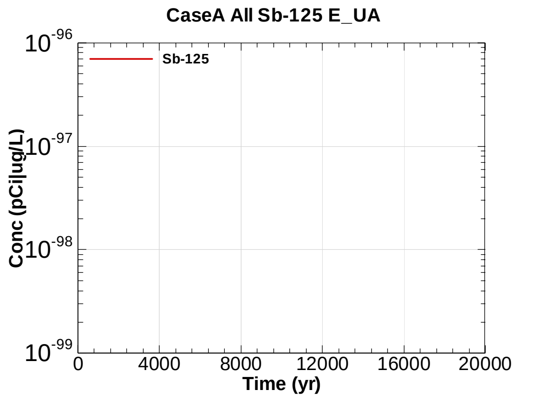

Figure B.1-325 - 100m Aquifer Concentration for CaseA All Sb-125 E_UA

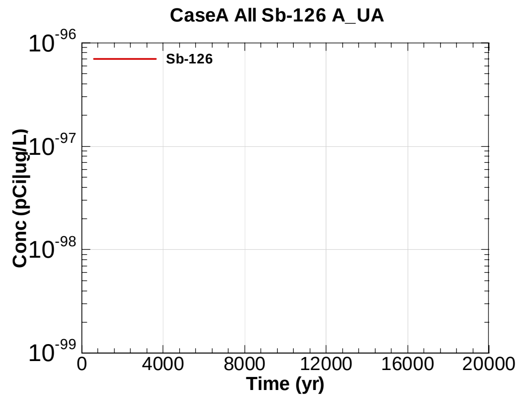

Figure B.1-326 - 100m Aquifer Concentration for CaseA All Sb-126 A_UA

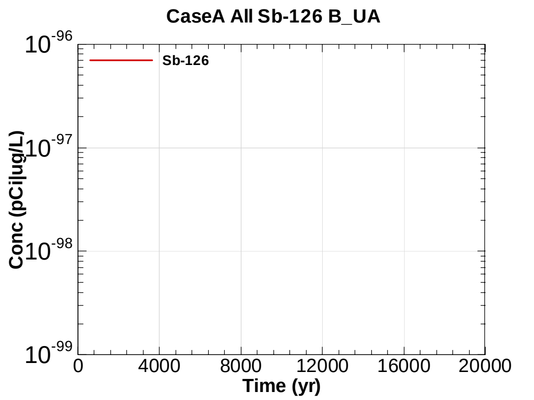

Figure B.1-327 - 100m Aquifer Concentration for CaseA All Sb-126 B_UA

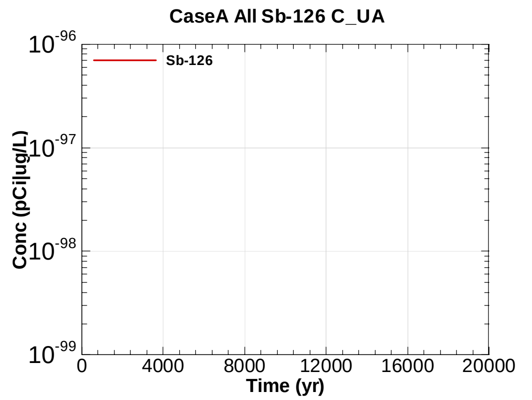

Figure B.1-328 - 100m Aquifer Concentration for CaseA All Sb-126 C_UA

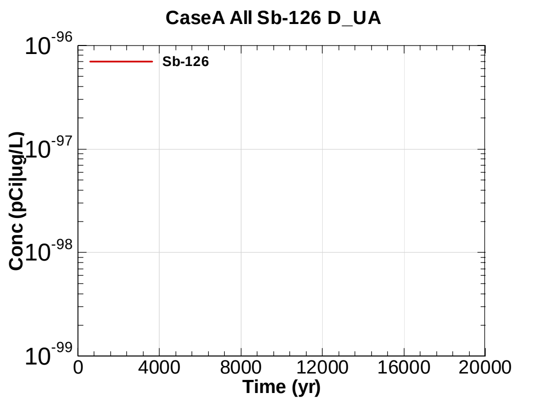

Figure B.1-329 - 100m Aquifer Concentration for CaseA All Sb-126 D_UA

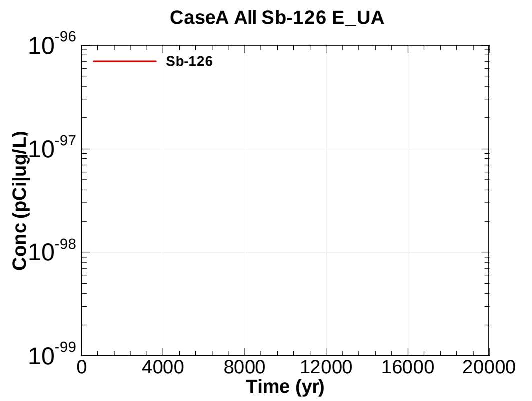

Figure B.1-330 - 100m Aquifer Concentration for CaseA All Sb-126 E_UA

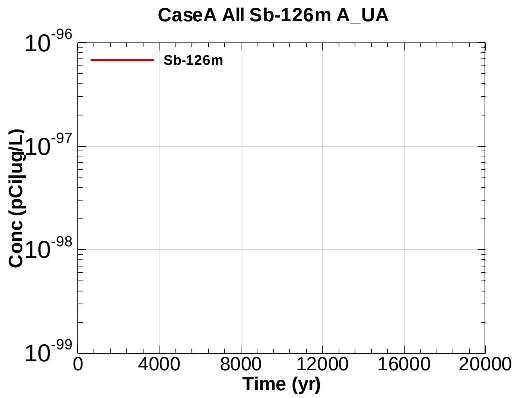

Figure B.1-331 - 100m Aquifer Concentration for CaseA All Sb-126m A_UA

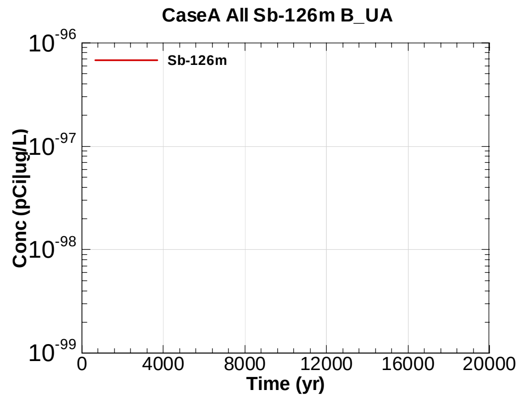

Figure B.1-332 - 100m Aquifer Concentration for CaseA All Sb-126m B_UA

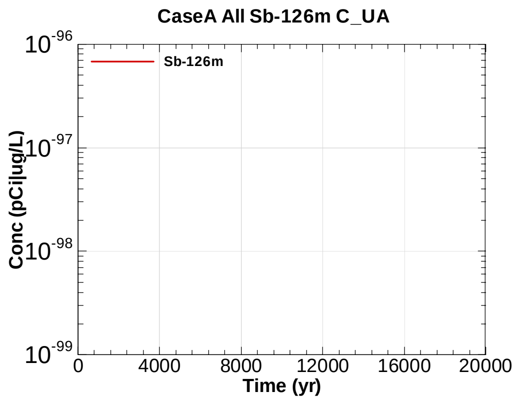

Figure B.1-333 - 100m Aquifer Concentration for CaseA All Sb-126m C_UA

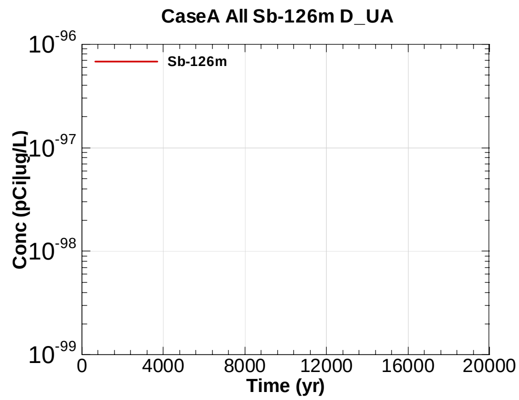

Figure B.1-334 - 100m Aquifer Concentration for CaseA All Sb-126m D_UA

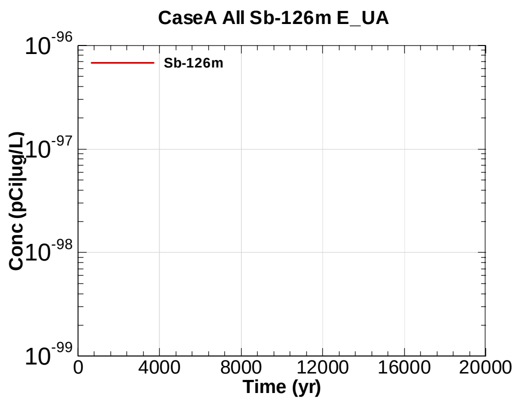

Figure B.1-335 - 100m Aquifer Concentration for CaseA All Sb-126m E_UA

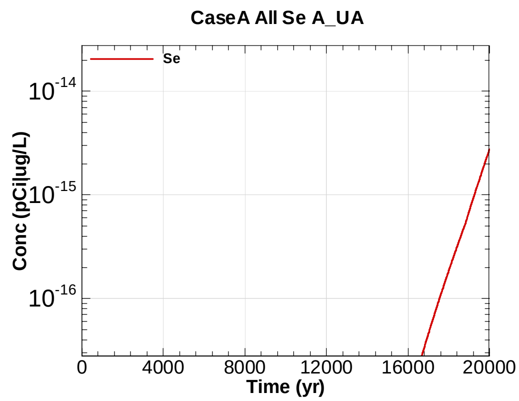

Figure B.1-336 - 100m Aquifer Concentration for CaseA All Se A_UA

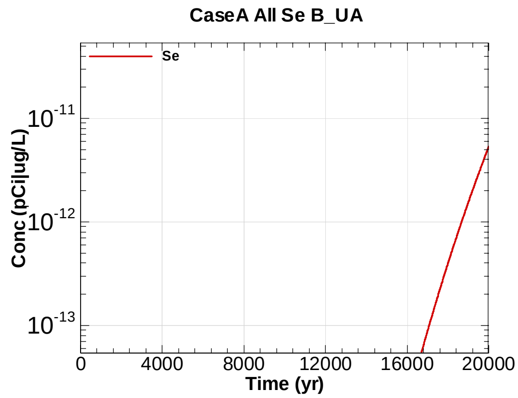

Figure B.1-337 - 100m Aquifer Concentration for CaseA All Se B_UA

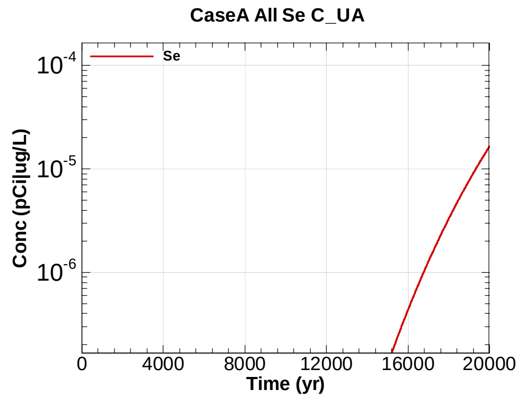

Figure B.1-338 - 100m Aquifer Concentration for CaseA All Se C_UA

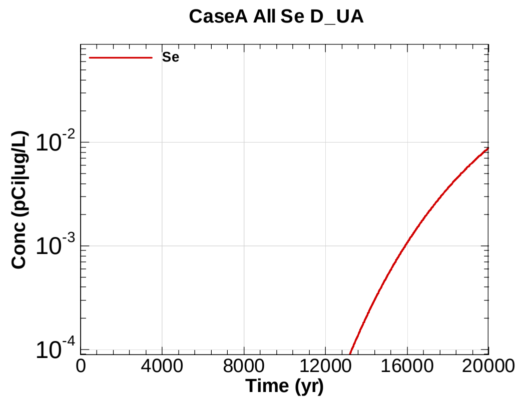

Figure B.1-339 - 100m Aquifer Concentration for CaseA All Se D_UA

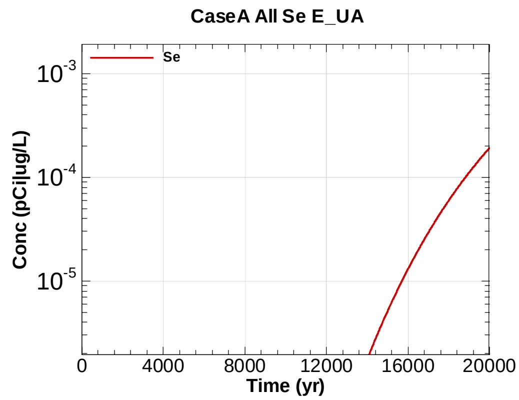

Figure B.1-340 - 100m Aquifer Concentration for CaseA All Se E_UA

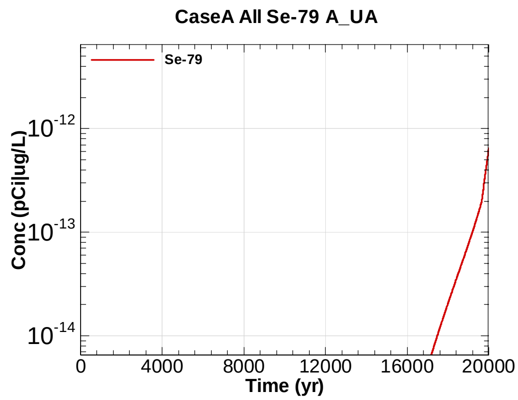

Figure B.1-341 - 100m Aquifer Concentration for CaseA All Se-79 A_UA

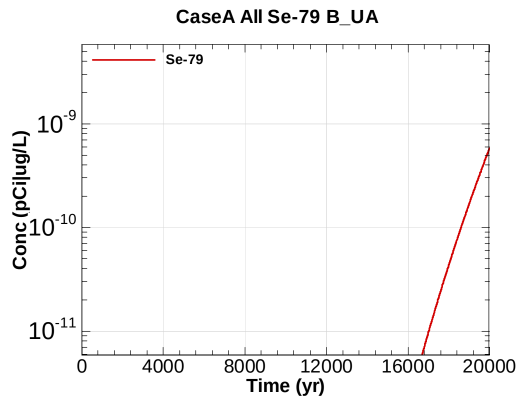

Figure B.1-342 - 100m Aquifer Concentration for CaseA All Se-79 B_UA

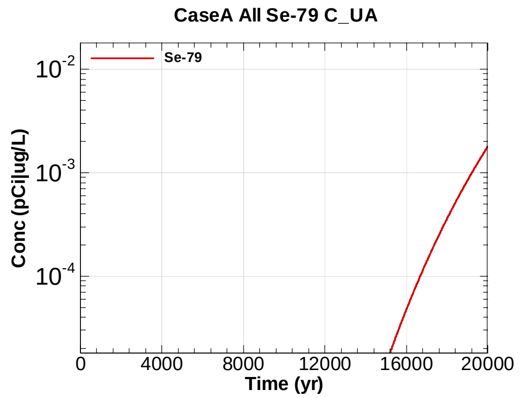

Figure B.1-343 - 100m Aquifer Concentration for CaseA All Se-79 C_UA

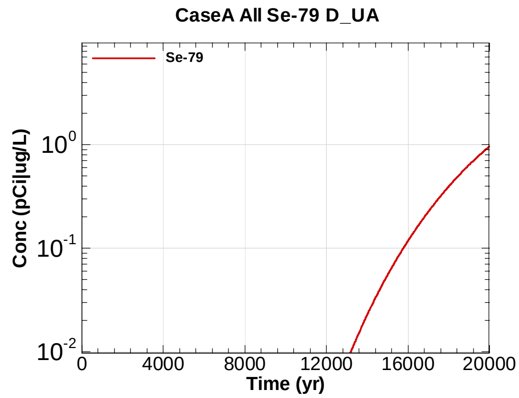

Figure B.1-344 - 100m Aquifer Concentration for CaseA All Se-79 D_UA

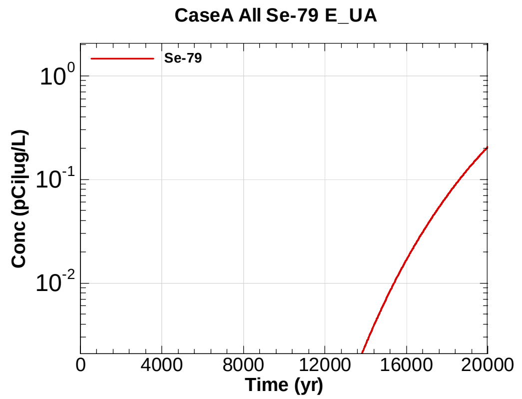

Figure B.1-345 - 100m Aquifer Concentration for CaseA All Se-79 E_UA

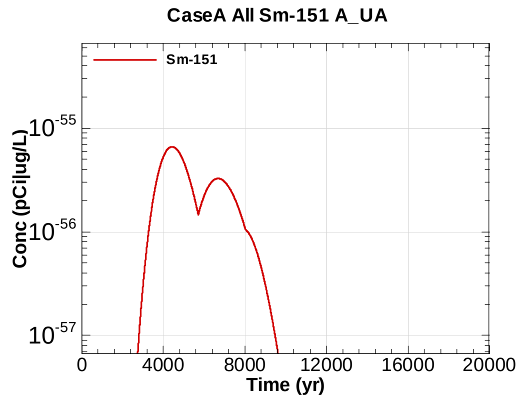

Figure B.1-346 - 100m Aquifer Concentration for CaseA All Sm-151 A_UA

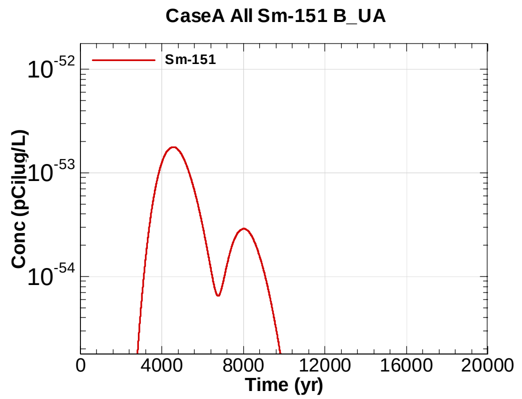

Figure B.1-347 - 100m Aquifer Concentration for CaseA All Sm-151 B_UA

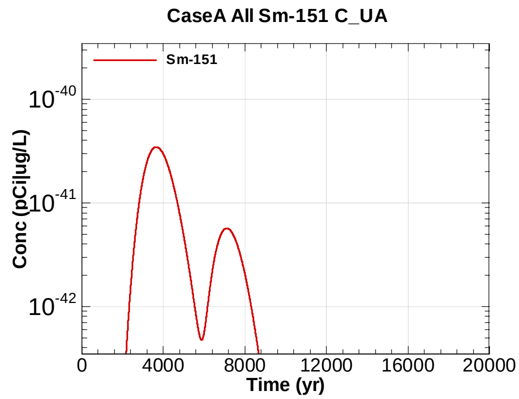

Figure B.1-348 - 100m Aquifer Concentration for CaseA All Sm-151 C_UA

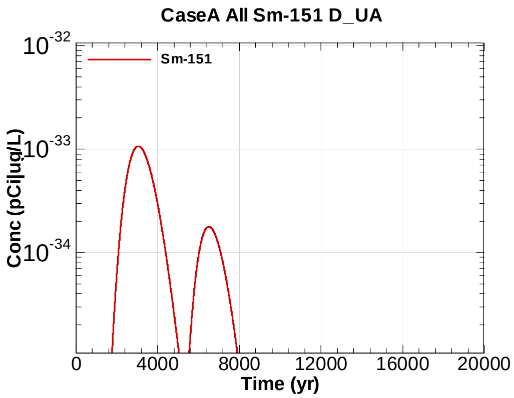

Figure B.1-349 - 100m Aquifer Concentration for CaseA All Sm-151 D_UA

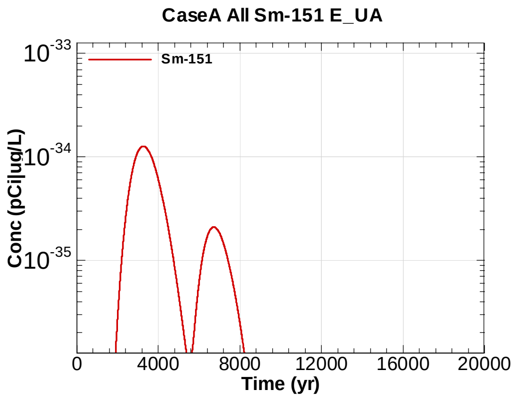

Figure B.1-350 - 100m Aquifer Concentration for CaseA All Sm-151 E_UA

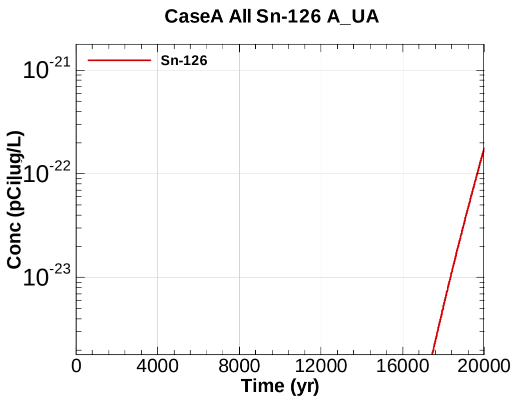

Figure B.1-351 - 100m Aquifer Concentration for CaseA All Sn-126 A_UA

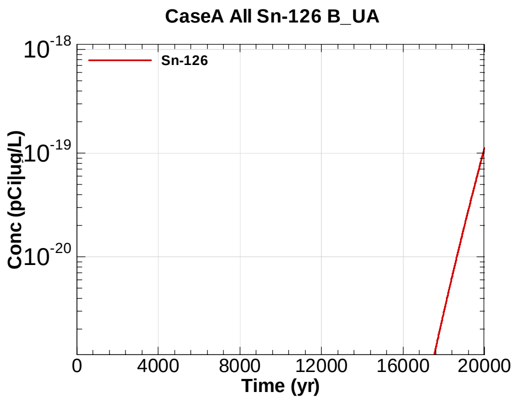

Figure B.1-352 - 100m Aquifer Concentration for CaseA All Sn-126 B_UA

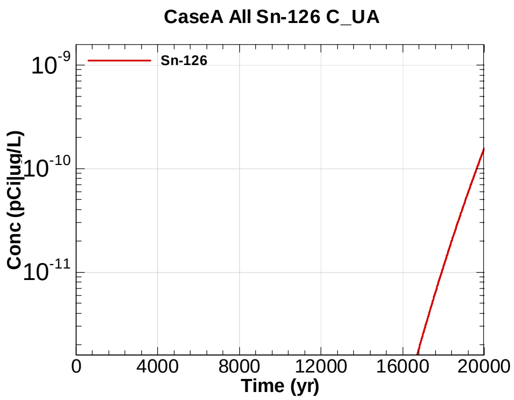

Figure B.1-353 - 100m Aquifer Concentration for CaseA All Sn-126 C_UA

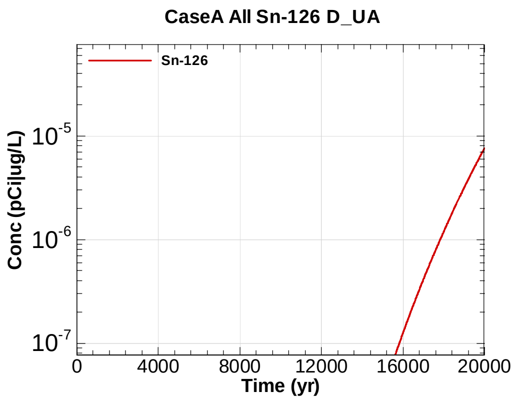

Figure B.1-354 - 100m Aquifer Concentration for CaseA All Sn-126 D_UA

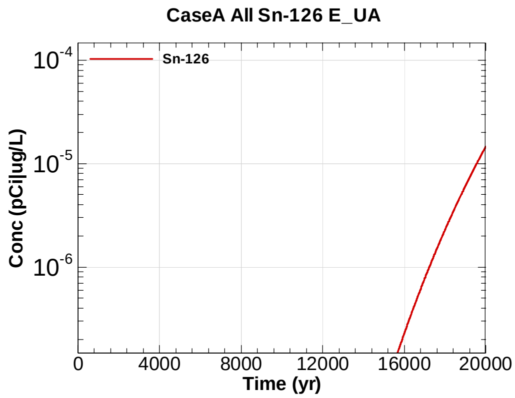

Figure B.1-355 - 100m Aquifer Concentration for CaseA All Sn-126 E_UA

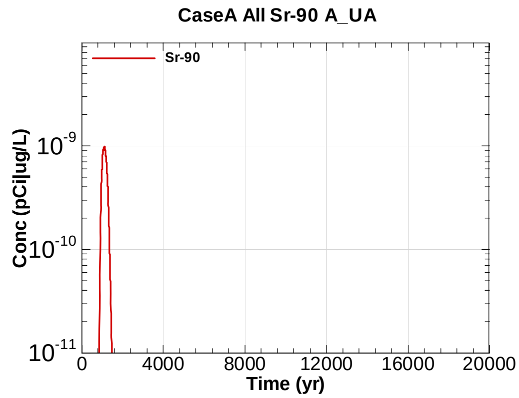

Figure B.1-356 - 100m Aquifer Concentration for CaseA All Sr-90 A_UA

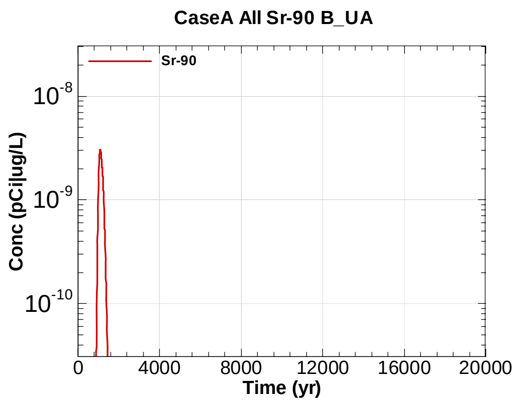

Figure B.1-357 - 100m Aquifer Concentration for CaseA All Sr-90 B_UA

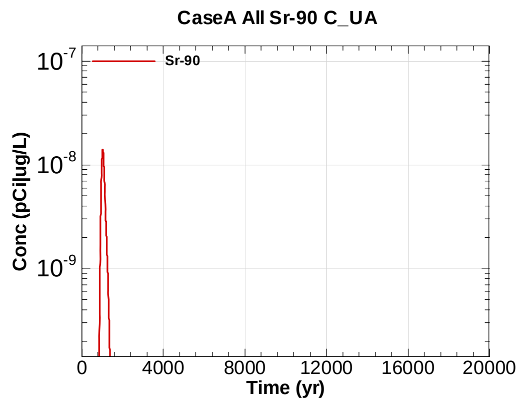

Figure B.1-358 - 100m Aquifer Concentration for CaseA All Sr-90 C_UA

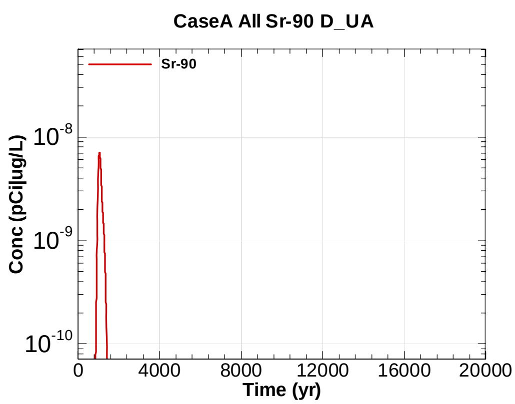

Figure B.1-359 - 100m Aquifer Concentration for CaseA All Sr-90 D_UA

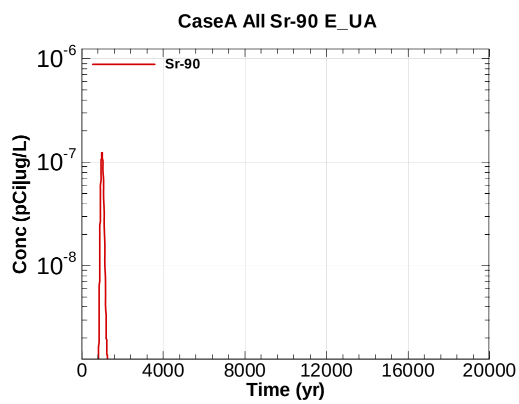

Figure B.1-360 - 100m Aquifer Concentration for CaseA All Sr-90 E_UA

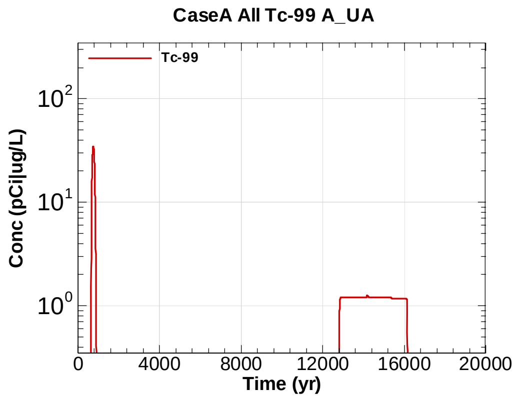

Figure B.1-361 - 100m Aquifer Concentration for CaseA All Tc-99 A_UA

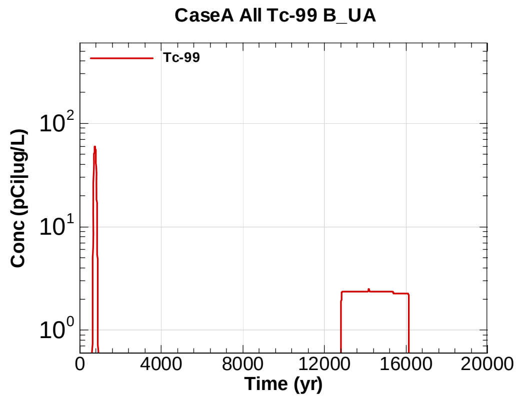

Figure B.1-362 - 100m Aquifer Concentration for CaseA All Tc-99 B_UA

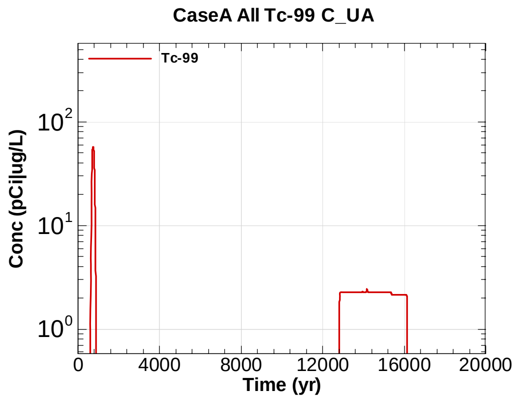

Figure B.1-363 - 100m Aquifer Concentration for CaseA All Tc-99 C_UA

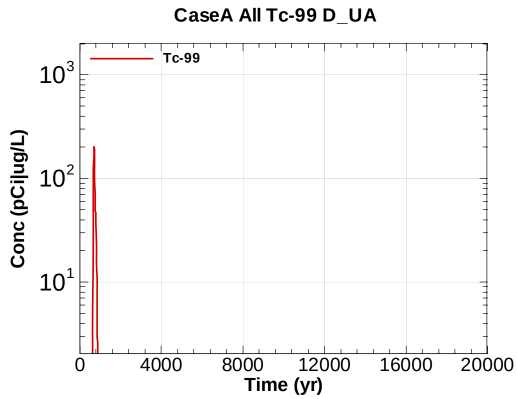

Figure B.1-364 - 100m Aquifer Concentration for CaseA All Tc-99 D_UA

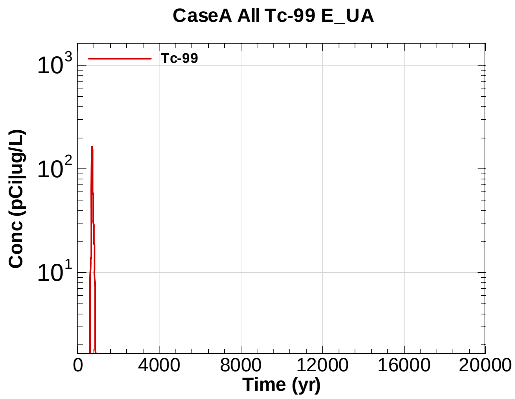

Figure B.1-365 - 100m Aquifer Concentration for CaseA All Tc-99 E_UA

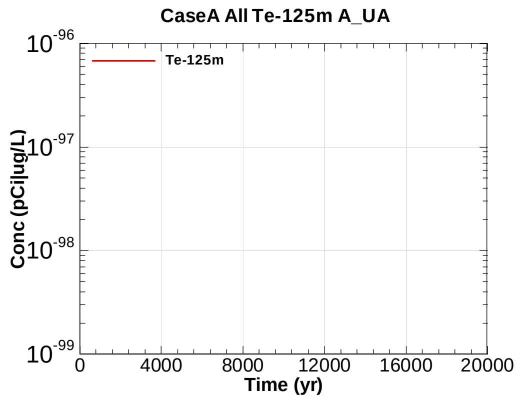

Figure B.1-366 - 100m Aquifer Concentration for CaseA All Te-125m A_UA

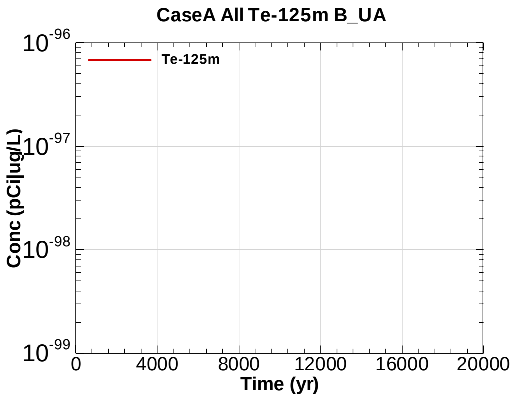

Figure B.1-367 - 100m Aquifer Concentration for CaseA All Te-125m B_UA

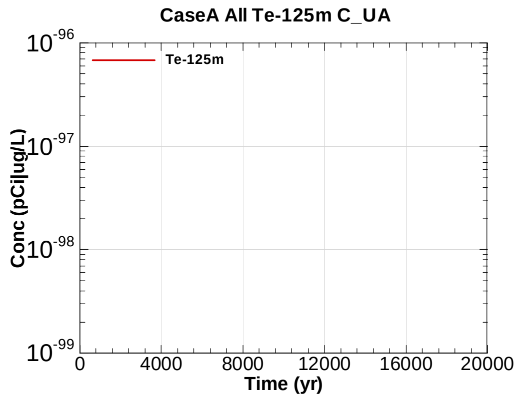

Figure B.1-368 - 100m Aquifer Concentration for CaseA All Te-125m C_UA

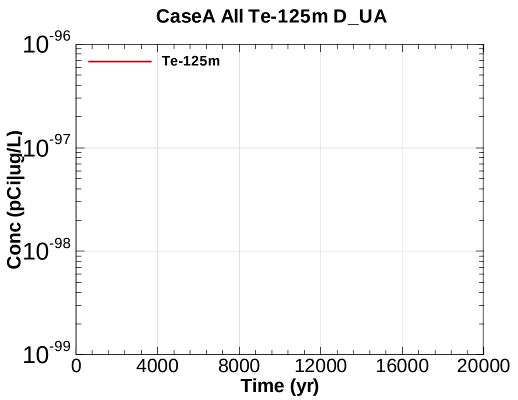

Figure B.1-369 - 100m Aquifer Concentration for CaseA All Te-125m D_UA

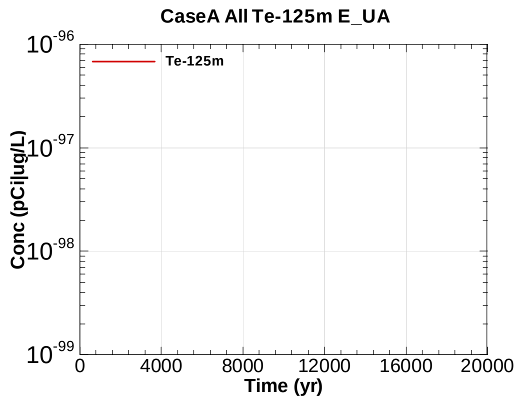

Figure B.1-370 - 100m Aquifer Concentration for CaseA All Te-125m E_UA

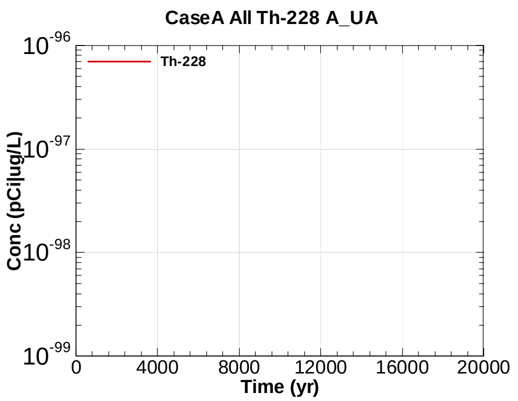

Figure B.1-371 - 100m Aquifer Concentration for CaseA All Th-228 A_UA

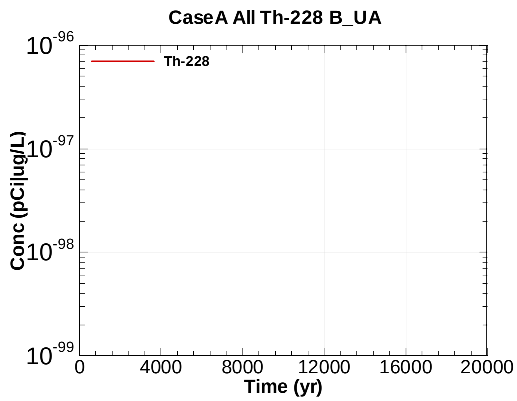

Figure B.1-372 - 100m Aquifer Concentration for CaseA All Th-228 B_UA

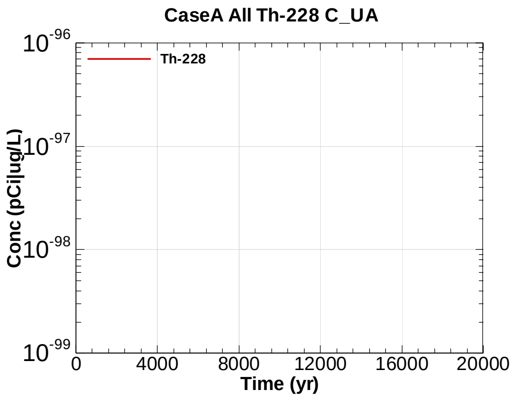

Figure B.1-373 - 100m Aquifer Concentration for CaseA All Th-228 C_UA

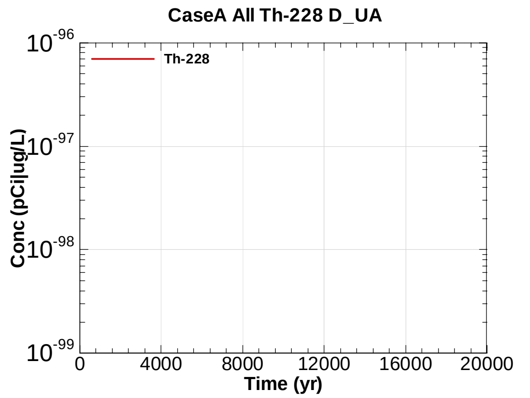

Figure B.1-374 - 100m Aquifer Concentration for CaseA All Th-228 D_UA

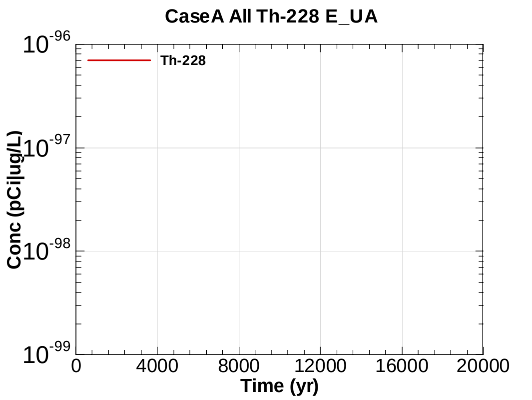

Figure B.1-375 - 100m Aquifer Concentration for CaseA All Th-228 E_UA

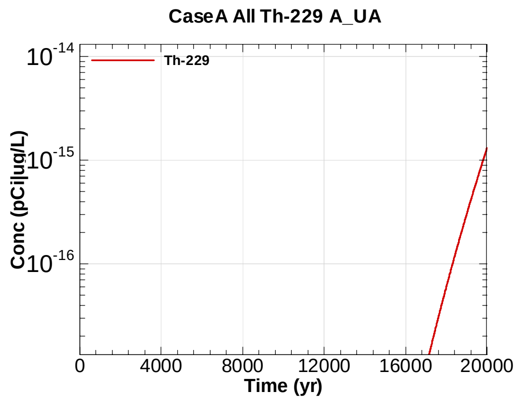

Figure B.1-376 - 100m Aquifer Concentration for CaseA All Th-229 A_UA

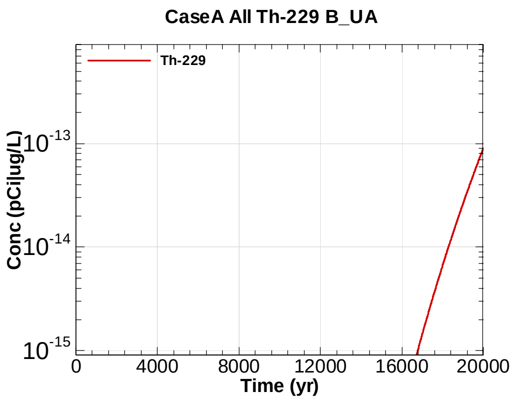

Figure B.1-377 - 100m Aquifer Concentration for CaseA All Th-229 B_UA

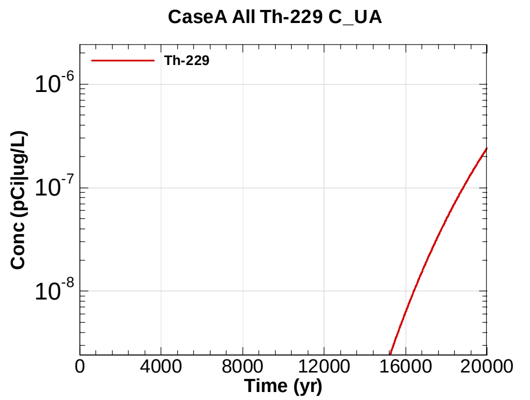

Figure B.1-378 - 100m Aquifer Concentration for CaseA All Th-229 C_UA

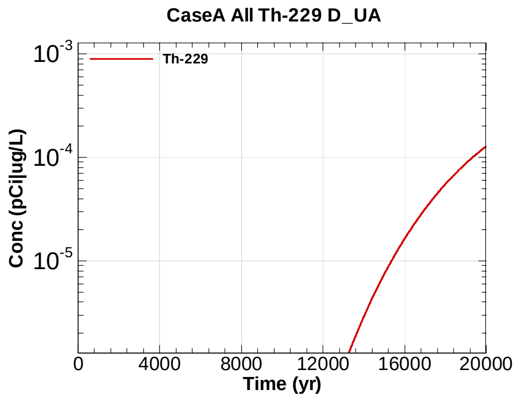

Figure B.1-379 - 100m Aquifer Concentration for CaseA All Th-229 D_UA

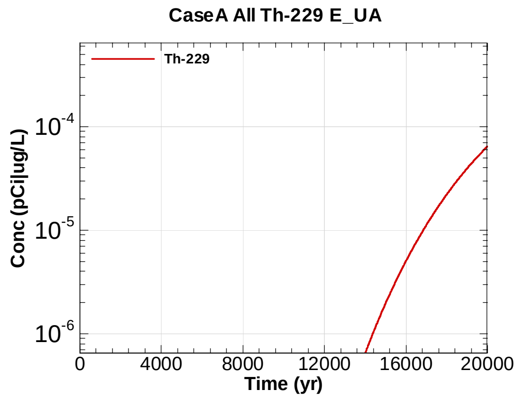

Figure B.1-380 - 100m Aquifer Concentration for CaseA All Th-229 E_UA

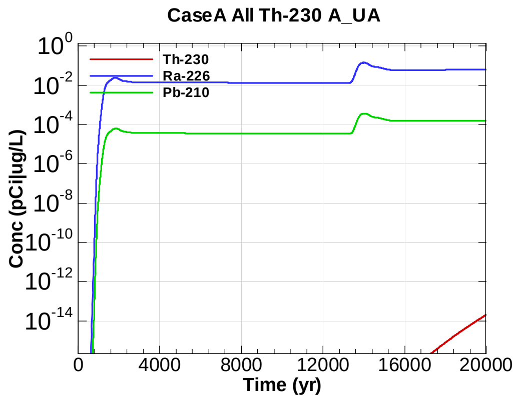

Figure B.1-381 - 100m Aquifer Concentration for CaseA All Th-230 A_UA

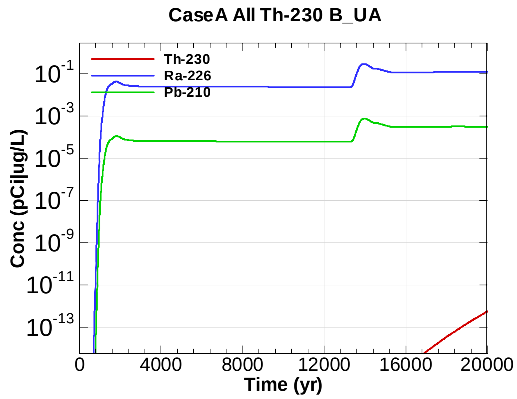

Figure B.1-382 - 100m Aquifer Concentration for CaseA All Th-230 B_UA

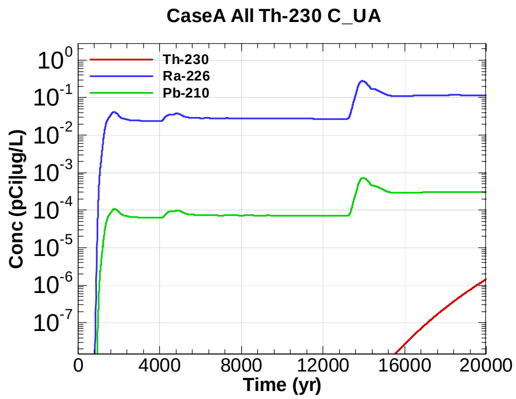

Figure B.1-383 - 100m Aquifer Concentration for CaseA All Th-230 C_UA

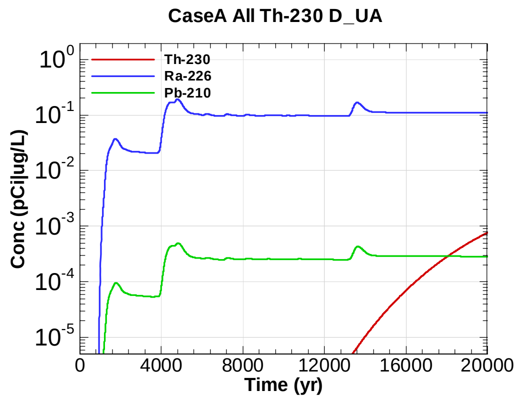

Figure B.1-384 - 100m Aquifer Concentration for CaseA All Th-230 D_UA

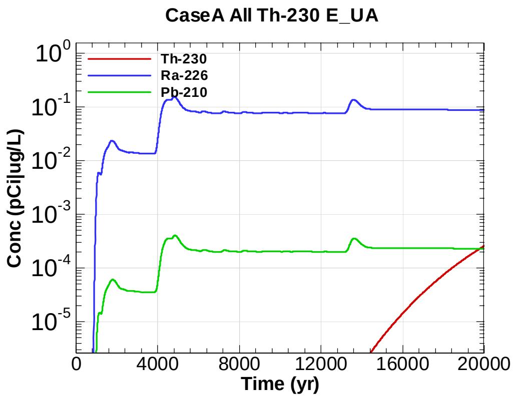

Figure B.1-385 - 100m Aquifer Concentration for CaseA All Th-230 E_UA

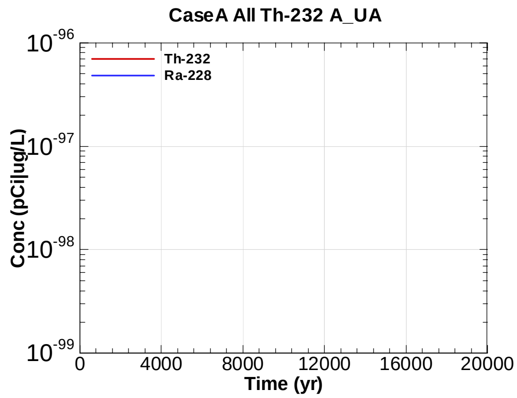

Figure B.1-386 - 100m Aquifer Concentration for CaseA All Th-232 A_UA

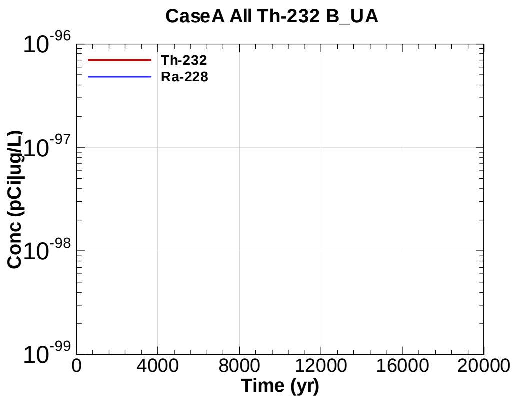

Figure B.1-387 - 100m Aquifer Concentration for CaseA All Th-232 B_UA

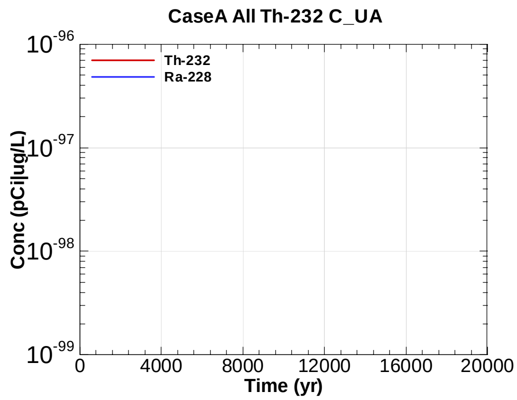

Figure B.1-388 - 100m Aquifer Concentration for CaseA All Th-232 C_UA

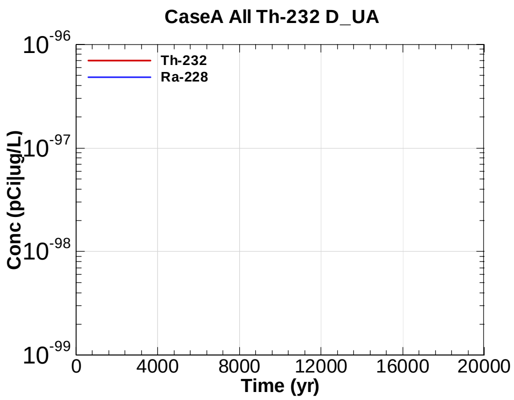

Figure B.1-389 - 100m Aquifer Concentration for CaseA All Th-232 D_UA

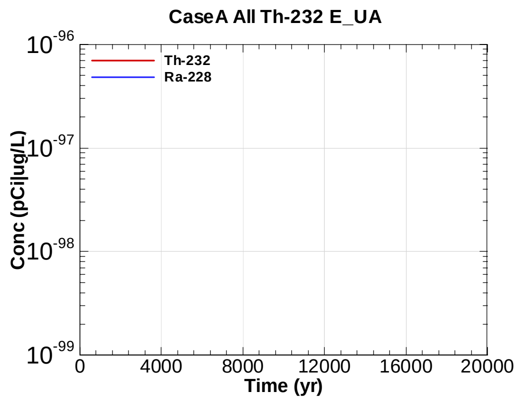

Figure B.1-390 - 100m Aquifer Concentration for CaseA All Th-232 E_UA

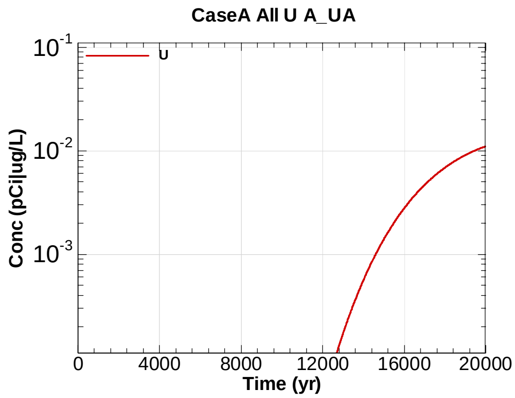

Figure B.1-391 - 100m Aquifer Concentration for CaseA All U A_UA

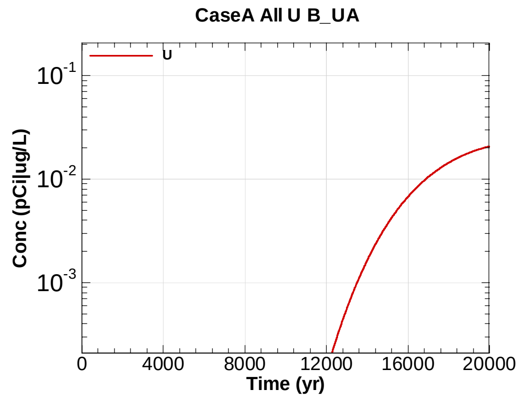

Figure B.1-392 - 100m Aquifer Concentration for CaseA All U B_UA

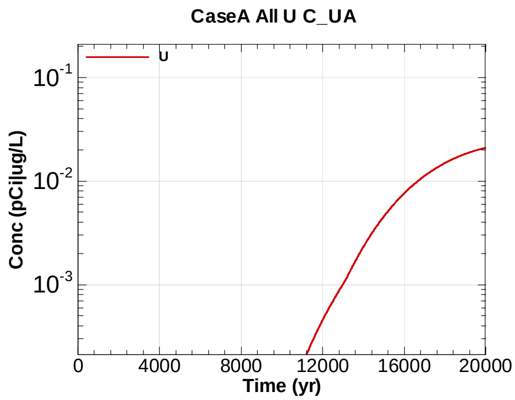

Figure B.1-393 - 100m Aquifer Concentration for CaseA All U C_UA

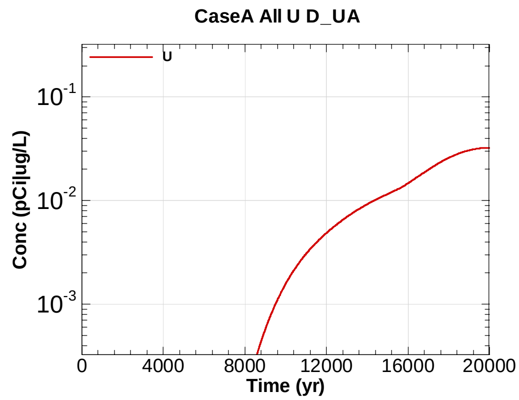

Figure B.1-394 - 100m Aquifer Concentration for CaseA All U D_UA

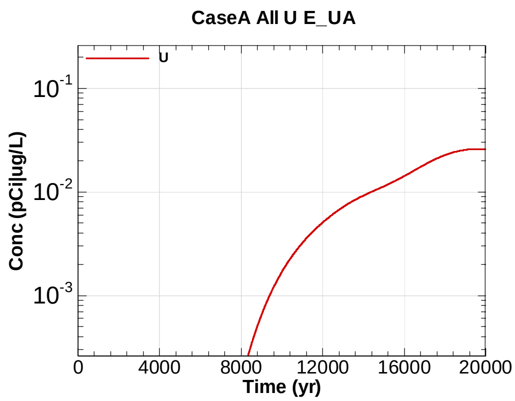

Figure B.1-395 - 100m Aquifer Concentration for CaseA All U E_UA

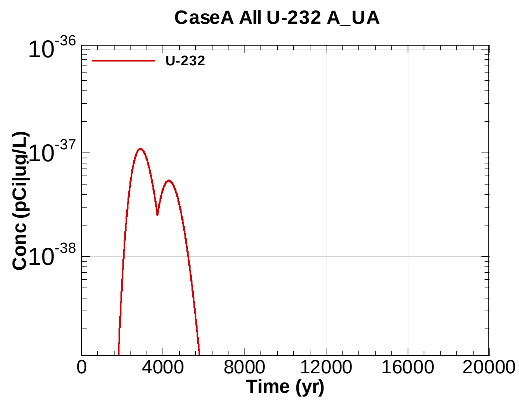

Figure B.1-396 - 100m Aquifer Concentration for CaseA All U-232 A_UA

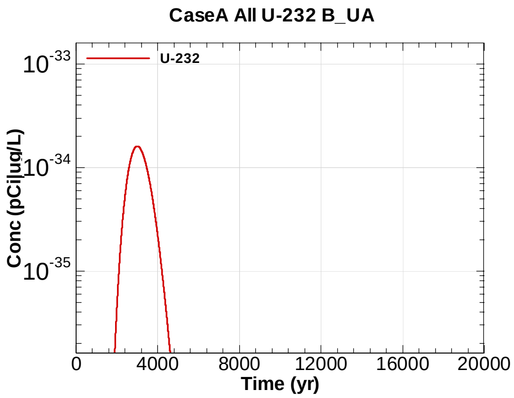

Figure B.1-397 - 100m Aquifer Concentration for CaseA All U-232 B_UA

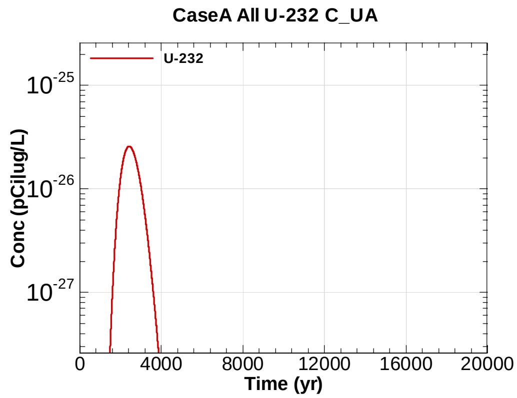

Figure B.1-398 - 100m Aquifer Concentration for CaseA All U-232 C_UA

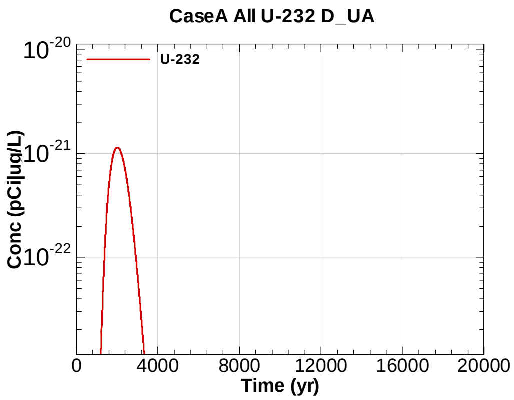

Figure B.1-399 - 100m Aquifer Concentration for CaseA All U-232 D_UA

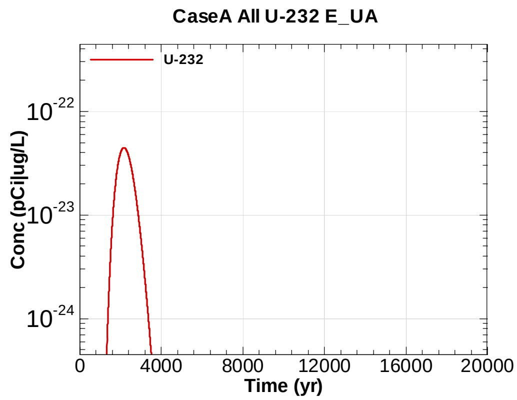

Figure B.1-400 - 100m Aquifer Concentration for CaseA All U-232 E_UA

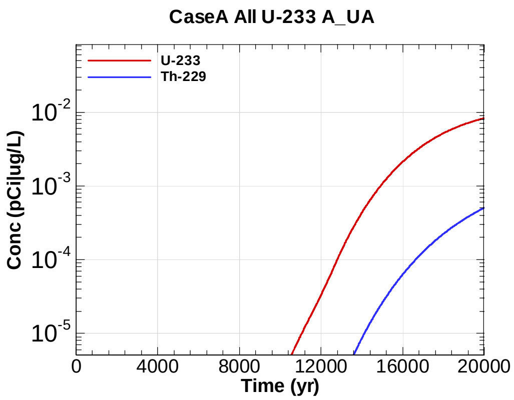

Figure B.1-401 - 100m Aquifer Concentration for CaseA All U-233 A_UA

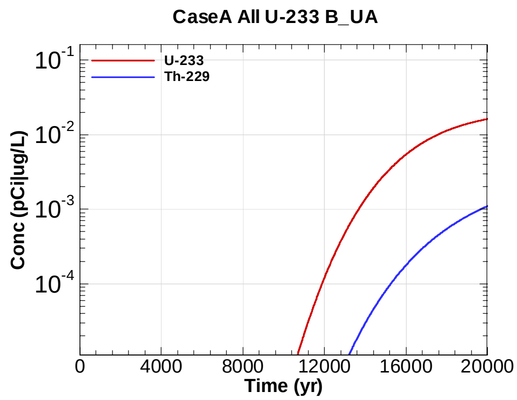

Figure B.1-402 - 100m Aquifer Concentration for CaseA All U-233 B_UA

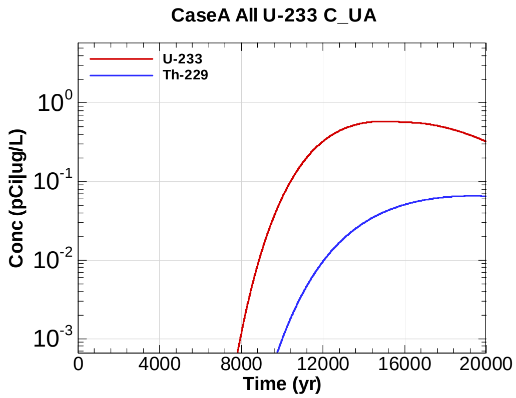

Figure B.1-403 - 100m Aquifer Concentration for CaseA All U-233 C_UA

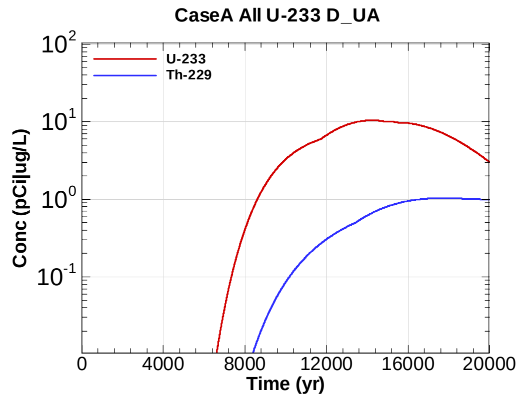

Figure B.1-404 - 100m Aquifer Concentration for CaseA All U-233 D_UA

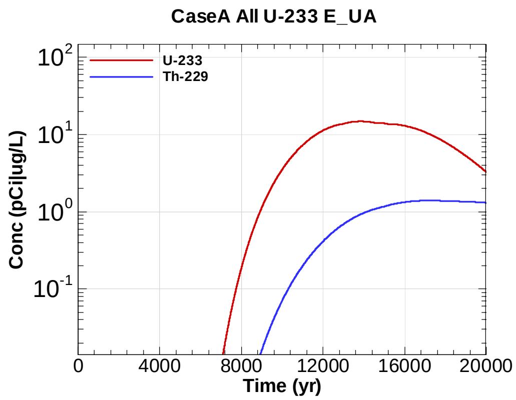

Figure B.1-405 - 100m Aquifer Concentration for CaseA All U-233 E_UA

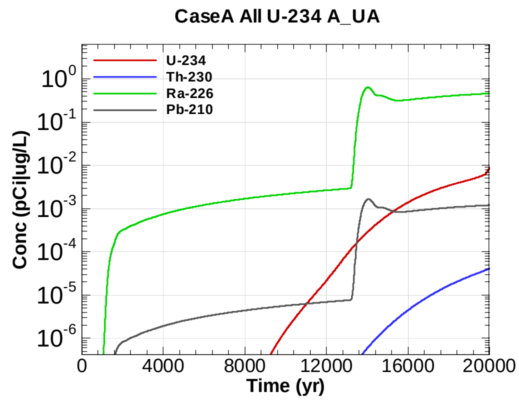

Figure B.1-406 - 100m Aquifer Concentration for CaseA All U-234 A_UA

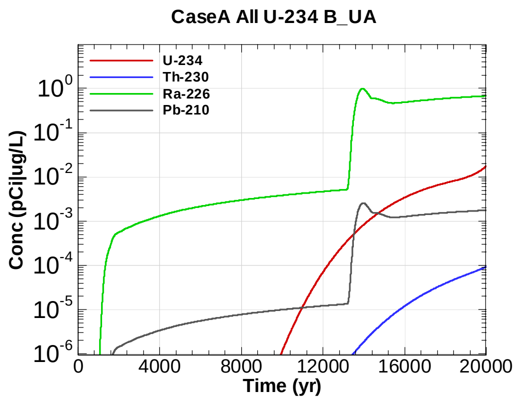

Figure B.1-407 - 100m Aquifer Concentration for CaseA All U-234 B_UA

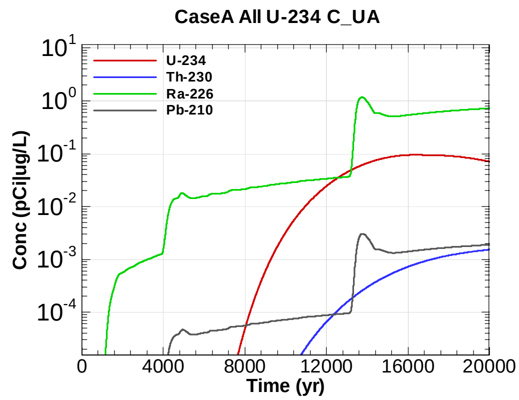

Figure B.1-408 - 100m Aquifer Concentration for CaseA All U-234 C_UA

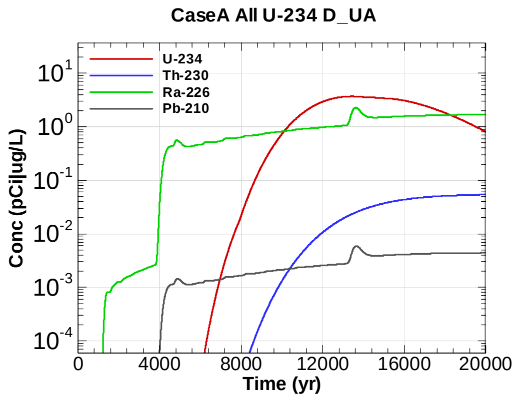

Figure B.1-409 - 100m Aquifer Concentration for CaseA All U-234 D_UA

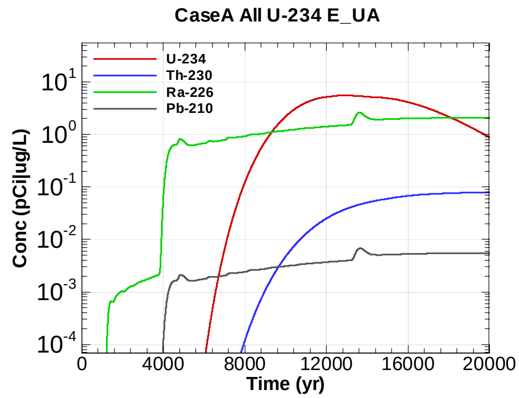

Figure B.1-410 - 100m Aquifer Concentration for CaseA All U-234 E_UA

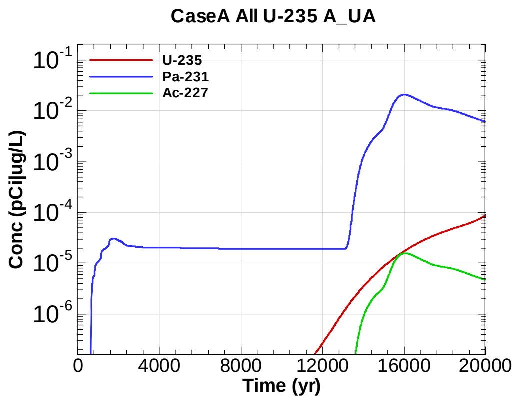

Figure B.1-411 - 100m Aquifer Concentration for CaseA All U-235 A_UA

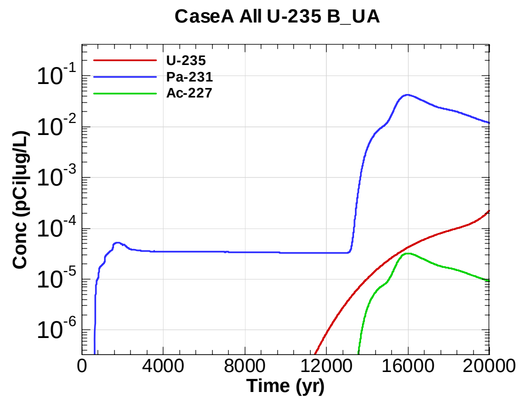

Figure B.1-412 - 100m Aquifer Concentration for CaseA All U-235 B_UA

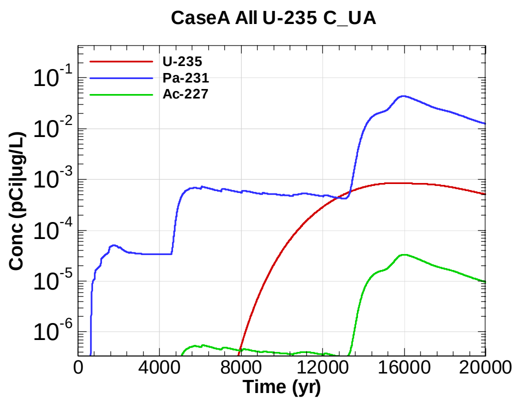

Figure B.1-413 - 100m Aquifer Concentration for CaseA All U-235 C_UA

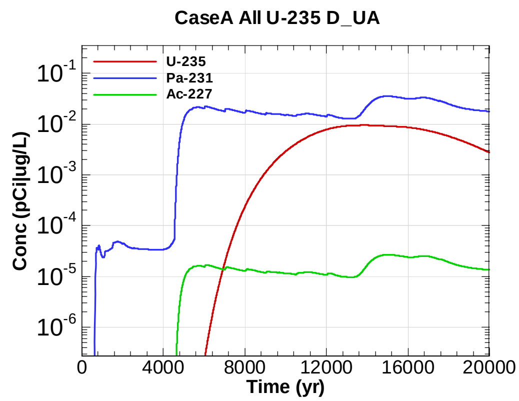

Figure B.1-414 - 100m Aquifer Concentration for CaseA All U-235 D_UA

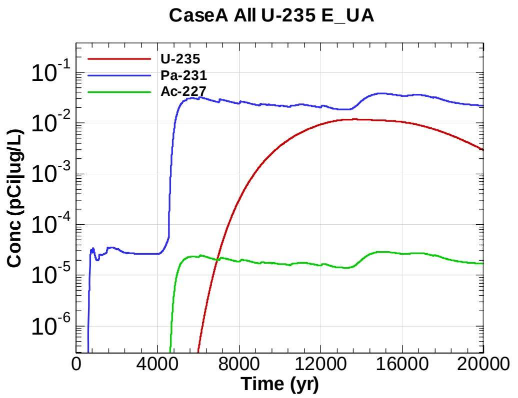

Figure B.1-415 - 100m Aquifer Concentration for CaseA All U-235 E_UA

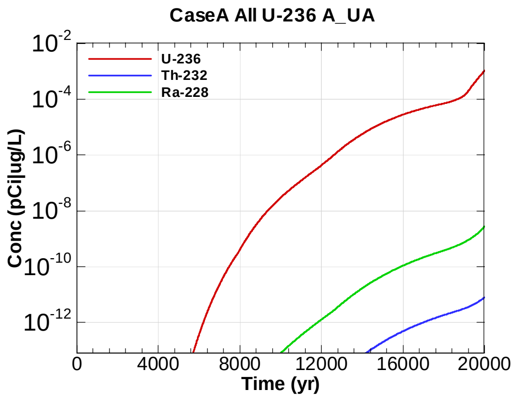

Figure B.1-416 - 100m Aquifer Concentration for CaseA All U-236 A_UA

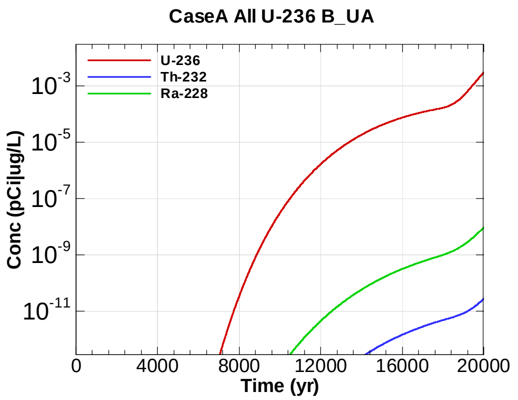

Figure B.1-417 - 100m Aquifer Concentration for CaseA All U-236 B_UA

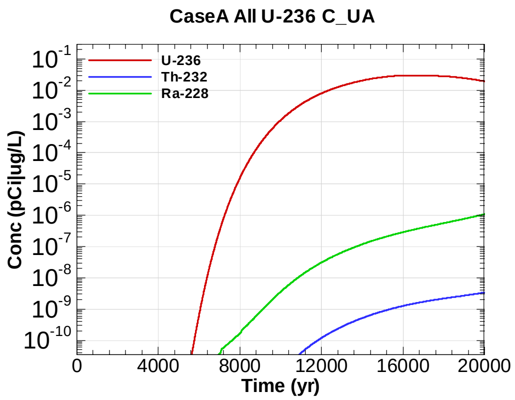

Figure B.1-418 - 100m Aquifer Concentration for CaseA All U-236 C_UA

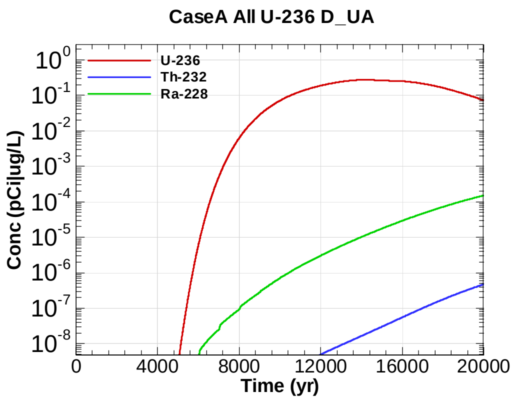

Figure B.1-419 - 100m Aquifer Concentration for CaseA All U-236 D_UA

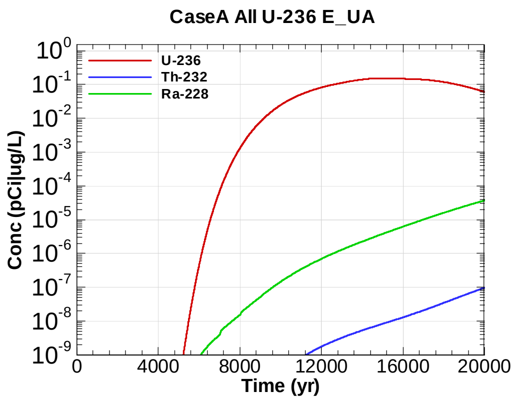

Figure B.1-420 - 100m Aquifer Concentration for CaseA All U-236 E_UA

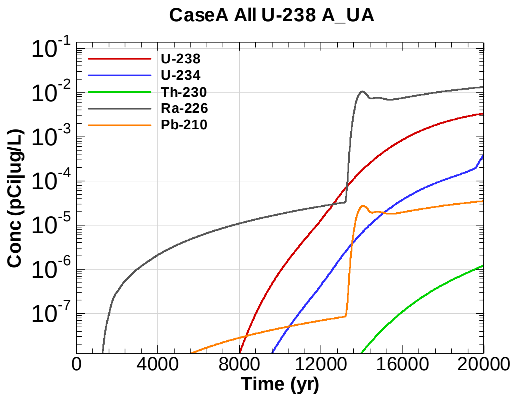

Figure B.1-421 - 100m Aquifer Concentration for CaseA All U-238 A_UA

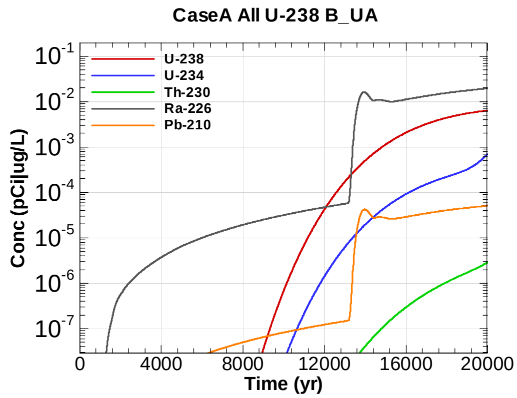

Figure B.1-422 - 100m Aquifer Concentration for CaseA All U-238 B_UA

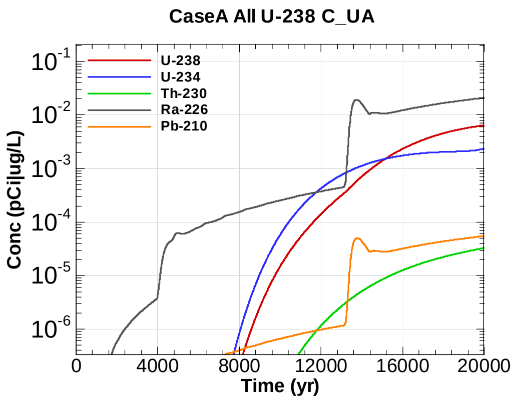

Figure B.1-423 - 100m Aquifer Concentration for CaseA All U-238 C_UA

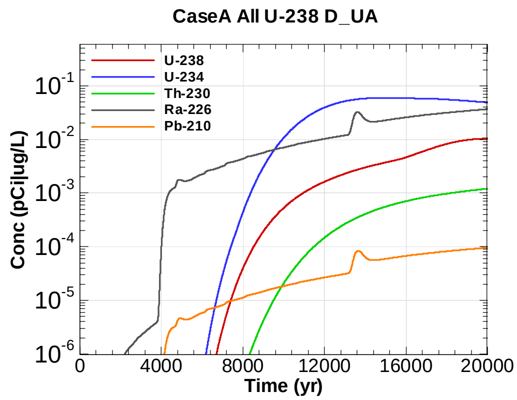

Figure B.1-424 - 100m Aquifer Concentration for CaseA All U-238 D_UA

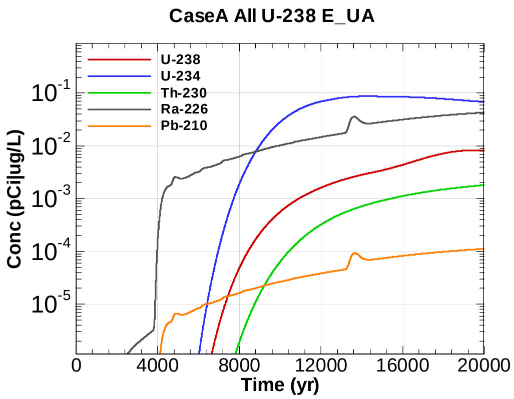

Figure B.1-425 - 100m Aquifer Concentration for CaseA All U-238 E_UA

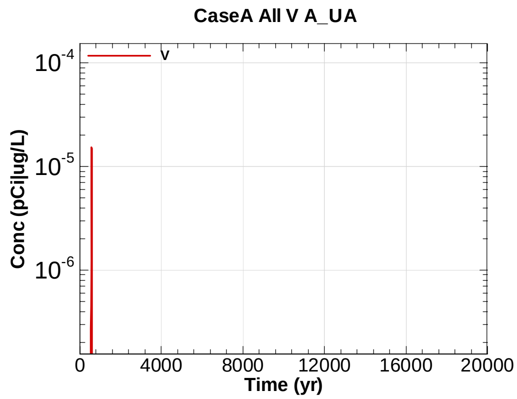

Figure B.1-426 - 100m Aquifer Concentration for CaseA All V A_UA

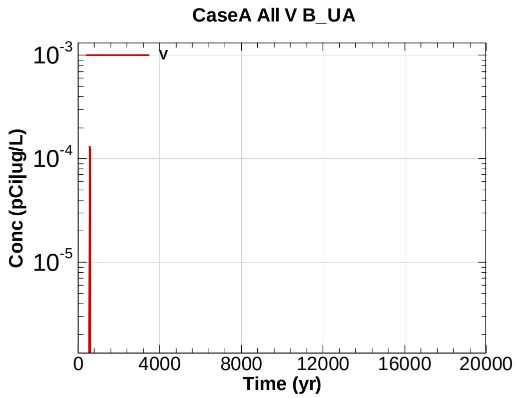

Figure B.1-427 - 100m Aquifer Concentration for CaseA All V B_UA

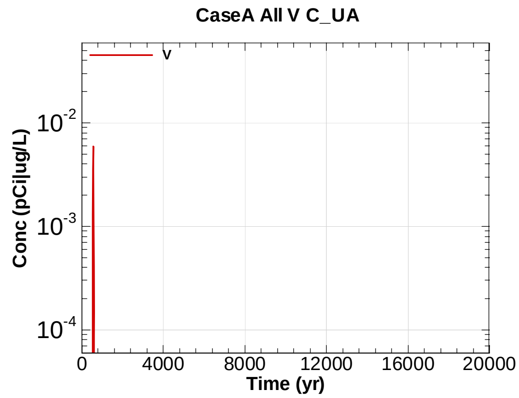

Figure B.1-428 - 100m Aquifer Concentration for CaseA All V C_UA

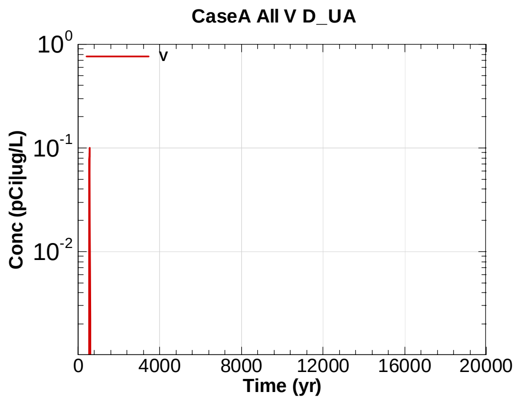

Figure B.1-429 - 100m Aquifer Concentration for CaseA All V D_UA

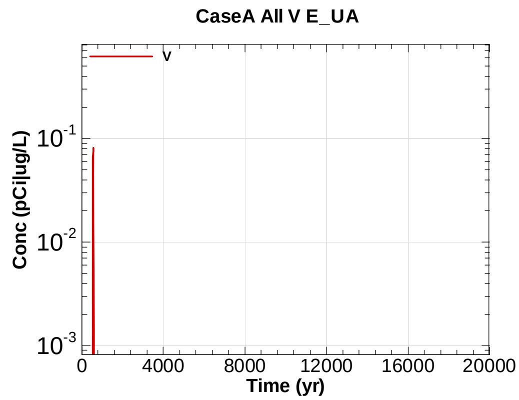

Figure B.1-430 - 100m Aquifer Concentration for CaseA All V E_UA

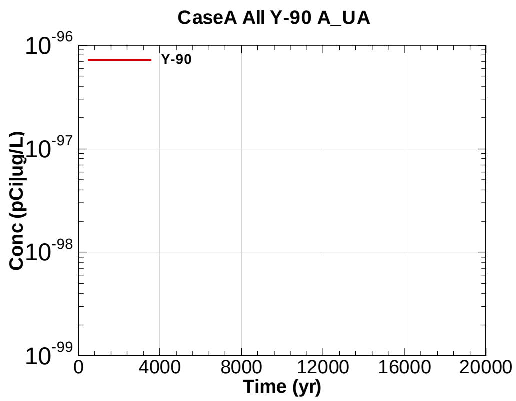

Figure B.1-431 - 100m Aquifer Concentration for CaseA All Y-90 A_UA

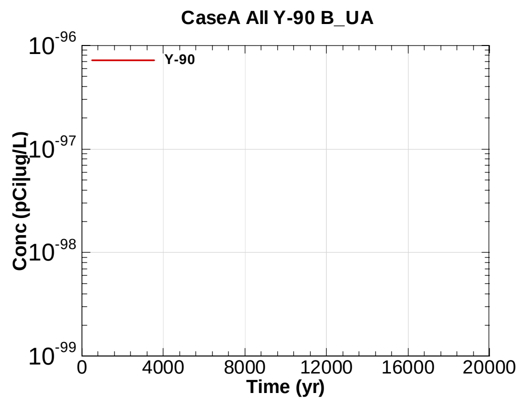

Figure B.1-432 - 100m Aquifer Concentration for CaseA All Y-90 B_UA

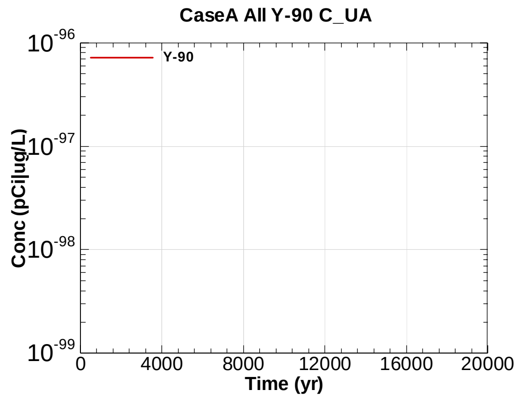

Figure B.1-433 - 100m Aquifer Concentration for CaseA All Y-90 C_UA

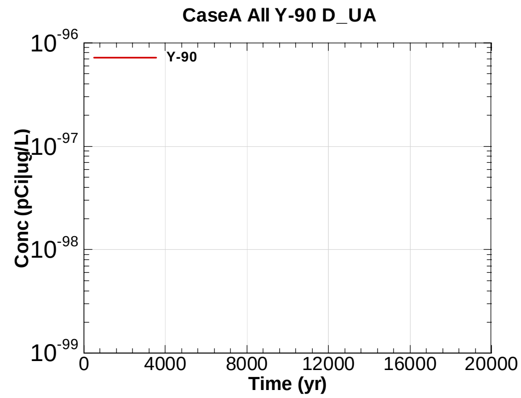

Figure B.1-434 - 100m Aquifer Concentration for CaseA All Y-90 D_UA

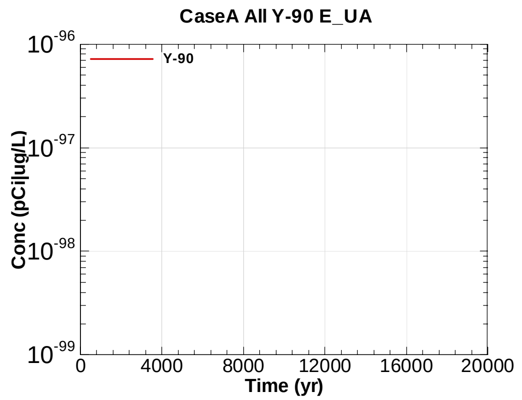

Figure B.1-435 - 100m Aquifer Concentration for CaseA All Y-90 E_UA

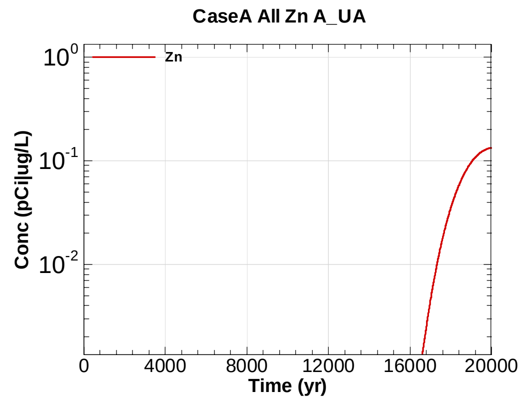

Figure B.1-436 - 100m Aquifer Concentration for CaseA All Zn A_UA

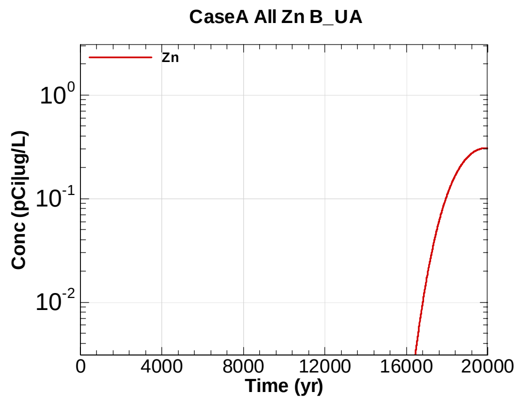

Figure B.1-437 - 100m Aquifer Concentration for CaseA All Zn B_UA

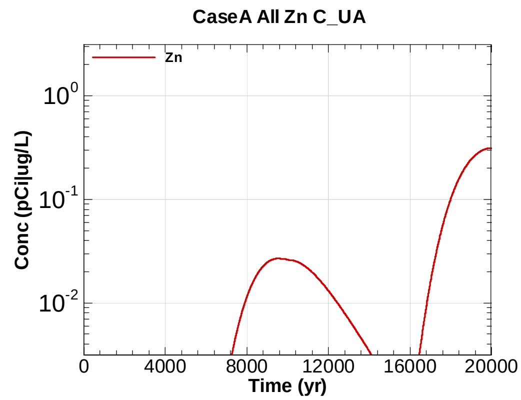

Figure B.1-438 - 100m Aquifer Concentration for CaseA All Zn C_UA

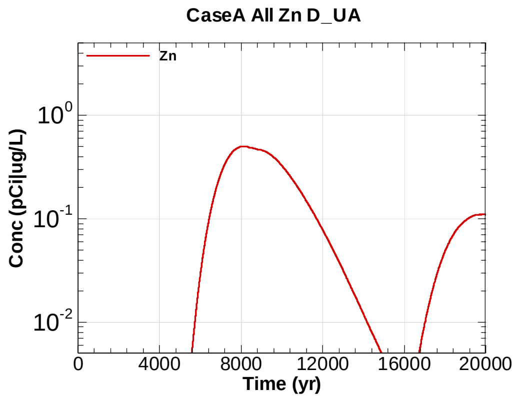

Figure B.1-439 - 100m Aquifer Concentration for CaseA All Zn D_UA

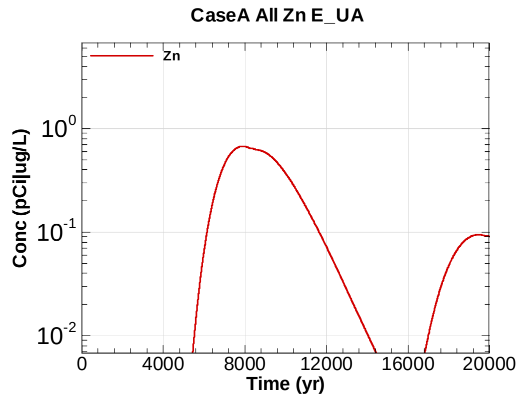

Figure B.1-440 - 100m Aquifer Concentration for CaseA All Zn E_UA

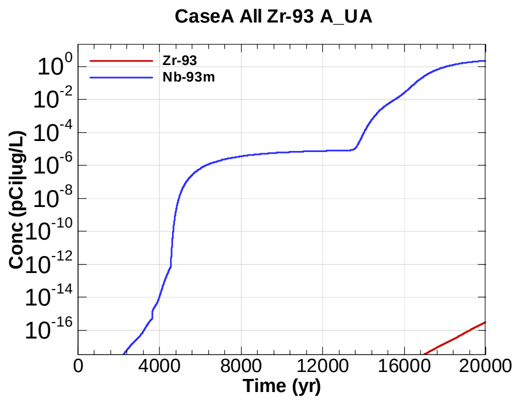

Figure B.1-441 - 100m Aquifer Concentration for CaseA All Zr-93 A_UA

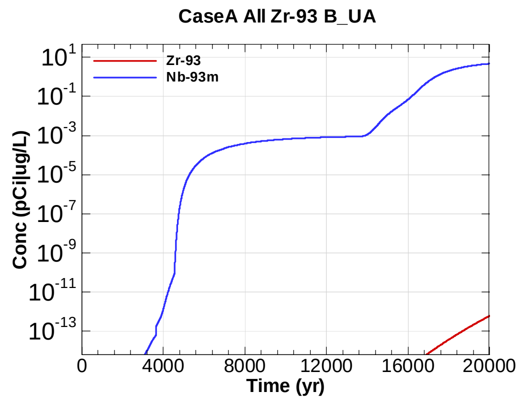

Figure B.1-442 - 100m Aquifer Concentration for CaseA All Zr-93 B_UA

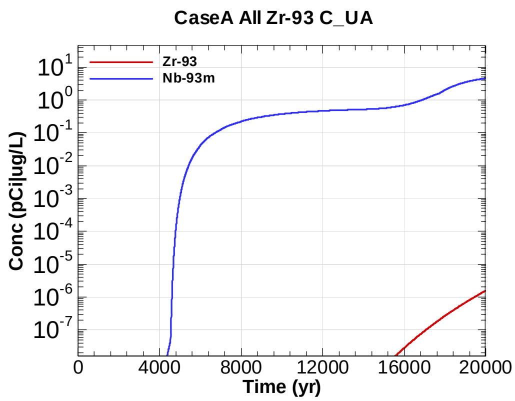

Figure B.1-443 - 100m Aquifer Concentration for CaseA All Zr-93 C_UA

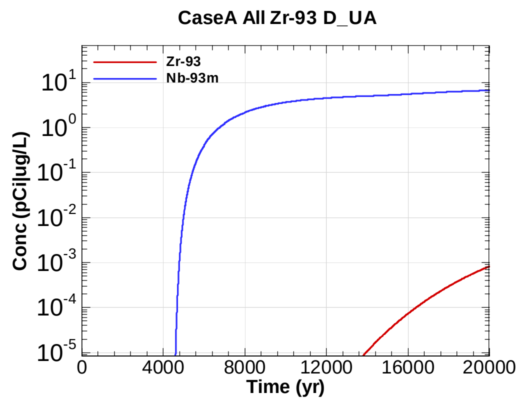

Figure B.1-444 - 100m Aquifer Concentration for CaseA All Zr-93 D_UA

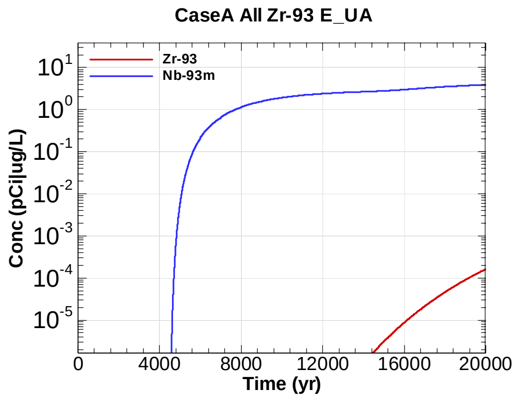

Figure B.1-445 - 100m Aquifer Concentration for CaseA All Zr-93 E_UA

Appendix B.2
100-METER RADIOLOGICAL AND CHEMICAL CONCENTRATIONS AT THE UPPER THREE RUNS AQUIFER - LOWER

Appendix B.2 contains curves showing the one-hundred meter radiological and chemical concentrations for all of FTF (tank and ancillary inventories) for the Base Case (Case/Configuration A). 20,000 year concentration results are presented from the Upper Three Runs Aquifer- Lower Zone for Sectors A through E.

Graph heading example "CaseA All Ac-227 A_LA"

Key

CaseA = scenario case/configuration
All = all FTF inventory source
Ac-227 = radionuclide or chemical of concern
A = Sector of concern (see sector map with stream traces)
LA = aquifer of concern
- UA = Upper Three Runs – Upper Zone
- LA = Upper Three Runs – Lower Zone
- GA = Gordon

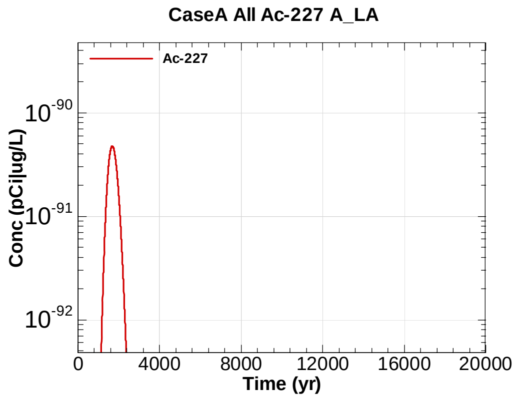

Figure B.2-1 - 100m Aquifer Concentration for CaseA All Ac-227 A_LA

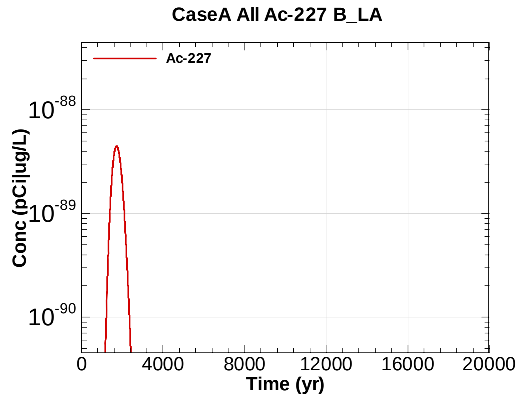

Figure B.2-2 - 100m Aquifer Concentration for CaseA All Ac-227 B_LA

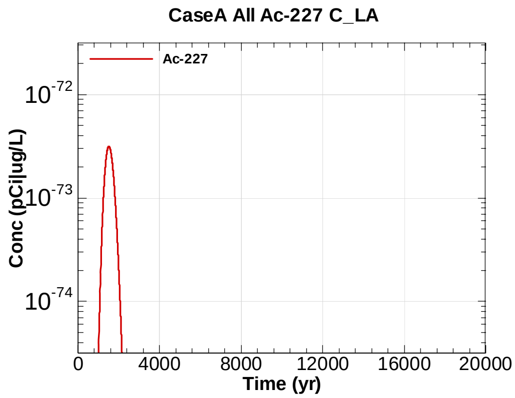

Figure B.2-3 - 100m Aquifer Concentration for CaseA All Ac-227 C_LA

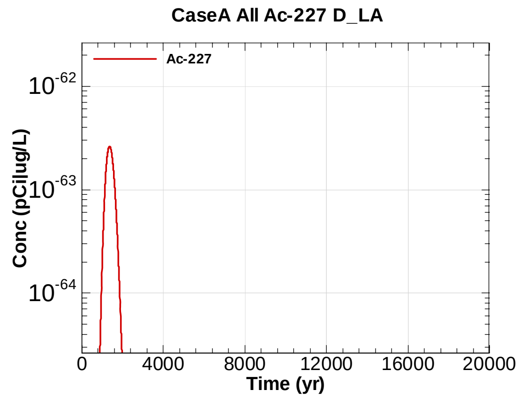

Figure B.2-4 - 100m Aquifer Concentration for CaseA All Ac-227 D_LA

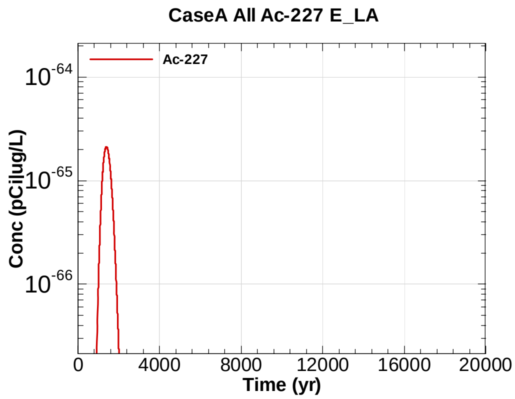

Figure B.2-5 - 100m Aquifer Concentration for CaseA All Ac-227 E_LA

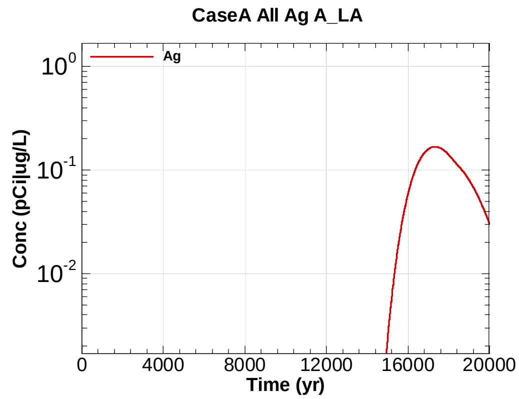

Figure B.2-6 - 100m Aquifer Concentration for CaseA All Ag A_LA

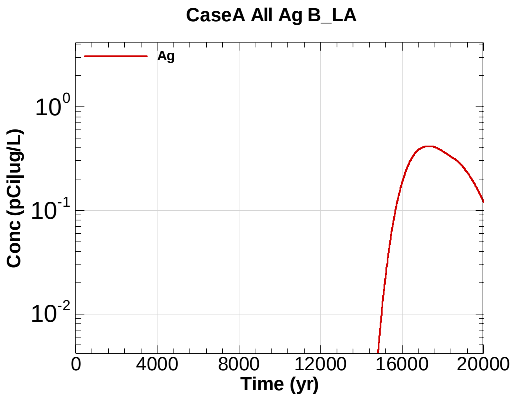

Figure B.2-7 - 100m Aquifer Concentration for CaseA All Ag B_LA

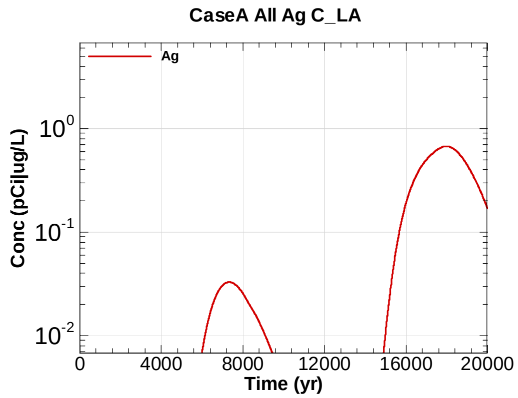

Figure B.2-8 - 100m Aquifer Concentration for CaseA All Ag C_LA

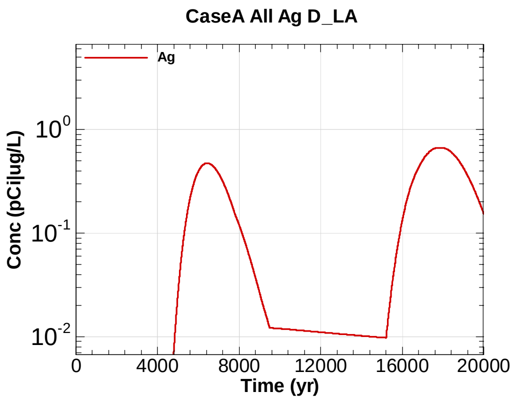

Figure B.2-9 - 100m Aquifer Concentration for CaseA All Ag D_LA

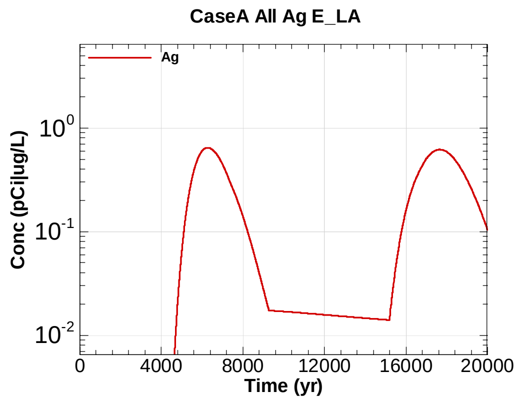

Figure B.2-10 - 100m Aquifer Concentration for CaseA All Ag E_LA

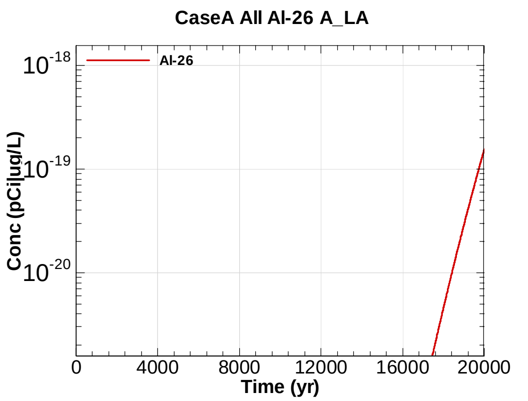

Figure B.2-11 - 100m Aquifer Concentration for CaseA All Al-26 A_LA

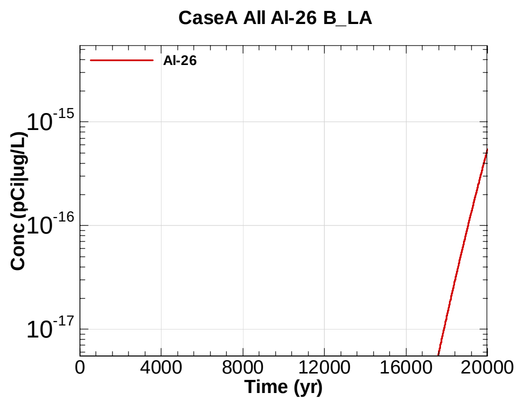

Figure B.2-12 - 100m Aquifer Concentration for CaseA All Al-26 B_LA

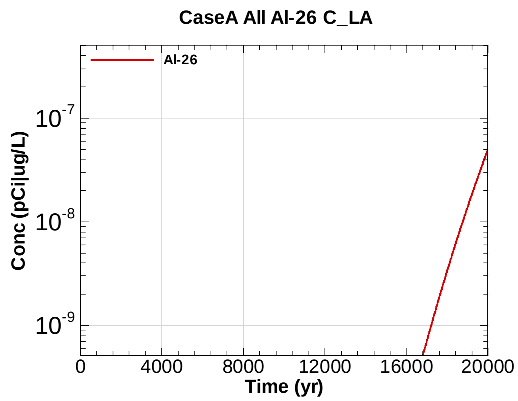

Figure B.2-13 - 100m Aquifer Concentration for CaseA All Al-26 C_LA

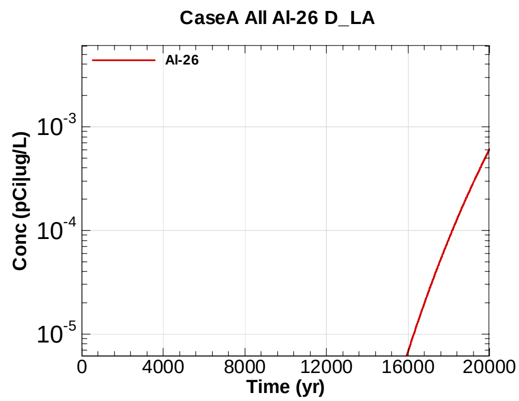

Figure B.2-14 - 100m Aquifer Concentration for CaseA All Al-26 D_LA

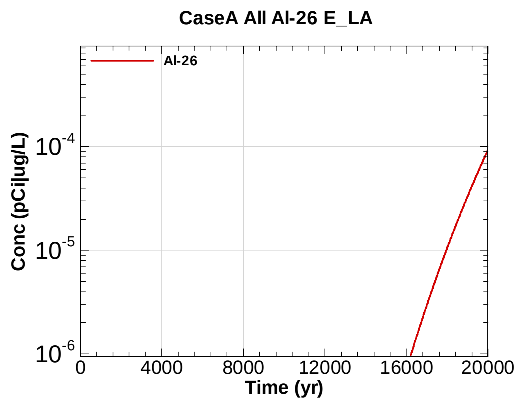

Figure B.2-15 - 100m Aquifer Concentration for CaseA All Al-26 E_LA

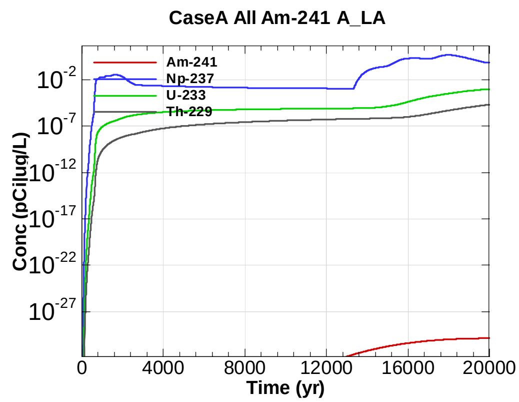

Figure B.2-16 - 100m Aquifer Concentration for CaseA All Am-241 A_LA

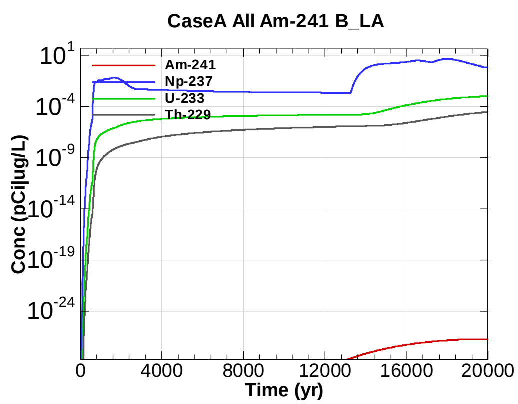

Figure B.2-17 - 100m Aquifer Concentration for CaseA All Am-241 B_LA

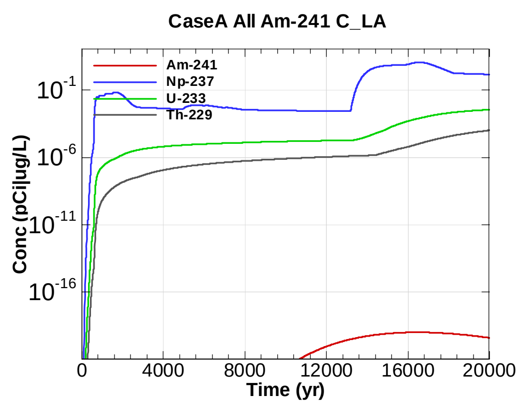

Figure B.2-18 - 100m Aquifer Concentration for CaseA All Am-241 C_LA

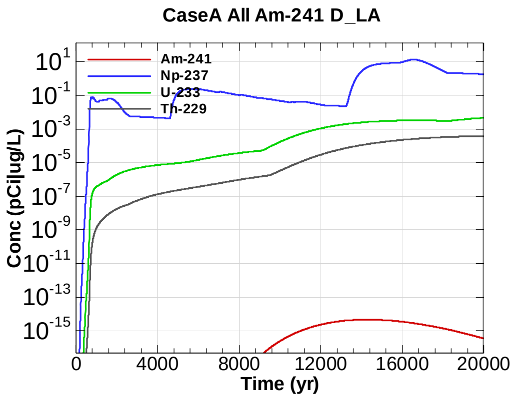

Figure B.2-19 - 100m Aquifer Concentration for CaseA All Am-241 D_LA

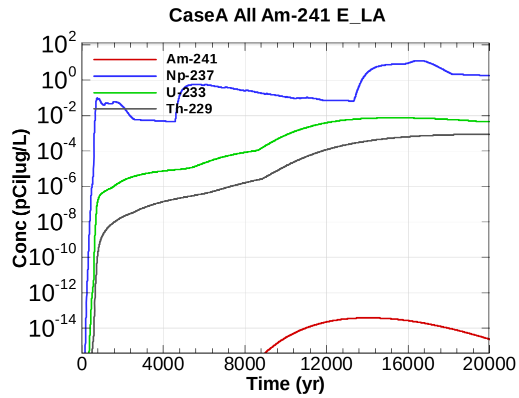

Figure B.2-20 - 100m Aquifer Concentration for CaseA All Am-241 E_LA

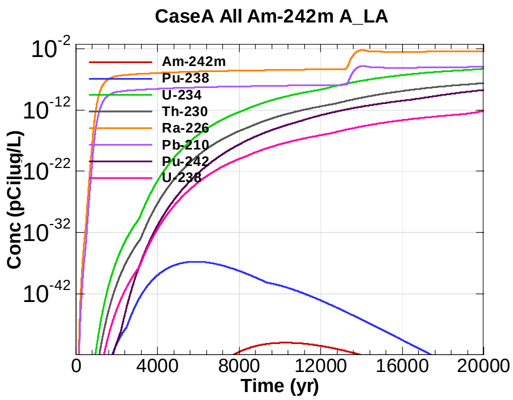

Figure B.2-21 - 100m Aquifer Concentration for CaseA All Am-242m A_LA

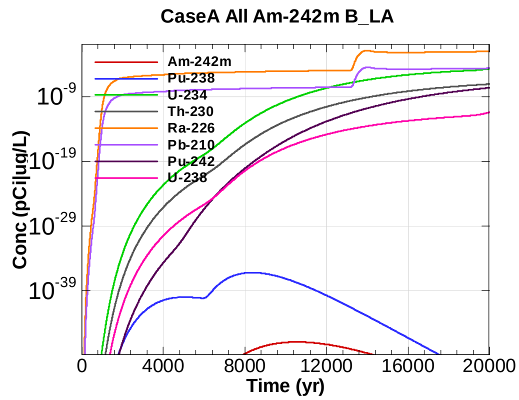

Figure B.2-22 - 100m Aquifer Concentration for CaseA All Am-242m B_LA

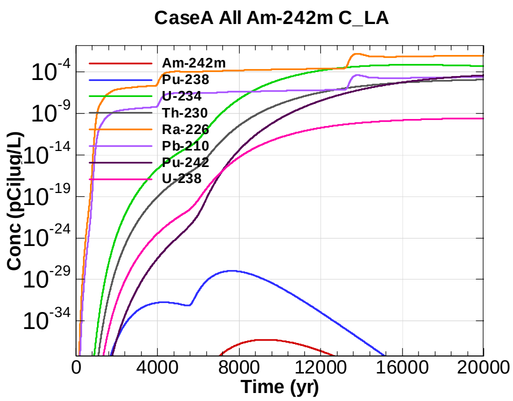

Figure B.2-23 - 100m Aquifer Concentration for CaseA All Am-242m C_LA

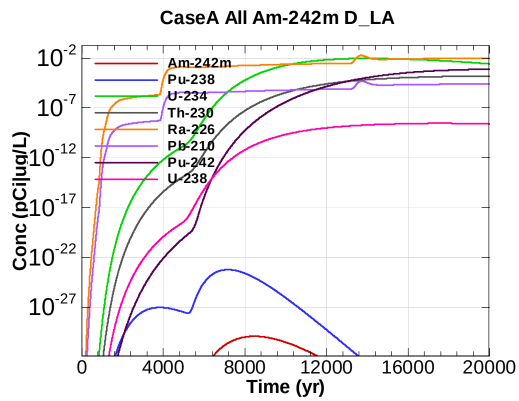

Figure B.2-24 - 100m Aquifer Concentration for CaseA All Am-242m D_LA

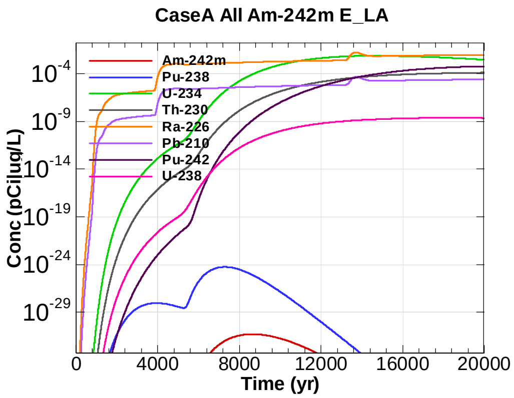

Figure B.2-25 - 100m Aquifer Concentration for CaseA All Am-242m E_LA

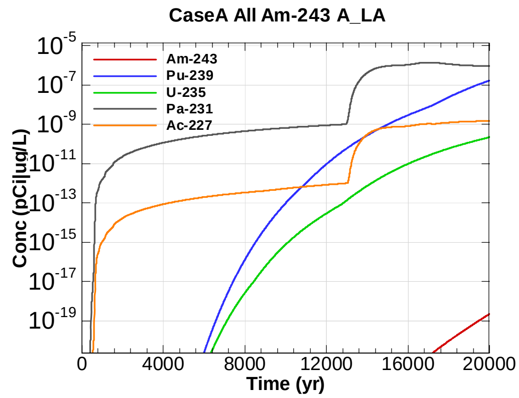

Figure B.2-26 - 100m Aquifer Concentration for CaseA All Am-243 A_LA

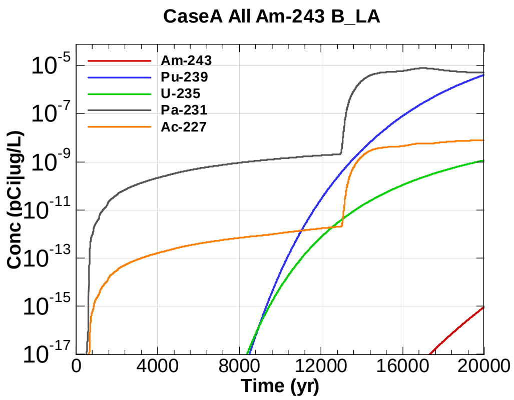

Figure B.2-27 - 100m Aquifer Concentration for CaseA All Am-243 B_LA

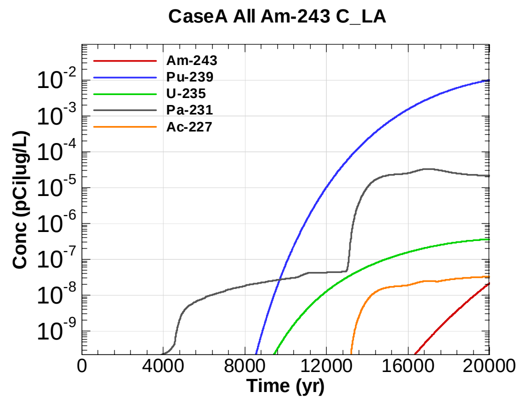

Figure B.2-28 - 100m Aquifer Concentration for CaseA All Am-243 C_LA

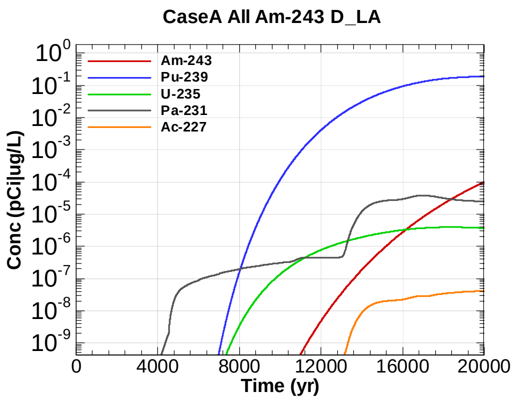

Figure B.2-29 - 100m Aquifer Concentration for CaseA All Am-243 D_LA

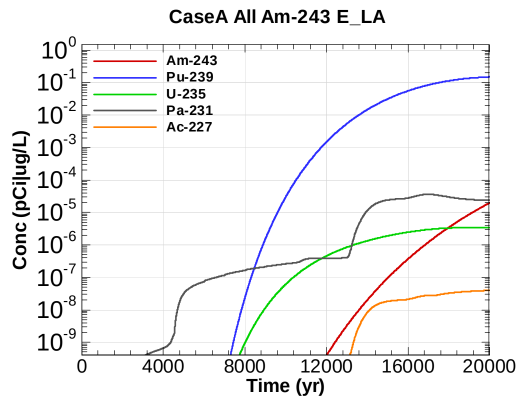

Figure B.2-30 - 100m Aquifer Concentration for CaseA All Am-243 E_LA

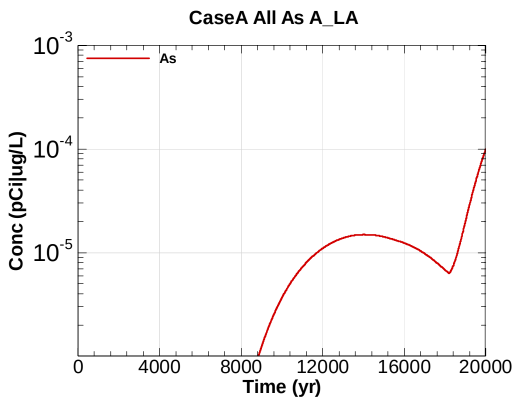

Figure B.2-31 - 100m Aquifer Concentration for CaseA All As A_LA

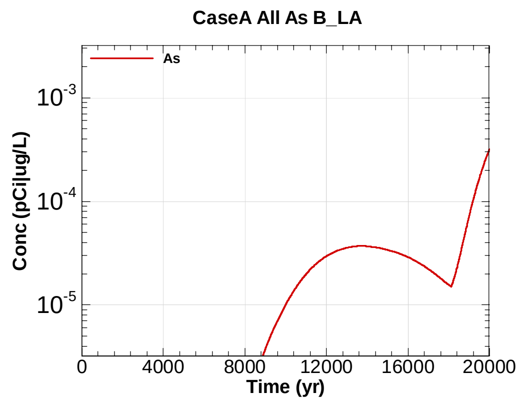

Figure B.2-32 - 100m Aquifer Concentration for CaseA All As B_LA

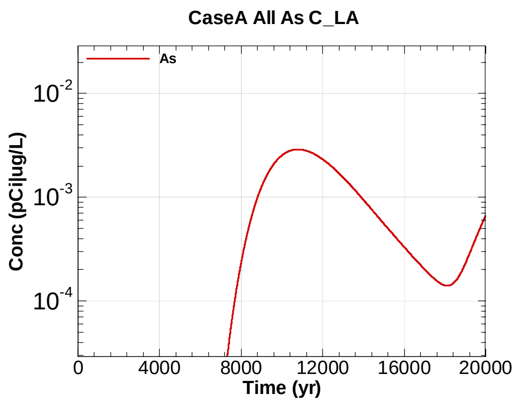

Figure B.2-33 - 100m Aquifer Concentration for CaseA All As C_LA

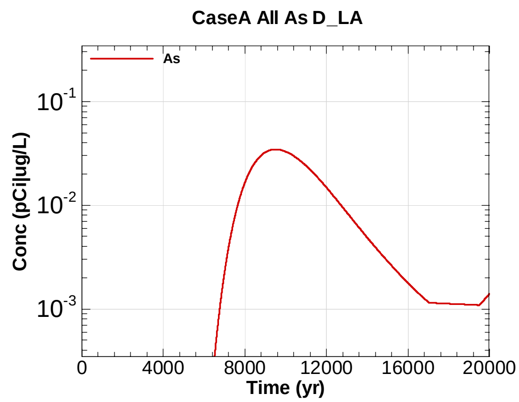

Figure B.2-34 - 100m Aquifer Concentration for CaseA All As D_LA

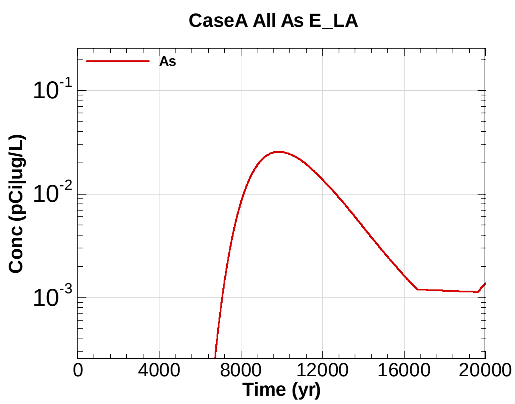

Figure B.2-35 - 100m Aquifer Concentration for CaseA All As E_LA

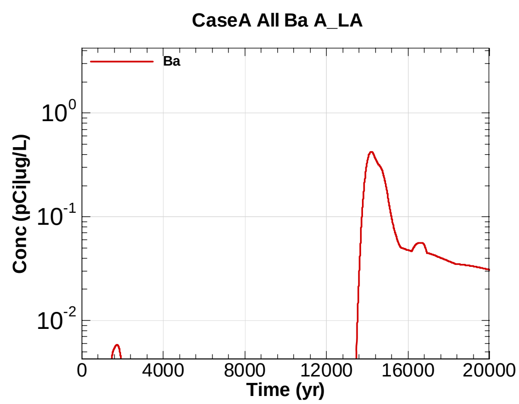

Figure B.2-36 - 100m Aquifer Concentration for CaseA All Ba A_LA

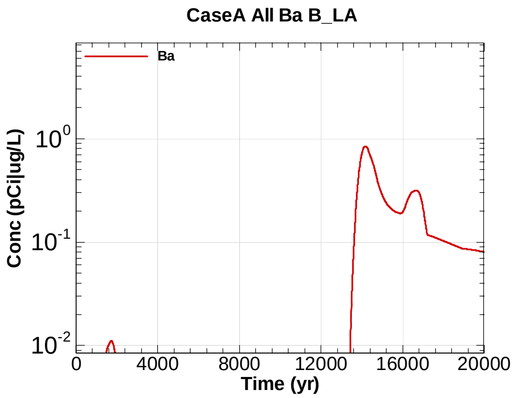

Figure B.2-37 - 100m Aquifer Concentration for CaseA All Ba B_LA

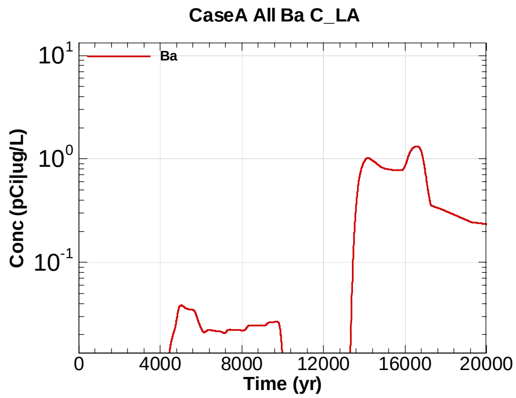

Figure B.2-38 - 100m Aquifer Concentration for CaseA All Ba C_LA

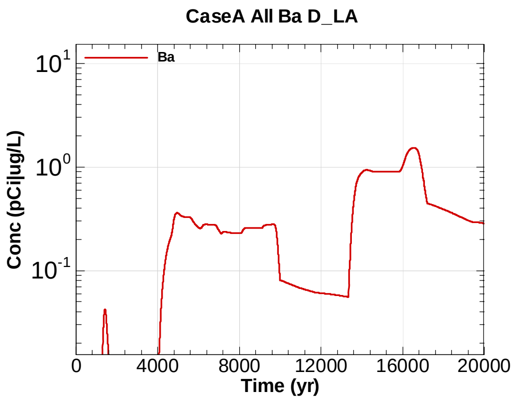

Figure B.2-39 - 100m Aquifer Concentration for CaseA All Ba D_LA

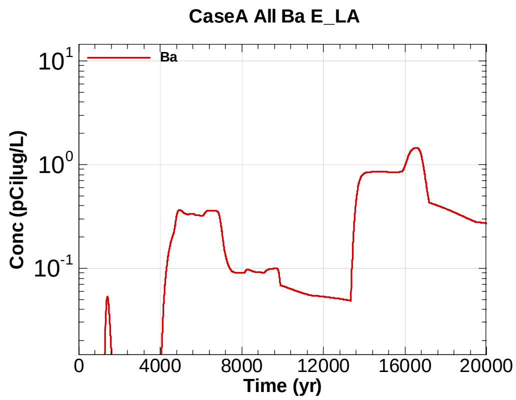

Figure B.2-40 - 100m Aquifer Concentration for CaseA All Ba E_LA

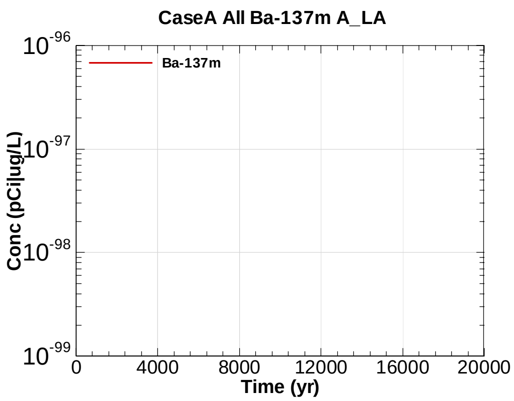

Figure B.2-41 - 100m Aquifer Concentration for CaseA All Ba-137m A_LA

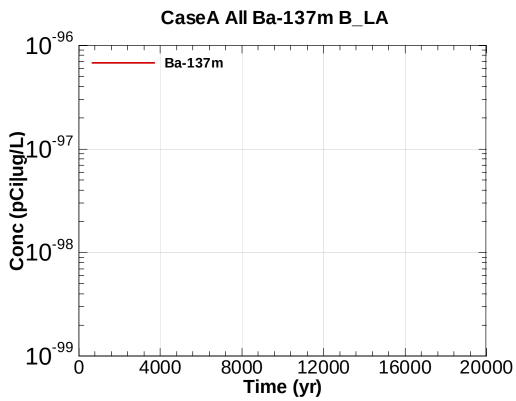

Figure B.2-42 - 100m Aquifer Concentration for CaseA All Ba-137m B_LA

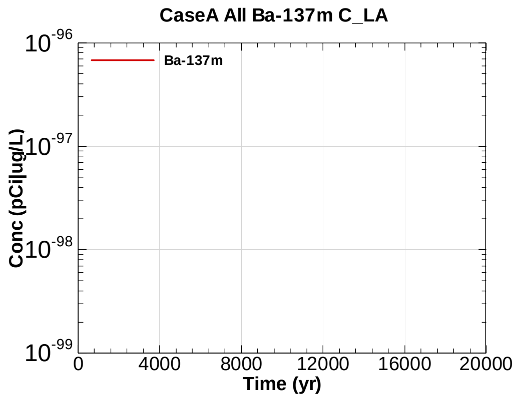

Figure B.2-43 - 100m Aquifer Concentration for CaseA All Ba-137m C_LA

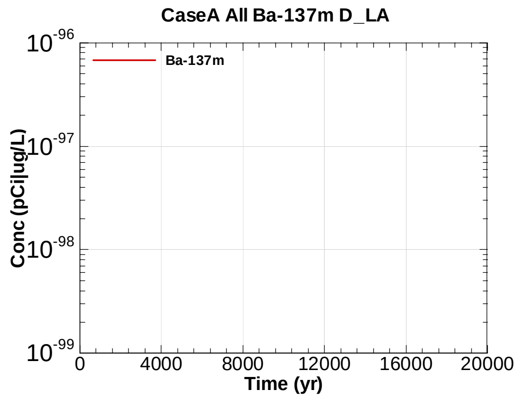

Figure B.2-44 - 100m Aquifer Concentration for CaseA All Ba-137m D_LA

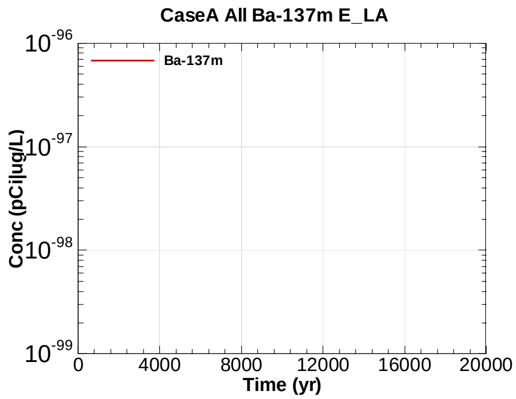

Figure B.2-45 - 100m Aquifer Concentration for CaseA All Ba-137m E_LA

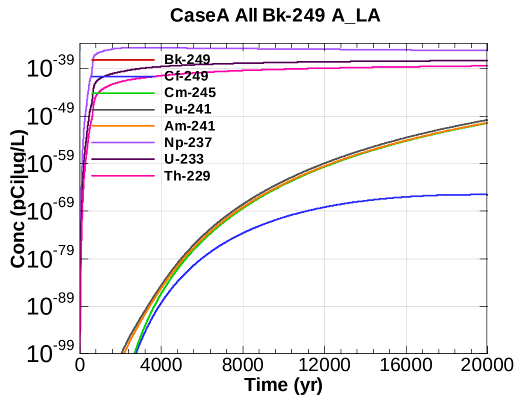

Figure B.2-46 - 100m Aquifer Concentration for CaseA All Bk-249 A_LA

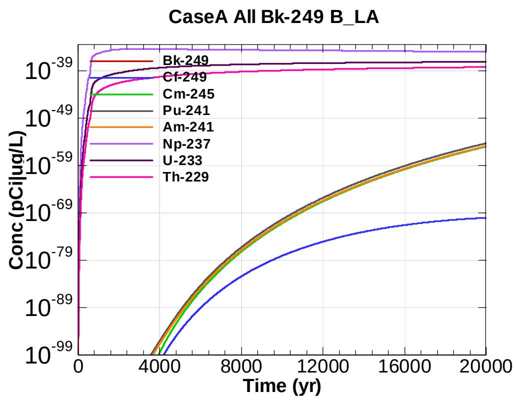

Figure B.2-47 - 100m Aquifer Concentration for CaseA All Bk-249 B_LA

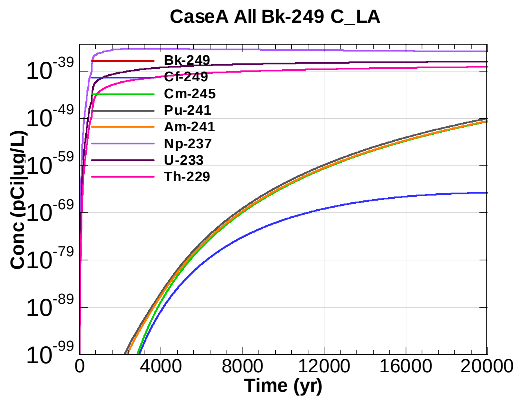

Figure B.2-48 - 100m Aquifer Concentration for CaseA All Bk-249 C_LA

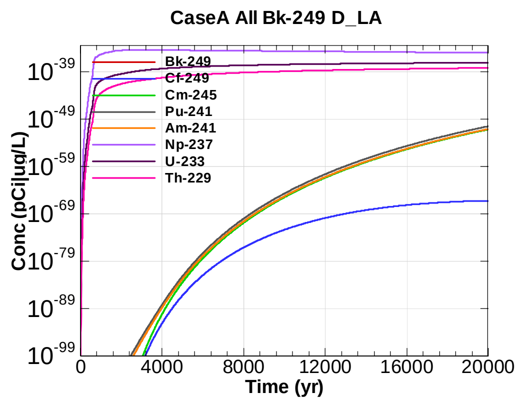

Figure B.2-49 - 100m Aquifer Concentration for CaseA All Bk-249 D_LA

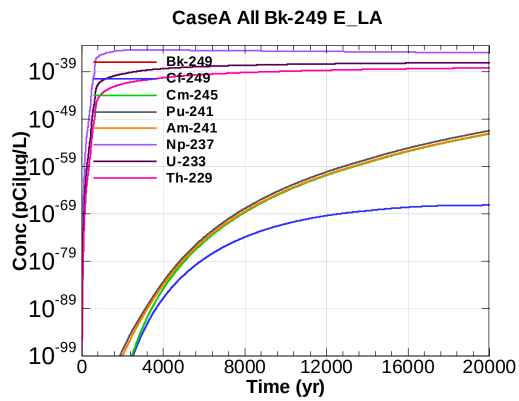

Figure B.2-50 - 100m Aquifer Concentration for CaseA All Bk-249 E_LA

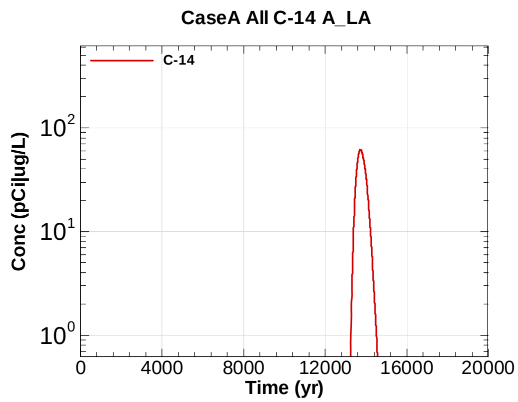

Figure B.2-51 - 100m Aquifer Concentration for CaseA All C-14 A_LA

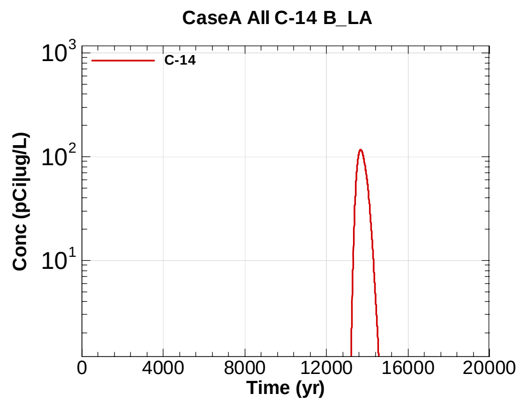

Figure B.2-52 - 100m Aquifer Concentration for CaseA All C-14 B_LA

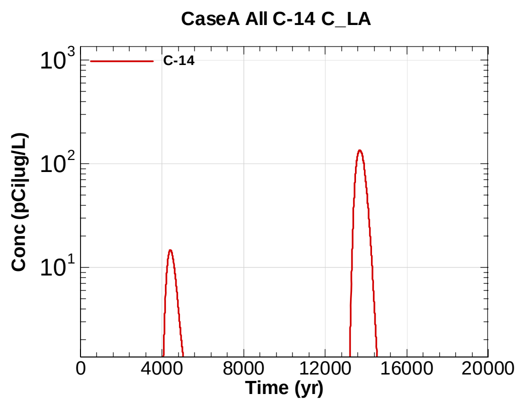

Figure B.2-53 - 100m Aquifer Concentration for CaseA All C-14 C_LA

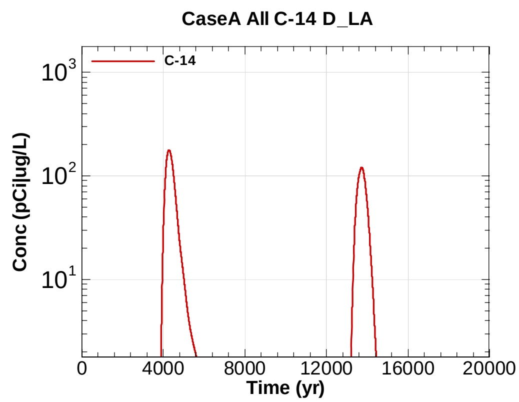

Figure B.2-54 - 100m Aquifer Concentration for CaseA All C-14 D_LA

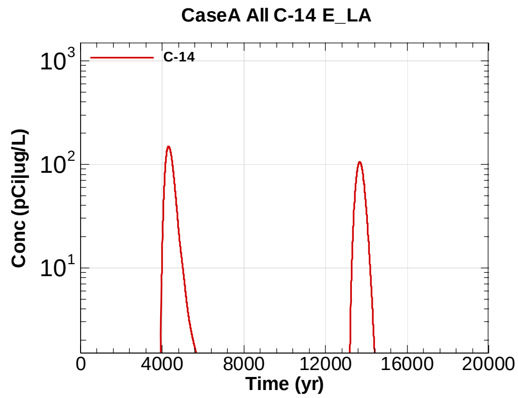

Figure B.2-55 - 100m Aquifer Concentration for CaseA All C-14 E_LA

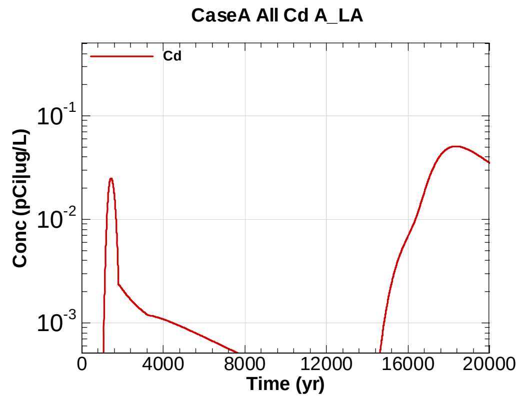

Figure B.2-56 - 100m Aquifer Concentration for CaseA All Cd A_LA

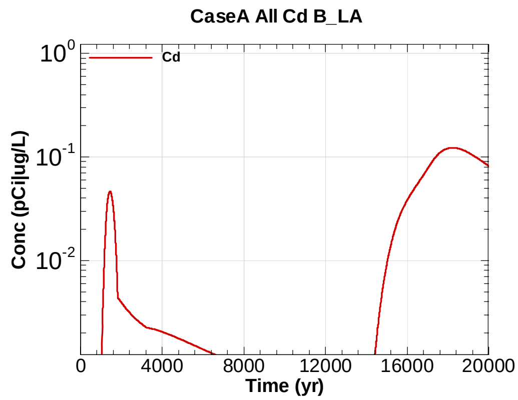

Figure B.2-57 - 100m Aquifer Concentration for CaseA All Cd B_LA

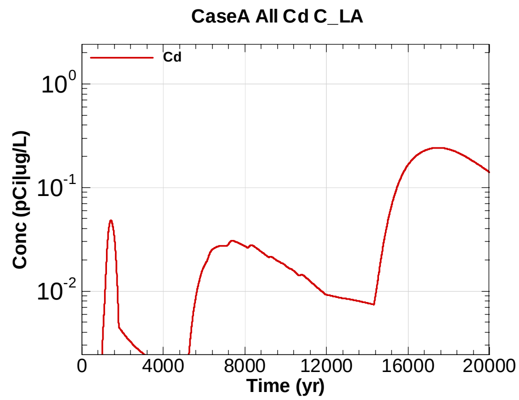

Figure B.2-58 - 100m Aquifer Concentration for CaseA All Cd C_LA

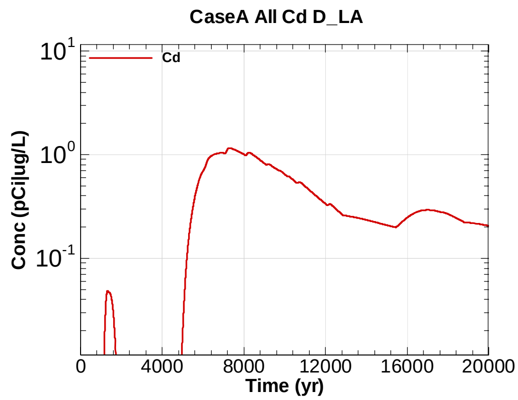

Figure B.2-59 - 100m Aquifer Concentration for CaseA All Cd D_LA

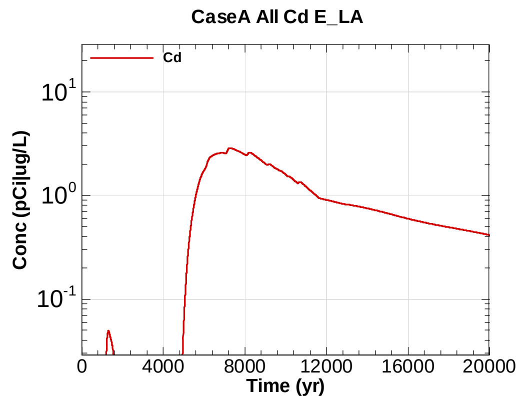

Figure B.2-60 - 100m Aquifer Concentration for CaseA All Cd E_LA

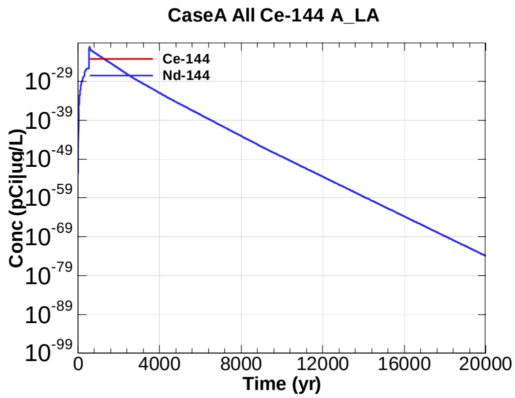

Figure B.2-61 - 100m Aquifer Concentration for CaseA All Ce-144 A_LA

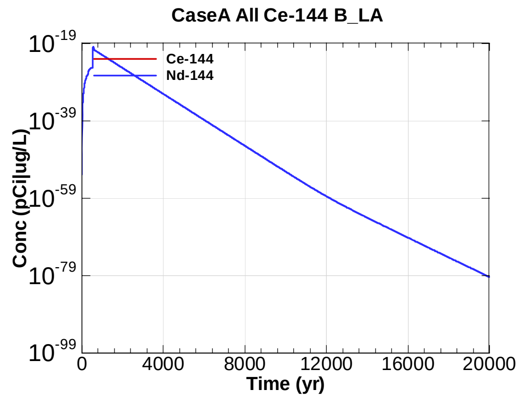

Figure B.2-62 - 100m Aquifer Concentration for CaseA All Ce-144 B_LA

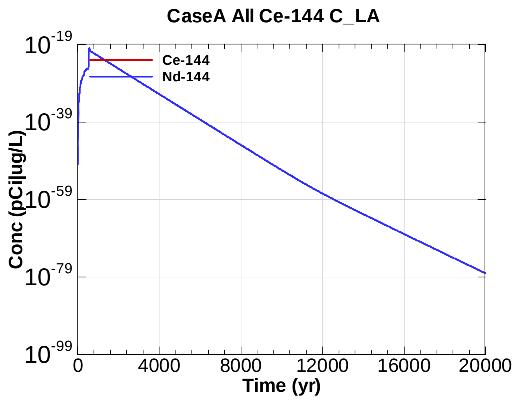

Figure B.2-63 - 100m Aquifer Concentration for CaseA All Ce-144 C_LA

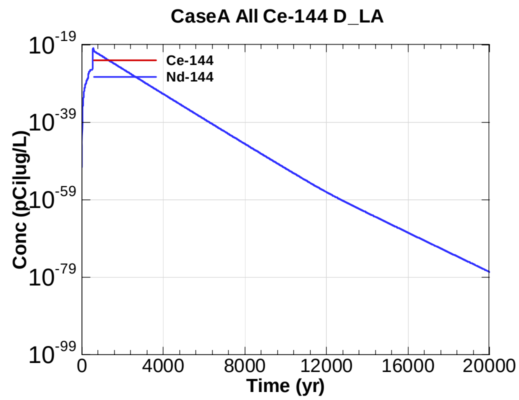

Figure B.2-64 - 100m Aquifer Concentration for CaseA All Ce-144 D_LA

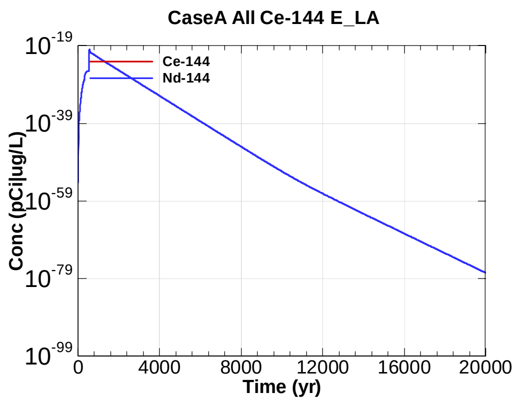

Figure B.2-65 - 100m Aquifer Concentration for CaseA All Ce-144 E_LA

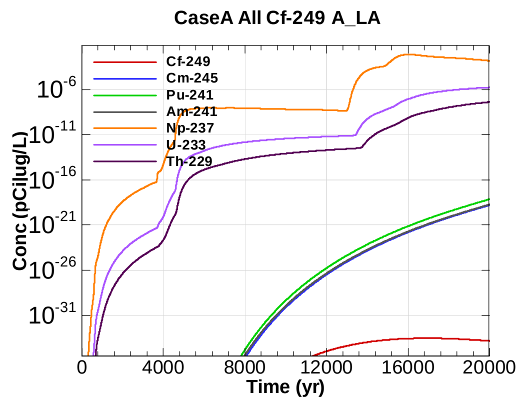

Figure B.2-66 - 100m Aquifer Concentration for CaseA All Cf-249 A_LA

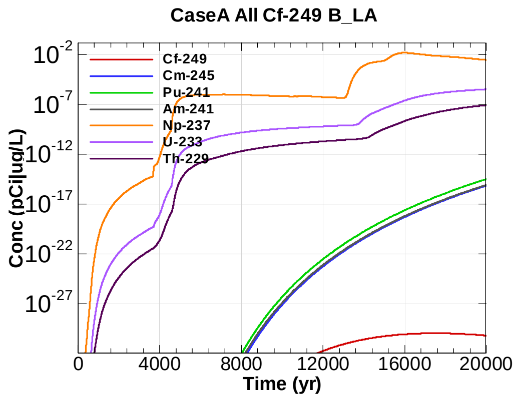

Figure B.2-67 - 100m Aquifer Concentration for CaseA All Cf-249 B_LA

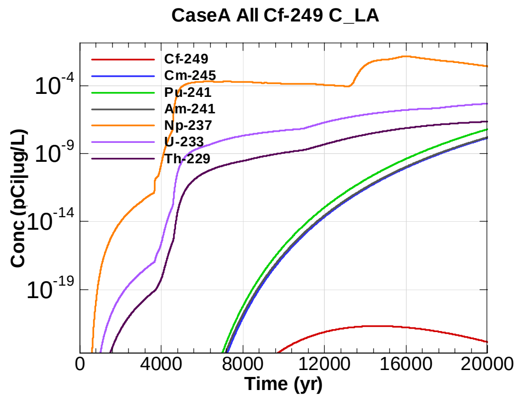

Figure B.2-68 - 100m Aquifer Concentration for CaseA All Cf-249 C_LA

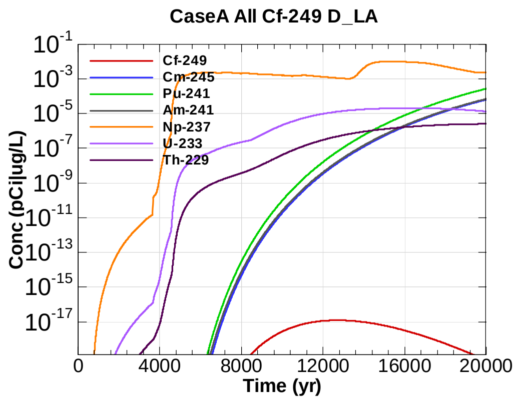

Figure B.2-69 - 100m Aquifer Concentration for CaseA All Cf-249 D_LA

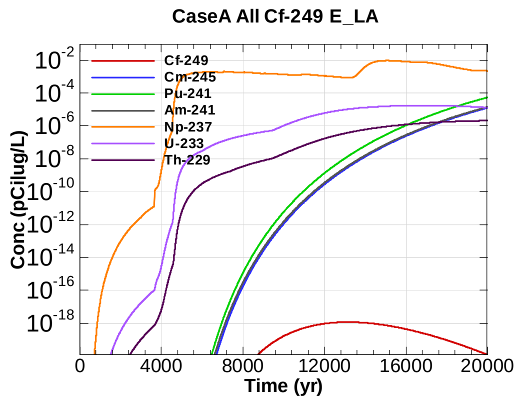

Figure B.2-70 - 100m Aquifer Concentration for CaseA All Cf-249 E_LA

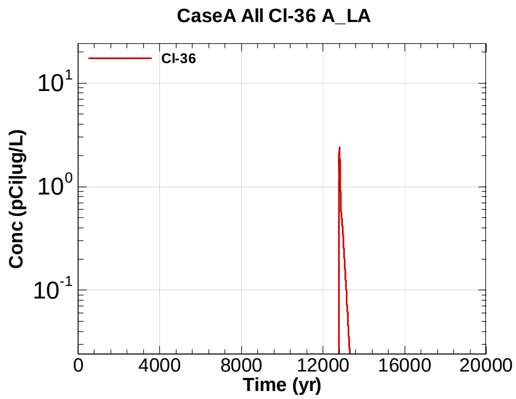

Figure B.2-71 - 100m Aquifer Concentration for CaseA All Cl-36 A_LA

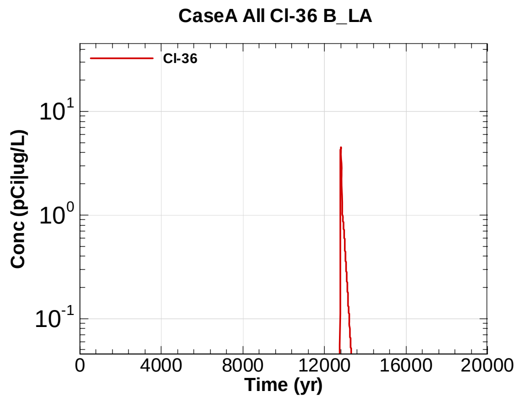

Figure B.2-72 - 100m Aquifer Concentration for CaseA All Cl-36 B_LA

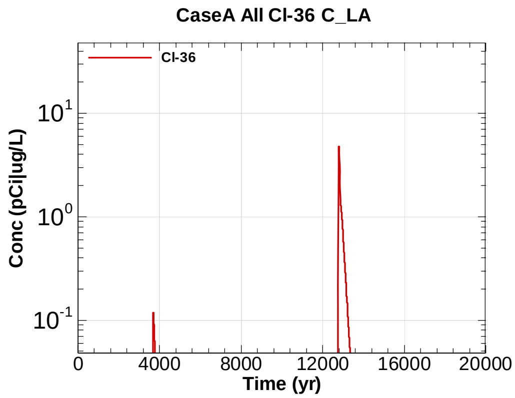

Figure B.2-73 - 100m Aquifer Concentration for CaseA All Cl-36 C_LA

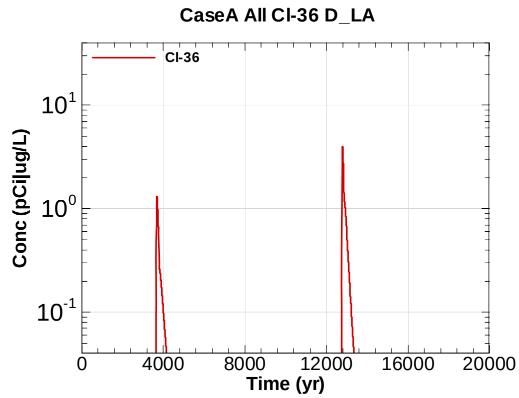

Figure B.2-74 - 100m Aquifer Concentration for CaseA All Cl-36 D_LA

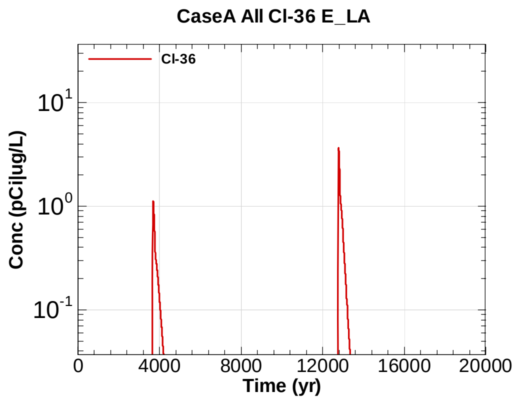

Figure B.2-75 - 100m Aquifer Concentration for CaseA All Cl-36 E_LA

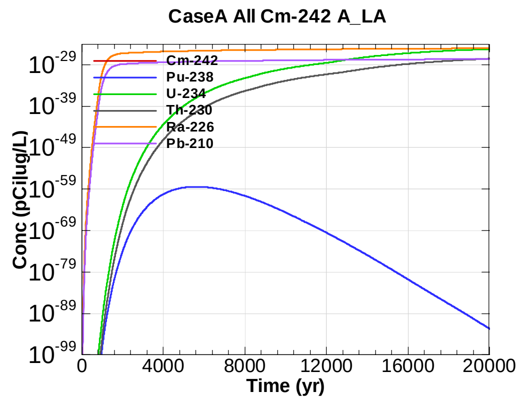

Figure B.2-76 - 100m Aquifer Concentration for CaseA All Cm-242 A_LA

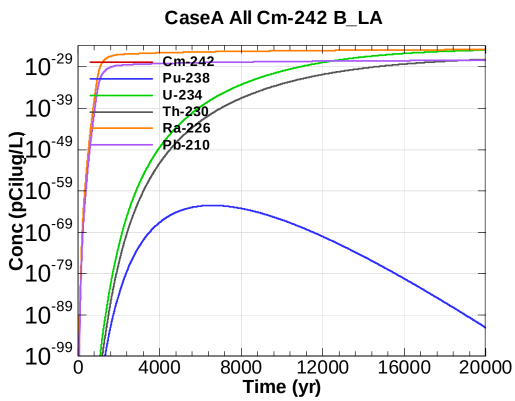

Figure B.2-77 - 100m Aquifer Concentration for CaseA All Cm-242 B_LA

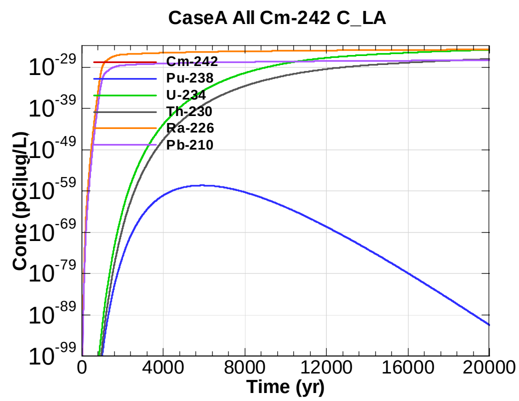

Figure B.2-78 - 100m Aquifer Concentration for CaseA All Cm-242 C_LA

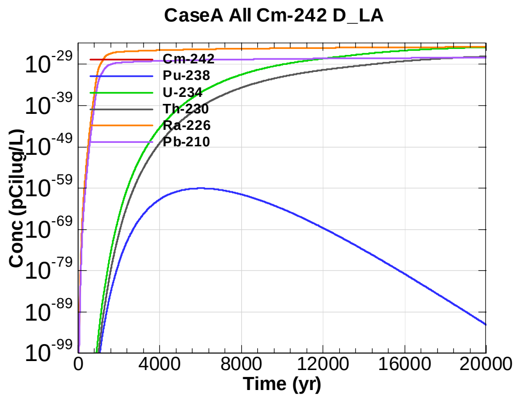

Figure B.2-79 - 100m Aquifer Concentration for CaseA All Cm-242 D_LA

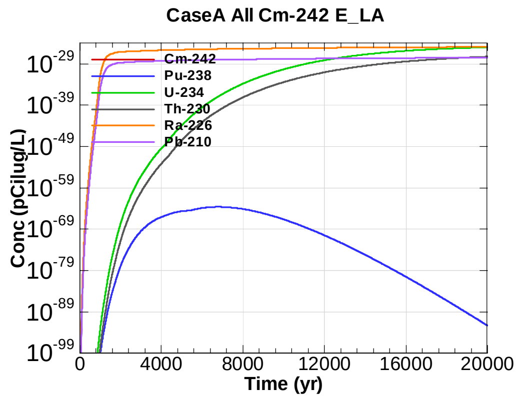

Figure B.2-80 - 100m Aquifer Concentration for CaseA All Cm-242 E_LA

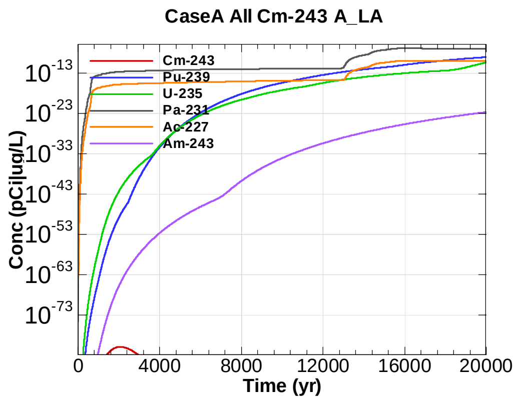

Figure B.2-81 - 100m Aquifer Concentration for CaseA All Cm-243 A_LA

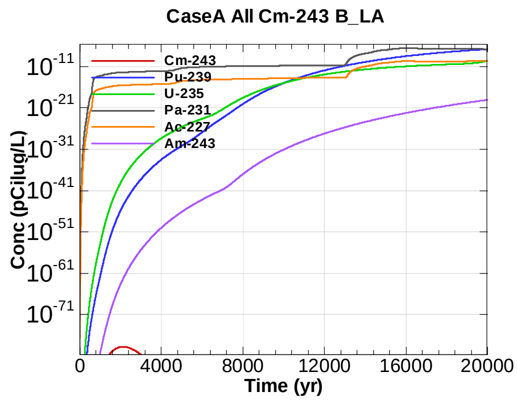

Figure B.2-82 - 100m Aquifer Concentration for CaseA All Cm-243 B_LA

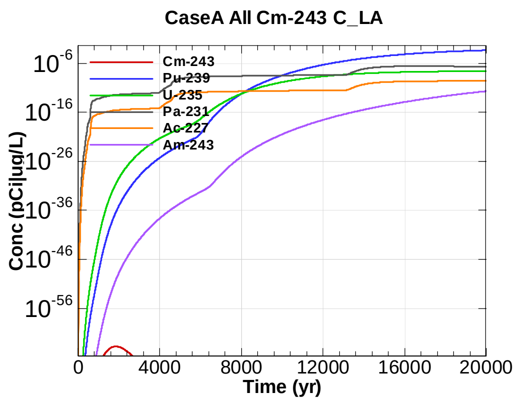

Figure B.2-83 - 100m Aquifer Concentration for CaseA All Cm-243 C_LA

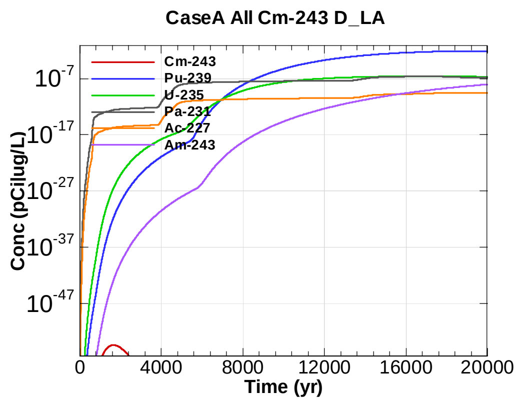

Figure B.2-84 - 100m Aquifer Concentration for CaseA All Cm-243 D_LA

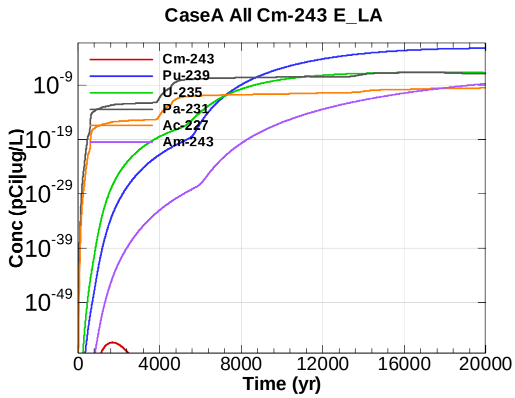

Figure B.2-85 - 100m Aquifer Concentration for CaseA All Cm-243 E_LA

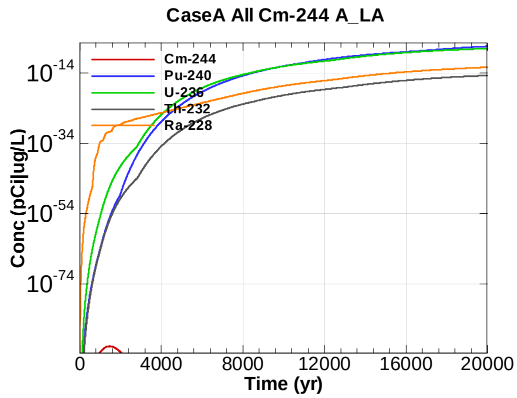

Figure B.2-86 - 100m Aquifer Concentration for CaseA All Cm-244 A_LA

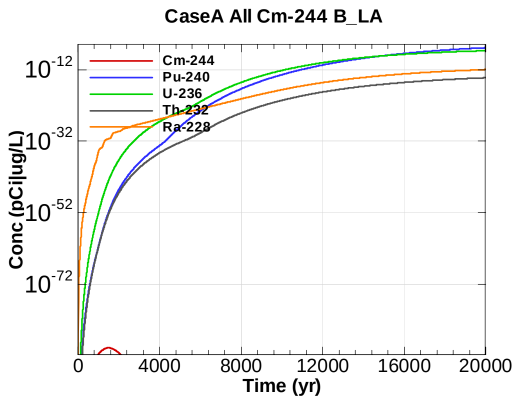

Figure B.2-87 - 100m Aquifer Concentration for CaseA All Cm-244 B_LA

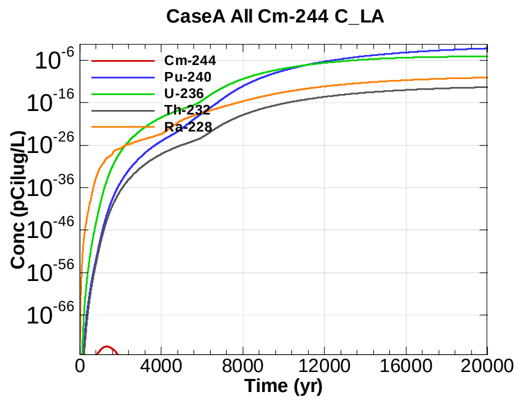

Figure B.2-88 - 100m Aquifer Concentration for CaseA All Cm-244 C_LA

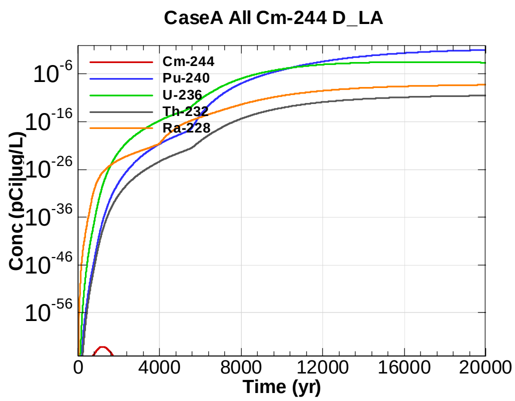

Figure B.2-89 - 100m Aquifer Concentration for CaseA All Cm-244 D_LA

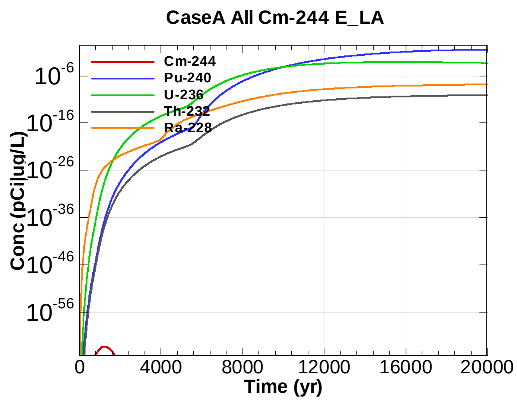

Figure B.2-90 - 100m Aquifer Concentration for CaseA All Cm-244 E_LA

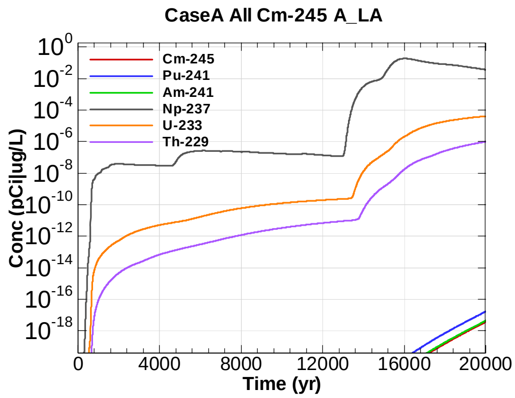

Figure B.2-91 - 100m Aquifer Concentration for CaseA All Cm-245 A_LA

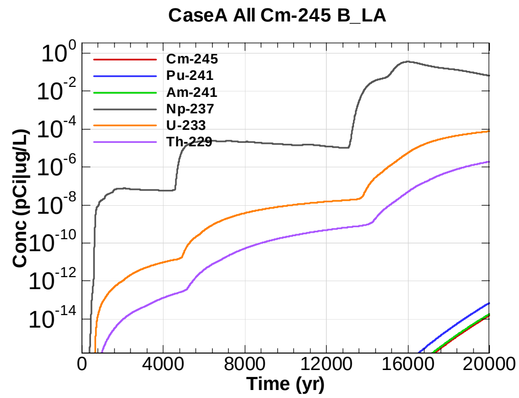

Figure B.2-92 - 100m Aquifer Concentration for CaseA All Cm-245 B_LA

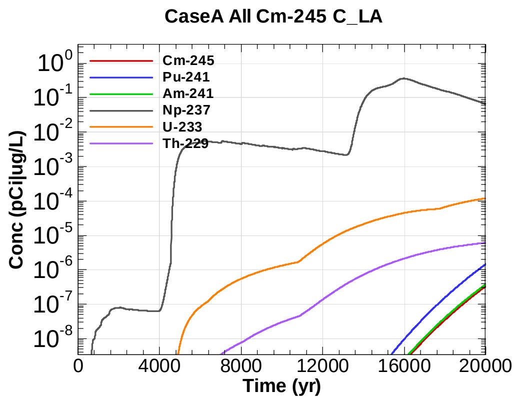

Figure B.2-93 - 100m Aquifer Concentration for CaseA All Cm-245 C_LA

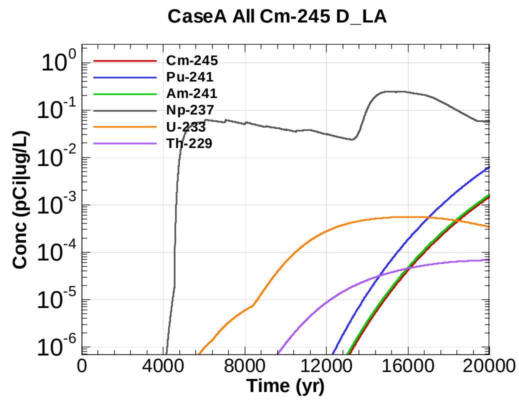

Figure B.2-94 - 100m Aquifer Concentration for CaseA All Cm-245 D_LA

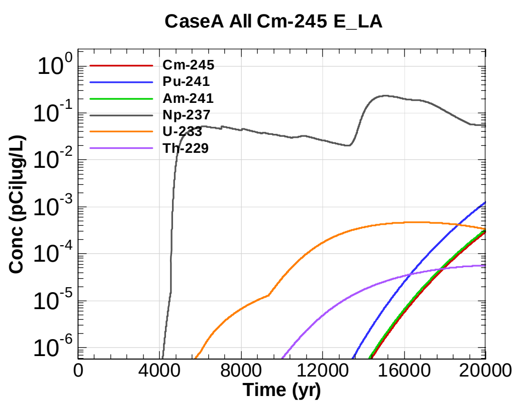

Figure B.2-95 - 100m Aquifer Concentration for CaseA All Cm-245 E_LA

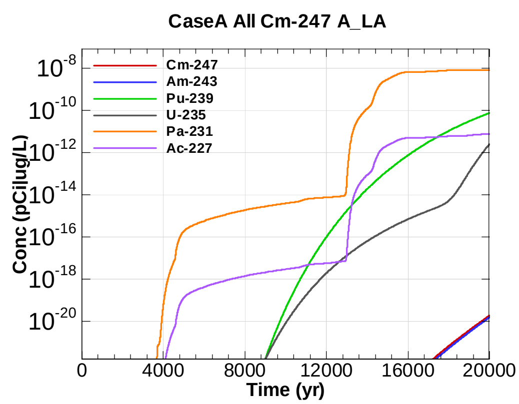

Figure B.2-96 - 100m Aquifer Concentration for CaseA All Cm-247 A_LA

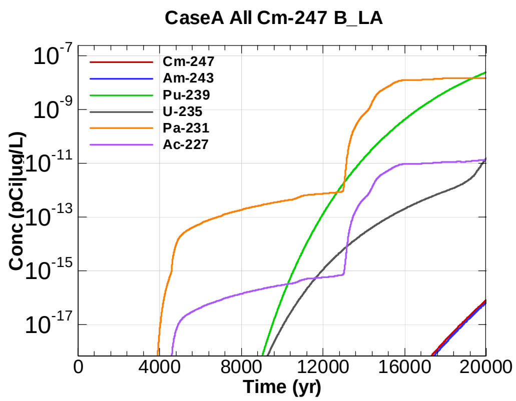

Figure B.2-97 - 100m Aquifer Concentration for CaseA All Cm-247 B_LA

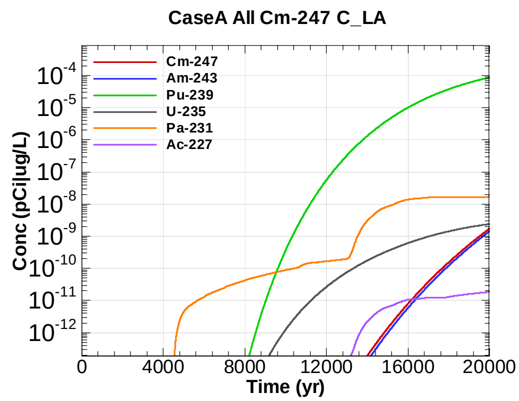

Figure B.2-98 - 100m Aquifer Concentration for CaseA All Cm-247 C_LA

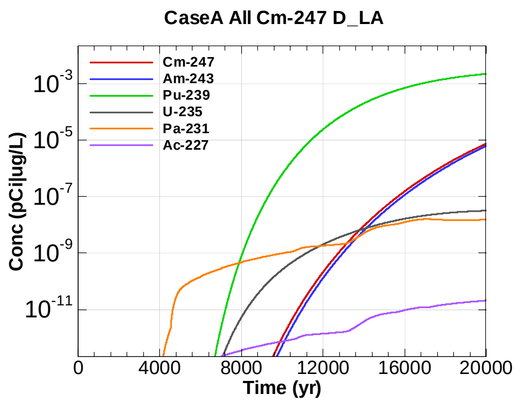

Figure B.2-99 - 100m Aquifer Concentration for CaseA All Cm-247 D_LA

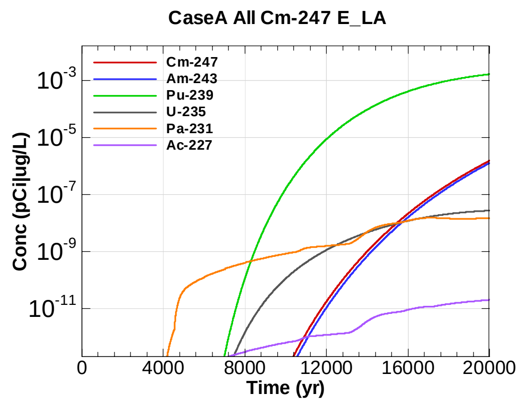

Figure B.2-100 - 100m Aquifer Concentration for CaseA All Cm-247 E_LA

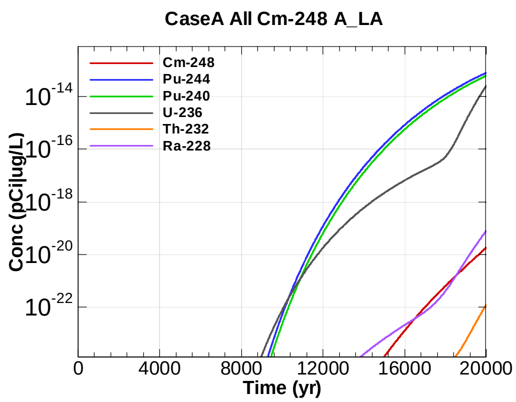

Figure B.2-101 - 100m Aquifer Concentration for CaseA All Cm-248 A_LA

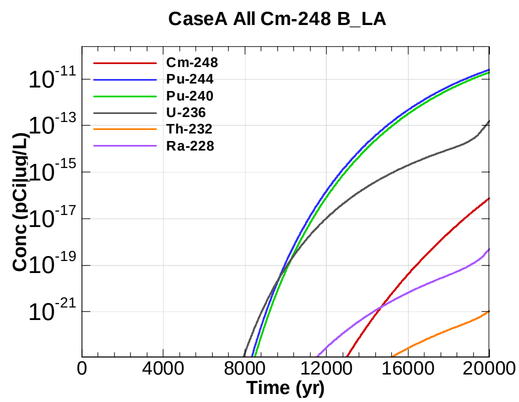

Figure B.2-102 - 100m Aquifer Concentration for CaseA All Cm-248 B_LA

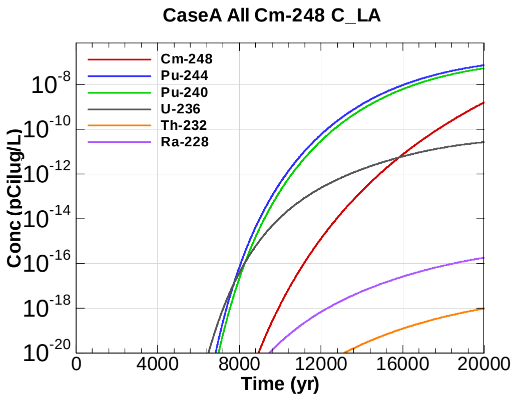

Figure B.2-103 - 100m Aquifer Concentration for CaseA All Cm-248 C_LA

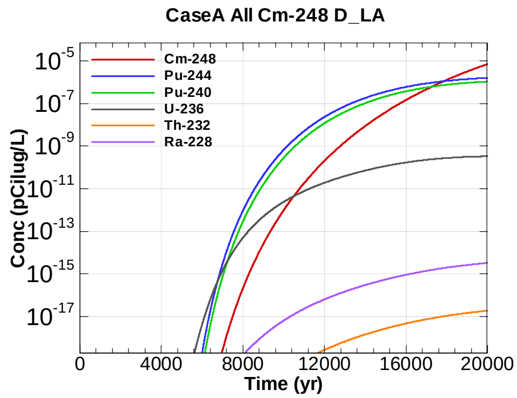

Figure B.2-104 - 100m Aquifer Concentration for CaseA All Cm-248 D_LA

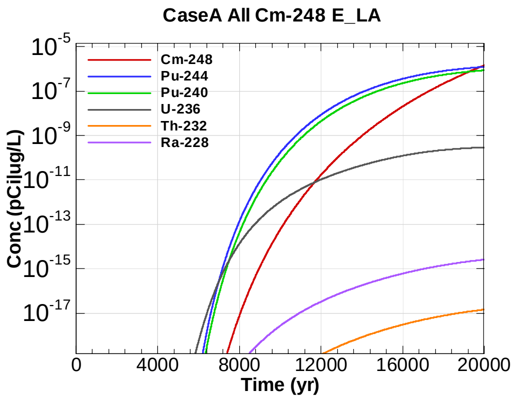

Figure B.2-105 - 100m Aquifer Concentration for CaseA All Cm-248 E_LA

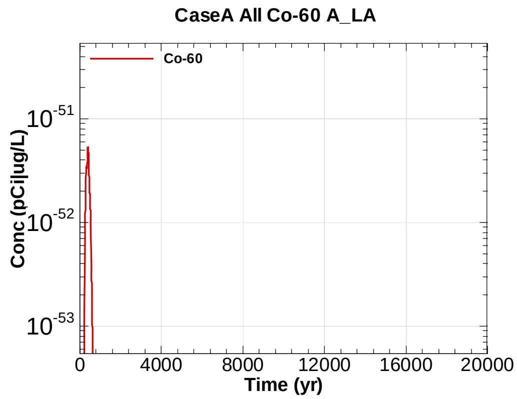

Figure B.2-106 - 100m Aquifer Concentration for CaseA All Co-60 A_LA

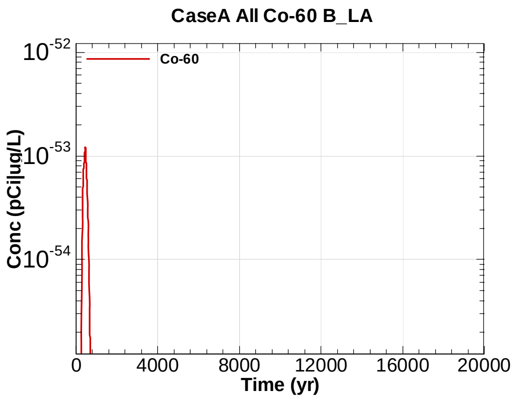

Figure B.2-107 - 100m Aquifer Concentration for CaseA All Co-60 B_LA

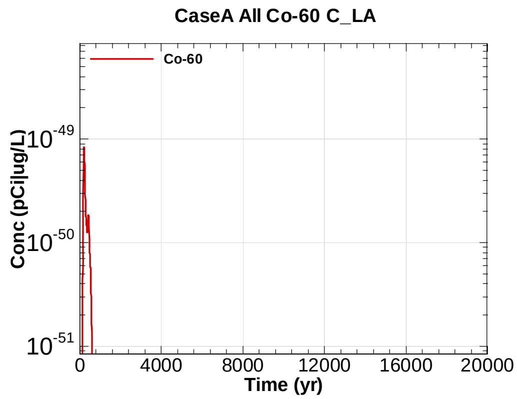

Figure B.2-108 - 100m Aquifer Concentration for CaseA All Co-60 C_LA

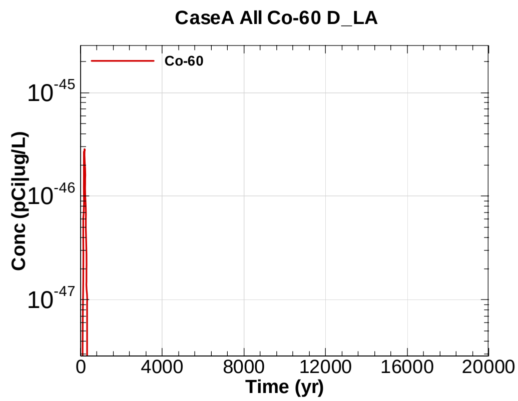

Figure B.2-109 - 100m Aquifer Concentration for CaseA All Co-60 D_LA

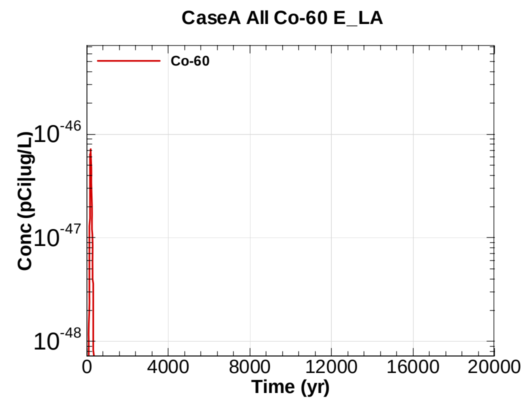

Figure B.2-110 - 100m Aquifer Concentration for CaseA All Co-60 E_LA

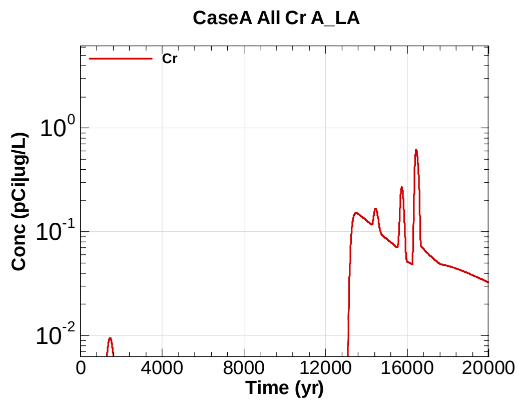

Figure B.2-111 - 100m Aquifer Concentration for CaseA All Cr A_LA

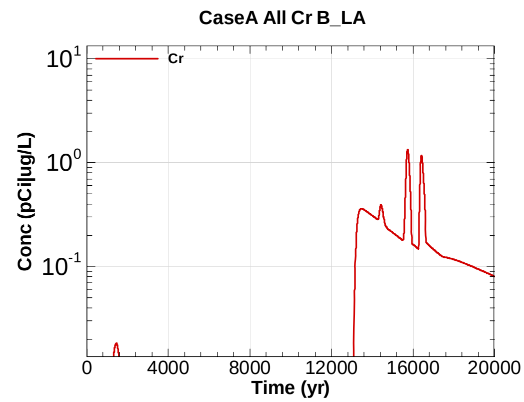

Figure B.2-112 - 100m Aquifer Concentration for CaseA All Cr B_LA

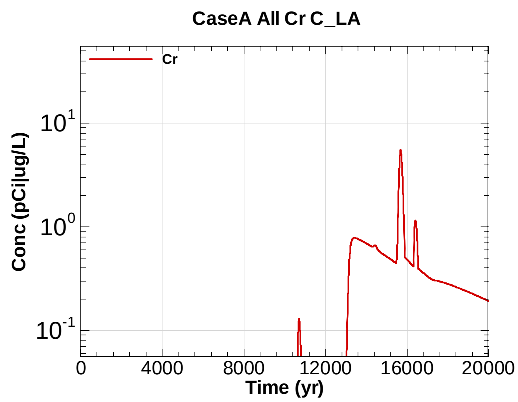

Figure B.2-113 - 100m Aquifer Concentration for CaseA All Cr C_LA

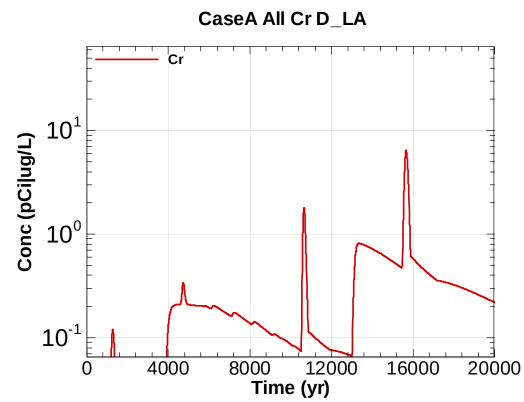

Figure B.2-114 - 100m Aquifer Concentration for CaseA All Cr D_LA

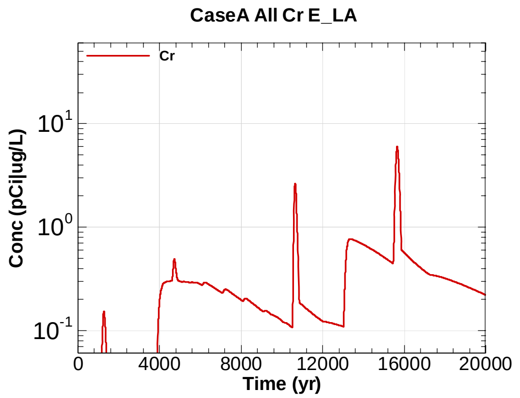

Figure B.2-115 - 100m Aquifer Concentration for CaseA All Cr E_LA

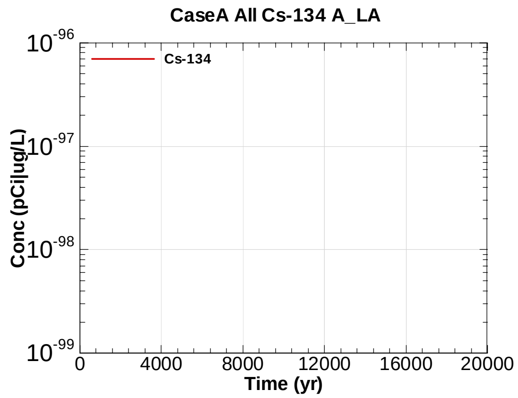

Figure B.2-116 - 100m Aquifer Concentration for CaseA All Cs-134 A_LA

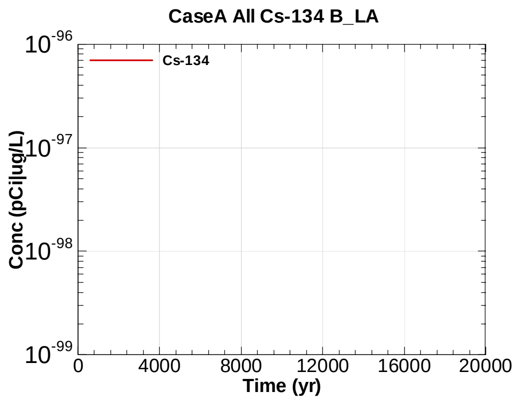

Figure B.2-117 - 100m Aquifer Concentration for CaseA All Cs-134 B_LA

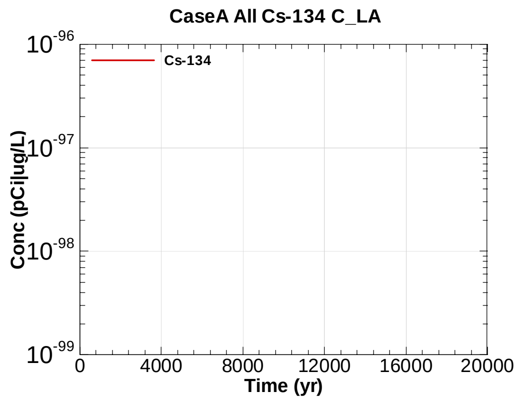

Figure B.2-118 - 100m Aquifer Concentration for CaseA All Cs-134 C_LA

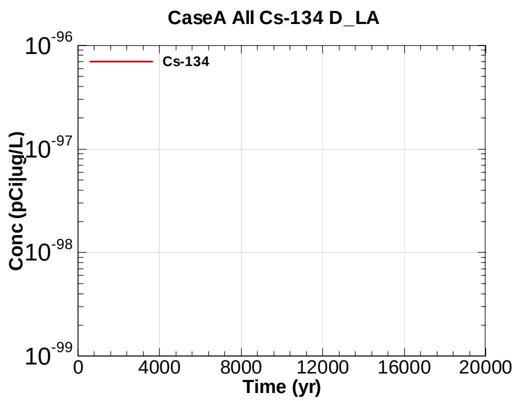

Figure B.2-119 - 100m Aquifer Concentration for CaseA All Cs-134 D_LA

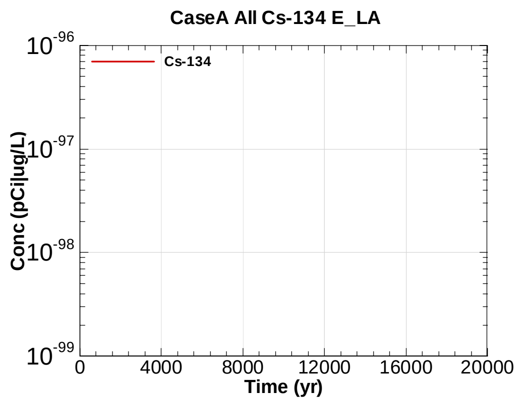

Figure B.2-120 - 100m Aquifer Concentration for CaseA All Cs-134 E_LA

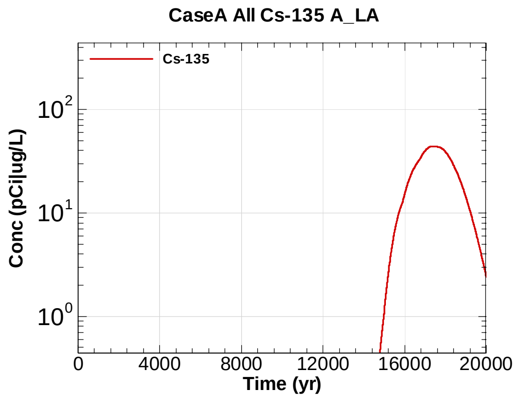

Figure B.2-121 - 100m Aquifer Concentration for CaseA All Cs-135 A_LA

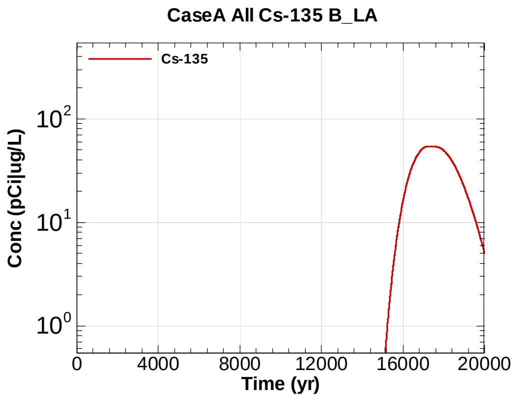

Figure B.2-122 - 100m Aquifer Concentration for CaseA All Cs-135 B_LA

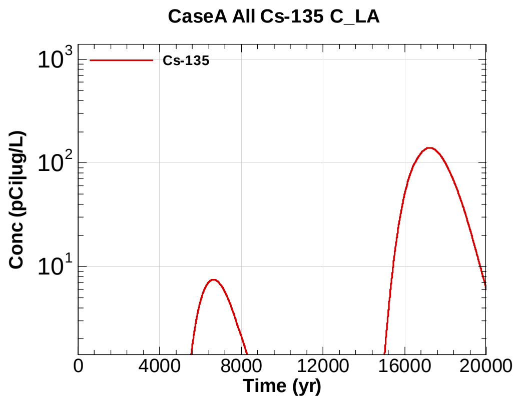

Figure B.2-123 - 100m Aquifer Concentration for CaseA All Cs-135 C_LA

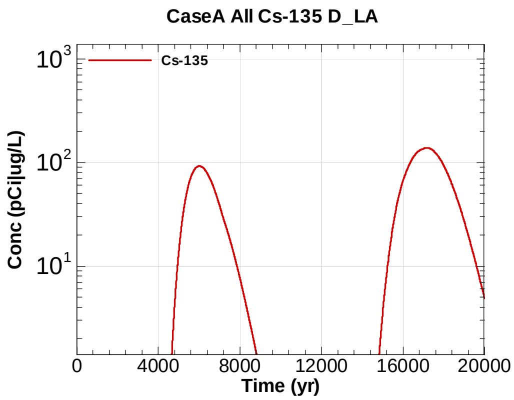

Figure B.2-124 - 100m Aquifer Concentration for CaseA All Cs-135 D_LA

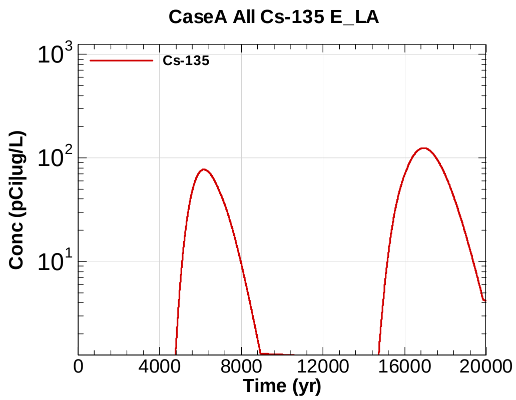

Figure B.2-125 - 100m Aquifer Concentration for CaseA All Cs-135 E_LA

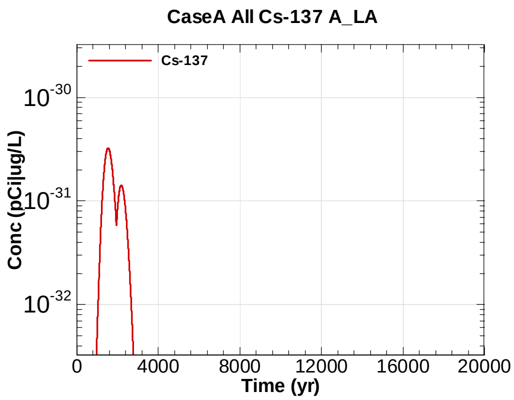

Figure B.2-126 - 100m Aquifer Concentration for CaseA All Cs-137 A_LA

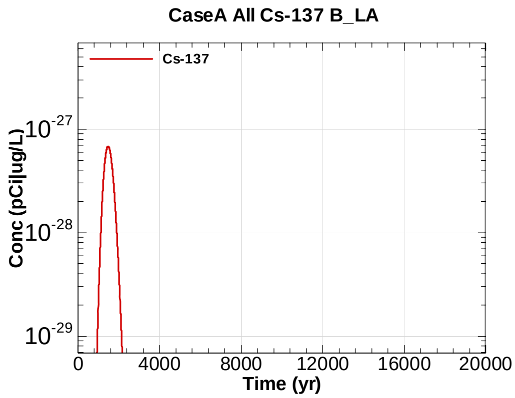

Figure B.2-127 - 100m Aquifer Concentration for CaseA All Cs-137 B_LA

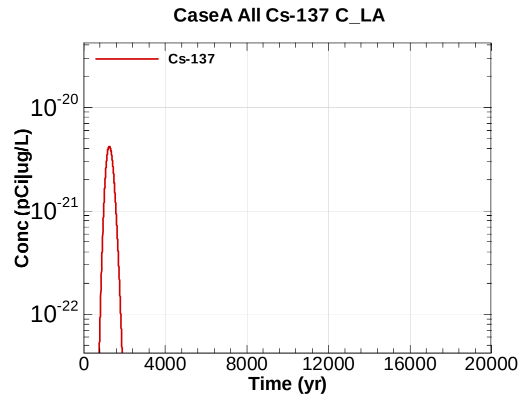

Figure B.2-128 - 100m Aquifer Concentration for CaseA All Cs-137 C_LA

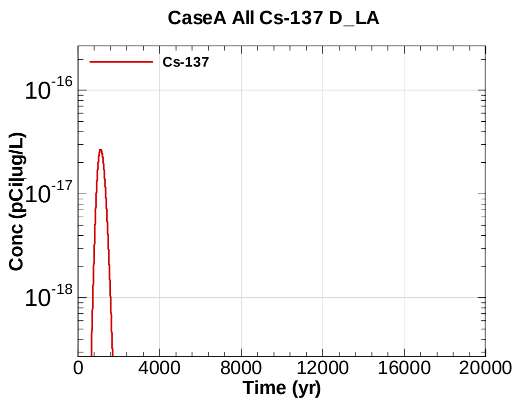

Figure B.2-129 - 100m Aquifer Concentration for CaseA All Cs-137 D_LA

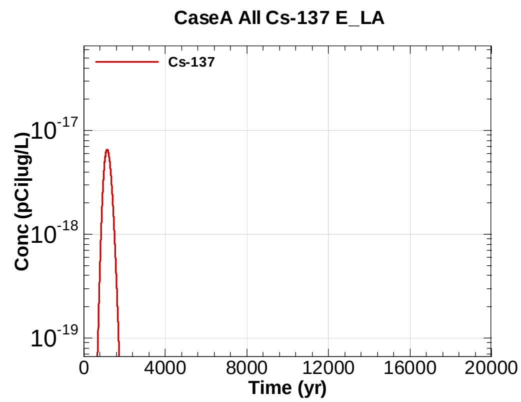

Figure B.2-130 - 100m Aquifer Concentration for CaseA All Cs-137 E_LA

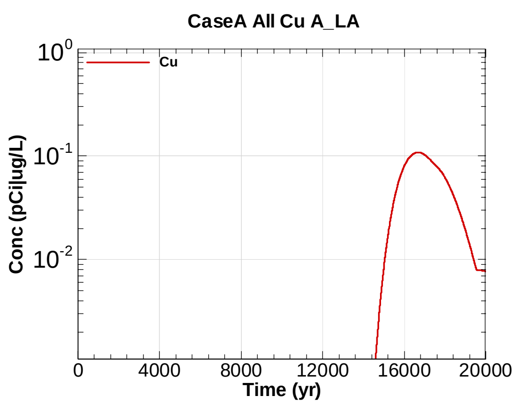

Figure B.2-131 - 100m Aquifer Concentration for CaseA All Cu A_LA

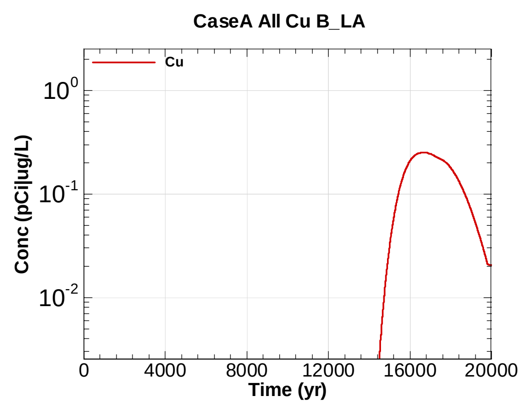

Figure B.2-132 - 100m Aquifer Concentration for CaseA All Cu B_LA

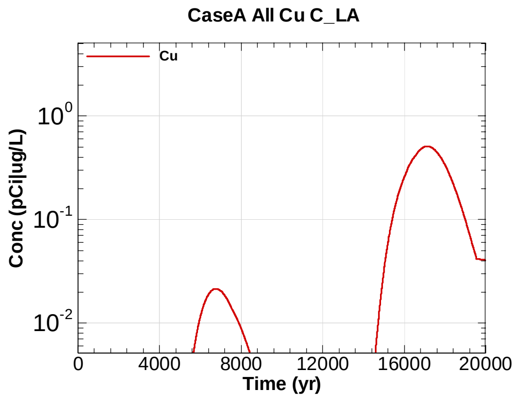

Figure B.2-133 - 100m Aquifer Concentration for CaseA All Cu C_LA

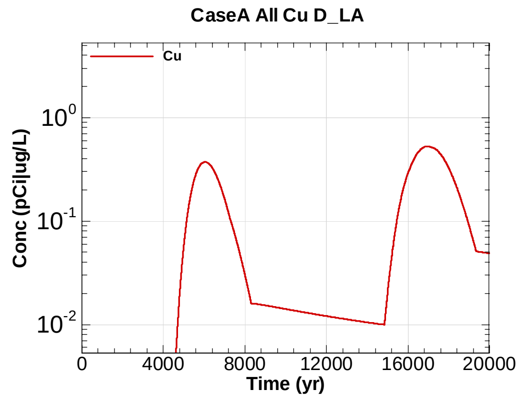

Figure B.2-134 - 100m Aquifer Concentration for CaseA All Cu D_LA

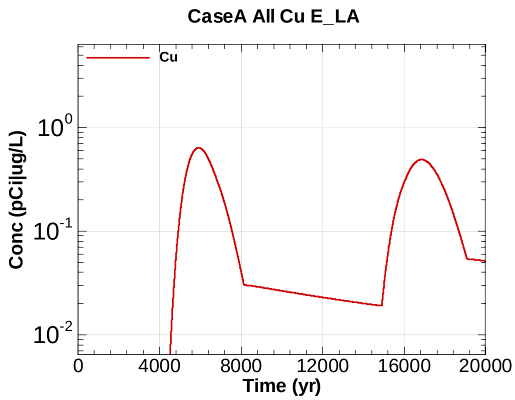

Figure B.2-135 - 100m Aquifer Concentration for CaseA All Cu E_LA

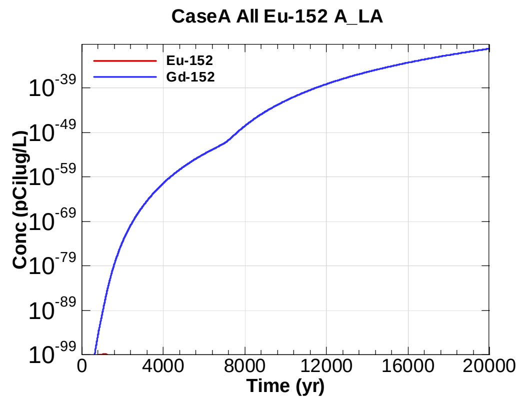

Figure B.2-136 - 100m Aquifer Concentration for CaseA All Eu-152 A_LA

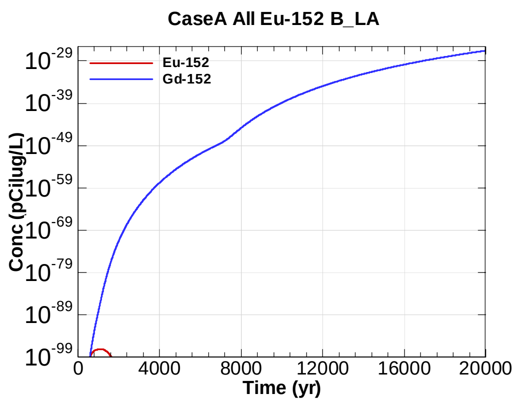

Figure B.2-137 - 100m Aquifer Concentration for CaseA All Eu-152 B_LA

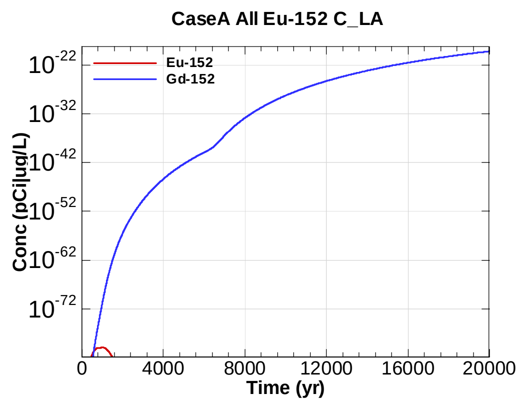

Figure B.2-138 - 100m Aquifer Concentration for CaseA All Eu-152 C_LA

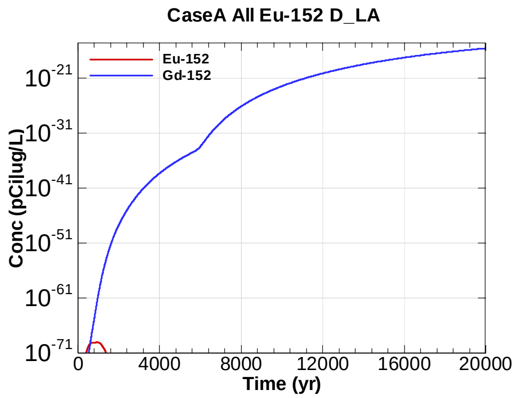

Figure B.2-139 - 100m Aquifer Concentration for CaseA All Eu-152 D_LA

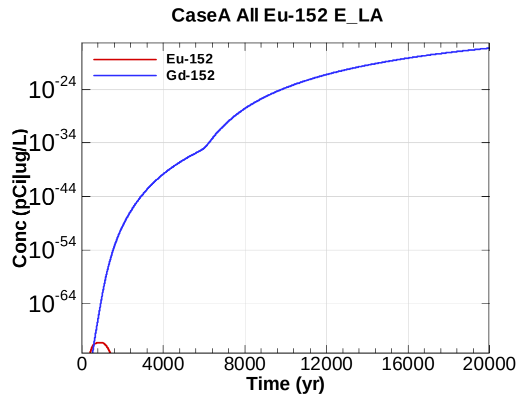

Figure B.2-140 - 100m Aquifer Concentration for CaseA All Eu-152 E_LA

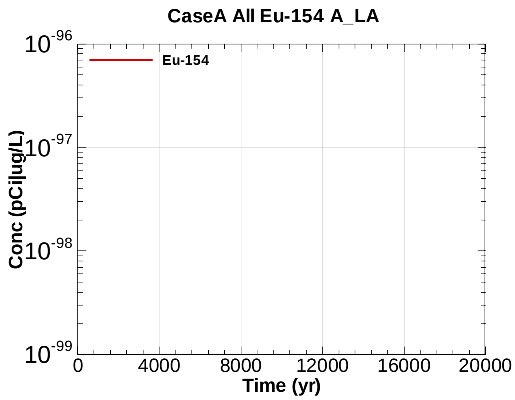

Figure B.2-141 - 100m Aquifer Concentration for CaseA All Eu-154 A_LA

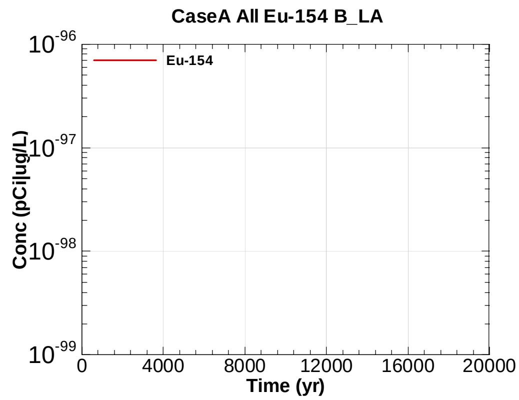

Figure B.2-142 - 100m Aquifer Concentration for CaseA All Eu-154 B_LA

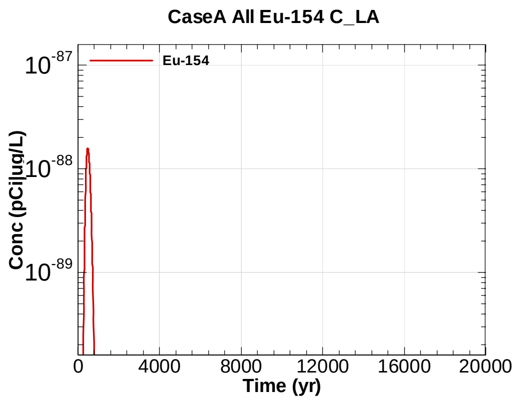

Figure B.2-143 - 100m Aquifer Concentration for CaseA All Eu-154 C_LA

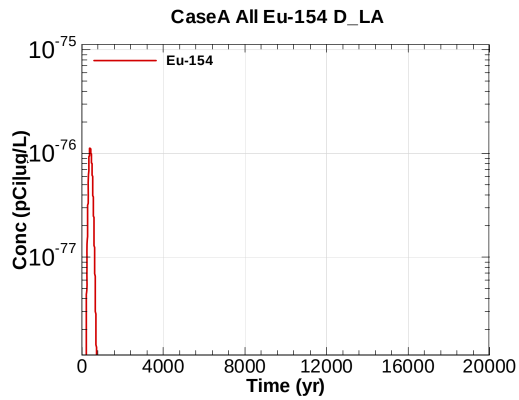

Figure B.2-144 - 100m Aquifer Concentration for CaseA All Eu-154 D_LA

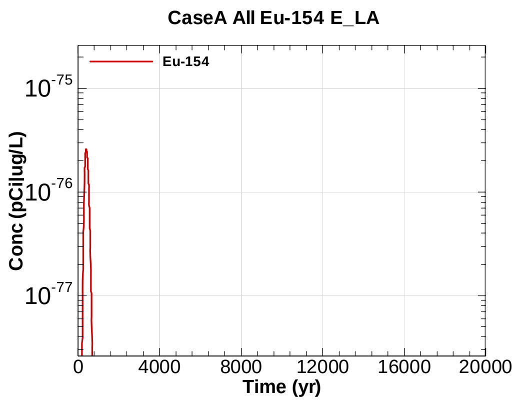

Figure B.2-145 - 100m Aquifer Concentration for CaseA All Eu-154 E_LA

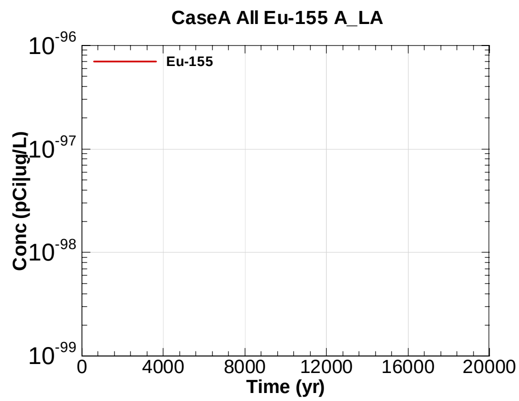

Figure B.2-146 - 100m Aquifer Concentration for CaseA All Eu-155 A_LA

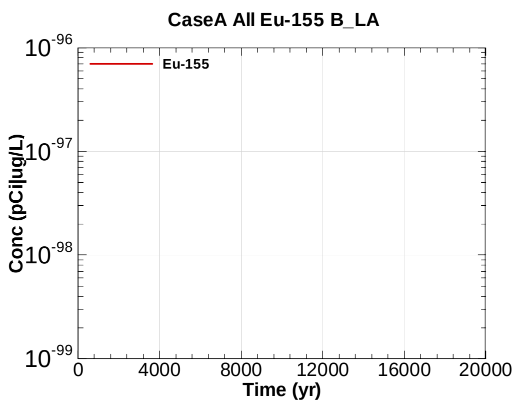

Figure B.2-147 - 100m Aquifer Concentration for CaseA All Eu-155 B_LA

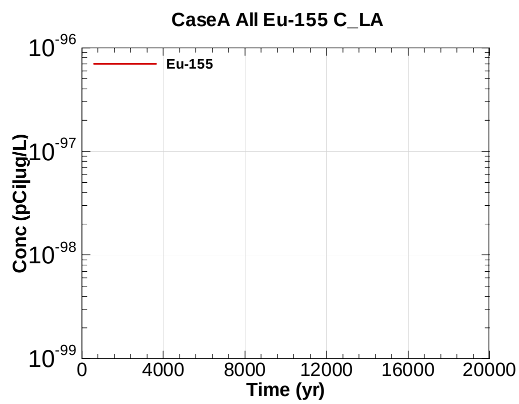

Figure B.2-148 - 100m Aquifer Concentration for CaseA All Eu-155 C_LA

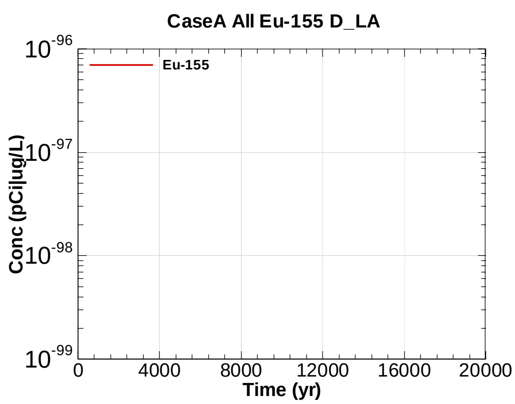

Figure B.2-149 - 100m Aquifer Concentration for CaseA All Eu-155 D_LA

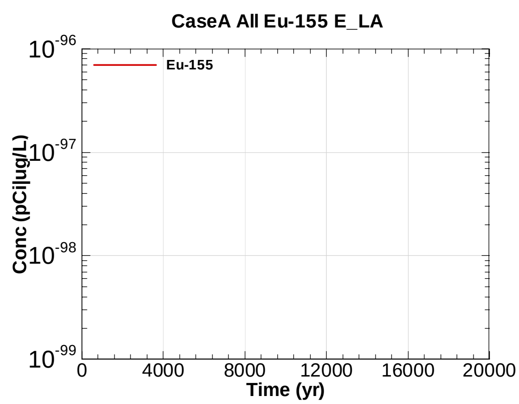

Figure B.2-150 - 100m Aquifer Concentration for CaseA All Eu-155 E_LA

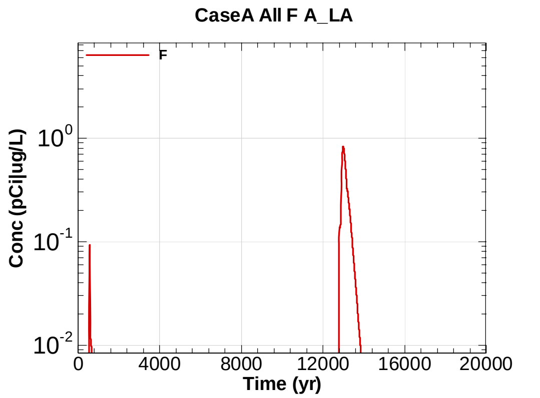

Figure B.2-151 - 100m Aquifer Concentration for CaseA All F A_LA

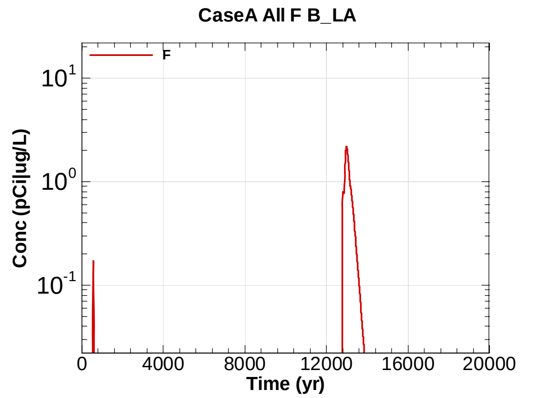

Figure B.2-152 - 100m Aquifer Concentration for CaseA All F B_LA

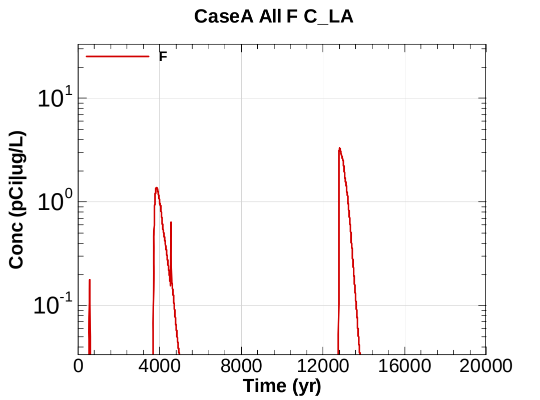

Figure B.2-153 - 100m Aquifer Concentration for CaseA All F C_LA

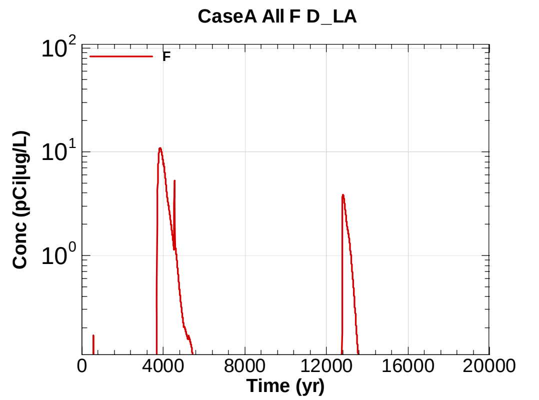

Figure B.2-154 - 100m Aquifer Concentration for CaseA All F D_LA

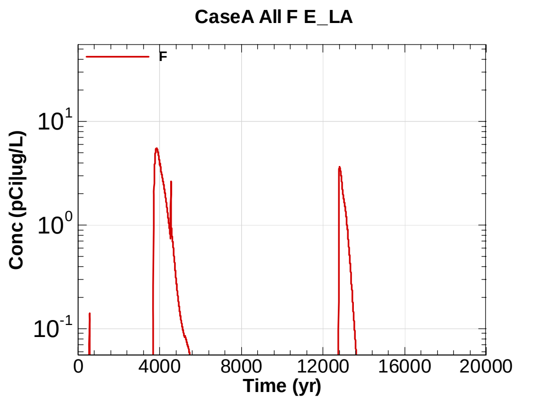

Figure B.2-155 - 100m Aquifer Concentration for CaseA All F E_LA

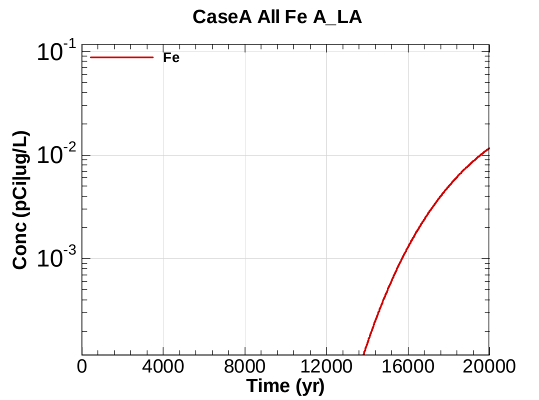

Figure B.2-156 - 100m Aquifer Concentration for CaseA All Fe A_LA

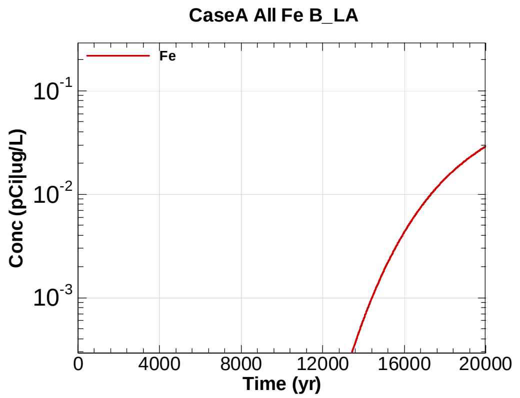

Figure B.2-157 - 100m Aquifer Concentration for CaseA All Fe B_LA

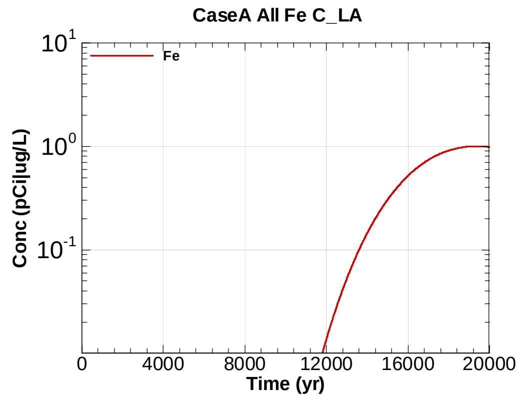

Figure B.2-158 - 100m Aquifer Concentration for CaseA All Fe C_LA

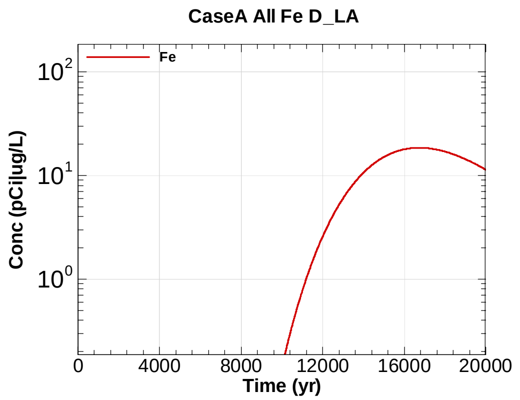

Figure B.2-159 - 100m Aquifer Concentration for CaseA All Fe D_LA

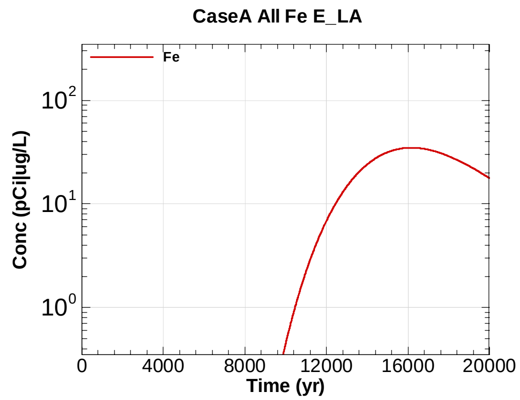

Figure B.2-160 - 100m Aquifer Concentration for CaseA All Fe E_LA

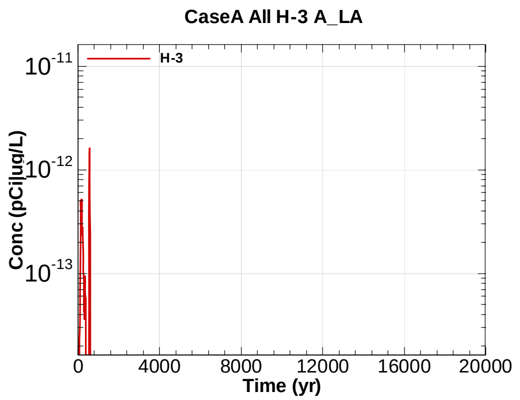

Figure B.2-161 - 100m Aquifer Concentration for CaseA All H-3 A_LA

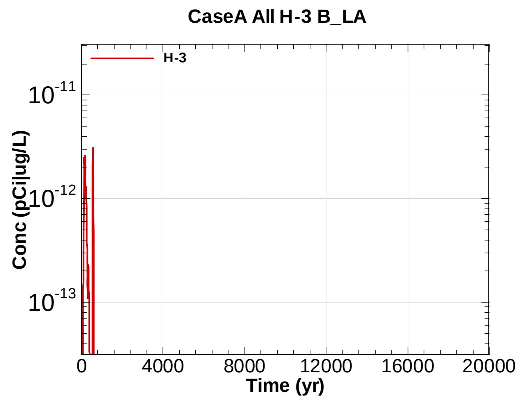

Figure B.2-162 - 100m Aquifer Concentration for CaseA All H-3 B_LA

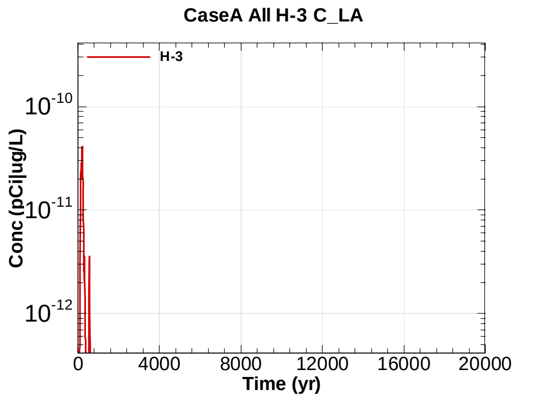

Figure B.2-163 - 100m Aquifer Concentration for CaseA All H-3 C_LA

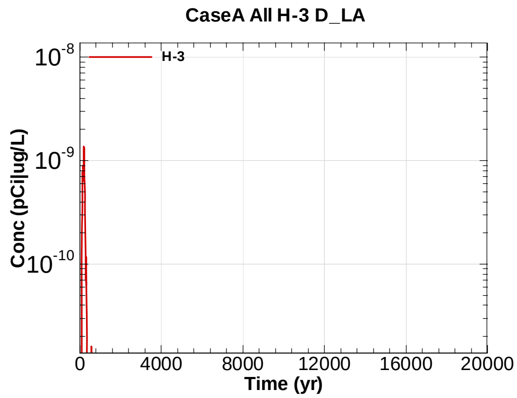

Figure B.2-164 - 100m Aquifer Concentration for CaseA All H-3 D_LA

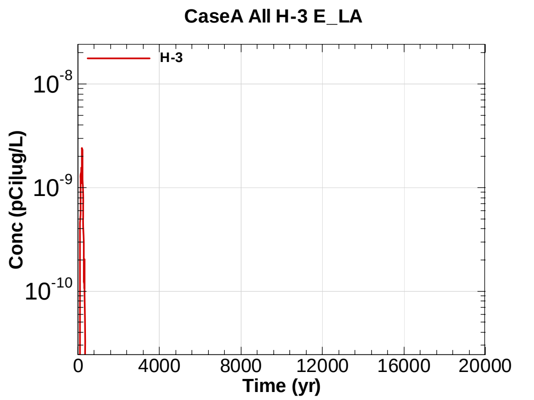

Figure B.2-165 - 100m Aquifer Concentration for CaseA All H-3 E_LA

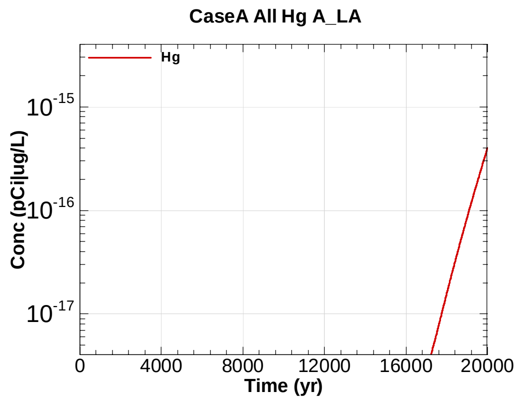

Figure B.2-166 - 100m Aquifer Concentration for CaseA All Hg A_LA

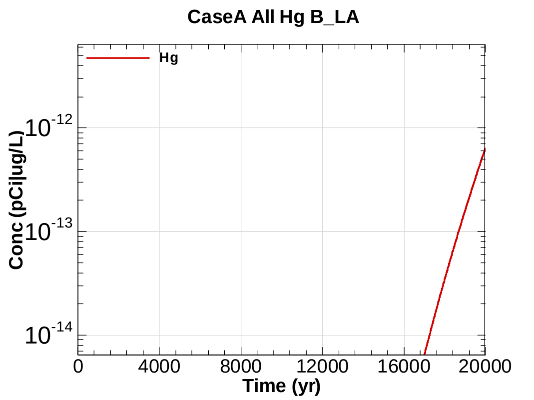

Figure B.2-167 - 100m Aquifer Concentration for CaseA All Hg B_LA

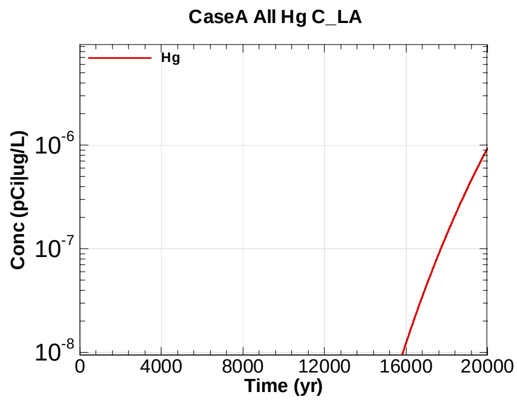

Figure B.2-168 - 100m Aquifer Concentration for CaseA All Hg C_LA

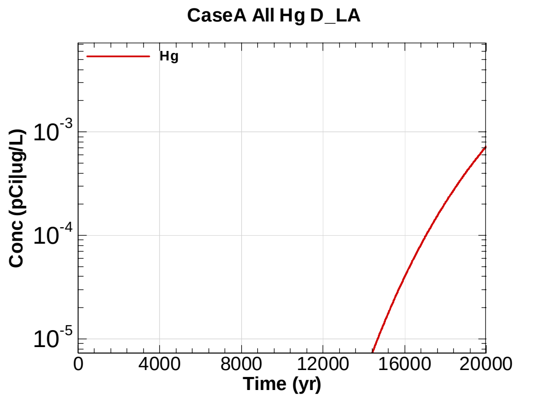

Figure B.2-169 - 100m Aquifer Concentration for CaseA All Hg D_LA

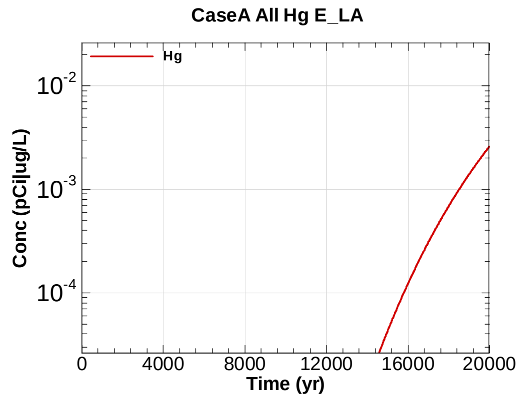

Figure B.2-170 - 100m Aquifer Concentration for CaseA All Hg E_LA

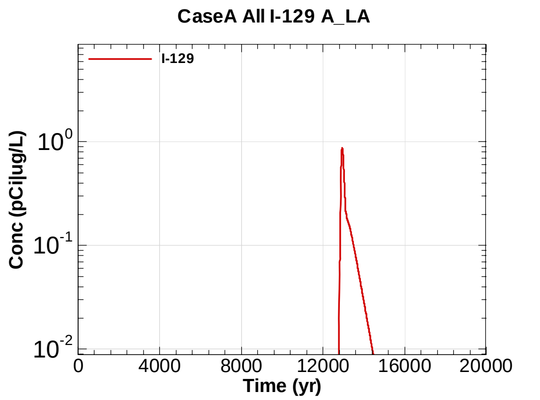

Figure B.2-171 - 100m Aquifer Concentration for CaseA All I-129 A_LA

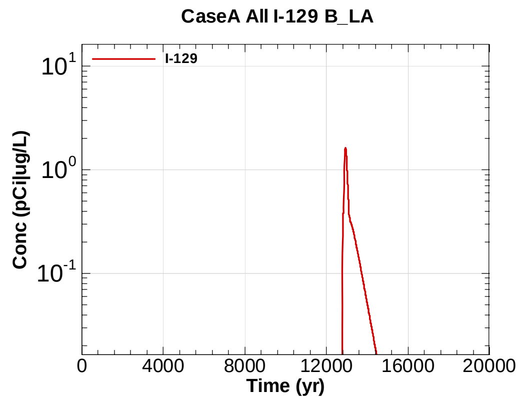

Figure B.2-172 - 100m Aquifer Concentration for CaseA All I-129 B_LA

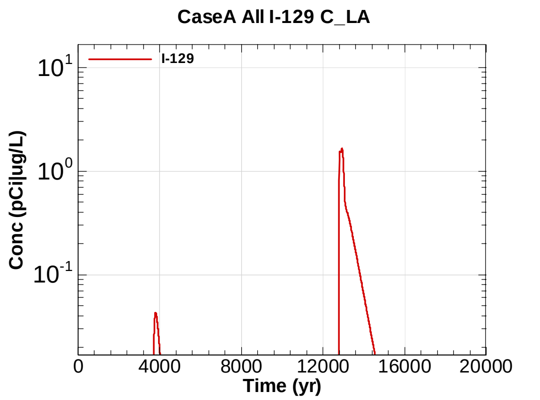

Figure B.2-173 - 100m Aquifer Concentration for CaseA All I-129 C_LA

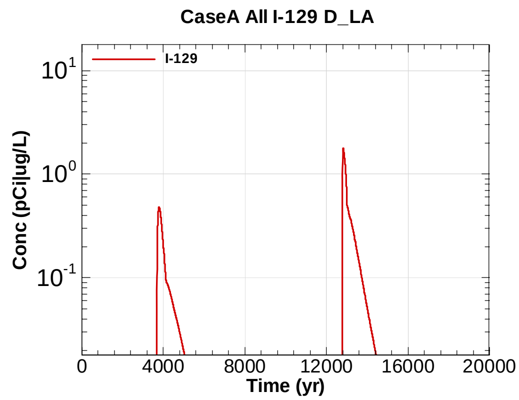

Figure B.2-174 - 100m Aquifer Concentration for CaseA All I-129 D_LA

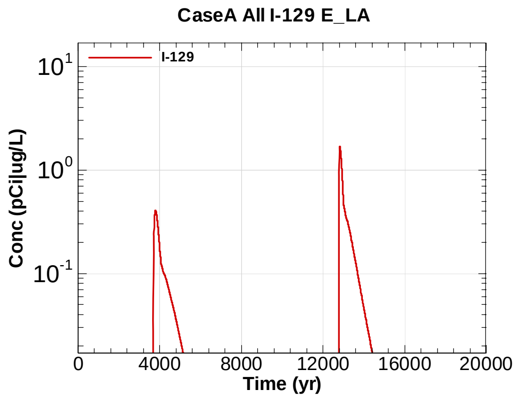

Figure B.2-175 - 100m Aquifer Concentration for CaseA All I-129 E_LA

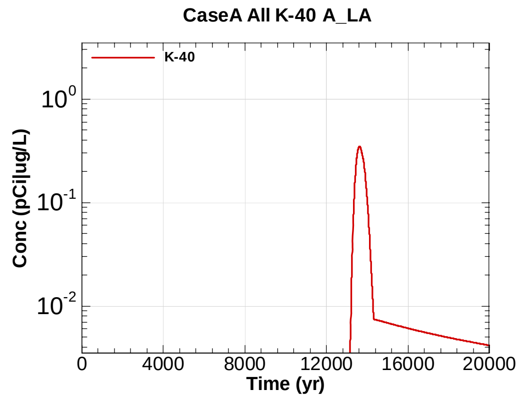

Figure B.2-176 - 100m Aquifer Concentration for CaseA All K-40 A_LA

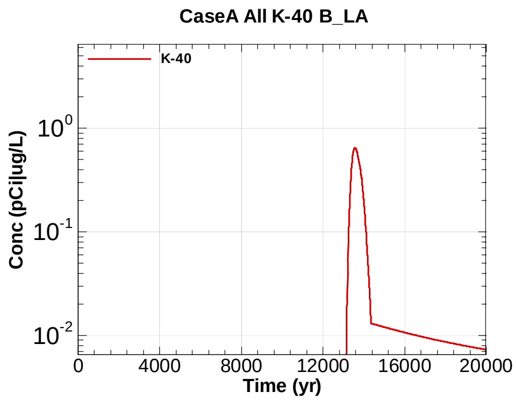

Figure B.2-177 - 100m Aquifer Concentration for CaseA All K-40 B_LA

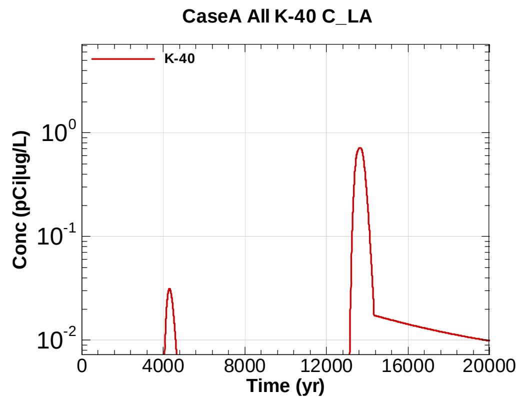

Figure B.2-178 - 100m Aquifer Concentration for CaseA All K-40 C_LA

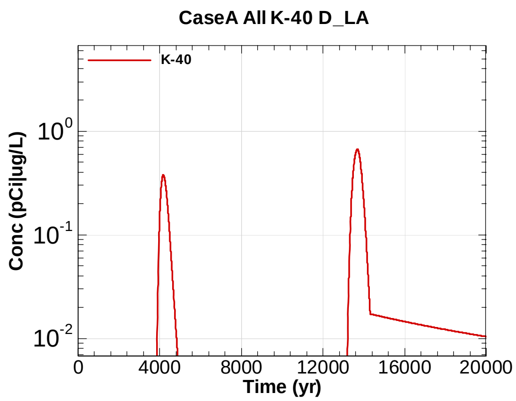

Figure B.2-179 - 100m Aquifer Concentration for CaseA All K-40 D_LA

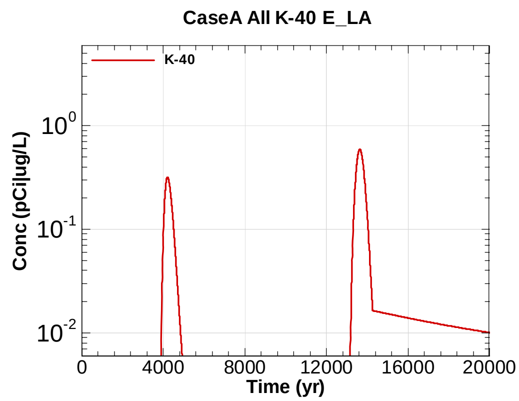

Figure B.2-180 - 100m Aquifer Concentration for CaseA All K-40 E_LA

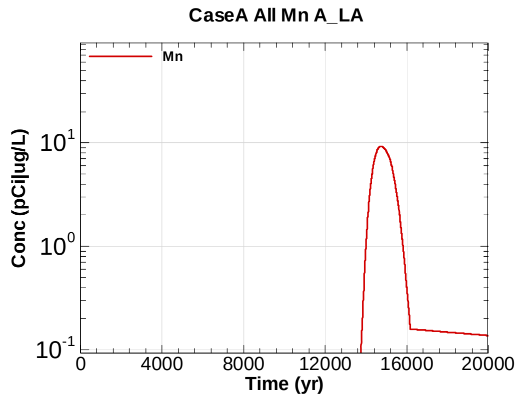

Figure B.2-181 - 100m Aquifer Concentration for CaseA All Mn A_LA

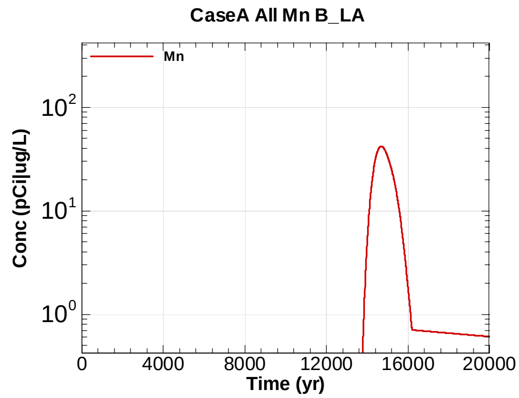

Figure B.2-182 - 100m Aquifer Concentration for CaseA All Mn B_LA

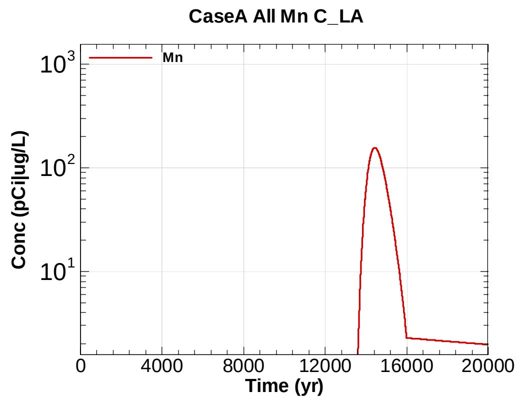

Figure B.2-183 - 100m Aquifer Concentration for CaseA All Mn C_LA

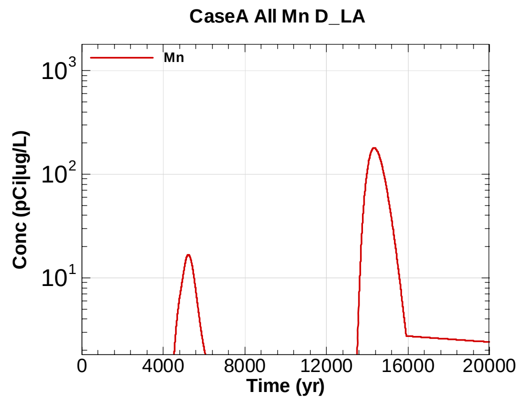

Figure B.2-184 - 100m Aquifer Concentration for CaseA All Mn D_LA

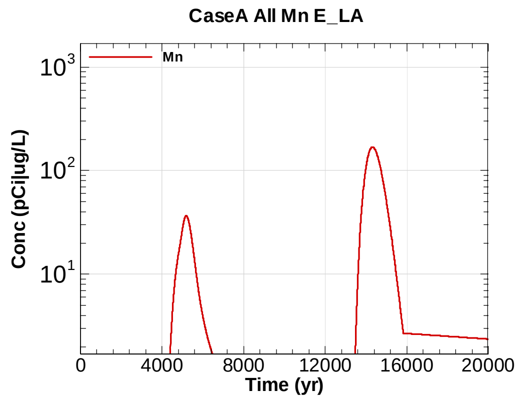

Figure B.2-185 - 100m Aquifer Concentration for CaseA All Mn E_LA

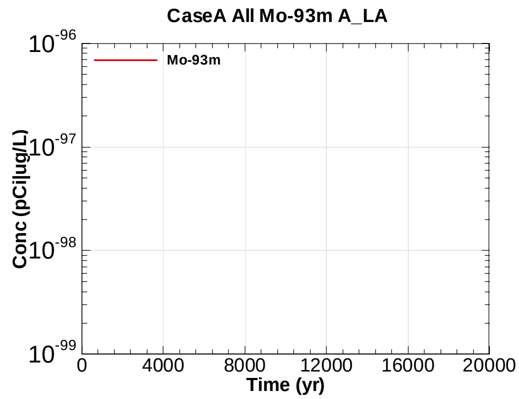

Figure B.2-186 - 100m Aquifer Concentration for CaseA All Mo-93m A_LA

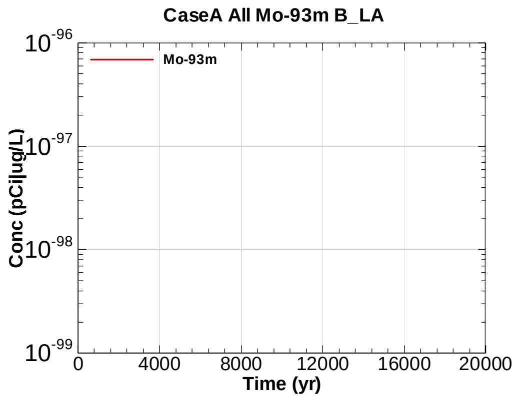

Figure B.2-187 - 100m Aquifer Concentration for CaseA All Mo-93m B_LA

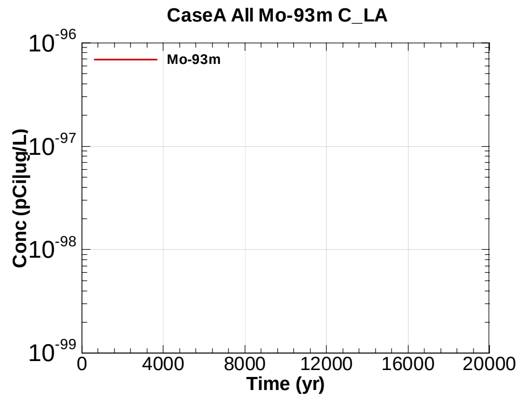

Figure B.2-188 - 100m Aquifer Concentration for CaseA All Mo-93m C_LA

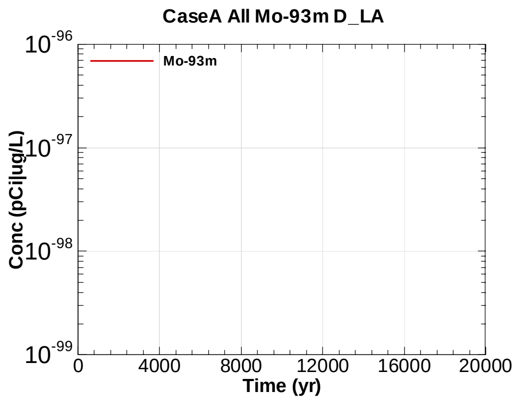

Figure B.2-189 - 100m Aquifer Concentration for CaseA All Mo-93m D_LA

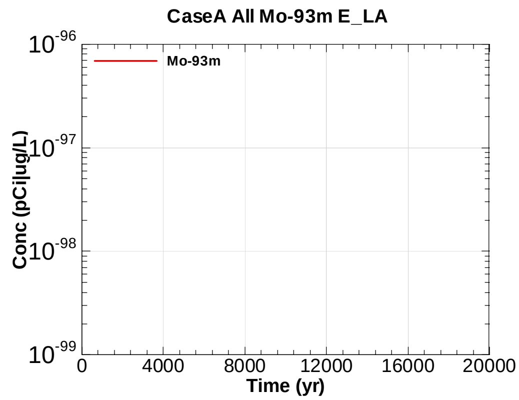

Figure B.2-190 - 100m Aquifer Concentration for CaseA All Mo-93m E_LA

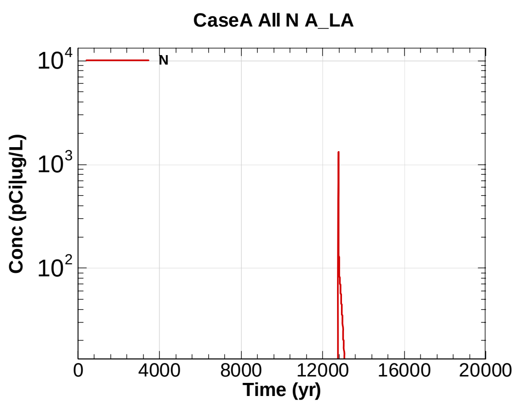

Figure B.2-191 - 100m Aquifer Concentration for CaseA All N A_LA

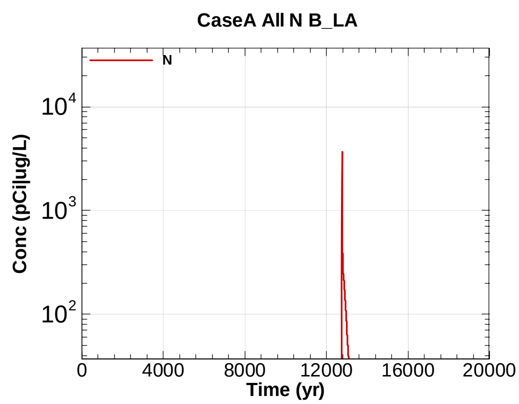

Figure B.2-192 - 100m Aquifer Concentration for CaseA All N B_LA

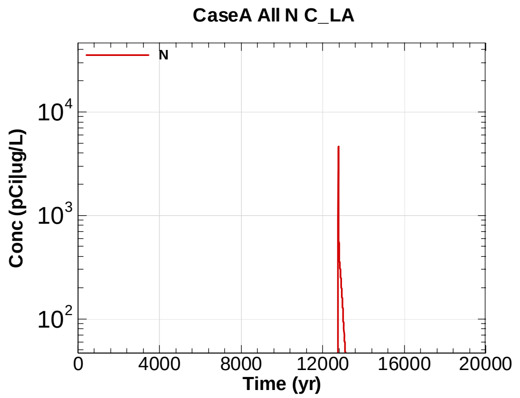

Figure B.2-193 - 100m Aquifer Concentration for CaseA All N C_LA

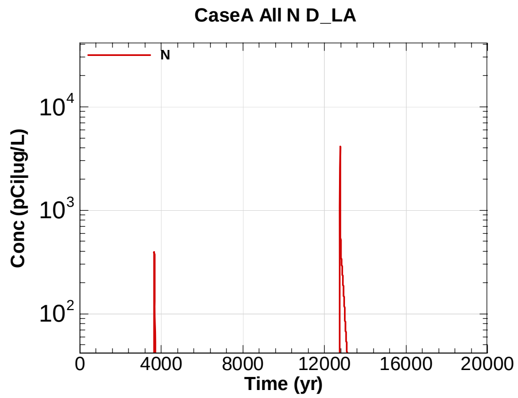

Figure B.2-194 - 100m Aquifer Concentration for CaseA All N D_LA

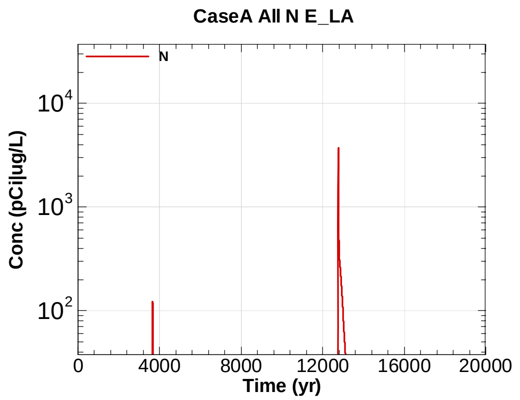

Figure B.2-195 - 100m Aquifer Concentration for CaseA All N E_LA

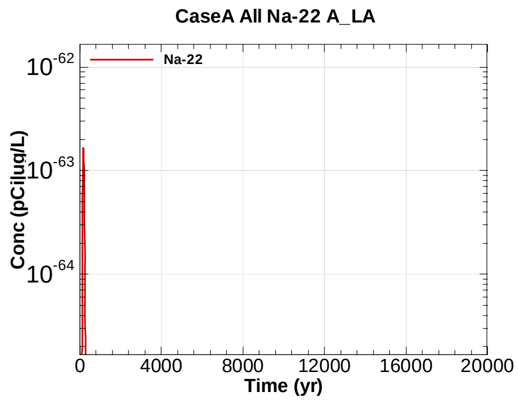

Figure B.2-196 - 100m Aquifer Concentration for CaseA All Na-22 A_LA

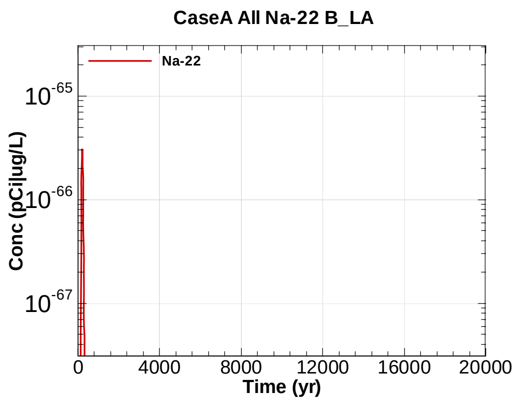

Figure B.2-197 - 100m Aquifer Concentration for CaseA All Na-22 B_LA

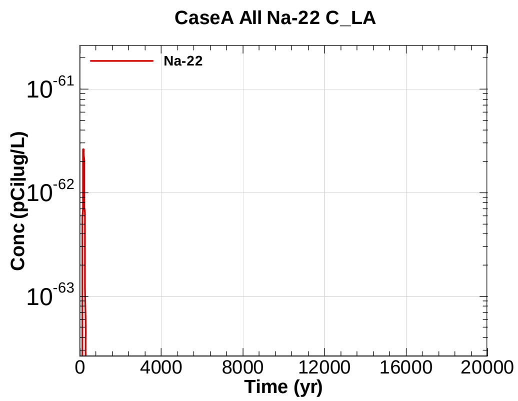

Figure B.2-198 - 100m Aquifer Concentration for CaseA All Na-22 C_LA

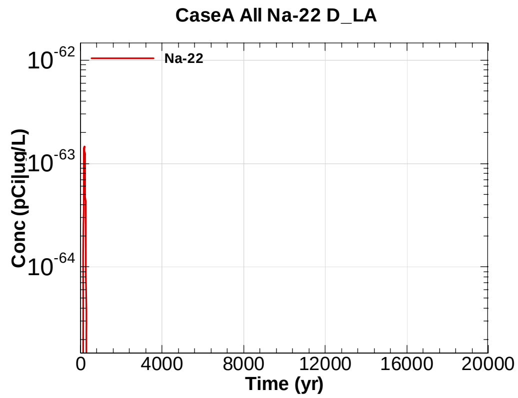

Figure B.2-199 - 100m Aquifer Concentration for CaseA All Na-22 D_LA

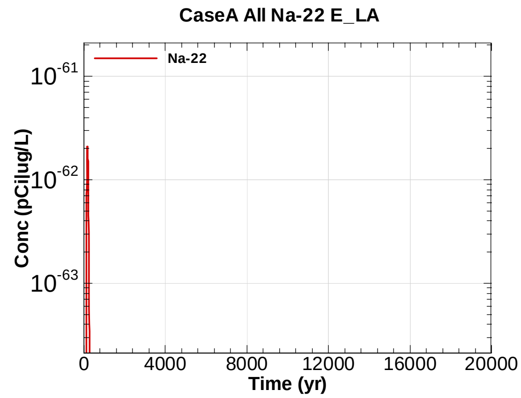

Figure B.2-200 - 100m Aquifer Concentration for CaseA All Na-22 E_LA

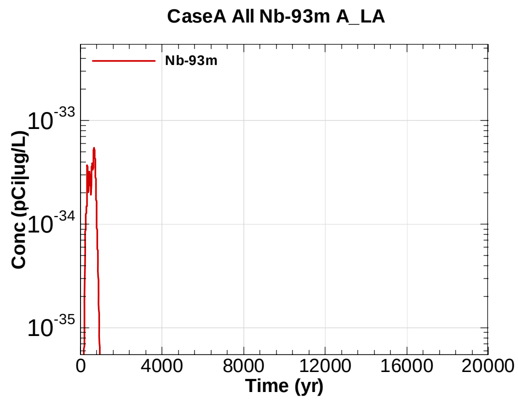

Figure B.2-201 - 100m Aquifer Concentration for CaseA All Nb-93m A_LA

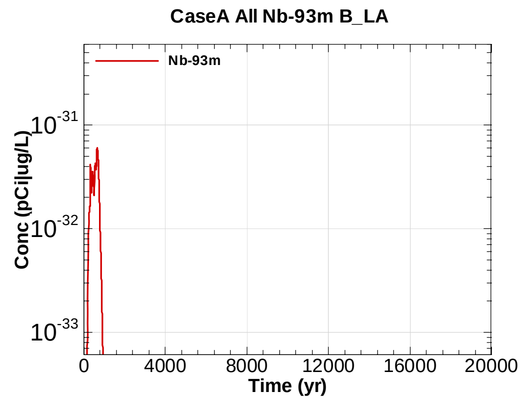

Figure B.2-202 - 100m Aquifer Concentration for CaseA All Nb-93m B_LA

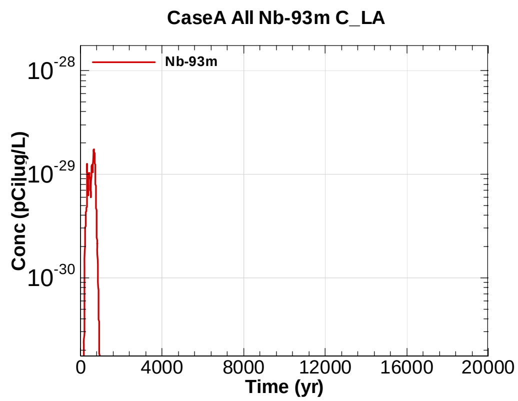

Figure B.2-203 - 100m Aquifer Concentration for CaseA All Nb-93m C_LA

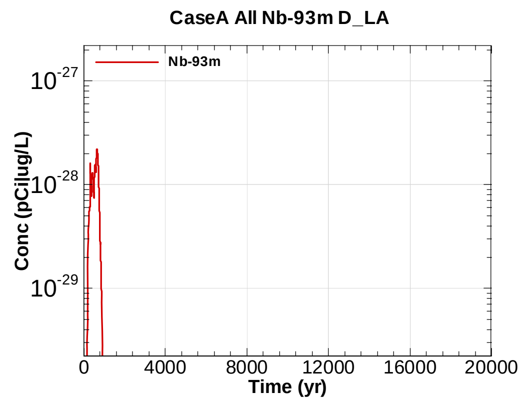

Figure B.2-204 - 100m Aquifer Concentration for CaseA All Nb-93m D_LA

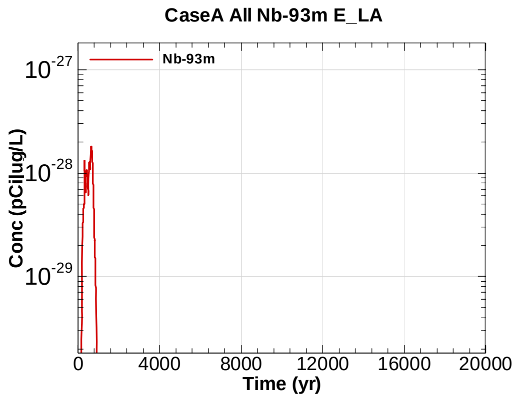

Figure B.2-205 - 100m Aquifer Concentration for CaseA All Nb-93m E_LA

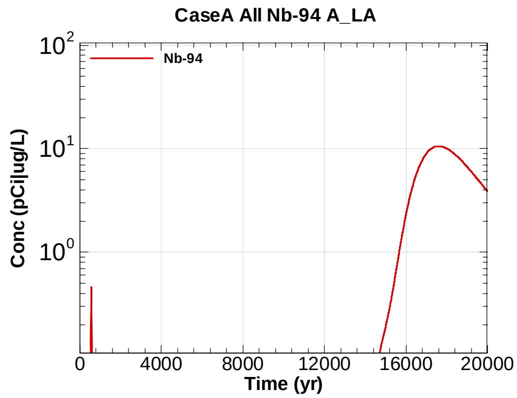

Figure B.2-206 - 100m Aquifer Concentration for CaseA All Nb-94 A_LA

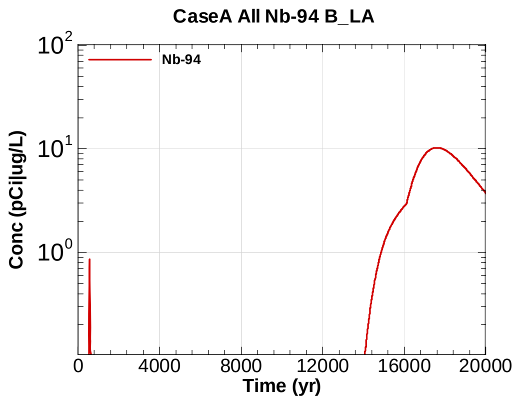

Figure B.2-207 - 100m Aquifer Concentration for CaseA All Nb-94 B_LA

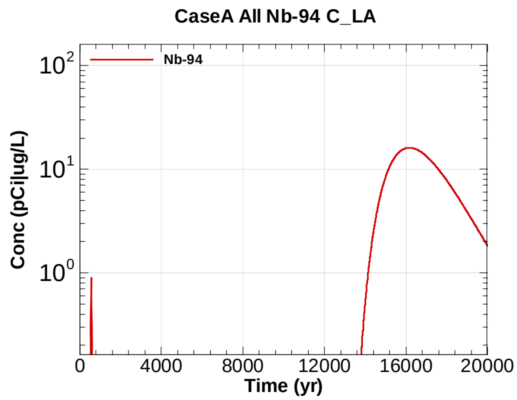

Figure B.2-208 - 100m Aquifer Concentration for CaseA All Nb-94 C_LA

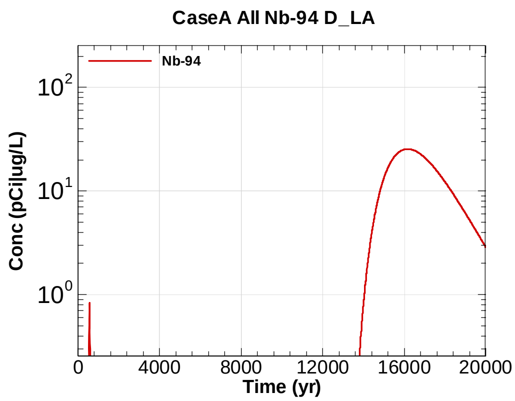

Figure B.2-209 - 100m Aquifer Concentration for CaseA All Nb-94 D_LA

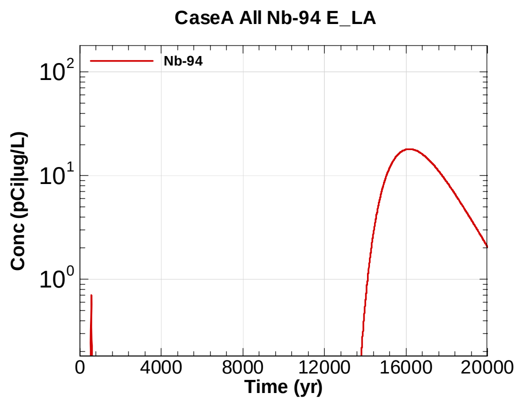

Figure B.2-210 - 100m Aquifer Concentration for CaseA All Nb-94 E_LA

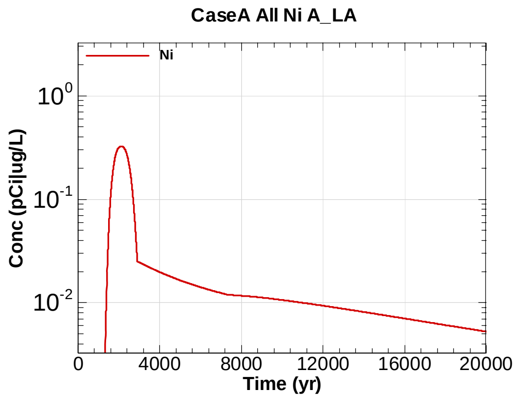

Figure B.2-211 - 100m Aquifer Concentration for CaseA All Ni A_LA

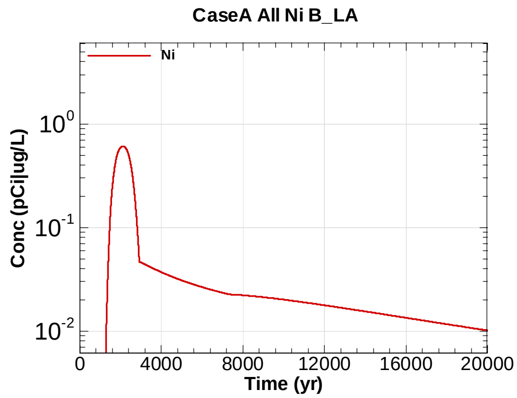

Figure B.2-212 - 100m Aquifer Concentration for CaseA All Ni B_LA

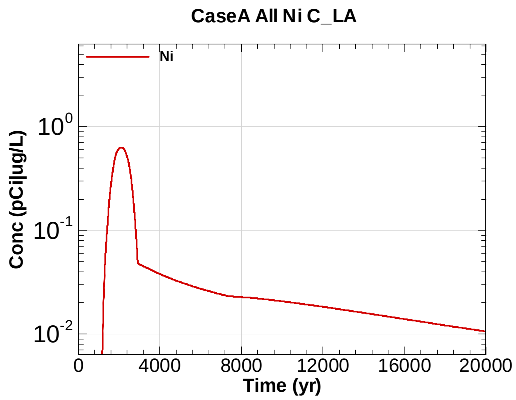

Figure B.2-213 - 100m Aquifer Concentration for CaseA All Ni C_LA

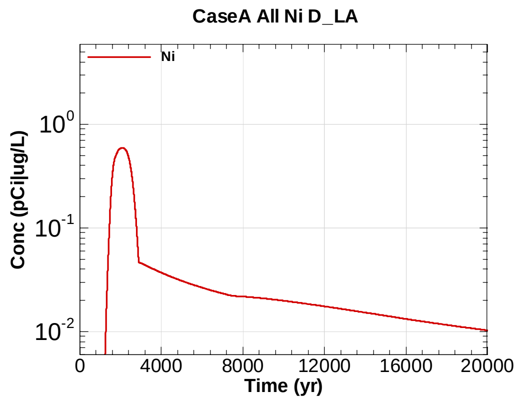

Figure B.2-214 - 100m Aquifer Concentration for CaseA All Ni D_LA

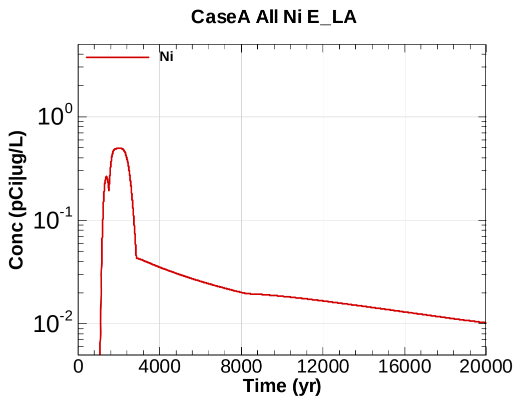

Figure B.2-215 - 100m Aquifer Concentration for CaseA All Ni E_LA

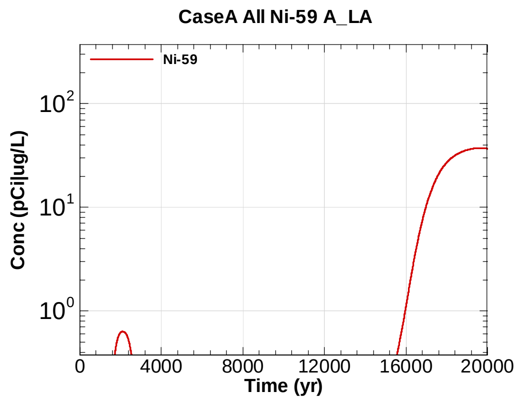

Figure B.2-216 - 100m Aquifer Concentration for CaseA All Ni-59 A_LA

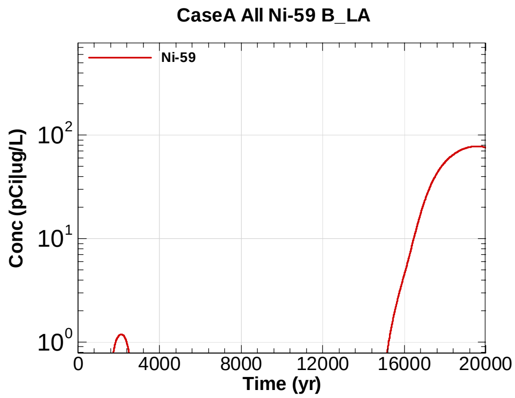

Figure B.2-217 - 100m Aquifer Concentration for CaseA All Ni-59 B_LA

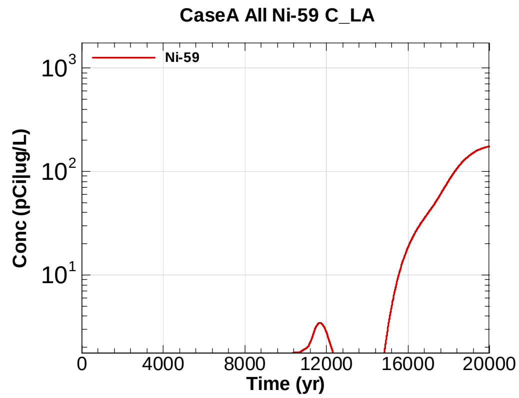

Figure B.2-218 - 100m Aquifer Concentration for CaseA All Ni-59 C_LA

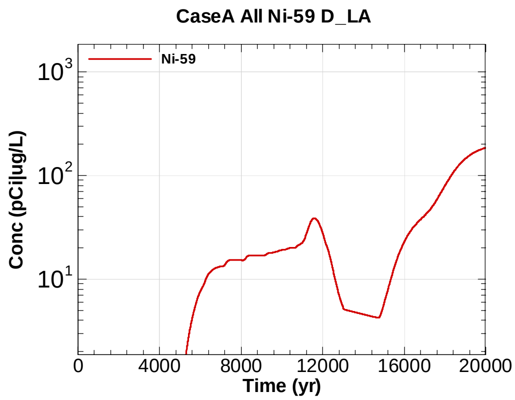

Figure B.2-219 - 100m Aquifer Concentration for CaseA All Ni-59 D_LA

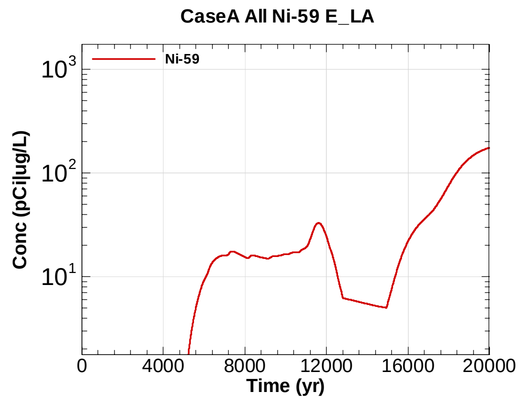

Figure B.2-220 - 100m Aquifer Concentration for CaseA All Ni-59 E_LA

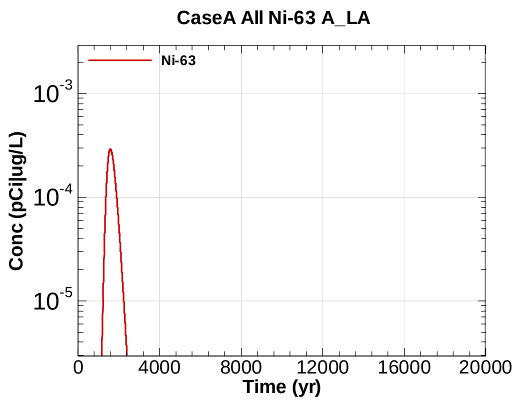

Figure B.2-221 - 100m Aquifer Concentration for CaseA All Ni-63 A_LA

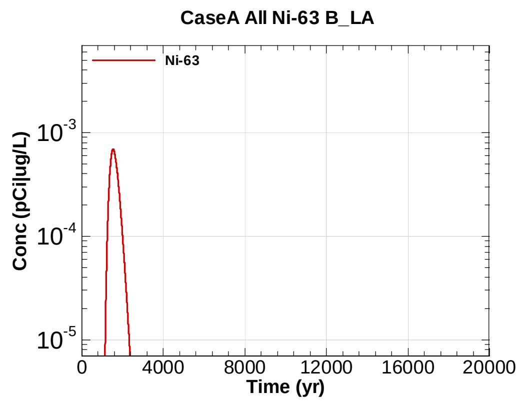

Figure B.2-222 - 100m Aquifer Concentration for CaseA All Ni-63 B_LA

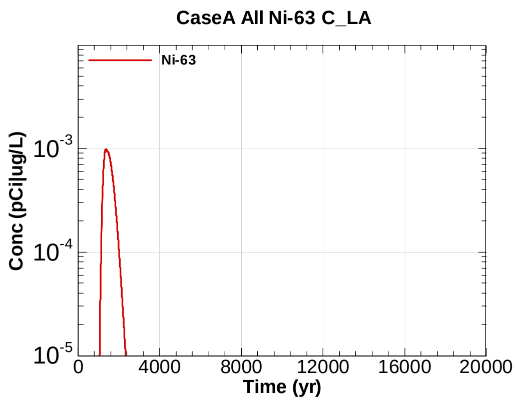

Figure B.2-223 - 100m Aquifer Concentration for CaseA All Ni-63 C_LA

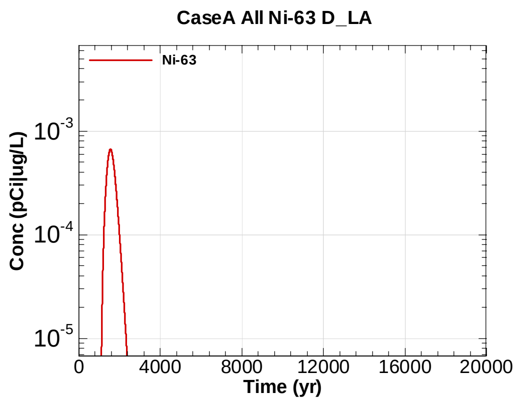

Figure B.2-224 - 100m Aquifer Concentration for CaseA All Ni-63 D_LA

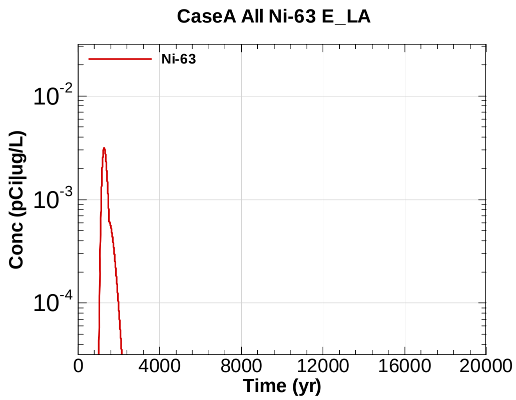

Figure B.2-225 - 100m Aquifer Concentration for CaseA All Ni-63 E_LA

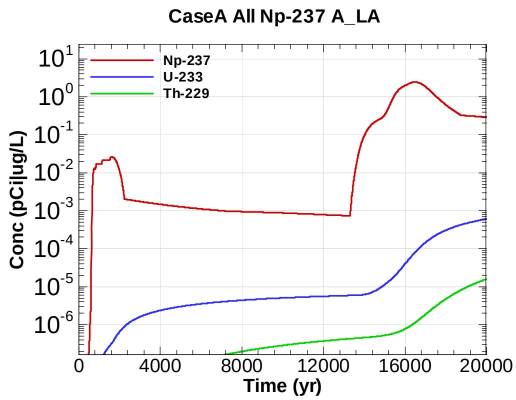

Figure B.2-226 - 100m Aquifer Concentration for CaseA All Np-237 A_LA

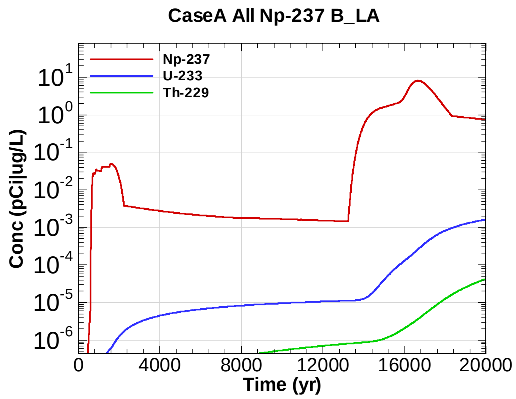

Figure B.2-227 - 100m Aquifer Concentration for CaseA All Np-237 B_LA

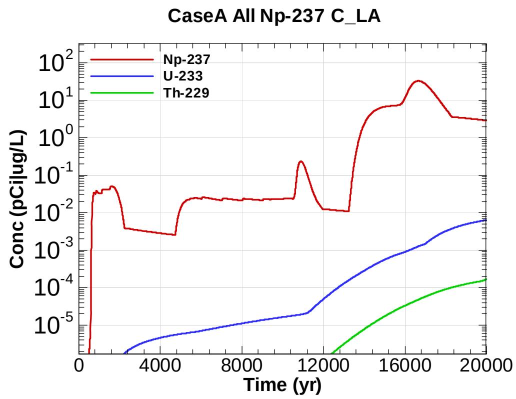

Figure B.2-228 - 100m Aquifer Concentration for CaseA All Np-237 C_LA

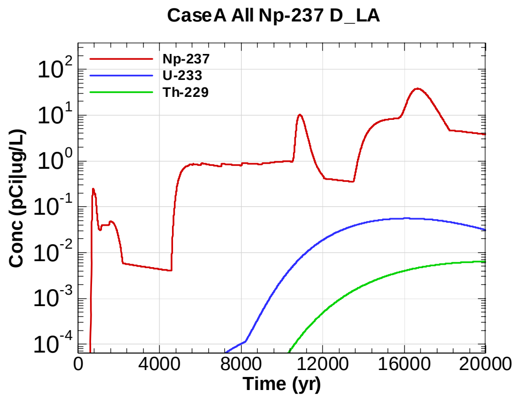

Figure B.2-229 - 100m Aquifer Concentration for CaseA All Np-237 D_LA

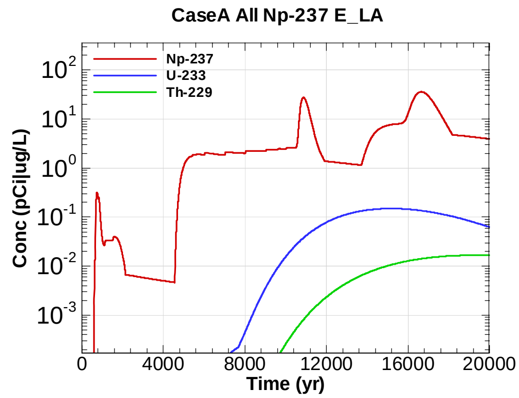

Figure B.2-230 - 100m Aquifer Concentration for CaseA All Np-237 E_LA

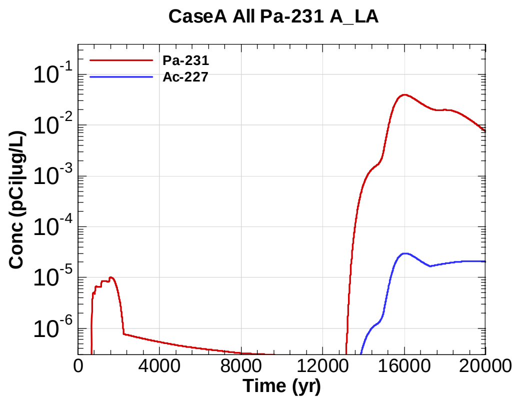

Figure B.2-231 - 100m Aquifer Concentration for CaseA All Pa-231 A_LA

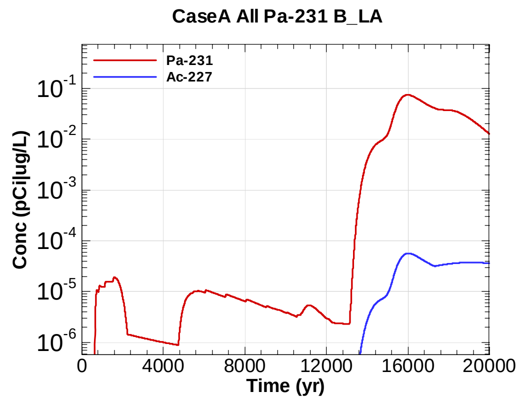

Figure B.2-232 - 100m Aquifer Concentration for CaseA All Pa-231 B_LA

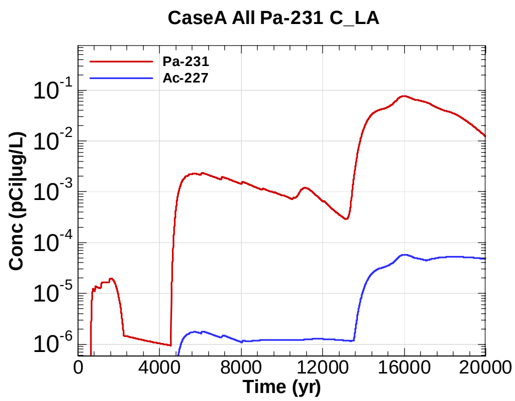

Figure B.2-233 - 100m Aquifer Concentration for CaseA All Pa-231 C_LA

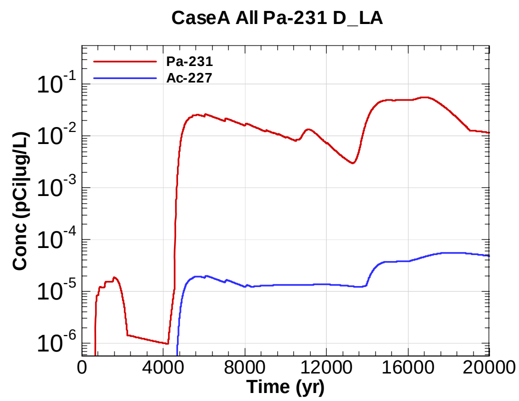

Figure B.2-234 - 100m Aquifer Concentration for CaseA All Pa-231 D_LA

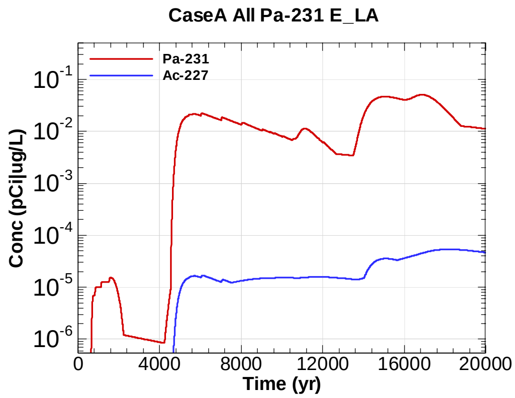

Figure B.2-235 - 100m Aquifer Concentration for CaseA All Pa-231 E_LA

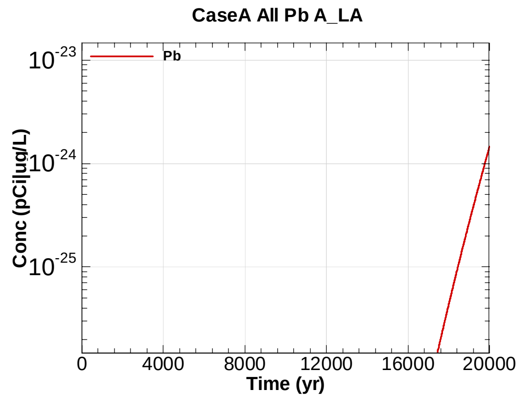

Figure B.2-236 - 100m Aquifer Concentration for CaseA All Pb A_LA

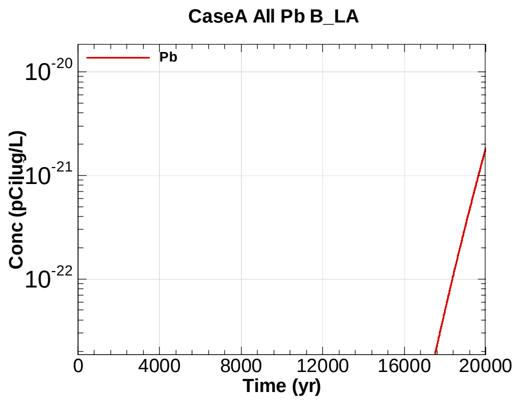

Figure B.2-237 - 100m Aquifer Concentration for CaseA All Pb B_LA

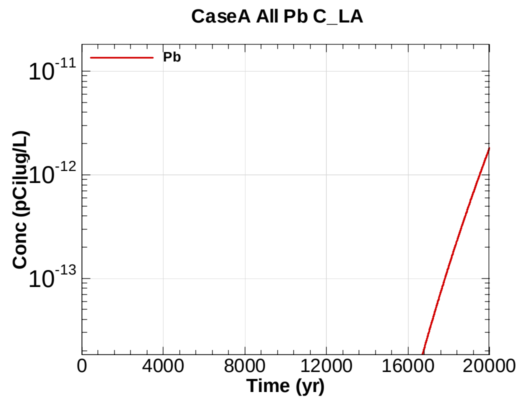

Figure B.2-238 - 100m Aquifer Concentration for CaseA All Pb C_LA

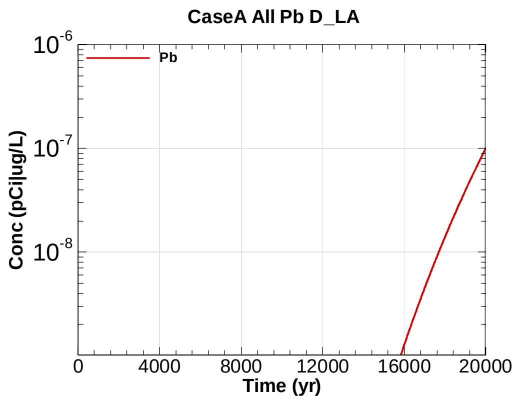

Figure B.2-239 - 100m Aquifer Concentration for CaseA All Pb D_LA

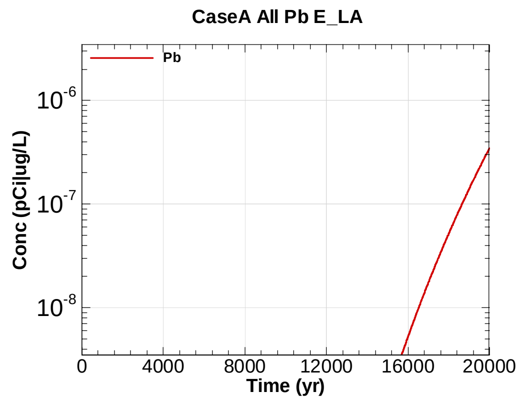

Figure B.2-240 - 100m Aquifer Concentration for CaseA All Pb E_LA

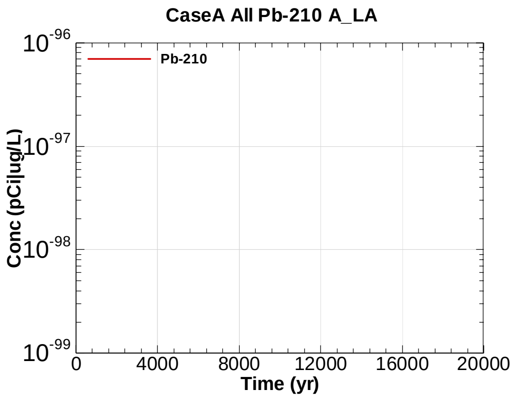

Figure B.2-241 - 100m Aquifer Concentration for CaseA All Pb-210 A_LA

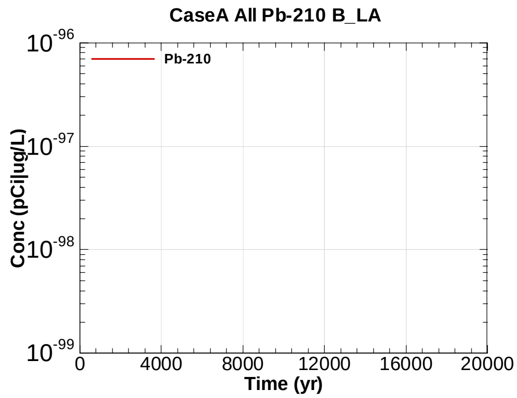

Figure B.2-242 - 100m Aquifer Concentration for CaseA All Pb-210 B_LA

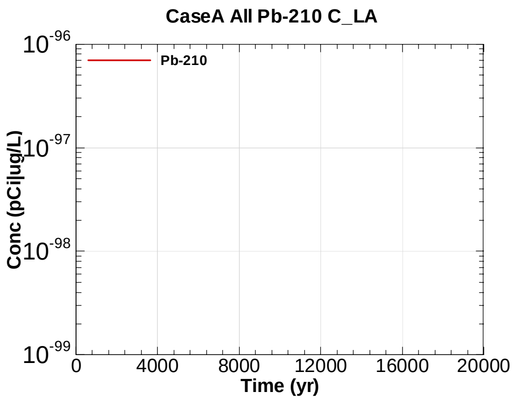

Figure B.2-243 - 100m Aquifer Concentration for CaseA All Pb-210 C_LA

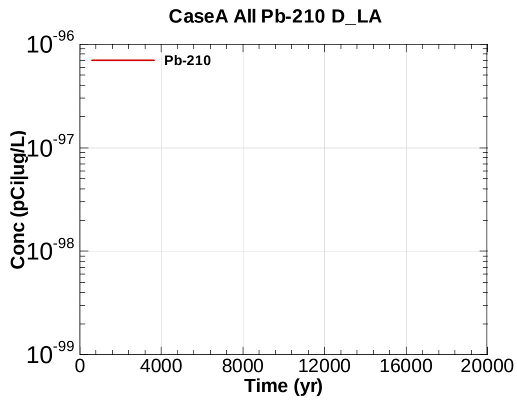

Figure B.2-244 - 100m Aquifer Concentration for CaseA All Pb-210 D_LA

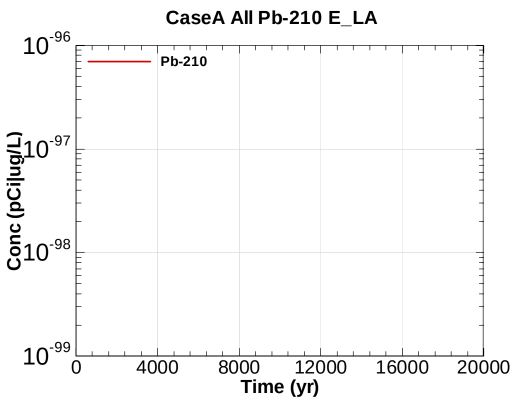

Figure B.2-245 - 100m Aquifer Concentration for CaseA All Pb-210 E_LA

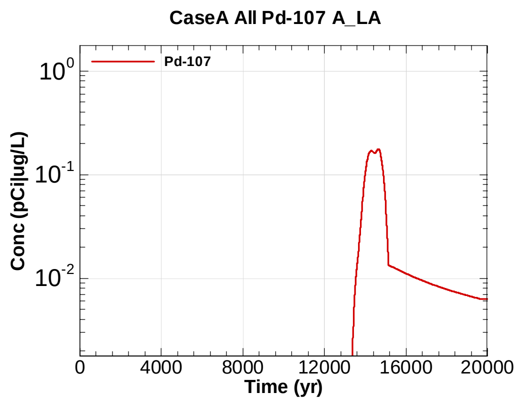

Figure B.2-246 - 100m Aquifer Concentration for CaseA All Pd-107 A_LA

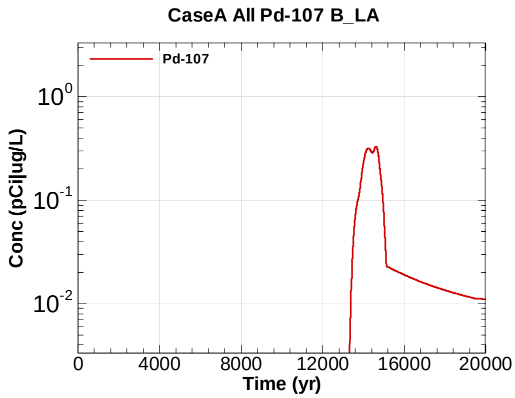

Figure B.2-247 - 100m Aquifer Concentration for CaseA All Pd-107 B_LA

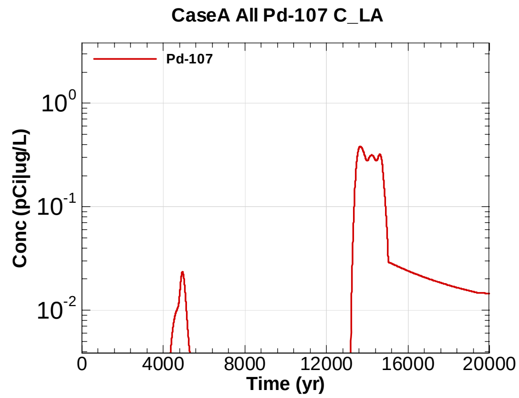

Figure B.2-248 - 100m Aquifer Concentration for CaseA All Pd-107 C_LA

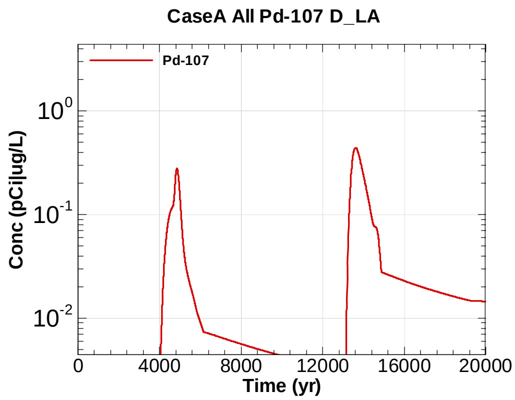

Figure B.2-249 - 100m Aquifer Concentration for CaseA All Pd-107 D_LA

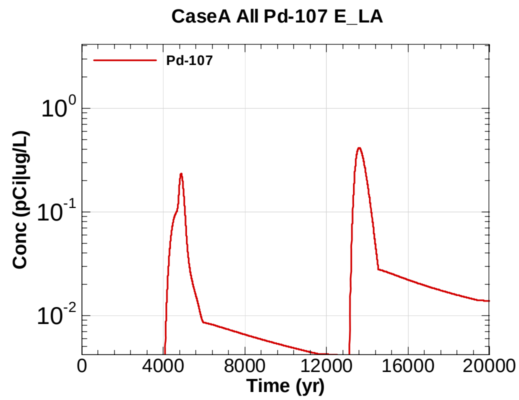

Figure B.2-250 - 100m Aquifer Concentration for CaseA All Pd-107 E_LA

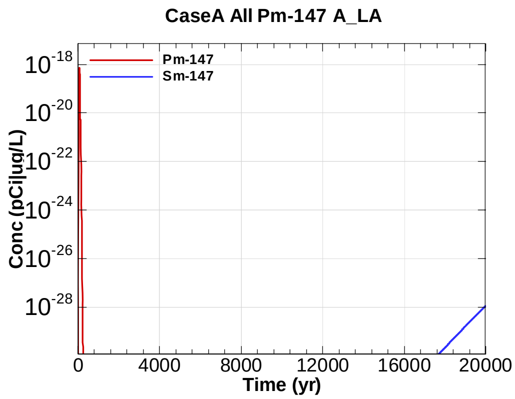

Figure B.2-251 - 100m Aquifer Concentration for CaseA All Pm-147 A_LA

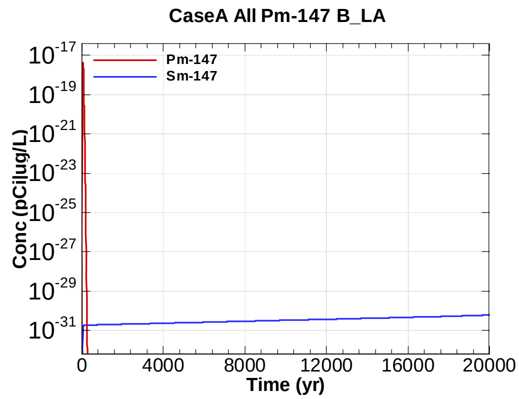

Figure B.2-252 - 100m Aquifer Concentration for CaseA All Pm-147 B_LA

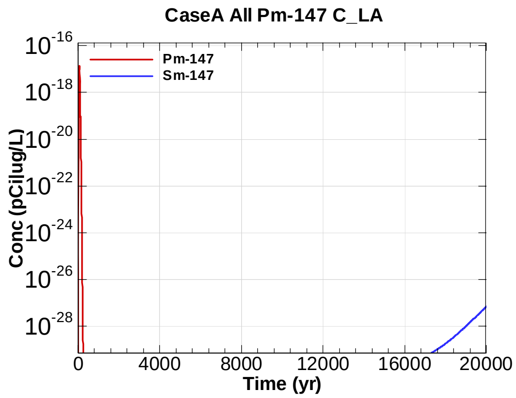

Figure B.2-253 - 100m Aquifer Concentration for CaseA All Pm-147 C_LA

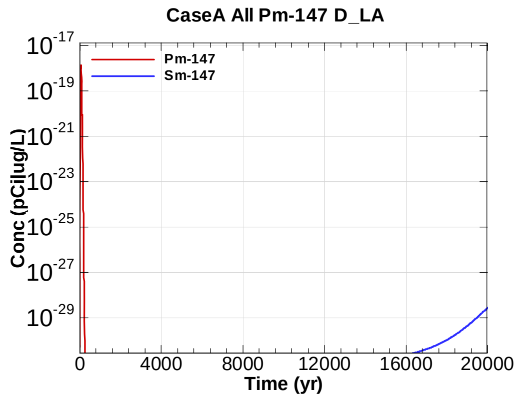

Figure B.2-254 - 100m Aquifer Concentration for CaseA All Pm-147 D_LA

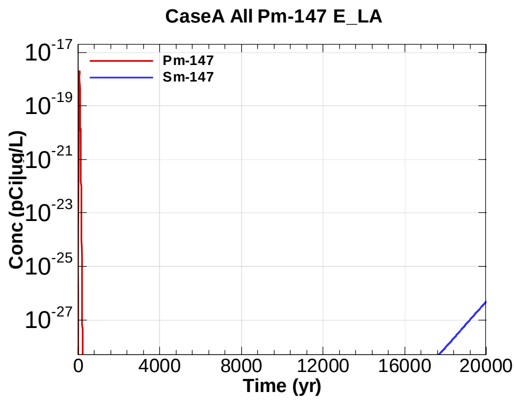

Figure B.2-255 - 100m Aquifer Concentration for CaseA All Pm-147 E_LA

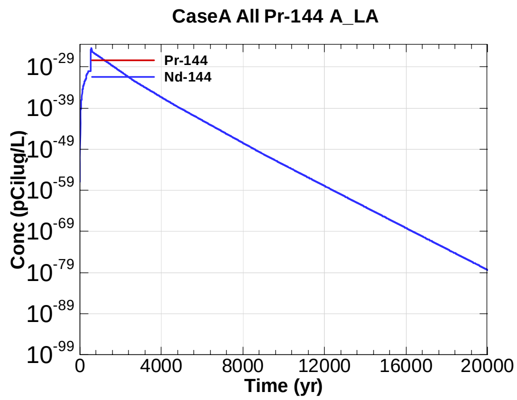

Figure B.2-256 - 100m Aquifer Concentration for CaseA All Pr-144 A_LA

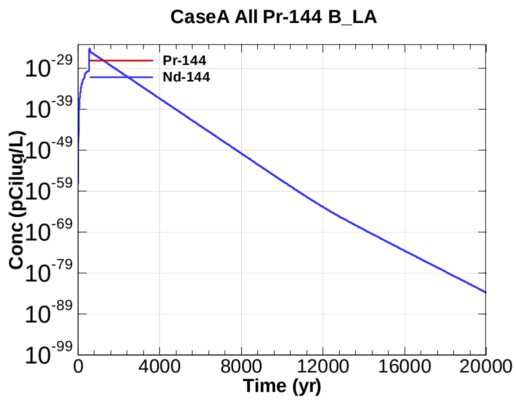

Figure B.2-257 - 100m Aquifer Concentration for CaseA All Pr-144 B_LA

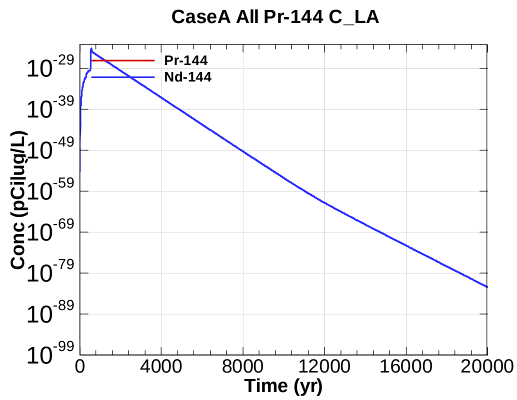

Figure B.2-258 - 100m Aquifer Concentration for CaseA All Pr-144 C_LA

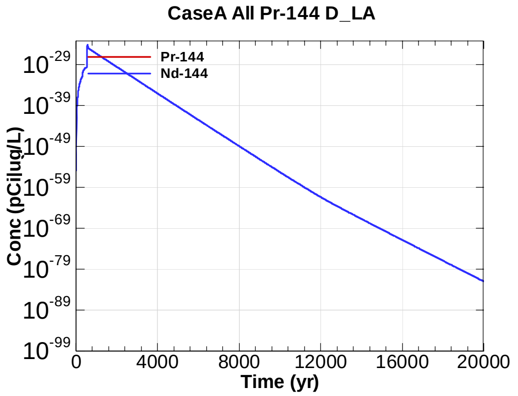

Figure B.2-259 - 100m Aquifer Concentration for CaseA All Pr-144 D_LA

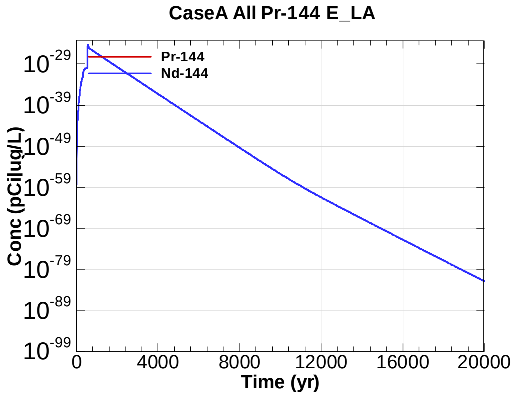

Figure B.2-260 - 100m Aquifer Concentration for CaseA All Pr-144 E_LA

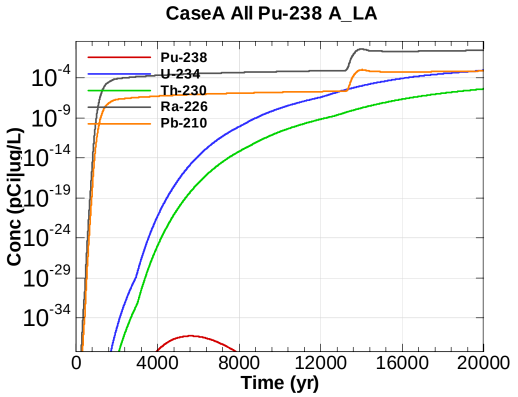

Figure B.2-261 - 100m Aquifer Concentration for CaseA All Pu-238 A_LA

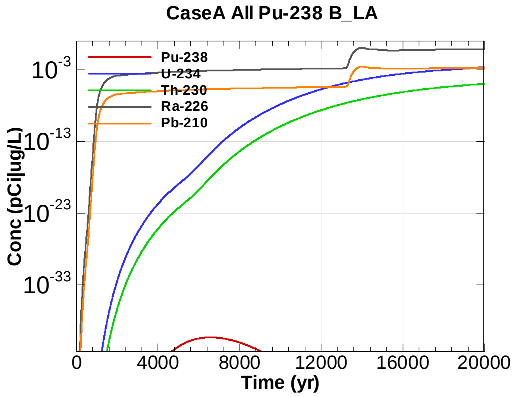

Figure B.2-262 - 100m Aquifer Concentration for CaseA All Pu-238 B_LA

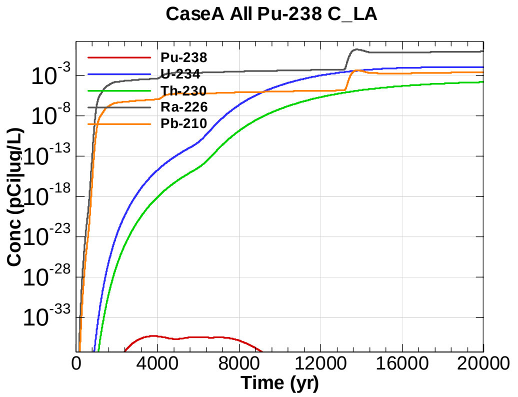

Figure B.2-263 - 100m Aquifer Concentration for CaseA All Pu-238 C_LA

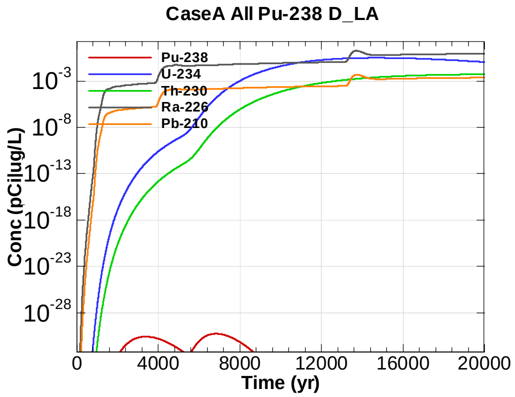

Figure B.2-264 - 100m Aquifer Concentration for CaseA All Pu-238 D_LA

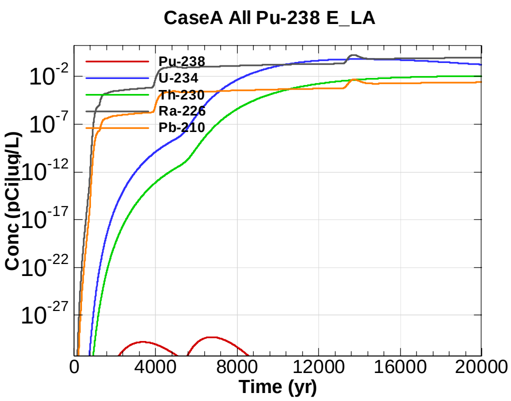

Figure B.2-265 - 100m Aquifer Concentration for CaseA All Pu-238 E_LA

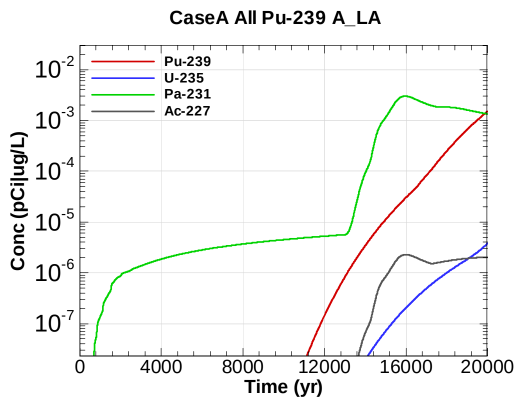

Figure B.2-266 - 100m Aquifer Concentration for CaseA All Pu-239 A_LA

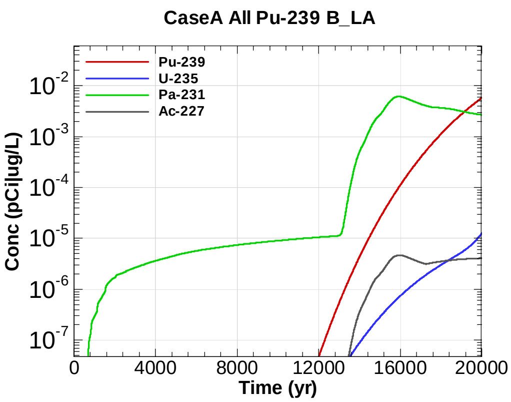

Figure B.2-267 - 100m Aquifer Concentration for CaseA All Pu-239 B_LA

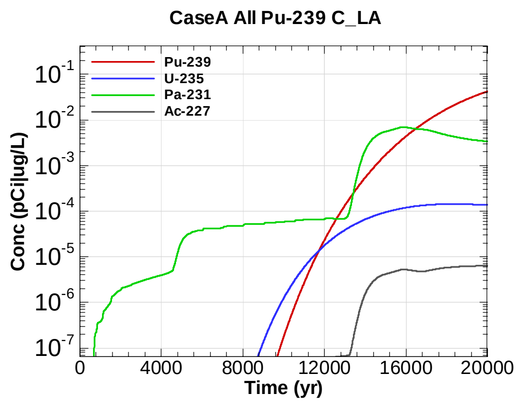

Figure B.2-268 - 100m Aquifer Concentration for CaseA All Pu-239 C_LA

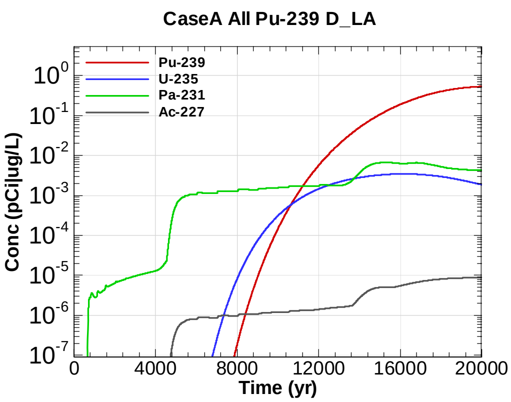

Figure B.2-269 - 100m Aquifer Concentration for CaseA All Pu-239 D_LA

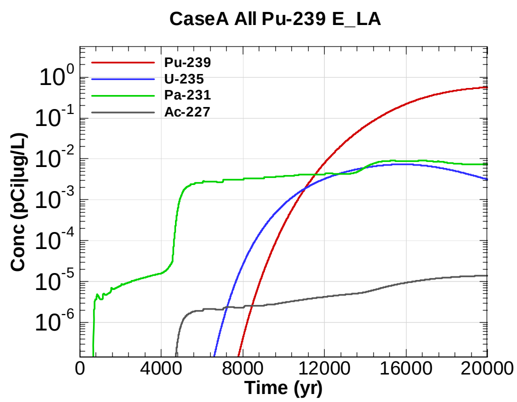

Figure B.2-270 - 100m Aquifer Concentration for CaseA All Pu-239 E_LA

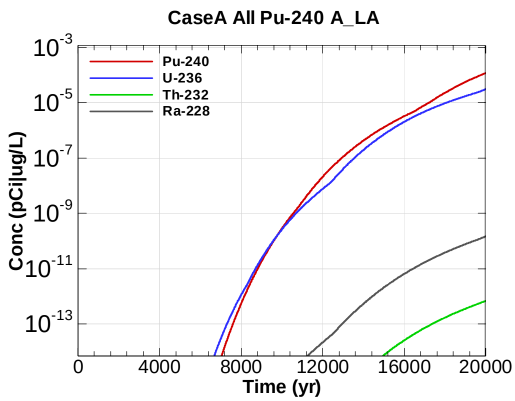

Figure B.2-271 - 100m Aquifer Concentration for CaseA All Pu-240 A_LA

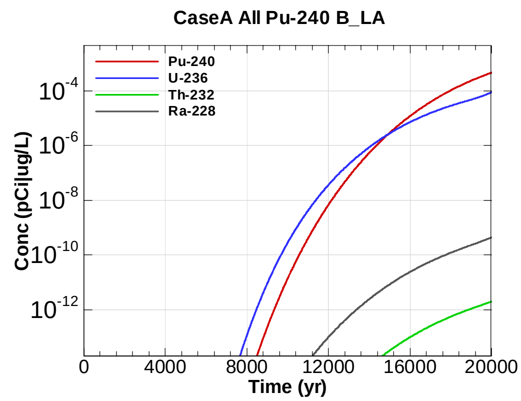

Figure B.2-272 - 100m Aquifer Concentration for CaseA All Pu-240 B_LA

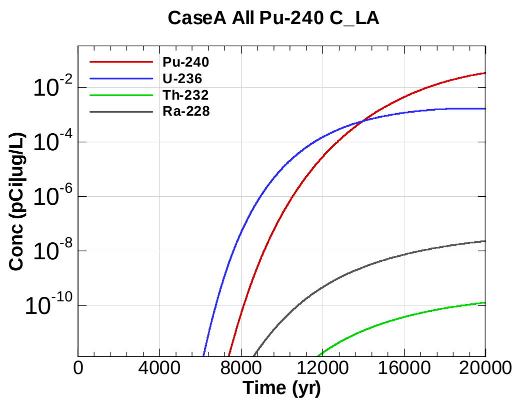

Figure B.2-273 - 100m Aquifer Concentration for CaseA All Pu-240 C_LA

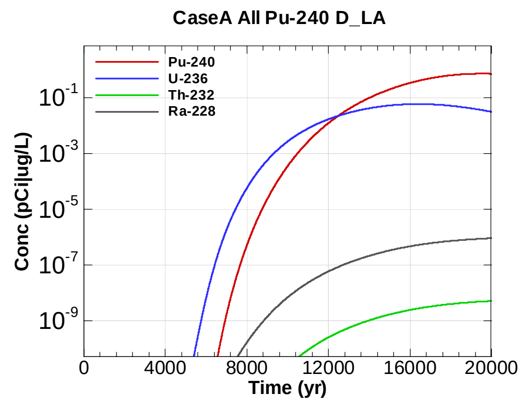

Figure B.2-274 - 100m Aquifer Concentration for CaseA All Pu-240 D_LA

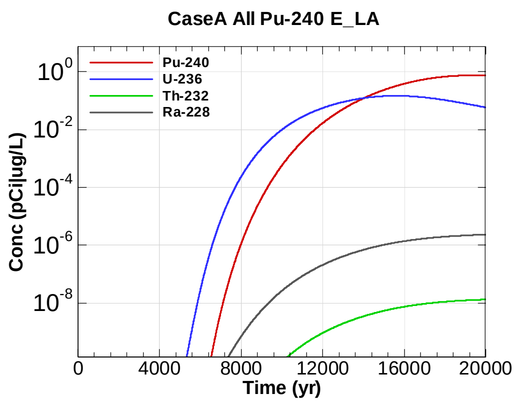

Figure B.2-275 - 100m Aquifer Concentration for CaseA All Pu-240 E_LA

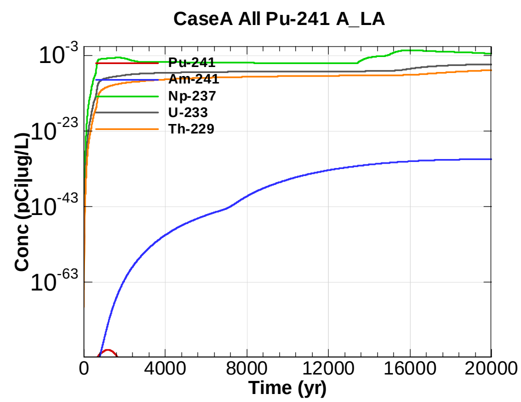

Figure B.2-276 - 100m Aquifer Concentration for CaseA All Pu-241 A_LA

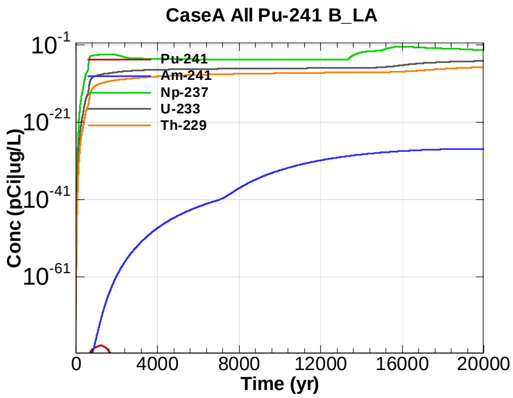

Figure B.2-277 - 100m Aquifer Concentration for CaseA All Pu-241 B_LA

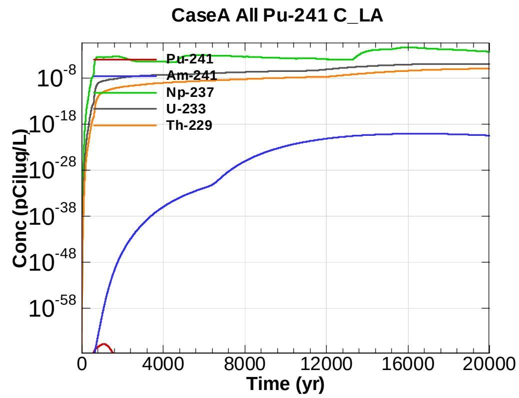

Figure B.2-278 - 100m Aquifer Concentration for CaseA All Pu-241 C_LA

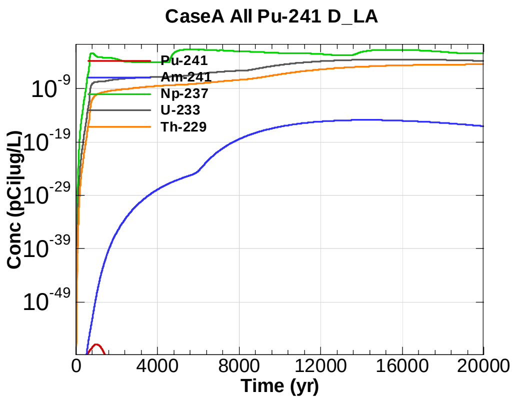

Figure B.2-279 - 100m Aquifer Concentration for CaseA All Pu-241 D_LA

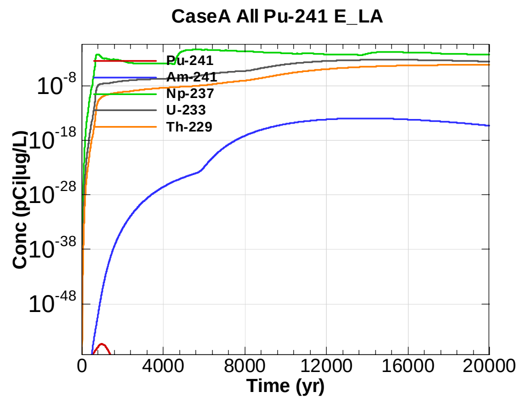

Figure B.2-280 - 100m Aquifer Concentration for CaseA All Pu-241 E_LA

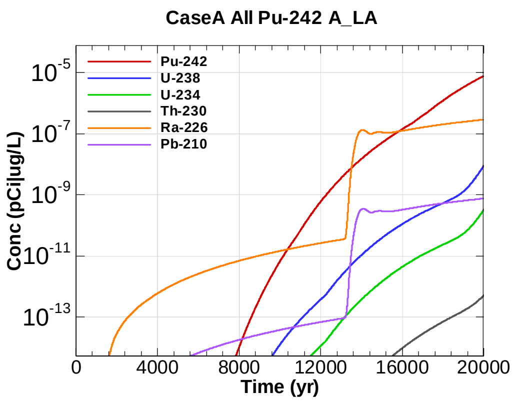

Figure B.2-281 - 100m Aquifer Concentration for CaseA All Pu-242 A_LA

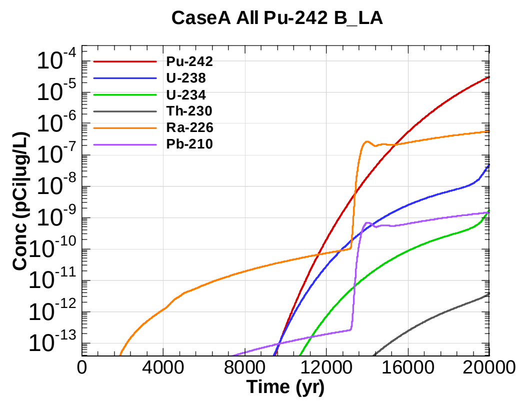

Figure B.2-282 - 100m Aquifer Concentration for CaseA All Pu-242 B_LA

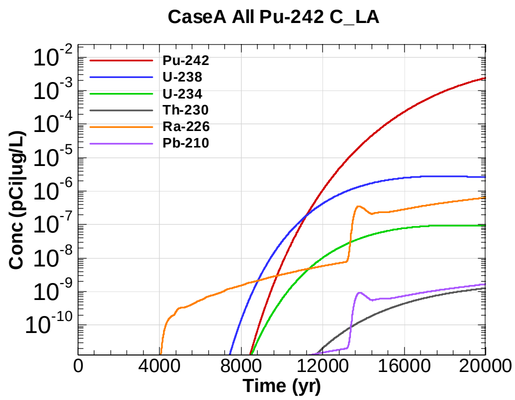

Figure B.2-283 - 100m Aquifer Concentration for CaseA All Pu-242 C_LA

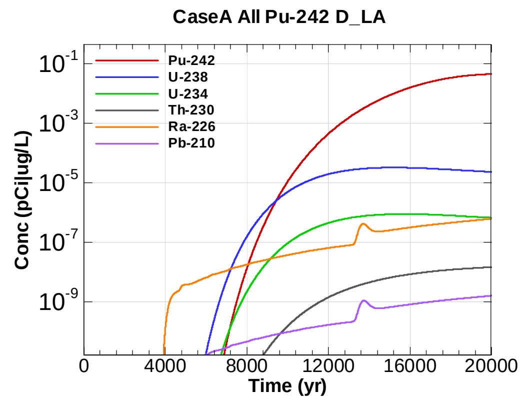

Figure B.2-284 - 100m Aquifer Concentration for CaseA All Pu-242 D_LA

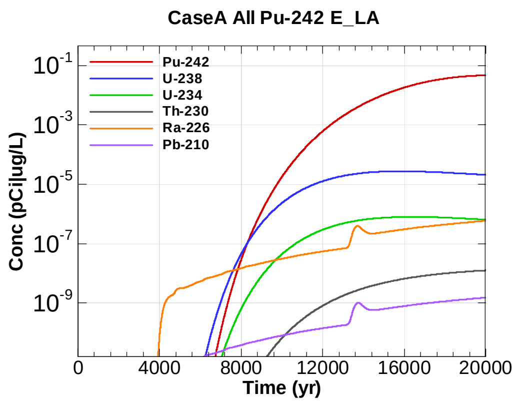

Figure B.2-285 - 100m Aquifer Concentration for CaseA All Pu-242 E_LA

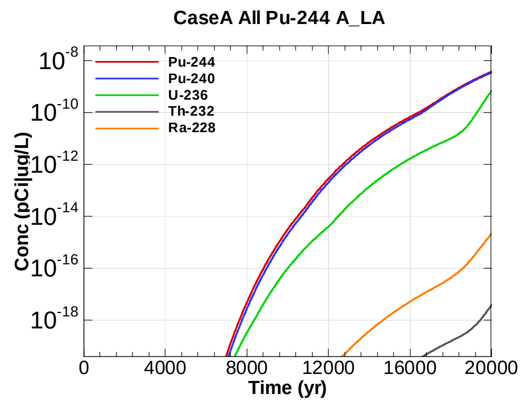

Figure B.2-286 - 100m Aquifer Concentration for CaseA All Pu-244 A_LA

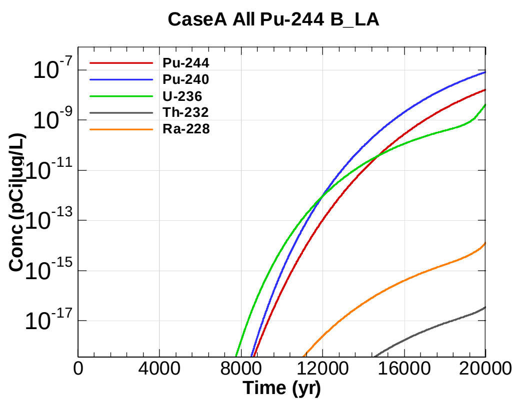

Figure B.2-287 - 100m Aquifer Concentration for CaseA All Pu-244 B_LA

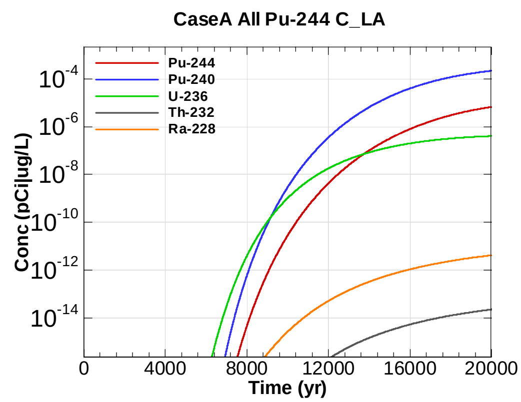

Figure B.2-288 - 100m Aquifer Concentration for CaseA All Pu-244 C_LA

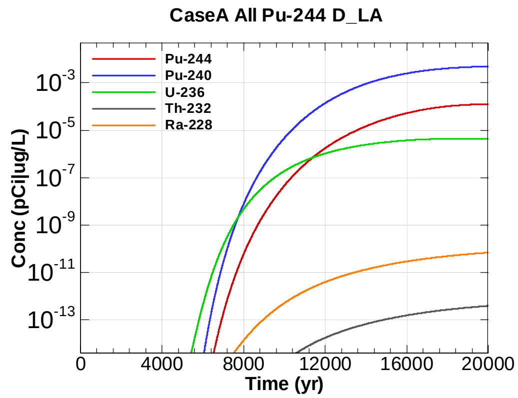

Figure B.2-289 - 100m Aquifer Concentration for CaseA All Pu-244 D_LA

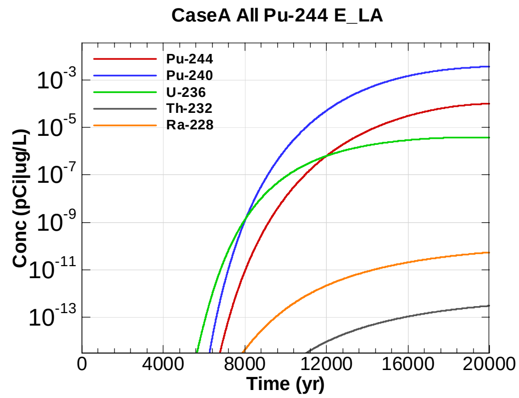

Figure B.2-290 - 100m Aquifer Concentration for CaseA All Pu-244 E_LA

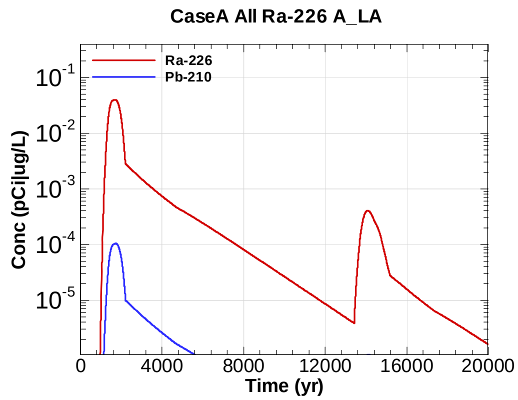

Figure B.2-291 - 100m Aquifer Concentration for CaseA All Ra-226 A_LA

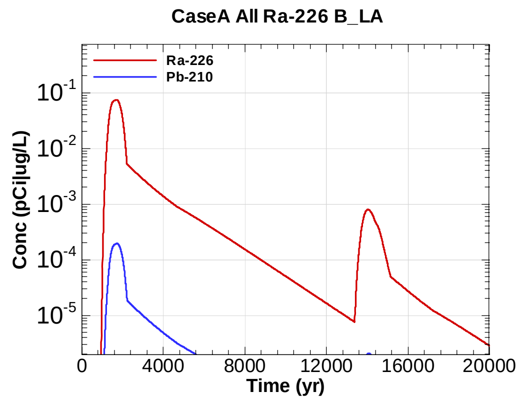

Figure B.2-292 - 100m Aquifer Concentration for CaseA All Ra-226 B_LA

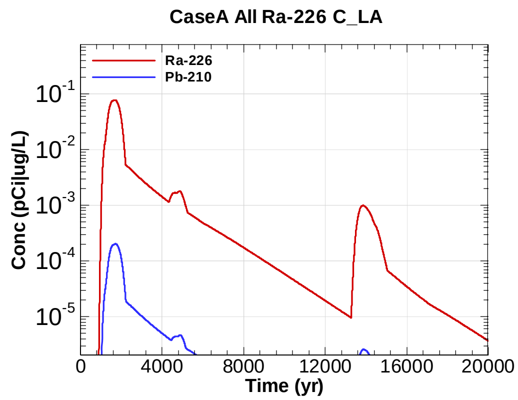

Figure B.2-293 - 100m Aquifer Concentration for CaseA All Ra-226 C_LA

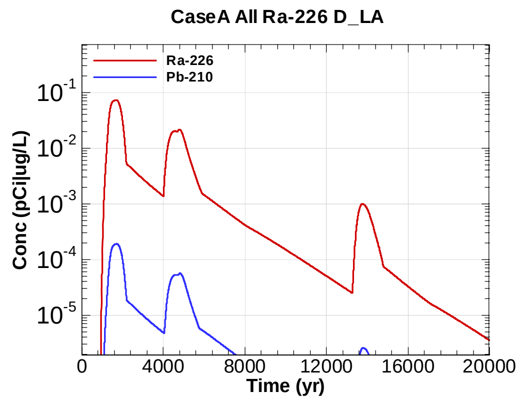

Figure B.2-294 - 100m Aquifer Concentration for CaseA All Ra-226 D_LA

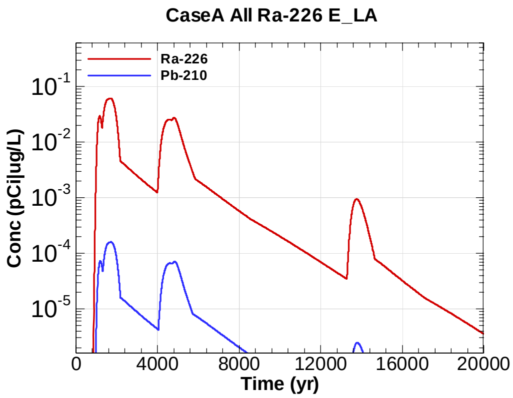

Figure B.2-295 - 100m Aquifer Concentration for CaseA All Ra-226 E_LA

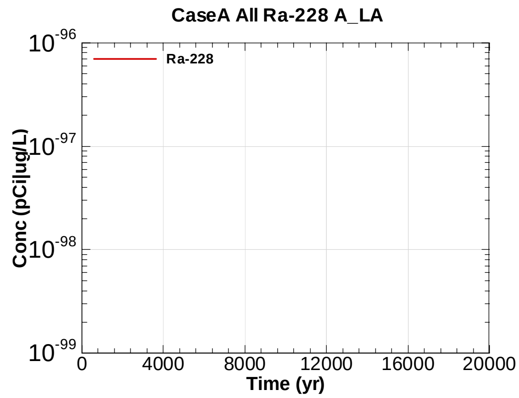

Figure B.2-296 - 100m Aquifer Concentration for CaseA All Ra-228 A_LA

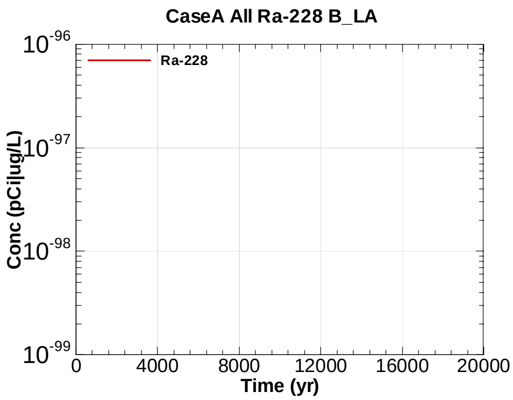

Figure B.2-297 - 100m Aquifer Concentration for CaseA All Ra-228 B_LA

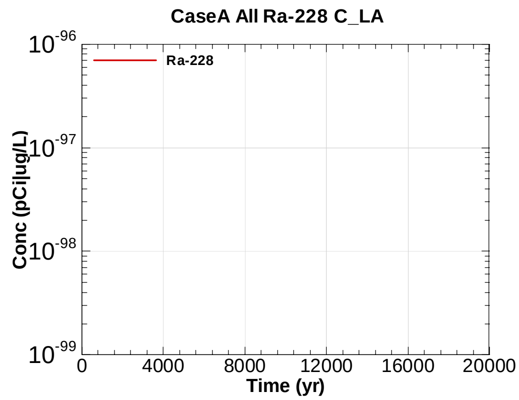

Figure B.2-298 - 100m Aquifer Concentration for CaseA All Ra-228 C_LA

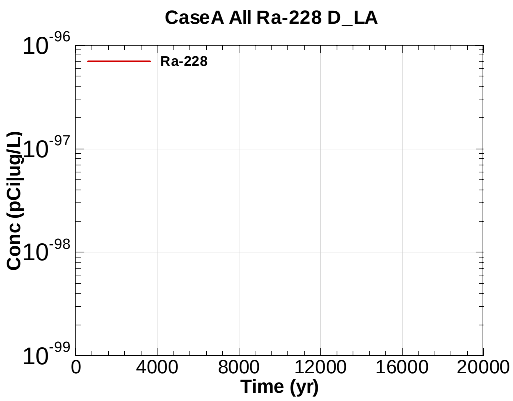

Figure B.2-299 - 100m Aquifer Concentration for CaseA All Ra-228 D_LA

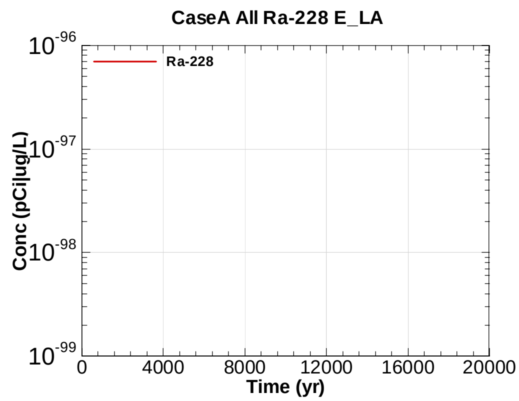

Figure B.2-300 - 100m Aquifer Concentration for CaseA All Ra-228 E_LA

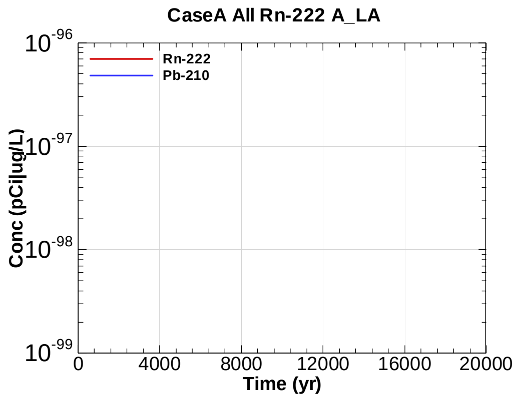

Figure B.2-301 - 100m Aquifer Concentration for CaseA All Rn-222 A_LA

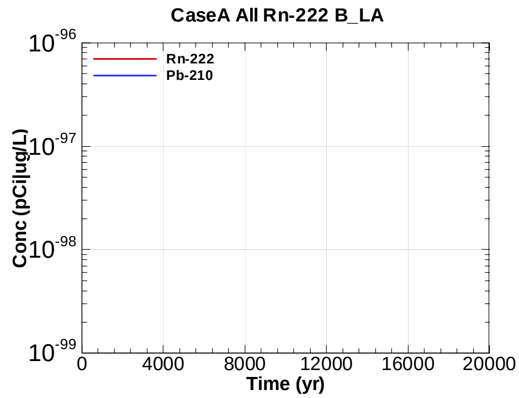

Figure B.2-302 - 100m Aquifer Concentration for CaseA All Rn-222 B_LA

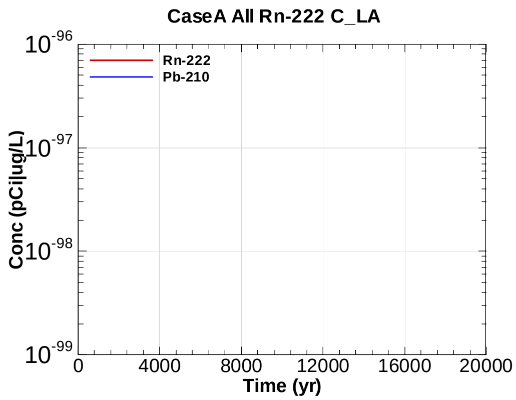

Figure B.2-303 - 100m Aquifer Concentration for CaseA All Rn-222 C_LA

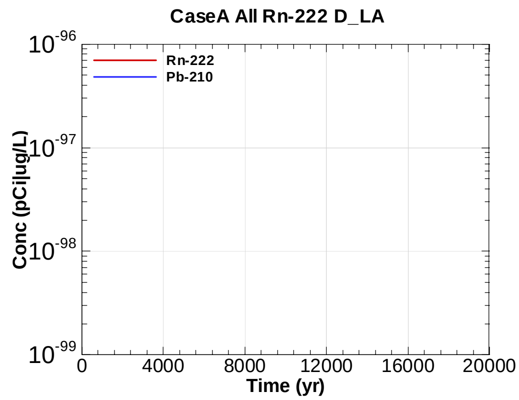

Figure B.2-304 - 100m Aquifer Concentration for CaseA All Rn-222 D_LA

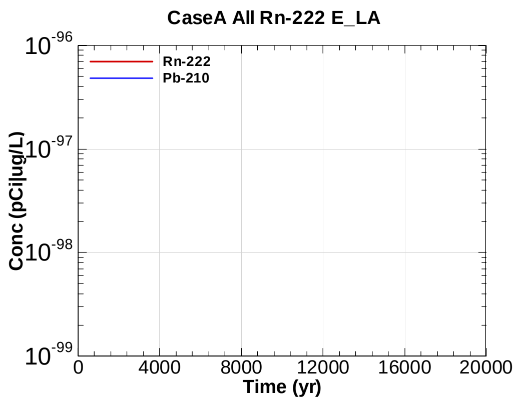

Figure B.2-305 - 100m Aquifer Concentration for CaseA All Rn-222 E_LA

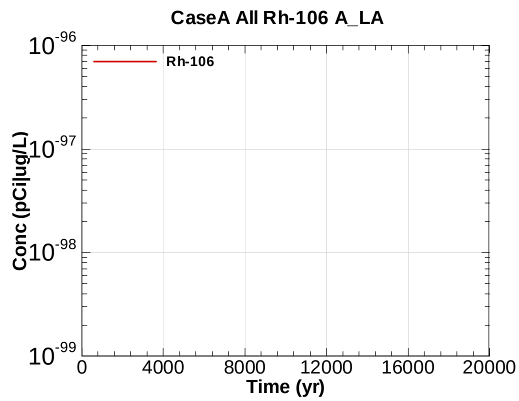

Figure B.2-306 - 100m Aquifer Concentration for CaseA All Rh-106 A_LA

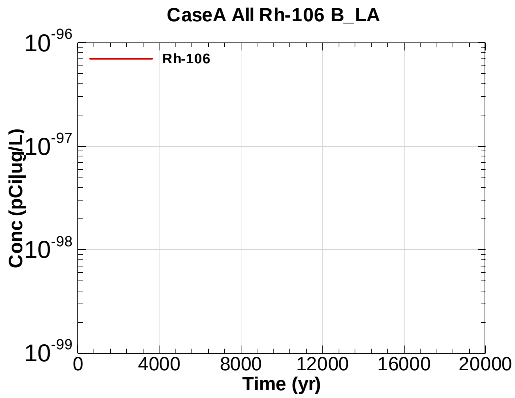

Figure B.2-307 - 100m Aquifer Concentration for CaseA All Rh-106 B_LA

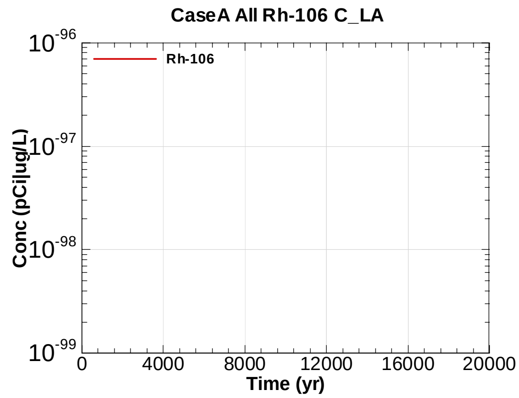

Figure B.2-308 - 100m Aquifer Concentration for CaseA All Rh-106 C_LA

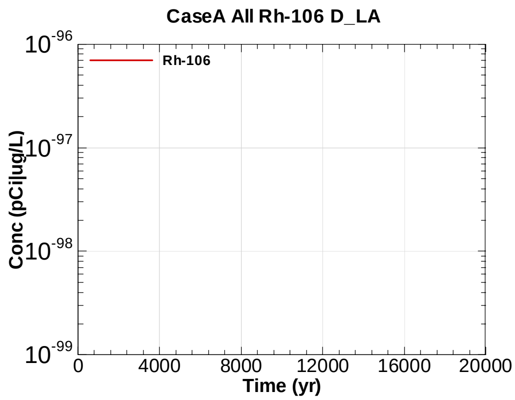

Figure B.2-309 - 100m Aquifer Concentration for CaseA All Rh-106 D_LA

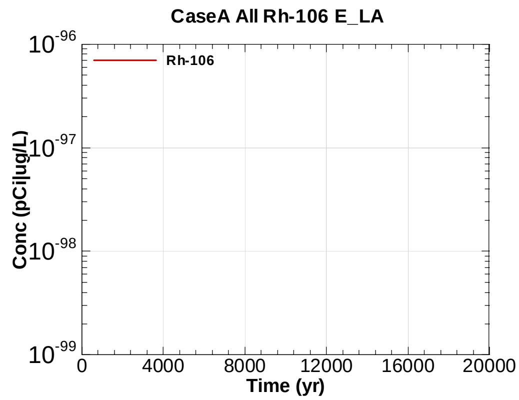

Figure B.2-310 - 100m Aquifer Concentration for CaseA All Rh-106 E_LA

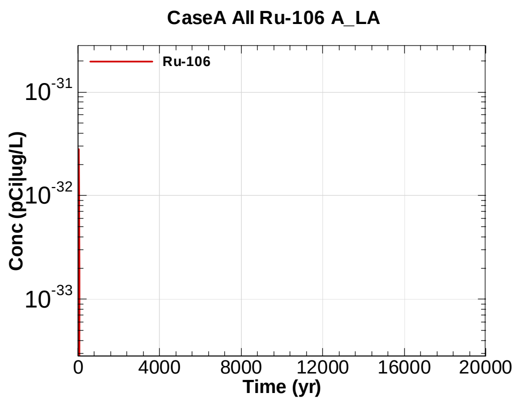

Figure B.2-311 - 100m Aquifer Concentration for CaseA All Ru-106 A_LA

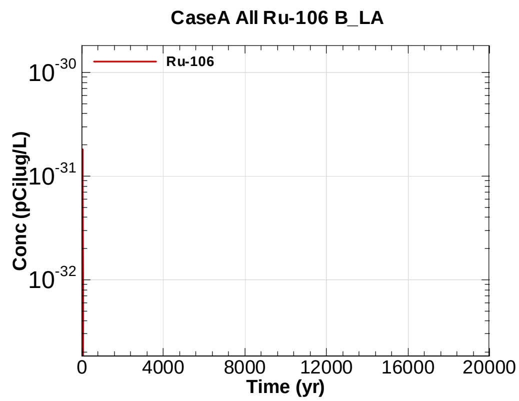

Figure B.2-312 - 100m Aquifer Concentration for CaseA All Ru-106 B_LA

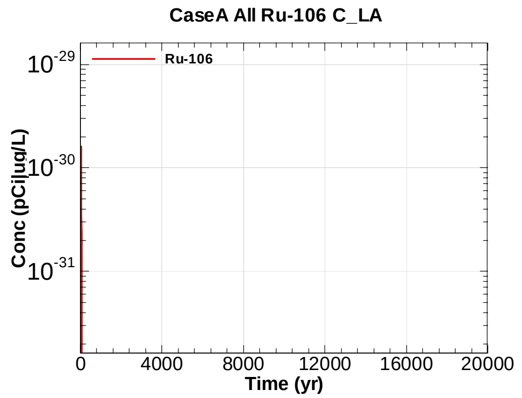

Figure B.2-313 - 100m Aquifer Concentration for CaseA All Ru-106 C_LA

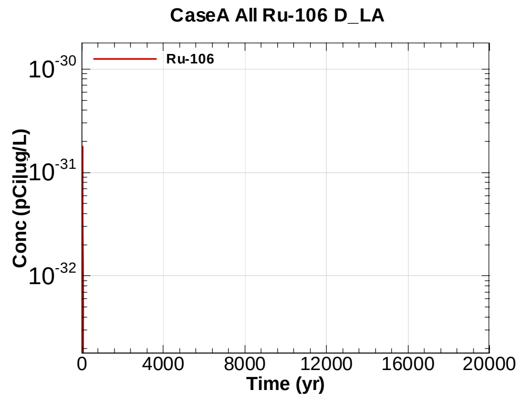

Figure B.2-314 - 100m Aquifer Concentration for CaseA All Ru-106 D_LA

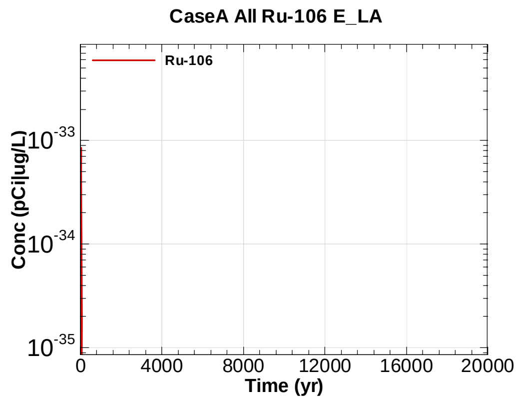

Figure B.2-315 - 100m Aquifer Concentration for CaseA All Ru-106 E_LA

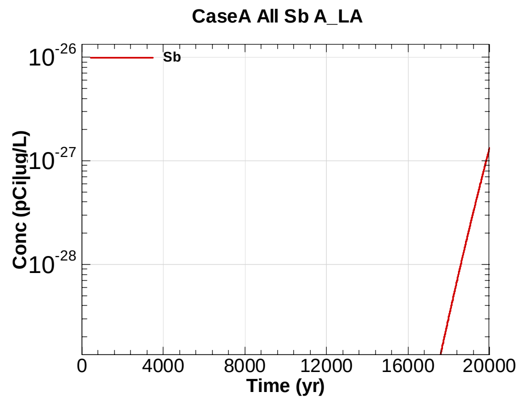

Figure B.2-316 - 100m Aquifer Concentration for CaseA All Sb A_LA

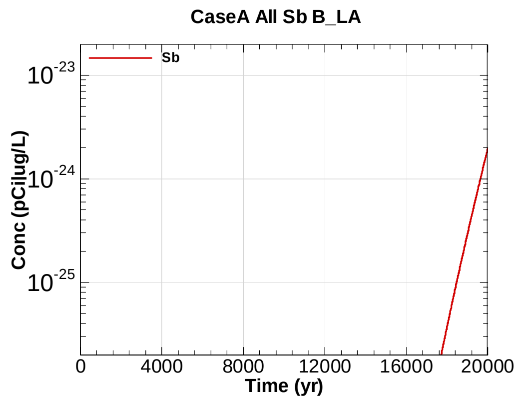

Figure B.2-317 - 100m Aquifer Concentration for CaseA All Sb B_LA

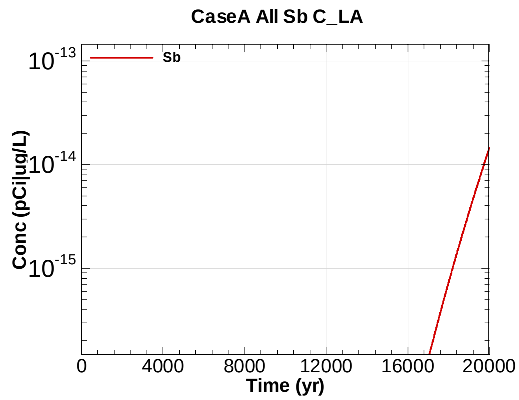

Figure B.2-318 - 100m Aquifer Concentration for CaseA All Sb C_LA

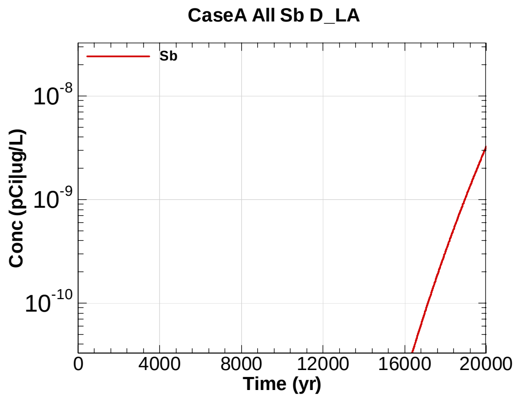

Figure B.2-319 - 100m Aquifer Concentration for CaseA All Sb D_LA

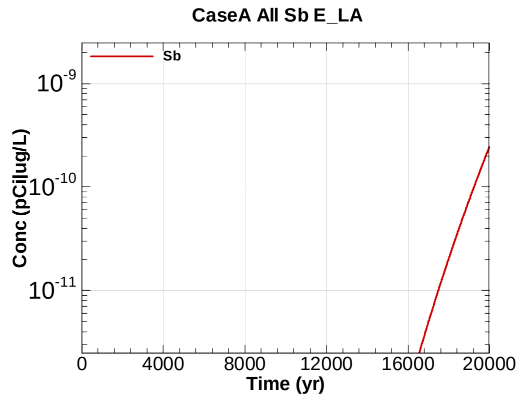

Figure B.2-320 - 100m Aquifer Concentration for CaseA All Sb E_LA

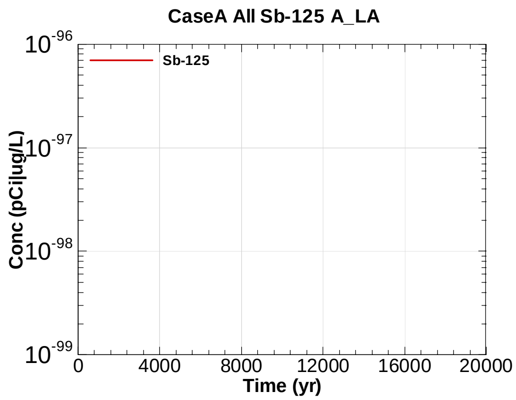

Figure B.2-321 - 100m Aquifer Concentration for CaseA All Sb-125 A_LA

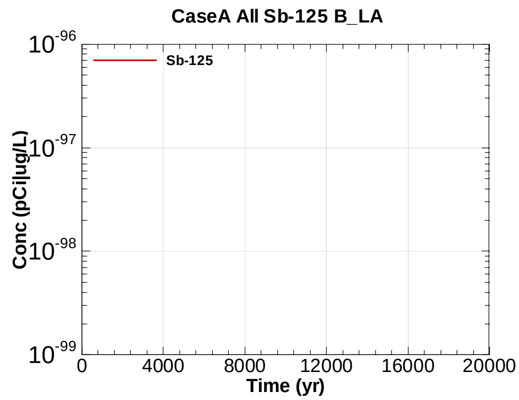

Figure B.2-322 - 100m Aquifer Concentration for CaseA All Sb-125 B_LA

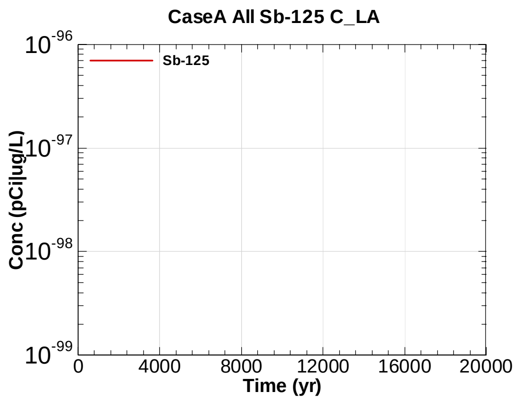

Figure B.2-323 - 100m Aquifer Concentration for CaseA All Sb-125 C_LA

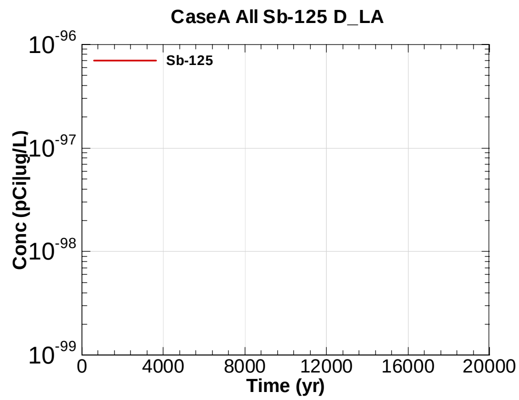

Figure B.2-324 - 100m Aquifer Concentration for CaseA All Sb-125 D_LA

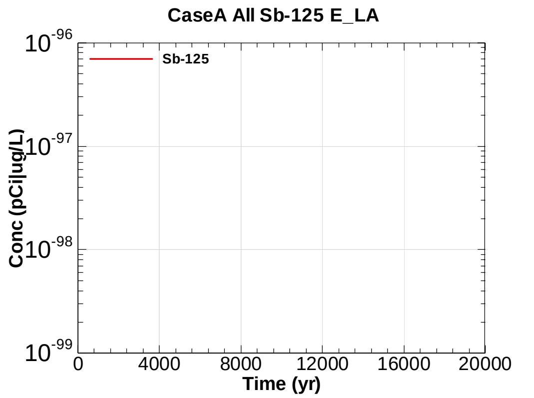

Figure B.2-325 - 100m Aquifer Concentration for CaseA All Sb-125 E_LA

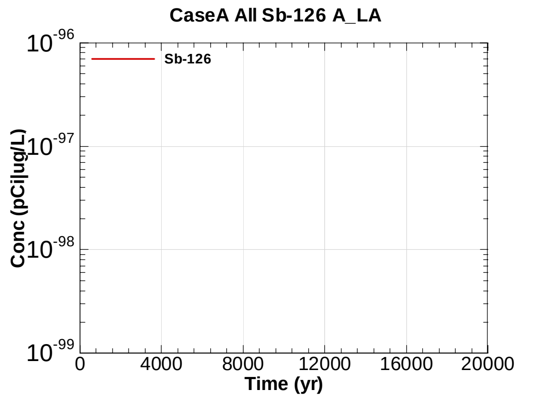

Figure B.2-326 - 100m Aquifer Concentration for CaseA All Sb-126 A_LA

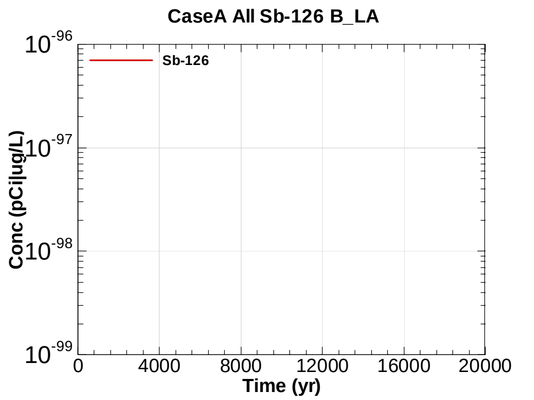

Figure B.2-327 - 100m Aquifer Concentration for CaseA All Sb-126 B_LA

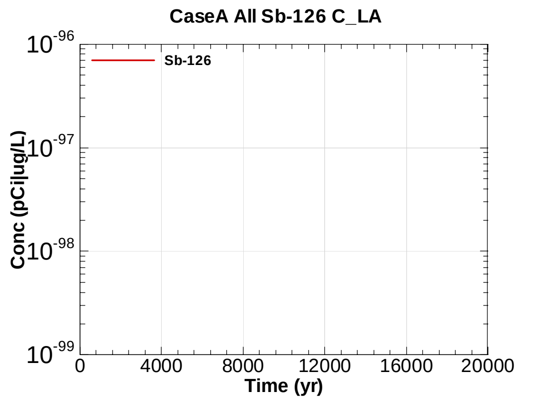

Figure B.2-328 - 100m Aquifer Concentration for CaseA All Sb-126 C_LA

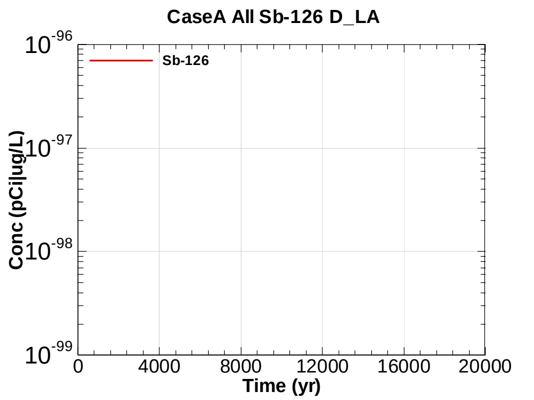

Figure B.2-329 - 100m Aquifer Concentration for CaseA All Sb-126 D_LA

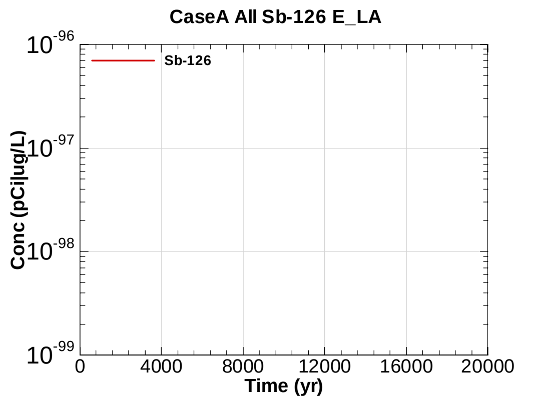

Figure B.2-330 - 100m Aquifer Concentration for CaseA All Sb-126 E_LA

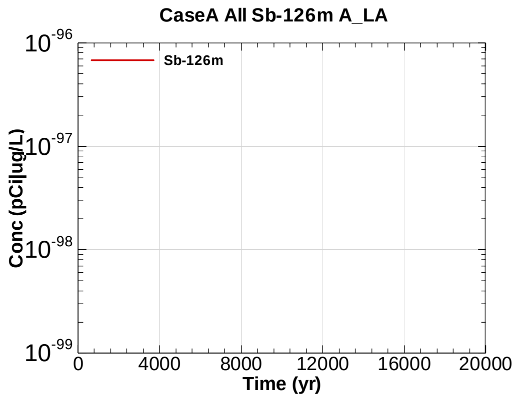

Figure B.2-331 - 100m Aquifer Concentration for CaseA All Sb-126m A_LA

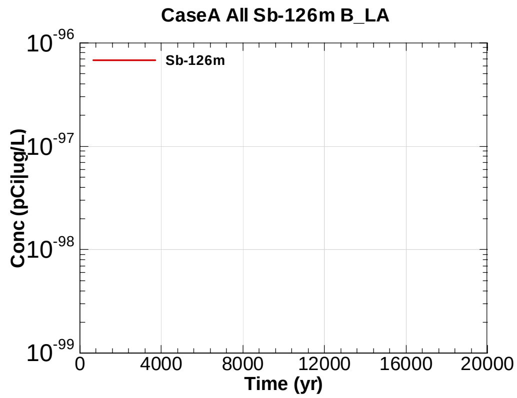

Figure B.2-332 - 100m Aquifer Concentration for CaseA All Sb-126m B_LA

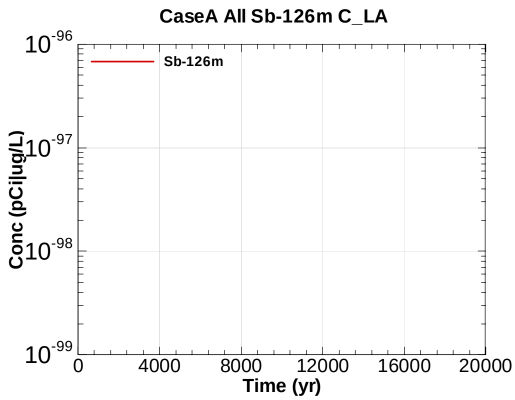

Figure B.2-333 - 100m Aquifer Concentration for CaseA All Sb-126m C_LA

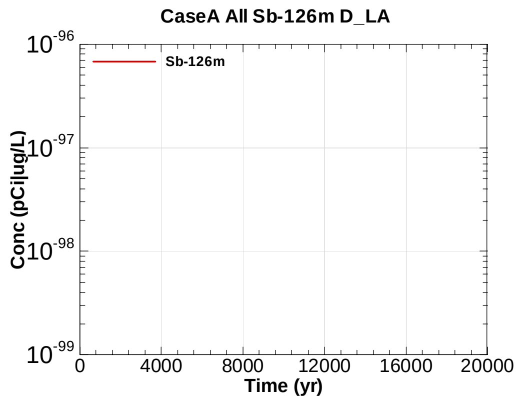

Figure B.2-334 - 100m Aquifer Concentration for CaseA All Sb-126m D_LA

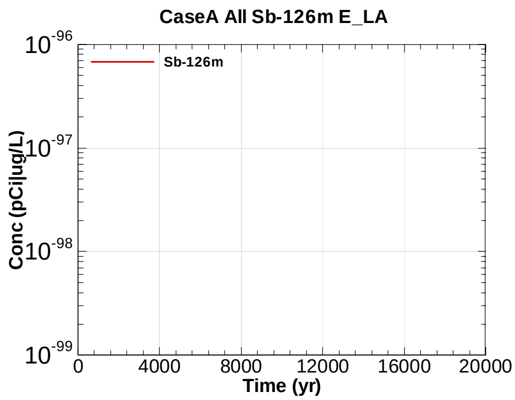

Figure B.2-335 - 100m Aquifer Concentration for CaseA All Sb-126m E_LA

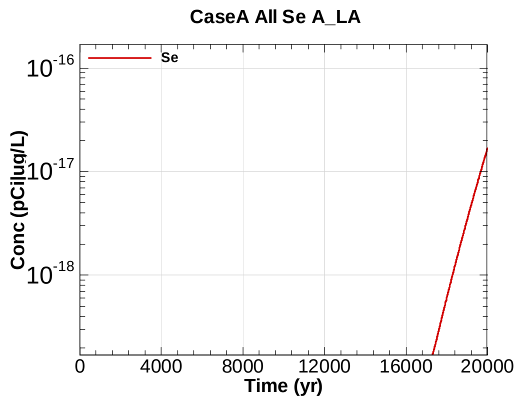

Figure B.2-336 - 100m Aquifer Concentration for CaseA All Se A_LA

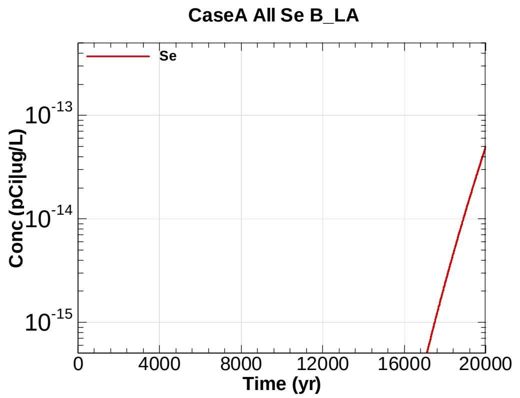

Figure B.2-337 - 100m Aquifer Concentration for CaseA All Se B_LA

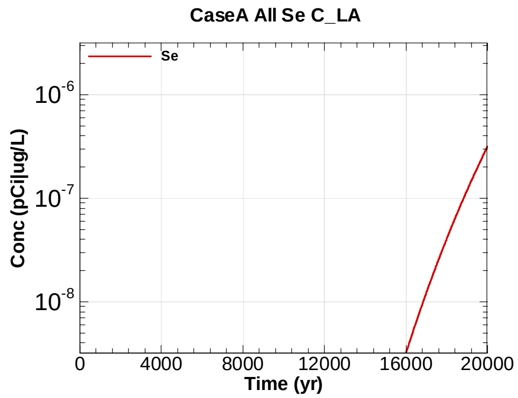

Figure B.2-338 - 100m Aquifer Concentration for CaseA All Se C_LA

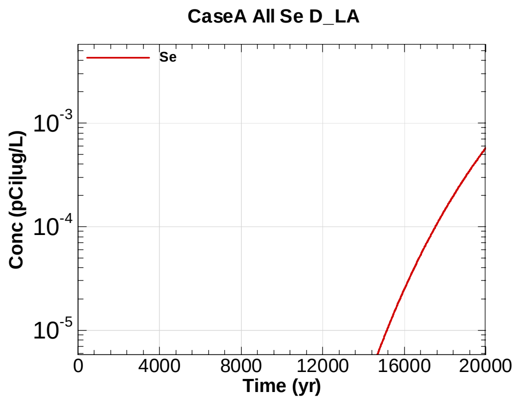

Figure B.2-339 - 100m Aquifer Concentration for CaseA All Se D_LA

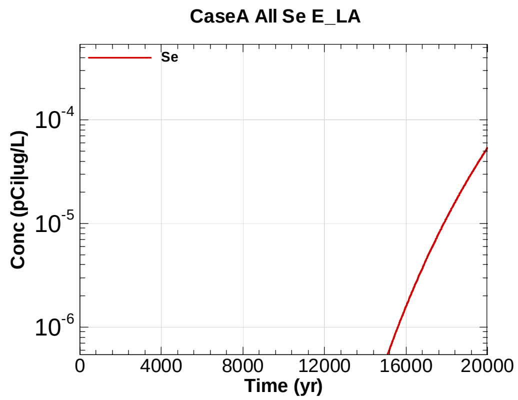

Figure B.2-340 - 100m Aquifer Concentration for CaseA All Se E_LA

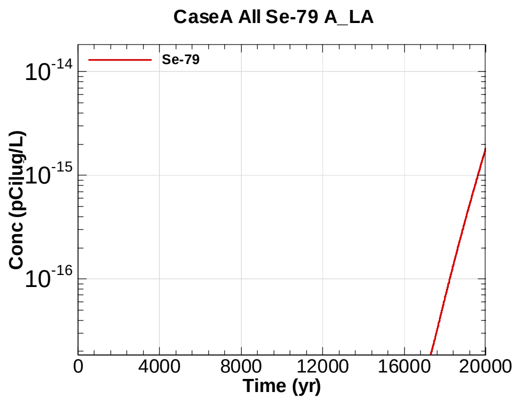

Figure B.2-341 - 100m Aquifer Concentration for CaseA All Se-79 A_LA

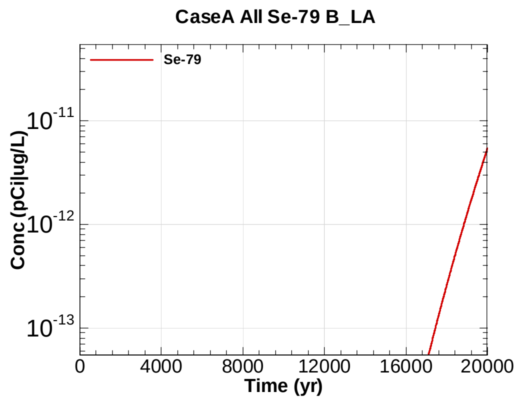

Figure B.2-342 - 100m Aquifer Concentration for CaseA All Se-79 B_LA

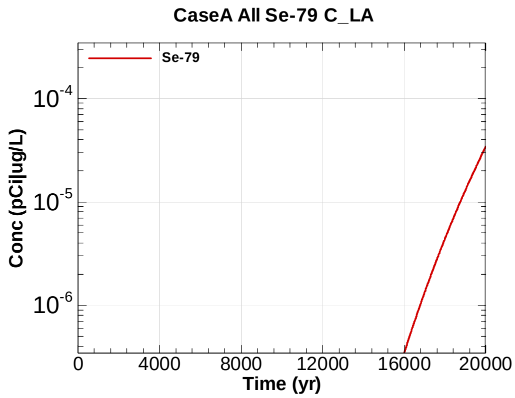

Figure B.2-343 - 100m Aquifer Concentration for CaseA All Se-79 C_LA

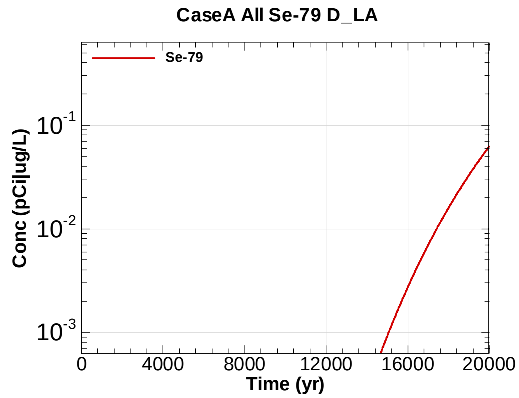

Figure B.2-344 - 100m Aquifer Concentration for CaseA All Se-79 D_LA

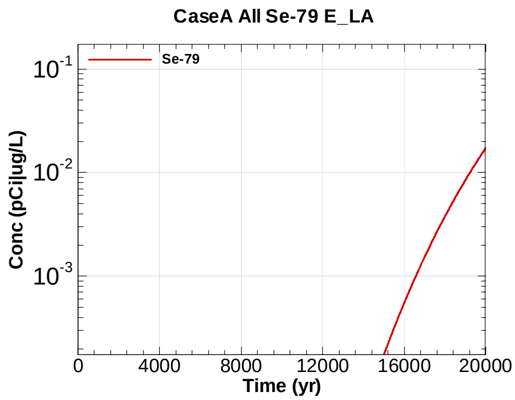

Figure B.2-345 - 100m Aquifer Concentration for CaseA All Se-79 E_LA

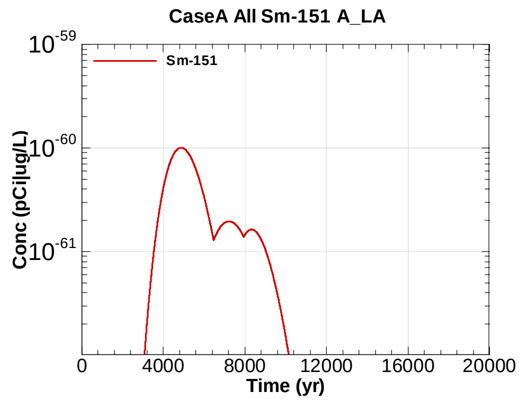

Figure B.2-346 - 100m Aquifer Concentration for CaseA All Sm-151 A_LA

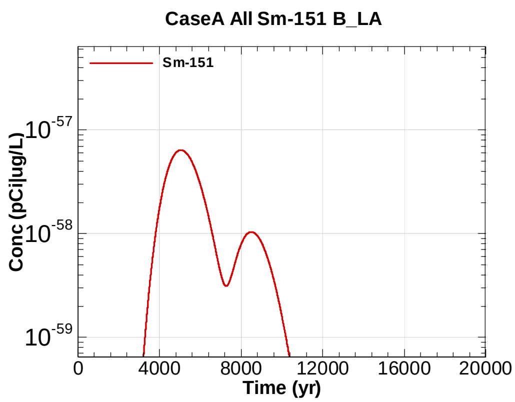

Figure B.2-347 - 100m Aquifer Concentration for CaseA All Sm-151 B_LA

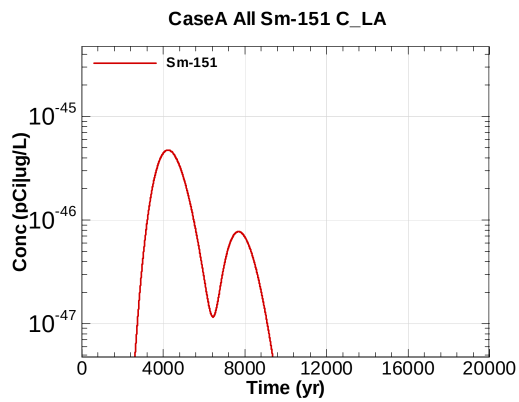

Figure B.2-348 - 100m Aquifer Concentration for CaseA All Sm-151 C_LA

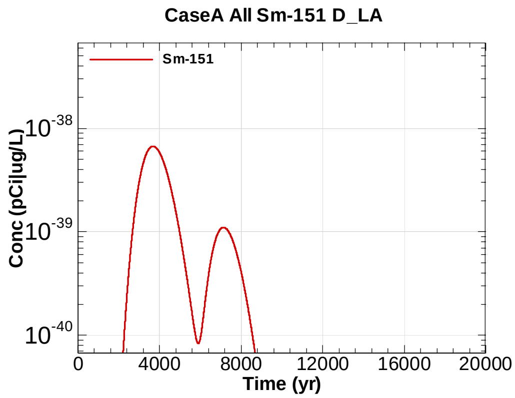

Figure B.2-349 - 100m Aquifer Concentration for CaseA All Sm-151 D_LA

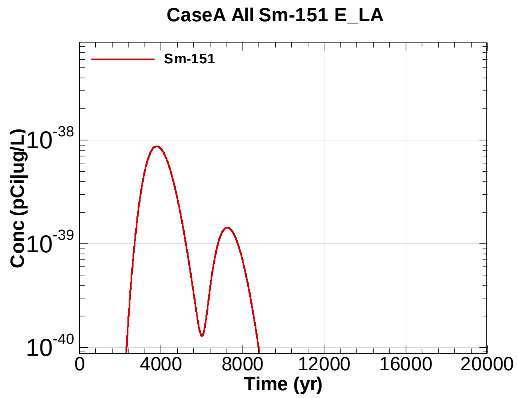

Figure B.2-350 - 100m Aquifer Concentration for CaseA All Sm-151 E_LA

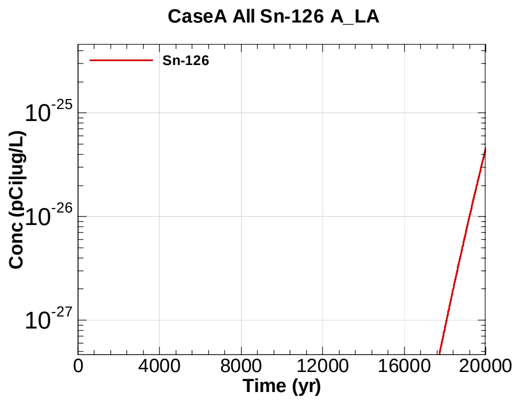

Figure B.2-351 - 100m Aquifer Concentration for CaseA All Sn-126 A_LA

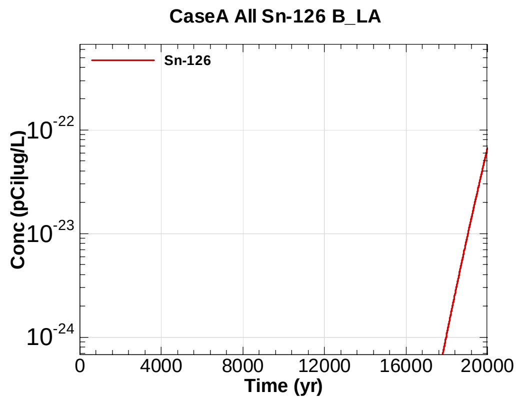

Figure B.2-352 - 100m Aquifer Concentration for CaseA All Sn-126 B_LA

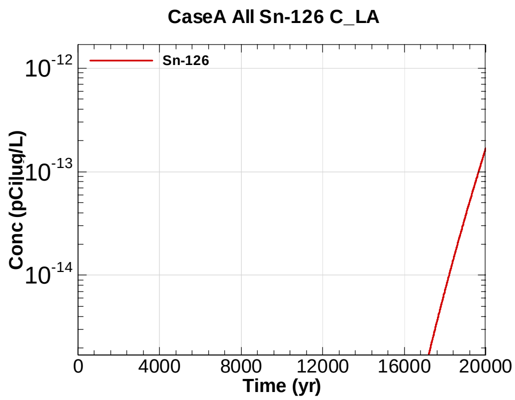

Figure B.2-353 - 100m Aquifer Concentration for CaseA All Sn-126 C_LA

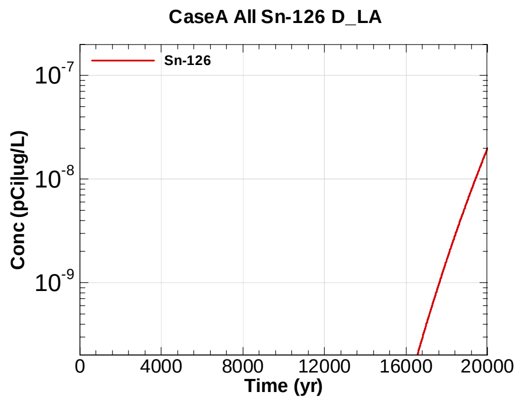

Figure B.2-354 - 100m Aquifer Concentration for CaseA All Sn-126 D_LA

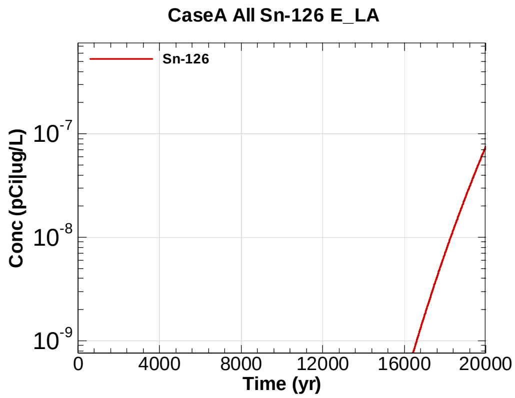

Figure B.2-355 - 100m Aquifer Concentration for CaseA All Sn-126 E_LA

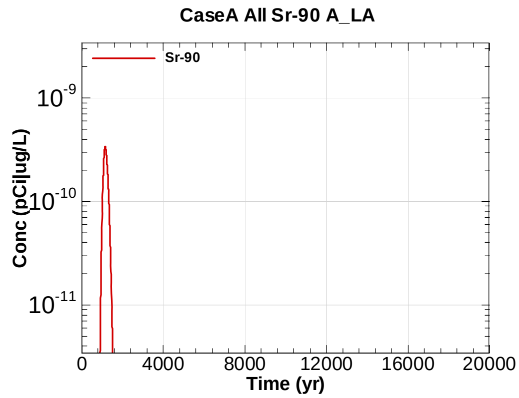

Figure B.2-356 - 100m Aquifer Concentration for CaseA All Sr-90 A_LA

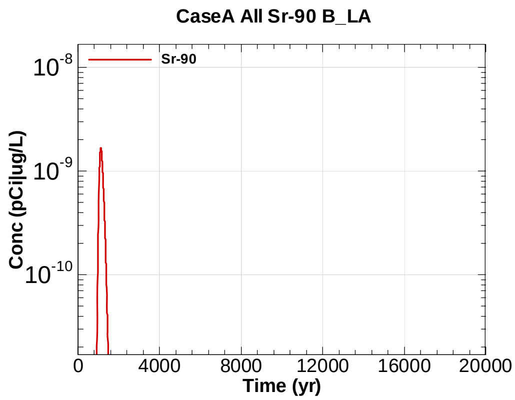

Figure B.2-357 - 100m Aquifer Concentration for CaseA All Sr-90 B_LA

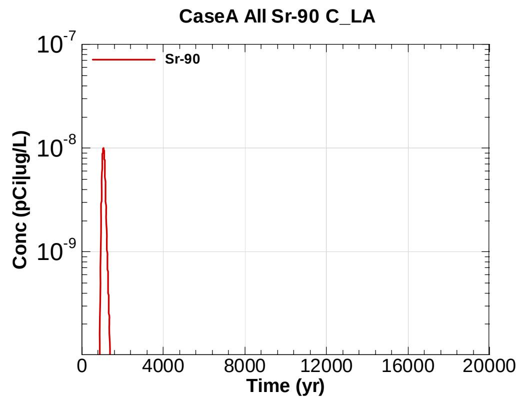

Figure B.2-358 - 100m Aquifer Concentration for CaseA All Sr-90 C_LA

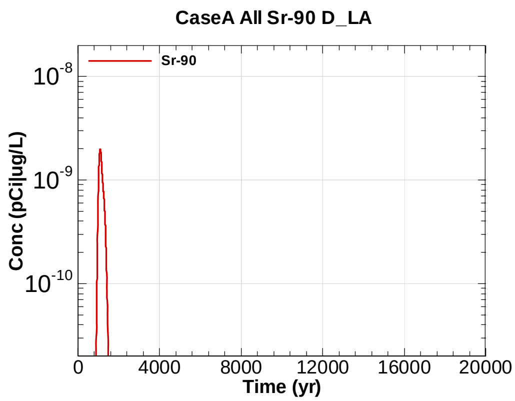

Figure B.2-359 - 100m Aquifer Concentration for CaseA All Sr-90 D_LA

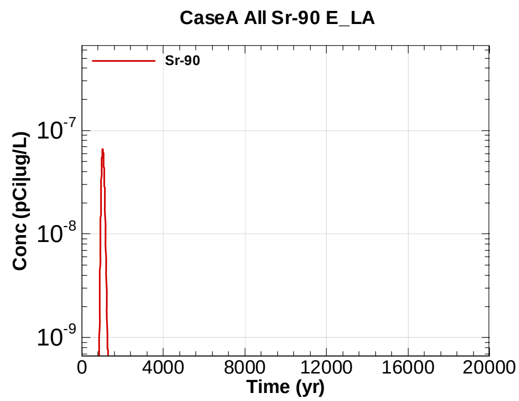

Figure B.2-360 - 100m Aquifer Concentration for CaseA All Sr-90 E_LA

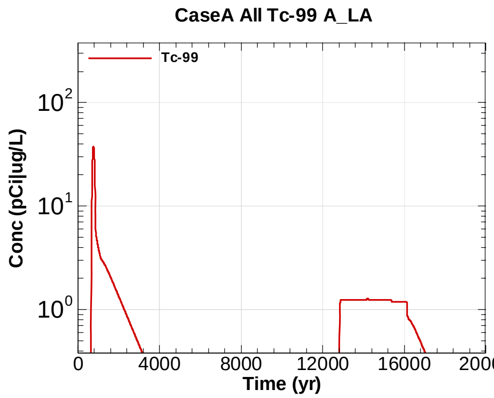

Figure B.2-361 - 100m Aquifer Concentration for CaseA All Tc-99 A_LA

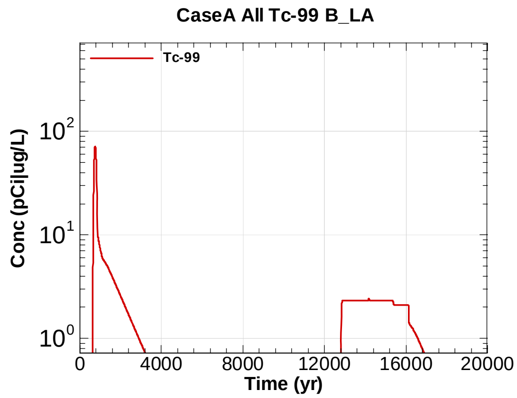

Figure B.2-362 - 100m Aquifer Concentration for CaseA All Tc-99 B_LA

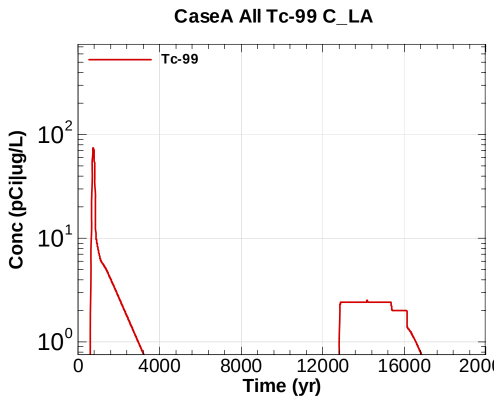

Figure B.2-363 - 100m Aquifer Concentration for CaseA All Tc-99 C_LA

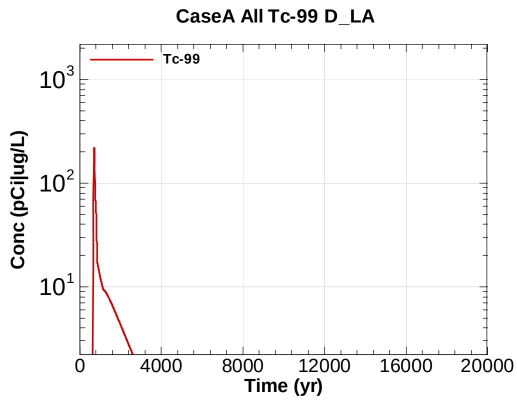

Figure B.2-364 - 100m Aquifer Concentration for CaseA All Tc-99 D_LA

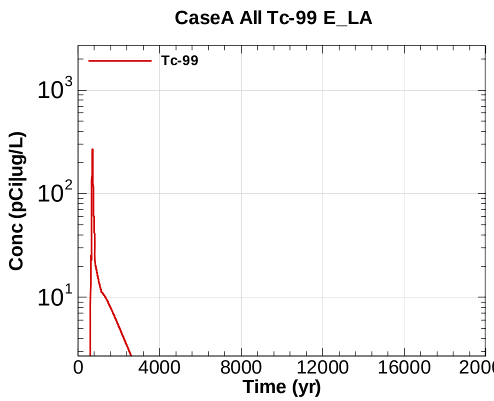

Figure B.2-365 - 100m Aquifer Concentration for CaseA All Tc-99 E_LA

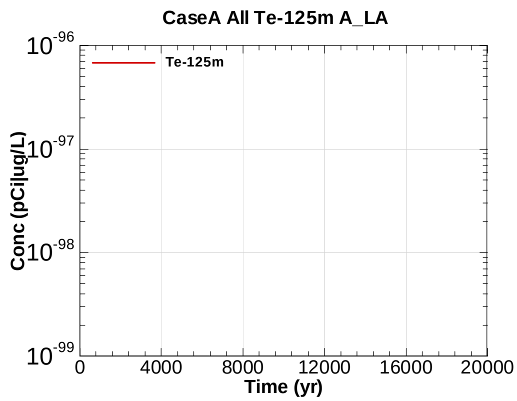

Figure B.2-366 - 100m Aquifer Concentration for CaseA All Te-125m A_LA

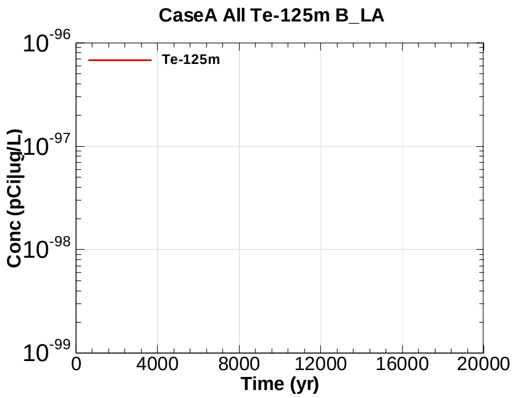

Figure B.2-367 - 100m Aquifer Concentration for CaseA All Te-125m B_LA

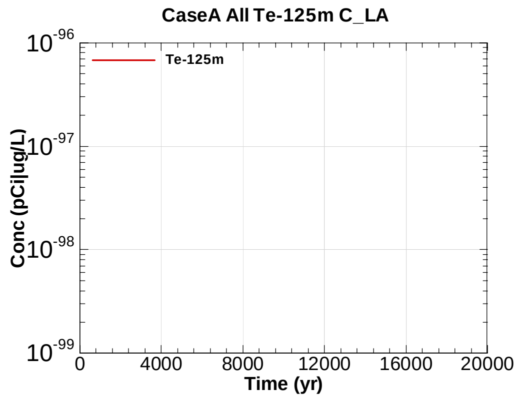

Figure B.2-368 - 100m Aquifer Concentration for CaseA All Te-125m C_LA

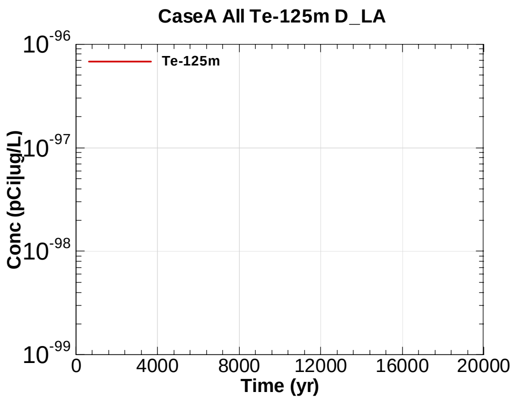

Figure B.2-369 - 100m Aquifer Concentration for CaseA All Te-125m D_LA

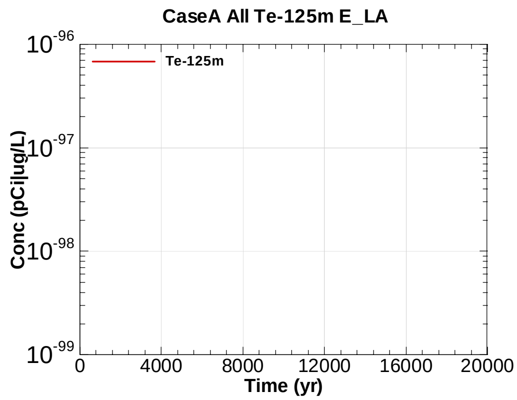

Figure B.2-370 - 100m Aquifer Concentration for CaseA All Te-125m E_LA

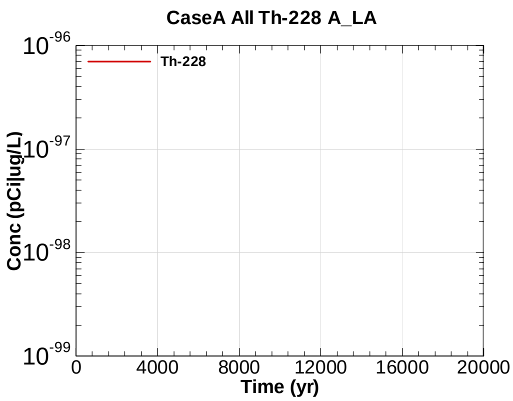

Figure B.2-371 - 100m Aquifer Concentration for CaseA All Th-228 A_LA

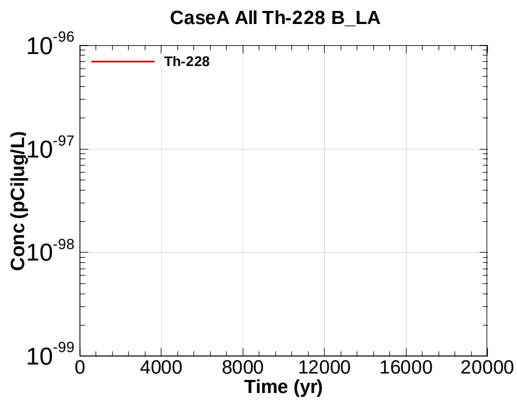

Figure B.2-372 - 100m Aquifer Concentration for CaseA All Th-228 B_LA

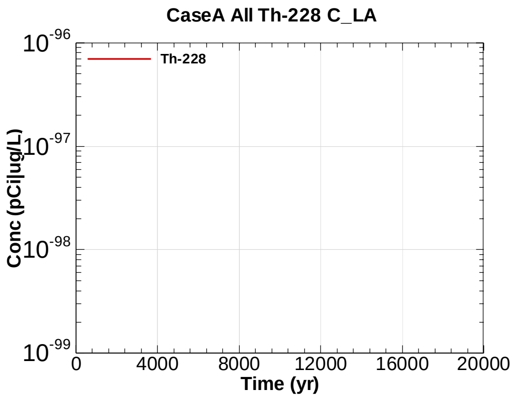

Figure B.2-373 - 100m Aquifer Concentration for CaseA All Th-228 C_LA

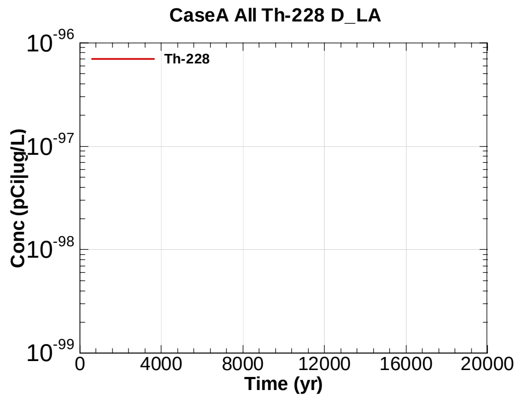

Figure B.2-374 - 100m Aquifer Concentration for CaseA All Th-228 D_LA

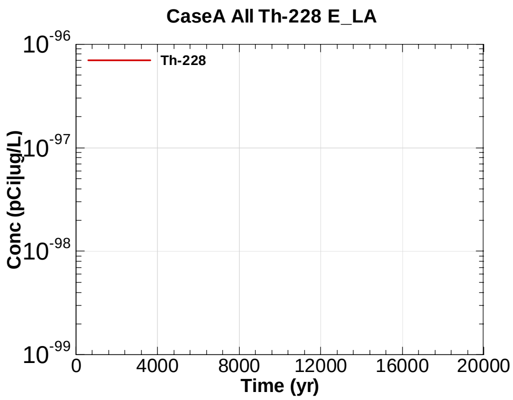

Figure B.2-375 - 100m Aquifer Concentration for CaseA All Th-228 E_LA

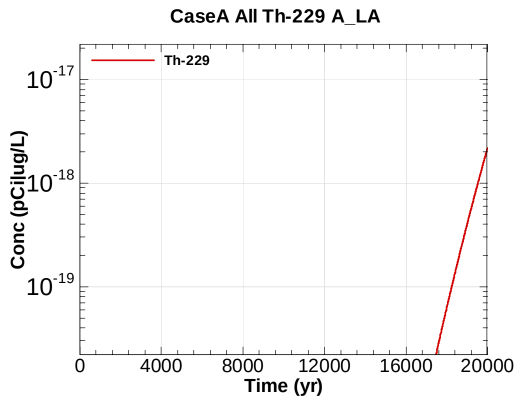

Figure B.2-376 - 100m Aquifer Concentration for CaseA All Th-229 A_LA

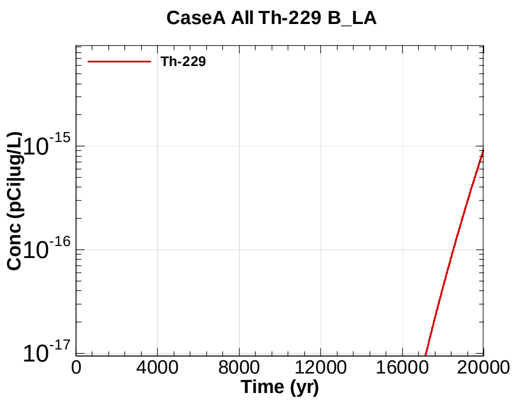

Figure B.2-377 - 100m Aquifer Concentration for CaseA All Th-229 B_LA

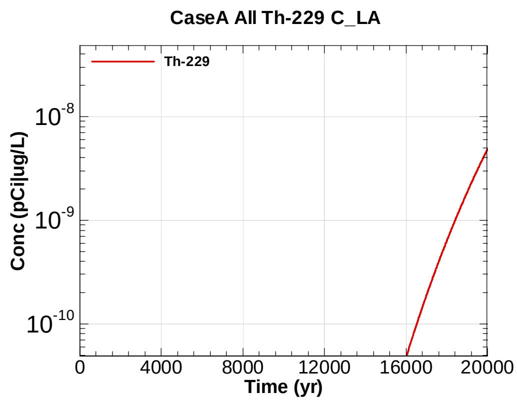

Figure B.2-378 - 100m Aquifer Concentration for CaseA All Th-229 C_LA

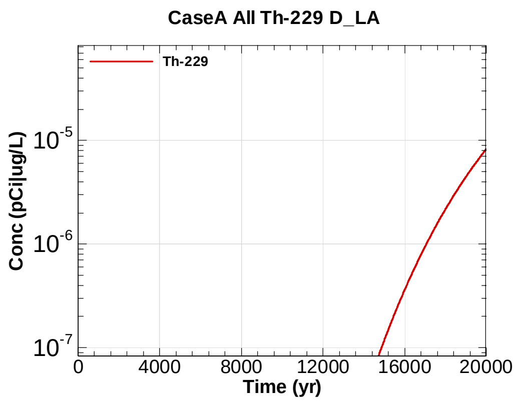

Figure B.2-379 - 100m Aquifer Concentration for CaseA All Th-229 D_LA

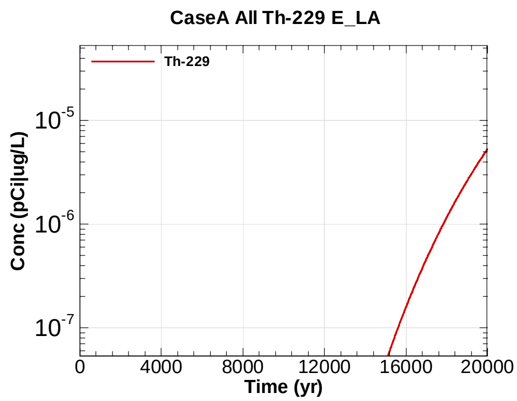

Figure B.2-380 - 100m Aquifer Concentration for CaseA All Th-229 E_LA

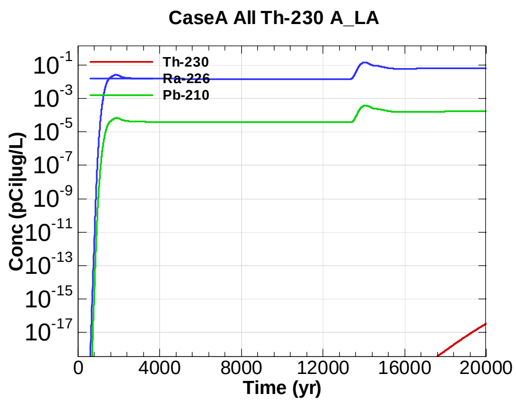

Figure B.2-381 - 100m Aquifer Concentration for CaseA All Th-230 A_LA

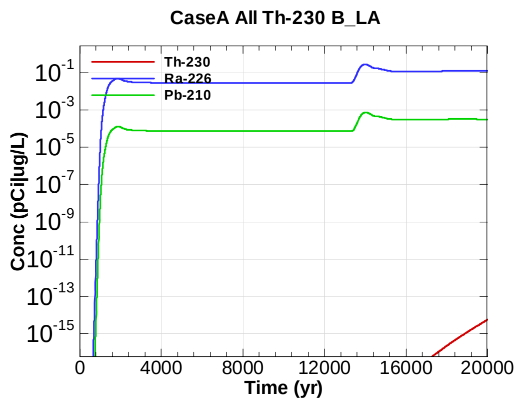

Figure B.2-382 - 100m Aquifer Concentration for CaseA All Th-230 B_LA

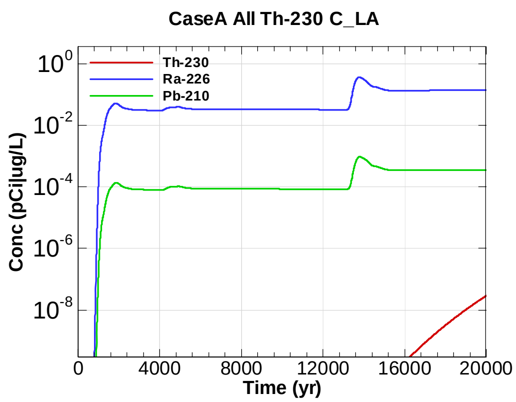

Figure B.2-383 - 100m Aquifer Concentration for CaseA All Th-230 C_LA

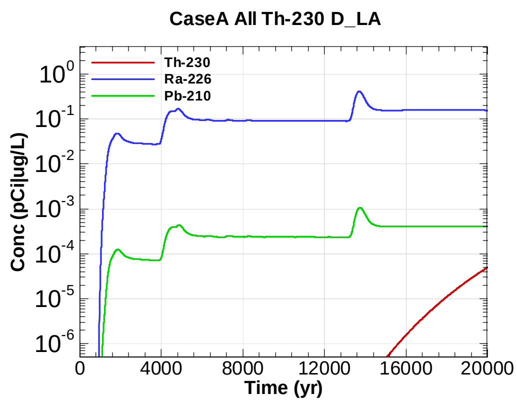

Figure B.2-384 - 100m Aquifer Concentration for CaseA All Th-230 D_LA

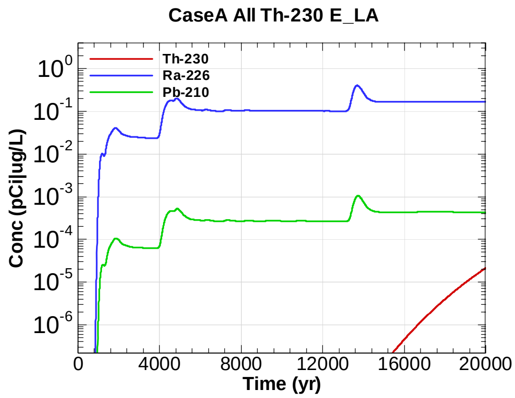

Figure B.2-385 - 100m Aquifer Concentration for CaseA All Th-230 E_LA

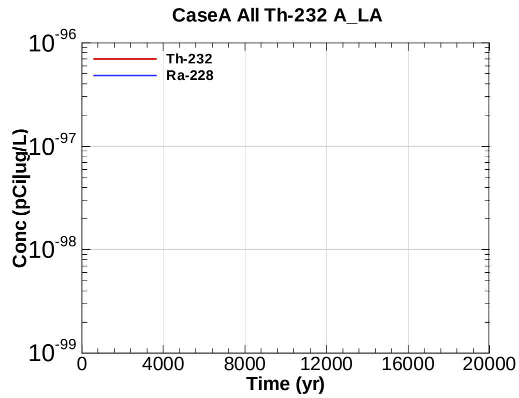

Figure B.2-386 - 100m Aquifer Concentration for CaseA All Th-232 A_LA

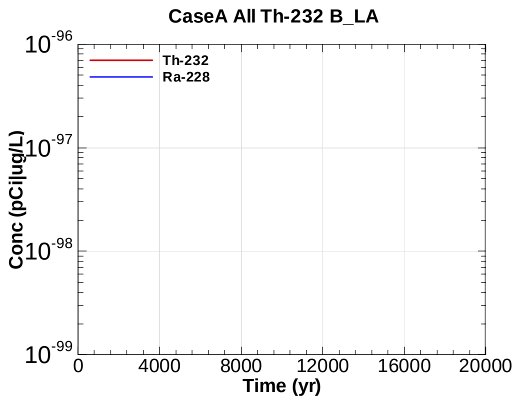

Figure B.2-387 - 100m Aquifer Concentration for CaseA All Th-232 B_LA

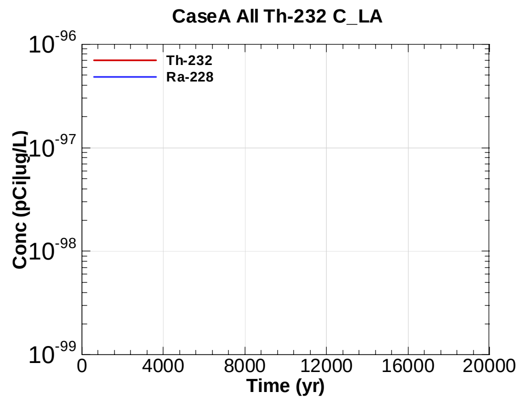

Figure B.2-388 - 100m Aquifer Concentration for CaseA All Th-232 C_LA

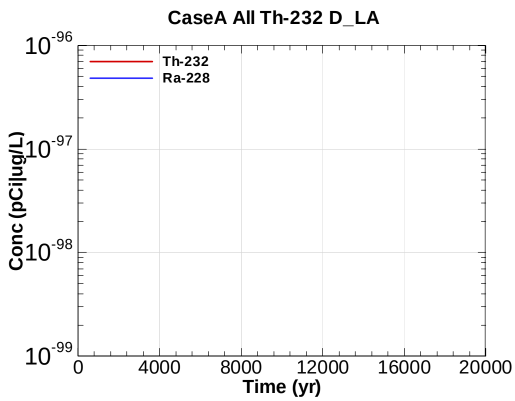

Figure B.2-389 - 100m Aquifer Concentration for CaseA All Th-232 D_LA

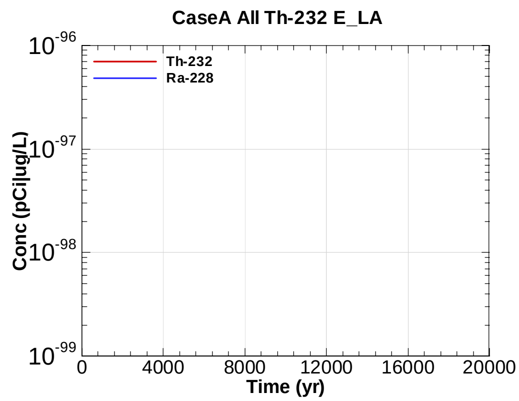

Figure B.2-390 - 100m Aquifer Concentration for CaseA All Th-232 E_LA

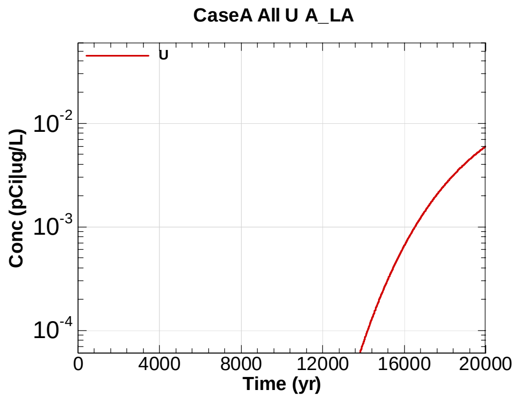

Figure B.2-391 - 100m Aquifer Concentration for CaseA All U A_LA

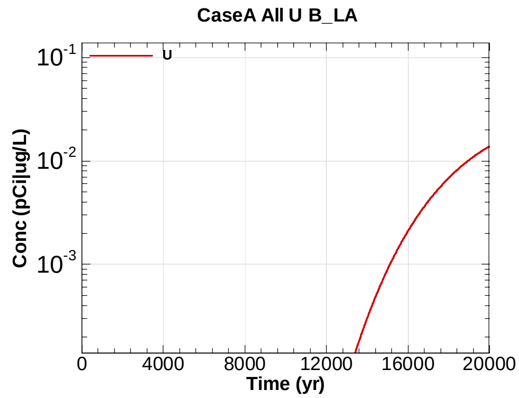

Figure B.2-392 - 100m Aquifer Concentration for CaseA All U B_LA

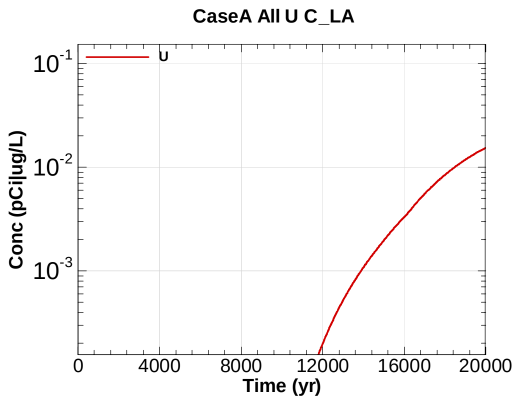

Figure B.2-393 - 100m Aquifer Concentration for CaseA All U C_LA

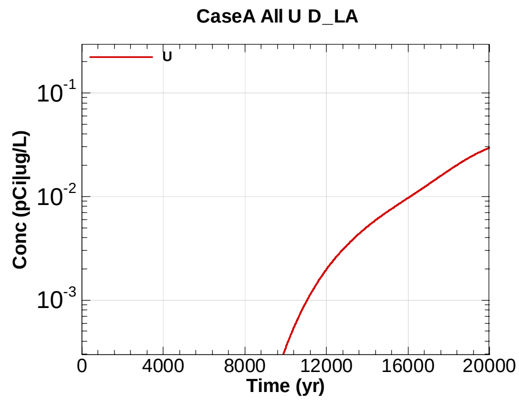

Figure B.2-394 - 100m Aquifer Concentration for CaseA All U D_LA

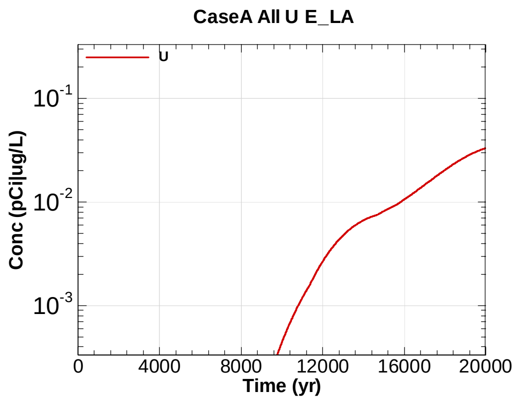

Figure B.2-395 - 100m Aquifer Concentration for CaseA All U E_LA

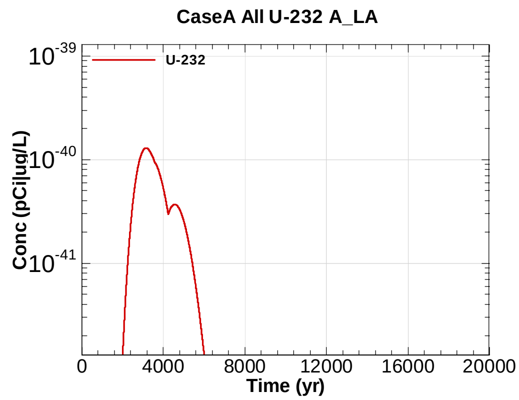

Figure B.2-396 - 100m Aquifer Concentration for CaseA All U-232 A_LA

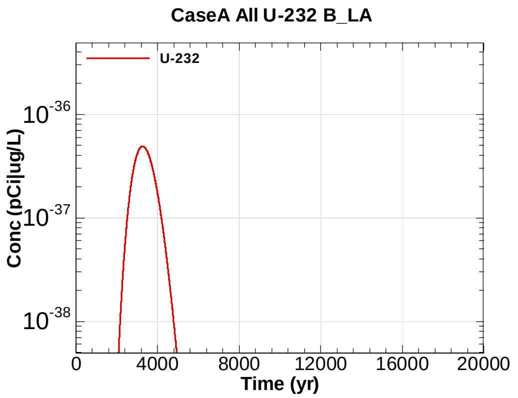

Figure B.2-397 - 100m Aquifer Concentration for CaseA All U-232 B_LA

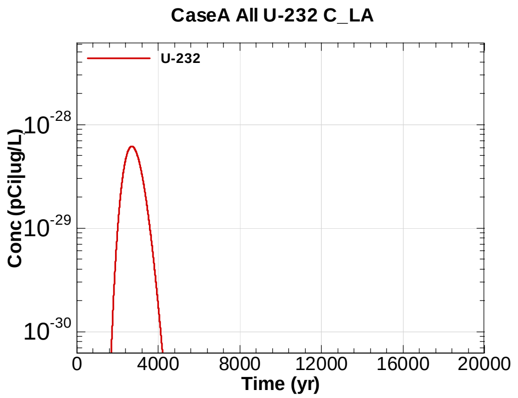

Figure B.2-398 - 100m Aquifer Concentration for CaseA All U-232 C_LA

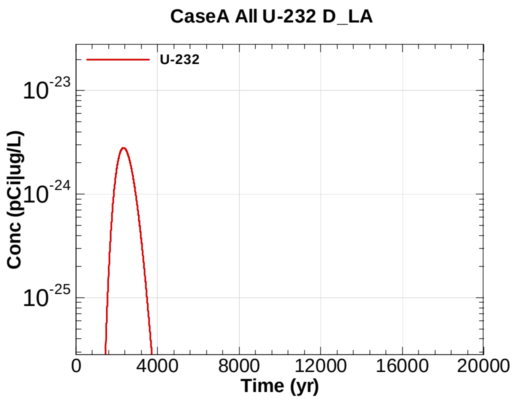

Figure B.2-399 - 100m Aquifer Concentration for CaseA All U-232 D_LA

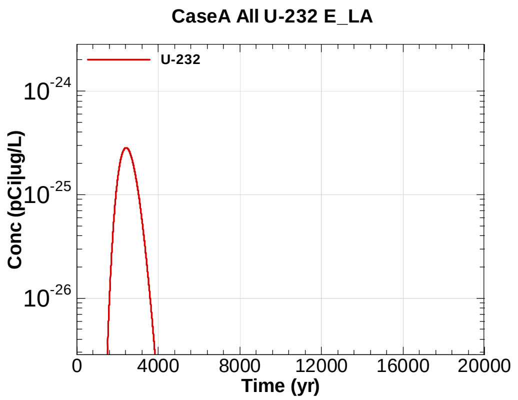

Figure B.2-400 - 100m Aquifer Concentration for CaseA All U-232 E_LA

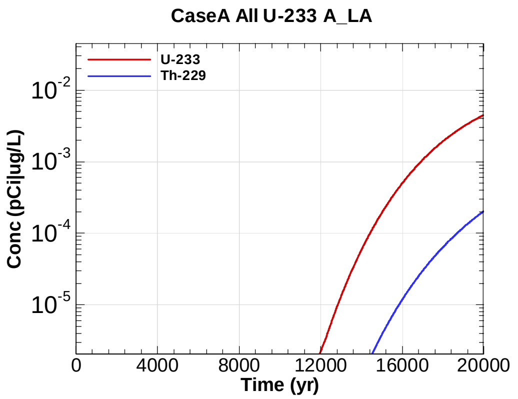

Figure B.2-401 - 100m Aquifer Concentration for CaseA All U-233 A_LA

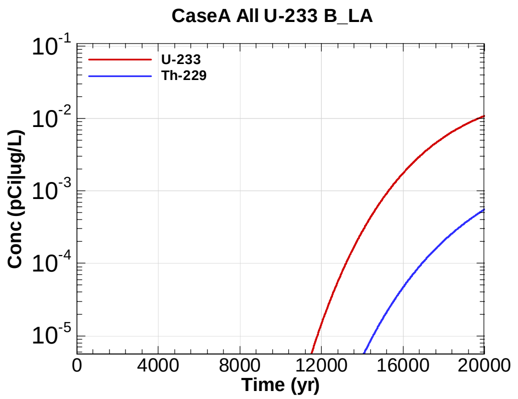

Figure B.2-402 - 100m Aquifer Concentration for CaseA All U-233 B_LA

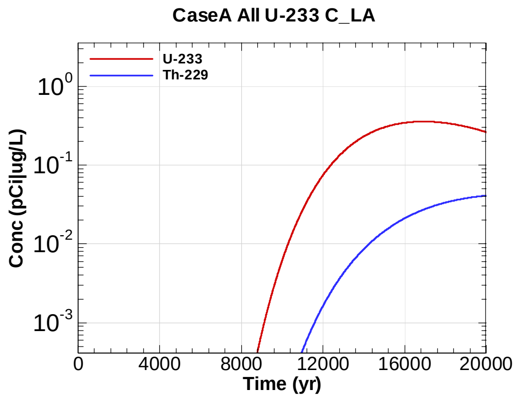

Figure B.2-403 - 100m Aquifer Concentration for CaseA All U-233 C_LA

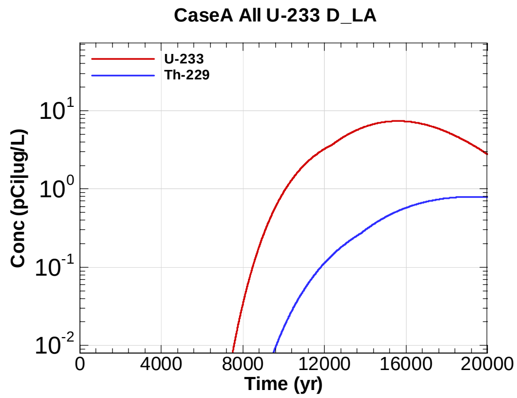

Figure B.2-404 - 100m Aquifer Concentration for CaseA All U-233 D_LA

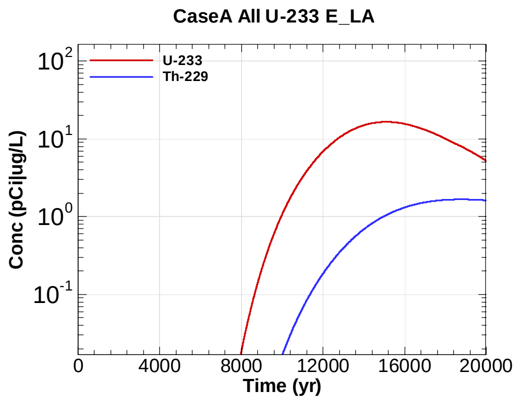

Figure B.2-405 - 100m Aquifer Concentration for CaseA All U-233 E_LA

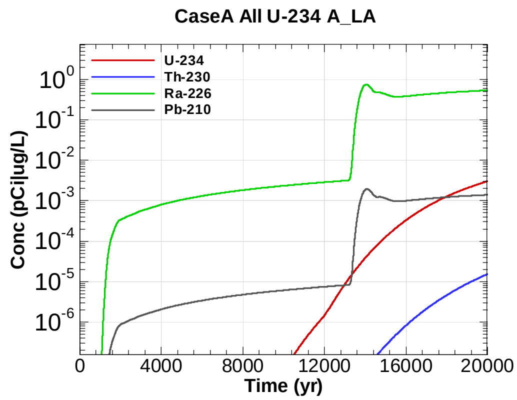

Figure B.2-406 - 100m Aquifer Concentration for CaseA All U-234 A_LA

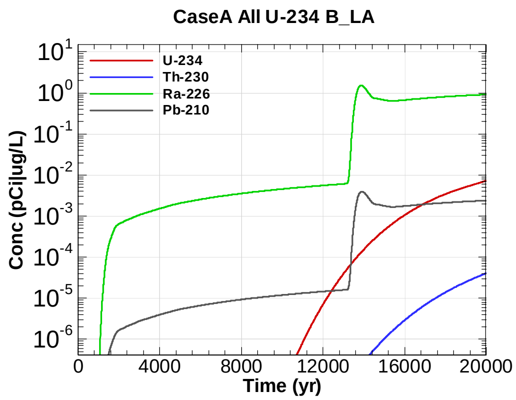

Figure B.2-407 - 100m Aquifer Concentration for CaseA All U-234 B_LA

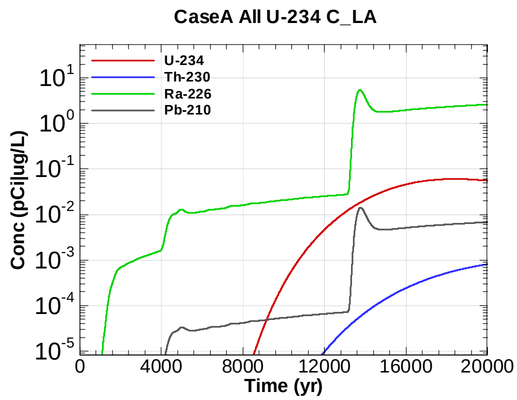

Figure B.2-408 - 100m Aquifer Concentration for CaseA All U-234 C_LA

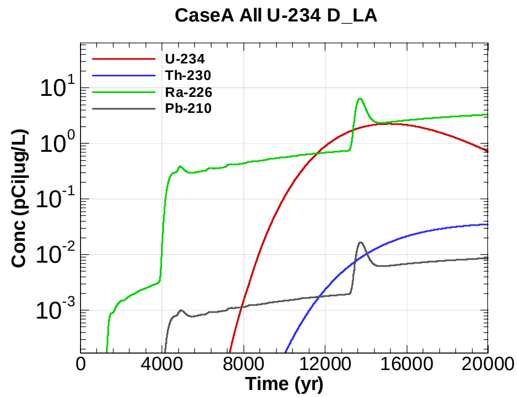

Figure B.2-409 - 100m Aquifer Concentration for CaseA All U-234 D_LA

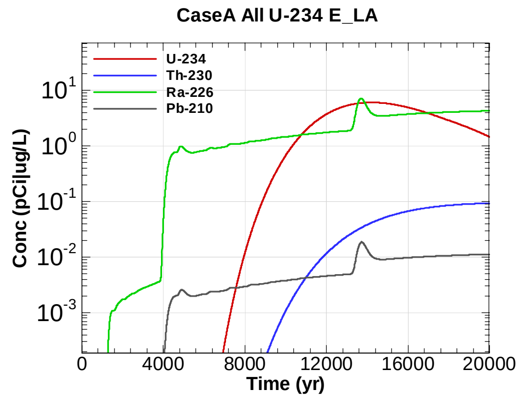

Figure B.2-410 - 100m Aquifer Concentration for CaseA All U-234 E_LA

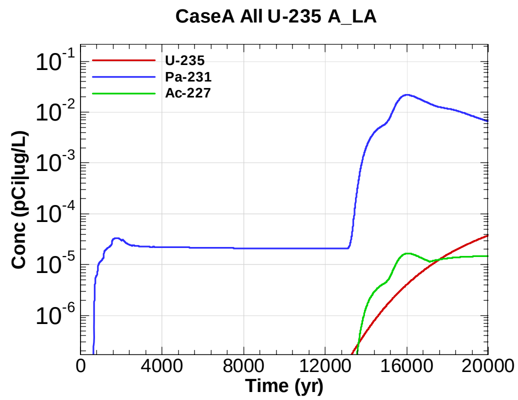

Figure B.2-411 - 100m Aquifer Concentration for CaseA All U-235 A_LA

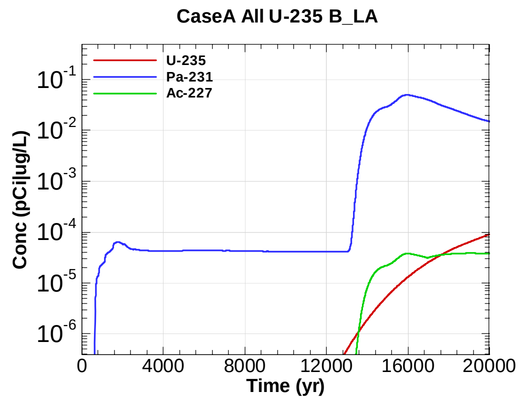

Figure B.2-412 - 100m Aquifer Concentration for CaseA All U-235 B_LA

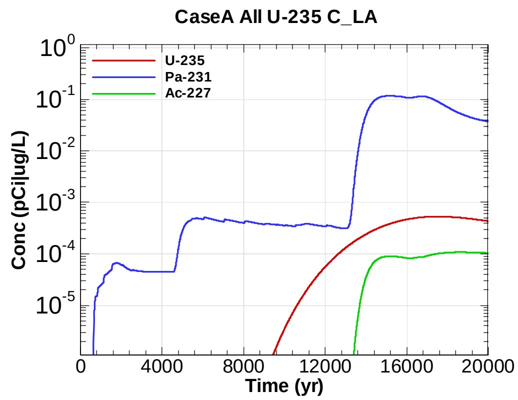

Figure B.2-413 - 100m Aquifer Concentration for CaseA All U-235 C_LA

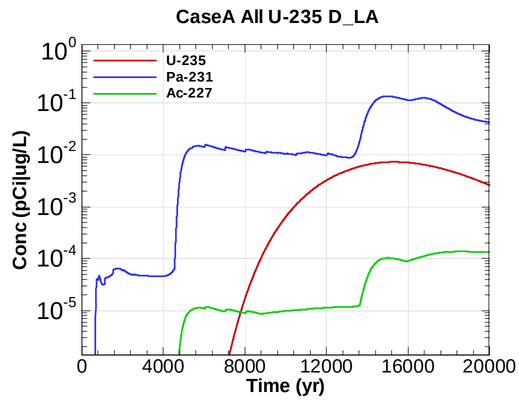

Figure B.2-414 - 100m Aquifer Concentration for CaseA All U-235 D_LA

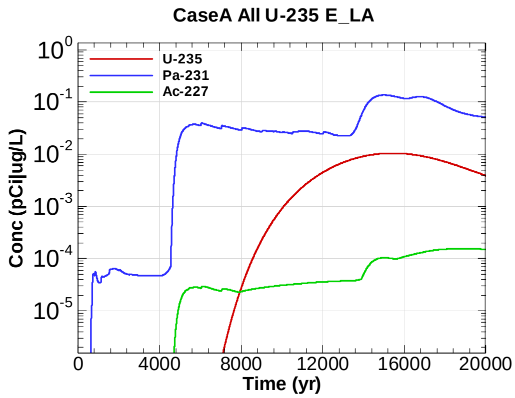

Figure B.2-415 - 100m Aquifer Concentration for CaseA All U-235 E_LA

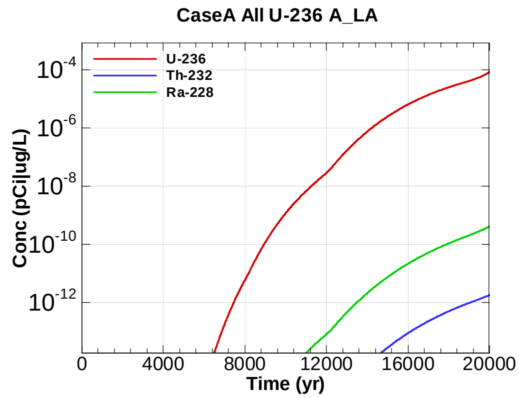

Figure B.2-416 - 100m Aquifer Concentration for CaseA All U-236 A_LA

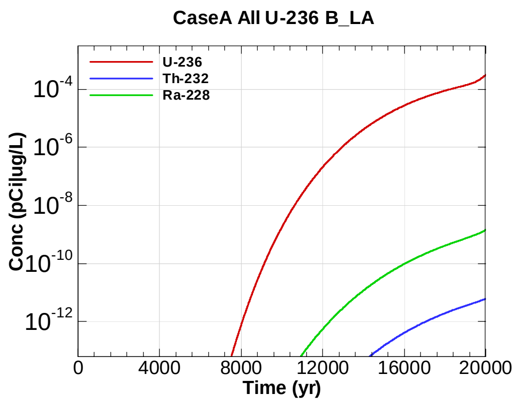

Figure B.2-417 - 100m Aquifer Concentration for CaseA All U-236 B_LA

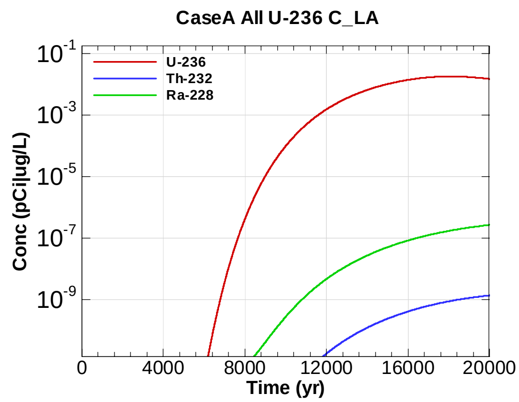

Figure B.2-418 - 100m Aquifer Concentration for CaseA All U-236 C_LA

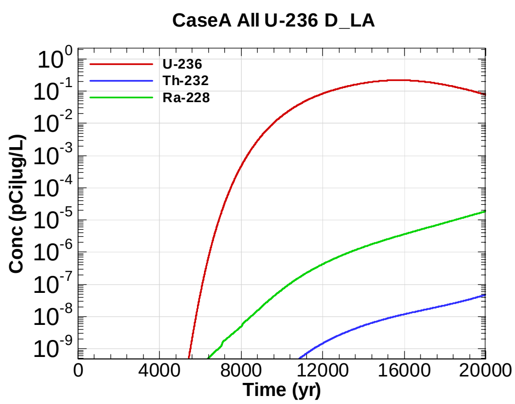

Figure B.2-419 - 100m Aquifer Concentration for CaseA All U-236 D_LA

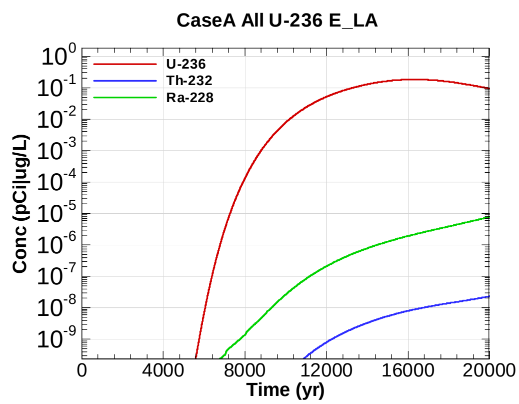

Figure B.2-420 - 100m Aquifer Concentration for CaseA All U-236 E_LA

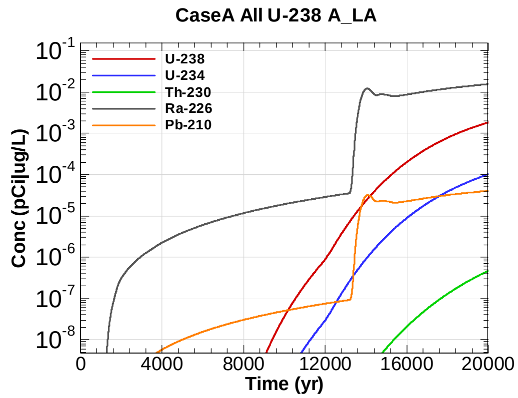

Figure B.2-421 - 100m Aquifer Concentration for CaseA All U-238 A_LA

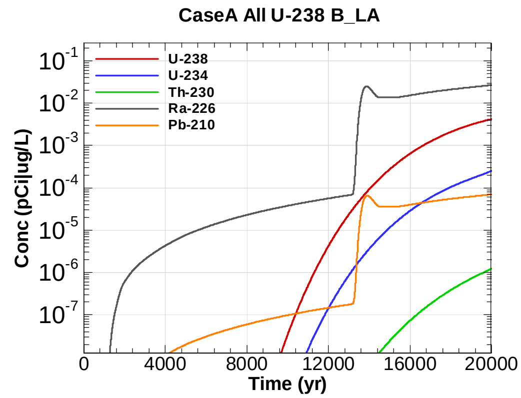

Figure B.2-422 - 100m Aquifer Concentration for CaseA All U-238 B_LA

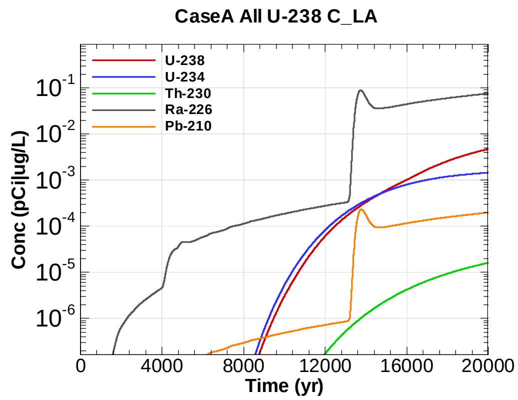

Figure B.2-423 - 100m Aquifer Concentration for CaseA All U-238 C_LA

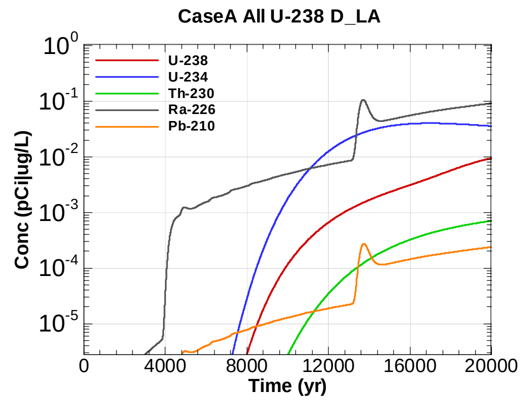

Figure B.2-424 - 100m Aquifer Concentration for CaseA All U-238 D_LA

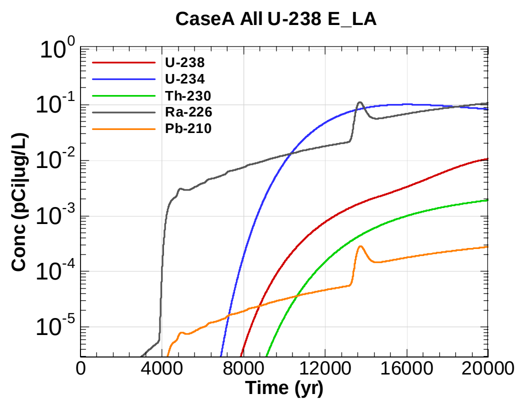

Figure B.2-425 - 100m Aquifer Concentration for CaseA All U-238 E_LA

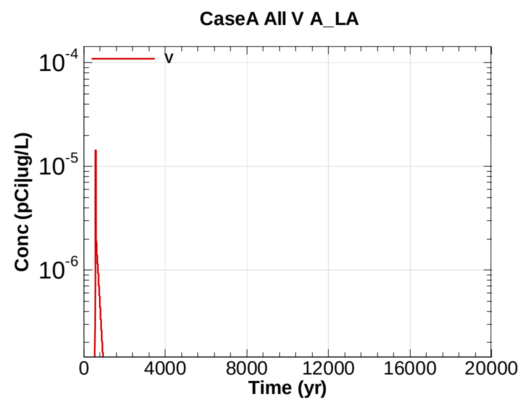

Figure B.2-426 - 100m Aquifer Concentration for CaseA All V A_LA

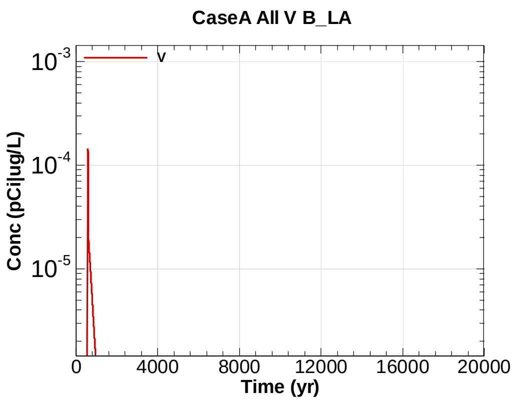

Figure B.2-427 - 100m Aquifer Concentration for CaseA All V B_LA

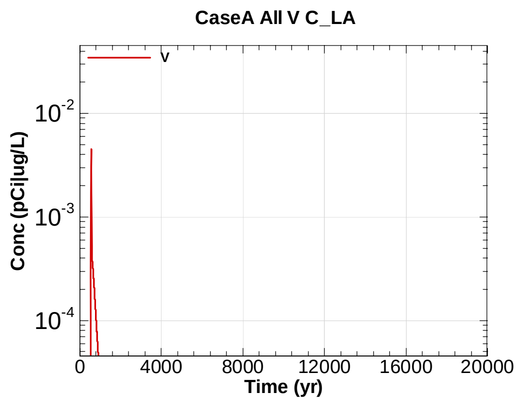

Figure B.2-428 - 100m Aquifer Concentration for CaseA All V C_LA

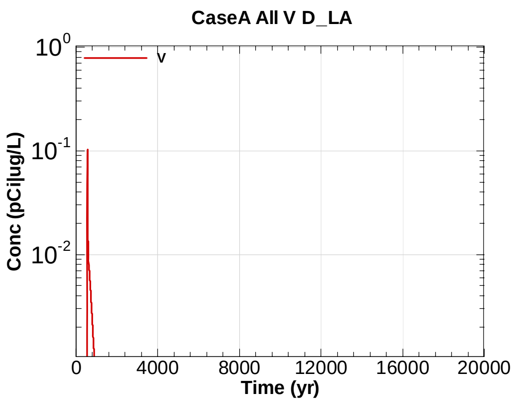

Figure B.2-429 - 100m Aquifer Concentration for CaseA All V D_LA

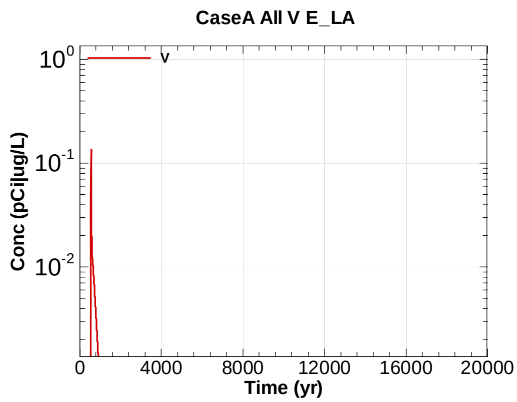

Figure B.2-430 - 100m Aquifer Concentration for CaseA All V E_LA

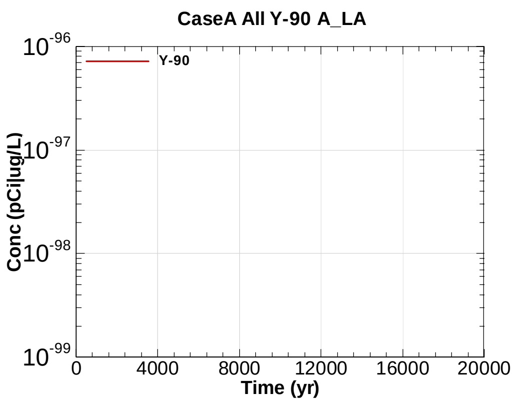

Figure B.2-431 - 100m Aquifer Concentration for CaseA All Y-90 A_LA

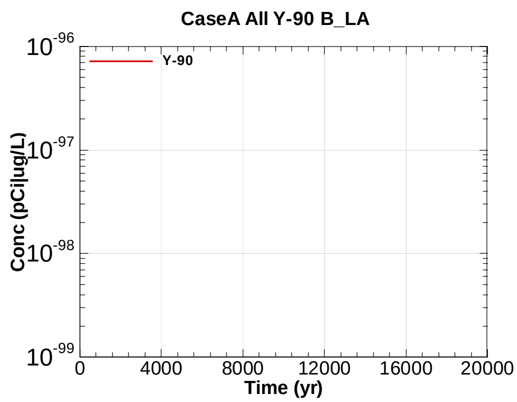

Figure B.2-432 - 100m Aquifer Concentration for CaseA All Y-90 B_LA

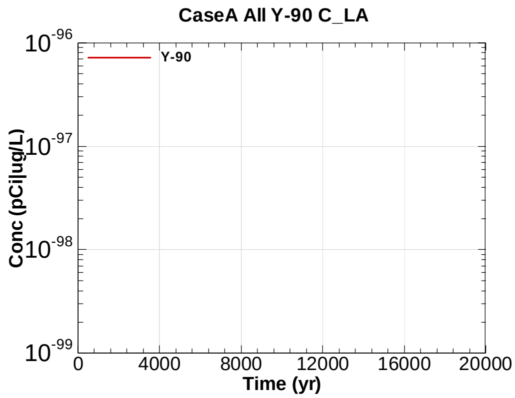

Figure B.2-433 - 100m Aquifer Concentration for CaseA All Y-90 C_LA

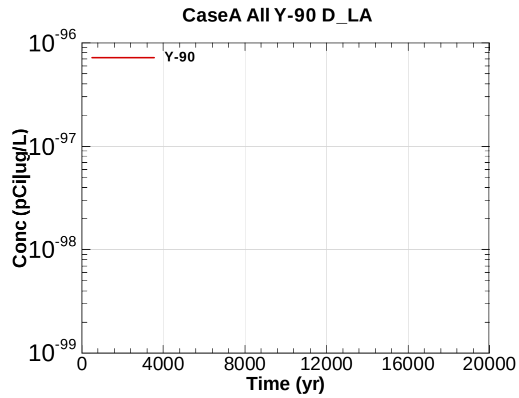

Figure B.2-434 - 100m Aquifer Concentration for CaseA All Y-90 D_LA

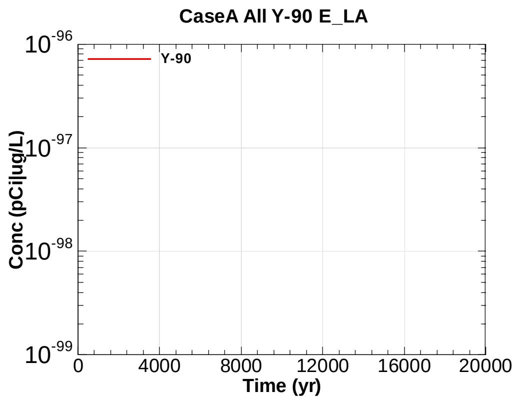

Figure B.2-435 - 100m Aquifer Concentration for CaseA All Y-90 E_LA

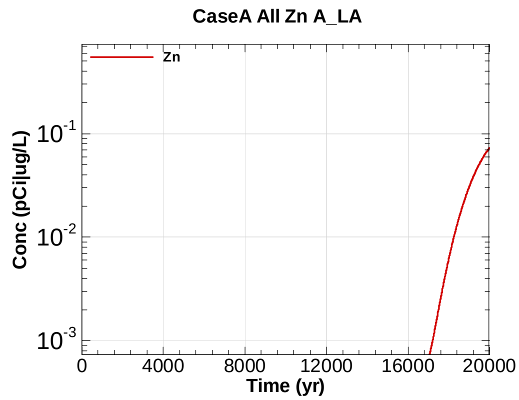

Figure B.2-436 - 100m Aquifer Concentration for CaseA All Zn A_LA

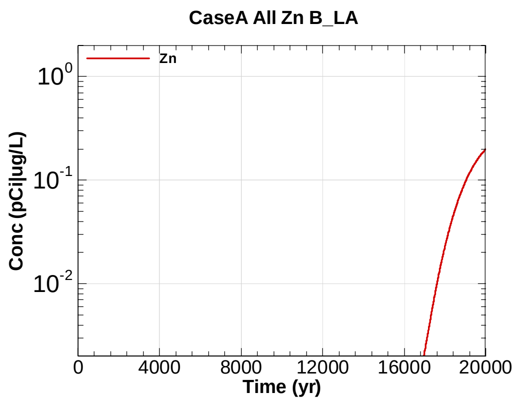

Figure B.2-437 - 100m Aquifer Concentration for CaseA All Zn B_LA

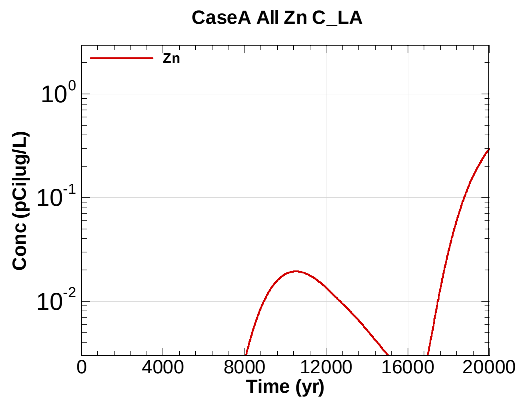

Figure B.2-438 - 100m Aquifer Concentration for CaseA All Zn C_LA

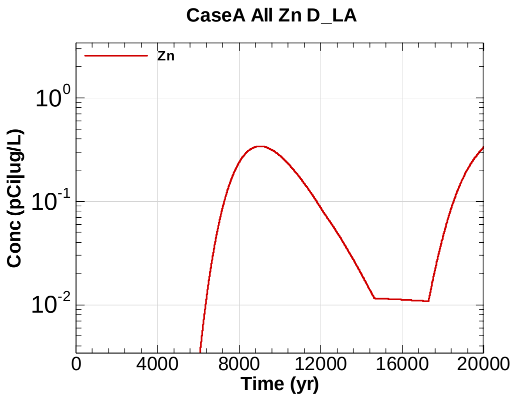

Figure B.2-439 - 100m Aquifer Concentration for CaseA All Zn D_LA

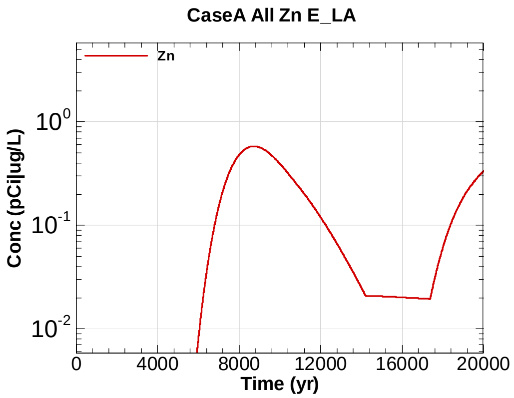

Figure B.2-440 - 100m Aquifer Concentration for CaseA All Zn E_LA

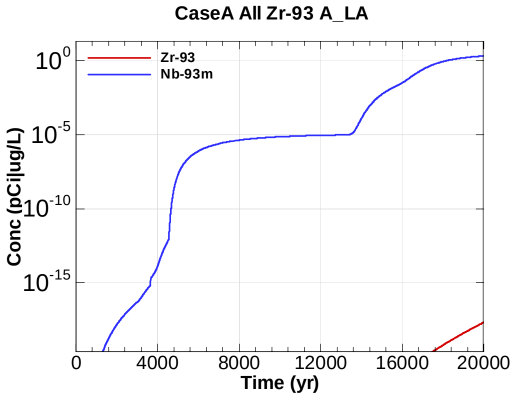

Figure B.2-441 - 100m Aquifer Concentration for CaseA All Zr-93 A_LA

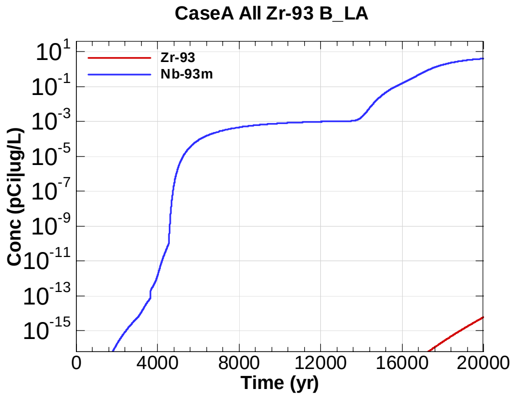

Figure B.2-442 - 100m Aquifer Concentration for CaseA All Zr-93 B_LA

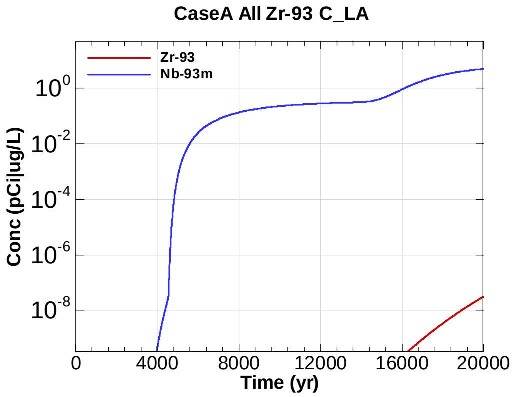

Figure B.2-443 - 100m Aquifer Concentration for CaseA All Zr-93 C_LA

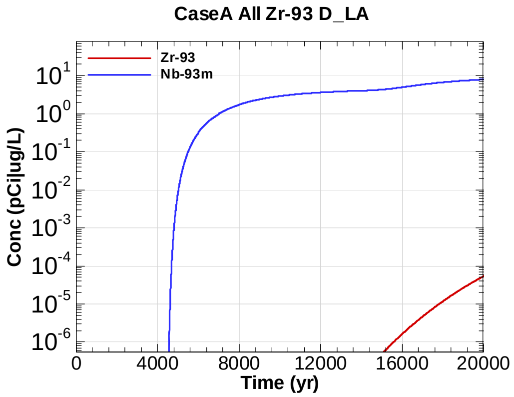

Figure B.2-444 - 100m Aquifer Concentration for CaseA All Zr-93 D_LA

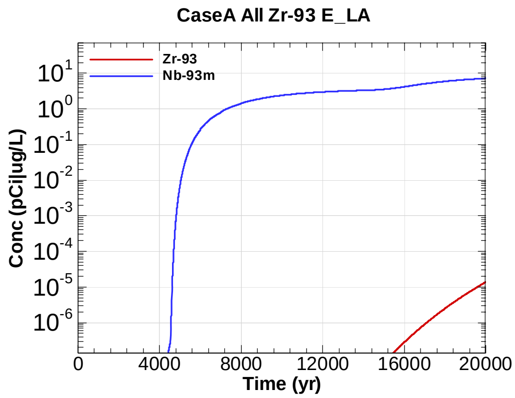

Figure B.2-445 - 100m Aquifer Concentration for CaseA All Zr-93 E_LA

Appendix B.3
100-METER RADIOLOGICAL AND CHEMICAL CONCENTRATIONS AT THE GORDON AQUIFER

Appendix B.3 contains curves showing the one-hundred meter radiological and chemical concentrations for all of FTF (tank and ancillary inventories) for the Base Case (Case/Configuration A). 20,000 year concentration results are presented from the Gordon Aquifer for Sectors A through E.

Graph heading example "CaseA All Ac-227 A_GA"

Key

CaseA = scenario case/configuration
All = all FTF inventory source
Ac-227 = radionuclide or chemical of concern
A = Sector of concern (see sector map with stream traces)
GA = aquifer of concern
    UA = Upper Three Runs – Upper Zone
    LA = Upper Three Runs – Lower Zone
    GA = Gordon

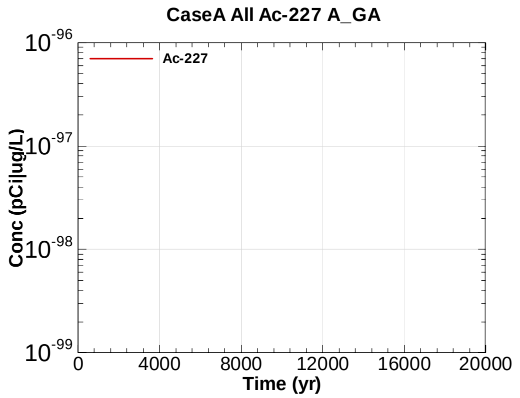

Figure B.3-1 - 100m Aquifer Concentration for CaseA All Ac-227 A_GA

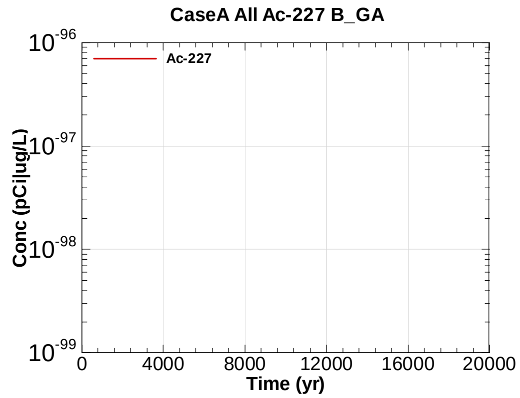

Figure B.3-2 - 100m Aquifer Concentration for CaseA All Ac-227 B_GA

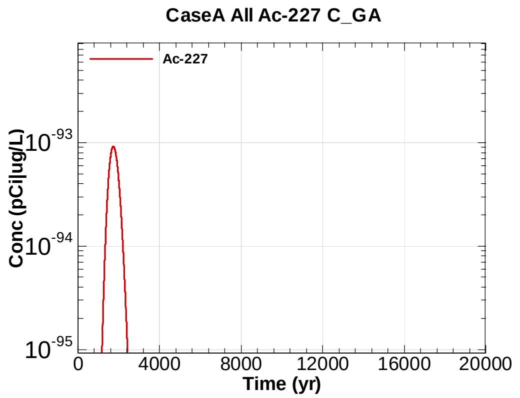

Figure B.3-3 - 100m Aquifer Concentration for CaseA All Ac-227 C_GA

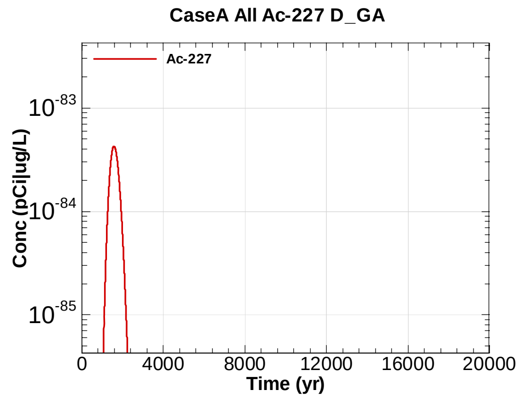

Figure B.3-4 - 100m Aquifer Concentration for CaseA All Ac-227 D_GA

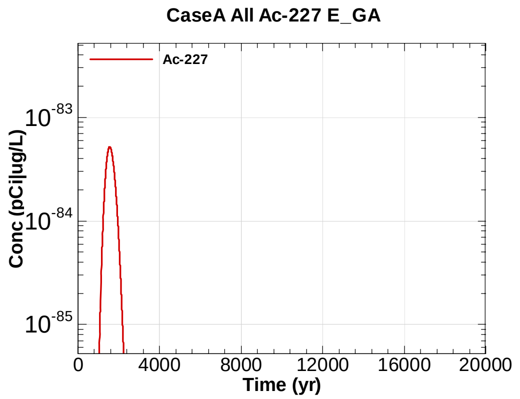

Figure B.3-5 - 100m Aquifer Concentration for CaseA All Ac-227 E_GA

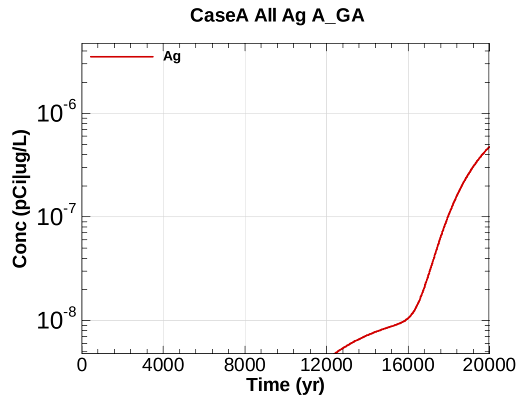

Figure B.3-6 - 100m Aquifer Concentration for CaseA All Ag A_GA

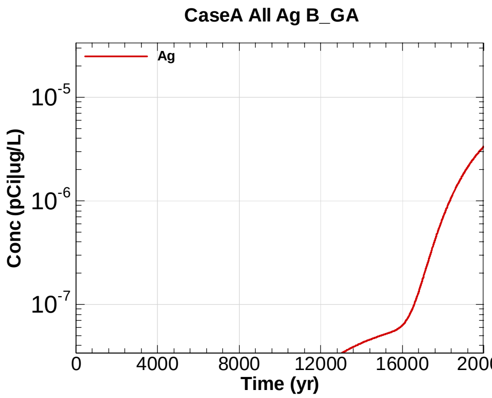

Figure B.3-7 - 100m Aquifer Concentration for CaseA All Ag B_GA

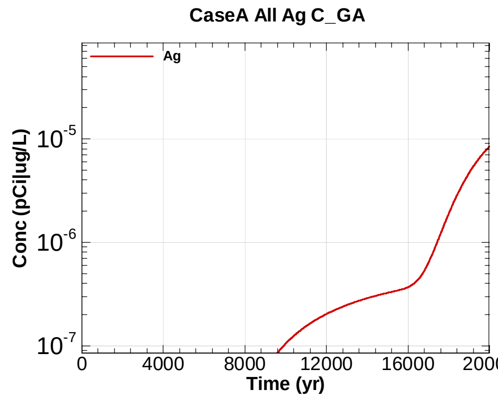

Figure B.3-8 - 100m Aquifer Concentration for CaseA All Ag C_GA

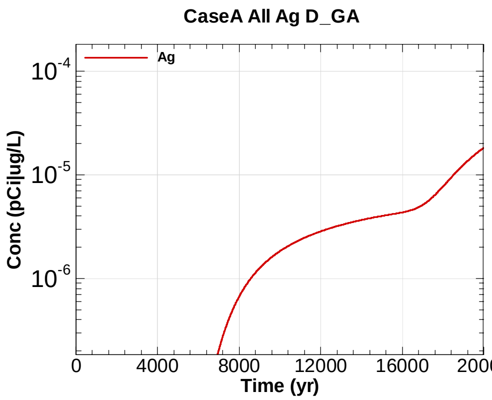

Figure B.3-9 - 100m Aquifer Concentration for CaseA All Ag D_GA

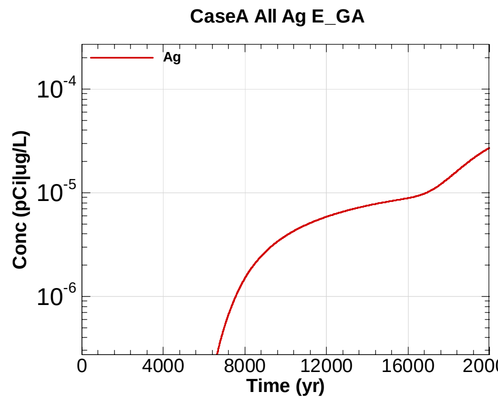

Figure B.3-10 - 100m Aquifer Concentration for CaseA All Ag E_GA

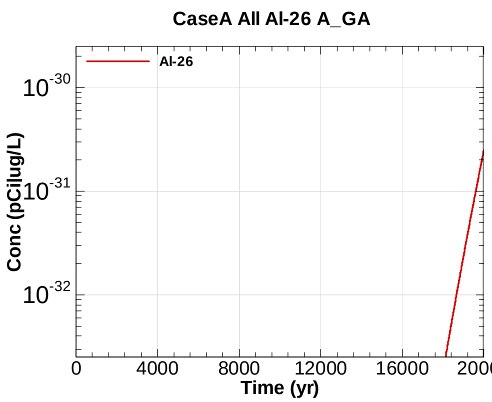

Figure B.3-11 - 100m Aquifer Concentration for CaseA All Al-26 A_GA

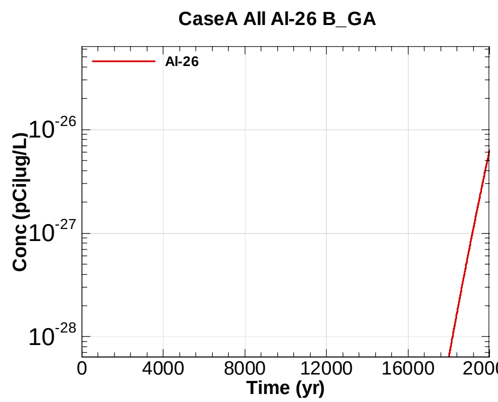

Figure B.3-12 - 100m Aquifer Concentration for CaseA All Al-26 B_GA

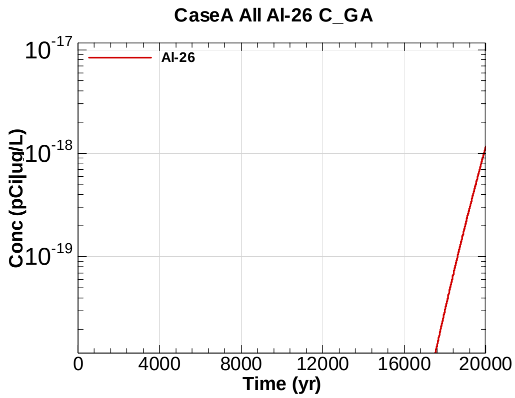

Figure B.3-13 - 100m Aquifer Concentration for CaseA All Al-26 C_GA

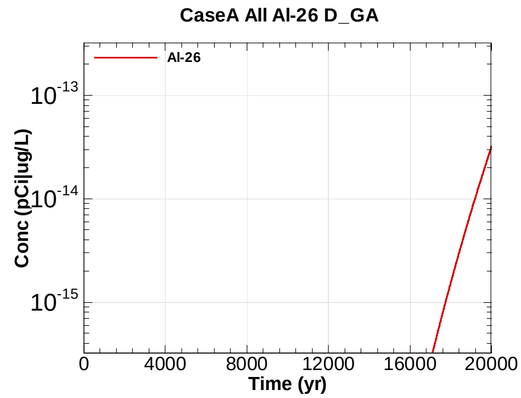

Figure B.3-14 - 100m Aquifer Concentration for CaseA All Al-26 D_GA

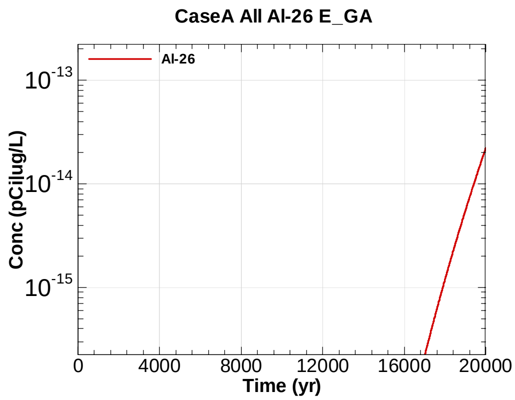

Figure B.3-15 - 100m Aquifer Concentration for CaseA All Al-26 E_GA

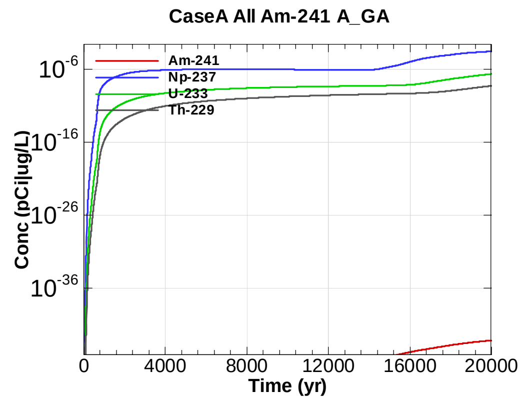

Figure B.3-16 - 100m Aquifer Concentration for CaseA All Am-241 A_GA

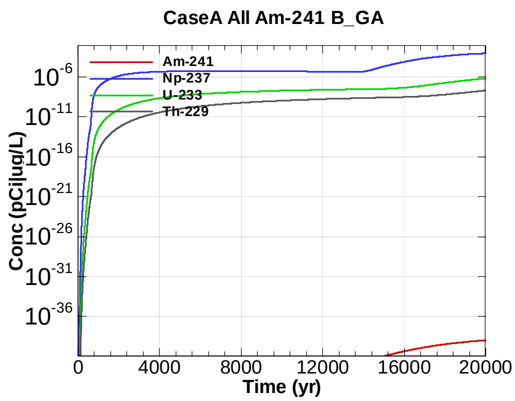

Figure B.3-17 - 100m Aquifer Concentration for CaseA All Am-241 B_GA

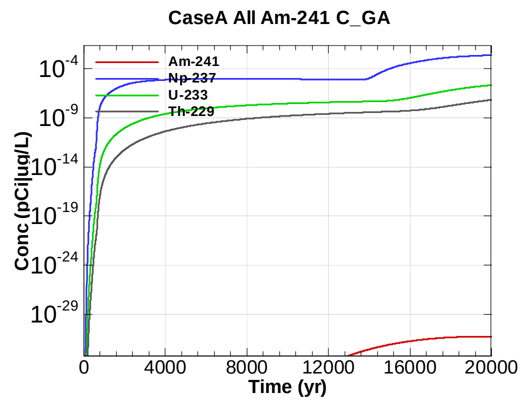

Figure B.3-18 - 100m Aquifer Concentration for CaseA All Am-241 C_GA

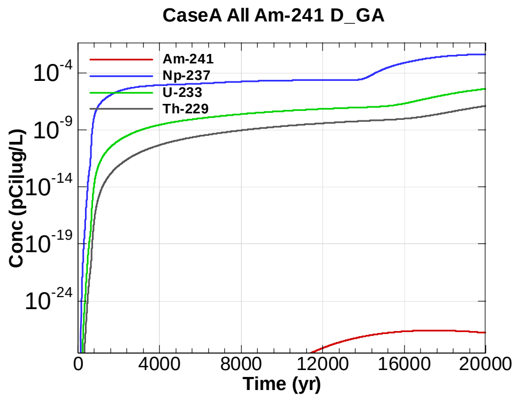

Figure B.3-19 - 100m Aquifer Concentration for CaseA All Am-241 D_GA

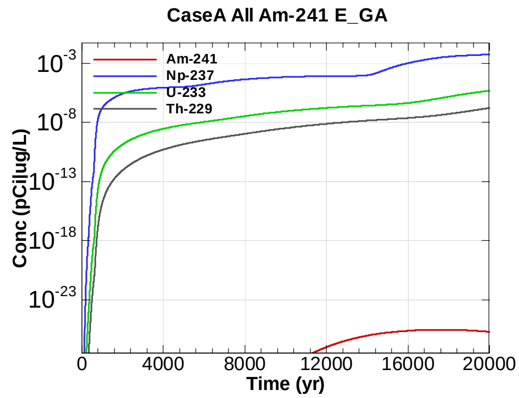

Figure B.3-20 - 100m Aquifer Concentration for CaseA All Am-241 E_GA

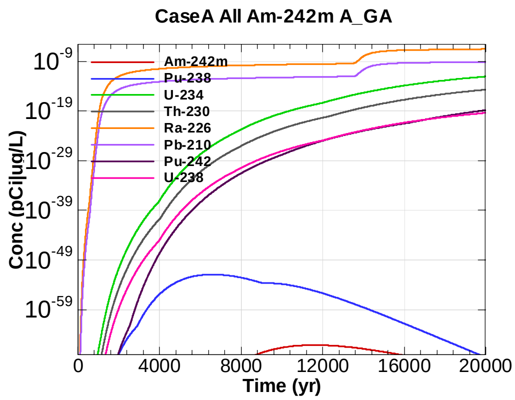

Figure B.3-21 - 100m Aquifer Concentration for CaseA All Am-242m A_GA

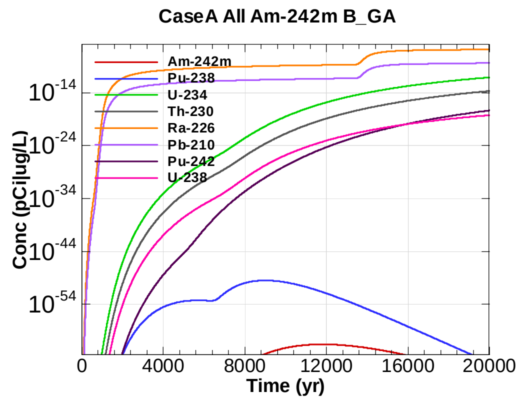

Figure B.3-22 - 100m Aquifer Concentration for CaseA All Am-242m B_GA

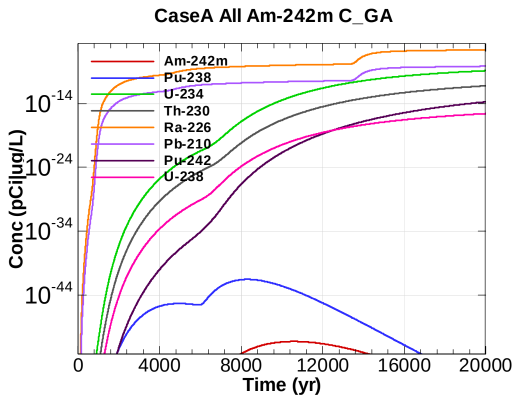

Figure B.3-23 - 100m Aquifer Concentration for CaseA All Am-242m C_GA

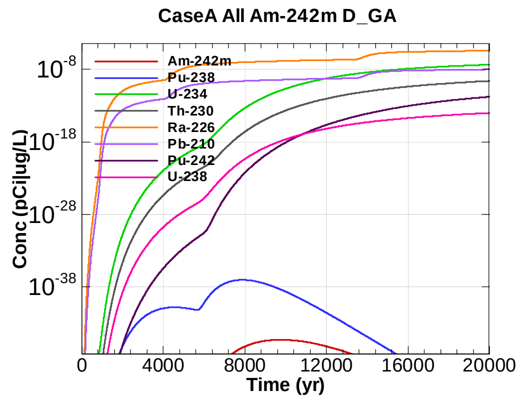

Figure B.3-24 - 100m Aquifer Concentration for CaseA All Am-242m D_GA

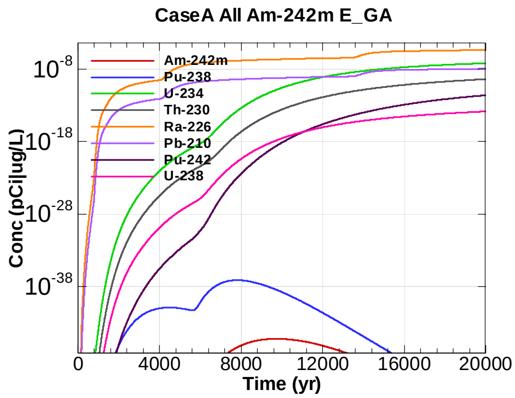

Figure B.3-25 - 100m Aquifer Concentration for CaseA All Am-242m E_GA

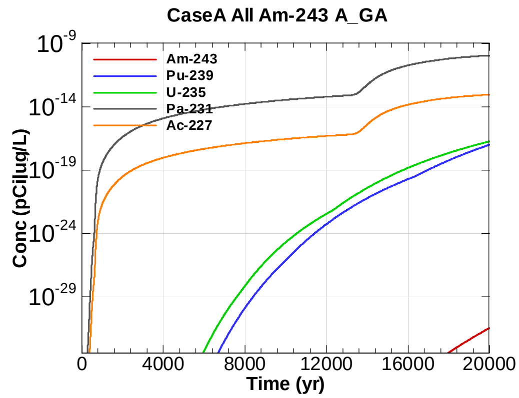

Figure B.3-26 - 100m Aquifer Concentration for CaseA All Am-243 A_GA

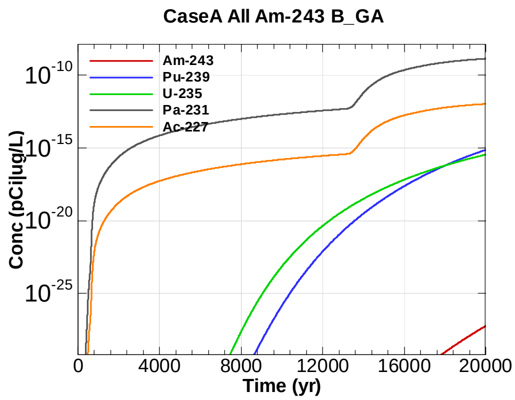

Figure B.3-27 - 100m Aquifer Concentration for CaseA All Am-243 B_GA

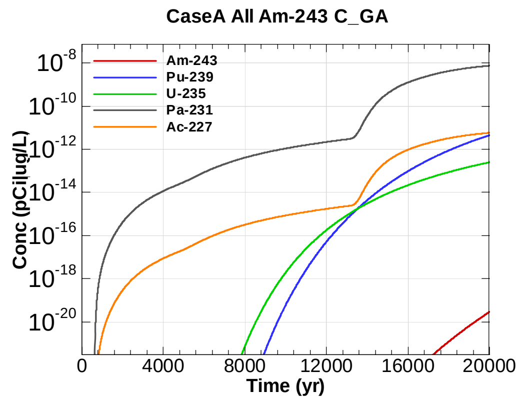

Figure B.3-28 - 100m Aquifer Concentration for CaseA All Am-243 C_GA

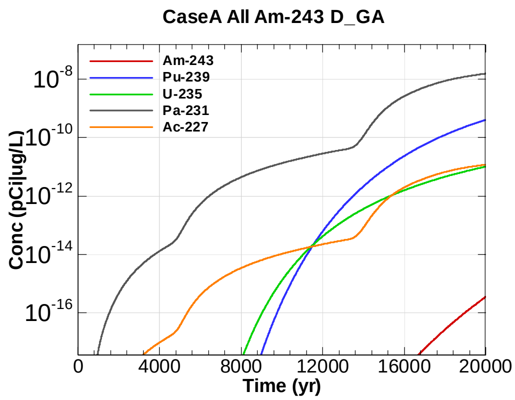

Figure B.3-29 - 100m Aquifer Concentration for CaseA All Am-243 D_GA

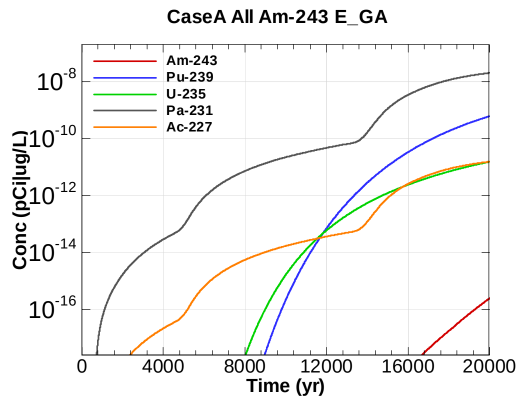

Figure B.3-30 - 100m Aquifer Concentration for CaseA All Am-243 E_GA

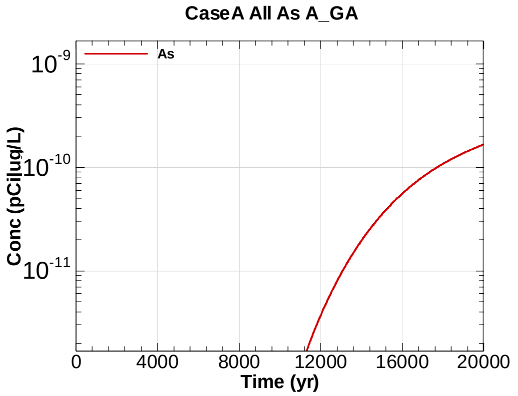

Figure B.3-31 - 100m Aquifer Concentration for CaseA All As A_GA

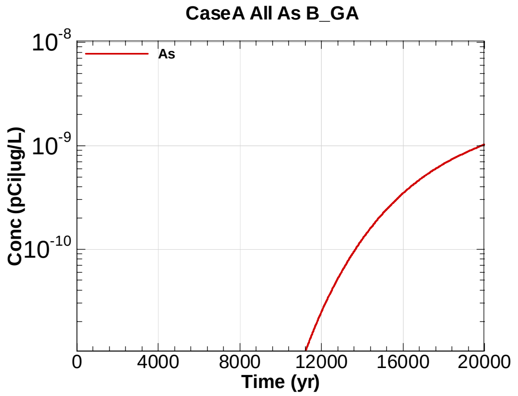

Figure B.3-32 - 100m Aquifer Concentration for CaseA All As B_GA

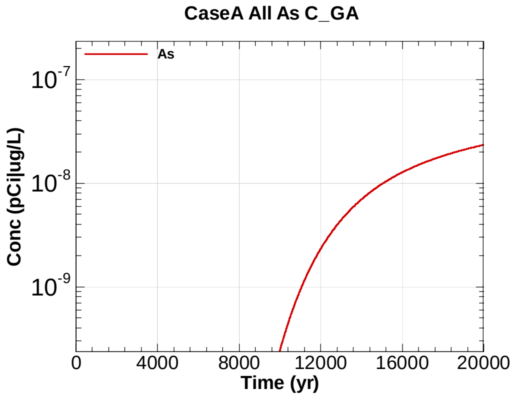

Figure B.3-33 - 100m Aquifer Concentration for CaseA All As C_GA

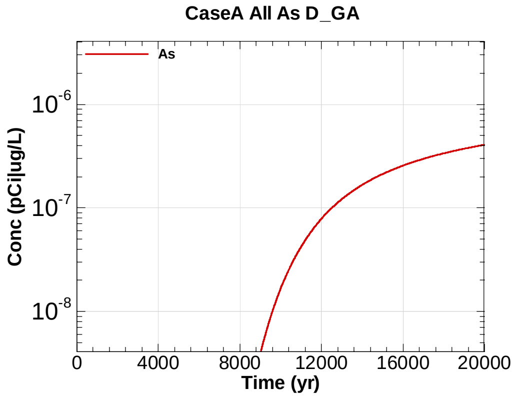

Figure B.3-34 - 100m Aquifer Concentration for CaseA All As D_GA

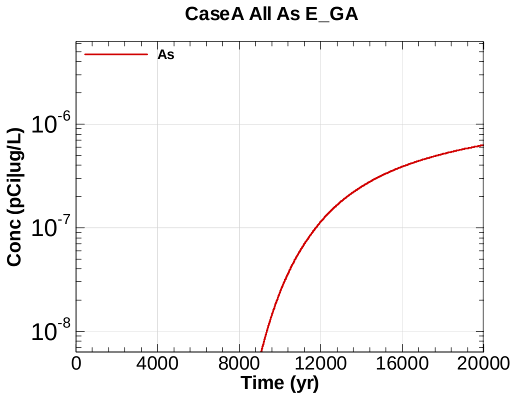

Figure B.3-35 - 100m Aquifer Concentration for CaseA All As E_GA

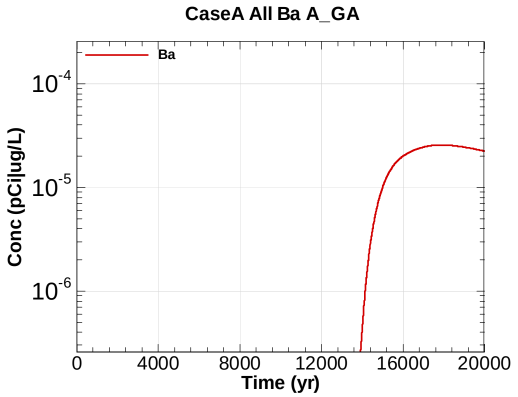

Figure B.3-36 - 100m Aquifer Concentration for CaseA All Ba A_GA

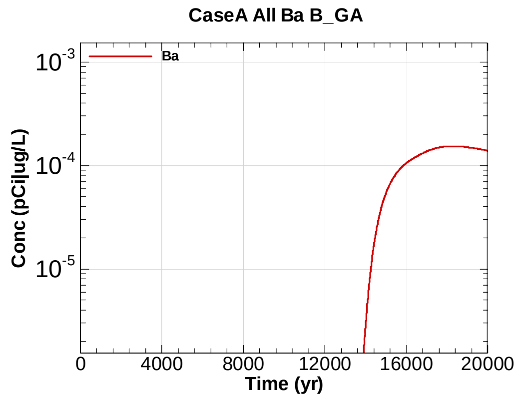

Figure B.3-37 - 100m Aquifer Concentration for CaseA All Ba B_GA

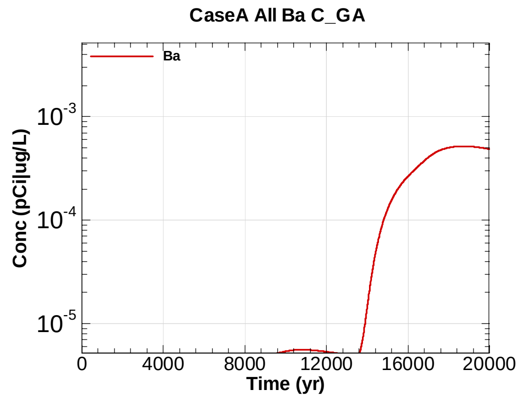

Figure B.3-38 - 100m Aquifer Concentration for CaseA All Ba C_GA

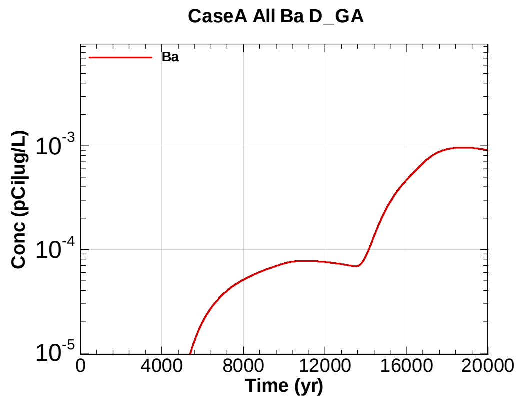

Figure B.3-39 - 100m Aquifer Concentration for CaseA All Ba D_GA

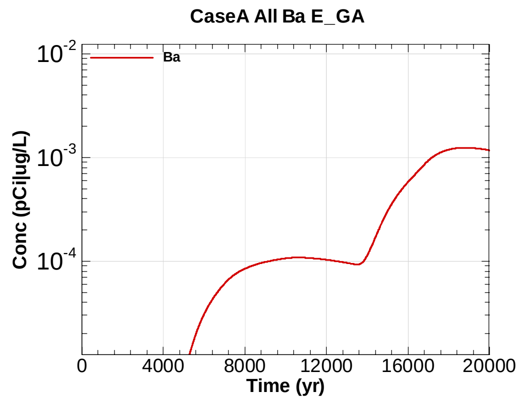

Figure B.3-40 - 100m Aquifer Concentration for CaseA All Ba E_GA

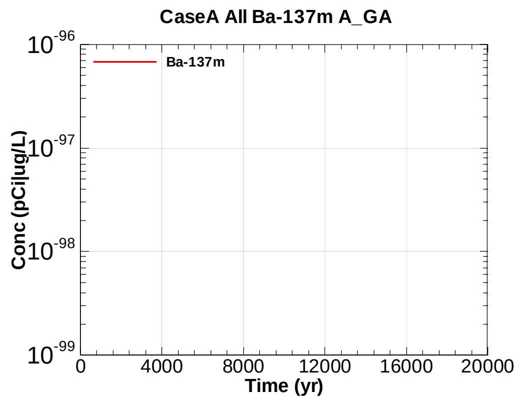

Figure B.3-41 - 100m Aquifer Concentration for CaseA All Ba-137m A_GA

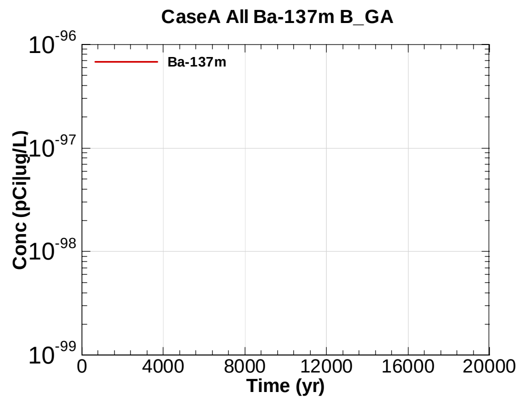

Figure B.3-42 - 100m Aquifer Concentration for CaseA All Ba-137m B_GA

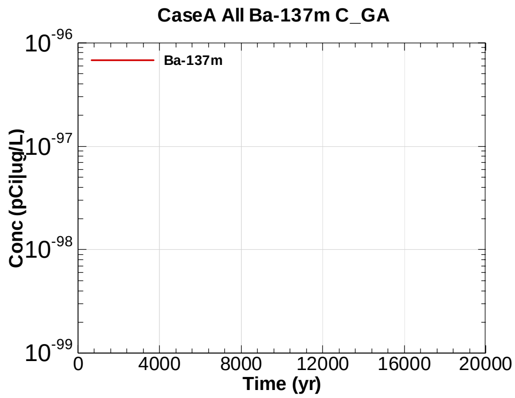

Figure B.3-43 - 100m Aquifer Concentration for CaseA All Ba-137m C_GA

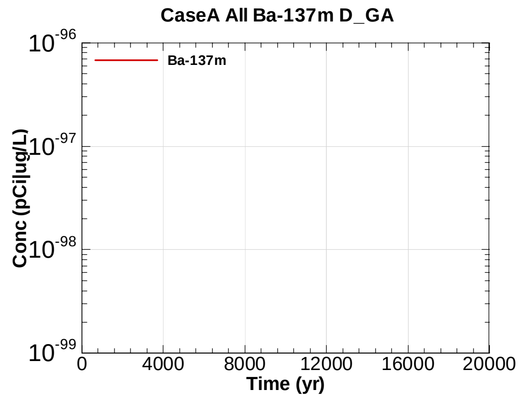

Figure B.3-44 - 100m Aquifer Concentration for CaseA All Ba-137m D_GA

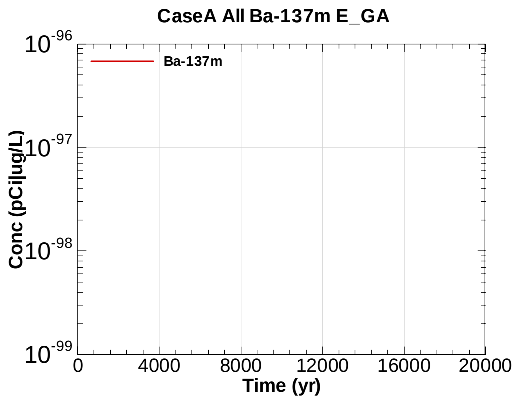

Figure B.3-45 - 100m Aquifer Concentration for CaseA All Ba-137m E_GA

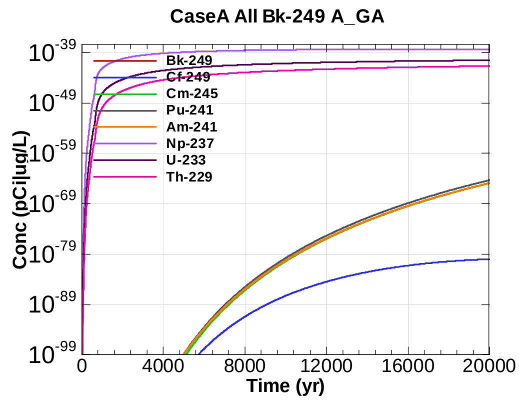

Figure B.3-46 - 100m Aquifer Concentration for CaseA All Bk-249 A_GA

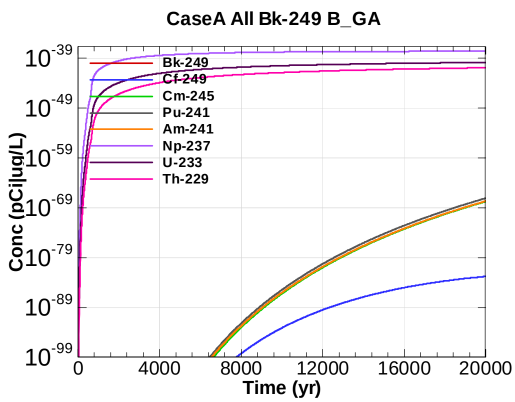

Figure B.3-47 - 100m Aquifer Concentration for CaseA All Bk-249 B_GA

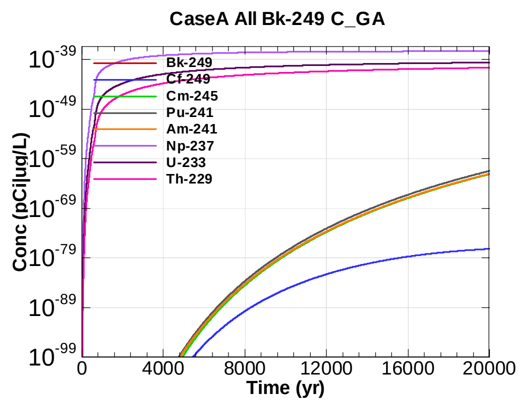

Figure B.3-48 - 100m Aquifer Concentration for CaseA All Bk-249 C_GA

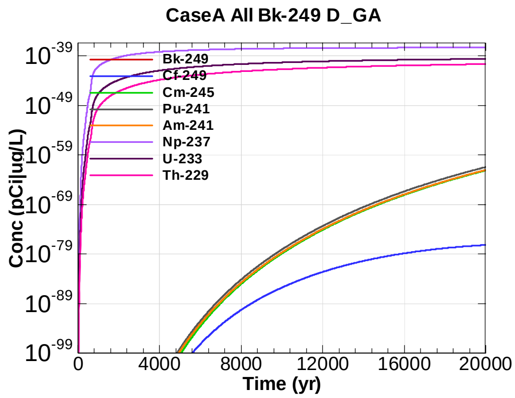

Figure B.3-49 - 100m Aquifer Concentration for CaseA All Bk-249 D_GA

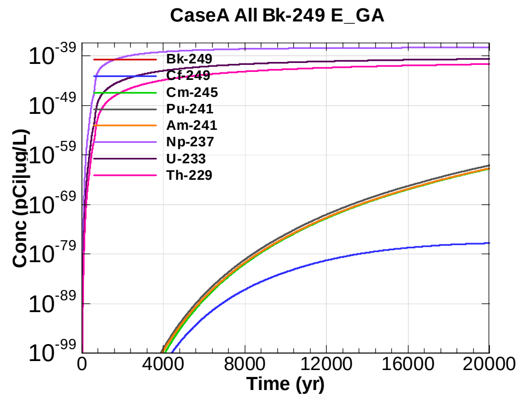

Figure B.3-50 - 100m Aquifer Concentration for CaseA All Bk-249 E_GA

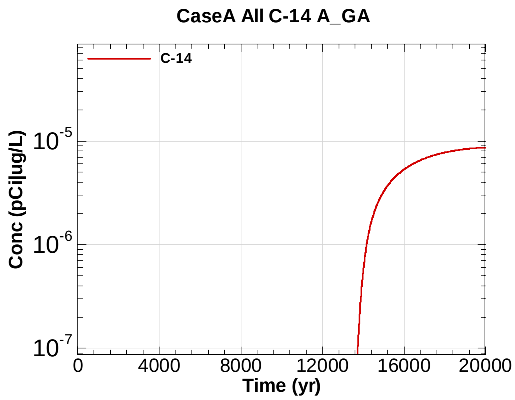

Figure B.3-51 - 100m Aquifer Concentration for CaseA All C-14 A_GA

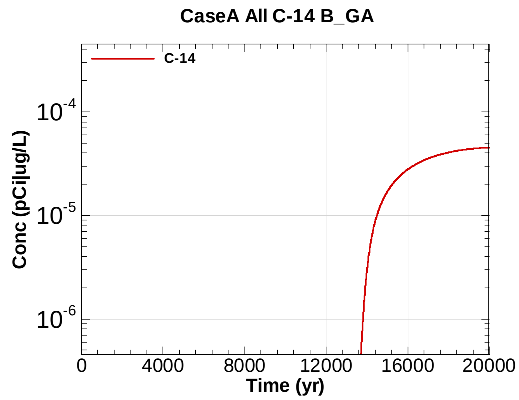

Figure B.3-52 - 100m Aquifer Concentration for CaseA All C-14 B_GA

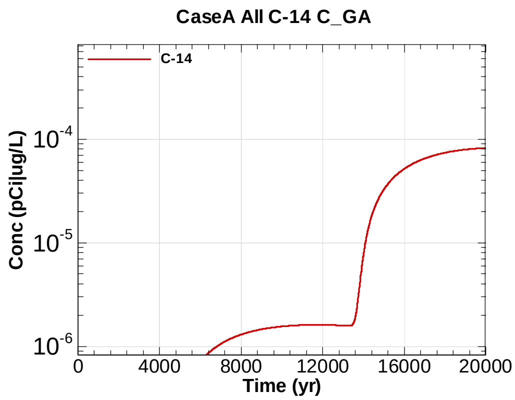

Figure B.3-53 - 100m Aquifer Concentration for CaseA All C-14 C_GA

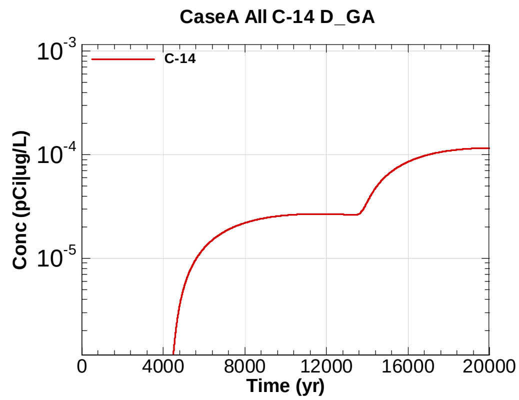

Figure B.3-54 - 100m Aquifer Concentration for CaseA All C-14 D_GA

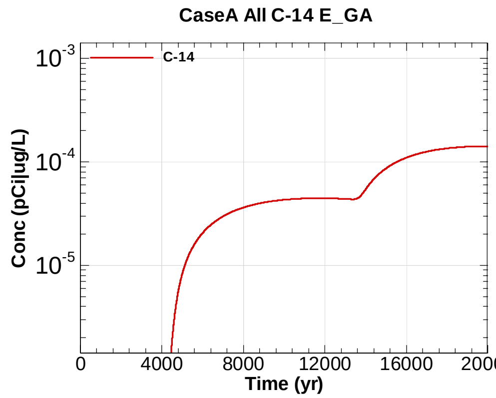

Figure B.3-55 - 100m Aquifer Concentration for CaseA All C-14 E_GA

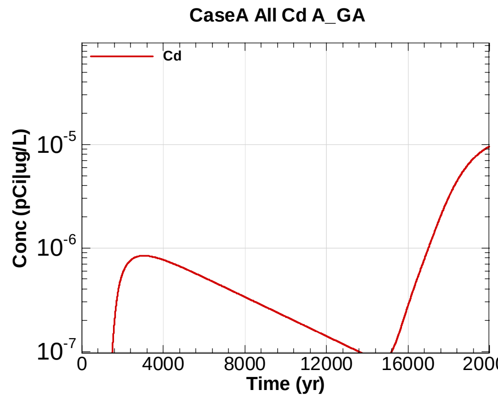

Figure B.3-56 - 100m Aquifer Concentration for CaseA All Cd A_GA

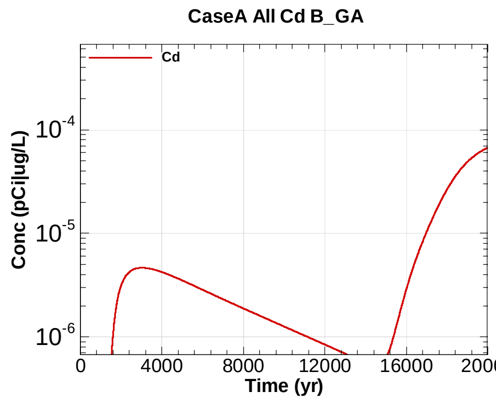

Figure B.3-57 - 100m Aquifer Concentration for CaseA All Cd B_GA

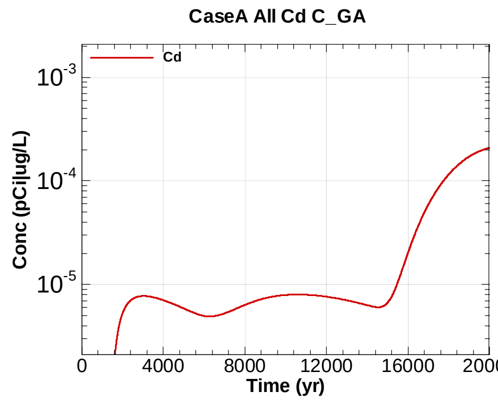

Figure B.3-58 - 100m Aquifer Concentration for CaseA All Cd C_GA

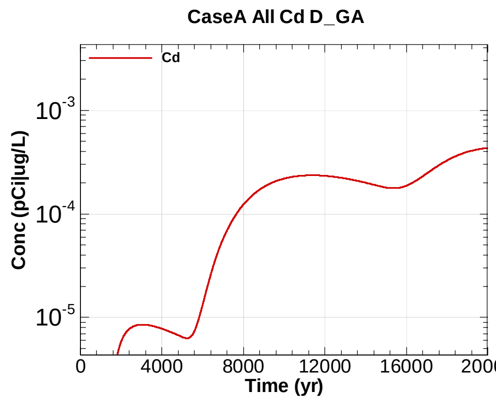

Figure B.3-59 - 100m Aquifer Concentration for CaseA All Cd D_GA

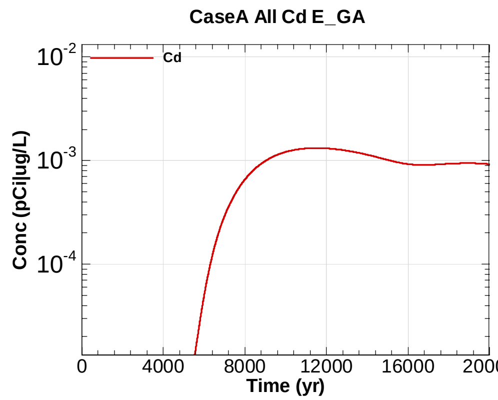

Figure B.3-60 - 100m Aquifer Concentration for CaseA All Cd E_GA

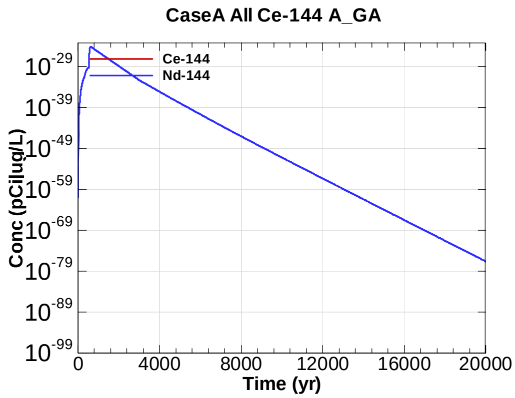

Figure B.3-61 - 100m Aquifer Concentration for CaseA All Ce-144 A_GA

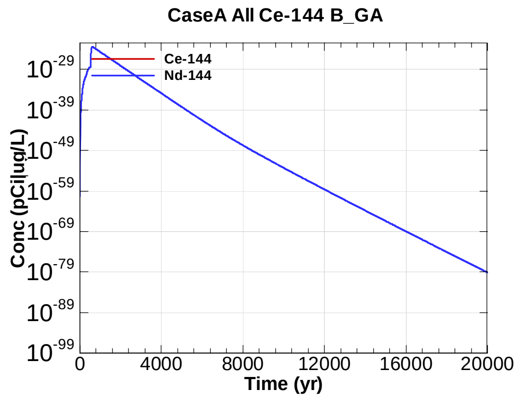

Figure B.3-62 - 100m Aquifer Concentration for CaseA All Ce-144 B_GA

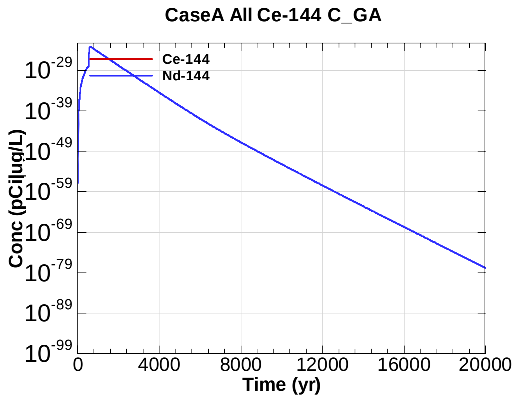

Figure B.3-63 - 100m Aquifer Concentration for CaseA All Ce-144 C_GA

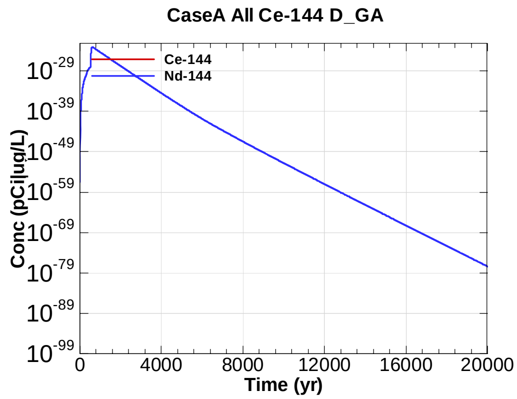

Figure B.3-64 - 100m Aquifer Concentration for CaseA All Ce-144 D_GA

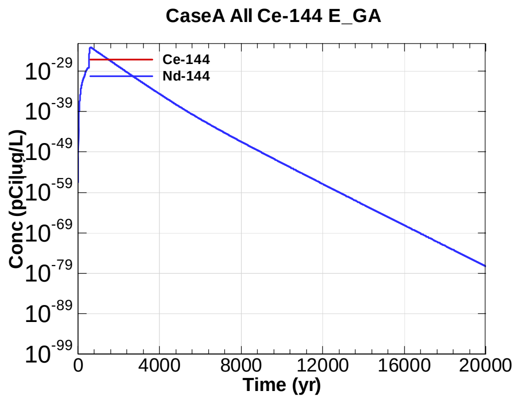

Figure B.3-65 - 100m Aquifer Concentration for CaseA All Ce-144 E_GA

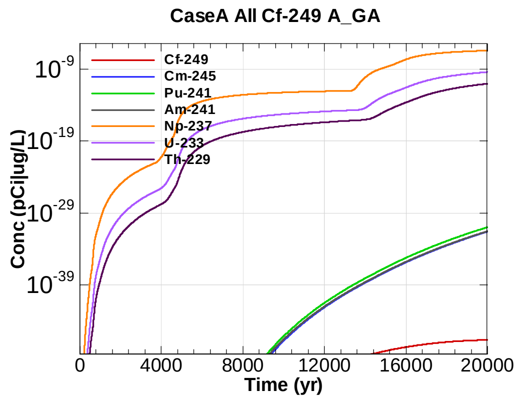

Figure B.3-66 - 100m Aquifer Concentration for CaseA All Cf-249 A_GA

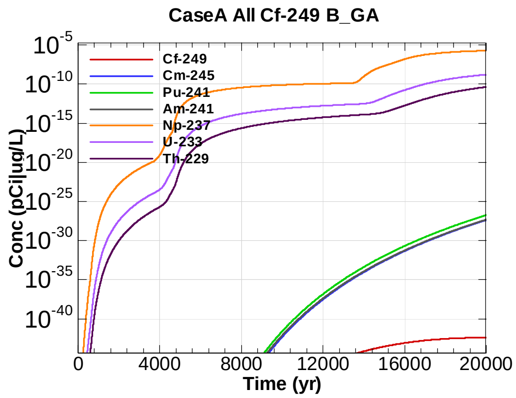

Figure B.3-67 - 100m Aquifer Concentration for CaseA All Cf-249 B_GA

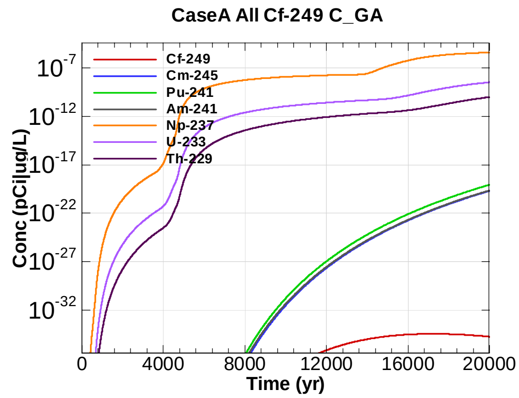

Figure B.3-68 - 100m Aquifer Concentration for CaseA All Cf-249 C_GA

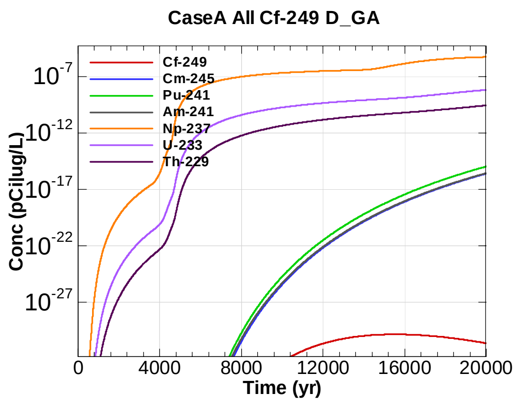

Figure B.3-69 - 100m Aquifer Concentration for CaseA All Cf-249 D_GA

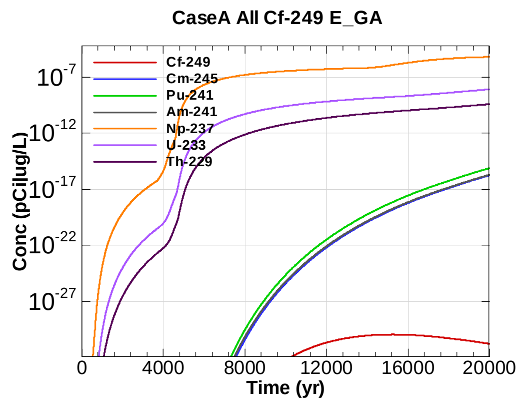

Figure B.3-70 - 100m Aquifer Concentration for CaseA All Cf-249 E_GA

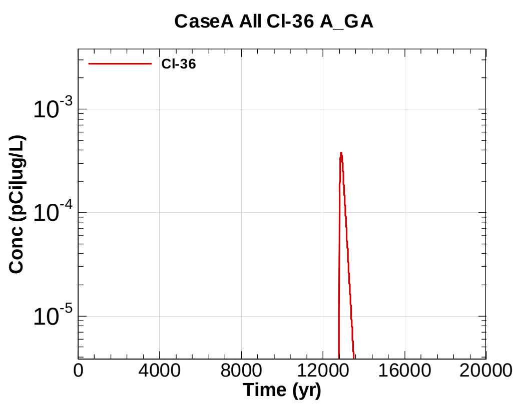

Figure B.3-71 - 100m Aquifer Concentration for CaseA All Cl-36 A_GA

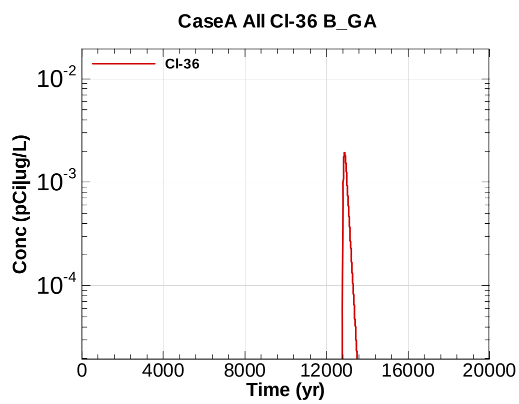

Figure B.3-72 - 100m Aquifer Concentration for CaseA All Cl-36 B_GA

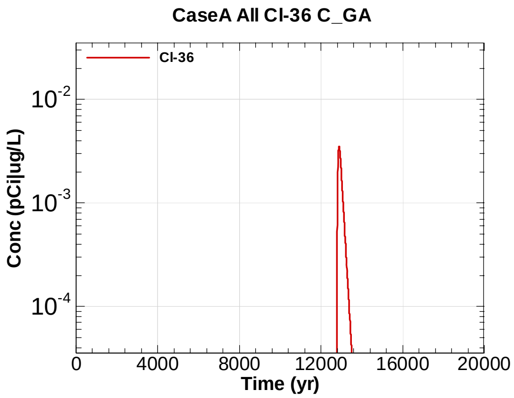

Figure B.3-73 - 100m Aquifer Concentration for CaseA All Cl-36 C_GA

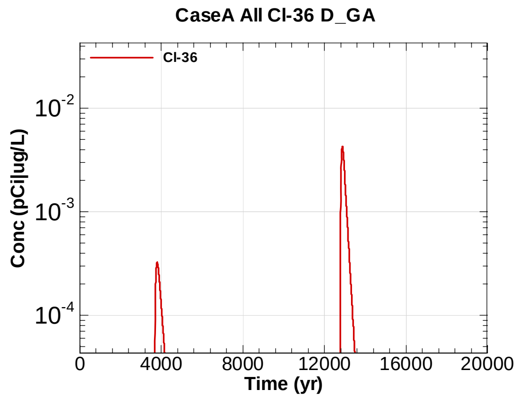

Figure B.3-74 - 100m Aquifer Concentration for CaseA All Cl-36 D_GA

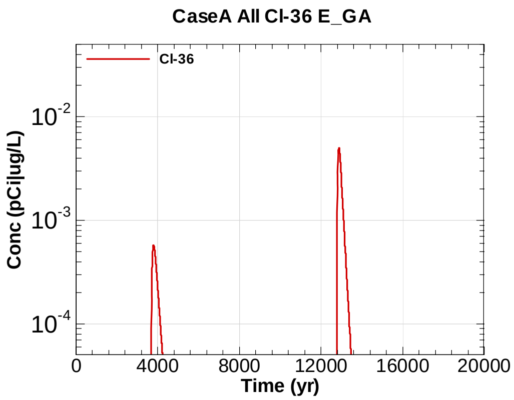

Figure B.3-75 - 100m Aquifer Concentration for CaseA All Cl-36 E_GA

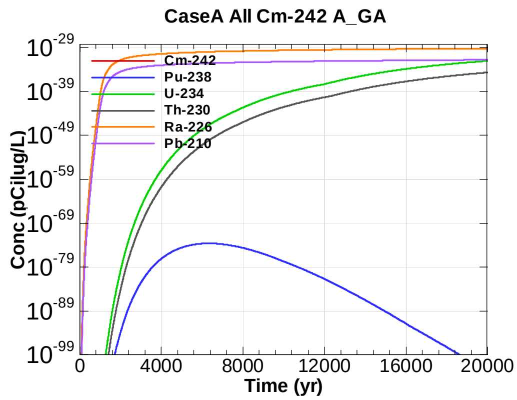

Figure B.3-76 - 100m Aquifer Concentration for CaseA All Cm-242 A_GA

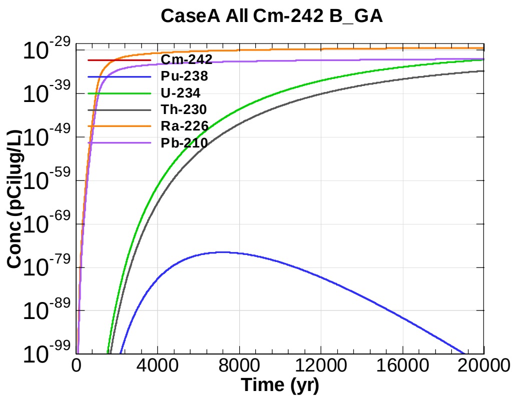

Figure B.3-77 - 100m Aquifer Concentration for CaseA All Cm-242 B_GA

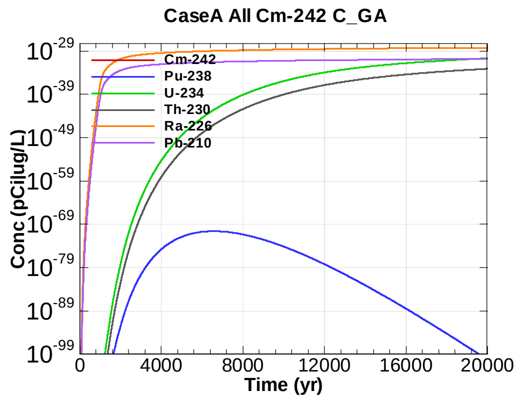

Figure B.3-78 - 100m Aquifer Concentration for CaseA All Cm-242 C_GA

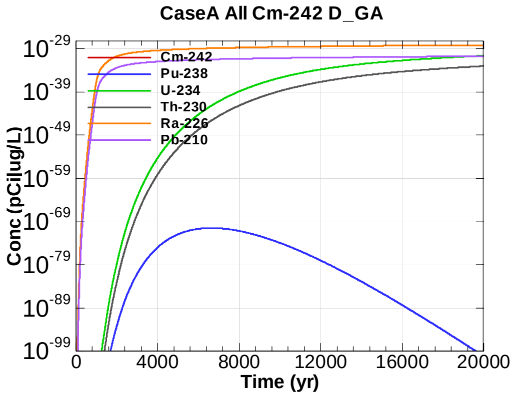

Figure B.3-79 - 100m Aquifer Concentration for CaseA All Cm-242 D_GA

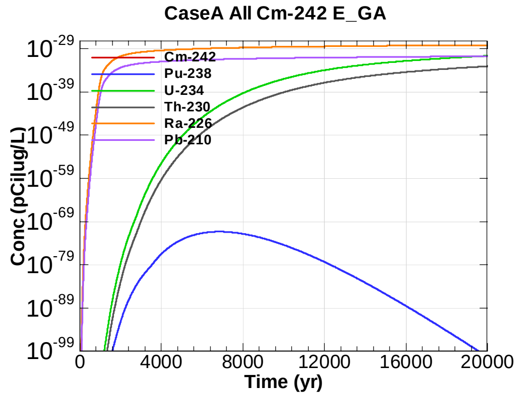

Figure B.3-80 - 100m Aquifer Concentration for CaseA All Cm-242 E_GA

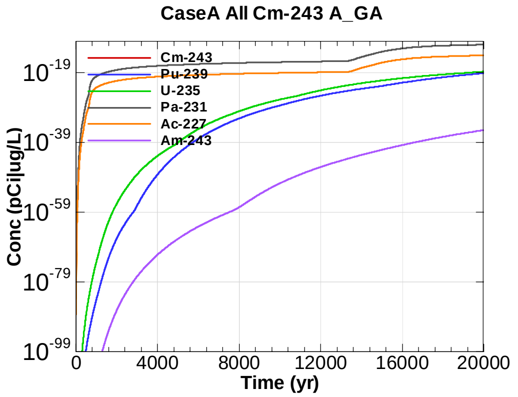

Figure B.3-81 - 100m Aquifer Concentration for CaseA All Cm-243 A_GA

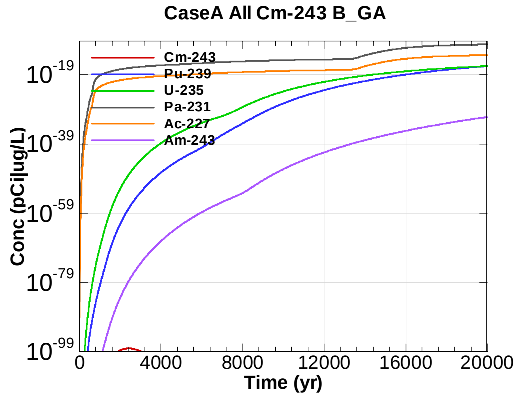

Figure B.3-82 - 100m Aquifer Concentration for CaseA All Cm-243 B_GA

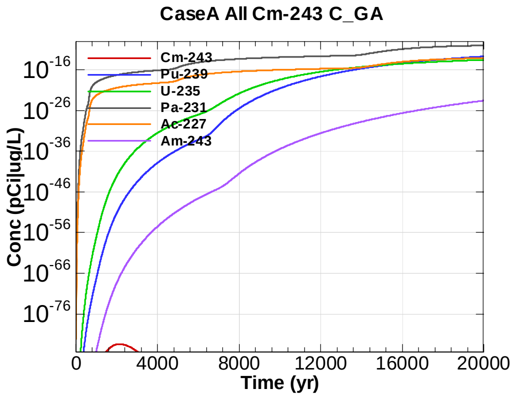

Figure B.3-83 - 100m Aquifer Concentration for CaseA All Cm-243 C_GA

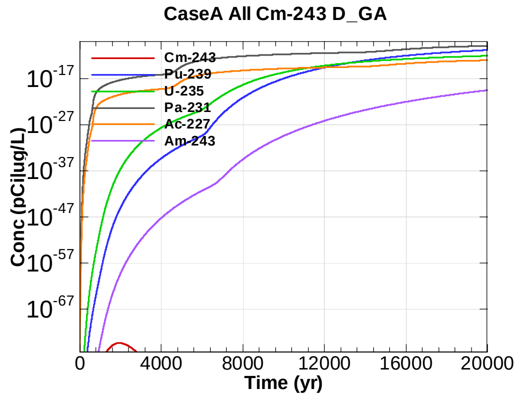

Figure B.3-84 - 100m Aquifer Concentration for CaseA All Cm-243 D_GA

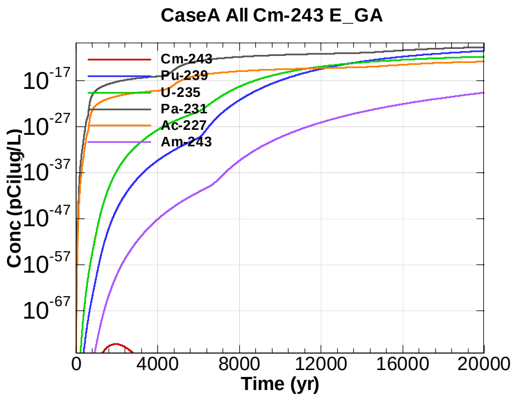

Figure B.3-85 - 100m Aquifer Concentration for CaseA All Cm-243 E_GA

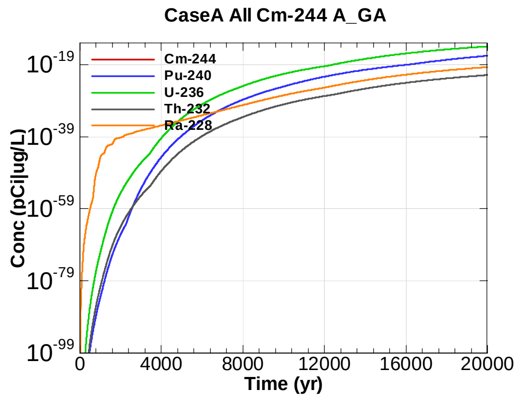

Figure B.3-86 - 100m Aquifer Concentration for CaseA All Cm-244 A_GA

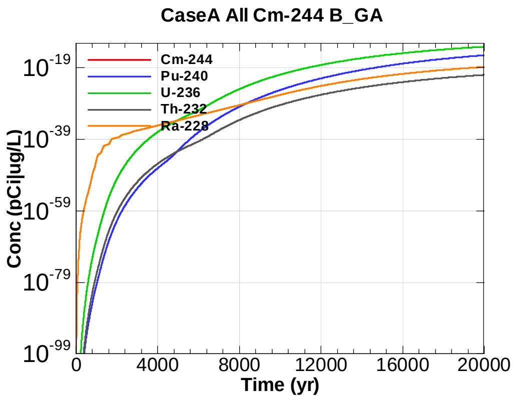

Figure B.3-87 - 100m Aquifer Concentration for CaseA All Cm-244 B_GA

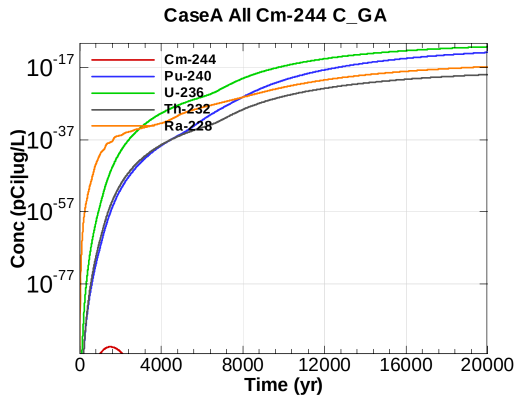

Figure B.3-88 - 100m Aquifer Concentration for CaseA All Cm-244 C_GA

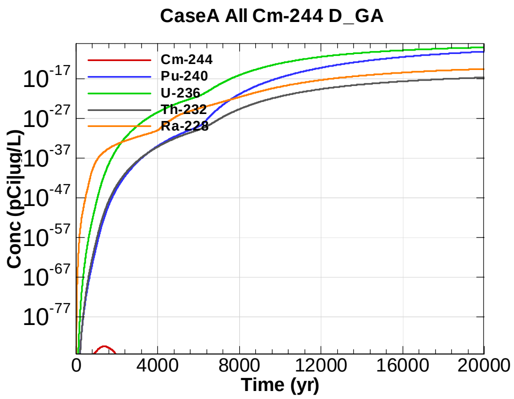

Figure B.3-89 - 100m Aquifer Concentration for CaseA All Cm-244 D_GA

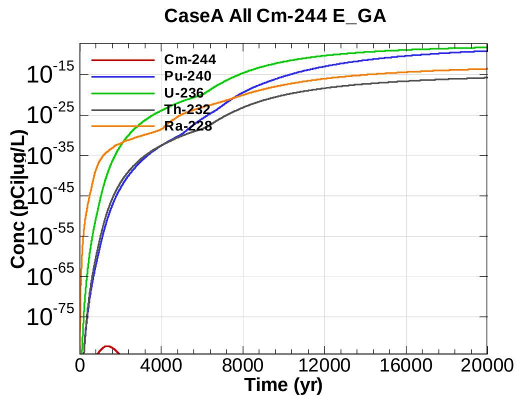

Figure B.3-90 - 100m Aquifer Concentration for CaseA All Cm-244 E_GA

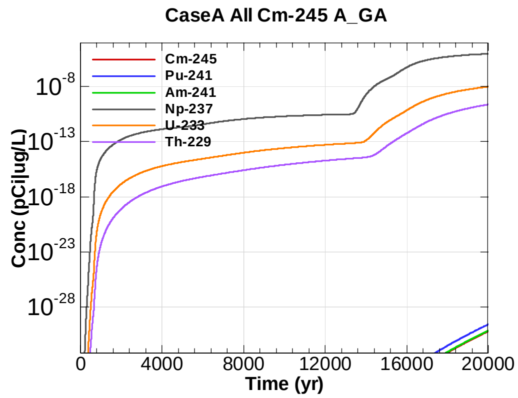

Figure B.3-91 - 100m Aquifer Concentration for CaseA All Cm-245 A_GA

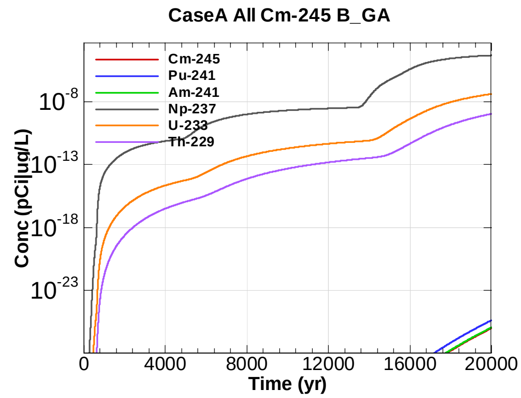

Figure B.3-92 - 100m Aquifer Concentration for CaseA All Cm-245 B_GA

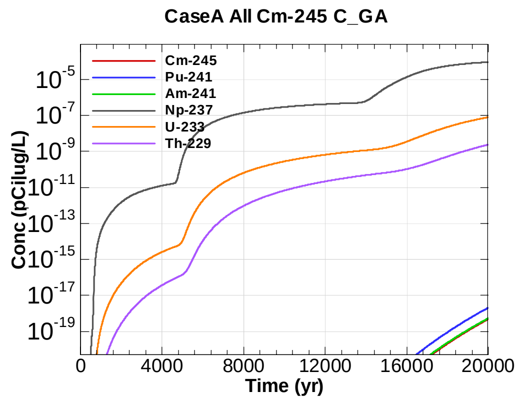

Figure B.3-93 - 100m Aquifer Concentration for CaseA All Cm-245 C_GA

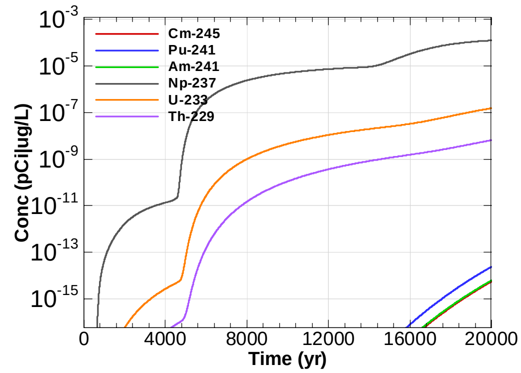

Figure B.3-94 - 100m Aquifer Concentration for CaseA All Cm-245 D_GA

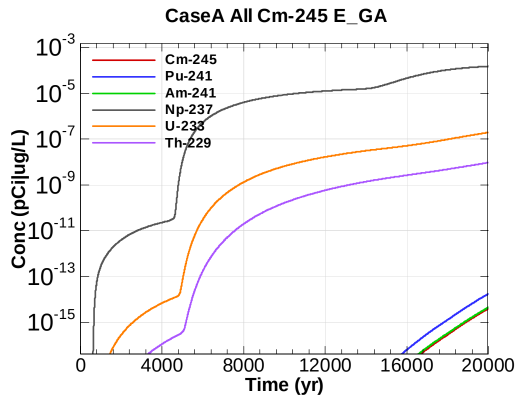

Figure B.3-95 - 100m Aquifer Concentration for CaseA All Cm-245 E_GA

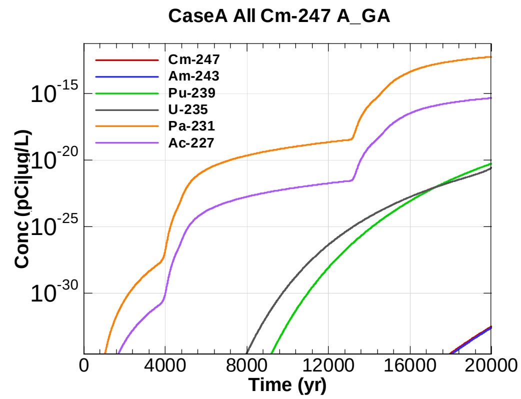

Figure B.3-96 - 100m Aquifer Concentration for CaseA All Cm-247 A_GA

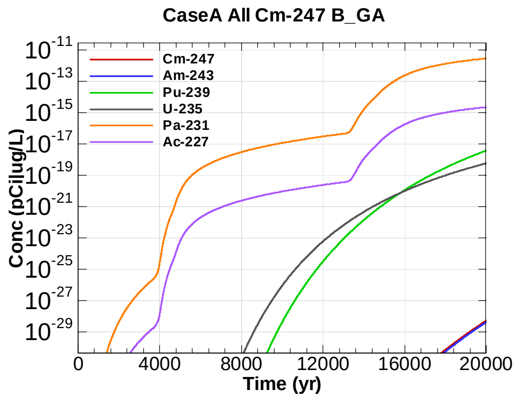

Figure B.3-97 - 100m Aquifer Concentration for CaseA All Cm-247 B_GA

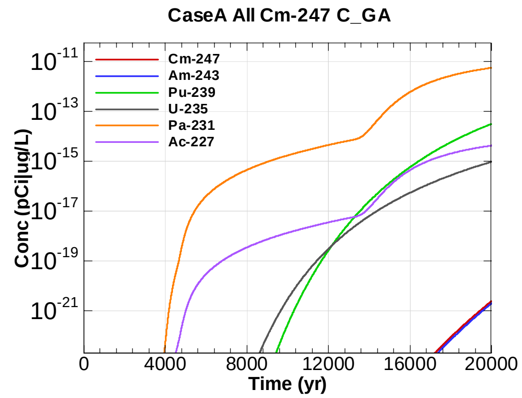

Figure B.3-98 - 100m Aquifer Concentration for CaseA All Cm-247 C_GA

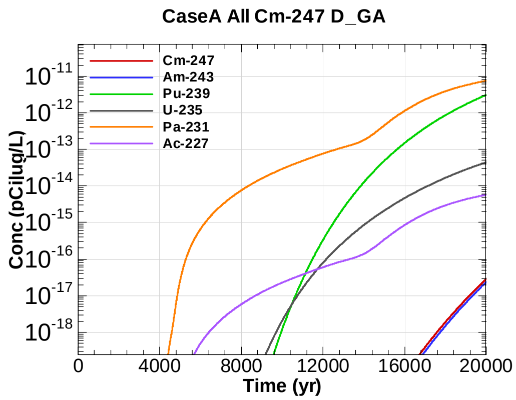

Figure B.3-99 - 100m Aquifer Concentration for CaseA All Cm-247 D_GA

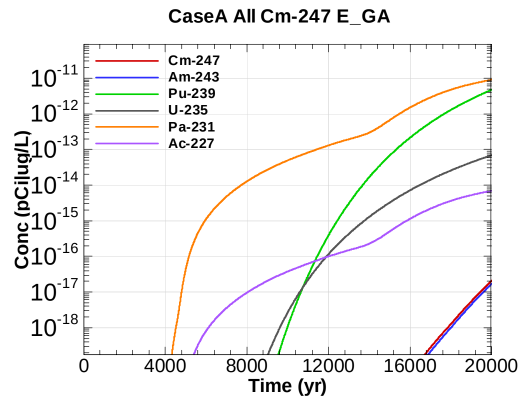

Figure B.3-100 - 100m Aquifer Concentration for CaseA All Cm-247 E_GA

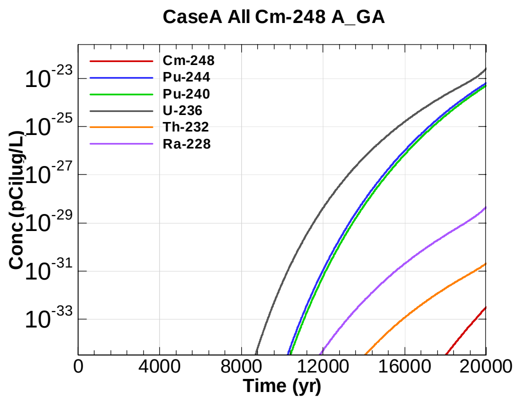

Figure B.3-101 - 100m Aquifer Concentration for CaseA All Cm-248 A_GA

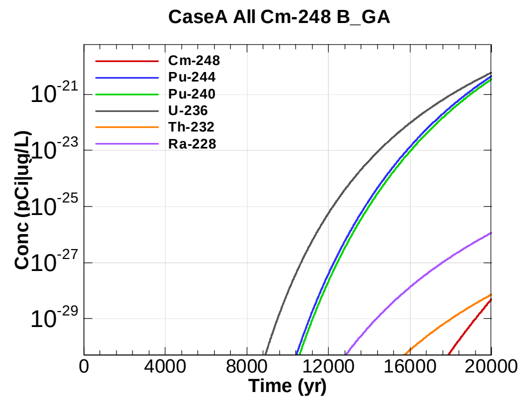

Figure B.3-102 - 100m Aquifer Concentration for CaseA All Cm-248 B_GA

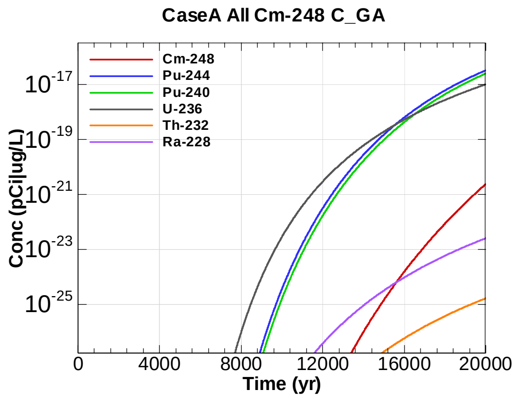

Figure B.3-103 - 100m Aquifer Concentration for CaseA All Cm-248 C_GA

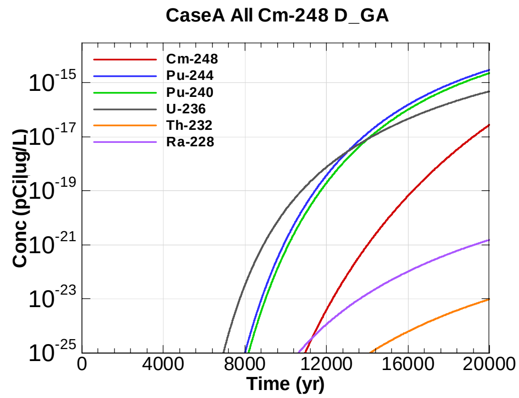

Figure B.3-104 - 100m Aquifer Concentration for CaseA All Cm-248 D_GA

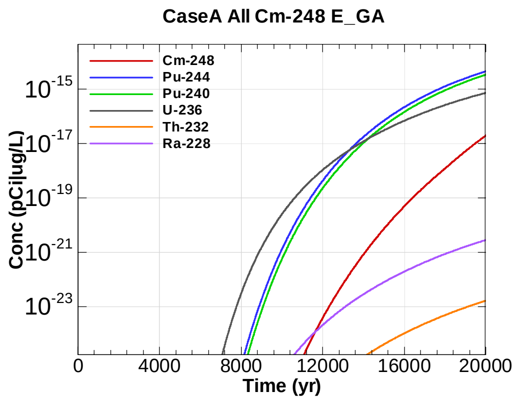

Figure B.3-105 - 100m Aquifer Concentration for CaseA All Cm-248 E_GA

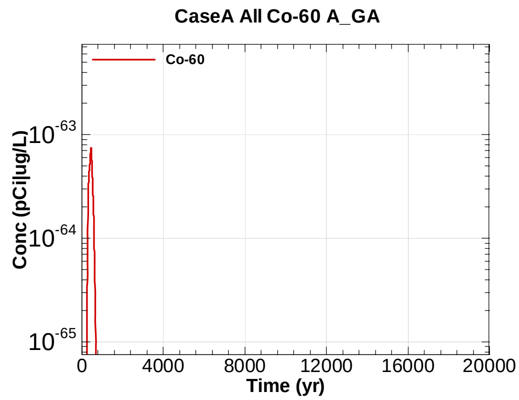

Figure B.3-106 - 100m Aquifer Concentration for CaseA All Co-60 A_GA

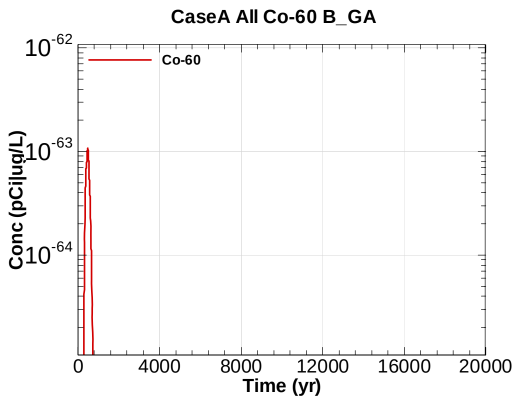

Figure B.3-107 - 100m Aquifer Concentration for CaseA All Co-60 B_GA

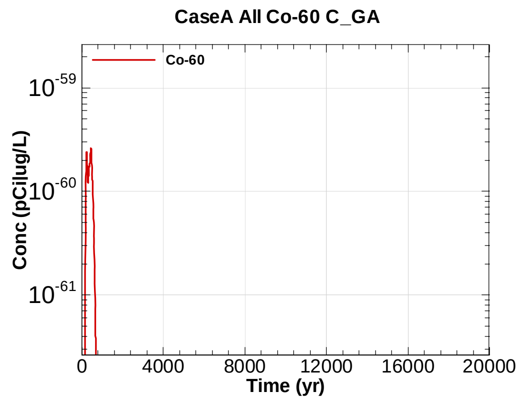

Figure B.3-108 - 100m Aquifer Concentration for CaseA All Co-60 C_GA

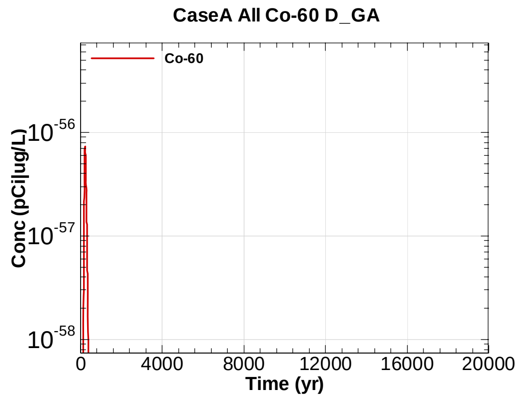

Figure B.3-109 - 100m Aquifer Concentration for CaseA All Co-60 D_GA

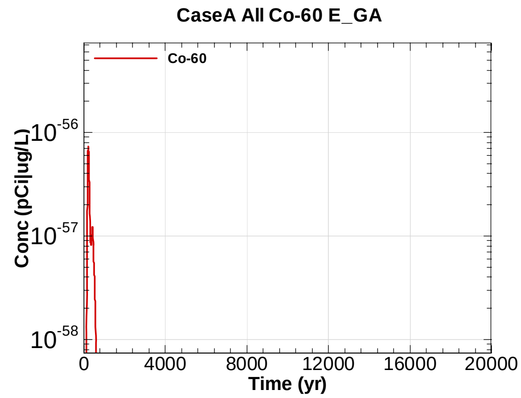

Figure B.3-110 - 100m Aquifer Concentration for CaseA All Co-60 E_GA

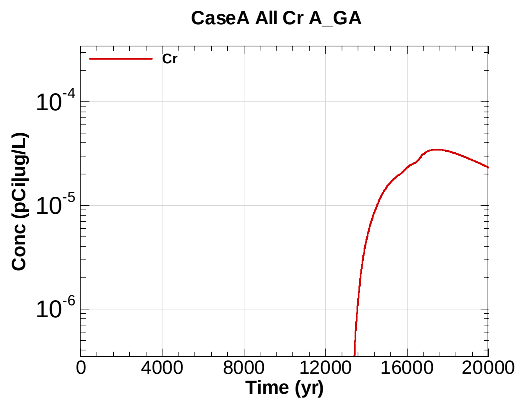

Figure B.3-111 - 100m Aquifer Concentration for CaseA All Cr A_GA

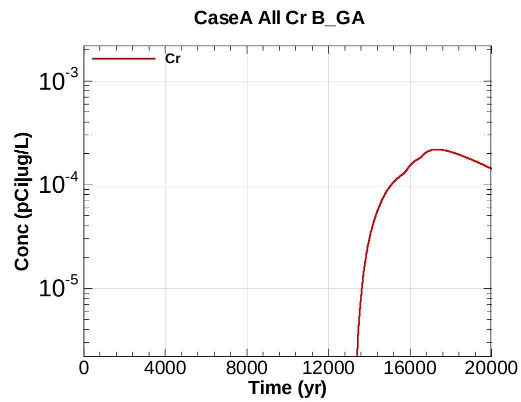

Figure B.3-112 - 100m Aquifer Concentration for CaseA All Cr B_GA

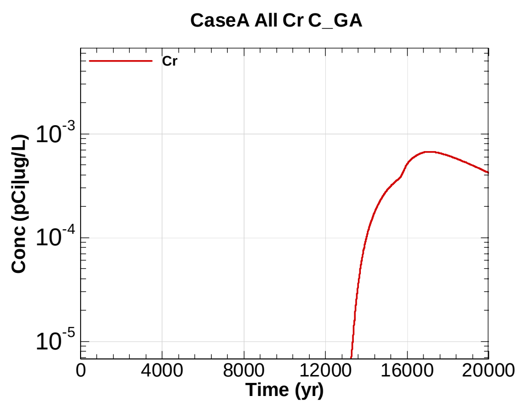

Figure B.3-113 - 100m Aquifer Concentration for CaseA All Cr C_GA

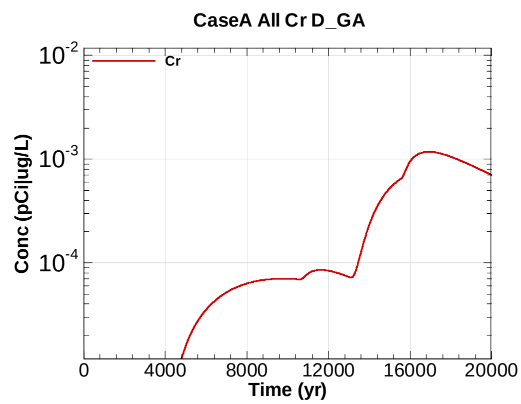

Figure B.3-114 - 100m Aquifer Concentration for CaseA All Cr D_GA

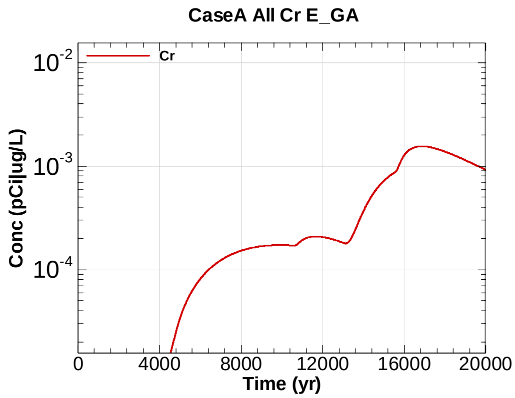

Figure B.3-115 - 100m Aquifer Concentration for CaseA All Cr E_GA

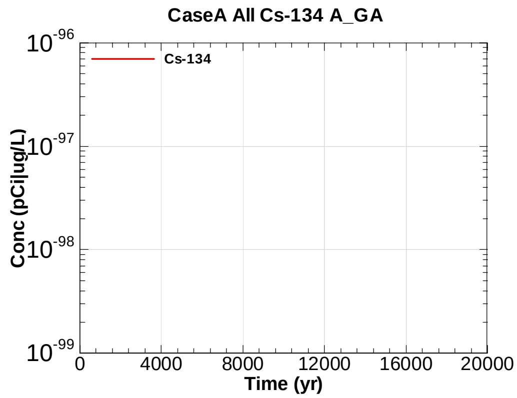

Figure B.3-116 - 100m Aquifer Concentration for CaseA All Cs-134 A_GA

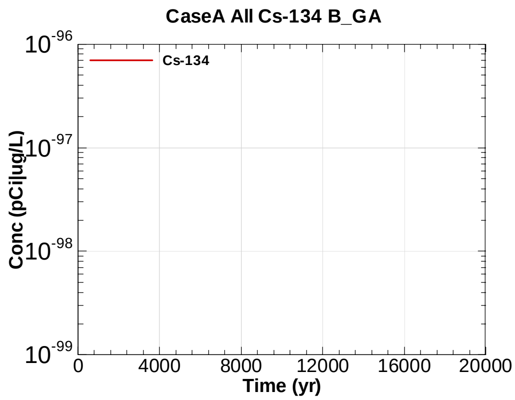

Figure B.3-117 - 100m Aquifer Concentration for CaseA All Cs-134 B_GA

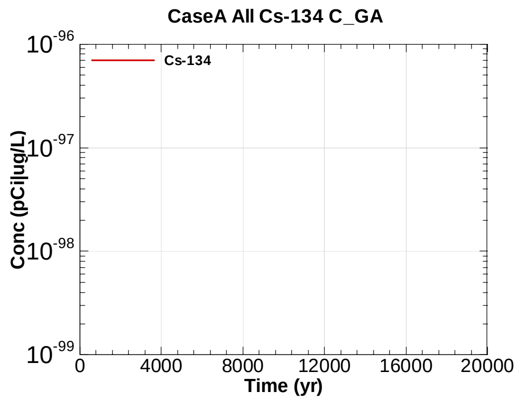

Figure B.3-118 - 100m Aquifer Concentration for CaseA All Cs-134 C_GA

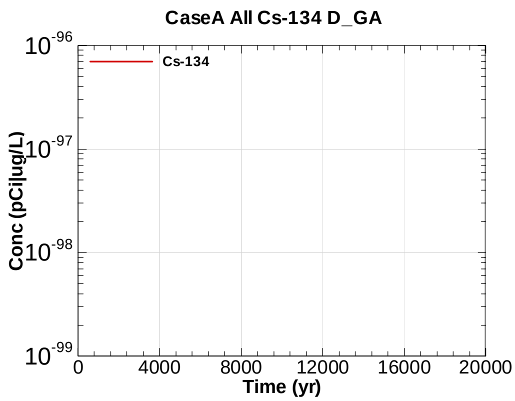

Figure B.3-119 - 100m Aquifer Concentration for CaseA All Cs-134 D_GA

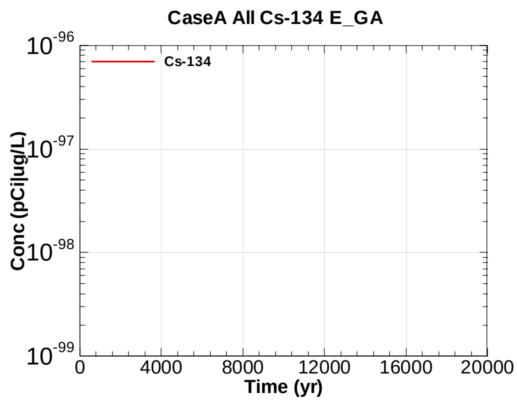

Figure B.3-120 - 100m Aquifer Concentration for CaseA All Cs-134 E_GA

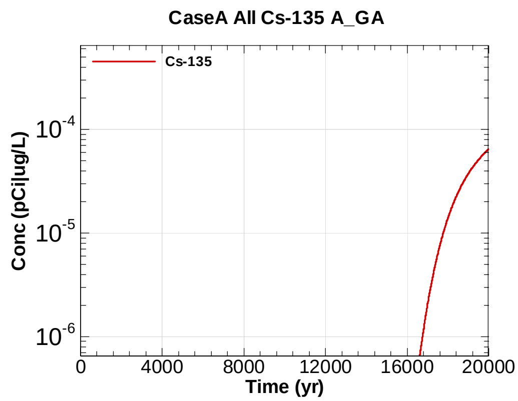

Figure B.3-121 - 100m Aquifer Concentration for CaseA All Cs-135 A_GA

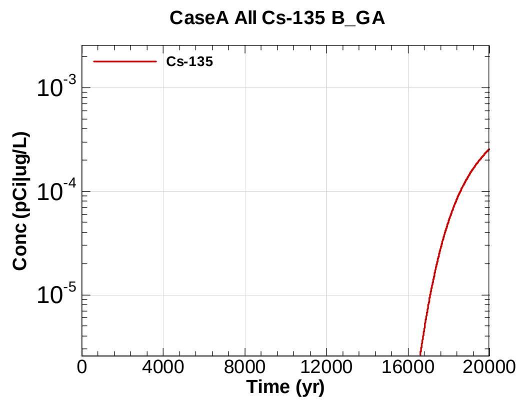

Figure B.3-122 - 100m Aquifer Concentration for CaseA All Cs-135 B_GA

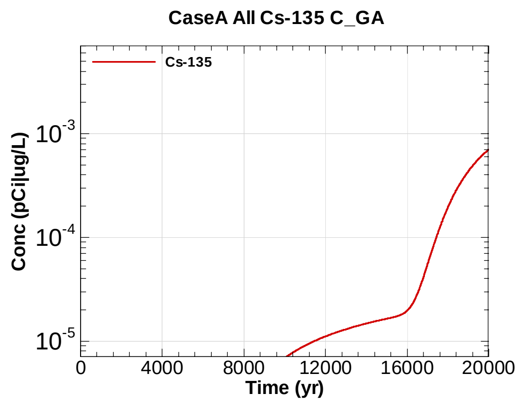

Figure B.3-123 - 100m Aquifer Concentration for CaseA All Cs-135 C_GA

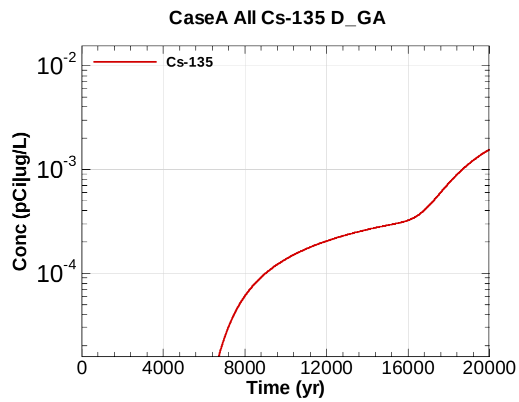

Figure B.3-124 - 100m Aquifer Concentration for CaseA All Cs-135 D_GA

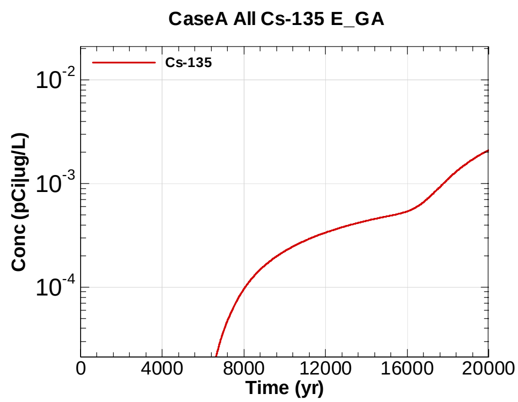

Figure B.3-125 - 100m Aquifer Concentration for CaseA All Cs-135 E_GA

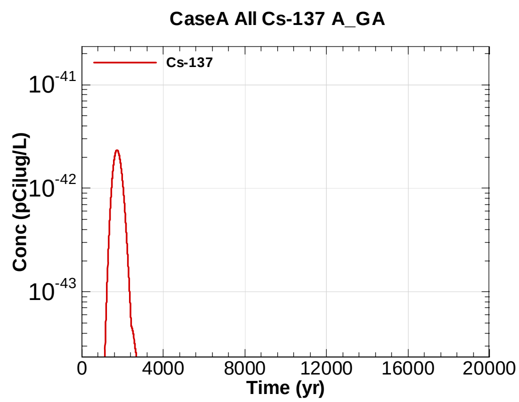

Figure B.3-126 - 100m Aquifer Concentration for CaseA All Cs-137 A_GA

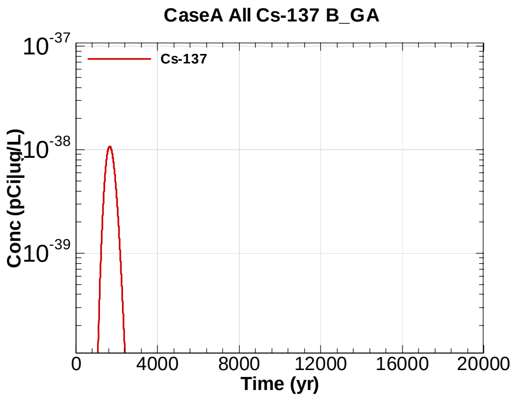

Figure B.3-127 - 100m Aquifer Concentration for CaseA All Cs-137 B_GA

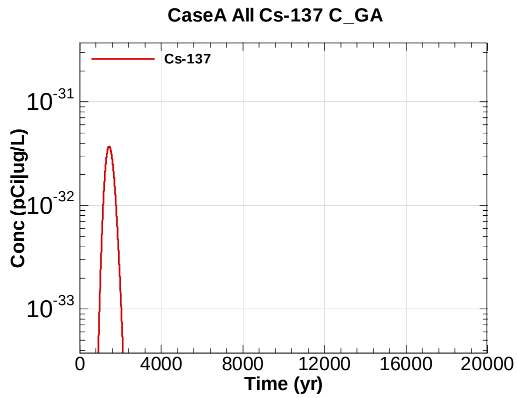

Figure B.3-128 - 100m Aquifer Concentration for CaseA All Cs-137 C_GA

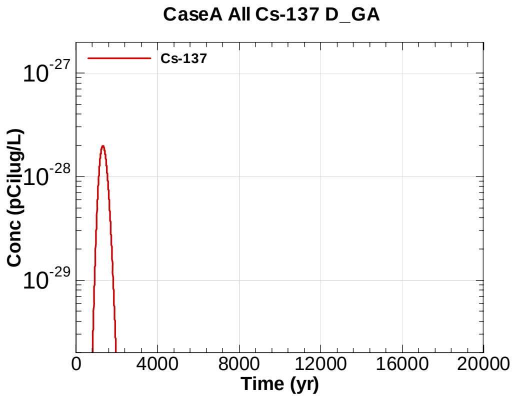

Figure B.3-129 - 100m Aquifer Concentration for CaseA All Cs-137 D_GA

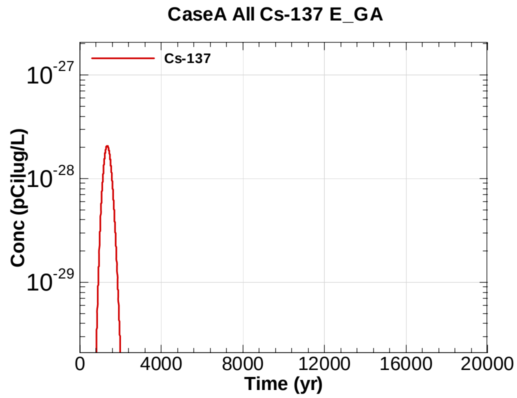

Figure B.3-130 - 100m Aquifer Concentration for CaseA All Cs-137 E_GA

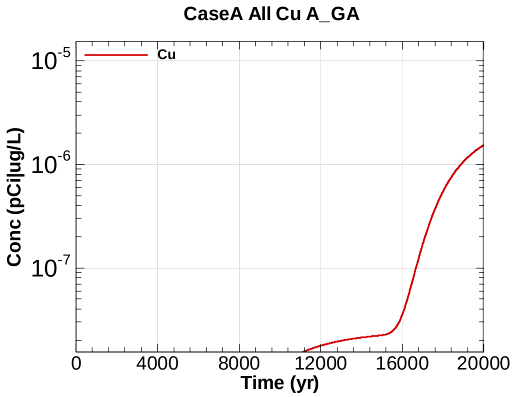

Figure B.3-131 - 100m Aquifer Concentration for CaseA All Cu A_GA

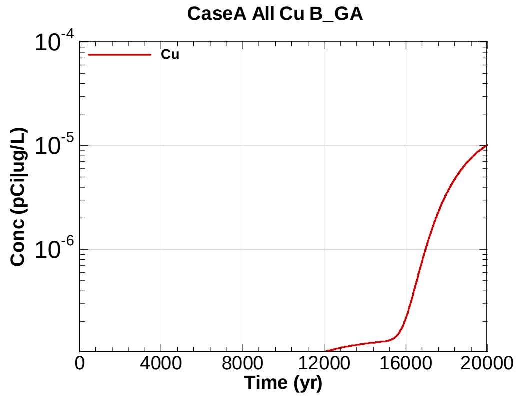

Figure B.3-132 - 100m Aquifer Concentration for CaseA All Cu B_GA

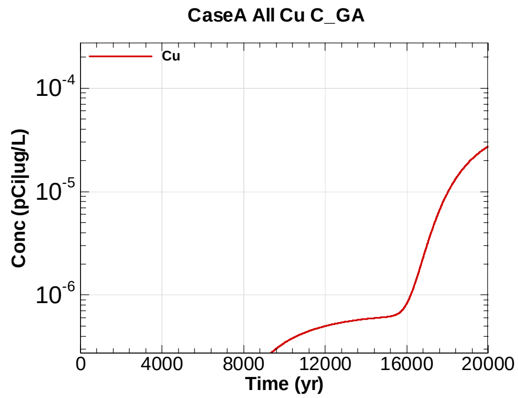

Figure B.3-133 - 100m Aquifer Concentration for CaseA All Cu C_GA

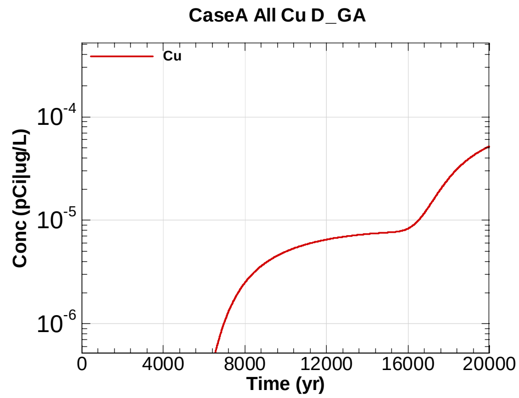

Figure B.3-134 - 100m Aquifer Concentration for CaseA All Cu D_GA

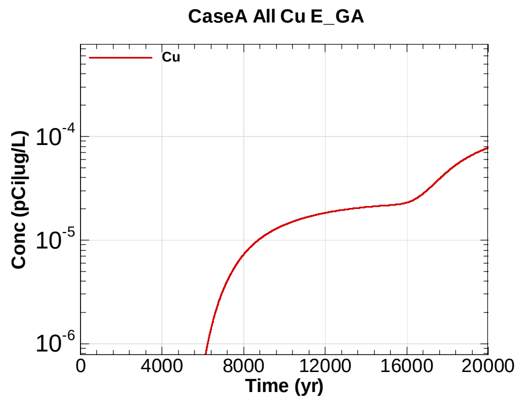

Figure B.3-135 - 100m Aquifer Concentration for CaseA All Cu E_GA

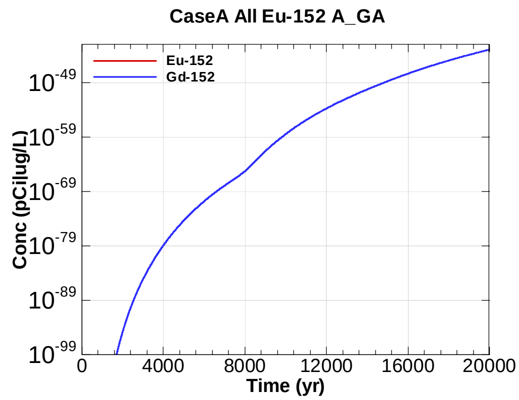

Figure B.3-136 - 100m Aquifer Concentration for CaseA All Eu-152 A_GA

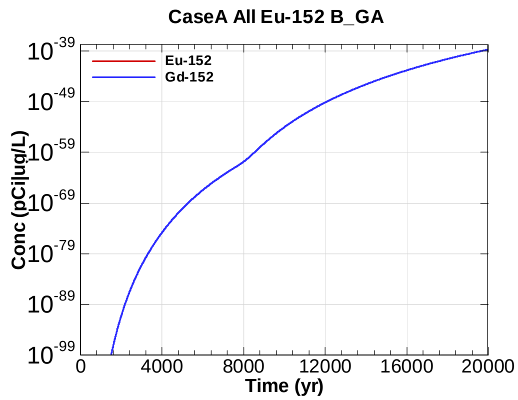

Figure B.3-137 - 100m Aquifer Concentration for CaseA All Eu-152 B_GA

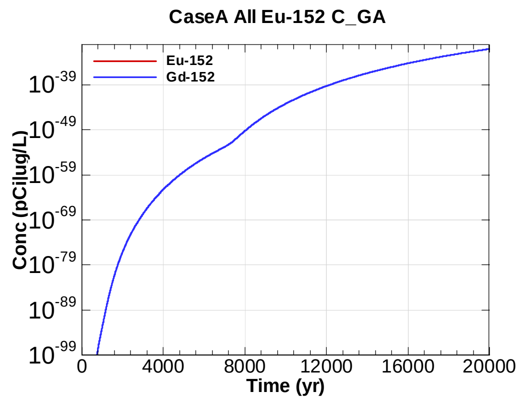

Figure B.3-138 - 100m Aquifer Concentration for CaseA All Eu-152 C_GA

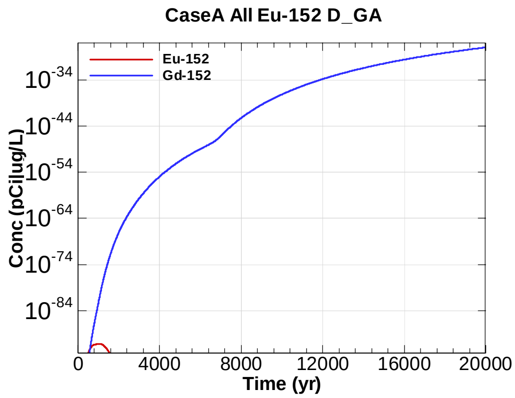

Figure B.3-139 - 100m Aquifer Concentration for CaseA All Eu-152 D_GA

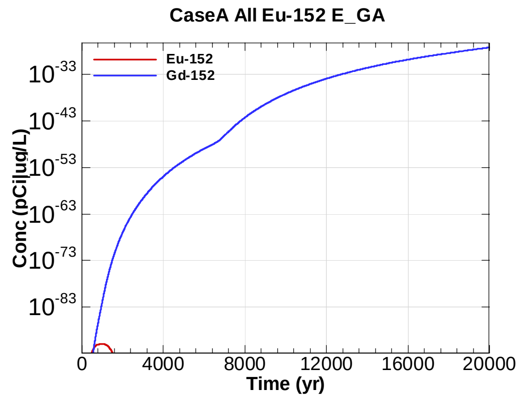

Figure B.3-140 - 100m Aquifer Concentration for CaseA All Eu-152 E_GA

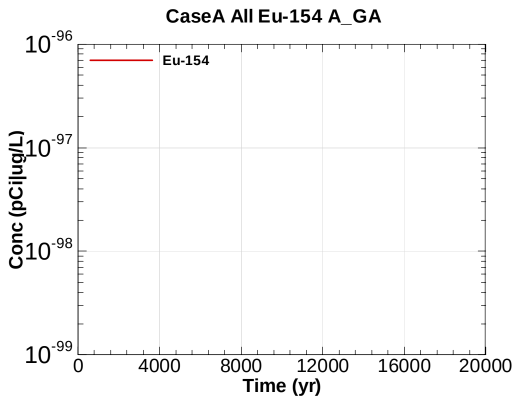

Figure B.3-141 - 100m Aquifer Concentration for CaseA All Eu-154 A_GA

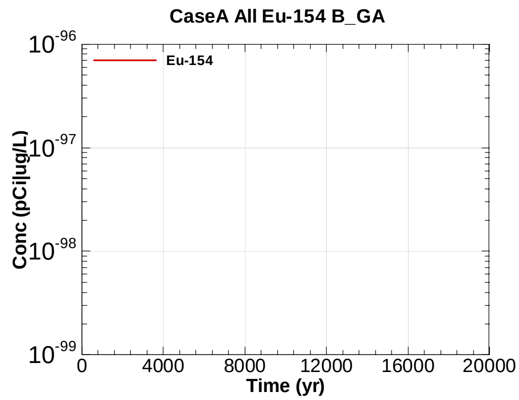

Figure B.3-142 - 100m Aquifer Concentration for CaseA All Eu-154 B_GA

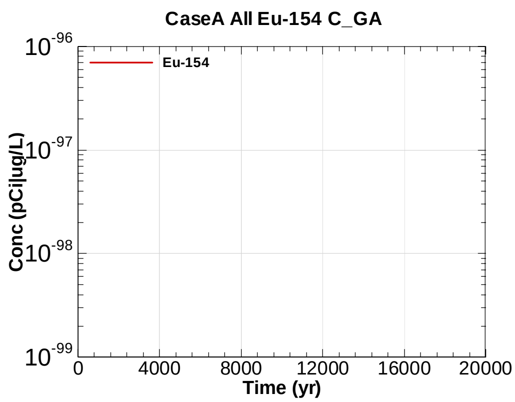

Figure B.3-143 - 100m Aquifer Concentration for CaseA All Eu-154 C_GA

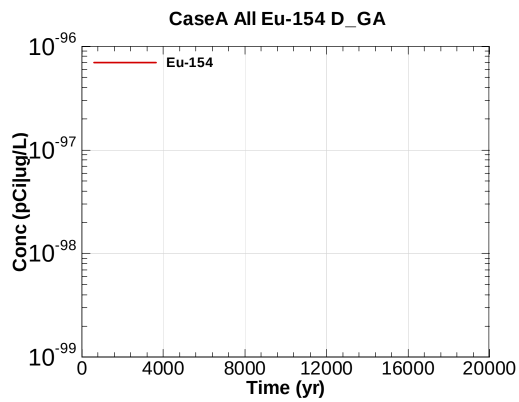

Figure B.3-144 - 100m Aquifer Concentration for CaseA All Eu-154 D_GA

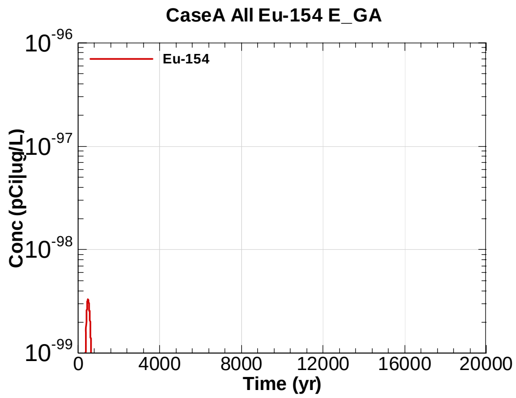

Figure B.3-145 - 100m Aquifer Concentration for CaseA All Eu-154 E_GA

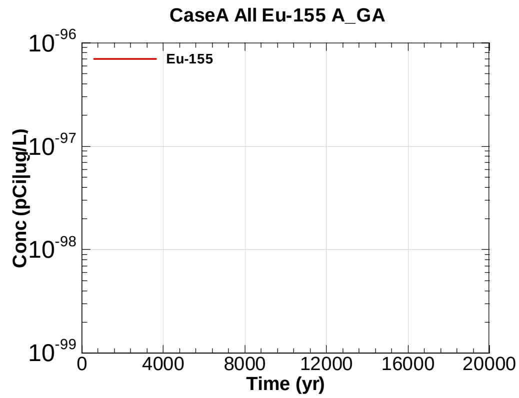

Figure B.3-146 - 100m Aquifer Concentration for CaseA All Eu-155 A_GA

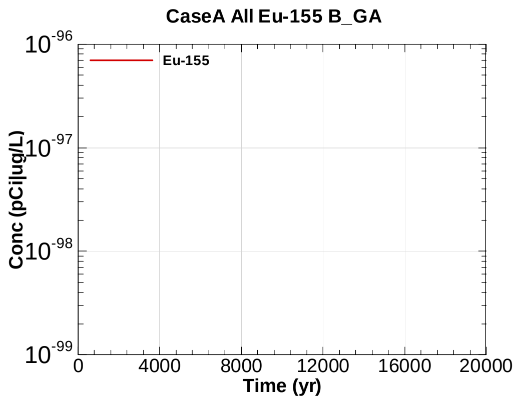

Figure B.3-147 - 100m Aquifer Concentration for CaseA All Eu-155 B_GA

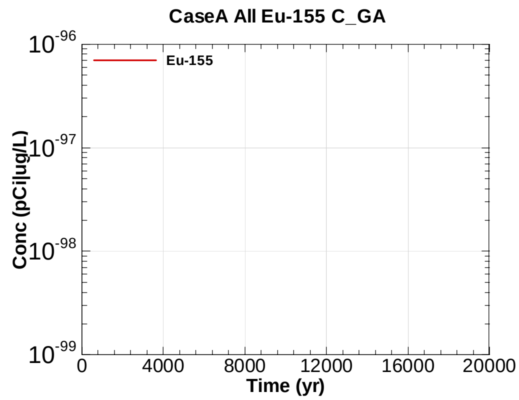

Figure B.3-148 - 100m Aquifer Concentration for CaseA All Eu-155 C_GA

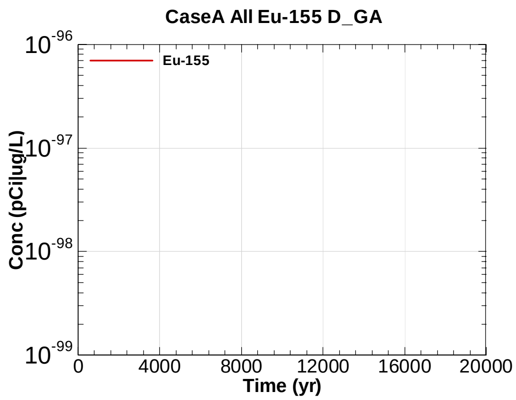

Figure B.3-149 - 100m Aquifer Concentration for CaseA All Eu-155 D_GA

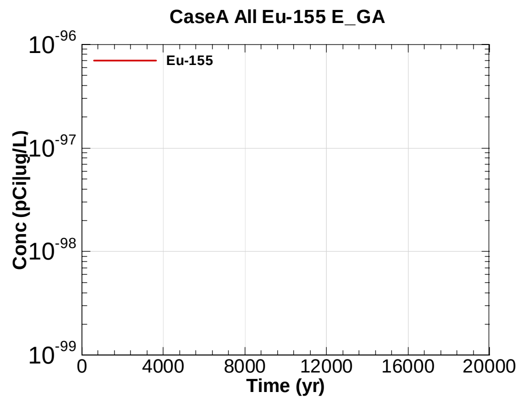

Figure B.3-150 - 100m Aquifer Concentration for CaseA All Eu-155 E_GA

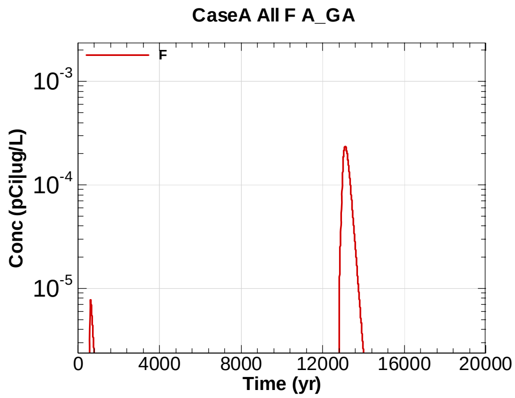

Figure B.3-151 - 100m Aquifer Concentration for CaseA All F A_GA

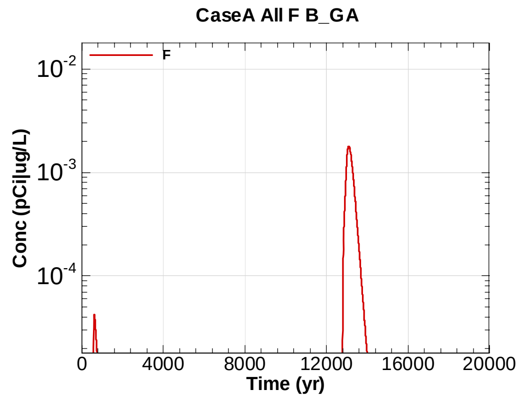

Figure B.3-152 - 100m Aquifer Concentration for CaseA All F B_GA

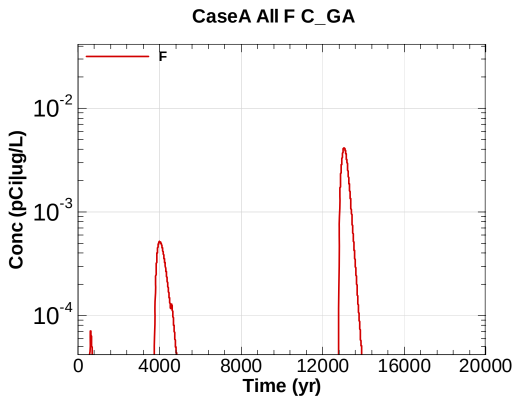

Figure B.3-153 - 100m Aquifer Concentration for CaseA All F C_GA

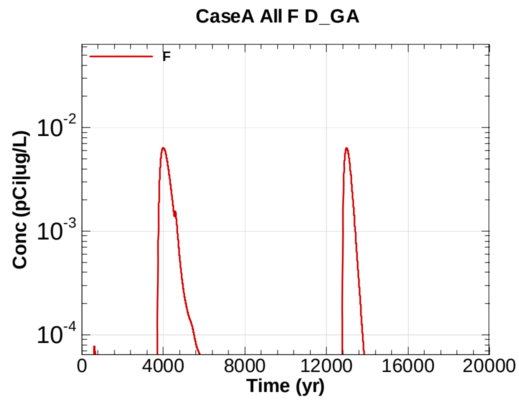

Figure B.3-154 - 100m Aquifer Concentration for CaseA All F D_GA

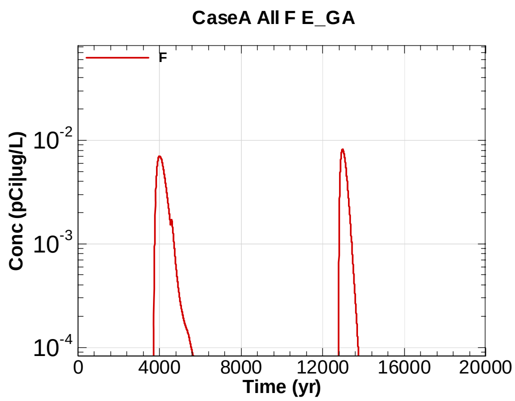

Figure B.3-155 - 100m Aquifer Concentration for CaseA All F E_GA

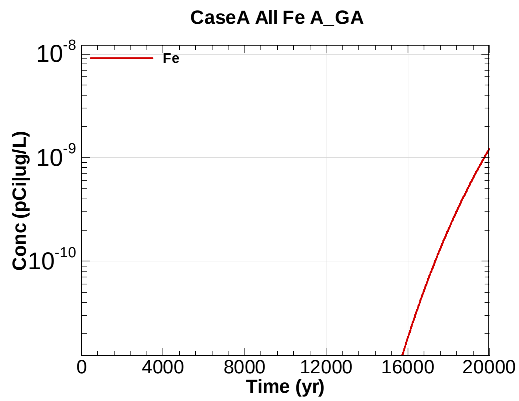

Figure B.3-156 - 100m Aquifer Concentration for CaseA All Fe A_GA

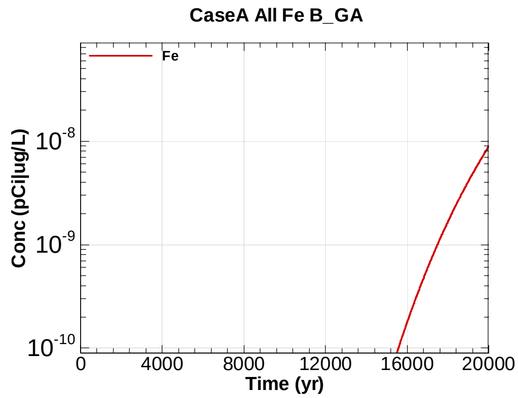

Figure B.3-157 - 100m Aquifer Concentration for CaseA All Fe B_GA

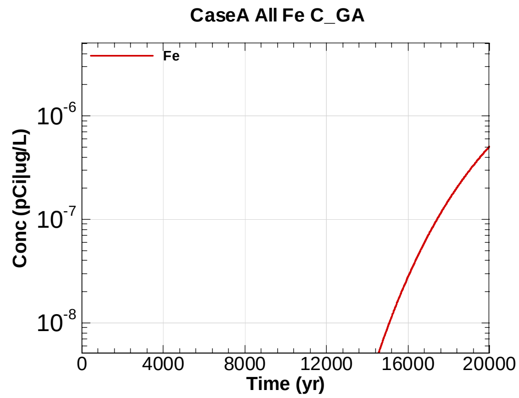

Figure B.3-158 - 100m Aquifer Concentration for CaseA All Fe C_GA

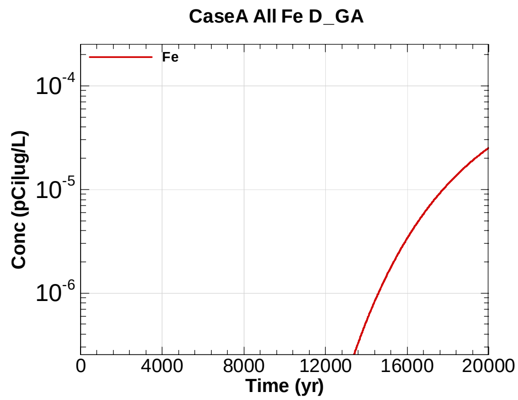

Figure B.3-159 - 100m Aquifer Concentration for CaseA All Fe D_GA

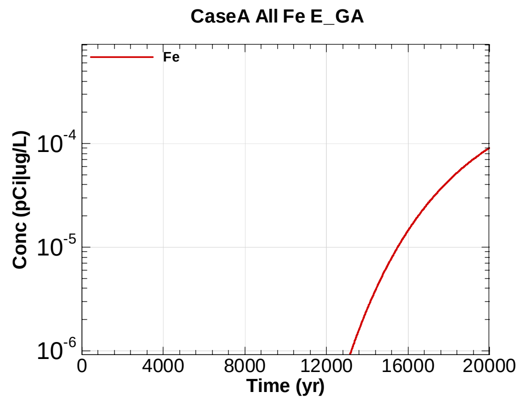

Figure B.3-160 - 100m Aquifer Concentration for CaseA All Fe E_GA

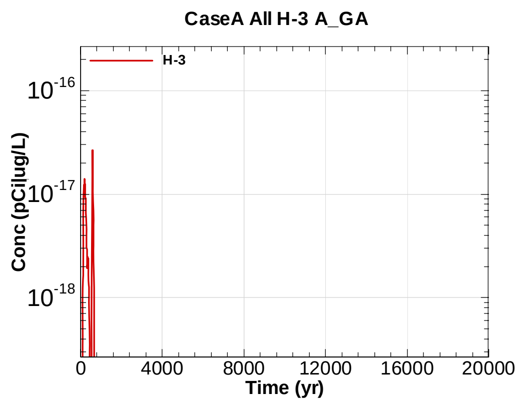

Figure B.3-161 - 100m Aquifer Concentration for CaseA All H-3 A_GA

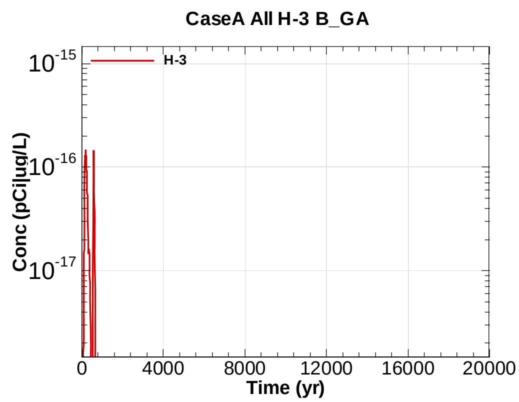

Figure B.3-162 - 100m Aquifer Concentration for CaseA All H-3 B_GA

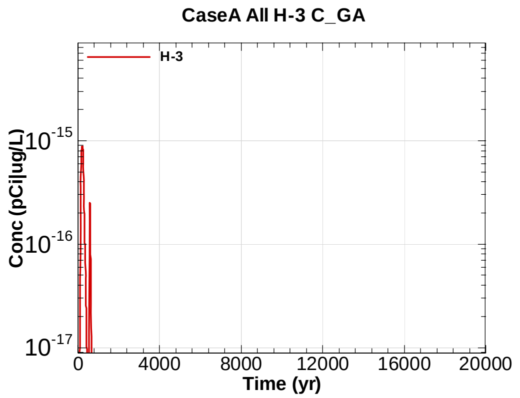

Figure B.3-163 - 100m Aquifer Concentration for CaseA All H-3 C_GA

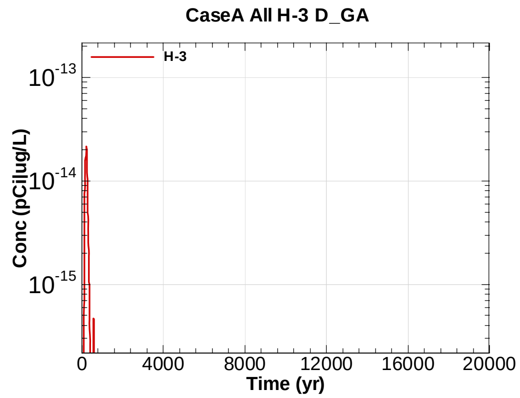

Figure B.3-164 - 100m Aquifer Concentration for CaseA All H-3 D_GA

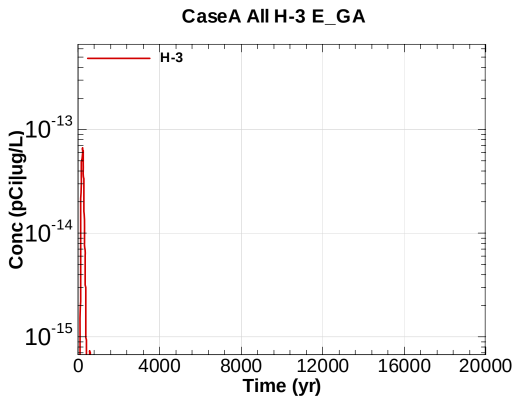

Figure B.3-165 - 100m Aquifer Concentration for CaseA All H-3 E_GA

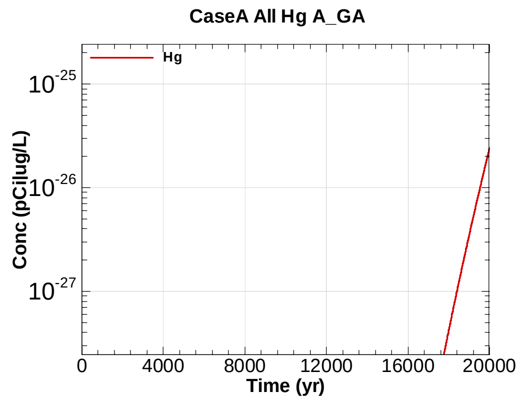

Figure B.3-166 - 100m Aquifer Concentration for CaseA All Hg A_GA

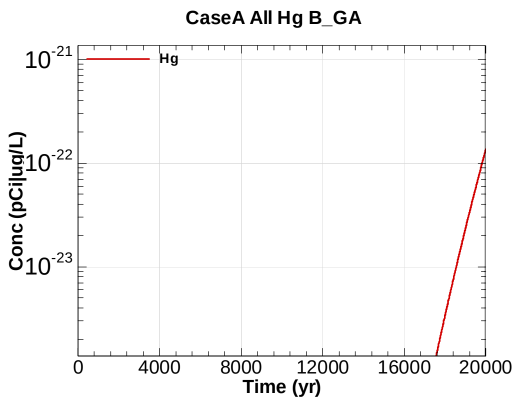

Figure B.3-167 - 100m Aquifer Concentration for CaseA All Hg B_GA

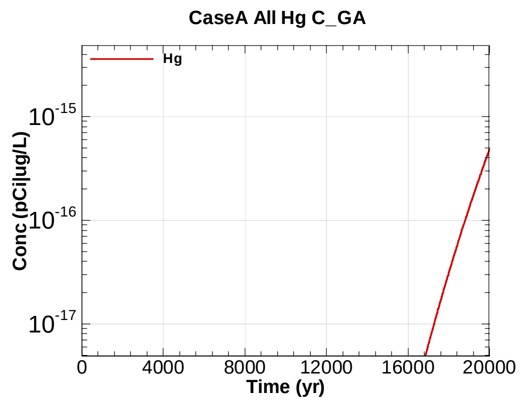

Figure B.3-168 - 100m Aquifer Concentration for CaseA All Hg C_GA

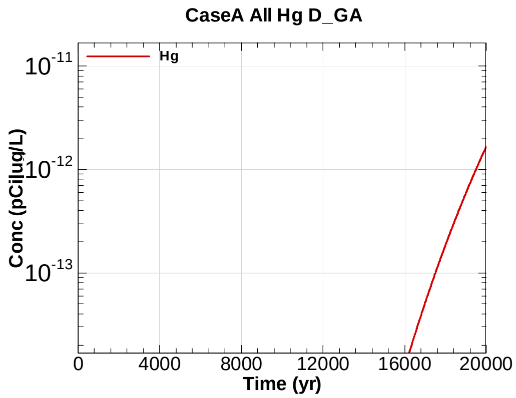

Figure B.3-169 - 100m Aquifer Concentration for CaseA All Hg D_GA

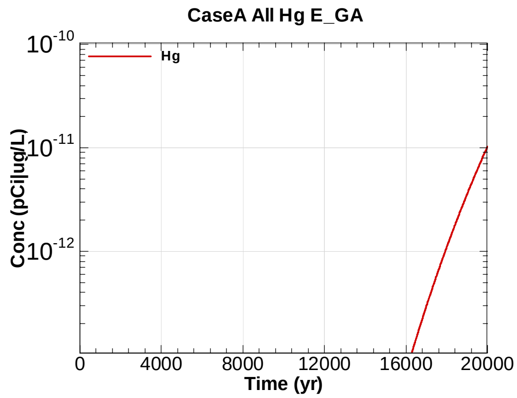

Figure B.3-170 - 100m Aquifer Concentration for CaseA All Hg E_GA

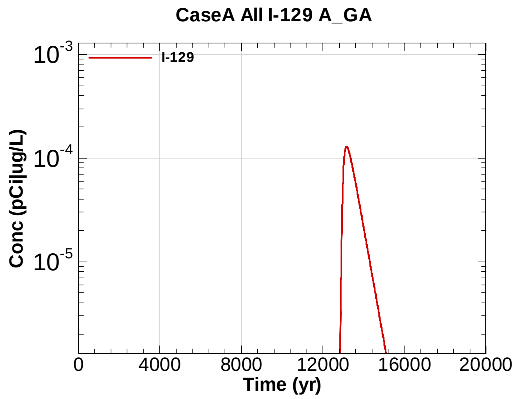

Figure B.3-171 - 100m Aquifer Concentration for CaseA All I-129 A_GA

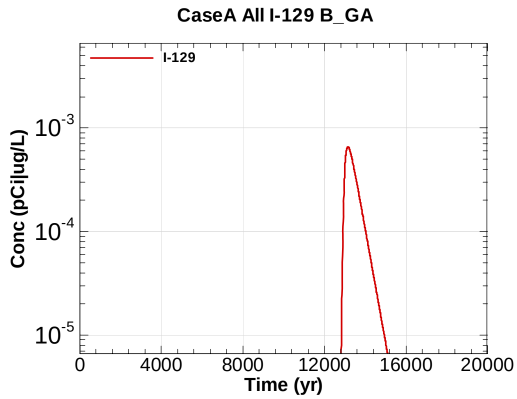

Figure B.3-172 - 100m Aquifer Concentration for CaseA All I-129 B_GA

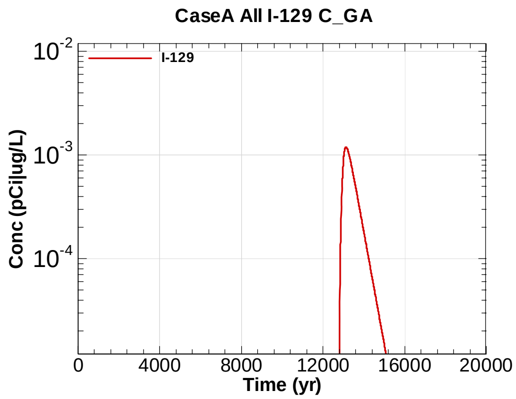

Figure B.3-173 - 100m Aquifer Concentration for CaseA All I-129 C_GA

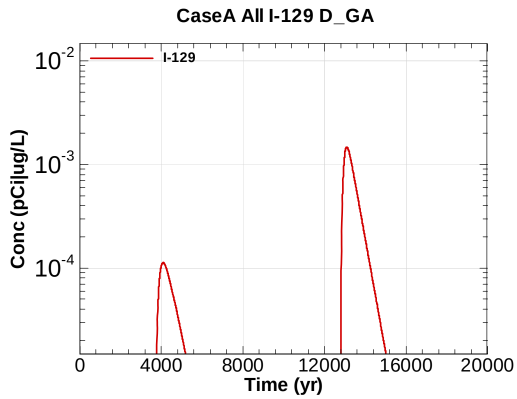

Figure B.3-174 - 100m Aquifer Concentration for CaseA All I-129 D_GA

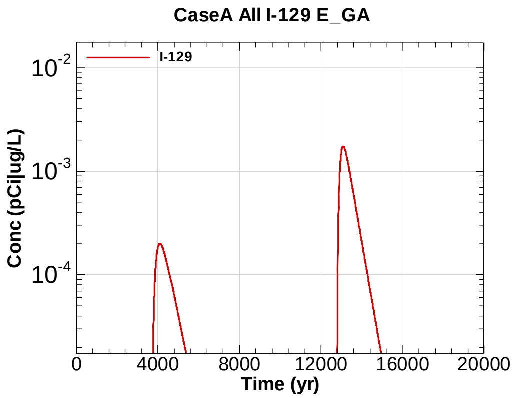

Figure B.3-175 - 100m Aquifer Concentration for CaseA All I-129 E_GA

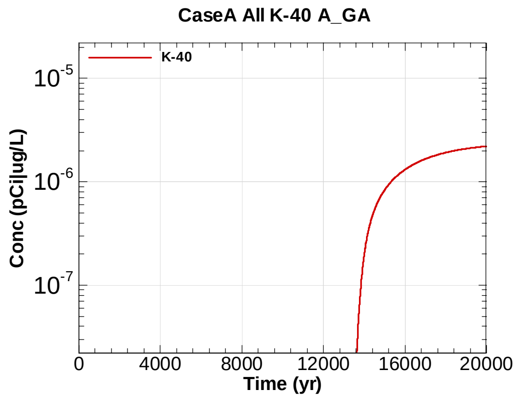

Figure B.3-176 - 100m Aquifer Concentration for CaseA All K-40 A_GA

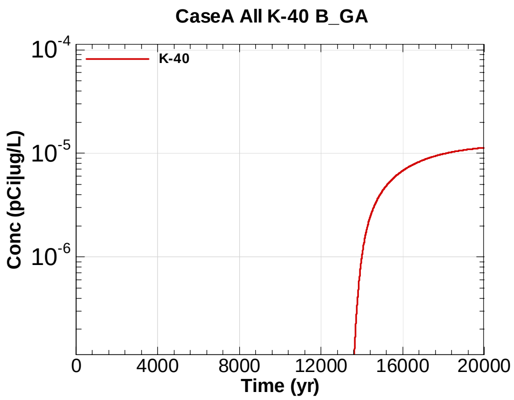

Figure B.3-177 - 100m Aquifer Concentration for CaseA All K-40 B_GA

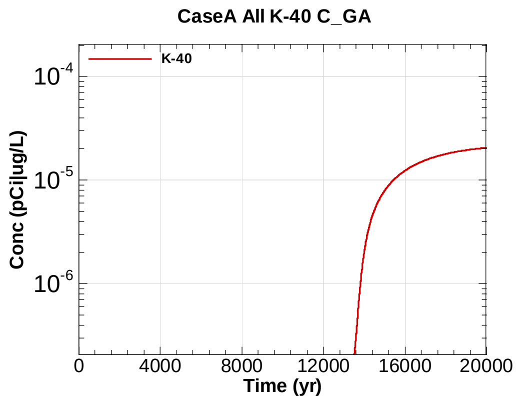

Figure B.3-178 - 100m Aquifer Concentration for CaseA All K-40 C_GA

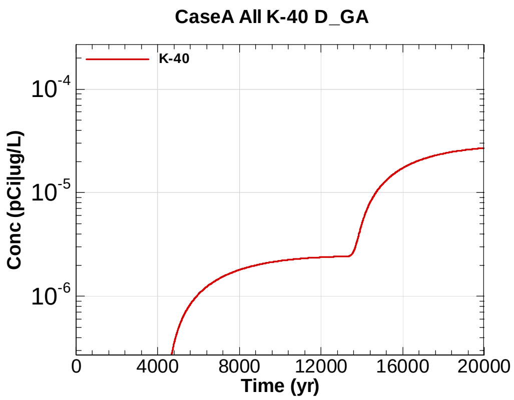

Figure B.3-179 - 100m Aquifer Concentration for CaseA All K-40 D_GA

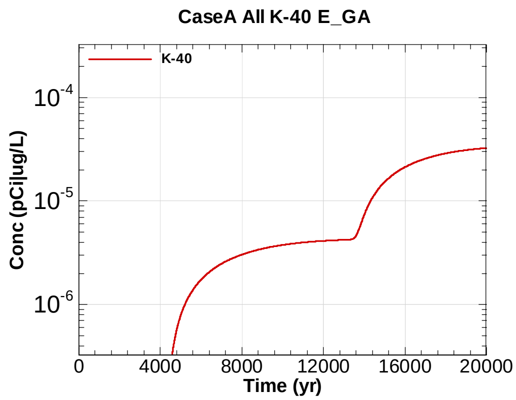

Figure B.3-180 - 100m Aquifer Concentration for CaseA All K-40 E_GA

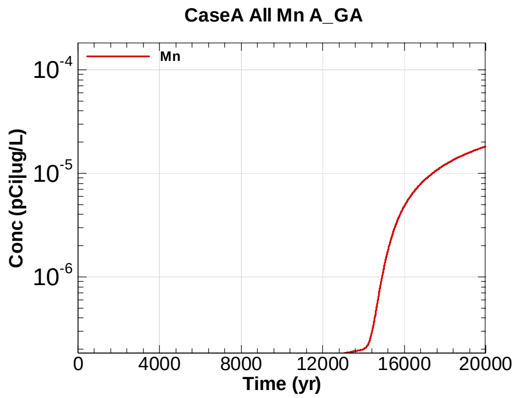

Figure B.3-181 - 100m Aquifer Concentration for CaseA All Mn A_GA

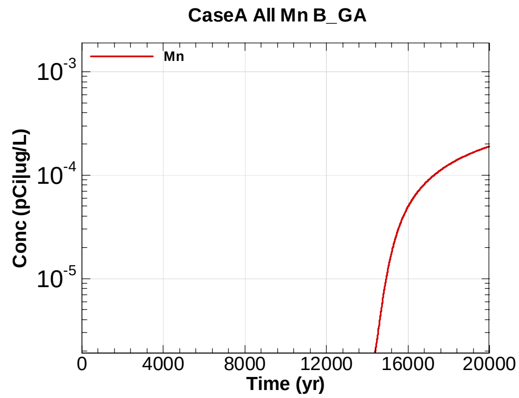

Figure B.3-182 - 100m Aquifer Concentration for CaseA All Mn B_GA

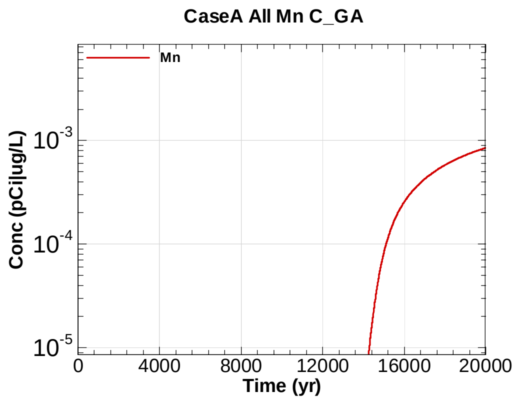

Figure B.3-183 - 100m Aquifer Concentration for CaseA All Mn C_GA

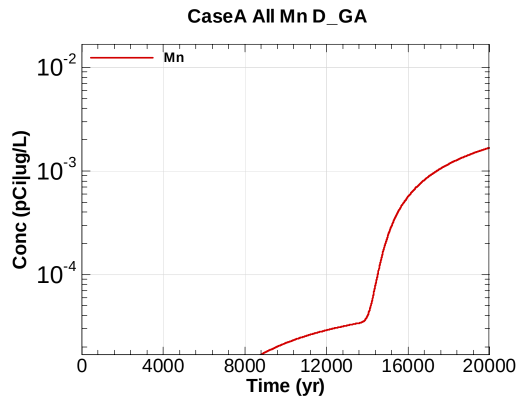

Figure B.3-184 - 100m Aquifer Concentration for CaseA All Mn D_GA

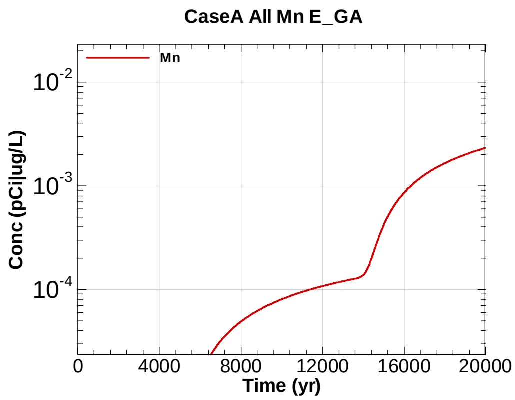

Figure B.3-185 - 100m Aquifer Concentration for CaseA All Mn E_GA

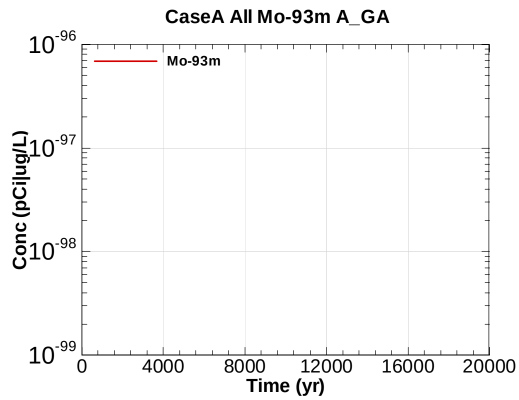

Figure B.3-186 - 100m Aquifer Concentration for CaseA All Mo-93m A_GA

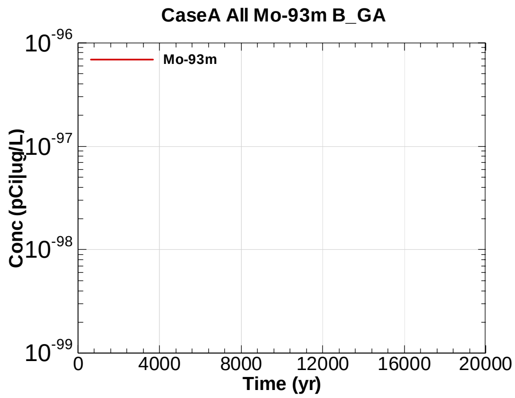

Figure B.3-187 - 100m Aquifer Concentration for CaseA All Mo-93m B_GA

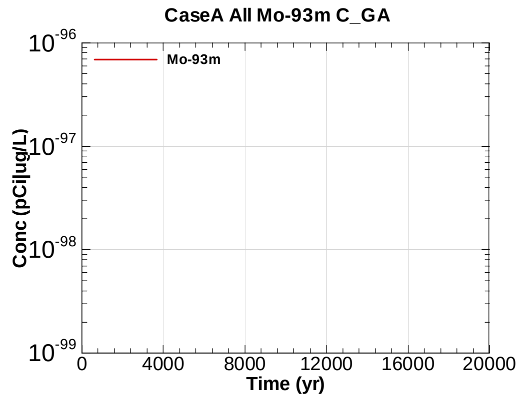

Figure B.3-188 - 100m Aquifer Concentration for CaseA All Mo-93m C_GA

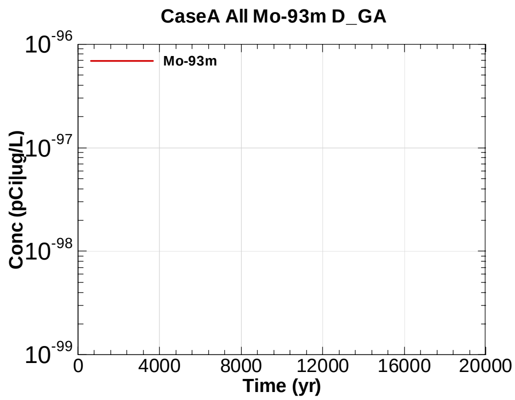

Figure B.3-189 - 100m Aquifer Concentration for CaseA All Mo-93m D_GA

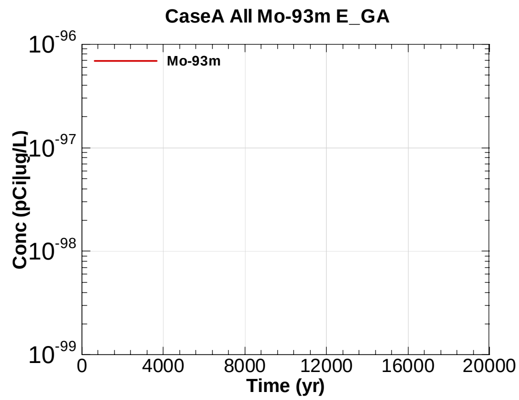

Figure B.3-190 - 100m Aquifer Concentration for CaseA All Mo-93m E_GA

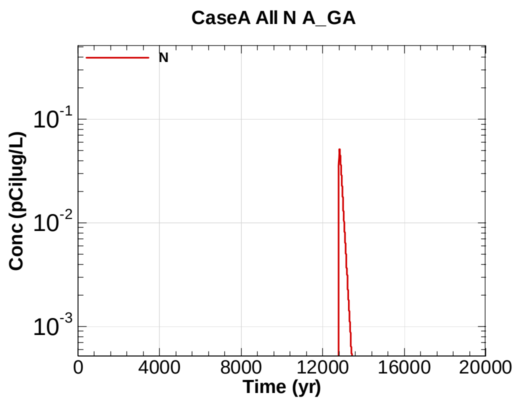

Figure B.3-191 - 100m Aquifer Concentration for CaseA All N A_GA

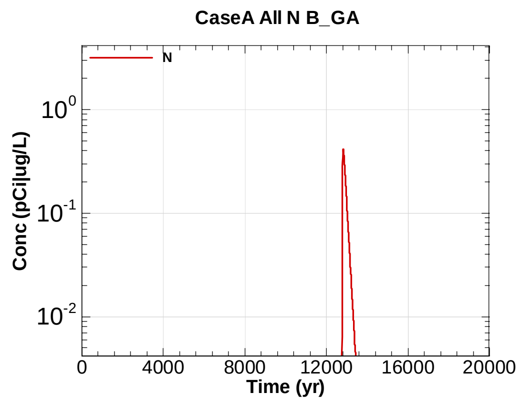

Figure B.3-192 - 100m Aquifer Concentration for CaseA All N B_GA

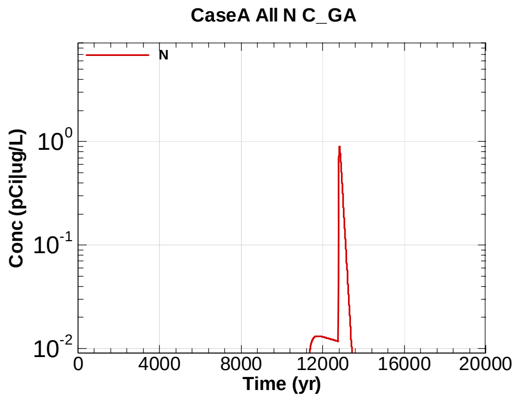

Figure B.3-193 - 100m Aquifer Concentration for CaseA All N C_GA

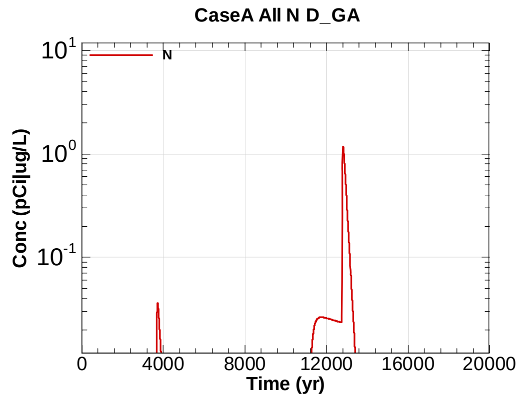

Figure B.3-194 - 100m Aquifer Concentration for CaseA All N D_GA

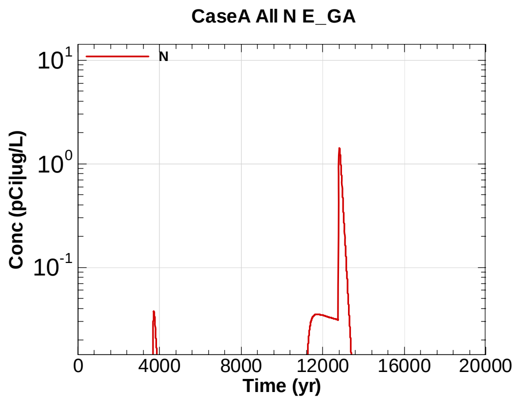

Figure B.3-195 - 100m Aquifer Concentration for CaseA All N E_GA

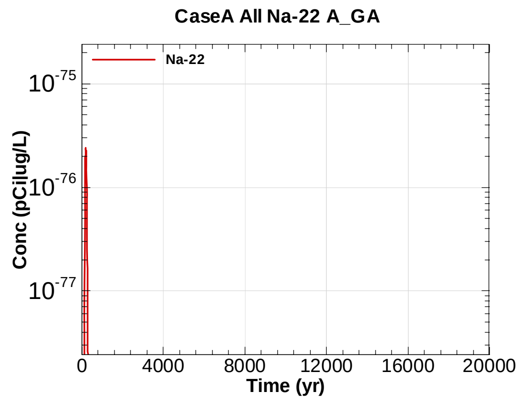

Figure B.3-196 - 100m Aquifer Concentration for CaseA All Na-22 A_GA

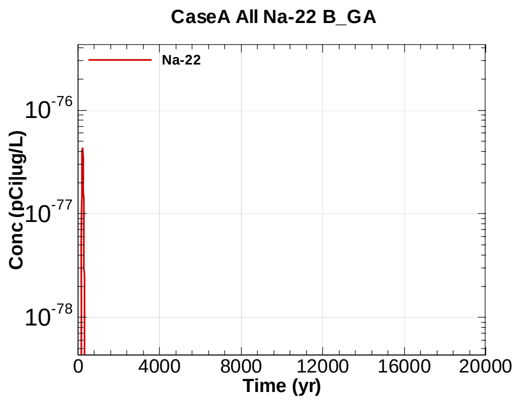

Figure B.3-197 - 100m Aquifer Concentration for CaseA All Na-22 B_GA

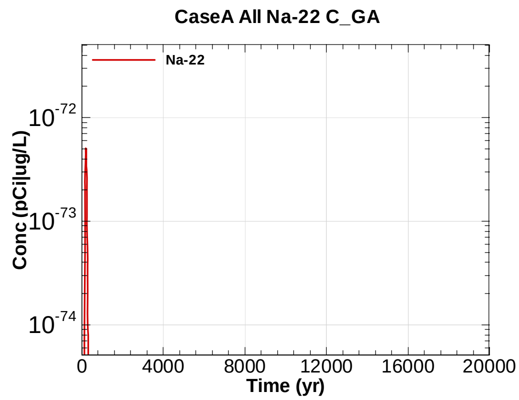

Figure B.3-198 - 100m Aquifer Concentration for CaseA All Na-22 C_GA

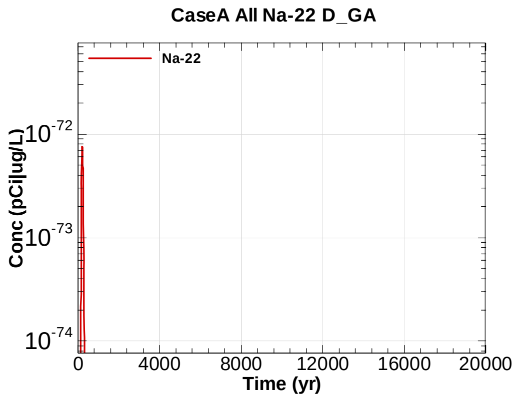

Figure B.3-199 - 100m Aquifer Concentration for CaseA All Na-22 D_GA

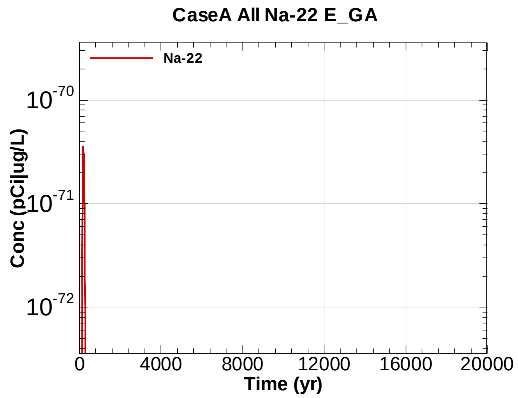

Figure B.3-200 - 100m Aquifer Concentration for CaseA All Na-22 E_GA

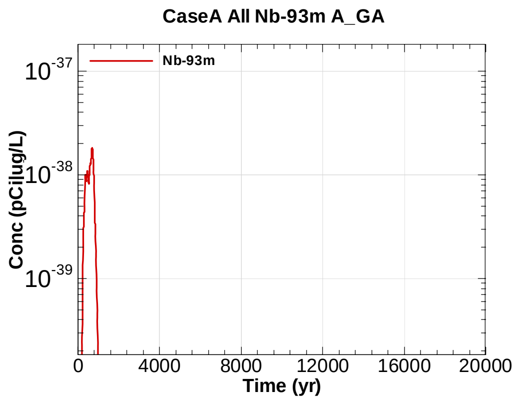

Figure B.3-201 - 100m Aquifer Concentration for CaseA All Nb-93m A_GA

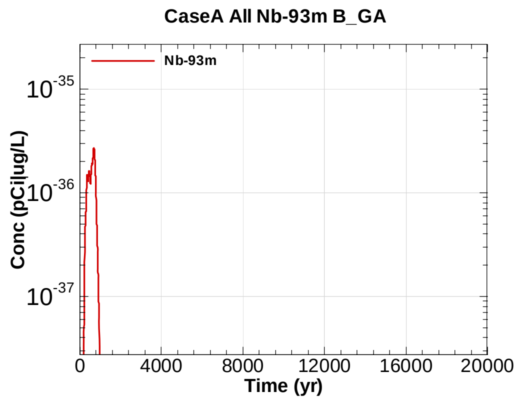

Figure B.3-202 - 100m Aquifer Concentration for CaseA All Nb-93m B_GA

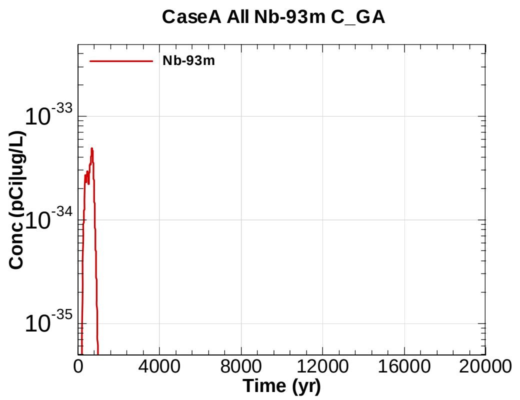

Figure B.3-203 - 100m Aquifer Concentration for CaseA All Nb-93m C_GA

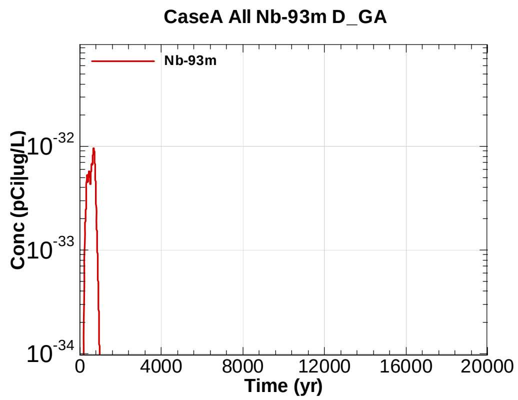

Figure B.3-204 - 100m Aquifer Concentration for CaseA All Nb-93m D_GA

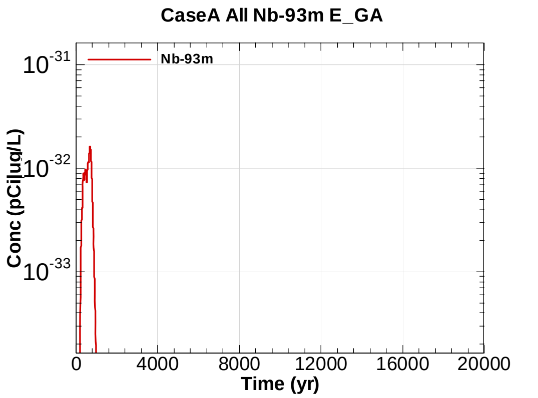

Figure B.3-205 - 100m Aquifer Concentration for CaseA All Nb-93m E_GA

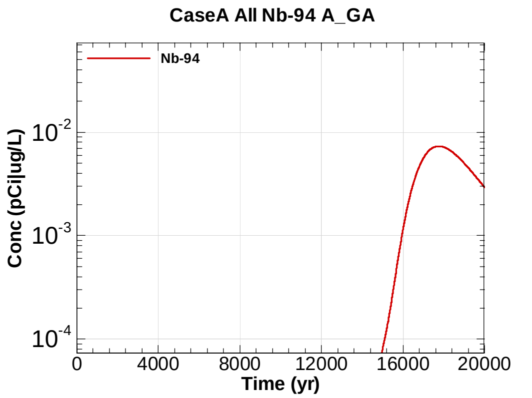

Figure B.3-206 - 100m Aquifer Concentration for CaseA All Nb-94 A_GA

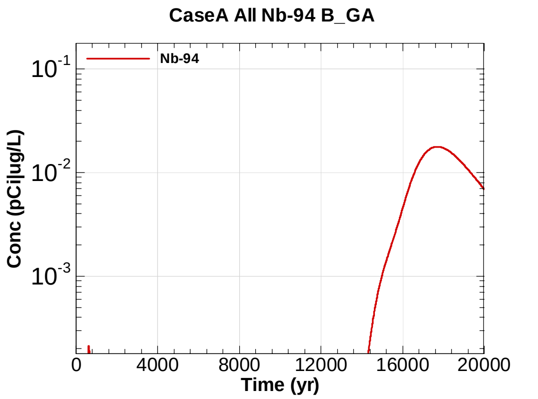

Figure B.3-207 - 100m Aquifer Concentration for CaseA All Nb-94 B_GA

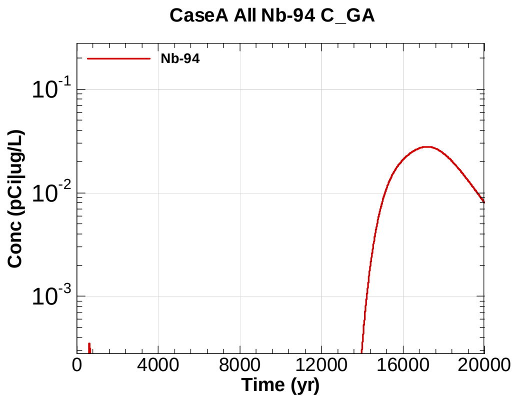

Figure B.3-208 - 100m Aquifer Concentration for CaseA All Nb-94 C_GA

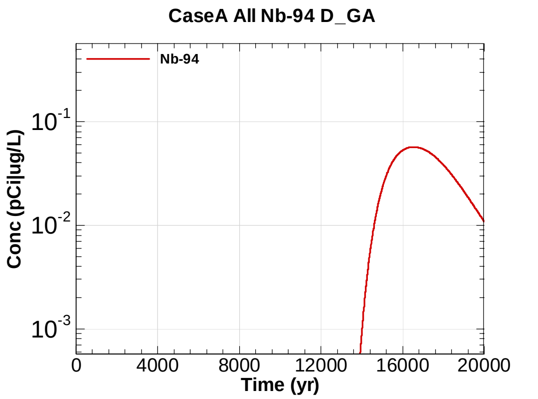

Figure B.3-209 - 100m Aquifer Concentration for CaseA All Nb-94 D_GA

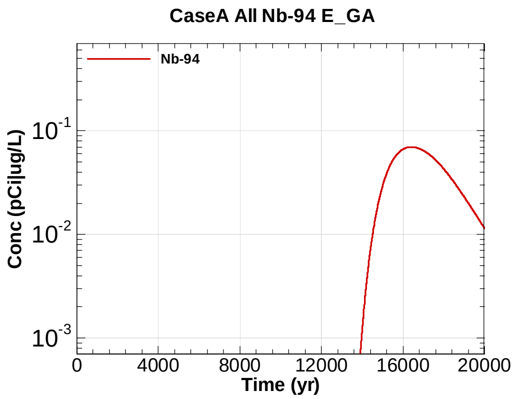

Figure B.3-210 - 100m Aquifer Concentration for CaseA All Nb-94 E_GA

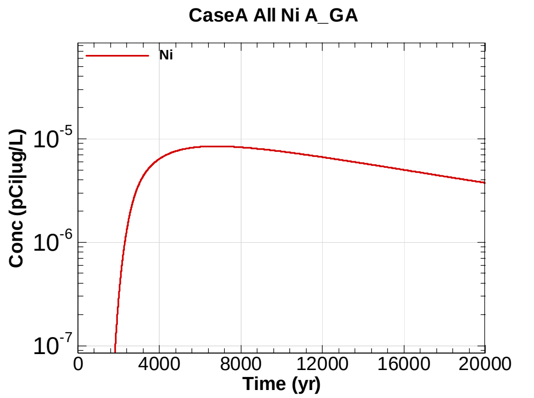

Figure B.3-211 - 100m Aquifer Concentration for CaseA All Ni A_GA

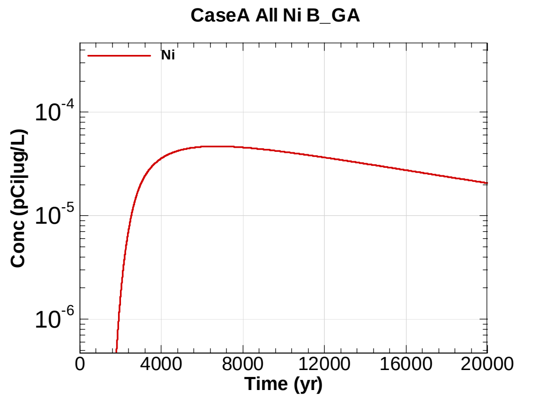

Figure B.3-212 - 100m Aquifer Concentration for CaseA All Ni B_GA

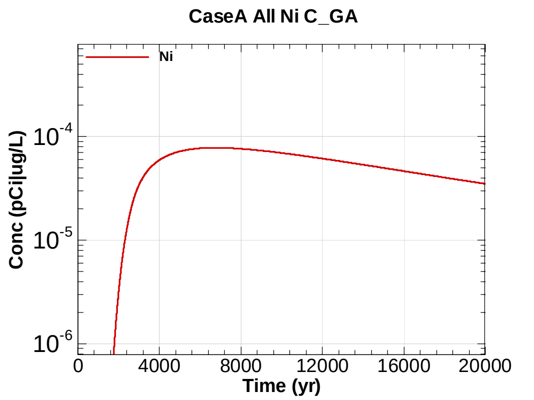

Figure B.3-213 - 100m Aquifer Concentration for CaseA All Ni C_GA

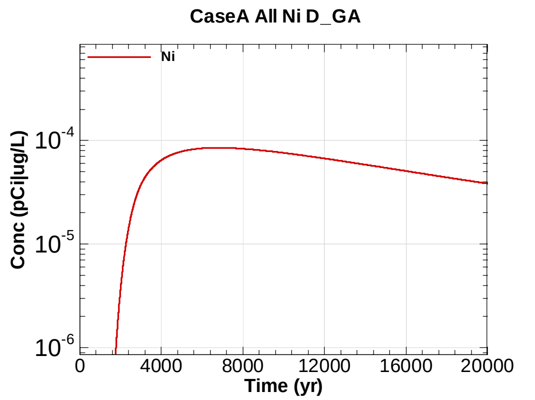

Figure B.3-214 - 100m Aquifer Concentration for CaseA All Ni D_GA

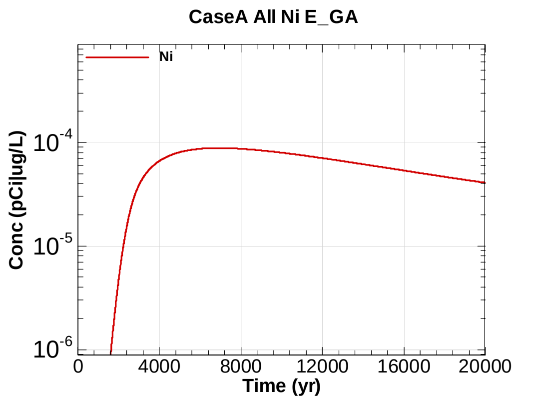

Figure B.3-215 - 100m Aquifer Concentration for CaseA All Ni E_GA

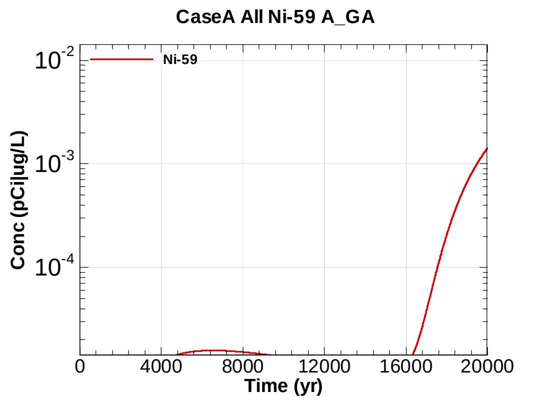

Figure B.3-216 - 100m Aquifer Concentration for CaseA All Ni-59 A_GA

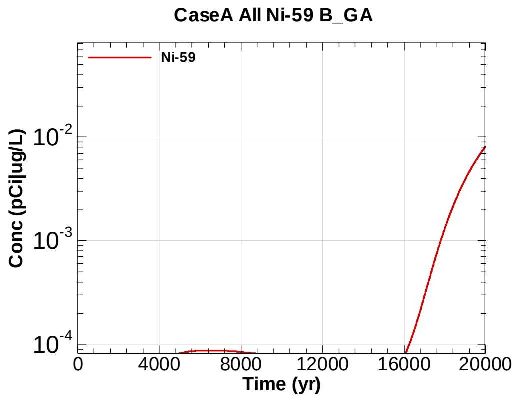

Figure B.3-217 - 100m Aquifer Concentration for CaseA All Ni-59 B_GA

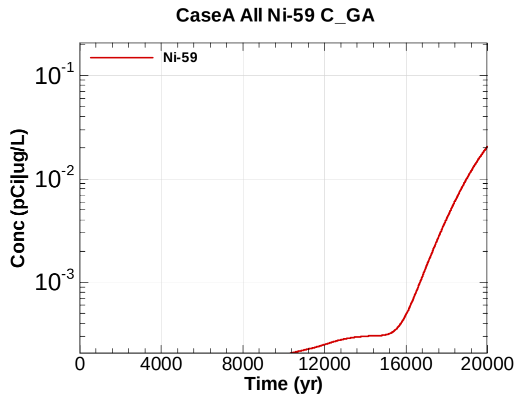

Figure B.3-218 - 100m Aquifer Concentration for CaseA All Ni-59 C_GA

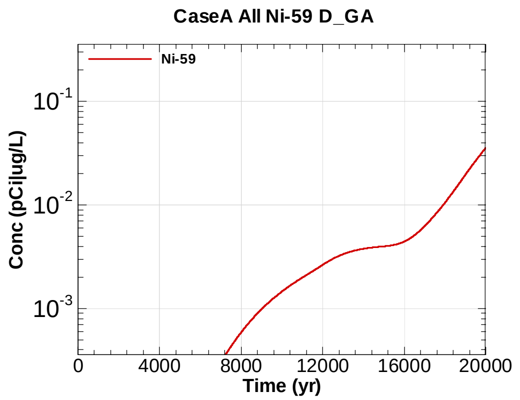

Figure B.3-219 - 100m Aquifer Concentration for CaseA All Ni-59 D_GA

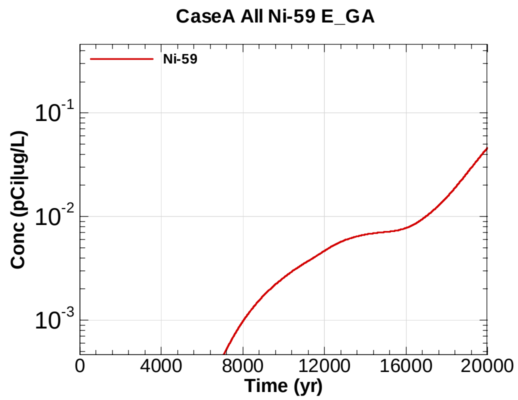

Figure B.3-220 - 100m Aquifer Concentration for CaseA All Ni-59 E_GA

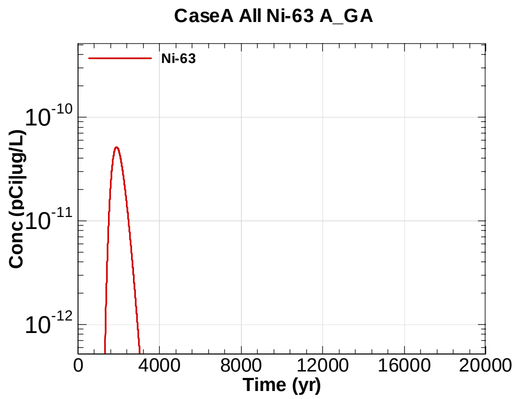

Figure B.3-221 - 100m Aquifer Concentration for CaseA All Ni-63 A_GA

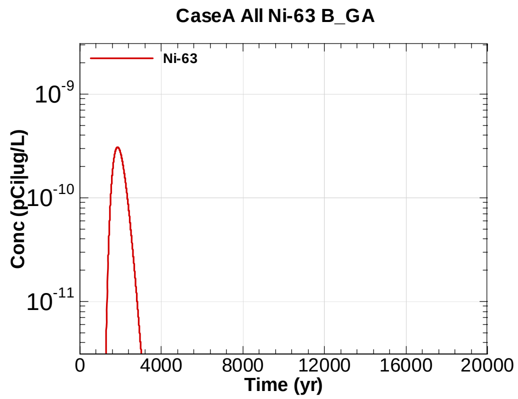

Figure B.3-222 - 100m Aquifer Concentration for CaseA All Ni-63 B_GA

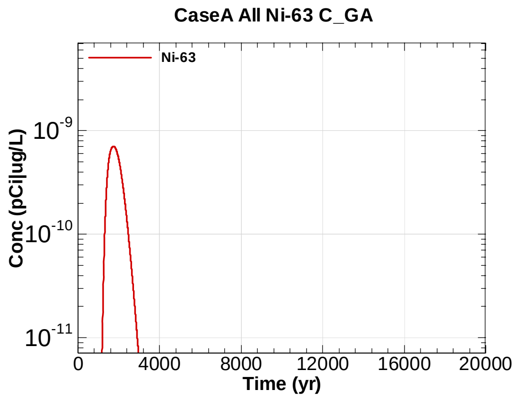

Figure B.3-223 - 100m Aquifer Concentration for CaseA All Ni-63 C_GA

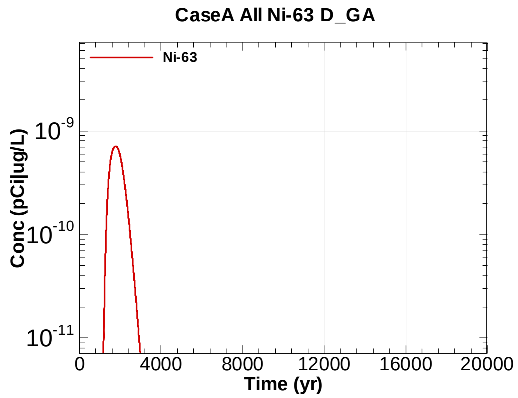

Figure B.3-224 - 100m Aquifer Concentration for CaseA All Ni-63 D_GA

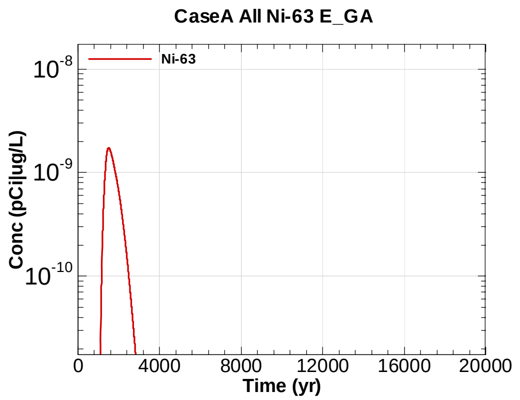

Figure B.3-225 - 100m Aquifer Concentration for CaseA All Ni-63 E_GA

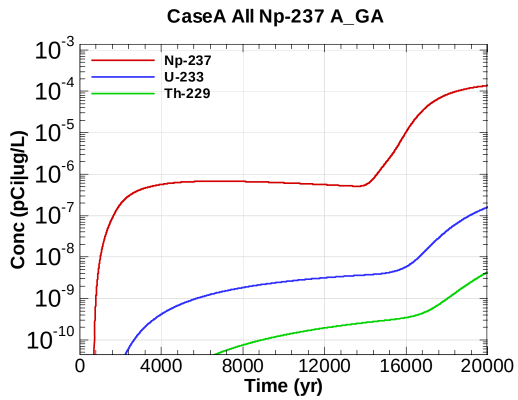

Figure B.3-226 - 100m Aquifer Concentration for CaseA All Np-237 A_GA

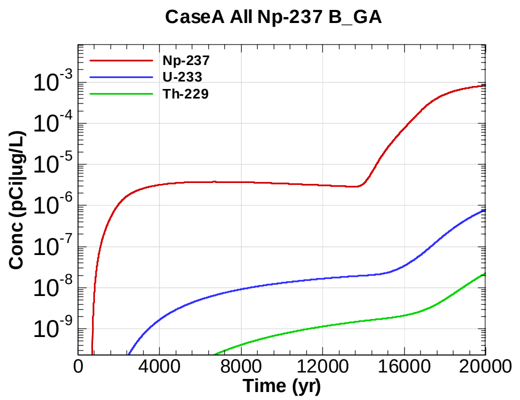

Figure B.3-227 - 100m Aquifer Concentration for CaseA All Np-237 B_GA

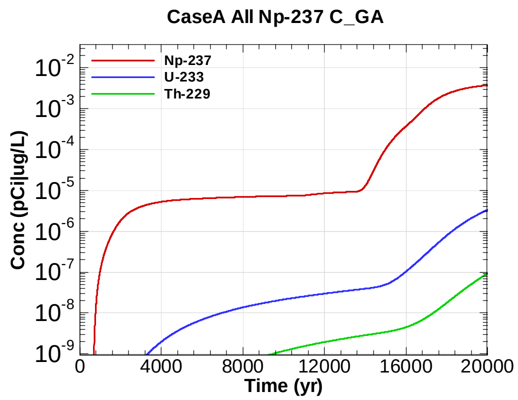

Figure B.3-228 - 100m Aquifer Concentration for CaseA All Np-237 C_GA

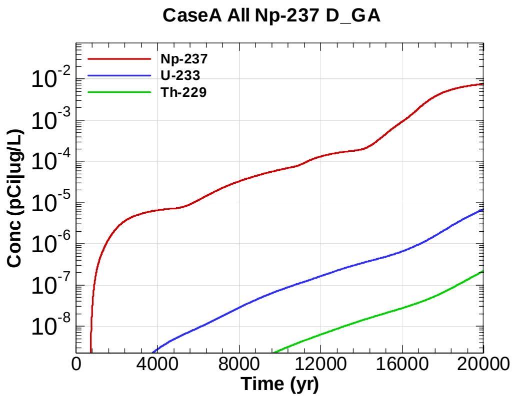

Figure B.3-229 - 100m Aquifer Concentration for CaseA All Np-237 D_GA

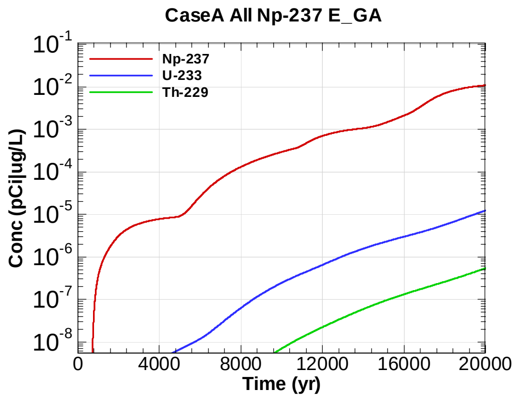

Figure B.3-230 - 100m Aquifer Concentration for CaseA All Np-237 E_GA

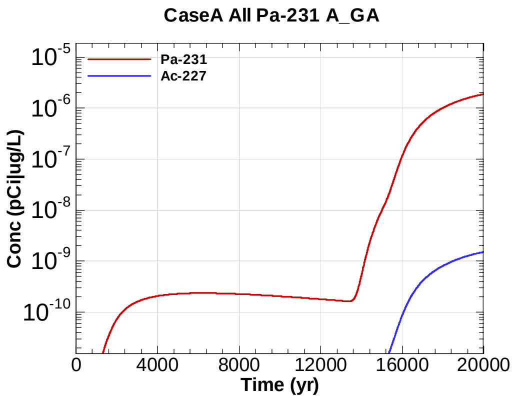

Figure B.3-231 - 100m Aquifer Concentration for CaseA All Pa-231 A_GA

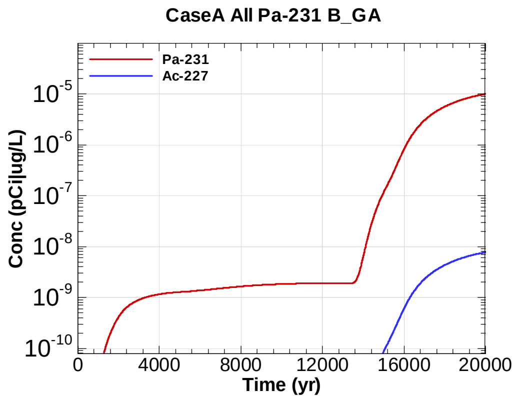

Figure B.3-232 - 100m Aquifer Concentration for CaseA All Pa-231 B_GA

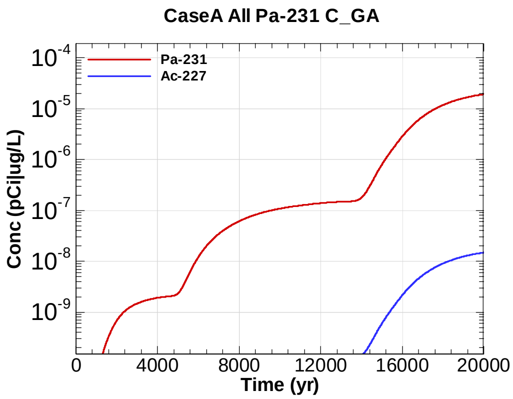

Figure B.3-233 - 100m Aquifer Concentration for CaseA All Pa-231 C_GA

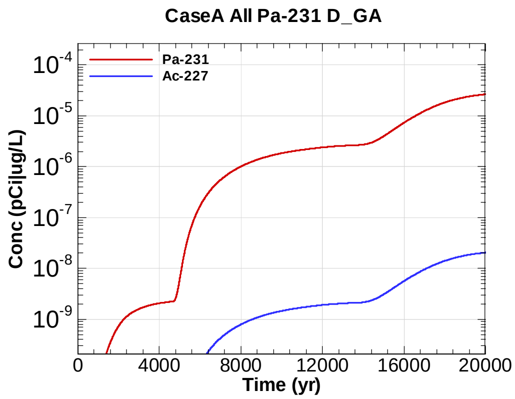

Figure B.3-234 - 100m Aquifer Concentration for CaseA All Pa-231 D_GA

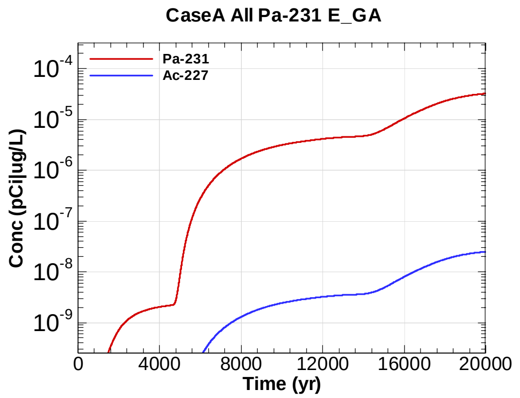

Figure B.3-235 - 100m Aquifer Concentration for CaseA All Pa-231 E_GA

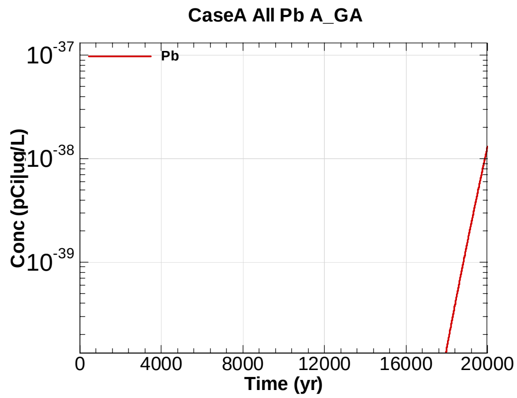

Figure B.3-236 - 100m Aquifer Concentration for CaseA All Pb A_GA

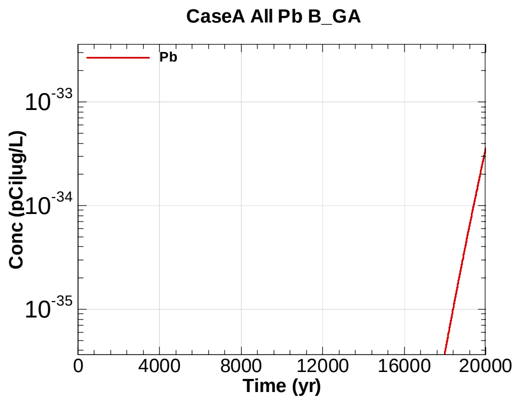

Figure B.3-237 - 100m Aquifer Concentration for CaseA All Pb B_GA

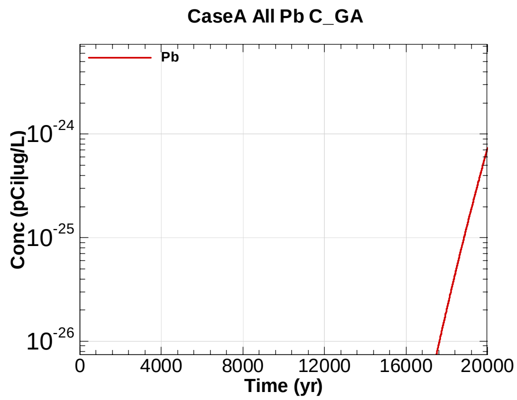

Figure B.3-238 - 100m Aquifer Concentration for CaseA All Pb C_GA

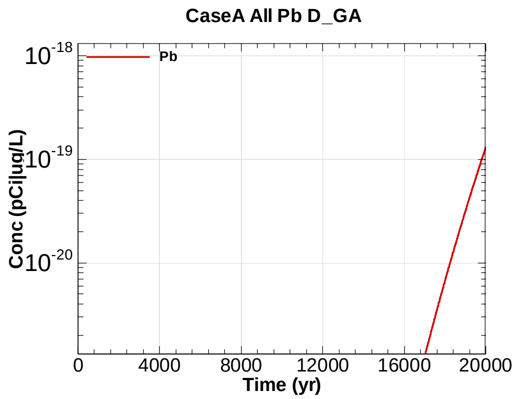

Figure B.3-239 - 100m Aquifer Concentration for CaseA All Pb D_GA

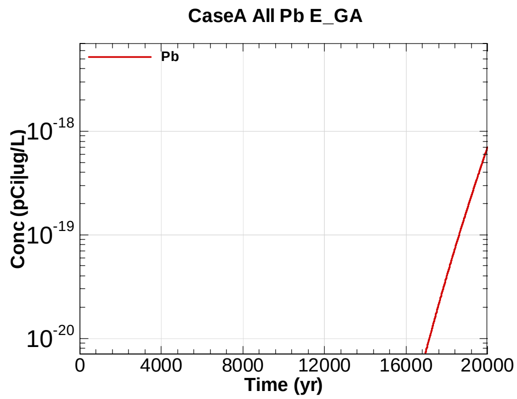

Figure B.3-240 - 100m Aquifer Concentration for CaseA All Pb E_GA

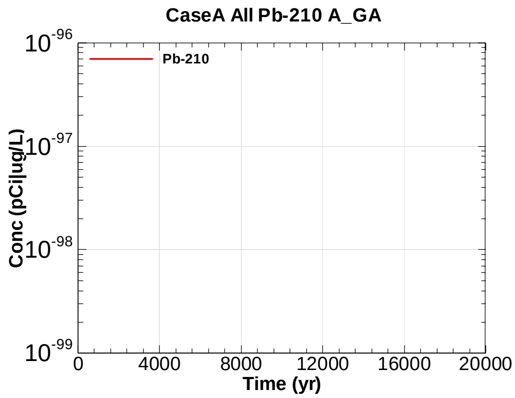

Figure B.3-241 - 100m Aquifer Concentration for CaseA All Pb-210 A_GA

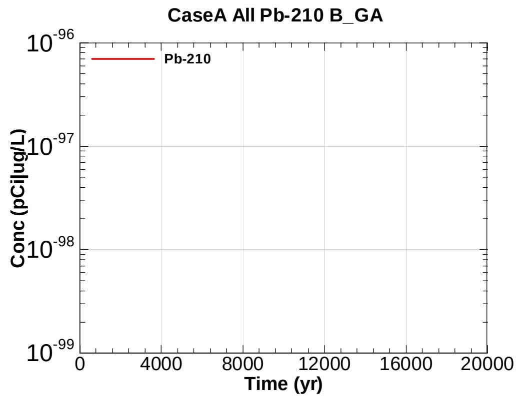

Figure B.3-242 - 100m Aquifer Concentration for CaseA All Pb-210 B_GA

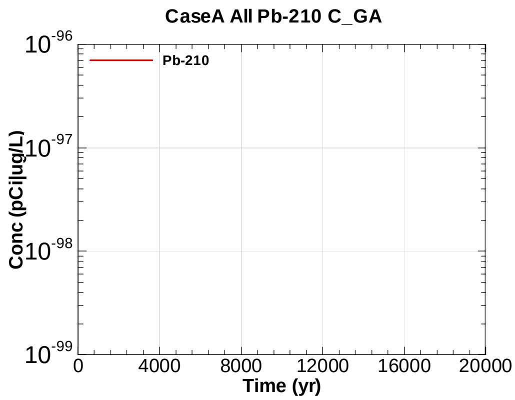

Figure B.3-243 - 100m Aquifer Concentration for CaseA All Pb-210 C_GA

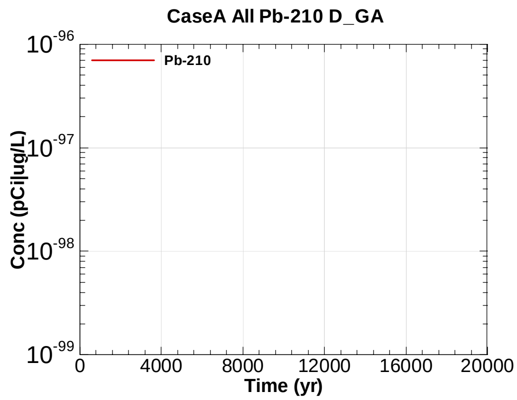

Figure B.3-244 - 100m Aquifer Concentration for CaseA All Pb-210 D_GA

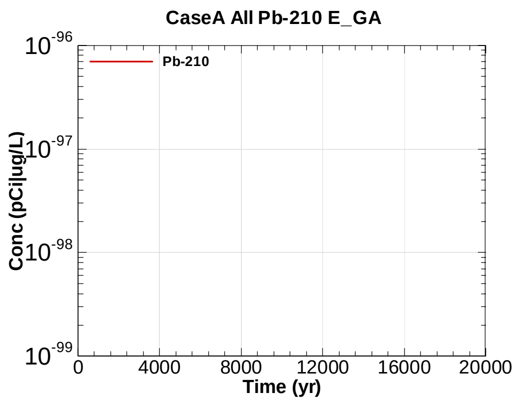

Figure B.3-245 - 100m Aquifer Concentration for CaseA All Pb-210 E_GA

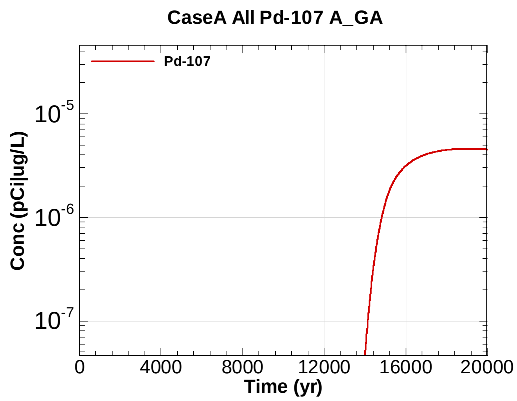

Figure B.3-246 - 100m Aquifer Concentration for CaseA All Pd-107 A_GA

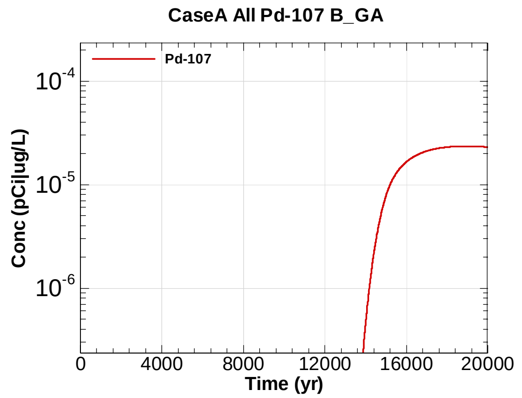

Figure B.3-247 - 100m Aquifer Concentration for CaseA All Pd-107 B_GA

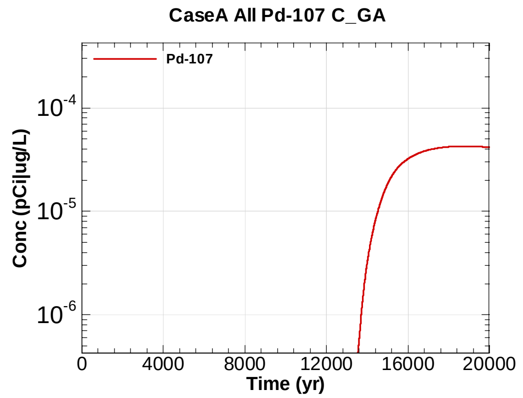

Figure B.3-248 - 100m Aquifer Concentration for CaseA All Pd-107 C_GA

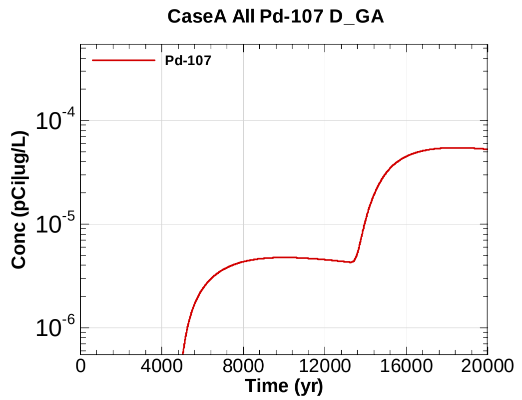

Figure B.3-249 - 100m Aquifer Concentration for CaseA All Pd-107 D_GA

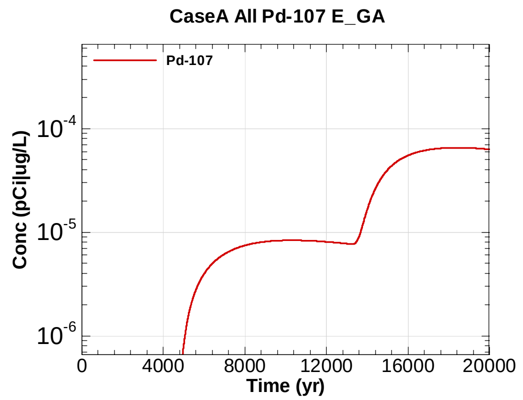

Figure B.3-250 - 100m Aquifer Concentration for CaseA All Pd-107 E_GA

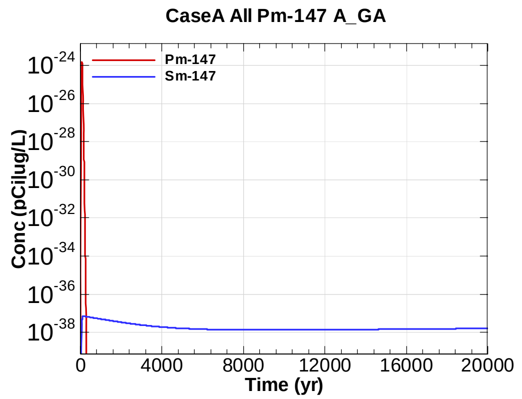

Figure B.3-251 - 100m Aquifer Concentration for CaseA All Pm-147 A_GA

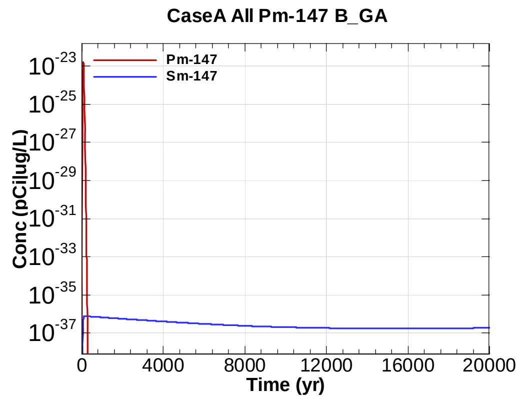

Figure B.3-252 - 100m Aquifer Concentration for CaseA All Pm-147 B_GA

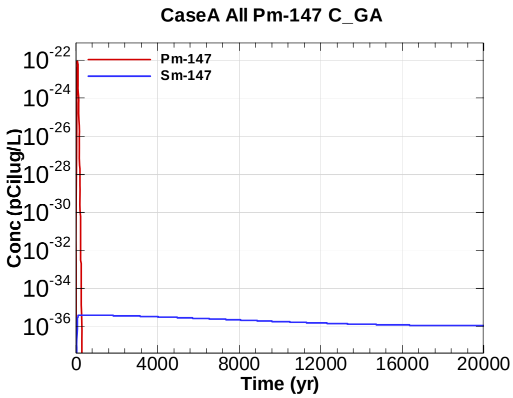

Figure B.3-253 - 100m Aquifer Concentration for CaseA All Pm-147 C_GA

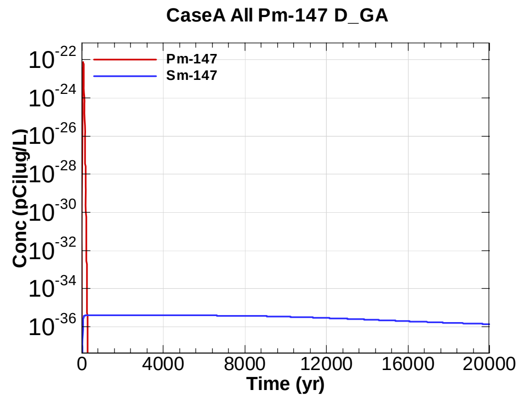

Figure B.3-254 - 100m Aquifer Concentration for CaseA All Pm-147 D_GA

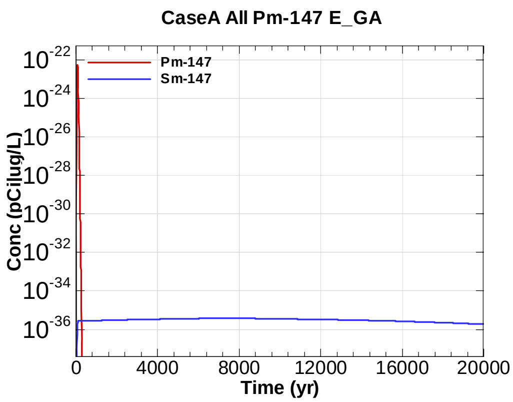

Figure B.3-255 - 100m Aquifer Concentration for CaseA All Pm-147 E_GA

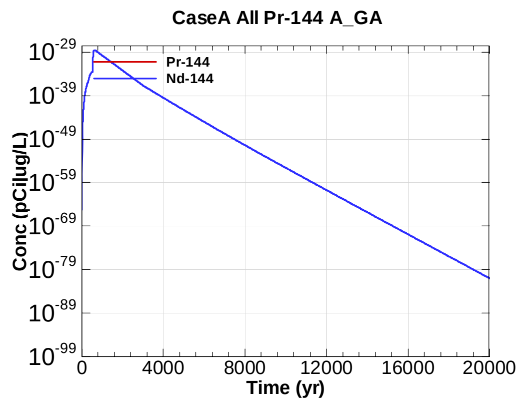

Figure B.3-256 - 100m Aquifer Concentration for CaseA All Pr-144 A_GA

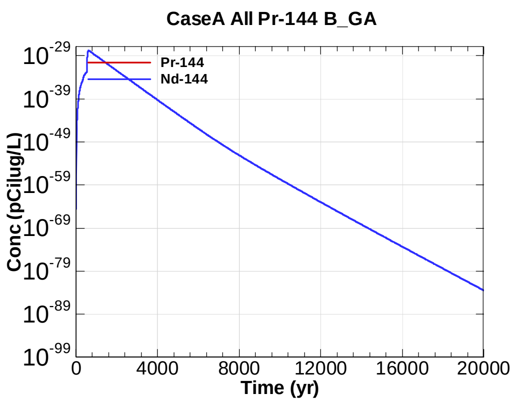

Figure B.3-257 - 100m Aquifer Concentration for CaseA All Pr-144 B_GA

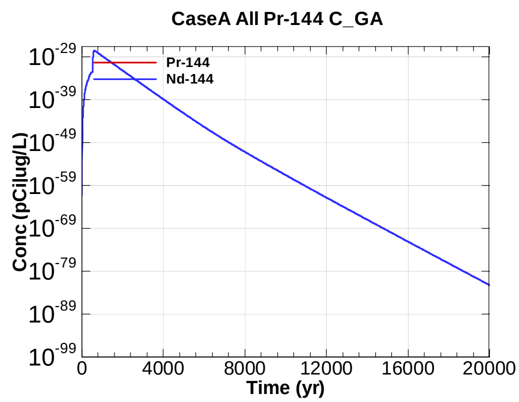

Figure B.3-258 - 100m Aquifer Concentration for CaseA All Pr-144 C_GA

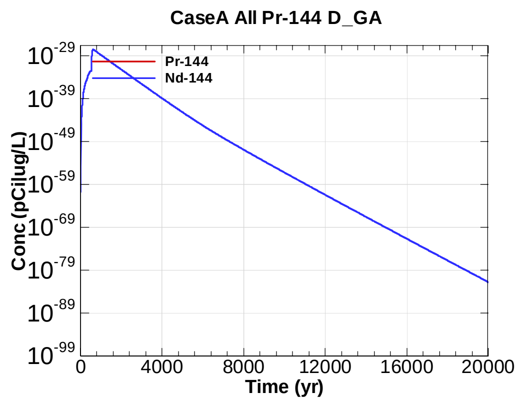

Figure B.3-259 - 100m Aquifer Concentration for CaseA All Pr-144 D_GA

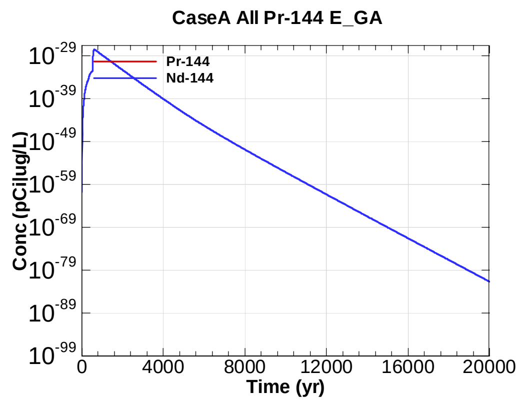

Figure B.3-260 - 100m Aquifer Concentration for CaseA All Pr-144 E_GA

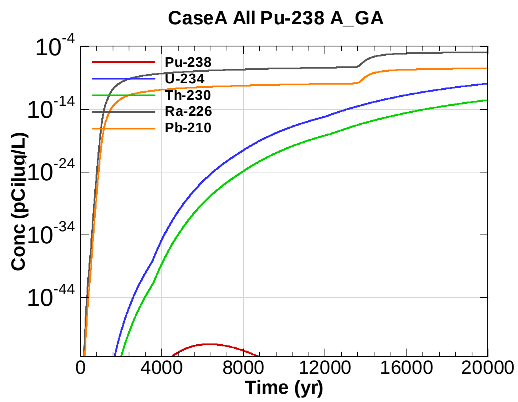

Figure B.3-261 - 100m Aquifer Concentration for CaseA All Pu-238 A_GA

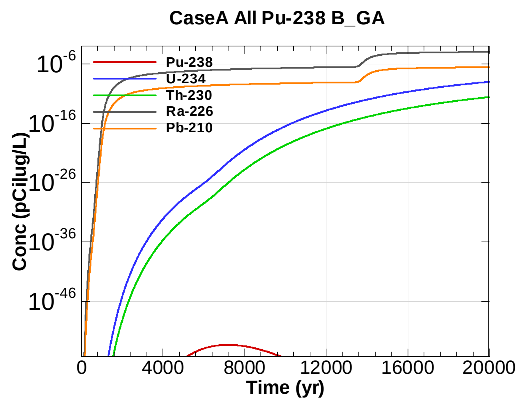

Figure B.3-262 - 100m Aquifer Concentration for CaseA All Pu-238 B_GA

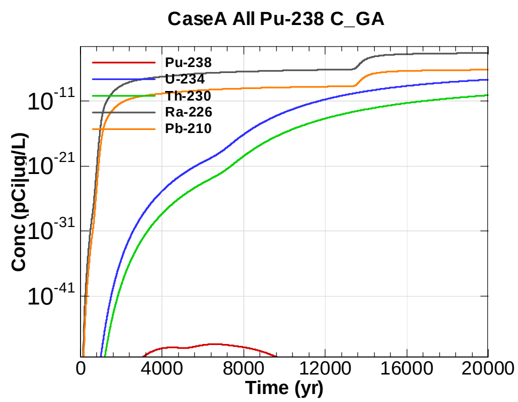

Figure B.3-263 - 100m Aquifer Concentration for CaseA All Pu-238 C_GA

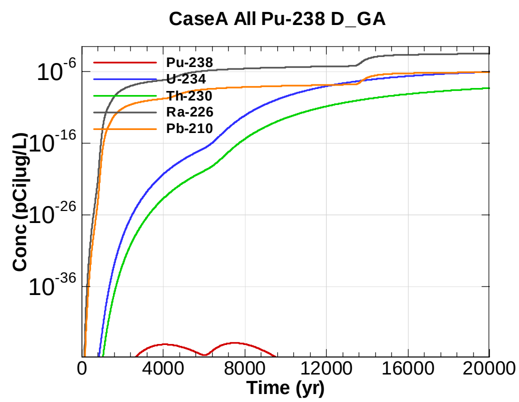

Figure B.3-264 - 100m Aquifer Concentration for CaseA All Pu-238 D_GA

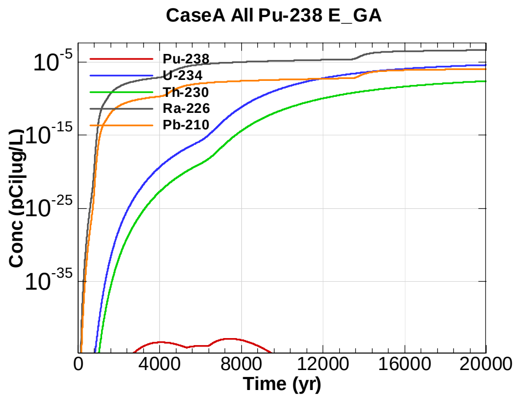

Figure B.3-265 - 100m Aquifer Concentration for CaseA All Pu-238 E_GA

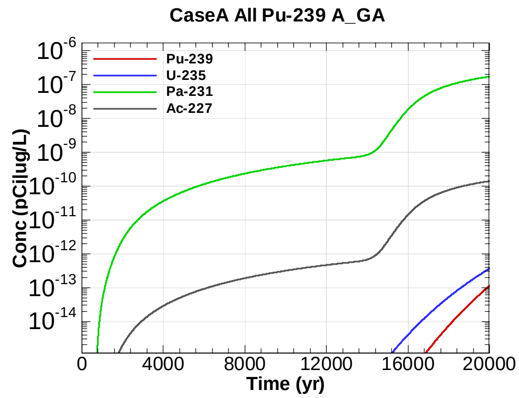

Figure B.3-266 - 100m Aquifer Concentration for CaseA All Pu-239 A_GA

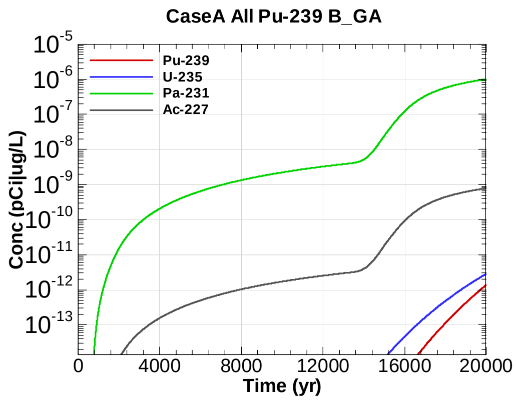

Figure B.3-267 - 100m Aquifer Concentration for CaseA All Pu-239 B_GA

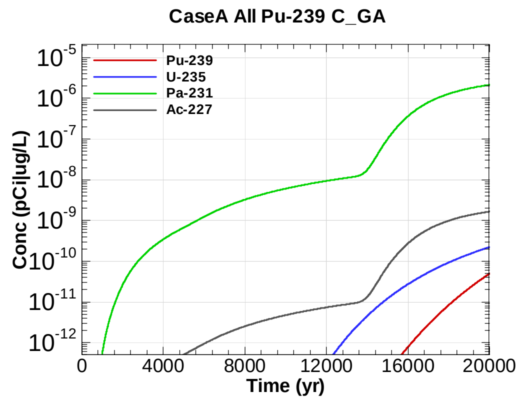

Figure B.3-268 - 100m Aquifer Concentration for CaseA All Pu-239 C_GA

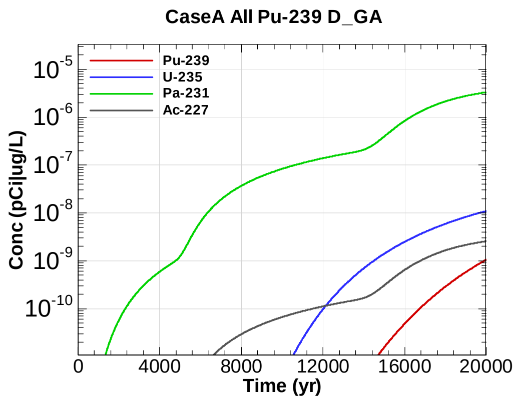

Figure B.3-269 - 100m Aquifer Concentration for CaseA All Pu-239 D_GA

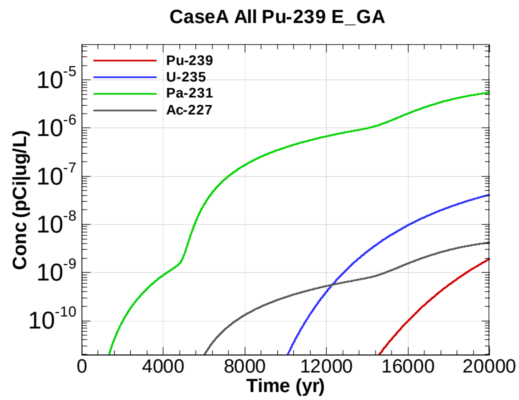

Figure B.3-270 - 100m Aquifer Concentration for CaseA All Pu-239 E_GA

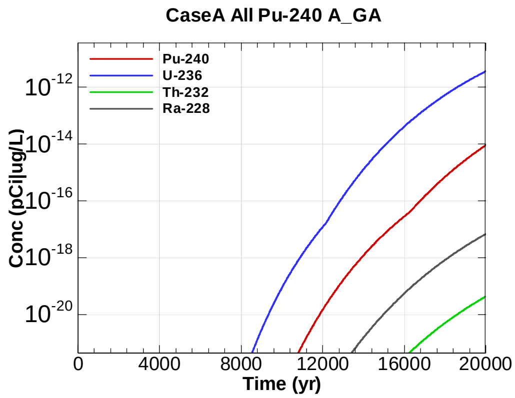

Figure B.3-271 - 100m Aquifer Concentration for CaseA All Pu-240 A_GA

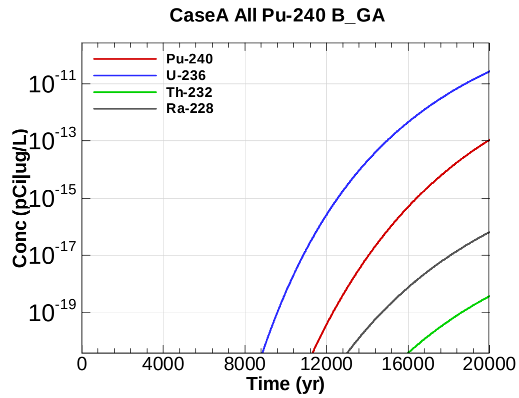

Figure B.3-272 - 100m Aquifer Concentration for CaseA All Pu-240 B_GA

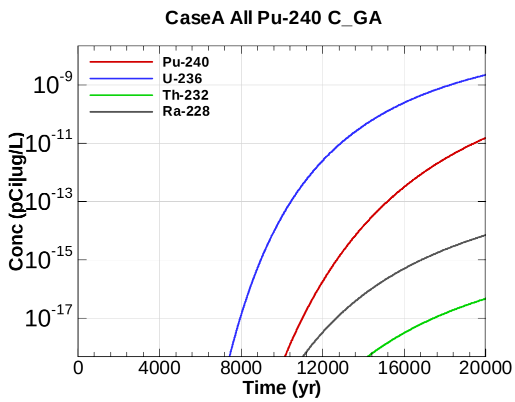

Figure B.3-273 - 100m Aquifer Concentration for CaseA All Pu-240 C_GA

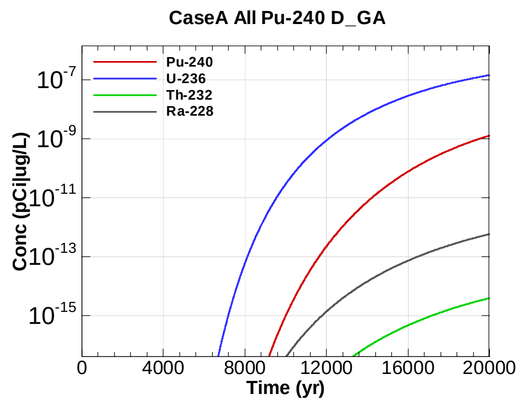

Figure B.3-274 - 100m Aquifer Concentration for CaseA All Pu-240 D_GA

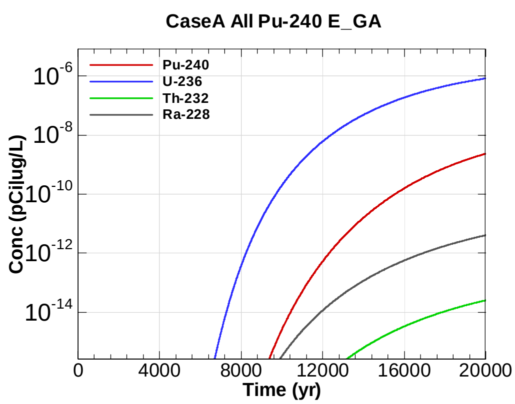

Figure B.3-275 - 100m Aquifer Concentration for CaseA All Pu-240 E_GA

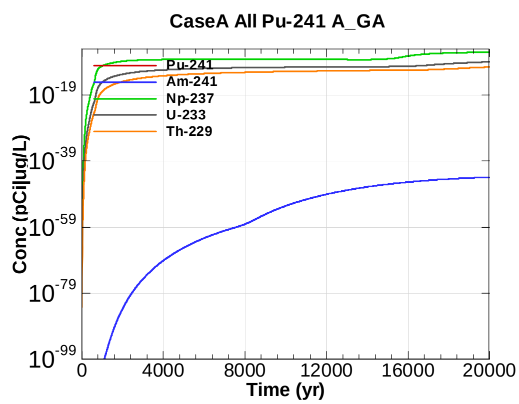

Figure B.3-276 - 100m Aquifer Concentration for CaseA All Pu-241 A_GA

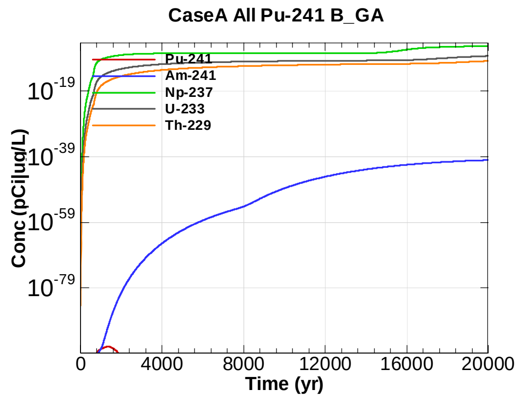

Figure B.3-277 - 100m Aquifer Concentration for CaseA All Pu-241 B_GA

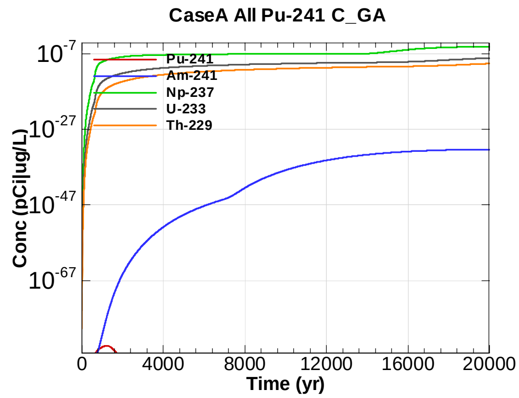

Figure B.3-278 - 100m Aquifer Concentration for CaseA All Pu-241 C_GA

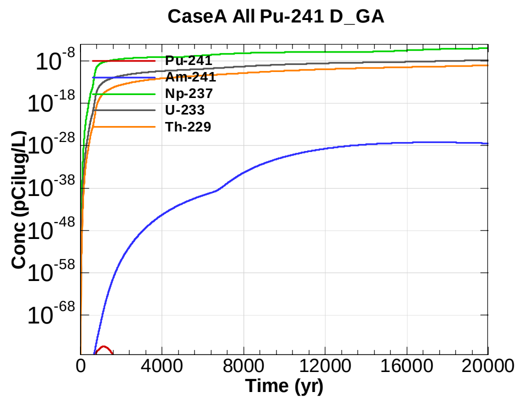

Figure B.3-279 - 100m Aquifer Concentration for CaseA All Pu-241 D_GA

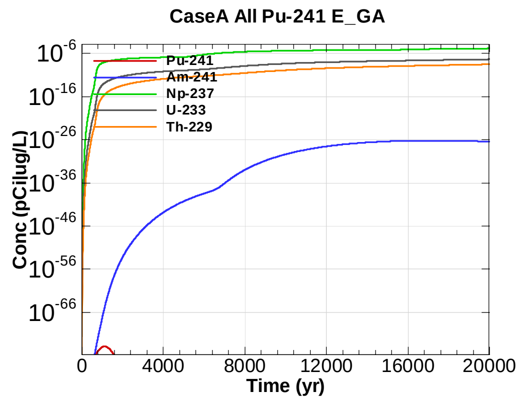

Figure B.3-280 - 100m Aquifer Concentration for CaseA All Pu-241 E_GA

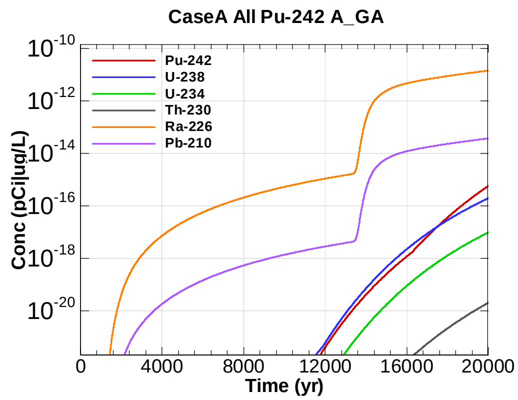

Figure B.3-281 - 100m Aquifer Concentration for CaseA All Pu-242 A_GA

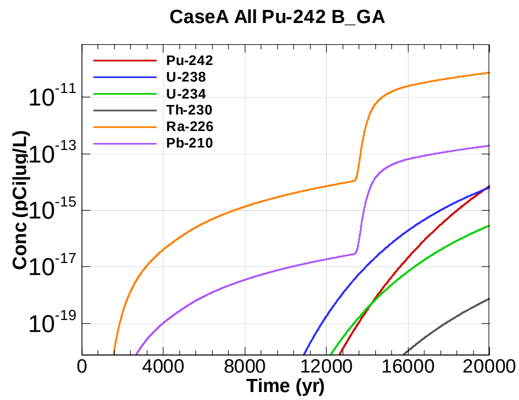

Figure B.3-282 - 100m Aquifer Concentration for CaseA All Pu-242 B_GA

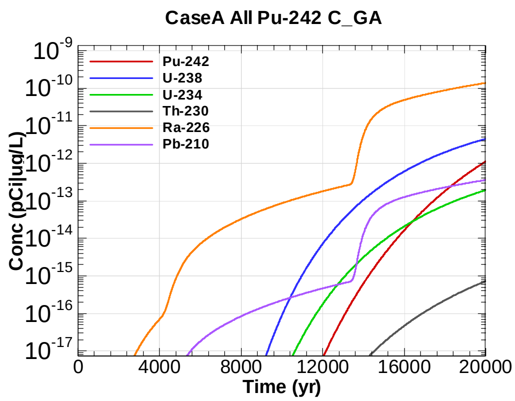

Figure B.3-283 - 100m Aquifer Concentration for CaseA All Pu-242 C_GA

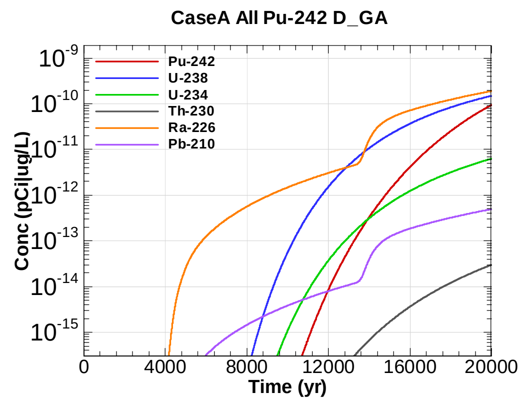

Figure B.3-284 - 100m Aquifer Concentration for CaseA All Pu-242 D_GA

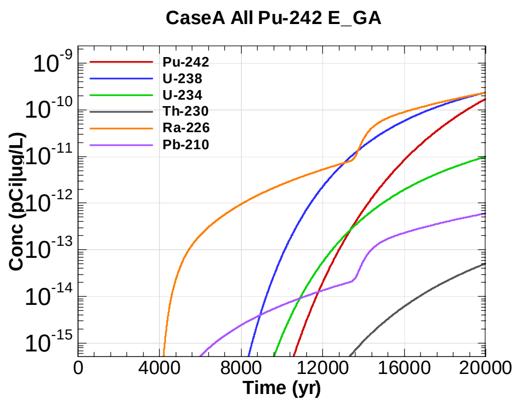

Figure B.3-285 - 100m Aquifer Concentration for CaseA All Pu-242 E_GA

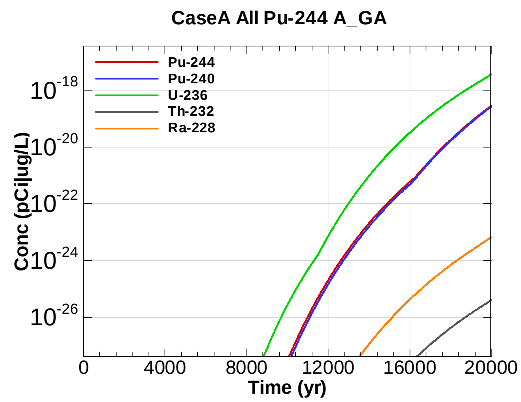

Figure B.3-286 - 100m Aquifer Concentration for CaseA All Pu-244 A_GA

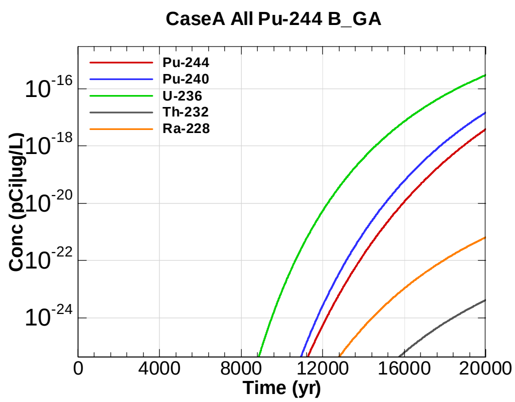

Figure B.3-287 - 100m Aquifer Concentration for CaseA All Pu-244 B_GA

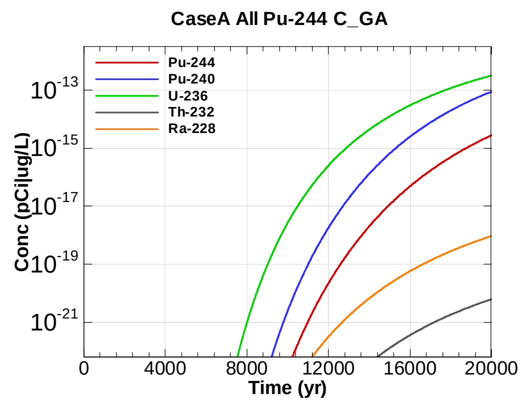

Figure B.3-288 - 100m Aquifer Concentration for CaseA All Pu-244 C_GA

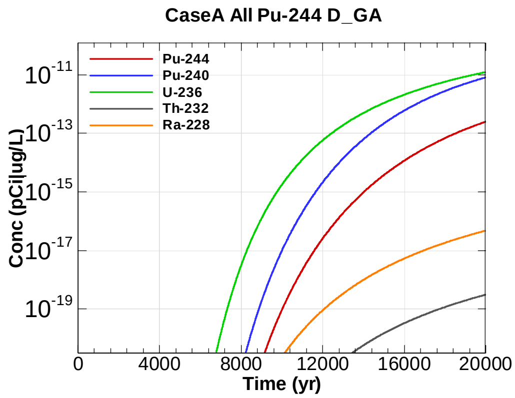

Figure B.3-289 - 100m Aquifer Concentration for CaseA All Pu-244 D_GA

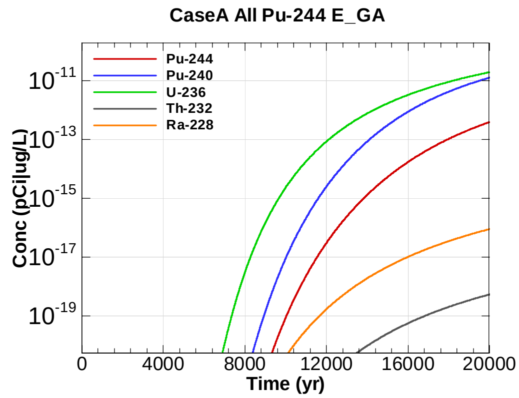

Figure B.3-290 - 100m Aquifer Concentration for CaseA All Pu-244 E_GA

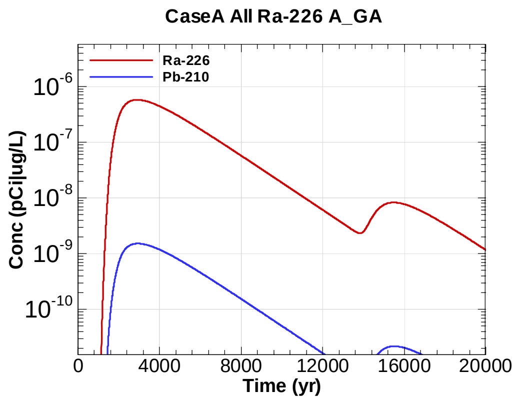

Figure B.3-291 - 100m Aquifer Concentration for CaseA All Ra-226 A_GA

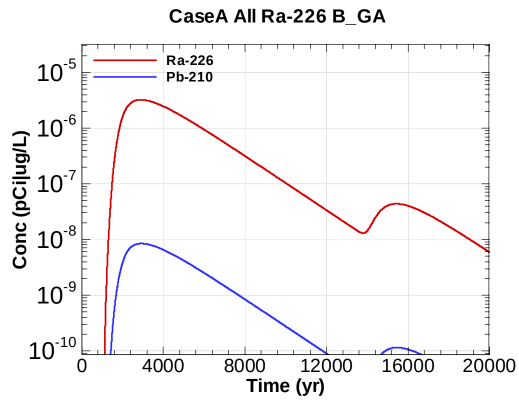

Figure B.3-292 - 100m Aquifer Concentration for CaseA All Ra-226 B_GA

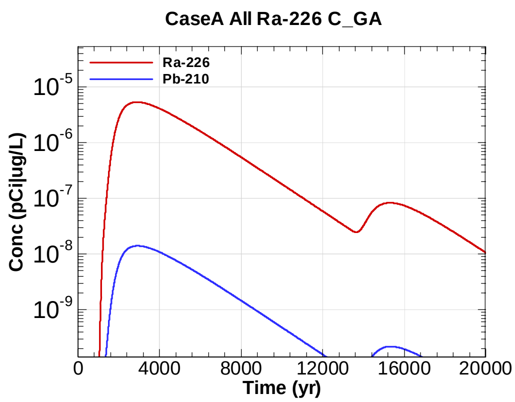

Figure B.3-293 - 100m Aquifer Concentration for CaseA All Ra-226 C_GA

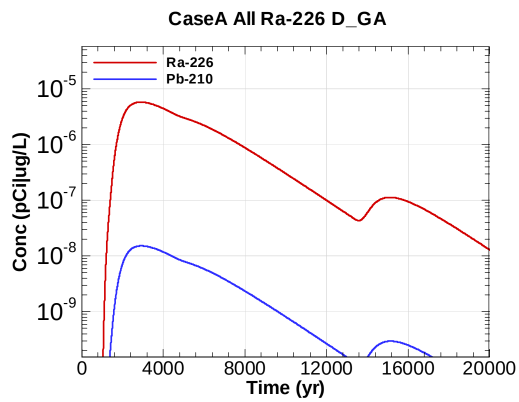

Figure B.3-294 - 100m Aquifer Concentration for CaseA All Ra-226 D_GA

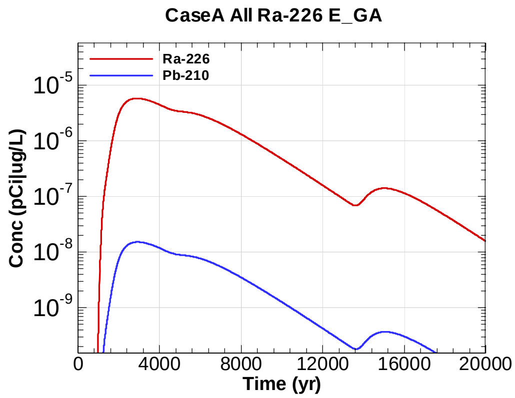

Figure B.3-295 - 100m Aquifer Concentration for CaseA All Ra-226 E_GA

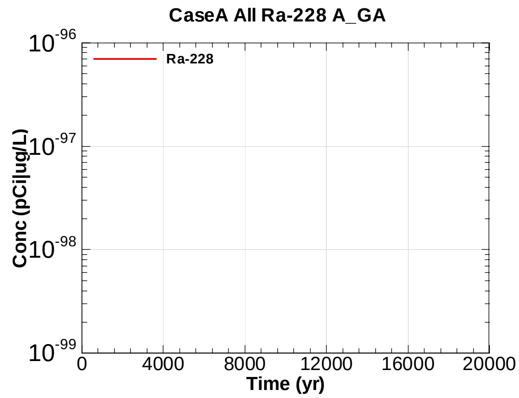

Figure B.3-296 - 100m Aquifer Concentration for CaseA All Ra-228 A_GA

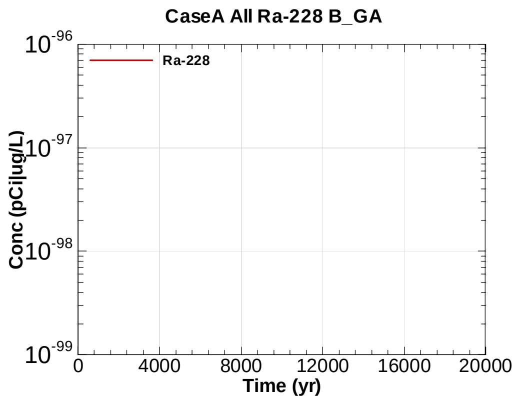

Figure B.3-297 - 100m Aquifer Concentration for CaseA All Ra-228 B_GA

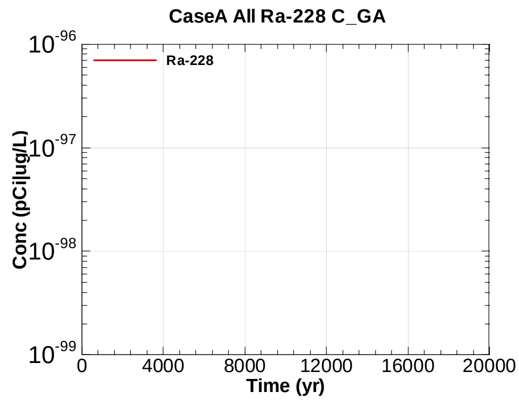

Figure B.3-298 - 100m Aquifer Concentration for CaseA All Ra-228 C_GA

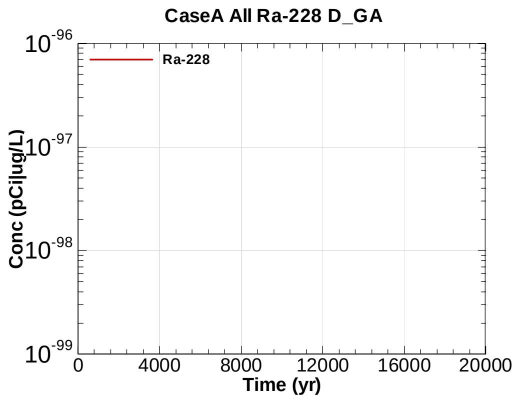

Figure B.3-299 - 100m Aquifer Concentration for CaseA All Ra-228 D_GA

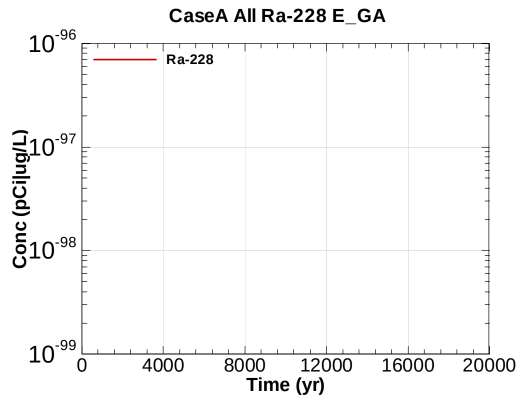

Figure B.3-300 - 100m Aquifer Concentration for CaseA All Ra-228 E_GA

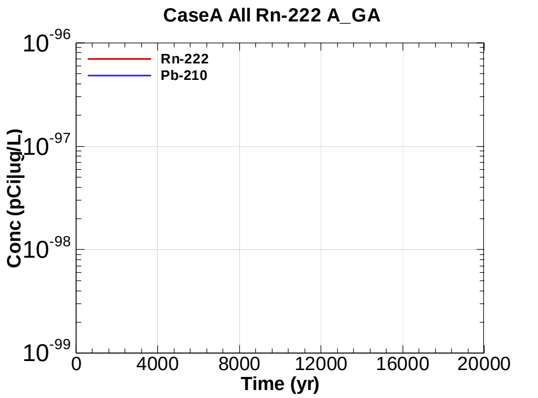

Figure B.3-301 - 100m Aquifer Concentration for CaseA All Rn-222 A_GA

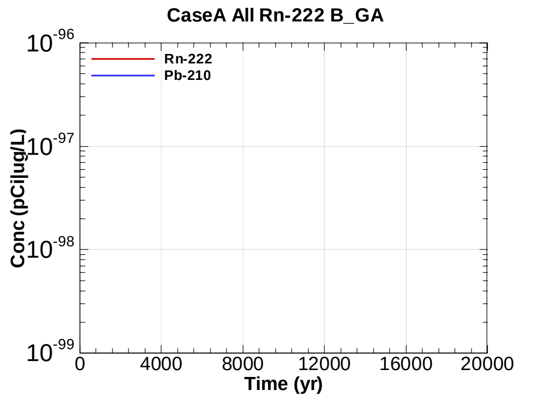

Figure B.3-302 - 100m Aquifer Concentration for CaseA All Rn-222 B_GA

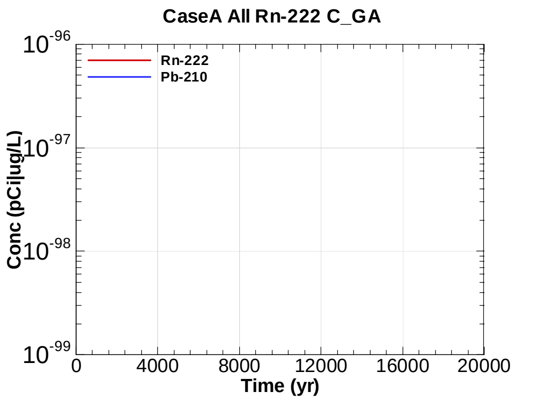

Figure B.3-303 - 100m Aquifer Concentration for CaseA All Rn-222 C_GA

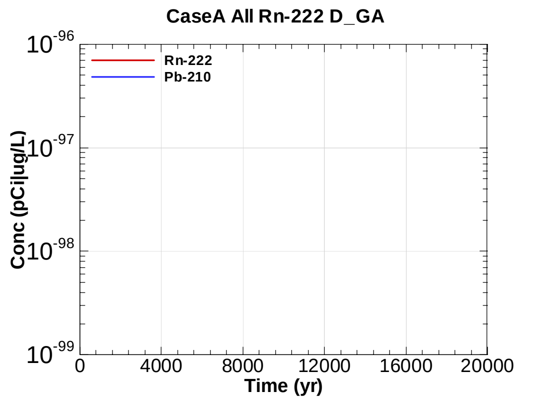

Figure B.3-304 - 100m Aquifer Concentration for CaseA All Rn-222 D_GA

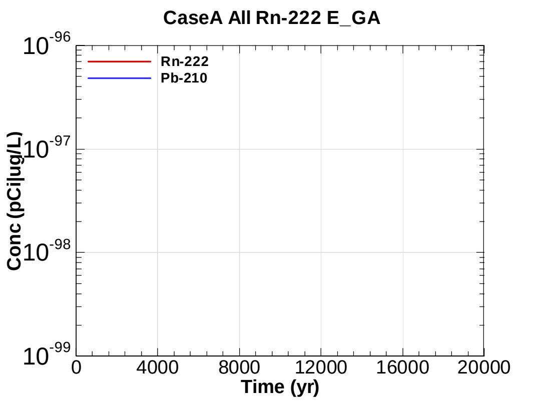

Figure B.3-305 - 100m Aquifer Concentration for CaseA All Rn-222 E_GA

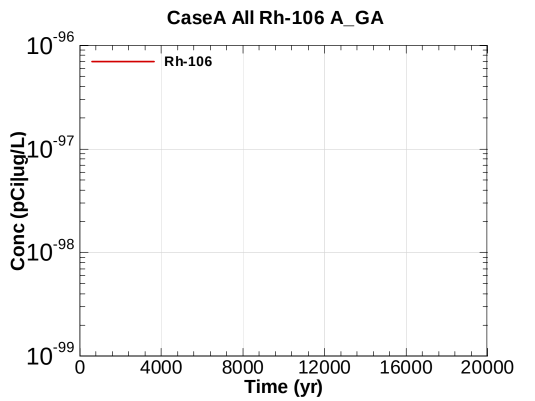

Figure B.3-306 - 100m Aquifer Concentration for CaseA All Rh-106 A_GA

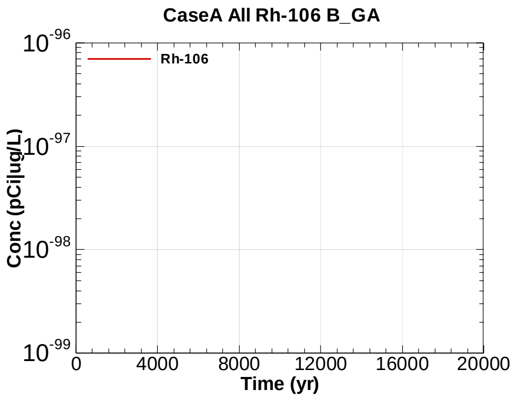

Figure B.3-307 - 100m Aquifer Concentration for CaseA All Rh-106 B_GA

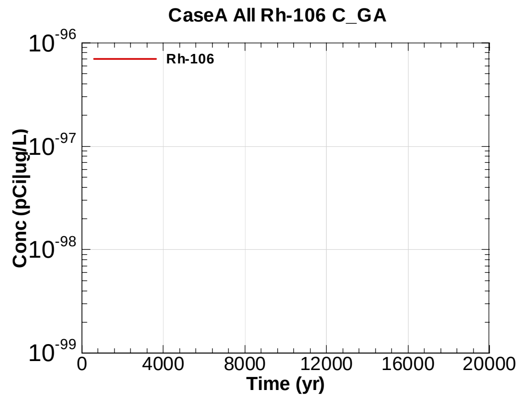

Figure B.3-308 - 100m Aquifer Concentration for CaseA All Rh-106 C_GA

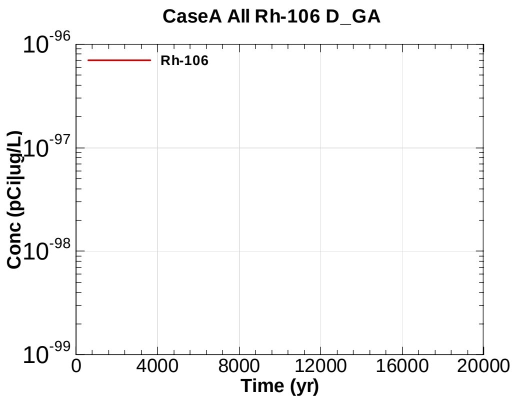

Figure B.3-309 - 100m Aquifer Concentration for CaseA All Rh-106 D_GA

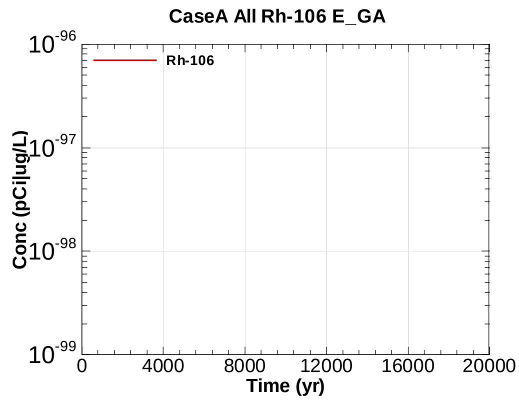

Figure B.3-310 - 100m Aquifer Concentration for CaseA All Rh-106 E_GA

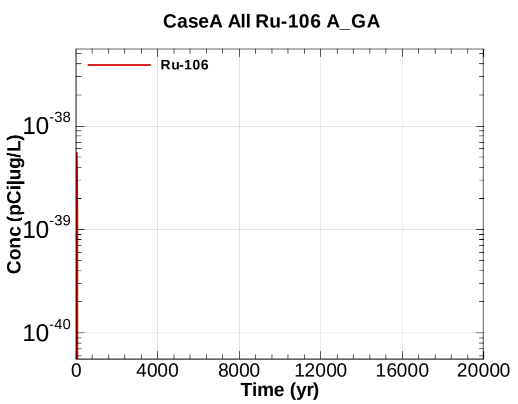

Figure B.3-311 - 100m Aquifer Concentration for CaseA All Ru-106 A_GA

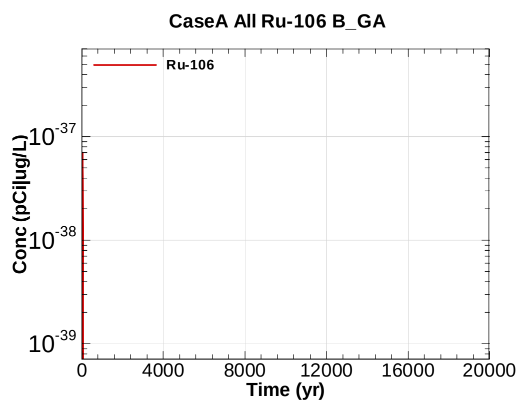

Figure B.3-312 - 100m Aquifer Concentration for CaseA All Ru-106 B_GA

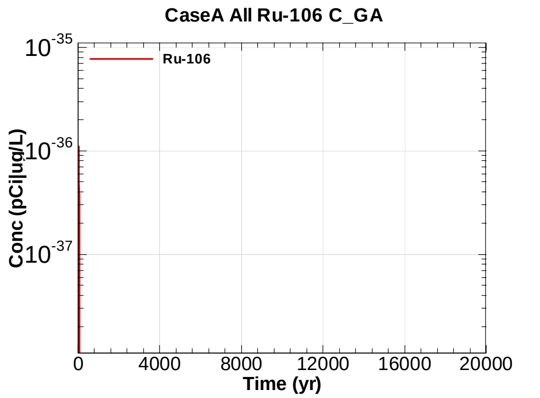

Figure B.3-313 - 100m Aquifer Concentration for CaseA All Ru-106 C_GA

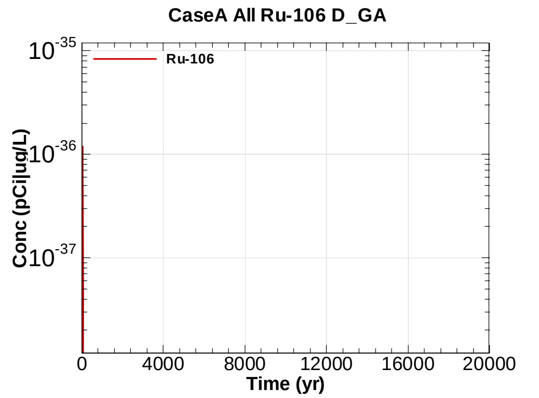

Figure B.3-314 - 100m Aquifer Concentration for CaseA All Ru-106 D_GA

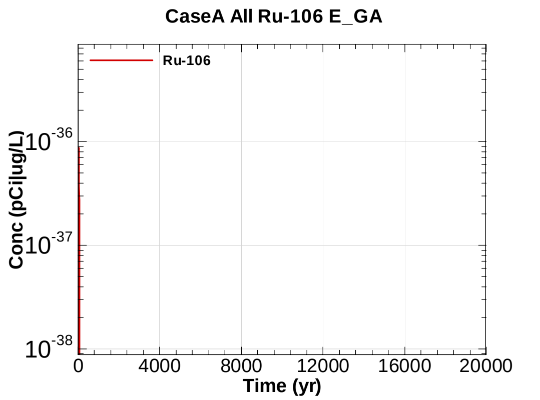

Figure B.3-315 - 100m Aquifer Concentration for CaseA All Ru-106 E_GA

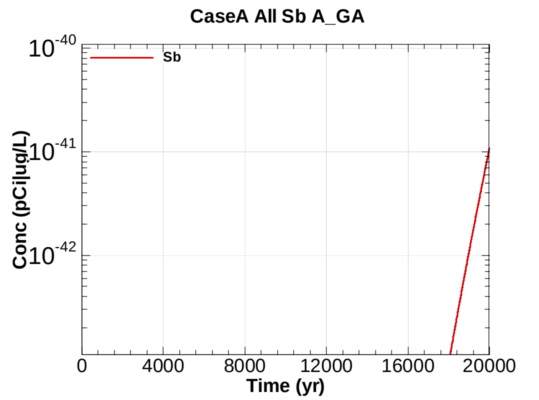

Figure B.3-316 - 100m Aquifer Concentration for CaseA All Sb A_GA

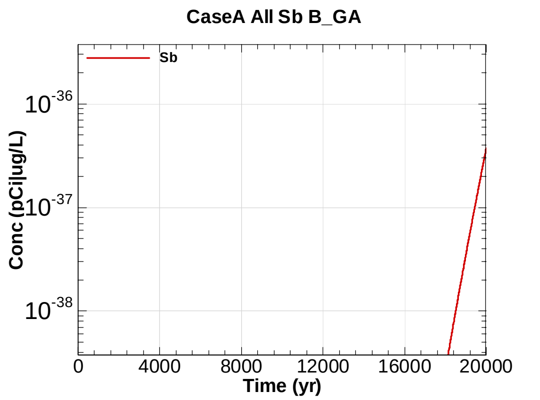

Figure B.3-317 - 100m Aquifer Concentration for CaseA All Sb B_GA

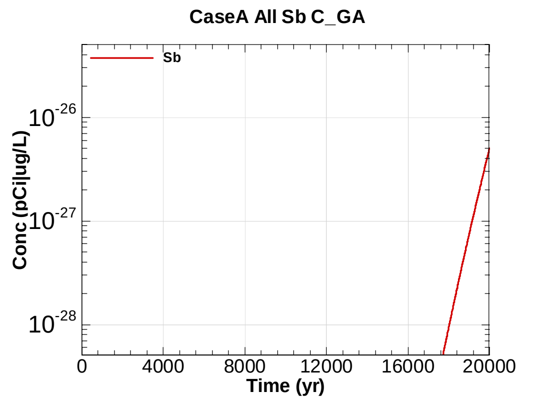

Figure B.3-318 - 100m Aquifer Concentration for CaseA All Sb C_GA

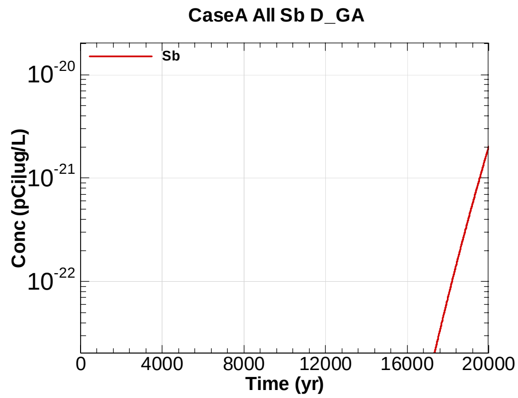

Figure B.3-319 - 100m Aquifer Concentration for CaseA All Sb D_GA

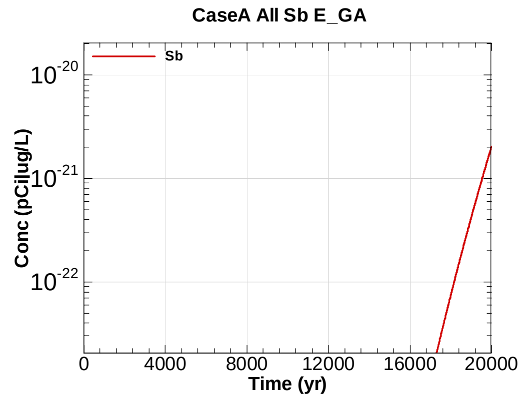

Figure B.3-320 - 100m Aquifer Concentration for CaseA All Sb E_GA

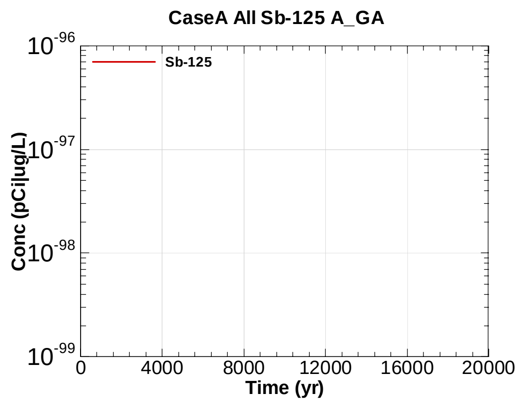

Figure B.3-321 - 100m Aquifer Concentration for CaseA All Sb-125 A_GA

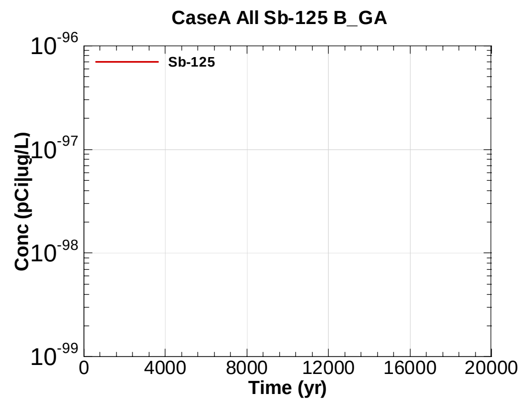

Figure B.3-322 - 100m Aquifer Concentration for CaseA All Sb-125 B_GA

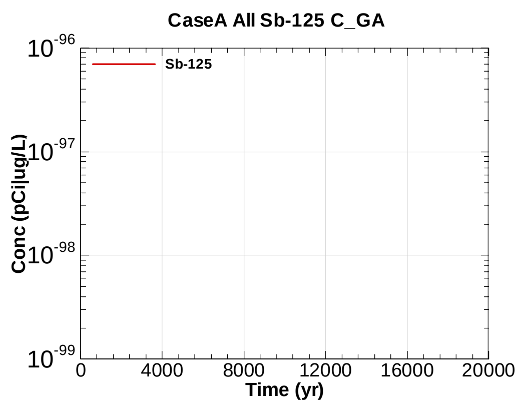

Figure B.3-323 - 100m Aquifer Concentration for CaseA All Sb-125 C_GA

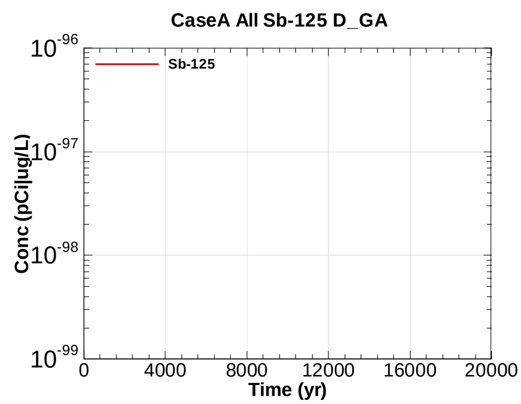

Figure B.3-324 - 100m Aquifer Concentration for CaseA All Sb-125 D_GA

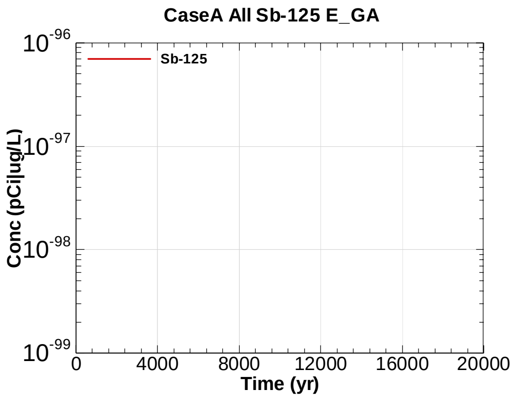

Figure B.3-325 - 100m Aquifer Concentration for CaseA All Sb-125 E_GA

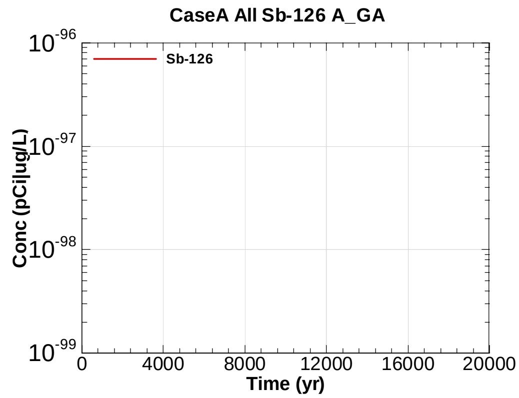

Figure B.3-326 - 100m Aquifer Concentration for CaseA All Sb-126 A_GA

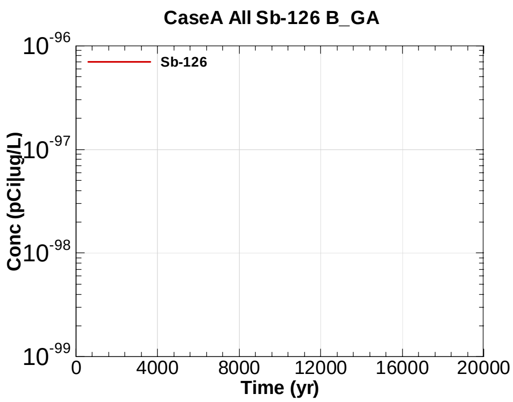

Figure B.3-327 - 100m Aquifer Concentration for CaseA All Sb-126 B_GA

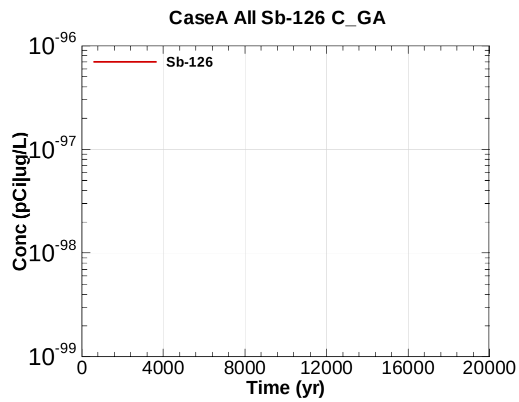

Figure B.3-328 - 100m Aquifer Concentration for CaseA All Sb-126 C_GA

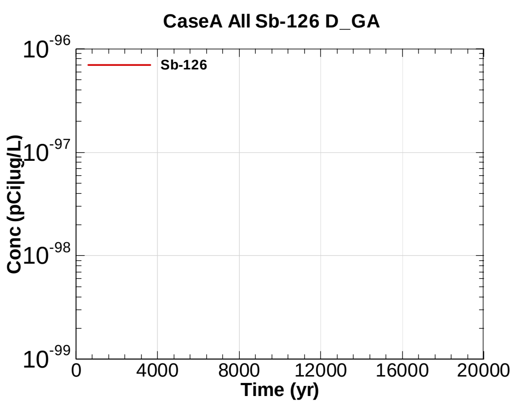

Figure B.3-329 - 100m Aquifer Concentration for CaseA All Sb-126 D_GA

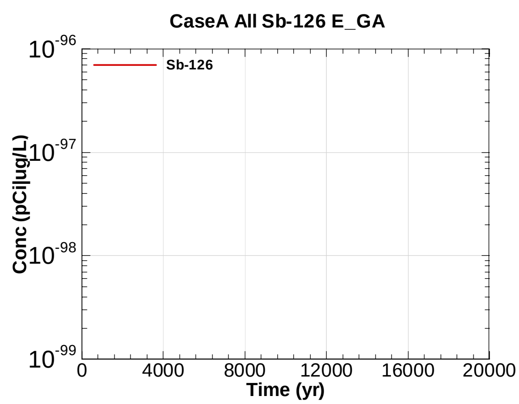

Figure B.3-330 - 100m Aquifer Concentration for CaseA All Sb-126 E_GA

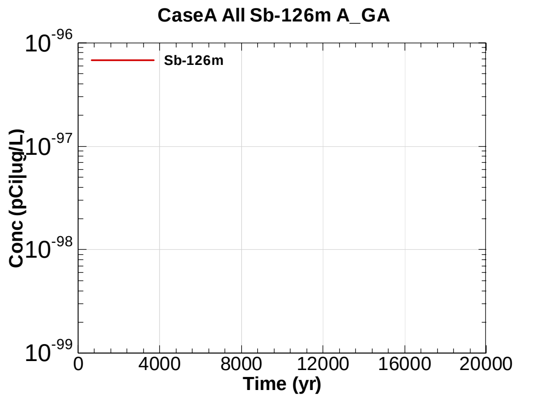

Figure B.3-331 - 100m Aquifer Concentration for CaseA All Sb-126m A_GA

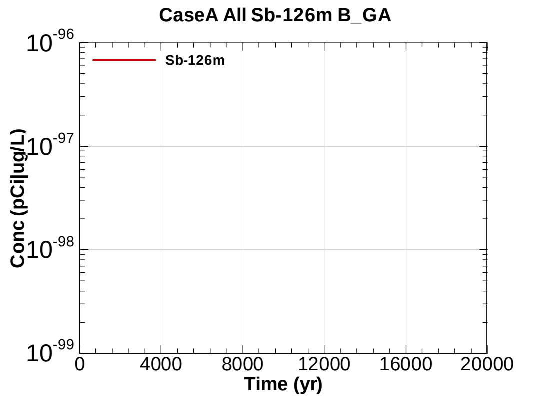

Figure B.3-332 - 100m Aquifer Concentration for CaseA All Sb-126m B_GA

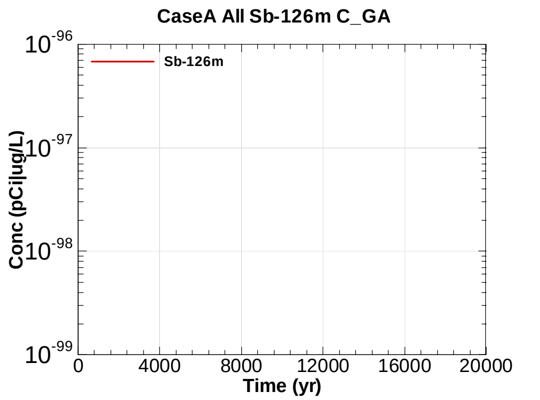

Figure B.3-333 - 100m Aquifer Concentration for CaseA All Sb-126m C_GA

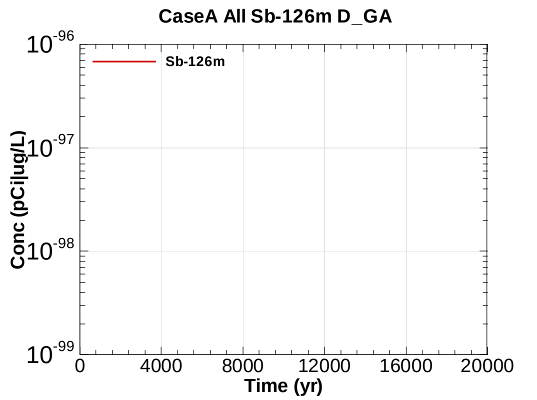

Figure B.3-334 - 100m Aquifer Concentration for CaseA All Sb-126m D_GA

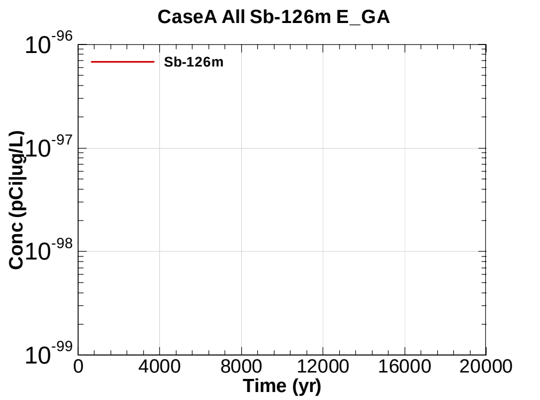

Figure B.3-335 - 100m Aquifer Concentration for CaseA All Sb-126m E_GA

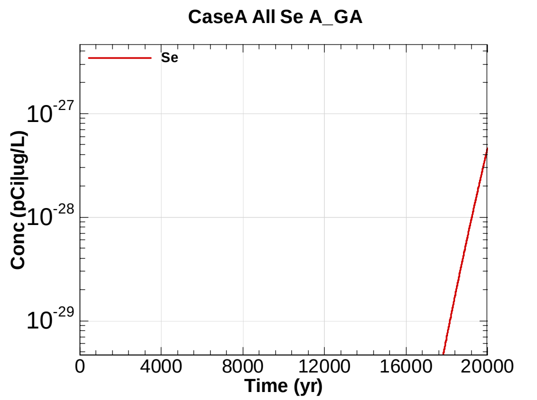

Figure B.3-336 - 100m Aquifer Concentration for CaseA All Se A_GA

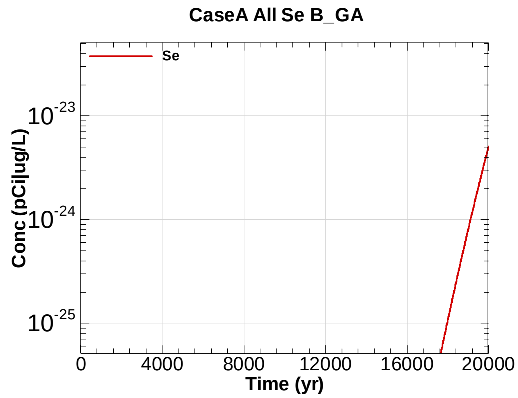

Figure B.3-337 - 100m Aquifer Concentration for CaseA All Se B_GA

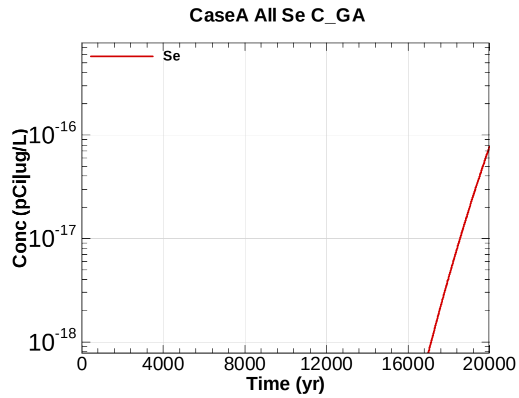

Figure B.3-338 - 100m Aquifer Concentration for CaseA All Se C_GA

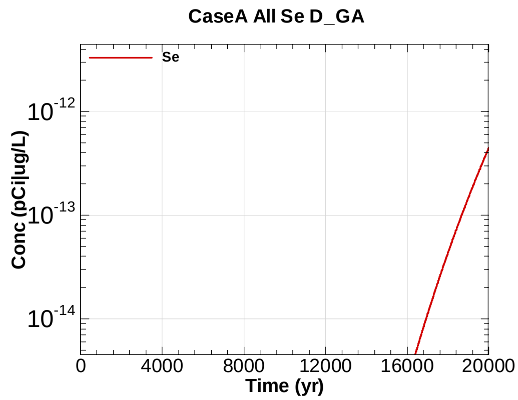

Figure B.3-339 - 100m Aquifer Concentration for CaseA All Se D_GA

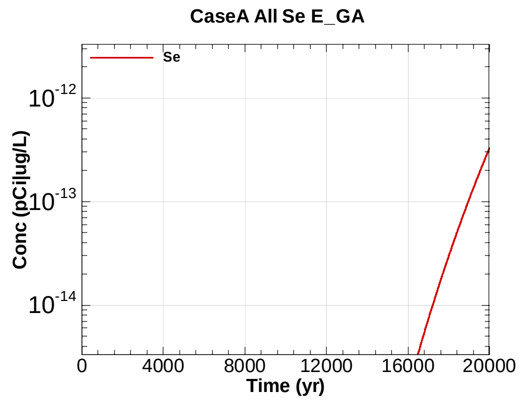

Figure B.3-340 - 100m Aquifer Concentration for CaseA All Se E_GA

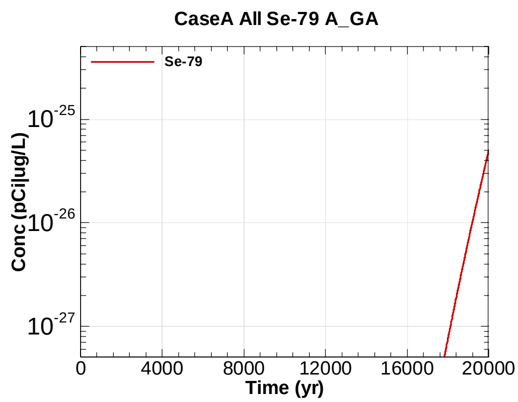

Figure B.3-341 - 100m Aquifer Concentration for CaseA All Se-79 A_GA

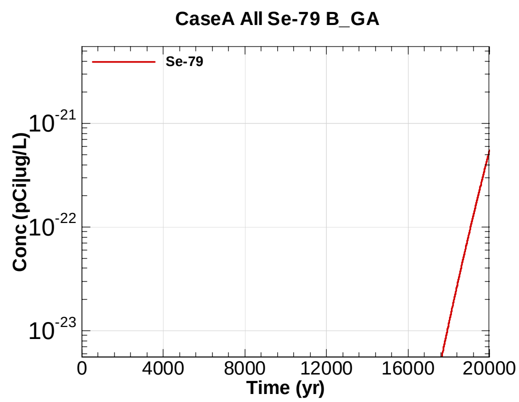

Figure B.3-342 - 100m Aquifer Concentration for CaseA All Se-79 B_GA

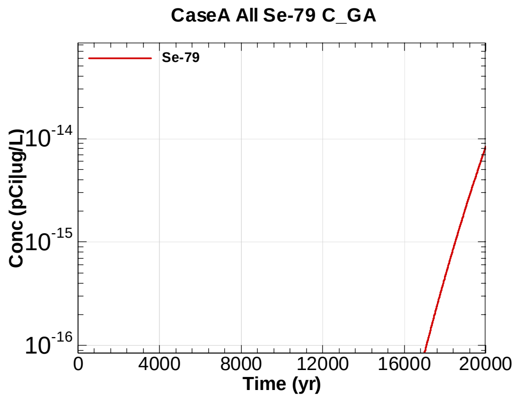

Figure B.3-343 - 100m Aquifer Concentration for CaseA All Se-79 C_GA

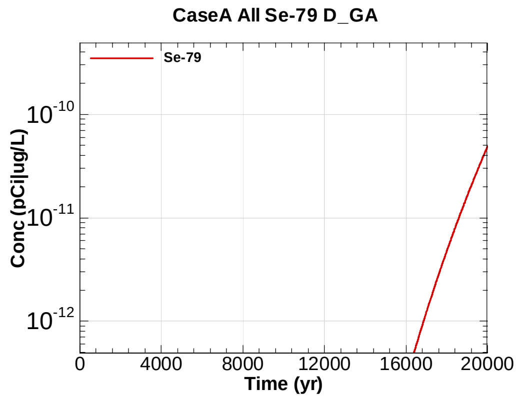

Figure B.3-344 - 100m Aquifer Concentration for CaseA All Se-79 D_GA

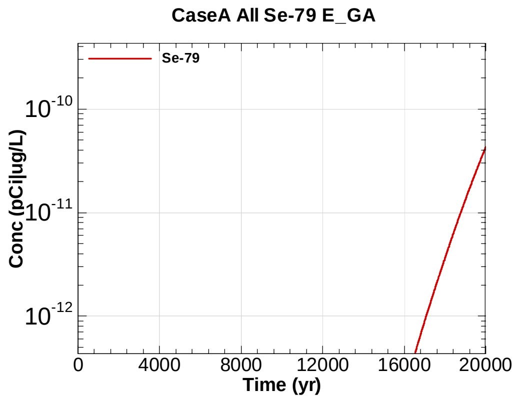

Figure B.3-345 - 100m Aquifer Concentration for CaseA All Se-79 E_GA

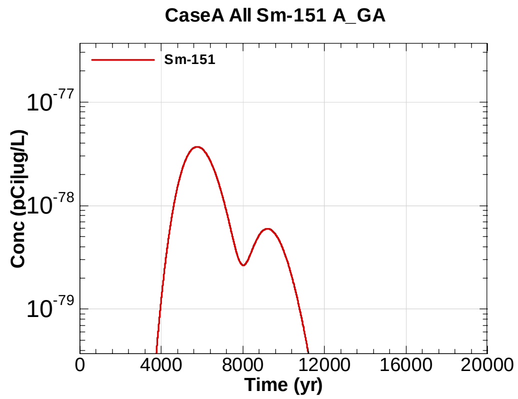

Figure B.3-346 - 100m Aquifer Concentration for CaseA All Sm-151 A_GA

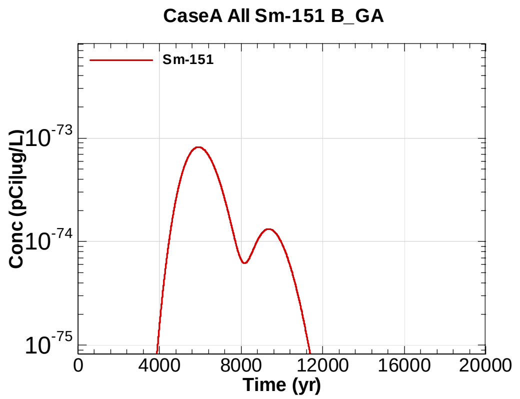

Figure B.3-347 - 100m Aquifer Concentration for CaseA All Sm-151 B_GA

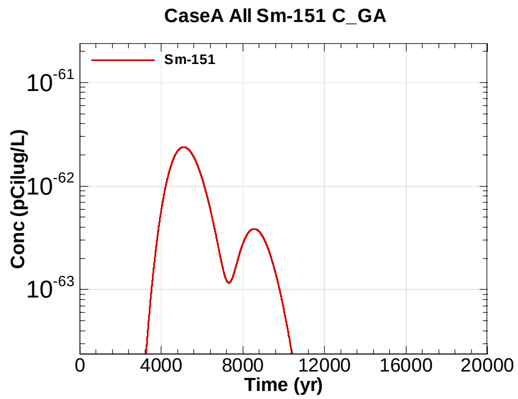

Figure B.3-348 - 100m Aquifer Concentration for CaseA All Sm-151 C_GA

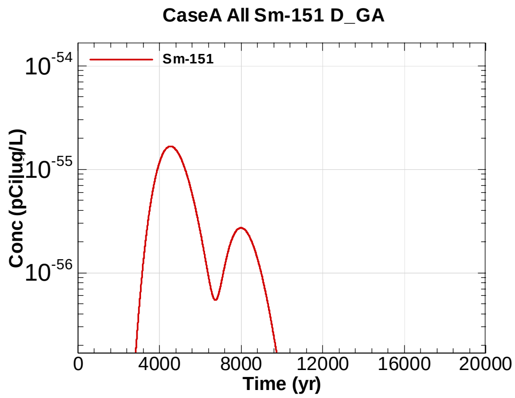

Figure B.3-349 - 100m Aquifer Concentration for CaseA All Sm-151 D_GA

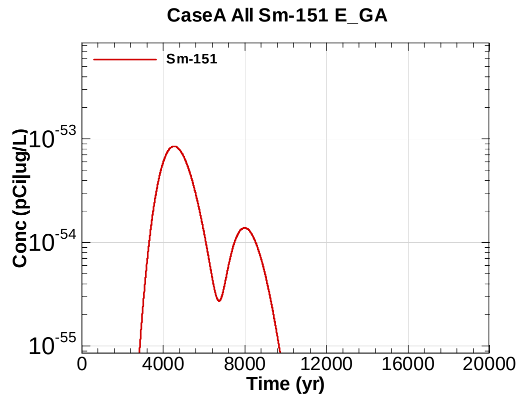

Figure B.3-350 - 100m Aquifer Concentration for CaseA All Sm-151 E_GA

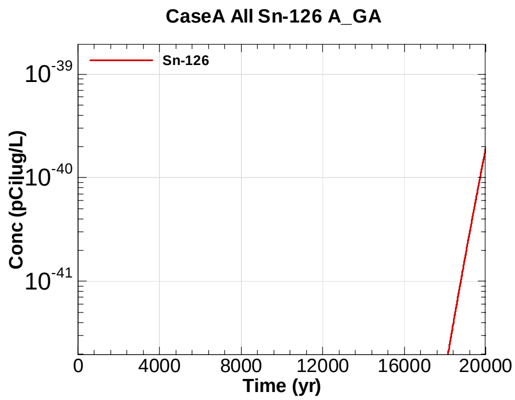

Figure B.3-351 - 100m Aquifer Concentration for CaseA All Sn-126 A_GA

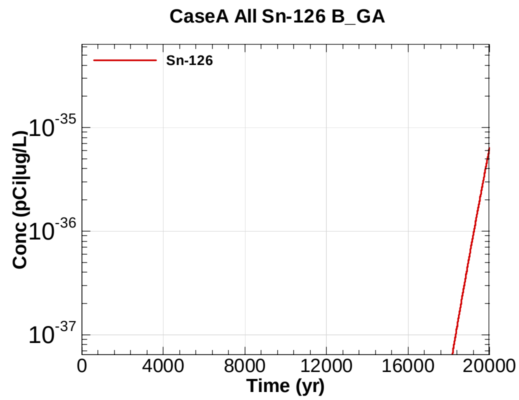

Figure B.3-352 - 100m Aquifer Concentration for CaseA All Sn-126 B_GA

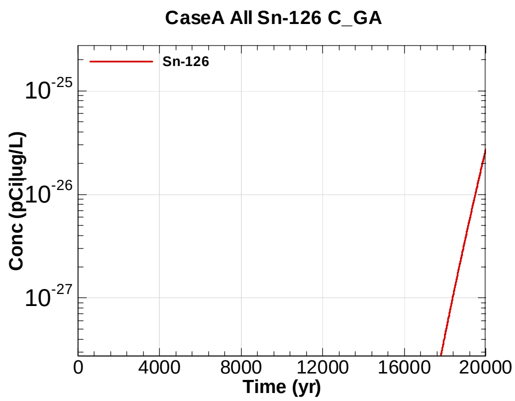

Figure B.3-353 - 100m Aquifer Concentration for CaseA All Sn-126 C_GA

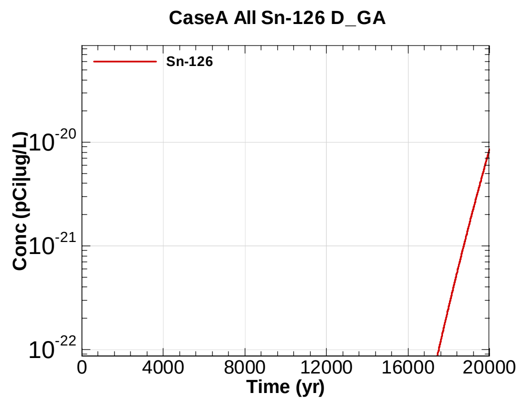

Figure B.3-354 - 100m Aquifer Concentration for CaseA All Sn-126 D_GA

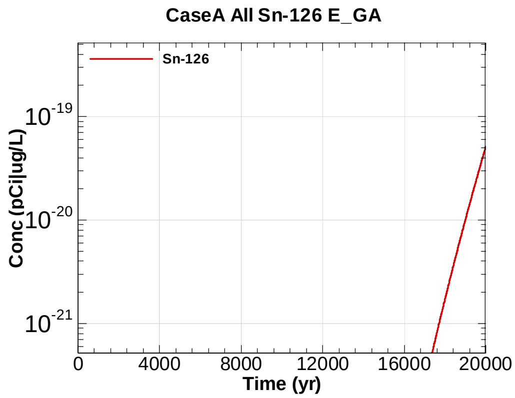

Figure B.3-355 - 100m Aquifer Concentration for CaseA All Sn-126 E_GA

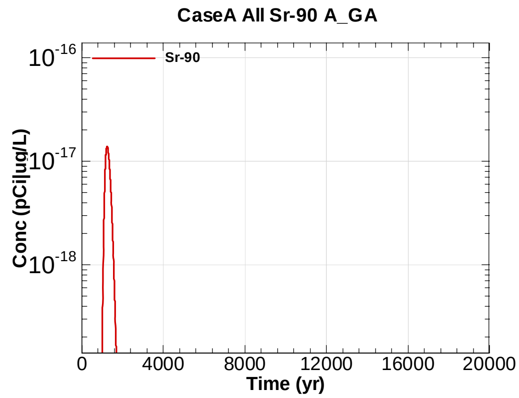

Figure B.3-356 - 100m Aquifer Concentration for CaseA All Sr-90 A_GA

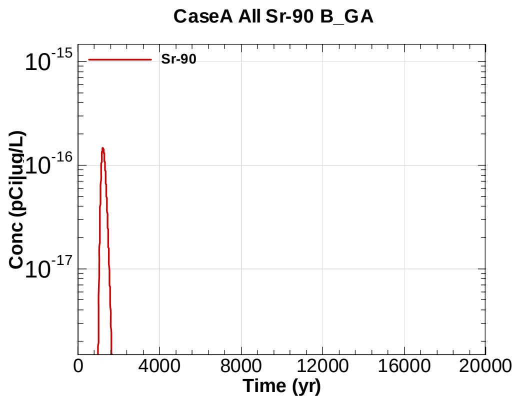

Figure B.3-357 - 100m Aquifer Concentration for CaseA All Sr-90 B_GA

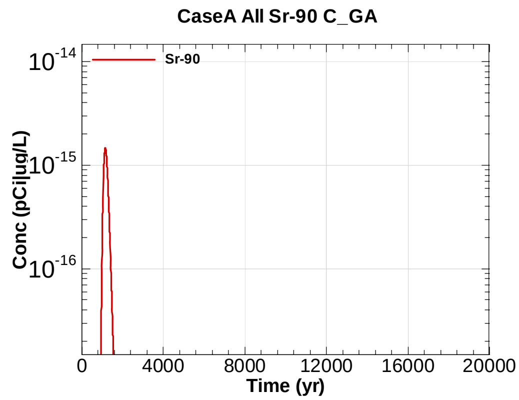

Figure B.3-358 - 100m Aquifer Concentration for CaseA All Sr-90 C_GA

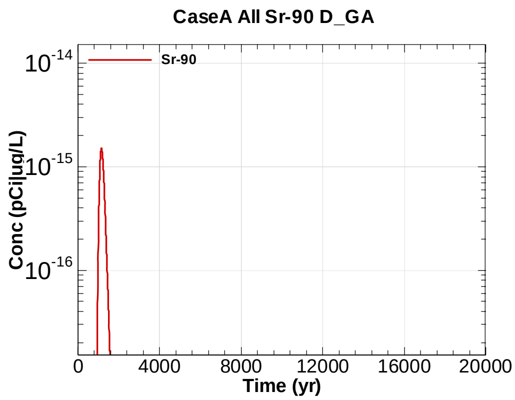

Figure B.3-359 - 100m Aquifer Concentration for CaseA All Sr-90 D_GA

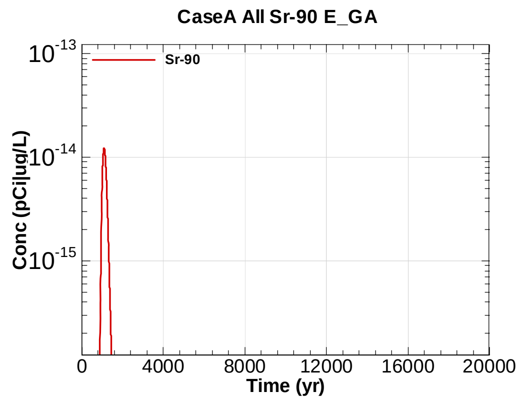

Figure B.3-360 - 100m Aquifer Concentration for CaseA All Sr-90 E_GA

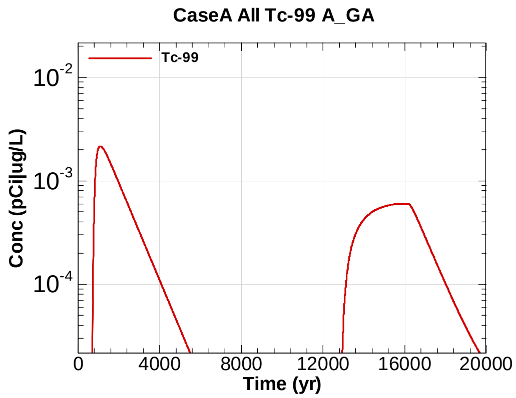

Figure B.3-361 - 100m Aquifer Concentration for CaseA All Tc-99 A_GA

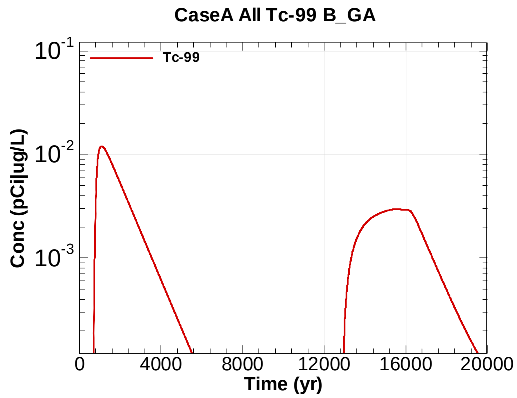

Figure B.3-362 - 100m Aquifer Concentration for CaseA All Tc-99 B_GA

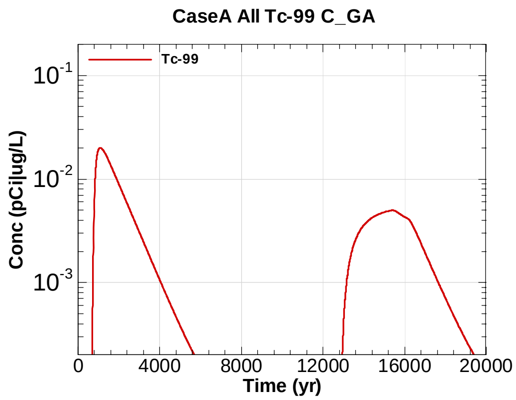

Figure B.3-363 - 100m Aquifer Concentration for CaseA All Tc-99 C_GA

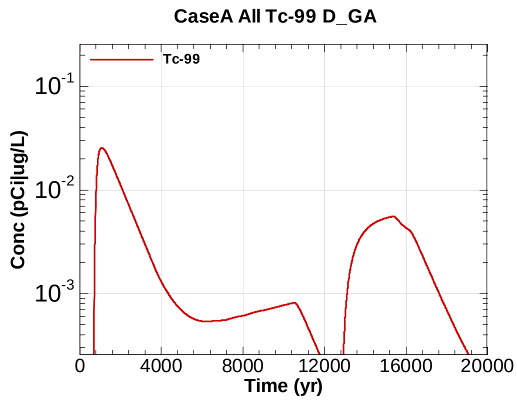

Figure B.3-364 - 100m Aquifer Concentration for CaseA All Tc-99 D_GA

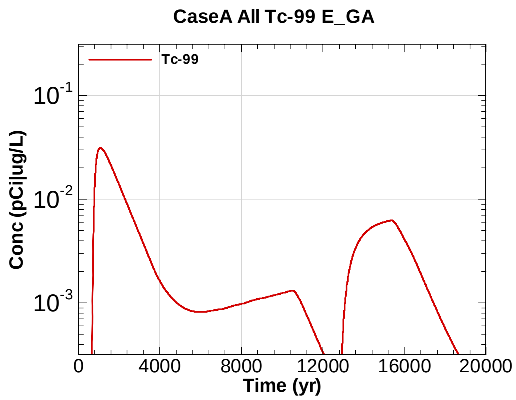

Figure B.3-365 - 100m Aquifer Concentration for CaseA All Tc-99 E_GA

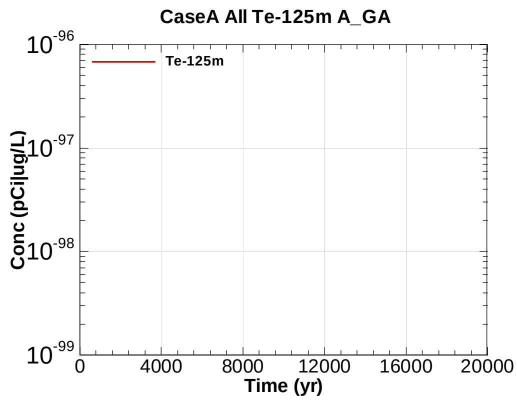

Figure B.3-366 - 100m Aquifer Concentration for CaseA All Te-125m A_GA

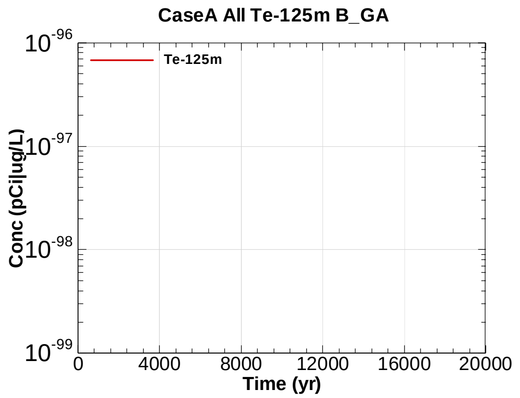

Figure B.3-367 - 100m Aquifer Concentration for CaseA All Te-125m B_GA

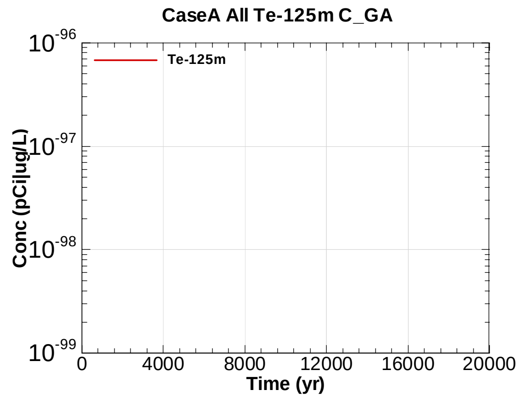

Figure B.3-368 - 100m Aquifer Concentration for CaseA All Te-125m C_GA

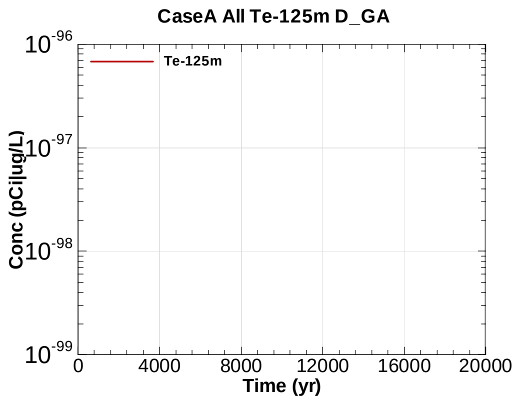

Figure B.3-369 - 100m Aquifer Concentration for CaseA All Te-125m D_GA

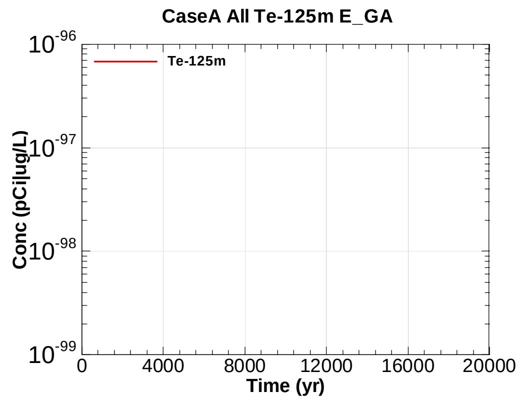

Figure B.3-370 - 100m Aquifer Concentration for CaseA All Te-125m E_GA

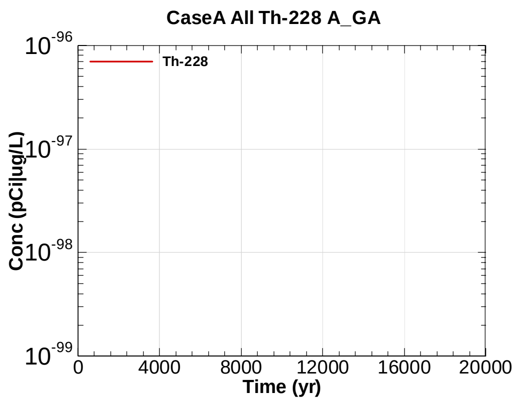

Figure B.3-371 - 100m Aquifer Concentration for CaseA All Th-228 A_GA

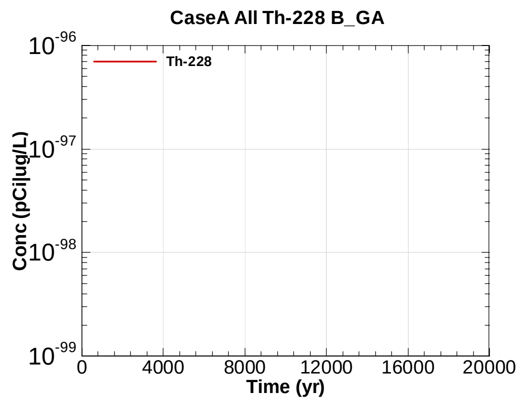

Figure B.3-372 - 100m Aquifer Concentration for CaseA All Th-228 B_GA

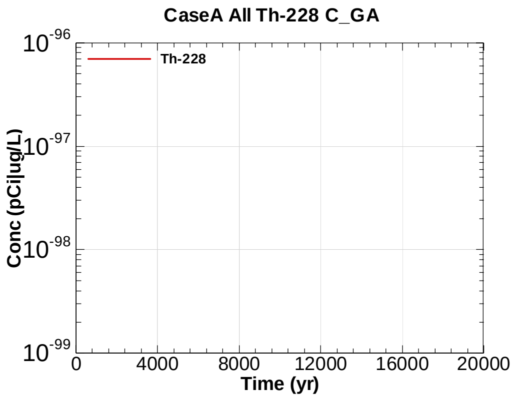

Figure B.3-373 - 100m Aquifer Concentration for CaseA All Th-228 C_GA

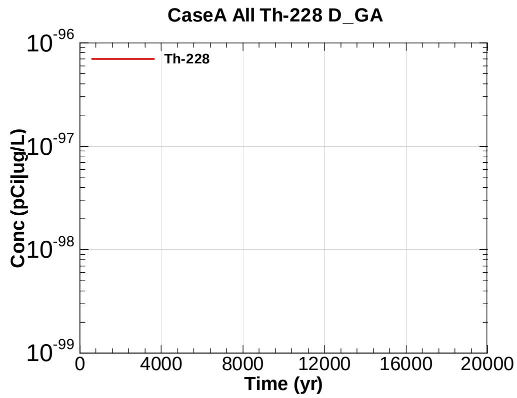

Figure B.3-374 - 100m Aquifer Concentration for CaseA All Th-228 D_GA

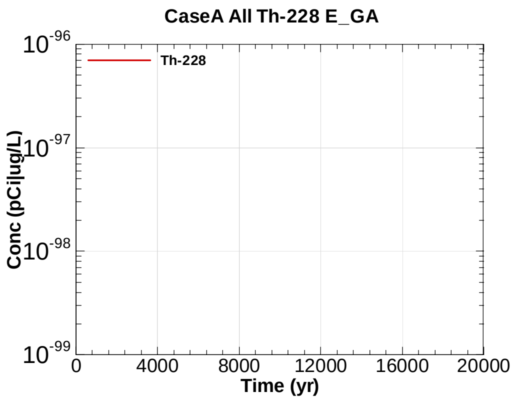

Figure B.3-375 - 100m Aquifer Concentration for CaseA All Th-228 E_GA

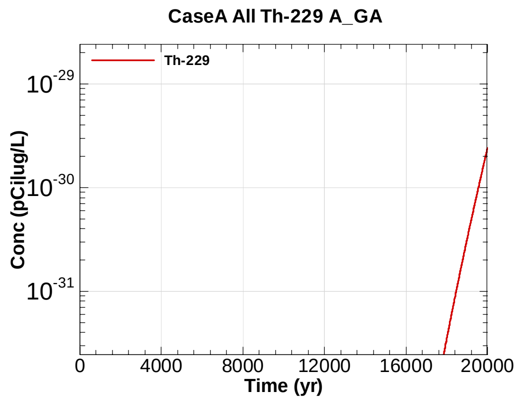

Figure B.3-376 - 100m Aquifer Concentration for CaseA All Th-229 A_GA

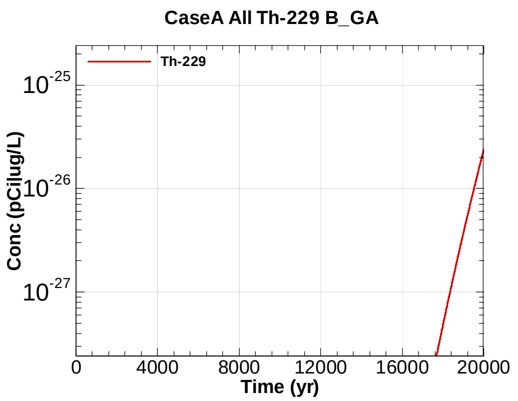

Figure B.3-377 - 100m Aquifer Concentration for CaseA All Th-229 B_GA

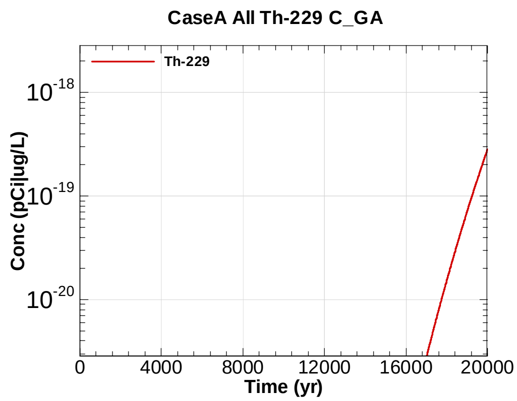

Figure B.3-378 - 100m Aquifer Concentration for CaseA All Th-229 C_GA

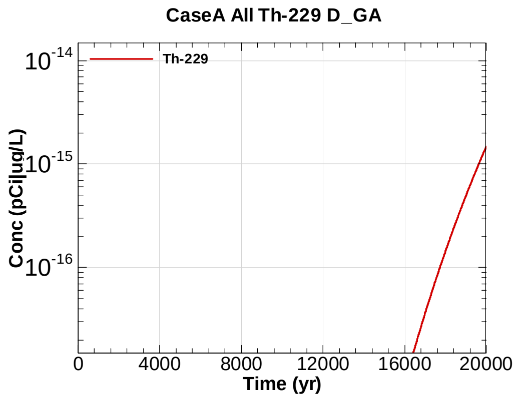

Figure B.3-379 - 100m Aquifer Concentration for CaseA All Th-229 D_GA

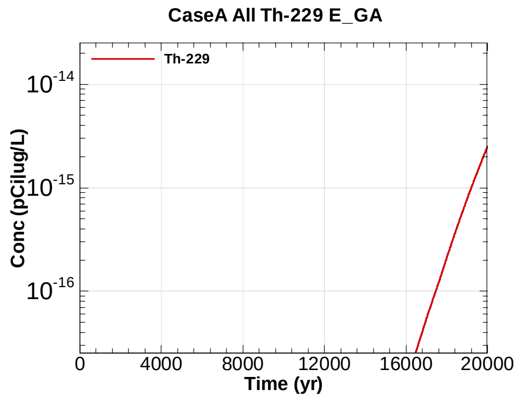

Figure B.3-380 - 100m Aquifer Concentration for CaseA All Th-229 E_GA

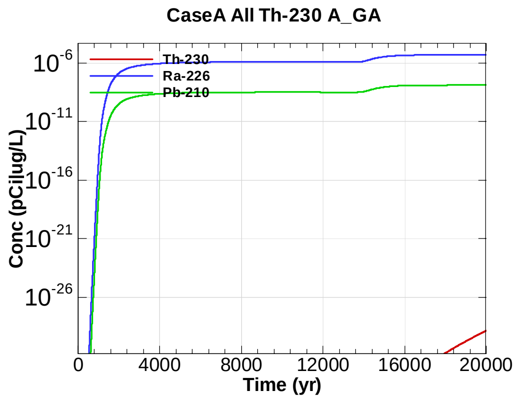

Figure B.3-381 - 100m Aquifer Concentration for CaseA All Th-230 A_GA

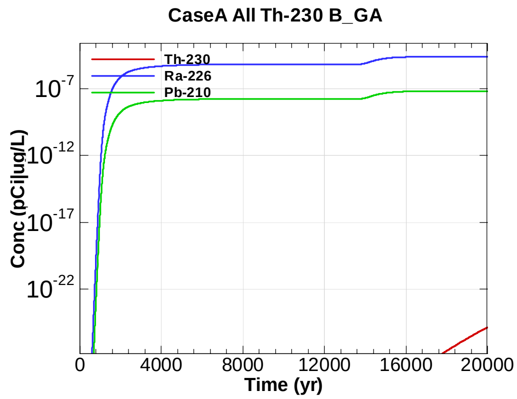

Figure B.3-382 - 100m Aquifer Concentration for CaseA All Th-230 B_GA

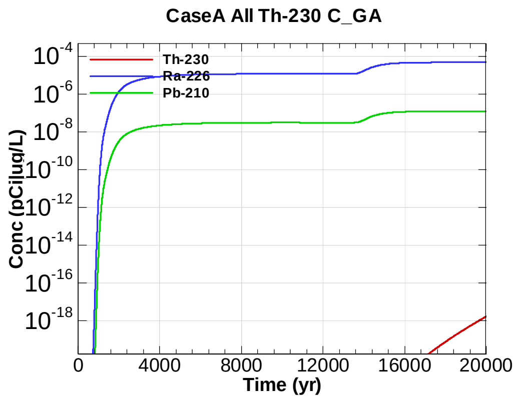

Figure B.3-383 - 100m Aquifer Concentration for CaseA All Th-230 C_GA

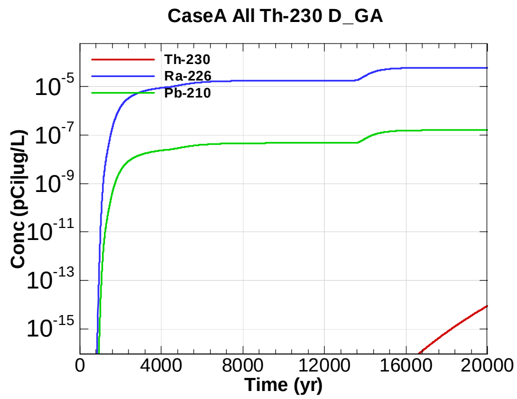

Figure B.3-384 - 100m Aquifer Concentration for CaseA All Th-230 D_GA

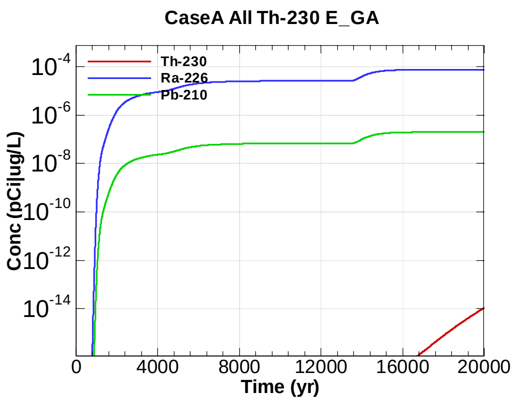

Figure B.3-385 - 100m Aquifer Concentration for CaseA All Th-230 E_GA

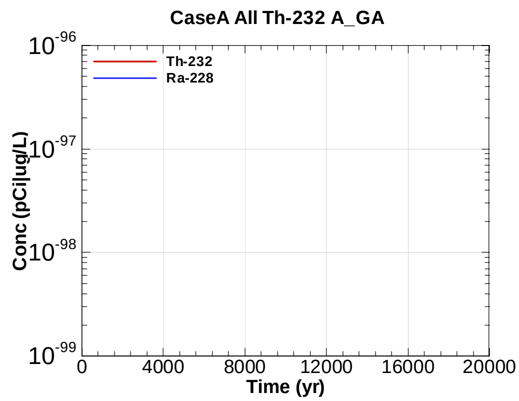

Figure B.3-386 - 100m Aquifer Concentration for CaseA All Th-232 A_GA

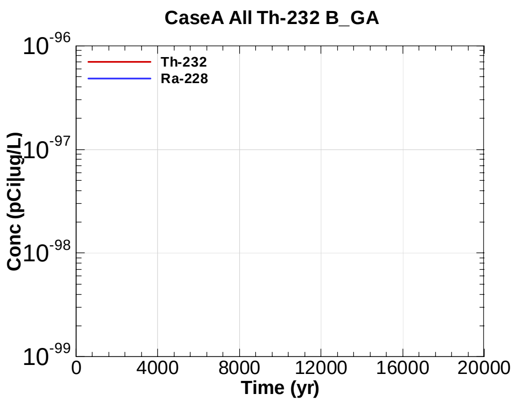

Figure B.3-387 - 100m Aquifer Concentration for CaseA All Th-232 B_GA

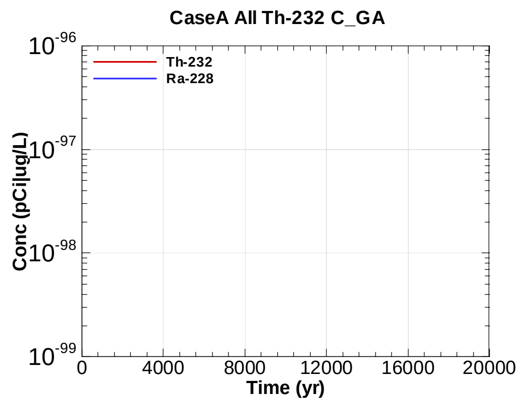

Figure B.3-388 - 100m Aquifer Concentration for CaseA All Th-232 C_GA

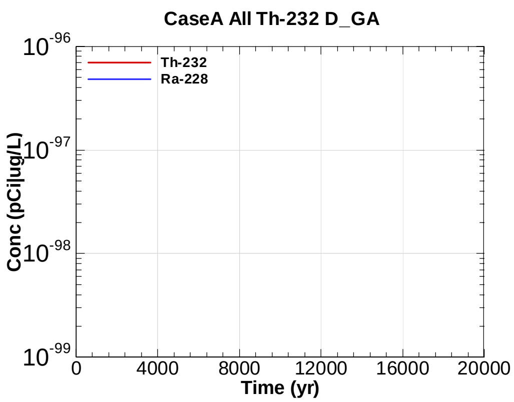

Figure B.3-389 - 100m Aquifer Concentration for CaseA All Th-232 D_GA

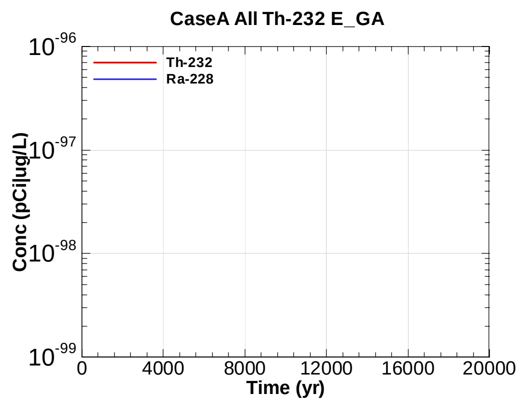

Figure B.3-390 - 100m Aquifer Concentration for CaseA All Th-232 E_GA

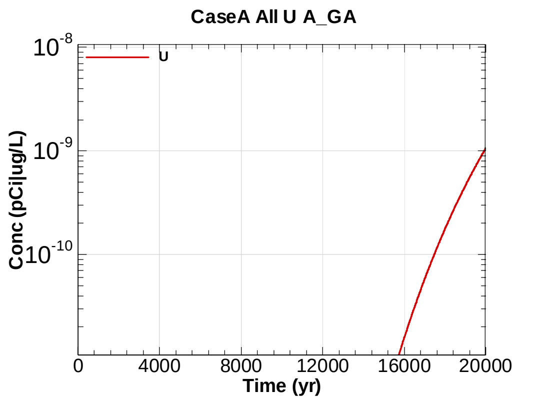

Figure B.3-391 - 100m Aquifer Concentration for CaseA All U A_GA

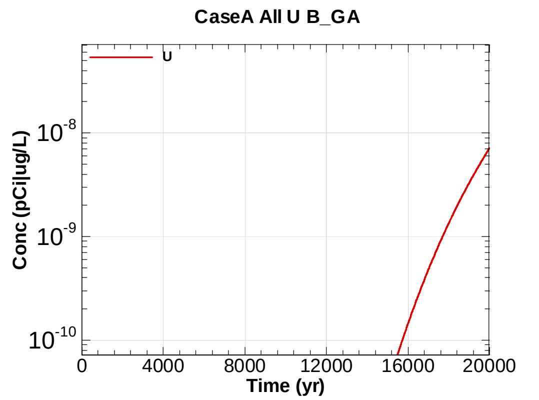

Figure B.3-392 - 100m Aquifer Concentration for CaseA All U B_GA

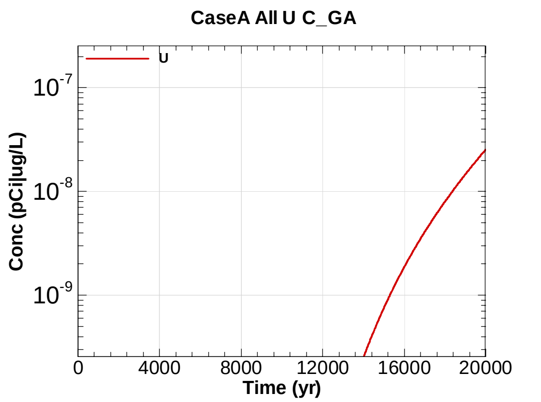

Figure B.3-393 - 100m Aquifer Concentration for CaseA All U C_GA

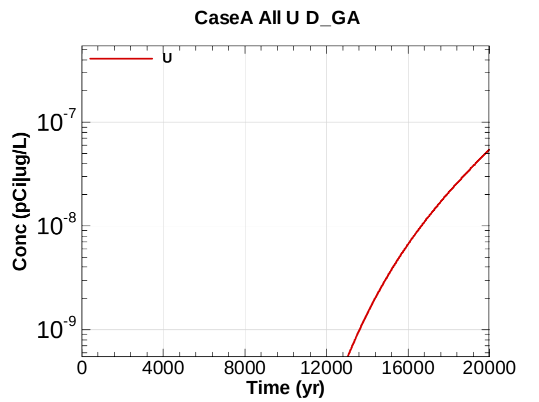

Figure B.3-394 - 100m Aquifer Concentration for CaseA All U D_GA

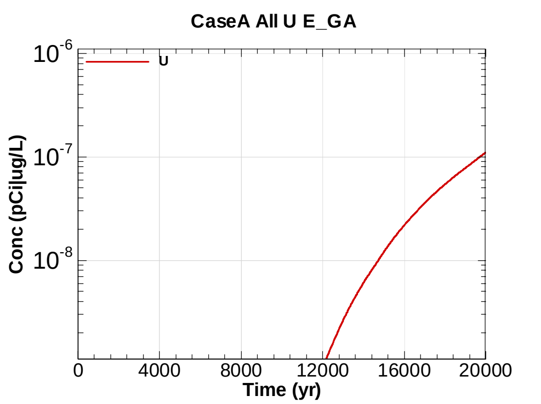

Figure B.3-395 - 100m Aquifer Concentration for CaseA All U E_GA

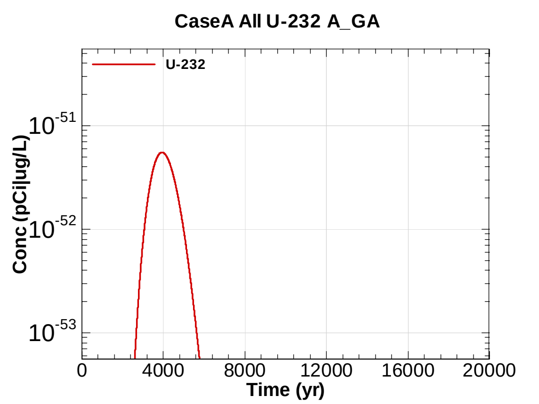

Figure B.3-396 - 100m Aquifer Concentration for CaseA All U-232 A_GA

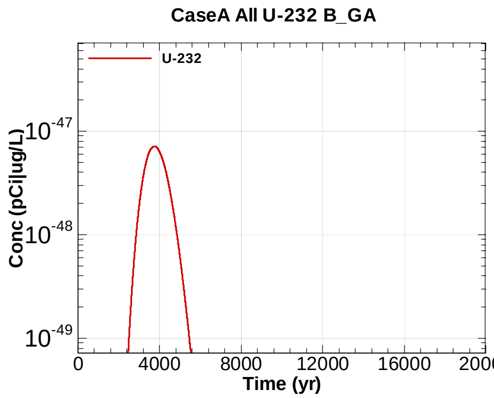

Figure B.3-397 - 100m Aquifer Concentration for CaseA All U-232 B_GA

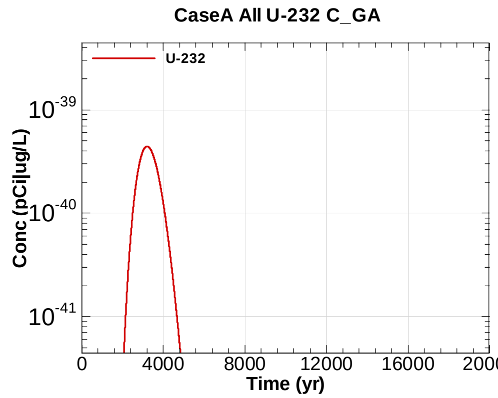

Figure B.3-398 - 100m Aquifer Concentration for CaseA All U-232 C_GA

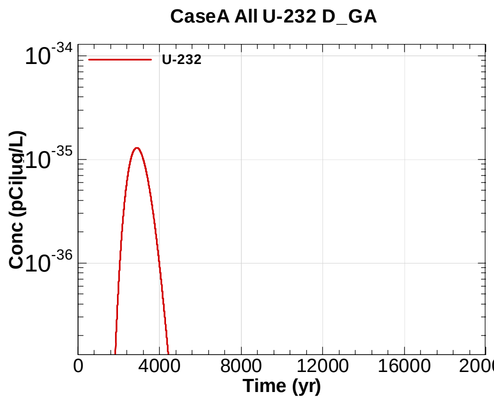

Figure B.3-399 - 100m Aquifer Concentration for CaseA All U-232 D_GA

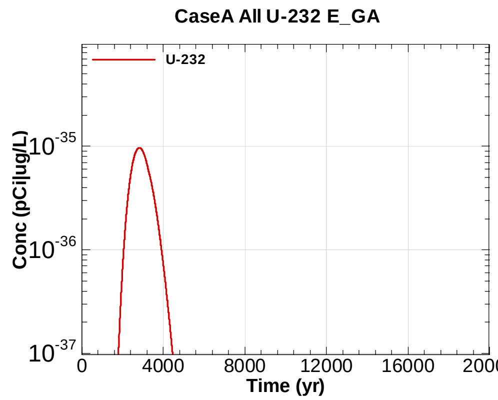

Figure B.3-400 - 100m Aquifer Concentration for CaseA All U-232 E_GA

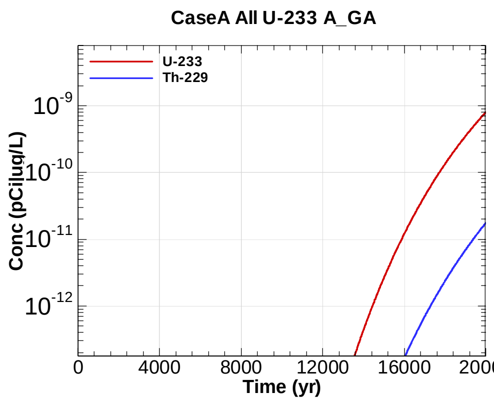

Figure B.3-401 - 100m Aquifer Concentration for CaseA All U-233 A_GA

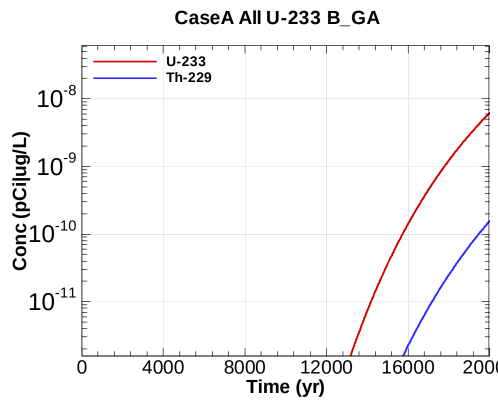

Figure B.3-402 - 100m Aquifer Concentration for CaseA All U-233 B_GA

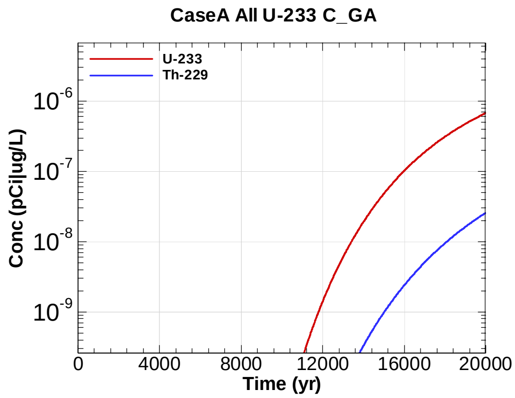

Figure B.3-403 - 100m Aquifer Concentration for CaseA All U-233 C_GA

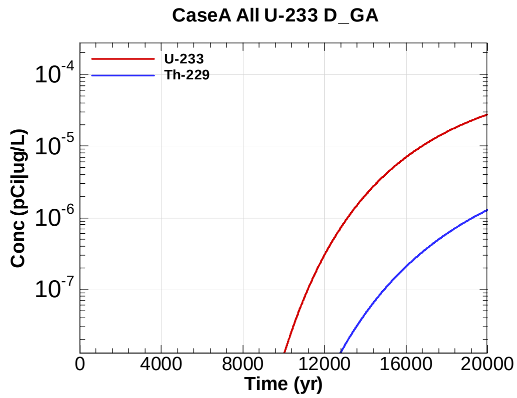

Figure B.3-404 - 100m Aquifer Concentration for CaseA All U-233 D_GA

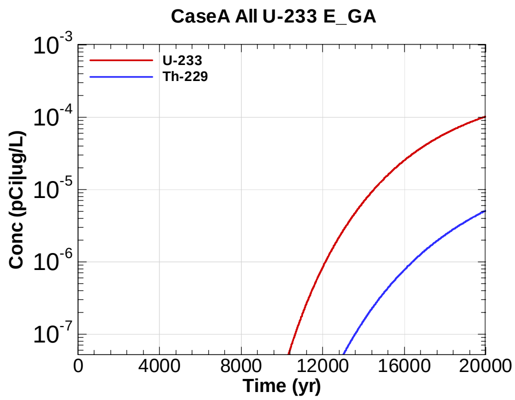

Figure B.3-405 - 100m Aquifer Concentration for CaseA All U-233 E_GA

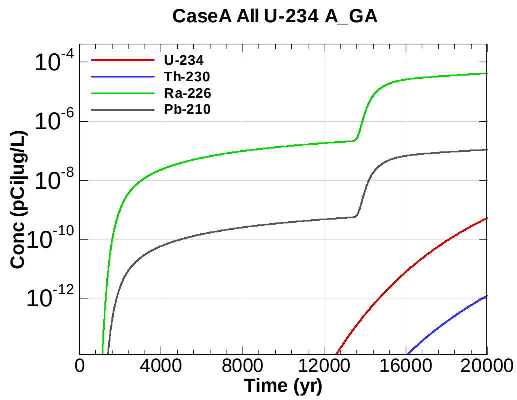

Figure B.3-406 - 100m Aquifer Concentration for CaseA All U-234 A_GA

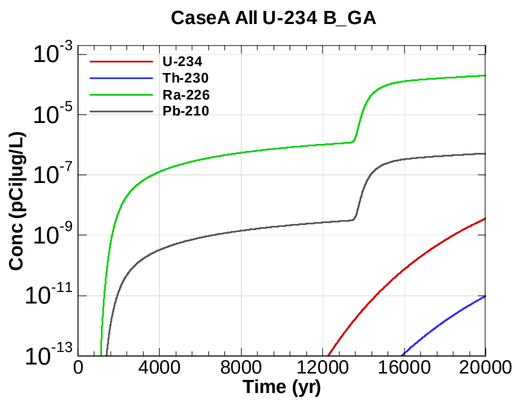

Figure B.3-407 - 100m Aquifer Concentration for CaseA All U-234 B_GA

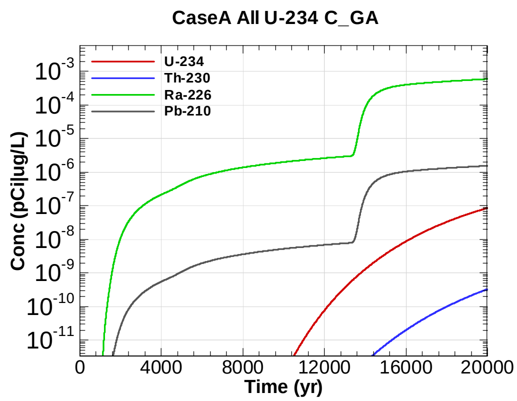

Figure B.3-408 - 100m Aquifer Concentration for CaseA All U-234 C_GA

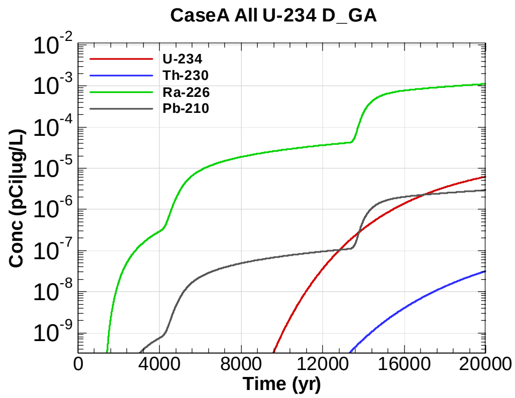

Figure B.3-409 - 100m Aquifer Concentration for CaseA All U-234 D_GA

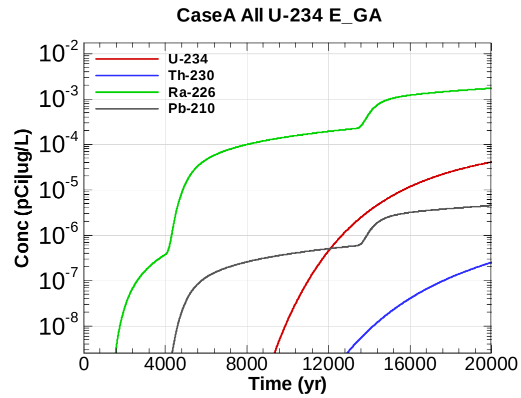

Figure B.3-410 - 100m Aquifer Concentration for CaseA All U-234 E_GA

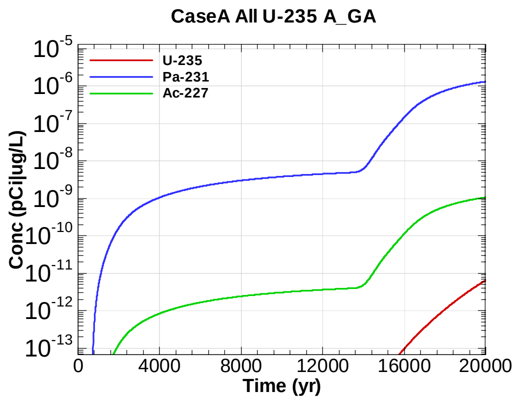

Figure B.3-411 - 100m Aquifer Concentration for CaseA All U-235 A_GA

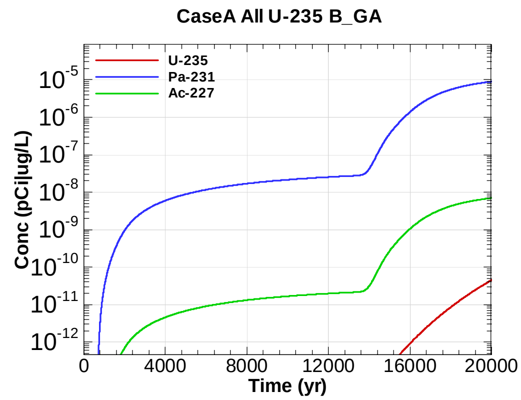

Figure B.3-412 - 100m Aquifer Concentration for CaseA All U-235 B_GA

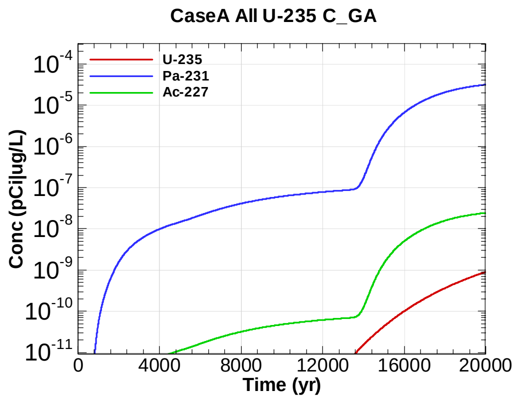

Figure B.3-413 - 100m Aquifer Concentration for CaseA All U-235 C_GA

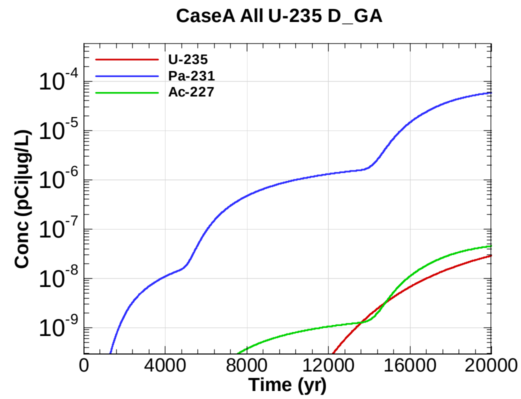

Figure B.3-414 - 100m Aquifer Concentration for CaseA All U-235 D_GA

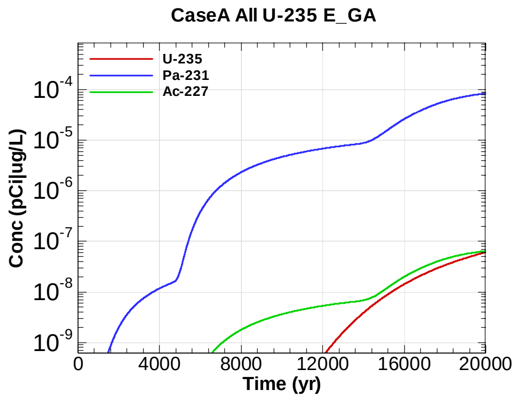

Figure B.3-415 - 100m Aquifer Concentration for CaseA All U-235 E_GA

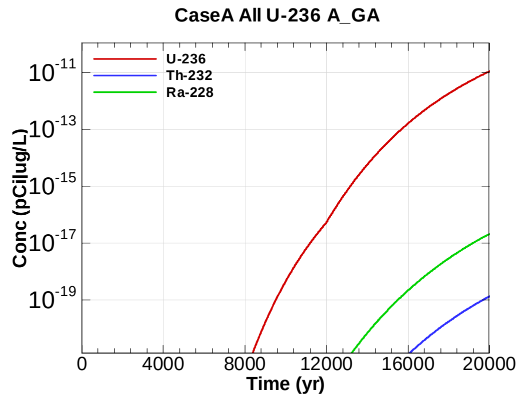

Figure B.3-416 - 100m Aquifer Concentration for CaseA All U-236 A_GA

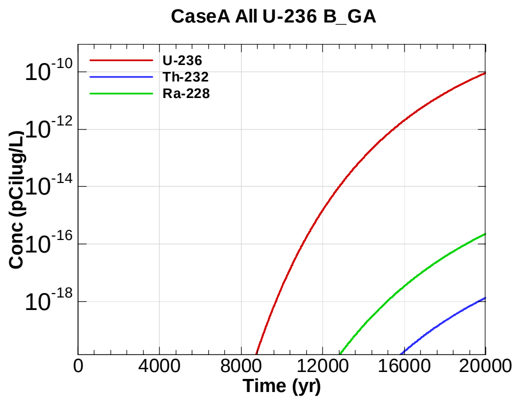

Figure B.3-417 - 100m Aquifer Concentration for CaseA All U-236 B_GA

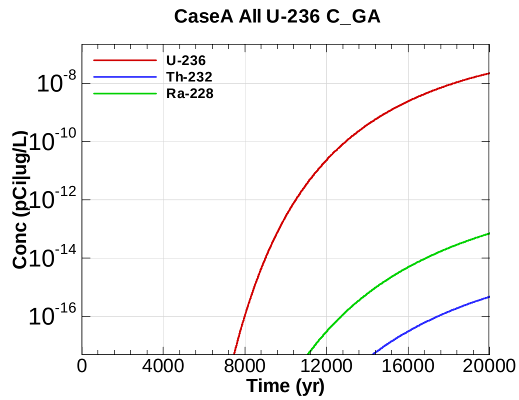

Figure B.3-418 - 100m Aquifer Concentration for CaseA All U-236 C_GA

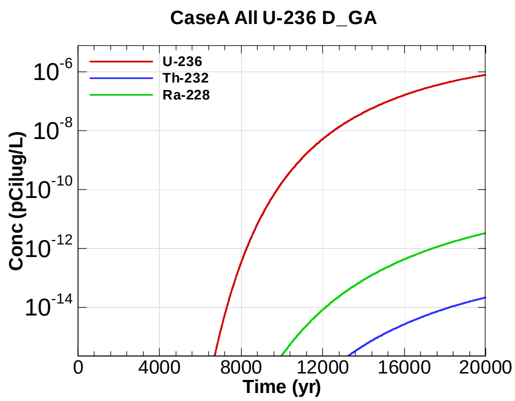

Figure B.3-419 - 100m Aquifer Concentration for CaseA All U-236 D_GA

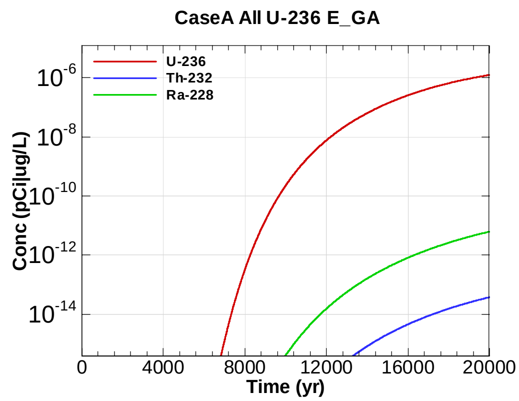

Figure B.3-420 - 100m Aquifer Concentration for CaseA All U-236 E_GA

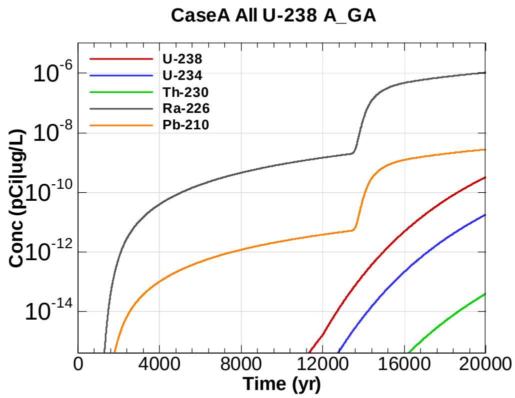

Figure B.3-421 - 100m Aquifer Concentration for CaseA All U-238 A_GA

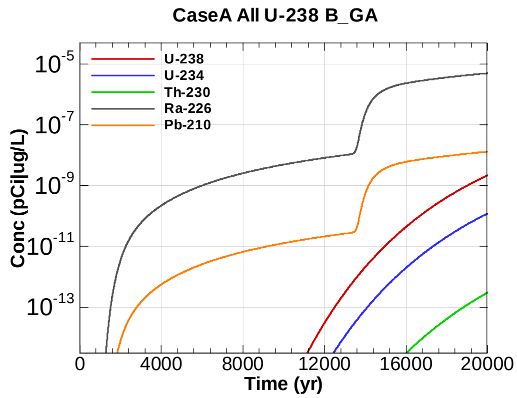

Figure B.3-422 - 100m Aquifer Concentration for CaseA All U-238 B_GA

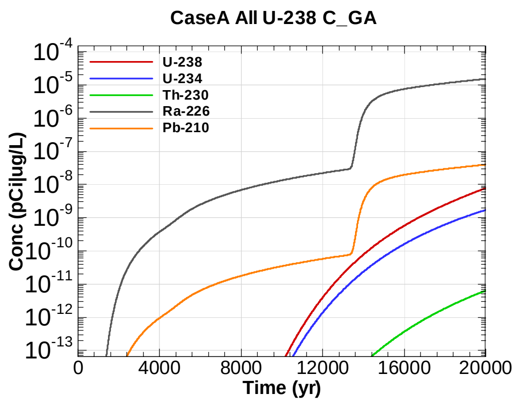

Figure B.3-423 - 100m Aquifer Concentration for CaseA All U-238 C_GA

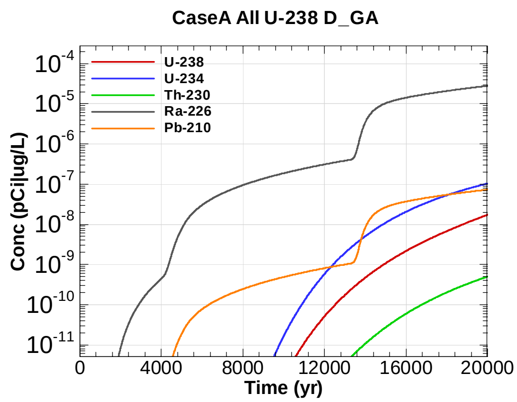

Figure B.3-424 - 100m Aquifer Concentration for CaseA All U-238 D_GA

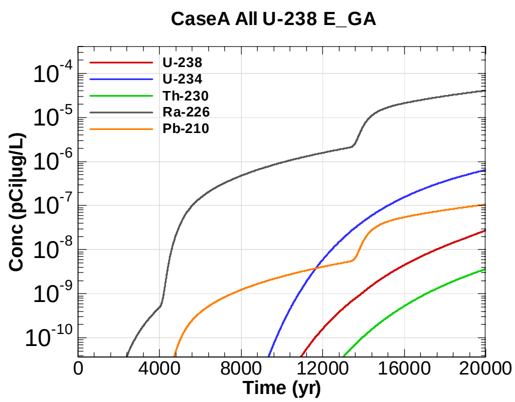

Figure B.3-425 - 100m Aquifer Concentration for CaseA All U-238 E_GA

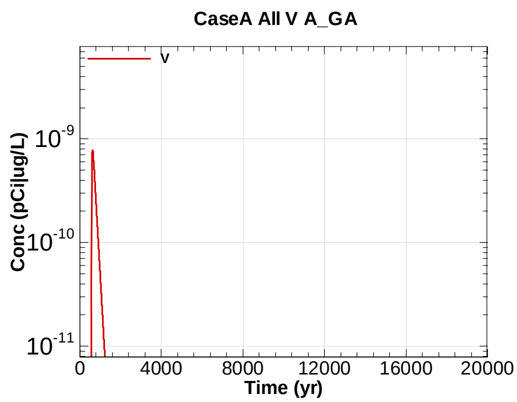

Figure B.3-426 - 100m Aquifer Concentration for CaseA All V A_GA

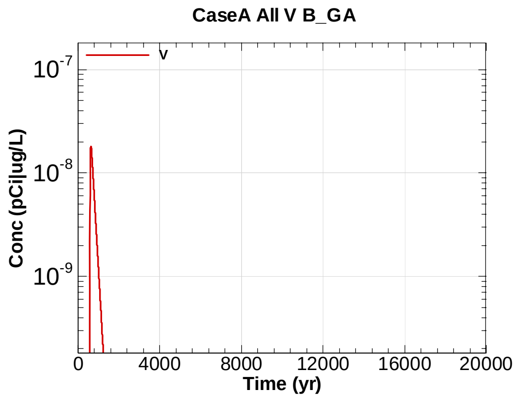

Figure B.3-427 - 100m Aquifer Concentration for CaseA All V B_GA

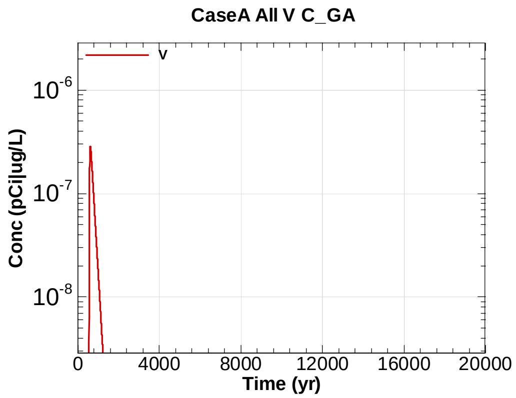

Figure B.3-428 - 100m Aquifer Concentration for CaseA All V C_GA

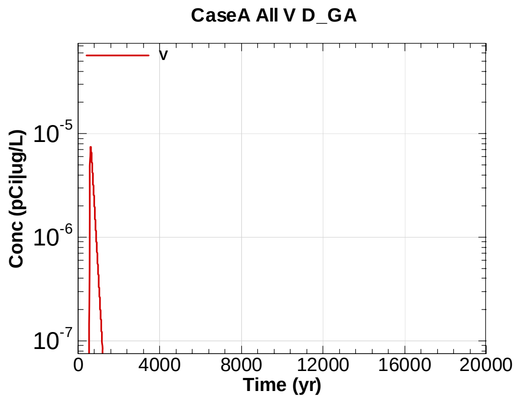

Figure B.3-429 - 100m Aquifer Concentration for CaseA All V D_GA

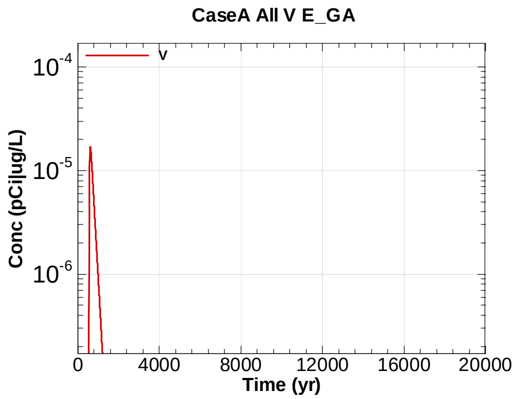

Figure B.3-430 - 100m Aquifer Concentration for CaseA All V E_GA

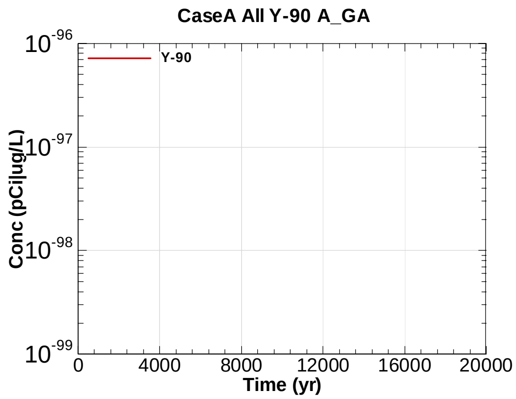

Figure B.3-431 - 100m Aquifer Concentration for CaseA All Y-90 A_GA

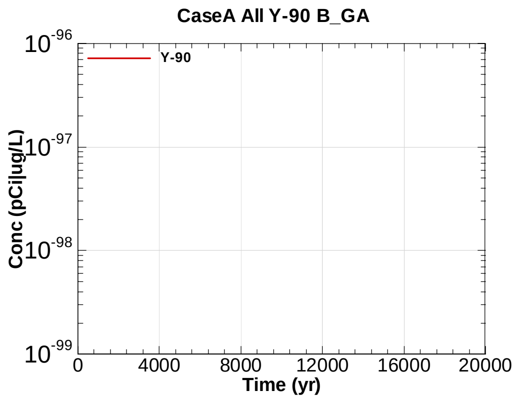

Figure B.3-432 - 100m Aquifer Concentration for CaseA All Y-90 B_GA

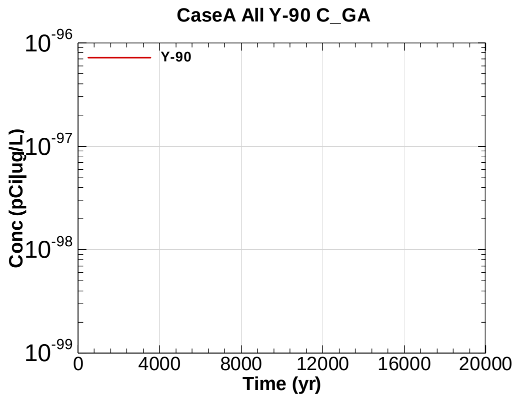

Figure B.3-433 - 100m Aquifer Concentration for CaseA All Y-90 C_GA

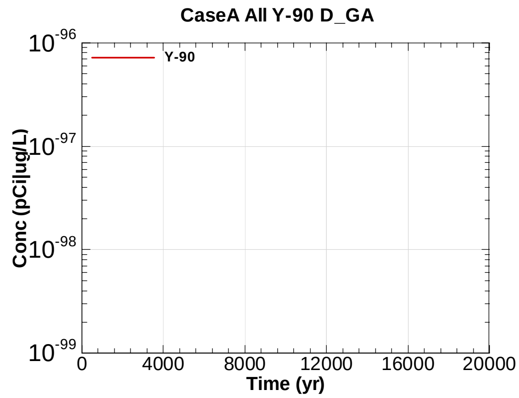

Figure B.3-434 - 100m Aquifer Concentration for CaseA All Y-90 D_GA

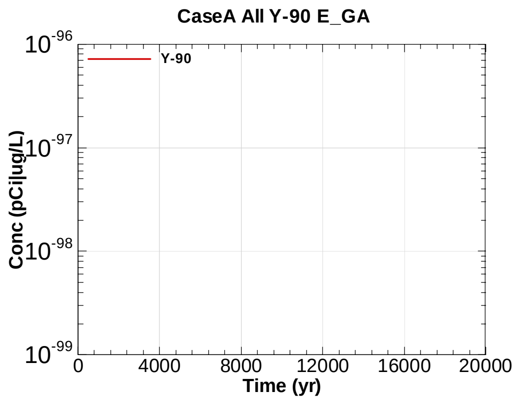

Figure B.3-435 - 100m Aquifer Concentration for CaseA All Y-90 E_GA

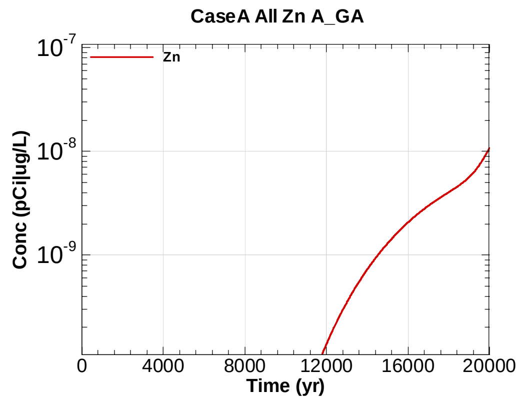

Figure B.3-436 - 100m Aquifer Concentration for CaseA All Zn A_GA

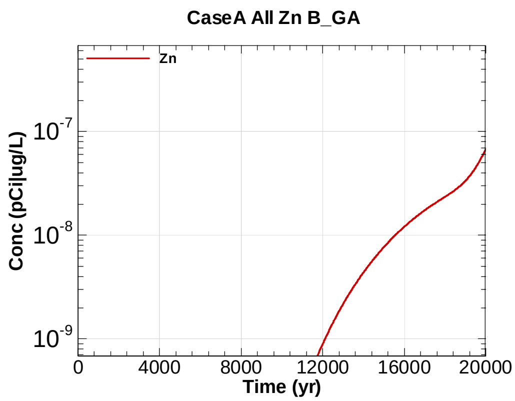

Figure B.3-437 - 100m Aquifer Concentration for CaseA All Zn B_GA

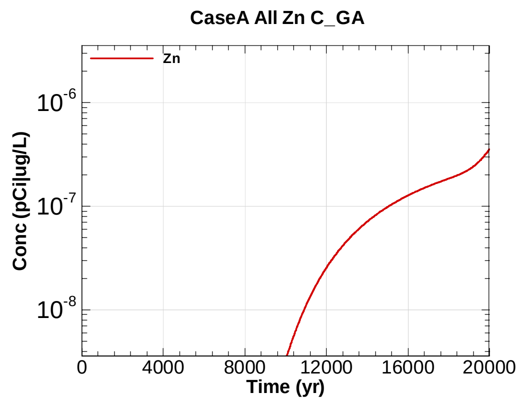

Figure B.3-438 - 100m Aquifer Concentration for CaseA All Zn C_GA

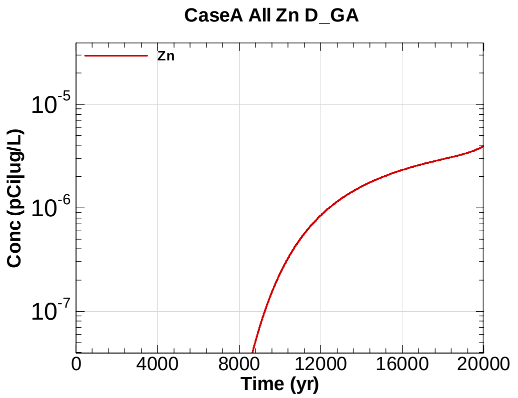

Figure B.3-439 - 100m Aquifer Concentration for CaseA All Zn D_GA

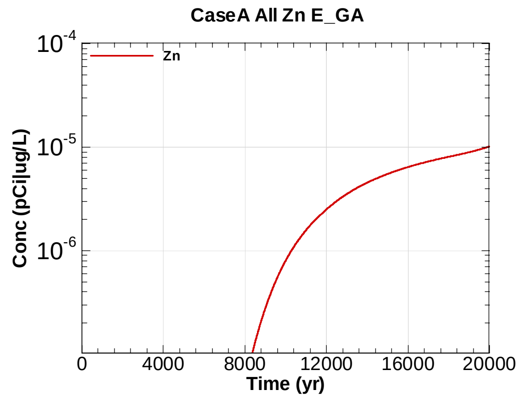

Figure B.3-440 - 100m Aquifer Concentration for CaseA All Zn E_GA

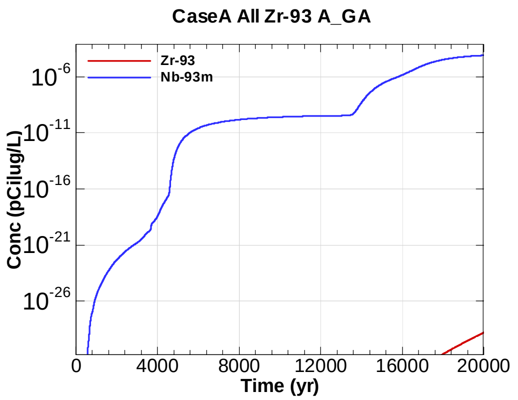

Figure B.3-441 - 100m Aquifer Concentration for CaseA All Zr-93 A_GA

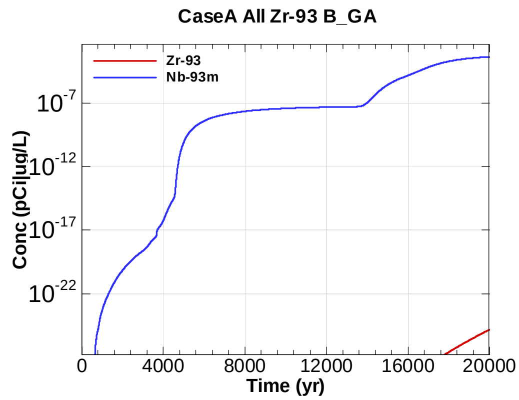

Figure B.3-442 - 100m Aquifer Concentration for CaseA All Zr-93 B_GA

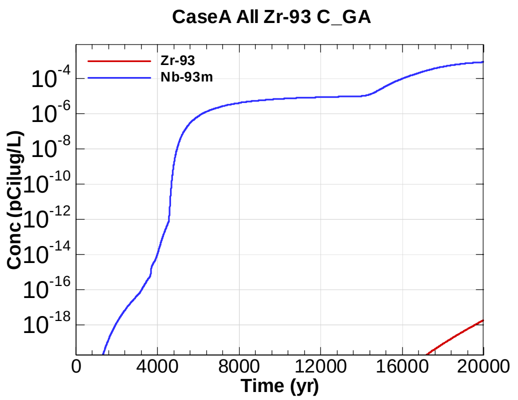

Figure B.3-443 - 100m Aquifer Concentration for CaseA All Zr-93 C_GA

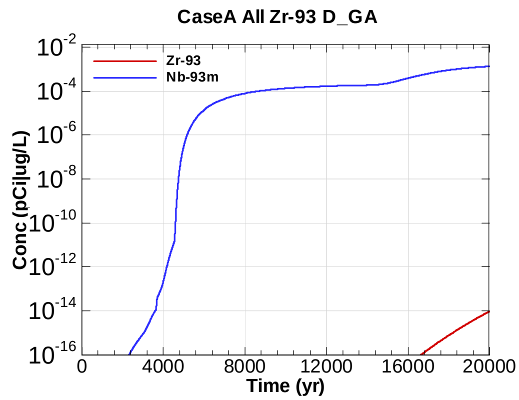

Figure B.3-444 - 100m Aquifer Concentration for CaseA All Zr-93 D_GA

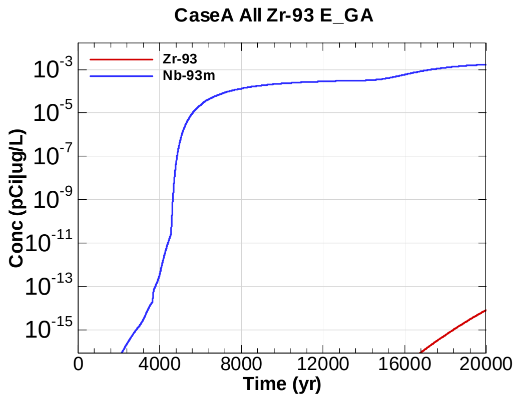

Figure B.3-445 - 100m Aquifer Concentration for CaseA All Zr-93 E_GA

Appendix C
SEEPLINE SENSITIVITY RUN RADIONUCLIDE CONCENTRATIONS

Appendix C contains curves showing the far field (i.e., seepline) radiological concentrations (sensistivity run radionuclides only) for all of FTF (tank and ancillary inventories) for the Base Case (Case/Configuration A). 20,000 year peak concentration results are presented for Upper Three Runs and Fourmile Branch.

Graph heading example “CaseA All Am-241 FMB”

Key

CaseA = scenario case/configuration
All = all FTF inventory source
Am-241 = radionuclide or chemical of concern
FMB = aquifer of concern
FMB=Fourmile Branch
UTR=Upper Three Runs

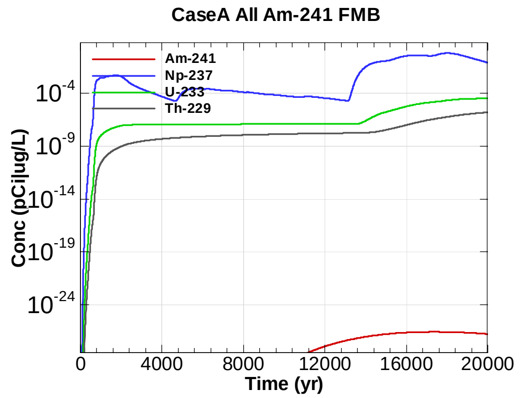

Figure C-1 - Aquifer Concentration for CaseA All Am-241 FMB

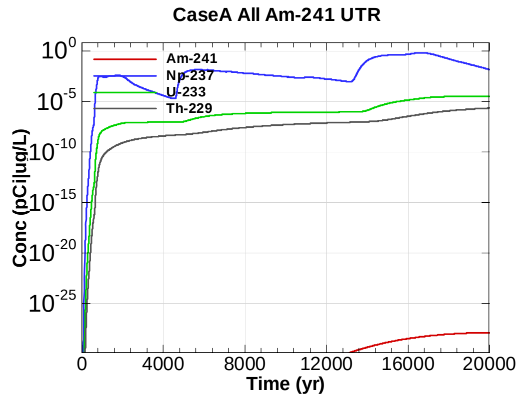

Figure C-2 - Aquifer Concentration for CaseA All Am-241 UTR

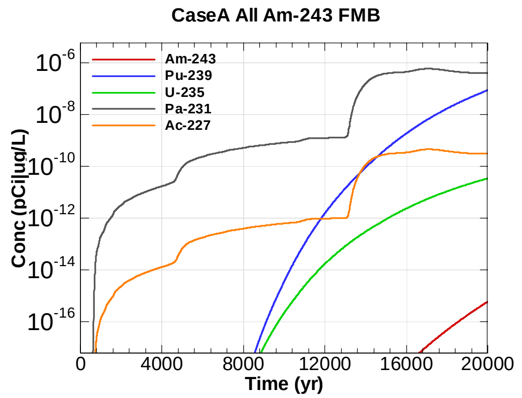

Figure C-3 - Aquifer Concentration for CaseA All Am-243 FMB

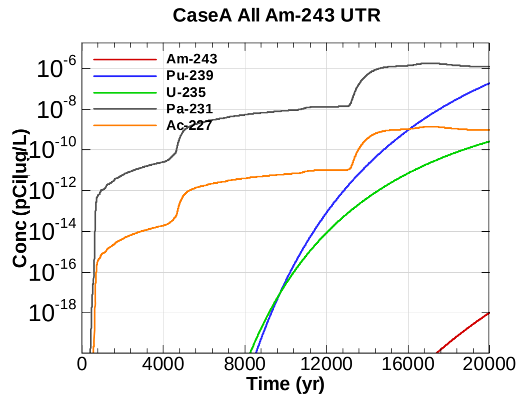

Figure C-4 - Aquifer Concentration for CaseA All Am-243 UTR

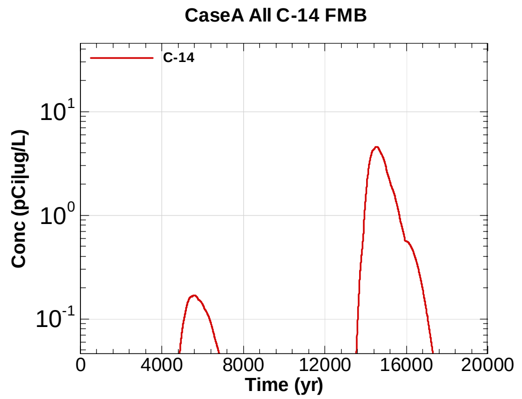

Figure C-5 - Aquifer Concentration for CaseA All C-14 FMB

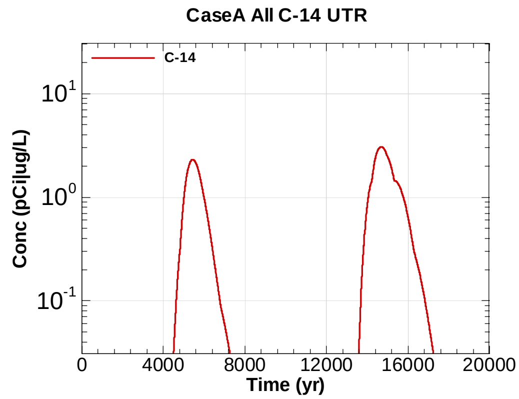

Figure C-6 - Aquifer Concentration for CaseA All C-14 UTR

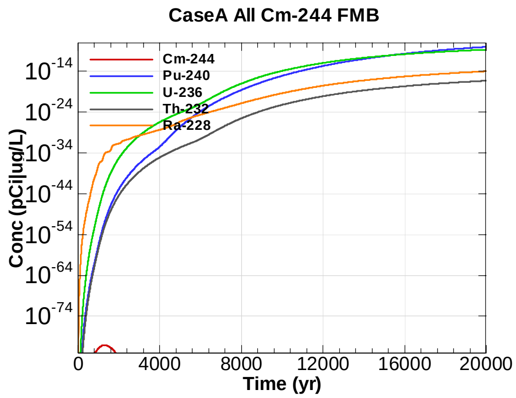

Figure C-7 - Aquifer Concentration for CaseA All Cm-244 FMB

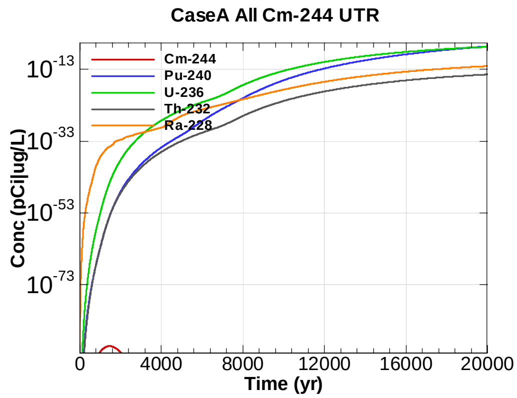

Figure C-8 - Aquifer Concentration for CaseA All Cm-244 UTR

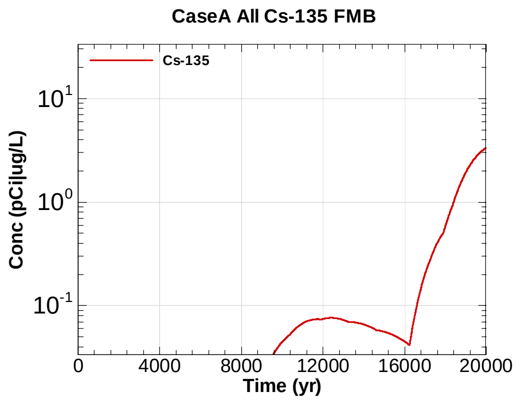

Figure C-9 - Aquifer Concentration for CaseA All Cs-135 FMB

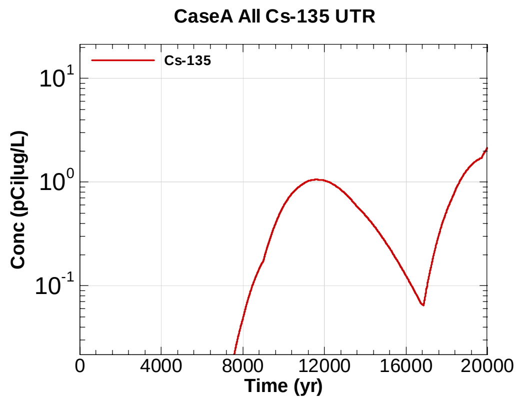

Figure C-10 - Aquifer Concentration for CaseA All Cs-135 UTR

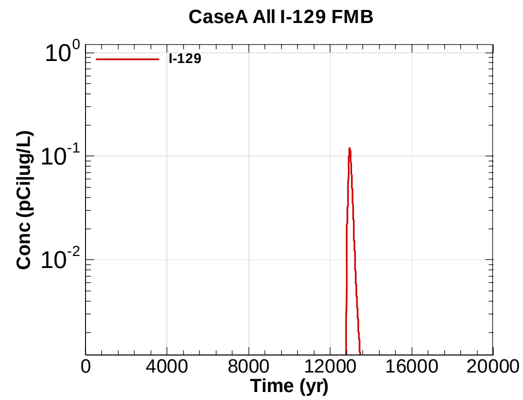

Figure C-11 - Aquifer Concentration for CaseA All I-129 FMB

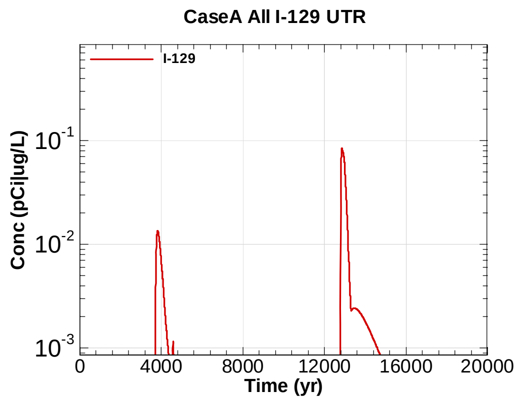

Figure C-12 - Aquifer Concentration for CaseA All I-129 UTR

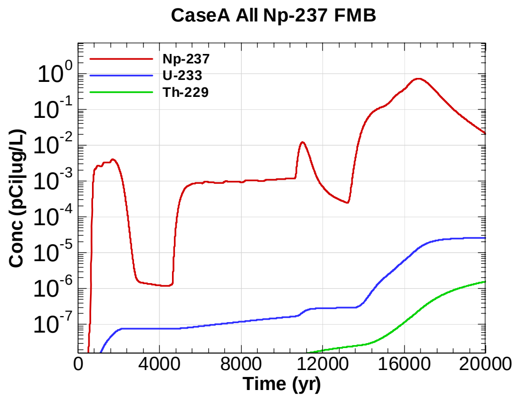

Figure C-13 - Aquifer Concentration for CaseA All Np-237 FMB

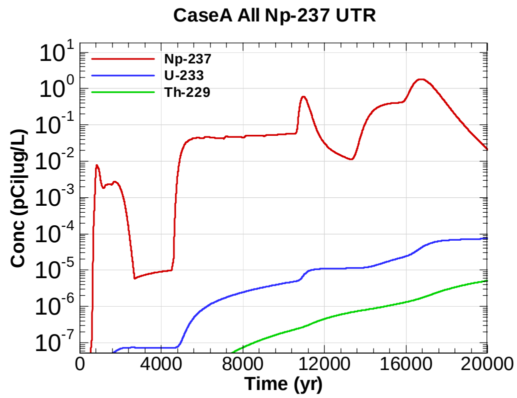

Figure C-14 - Aquifer Concentration for CaseA All Np-237 UTR

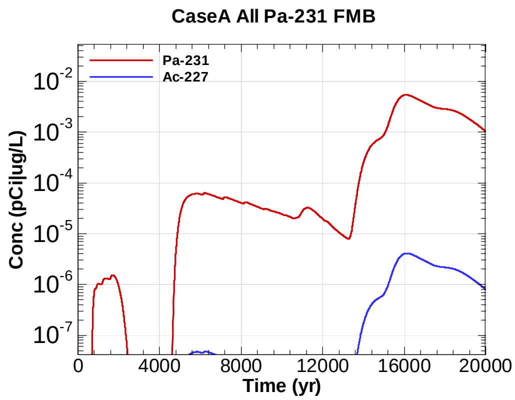

Figure C-15 - Aquifer Concentration for CaseA All Pa-231 FMB

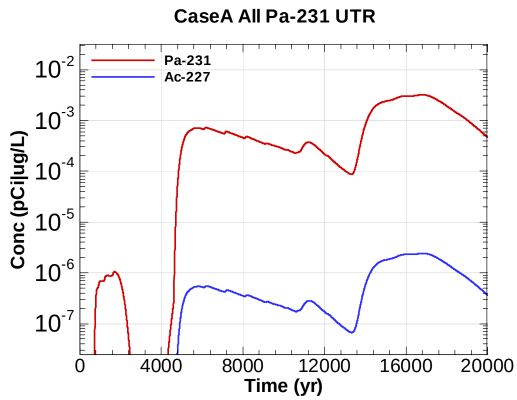

Figure C-16 - Aquifer Concentration for CaseA All Pa-231 UTR

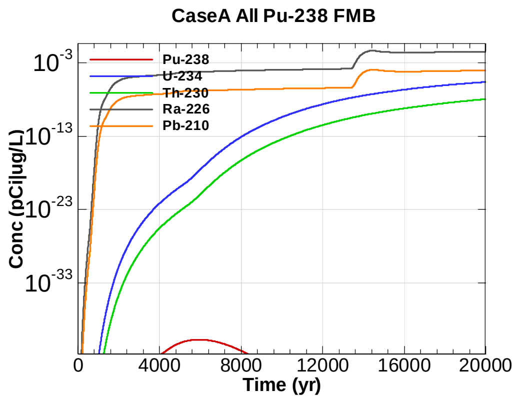

Figure C-17 - Aquifer Concentration for CaseA All Pu-238 FMB

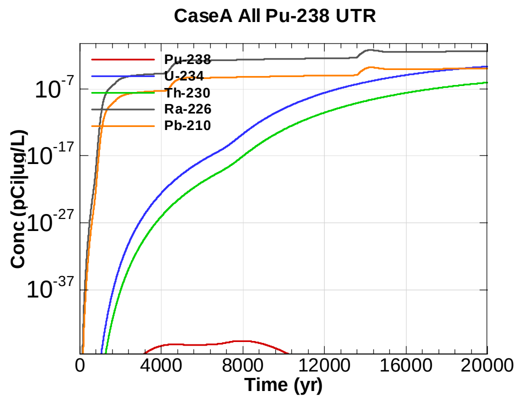

Figure C-18 - Aquifer Concentration for CaseA All Pu-238 UTR

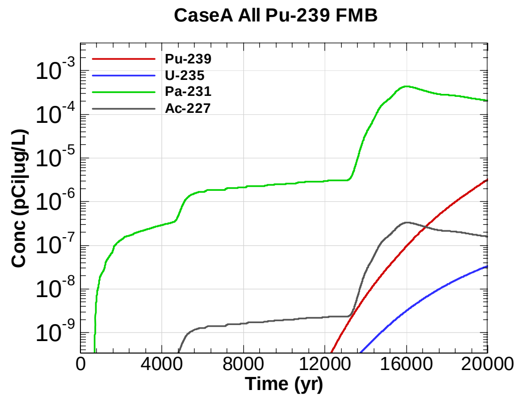

Figure C-19 - Aquifer Concentration for CaseA All Pu-239 FMB

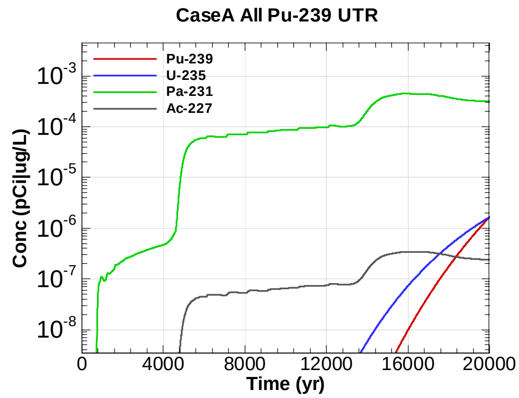

Figure C-20 - Aquifer Concentration for CaseA All Pu-239 UTR

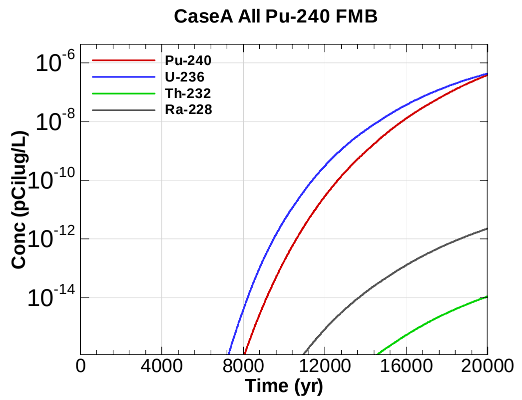

Figure C-21 - Aquifer Concentration for CaseA All Pu-240 FMB

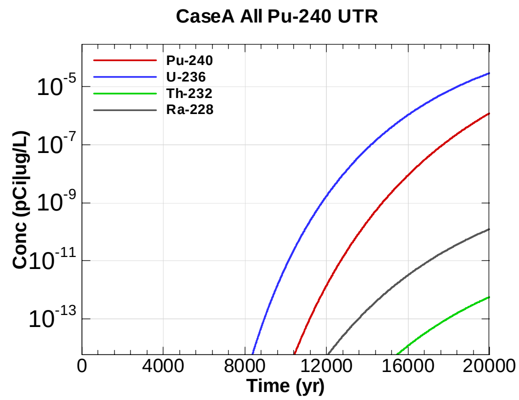

Figure C-22 - Aquifer Concentration for CaseA All Pu-240 UTR

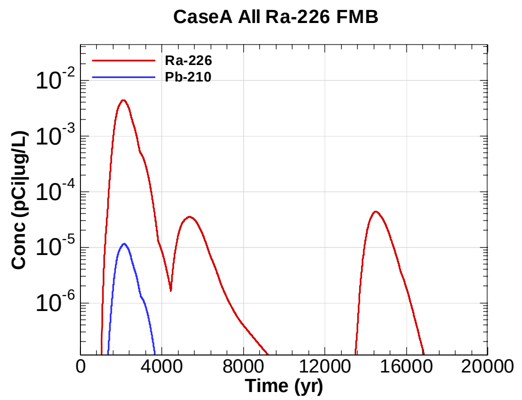

Figure C-23 - Aquifer Concentration for CaseA All Ra-226 FMB

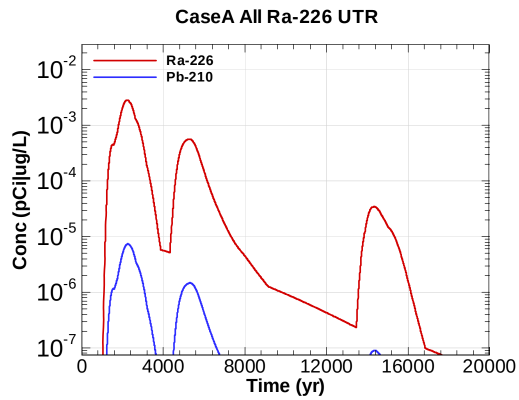

Figure C-24 - Aquifer Concentration for CaseA All Ra-226 UTR

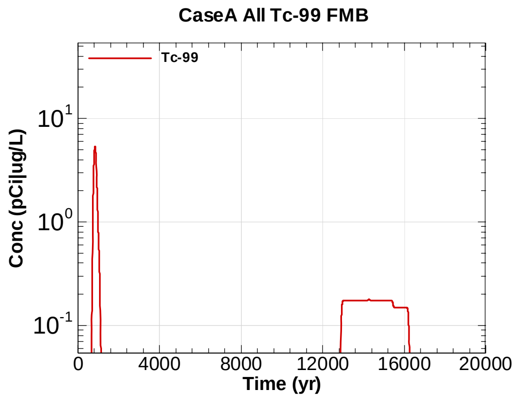

Figure C-25 - Aquifer Concentration for CaseA All Tc-99 FMB

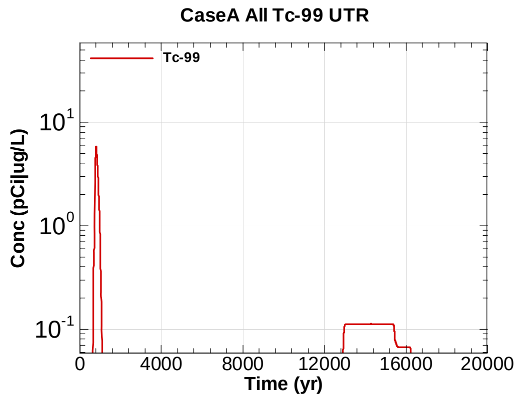

Figure C-26 - Aquifer Concentration for CaseA All Tc-99 UTR

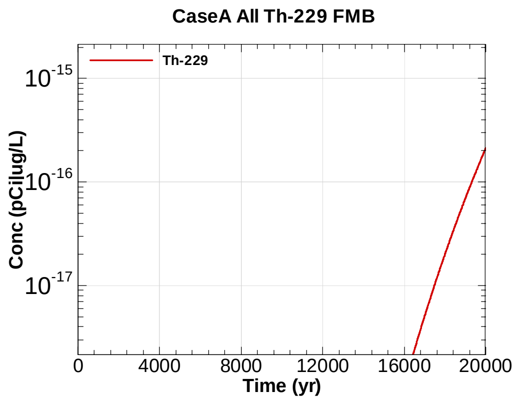

Figure C-27 - Aquifer Concentration for CaseA All Th-229 FMB

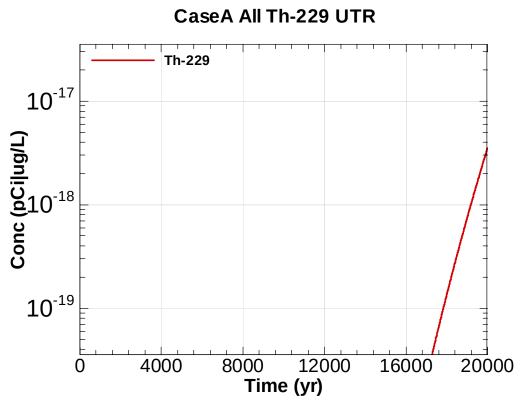

Figure C-28 - Aquifer Concentration for CaseA All Th-229 UTR

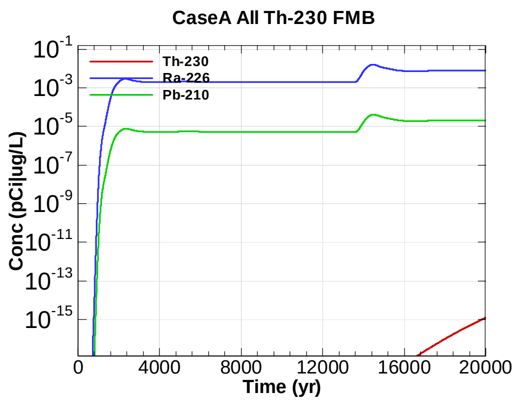

Figure C-29 - Aquifer Concentration for CaseA All Th-230 FMB

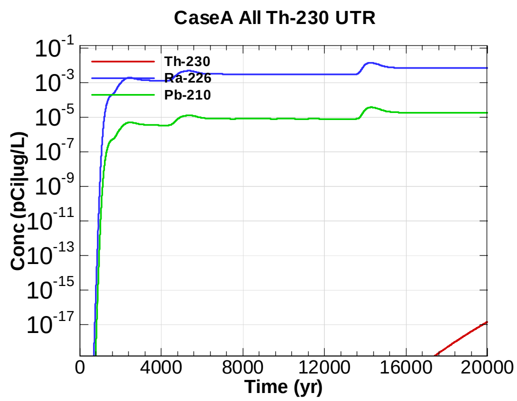

Figure C-30 - Aquifer Concentration for CaseA All Th-230 UTR

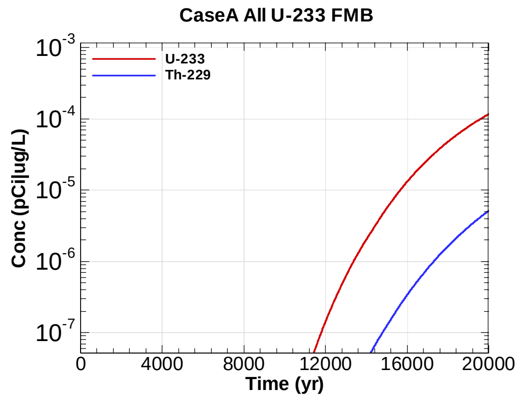

Figure C-31 - Aquifer Concentration for CaseA All U-233 FMB

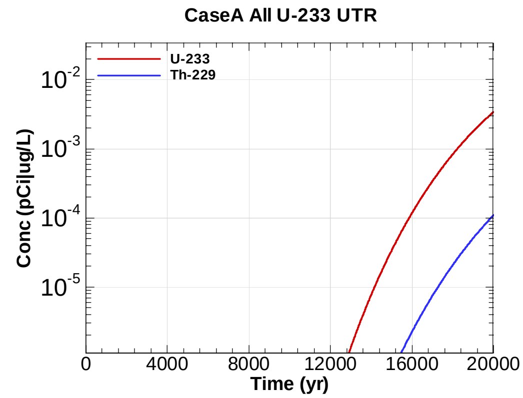

Figure C-32 - Aquifer Concentration for CaseA All U-233 UTR

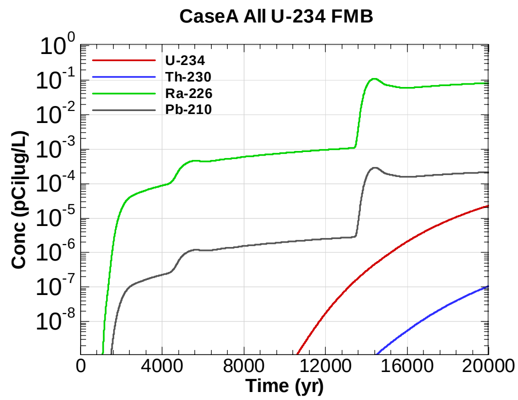

Figure C-33 - Aquifer Concentration for CaseA All U-234 FMB

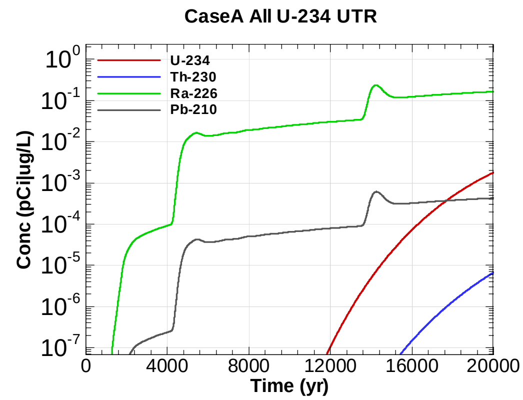

Figure C-34 - Aquifer Concentration for CaseA All U-234 UTR

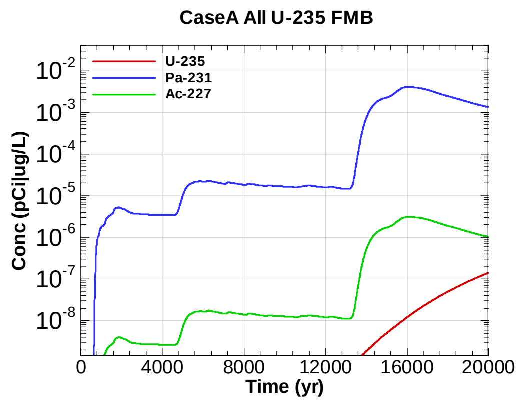

Figure C-35 - Aquifer Concentration for CaseA All U-235 FMB

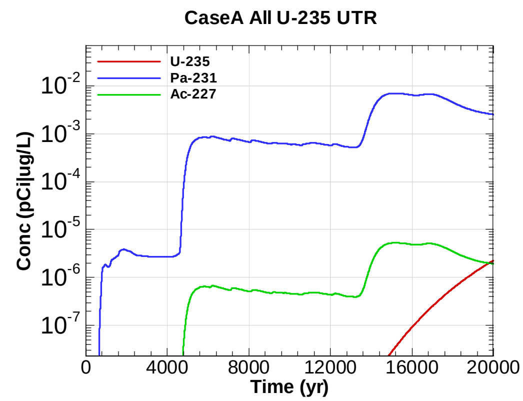

Figure C-36 - Aquifer Concentration for CaseA All U-235 UTR

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Appendix D
100-METER SENSITIVITY RUN RADIONUCLIDE CONCENTRATIONS FOR 100,000 YEARS

Appendix D contains curves showing the one-hundred meter radiological concentrations (sensitivity run radionuclides only) for all of FTF (tank and ancillary inventories) for the Base Case (Case/Configuration A). The 100,000 year concentration results are presented from the three aquifers of concern (Upper Three Runs Aquifer-Upper Zone, Upper Three Runs-Lower Zone, and Gordon Aquifer) for Sectors A through E.

Graph heading example "CaseA_100k All Am-241 A_UA"

Key

CaseA = scenario case/configuration
100k = period is over 100,000 years
All = all FTF inventory source
Am-241 = radionuclide of concern
A = sector of concern (see sector map with stream traces)
UA = aquifer of concern
  UA = Upper Three Runs – Upper Zone
  LA = Upper Three Runs – Lower Zone
  GA = Gordon

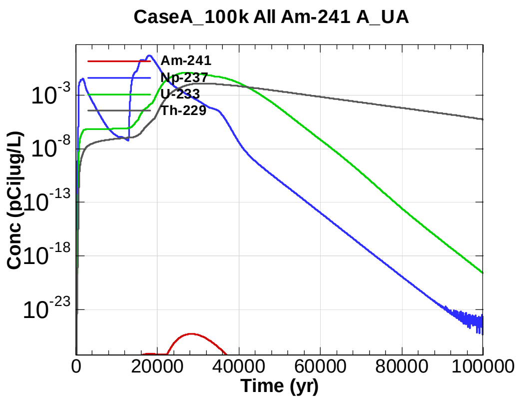

Figure D-1 - 100m Aquifer Concentration for CaseA_100k All Am-241 A_UA

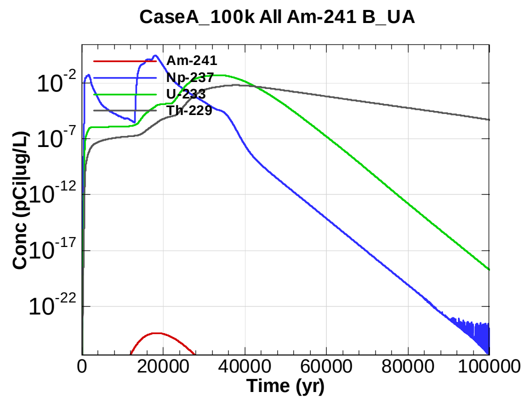

Figure D-2 - 100m Aquifer Concentration for CaseA_100k All Am-241 B_UA

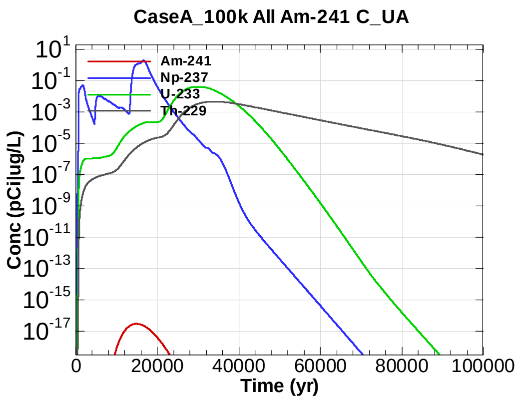

Figure D-3 - 100m Aquifer Concentration for CaseA_100k All Am-241 C_UA

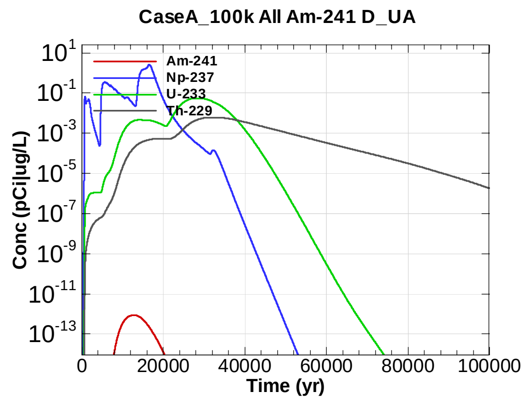

Figure D-4 - 100m Aquifer Concentration for CaseA_100k All Am-241 D_UA

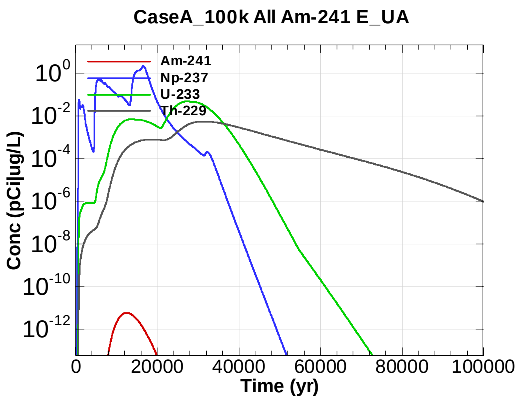

Figure D-5 - 100m Aquifer Concentration for CaseA_100k All Am-241 E_UA

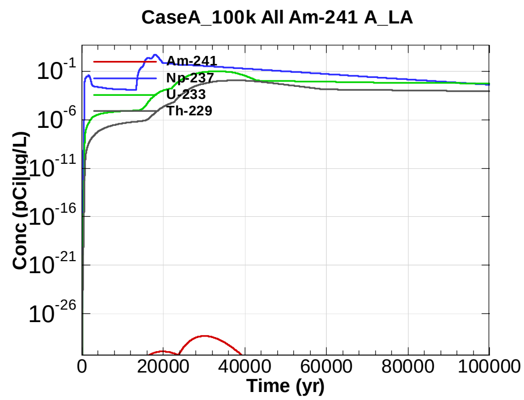

Figure D-6 - 100m Aquifer Concentration for CaseA_100k All Am-241 A_LA

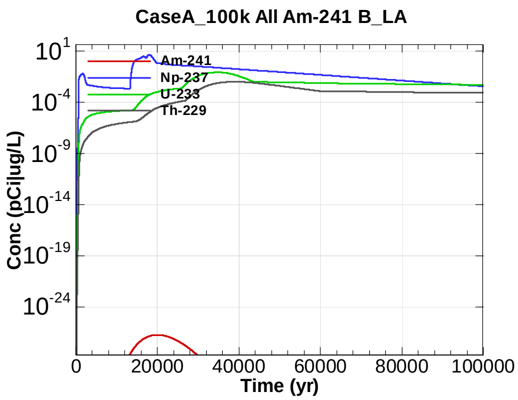

Figure D-7 - 100m Aquifer Concentration for CaseA_100k All Am-241 B_LA

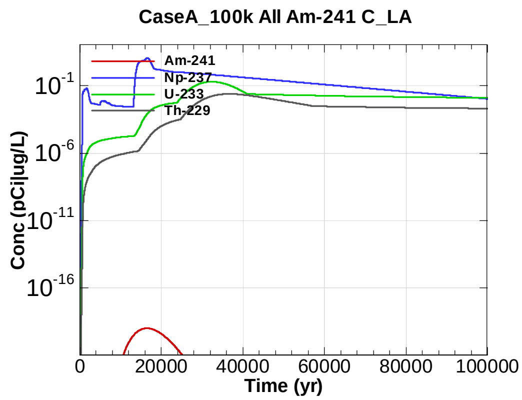

Figure D-8 - 100m Aquifer Concentration for CaseA_100k All Am-241 C_LA

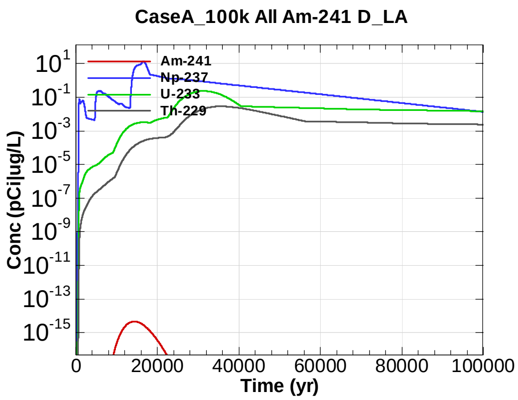

Figure D-9 - 100m Aquifer Concentration for CaseA_100k All Am-241 D_LA

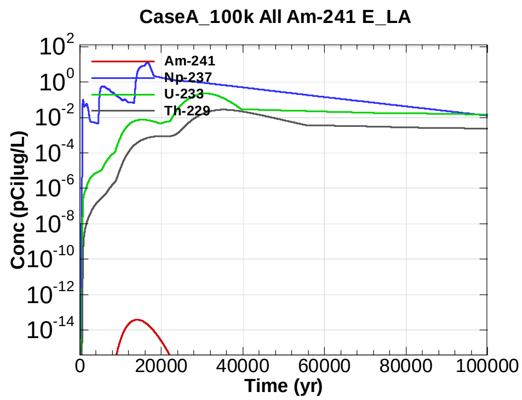

Figure D-10 - 100m Aquifer Concentration for CaseA_100k All Am-241 E_LA

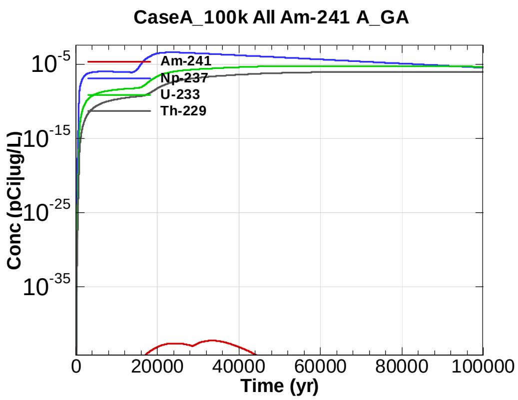

Figure D-11 - 100m Aquifer Concentration for CaseA_100k All Am-241 A_GA

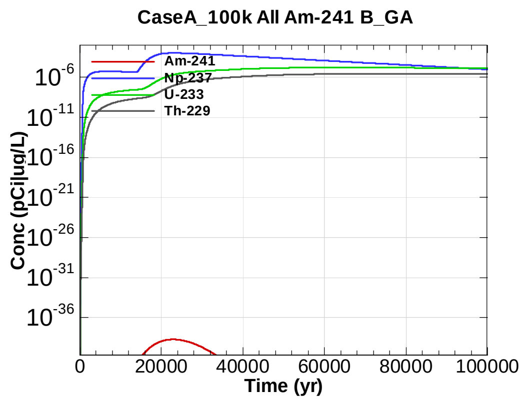

Figure D-12 - 100m Aquifer Concentration for CaseA_100k All Am-241 B_GA

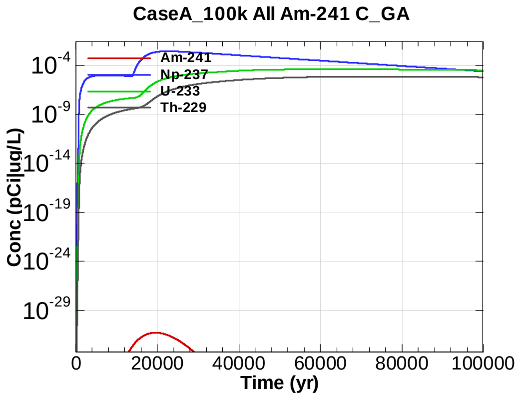

Figure D-13 - 100m Aquifer Concentration for CaseA_100k All Am-241 C_GA

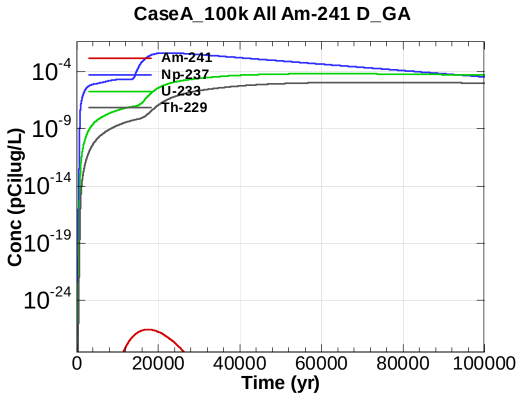

Figure D-14 - 100m Aquifer Concentration for CaseA_100k All Am-241 D_GA

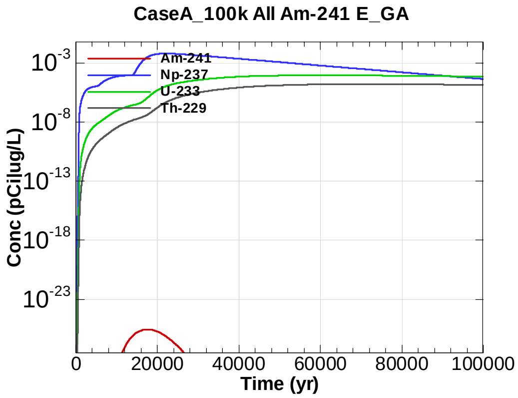

Figure D-15 - 100m Aquifer Concentration for CaseA_100k All Am-241 E_GA

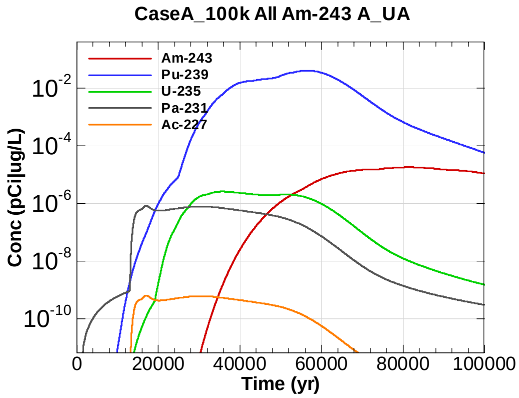

Figure D-16 - 100m Aquifer Concentration for CaseA_100k All Am-243 A_UA

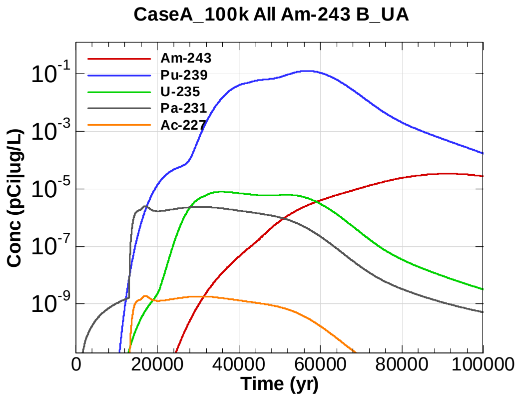

Figure D-17 - 100m Aquifer Concentration for CaseA_100k All Am-243 B_UA

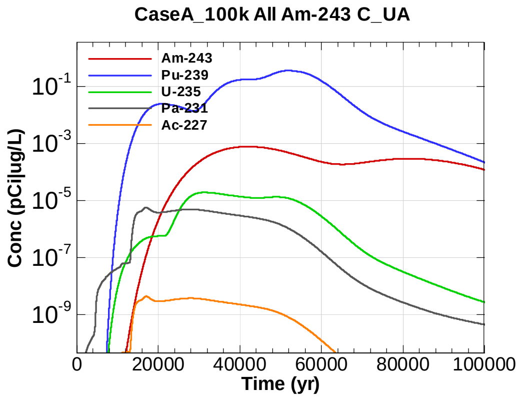

Figure D-18 - 100m Aquifer Concentration for CaseA_100k All Am-243 C_UA

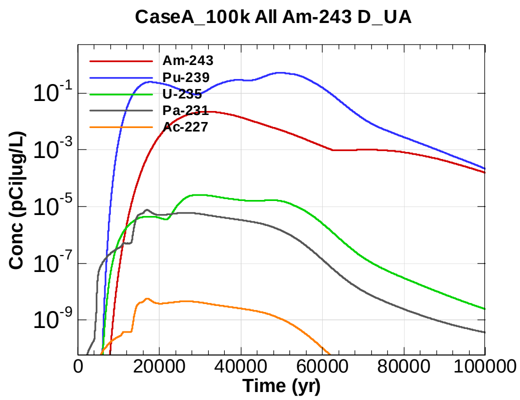

Figure D-19 - 100m Aquifer Concentration for CaseA_100k All Am-243 D_UA

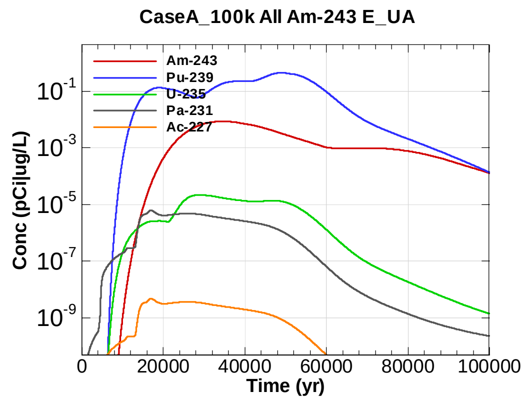

Figure D-20 - 100m Aquifer Concentration for CaseA_100k All Am-243 E_UA

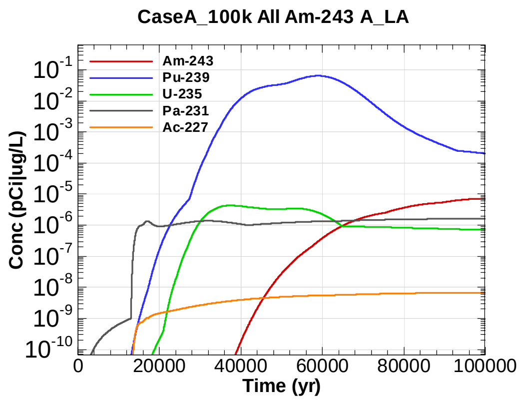

Figure D-21 - 100m Aquifer Concentration for CaseA_100k All Am-243 A_LA

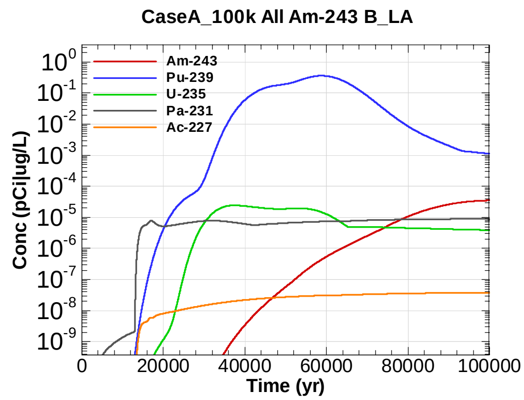

Figure D-22 - 100m Aquifer Concentration for CaseA_100k All Am-243 B_LA

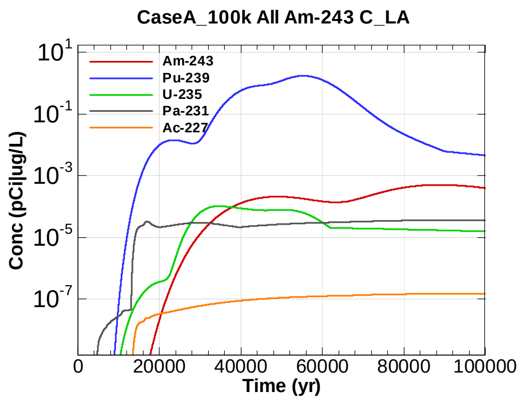

Figure D-23 - 100m Aquifer Concentration for CaseA_100k All Am-243 C_LA

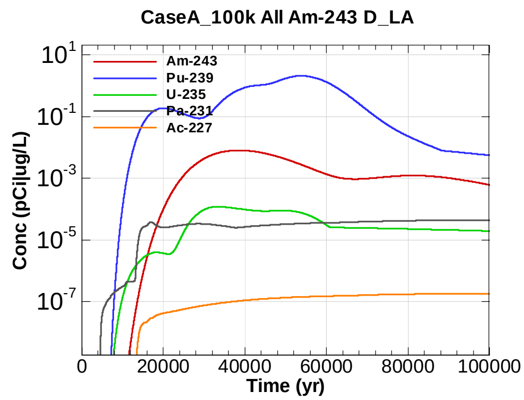

Figure D-24 - 100m Aquifer Concentration for CaseA_100k All Am-243 D_LA

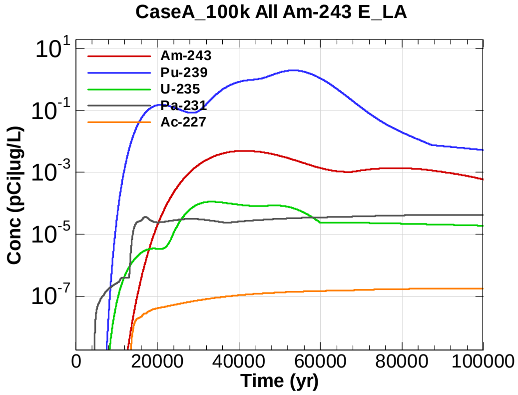

Figure D-25 - 100m Aquifer Concentration for CaseA_100k All Am-243 E_LA

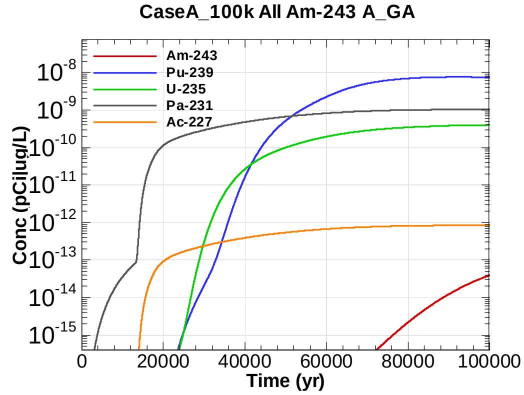

Figure D-26 - 100m Aquifer Concentration for CaseA_100k All Am-243 A_GA

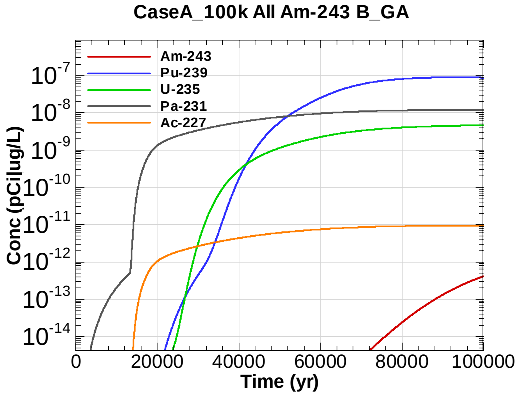

Figure D-27 - 100m Aquifer Concentration for CaseA_100k All Am-243 B_GA

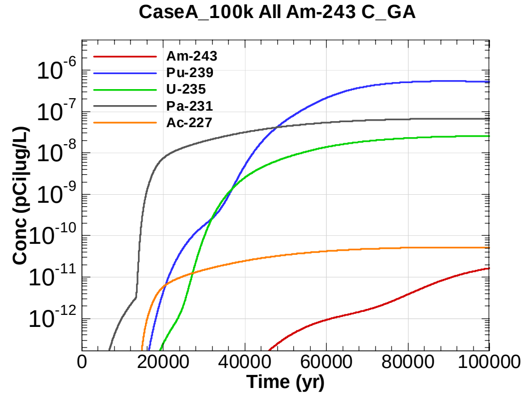

Figure D-28 - 100m Aquifer Concentration for CaseA_100k All Am-243 C_GA

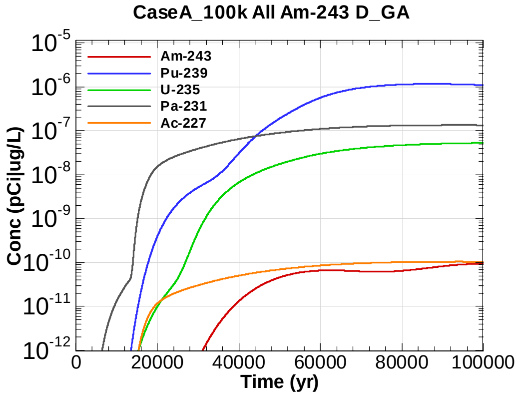

Figure D-29 - 100m Aquifer Concentration for CaseA_100k All Am-243 D_GA

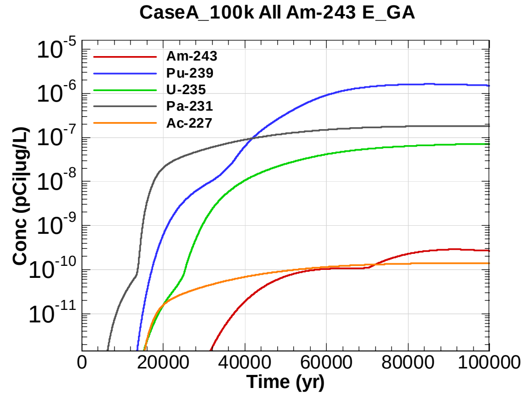

Figure D-30 - 100m Aquifer Concentration for CaseA_100k All Am-243 E_GA

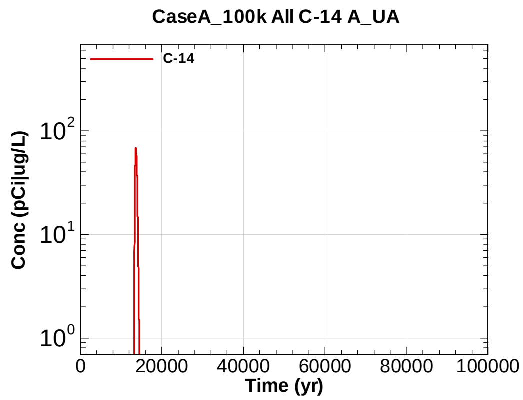

Figure D-31 - 100m Aquifer Concentration for CaseA_100k All C-14 A_UA

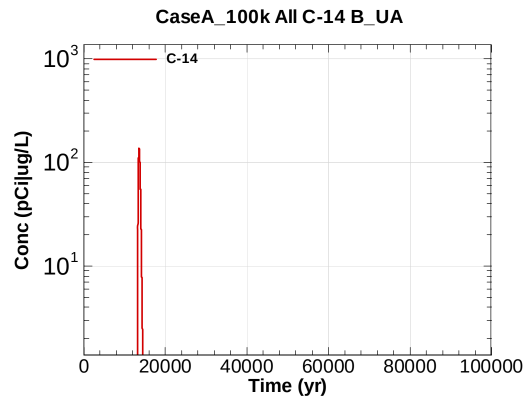

Figure D-32 - 100m Aquifer Concentration for CaseA_100k All C-14 B_UA

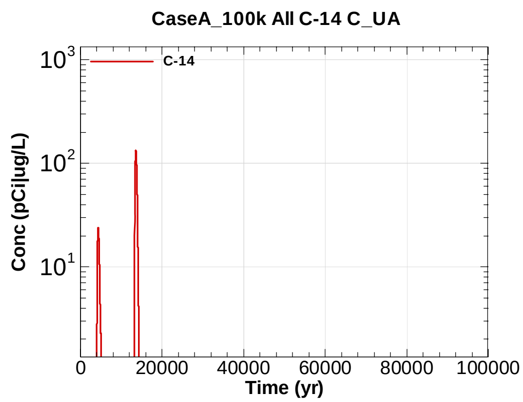

Figure D-33 - 100m Aquifer Concentration for CaseA_100k All C-14 C_UA

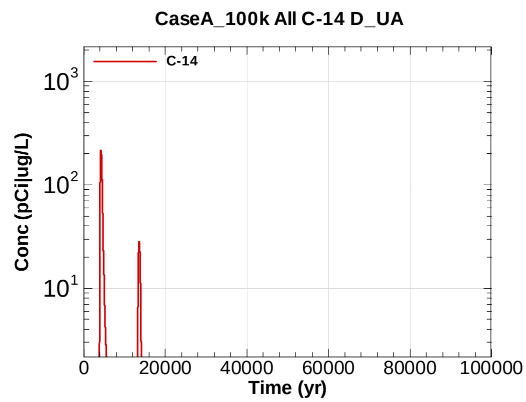

Figure D-34 - 100m Aquifer Concentration for CaseA_100k All C-14 D_UA

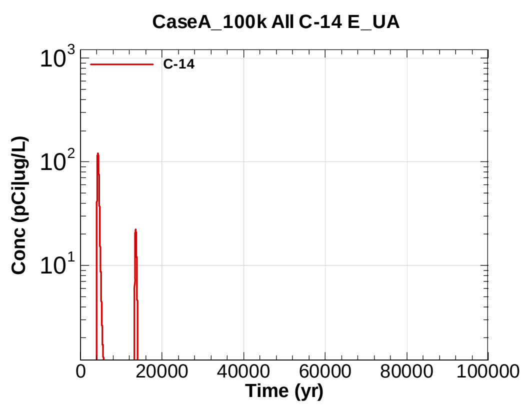

Figure D-35 - 100m Aquifer Concentration for CaseA_100k All C-14 E_UA

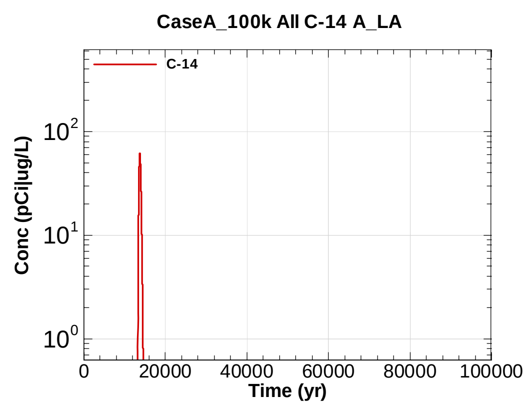

Figure D-36 - 100m Aquifer Concentration for CaseA_100k All C-14 A_LA

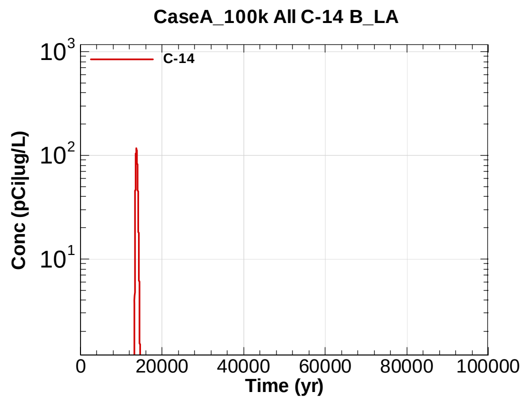

Figure D-37 - 100m Aquifer Concentration for CaseA_100k All C-14 B_LA

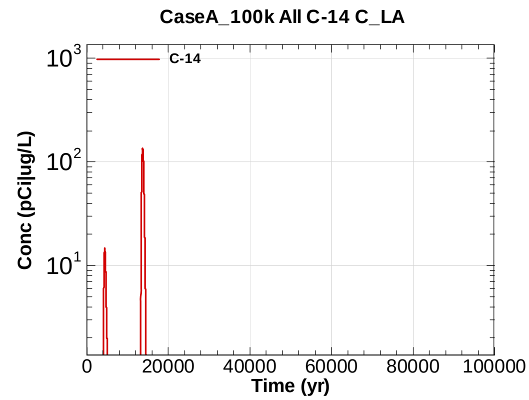

Figure D-38 - 100m Aquifer Concentration for CaseA_100k All C-14 C_LA

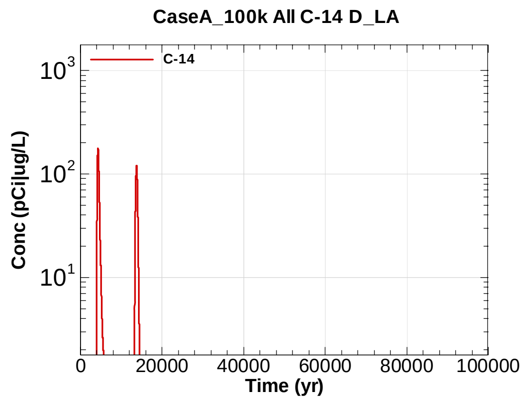

Figure D-39 - 100m Aquifer Concentration for CaseA_100k All C-14 D_LA

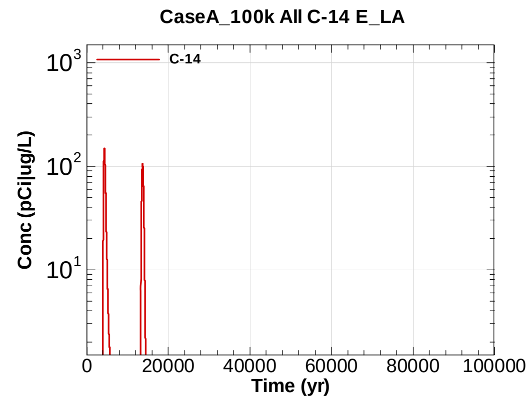

Figure D-40 - 100m Aquifer Concentration for CaseA_100k All C-14 E_LA

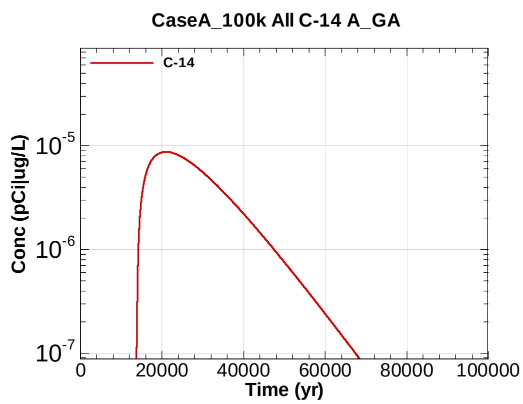

Figure D-41 - 100m Aquifer Concentration for CaseA_100k All C-14 A_GA

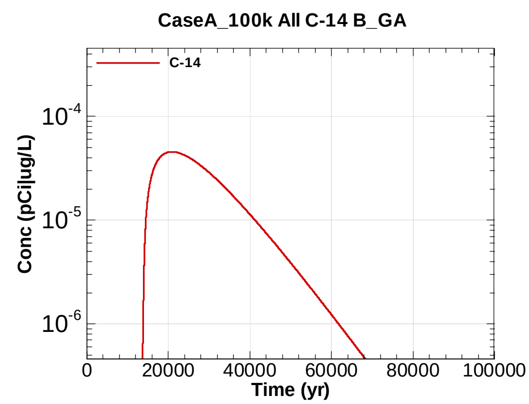

Figure D-42 - 100m Aquifer Concentration for CaseA_100k All C-14 B_GA

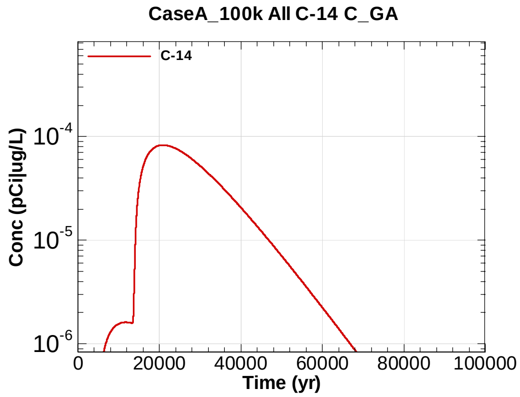

Figure D-43 - 100m Aquifer Concentration for CaseA_100k All C-14 C_GA

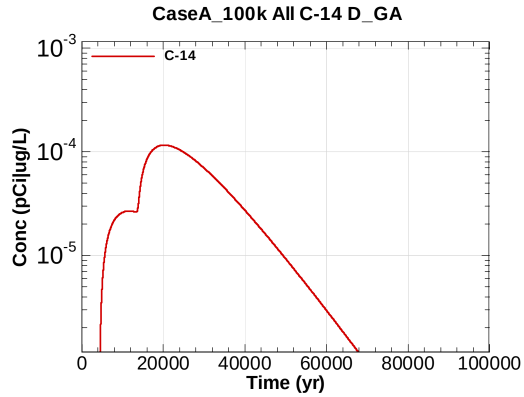

Figure D-44 - 100m Aquifer Concentration for CaseA_100k All C-14 D_GA

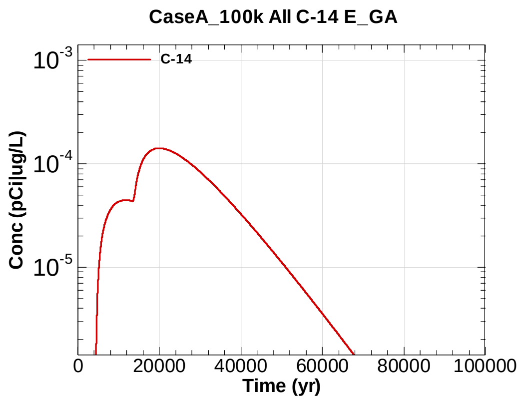

Figure D-45 - 100m Aquifer Concentration for CaseA_100k All C-14 E_GA

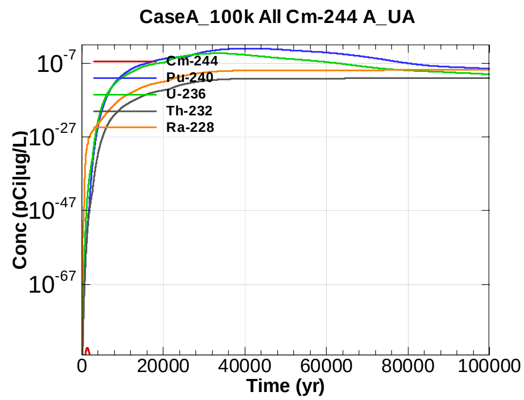

Figure D-46 - 100m Aquifer Concentration for CaseA_100k All Cm-244 A_UA

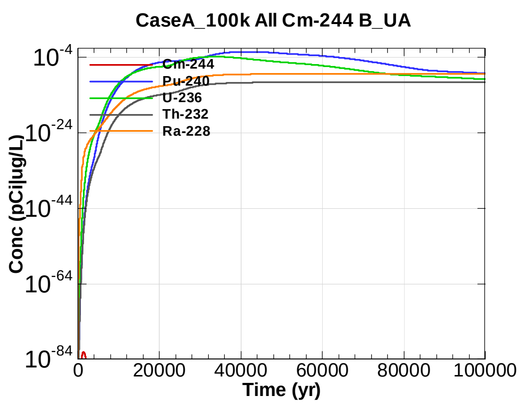

Figure D-47 - 100m Aquifer Concentration for CaseA_100k All Cm-244 B_UA

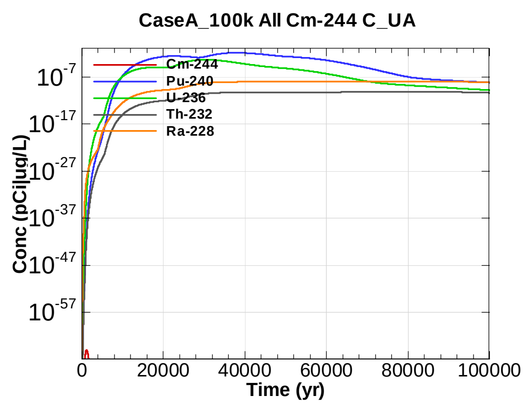

Figure D-48 - 100m Aquifer Concentration for CaseA_100k All Cm-244 C_UA

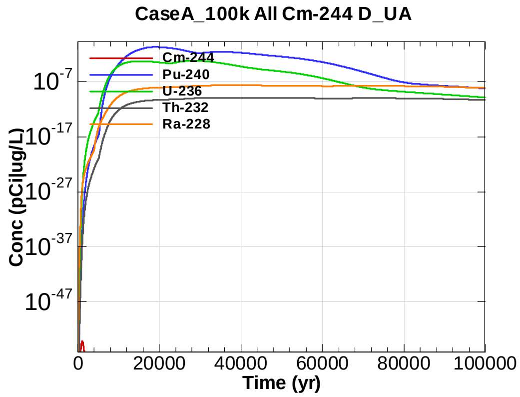

Figure D-49 - 100m Aquifer Concentration for CaseA_100k All Cm-244 D_UA

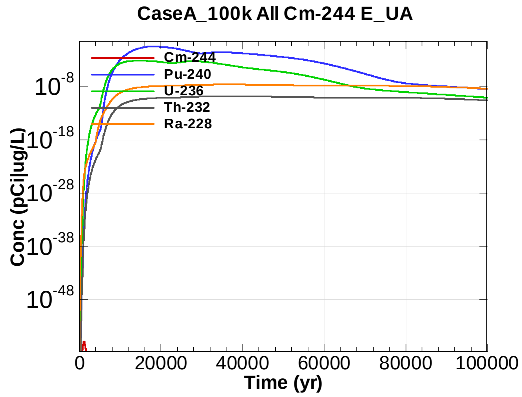

Figure D-50 - 100m Aquifer Concentration for CaseA_100k All Cm-244 E_UA

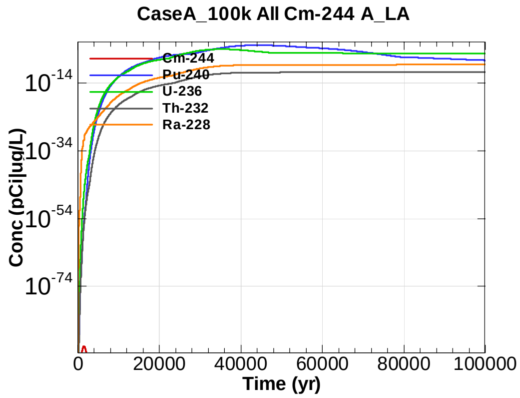

Figure D-51 - 100m Aquifer Concentration for CaseA_100k All Cm-244 A_LA

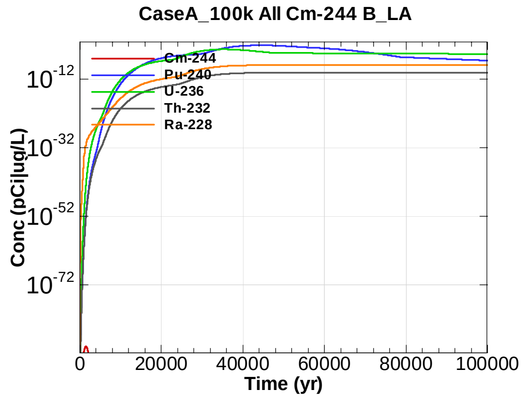

Figure D-52 - 100m Aquifer Concentration for CaseA_100k All Cm-244 B_LA

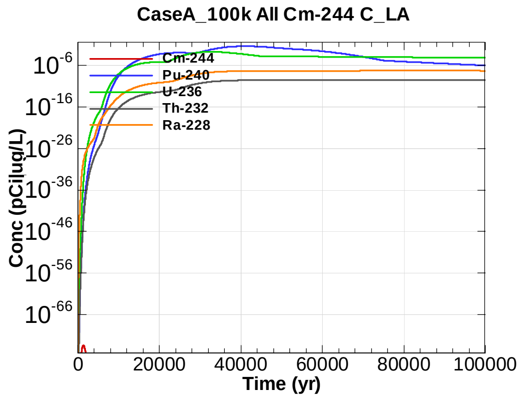

Figure D-53 - 100m Aquifer Concentration for CaseA_100k All Cm-244 C_LA

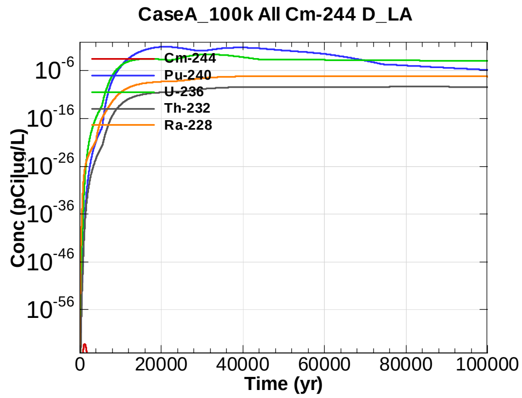

Figure D-54 - 100m Aquifer Concentration for CaseA_100k All Cm-244 D_LA

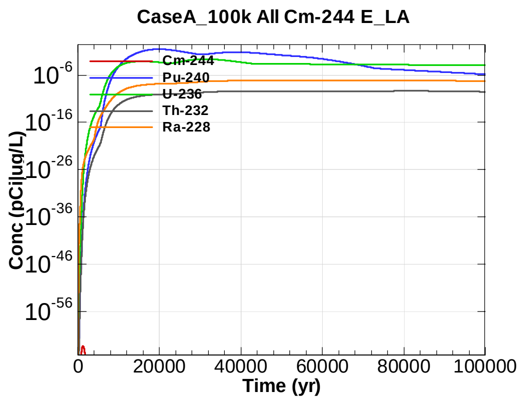

Figure D-55 - 100m Aquifer Concentration for CaseA_100k All Cm-244 E_LA

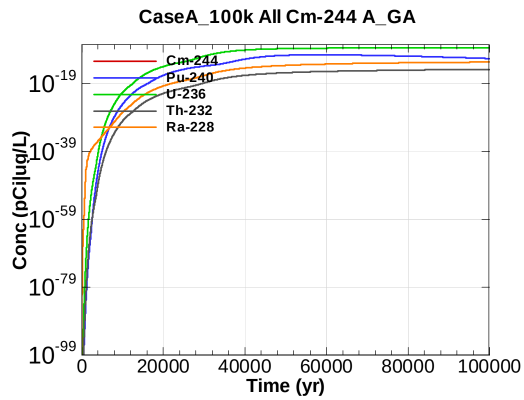

Figure D-56 - 100m Aquifer Concentration for CaseA_100k All Cm-244 A_GA

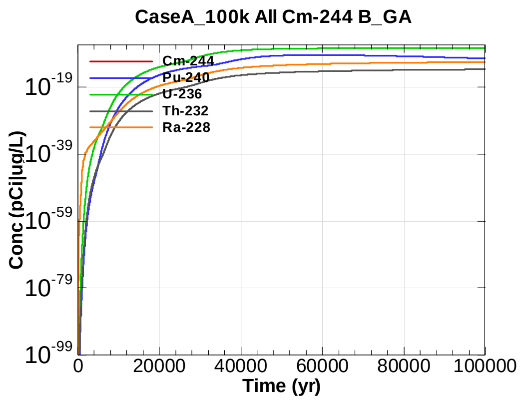

Figure D-57 - 100m Aquifer Concentration for CaseA_100k All Cm-244 B_GA

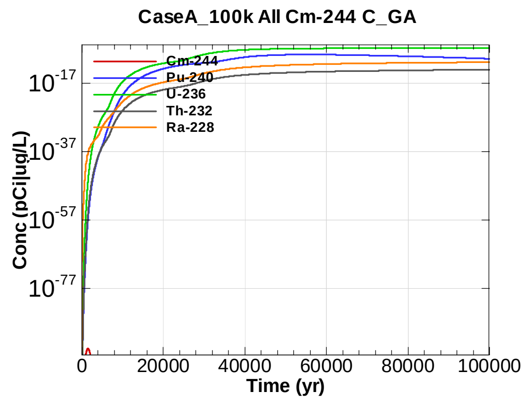

Figure D-58 - 100m Aquifer Concentration for CaseA_100k All Cm-244 C_GA

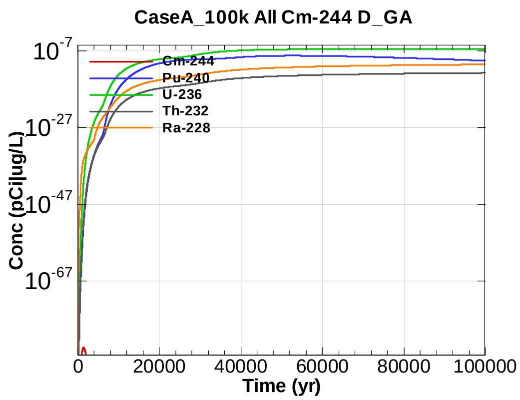

Figure D-59 - 100m Aquifer Concentration for CaseA_100k All Cm-244 D_GA

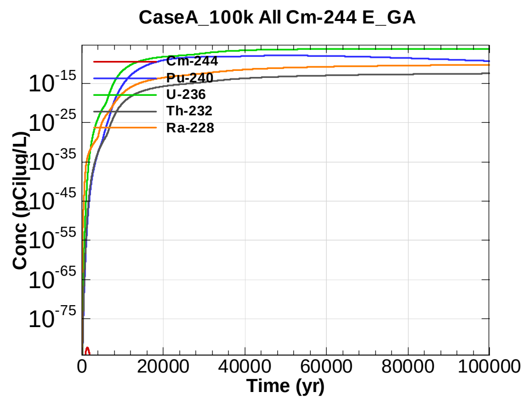

Figure D-60 - 100m Aquifer Concentration for CaseA_100k All Cm-244 E_GA

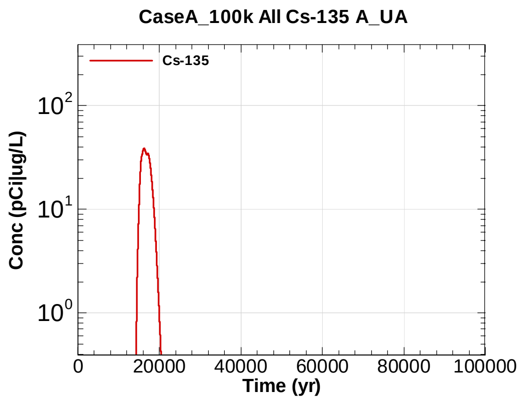

Figure D-61 - 100m Aquifer Concentration for CaseA_100k All Cs-135 A_UA

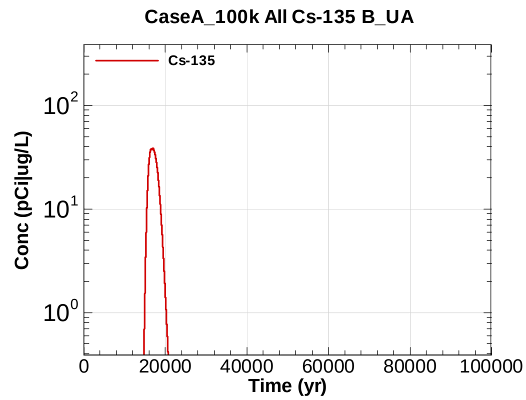

Figure D-62 - 100m Aquifer Concentration for CaseA_100k All Cs-135 B_UA

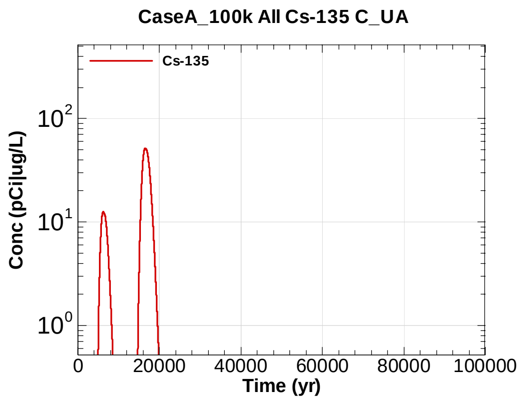

Figure D-63 - 100m Aquifer Concentration for CaseA_100k All Cs-135 C_UA

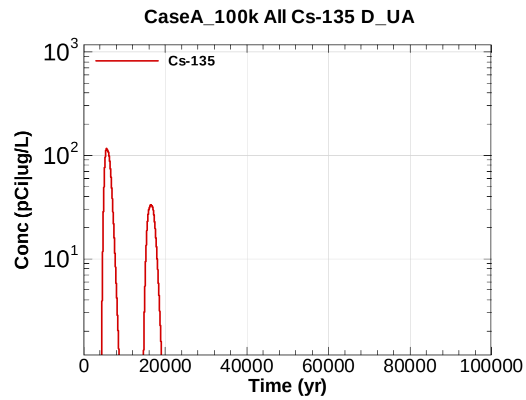

Figure D-64 - 100m Aquifer Concentration for CaseA_100k All Cs-135 D_UA

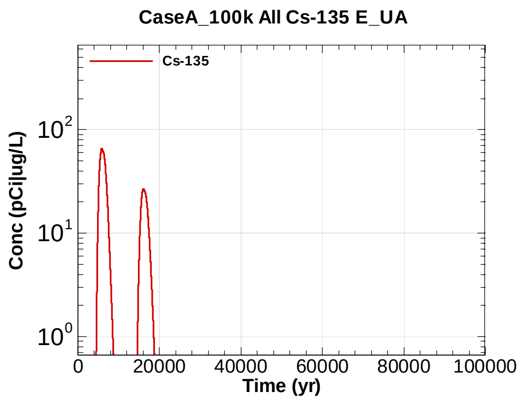

Figure D-65 - 100m Aquifer Concentration for CaseA_100k All Cs-135 E_UA

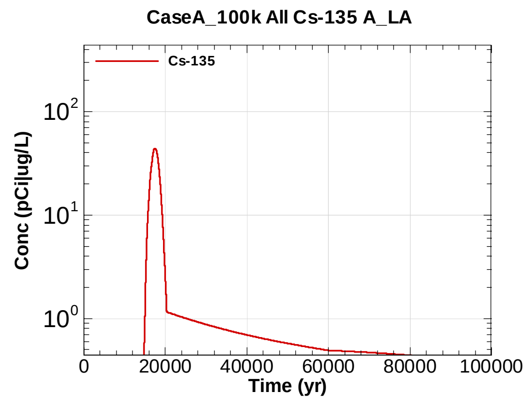

Figure D-66 - 100m Aquifer Concentration for CaseA_100k All Cs-135 A_LA

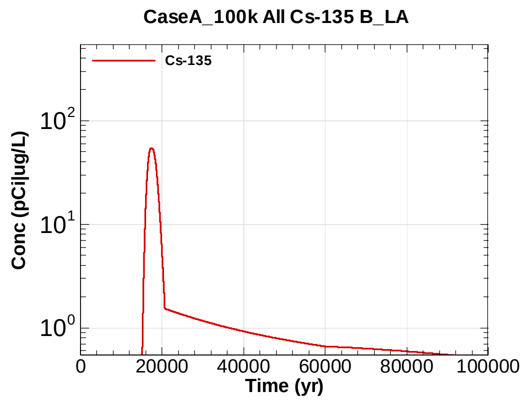

Figure D-67 - 100m Aquifer Concentration for CaseA_100k All Cs-135 B_LA

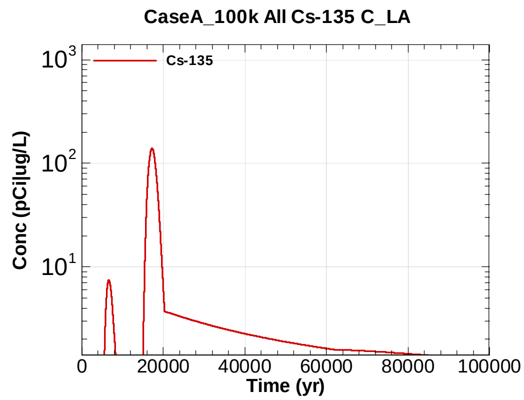

Figure D-68 - 100m Aquifer Concentration for CaseA_100k All Cs-135 C_LA

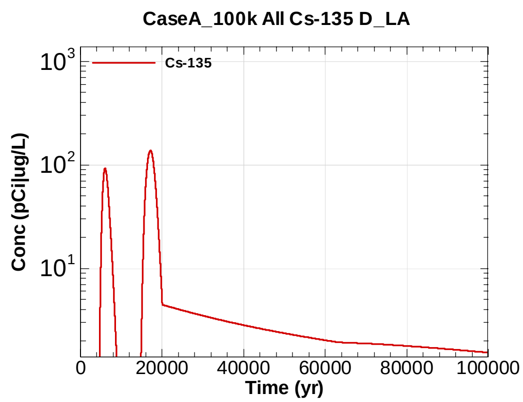

Figure D-69 - 100m Aquifer Concentration for CaseA_100k All Cs-135 D_LA

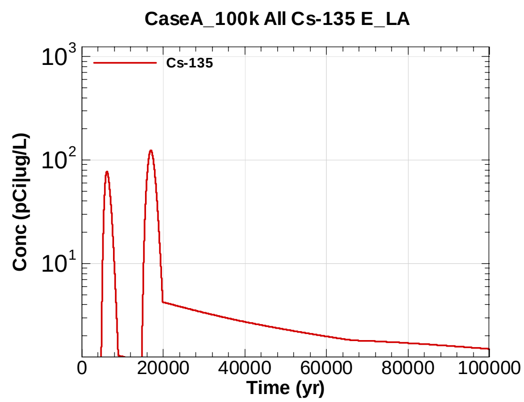

Figure D-70 - 100m Aquifer Concentration for CaseA_100k All Cs-135 E_LA

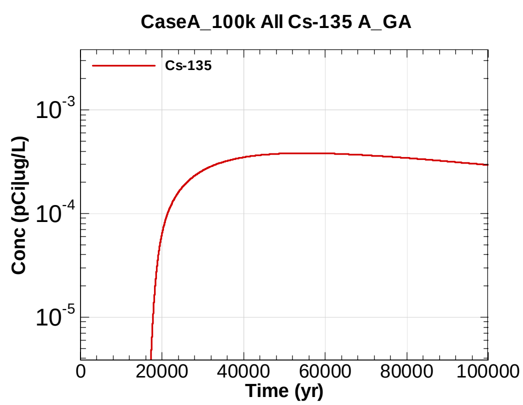

Figure D-71 - 100m Aquifer Concentration for CaseA_100k All Cs-135 A_GA

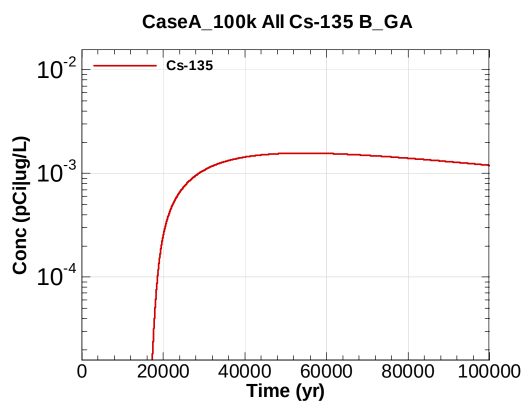

Figure D-72 - 100m Aquifer Concentration for CaseA_100k All Cs-135 B_GA

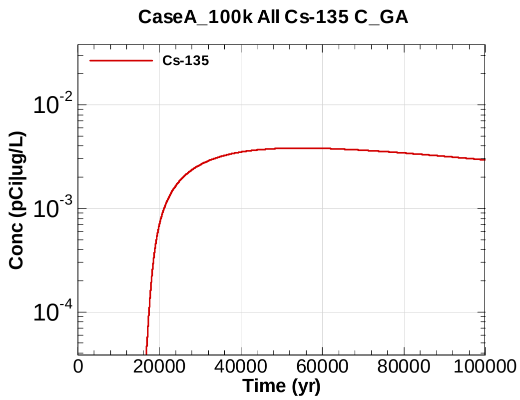

Figure D-73 - 100m Aquifer Concentration for CaseA_100k All Cs-135 C_GA

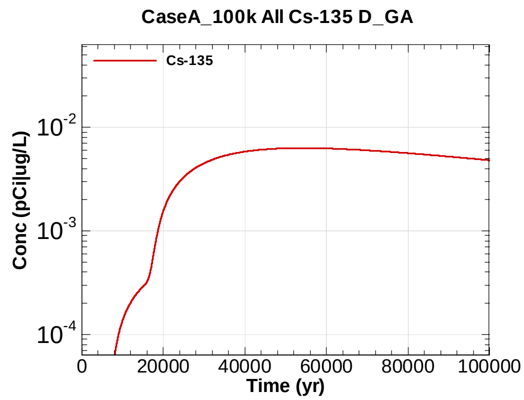

Figure D-74 - 100m Aquifer Concentration for CaseA_100k All Cs-135 D_GA

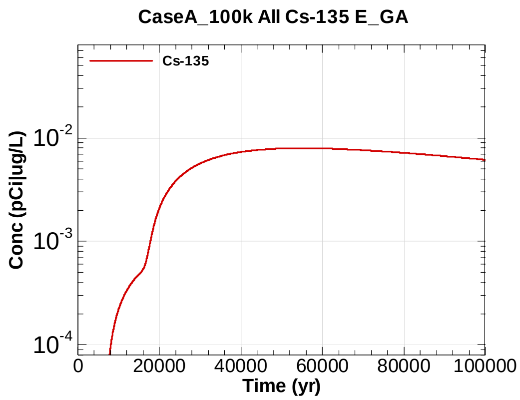

Figure D-75 - 100m Aquifer Concentration for CaseA_100k All Cs-135 E_GA

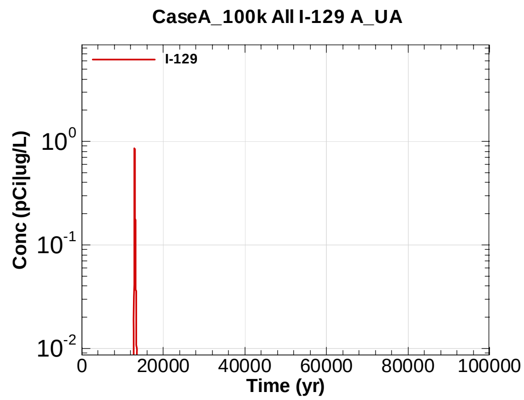

Figure D-76 - 100m Aquifer Concentration for CaseA_100k All I-129 A_UA

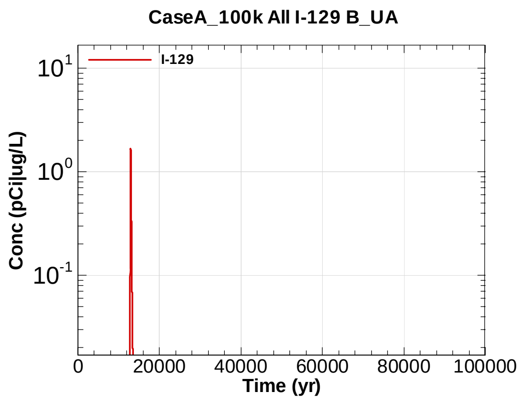

Figure D-77 - 100m Aquifer Concentration for CaseA_100k All I-129 B_UA

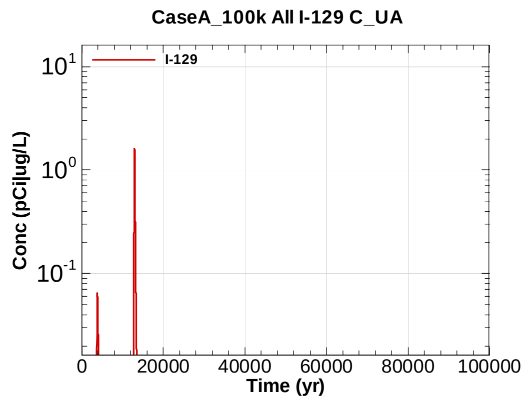

Figure D-78 - 100m Aquifer Concentration for CaseA_100k All I-129 C_UA

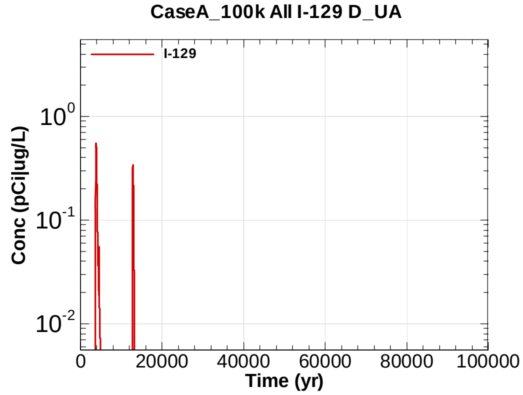

Figure D-79 - 100m Aquifer Concentration for CaseA_100k All I-129 D_UA

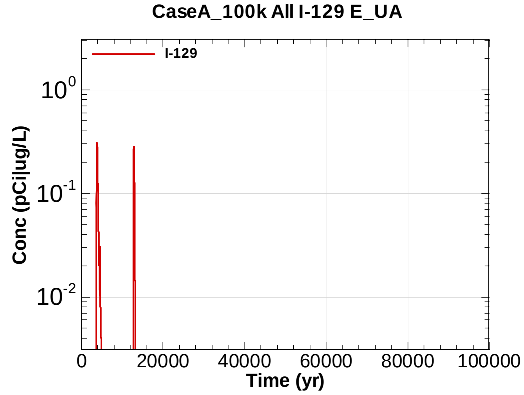

Figure D-80 - 100m Aquifer Concentration for CaseA_100k All I-129 E_UA

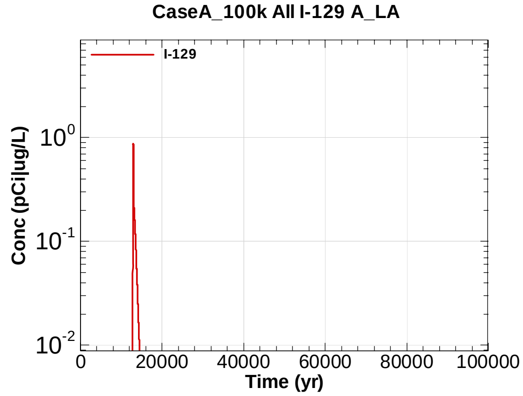

Figure D-81 - 100m Aquifer Concentration for CaseA_100k All I-129 A_LA

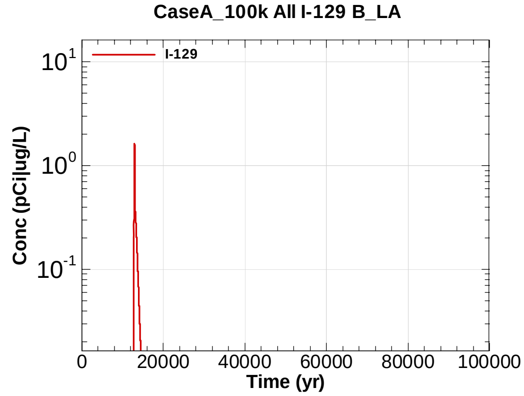

Figure D-82 - 100m Aquifer Concentration for CaseA_100k All I-129 B_LA

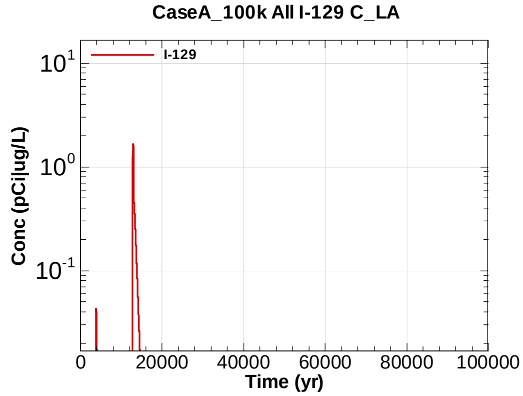

Figure D-83 - 100m Aquifer Concentration for CaseA_100k All I-129 C_LA

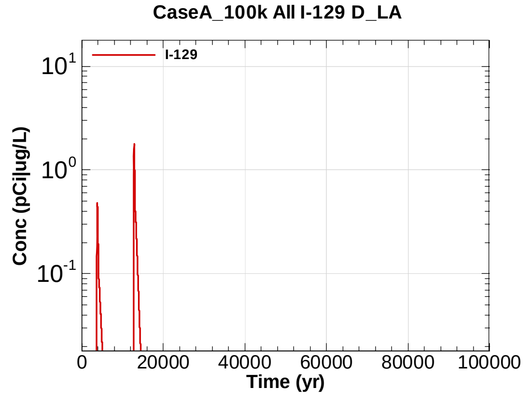

Figure D-84 - 100m Aquifer Concentration for CaseA_100k All I-129 D_LA

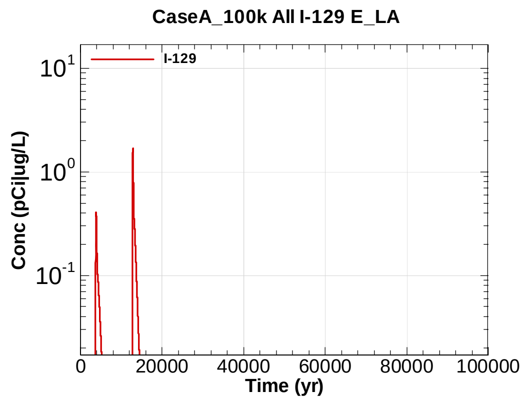

Figure D-85 - 100m Aquifer Concentration for CaseA_100k All I-129 E_LA

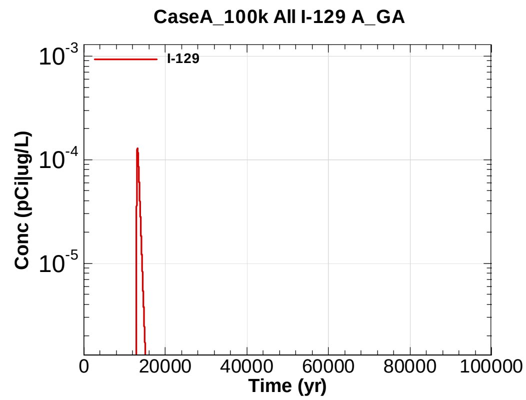

Figure D-86 - 100m Aquifer Concentration for CaseA_100k All I-129 A_GA

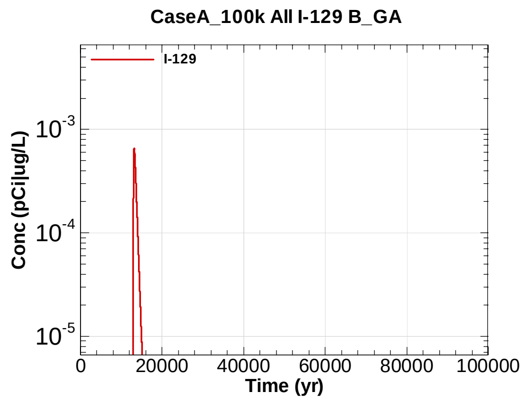

Figure D-87 - 100m Aquifer Concentration for CaseA_100k All I-129 B_GA

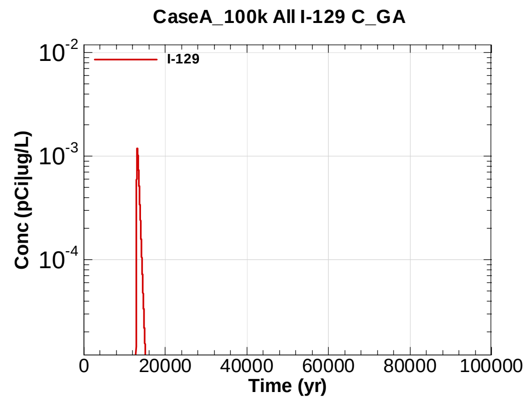

Figure D-88 - 100m Aquifer Concentration for CaseA_100k All I-129 C_GA

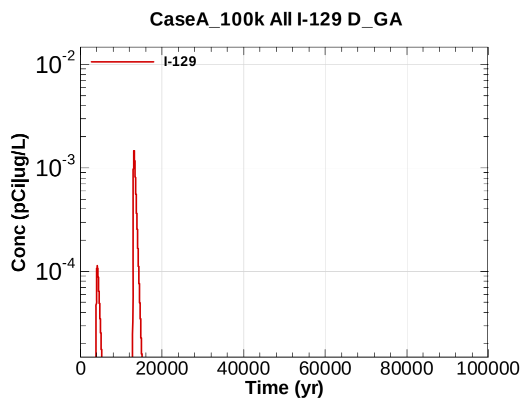

Figure D-89 - 100m Aquifer Concentration for CaseA_100k All I-129 D_GA

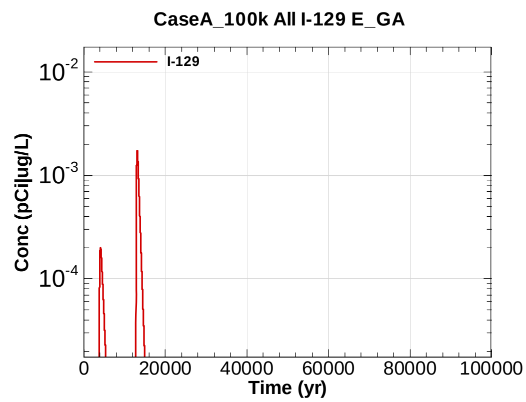

Figure D-90 - 100m Aquifer Concentration for CaseA_100k All I-129 E_GA

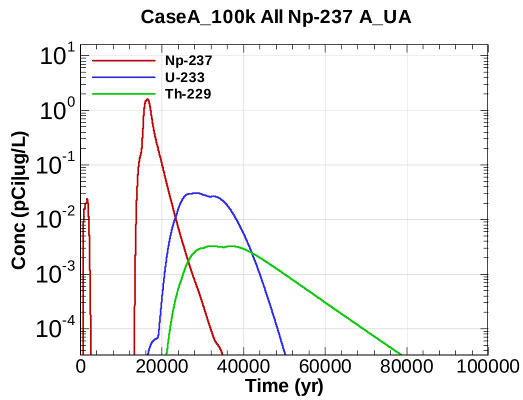

Figure D-91 - 100m Aquifer Concentration for CaseA_100k All Np-237 A_UA

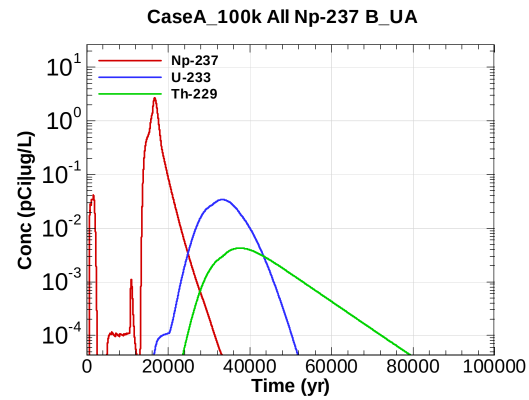

Figure D-92 - 100m Aquifer Concentration for CaseA_100k All Np-237 B_UA

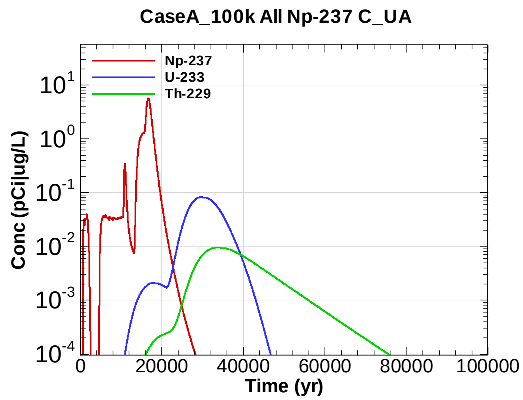

Figure D-93 - 100m Aquifer Concentration for CaseA_100k All Np-237 C_UA

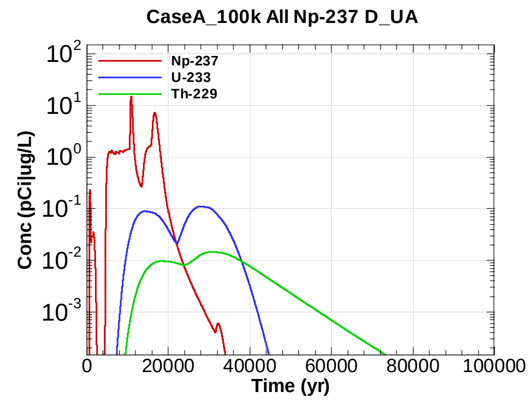

Figure D-94 - 100m Aquifer Concentration for CaseA_100k All Np-237 D_UA

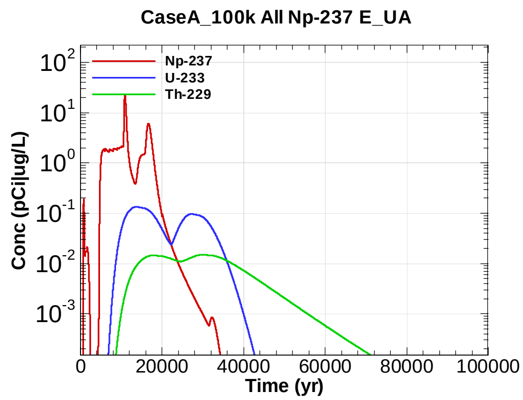

Figure D-95 - 100m Aquifer Concentration for CaseA_100k All Np-237 E_UA

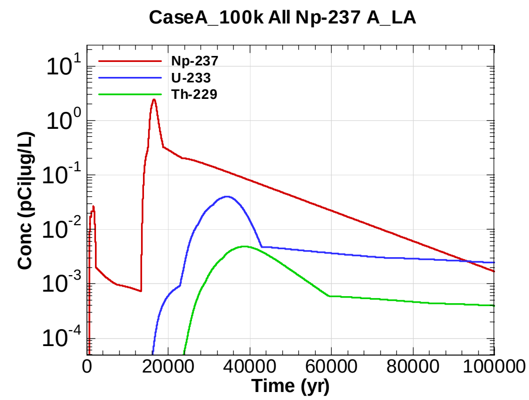

Figure D-96 - 100m Aquifer Concentration for CaseA_100k All Np-237 A_LA

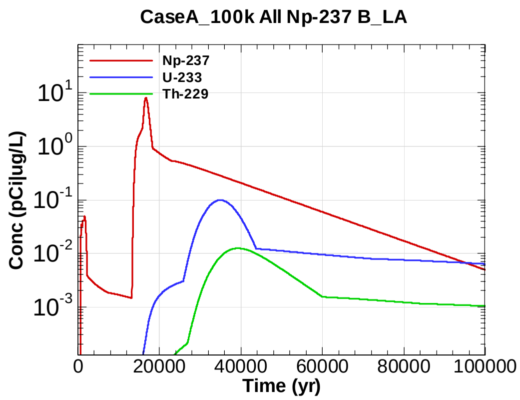

Figure D-97 - 100m Aquifer Concentration for CaseA_100k All Np-237 B_LA

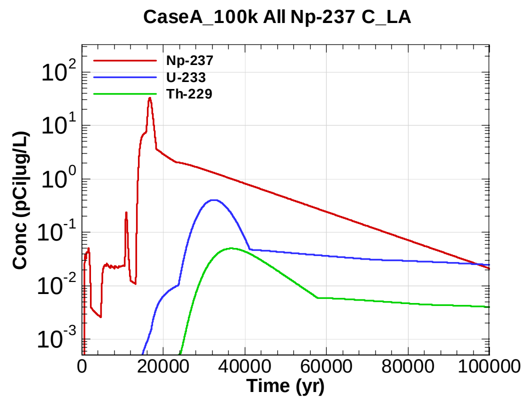

Figure D-98 - 100m Aquifer Concentration for CaseA_100k All Np-237 C_LA

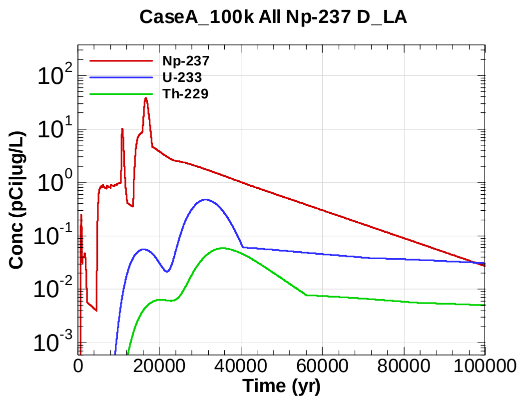

Figure D-99 - 100m Aquifer Concentration for CaseA_100k All Np-237 D_LA

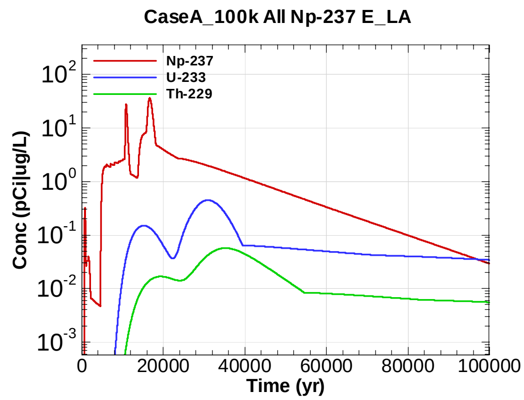

Figure D-100 - 100m Aquifer Concentration for CaseA_100k All Np-237 E_LA

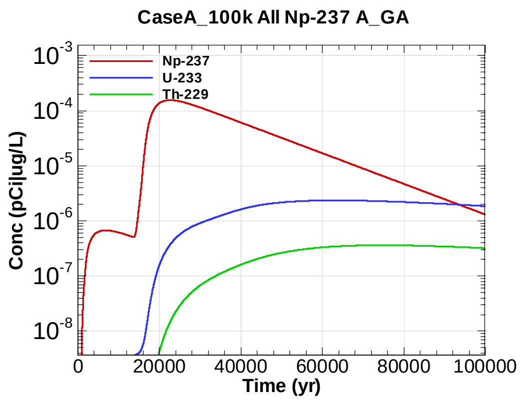

Figure D-101 - 100m Aquifer Concentration for CaseA_100k All Np-237 A_GA

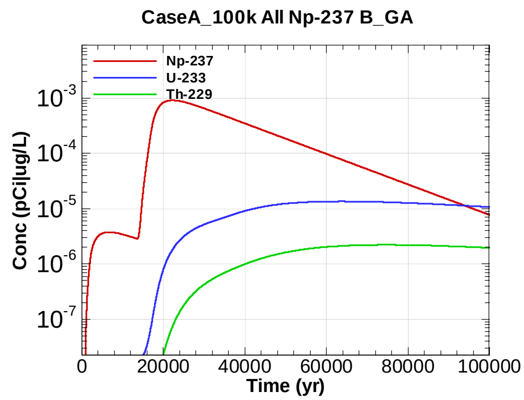

Figure D-102 - 100m Aquifer Concentration for CaseA_100k All Np-237 B_GA

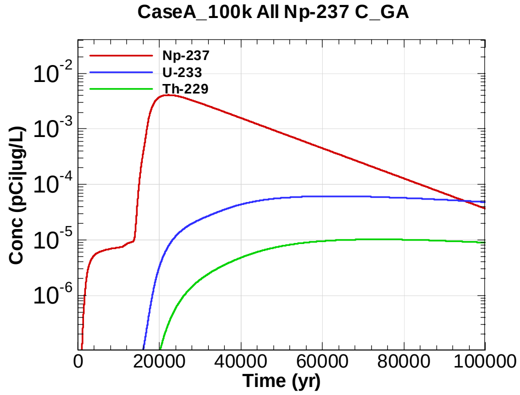

Figure D-103 - 100m Aquifer Concentration for CaseA_100k All Np-237 C_GA

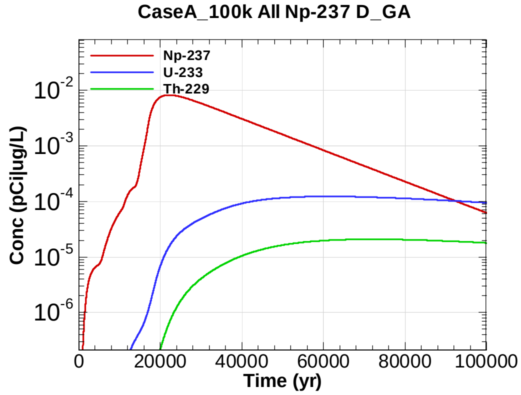

Figure D-104 - 100m Aquifer Concentration for CaseA_100k All Np-237 D_GA

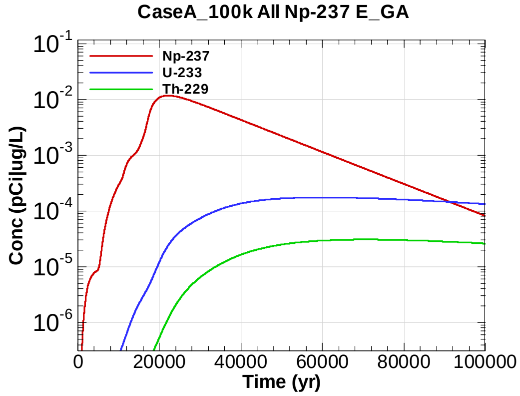

Figure D-105 - 100m Aquifer Concentration for CaseA_100k All Np-237 E_GA

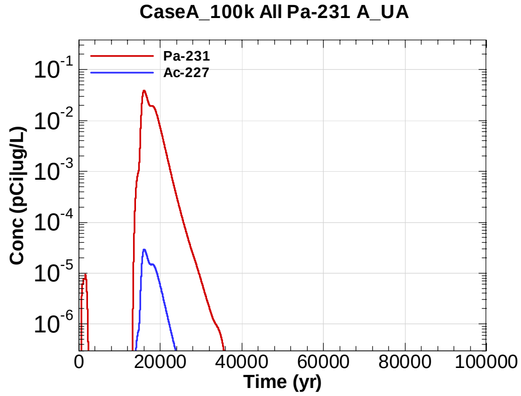

Figure D-106 - 100m Aquifer Concentration for CaseA_100k All Pa-231 A_UA

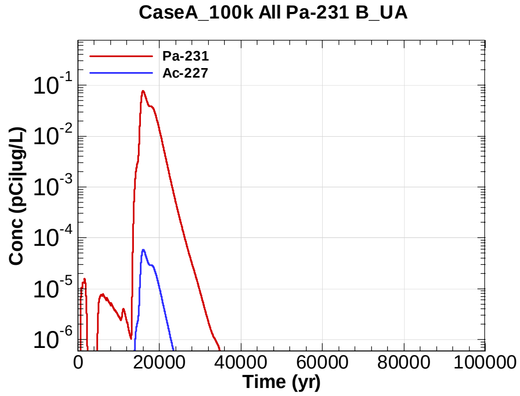

Figure D-107 - 100m Aquifer Concentration for CaseA_100k All Pa-231 B_UA

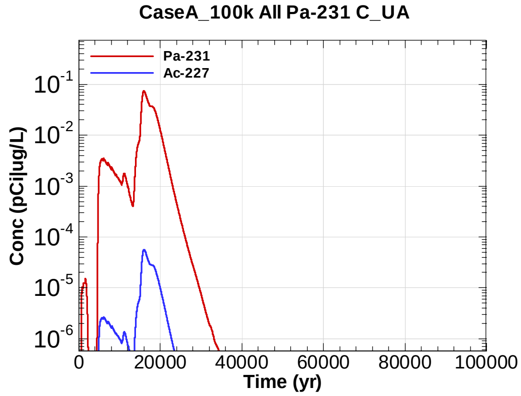

Figure D-108 - 100m Aquifer Concentration for CaseA_100k All Pa-231 C_UA

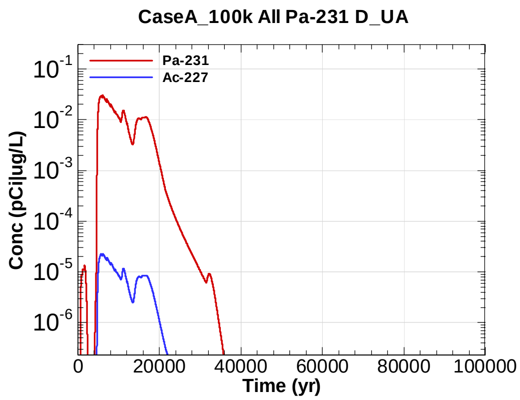

Figure D-109 - 100m Aquifer Concentration for CaseA_100k All Pa-231 D_UA

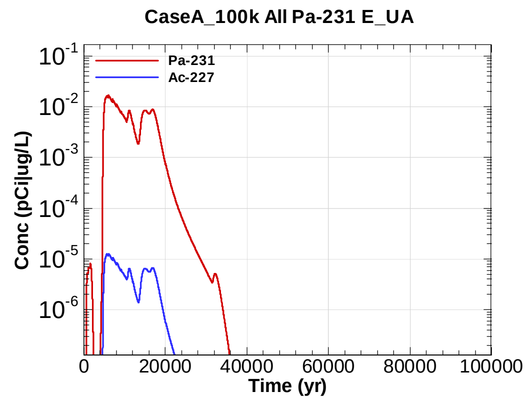

Figure D-110 - 100m Aquifer Concentration for CaseA_100k All Pa-231 E_UA

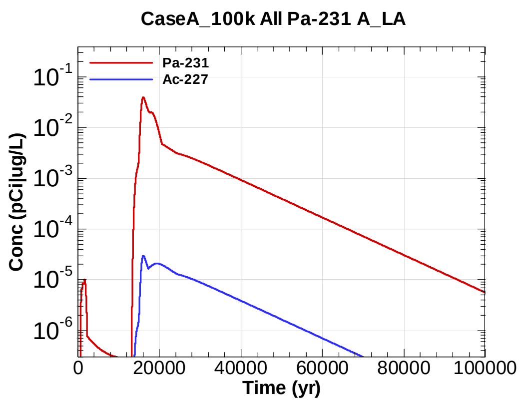

Figure D-111 - 100m Aquifer Concentration for CaseA_100k All Pa-231 A_LA

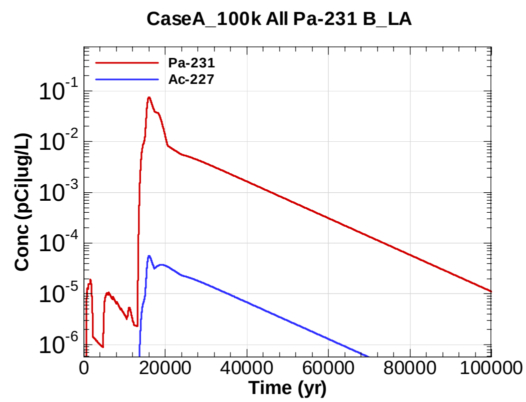

Figure D-112 - 100m Aquifer Concentration for CaseA_100k All Pa-231 B_LA

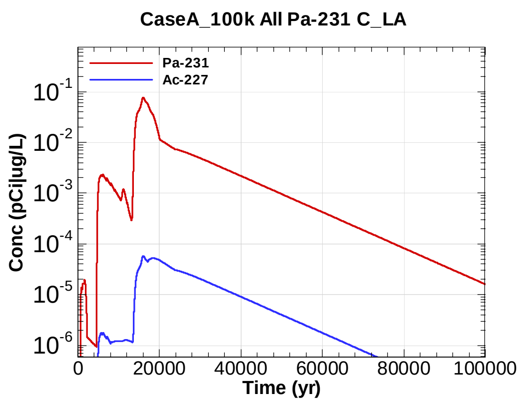

Figure D-113 - 100m Aquifer Concentration for CaseA_100k All Pa-231 C_LA

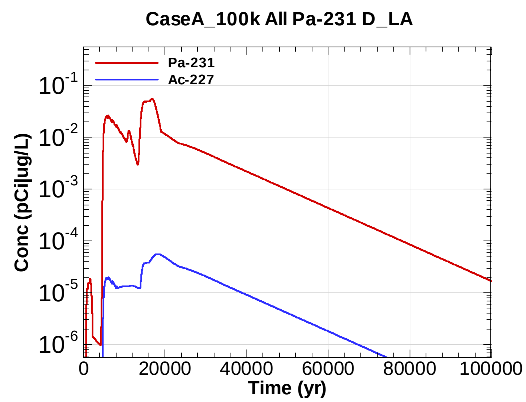

Figure D-114 - 100m Aquifer Concentration for CaseA_100k All Pa-231 D_LA

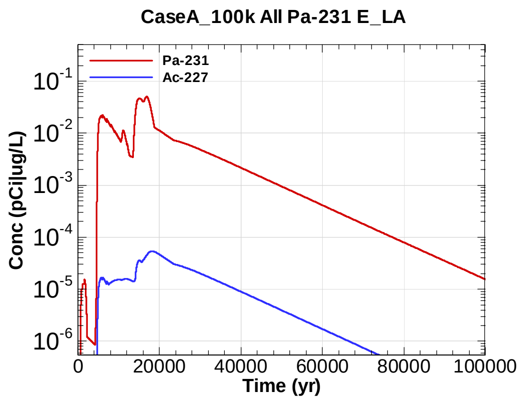

Figure D-115 - 100m Aquifer Concentration for CaseA_100k All Pa-231 E_LA

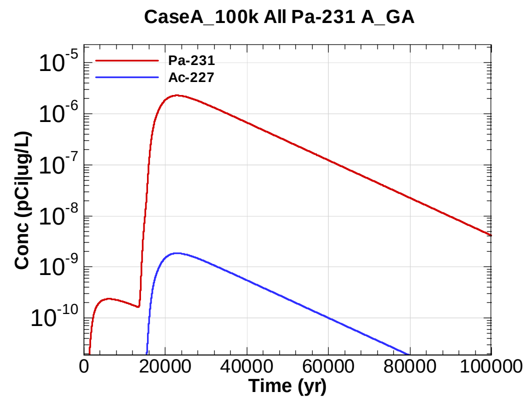

Figure D-116 - 100m Aquifer Concentration for CaseA_100k All Pa-231 A_GA

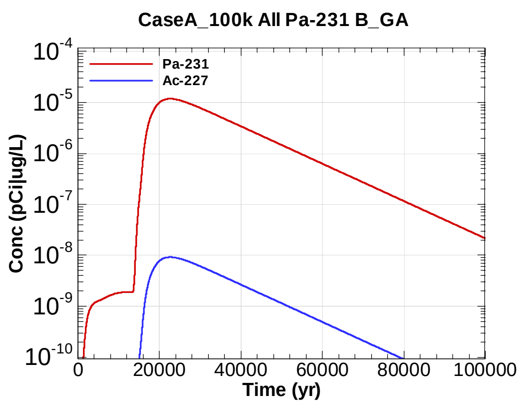

Figure D-117 - 100m Aquifer Concentration for CaseA_100k All Pa-231 B_GA

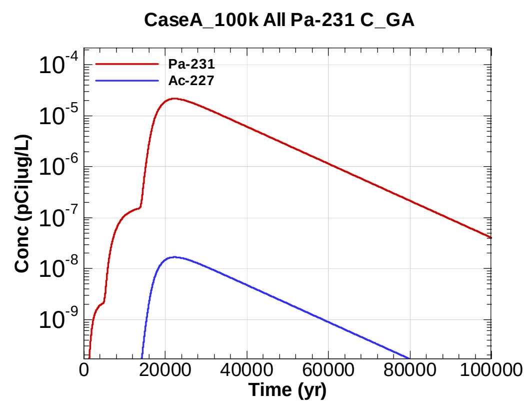

Figure D-118 - 100m Aquifer Concentration for CaseA_100k All Pa-231 C_GA

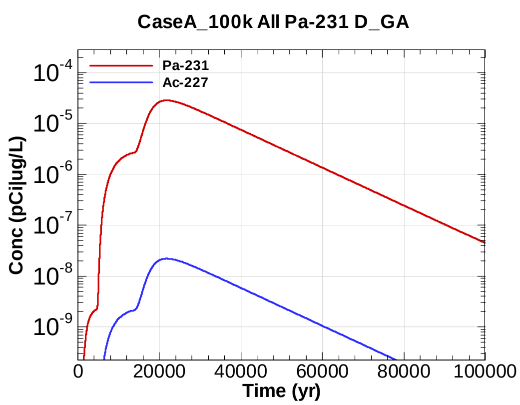

Figure D-119 - 100m Aquifer Concentration for CaseA_100k All Pa-231 D_GA

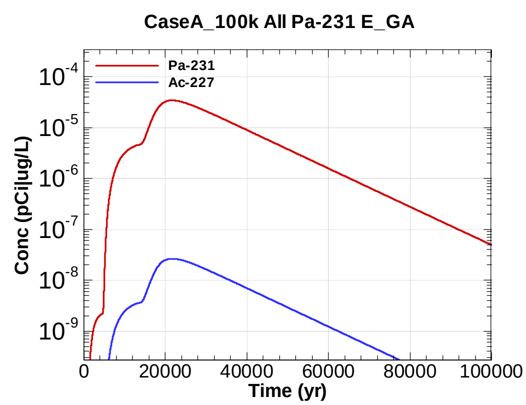

Figure D-120 - 100m Aquifer Concentration for CaseA_100k All Pa-231 E_GA

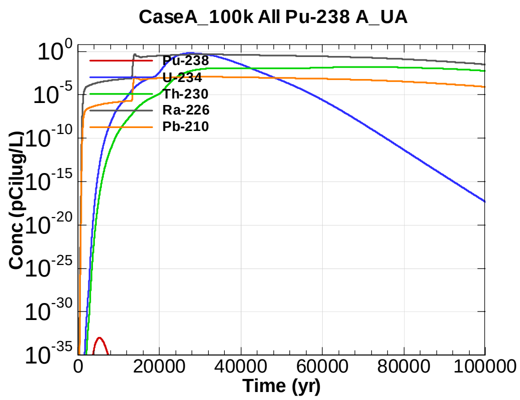

Figure D-121 - 100m Aquifer Concentration for CaseA_100k All Pu-238 A_UA

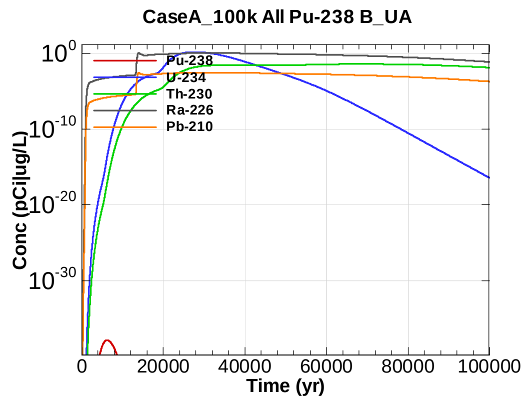

Figure D-122 - 100m Aquifer Concentration for CaseA_100k All Pu-238 B_UA

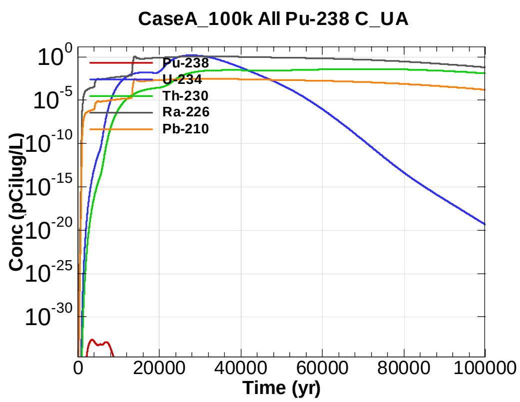

Figure D-123 - 100m Aquifer Concentration for CaseA_100k All Pu-238 C_UA

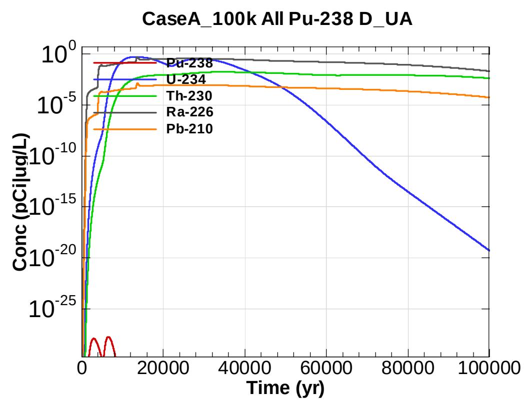

Figure D-124 - 100m Aquifer Concentration for CaseA_100k All Pu-238 D_UA

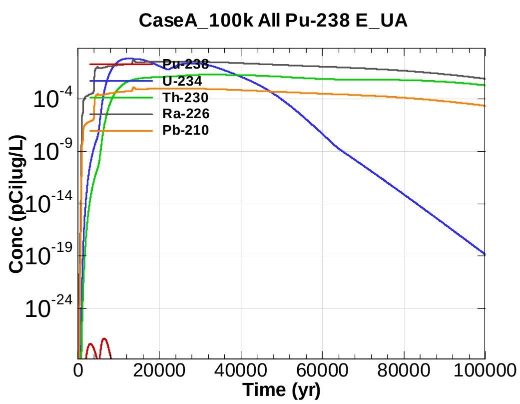

Figure D-125 - 100m Aquifer Concentration for CaseA_100k All Pu-238 E_UA

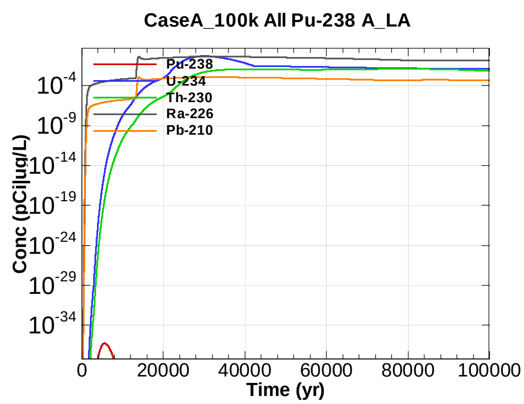

Figure D-126 - 100m Aquifer Concentration for CaseA_100k All Pu-238 A_LA

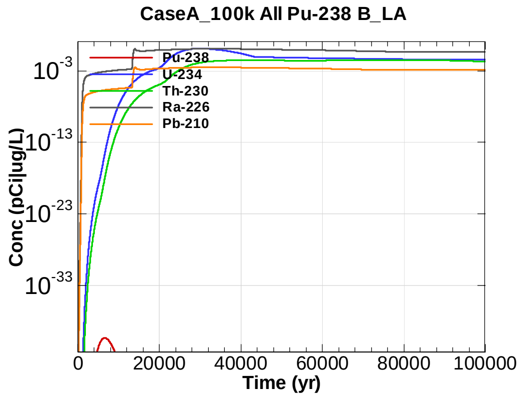

Figure D-127 - 100m Aquifer Concentration for CaseA_100k All Pu-238 B_LA

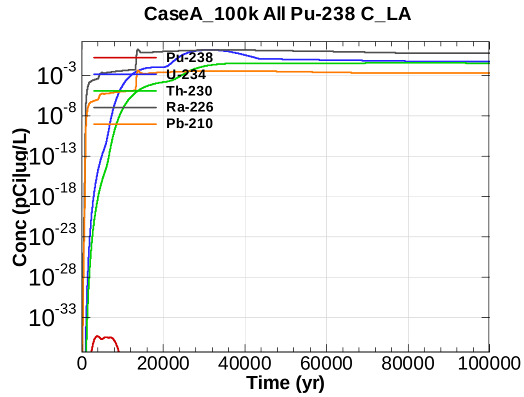

Figure D-128 - 100m Aquifer Concentration for CaseA_100k All Pu-238 C_LA

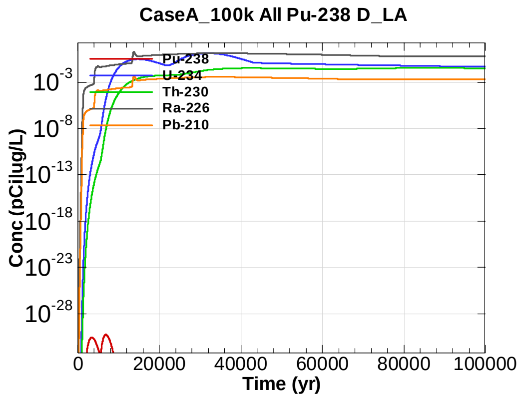

Figure D-129 - 100m Aquifer Concentration for CaseA_100k All Pu-238 D_LA

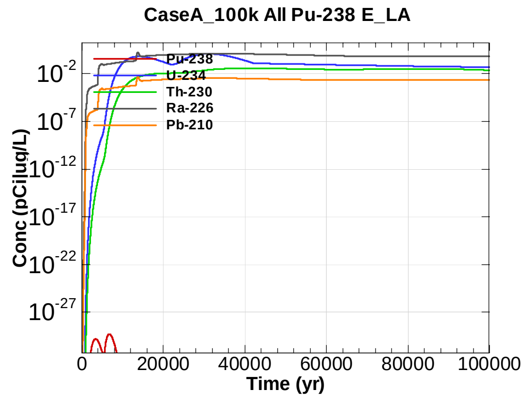

Figure D-130 - 100m Aquifer Concentration for CaseA_100k All Pu-238 E_LA

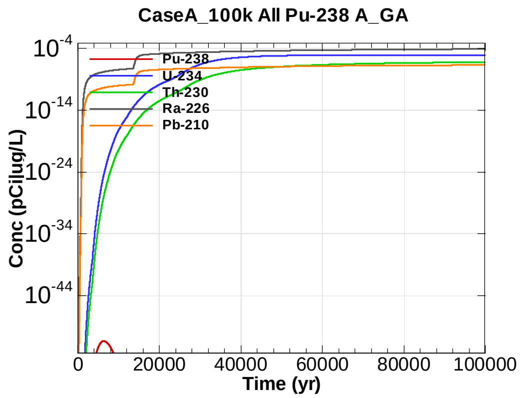

Figure D-131 - 100m Aquifer Concentration for CaseA_100k All Pu-238 A_GA

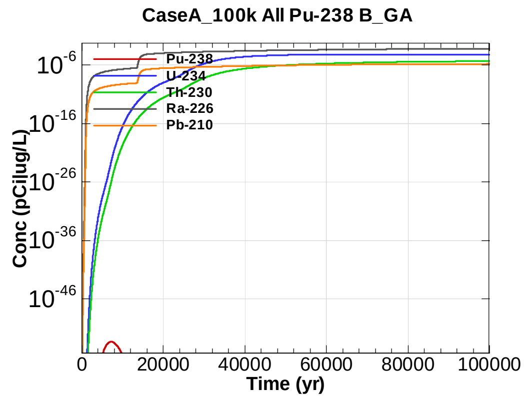

Figure D-132 - 100m Aquifer Concentration for CaseA_100k All Pu-238 B_GA

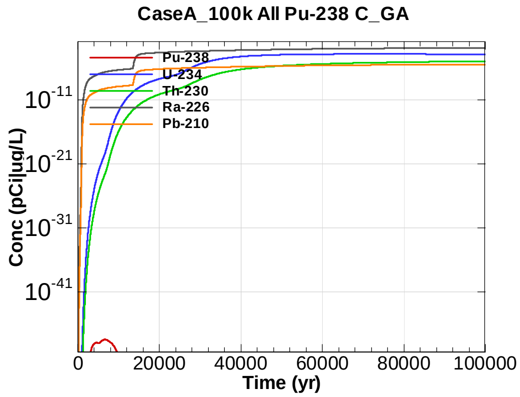

Figure D-133 - 100m Aquifer Concentration for CaseA_100k All Pu-238 C_GA

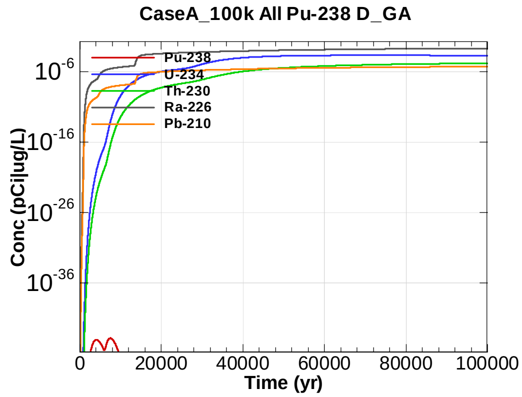

Figure D-134 - 100m Aquifer Concentration for CaseA_100k All Pu-238 D_GA

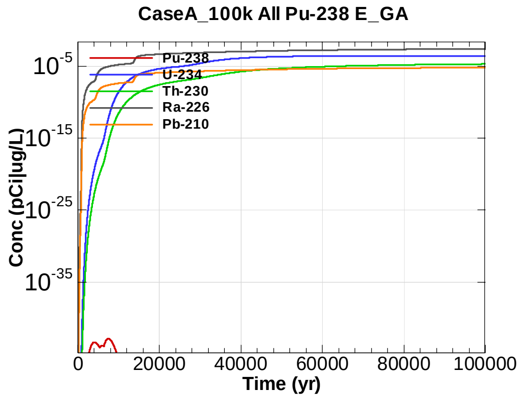

Figure D-135 - 100m Aquifer Concentration for CaseA_100k All Pu-238 E_GA

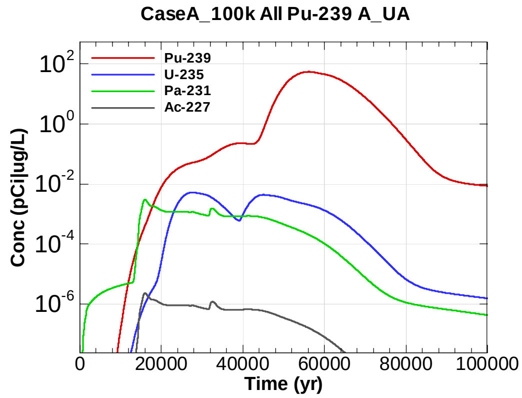

Figure D-136 - 100m Aquifer Concentration for CaseA_100k All Pu-239 A_UA

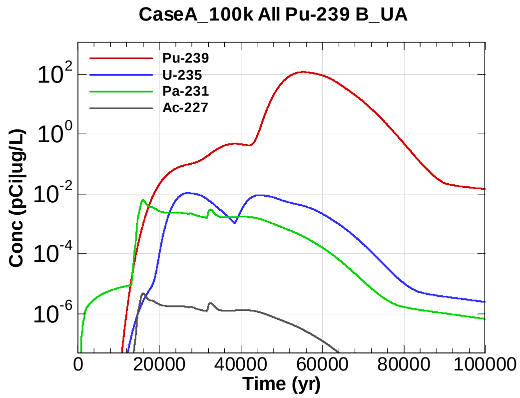

Figure D-137 - 100m Aquifer Concentration for CaseA_100k All Pu-239 B_UA

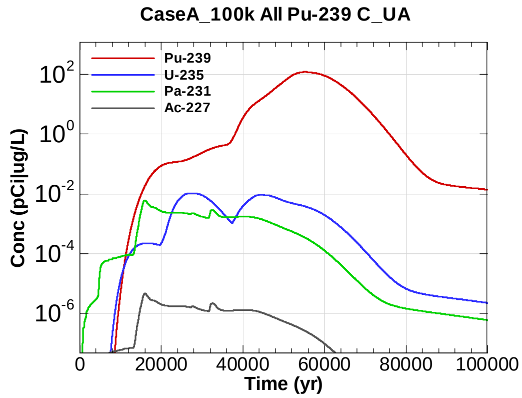

Figure D-138 - 100m Aquifer Concentration for CaseA_100k All Pu-239 C_UA

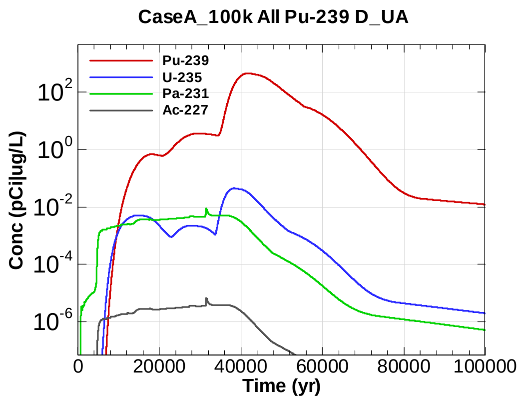

Figure D-139 - 100m Aquifer Concentration for CaseA_100k All Pu-239 D_UA

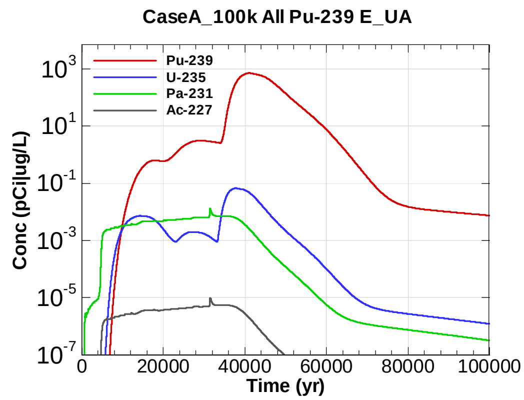

Figure D-140 - 100m Aquifer Concentration for CaseA_100k All Pu-239 E_UA

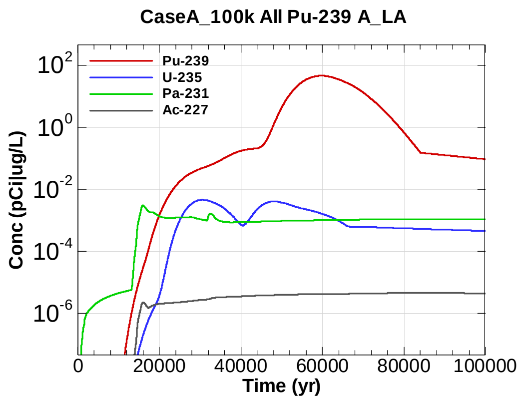

Figure D-141 - 100m Aquifer Concentration for CaseA_100k All Pu-239 A_LA

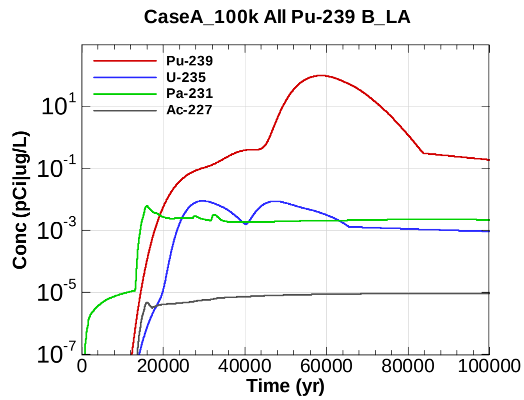

Figure D-142 - 100m Aquifer Concentration for CaseA_100k All Pu-239 B_LA

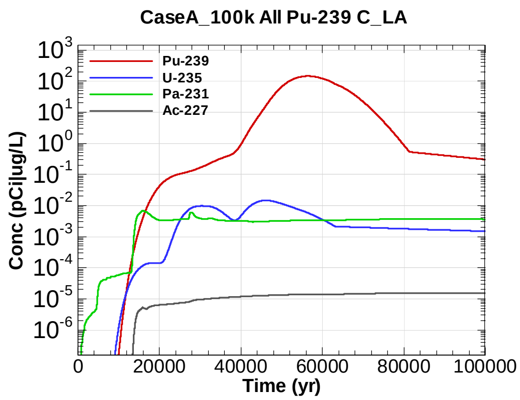

Figure D-143 - 100m Aquifer Concentration for CaseA_100k All Pu-239 C_LA

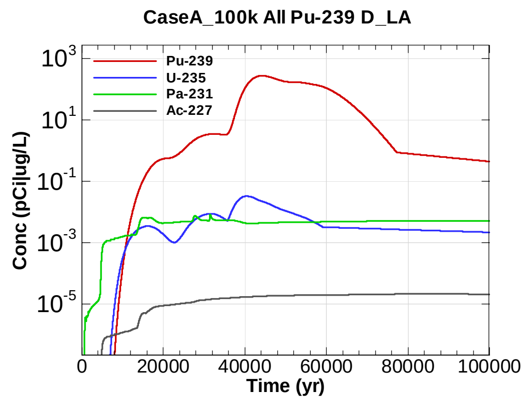

Figure D-144 - 100m Aquifer Concentration for CaseA_100k All Pu-239 D_LA

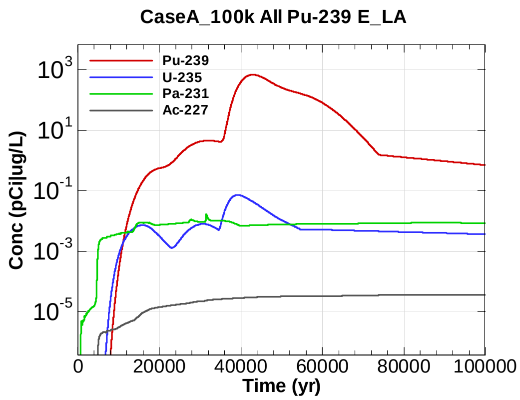

Figure D-145 - 100m Aquifer Concentration for CaseA_100k All Pu-239 E_LA

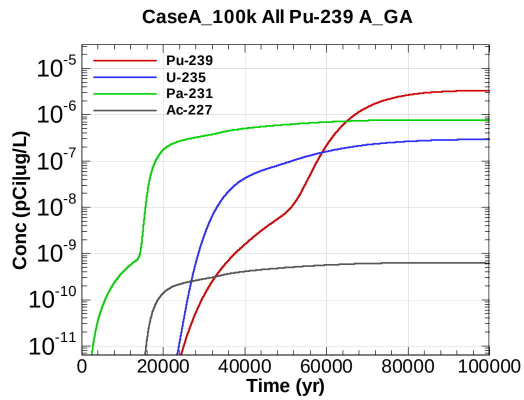

Figure D-146 - 100m Aquifer Concentration for CaseA_100k All Pu-239 A_GA

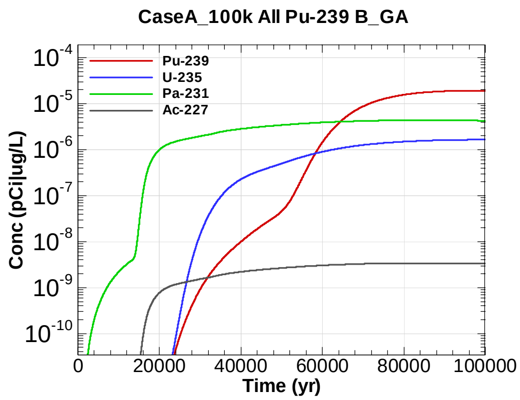

Figure D-147 - 100m Aquifer Concentration for CaseA_100k All Pu-239 B_GA

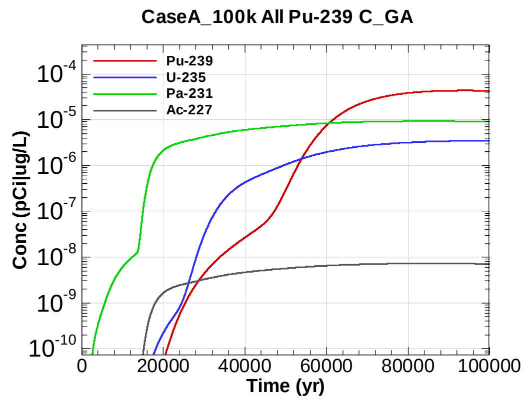

Figure D-148 - 100m Aquifer Concentration for CaseA_100k All Pu-239 C_GA

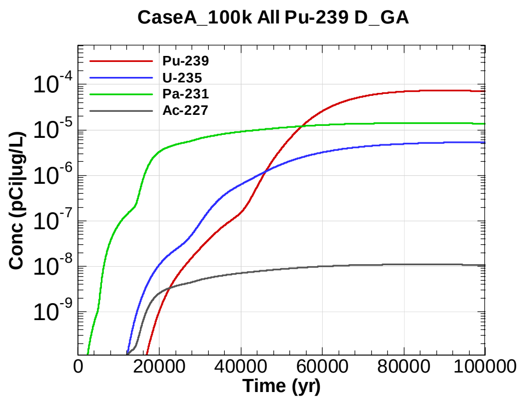

Figure D-149 - 100m Aquifer Concentration for CaseA_100k All Pu-239 D_GA

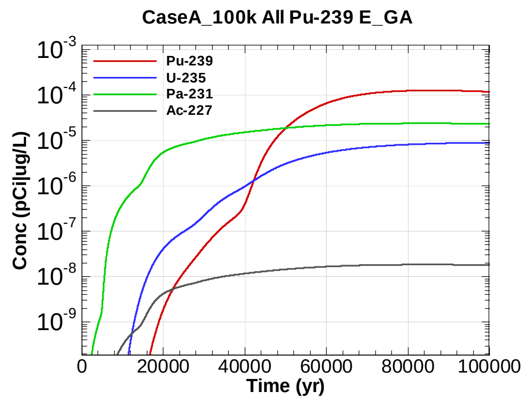

Figure D-150 - 100m Aquifer Concentration for CaseA_100k All Pu-239 E_GA

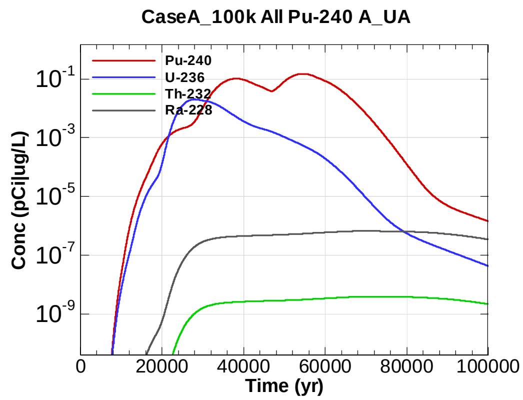

Figure D-151 - 100m Aquifer Concentration for CaseA_100k All Pu-240 A_UA

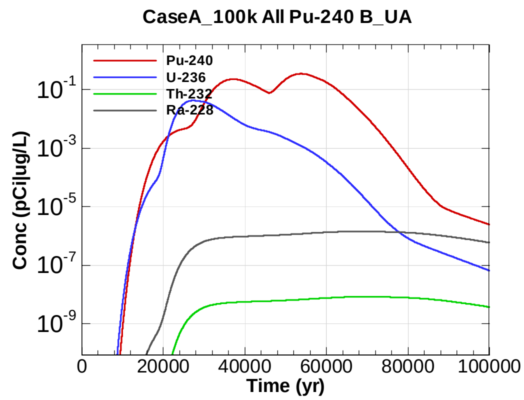

Figure D-152 - 100m Aquifer Concentration for CaseA_100k All Pu-240 B_UA

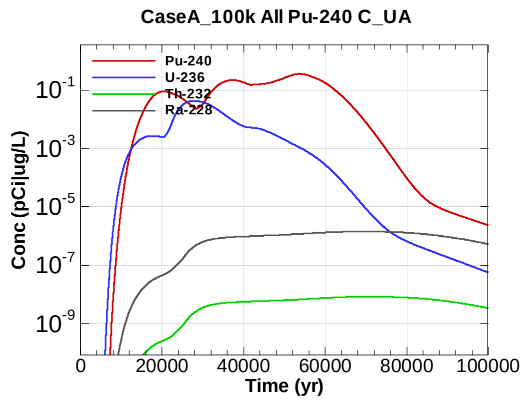

Figure D-153 - 100m Aquifer Concentration for CaseA_100k All Pu-240 C_UA

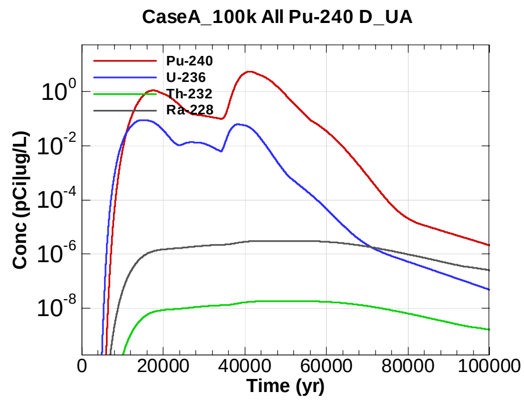

Figure D-154 - 100m Aquifer Concentration for CaseA_100k All Pu-240 D_UA

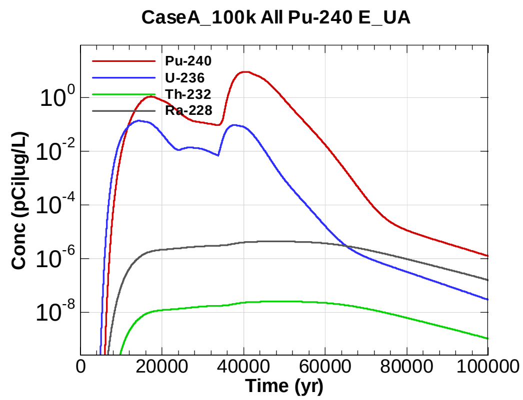

Figure D-155 - 100m Aquifer Concentration for CaseA_100k All Pu-240 E_UA

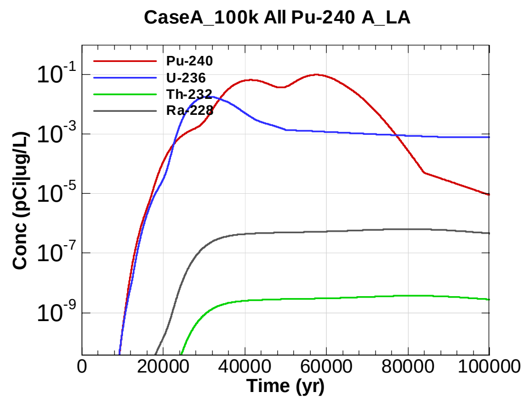

Figure D-156 - 100m Aquifer Concentration for CaseA_100k All Pu-240 A_LA

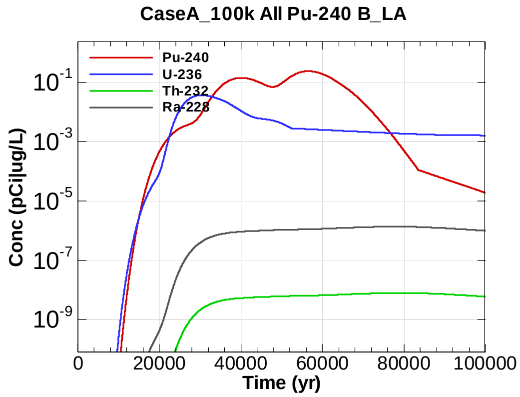

Figure D-157 - 100m Aquifer Concentration for CaseA_100k All Pu-240 B_LA

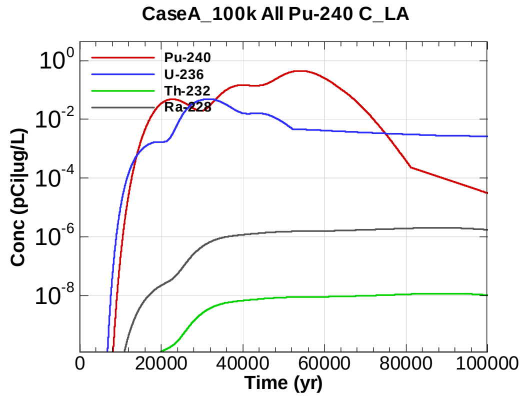

Figure D-158 - 100m Aquifer Concentration for CaseA_100k All Pu-240 C_LA

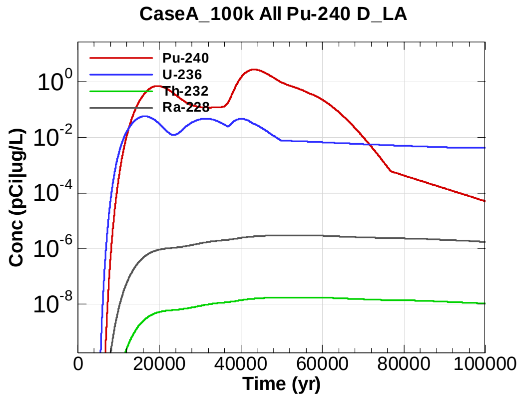

Figure D-159 - 100m Aquifer Concentration for CaseA_100k All Pu-240 D_LA

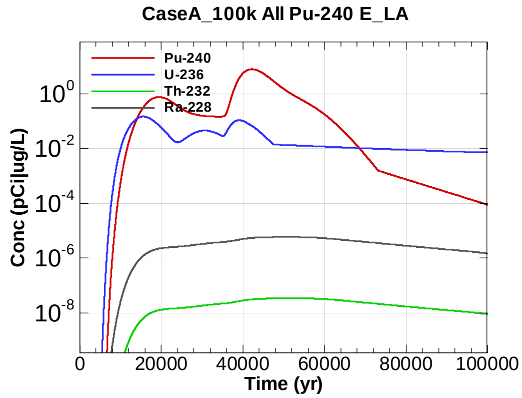

Figure D-160 - 100m Aquifer Concentration for CaseA_100k All Pu-240 E_LA

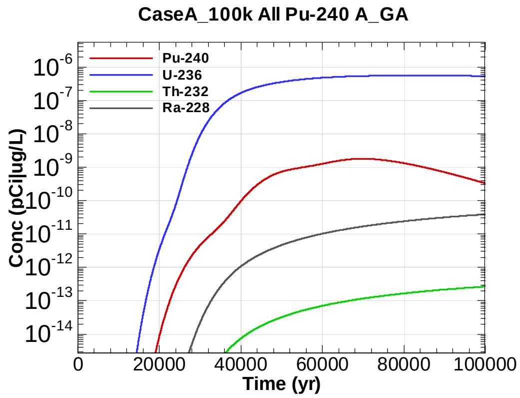

Figure D-161 - 100m Aquifer Concentration for CaseA_100k All Pu-240 A_GA

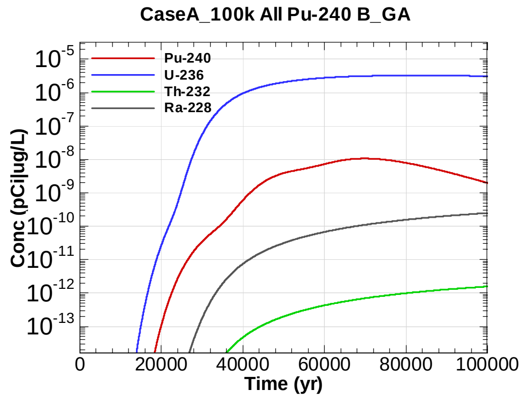

Figure D-162 - 100m Aquifer Concentration for CaseA_100k All Pu-240 B_GA

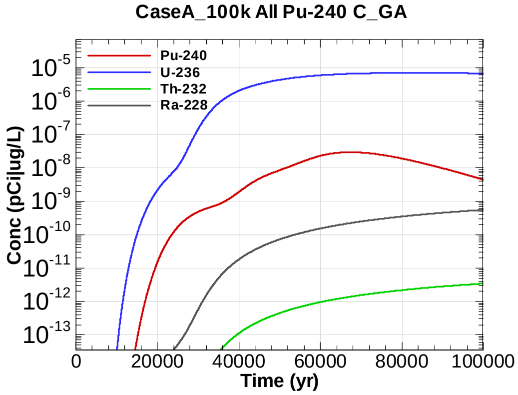

Figure D-163 - 100m Aquifer Concentration for CaseA_100k All Pu-240 C_GA

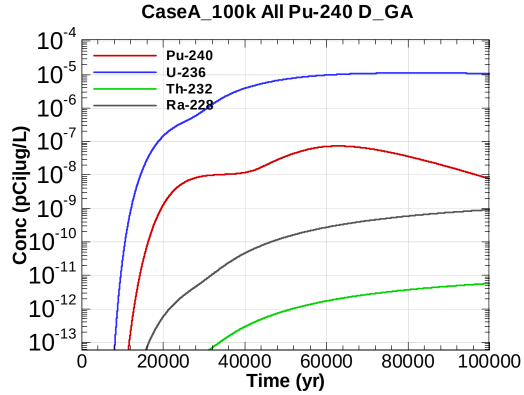

Figure D-164 - 100m Aquifer Concentration for CaseA_100k All Pu-240 D_GA

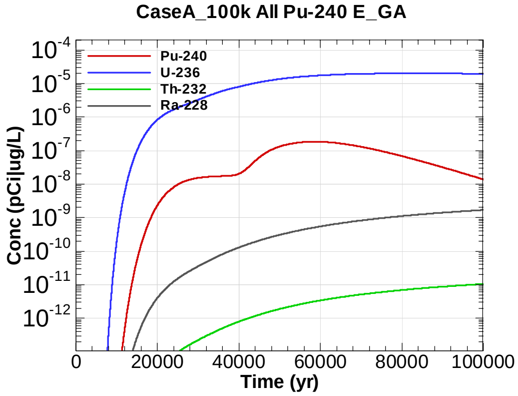

Figure D-165 - 100m Aquifer Concentration for CaseA_100k All Pu-240 E_GA

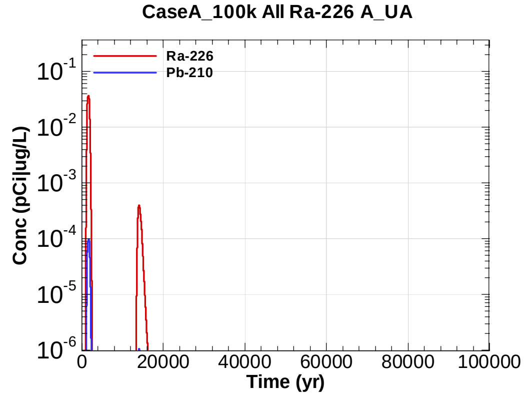

Figure D-166 - 100m Aquifer Concentration for CaseA_100k All Ra-226 A_UA

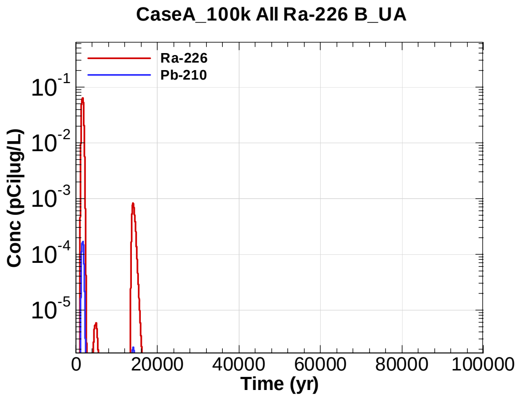

Figure D-167 - 100m Aquifer Concentration for CaseA_100k All Ra-226 B_UA

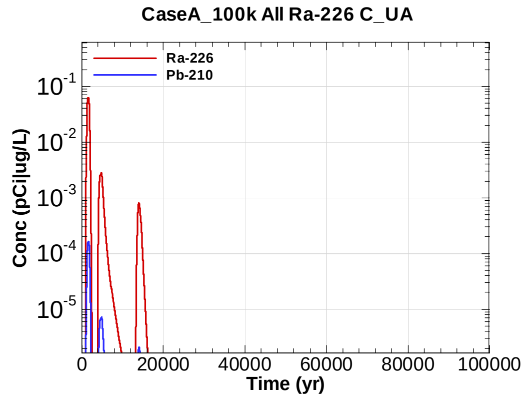

Figure D-168 - 100m Aquifer Concentration for CaseA_100k All Ra-226 C_UA

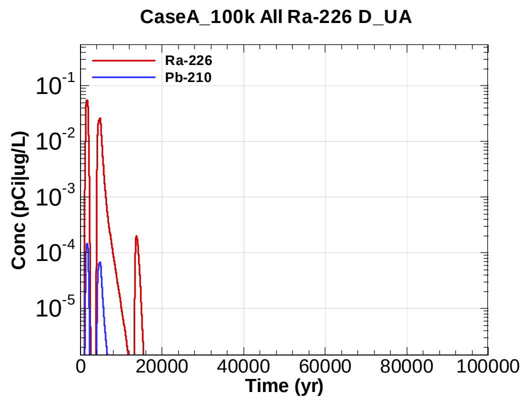

Figure D-169 - 100m Aquifer Concentration for CaseA_100k All Ra-226 D_UA

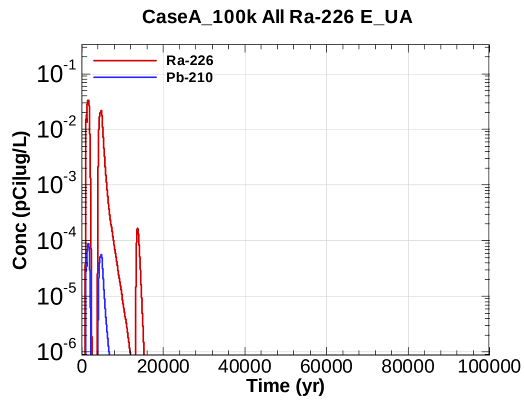

Figure D-170 - 100m Aquifer Concentration for CaseA_100k All Ra-226 E_UA

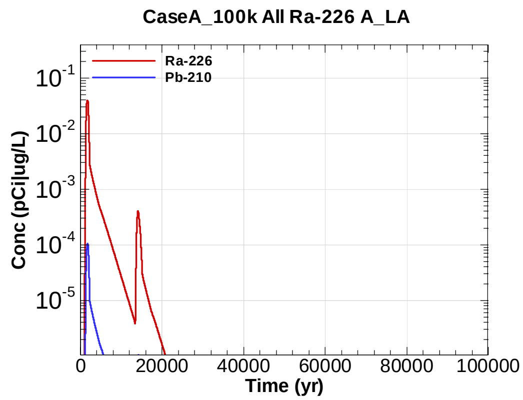

Figure D-171 - 100m Aquifer Concentration for CaseA_100k All Ra-226 A_LA

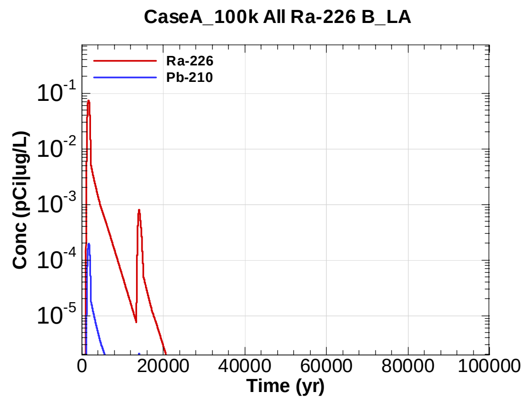

Figure D-172 - 100m Aquifer Concentration for CaseA_100k All Ra-226 B_LA

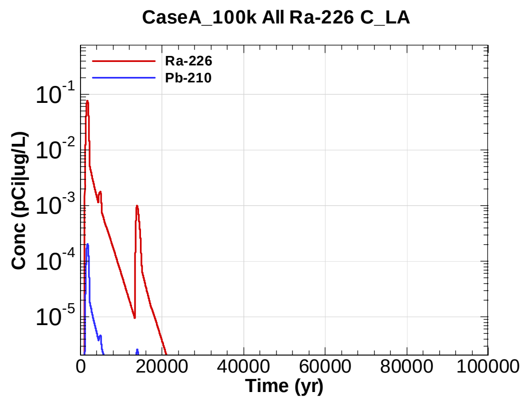

Figure D-173 - 100m Aquifer Concentration for CaseA_100k All Ra-226 C_LA

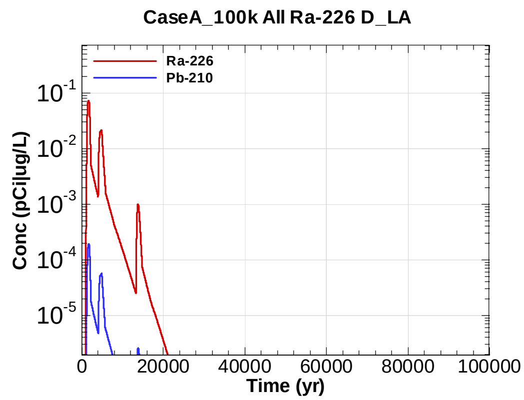

Figure D-174 - 100m Aquifer Concentration for CaseA_100k All Ra-226 D_LA

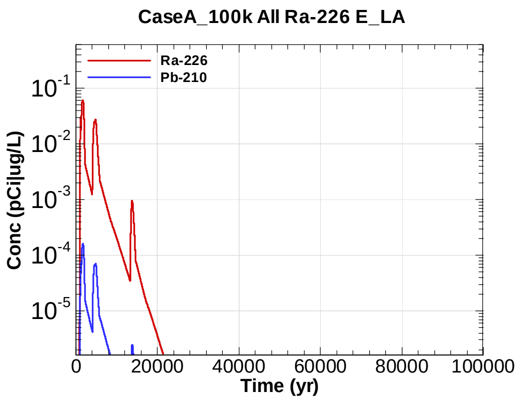

Figure D-175 - 100m Aquifer Concentration for CaseA_100k All Ra-226 E_LA

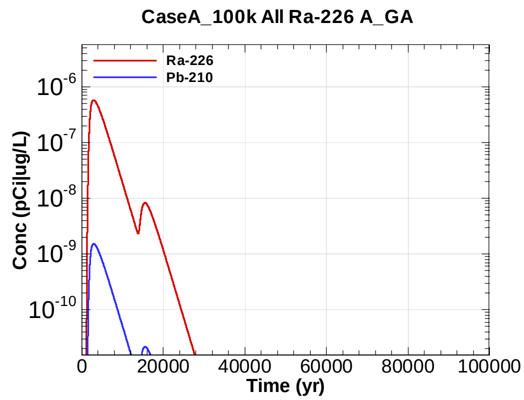

Figure D-176 - 100m Aquifer Concentration for CaseA_100k All Ra-226 A_GA

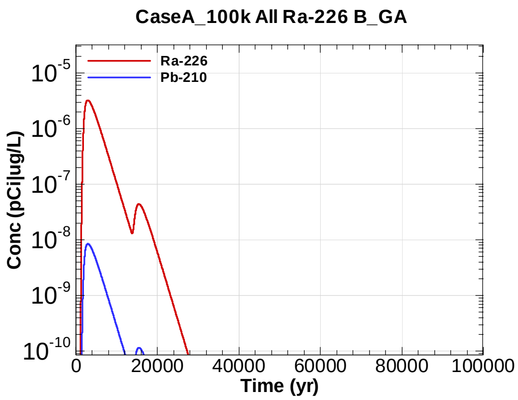

Figure D-177 - 100m Aquifer Concentration for CaseA_100k All Ra-226 B_GA

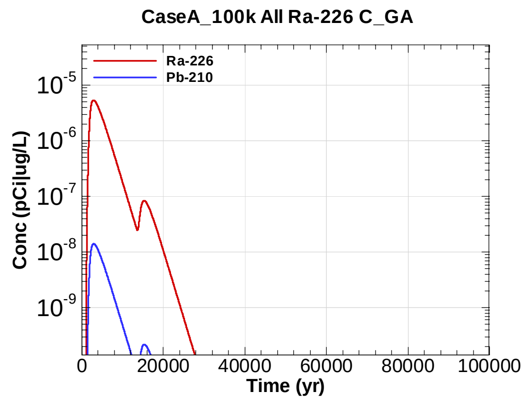

Figure D-178 - 100m Aquifer Concentration for CaseA_100k All Ra-226 C_GA

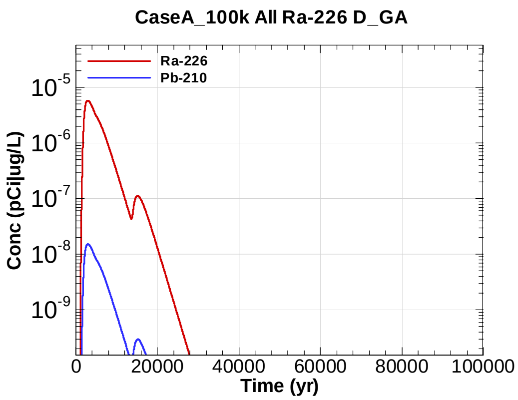

Figure D-179 - 100m Aquifer Concentration for CaseA_100k All Ra-226 D_GA

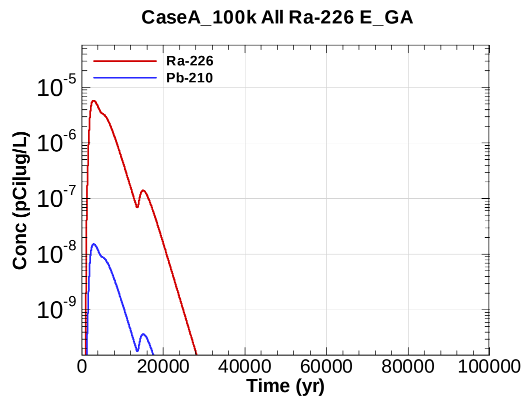

Figure D-180 - 100m Aquifer Concentration for CaseA_100k All Ra-226 E_GA

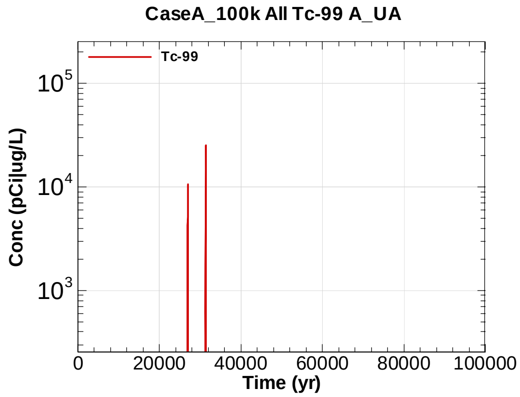

Figure D-181 - 100m Aquifer Concentration for CaseA_100k All Tc-99 A_UA

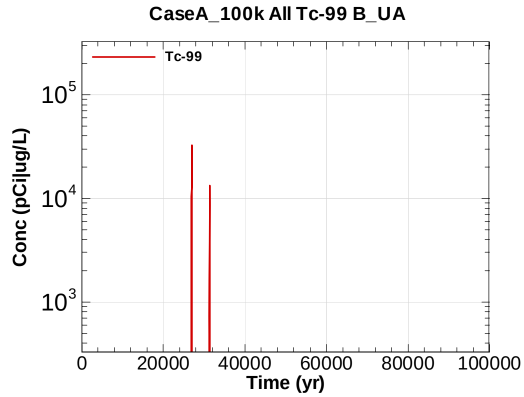

Figure D-182 - 100m Aquifer Concentration for CaseA_100k All Tc-99 B_UA

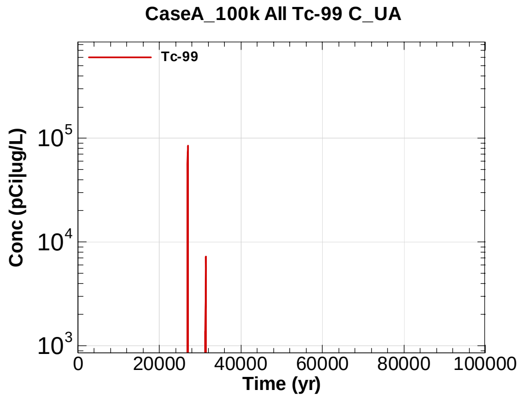

Figure D-183 - 100m Aquifer Concentration for CaseA_100k All Tc-99 C_UA

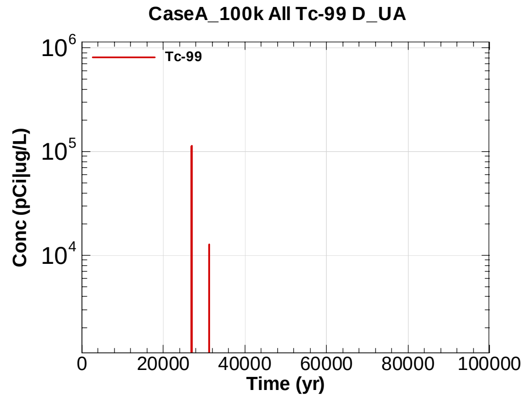

Figure D-184 - 100m Aquifer Concentration for CaseA_100k All Tc-99 D_UA

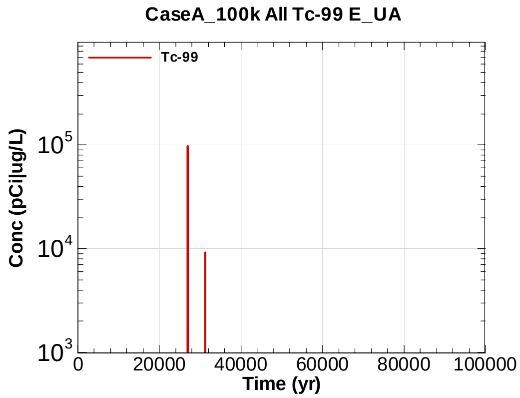

Figure D-185 - 100m Aquifer Concentration for CaseA_100k All Tc-99 E_UA

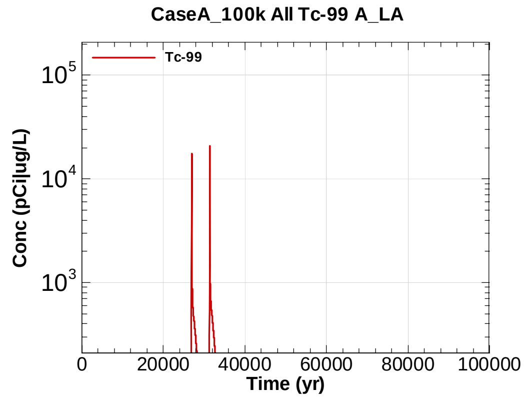

Figure D-186 - 100m Aquifer Concentration for CaseA_100k All Tc-99 A_LA

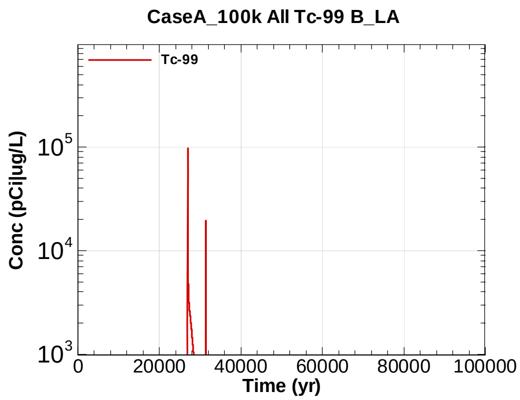

Figure D-187 - 100m Aquifer Concentration for CaseA_100k All Tc-99 B_LA

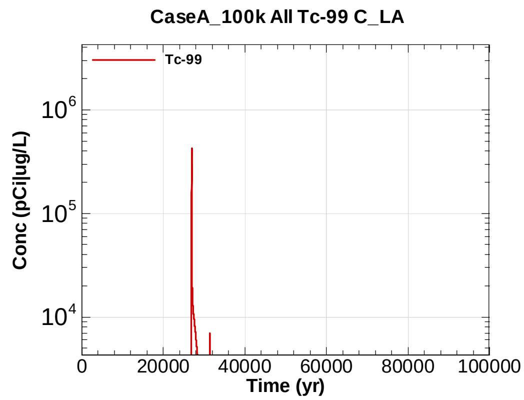

Figure D-188 - 100m Aquifer Concentration for CaseA_100k All Tc-99 C_LA

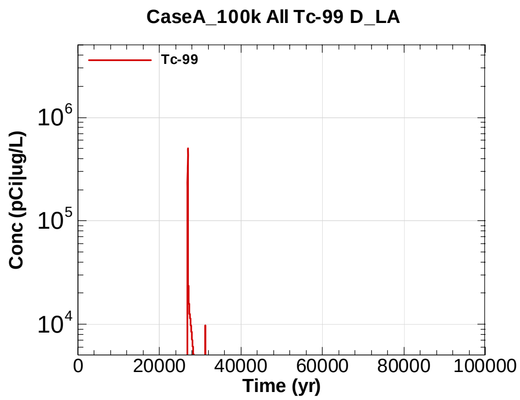

Figure D-189 - 100m Aquifer Concentration for CaseA_100k All Tc-99 D_LA

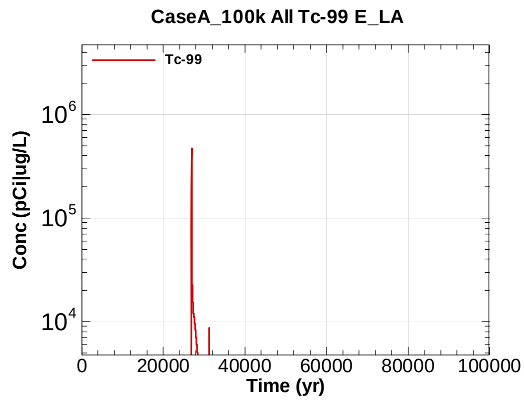

Figure D-190 - 100m Aquifer Concentration for CaseA_100k All Tc-99 E_LA

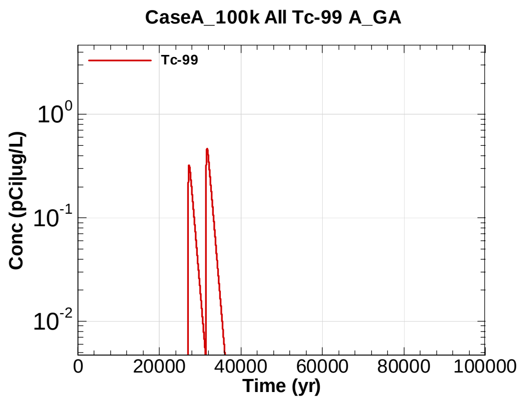

Figure D-191 - 100m Aquifer Concentration for CaseA_100k All Tc-99 A_GA

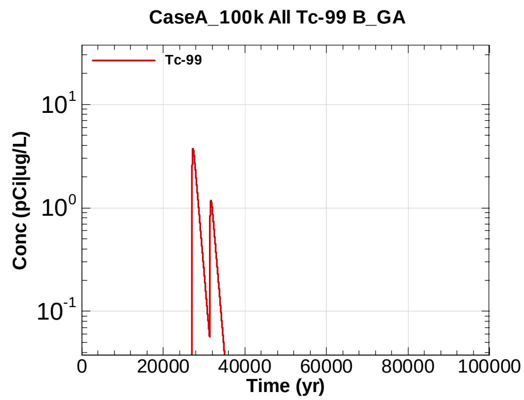

Figure D-192 - 100m Aquifer Concentration for CaseA_100k All Tc-99 B_GA

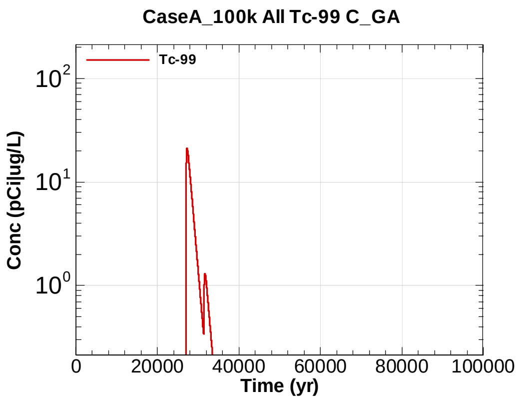

Figure D-193 - 100m Aquifer Concentration for CaseA_100k All Tc-99 C_GA

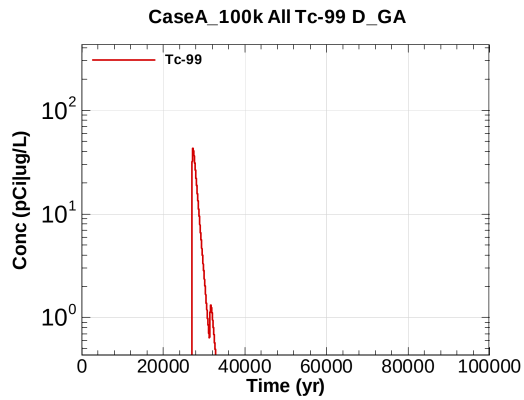

Figure D-194 - 100m Aquifer Concentration for CaseA_100k All Tc-99 D_GA

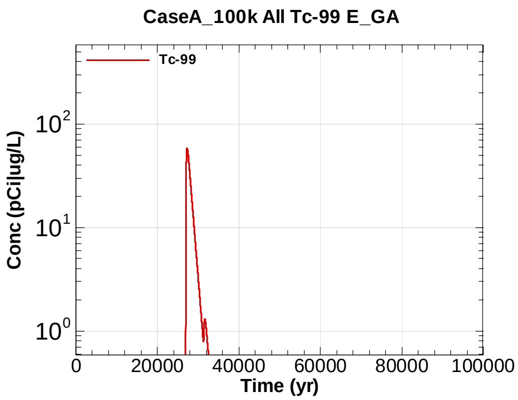

Figure D-195 - 100m Aquifer Concentration for CaseA_100k All Tc-99 E_GA

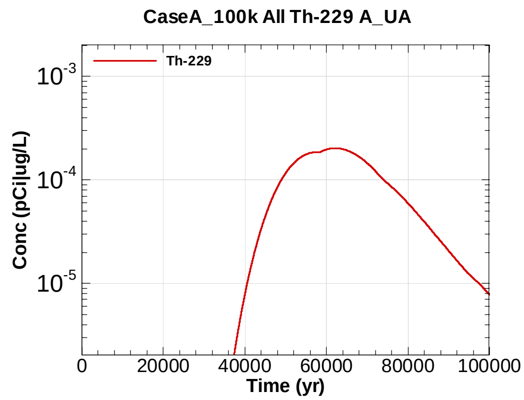

Figure D-196 - 100m Aquifer Concentration for CaseA_100k All Th-229 A_UA

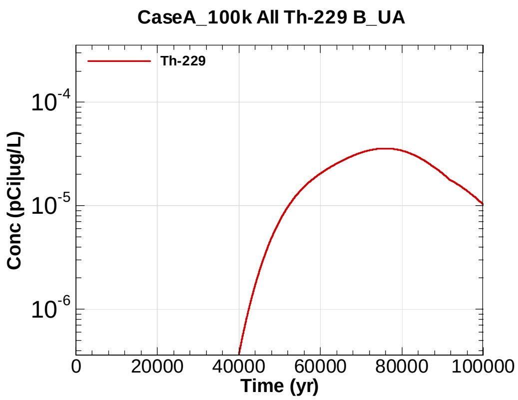

Figure D-197 - 100m Aquifer Concentration for CaseA_100k All Th-229 B_UA

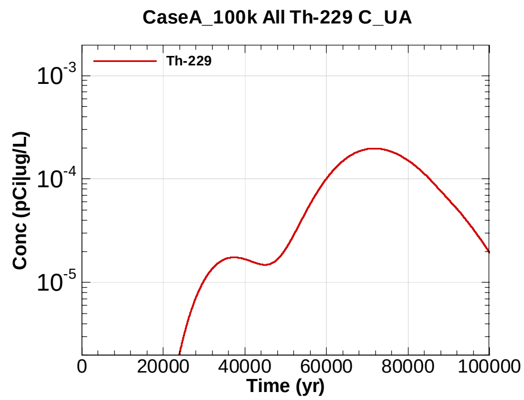

Figure D-198 - 100m Aquifer Concentration for CaseA_100k All Th-229 C_UA

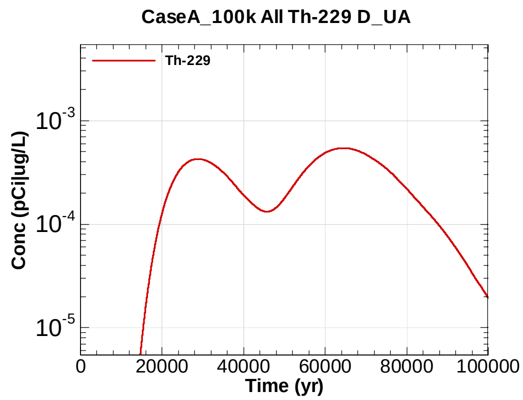

Figure D-199 - 100m Aquifer Concentration for CaseA_100k All Th-229 D_UA

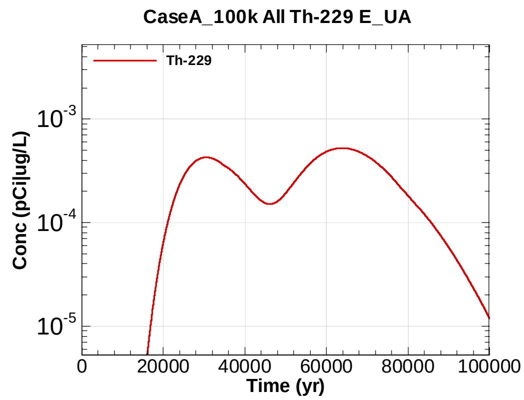

Figure D-200 - 100m Aquifer Concentration for CaseA_100k All Th-229 E_UA

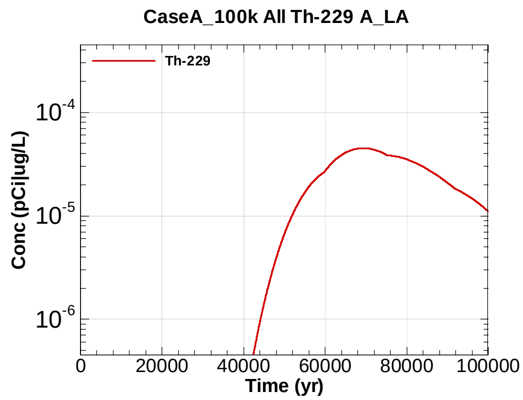

Figure D-201 - 100m Aquifer Concentration for CaseA_100k All Th-229 A_LA

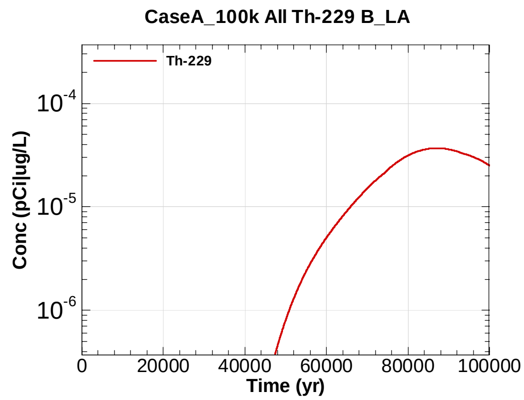

Figure D-202 - 100m Aquifer Concentration for CaseA_100k All Th-229 B_LA

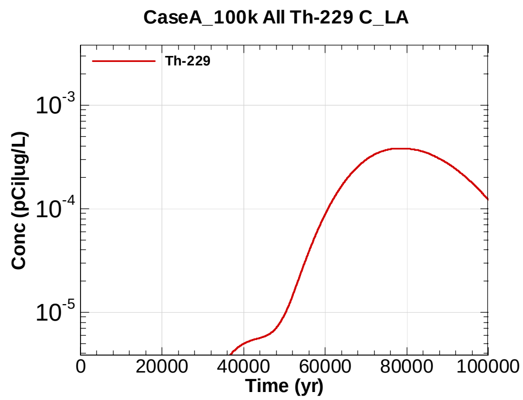

Figure D-203 - 100m Aquifer Concentration for CaseA_100k All Th-229 C_LA

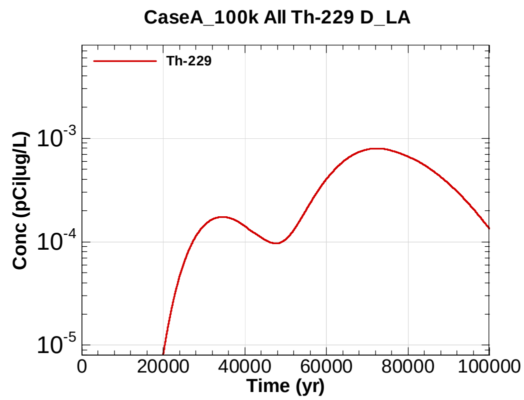

Figure D-204 - 100m Aquifer Concentration for CaseA_100k All Th-229 D_LA

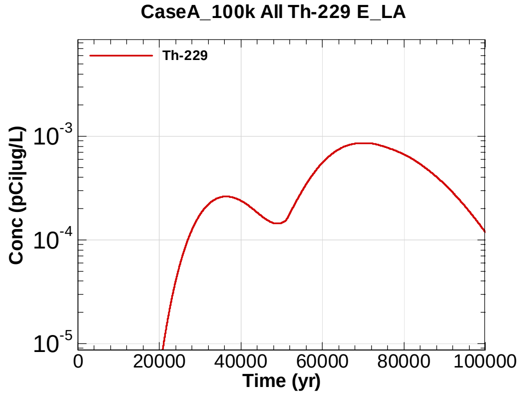

Figure D-205 - 100m Aquifer Concentration for CaseA_100k All Th-229 E_LA

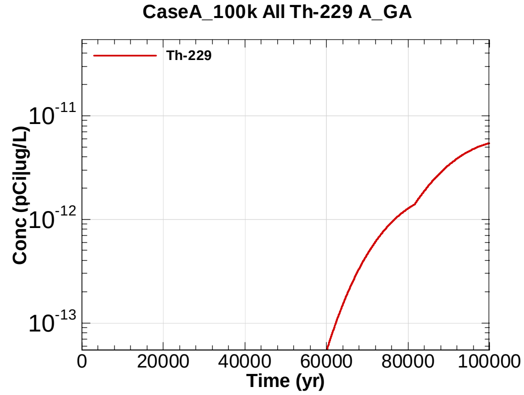

Figure D-206 - 100m Aquifer Concentration for CaseA_100k All Th-229 A_GA

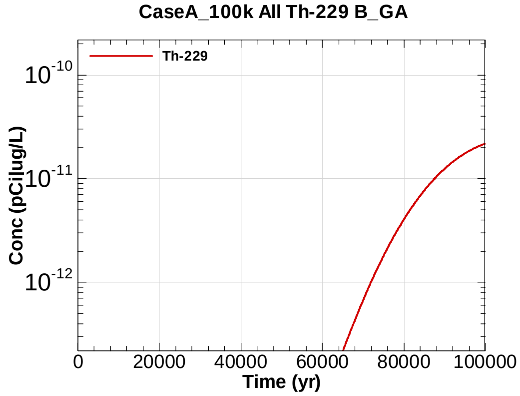

Figure D-207 - 100m Aquifer Concentration for CaseA_100k All Th-229 B_GA

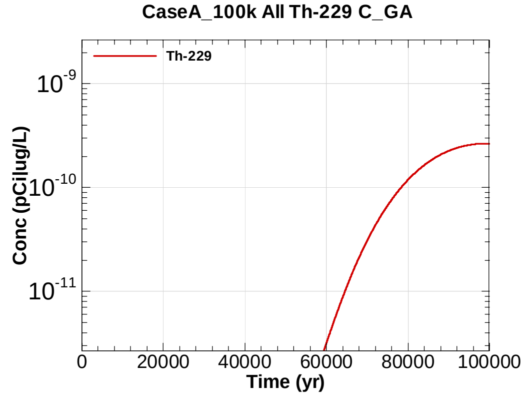

Figure D-208 - 100m Aquifer Concentration for CaseA_100k All Th-229 C_GA

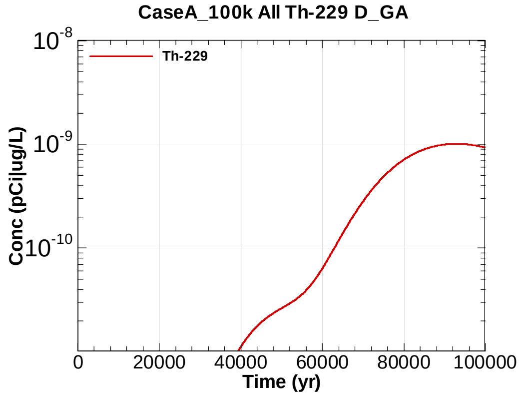

Figure D-209 - 100m Aquifer Concentration for CaseA_100k All Th-229 D_GA

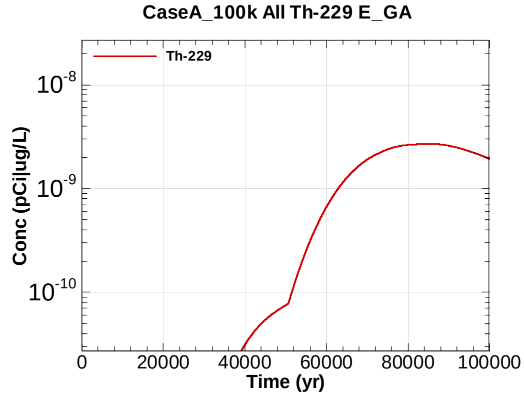

Figure D-210 - 100m Aquifer Concentration for CaseA_100k All Th-229 E_GA

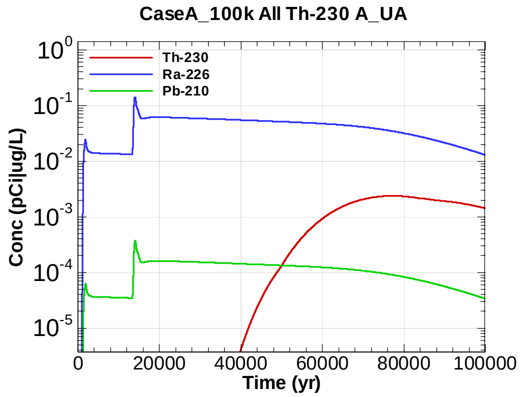

Figure D-211 - 100m Aquifer Concentration for CaseA_100k All Th-230 A_UA

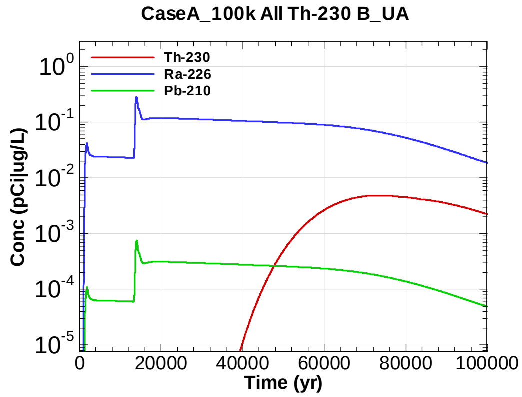

Figure D-212 - 100m Aquifer Concentration for CaseA_100k All Th-230 B_UA

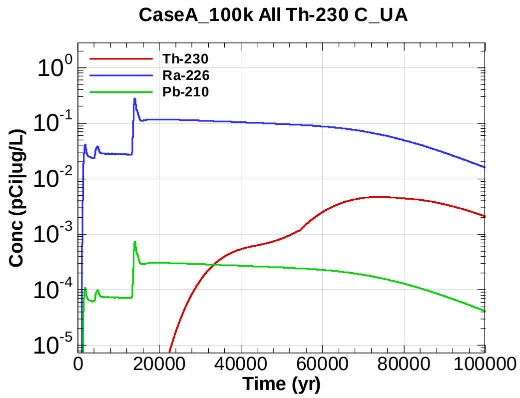

Figure D-213 - 100m Aquifer Concentration for CaseA_100k All Th-230 C_UA

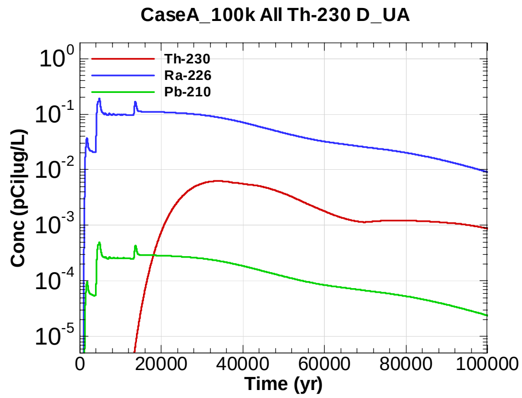

Figure D-214 - 100m Aquifer Concentration for CaseA_100k All Th-230 D_UA

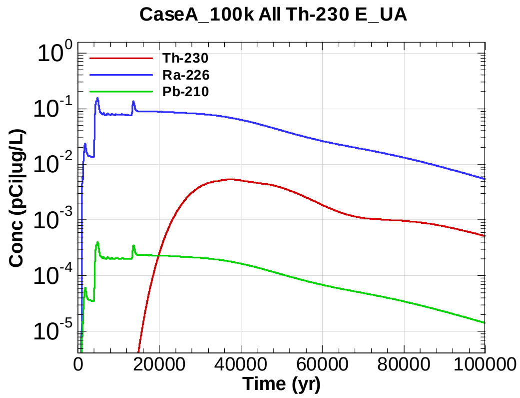

Figure D-215 - 100m Aquifer Concentration for CaseA_100k All Th-230 E_UA

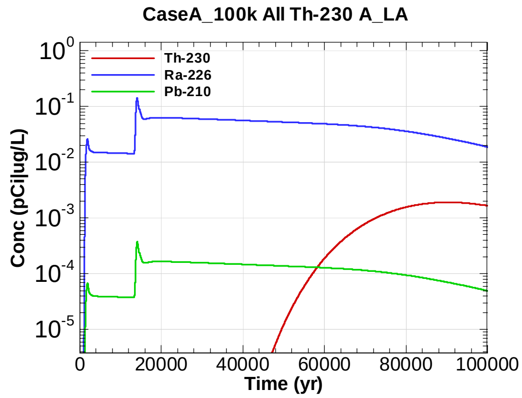

Figure D-216 - 100m Aquifer Concentration for CaseA_100k All Th-230 A_LA

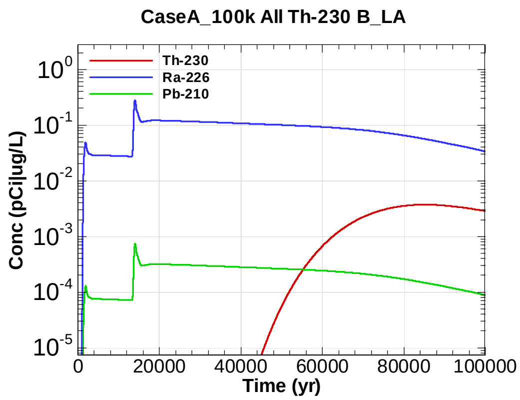

Figure D-217 - 100m Aquifer Concentration for CaseA_100k All Th-230 B_LA

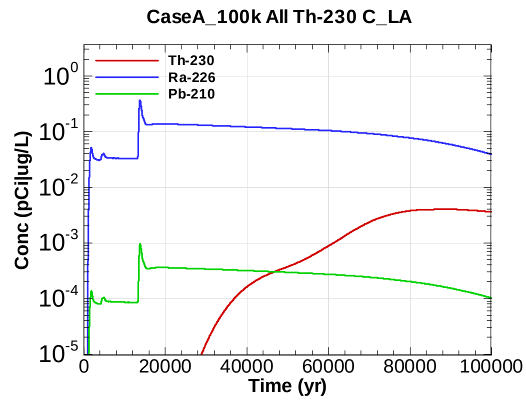

Figure D-218 - 100m Aquifer Concentration for CaseA_100k All Th-230 C_LA

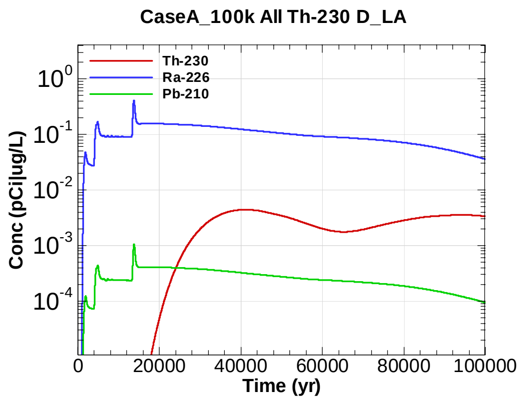

Figure D-219 - 100m Aquifer Concentration for CaseA_100k All Th-230 D_LA

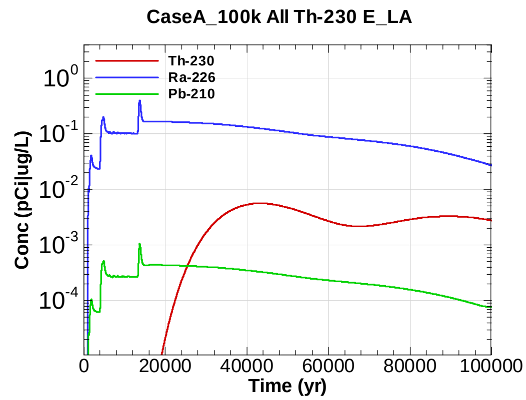

Figure D-220 - 100m Aquifer Concentration for CaseA_100k All Th-230 E_LA

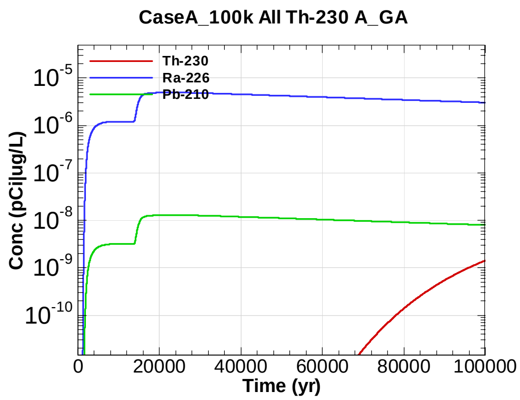

Figure D-221 - 100m Aquifer Concentration for CaseA_100k All Th-230 A_GA

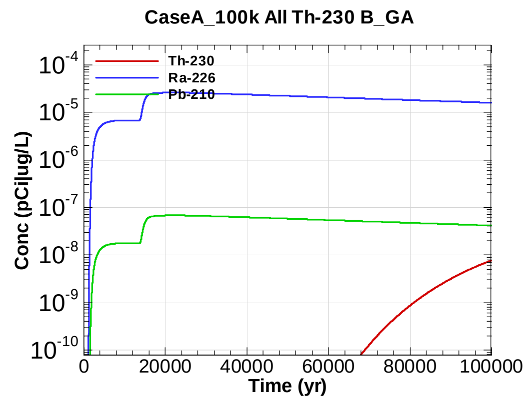

Figure D-222 - 100m Aquifer Concentration for CaseA_100k All Th-230 B_GA

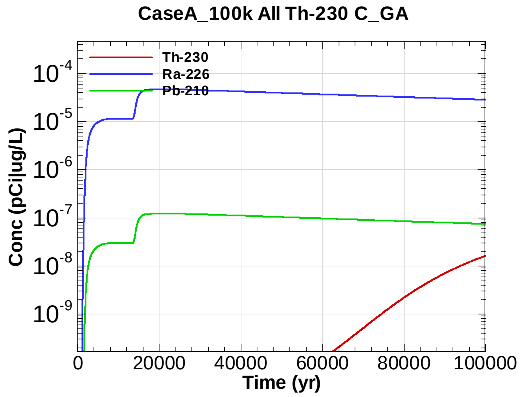

Figure D-223 - 100m Aquifer Concentration for CaseA_100k All Th-230 C_GA

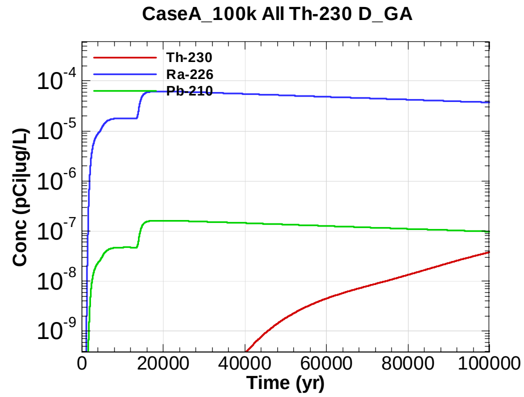

Figure D-224 - 100m Aquifer Concentration for CaseA_100k All Th-230 D_GA

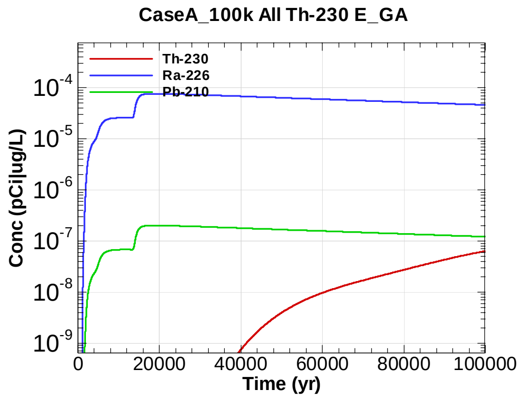

Figure D-225 - 100m Aquifer Concentration for CaseA_100k All Th-230 E_GA

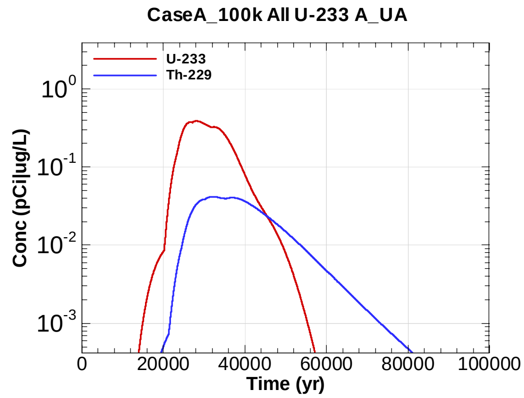

Figure D-226 - 100m Aquifer Concentration for CaseA_100k All U-233 A_UA

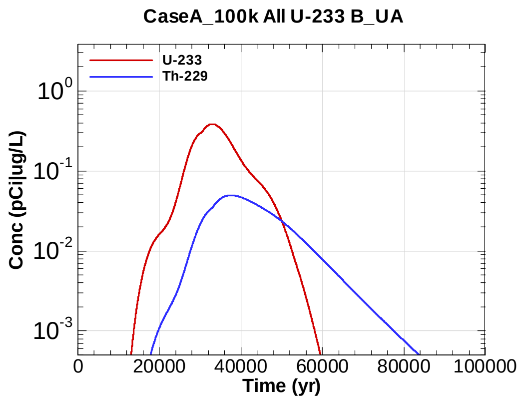

Figure D-227 - 100m Aquifer Concentration for CaseA_100k All U-233 B_UA

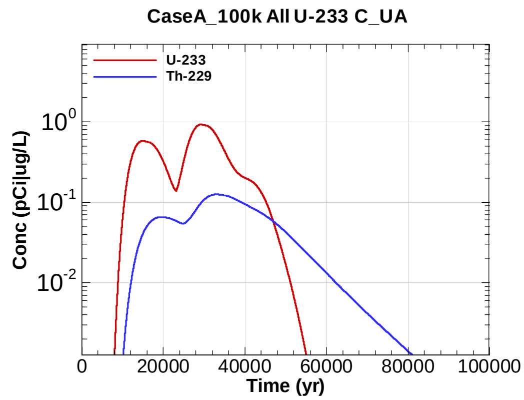

Figure D-228 - 100m Aquifer Concentration for CaseA_100k All U-233 C_UA

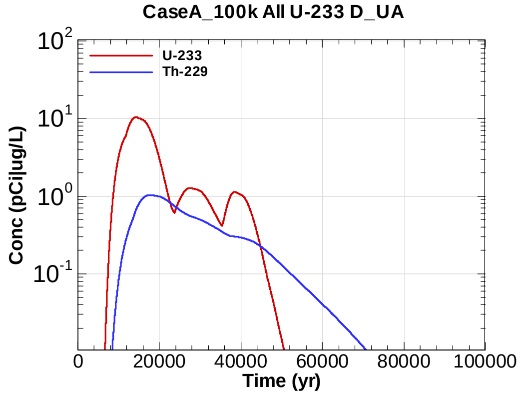

Figure D-229 - 100m Aquifer Concentration for CaseA_100k All U-233 D_UA

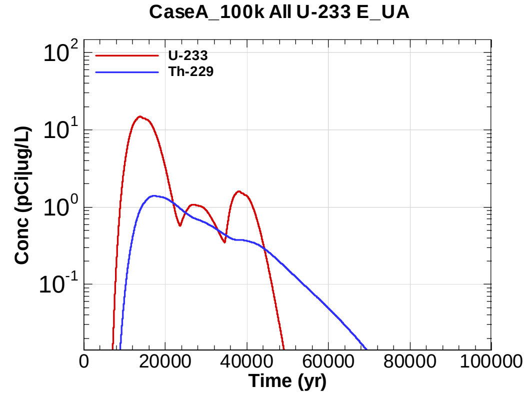

Figure D-230 - 100m Aquifer Concentration for CaseA_100k All U-233 E_UA

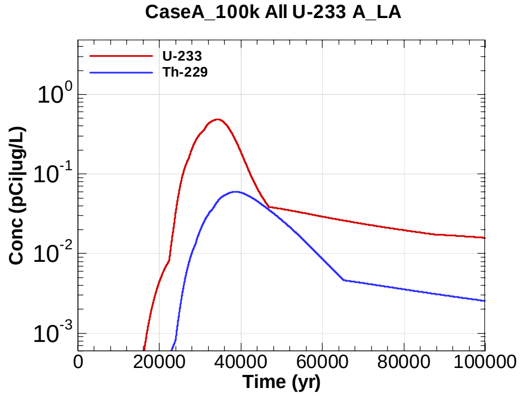

Figure D-231 - 100m Aquifer Concentration for CaseA_100k All U-233 A_LA

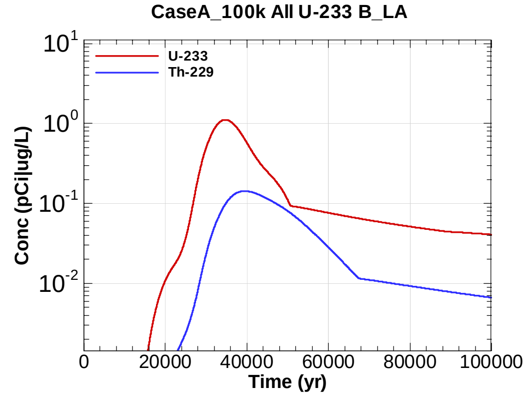

Figure D-232 - 100m Aquifer Concentration for CaseA_100k All U-233 B_LA

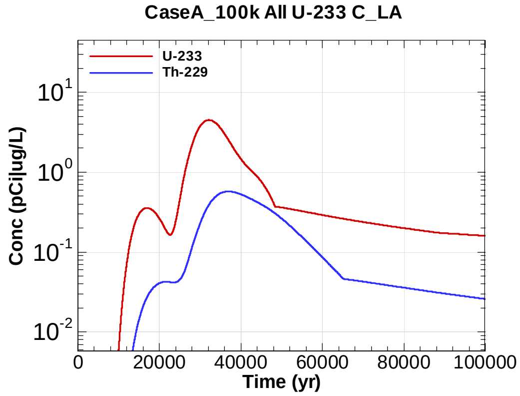

Figure D-233 - 100m Aquifer Concentration for CaseA_100k All U-233 C_LA

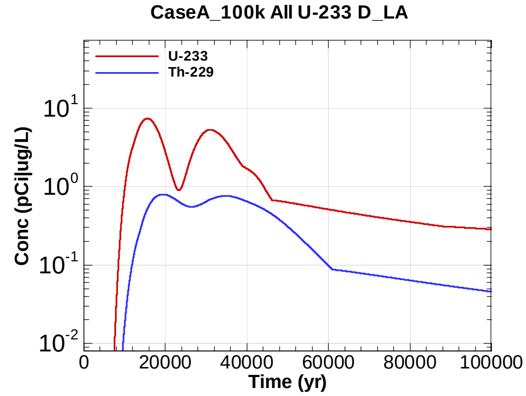

Figure D-234 - 100m Aquifer Concentration for CaseA_100k All U-233 D_LA

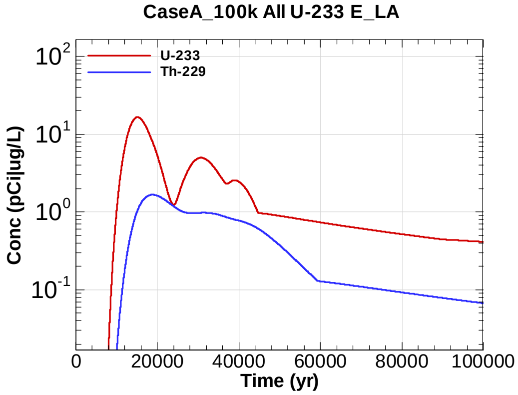

Figure D-235 - 100m Aquifer Concentration for CaseA_100k All U-233 E_LA

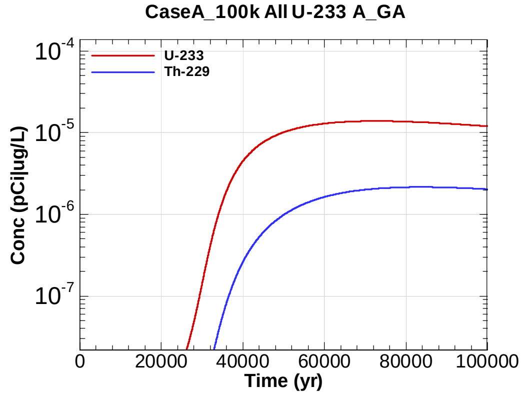

Figure D-236 - 100m Aquifer Concentration for CaseA_100k All U-233 A_GA

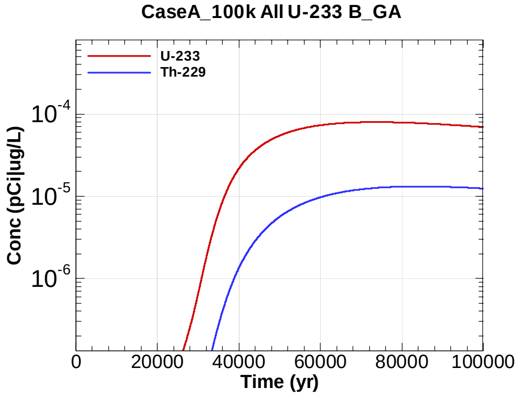

Figure D-237 - 100m Aquifer Concentration for CaseA_100k All U-233 B_GA

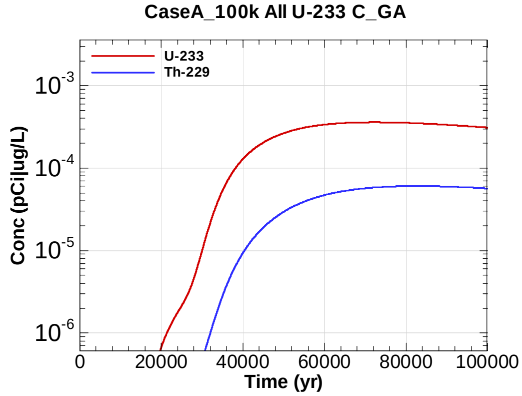

Figure D-238 - 100m Aquifer Concentration for CaseA_100k All U-233 C_GA

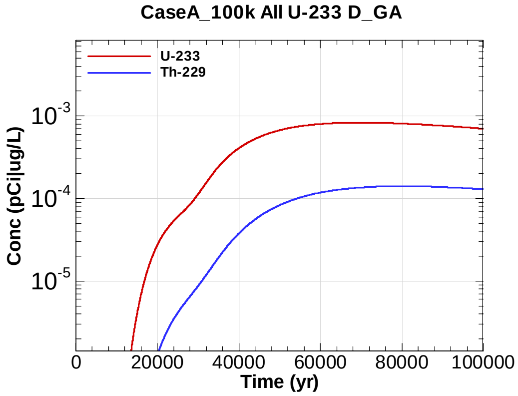

Figure D-239 - 100m Aquifer Concentration for CaseA_100k All U-233 D_GA

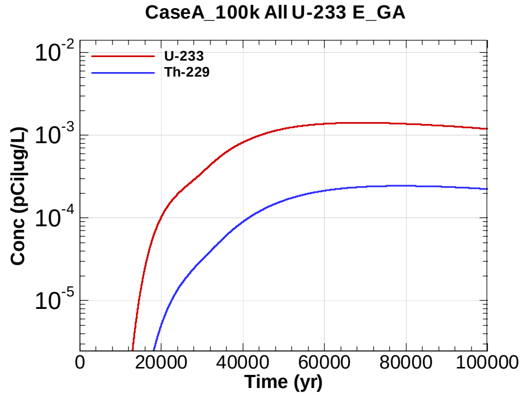

Figure D-240 - 100m Aquifer Concentration for CaseA_100k All U-233 E_GA

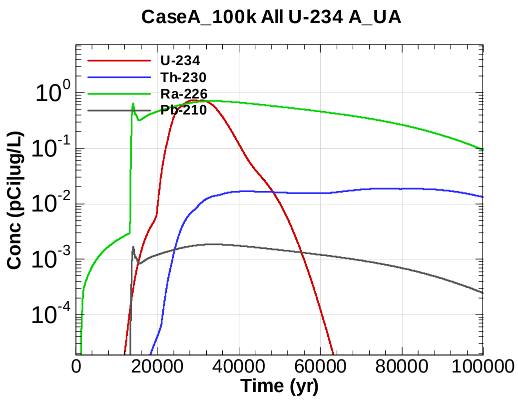

Figure D-241 - 100m Aquifer Concentration for CaseA_100k All U-234 A_UA

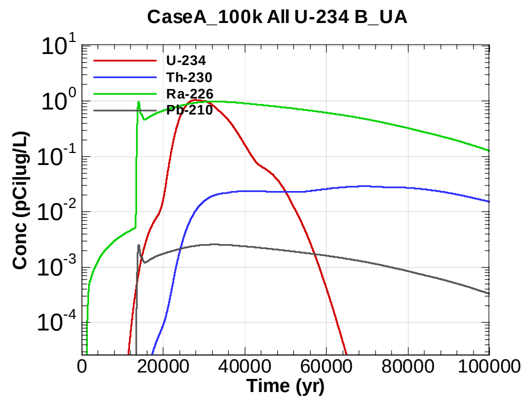

Figure D-242 - 100m Aquifer Concentration for CaseA_100k All U-234 B_UA

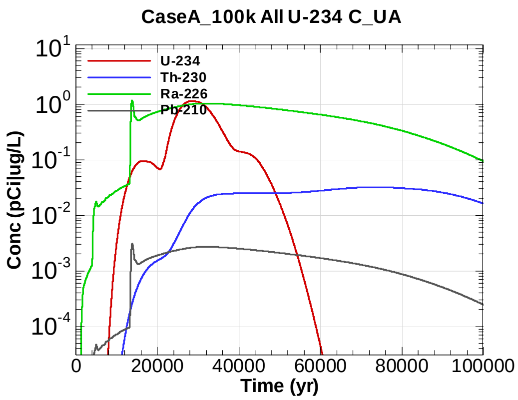

Figure D-243 - 100m Aquifer Concentration for CaseA_100k All U-234 C_UA

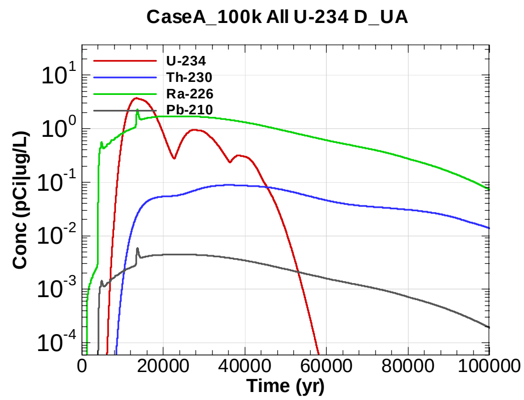

Figure D-244 - 100m Aquifer Concentration for CaseA_100k All U-234 D_UA

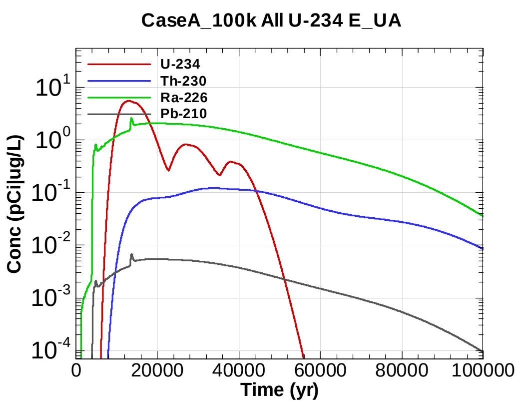

Figure D-245 - 100m Aquifer Concentration for CaseA_100k All U-234 E_UA

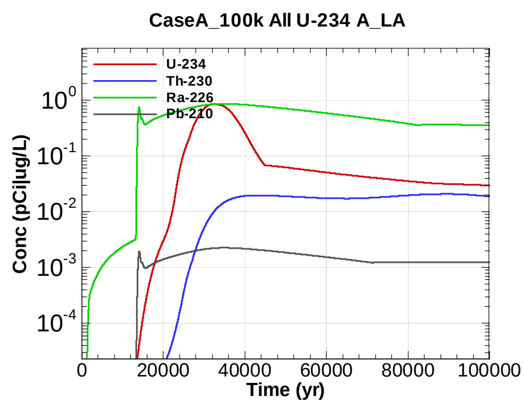

Figure D-246 - 100m Aquifer Concentration for CaseA_100k All U-234 A_LA

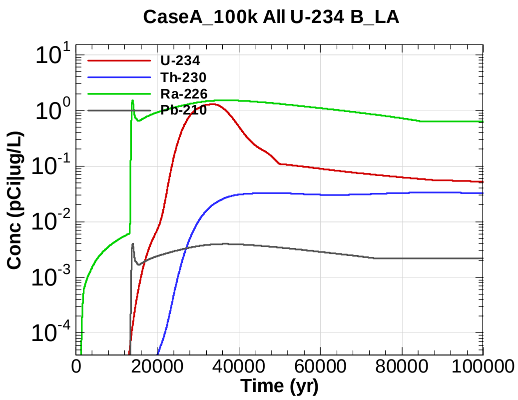

Figure D-247 - 100m Aquifer Concentration for CaseA_100k All U-234 B_LA

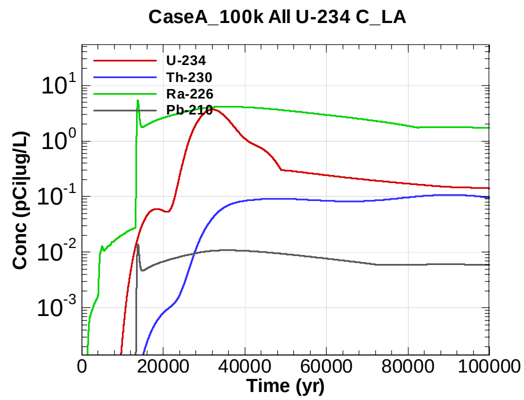

Figure D-248 - 100m Aquifer Concentration for CaseA_100k All U-234 C_LA

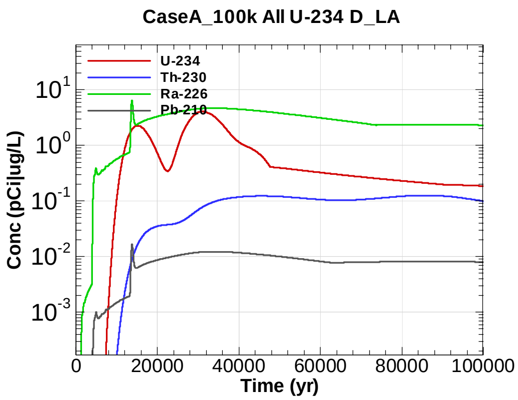

Figure D-249 - 100m Aquifer Concentration for CaseA_100k All U-234 D_LA

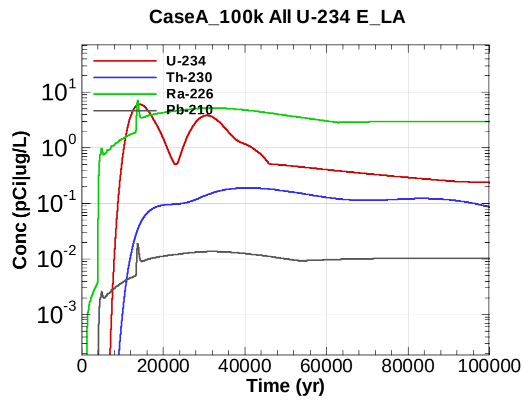

Figure D-250 - 100m Aquifer Concentration for CaseA_100k All U-234 E_LA

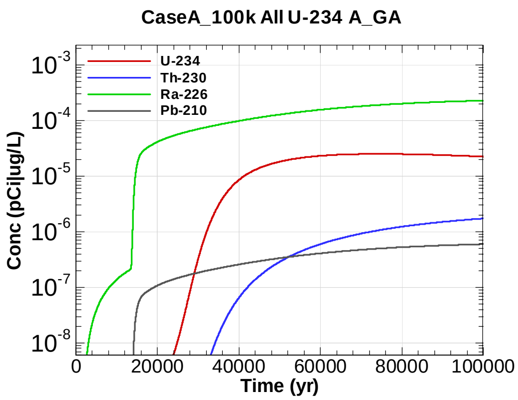

Figure D-251 - 100m Aquifer Concentration for CaseA_100k All U-234 A_GA

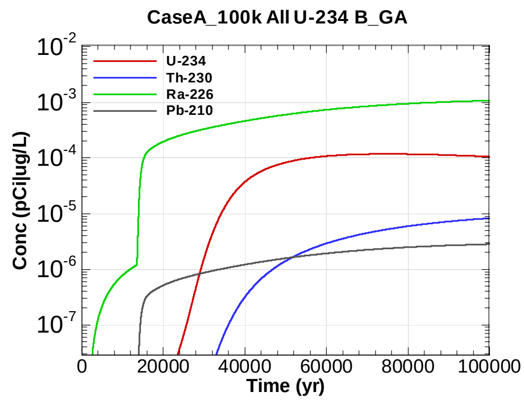

Figure D-252 - 100m Aquifer Concentration for CaseA_100k All U-234 B_GA

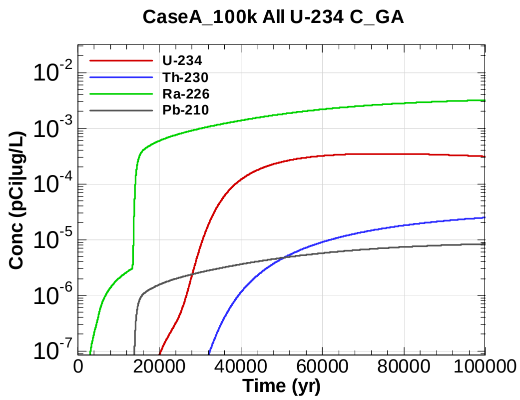

Figure D-253 - 100m Aquifer Concentration for CaseA_100k All U-234 C_GA

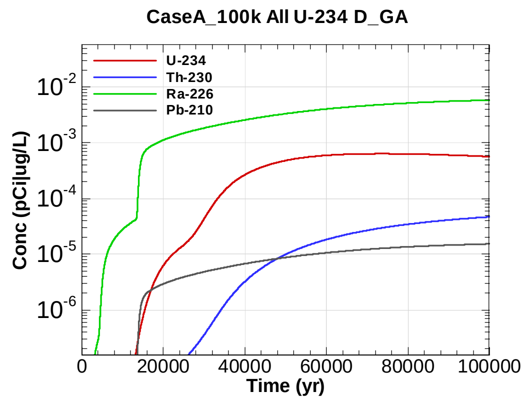

Figure D-254 - 100m Aquifer Concentration for CaseA_100k All U-234 D_GA

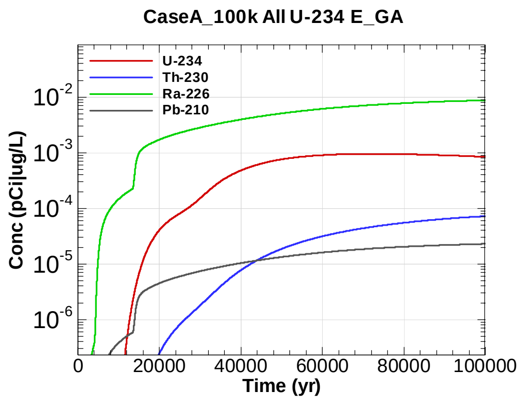

Figure D-255 - 100m Aquifer Concentration for CaseA_100k All U-234 E_GA

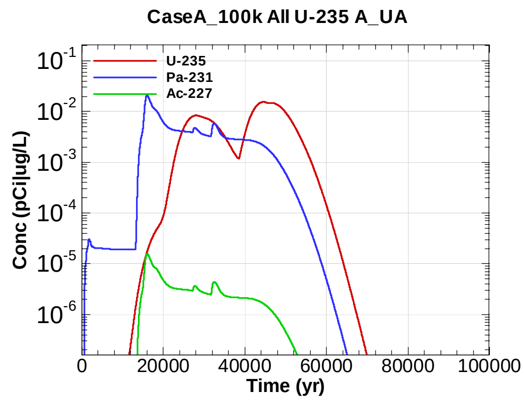

Figure D-256 - 100m Aquifer Concentration for CaseA_100k All U-235 A_UA

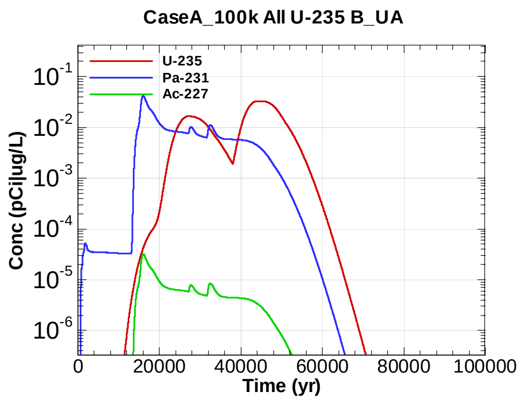

Figure D-257 - 100m Aquifer Concentration for CaseA_100k All U-235 B_UA

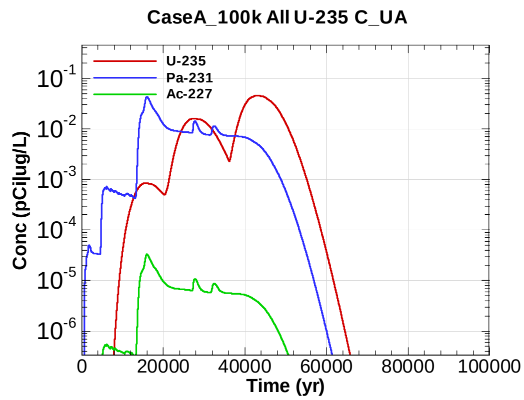

Figure D-258 - 100m Aquifer Concentration for CaseA_100k All U-235 C_UA

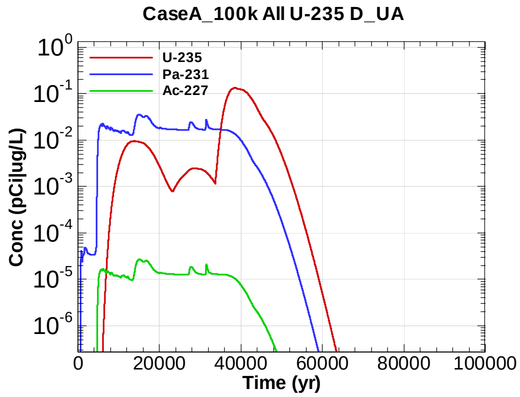

Figure D-259 - 100m Aquifer Concentration for CaseA_100k All U-235 D_UA

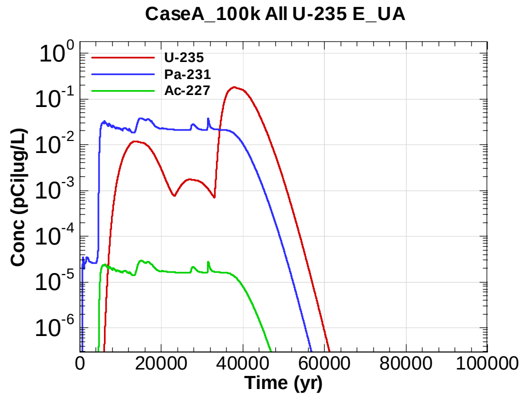

Figure D-260 - 100m Aquifer Concentration for CaseA_100k All U-235 E_UA

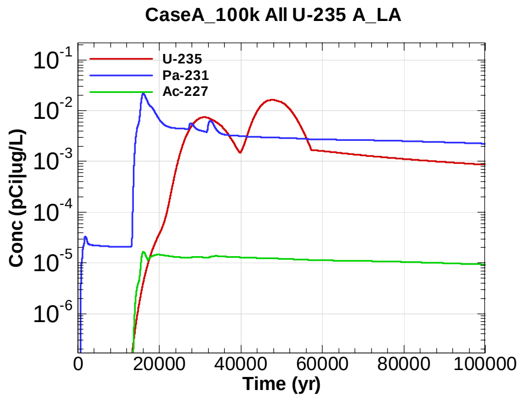

Figure D-261 - 100m Aquifer Concentration for CaseA_100k All U-235 A_LA

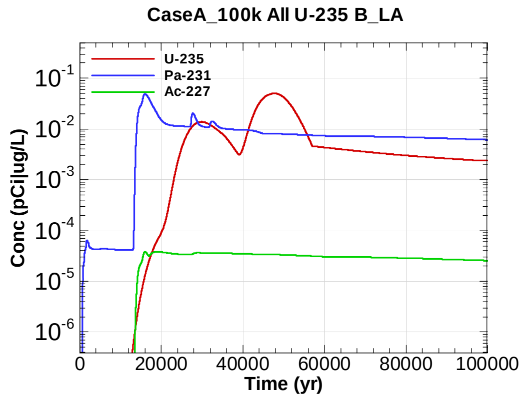

Figure D-262 - 100m Aquifer Concentration for CaseA_100k All U-235 B_LA

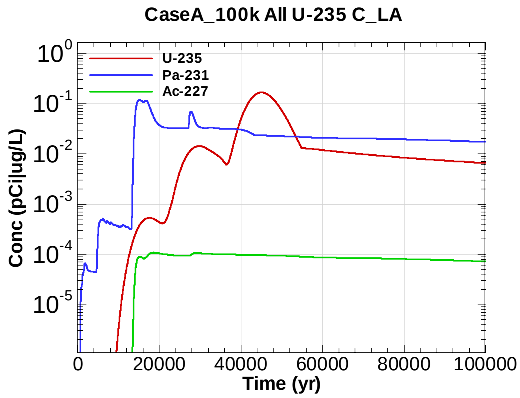

Figure D-263 - 100m Aquifer Concentration for CaseA_100k All U-235 C_LA

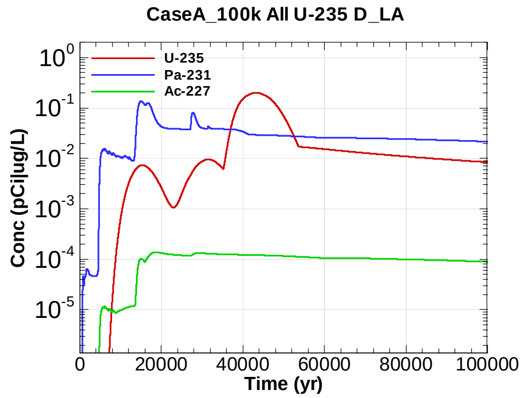

Figure D-264 - 100m Aquifer Concentration for CaseA_100k All U-235 D_LA

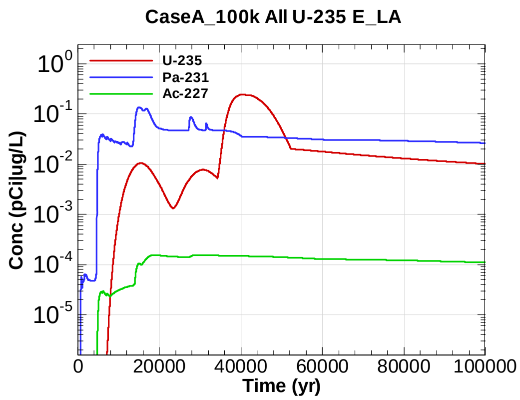

Figure D-265 - 100m Aquifer Concentration for CaseA_100k All U-235 E_LA

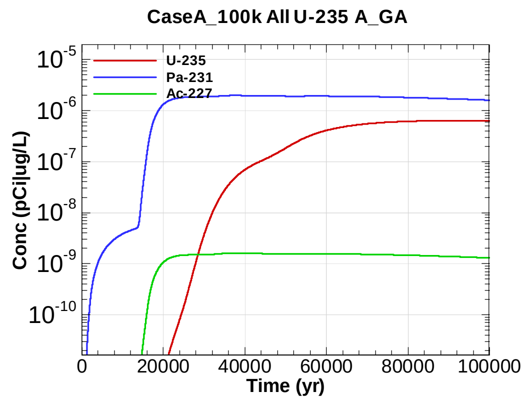

Figure D-266 - 100m Aquifer Concentration for CaseA_100k All U-235 A_GA

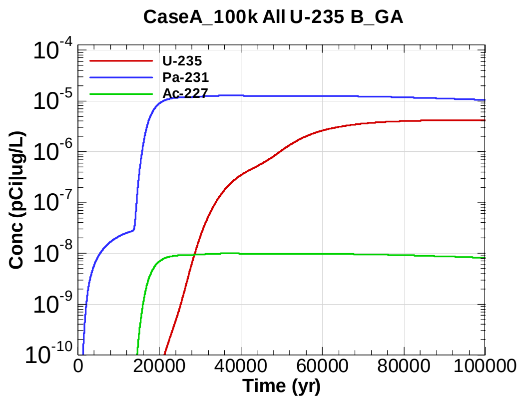

Figure D-267 - 100m Aquifer Concentration for CaseA_100k All U-235 B_GA

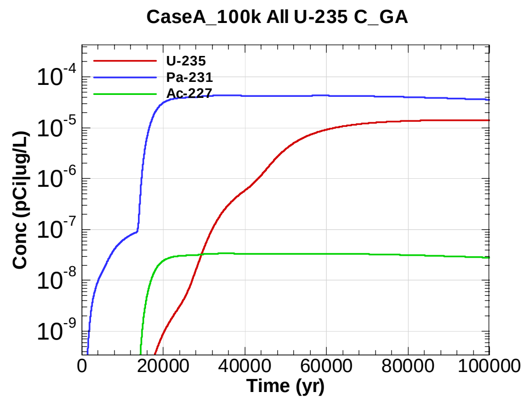

Figure D-268 - 100m Aquifer Concentration for CaseA_100k All U-235 C_GA

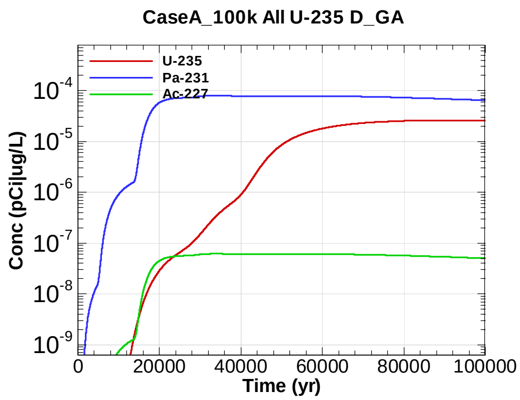

Figure D-269 - 100m Aquifer Concentration for CaseA_100k All U-235 D_GA

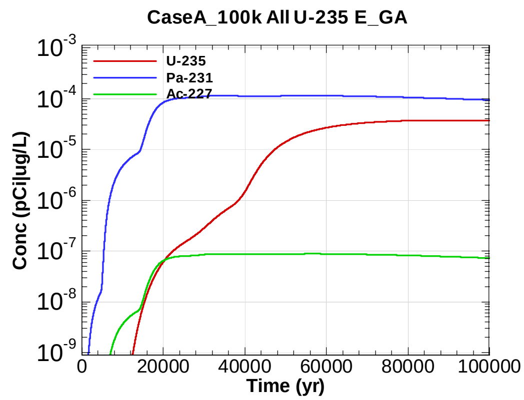

Figure D-270 - 100m Aquifer Concentration for CaseA_100k All U-235 E_GA

Appendix E
100-METER SENSITIVITY RUN RADIONUCLIDE CONCENTRATIONS FOR SELECTED SOURCES

Appendix E contains curves showing the one-hundred meter radiological concentrations (sensitivity run radionuclides only) for selected FTF locations (Tanks 1, 5, 6, 17, 18, 19, 20, 33, 34, Ancillary Equipment, and All Others) for the Base Case (Case/Configuration A). 20,000 year concentration results are presented from the three aquifers of concern (Upper Three Runs Aquifer-Upper Zone, Upper Three Runs-Lower Zone, and Gordon Aquifer) for Sectors A through E.

Graph heading example "CaseA Tank01 Am-241 A_UA"

Key

CaseA = scenario case/configuration
Tank01 = inventory source is Tank01 (Other = Transfer Lines)
Am-241 = radionuclide or chemical of concern
A = Sector of concern (see sector map with stream traces)
UA = aquifer of concern

- UA = Upper Three Runs – Upper Zone
- LA = Upper Three Runs – Lower Zone
- GA = Gordon

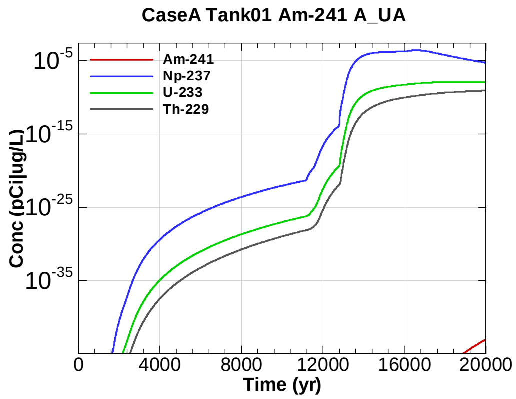

Figure E-1 - 100m Aquifer Concentration for CaseA Tank01 Am-241 A_UA

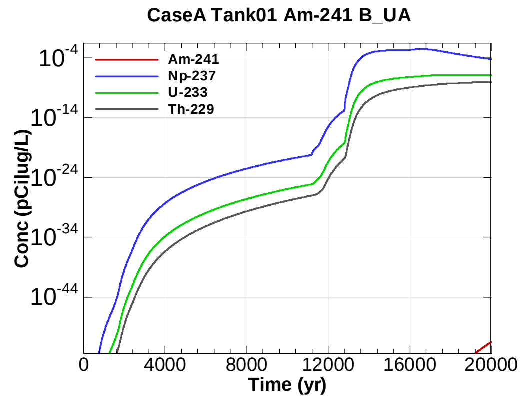

Figure E-2 - 100m Aquifer Concentration for CaseA Tank01 Am-241 B_UA

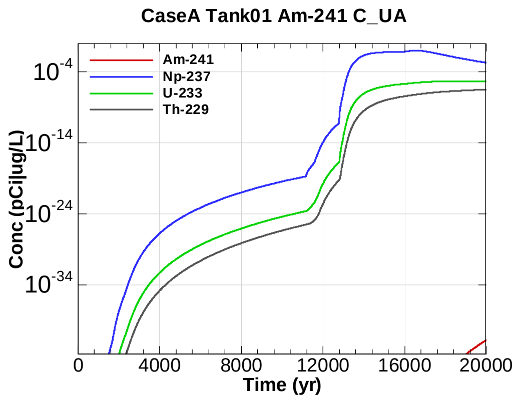

Figure E-3 - 100m Aquifer Concentration for CaseA Tank01 Am-241 C_UA

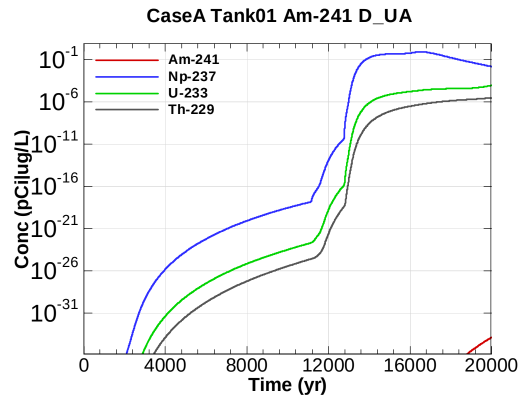

Figure E-4 - 100m Aquifer Concentration for CaseA Tank01 Am-241 D_UA

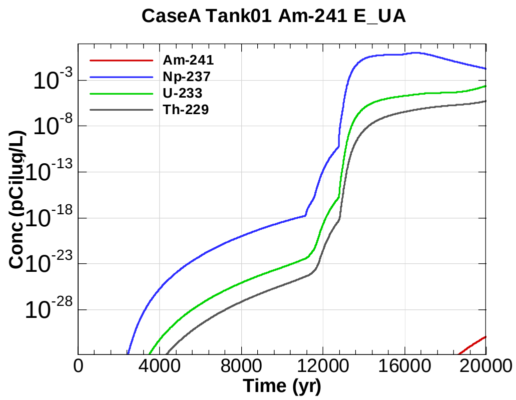

Figure E-5 - 100m Aquifer Concentration for CaseA Tank01 Am-241 E_UA

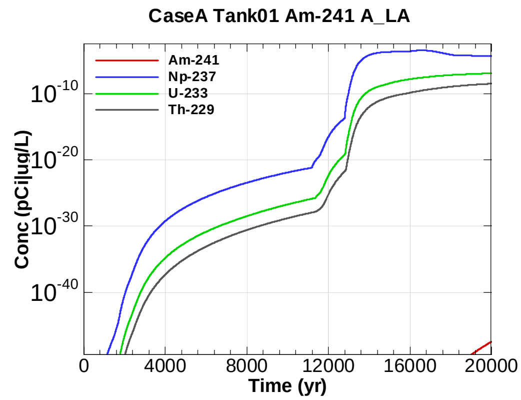

Figure E-6 - 100m Aquifer Concentration for CaseA Tank01 Am-241 A_LA

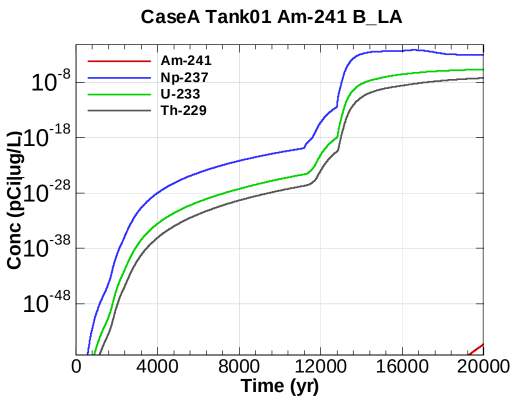

Figure E-7 - 100m Aquifer Concentration for CaseA Tank01 Am-241 B_LA

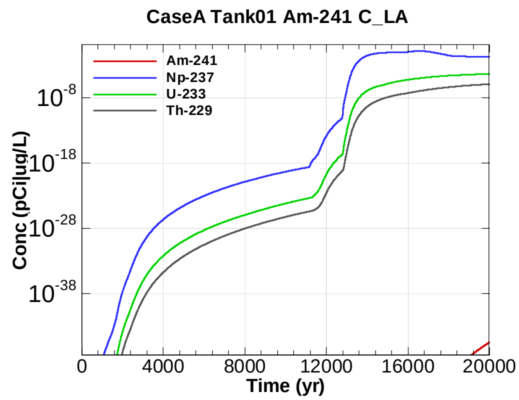

Figure E-8 - 100m Aquifer Concentration for CaseA Tank01 Am-241 C_LA

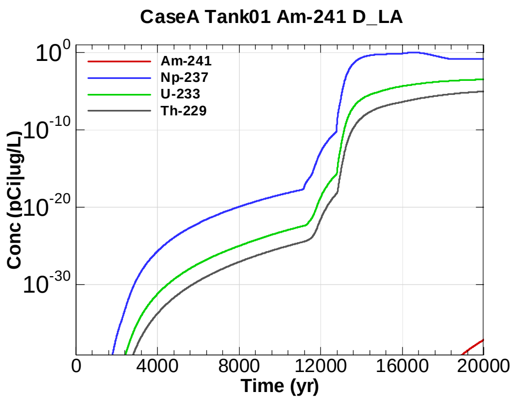

Figure E-9 - 100m Aquifer Concentration for CaseA Tank01 Am-241 D_LA

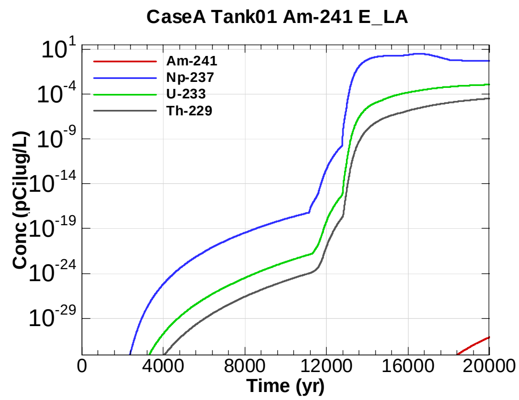

Figure E-10 - 100m Aquifer Concentration for CaseA Tank01 Am-241 E_LA

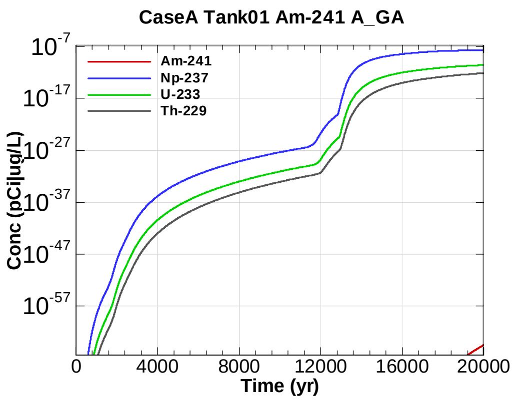

Figure E-11 - 100m Aquifer Concentration for CaseA Tank01 Am-241 A_GA

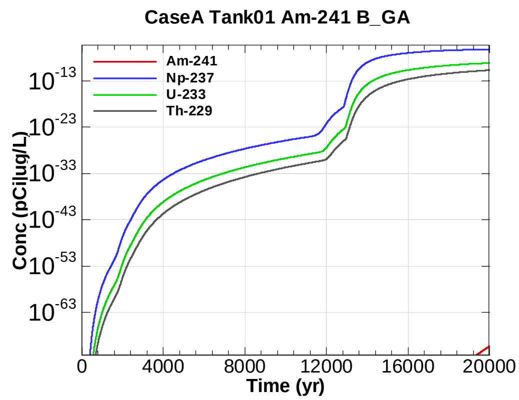

Figure E-12 - 100m Aquifer Concentration for CaseA Tank01 Am-241 B_GA

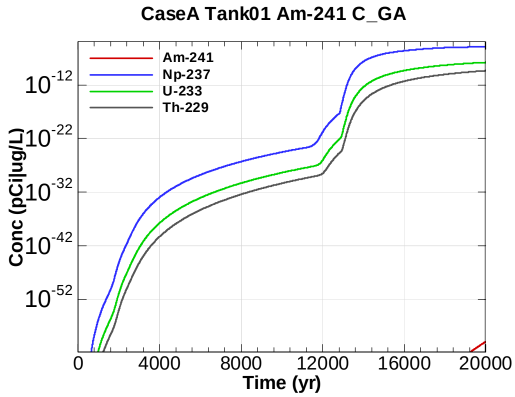

Figure E-13 - 100m Aquifer Concentration for CaseA Tank01 Am-241 C_GA

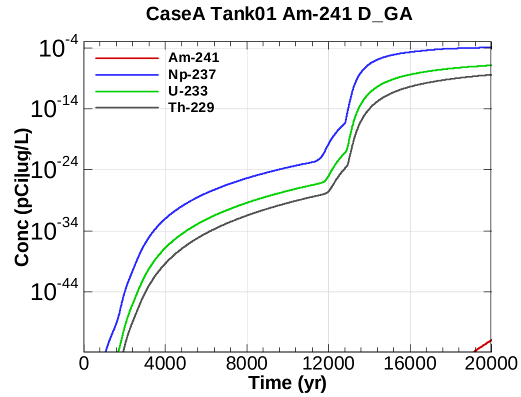

Figure E-14 - 100m Aquifer Concentration for CaseA Tank01 Am-241 D_GA

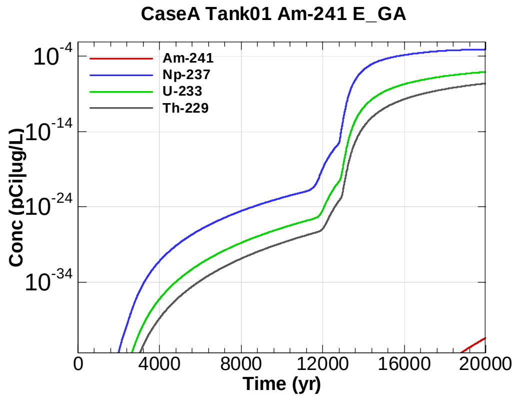

Figure E-15 - 100m Aquifer Concentration for CaseA Tank01 Am-241 E_GA

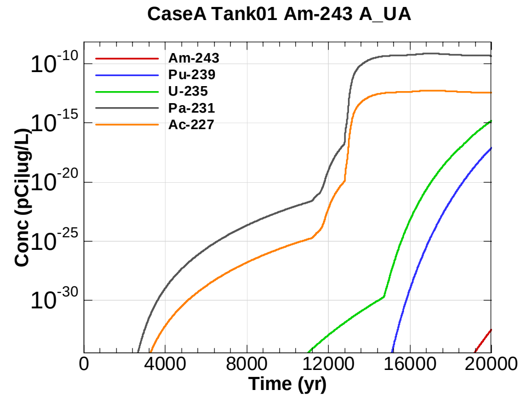

Figure E-16 - 100m Aquifer Concentration for CaseA Tank01 Am-243 A_UA

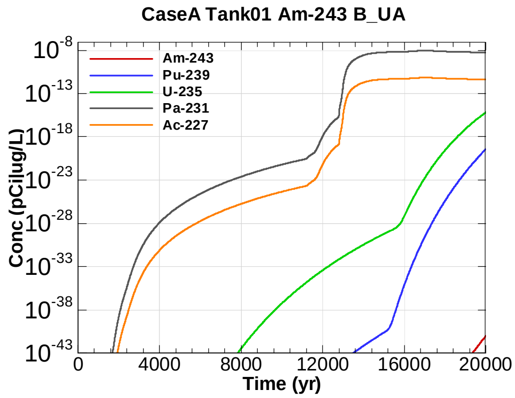

Figure E-17 - 100m Aquifer Concentration for CaseA Tank01 Am-243 B_UA

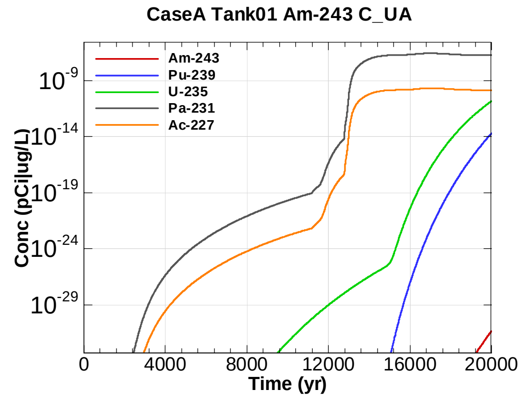

Figure E-18 - 100m Aquifer Concentration for CaseA Tank01 Am-243 C_UA

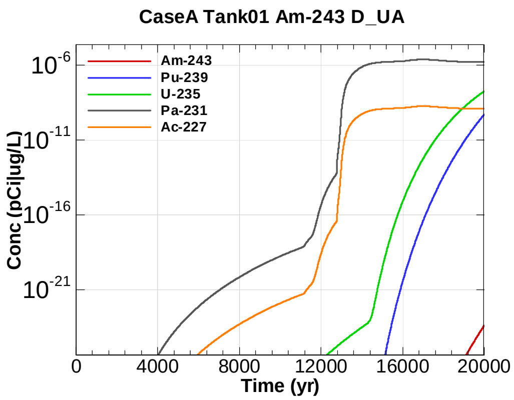

Figure E-19 - 100m Aquifer Concentration for CaseA Tank01 Am-243 D_UA

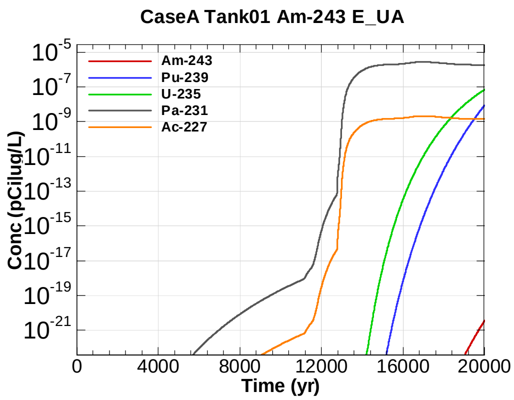

Figure E-20 - 100m Aquifer Concentration for CaseA Tank01 Am-243 E_UA

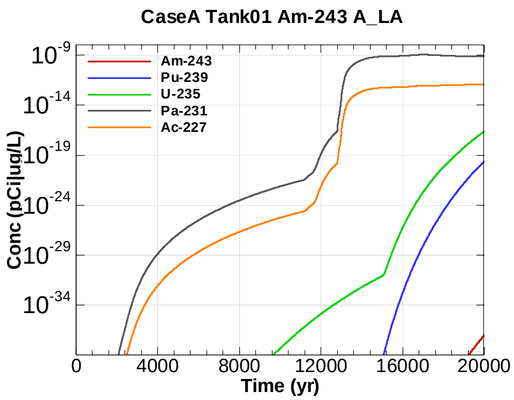

Figure E-21 - 100m Aquifer Concentration for CaseA Tank01 Am-243 A_LA

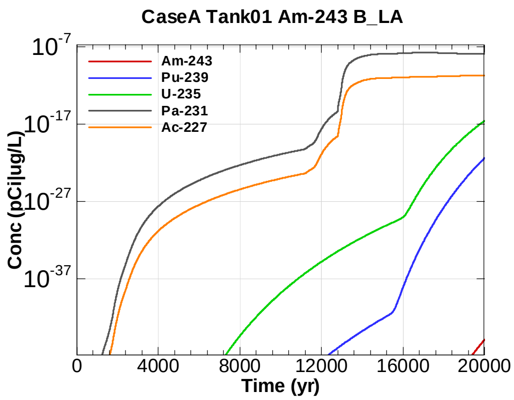

Figure E-22 - 100m Aquifer Concentration for CaseA Tank01 Am-243 B_LA

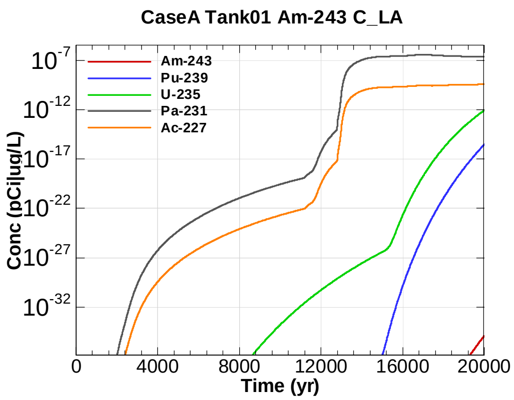

Figure E-23 - 100m Aquifer Concentration for CaseA Tank01 Am-243 C_LA

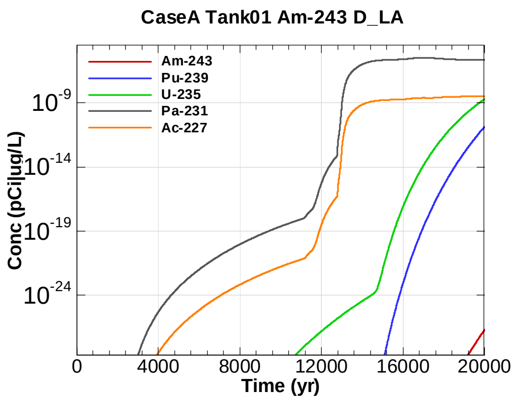

Figure E-24 - 100m Aquifer Concentration for CaseA Tank01 Am-243 D_LA

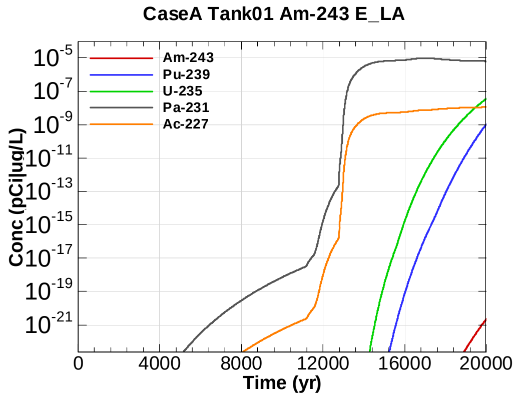

Figure E-25 - 100m Aquifer Concentration for CaseA Tank01 Am-243 E_LA

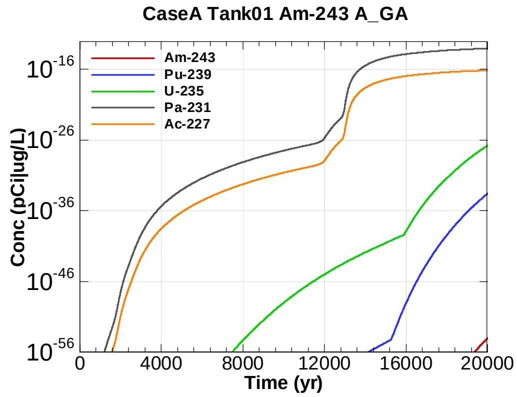

Figure E-26 - 100m Aquifer Concentration for CaseA Tank01 Am-243 A_GA

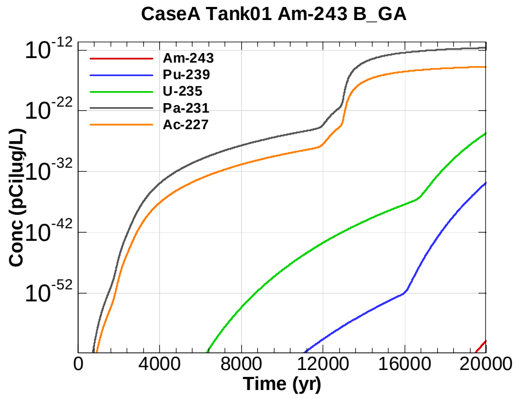

Figure E-27 - 100m Aquifer Concentration for CaseA Tank01 Am-243 B_GA

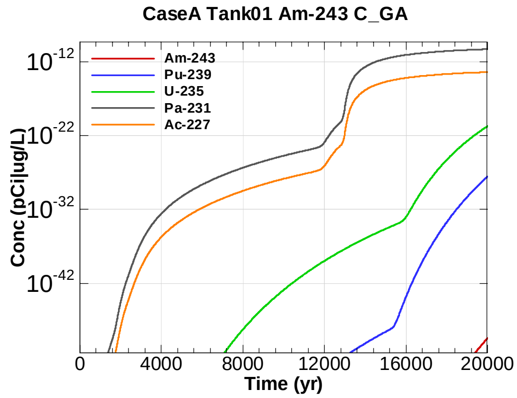

Figure E-28 - 100m Aquifer Concentration for CaseA Tank01 Am-243 C_GA

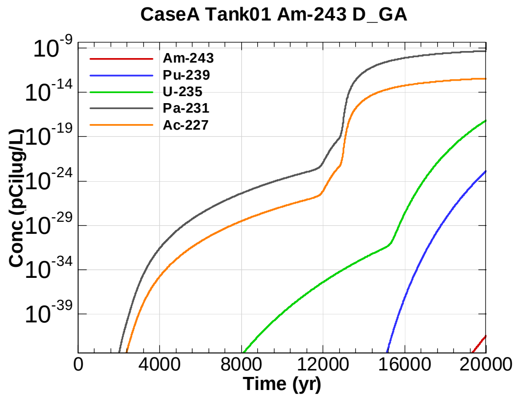

Figure E-29 - 100m Aquifer Concentration for CaseA Tank01 Am-243 D_GA

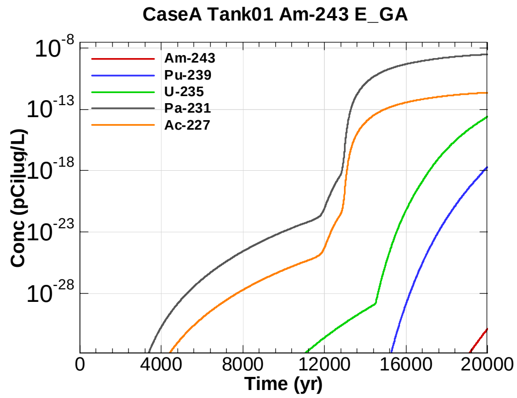

Figure E-30 - 100m Aquifer Concentration for CaseA Tank01 Am-243 E_GA

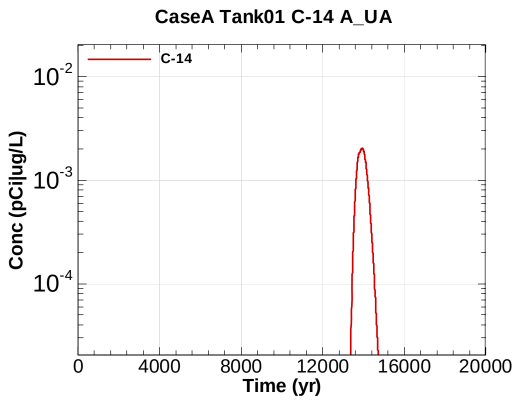

Figure E-31 - 100m Aquifer Concentration for CaseA Tank01 C-14 A_UA

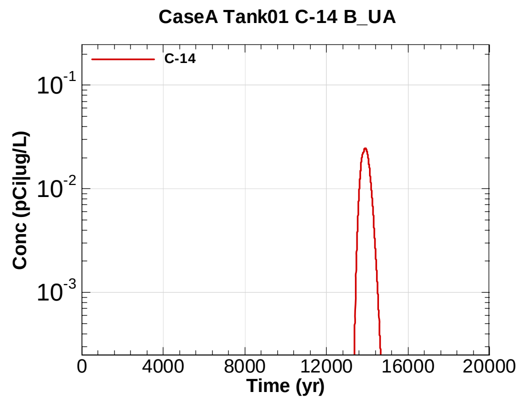

Figure E-32 - 100m Aquifer Concentration for CaseA Tank01 C-14 B_UA

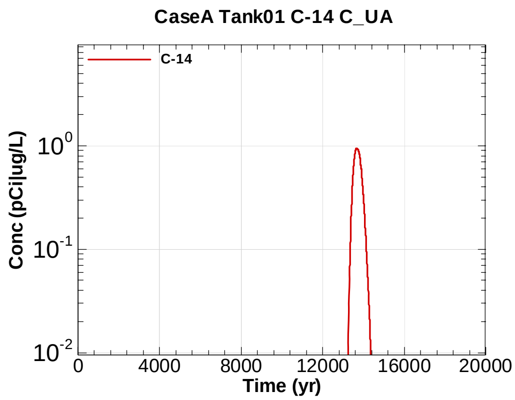

Figure E-33 - 100m Aquifer Concentration for CaseA Tank01 C-14 C_UA

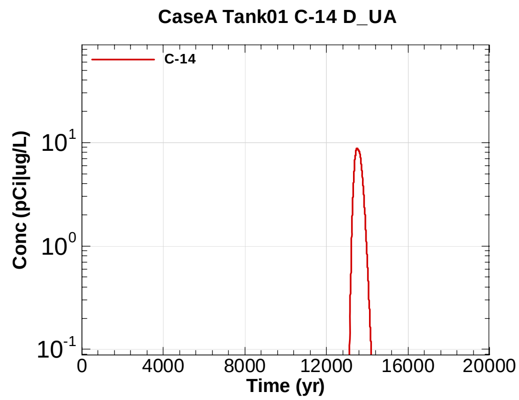

Figure E-34 - 100m Aquifer Concentration for CaseA Tank01 C-14 D_UA

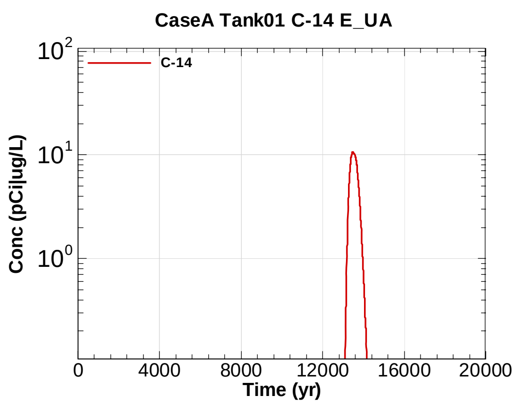

Figure E-35 - 100m Aquifer Concentration for CaseA Tank01 C-14 E_UA

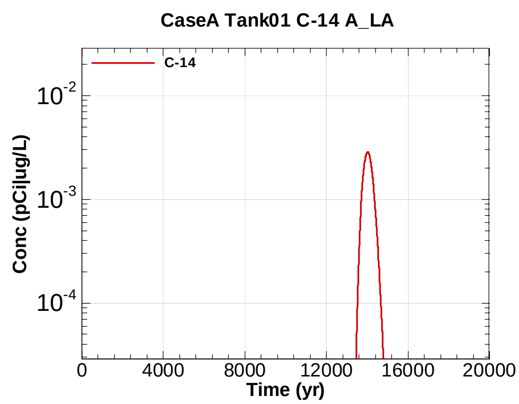

Figure E-36 - 100m Aquifer Concentration for CaseA Tank01 C-14 A_LA

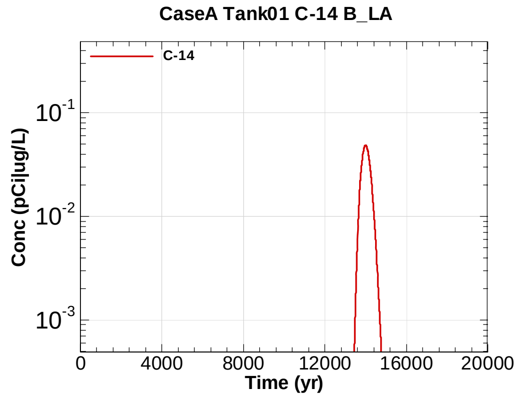

Figure E-37 - 100m Aquifer Concentration for CaseA Tank01 C-14 B_LA

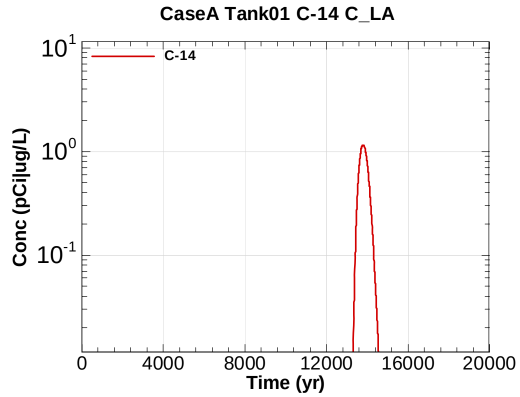

Figure E-38 - 100m Aquifer Concentration for CaseA Tank01 C-14 C_LA

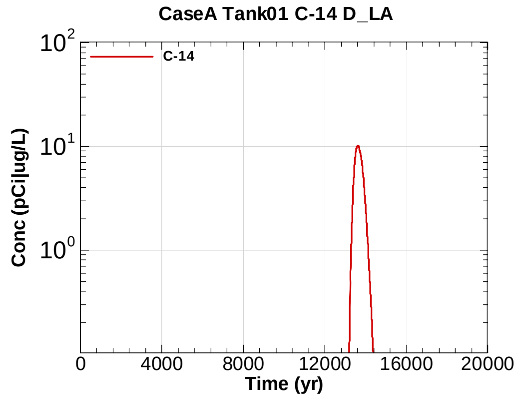

Figure E-39 - 100m Aquifer Concentration for CaseA Tank01 C-14 D_LA

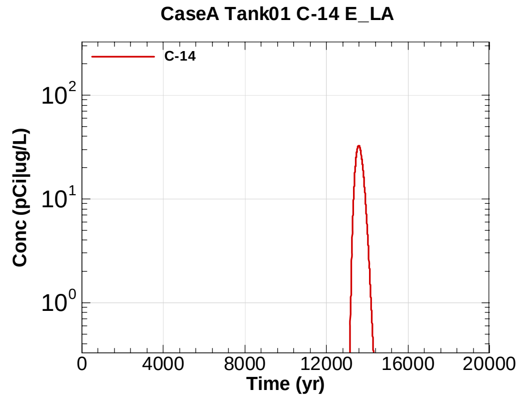

Figure E-40 - 100m Aquifer Concentration for CaseA Tank01 C-14 E_LA

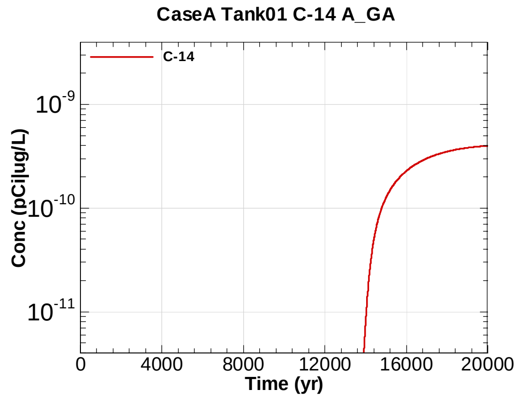

Figure E-41 - 100m Aquifer Concentration for CaseA Tank01 C-14 A_GA

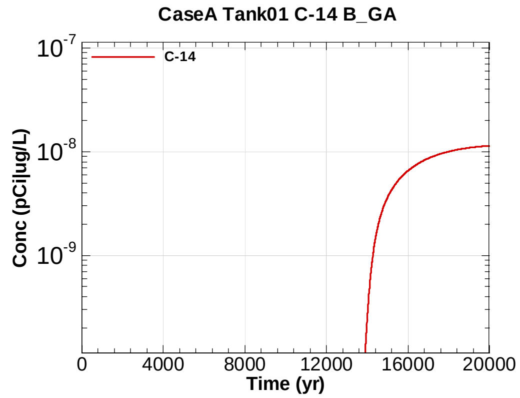

Figure E-42 - 100m Aquifer Concentration for CaseA Tank01 C-14 B_GA

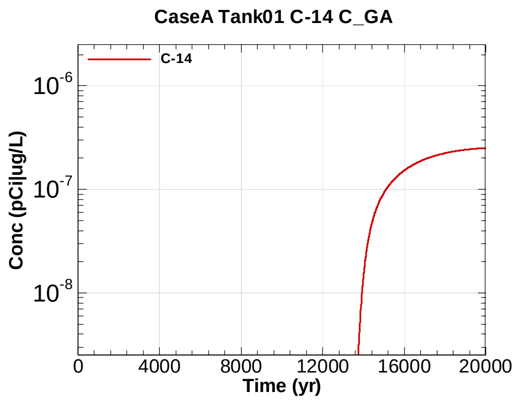

Figure E-43 - 100m Aquifer Concentration for CaseA Tank01 C-14 C_GA

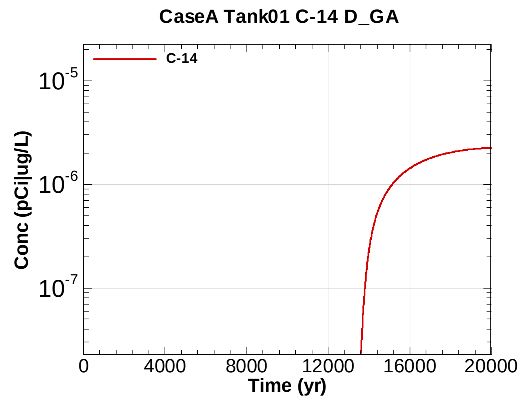

Figure E-44 - 100m Aquifer Concentration for CaseA Tank01 C-14 D_GA

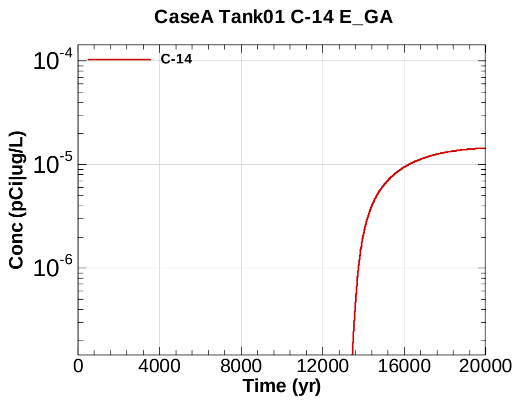

Figure E-45 - 100m Aquifer Concentration for CaseA Tank01 C-14 E_GA

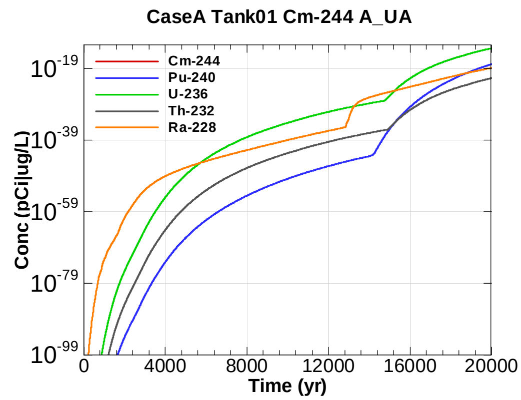

Figure E-46 - 100m Aquifer Concentration for CaseA Tank01 Cm-244 A_UA

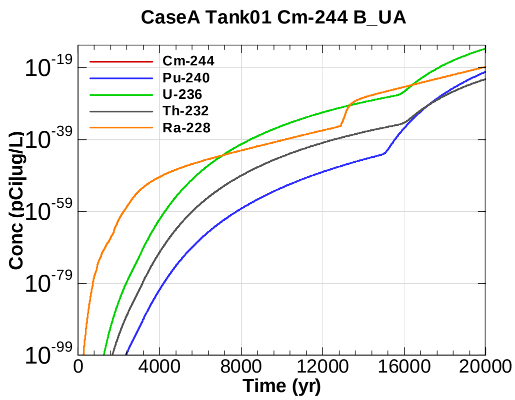

Figure E-47 - 100m Aquifer Concentration for CaseA Tank01 Cm-244 B_UA

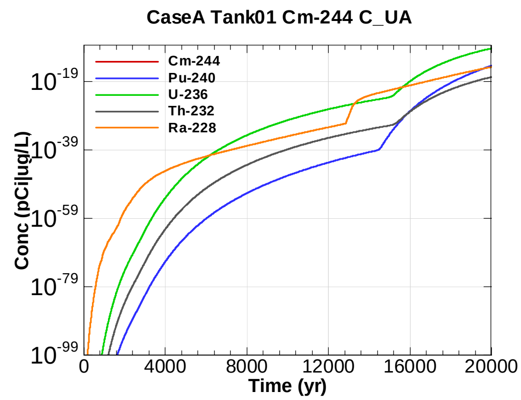

Figure E-48 - 100m Aquifer Concentration for CaseA Tank01 Cm-244 C_UA

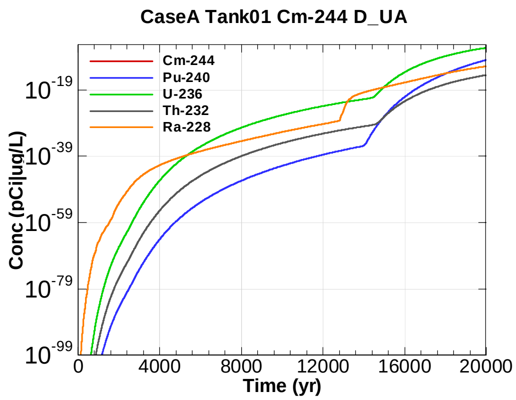

Figure E-49 - 100m Aquifer Concentration for CaseA Tank01 Cm-244 D_UA

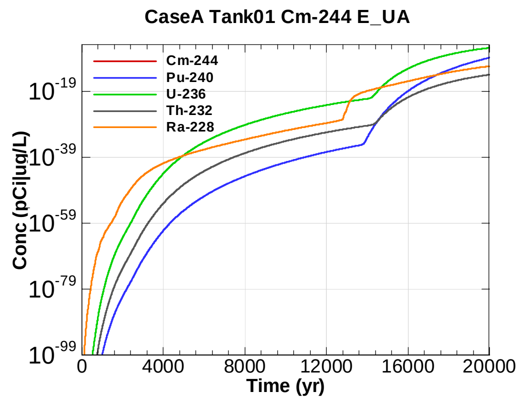

Figure E-50 - 100m Aquifer Concentration for CaseA Tank01 Cm-244 E_UA

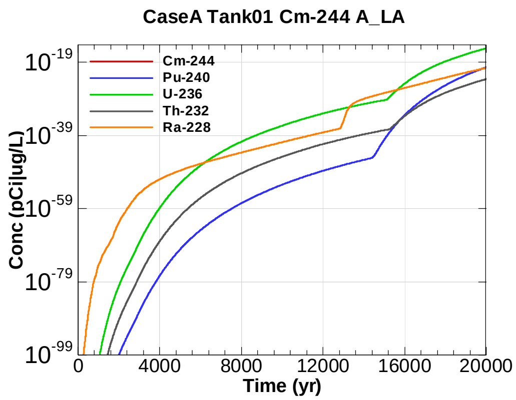

Figure E-51 - 100m Aquifer Concentration for CaseA Tank01 Cm-244 A_LA

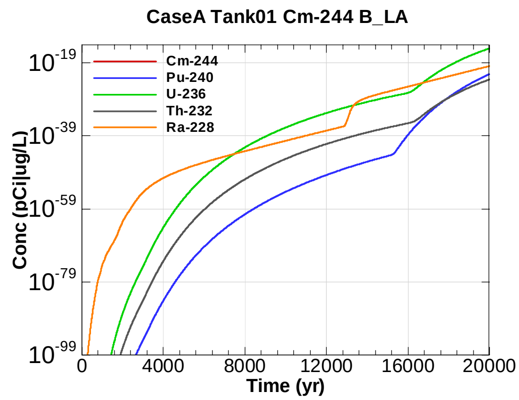

Figure E-52 - 100m Aquifer Concentration for CaseA Tank01 Cm-244 B_LA

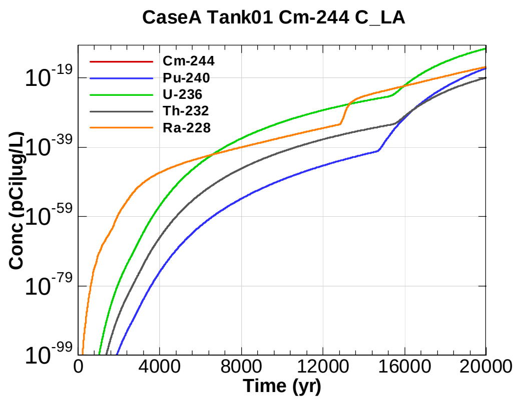

Figure E-53 - 100m Aquifer Concentration for CaseA Tank01 Cm-244 C_LA

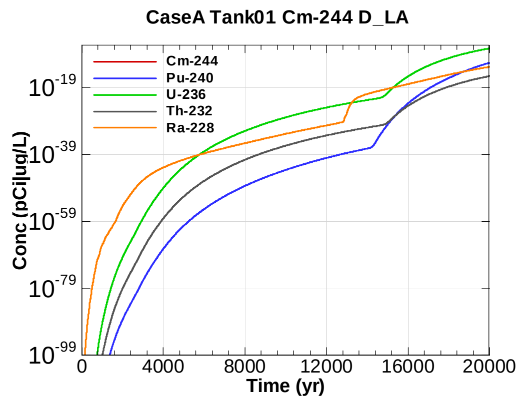

Figure E-54 - 100m Aquifer Concentration for CaseA Tank01 Cm-244 D_LA

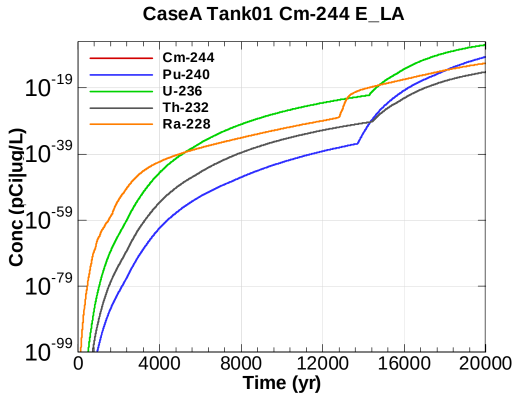

Figure E-55 - 100m Aquifer Concentration for CaseA Tank01 Cm-244 E_LA

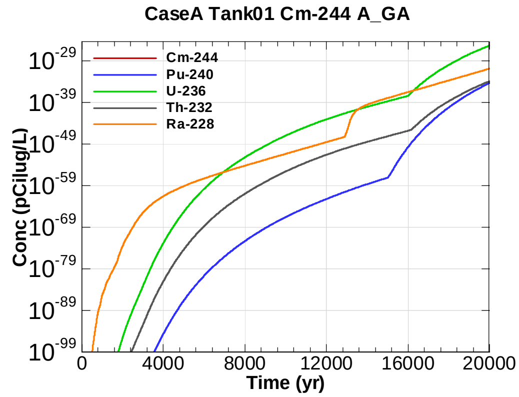

Figure E-56 - 100m Aquifer Concentration for CaseA Tank01 Cm-244 A_GA

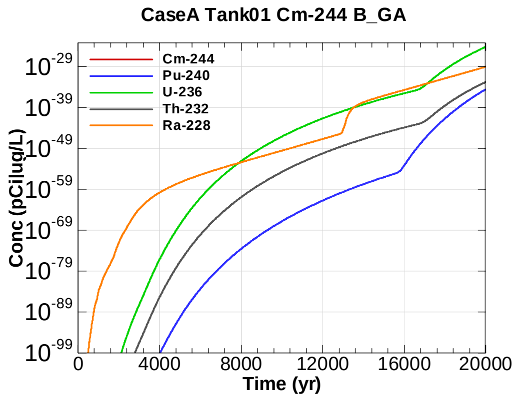

Figure E-57 - 100m Aquifer Concentration for CaseA Tank01 Cm-244 B_GA

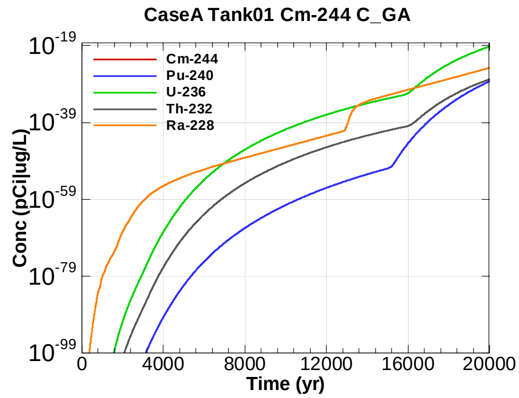

Figure E-58 - 100m Aquifer Concentration for CaseA Tank01 Cm-244 C_GA

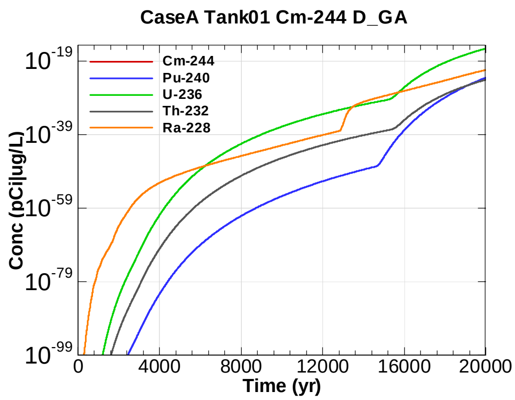

Figure E-59 - 100m Aquifer Concentration for CaseA Tank01 Cm-244 D_GA

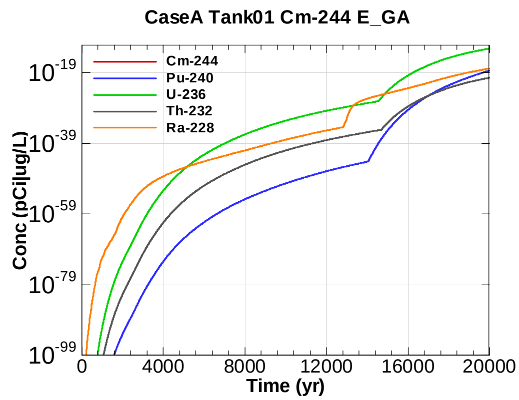

Figure E-60 - 100m Aquifer Concentration for CaseA Tank01 Cm-244 E_GA

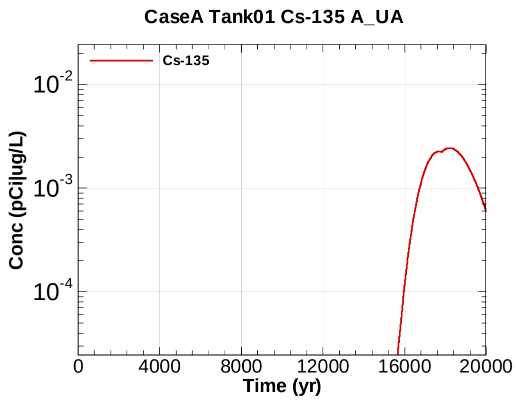

Figure E-61 - 100m Aquifer Concentration for CaseA Tank01 Cs-135 A_UA

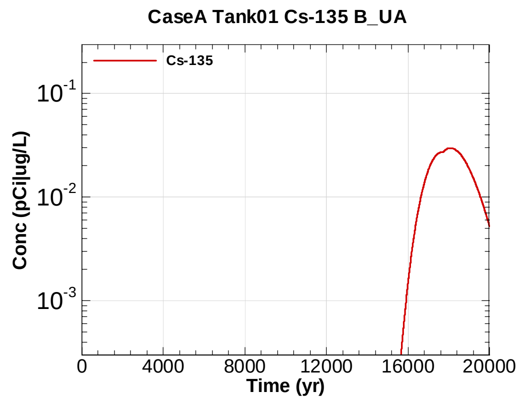

Figure E-62 - 100m Aquifer Concentration for CaseA Tank01 Cs-135 B_UA

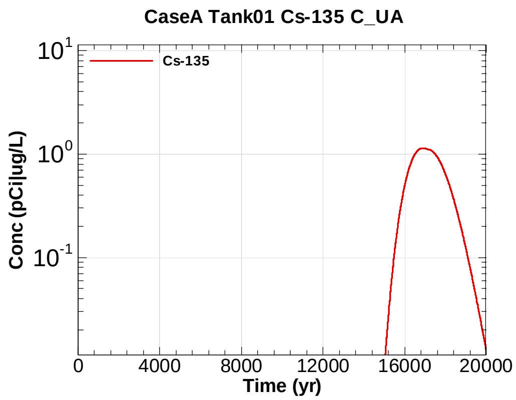

Figure E-63 - 100m Aquifer Concentration for CaseA Tank01 Cs-135 C_UA

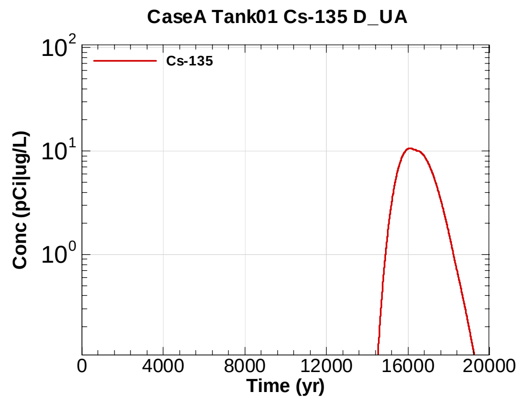

Figure E-64 - 100m Aquifer Concentration for CaseA Tank01 Cs-135 D_UA

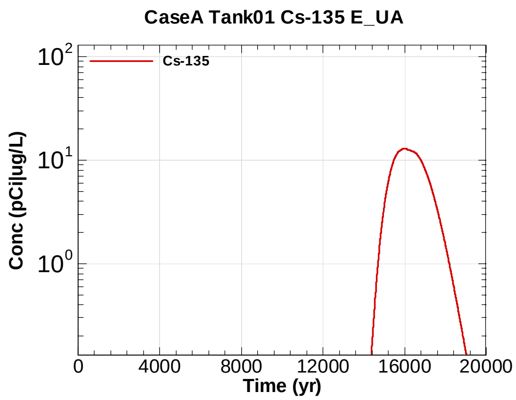

Figure E-65 - 100m Aquifer Concentration for CaseA Tank01 Cs-135 E_UA

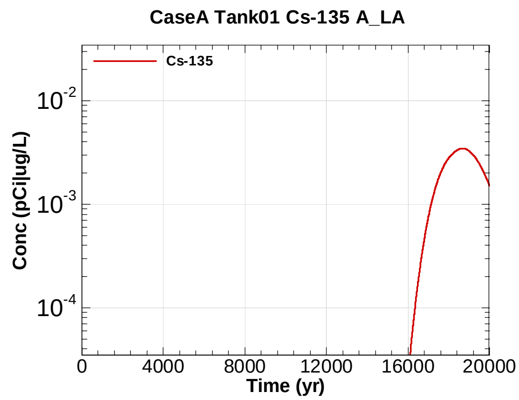

Figure E-66 - 100m Aquifer Concentration for CaseA Tank01 Cs-135 A_LA

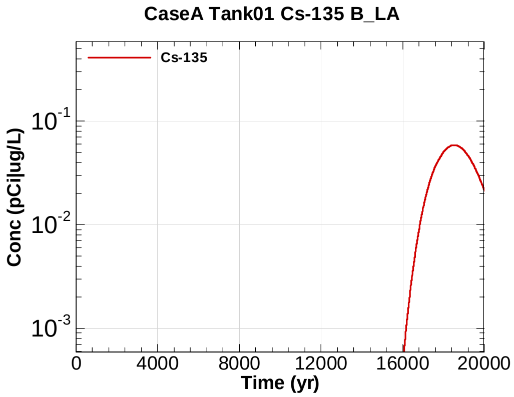

Figure E-67 - 100m Aquifer Concentration for CaseA Tank01 Cs-135 B_LA

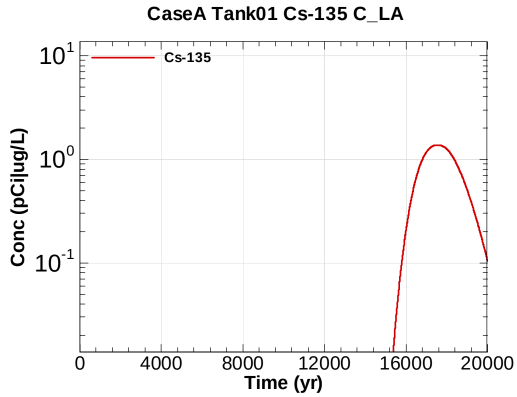

Figure E-68 - 100m Aquifer Concentration for CaseA Tank01 Cs-135 C_LA

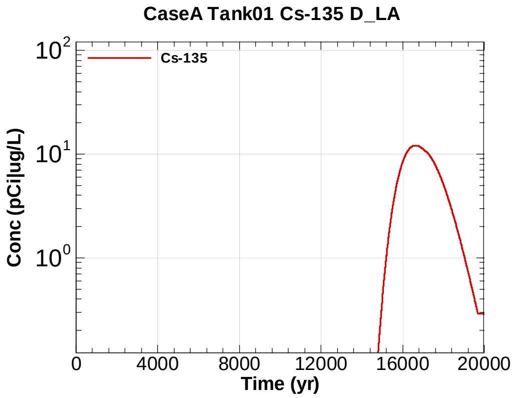

Figure E-69 - 100m Aquifer Concentration for CaseA Tank01 Cs-135 D_LA

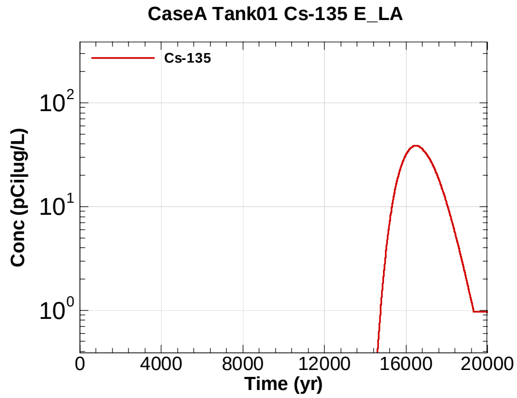

Figure E-70 - 100m Aquifer Concentration for CaseA Tank01 Cs-135 E_LA

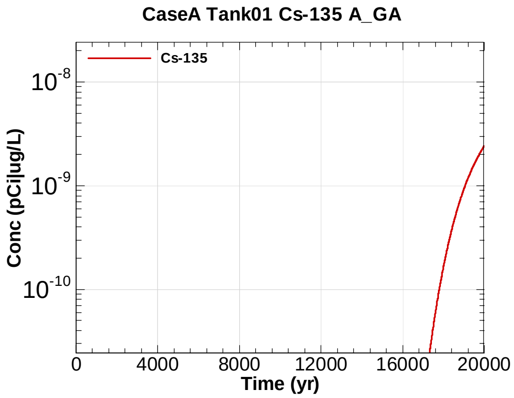

Figure E-71 - 100m Aquifer Concentration for CaseA Tank01 Cs-135 A_GA

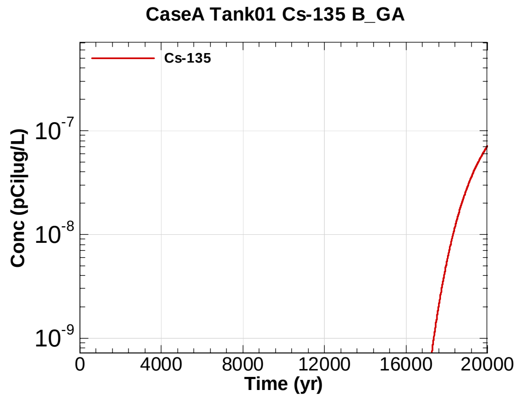

Figure E-72 - 100m Aquifer Concentration for CaseA Tank01 Cs-135 B_GA

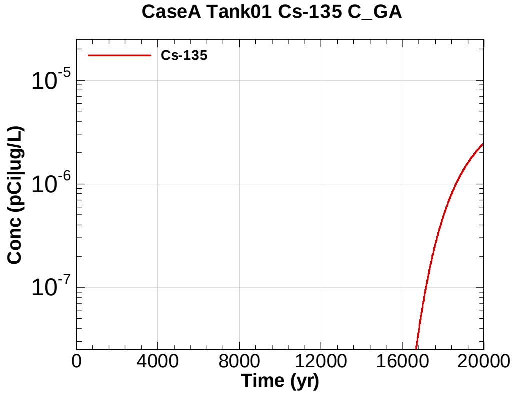

Figure E-73 - 100m Aquifer Concentration for CaseA Tank01 Cs-135 C_GA

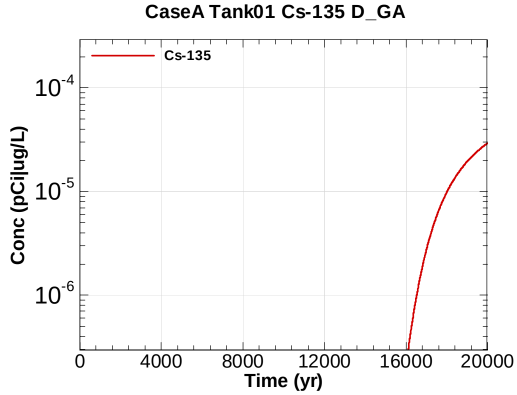

Figure E-74 - 100m Aquifer Concentration for CaseA Tank01 Cs-135 D_GA

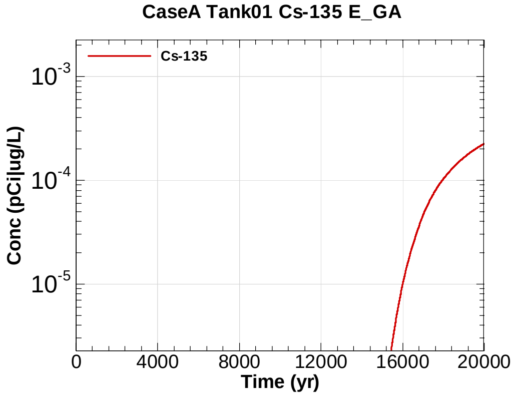

Figure E-75 - 100m Aquifer Concentration for CaseA Tank01 Cs-135 E_GA

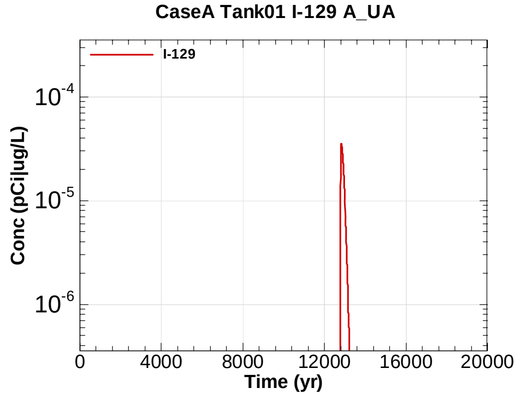

Figure E-76 - 100m Aquifer Concentration for CaseA Tank01 I-129 A_UA

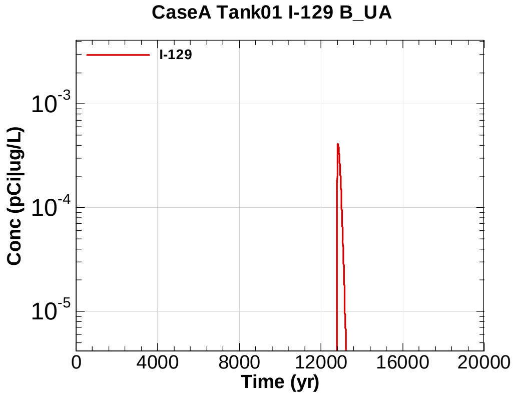

Figure E-77 - 100m Aquifer Concentration for CaseA Tank01 I-129 B_UA

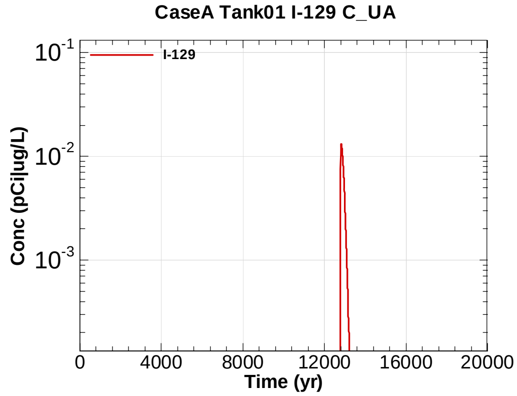

Figure E-78 - 100m Aquifer Concentration for CaseA Tank01 I-129 C_UA

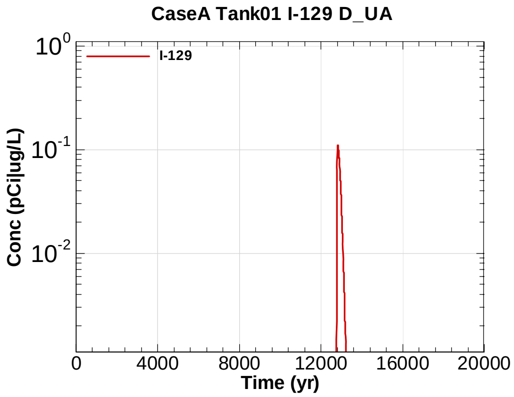

Figure E-79 - 100m Aquifer Concentration for CaseA Tank01 I-129 D_UA

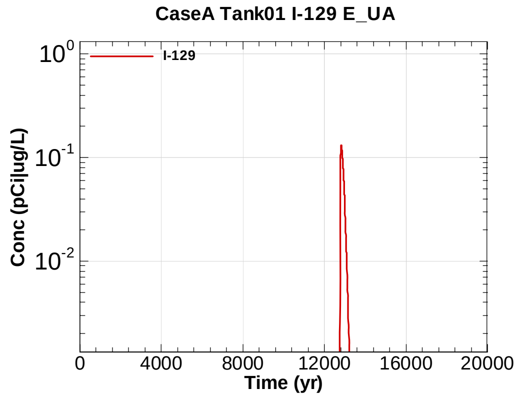

Figure E-80 - 100m Aquifer Concentration for CaseA Tank01 I-129 E_UA

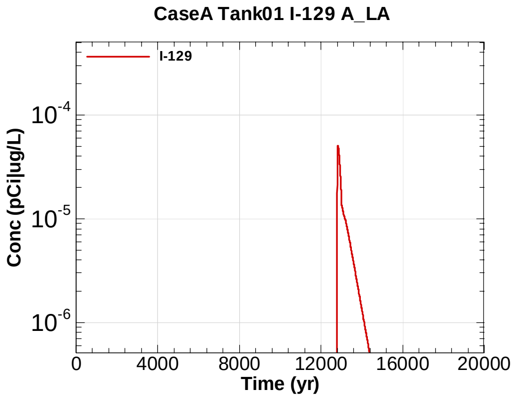

Figure E-81 - 100m Aquifer Concentration for CaseA Tank01 I-129 A_LA

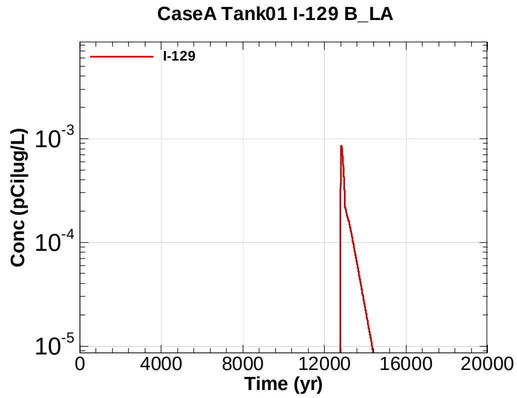

Figure E-82 - 100m Aquifer Concentration for CaseA Tank01 I-129 B_LA

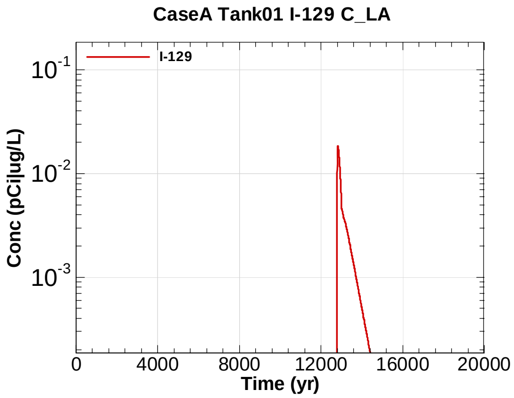

Figure E-83 - 100m Aquifer Concentration for CaseA Tank01 I-129 C_LA

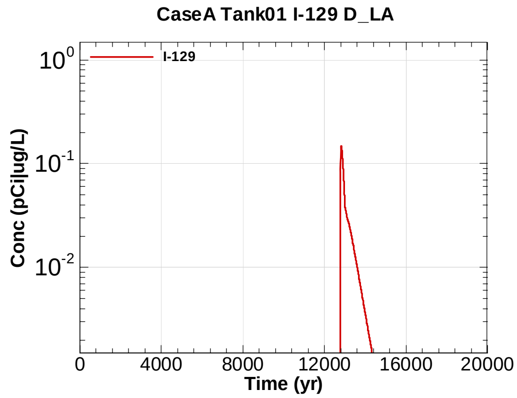

Figure E-84 - 100m Aquifer Concentration for CaseA Tank01 I-129 D_LA

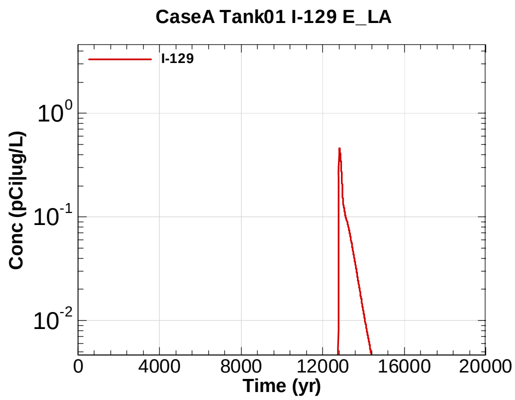

Figure E-85 - 100m Aquifer Concentration for CaseA Tank01 I-129 E_LA

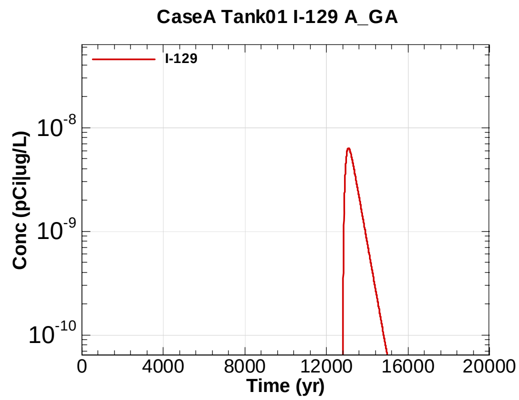

Figure E-86 - 100m Aquifer Concentration for CaseA Tank01 I-129 A_GA

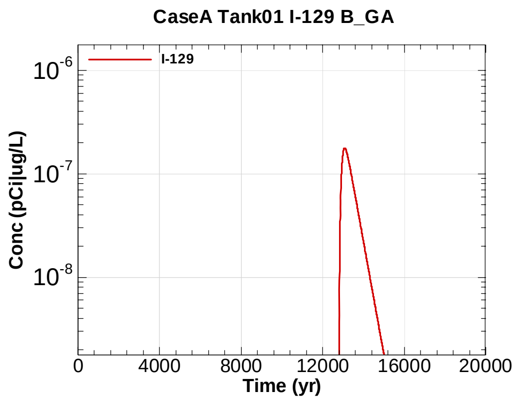

Figure E-87 - 100m Aquifer Concentration for CaseA Tank01 I-129 B_GA

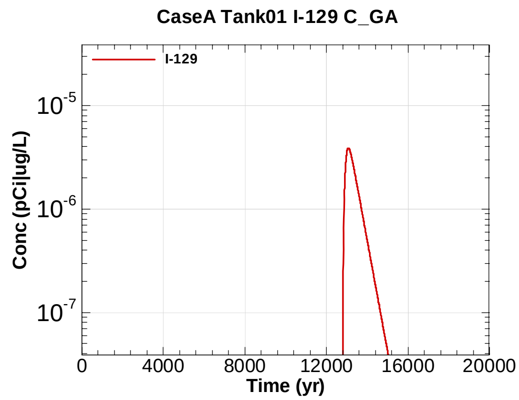

Figure E-88 - 100m Aquifer Concentration for CaseA Tank01 I-129 C_GA

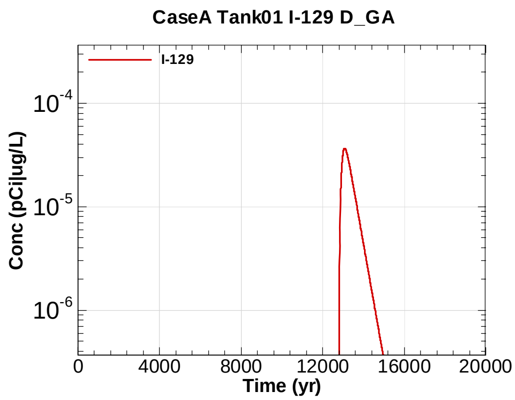

Figure E-89 - 100m Aquifer Concentration for CaseA Tank01 I-129 D_GA

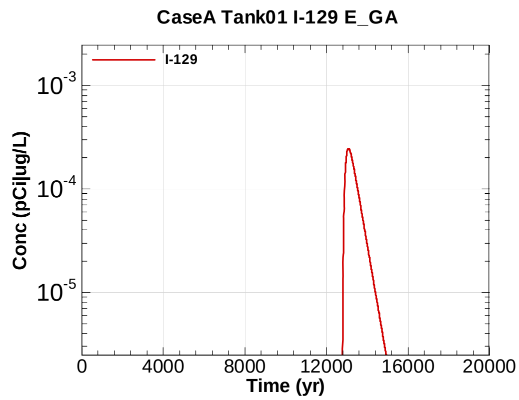

Figure E-90 - 100m Aquifer Concentration for CaseA Tank01 I-129 E_GA

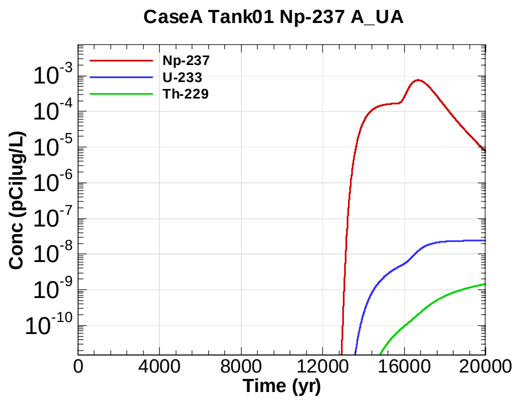

Figure E-91 - 100m Aquifer Concentration for CaseA Tank01 Np-237 A_UA

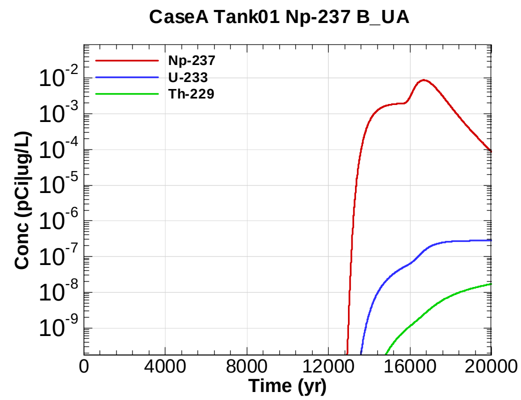

Figure E-92 - 100m Aquifer Concentration for CaseA Tank01 Np-237 B_UA

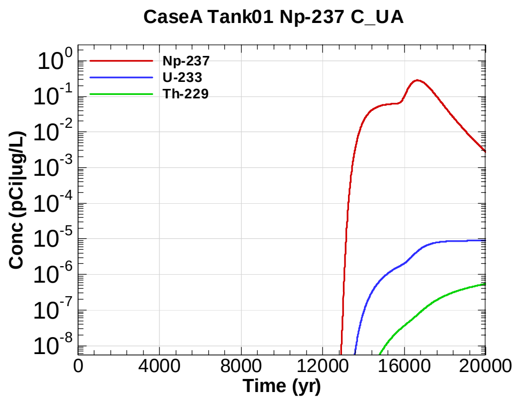

Figure E-93 - 100m Aquifer Concentration for CaseA Tank01 Np-237 C_UA

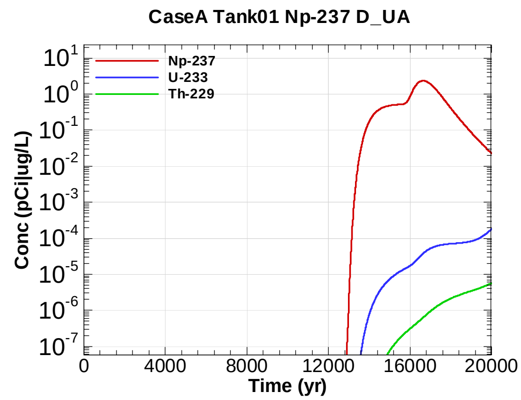

Figure E-94 - 100m Aquifer Concentration for CaseA Tank01 Np-237 D_UA

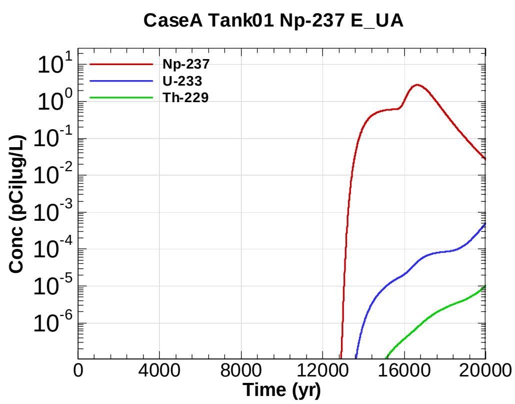

Figure E-95 - 100m Aquifer Concentration for CaseA Tank01 Np-237 E_UA

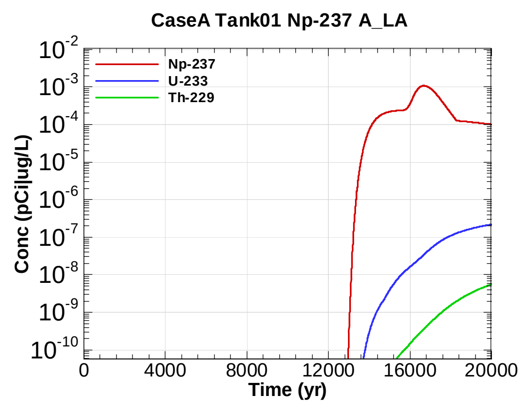

Figure E-96 - 100m Aquifer Concentration for CaseA Tank01 Np-237 A_LA

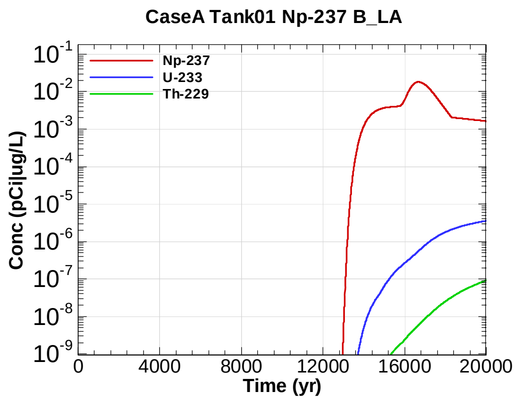

Figure E-97 - 100m Aquifer Concentration for CaseA Tank01 Np-237 B_LA

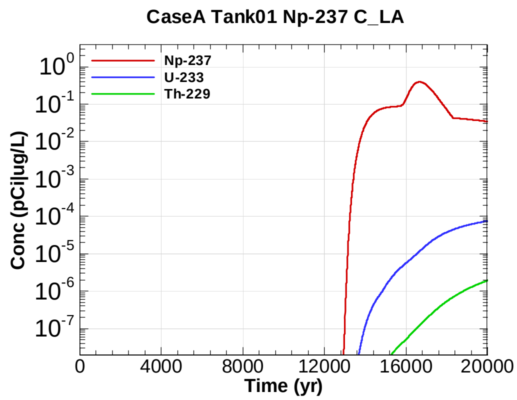

Figure E-98 - 100m Aquifer Concentration for CaseA Tank01 Np-237 C_LA

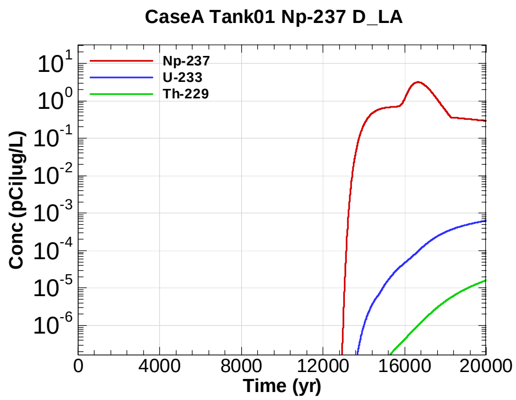

Figure E-99 - 100m Aquifer Concentration for CaseA Tank01 Np-237 D_LA

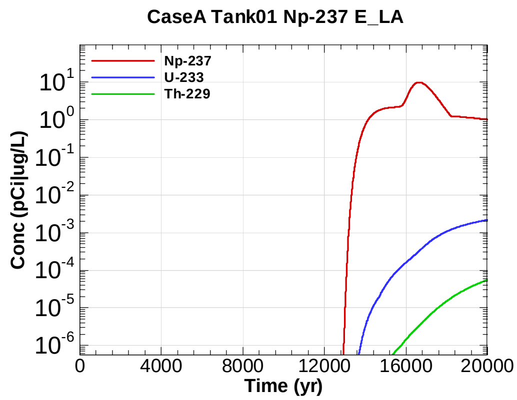

Figure E-100 - 100m Aquifer Concentration for CaseA Tank01 Np-237 E_LA

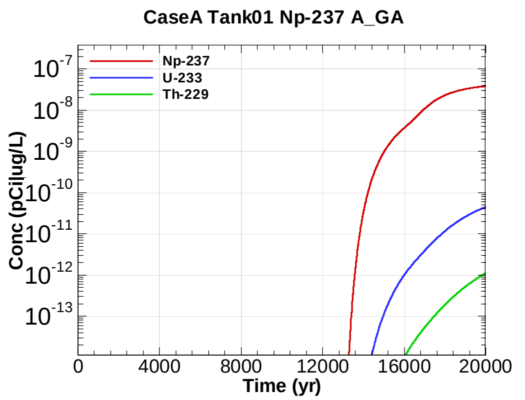

Figure E-101 - 100m Aquifer Concentration for CaseA Tank01 Np-237 A_GA

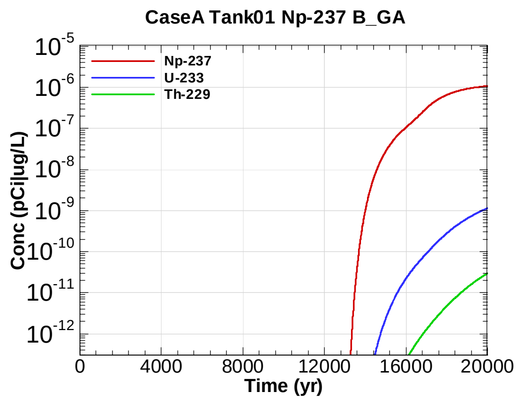

Figure E-102 - 100m Aquifer Concentration for CaseA Tank01 Np-237 B_GA

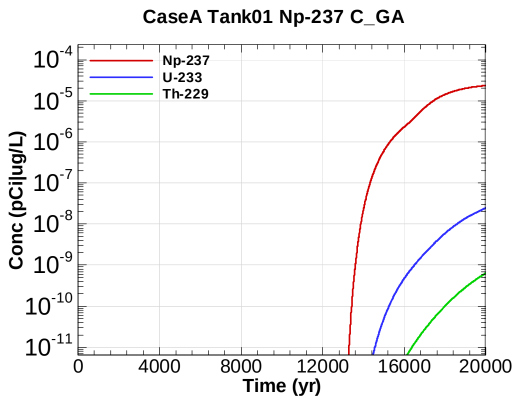

Figure E-103 - 100m Aquifer Concentration for CaseA Tank01 Np-237 C_GA

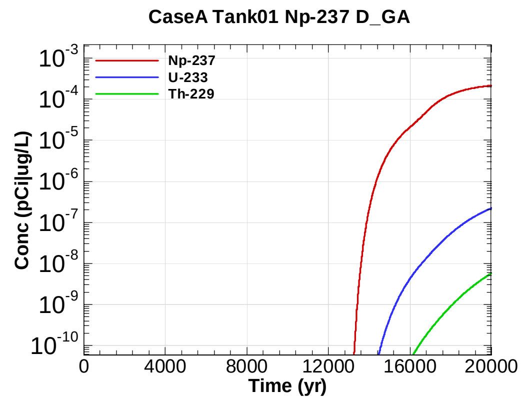

Figure E-104 - 100m Aquifer Concentration for CaseA Tank01 Np-237 D_GA

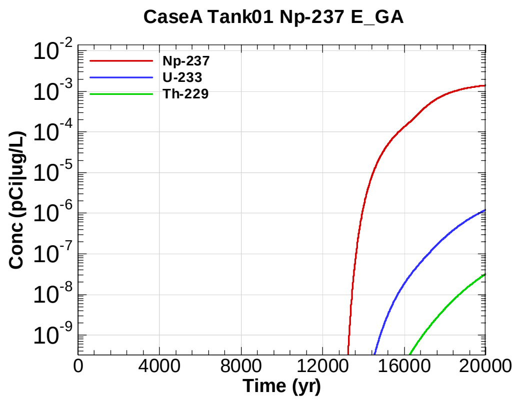

Figure E-105 - 100m Aquifer Concentration for CaseA Tank01 Np-237 E_GA

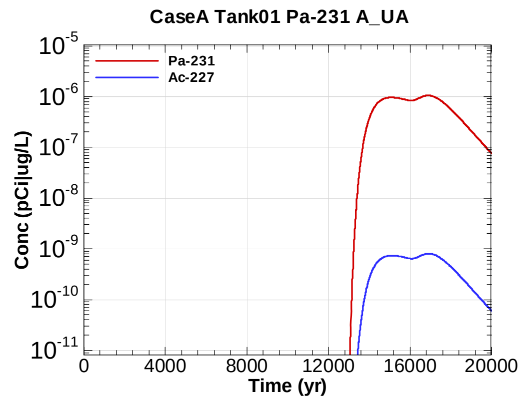

Figure E-106 - 100m Aquifer Concentration for CaseA Tank01 Pa-231 A_UA

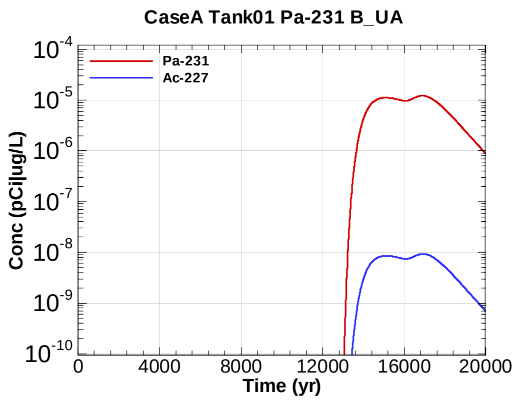

Figure E-107 - 100m Aquifer Concentration for CaseA Tank01 Pa-231 B_UA

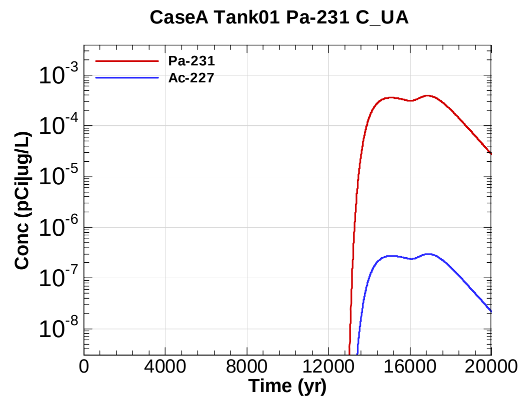

Figure E-108 - 100m Aquifer Concentration for CaseA Tank01 Pa-231 C_UA

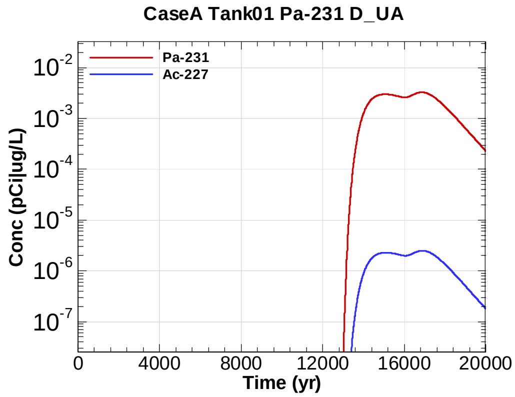

Figure E-109 - 100m Aquifer Concentration for CaseA Tank01 Pa-231 D_UA

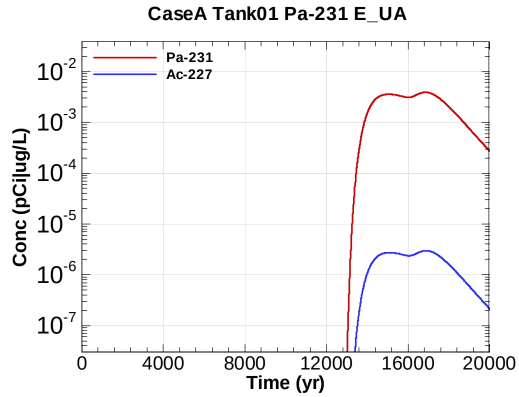

Figure E-110 - 100m Aquifer Concentration for CaseA Tank01 Pa-231 E_UA

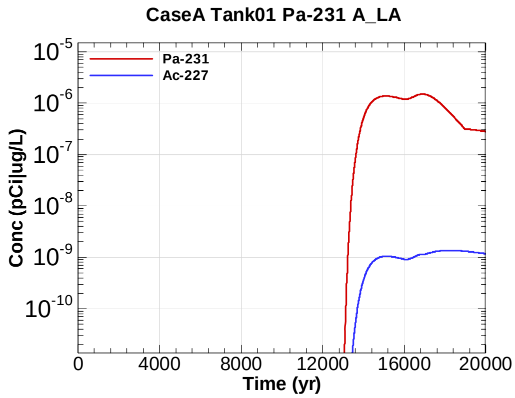

Figure E-111 - 100m Aquifer Concentration for CaseA Tank01 Pa-231 A_LA

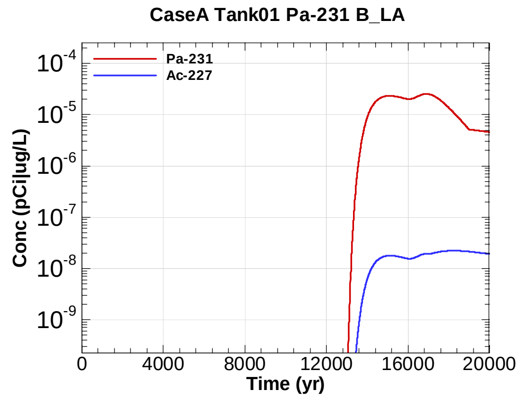

Figure E-112 - 100m Aquifer Concentration for CaseA Tank01 Pa-231 B_LA

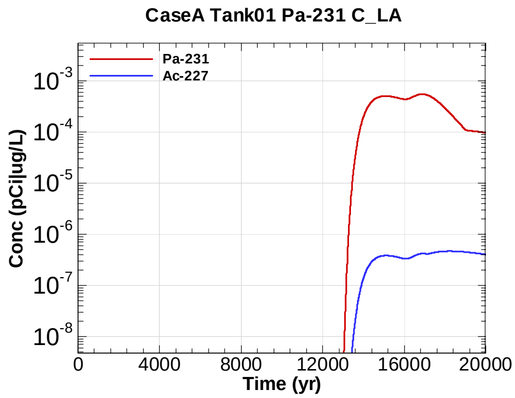

Figure E-113 - 100m Aquifer Concentration for CaseA Tank01 Pa-231 C_LA

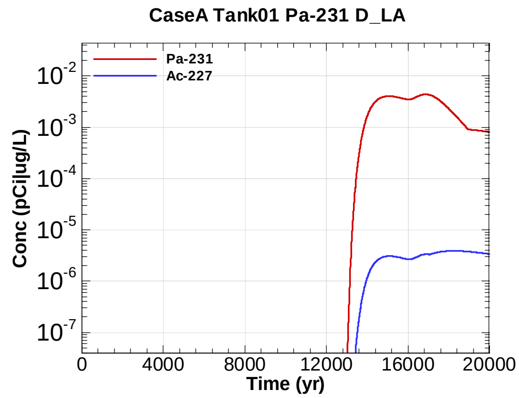

Figure E-114 - 100m Aquifer Concentration for CaseA Tank01 Pa-231 D_LA

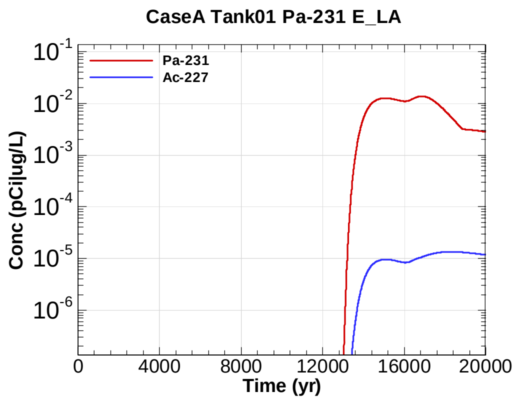

Figure E-115 - 100m Aquifer Concentration for CaseA Tank01 Pa-231 E_LA

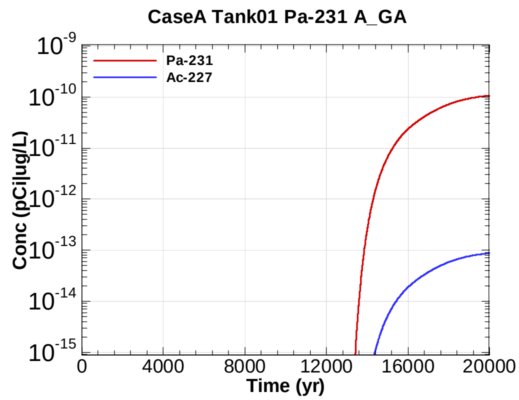

Figure E-116 - 100m Aquifer Concentration for CaseA Tank01 Pa-231 A_GA

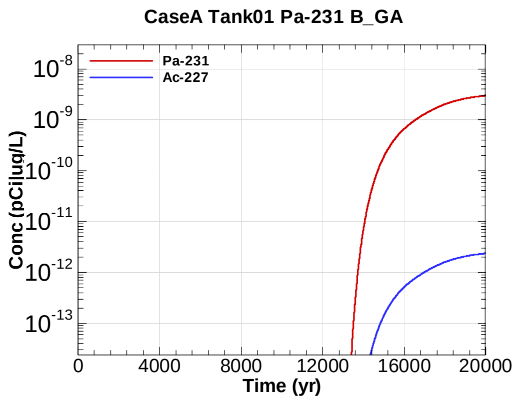

Figure E-117 - 100m Aquifer Concentration for CaseA Tank01 Pa-231 B_GA

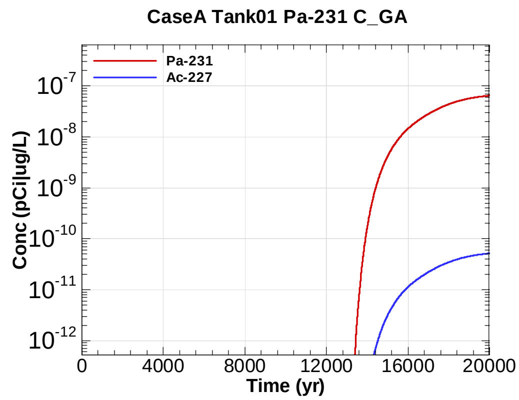

Figure E-118 - 100m Aquifer Concentration for CaseA Tank01 Pa-231 C_GA

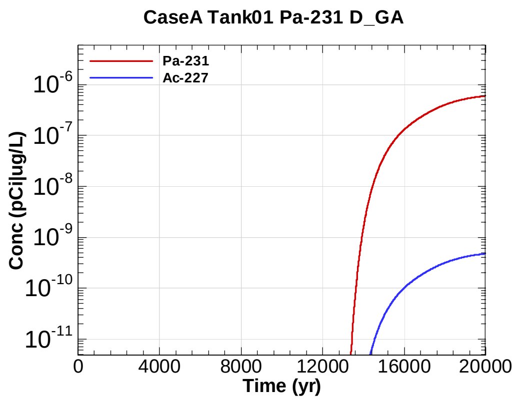

Figure E-119 - 100m Aquifer Concentration for CaseA Tank01 Pa-231 D_GA

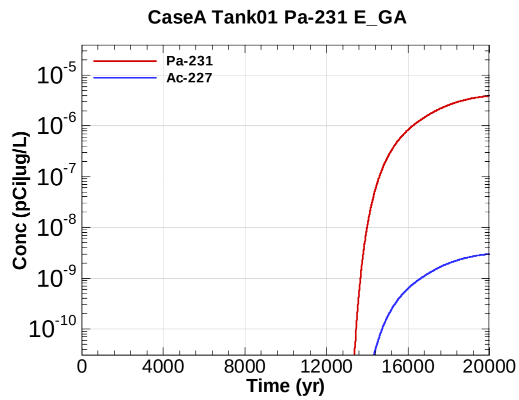

Figure E-120 - 100m Aquifer Concentration for CaseA Tank01 Pa-231 E_GA

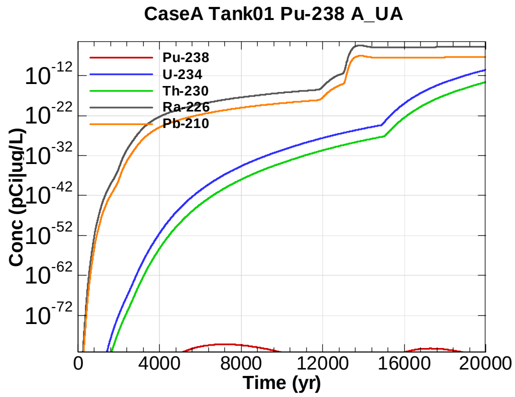

Figure E-121 - 100m Aquifer Concentration for CaseA Tank01 Pu-238 A_UA

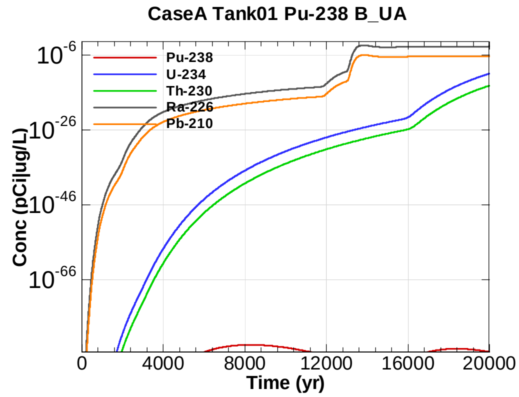

Figure E-122 - 100m Aquifer Concentration for CaseA Tank01 Pu-238 B_UA

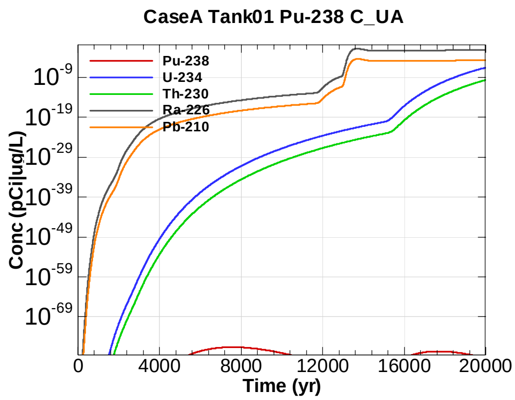

Figure E-123 - 100m Aquifer Concentration for CaseA Tank01 Pu-238 C_UA

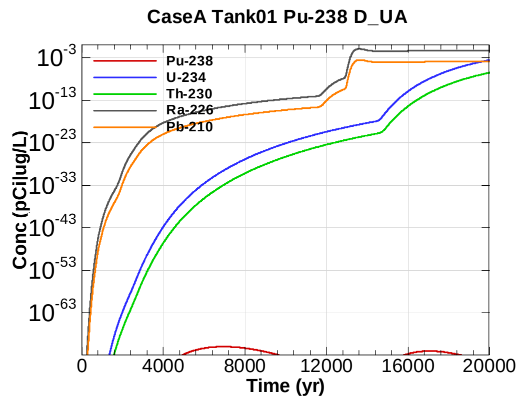

Figure E-124 - 100m Aquifer Concentration for CaseA Tank01 Pu-238 D_UA

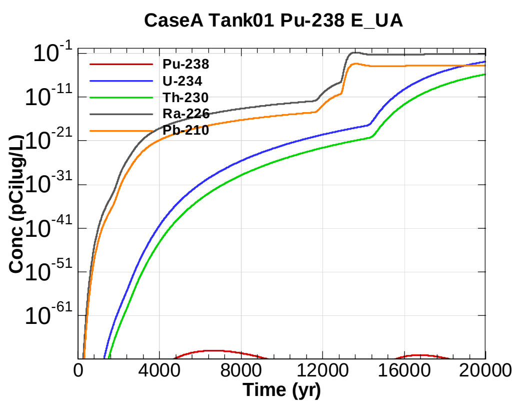

Figure E-125 - 100m Aquifer Concentration for CaseA Tank01 Pu-238 E_UA

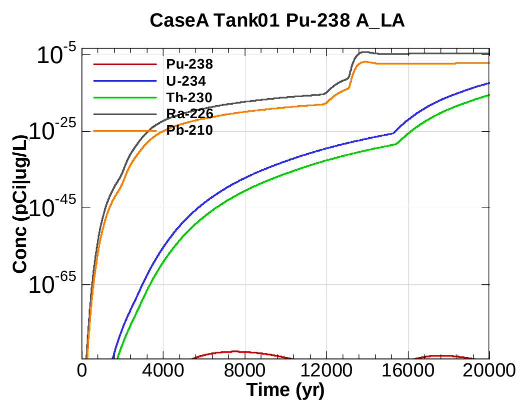

Figure E-126 - 100m Aquifer Concentration for CaseA Tank01 Pu-238 A_LA

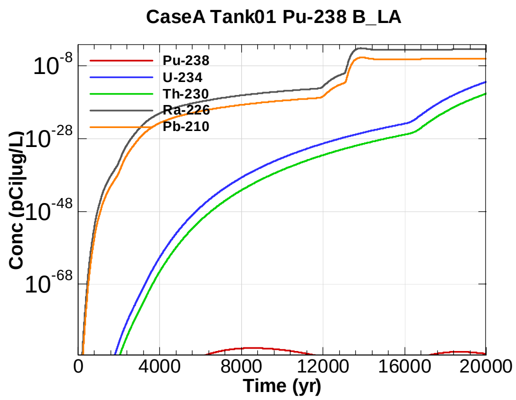

Figure E-127 - 100m Aquifer Concentration for CaseA Tank01 Pu-238 B_LA

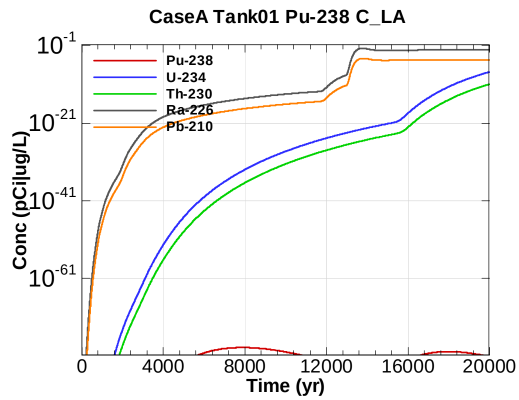

Figure E-128 - 100m Aquifer Concentration for CaseA Tank01 Pu-238 C_LA

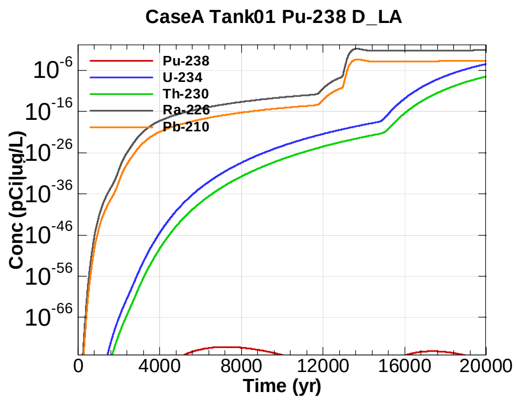

Figure E-129 - 100m Aquifer Concentration for CaseA Tank01 Pu-238 D_LA

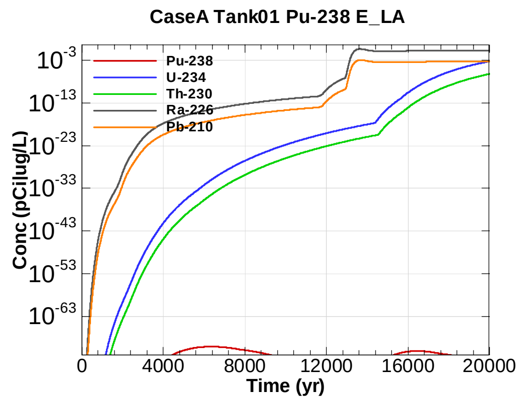

Figure E-130 - 100m Aquifer Concentration for CaseA Tank01 Pu-238 E_LA

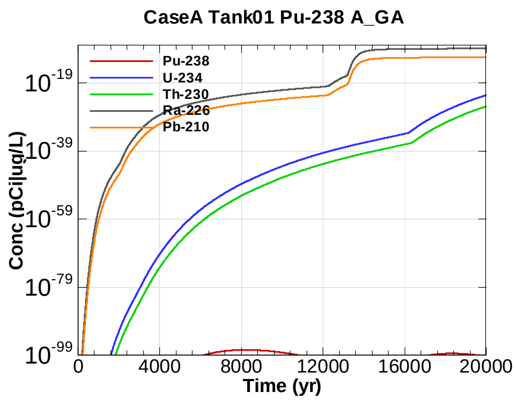

Figure E-131 - 100m Aquifer Concentration for CaseA Tank01 Pu-238 A_GA

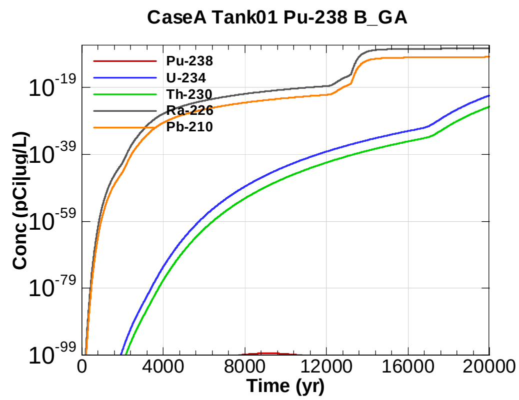

Figure E-132 - 100m Aquifer Concentration for CaseA Tank01 Pu-238 B_GA

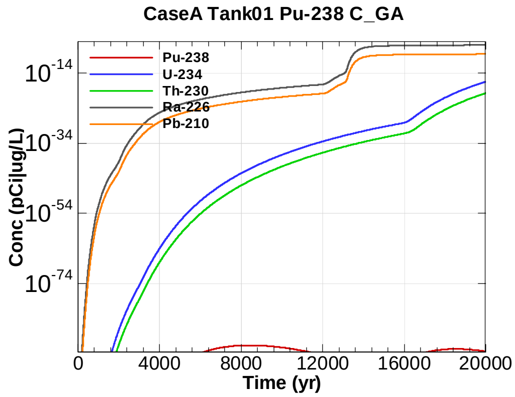

Figure E-133 - 100m Aquifer Concentration for CaseA Tank01 Pu-238 C_GA

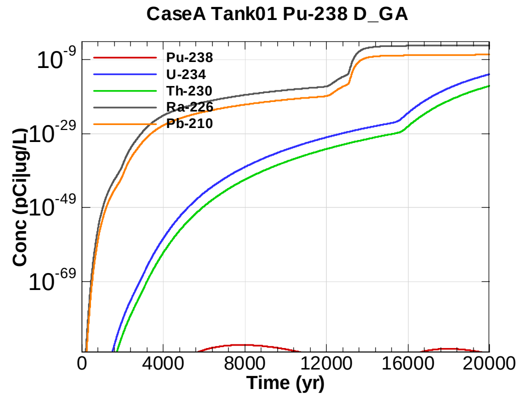

Figure E-134 - 100m Aquifer Concentration for CaseA Tank01 Pu-238 D_GA

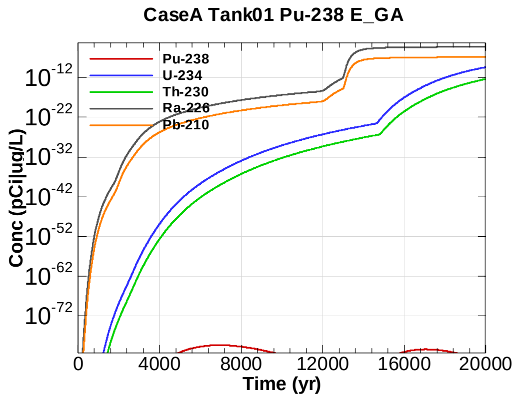

Figure E-135 - 100m Aquifer Concentration for CaseA Tank01 Pu-238 E_GA

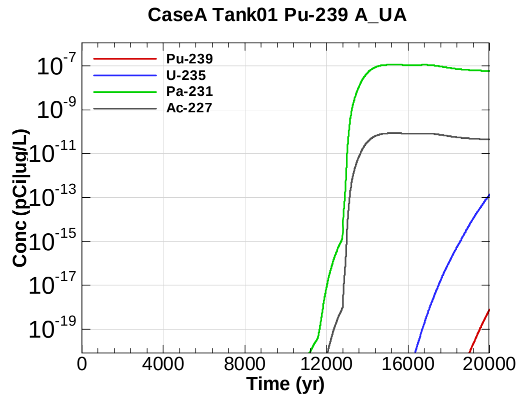

Figure E-136 - 100m Aquifer Concentration for CaseA Tank01 Pu-239 A_UA

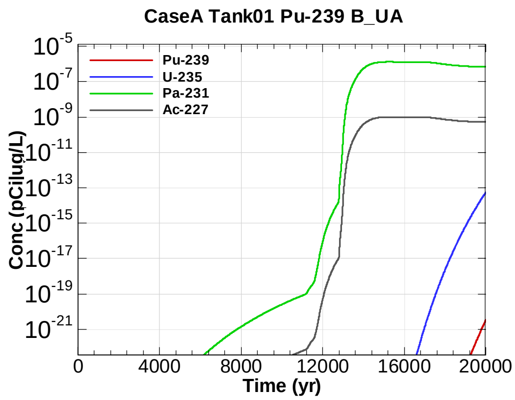

Figure E-137 - 100m Aquifer Concentration for CaseA Tank01 Pu-239 B_UA

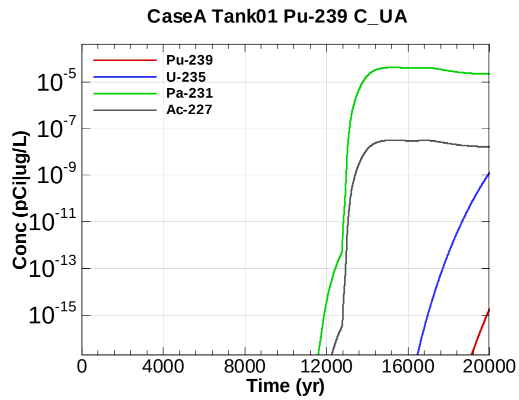

Figure E-138 - 100m Aquifer Concentration for CaseA Tank01 Pu-239 C_UA

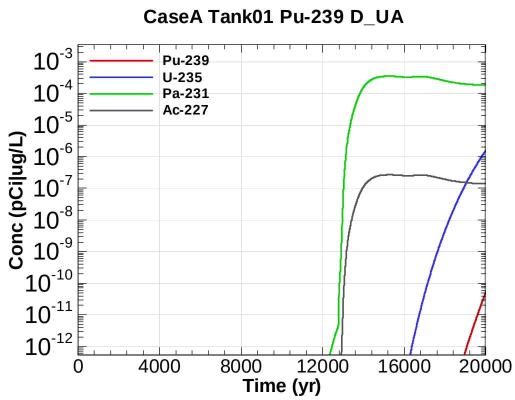

Figure E-139 - 100m Aquifer Concentration for CaseA Tank01 Pu-239 D_UA

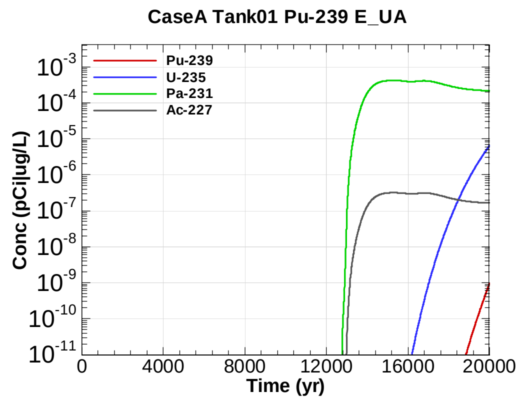

Figure E-140 - 100m Aquifer Concentration for CaseA Tank01 Pu-239 E_UA

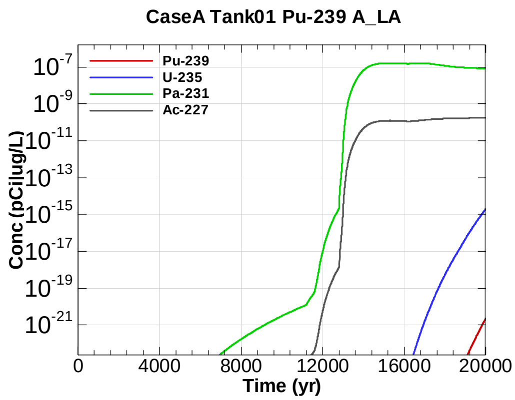

Figure E-141 - 100m Aquifer Concentration for CaseA Tank01 Pu-239 A_LA

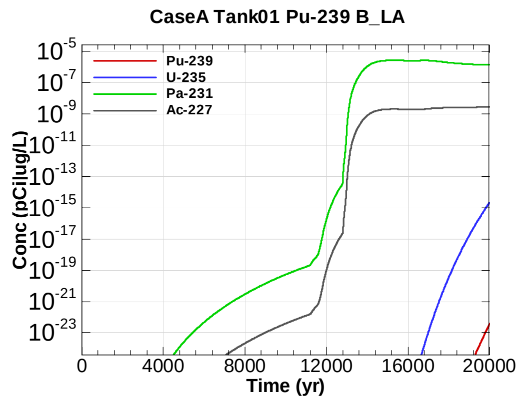

Figure E-142 - 100m Aquifer Concentration for CaseA Tank01 Pu-239 B_LA

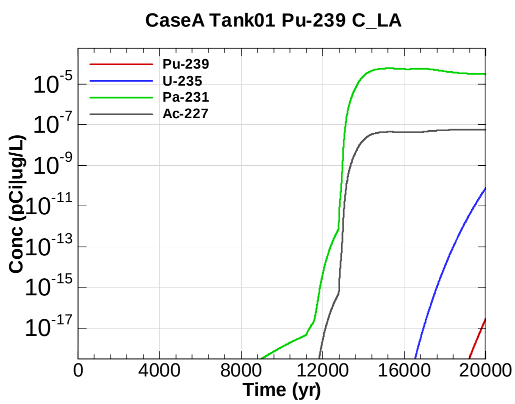

Figure E-143 - 100m Aquifer Concentration for CaseA Tank01 Pu-239 C_LA

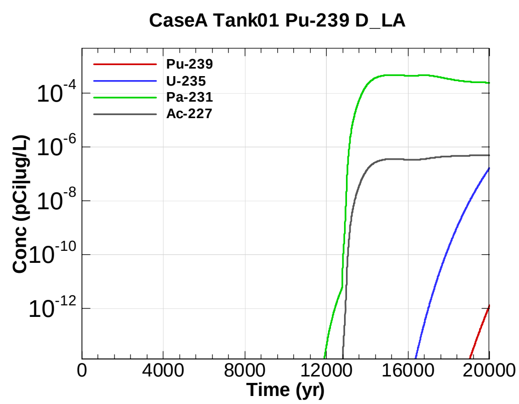

Figure E-144 - 100m Aquifer Concentration for CaseA Tank01 Pu-239 D_LA

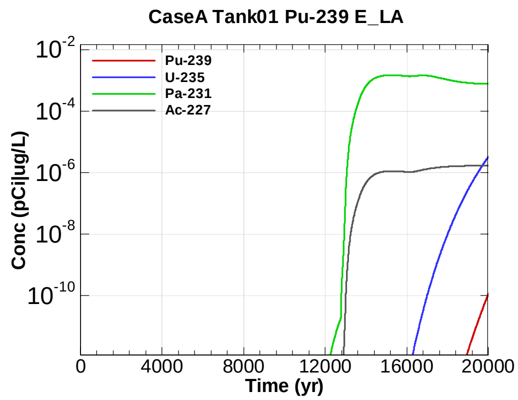

Figure E-145 - 100m Aquifer Concentration for CaseA Tank01 Pu-239 E_LA

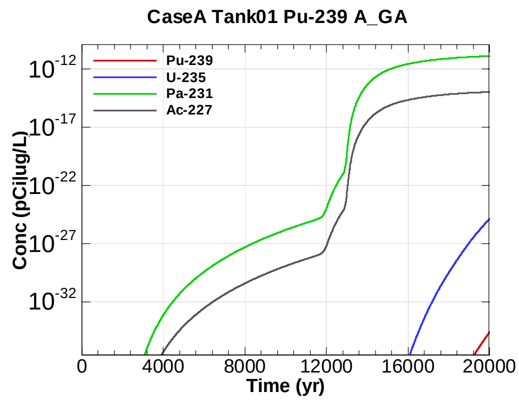

Figure E-146 - 100m Aquifer Concentration for CaseA Tank01 Pu-239 A_GA

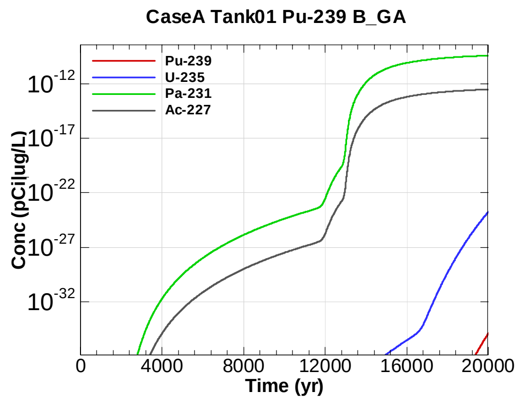

Figure E-147 - 100m Aquifer Concentration for CaseA Tank01 Pu-239 B_GA

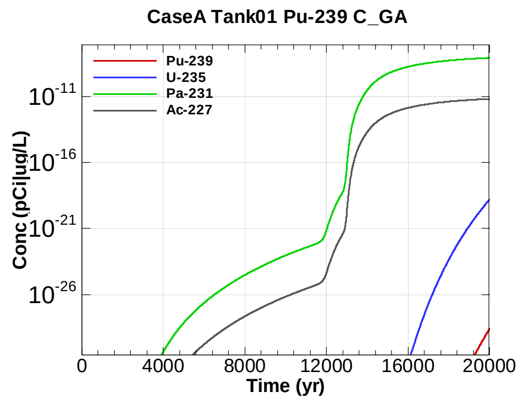

Figure E-148 - 100m Aquifer Concentration for CaseA Tank01 Pu-239 C_GA

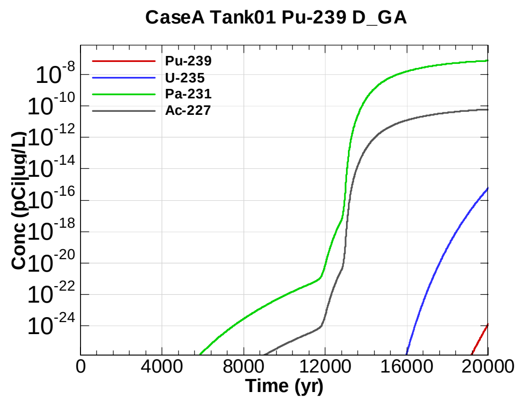

Figure E-149 - 100m Aquifer Concentration for CaseA Tank01 Pu-239 D_GA

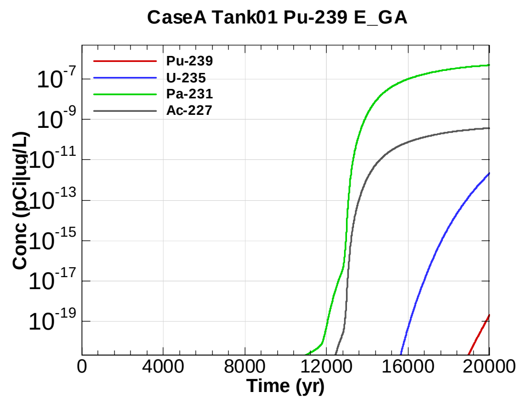

Figure E-150 - 100m Aquifer Concentration for CaseA Tank01 Pu-239 E_GA

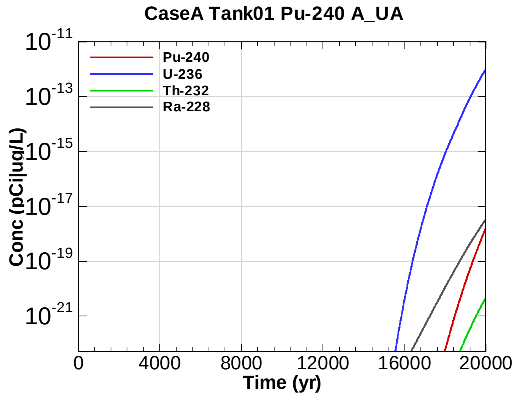

Figure E-151 - 100m Aquifer Concentration for CaseA Tank01 Pu-240 A_UA

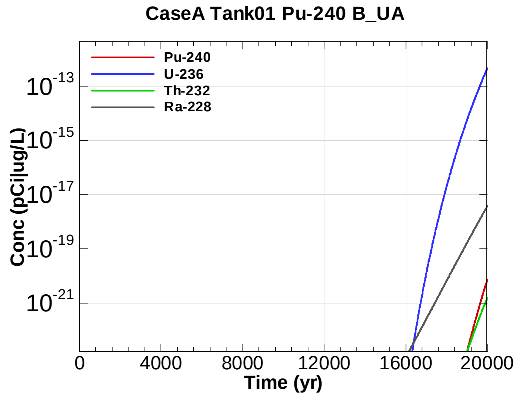

Figure E-152 - 100m Aquifer Concentration for CaseA Tank01 Pu-240 B_UA

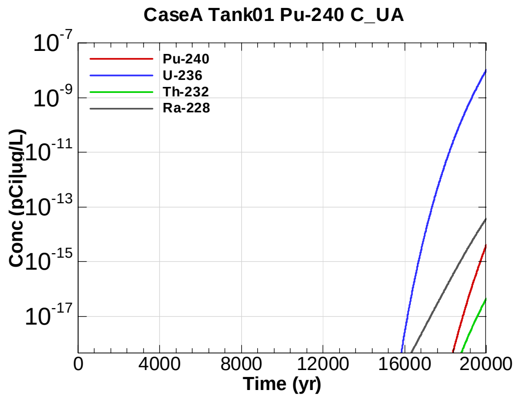

Figure E-153 - 100m Aquifer Concentration for CaseA Tank01 Pu-240 C_UA

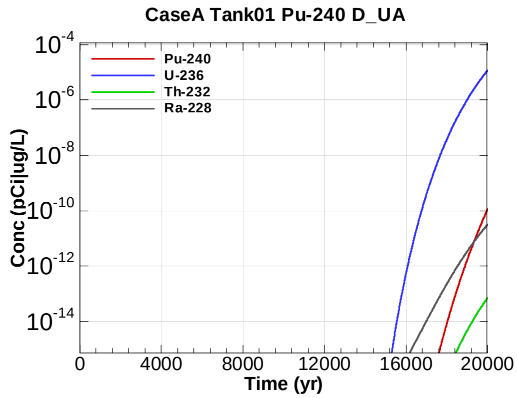

Figure E-154 - 100m Aquifer Concentration for CaseA Tank01 Pu-240 D_UA

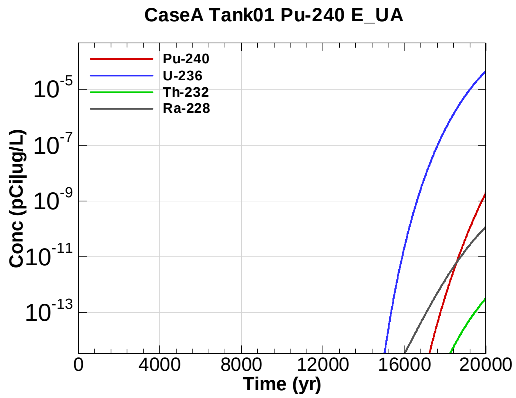

Figure E-155 - 100m Aquifer Concentration for CaseA Tank01 Pu-240 E_UA

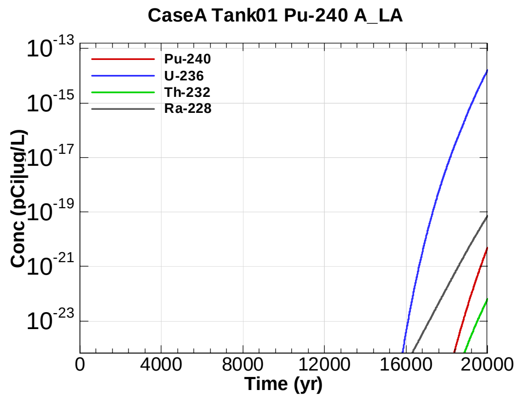

Figure E-156 - 100m Aquifer Concentration for CaseA Tank01 Pu-240 A_LA

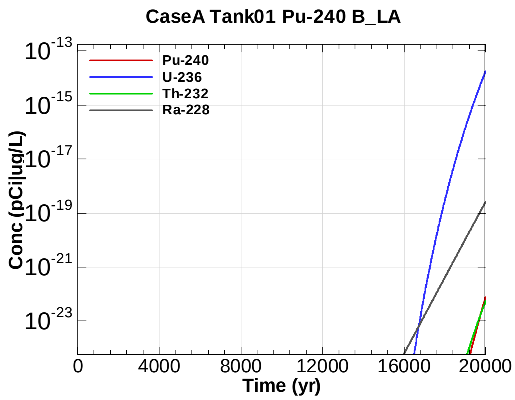

Figure E-157 - 100m Aquifer Concentration for CaseA Tank01 Pu-240 B_LA

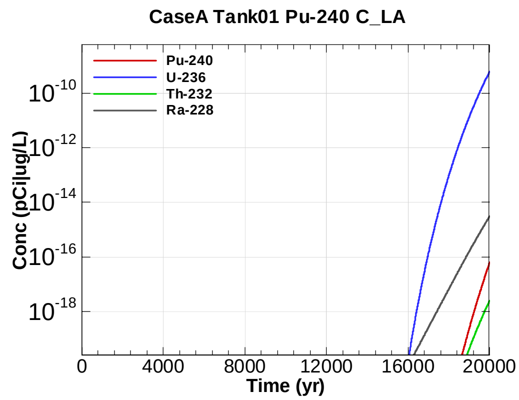

Figure E-158 - 100m Aquifer Concentration for CaseA Tank01 Pu-240 C_LA

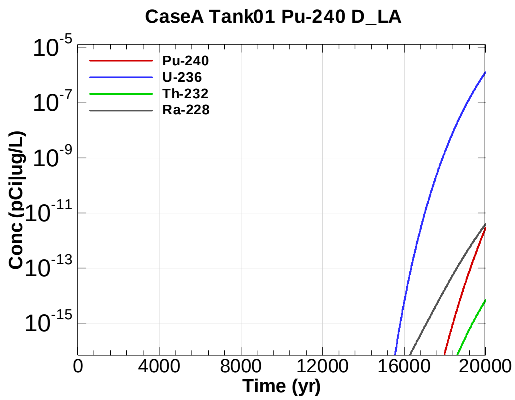

Figure E-159 - 100m Aquifer Concentration for CaseA Tank01 Pu-240 D_LA

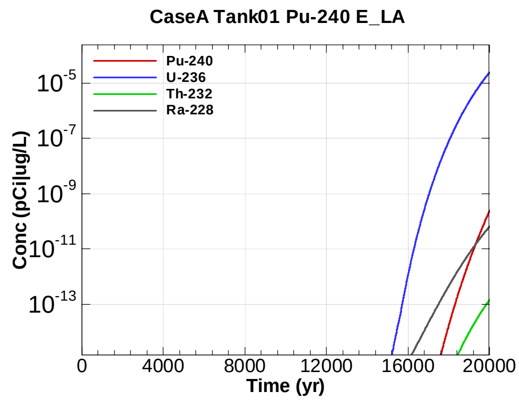

Figure E-160 - 100m Aquifer Concentration for CaseA Tank01 Pu-240 E_LA

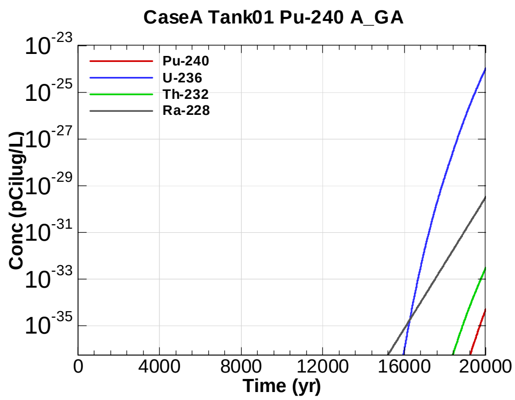

Figure E-161 - 100m Aquifer Concentration for CaseA Tank01 Pu-240 A_GA

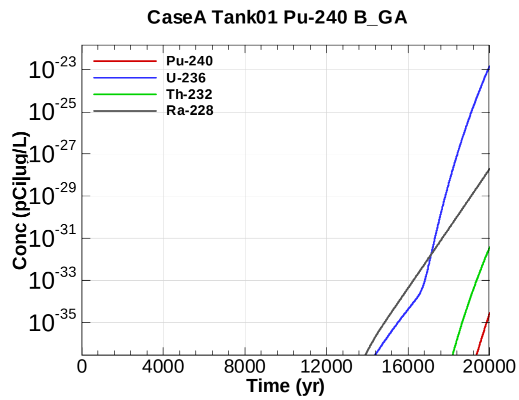

Figure E-162 - 100m Aquifer Concentration for CaseA Tank01 Pu-240 B_GA

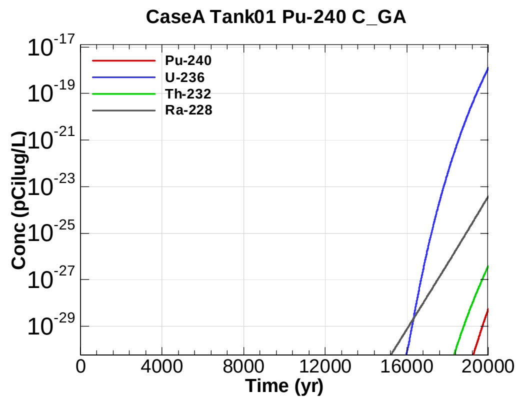

Figure E-163 - 100m Aquifer Concentration for CaseA Tank01 Pu-240 C_GA

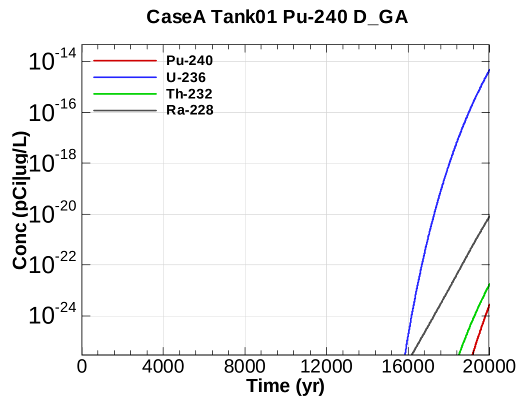

Figure E-164 - 100m Aquifer Concentration for CaseA Tank01 Pu-240 D_GA

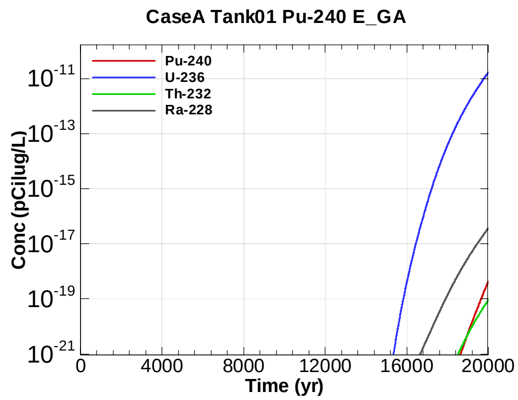

Figure E-165 - 100m Aquifer Concentration for CaseA Tank01 Pu-240 E_GA

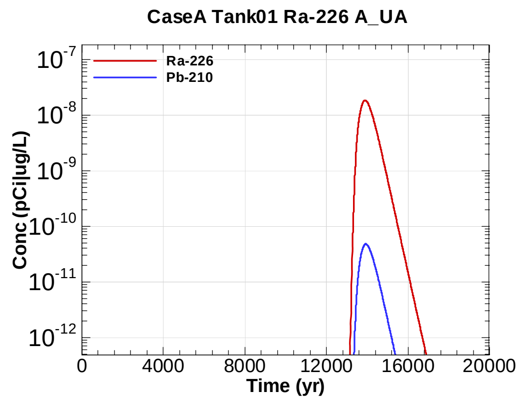

Figure E-166 - 100m Aquifer Concentration for CaseA Tank01 Ra-226 A_UA

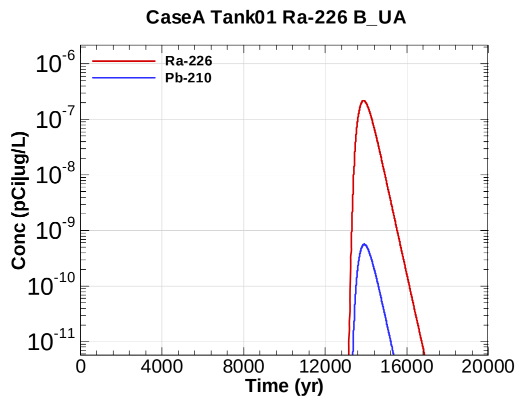

Figure E-167 - 100m Aquifer Concentration for CaseA Tank01 Ra-226 B_UA

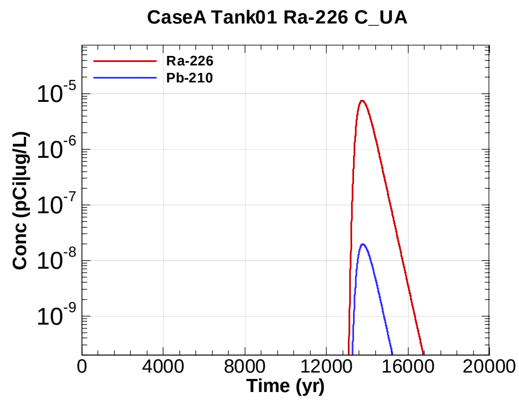

Figure E-168 - 100m Aquifer Concentration for CaseA Tank01 Ra-226 C_UA

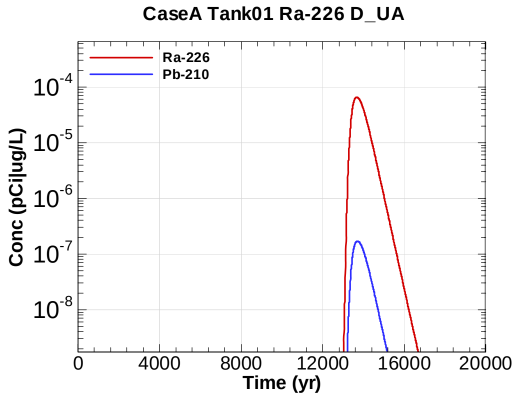

Figure E-169 - 100m Aquifer Concentration for CaseA Tank01 Ra-226 D_UA

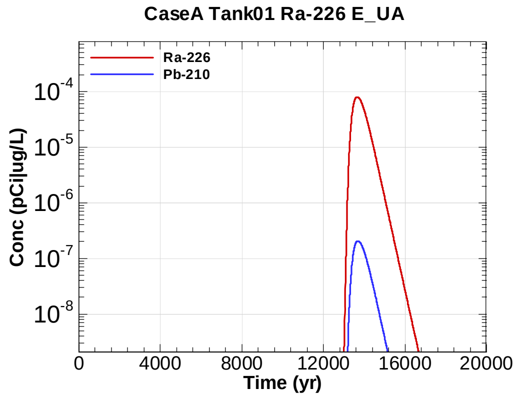

Figure E-170 - 100m Aquifer Concentration for CaseA Tank01 Ra-226 E_UA

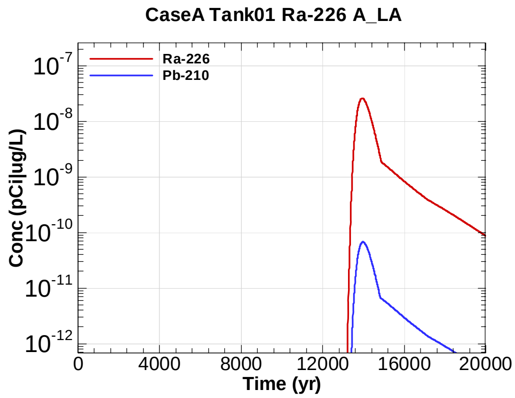

Figure E-171 - 100m Aquifer Concentration for CaseA Tank01 Ra-226 A_LA

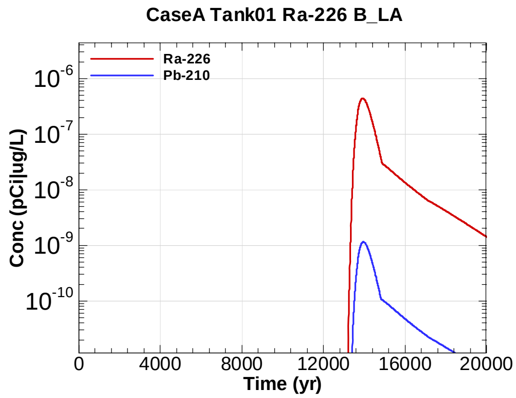

Figure E-172 - 100m Aquifer Concentration for CaseA Tank01 Ra-226 B_LA

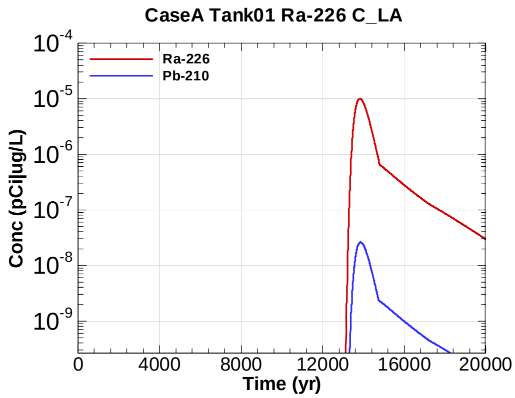

Figure E-173 - 100m Aquifer Concentration for CaseA Tank01 Ra-226 C_LA

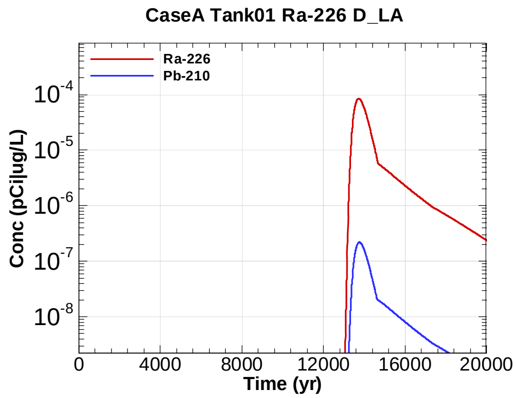

Figure E-174 - 100m Aquifer Concentration for CaseA Tank01 Ra-226 D_LA

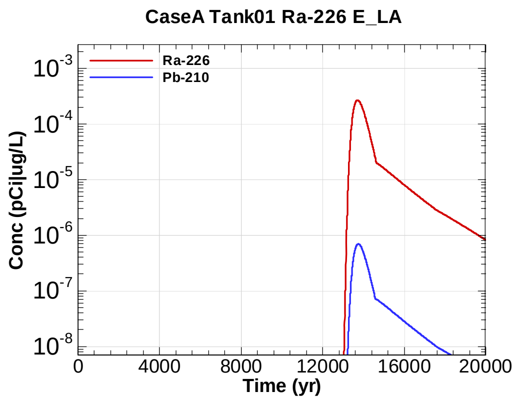

Figure E-175 - 100m Aquifer Concentration for CaseA Tank01 Ra-226 E_LA

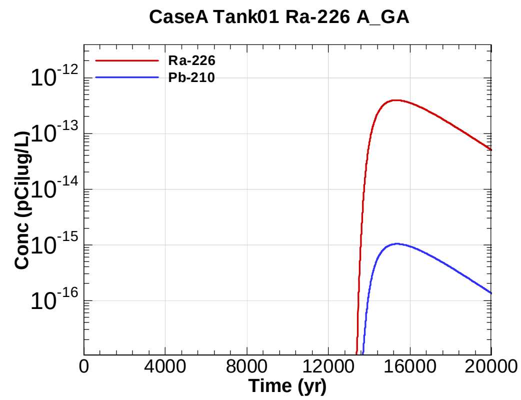

Figure E-176 - 100m Aquifer Concentration for CaseA Tank01 Ra-226 A_GA

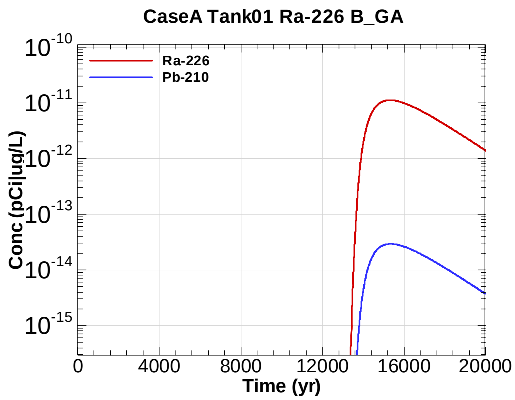

Figure E-177 - 100m Aquifer Concentration for CaseA Tank01 Ra-226 B_GA

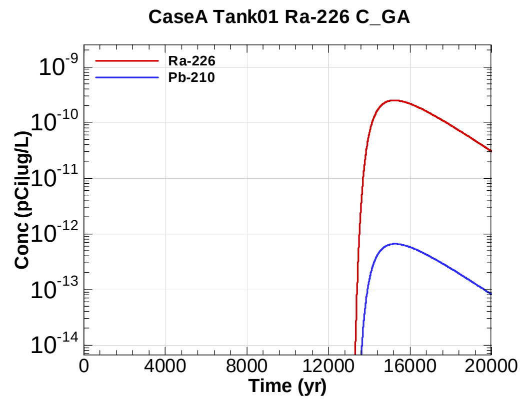

Figure E-178 - 100m Aquifer Concentration for CaseA Tank01 Ra-226 C_GA

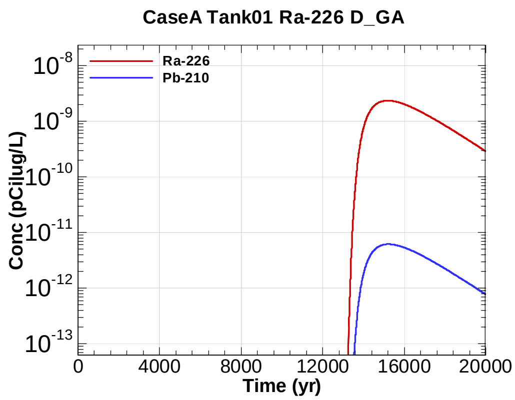

Figure E-179 - 100m Aquifer Concentration for CaseA Tank01 Ra-226 D_GA

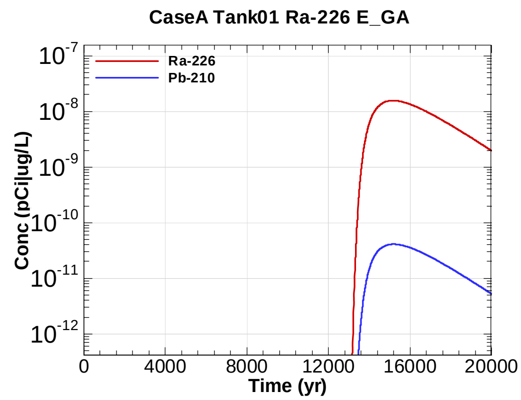

Figure E-180 - 100m Aquifer Concentration for CaseA Tank01 Ra-226 E_GA

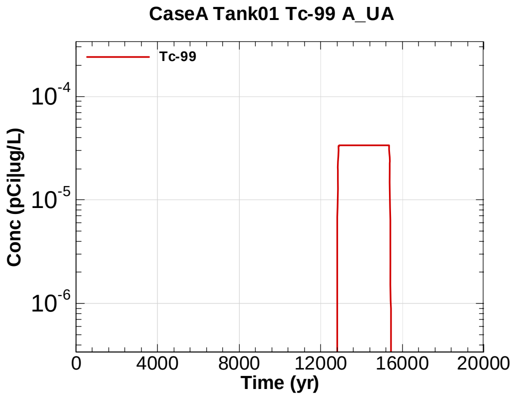

Figure E-181 - 100m Aquifer Concentration for CaseA Tank01 Tc-99 A_UA

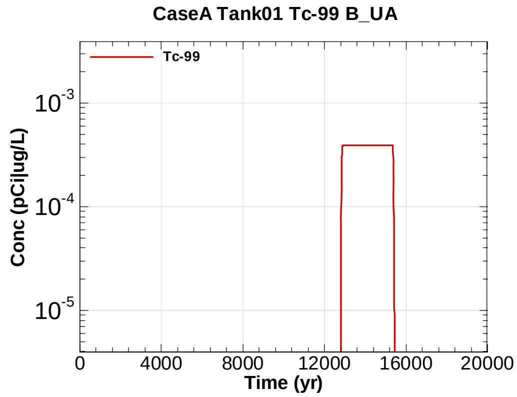

Figure E-182 - 100m Aquifer Concentration for CaseA Tank01 Tc-99 B_UA

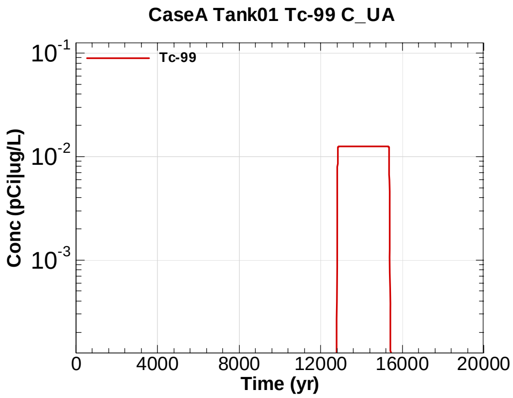

Figure E-183 - 100m Aquifer Concentration for CaseA Tank01 Tc-99 C_UA

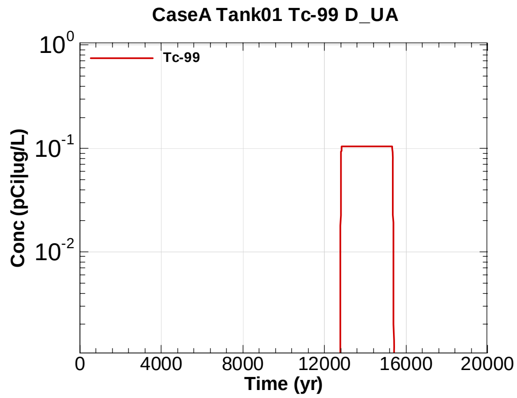

Figure E-184 - 100m Aquifer Concentration for CaseA Tank01 Tc-99 D_UA

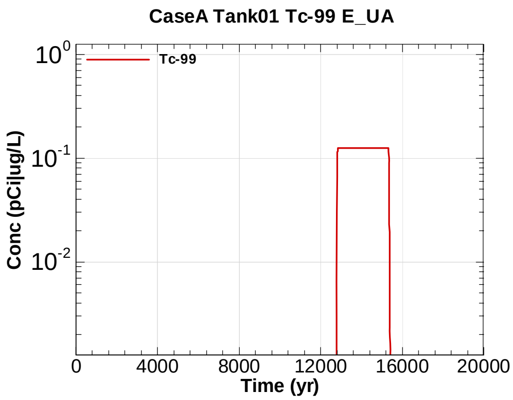

Figure E-185 - 100m Aquifer Concentration for CaseA Tank01 Tc-99 E_UA

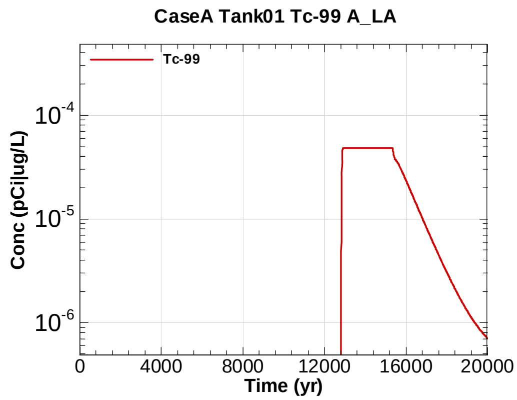

Figure E-186 - 100m Aquifer Concentration for CaseA Tank01 Tc-99 A_LA

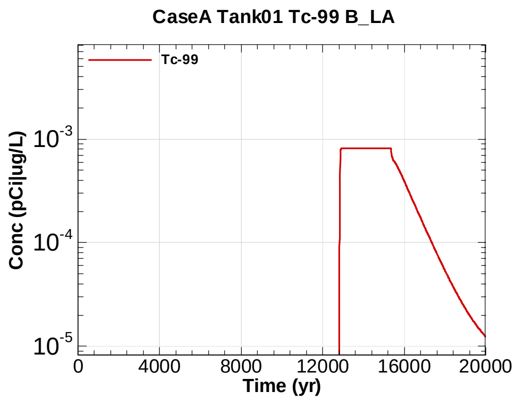

Figure E-187 - 100m Aquifer Concentration for CaseA Tank01 Tc-99 B_LA

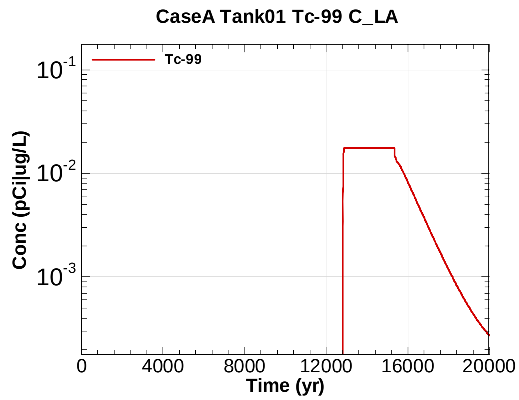

Figure E-188 - 100m Aquifer Concentration for CaseA Tank01 Tc-99 C_LA

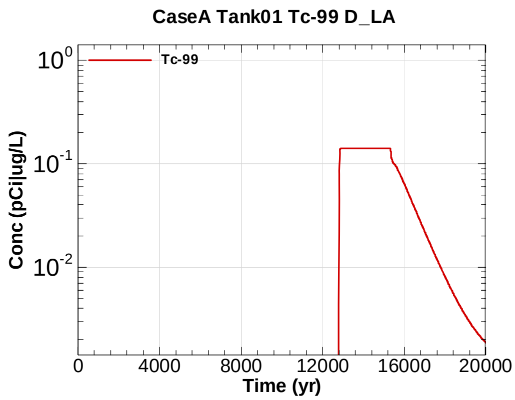

Figure E-189 - 100m Aquifer Concentration for CaseA Tank01 Tc-99 D_LA

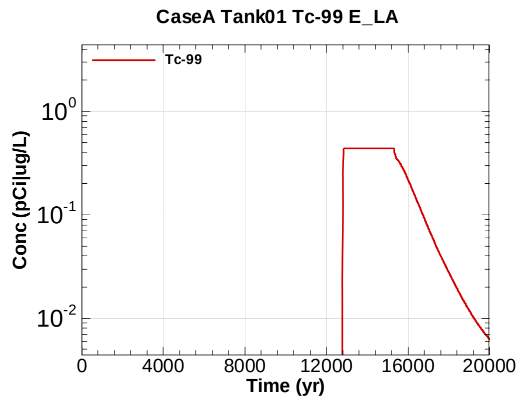

Figure E-190 - 100m Aquifer Concentration for CaseA Tank01 Tc-99 E_LA

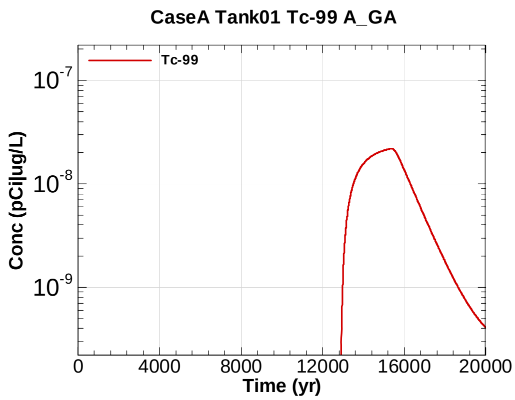

Figure E-191 - 100m Aquifer Concentration for CaseA Tank01 Tc-99 A_GA

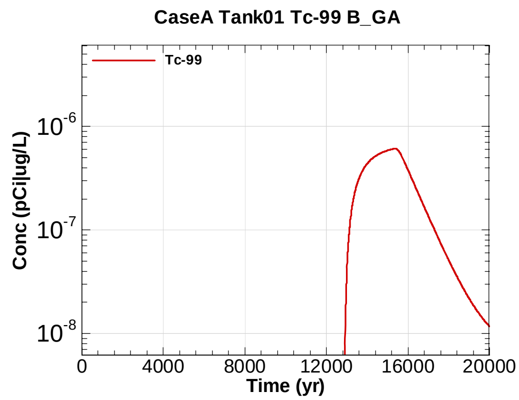

Figure E-192 - 100m Aquifer Concentration for CaseA Tank01 Tc-99 B_GA

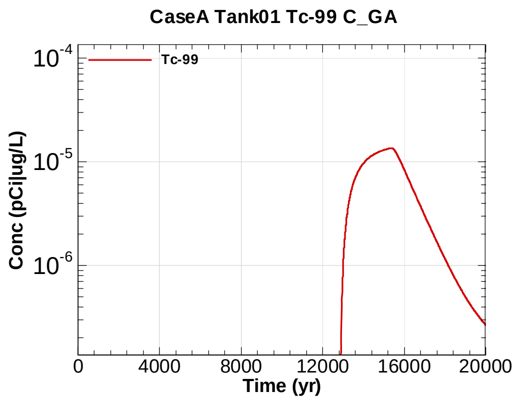

Figure E-193 - 100m Aquifer Concentration for CaseA Tank01 Tc-99 C_GA

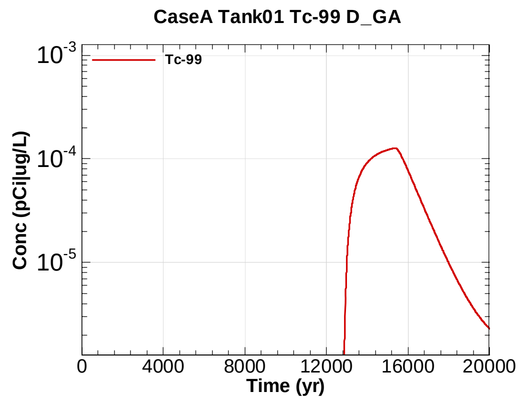

Figure E-194 - 100m Aquifer Concentration for CaseA Tank01 Tc-99 D_GA

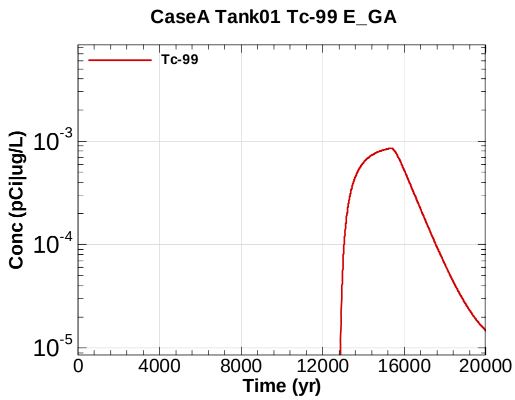

Figure E-195 - 100m Aquifer Concentration for CaseA Tank01 Tc-99 E_GA

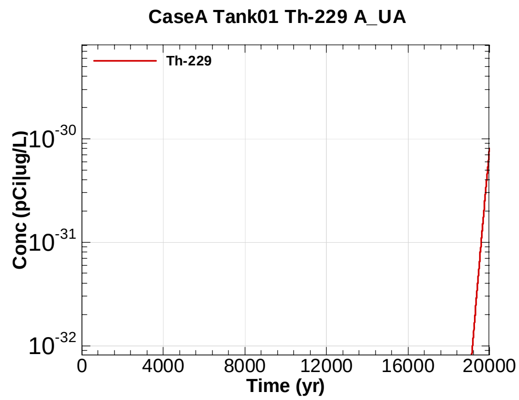

Figure E-196 - 100m Aquifer Concentration for CaseA Tank01 Th-229 A_UA

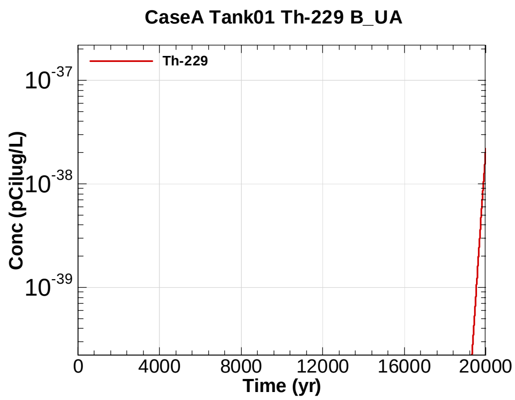

Figure E-197 - 100m Aquifer Concentration for CaseA Tank01 Th-229 B_UA

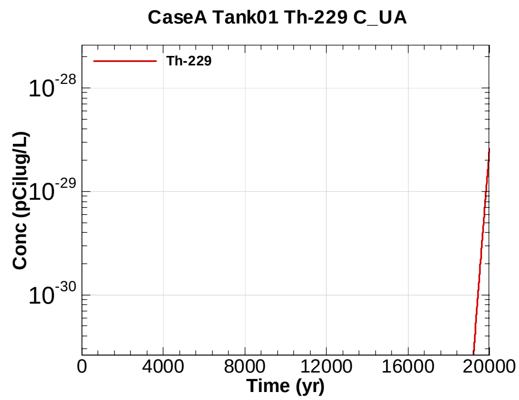

Figure E-198 - 100m Aquifer Concentration for CaseA Tank01 Th-229 C_UA

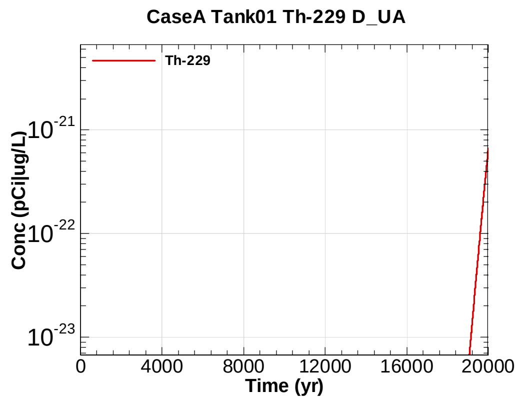

Figure E-199 - 100m Aquifer Concentration for CaseA Tank01 Th-229 D_UA

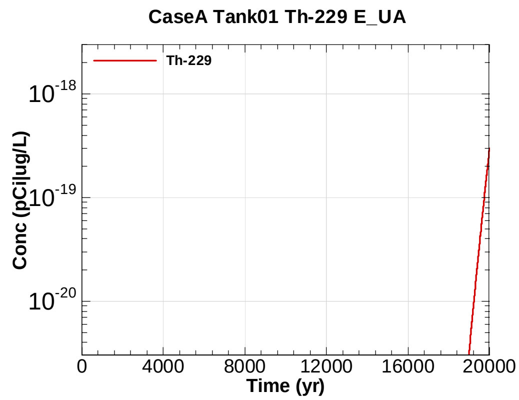

Figure E-200 - 100m Aquifer Concentration for CaseA Tank01 Th-229 E_UA

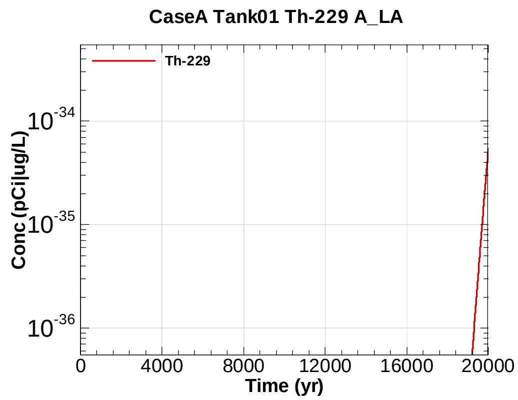

Figure E-201 - 100m Aquifer Concentration for CaseA Tank01 Th-229 A_LA

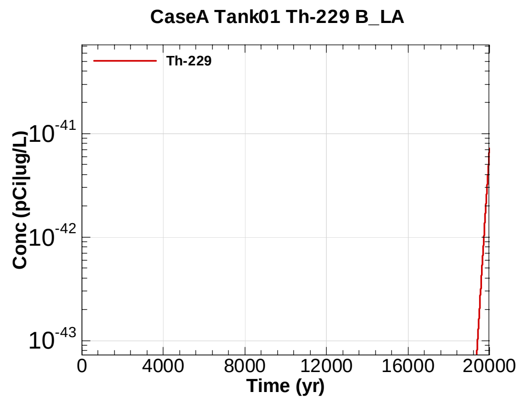

Figure E-202 - 100m Aquifer Concentration for CaseA Tank01 Th-229 B_LA

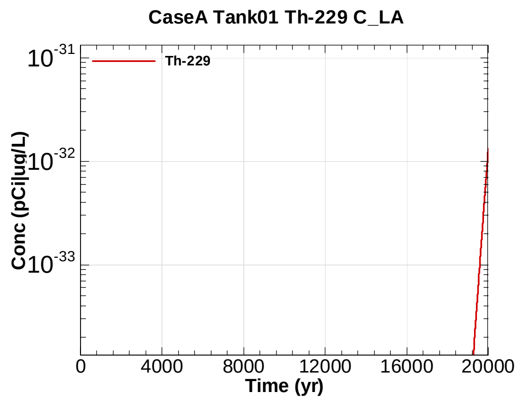

Figure E-203 - 100m Aquifer Concentration for CaseA Tank01 Th-229 C_LA

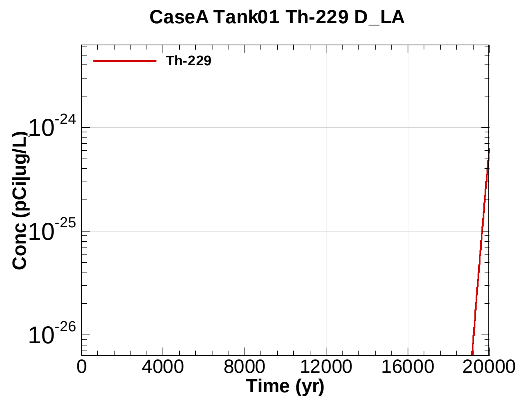

Figure E-204 - 100m Aquifer Concentration for CaseA Tank01 Th-229 D_LA

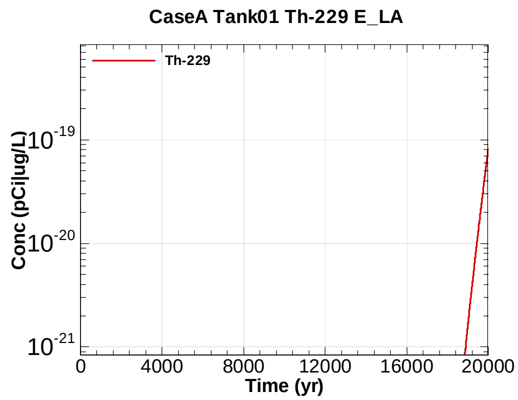

Figure E-205 - 100m Aquifer Concentration for CaseA Tank01 Th-229 E_LA

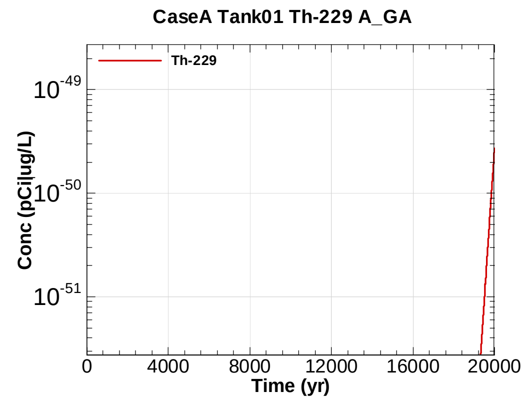

Figure E-206 - 100m Aquifer Concentration for CaseA Tank01 Th-229 A_GA

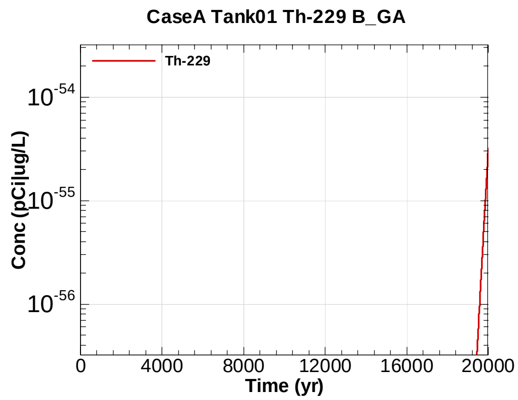

Figure E-207 - 100m Aquifer Concentration for CaseA Tank01 Th-229 B_GA

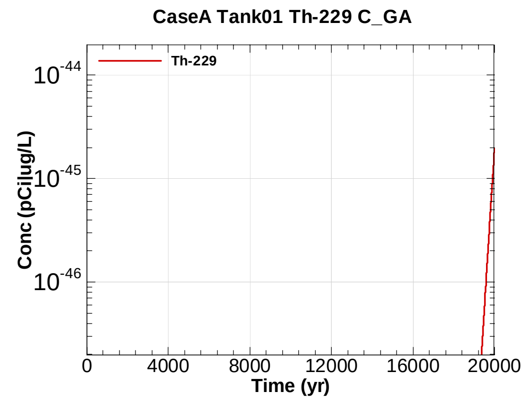

Figure E-208 - 100m Aquifer Concentration for CaseA Tank01 Th-229 C_GA

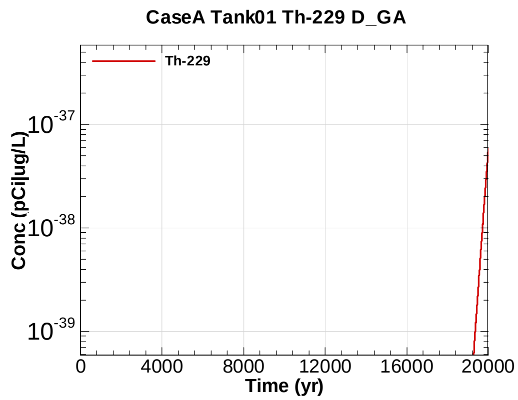

Figure E-209 - 100m Aquifer Concentration for CaseA Tank01 Th-229 D_GA

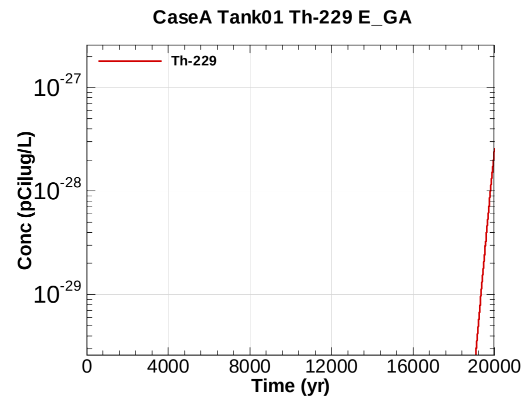

Figure E-210 - 100m Aquifer Concentration for CaseA Tank01 Th-229 E_GA

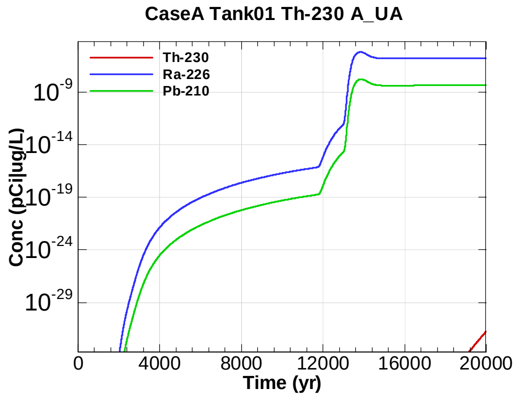

Figure E-211 - 100m Aquifer Concentration for CaseA Tank01 Th-230 A_UA

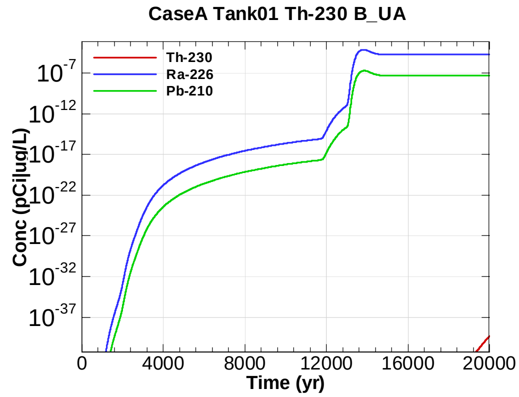

Figure E-212 - 100m Aquifer Concentration for CaseA Tank01 Th-230 B_UA

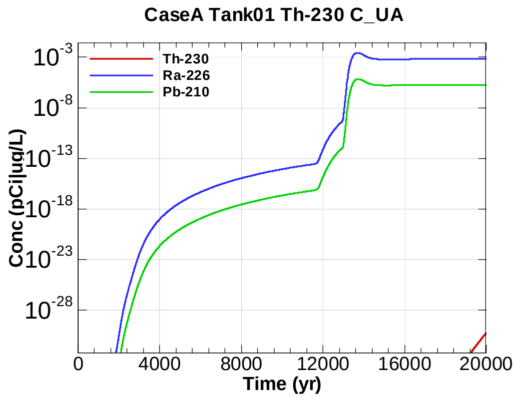

Figure E-213 - 100m Aquifer Concentration for CaseA Tank01 Th-230 C_UA

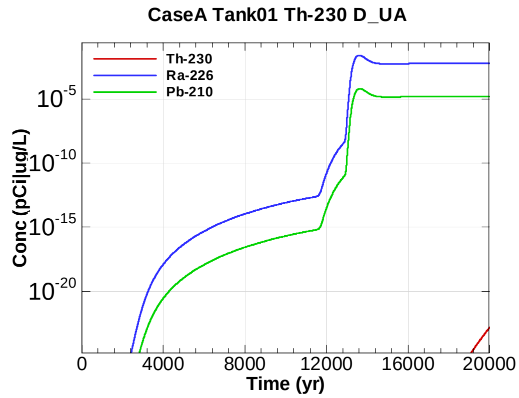

Figure E-214 - 100m Aquifer Concentration for CaseA Tank01 Th-230 D_UA

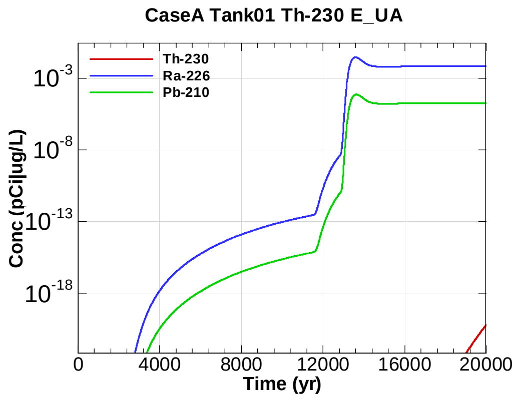

Figure E-215 - 100m Aquifer Concentration for CaseA Tank01 Th-230 E_UA

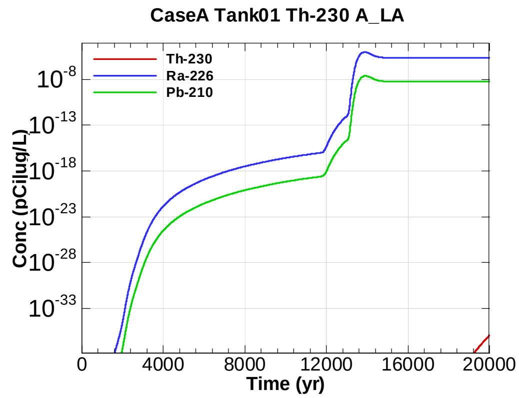

Figure E-216 - 100m Aquifer Concentration for CaseA Tank01 Th-230 A_LA

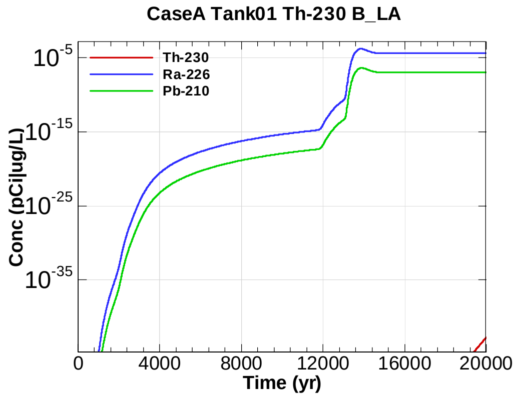

Figure E-217 - 100m Aquifer Concentration for CaseA Tank01 Th-230 B_LA

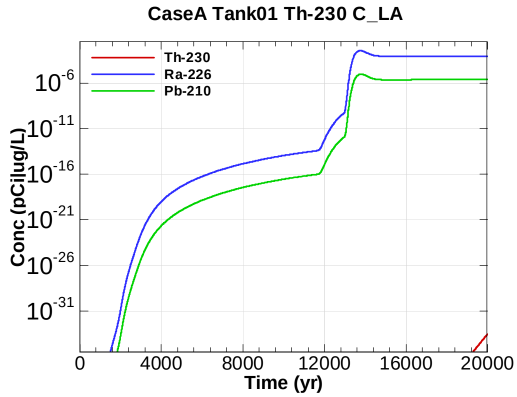

Figure E-218 - 100m Aquifer Concentration for CaseA Tank01 Th-230 C_LA

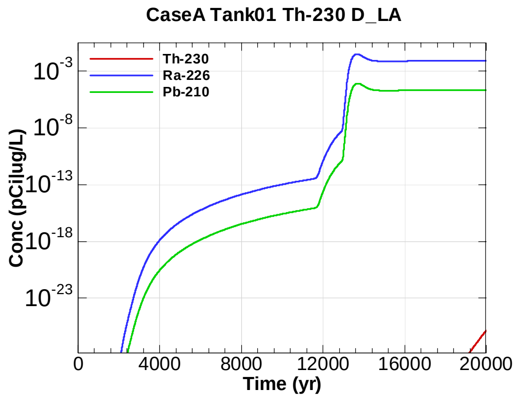

Figure E-219 - 100m Aquifer Concentration for CaseA Tank01 Th-230 D_LA

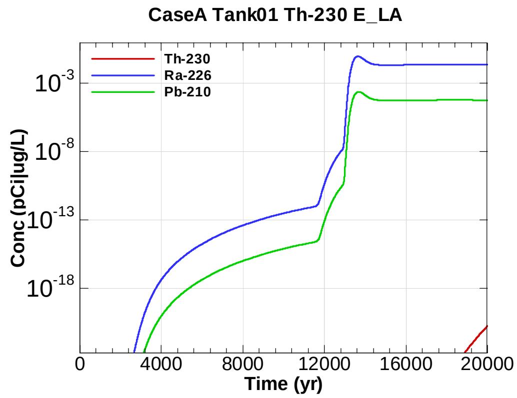

Figure E-220 - 100m Aquifer Concentration for CaseA Tank01 Th-230 E_LA

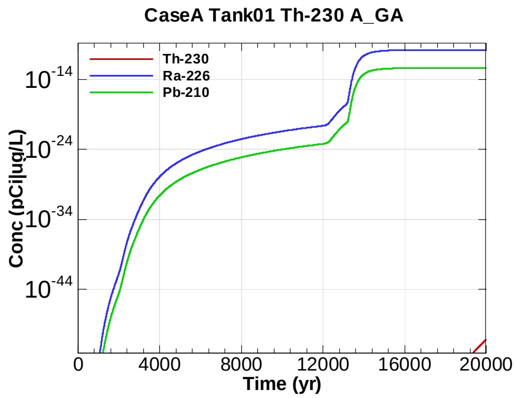

Figure E-221 - 100m Aquifer Concentration for CaseA Tank01 Th-230 A_GA

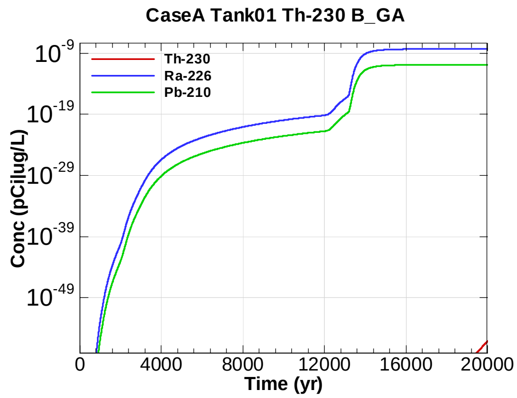

Figure E-222 - 100m Aquifer Concentration for CaseA Tank01 Th-230 B_GA

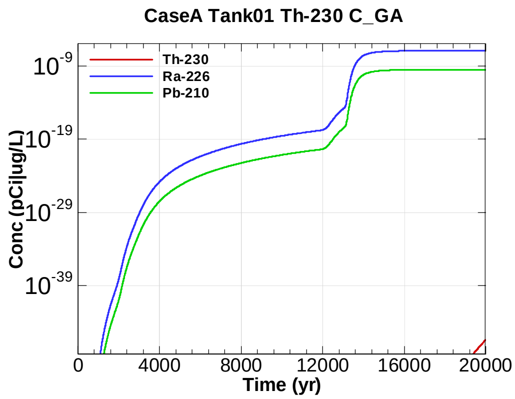

Figure E-223 - 100m Aquifer Concentration for CaseA Tank01 Th-230 C_GA

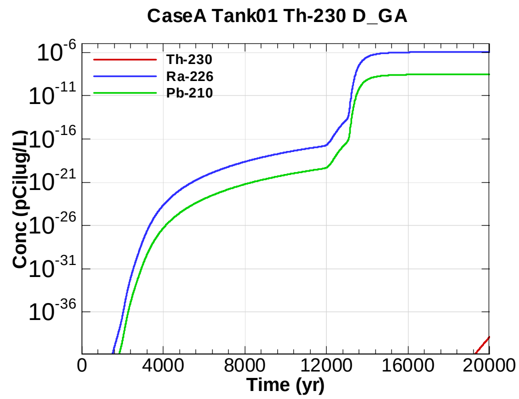

Figure E-224 - 100m Aquifer Concentration for CaseA Tank01 Th-230 D_GA

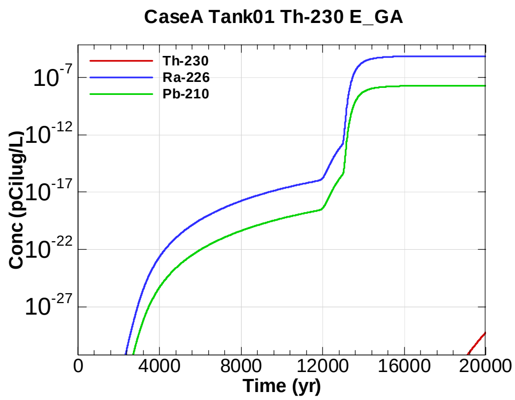

Figure E-225 - 100m Aquifer Concentration for CaseA Tank01 Th-230 E_GA

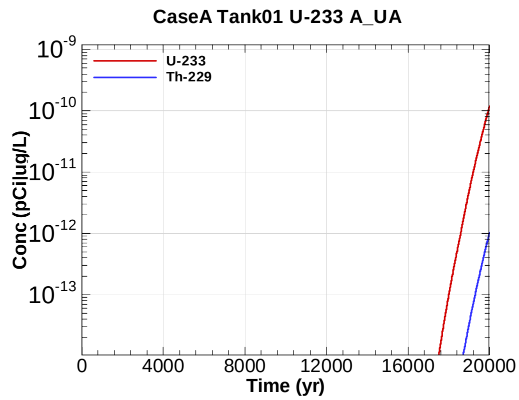

Figure E-226 - 100m Aquifer Concentration for CaseA Tank01 U-233 A_UA

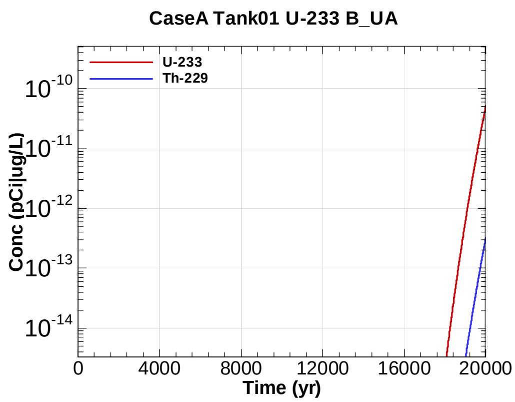

Figure E-227 - 100m Aquifer Concentration for CaseA Tank01 U-233 B_UA

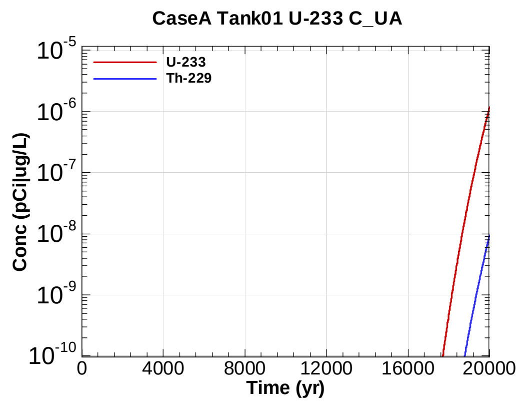

Figure E-228 - 100m Aquifer Concentration for CaseA Tank01 U-233 C_UA

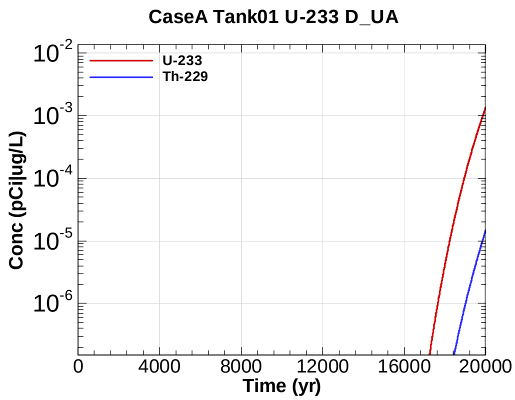

Figure E-229 - 100m Aquifer Concentration for CaseA Tank01 U-233 D_UA

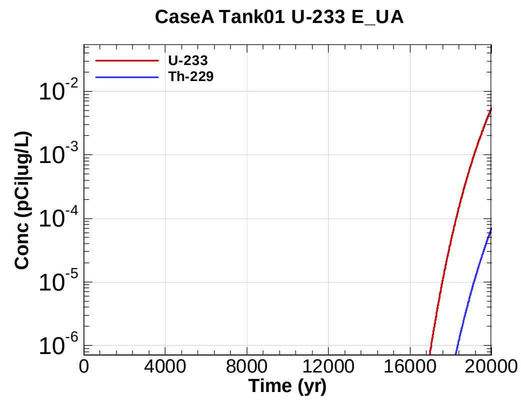

Figure E-230 - 100m Aquifer Concentration for CaseA Tank01 U-233 E_UA

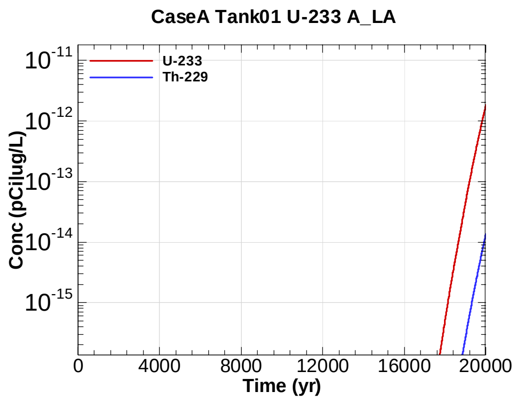

Figure E-231 - 100m Aquifer Concentration for CaseA Tank01 U-233 A_LA

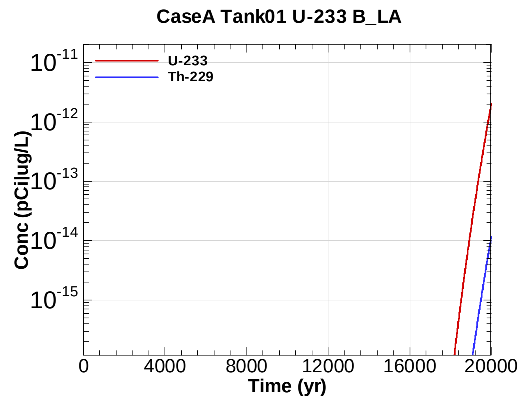

Figure E-232 - 100m Aquifer Concentration for CaseA Tank01 U-233 B_LA

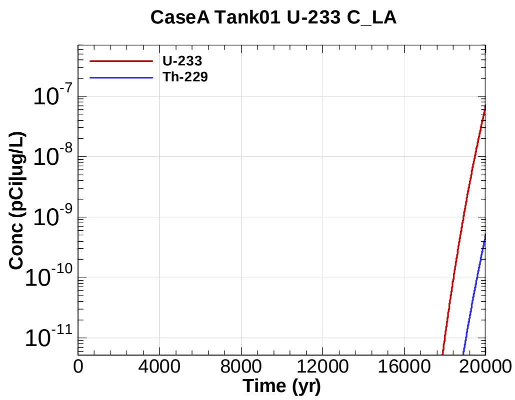

Figure E-233 - 100m Aquifer Concentration for CaseA Tank01 U-233 C_LA

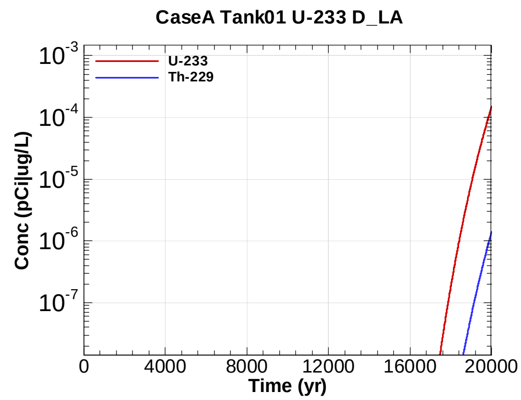

Figure E-234 - 100m Aquifer Concentration for CaseA Tank01 U-233 D_LA

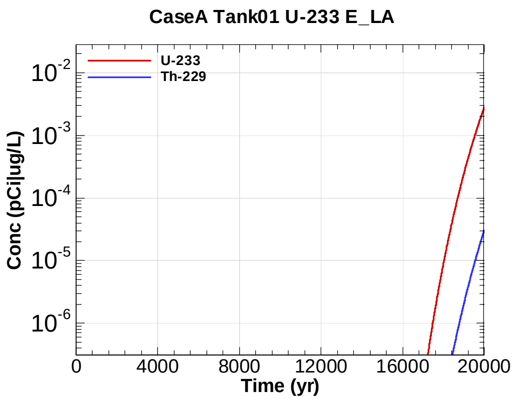

Figure E-235 - 100m Aquifer Concentration for CaseA Tank01 U-233 E_LA

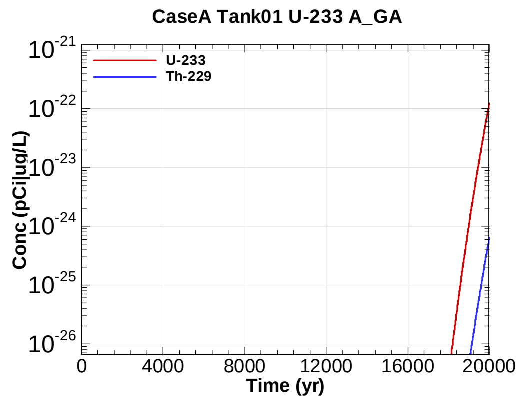

Figure E-236 - 100m Aquifer Concentration for CaseA Tank01 U-233 A_GA

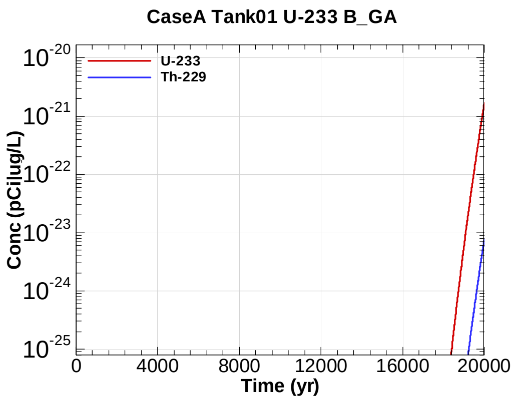

Figure E-237 - 100m Aquifer Concentration for CaseA Tank01 U-233 B_GA

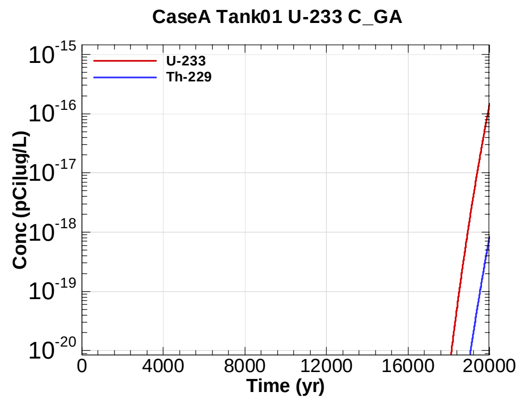

Figure E-238 - 100m Aquifer Concentration for CaseA Tank01 U-233 C_GA

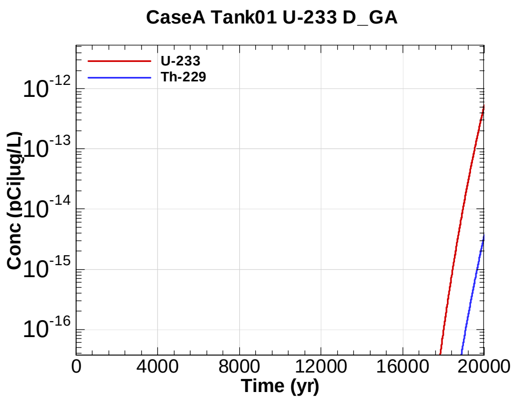

Figure E-239 - 100m Aquifer Concentration for CaseA Tank01 U-233 D_GA

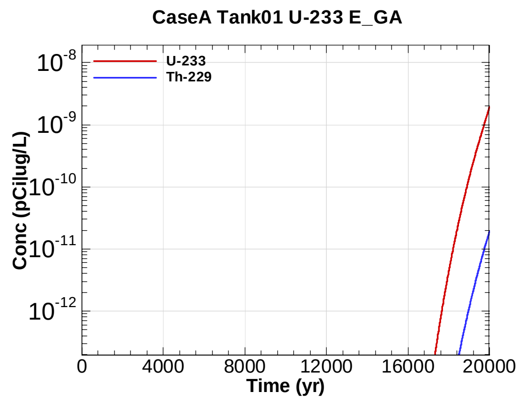

Figure E-240 - 100m Aquifer Concentration for CaseA Tank01 U-233 E_GA

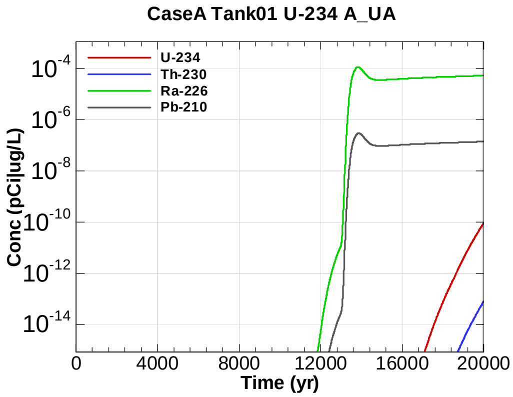

Figure E-241 - 100m Aquifer Concentration for CaseA Tank01 U-234 A_UA

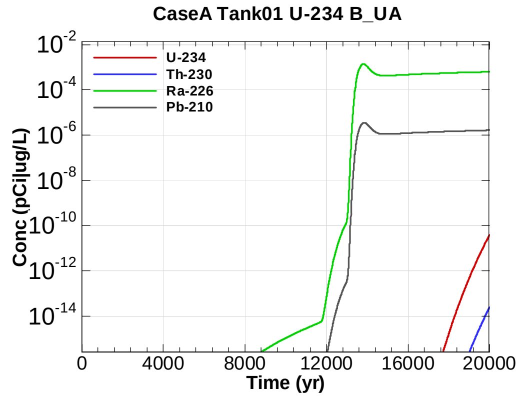

Figure E-242 - 100m Aquifer Concentration for CaseA Tank01 U-234 B_UA

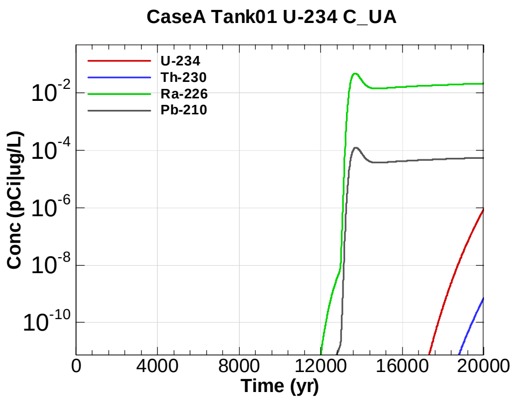

Figure E-243 - 100m Aquifer Concentration for CaseA Tank01 U-234 C_UA

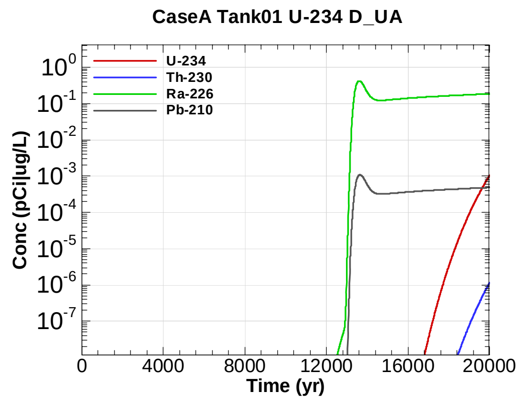

Figure E-244 - 100m Aquifer Concentration for CaseA Tank01 U-234 D_UA

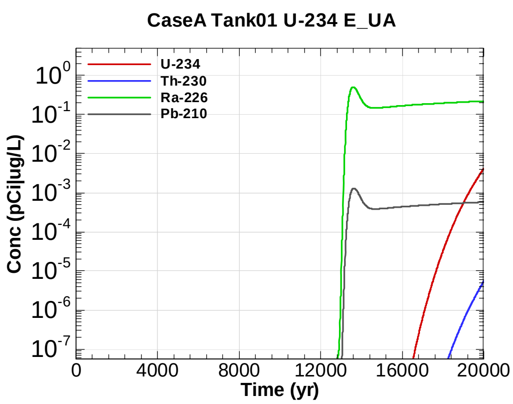

Figure E-245 - 100m Aquifer Concentration for CaseA Tank01 U-234 E_UA

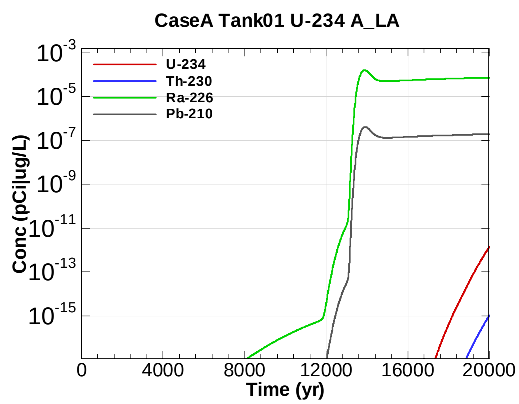

Figure E-246 - 100m Aquifer Concentration for CaseA Tank01 U-234 A_LA

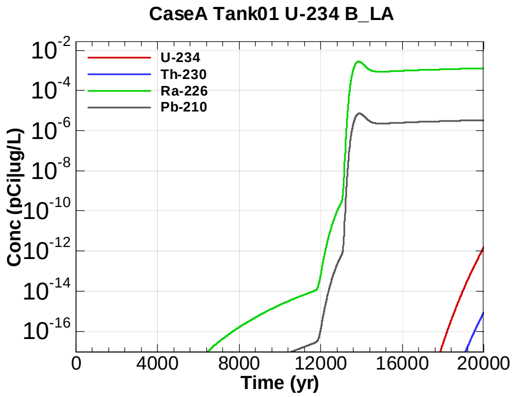

Figure E-247 - 100m Aquifer Concentration for CaseA Tank01 U-234 B_LA

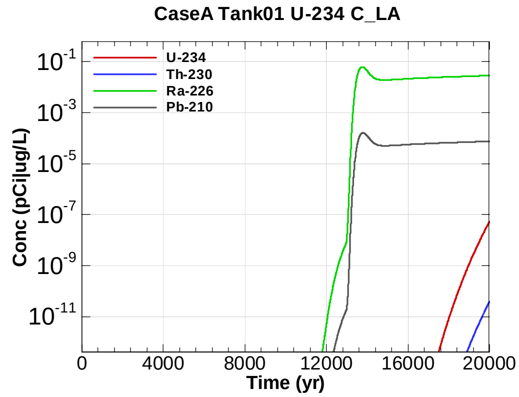

Figure E-248 - 100m Aquifer Concentration for CaseA Tank01 U-234 C_LA

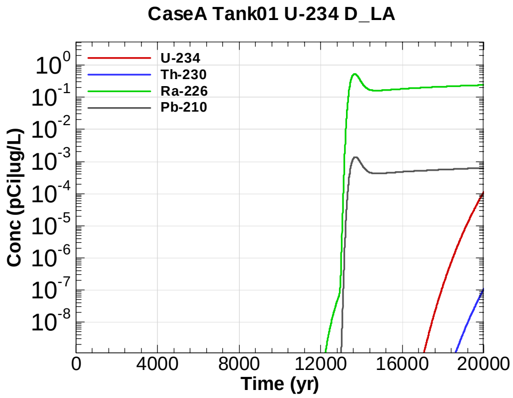

Figure E-249 - 100m Aquifer Concentration for CaseA Tank01 U-234 D_LA

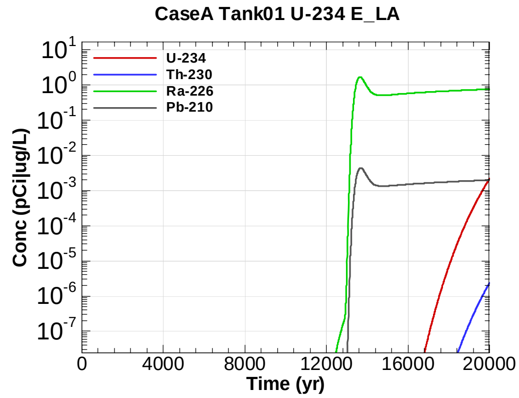

Figure E-250 - 100m Aquifer Concentration for CaseA Tank01 U-234 E_LA

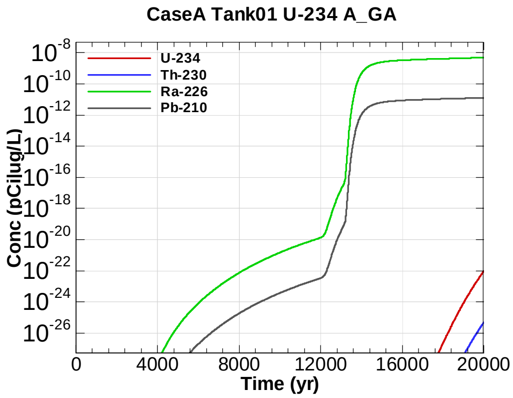

Figure E-251 - 100m Aquifer Concentration for CaseA Tank01 U-234 A_GA

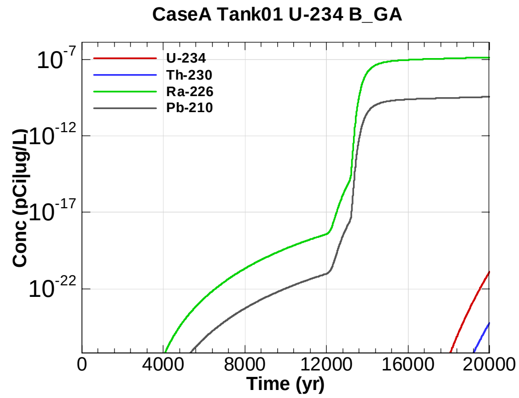

Figure E-252 - 100m Aquifer Concentration for CaseA Tank01 U-234 B_GA

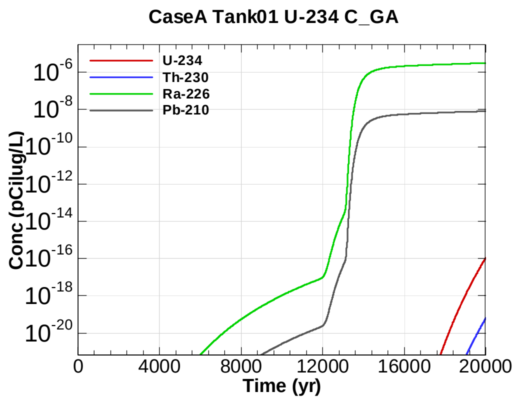

Figure E-253 - 100m Aquifer Concentration for CaseA Tank01 U-234 C_GA

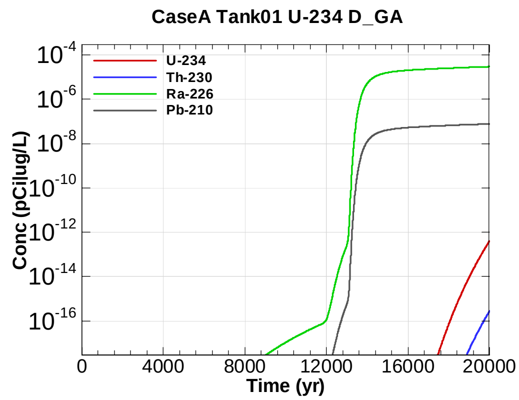

Figure E-254 - 100m Aquifer Concentration for CaseA Tank01 U-234 D_GA

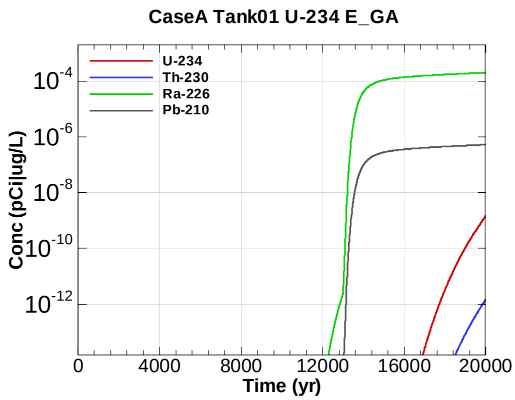

Figure E-255 - 100m Aquifer Concentration for CaseA Tank01 U-234 E_GA

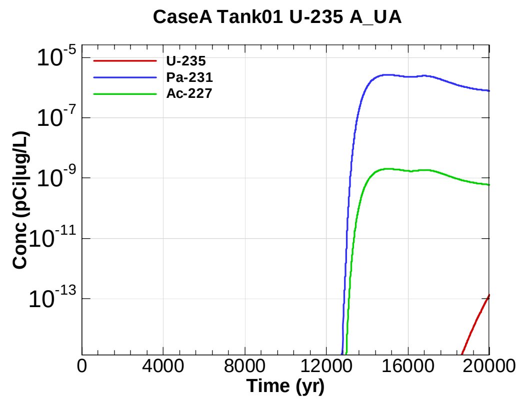

Figure E-256 - 100m Aquifer Concentration for CaseA Tank01 U-235 A_UA

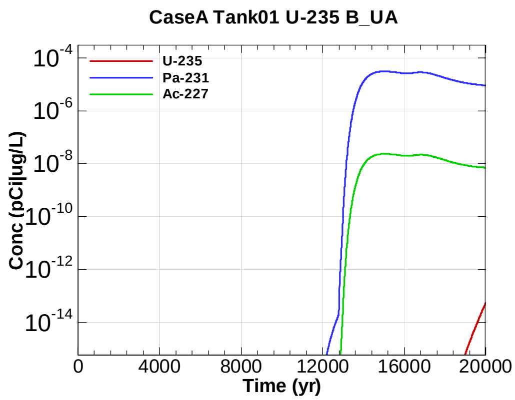

Figure E-257 - 100m Aquifer Concentration for CaseA Tank01 U-235 B_UA

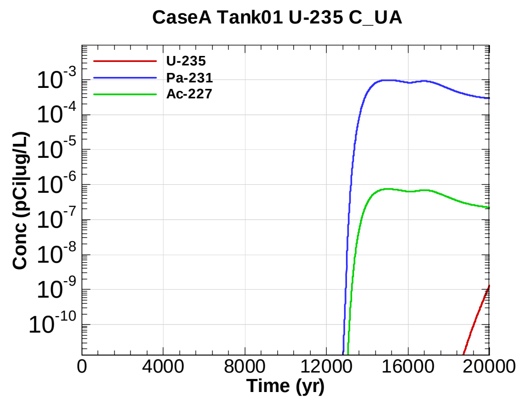

Figure E-258 - 100m Aquifer Concentration for CaseA Tank01 U-235 C_UA

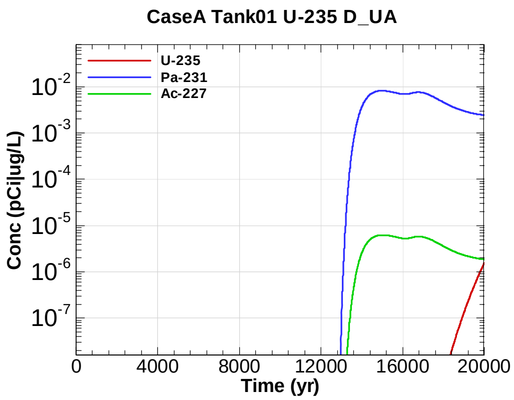

Figure E-259 - 100m Aquifer Concentration for CaseA Tank01 U-235 D_UA

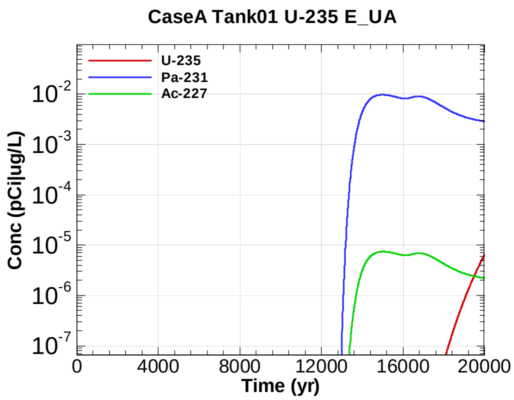

Figure E-260 - 100m Aquifer Concentration for CaseA Tank01 U-235 E_UA

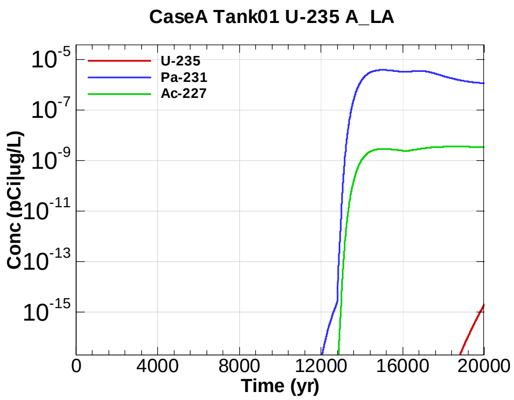

Figure E-261 - 100m Aquifer Concentration for CaseA Tank01 U-235 A_LA

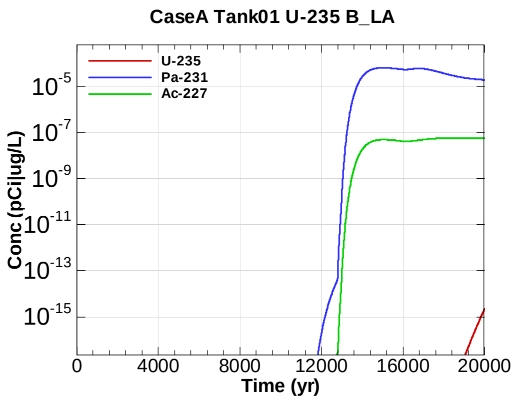

Figure E-262 - 100m Aquifer Concentration for CaseA Tank01 U-235 B_LA

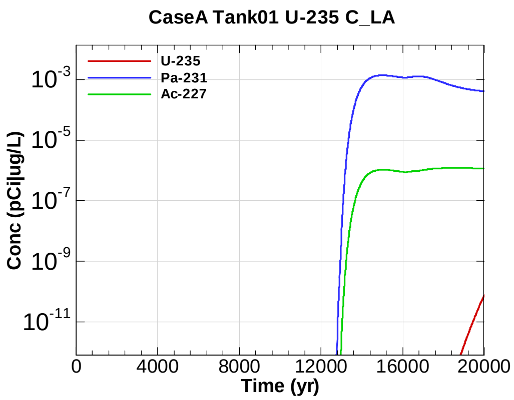

Figure E-263 - 100m Aquifer Concentration for CaseA Tank01 U-235 C_LA

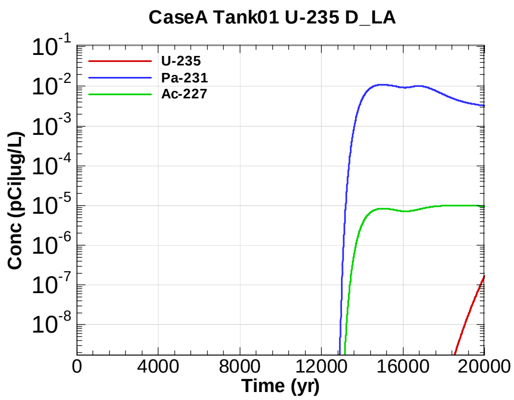

Figure E-264 - 100m Aquifer Concentration for CaseA Tank01 U-235 D_LA

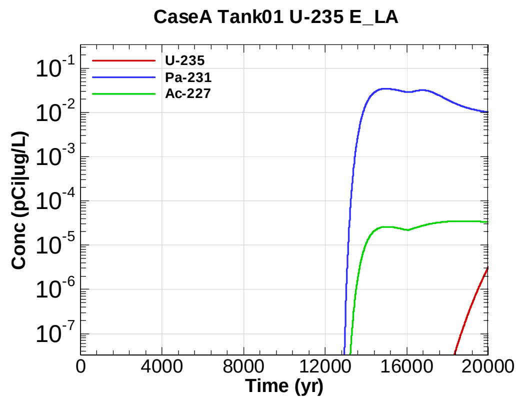

Figure E-265 - 100m Aquifer Concentration for CaseA Tank01 U-235 E_LA

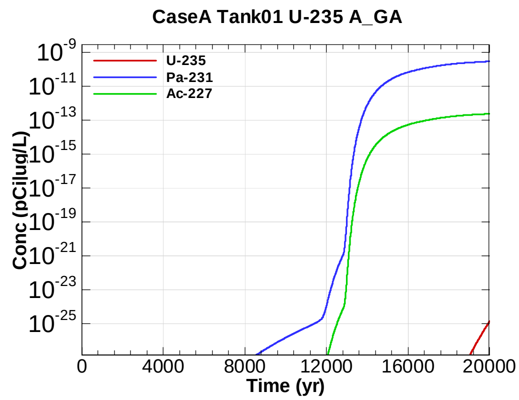

Figure E-266 - 100m Aquifer Concentration for CaseA Tank01 U-235 A_GA

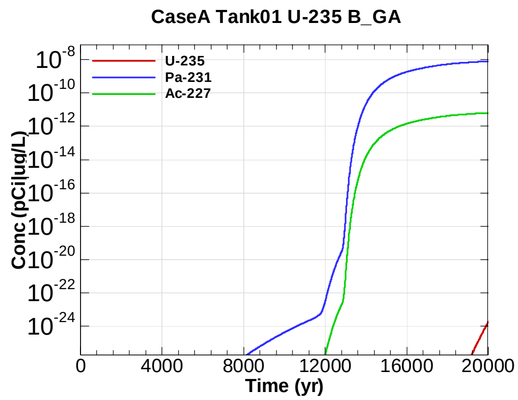

Figure E-267 - 100m Aquifer Concentration for CaseA Tank01 U-235 B_GA

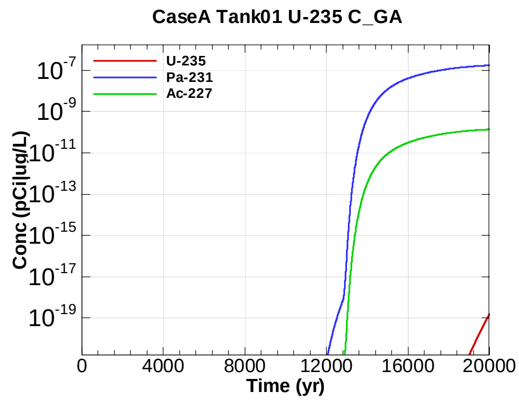

Figure E-268 - 100m Aquifer Concentration for CaseA Tank01 U-235 C_GA

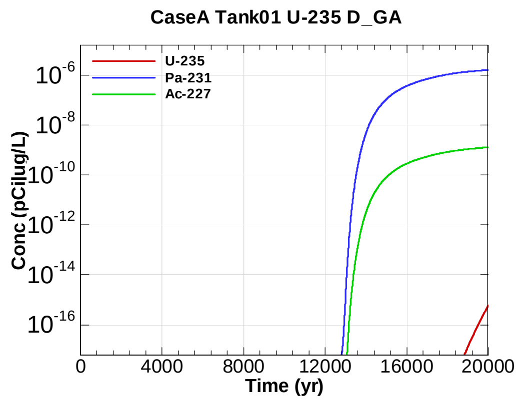

Figure E-269 - 100m Aquifer Concentration for CaseA Tank01 U-235 D_GA

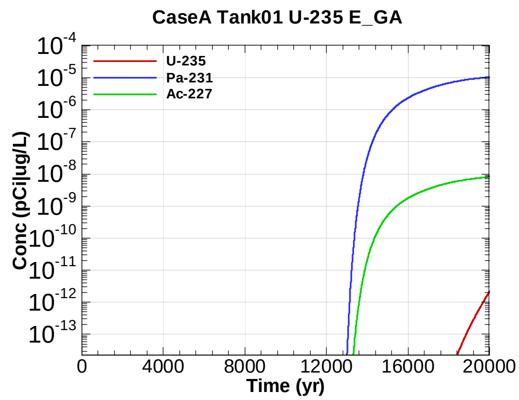

Figure E-270 - 100m Aquifer Concentration for CaseA Tank01 U-235 E_GA

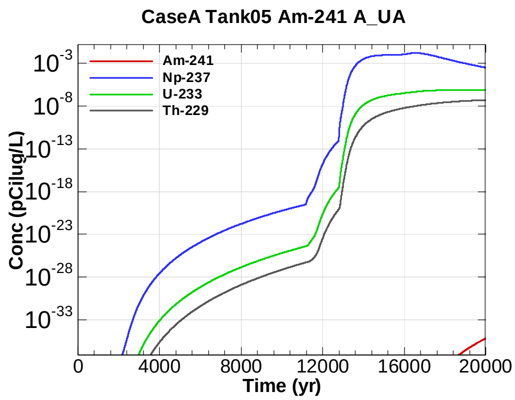

Figure E-271 - 100m Aquifer Concentration for CaseA Tank05 Am-241 A_UA

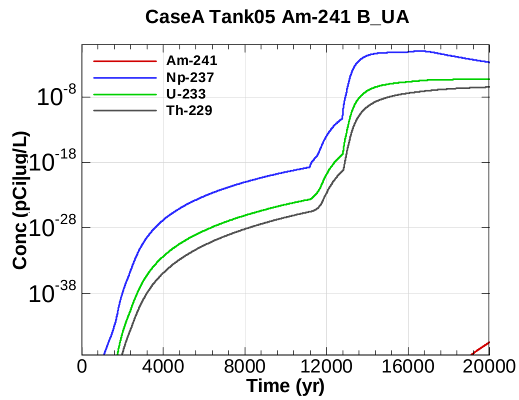

Figure E-272 - 100m Aquifer Concentration for CaseA Tank05 Am-241 B_UA

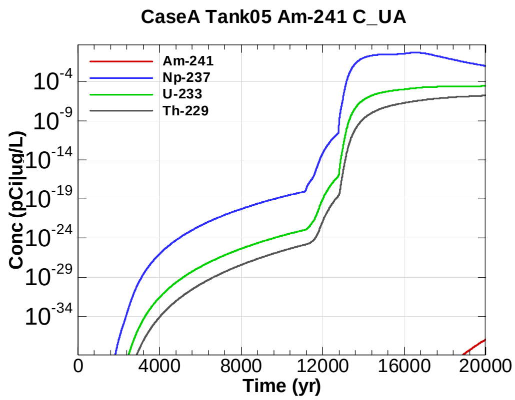

Figure E-273 - 100m Aquifer Concentration for CaseA Tank05 Am-241 C_UA

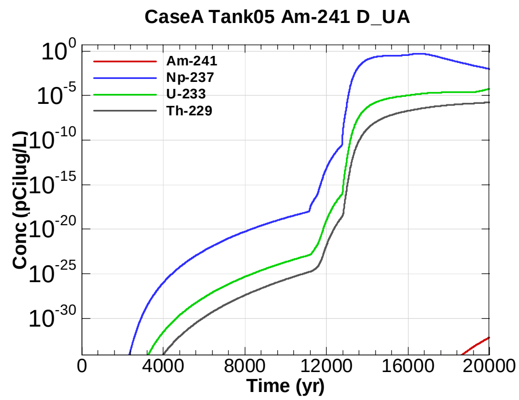

Figure E-274 - 100m Aquifer Concentration for CaseA Tank05 Am-241 D_UA

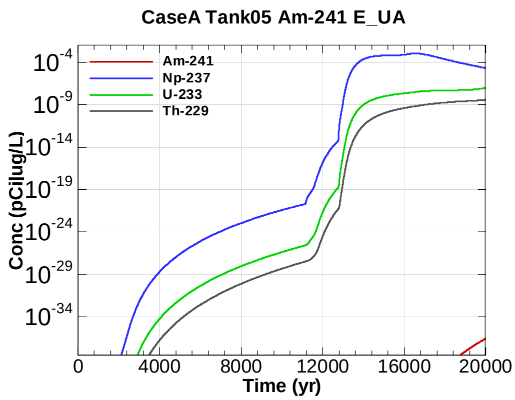

Figure E-275 - 100m Aquifer Concentration for CaseA Tank05 Am-241 E_UA

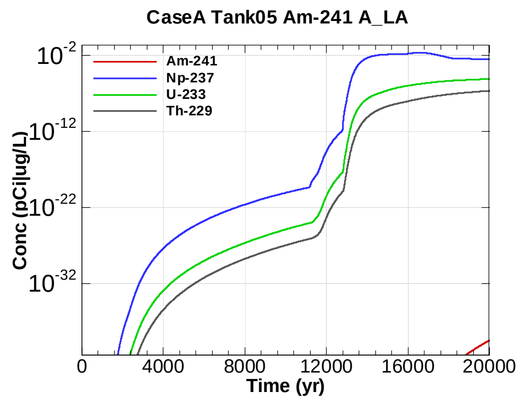

Figure E-276 - 100m Aquifer Concentration for CaseA Tank05 Am-241 A_LA

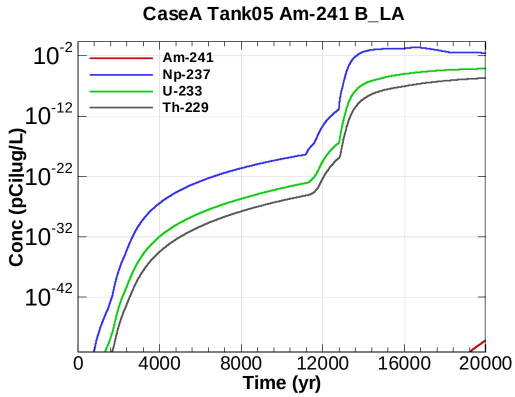

Figure E-277 - 100m Aquifer Concentration for CaseA Tank05 Am-241 B_LA

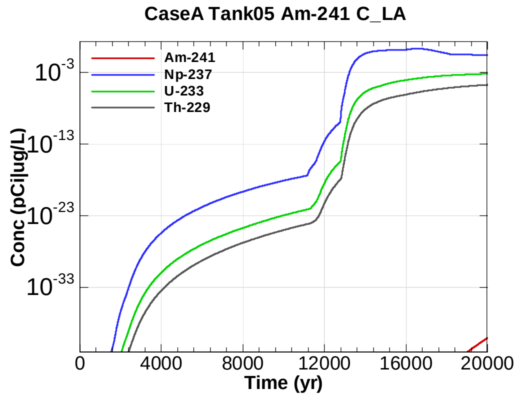

Figure E-278 - 100m Aquifer Concentration for CaseA Tank05 Am-241 C_LA

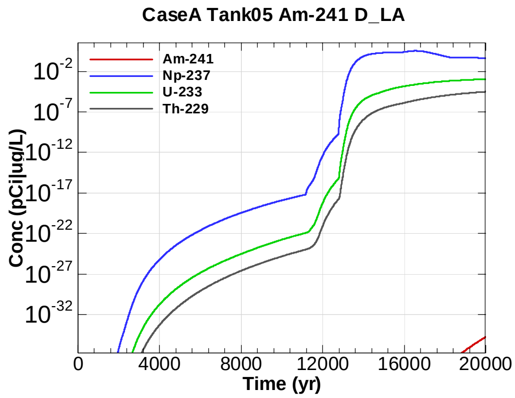

Figure E-279 - 100m Aquifer Concentration for CaseA Tank05 Am-241 D_LA

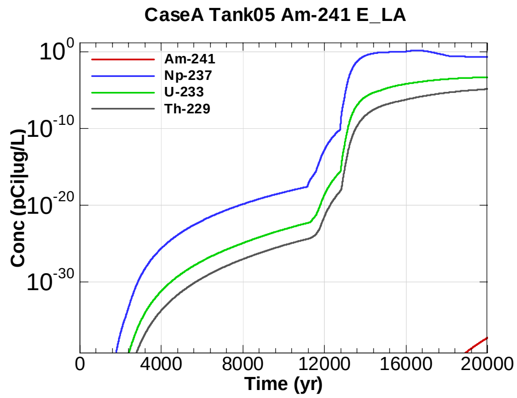

Figure E-280 - 100m Aquifer Concentration for CaseA Tank05 Am-241 E_LA

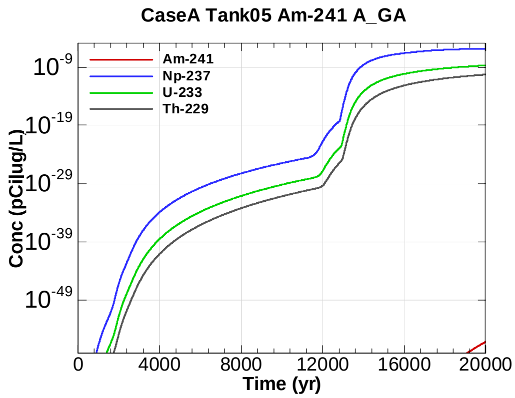

Figure E-281 - 100m Aquifer Concentration for CaseA Tank05 Am-241 A_GA

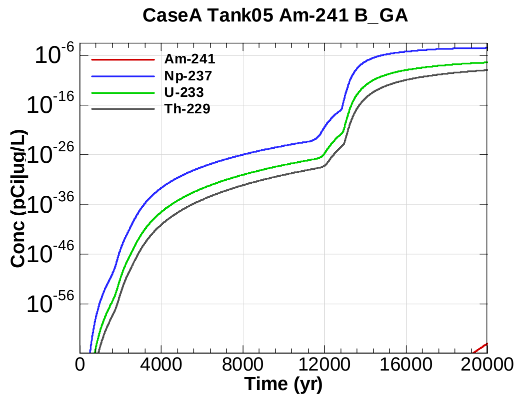

Figure E-282 - 100m Aquifer Concentration for CaseA Tank05 Am-241 B_GA

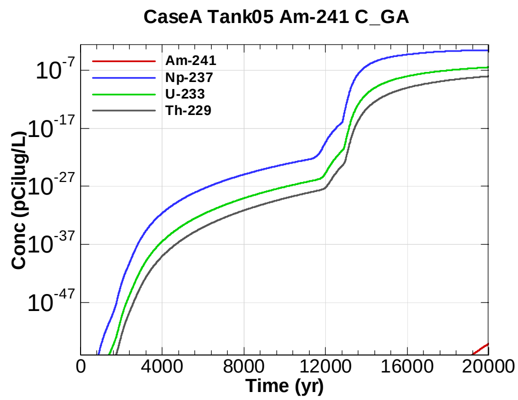

Figure E-283 - 100m Aquifer Concentration for CaseA Tank05 Am-241 C_GA

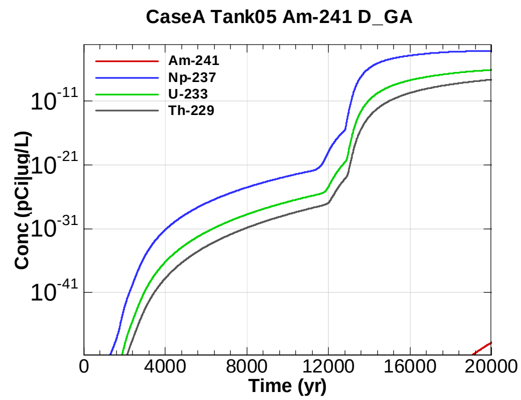

Figure E-284 - 100m Aquifer Concentration for CaseA Tank05 Am-241 D_GA

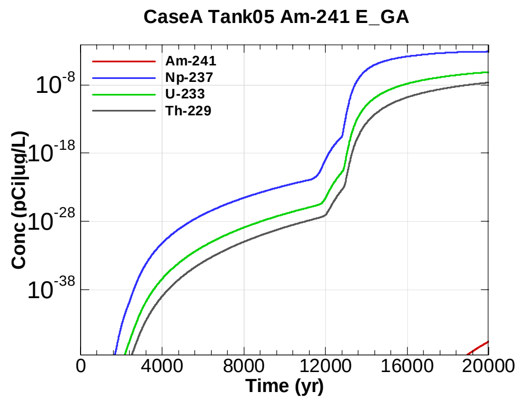

Figure E-285 - 100m Aquifer Concentration for CaseA Tank05 Am-241 E_GA

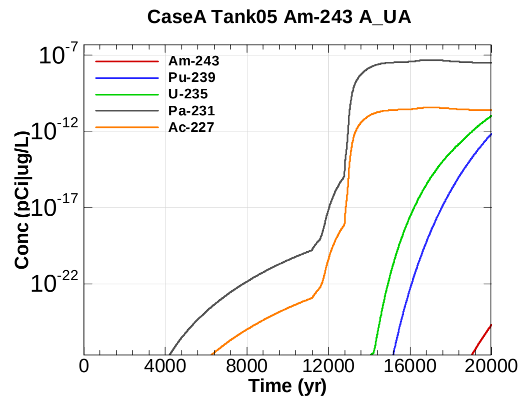

Figure E-286 - 100m Aquifer Concentration for CaseA Tank05 Am-243 A_UA

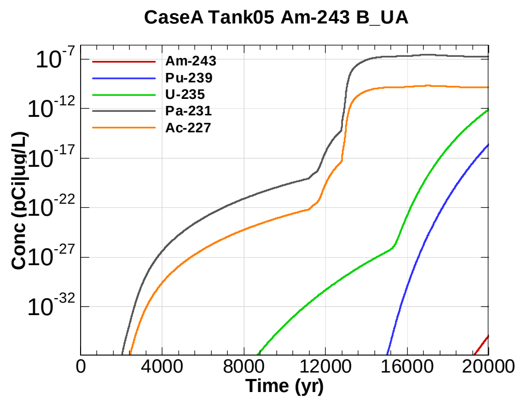

Figure E-287 - 100m Aquifer Concentration for CaseA Tank05 Am-243 B_UA

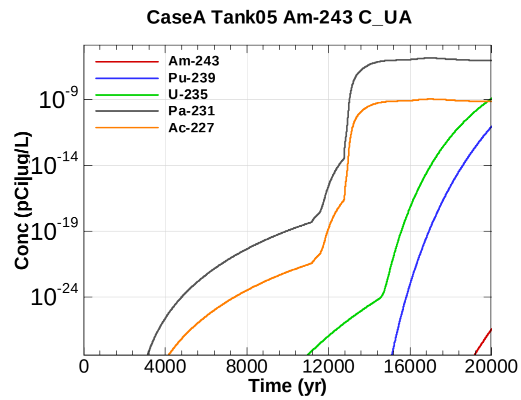

Figure E-288 - 100m Aquifer Concentration for CaseA Tank05 Am-243 C_UA

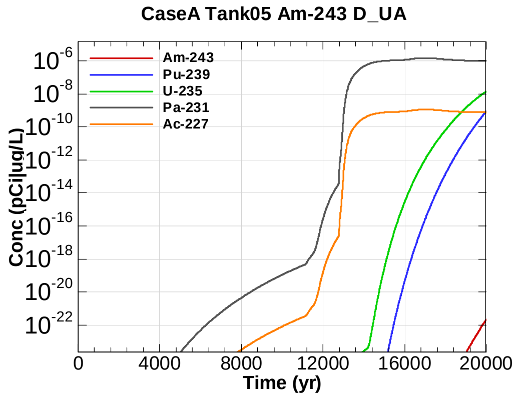

Figure E-289 - 100m Aquifer Concentration for CaseA Tank05 Am-243 D_UA

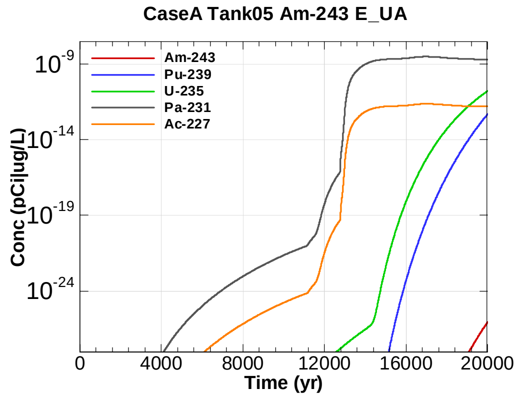

Figure E-290 - 100m Aquifer Concentration for CaseA Tank05 Am-243 E_UA

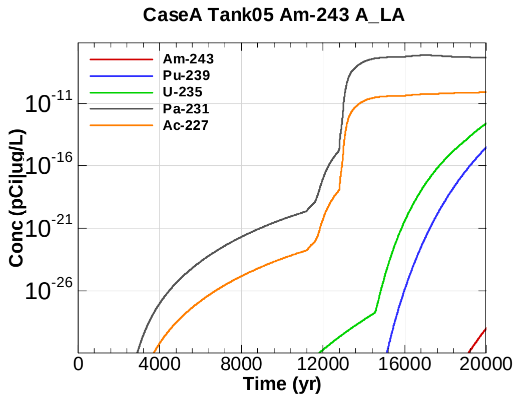

Figure E-291 - 100m Aquifer Concentration for CaseA Tank05 Am-243 A_LA

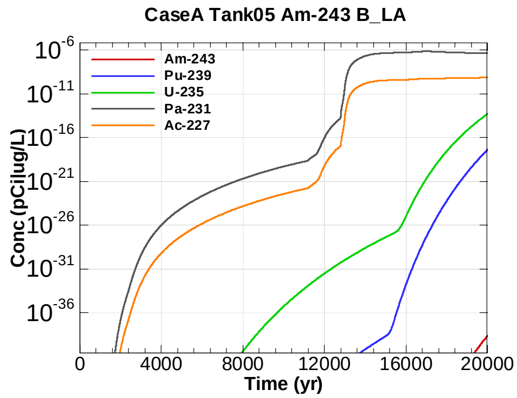

Figure E-292 - 100m Aquifer Concentration for CaseA Tank05 Am-243 B_LA

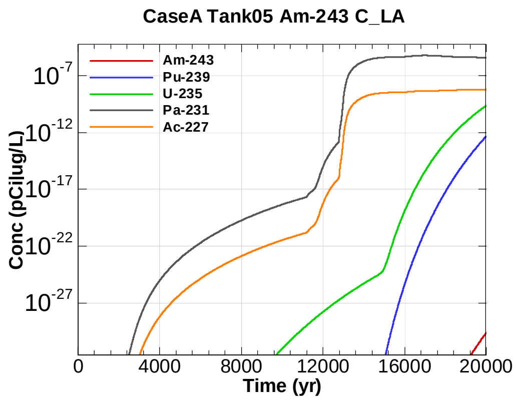

Figure E-293 - 100m Aquifer Concentration for CaseA Tank05 Am-243 C_LA

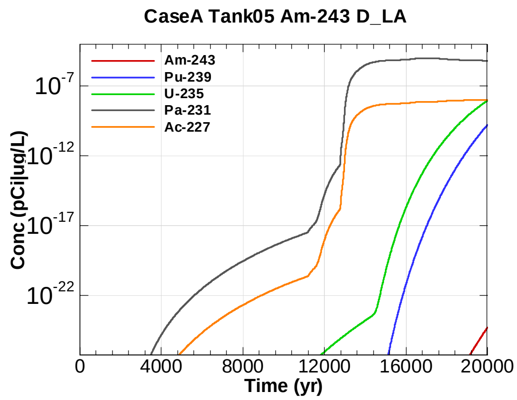

Figure E-294 - 100m Aquifer Concentration for CaseA Tank05 Am-243 D_LA

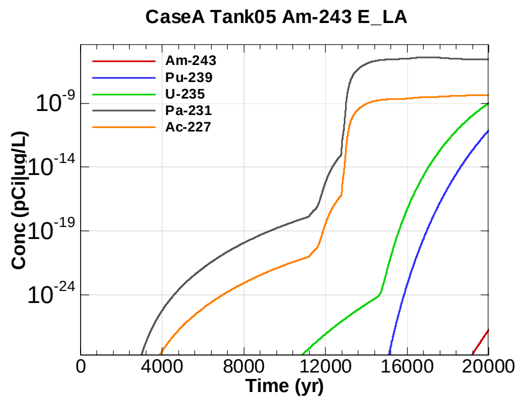

Figure E-295 - 100m Aquifer Concentration for CaseA Tank05 Am-243 E_LA

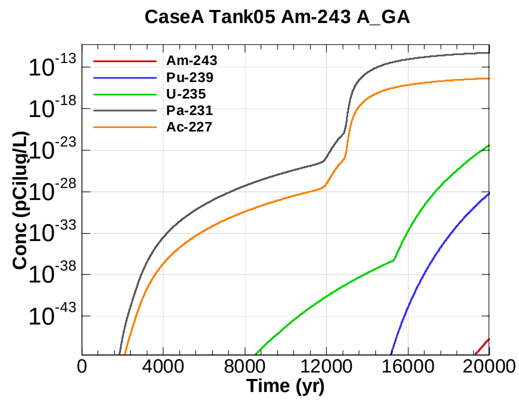

Figure E-296 - 100m Aquifer Concentration for CaseA Tank05 Am-243 A_GA

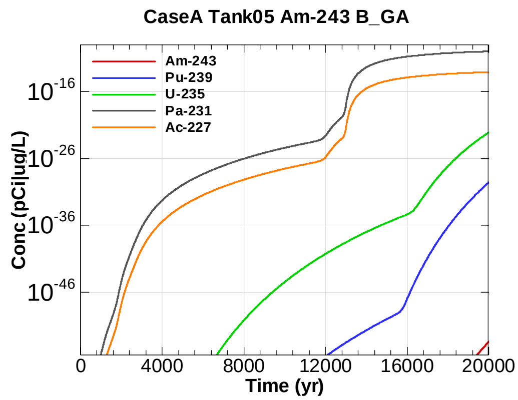

Figure E-297 - 100m Aquifer Concentration for CaseA Tank05 Am-243 B_GA

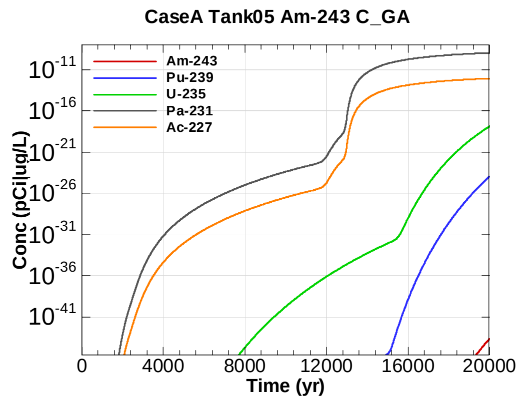

Figure E-298 - 100m Aquifer Concentration for CaseA Tank05 Am-243 C_GA

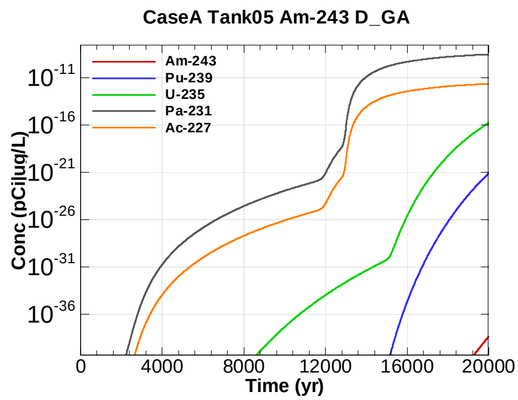

Figure E-299 - 100m Aquifer Concentration for CaseA Tank05 Am-243 D_GA

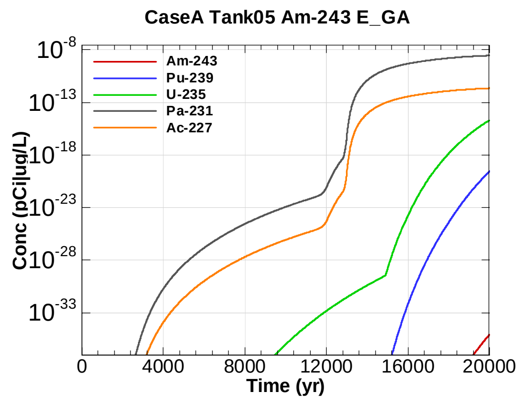

Figure E-300 - 100m Aquifer Concentration for CaseA Tank05 Am-243 E_GA

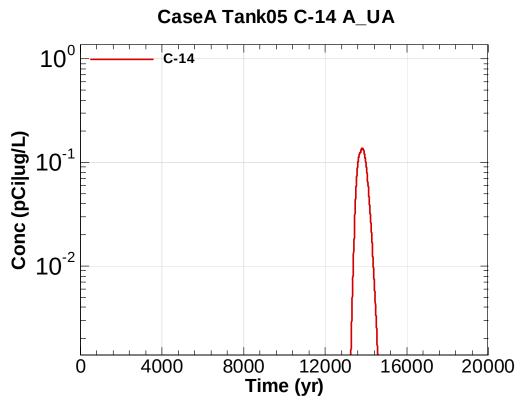

Figure E-301 - 100m Aquifer Concentration for CaseA Tank05 C-14 A_UA

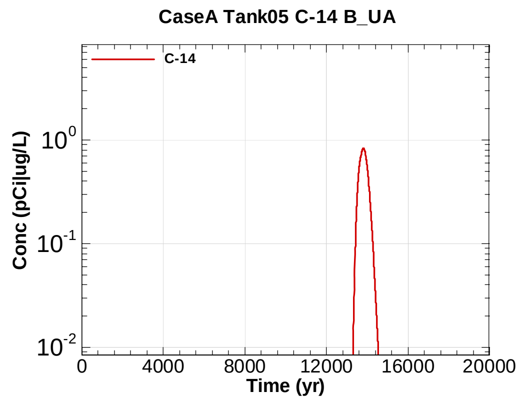

Figure E-302 - 100m Aquifer Concentration for CaseA Tank05 C-14 B_UA

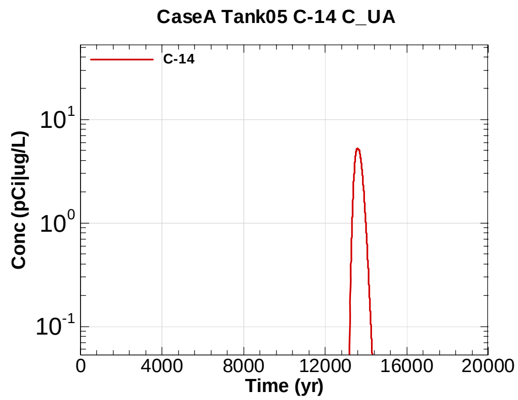

Figure E-303 - 100m Aquifer Concentration for CaseA Tank05 C-14 C_UA

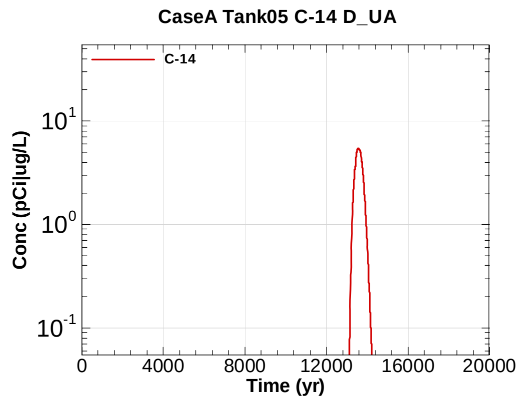

Figure E-304 - 100m Aquifer Concentration for CaseA Tank05 C-14 D_UA

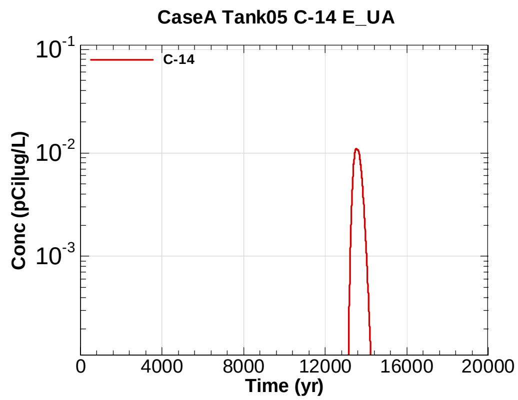

Figure E-305 - 100m Aquifer Concentration for CaseA Tank05 C-14 E_UA

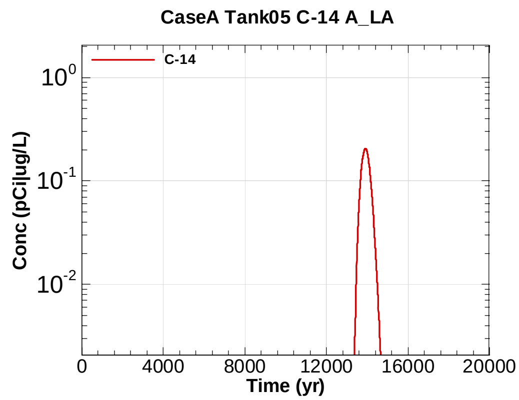

Figure E-306 - 100m Aquifer Concentration for CaseA Tank05 C-14 A_LA

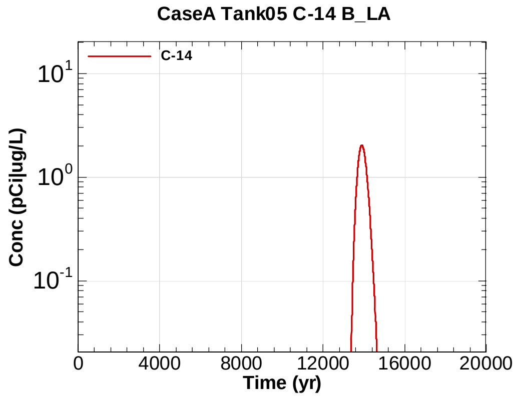

Figure E-307 - 100m Aquifer Concentration for CaseA Tank05 C-14 B_LA

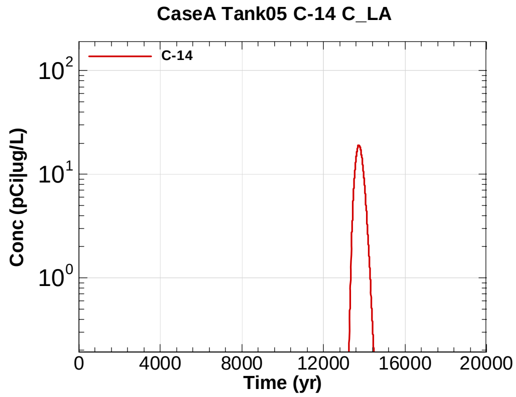

Figure E-308 - 100m Aquifer Concentration for CaseA Tank05 C-14 C_LA

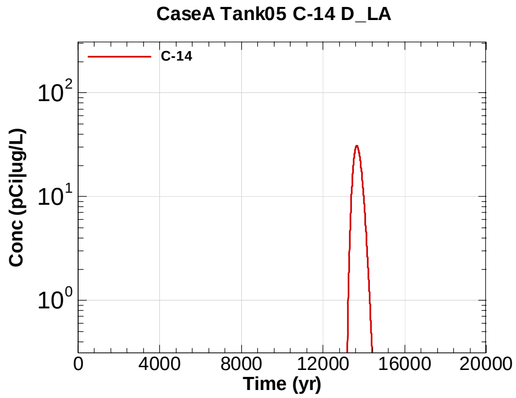

Figure E-309 - 100m Aquifer Concentration for CaseA Tank05 C-14 D_LA

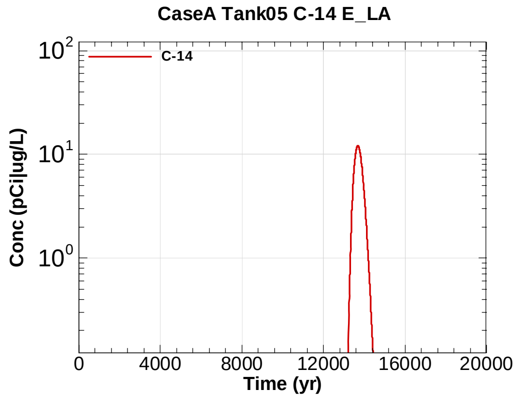

Figure E-310 - 100m Aquifer Concentration for CaseA Tank05 C-14 E_LA

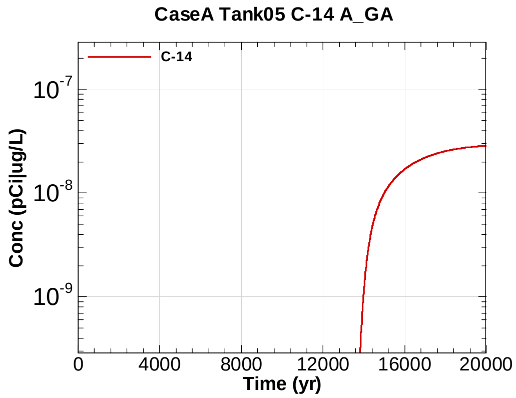

Figure E-311 - 100m Aquifer Concentration for CaseA Tank05 C-14 A_GA

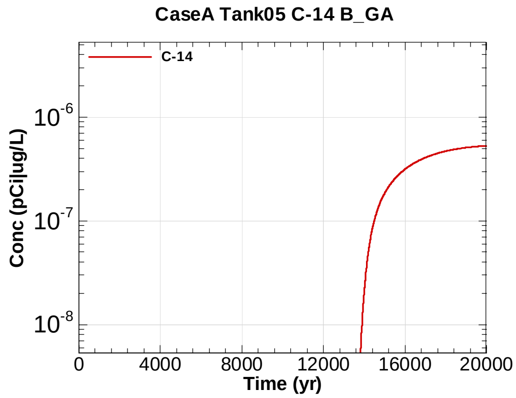

Figure E-312 - 100m Aquifer Concentration for CaseA Tank05 C-14 B_GA

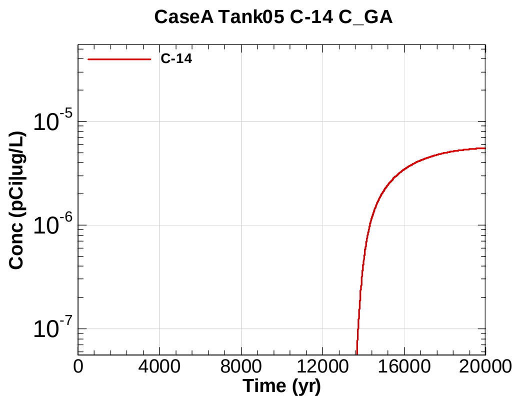

Figure E-313 - 100m Aquifer Concentration for CaseA Tank05 C-14 C_GA

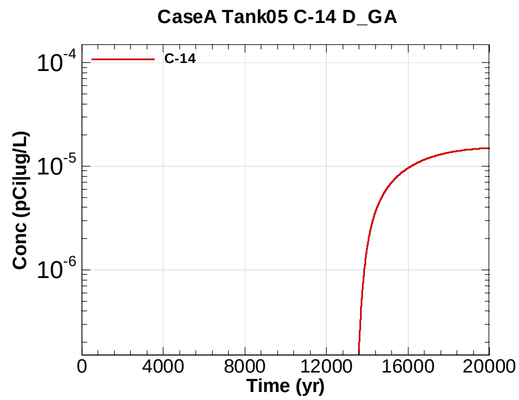

Figure E-314 - 100m Aquifer Concentration for CaseA Tank05 C-14 D_GA

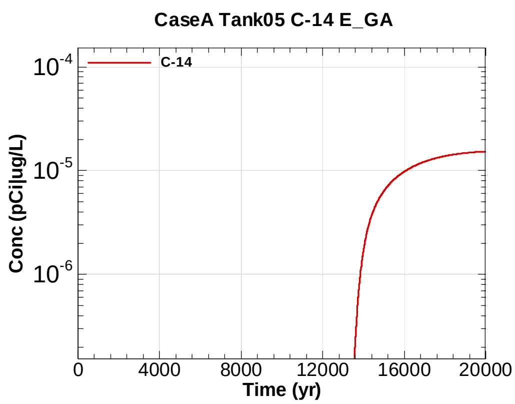

Figure E-315 - 100m Aquifer Concentration for CaseA Tank05 C-14 E_GA

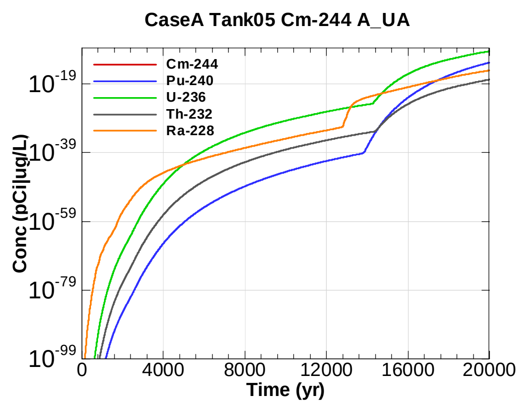

Figure E-316 - 100m Aquifer Concentration for CaseA Tank05 Cm-244 A_UA

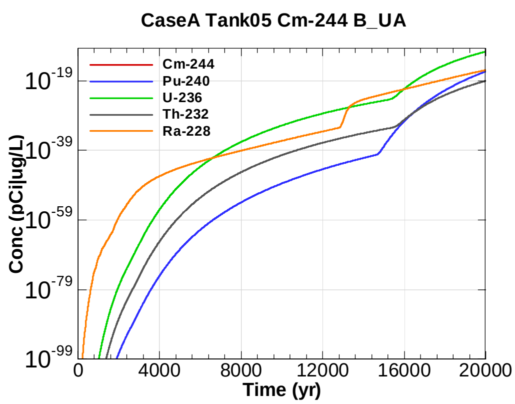

Figure E-317 - 100m Aquifer Concentration for CaseA Tank05 Cm-244 B_UA

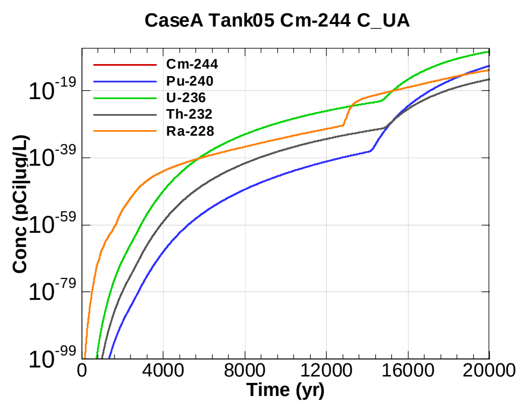

Figure E-318 - 100m Aquifer Concentration for CaseA Tank05 Cm-244 C_UA

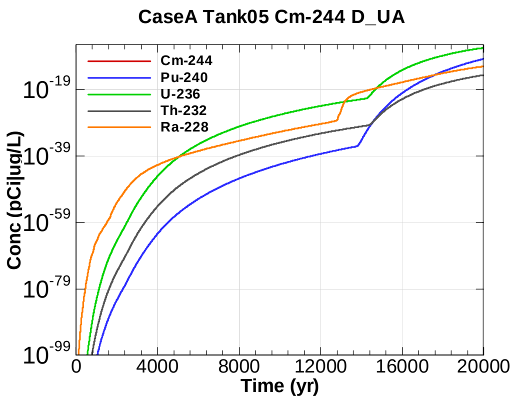

Figure E-319 - 100m Aquifer Concentration for CaseA Tank05 Cm-244 D_UA

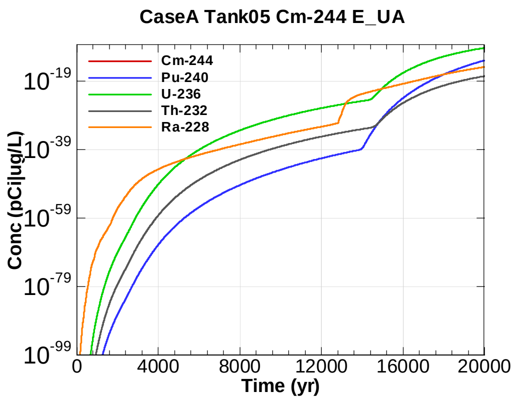

Figure E-320 - 100m Aquifer Concentration for CaseA Tank05 Cm-244 E_UA

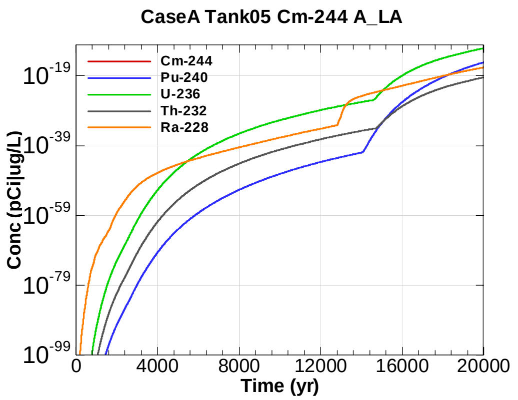

Figure E-321 - 100m Aquifer Concentration for CaseA Tank05 Cm-244 A_LA

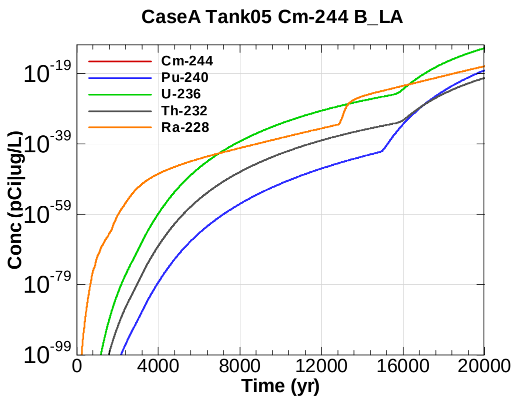

Figure E-322 - 100m Aquifer Concentration for CaseA Tank05 Cm-244 B_LA

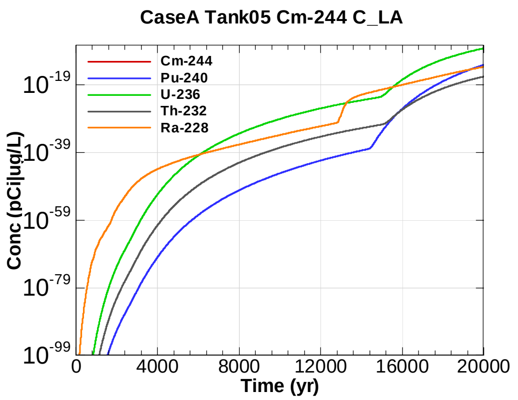

Figure E-323 - 100m Aquifer Concentration for CaseA Tank05 Cm-244 C_LA

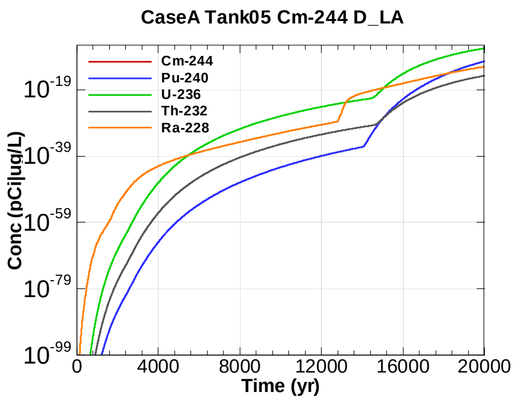

Figure E-324 - 100m Aquifer Concentration for CaseA Tank05 Cm-244 D_LA

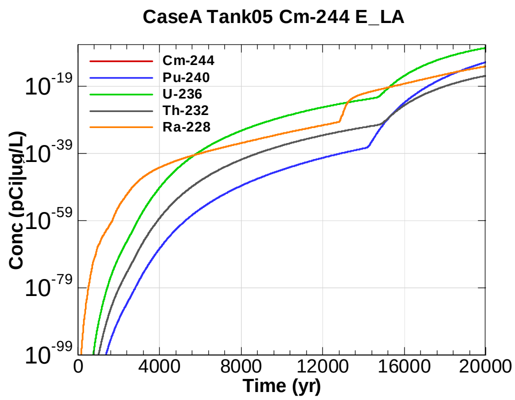

Figure E-325 - 100m Aquifer Concentration for CaseA Tank05 Cm-244 E_LA

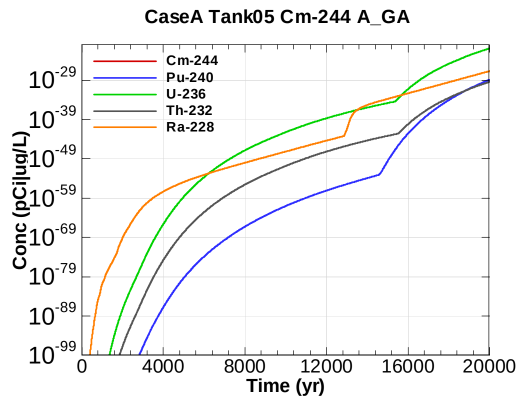

Figure E-326 - 100m Aquifer Concentration for CaseA Tank05 Cm-244 A_GA

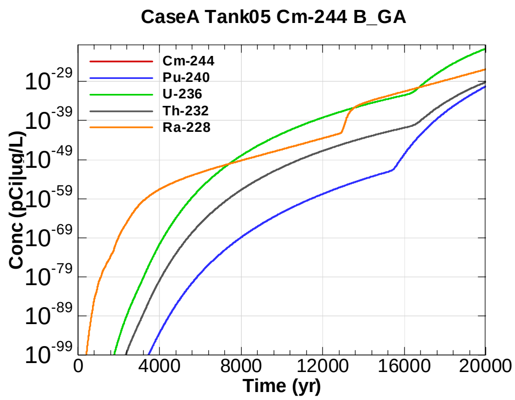

Figure E-327 - 100m Aquifer Concentration for CaseA Tank05 Cm-244 B_GA

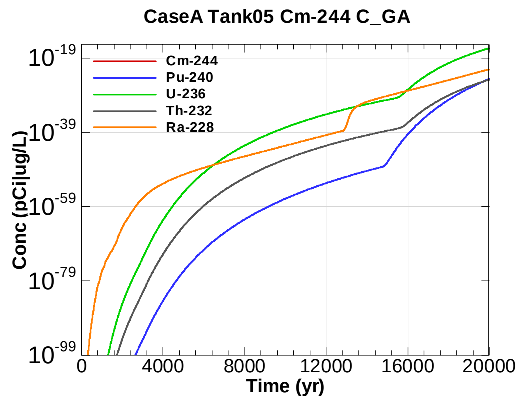

Figure E-328 - 100m Aquifer Concentration for CaseA Tank05 Cm-244 C_GA

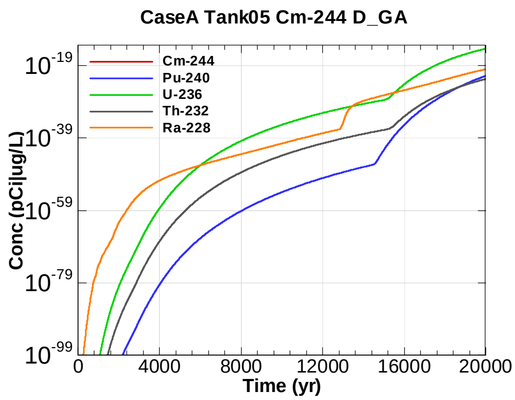

Figure E-329 - 100m Aquifer Concentration for CaseA Tank05 Cm-244 D_GA

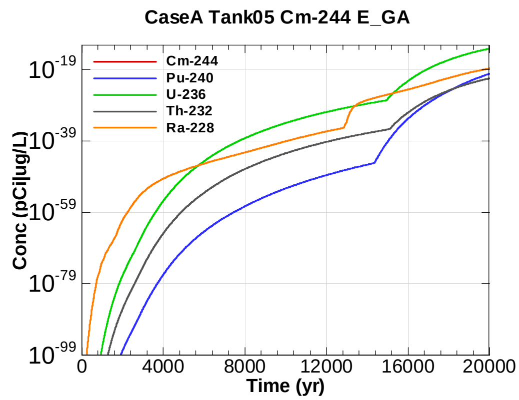

Figure E-330 - 100m Aquifer Concentration for CaseA Tank05 Cm-244 E_GA

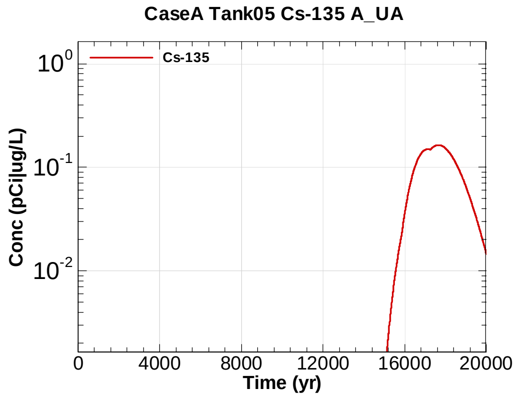

Figure E-331 - 100m Aquifer Concentration for CaseA Tank05 Cs-135 A_UA

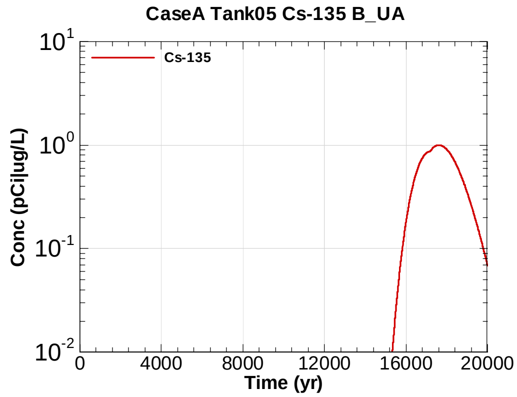

Figure E-332 - 100m Aquifer Concentration for CaseA Tank05 Cs-135 B_UA

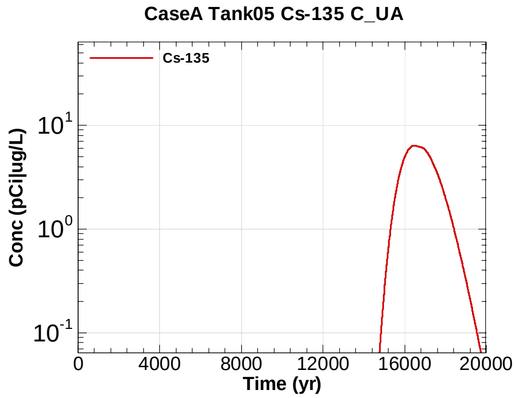

Figure E-333 - 100m Aquifer Concentration for CaseA Tank05 Cs-135 C_UA

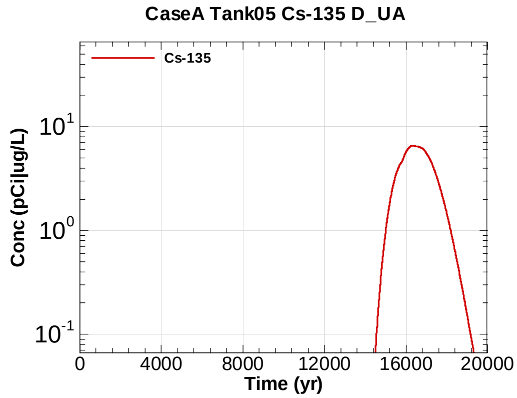

Figure E-334 - 100m Aquifer Concentration for CaseA Tank05 Cs-135 D_UA

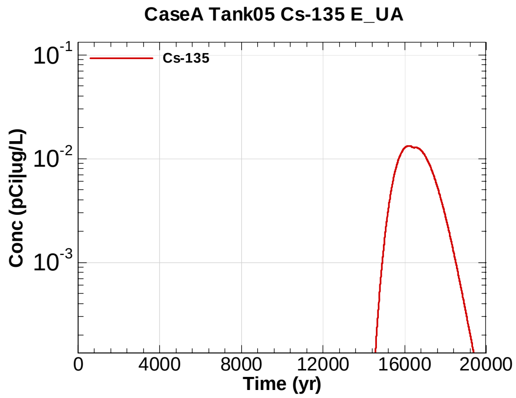

Figure E-335 - 100m Aquifer Concentration for CaseA Tank05 Cs-135 E_UA

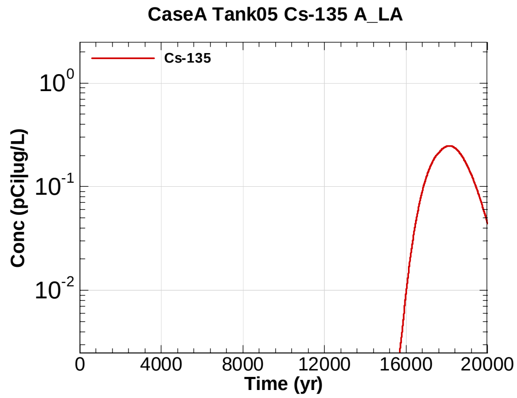

Figure E-336 - 100m Aquifer Concentration for CaseA Tank05 Cs-135 A_LA

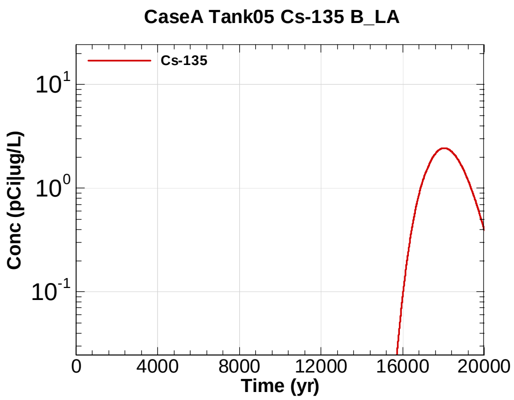

Figure E-337 - 100m Aquifer Concentration for CaseA Tank05 Cs-135 B_LA

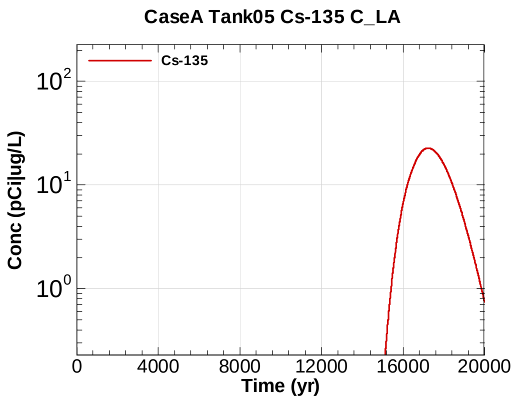

Figure E-338 - 100m Aquifer Concentration for CaseA Tank05 Cs-135 C_LA

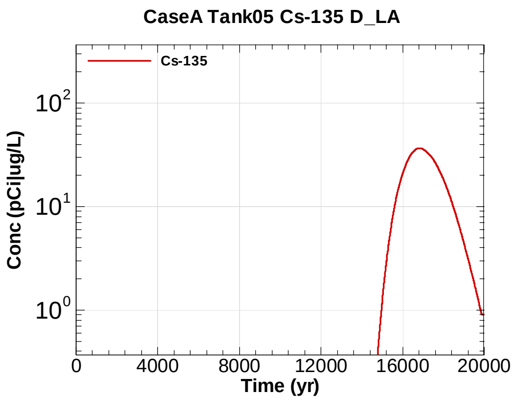

Figure E-339 - 100m Aquifer Concentration for CaseA Tank05 Cs-135 D_LA

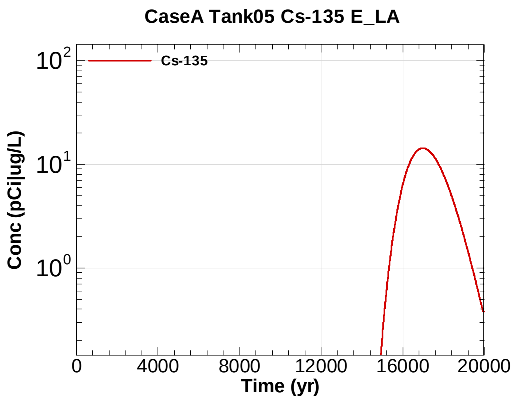

Figure E-340 - 100m Aquifer Concentration for CaseA Tank05 Cs-135 E_LA

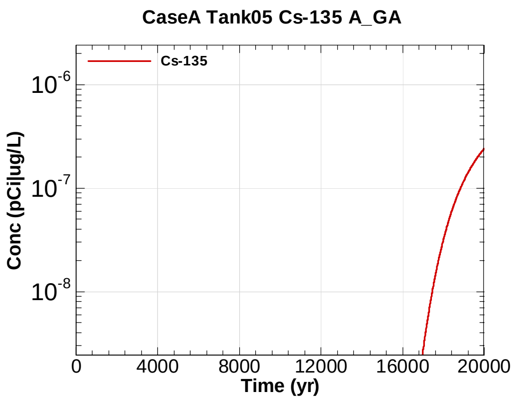

Figure E-341 - 100m Aquifer Concentration for CaseA Tank05 Cs-135 A_GA

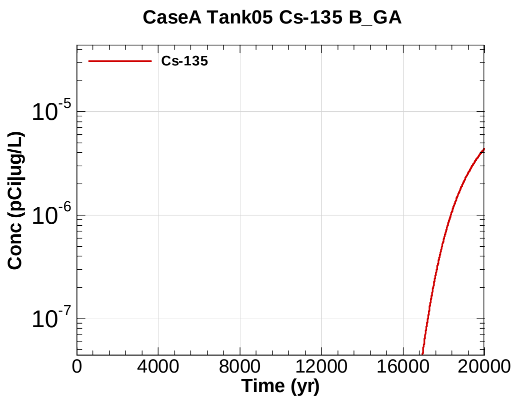

Figure E-342 - 100m Aquifer Concentration for CaseA Tank05 Cs-135 B_GA

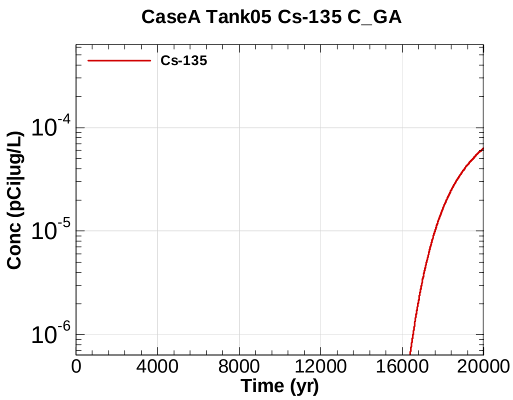

Figure E-343 - 100m Aquifer Concentration for CaseA Tank05 Cs-135 C_GA

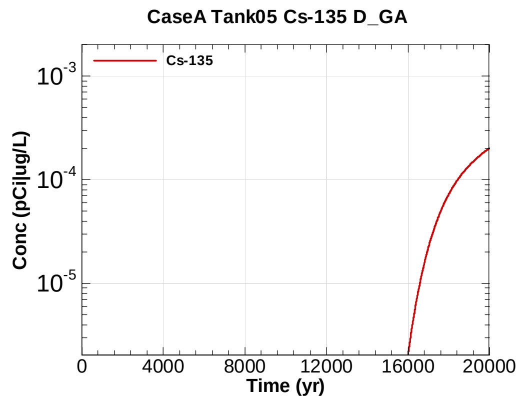

Figure E-344 - 100m Aquifer Concentration for CaseA Tank05 Cs-135 D_GA

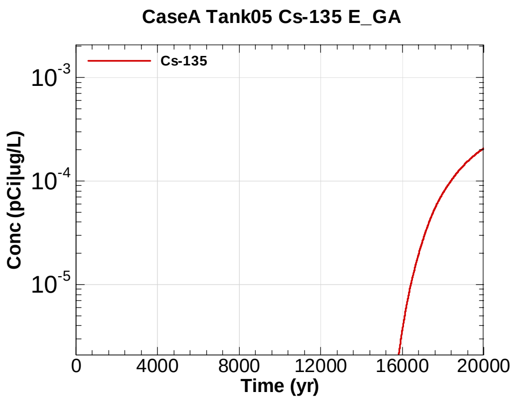

Figure E-345 - 100m Aquifer Concentration for CaseA Tank05 Cs-135 E_GA

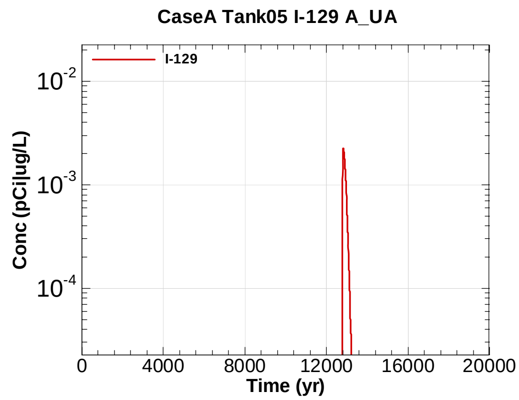

Figure E-346 - 100m Aquifer Concentration for CaseA Tank05 I-129 A_UA

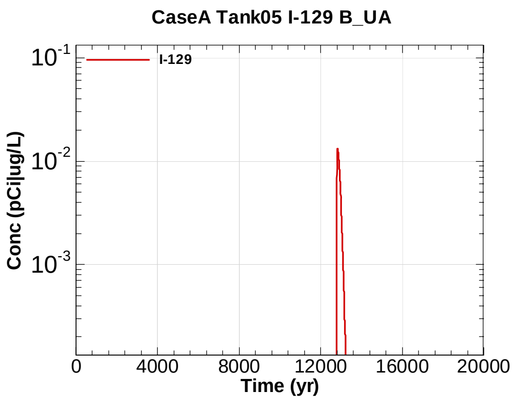

Figure E-347 - 100m Aquifer Concentration for CaseA Tank05 I-129 B_UA

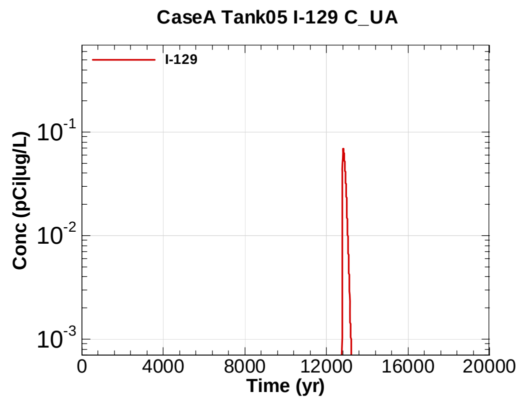

Figure E-348 - 100m Aquifer Concentration for CaseA Tank05 I-129 C_UA

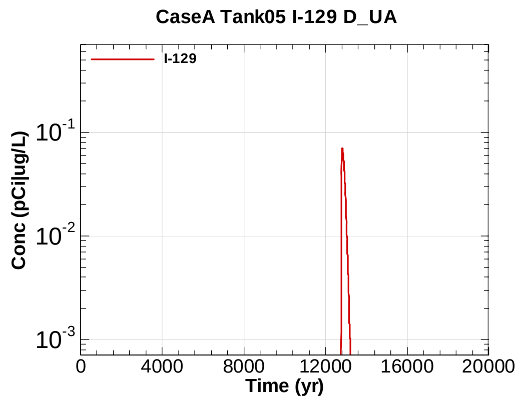

Figure E-349 - 100m Aquifer Concentration for CaseA Tank05 I-129 D_UA

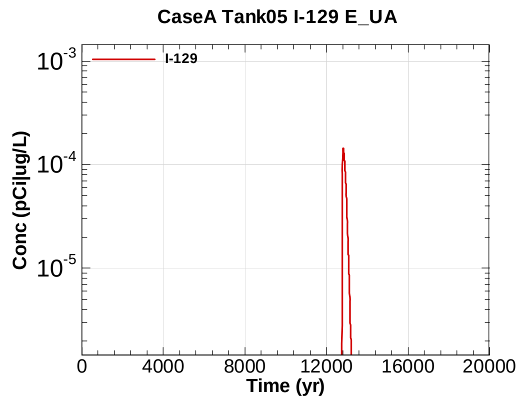

Figure E-350 - 100m Aquifer Concentration for CaseA Tank05 I-129 E_UA

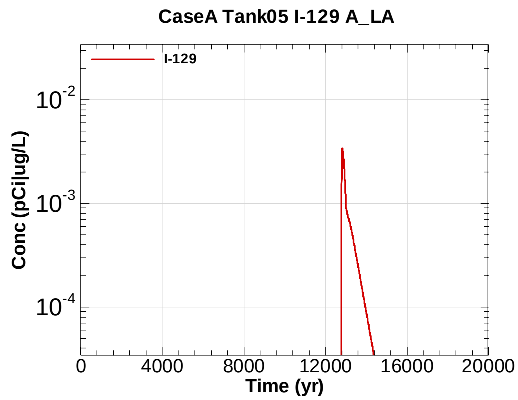

Figure E-351 - 100m Aquifer Concentration for CaseA Tank05 I-129 A_LA

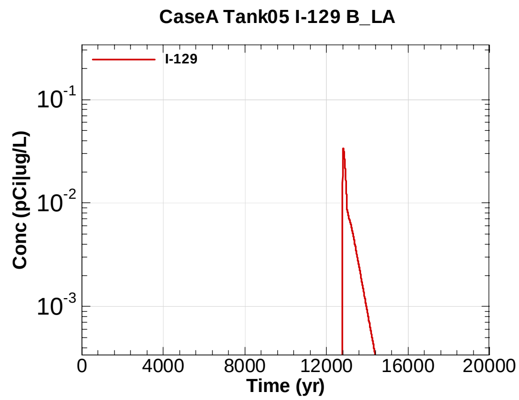

Figure E-352 - 100m Aquifer Concentration for CaseA Tank05 I-129 B_LA

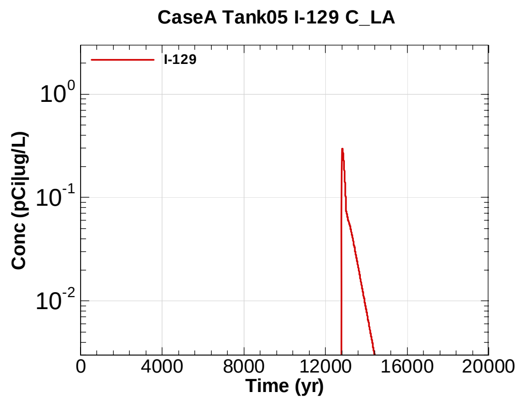

Figure E-353 - 100m Aquifer Concentration for CaseA Tank05 I-129 C_LA

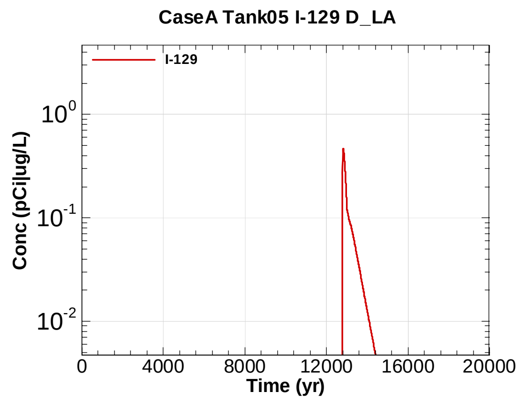

Figure E-354 - 100m Aquifer Concentration for CaseA Tank05 I-129 D_LA

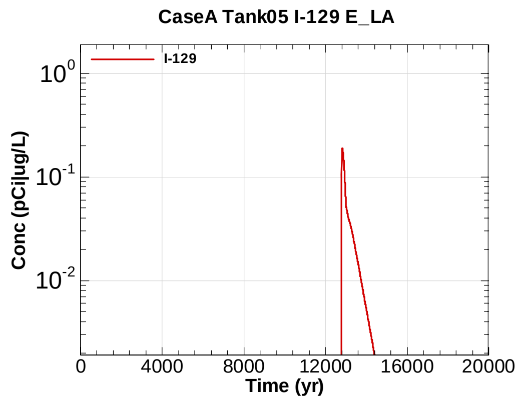

Figure E-355 - 100m Aquifer Concentration for CaseA Tank05 I-129 E_LA

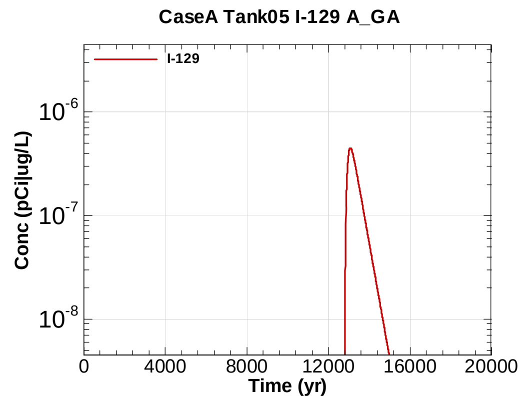

Figure E-356 - 100m Aquifer Concentration for CaseA Tank05 I-129 A_GA

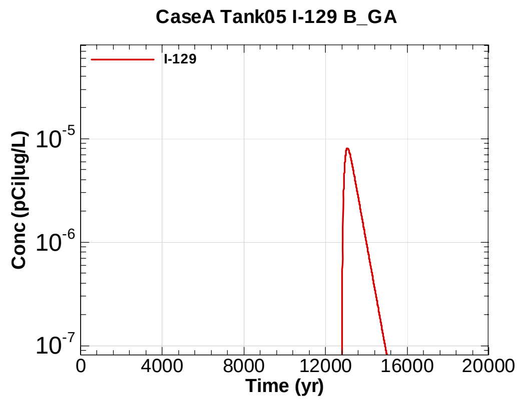

Figure E-357 - 100m Aquifer Concentration for CaseA Tank05 I-129 B_GA

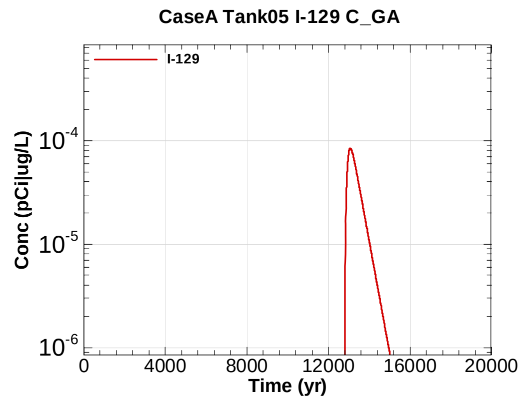

Figure E-358 - 100m Aquifer Concentration for CaseA Tank05 I-129 C_GA

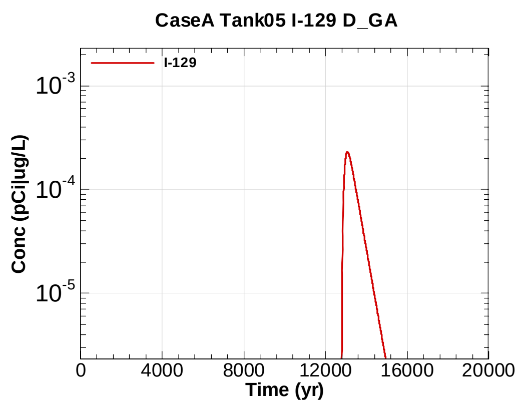

Figure E-359 - 100m Aquifer Concentration for CaseA Tank05 I-129 D_GA

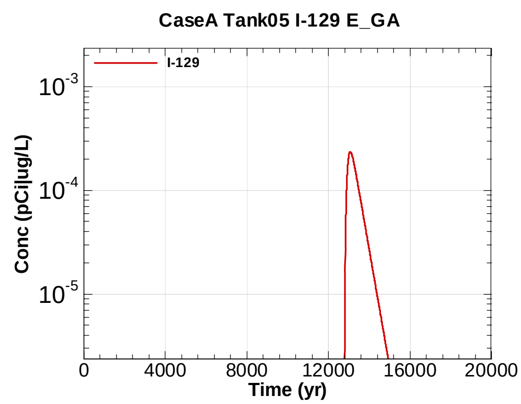

Figure E-360 - 100m Aquifer Concentration for CaseA Tank05 I-129 E_GA

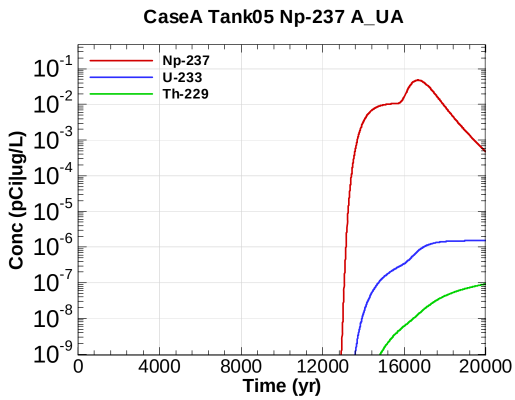

Figure E-361 - 100m Aquifer Concentration for CaseA Tank05 Np-237 A_UA

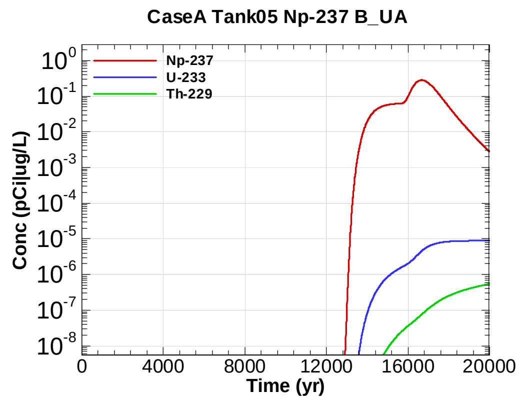

Figure E-362 - 100m Aquifer Concentration for CaseA Tank05 Np-237 B_UA

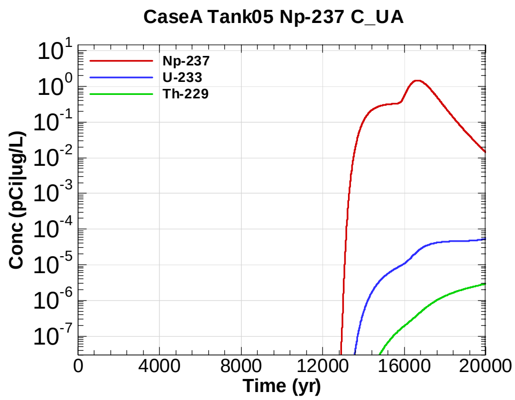

Figure E-363 - 100m Aquifer Concentration for CaseA Tank05 Np-237 C_UA

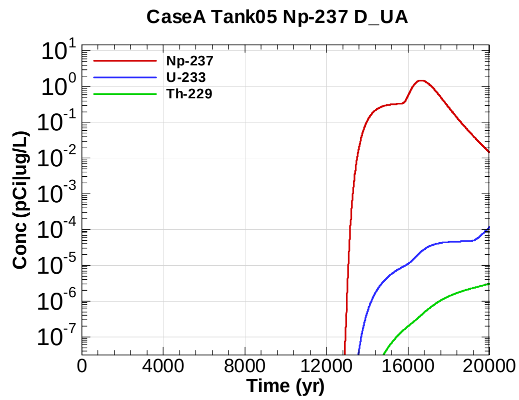

Figure E-364 - 100m Aquifer Concentration for CaseA Tank05 Np-237 D_UA

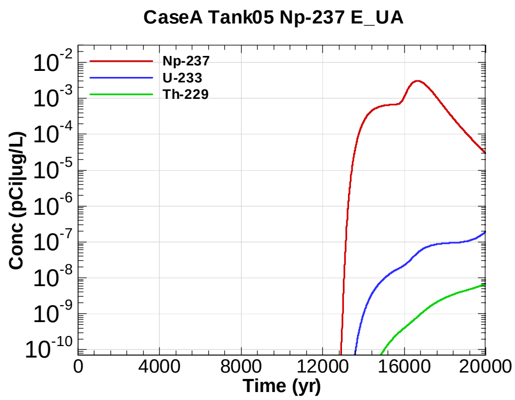

Figure E-365 - 100m Aquifer Concentration for CaseA Tank05 Np-237 E_UA

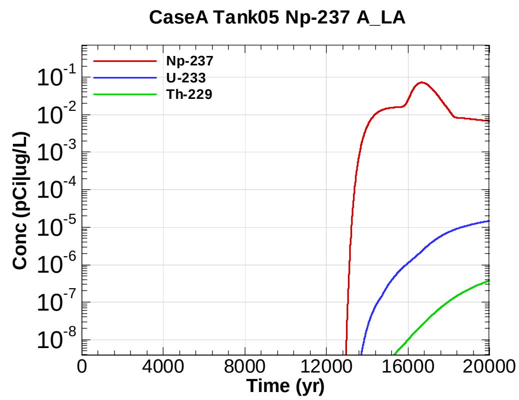

Figure E-366 - 100m Aquifer Concentration for CaseA Tank05 Np-237 A_LA

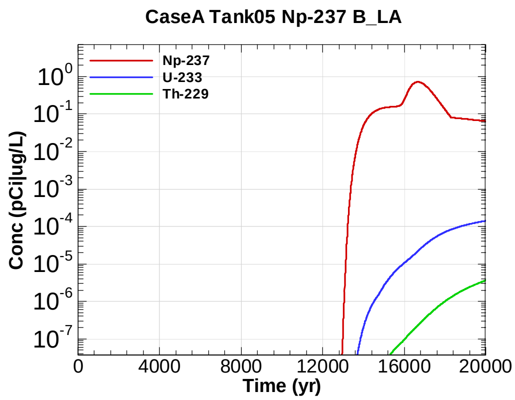

Figure E-367 - 100m Aquifer Concentration for CaseA Tank05 Np-237 B_LA

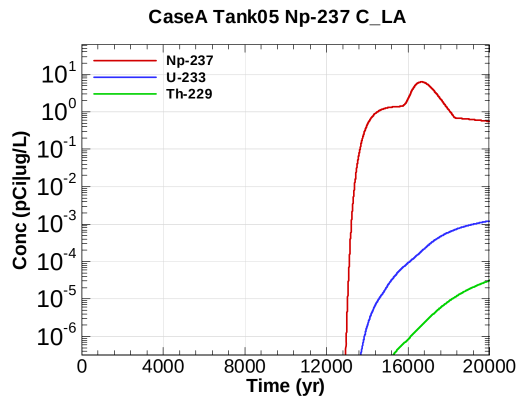

Figure E-368 - 100m Aquifer Concentration for CaseA Tank05 Np-237 C_LA

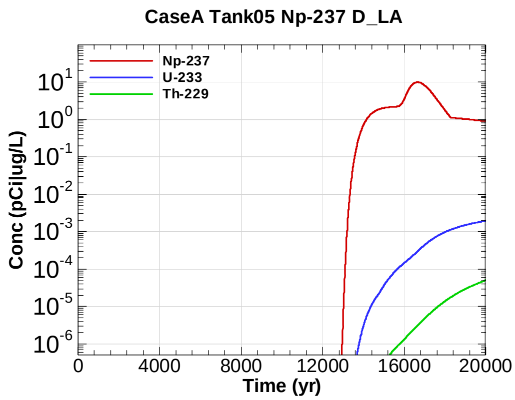

Figure E-369 - 100m Aquifer Concentration for CaseA Tank05 Np-237 D_LA

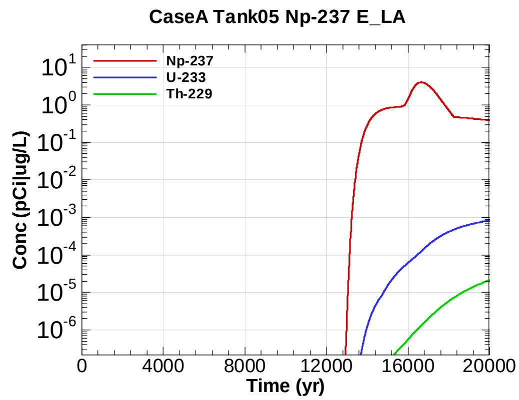

Figure E-370 - 100m Aquifer Concentration for CaseA Tank05 Np-237 E_LA

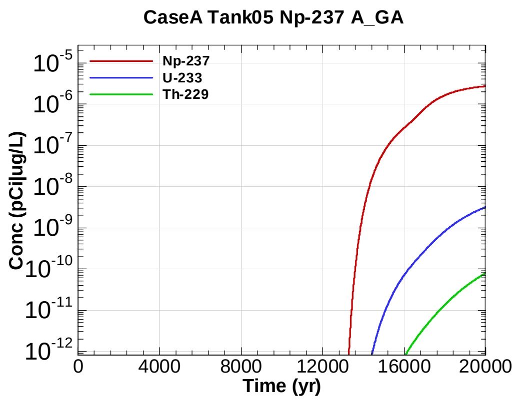

Figure E-371 - 100m Aquifer Concentration for CaseA Tank05 Np-237 A_GA

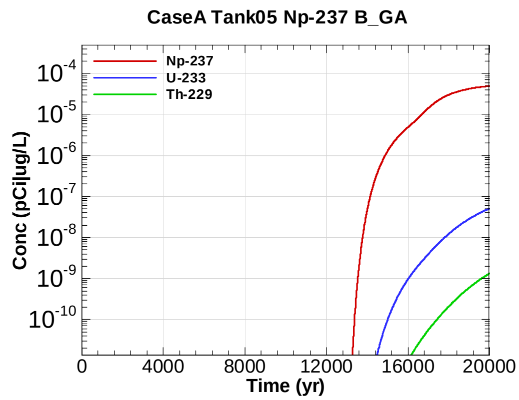

Figure E-372 - 100m Aquifer Concentration for CaseA Tank05 Np-237 B_GA

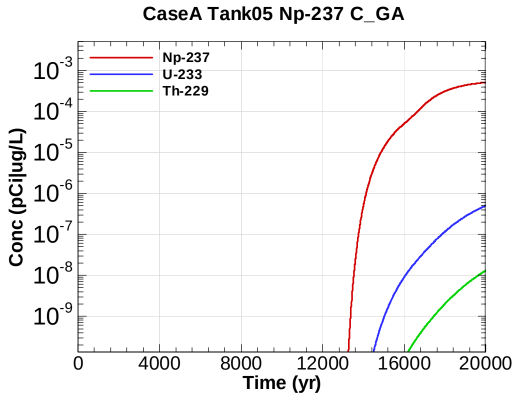

Figure E-373 - 100m Aquifer Concentration for CaseA Tank05 Np-237 C_GA

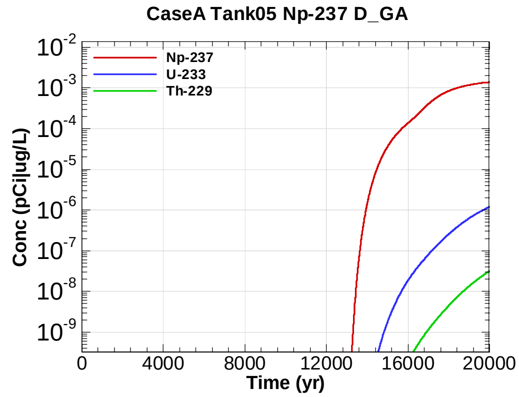

Figure E-374 - 100m Aquifer Concentration for CaseA Tank05 Np-237 D_GA

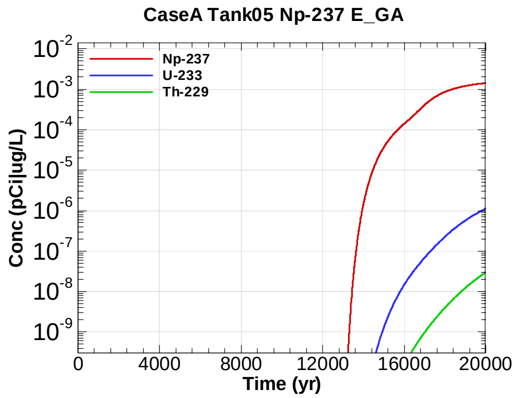

Figure E-375 - 100m Aquifer Concentration for CaseA Tank05 Np-237 E_GA

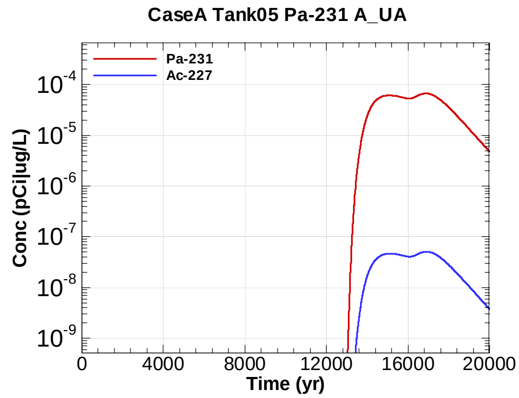

Figure E-376 - 100m Aquifer Concentration for CaseA Tank05 Pa-231 A_UA

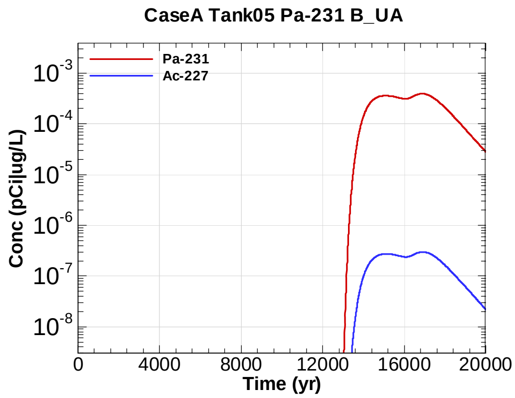

Figure E-377 - 100m Aquifer Concentration for CaseA Tank05 Pa-231 B_UA

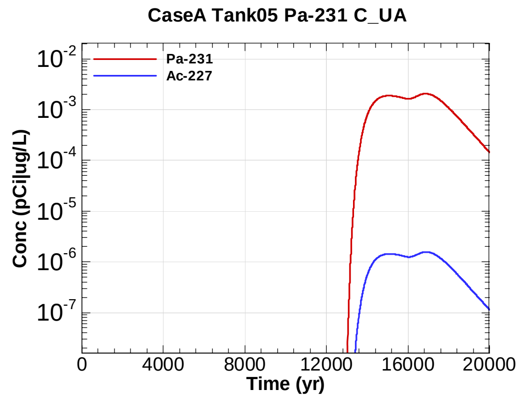

Figure E-378 - 100m Aquifer Concentration for CaseA Tank05 Pa-231 C_UA

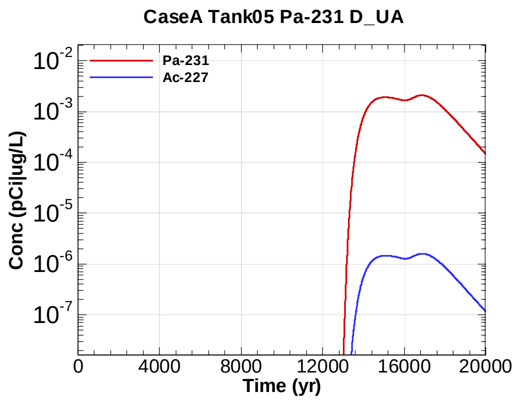

Figure E-379 - 100m Aquifer Concentration for CaseA Tank05 Pa-231 D_UA

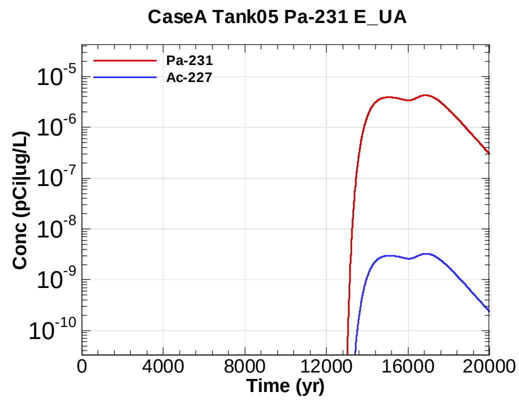

Figure E-380 - 100m Aquifer Concentration for CaseA Tank05 Pa-231 E_UA

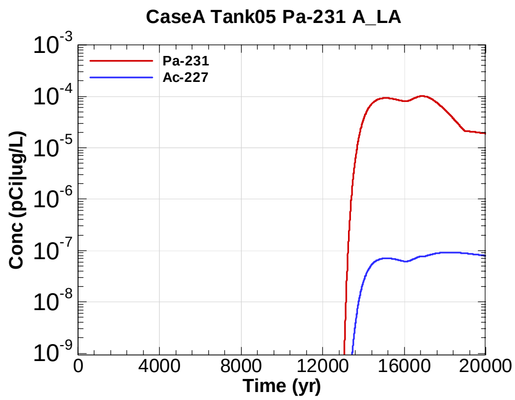

Figure E-381 - 100m Aquifer Concentration for CaseA Tank05 Pa-231 A_LA

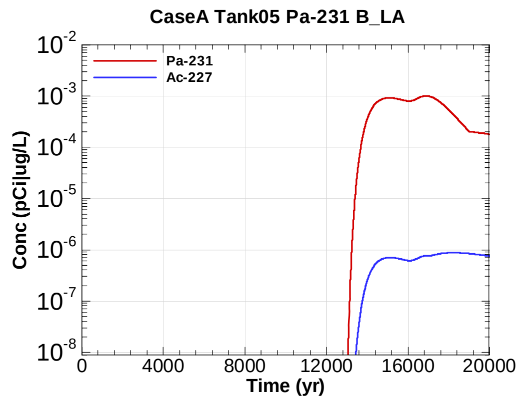

Figure E-382 - 100m Aquifer Concentration for CaseA Tank05 Pa-231 B_LA

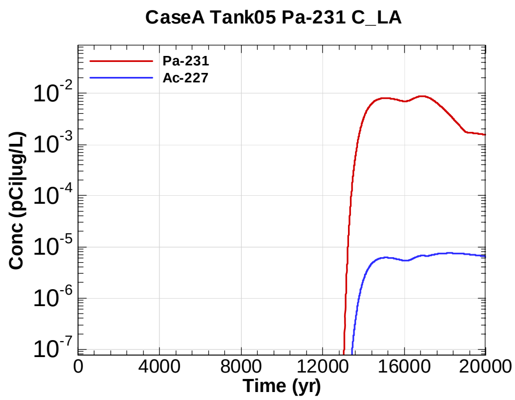

Figure E-383 - 100m Aquifer Concentration for CaseA Tank05 Pa-231 C_LA

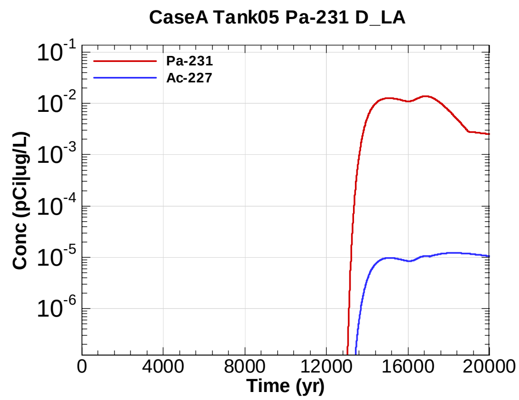

Figure E-384 - 100m Aquifer Concentration for CaseA Tank05 Pa-231 D_LA

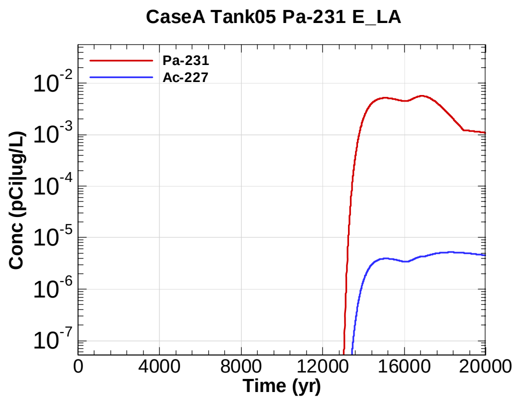

Figure E-385 - 100m Aquifer Concentration for CaseA Tank05 Pa-231 E_LA

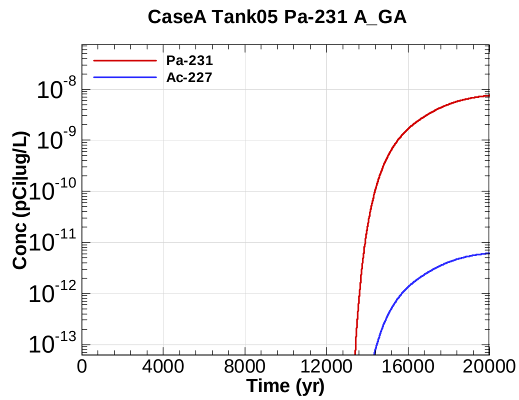

Figure E-386 - 100m Aquifer Concentration for CaseA Tank05 Pa-231 A_GA

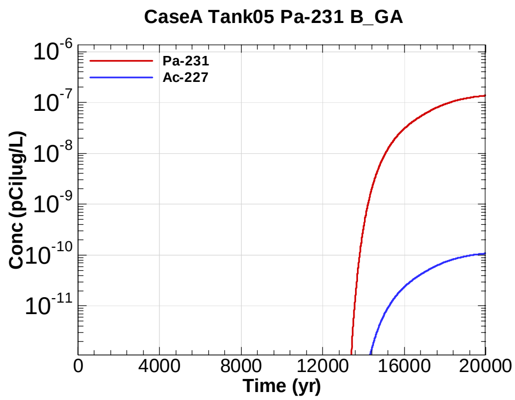

Figure E-387 - 100m Aquifer Concentration for CaseA Tank05 Pa-231 B_GA

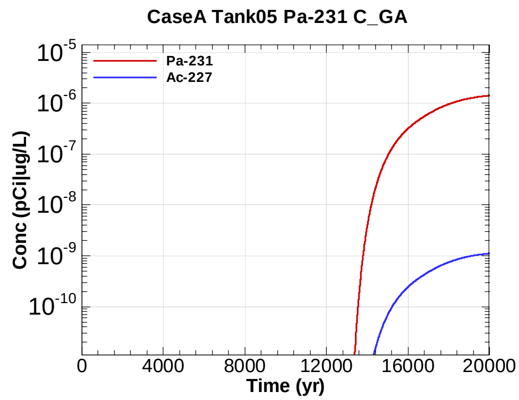

Figure E-388 - 100m Aquifer Concentration for CaseA Tank05 Pa-231 C_GA

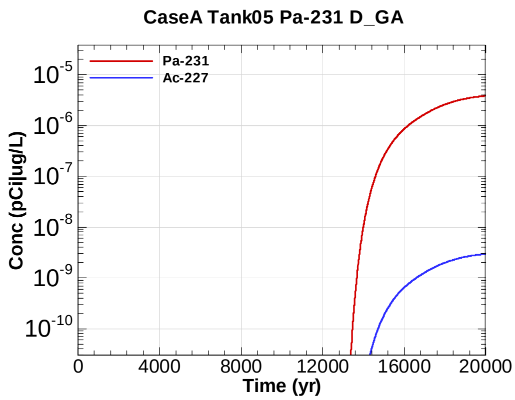

Figure E-389 - 100m Aquifer Concentration for CaseA Tank05 Pa-231 D_GA

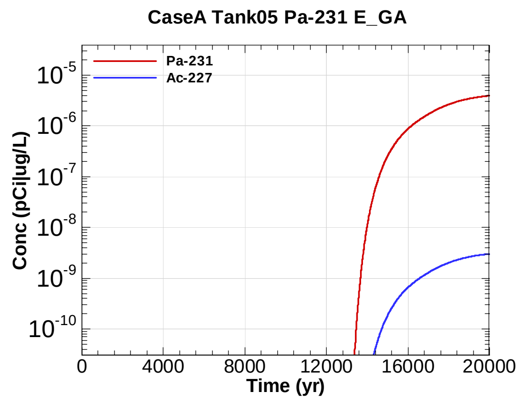

Figure E-390 - 100m Aquifer Concentration for CaseA Tank05 Pa-231 E_GA

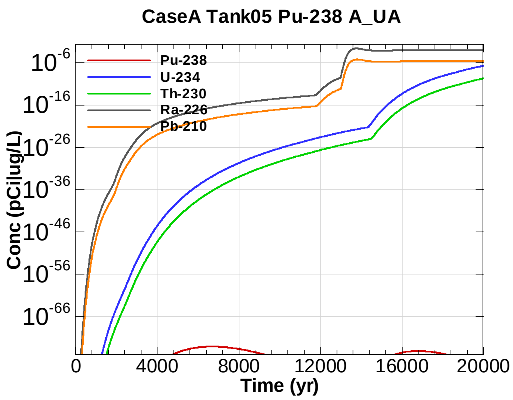

Figure E-391 - 100m Aquifer Concentration for CaseA Tank05 Pu-238 A_UA

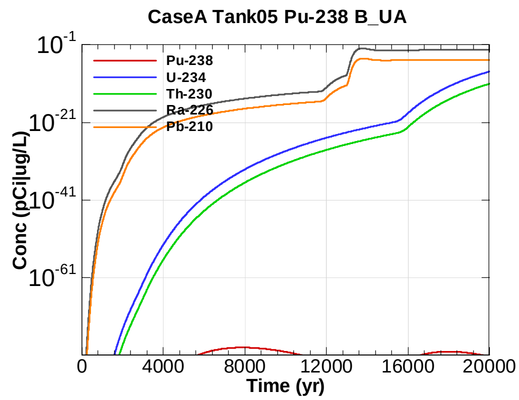

Figure E-392 - 100m Aquifer Concentration for CaseA Tank05 Pu-238 B_UA

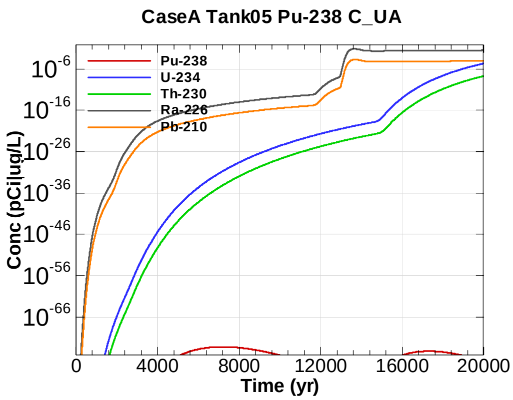

Figure E-393 - 100m Aquifer Concentration for CaseA Tank05 Pu-238 C_UA

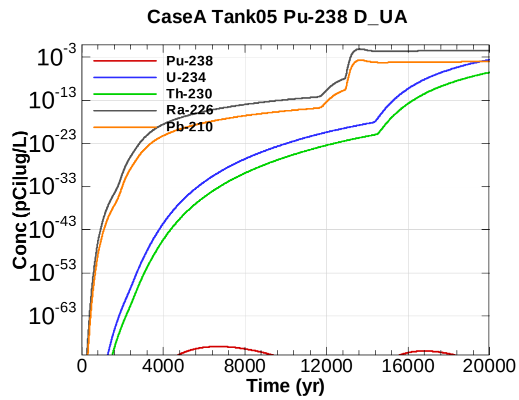

Figure E-394 - 100m Aquifer Concentration for CaseA Tank05 Pu-238 D_UA

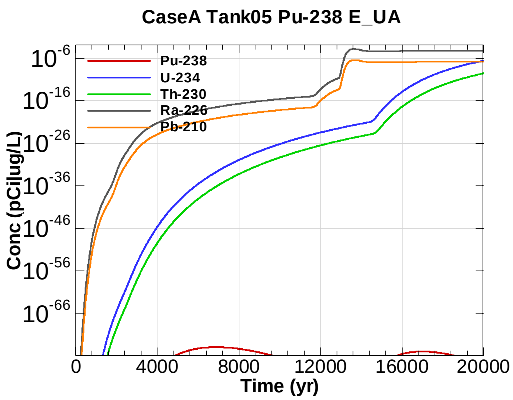

Figure E-395 - 100m Aquifer Concentration for CaseA Tank05 Pu-238 E_UA

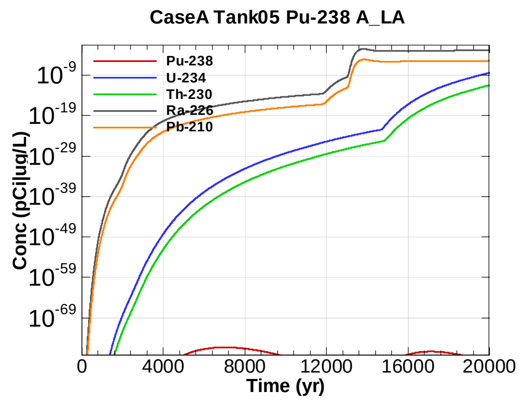

Figure E-396 - 100m Aquifer Concentration for CaseA Tank05 Pu-238 A_LA

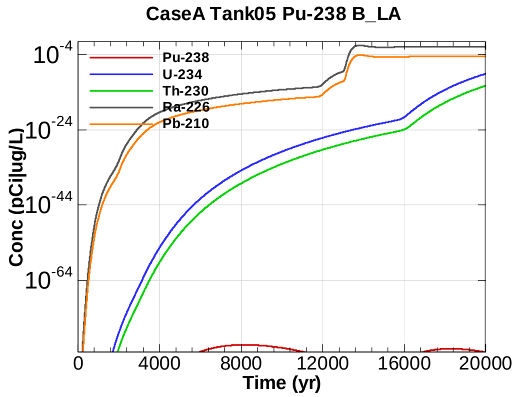

Figure E-397 - 100m Aquifer Concentration for CaseA Tank05 Pu-238 B_LA

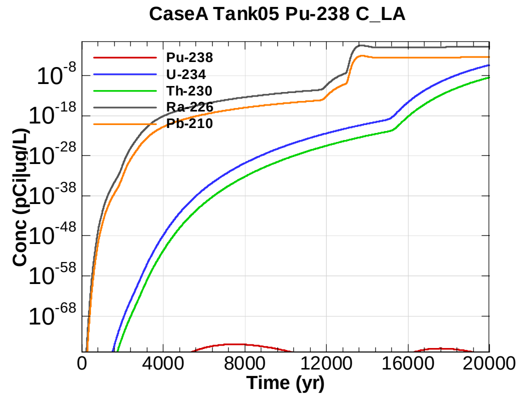

Figure E-398 - 100m Aquifer Concentration for CaseA Tank05 Pu-238 C_LA

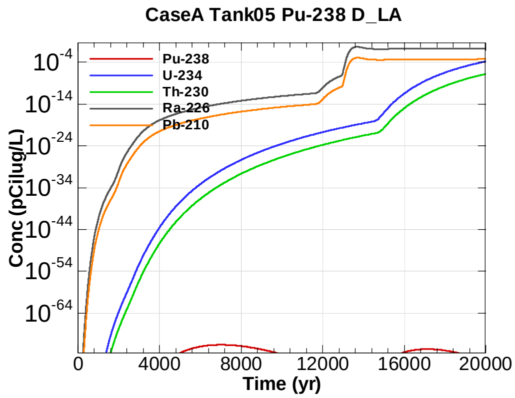

Figure E-399 - 100m Aquifer Concentration for CaseA Tank05 Pu-238 D_LA

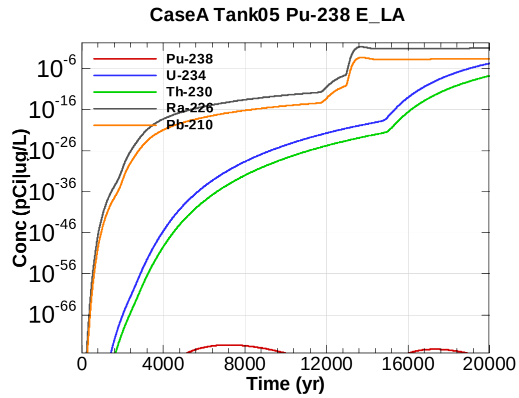

Figure E-400 - 100m Aquifer Concentration for CaseA Tank05 Pu-238 E_LA

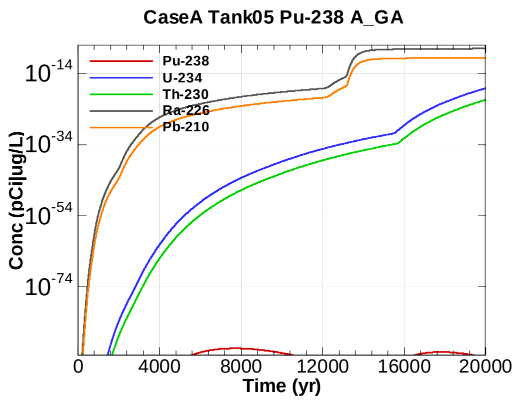

Figure E-401 - 100m Aquifer Concentration for CaseA Tank05 Pu-238 A_GA

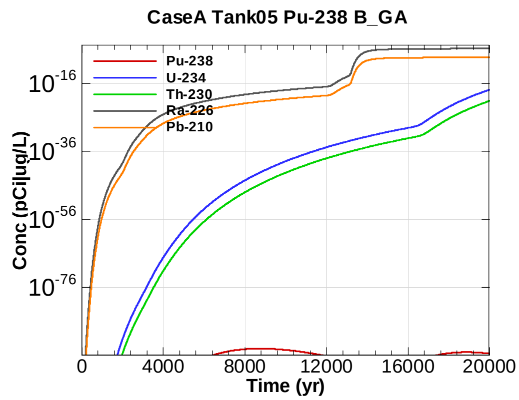

Figure E-402 - 100m Aquifer Concentration for CaseA Tank05 Pu-238 B_GA

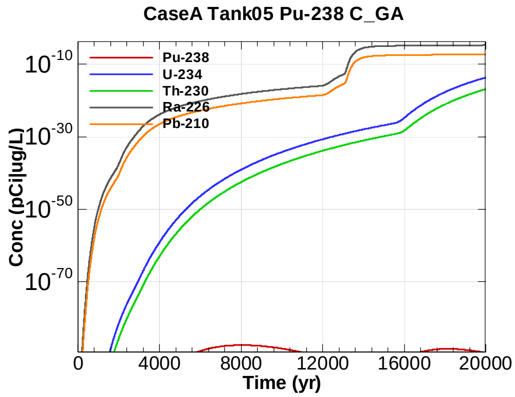

Figure E-403 - 100m Aquifer Concentration for CaseA Tank05 Pu-238 C_GA

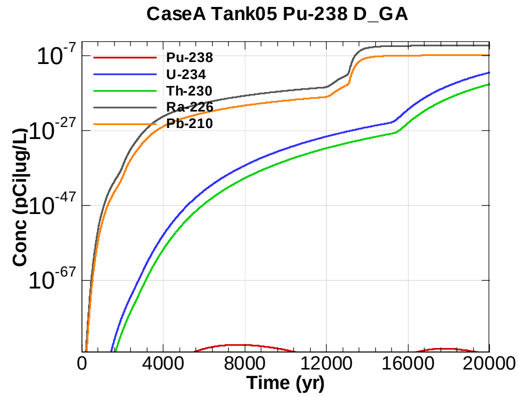

Figure E-404 - 100m Aquifer Concentration for CaseA Tank05 Pu-238 D_GA

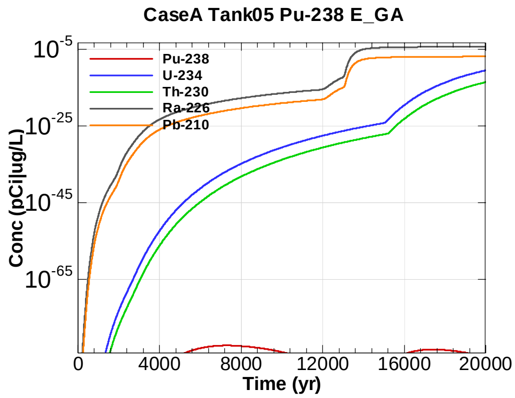

Figure E-405 - 100m Aquifer Concentration for CaseA Tank05 Pu-238 E_GA

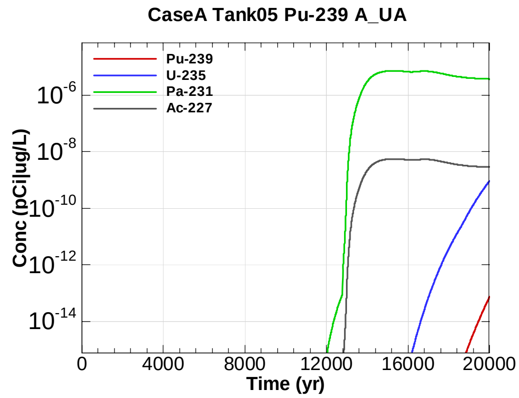

Figure E-406 - 100m Aquifer Concentration for CaseA Tank05 Pu-239 A_UA

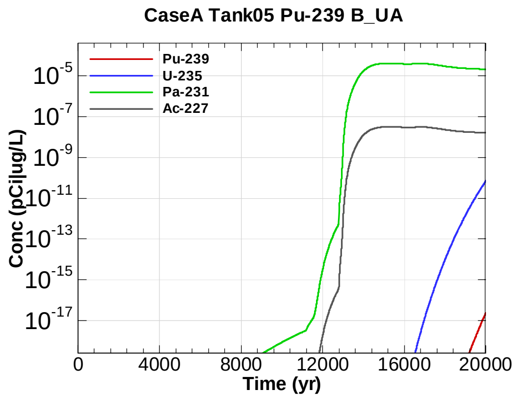

Figure E-407 - 100m Aquifer Concentration for CaseA Tank05 Pu-239 B_UA

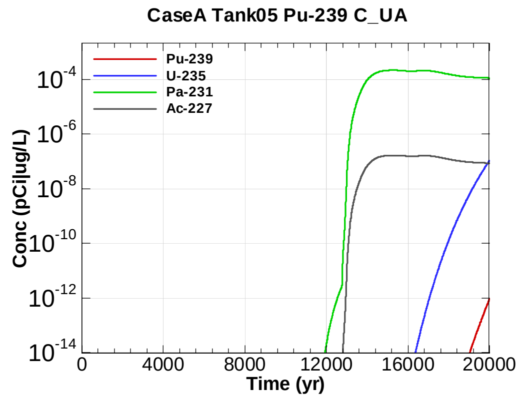

Figure E-408 - 100m Aquifer Concentration for CaseA Tank05 Pu-239 C_UA

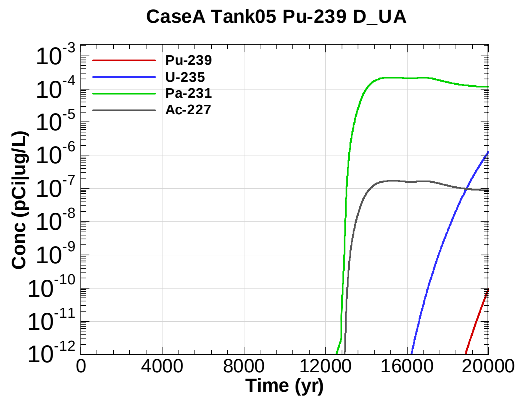

Figure E-409 - 100m Aquifer Concentration for CaseA Tank05 Pu-239 D_UA

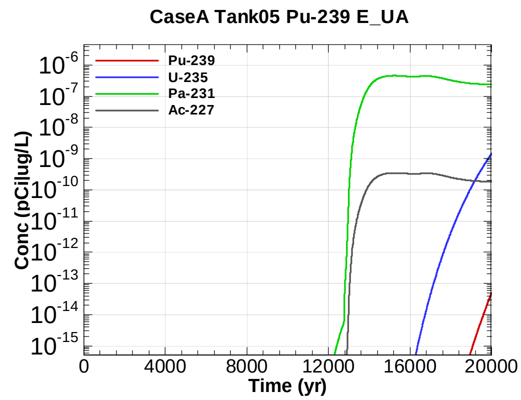

Figure E-410 - 100m Aquifer Concentration for CaseA Tank05 Pu-239 E_UA

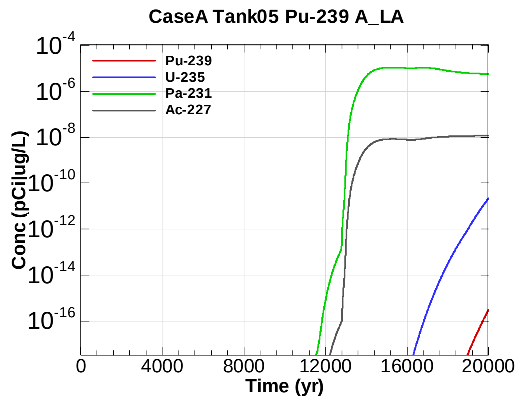

Figure E-411 - 100m Aquifer Concentration for CaseA Tank05 Pu-239 A_LA

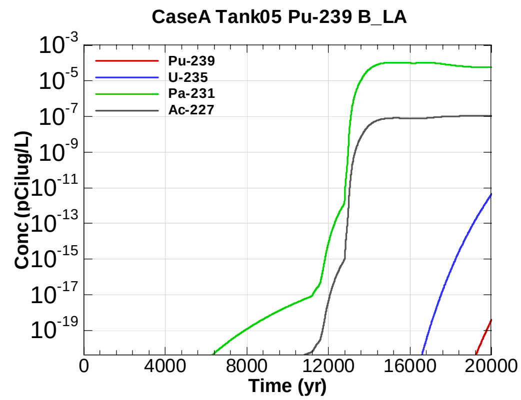

Figure E-412 - 100m Aquifer Concentration for CaseA Tank05 Pu-239 B_LA

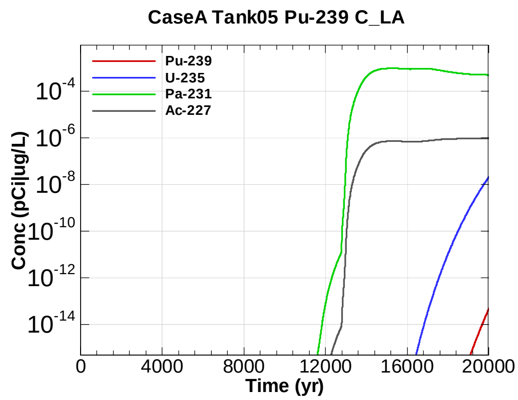

Figure E-413 - 100m Aquifer Concentration for CaseA Tank05 Pu-239 C_LA

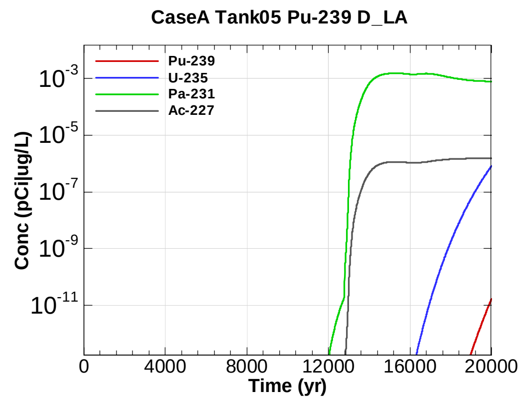

Figure E-414 - 100m Aquifer Concentration for CaseA Tank05 Pu-239 D_LA

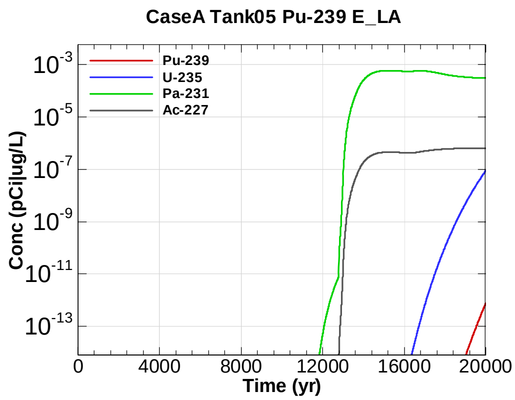

Figure E-415 - 100m Aquifer Concentration for CaseA Tank05 Pu-239 E_LA

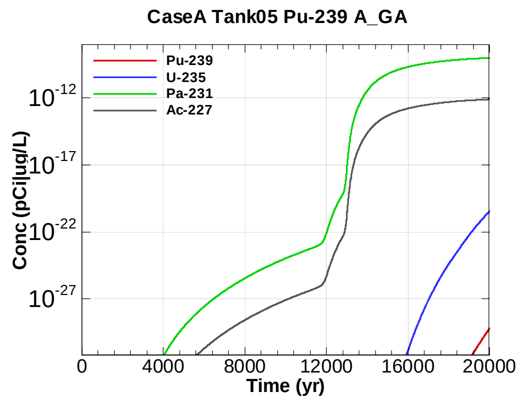

Figure E-416 - 100m Aquifer Concentration for CaseA Tank05 Pu-239 A_GA

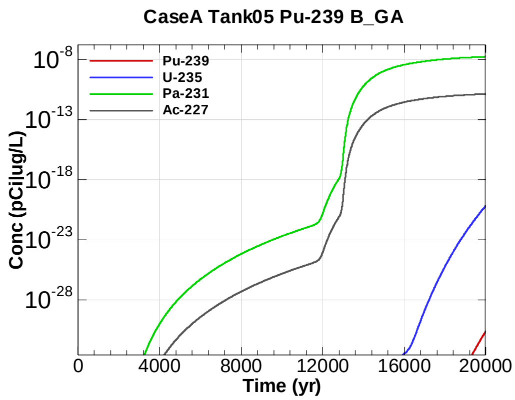

Figure E-417 - 100m Aquifer Concentration for CaseA Tank05 Pu-239 B_GA

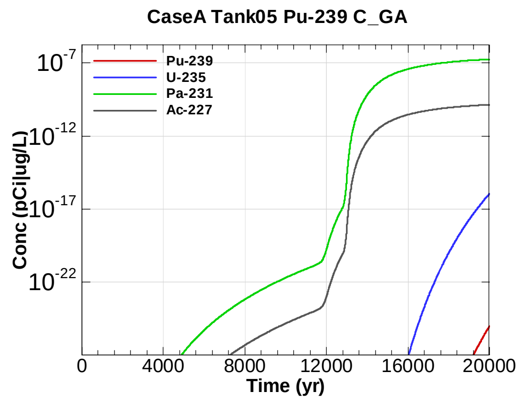

Figure E-418 - 100m Aquifer Concentration for CaseA Tank05 Pu-239 C_GA

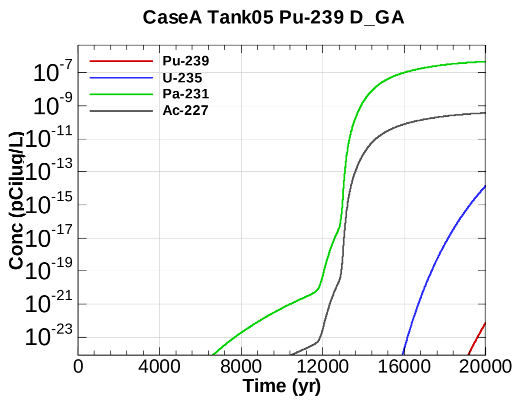

Figure E-419 - 100m Aquifer Concentration for CaseA Tank05 Pu-239 D_GA

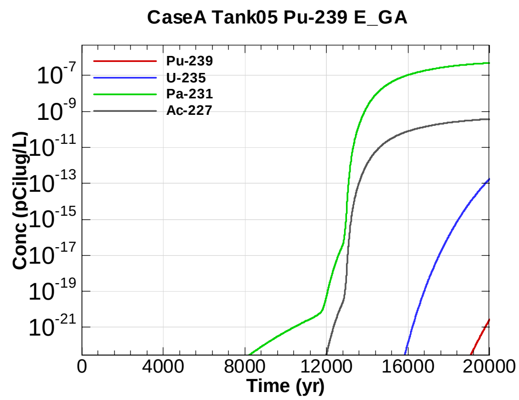

Figure E-420 - 100m Aquifer Concentration for CaseA Tank05 Pu-239 E_GA

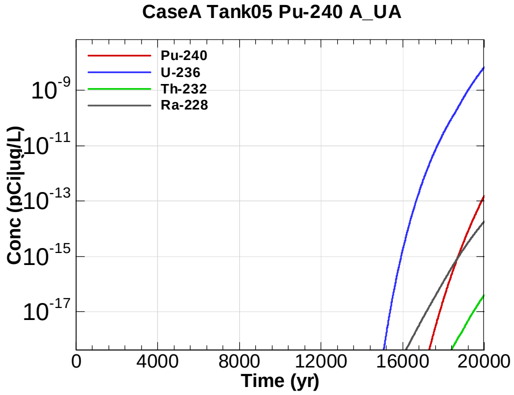

Figure E-421 - 100m Aquifer Concentration for CaseA Tank05 Pu-240 A_UA

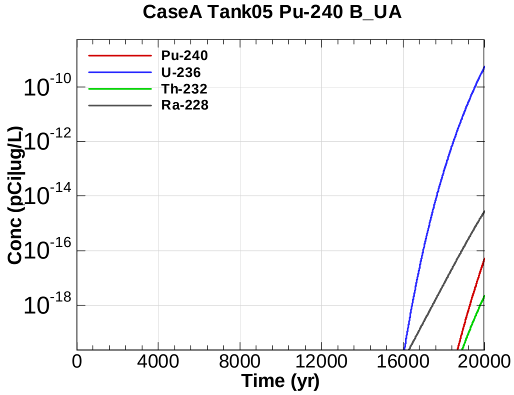

Figure E-422 - 100m Aquifer Concentration for CaseA Tank05 Pu-240 B_UA

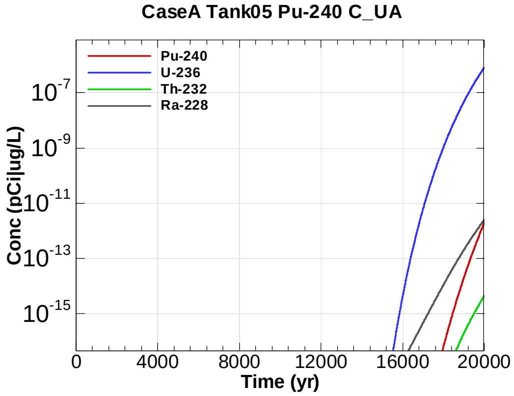

Figure E-423 - 100m Aquifer Concentration for CaseA Tank05 Pu-240 C_UA

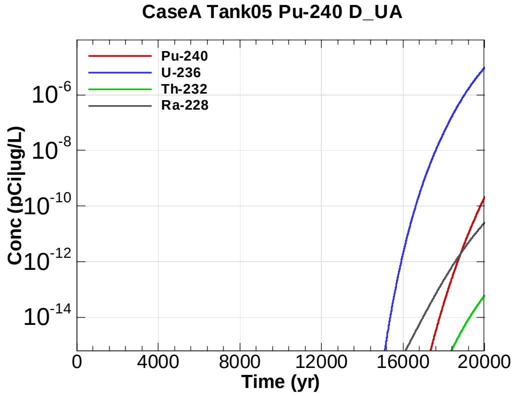

Figure E-424 - 100m Aquifer Concentration for CaseA Tank05 Pu-240 D_UA

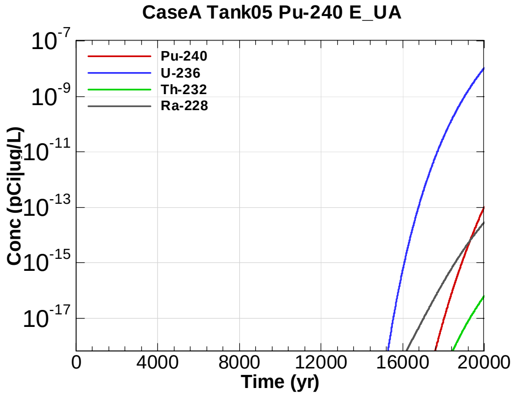

Figure E-425 - 100m Aquifer Concentration for CaseA Tank05 Pu-240 E_UA

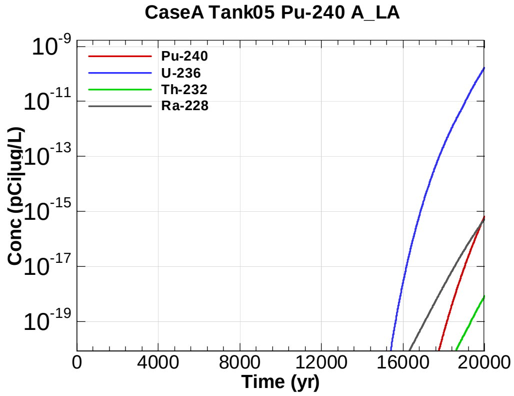

Figure E-426 - 100m Aquifer Concentration for CaseA Tank05 Pu-240 A_LA

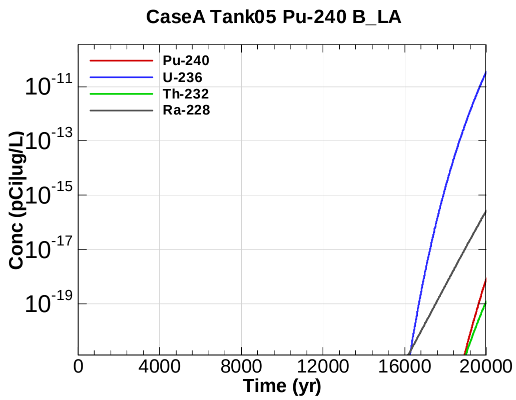

Figure E-427 - 100m Aquifer Concentration for CaseA Tank05 Pu-240 B_LA

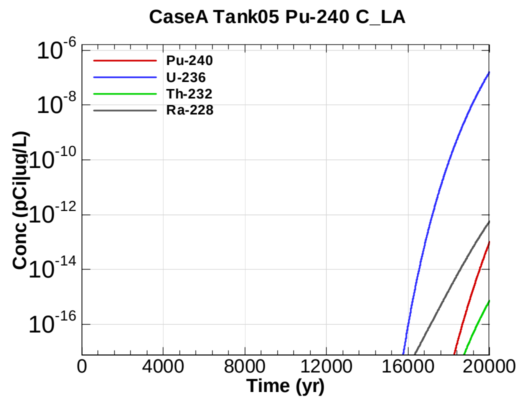

Figure E-428 - 100m Aquifer Concentration for CaseA Tank05 Pu-240 C_LA

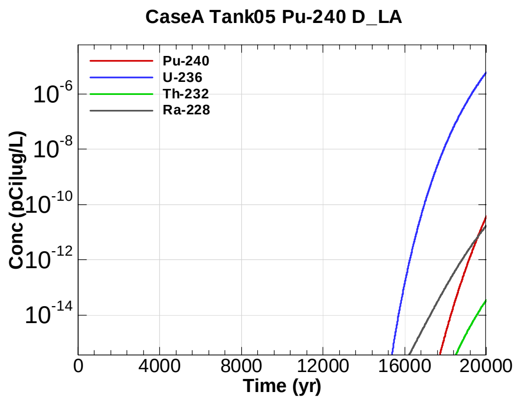

Figure E-429 - 100m Aquifer Concentration for CaseA Tank05 Pu-240 D_LA

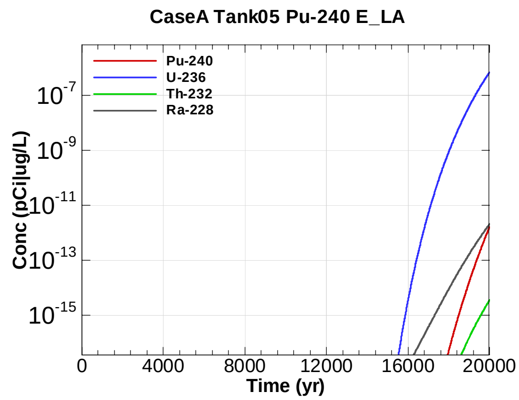

Figure E-430 - 100m Aquifer Concentration for CaseA Tank05 Pu-240 E_LA

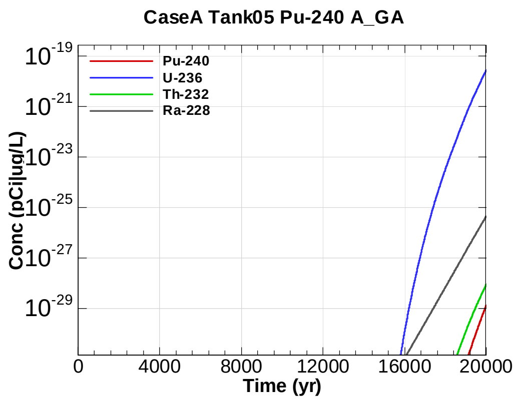

Figure E-431 - 100m Aquifer Concentration for CaseA Tank05 Pu-240 A_GA

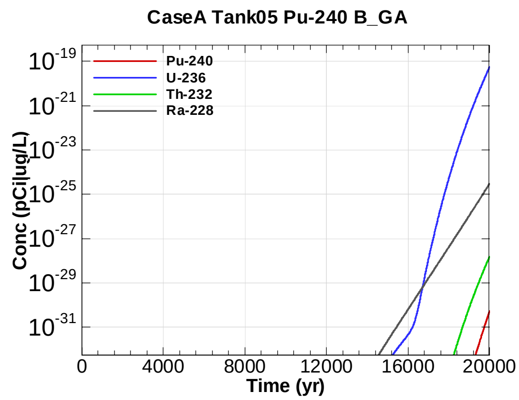

Figure E-432 - 100m Aquifer Concentration for CaseA Tank05 Pu-240 B_GA

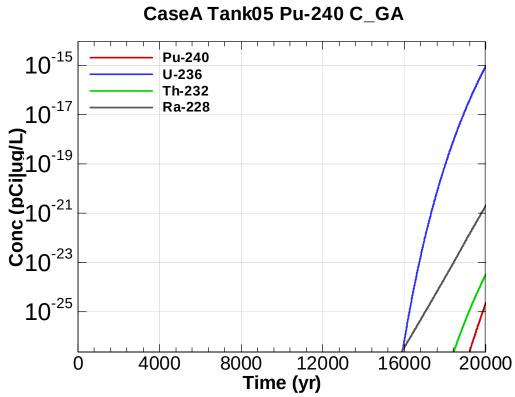

Figure E-433 - 100m Aquifer Concentration for CaseA Tank05 Pu-240 C_GA

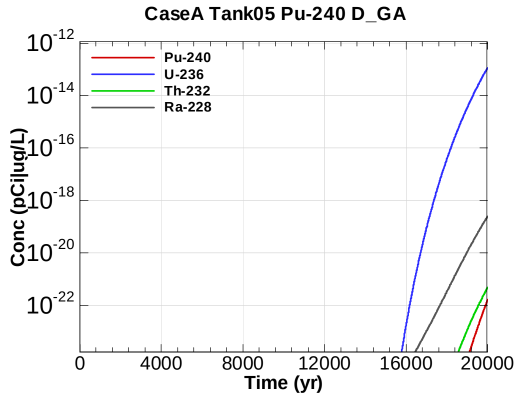

Figure E-434 - 100m Aquifer Concentration for CaseA Tank05 Pu-240 D_GA

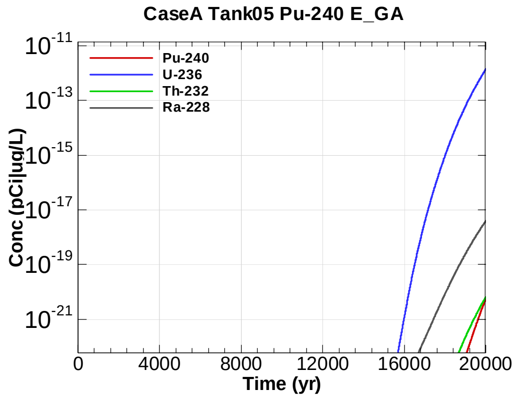

Figure E-435 - 100m Aquifer Concentration for CaseA Tank05 Pu-240 E_GA

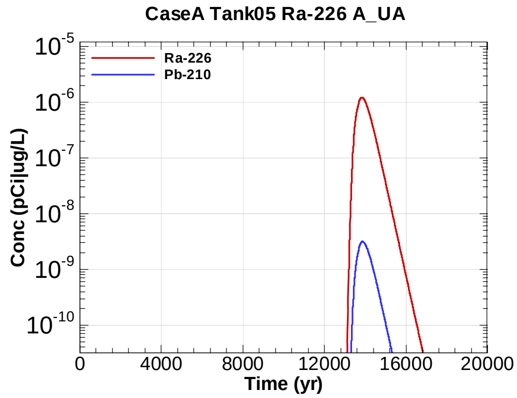

Figure E-436 - 100m Aquifer Concentration for CaseA Tank05 Ra-226 A_UA

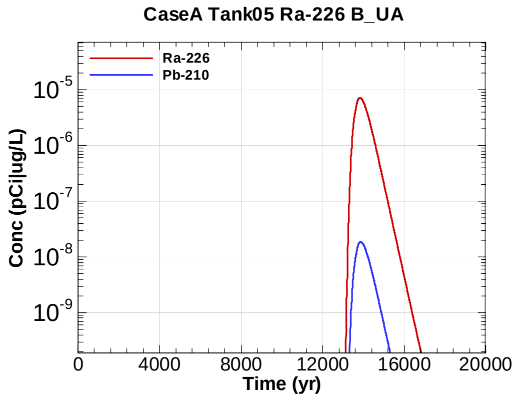

Figure E-437 - 100m Aquifer Concentration for CaseA Tank05 Ra-226 B_UA

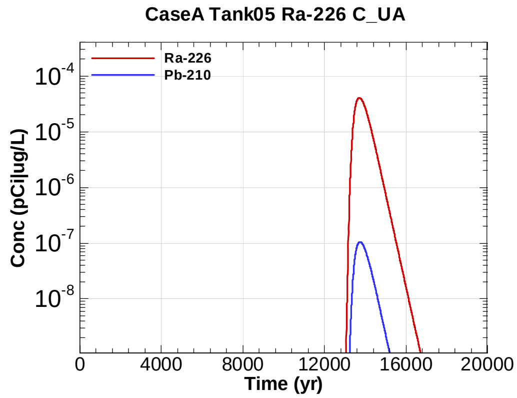

Figure E-438 - 100m Aquifer Concentration for CaseA Tank05 Ra-226 C_UA

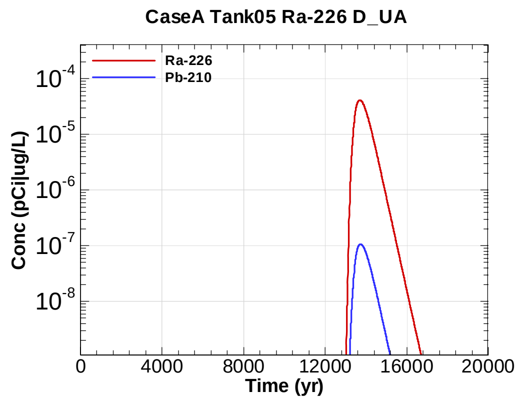

Figure E-439 - 100m Aquifer Concentration for CaseA Tank05 Ra-226 D_UA

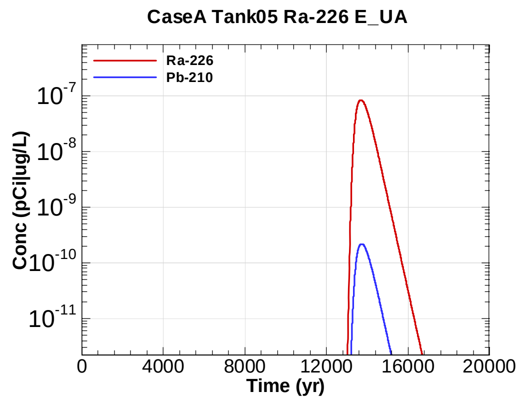

Figure E-440 - 100m Aquifer Concentration for CaseA Tank05 Ra-226 E_UA

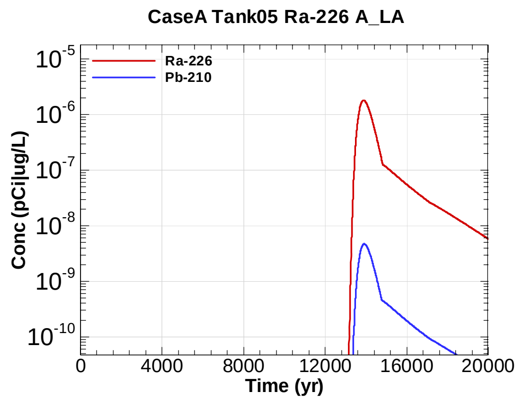

Figure E-441 - 100m Aquifer Concentration for CaseA Tank05 Ra-226 A_LA

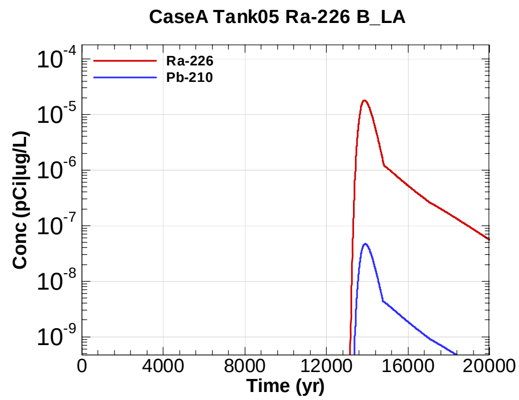

Figure E-442 - 100m Aquifer Concentration for CaseA Tank05 Ra-226 B_LA

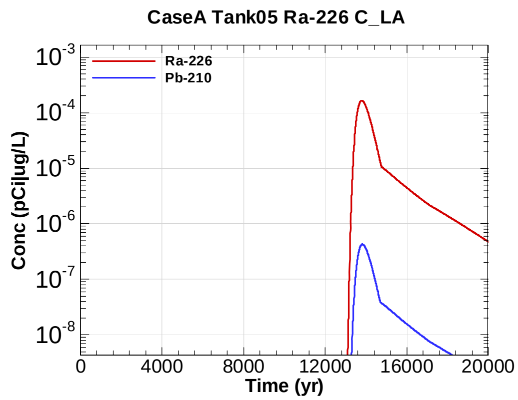

Figure E-443 - 100m Aquifer Concentration for CaseA Tank05 Ra-226 C_LA

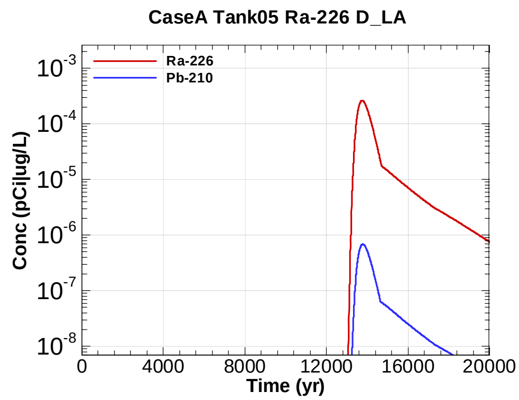

Figure E-444 - 100m Aquifer Concentration for CaseA Tank05 Ra-226 D_LA

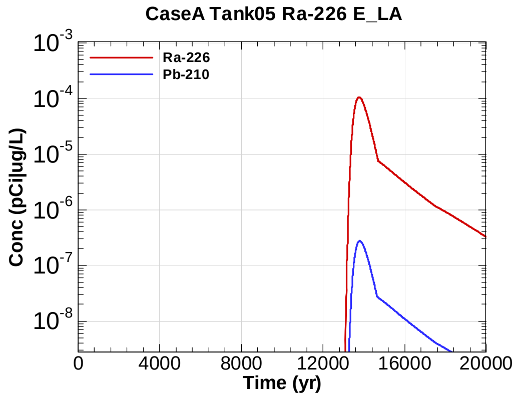

Figure E-445 - 100m Aquifer Concentration for CaseA Tank05 Ra-226 E_LA

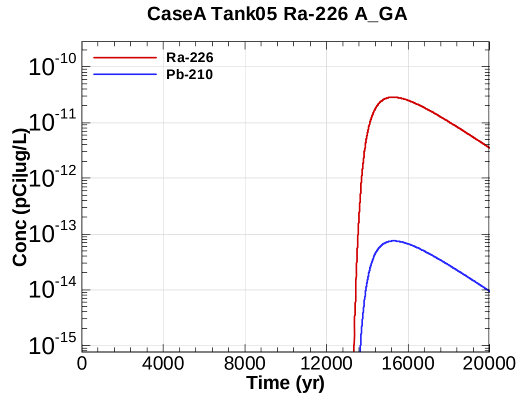

Figure E-446 - 100m Aquifer Concentration for CaseA Tank05 Ra-226 A_GA

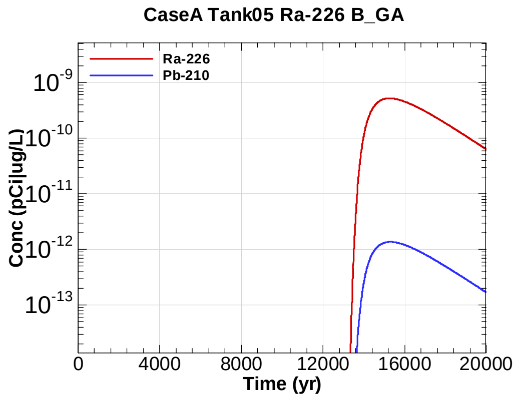

Figure E-447 - 100m Aquifer Concentration for CaseA Tank05 Ra-226 B_GA

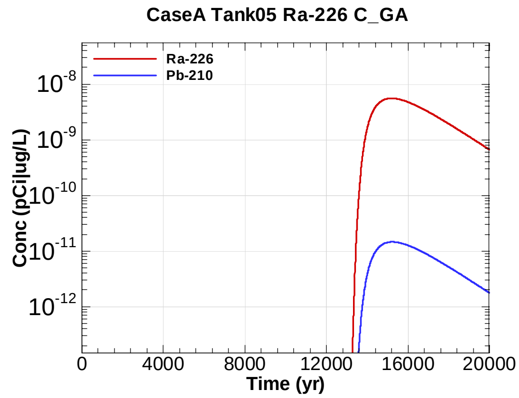

Figure E-448 - 100m Aquifer Concentration for CaseA Tank05 Ra-226 C_GA

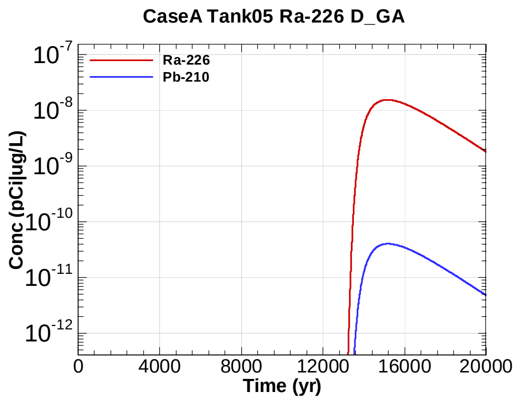

Figure E-449 - 100m Aquifer Concentration for CaseA Tank05 Ra-226 D_GA

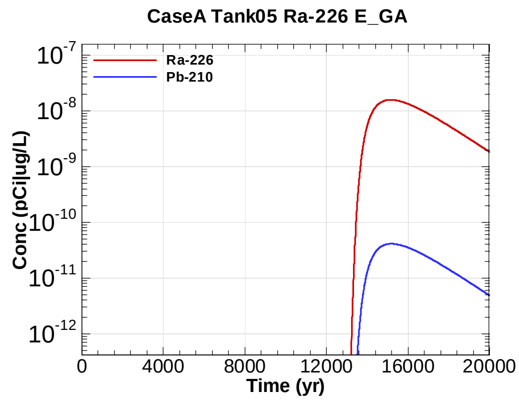

Figure E-450 - 100m Aquifer Concentration for CaseA Tank05 Ra-226 E_GA

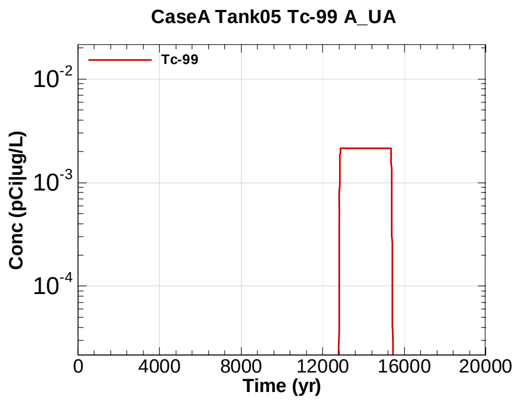

Figure E-451 - 100m Aquifer Concentration for CaseA Tank05 Tc-99 A_UA

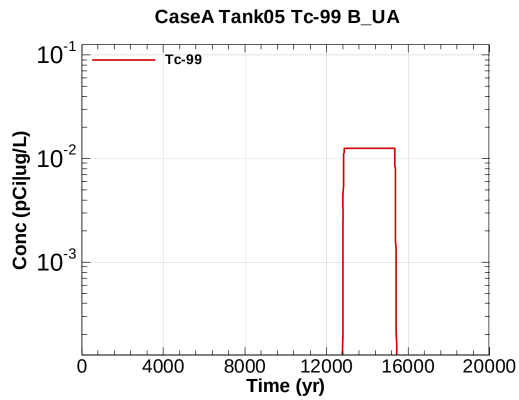

Figure E-452 - 100m Aquifer Concentration for CaseA Tank05 Tc-99 B_UA

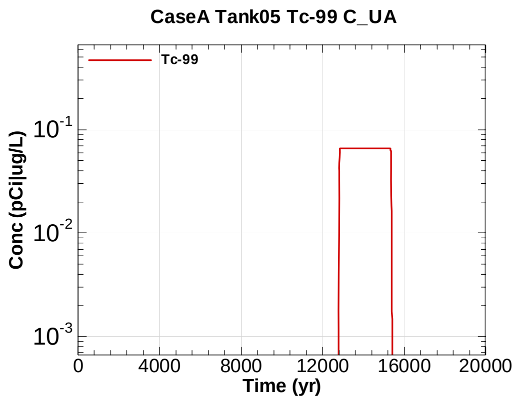

Figure E-453 - 100m Aquifer Concentration for CaseA Tank05 Tc-99 C_UA

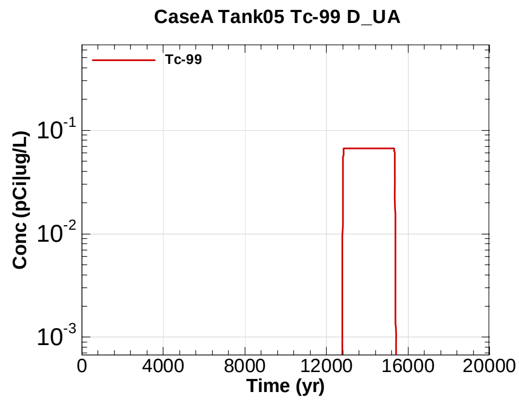

Figure E-454 - 100m Aquifer Concentration for CaseA Tank05 Tc-99 D_UA

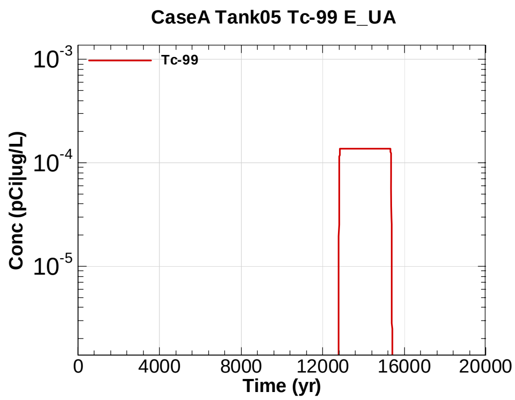

Figure E-455 - 100m Aquifer Concentration for CaseA Tank05 Tc-99 E_UA

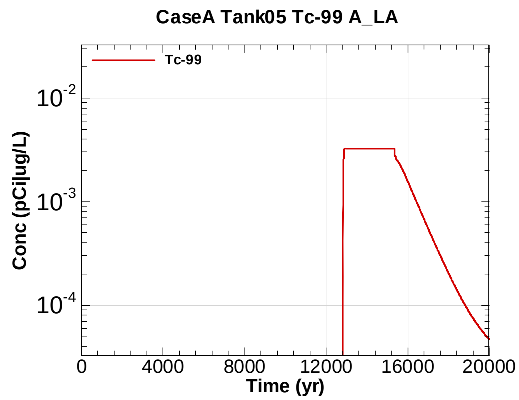

Figure E-456 - 100m Aquifer Concentration for CaseA Tank05 Tc-99 A_LA

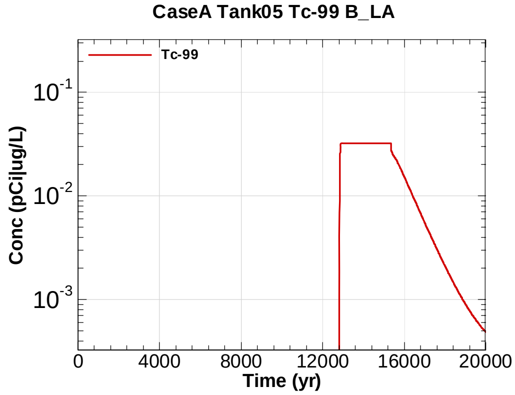

Figure E-457 - 100m Aquifer Concentration for CaseA Tank05 Tc-99 B_LA

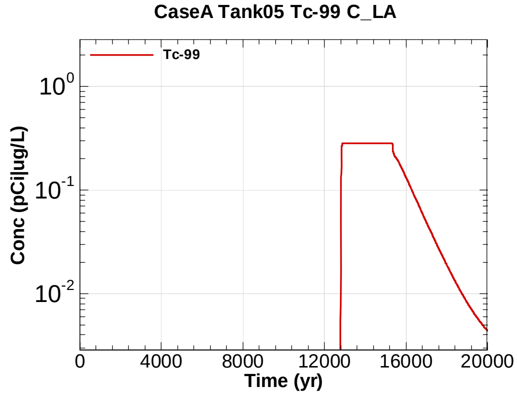

Figure E-458 - 100m Aquifer Concentration for CaseA Tank05 Tc-99 C_LA

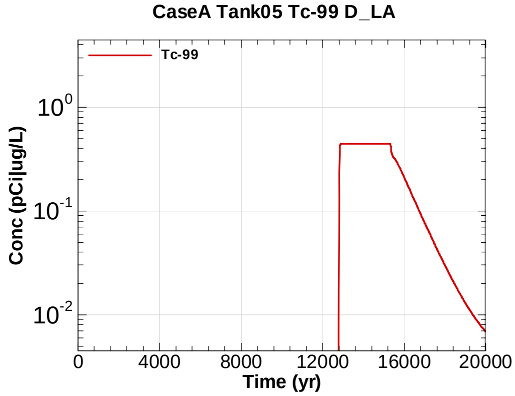

Figure E-459 - 100m Aquifer Concentration for CaseA Tank05 Tc-99 D_LA

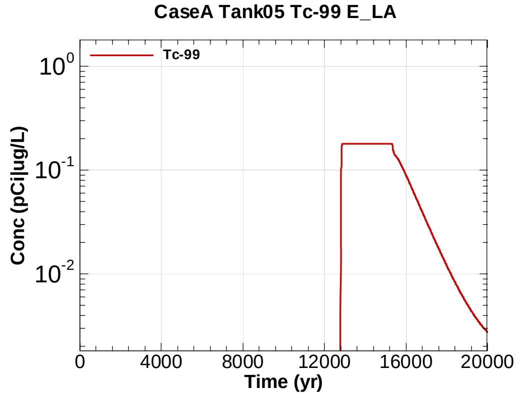

Figure E-460 - 100m Aquifer Concentration for CaseA Tank05 Tc-99 E_LA

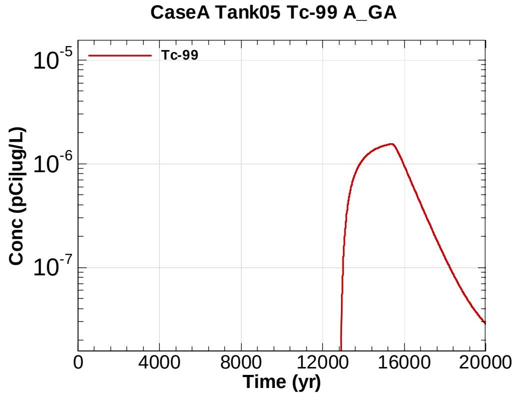

Figure E-461 - 100m Aquifer Concentration for CaseA Tank05 Tc-99 A_GA

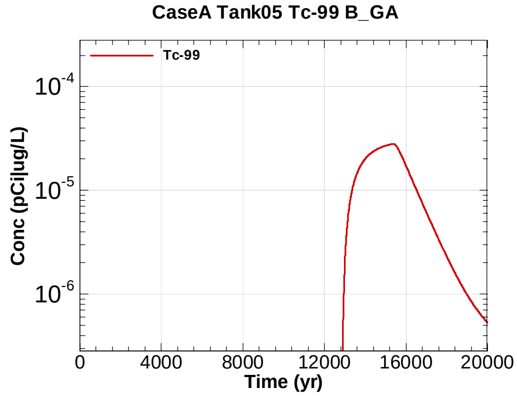

Figure E-462 - 100m Aquifer Concentration for CaseA Tank05 Tc-99 B_GA

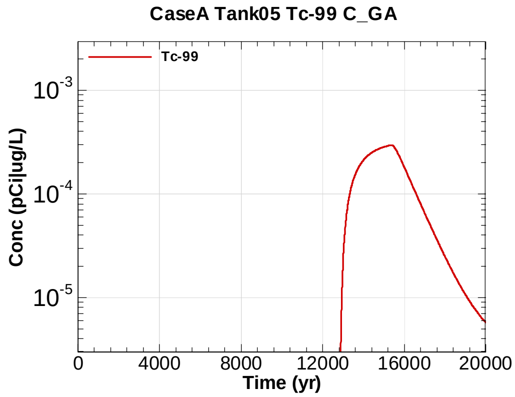

Figure E-463 - 100m Aquifer Concentration for CaseA Tank05 Tc-99 C_GA

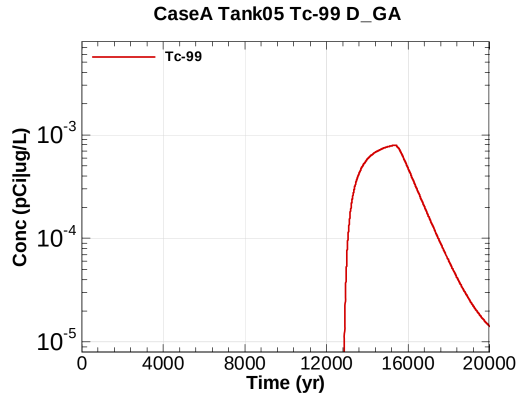

Figure E-464 - 100m Aquifer Concentration for CaseA Tank05 Tc-99 D_GA

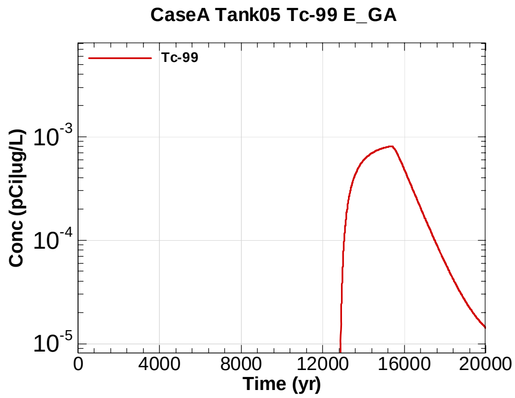

Figure E-465 - 100m Aquifer Concentration for CaseA Tank05 Tc-99 E_GA

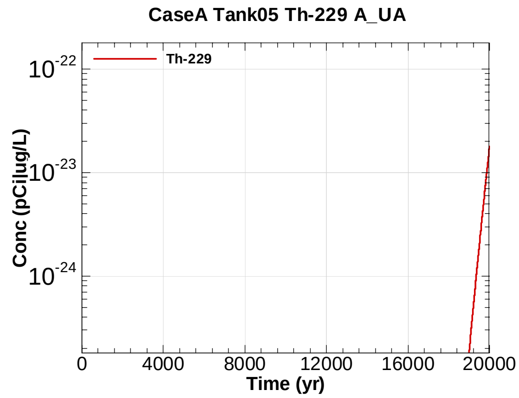

Figure E-466 - 100m Aquifer Concentration for CaseA Tank05 Th-229 A_UA

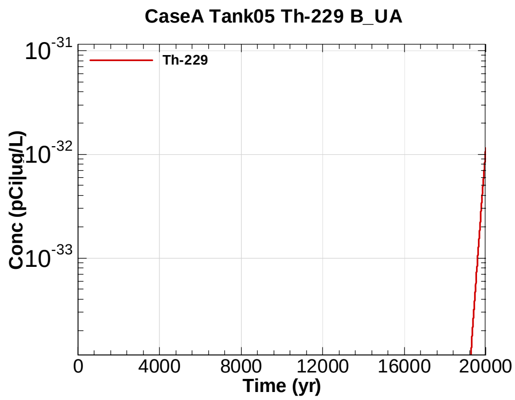

Figure E-467 - 100m Aquifer Concentration for CaseA Tank05 Th-229 B_UA

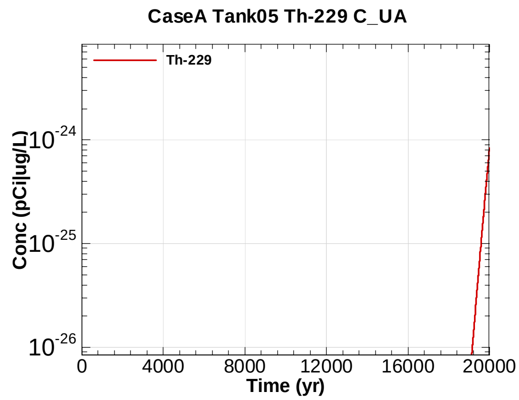

Figure E-468 - 100m Aquifer Concentration for CaseA Tank05 Th-229 C_UA

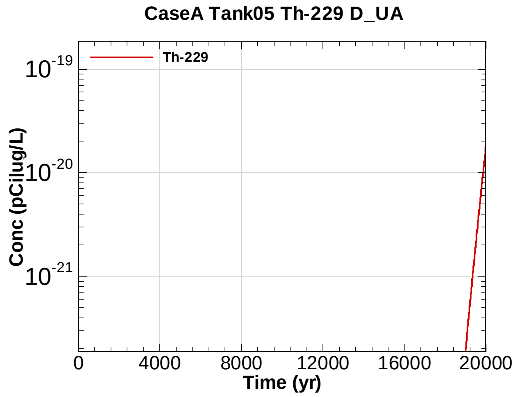

Figure E-469 - 100m Aquifer Concentration for CaseA Tank05 Th-229 D_UA

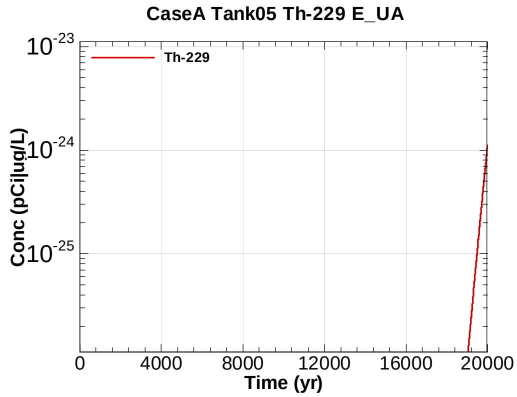

Figure E-470 - 100m Aquifer Concentration for CaseA Tank05 Th-229 E_UA

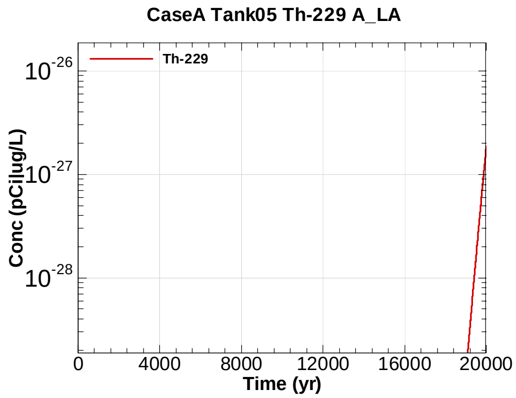

Figure E-471 - 100m Aquifer Concentration for CaseA Tank05 Th-229 A_LA

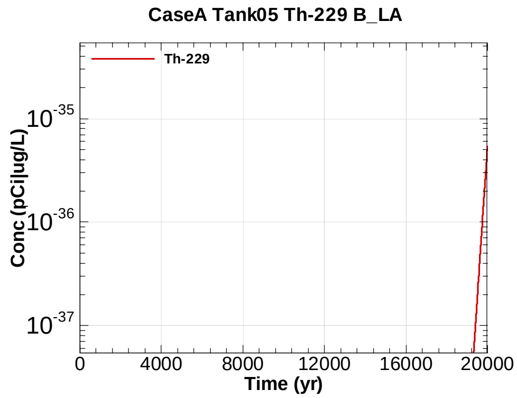

Figure E-472 - 100m Aquifer Concentration for CaseA Tank05 Th-229 B_LA

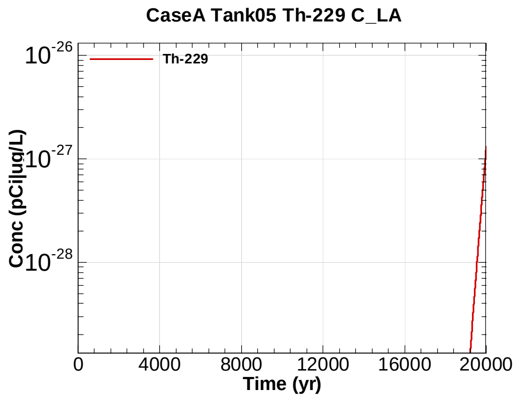

Figure E-473 - 100m Aquifer Concentration for CaseA Tank05 Th-229 C_LA

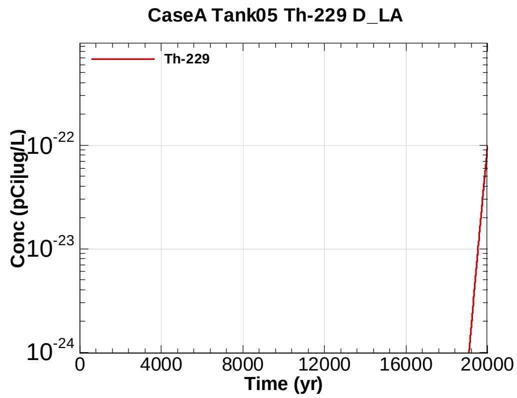

Figure E-474 - 100m Aquifer Concentration for CaseA Tank05 Th-229 D_LA

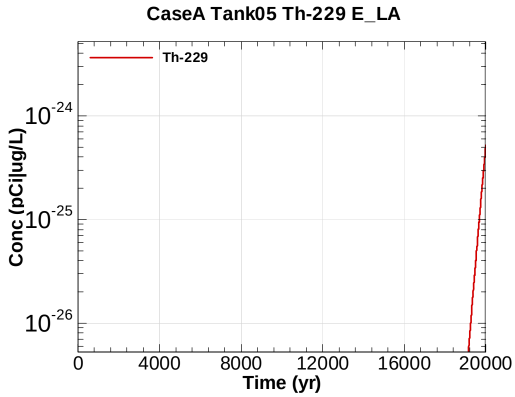

Figure E-475 - 100m Aquifer Concentration for CaseA Tank05 Th-229 E_LA

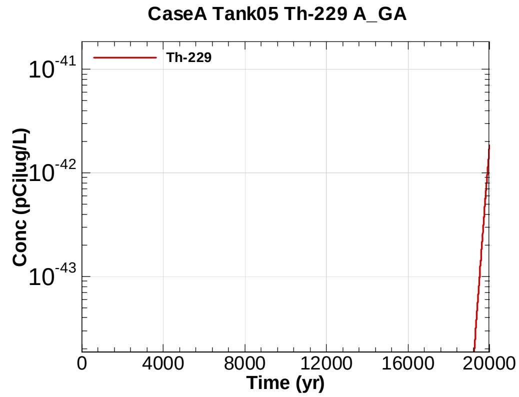

Figure E-476 - 100m Aquifer Concentration for CaseA Tank05 Th-229 A_GA

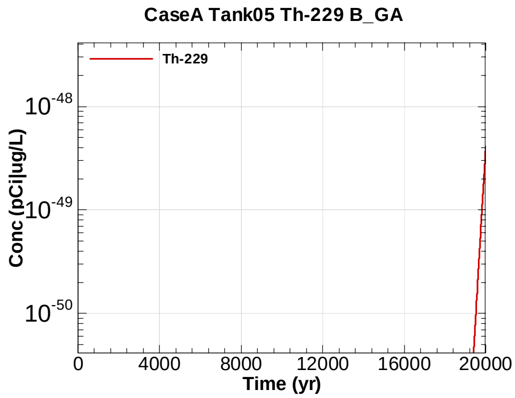

Figure E-477 - 100m Aquifer Concentration for CaseA Tank05 Th-229 B_GA

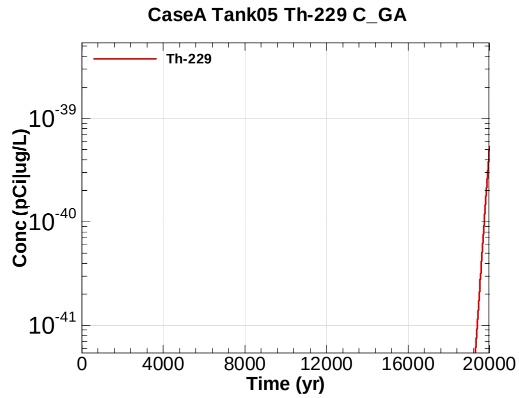

Figure E-478 - 100m Aquifer Concentration for CaseA Tank05 Th-229 C_GA

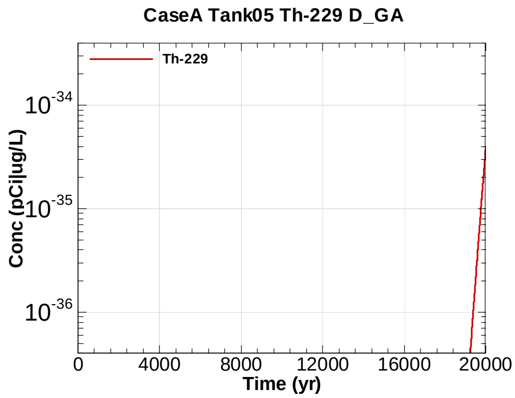

Figure E-479 - 100m Aquifer Concentration for CaseA Tank05 Th-229 D_GA

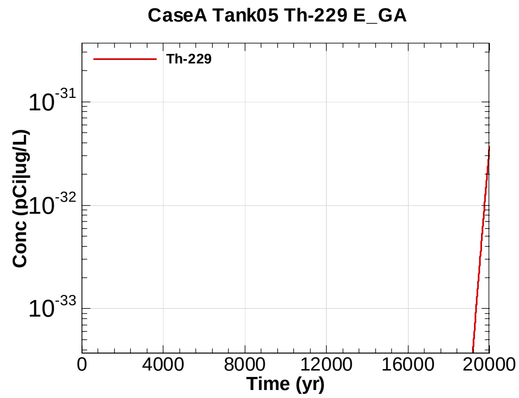

Figure E-480 - 100m Aquifer Concentration for CaseA Tank05 Th-229 E_GA

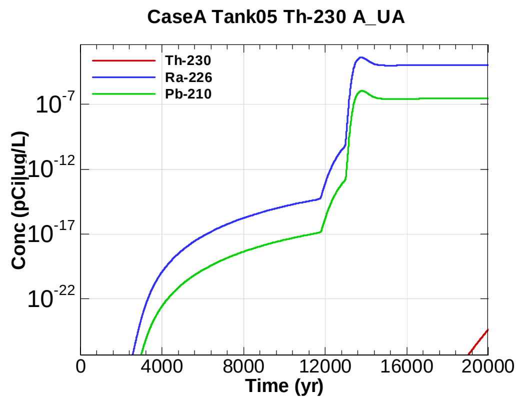

Figure E-481 - 100m Aquifer Concentration for CaseA Tank05 Th-230 A_UA

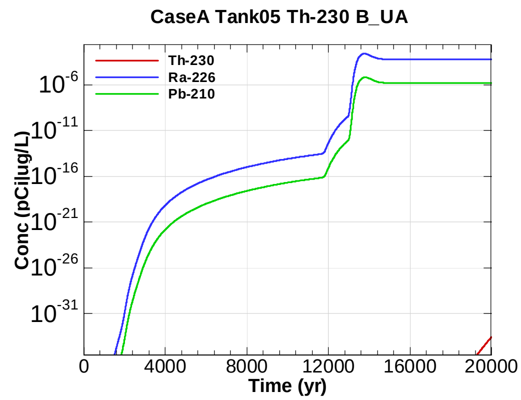

Figure E-482 - 100m Aquifer Concentration for CaseA Tank05 Th-230 B_UA

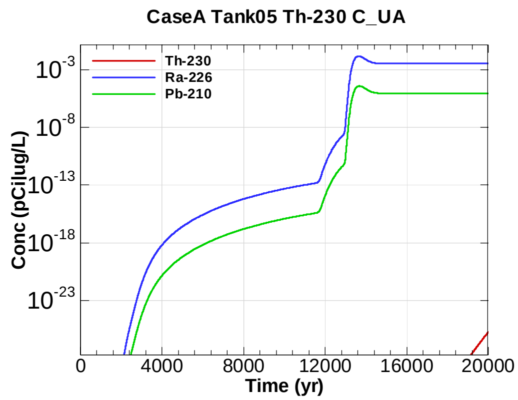

Figure E-483 - 100m Aquifer Concentration for CaseA Tank05 Th-230 C_UA

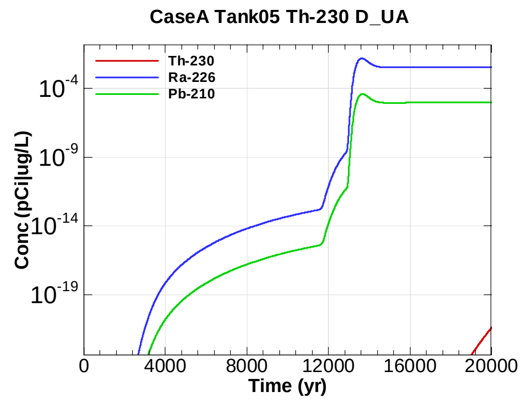

Figure E-484 - 100m Aquifer Concentration for CaseA Tank05 Th-230 D_UA

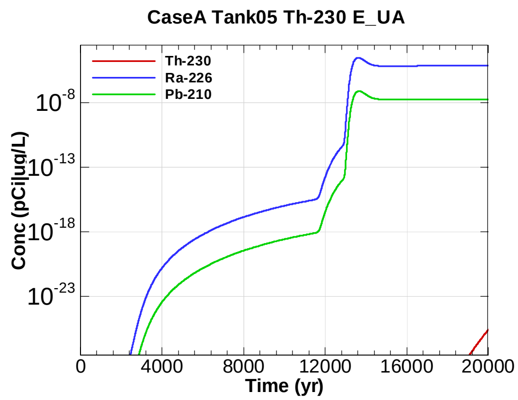

Figure E-485 - 100m Aquifer Concentration for CaseA Tank05 Th-230 E_UA

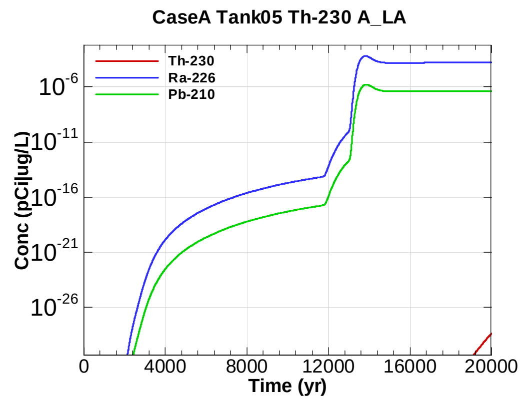

Figure E-486 - 100m Aquifer Concentration for CaseA Tank05 Th-230 A_LA

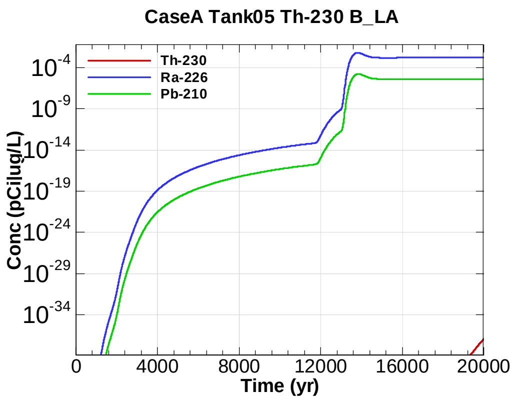

Figure E-487 - 100m Aquifer Concentration for CaseA Tank05 Th-230 B_LA

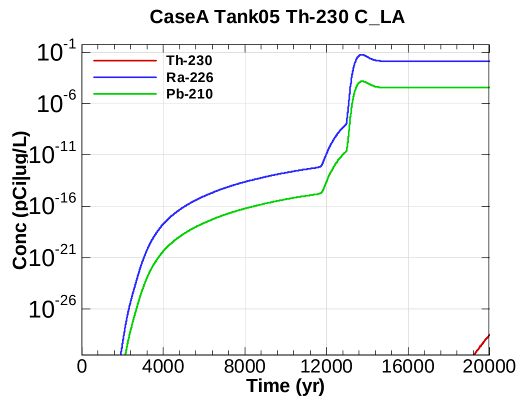

Figure E-488 - 100m Aquifer Concentration for CaseA Tank05 Th-230 C_LA

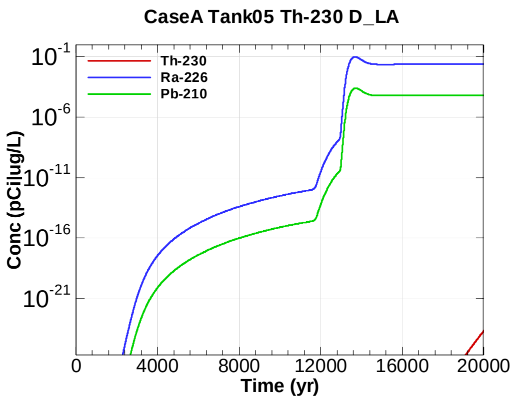

Figure E-489 - 100m Aquifer Concentration for CaseA Tank05 Th-230 D_LA

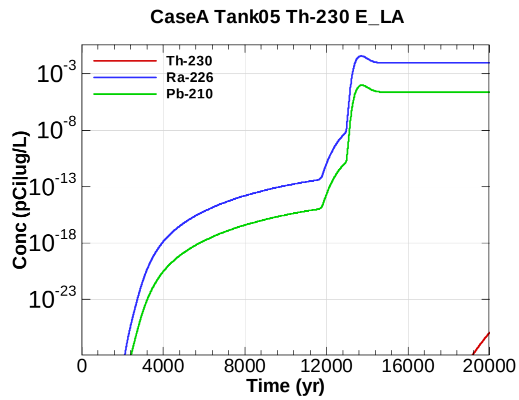

Figure E-490 - 100m Aquifer Concentration for CaseA Tank05 Th-230 E_LA

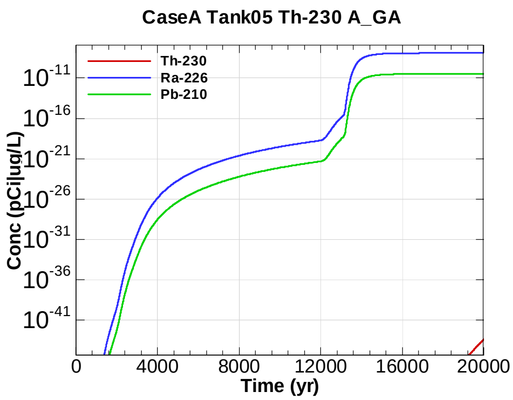

Figure E-491 - 100m Aquifer Concentration for CaseA Tank05 Th-230 A_GA

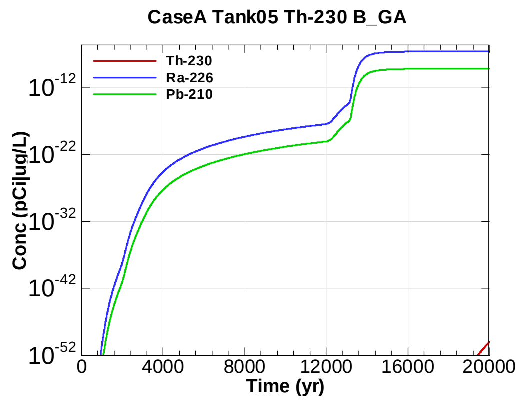

Figure E-492 - 100m Aquifer Concentration for CaseA Tank05 Th-230 B_GA

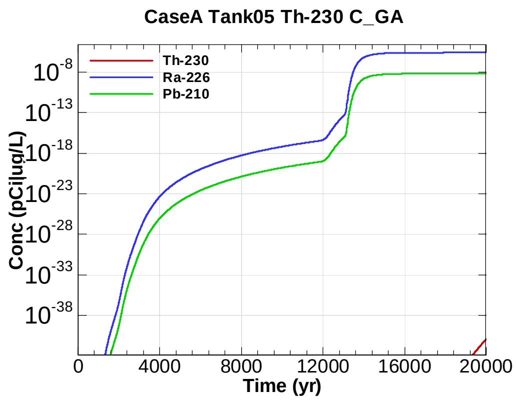

Figure E-493 - 100m Aquifer Concentration for CaseA Tank05 Th-230 C_GA

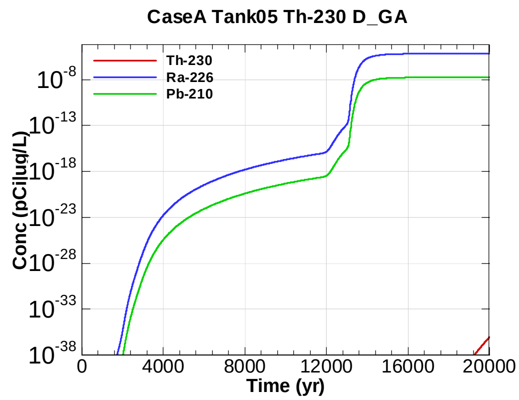

Figure E-494 - 100m Aquifer Concentration for CaseA Tank05 Th-230 D_GA

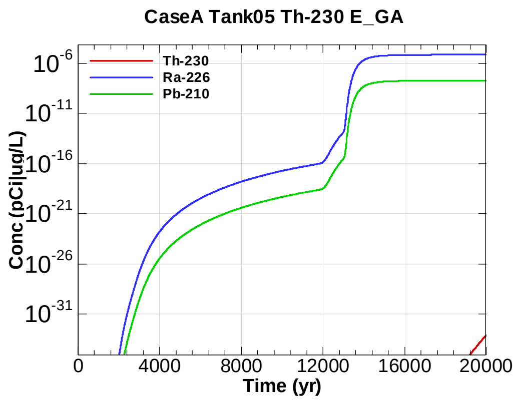

Figure E-495 - 100m Aquifer Concentration for CaseA Tank05 Th-230 E_GA

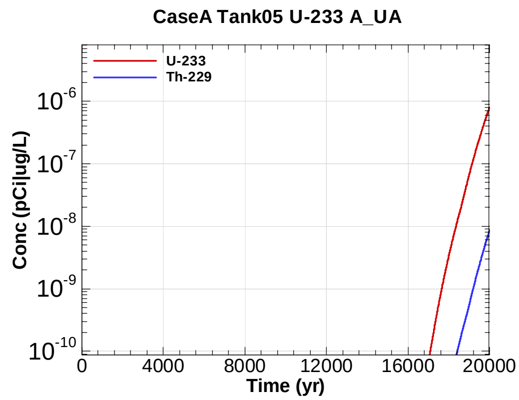

Figure E-496 - 100m Aquifer Concentration for CaseA Tank05 U-233 A_UA

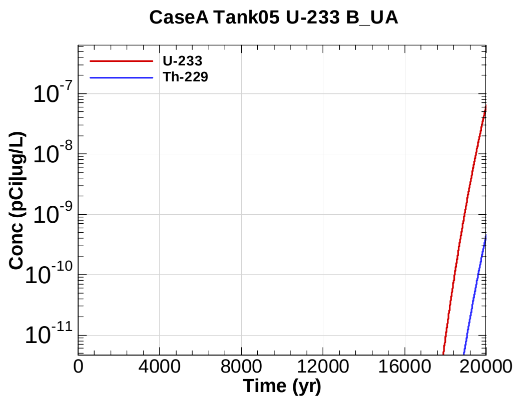

Figure E-497 - 100m Aquifer Concentration for CaseA Tank05 U-233 B_UA

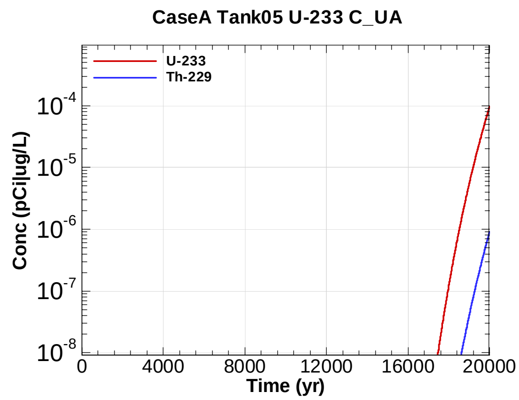

Figure E-498 - 100m Aquifer Concentration for CaseA Tank05 U-233 C_UA

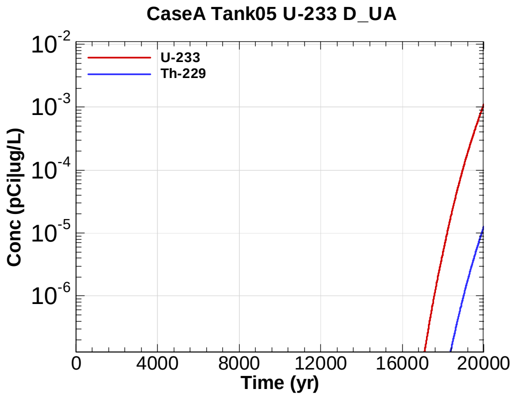

Figure E-499 - 100m Aquifer Concentration for CaseA Tank05 U-233 D_UA

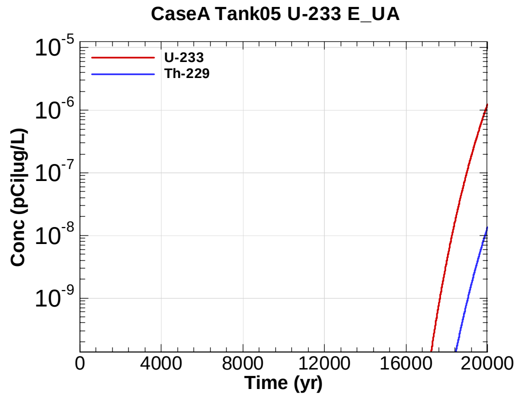

Figure E-500 - 100m Aquifer Concentration for CaseA Tank05 U-233 E_UA

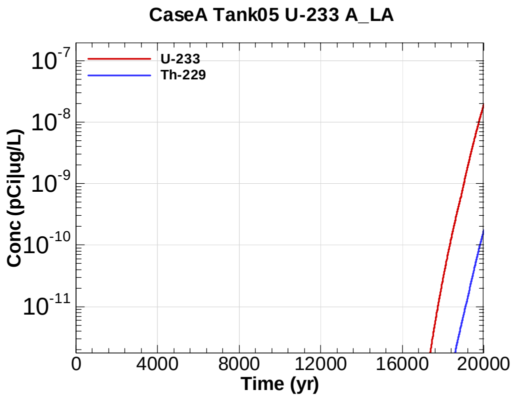

Figure E-501 - 100m Aquifer Concentration for CaseA Tank05 U-233 A_LA

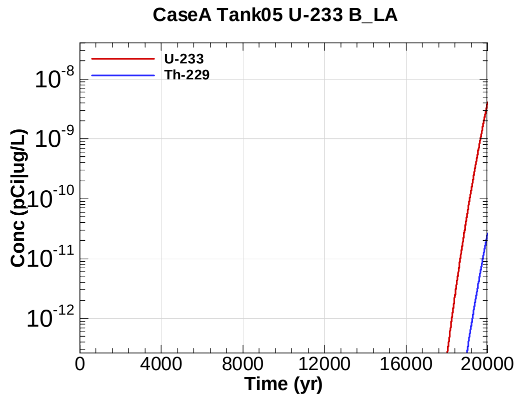

Figure E-502 - 100m Aquifer Concentration for CaseA Tank05 U-233 B_LA

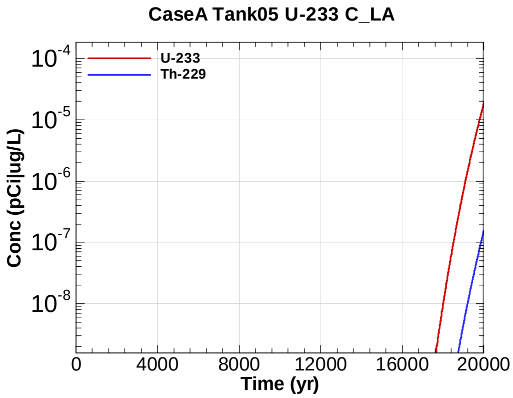

Figure E-503 - 100m Aquifer Concentration for CaseA Tank05 U-233 C_LA

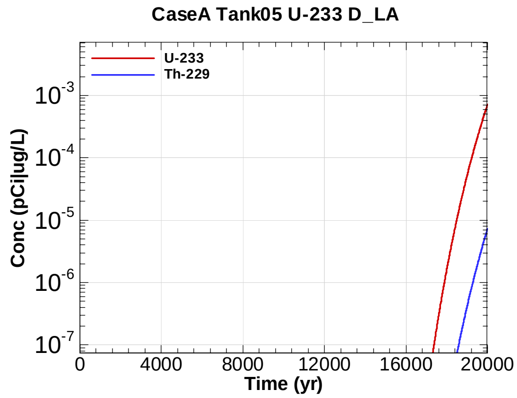

Figure E-504 - 100m Aquifer Concentration for CaseA Tank05 U-233 D_LA

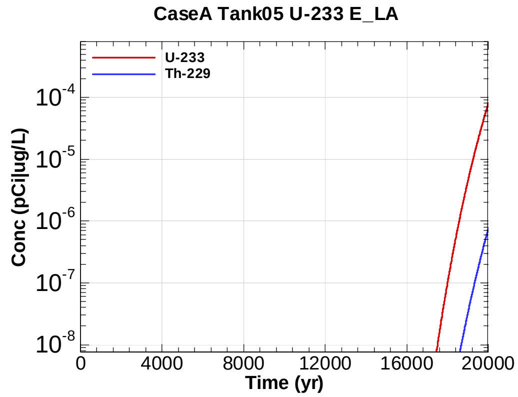

Figure E-505 - 100m Aquifer Concentration for CaseA Tank05 U-233 E_LA

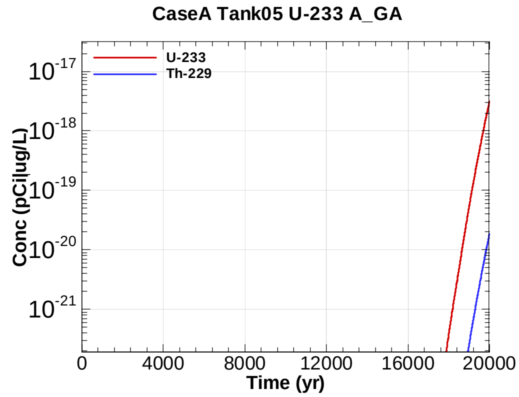

Figure E-506 - 100m Aquifer Concentration for CaseA Tank05 U-233 A_GA

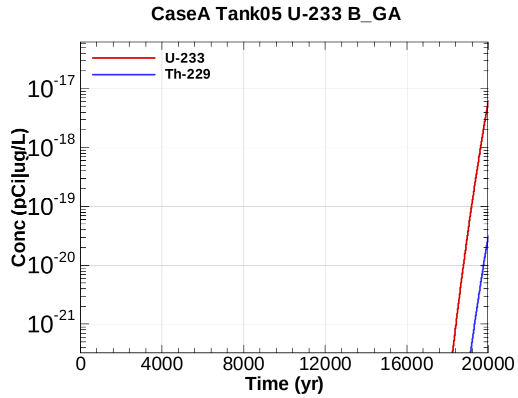

Figure E-507 - 100m Aquifer Concentration for CaseA Tank05 U-233 B_GA

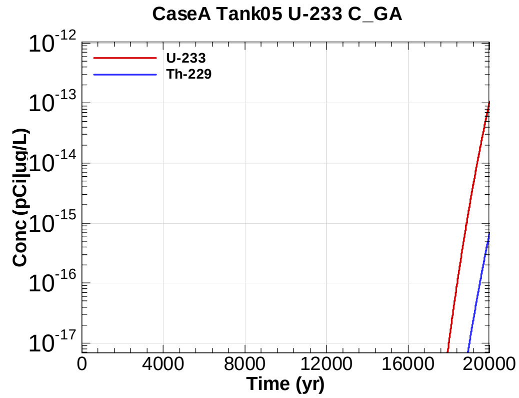

Figure E-508 - 100m Aquifer Concentration for CaseA Tank05 U-233 C_GA

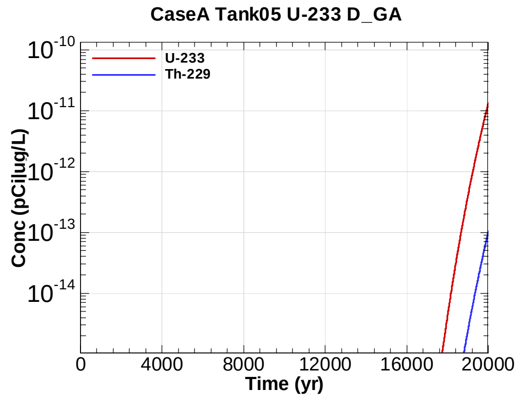

Figure E-509 - 100m Aquifer Concentration for CaseA Tank05 U-233 D_GA

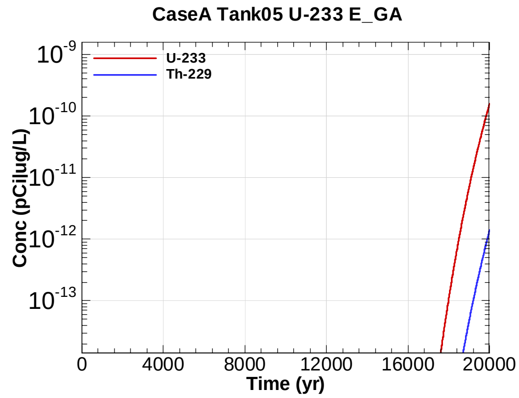

Figure E-510 - 100m Aquifer Concentration for CaseA Tank05 U-233 E_GA

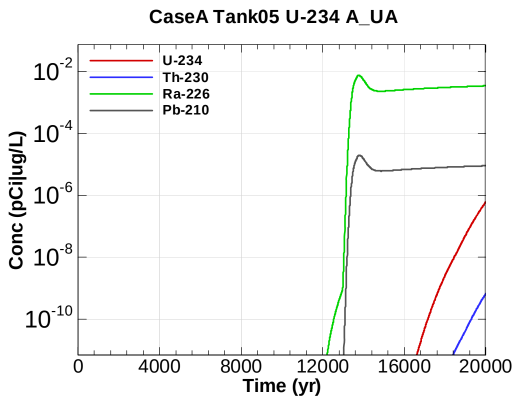

Figure E-511 - 100m Aquifer Concentration for CaseA Tank05 U-234 A_UA

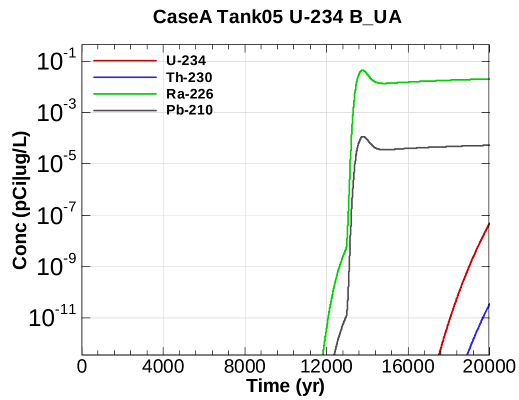

Figure E-512 - 100m Aquifer Concentration for CaseA Tank05 U-234 B_UA

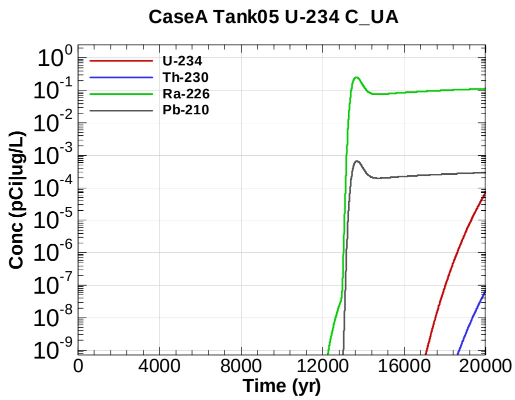

Figure E-513 - 100m Aquifer Concentration for CaseA Tank05 U-234 C_UA

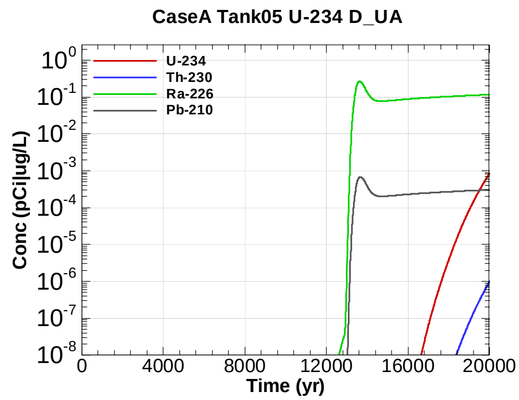

Figure E-514 - 100m Aquifer Concentration for CaseA Tank05 U-234 D_UA

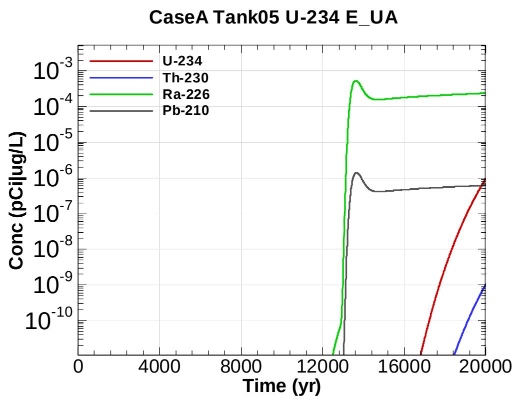

Figure E-515 - 100m Aquifer Concentration for CaseA Tank05 U-234 E_UA

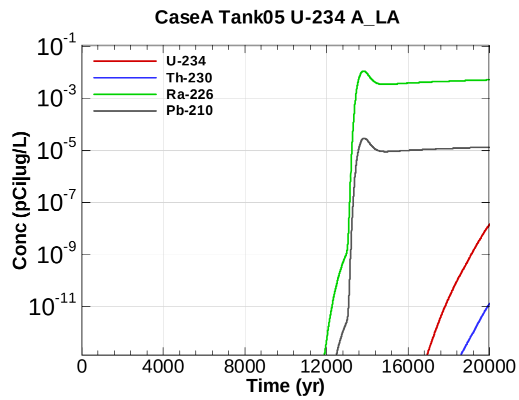

Figure E-516 - 100m Aquifer Concentration for CaseA Tank05 U-234 A_LA

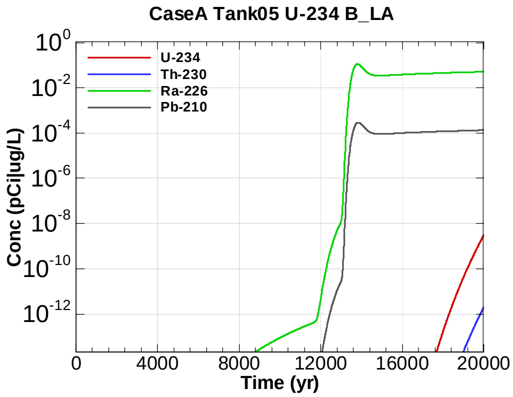

Figure E-517 - 100m Aquifer Concentration for CaseA Tank05 U-234 B_LA

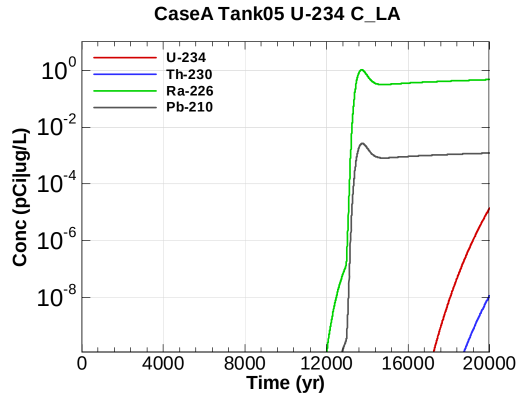

Figure E-518 - 100m Aquifer Concentration for CaseA Tank05 U-234 C_LA

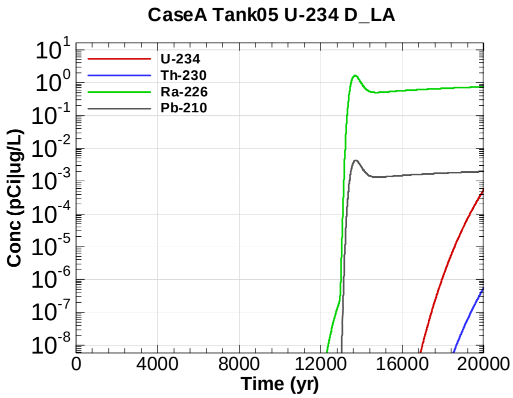

Figure E-519 - 100m Aquifer Concentration for CaseA Tank05 U-234 D_LA

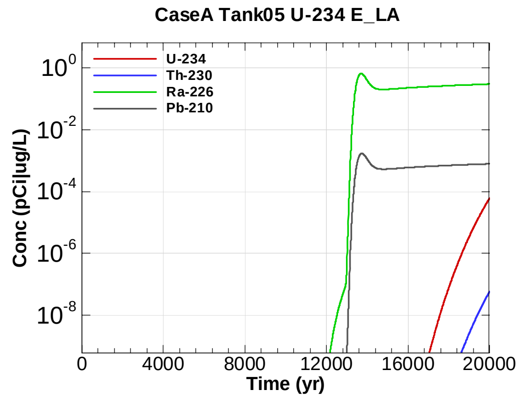

Figure E-520 - 100m Aquifer Concentration for CaseA Tank05 U-234 E_LA

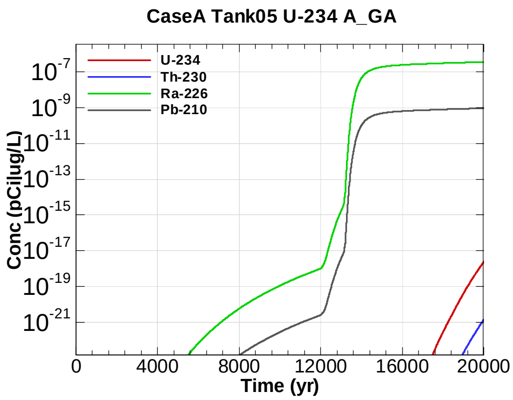

Figure E-521 - 100m Aquifer Concentration for CaseA Tank05 U-234 A_GA

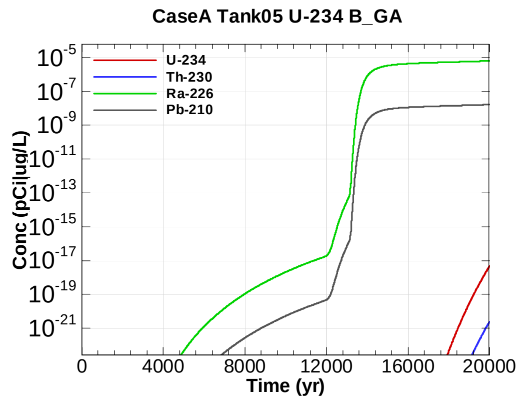

Figure E-522 - 100m Aquifer Concentration for CaseA Tank05 U-234 B_GA

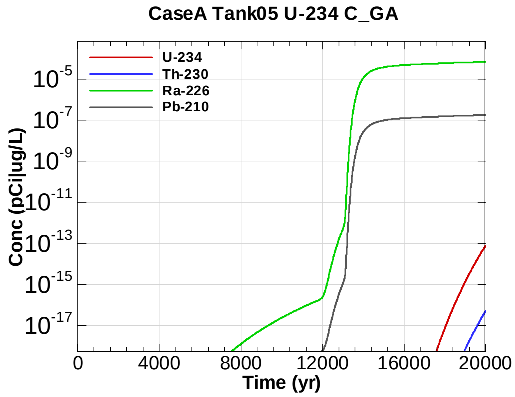

Figure E-523 - 100m Aquifer Concentration for CaseA Tank05 U-234 C_GA

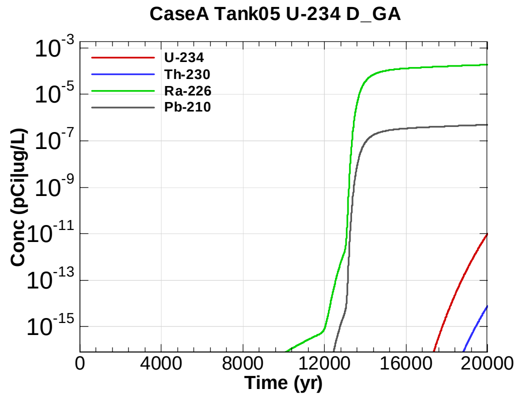

Figure E-524 - 100m Aquifer Concentration for CaseA Tank05 U-234 D_GA

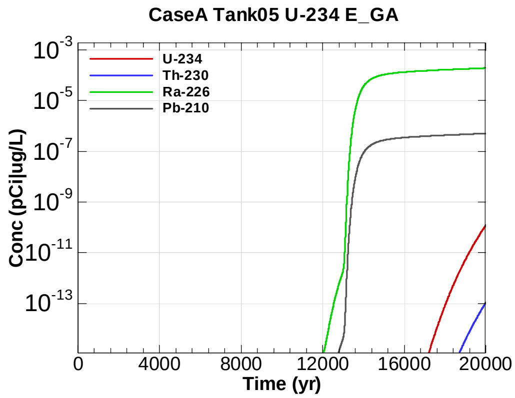

Figure E-525 - 100m Aquifer Concentration for CaseA Tank05 U-234 E_GA

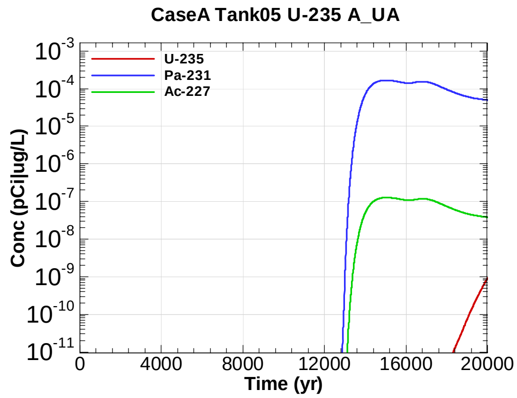

Figure E-526 - 100m Aquifer Concentration for CaseA Tank05 U-235 A_UA

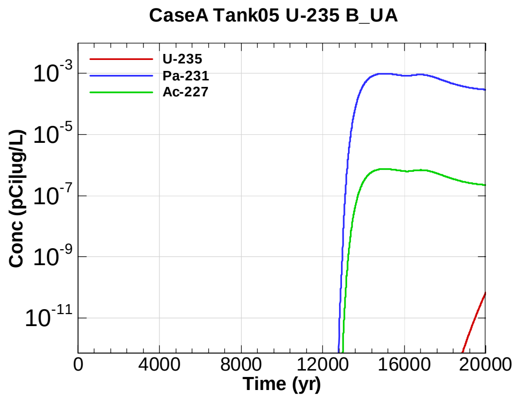

Figure E-527 - 100m Aquifer Concentration for CaseA Tank05 U-235 B_UA

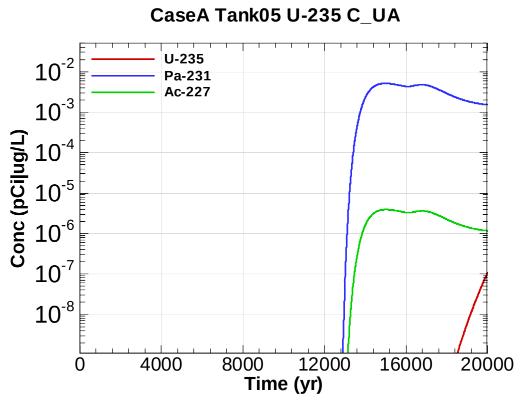

Figure E-528 - 100m Aquifer Concentration for CaseA Tank05 U-235 C_UA

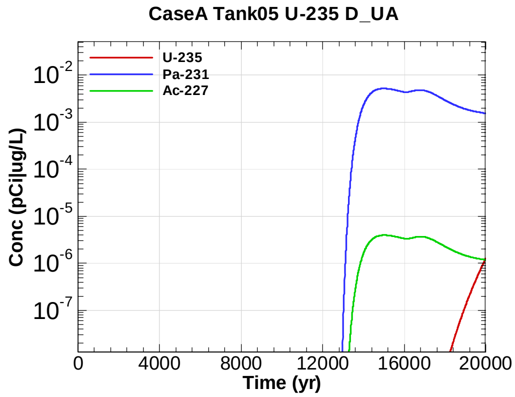

Figure E-529 - 100m Aquifer Concentration for CaseA Tank05 U-235 D_UA

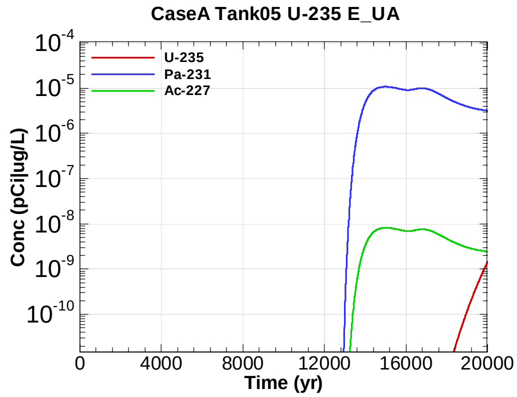

Figure E-530 - 100m Aquifer Concentration for CaseA Tank05 U-235 E_UA

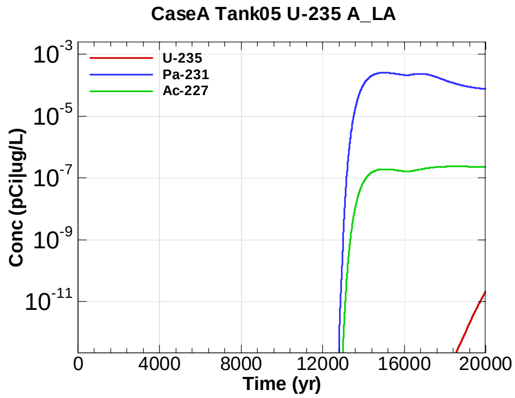

Figure E-531 - 100m Aquifer Concentration for CaseA Tank05 U-235 A_LA

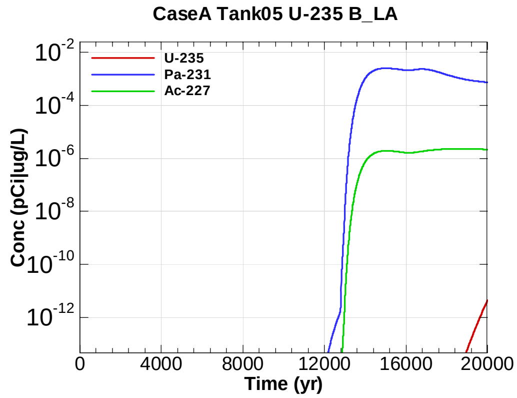

Figure E-532 - 100m Aquifer Concentration for CaseA Tank05 U-235 B_LA

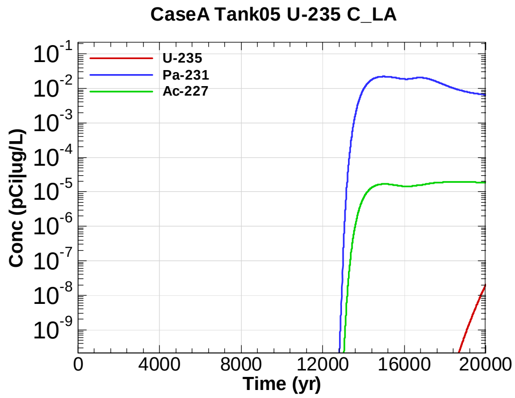

Figure E-533 - 100m Aquifer Concentration for CaseA Tank05 U-235 C_LA

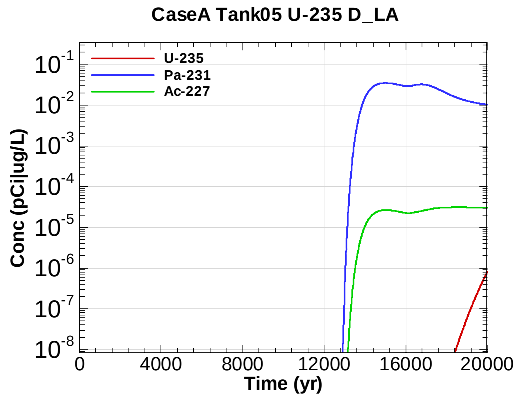

Figure E-534 - 100m Aquifer Concentration for CaseA Tank05 U-235 D_LA

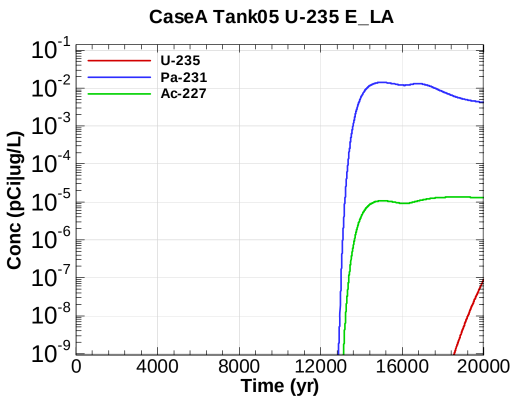

Figure E-535 - 100m Aquifer Concentration for CaseA Tank05 U-235 E_LA

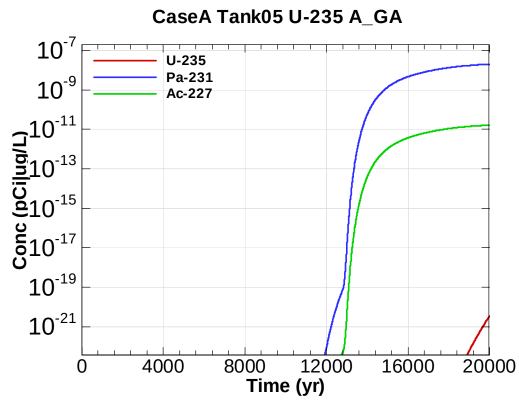

Figure E-536 - 100m Aquifer Concentration for CaseA Tank05 U-235 A_GA

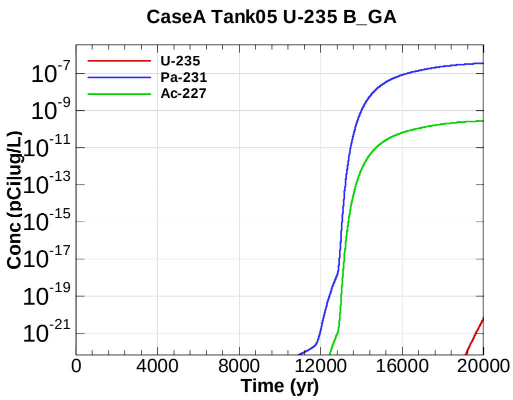

Figure E-537 - 100m Aquifer Concentration for CaseA Tank05 U-235 B_GA

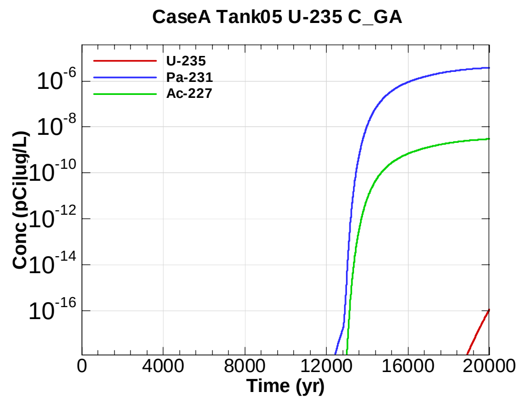

Figure E-538 - 100m Aquifer Concentration for CaseA Tank05 U-235 C_GA

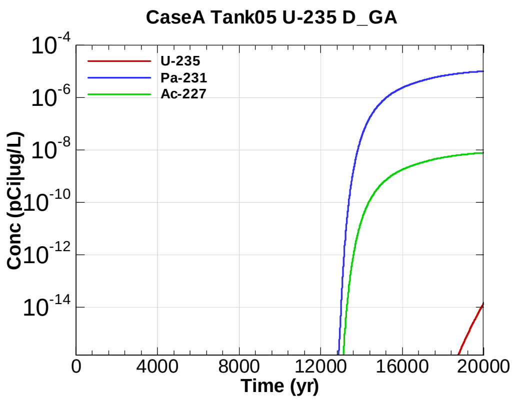

Figure E-539 - 100m Aquifer Concentration for CaseA Tank05 U-235 D_GA

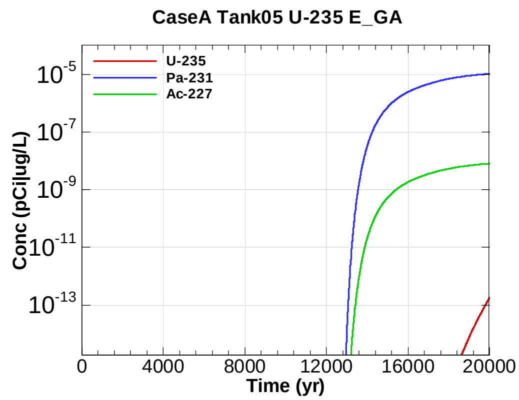

Figure E-540 - 100m Aquifer Concentration for CaseA Tank05 U-235 E_GA

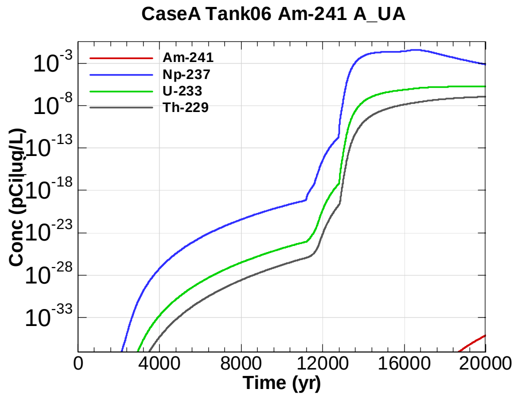

Figure E-541 - 100m Aquifer Concentration for CaseA Tank06 Am-241 A_UA

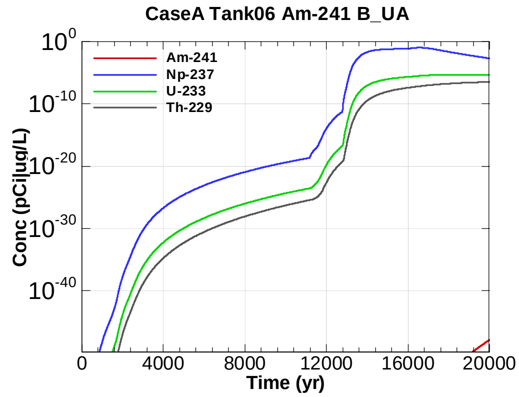

Figure E-542 - 100m Aquifer Concentration for CaseA Tank06 Am-241 B_UA

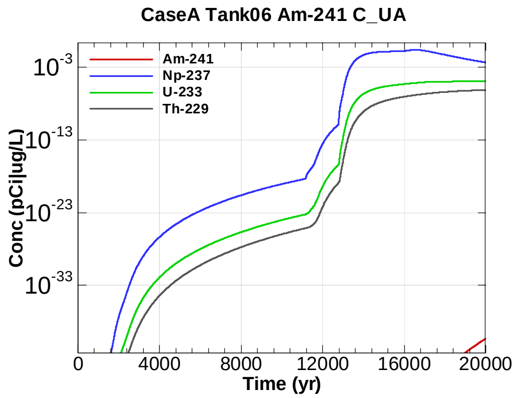

Figure E-543 - 100m Aquifer Concentration for CaseA Tank06 Am-241 C_UA

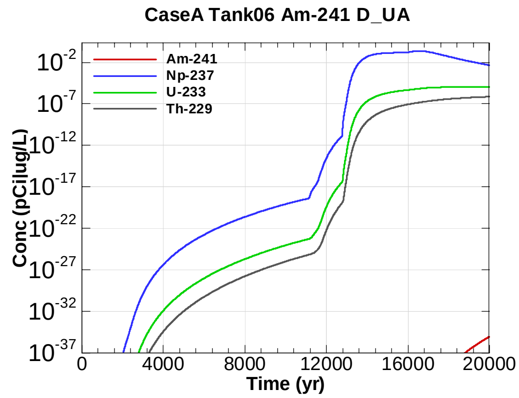

Figure E-544 - 100m Aquifer Concentration for CaseA Tank06 Am-241 D_UA

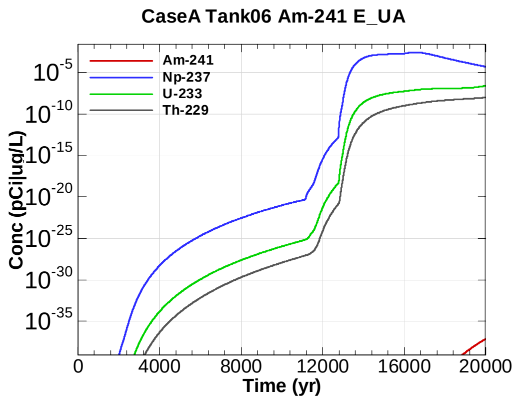

Figure E-545 - 100m Aquifer Concentration for CaseA Tank06 Am-241 E_UA

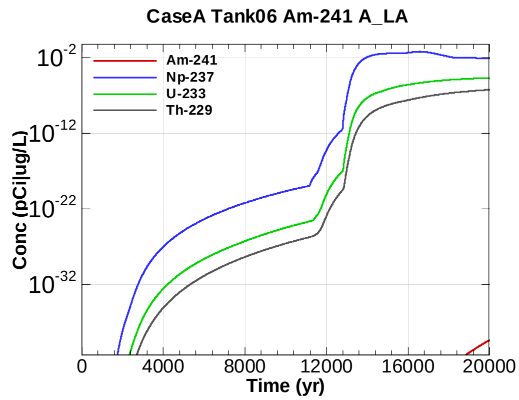

Figure E-546 - 100m Aquifer Concentration for CaseA Tank06 Am-241 A_LA

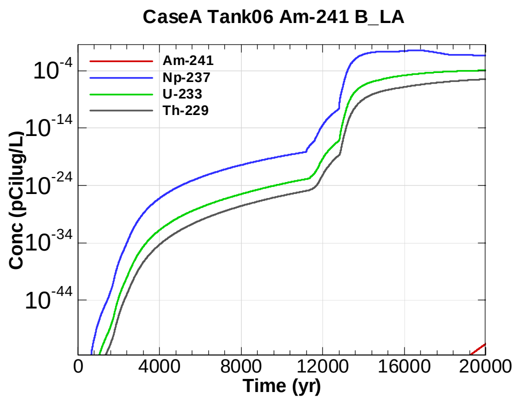

Figure E-547 - 100m Aquifer Concentration for CaseA Tank06 Am-241 B_LA

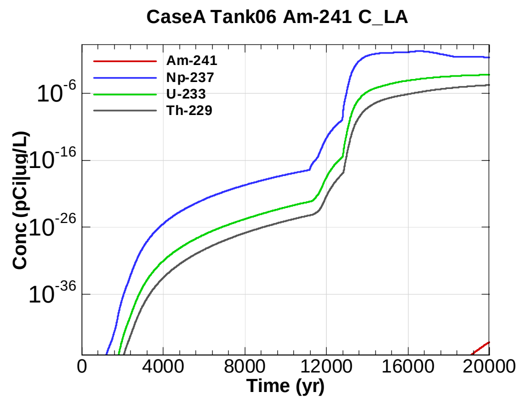

Figure E-548 - 100m Aquifer Concentration for CaseA Tank06 Am-241 C_LA

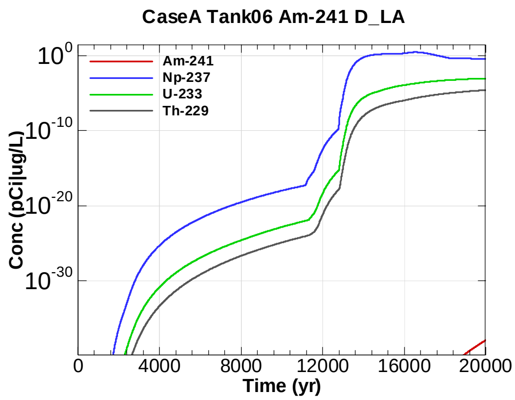

Figure E-549 - 100m Aquifer Concentration for CaseA Tank06 Am-241 D_LA

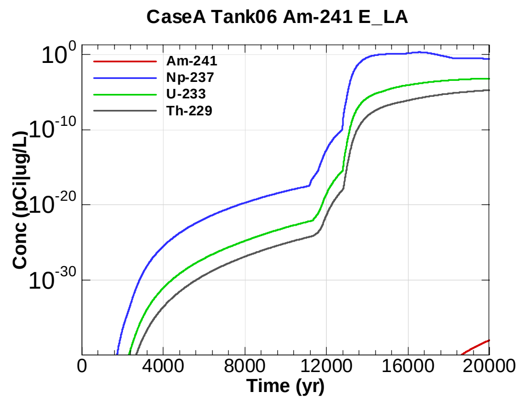

Figure E-550 - 100m Aquifer Concentration for CaseA Tank06 Am-241 E_LA

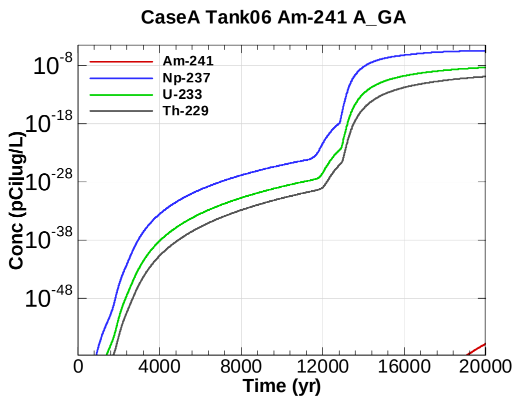

Figure E-551 - 100m Aquifer Concentration for CaseA Tank06 Am-241 A_GA

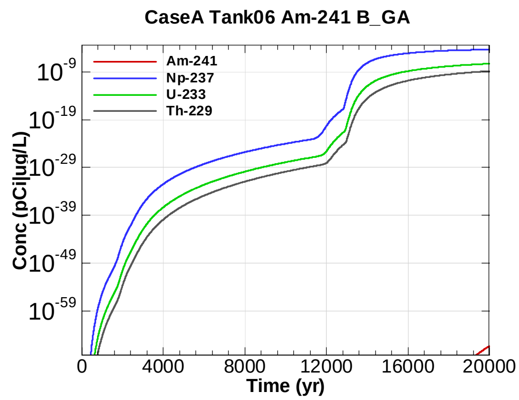

Figure E-552 - 100m Aquifer Concentration for CaseA Tank06 Am-241 B_GA

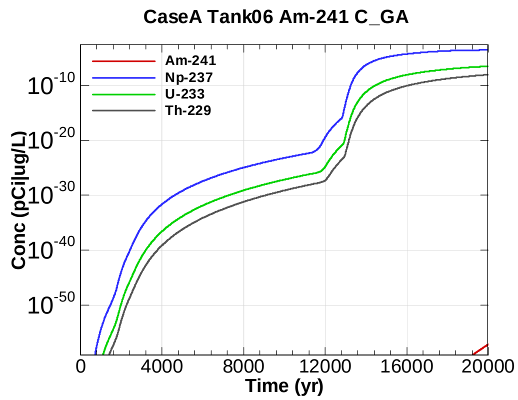

Figure E-553 - 100m Aquifer Concentration for CaseA Tank06 Am-241 C_GA

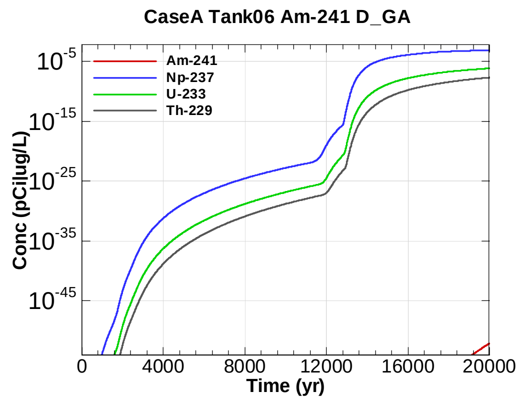

Figure E-554 - 100m Aquifer Concentration for CaseA Tank06 Am-241 D_GA

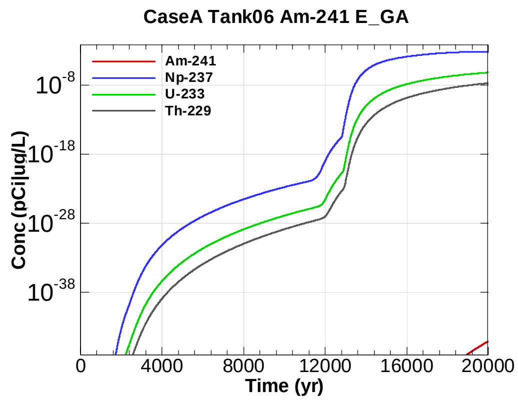

Figure E-555 - 100m Aquifer Concentration for CaseA Tank06 Am-241 E_GA

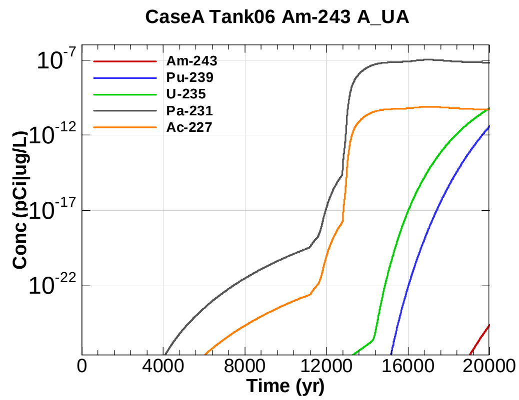

Figure E-556 - 100m Aquifer Concentration for CaseA Tank06 Am-243 A_UA

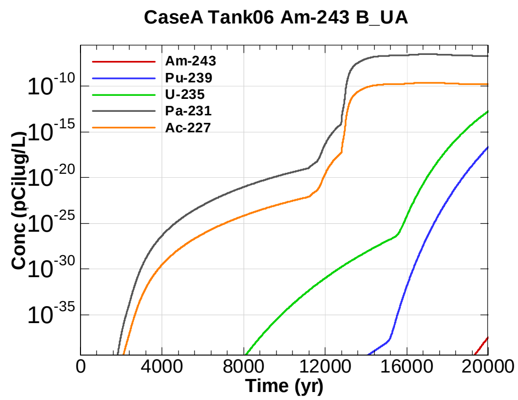

Figure E-557 - 100m Aquifer Concentration for CaseA Tank06 Am-243 B_UA

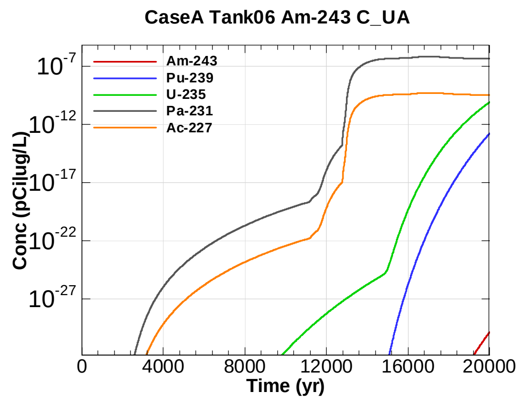

Figure E-558 - 100m Aquifer Concentration for CaseA Tank06 Am-243 C_UA

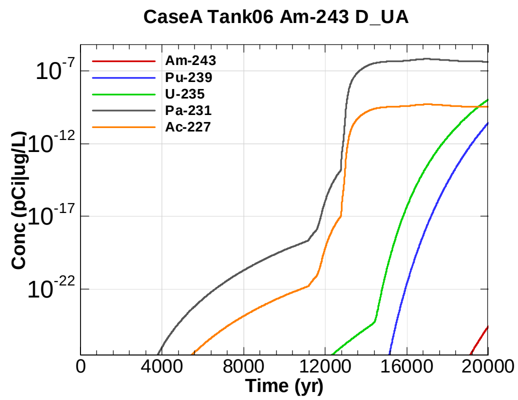

Figure E-559 - 100m Aquifer Concentration for CaseA Tank06 Am-243 D_UA

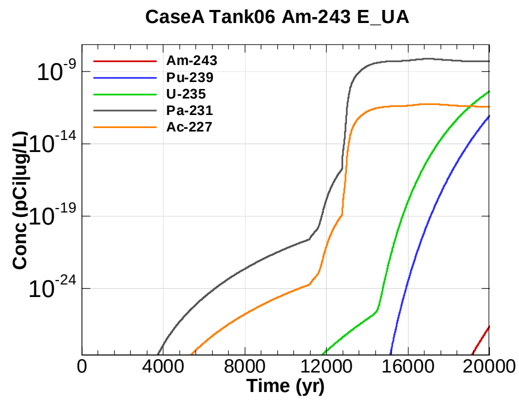

Figure E-560 - 100m Aquifer Concentration for CaseA Tank06 Am-243 E_UA

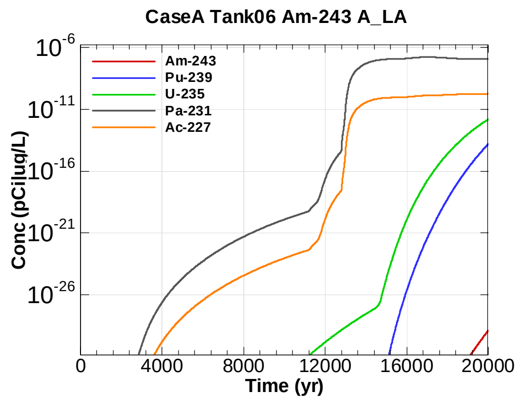

Figure E-561 - 100m Aquifer Concentration for CaseA Tank06 Am-243 A_LA

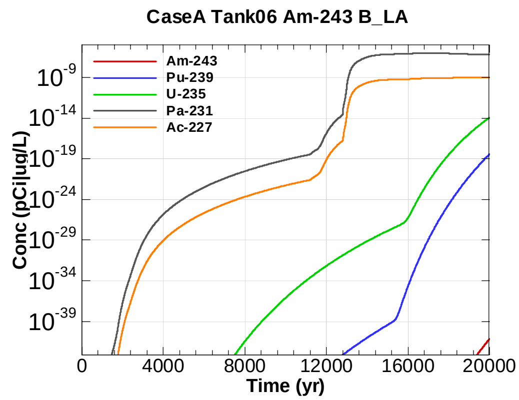

Figure E-562 - 100m Aquifer Concentration for CaseA Tank06 Am-243 B_LA

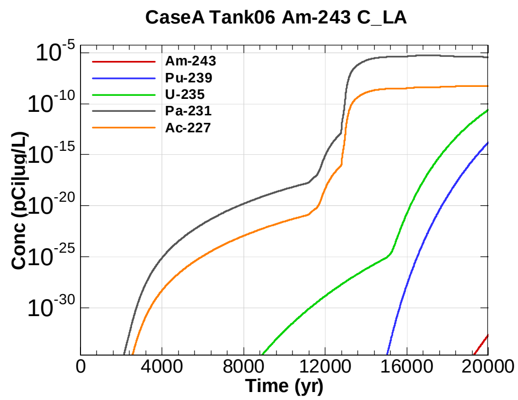

Figure E-563 - 100m Aquifer Concentration for CaseA Tank06 Am-243 C_LA

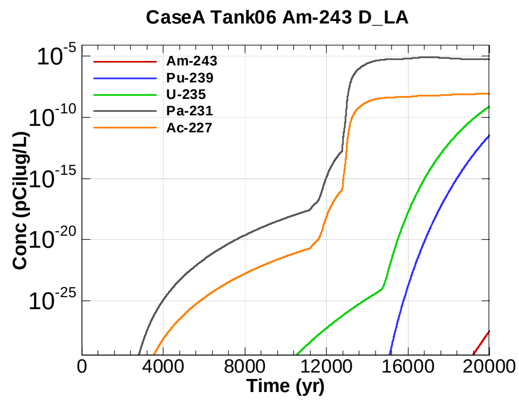

Figure E-564 - 100m Aquifer Concentration for CaseA Tank06 Am-243 D_LA

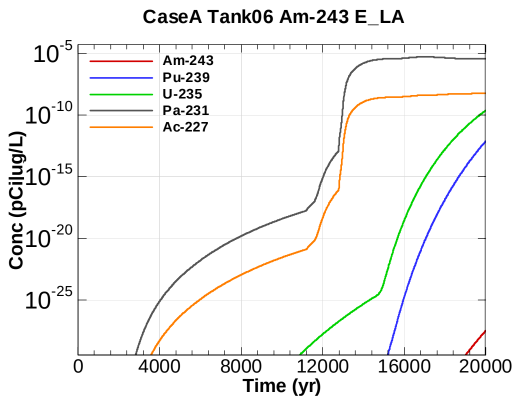

Figure E-565 - 100m Aquifer Concentration for CaseA Tank06 Am-243 E_LA

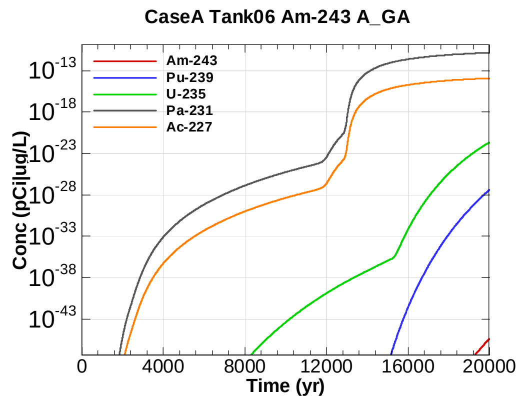

Figure E-566 - 100m Aquifer Concentration for CaseA Tank06 Am-243 A_GA

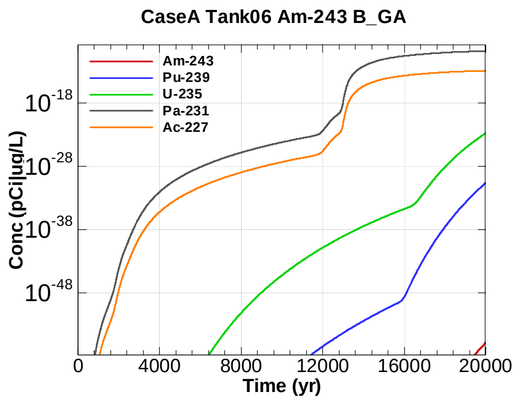

Figure E-567 - 100m Aquifer Concentration for CaseA Tank06 Am-243 B_GA

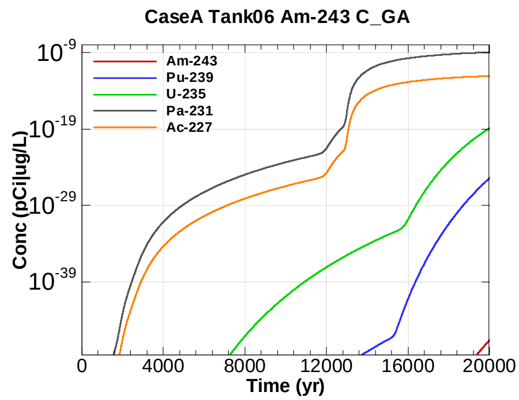

Figure E-568 - 100m Aquifer Concentration for CaseA Tank06 Am-243 C_GA

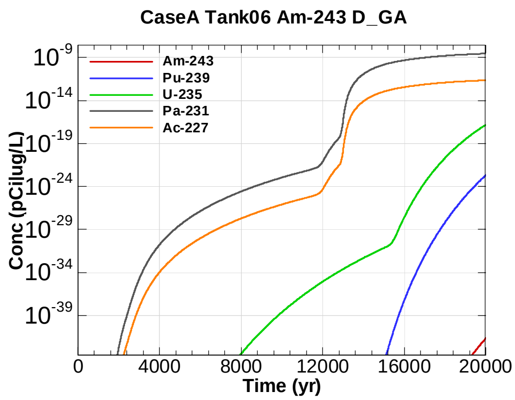

Figure E-569 - 100m Aquifer Concentration for CaseA Tank06 Am-243 D_GA

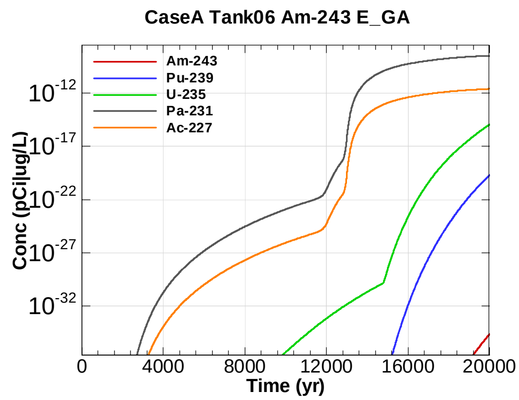

Figure E-570 - 100m Aquifer Concentration for CaseA Tank06 Am-243 E_GA

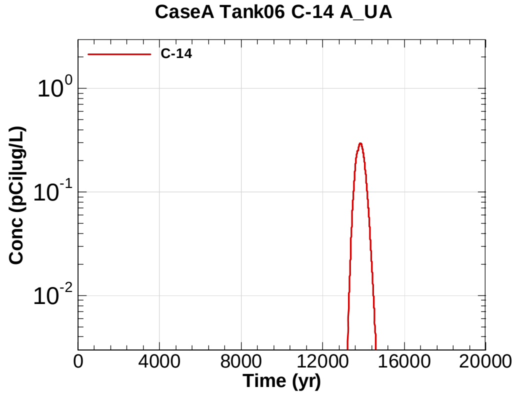

Figure E-571 - 100m Aquifer Concentration for CaseA Tank06 C-14 A_UA

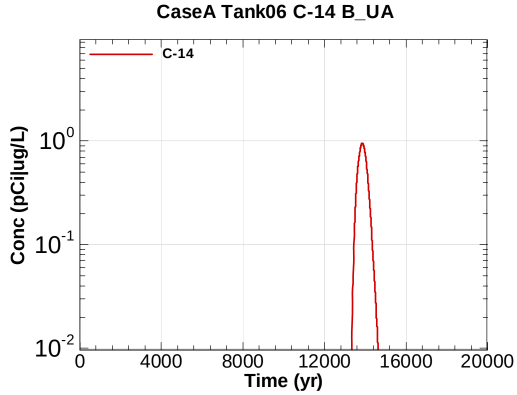

Figure E-572 - 100m Aquifer Concentration for CaseA Tank06 C-14 B_UA

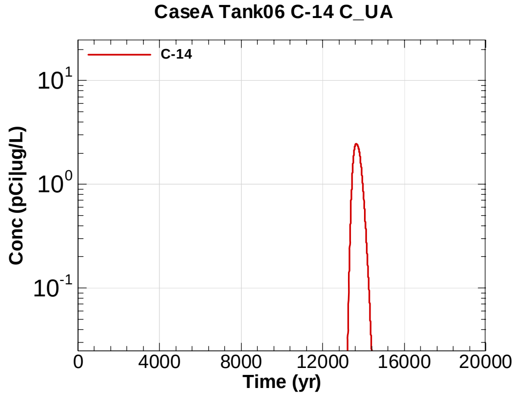

Figure E-573 - 100m Aquifer Concentration for CaseA Tank06 C-14 C_UA

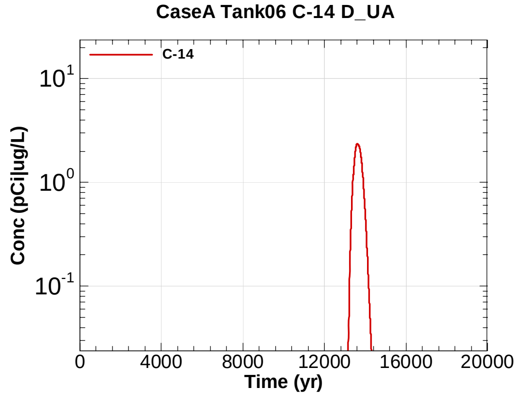

Figure E-574 - 100m Aquifer Concentration for CaseA Tank06 C-14 D_UA

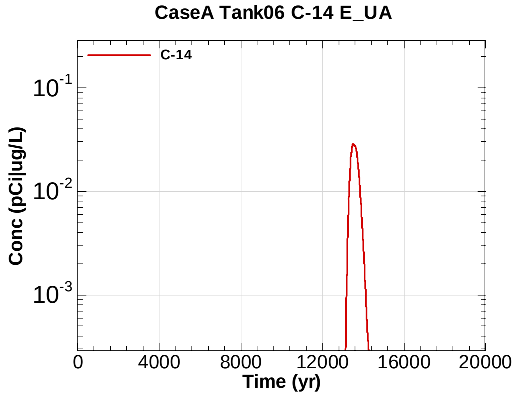

Figure E-575 - 100m Aquifer Concentration for CaseA Tank06 C-14 E_UA

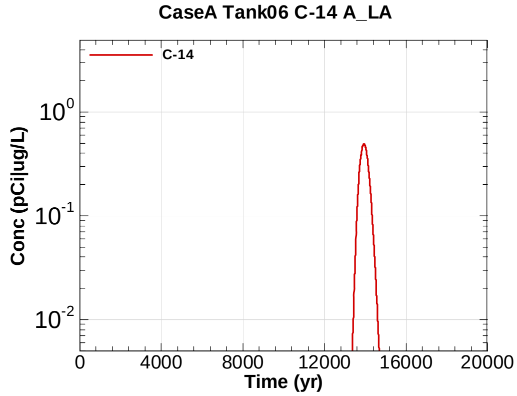

Figure E-576 - 100m Aquifer Concentration for CaseA Tank06 C-14 A_LA

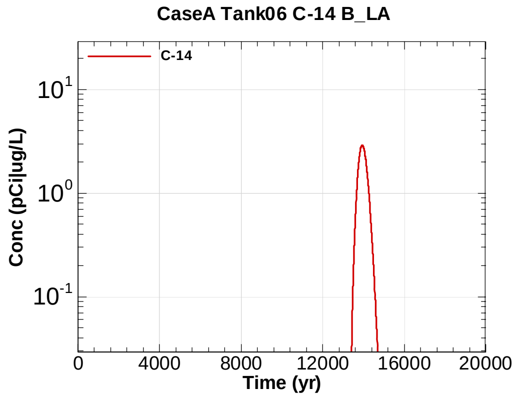

Figure E-577 - 100m Aquifer Concentration for CaseA Tank06 C-14 B_LA

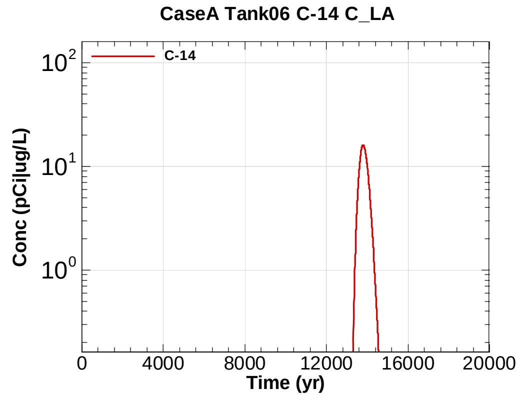

Figure E-578 - 100m Aquifer Concentration for CaseA Tank06 C-14 C_LA

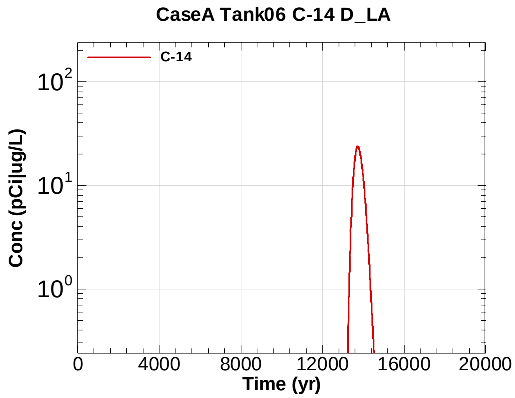

Figure E-579 - 100m Aquifer Concentration for CaseA Tank06 C-14 D_LA

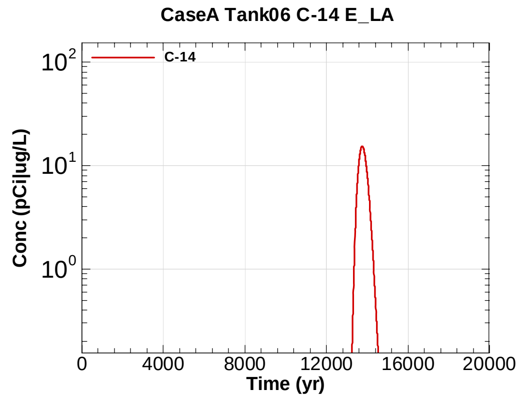

Figure E-580 - 100m Aquifer Concentration for CaseA Tank06 C-14 E_LA

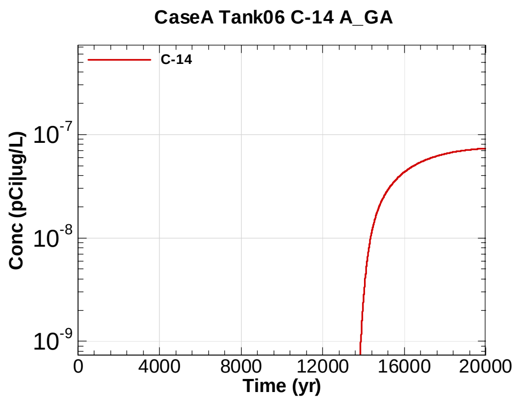

Figure E-581 - 100m Aquifer Concentration for CaseA Tank06 C-14 A_GA

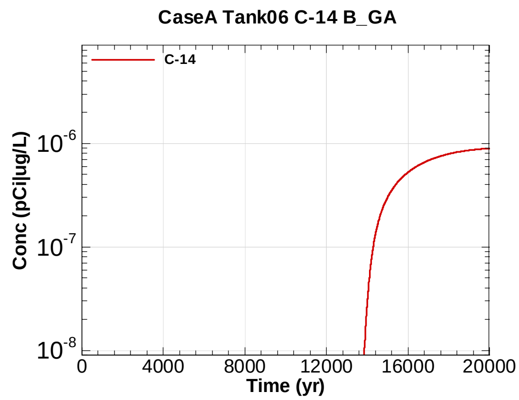

Figure E-582 - 100m Aquifer Concentration for CaseA Tank06 C-14 B_GA

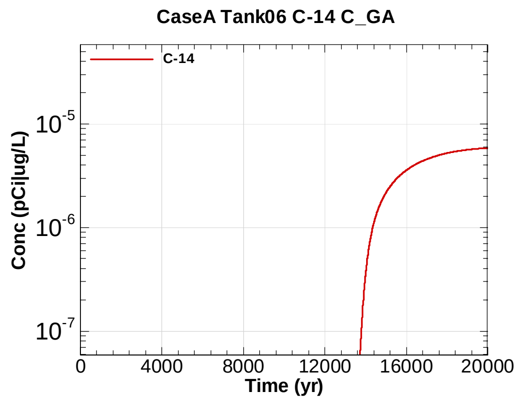

Figure E-583 - 100m Aquifer Concentration for CaseA Tank06 C-14 C_GA

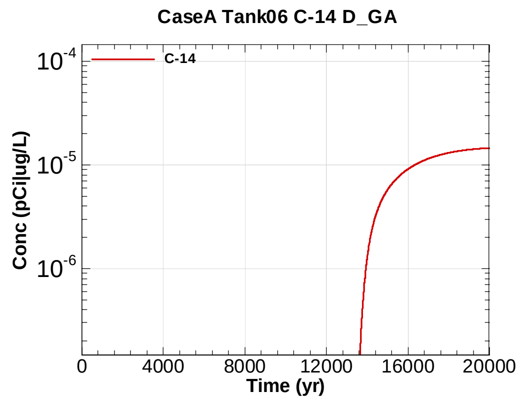

Figure E-584 - 100m Aquifer Concentration for CaseA Tank06 C-14 D_GA

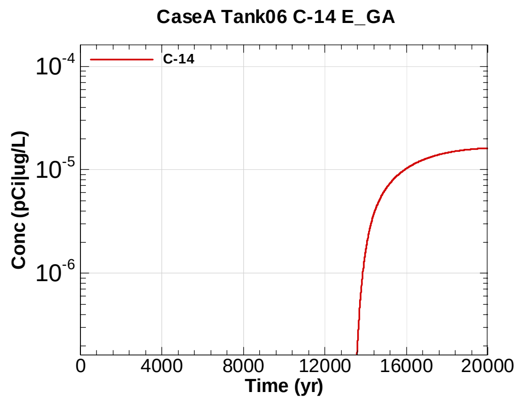

Figure E-585 - 100m Aquifer Concentration for CaseA Tank06 C-14 E_GA

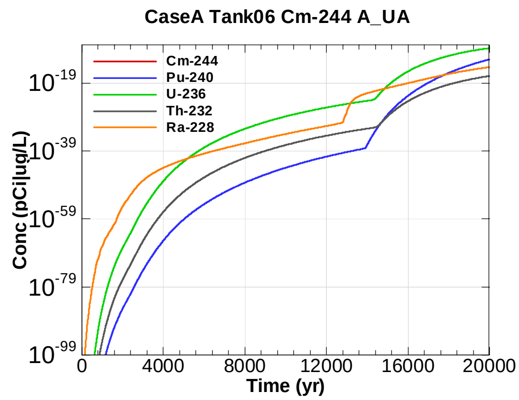

Figure E-586 - 100m Aquifer Concentration for CaseA Tank06 Cm-244 A_UA

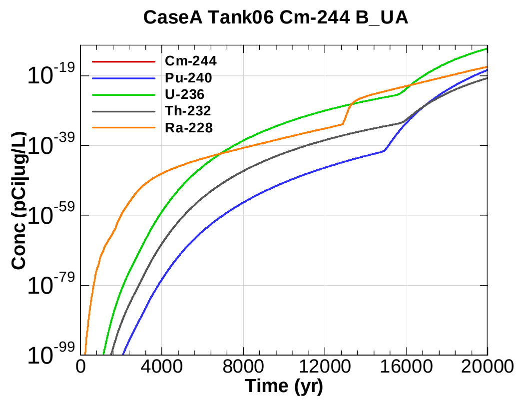

Figure E-587 - 100m Aquifer Concentration for CaseA Tank06 Cm-244 B_UA

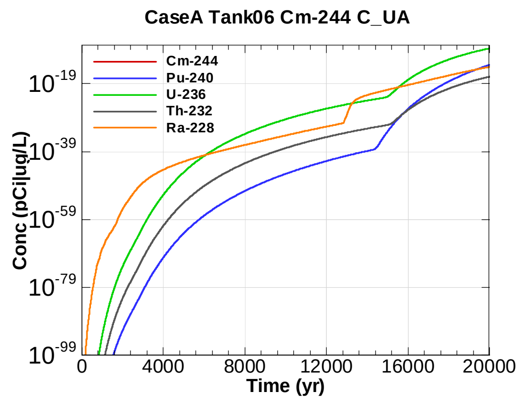

Figure E-588 - 100m Aquifer Concentration for CaseA Tank06 Cm-244 C_UA

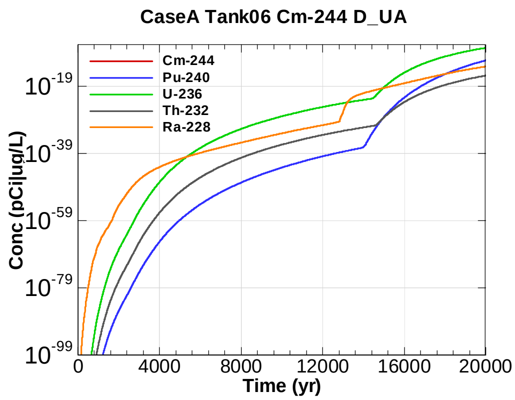

Figure E-589 - 100m Aquifer Concentration for CaseA Tank06 Cm-244 D_UA

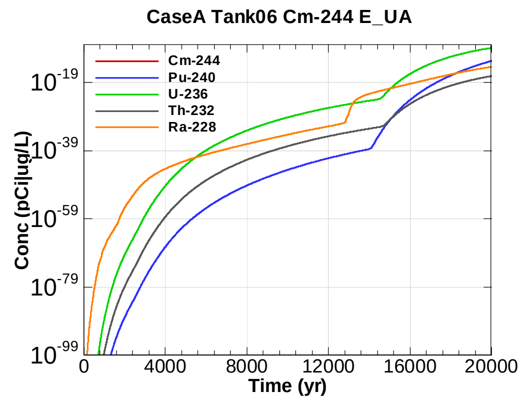

Figure E-590 - 100m Aquifer Concentration for CaseA Tank06 Cm-244 E_UA

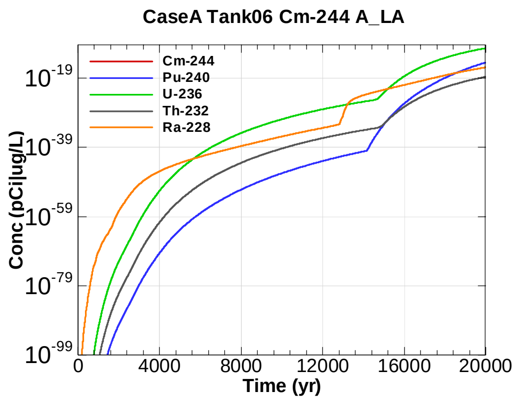

Figure E-591 - 100m Aquifer Concentration for CaseA Tank06 Cm-244 A_LA

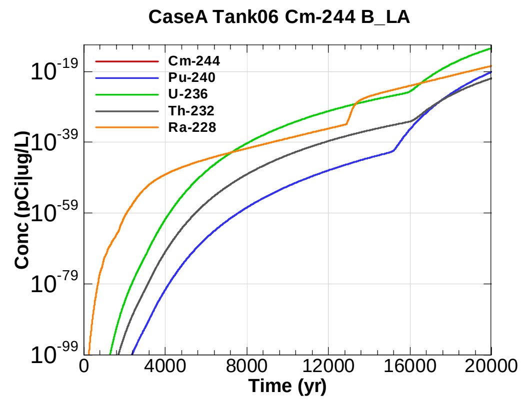

Figure E-592 - 100m Aquifer Concentration for CaseA Tank06 Cm-244 B_LA

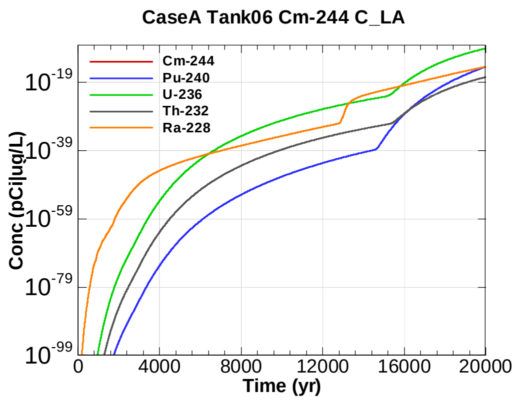

Figure E-593 - 100m Aquifer Concentration for CaseA Tank06 Cm-244 C_LA

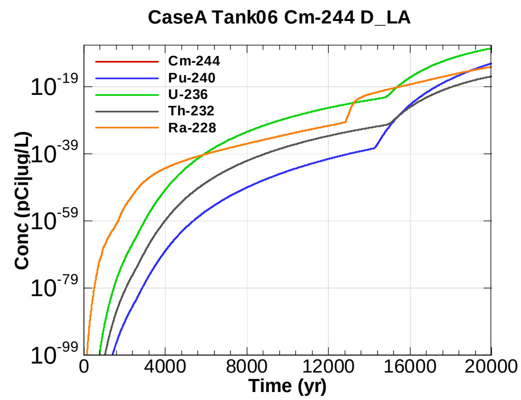

Figure E-594 - 100m Aquifer Concentration for CaseA Tank06 Cm-244 D_LA

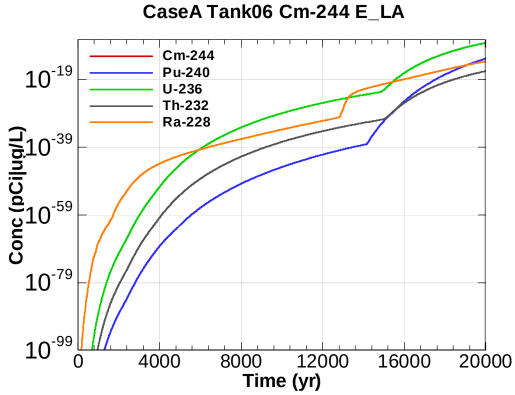

Figure E-595 - 100m Aquifer Concentration for CaseA Tank06 Cm-244 E_LA

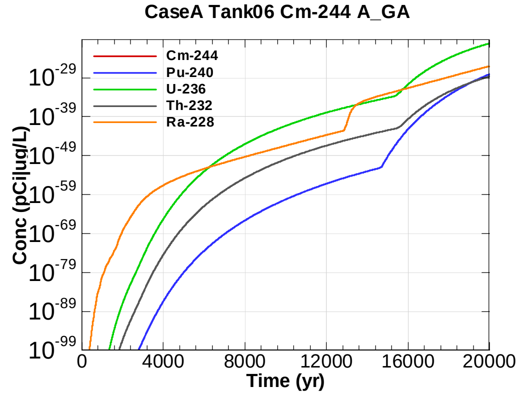

Figure E-596 - 100m Aquifer Concentration for CaseA Tank06 Cm-244 A_GA

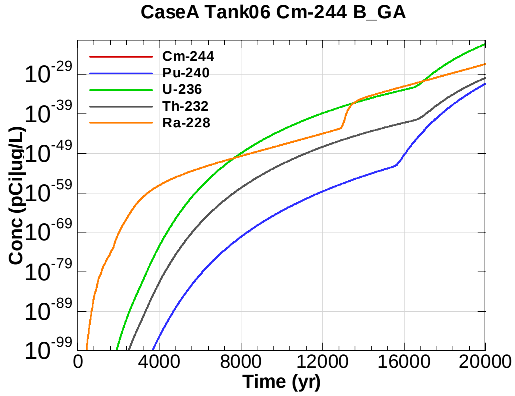

Figure E-597 - 100m Aquifer Concentration for CaseA Tank06 Cm-244 B_GA

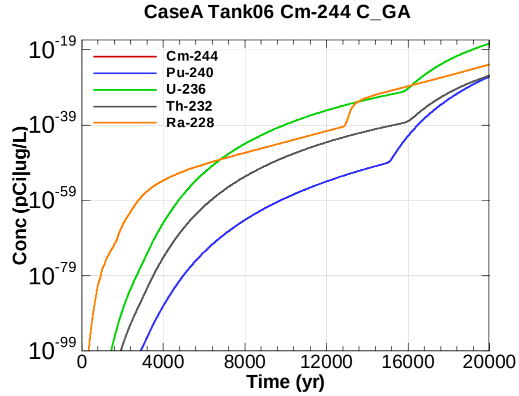

Figure E-598 - 100m Aquifer Concentration for CaseA Tank06 Cm-244 C_GA

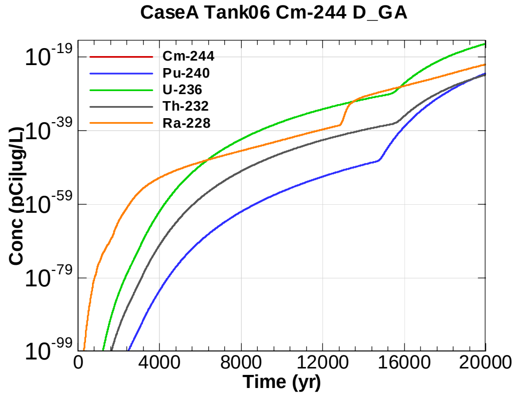

Figure E-599 - 100m Aquifer Concentration for CaseA Tank06 Cm-244 D_GA

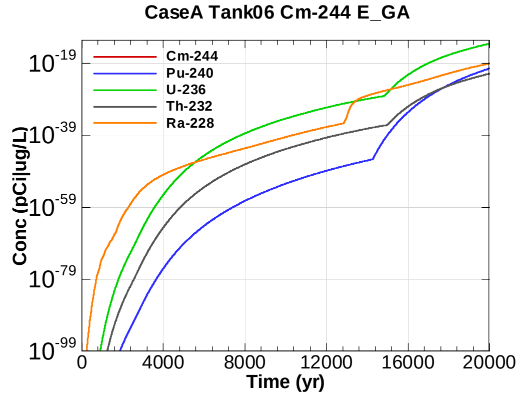

Figure E-600 - 100m Aquifer Concentration for CaseA Tank06 Cm-244 E_GA

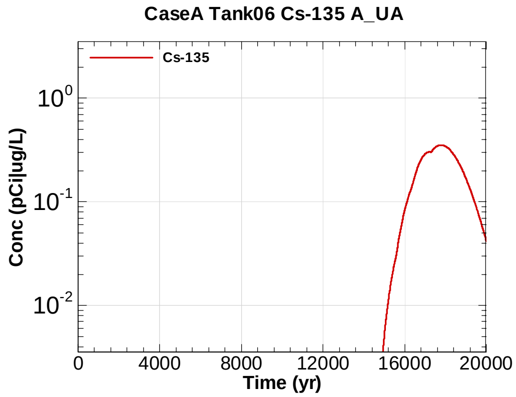

Figure E-601 - 100m Aquifer Concentration for CaseA Tank06 Cs-135 A_UA

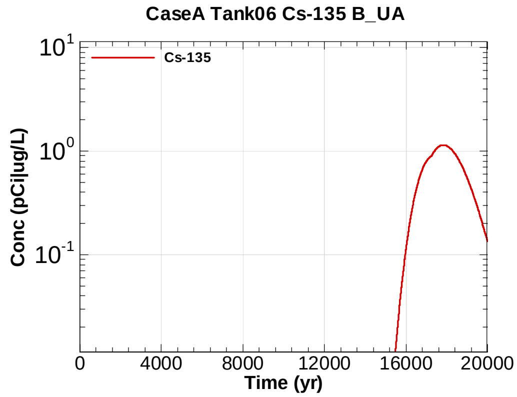

Figure E-602 - 100m Aquifer Concentration for CaseA Tank06 Cs-135 B_UA

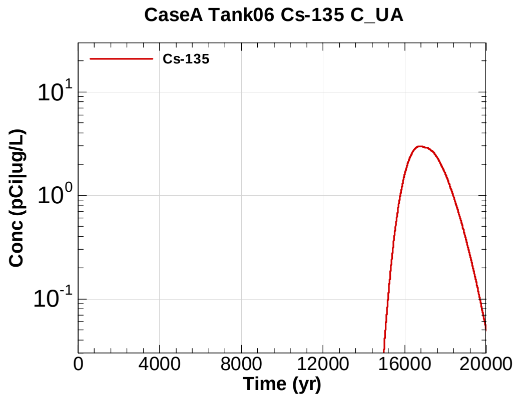

Figure E-603 - 100m Aquifer Concentration for CaseA Tank06 Cs-135 C_UA

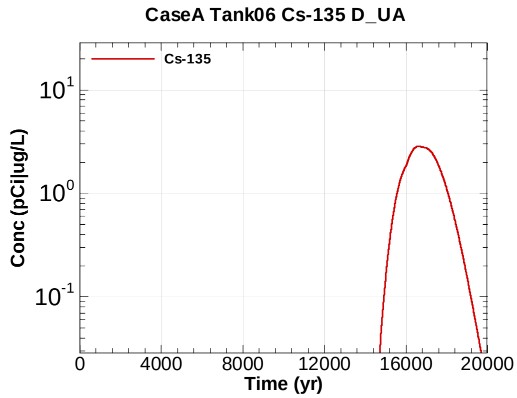

Figure E-604 - 100m Aquifer Concentration for CaseA Tank06 Cs-135 D_UA

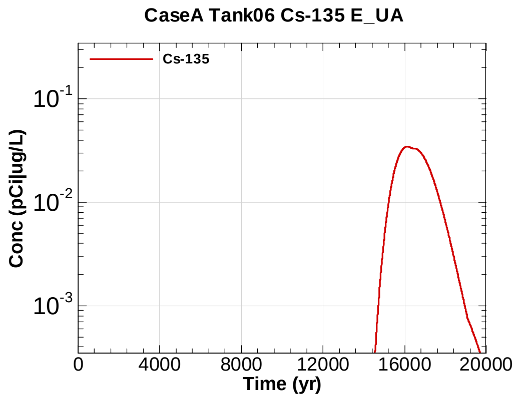

Figure E-605 - 100m Aquifer Concentration for CaseA Tank06 Cs-135 E_UA

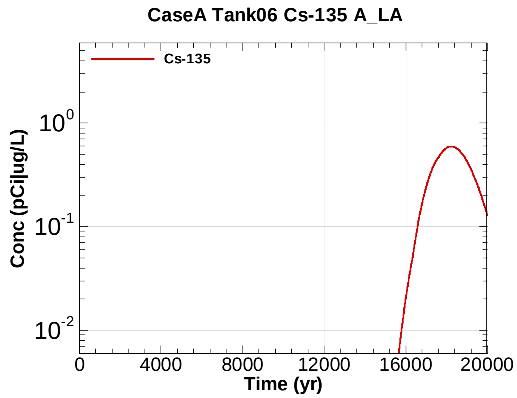

Figure E-606 - 100m Aquifer Concentration for CaseA Tank06 Cs-135 A_LA

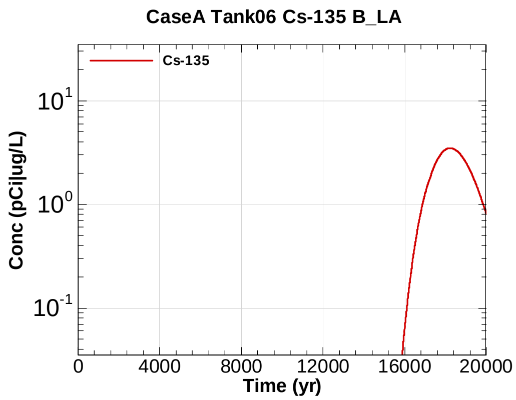

Figure E-607 - 100m Aquifer Concentration for CaseA Tank06 Cs-135 B_LA

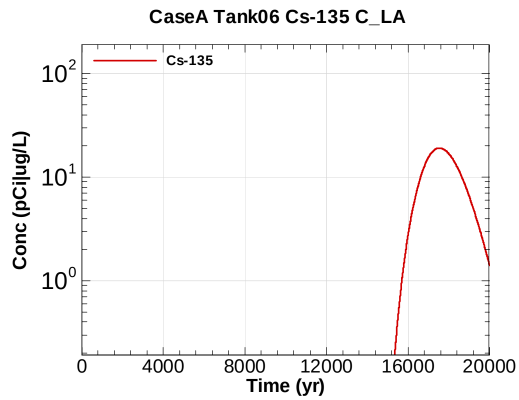

Figure E-608 - 100m Aquifer Concentration for CaseA Tank06 Cs-135 C_LA

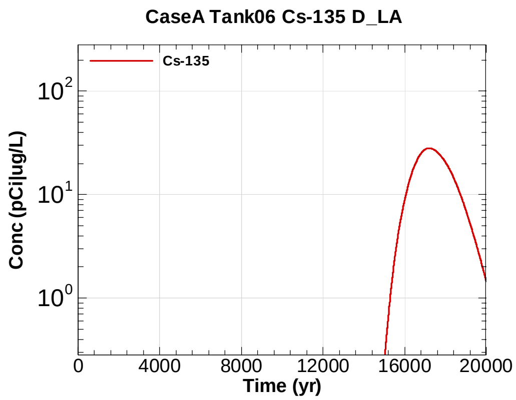

Figure E-609 - 100m Aquifer Concentration for CaseA Tank06 Cs-135 D_LA

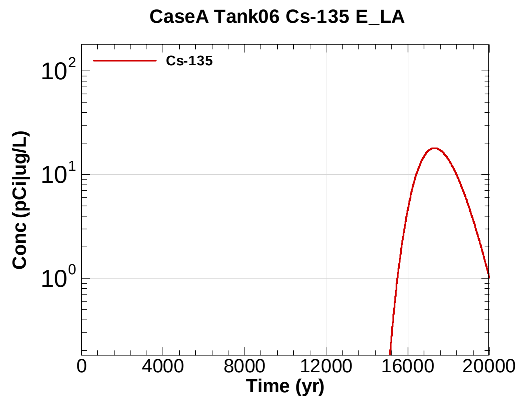

Figure E-610 - 100m Aquifer Concentration for CaseA Tank06 Cs-135 E_LA

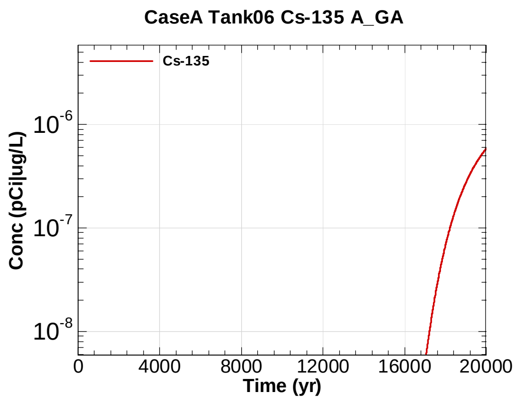

Figure E-611 - 100m Aquifer Concentration for CaseA Tank06 Cs-135 A_GA

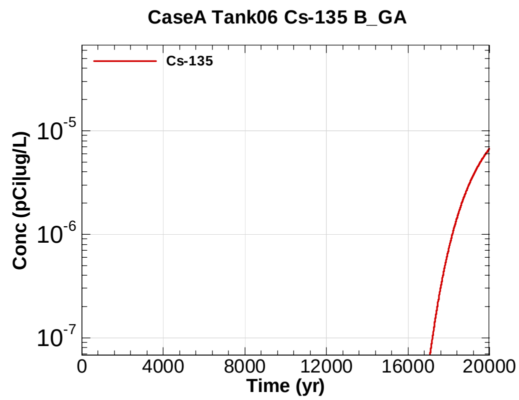

Figure E-612 - 100m Aquifer Concentration for CaseA Tank06 Cs-135 B_GA

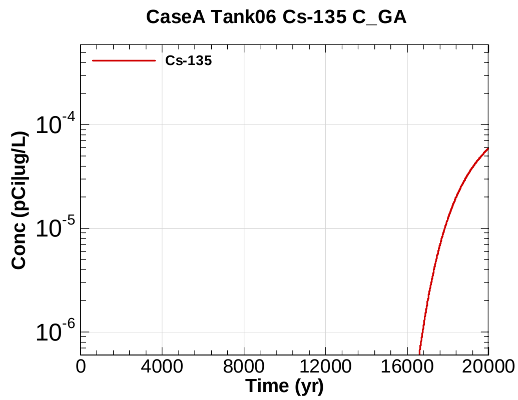

Figure E-613 - 100m Aquifer Concentration for CaseA Tank06 Cs-135 C_GA

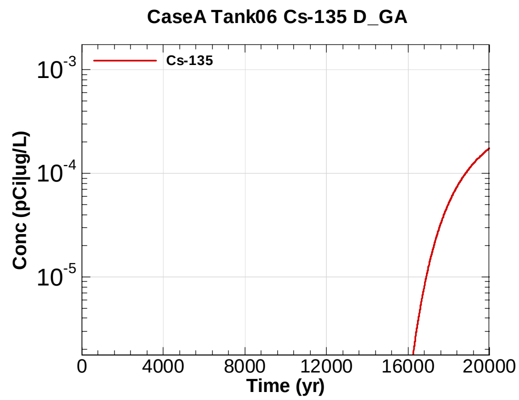

Figure E-614 - 100m Aquifer Concentration for CaseA Tank06 Cs-135 D_GA

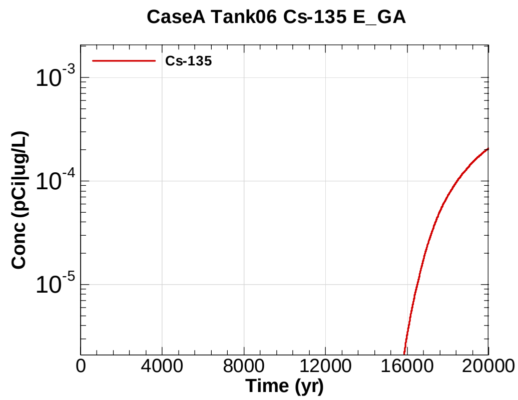

Figure E-615 - 100m Aquifer Concentration for CaseA Tank06 Cs-135 E_GA

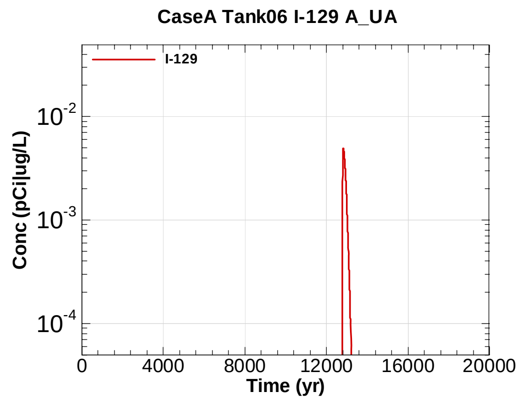

Figure E-616 - 100m Aquifer Concentration for CaseA Tank06 I-129 A_UA

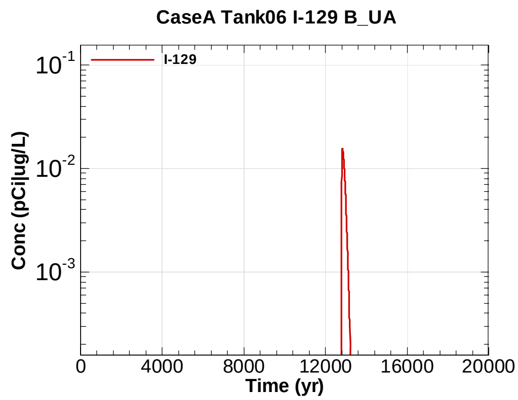

Figure E-617 - 100m Aquifer Concentration for CaseA Tank06 I-129 B_UA

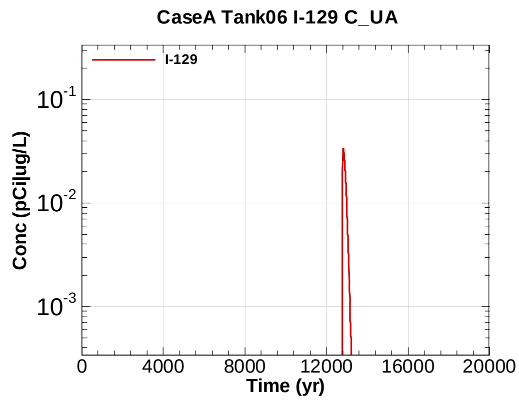

Figure E-618 - 100m Aquifer Concentration for CaseA Tank06 I-129 C_UA

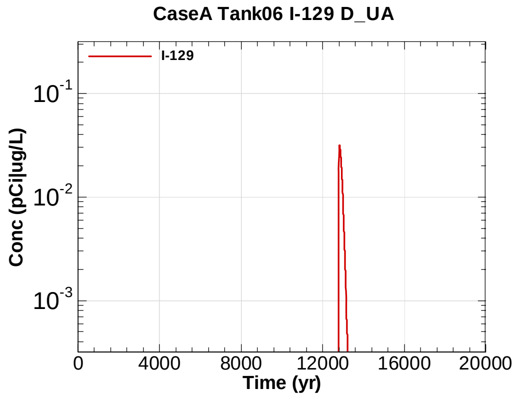

Figure E-619 - 100m Aquifer Concentration for CaseA Tank06 I-129 D_UA

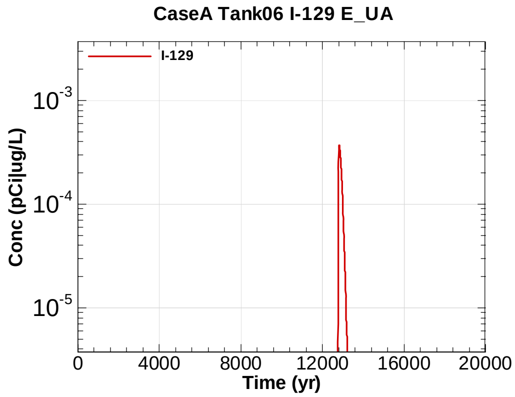

Figure E-620 - 100m Aquifer Concentration for CaseA Tank06 I-129 E_UA

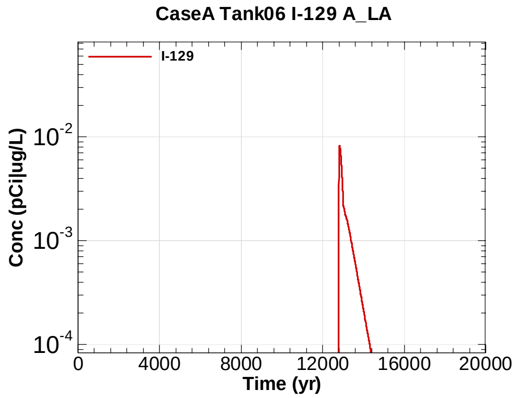

Figure E-621 - 100m Aquifer Concentration for CaseA Tank06 I-129 A_LA

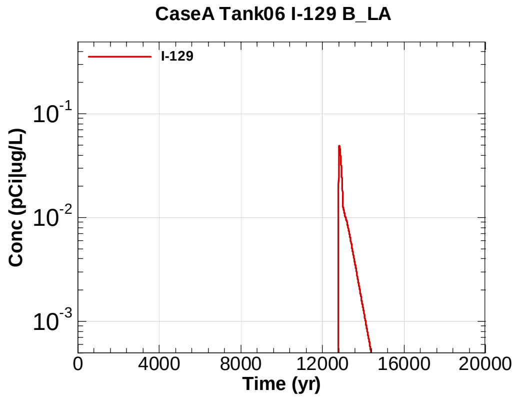

Figure E-622 - 100m Aquifer Concentration for CaseA Tank06 I-129 B_LA

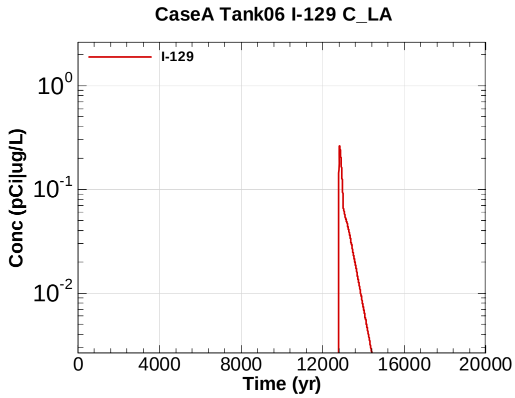

Figure E-623 - 100m Aquifer Concentration for CaseA Tank06 I-129 C_LA

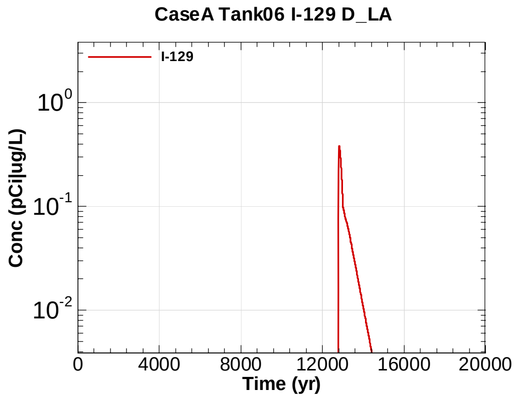

Figure E-624 - 100m Aquifer Concentration for CaseA Tank06 I-129 D_LA

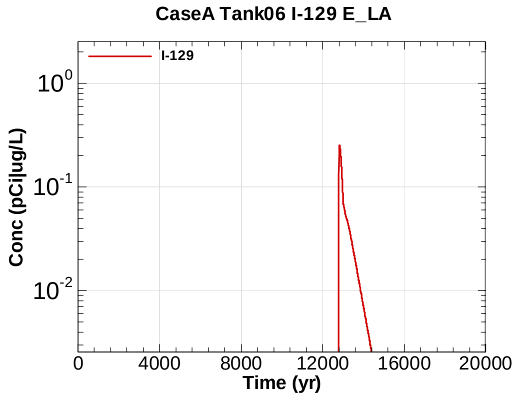

Figure E-625 - 100m Aquifer Concentration for CaseA Tank06 I-129 E_LA

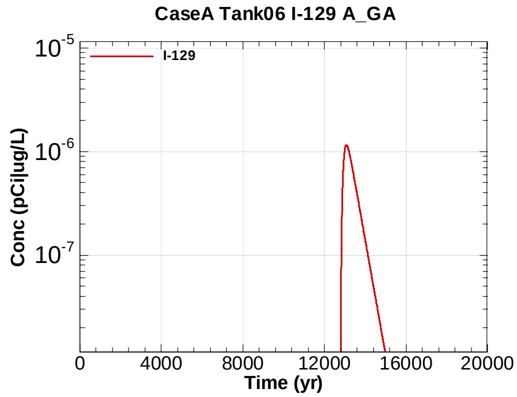

Figure E-626 - 100m Aquifer Concentration for CaseA Tank06 I-129 A_GA

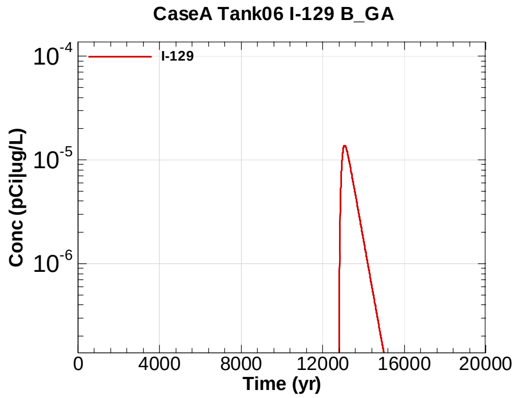

Figure E-627 - 100m Aquifer Concentration for CaseA Tank06 I-129 B_GA

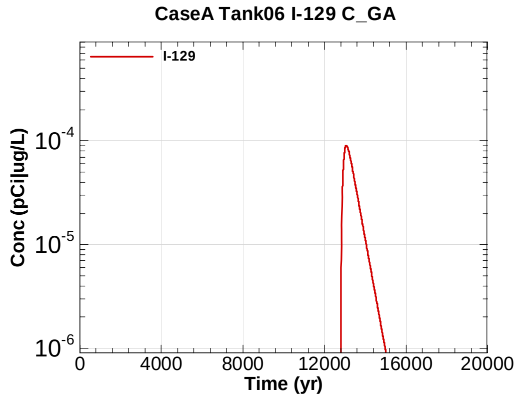

Figure E-628 - 100m Aquifer Concentration for CaseA Tank06 I-129 C_GA

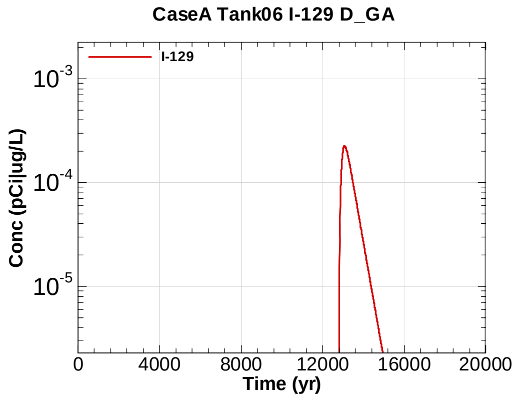

Figure E-629 - 100m Aquifer Concentration for CaseA Tank06 I-129 D_GA

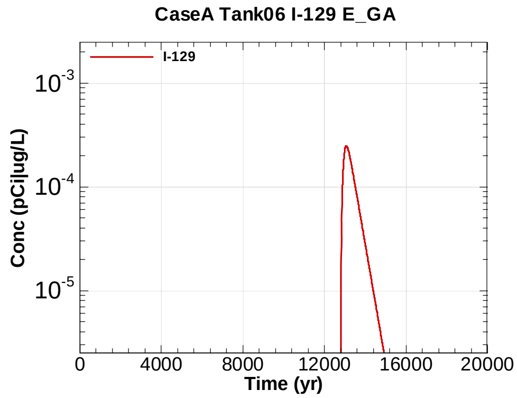

Figure E-630 - 100m Aquifer Concentration for CaseA Tank06 I-129 E_GA

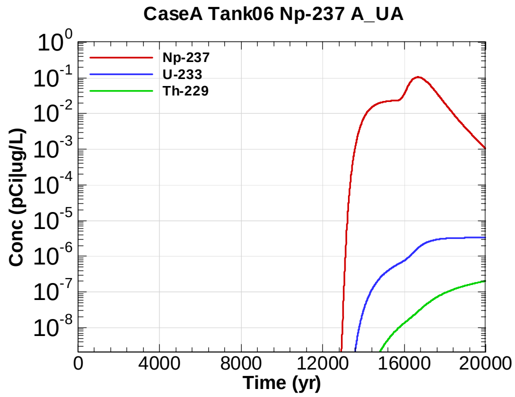

Figure E-631 - 100m Aquifer Concentration for CaseA Tank06 Np-237 A_UA

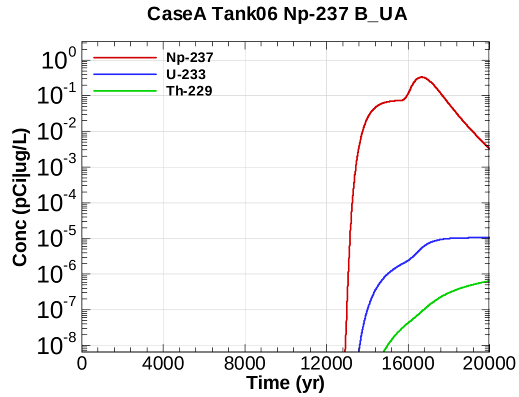

Figure E-632 - 100m Aquifer Concentration for CaseA Tank06 Np-237 B_UA

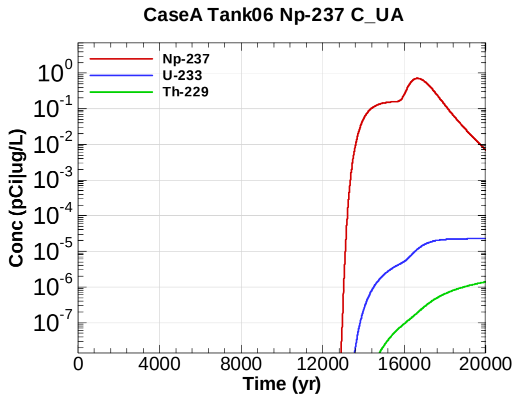

Figure E-633 - 100m Aquifer Concentration for CaseA Tank06 Np-237 C_UA

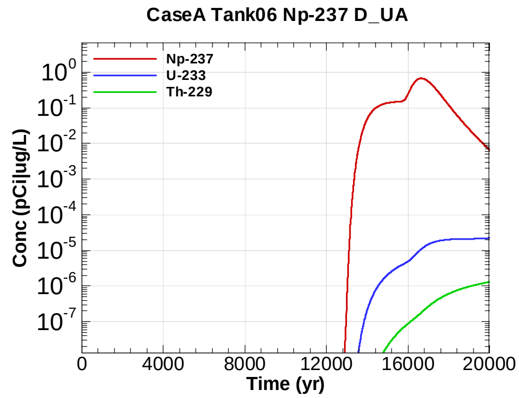

Figure E-634 - 100m Aquifer Concentration for CaseA Tank06 Np-237 D_UA

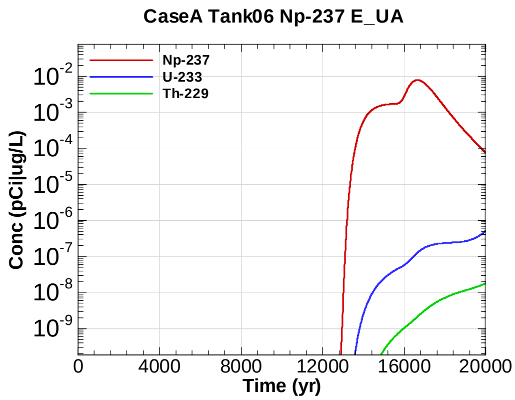

Figure E-635 - 100m Aquifer Concentration for CaseA Tank06 Np-237 E_UA

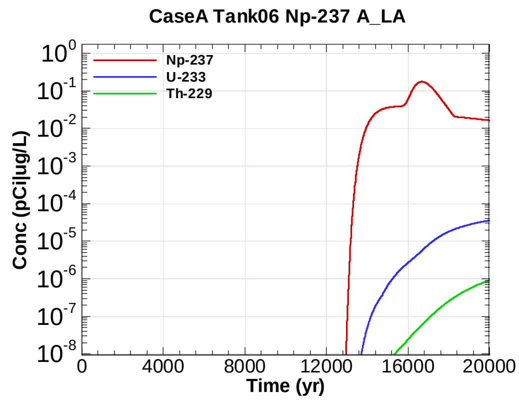

Figure E-636 - 100m Aquifer Concentration for CaseA Tank06 Np-237 A_LA

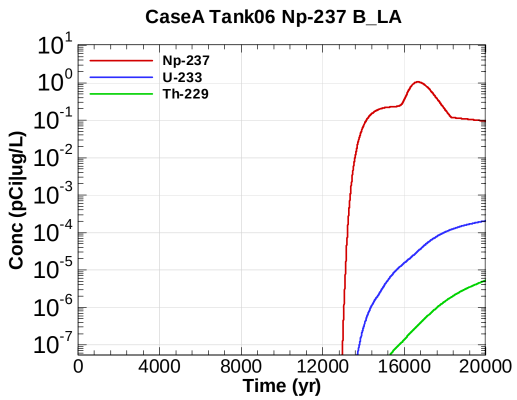

Figure E-637 - 100m Aquifer Concentration for CaseA Tank06 Np-237 B_LA

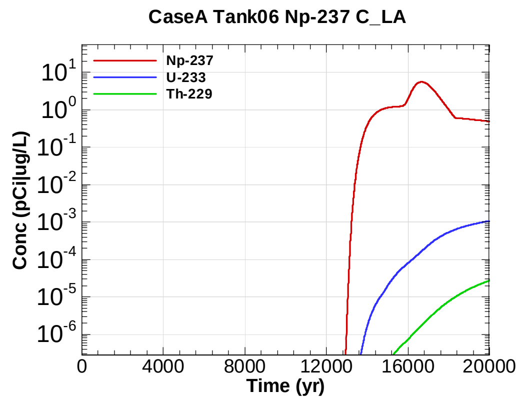

Figure E-638 - 100m Aquifer Concentration for CaseA Tank06 Np-237 C_LA

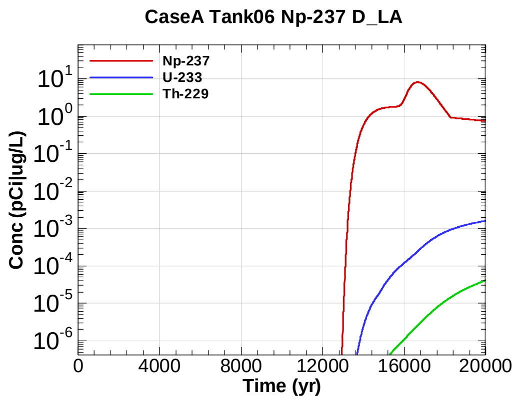

Figure E-639 - 100m Aquifer Concentration for CaseA Tank06 Np-237 D_LA

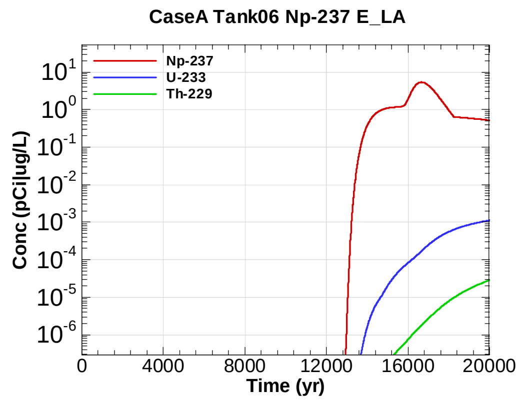

Figure E-640 - 100m Aquifer Concentration for CaseA Tank06 Np-237 E_LA

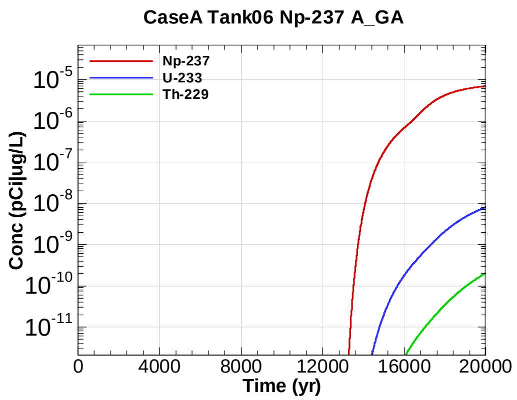

Figure E-641 - 100m Aquifer Concentration for CaseA Tank06 Np-237 A_GA

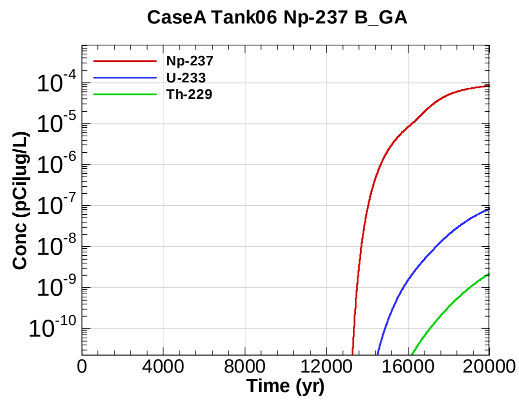

Figure E-642 - 100m Aquifer Concentration for CaseA Tank06 Np-237 B_GA

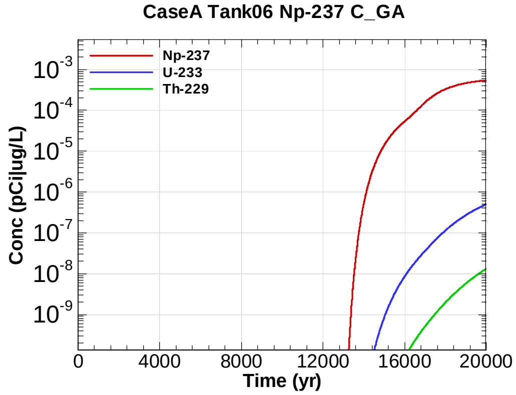

Figure E-643 - 100m Aquifer Concentration for CaseA Tank06 Np-237 C_GA

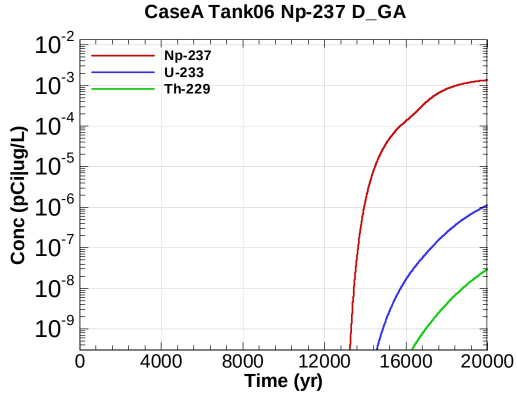

Figure E-644 - 100m Aquifer Concentration for CaseA Tank06 Np-237 D_GA

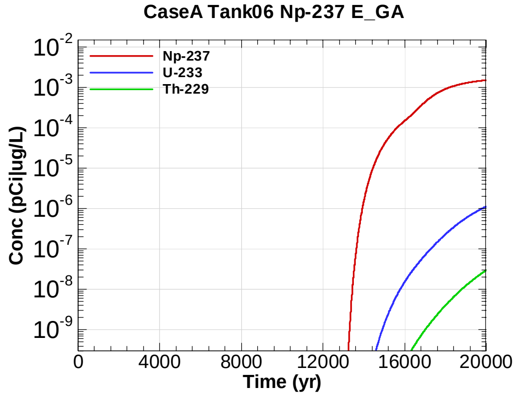

Figure E-645 - 100m Aquifer Concentration for CaseA Tank06 Np-237 E_GA

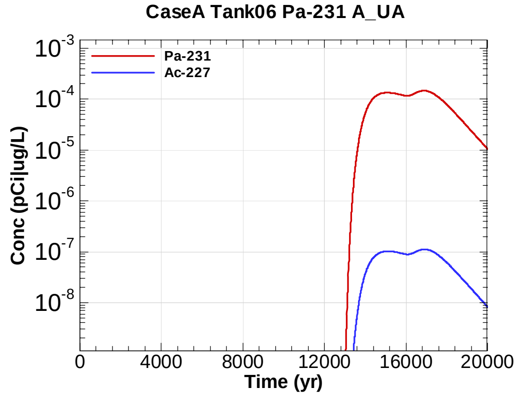

Figure E-646 - 100m Aquifer Concentration for CaseA Tank06 Pa-231 A_UA

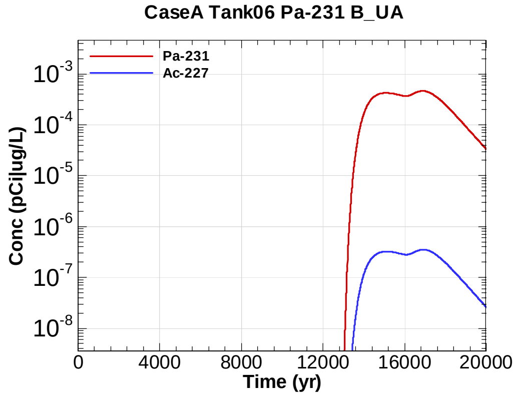

Figure E-647 - 100m Aquifer Concentration for CaseA Tank06 Pa-231 B_UA

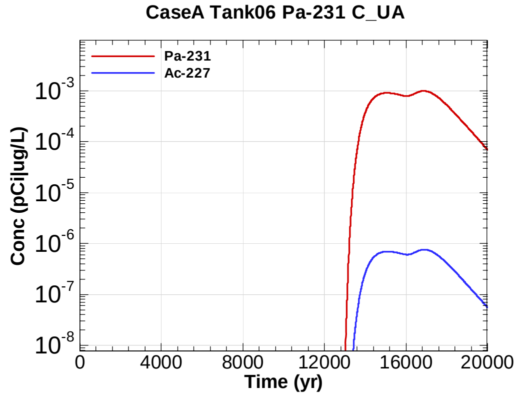

Figure E-648 - 100m Aquifer Concentration for CaseA Tank06 Pa-231 C_UA

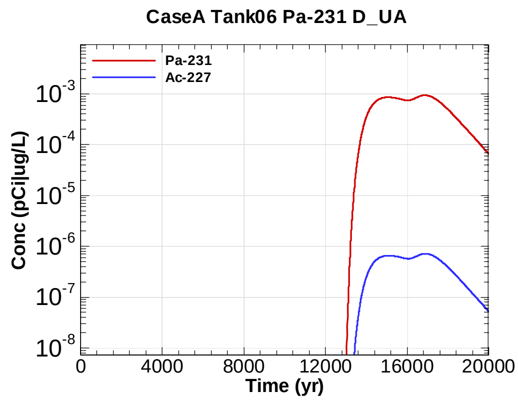

Figure E-649 - 100m Aquifer Concentration for CaseA Tank06 Pa-231 D_UA

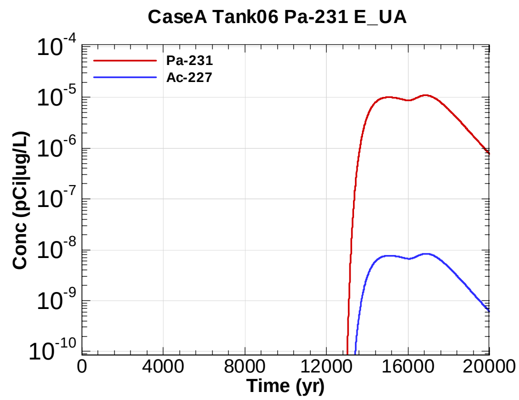

Figure E-650 - 100m Aquifer Concentration for CaseA Tank06 Pa-231 E_UA

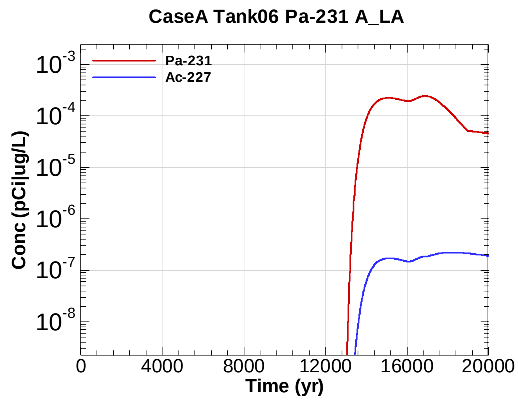

Figure E-651 - 100m Aquifer Concentration for CaseA Tank06 Pa-231 A_LA

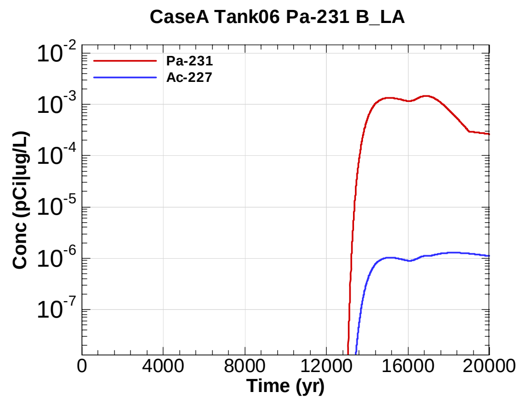

Figure E-652 - 100m Aquifer Concentration for CaseA Tank06 Pa-231 B_LA

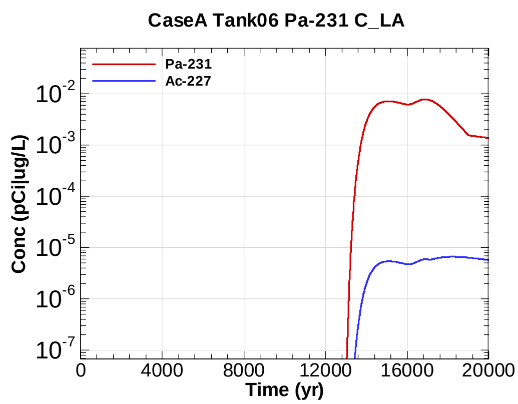

Figure E-653 - 100m Aquifer Concentration for CaseA Tank06 Pa-231 C_LA

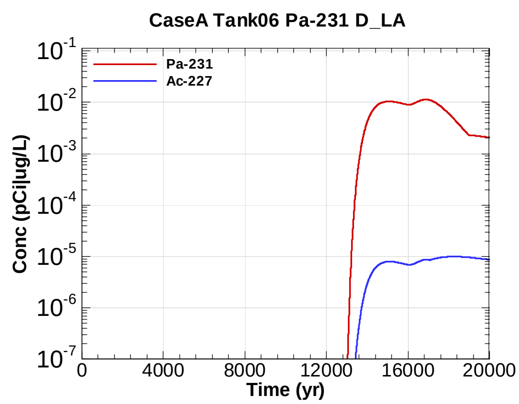

Figure E-654 - 100m Aquifer Concentration for CaseA Tank06 Pa-231 D_LA

CaseA Tank06 Pa-231 E_LA

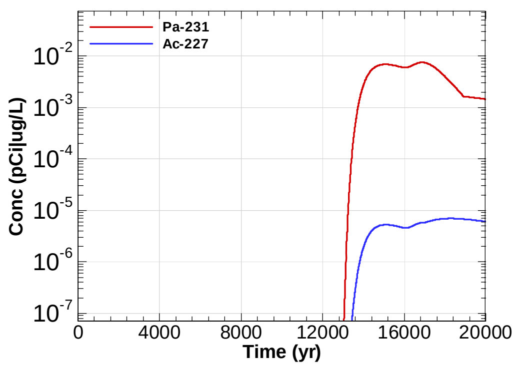

Figure E-655 - 100m Aquifer Concentration for CaseA Tank06 Pa-231 E_LA

CaseA Tank06 Pa-231 A_GA

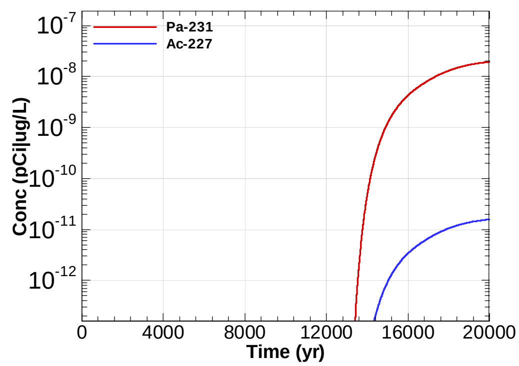

Figure E-656 - 100m Aquifer Concentration for CaseA Tank06 Pa-231 A_GA

CaseA Tank06 Pa-231 B_GA

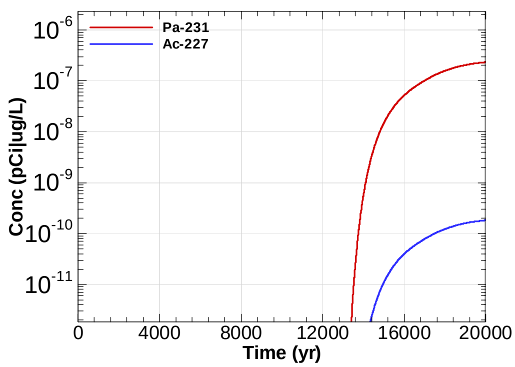

Figure E-657 - 100m Aquifer Concentration for CaseA Tank06 Pa-231 B_GA

CaseA Tank06 Pa-231 C_GA

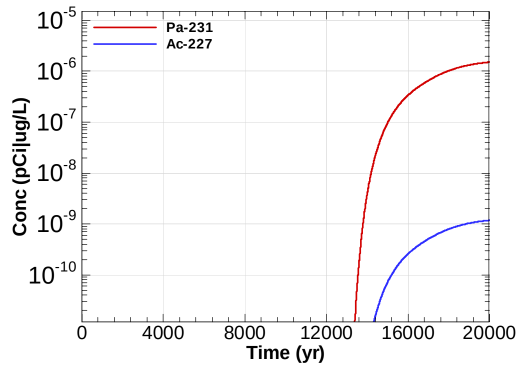

Figure E-658 - 100m Aquifer Concentration for CaseA Tank06 Pa-231 C_GA

CaseA Tank06 Pa-231 D_GA

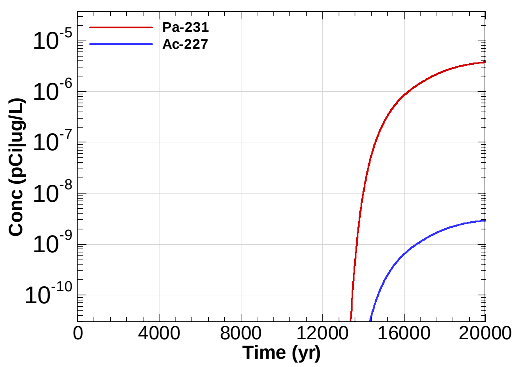

Figure E-659 - 100m Aquifer Concentration for CaseA Tank06 Pa-231 D_GA

CaseA Tank06 Pa-231 E_GA

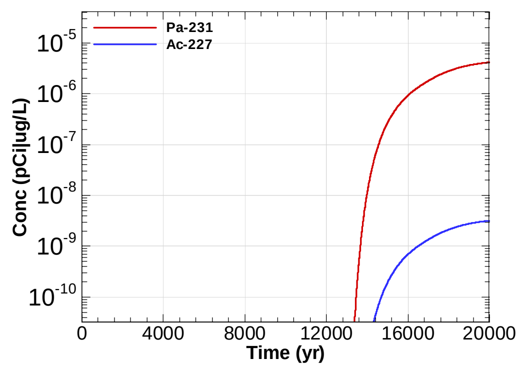

Figure E-660 - 100m Aquifer Concentration for CaseA Tank06 Pa-231 E_GA

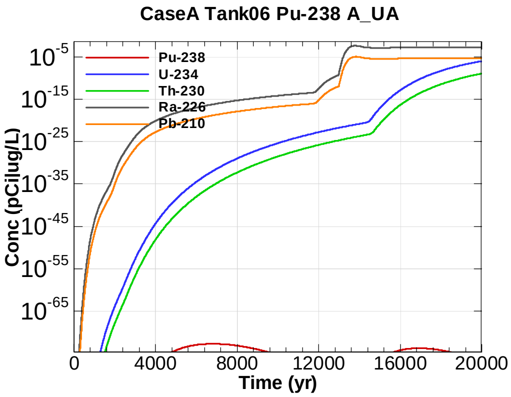

Figure E-661 - 100m Aquifer Concentration for CaseA Tank06 Pu-238 A_UA

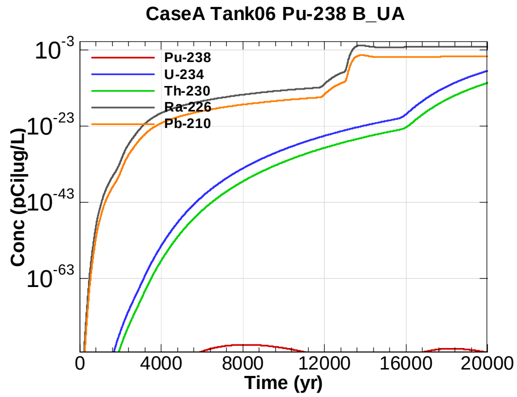

Figure E-662 - 100m Aquifer Concentration for CaseA Tank06 Pu-238 B_UA

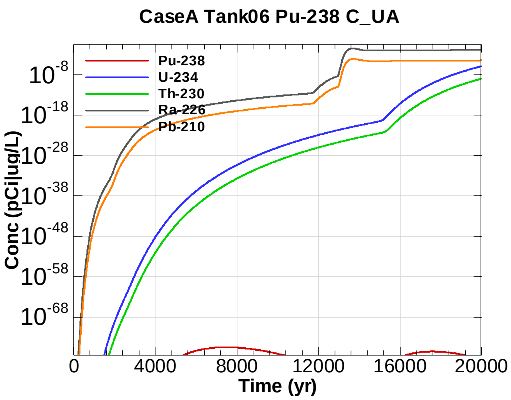

Figure E-663 - 100m Aquifer Concentration for CaseA Tank06 Pu-238 C_UA

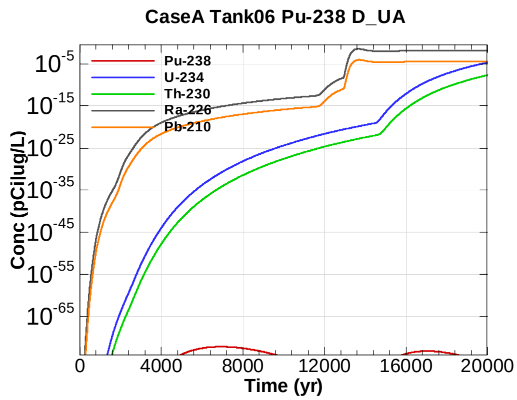

Figure E-664 - 100m Aquifer Concentration for CaseA Tank06 Pu-238 D_UA

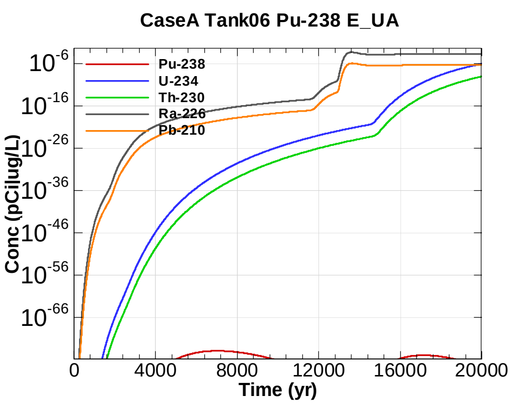

Figure E-665 - 100m Aquifer Concentration for CaseA Tank06 Pu-238 E_UA

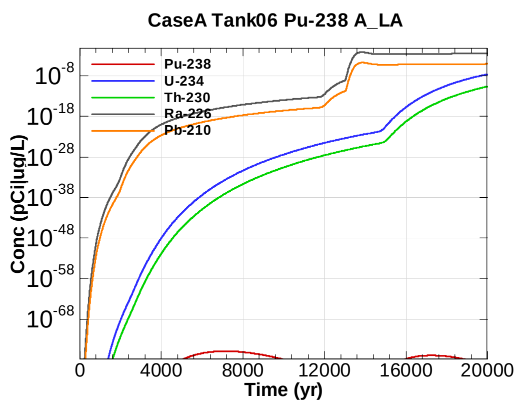

Figure E-666 - 100m Aquifer Concentration for CaseA Tank06 Pu-238 A_LA

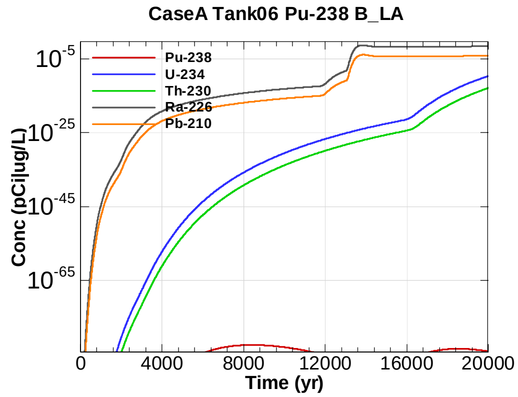

Figure E-667 - 100m Aquifer Concentration for CaseA Tank06 Pu-238 B_LA

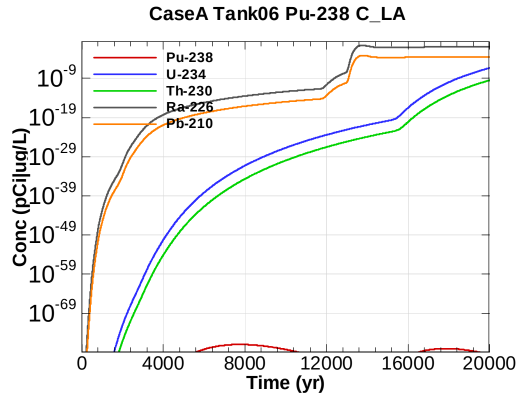

Figure E-668 - 100m Aquifer Concentration for CaseA Tank06 Pu-238 C_LA

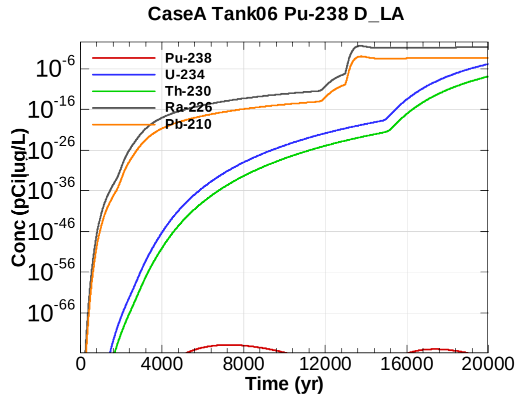

Figure E-669 - 100m Aquifer Concentration for CaseA Tank06 Pu-238 D_LA

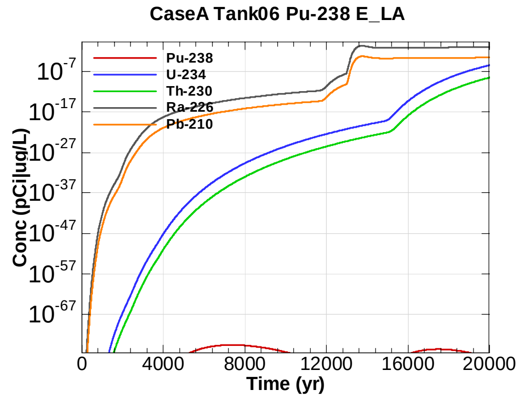

Figure E-670 - 100m Aquifer Concentration for CaseA Tank06 Pu-238 E_LA

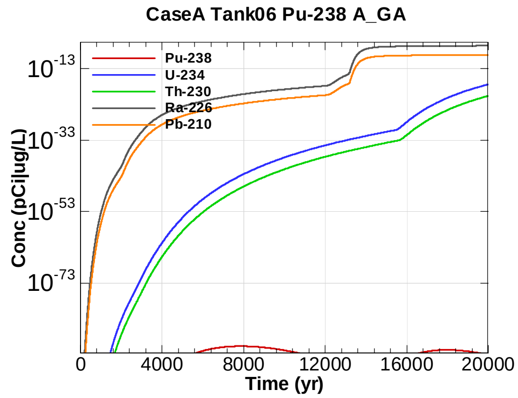

Figure E-671 - 100m Aquifer Concentration for CaseA Tank06 Pu-238 A_GA

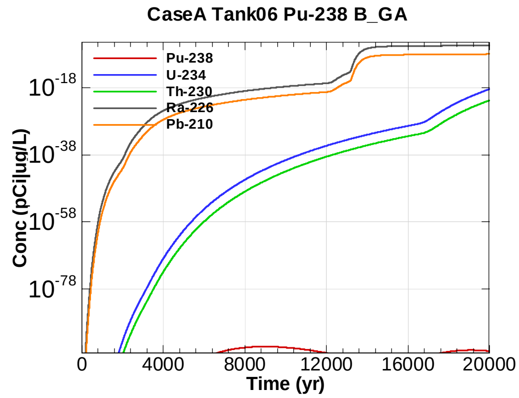

Figure E-672 - 100m Aquifer Concentration for CaseA Tank06 Pu-238 B_GA

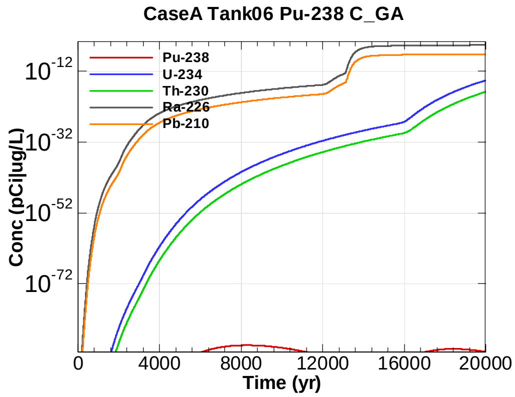

Figure E-673 - 100m Aquifer Concentration for CaseA Tank06 Pu-238 C_GA

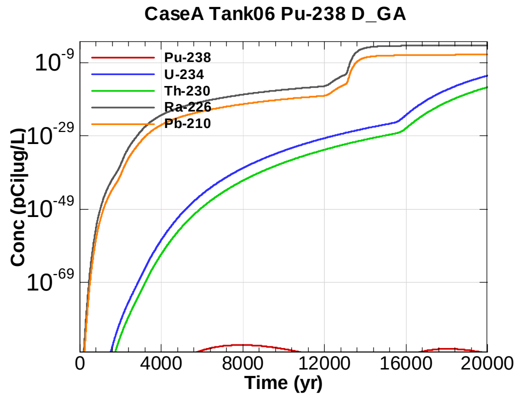

Figure E-674 - 100m Aquifer Concentration for CaseA Tank06 Pu-238 D_GA

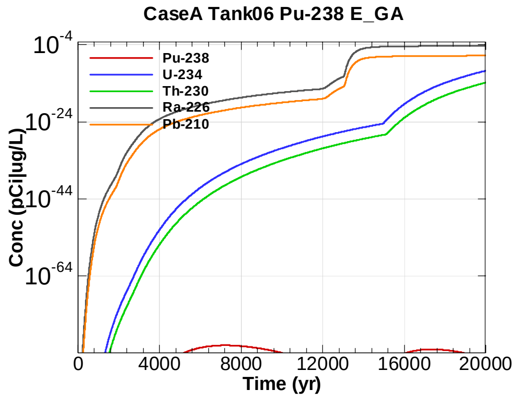

Figure E-675 - 100m Aquifer Concentration for CaseA Tank06 Pu-238 E_GA

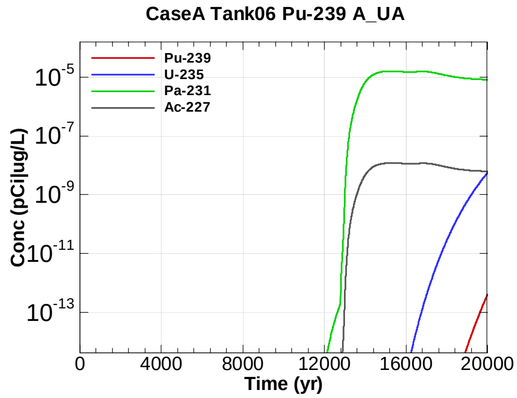

Figure E-676 - 100m Aquifer Concentration for CaseA Tank06 Pu-239 A_UA

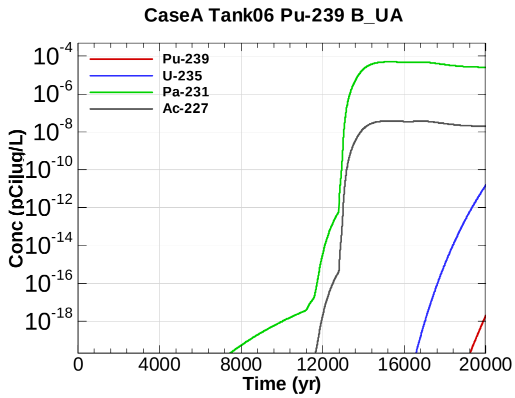

Figure E-677 - 100m Aquifer Concentration for CaseA Tank06 Pu-239 B_UA

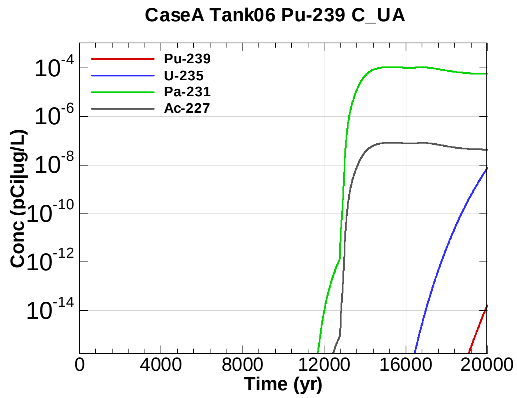

Figure E-678 - 100m Aquifer Concentration for CaseA Tank06 Pu-239 C_UA

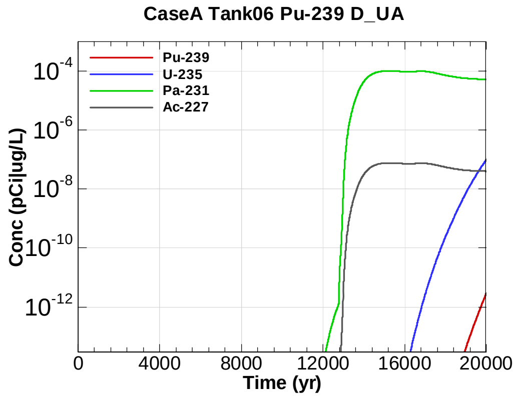

Figure E-679 - 100m Aquifer Concentration for CaseA Tank06 Pu-239 D_UA

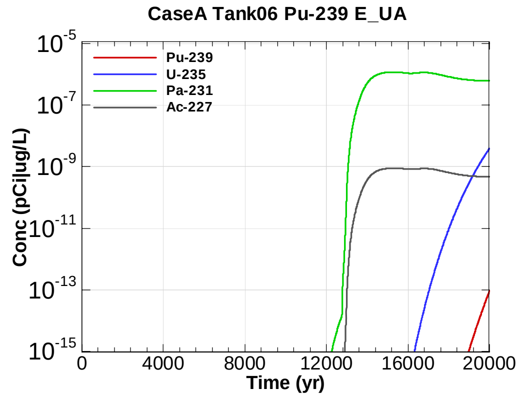

Figure E-680 - 100m Aquifer Concentration for CaseA Tank06 Pu-239 E_UA

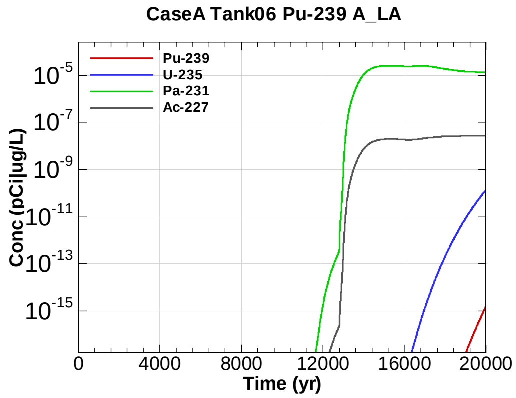

Figure E-681 - 100m Aquifer Concentration for CaseA Tank06 Pu-239 A_LA

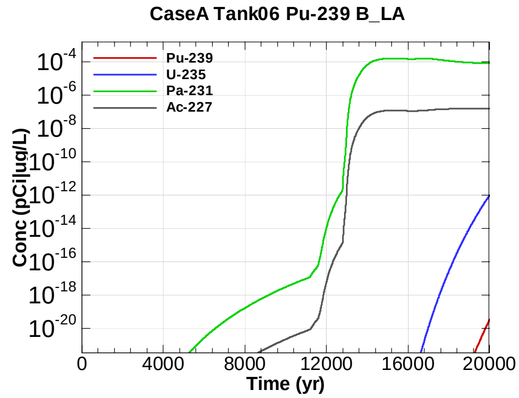

Figure E-682 - 100m Aquifer Concentration for CaseA Tank06 Pu-239 B_LA

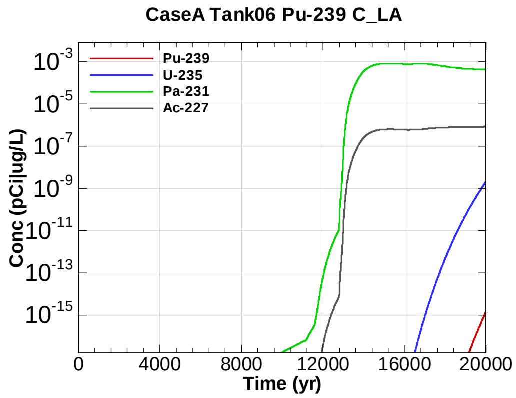

Figure E-683 - 100m Aquifer Concentration for CaseA Tank06 Pu-239 C_LA

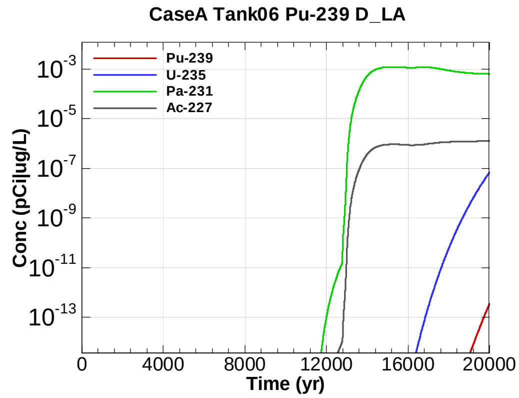

Figure E-684 - 100m Aquifer Concentration for CaseA Tank06 Pu-239 D_LA

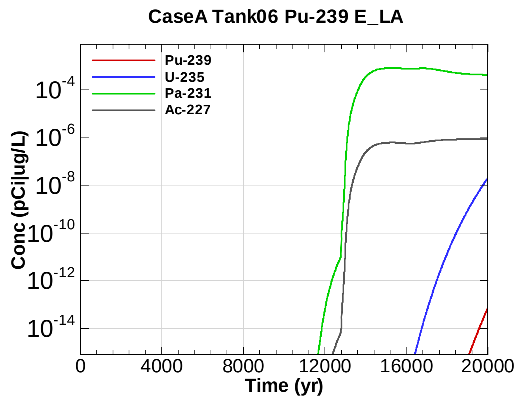

Figure E-685 - 100m Aquifer Concentration for CaseA Tank06 Pu-239 E_LA

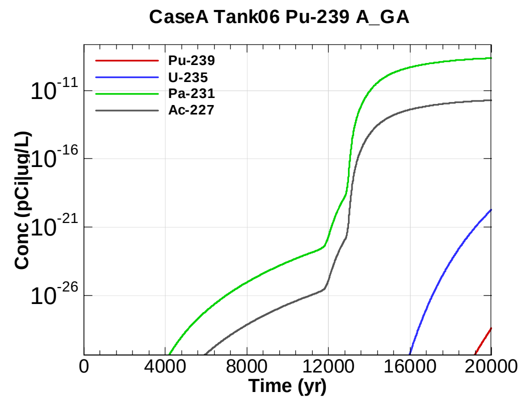

Figure E-686 - 100m Aquifer Concentration for CaseA Tank06 Pu-239 A_GA

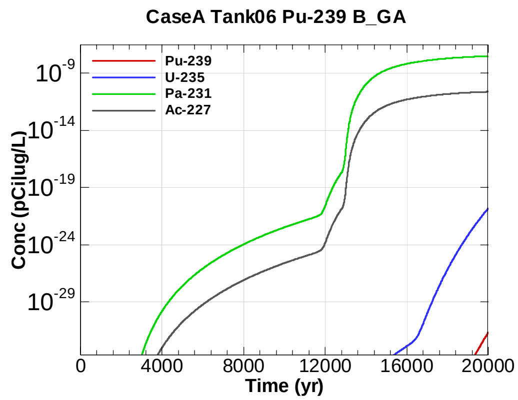

Figure E-687 - 100m Aquifer Concentration for CaseA Tank06 Pu-239 B_GA

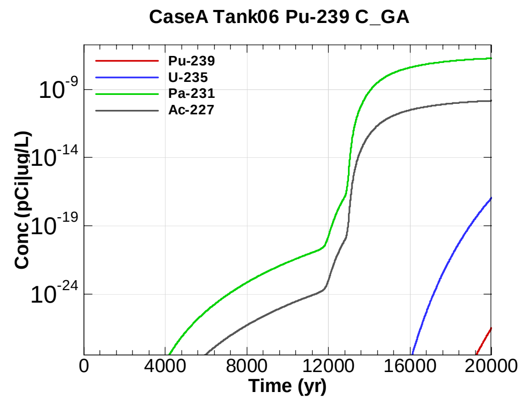

Figure E-688 - 100m Aquifer Concentration for CaseA Tank06 Pu-239 C_GA

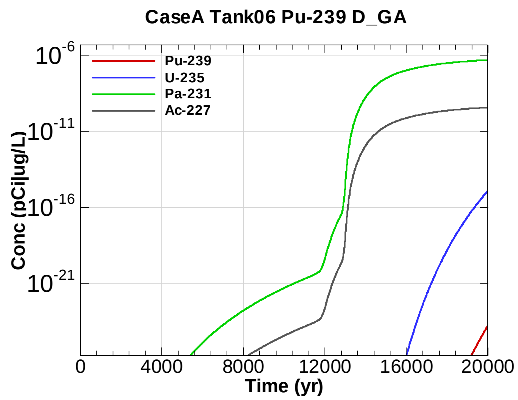

Figure E-689 - 100m Aquifer Concentration for CaseA Tank06 Pu-239 D_GA

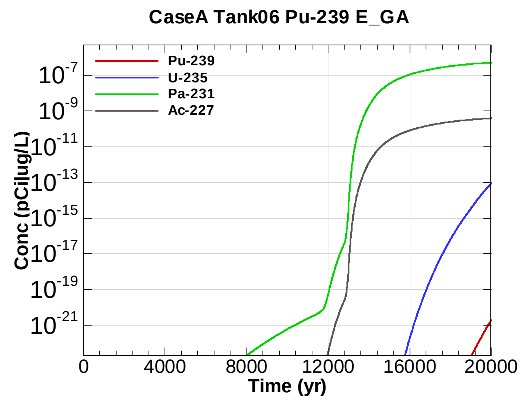

Figure E-690 - 100m Aquifer Concentration for CaseA Tank06 Pu-239 E_GA

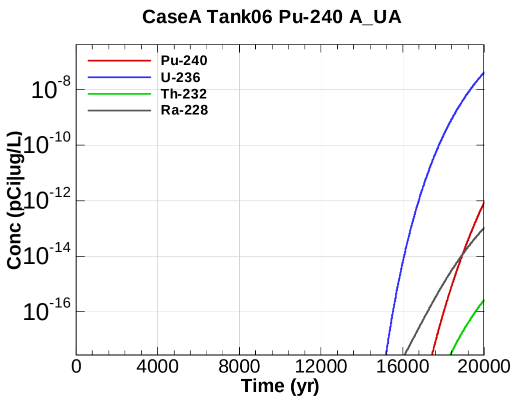

Figure E-691 - 100m Aquifer Concentration for CaseA Tank06 Pu-240 A_UA

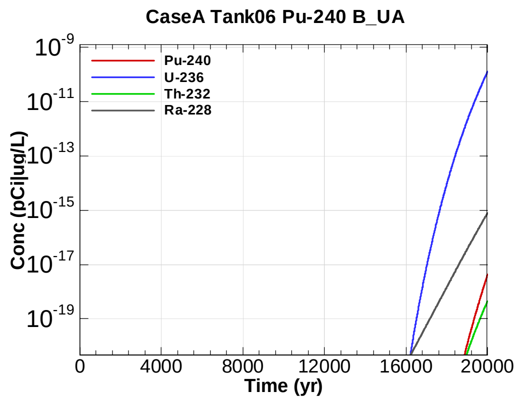

Figure E-692 - 100m Aquifer Concentration for CaseA Tank06 Pu-240 B_UA

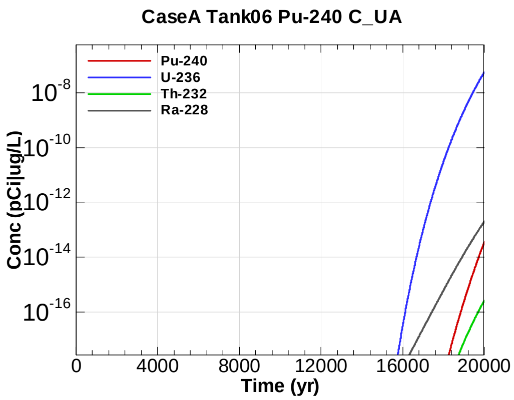

Figure E-693 - 100m Aquifer Concentration for CaseA Tank06 Pu-240 C_UA

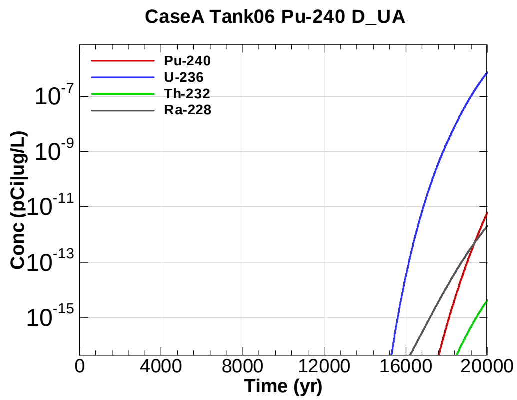

Figure E-694 - 100m Aquifer Concentration for CaseA Tank06 Pu-240 D_UA

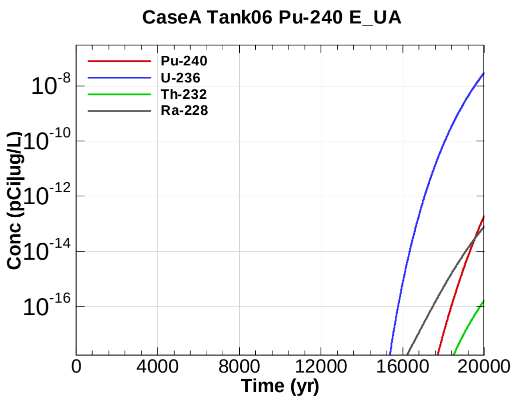

Figure E-695 - 100m Aquifer Concentration for CaseA Tank06 Pu-240 E_UA

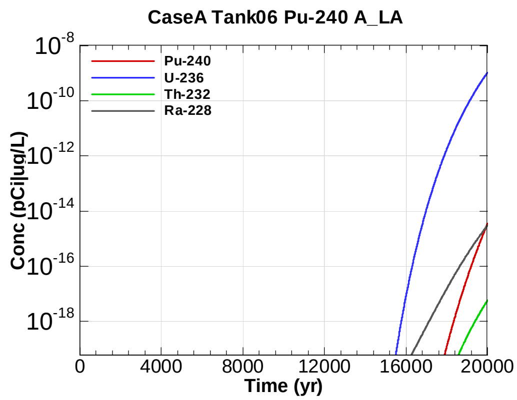

Figure E-696 - 100m Aquifer Concentration for CaseA Tank06 Pu-240 A_LA

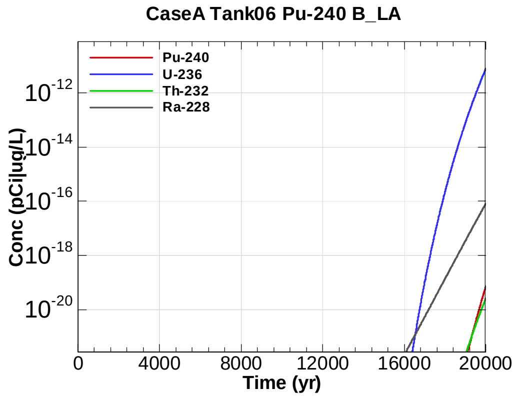

Figure E-697 - 100m Aquifer Concentration for CaseA Tank06 Pu-240 B_LA

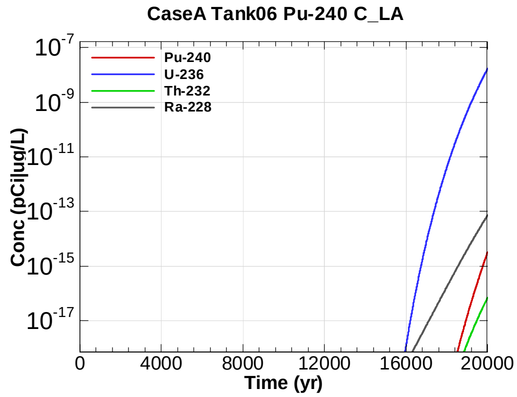

Figure E-698 - 100m Aquifer Concentration for CaseA Tank06 Pu-240 C_LA

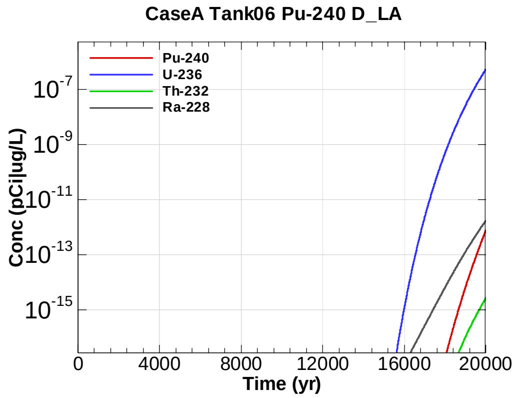

Figure E-699 - 100m Aquifer Concentration for CaseA Tank06 Pu-240 D_LA

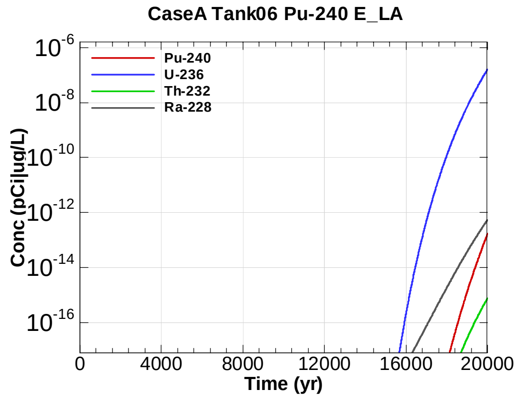

Figure E-700 - 100m Aquifer Concentration for CaseA Tank06 Pu-240 E_LA

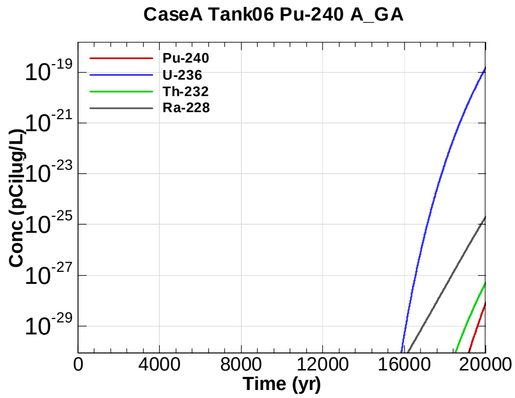

Figure E-701 - 100m Aquifer Concentration for CaseA Tank06 Pu-240 A_GA

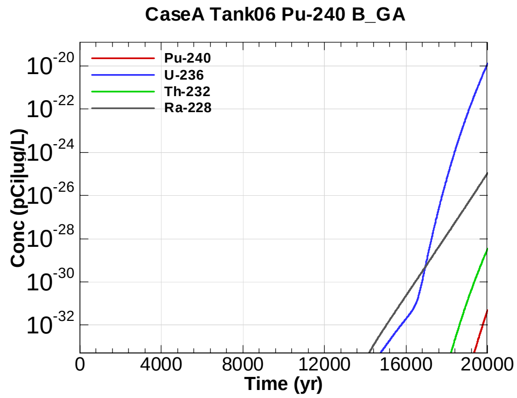

Figure E-702 - 100m Aquifer Concentration for CaseA Tank06 Pu-240 B_GA

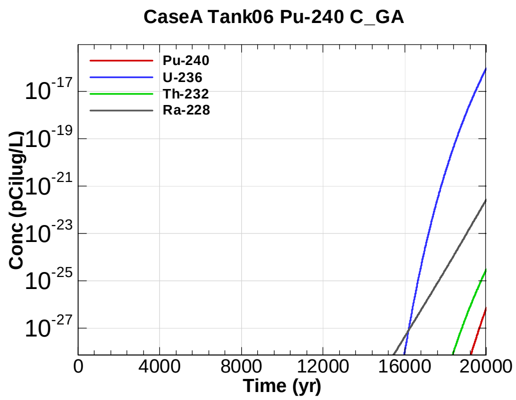

Figure E-703 - 100m Aquifer Concentration for CaseA Tank06 Pu-240 C_GA

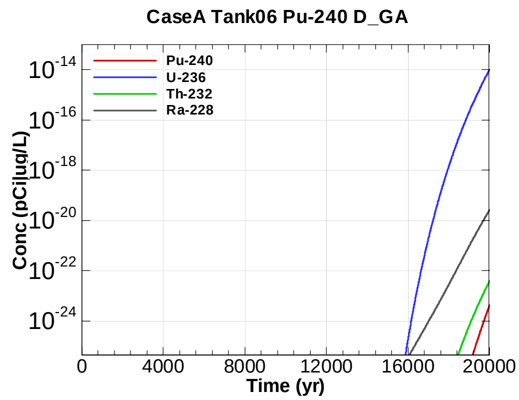

Figure E-704 - 100m Aquifer Concentration for CaseA Tank06 Pu-240 D_GA

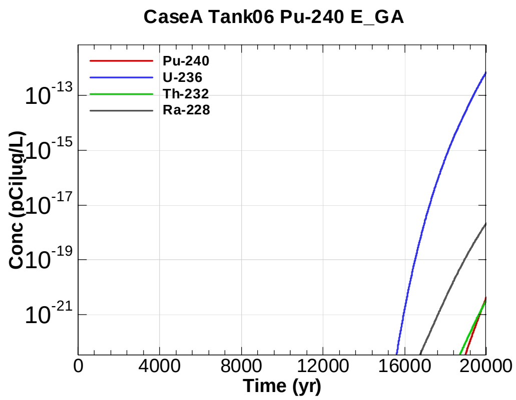

Figure E-705 - 100m Aquifer Concentration for CaseA Tank06 Pu-240 E_GA

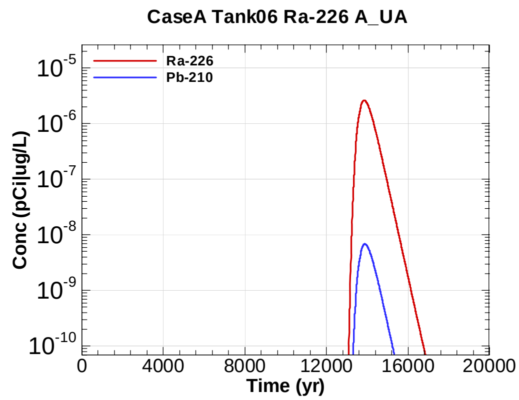

Figure E-706 - 100m Aquifer Concentration for CaseA Tank06 Ra-226 A_UA

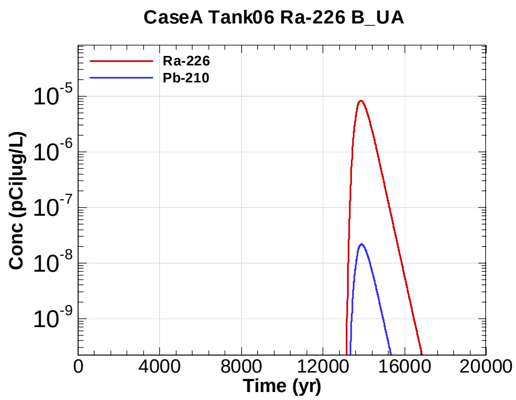

Figure E-707 - 100m Aquifer Concentration for CaseA Tank06 Ra-226 B_UA

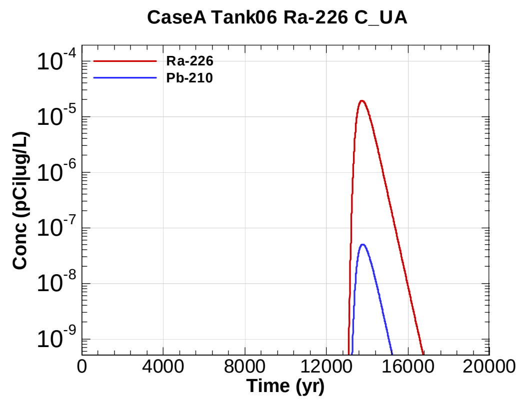

Figure E-708 - 100m Aquifer Concentration for CaseA Tank06 Ra-226 C_UA

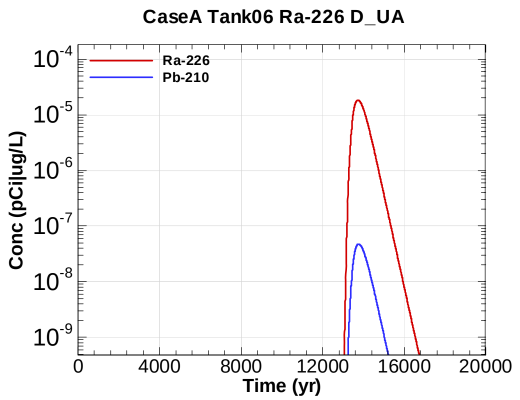

Figure E-709 - 100m Aquifer Concentration for CaseA Tank06 Ra-226 D_UA

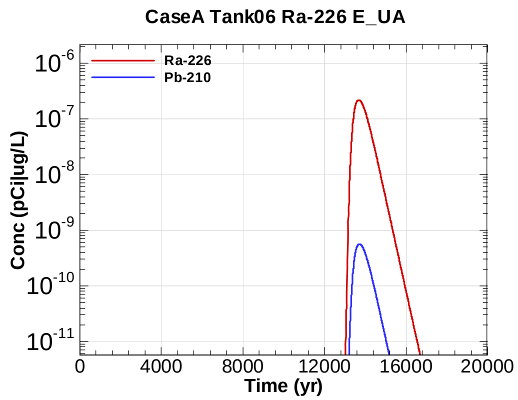

Figure E-710 - 100m Aquifer Concentration for CaseA Tank06 Ra-226 E_UA

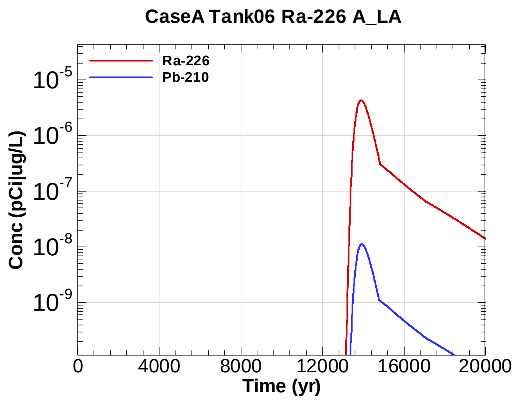

Figure E-711 - 100m Aquifer Concentration for CaseA Tank06 Ra-226 A_LA

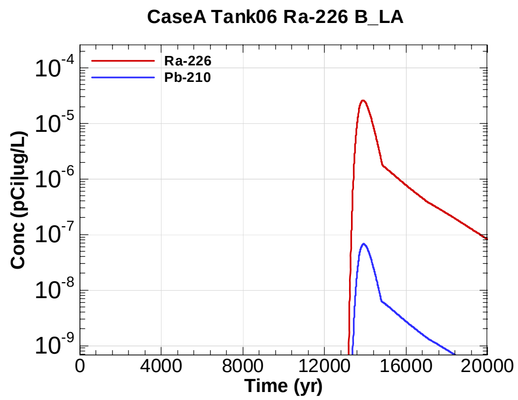

Figure E-712 - 100m Aquifer Concentration for CaseA Tank06 Ra-226 B_LA

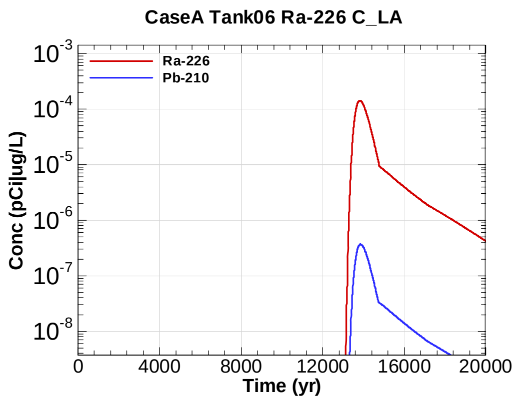

Figure E-713 - 100m Aquifer Concentration for CaseA Tank06 Ra-226 C_LA

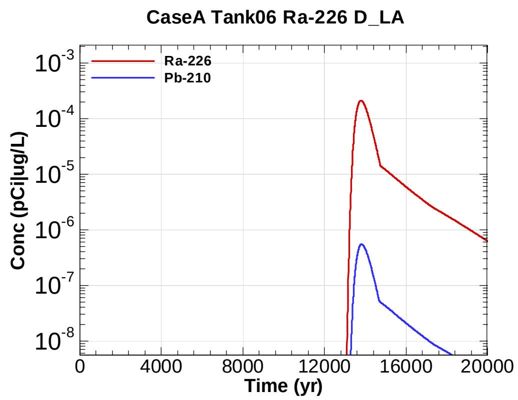

Figure E-714 - 100m Aquifer Concentration for CaseA Tank06 Ra-226 D_LA

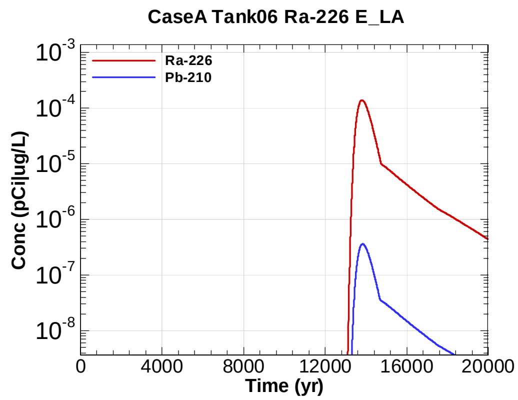

Figure E-715 - 100m Aquifer Concentration for CaseA Tank06 Ra-226 E_LA

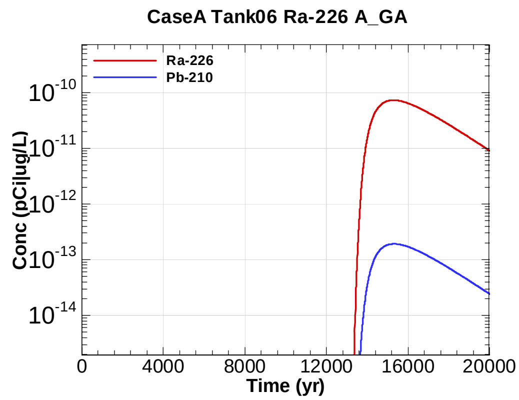

Figure E-716 - 100m Aquifer Concentration for CaseA Tank06 Ra-226 A_GA

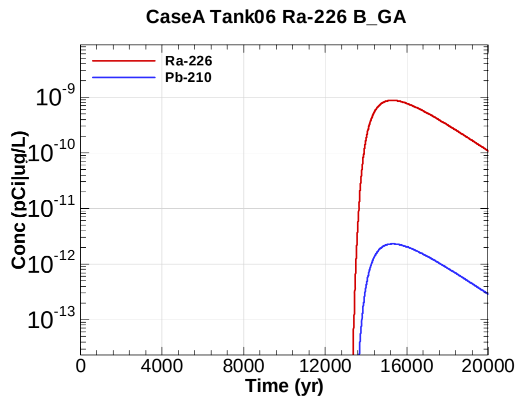

Figure E-717 - 100m Aquifer Concentration for CaseA Tank06 Ra-226 B_GA

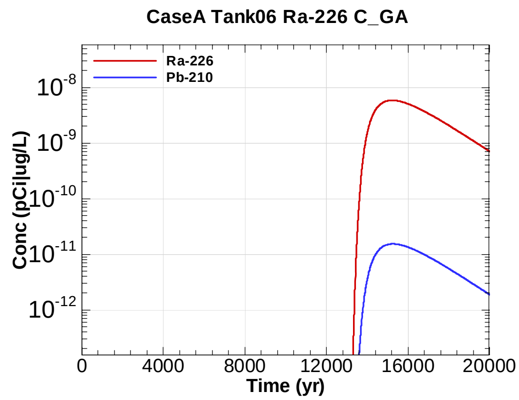

Figure E-718 - 100m Aquifer Concentration for CaseA Tank06 Ra-226 C_GA

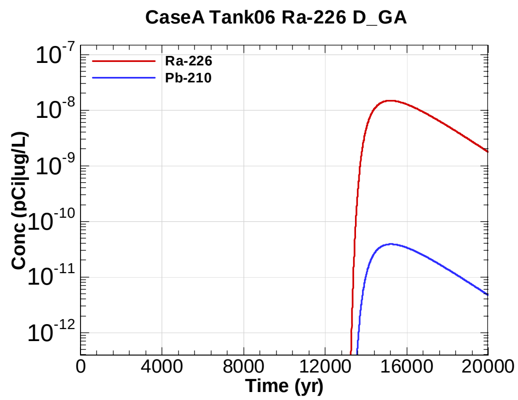

Figure E-719 - 100m Aquifer Concentration for CaseA Tank06 Ra-226 D_GA

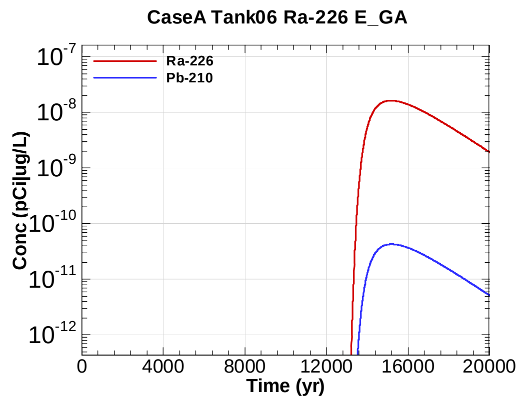

Figure E-720 - 100m Aquifer Concentration for CaseA Tank06 Ra-226 E_GA

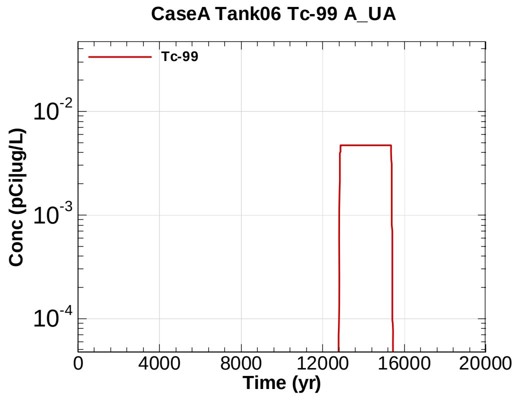

Figure E-721 - 100m Aquifer Concentration for CaseA Tank06 Tc-99 A_UA

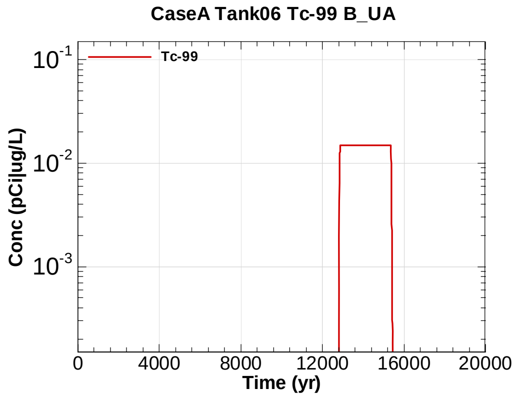

Figure E-722 - 100m Aquifer Concentration for CaseA Tank06 Tc-99 B_UA

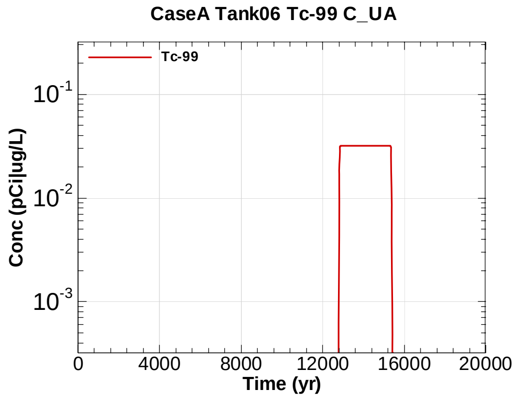

Figure E-723 - 100m Aquifer Concentration for CaseA Tank06 Tc-99 C_UA

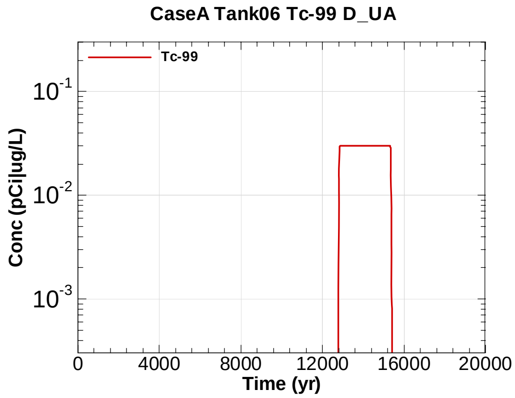

Figure E-724 - 100m Aquifer Concentration for CaseA Tank06 Tc-99 D_UA

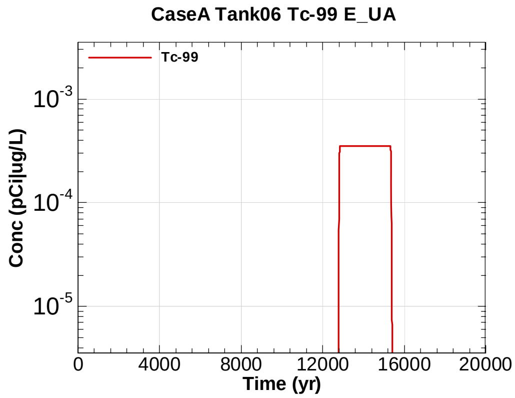

Figure E-725 - 100m Aquifer Concentration for CaseA Tank06 Tc-99 E_UA

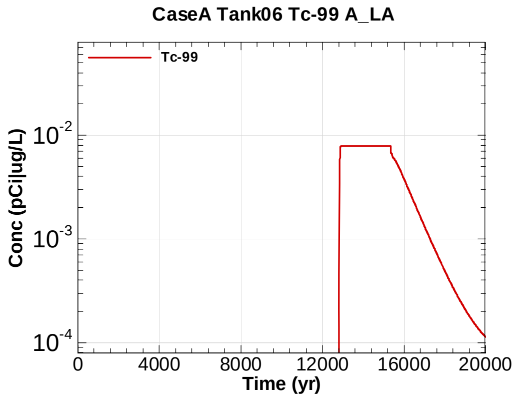

Figure E-726 - 100m Aquifer Concentration for CaseA Tank06 Tc-99 A_LA

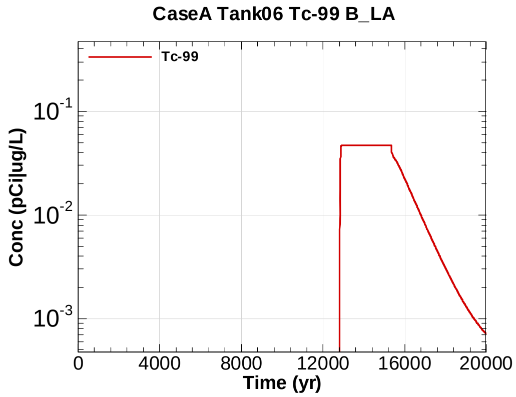

Figure E-727 - 100m Aquifer Concentration for CaseA Tank06 Tc-99 B_LA

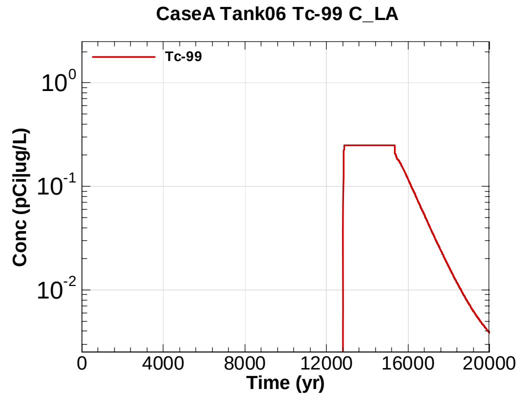

Figure E-728 - 100m Aquifer Concentration for CaseA Tank06 Tc-99 C_LA

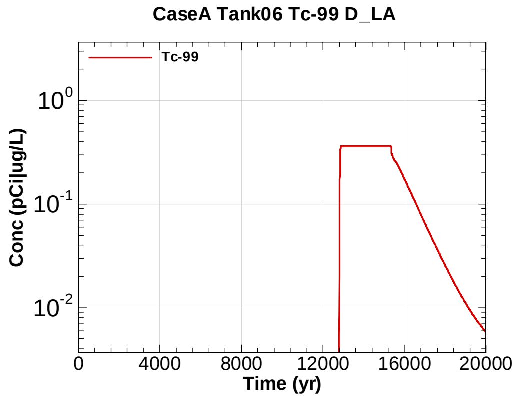

Figure E-729 - 100m Aquifer Concentration for CaseA Tank06 Tc-99 D_LA

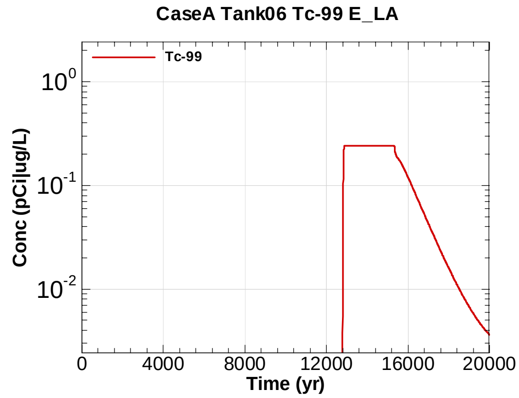

Figure E-730 - 100m Aquifer Concentration for CaseA Tank06 Tc-99 E_LA

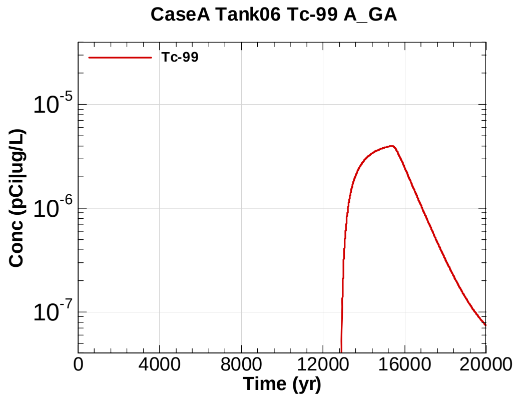

Figure E-731 - 100m Aquifer Concentration for CaseA Tank06 Tc-99 A_GA

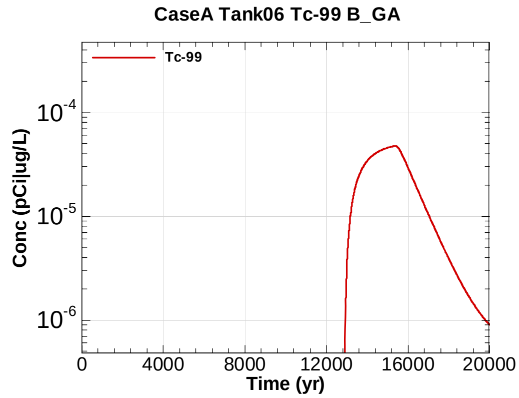

Figure E-732 - 100m Aquifer Concentration for CaseA Tank06 Tc-99 B_GA

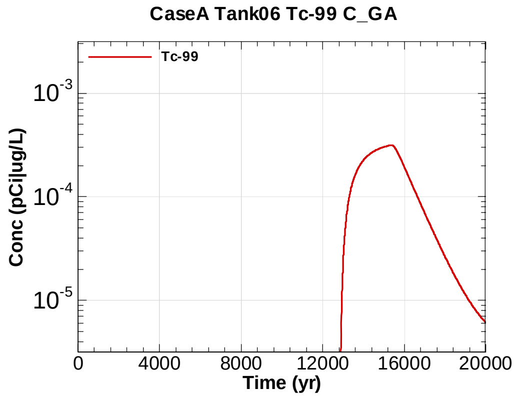

Figure E-733 - 100m Aquifer Concentration for CaseA Tank06 Tc-99 C_GA

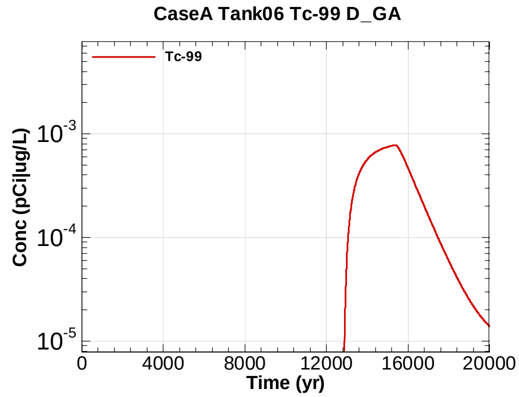

Figure E-734 - 100m Aquifer Concentration for CaseA Tank06 Tc-99 D_GA

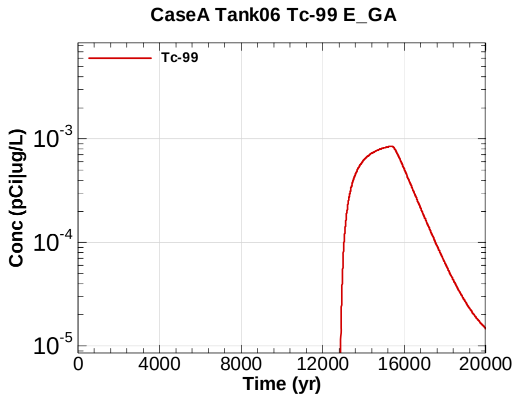

Figure E-735 - 100m Aquifer Concentration for CaseA Tank06 Tc-99 E_GA

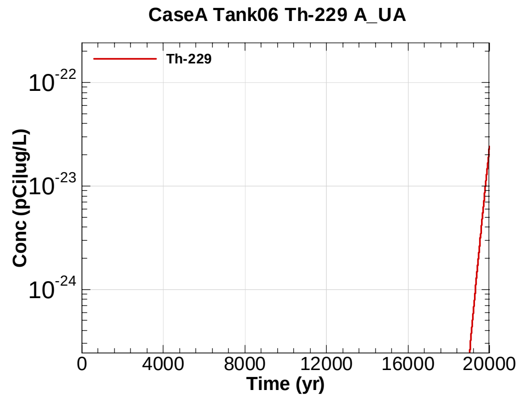

Figure E-736 - 100m Aquifer Concentration for CaseA Tank06 Th-229 A_UA

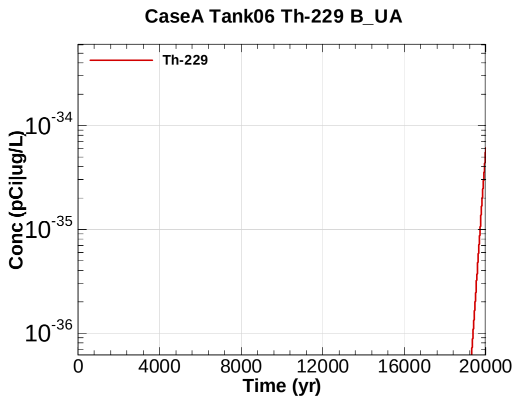

Figure E-737 - 100m Aquifer Concentration for CaseA Tank06 Th-229 B_UA

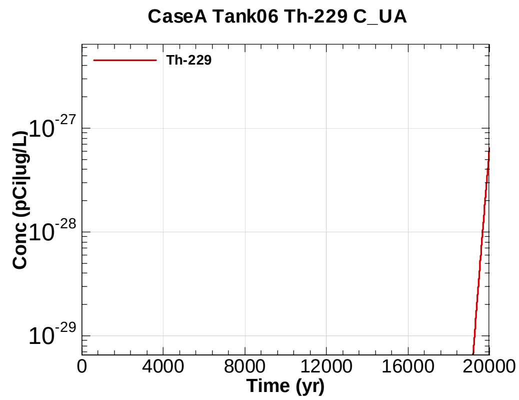

Figure E-738 - 100m Aquifer Concentration for CaseA Tank06 Th-229 C_UA

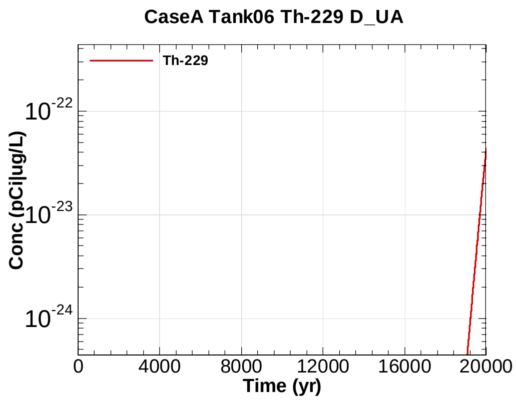

Figure E-739 - 100m Aquifer Concentration for CaseA Tank06 Th-229 D_UA

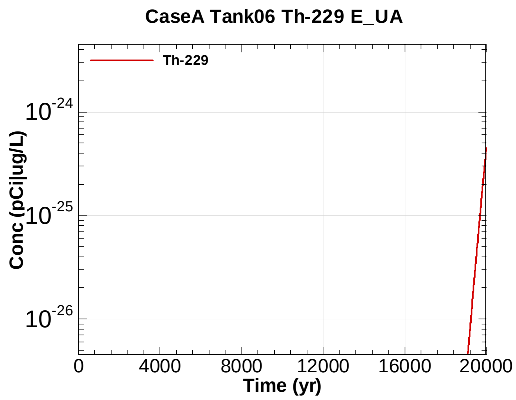

Figure E-740 - 100m Aquifer Concentration for CaseA Tank06 Th-229 E_UA

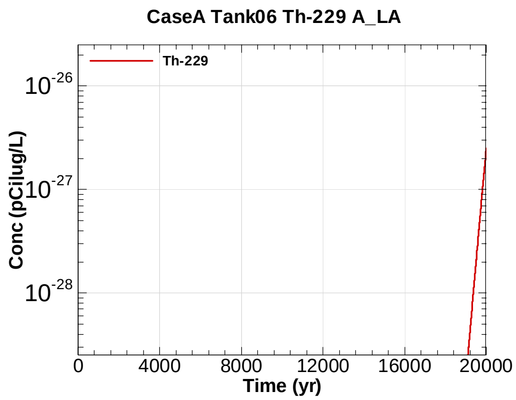

Figure E-741 - 100m Aquifer Concentration for CaseA Tank06 Th-229 A_LA

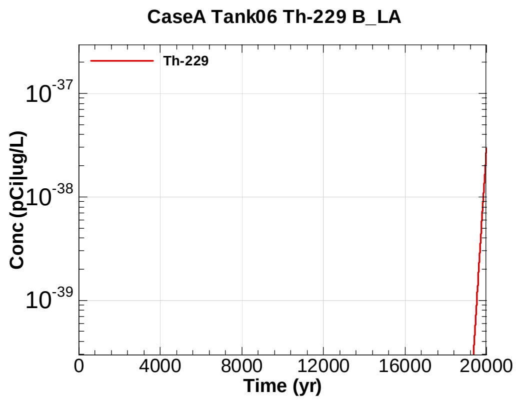

Figure E-742 - 100m Aquifer Concentration for CaseA Tank06 Th-229 B_LA

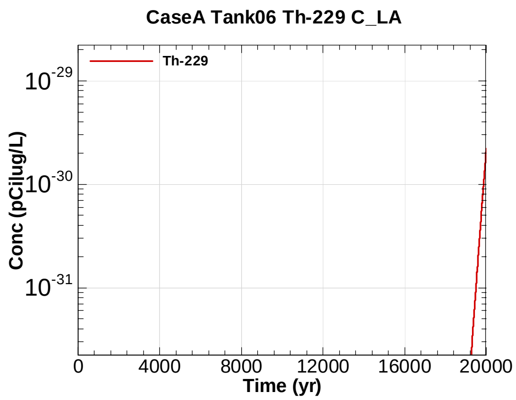

Figure E-743 - 100m Aquifer Concentration for CaseA Tank06 Th-229 C_LA

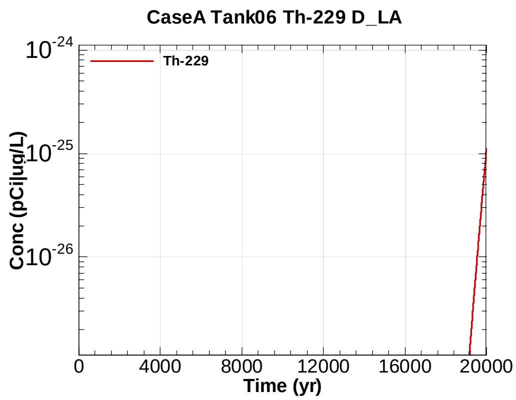

Figure E-744 - 100m Aquifer Concentration for CaseA Tank06 Th-229 D_LA

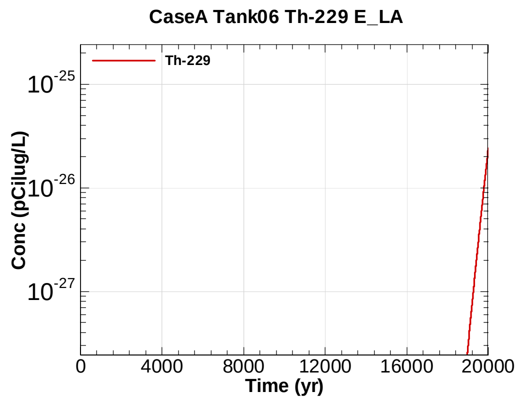

Figure E-745 - 100m Aquifer Concentration for CaseA Tank06 Th-229 E_LA

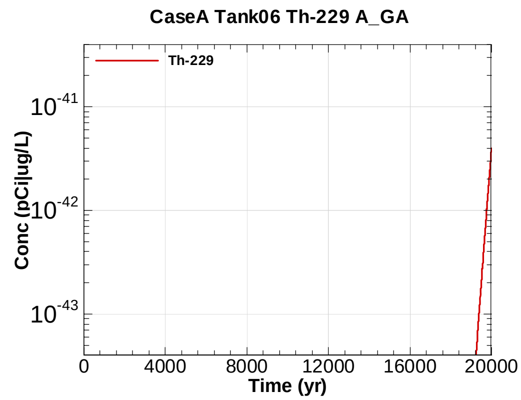

Figure E-746 - 100m Aquifer Concentration for CaseA Tank06 Th-229 A_GA

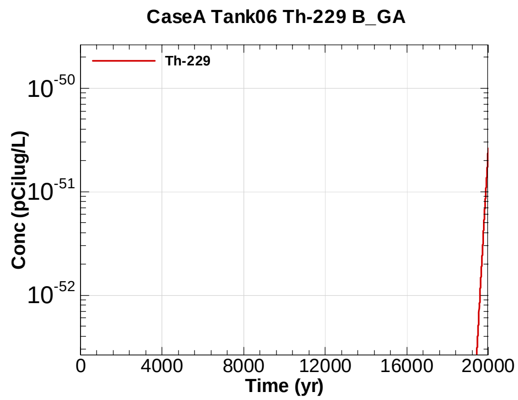

Figure E-747 - 100m Aquifer Concentration for CaseA Tank06 Th-229 B_GA

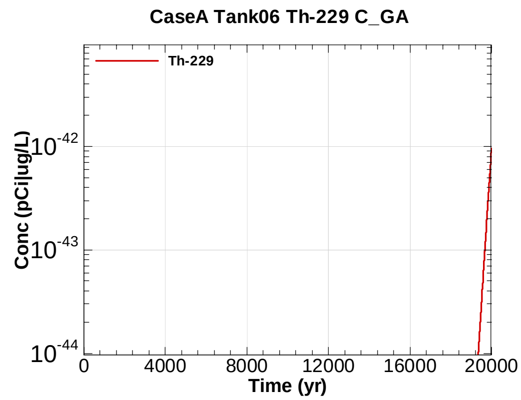

Figure E-748 - 100m Aquifer Concentration for CaseA Tank06 Th-229 C_GA

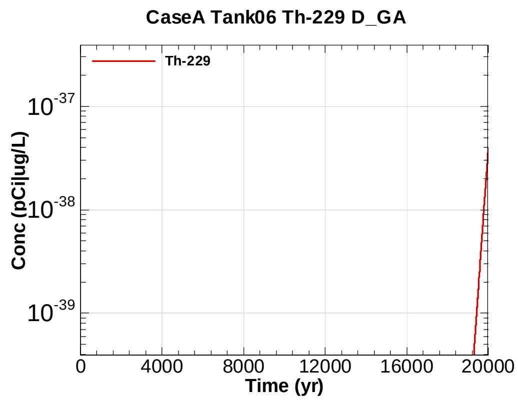

Figure E-749 - 100m Aquifer Concentration for CaseA Tank06 Th-229 D_GA

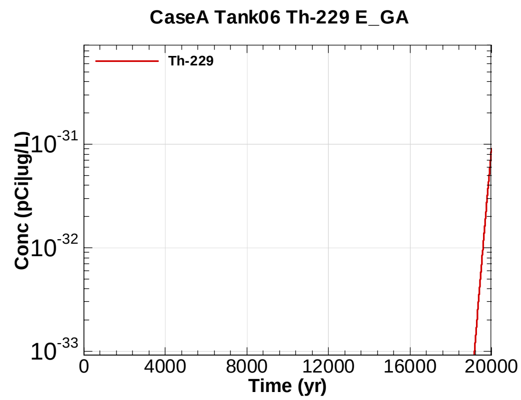

Figure E-750 - 100m Aquifer Concentration for CaseA Tank06 Th-229 E_GA

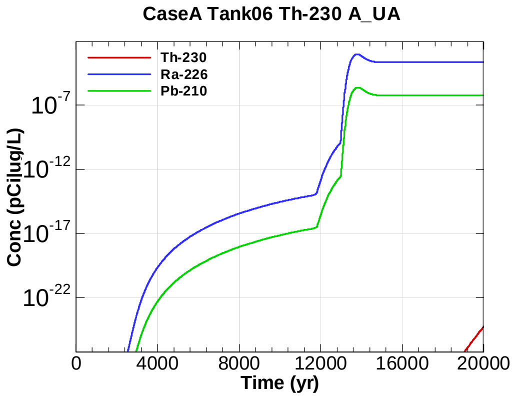

Figure E-751 - 100m Aquifer Concentration for CaseA Tank06 Th-230 A_UA

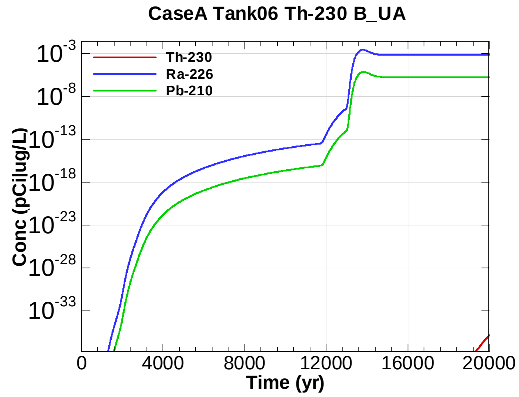

Figure E-752 - 100m Aquifer Concentration for CaseA Tank06 Th-230 B_UA

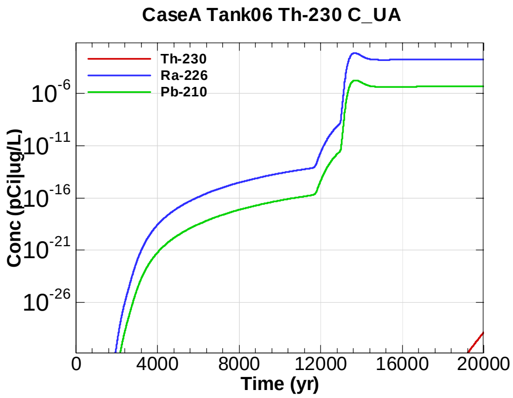

Figure E-753 - 100m Aquifer Concentration for CaseA Tank06 Th-230 C_UA

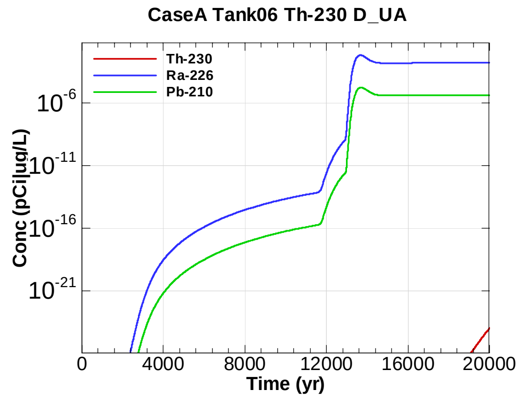

Figure E-754 - 100m Aquifer Concentration for CaseA Tank06 Th-230 D_UA

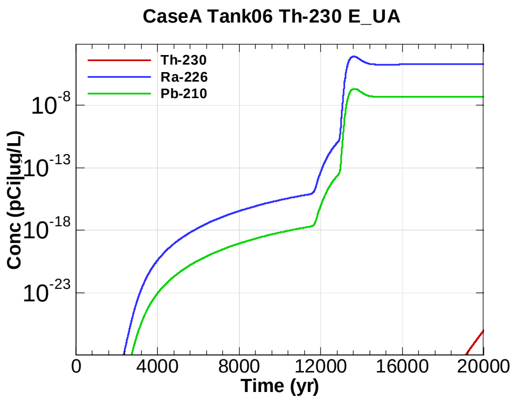

Figure E-755 - 100m Aquifer Concentration for CaseA Tank06 Th-230 E_UA

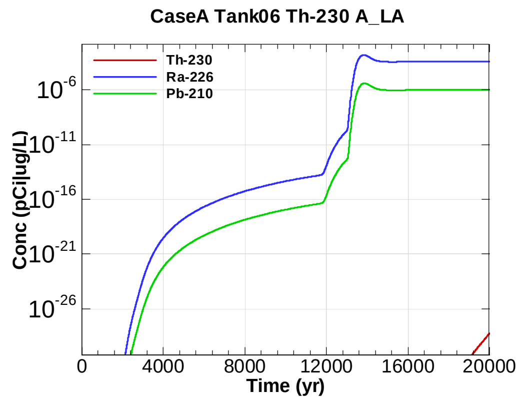

Figure E-756 - 100m Aquifer Concentration for CaseA Tank06 Th-230 A_LA

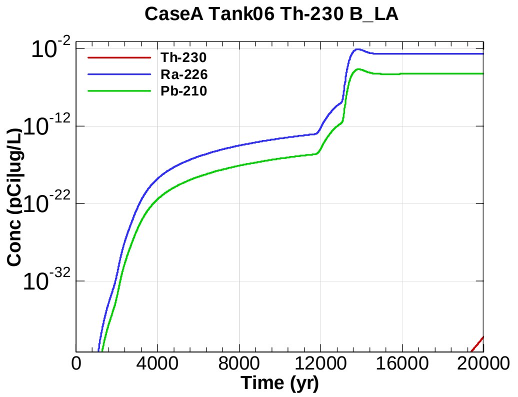

Figure E-757 - 100m Aquifer Concentration for CaseA Tank06 Th-230 B_LA

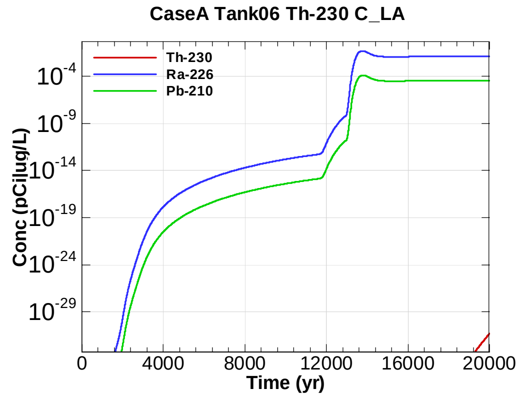

Figure E-758 - 100m Aquifer Concentration for CaseA Tank06 Th-230 C_LA

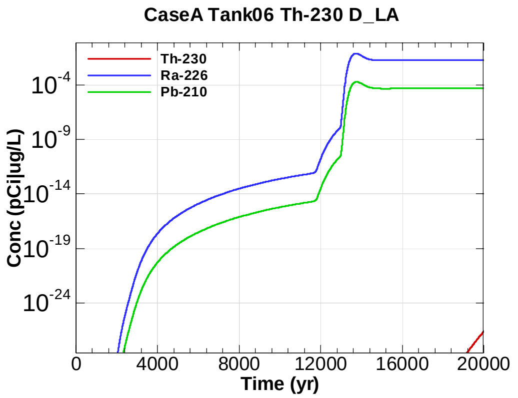

Figure E-759 - 100m Aquifer Concentration for CaseA Tank06 Th-230 D_LA

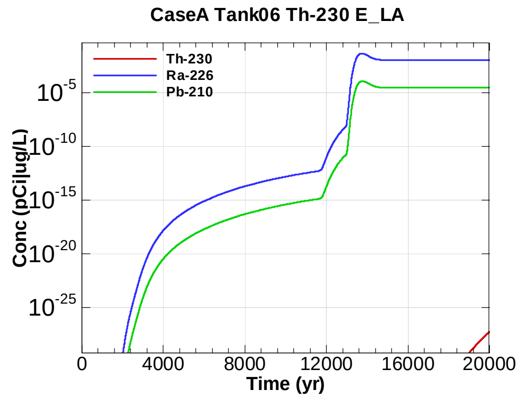

Figure E-760 - 100m Aquifer Concentration for CaseA Tank06 Th-230 E_LA

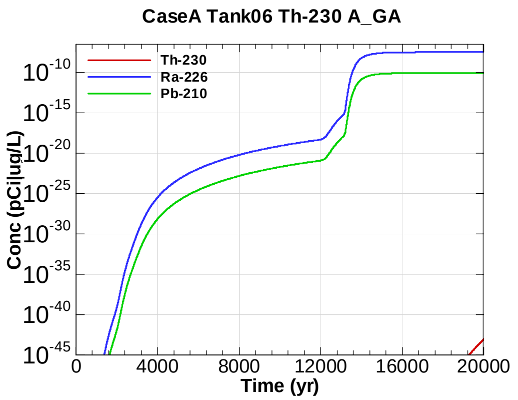

Figure E-761 - 100m Aquifer Concentration for CaseA Tank06 Th-230 A_GA

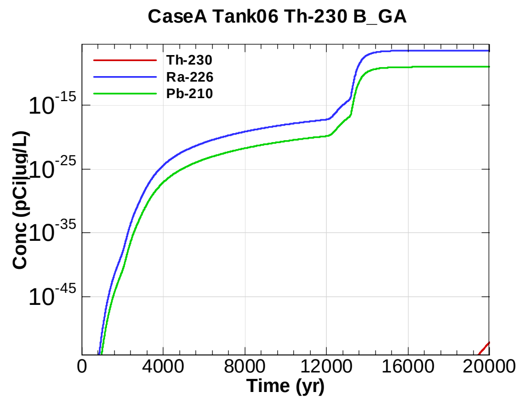

Figure E-762 - 100m Aquifer Concentration for CaseA Tank06 Th-230 B_GA

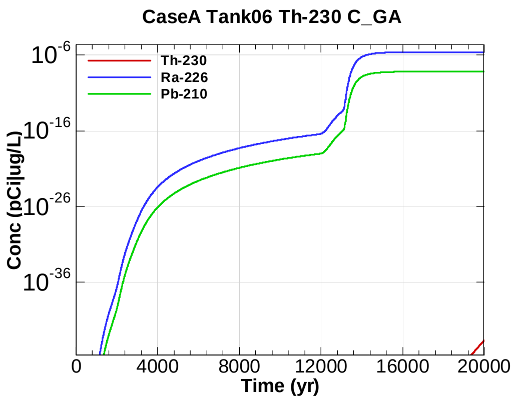

Figure E-763 - 100m Aquifer Concentration for CaseA Tank06 Th-230 C_GA

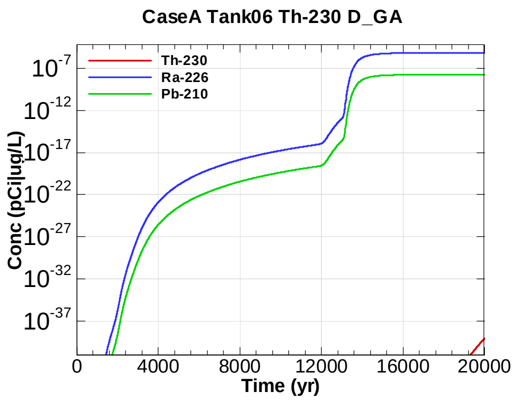

Figure E-764 - 100m Aquifer Concentration for CaseA Tank06 Th-230 D_GA

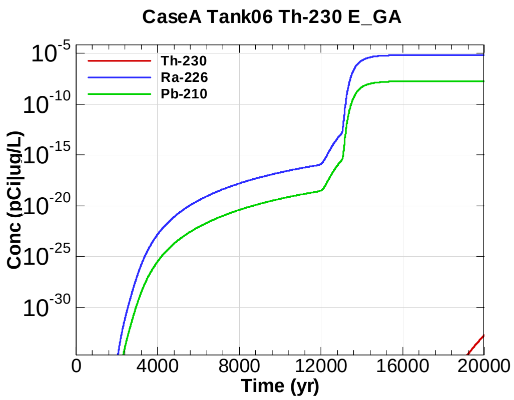

Figure E-765 - 100m Aquifer Concentration for CaseA Tank06 Th-230 E_GA

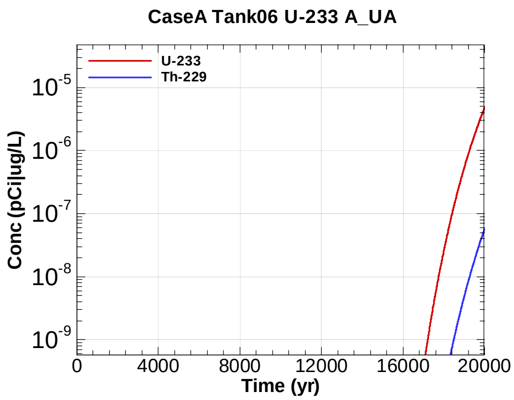

Figure E-766 - 100m Aquifer Concentration for CaseA Tank06 U-233 A_UA

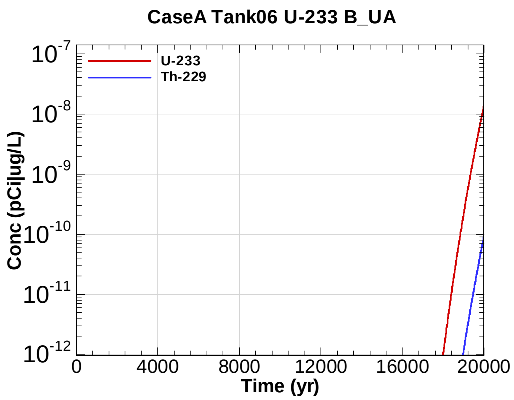

Figure E-767 - 100m Aquifer Concentration for CaseA Tank06 U-233 B_UA

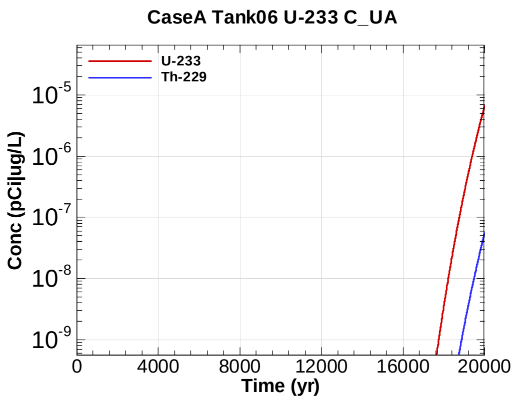

Figure E-768 - 100m Aquifer Concentration for CaseA Tank06 U-233 C_UA

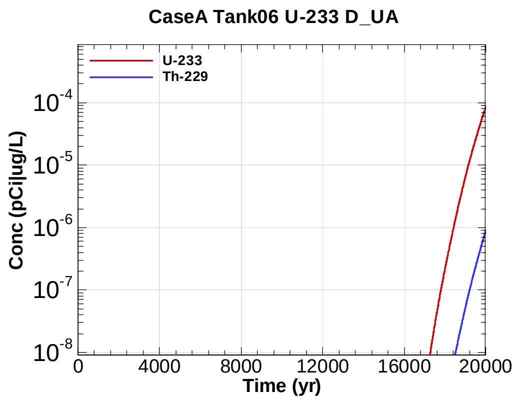

Figure E-769 - 100m Aquifer Concentration for CaseA Tank06 U-233 D_UA

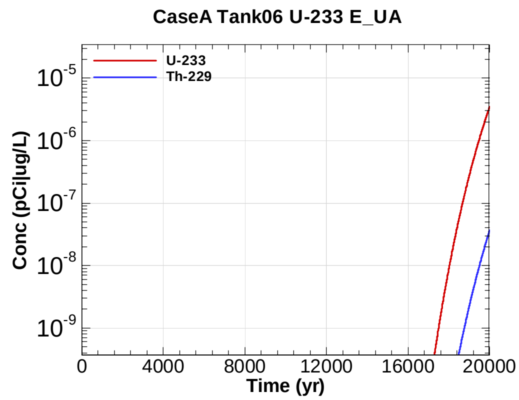

Figure E-770 - 100m Aquifer Concentration for CaseA Tank06 U-233 E_UA

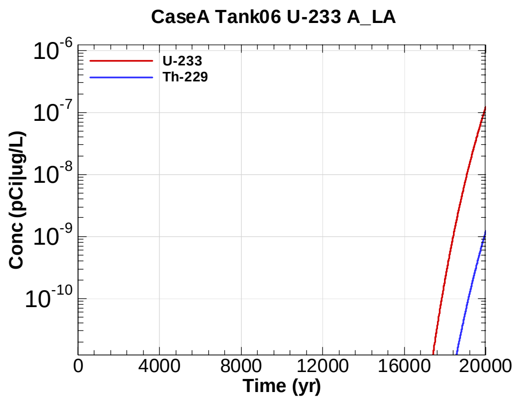

Figure E-771 - 100m Aquifer Concentration for CaseA Tank06 U-233 A_LA

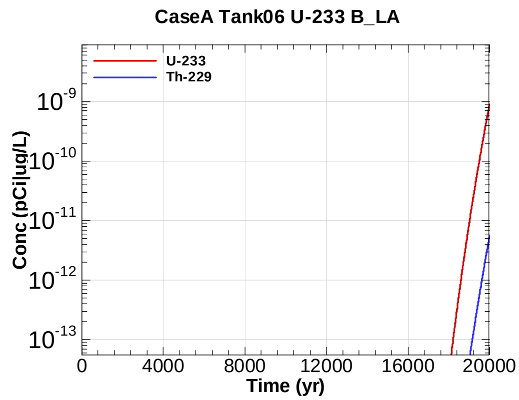

Figure E-772 - 100m Aquifer Concentration for CaseA Tank06 U-233 B_LA

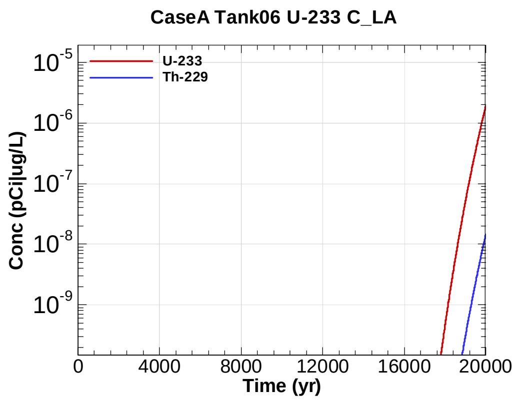

Figure E-773 - 100m Aquifer Concentration for CaseA Tank06 U-233 C_LA

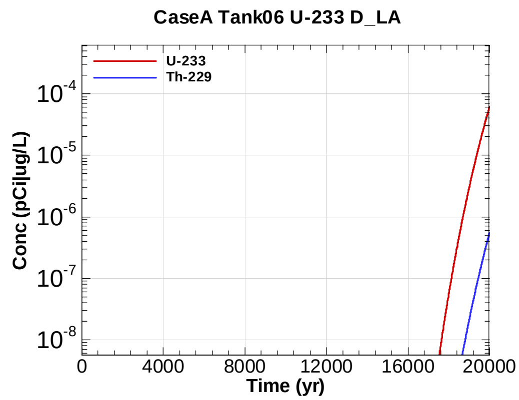

Figure E-774 - 100m Aquifer Concentration for CaseA Tank06 U-233 D_LA

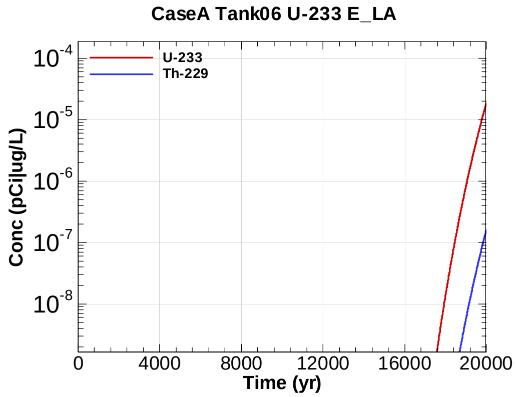

Figure E-775 - 100m Aquifer Concentration for CaseA Tank06 U-233 E_LA

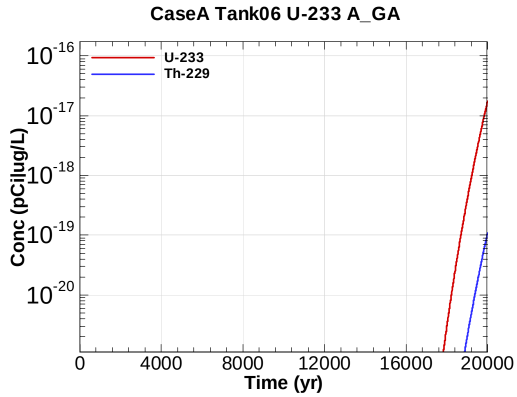

Figure E-776 - 100m Aquifer Concentration for CaseA Tank06 U-233 A_GA

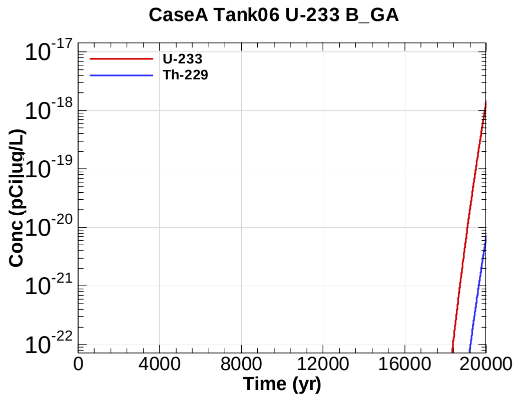

Figure E-777 - 100m Aquifer Concentration for CaseA Tank06 U-233 B_GA

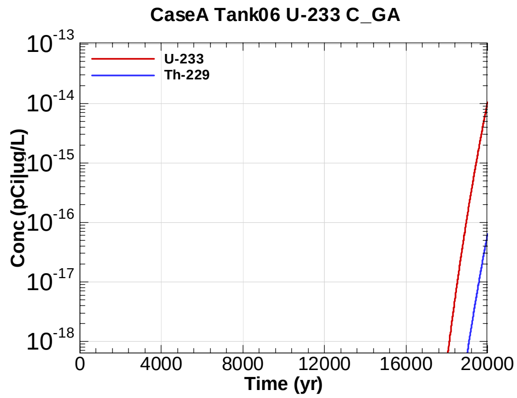

Figure E-778 - 100m Aquifer Concentration for CaseA Tank06 U-233 C_GA

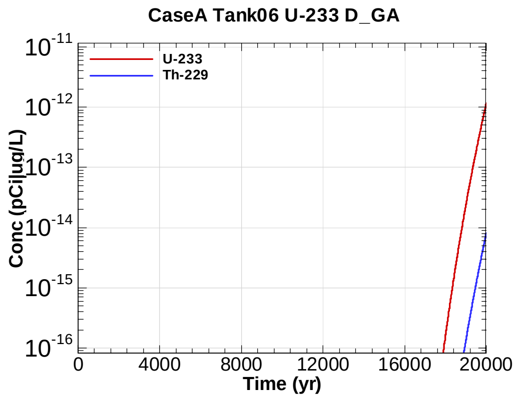

Figure E-779 - 100m Aquifer Concentration for CaseA Tank06 U-233 D_GA

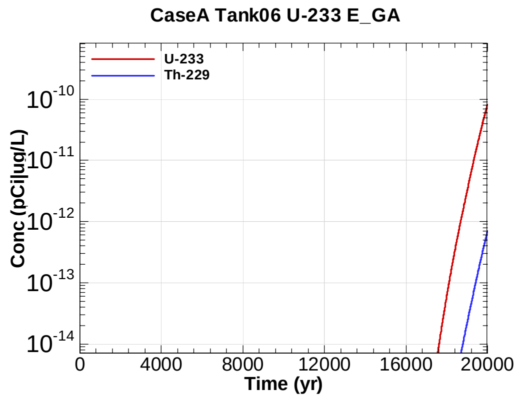

Figure E-780 - 100m Aquifer Concentration for CaseA Tank06 U-233 E_GA

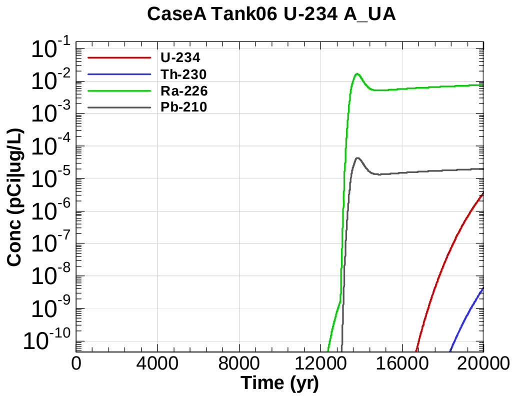

Figure E-781 - 100m Aquifer Concentration for CaseA Tank06 U-234 A_UA

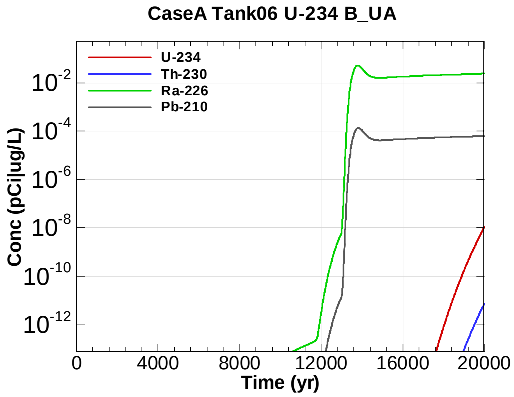

Figure E-782 - 100m Aquifer Concentration for CaseA Tank06 U-234 B_UA

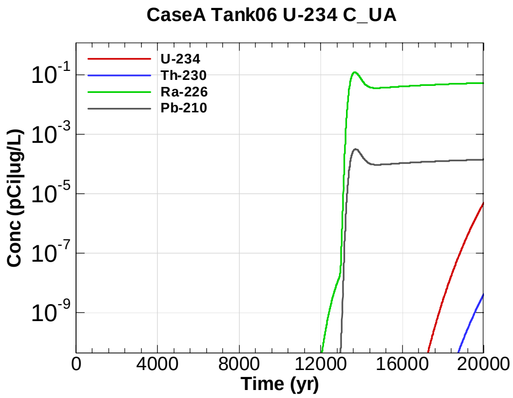

Figure E-783 - 100m Aquifer Concentration for CaseA Tank06 U-234 C_UA

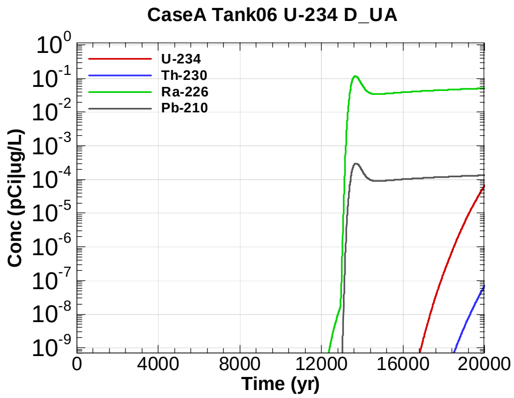

Figure E-784 - 100m Aquifer Concentration for CaseA Tank06 U-234 D_UA

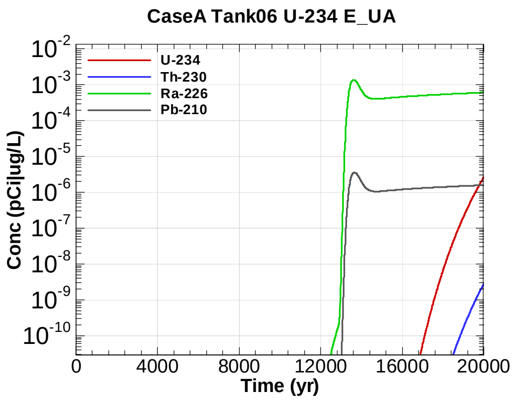

Figure E-785 - 100m Aquifer Concentration for CaseA Tank06 U-234 E_UA

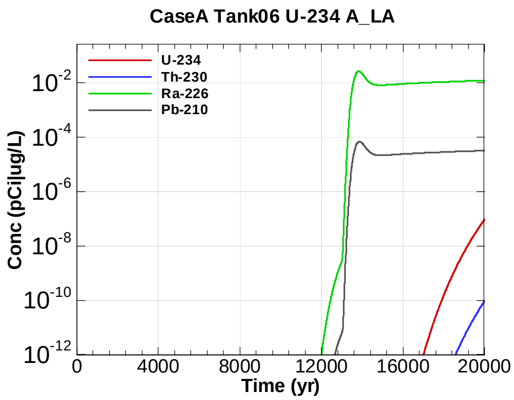

Figure E-786 - 100m Aquifer Concentration for CaseA Tank06 U-234 A_LA

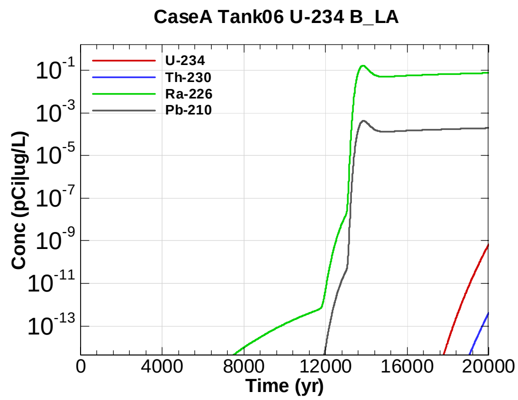

Figure E-787 - 100m Aquifer Concentration for CaseA Tank06 U-234 B_LA

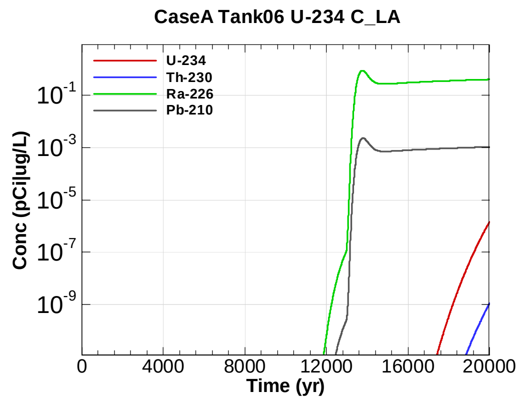

Figure E-788 - 100m Aquifer Concentration for CaseA Tank06 U-234 C_LA

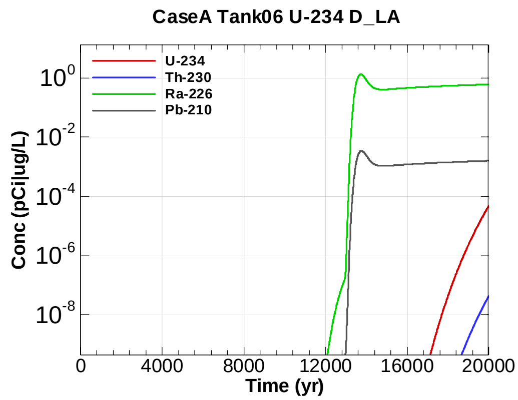

Figure E-789 - 100m Aquifer Concentration for CaseA Tank06 U-234 D_LA

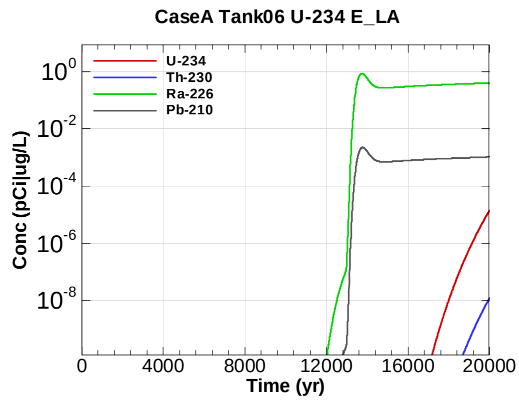

Figure E-790 - 100m Aquifer Concentration for CaseA Tank06 U-234 E_LA

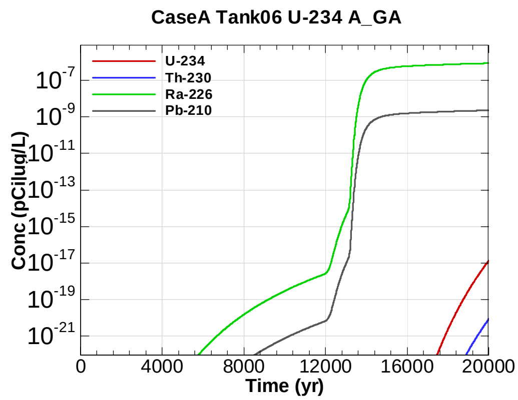

Figure E-791 - 100m Aquifer Concentration for CaseA Tank06 U-234 A_GA

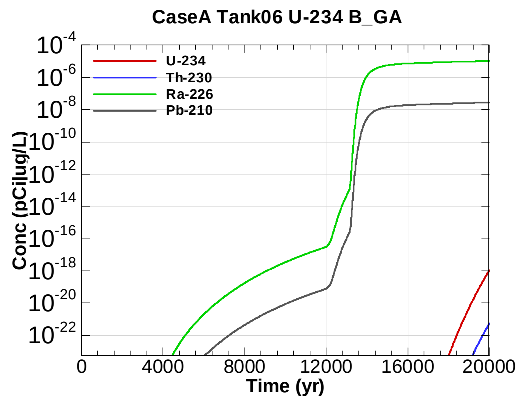

Figure E-792 - 100m Aquifer Concentration for CaseA Tank06 U-234 B_GA

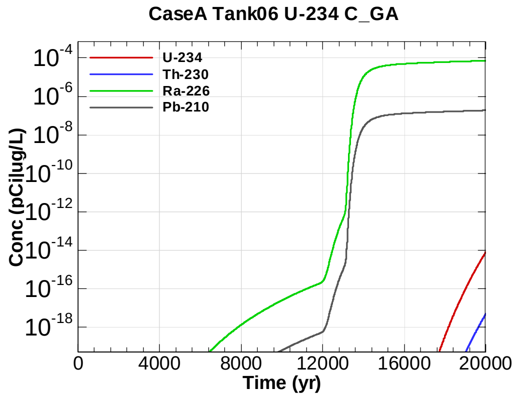

Figure E-793 - 100m Aquifer Concentration for CaseA Tank06 U-234 C_GA

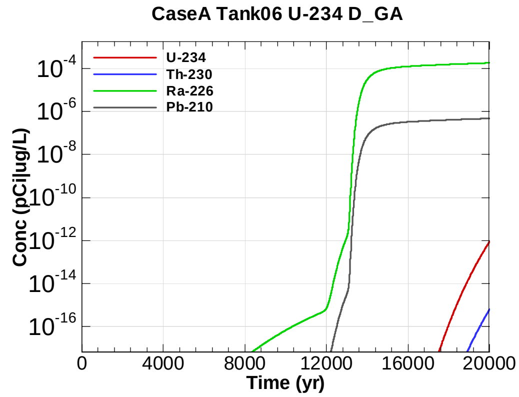

Figure E-794 - 100m Aquifer Concentration for CaseA Tank06 U-234 D_GA

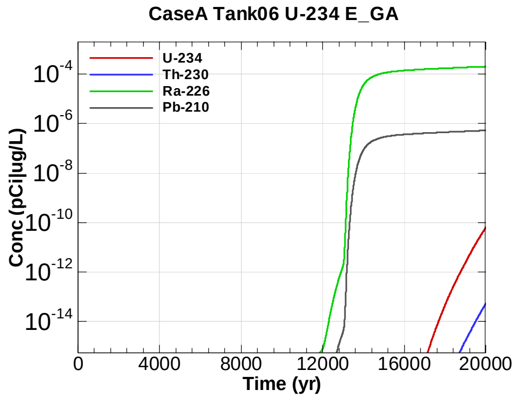

Figure E-795 - 100m Aquifer Concentration for CaseA Tank06 U-234 E_GA

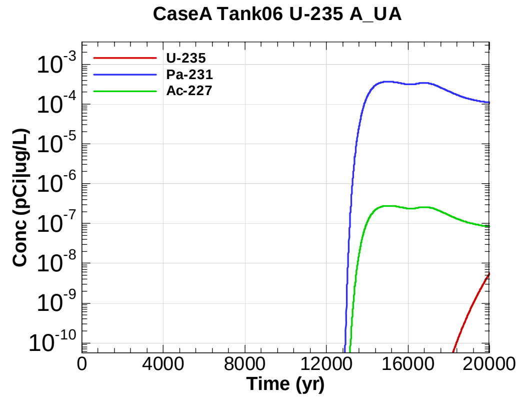

Figure E-796 - 100m Aquifer Concentration for CaseA Tank06 U-235 A_UA

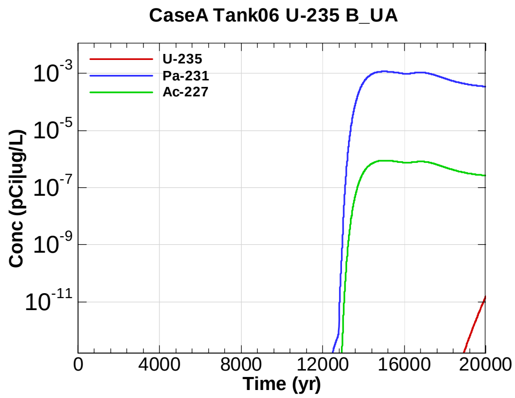

Figure E-797 - 100m Aquifer Concentration for CaseA Tank06 U-235 B_UA

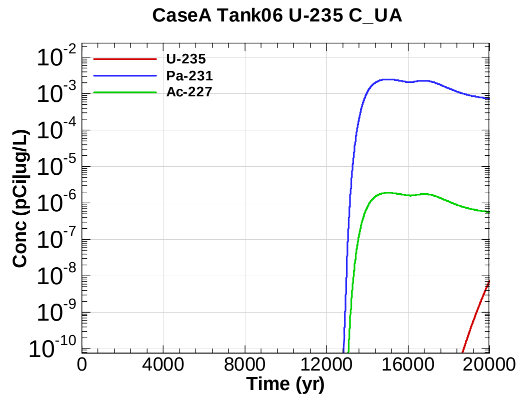

Figure E-798 - 100m Aquifer Concentration for CaseA Tank06 U-235 C_UA

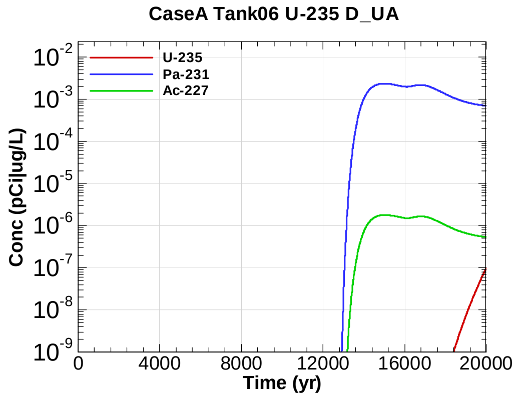

Figure E-799 - 100m Aquifer Concentration for CaseA Tank06 U-235 D_UA

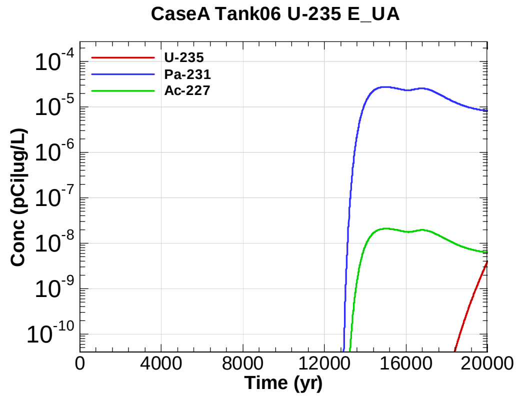

Figure E-800 - 100m Aquifer Concentration for CaseA Tank06 U-235 E_UA

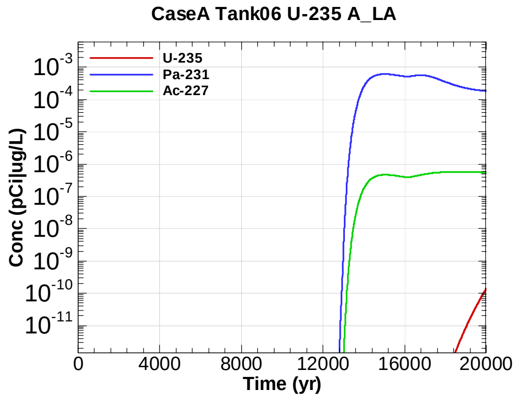

Figure E-801 - 100m Aquifer Concentration for CaseA Tank06 U-235 A_LA

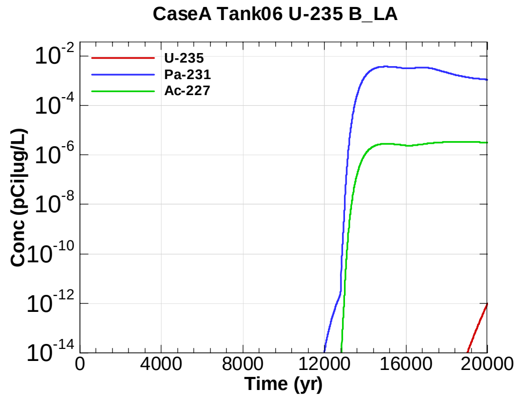

Figure E-802 - 100m Aquifer Concentration for CaseA Tank06 U-235 B_LA

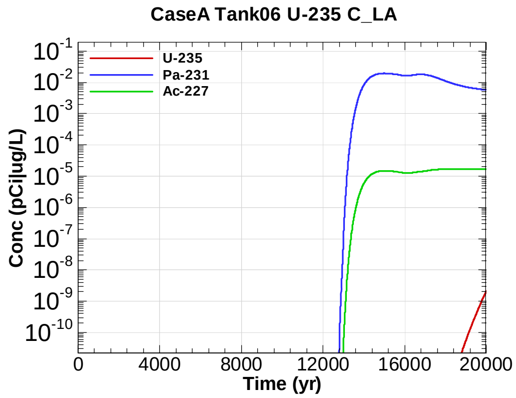

Figure E-803 - 100m Aquifer Concentration for CaseA Tank06 U-235 C_LA

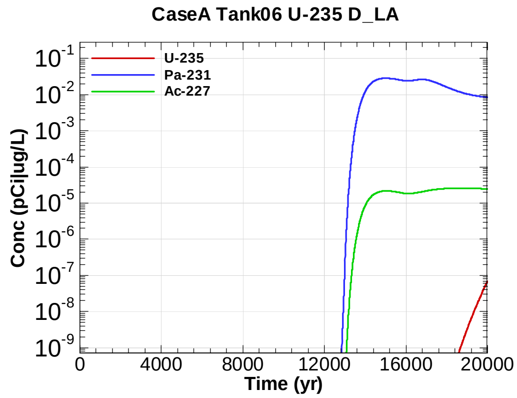

Figure E-804 - 100m Aquifer Concentration for CaseA Tank06 U-235 D_LA

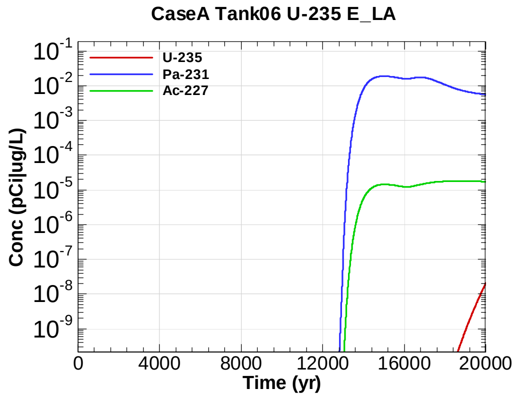

Figure E-805 - 100m Aquifer Concentration for CaseA Tank06 U-235 E_LA

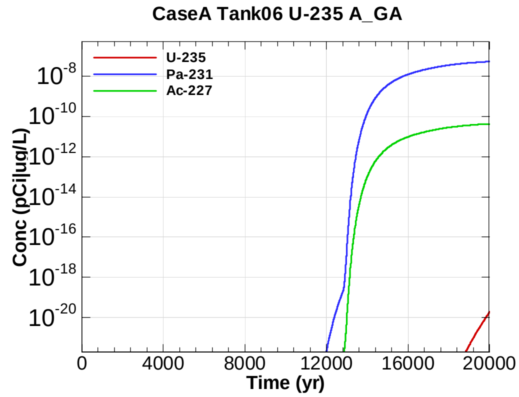

Figure E-806 - 100m Aquifer Concentration for CaseA Tank06 U-235 A_GA

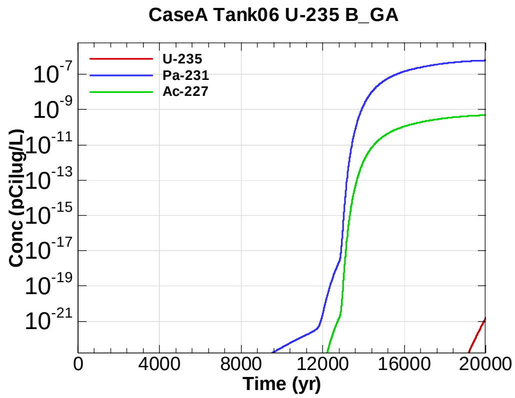

Figure E-807 - 100m Aquifer Concentration for CaseA Tank06 U-235 B_GA

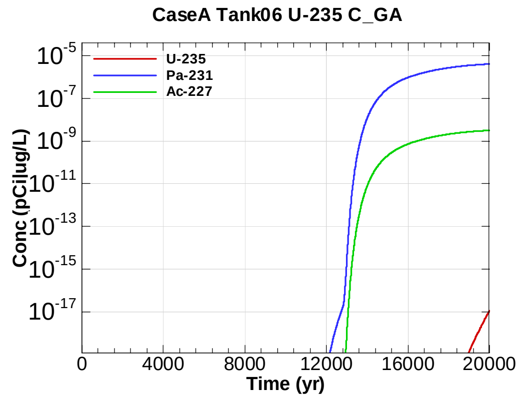

Figure E-808 - 100m Aquifer Concentration for CaseA Tank06 U-235 C_GA

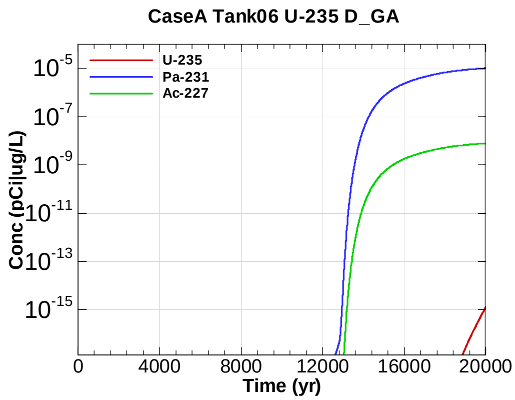

Figure E-809 - 100m Aquifer Concentration for CaseA Tank06 U-235 D_GA

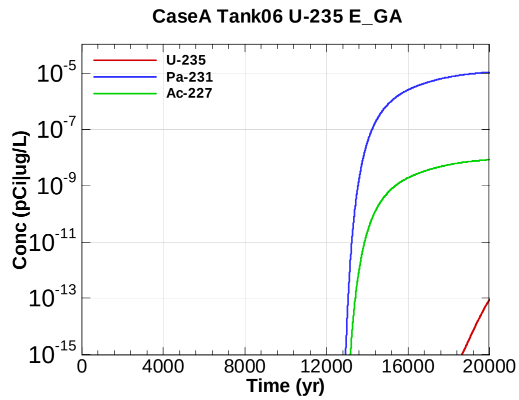

Figure E-810 - 100m Aquifer Concentration for CaseA Tank06 U-235 E_GA

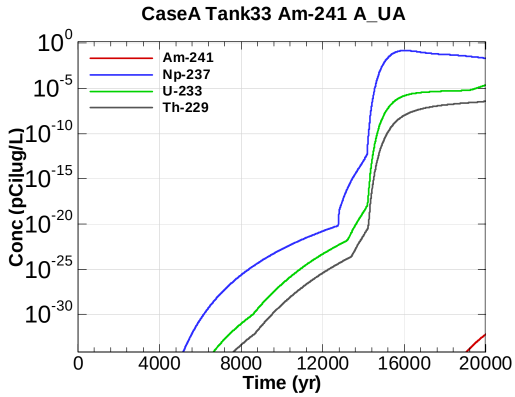

Figure E-811 - 100m Aquifer Concentration for CaseA Tank33 Am-241 A_UA

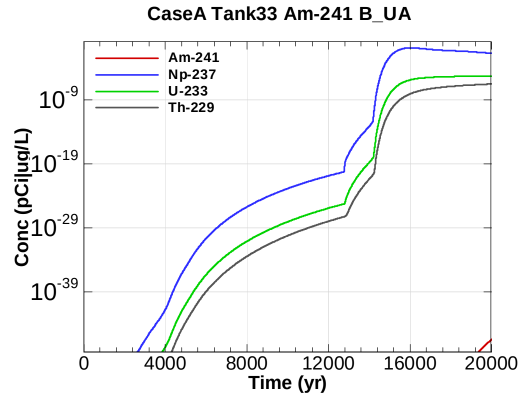

Figure E-812 - 100m Aquifer Concentration for CaseA Tank33 Am-241 B_UA

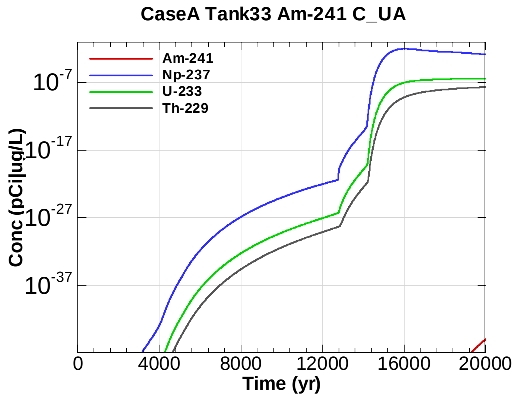

Figure E-813 - 100m Aquifer Concentration for CaseA Tank33 Am-241 C_UA

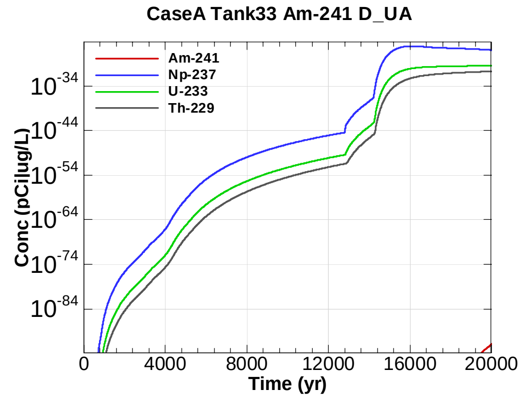

Figure E-814 - 100m Aquifer Concentration for CaseA Tank33 Am-241 D_UA

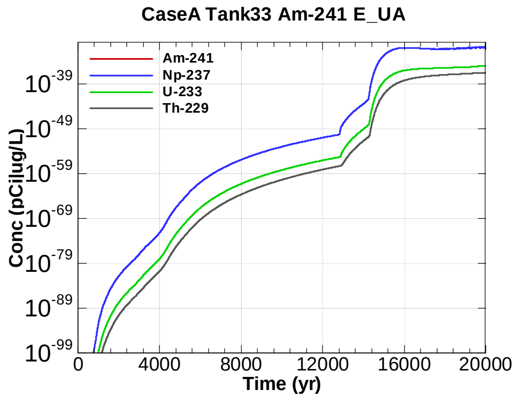

Figure E-815 - 100m Aquifer Concentration for CaseA Tank33 Am-241 E_UA

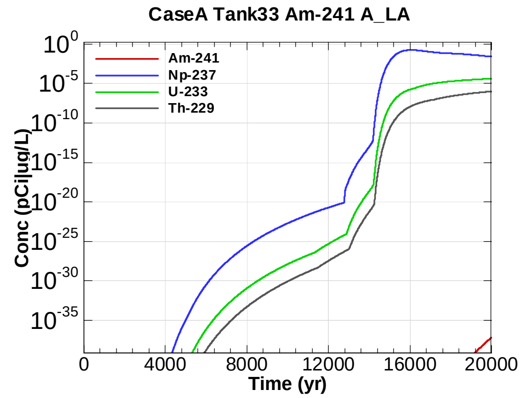

Figure E-816 - 100m Aquifer Concentration for CaseA Tank33 Am-241 A_LA

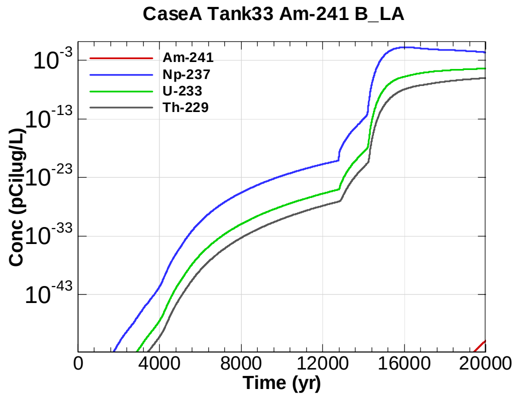

Figure E-817 - 100m Aquifer Concentration for CaseA Tank33 Am-241 B_LA

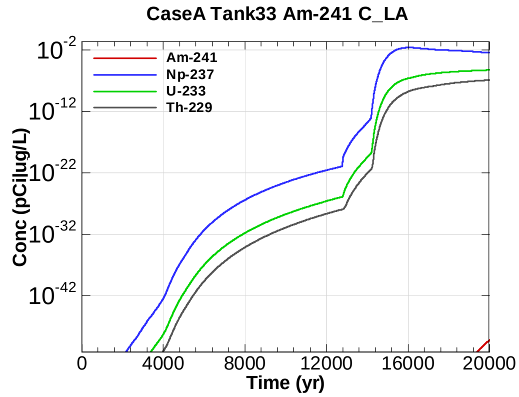

Figure E-818 - 100m Aquifer Concentration for CaseA Tank33 Am-241 C_LA

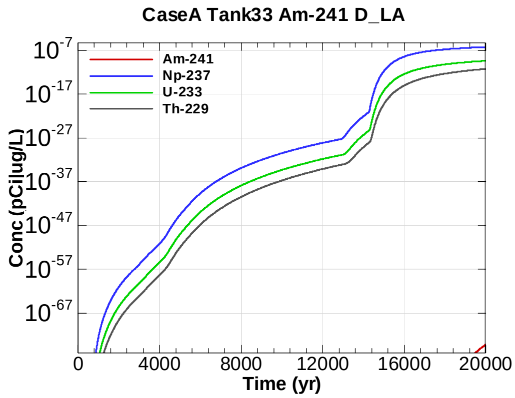

Figure E-819 - 100m Aquifer Concentration for CaseA Tank33 Am-241 D_LA

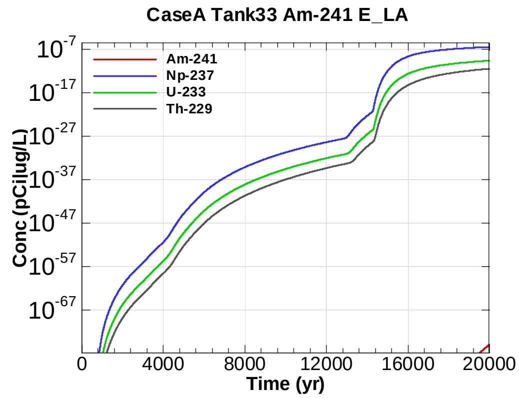

Figure E-820 - 100m Aquifer Concentration for CaseA Tank33 Am-241 E_LA

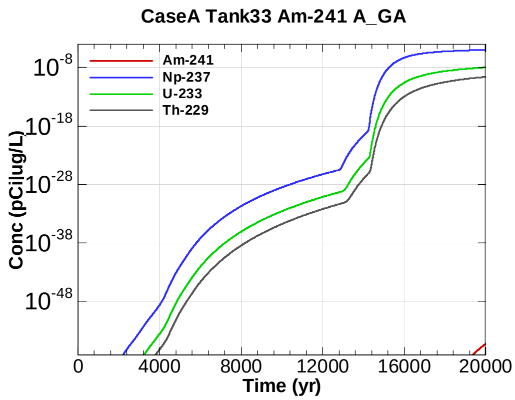

Figure E-821 - 100m Aquifer Concentration for CaseA Tank33 Am-241 A_GA

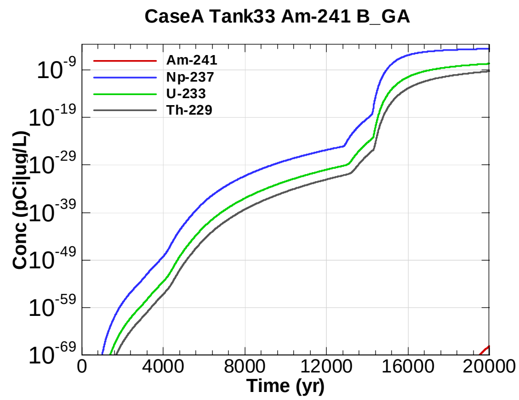

Figure E-822 - 100m Aquifer Concentration for CaseA Tank33 Am-241 B_GA

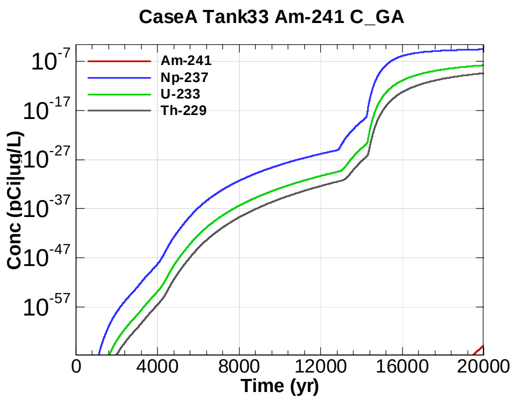

Figure E-823 - 100m Aquifer Concentration for CaseA Tank33 Am-241 C_GA

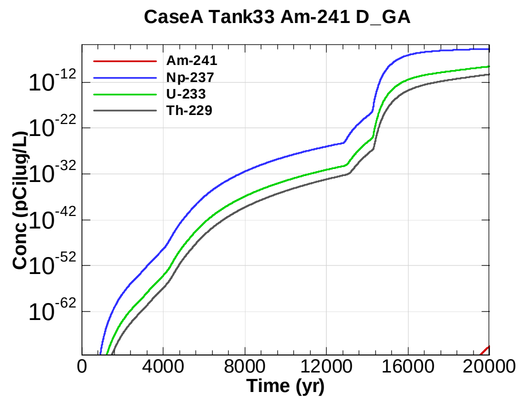

Figure E-824 - 100m Aquifer Concentration for CaseA Tank33 Am-241 D_GA

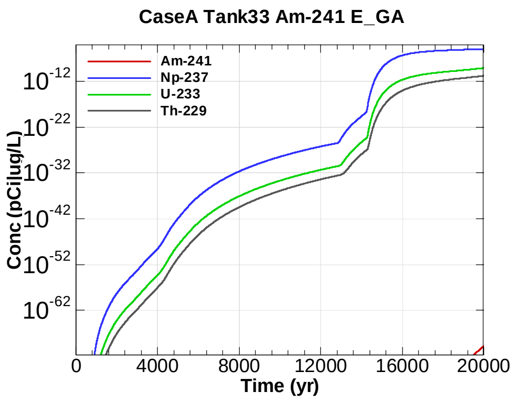

Figure E-825 - 100m Aquifer Concentration for CaseA Tank33 Am-241 E_GA

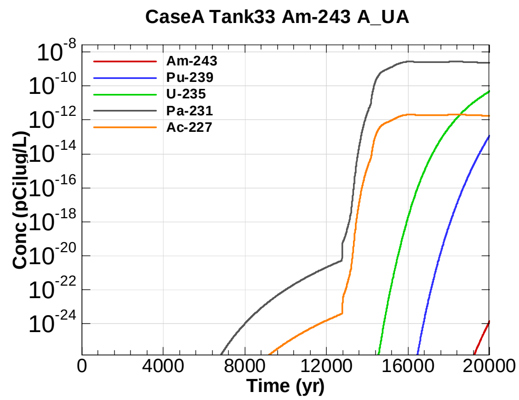

Figure E-826 - 100m Aquifer Concentration for CaseA Tank33 Am-243 A_UA

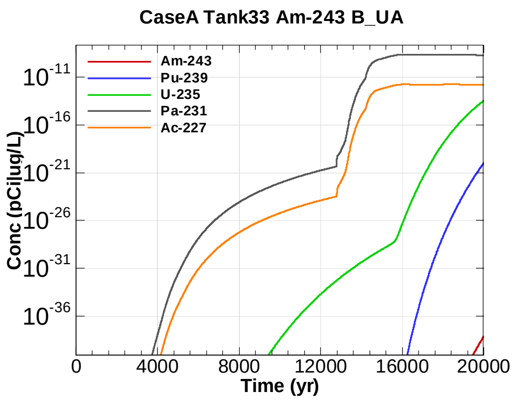

Figure E-827 - 100m Aquifer Concentration for CaseA Tank33 Am-243 B_UA

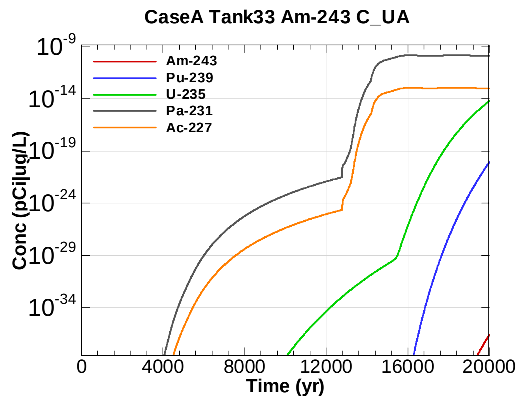

Figure E-828 - 100m Aquifer Concentration for CaseA Tank33 Am-243 C_UA

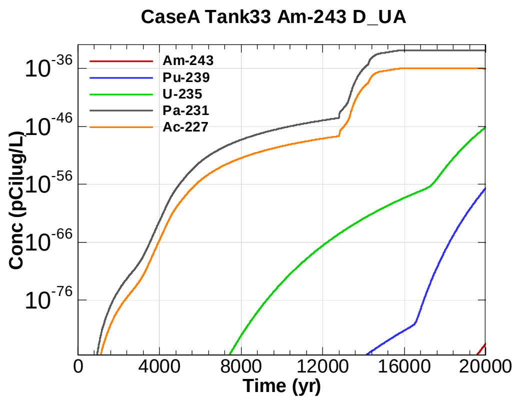

Figure E-829 - 100m Aquifer Concentration for CaseA Tank33 Am-243 D_UA

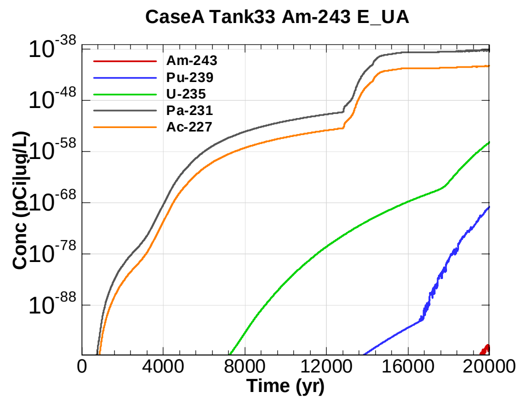

Figure E-830 - 100m Aquifer Concentration for CaseA Tank33 Am-243 E_UA

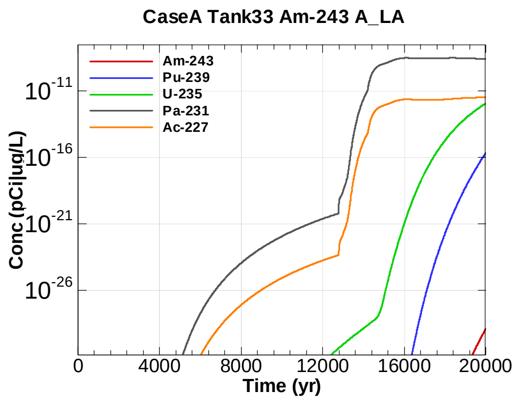

Figure E-831 - 100m Aquifer Concentration for CaseA Tank33 Am-243 A_LA

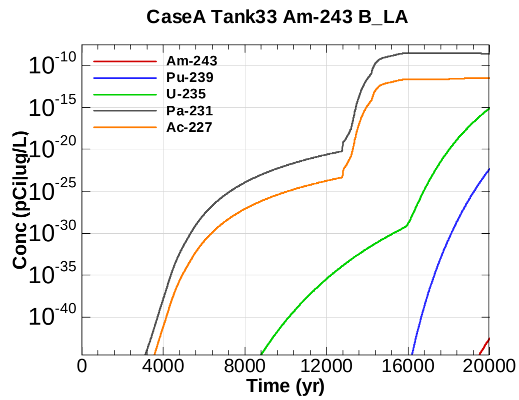

Figure E-832 - 100m Aquifer Concentration for CaseA Tank33 Am-243 B_LA

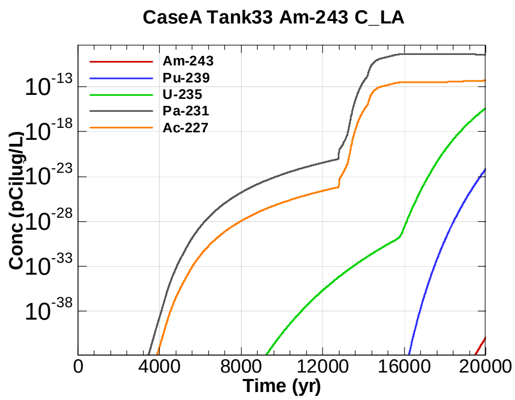

Figure E-833 - 100m Aquifer Concentration for CaseA Tank33 Am-243 C_LA

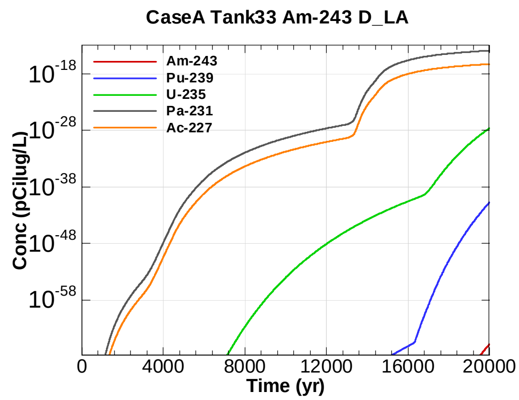

Figure E-834 - 100m Aquifer Concentration for CaseA Tank33 Am-243 D_LA

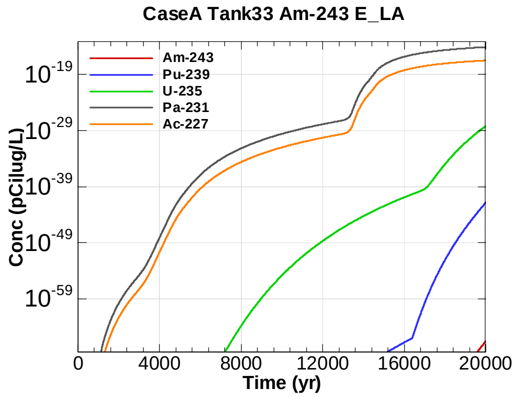

Figure E-835 - 100m Aquifer Concentration for CaseA Tank33 Am-243 E_LA

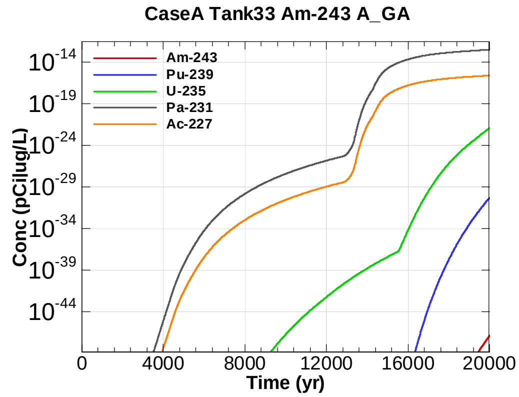

Figure E-836 - 100m Aquifer Concentration for CaseA Tank33 Am-243 A_GA

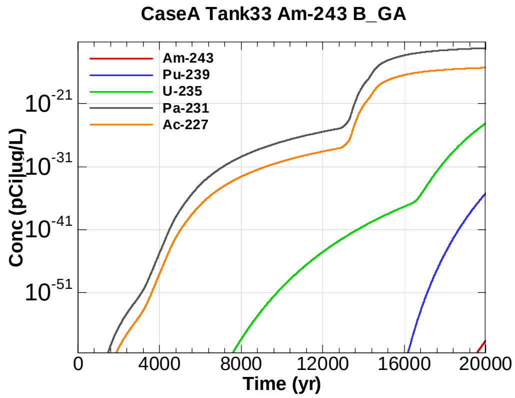

Figure E-837 - 100m Aquifer Concentration for CaseA Tank33 Am-243 B_GA

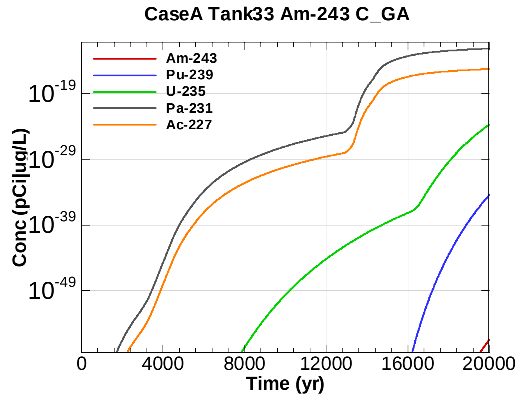

Figure E-838 - 100m Aquifer Concentration for CaseA Tank33 Am-243 C_GA

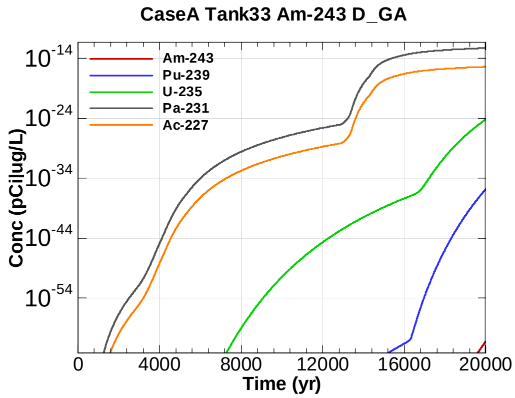

Figure E-839 - 100m Aquifer Concentration for CaseA Tank33 Am-243 D_GA

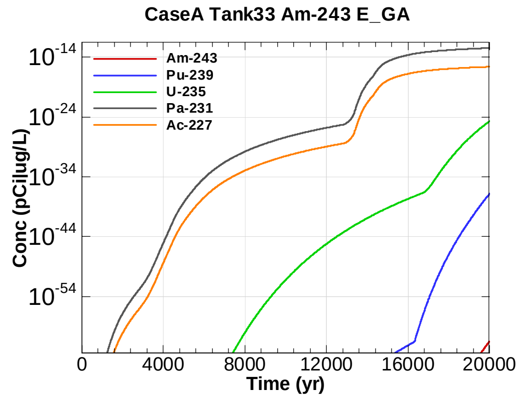

Figure E-840 - 100m Aquifer Concentration for CaseA Tank33 Am-243 E_GA

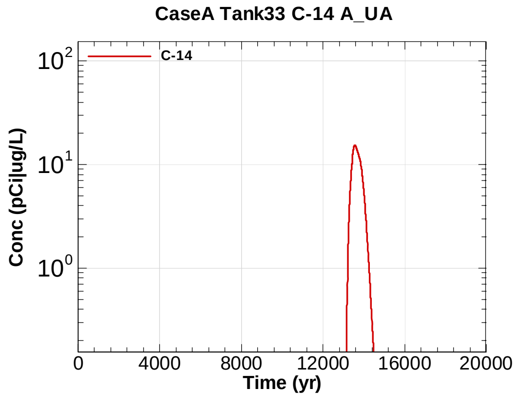

Figure E-841 - 100m Aquifer Concentration for CaseA Tank33 C-14 A_UA

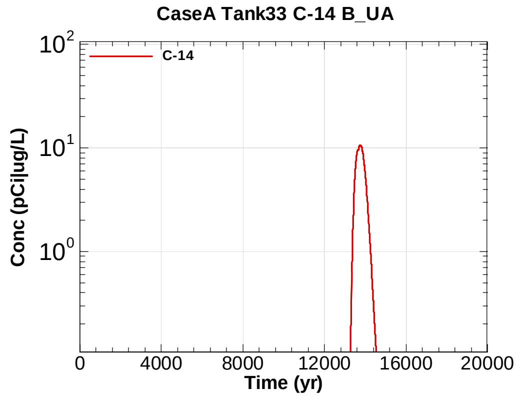

Figure E-842 - 100m Aquifer Concentration for CaseA Tank33 C-14 B_UA

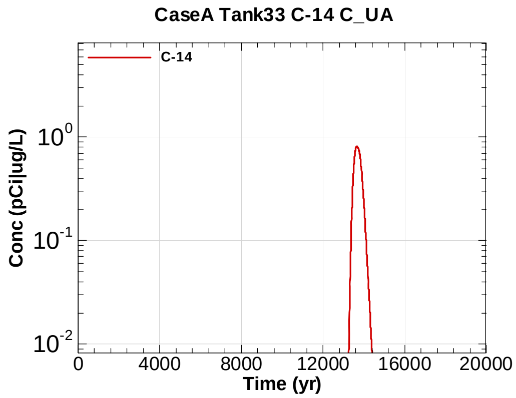

Figure E-843 - 100m Aquifer Concentration for CaseA Tank33 C-14 C_UA

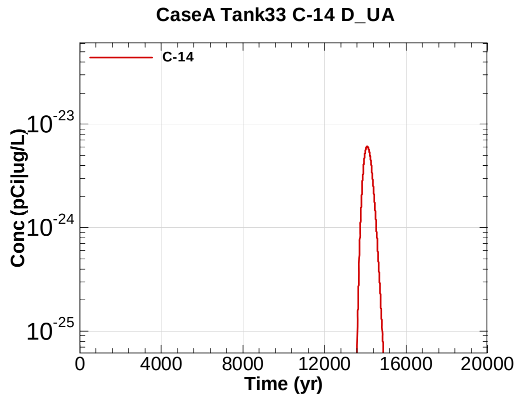

Figure E-844 - 100m Aquifer Concentration for CaseA Tank33 C-14 D_UA

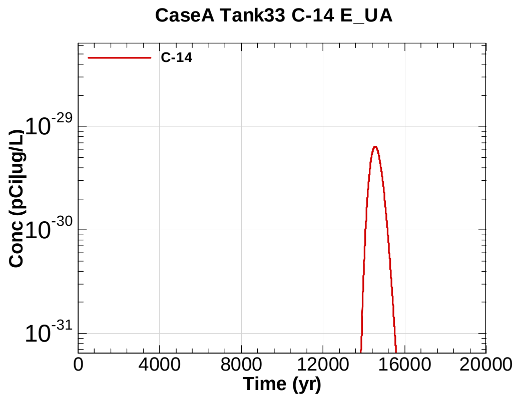

Figure E-845 - 100m Aquifer Concentration for CaseA Tank33 C-14 E_UA

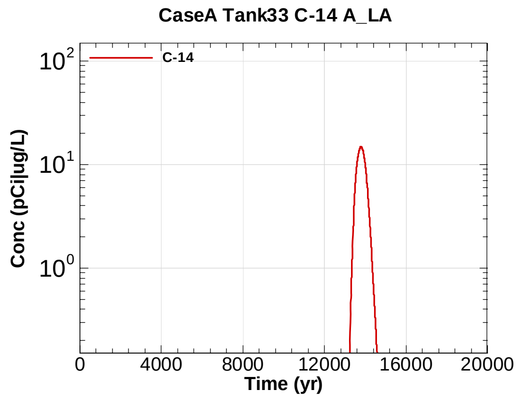

Figure E-846 - 100m Aquifer Concentration for CaseA Tank33 C-14 A_LA

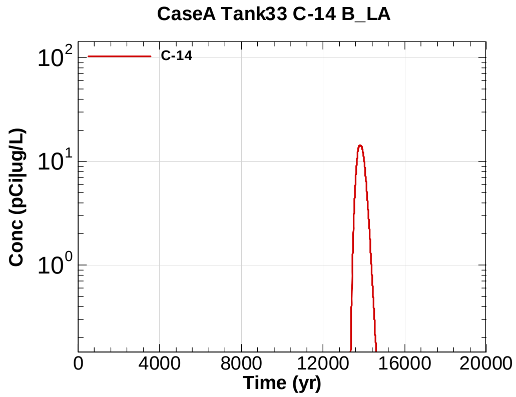

Figure E-847 - 100m Aquifer Concentration for CaseA Tank33 C-14 B_LA

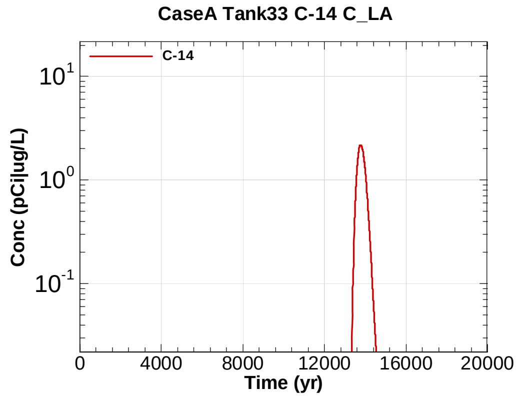

Figure E-848 - 100m Aquifer Concentration for CaseA Tank33 C-14 C_LA

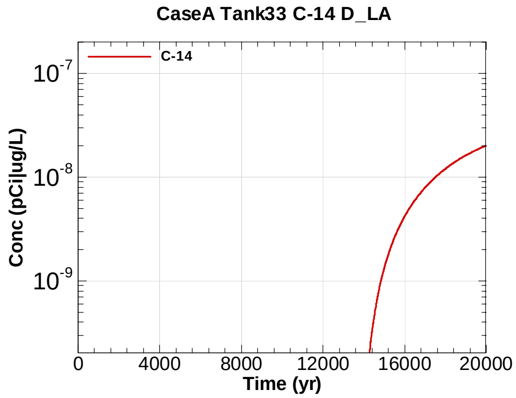

Figure E-849 - 100m Aquifer Concentration for CaseA Tank33 C-14 D_LA

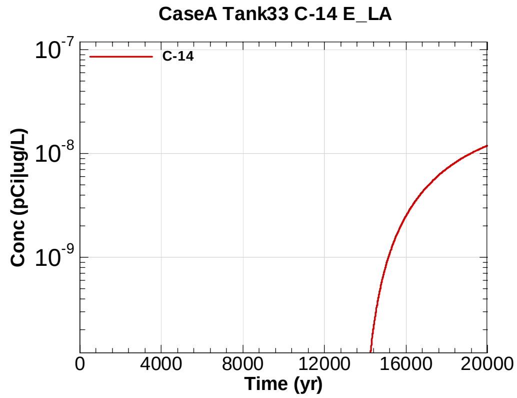

Figure E-850 - 100m Aquifer Concentration for CaseA Tank33 C-14 E_LA

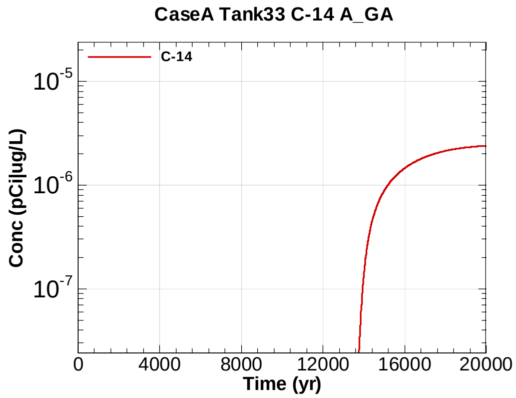

Figure E-851 - 100m Aquifer Concentration for CaseA Tank33 C-14 A_GA

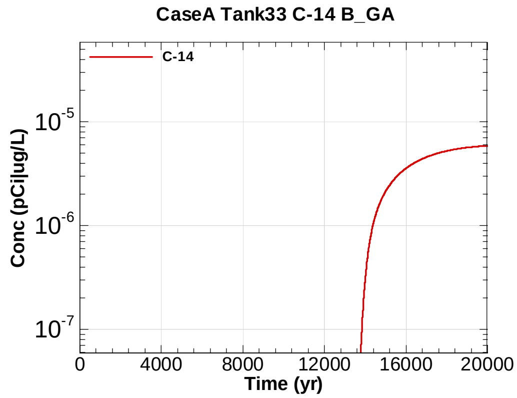

Figure E-852 - 100m Aquifer Concentration for CaseA Tank33 C-14 B_GA

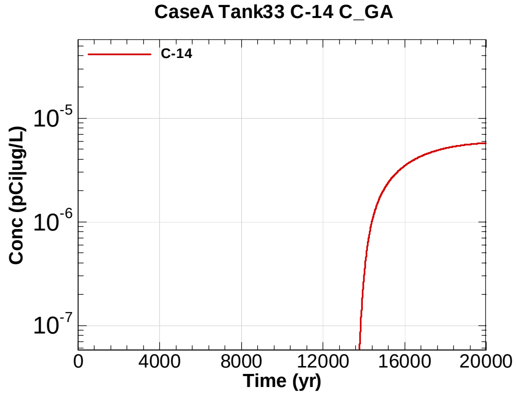

Figure E-853 - 100m Aquifer Concentration for CaseA Tank33 C-14 C_GA

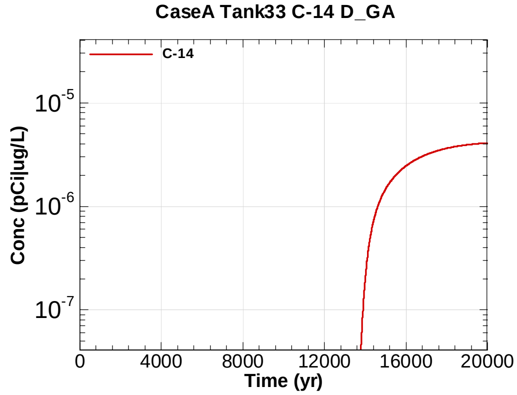

Figure E-854 - 100m Aquifer Concentration for CaseA Tank33 C-14 D_GA

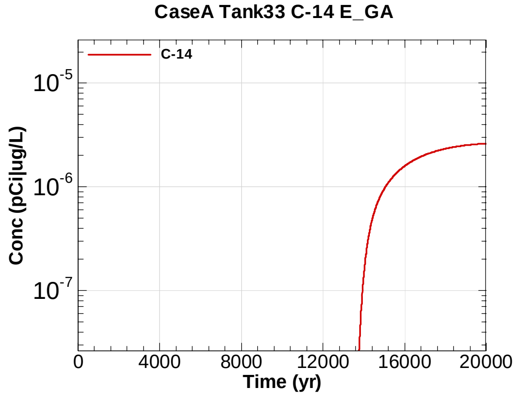

Figure E-855 - 100m Aquifer Concentration for CaseA Tank33 C-14 E_GA

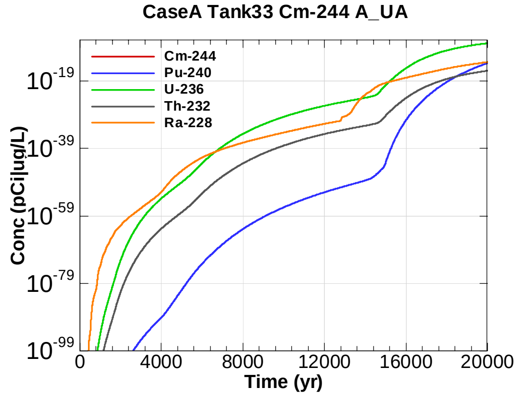

Figure E-856 - 100m Aquifer Concentration for CaseA Tank33 Cm-244 A_UA

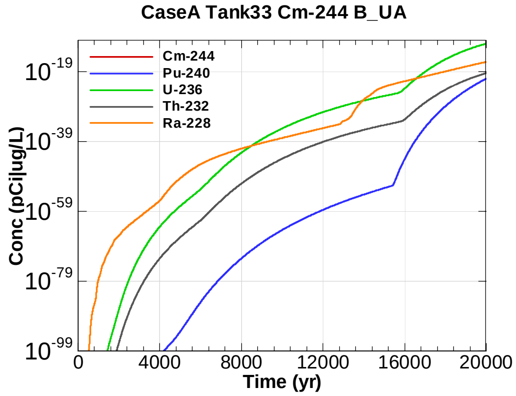

Figure E-857 - 100m Aquifer Concentration for CaseA Tank33 Cm-244 B_UA

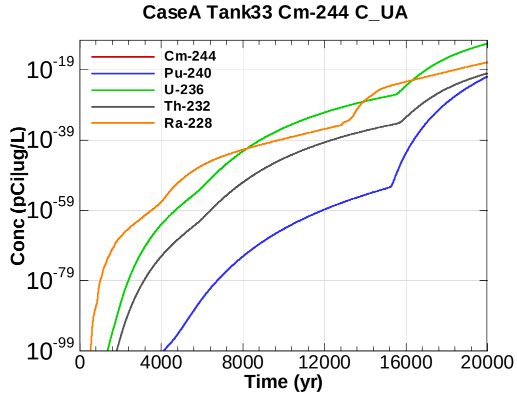

Figure E-858 - 100m Aquifer Concentration for CaseA Tank33 Cm-244 C_UA

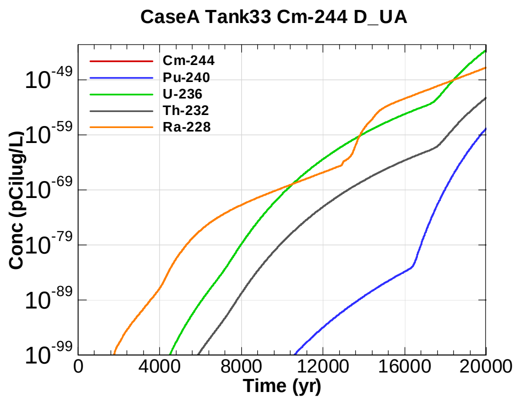

Figure E-859 - 100m Aquifer Concentration for CaseA Tank33 Cm-244 D_UA

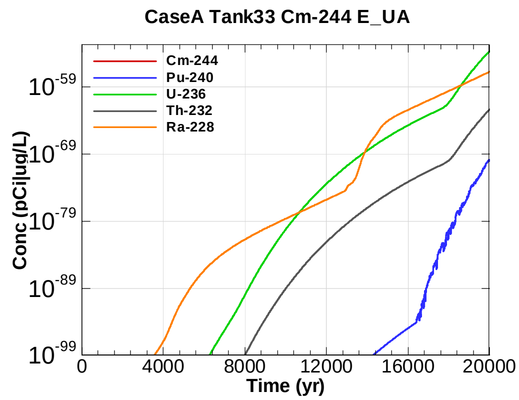

Figure E-860 - 100m Aquifer Concentration for CaseA Tank33 Cm-244 E_UA

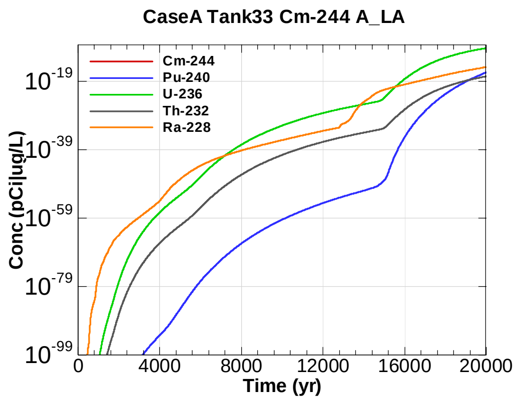

Figure E-861 - 100m Aquifer Concentration for CaseA Tank33 Cm-244 A_LA

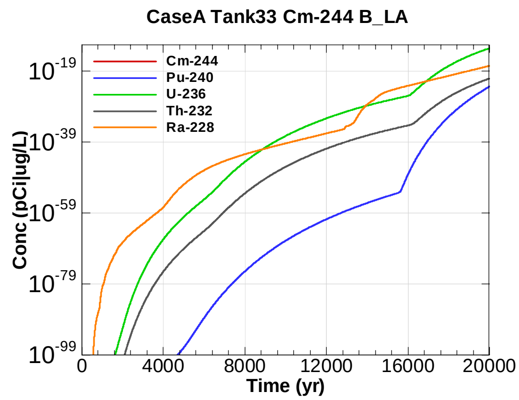

Figure E-862 - 100m Aquifer Concentration for CaseA Tank33 Cm-244 B_LA

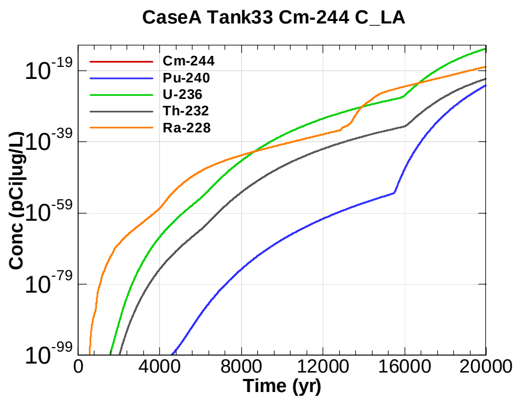

Figure E-863 - 100m Aquifer Concentration for CaseA Tank33 Cm-244 C_LA

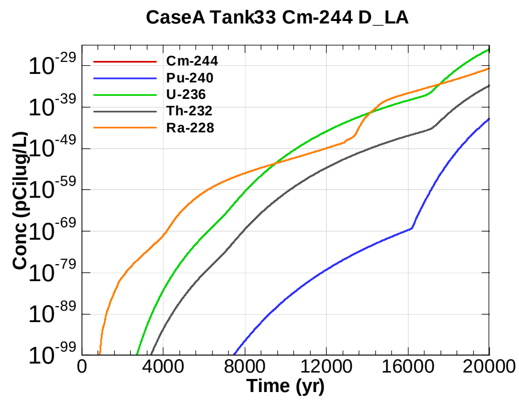

Figure E-864 - 100m Aquifer Concentration for CaseA Tank33 Cm-244 D_LA

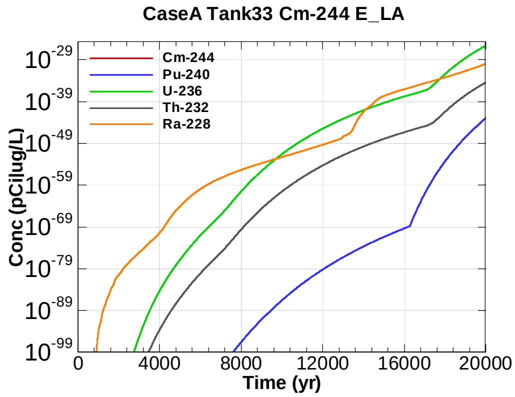

Figure E-865 - 100m Aquifer Concentration for CaseA Tank33 Cm-244 E_LA

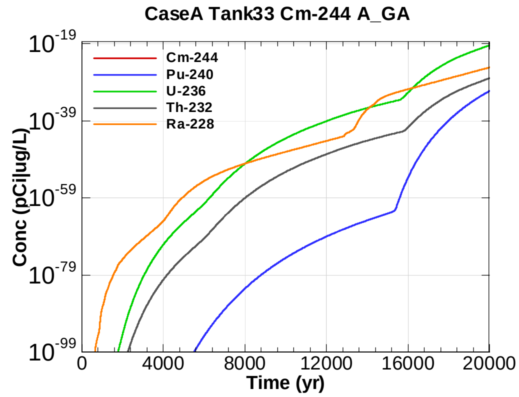

Figure E-866 - 100m Aquifer Concentration for CaseA Tank33 Cm-244 A_GA

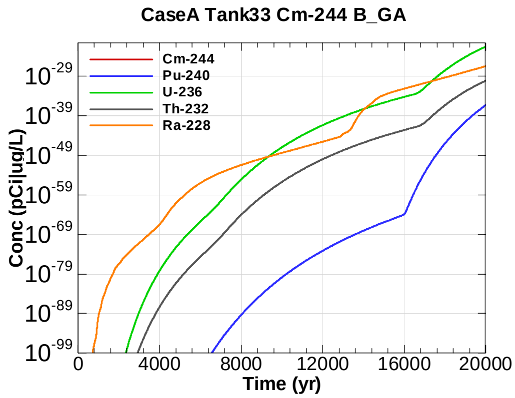

Figure E-867 - 100m Aquifer Concentration for CaseA Tank33 Cm-244 B_GA

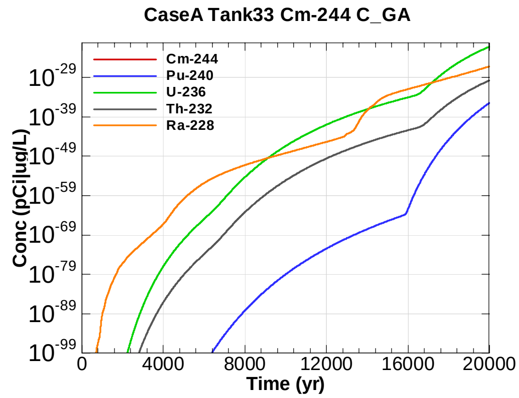

Figure E-868 - 100m Aquifer Concentration for CaseA Tank33 Cm-244 C_GA

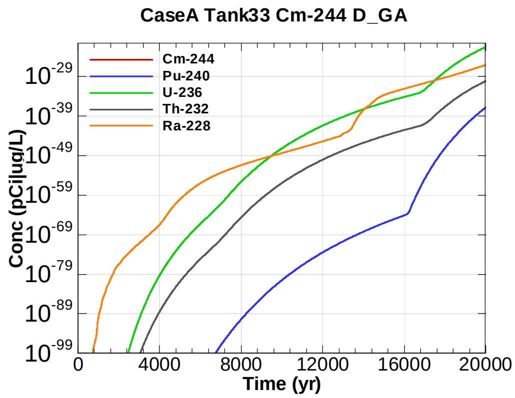

Figure E-869 - 100m Aquifer Concentration for CaseA Tank33 Cm-244 D_GA

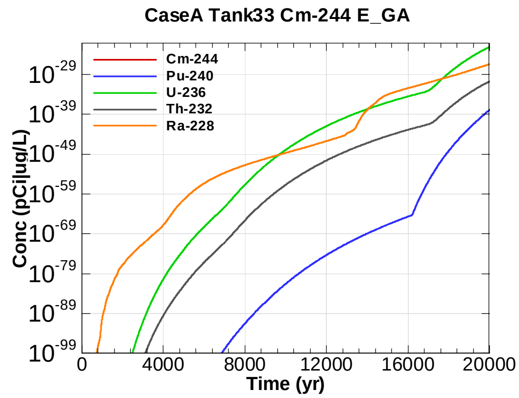

Figure E-870 - 100m Aquifer Concentration for CaseA Tank33 Cm-244 E_GA

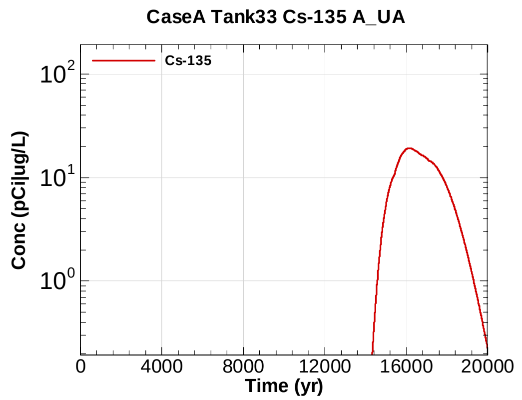

Figure E-871 - 100m Aquifer Concentration for CaseA Tank33 Cs-135 A_UA

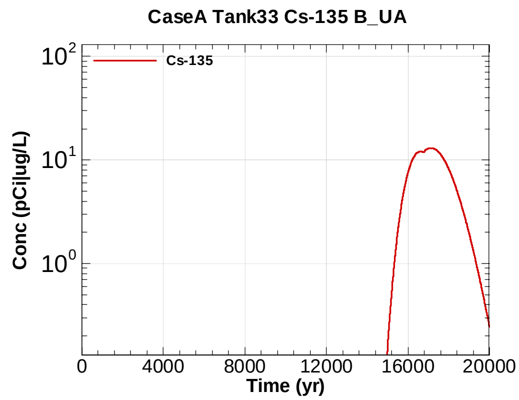

Figure E-872 - 100m Aquifer Concentration for CaseA Tank33 Cs-135 B_UA

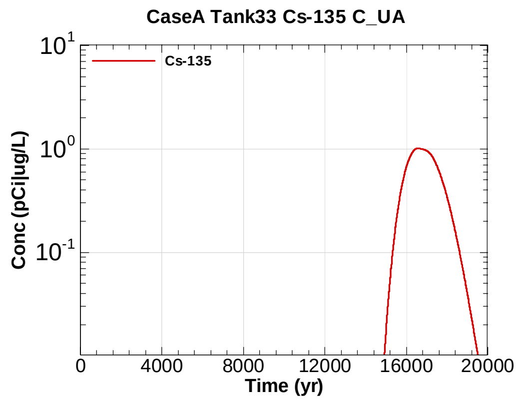

Figure E-873 - 100m Aquifer Concentration for CaseA Tank33 Cs-135 C_UA

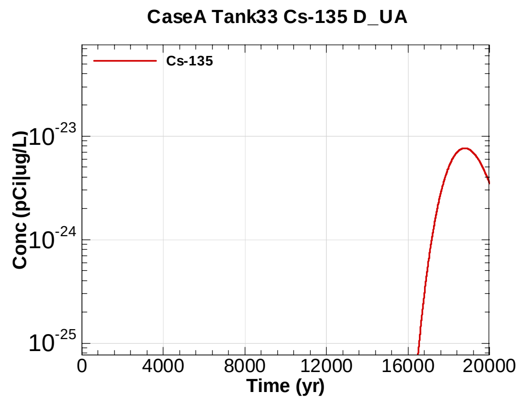

Figure E-874 - 100m Aquifer Concentration for CaseA Tank33 Cs-135 D_UA

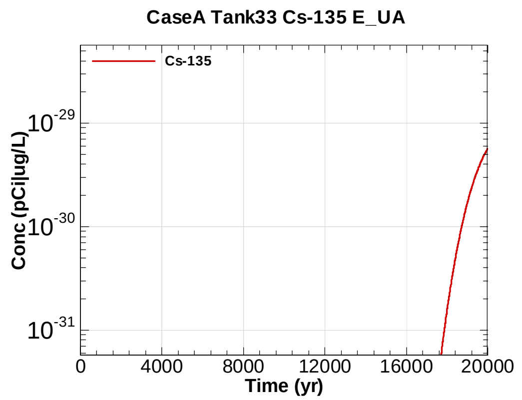

Figure E-875 - 100m Aquifer Concentration for CaseA Tank33 Cs-135 E_UA

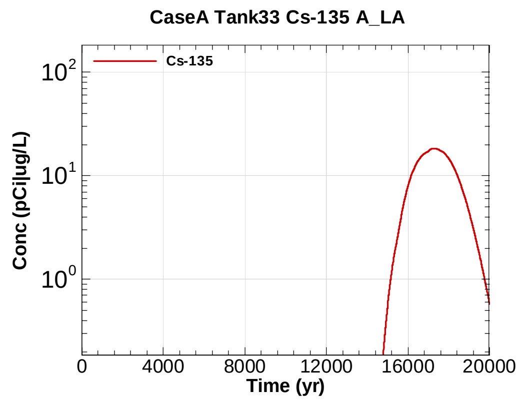

Figure E-876 - 100m Aquifer Concentration for CaseA Tank33 Cs-135 A_LA

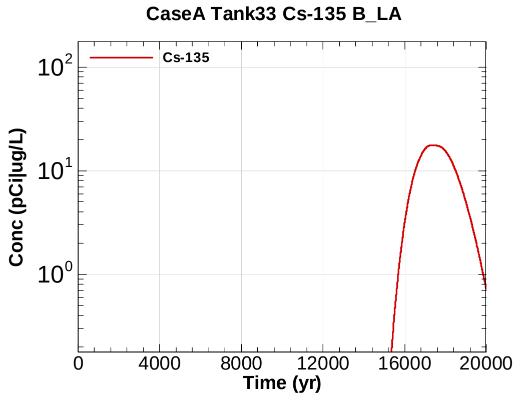

Figure E-877 - 100m Aquifer Concentration for CaseA Tank33 Cs-135 B_LA

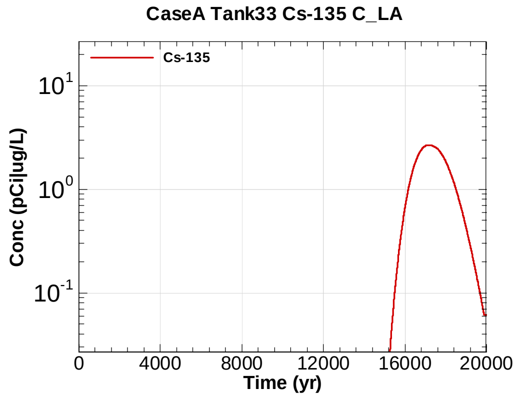

Figure E-878 - 100m Aquifer Concentration for CaseA Tank33 Cs-135 C_LA

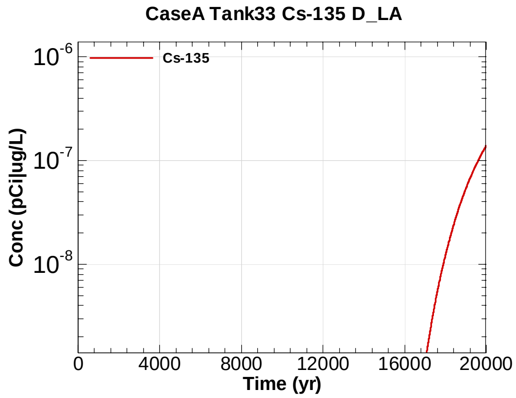

Figure E-879 - 100m Aquifer Concentration for CaseA Tank33 Cs-135 D_LA

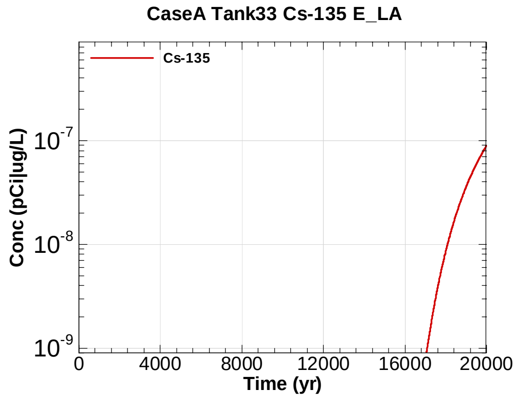

Figure E-880 - 100m Aquifer Concentration for CaseA Tank33 Cs-135 E_LA

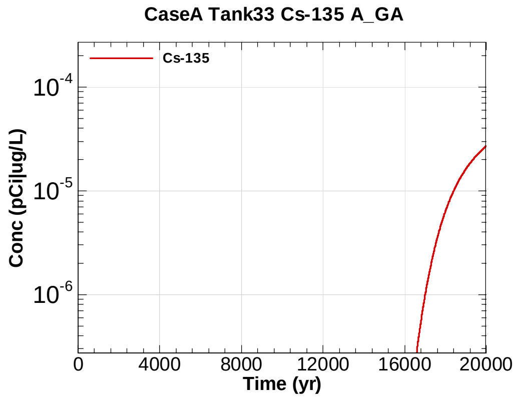

Figure E-881 - 100m Aquifer Concentration for CaseA Tank33 Cs-135 A_GA

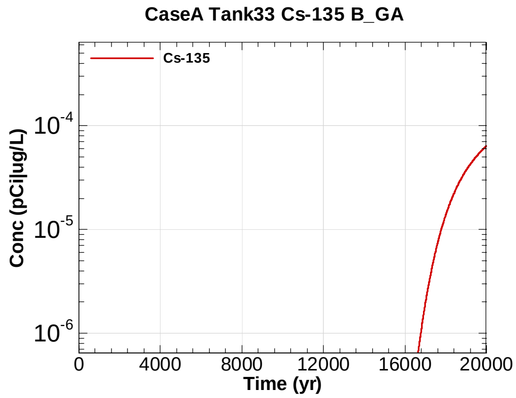

Figure E-882 - 100m Aquifer Concentration for CaseA Tank33 Cs-135 B_GA

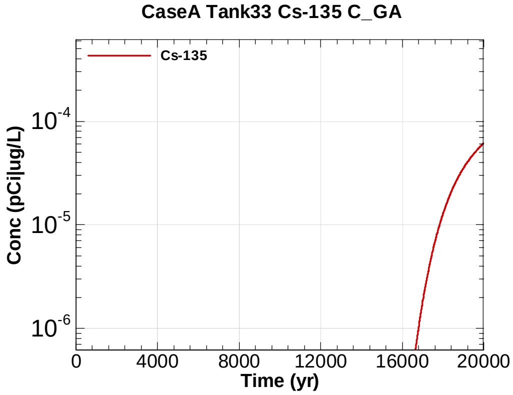

Figure E-883 - 100m Aquifer Concentration for CaseA Tank33 Cs-135 C_GA

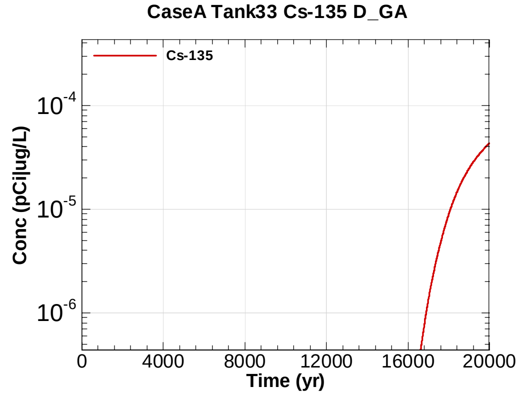

Figure E-884 - 100m Aquifer Concentration for CaseA Tank33 Cs-135 D_GA

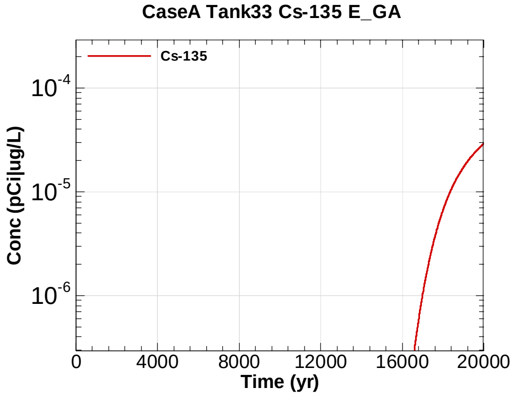

Figure E-885 - 100m Aquifer Concentration for CaseA Tank33 Cs-135 E_GA

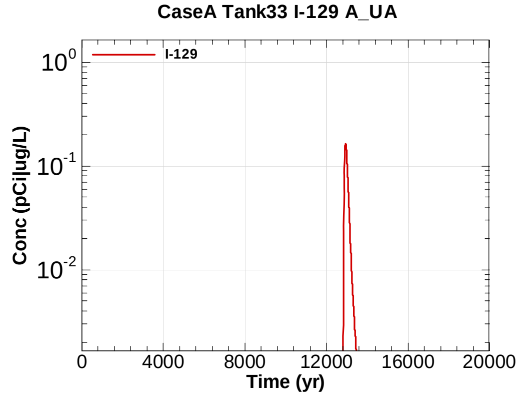

Figure E-886 - 100m Aquifer Concentration for CaseA Tank33 I-129 A_UA

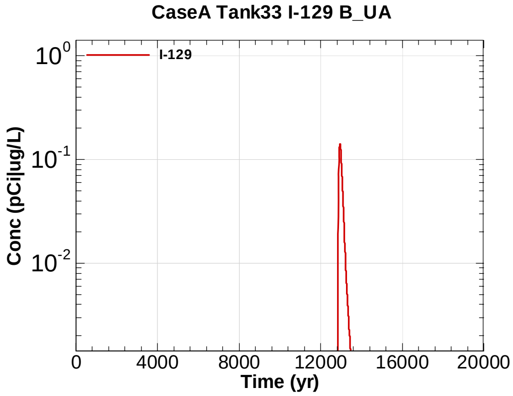

Figure E-887 - 100m Aquifer Concentration for CaseA Tank33 I-129 B_UA

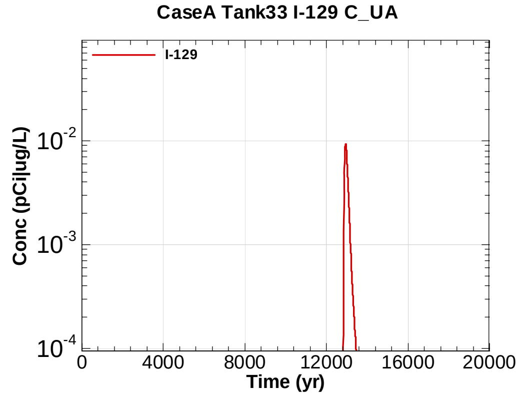

Figure E-888 - 100m Aquifer Concentration for CaseA Tank33 I-129 C_UA

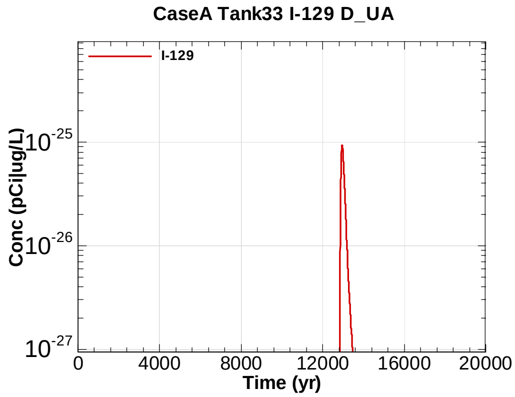

Figure E-889 - 100m Aquifer Concentration for CaseA Tank33 I-129 D_UA

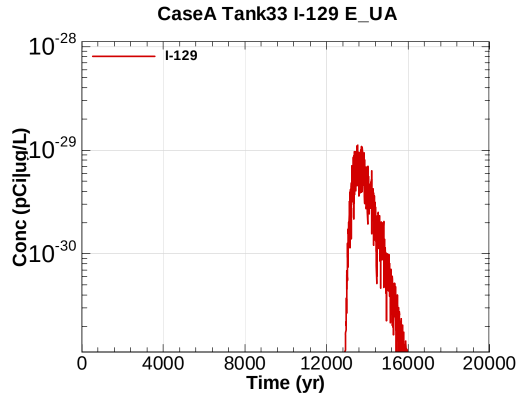

Figure E-890 - 100m Aquifer Concentration for CaseA Tank33 I-129 E_UA

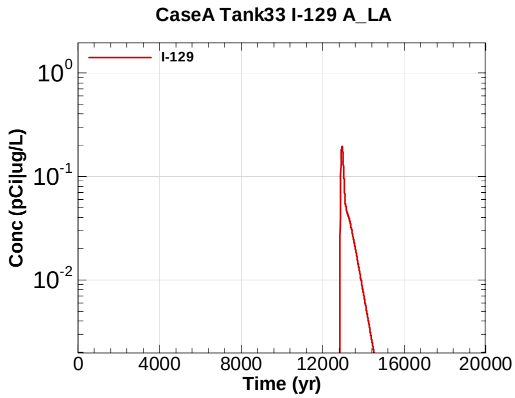

Figure E-891 - 100m Aquifer Concentration for CaseA Tank33 I-129 A_LA

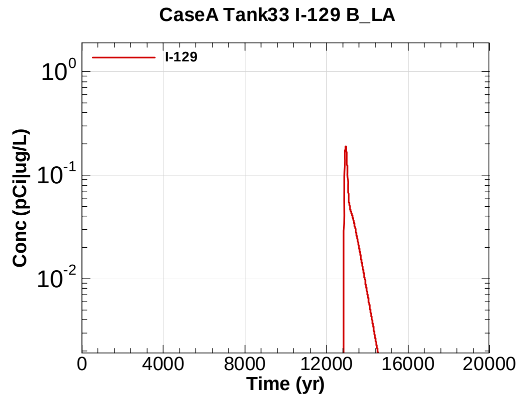

Figure E-892 - 100m Aquifer Concentration for CaseA Tank33 I-129 B_LA

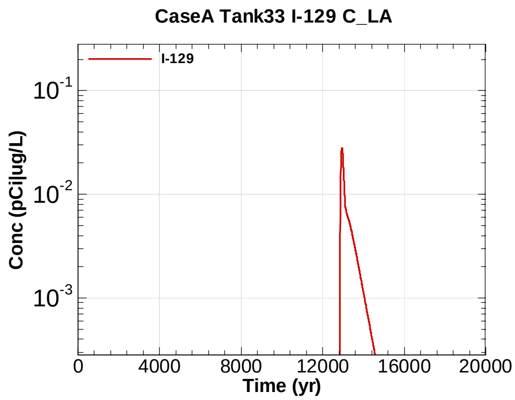

Figure E-893 - 100m Aquifer Concentration for CaseA Tank33 I-129 C_LA

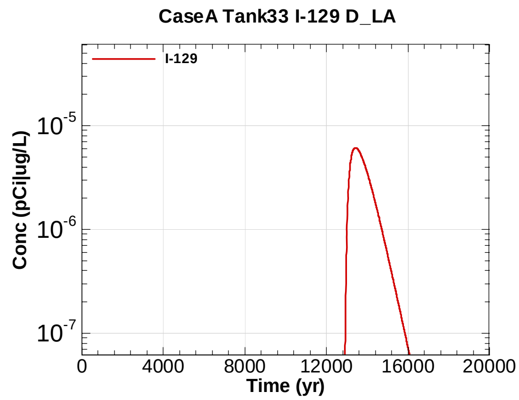

Figure E-894 - 100m Aquifer Concentration for CaseA Tank33 I-129 D_LA

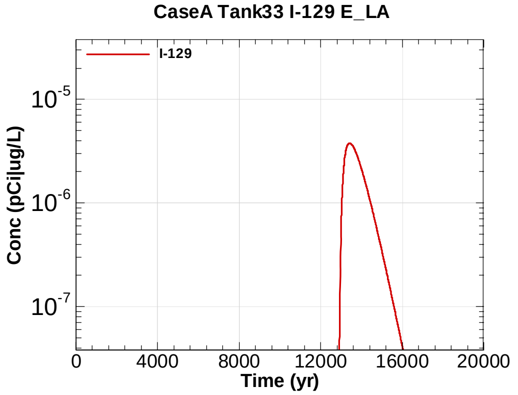

Figure E-895 - 100m Aquifer Concentration for CaseA Tank33 I-129 E_LA

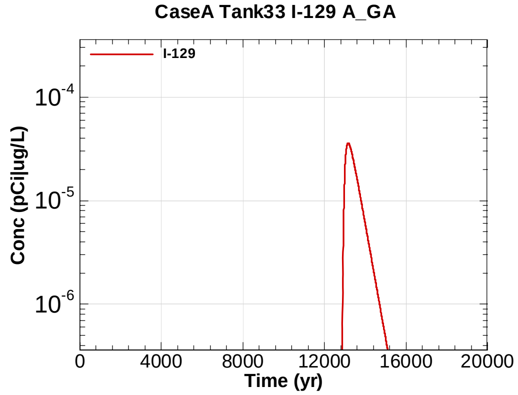

Figure E-896 - 100m Aquifer Concentration for CaseA Tank33 I-129 A_GA

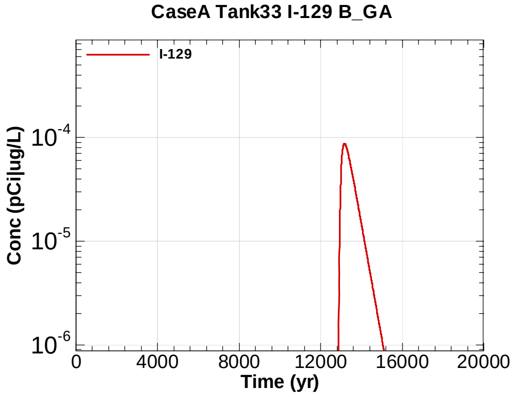

Figure E-897 - 100m Aquifer Concentration for CaseA Tank33 I-129 B_GA

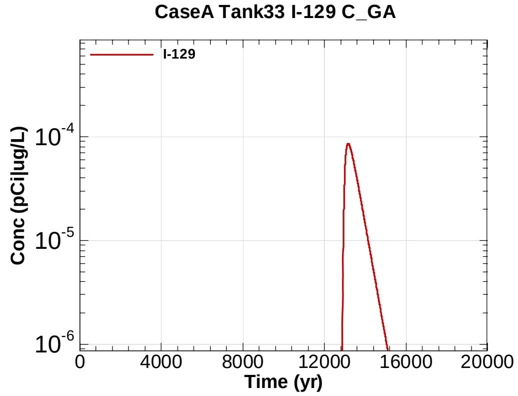

Figure E-898 - 100m Aquifer Concentration for CaseA Tank33 I-129 C_GA

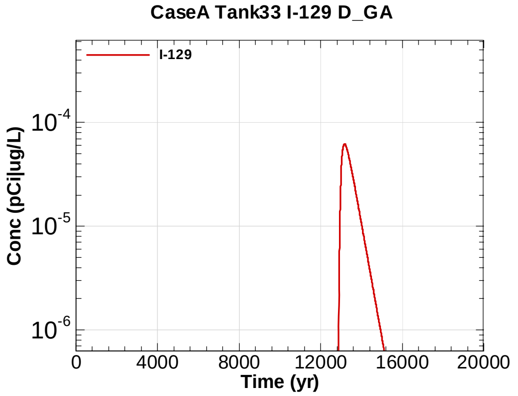

Figure E-899 - 100m Aquifer Concentration for CaseA Tank33 I-129 D_GA

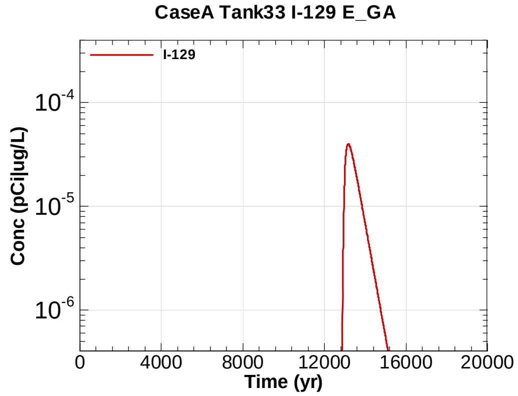

Figure E-900 - 100m Aquifer Concentration for CaseA Tank33 I-129 E_GA

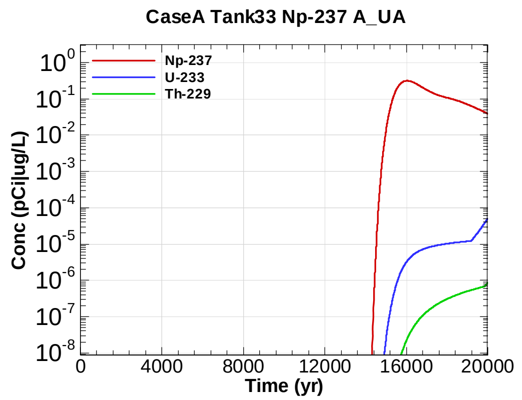

Figure E-901 - 100m Aquifer Concentration for CaseA Tank33 Np-237 A_UA

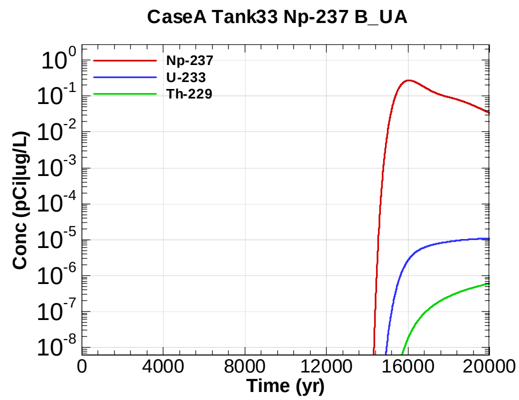

Figure E-902 - 100m Aquifer Concentration for CaseA Tank33 Np-237 B_UA

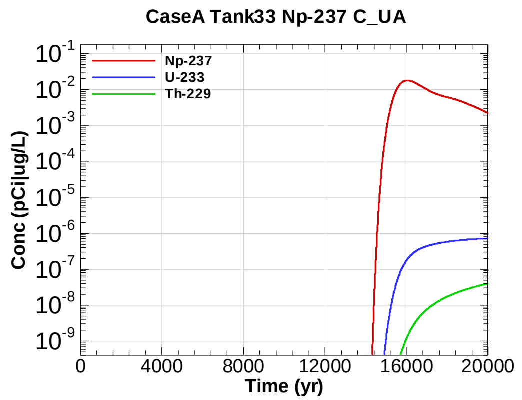

Figure E-903 - 100m Aquifer Concentration for CaseA Tank33 Np-237 C_UA

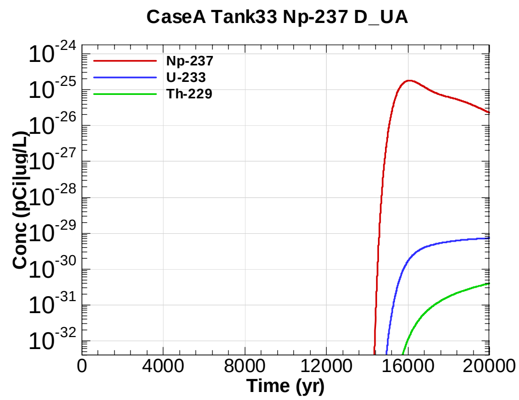

Figure E-904 - 100m Aquifer Concentration for CaseA Tank33 Np-237 D_UA

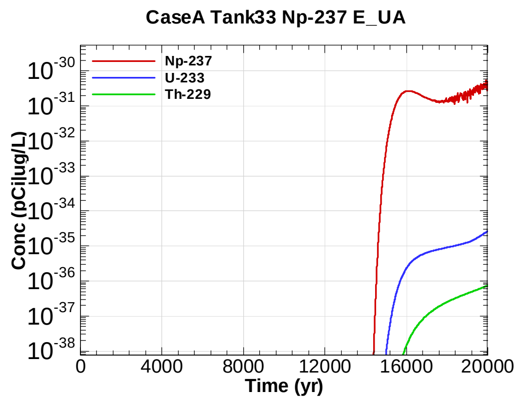

Figure E-905 - 100m Aquifer Concentration for CaseA Tank33 Np-237 E_UA

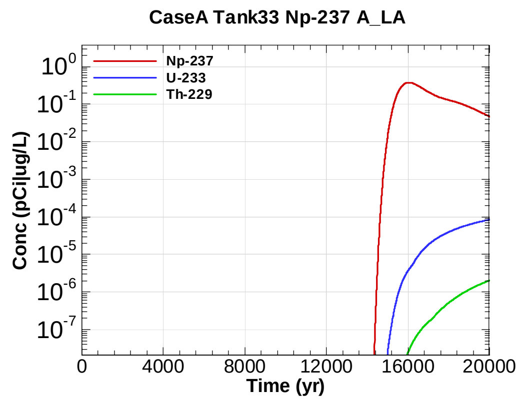

Figure E-906 - 100m Aquifer Concentration for CaseA Tank33 Np-237 A_LA

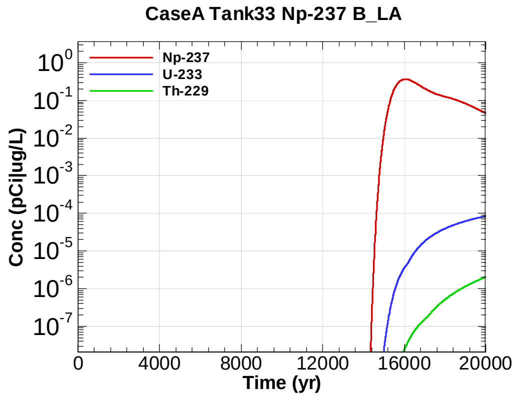

Figure E-907 - 100m Aquifer Concentration for CaseA Tank33 Np-237 B_LA

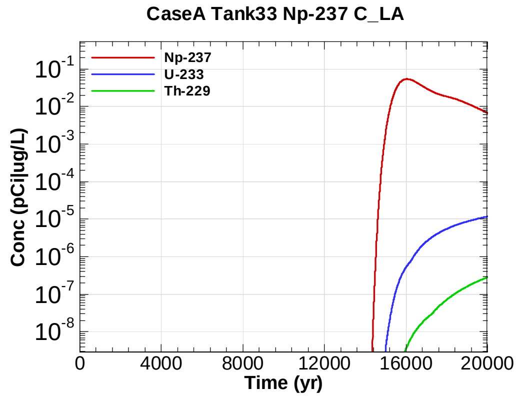

Figure E-908 - 100m Aquifer Concentration for CaseA Tank33 Np-237 C_LA

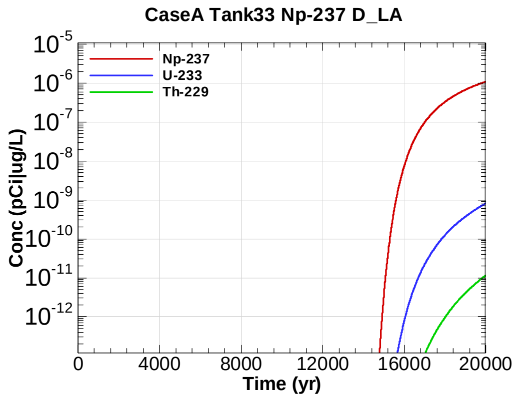

Figure E-909 - 100m Aquifer Concentration for CaseA Tank33 Np-237 D_LA

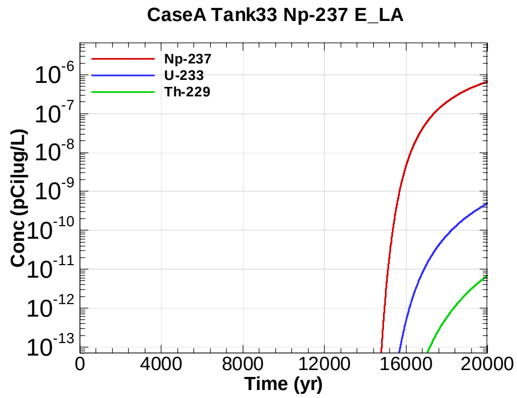

Figure E-910 - 100m Aquifer Concentration for CaseA Tank33 Np-237 E_LA

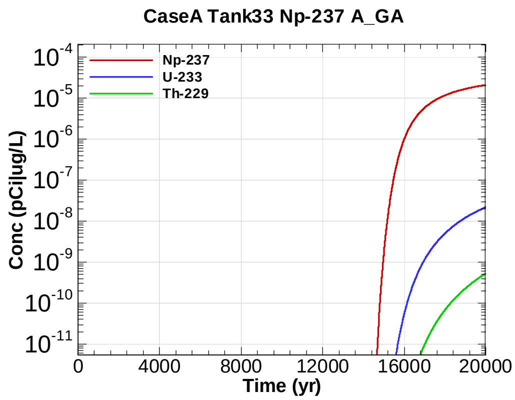

Figure E-911 - 100m Aquifer Concentration for CaseA Tank33 Np-237 A_GA

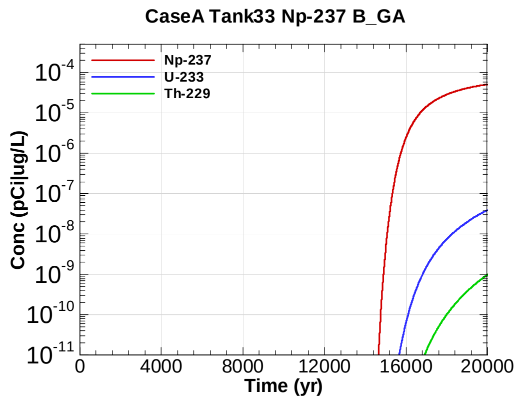

Figure E-912 - 100m Aquifer Concentration for CaseA Tank33 Np-237 B_GA

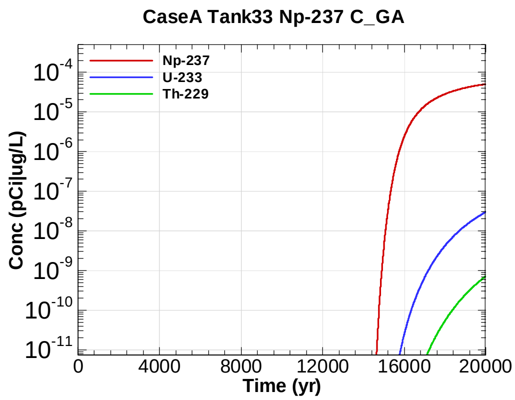

Figure E-913 - 100m Aquifer Concentration for CaseA Tank33 Np-237 C_GA

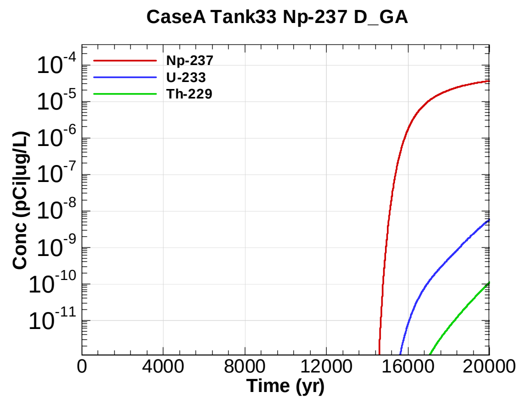

Figure E-914 - 100m Aquifer Concentration for CaseA Tank33 Np-237 D_GA

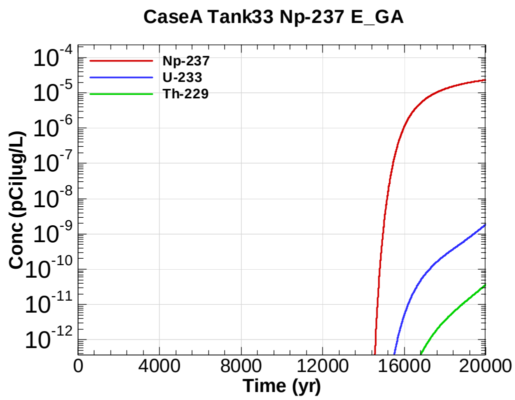

Figure E-915 - 100m Aquifer Concentration for CaseA Tank33 Np-237 E_GA

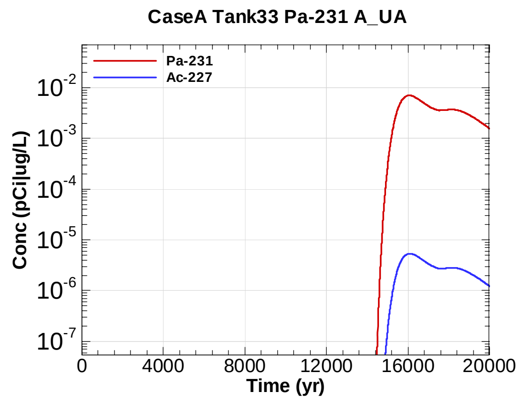

Figure E-916 - 100m Aquifer Concentration for CaseA Tank33 Pa-231 A_UA

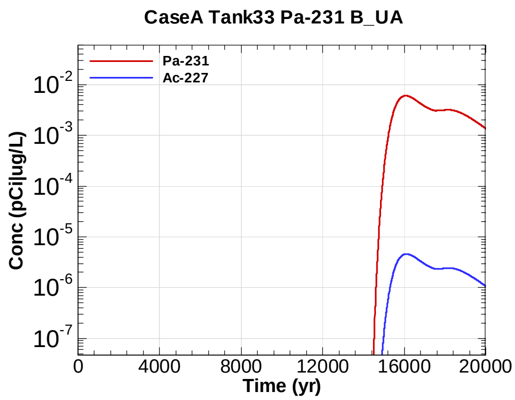

Figure E-917 - 100m Aquifer Concentration for CaseA Tank33 Pa-231 B_UA

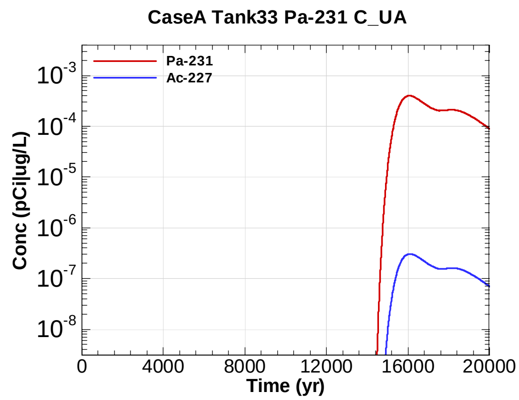

Figure E-918 - 100m Aquifer Concentration for CaseA Tank33 Pa-231 C_UA

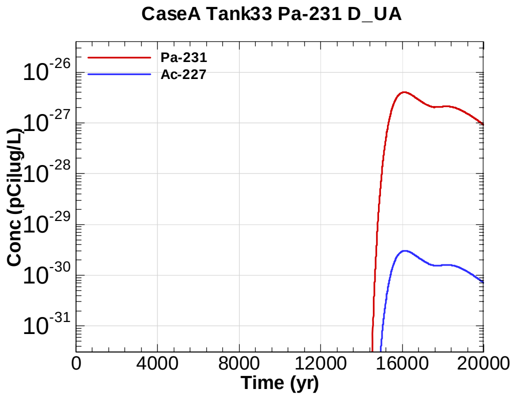

Figure E-919 - 100m Aquifer Concentration for CaseA Tank33 Pa-231 D_UA

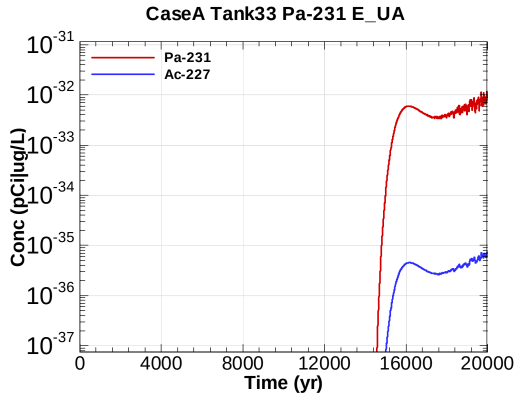

Figure E-920 - 100m Aquifer Concentration for CaseA Tank33 Pa-231 E_UA

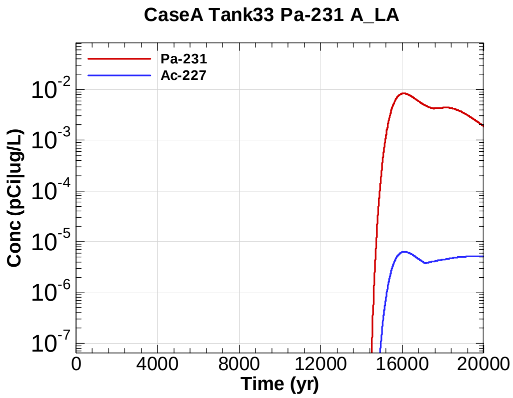

Figure E-921 - 100m Aquifer Concentration for CaseA Tank33 Pa-231 A_LA

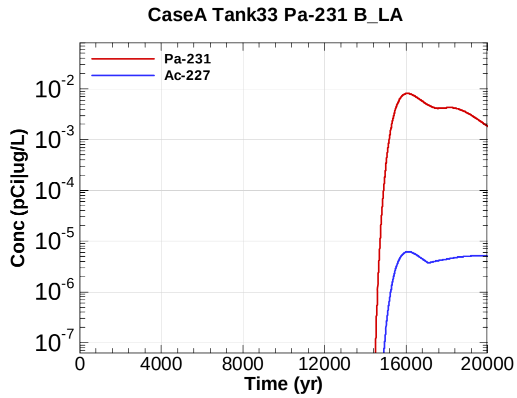

Figure E-922 - 100m Aquifer Concentration for CaseA Tank33 Pa-231 B_LA

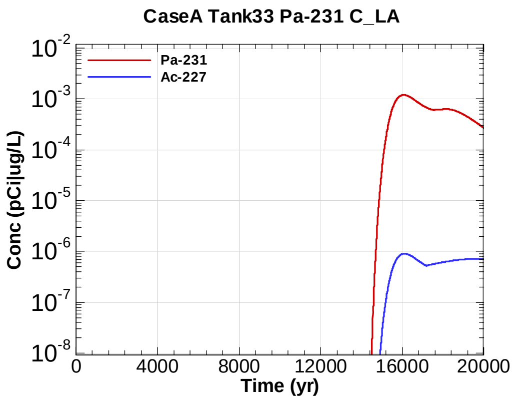

Figure E-923 - 100m Aquifer Concentration for CaseA Tank33 Pa-231 C_LA

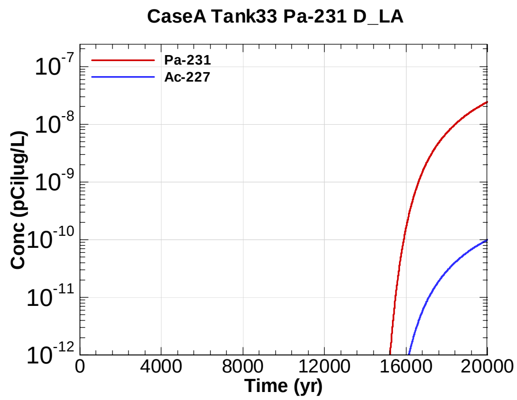

Figure E-924 - 100m Aquifer Concentration for CaseA Tank33 Pa-231 D_LA

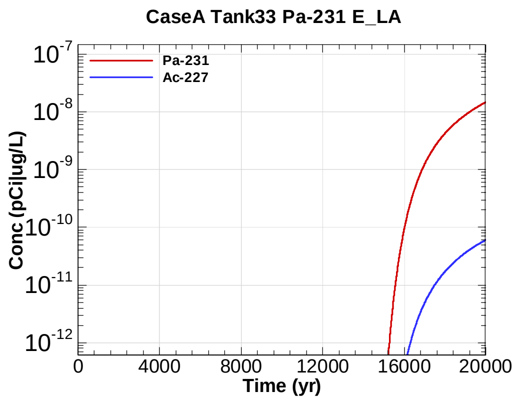

Figure E-925 - 100m Aquifer Concentration for CaseA Tank33 Pa-231 E_LA

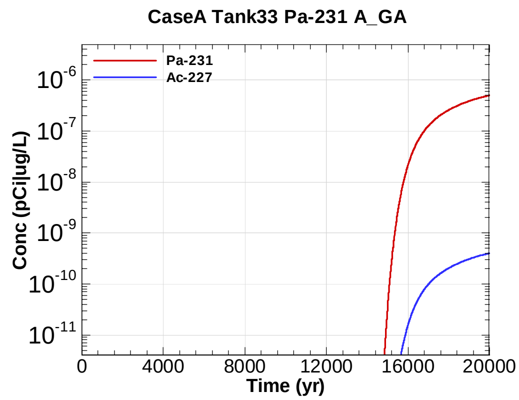

Figure E-926 - 100m Aquifer Concentration for CaseA Tank33 Pa-231 A_GA

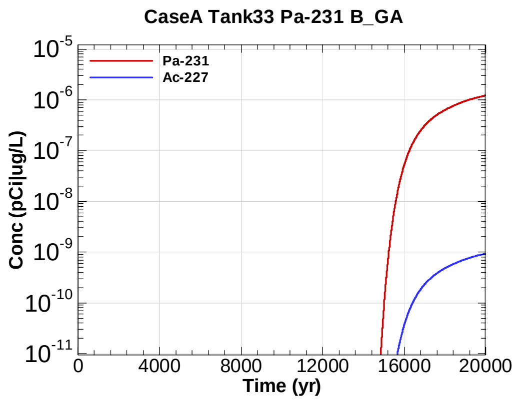

Figure E-927 - 100m Aquifer Concentration for CaseA Tank33 Pa-231 B_GA

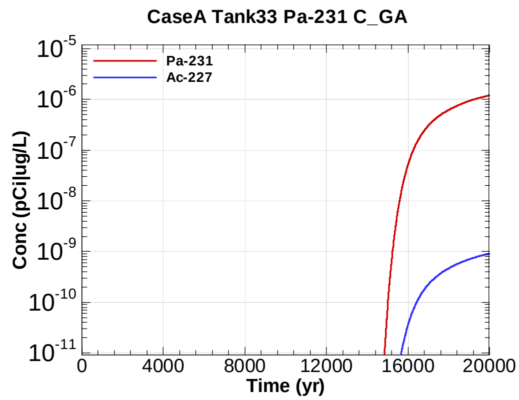

Figure E-928 - 100m Aquifer Concentration for CaseA Tank33 Pa-231 C_GA

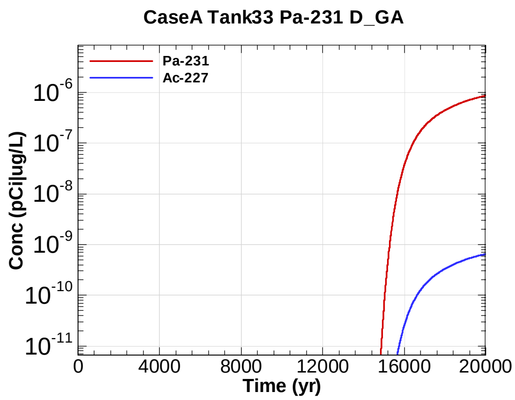

Figure E-929 - 100m Aquifer Concentration for CaseA Tank33 Pa-231 D_GA

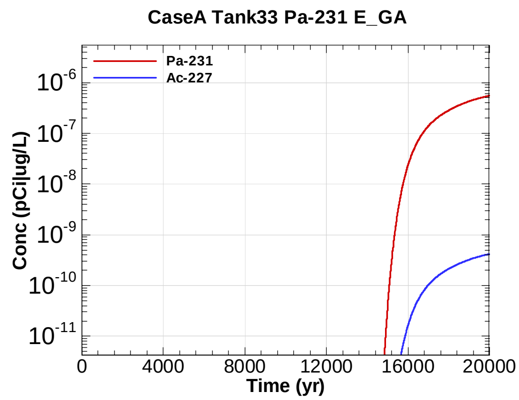

Figure E-930 - 100m Aquifer Concentration for CaseA Tank33 Pa-231 E_GA

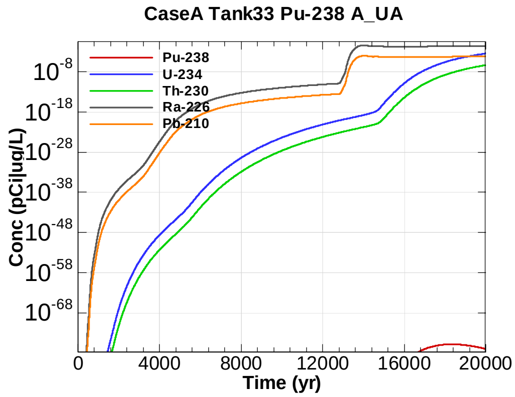

Figure E-931 - 100m Aquifer Concentration for CaseA Tank33 Pu-238 A_UA

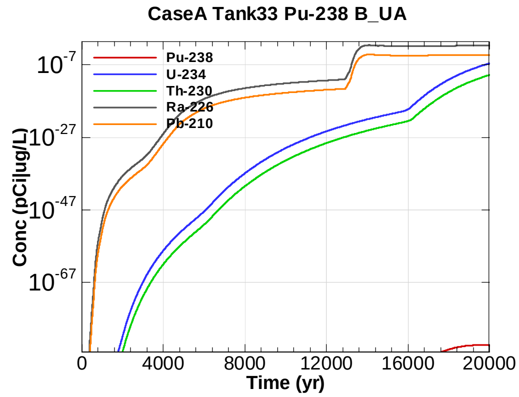

Figure E-932 - 100m Aquifer Concentration for CaseA Tank33 Pu-238 B_UA

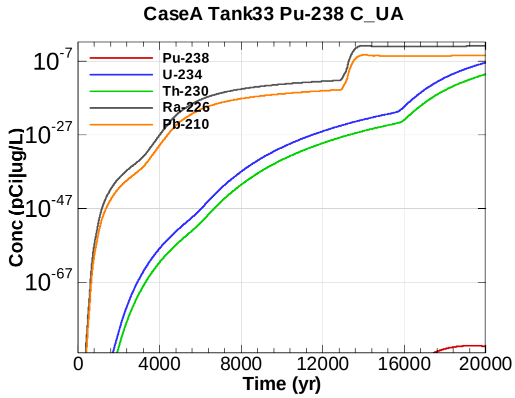

Figure E-933 - 100m Aquifer Concentration for CaseA Tank33 Pu-238 C_UA

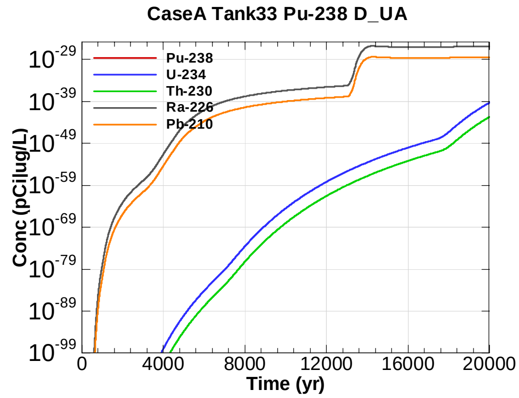

Figure E-934 - 100m Aquifer Concentration for CaseA Tank33 Pu-238 D_UA

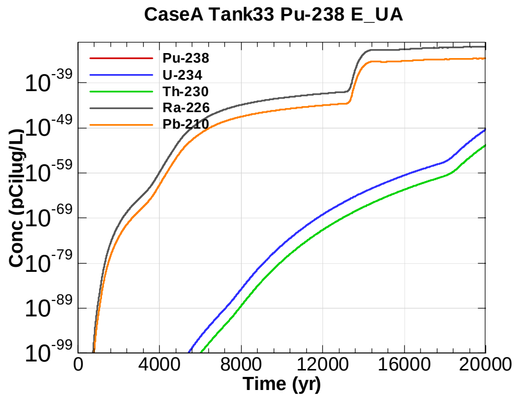

Figure E-935 - 100m Aquifer Concentration for CaseA Tank33 Pu-238 E_UA

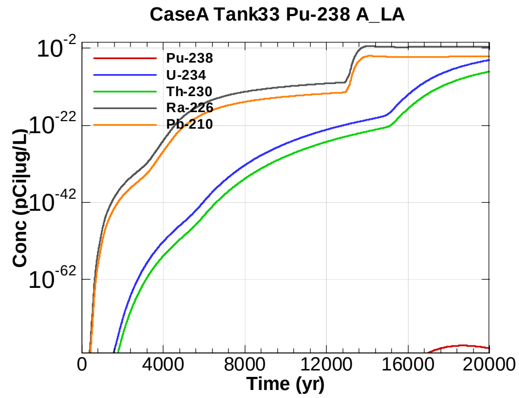

Figure E-936 - 100m Aquifer Concentration for CaseA Tank33 Pu-238 A_LA

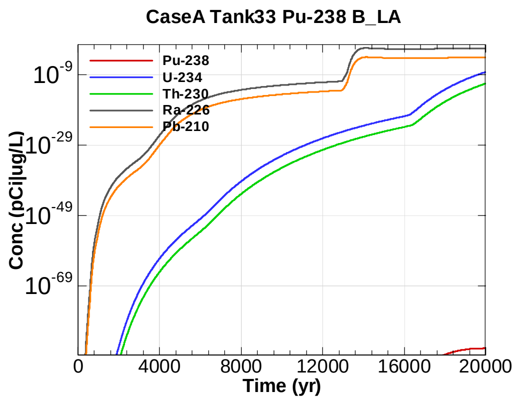

Figure E-937 - 100m Aquifer Concentration for CaseA Tank33 Pu-238 B_LA

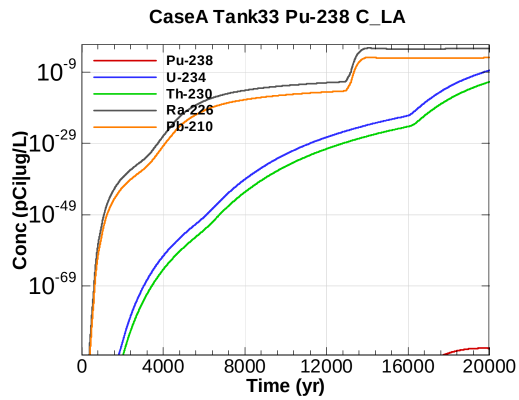

Figure E-938 - 100m Aquifer Concentration for CaseA Tank33 Pu-238 C_LA

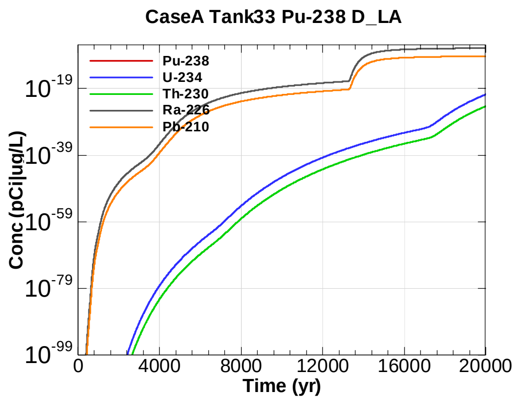

Figure E-939 - 100m Aquifer Concentration for CaseA Tank33 Pu-238 D_LA

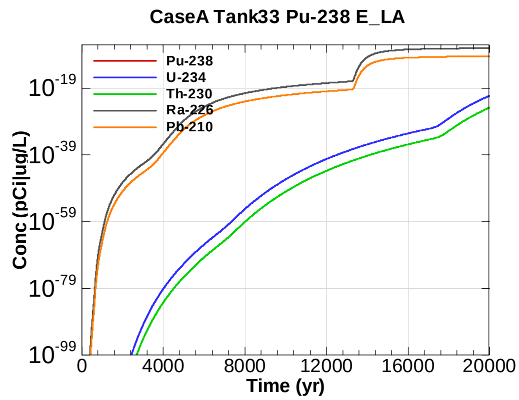

Figure E-940 - 100m Aquifer Concentration for CaseA Tank33 Pu-238 E_LA

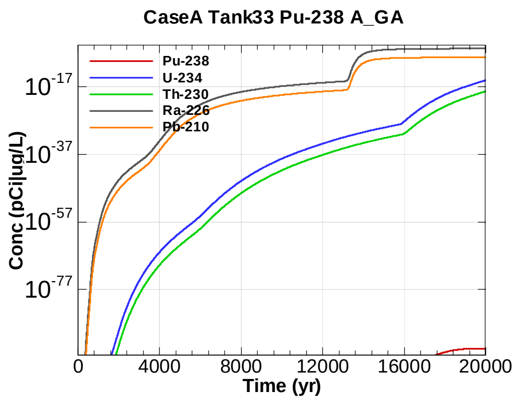

Figure E-941 - 100m Aquifer Concentration for CaseA Tank33 Pu-238 A_GA

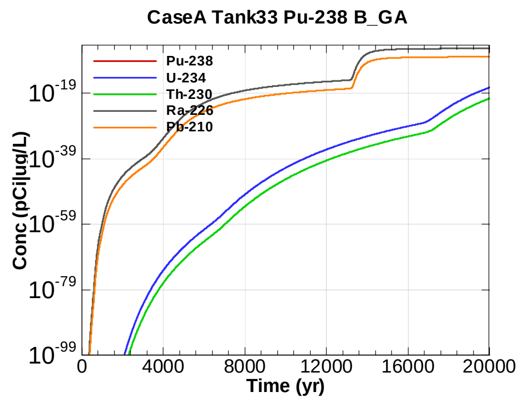

Figure E-942 - 100m Aquifer Concentration for CaseA Tank33 Pu-238 B_GA

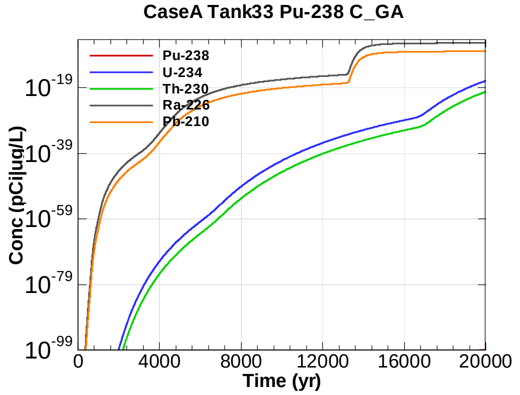

Figure E-943 - 100m Aquifer Concentration for CaseA Tank33 Pu-238 C_GA

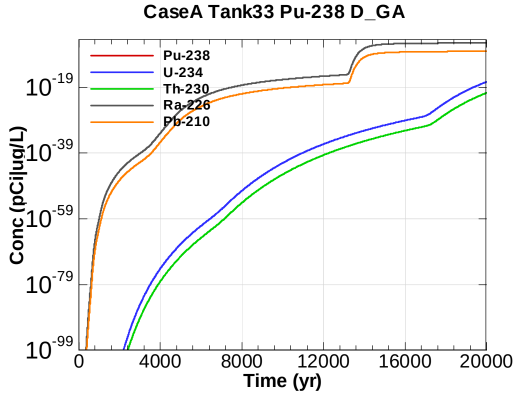

Figure E-944 - 100m Aquifer Concentration for CaseA Tank33 Pu-238 D_GA

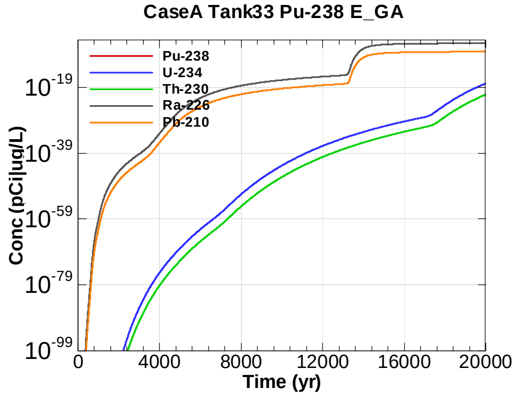

Figure E-945 - 100m Aquifer Concentration for CaseA Tank33 Pu-238 E_GA

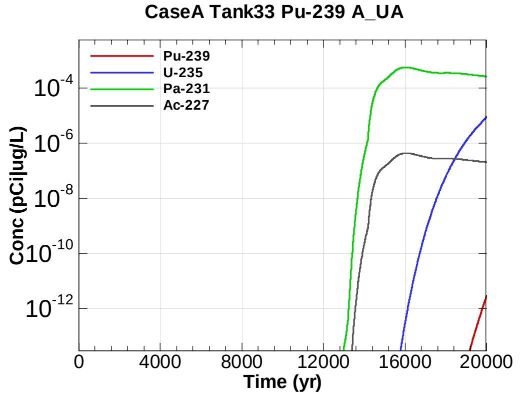

Figure E-946 - 100m Aquifer Concentration for CaseA Tank33 Pu-239 A_UA

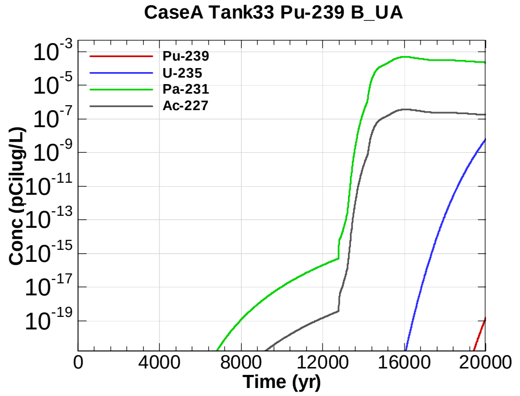

Figure E-947 - 100m Aquifer Concentration for CaseA Tank33 Pu-239 B_UA

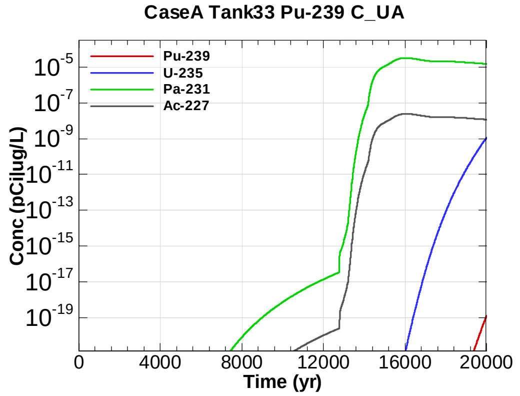

Figure E-948 - 100m Aquifer Concentration for CaseA Tank33 Pu-239 C_UA

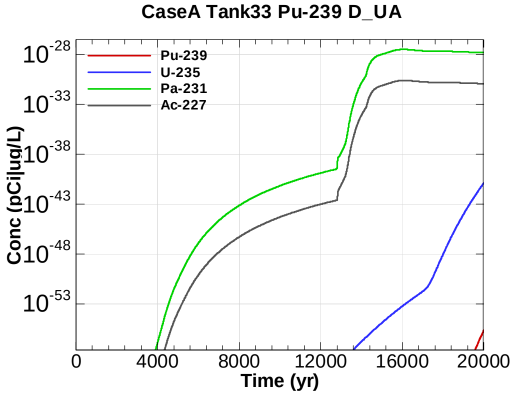

Figure E-949 - 100m Aquifer Concentration for CaseA Tank33 Pu-239 D_UA

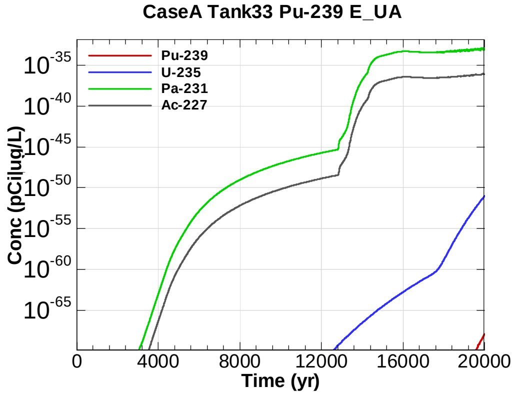

Figure E-950 - 100m Aquifer Concentration for CaseA Tank33 Pu-239 E_UA

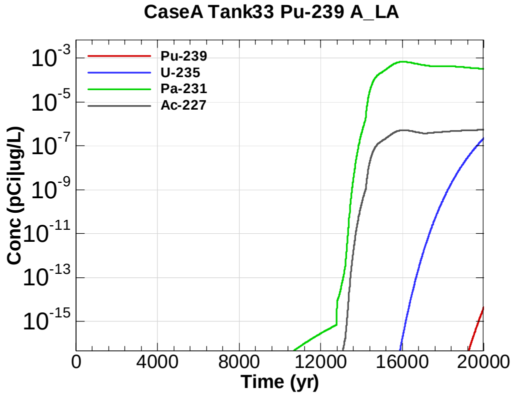

Figure E-951 - 100m Aquifer Concentration for CaseA Tank33 Pu-239 A_LA

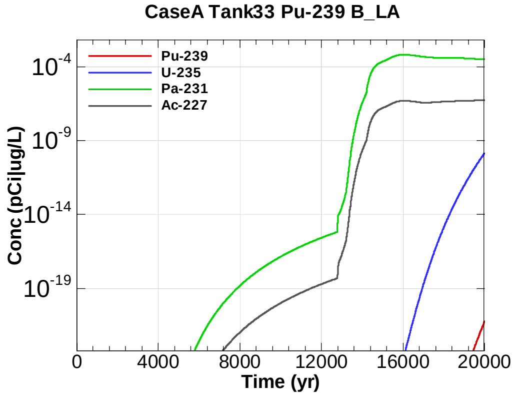

Figure E-952 - 100m Aquifer Concentration for CaseA Tank33 Pu-239 B_LA

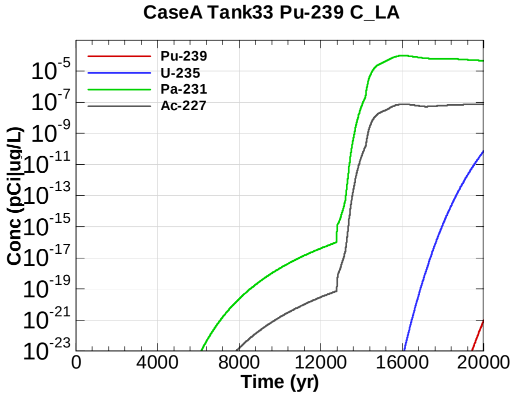

Figure E-953 - 100m Aquifer Concentration for CaseA Tank33 Pu-239 C_LA

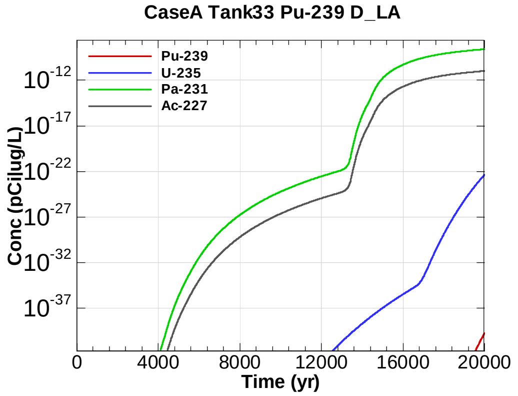

Figure E-954 - 100m Aquifer Concentration for CaseA Tank33 Pu-239 D_LA

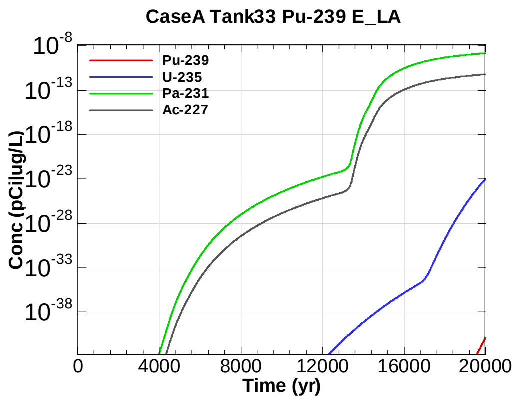

Figure E-955 - 100m Aquifer Concentration for CaseA Tank33 Pu-239 E_LA

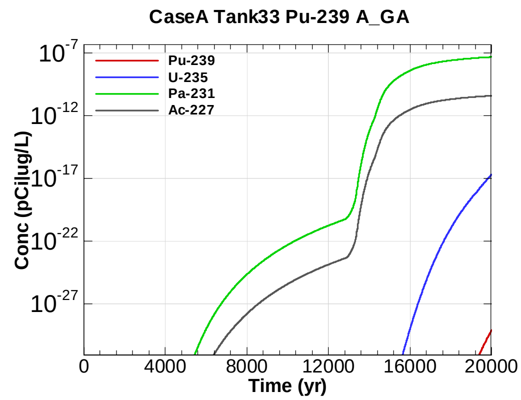

Figure E-956 - 100m Aquifer Concentration for CaseA Tank33 Pu-239 A_GA

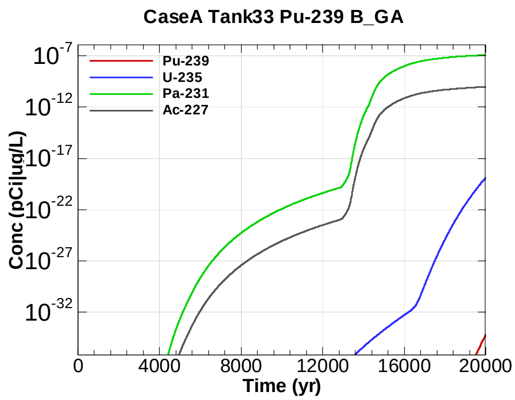

Figure E-957 - 100m Aquifer Concentration for CaseA Tank33 Pu-239 B_GA

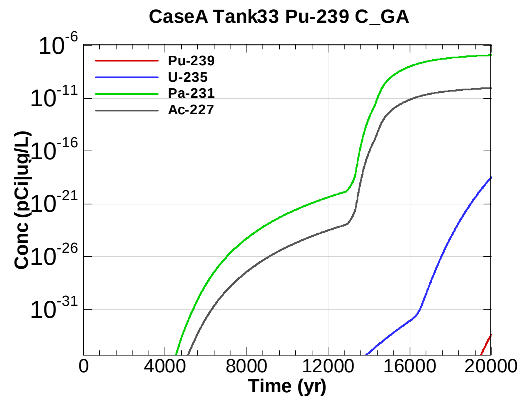

Figure E-958 - 100m Aquifer Concentration for CaseA Tank33 Pu-239 C_GA

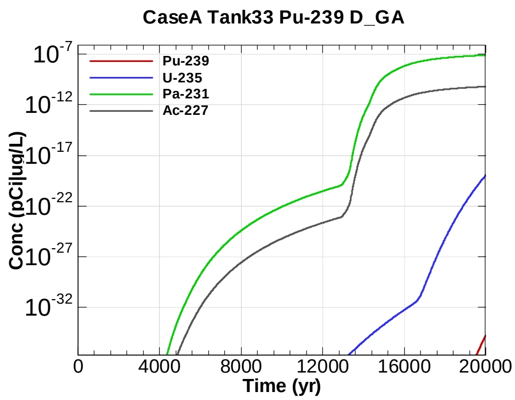

Figure E-959 - 100m Aquifer Concentration for CaseA Tank33 Pu-239 D_GA

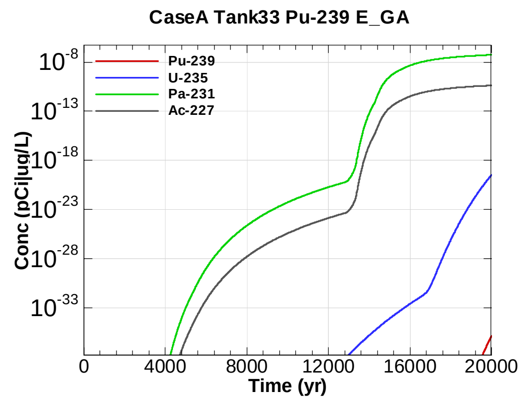

Figure E-960 - 100m Aquifer Concentration for CaseA Tank33 Pu-239 E_GA

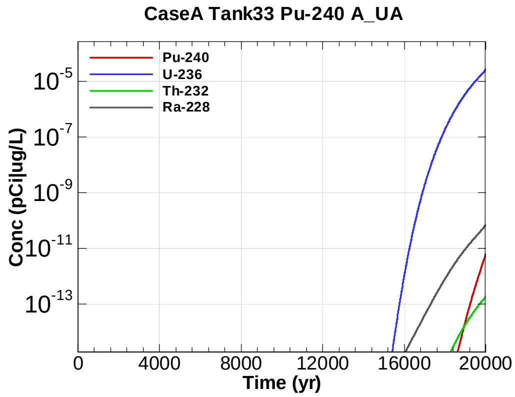

Figure E-961 - 100m Aquifer Concentration for CaseA Tank33 Pu-240 A_UA

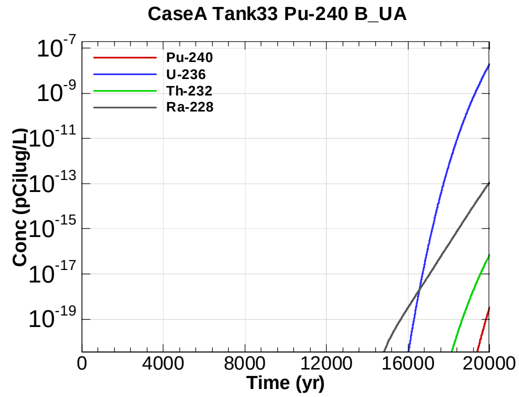

Figure E-962 - 100m Aquifer Concentration for CaseA Tank33 Pu-240 B_UA

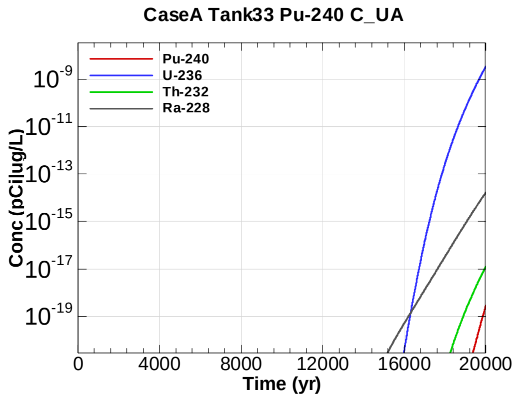

Figure E-963 - 100m Aquifer Concentration for CaseA Tank33 Pu-240 C_UA

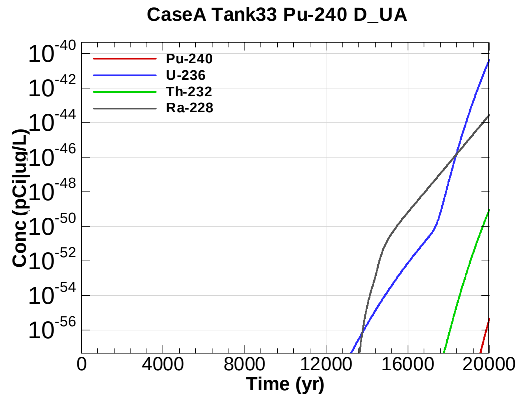

Figure E-964 - 100m Aquifer Concentration for CaseA Tank33 Pu-240 D_UA

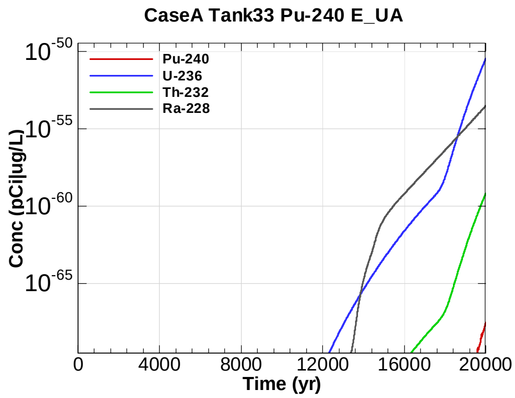

Figure E-965 - 100m Aquifer Concentration for CaseA Tank33 Pu-240 E_UA

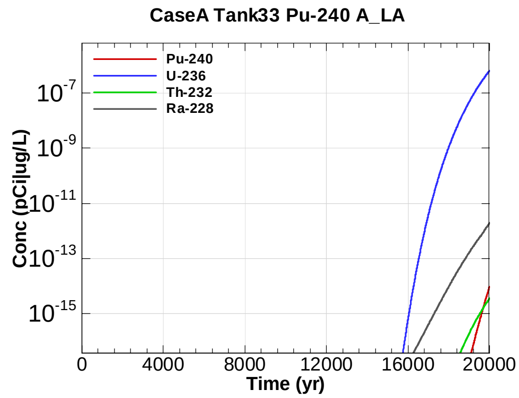

Figure E-966 - 100m Aquifer Concentration for CaseA Tank33 Pu-240 A_LA

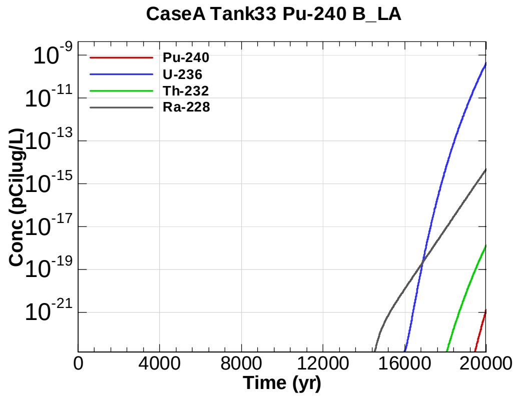

Figure E-967 - 100m Aquifer Concentration for CaseA Tank33 Pu-240 B_LA

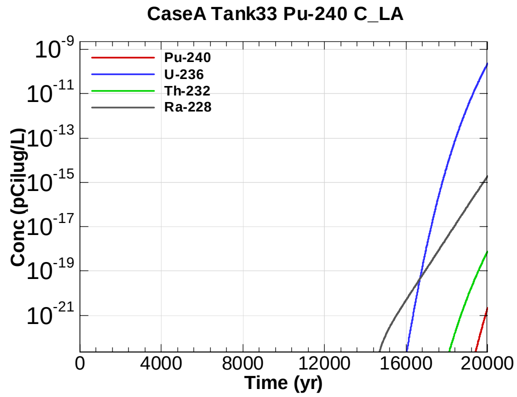

Figure E-968 - 100m Aquifer Concentration for CaseA Tank33 Pu-240 C_LA

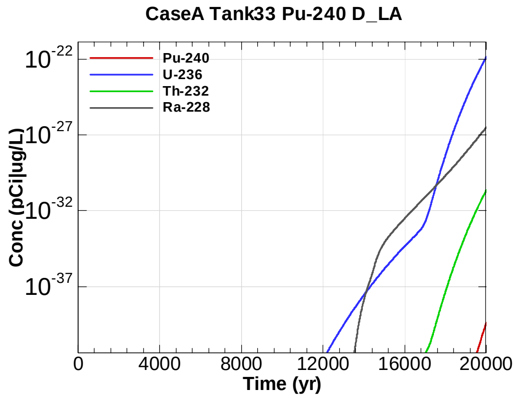

Figure E-969 - 100m Aquifer Concentration for CaseA Tank33 Pu-240 D_LA

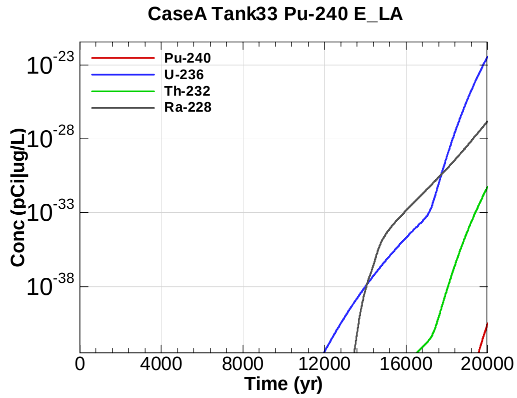

Figure E-970 - 100m Aquifer Concentration for CaseA Tank33 Pu-240 E_LA

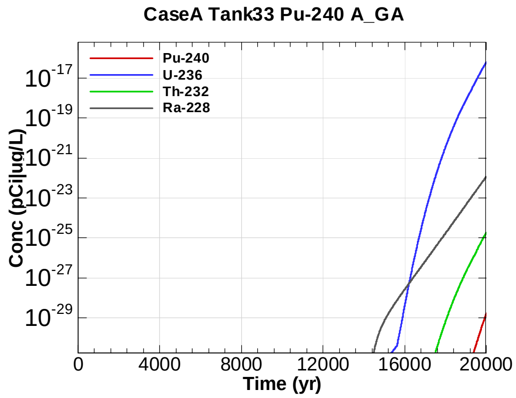

Figure E-971 - 100m Aquifer Concentration for CaseA Tank33 Pu-240 A_GA

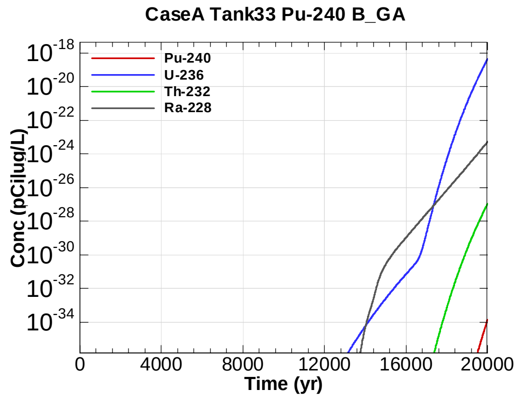

Figure E-972 - 100m Aquifer Concentration for CaseA Tank33 Pu-240 B_GA

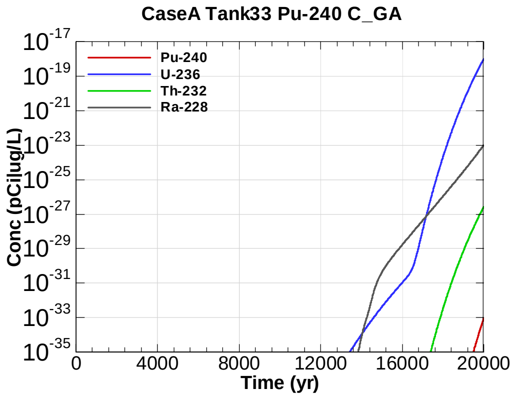

Figure E-973 - 100m Aquifer Concentration for CaseA Tank33 Pu-240 C_GA

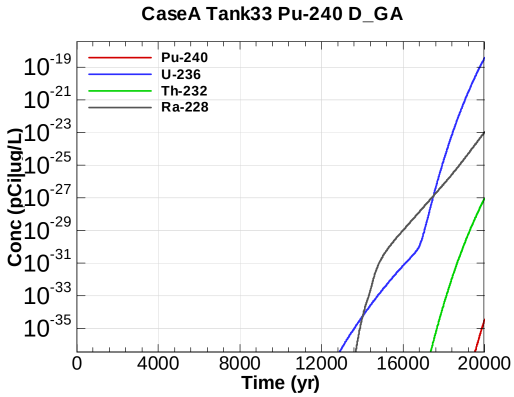

Figure E-974 - 100m Aquifer Concentration for CaseA Tank33 Pu-240 D_GA

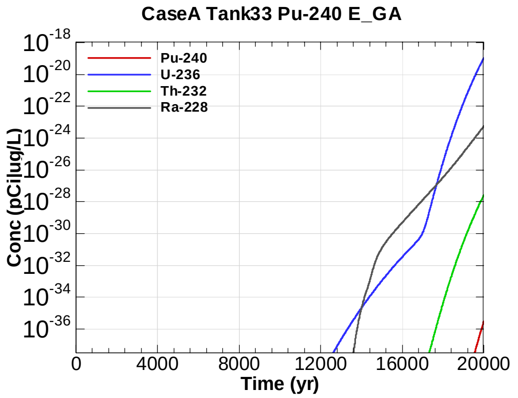

Figure E-975 - 100m Aquifer Concentration for CaseA Tank33 Pu-240 E_GA

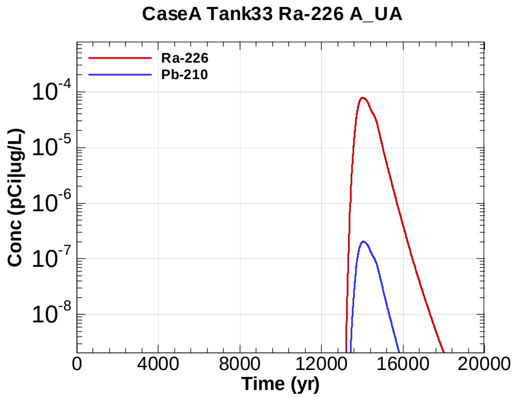

Figure E-976 - 100m Aquifer Concentration for CaseA Tank33 Ra-226 A_UA

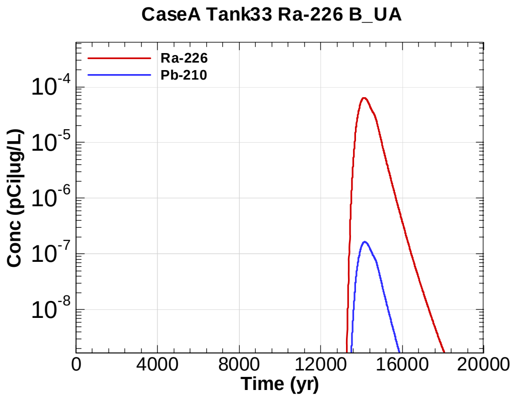

Figure E-977 - 100m Aquifer Concentration for CaseA Tank33 Ra-226 B_UA

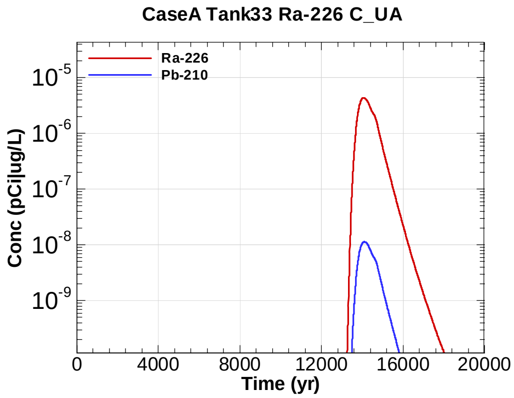

Figure E-978 - 100m Aquifer Concentration for CaseA Tank33 Ra-226 C_UA

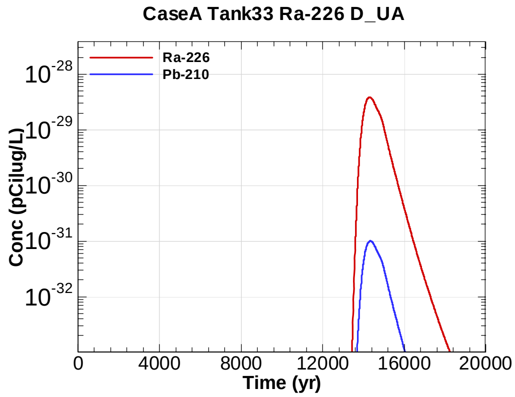

Figure E-979 - 100m Aquifer Concentration for CaseA Tank33 Ra-226 D_UA

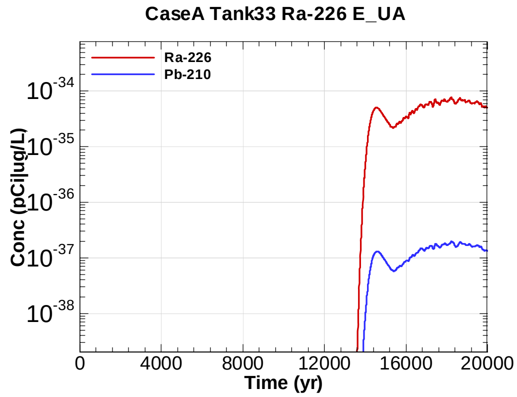

Figure E-980 - 100m Aquifer Concentration for CaseA Tank33 Ra-226 E_UA

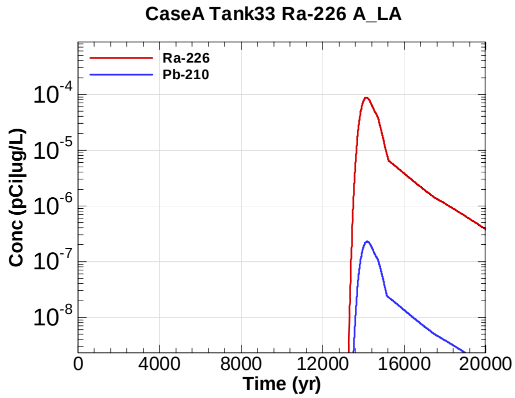

Figure E-981 - 100m Aquifer Concentration for CaseA Tank33 Ra-226 A_LA

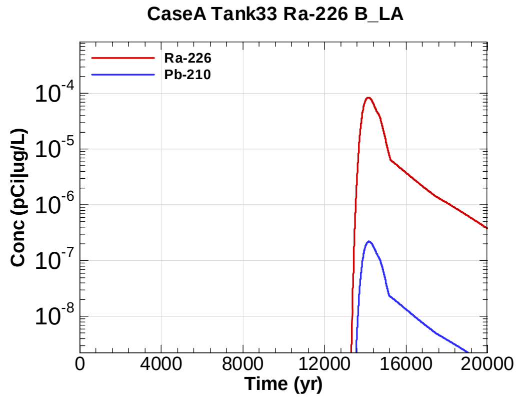

Figure E-982 - 100m Aquifer Concentration for CaseA Tank33 Ra-226 B_LA

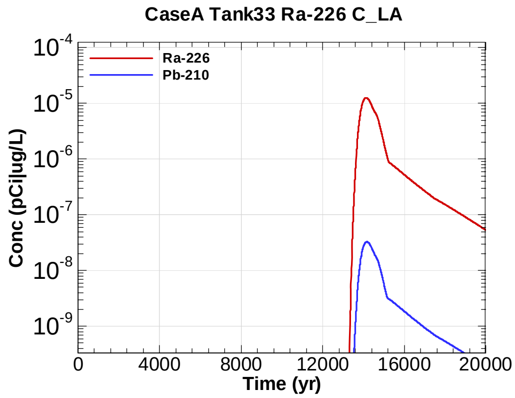

Figure E-983 - 100m Aquifer Concentration for CaseA Tank33 Ra-226 C_LA

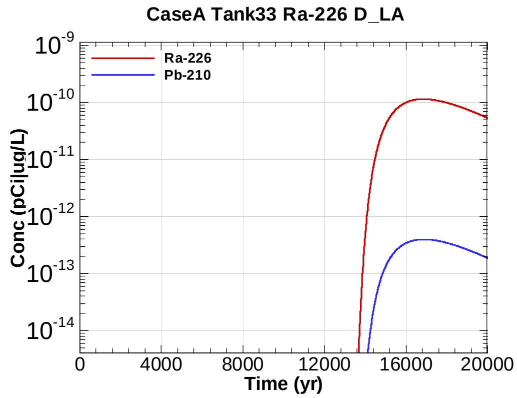

Figure E-984 - 100m Aquifer Concentration for CaseA Tank33 Ra-226 D_LA

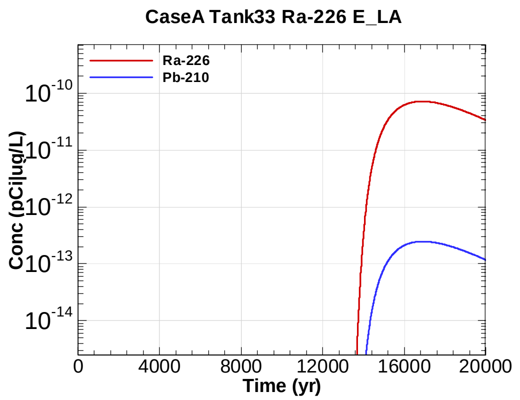

Figure E-985 - 100m Aquifer Concentration for CaseA Tank33 Ra-226 E_LA

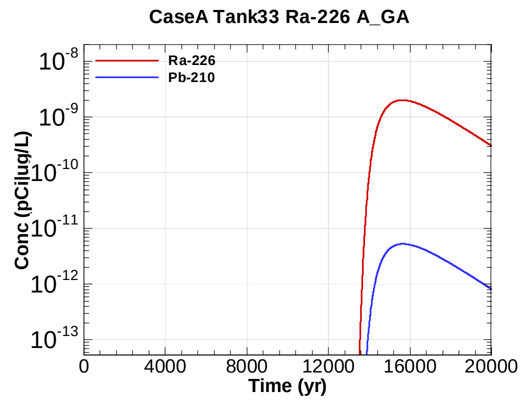

Figure E-986 - 100m Aquifer Concentration for CaseA Tank33 Ra-226 A_GA

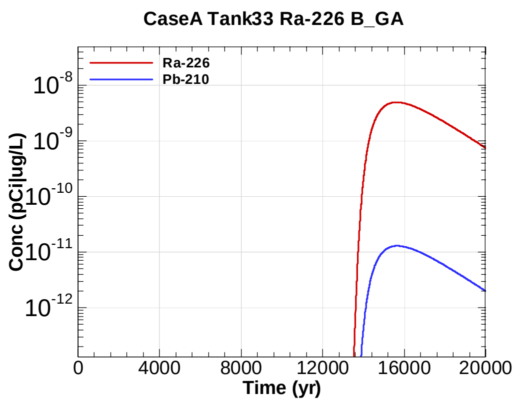

Figure E-987 - 100m Aquifer Concentration for CaseA Tank33 Ra-226 B_GA

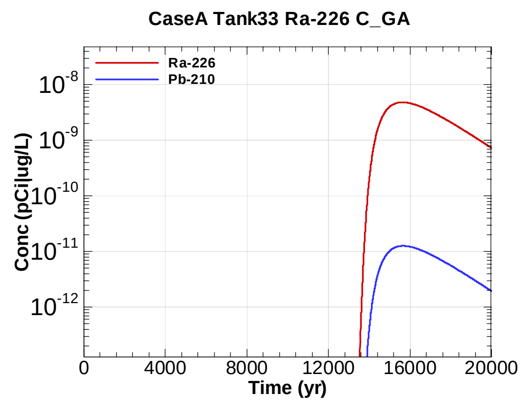

Figure E-988 - 100m Aquifer Concentration for CaseA Tank33 Ra-226 C_GA

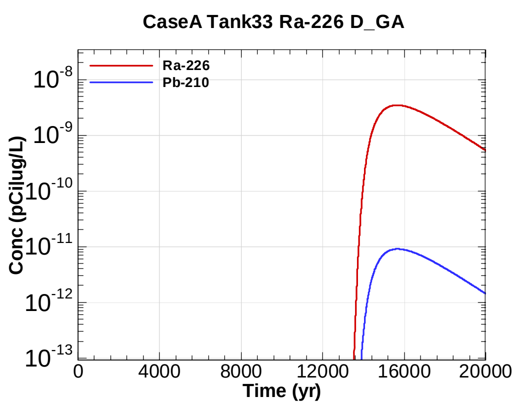

Figure E-989 - 100m Aquifer Concentration for CaseA Tank33 Ra-226 D_GA

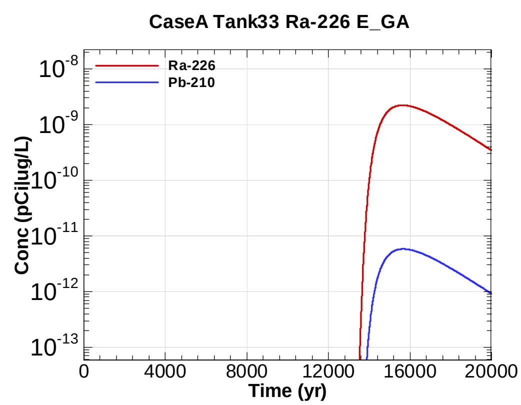

Figure E-990 - 100m Aquifer Concentration for CaseA Tank33 Ra-226 E_GA

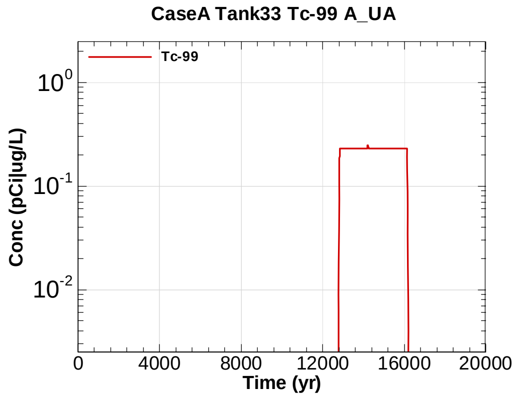

Figure E-991 - 100m Aquifer Concentration for CaseA Tank33 Tc-99 A_UA

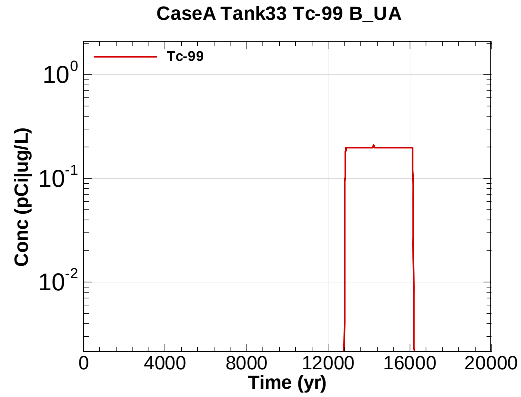

Figure E-992 - 100m Aquifer Concentration for CaseA Tank33 Tc-99 B_UA

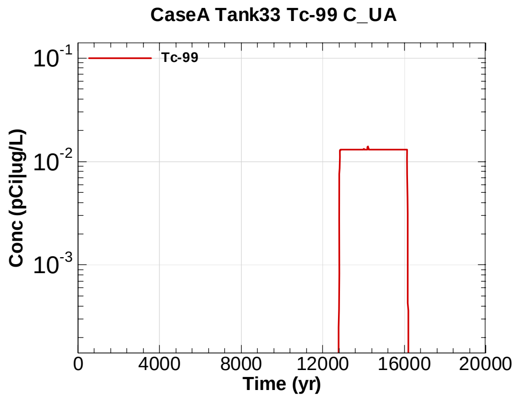

Figure E-993 - 100m Aquifer Concentration for CaseA Tank33 Tc-99 C_UA

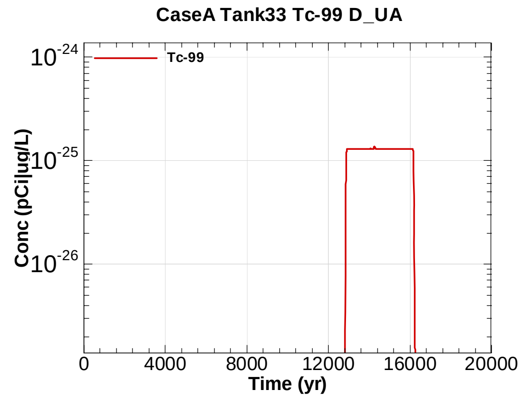

Figure E-994 - 100m Aquifer Concentration for CaseA Tank33 Tc-99 D_UA

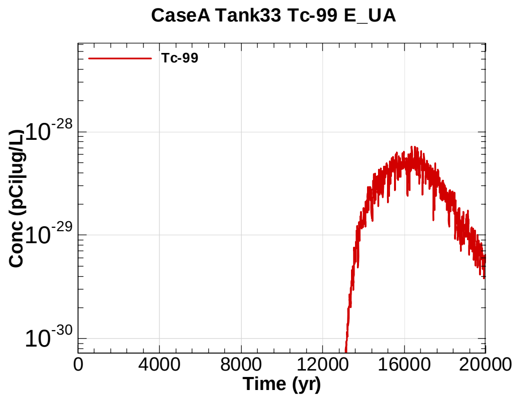

Figure E-995 - 100m Aquifer Concentration for CaseA Tank33 Tc-99 E_UA

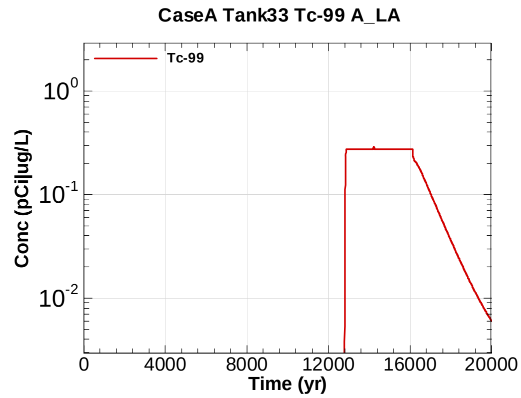

Figure E-996 - 100m Aquifer Concentration for CaseA Tank33 Tc-99 A_LA

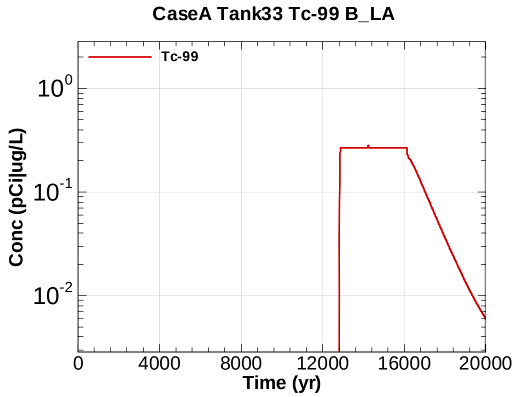

Figure E-997 - 100m Aquifer Concentration for CaseA Tank33 Tc-99 B_LA

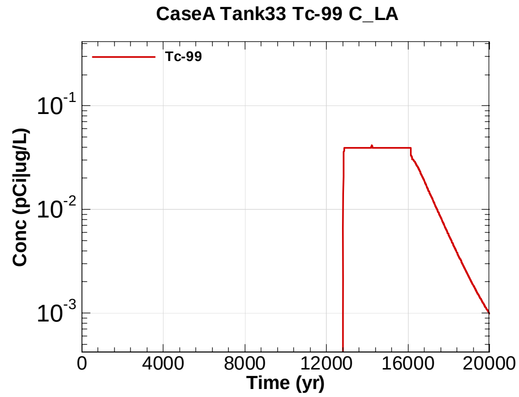

Figure E-998 - 100m Aquifer Concentration for CaseA Tank33 Tc-99 C_LA

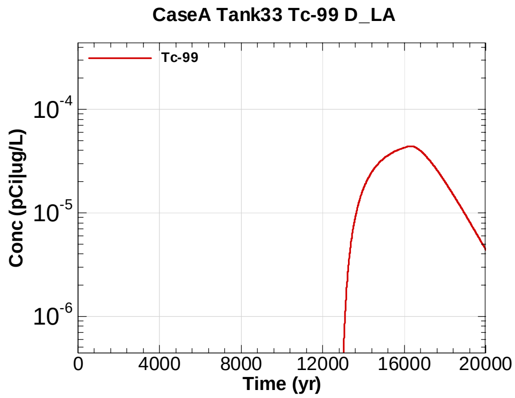

Figure E-999 - 100m Aquifer Concentration for CaseA Tank33 Tc-99 D_LA

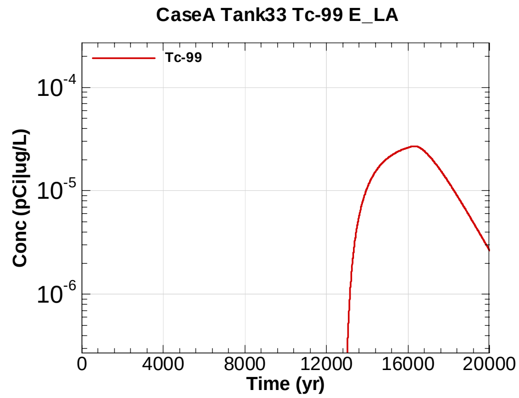

Figure E-1000 - 100m Aquifer Concentration for CaseA Tank33 Tc-99 E_LA

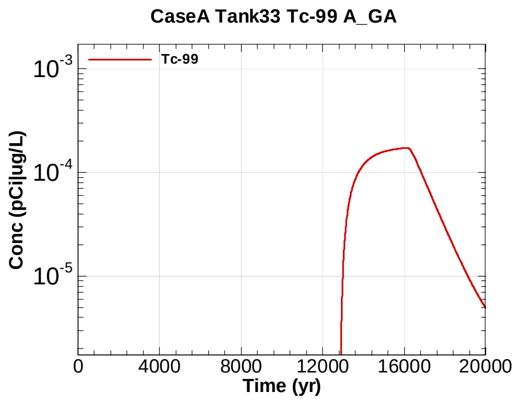

Figure E-1001 - 100m Aquifer Concentration for CaseA Tank33 Tc-99 A_GA

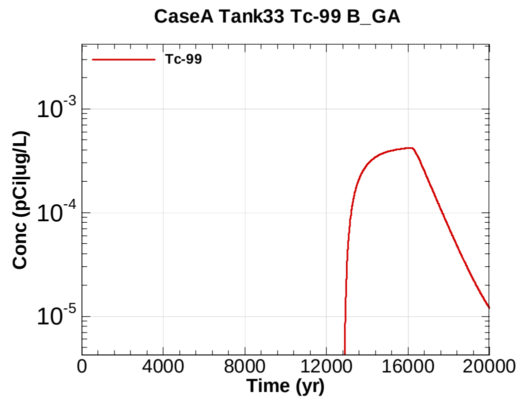

Figure E-1002 - 100m Aquifer Concentration for CaseA Tank33 Tc-99 B_GA

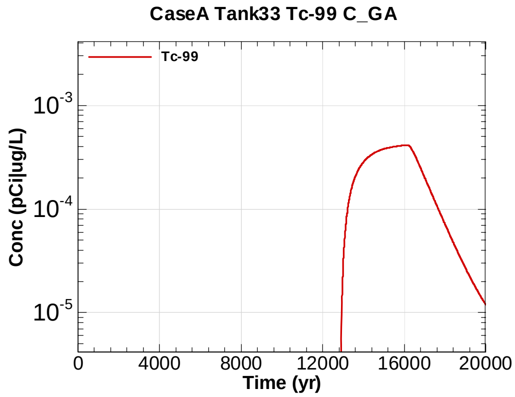

Figure E-1003 - 100m Aquifer Concentration for CaseA Tank33 Tc-99 C_GA

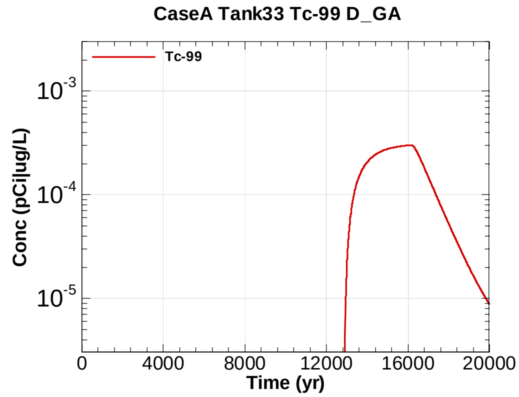

Figure E-1004 - 100m Aquifer Concentration for CaseA Tank33 Tc-99 D_GA

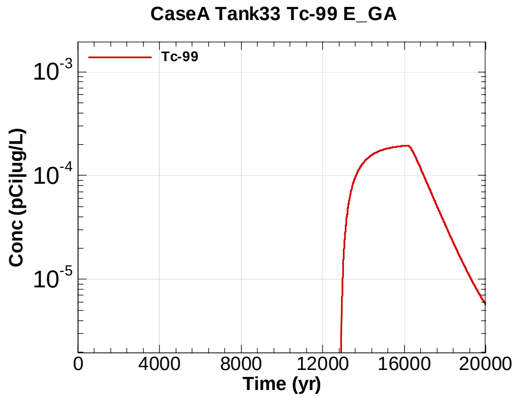

Figure E-1005 - 100m Aquifer Concentration for CaseA Tank33 Tc-99 E_GA

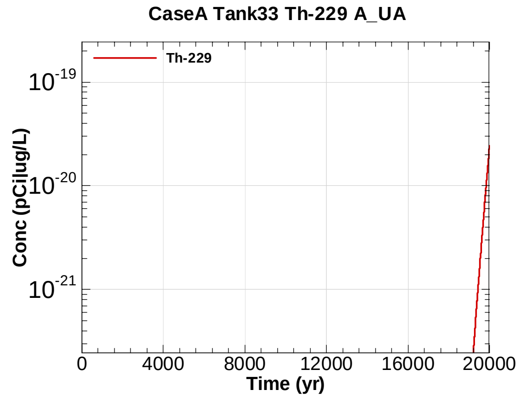

Figure E-1006 - 100m Aquifer Concentration for CaseA Tank33 Th-229 A_UA

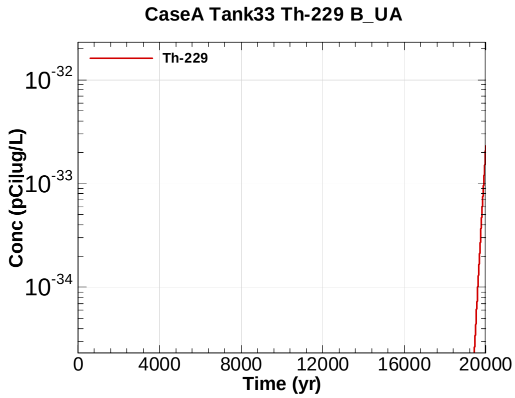

Figure E-1007 - 100m Aquifer Concentration for CaseA Tank33 Th-229 B_UA

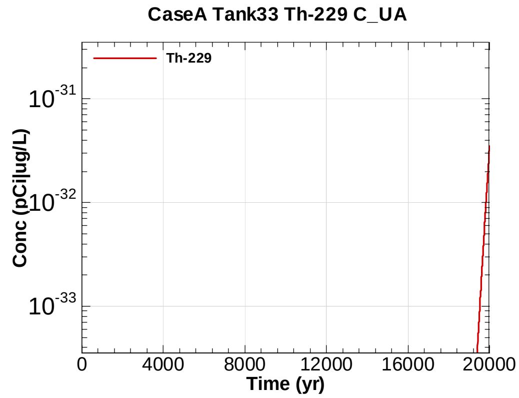

Figure E-1008 - 100m Aquifer Concentration for CaseA Tank33 Th-229 C_UA

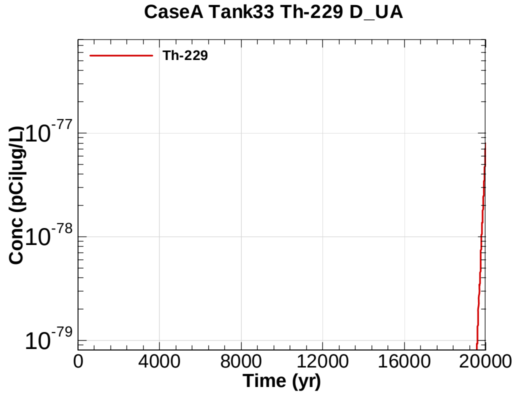

Figure E-1009 - 100m Aquifer Concentration for CaseA Tank33 Th-229 D_UA

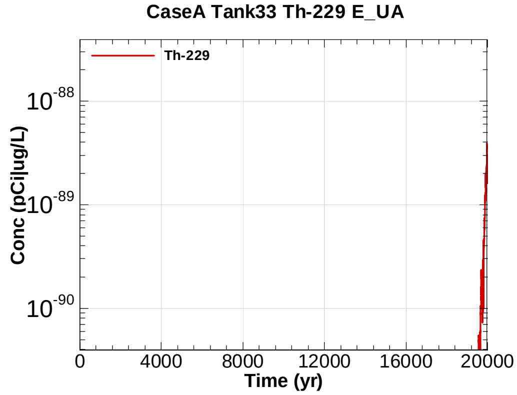

Figure E-1010 - 100m Aquifer Concentration for CaseA Tank33 Th-229 E_UA

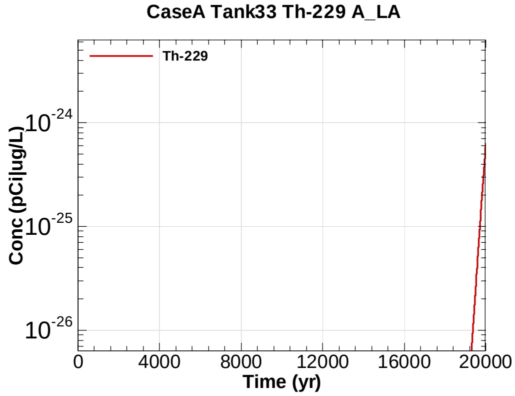

Figure E-1011 - 100m Aquifer Concentration for CaseA Tank33 Th-229 A_LA

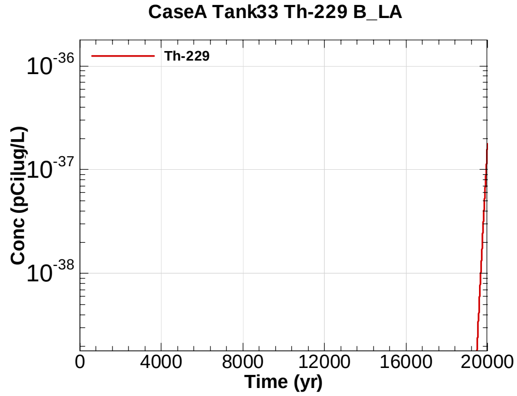

Figure E-1012 - 100m Aquifer Concentration for CaseA Tank33 Th-229 B_LA

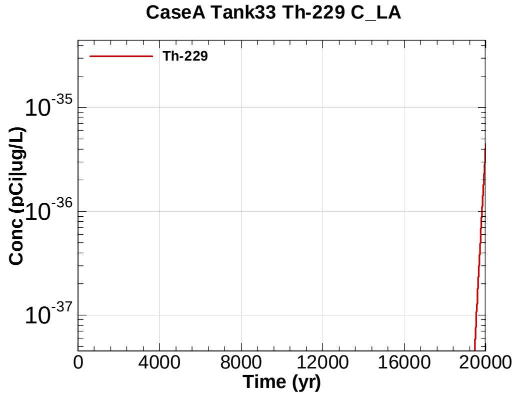

Figure E-1013 - 100m Aquifer Concentration for CaseA Tank33 Th-229 C_LA

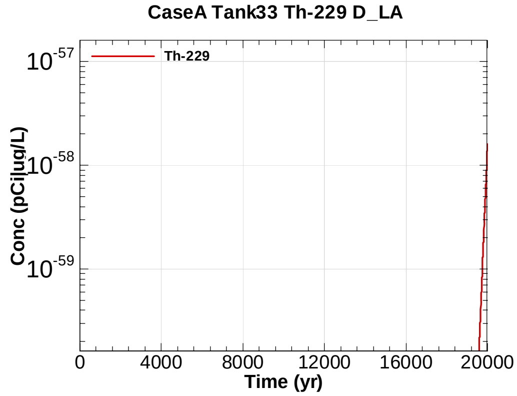

Figure E-1014 - 100m Aquifer Concentration for CaseA Tank33 Th-229 D_LA

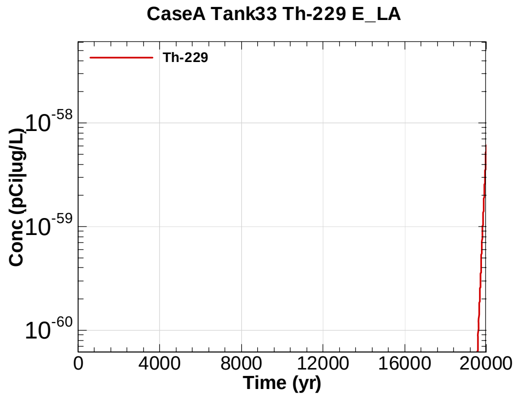

Figure E-1015 - 100m Aquifer Concentration for CaseA Tank33 Th-229 E_LA

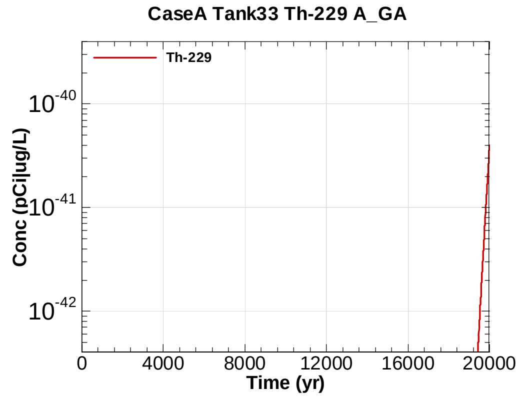

Figure E-1016 - 100m Aquifer Concentration for CaseA Tank33 Th-229 A_GA

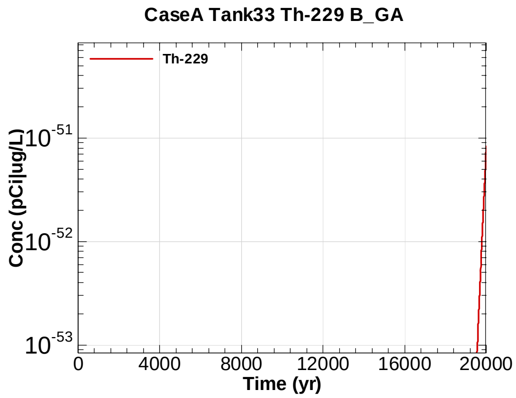

Figure E-1017 - 100m Aquifer Concentration for CaseA Tank33 Th-229 B_GA

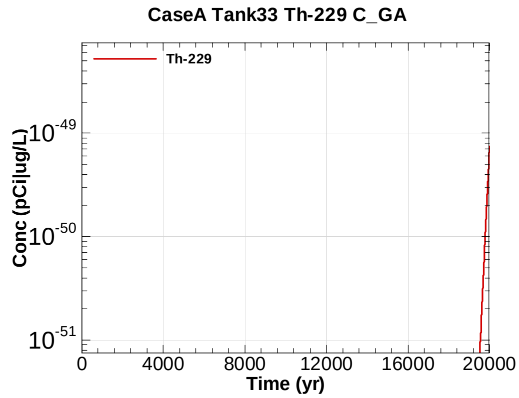

Figure E-1018 - 100m Aquifer Concentration for CaseA Tank33 Th-229 C_GA

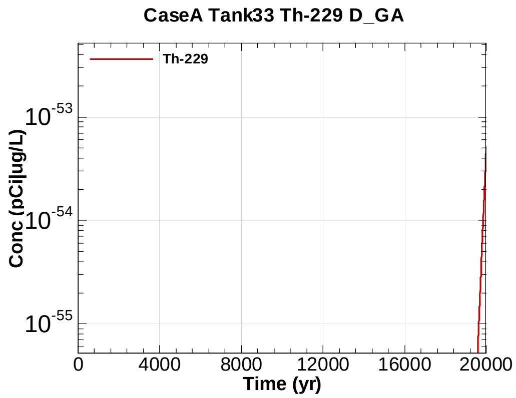

Figure E-1019 - 100m Aquifer Concentration for CaseA Tank33 Th-229 D_GA

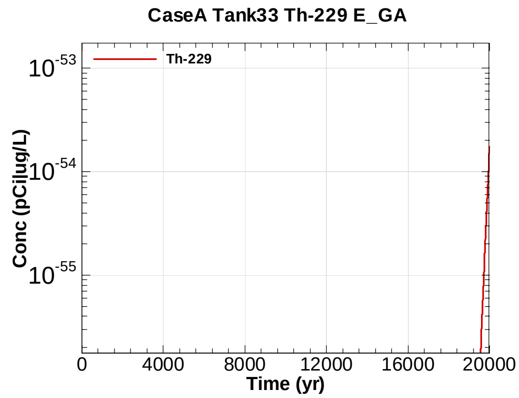

Figure E-1020 - 100m Aquifer Concentration for CaseA Tank33 Th-229 E_GA

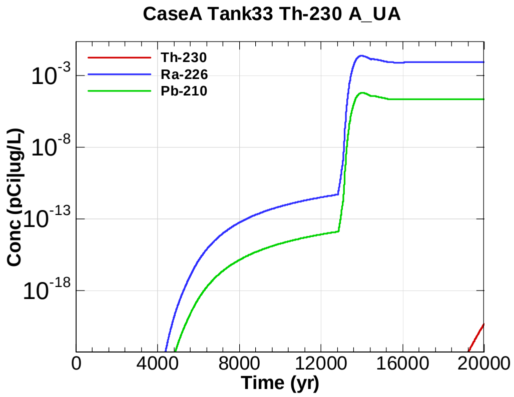

Figure E-1021 - 100m Aquifer Concentration for CaseA Tank33 Th-230 A_UA

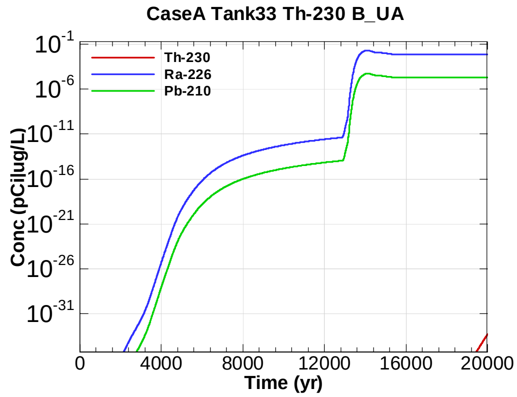

Figure E-1022 - 100m Aquifer Concentration for CaseA Tank33 Th-230 B_UA

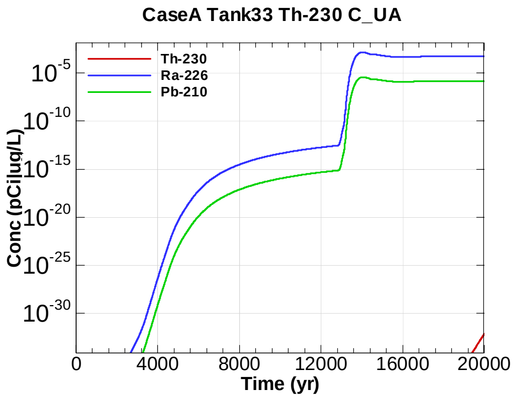

Figure E-1023 - 100m Aquifer Concentration for CaseA Tank33 Th-230 C_UA

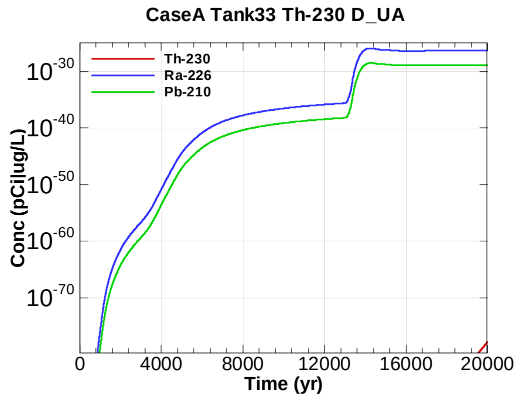

Figure E-1024 - 100m Aquifer Concentration for CaseA Tank33 Th-230 D_UA

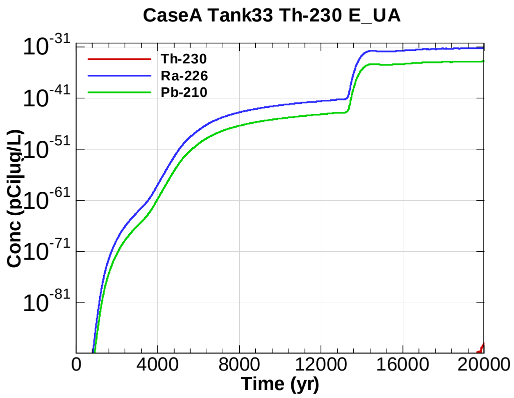

Figure E-1025 - 100m Aquifer Concentration for CaseA Tank33 Th-230 E_UA

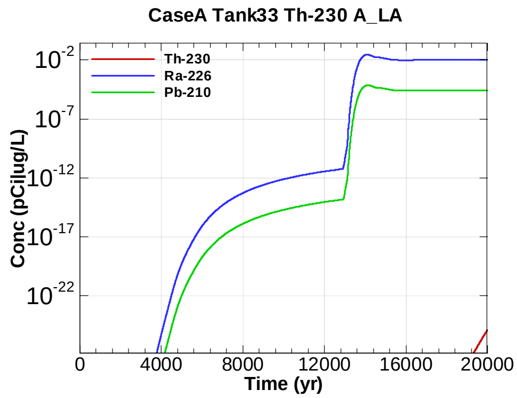

Figure E-1026 - 100m Aquifer Concentration for CaseA Tank33 Th-230 A_LA

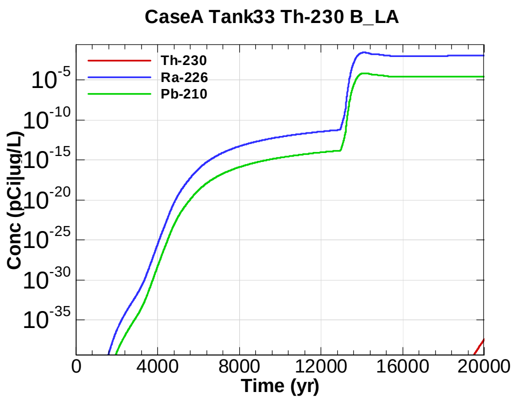

Figure E-1027 - 100m Aquifer Concentration for CaseA Tank33 Th-230 B_LA

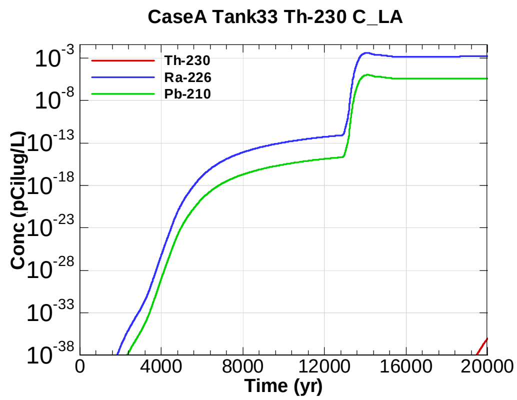

Figure E-1028 - 100m Aquifer Concentration for CaseA Tank33 Th-230 C_LA

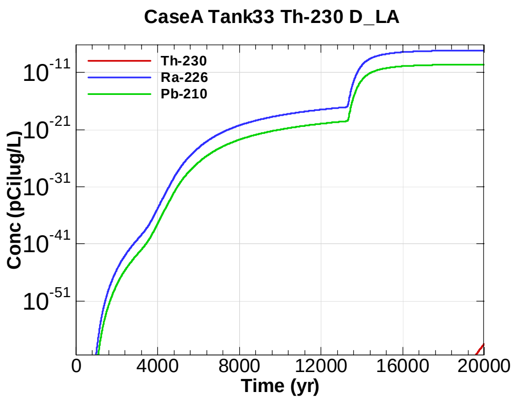

Figure E-1029 - 100m Aquifer Concentration for CaseA Tank33 Th-230 D_LA

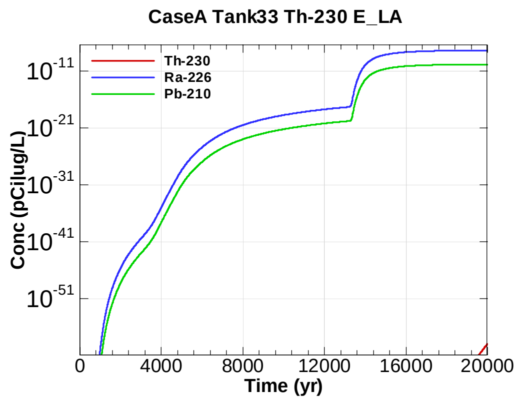

Figure E-1030 - 100m Aquifer Concentration for CaseA Tank33 Th-230 E_LA

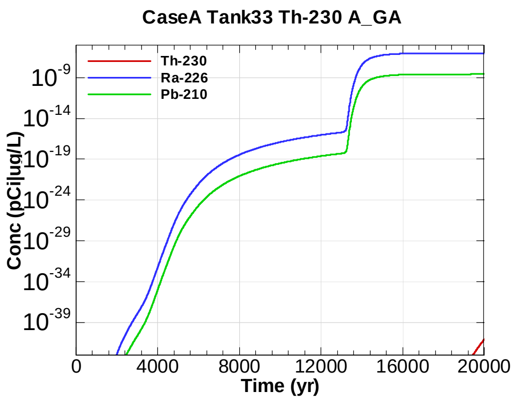

Figure E-1031 - 100m Aquifer Concentration for CaseA Tank33 Th-230 A_GA

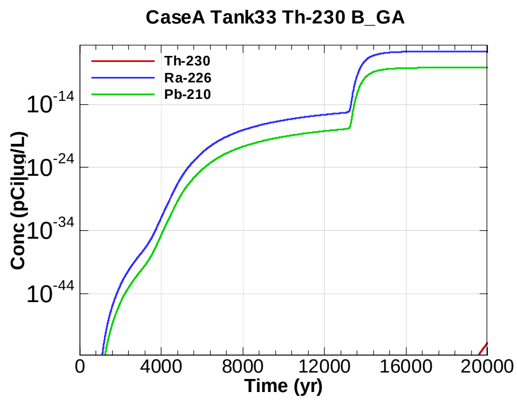

Figure E-1032 - 100m Aquifer Concentration for CaseA Tank33 Th-230 B_GA

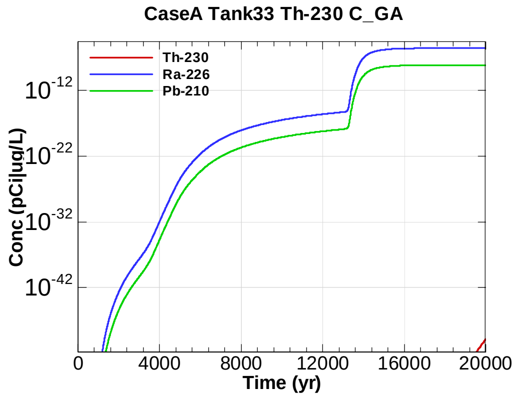

Figure E-1033 - 100m Aquifer Concentration for CaseA Tank33 Th-230 C_GA

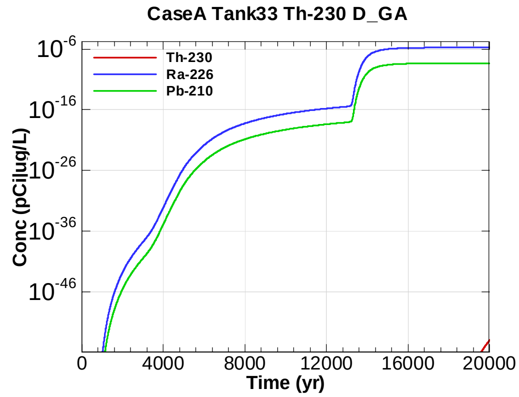

Figure E-1034 - 100m Aquifer Concentration for CaseA Tank33 Th-230 D_GA

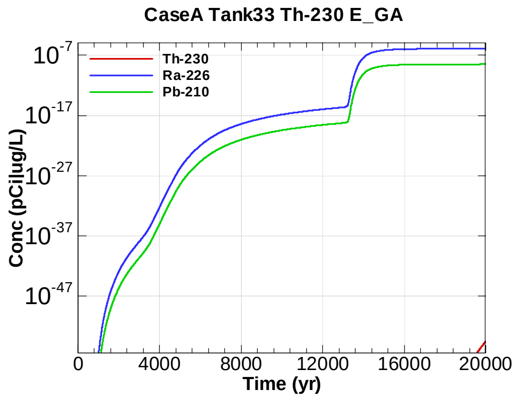

Figure E-1035 - 100m Aquifer Concentration for CaseA Tank33 Th-230 E_GA

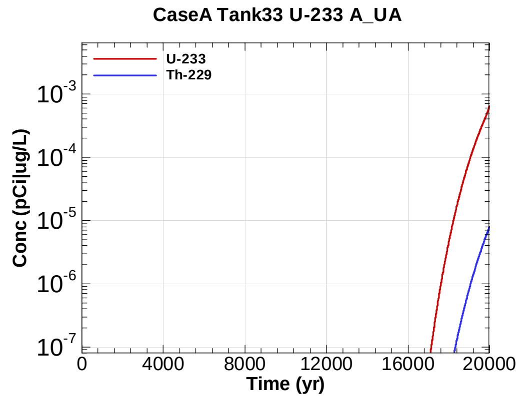

Figure E-1036 - 100m Aquifer Concentration for CaseA Tank33 U-233 A_UA

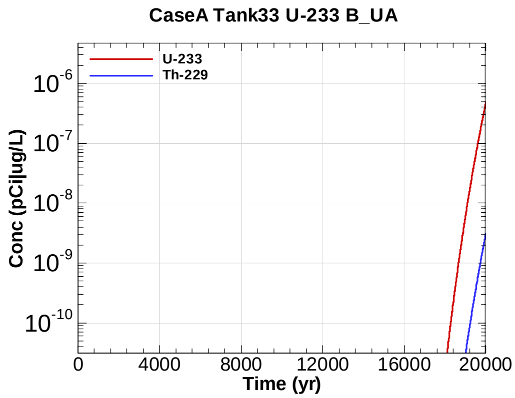

Figure E-1037 - 100m Aquifer Concentration for CaseA Tank33 U-233 B_UA

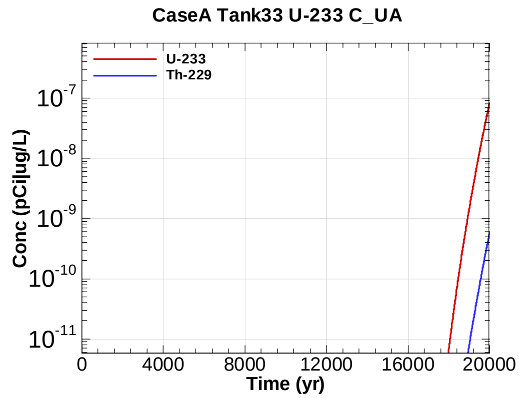

Figure E-1038 - 100m Aquifer Concentration for CaseA Tank33 U-233 C_UA

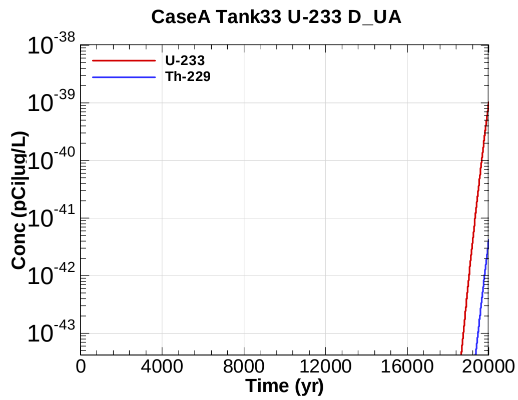

Figure E-1039 - 100m Aquifer Concentration for CaseA Tank33 U-233 D_UA

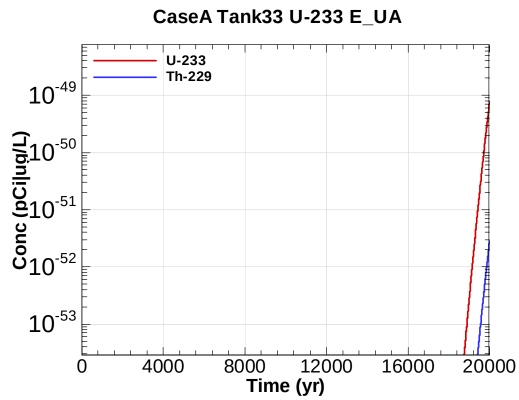

Figure E-1040 - 100m Aquifer Concentration for CaseA Tank33 U-233 E_UA

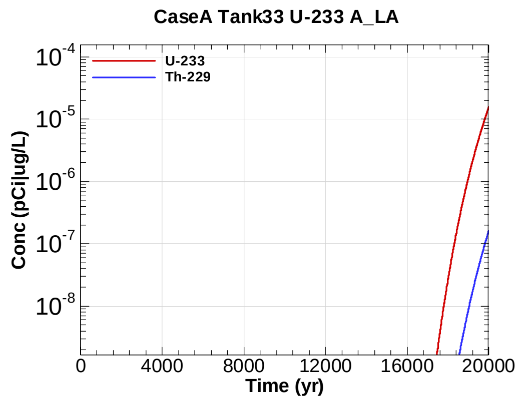

Figure E-1041 - 100m Aquifer Concentration for CaseA Tank33 U-233 A_LA

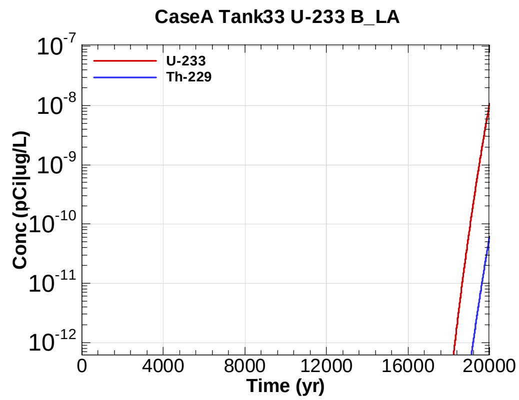

Figure E-1042 - 100m Aquifer Concentration for CaseA Tank33 U-233 B_LA

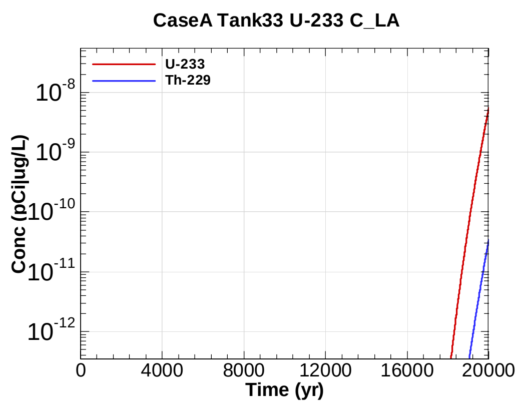

Figure E-1043 - 100m Aquifer Concentration for CaseA Tank33 U-233 C_LA

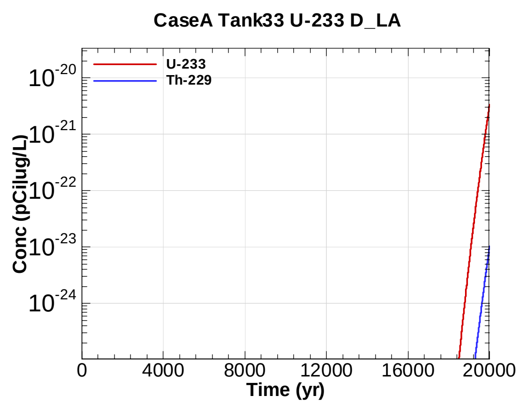

Figure E-1044 - 100m Aquifer Concentration for CaseA Tank33 U-233 D_LA

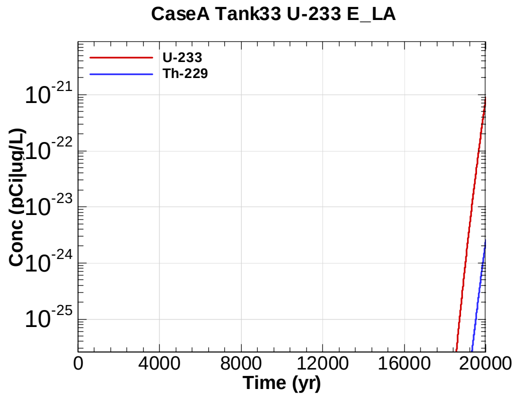

Figure E-1045 - 100m Aquifer Concentration for CaseA Tank33 U-233 E_LA

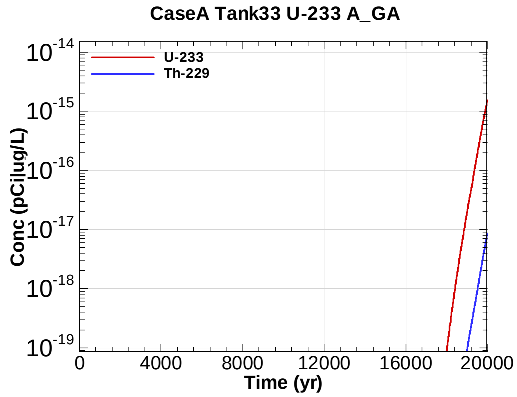

Figure E-1046 - 100m Aquifer Concentration for CaseA Tank33 U-233 A_GA

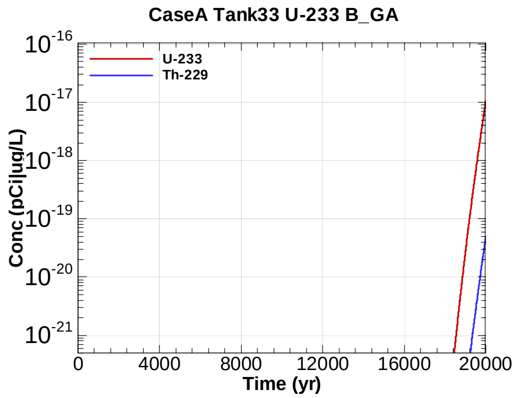

Figure E-1047 - 100m Aquifer Concentration for CaseA Tank33 U-233 B_GA

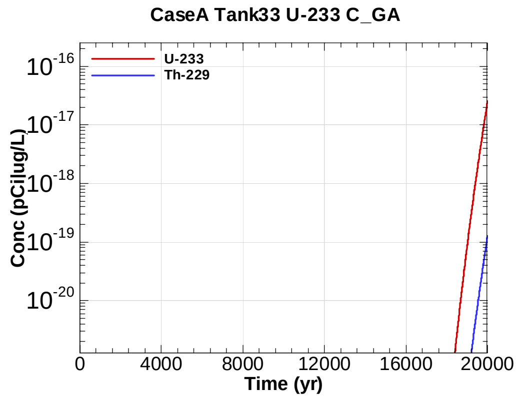

Figure E-1048 - 100m Aquifer Concentration for CaseA Tank33 U-233 C_GA

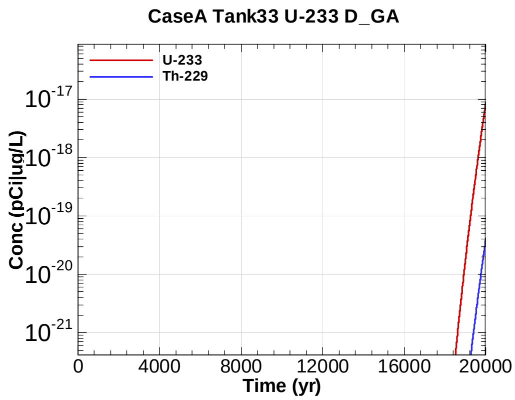

Figure E-1049 - 100m Aquifer Concentration for CaseA Tank33 U-233 D_GA

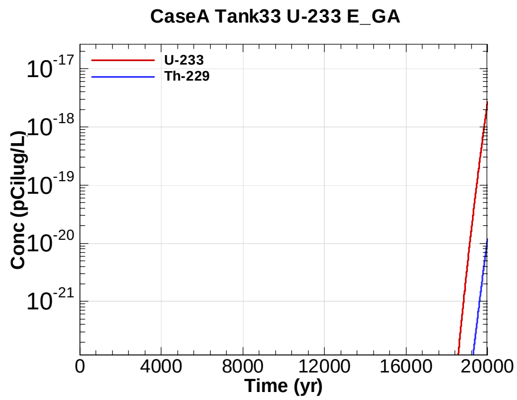

Figure E-1050 - 100m Aquifer Concentration for CaseA Tank33 U-233 E_GA

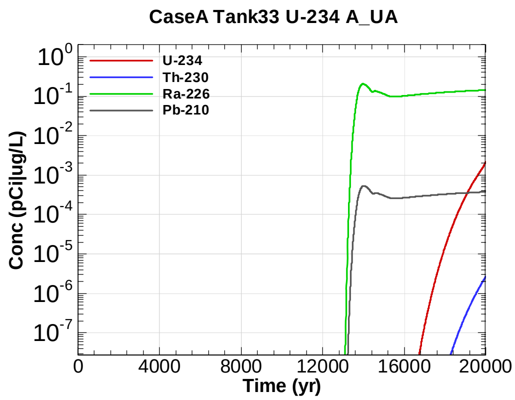

Figure E-1051 - 100m Aquifer Concentration for CaseA Tank33 U-234 A_UA

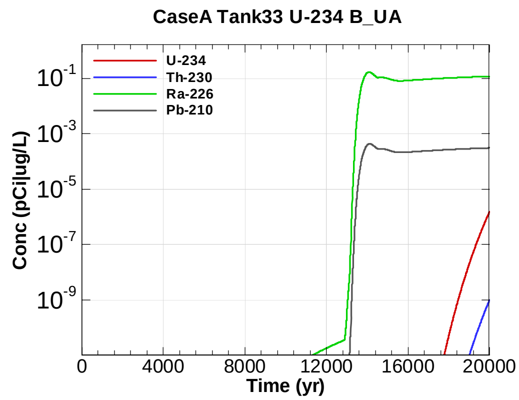

Figure E-1052 - 100m Aquifer Concentration for CaseA Tank33 U-234 B_UA

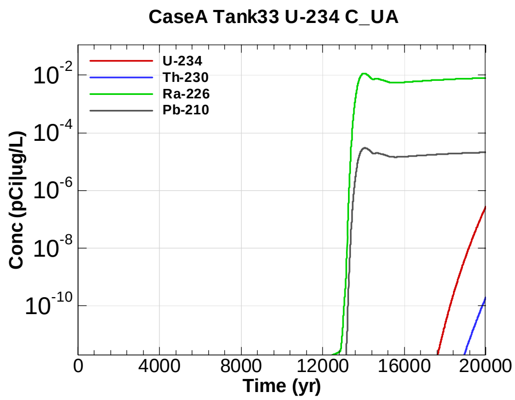

Figure E-1053 - 100m Aquifer Concentration for CaseA Tank33 U-234 C_UA

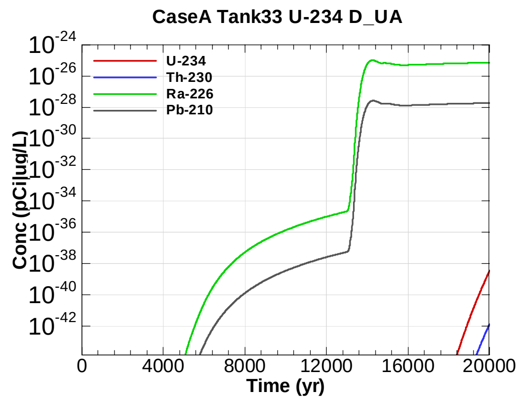

Figure E-1054 - 100m Aquifer Concentration for CaseA Tank33 U-234 D_UA

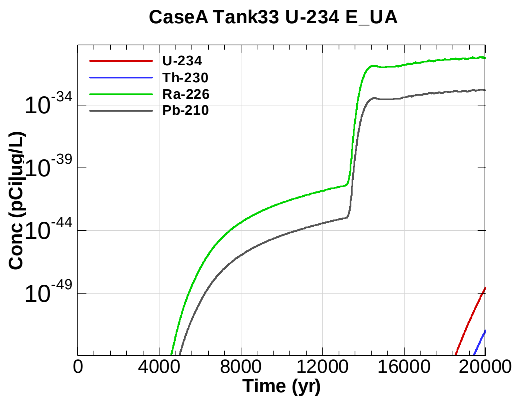

Figure E-1055 - 100m Aquifer Concentration for CaseA Tank33 U-234 E_UA

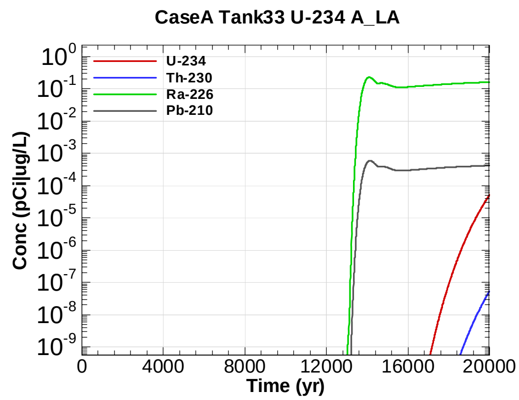

Figure E-1056 - 100m Aquifer Concentration for CaseA Tank33 U-234 A_LA

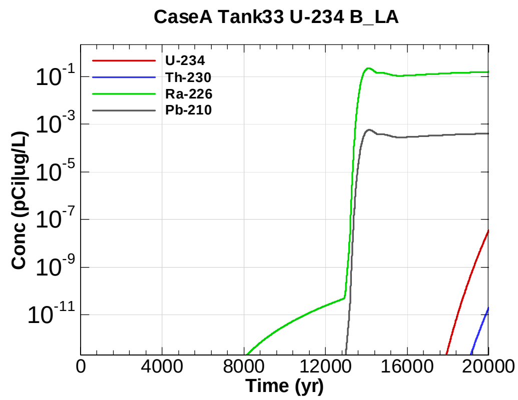

Figure E-1057 - 100m Aquifer Concentration for CaseA Tank33 U-234 B_LA

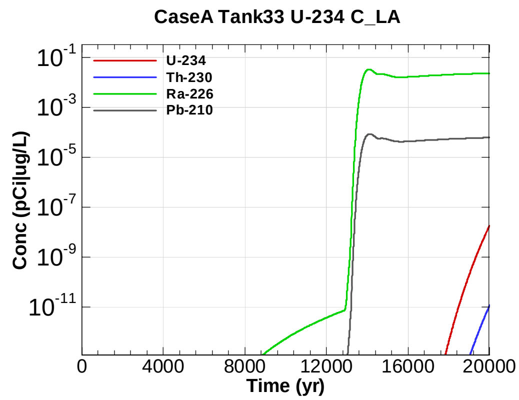

Figure E-1058 - 100m Aquifer Concentration for CaseA Tank33 U-234 C_LA

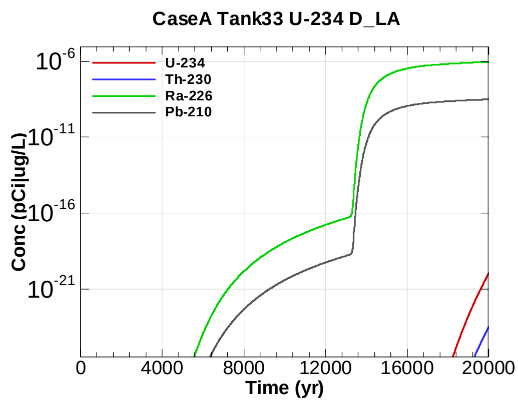

Figure E-1059 - 100m Aquifer Concentration for CaseA Tank33 U-234 D_LA

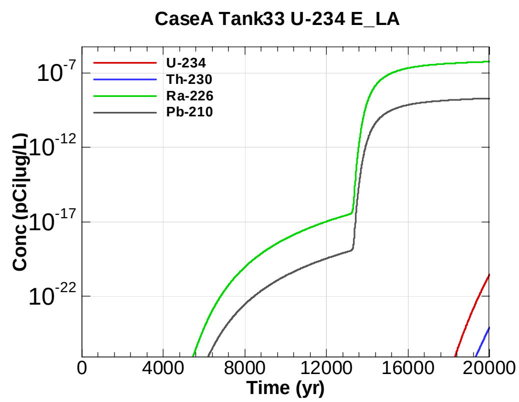

Figure E-1060 - 100m Aquifer Concentration for CaseA Tank33 U-234 E_LA

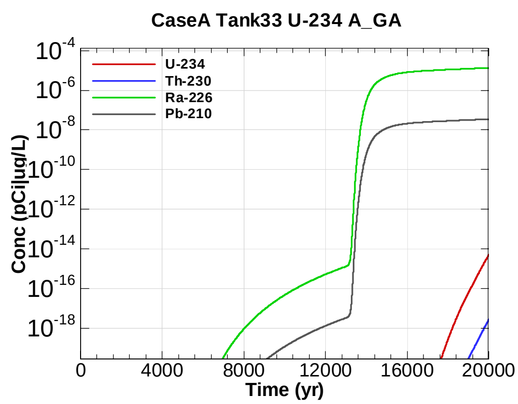

Figure E-1061 - 100m Aquifer Concentration for CaseA Tank33 U-234 A_GA

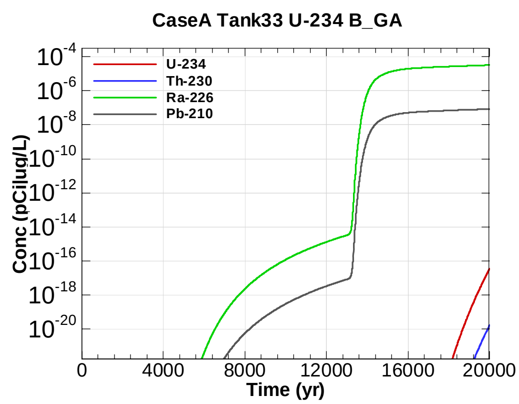

Figure E-1062 - 100m Aquifer Concentration for CaseA Tank33 U-234 B_GA

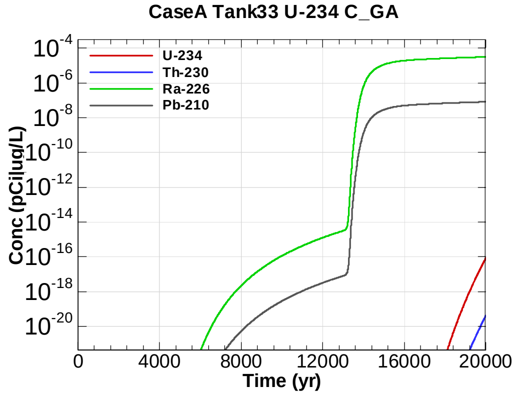

Figure E-1063 - 100m Aquifer Concentration for CaseA Tank33 U-234 C_GA

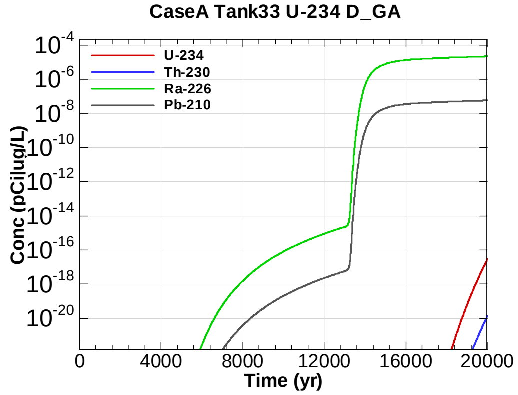

Figure E-1064 - 100m Aquifer Concentration for CaseA Tank33 U-234 D_GA

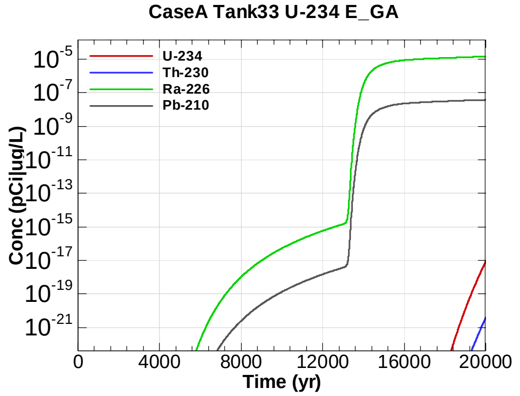

Figure E-1065 - 100m Aquifer Concentration for CaseA Tank33 U-234 E_GA

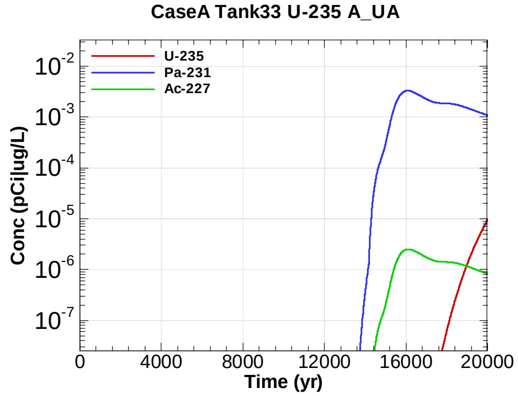

Figure E-1066 - 100m Aquifer Concentration for CaseA Tank33 U-235 A_UA

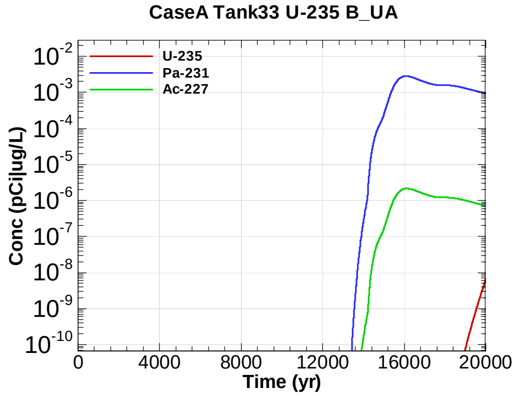

Figure E-1067 - 100m Aquifer Concentration for CaseA Tank33 U-235 B_UA

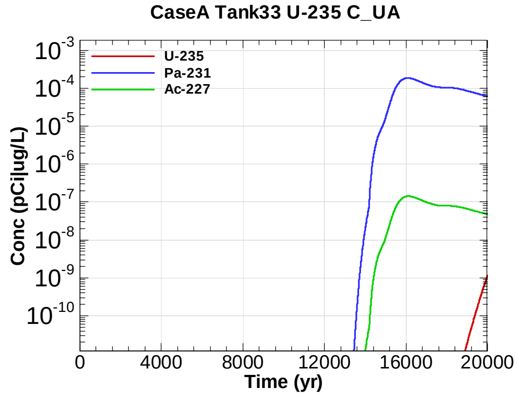

Figure E-1068 - 100m Aquifer Concentration for CaseA Tank33 U-235 C_UA

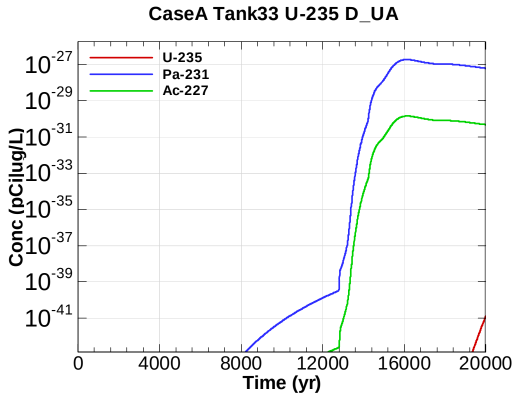

Figure E-1069 - 100m Aquifer Concentration for CaseA Tank33 U-235 D_UA

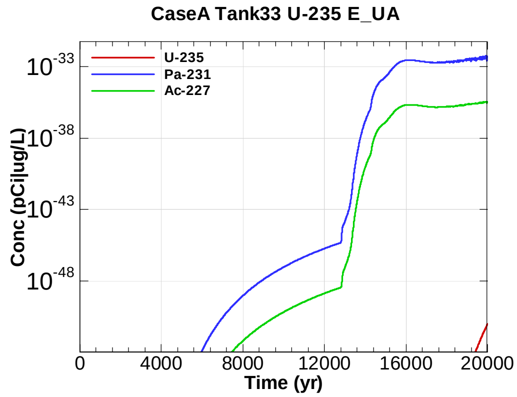

Figure E-1070 - 100m Aquifer Concentration for CaseA Tank33 U-235 E_UA

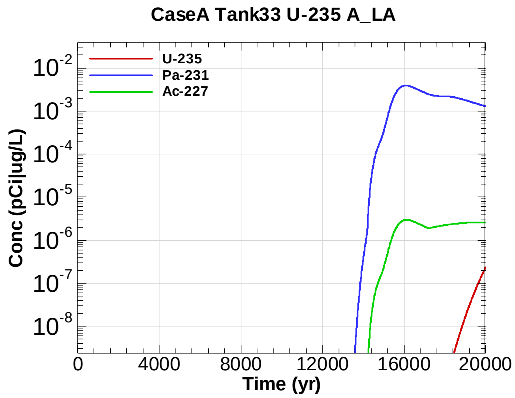

Figure E-1071 - 100m Aquifer Concentration for CaseA Tank33 U-235 A_LA

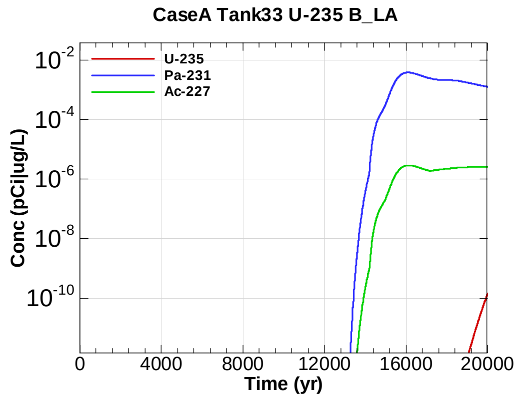

Figure E-1072 - 100m Aquifer Concentration for CaseA Tank33 U-235 B_LA

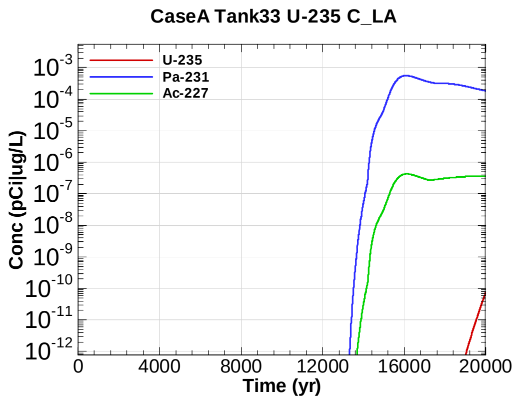

Figure E-1073 - 100m Aquifer Concentration for CaseA Tank33 U-235 C_LA

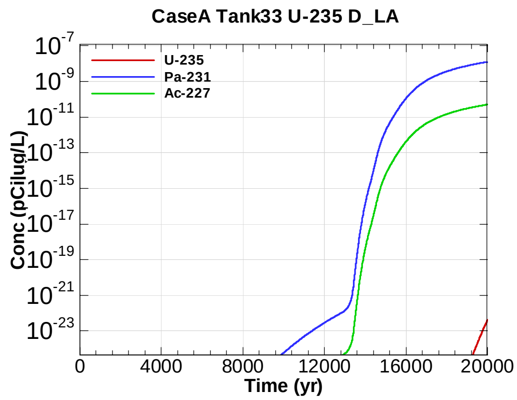

Figure E-1074 - 100m Aquifer Concentration for CaseA Tank33 U-235 D_LA

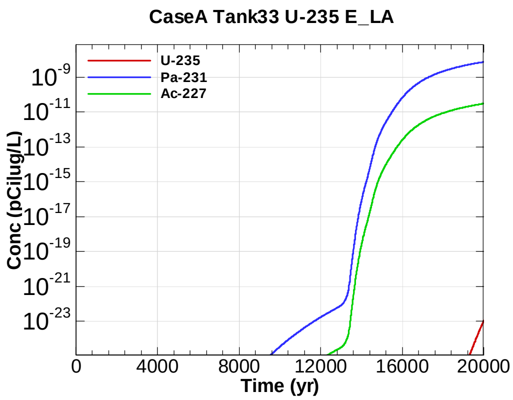

Figure E-1075 - 100m Aquifer Concentration for CaseA Tank33 U-235 E_LA

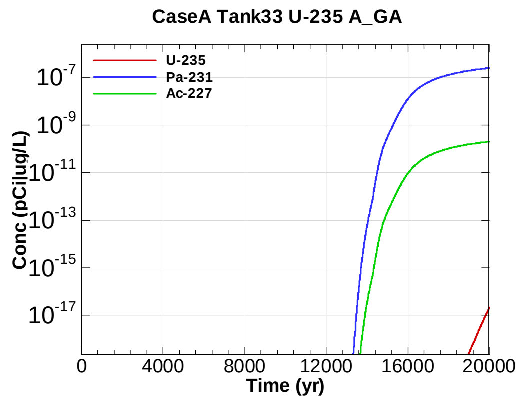

Figure E-1076 - 100m Aquifer Concentration for CaseA Tank33 U-235 A_GA

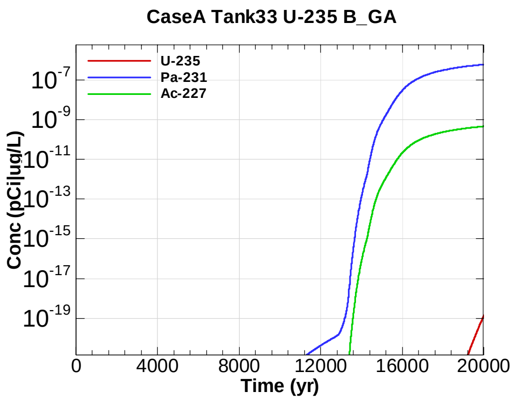

Figure E-1077 - 100m Aquifer Concentration for CaseA Tank33 U-235 B_GA

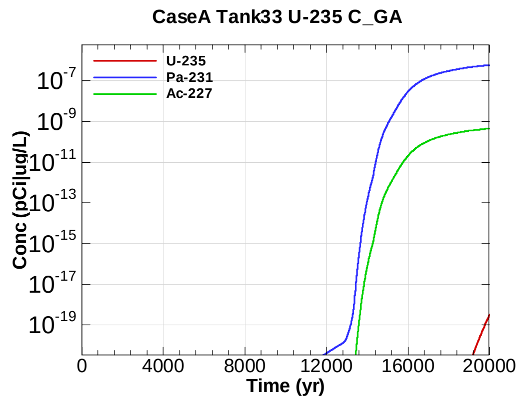

Figure E-1078 - 100m Aquifer Concentration for CaseA Tank33 U-235 C_GA

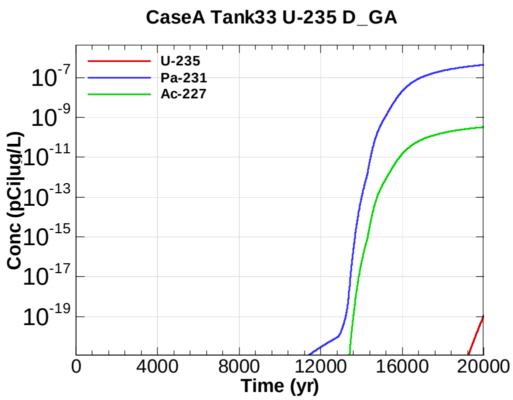

Figure E-1079 - 100m Aquifer Concentration for CaseA Tank33 U-235 D_GA

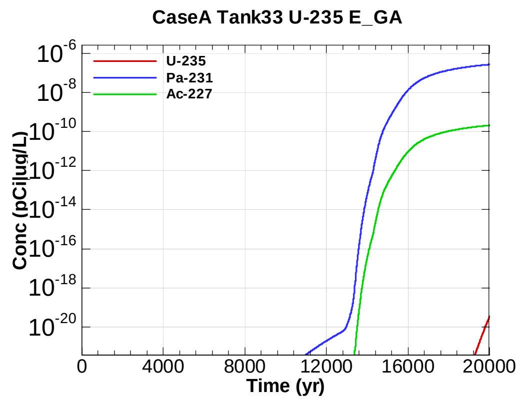

Figure E-1080 - 100m Aquifer Concentration for CaseA Tank33 U-235 E_GA

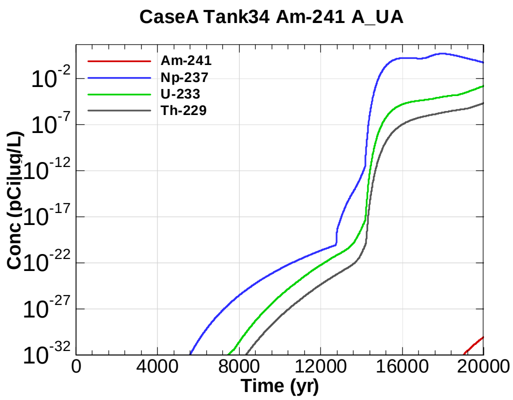

Figure E-1081 - 100m Aquifer Concentration for CaseA Tank34 Am-241 A_UA

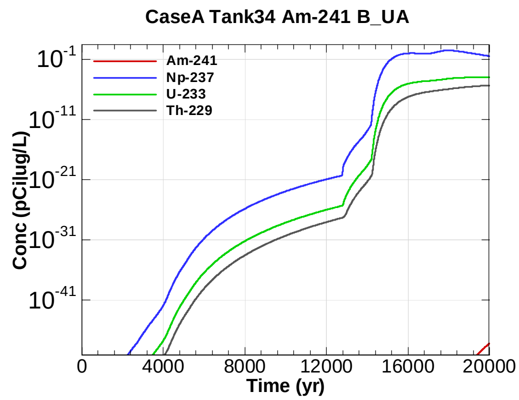

Figure E-1082 - 100m Aquifer Concentration for CaseA Tank34 Am-241 B_UA

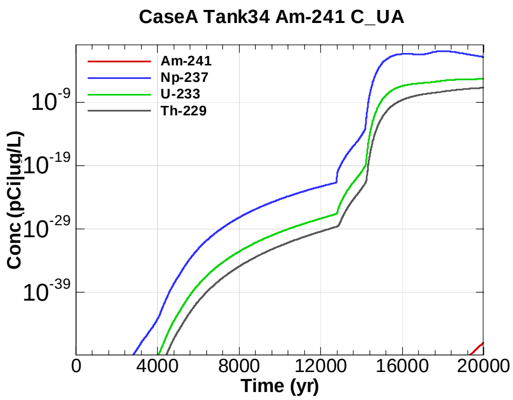

Figure E-1083 - 100m Aquifer Concentration for CaseA Tank34 Am-241 C_UA

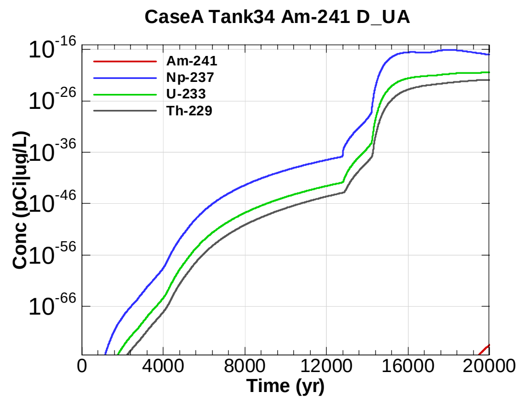

Figure E-1084 - 100m Aquifer Concentration for CaseA Tank34 Am-241 D_UA

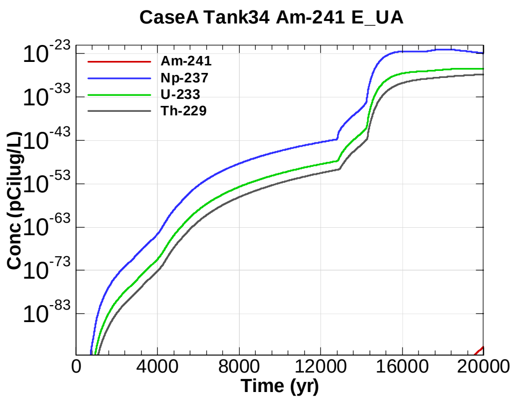

Figure E-1085 - 100m Aquifer Concentration for CaseA Tank34 Am-241 E_UA

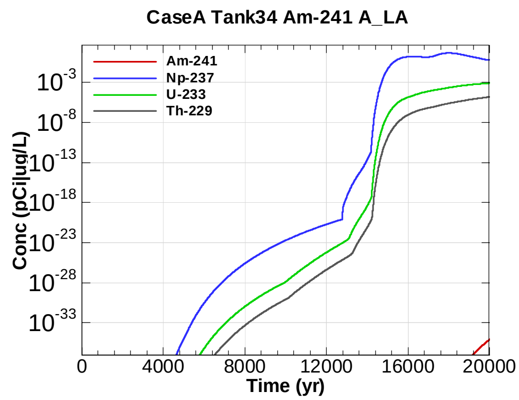

Figure E-1086 - 100m Aquifer Concentration for CaseA Tank34 Am-241 A_LA

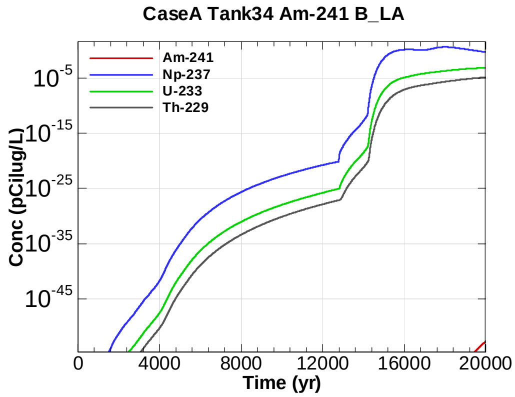

Figure E-1087 - 100m Aquifer Concentration for CaseA Tank34 Am-241 B_LA

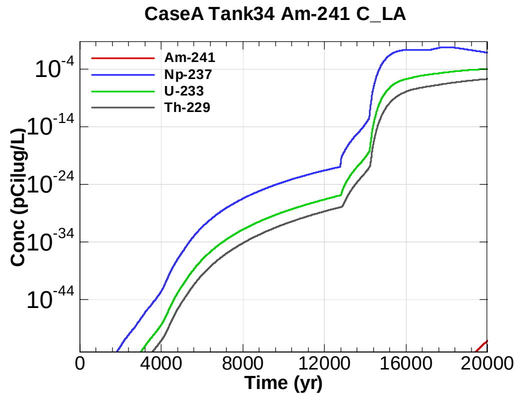

Figure E-1088 - 100m Aquifer Concentration for CaseA Tank34 Am-241 C_LA

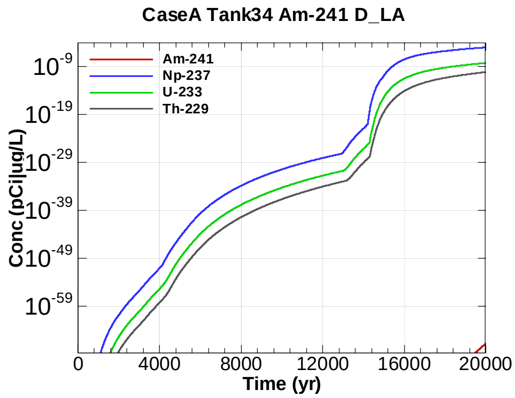

Figure E-1089 - 100m Aquifer Concentration for CaseA Tank34 Am-241 D_LA

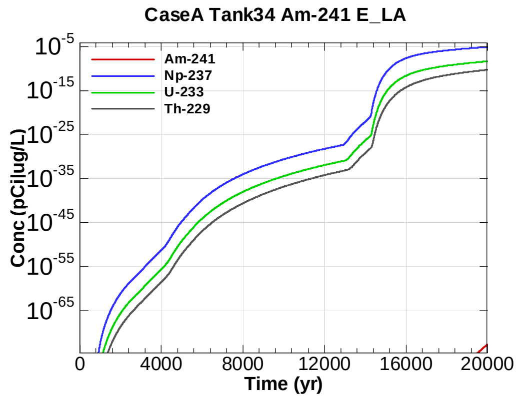

Figure E-1090 - 100m Aquifer Concentration for CaseA Tank34 Am-241 E_LA

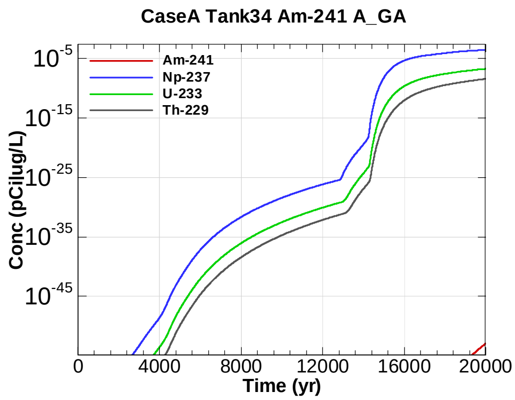

Figure E-1091 - 100m Aquifer Concentration for CaseA Tank34 Am-241 A_GA

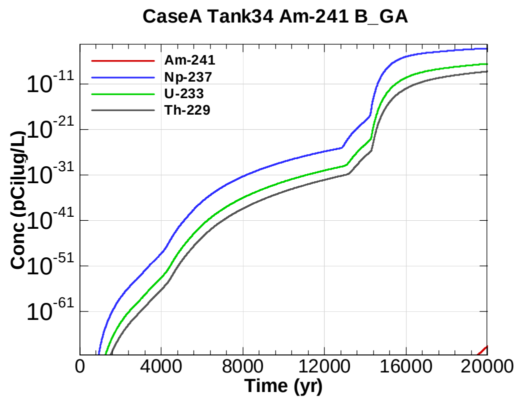

Figure E-1092 - 100m Aquifer Concentration for CaseA Tank34 Am-241 B_GA

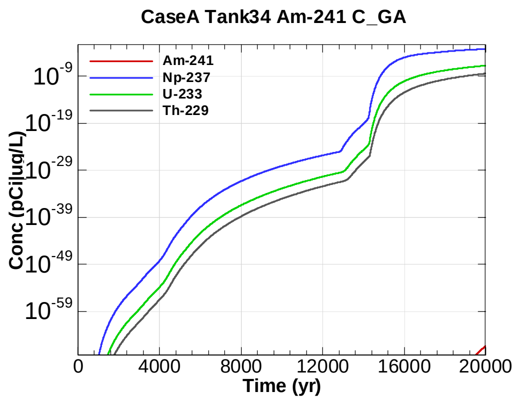

Figure E-1093 - 100m Aquifer Concentration for CaseA Tank34 Am-241 C_GA

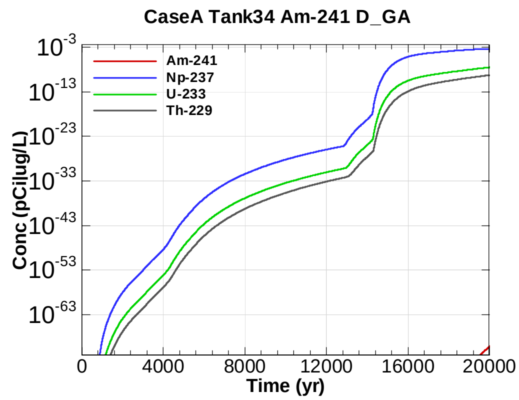

Figure E-1094 - 100m Aquifer Concentration for CaseA Tank34 Am-241 D_GA

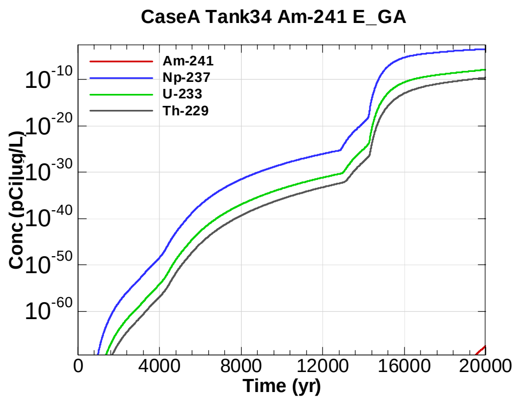

Figure E-1095 - 100m Aquifer Concentration for CaseA Tank34 Am-241 E_GA

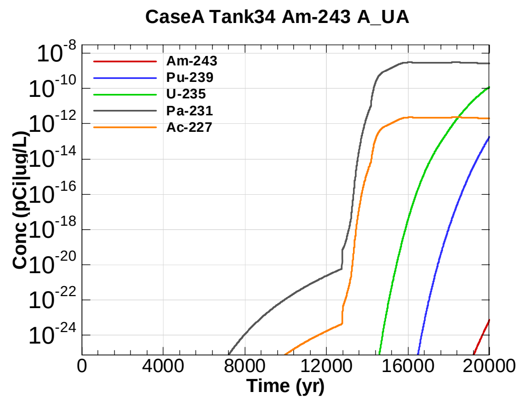

Figure E-1096 - 100m Aquifer Concentration for CaseA Tank34 Am-243 A_UA

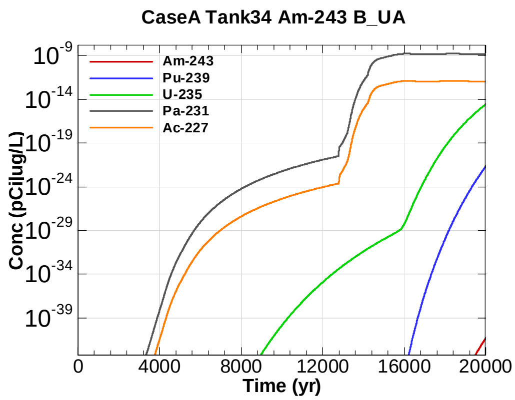

Figure E-1097 - 100m Aquifer Concentration for CaseA Tank34 Am-243 B_UA

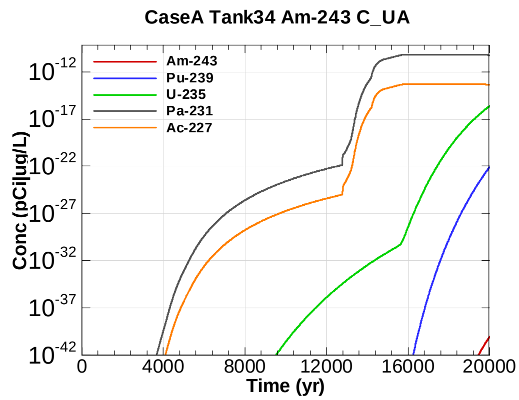

Figure E-1098 - 100m Aquifer Concentration for CaseA Tank34 Am-243 C_UA

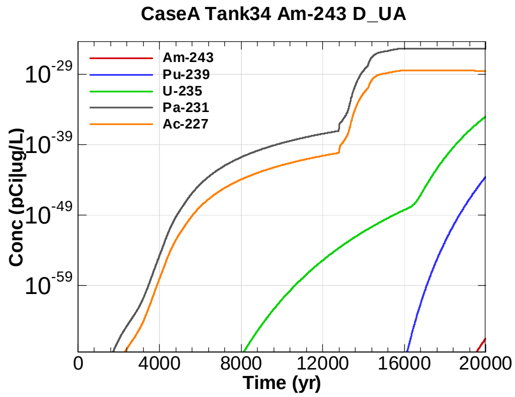

Figure E-1099 - 100m Aquifer Concentration for CaseA Tank34 Am-243 D_UA

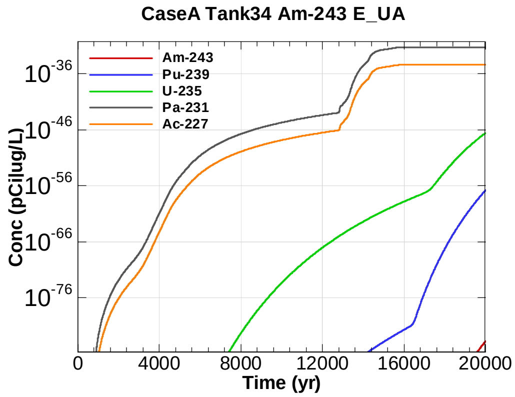

Figure E-1100 - 100m Aquifer Concentration for CaseA Tank34 Am-243 E_UA

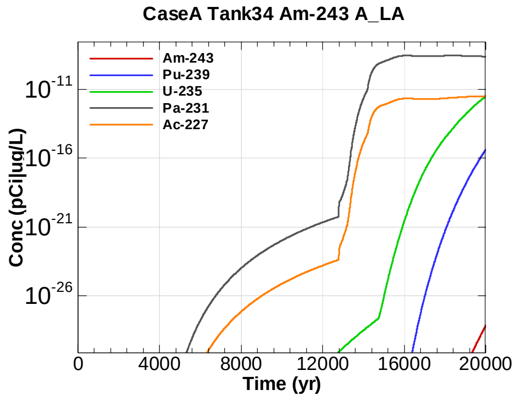

Figure E-1101 - 100m Aquifer Concentration for CaseA Tank34 Am-243 A_LA

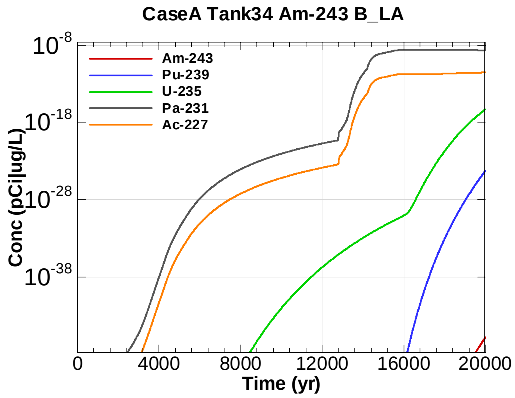

Figure E-1102 - 100m Aquifer Concentration for CaseA Tank34 Am-243 B_LA

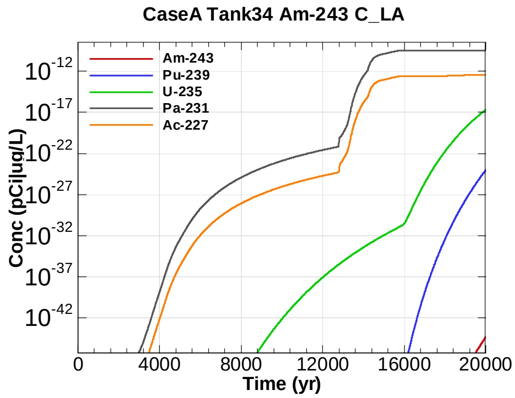

Figure E-1103 - 100m Aquifer Concentration for CaseA Tank34 Am-243 C_LA

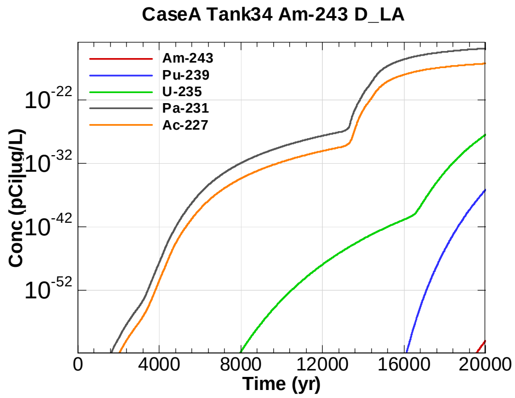

Figure E-1104 - 100m Aquifer Concentration for CaseA Tank34 Am-243 D_LA

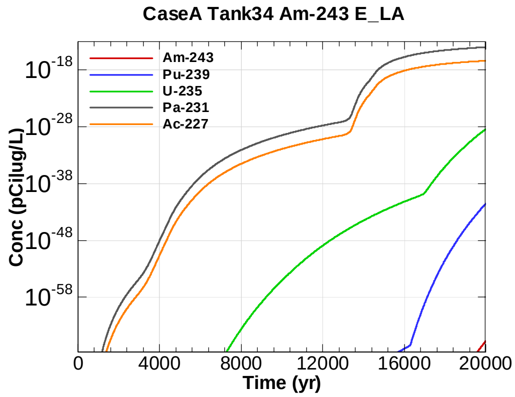

Figure E-1105 - 100m Aquifer Concentration for CaseA Tank34 Am-243 E_LA

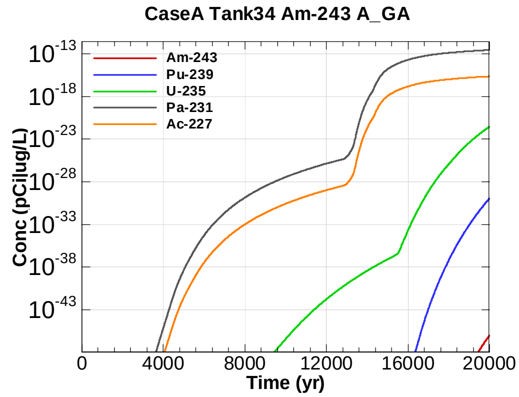

Figure E-1106 - 100m Aquifer Concentration for CaseA Tank34 Am-243 A_GA

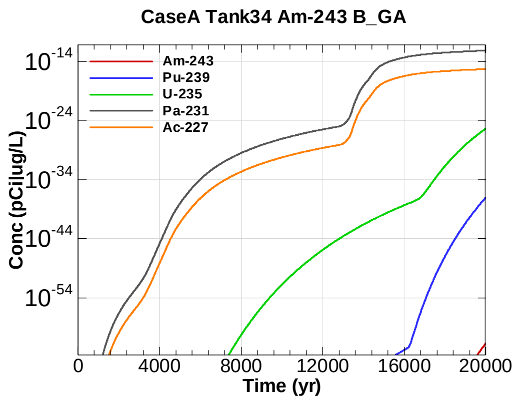

Figure E-1107 - 100m Aquifer Concentration for CaseA Tank34 Am-243 B_GA

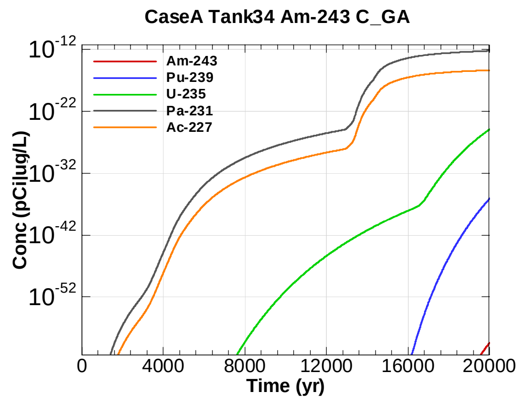

Figure E-1108 - 100m Aquifer Concentration for CaseA Tank34 Am-243 C_GA

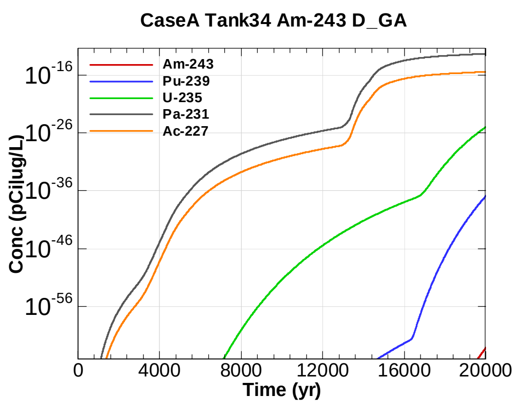

Figure E-1109 - 100m Aquifer Concentration for CaseA Tank34 Am-243 D_GA

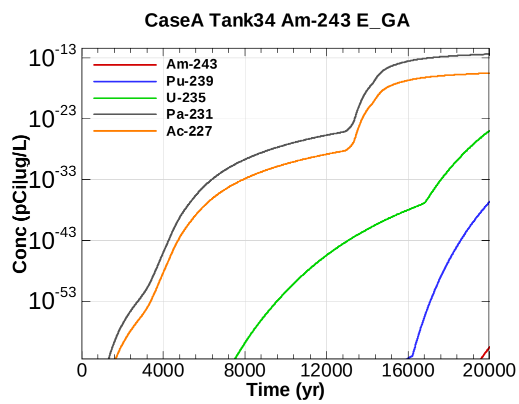

Figure E-1110 - 100m Aquifer Concentration for CaseA Tank34 Am-243 E_GA

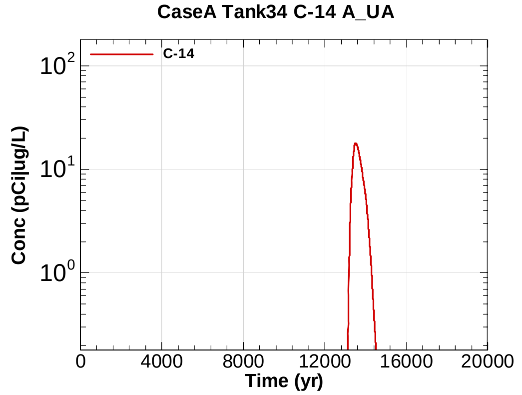

Figure E-1111 - 100m Aquifer Concentration for CaseA Tank34 C-14 A_UA

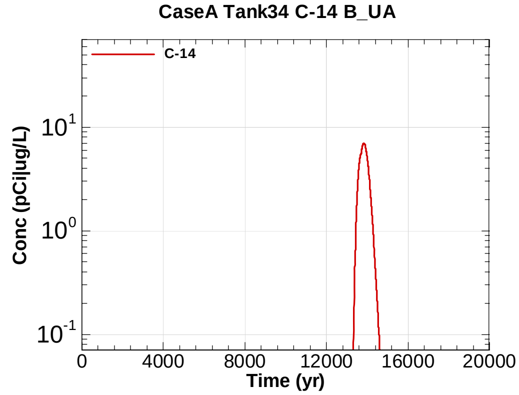

Figure E-1112 - 100m Aquifer Concentration for CaseA Tank34 C-14 B_UA

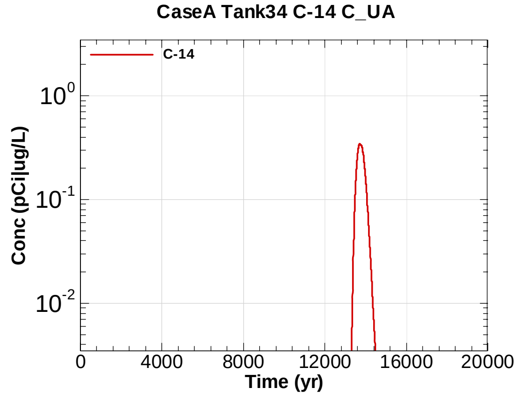

Figure E-1113 - 100m Aquifer Concentration for CaseA Tank34 C-14 C_UA

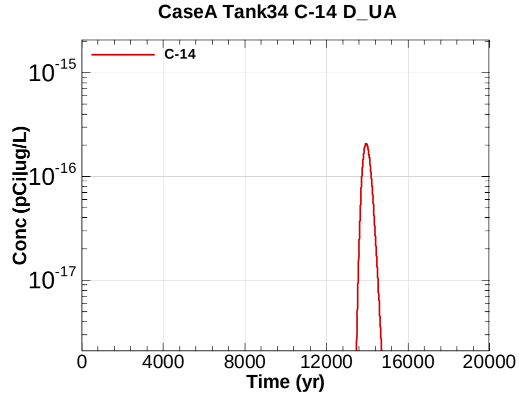

Figure E-1114 - 100m Aquifer Concentration for CaseA Tank34 C-14 D_UA

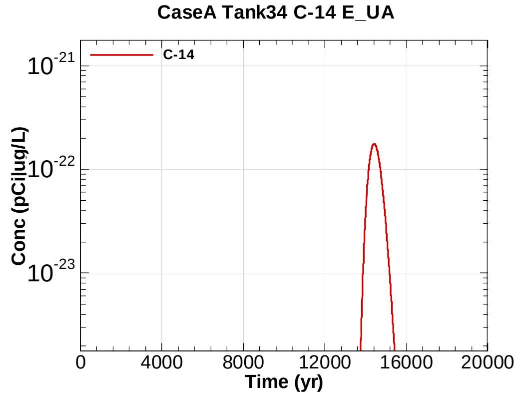

Figure E-1115 - 100m Aquifer Concentration for CaseA Tank34 C-14 E_UA

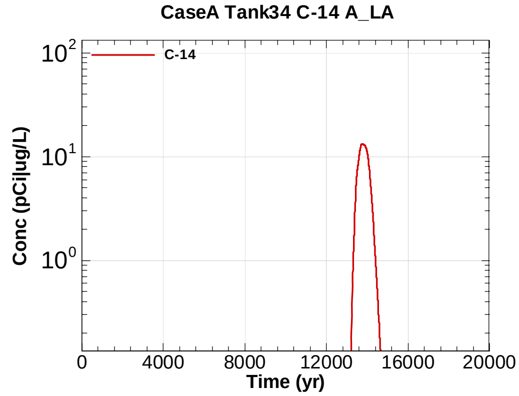

Figure E-1116 - 100m Aquifer Concentration for CaseA Tank34 C-14 A_LA

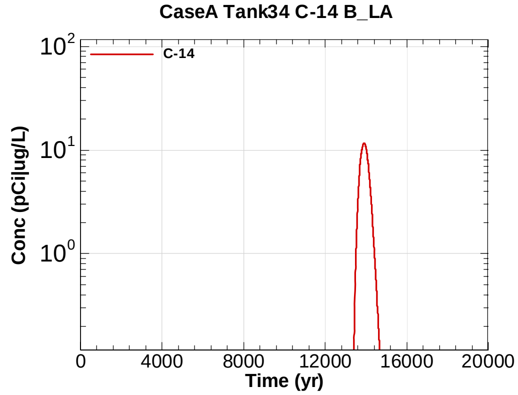

Figure E-1117 - 100m Aquifer Concentration for CaseA Tank34 C-14 B_LA

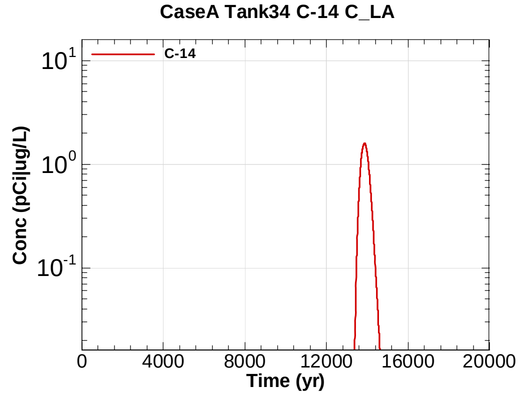

Figure E-1118 - 100m Aquifer Concentration for CaseA Tank34 C-14 C_LA

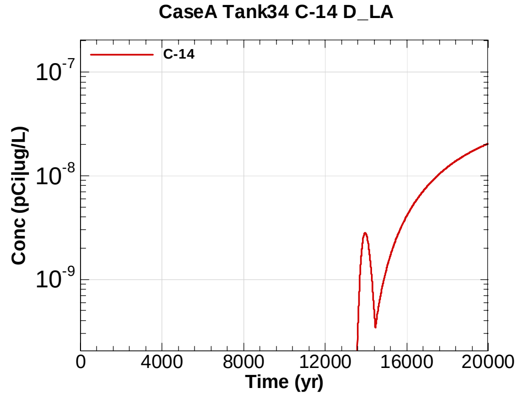

Figure E-1119 - 100m Aquifer Concentration for CaseA Tank34 C-14 D_LA

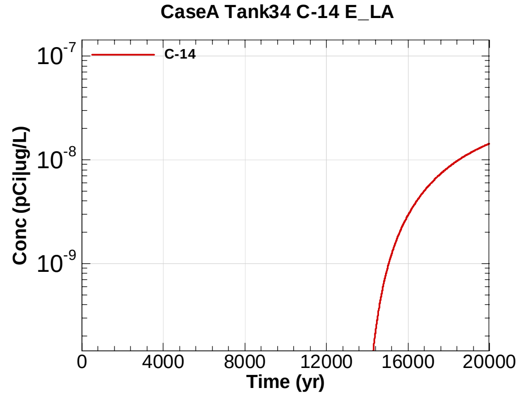

Figure E-1120 - 100m Aquifer Concentration for CaseA Tank34 C-14 E_LA

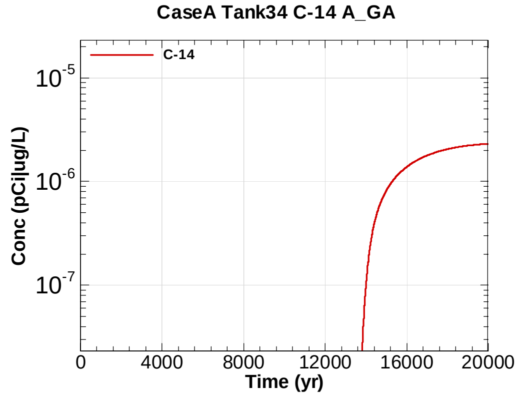

Figure E-1121 - 100m Aquifer Concentration for CaseA Tank34 C-14 A_GA

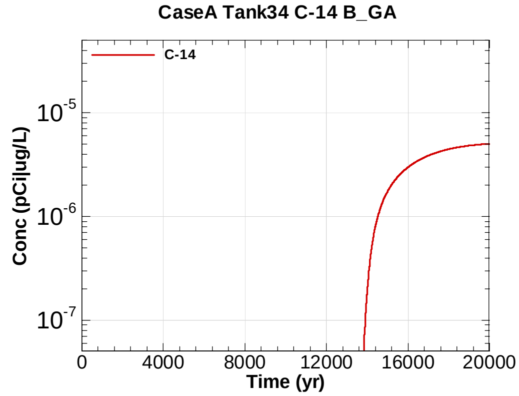

Figure E-1122 - 100m Aquifer Concentration for CaseA Tank34 C-14 B_GA

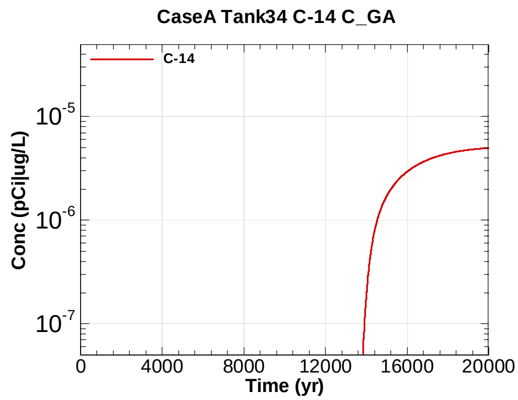

Figure E-1123 - 100m Aquifer Concentration for CaseA Tank34 C-14 C_GA

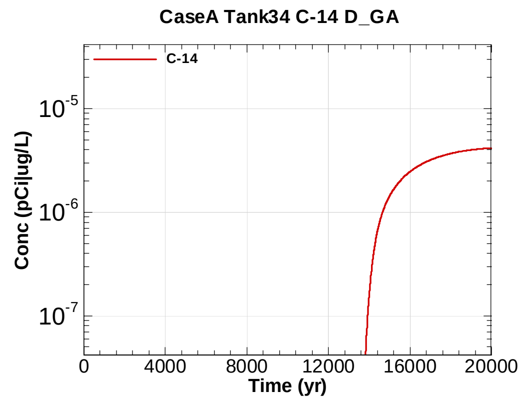

Figure E-1124 - 100m Aquifer Concentration for CaseA Tank34 C-14 D_GA

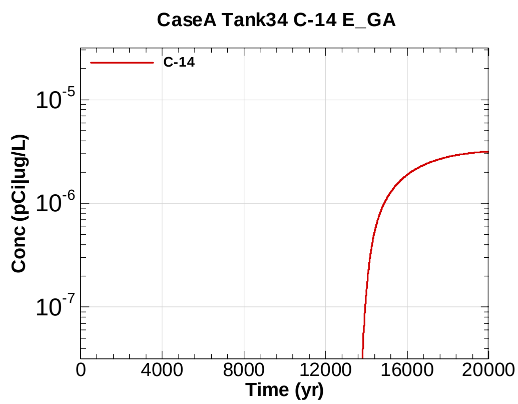

Figure E-1125 - 100m Aquifer Concentration for CaseA Tank34 C-14 E_GA

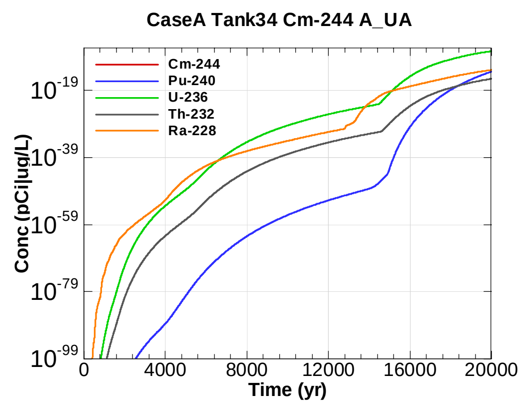

Figure E-1126 - 100m Aquifer Concentration for CaseA Tank34 Cm-244 A_UA

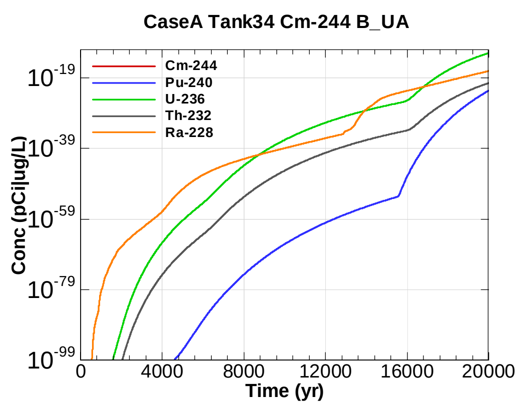

Figure E-1127 - 100m Aquifer Concentration for CaseA Tank34 Cm-244 B_UA

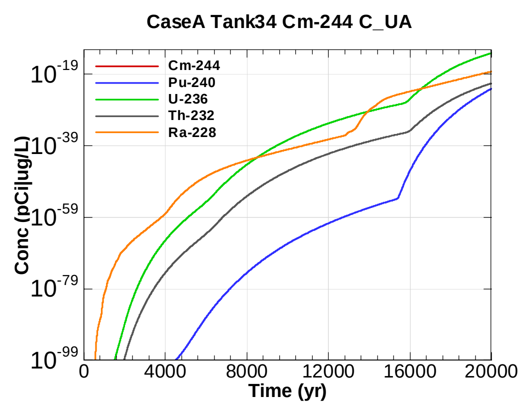

Figure E-1128 - 100m Aquifer Concentration for CaseA Tank34 Cm-244 C_UA

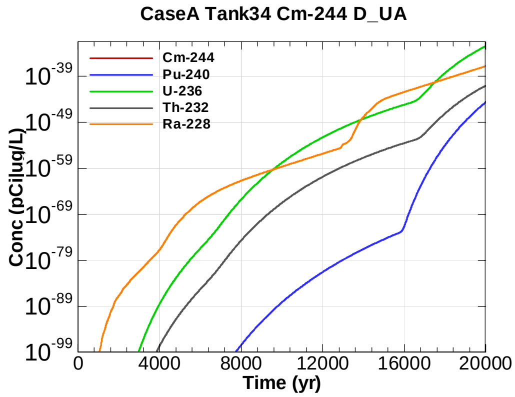

Figure E-1129 - 100m Aquifer Concentration for CaseA Tank34 Cm-244 D_UA

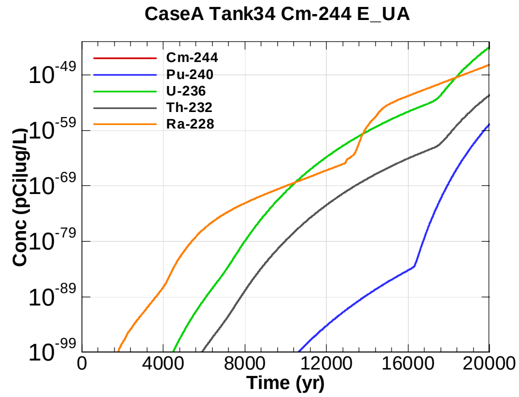

Figure E-1130 - 100m Aquifer Concentration for CaseA Tank34 Cm-244 E_UA

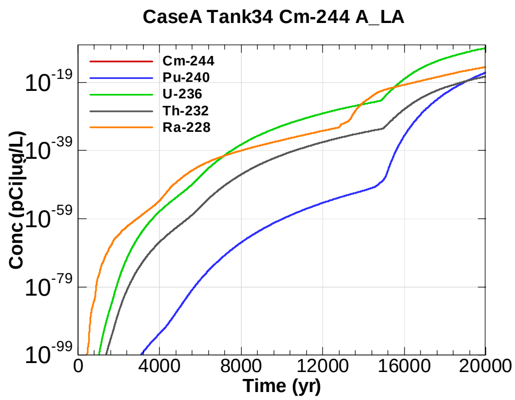

Figure E-1131 - 100m Aquifer Concentration for CaseA Tank34 Cm-244 A_LA

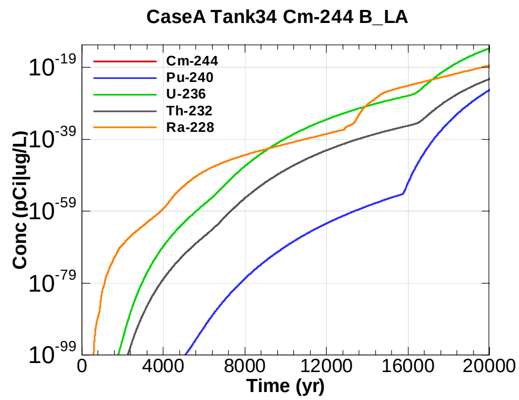

Figure E-1132 - 100m Aquifer Concentration for CaseA Tank34 Cm-244 B_LA

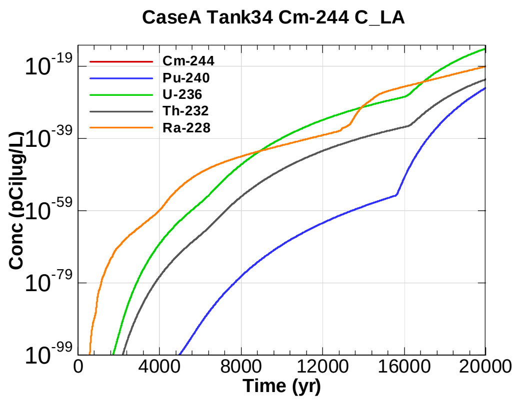

Figure E-1133 - 100m Aquifer Concentration for CaseA Tank34 Cm-244 C_LA

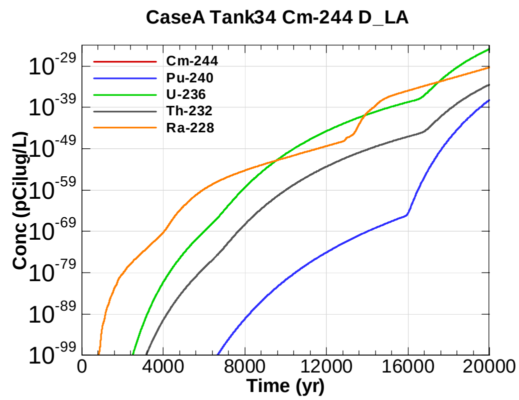

Figure E-1134 - 100m Aquifer Concentration for CaseA Tank34 Cm-244 D_LA

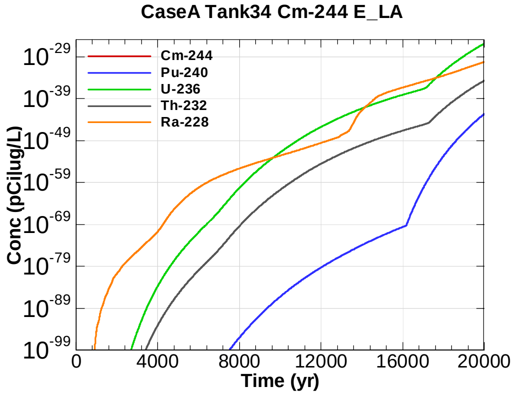

Figure E-1135 - 100m Aquifer Concentration for CaseA Tank34 Cm-244 E_LA

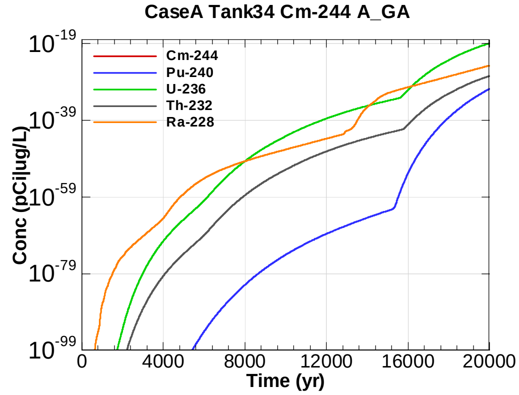

Figure E-1136 - 100m Aquifer Concentration for CaseA Tank34 Cm-244 A_GA

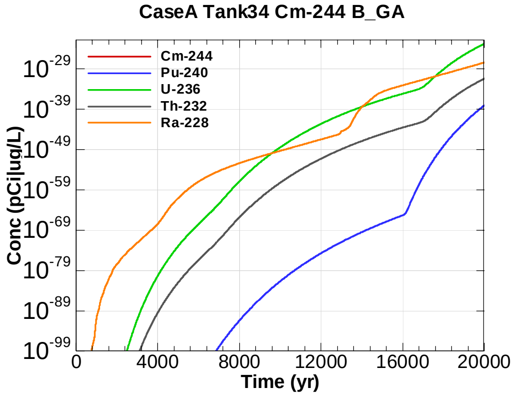

Figure E-1137 - 100m Aquifer Concentration for CaseA Tank34 Cm-244 B_GA

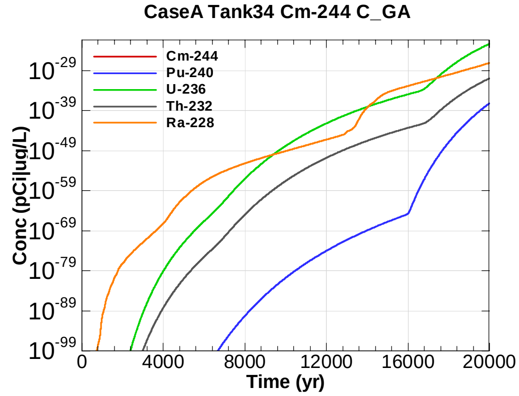

Figure E-1138 - 100m Aquifer Concentration for CaseA Tank34 Cm-244 C_GA

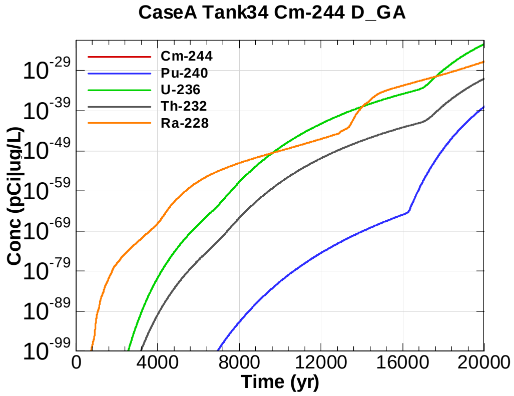

Figure E-1139 - 100m Aquifer Concentration for CaseA Tank34 Cm-244 D_GA

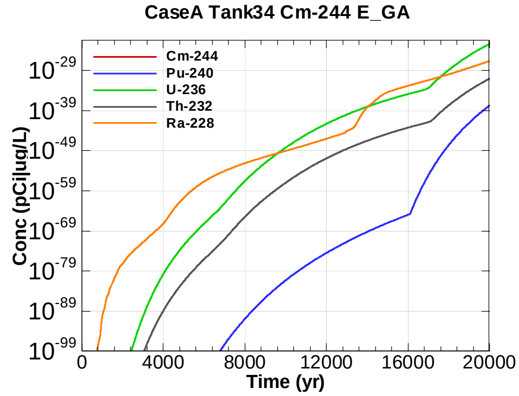

Figure E-1140 - 100m Aquifer Concentration for CaseA Tank34 Cm-244 E_GA

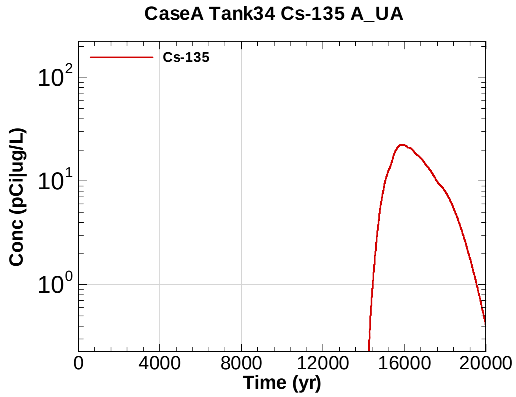

Figure E-1141 - 100m Aquifer Concentration for CaseA Tank34 Cs-135 A_UA

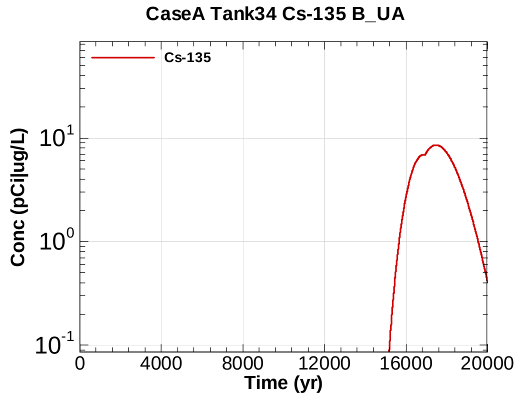

Figure E-1142 - 100m Aquifer Concentration for CaseA Tank34 Cs-135 B_UA

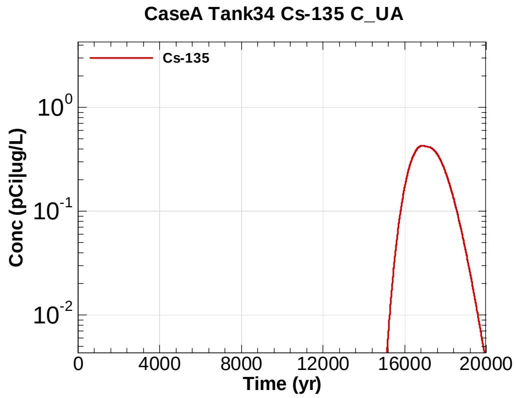

Figure E-1143 - 100m Aquifer Concentration for CaseA Tank34 Cs-135 C_UA

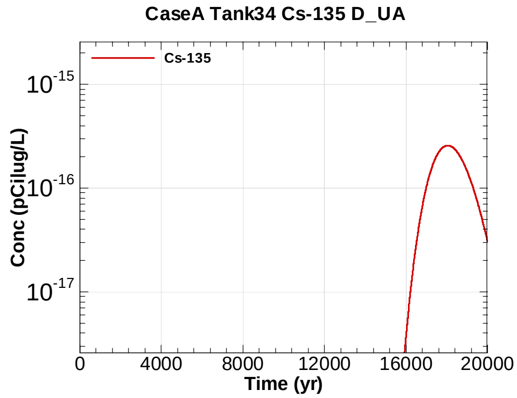

Figure E-1144 - 100m Aquifer Concentration for CaseA Tank34 Cs-135 D_UA

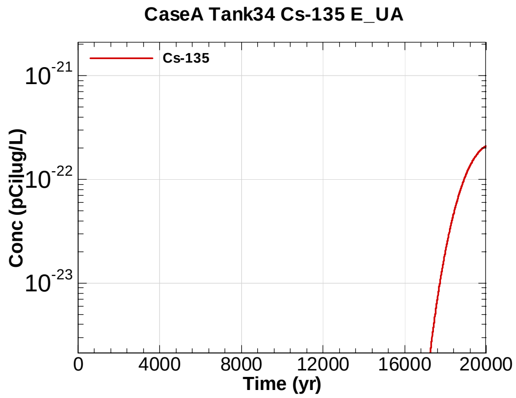

Figure E-1145 - 100m Aquifer Concentration for CaseA Tank34 Cs-135 E_UA

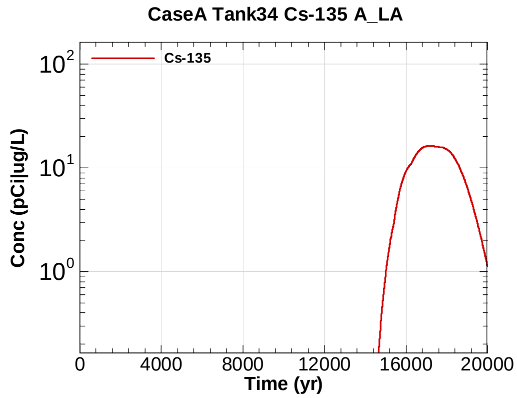

Figure E-1146 - 100m Aquifer Concentration for CaseA Tank34 Cs-135 A_LA

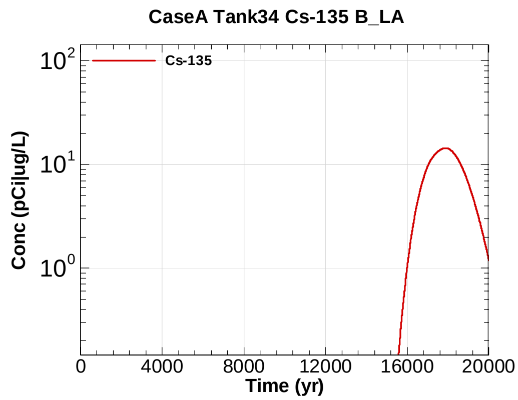

Figure E-1147 - 100m Aquifer Concentration for CaseA Tank34 Cs-135 B_LA

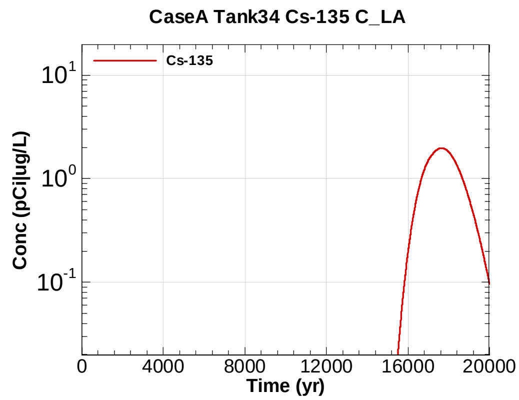

Figure E-1148 - 100m Aquifer Concentration for CaseA Tank34 Cs-135 C_LA

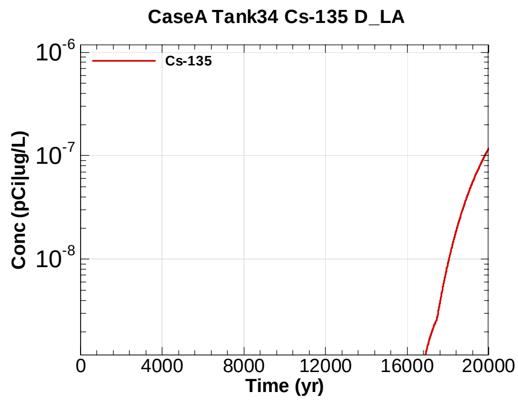

Figure E-1149 - 100m Aquifer Concentration for CaseA Tank34 Cs-135 D_LA

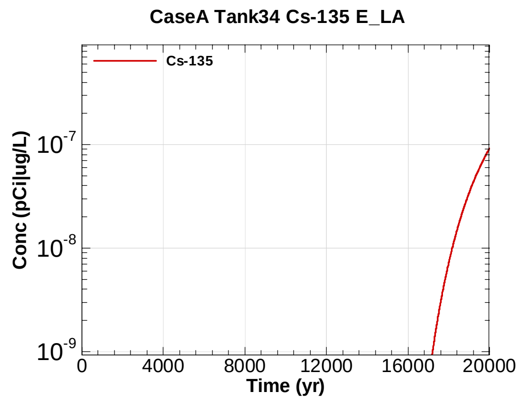

Figure E-1150 - 100m Aquifer Concentration for CaseA Tank34 Cs-135 E_LA

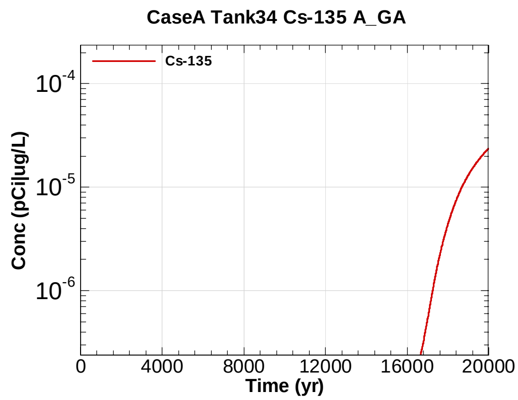

Figure E-1151 - 100m Aquifer Concentration for CaseA Tank34 Cs-135 A_GA

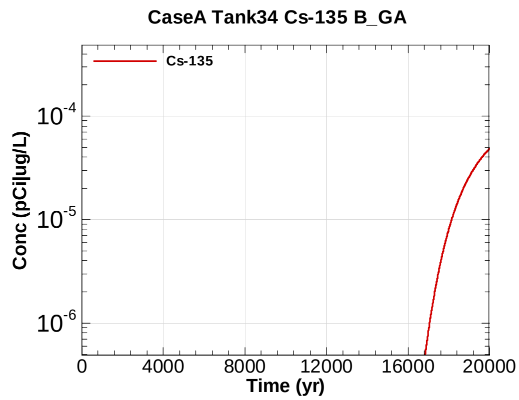

Figure E-1152 - 100m Aquifer Concentration for CaseA Tank34 Cs-135 B_GA

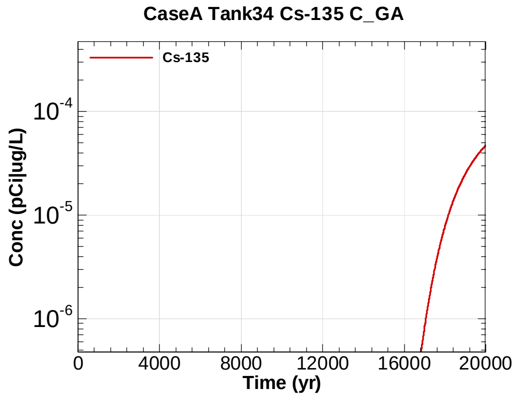

Figure E-1153 - 100m Aquifer Concentration for CaseA Tank34 Cs-135 C_GA

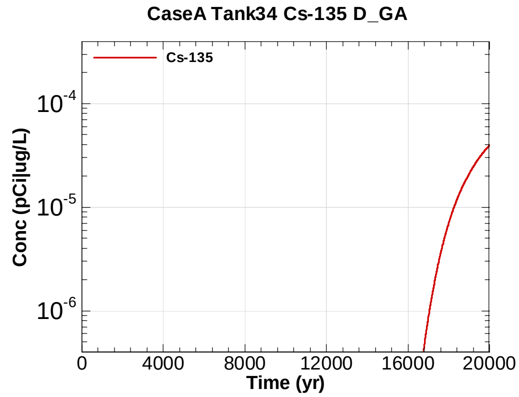

Figure E-1154 - 100m Aquifer Concentration for CaseA Tank34 Cs-135 D_GA

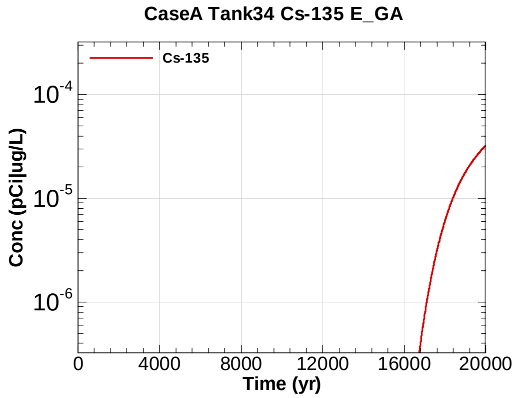

Figure E-1155 - 100m Aquifer Concentration for CaseA Tank34 Cs-135 E_GA

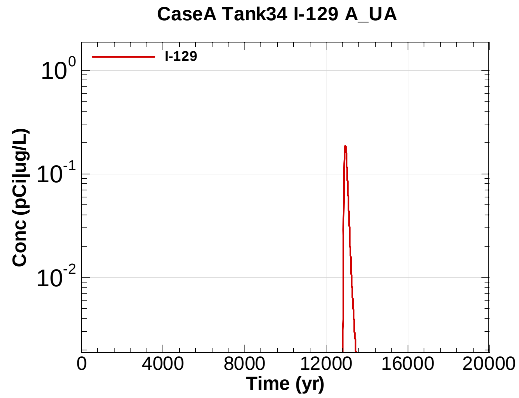

Figure E-1156 - 100m Aquifer Concentration for CaseA Tank34 I-129 A_UA

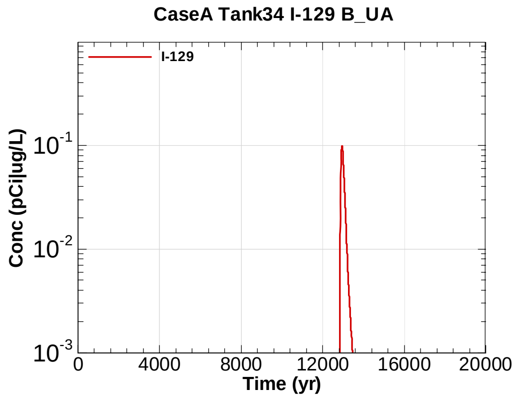

Figure E-1157 - 100m Aquifer Concentration for CaseA Tank34 I-129 B_UA

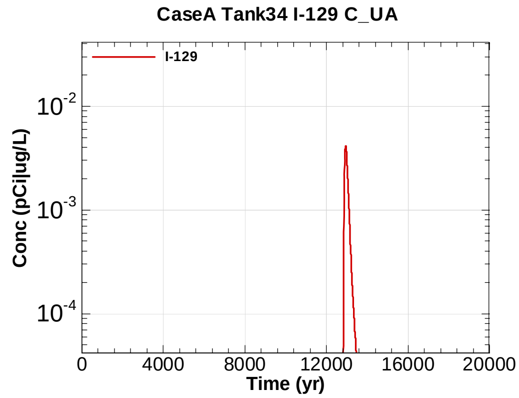

Figure E-1158 - 100m Aquifer Concentration for CaseA Tank34 I-129 C_UA

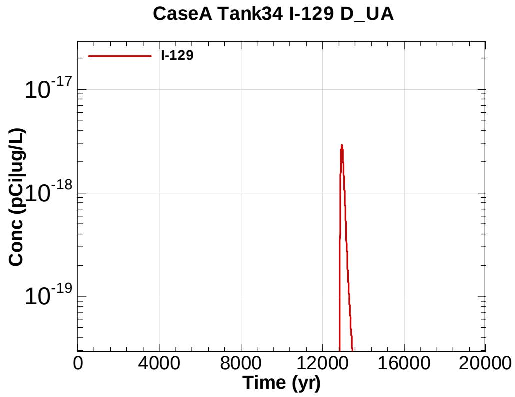

Figure E-1159 - 100m Aquifer Concentration for CaseA Tank34 I-129 D_UA

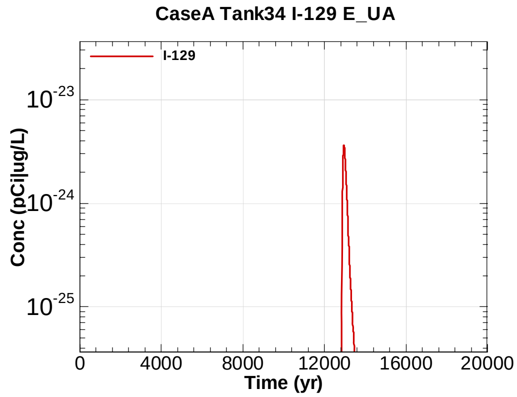

Figure E-1160 - 100m Aquifer Concentration for CaseA Tank34 I-129 E_UA

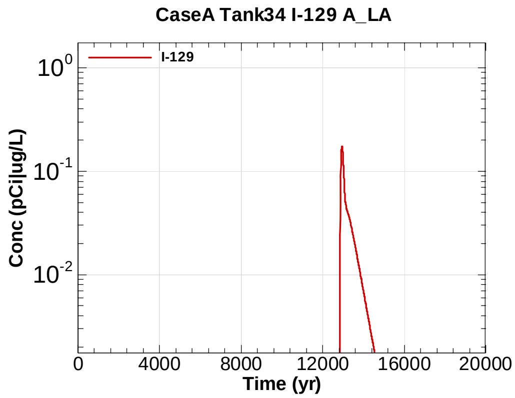

Figure E-1161 - 100m Aquifer Concentration for CaseA Tank34 I-129 A_LA

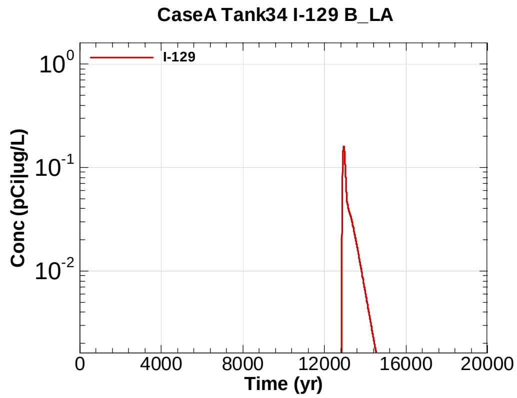

Figure E-1162 - 100m Aquifer Concentration for CaseA Tank34 I-129 B_LA

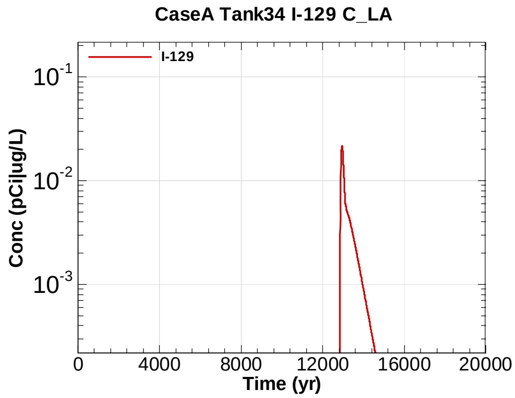

Figure E-1163 - 100m Aquifer Concentration for CaseA Tank34 I-129 C_LA

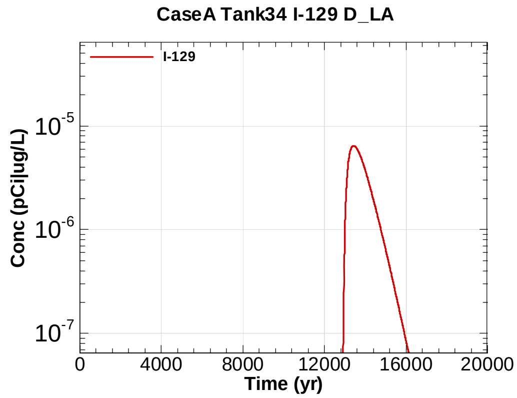

Figure E-1164 - 100m Aquifer Concentration for CaseA Tank34 I-129 D_LA

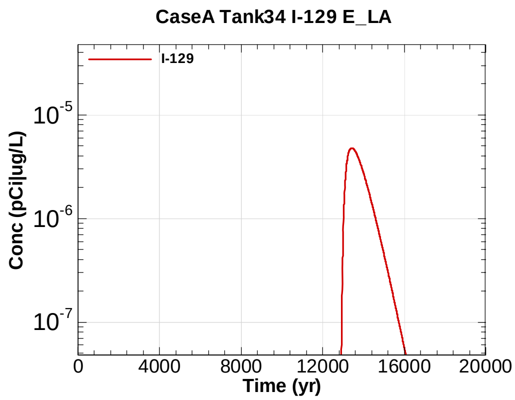

Figure E-1165 - 100m Aquifer Concentration for CaseA Tank34 I-129 E_LA

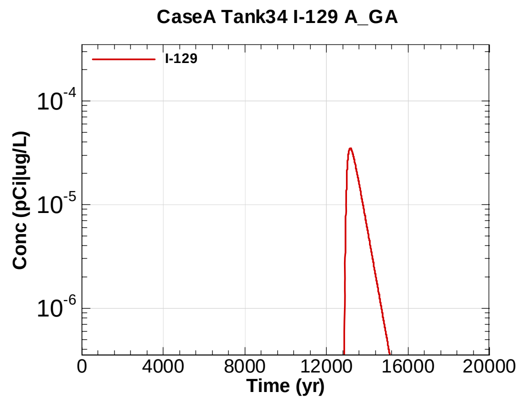

Figure E-1166 - 100m Aquifer Concentration for CaseA Tank34 I-129 A_GA

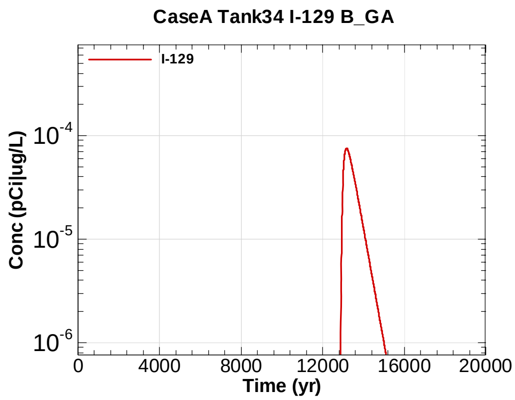

Figure E-1167 - 100m Aquifer Concentration for CaseA Tank34 I-129 B_GA

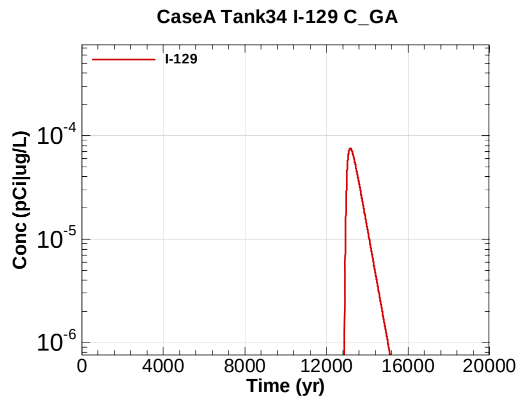

Figure E-1168 - 100m Aquifer Concentration for CaseA Tank34 I-129 C_GA

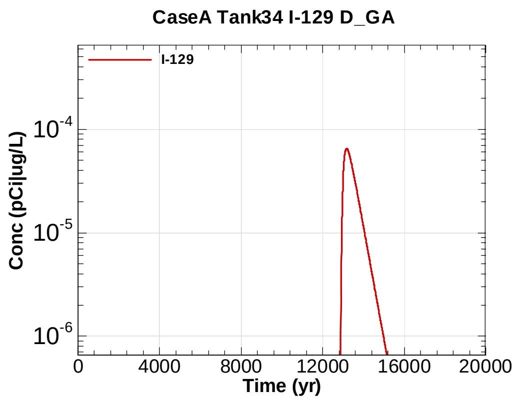

Figure E-1169 - 100m Aquifer Concentration for CaseA Tank34 I-129 D_GA

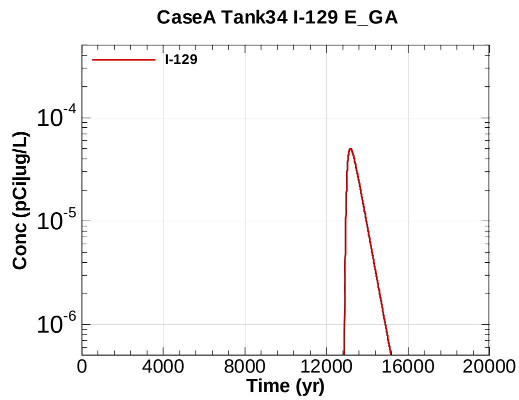

Figure E-1170 - 100m Aquifer Concentration for CaseA Tank34 I-129 E_GA

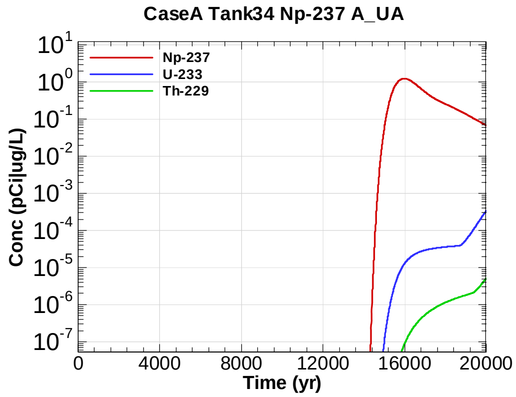

Figure E-1171 - 100m Aquifer Concentration for CaseA Tank34 Np-237 A_UA

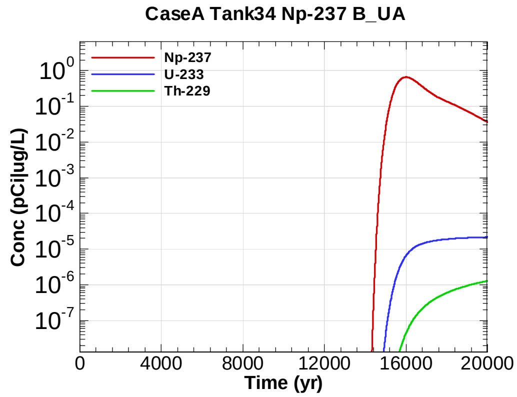

Figure E-1172 - 100m Aquifer Concentration for CaseA Tank34 Np-237 B_UA

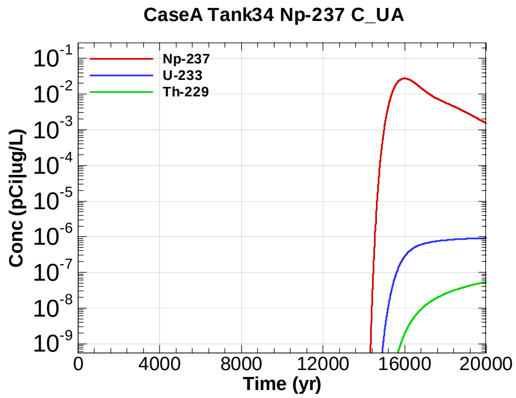

Figure E-1173 - 100m Aquifer Concentration for CaseA Tank34 Np-237 C_UA

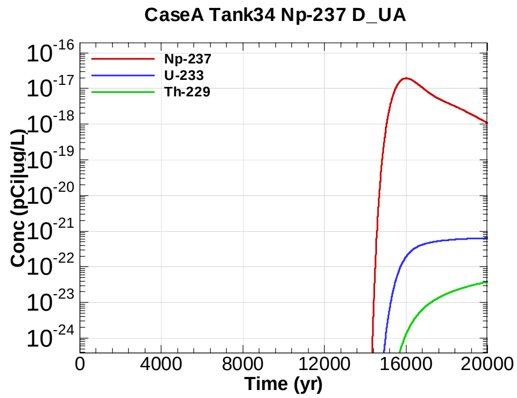

Figure E-1174 - 100m Aquifer Concentration for CaseA Tank34 Np-237 D_UA

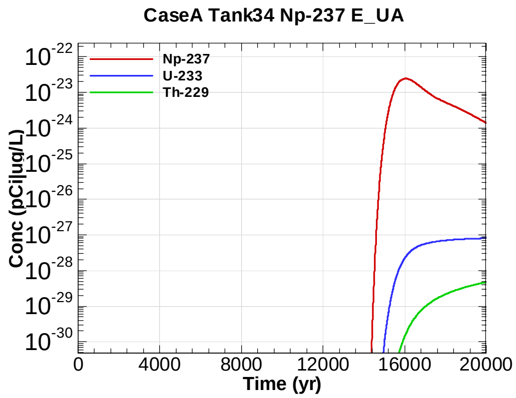

Figure E-1175 - 100m Aquifer Concentration for CaseA Tank34 Np-237 E_UA

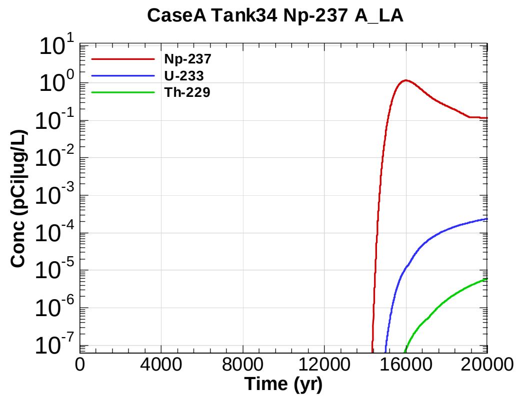

Figure E-1176 - 100m Aquifer Concentration for CaseA Tank34 Np-237 A_LA

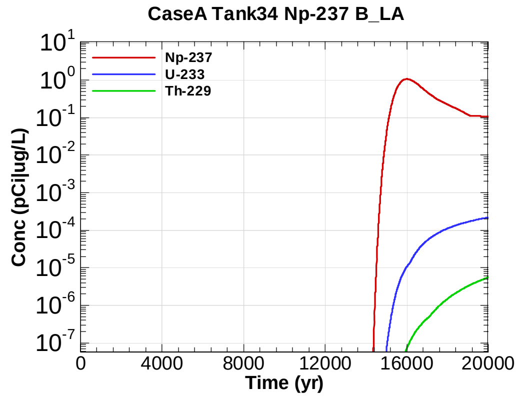

Figure E-1177 - 100m Aquifer Concentration for CaseA Tank34 Np-237 B_LA

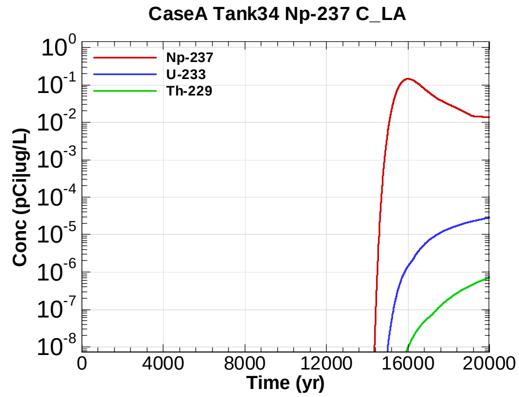

Figure E-1178 - 100m Aquifer Concentration for CaseA Tank34 Np-237 C_LA

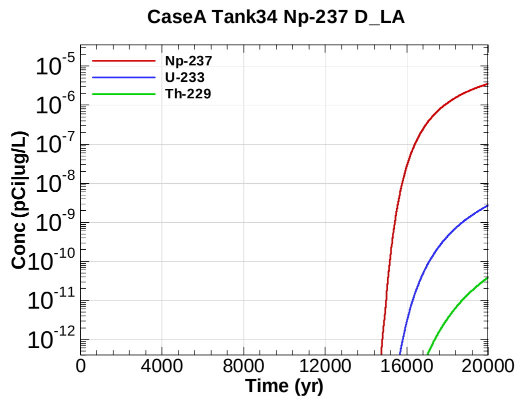

Figure E-1179 - 100m Aquifer Concentration for CaseA Tank34 Np-237 D_LA

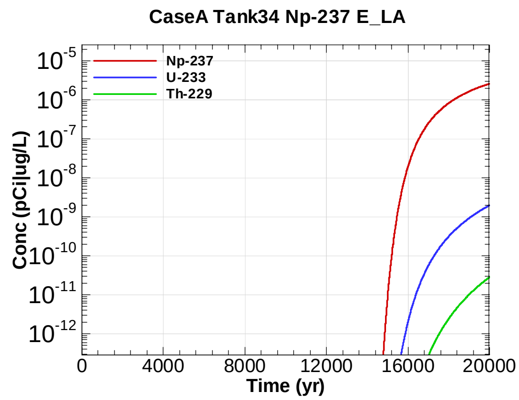

Figure E-1180 - 100m Aquifer Concentration for CaseA Tank34 Np-237 E_LA

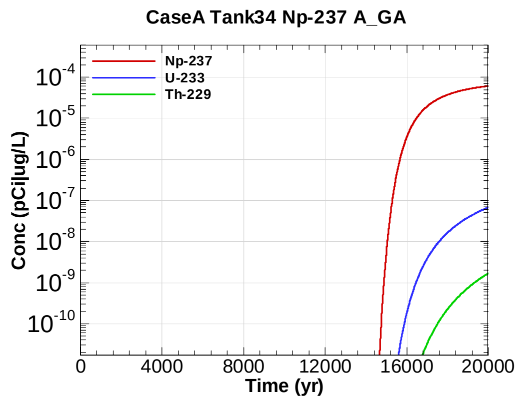

Figure E-1181 - 100m Aquifer Concentration for CaseA Tank34 Np-237 A_GA

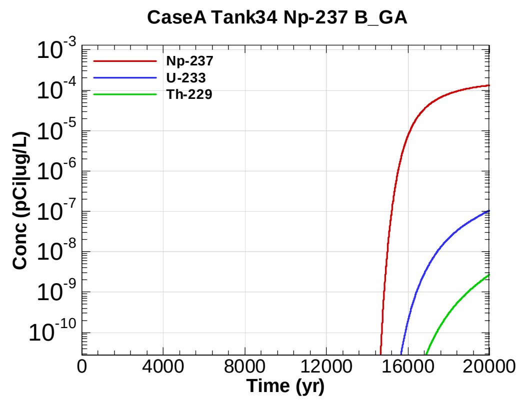

Figure E-1182 - 100m Aquifer Concentration for CaseA Tank34 Np-237 B_GA

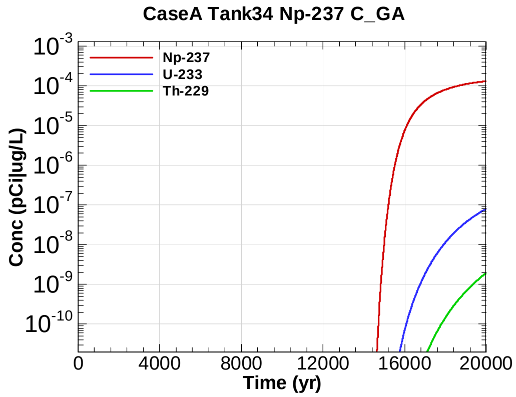

Figure E-1183 - 100m Aquifer Concentration for CaseA Tank34 Np-237 C_GA

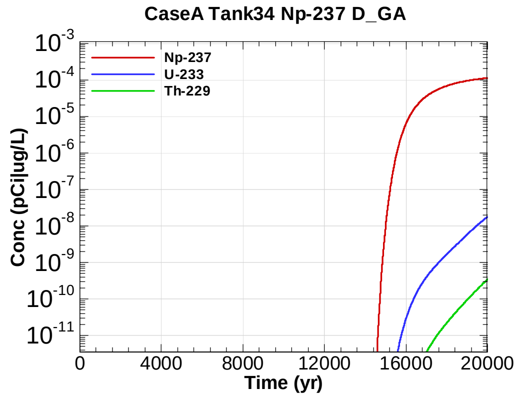

Figure E-1184 - 100m Aquifer Concentration for CaseA Tank34 Np-237 D_GA

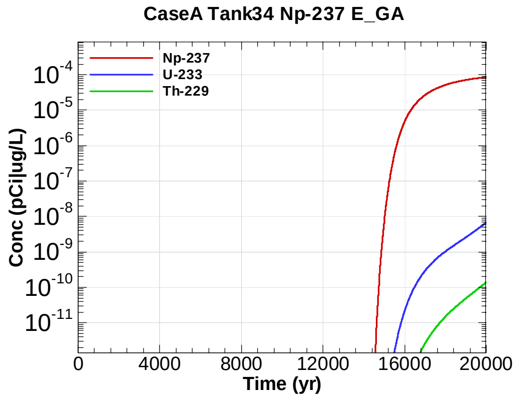

Figure E-1185 - 100m Aquifer Concentration for CaseA Tank34 Np-237 E_GA

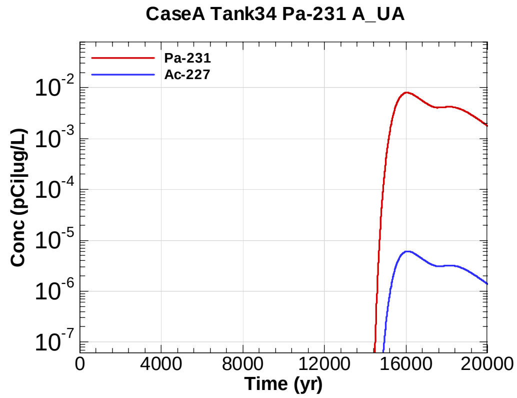

Figure E-1186 - 100m Aquifer Concentration for CaseA Tank34 Pa-231 A_UA

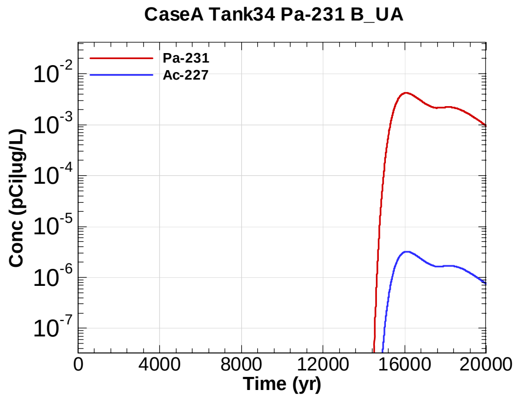

Figure E-1187 - 100m Aquifer Concentration for CaseA Tank34 Pa-231 B_UA

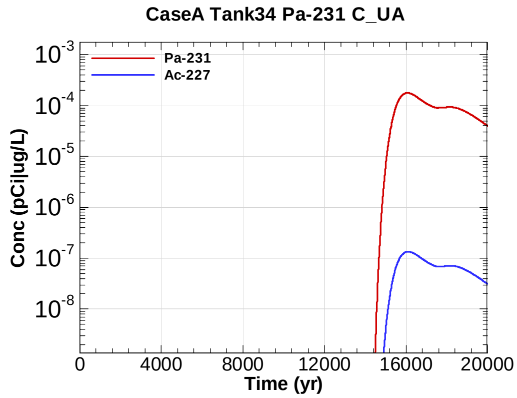

Figure E-1188 - 100m Aquifer Concentration for CaseA Tank34 Pa-231 C_UA

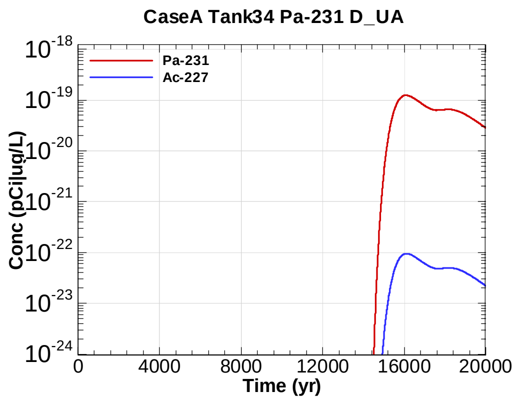

Figure E-1189 - 100m Aquifer Concentration for CaseA Tank34 Pa-231 D_UA

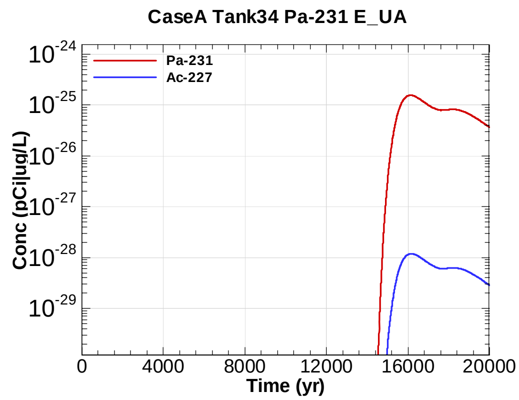

Figure E-1190 - 100m Aquifer Concentration for CaseA Tank34 Pa-231 E_UA

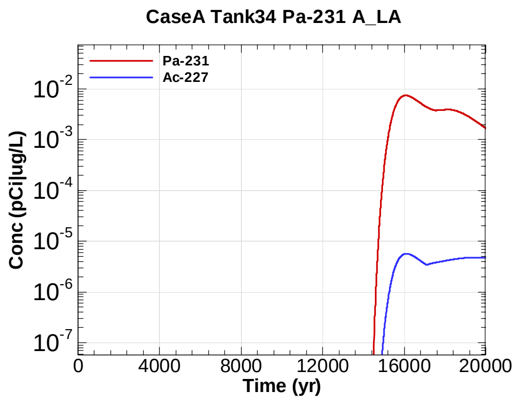

Figure E-1191 - 100m Aquifer Concentration for CaseA Tank34 Pa-231 A_LA

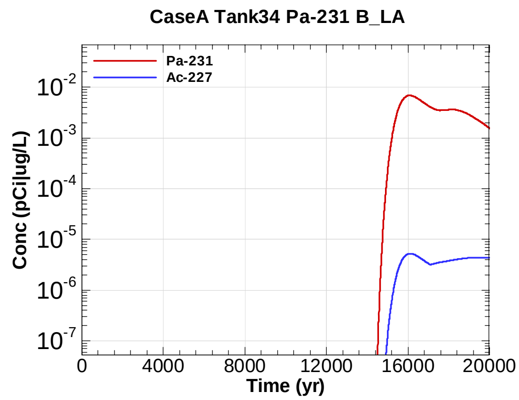

Figure E-1192 - 100m Aquifer Concentration for CaseA Tank34 Pa-231 B_LA

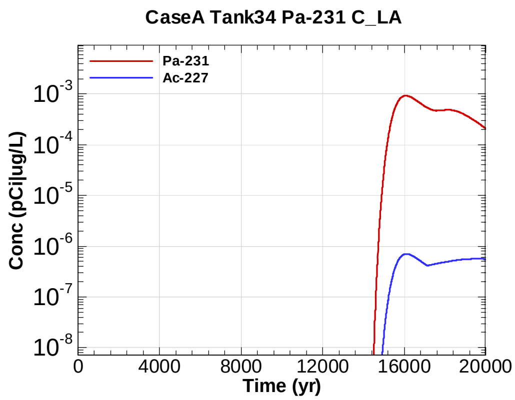

Figure E-1193 - 100m Aquifer Concentration for CaseA Tank34 Pa-231 C_LA

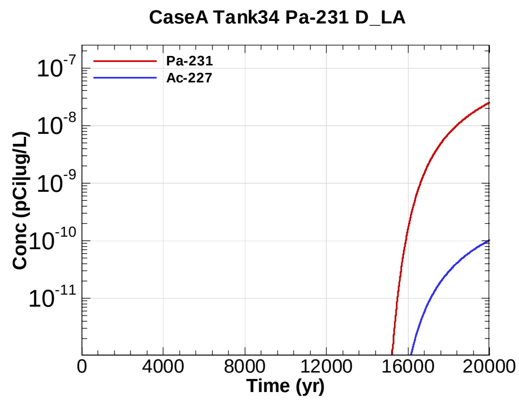

Figure E-1194 - 100m Aquifer Concentration for CaseA Tank34 Pa-231 D_LA

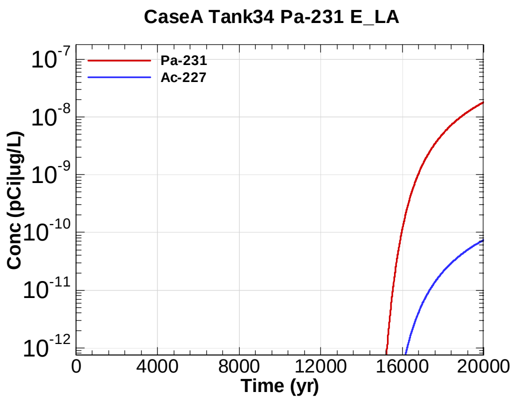

Figure E-1195 - 100m Aquifer Concentration for CaseA Tank34 Pa-231 E_LA

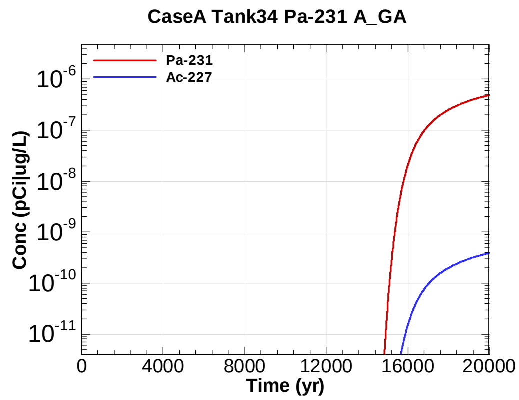

Figure E-1196 - 100m Aquifer Concentration for CaseA Tank34 Pa-231 A_GA

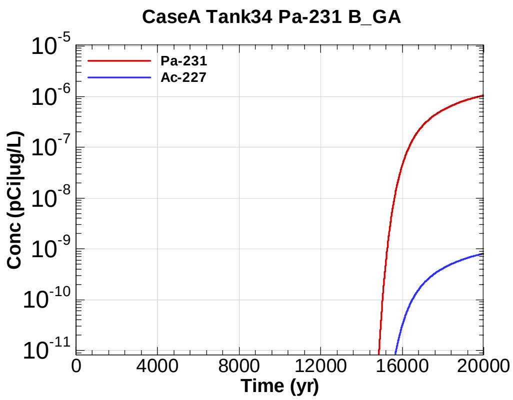

Figure E-1197 - 100m Aquifer Concentration for CaseA Tank34 Pa-231 B_GA

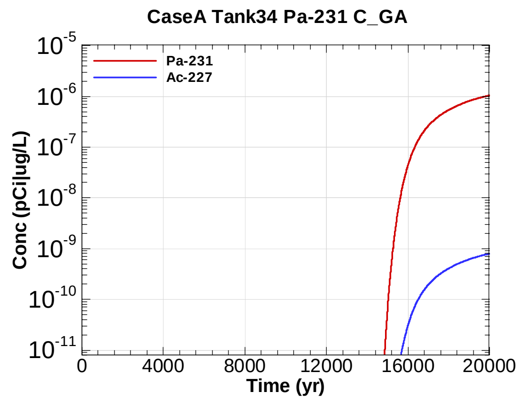

Figure E-1198 - 100m Aquifer Concentration for CaseA Tank34 Pa-231 C_GA

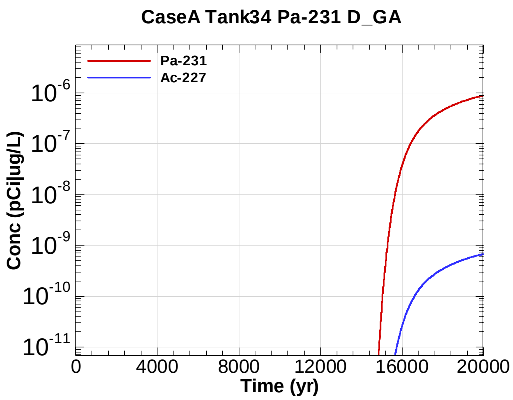

Figure E-1199 - 100m Aquifer Concentration for CaseA Tank34 Pa-231 D_GA

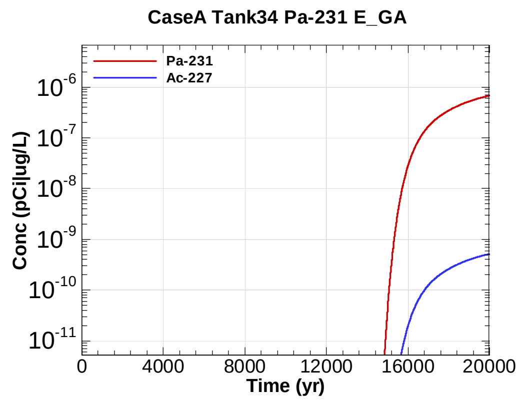

Figure E-1200 - 100m Aquifer Concentration for CaseA Tank34 Pa-231 E_GA

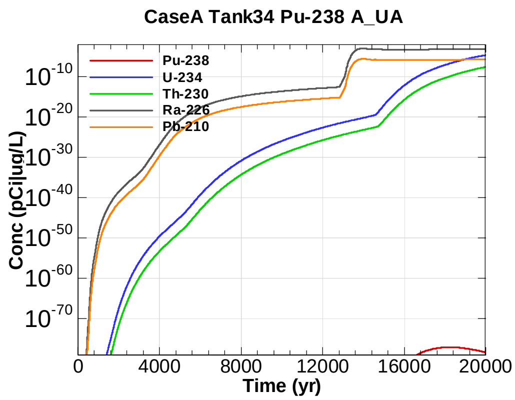

Figure E-1201 - 100m Aquifer Concentration for CaseA Tank34 Pu-238 A_UA

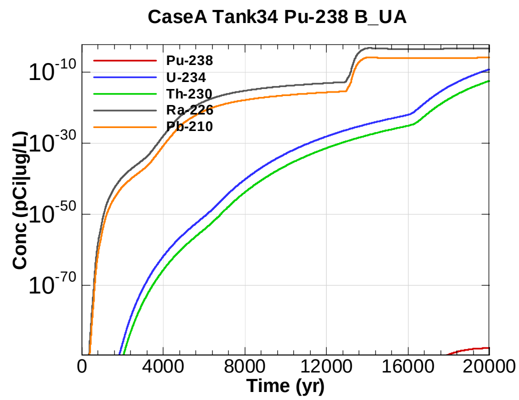

Figure E-1202 - 100m Aquifer Concentration for CaseA Tank34 Pu-238 B_UA

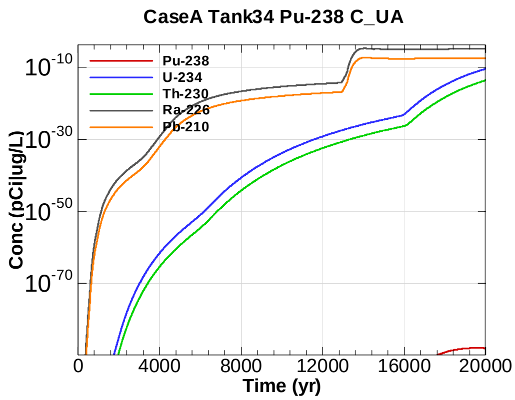

Figure E-1203 - 100m Aquifer Concentration for CaseA Tank34 Pu-238 C_UA

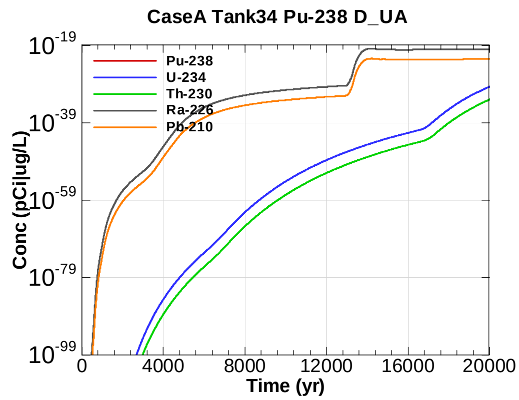

Figure E-1204 - 100m Aquifer Concentration for CaseA Tank34 Pu-238 D_UA

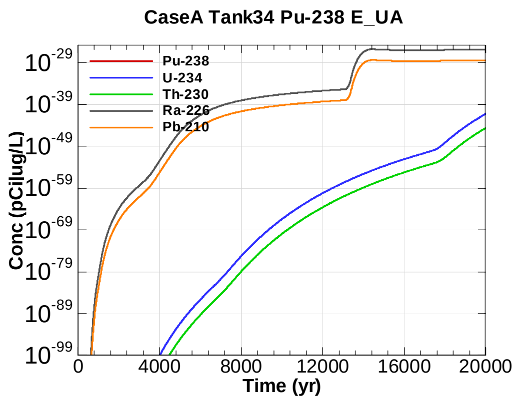

Figure E-1205 - 100m Aquifer Concentration for CaseA Tank34 Pu-238 E_UA

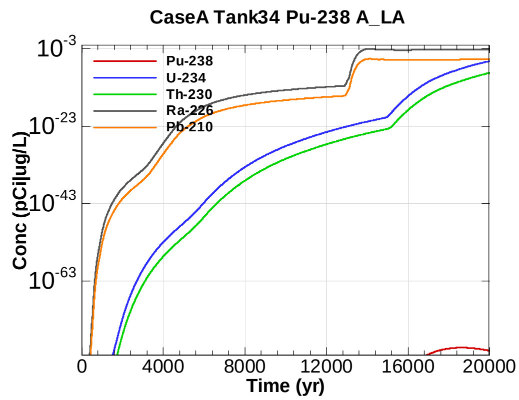

Figure E-1206 - 100m Aquifer Concentration for CaseA Tank34 Pu-238 A_LA

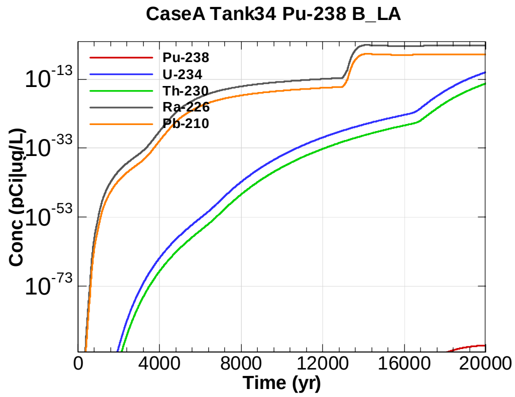

Figure E-1207 - 100m Aquifer Concentration for CaseA Tank34 Pu-238 B_LA

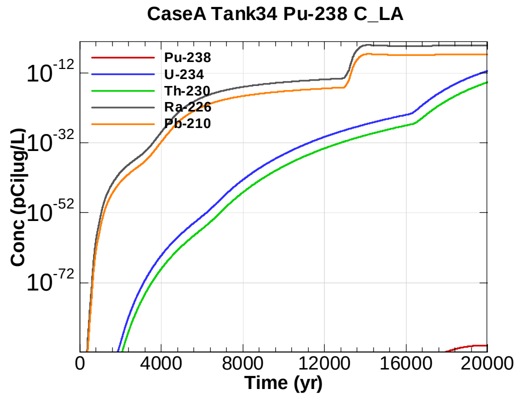

Figure E-1208 - 100m Aquifer Concentration for CaseA Tank34 Pu-238 C_LA

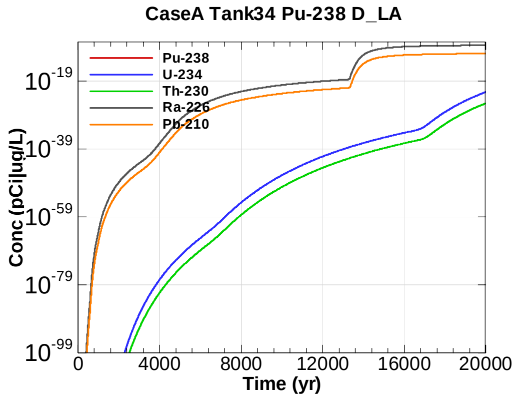

Figure E-1209 - 100m Aquifer Concentration for CaseA Tank34 Pu-238 D_LA

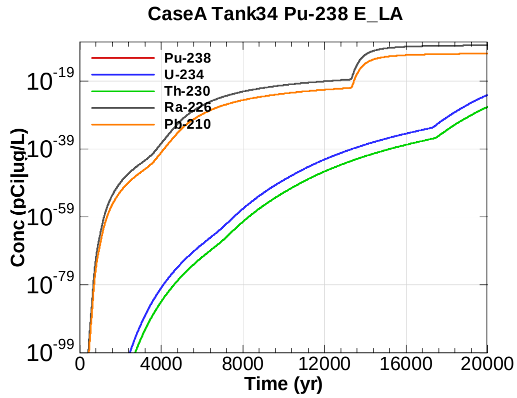

Figure E-1210 - 100m Aquifer Concentration for CaseA Tank34 Pu-238 E_LA

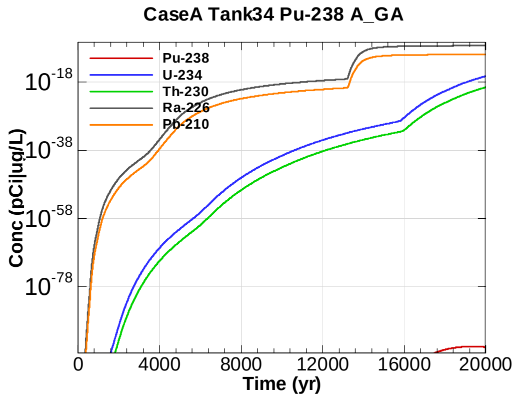

Figure E-1211 - 100m Aquifer Concentration for CaseA Tank34 Pu-238 A_GA

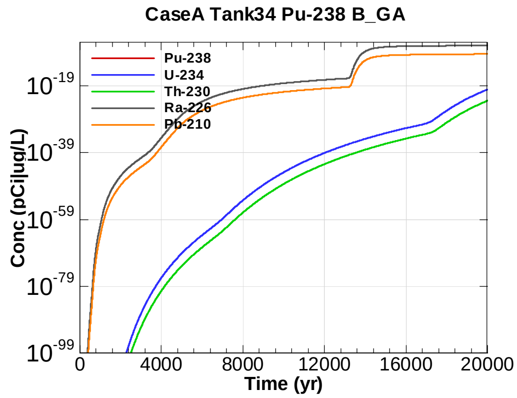

Figure E-1212 - 100m Aquifer Concentration for CaseA Tank34 Pu-238 B_GA

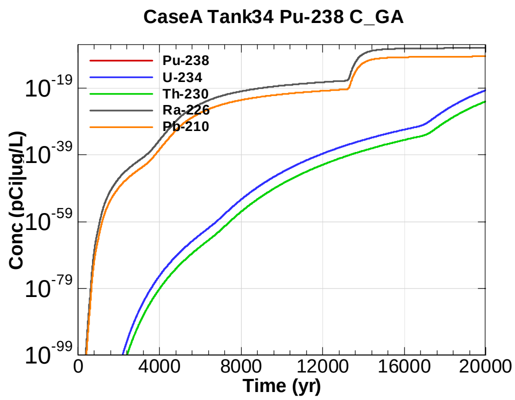

Figure E-1213 - 100m Aquifer Concentration for CaseA Tank34 Pu-238 C_GA

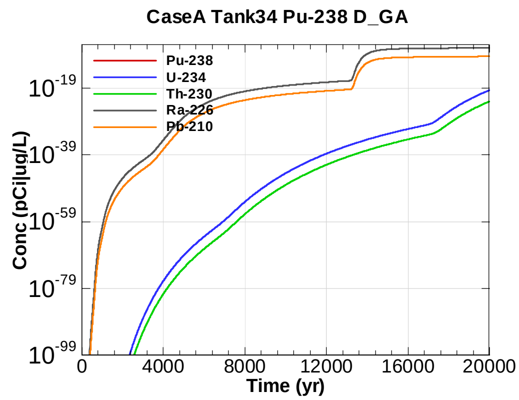

Figure E-1214 - 100m Aquifer Concentration for CaseA Tank34 Pu-238 D_GA

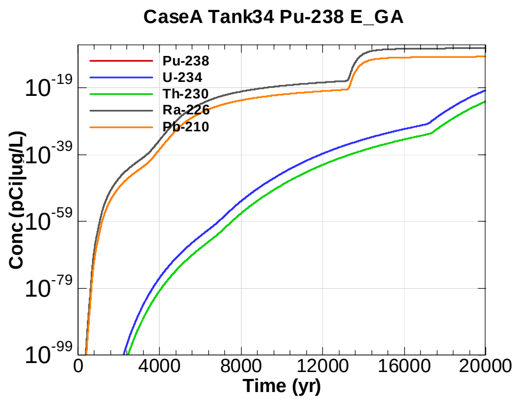

Figure E-1215 - 100m Aquifer Concentration for CaseA Tank34 Pu-238 E_GA

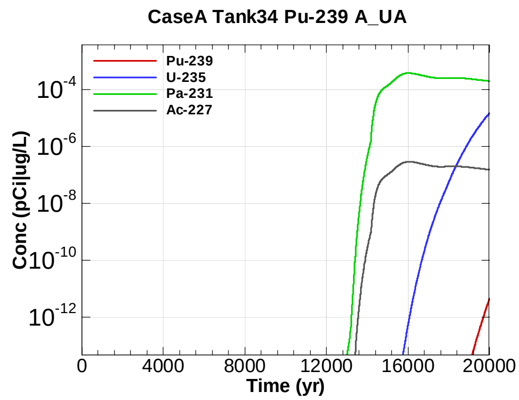

Figure E-1216 - 100m Aquifer Concentration for CaseA Tank34 Pu-239 A_UA

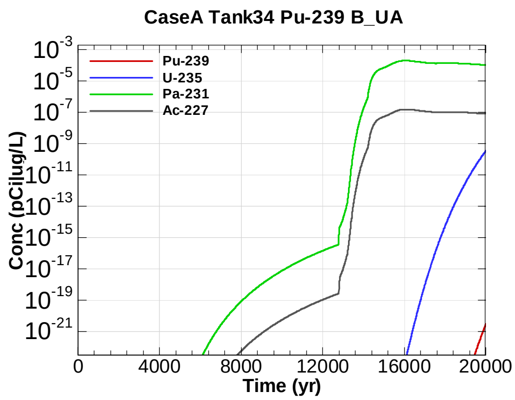

Figure E-1217 - 100m Aquifer Concentration for CaseA Tank34 Pu-239 B_UA

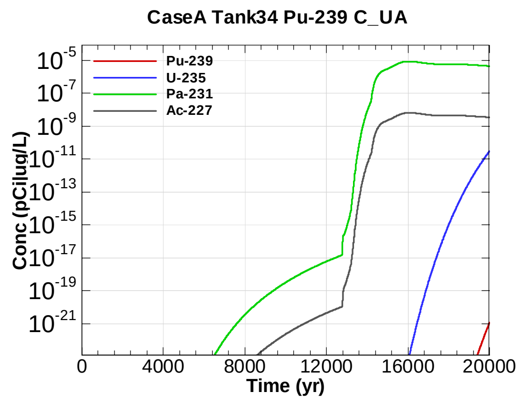

Figure E-1218 - 100m Aquifer Concentration for CaseA Tank34 Pu-239 C_UA

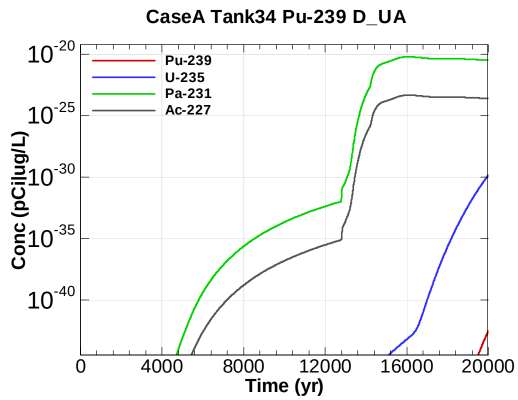

Figure E-1219 - 100m Aquifer Concentration for CaseA Tank34 Pu-239 D_UA

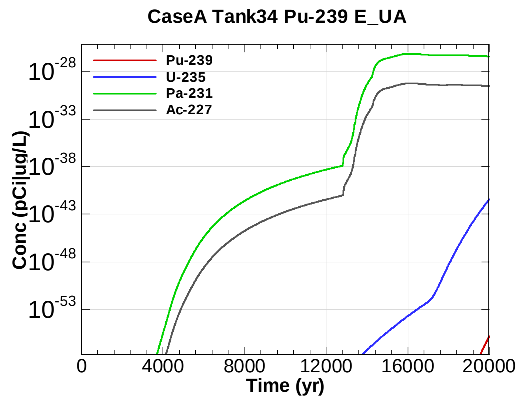

Figure E-1220 - 100m Aquifer Concentration for CaseA Tank34 Pu-239 E_UA

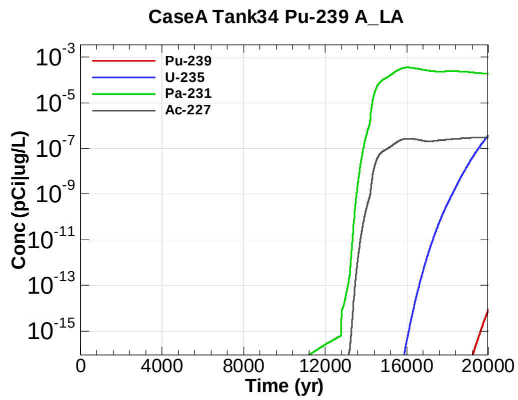

Figure E-1221 - 100m Aquifer Concentration for CaseA Tank34 Pu-239 A_LA

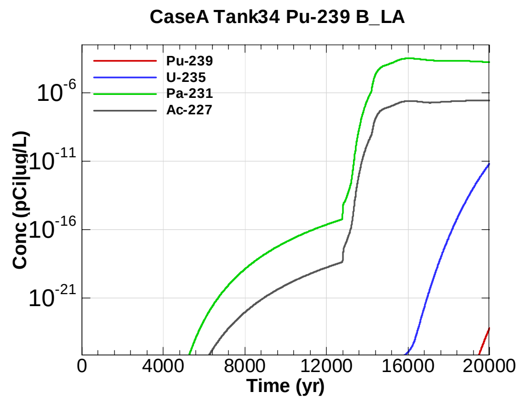

Figure E-1222 - 100m Aquifer Concentration for CaseA Tank34 Pu-239 B_LA

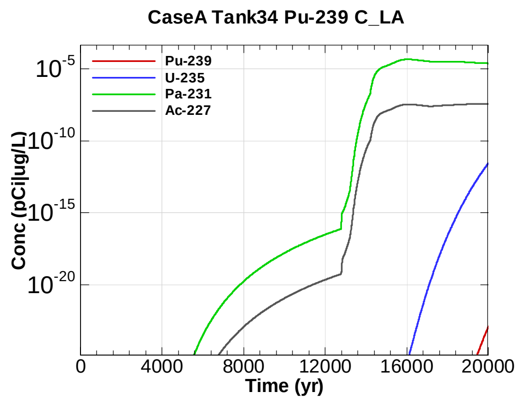

Figure E-1223 - 100m Aquifer Concentration for CaseA Tank34 Pu-239 C_LA

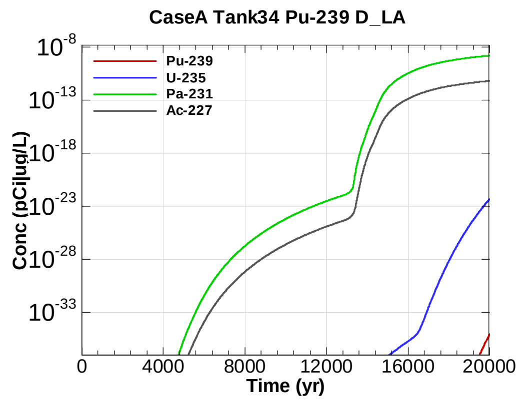

Figure E-1224 - 100m Aquifer Concentration for CaseA Tank34 Pu-239 D_LA

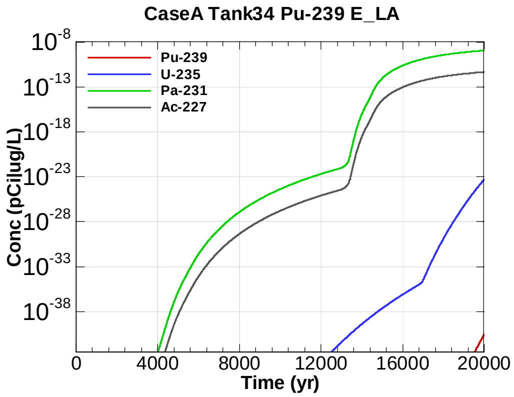

Figure E-1225 - 100m Aquifer Concentration for CaseA Tank34 Pu-239 E_LA

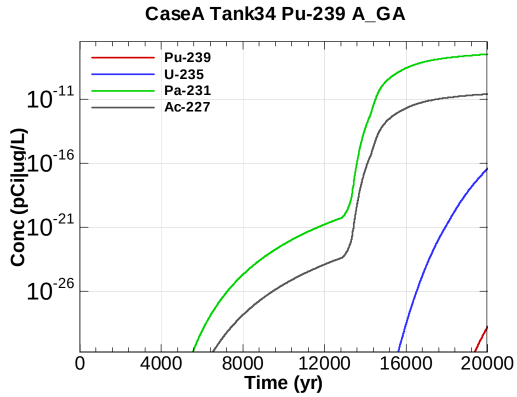

Figure E-1226 - 100m Aquifer Concentration for CaseA Tank34 Pu-239 A_GA

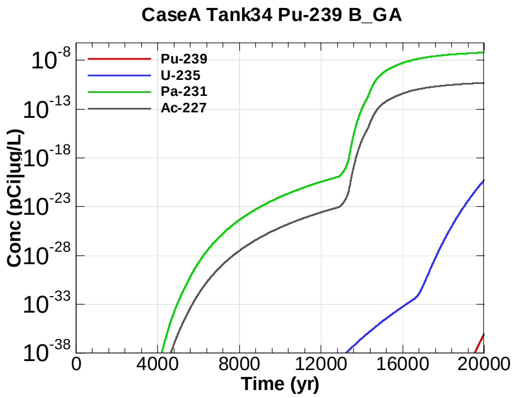

Figure E-1227 - 100m Aquifer Concentration for CaseA Tank34 Pu-239 B_GA

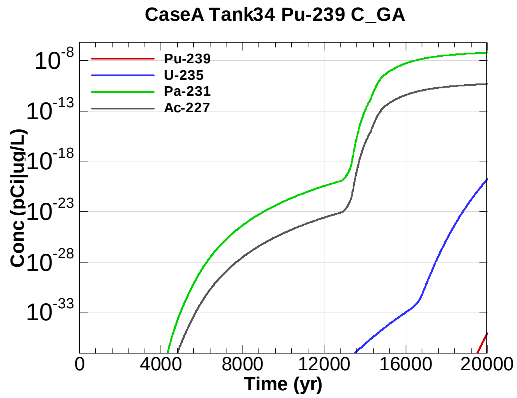

Figure E-1228 - 100m Aquifer Concentration for CaseA Tank34 Pu-239 C_GA

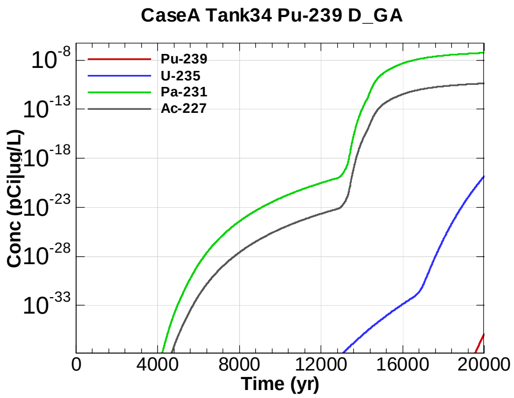

Figure E-1229 - 100m Aquifer Concentration for CaseA Tank34 Pu-239 D_GA

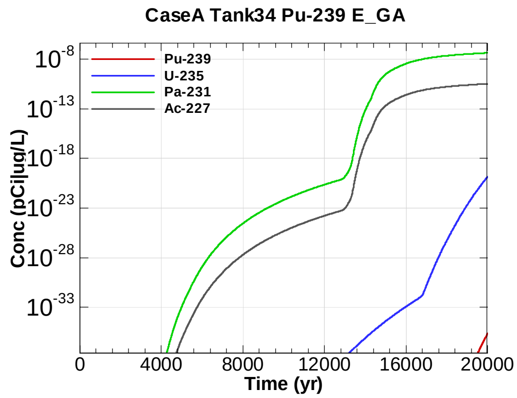

Figure E-1230 - 100m Aquifer Concentration for CaseA Tank34 Pu-239 E_GA

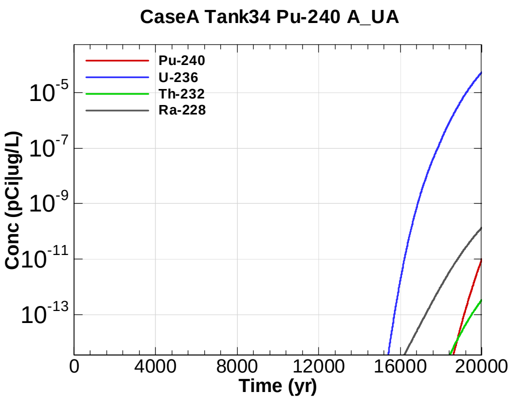

Figure E-1231 - 100m Aquifer Concentration for CaseA Tank34 Pu-240 A_UA

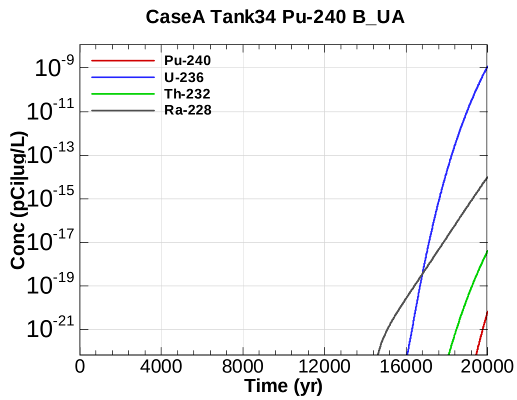

Figure E-1232 - 100m Aquifer Concentration for CaseA Tank34 Pu-240 B_UA

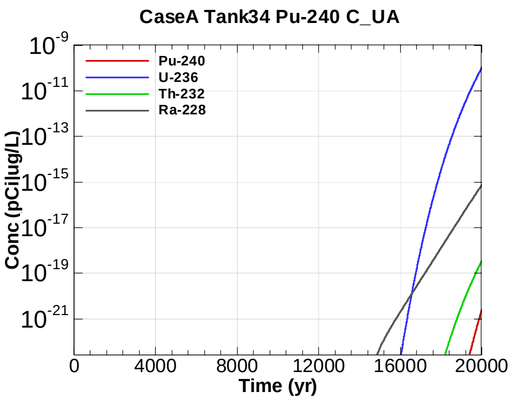

Figure E-1233 - 100m Aquifer Concentration for CaseA Tank34 Pu-240 C_UA

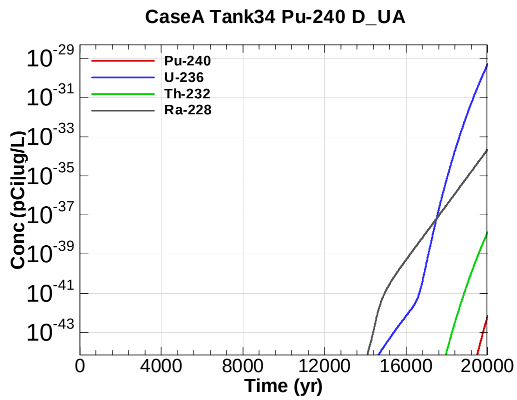

Figure E-1234 - 100m Aquifer Concentration for CaseA Tank34 Pu-240 D_UA

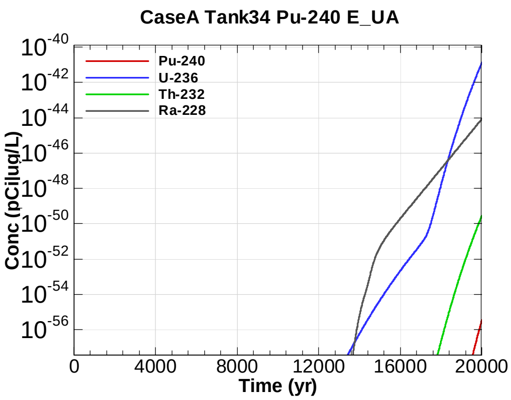

Figure E-1235 - 100m Aquifer Concentration for CaseA Tank34 Pu-240 E_UA

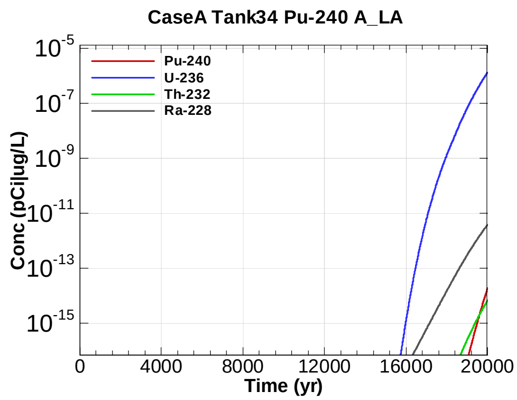

Figure E-1236 - 100m Aquifer Concentration for CaseA Tank34 Pu-240 A_LA

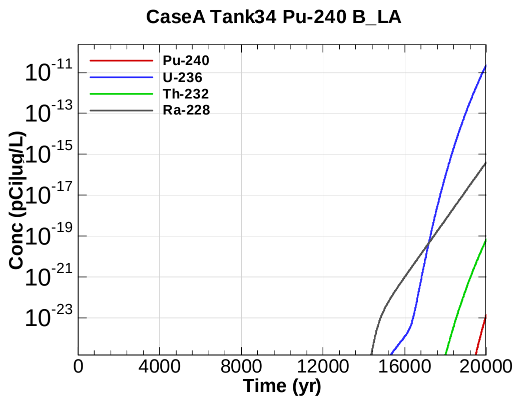

Figure E-1237 - 100m Aquifer Concentration for CaseA Tank34 Pu-240 B_LA

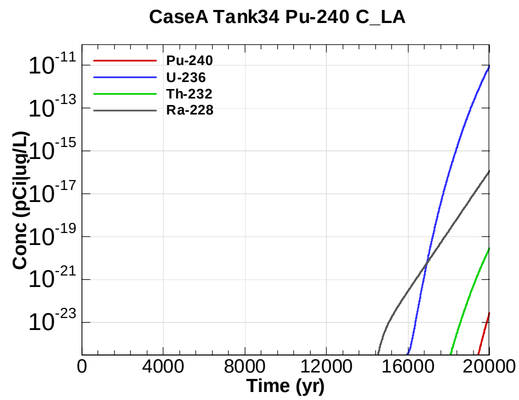

Figure E-1238 - 100m Aquifer Concentration for CaseA Tank34 Pu-240 C_LA

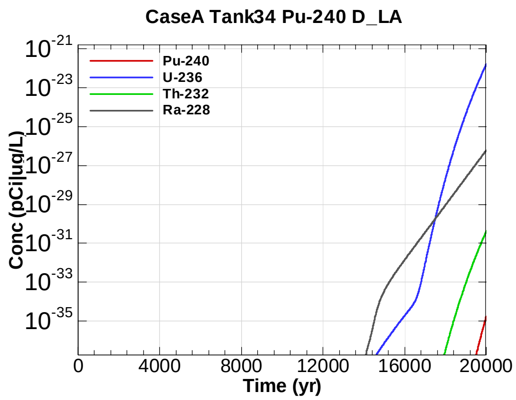

Figure E-1239 - 100m Aquifer Concentration for CaseA Tank34 Pu-240 D_LA

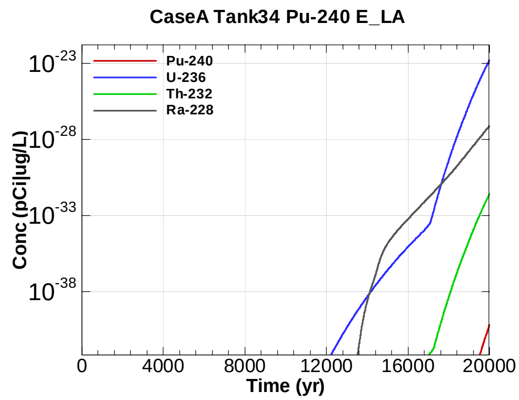

Figure E-1240 - 100m Aquifer Concentration for CaseA Tank34 Pu-240 E_LA

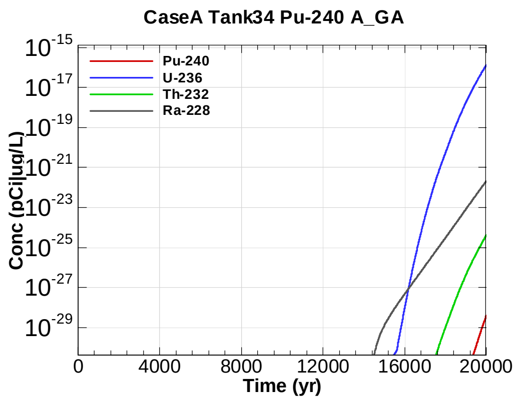

Figure E-1241 - 100m Aquifer Concentration for CaseA Tank34 Pu-240 A_GA

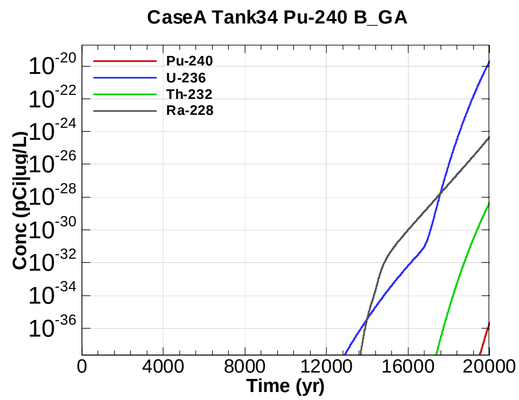

Figure E-1242 - 100m Aquifer Concentration for CaseA Tank34 Pu-240 B_GA

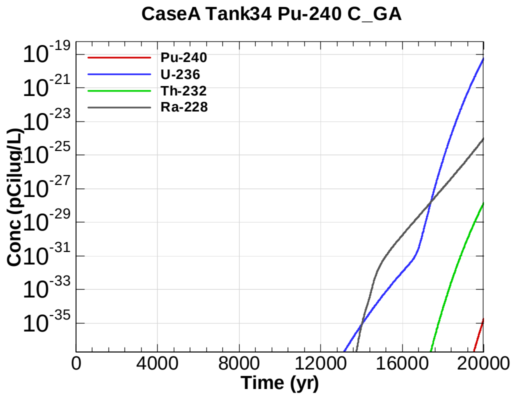

Figure E-1243 - 100m Aquifer Concentration for CaseA Tank34 Pu-240 C_GA

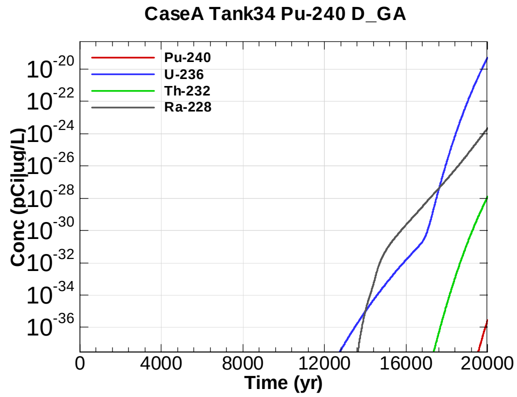

Figure E-1244 - 100m Aquifer Concentration for CaseA Tank34 Pu-240 D_GA

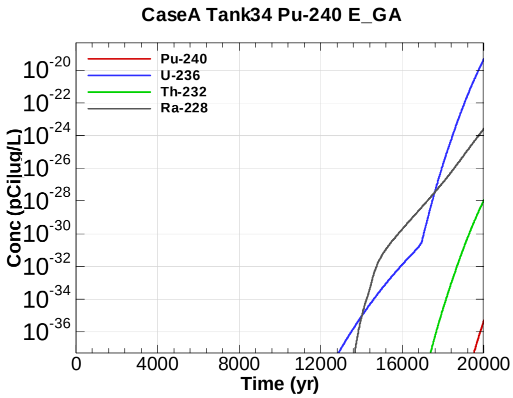

Figure E-1245 - 100m Aquifer Concentration for CaseA Tank34 Pu-240 E_GA

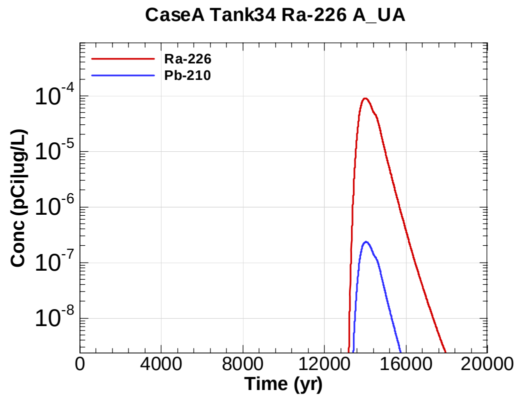

Figure E-1246 - 100m Aquifer Concentration for CaseA Tank34 Ra-226 A_UA

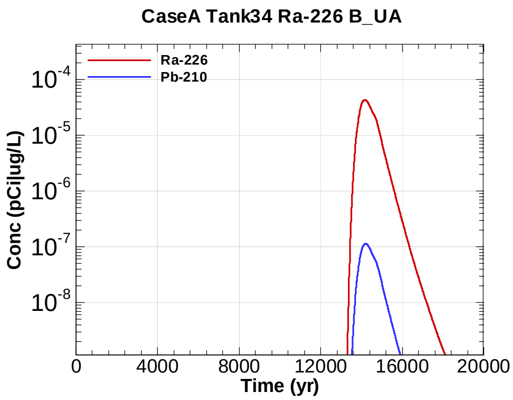

Figure E-1247 - 100m Aquifer Concentration for CaseA Tank34 Ra-226 B_UA

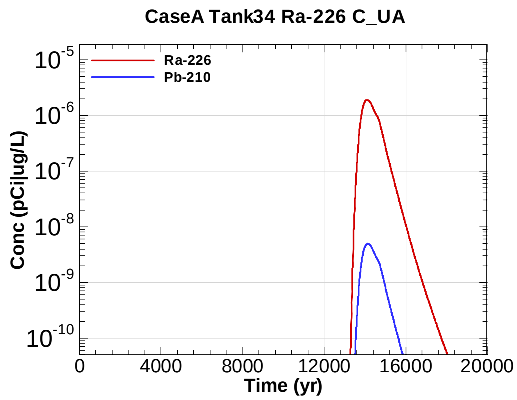

Figure E-1248 - 100m Aquifer Concentration for CaseA Tank34 Ra-226 C_UA

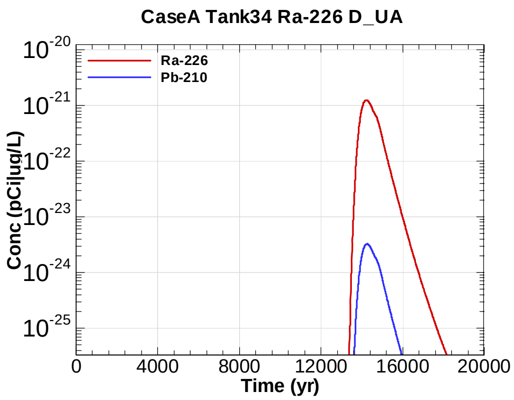

Figure E-1249 - 100m Aquifer Concentration for CaseA Tank34 Ra-226 D_UA

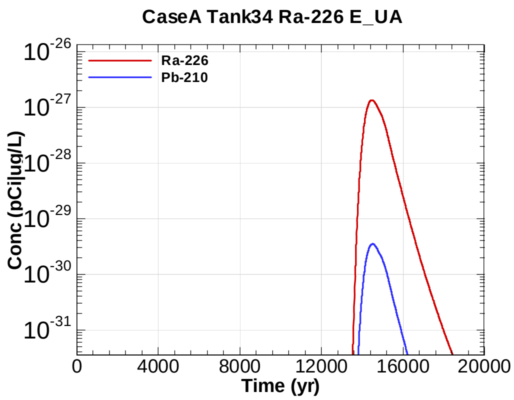

Figure E-1250 - 100m Aquifer Concentration for CaseA Tank34 Ra-226 E_UA

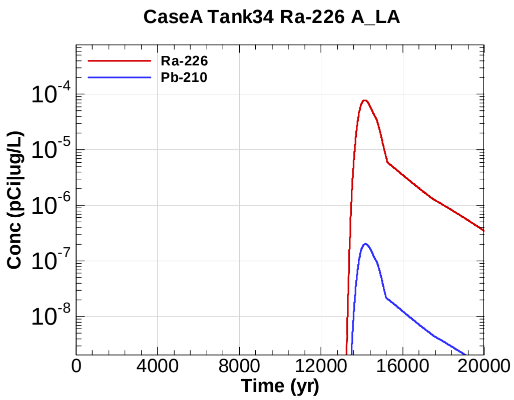

Figure E-1251 - 100m Aquifer Concentration for CaseA Tank34 Ra-226 A_LA

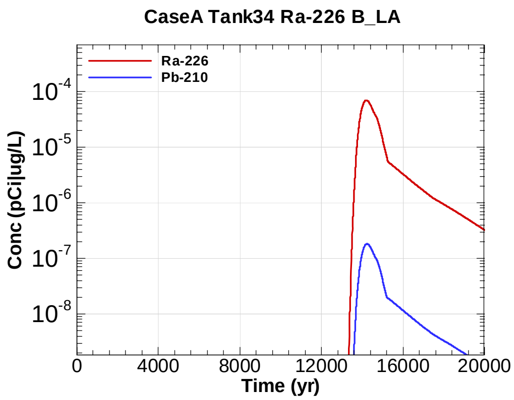

Figure E-1252 - 100m Aquifer Concentration for CaseA Tank34 Ra-226 B_LA

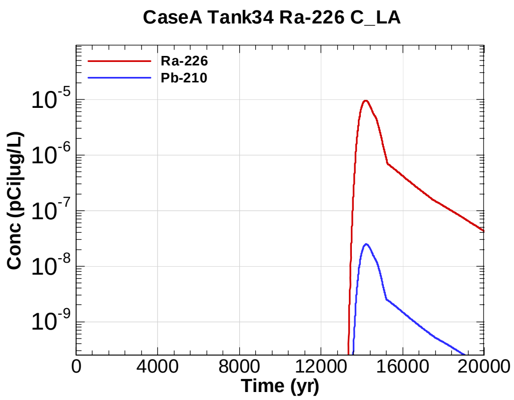

Figure E-1253 - 100m Aquifer Concentration for CaseA Tank34 Ra-226 C_LA

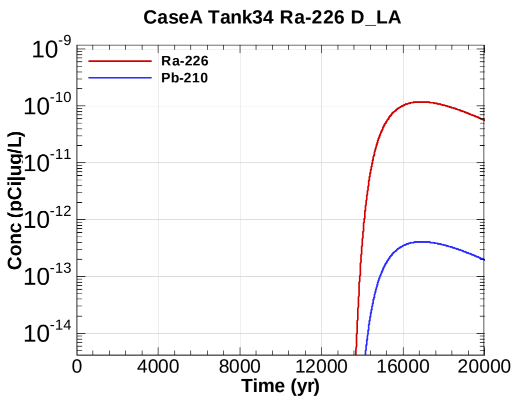

Figure E-1254 - 100m Aquifer Concentration for CaseA Tank34 Ra-226 D_LA

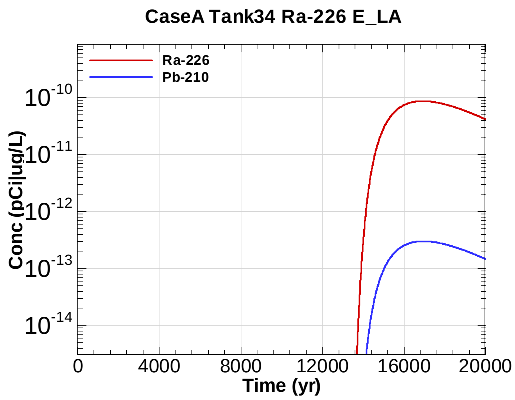

Figure E-1255 - 100m Aquifer Concentration for CaseA Tank34 Ra-226 E_LA

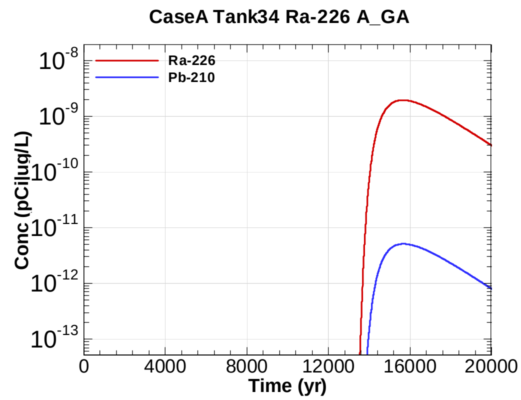

Figure E-1256 - 100m Aquifer Concentration for CaseA Tank34 Ra-226 A_GA

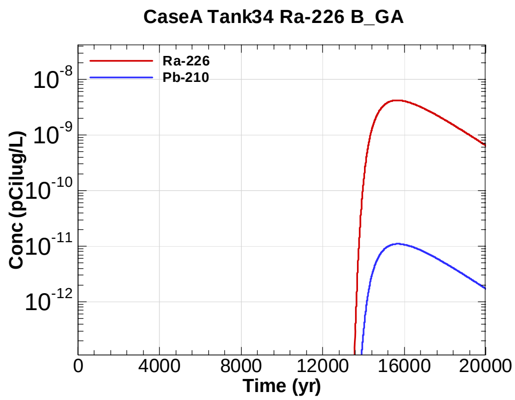

Figure E-1257 - 100m Aquifer Concentration for CaseA Tank34 Ra-226 B_GA

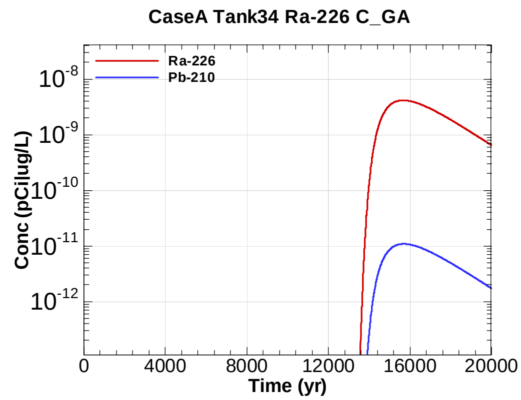

Figure E-1258 - 100m Aquifer Concentration for CaseA Tank34 Ra-226 C_GA

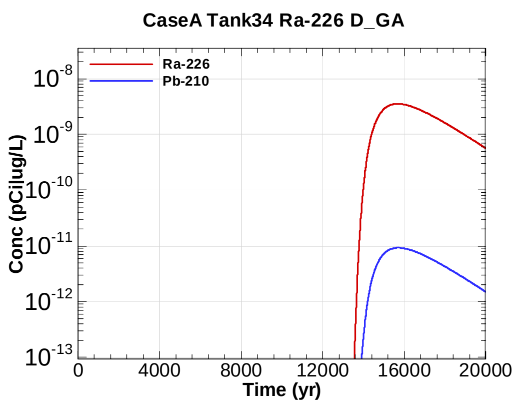

Figure E-1259 - 100m Aquifer Concentration for CaseA Tank34 Ra-226 D_GA

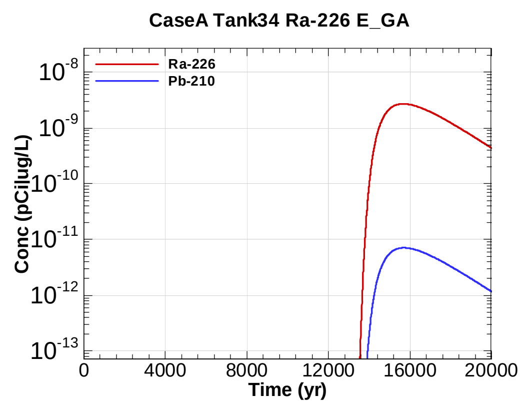

Figure E-1260 - 100m Aquifer Concentration for CaseA Tank34 Ra-226 E_GA

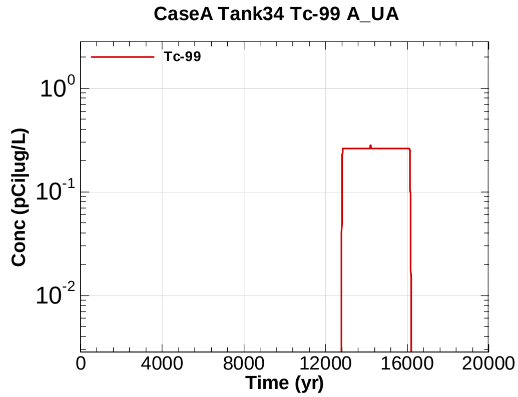

Figure E-1261 - 100m Aquifer Concentration for CaseA Tank34 Tc-99 A_UA

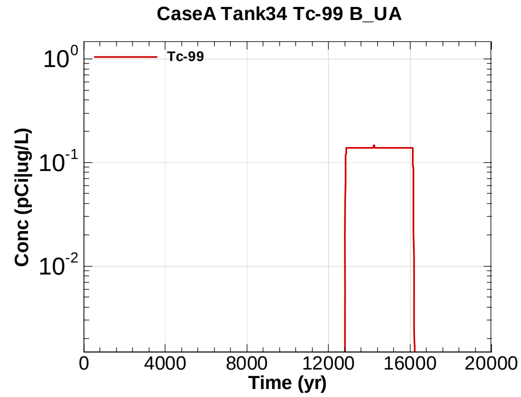

Figure E-1262 - 100m Aquifer Concentration for CaseA Tank34 Tc-99 B_UA

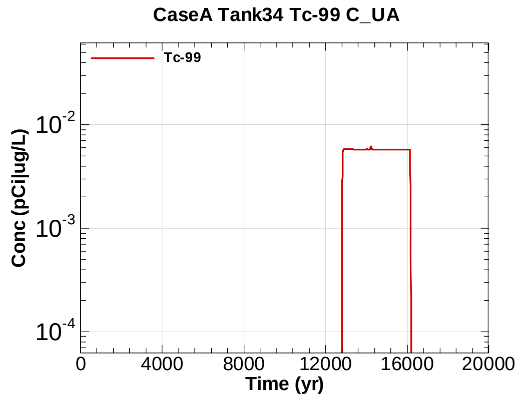

Figure E-1263 - 100m Aquifer Concentration for CaseA Tank34 Tc-99 C_UA

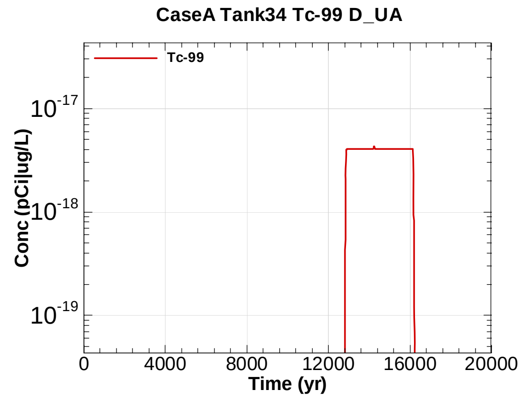

Figure E-1264 - 100m Aquifer Concentration for CaseA Tank34 Tc-99 D_UA

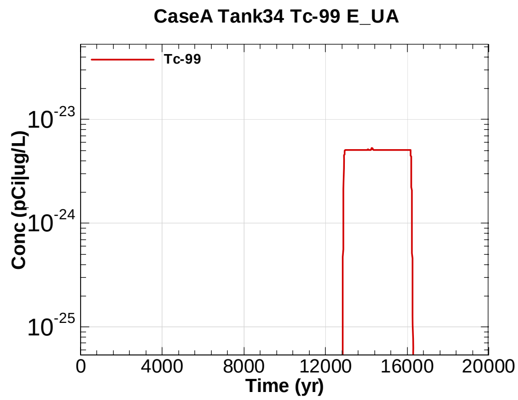

Figure E-1265 - 100m Aquifer Concentration for CaseA Tank34 Tc-99 E_UA

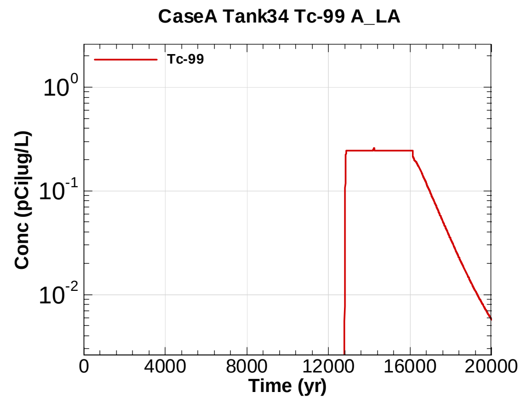

Figure E-1266 - 100m Aquifer Concentration for CaseA Tank34 Tc-99 A_LA

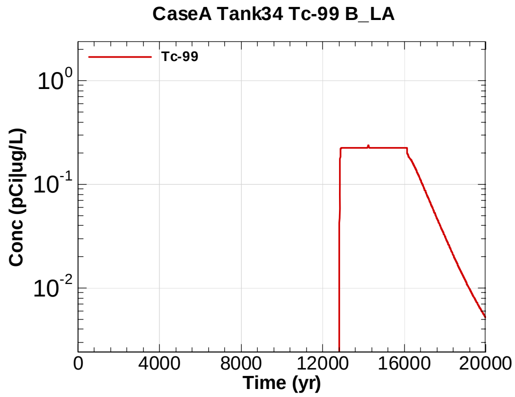

Figure E-1267 - 100m Aquifer Concentration for CaseA Tank34 Tc-99 B_LA

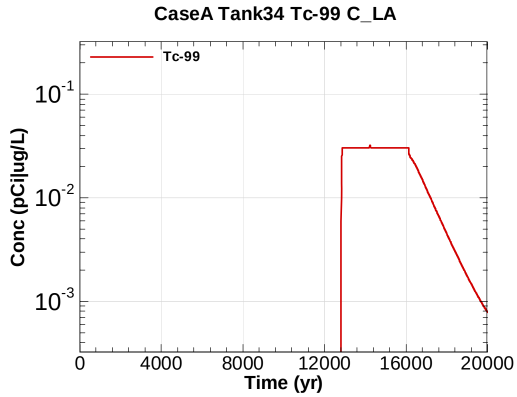

Figure E-1268 - 100m Aquifer Concentration for CaseA Tank34 Tc-99 C_LA

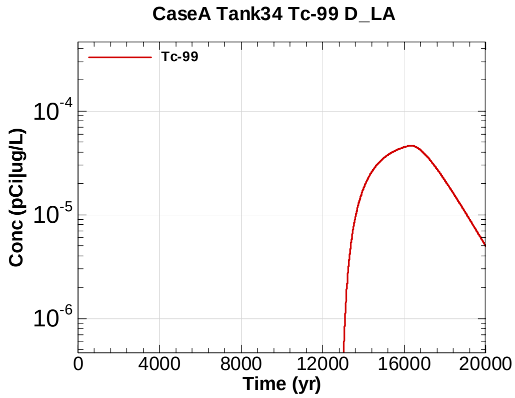

Figure E-1269 - 100m Aquifer Concentration for CaseA Tank34 Tc-99 D_LA

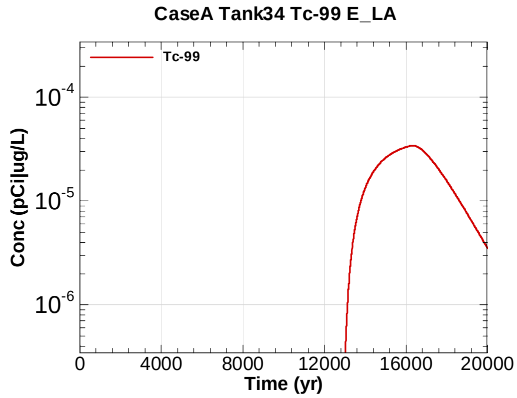

Figure E-1270 - 100m Aquifer Concentration for CaseA Tank34 Tc-99 E_LA

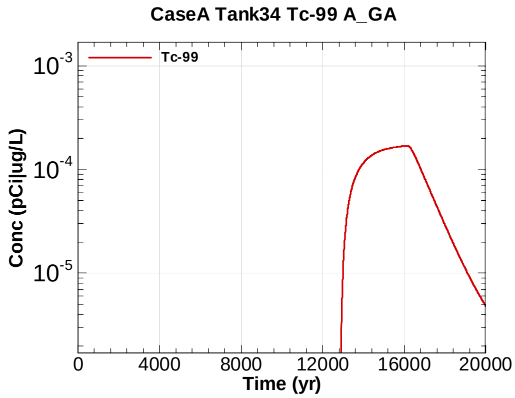

Figure E-1271 - 100m Aquifer Concentration for CaseA Tank34 Tc-99 A_GA

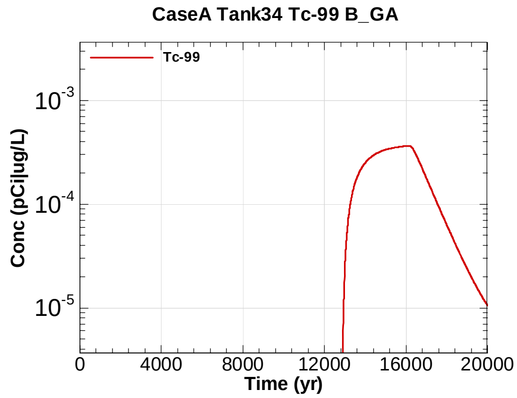

Figure E-1272 - 100m Aquifer Concentration for CaseA Tank34 Tc-99 B_GA

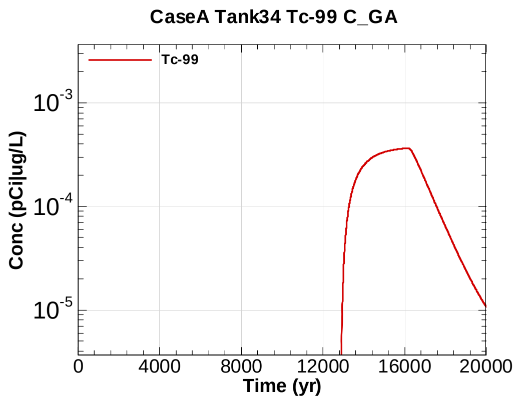

Figure E-1273 - 100m Aquifer Concentration for CaseA Tank34 Tc-99 C_GA

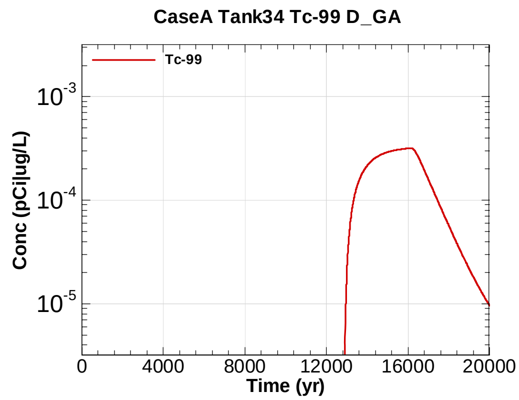

Figure E-1274 - 100m Aquifer Concentration for CaseA Tank34 Tc-99 D_GA

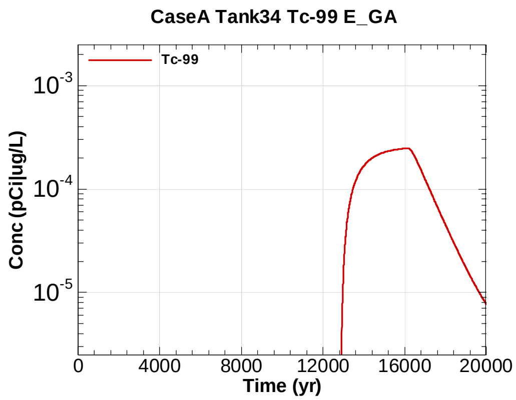

Figure E-1275 - 100m Aquifer Concentration for CaseA Tank34 Tc-99 E_GA

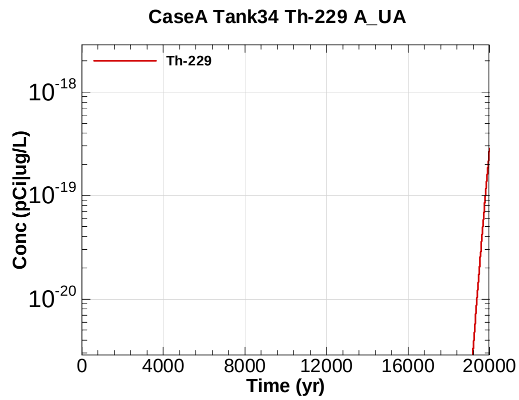

Figure E-1276 - 100m Aquifer Concentration for CaseA Tank34 Th-229 A_UA

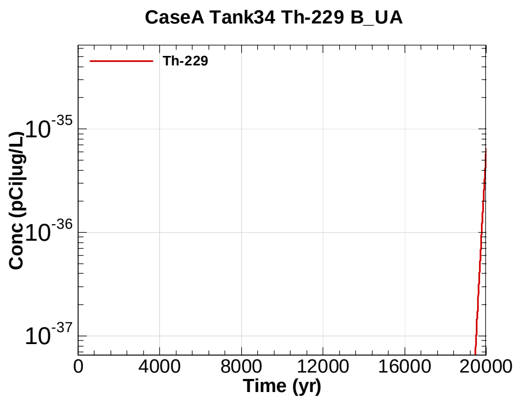

Figure E-1277 - 100m Aquifer Concentration for CaseA Tank34 Th-229 B_UA

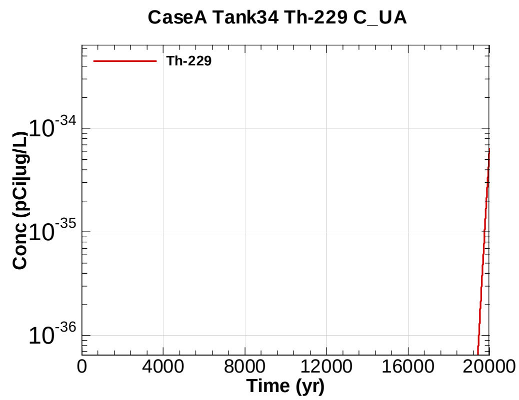

Figure E-1278 - 100m Aquifer Concentration for CaseA Tank34 Th-229 C_UA

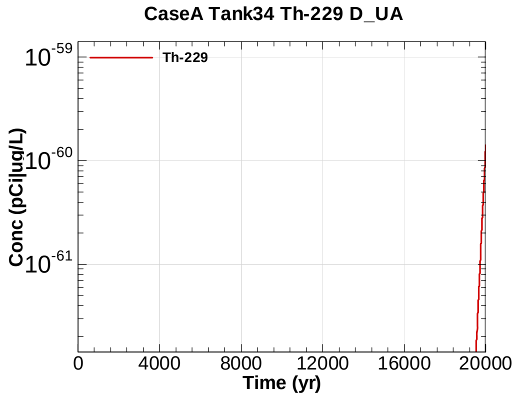

Figure E-1279 - 100m Aquifer Concentration for CaseA Tank34 Th-229 D_UA

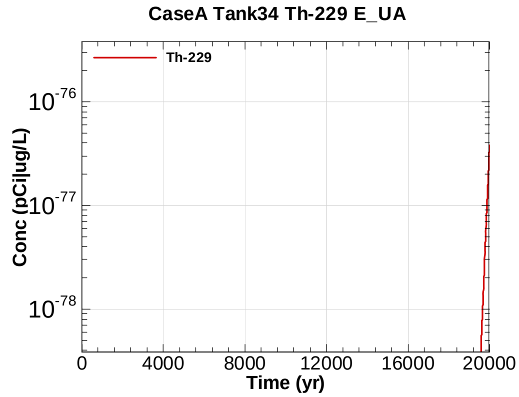

Figure E-1280 - 100m Aquifer Concentration for CaseA Tank34 Th-229 E_UA

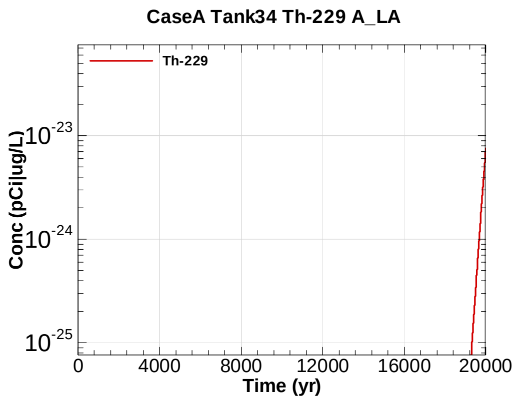

Figure E-1281 - 100m Aquifer Concentration for CaseA Tank34 Th-229 A_LA

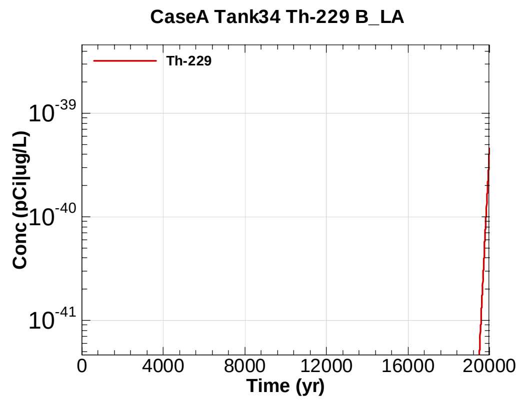

Figure E-1282 - 100m Aquifer Concentration for CaseA Tank34 Th-229 B_LA

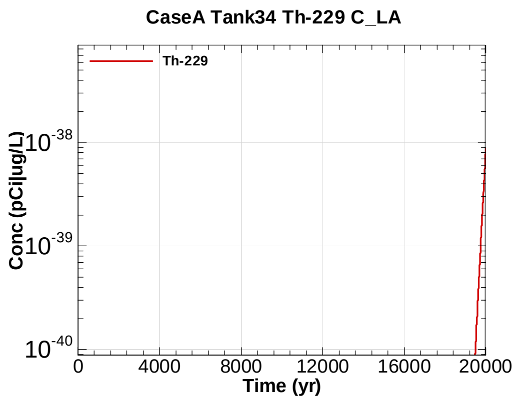

Figure E-1283 - 100m Aquifer Concentration for CaseA Tank34 Th-229 C_LA

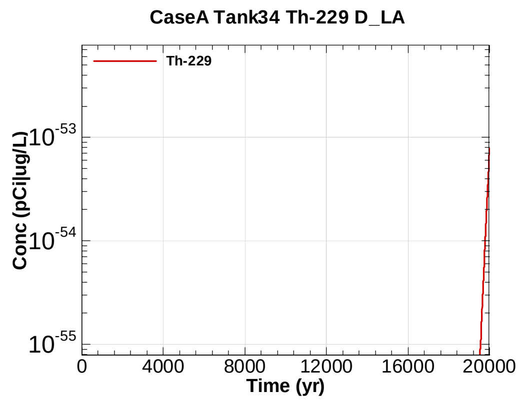

Figure E-1284 - 100m Aquifer Concentration for CaseA Tank34 Th-229 D_LA

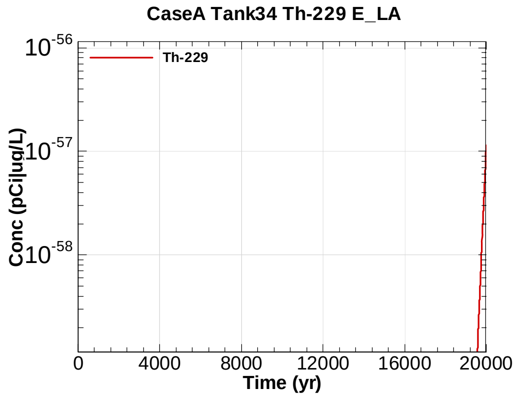

Figure E-1285 - 100m Aquifer Concentration for CaseA Tank34 Th-229 E_LA

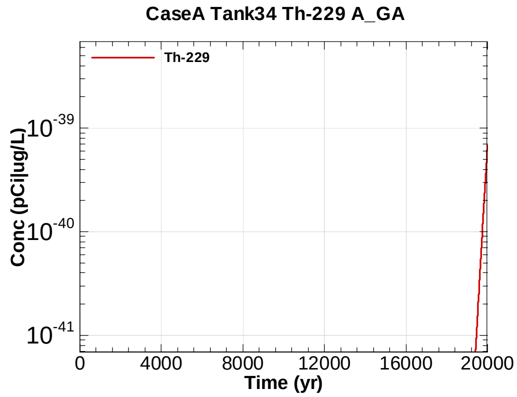

Figure E-1286 - 100m Aquifer Concentration for CaseA Tank34 Th-229 A_GA

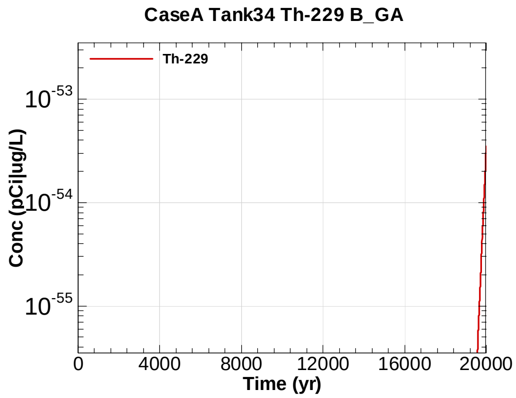

Figure E-1287 - 100m Aquifer Concentration for CaseA Tank34 Th-229 B_GA

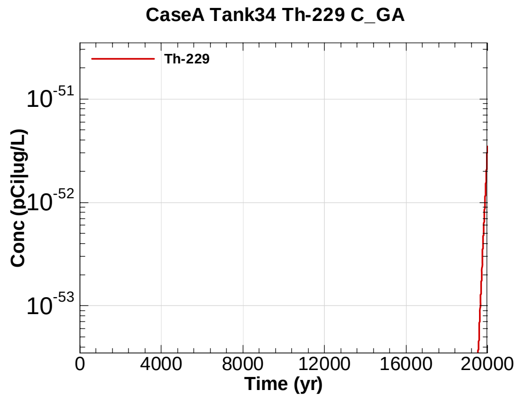

Figure E-1288 - 100m Aquifer Concentration for CaseA Tank34 Th-229 C_GA

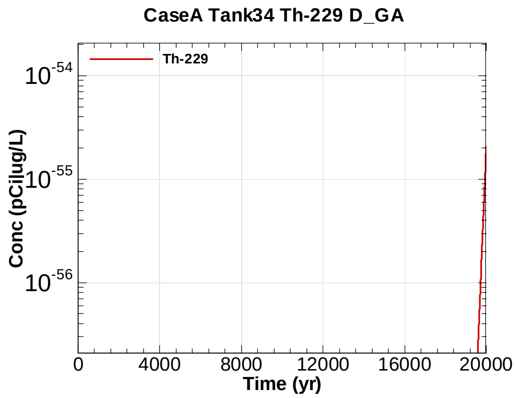

Figure E-1289 - 100m Aquifer Concentration for CaseA Tank34 Th-229 D_GA

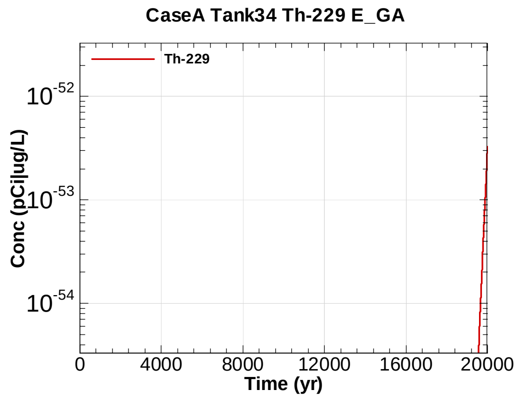

Figure E-1290 - 100m Aquifer Concentration for CaseA Tank34 Th-229 E_GA

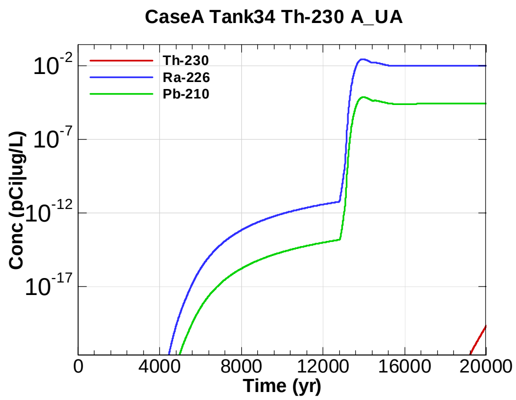

Figure E-1291 - 100m Aquifer Concentration for CaseA Tank34 Th-230 A_UA

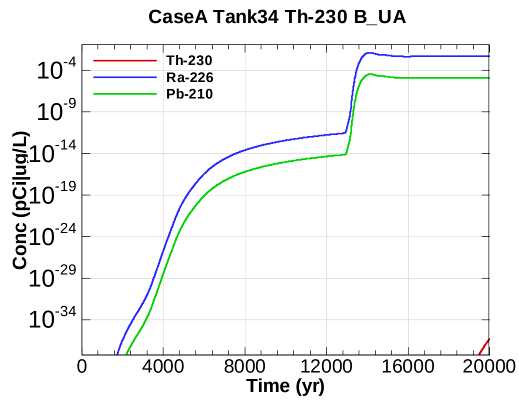

Figure E-1292 - 100m Aquifer Concentration for CaseA Tank34 Th-230 B_UA

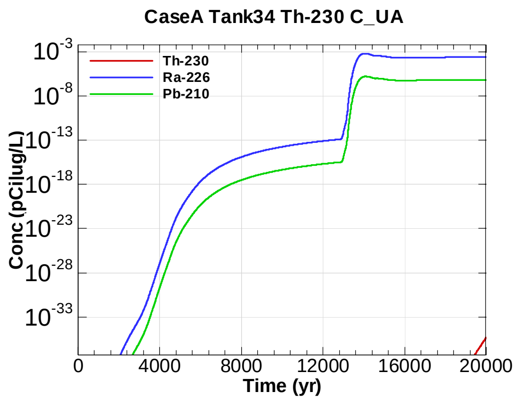

Figure E-1293 - 100m Aquifer Concentration for CaseA Tank34 Th-230 C_UA

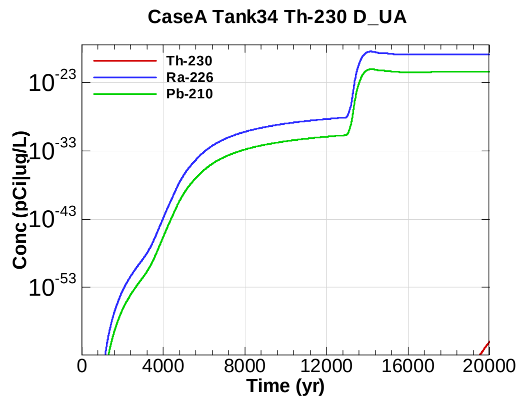

Figure E-1294 - 100m Aquifer Concentration for CaseA Tank34 Th-230 D_UA

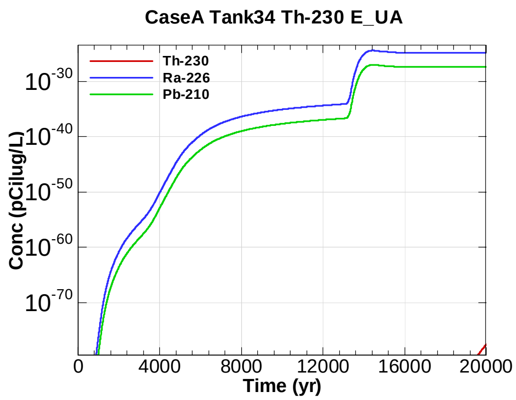

Figure E-1295 - 100m Aquifer Concentration for CaseA Tank34 Th-230 E_UA

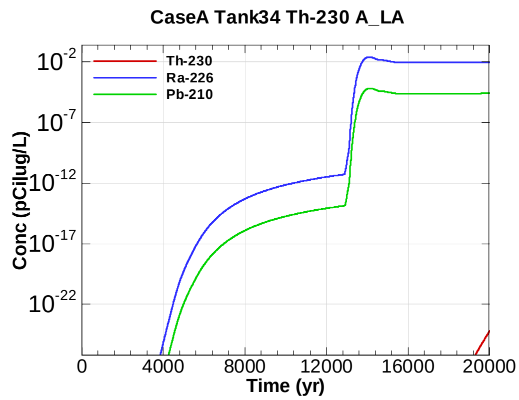

Figure E-1296 - 100m Aquifer Concentration for CaseA Tank34 Th-230 A_LA

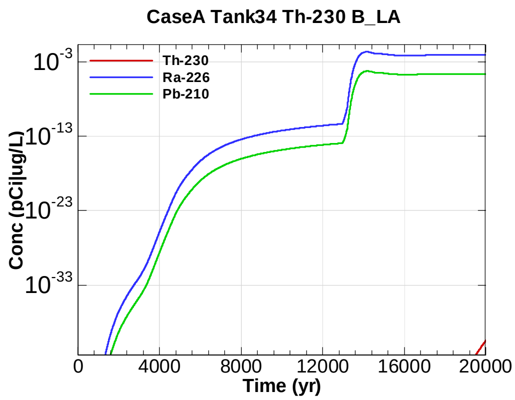

Figure E-1297 - 100m Aquifer Concentration for CaseA Tank34 Th-230 B_LA

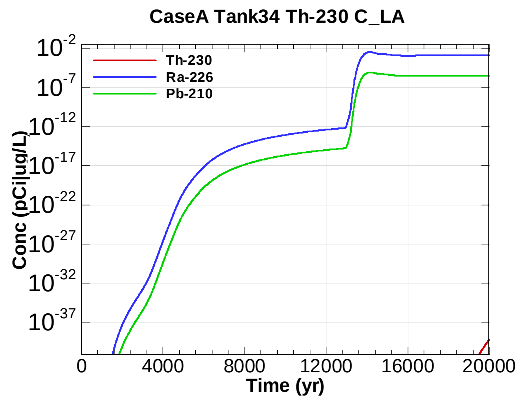

Figure E-1298 - 100m Aquifer Concentration for CaseA Tank34 Th-230 C_LA

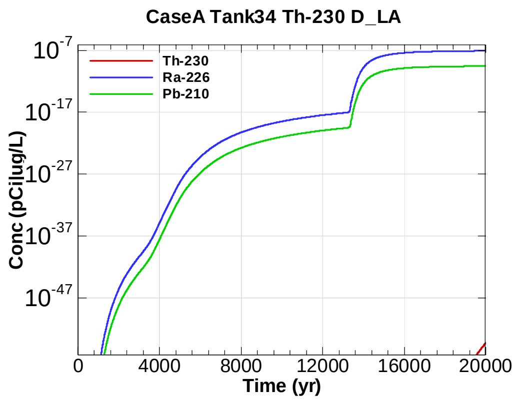

Figure E-1299 - 100m Aquifer Concentration for CaseA Tank34 Th-230 D_LA

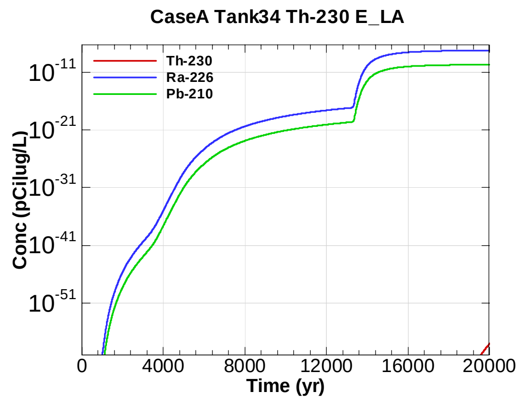

Figure E-1300 - 100m Aquifer Concentration for CaseA Tank34 Th-230 E_LA

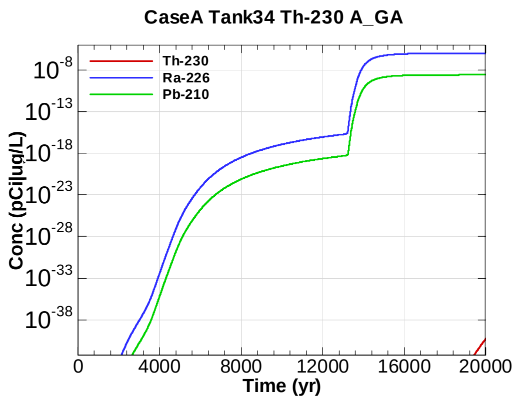

Figure E-1301 - 100m Aquifer Concentration for CaseA Tank34 Th-230 A_GA

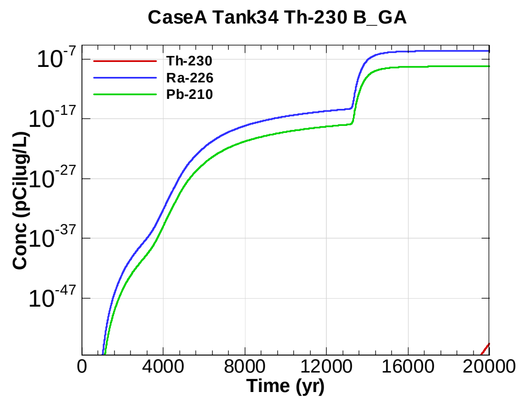

Figure E-1302 - 100m Aquifer Concentration for CaseA Tank34 Th-230 B_GA

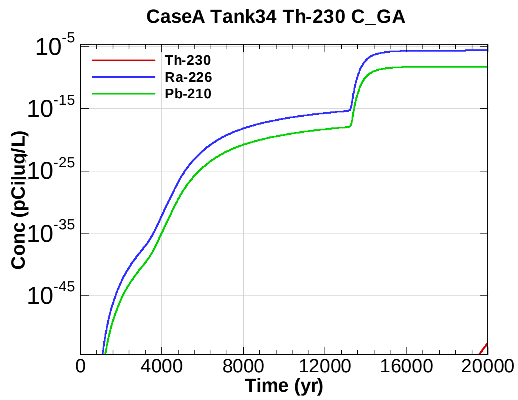

Figure E-1303 - 100m Aquifer Concentration for CaseA Tank34 Th-230 C_GA

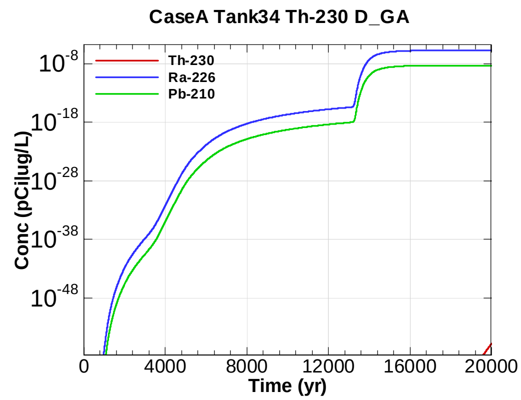

Figure E-1304 - 100m Aquifer Concentration for CaseA Tank34 Th-230 D_GA

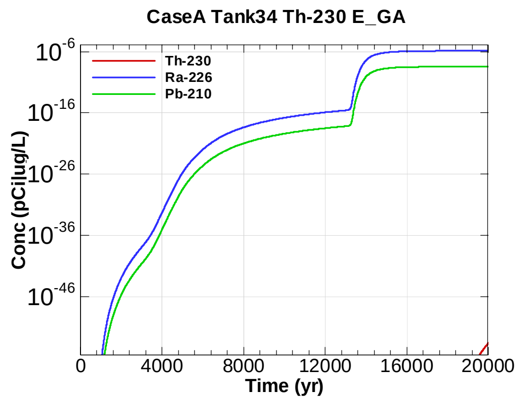

Figure E-1305 - 100m Aquifer Concentration for CaseA Tank34 Th-230 E_GA

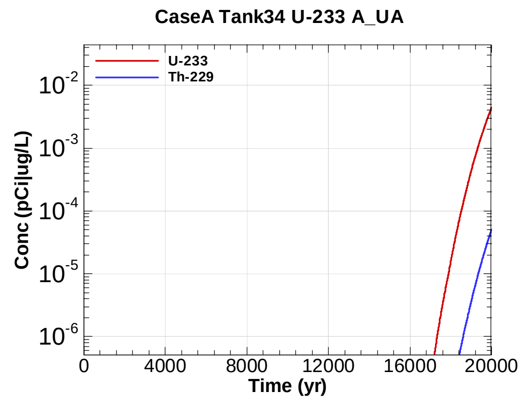

Figure E-1306 - 100m Aquifer Concentration for CaseA Tank34 U-233 A_UA

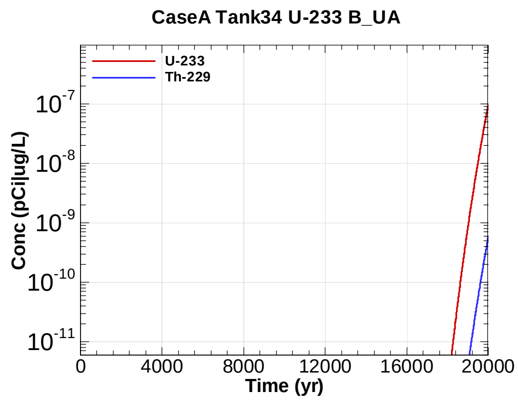

Figure E-1307 - 100m Aquifer Concentration for CaseA Tank34 U-233 B_UA

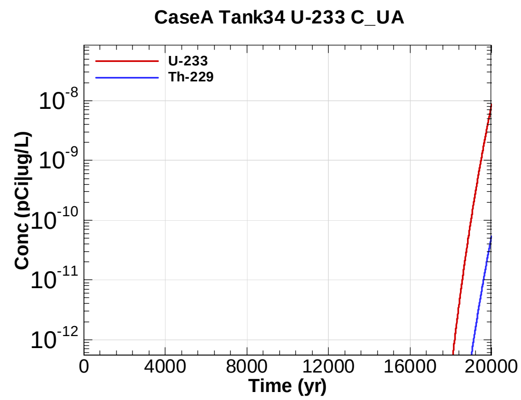

Figure E-1308 - 100m Aquifer Concentration for CaseA Tank34 U-233 C_UA

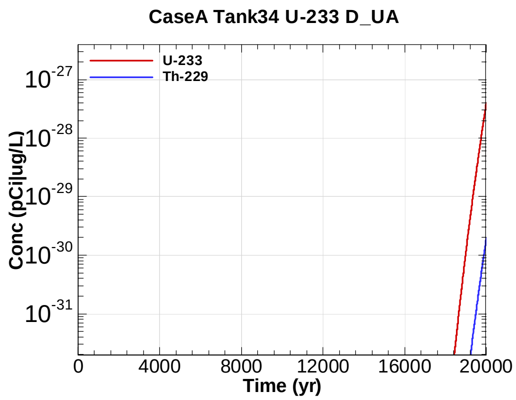

Figure E-1309 - 100m Aquifer Concentration for CaseA Tank34 U-233 D_UA

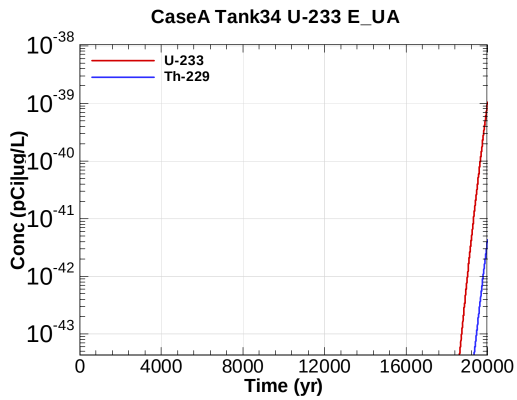

Figure E-1310 - 100m Aquifer Concentration for CaseA Tank34 U-233 E_UA

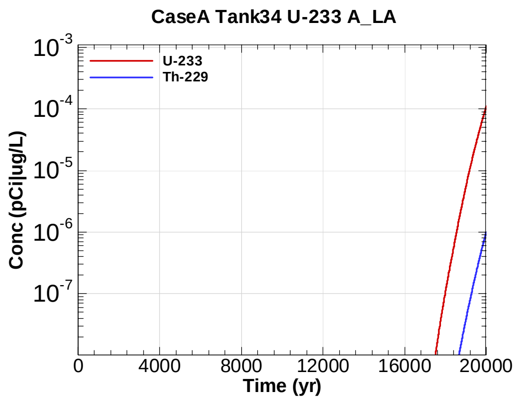

Figure E-1311 - 100m Aquifer Concentration for CaseA Tank34 U-233 A_LA

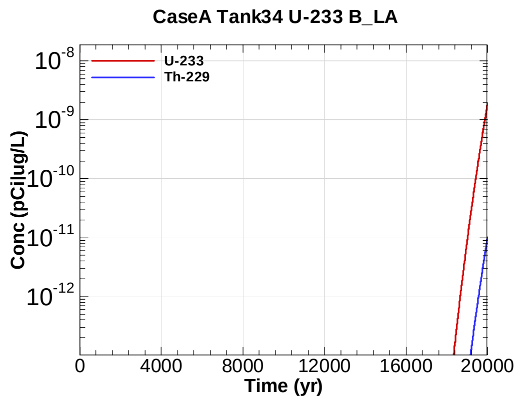

Figure E-1312 - 100m Aquifer Concentration for CaseA Tank34 U-233 B_LA

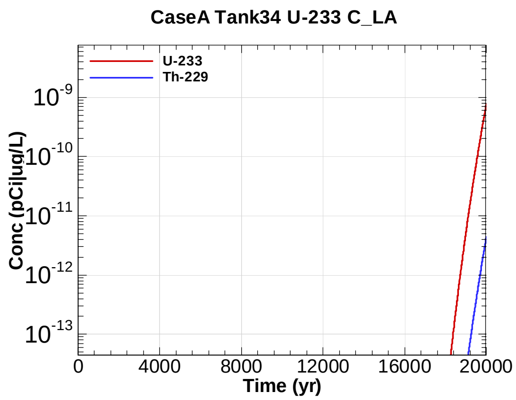

Figure E-1313 - 100m Aquifer Concentration for CaseA Tank34 U-233 C_LA

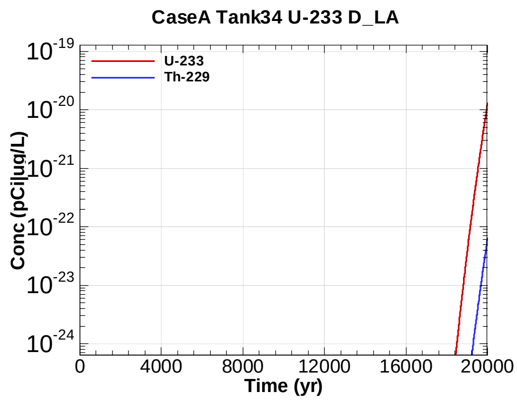

Figure E-1314 - 100m Aquifer Concentration for CaseA Tank34 U-233 D_LA

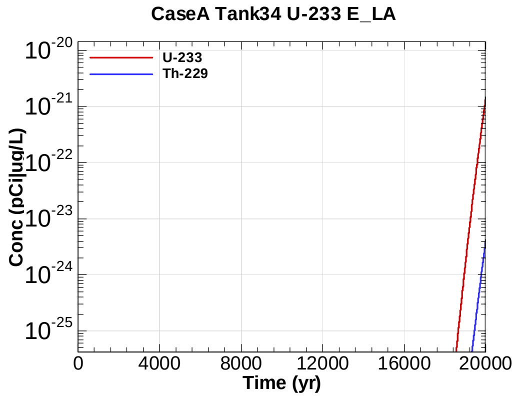

Figure E-1315 - 100m Aquifer Concentration for CaseA Tank34 U-233 E_LA

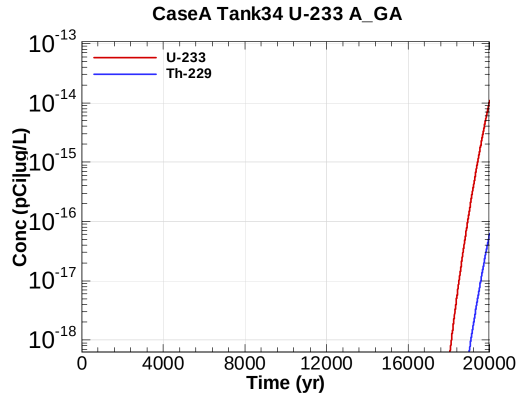

Figure E-1316 - 100m Aquifer Concentration for CaseA Tank34 U-233 A_GA

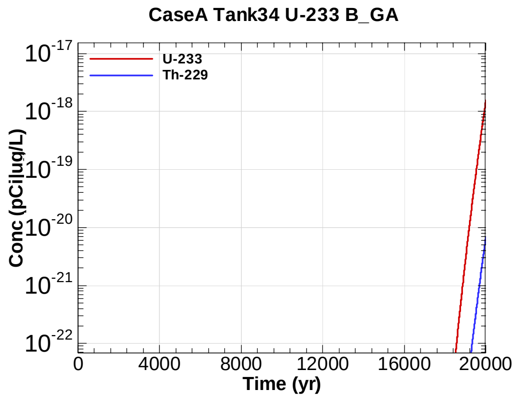

Figure E-1317 - 100m Aquifer Concentration for CaseA Tank34 U-233 B_GA

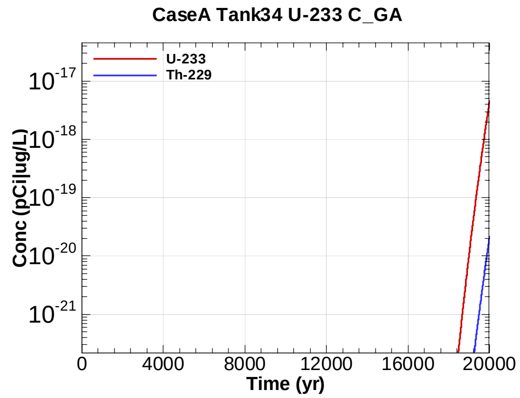

Figure E-1318 - 100m Aquifer Concentration for CaseA Tank34 U-233 C_GA

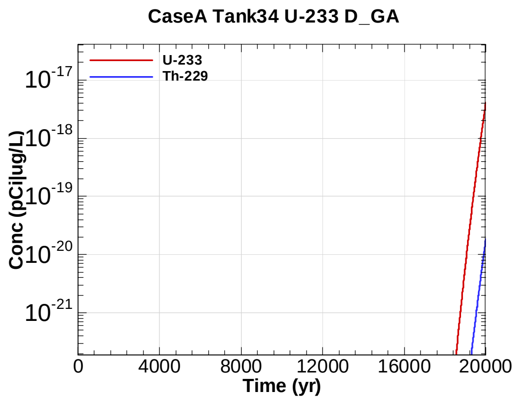

Figure E-1319 - 100m Aquifer Concentration for CaseA Tank34 U-233 D_GA

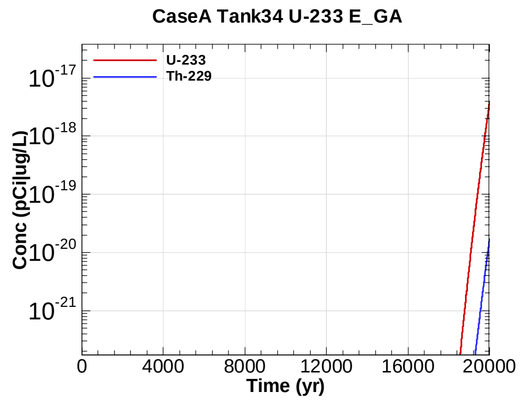

Figure E-1320 - 100m Aquifer Concentration for CaseA Tank34 U-233 E_GA

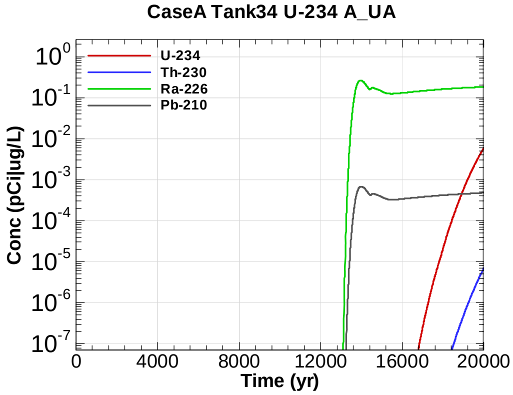

Figure E-1321 - 100m Aquifer Concentration for CaseA Tank34 U-234 A_UA

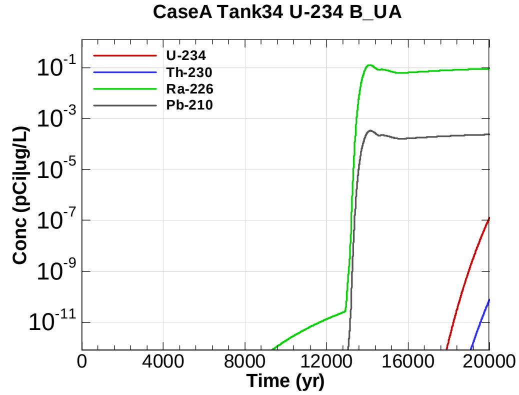

Figure E-1322 - 100m Aquifer Concentration for CaseA Tank34 U-234 B_UA

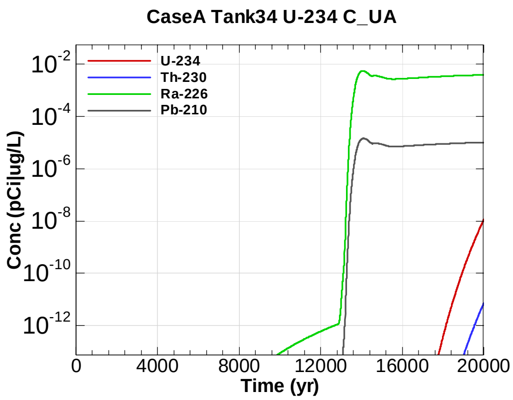

Figure E-1323 - 100m Aquifer Concentration for CaseA Tank34 U-234 C_UA

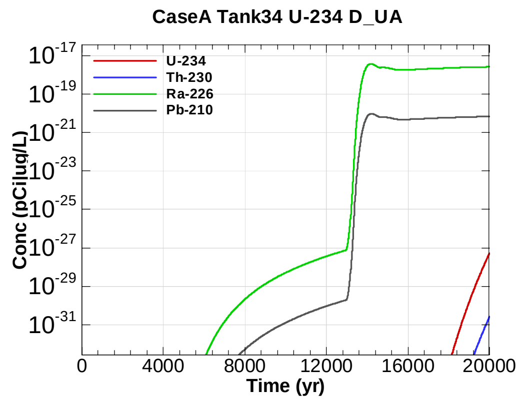

Figure E-1324 - 100m Aquifer Concentration for CaseA Tank34 U-234 D_UA

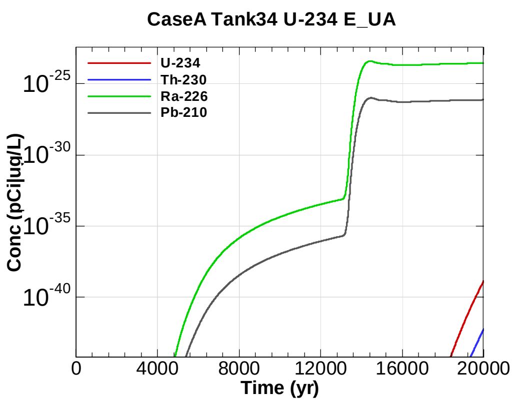

Figure E-1325 - 100m Aquifer Concentration for CaseA Tank34 U-234 E_UA

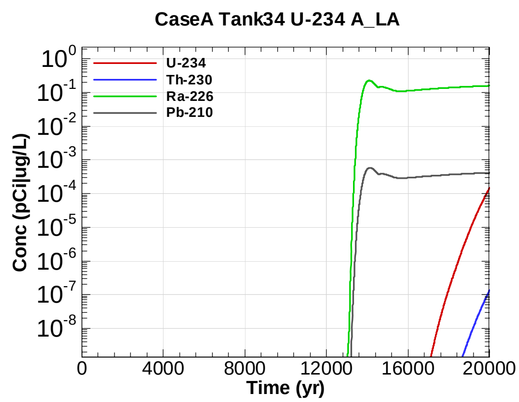

Figure E-1326 - 100m Aquifer Concentration for CaseA Tank34 U-234 A_LA

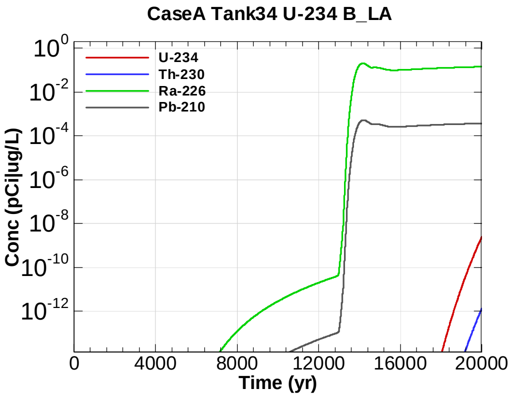

Figure E-1327 - 100m Aquifer Concentration for CaseA Tank34 U-234 B_LA

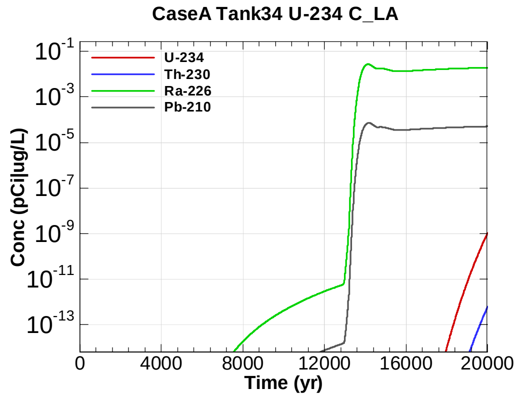

Figure E-1328 - 100m Aquifer Concentration for CaseA Tank34 U-234 C_LA

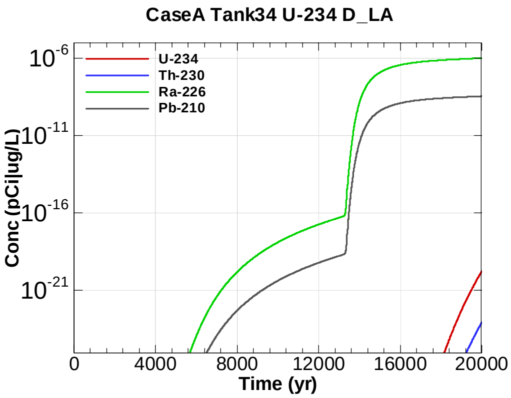

Figure E-1329 - 100m Aquifer Concentration for CaseA Tank34 U-234 D_LA

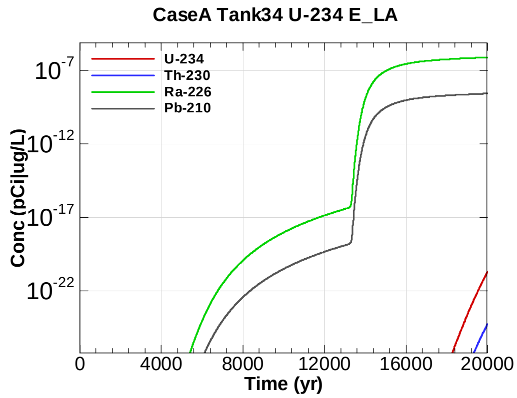

Figure E-1330 - 100m Aquifer Concentration for CaseA Tank34 U-234 E_LA

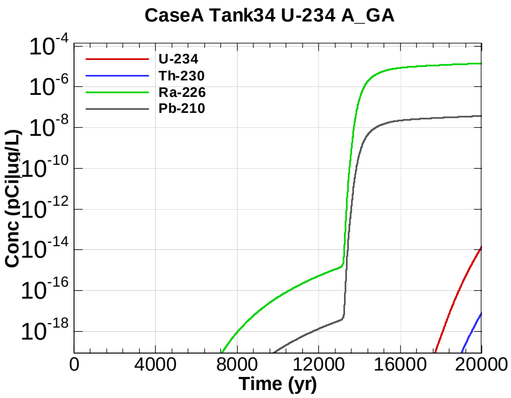

Figure E-1331 - 100m Aquifer Concentration for CaseA Tank34 U-234 A_GA

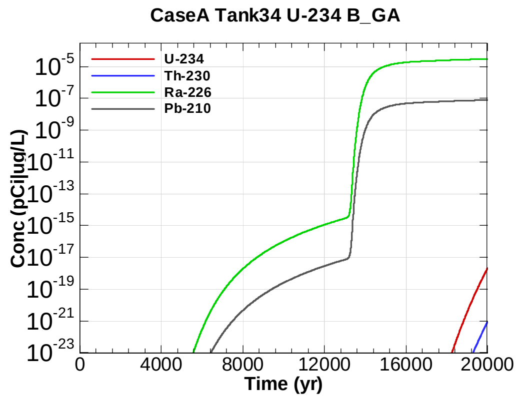

Figure E-1332 - 100m Aquifer Concentration for CaseA Tank34 U-234 B_GA

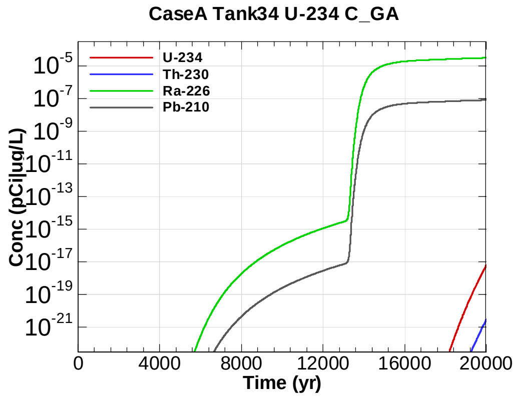

Figure E-1333 - 100m Aquifer Concentration for CaseA Tank34 U-234 C_GA

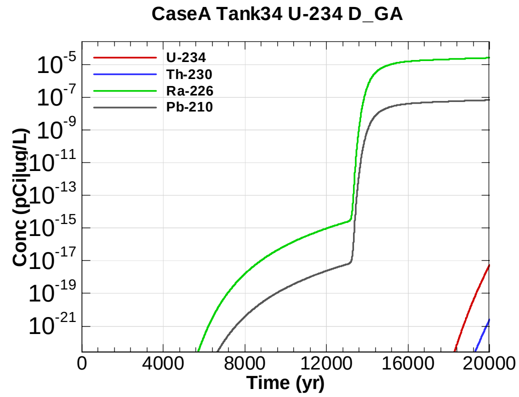

Figure E-1334 - 100m Aquifer Concentration for CaseA Tank34 U-234 D_GA

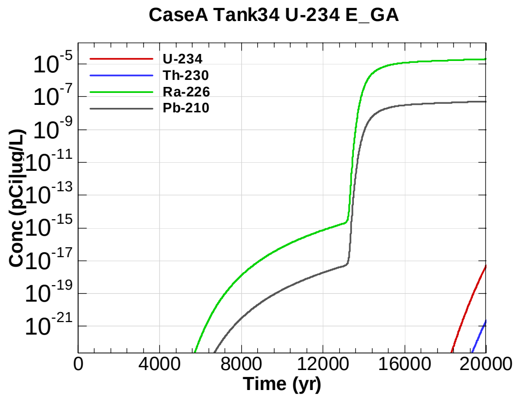

Figure E-1335 - 100m Aquifer Concentration for CaseA Tank34 U-234 E_GA

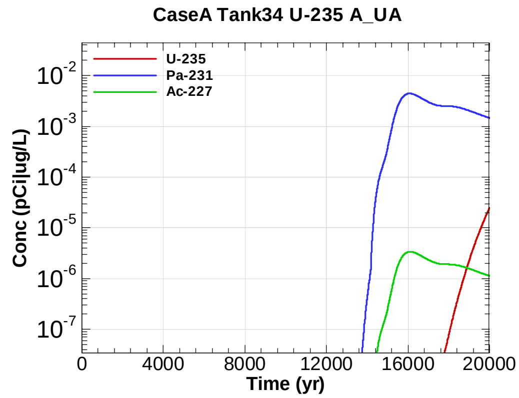

Figure E-1336 - 100m Aquifer Concentration for CaseA Tank34 U-235 A_UA

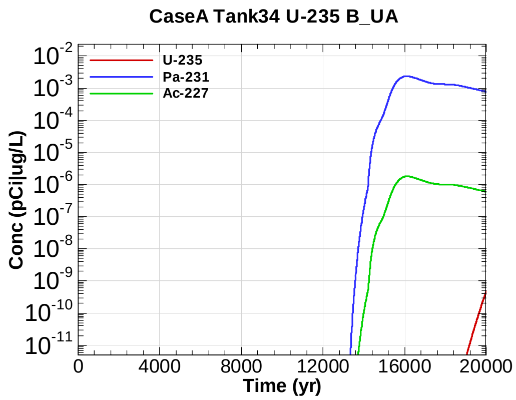

Figure E-1337 - 100m Aquifer Concentration for CaseA Tank34 U-235 B_UA

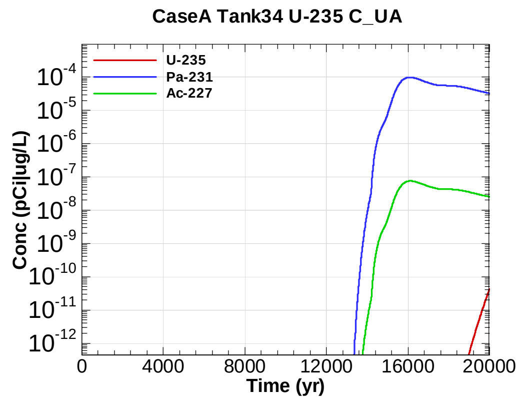

Figure E-1338 - 100m Aquifer Concentration for CaseA Tank34 U-235 C_UA

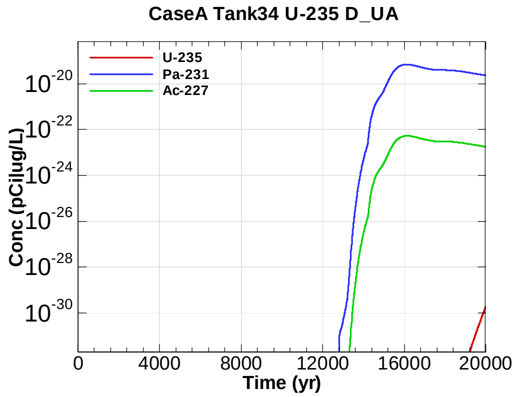

Figure E-1339 - 100m Aquifer Concentration for CaseA Tank34 U-235 D_UA

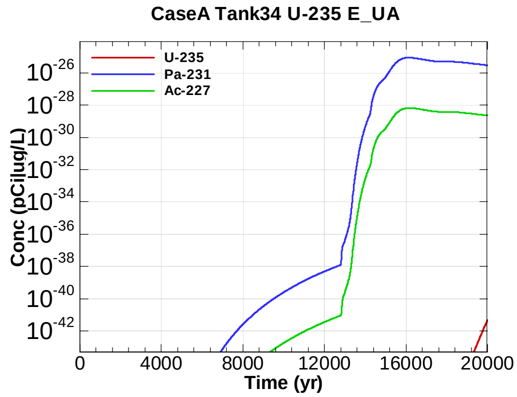

Figure E-1340 - 100m Aquifer Concentration for CaseA Tank34 U-235 E_UA

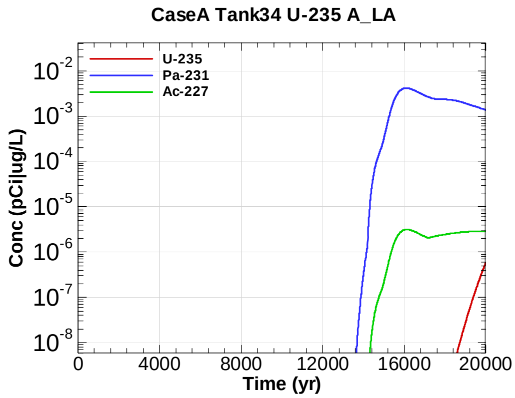

Figure E-1341 - 100m Aquifer Concentration for CaseA Tank34 U-235 A_LA

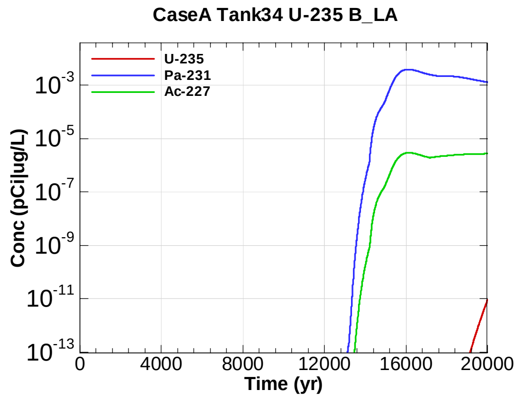

Figure E-1342 - 100m Aquifer Concentration for CaseA Tank34 U-235 B_LA

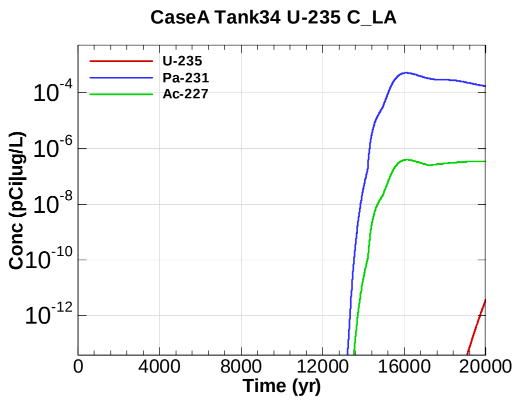

Figure E-1343 - 100m Aquifer Concentration for CaseA Tank34 U-235 C_LA

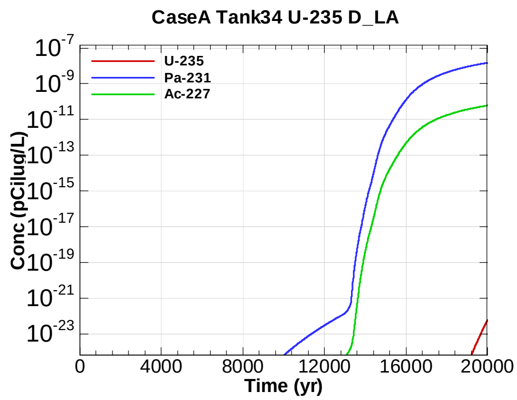

Figure E-1344 - 100m Aquifer Concentration for CaseA Tank34 U-235 D_LA

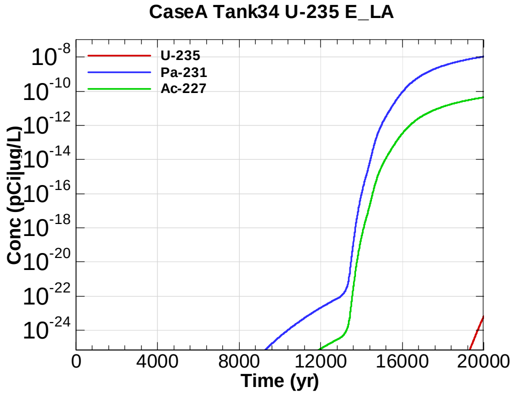

Figure E-1345 - 100m Aquifer Concentration for CaseA Tank34 U-235 E_LA

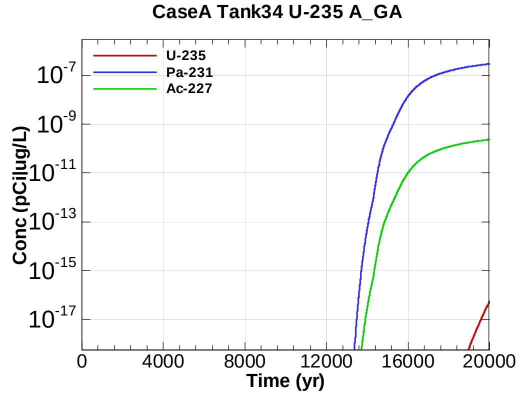

Figure E-1346 - 100m Aquifer Concentration for CaseA Tank34 U-235 A_GA

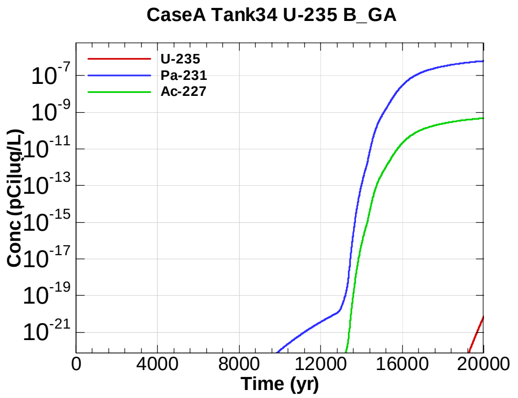

Figure E-1347 - 100m Aquifer Concentration for CaseA Tank34 U-235 B_GA

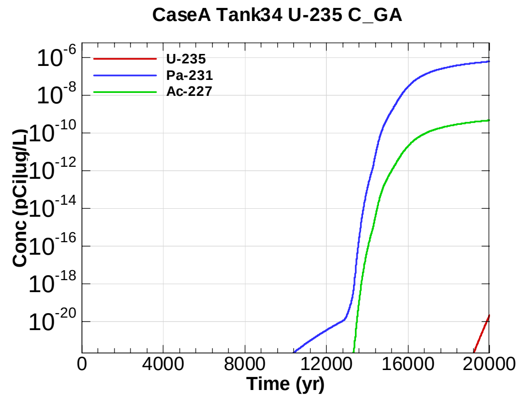

Figure E-1348 - 100m Aquifer Concentration for CaseA Tank34 U-235 C_GA

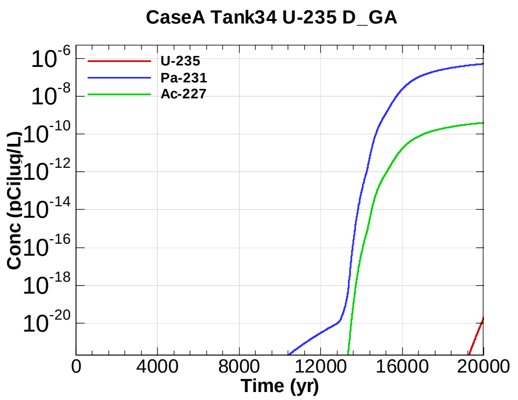

Figure E-1349 - 100m Aquifer Concentration for CaseA Tank34 U-235 D_GA

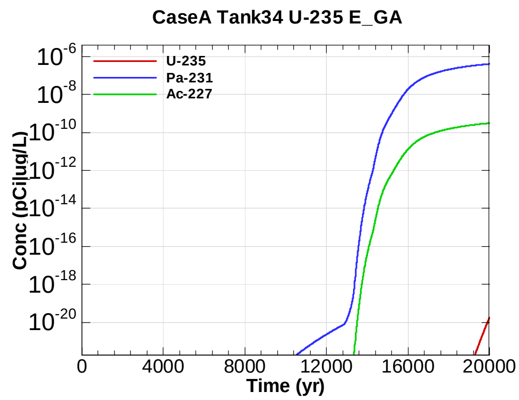

Figure E-1350 - 100m Aquifer Concentration for CaseA Tank34 U-235 E_GA

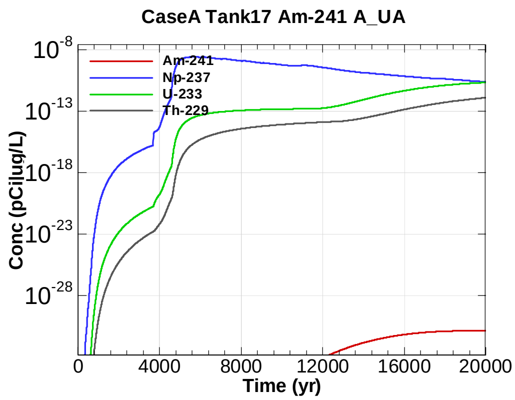

Figure E-1351 - 100m Aquifer Concentration for CaseA Tank17 Am-241 A_UA

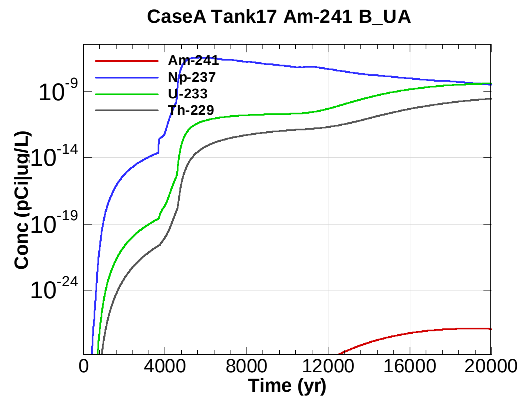

Figure E-1352 - 100m Aquifer Concentration for CaseA Tank17 Am-241 B_UA

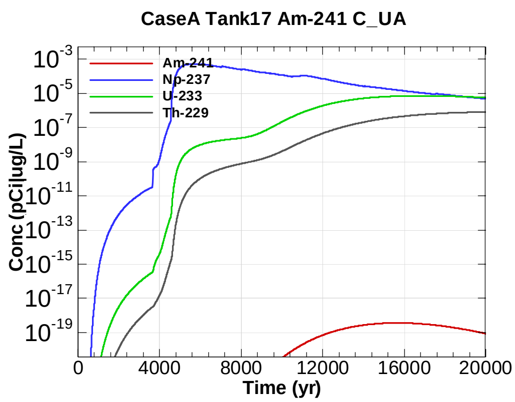

Figure E-1353 - 100m Aquifer Concentration for CaseA Tank17 Am-241 C_UA

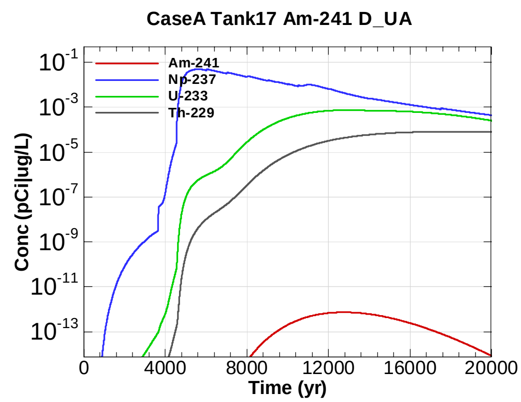

Figure E-1354 - 100m Aquifer Concentration for CaseA Tank17 Am-241 D_UA

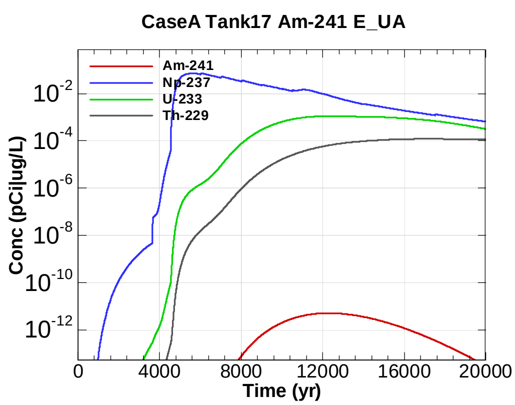

Figure E-1355 - 100m Aquifer Concentration for CaseA Tank17 Am-241 E_UA

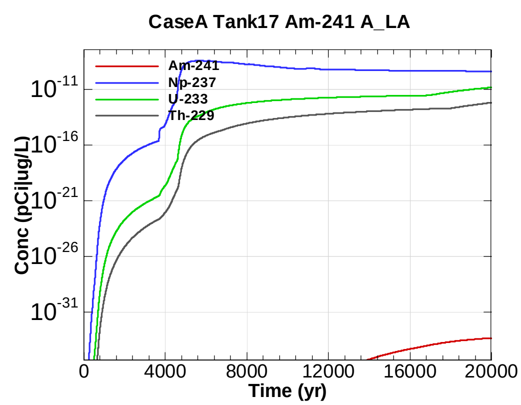

Figure E-1356 - 100m Aquifer Concentration for CaseA Tank17 Am-241 A_LA

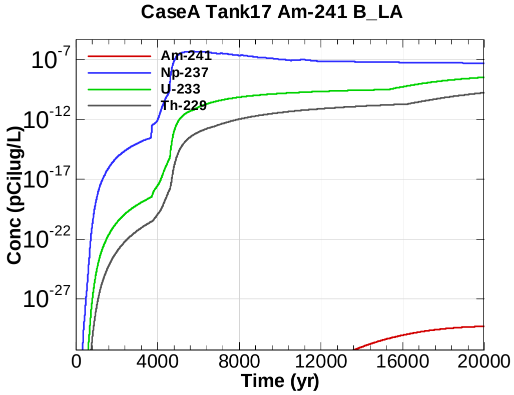

Figure E-1357 - 100m Aquifer Concentration for CaseA Tank17 Am-241 B_LA

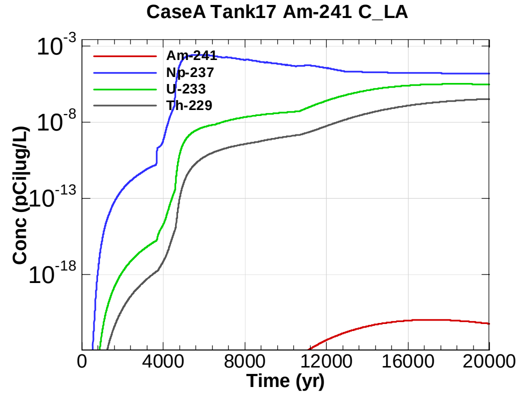

Figure E-1358 - 100m Aquifer Concentration for CaseA Tank17 Am-241 C_LA

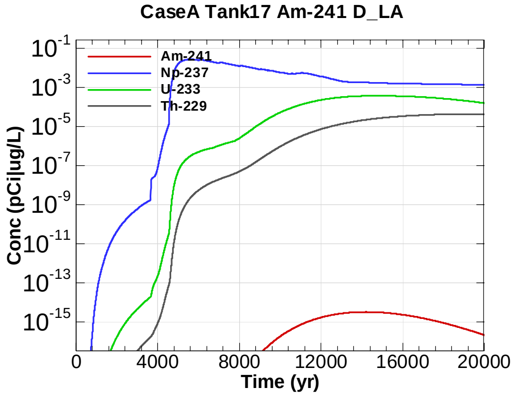

Figure E-1359 - 100m Aquifer Concentration for CaseA Tank17 Am-241 D_LA

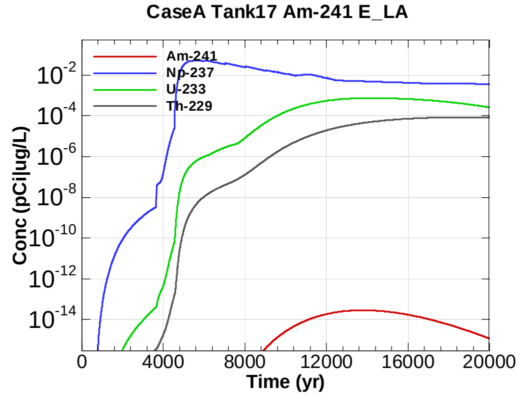

Figure E-1360 - 100m Aquifer Concentration for CaseA Tank17 Am-241 E_LA

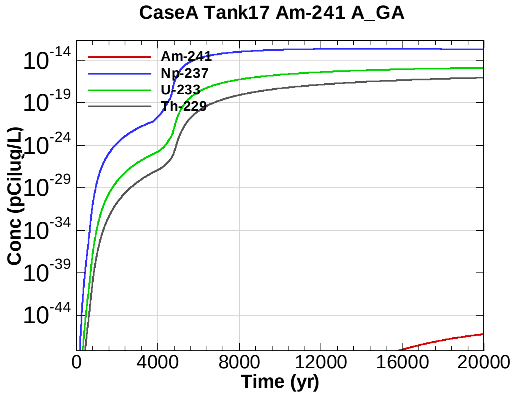

Figure E-1361 - 100m Aquifer Concentration for CaseA Tank17 Am-241 A_GA

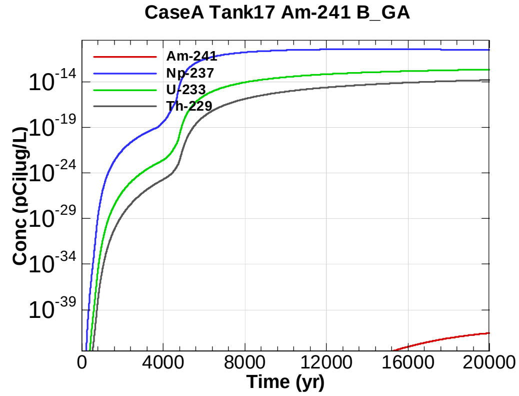

Figure E-1362 - 100m Aquifer Concentration for CaseA Tank17 Am-241 B_GA

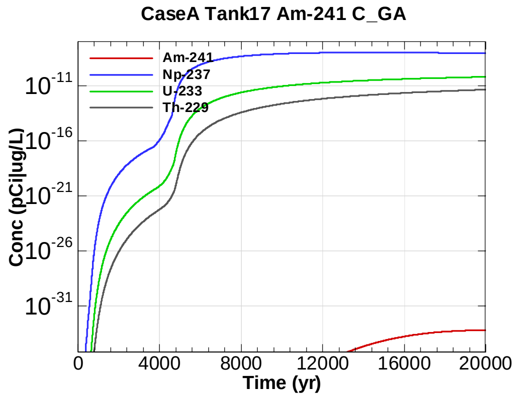

Figure E-1363 - 100m Aquifer Concentration for CaseA Tank17 Am-241 C_GA

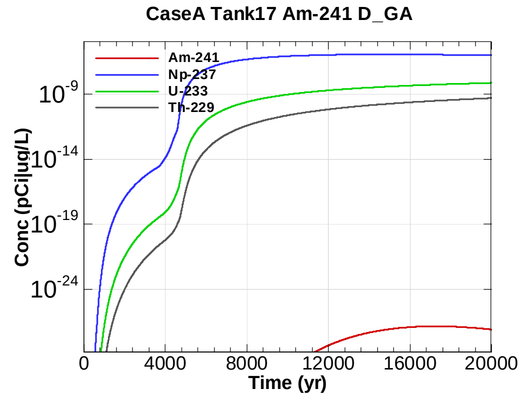

Figure E-1364 - 100m Aquifer Concentration for CaseA Tank17 Am-241 D_GA

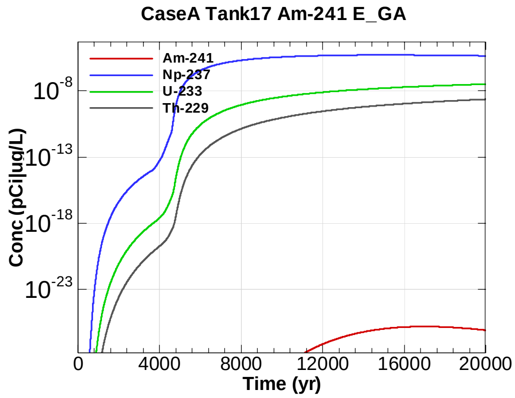

Figure E-1365 - 100m Aquifer Concentration for CaseA Tank17 Am-241 E_GA

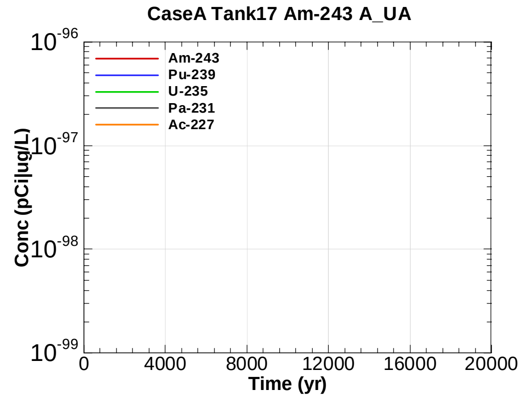

Figure E-1366 - 100m Aquifer Concentration for CaseA Tank17 Am-243 A_UA

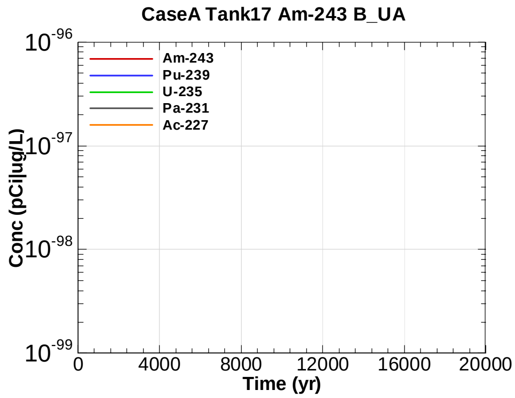

Figure E-1367 - 100m Aquifer Concentration for CaseA Tank17 Am-243 B_UA

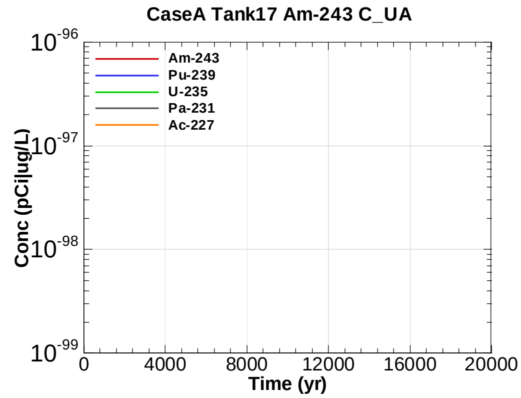

Figure E-1368 - 100m Aquifer Concentration for CaseA Tank17 Am-243 C_UA

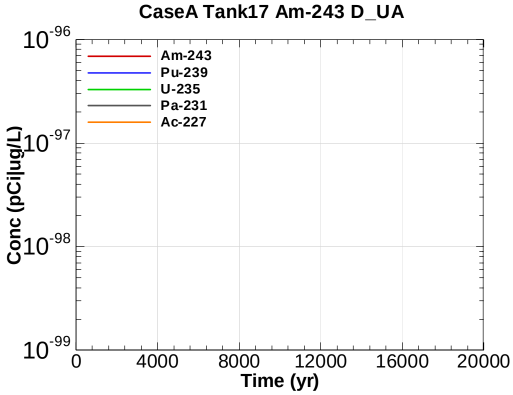

Figure E-1369 - 100m Aquifer Concentration for CaseA Tank17 Am-243 D_UA

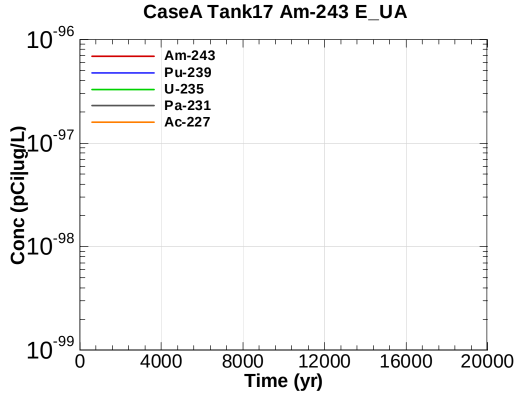

Figure E-1370 - 100m Aquifer Concentration for CaseA Tank17 Am-243 E_UA

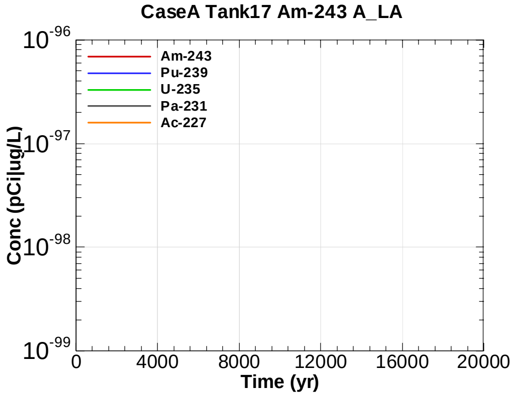

Figure E-1371 - 100m Aquifer Concentration for CaseA Tank17 Am-243 A_LA

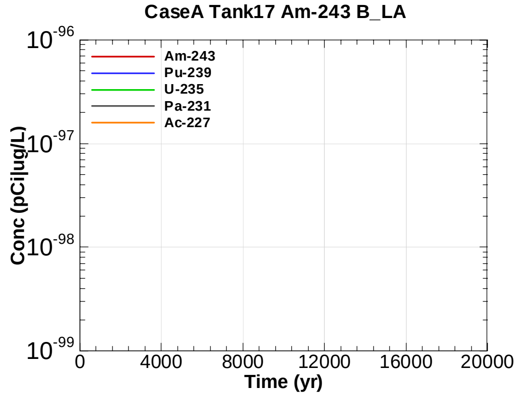

Figure E-1372 - 100m Aquifer Concentration for CaseA Tank17 Am-243 B_LA

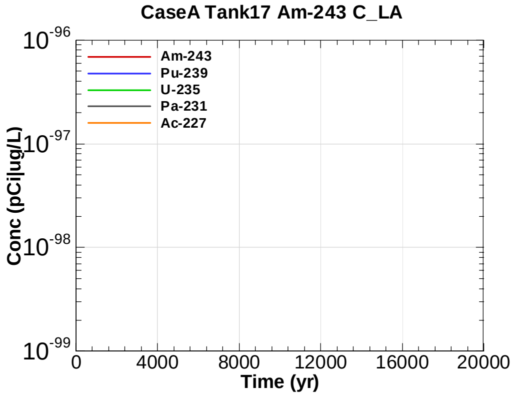

Figure E-1373 - 100m Aquifer Concentration for CaseA Tank17 Am-243 C_LA

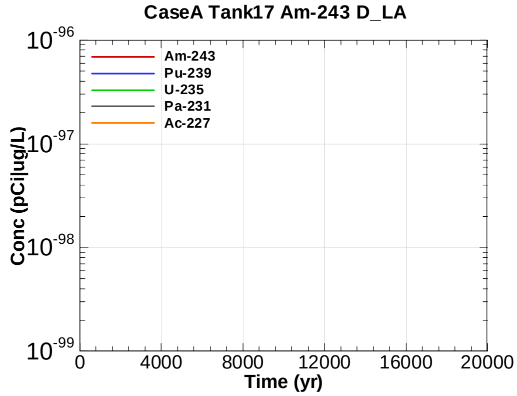

Figure E-1374 - 100m Aquifer Concentration for CaseA Tank17 Am-243 D_LA

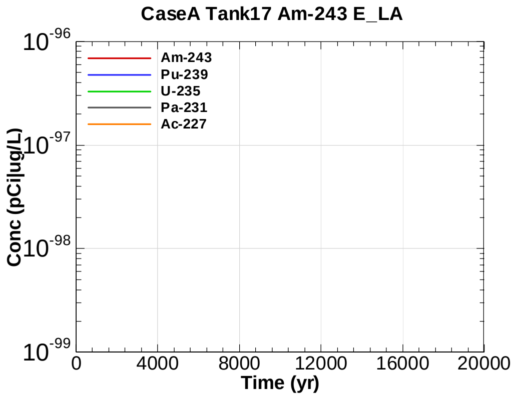

Figure E-1375 - 100m Aquifer Concentration for CaseA Tank17 Am-243 E_LA

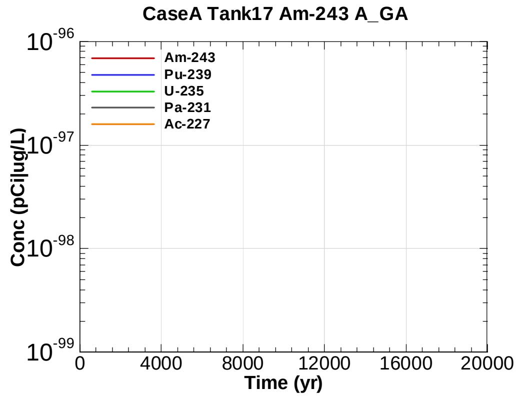

Figure E-1376 - 100m Aquifer Concentration for CaseA Tank17 Am-243 A_GA

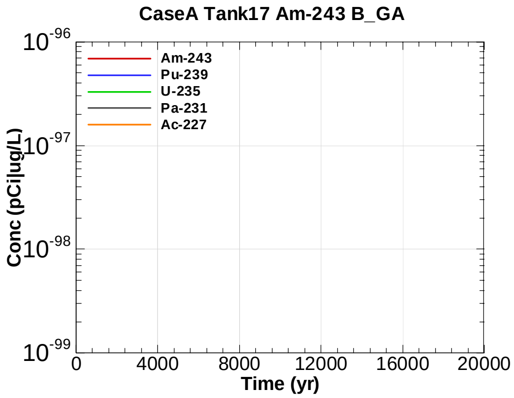

Figure E-1377 - 100m Aquifer Concentration for CaseA Tank17 Am-243 B_GA

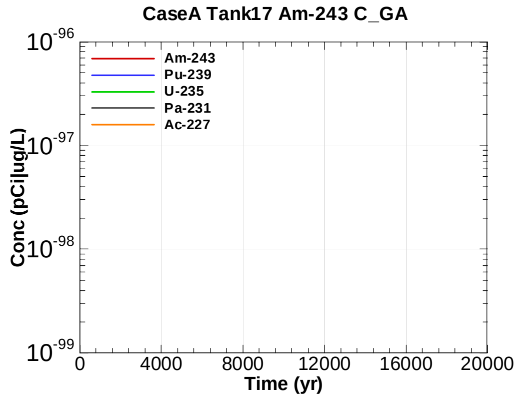

Figure E-1378 - 100m Aquifer Concentration for CaseA Tank17 Am-243 C_GA

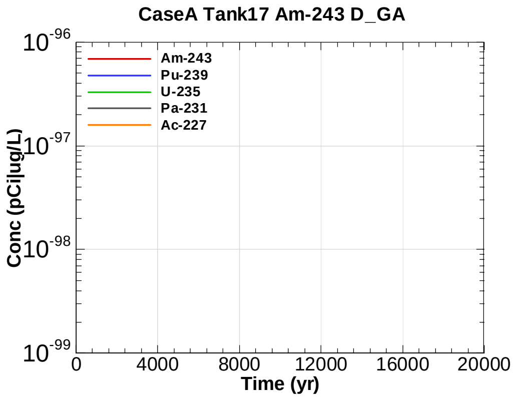

Figure E-1379 - 100m Aquifer Concentration for CaseA Tank17 Am-243 D_GA

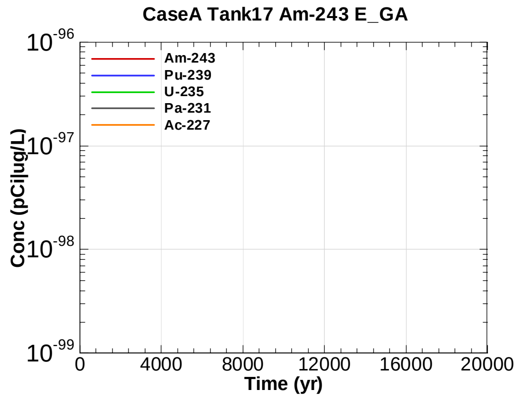

Figure E-1380 - 100m Aquifer Concentration for CaseA Tank17 Am-243 E_GA

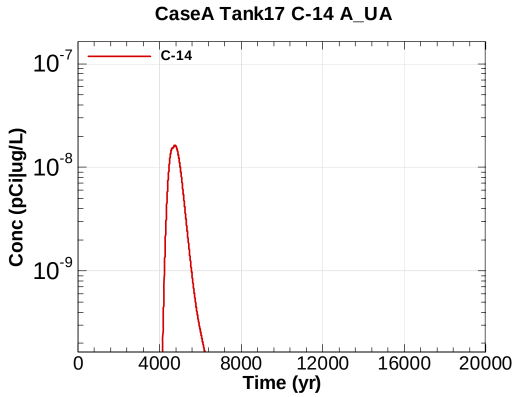

Figure E-1381 - 100m Aquifer Concentration for CaseA Tank17 C-14 A_UA

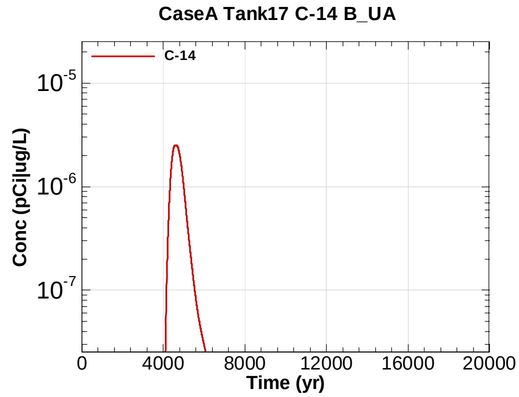

Figure E-1382 - 100m Aquifer Concentration for CaseA Tank17 C-14 B_UA

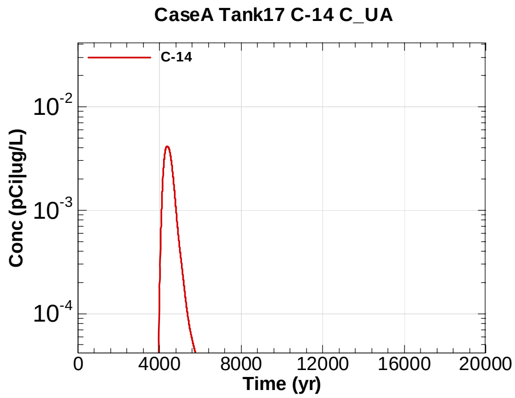

Figure E-1383 - 100m Aquifer Concentration for CaseA Tank17 C-14 C_UA

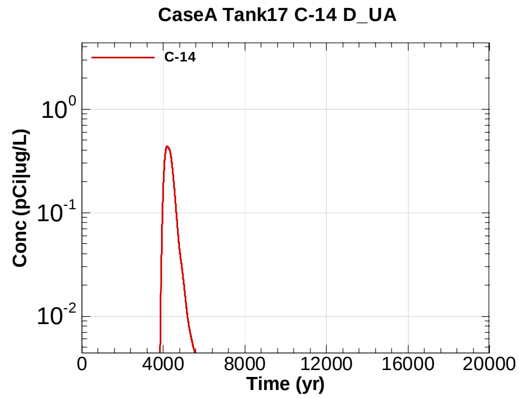

Figure E-1384 - 100m Aquifer Concentration for CaseA Tank17 C-14 D_UA

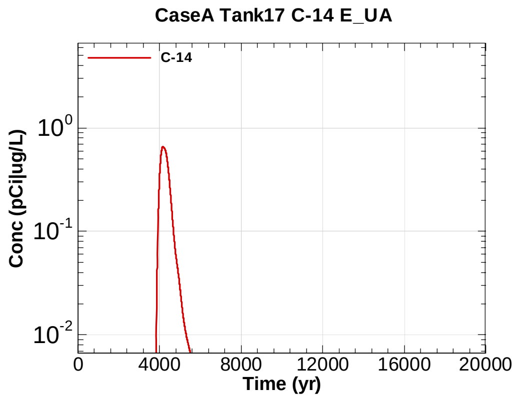

Figure E-1385 - 100m Aquifer Concentration for CaseA Tank17 C-14 E_UA

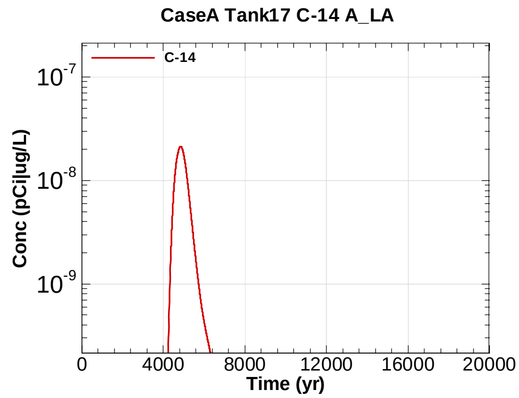

Figure E-1386 - 100m Aquifer Concentration for CaseA Tank17 C-14 A_LA

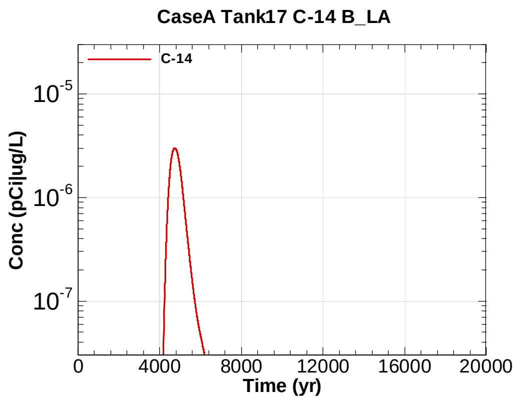

Figure E-1387 - 100m Aquifer Concentration for CaseA Tank17 C-14 B_LA

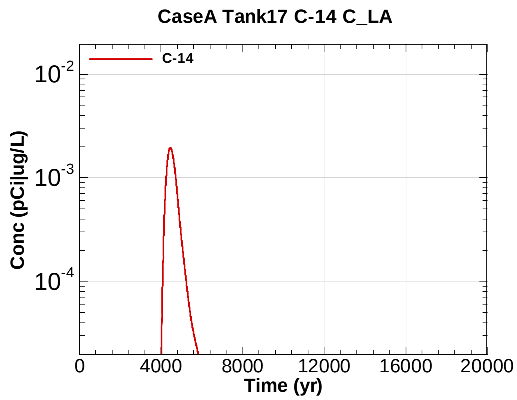

Figure E-1388 - 100m Aquifer Concentration for CaseA Tank17 C-14 C_LA

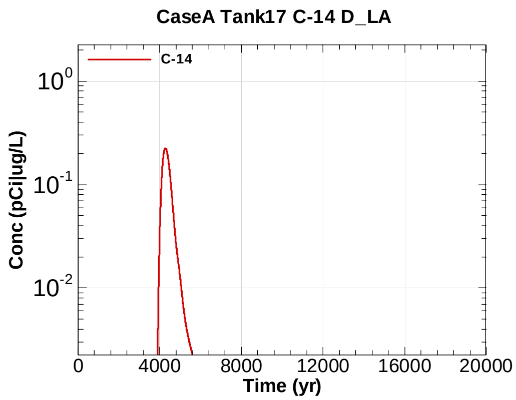

Figure E-1389 - 100m Aquifer Concentration for CaseA Tank17 C-14 D_LA

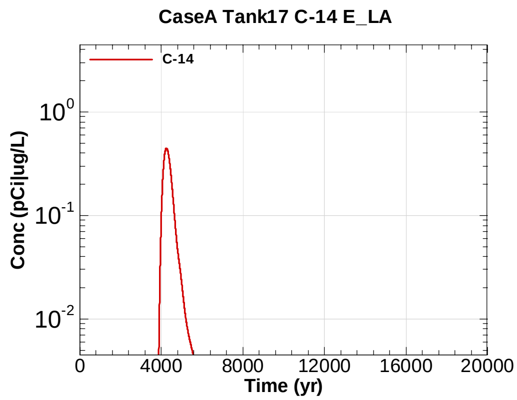

Figure E-1390 - 100m Aquifer Concentration for CaseA Tank17 C-14 E_LA

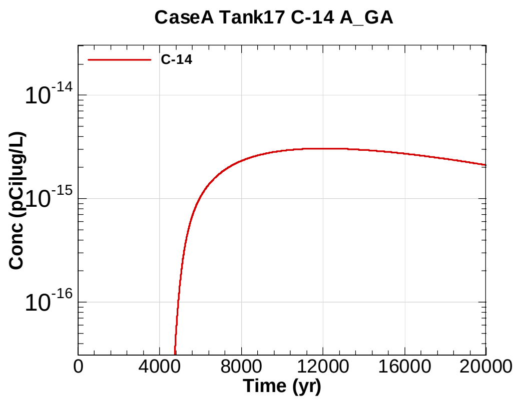

Figure E-1391 - 100m Aquifer Concentration for CaseA Tank17 C-14 A_GA

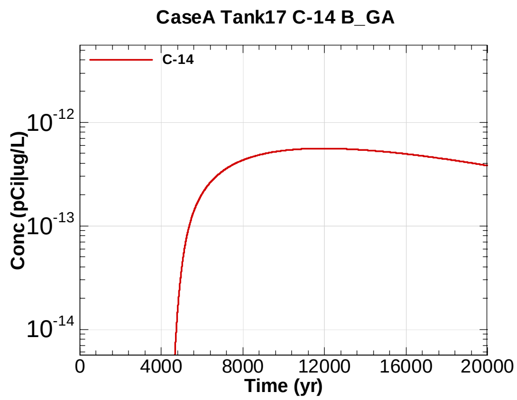

Figure E-1392 - 100m Aquifer Concentration for CaseA Tank17 C-14 B_GA

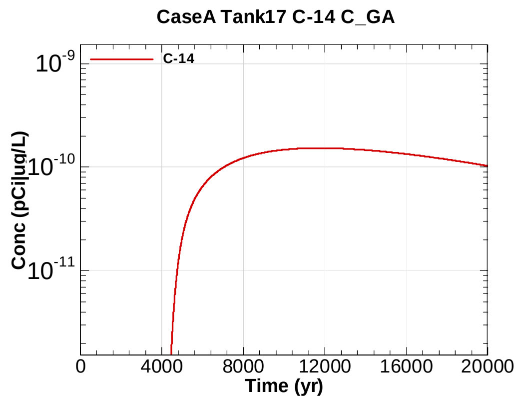

Figure E-1393 - 100m Aquifer Concentration for CaseA Tank17 C-14 C_GA

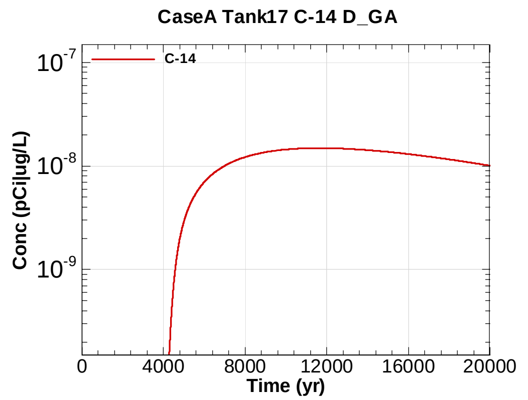

Figure E-1394 - 100m Aquifer Concentration for CaseA Tank17 C-14 D_GA

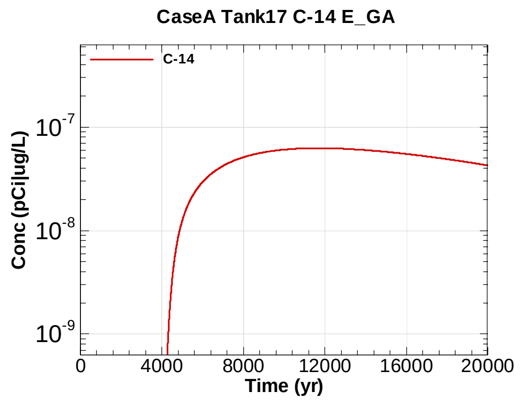

Figure E-1395 - 100m Aquifer Concentration for CaseA Tank17 C-14 E_GA

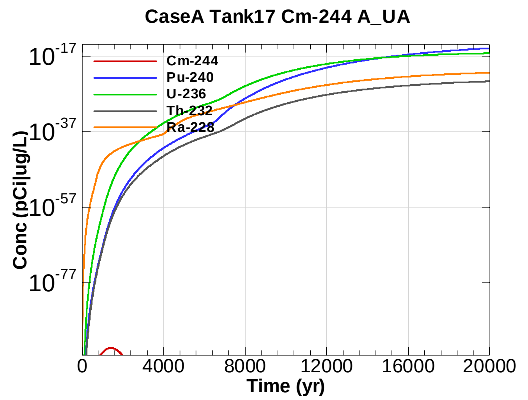

Figure E-1396 - 100m Aquifer Concentration for CaseA Tank17 Cm-244 A_UA

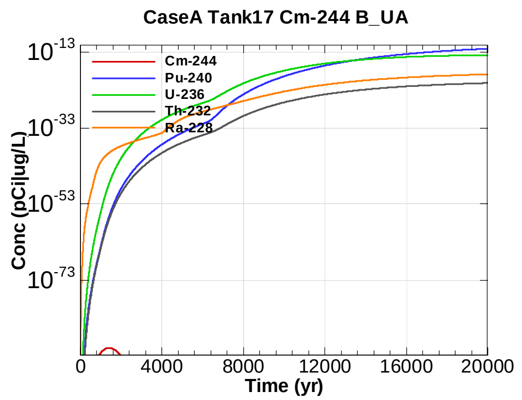

Figure E-1397 - 100m Aquifer Concentration for CaseA Tank17 Cm-244 B_UA

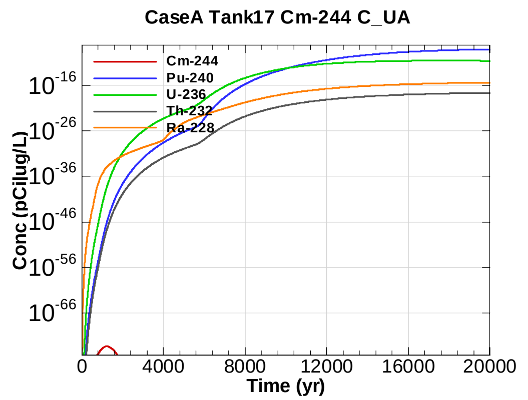

Figure E-1398 - 100m Aquifer Concentration for CaseA Tank17 Cm-244 C_UA

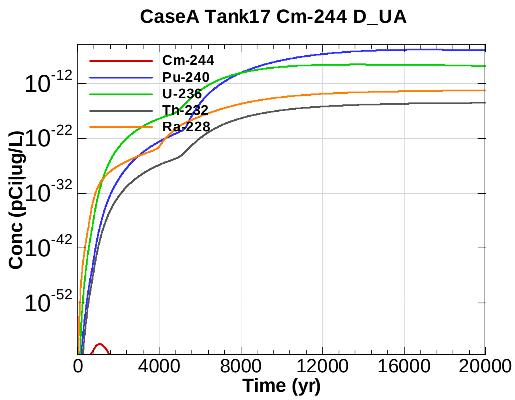

Figure E-1399 - 100m Aquifer Concentration for CaseA Tank17 Cm-244 D_UA

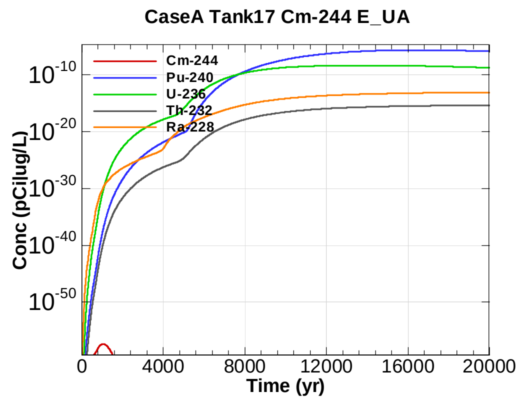

Figure E-1400 - 100m Aquifer Concentration for CaseA Tank17 Cm-244 E_UA

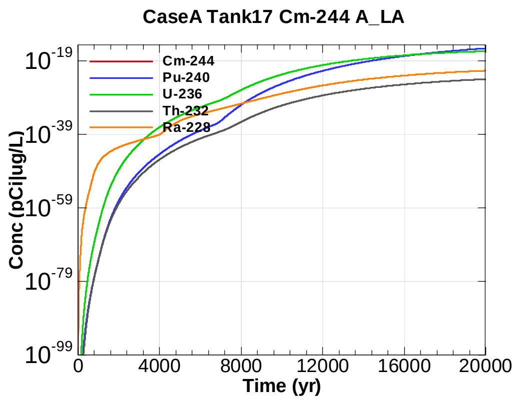

Figure E-1401 - 100m Aquifer Concentration for CaseA Tank17 Cm-244 A_LA

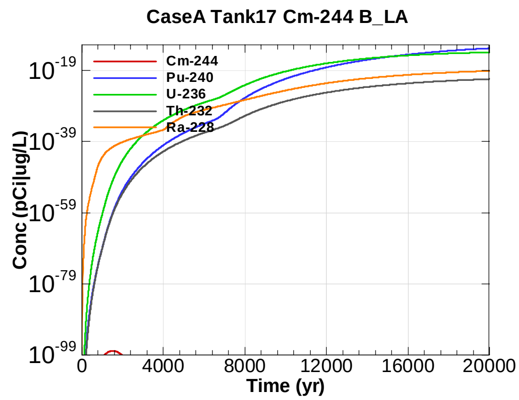

Figure E-1402 - 100m Aquifer Concentration for CaseA Tank17 Cm-244 B_LA

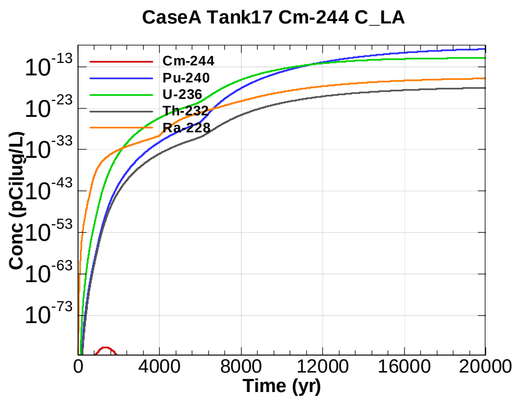

Figure E-1403 - 100m Aquifer Concentration for CaseA Tank17 Cm-244 C_LA

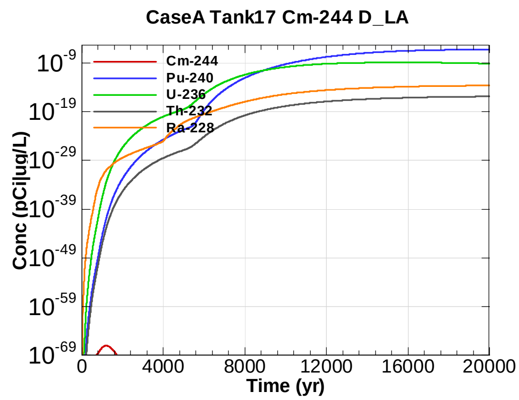

Figure E-1404 - 100m Aquifer Concentration for CaseA Tank17 Cm-244 D_LA

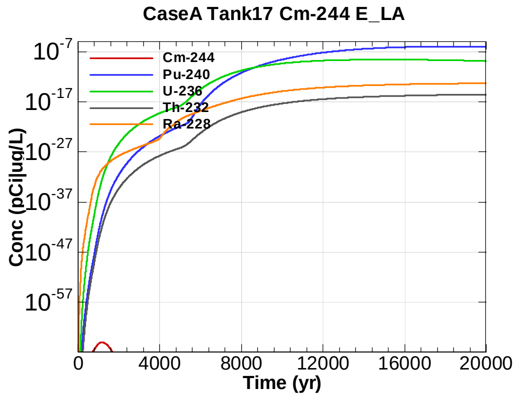

Figure E-1405 - 100m Aquifer Concentration for CaseA Tank17 Cm-244 E_LA

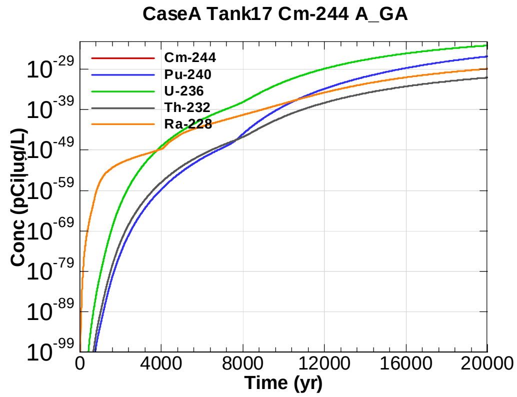

Figure E-1406 - 100m Aquifer Concentration for CaseA Tank17 Cm-244 A_GA

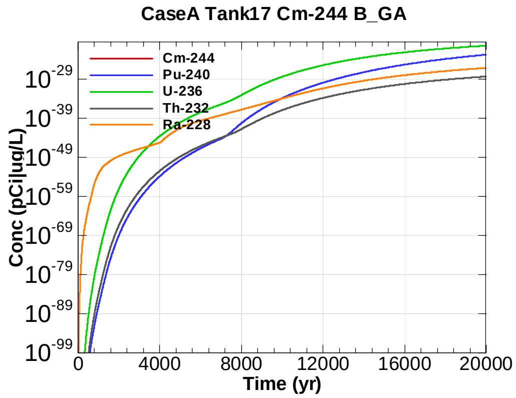

Figure E-1407 - 100m Aquifer Concentration for CaseA Tank17 Cm-244 B_GA

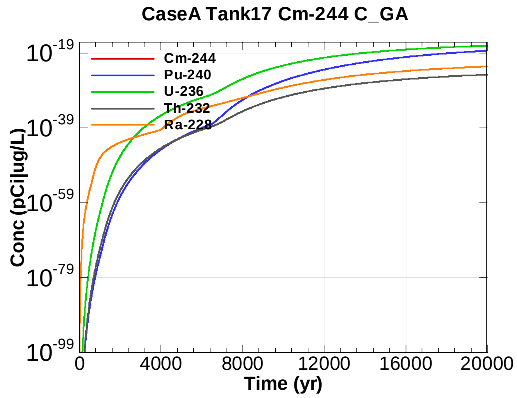

Figure E-1408 - 100m Aquifer Concentration for CaseA Tank17 Cm-244 C_GA

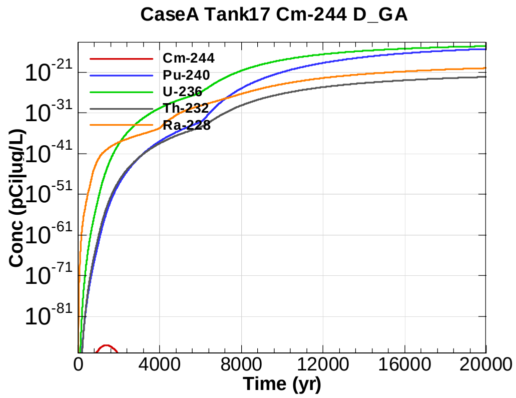

Figure E-1409 - 100m Aquifer Concentration for CaseA Tank17 Cm-244 D_GA

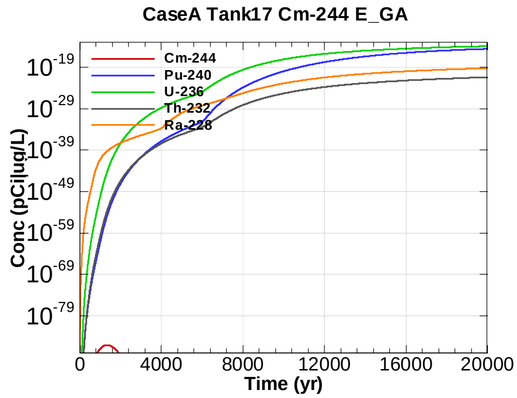

Figure E-1410 - 100m Aquifer Concentration for CaseA Tank17 Cm-244 E_GA

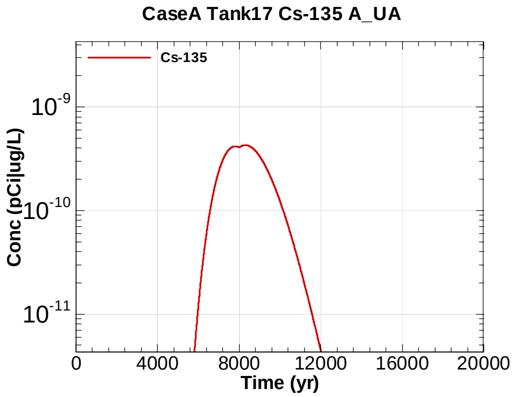

Figure E-1411 - 100m Aquifer Concentration for CaseA Tank17 Cs-135 A_UA

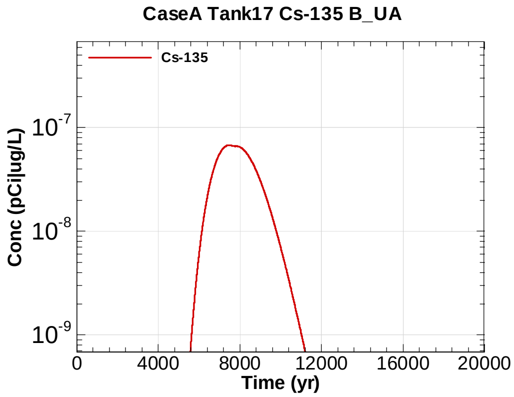

Figure E-1412 - 100m Aquifer Concentration for CaseA Tank17 Cs-135 B_UA

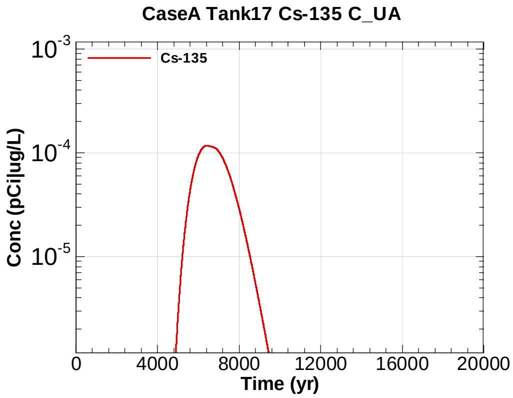

Figure E-1413 - 100m Aquifer Concentration for CaseA Tank17 Cs-135 C_UA

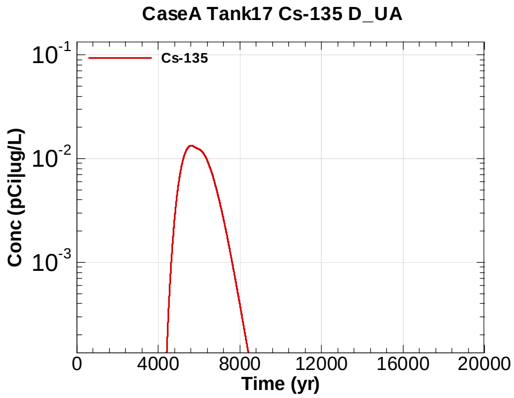

Figure E-1414 - 100m Aquifer Concentration for CaseA Tank17 Cs-135 D_UA

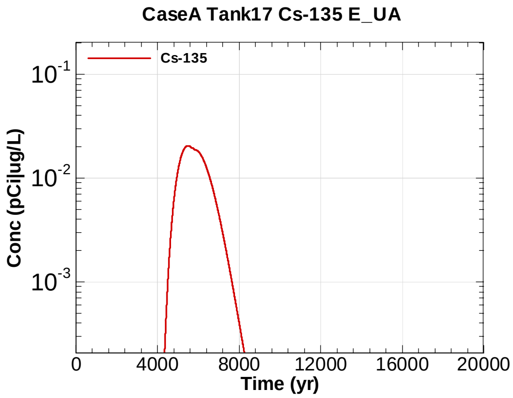

Figure E-1415 - 100m Aquifer Concentration for CaseA Tank17 Cs-135 E_UA

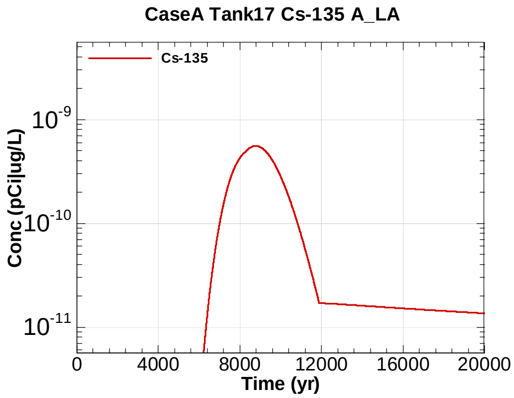

Figure E-1416 - 100m Aquifer Concentration for CaseA Tank17 Cs-135 A_LA

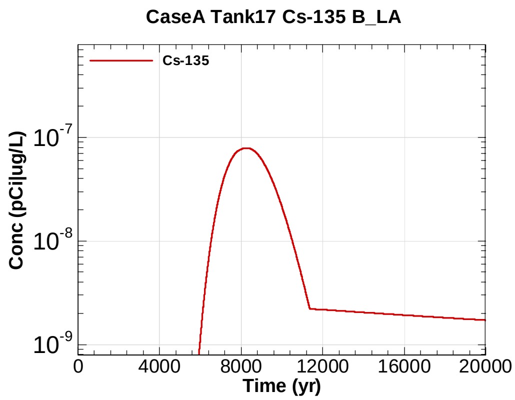

Figure E-1417 - 100m Aquifer Concentration for CaseA Tank17 Cs-135 B_LA

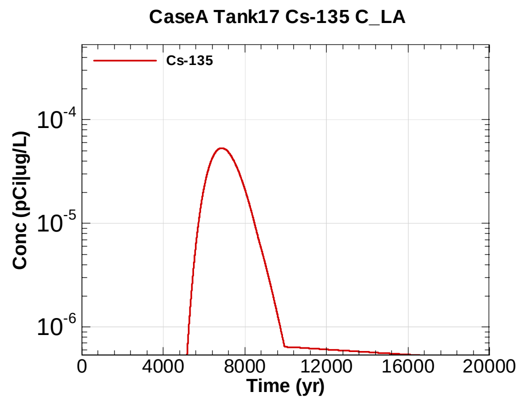

Figure E-1418 - 100m Aquifer Concentration for CaseA Tank17 Cs-135 C_LA

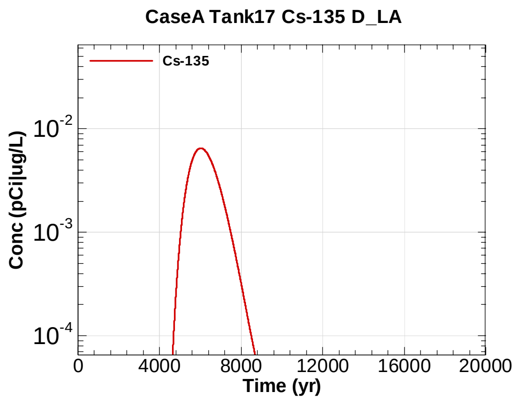

Figure E-1419 - 100m Aquifer Concentration for CaseA Tank17 Cs-135 D_LA

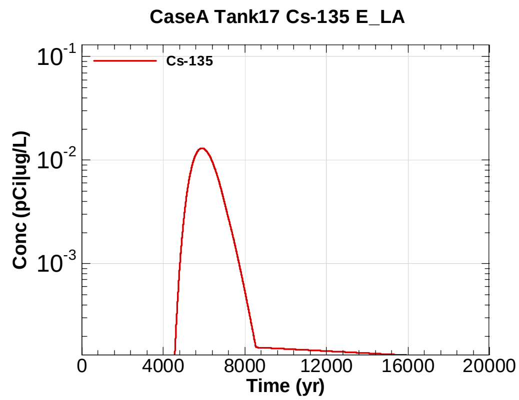

Figure E-1420 - 100m Aquifer Concentration for CaseA Tank17 Cs-135 E_LA

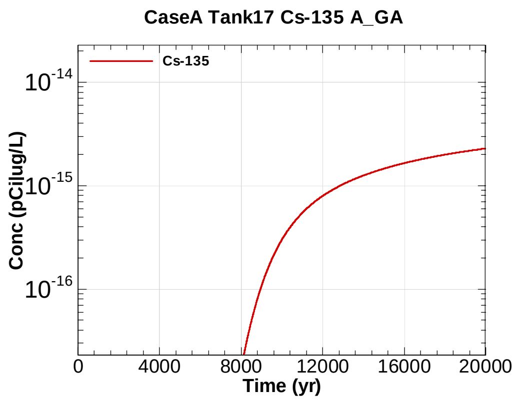

Figure E-1421 - 100m Aquifer Concentration for CaseA Tank17 Cs-135 A_GA

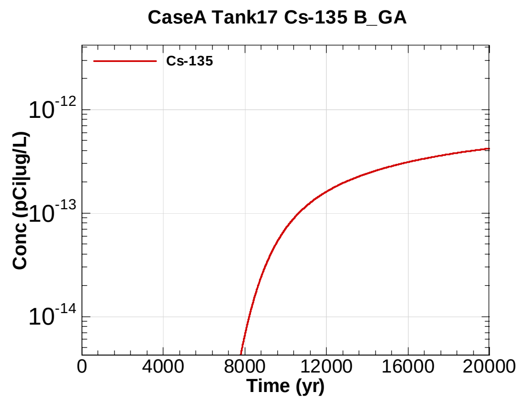

Figure E-1422 - 100m Aquifer Concentration for CaseA Tank17 Cs-135 B_GA

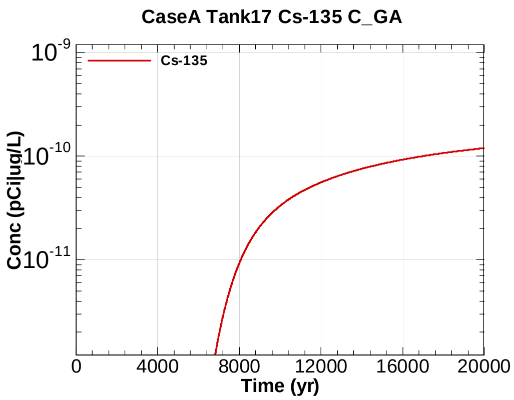

Figure E-1423 - 100m Aquifer Concentration for CaseA Tank17 Cs-135 C_GA

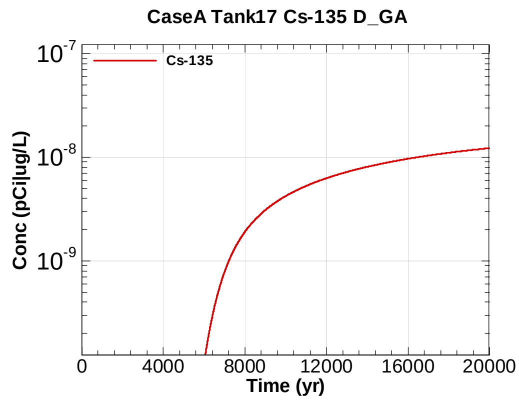

Figure E-1424 - 100m Aquifer Concentration for CaseA Tank17 Cs-135 D_GA

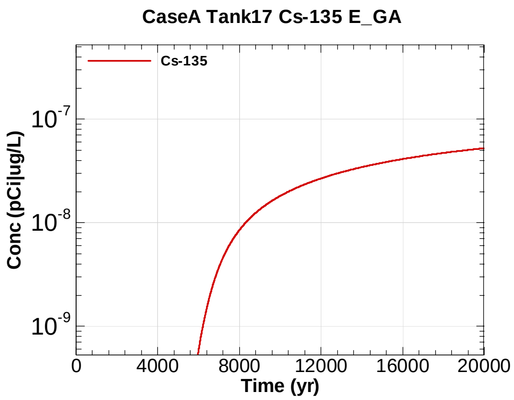

Figure E-1425 - 100m Aquifer Concentration for CaseA Tank17 Cs-135 E_GA

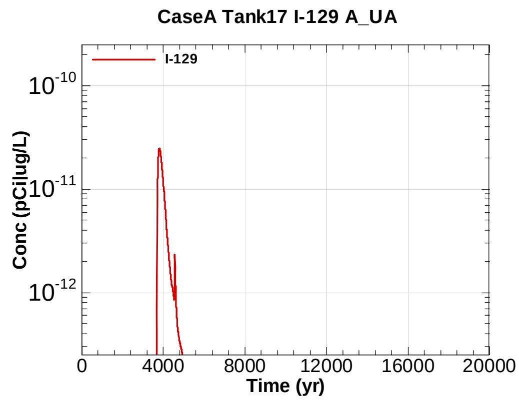

Figure E-1426 - 100m Aquifer Concentration for CaseA Tank17 I-129 A_UA

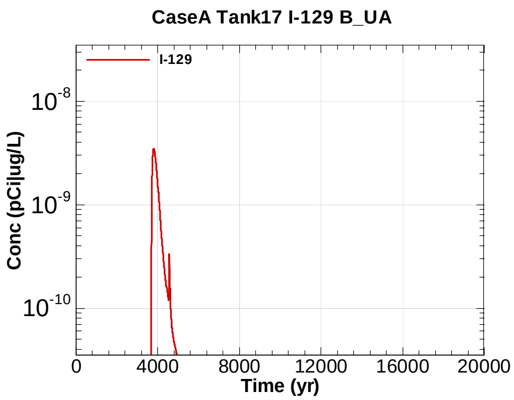

Figure E-1427 - 100m Aquifer Concentration for CaseA Tank17 I-129 B_UA

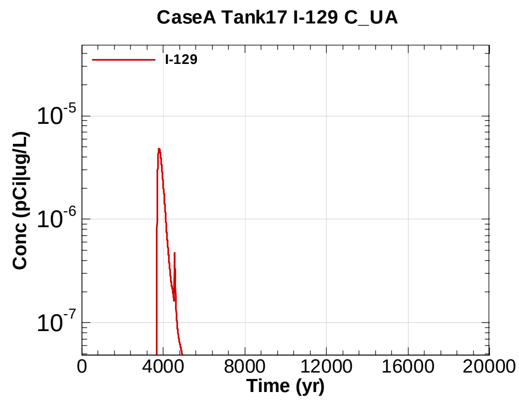

Figure E-1428 - 100m Aquifer Concentration for CaseA Tank17 I-129 C_UA

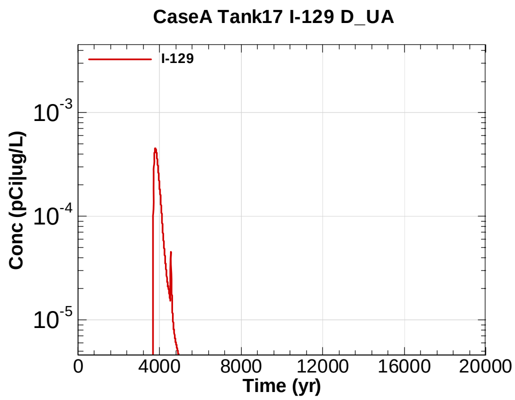

Figure E-1429 - 100m Aquifer Concentration for CaseA Tank17 I-129 D_UA

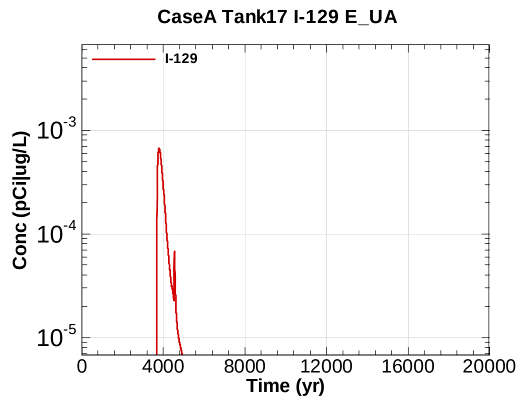

Figure E-1430 - 100m Aquifer Concentration for CaseA Tank17 I-129 E_UA

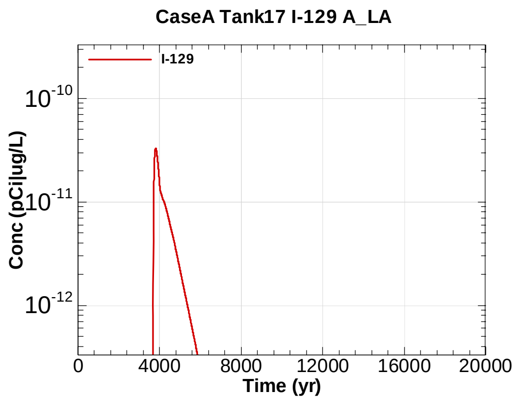

Figure E-1431 - 100m Aquifer Concentration for CaseA Tank17 I-129 A_LA

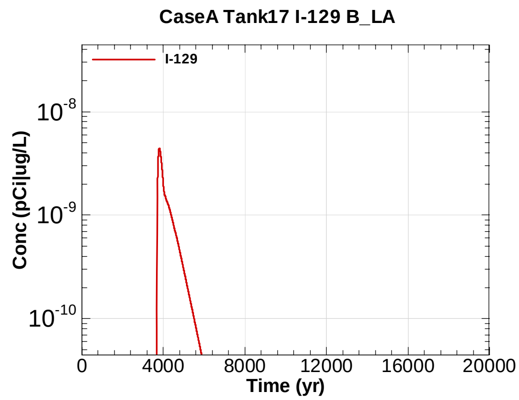

Figure E-1432 - 100m Aquifer Concentration for CaseA Tank17 I-129 B_LA

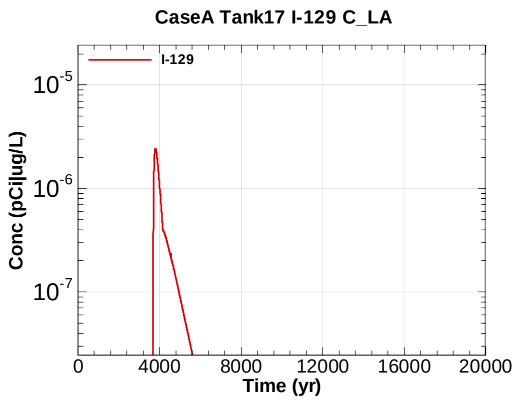

Figure E-1433 - 100m Aquifer Concentration for CaseA Tank17 I-129 C_LA

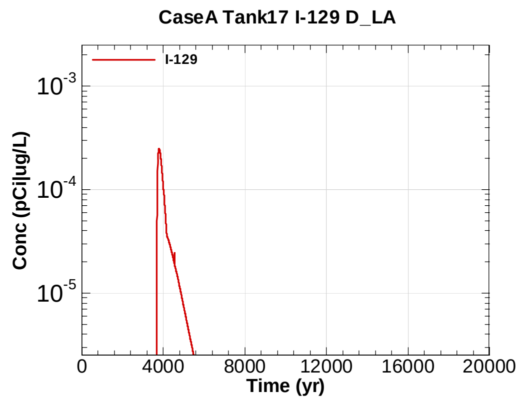

Figure E-1434 - 100m Aquifer Concentration for CaseA Tank17 I-129 D_LA

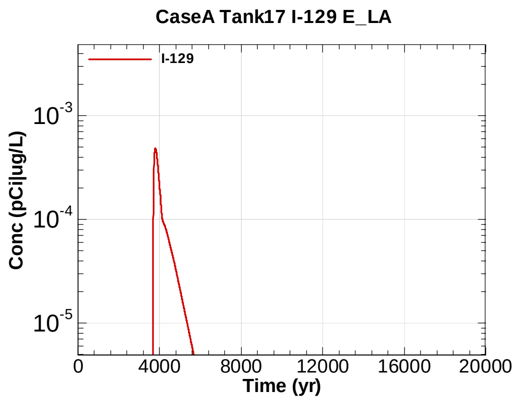

Figure E-1435 - 100m Aquifer Concentration for CaseA Tank17 I-129 E_LA

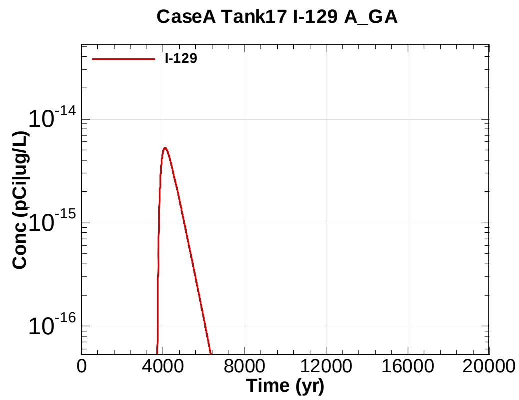

Figure E-1436 - 100m Aquifer Concentration for CaseA Tank17 I-129 A_GA

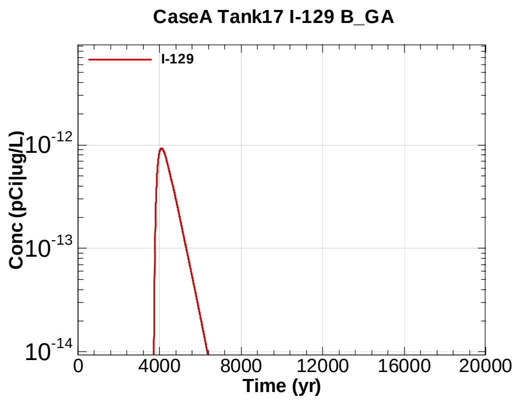

Figure E-1437 - 100m Aquifer Concentration for CaseA Tank17 I-129 B_GA

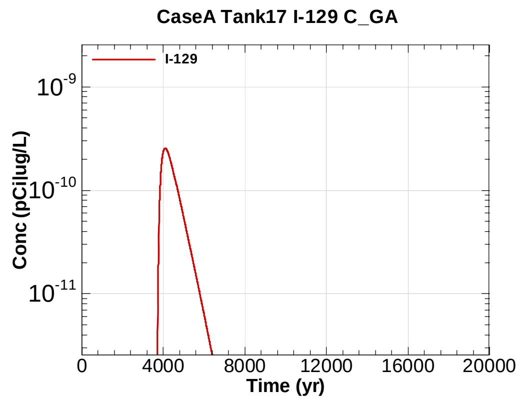

Figure E-1438 - 100m Aquifer Concentration for CaseA Tank17 I-129 C_GA

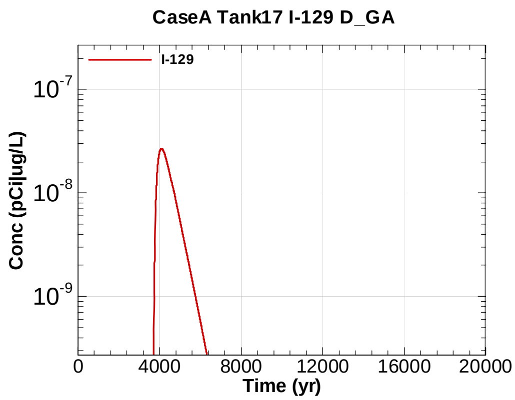

Figure E-1439 - 100m Aquifer Concentration for CaseA Tank17 I-129 D_GA

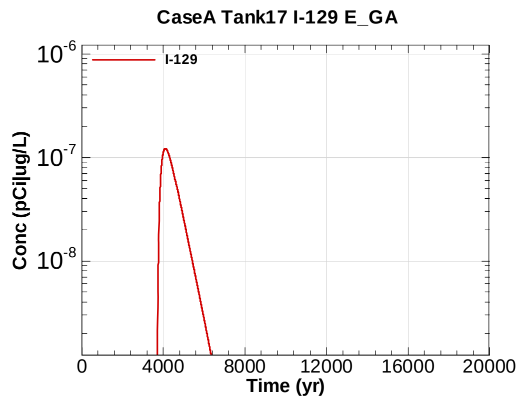

Figure E-1440 - 100m Aquifer Concentration for CaseA Tank17 I-129 E_GA

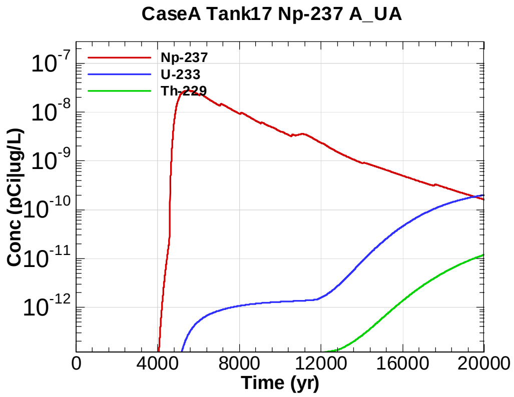

Figure E-1441 - 100m Aquifer Concentration for CaseA Tank17 Np-237 A_UA

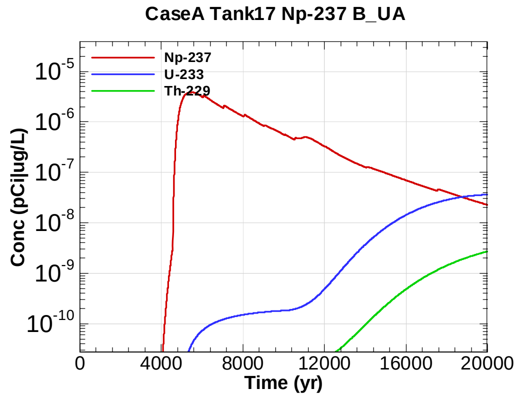

Figure E-1442 - 100m Aquifer Concentration for CaseA Tank17 Np-237 B_UA

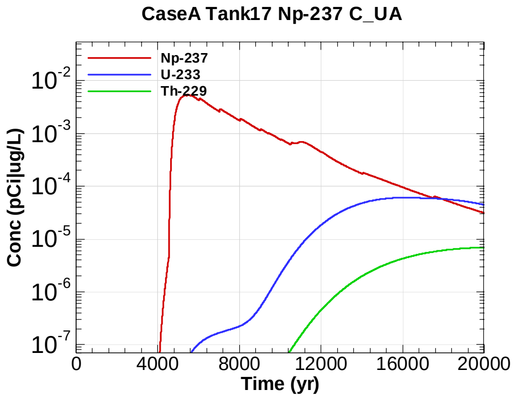

Figure E-1443 - 100m Aquifer Concentration for CaseA Tank17 Np-237 C_UA

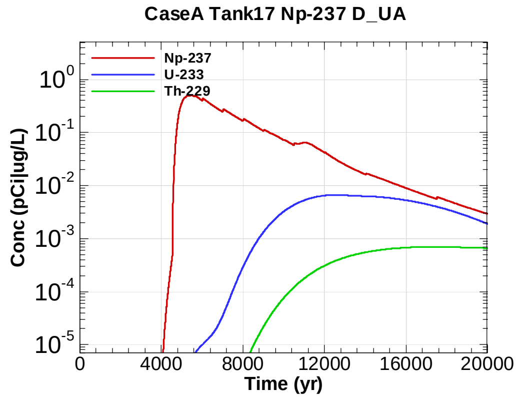

Figure E-1444 - 100m Aquifer Concentration for CaseA Tank17 Np-237 D_UA

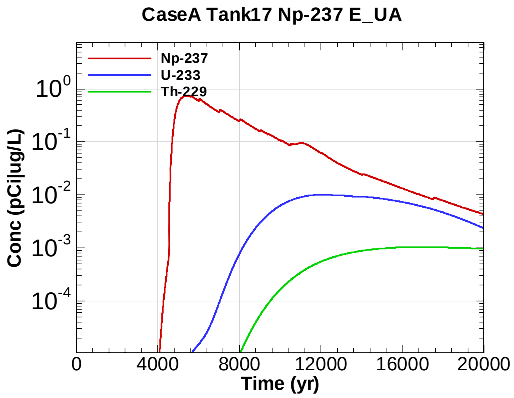

Figure E-1445 - 100m Aquifer Concentration for CaseA Tank17 Np-237 E_UA

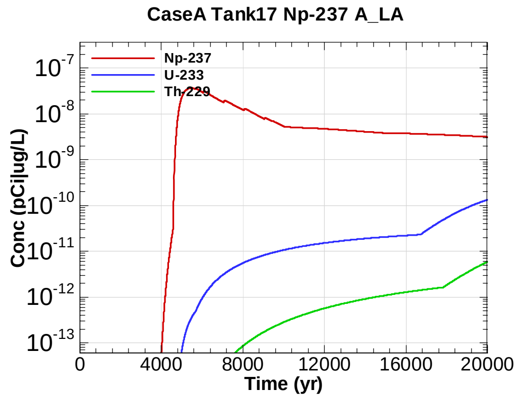

Figure E-1446 - 100m Aquifer Concentration for CaseA Tank17 Np-237 A_LA

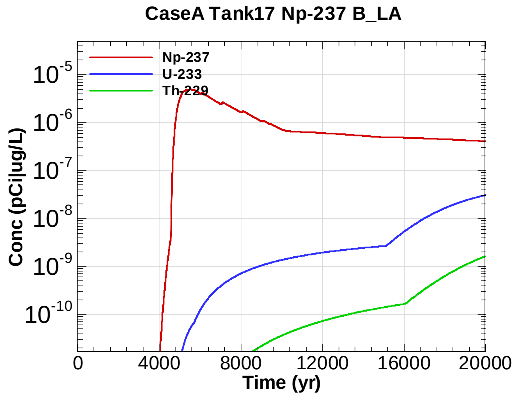

Figure E-1447 - 100m Aquifer Concentration for CaseA Tank17 Np-237 B_LA

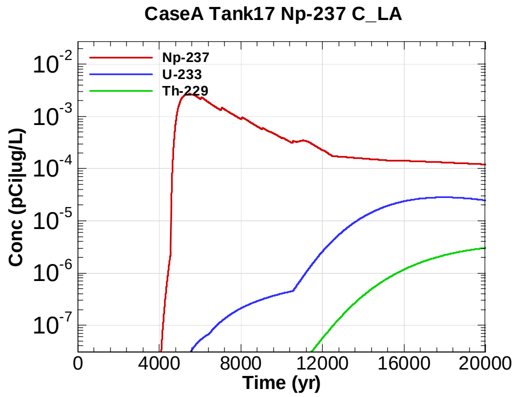

Figure E-1448 - 100m Aquifer Concentration for CaseA Tank17 Np-237 C_LA

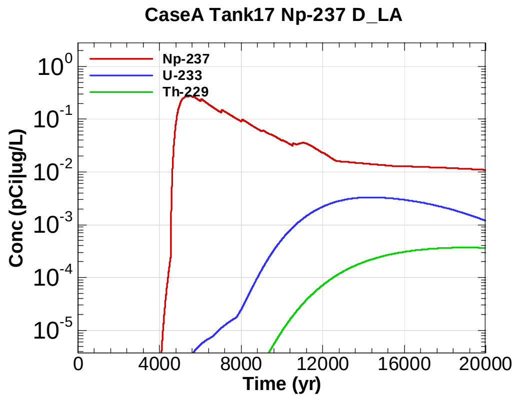

Figure E-1449 - 100m Aquifer Concentration for CaseA Tank17 Np-237 D_LA

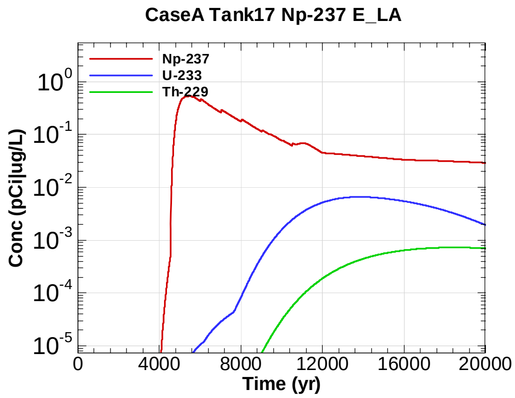

Figure E-1450 - 100m Aquifer Concentration for CaseA Tank17 Np-237 E_LA

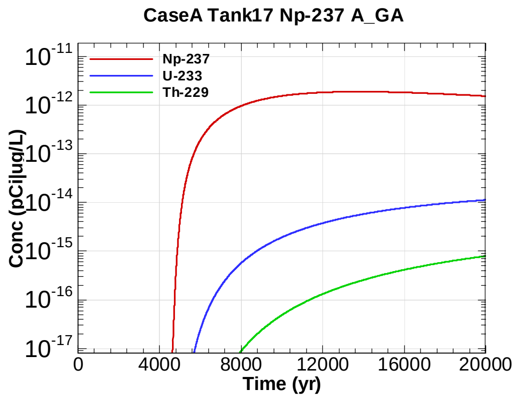

Figure E-1451 - 100m Aquifer Concentration for CaseA Tank17 Np-237 A_GA

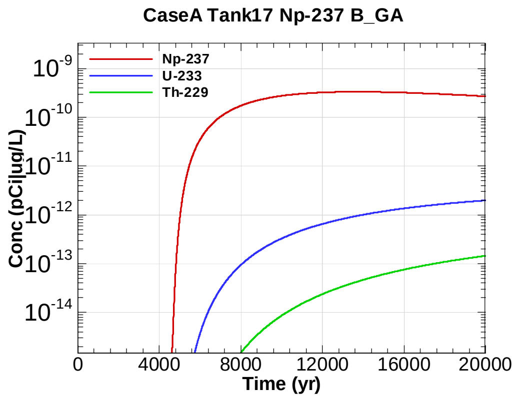

Figure E-1452 - 100m Aquifer Concentration for CaseA Tank17 Np-237 B_GA

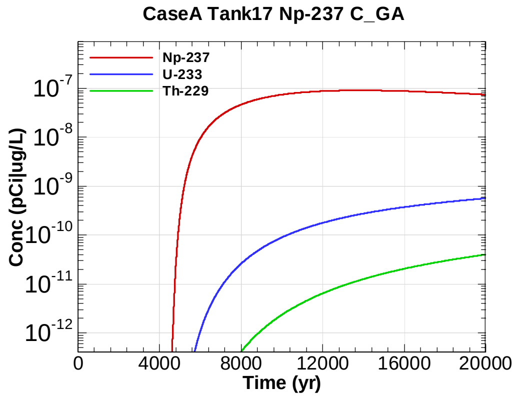

Figure E-1453 - 100m Aquifer Concentration for CaseA Tank17 Np-237 C_GA

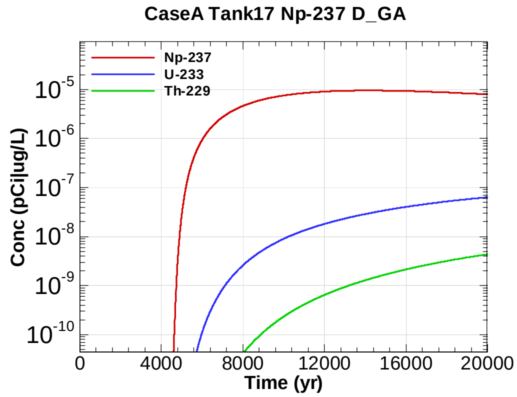

Figure E-1454 - 100m Aquifer Concentration for CaseA Tank17 Np-237 D_GA

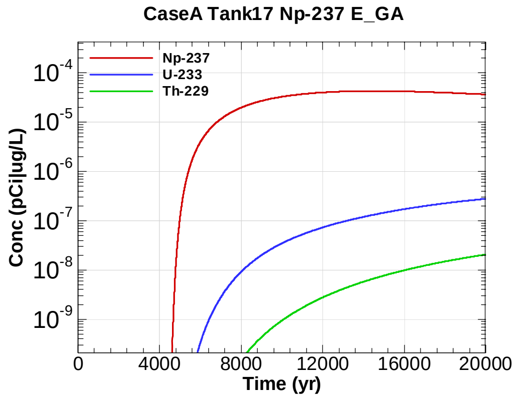

Figure E-1455 - 100m Aquifer Concentration for CaseA Tank17 Np-237 E_GA

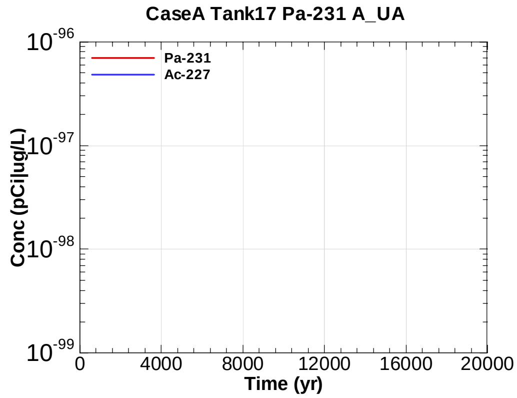

Figure E-1456 - 100m Aquifer Concentration for CaseA Tank17 Pa-231 A_UA

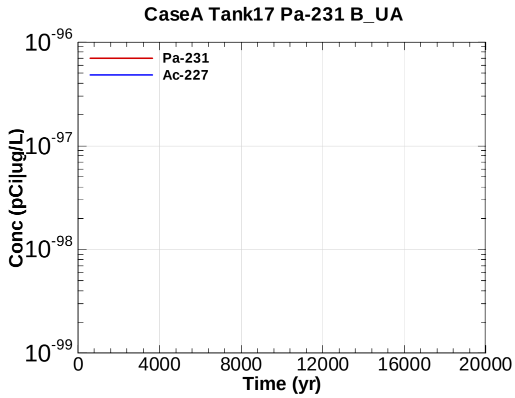

Figure E-1457 - 100m Aquifer Concentration for CaseA Tank17 Pa-231 B_UA

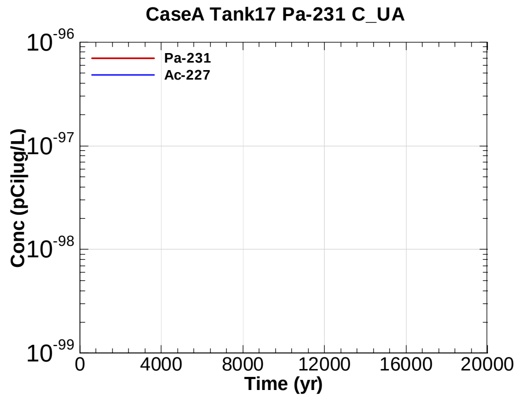

Figure E-1458 - 100m Aquifer Concentration for CaseA Tank17 Pa-231 C_UA

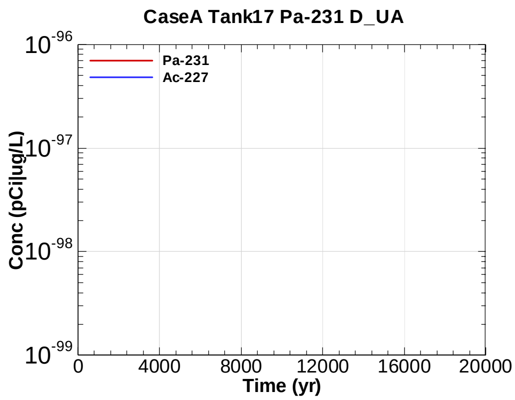

Figure E-1459 - 100m Aquifer Concentration for CaseA Tank17 Pa-231 D_UA

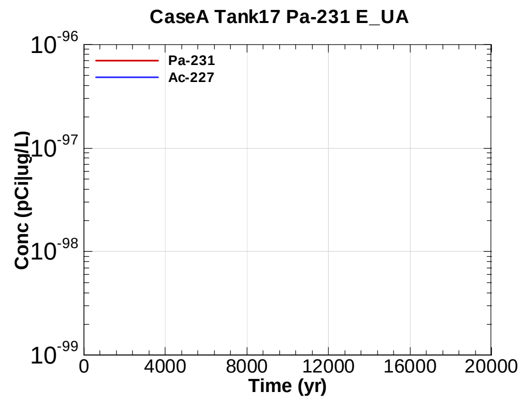

Figure E-1460 - 100m Aquifer Concentration for CaseA Tank17 Pa-231 E_UA

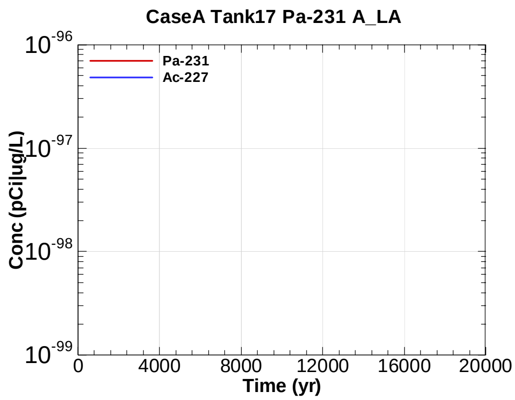

Figure E-1461 - 100m Aquifer Concentration for CaseA Tank17 Pa-231 A_LA

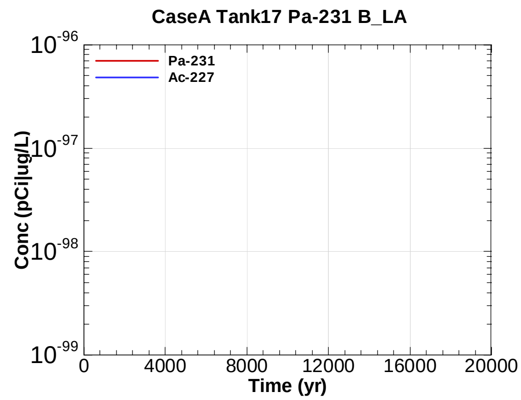

Figure E-1462 - 100m Aquifer Concentration for CaseA Tank17 Pa-231 B_LA

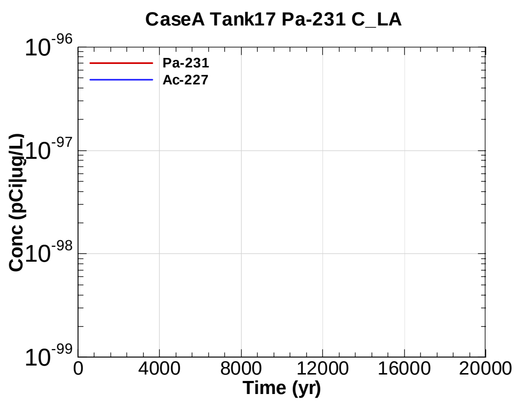

Figure E-1463 - 100m Aquifer Concentration for CaseA Tank17 Pa-231 C_LA

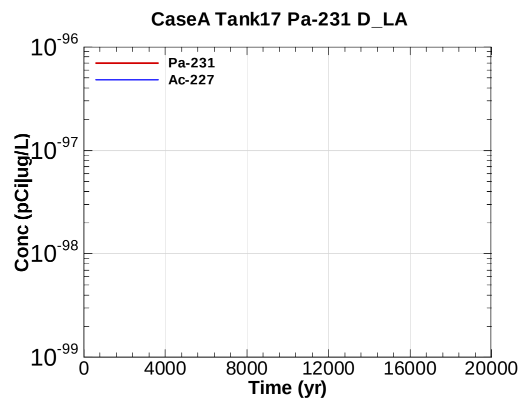

Figure E-1464 - 100m Aquifer Concentration for CaseA Tank17 Pa-231 D_LA

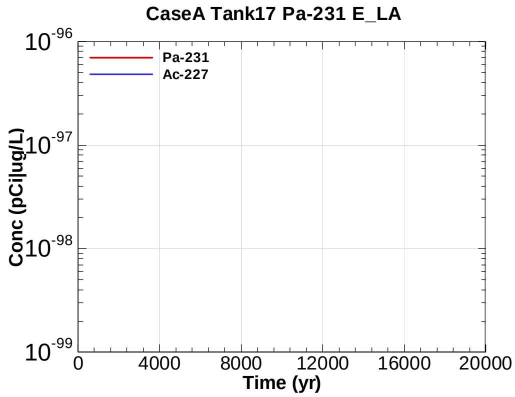

Figure E-1465 - 100m Aquifer Concentration for CaseA Tank17 Pa-231 E_LA

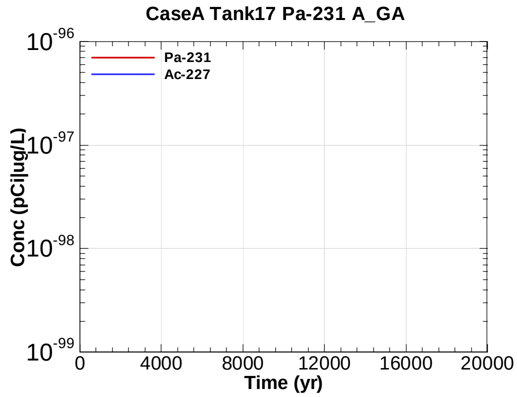

Figure E-1466 - 100m Aquifer Concentration for CaseA Tank17 Pa-231 A_GA

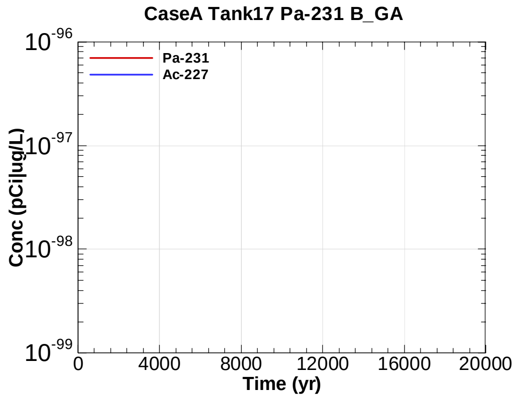

Figure E-1467 - 100m Aquifer Concentration for CaseA Tank17 Pa-231 B_GA

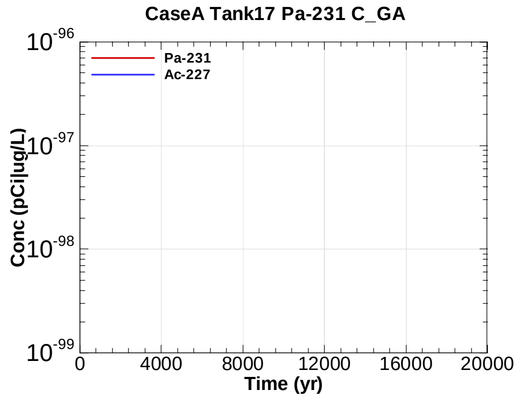

Figure E-1468 - 100m Aquifer Concentration for CaseA Tank17 Pa-231 C_GA

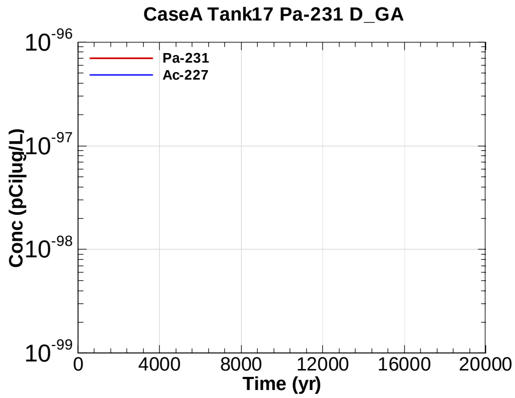

Figure E-1469 - 100m Aquifer Concentration for CaseA Tank17 Pa-231 D_GA

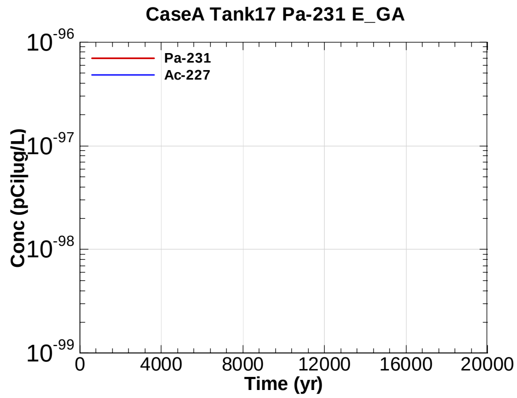

Figure E-1470 - 100m Aquifer Concentration for CaseA Tank17 Pa-231 E_GA

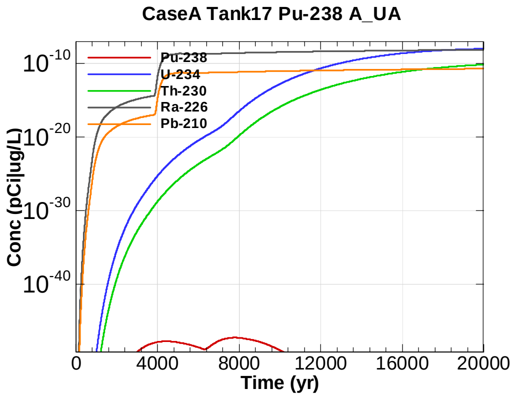

Figure E-1471 - 100m Aquifer Concentration for CaseA Tank17 Pu-238 A_UA

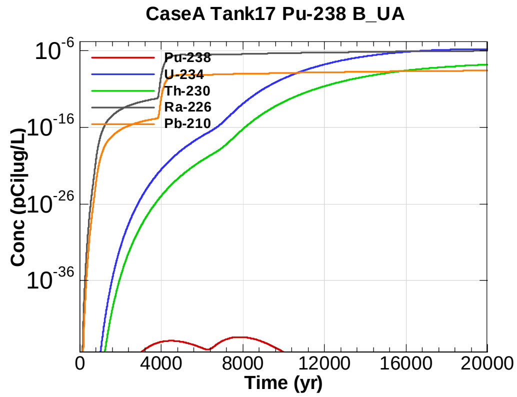

Figure E-1472 - 100m Aquifer Concentration for CaseA Tank17 Pu-238 B_UA

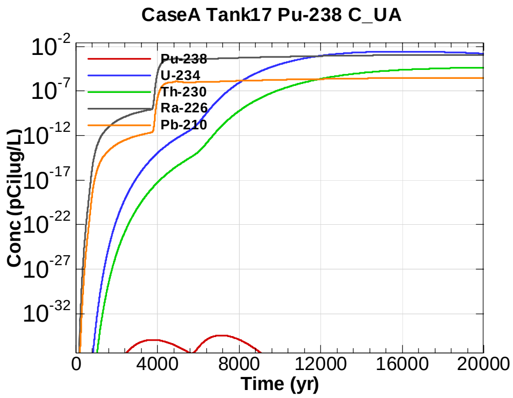

Figure E-1473 - 100m Aquifer Concentration for CaseA Tank17 Pu-238 C_UA

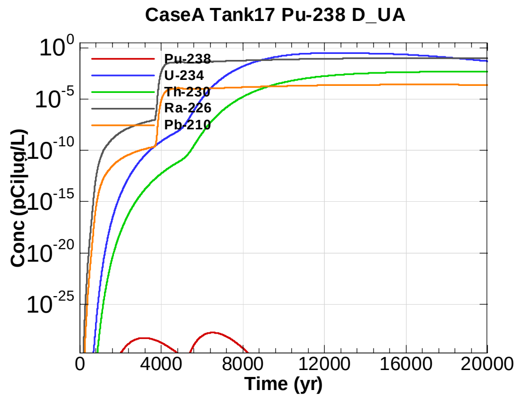

Figure E-1474 - 100m Aquifer Concentration for CaseA Tank17 Pu-238 D_UA

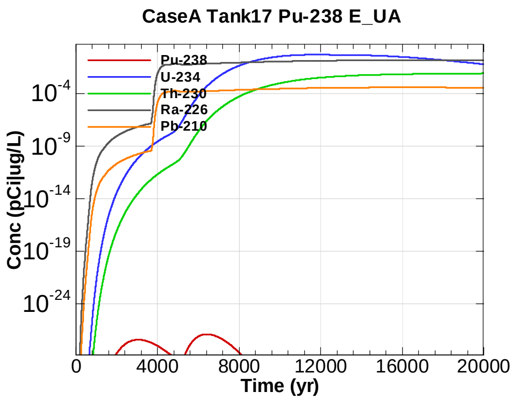

Figure E-1475 - 100m Aquifer Concentration for CaseA Tank17 Pu-238 E_UA

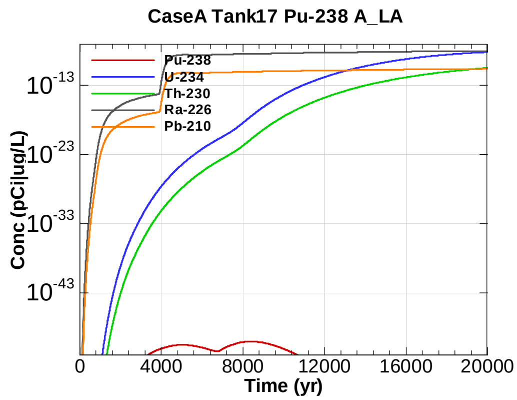

Figure E-1476 - 100m Aquifer Concentration for CaseA Tank17 Pu-238 A_LA

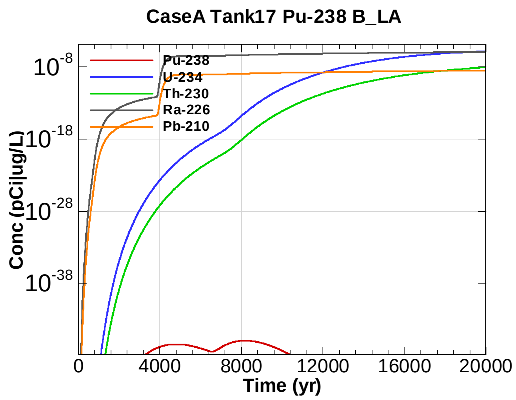

Figure E-1477 - 100m Aquifer Concentration for CaseA Tank17 Pu-238 B_LA

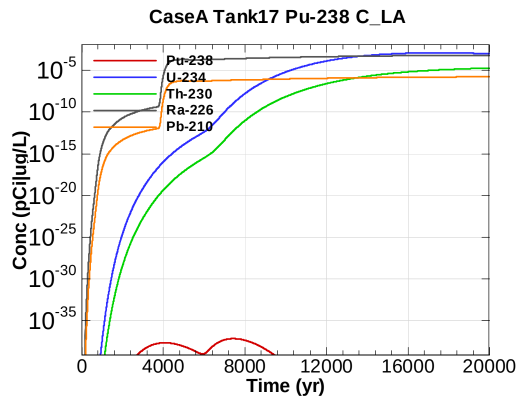

Figure E-1478 - 100m Aquifer Concentration for CaseA Tank17 Pu-238 C_LA

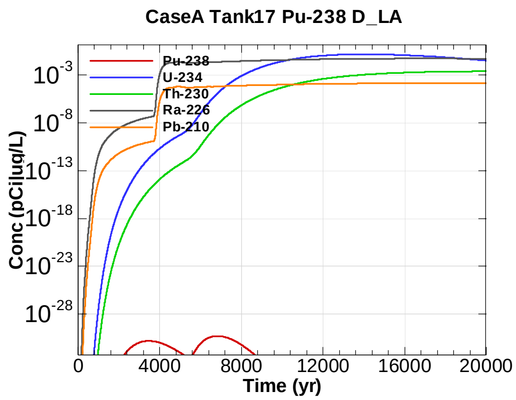

Figure E-1479 - 100m Aquifer Concentration for CaseA Tank17 Pu-238 D_LA

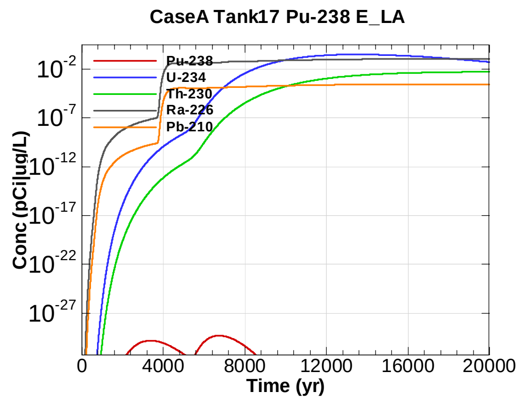

Figure E-1480 - 100m Aquifer Concentration for CaseA Tank17 Pu-238 E_LA

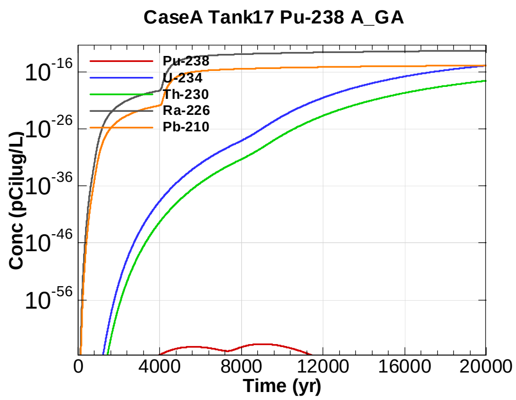

Figure E-1481 - 100m Aquifer Concentration for CaseA Tank17 Pu-238 A_GA

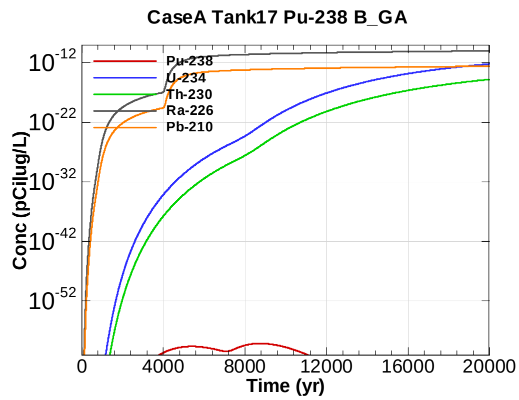

Figure E-1482 - 100m Aquifer Concentration for CaseA Tank17 Pu-238 B_GA

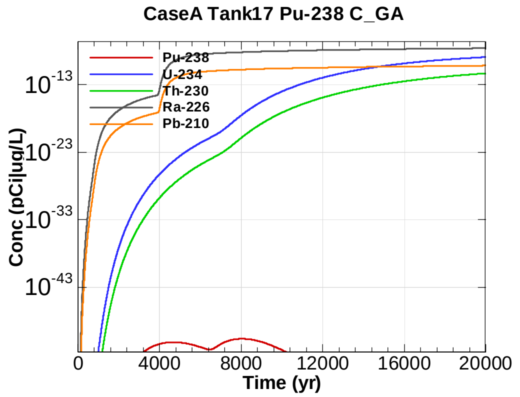

Figure E-1483 - 100m Aquifer Concentration for CaseA Tank17 Pu-238 C_GA

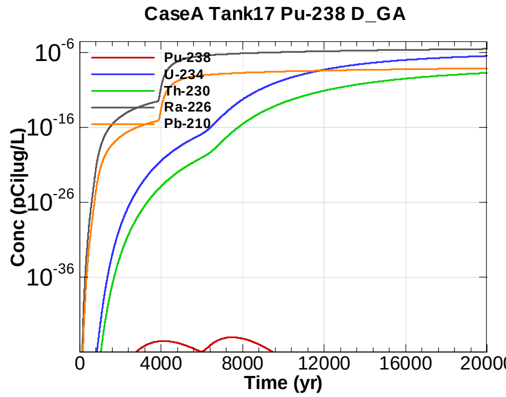

Figure E-1484 - 100m Aquifer Concentration for CaseA Tank17 Pu-238 D_GA

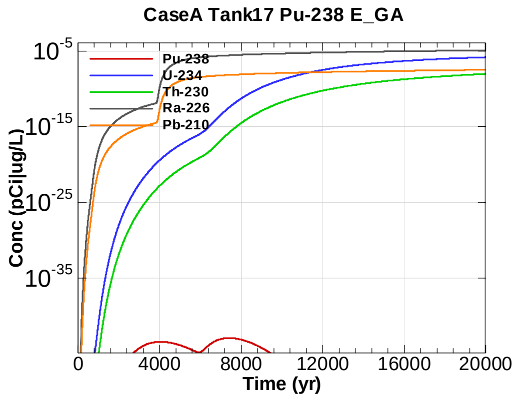

Figure E-1485 - 100m Aquifer Concentration for CaseA Tank17 Pu-238 E_GA

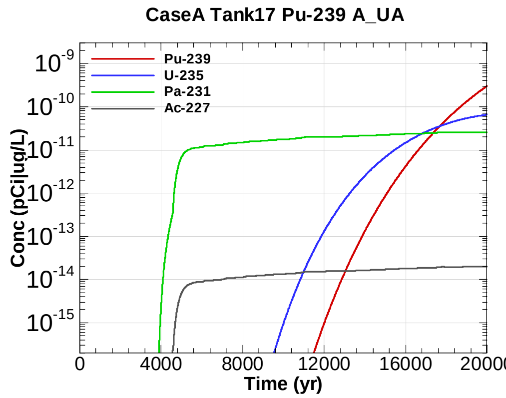

Figure E-1486 - 100m Aquifer Concentration for CaseA Tank17 Pu-239 A_UA

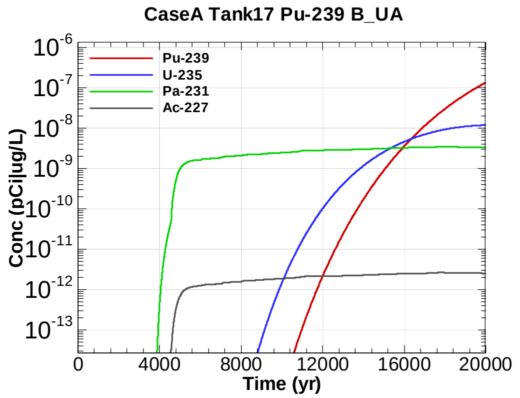

Figure E-1487 - 100m Aquifer Concentration for CaseA Tank17 Pu-239 B_UA

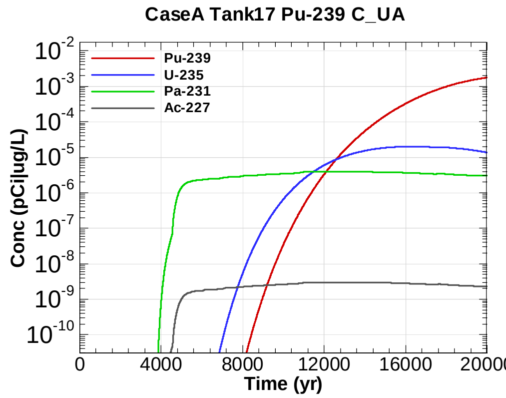

Figure E-1488 - 100m Aquifer Concentration for CaseA Tank17 Pu-239 C_UA

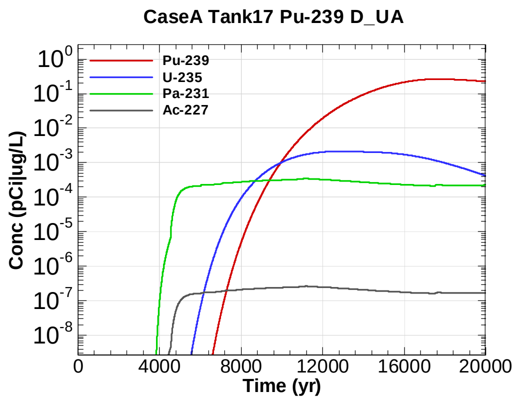

Figure E-1489 - 100m Aquifer Concentration for CaseA Tank17 Pu-239 D_UA

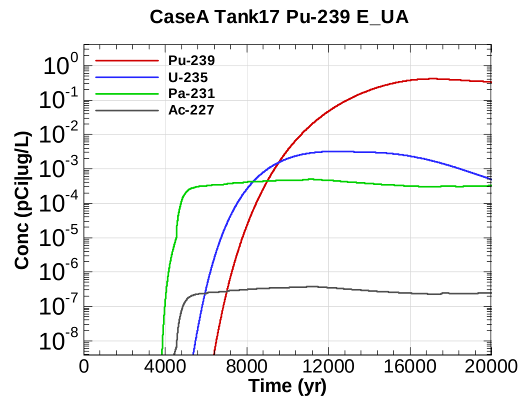

Figure E-1490 - 100m Aquifer Concentration for CaseA Tank17 Pu-239 E_UA

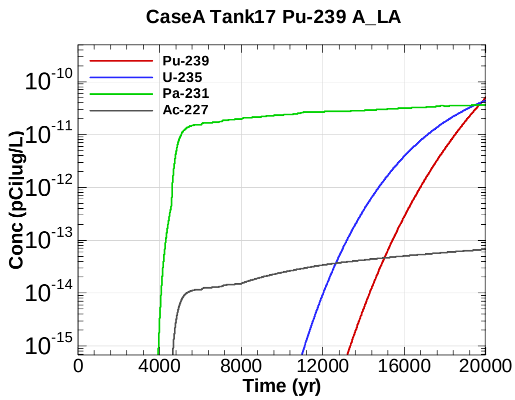

Figure E-1491 - 100m Aquifer Concentration for CaseA Tank17 Pu-239 A_LA

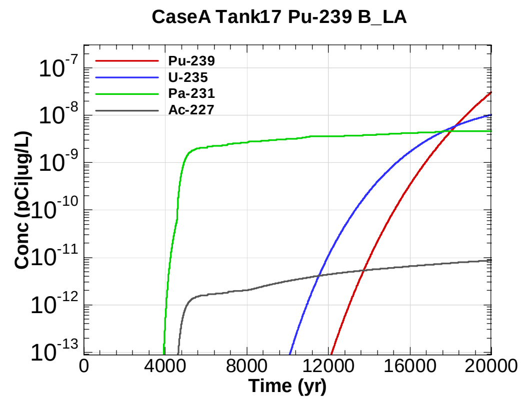

Figure E-1492 - 100m Aquifer Concentration for CaseA Tank17 Pu-239 B_LA

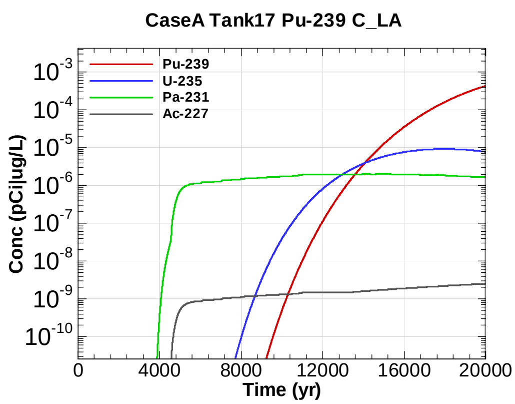

Figure E-1493 - 100m Aquifer Concentration for CaseA Tank17 Pu-239 C_LA

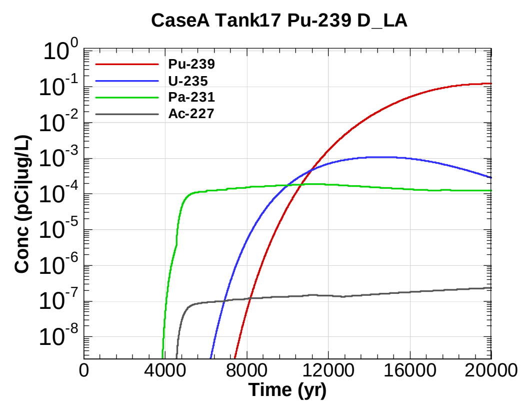

Figure E-1494 - 100m Aquifer Concentration for CaseA Tank17 Pu-239 D_LA

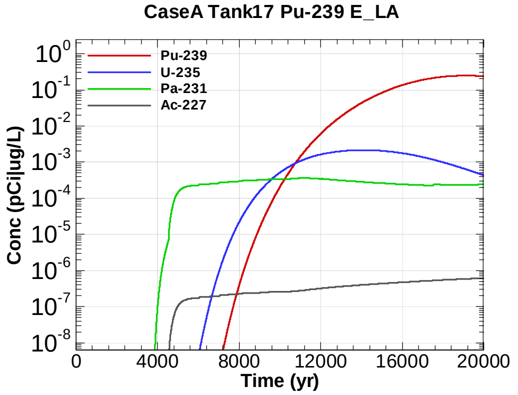

Figure E-1495 - 100m Aquifer Concentration for CaseA Tank17 Pu-239 E_LA

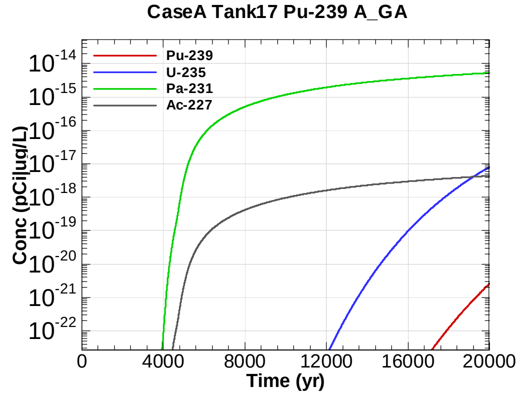

Figure E-1496 - 100m Aquifer Concentration for CaseA Tank17 Pu-239 A_GA

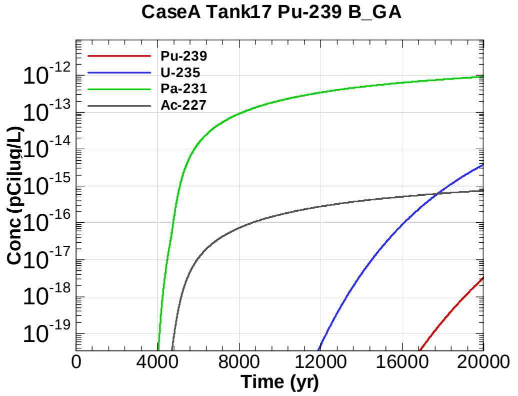

Figure E-1497 - 100m Aquifer Concentration for CaseA Tank17 Pu-239 B_GA

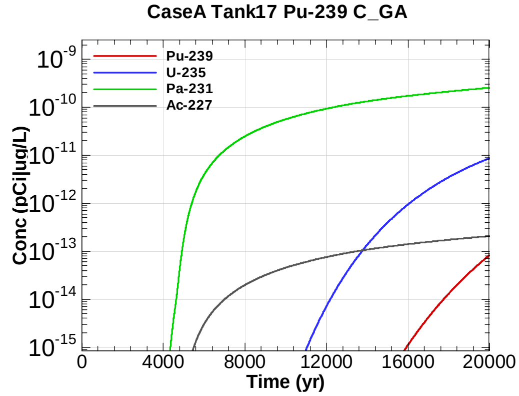

Figure E-1498 - 100m Aquifer Concentration for CaseA Tank17 Pu-239 C_GA

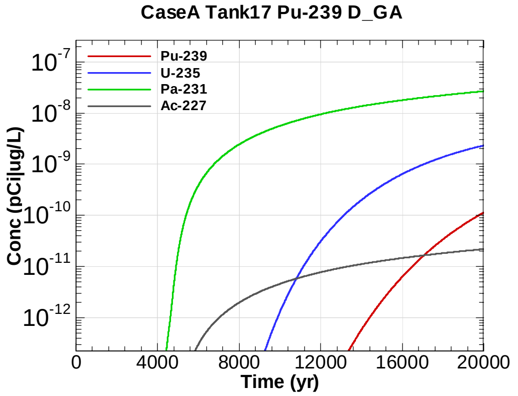

Figure E-1499 - 100m Aquifer Concentration for CaseA Tank17 Pu-239 D_GA

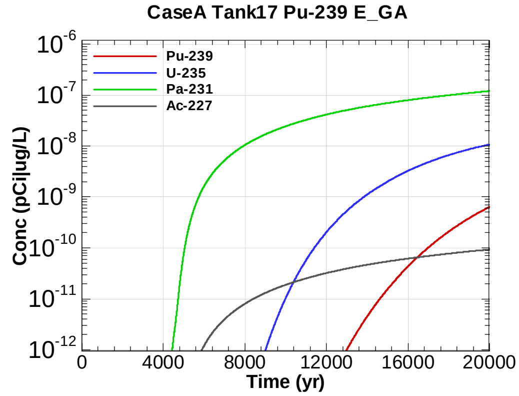

Figure E-1500 - 100m Aquifer Concentration for CaseA Tank17 Pu-239 E_GA

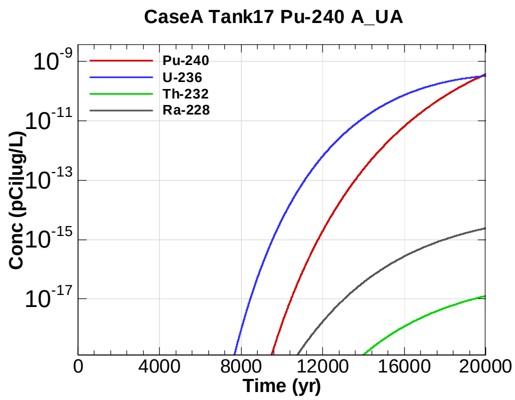

Figure E-1501 - 100m Aquifer Concentration for CaseA Tank17 Pu-240 A_UA

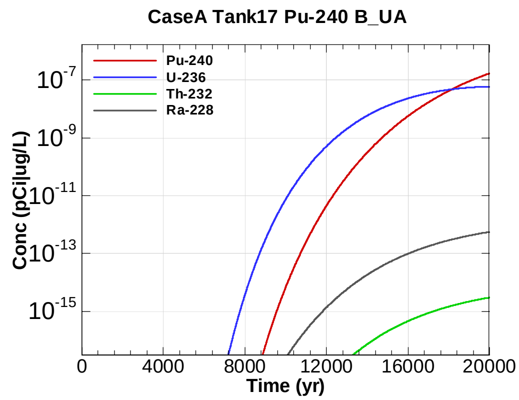

Figure E-1502 - 100m Aquifer Concentration for CaseA Tank17 Pu-240 B_UA

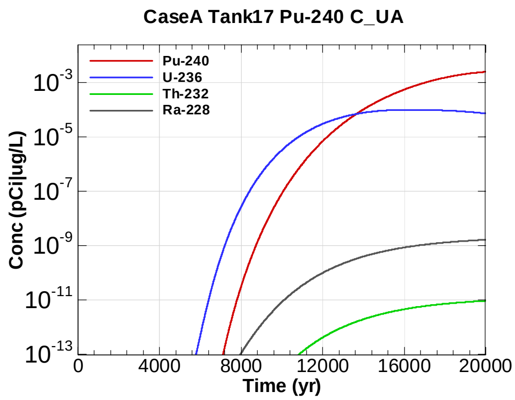

Figure E-1503 - 100m Aquifer Concentration for CaseA Tank17 Pu-240 C_UA

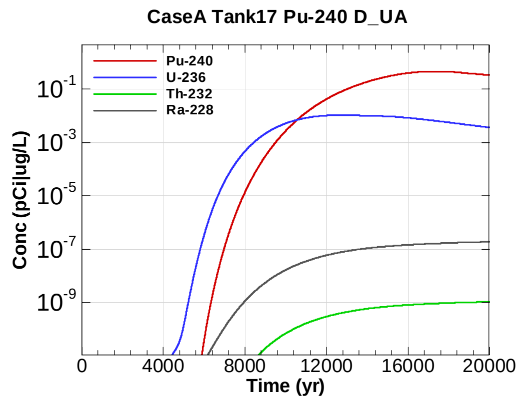

Figure E-1504 - 100m Aquifer Concentration for CaseA Tank17 Pu-240 D_UA

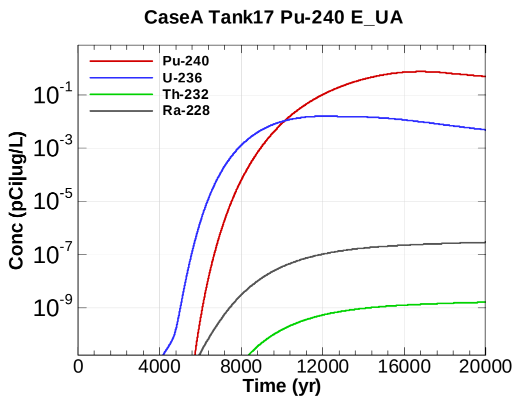

Figure E-1505 - 100m Aquifer Concentration for CaseA Tank17 Pu-240 E_UA

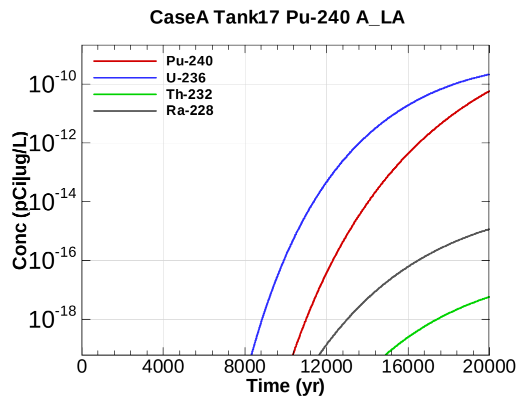

Figure E-1506 - 100m Aquifer Concentration for CaseA Tank17 Pu-240 A_LA

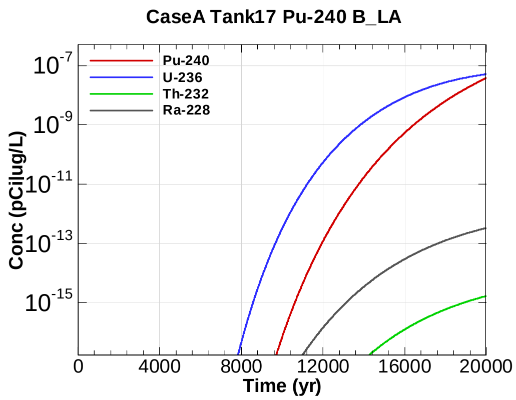

Figure E-1507 - 100m Aquifer Concentration for CaseA Tank17 Pu-240 B_LA

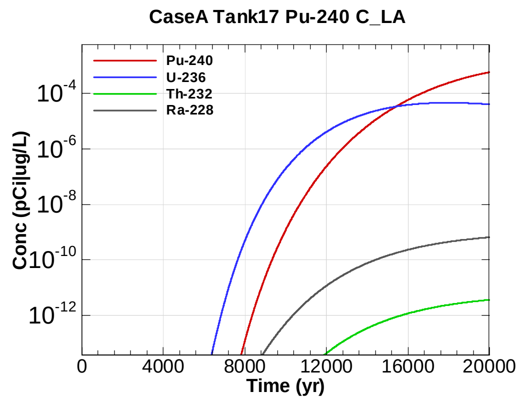

Figure E-1508 - 100m Aquifer Concentration for CaseA Tank17 Pu-240 C_LA

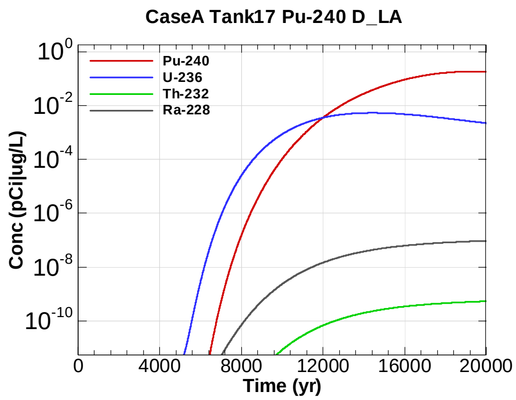

Figure E-1509 - 100m Aquifer Concentration for CaseA Tank17 Pu-240 D_LA

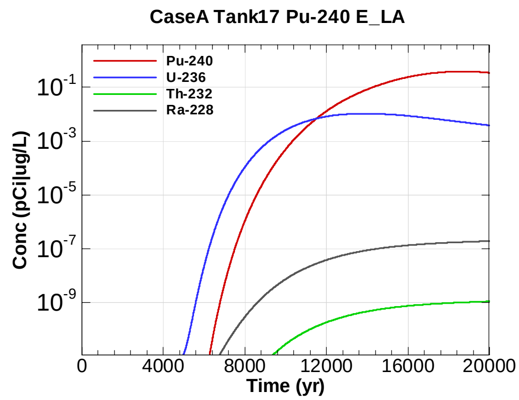

Figure E-1510 - 100m Aquifer Concentration for CaseA Tank17 Pu-240 E_LA

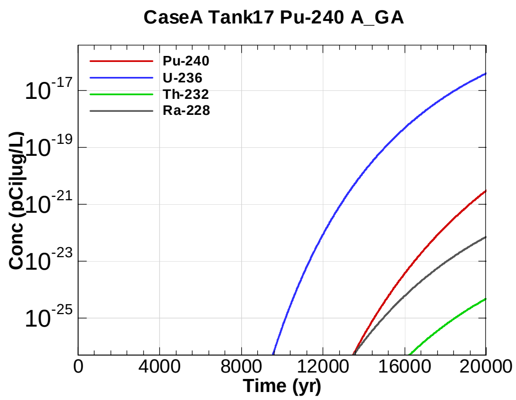

Figure E-1511 - 100m Aquifer Concentration for CaseA Tank17 Pu-240 A_GA

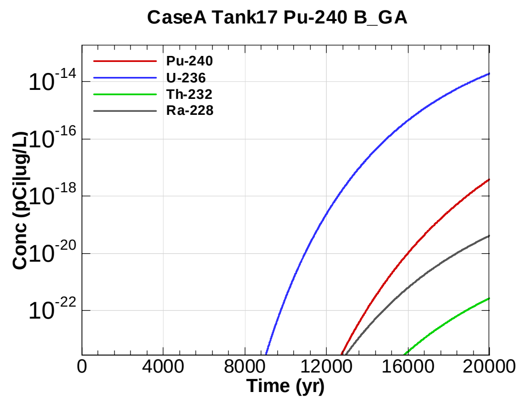

Figure E-1512 - 100m Aquifer Concentration for CaseA Tank17 Pu-240 B_GA

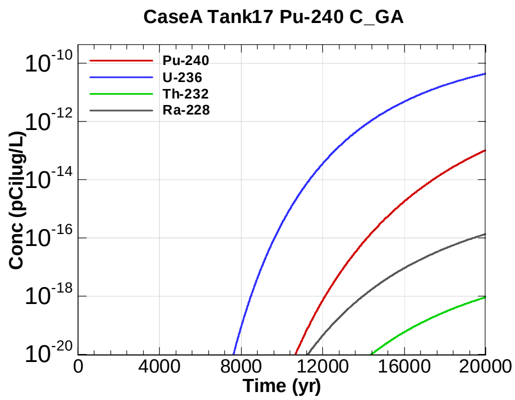

Figure E-1513 - 100m Aquifer Concentration for CaseA Tank17 Pu-240 C_GA

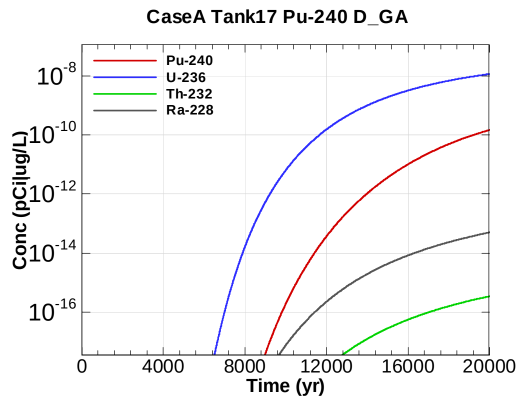

Figure E-1514 - 100m Aquifer Concentration for CaseA Tank17 Pu-240 D_GA

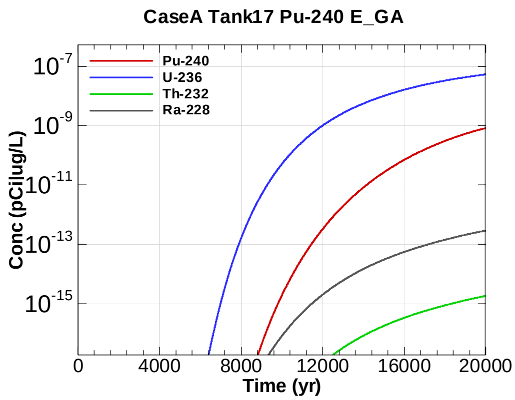

Figure E-1515 - 100m Aquifer Concentration for CaseA Tank17 Pu-240 E_GA

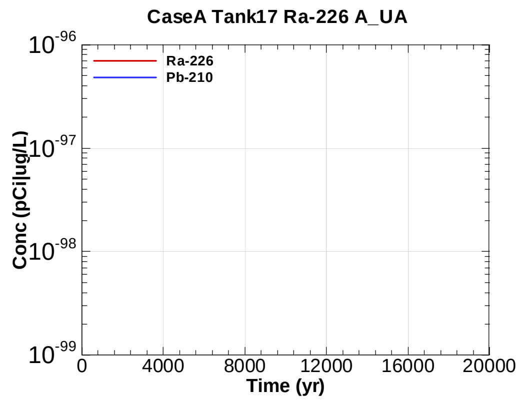

Figure E-1516 - 100m Aquifer Concentration for CaseA Tank17 Ra-226 A_UA

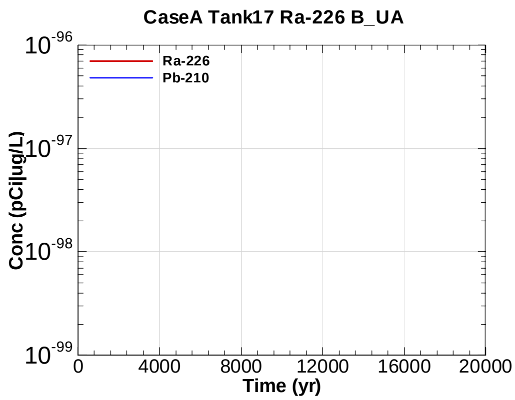

Figure E-1517 - 100m Aquifer Concentration for CaseA Tank17 Ra-226 B_UA

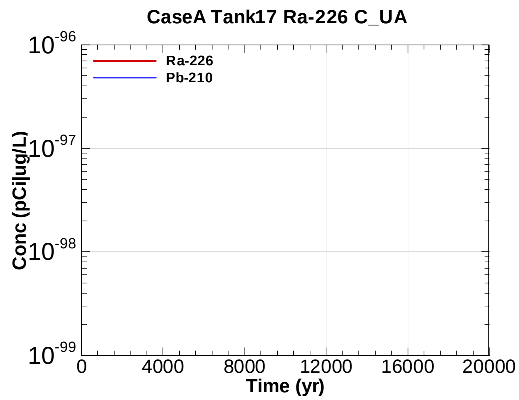

Figure E-1518 - 100m Aquifer Concentration for CaseA Tank17 Ra-226 C_UA

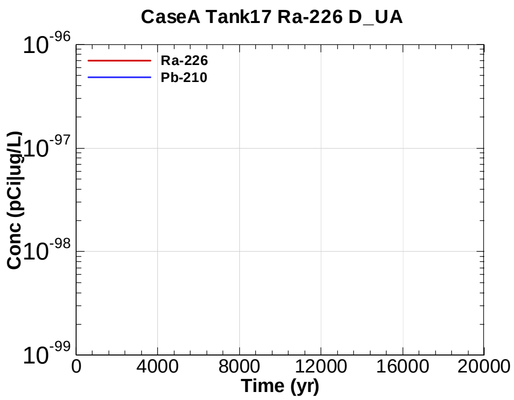

Figure E-1519 - 100m Aquifer Concentration for CaseA Tank17 Ra-226 D_UA

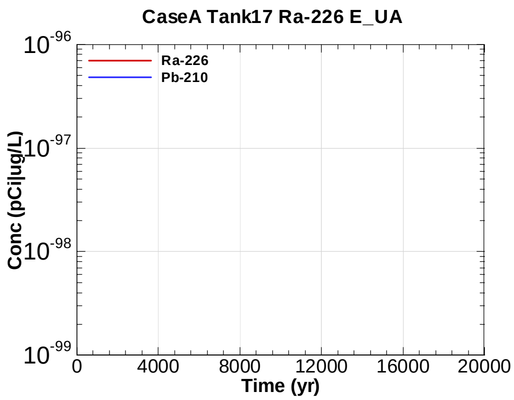

Figure E-1520 - 100m Aquifer Concentration for CaseA Tank17 Ra-226 E_UA

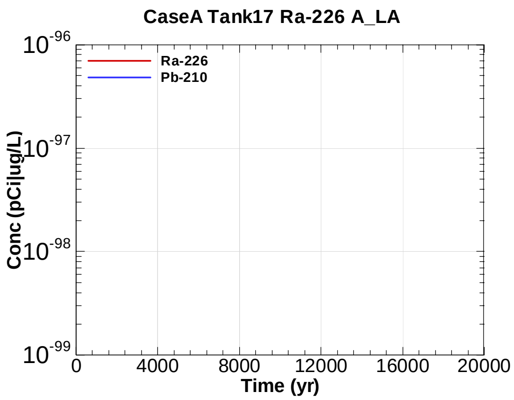

Figure E-1521 - 100m Aquifer Concentration for CaseA Tank17 Ra-226 A_LA

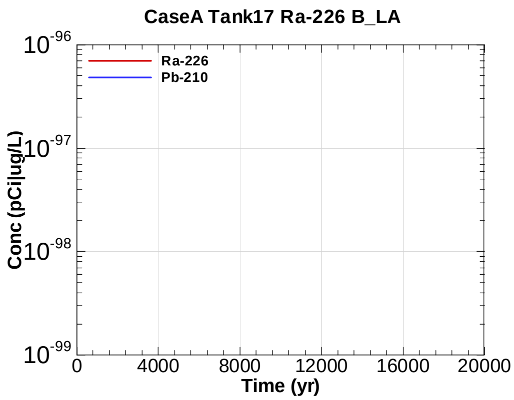

Figure E-1522 - 100m Aquifer Concentration for CaseA Tank17 Ra-226 B_LA

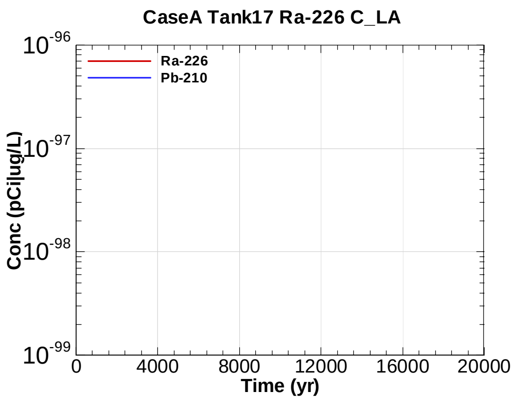

Figure E-1523 - 100m Aquifer Concentration for CaseA Tank17 Ra-226 C_LA

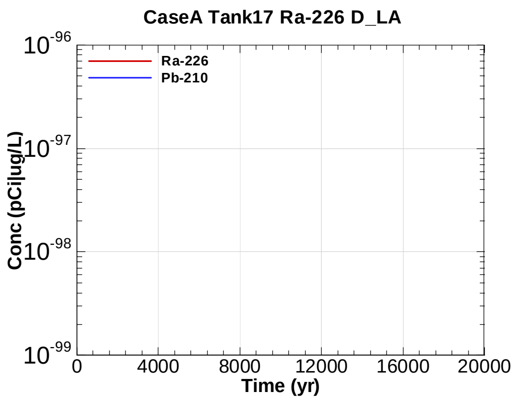

Figure E-1524 - 100m Aquifer Concentration for CaseA Tank17 Ra-226 D_LA

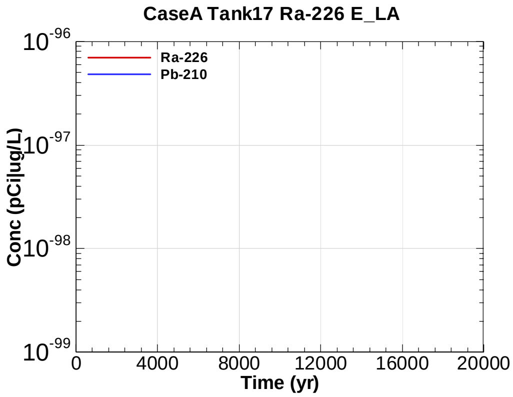

Figure E-1525 - 100m Aquifer Concentration for CaseA Tank17 Ra-226 E_LA

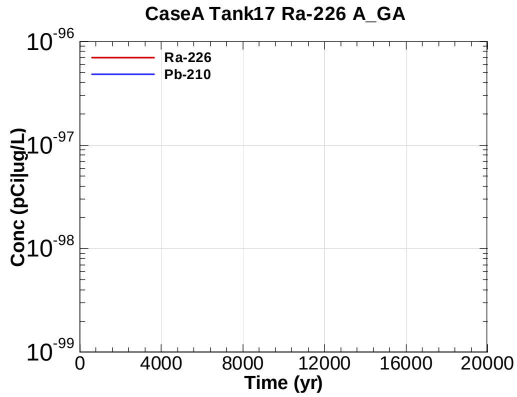

Figure E-1526 - 100m Aquifer Concentration for CaseA Tank17 Ra-226 A_GA

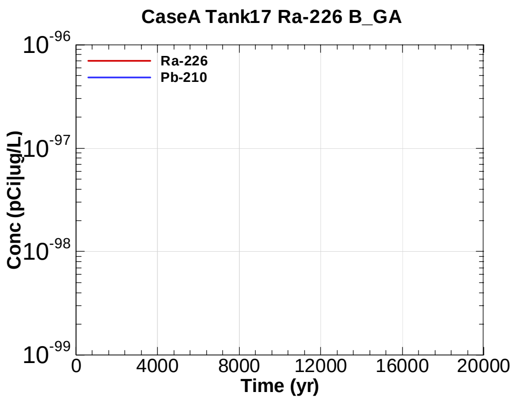

Figure E-1527 - 100m Aquifer Concentration for CaseA Tank17 Ra-226 B_GA

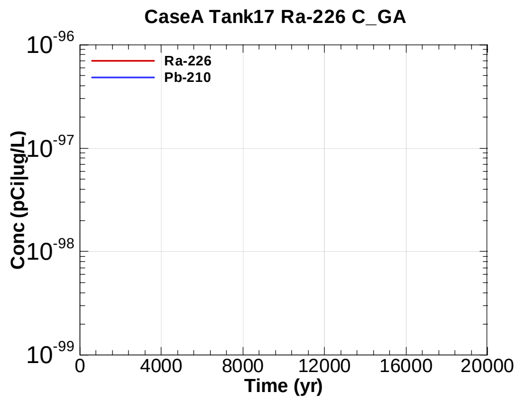

Figure E-1528 - 100m Aquifer Concentration for CaseA Tank17 Ra-226 C_GA

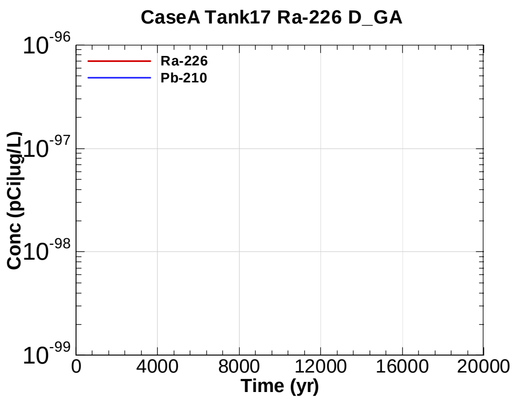

Figure E-1529 - 100m Aquifer Concentration for CaseA Tank17 Ra-226 D_GA

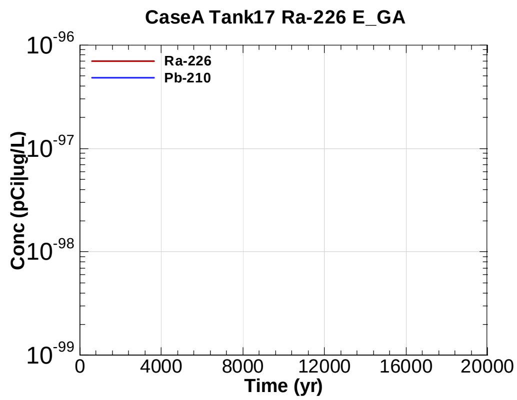

Figure E-1530 - 100m Aquifer Concentration for CaseA Tank17 Ra-226 E_GA

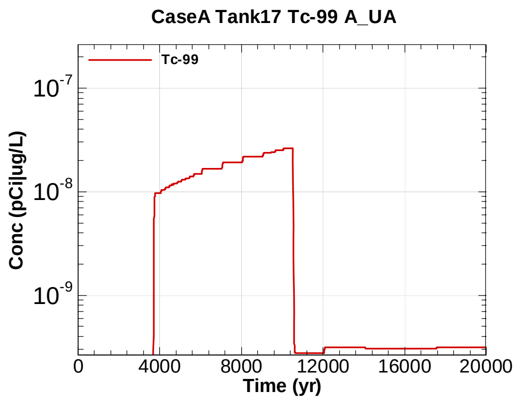

Figure E-1531 - 100m Aquifer Concentration for CaseA Tank17 Tc-99 A_UA

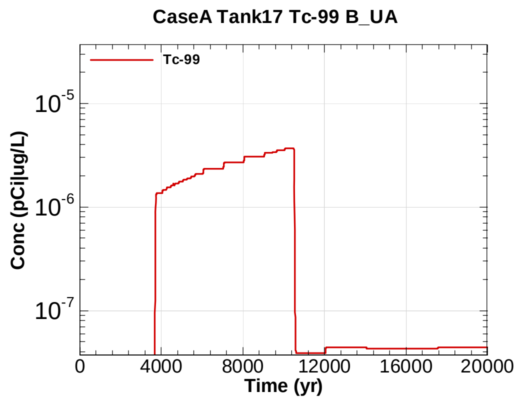

Figure E-1532 - 100m Aquifer Concentration for CaseA Tank17 Tc-99 B_UA

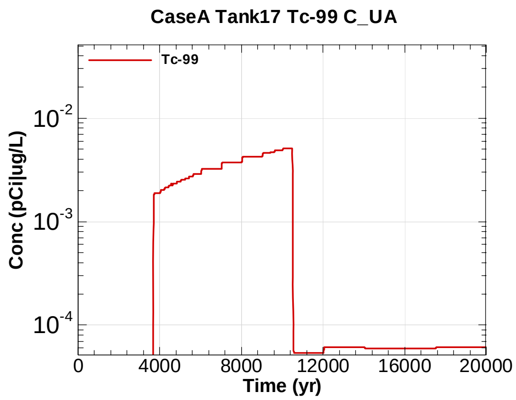

Figure E-1533 - 100m Aquifer Concentration for CaseA Tank17 Tc-99 C_UA

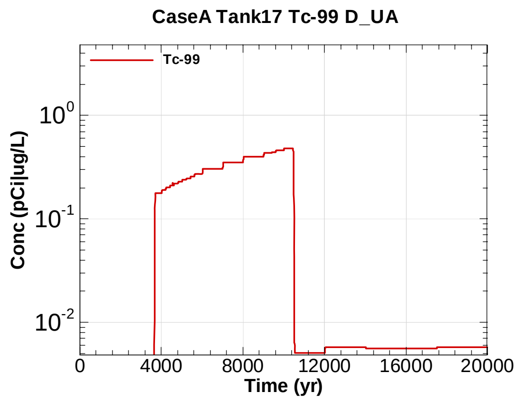

Figure E-1534 - 100m Aquifer Concentration for CaseA Tank17 Tc-99 D_UA

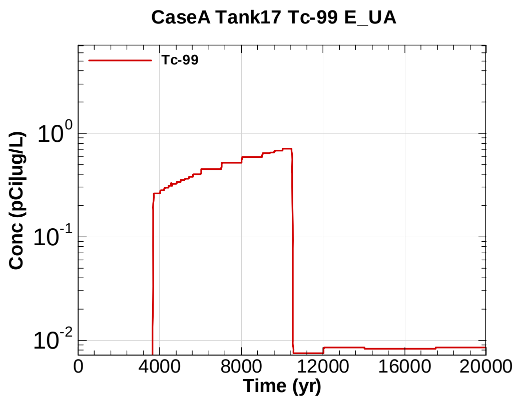

Figure E-1535 - 100m Aquifer Concentration for CaseA Tank17 Tc-99 E_UA

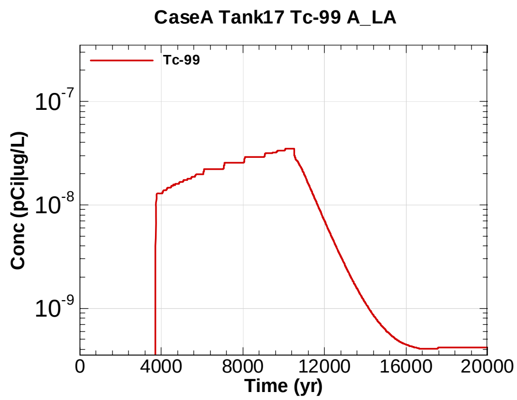

Figure E-1536 - 100m Aquifer Concentration for CaseA Tank17 Tc-99 A_LA

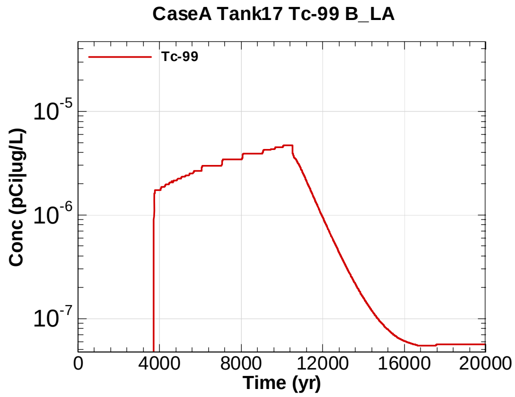

Figure E-1537 - 100m Aquifer Concentration for CaseA Tank17 Tc-99 B_LA

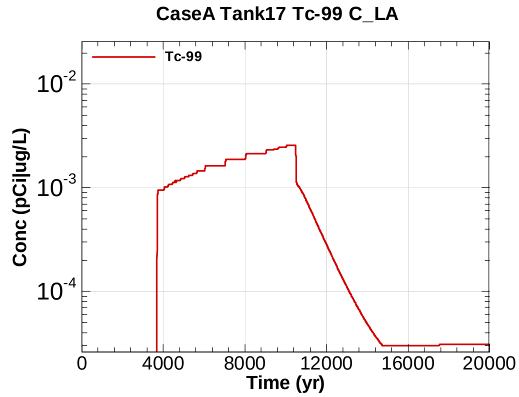

Figure E-1538 - 100m Aquifer Concentration for CaseA Tank17 Tc-99 C_LA

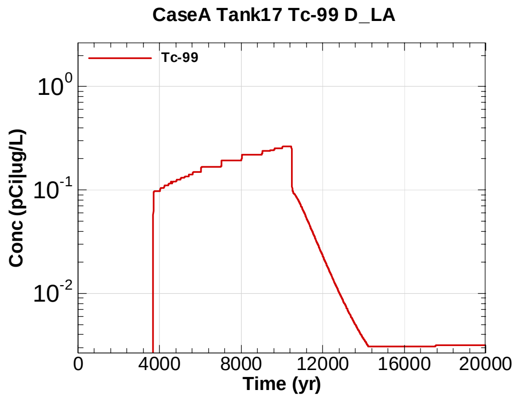

Figure E-1539 - 100m Aquifer Concentration for CaseA Tank17 Tc-99 D_LA

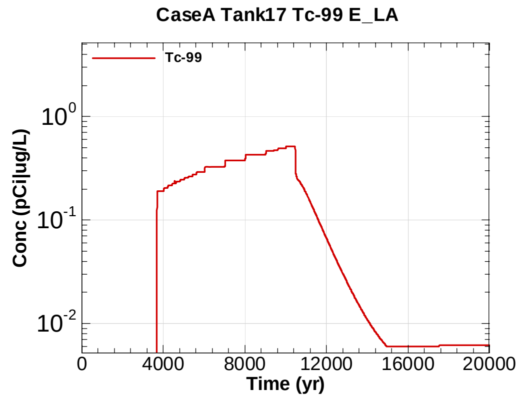

Figure E-1540 - 100m Aquifer Concentration for CaseA Tank17 Tc-99 E_LA

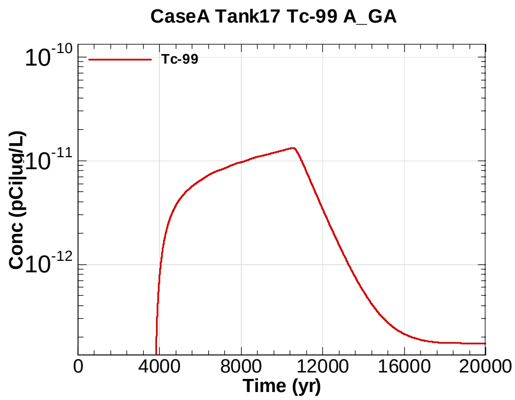

Figure E-1541 - 100m Aquifer Concentration for CaseA Tank17 Tc-99 A_GA

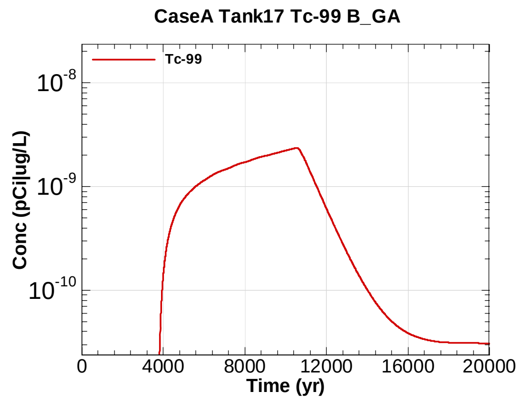

Figure E-1542 - 100m Aquifer Concentration for CaseA Tank17 Tc-99 B_GA

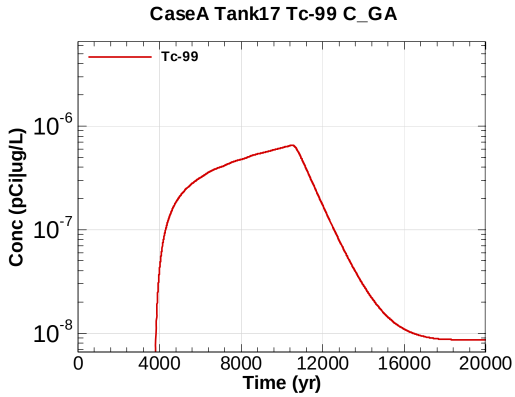

Figure E-1543 - 100m Aquifer Concentration for CaseA Tank17 Tc-99 C_GA

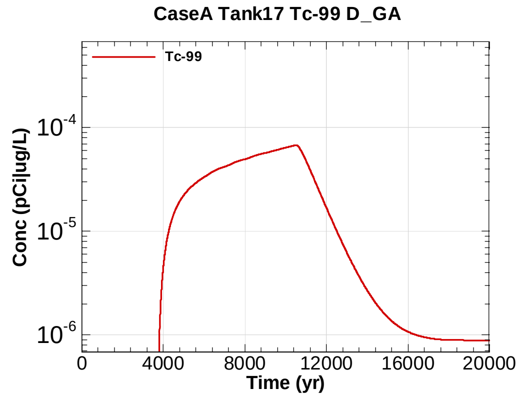

Figure E-1544 - 100m Aquifer Concentration for CaseA Tank17 Tc-99 D_GA

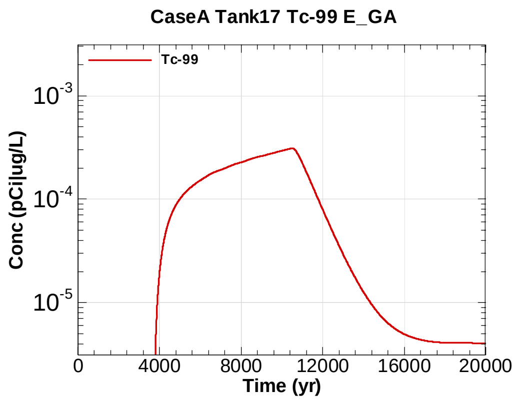

Figure E-1545 - 100m Aquifer Concentration for CaseA Tank17 Tc-99 E_GA

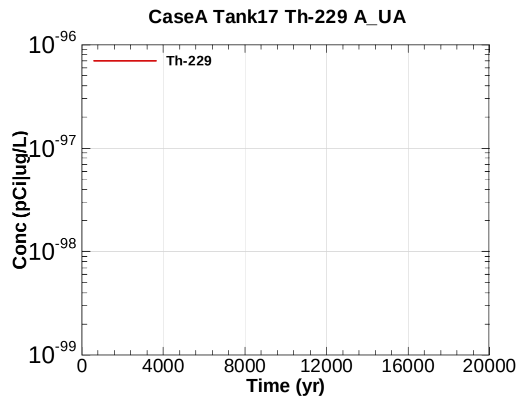

Figure E-1546 - 100m Aquifer Concentration for CaseA Tank17 Th-229 A_UA

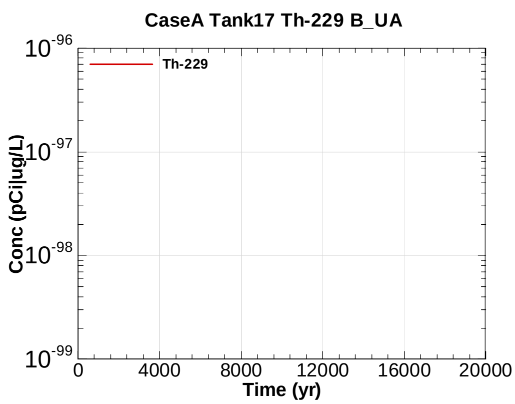

Figure E-1547 - 100m Aquifer Concentration for CaseA Tank17 Th-229 B_UA

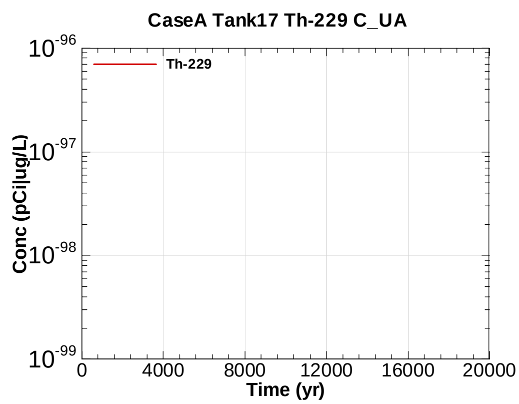

Figure E-1548 - 100m Aquifer Concentration for CaseA Tank17 Th-229 C_UA

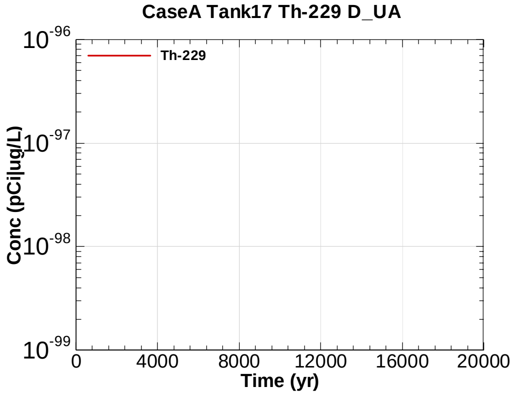

Figure E-1549 - 100m Aquifer Concentration for CaseA Tank17 Th-229 D_UA

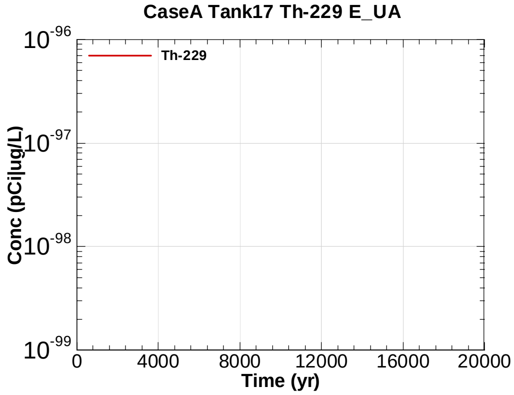

Figure E-1550 - 100m Aquifer Concentration for CaseA Tank17 Th-229 E_UA

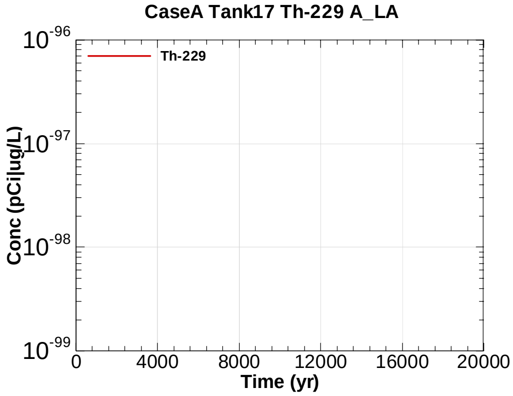

Figure E-1551 - 100m Aquifer Concentration for CaseA Tank17 Th-229 A_LA

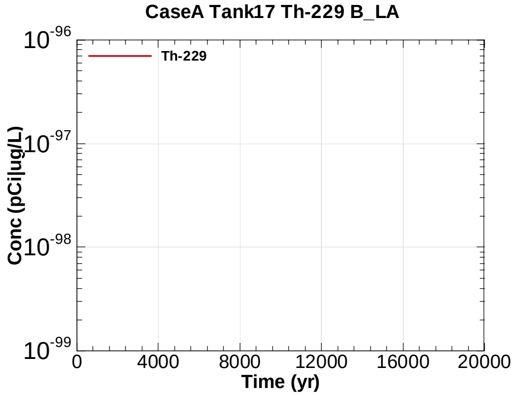

Figure E-1552 - 100m Aquifer Concentration for CaseA Tank17 Th-229 B_LA

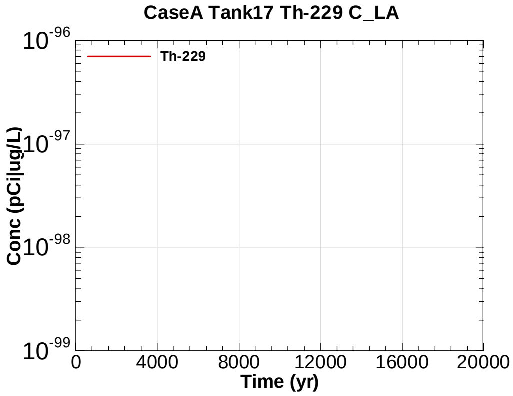

Figure E-1553 - 100m Aquifer Concentration for CaseA Tank17 Th-229 C_LA

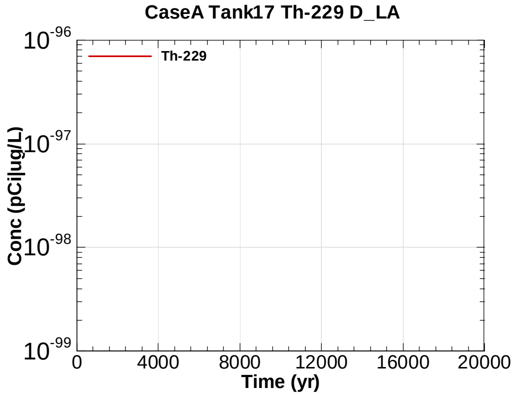

Figure E-1554 - 100m Aquifer Concentration for CaseA Tank17 Th-229 D_LA

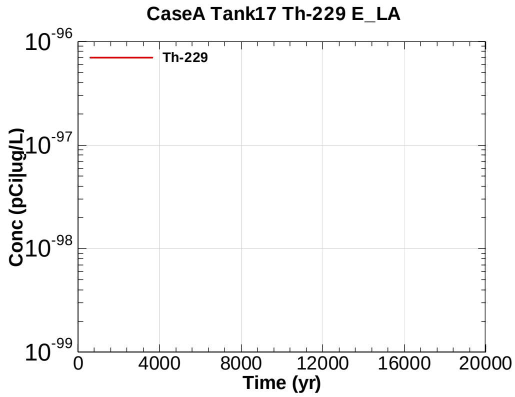

Figure E-1555 - 100m Aquifer Concentration for CaseA Tank17 Th-229 E_LA

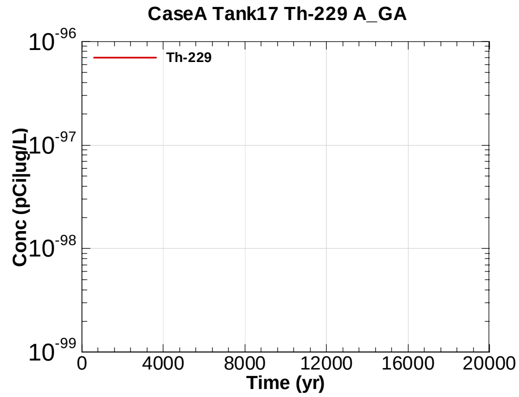

Figure E-1556 - 100m Aquifer Concentration for CaseA Tank17 Th-229 A_GA

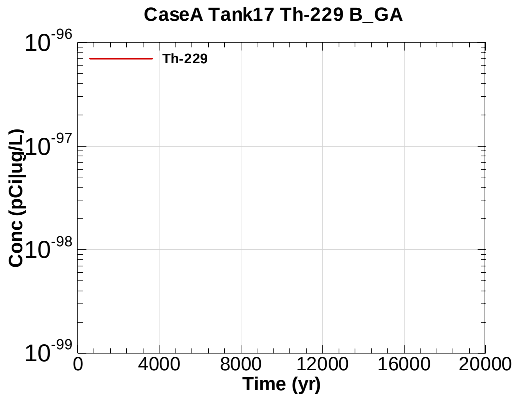

Figure E-1557 - 100m Aquifer Concentration for CaseA Tank17 Th-229 B_GA

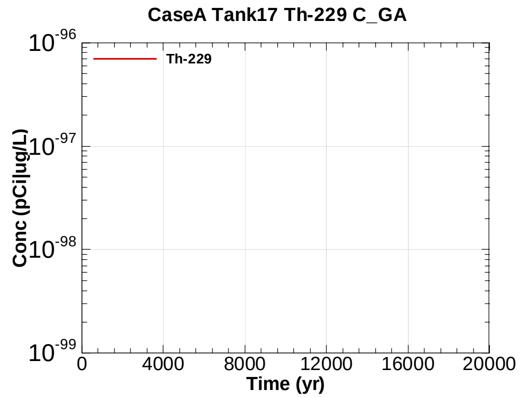

Figure E-1558 - 100m Aquifer Concentration for CaseA Tank17 Th-229 C_GA

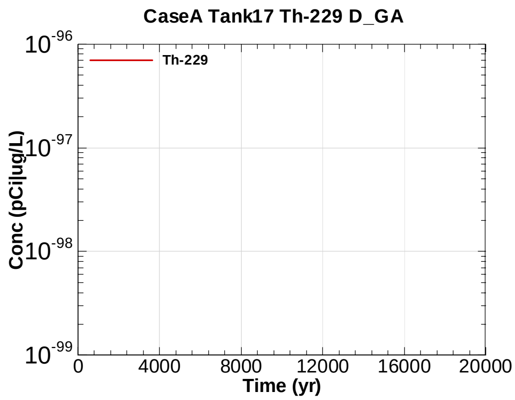

Figure E-1559 - 100m Aquifer Concentration for CaseA Tank17 Th-229 D_GA

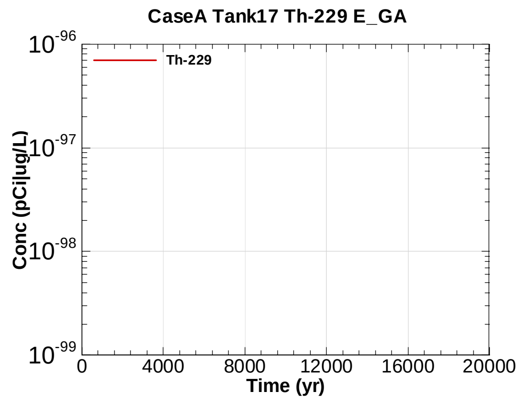

Figure E-1560 - 100m Aquifer Concentration for CaseA Tank17 Th-229 E_GA

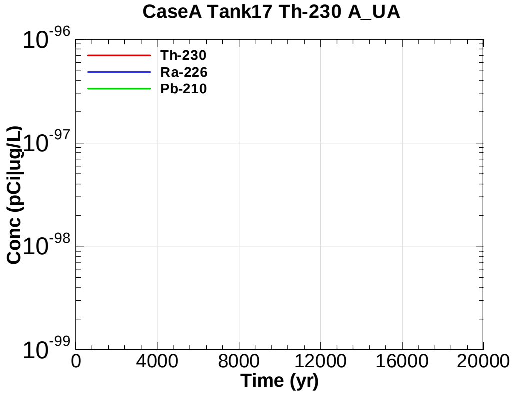

Figure E-1561 - 100m Aquifer Concentration for CaseA Tank17 Th-230 A_UA

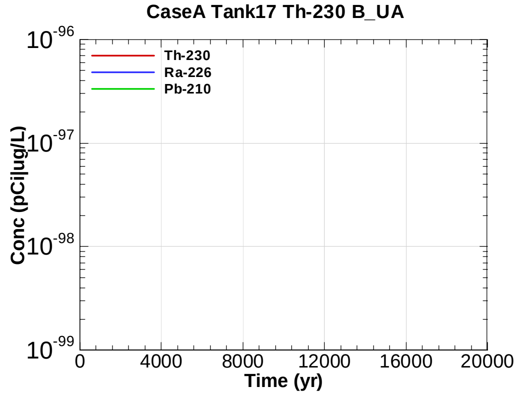

Figure E-1562 - 100m Aquifer Concentration for CaseA Tank17 Th-230 B_UA

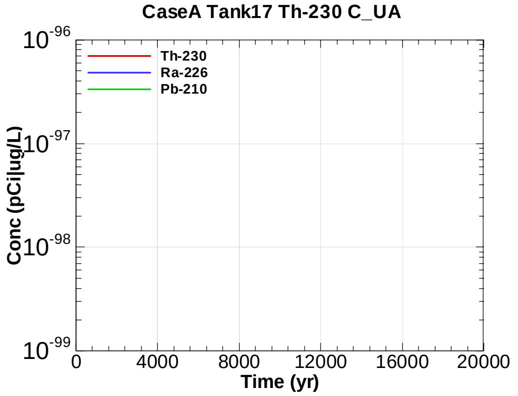

Figure E-1563 - 100m Aquifer Concentration for CaseA Tank17 Th-230 C_UA

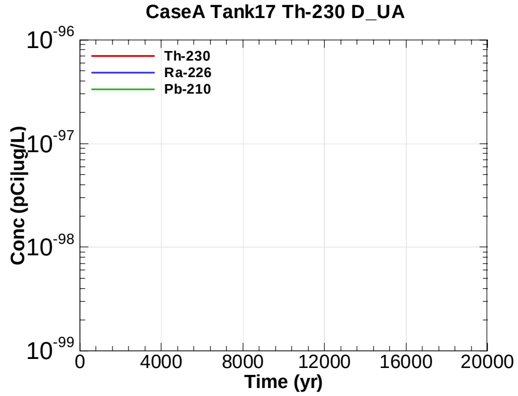

Figure E-1564 - 100m Aquifer Concentration for CaseA Tank17 Th-230 D_UA

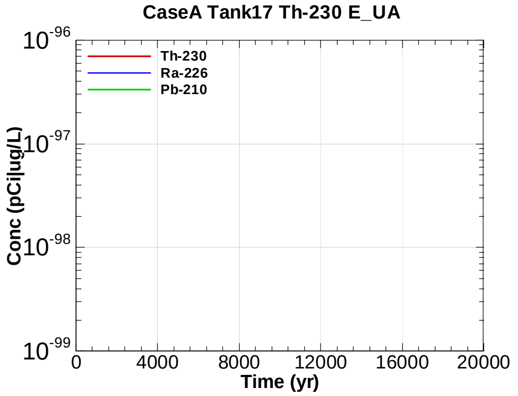

Figure E-1565 - 100m Aquifer Concentration for CaseA Tank17 Th-230 E_UA

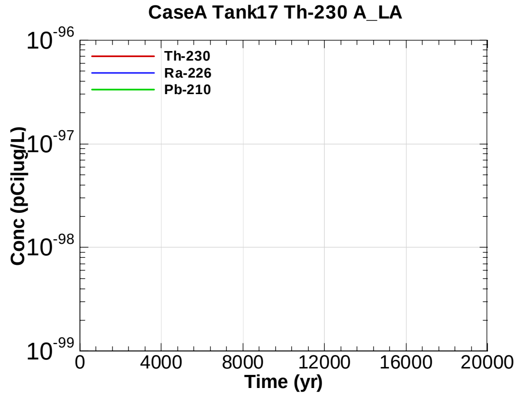

Figure E-1566 - 100m Aquifer Concentration for CaseA Tank17 Th-230 A_LA

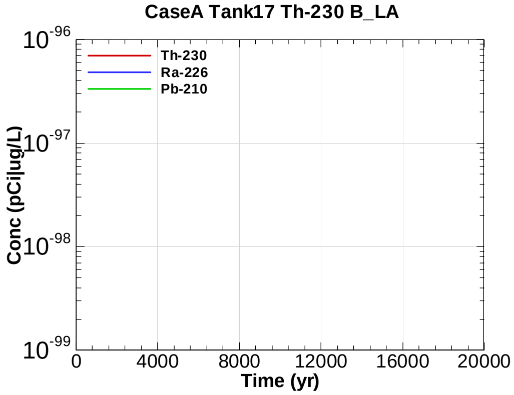

Figure E-1567 - 100m Aquifer Concentration for CaseA Tank17 Th-230 B_LA

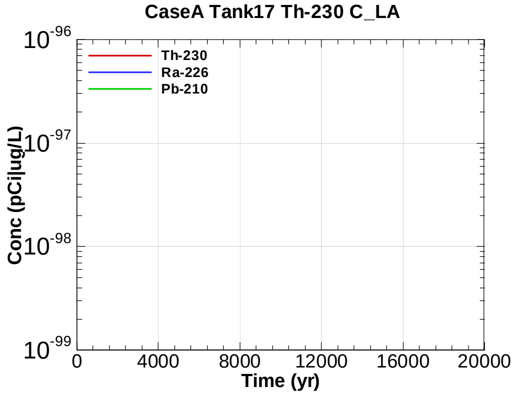

Figure E-1568 - 100m Aquifer Concentration for CaseA Tank17 Th-230 C_LA

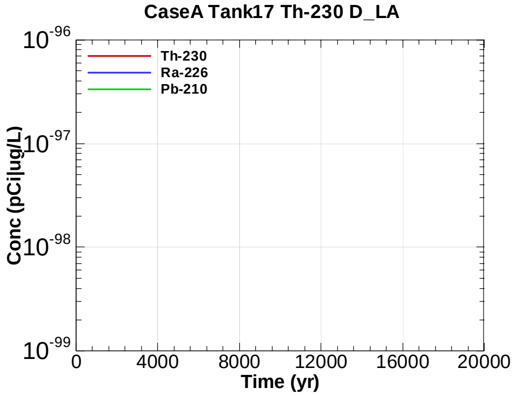

Figure E-1569 - 100m Aquifer Concentration for CaseA Tank17 Th-230 D_LA

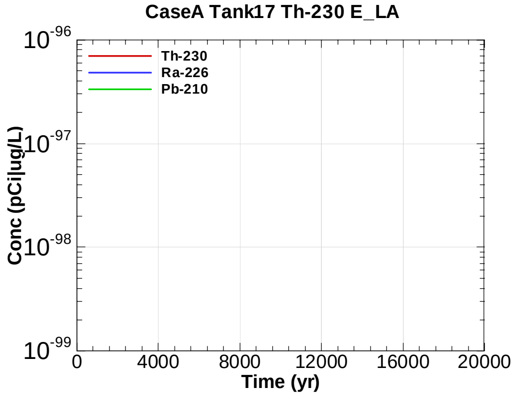

Figure E-1570 - 100m Aquifer Concentration for CaseA Tank17 Th-230 E_LA

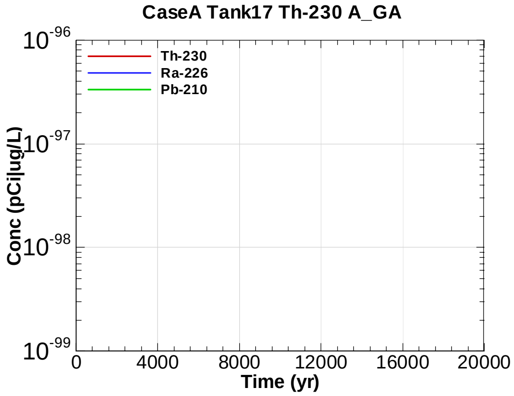

Figure E-1571 - 100m Aquifer Concentration for CaseA Tank17 Th-230 A_GA

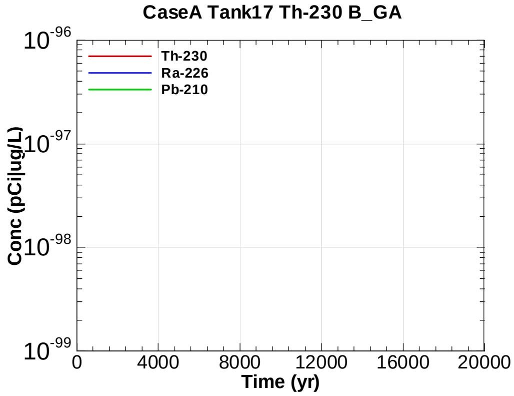

Figure E-1572 - 100m Aquifer Concentration for CaseA Tank17 Th-230 B_GA

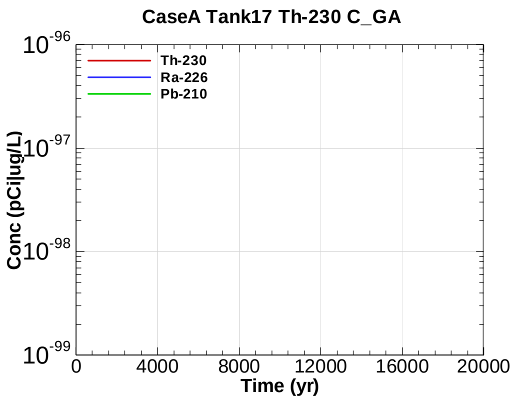

Figure E-1573 - 100m Aquifer Concentration for CaseA Tank17 Th-230 C_GA

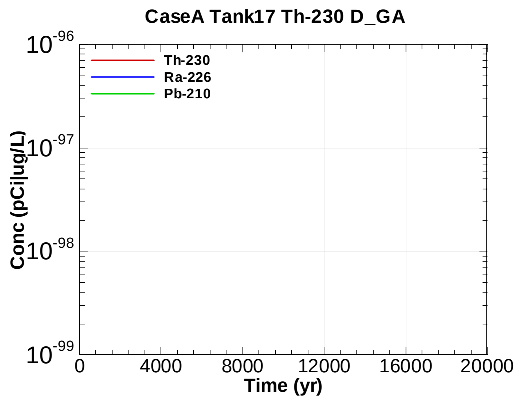

Figure E-1574 - 100m Aquifer Concentration for CaseA Tank17 Th-230 D_GA

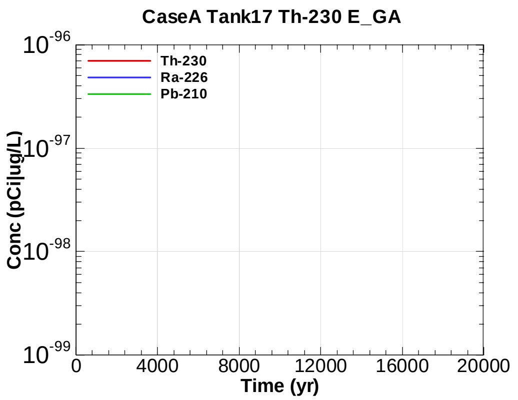

Figure E-1575 - 100m Aquifer Concentration for CaseA Tank17 Th-230 E_GA

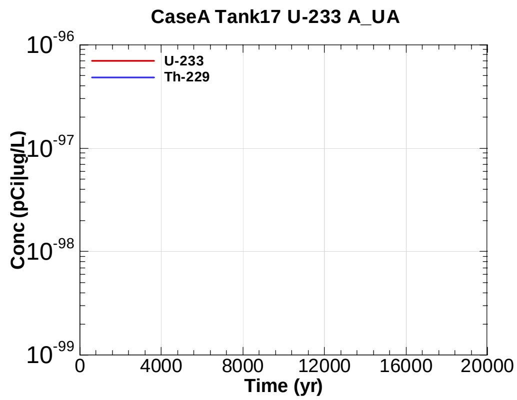

Figure E-1576 - 100m Aquifer Concentration for CaseA Tank17 U-233 A_UA

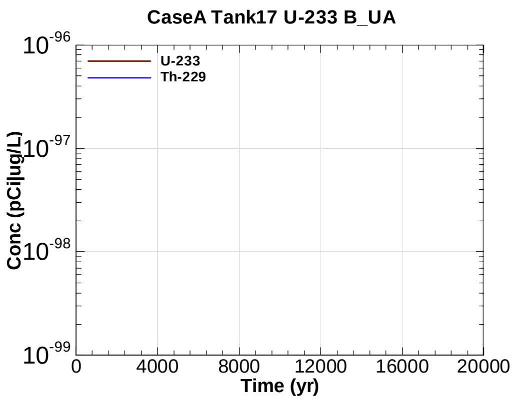

Figure E-1577 - 100m Aquifer Concentration for CaseA Tank17 U-233 B_UA

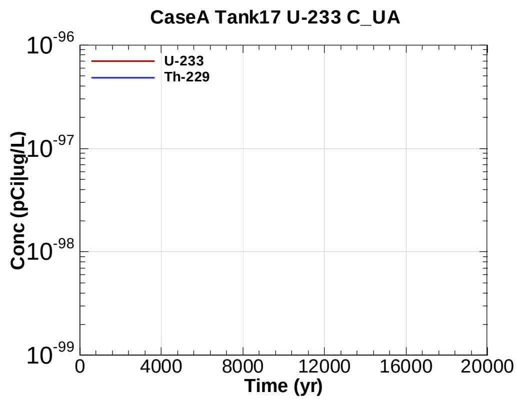

Figure E-1578 - 100m Aquifer Concentration for CaseA Tank17 U-233 C_UA

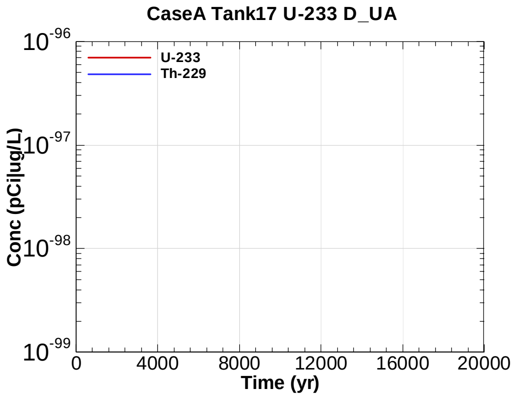

Figure E-1579 - 100m Aquifer Concentration for CaseA Tank17 U-233 D_UA

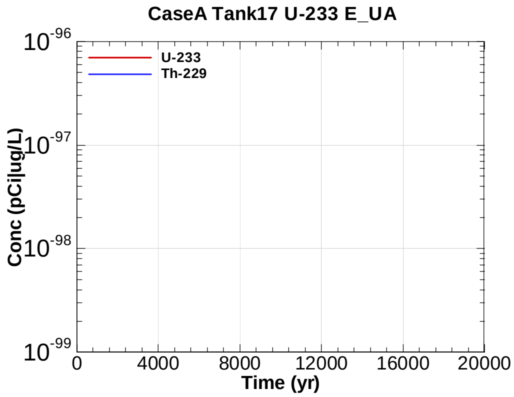

Figure E-1580 - 100m Aquifer Concentration for CaseA Tank17 U-233 E_UA

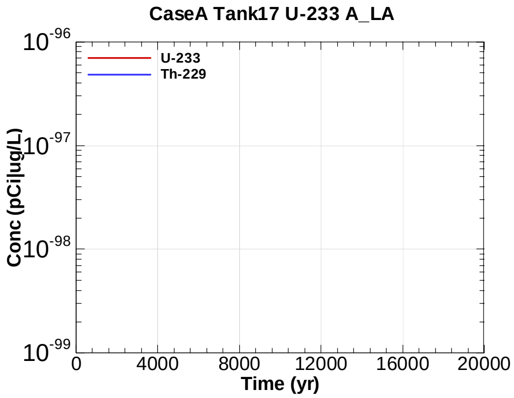

Figure E-1581 - 100m Aquifer Concentration for CaseA Tank17 U-233 A_LA

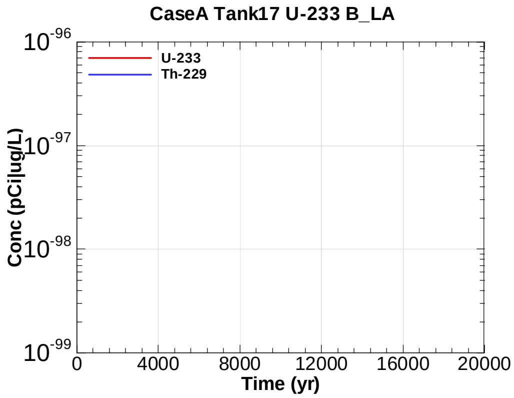

Figure E-1582 - 100m Aquifer Concentration for CaseA Tank17 U-233 B_LA

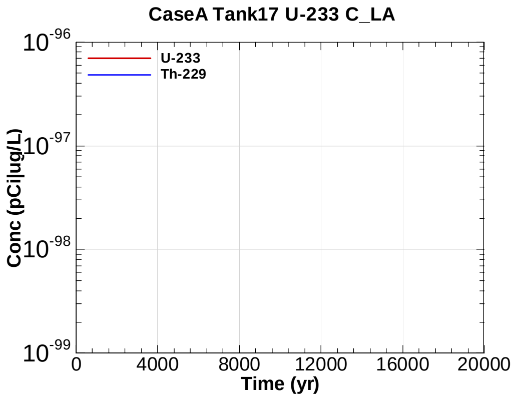

Figure E-1583 - 100m Aquifer Concentration for CaseA Tank17 U-233 C_LA

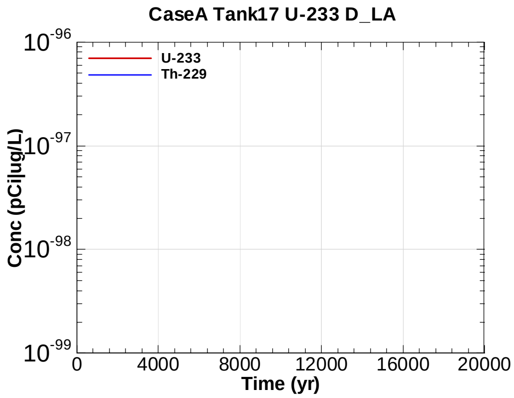

Figure E-1584 - 100m Aquifer Concentration for CaseA Tank17 U-233 D_LA

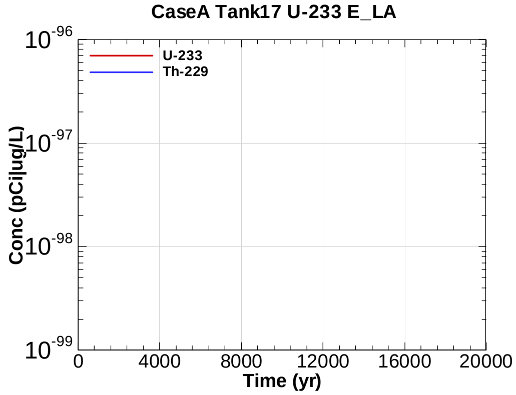

Figure E-1585 - 100m Aquifer Concentration for CaseA Tank17 U-233 E_LA

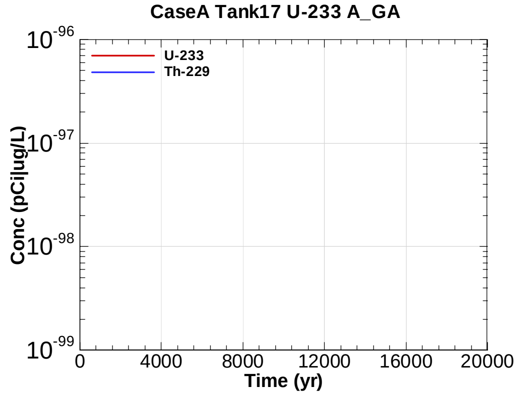

Figure E-1586 - 100m Aquifer Concentration for CaseA Tank17 U-233 A_GA

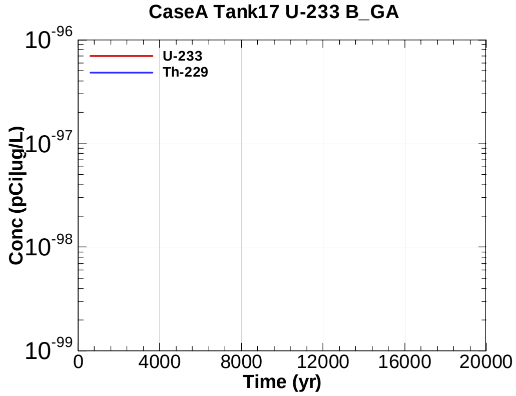

Figure E-1587 - 100m Aquifer Concentration for CaseA Tank17 U-233 B_GA

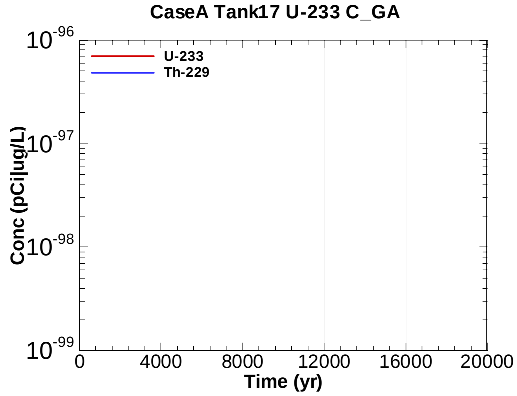

Figure E-1588 - 100m Aquifer Concentration for CaseA Tank17 U-233 C_GA

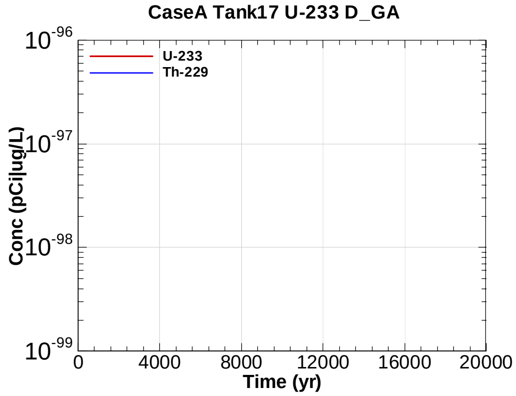

Figure E-1589 - 100m Aquifer Concentration for CaseA Tank17 U-233 D_GA

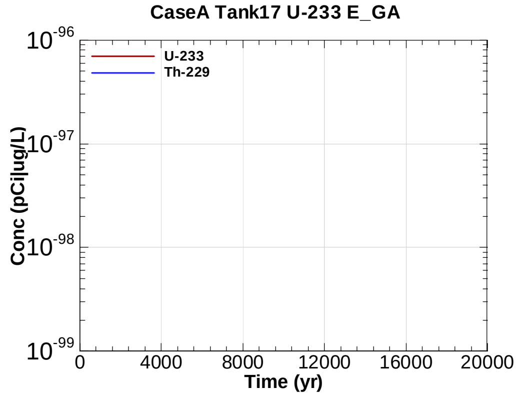

Figure E-1590 - 100m Aquifer Concentration for CaseA Tank17 U-233 E_GA

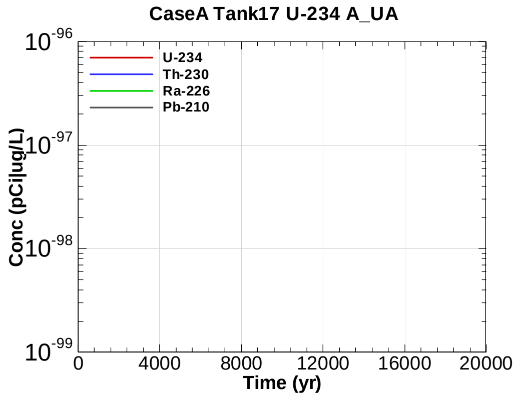

Figure E-1591 - 100m Aquifer Concentration for CaseA Tank17 U-234 A_UA

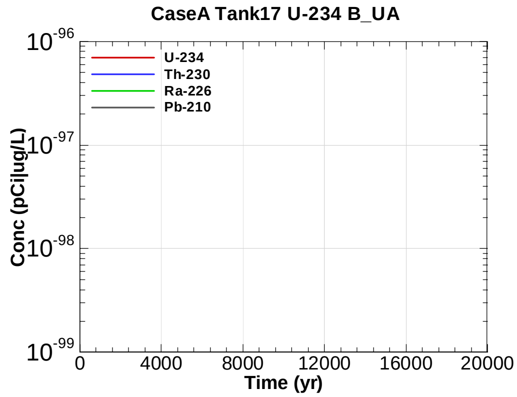

Figure E-1592 - 100m Aquifer Concentration for CaseA Tank17 U-234 B_UA

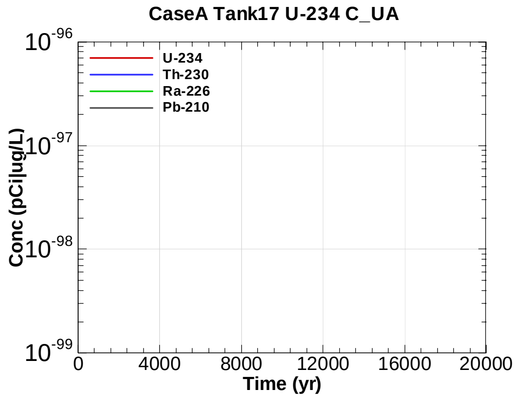

Figure E-1593 - 100m Aquifer Concentration for CaseA Tank17 U-234 C_UA

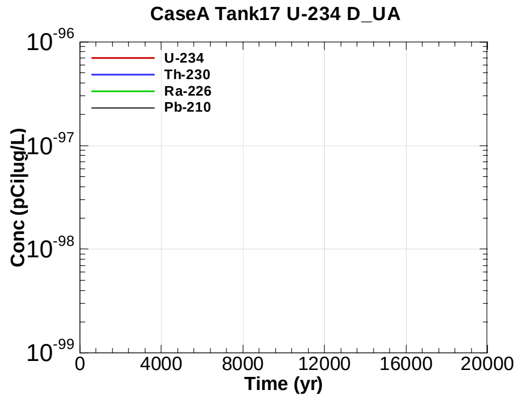

Figure E-1594 - 100m Aquifer Concentration for CaseA Tank17 U-234 D_UA

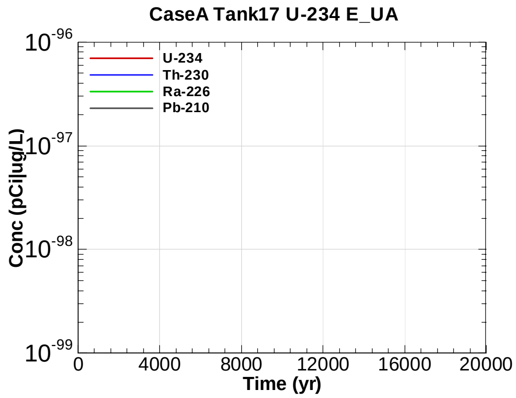

Figure E-1595 - 100m Aquifer Concentration for CaseA Tank17 U-234 E_UA

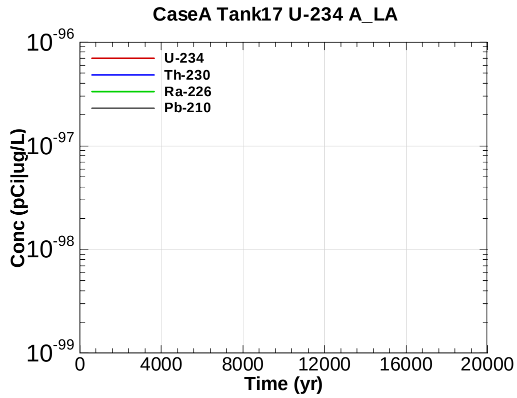

Figure E-1596 - 100m Aquifer Concentration for CaseA Tank17 U-234 A_LA

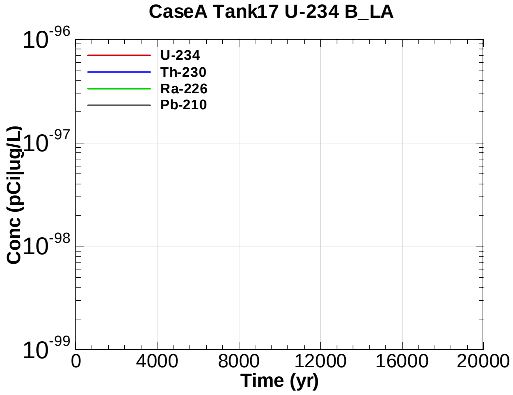

Figure E-1597 - 100m Aquifer Concentration for CaseA Tank17 U-234 B_LA

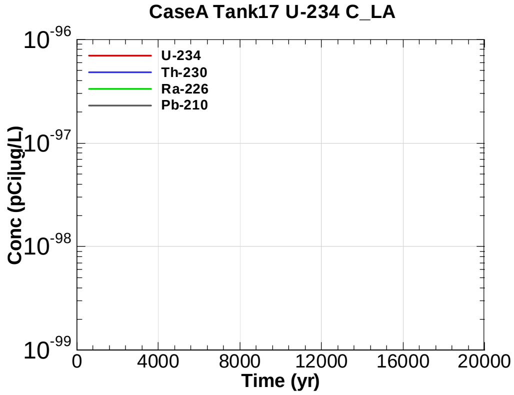

Figure E-1598 - 100m Aquifer Concentration for CaseA Tank17 U-234 C_LA

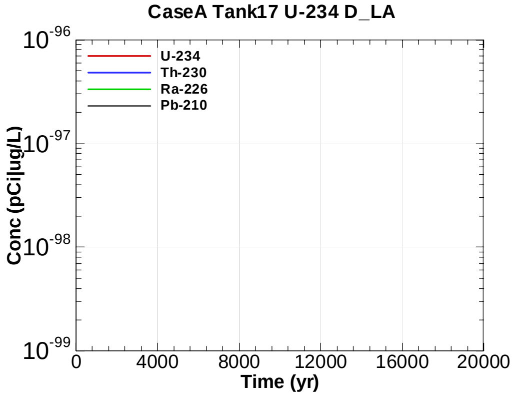

Figure E-1599 - 100m Aquifer Concentration for CaseA Tank17 U-234 D_LA

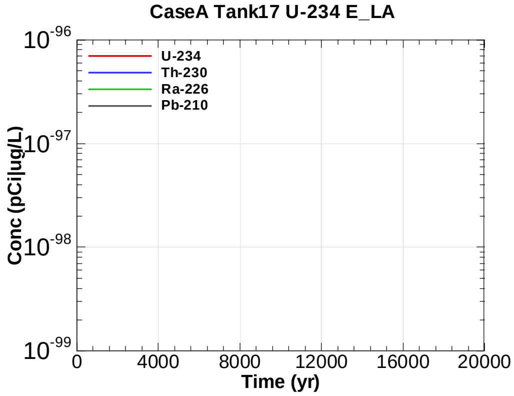

Figure E-1600 - 100m Aquifer Concentration for CaseA Tank17 U-234 E_LA

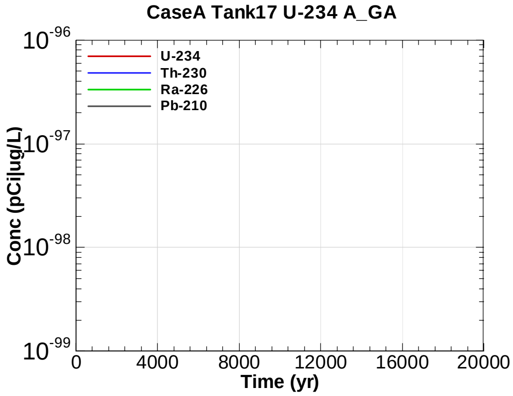

Figure E-1601 - 100m Aquifer Concentration for CaseA Tank17 U-234 A_GA

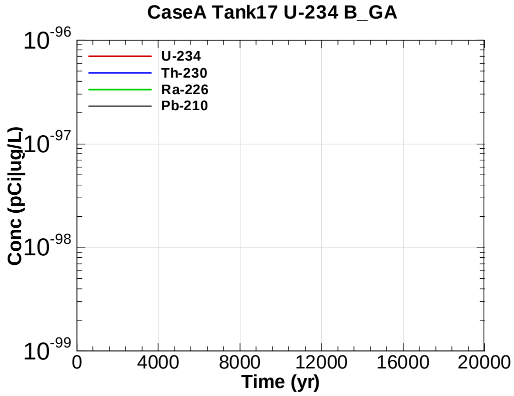

Figure E-1602 - 100m Aquifer Concentration for CaseA Tank17 U-234 B_GA

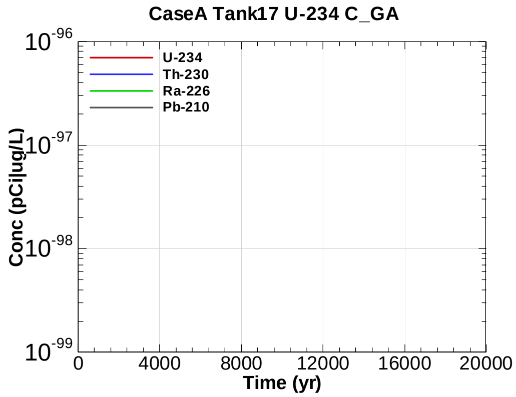

Figure E-1603 - 100m Aquifer Concentration for CaseA Tank17 U-234 C_GA

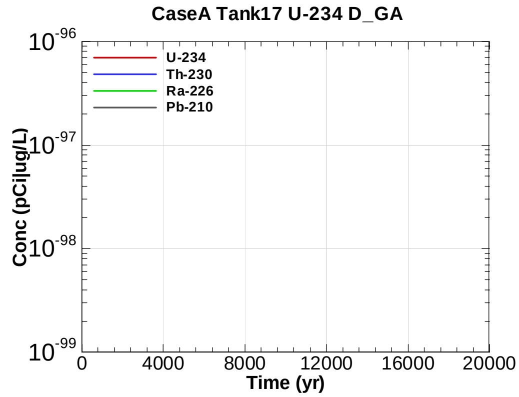

Figure E-1604 - 100m Aquifer Concentration for CaseA Tank17 U-234 D_GA

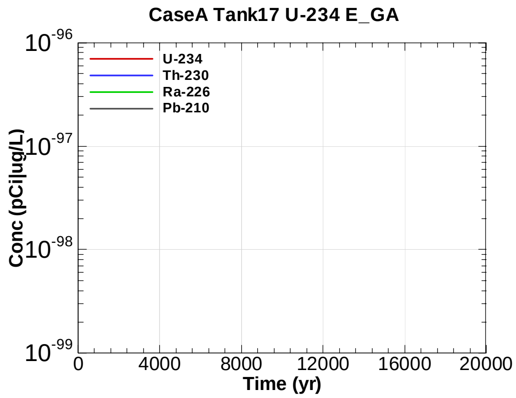

Figure E-1605 - 100m Aquifer Concentration for CaseA Tank17 U-234 E_GA

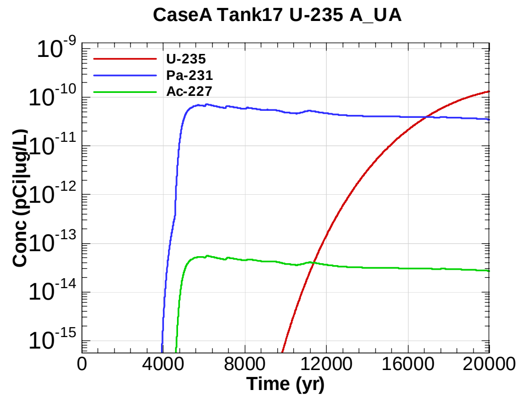

Figure E-1606 - 100m Aquifer Concentration for CaseA Tank17 U-235 A_UA

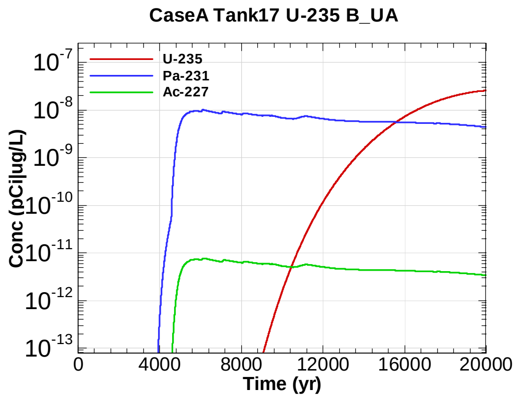

Figure E-1607 - 100m Aquifer Concentration for CaseA Tank17 U-235 B_UA

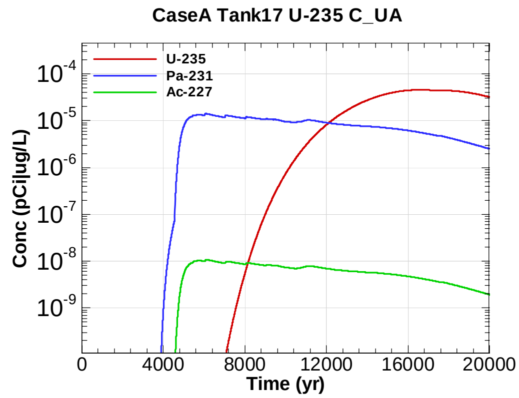

Figure E-1608 - 100m Aquifer Concentration for CaseA Tank17 U-235 C_UA

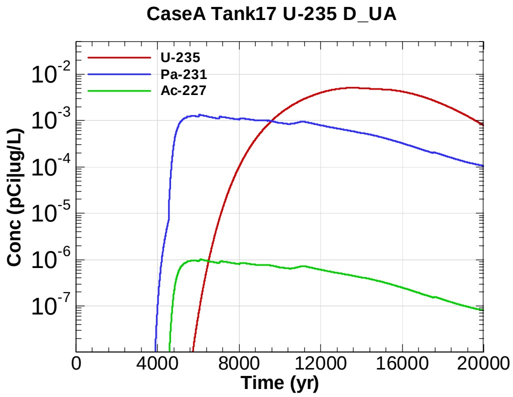

Figure E-1609 - 100m Aquifer Concentration for CaseA Tank17 U-235 D_UA

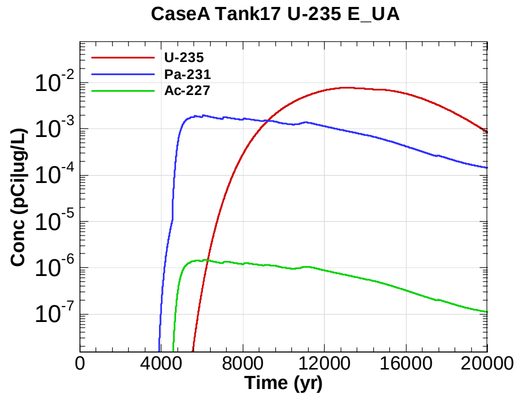

Figure E-1610 - 100m Aquifer Concentration for CaseA Tank17 U-235 E_UA

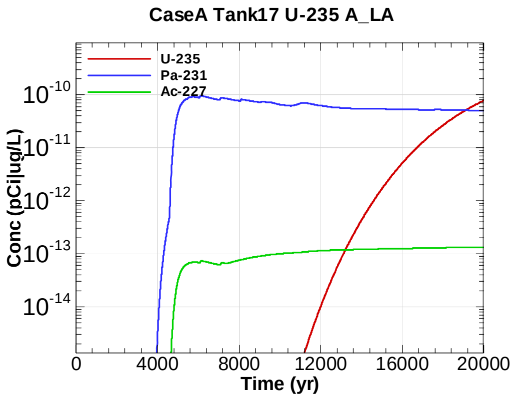

Figure E-1611 - 100m Aquifer Concentration for CaseA Tank17 U-235 A_LA

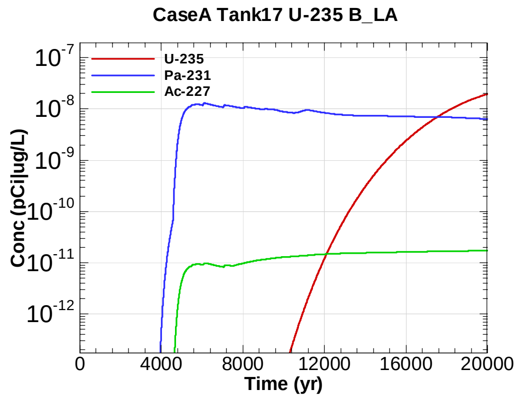

Figure E-1612 - 100m Aquifer Concentration for CaseA Tank17 U-235 B_LA

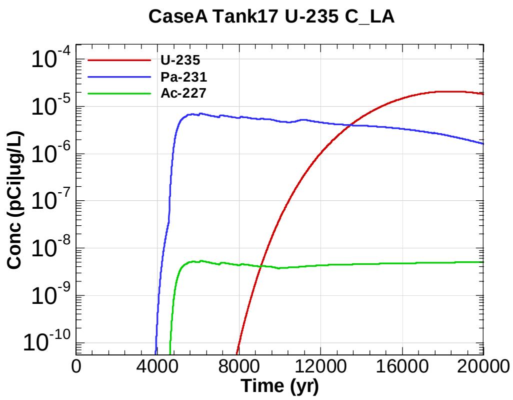

Figure E-1613 - 100m Aquifer Concentration for CaseA Tank17 U-235 C_LA

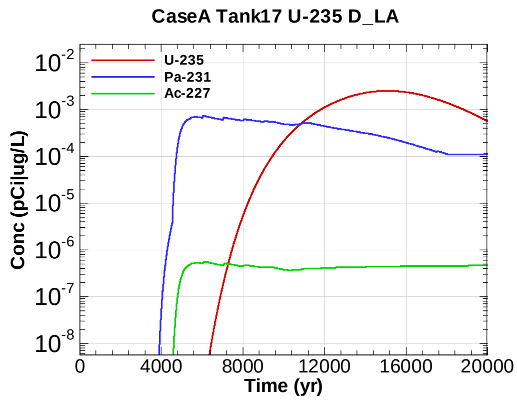

Figure E-1614 - 100m Aquifer Concentration for CaseA Tank17 U-235 D_LA

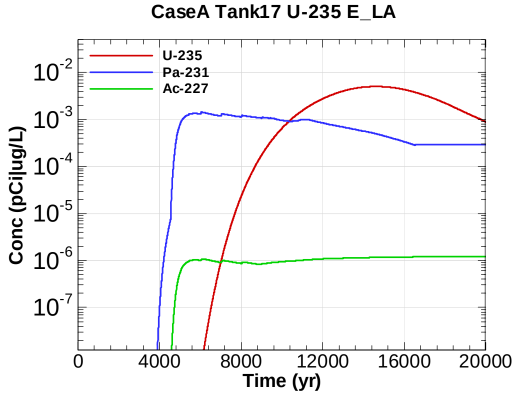

Figure E-1615 - 100m Aquifer Concentration for CaseA Tank17 U-235 E_LA

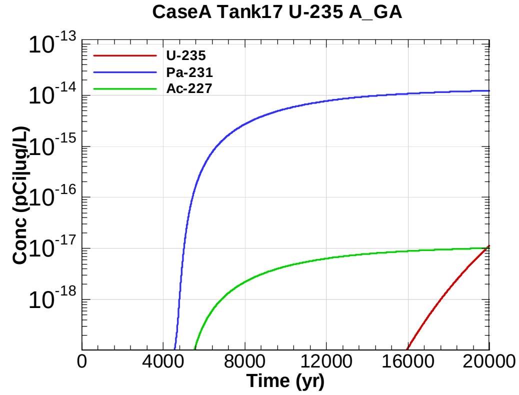

Figure E-1616 - 100m Aquifer Concentration for CaseA Tank17 U-235 A_GA

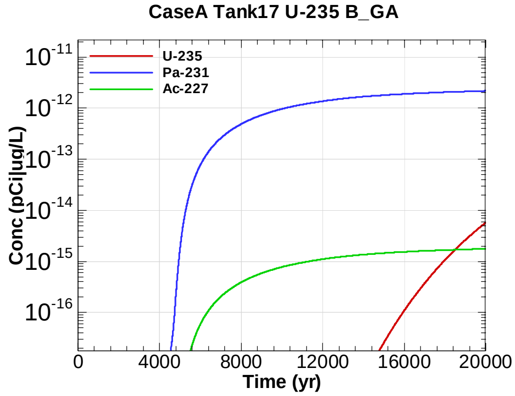

Figure E-1617 - 100m Aquifer Concentration for CaseA Tank17 U-235 B_GA

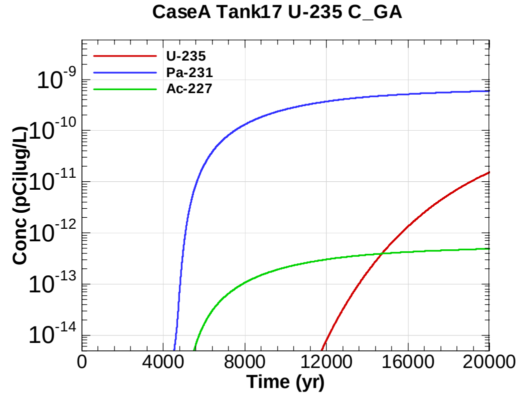

Figure E-1618 - 100m Aquifer Concentration for CaseA Tank17 U-235 C_GA

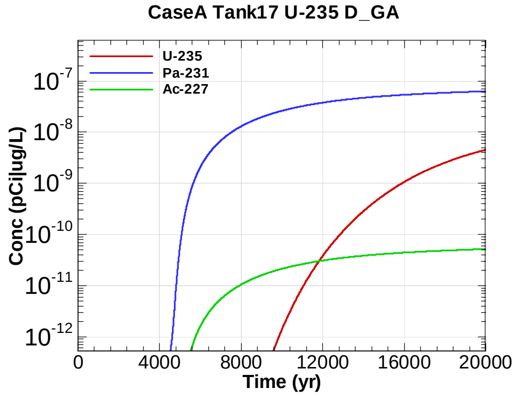

Figure E-1619 - 100m Aquifer Concentration for CaseA Tank17 U-235 D_GA

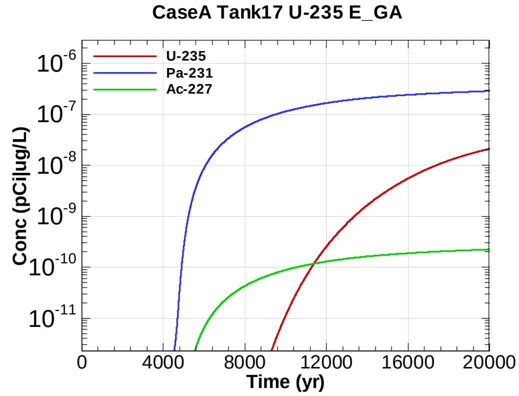

Figure E-1620 - 100m Aquifer Concentration for CaseA Tank17 U-235 E_GA

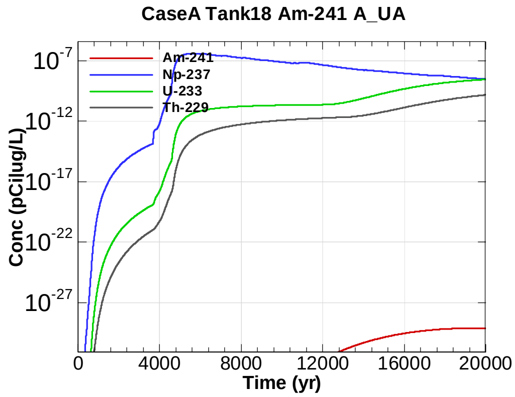

Figure E-1621 - 100m Aquifer Concentration for CaseA Tank18 Am-241 A_UA

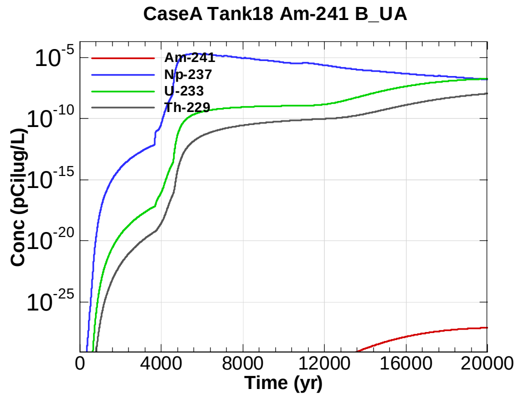

Figure E-1622 - 100m Aquifer Concentration for CaseA Tank18 Am-241 B_UA

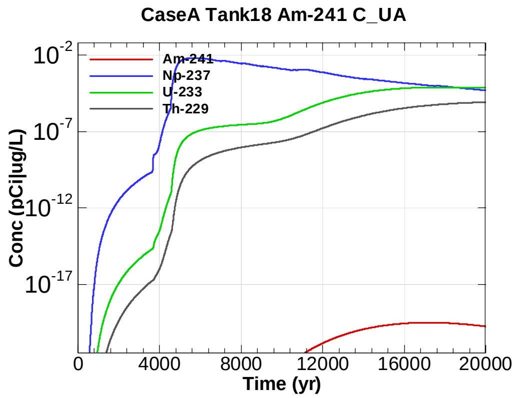

Figure E-1623 - 100m Aquifer Concentration for CaseA Tank18 Am-241 C_UA

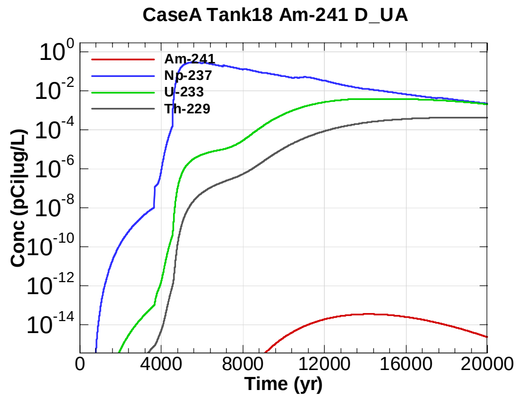

Figure E-1624 - 100m Aquifer Concentration for CaseA Tank18 Am-241 D_UA

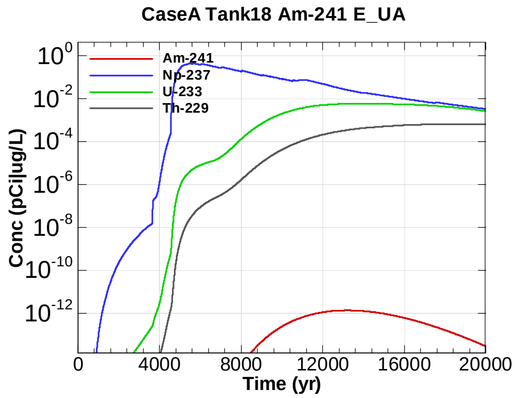

Figure E-1625 - 100m Aquifer Concentration for CaseA Tank18 Am-241 E_UA

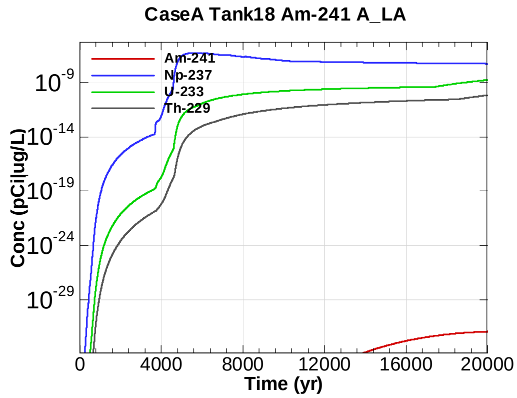

Figure E-1626 - 100m Aquifer Concentration for CaseA Tank18 Am-241 A_LA

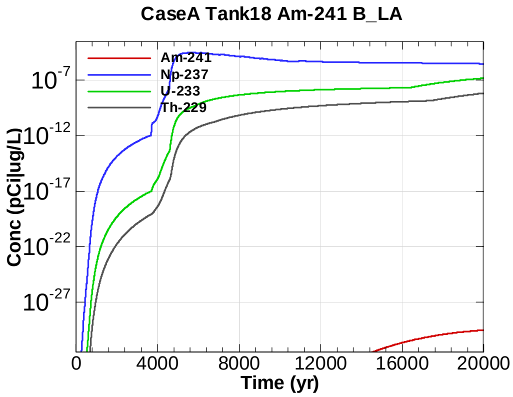

Figure E-1627 - 100m Aquifer Concentration for CaseA Tank18 Am-241 B_LA

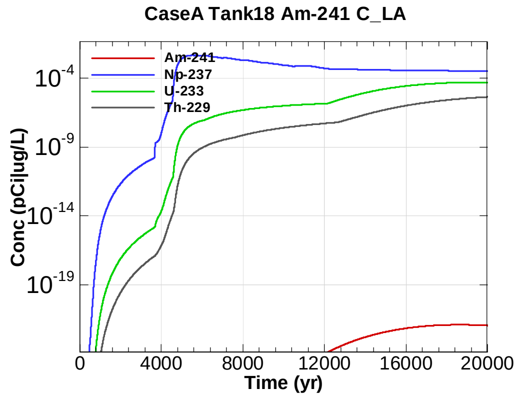

Figure E-1628 - 100m Aquifer Concentration for CaseA Tank18 Am-241 C_LA

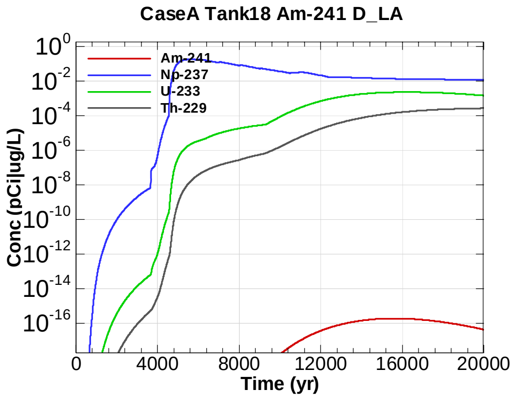

Figure E-1629 - 100m Aquifer Concentration for CaseA Tank18 Am-241 D_LA

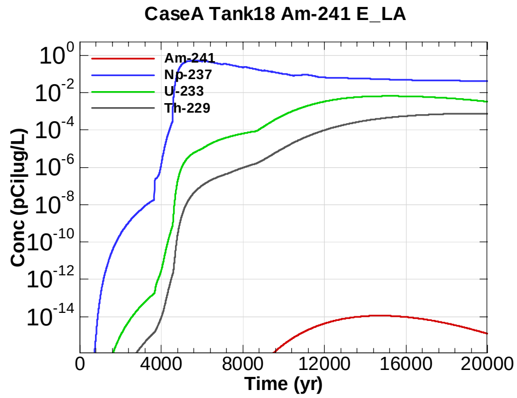

Figure E-1630 - 100m Aquifer Concentration for CaseA Tank18 Am-241 E_LA

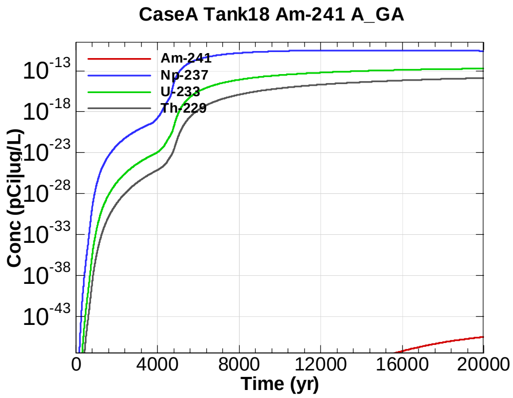

Figure E-1631 - 100m Aquifer Concentration for CaseA Tank18 Am-241 A_GA

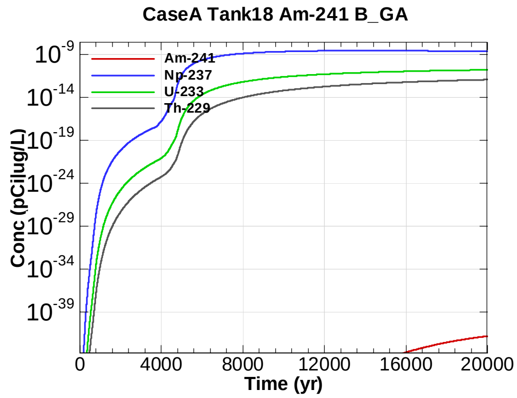

Figure E-1632 - 100m Aquifer Concentration for CaseA Tank18 Am-241 B_GA

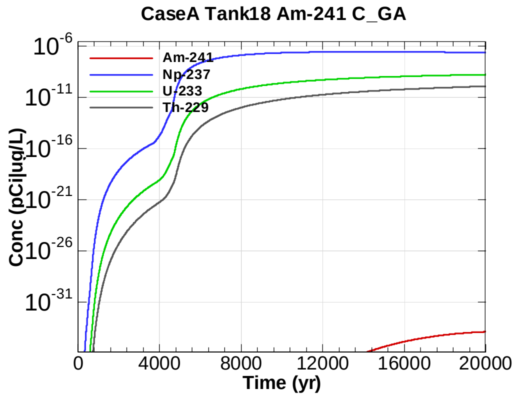

Figure E-1633 - 100m Aquifer Concentration for CaseA Tank18 Am-241 C_GA

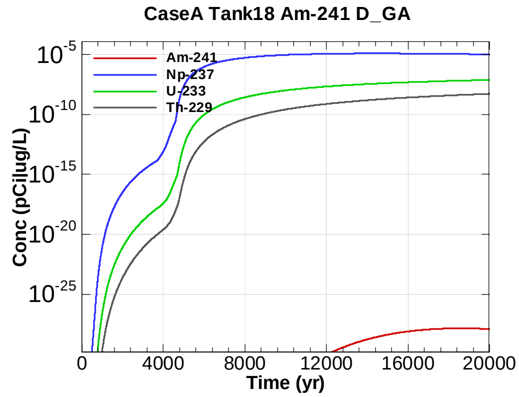

Figure E-1634 - 100m Aquifer Concentration for CaseA Tank18 Am-241 D_GA

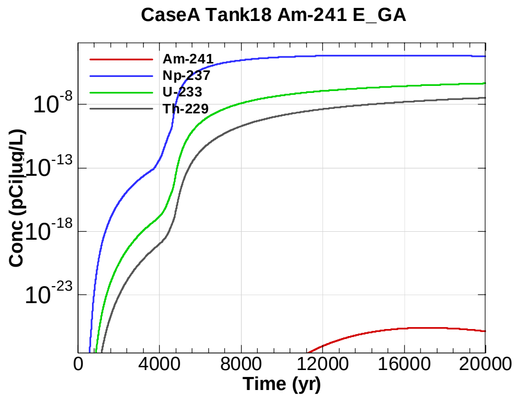

Figure E-1635 - 100m Aquifer Concentration for CaseA Tank18 Am-241 E_GA

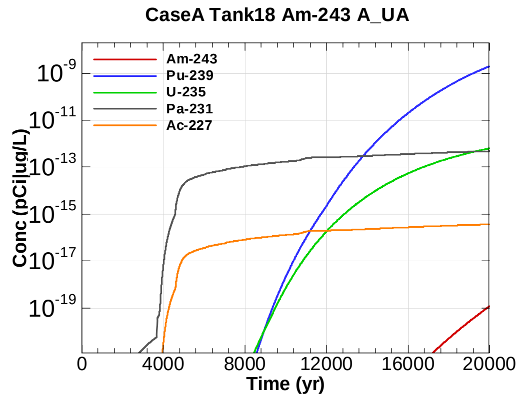

Figure E-1636 - 100m Aquifer Concentration for CaseA Tank18 Am-243 A_UA

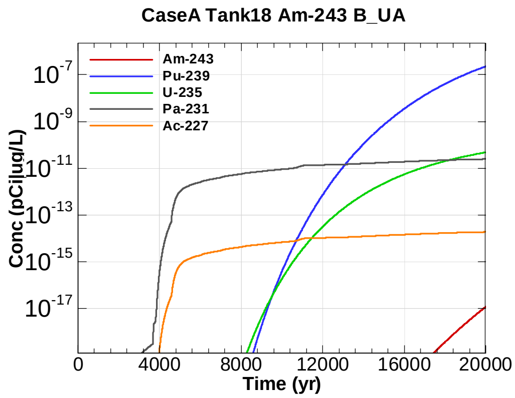

Figure E-1637 - 100m Aquifer Concentration for CaseA Tank18 Am-243 B_UA

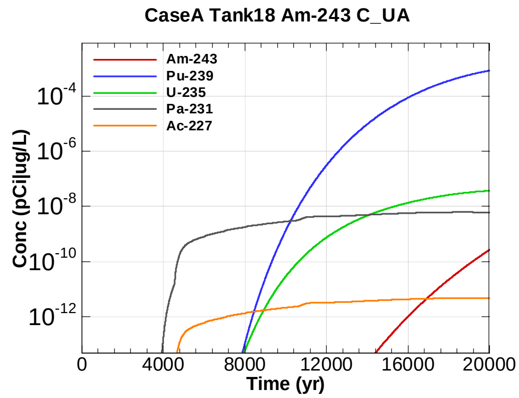

Figure E-1638 - 100m Aquifer Concentration for CaseA Tank18 Am-243 C_UA

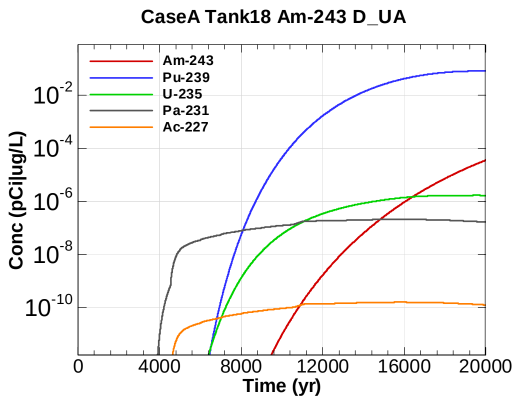

Figure E-1639 - 100m Aquifer Concentration for CaseA Tank18 Am-243 D_UA

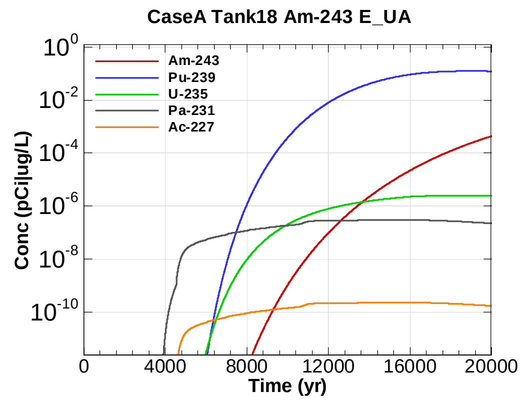

Figure E-1640 - 100m Aquifer Concentration for CaseA Tank18 Am-243 E_UA

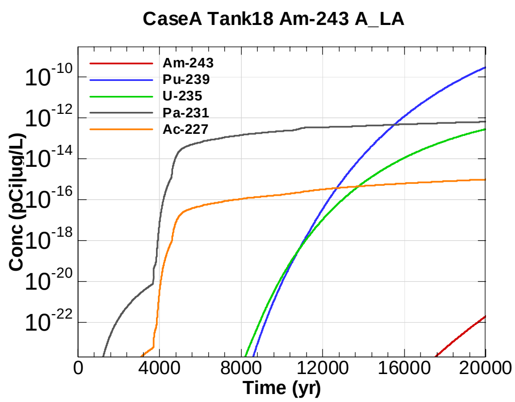

Figure E-1641 - 100m Aquifer Concentration for CaseA Tank18 Am-243 A_LA

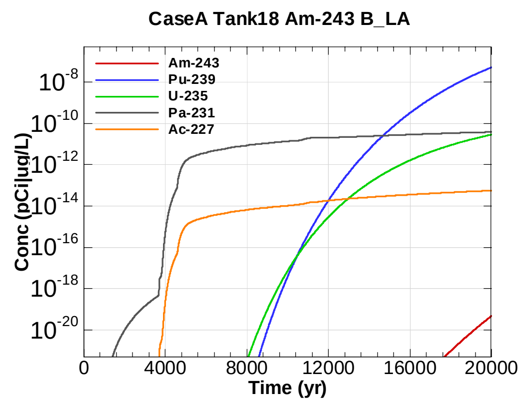

Figure E-1642 - 100m Aquifer Concentration for CaseA Tank18 Am-243 B_LA

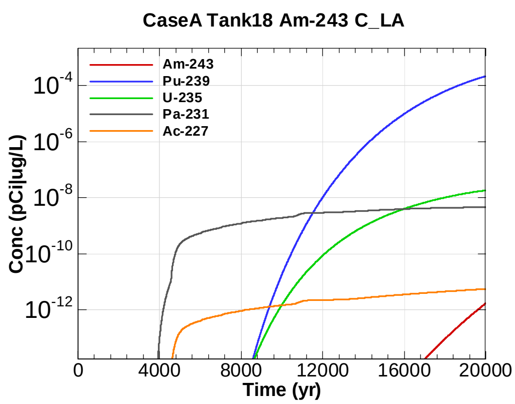

Figure E-1643 - 100m Aquifer Concentration for CaseA Tank18 Am-243 C_LA

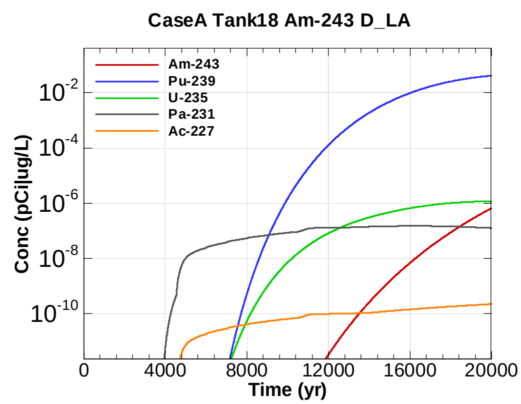

Figure E-1644 - 100m Aquifer Concentration for CaseA Tank18 Am-243 D_LA

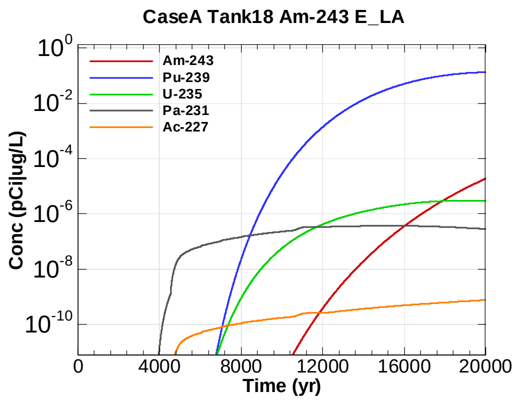

Figure E-1645 - 100m Aquifer Concentration for CaseA Tank18 Am-243 E_LA

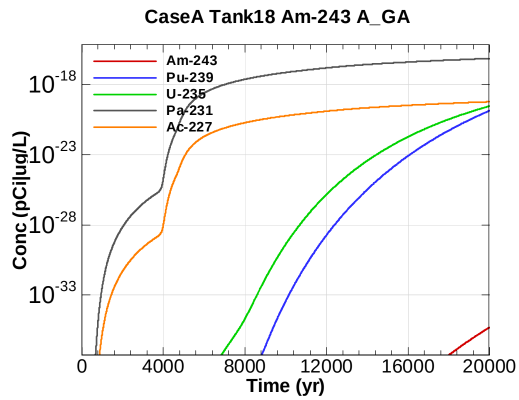

Figure E-1646 - 100m Aquifer Concentration for CaseA Tank18 Am-243 A_GA

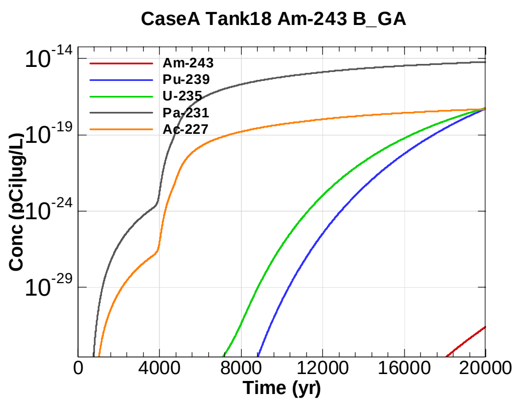

Figure E-1647 - 100m Aquifer Concentration for CaseA Tank18 Am-243 B_GA

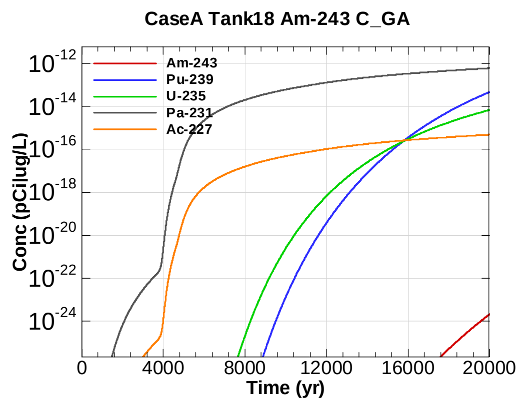

Figure E-1648 - 100m Aquifer Concentration for CaseA Tank18 Am-243 C_GA

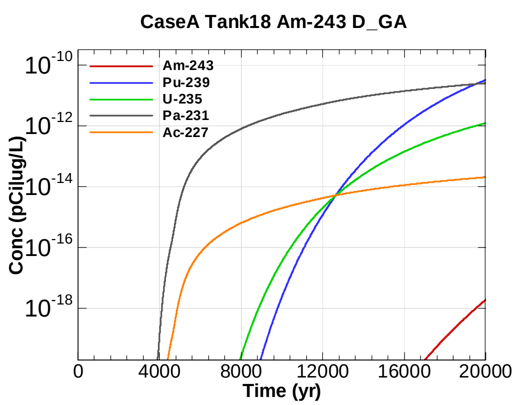

Figure E-1649 - 100m Aquifer Concentration for CaseA Tank18 Am-243 D_GA

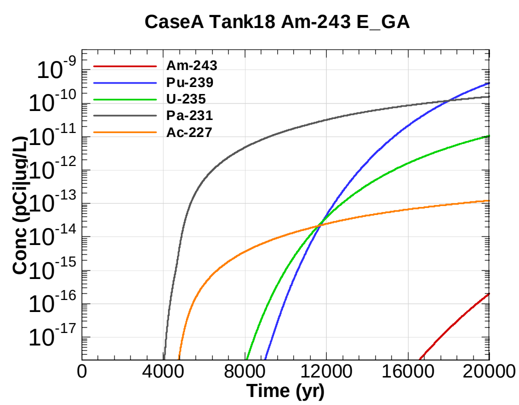

Figure E-1650 - 100m Aquifer Concentration for CaseA Tank18 Am-243 E_GA

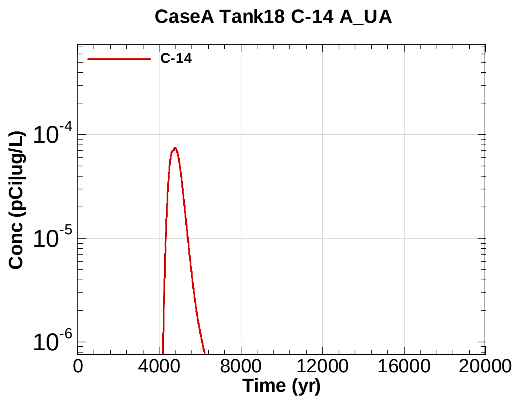

Figure E-1651 - 100m Aquifer Concentration for CaseA Tank18 C-14 A_UA

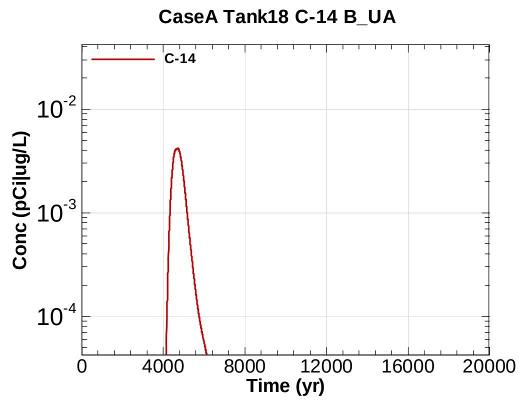

Figure E-1652 - 100m Aquifer Concentration for CaseA Tank18 C-14 B_UA

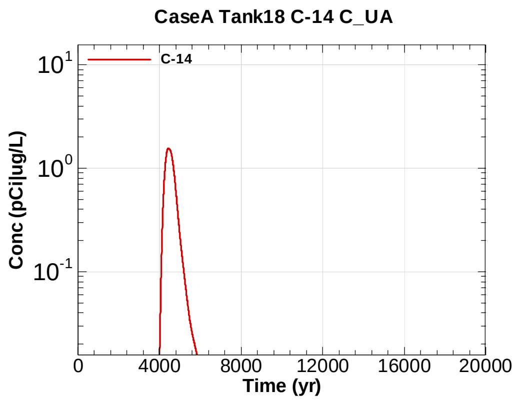

Figure E-1653 - 100m Aquifer Concentration for CaseA Tank18 C-14 C_UA

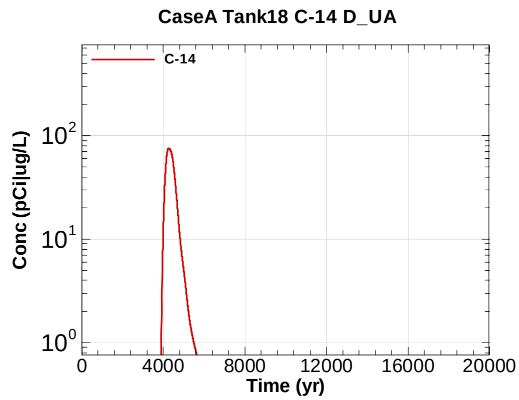

Figure E-1654 - 100m Aquifer Concentration for CaseA Tank18 C-14 D_UA

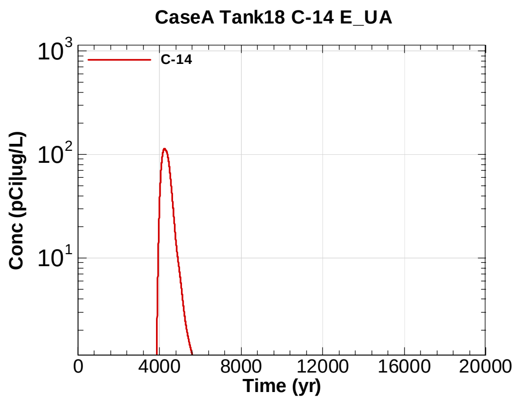

Figure E-1655 - 100m Aquifer Concentration for CaseA Tank18 C-14 E_UA

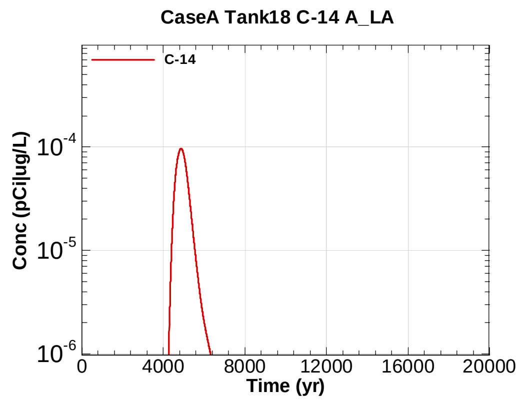

Figure E-1656 - 100m Aquifer Concentration for CaseA Tank18 C-14 A_LA

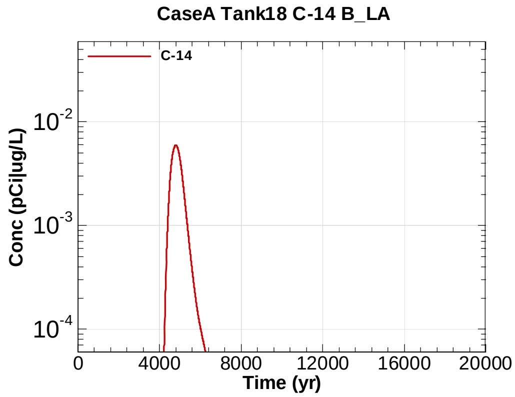

Figure E-1657 - 100m Aquifer Concentration for CaseA Tank18 C-14 B_LA

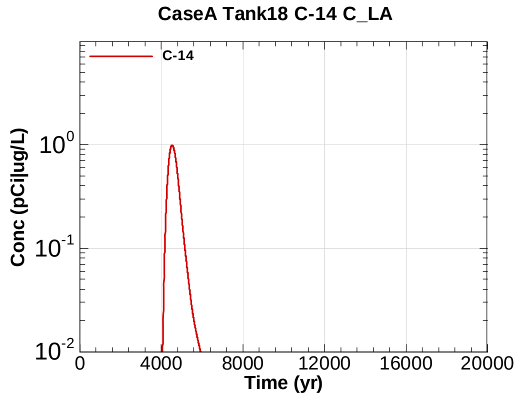

Figure E-1658 - 100m Aquifer Concentration for CaseA Tank18 C-14 C_LA

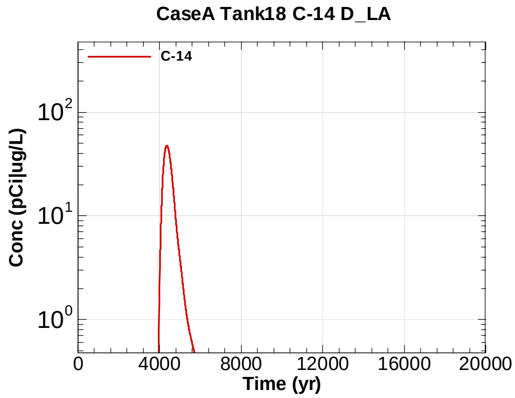

Figure E-1659 - 100m Aquifer Concentration for CaseA Tank18 C-14 D_LA

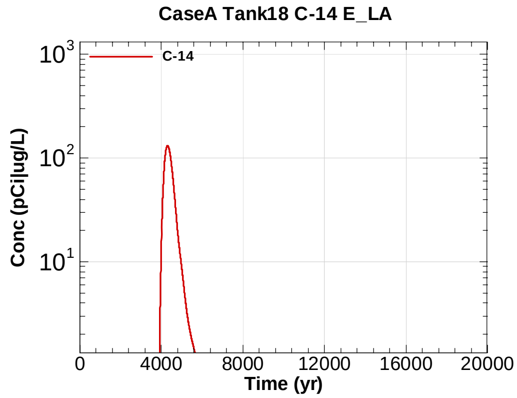

Figure E-1660 - 100m Aquifer Concentration for CaseA Tank18 C-14 E_LA

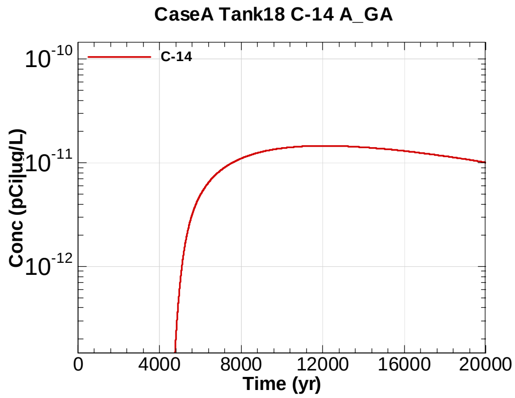

Figure E-1661 - 100m Aquifer Concentration for CaseA Tank18 C-14 A_GA

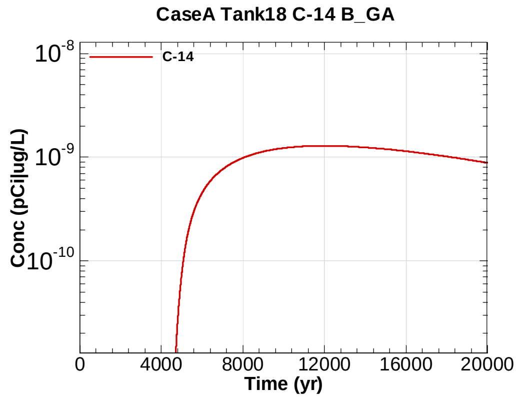

Figure E-1662 - 100m Aquifer Concentration for CaseA Tank18 C-14 B_GA

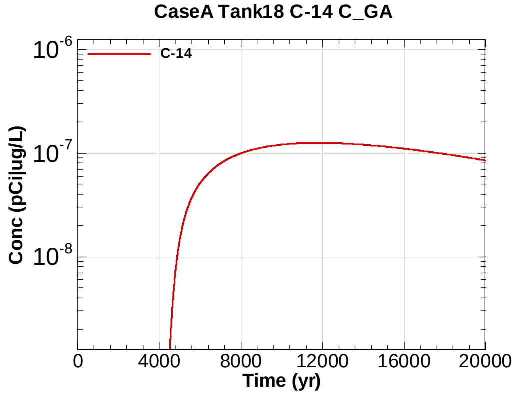

Figure E-1663 - 100m Aquifer Concentration for CaseA Tank18 C-14 C_GA

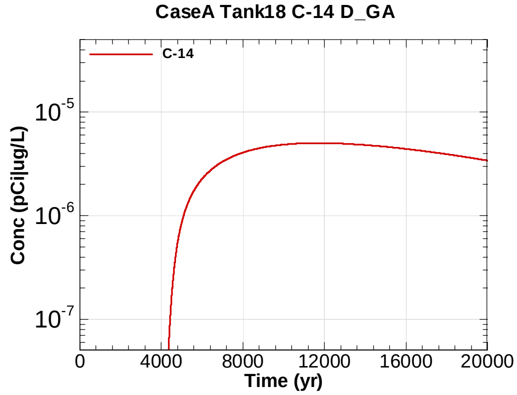

Figure E-1664 - 100m Aquifer Concentration for CaseA Tank18 C-14 D_GA

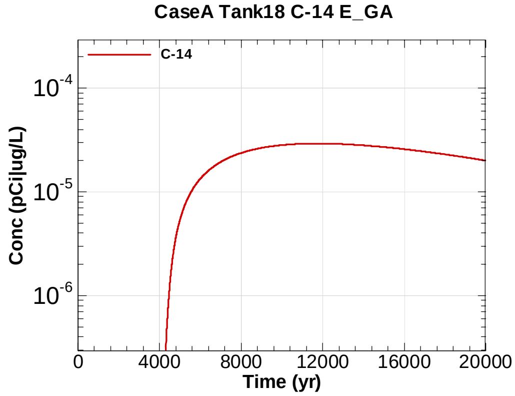

Figure E-1665 - 100m Aquifer Concentration for CaseA Tank18 C-14 E_GA

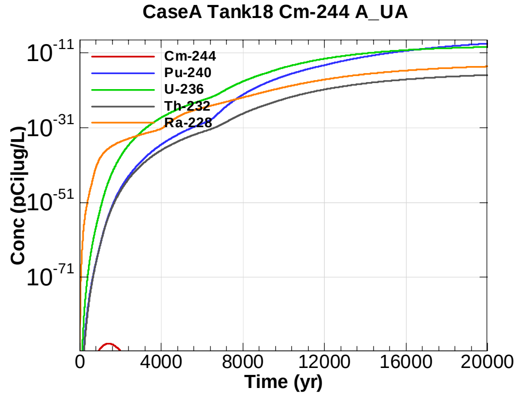

Figure E-1666 - 100m Aquifer Concentration for CaseA Tank18 Cm-244 A_UA

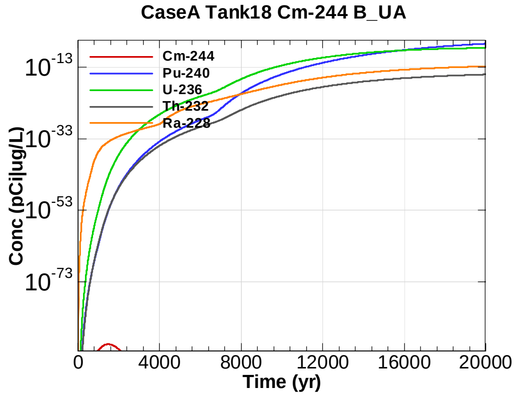

Figure E-1667 - 100m Aquifer Concentration for CaseA Tank18 Cm-244 B_UA

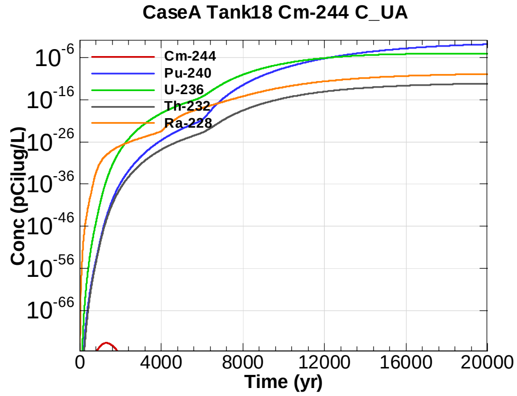

Figure E-1668 - 100m Aquifer Concentration for CaseA Tank18 Cm-244 C_UA

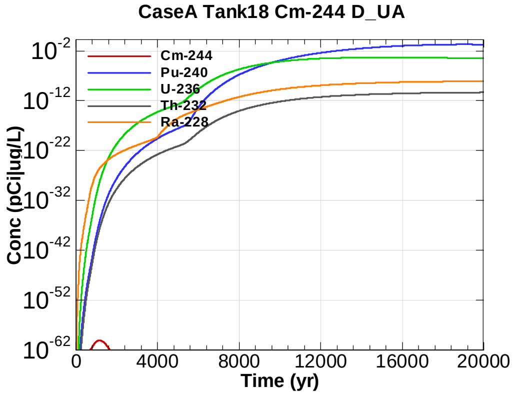

Figure E-1669 - 100m Aquifer Concentration for CaseA Tank18 Cm-244 D_UA

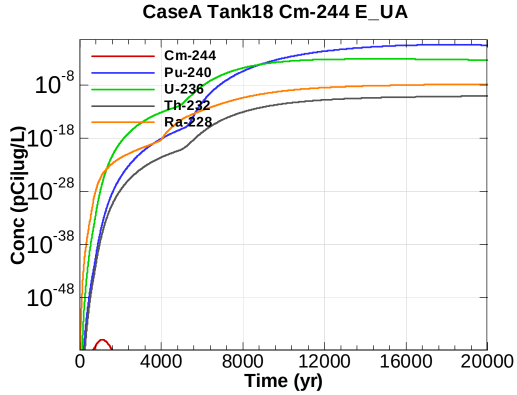

Figure E-1670 - 100m Aquifer Concentration for CaseA Tank18 Cm-244 E_UA

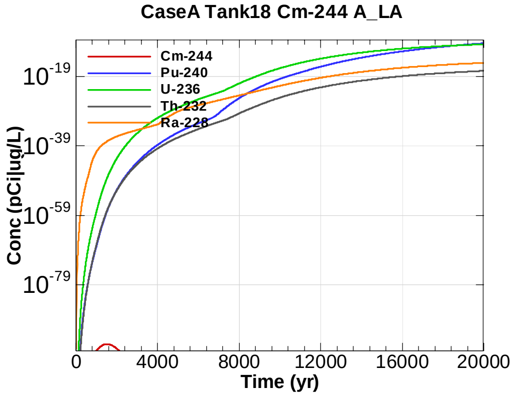

Figure E-1671 - 100m Aquifer Concentration for CaseA Tank18 Cm-244 A_LA

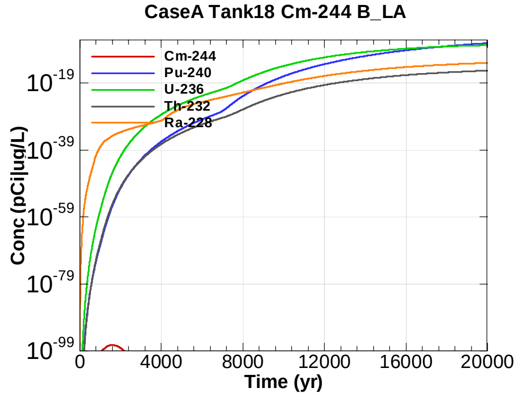

Figure E-1672 - 100m Aquifer Concentration for CaseA Tank18 Cm-244 B_LA

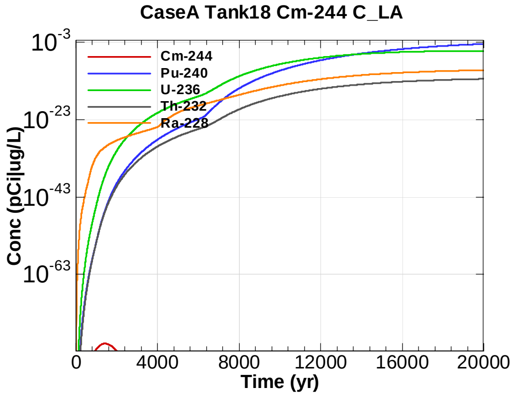

Figure E-1673 - 100m Aquifer Concentration for CaseA Tank18 Cm-244 C_LA

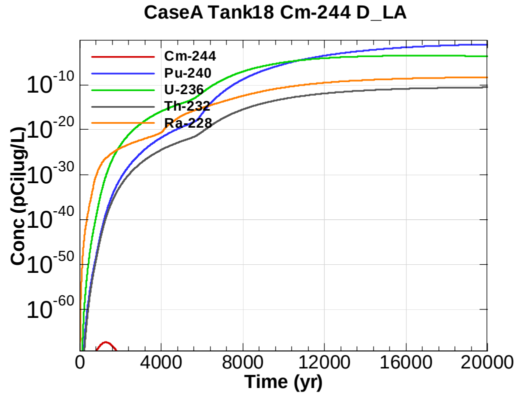

Figure E-1674 - 100m Aquifer Concentration for CaseA Tank18 Cm-244 D_LA

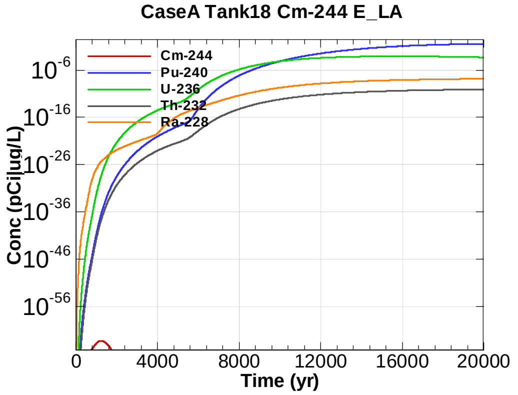

Figure E-1675 - 100m Aquifer Concentration for CaseA Tank18 Cm-244 E_LA

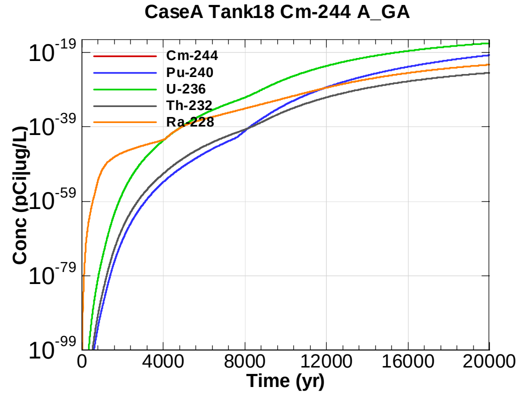

Figure E-1676 - 100m Aquifer Concentration for CaseA Tank18 Cm-244 A_GA

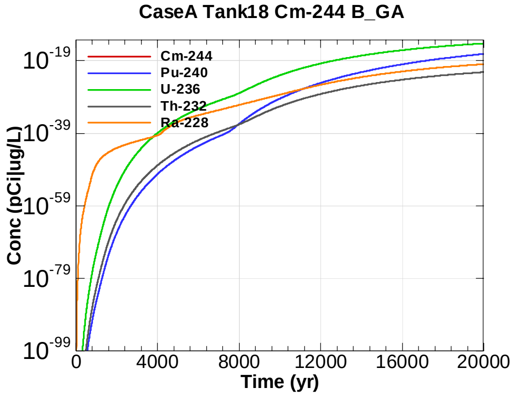

Figure E-1677 - 100m Aquifer Concentration for CaseA Tank18 Cm-244 B_GA

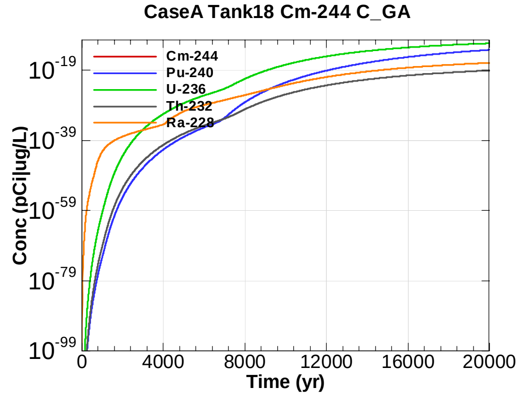

Figure E-1678 - 100m Aquifer Concentration for CaseA Tank18 Cm-244 C_GA

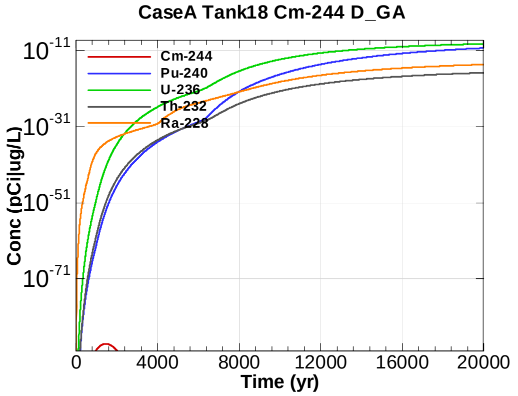

Figure E-1679 - 100m Aquifer Concentration for CaseA Tank18 Cm-244 D_GA

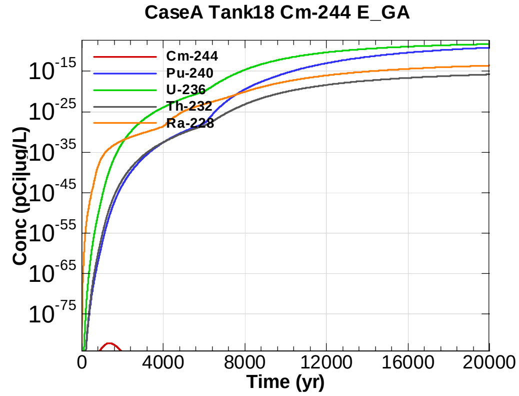

Figure E-1680 - 100m Aquifer Concentration for CaseA Tank18 Cm-244 E_GA

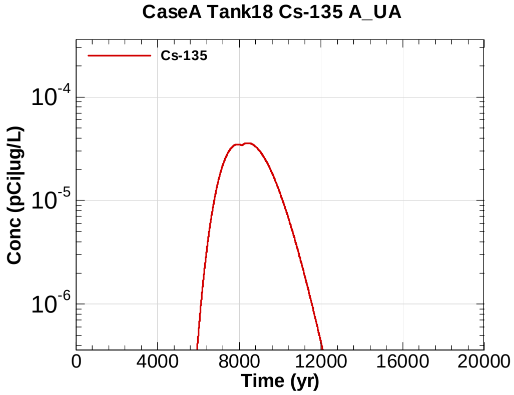

Figure E-1681 - 100m Aquifer Concentration for CaseA Tank18 Cs-135 A_UA

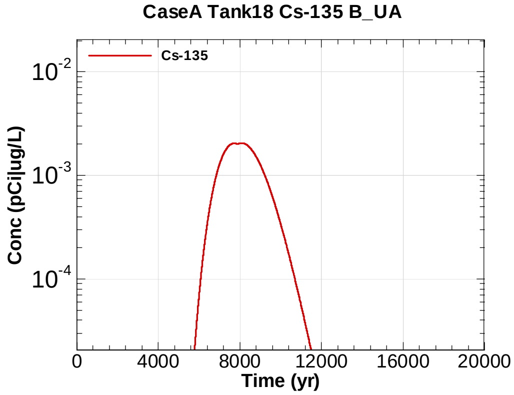

Figure E-1682 - 100m Aquifer Concentration for CaseA Tank18 Cs-135 B_UA

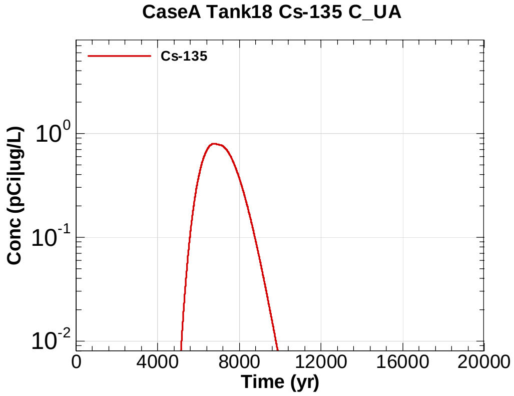

Figure E-1683 - 100m Aquifer Concentration for CaseA Tank18 Cs-135 C_UA

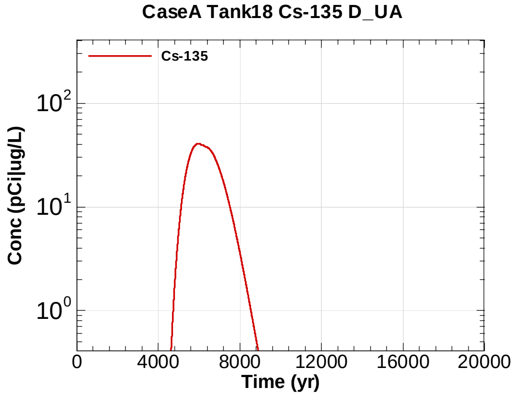

Figure E-1684 - 100m Aquifer Concentration for CaseA Tank18 Cs-135 D_UA

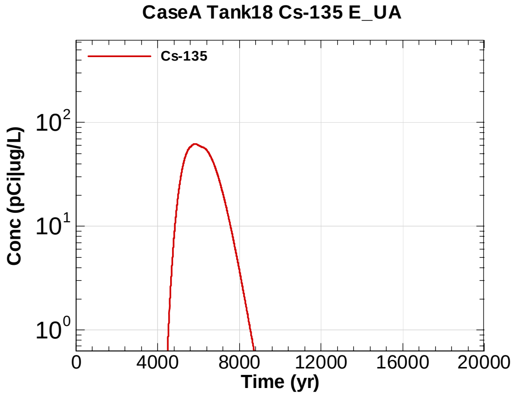

Figure E-1685 - 100m Aquifer Concentration for CaseA Tank18 Cs-135 E_UA

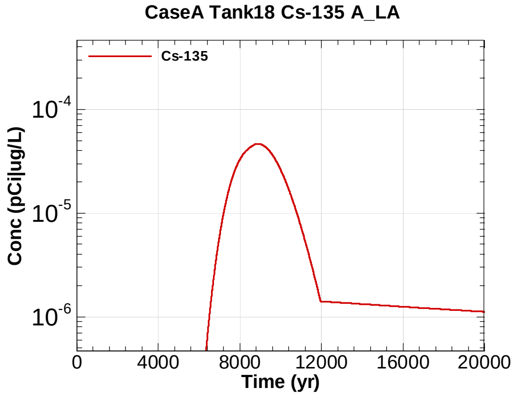

Figure E-1686 - 100m Aquifer Concentration for CaseA Tank18 Cs-135 A_LA

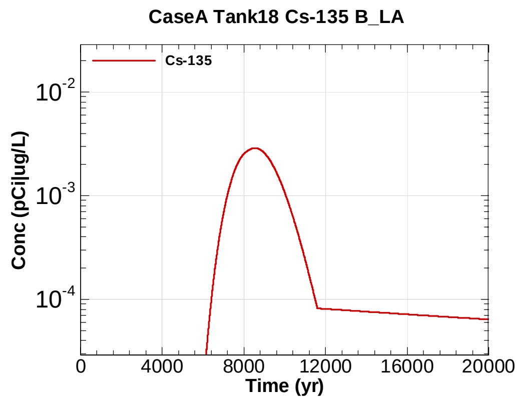

Figure E-1687 - 100m Aquifer Concentration for CaseA Tank18 Cs-135 B_LA

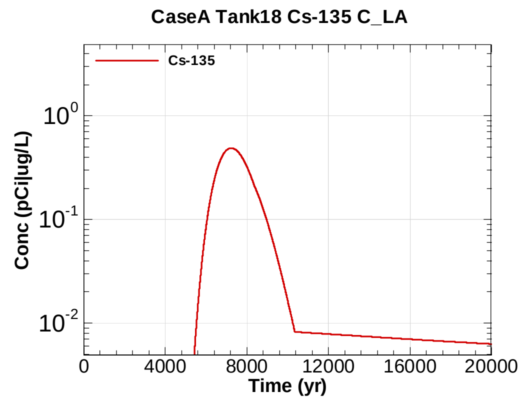

Figure E-1688 - 100m Aquifer Concentration for CaseA Tank18 Cs-135 C_LA

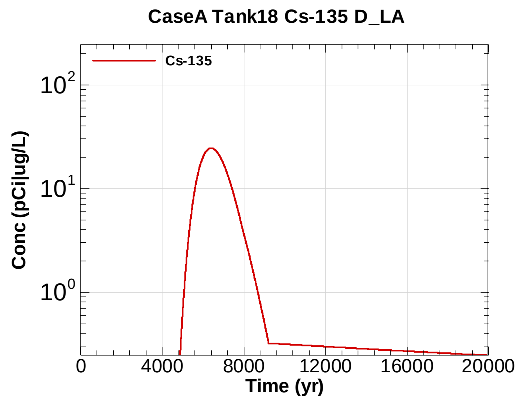

Figure E-1689 - 100m Aquifer Concentration for CaseA Tank18 Cs-135 D_LA

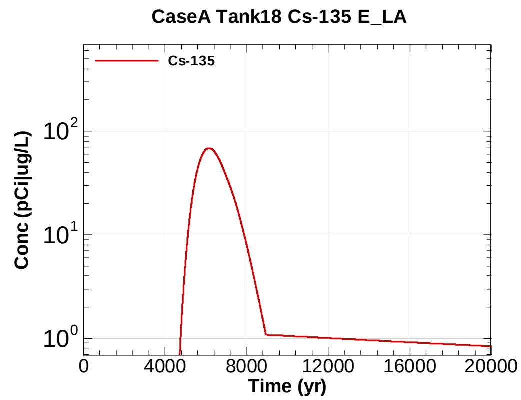

Figure E-1690 - 100m Aquifer Concentration for CaseA Tank18 Cs-135 E_LA

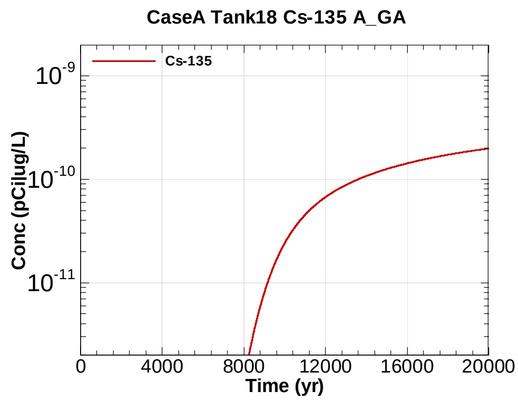

Figure E-1691 - 100m Aquifer Concentration for CaseA Tank18 Cs-135 A_GA

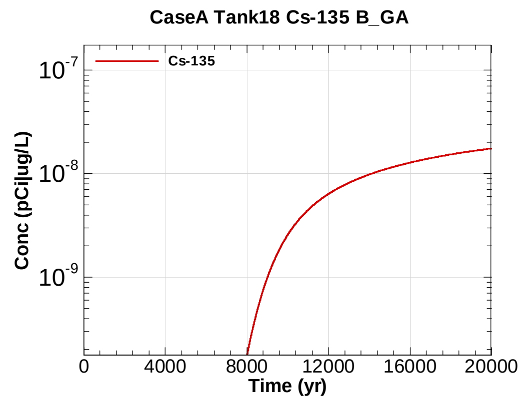

Figure E-1692 - 100m Aquifer Concentration for CaseA Tank18 Cs-135 B_GA

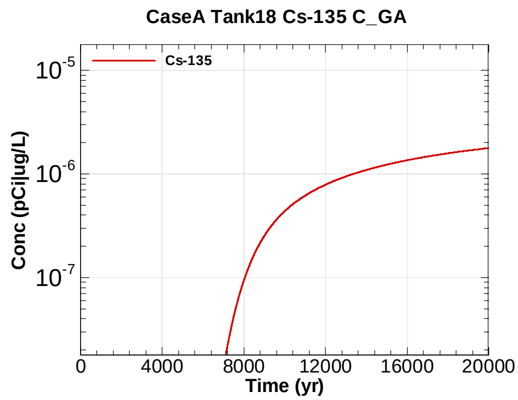

Figure E-1693 - 100m Aquifer Concentration for CaseA Tank18 Cs-135 C_GA

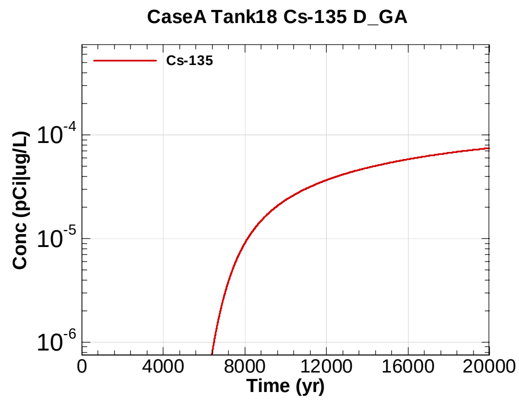

Figure E-1694 - 100m Aquifer Concentration for CaseA Tank18 Cs-135 D_GA

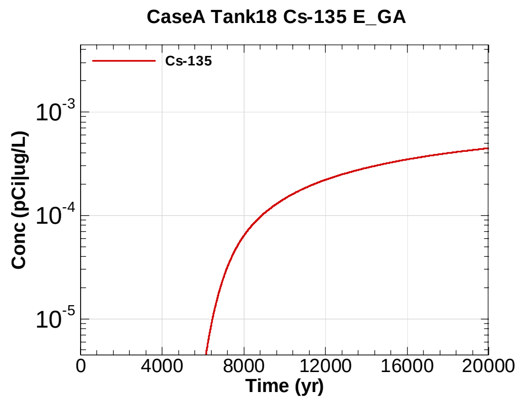

Figure E-1695 - 100m Aquifer Concentration for CaseA Tank18 Cs-135 E_GA

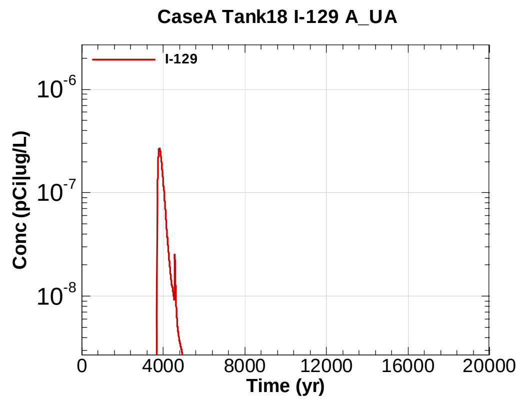

Figure E-1696 - 100m Aquifer Concentration for CaseA Tank18 I-129 A_UA

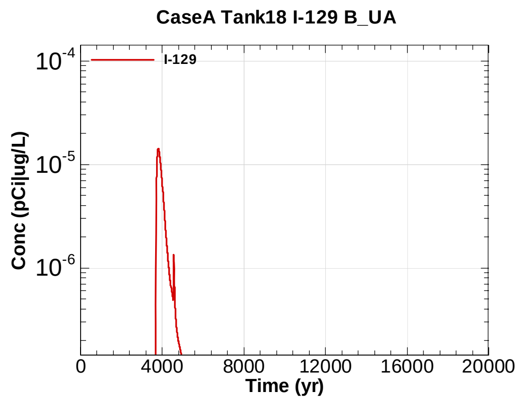

Figure E-1697 - 100m Aquifer Concentration for CaseA Tank18 I-129 B_UA

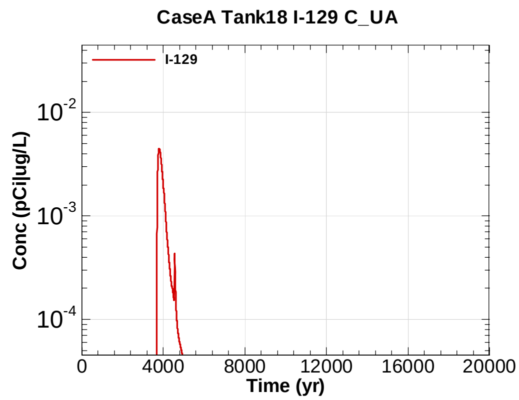

Figure E-1698 - 100m Aquifer Concentration for CaseA Tank18 I-129 C_UA

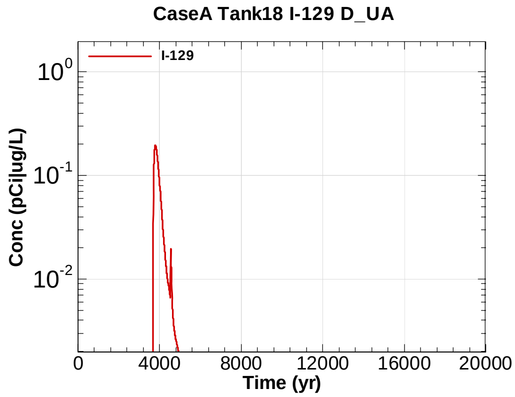

Figure E-1699 - 100m Aquifer Concentration for CaseA Tank18 I-129 D_UA

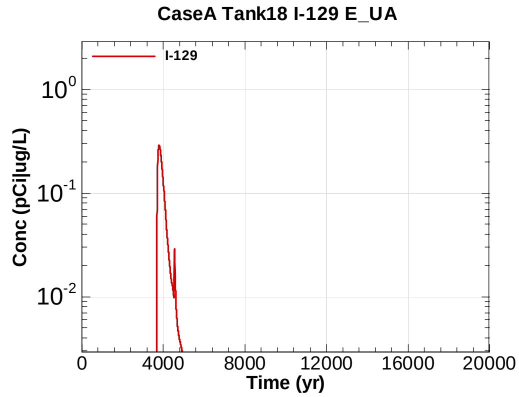

Figure E-1700 - 100m Aquifer Concentration for CaseA Tank18 I-129 E_UA

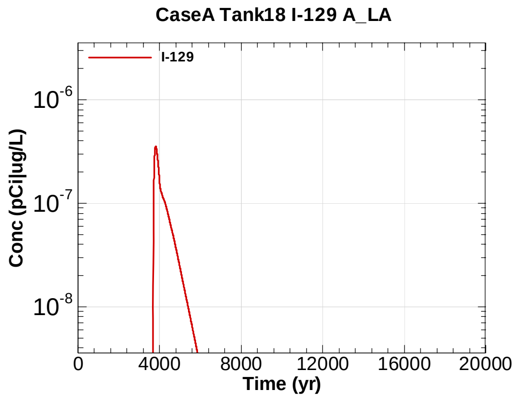

Figure E-1701 - 100m Aquifer Concentration for CaseA Tank18 I-129 A_LA

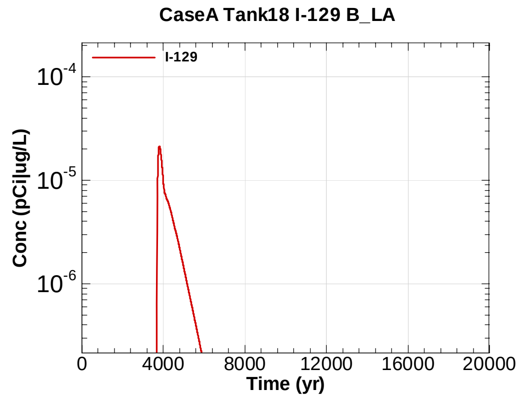

Figure E-1702 - 100m Aquifer Concentration for CaseA Tank18 I-129 B_LA

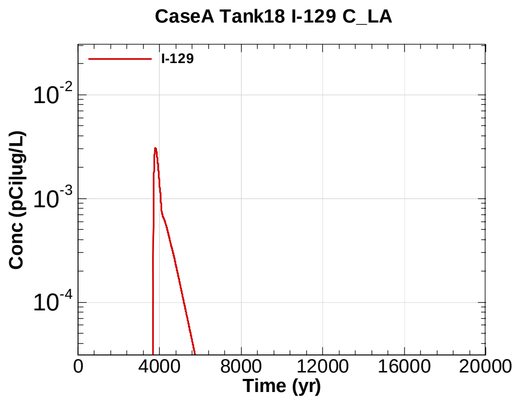

Figure E-1703 - 100m Aquifer Concentration for CaseA Tank18 I-129 C_LA

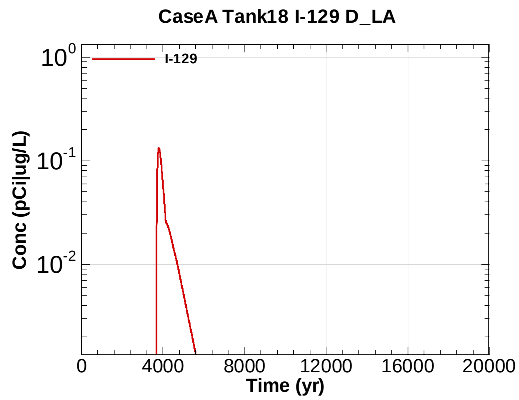

Figure E-1704 - 100m Aquifer Concentration for CaseA Tank18 I-129 D_LA

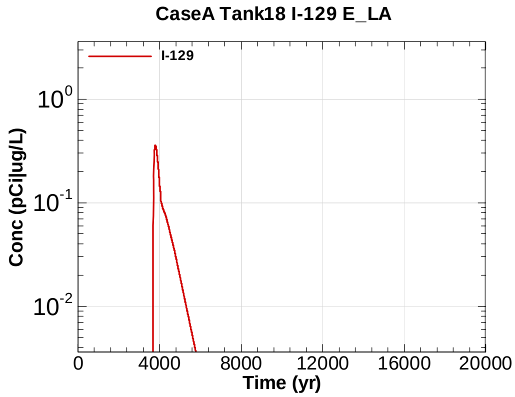

Figure E-1705 - 100m Aquifer Concentration for CaseA Tank18 I-129 E_LA

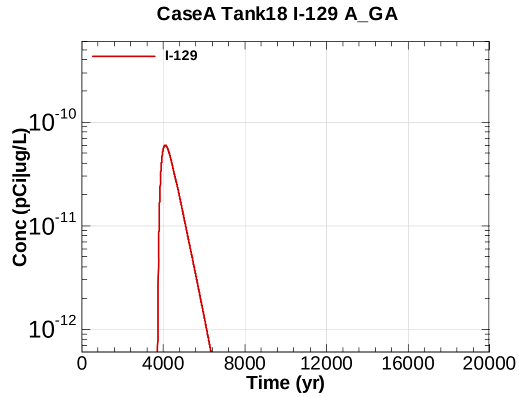

Figure E-1706 - 100m Aquifer Concentration for CaseA Tank18 I-129 A_GA

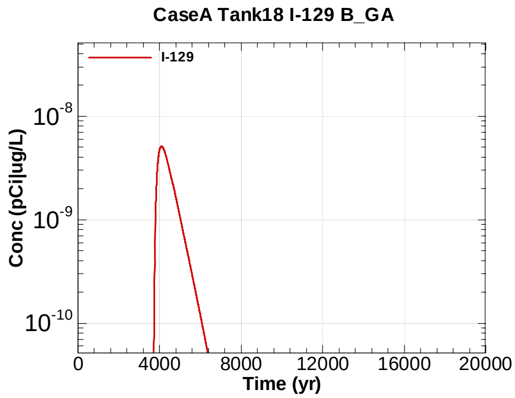

Figure E-1707 - 100m Aquifer Concentration for CaseA Tank18 I-129 B_GA

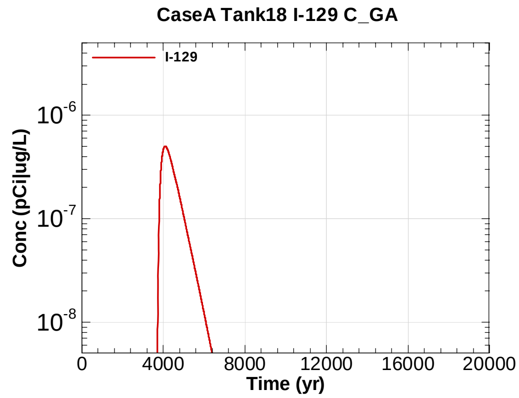

Figure E-1708 - 100m Aquifer Concentration for CaseA Tank18 I-129 C_GA

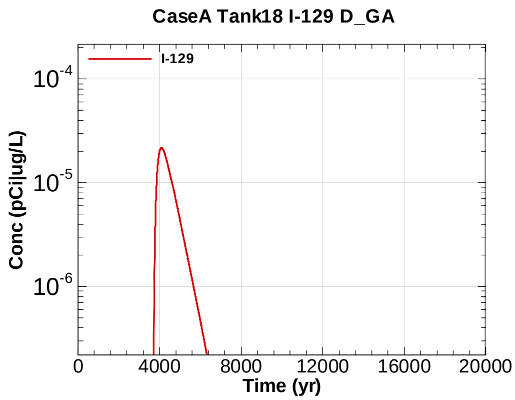

Figure E-1709 - 100m Aquifer Concentration for CaseA Tank18 I-129 D_GA

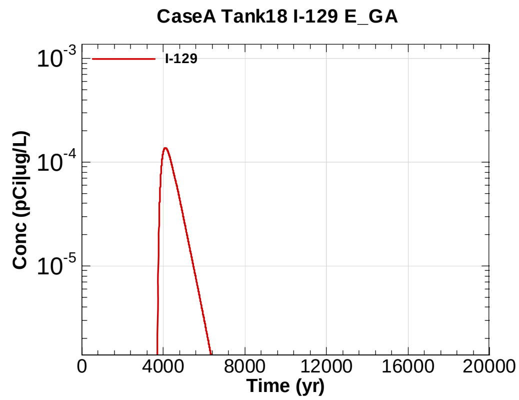

Figure E-1710 - 100m Aquifer Concentration for CaseA Tank18 I-129 E_GA

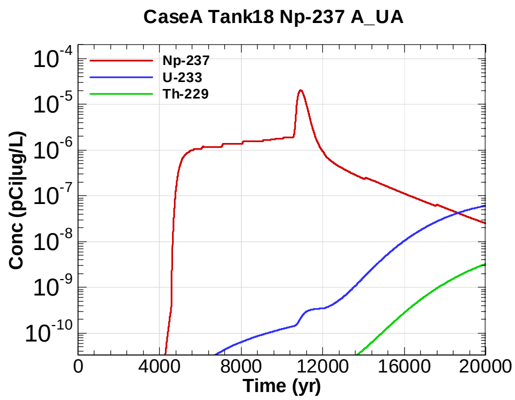

Figure E-1711 - 100m Aquifer Concentration for CaseA Tank18 Np-237 A_UA

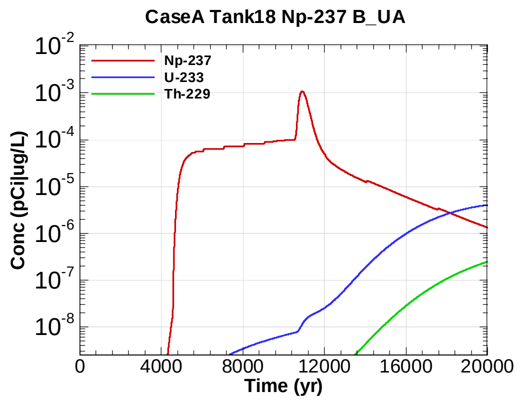

Figure E-1712 - 100m Aquifer Concentration for CaseA Tank18 Np-237 B_UA

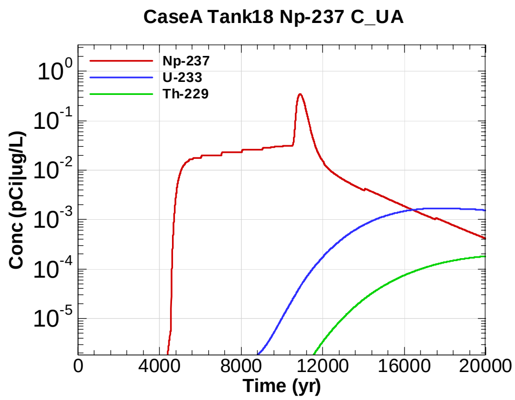

Figure E-1713 - 100m Aquifer Concentration for CaseA Tank18 Np-237 C_UA

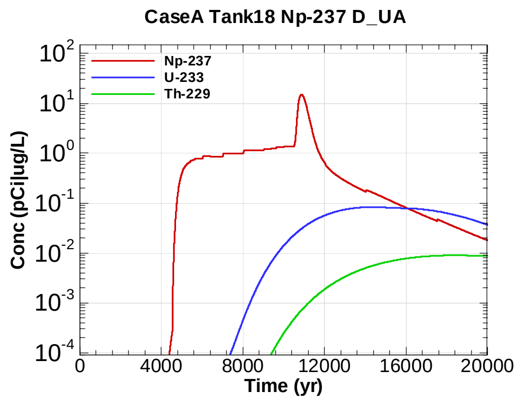

Figure E-1714 - 100m Aquifer Concentration for CaseA Tank18 Np-237 D_UA

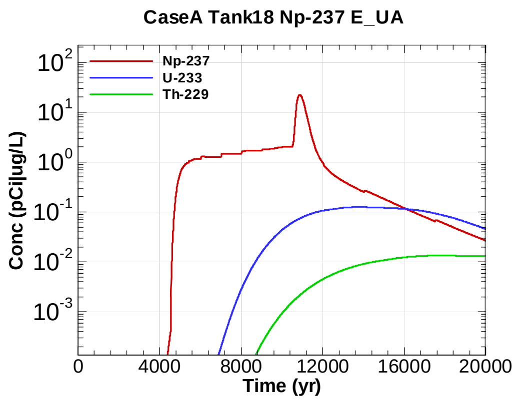

Figure E-1715 - 100m Aquifer Concentration for CaseA Tank18 Np-237 E_UA

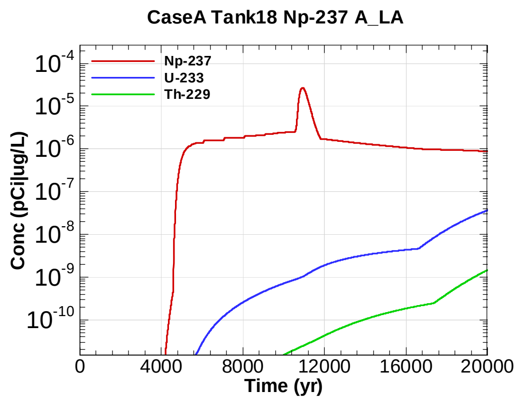

Figure E-1716 - 100m Aquifer Concentration for CaseA Tank18 Np-237 A_LA

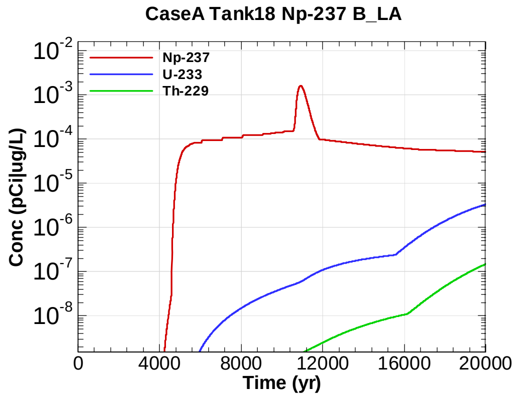

Figure E-1717 - 100m Aquifer Concentration for CaseA Tank18 Np-237 B_LA

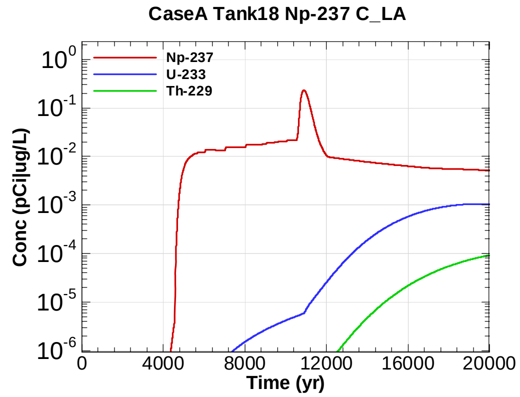

Figure E-1718 - 100m Aquifer Concentration for CaseA Tank18 Np-237 C_LA

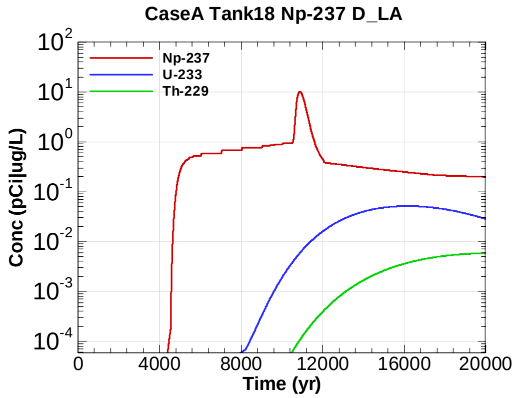

Figure E-1719 - 100m Aquifer Concentration for CaseA Tank18 Np-237 D_LA

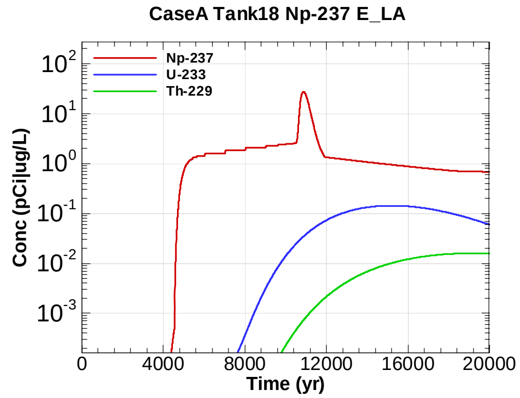

Figure E-1720 - 100m Aquifer Concentration for CaseA Tank18 Np-237 E_LA

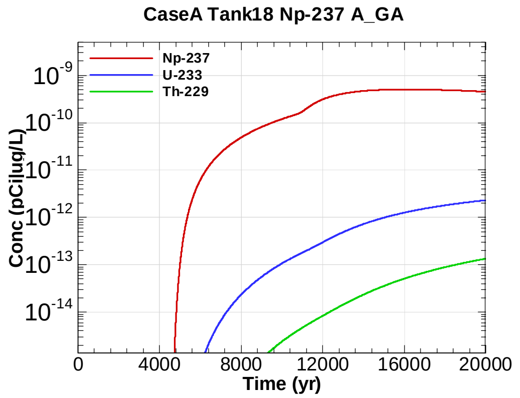

Figure E-1721 - 100m Aquifer Concentration for CaseA Tank18 Np-237 A_GA

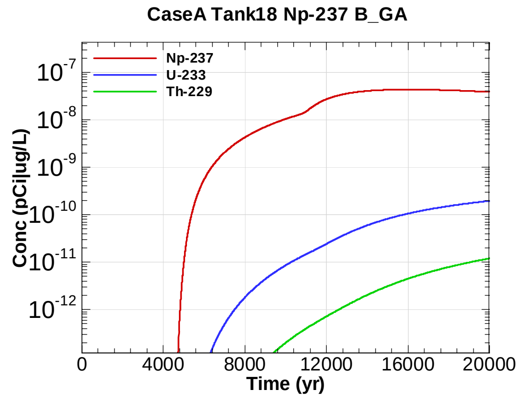

Figure E-1722 - 100m Aquifer Concentration for CaseA Tank18 Np-237 B_GA

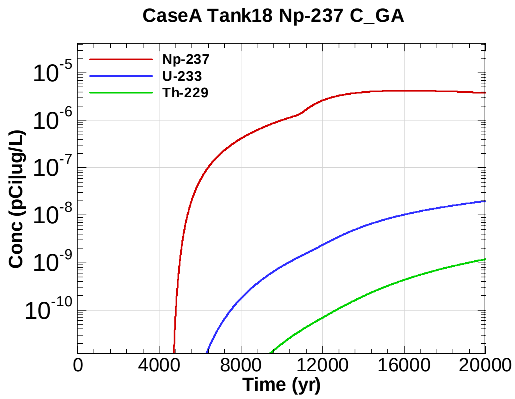

Figure E-1723 - 100m Aquifer Concentration for CaseA Tank18 Np-237 C_GA

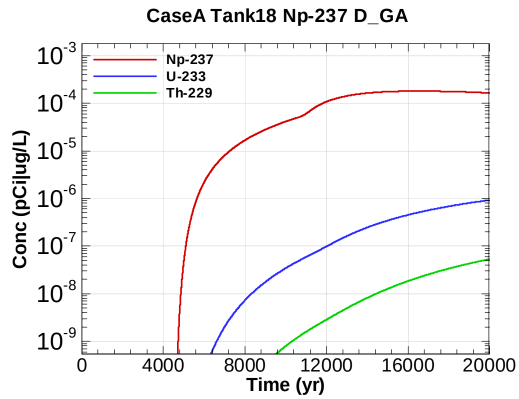

Figure E-1724 - 100m Aquifer Concentration for CaseA Tank18 Np-237 D_GA

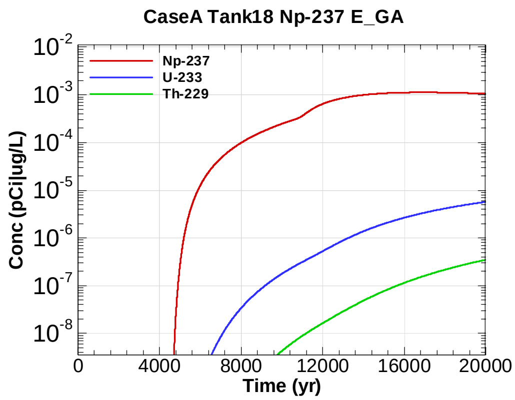

Figure E-1725 - 100m Aquifer Concentration for CaseA Tank18 Np-237 E_GA

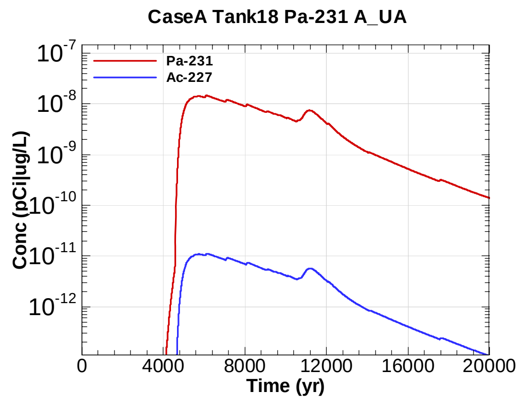

Figure E-1726 - 100m Aquifer Concentration for CaseA Tank18 Pa-231 A_UA

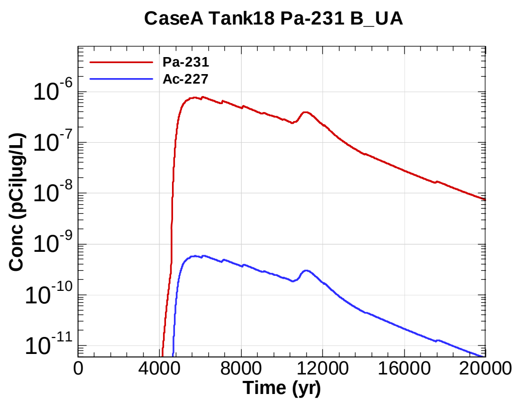

Figure E-1727 - 100m Aquifer Concentration for CaseA Tank18 Pa-231 B_UA

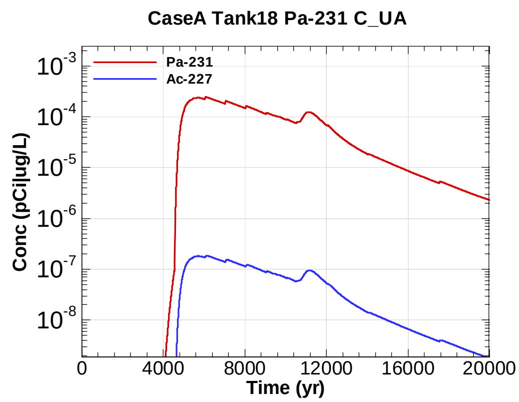

Figure E-1728 - 100m Aquifer Concentration for CaseA Tank18 Pa-231 C_UA

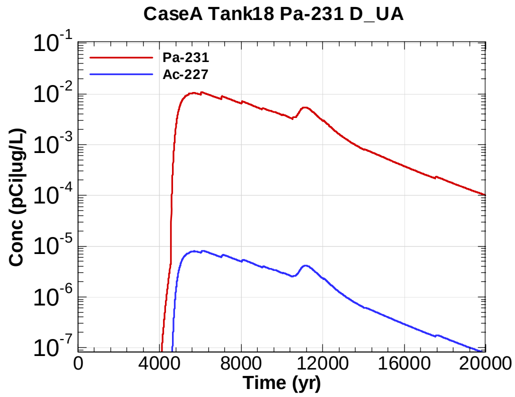

Figure E-1729 - 100m Aquifer Concentration for CaseA Tank18 Pa-231 D_UA

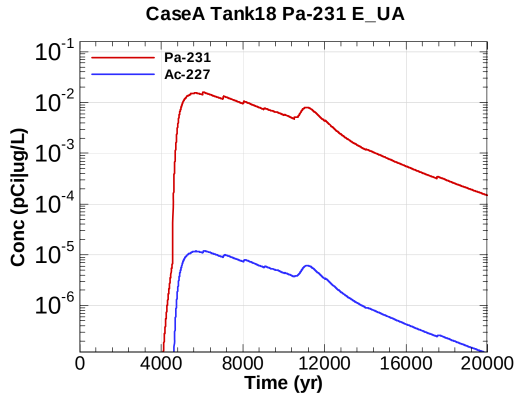

Figure E-1730 - 100m Aquifer Concentration for CaseA Tank18 Pa-231 E_UA

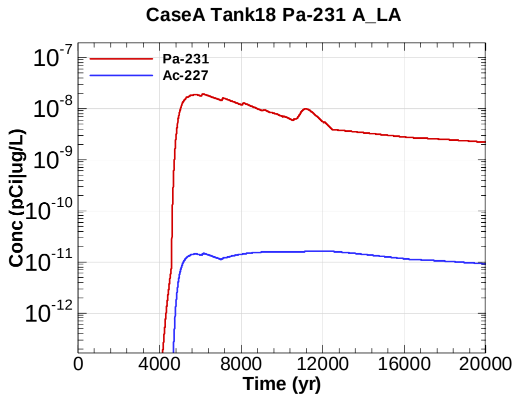

Figure E-1731 - 100m Aquifer Concentration for CaseA Tank18 Pa-231 A_LA

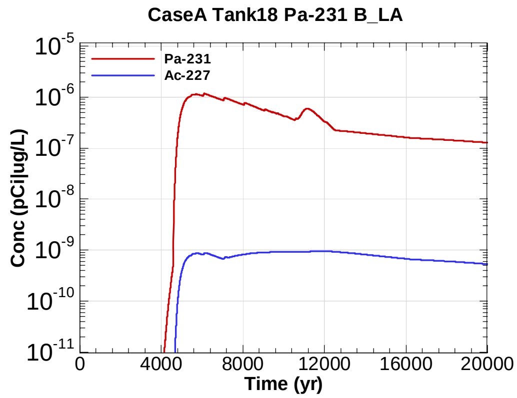

Figure E-1732 - 100m Aquifer Concentration for CaseA Tank18 Pa-231 B_LA

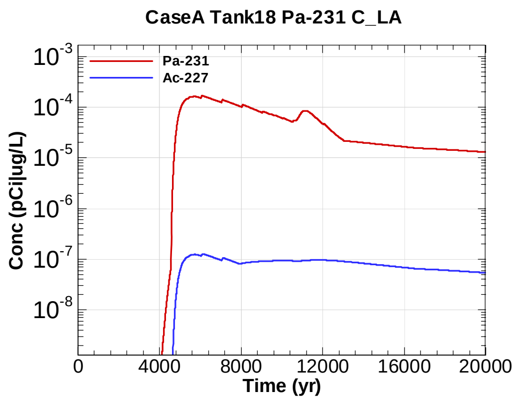

Figure E-1733 - 100m Aquifer Concentration for CaseA Tank18 Pa-231 C_LA

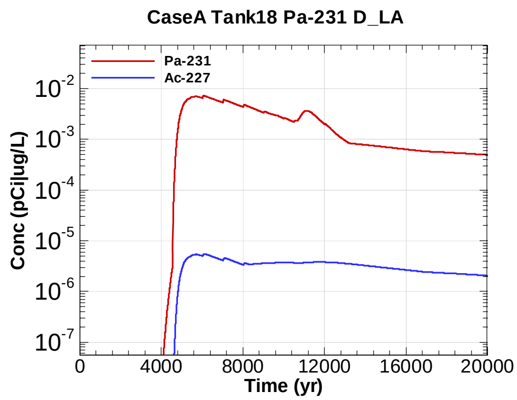

Figure E-1734 - 100m Aquifer Concentration for CaseA Tank18 Pa-231 D_LA

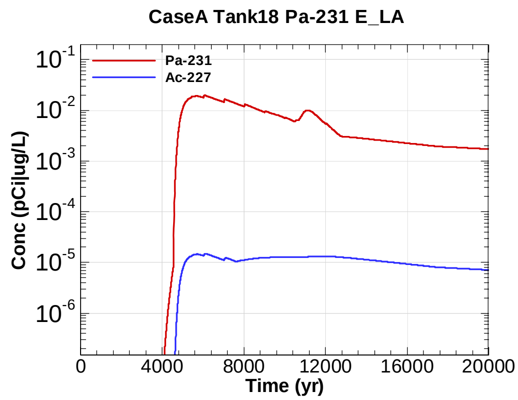

Figure E-1735 - 100m Aquifer Concentration for CaseA Tank18 Pa-231 E_LA

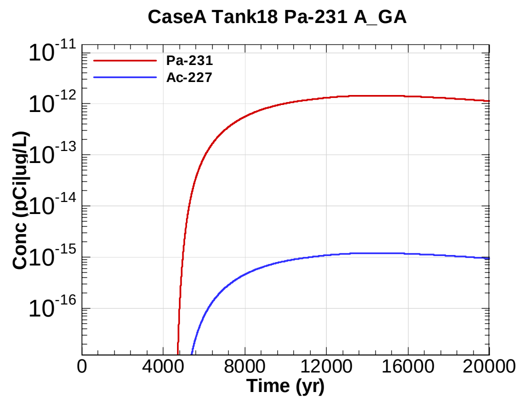

Figure E-1736 - 100m Aquifer Concentration for CaseA Tank18 Pa-231 A_GA

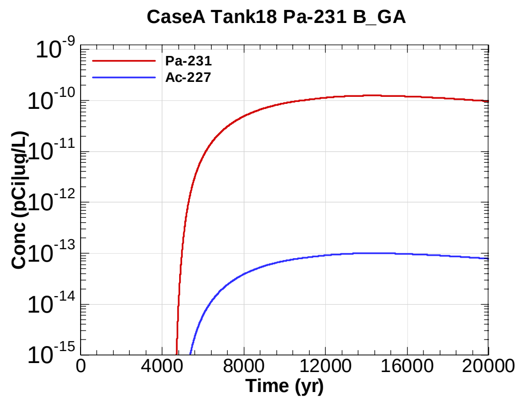

Figure E-1737 - 100m Aquifer Concentration for CaseA Tank18 Pa-231 B_GA

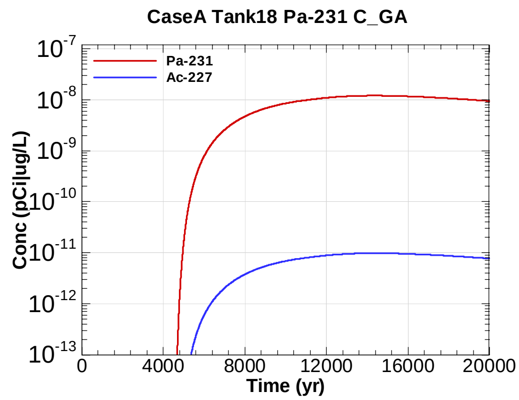

Figure E-1738 - 100m Aquifer Concentration for CaseA Tank18 Pa-231 C_GA

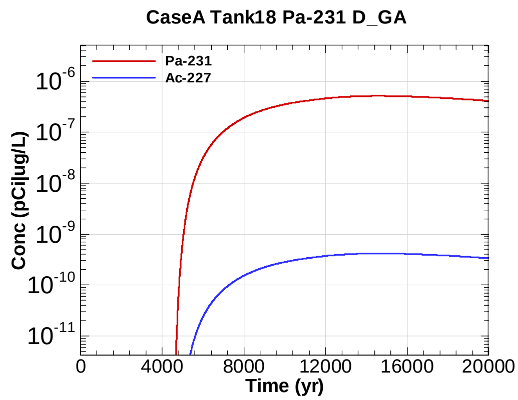

Figure E-1739 - 100m Aquifer Concentration for CaseA Tank18 Pa-231 D_GA

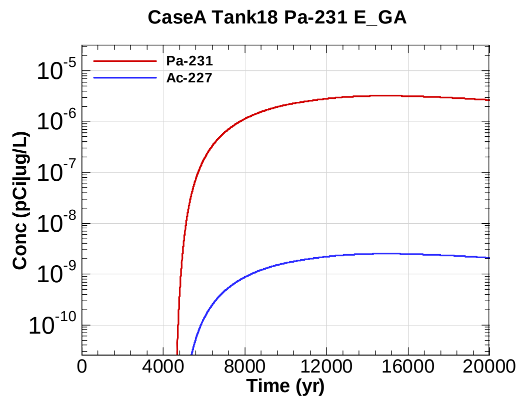

Figure E-1740 - 100m Aquifer Concentration for CaseA Tank18 Pa-231 E_GA

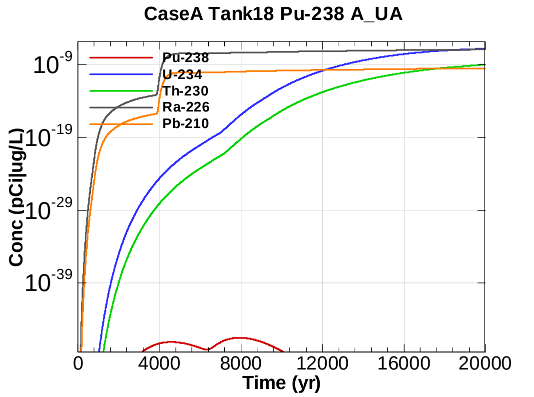

Figure E-1741 - 100m Aquifer Concentration for CaseA Tank18 Pu-238 A_UA

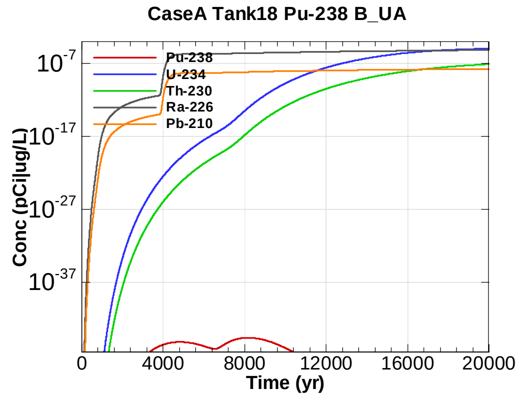

Figure E-1742 - 100m Aquifer Concentration for CaseA Tank18 Pu-238 B_UA

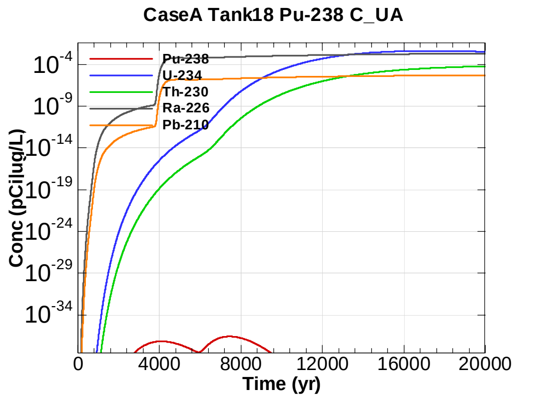

Figure E-1743 - 100m Aquifer Concentration for CaseA Tank18 Pu-238 C_UA

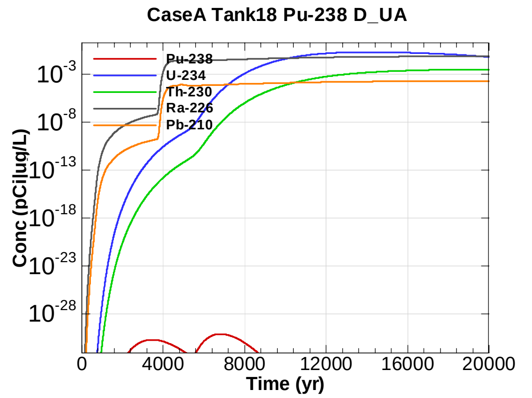

Figure E-1744 - 100m Aquifer Concentration for CaseA Tank18 Pu-238 D_UA

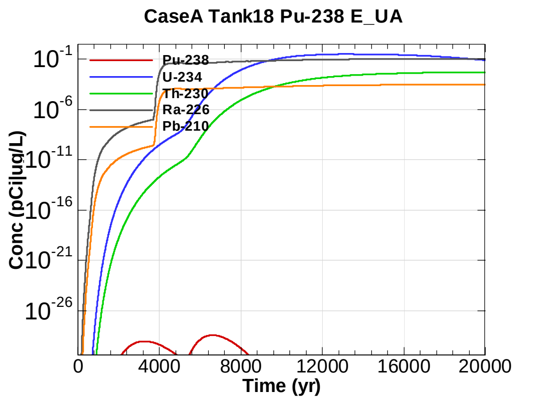

Figure E-1745 - 100m Aquifer Concentration for CaseA Tank18 Pu-238 E_UA

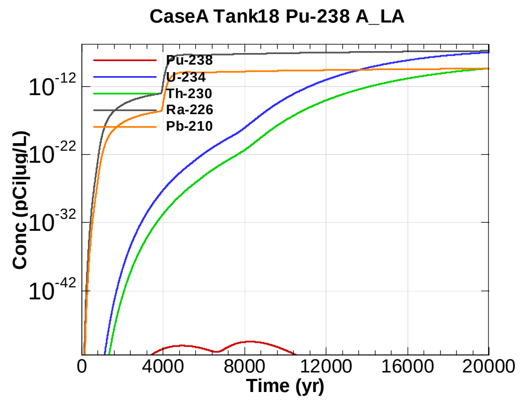

Figure E-1746 - 100m Aquifer Concentration for CaseA Tank18 Pu-238 A_LA

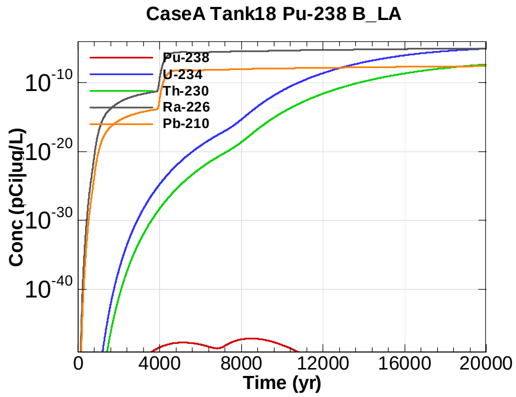

Figure E-1747 - 100m Aquifer Concentration for CaseA Tank18 Pu-238 B_LA

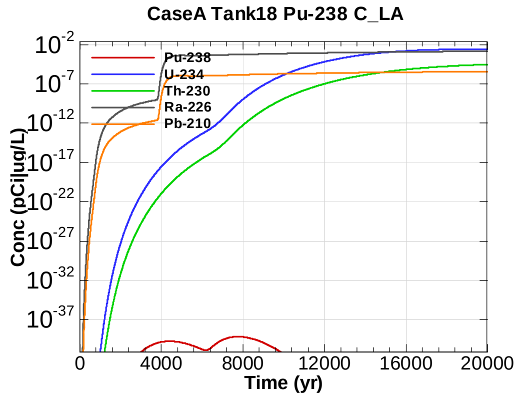

Figure E-1748 - 100m Aquifer Concentration for CaseA Tank18 Pu-238 C_LA

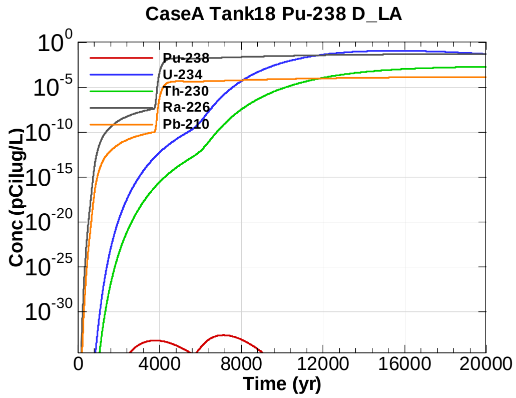

Figure E-1749 - 100m Aquifer Concentration for CaseA Tank18 Pu-238 D_LA

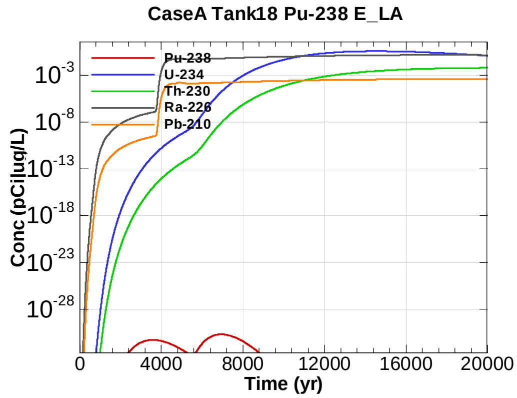

Figure E-1750 - 100m Aquifer Concentration for CaseA Tank18 Pu-238 E_LA

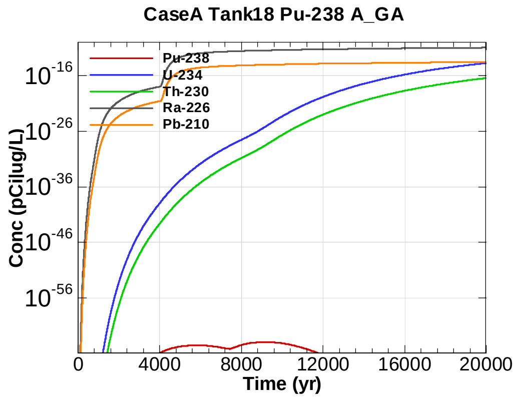

Figure E-1751 - 100m Aquifer Concentration for CaseA Tank18 Pu-238 A_GA

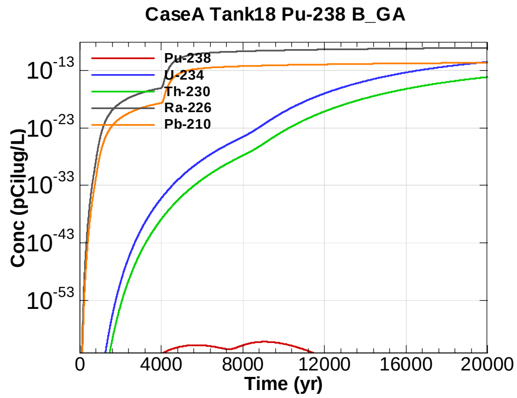

Figure E-1752 - 100m Aquifer Concentration for CaseA Tank18 Pu-238 B_GA

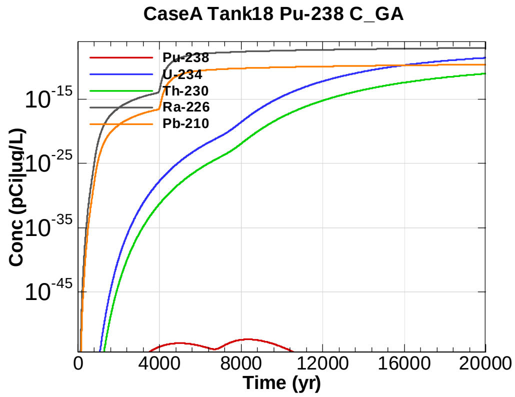

Figure E-1753 - 100m Aquifer Concentration for CaseA Tank18 Pu-238 C_GA

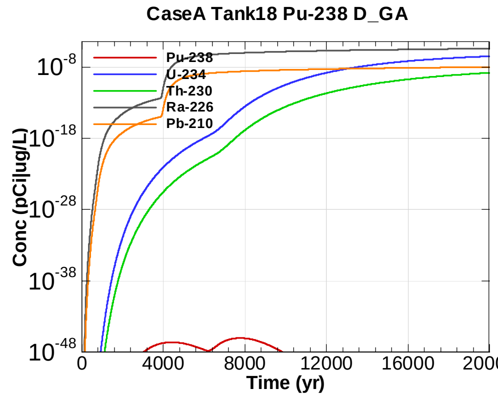

Figure E-1754 - 100m Aquifer Concentration for CaseA Tank18 Pu-238 D_GA

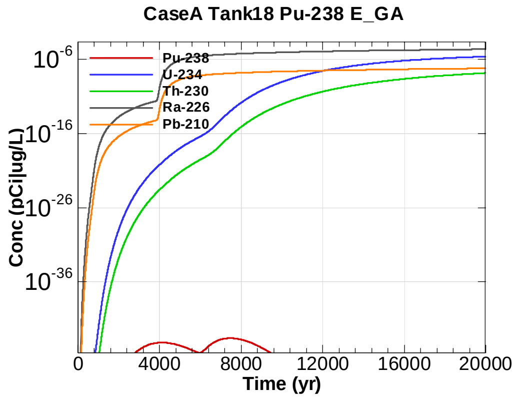

Figure E-1755 - 100m Aquifer Concentration for CaseA Tank18 Pu-238 E_GA

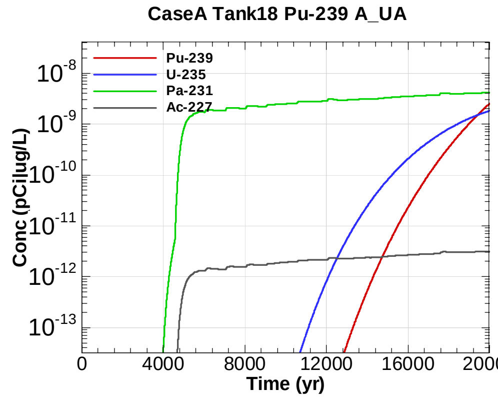

Figure E-1756 - 100m Aquifer Concentration for CaseA Tank18 Pu-239 A_UA

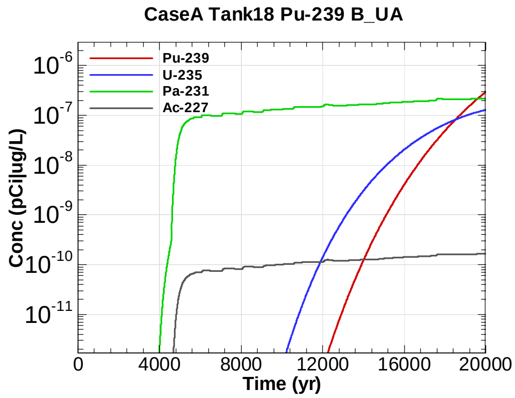

Figure E-1757 - 100m Aquifer Concentration for CaseA Tank18 Pu-239 B_UA

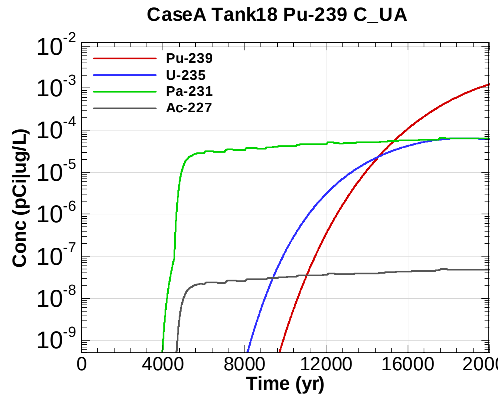

Figure E-1758 - 100m Aquifer Concentration for CaseA Tank18 Pu-239 C_UA

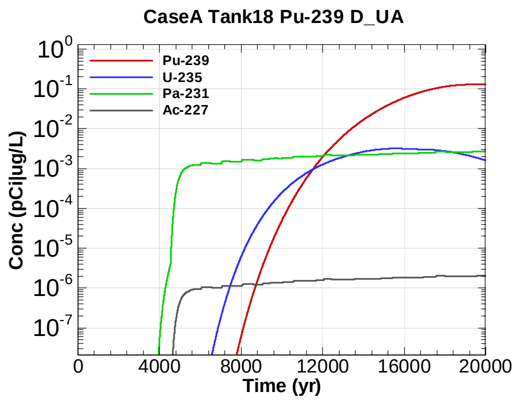

Figure E-1759 - 100m Aquifer Concentration for CaseA Tank18 Pu-239 D_UA

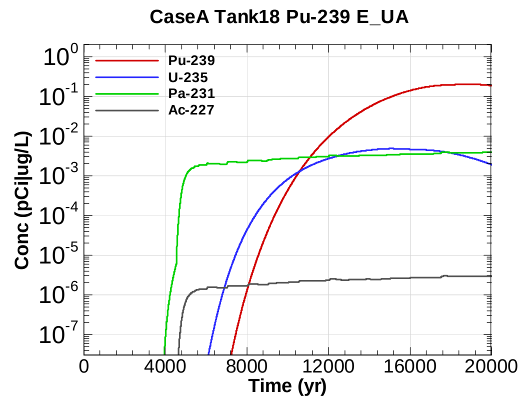

Figure E-1760 - 100m Aquifer Concentration for CaseA Tank18 Pu-239 E_UA

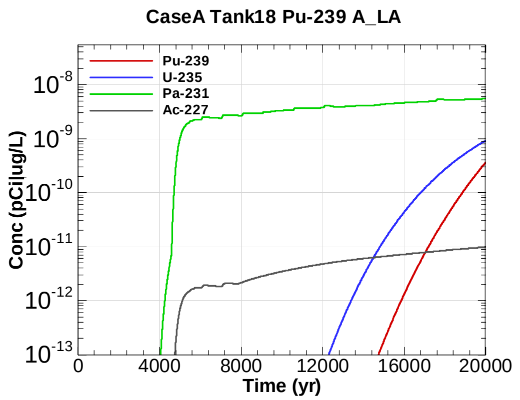

Figure E-1761 - 100m Aquifer Concentration for CaseA Tank18 Pu-239 A_LA

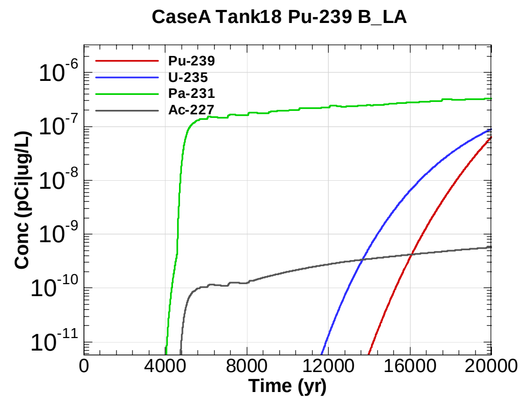

Figure E-1762 - 100m Aquifer Concentration for CaseA Tank18 Pu-239 B_LA

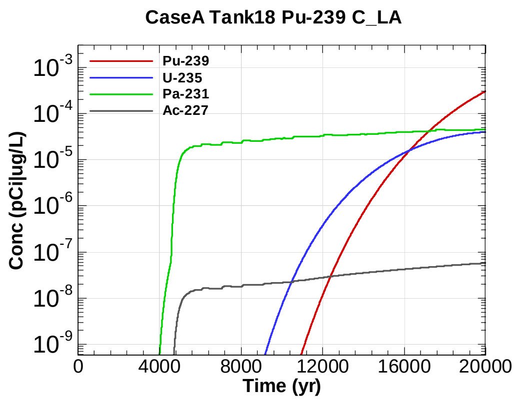

Figure E-1763 - 100m Aquifer Concentration for CaseA Tank18 Pu-239 C_LA

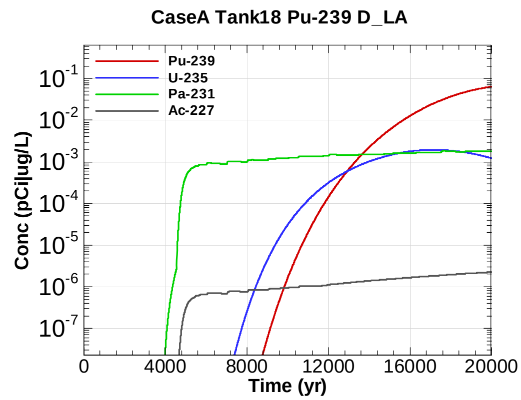

Figure E-1764 - 100m Aquifer Concentration for CaseA Tank18 Pu-239 D_LA

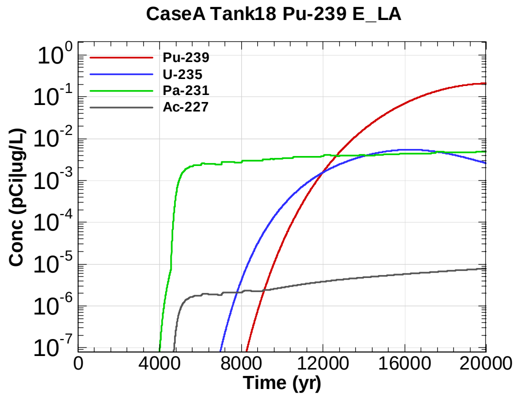

Figure E-1765 - 100m Aquifer Concentration for CaseA Tank18 Pu-239 E_LA

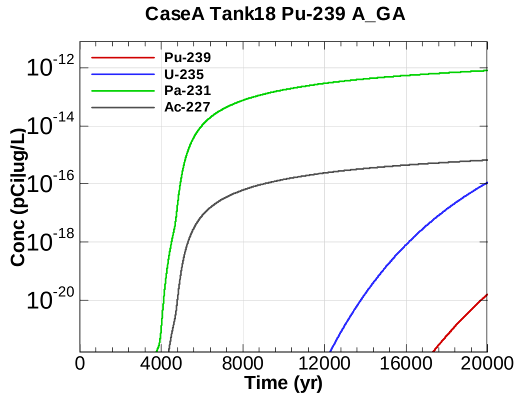

Figure E-1766 - 100m Aquifer Concentration for CaseA Tank18 Pu-239 A_GA

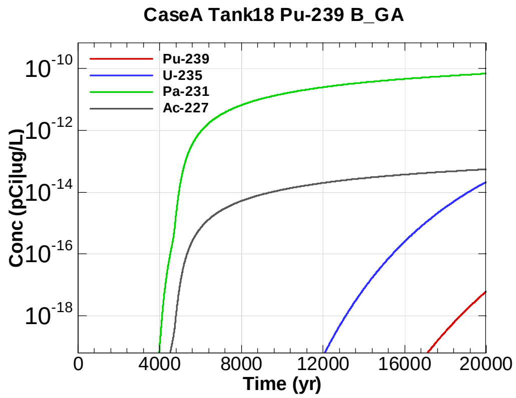

Figure E-1767 - 100m Aquifer Concentration for CaseA Tank18 Pu-239 B_GA

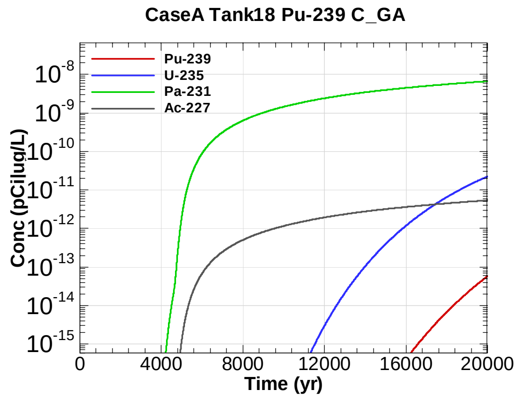

Figure E-1768 - 100m Aquifer Concentration for CaseA Tank18 Pu-239 C_GA

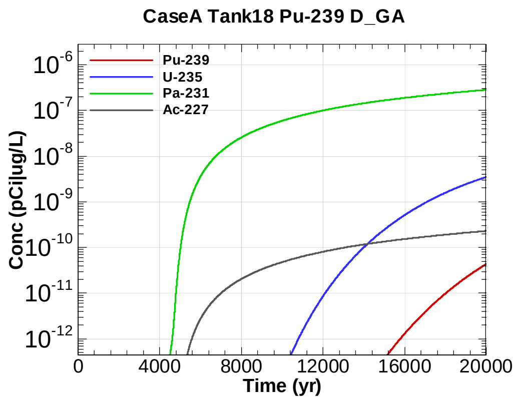

Figure E-1769 - 100m Aquifer Concentration for CaseA Tank18 Pu-239 D_GA

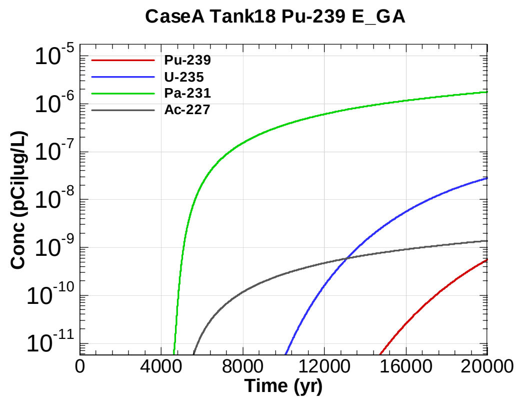

Figure E-1770 - 100m Aquifer Concentration for CaseA Tank18 Pu-239 E_GA

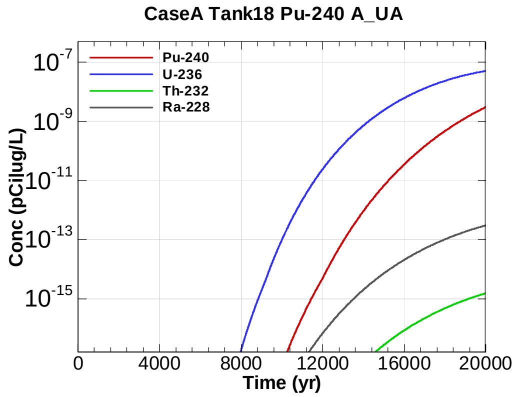

Figure E-1771 - 100m Aquifer Concentration for CaseA Tank18 Pu-240 A_UA

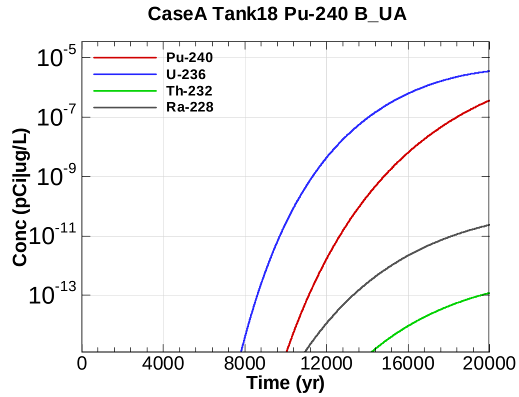

Figure E-1772 - 100m Aquifer Concentration for CaseA Tank18 Pu-240 B_UA

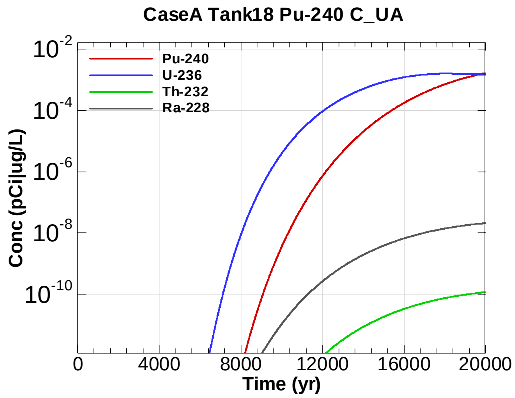

Figure E-1773 - 100m Aquifer Concentration for CaseA Tank18 Pu-240 C_UA

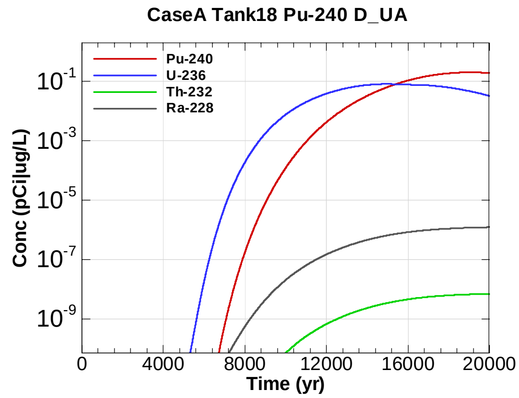

Figure E-1774 - 100m Aquifer Concentration for CaseA Tank18 Pu-240 D_UA

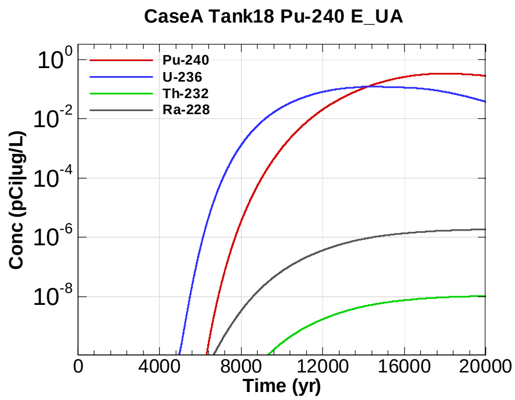

Figure E-1775 - 100m Aquifer Concentration for CaseA Tank18 Pu-240 E_UA

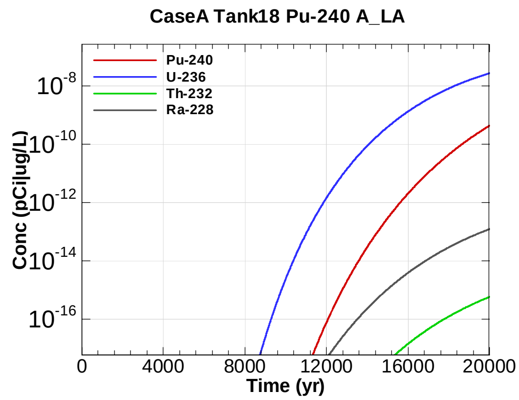

Figure E-1776 - 100m Aquifer Concentration for CaseA Tank18 Pu-240 A_LA

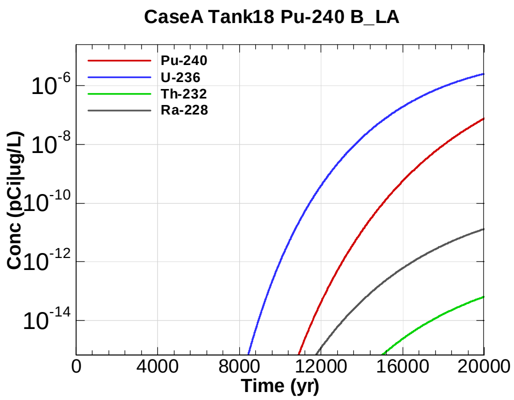

Figure E-1777 - 100m Aquifer Concentration for CaseA Tank18 Pu-240 B_LA

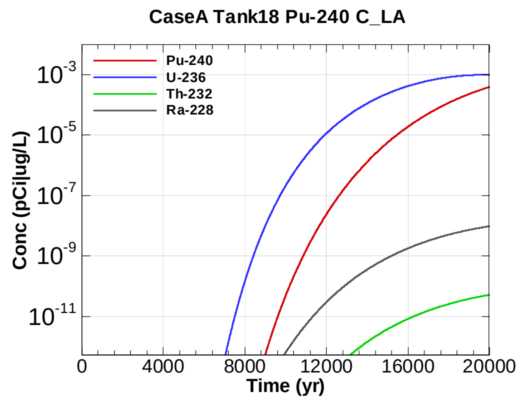

Figure E-1778 - 100m Aquifer Concentration for CaseA Tank18 Pu-240 C_LA

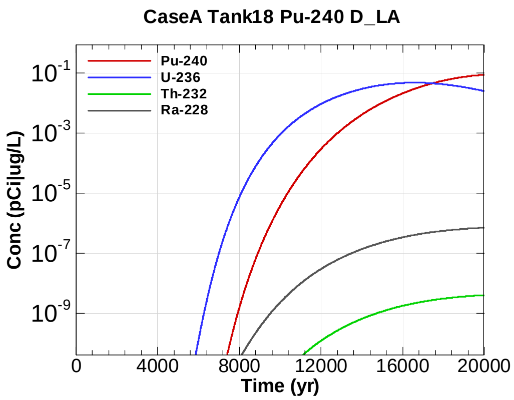

Figure E-1779 - 100m Aquifer Concentration for CaseA Tank18 Pu-240 D_LA

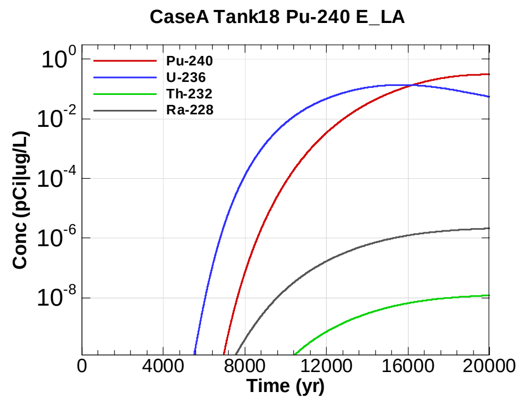

Figure E-1780 - 100m Aquifer Concentration for CaseA Tank18 Pu-240 E_LA

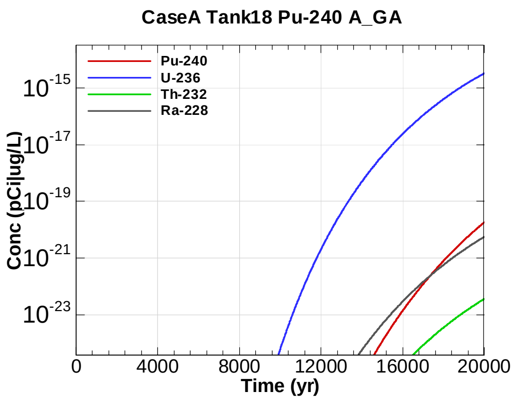

Figure E-1781 - 100m Aquifer Concentration for CaseA Tank18 Pu-240 A_GA

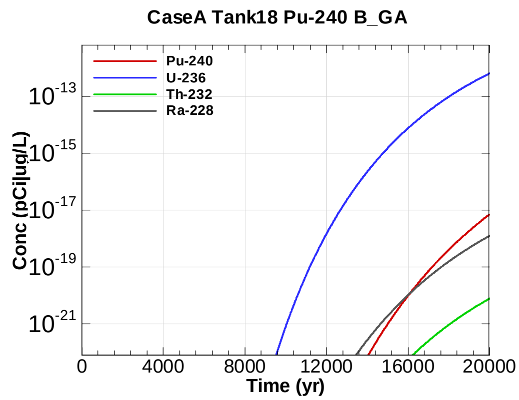

Figure E-1782 - 100m Aquifer Concentration for CaseA Tank18 Pu-240 B_GA

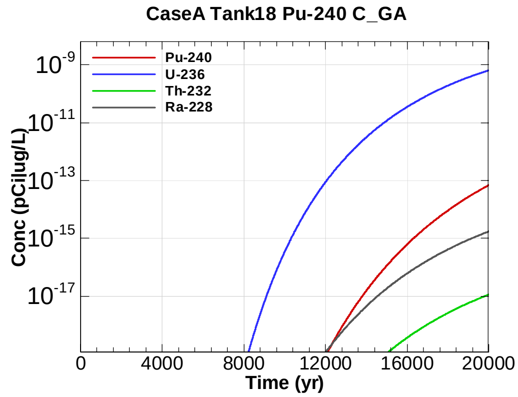

Figure E-1783 - 100m Aquifer Concentration for CaseA Tank18 Pu-240 C_GA

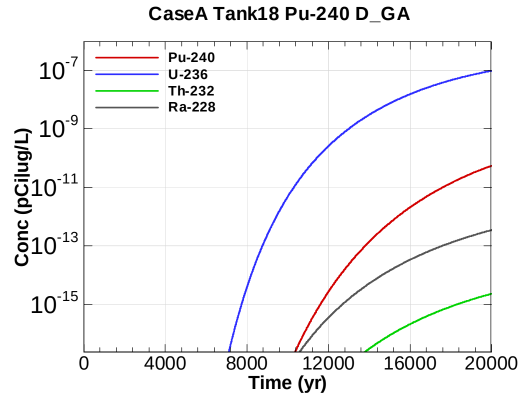

Figure E-1784 - 100m Aquifer Concentration for CaseA Tank18 Pu-240 D_GA

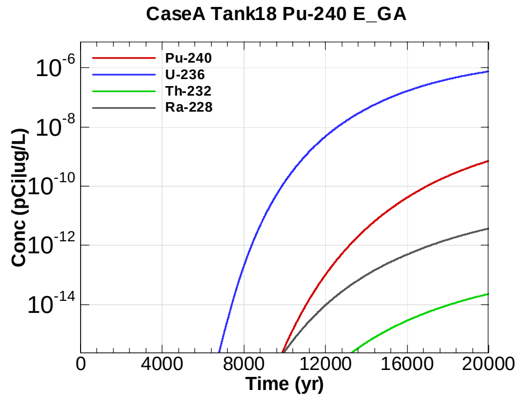

Figure E-1785 - 100m Aquifer Concentration for CaseA Tank18 Pu-240 E_GA

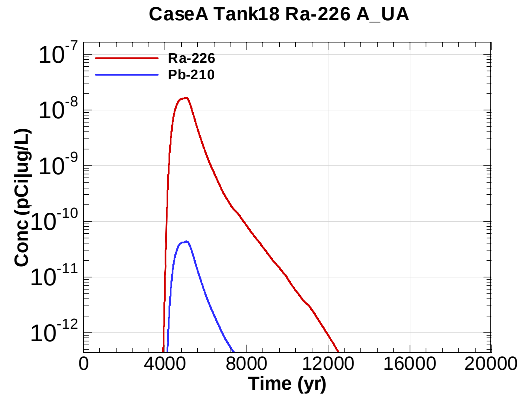

Figure E-1786 - 100m Aquifer Concentration for CaseA Tank18 Ra-226 A_UA

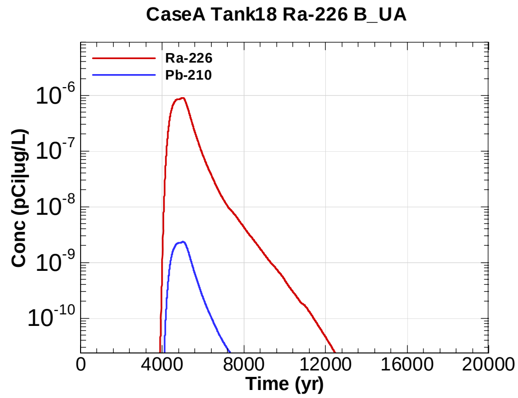

Figure E-1787 - 100m Aquifer Concentration for CaseA Tank18 Ra-226 B_UA

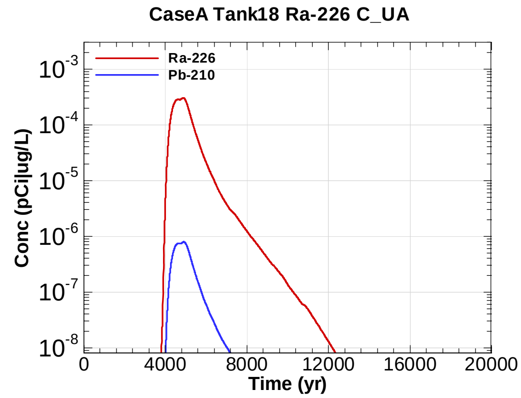

Figure E-1788 - 100m Aquifer Concentration for CaseA Tank18 Ra-226 C_UA

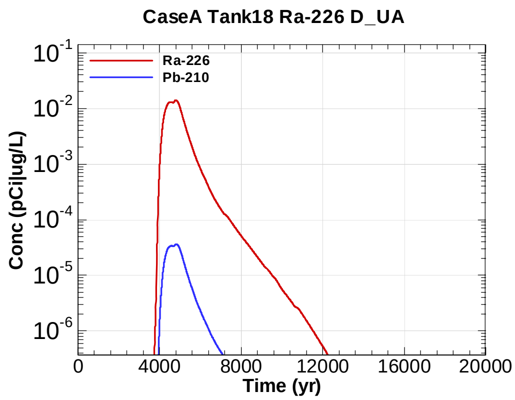

Figure E-1789 - 100m Aquifer Concentration for CaseA Tank18 Ra-226 D_UA

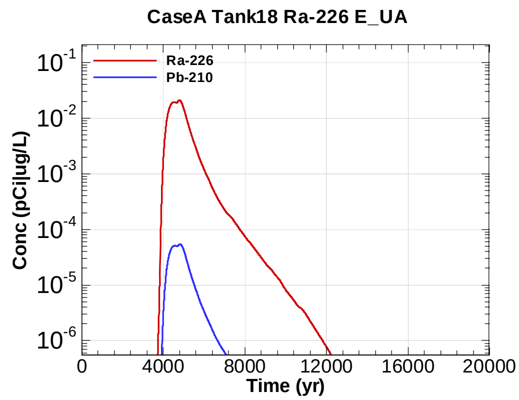

Figure E-1790 - 100m Aquifer Concentration for CaseA Tank18 Ra-226 E_UA

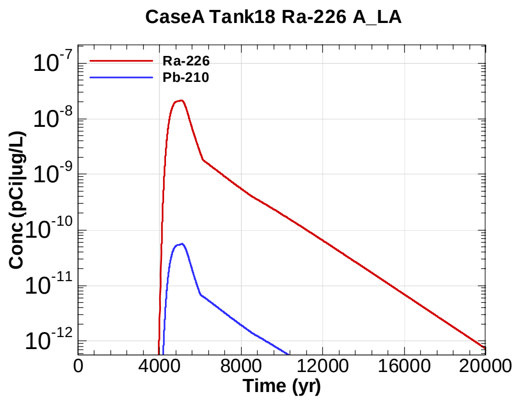

Figure E-1791 - 100m Aquifer Concentration for CaseA Tank18 Ra-226 A_LA

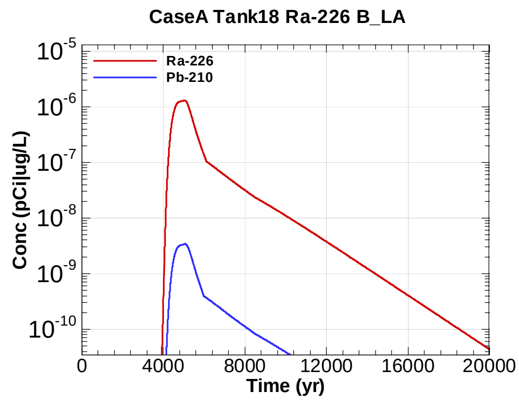

Figure E-1792 - 100m Aquifer Concentration for CaseA Tank18 Ra-226 B_LA

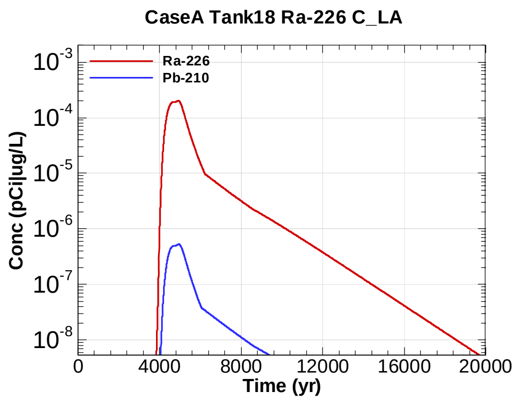

Figure E-1793 - 100m Aquifer Concentration for CaseA Tank18 Ra-226 C_LA

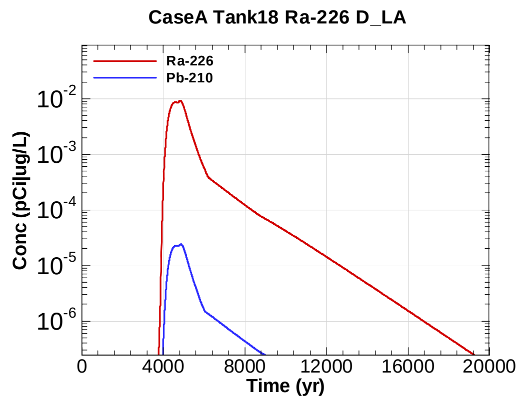

Figure E-1794 - 100m Aquifer Concentration for CaseA Tank18 Ra-226 D_LA

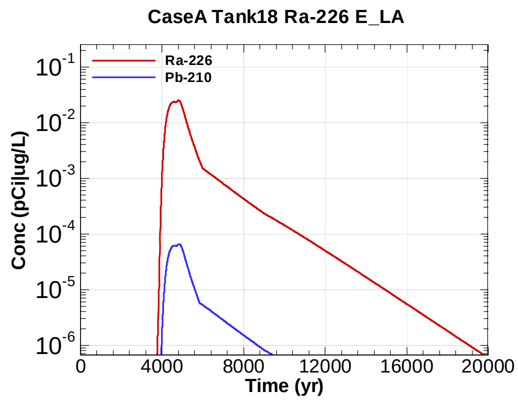

Figure E-1795 - 100m Aquifer Concentration for CaseA Tank18 Ra-226 E_LA

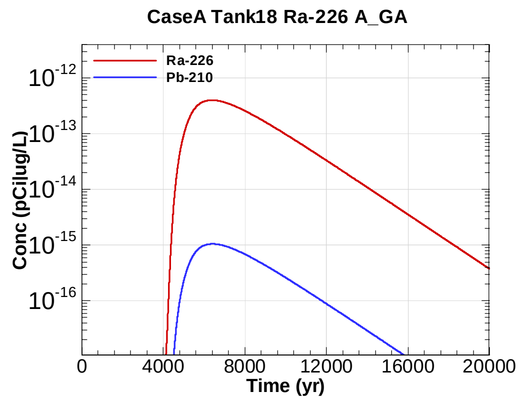

Figure E-1796 - 100m Aquifer Concentration for CaseA Tank18 Ra-226 A_GA

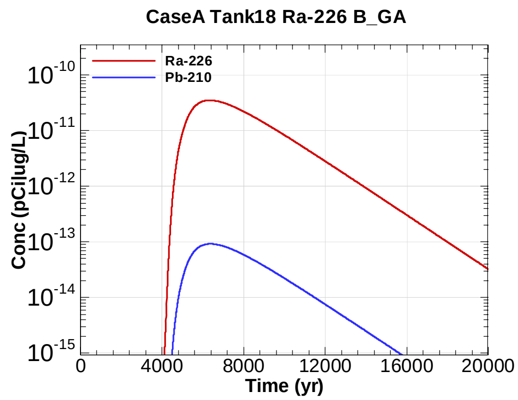

Figure E-1797 - 100m Aquifer Concentration for CaseA Tank18 Ra-226 B_GA

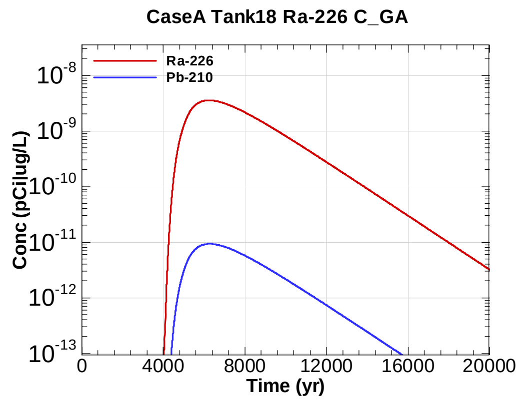

Figure E-1798 - 100m Aquifer Concentration for CaseA Tank18 Ra-226 C_GA

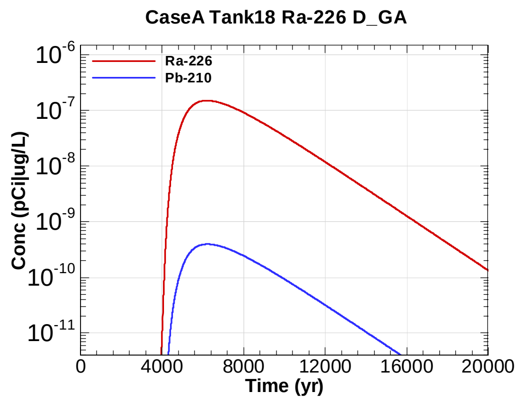

Figure E-1799 - 100m Aquifer Concentration for CaseA Tank18 Ra-226 D_GA

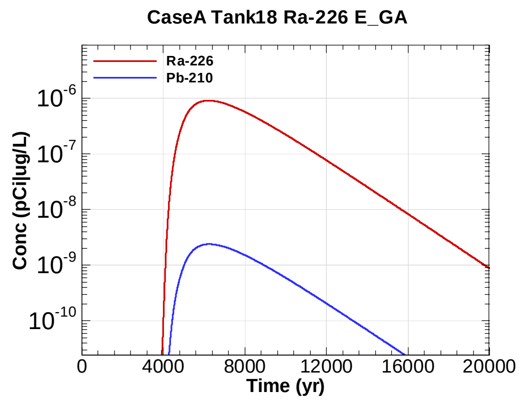

Figure E-1800 - 100m Aquifer Concentration for CaseA Tank18 Ra-226 E_GA

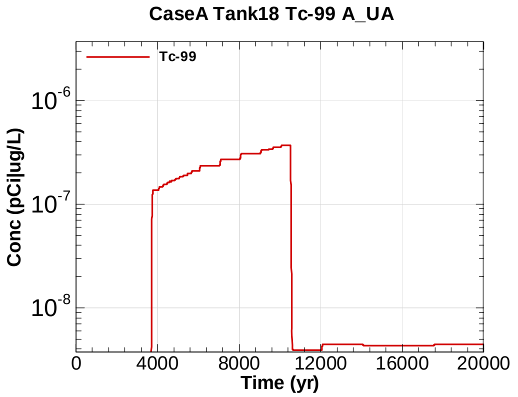

Figure E-1801 - 100m Aquifer Concentration for CaseA Tank18 Tc-99 A_UA

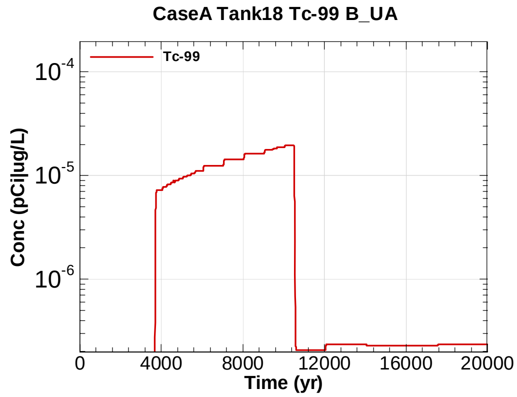

Figure E-1802 - 100m Aquifer Concentration for CaseA Tank18 Tc-99 B_UA

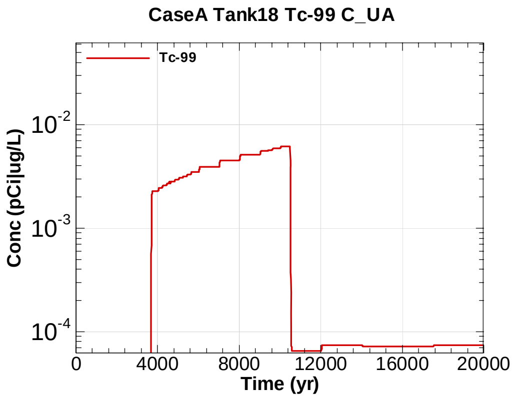

Figure E-1803 - 100m Aquifer Concentration for CaseA Tank18 Tc-99 C_UA

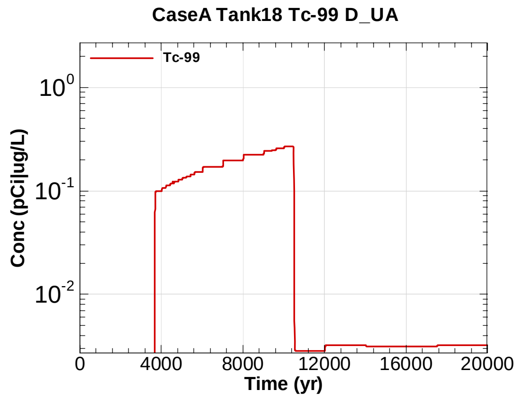

Figure E-1804 - 100m Aquifer Concentration for CaseA Tank18 Tc-99 D_UA

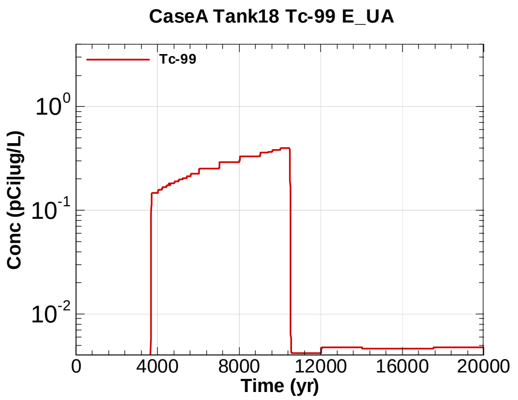

Figure E-1805 - 100m Aquifer Concentration for CaseA Tank18 Tc-99 E_UA

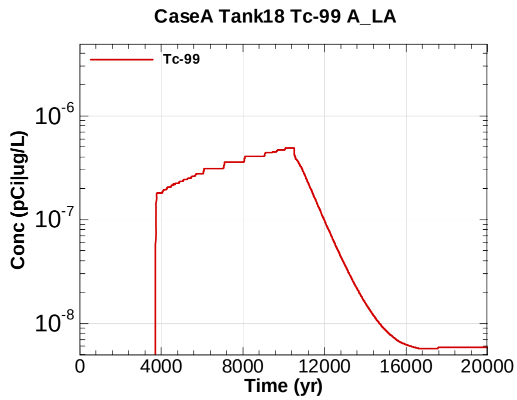

Figure E-1806 - 100m Aquifer Concentration for CaseA Tank18 Tc-99 A_LA

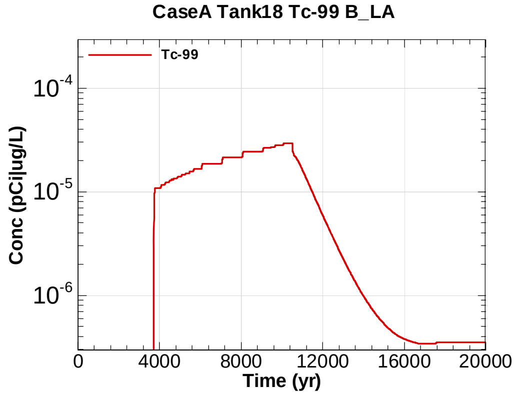

Figure E-1807 - 100m Aquifer Concentration for CaseA Tank18 Tc-99 B_LA

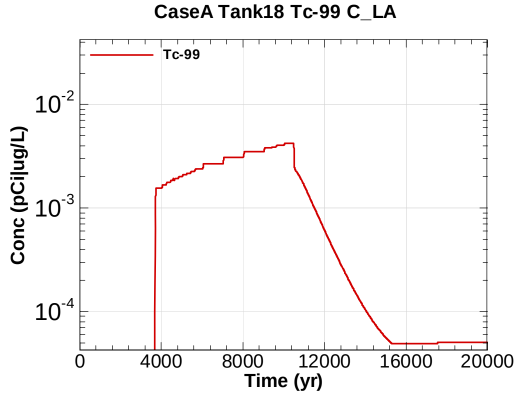

Figure E-1808 - 100m Aquifer Concentration for CaseA Tank18 Tc-99 C_LA

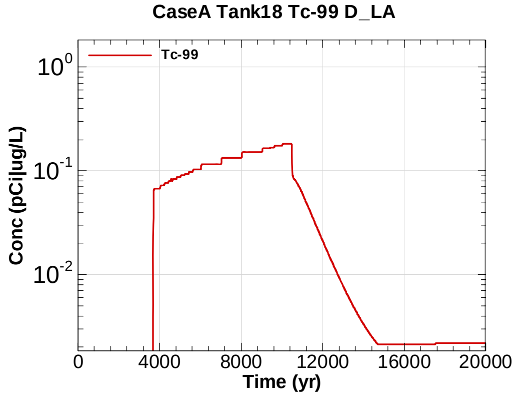

Figure E-1809 - 100m Aquifer Concentration for CaseA Tank18 Tc-99 D_LA

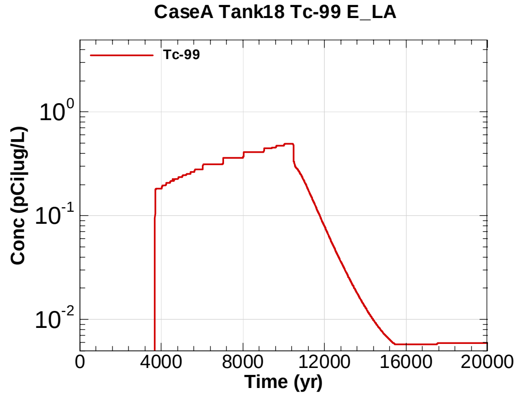

Figure E-1810 - 100m Aquifer Concentration for CaseA Tank18 Tc-99 E_LA

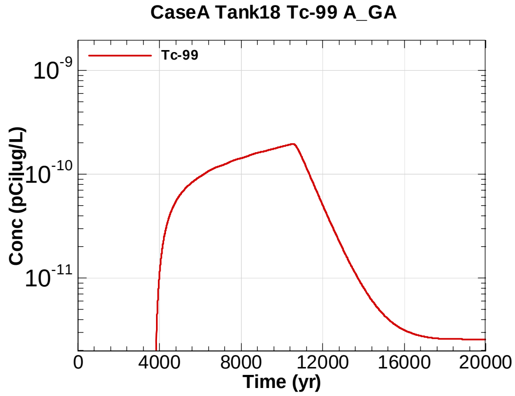

Figure E-1811 - 100m Aquifer Concentration for CaseA Tank18 Tc-99 A_GA

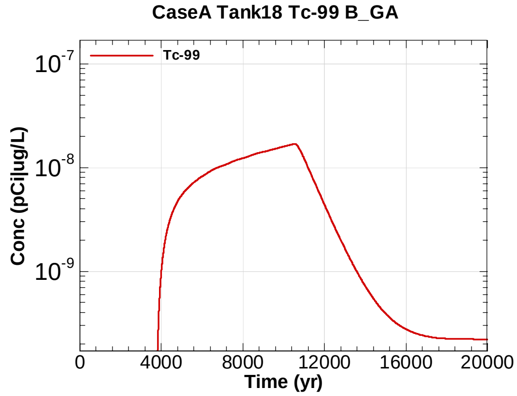

Figure E-1812 - 100m Aquifer Concentration for CaseA Tank18 Tc-99 B_GA

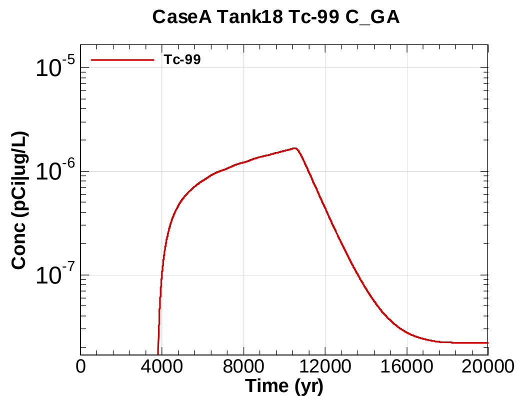

Figure E-1813 - 100m Aquifer Concentration for CaseA Tank18 Tc-99 C_GA

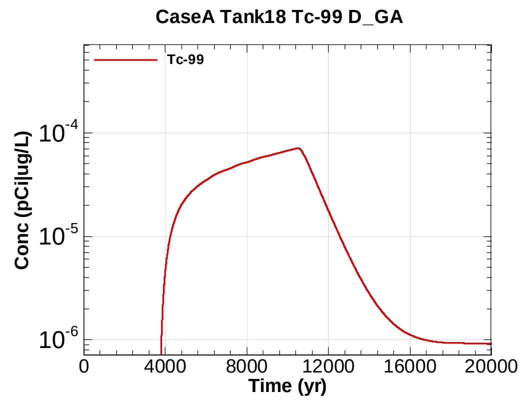

Figure E-1814 - 100m Aquifer Concentration for CaseA Tank18 Tc-99 D_GA

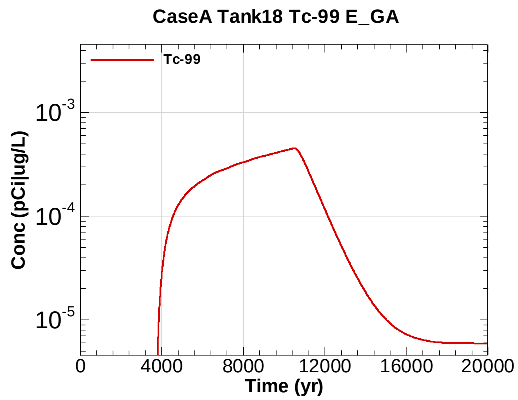

Figure E-1815 - 100m Aquifer Concentration for CaseA Tank18 Tc-99 E_GA

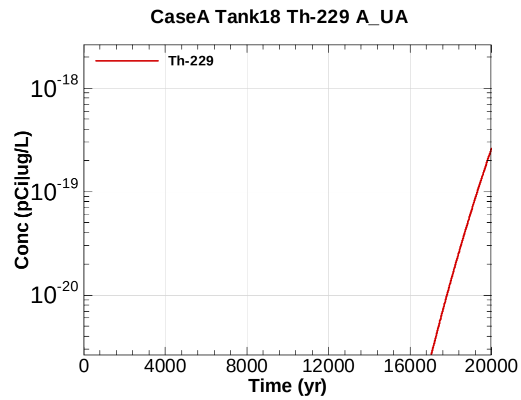

Figure E-1816 - 100m Aquifer Concentration for CaseA Tank18 Th-229 A_UA

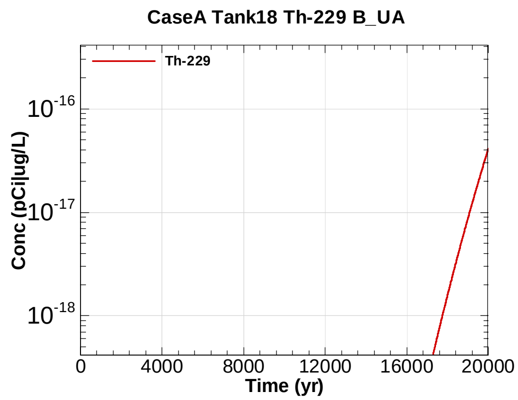

Figure E-1817 - 100m Aquifer Concentration for CaseA Tank18 Th-229 B_UA

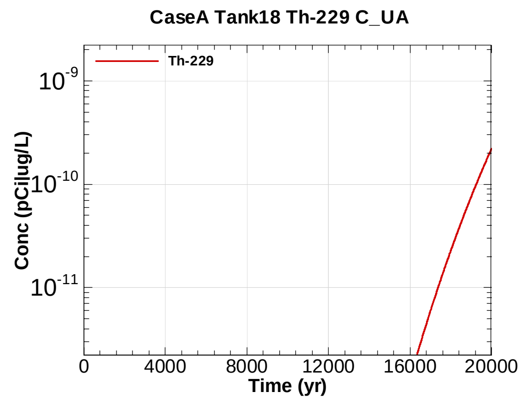

Figure E-1818 - 100m Aquifer Concentration for CaseA Tank18 Th-229 C_UA

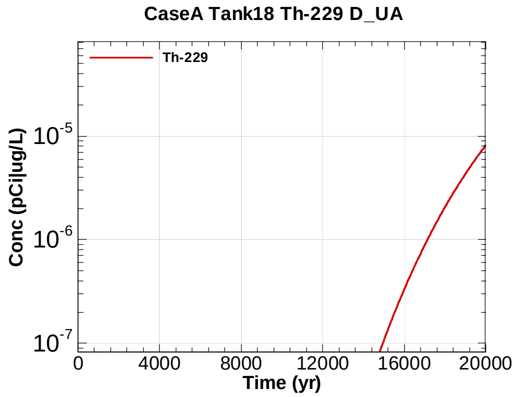

Figure E-1819 - 100m Aquifer Concentration for CaseA Tank18 Th-229 D_UA

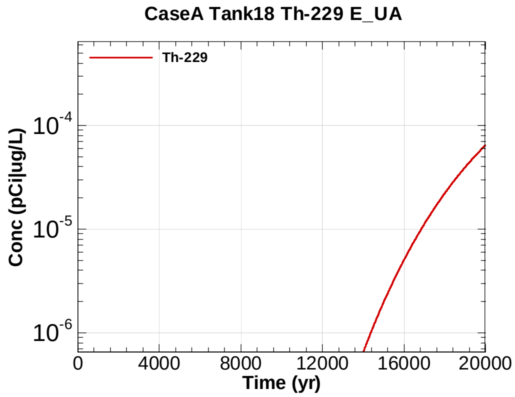

Figure E-1820 - 100m Aquifer Concentration for CaseA Tank18 Th-229 E_UA

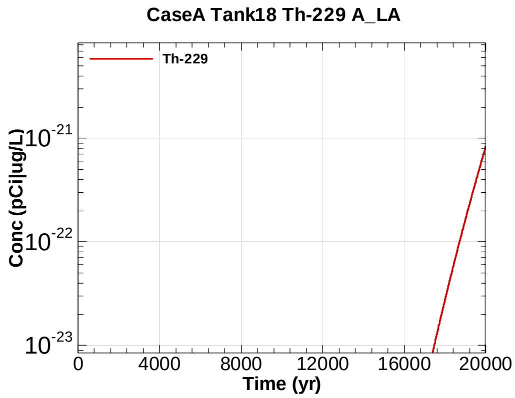

Figure E-1821 - 100m Aquifer Concentration for CaseA Tank18 Th-229 A_LA

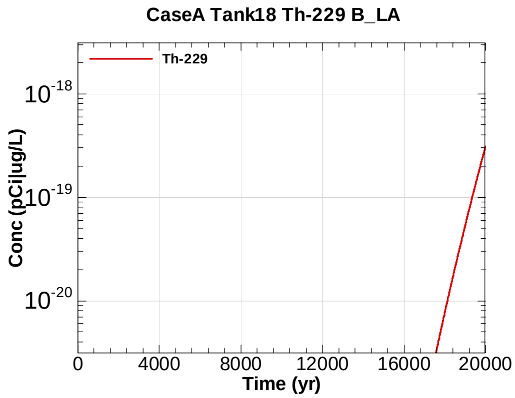

Figure E-1822 - 100m Aquifer Concentration for CaseA Tank18 Th-229 B_LA

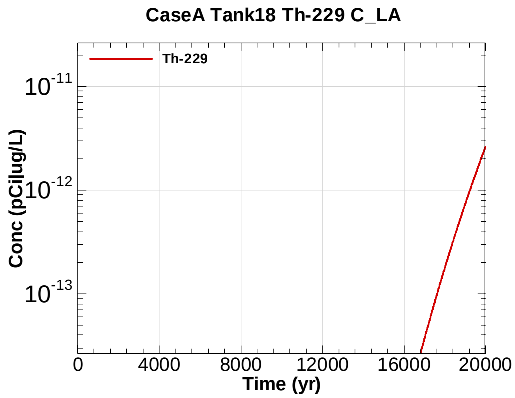

Figure E-1823 - 100m Aquifer Concentration for CaseA Tank18 Th-229 C_LA

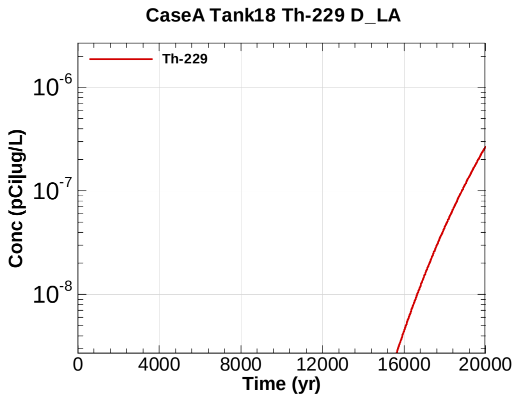

Figure E-1824 - 100m Aquifer Concentration for CaseA Tank18 Th-229 D_LA

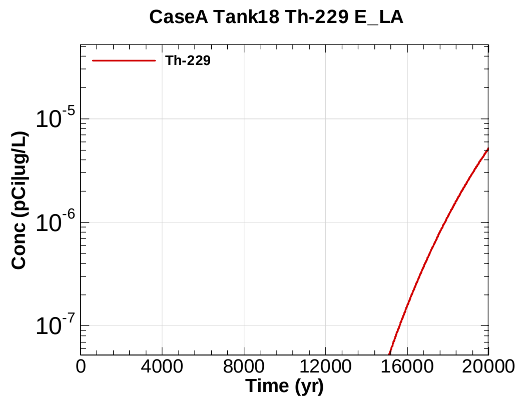

Figure E-1825 - 100m Aquifer Concentration for CaseA Tank18 Th-229 E_LA

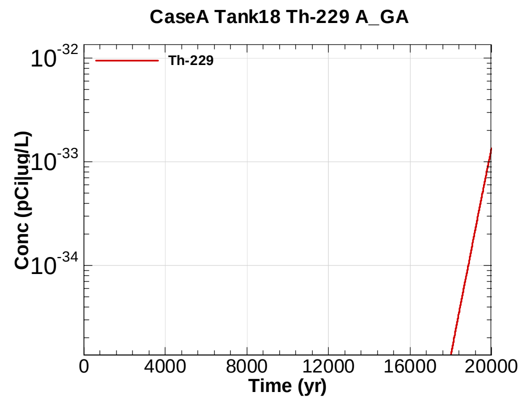

Figure E-1826 - 100m Aquifer Concentration for CaseA Tank18 Th-229 A_GA

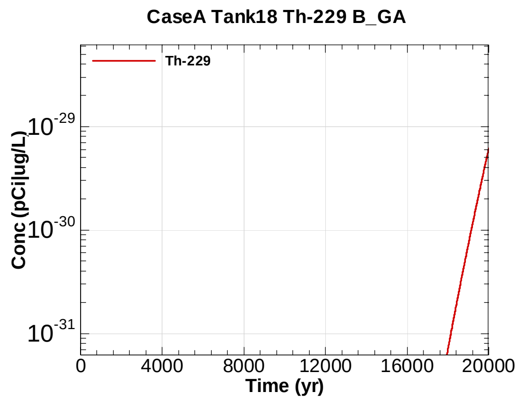

Figure E-1827 - 100m Aquifer Concentration for CaseA Tank18 Th-229 B_GA

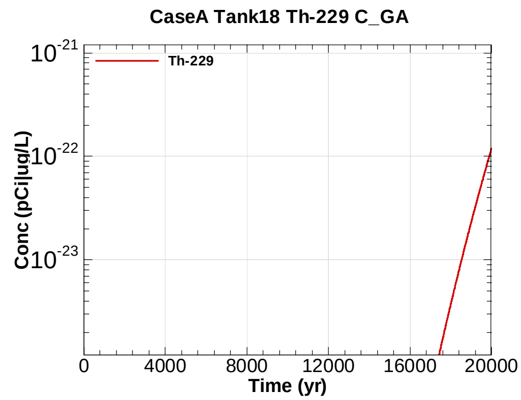

Figure E-1828 - 100m Aquifer Concentration for CaseA Tank18 Th-229 C_GA

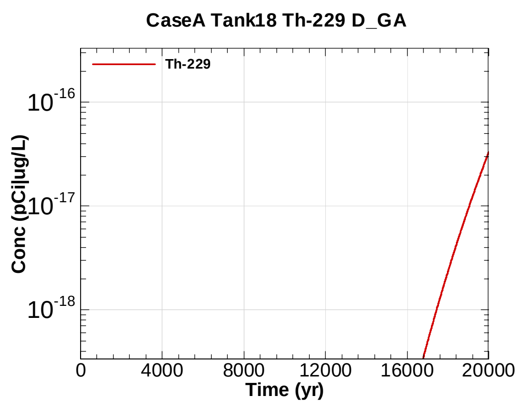

Figure E-1829 - 100m Aquifer Concentration for CaseA Tank18 Th-229 D_GA

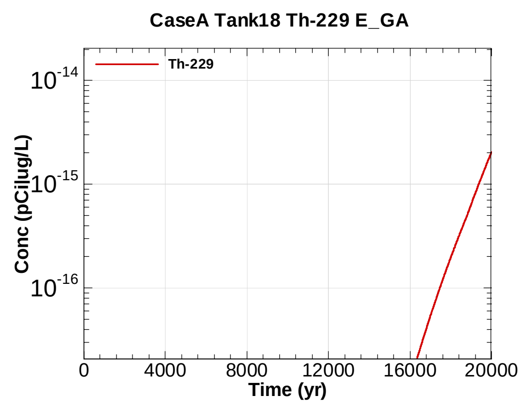

Figure E-1830 - 100m Aquifer Concentration for CaseA Tank18 Th-229 E_GA

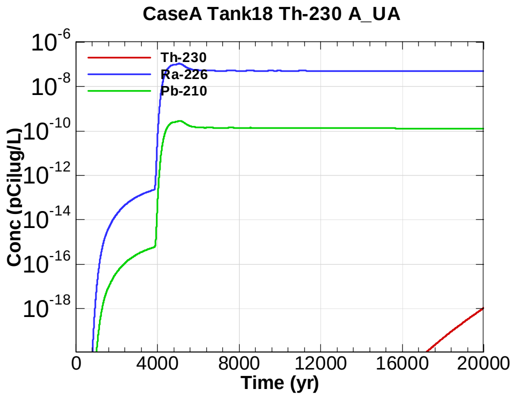

Figure E-1831 - 100m Aquifer Concentration for CaseA Tank18 Th-230 A_UA

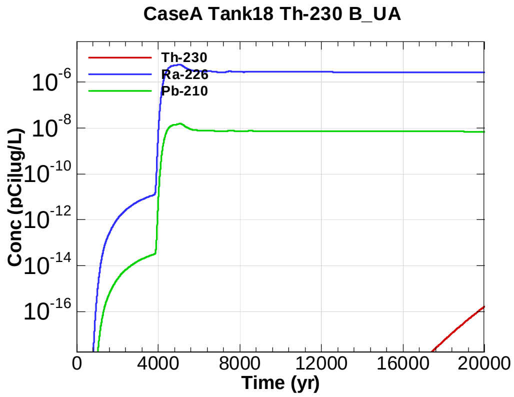

Figure E-1832 - 100m Aquifer Concentration for CaseA Tank18 Th-230 B_UA

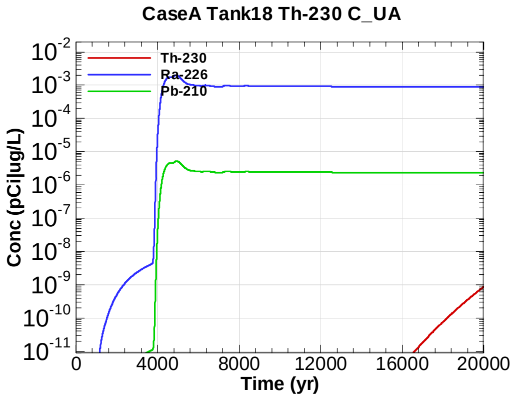

Figure E-1833 - 100m Aquifer Concentration for CaseA Tank18 Th-230 C_UA

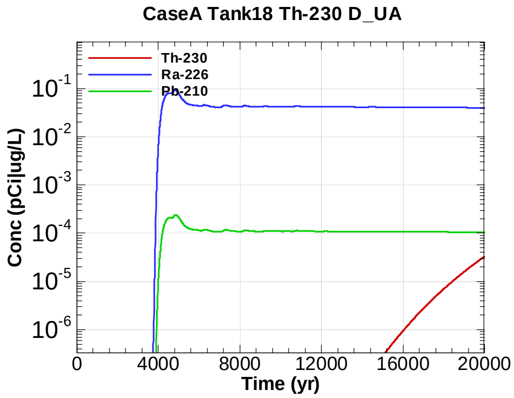

Figure E-1834 - 100m Aquifer Concentration for CaseA Tank18 Th-230 D_UA

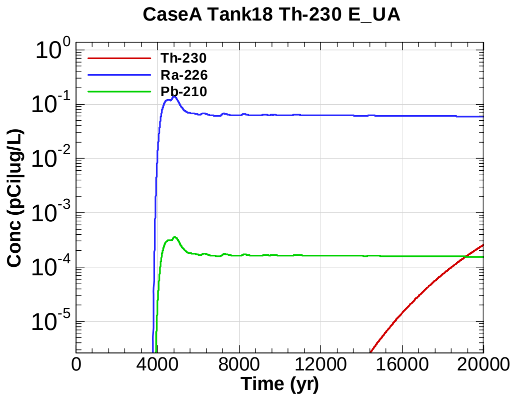

Figure E-1835 - 100m Aquifer Concentration for CaseA Tank18 Th-230 E_UA

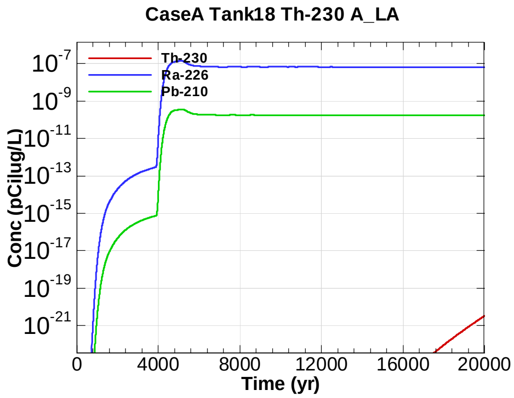

Figure E-1836 - 100m Aquifer Concentration for CaseA Tank18 Th-230 A_LA

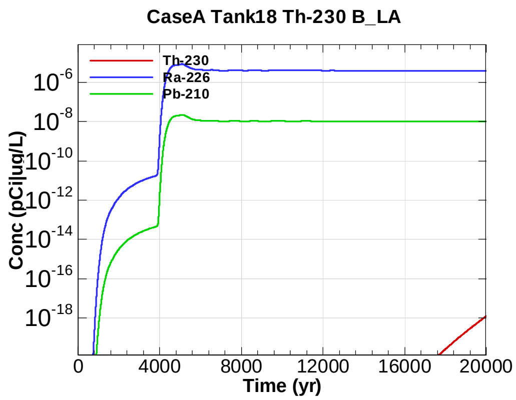

Figure E-1837 - 100m Aquifer Concentration for CaseA Tank18 Th-230 B_LA

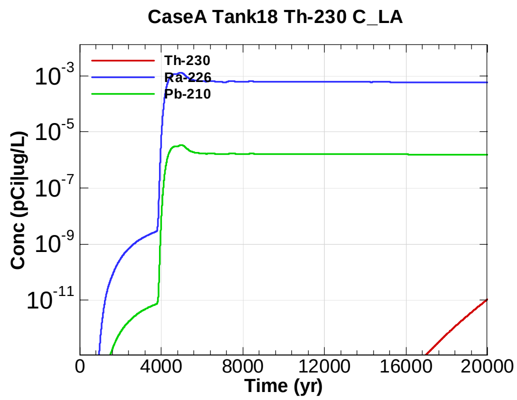

Figure E-1838 - 100m Aquifer Concentration for CaseA Tank18 Th-230 C_LA

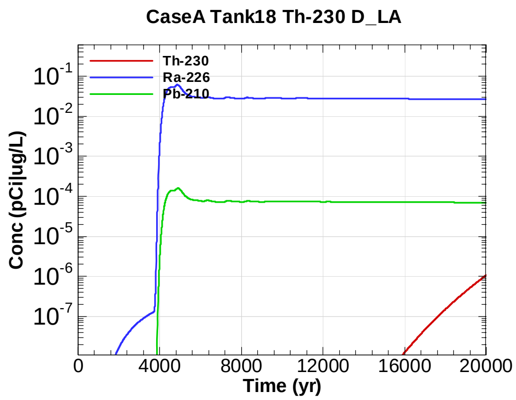

Figure E-1839 - 100m Aquifer Concentration for CaseA Tank18 Th-230 D_LA

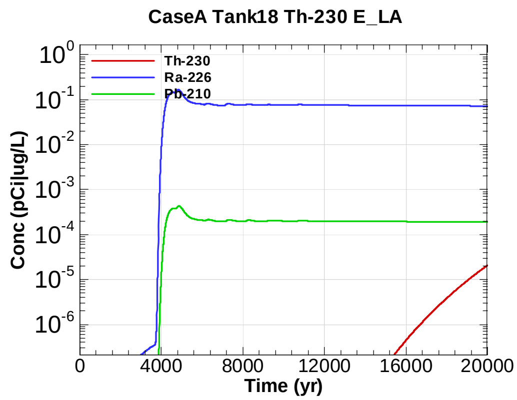

Figure E-1840 - 100m Aquifer Concentration for CaseA Tank18 Th-230 E_LA

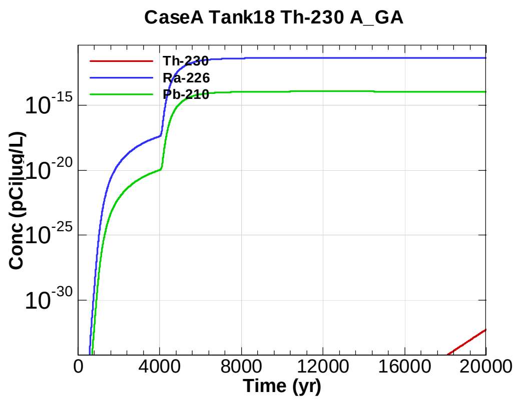

Figure E-1841 - 100m Aquifer Concentration for CaseA Tank18 Th-230 A_GA

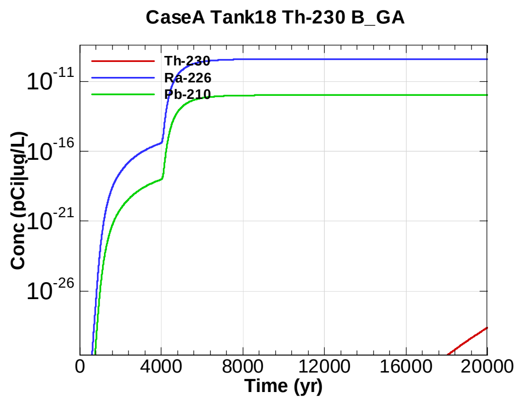

Figure E-1842 - 100m Aquifer Concentration for CaseA Tank18 Th-230 B_GA

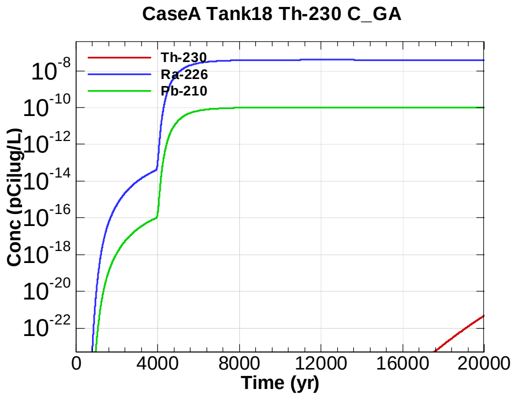

Figure E-1843 - 100m Aquifer Concentration for CaseA Tank18 Th-230 C_GA

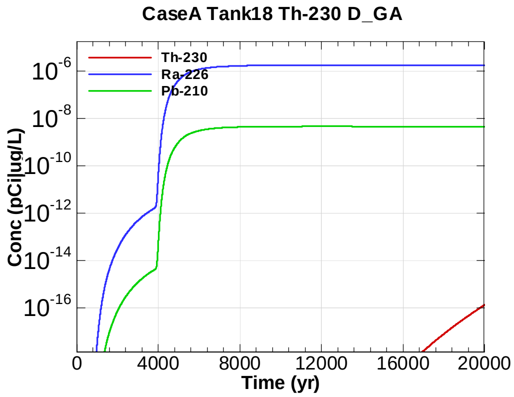

Figure E-1844 - 100m Aquifer Concentration for CaseA Tank18 Th-230 D_GA

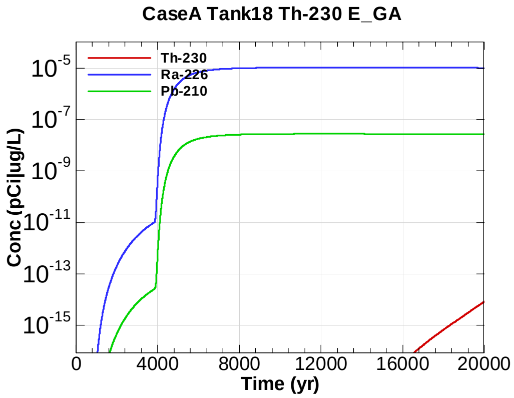

Figure E-1845 - 100m Aquifer Concentration for CaseA Tank18 Th-230 E_GA

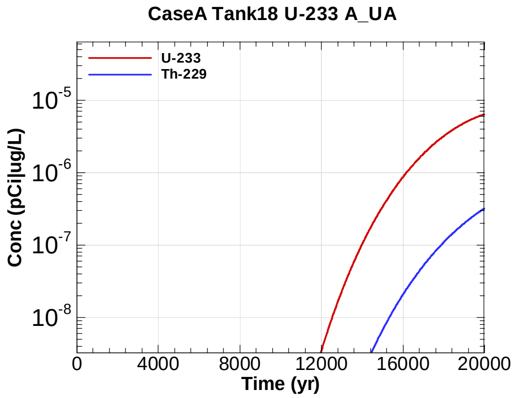

Figure E-1846 - 100m Aquifer Concentration for CaseA Tank18 U-233 A_UA

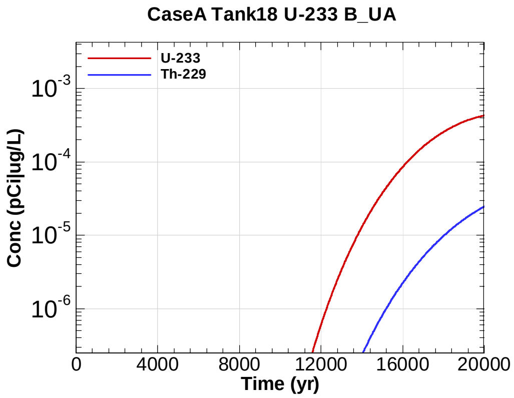

Figure E-1847 - 100m Aquifer Concentration for CaseA Tank18 U-233 B_UA

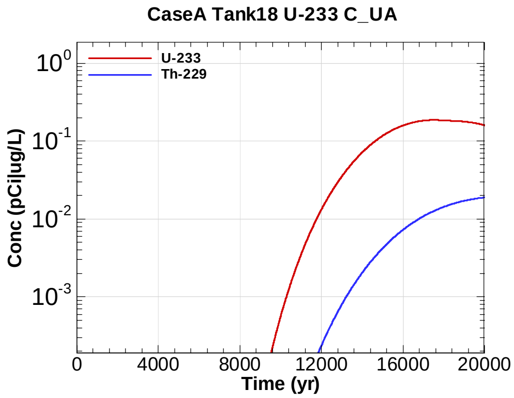

Figure E-1848 - 100m Aquifer Concentration for CaseA Tank18 U-233 C_UA

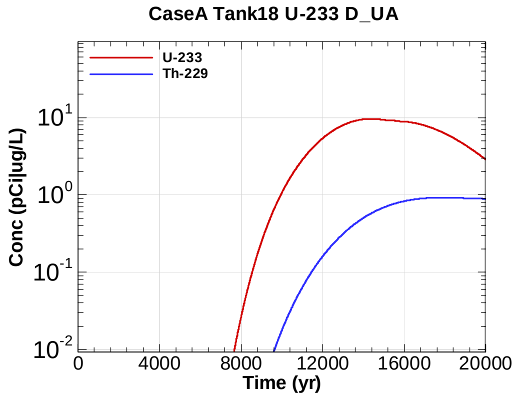

Figure E-1849 - 100m Aquifer Concentration for CaseA Tank18 U-233 D_UA

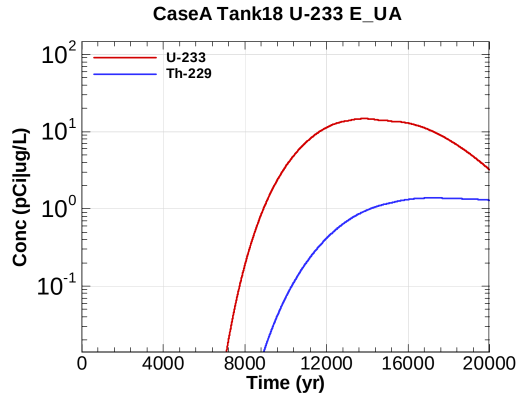

Figure E-1850 - 100m Aquifer Concentration for CaseA Tank18 U-233 E_UA

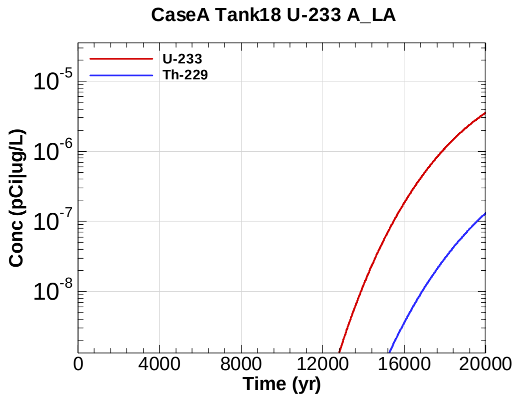

Figure E-1851 - 100m Aquifer Concentration for CaseA Tank18 U-233 A_LA

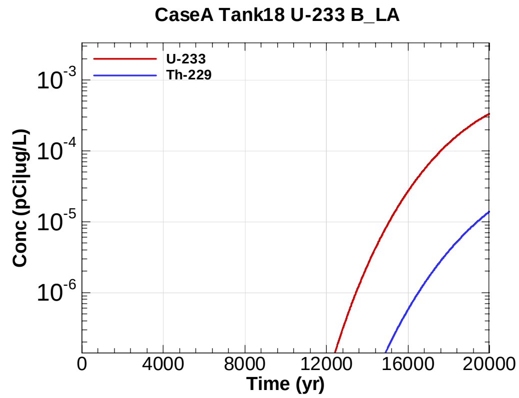

Figure E-1852 - 100m Aquifer Concentration for CaseA Tank18 U-233 B_LA

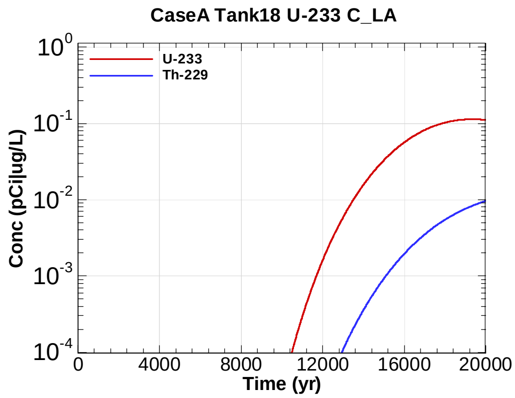

Figure E-1853 - 100m Aquifer Concentration for CaseA Tank18 U-233 C_LA

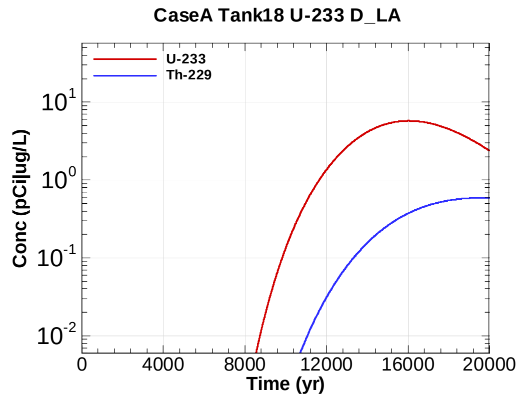

Figure E-1854 - 100m Aquifer Concentration for CaseA Tank18 U-233 D_LA

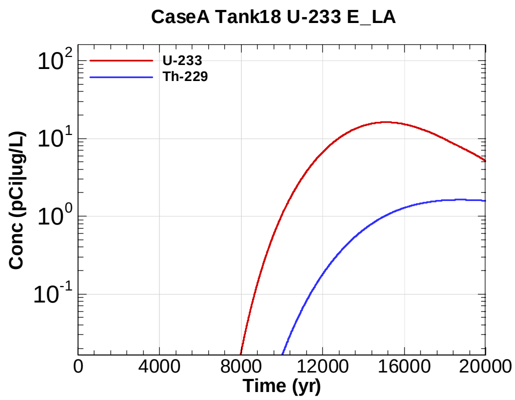

Figure E-1855 - 100m Aquifer Concentration for CaseA Tank18 U-233 E_LA

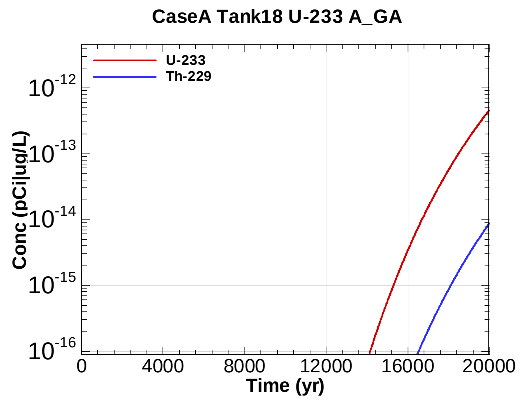

Figure E-1856 - 100m Aquifer Concentration for CaseA Tank18 U-233 A_GA

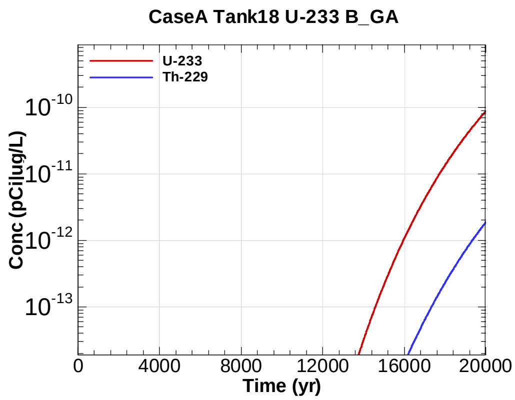

Figure E-1857 - 100m Aquifer Concentration for CaseA Tank18 U-233 B_GA

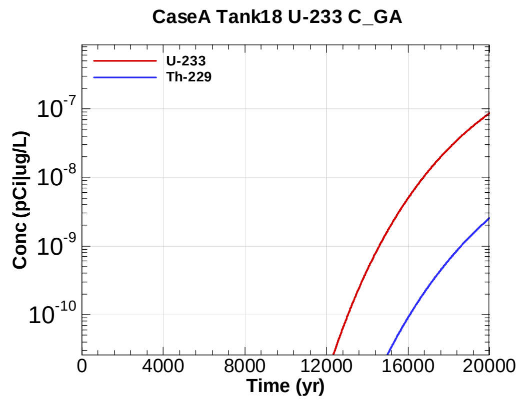

Figure E-1858 - 100m Aquifer Concentration for CaseA Tank18 U-233 C_GA

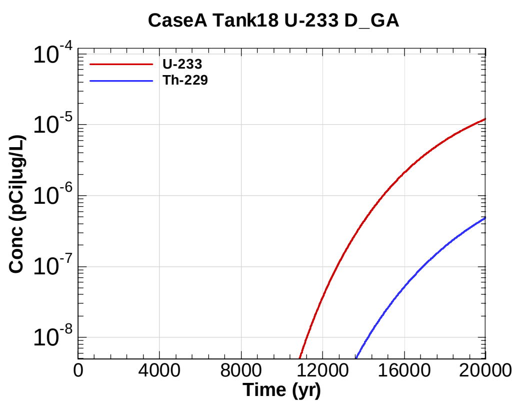

Figure E-1859 - 100m Aquifer Concentration for CaseA Tank18 U-233 D_GA

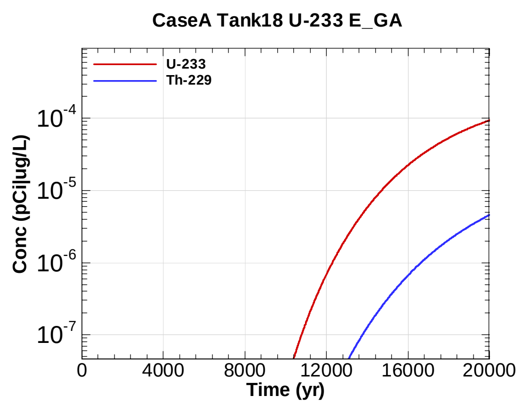

Figure E-1860 - 100m Aquifer Concentration for CaseA Tank18 U-233 E_GA

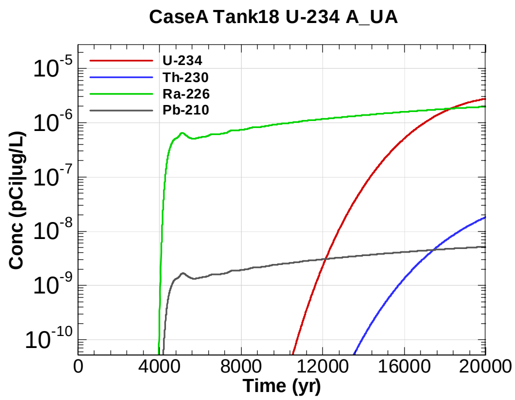

Figure E-1861 - 100m Aquifer Concentration for CaseA Tank18 U-234 A_UA

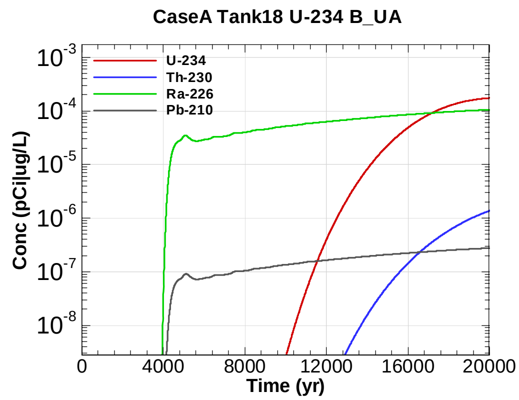

Figure E-1862 - 100m Aquifer Concentration for CaseA Tank18 U-234 B_UA

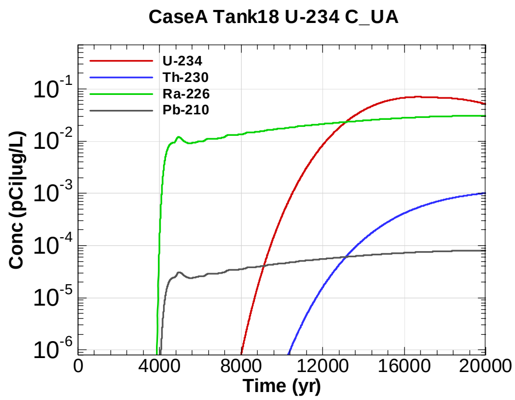

Figure E-1863 - 100m Aquifer Concentration for CaseA Tank18 U-234 C_UA

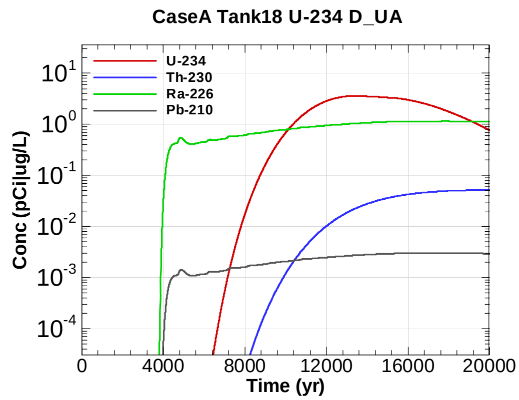

Figure E-1864 - 100m Aquifer Concentration for CaseA Tank18 U-234 D_UA

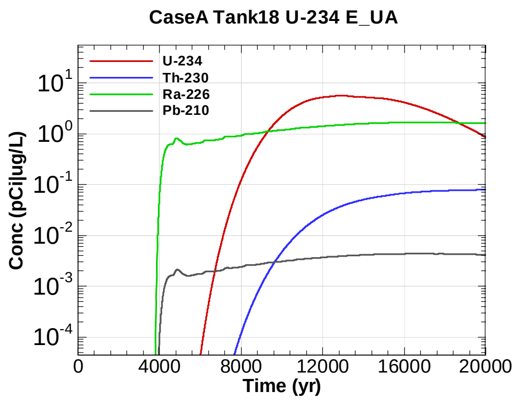

Figure E-1865 - 100m Aquifer Concentration for CaseA Tank18 U-234 E_UA

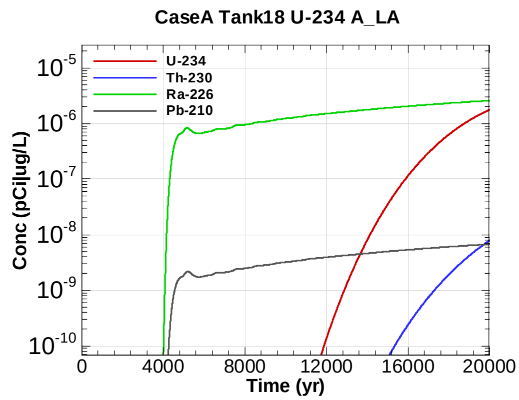

Figure E-1866 - 100m Aquifer Concentration for CaseA Tank18 U-234 A_LA

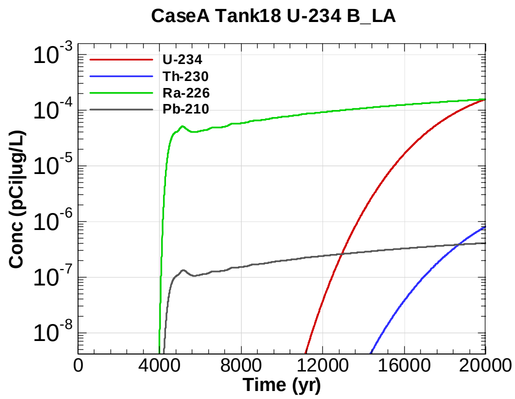

Figure E-1867 - 100m Aquifer Concentration for CaseA Tank18 U-234 B_LA

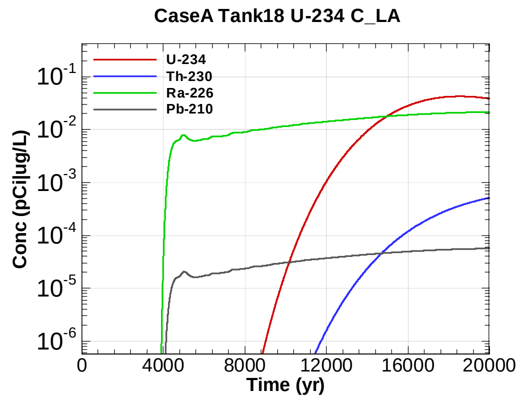

Figure E-1868 - 100m Aquifer Concentration for CaseA Tank18 U-234 C_LA

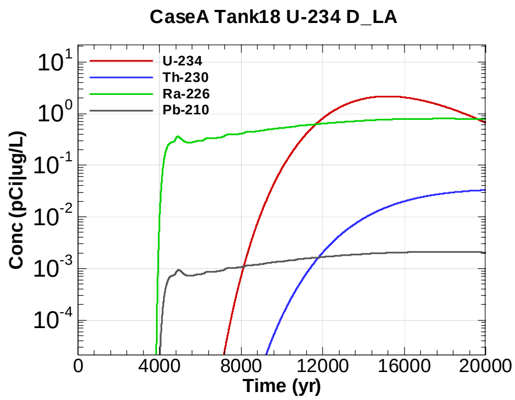

Figure E-1869 - 100m Aquifer Concentration for CaseA Tank18 U-234 D_LA

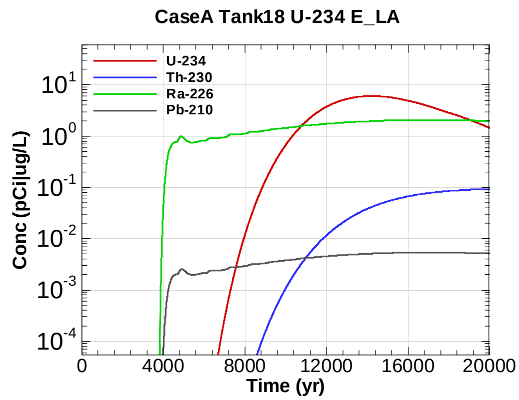

Figure E-1870 - 100m Aquifer Concentration for CaseA Tank18 U-234 E_LA

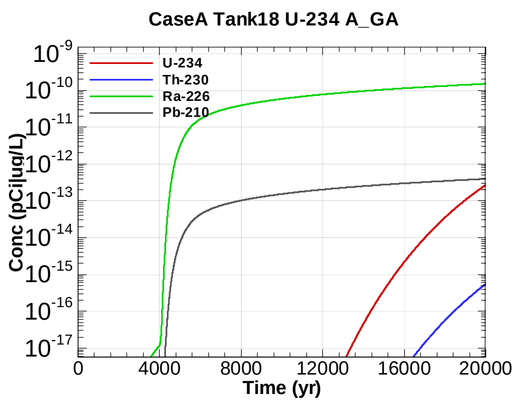

Figure E-1871 - 100m Aquifer Concentration for CaseA Tank18 U-234 A_GA

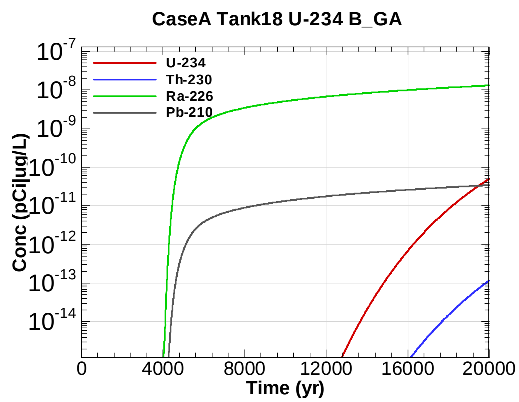

Figure E-1872 - 100m Aquifer Concentration for CaseA Tank18 U-234 B_GA

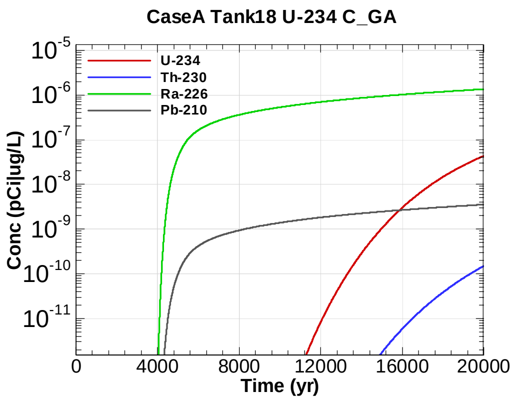

Figure E-1873 - 100m Aquifer Concentration for CaseA Tank18 U-234 C_GA

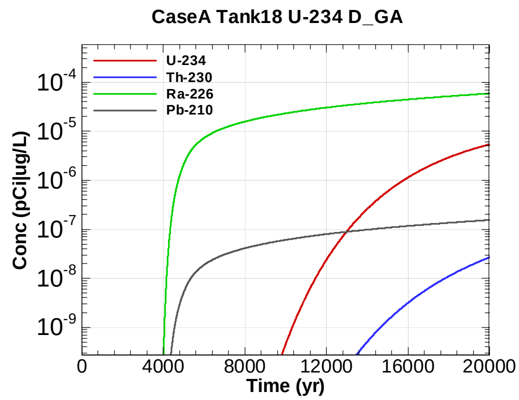

Figure E-1874 - 100m Aquifer Concentration for CaseA Tank18 U-234 D_GA

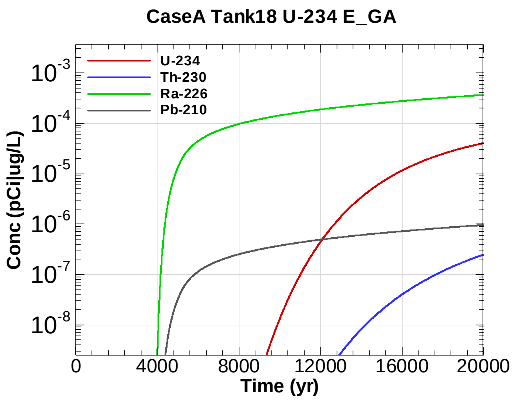

Figure E-1875 - 100m Aquifer Concentration for CaseA Tank18 U-234 E_GA

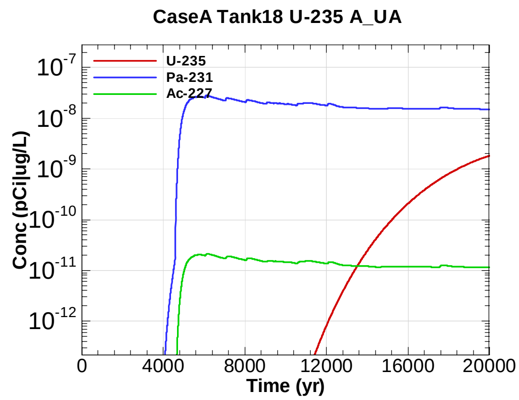

Figure E-1876 - 100m Aquifer Concentration for CaseA Tank18 U-235 A_UA

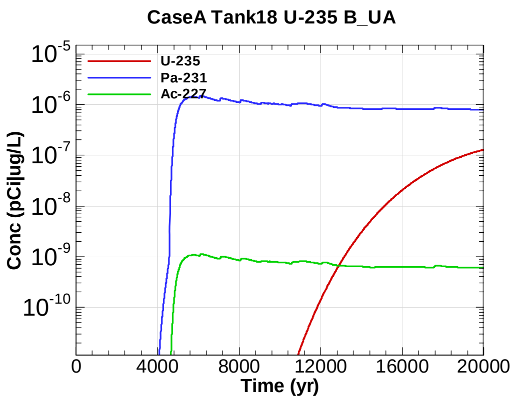

Figure E-1877 - 100m Aquifer Concentration for CaseA Tank18 U-235 B_UA

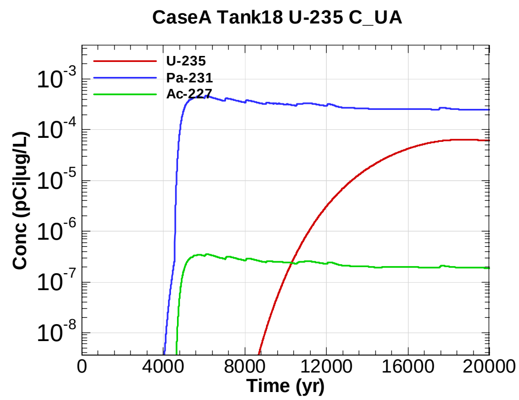

Figure E-1878 - 100m Aquifer Concentration for CaseA Tank18 U-235 C_UA

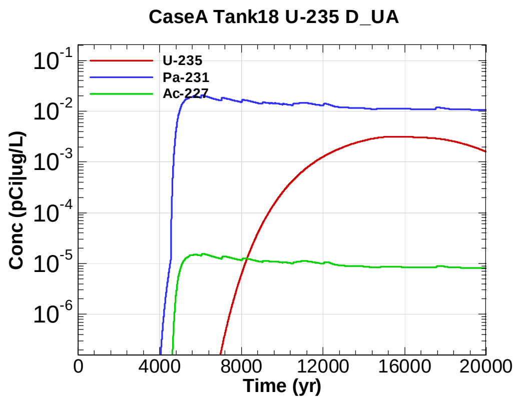

Figure E-1879 - 100m Aquifer Concentration for CaseA Tank18 U-235 D_UA

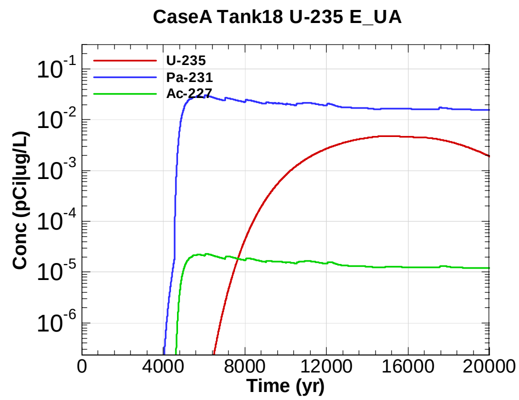

Figure E-1880 - 100m Aquifer Concentration for CaseA Tank18 U-235 E_UA

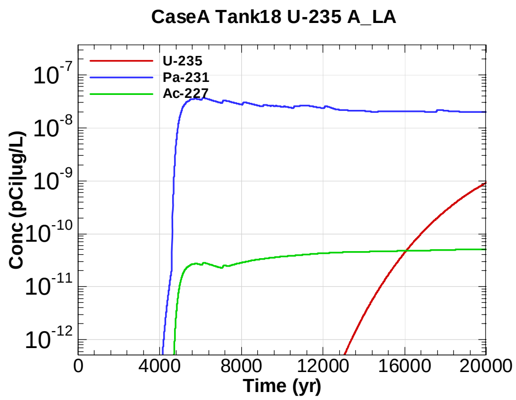

Figure E-1881 - 100m Aquifer Concentration for CaseA Tank18 U-235 A_LA

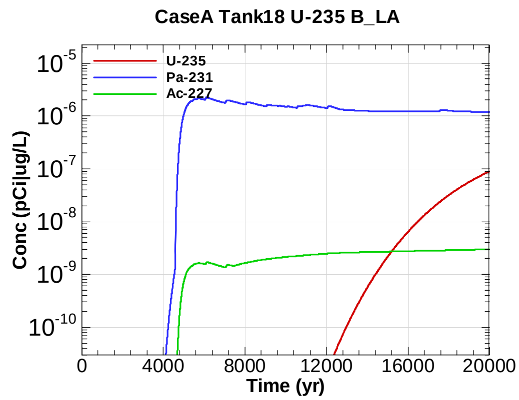

Figure E-1882 - 100m Aquifer Concentration for CaseA Tank18 U-235 B_LA

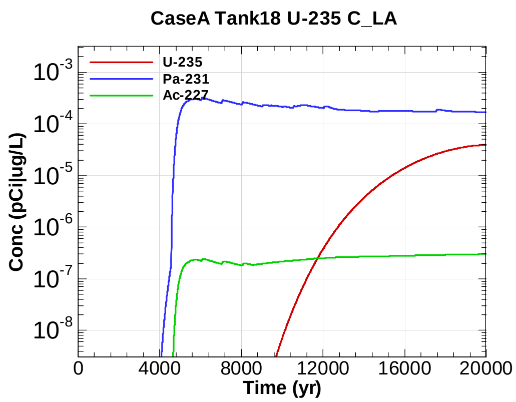

Figure E-1883 - 100m Aquifer Concentration for CaseA Tank18 U-235 C_LA

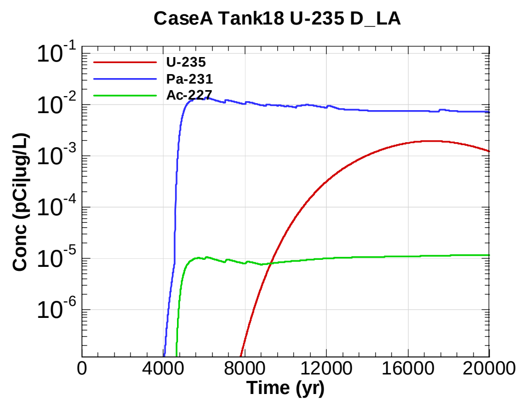

Figure E-1884 - 100m Aquifer Concentration for CaseA Tank18 U-235 D_LA

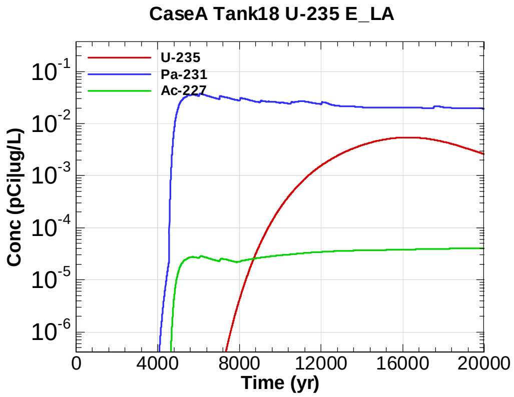

Figure E-1885 - 100m Aquifer Concentration for CaseA Tank18 U-235 E_LA

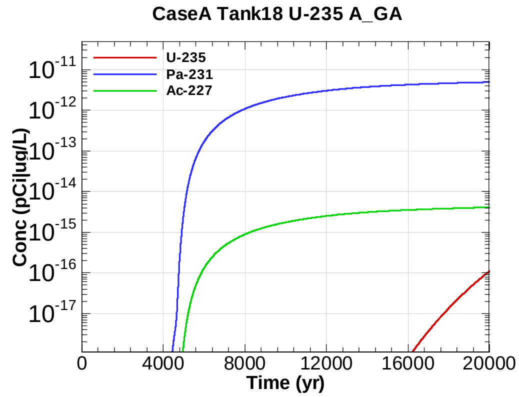

Figure E-1886 - 100m Aquifer Concentration for CaseA Tank18 U-235 A_GA

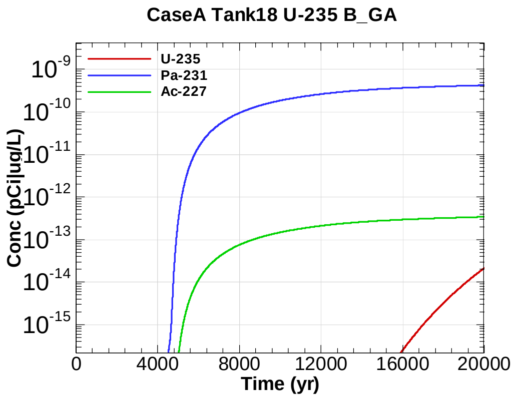

Figure E-1887 - 100m Aquifer Concentration for CaseA Tank18 U-235 B_GA

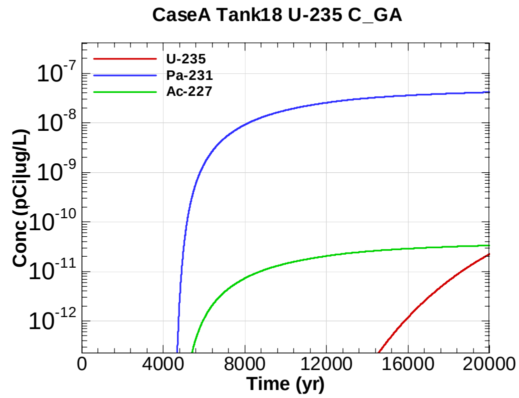

Figure E-1888 - 100m Aquifer Concentration for CaseA Tank18 U-235 C_GA

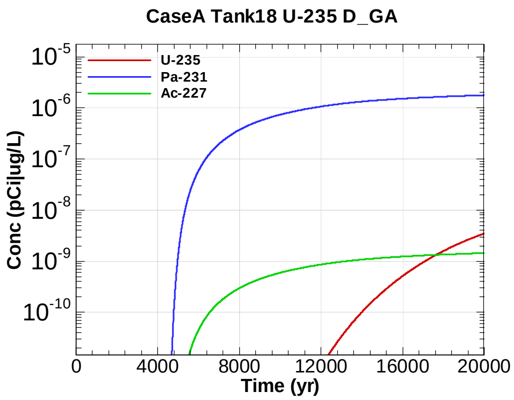

Figure E-1889 - 100m Aquifer Concentration for CaseA Tank18 U-235 D_GA

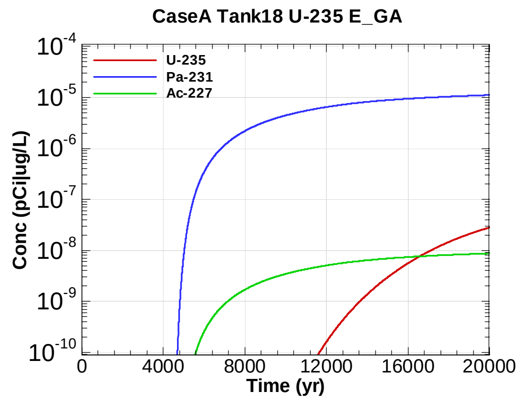

Figure E-1890 - 100m Aquifer Concentration for CaseA Tank18 U-235 E_GA

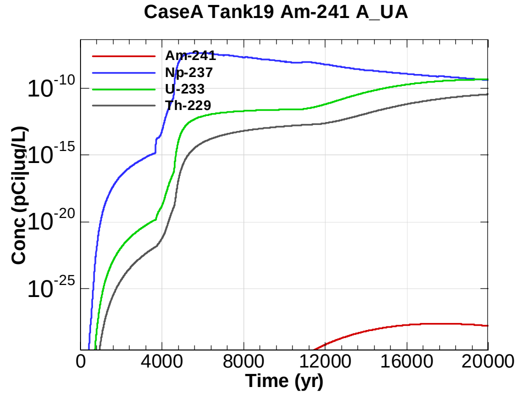

Figure E-1891 - 100m Aquifer Concentration for CaseA Tank19 Am-241 A_UA

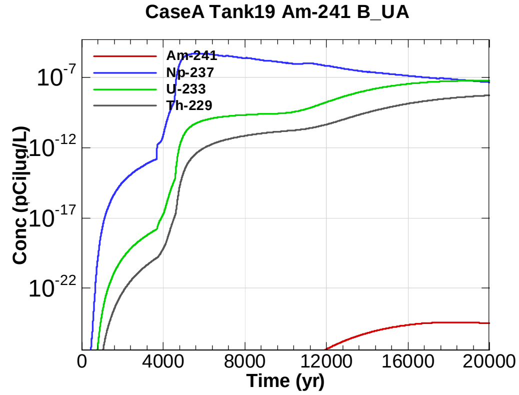

Figure E-1892 - 100m Aquifer Concentration for CaseA Tank19 Am-241 B_UA

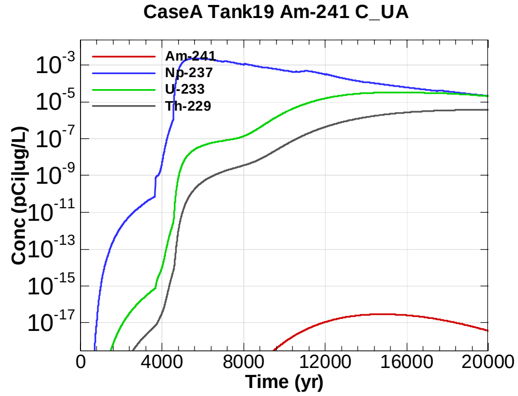

Figure E-1893 - 100m Aquifer Concentration for CaseA Tank19 Am-241 C_UA

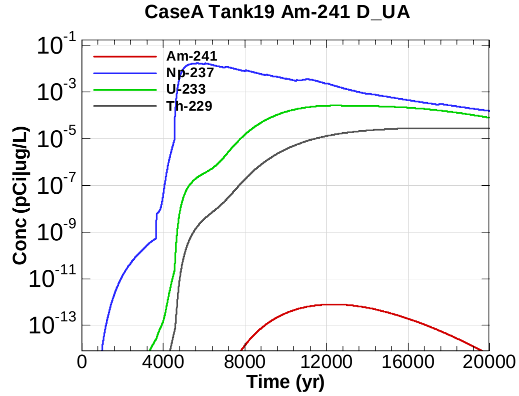

Figure E-1894 - 100m Aquifer Concentration for CaseA Tank19 Am-241 D_UA

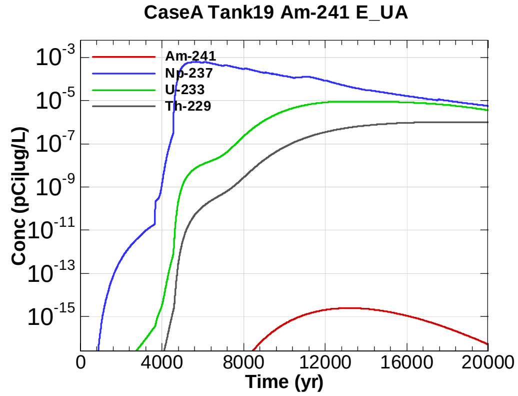

Figure E-1895 - 100m Aquifer Concentration for CaseA Tank19 Am-241 E_UA

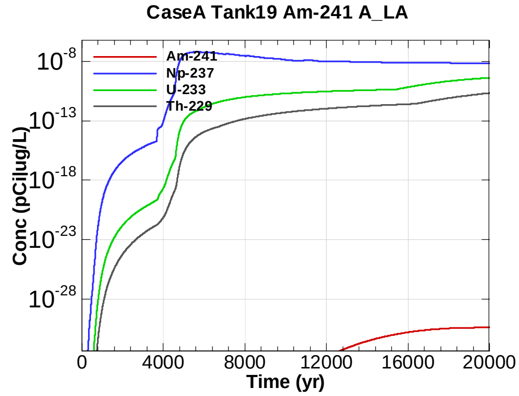

Figure E-1896 - 100m Aquifer Concentration for CaseA Tank19 Am-241 A_LA

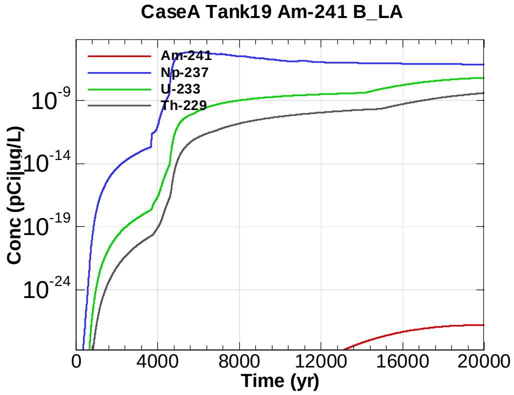

Figure E-1897 - 100m Aquifer Concentration for CaseA Tank19 Am-241 B_LA

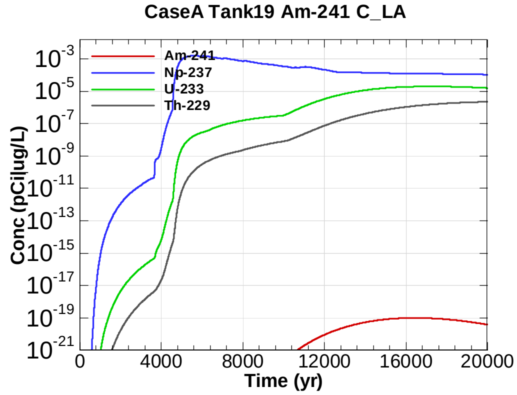

Figure E-1898 - 100m Aquifer Concentration for CaseA Tank19 Am-241 C_LA

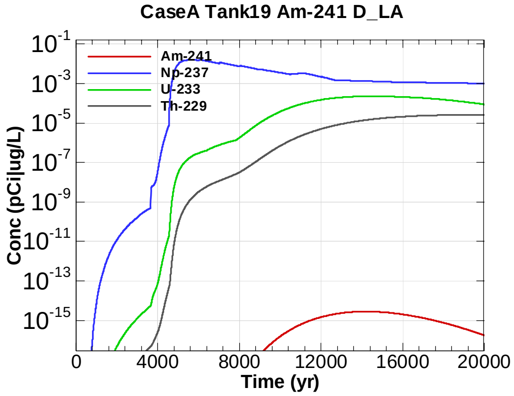

Figure E-1899 - 100m Aquifer Concentration for CaseA Tank19 Am-241 D_LA

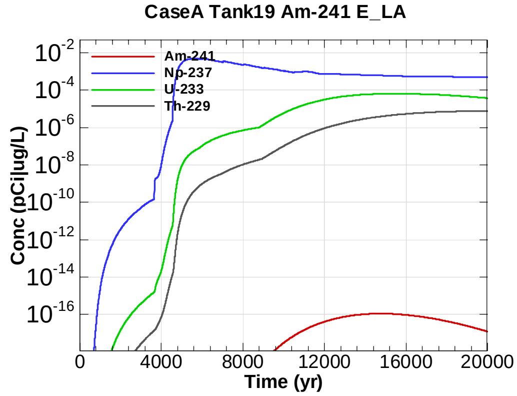

Figure E-1900 - 100m Aquifer Concentration for CaseA Tank19 Am-241 E_LA

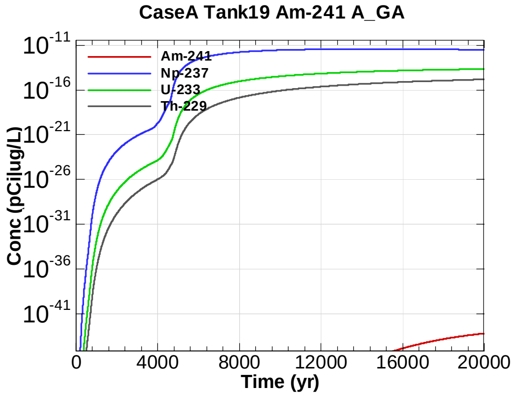

Figure E-1901 - 100m Aquifer Concentration for CaseA Tank19 Am-241 A_GA

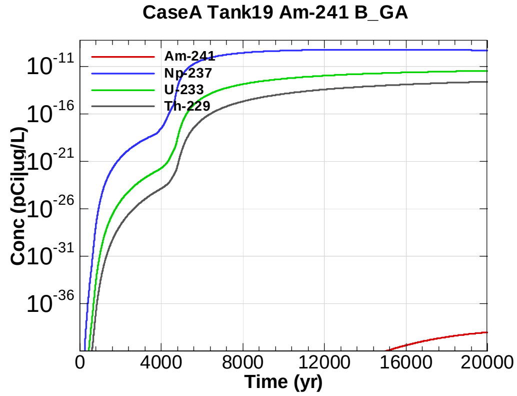

Figure E-1902 - 100m Aquifer Concentration for CaseA Tank19 Am-241 B_GA

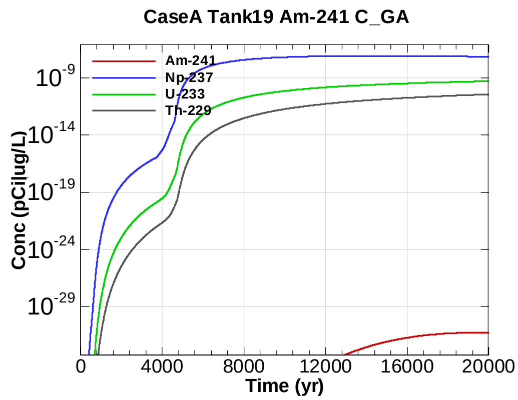

Figure E-1903 - 100m Aquifer Concentration for CaseA Tank19 Am-241 C_GA

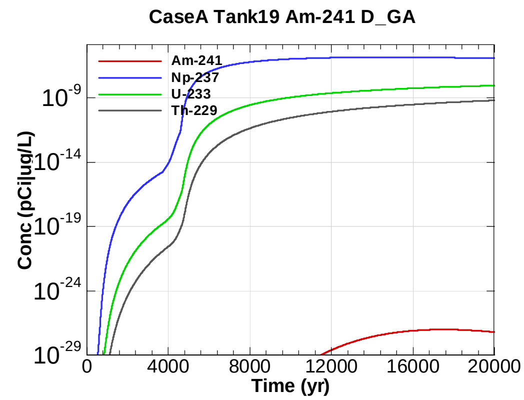

Figure E-1904 - 100m Aquifer Concentration for CaseA Tank19 Am-241 D_GA

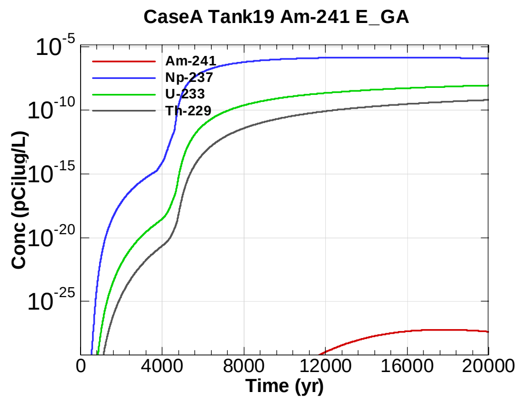

Figure E-1905 - 100m Aquifer Concentration for CaseA Tank19 Am-241 E_GA

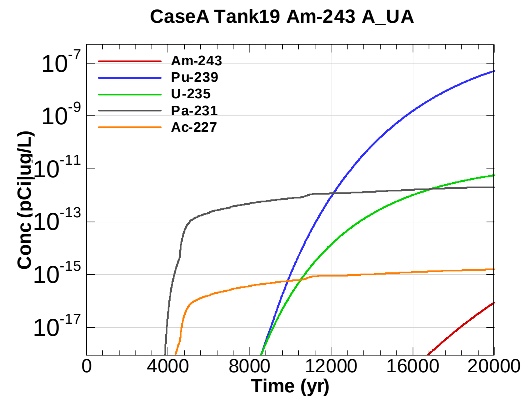

Figure E-1906 - 100m Aquifer Concentration for CaseA Tank19 Am-243 A_UA

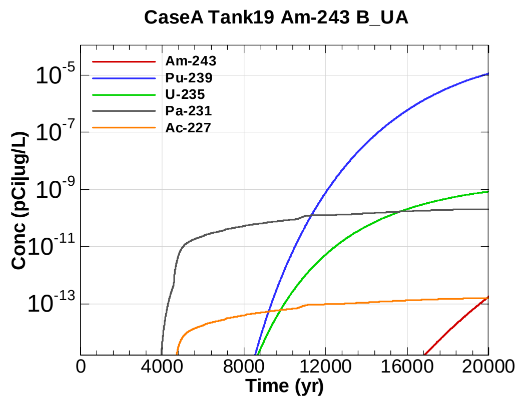

Figure E-1907 - 100m Aquifer Concentration for CaseA Tank19 Am-243 B_UA

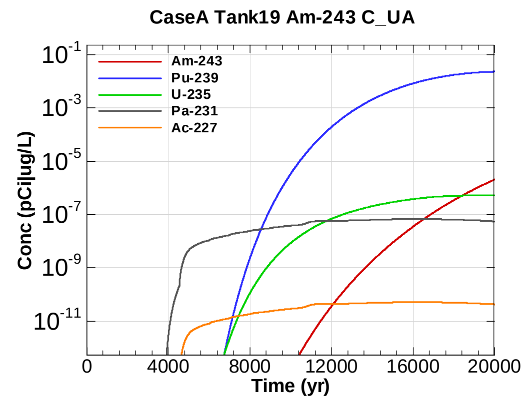

Figure E-1908 - 100m Aquifer Concentration for CaseA Tank19 Am-243 C_UA

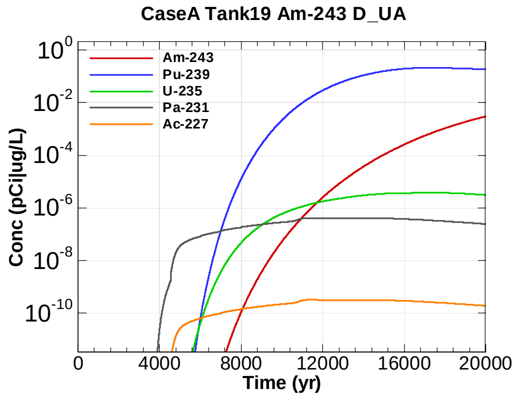

Figure E-1909 - 100m Aquifer Concentration for CaseA Tank19 Am-243 D_UA

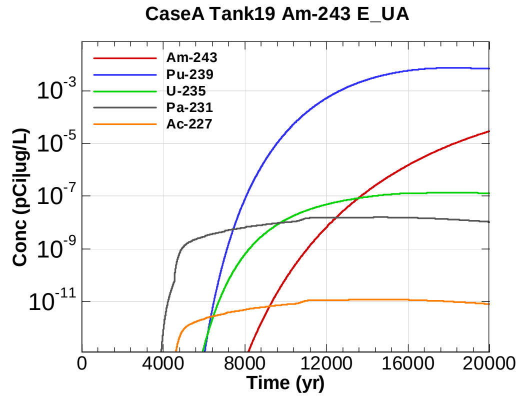

Figure E-1910 - 100m Aquifer Concentration for CaseA Tank19 Am-243 E_UA

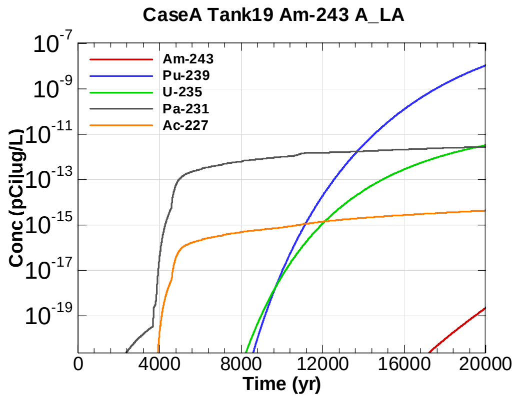

Figure E-1911 - 100m Aquifer Concentration for CaseA Tank19 Am-243 A_LA

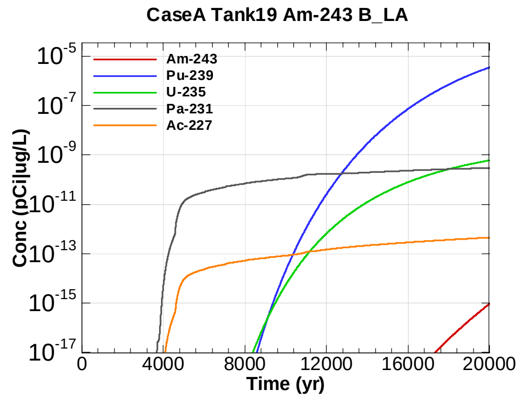

Figure E-1912 - 100m Aquifer Concentration for CaseA Tank19 Am-243 B_LA

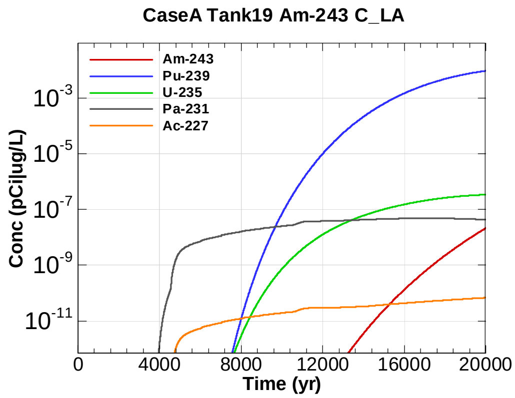

Figure E-1913 - 100m Aquifer Concentration for CaseA Tank19 Am-243 C_LA

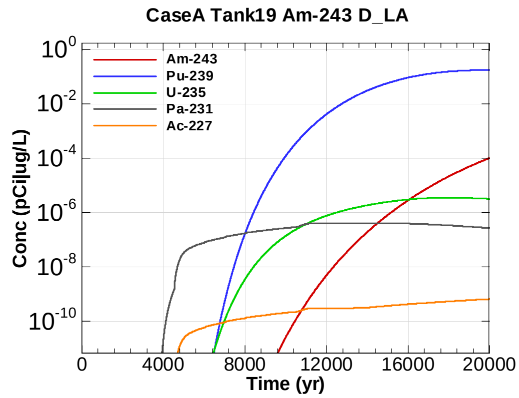

Figure E-1914 - 100m Aquifer Concentration for CaseA Tank19 Am-243 D_LA

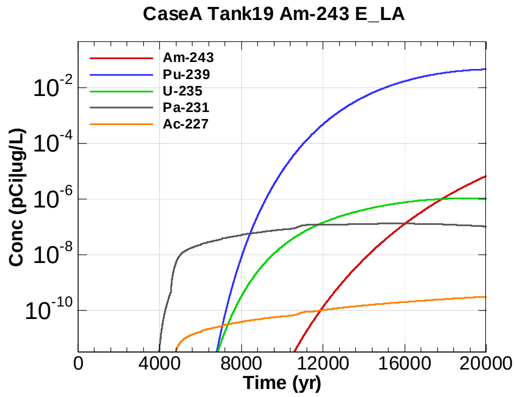

Figure E-1915 - 100m Aquifer Concentration for CaseA Tank19 Am-243 E_LA

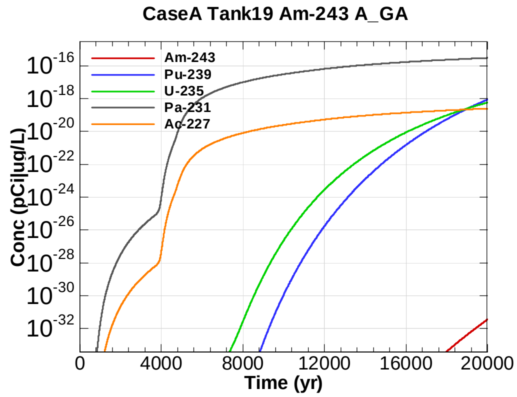

Figure E-1916 - 100m Aquifer Concentration for CaseA Tank19 Am-243 A_GA

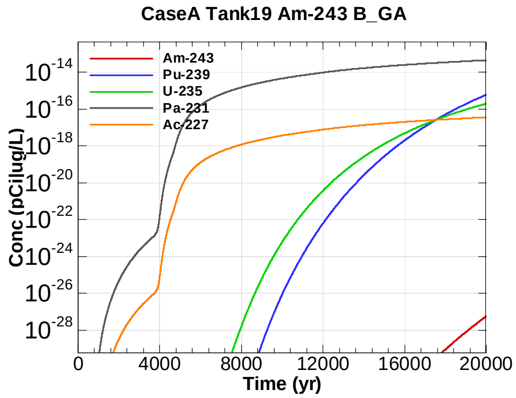

Figure E-1917 - 100m Aquifer Concentration for CaseA Tank19 Am-243 B_GA

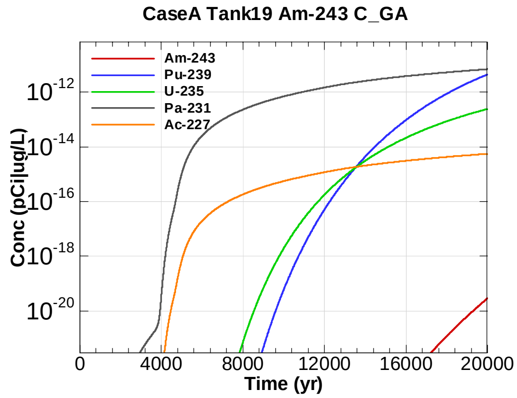

Figure E-1918 - 100m Aquifer Concentration for CaseA Tank19 Am-243 C_GA

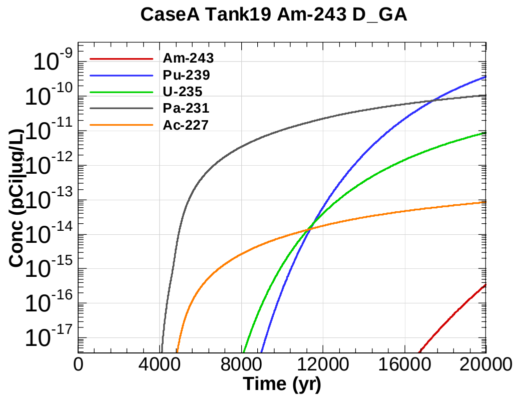

Figure E-1919 - 100m Aquifer Concentration for CaseA Tank19 Am-243 D_GA

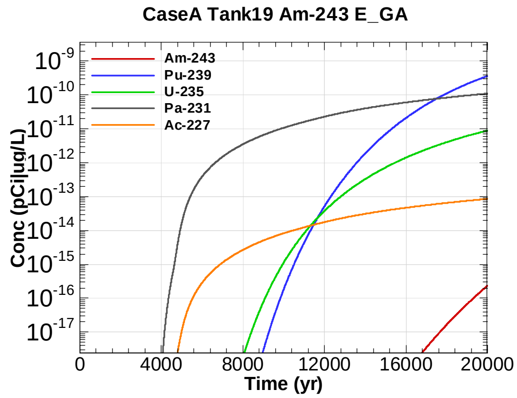

Figure E-1920 - 100m Aquifer Concentration for CaseA Tank19 Am-243 E_GA

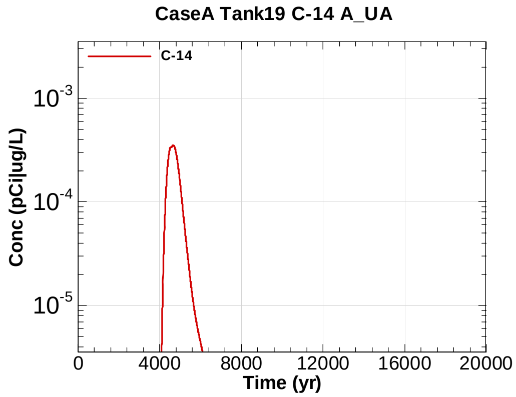

Figure E-1921 - 100m Aquifer Concentration for CaseA Tank19 C-14 A_UA

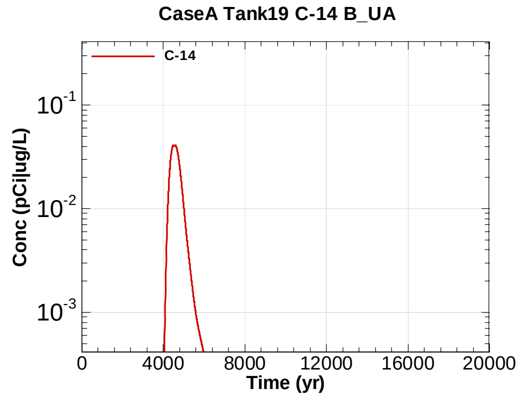

Figure E-1922 - 100m Aquifer Concentration for CaseA Tank19 C-14 B_UA

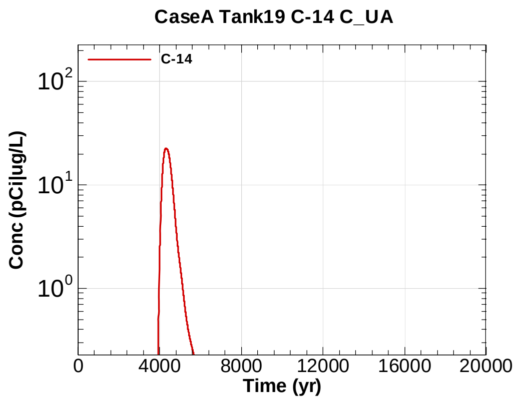

Figure E-1923 - 100m Aquifer Concentration for CaseA Tank19 C-14 C_UA

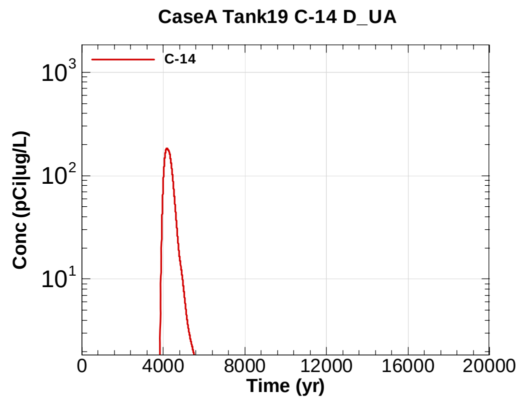

Figure E-1924 - 100m Aquifer Concentration for CaseA Tank19 C-14 D_UA

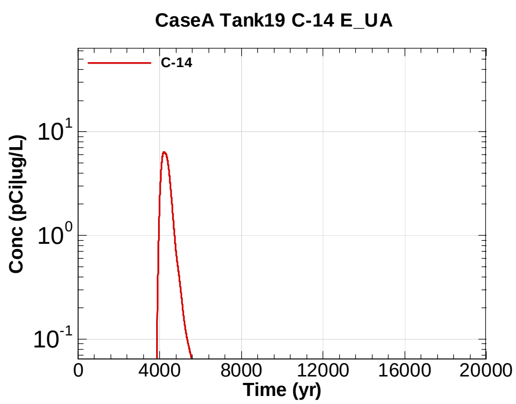

Figure E-1925 - 100m Aquifer Concentration for CaseA Tank19 C-14 E_UA

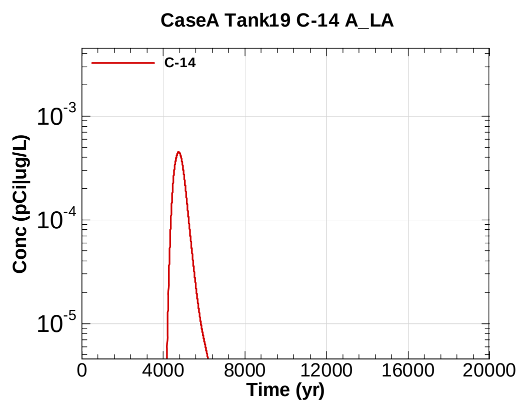

Figure E-1926 - 100m Aquifer Concentration for CaseA Tank19 C-14 A_LA

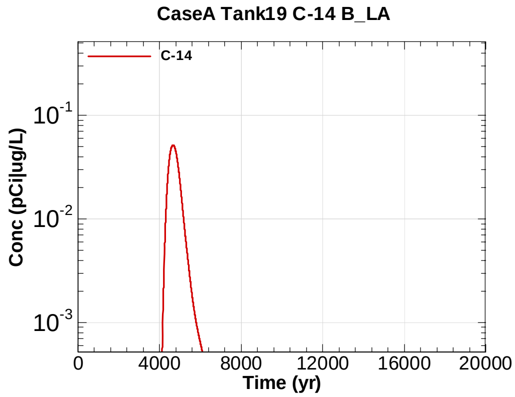

Figure E-1927 - 100m Aquifer Concentration for CaseA Tank19 C-14 B_LA

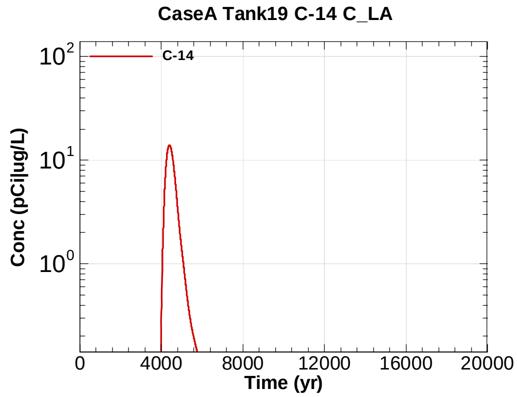

Figure E-1928 - 100m Aquifer Concentration for CaseA Tank19 C-14 C_LA

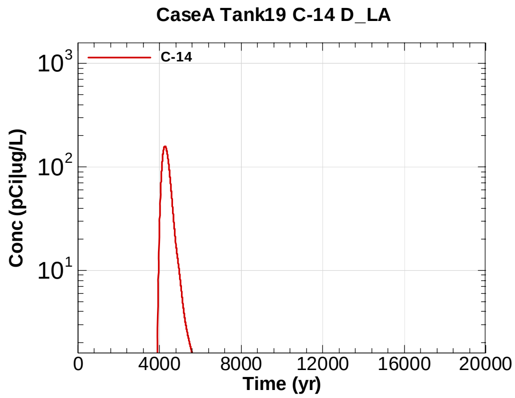

Figure E-1929 - 100m Aquifer Concentration for CaseA Tank19 C-14 D_LA

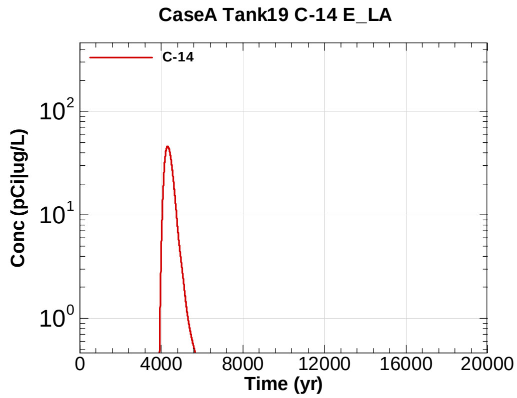

Figure E-1930 - 100m Aquifer Concentration for CaseA Tank19 C-14 E_LA

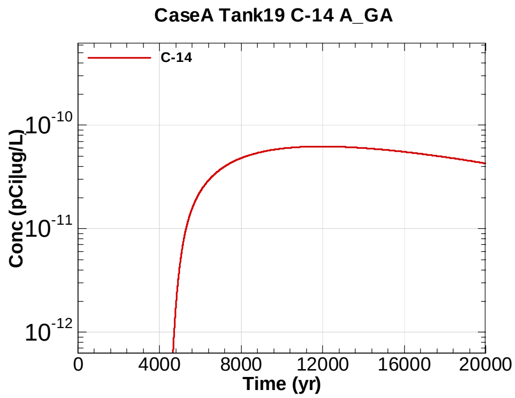

Figure E-1931 - 100m Aquifer Concentration for CaseA Tank19 C-14 A_GA

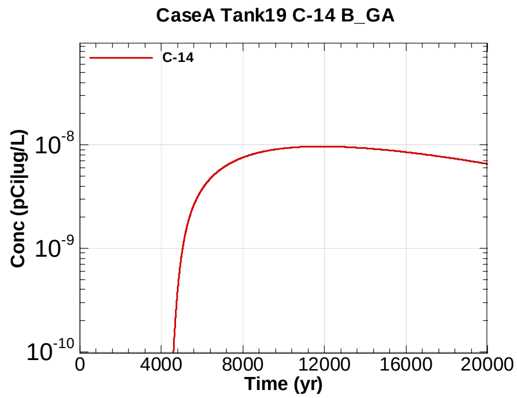

Figure E-1932 - 100m Aquifer Concentration for CaseA Tank19 C-14 B_GA

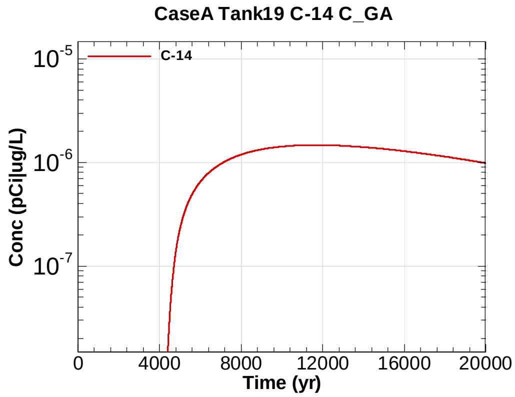

Figure E-1933 - 100m Aquifer Concentration for CaseA Tank19 C-14 C_GA

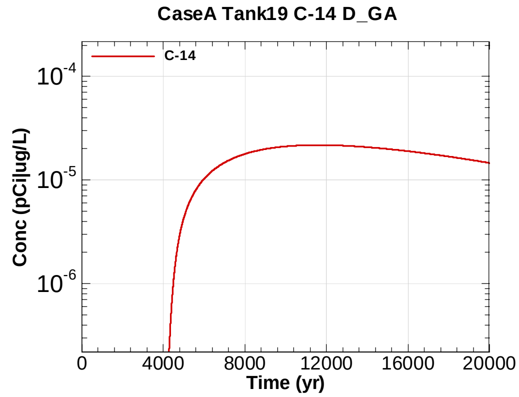

Figure E-1934 - 100m Aquifer Concentration for CaseA Tank19 C-14 D_GA

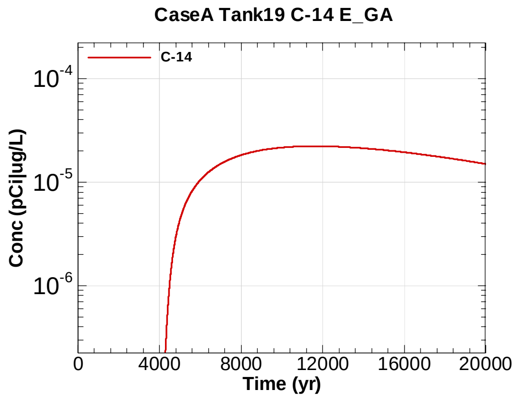

Figure E-1935 - 100m Aquifer Concentration for CaseA Tank19 C-14 E_GA

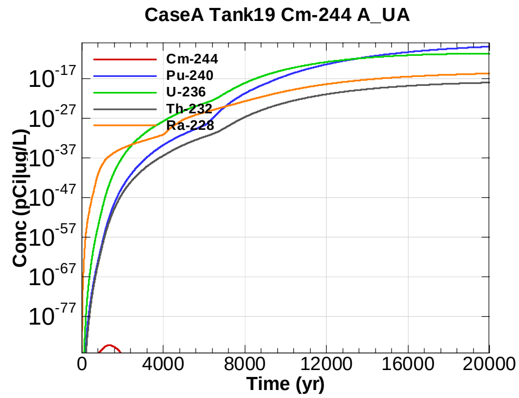

Figure E-1936 - 100m Aquifer Concentration for CaseA Tank19 Cm-244 A_UA

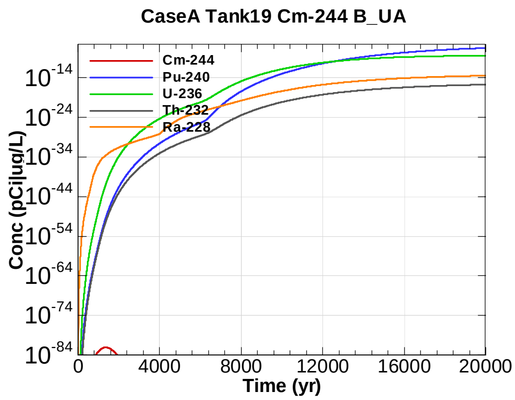

Figure E-1937 - 100m Aquifer Concentration for CaseA Tank19 Cm-244 B_UA

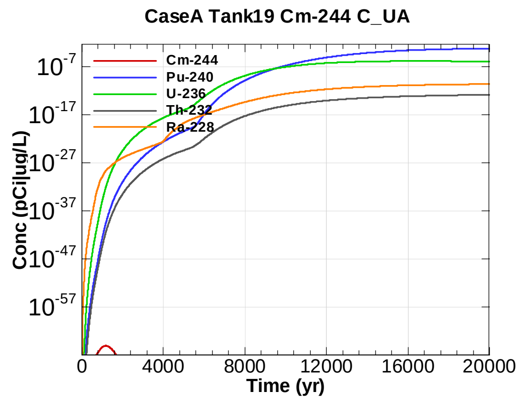

Figure E-1938 - 100m Aquifer Concentration for CaseA Tank19 Cm-244 C_UA

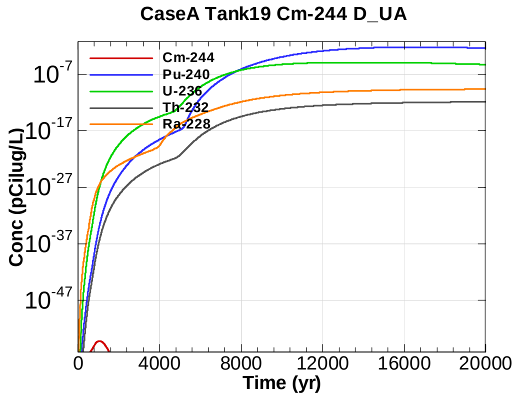

Figure E-1939 - 100m Aquifer Concentration for CaseA Tank19 Cm-244 D_UA

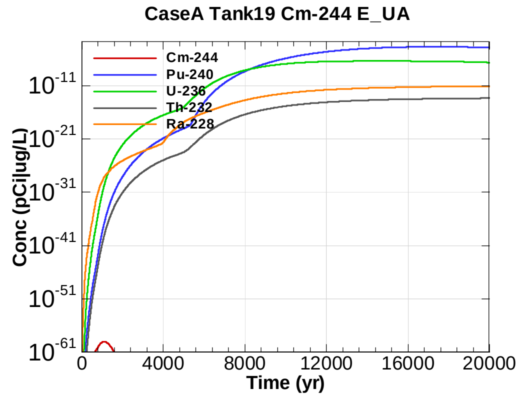

Figure E-1940 - 100m Aquifer Concentration for CaseA Tank19 Cm-244 E_UA

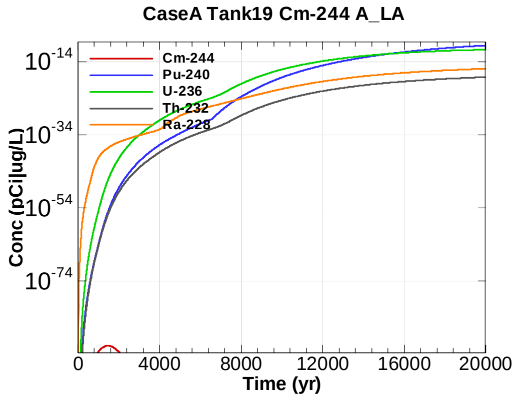

Figure E-1941 - 100m Aquifer Concentration for CaseA Tank19 Cm-244 A_LA

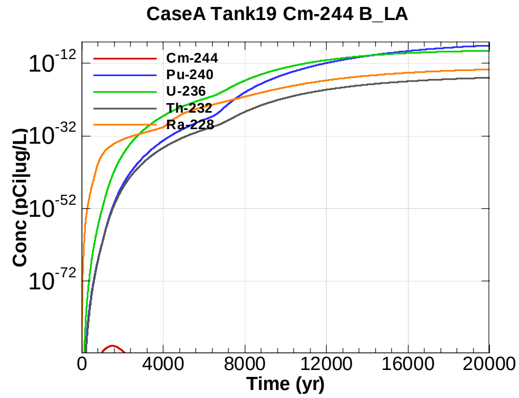

Figure E-1942 - 100m Aquifer Concentration for CaseA Tank19 Cm-244 B_LA

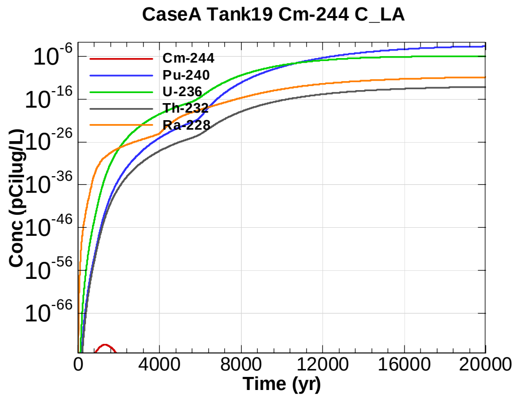

Figure E-1943 - 100m Aquifer Concentration for CaseA Tank19 Cm-244 C_LA

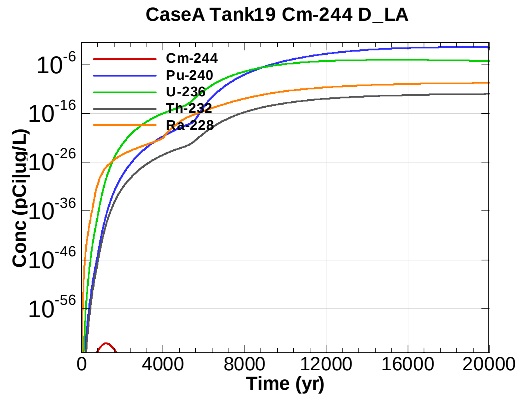

Figure E-1944 - 100m Aquifer Concentration for CaseA Tank19 Cm-244 D_LA

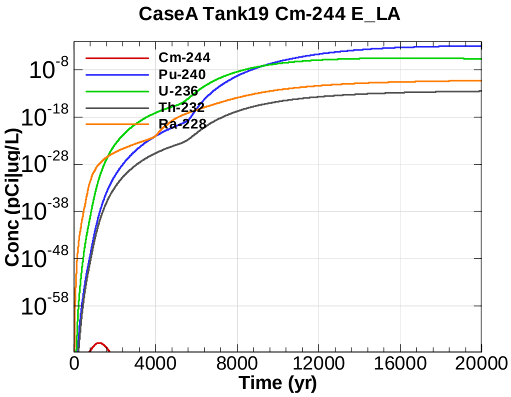

Figure E-1945 - 100m Aquifer Concentration for CaseA Tank19 Cm-244 E_LA

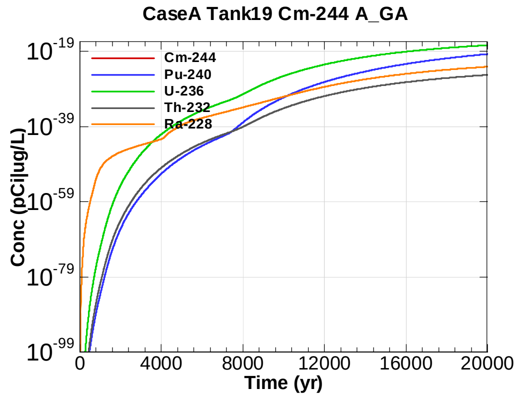

Figure E-1946 - 100m Aquifer Concentration for CaseA Tank19 Cm-244 A_GA

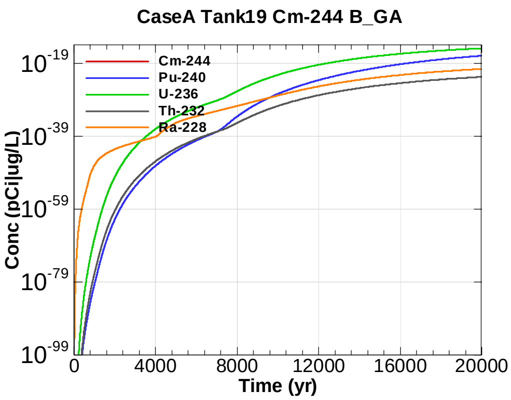

Figure E-1947 - 100m Aquifer Concentration for CaseA Tank19 Cm-244 B_GA

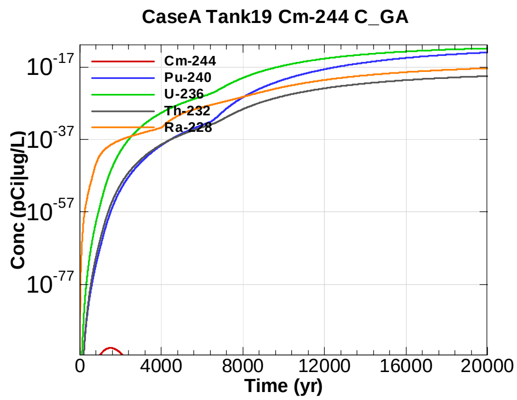

Figure E-1948 - 100m Aquifer Concentration for CaseA Tank19 Cm-244 C_GA

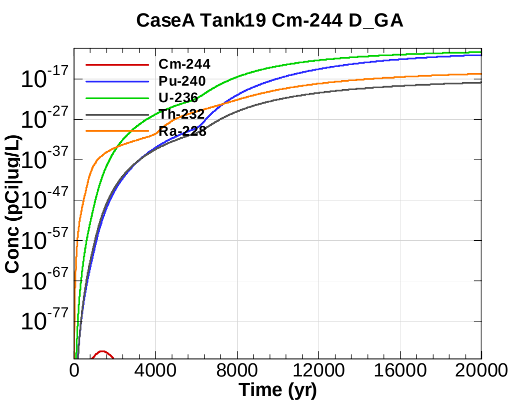

Figure E-1949 - 100m Aquifer Concentration for CaseA Tank19 Cm-244 D_GA

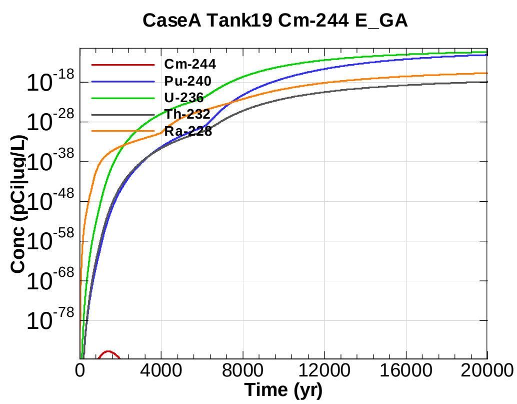

Figure E-1950 - 100m Aquifer Concentration for CaseA Tank19 Cm-244 E_GA

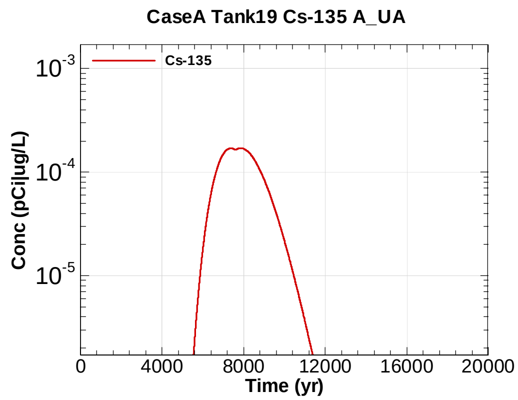

Figure E-1951 - 100m Aquifer Concentration for CaseA Tank19 Cs-135 A_UA

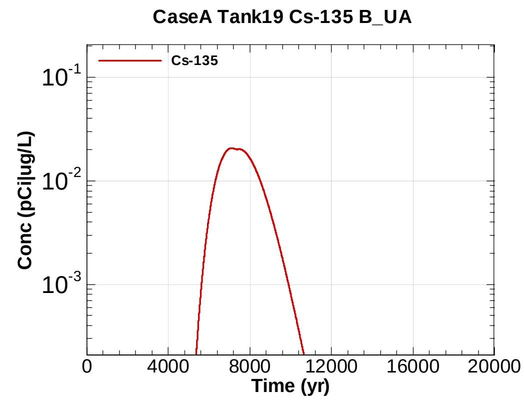

Figure E-1952 - 100m Aquifer Concentration for CaseA Tank19 Cs-135 B_UA

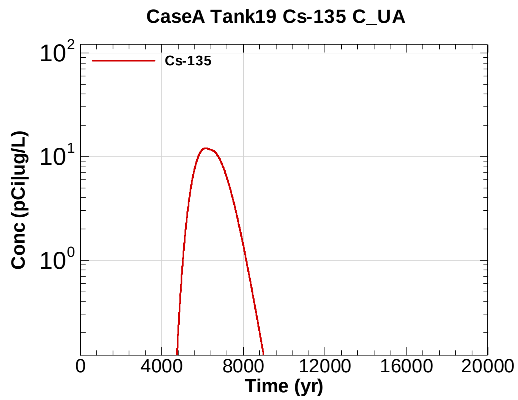

Figure E-1953 - 100m Aquifer Concentration for CaseA Tank19 Cs-135 C_UA

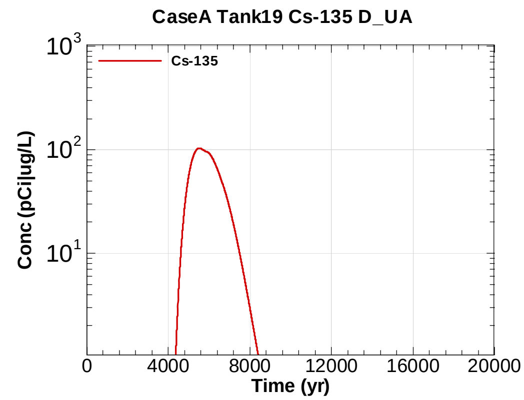

Figure E-1954 - 100m Aquifer Concentration for CaseA Tank19 Cs-135 D_UA

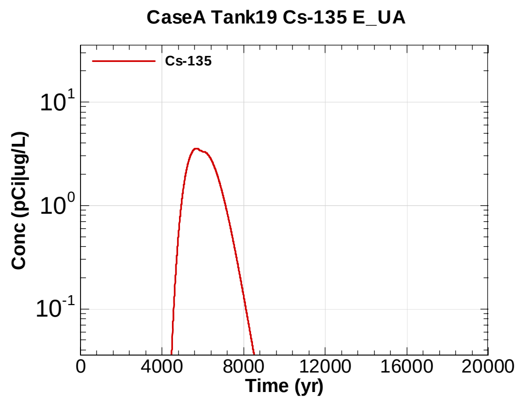

Figure E-1955 - 100m Aquifer Concentration for CaseA Tank19 Cs-135 E_UA

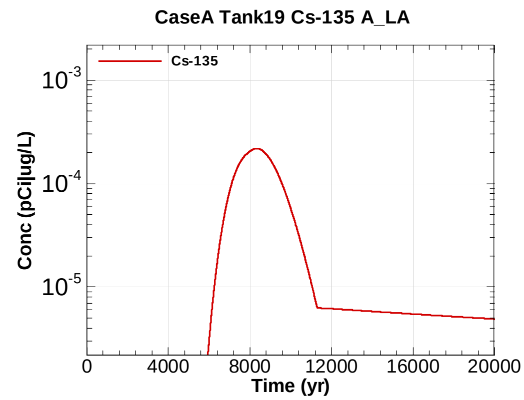

Figure E-1956 - 100m Aquifer Concentration for CaseA Tank19 Cs-135 A_LA

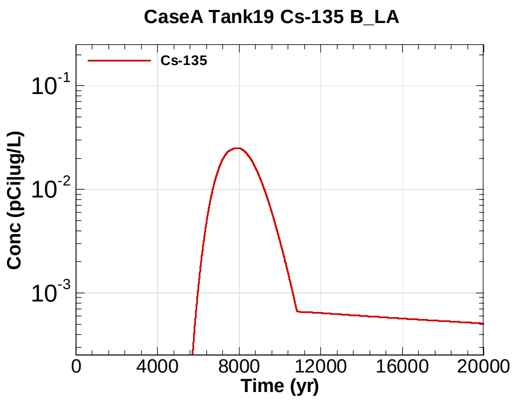

Figure E-1957 - 100m Aquifer Concentration for CaseA Tank19 Cs-135 B_LA

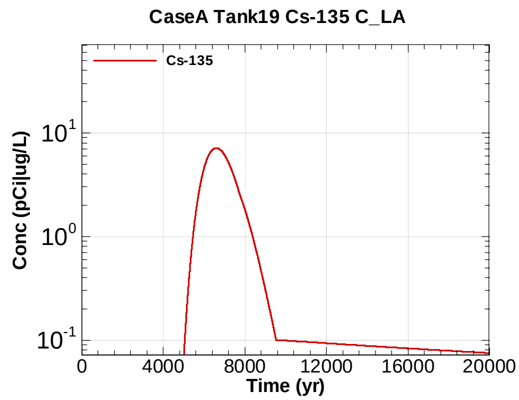

Figure E-1958 - 100m Aquifer Concentration for CaseA Tank19 Cs-135 C_LA

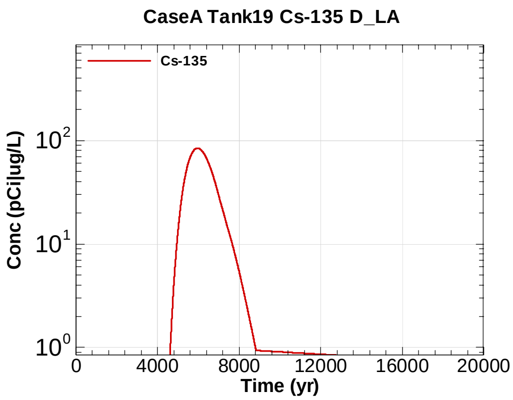

Figure E-1959 - 100m Aquifer Concentration for CaseA Tank19 Cs-135 D_LA

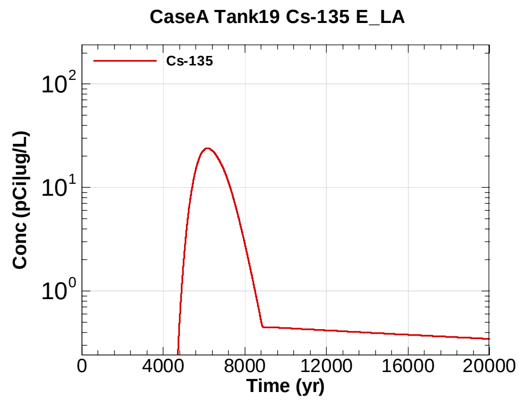

Figure E-1960 - 100m Aquifer Concentration for CaseA Tank19 Cs-135 E_LA

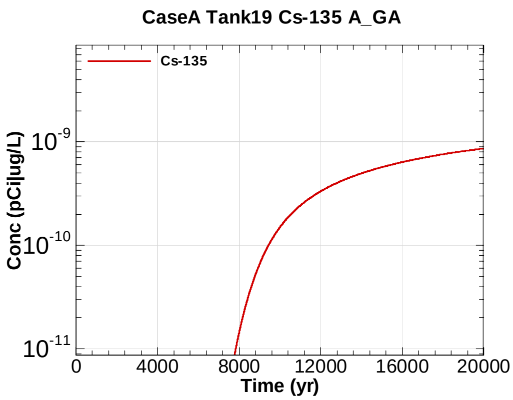

Figure E-1961 - 100m Aquifer Concentration for CaseA Tank19 Cs-135 A_GA

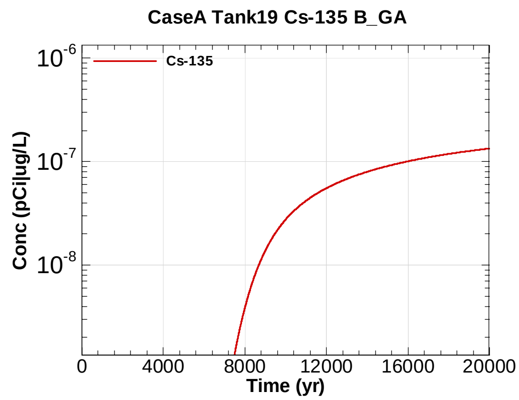

Figure E-1962 - 100m Aquifer Concentration for CaseA Tank19 Cs-135 B_GA

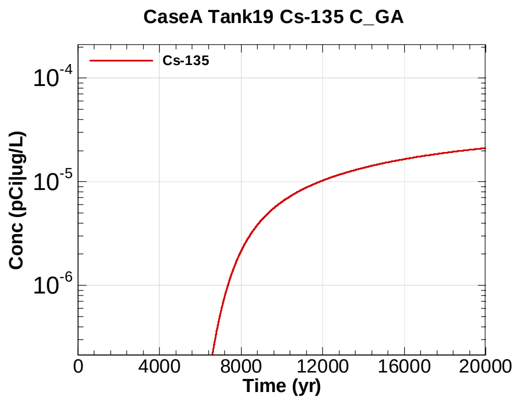

Figure E-1963 - 100m Aquifer Concentration for CaseA Tank19 Cs-135 C_GA

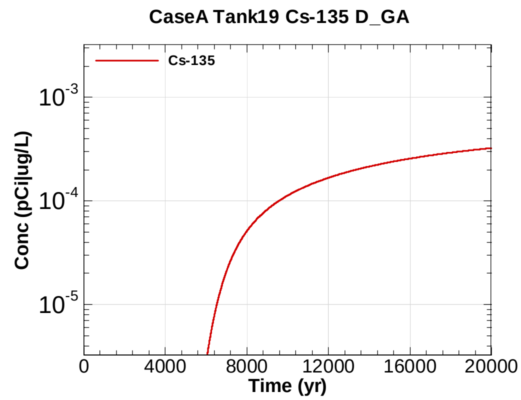

Figure E-1964 - 100m Aquifer Concentration for CaseA Tank19 Cs-135 D_GA

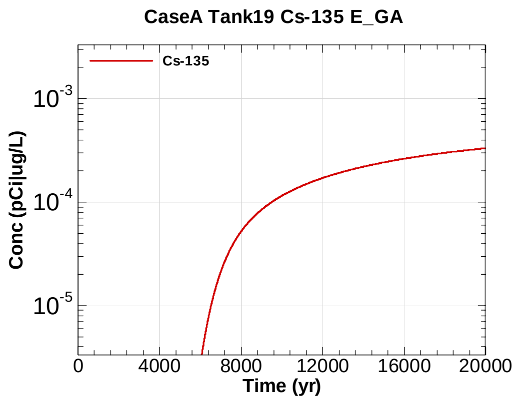

Figure E-1965 - 100m Aquifer Concentration for CaseA Tank19 Cs-135 E_GA

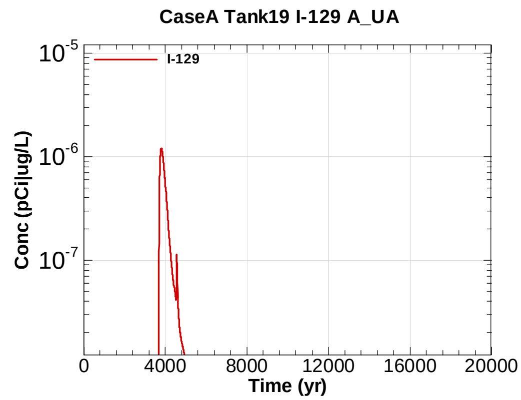

Figure E-1966 - 100m Aquifer Concentration for CaseA Tank19 I-129 A_UA

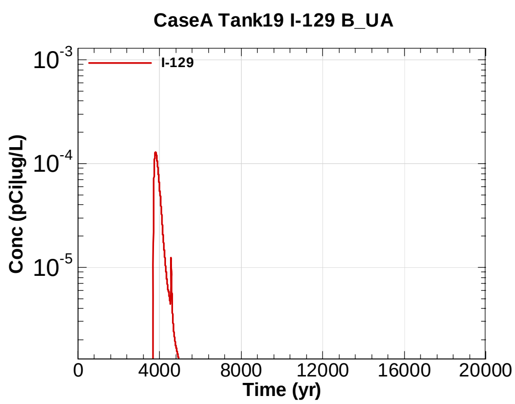

Figure E-1967 - 100m Aquifer Concentration for CaseA Tank19 I-129 B_UA

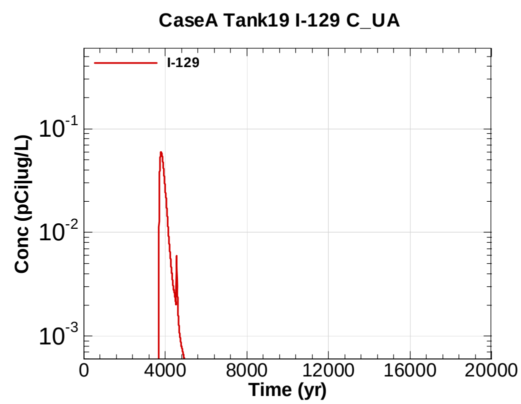

Figure E-1968 - 100m Aquifer Concentration for CaseA Tank19 I-129 C_UA

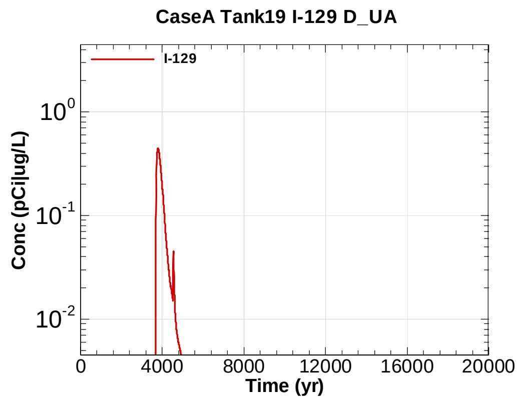

Figure E-1969 - 100m Aquifer Concentration for CaseA Tank19 I-129 D_UA

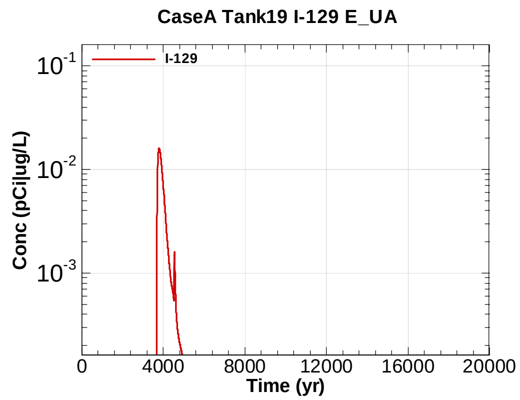

Figure E-1970 - 100m Aquifer Concentration for CaseA Tank19 I-129 E_UA

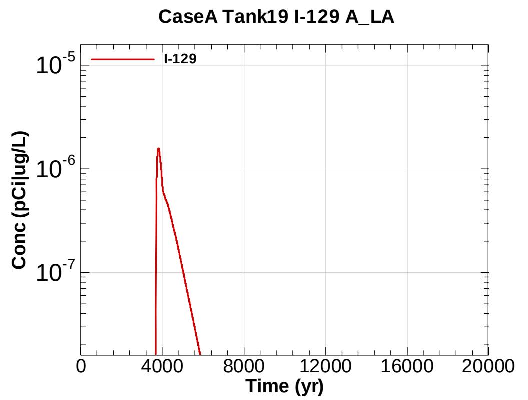

Figure E-1971 - 100m Aquifer Concentration for CaseA Tank19 I-129 A_LA

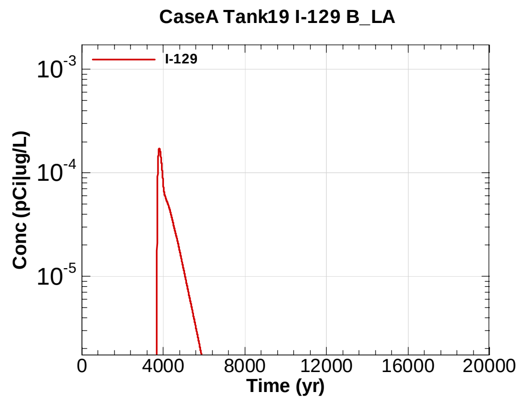

Figure E-1972 - 100m Aquifer Concentration for CaseA Tank19 I-129 B_LA

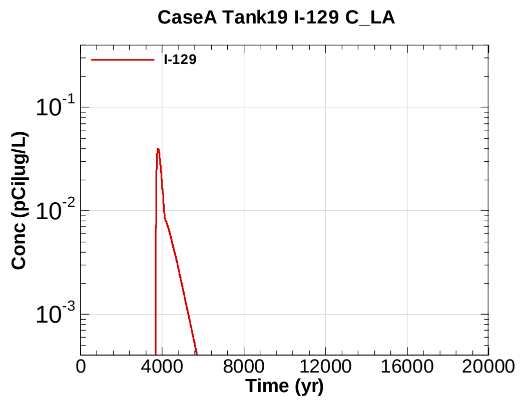

Figure E-1973 - 100m Aquifer Concentration for CaseA Tank19 I-129 C_LA

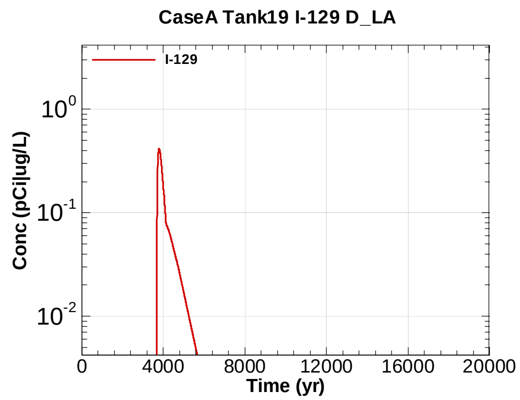

Figure E-1974 - 100m Aquifer Concentration for CaseA Tank19 I-129 D_LA

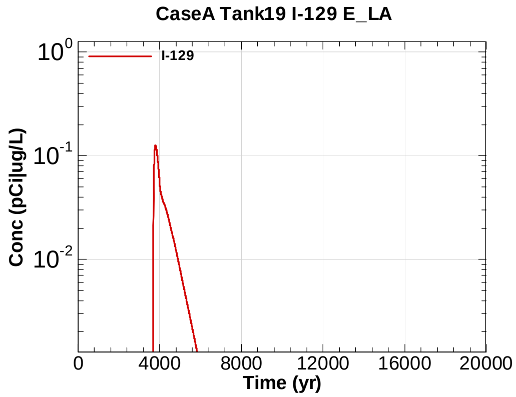

Figure E-1975 - 100m Aquifer Concentration for CaseA Tank19 I-129 E_LA

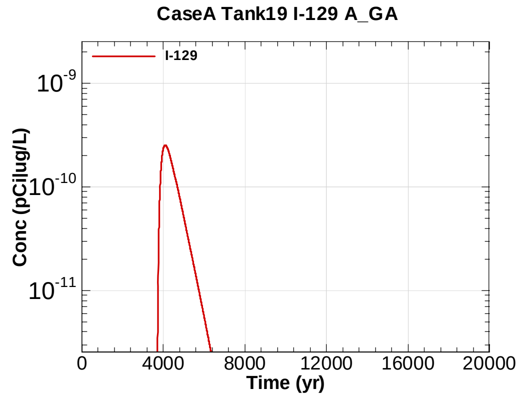

Figure E-1976 - 100m Aquifer Concentration for CaseA Tank19 I-129 A_GA

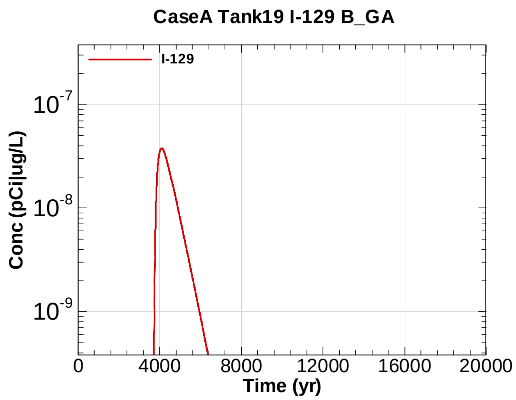

Figure E-1977 - 100m Aquifer Concentration for CaseA Tank19 I-129 B_GA

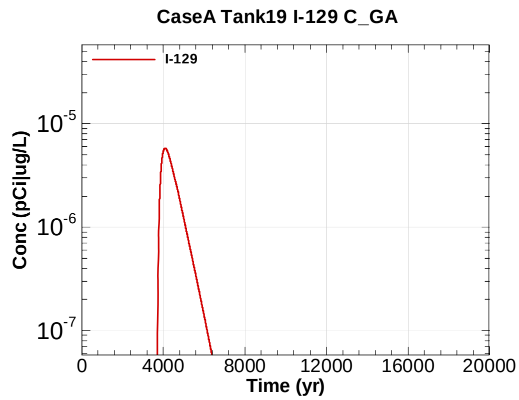

Figure E-1978 - 100m Aquifer Concentration for CaseA Tank19 I-129 C_GA

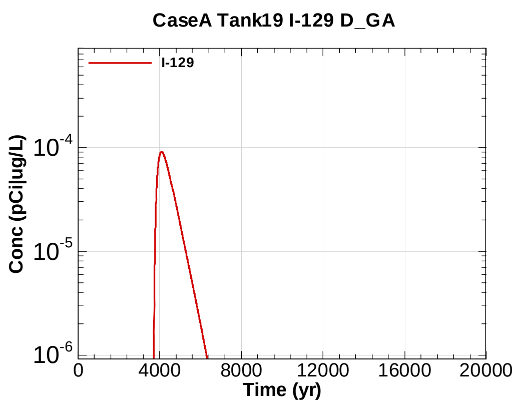

Figure E-1979 - 100m Aquifer Concentration for CaseA Tank19 I-129 D_GA

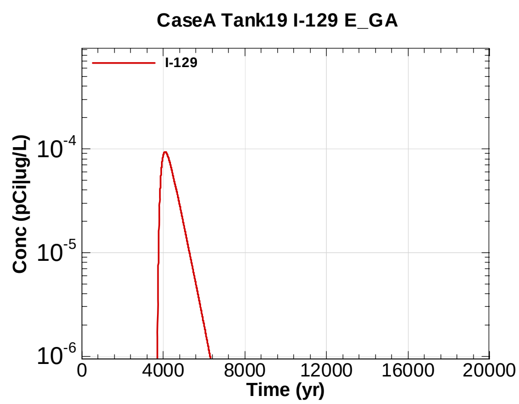

Figure E-1980 - 100m Aquifer Concentration for CaseA Tank19 I-129 E_GA

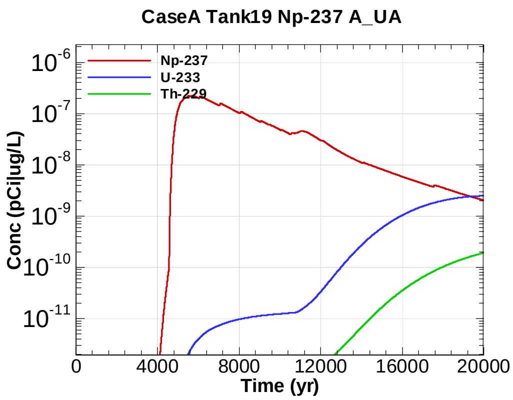

Figure E-1981 - 100m Aquifer Concentration for CaseA Tank19 Np-237 A_UA

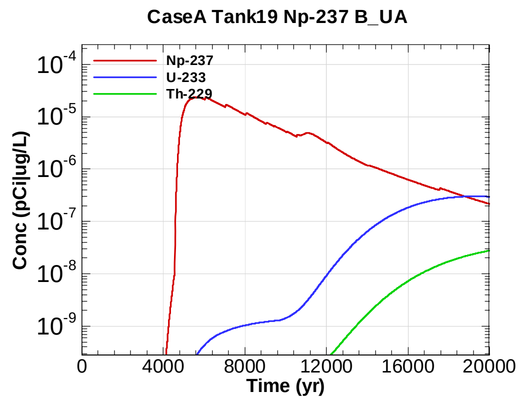

Figure E-1982 - 100m Aquifer Concentration for CaseA Tank19 Np-237 B_UA

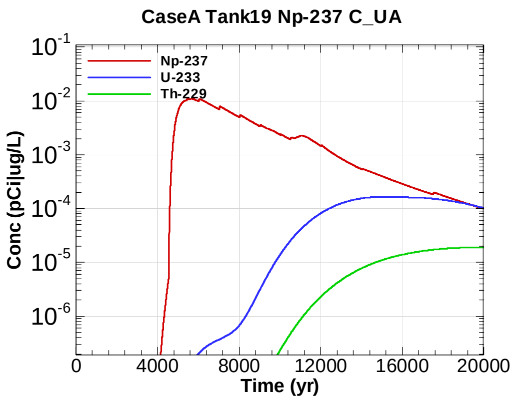

Figure E-1983 - 100m Aquifer Concentration for CaseA Tank19 Np-237 C_UA

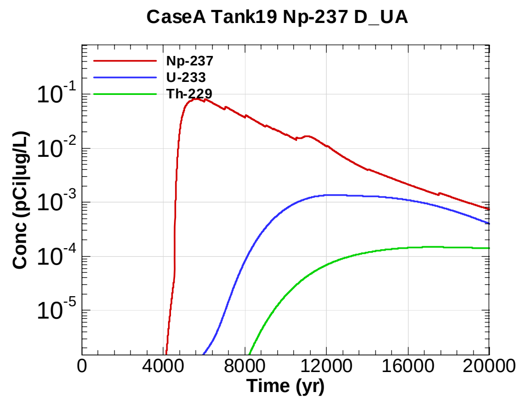

Figure E-1984 - 100m Aquifer Concentration for CaseA Tank19 Np-237 D_UA

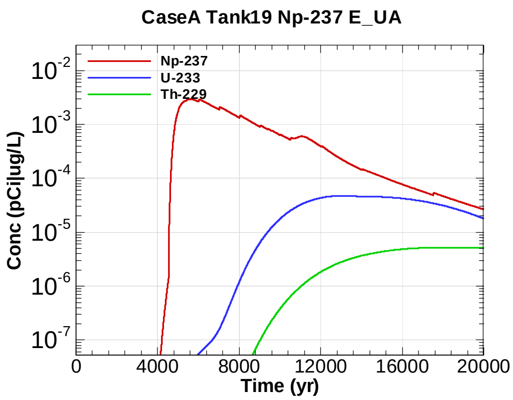

Figure E-1985 - 100m Aquifer Concentration for CaseA Tank19 Np-237 E_UA

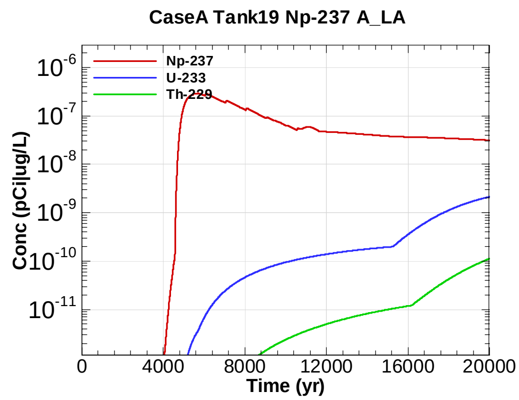

Figure E-1986 - 100m Aquifer Concentration for CaseA Tank19 Np-237 A_LA

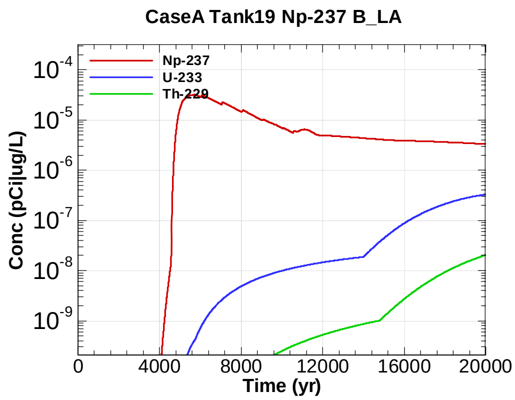

Figure E-1987 - 100m Aquifer Concentration for CaseA Tank19 Np-237 B_LA

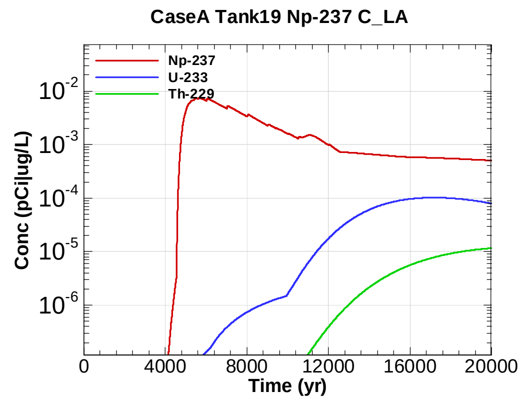

Figure E-1988 - 100m Aquifer Concentration for CaseA Tank19 Np-237 C_LA

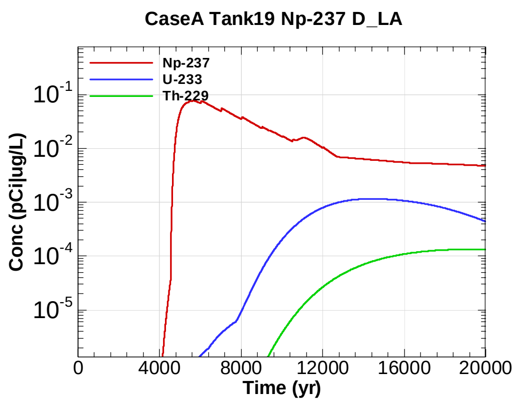

Figure E-1989 - 100m Aquifer Concentration for CaseA Tank19 Np-237 D_LA

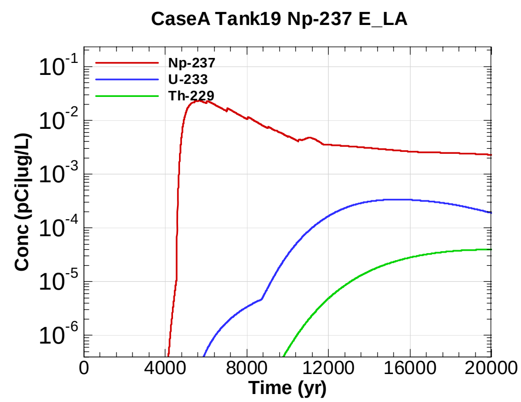

Figure E-1990 - 100m Aquifer Concentration for CaseA Tank19 Np-237 E_LA

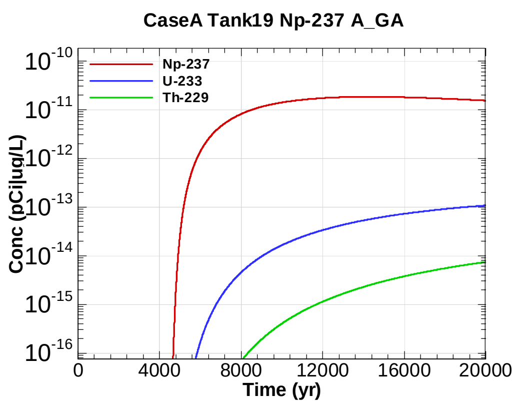

Figure E-1991 - 100m Aquifer Concentration for CaseA Tank19 Np-237 A_GA

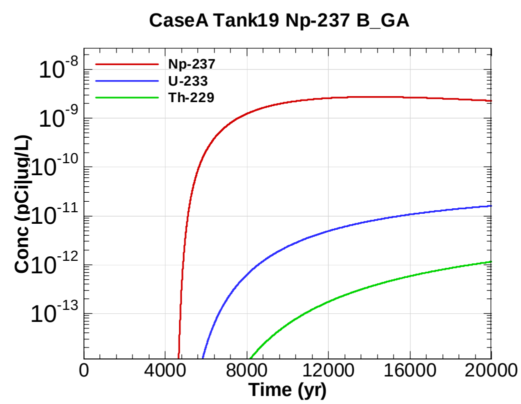

Figure E-1992 - 100m Aquifer Concentration for CaseA Tank19 Np-237 B_GA

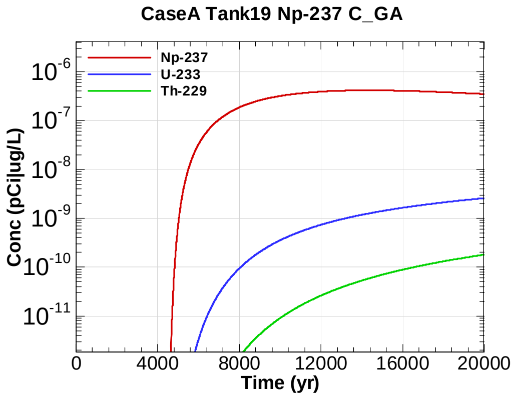

Figure E-1993 - 100m Aquifer Concentration for CaseA Tank19 Np-237 C_GA

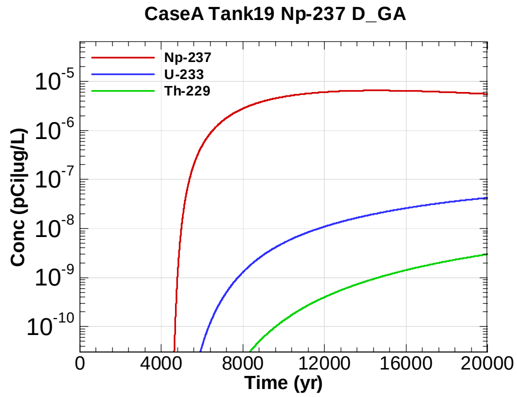

Figure E-1994 - 100m Aquifer Concentration for CaseA Tank19 Np-237 D_GA

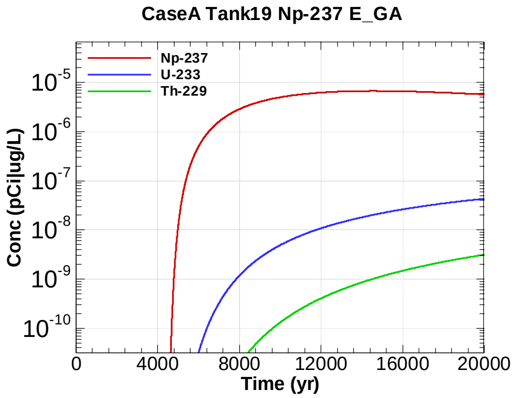

Figure E-1995 - 100m Aquifer Concentration for CaseA Tank19 Np-237 E_GA

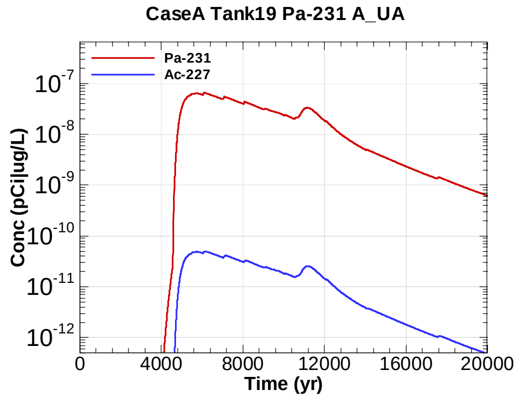

Figure E-1996 - 100m Aquifer Concentration for CaseA Tank19 Pa-231 A_UA

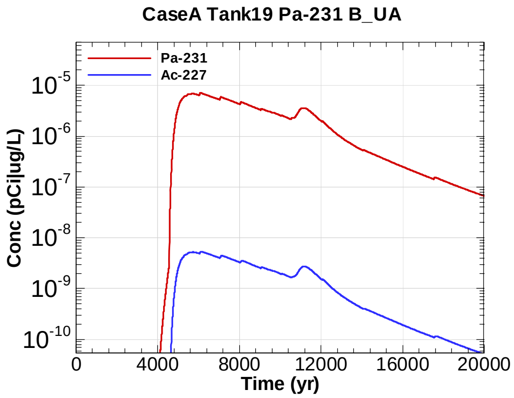

Figure E-1997 - 100m Aquifer Concentration for CaseA Tank19 Pa-231 B_UA

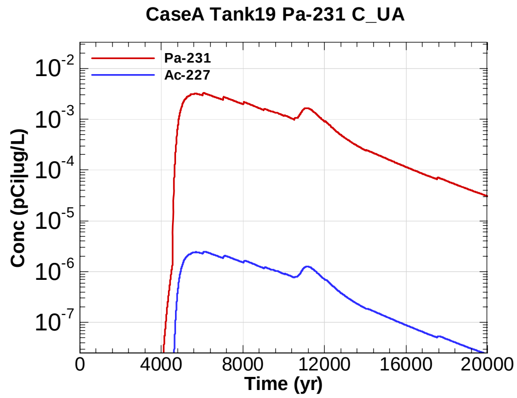

Figure E-1998 - 100m Aquifer Concentration for CaseA Tank19 Pa-231 C_UA

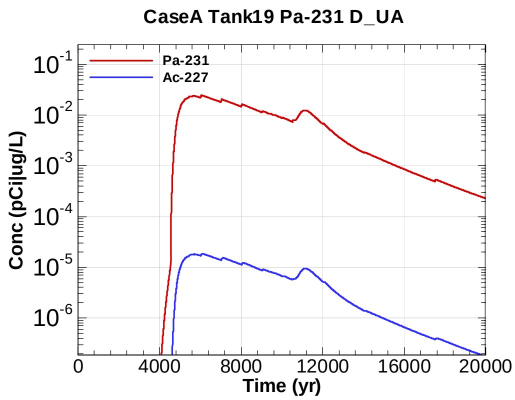

Figure E-1999 - 100m Aquifer Concentration for CaseA Tank19 Pa-231 D_UA

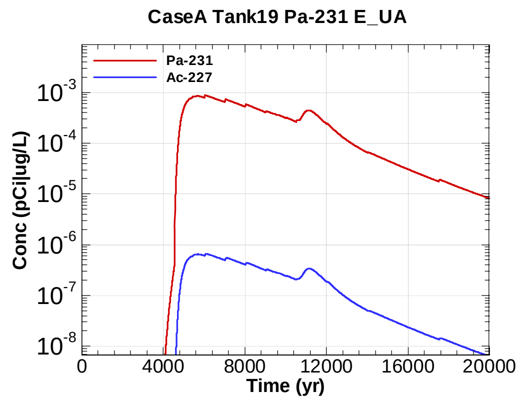

Figure E-2000 - 100m Aquifer Concentration for CaseA Tank19 Pa-231 E_UA

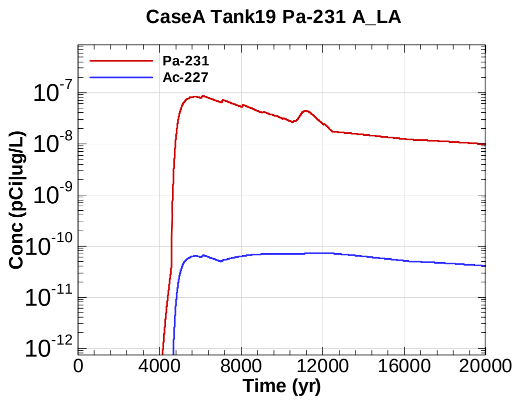

Figure E-2001 - 100m Aquifer Concentration for CaseA Tank19 Pa-231 A_LA

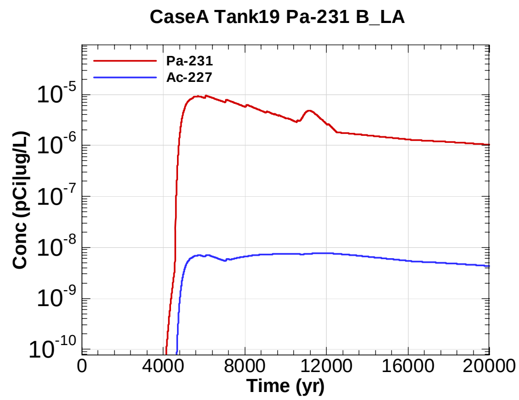

Figure E-2002 - 100m Aquifer Concentration for CaseA Tank19 Pa-231 B_LA

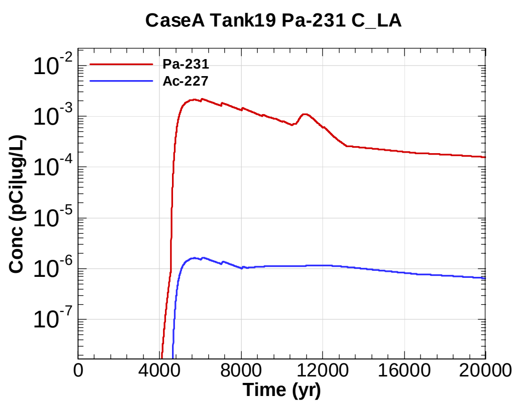

Figure E-2003 - 100m Aquifer Concentration for CaseA Tank19 Pa-231 C_LA

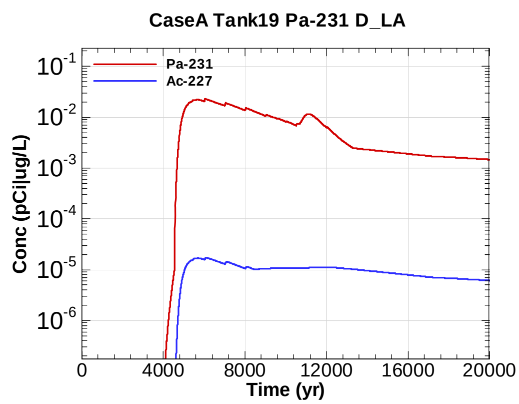

Figure E-2004 - 100m Aquifer Concentration for CaseA Tank19 Pa-231 D_LA

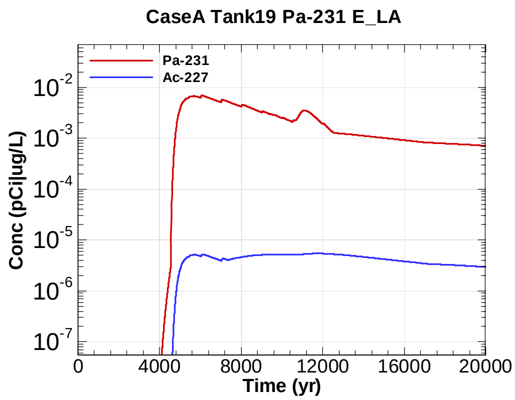

Figure E-2005 - 100m Aquifer Concentration for CaseA Tank19 Pa-231 E_LA

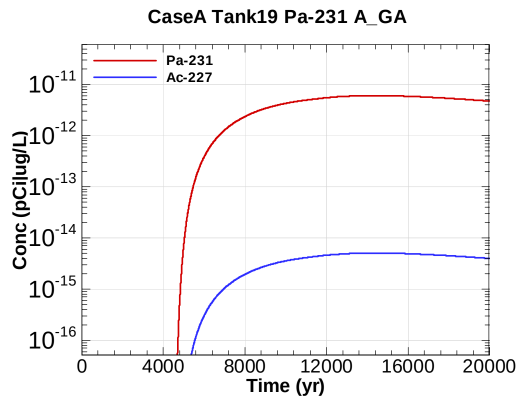

Figure E-2006 - 100m Aquifer Concentration for CaseA Tank19 Pa-231 A_GA

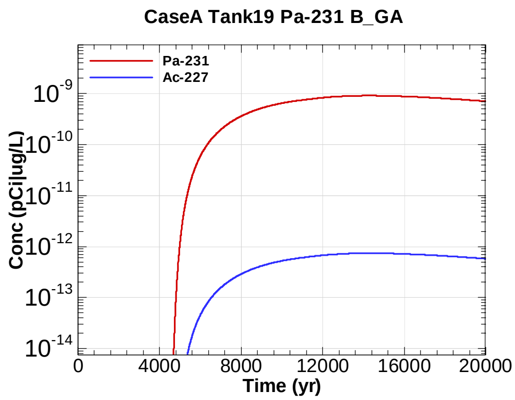

Figure E-2007 - 100m Aquifer Concentration for CaseA Tank19 Pa-231 B_GA

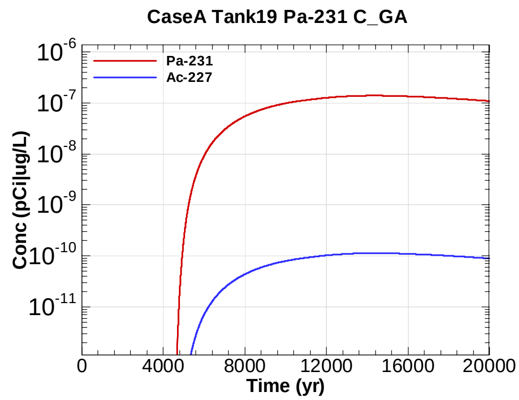

Figure E-2008 - 100m Aquifer Concentration for CaseA Tank19 Pa-231 C_GA

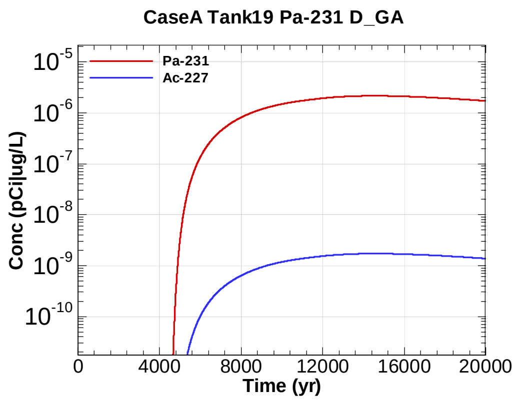

Figure E-2009 - 100m Aquifer Concentration for CaseA Tank19 Pa-231 D_GA

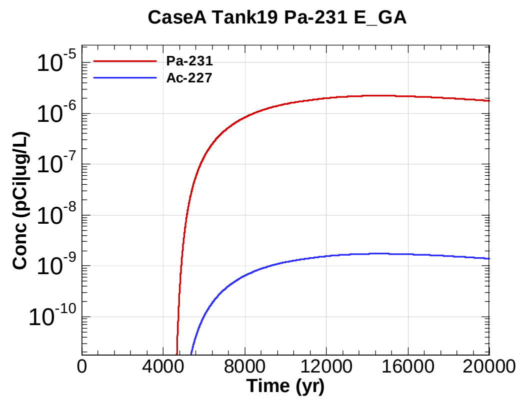

Figure E-2010 - 100m Aquifer Concentration for CaseA Tank19 Pa-231 E_GA

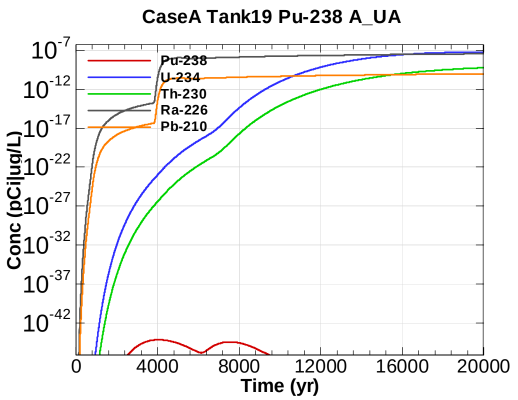

Figure E-2011 - 100m Aquifer Concentration for CaseA Tank19 Pu-238 A_UA

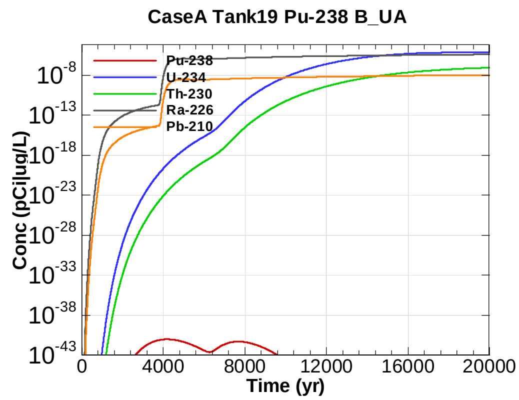

Figure E-2012 - 100m Aquifer Concentration for CaseA Tank19 Pu-238 B_UA

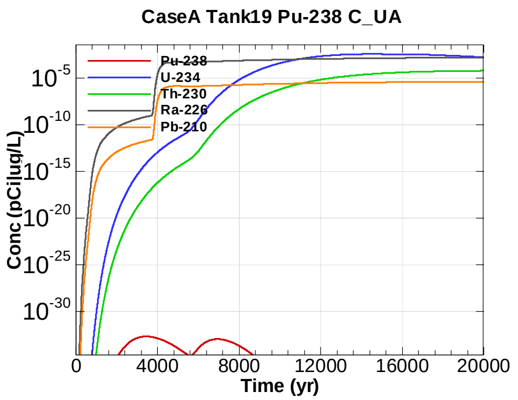

Figure E-2013 - 100m Aquifer Concentration for CaseA Tank19 Pu-238 C_UA

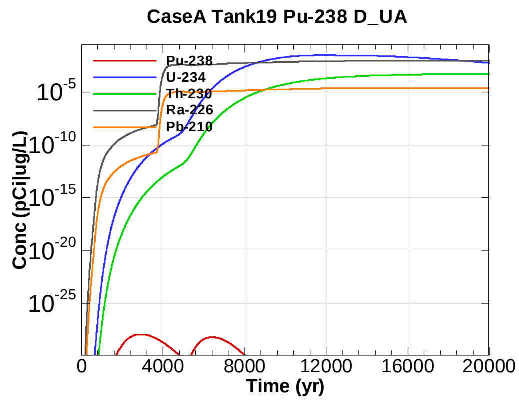

Figure E-2014 - 100m Aquifer Concentration for CaseA Tank19 Pu-238 D_UA

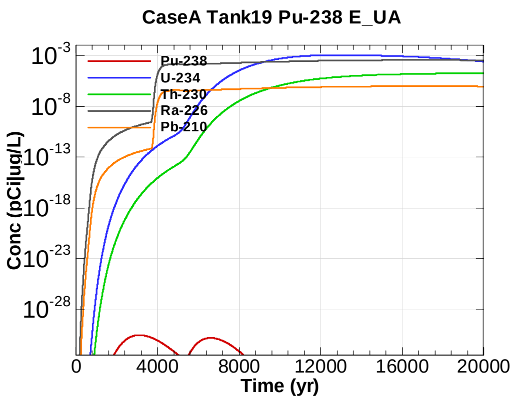

Figure E-2015 - 100m Aquifer Concentration for CaseA Tank19 Pu-238 E_UA

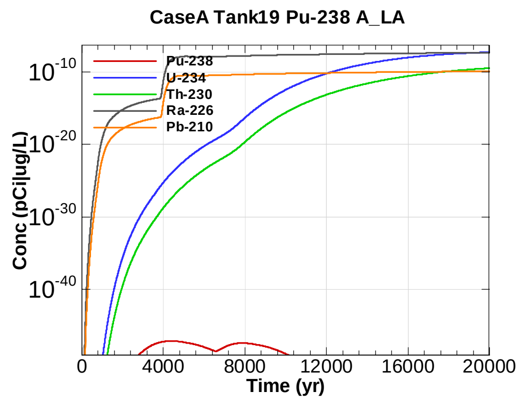

Figure E-2016 - 100m Aquifer Concentration for CaseA Tank19 Pu-238 A_LA

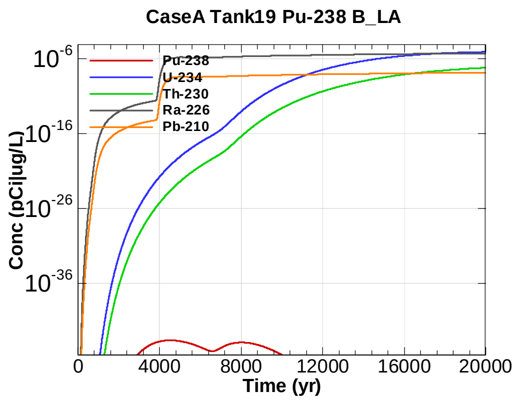

Figure E-2017 - 100m Aquifer Concentration for CaseA Tank19 Pu-238 B_LA

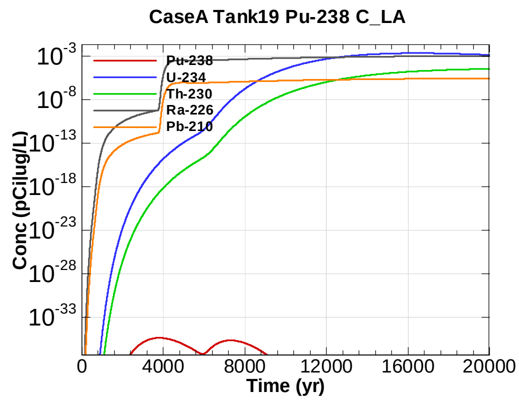

Figure E-2018 - 100m Aquifer Concentration for CaseA Tank19 Pu-238 C_LA

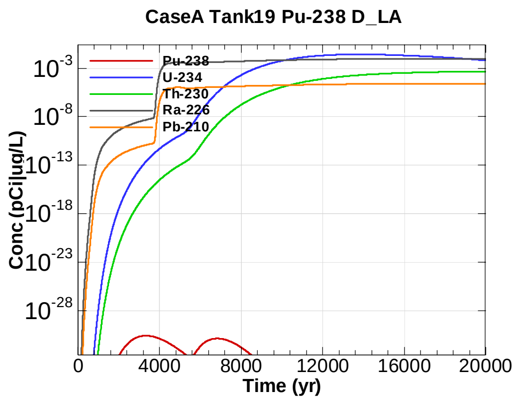

Figure E-2019 - 100m Aquifer Concentration for CaseA Tank19 Pu-238 D_LA

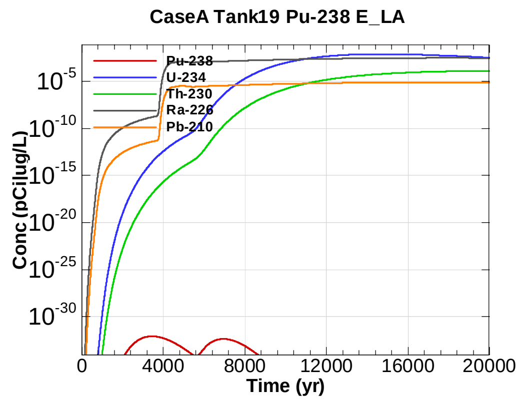

Figure E-2020 - 100m Aquifer Concentration for CaseA Tank19 Pu-238 E_LA

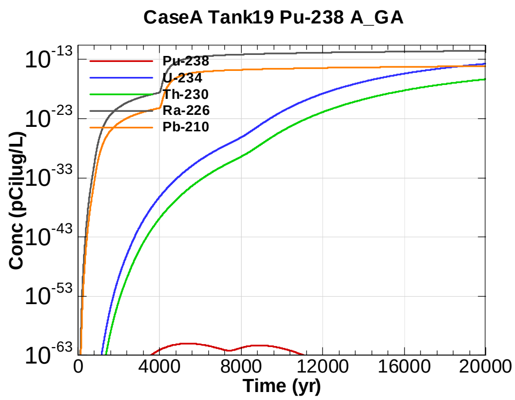

Figure E-2021 - 100m Aquifer Concentration for CaseA Tank19 Pu-238 A_GA

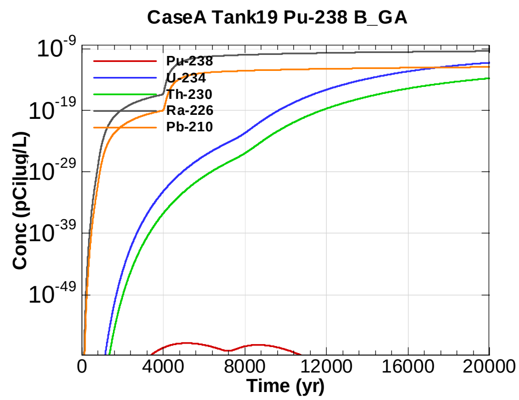

Figure E-2022 - 100m Aquifer Concentration for CaseA Tank19 Pu-238 B_GA

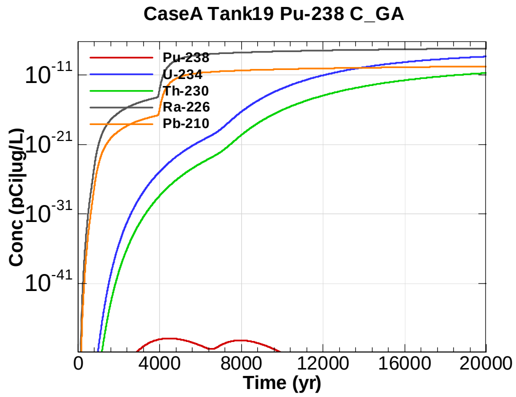

Figure E-2023 - 100m Aquifer Concentration for CaseA Tank19 Pu-238 C_GA

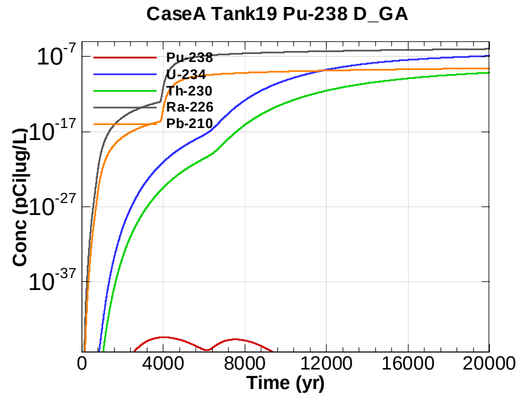

Figure E-2024 - 100m Aquifer Concentration for CaseA Tank19 Pu-238 D_GA

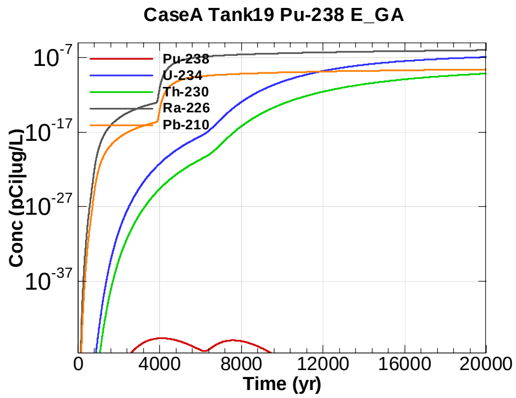

Figure E-2025 - 100m Aquifer Concentration for CaseA Tank19 Pu-238 E_GA

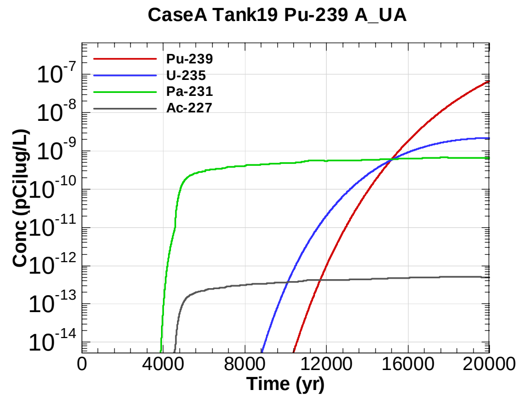

Figure E-2026 - 100m Aquifer Concentration for CaseA Tank19 Pu-239 A_UA

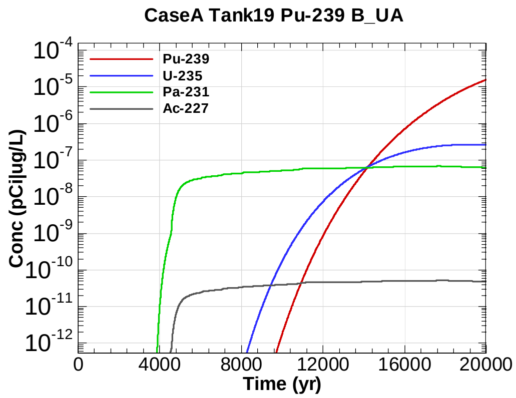

Figure E-2027 - 100m Aquifer Concentration for CaseA Tank19 Pu-239 B_UA

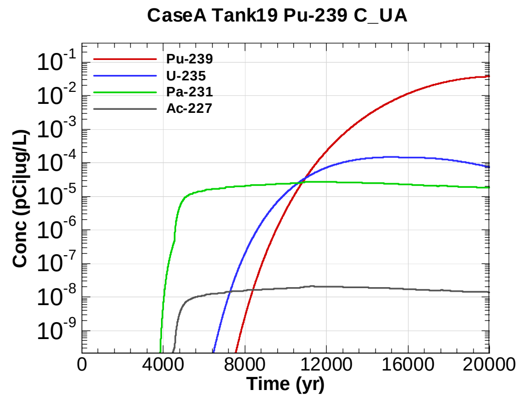

Figure E-2028 - 100m Aquifer Concentration for CaseA Tank19 Pu-239 C_UA

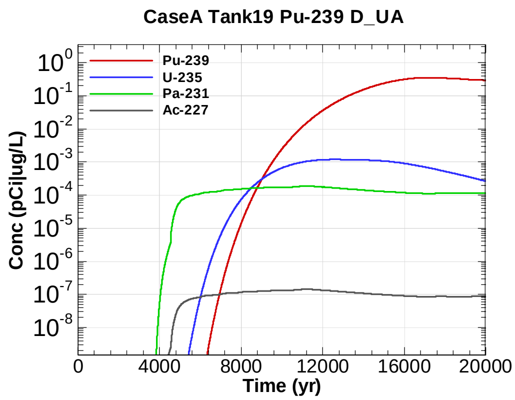

Figure E-2029 - 100m Aquifer Concentration for CaseA Tank19 Pu-239 D_UA

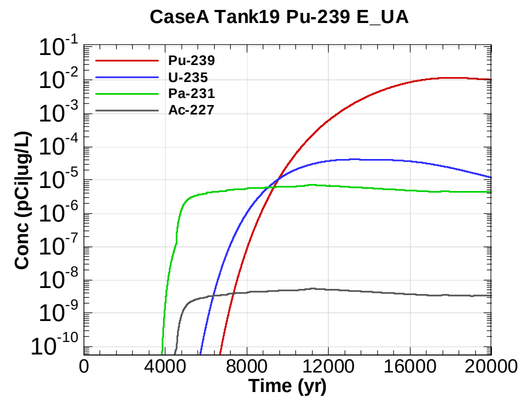

Figure E-2030 - 100m Aquifer Concentration for CaseA Tank19 Pu-239 E_UA

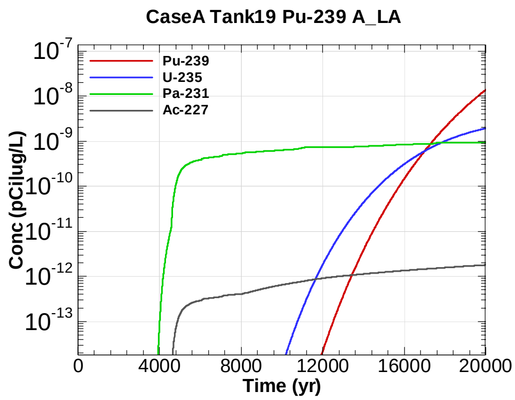

Figure E-2031 - 100m Aquifer Concentration for CaseA Tank19 Pu-239 A_LA

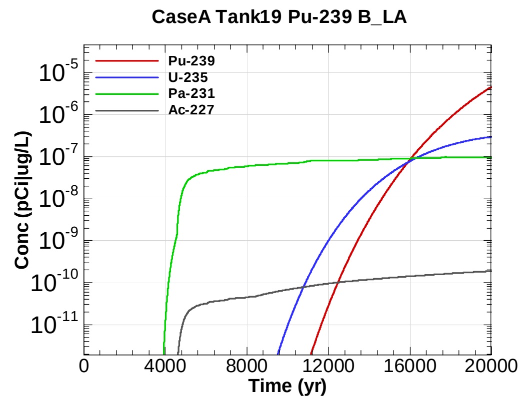

Figure E-2032 - 100m Aquifer Concentration for CaseA Tank19 Pu-239 B_LA

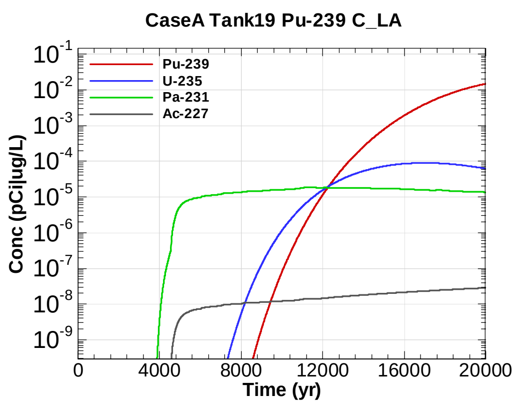

Figure E-2033 - 100m Aquifer Concentration for CaseA Tank19 Pu-239 C_LA

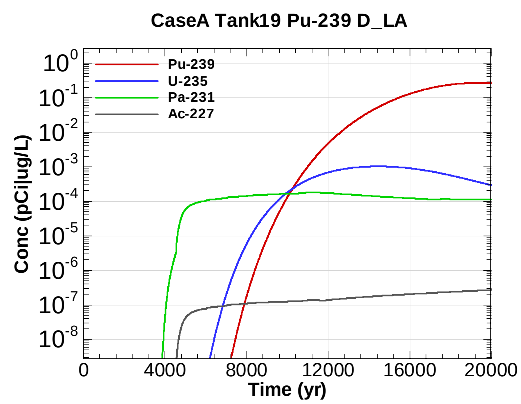

Figure E-2034 - 100m Aquifer Concentration for CaseA Tank19 Pu-239 D_LA

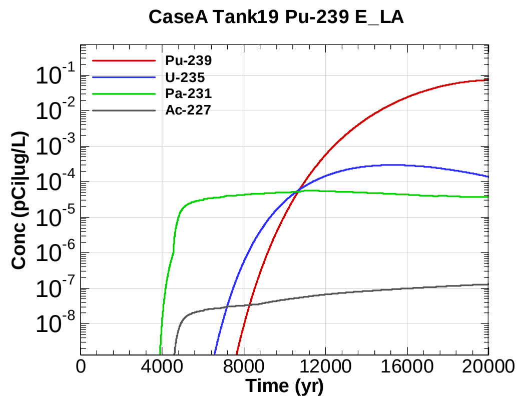

Figure E-2035 - 100m Aquifer Concentration for CaseA Tank19 Pu-239 E_LA

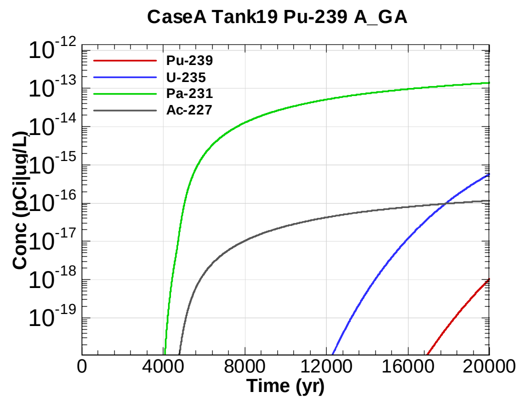

Figure E-2036 - 100m Aquifer Concentration for CaseA Tank19 Pu-239 A_GA

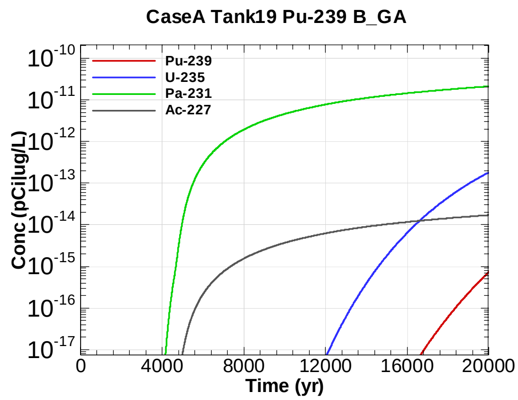

Figure E-2037 - 100m Aquifer Concentration for CaseA Tank19 Pu-239 B_GA

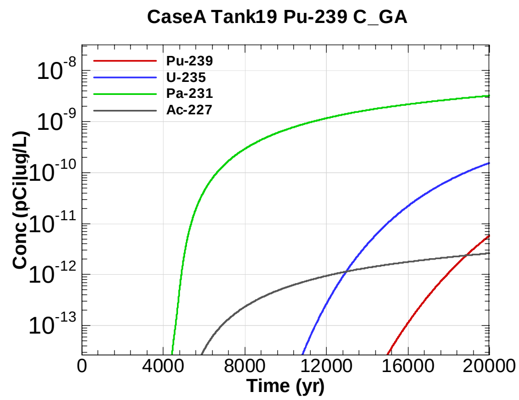

Figure E-2038 - 100m Aquifer Concentration for CaseA Tank19 Pu-239 C_GA

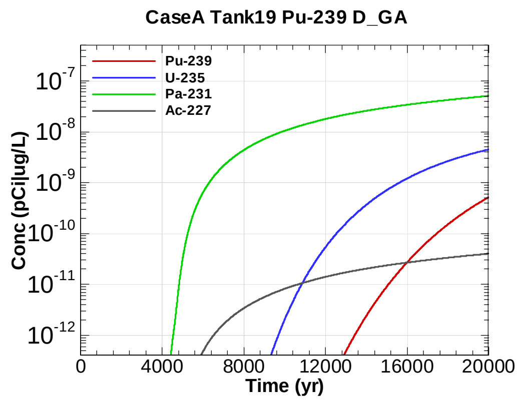

Figure E-2039 - 100m Aquifer Concentration for CaseA Tank19 Pu-239 D_GA

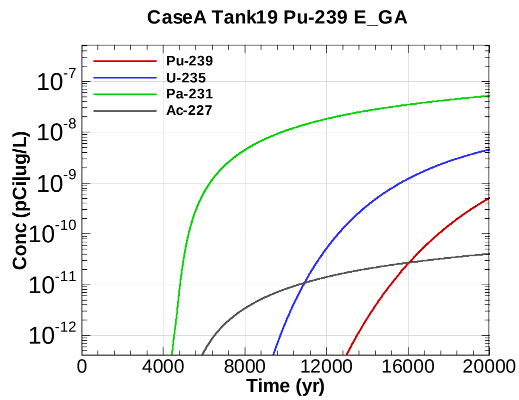

Figure E-2040 - 100m Aquifer Concentration for CaseA Tank19 Pu-239 E_GA

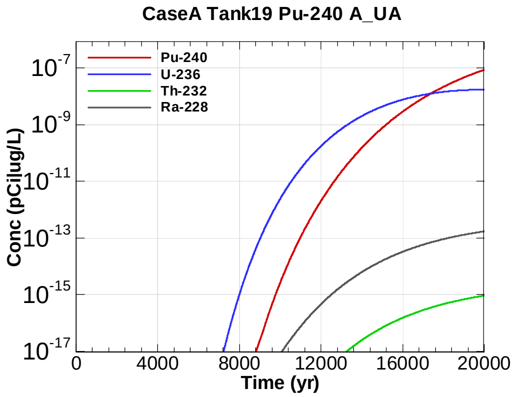

Figure E-2041 - 100m Aquifer Concentration for CaseA Tank19 Pu-240 A_UA

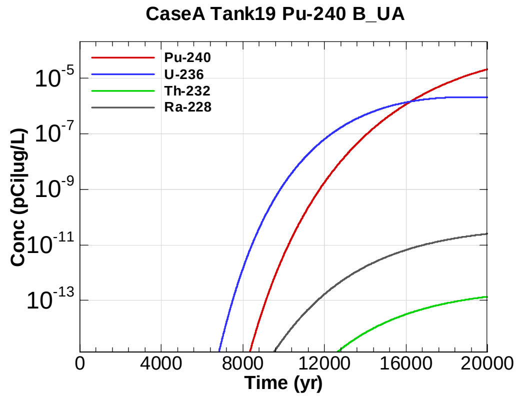

Figure E-2042 - 100m Aquifer Concentration for CaseA Tank19 Pu-240 B_UA

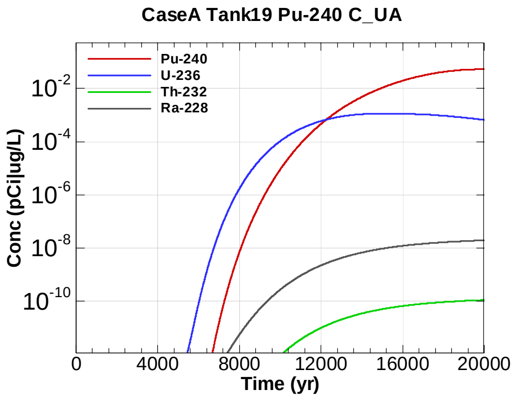

Figure E-2043 - 100m Aquifer Concentration for CaseA Tank19 Pu-240 C_UA

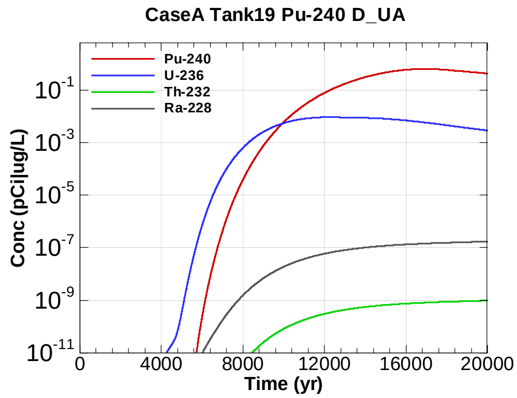

Figure E-2044 - 100m Aquifer Concentration for CaseA Tank19 Pu-240 D_UA

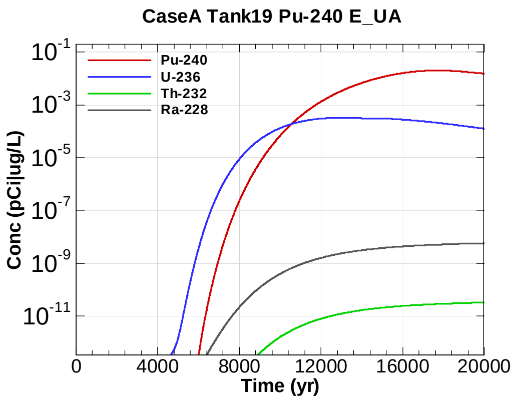

Figure E-2045 - 100m Aquifer Concentration for CaseA Tank19 Pu-240 E_UA

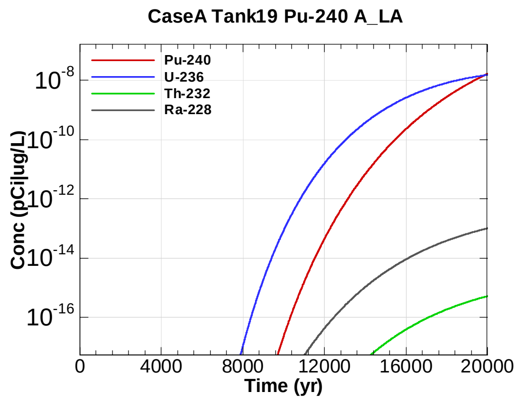

Figure E-2046 - 100m Aquifer Concentration for CaseA Tank19 Pu-240 A_LA

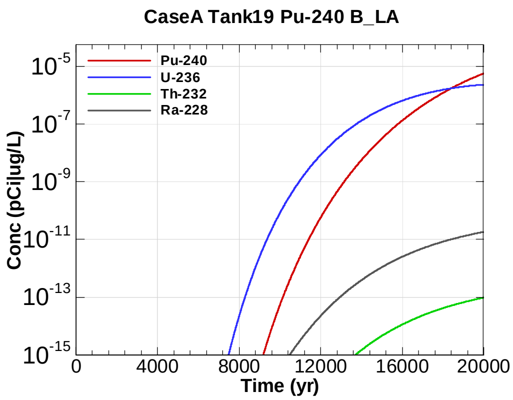

Figure E-2047 - 100m Aquifer Concentration for CaseA Tank19 Pu-240 B_LA

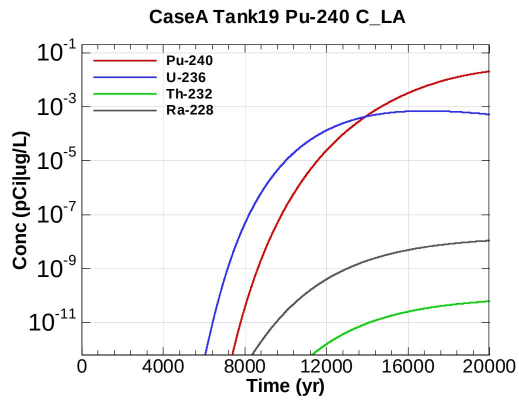

Figure E-2048 - 100m Aquifer Concentration for CaseA Tank19 Pu-240 C_LA

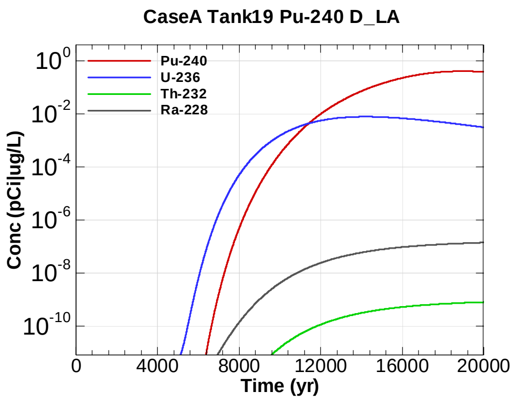

Figure E-2049 - 100m Aquifer Concentration for CaseA Tank19 Pu-240 D_LA

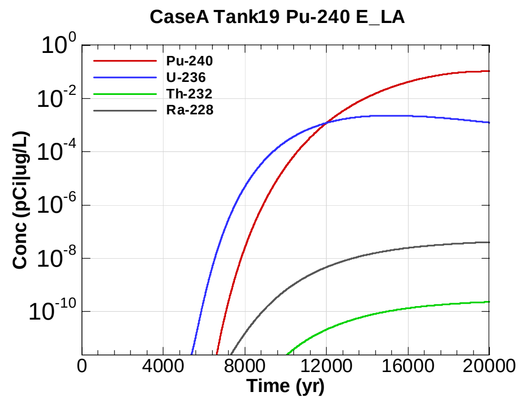

Figure E-2050 - 100m Aquifer Concentration for CaseA Tank19 Pu-240 E_LA

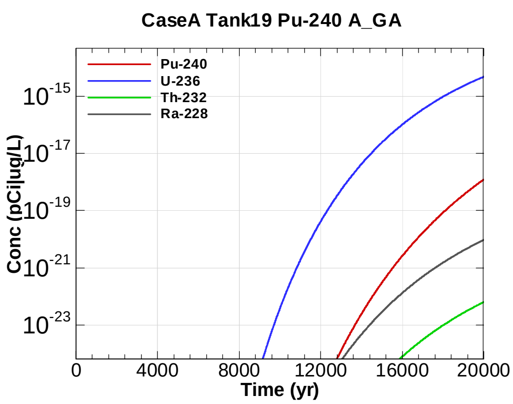

Figure E-2051 - 100m Aquifer Concentration for CaseA Tank19 Pu-240 A_GA

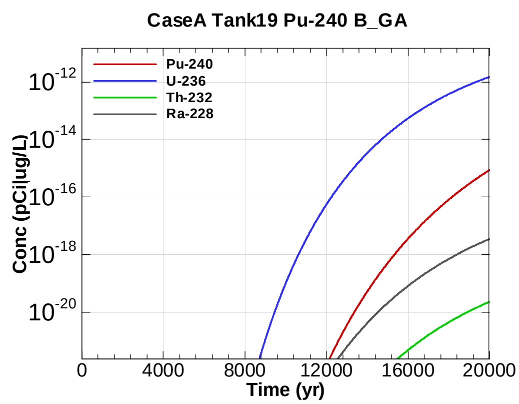

Figure E-2052 - 100m Aquifer Concentration for CaseA Tank19 Pu-240 B_GA

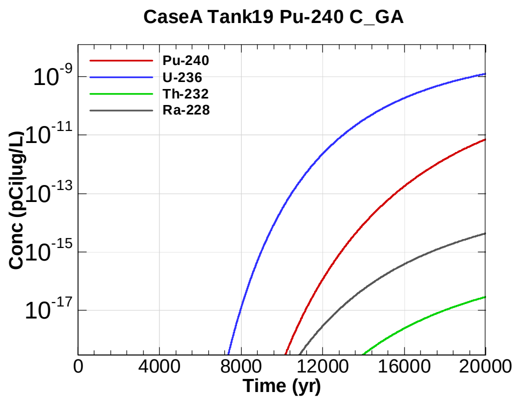

Figure E-2053 - 100m Aquifer Concentration for CaseA Tank19 Pu-240 C_GA

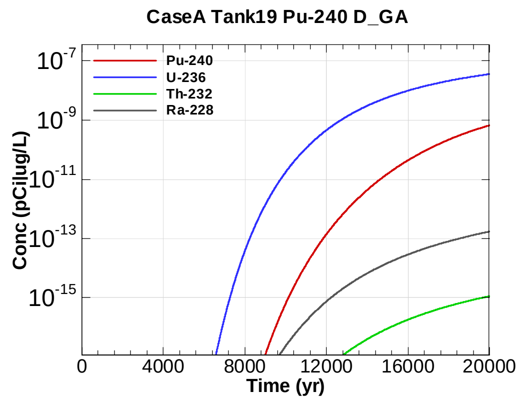

Figure E-2054 - 100m Aquifer Concentration for CaseA Tank19 Pu-240 D_GA

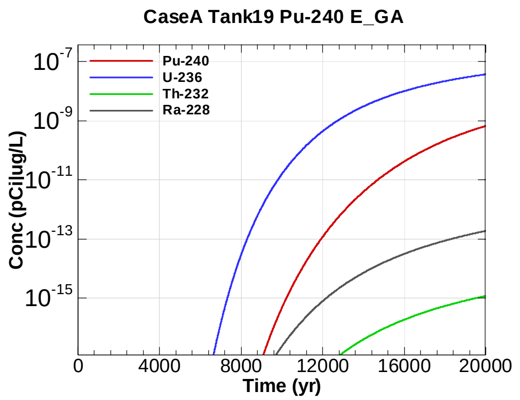

Figure E-2055 - 100m Aquifer Concentration for CaseA Tank19 Pu-240 E_GA

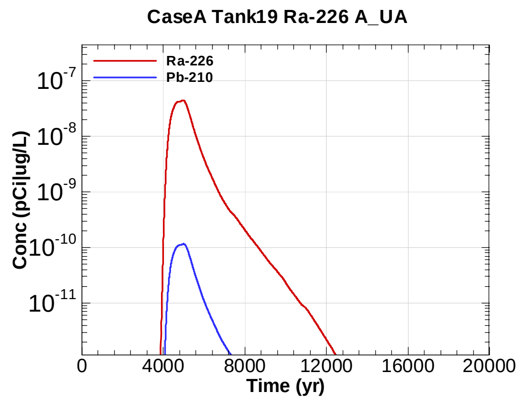

Figure E-2056 - 100m Aquifer Concentration for CaseA Tank19 Ra-226 A_UA

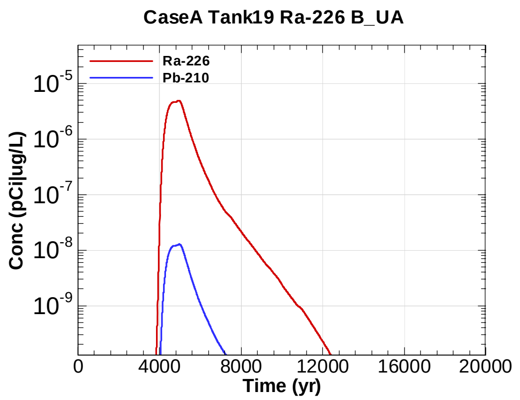

Figure E-2057 - 100m Aquifer Concentration for CaseA Tank19 Ra-226 B_UA

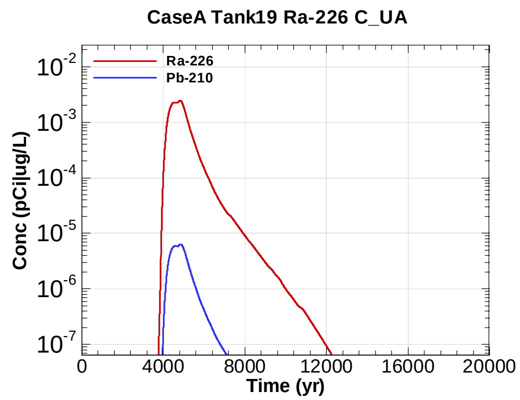

Figure E-2058 - 100m Aquifer Concentration for CaseA Tank19 Ra-226 C_UA

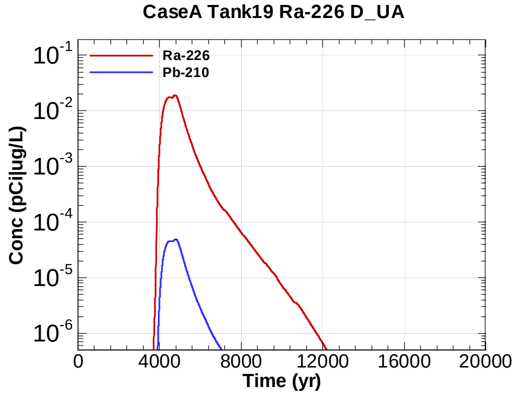

Figure E-2059 - 100m Aquifer Concentration for CaseA Tank19 Ra-226 D_UA

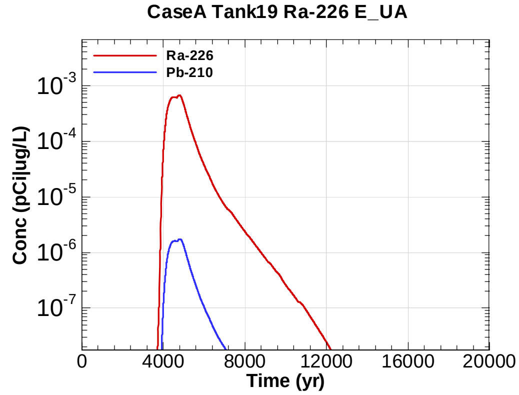

Figure E-2060 - 100m Aquifer Concentration for CaseA Tank19 Ra-226 E_UA

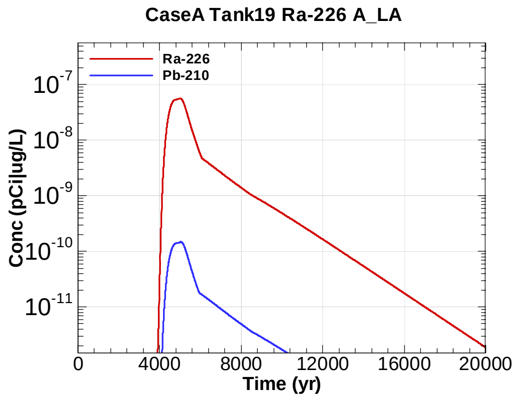

Figure E-2061 - 100m Aquifer Concentration for CaseA Tank19 Ra-226 A_LA

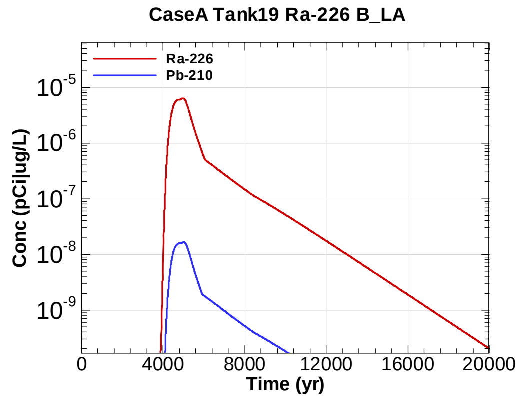

Figure E-2062 - 100m Aquifer Concentration for CaseA Tank19 Ra-226 B_LA

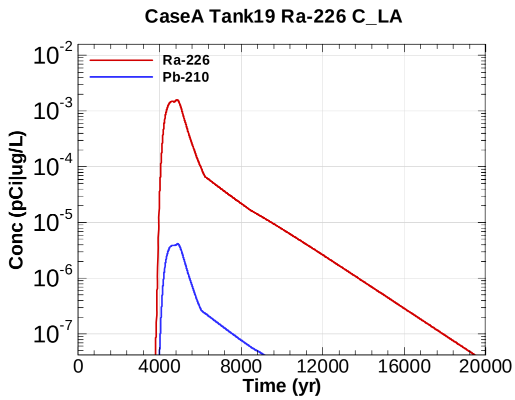

Figure E-2063 - 100m Aquifer Concentration for CaseA Tank19 Ra-226 C_LA

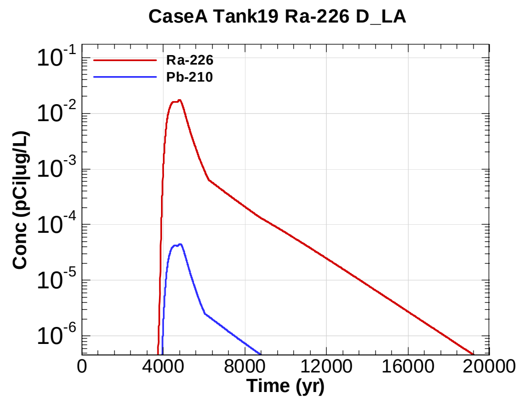

Figure E-2064 - 100m Aquifer Concentration for CaseA Tank19 Ra-226 D_LA

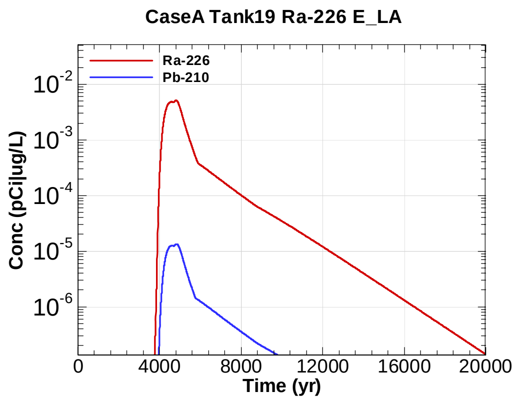

Figure E-2065 - 100m Aquifer Concentration for CaseA Tank19 Ra-226 E_LA

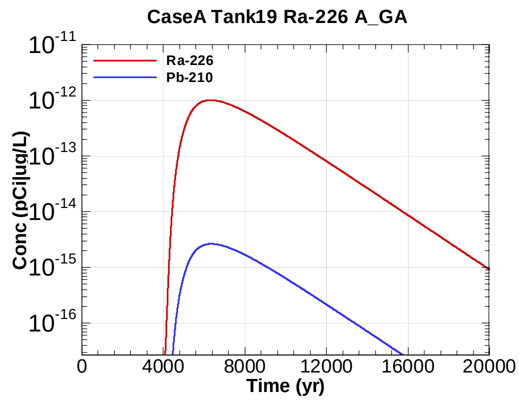

Figure E-2066 - 100m Aquifer Concentration for CaseA Tank19 Ra-226 A_GA

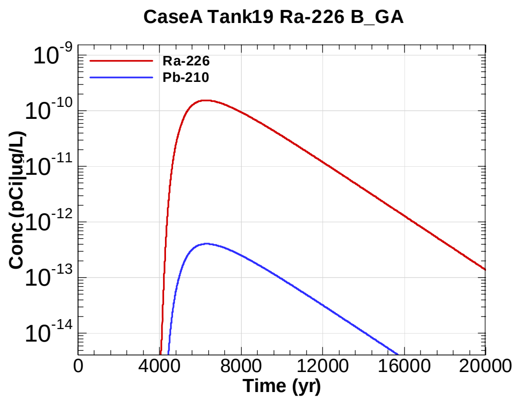

Figure E-2067 - 100m Aquifer Concentration for CaseA Tank19 Ra-226 B_GA

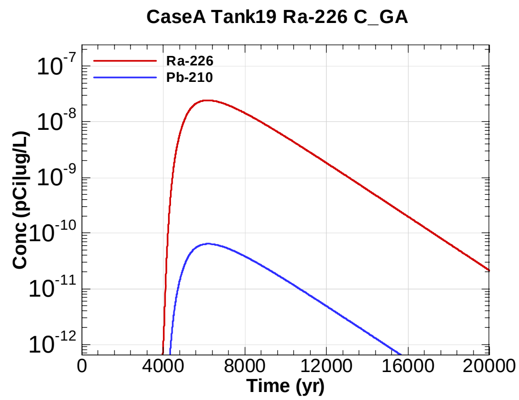

Figure E-2068 - 100m Aquifer Concentration for CaseA Tank19 Ra-226 C_GA

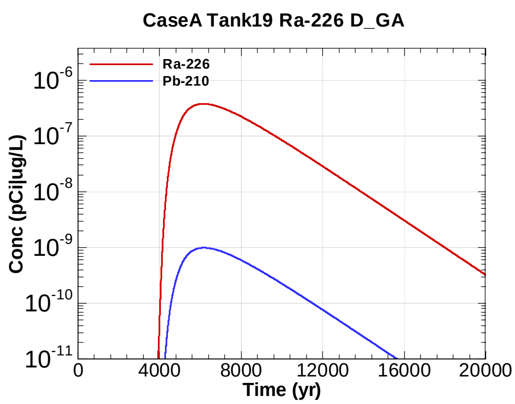

Figure E-2069 - 100m Aquifer Concentration for CaseA Tank19 Ra-226 D_GA

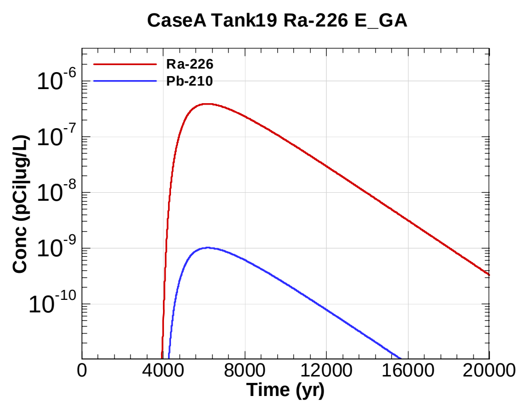

Figure E-2070 - 100m Aquifer Concentration for CaseA Tank19 Ra-226 E_GA

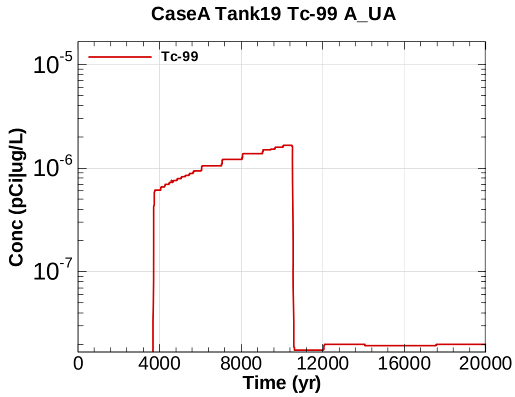

Figure E-2071 - 100m Aquifer Concentration for CaseA Tank19 Tc-99 A_UA

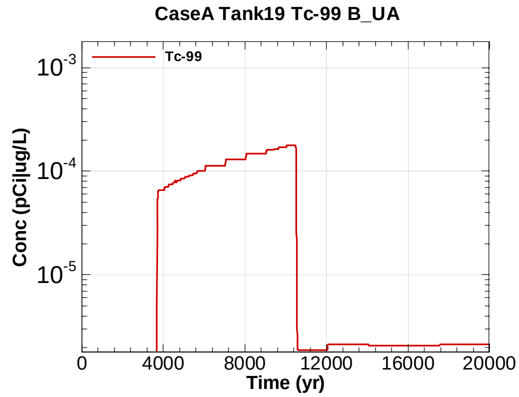

Figure E-2072 - 100m Aquifer Concentration for CaseA Tank19 Tc-99 B_UA

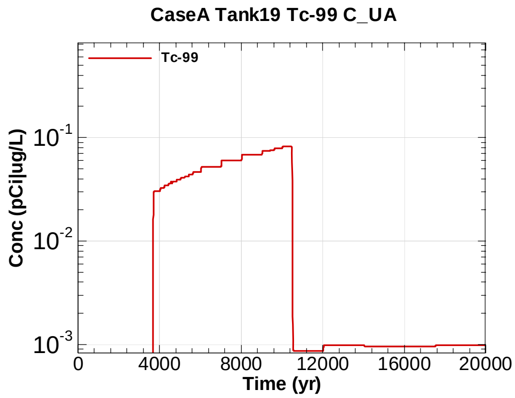

Figure E-2073 - 100m Aquifer Concentration for CaseA Tank19 Tc-99 C_UA

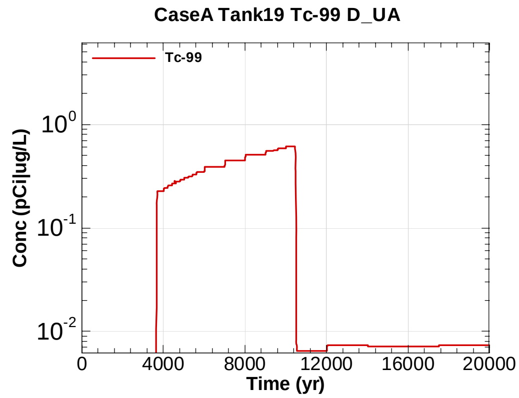

Figure E-2074 - 100m Aquifer Concentration for CaseA Tank19 Tc-99 D_UA

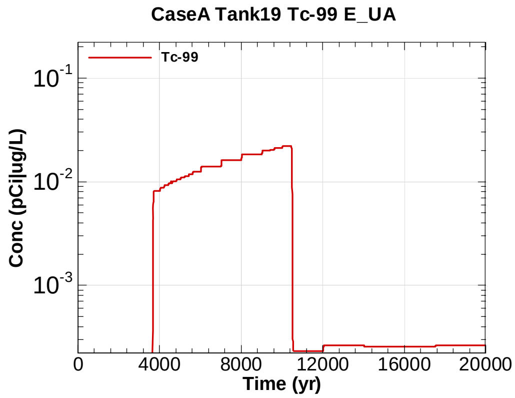

Figure E-2075 - 100m Aquifer Concentration for CaseA Tank19 Tc-99 E_UA

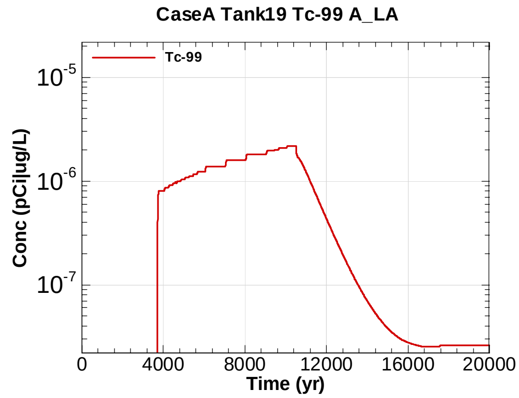

Figure E-2076 - 100m Aquifer Concentration for CaseA Tank19 Tc-99 A_LA

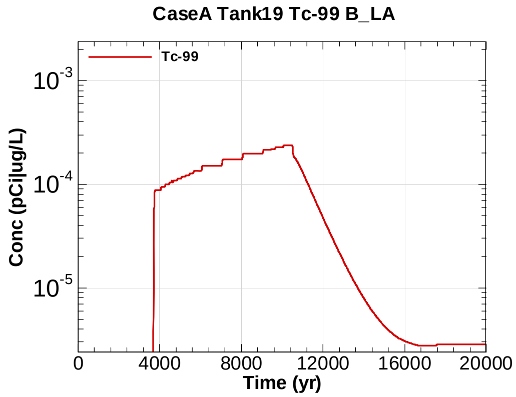

Figure E-2077 - 100m Aquifer Concentration for CaseA Tank19 Tc-99 B_LA

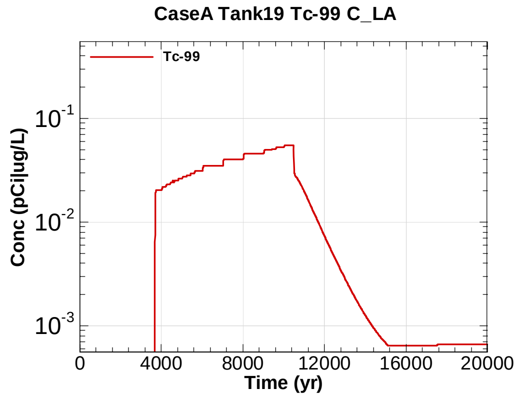

Figure E-2078 - 100m Aquifer Concentration for CaseA Tank19 Tc-99 C_LA

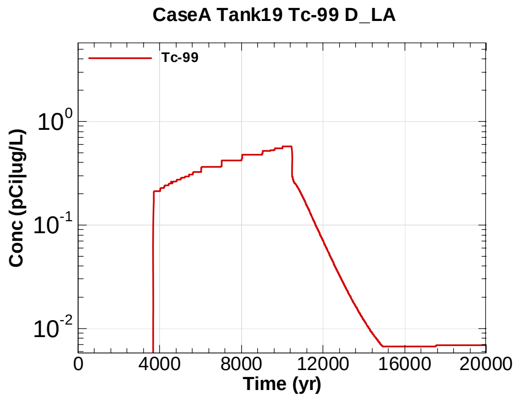

Figure E-2079 - 100m Aquifer Concentration for CaseA Tank19 Tc-99 D_LA

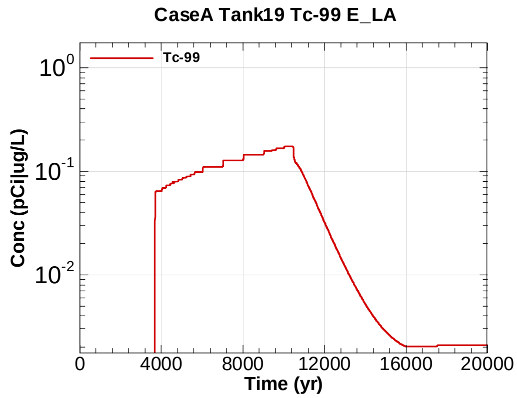

Figure E-2080 - 100m Aquifer Concentration for CaseA Tank19 Tc-99 E_LA

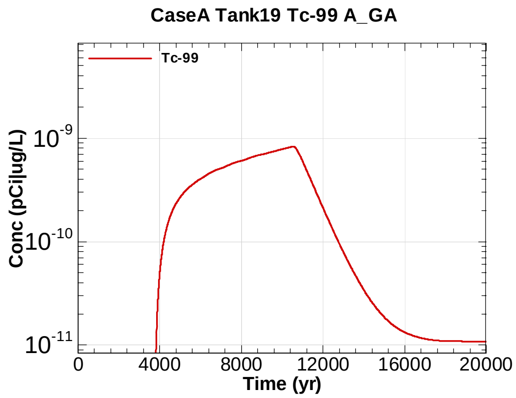

Figure E-2081 - 100m Aquifer Concentration for CaseA Tank19 Tc-99 A_GA

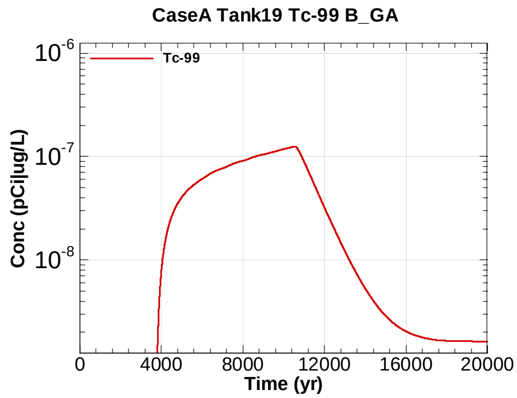

Figure E-2082 - 100m Aquifer Concentration for CaseA Tank19 Tc-99 B_GA

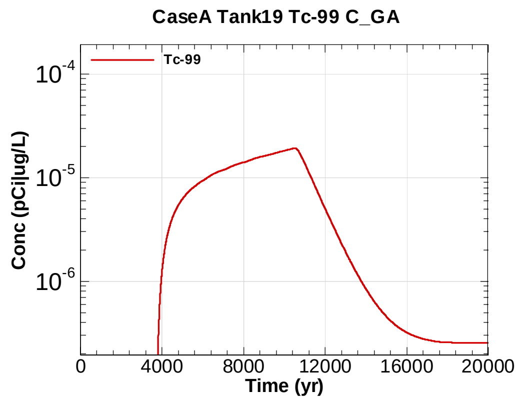

Figure E-2083 - 100m Aquifer Concentration for CaseA Tank19 Tc-99 C_GA

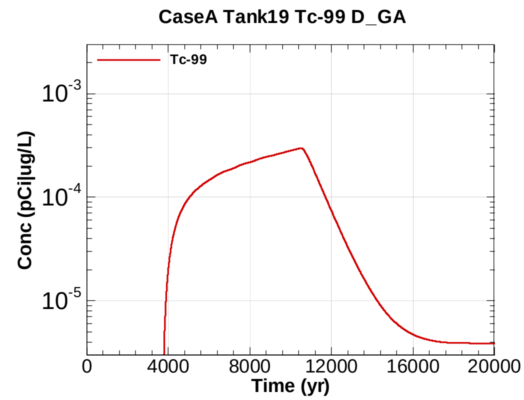

Figure E-2084 - 100m Aquifer Concentration for CaseA Tank19 Tc-99 D_GA

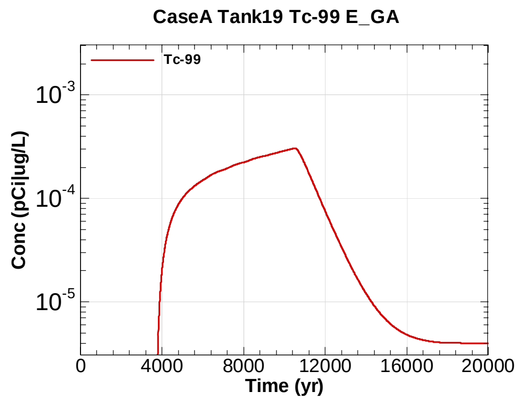

Figure E-2085 - 100m Aquifer Concentration for CaseA Tank19 Tc-99 E_GA

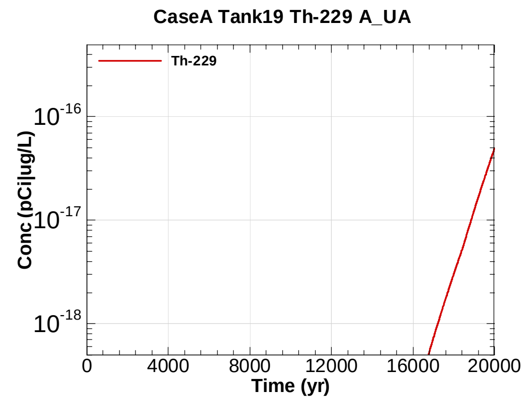

Figure E-2086 - 100m Aquifer Concentration for CaseA Tank19 Th-229 A_UA

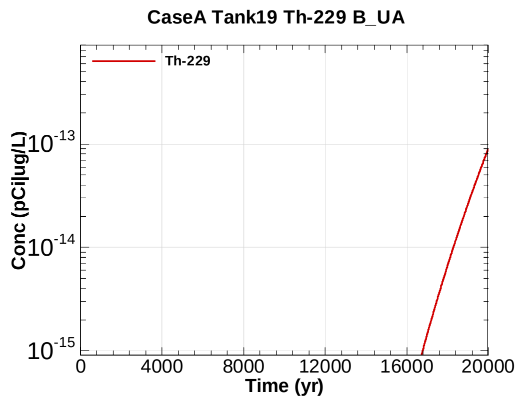

Figure E-2087 - 100m Aquifer Concentration for CaseA Tank19 Th-229 B_UA

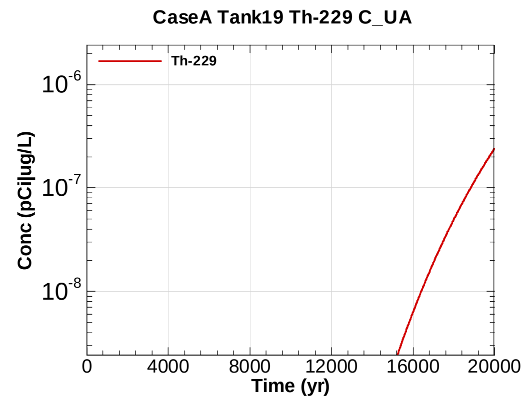

Figure E-2088 - 100m Aquifer Concentration for CaseA Tank19 Th-229 C_UA

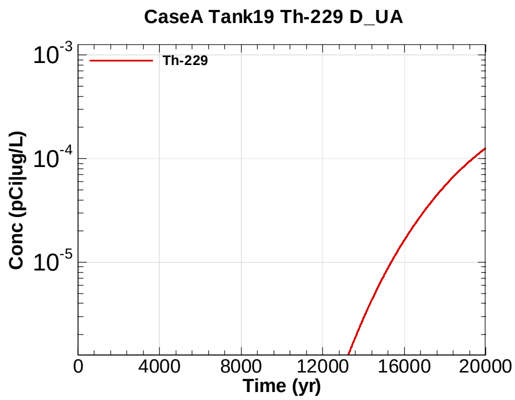

Figure E-2089 - 100m Aquifer Concentration for CaseA Tank19 Th-229 D_UA

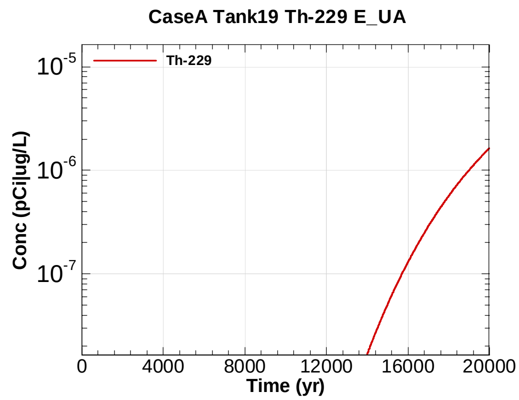

Figure E-2090 - 100m Aquifer Concentration for CaseA Tank19 Th-229 E_UA

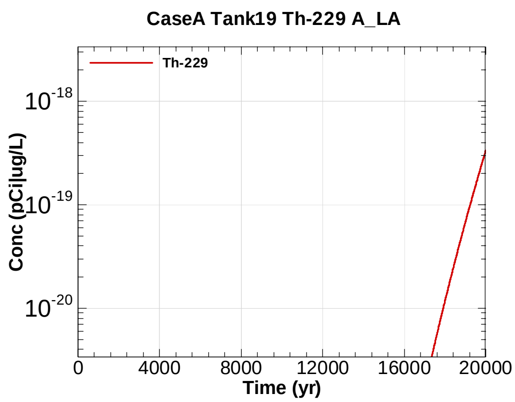

Figure E-2091 - 100m Aquifer Concentration for CaseA Tank19 Th-229 A_LA

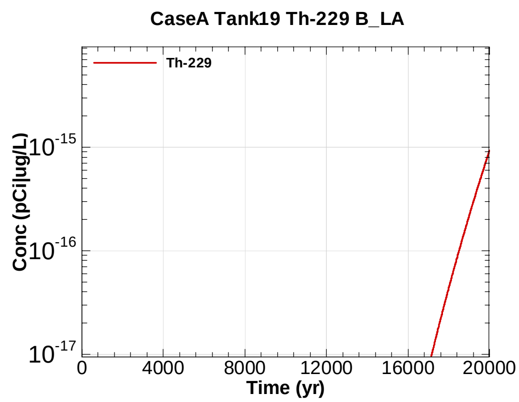

Figure E-2092 - 100m Aquifer Concentration for CaseA Tank19 Th-229 B_LA

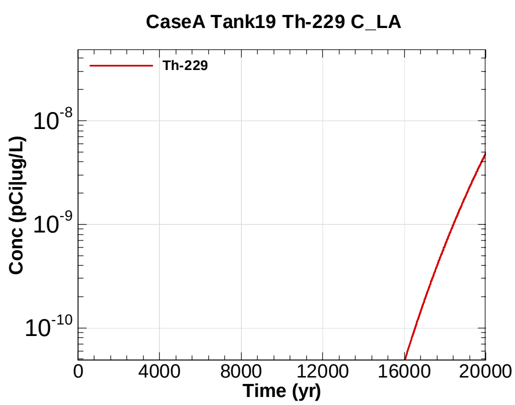

Figure E-2093 - 100m Aquifer Concentration for CaseA Tank19 Th-229 C_LA

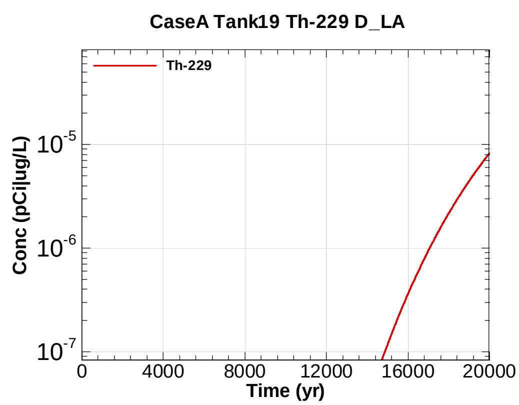

Figure E-2094 - 100m Aquifer Concentration for CaseA Tank19 Th-229 D_LA

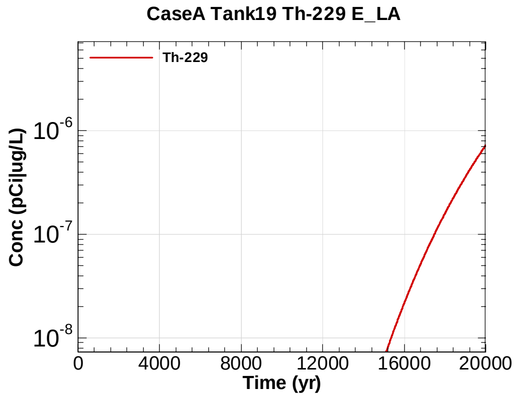

Figure E-2095 - 100m Aquifer Concentration for CaseA Tank19 Th-229 E_LA

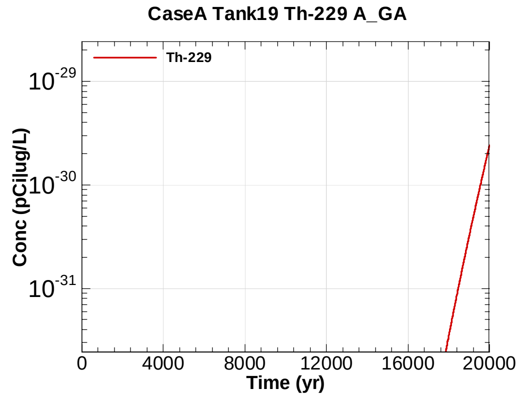

Figure E-2096 - 100m Aquifer Concentration for CaseA Tank19 Th-229 A_GA

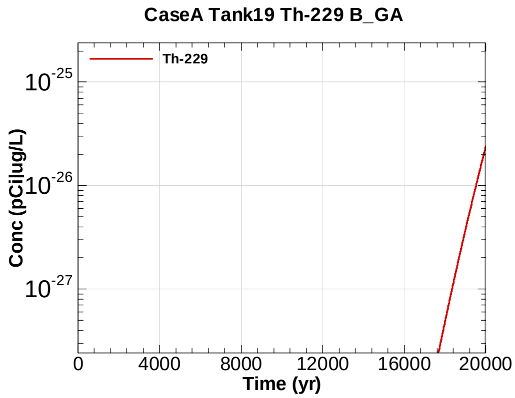

Figure E-2097 - 100m Aquifer Concentration for CaseA Tank19 Th-229 B_GA

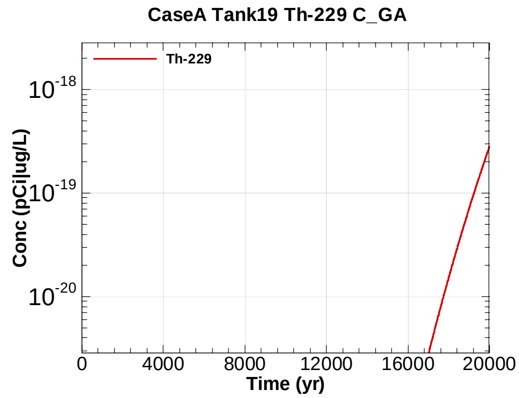

Figure E-2098 - 100m Aquifer Concentration for CaseA Tank19 Th-229 C_GA

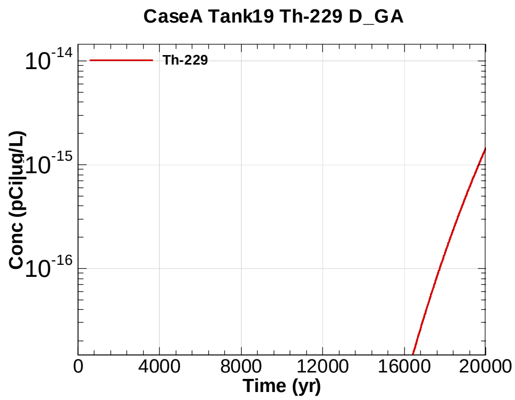

Figure E-2099 - 100m Aquifer Concentration for CaseA Tank19 Th-229 D_GA

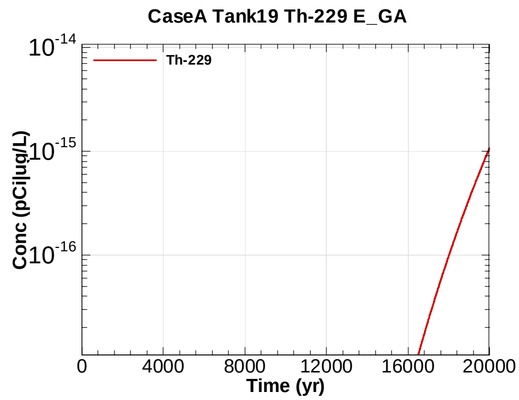

Figure E-2100 - 100m Aquifer Concentration for CaseA Tank19 Th-229 E_GA

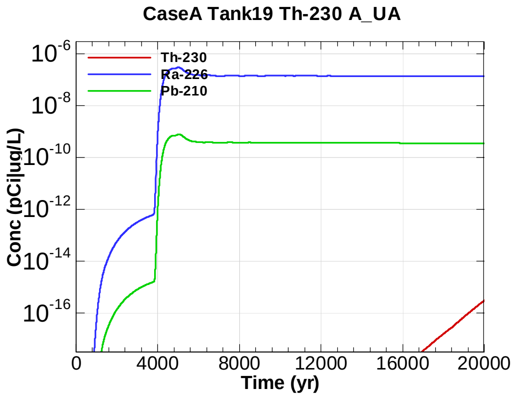

Figure E-2101 - 100m Aquifer Concentration for CaseA Tank19 Th-230 A_UA

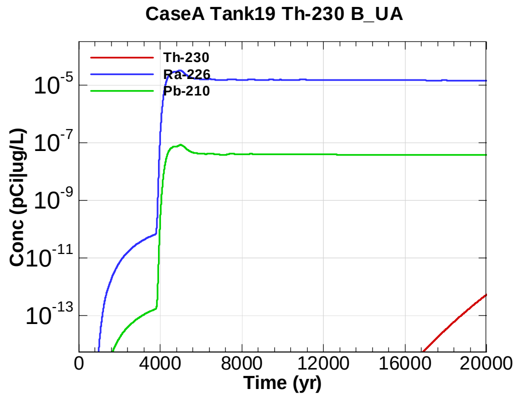

Figure E-2102 - 100m Aquifer Concentration for CaseA Tank19 Th-230 B_UA

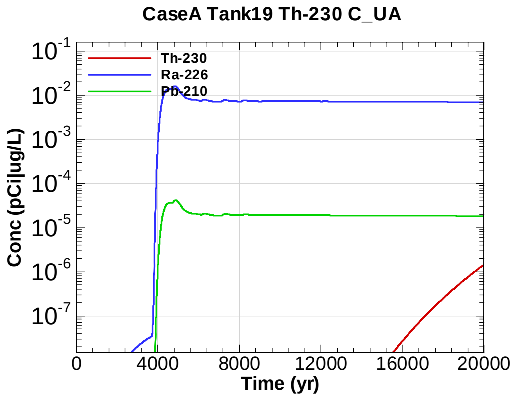

Figure E-2103 - 100m Aquifer Concentration for CaseA Tank19 Th-230 C_UA

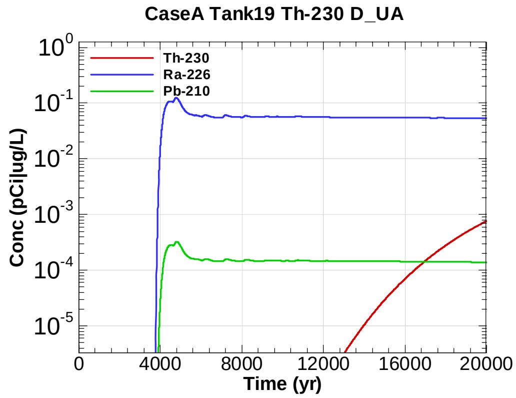

Figure E-2104 - 100m Aquifer Concentration for CaseA Tank19 Th-230 D_UA

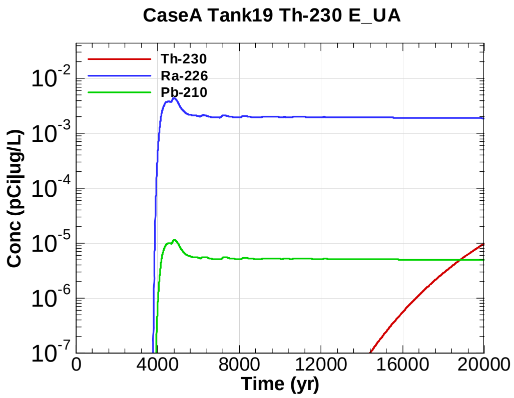

Figure E-2105 - 100m Aquifer Concentration for CaseA Tank19 Th-230 E_UA

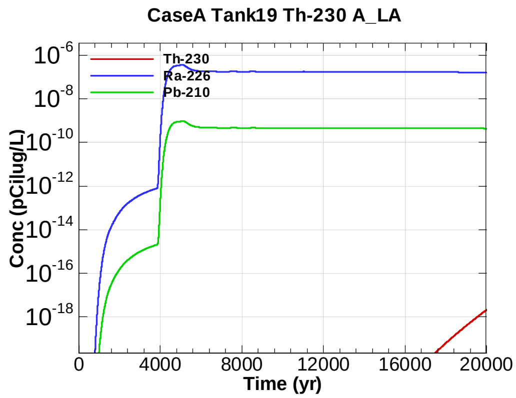

Figure E-2106 - 100m Aquifer Concentration for CaseA Tank19 Th-230 A_LA

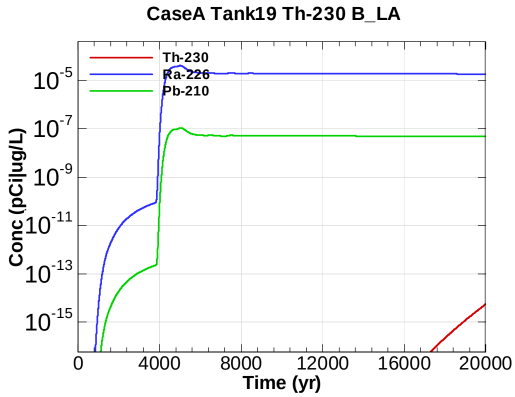

Figure E-2107 - 100m Aquifer Concentration for CaseA Tank19 Th-230 B_LA

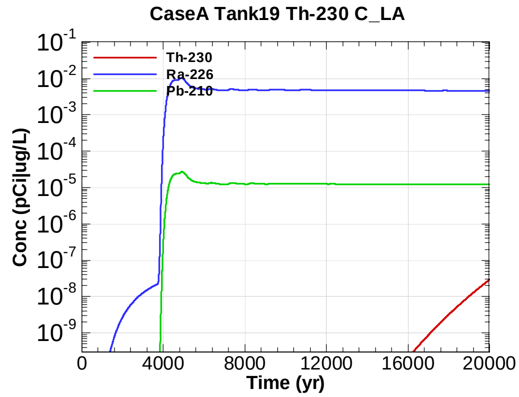

Figure E-2108 - 100m Aquifer Concentration for CaseA Tank19 Th-230 C_LA

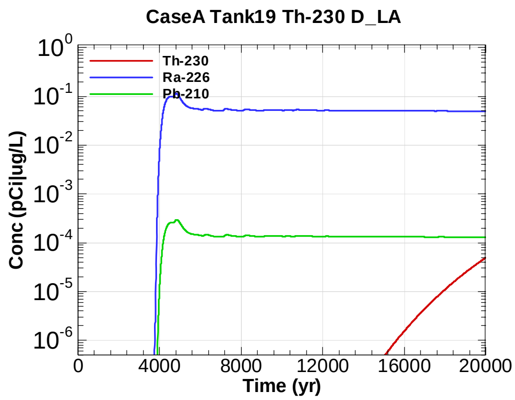

Figure E-2109 - 100m Aquifer Concentration for CaseA Tank19 Th-230 D_LA

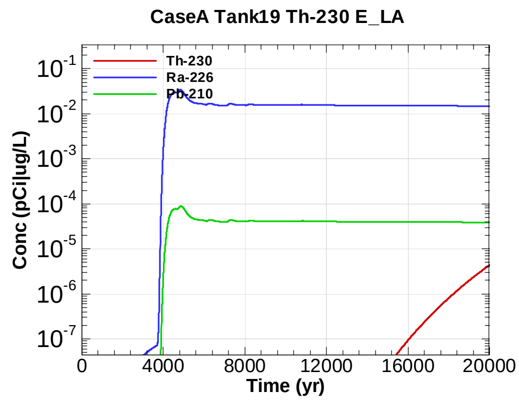

Figure E-2110 - 100m Aquifer Concentration for CaseA Tank19 Th-230 E_LA

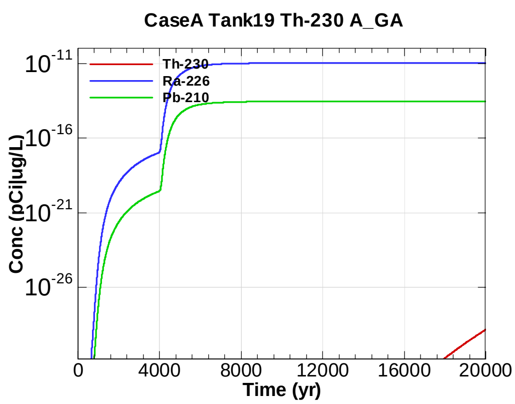

Figure E-2111 - 100m Aquifer Concentration for CaseA Tank19 Th-230 A_GA

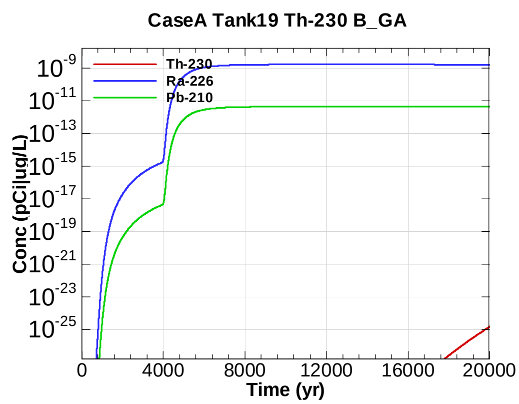

Figure E-2112 - 100m Aquifer Concentration for CaseA Tank19 Th-230 B_GA

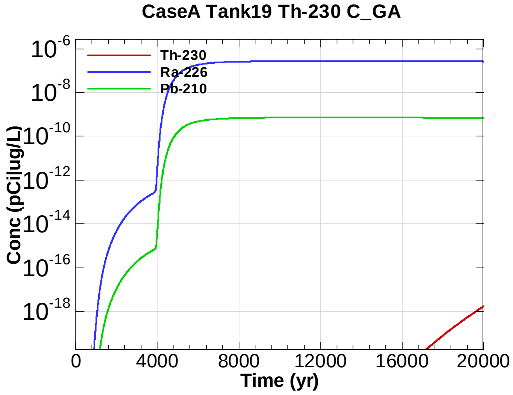

Figure E-2113 - 100m Aquifer Concentration for CaseA Tank19 Th-230 C_GA

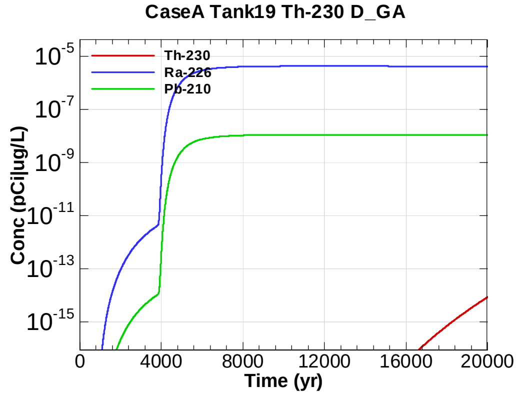

Figure E-2114 - 100m Aquifer Concentration for CaseA Tank19 Th-230 D_GA

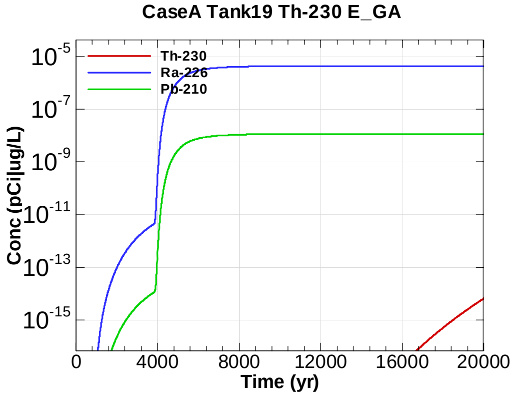

Figure E-2115 - 100m Aquifer Concentration for CaseA Tank19 Th-230 E_GA

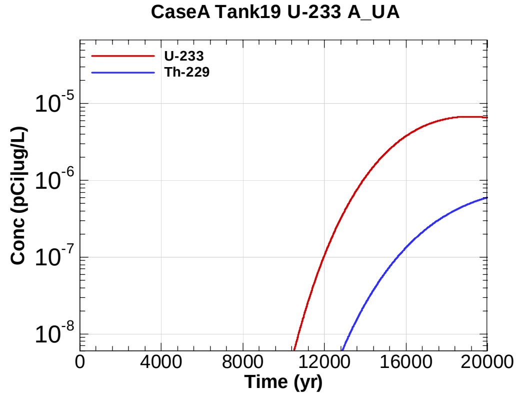

Figure E-2116 - 100m Aquifer Concentration for CaseA Tank19 U-233 A_UA

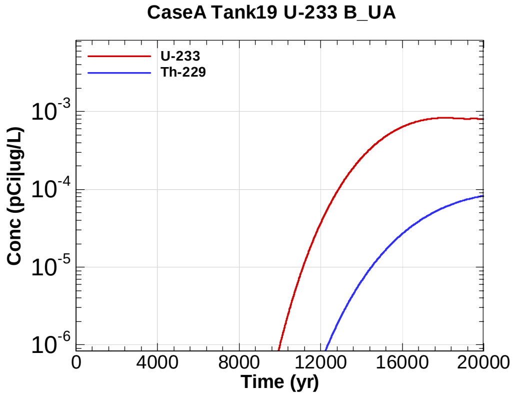

Figure E-2117 - 100m Aquifer Concentration for CaseA Tank19 U-233 B_UA

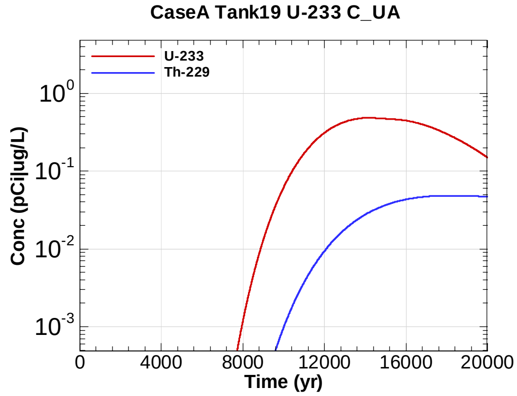

Figure E-2118 - 100m Aquifer Concentration for CaseA Tank19 U-233 C_UA

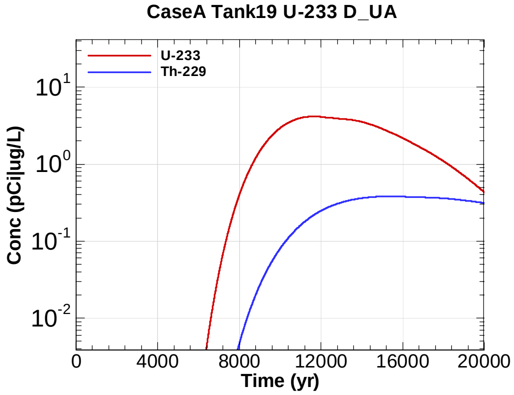

Figure E-2119 - 100m Aquifer Concentration for CaseA Tank19 U-233 D_UA

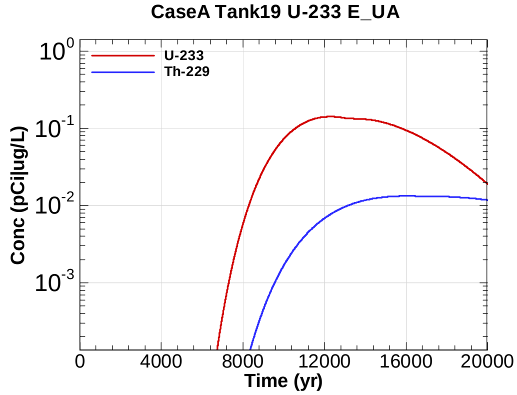

Figure E-2120 - 100m Aquifer Concentration for CaseA Tank19 U-233 E_UA

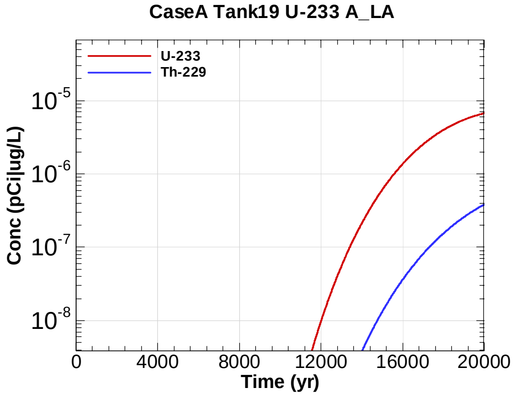

Figure E-2121 - 100m Aquifer Concentration for CaseA Tank19 U-233 A_LA

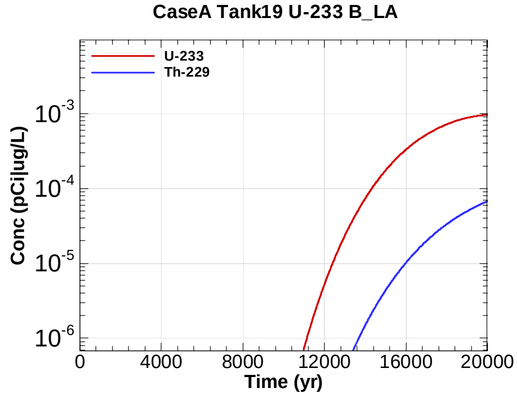

Figure E-2122 - 100m Aquifer Concentration for CaseA Tank19 U-233 B_LA

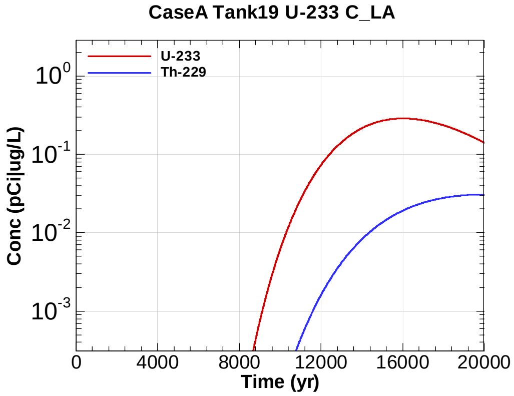

Figure E-2123 - 100m Aquifer Concentration for CaseA Tank19 U-233 C_LA

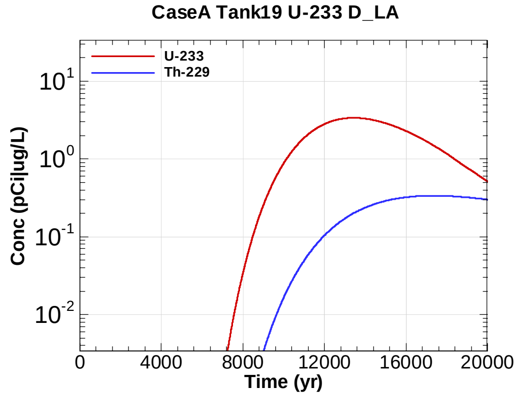

Figure E-2124 - 100m Aquifer Concentration for CaseA Tank19 U-233 D_LA

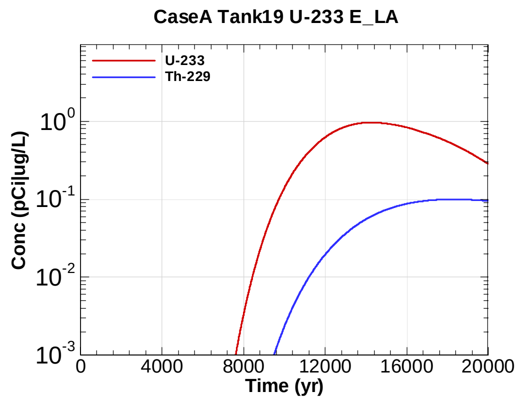

Figure E-2125 - 100m Aquifer Concentration for CaseA Tank19 U-233 E_LA

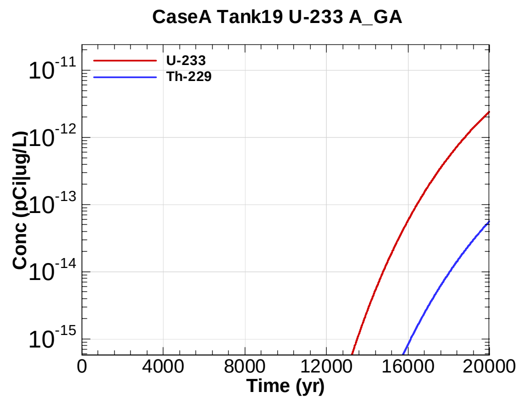

Figure E-2126 - 100m Aquifer Concentration for CaseA Tank19 U-233 A_GA

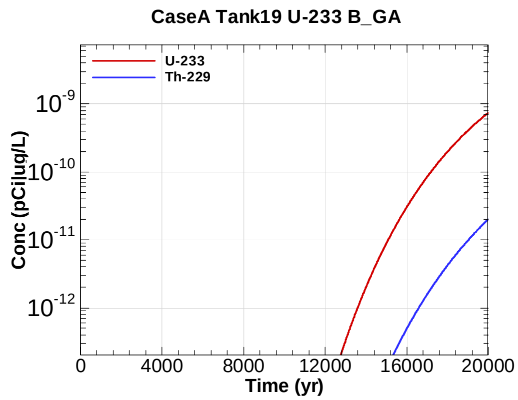

Figure E-2127 - 100m Aquifer Concentration for CaseA Tank19 U-233 B_GA

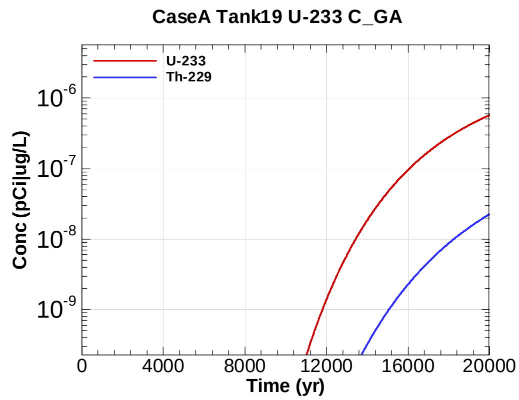

Figure E-2128 - 100m Aquifer Concentration for CaseA Tank19 U-233 C_GA

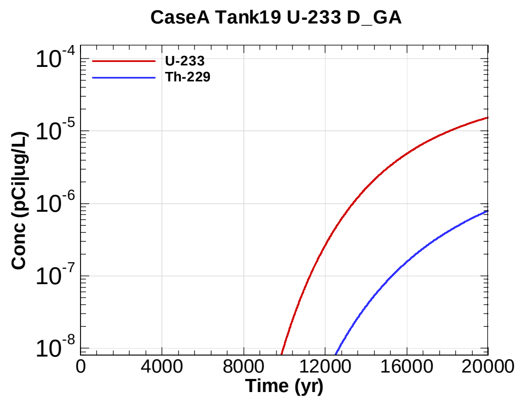

Figure E-2129 - 100m Aquifer Concentration for CaseA Tank19 U-233 D_GA

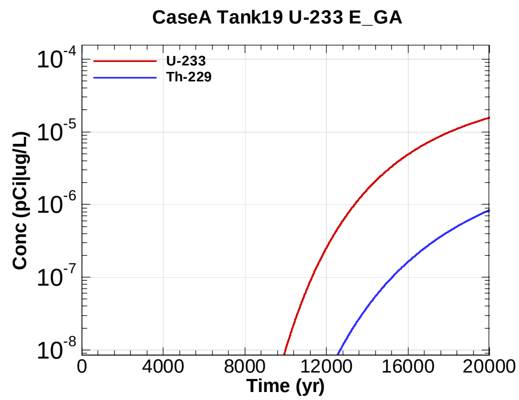

Figure E-2130 - 100m Aquifer Concentration for CaseA Tank19 U-233 E_GA

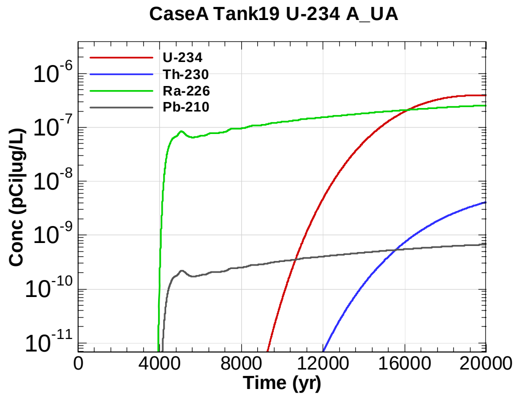

Figure E-2131 - 100m Aquifer Concentration for CaseA Tank19 U-234 A_UA

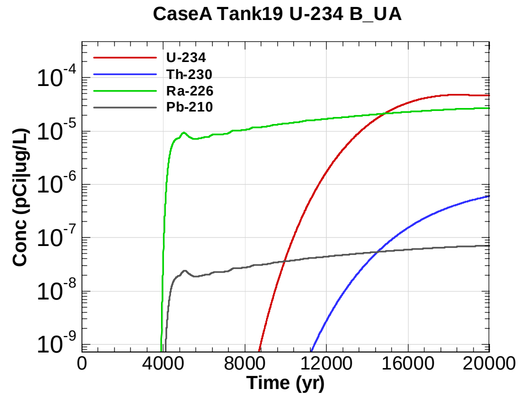

Figure E-2132 - 100m Aquifer Concentration for CaseA Tank19 U-234 B_UA

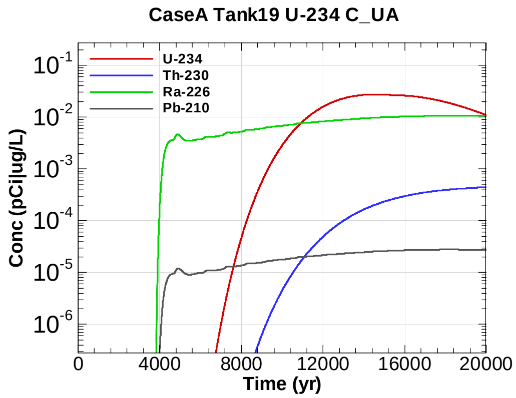

Figure E-2133 - 100m Aquifer Concentration for CaseA Tank19 U-234 C_UA

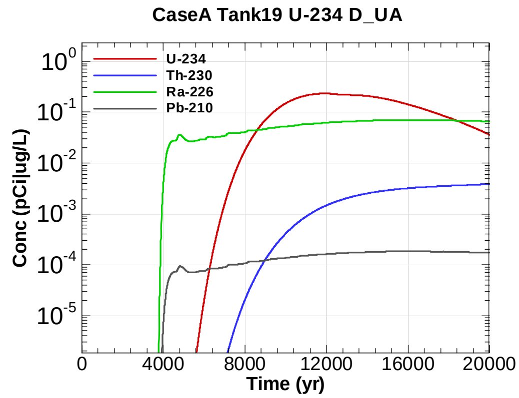

Figure E-2134 - 100m Aquifer Concentration for CaseA Tank19 U-234 D_UA

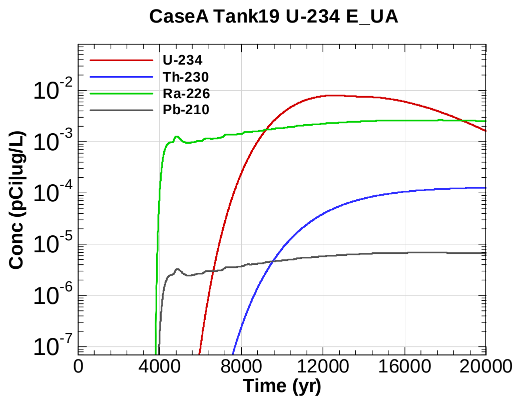

Figure E-2135 - 100m Aquifer Concentration for CaseA Tank19 U-234 E_UA

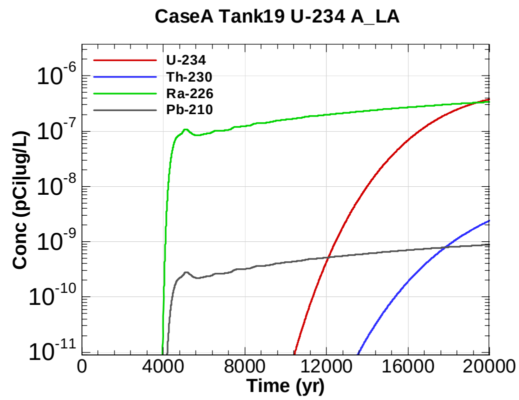

Figure E-2136 - 100m Aquifer Concentration for CaseA Tank19 U-234 A_LA

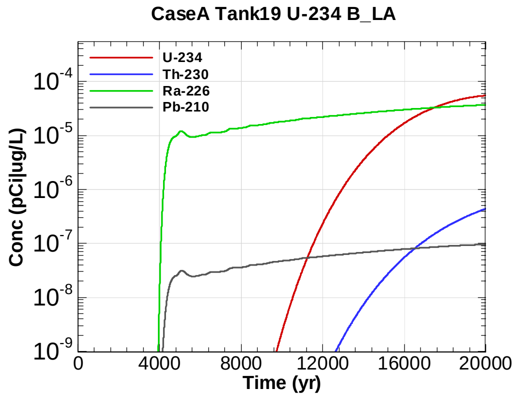

Figure E-2137 - 100m Aquifer Concentration for CaseA Tank19 U-234 B_LA

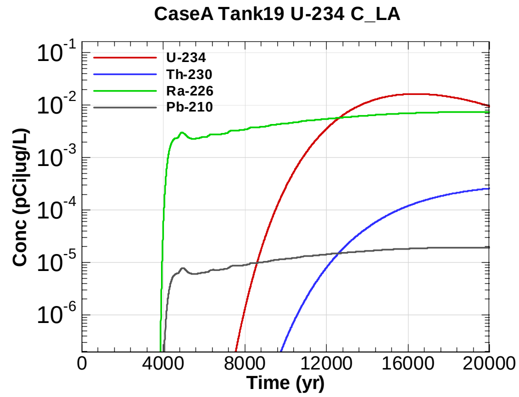

Figure E-2138 - 100m Aquifer Concentration for CaseA Tank19 U-234 C_LA

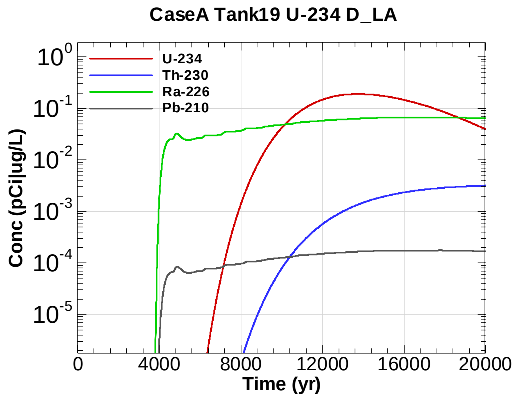

Figure E-2139 - 100m Aquifer Concentration for CaseA Tank19 U-234 D_LA

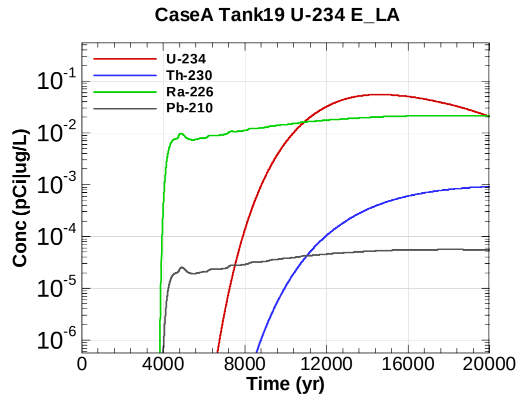

Figure E-2140 - 100m Aquifer Concentration for CaseA Tank19 U-234 E_LA

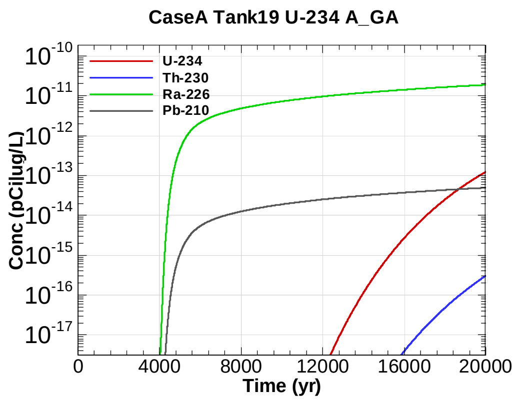

Figure E-2141 - 100m Aquifer Concentration for CaseA Tank19 U-234 A_GA

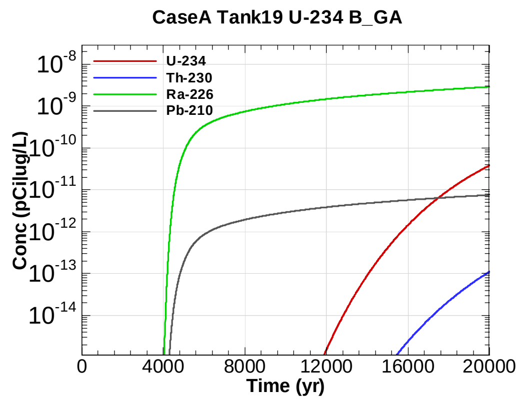

Figure E-2142 - 100m Aquifer Concentration for CaseA Tank19 U-234 B_GA

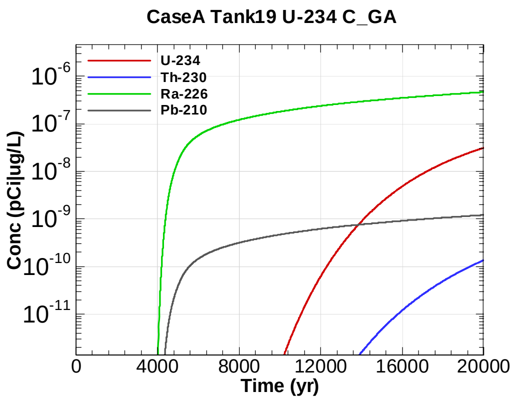

Figure E-2143 - 100m Aquifer Concentration for CaseA Tank19 U-234 C_GA

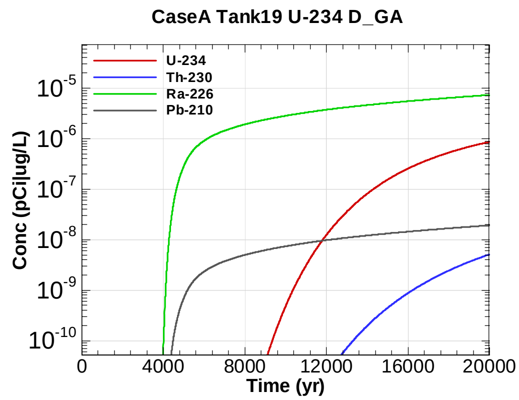

Figure E-2144 - 100m Aquifer Concentration for CaseA Tank19 U-234 D_GA

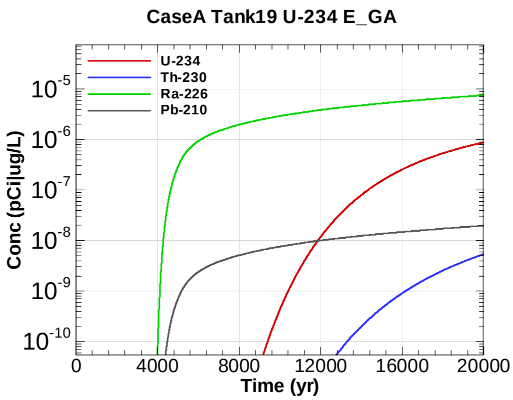

Figure E-2145 - 100m Aquifer Concentration for CaseA Tank19 U-234 E_GA

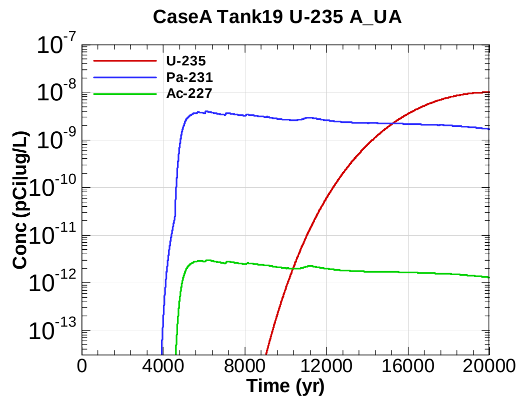

Figure E-2146 - 100m Aquifer Concentration for CaseA Tank19 U-235 A_UA

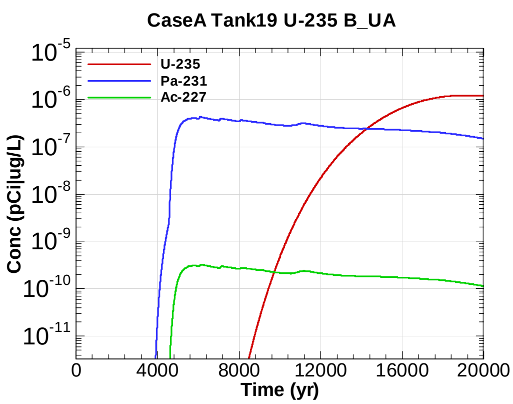

Figure E-2147 - 100m Aquifer Concentration for CaseA Tank19 U-235 B_UA

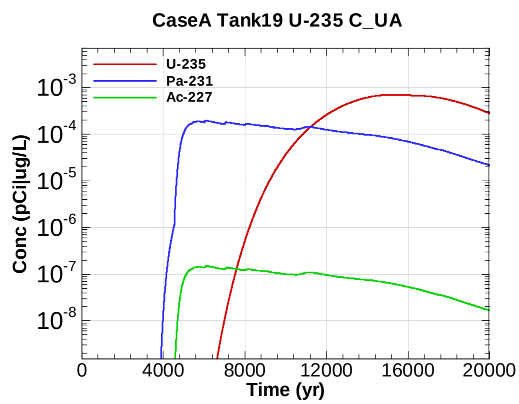

Figure E-2148 - 100m Aquifer Concentration for CaseA Tank19 U-235 C_UA

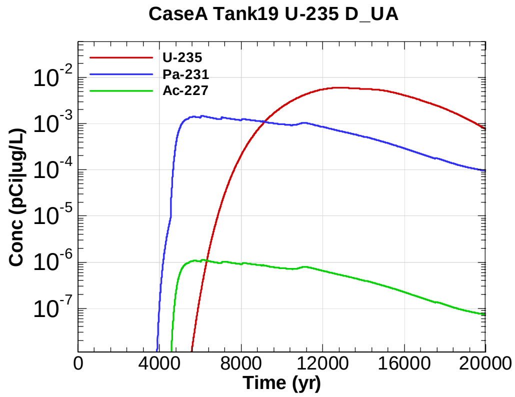

Figure E-2149 - 100m Aquifer Concentration for CaseA Tank19 U-235 D_UA

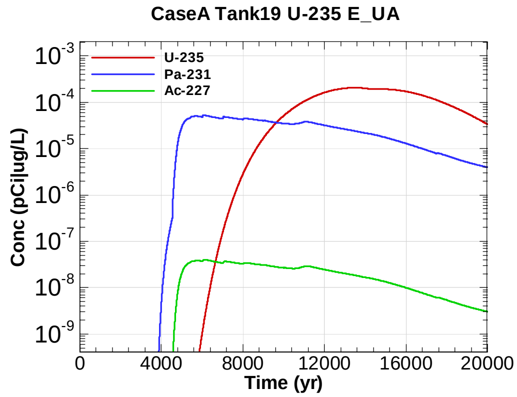

Figure E-2150 - 100m Aquifer Concentration for CaseA Tank19 U-235 E_UA

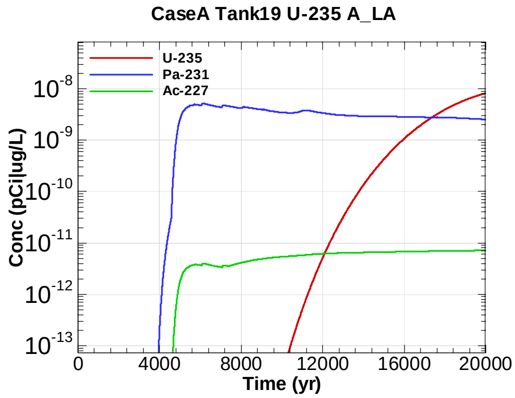

Figure E-2151 - 100m Aquifer Concentration for CaseA Tank19 U-235 A_LA

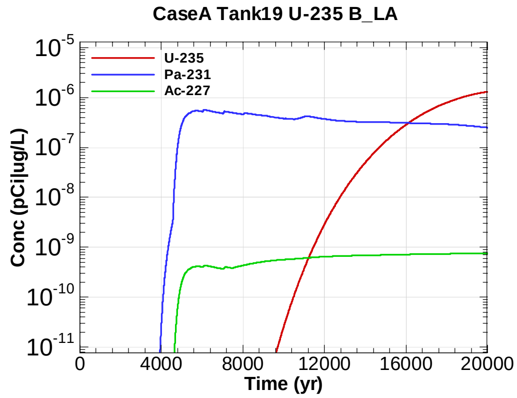

Figure E-2152 - 100m Aquifer Concentration for CaseA Tank19 U-235 B_LA

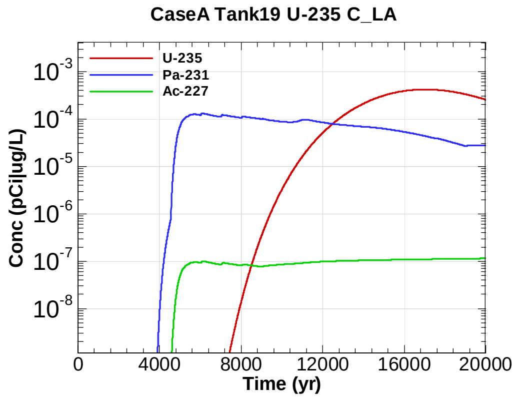

Figure E-2153 - 100m Aquifer Concentration for CaseA Tank19 U-235 C_LA

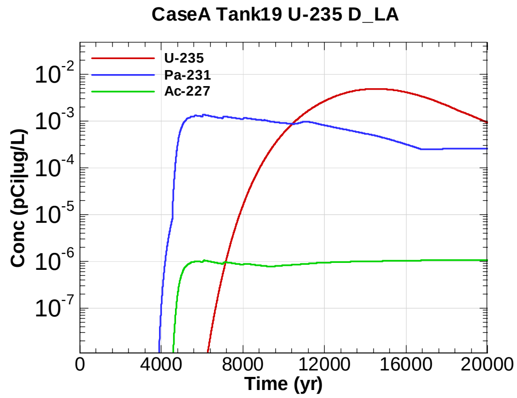

Figure E-2154 - 100m Aquifer Concentration for CaseA Tank19 U-235 D_LA

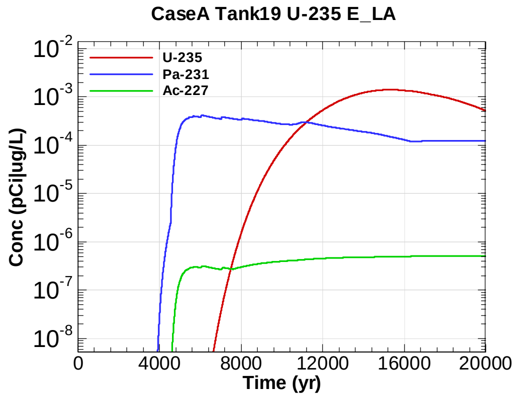

Figure E-2155 - 100m Aquifer Concentration for CaseA Tank19 U-235 E_LA

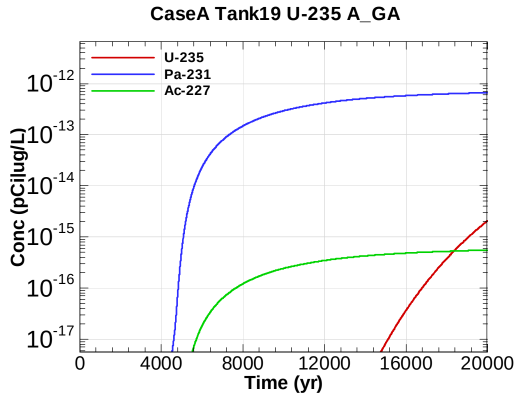

Figure E-2156 - 100m Aquifer Concentration for CaseA Tank19 U-235 A_GA

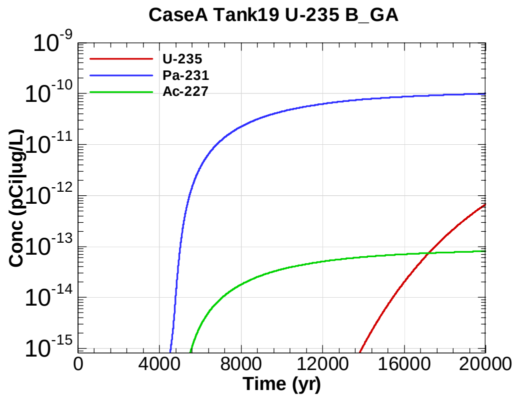

Figure E-2157 - 100m Aquifer Concentration for CaseA Tank19 U-235 B_GA

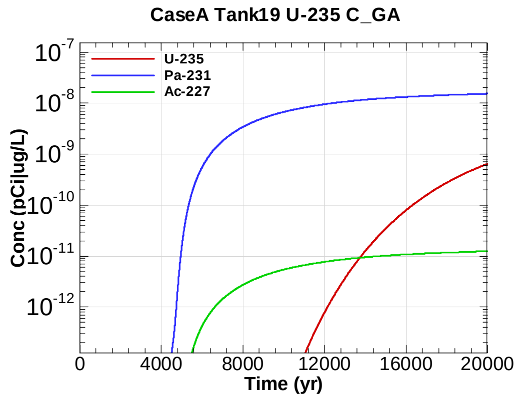

Figure E-2158 - 100m Aquifer Concentration for CaseA Tank19 U-235 C_GA

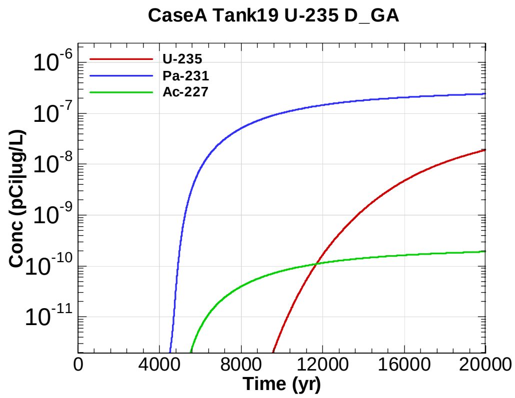

Figure E-2159 - 100m Aquifer Concentration for CaseA Tank19 U-235 D_GA

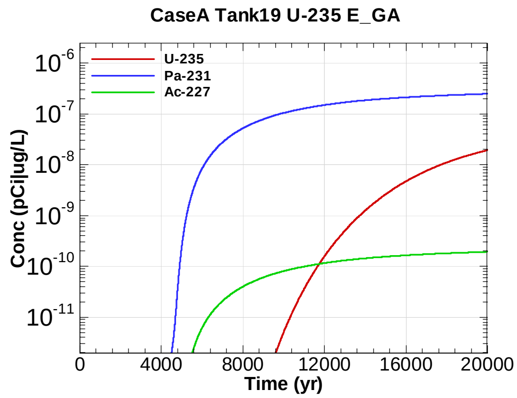

Figure E-2160 - 100m Aquifer Concentration for CaseA Tank19 U-235 E_GA

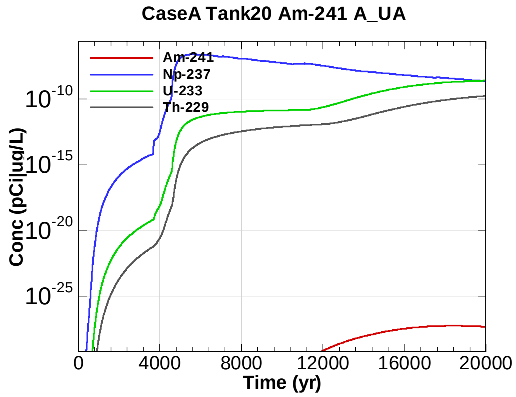

Figure E-2161 - 100m Aquifer Concentration for CaseA Tank20 Am-241 A_UA

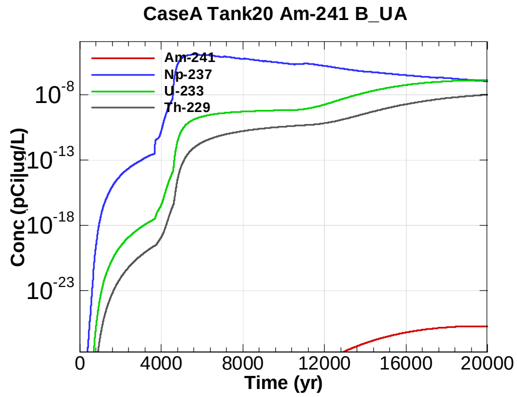

Figure E-2162 - 100m Aquifer Concentration for CaseA Tank20 Am-241 B_UA

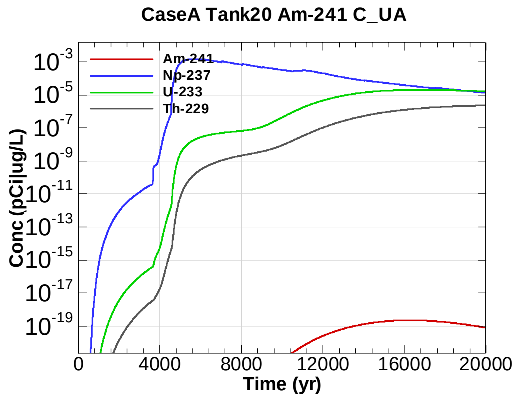

Figure E-2163 - 100m Aquifer Concentration for CaseA Tank20 Am-241 C_UA

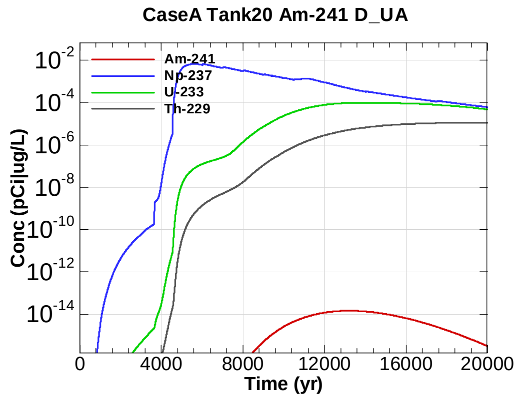

Figure E-2164 - 100m Aquifer Concentration for CaseA Tank20 Am-241 D_UA

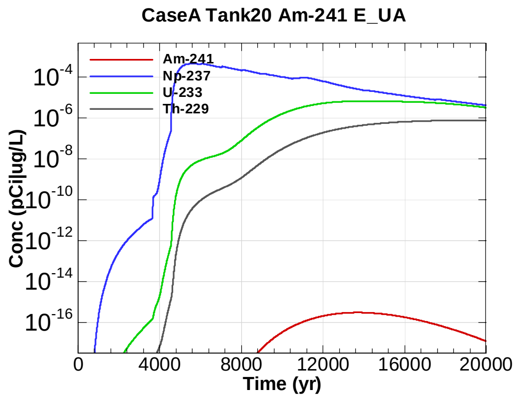

Figure E-2165 - 100m Aquifer Concentration for CaseA Tank20 Am-241 E_UA

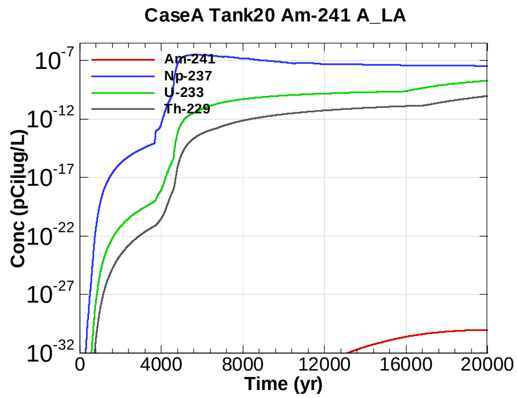

Figure E-2166 - 100m Aquifer Concentration for CaseA Tank20 Am-241 A_LA

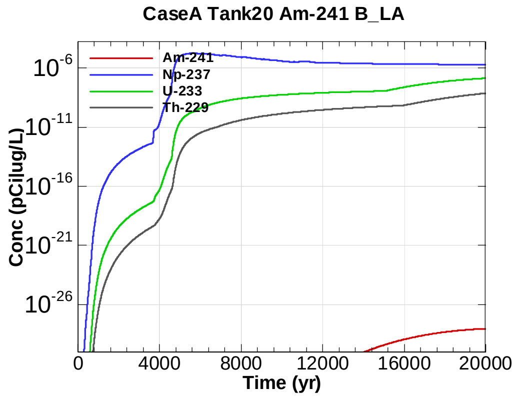

Figure E-2167 - 100m Aquifer Concentration for CaseA Tank20 Am-241 B_LA

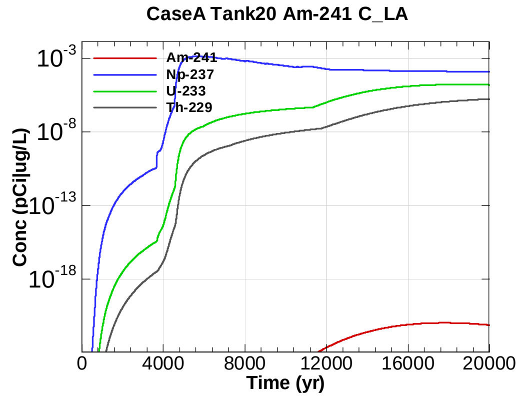

Figure E-2168 - 100m Aquifer Concentration for CaseA Tank20 Am-241 C_LA

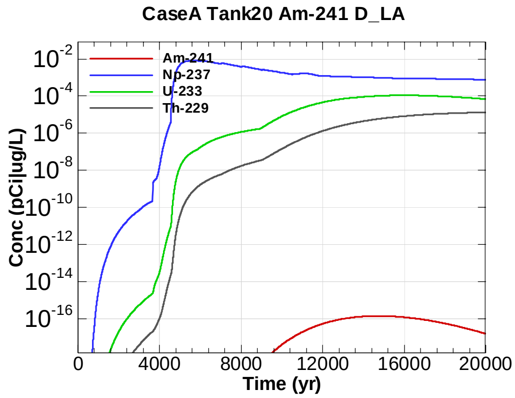

Figure E-2169 - 100m Aquifer Concentration for CaseA Tank20 Am-241 D_LA

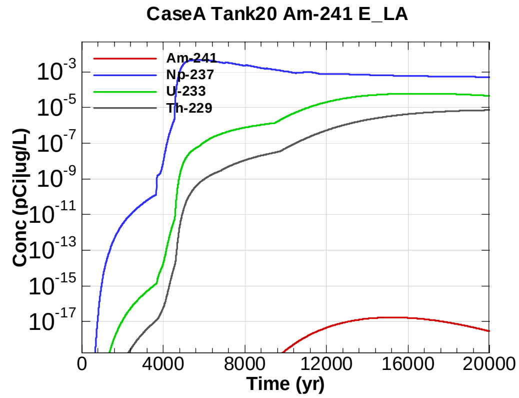

Figure E-2170 - 100m Aquifer Concentration for CaseA Tank20 Am-241 E_LA

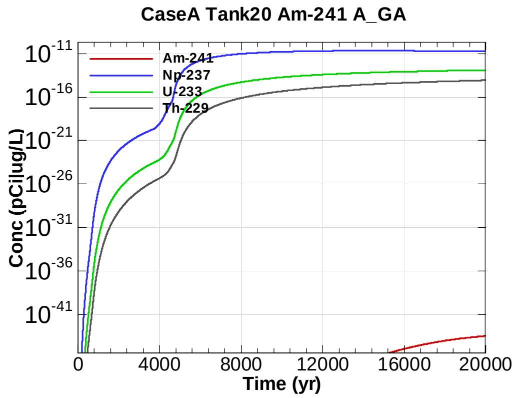

Figure E-2171 - 100m Aquifer Concentration for CaseA Tank20 Am-241 A_GA

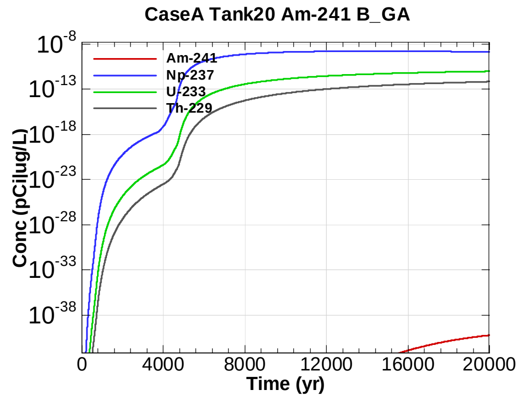

Figure E-2172 - 100m Aquifer Concentration for CaseA Tank20 Am-241 B_GA

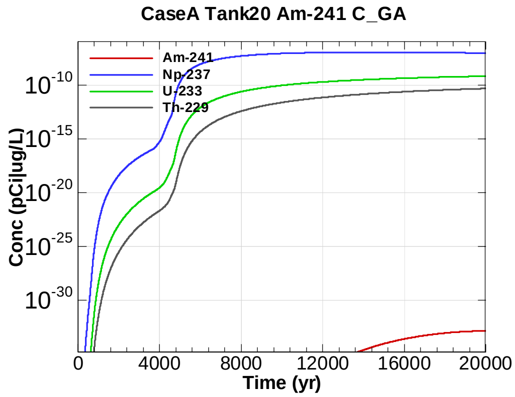

Figure E-2173 - 100m Aquifer Concentration for CaseA Tank20 Am-241 C_GA

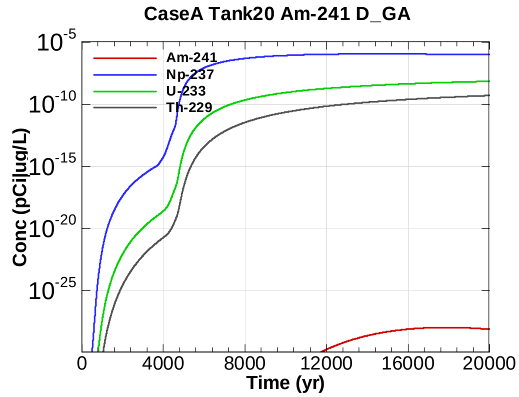

Figure E-2174 - 100m Aquifer Concentration for CaseA Tank20 Am-241 D_GA

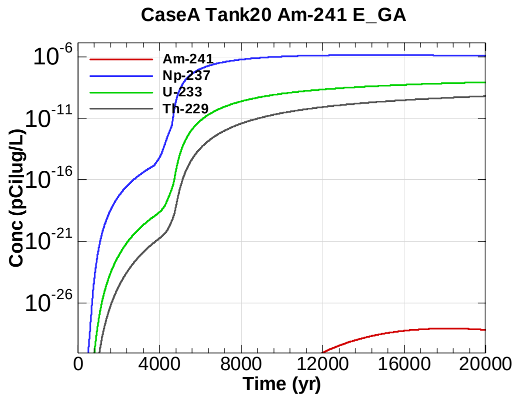

Figure E-2175 - 100m Aquifer Concentration for CaseA Tank20 Am-241 E_GA

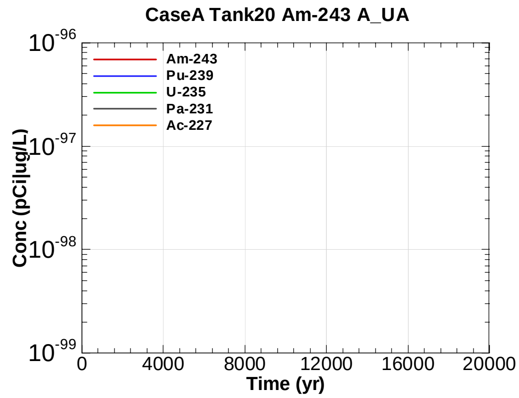

Figure E-2176 - 100m Aquifer Concentration for CaseA Tank20 Am-243 A_UA

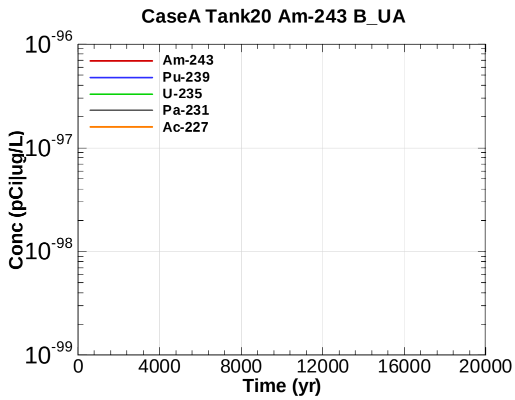

Figure E-2177 - 100m Aquifer Concentration for CaseA Tank20 Am-243 B_UA

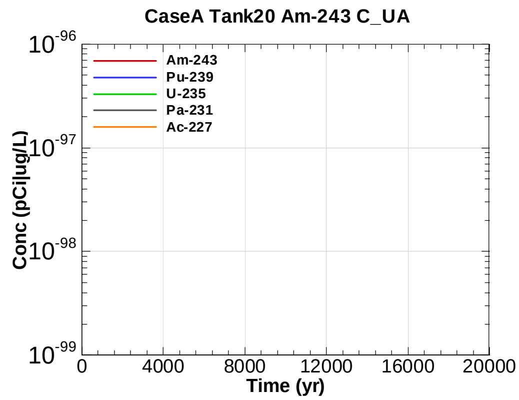

Figure E-2178 - 100m Aquifer Concentration for CaseA Tank20 Am-243 C_UA

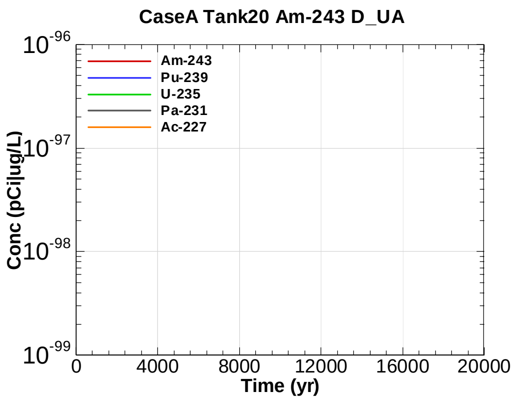

Figure E-2179 - 100m Aquifer Concentration for CaseA Tank20 Am-243 D_UA

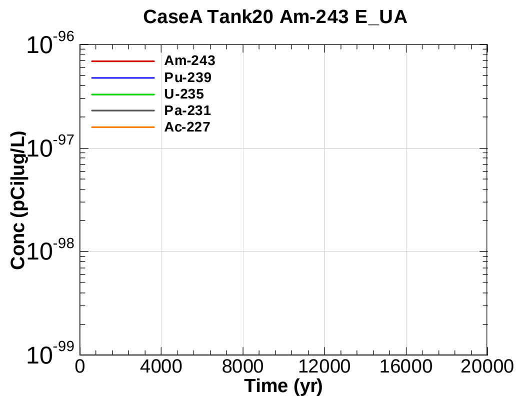

Figure E-2180 - 100m Aquifer Concentration for CaseA Tank20 Am-243 E_UA

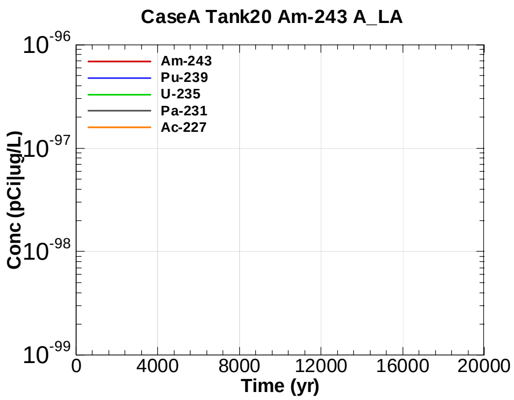

Figure E-2181 - 100m Aquifer Concentration for CaseA Tank20 Am-243 A_LA

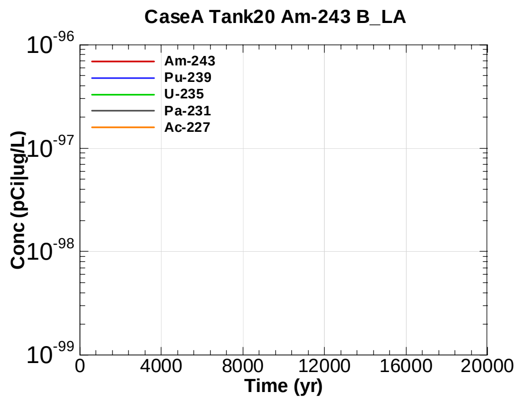

Figure E-2182 - 100m Aquifer Concentration for CaseA Tank20 Am-243 B_LA

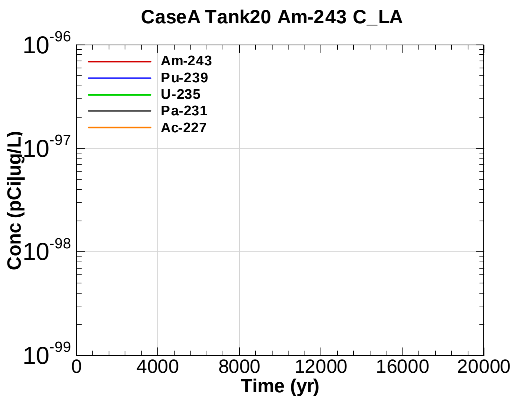

Figure E-2183 - 100m Aquifer Concentration for CaseA Tank20 Am-243 C_LA

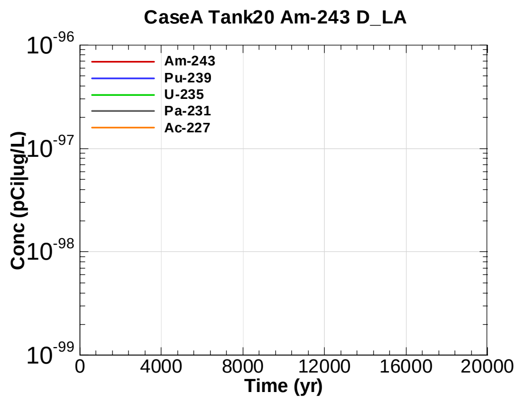

Figure E-2184 - 100m Aquifer Concentration for CaseA Tank20 Am-243 D_LA

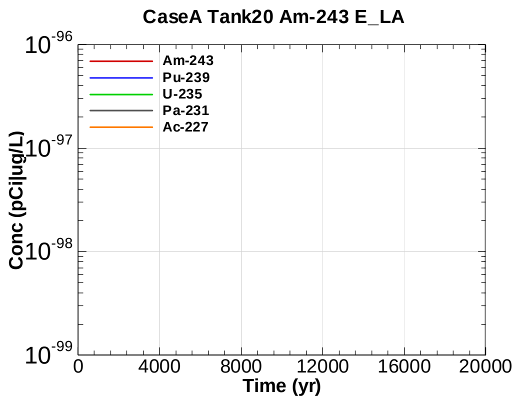

Figure E-2185 - 100m Aquifer Concentration for CaseA Tank20 Am-243 E_LA

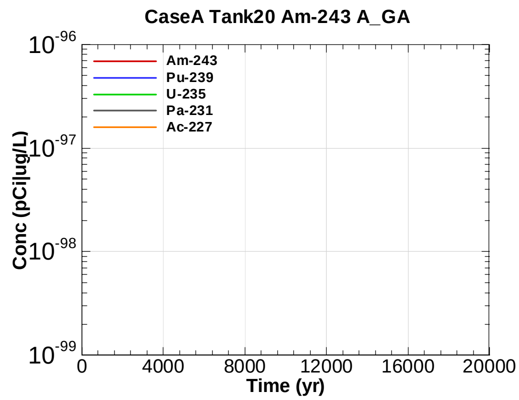

Figure E-2186 - 100m Aquifer Concentration for CaseA Tank20 Am-243 A_GA

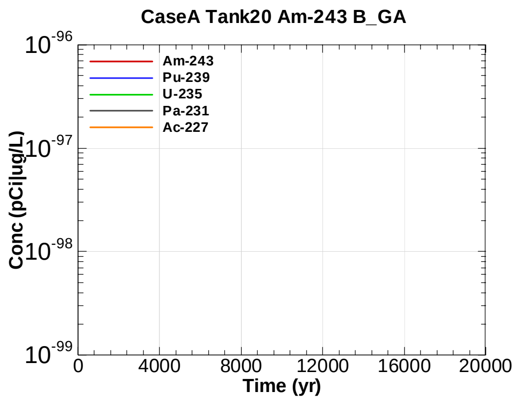

Figure E-2187 - 100m Aquifer Concentration for CaseA Tank20 Am-243 B_GA

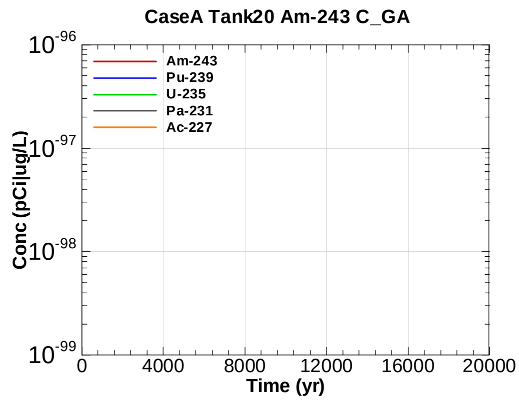

Figure E-2188 - 100m Aquifer Concentration for CaseA Tank20 Am-243 C_GA

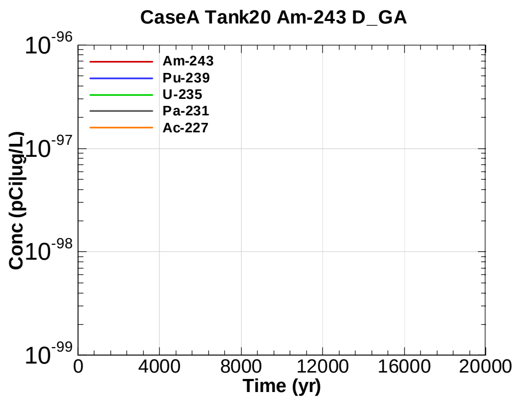

Figure E-2189 - 100m Aquifer Concentration for CaseA Tank20 Am-243 D_GA

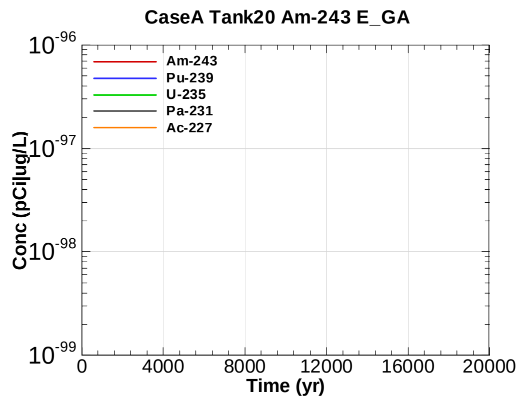

Figure E-2190 - 100m Aquifer Concentration for CaseA Tank20 Am-243 E_GA

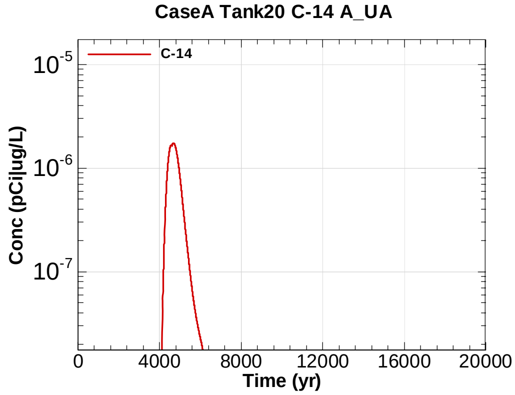

Figure E-2191 - 100m Aquifer Concentration for CaseA Tank20 C-14 A_UA

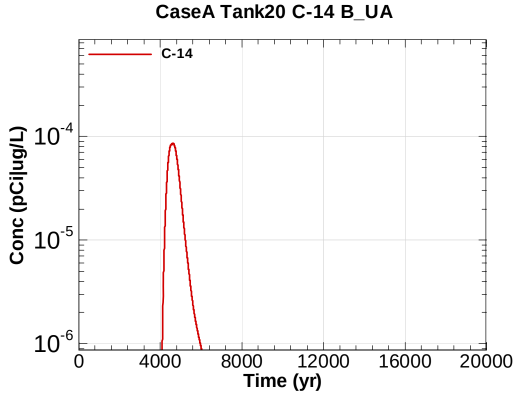

Figure E-2192 - 100m Aquifer Concentration for CaseA Tank20 C-14 B_UA

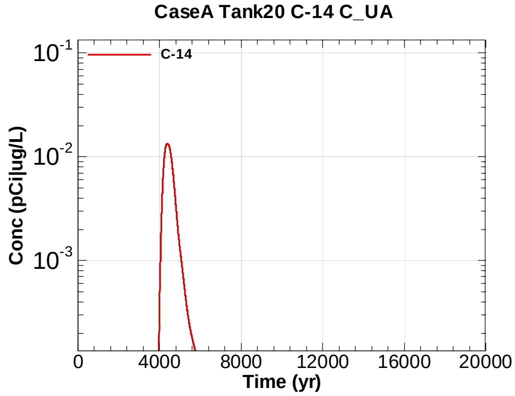

Figure E-2193 - 100m Aquifer Concentration for CaseA Tank20 C-14 C_UA

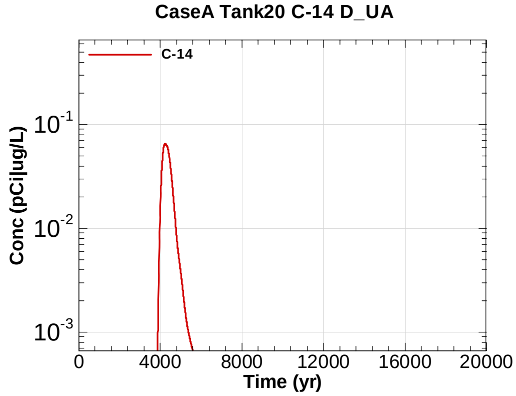

Figure E-2194 - 100m Aquifer Concentration for CaseA Tank20 C-14 D_UA

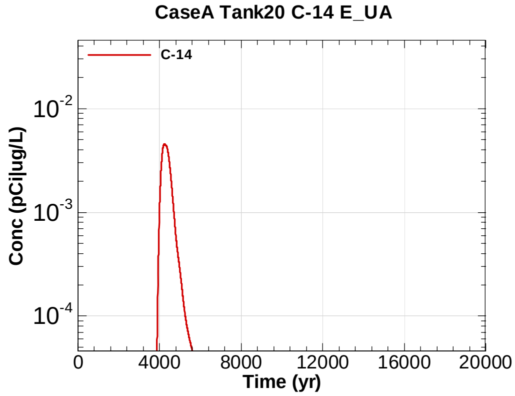

Figure E-2195 - 100m Aquifer Concentration for CaseA Tank20 C-14 E_UA

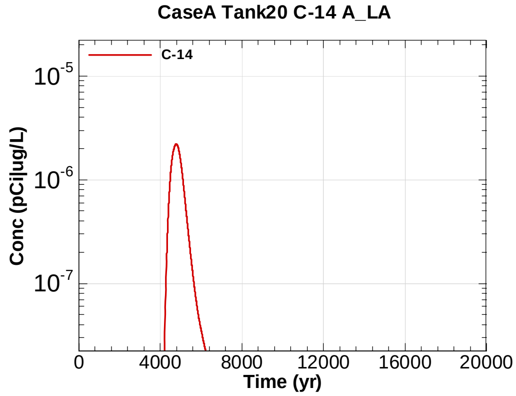

Figure E-2196 - 100m Aquifer Concentration for CaseA Tank20 C-14 A_LA

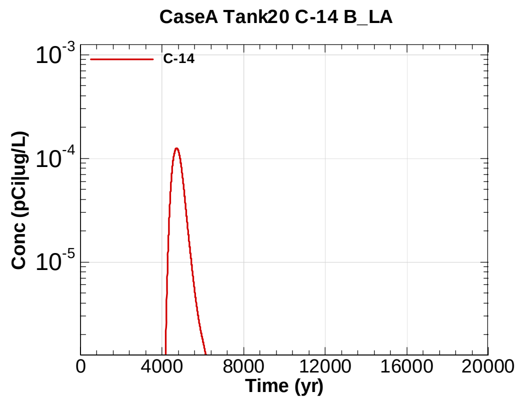

Figure E-2197 - 100m Aquifer Concentration for CaseA Tank20 C-14 B_LA

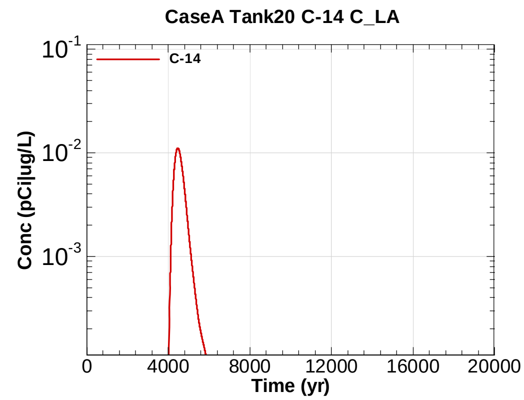

Figure E-2198 - 100m Aquifer Concentration for CaseA Tank20 C-14 C_LA

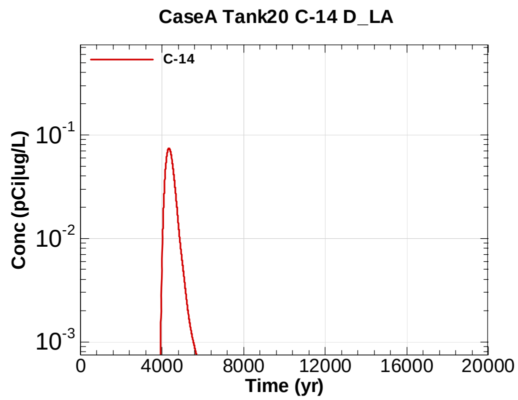

Figure E-2199 - 100m Aquifer Concentration for CaseA Tank20 C-14 D_LA

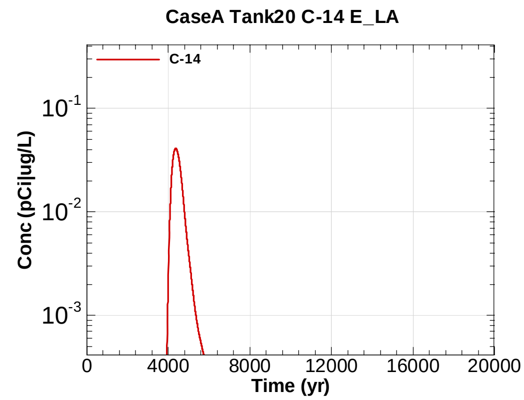

Figure E-2200 - 100m Aquifer Concentration for CaseA Tank20 C-14 E_LA

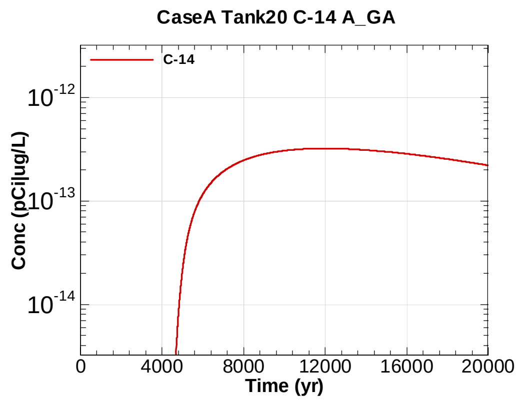

Figure E-2201 - 100m Aquifer Concentration for CaseA Tank20 C-14 A_GA

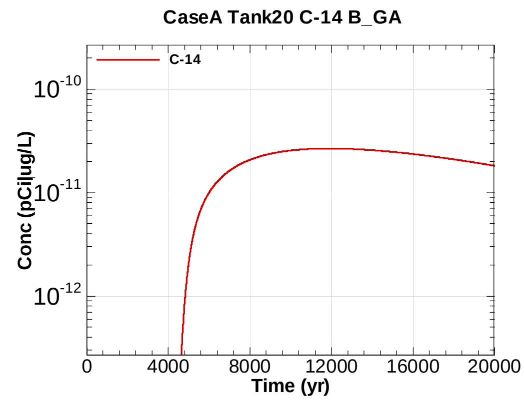

Figure E-2202 - 100m Aquifer Concentration for CaseA Tank20 C-14 B_GA

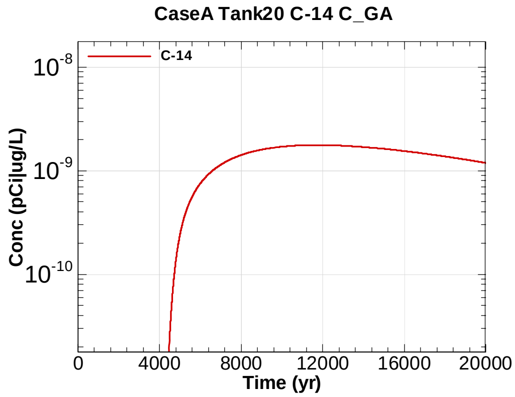

Figure E-2203 - 100m Aquifer Concentration for CaseA Tank20 C-14 C_GA

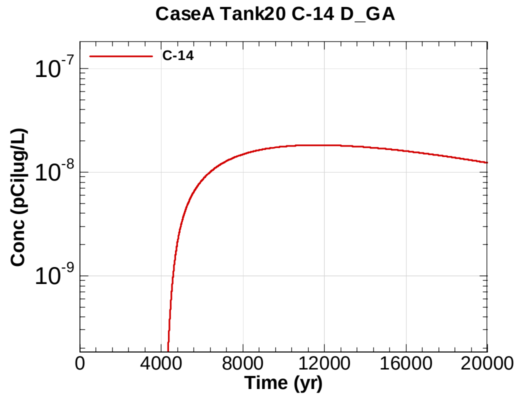

Figure E-2204 - 100m Aquifer Concentration for CaseA Tank20 C-14 D_GA

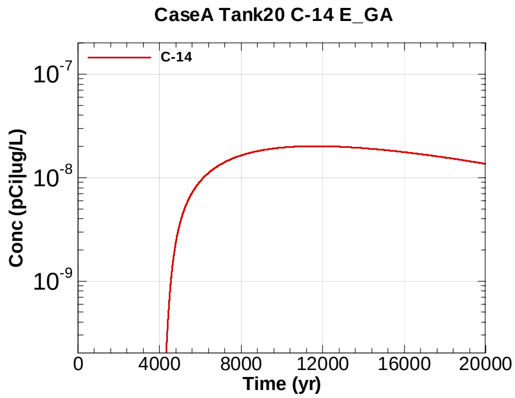

Figure E-2205 - 100m Aquifer Concentration for CaseA Tank20 C-14 E_GA

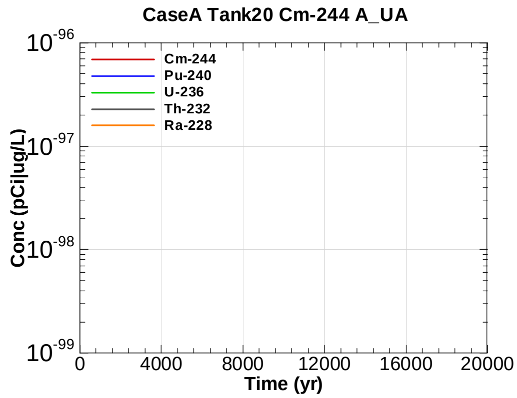

Figure E-2206 - 100m Aquifer Concentration for CaseA Tank20 Cm-244 A_UA

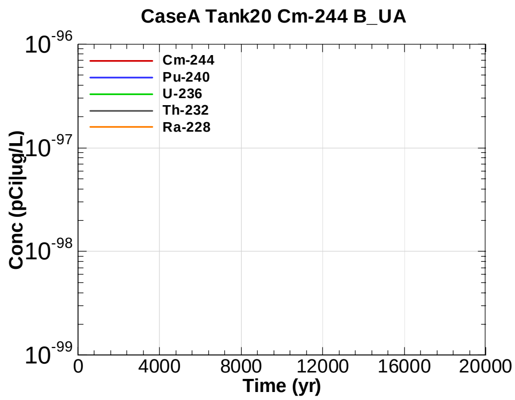

Figure E-2207 - 100m Aquifer Concentration for CaseA Tank20 Cm-244 B_UA

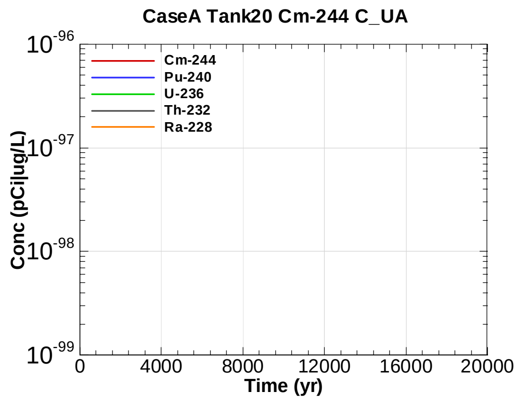

Figure E-2208 - 100m Aquifer Concentration for CaseA Tank20 Cm-244 C_UA

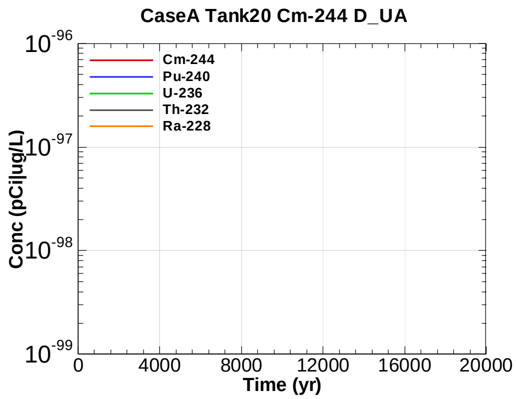

Figure E-2209 - 100m Aquifer Concentration for CaseA Tank20 Cm-244 D_UA

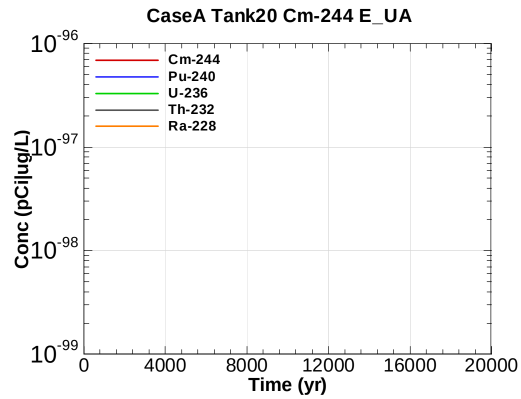

Figure E-2210 - 100m Aquifer Concentration for CaseA Tank20 Cm-244 E_UA

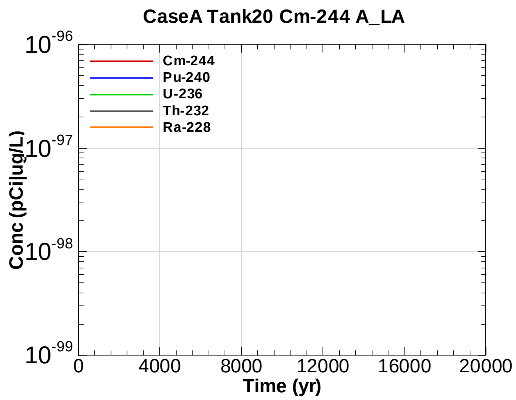

Figure E-2211 - 100m Aquifer Concentration for CaseA Tank20 Cm-244 A_LA

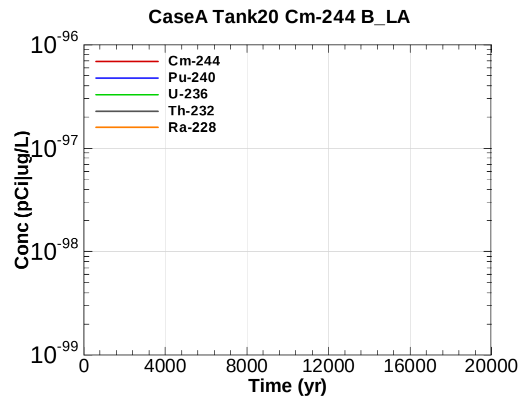

Figure E-2212 - 100m Aquifer Concentration for CaseA Tank20 Cm-244 B_LA

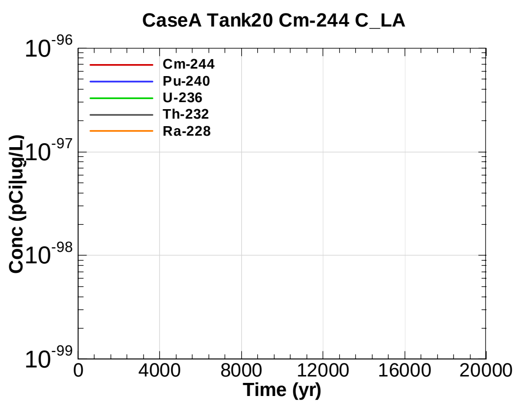

Figure E-2213 - 100m Aquifer Concentration for CaseA Tank20 Cm-244 C_LA

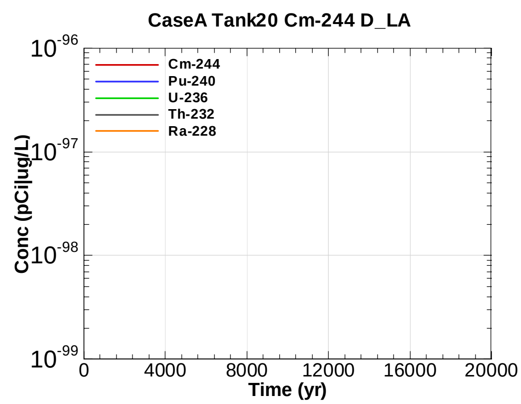

Figure E-2214 - 100m Aquifer Concentration for CaseA Tank20 Cm-244 D_LA

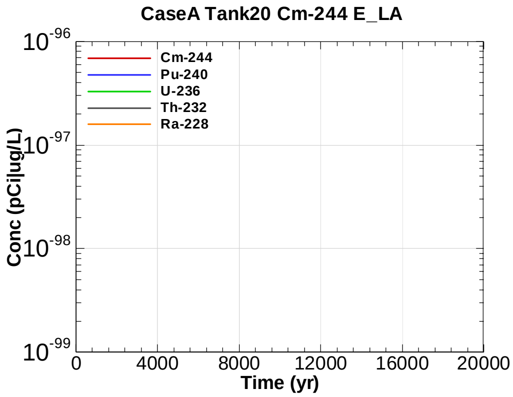

Figure E-2215 - 100m Aquifer Concentration for CaseA Tank20 Cm-244 E_LA

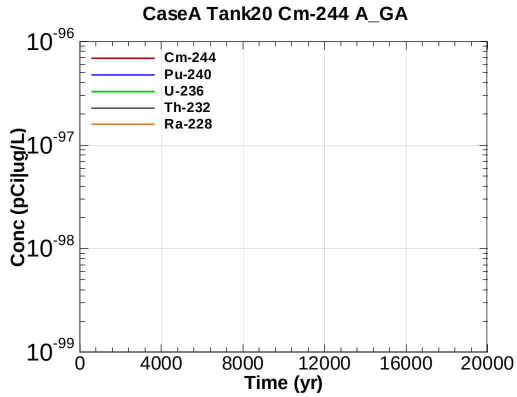

Figure E-2216 - 100m Aquifer Concentration for CaseA Tank20 Cm-244 A_GA

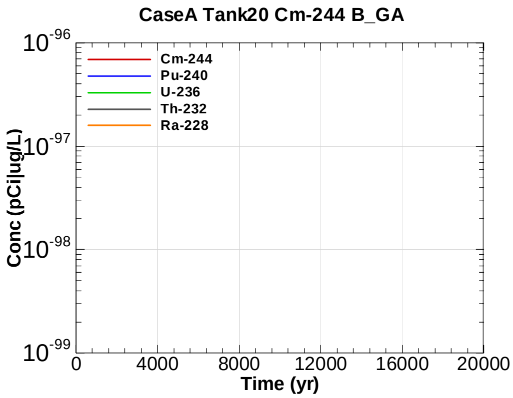

Figure E-2217 - 100m Aquifer Concentration for CaseA Tank20 Cm-244 B_GA

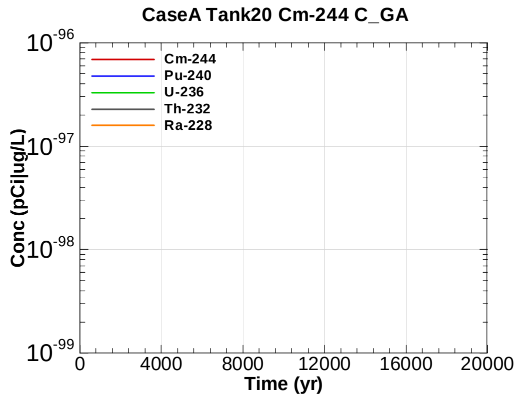

Figure E-2218 - 100m Aquifer Concentration for CaseA Tank20 Cm-244 C_GA

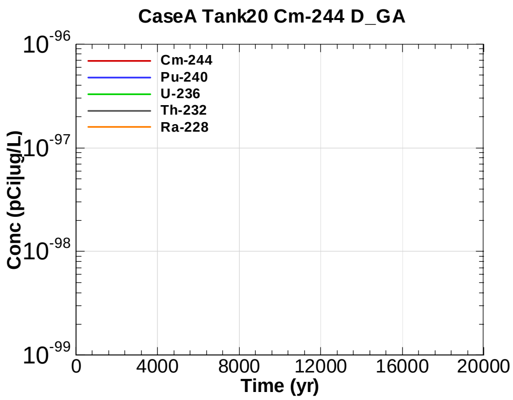

Figure E-2219 - 100m Aquifer Concentration for CaseA Tank20 Cm-244 D_GA

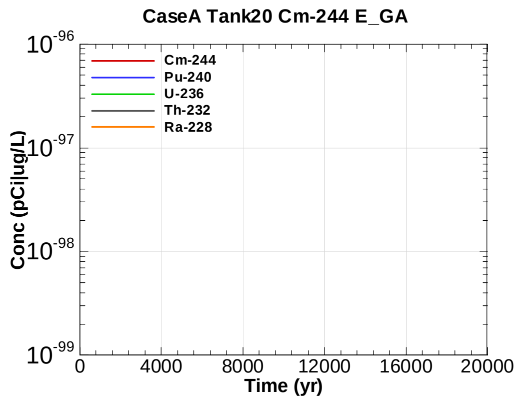

Figure E-2220 - 100m Aquifer Concentration for CaseA Tank20 Cm-244 E_GA

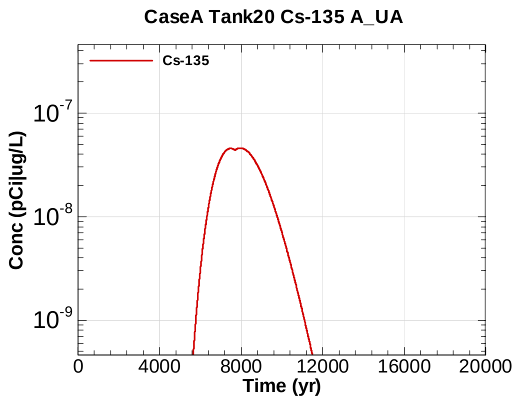

Figure E-2221 - 100m Aquifer Concentration for CaseA Tank20 Cs-135 A_UA

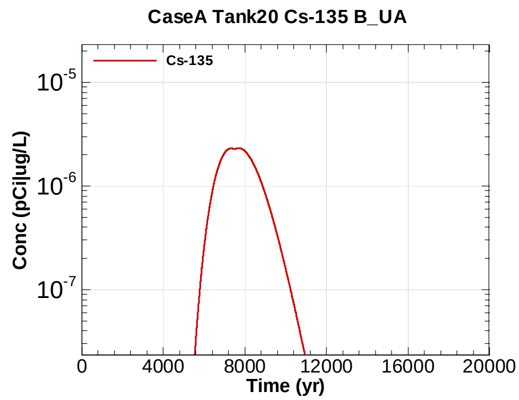

Figure E-2222 - 100m Aquifer Concentration for CaseA Tank20 Cs-135 B_UA

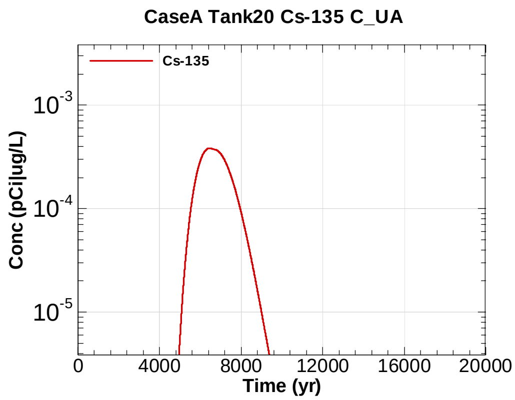

Figure E-2223 - 100m Aquifer Concentration for CaseA Tank20 Cs-135 C_UA

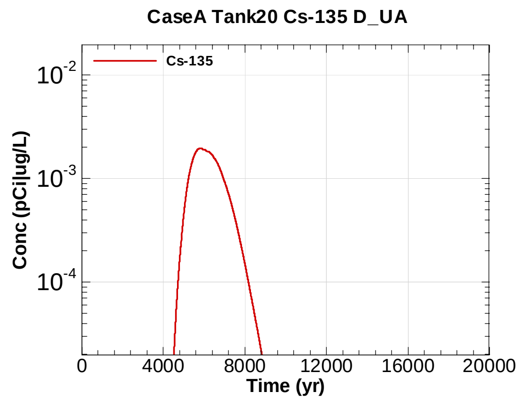

Figure E-2224 - 100m Aquifer Concentration for CaseA Tank20 Cs-135 D_UA

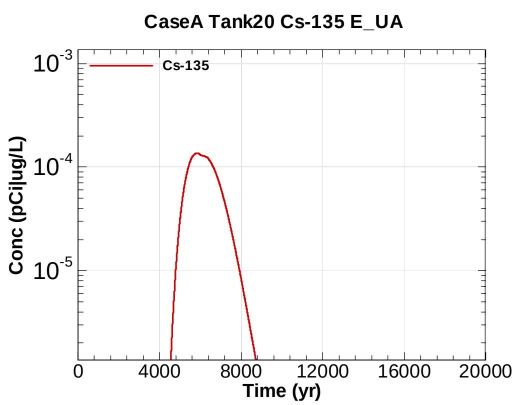

Figure E-2225 - 100m Aquifer Concentration for CaseA Tank20 Cs-135 E_UA

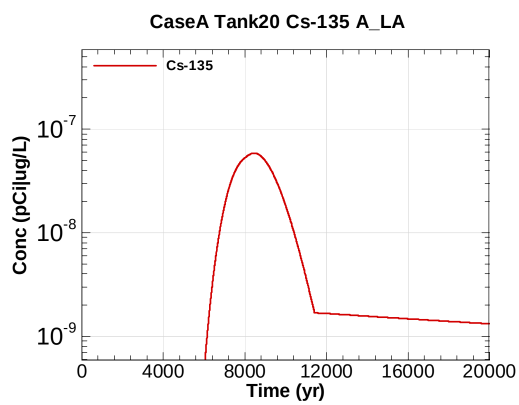

Figure E-2226 - 100m Aquifer Concentration for CaseA Tank20 Cs-135 A_LA

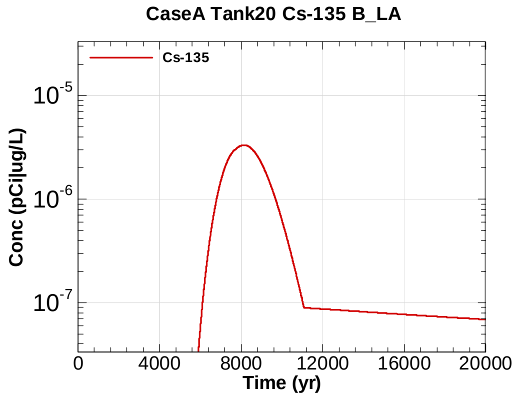

Figure E-2227 - 100m Aquifer Concentration for CaseA Tank20 Cs-135 B_LA

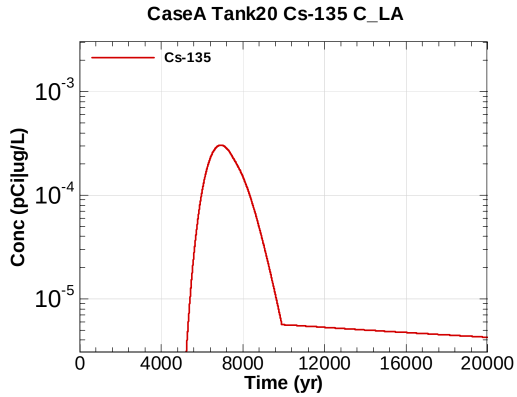

Figure E-2228 - 100m Aquifer Concentration for CaseA Tank20 Cs-135 C_LA

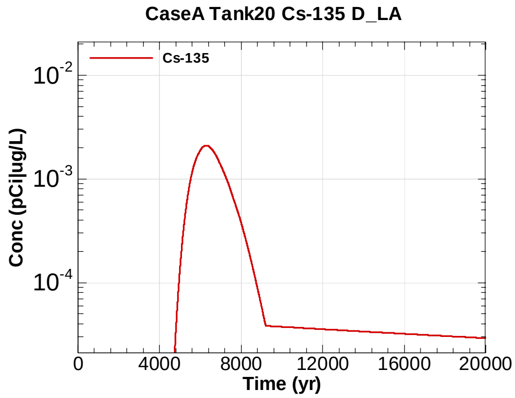

Figure E-2229 - 100m Aquifer Concentration for CaseA Tank20 Cs-135 D_LA

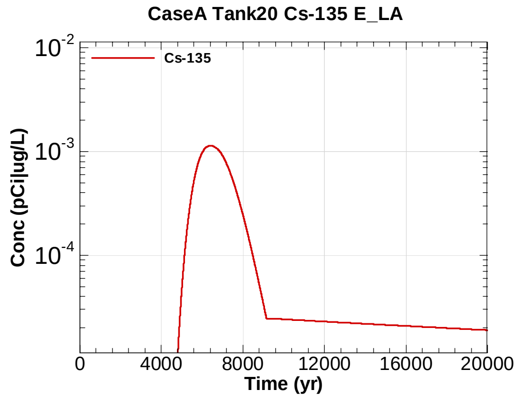

Figure E-2230 - 100m Aquifer Concentration for CaseA Tank20 Cs-135 E_LA

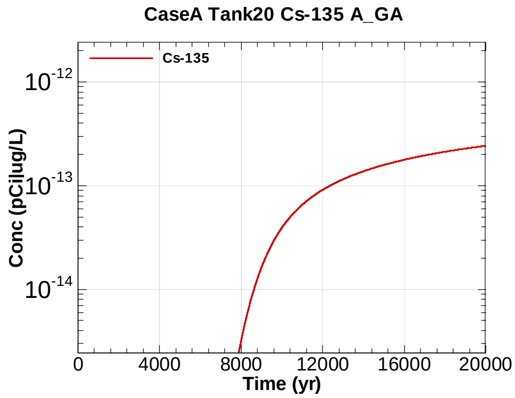

Figure E-2231 - 100m Aquifer Concentration for CaseA Tank20 Cs-135 A_GA

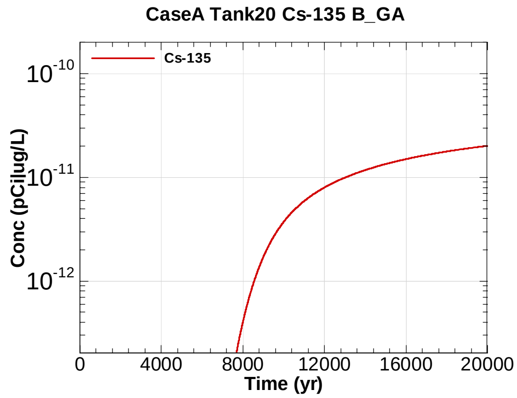

Figure E-2232 - 100m Aquifer Concentration for CaseA Tank20 Cs-135 B_GA

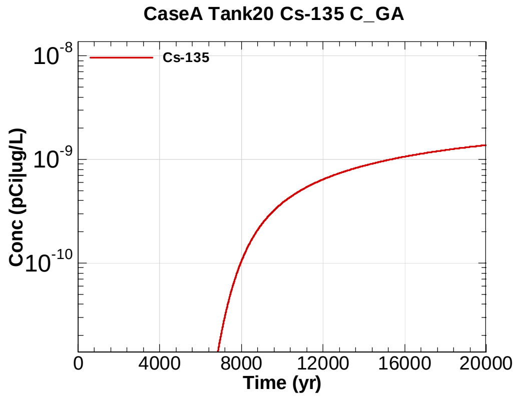

Figure E-2233 - 100m Aquifer Concentration for CaseA Tank20 Cs-135 C_GA

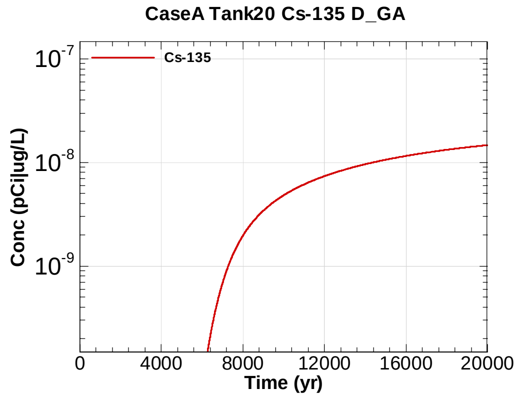

Figure E-2234 - 100m Aquifer Concentration for CaseA Tank20 Cs-135 D_GA

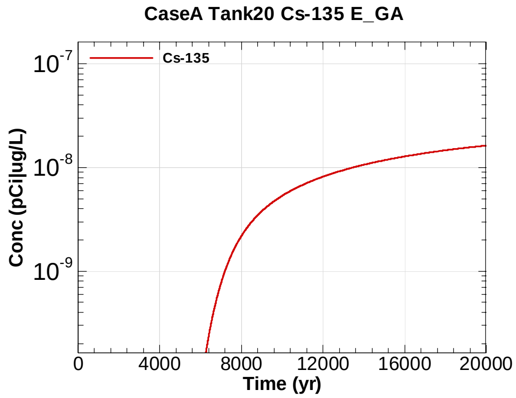

Figure E-2235 - 100m Aquifer Concentration for CaseA Tank20 Cs-135 E_GA

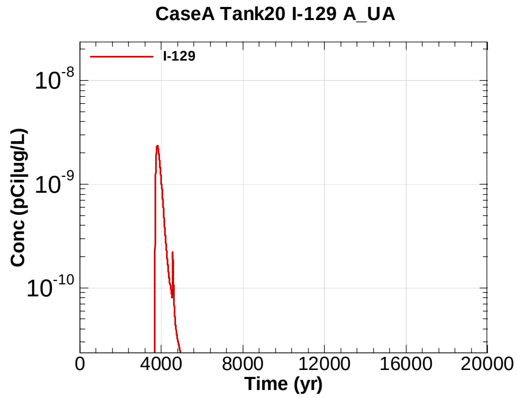

Figure E-2236 - 100m Aquifer Concentration for CaseA Tank20 I-129 A_UA

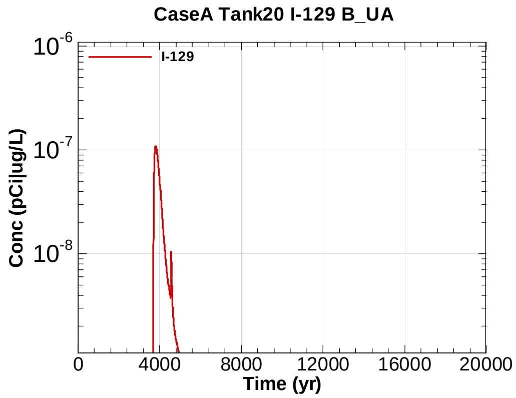

Figure E-2237 - 100m Aquifer Concentration for CaseA Tank20 I-129 B_UA

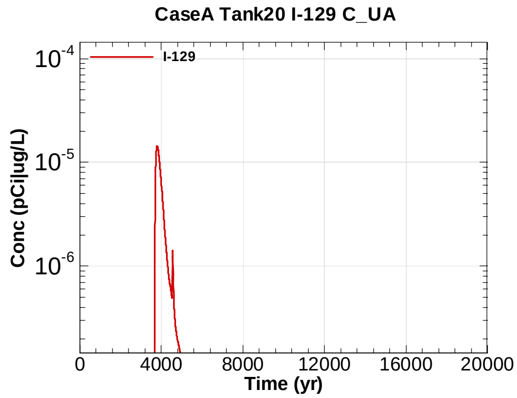

Figure E-2238 - 100m Aquifer Concentration for CaseA Tank20 I-129 C_UA

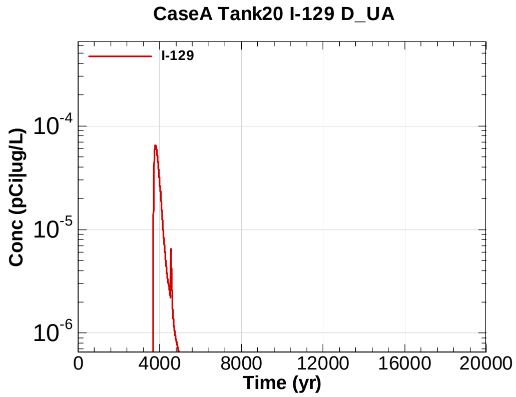

Figure E-2239 - 100m Aquifer Concentration for CaseA Tank20 I-129 D_UA

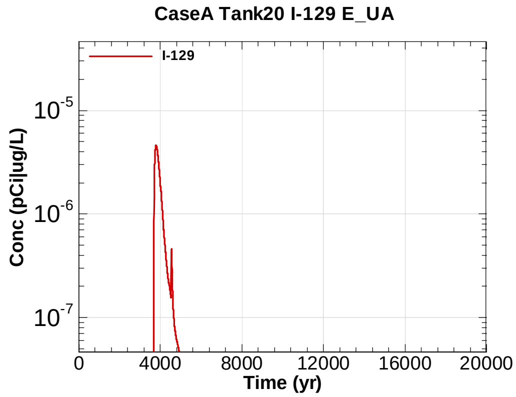

Figure E-2240 - 100m Aquifer Concentration for CaseA Tank20 I-129 E_UA

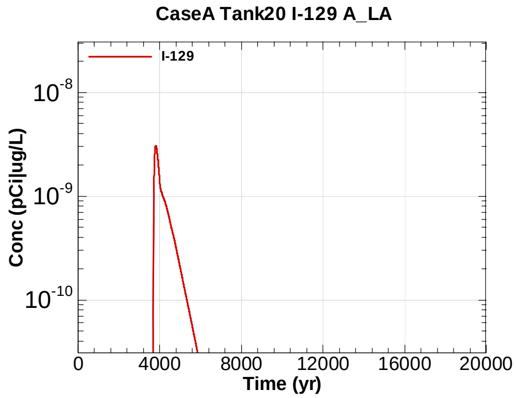

Figure E-2241 - 100m Aquifer Concentration for CaseA Tank20 I-129 A_LA

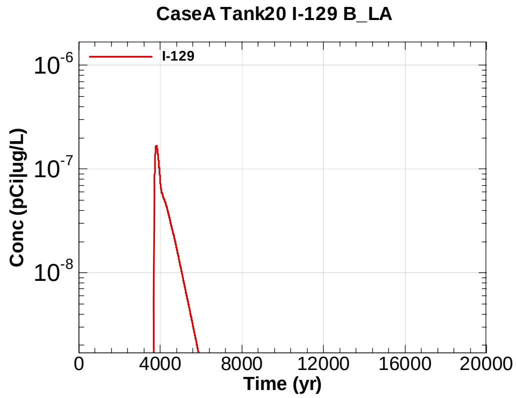

Figure E-2242 - 100m Aquifer Concentration for CaseA Tank20 I-129 B_LA

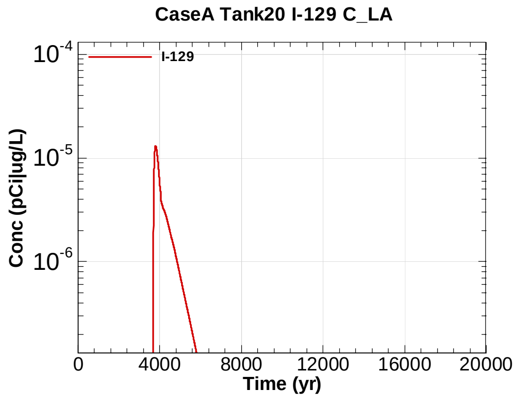

Figure E-2243 - 100m Aquifer Concentration for CaseA Tank20 I-129 C_LA

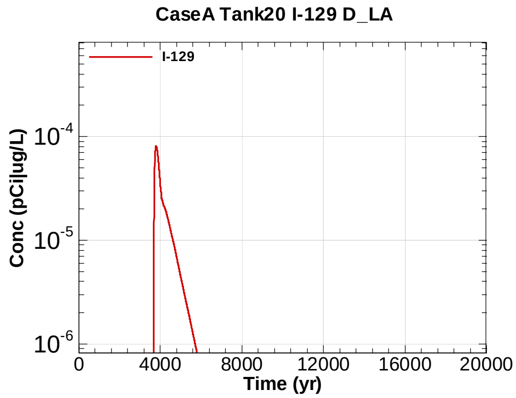

Figure E-2244 - 100m Aquifer Concentration for CaseA Tank20 I-129 D_LA

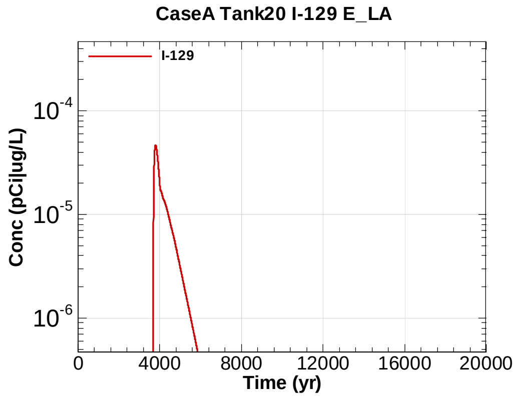

Figure E-2245 - 100m Aquifer Concentration for CaseA Tank20 I-129 E_LA

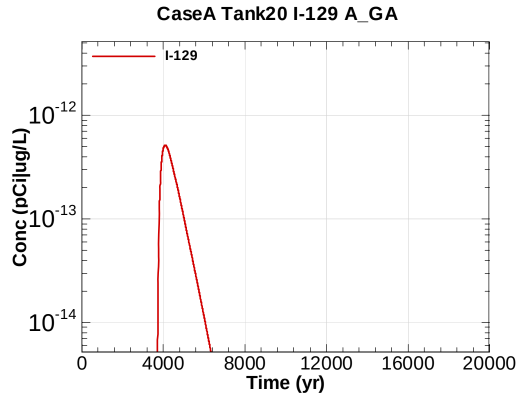

Figure E-2246 - 100m Aquifer Concentration for CaseA Tank20 I-129 A_GA

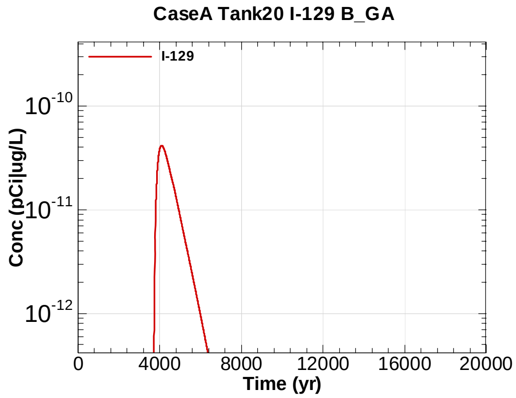

Figure E-2247 - 100m Aquifer Concentration for CaseA Tank20 I-129 B_GA

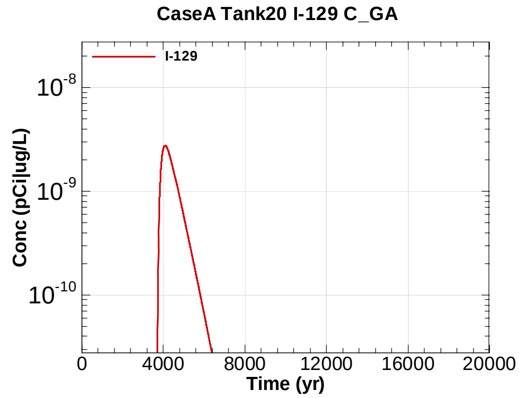

Figure E-2248 - 100m Aquifer Concentration for CaseA Tank20 I-129 C_GA

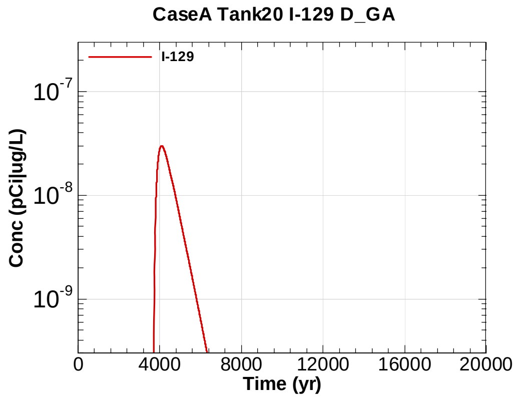

Figure E-2249 - 100m Aquifer Concentration for CaseA Tank20 I-129 D_GA

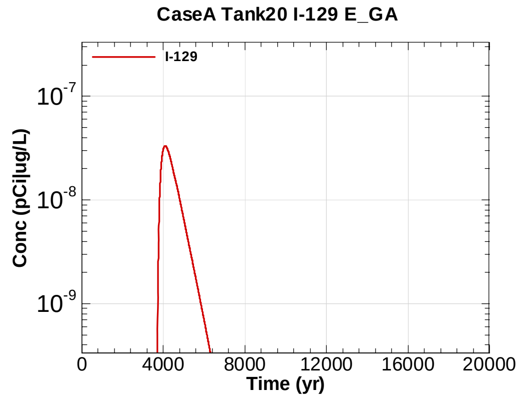

Figure E-2250 - 100m Aquifer Concentration for CaseA Tank20 I-129 E_GA

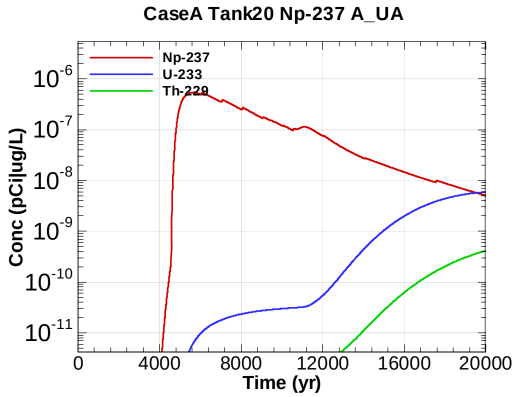

Figure E-2251 - 100m Aquifer Concentration for CaseA Tank20 Np-237 A_UA

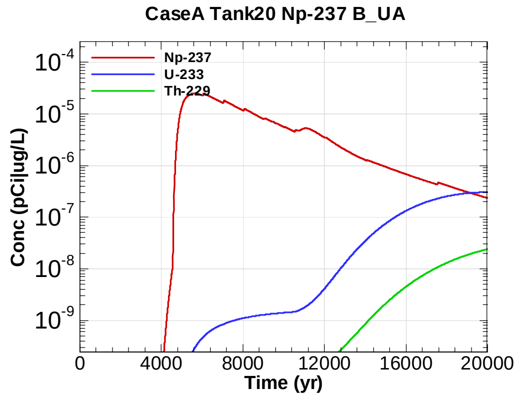

Figure E-2252 - 100m Aquifer Concentration for CaseA Tank20 Np-237 B_UA

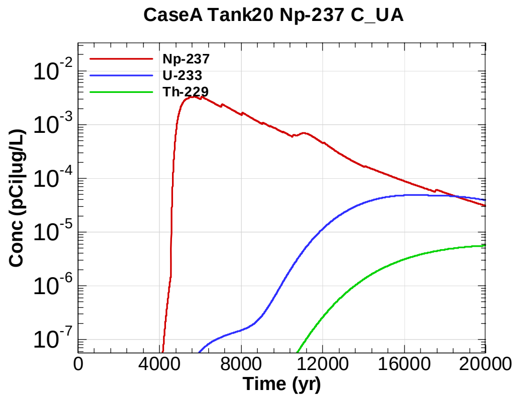

Figure E-2253 - 100m Aquifer Concentration for CaseA Tank20 Np-237 C_UA

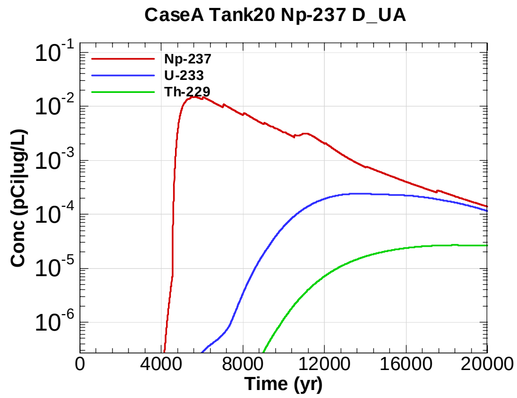

Figure E-2254 - 100m Aquifer Concentration for CaseA Tank20 Np-237 D_UA

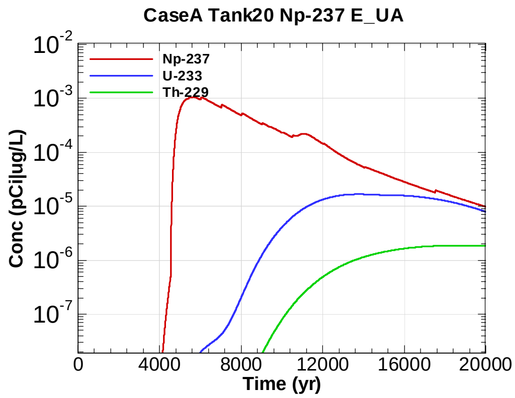

Figure E-2255 - 100m Aquifer Concentration for CaseA Tank20 Np-237 E_UA

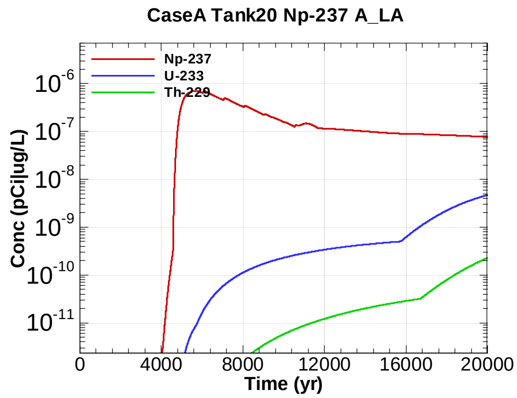

Figure E-2256 - 100m Aquifer Concentration for CaseA Tank20 Np-237 A_LA

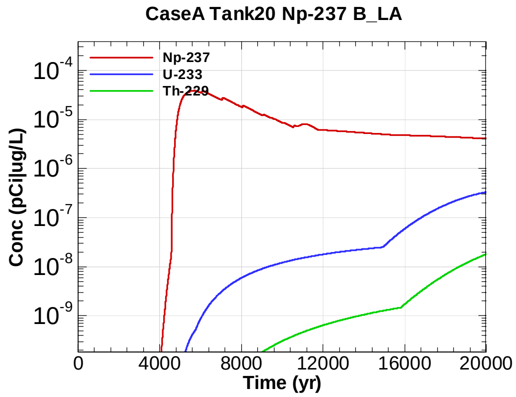

Figure E-2257 - 100m Aquifer Concentration for CaseA Tank20 Np-237 B_LA

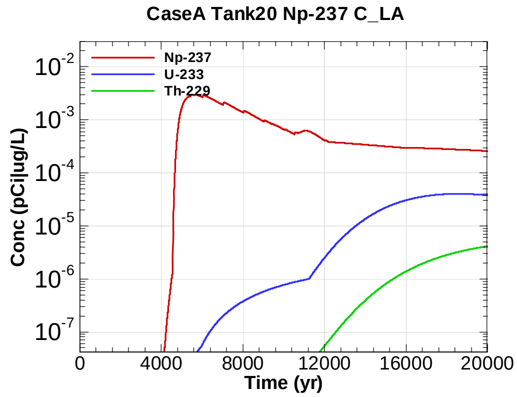

Figure E-2258 - 100m Aquifer Concentration for CaseA Tank20 Np-237 C_LA

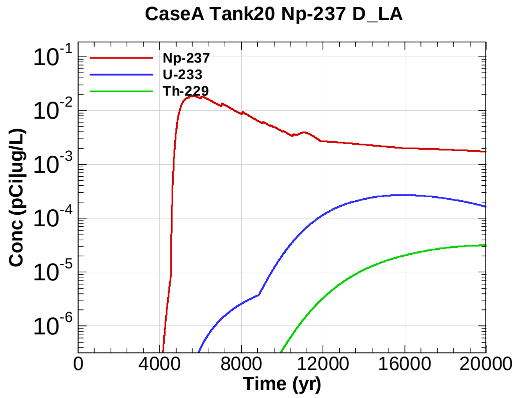

Figure E-2259 - 100m Aquifer Concentration for CaseA Tank20 Np-237 D_LA

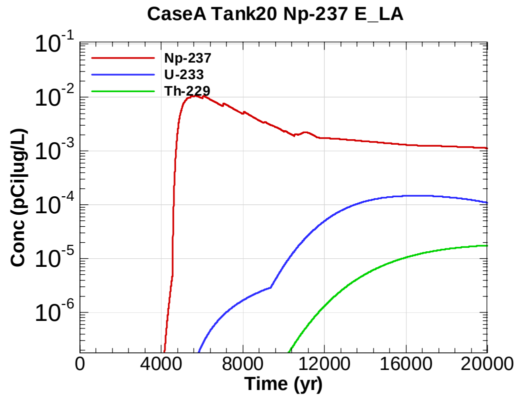

Figure E-2260 - 100m Aquifer Concentration for CaseA Tank20 Np-237 E_LA

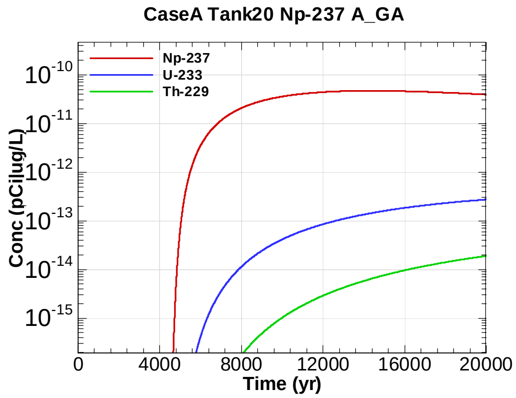

Figure E-2261 - 100m Aquifer Concentration for CaseA Tank20 Np-237 A_GA

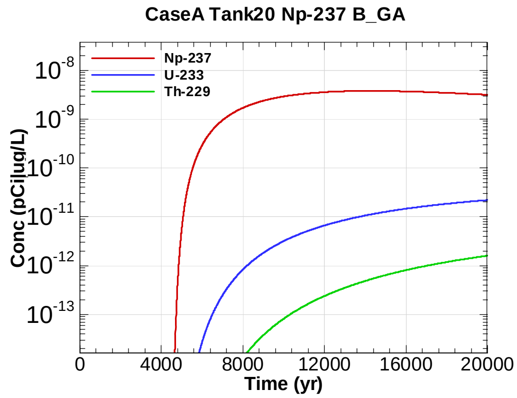

Figure E-2262 - 100m Aquifer Concentration for CaseA Tank20 Np-237 B_GA

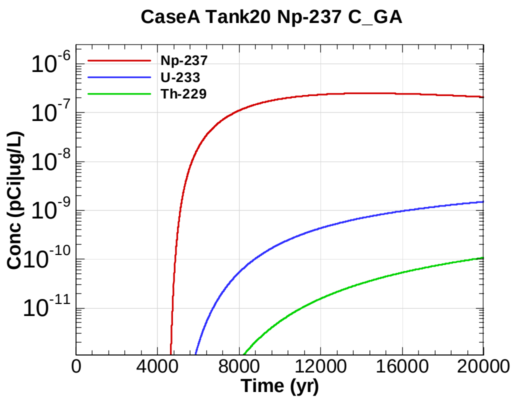

Figure E-2263 - 100m Aquifer Concentration for CaseA Tank20 Np-237 C_GA

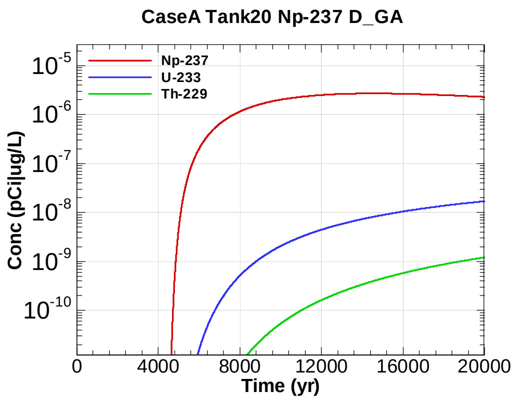

Figure E-2264 - 100m Aquifer Concentration for CaseA Tank20 Np-237 D_GA

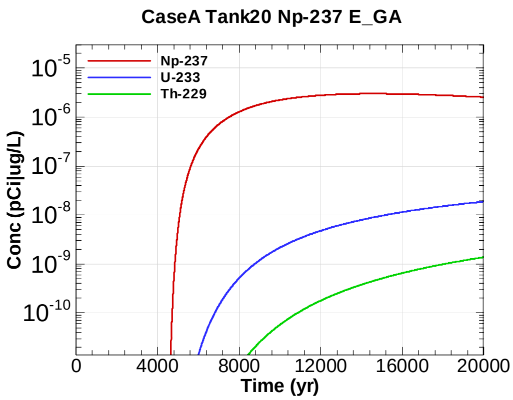

Figure E-2265 - 100m Aquifer Concentration for CaseA Tank20 Np-237 E_GA

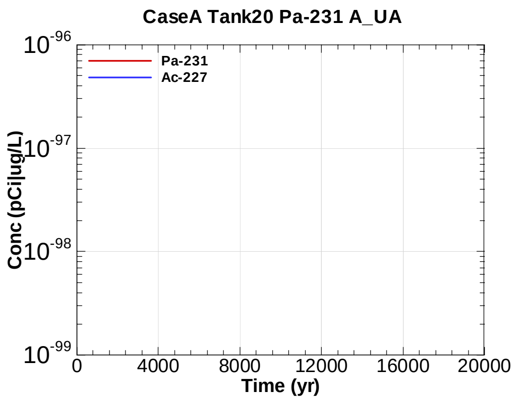

Figure E-2266 - 100m Aquifer Concentration for CaseA Tank20 Pa-231 A_UA

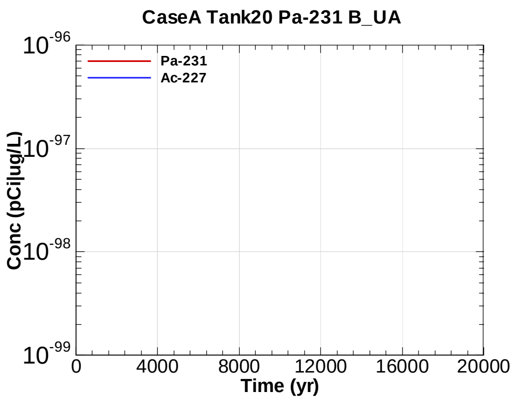

Figure E-2267 - 100m Aquifer Concentration for CaseA Tank20 Pa-231 B_UA

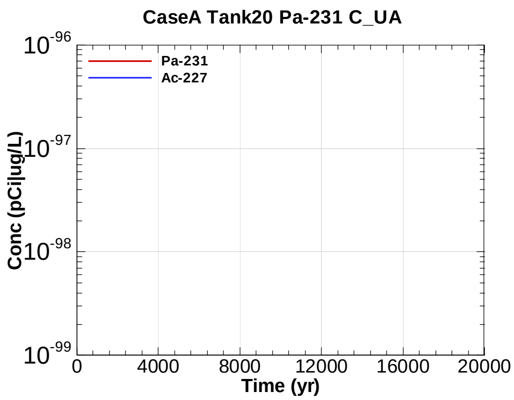

Figure E-2268 - 100m Aquifer Concentration for CaseA Tank20 Pa-231 C_UA

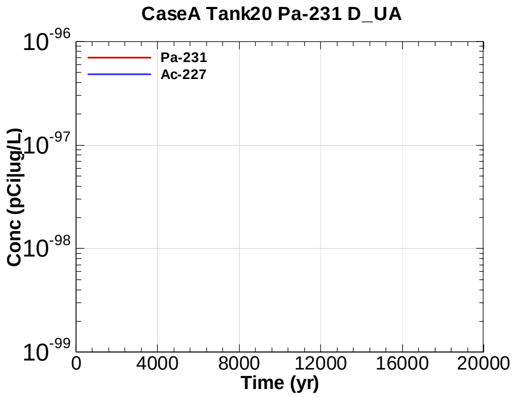

Figure E-2269 - 100m Aquifer Concentration for CaseA Tank20 Pa-231 D_UA

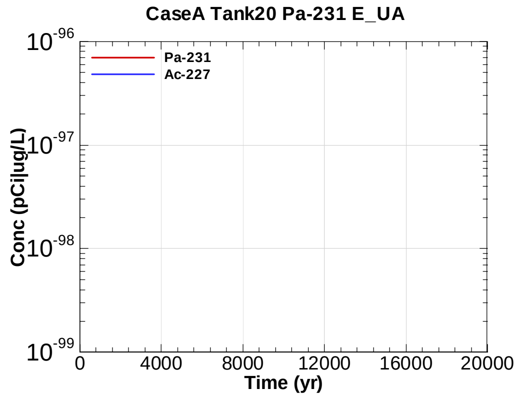

Figure E-2270 - 100m Aquifer Concentration for CaseA Tank20 Pa-231 E_UA

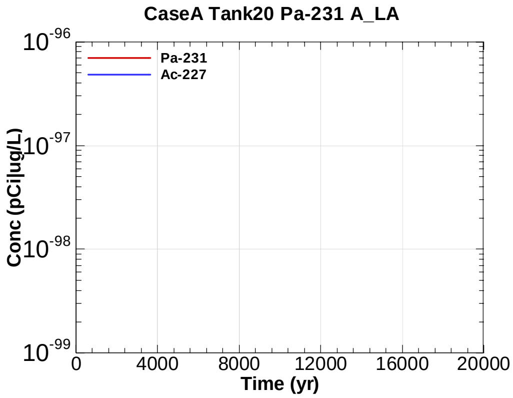

Figure E-2271 - 100m Aquifer Concentration for CaseA Tank20 Pa-231 A_LA

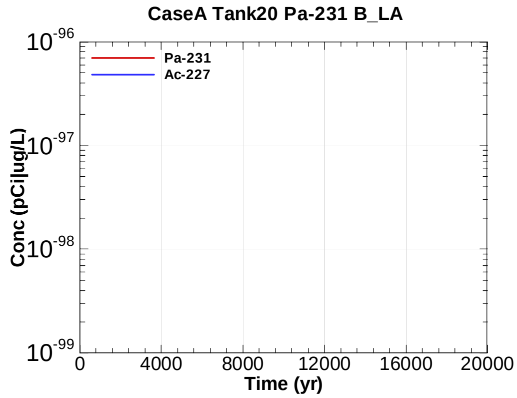

Figure E-2272 - 100m Aquifer Concentration for CaseA Tank20 Pa-231 B_LA

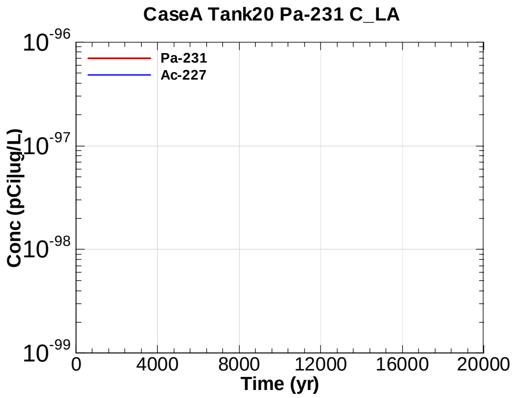

Figure E-2273 - 100m Aquifer Concentration for CaseA Tank20 Pa-231 C_LA

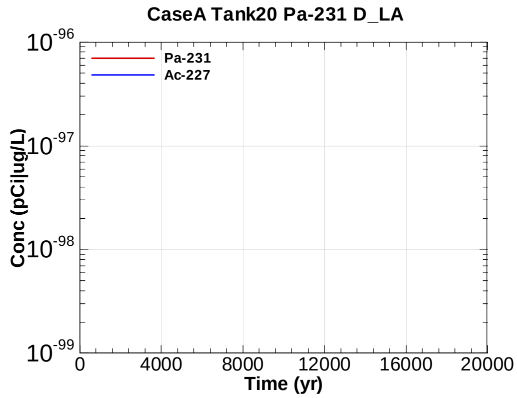

Figure E-2274 - 100m Aquifer Concentration for CaseA Tank20 Pa-231 D_LA

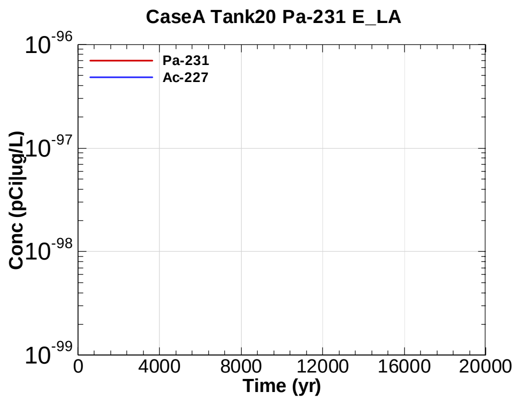

Figure E-2275 - 100m Aquifer Concentration for CaseA Tank20 Pa-231 E_LA

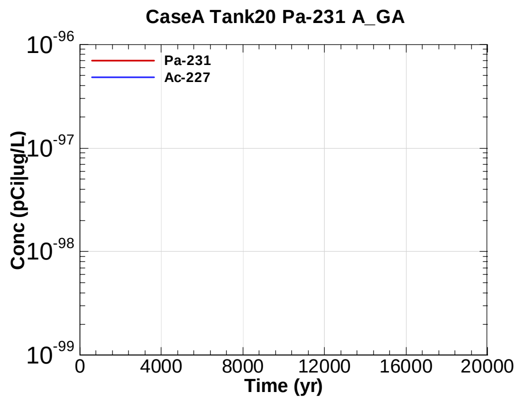

Figure E-2276 - 100m Aquifer Concentration for CaseA Tank20 Pa-231 A_GA

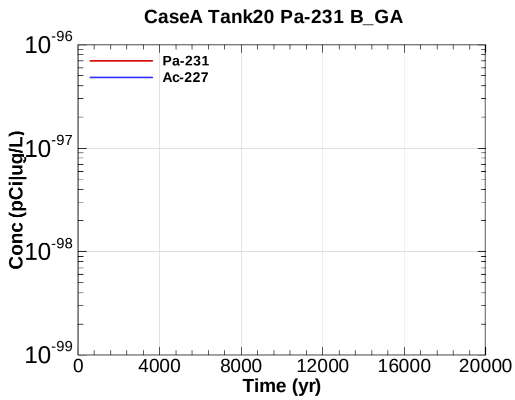

Figure E-2277 - 100m Aquifer Concentration for CaseA Tank20 Pa-231 B_GA

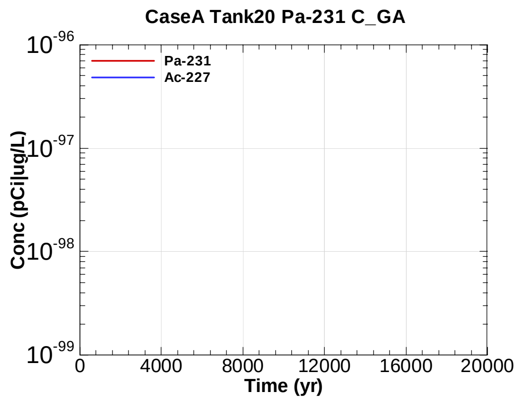

Figure E-2278 - 100m Aquifer Concentration for CaseA Tank20 Pa-231 C_GA

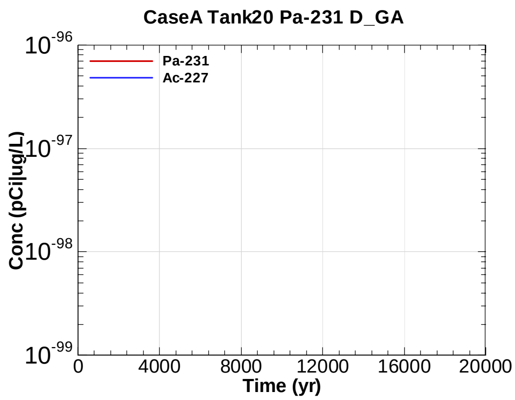

Figure E-2279 - 100m Aquifer Concentration for CaseA Tank20 Pa-231 D_GA

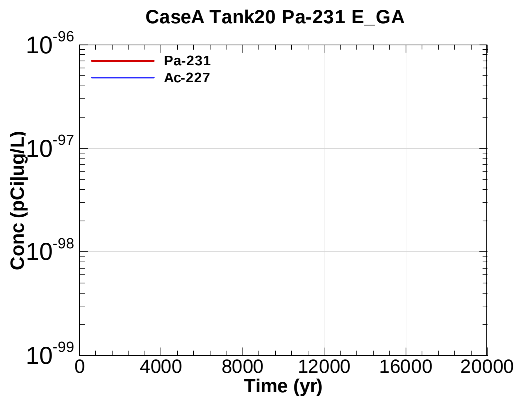

Figure E-2280 - 100m Aquifer Concentration for CaseA Tank20 Pa-231 E_GA

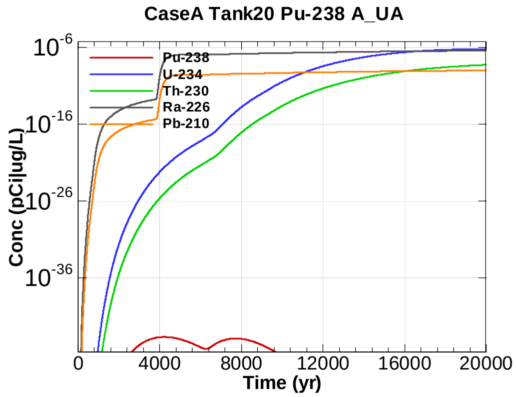

Figure E-2281 - 100m Aquifer Concentration for CaseA Tank20 Pu-238 A_UA

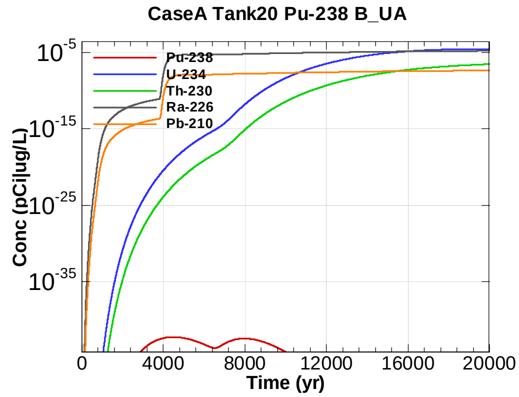

Figure E-2282 - 100m Aquifer Concentration for CaseA Tank20 Pu-238 B_UA

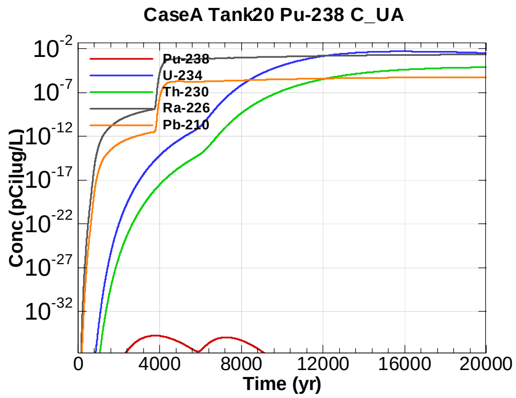

Figure E-2283 - 100m Aquifer Concentration for CaseA Tank20 Pu-238 C_UA

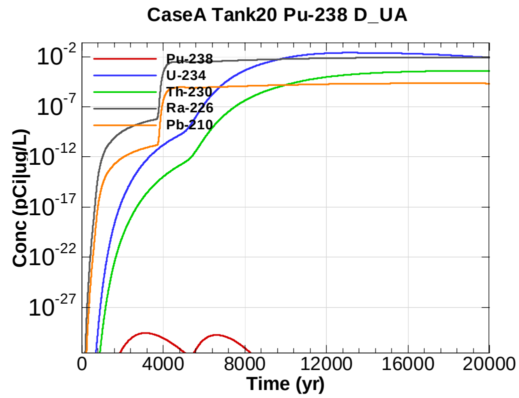

Figure E-2284 - 100m Aquifer Concentration for CaseA Tank20 Pu-238 D_UA

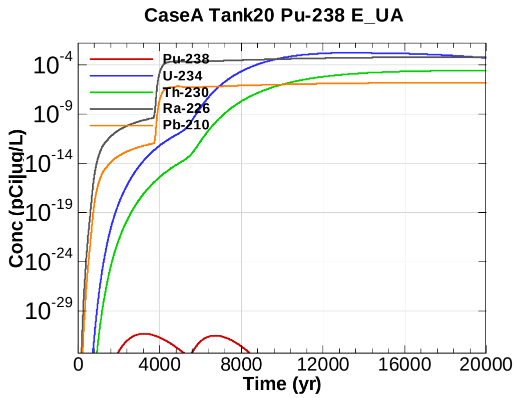

Figure E-2285 - 100m Aquifer Concentration for CaseA Tank20 Pu-238 E_UA

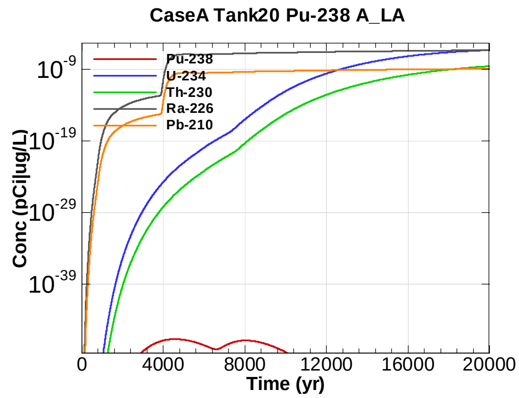

Figure E-2286 - 100m Aquifer Concentration for CaseA Tank20 Pu-238 A_LA

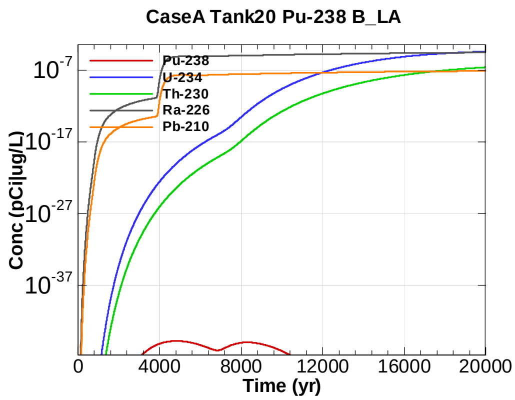

Figure E-2287 - 100m Aquifer Concentration for CaseA Tank20 Pu-238 B_LA

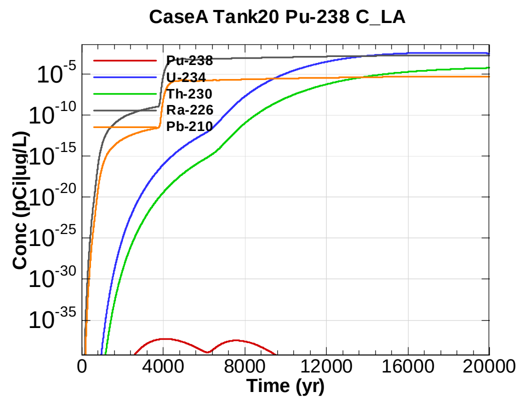

Figure E-2288 - 100m Aquifer Concentration for CaseA Tank20 Pu-238 C_LA

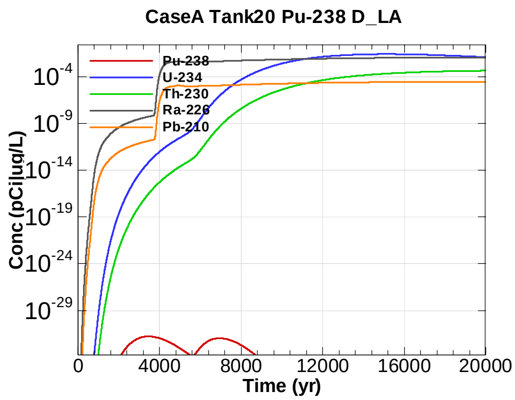

Figure E-2289 - 100m Aquifer Concentration for CaseA Tank20 Pu-238 D_LA

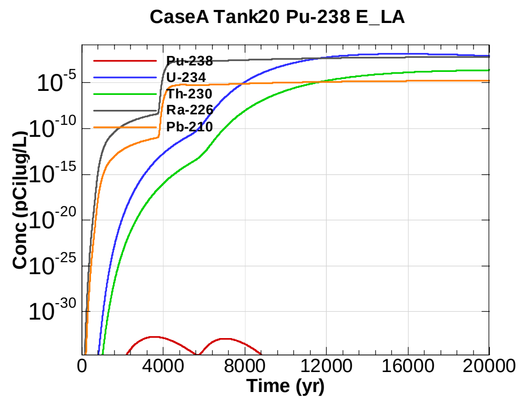

Figure E-2290 - 100m Aquifer Concentration for CaseA Tank20 Pu-238 E_LA

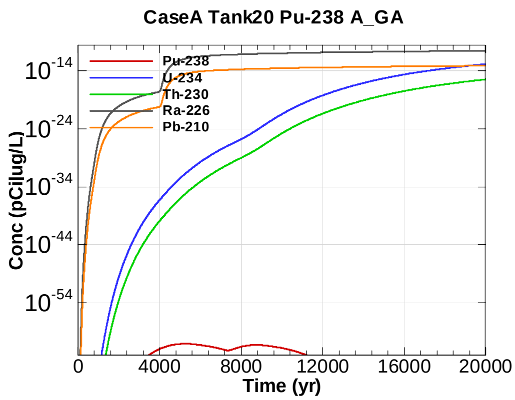

Figure E-2291 - 100m Aquifer Concentration for CaseA Tank20 Pu-238 A_GA

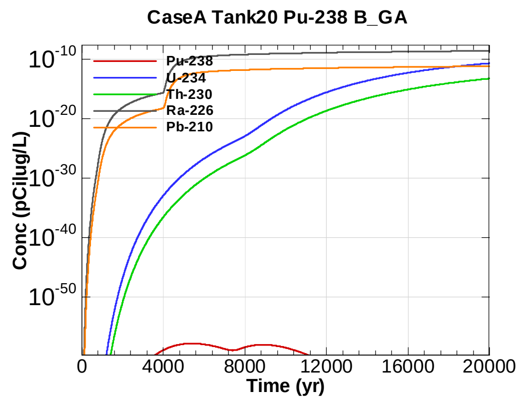

Figure E-2292 - 100m Aquifer Concentration for CaseA Tank20 Pu-238 B_GA

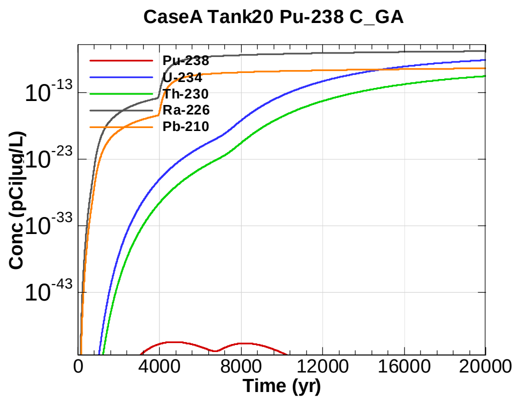

Figure E-2293 - 100m Aquifer Concentration for CaseA Tank20 Pu-238 C_GA

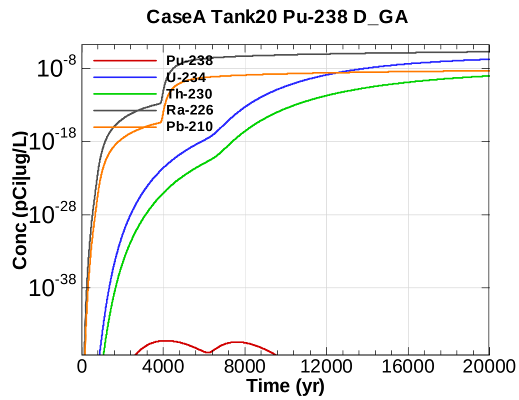

Figure E-2294 - 100m Aquifer Concentration for CaseA Tank20 Pu-238 D_GA

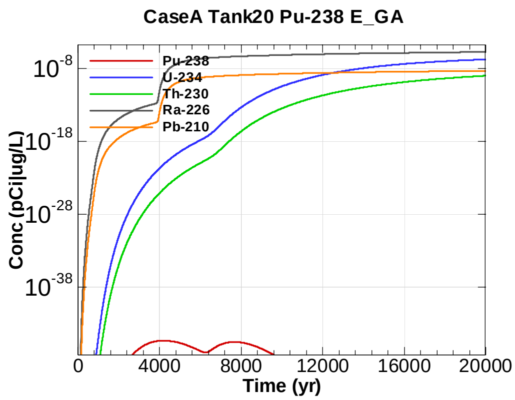

Figure E-2295 - 100m Aquifer Concentration for CaseA Tank20 Pu-238 E_GA

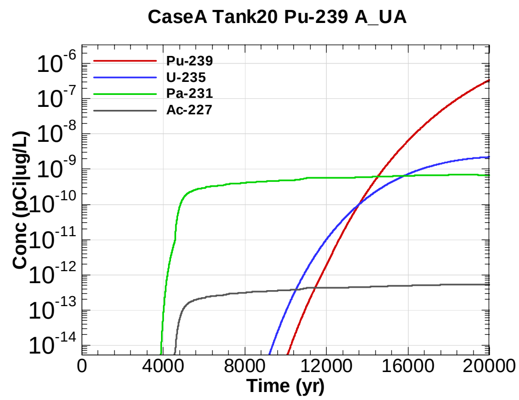

Figure E-2296 - 100m Aquifer Concentration for CaseA Tank20 Pu-239 A_UA

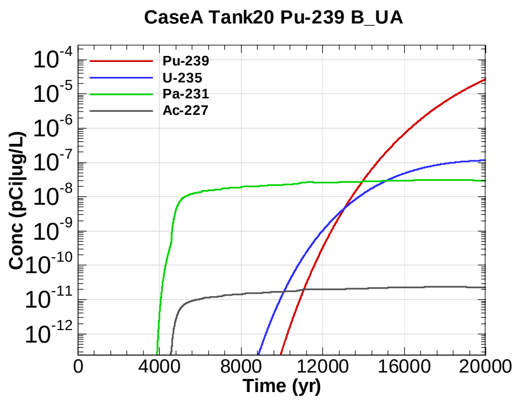

Figure E-2297 - 100m Aquifer Concentration for CaseA Tank20 Pu-239 B_UA

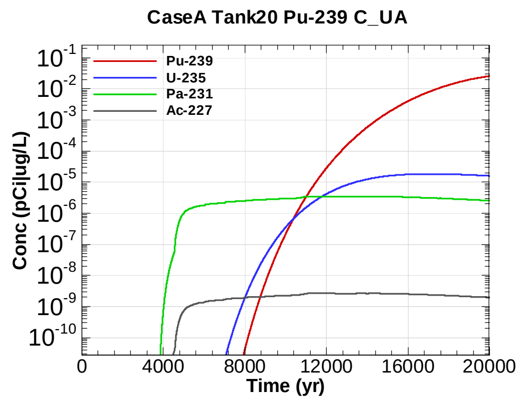

Figure E-2298 - 100m Aquifer Concentration for CaseA Tank20 Pu-239 C_UA

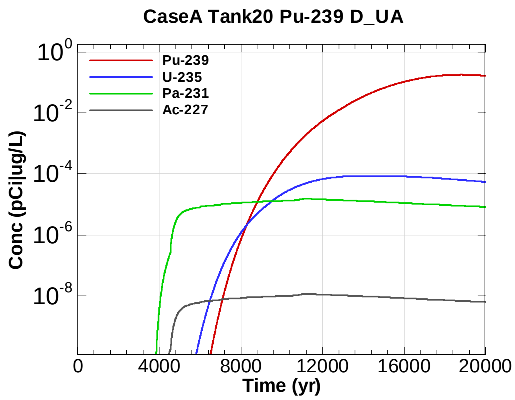

Figure E-2299 - 100m Aquifer Concentration for CaseA Tank20 Pu-239 D_UA

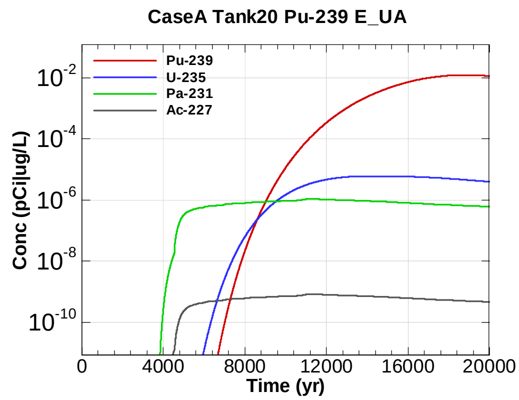

Figure E-2300 - 100m Aquifer Concentration for CaseA Tank20 Pu-239 E_UA

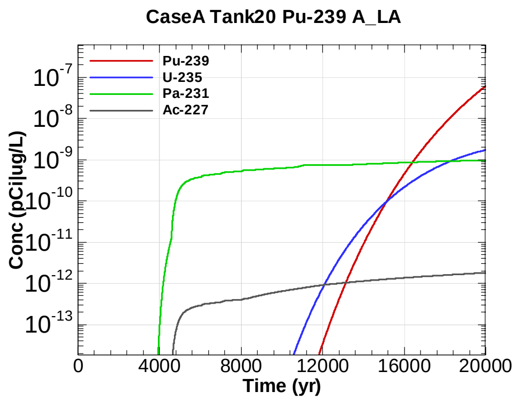

Figure E-2301 - 100m Aquifer Concentration for CaseA Tank20 Pu-239 A_LA

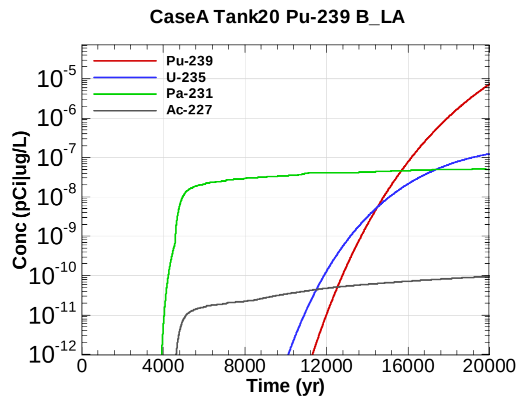

Figure E-2302 - 100m Aquifer Concentration for CaseA Tank20 Pu-239 B_LA

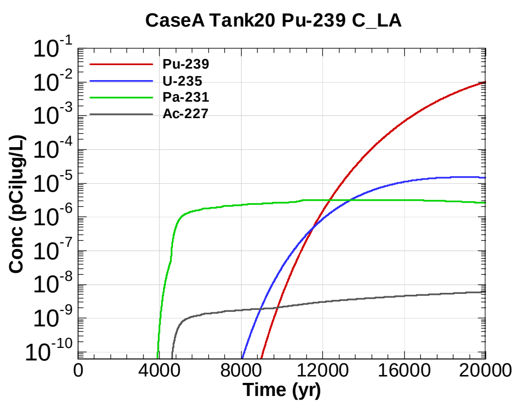

Figure E-2303 - 100m Aquifer Concentration for CaseA Tank20 Pu-239 C_LA

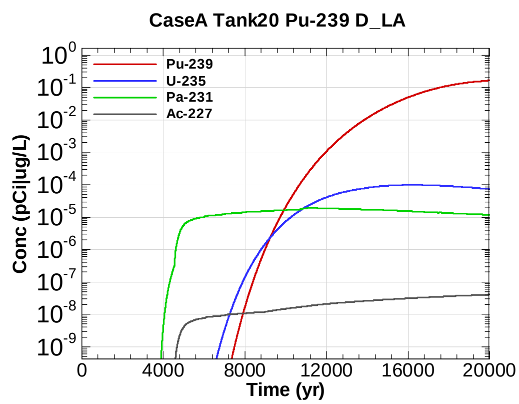

Figure E-2304 - 100m Aquifer Concentration for CaseA Tank20 Pu-239 D_LA

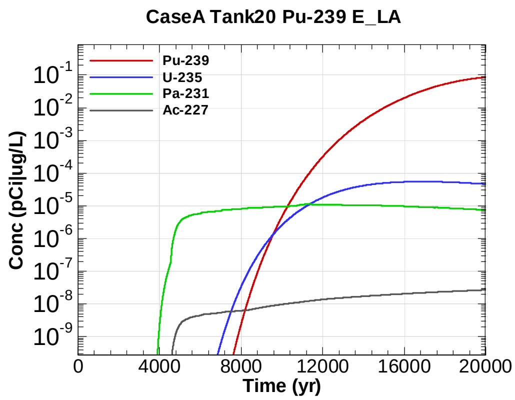

Figure E-2305 - 100m Aquifer Concentration for CaseA Tank20 Pu-239 E_LA

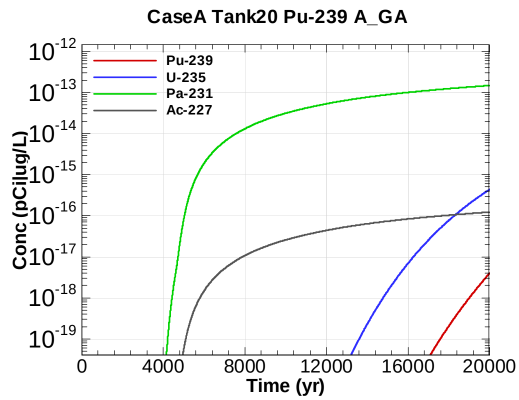

Figure E-2306 - 100m Aquifer Concentration for CaseA Tank20 Pu-239 A_GA

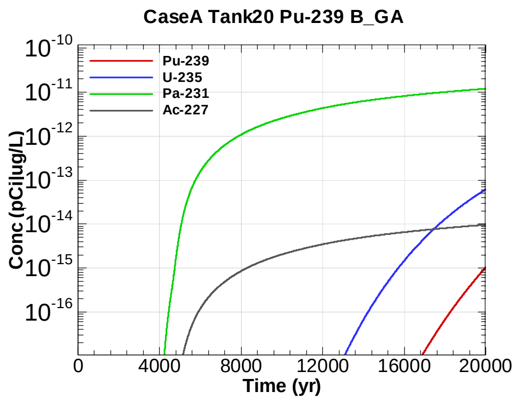

Figure E-2307 - 100m Aquifer Concentration for CaseA Tank20 Pu-239 B_GA

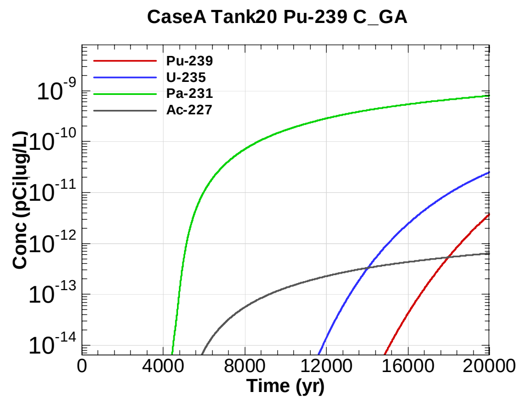

Figure E-2308 - 100m Aquifer Concentration for CaseA Tank20 Pu-239 C_GA

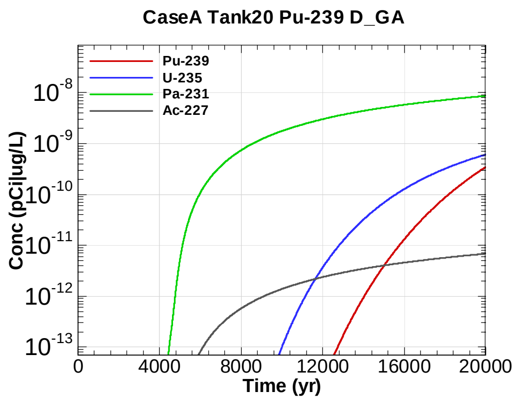

Figure E-2309 - 100m Aquifer Concentration for CaseA Tank20 Pu-239 D_GA

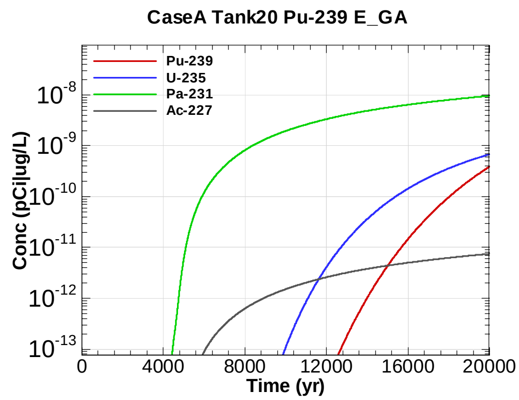

Figure E-2310 - 100m Aquifer Concentration for CaseA Tank20 Pu-239 E_GA

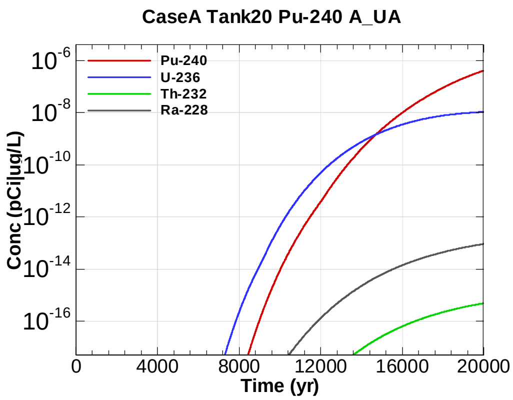

Figure E-2311 - 100m Aquifer Concentration for CaseA Tank20 Pu-240 A_UA

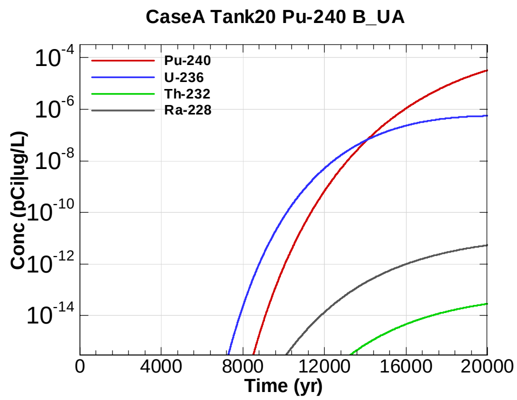

Figure E-2312 - 100m Aquifer Concentration for CaseA Tank20 Pu-240 B_UA

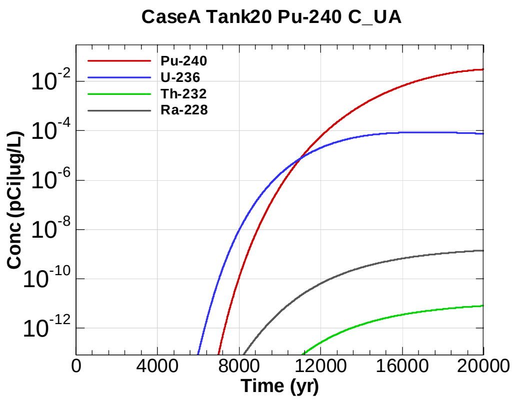

Figure E-2313 - 100m Aquifer Concentration for CaseA Tank20 Pu-240 C_UA

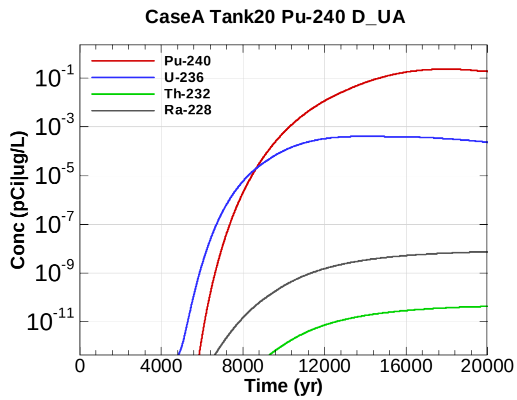

Figure E-2314 - 100m Aquifer Concentration for CaseA Tank20 Pu-240 D_UA

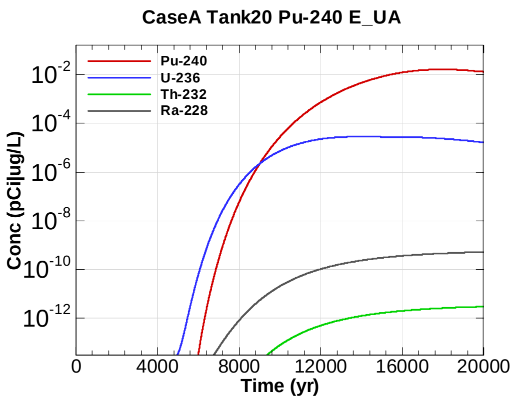

Figure E-2315 - 100m Aquifer Concentration for CaseA Tank20 Pu-240 E_UA

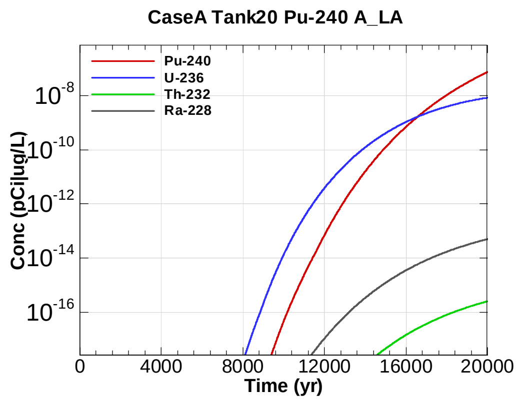

Figure E-2316 - 100m Aquifer Concentration for CaseA Tank20 Pu-240 A_LA

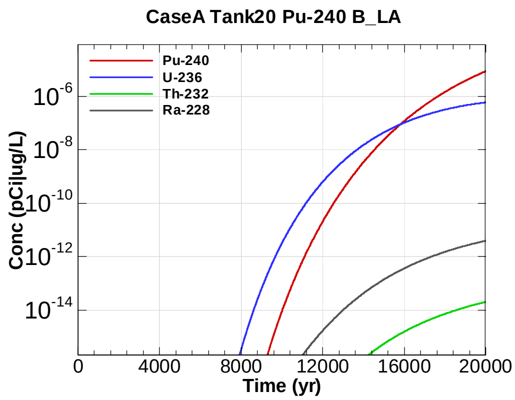

Figure E-2317 - 100m Aquifer Concentration for CaseA Tank20 Pu-240 B_LA

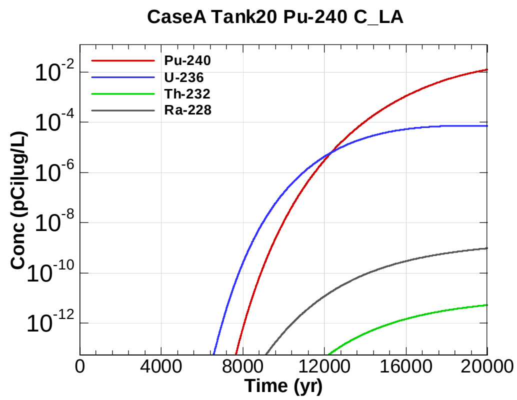

Figure E-2318 - 100m Aquifer Concentration for CaseA Tank20 Pu-240 C_LA

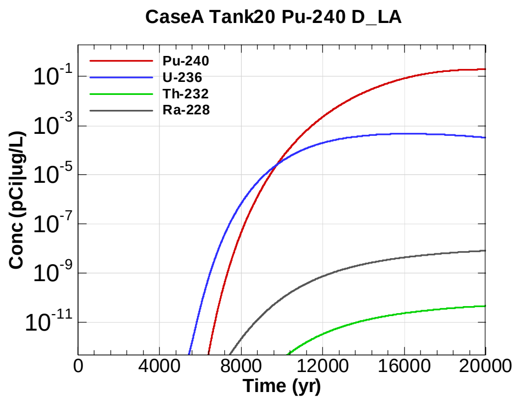

Figure E-2319 - 100m Aquifer Concentration for CaseA Tank20 Pu-240 D_LA

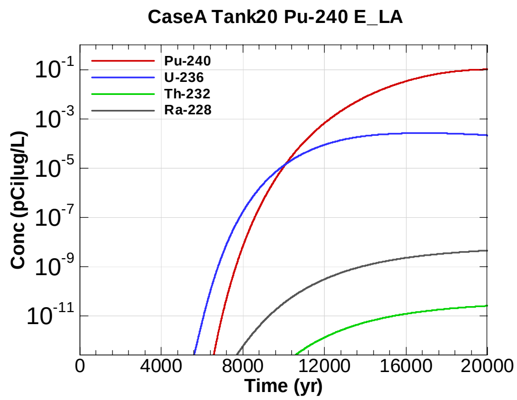

Figure E-2320 - 100m Aquifer Concentration for CaseA Tank20 Pu-240 E_LA

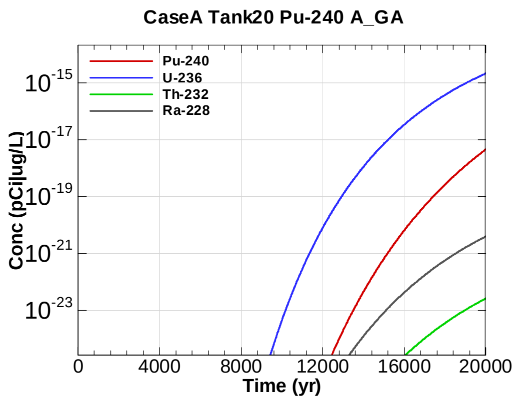

Figure E-2321 - 100m Aquifer Concentration for CaseA Tank20 Pu-240 A_GA

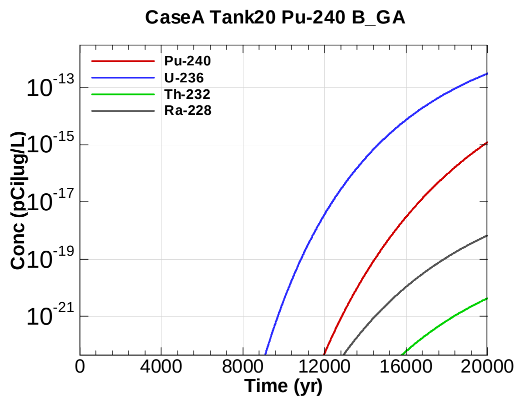

Figure E-2322 - 100m Aquifer Concentration for CaseA Tank20 Pu-240 B_GA

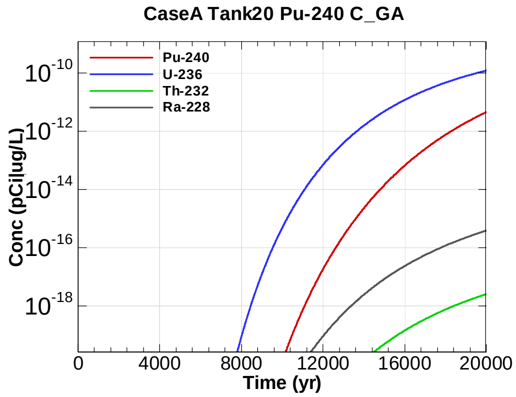

Figure E-2323 - 100m Aquifer Concentration for CaseA Tank20 Pu-240 C_GA

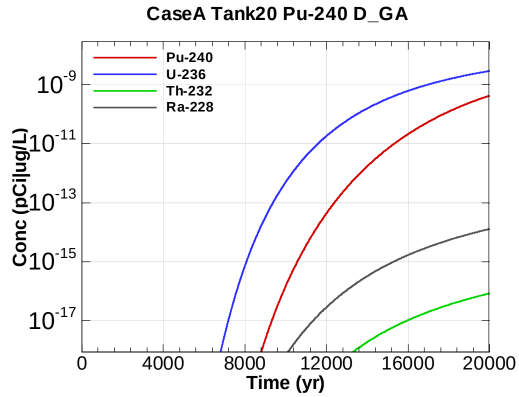

Figure E-2324 - 100m Aquifer Concentration for CaseA Tank20 Pu-240 D_GA

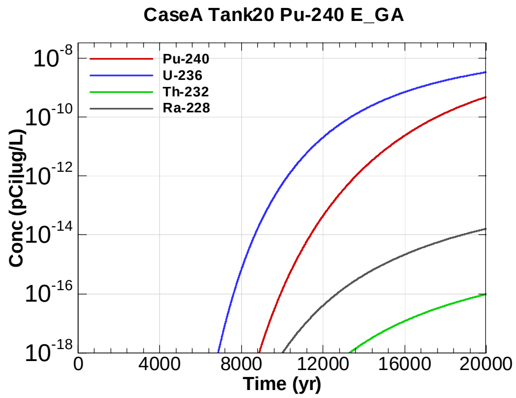

Figure E-2325 - 100m Aquifer Concentration for CaseA Tank20 Pu-240 E_GA

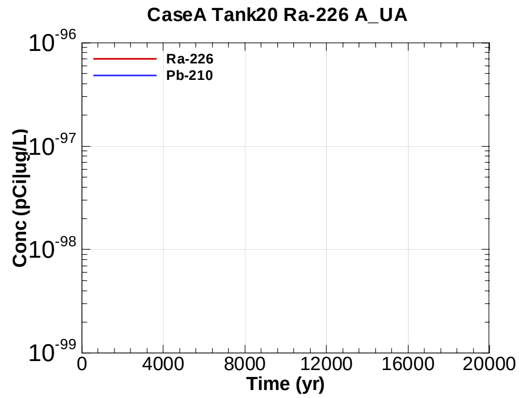

Figure E-2326 - 100m Aquifer Concentration for CaseA Tank20 Ra-226 A_UA

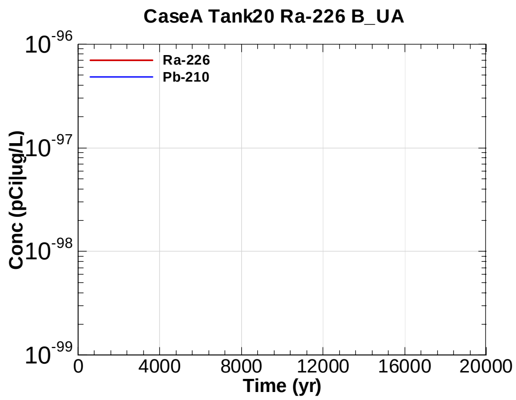

Figure E-2327 - 100m Aquifer Concentration for CaseA Tank20 Ra-226 B_UA

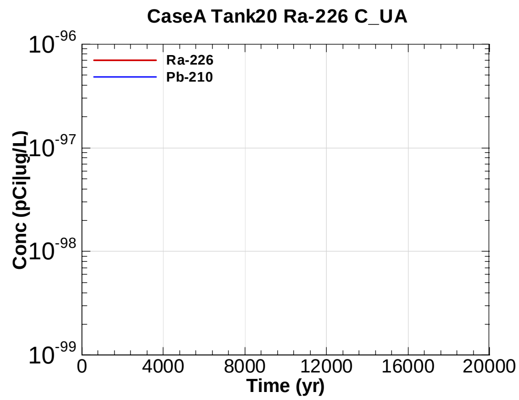

Figure E-2328 - 100m Aquifer Concentration for CaseA Tank20 Ra-226 C_UA

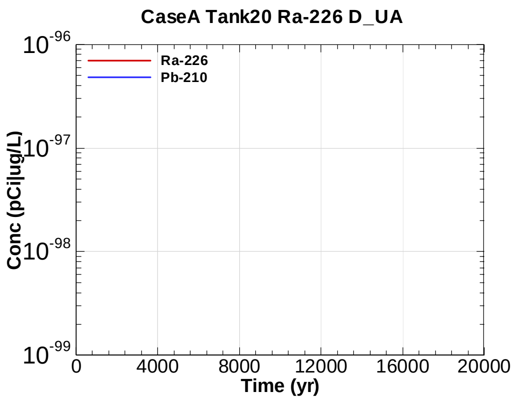

Figure E-2329 - 100m Aquifer Concentration for CaseA Tank20 Ra-226 D_UA

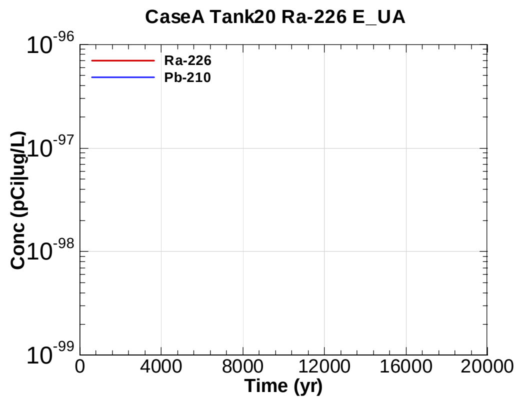

Figure E-2330 - 100m Aquifer Concentration for CaseA Tank20 Ra-226 E_UA

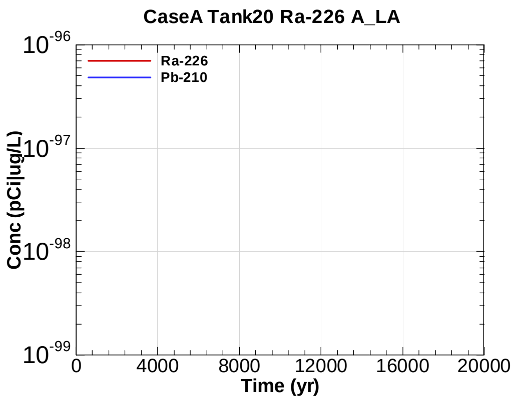

Figure E-2331 - 100m Aquifer Concentration for CaseA Tank20 Ra-226 A_LA

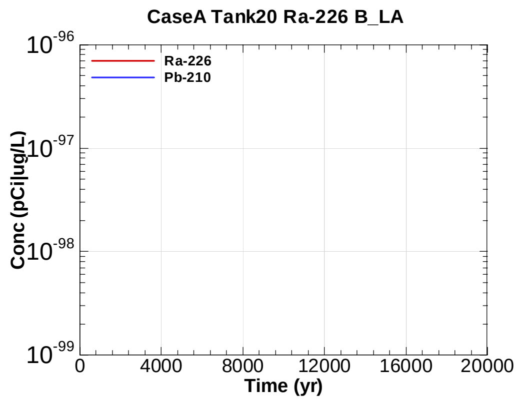

Figure E-2332 - 100m Aquifer Concentration for CaseA Tank20 Ra-226 B_LA

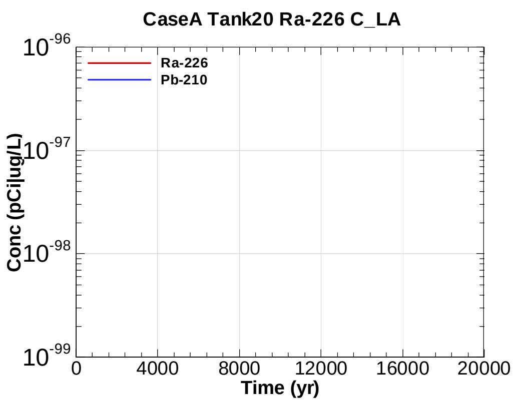

Figure E-2333 - 100m Aquifer Concentration for CaseA Tank20 Ra-226 C_LA

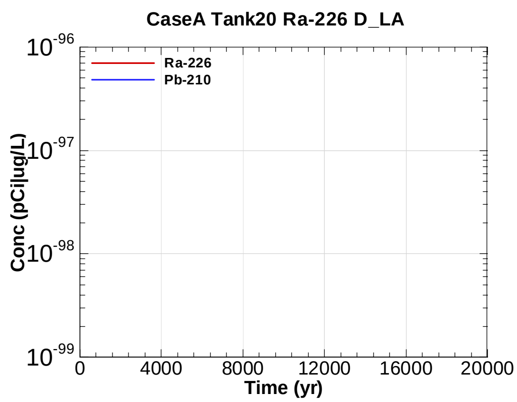

Figure E-2334 - 100m Aquifer Concentration for CaseA Tank20 Ra-226 D_LA

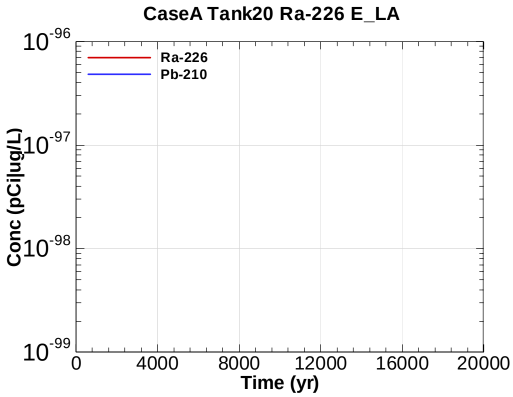

Figure E-2335 - 100m Aquifer Concentration for CaseA Tank20 Ra-226 E_LA

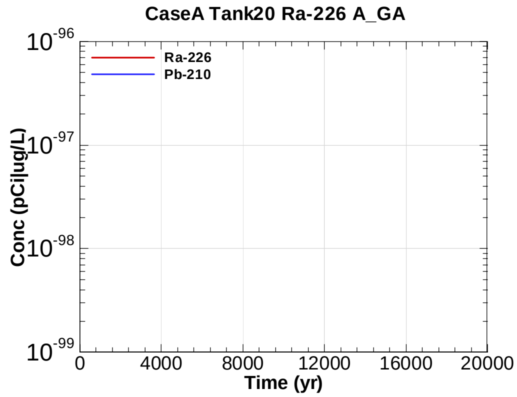

Figure E-2336 - 100m Aquifer Concentration for CaseA Tank20 Ra-226 A_GA

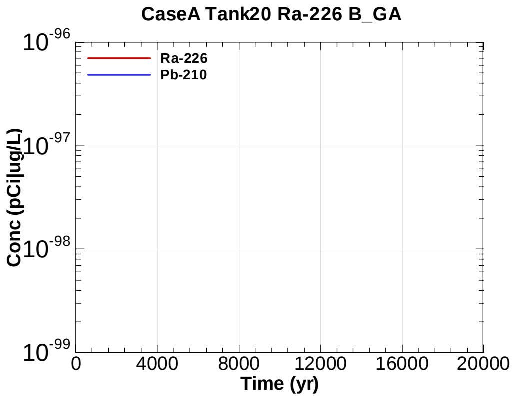

Figure E-2337 - 100m Aquifer Concentration for CaseA Tank20 Ra-226 B_GA

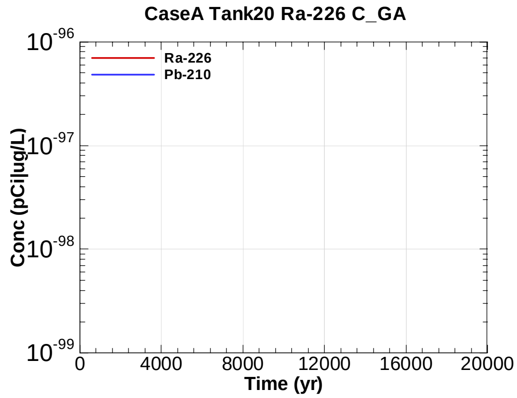

Figure E-2338 - 100m Aquifer Concentration for CaseA Tank20 Ra-226 C_GA

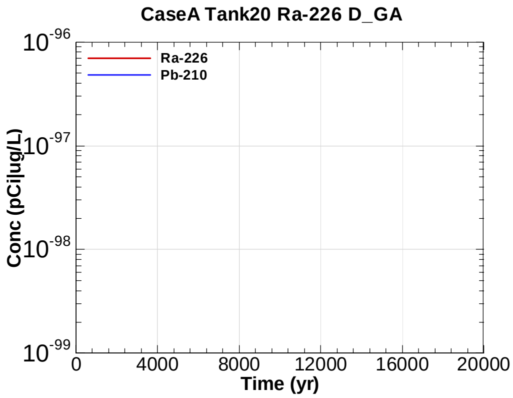

Figure E-2339 - 100m Aquifer Concentration for CaseA Tank20 Ra-226 D_GA

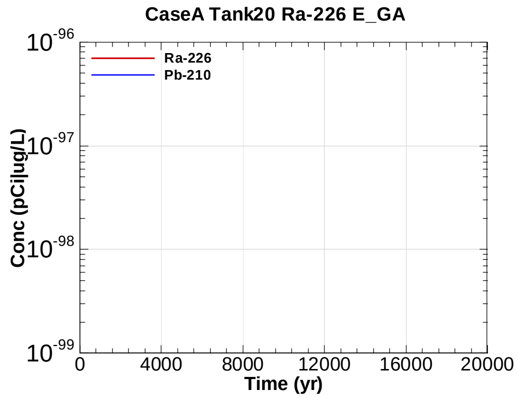

Figure E-2340 - 100m Aquifer Concentration for CaseA Tank20 Ra-226 E_GA

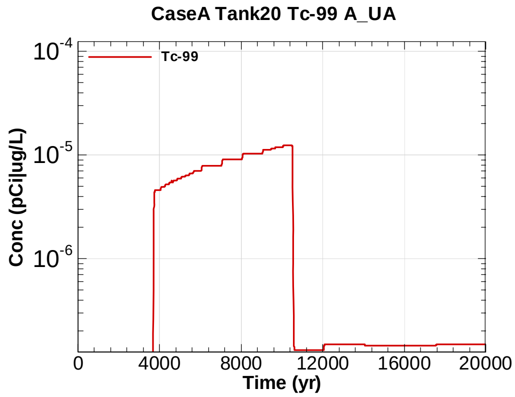

Figure E-2341 - 100m Aquifer Concentration for CaseA Tank20 Tc-99 A_UA

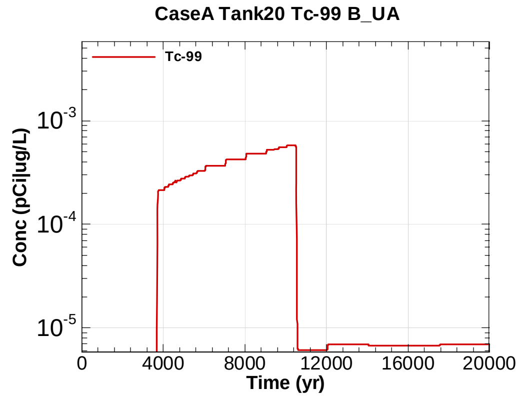

Figure E-2342 - 100m Aquifer Concentration for CaseA Tank20 Tc-99 B_UA

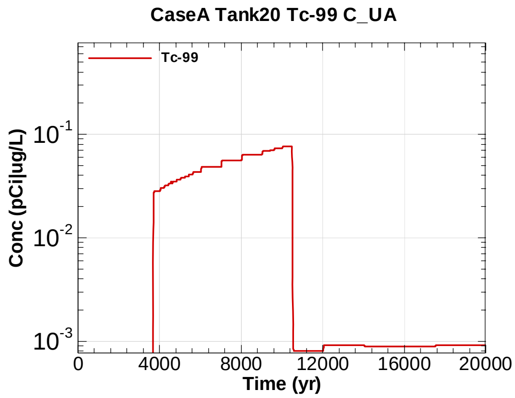

Figure E-2343 - 100m Aquifer Concentration for CaseA Tank20 Tc-99 C_UA

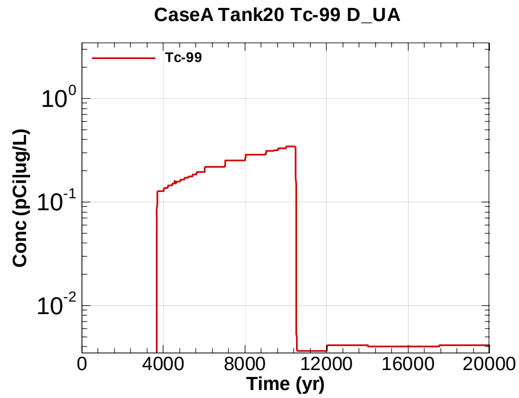

Figure E-2344 - 100m Aquifer Concentration for CaseA Tank20 Tc-99 D_UA

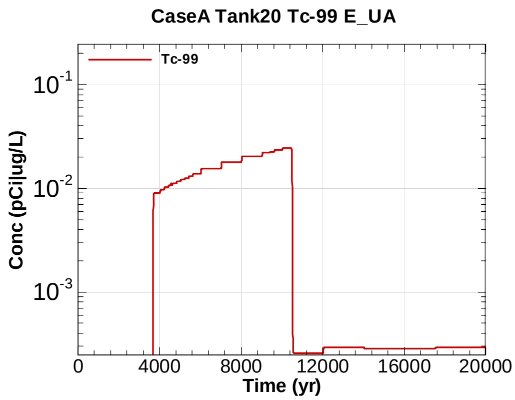

Figure E-2345 - 100m Aquifer Concentration for CaseA Tank20 Tc-99 E_UA

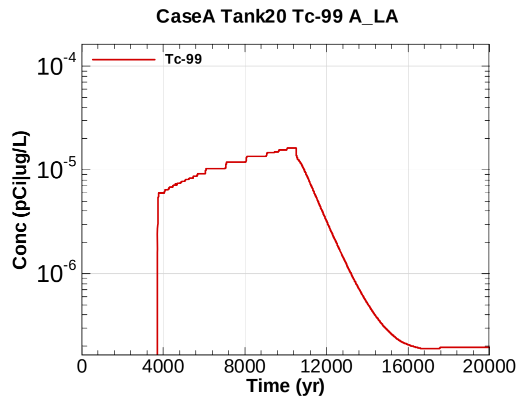

Figure E-2346 - 100m Aquifer Concentration for CaseA Tank20 Tc-99 A_LA

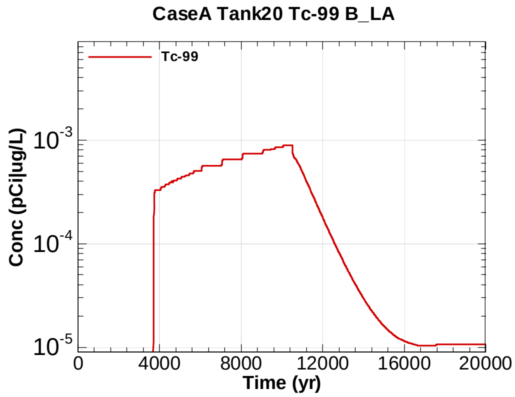

Figure E-2347 - 100m Aquifer Concentration for CaseA Tank20 Tc-99 B_LA

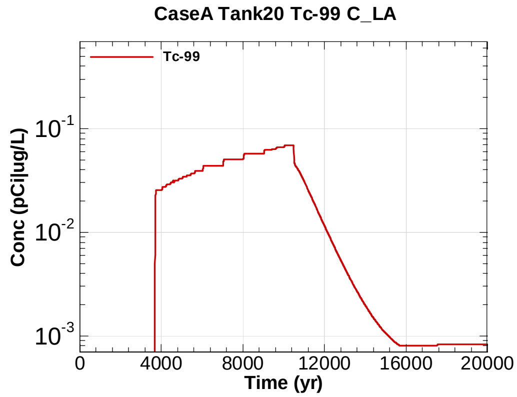

Figure E-2348 - 100m Aquifer Concentration for CaseA Tank20 Tc-99 C_LA

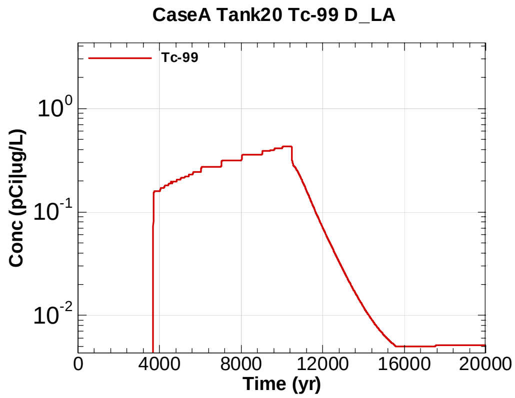

Figure E-2349 - 100m Aquifer Concentration for CaseA Tank20 Tc-99 D_LA

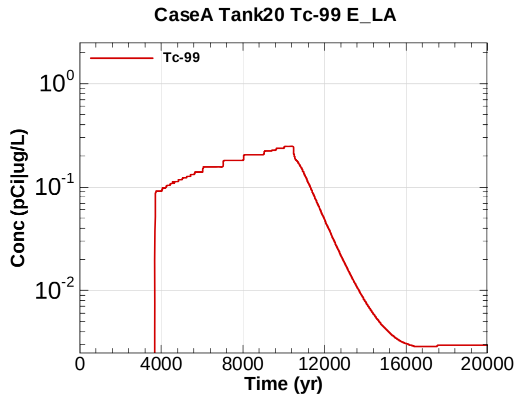

Figure E-2350 - 100m Aquifer Concentration for CaseA Tank20 Tc-99 E_LA

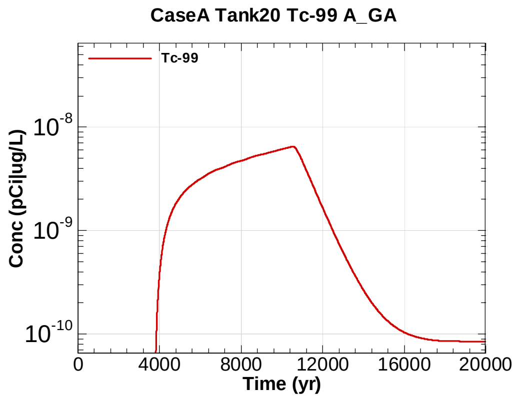

Figure E-2351 - 100m Aquifer Concentration for CaseA Tank20 Tc-99 A_GA

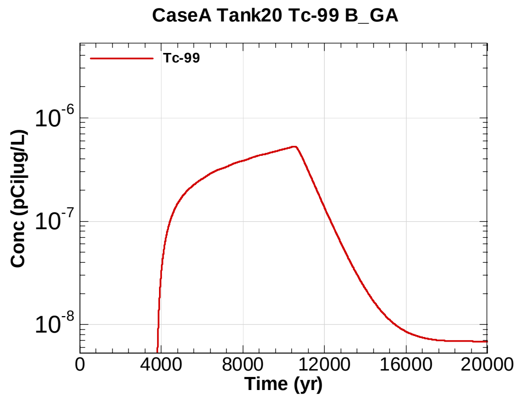

Figure E-2352 - 100m Aquifer Concentration for CaseA Tank20 Tc-99 B_GA

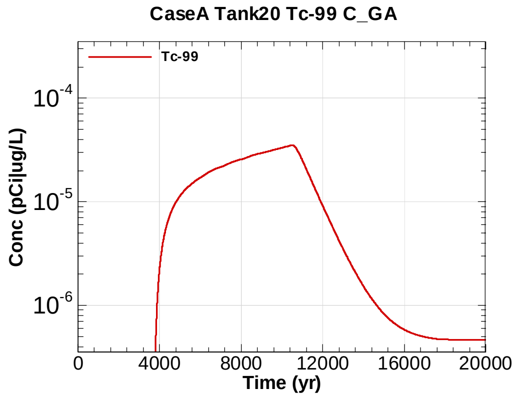

Figure E-2353 - 100m Aquifer Concentration for CaseA Tank20 Tc-99 C_GA

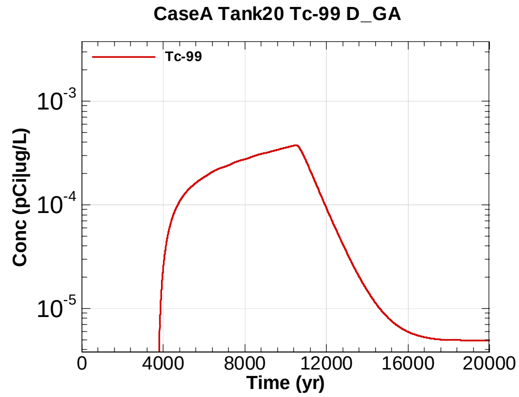

Figure E-2354 - 100m Aquifer Concentration for CaseA Tank20 Tc-99 D_GA

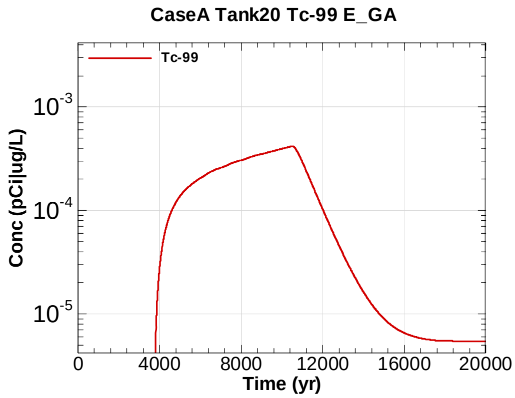

Figure E-2355 - 100m Aquifer Concentration for CaseA Tank20 Tc-99 E_GA

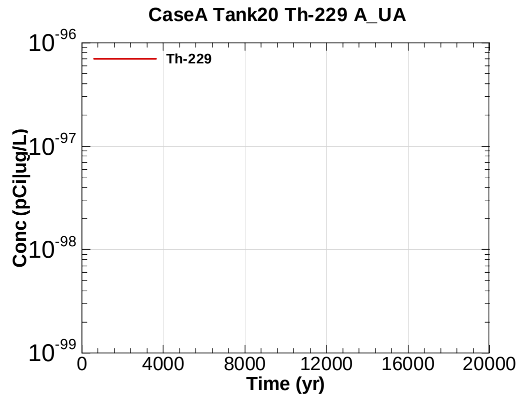

Figure E-2356 - 100m Aquifer Concentration for CaseA Tank20 Th-229 A_UA

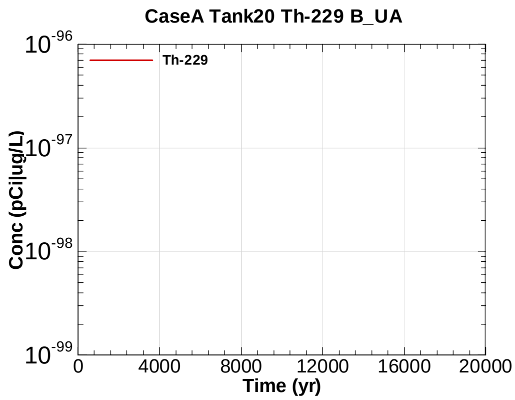

Figure E-2357 - 100m Aquifer Concentration for CaseA Tank20 Th-229 B_UA

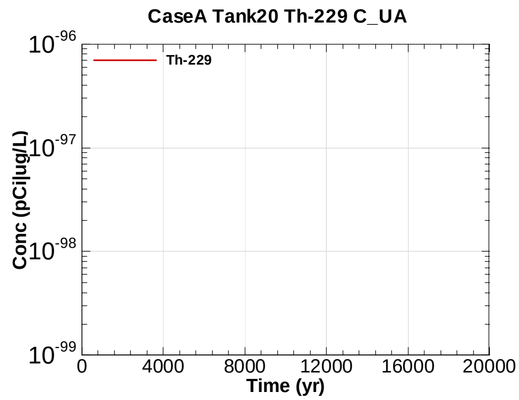

Figure E-2358 - 100m Aquifer Concentration for CaseA Tank20 Th-229 C_UA

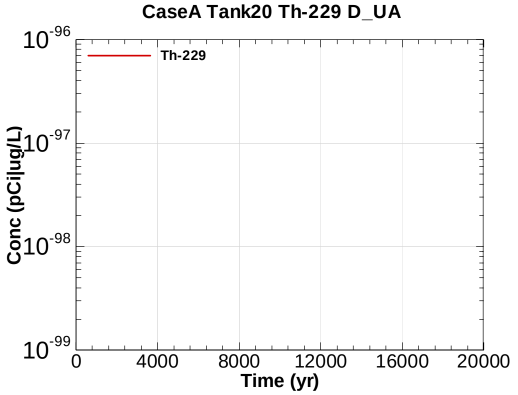

Figure E-2359 - 100m Aquifer Concentration for CaseA Tank20 Th-229 D_UA

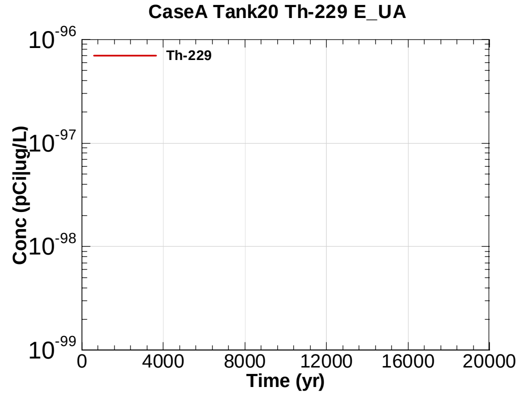

Figure E-2360 - 100m Aquifer Concentration for CaseA Tank20 Th-229 E_UA

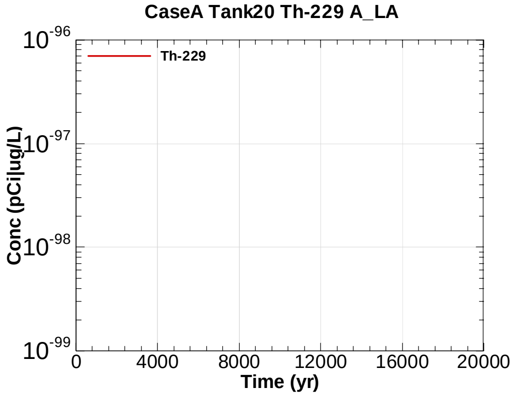

Figure E-2361 - 100m Aquifer Concentration for CaseA Tank20 Th-229 A_LA

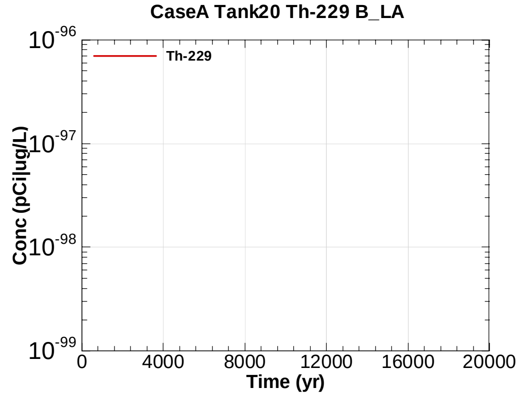

Figure E-2362 - 100m Aquifer Concentration for CaseA Tank20 Th-229 B_LA

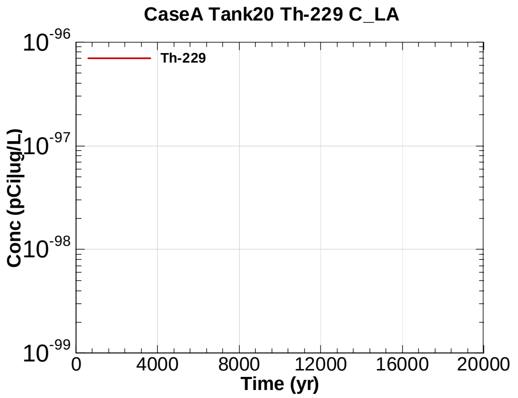

Figure E-2363 - 100m Aquifer Concentration for CaseA Tank20 Th-229 C_LA

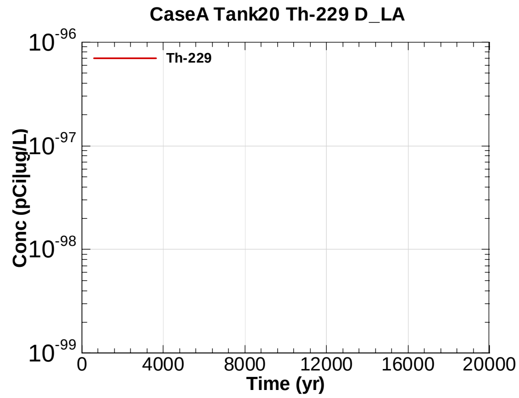

Figure E-2364 - 100m Aquifer Concentration for CaseA Tank20 Th-229 D_LA

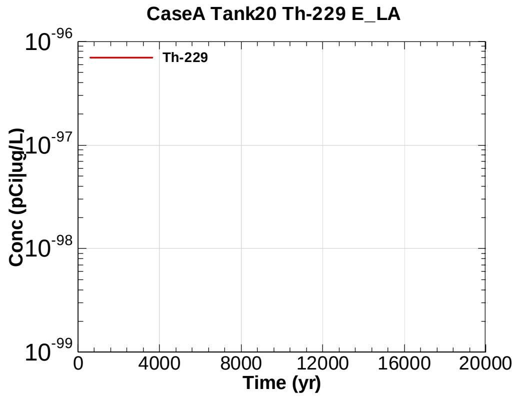

Figure E-2365 - 100m Aquifer Concentration for CaseA Tank20 Th-229 E_LA

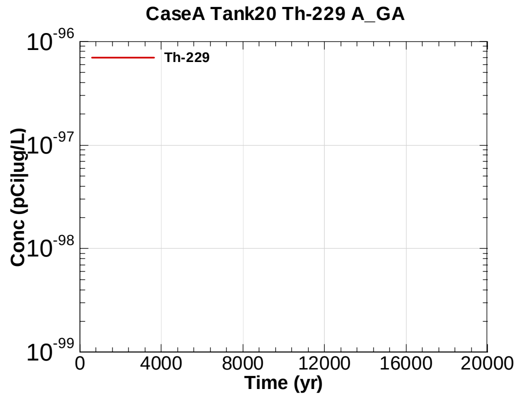

Figure E-2366 - 100m Aquifer Concentration for CaseA Tank20 Th-229 A_GA

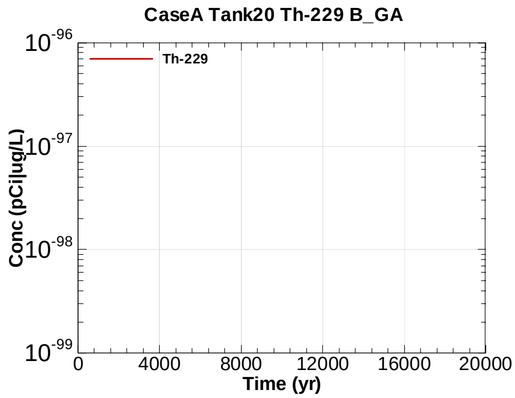

Figure E-2367 - 100m Aquifer Concentration for CaseA Tank20 Th-229 B_GA

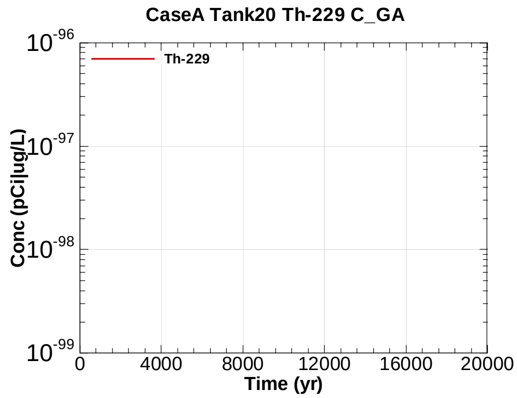

Figure E-2368 - 100m Aquifer Concentration for CaseA Tank20 Th-229 C_GA

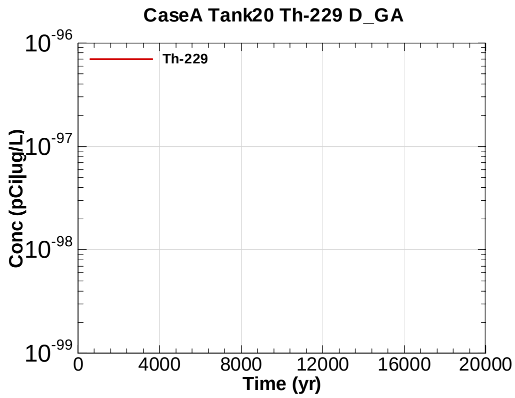

Figure E-2369 - 100m Aquifer Concentration for CaseA Tank20 Th-229 D_GA

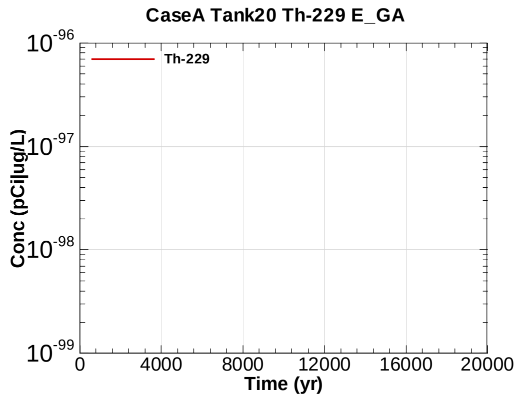

Figure E-2370 - 100m Aquifer Concentration for CaseA Tank20 Th-229 E_GA

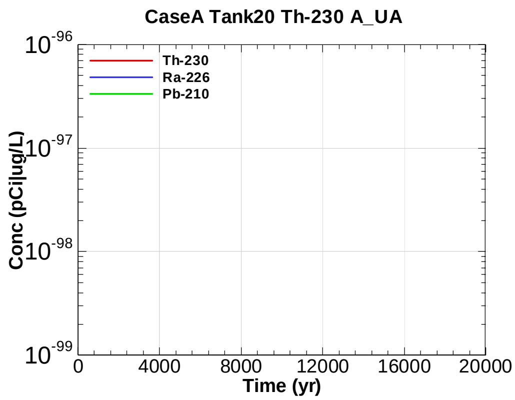

Figure E-2371 - 100m Aquifer Concentration for CaseA Tank20 Th-230 A_UA

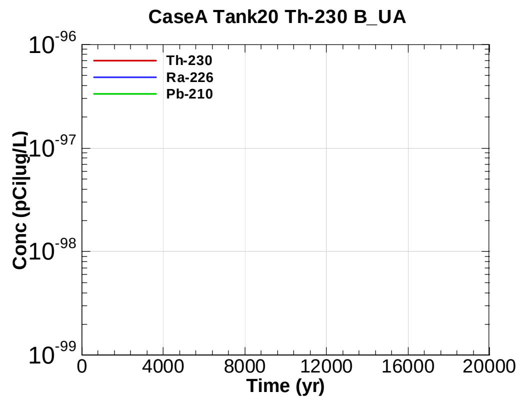

Figure E-2372 - 100m Aquifer Concentration for CaseA Tank20 Th-230 B_UA

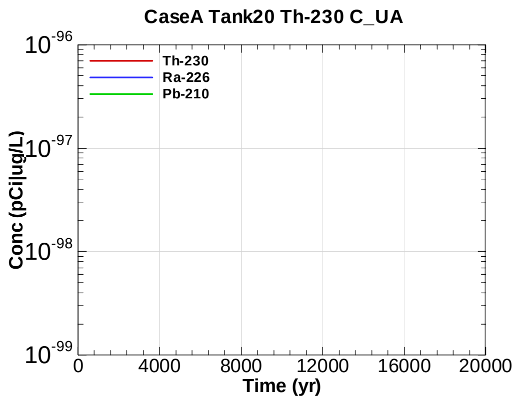

Figure E-2373 - 100m Aquifer Concentration for CaseA Tank20 Th-230 C_UA

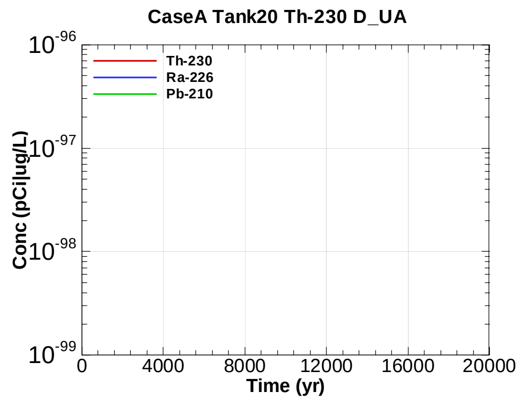

Figure E-2374 - 100m Aquifer Concentration for CaseA Tank20 Th-230 D_UA

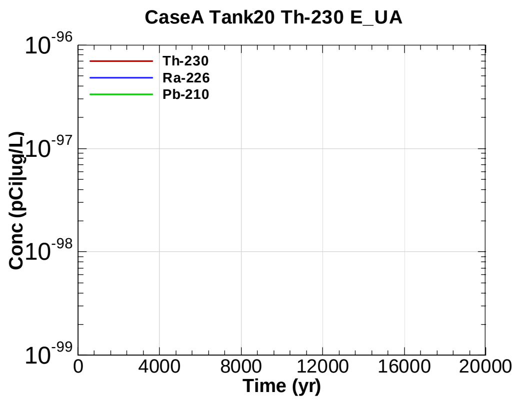

Figure E-2375 - 100m Aquifer Concentration for CaseA Tank20 Th-230 E_UA

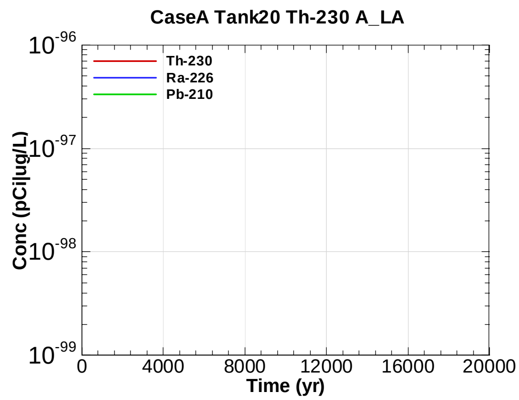

Figure E-2376 - 100m Aquifer Concentration for CaseA Tank20 Th-230 A_LA

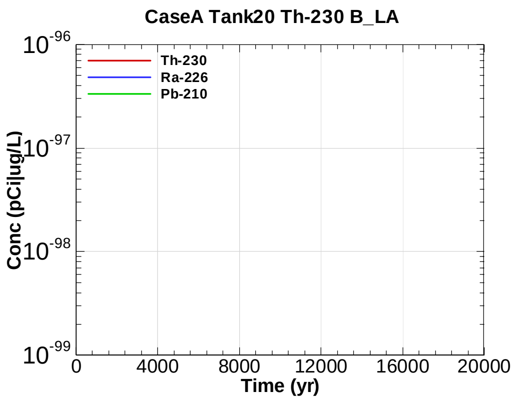

Figure E-2377 - 100m Aquifer Concentration for CaseA Tank20 Th-230 B_LA

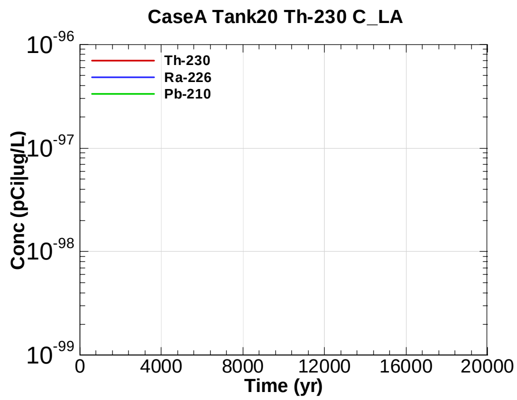

Figure E-2378 - 100m Aquifer Concentration for CaseA Tank20 Th-230 C_LA

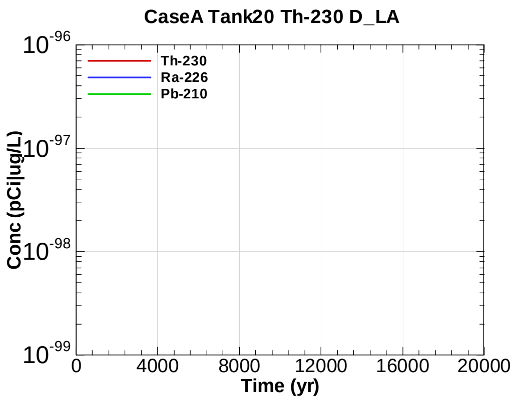

Figure E-2379 - 100m Aquifer Concentration for CaseA Tank20 Th-230 D_LA

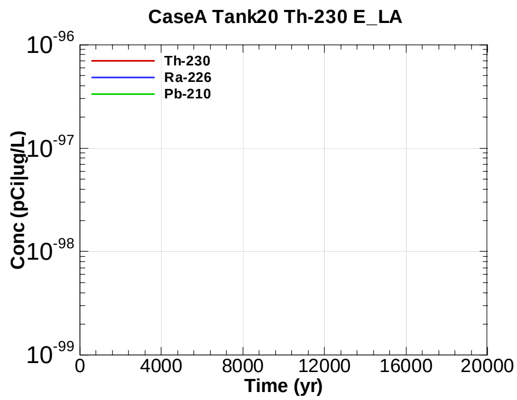

Figure E-2380 - 100m Aquifer Concentration for CaseA Tank20 Th-230 E_LA

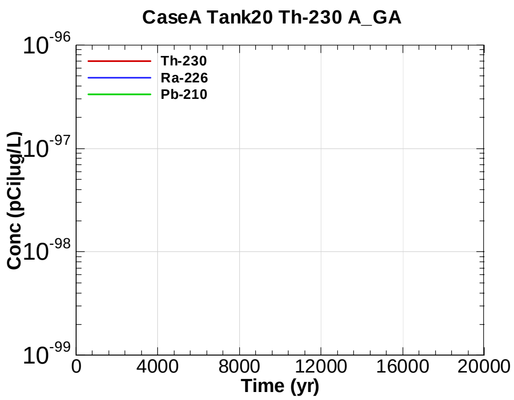

Figure E-2381 - 100m Aquifer Concentration for CaseA Tank20 Th-230 A_GA

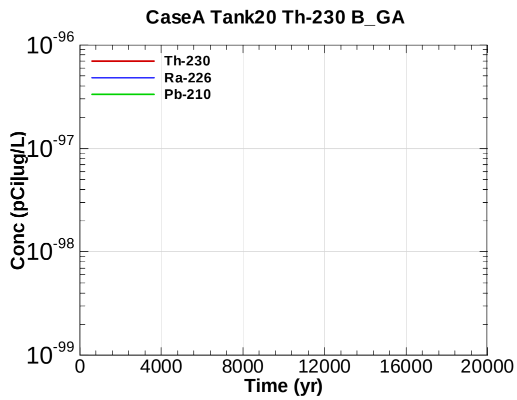

Figure E-2382 - 100m Aquifer Concentration for CaseA Tank20 Th-230 B_GA

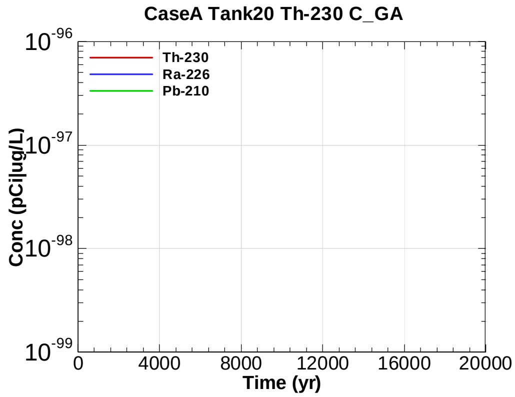

Figure E-2383 - 100m Aquifer Concentration for CaseA Tank20 Th-230 C_GA

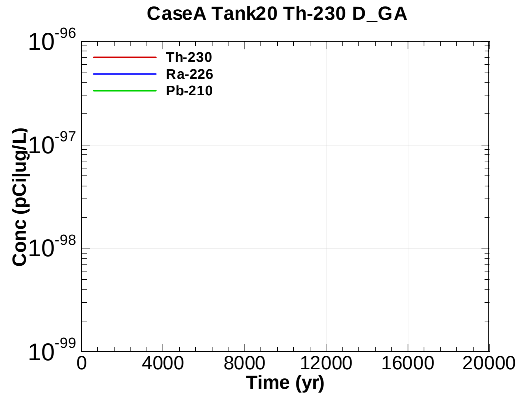

Figure E-2384 - 100m Aquifer Concentration for CaseA Tank20 Th-230 D_GA

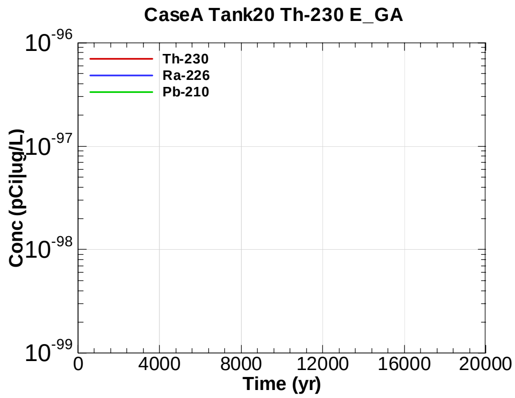

Figure E-2385 - 100m Aquifer Concentration for CaseA Tank20 Th-230 E_GA

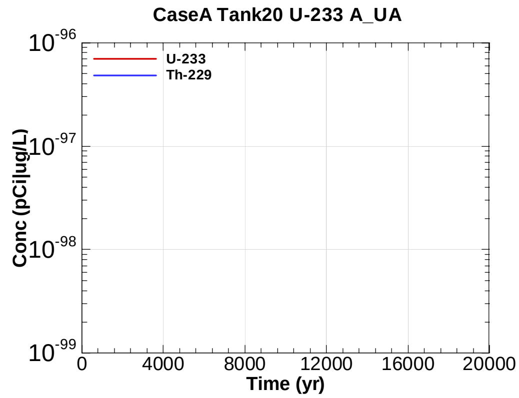

Figure E-2386 - 100m Aquifer Concentration for CaseA Tank20 U-233 A_UA

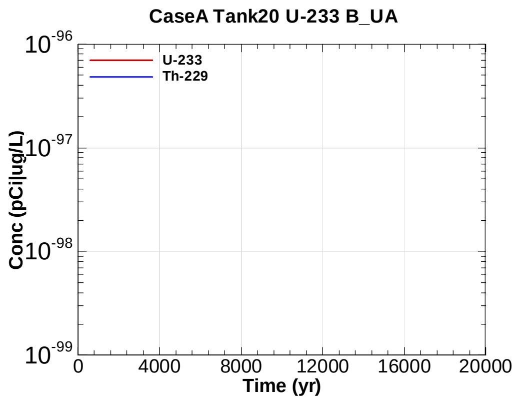

Figure E-2387 - 100m Aquifer Concentration for CaseA Tank20 U-233 B_UA

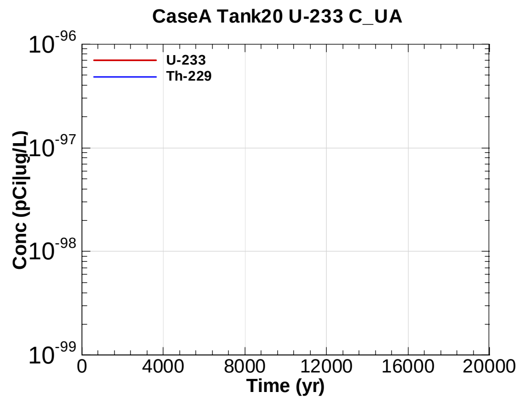

Figure E-2388 - 100m Aquifer Concentration for CaseA Tank20 U-233 C_UA

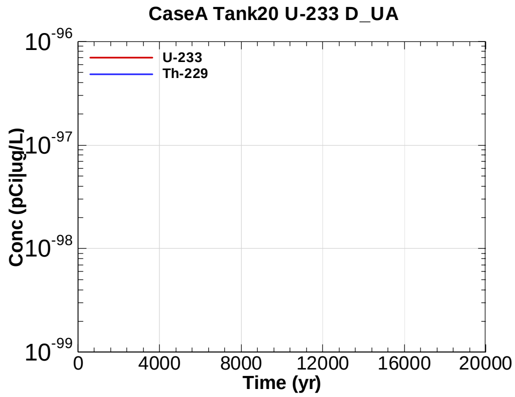

Figure E-2389 - 100m Aquifer Concentration for CaseA Tank20 U-233 D_UA

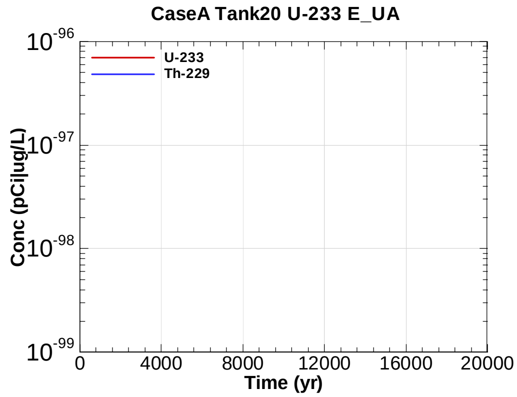

Figure E-2390 - 100m Aquifer Concentration for CaseA Tank20 U-233 E_UA

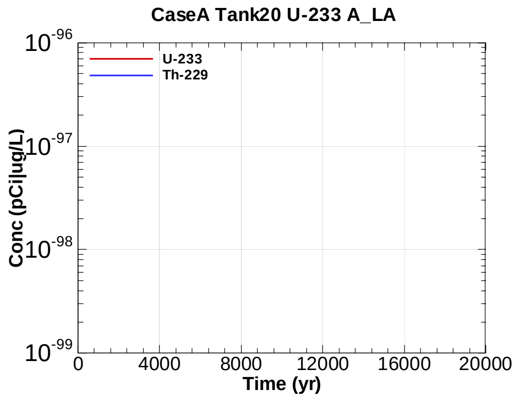

Figure E-2391 - 100m Aquifer Concentration for CaseA Tank20 U-233 A_LA

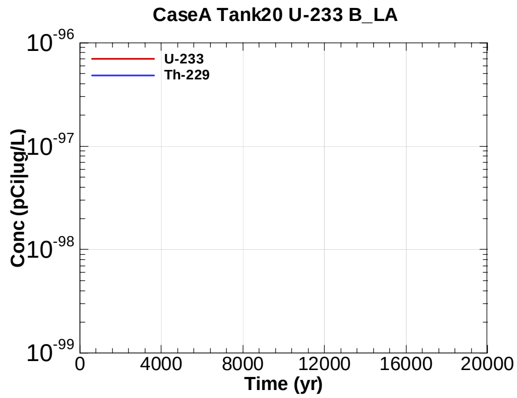

Figure E-2392 - 100m Aquifer Concentration for CaseA Tank20 U-233 B_LA

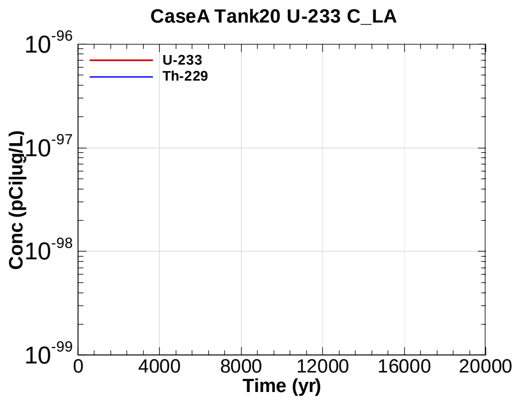

Figure E-2393 - 100m Aquifer Concentration for CaseA Tank20 U-233 C_LA

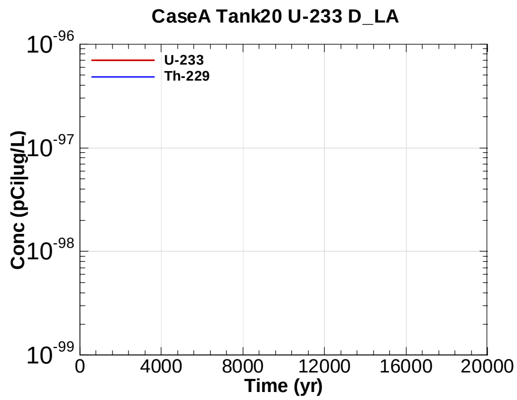

Figure E-2394 - 100m Aquifer Concentration for CaseA Tank20 U-233 D_LA

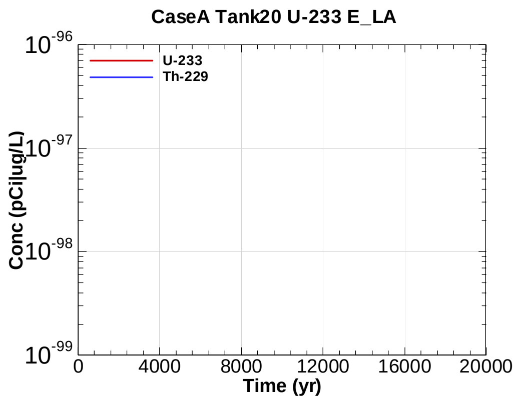

Figure E-2395 - 100m Aquifer Concentration for CaseA Tank20 U-233 E_LA

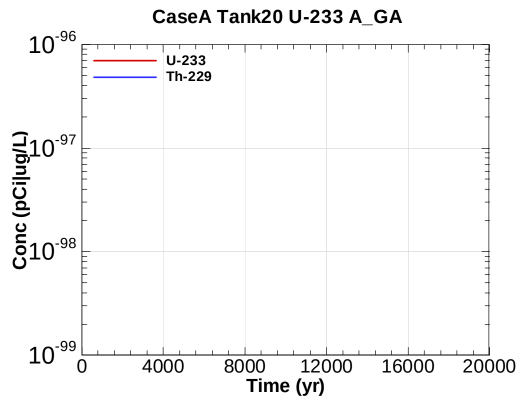

Figure E-2396 - 100m Aquifer Concentration for CaseA Tank20 U-233 A_GA

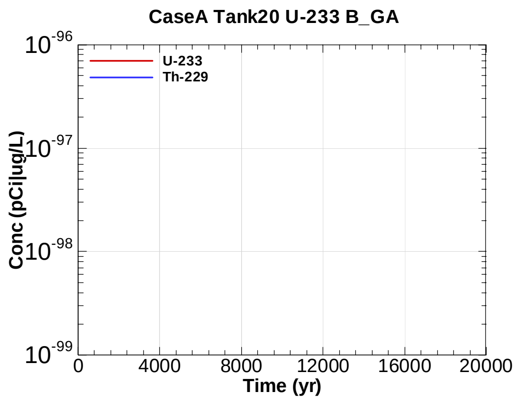

Figure E-2397 - 100m Aquifer Concentration for CaseA Tank20 U-233 B_GA

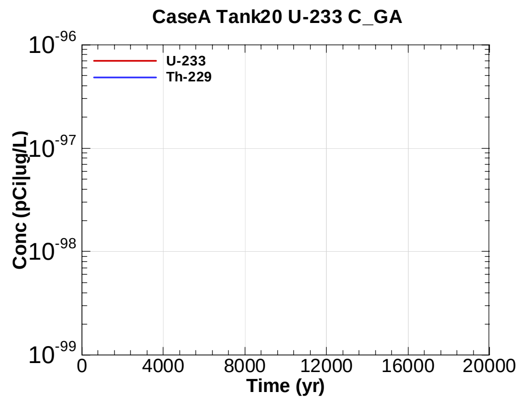

Figure E-2398 - 100m Aquifer Concentration for CaseA Tank20 U-233 C_GA

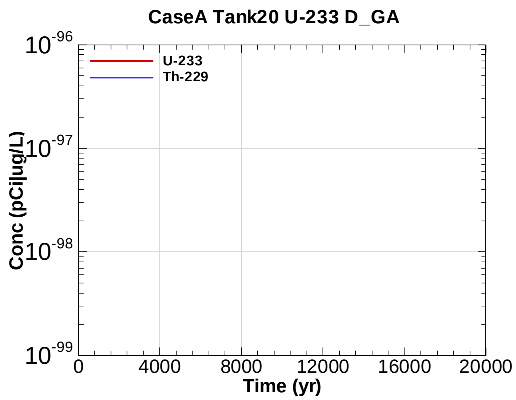

Figure E-2399 - 100m Aquifer Concentration for CaseA Tank20 U-233 D_GA

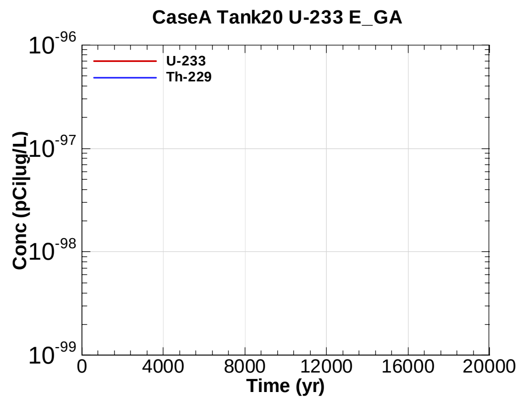

Figure E-2400 - 100m Aquifer Concentration for CaseA Tank20 U-233 E_GA

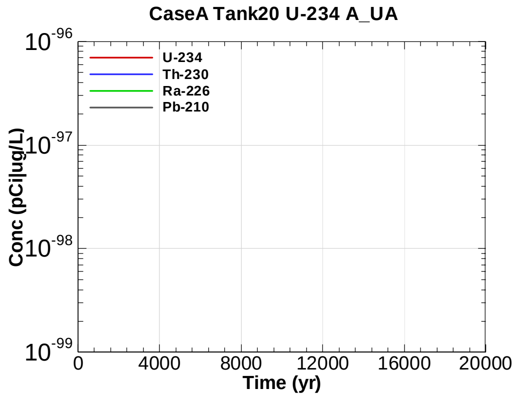

Figure E-2401 - 100m Aquifer Concentration for CaseA Tank20 U-234 A_UA

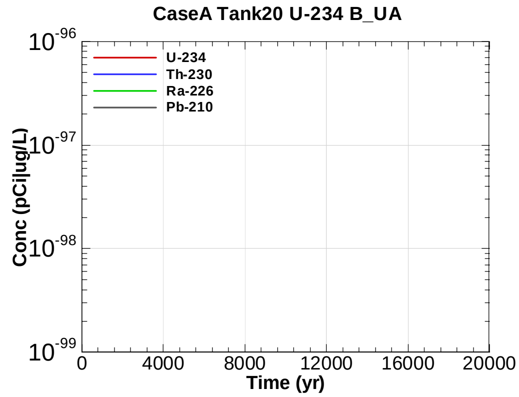

Figure E-2402 - 100m Aquifer Concentration for CaseA Tank20 U-234 B_UA

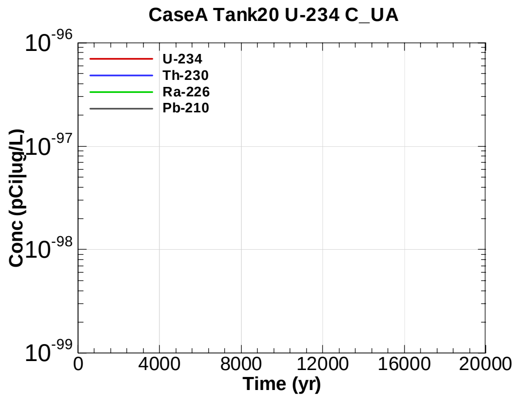

Figure E-2403 - 100m Aquifer Concentration for CaseA Tank20 U-234 C_UA

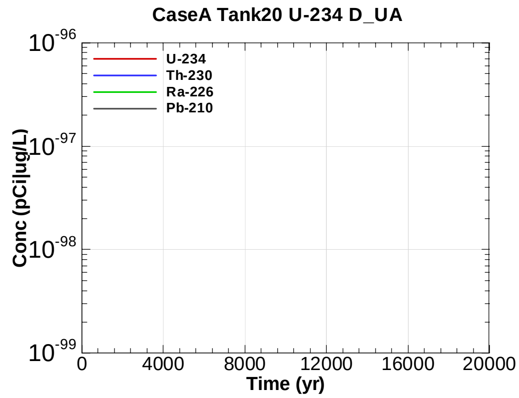

Figure E-2404 - 100m Aquifer Concentration for CaseA Tank20 U-234 D_UA

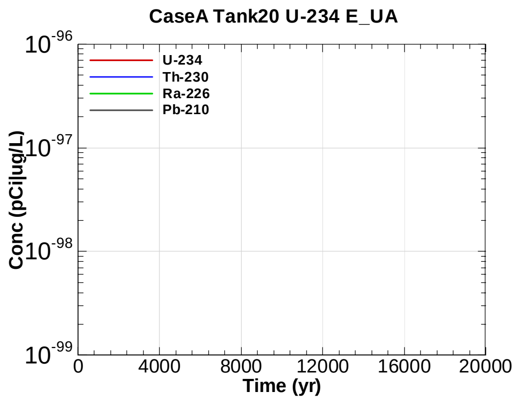

Figure E-2405 - 100m Aquifer Concentration for CaseA Tank20 U-234 E_UA

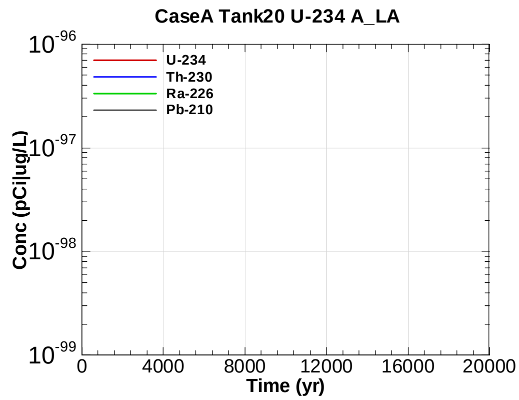

Figure E-2406 - 100m Aquifer Concentration for CaseA Tank20 U-234 A_LA

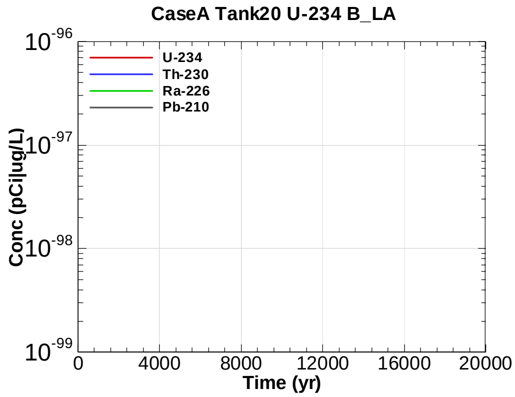

Figure E-2407 - 100m Aquifer Concentration for CaseA Tank20 U-234 B_LA

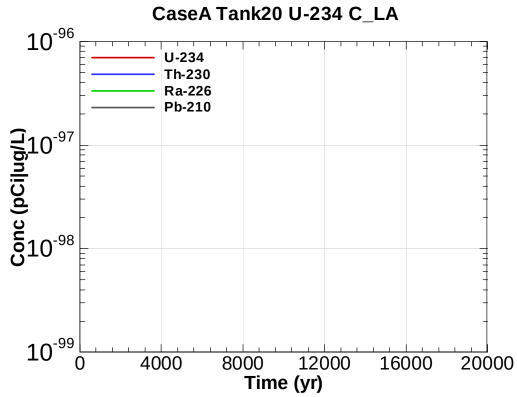

Figure E-2408 - 100m Aquifer Concentration for CaseA Tank20 U-234 C_LA

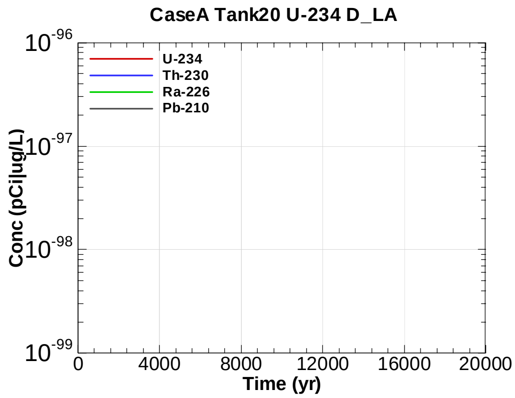

Figure E-2409 - 100m Aquifer Concentration for CaseA Tank20 U-234 D_LA

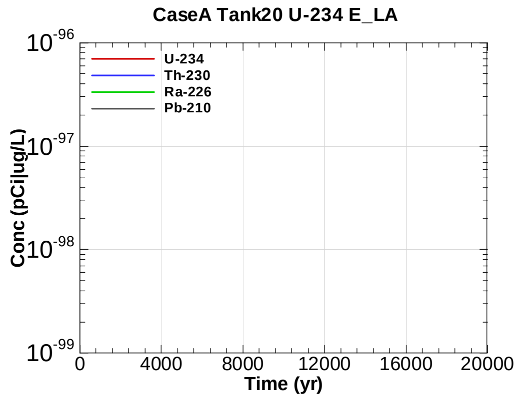

Figure E-2410 - 100m Aquifer Concentration for CaseA Tank20 U-234 E_LA

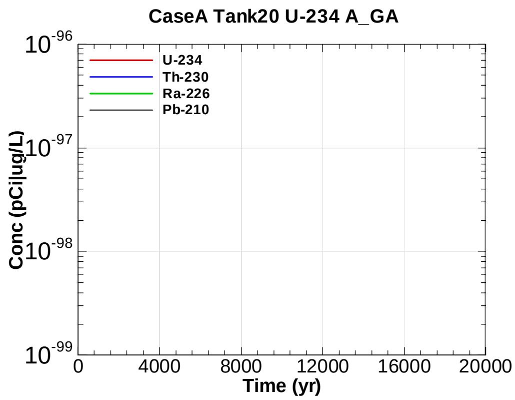

Figure E-2411 - 100m Aquifer Concentration for CaseA Tank20 U-234 A_GA

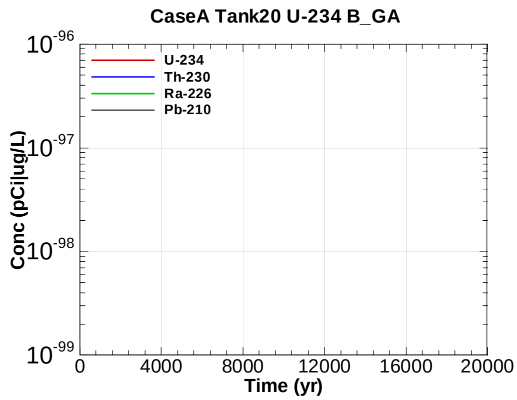

Figure E-2412 - 100m Aquifer Concentration for CaseA Tank20 U-234 B_GA

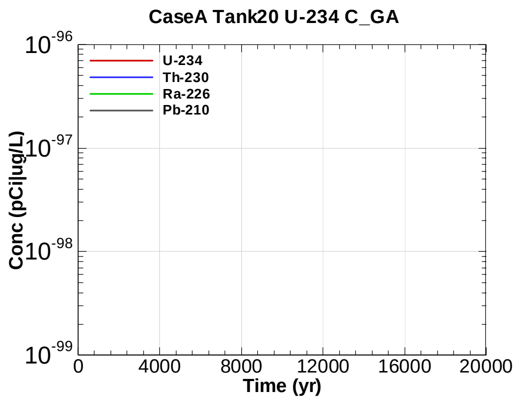

Figure E-2413 - 100m Aquifer Concentration for CaseA Tank20 U-234 C_GA

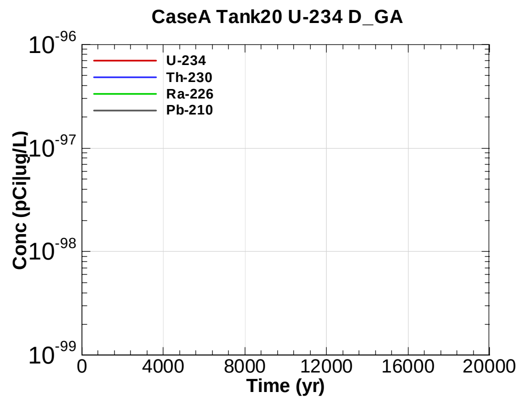

Figure E-2414 - 100m Aquifer Concentration for CaseA Tank20 U-234 D_GA

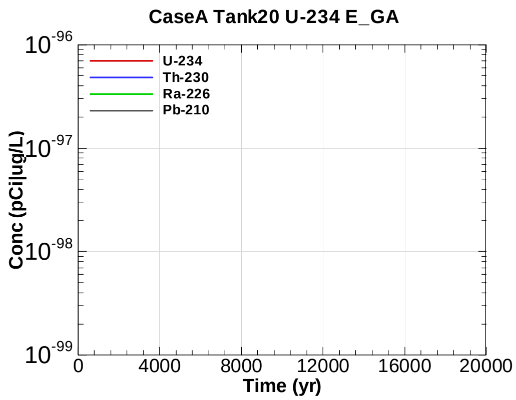

Figure E-2415 - 100m Aquifer Concentration for CaseA Tank20 U-234 E_GA

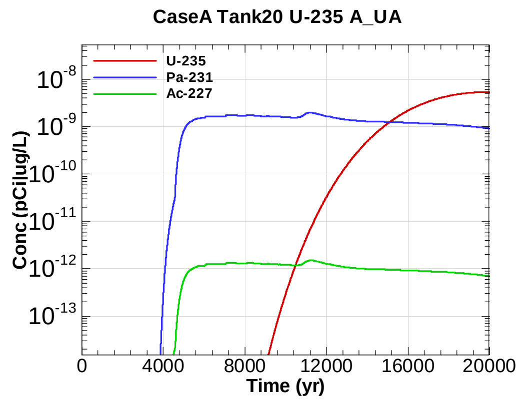

Figure E-2416 - 100m Aquifer Concentration for CaseA Tank20 U-235 A_UA

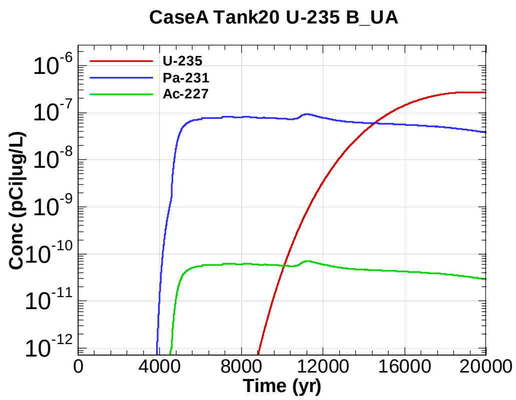

Figure E-2417 - 100m Aquifer Concentration for CaseA Tank20 U-235 B_UA

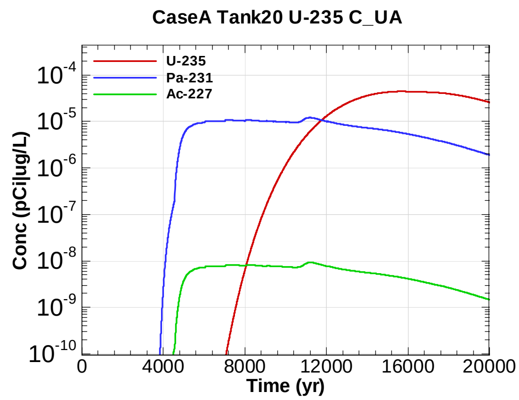

Figure E-2418 - 100m Aquifer Concentration for CaseA Tank20 U-235 C_UA

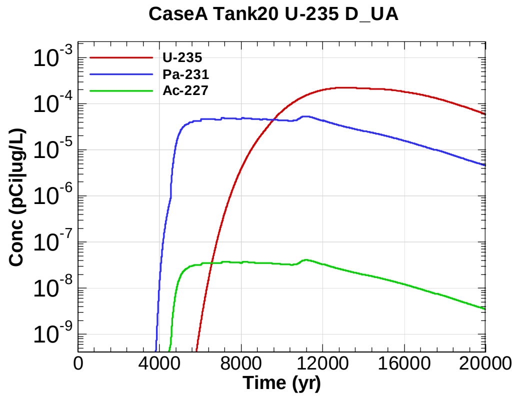

Figure E-2419 - 100m Aquifer Concentration for CaseA Tank20 U-235 D_UA

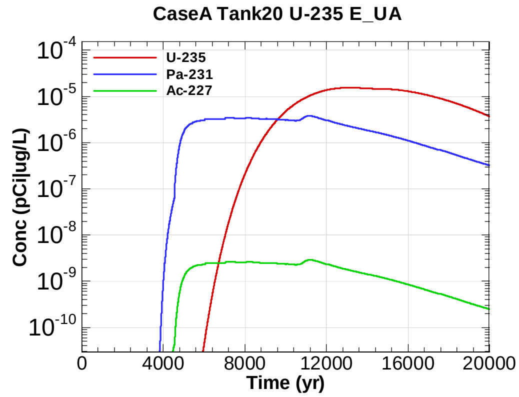

Figure E-2420 - 100m Aquifer Concentration for CaseA Tank20 U-235 E_UA

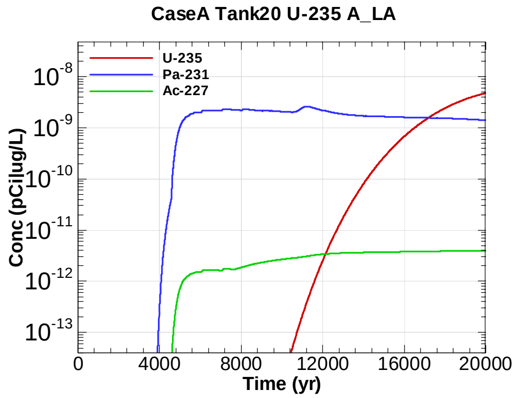

Figure E-2421 - 100m Aquifer Concentration for CaseA Tank20 U-235 A_LA

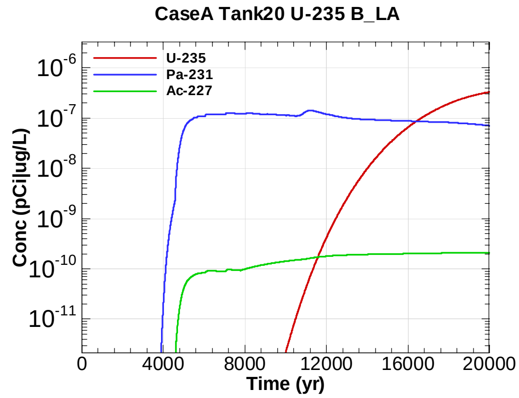

Figure E-2422 - 100m Aquifer Concentration for CaseA Tank20 U-235 B_LA

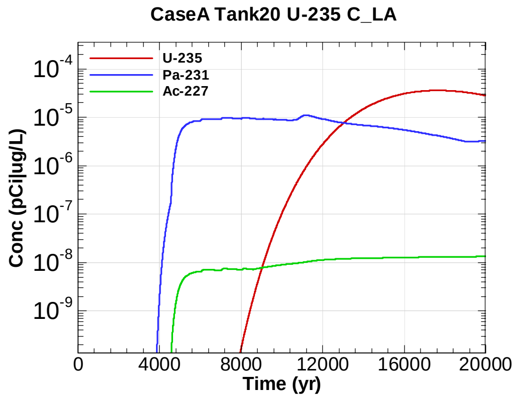

Figure E-2423 - 100m Aquifer Concentration for CaseA Tank20 U-235 C_LA

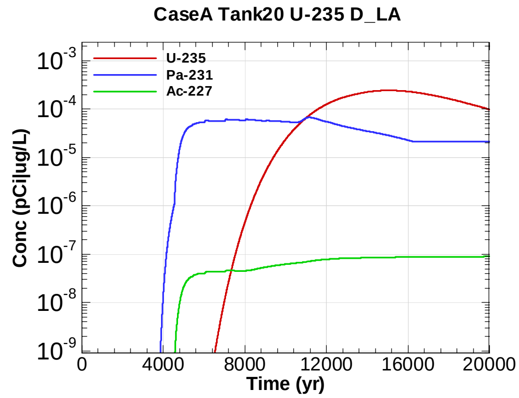

Figure E-2424 - 100m Aquifer Concentration for CaseA Tank20 U-235 D_LA

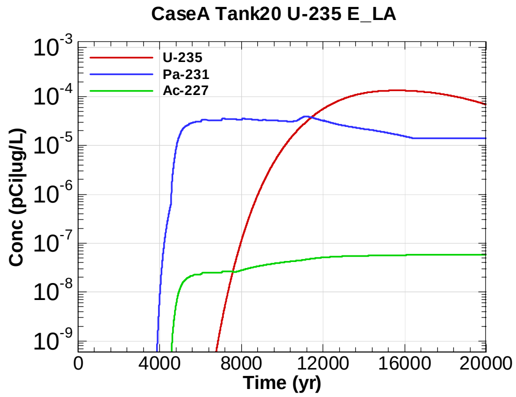

Figure E-2425 - 100m Aquifer Concentration for CaseA Tank20 U-235 E_LA

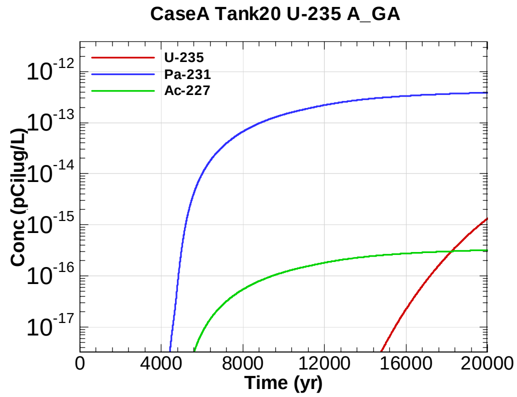

Figure E-2426 - 100m Aquifer Concentration for CaseA Tank20 U-235 A_GA

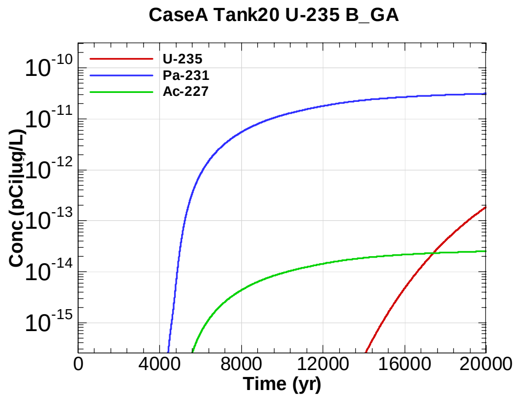

Figure E-2427 - 100m Aquifer Concentration for CaseA Tank20 U-235 B_GA

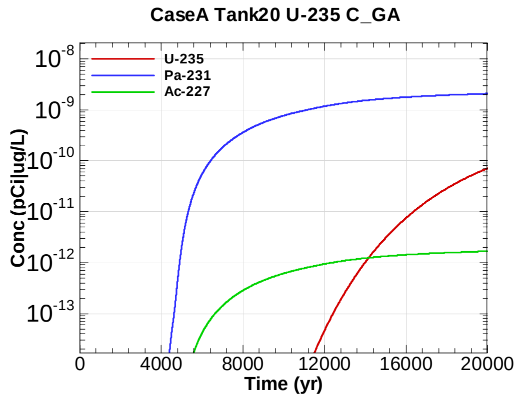

Figure E-2428 - 100m Aquifer Concentration for CaseA Tank20 U-235 C_GA

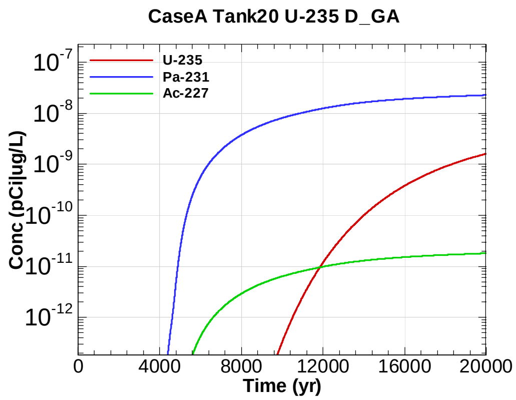

Figure E-2429 - 100m Aquifer Concentration for CaseA Tank20 U-235 D_GA

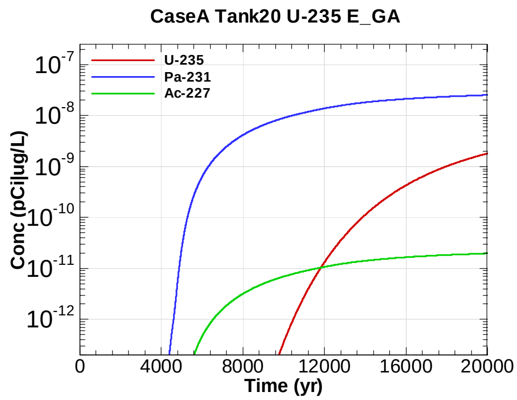

Figure E-2430 - 100m Aquifer Concentration for CaseA Tank20 U-235 E_GA

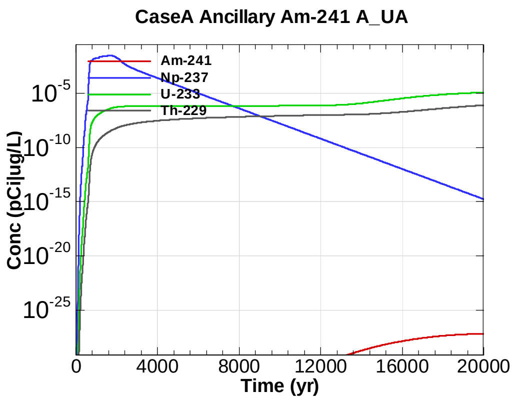

Figure E-2431 - 100m Aquifer Concentration for CaseA Ancillary Am-241 A_UA

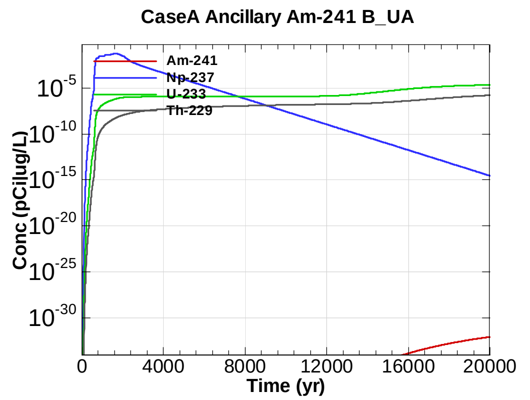

Figure E-2432 - 100m Aquifer Concentration for CaseA Ancillary Am-241 B_UA

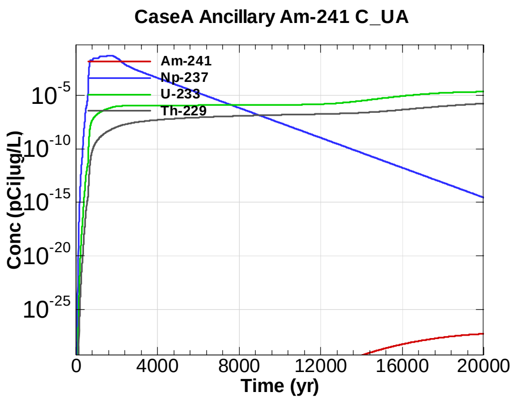

Figure E-2433 - 100m Aquifer Concentration for CaseA Ancillary Am-241 C_UA

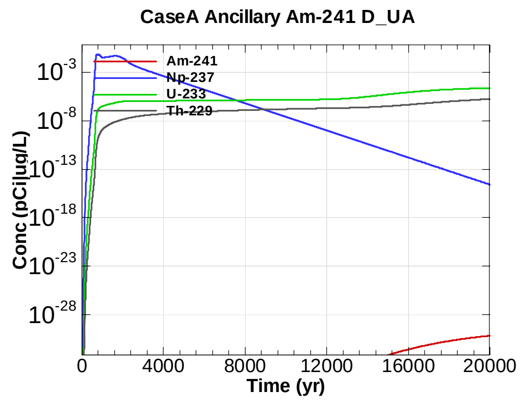

Figure E-2434 - 100m Aquifer Concentration for CaseA Ancillary Am-241 D_UA

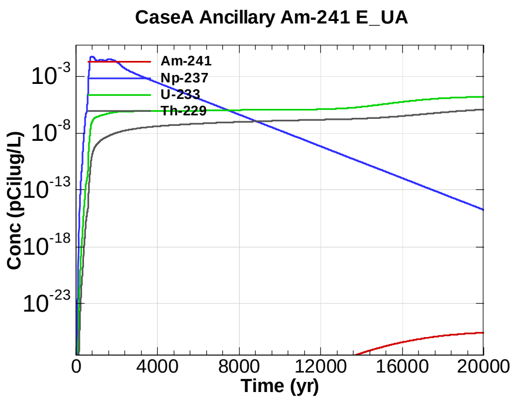

Figure E-2435 - 100m Aquifer Concentration for CaseA Ancillary Am-241 E_UA

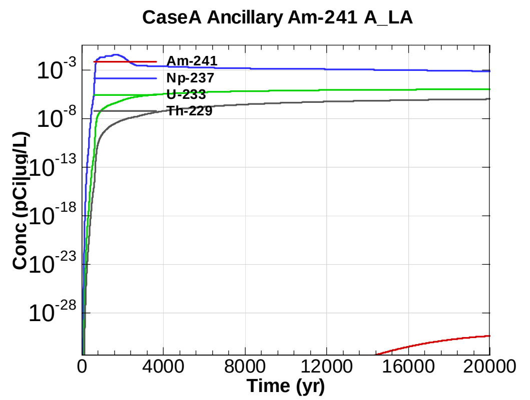

Figure E-2436 - 100m Aquifer Concentration for CaseA Ancillary Am-241 A_LA

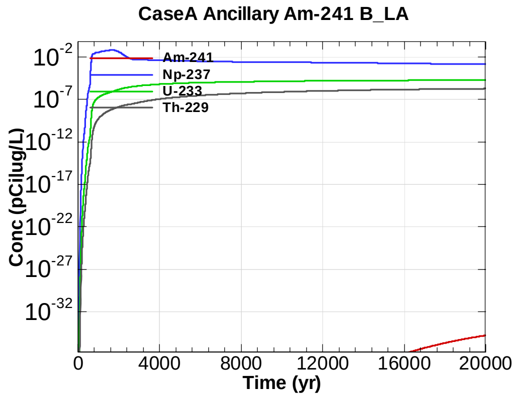

Figure E-2437 - 100m Aquifer Concentration for CaseA Ancillary Am-241 B_LA

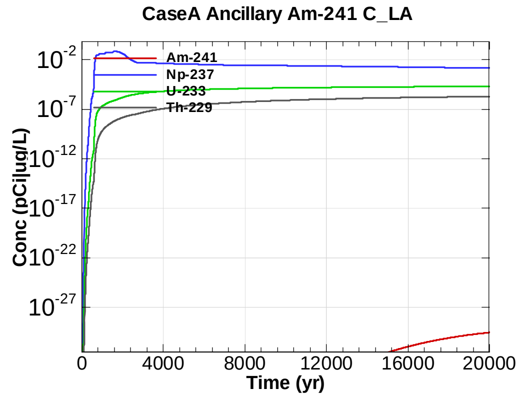

Figure E-2438 - 100m Aquifer Concentration for CaseA Ancillary Am-241 C_LA

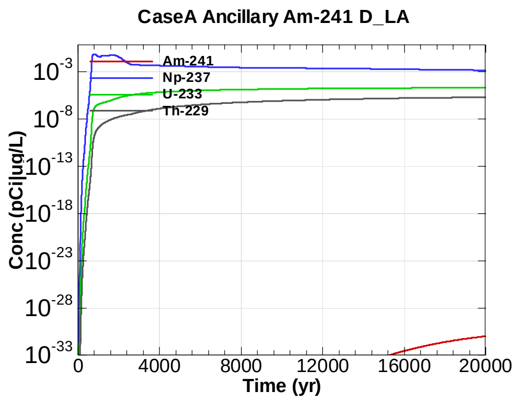

Figure E-2439 - 100m Aquifer Concentration for CaseA Ancillary Am-241 D_LA

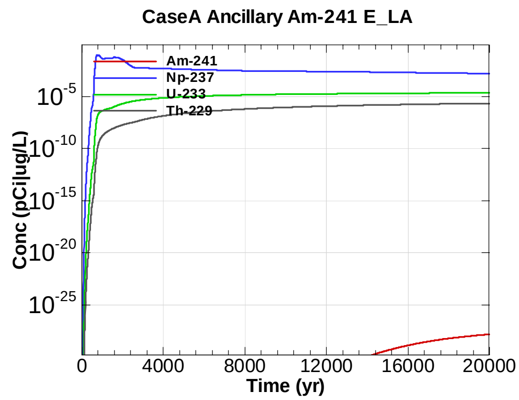

Figure E-2440 - 100m Aquifer Concentration for CaseA Ancillary Am-241 E_LA

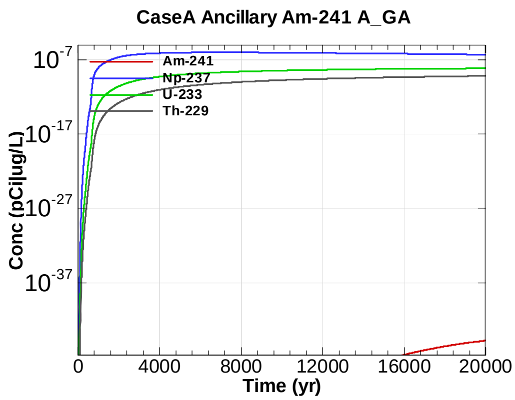

Figure E-2441 - 100m Aquifer Concentration for CaseA Ancillary Am-241 A_GA

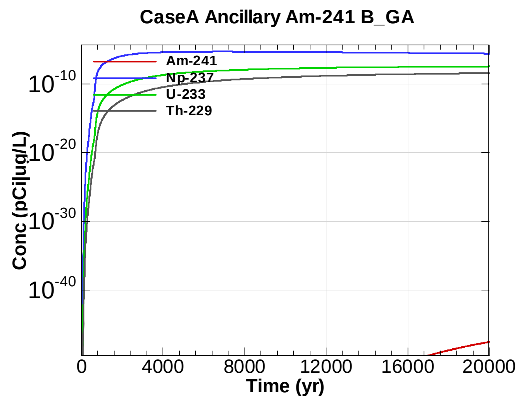

Figure E-2442 - 100m Aquifer Concentration for CaseA Ancillary Am-241 B_GA

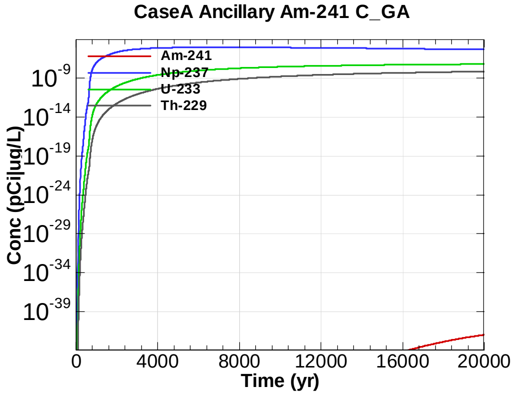

Figure E-2443 - 100m Aquifer Concentration for CaseA Ancillary Am-241 C_GA

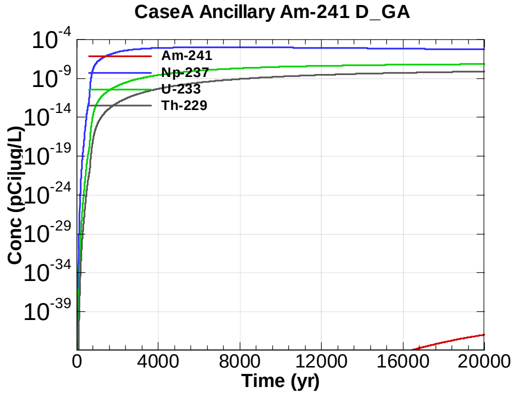

Figure E-2444 - 100m Aquifer Concentration for CaseA Ancillary Am-241 D_GA

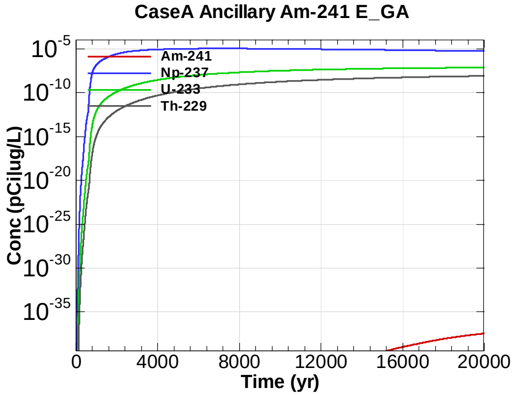

Figure E-2445 - 100m Aquifer Concentration for CaseA Ancillary Am-241 E_GA

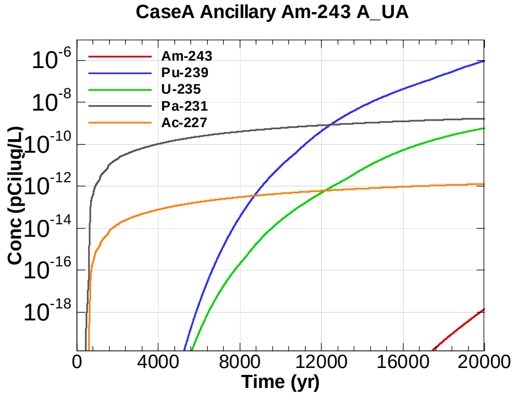

Figure E-2446 - 100m Aquifer Concentration for CaseA Ancillary Am-243 A_UA

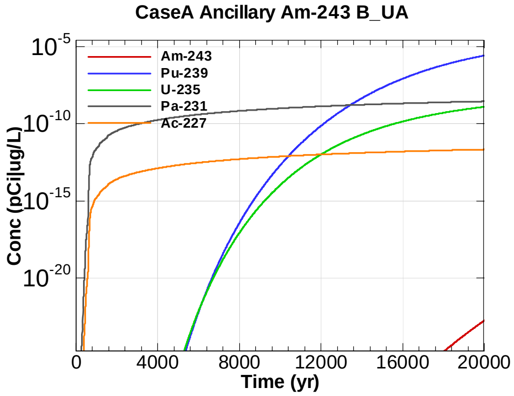

Figure E-2447 - 100m Aquifer Concentration for CaseA Ancillary Am-243 B_UA

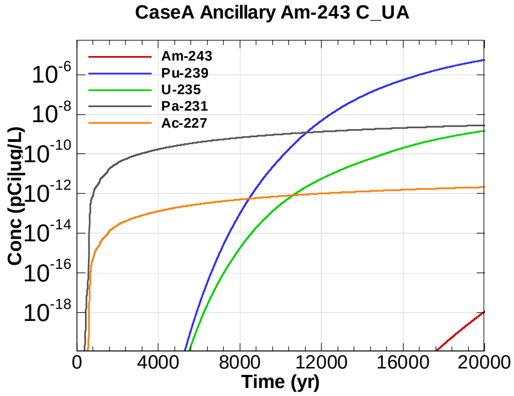

Figure E-2448 - 100m Aquifer Concentration for CaseA Ancillary Am-243 C_UA

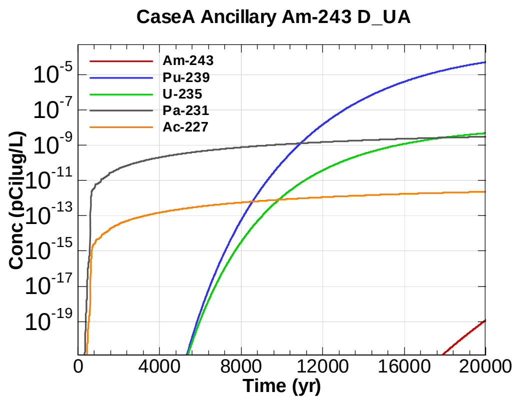

Figure E-2449 - 100m Aquifer Concentration for CaseA Ancillary Am-243 D_UA

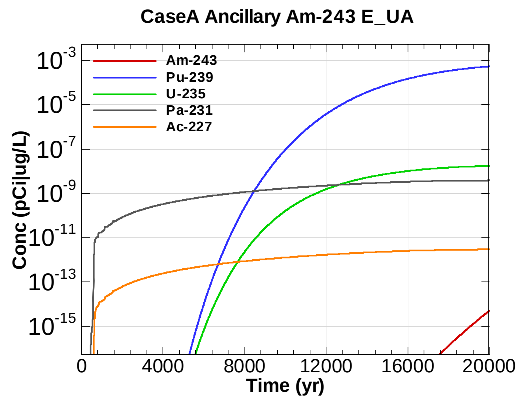

Figure E-2450 - 100m Aquifer Concentration for CaseA Ancillary Am-243 E_UA

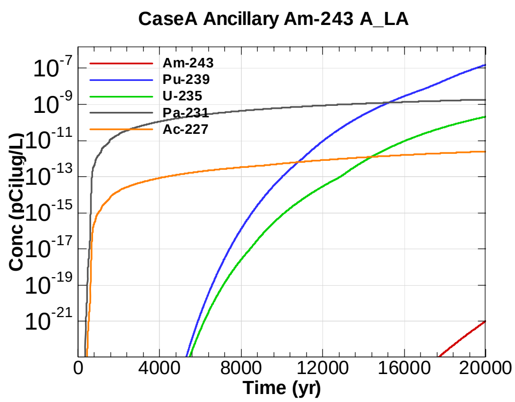

Figure E-2451 - 100m Aquifer Concentration for CaseA Ancillary Am-243 A_LA

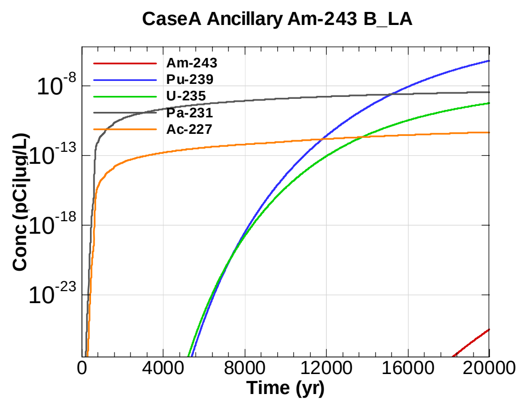

Figure E-2452 - 100m Aquifer Concentration for CaseA Ancillary Am-243 B_LA

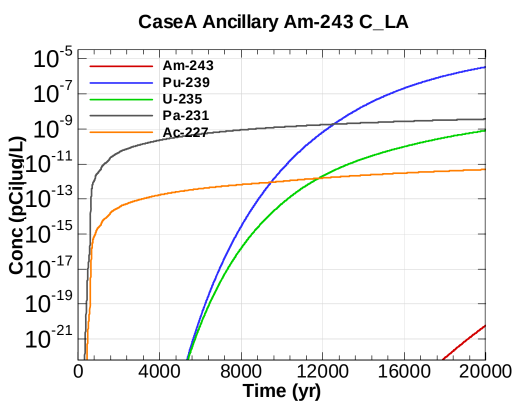

Figure E-2453 - 100m Aquifer Concentration for CaseA Ancillary Am-243 C_LA

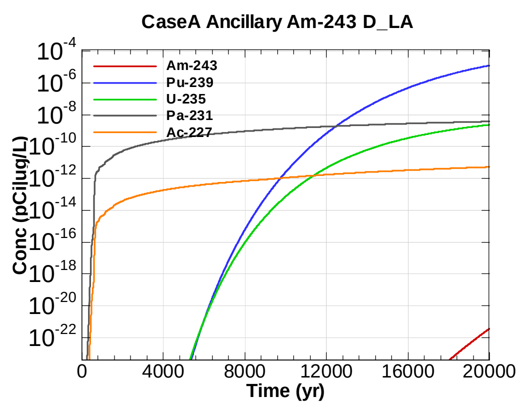

Figure E-2454 - 100m Aquifer Concentration for CaseA Ancillary Am-243 D_LA

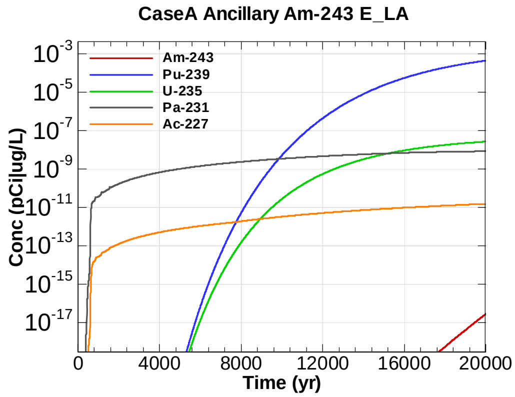

Figure E-2455 - 100m Aquifer Concentration for CaseA Ancillary Am-243 E_LA

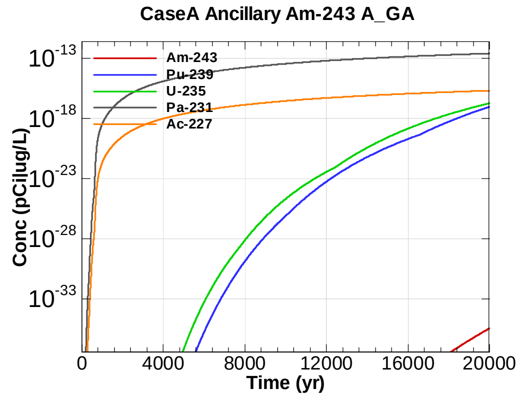

Figure E-2456 - 100m Aquifer Concentration for CaseA Ancillary Am-243 A_GA

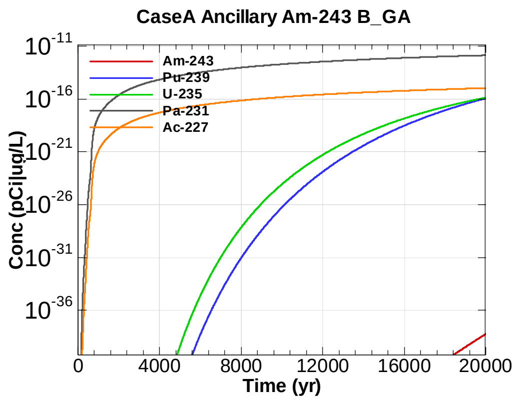

Figure E-2457 - 100m Aquifer Concentration for CaseA Ancillary Am-243 B_GA

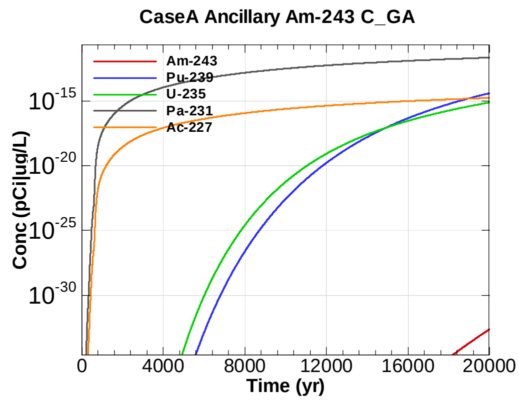

Figure E-2458 - 100m Aquifer Concentration for CaseA Ancillary Am-243 C_GA

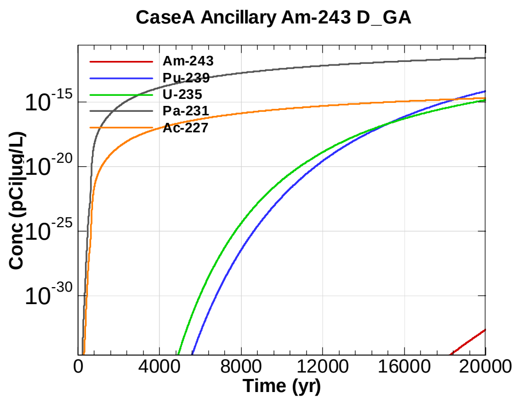

Figure E-2459 - 100m Aquifer Concentration for CaseA Ancillary Am-243 D_GA

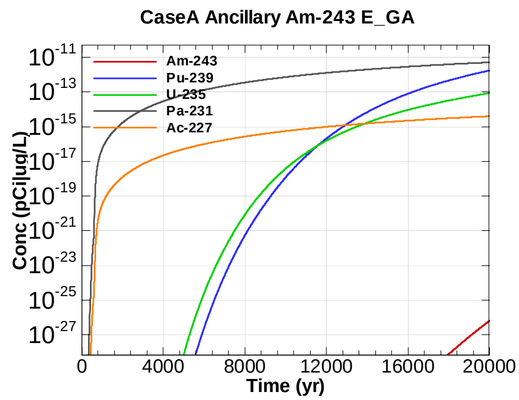

Figure E-2460 - 100m Aquifer Concentration for CaseA Ancillary Am-243 E_GA

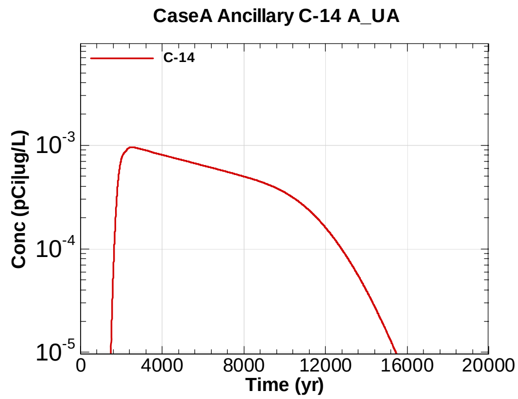

Figure E-2461 - 100m Aquifer Concentration for CaseA Ancillary C-14 A_UA

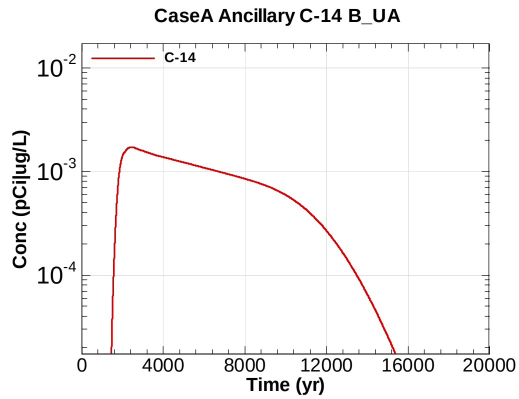

Figure E-2462 - 100m Aquifer Concentration for CaseA Ancillary C-14 B_UA

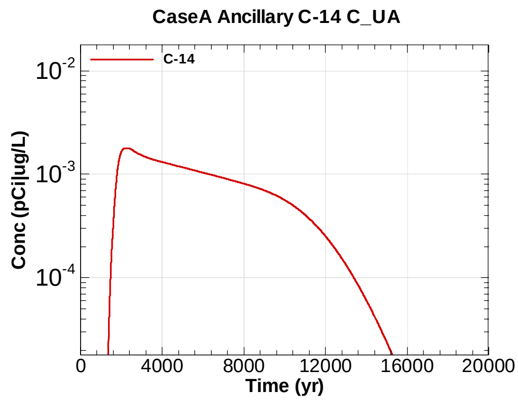

Figure E-2463 - 100m Aquifer Concentration for CaseA Ancillary C-14 C_UA

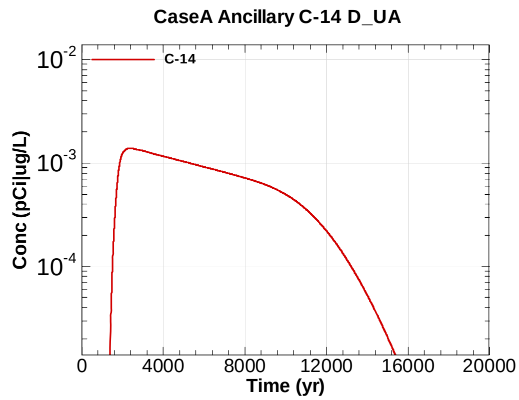

Figure E-2464 - 100m Aquifer Concentration for CaseA Ancillary C-14 D_UA

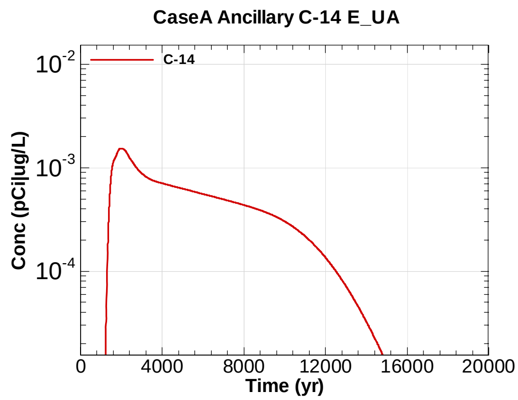

Figure E-2465 - 100m Aquifer Concentration for CaseA Ancillary C-14 E_UA

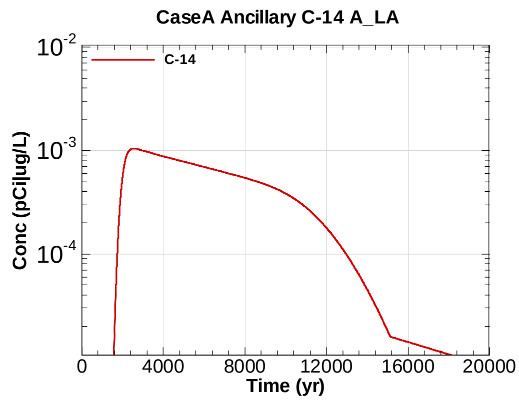

Figure E-2466 - 100m Aquifer Concentration for CaseA Ancillary C-14 A_LA

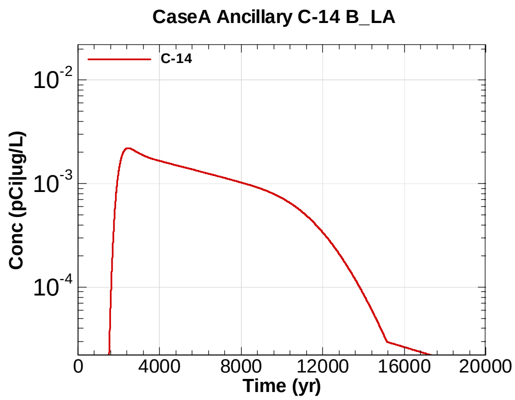

Figure E-2467 - 100m Aquifer Concentration for CaseA Ancillary C-14 B_LA

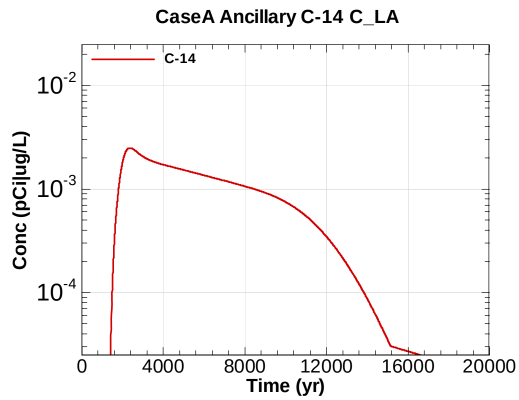

Figure E-2468 - 100m Aquifer Concentration for CaseA Ancillary C-14 C_LA

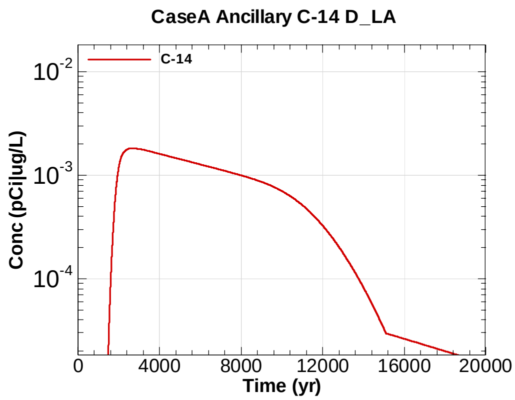

Figure E-2469 - 100m Aquifer Concentration for CaseA Ancillary C-14 D_LA

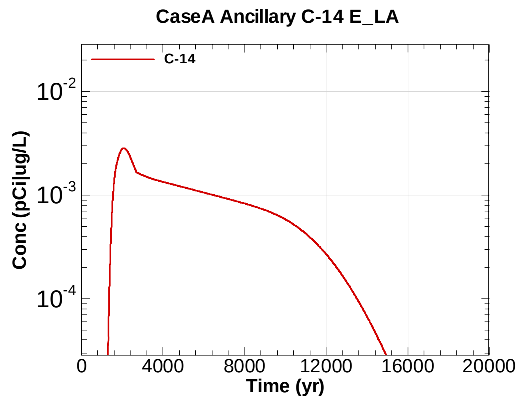

Figure E-2470 - 100m Aquifer Concentration for CaseA Ancillary C-14 E_LA

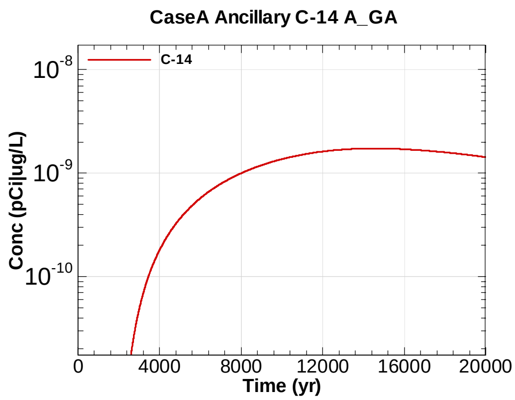

Figure E-2471 - 100m Aquifer Concentration for CaseA Ancillary C-14 A_GA

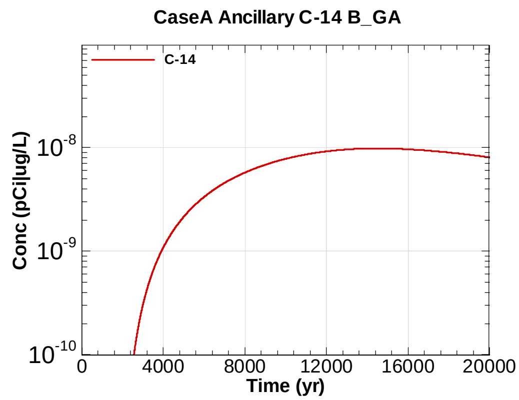

Figure E-2472 - 100m Aquifer Concentration for CaseA Ancillary C-14 B_GA

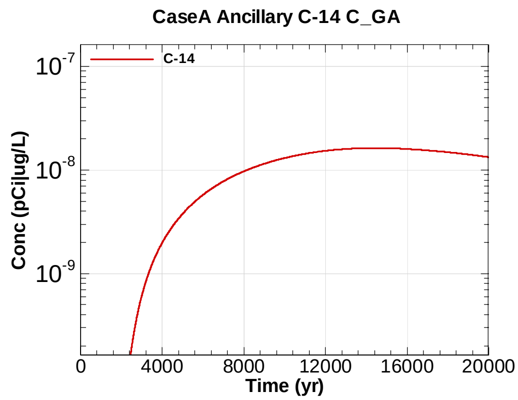

Figure E-2473 - 100m Aquifer Concentration for CaseA Ancillary C-14 C_GA

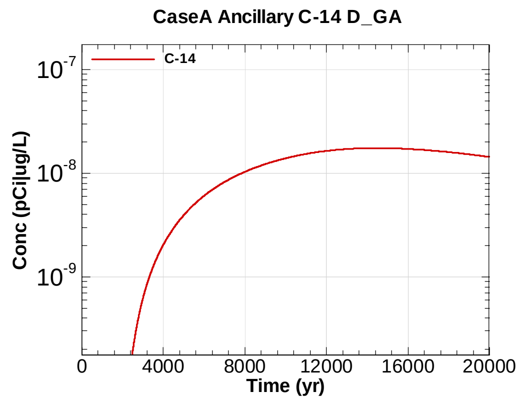

Figure E-2474 - 100m Aquifer Concentration for CaseA Ancillary C-14 D_GA

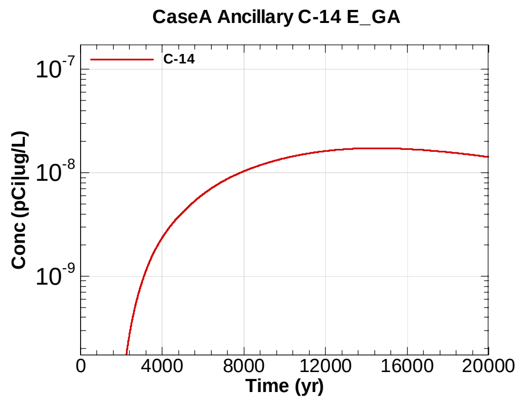

Figure E-2475 - 100m Aquifer Concentration for CaseA Ancillary C-14 E_GA

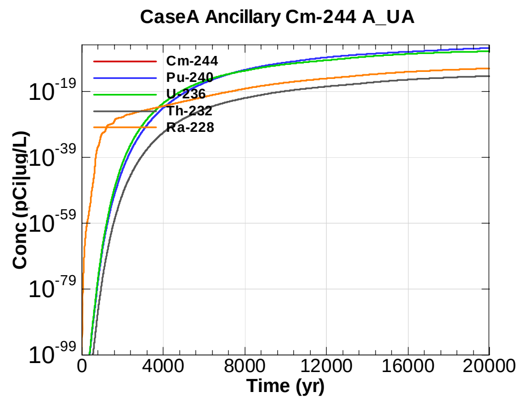

Figure E-2476 - 100m Aquifer Concentration for CaseA Ancillary Cm-244 A_UA

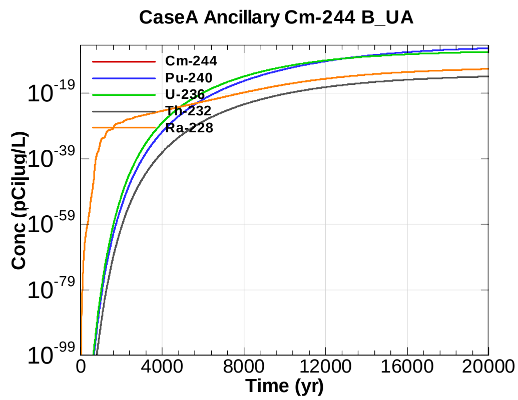

Figure E-2477 - 100m Aquifer Concentration for CaseA Ancillary Cm-244 B_UA

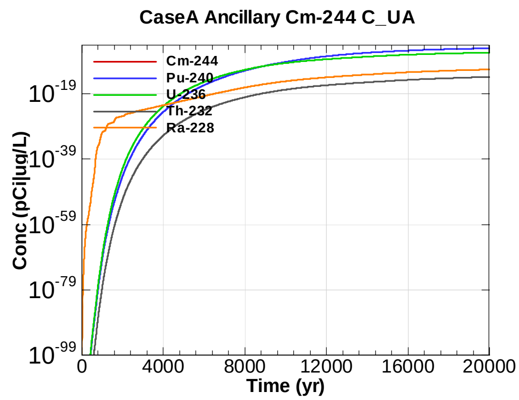

Figure E-2478 - 100m Aquifer Concentration for CaseA Ancillary Cm-244 C_UA

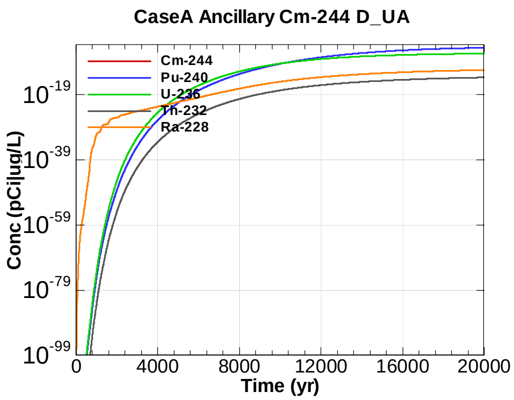

Figure E-2479 - 100m Aquifer Concentration for CaseA Ancillary Cm-244 D_UA

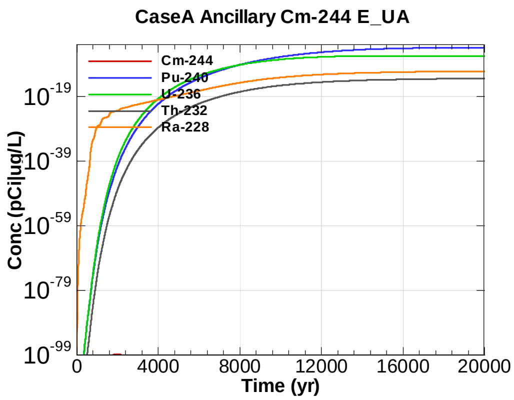

Figure E-2480 - 100m Aquifer Concentration for CaseA Ancillary Cm-244 E_UA

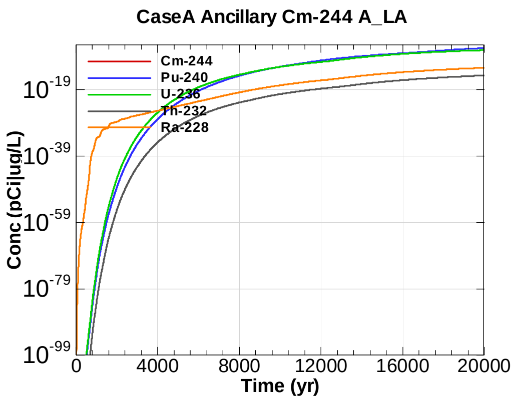

Figure E-2481 - 100m Aquifer Concentration for CaseA Ancillary Cm-244 A_LA

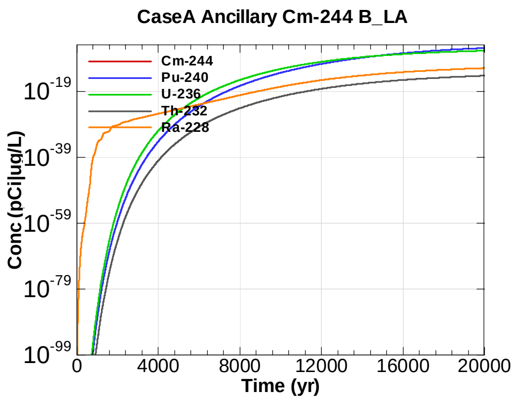

Figure E-2482 - 100m Aquifer Concentration for CaseA Ancillary Cm-244 B_LA

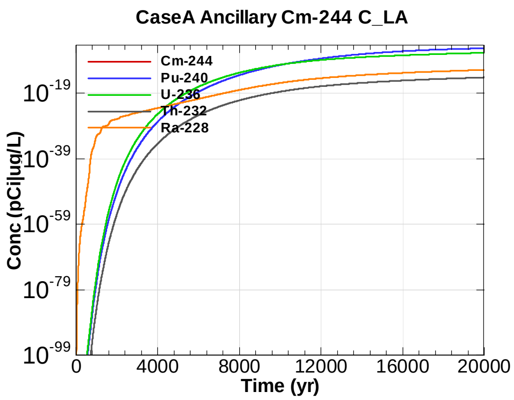

Figure E-2483 - 100m Aquifer Concentration for CaseA Ancillary Cm-244 C_LA

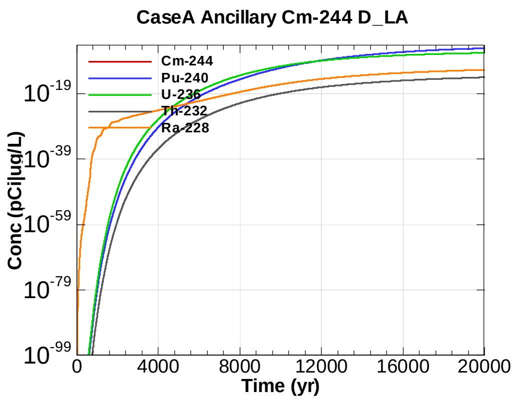

Figure E-2484 - 100m Aquifer Concentration for CaseA Ancillary Cm-244 D_LA

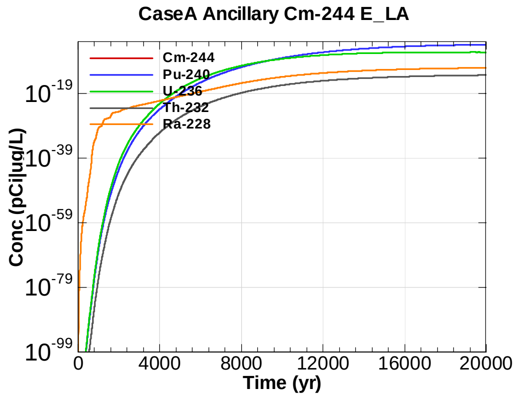

Figure E-2485 - 100m Aquifer Concentration for CaseA Ancillary Cm-244 E_LA

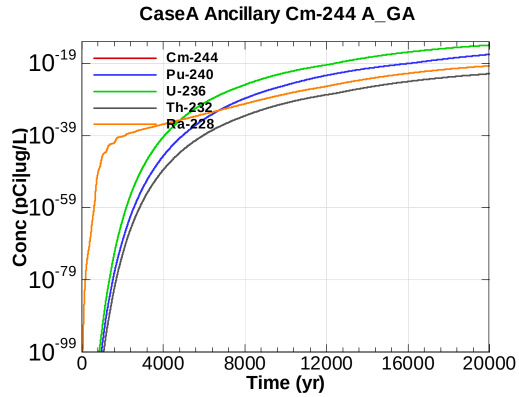

Figure E-2486 - 100m Aquifer Concentration for CaseA Ancillary Cm-244 A_GA

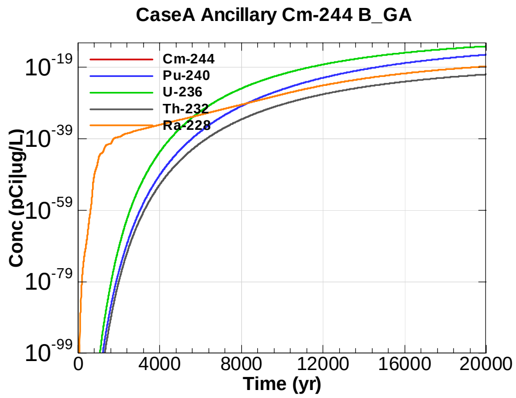

Figure E-2487 - 100m Aquifer Concentration for CaseA Ancillary Cm-244 B_GA

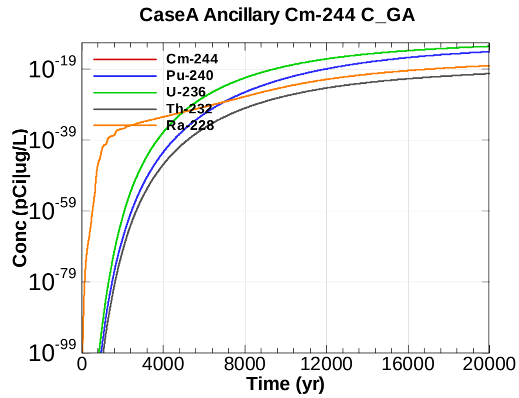

Figure E-2488 - 100m Aquifer Concentration for CaseA Ancillary Cm-244 C_GA

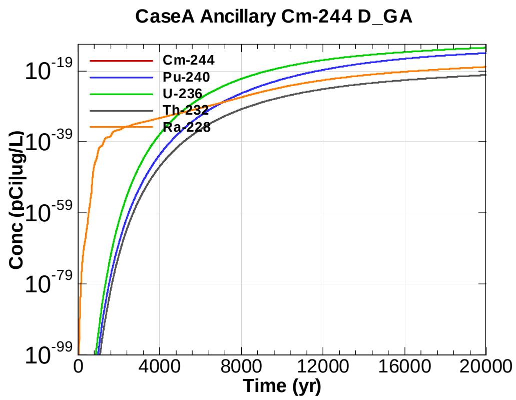

Figure E-2489 - 100m Aquifer Concentration for CaseA Ancillary Cm-244 D_GA

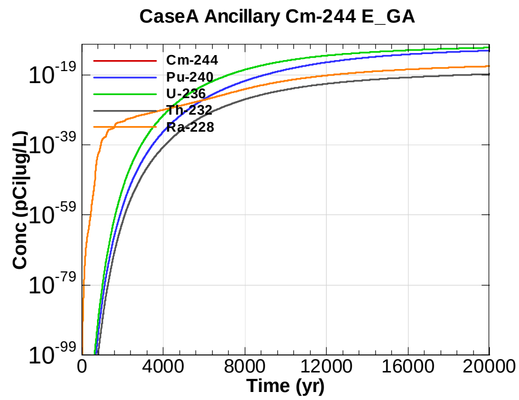

Figure E-2490 - 100m Aquifer Concentration for CaseA Ancillary Cm-244 E_GA

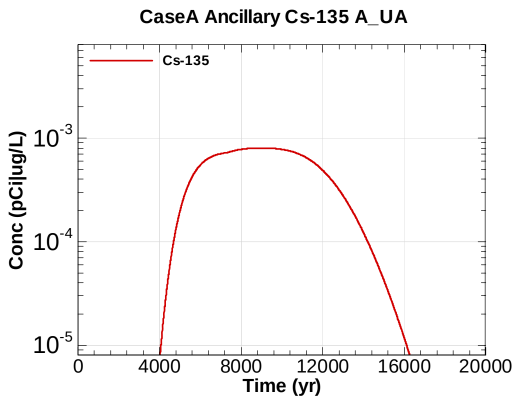

Figure E-2491 - 100m Aquifer Concentration for CaseA Ancillary Cs-135 A_UA

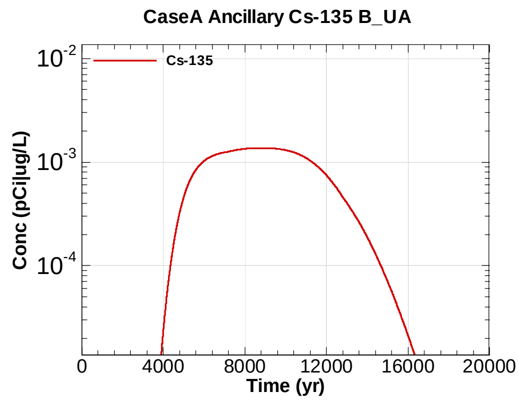

Figure E-2492 - 100m Aquifer Concentration for CaseA Ancillary Cs-135 B_UA

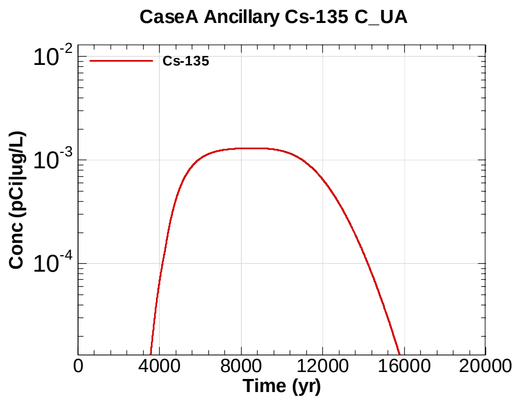

Figure E-2493 - 100m Aquifer Concentration for CaseA Ancillary Cs-135 C_UA

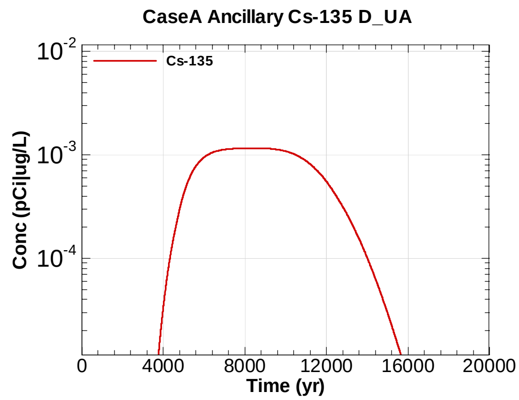

Figure E-2494 - 100m Aquifer Concentration for CaseA Ancillary Cs-135 D_UA

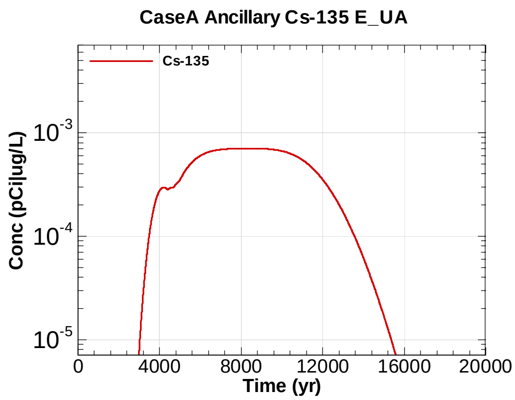

Figure E-2495 - 100m Aquifer Concentration for CaseA Ancillary Cs-135 E_UA

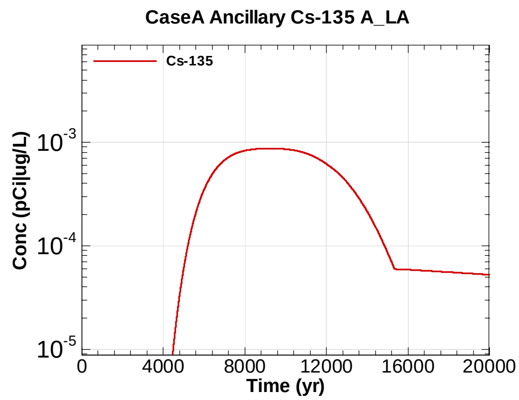

Figure E-2496 - 100m Aquifer Concentration for CaseA Ancillary Cs-135 A_LA

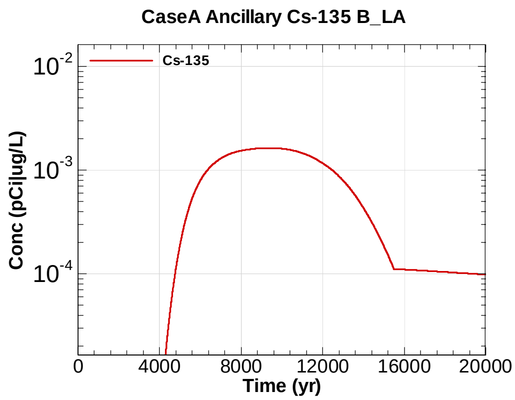

Figure E-2497 - 100m Aquifer Concentration for CaseA Ancillary Cs-135 B_LA

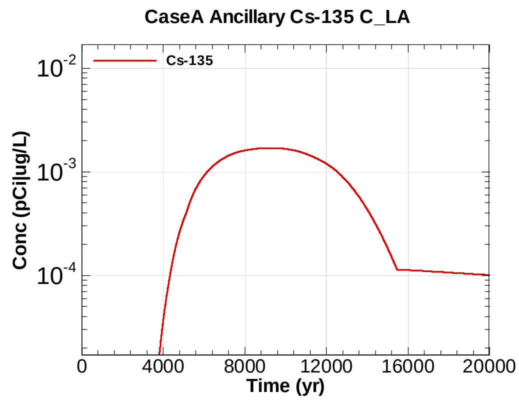

Figure E-2498 - 100m Aquifer Concentration for CaseA Ancillary Cs-135 C_LA

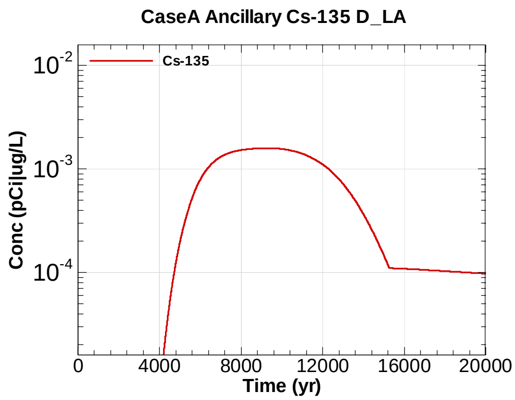

Figure E-2499 - 100m Aquifer Concentration for CaseA Ancillary Cs-135 D_LA

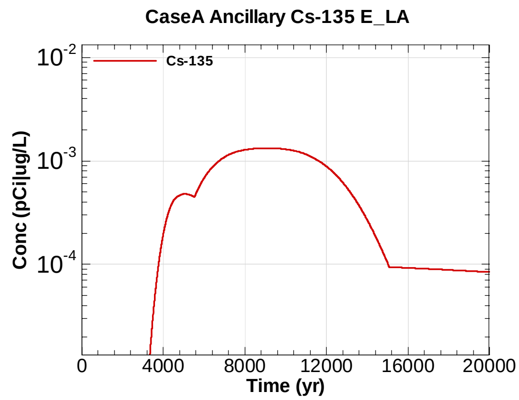

Figure E-2500 - 100m Aquifer Concentration for CaseA Ancillary Cs-135 E_LA

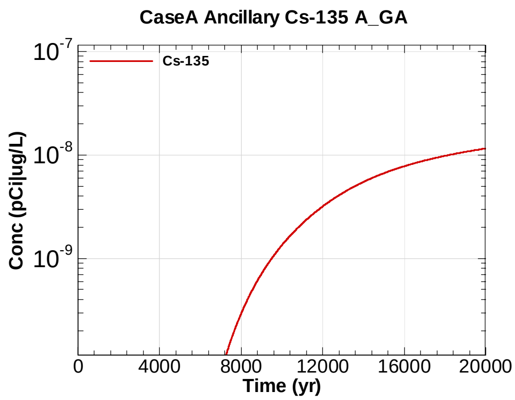

Figure E-2501 - 100m Aquifer Concentration for CaseA Ancillary Cs-135 A_GA

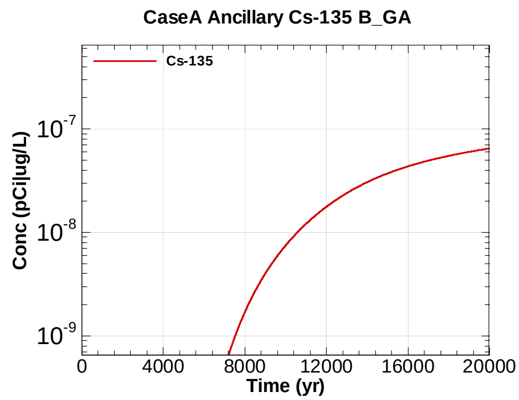

Figure E-2502 - 100m Aquifer Concentration for CaseA Ancillary Cs-135 B_GA

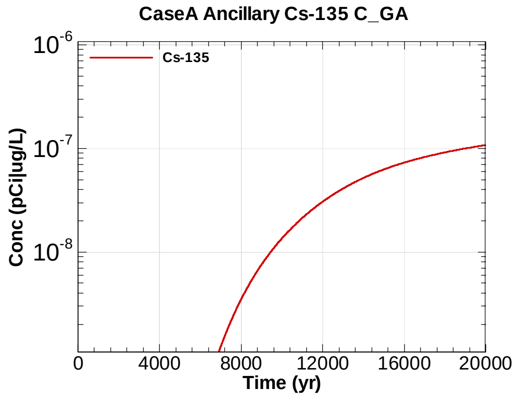

Figure E-2503 - 100m Aquifer Concentration for CaseA Ancillary Cs-135 C_GA

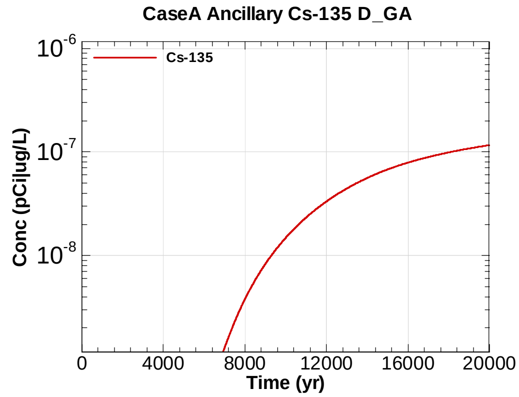

Figure E-2504 - 100m Aquifer Concentration for CaseA Ancillary Cs-135 D_GA

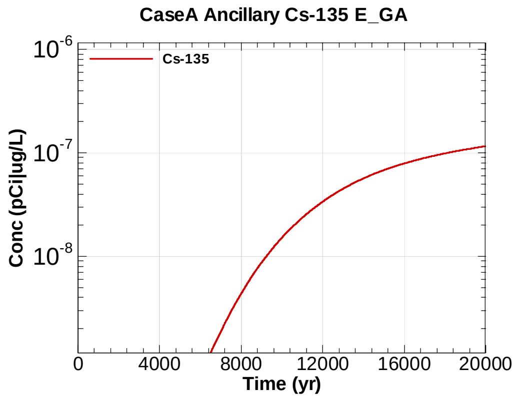

Figure E-2505 - 100m Aquifer Concentration for CaseA Ancillary Cs-135 E_GA

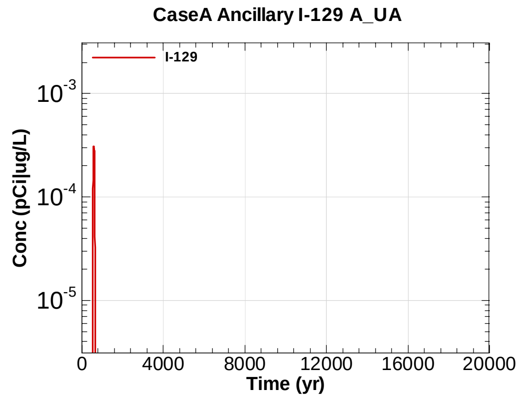

Figure E-2506 - 100m Aquifer Concentration for CaseA Ancillary I-129 A_UA

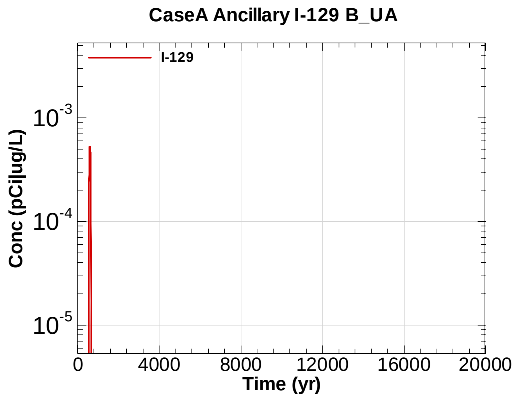

Figure E-2507 - 100m Aquifer Concentration for CaseA Ancillary I-129 B_UA

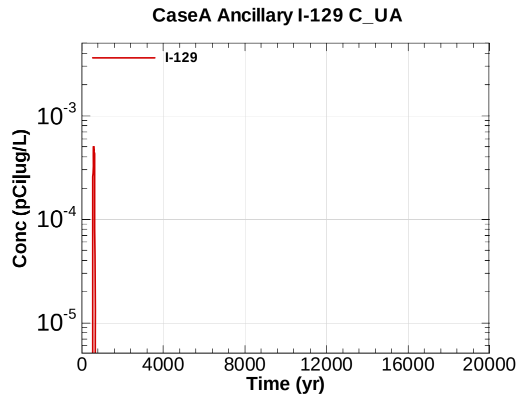

Figure E-2508 - 100m Aquifer Concentration for CaseA Ancillary I-129 C_UA

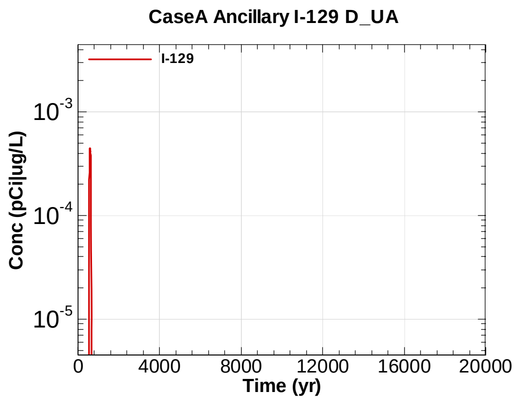

Figure E-2509 - 100m Aquifer Concentration for CaseA Ancillary I-129 D_UA

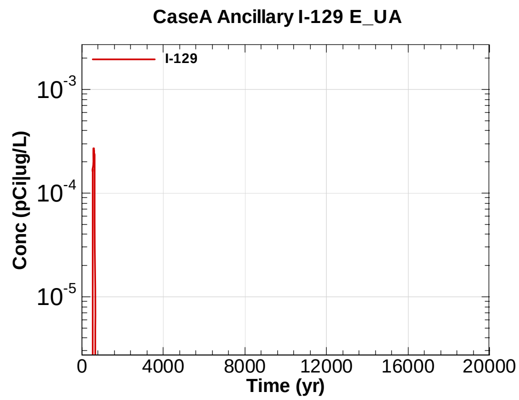

Figure E-2510 - 100m Aquifer Concentration for CaseA Ancillary I-129 E_UA

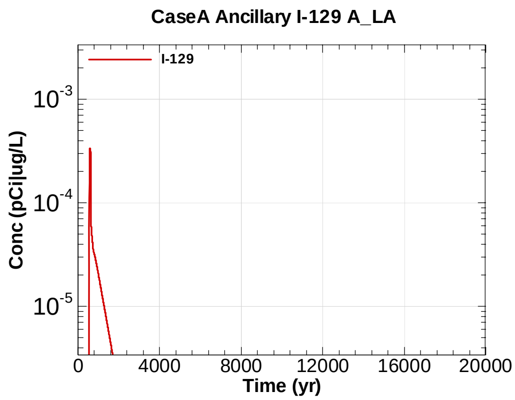

Figure E-2511 - 100m Aquifer Concentration for CaseA Ancillary I-129 A_LA

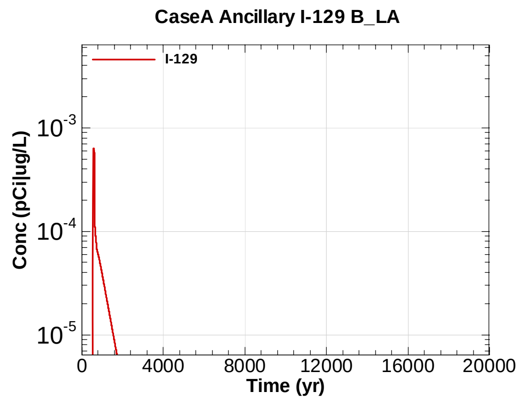

Figure E-2512 - 100m Aquifer Concentration for CaseA Ancillary I-129 B_LA

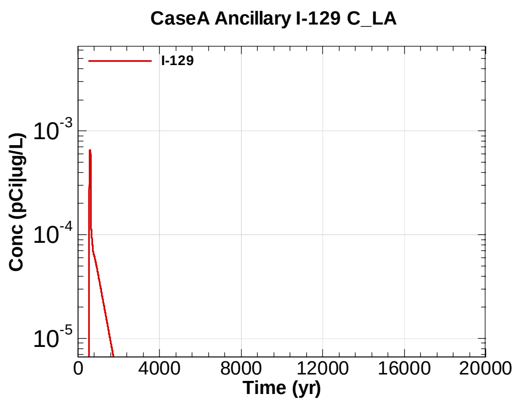

Figure E-2513 - 100m Aquifer Concentration for CaseA Ancillary I-129 C_LA

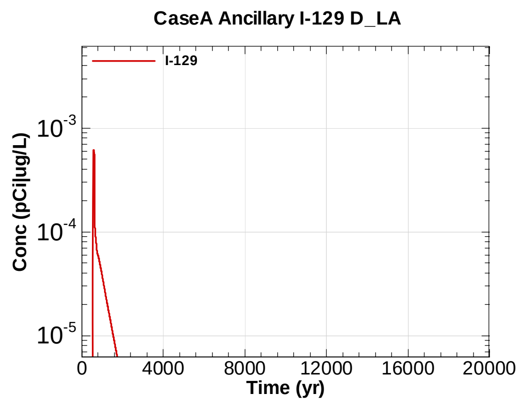

Figure E-2514 - 100m Aquifer Concentration for CaseA Ancillary I-129 D_LA

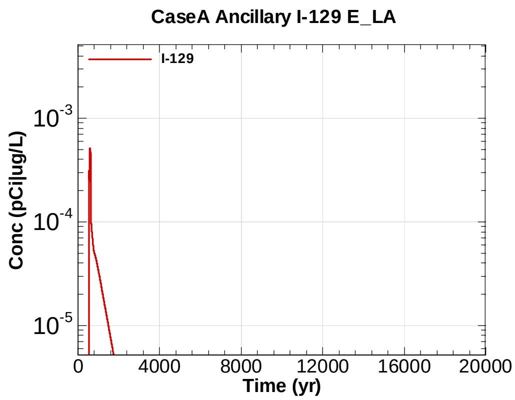

Figure E-2515 - 100m Aquifer Concentration for CaseA Ancillary I-129 E_LA

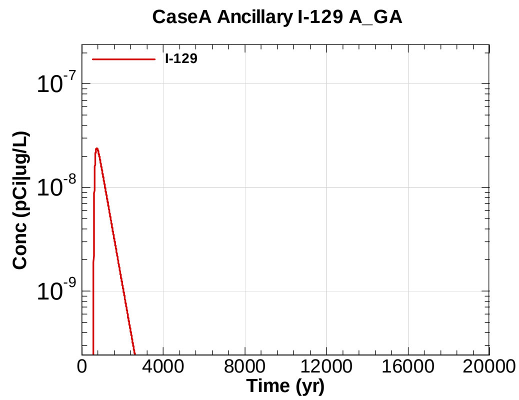

Figure E-2516 - 100m Aquifer Concentration for CaseA Ancillary I-129 A_GA

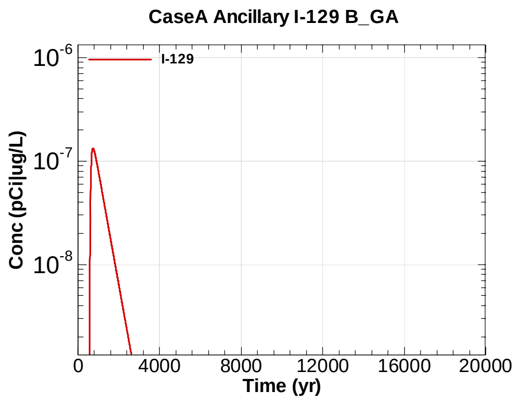

Figure E-2517 - 100m Aquifer Concentration for CaseA Ancillary I-129 B_GA

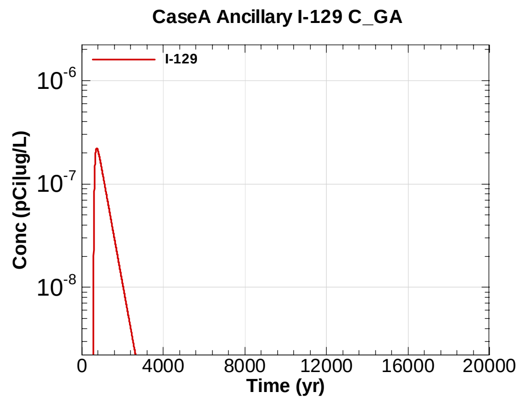

Figure E-2518 - 100m Aquifer Concentration for CaseA Ancillary I-129 C_GA

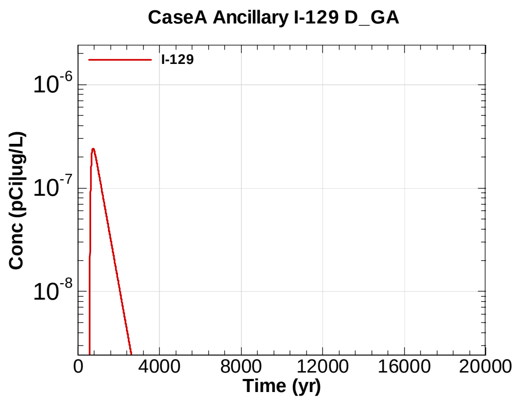

Figure E-2519 - 100m Aquifer Concentration for CaseA Ancillary I-129 D_GA

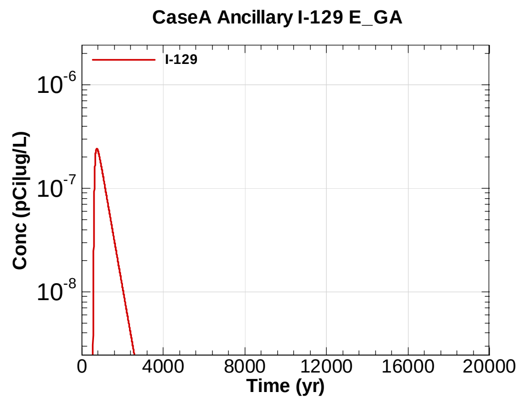

Figure E-2520 - 100m Aquifer Concentration for CaseA Ancillary I-129 E_GA

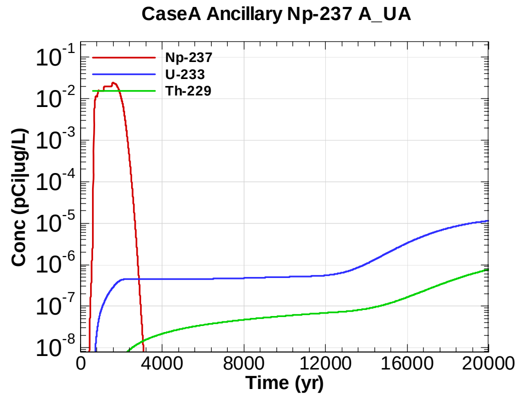

Figure E-2521 - 100m Aquifer Concentration for CaseA Ancillary Np-237 A_UA

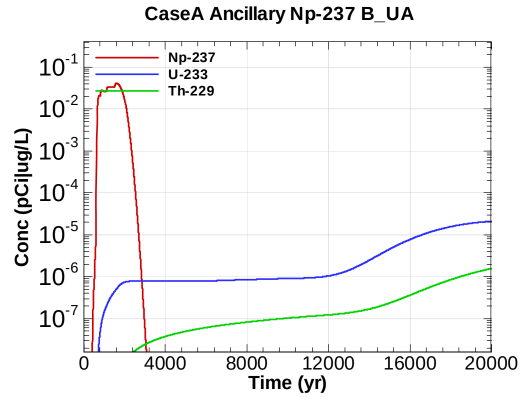

Figure E-2522 - 100m Aquifer Concentration for CaseA Ancillary Np-237 B_UA

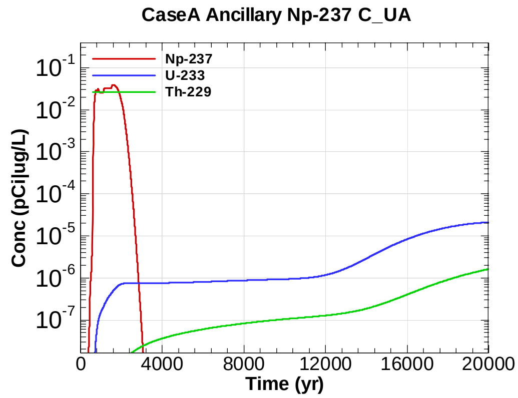

Figure E-2523 - 100m Aquifer Concentration for CaseA Ancillary Np-237 C_UA

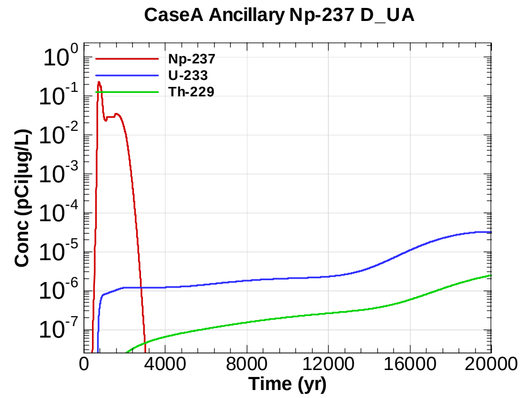

Figure E-2524 - 100m Aquifer Concentration for CaseA Ancillary Np-237 D_UA

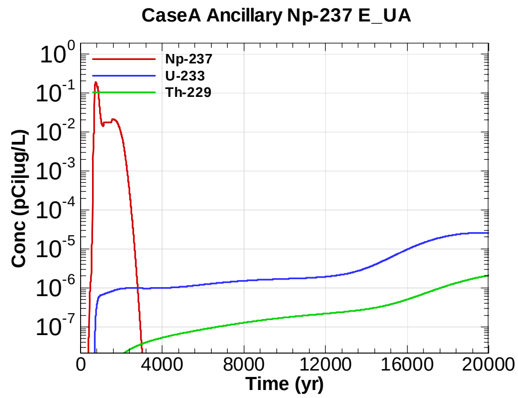

Figure E-2525 - 100m Aquifer Concentration for CaseA Ancillary Np-237 E_UA

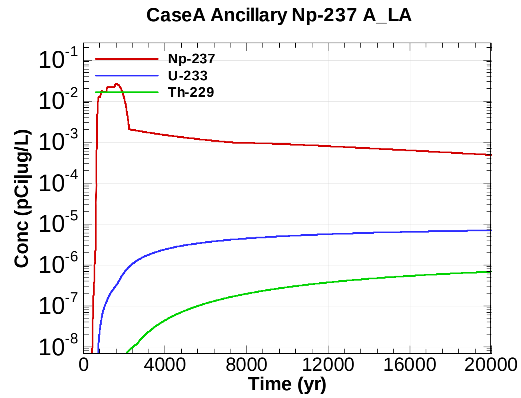

Figure E-2526 - 100m Aquifer Concentration for CaseA Ancillary Np-237 A_LA

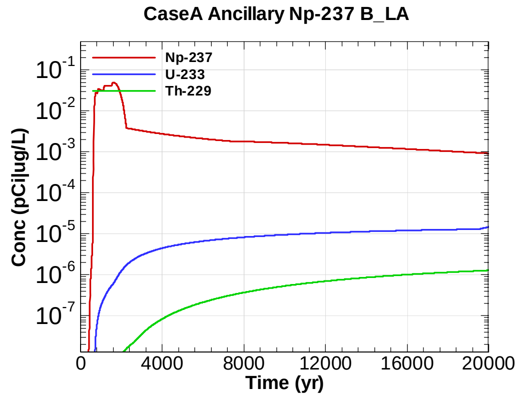

Figure E-2527 - 100m Aquifer Concentration for CaseA Ancillary Np-237 B_LA

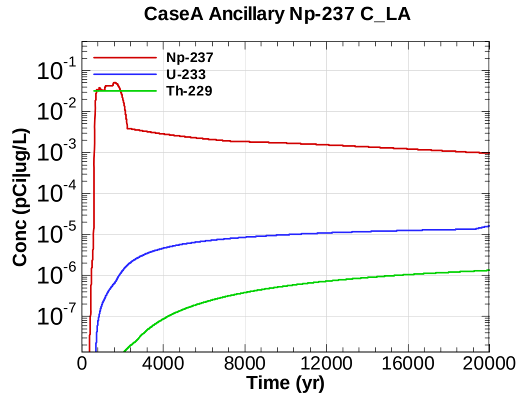

Figure E-2528 - 100m Aquifer Concentration for CaseA Ancillary Np-237 C_LA

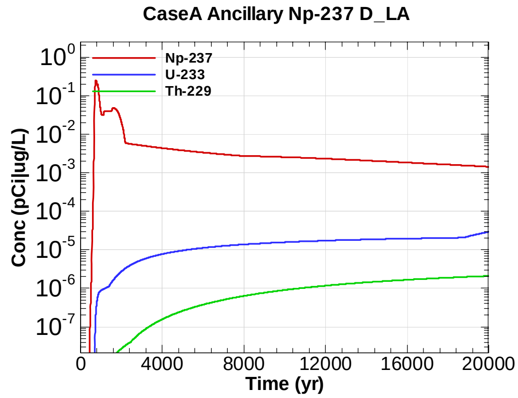

Figure E-2529 - 100m Aquifer Concentration for CaseA Ancillary Np-237 D_LA

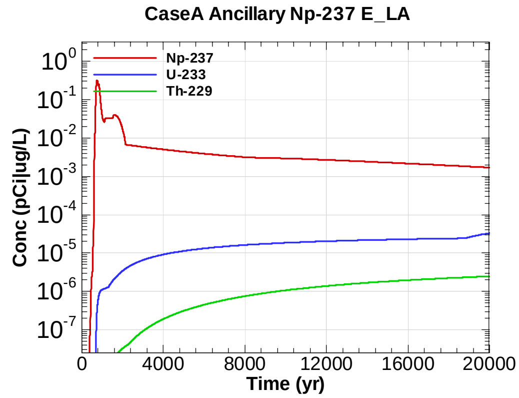

Figure E-2530 - 100m Aquifer Concentration for CaseA Ancillary Np-237 E_LA

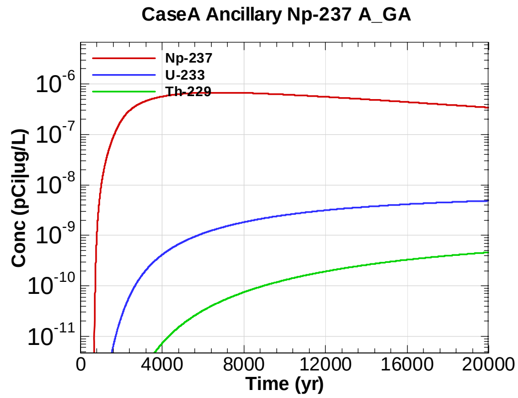

Figure E-2531 - 100m Aquifer Concentration for CaseA Ancillary Np-237 A_GA

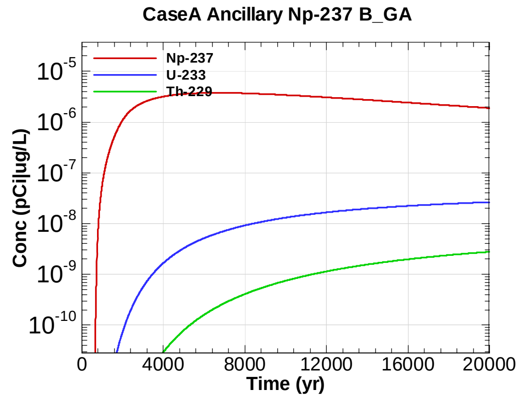

Figure E-2532 - 100m Aquifer Concentration for CaseA Ancillary Np-237 B_GA

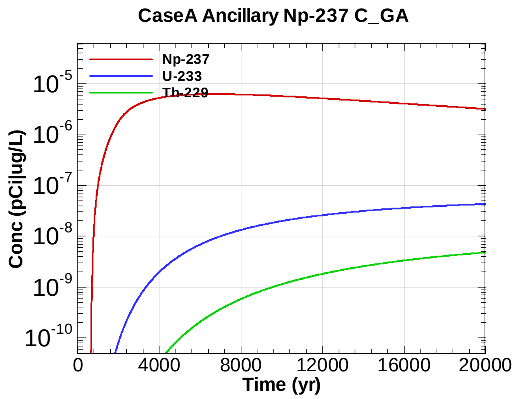

Figure E-2533 - 100m Aquifer Concentration for CaseA Ancillary Np-237 C_GA

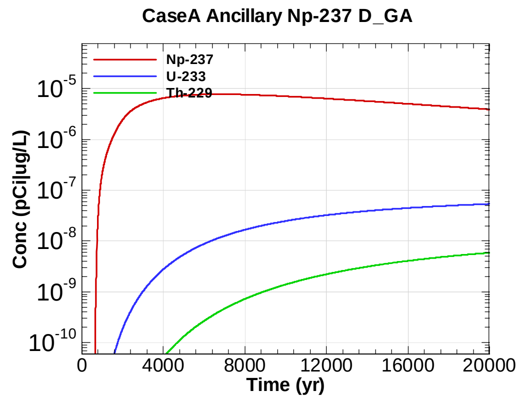

Figure E-2534 - 100m Aquifer Concentration for CaseA Ancillary Np-237 D_GA

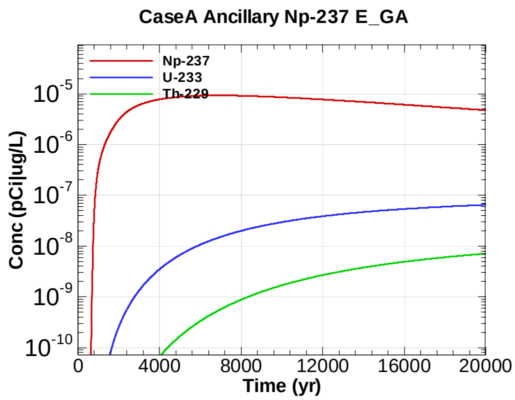

Figure E-2535 - 100m Aquifer Concentration for CaseA Ancillary Np-237 E_GA

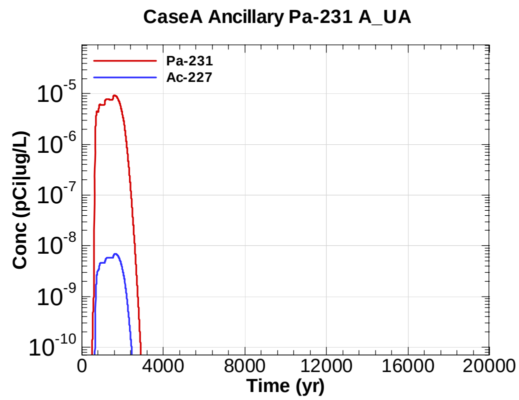

Figure E-2536 - 100m Aquifer Concentration for CaseA Ancillary Pa-231 A_UA

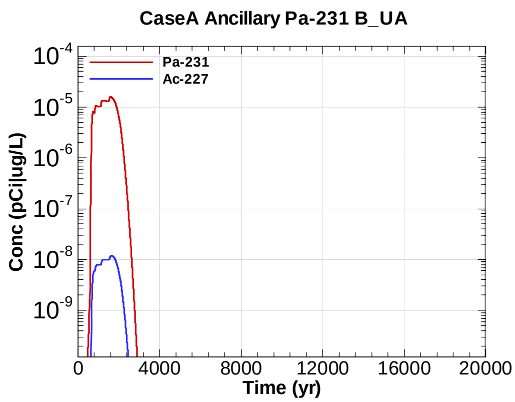

Figure E-2537 - 100m Aquifer Concentration for CaseA Ancillary Pa-231 B_UA

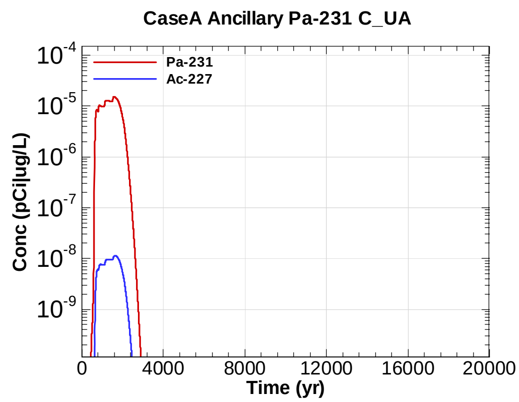

Figure E-2538 - 100m Aquifer Concentration for CaseA Ancillary Pa-231 C_UA

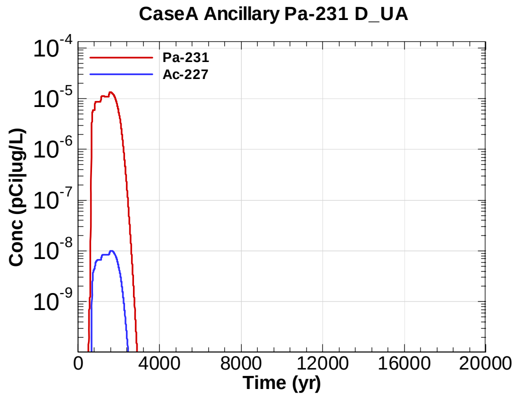

Figure E-2539 - 100m Aquifer Concentration for CaseA Ancillary Pa-231 D_UA

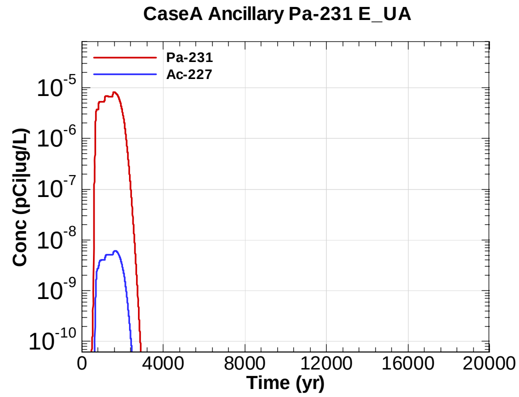

Figure E-2540 - 100m Aquifer Concentration for CaseA Ancillary Pa-231 E_UA

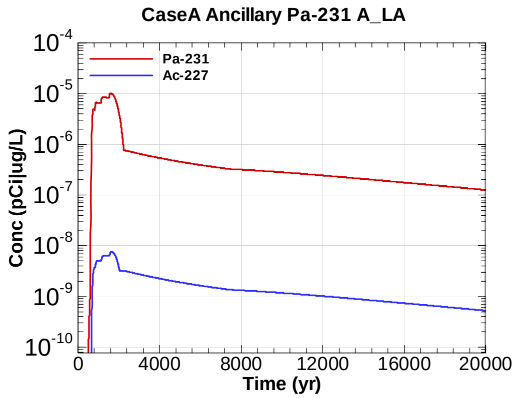

Figure E-2541 - 100m Aquifer Concentration for CaseA Ancillary Pa-231 A_LA

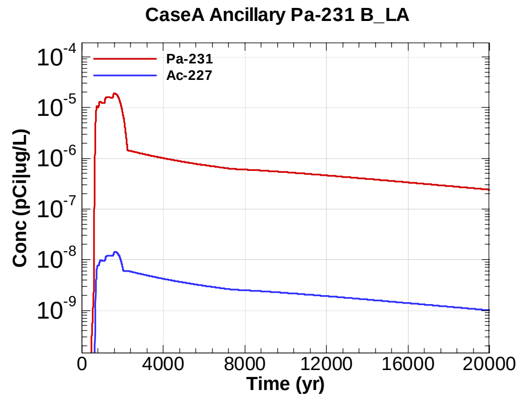

Figure E-2542 - 100m Aquifer Concentration for CaseA Ancillary Pa-231 B_LA

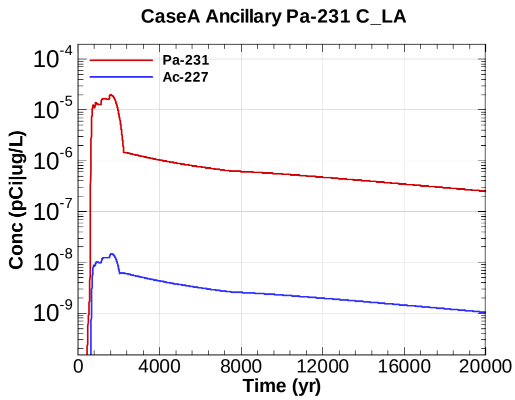

Figure E-2543 - 100m Aquifer Concentration for CaseA Ancillary Pa-231 C_LA

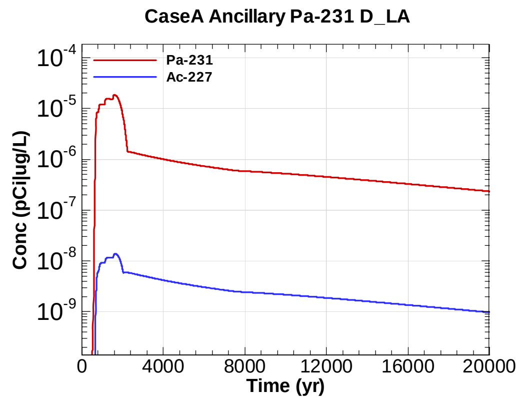

Figure E-2544 - 100m Aquifer Concentration for CaseA Ancillary Pa-231 D_LA

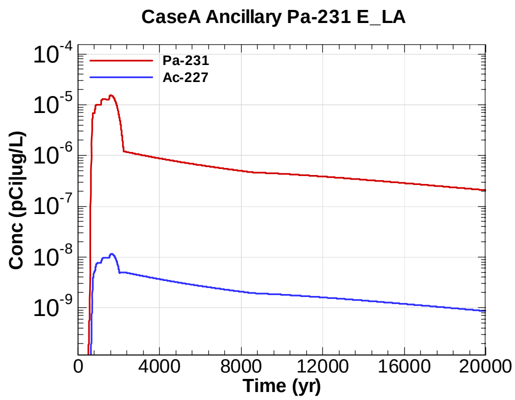

Figure E-2545 - 100m Aquifer Concentration for CaseA Ancillary Pa-231 E_LA

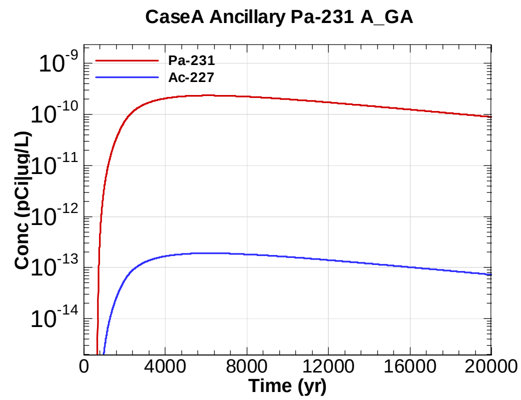

Figure E-2546 - 100m Aquifer Concentration for CaseA Ancillary Pa-231 A_GA

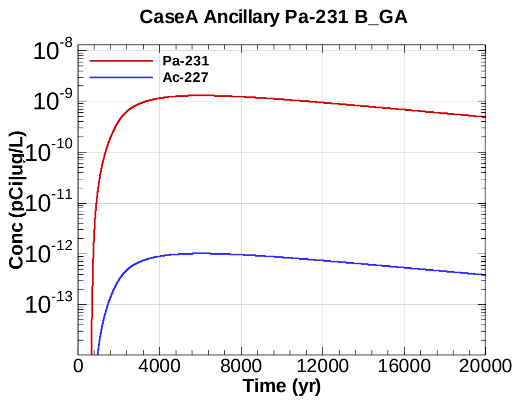

Figure E-2547 - 100m Aquifer Concentration for CaseA Ancillary Pa-231 B_GA

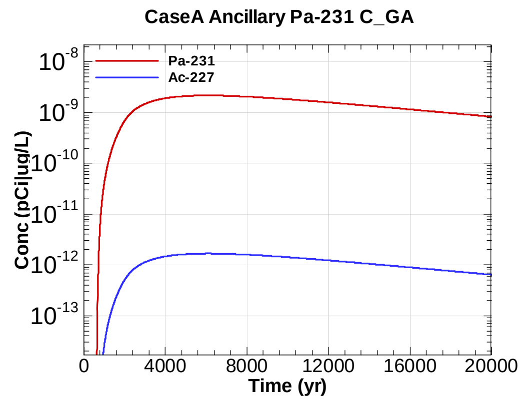

Figure E-2548 - 100m Aquifer Concentration for CaseA Ancillary Pa-231 C_GA

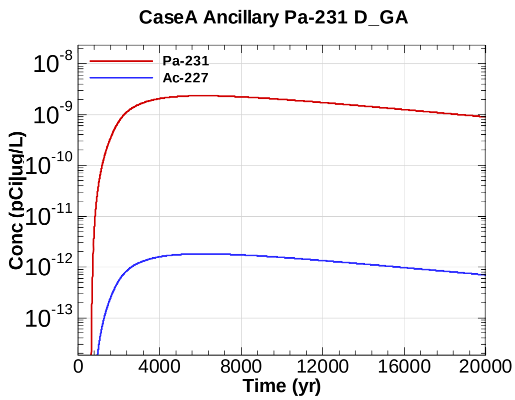

Figure E-2549 - 100m Aquifer Concentration for CaseA Ancillary Pa-231 D_GA

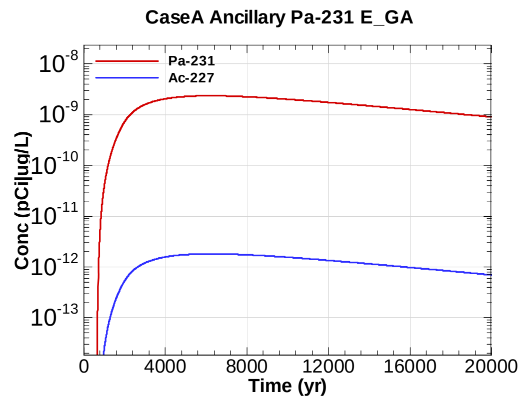

Figure E-2550 - 100m Aquifer Concentration for CaseA Ancillary Pa-231 E_GA

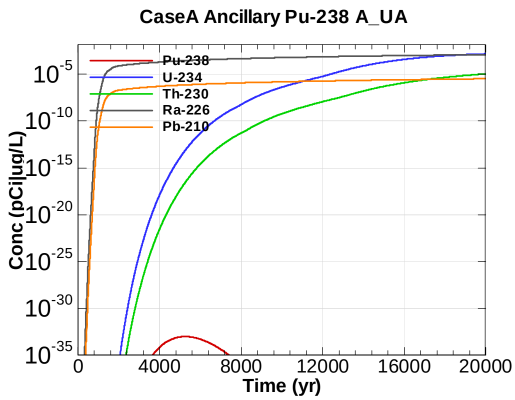

Figure E-2551 - 100m Aquifer Concentration for CaseA Ancillary Pu-238 A_UA

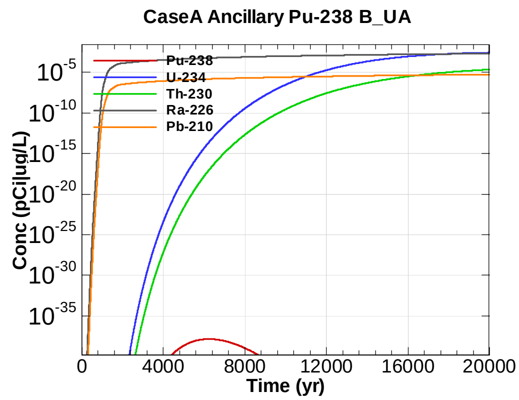

Figure E-2552 - 100m Aquifer Concentration for CaseA Ancillary Pu-238 B_UA

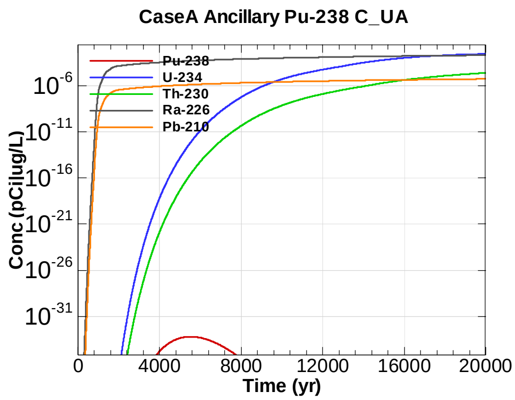

Figure E-2553 - 100m Aquifer Concentration for CaseA Ancillary Pu-238 C_UA

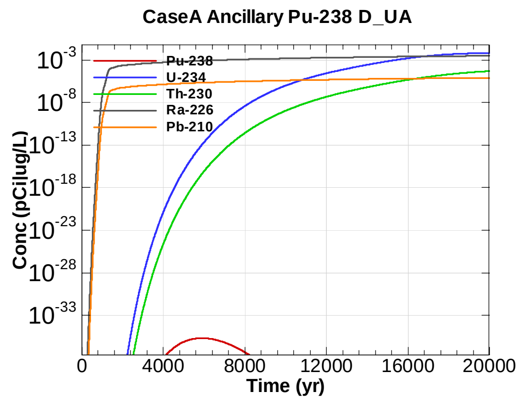

Figure E-2554 - 100m Aquifer Concentration for CaseA Ancillary Pu-238 D_UA

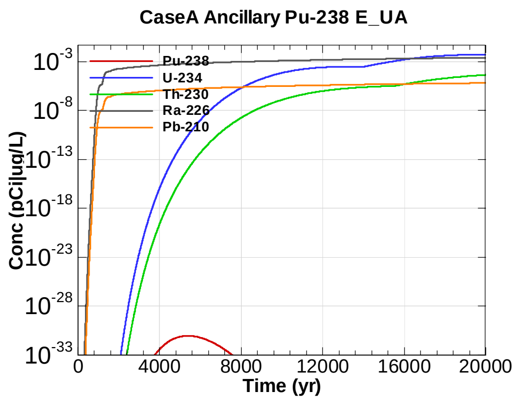

Figure E-2555 - 100m Aquifer Concentration for CaseA Ancillary Pu-238 E_UA

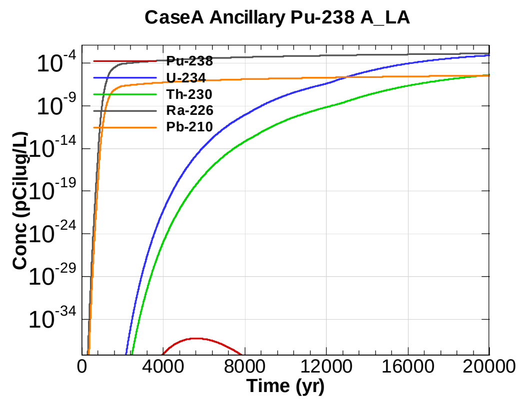

Figure E-2556 - 100m Aquifer Concentration for CaseA Ancillary Pu-238 A_LA

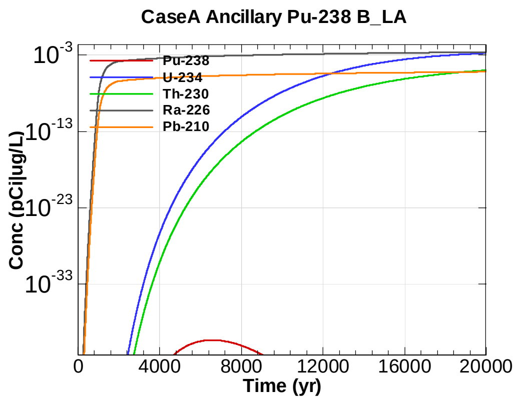

Figure E-2557 - 100m Aquifer Concentration for CaseA Ancillary Pu-238 B_LA

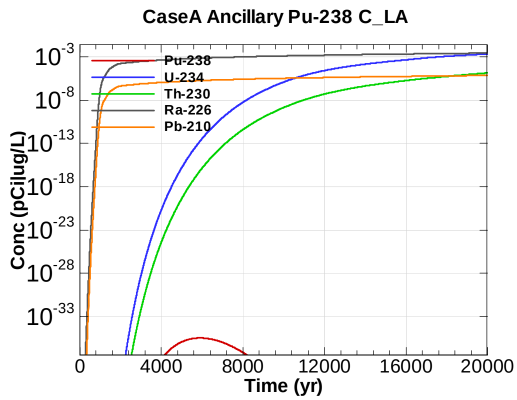

Figure E-2558 - 100m Aquifer Concentration for CaseA Ancillary Pu-238 C_LA

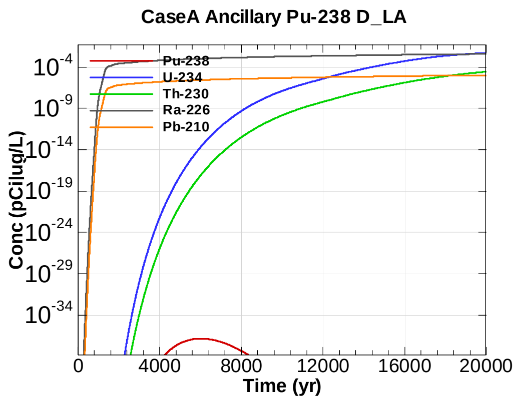

Figure E-2559 - 100m Aquifer Concentration for CaseA Ancillary Pu-238 D_LA

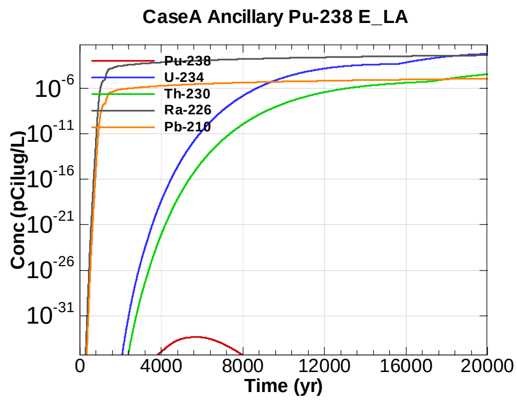

Figure E-2560 - 100m Aquifer Concentration for CaseA Ancillary Pu-238 E_LA

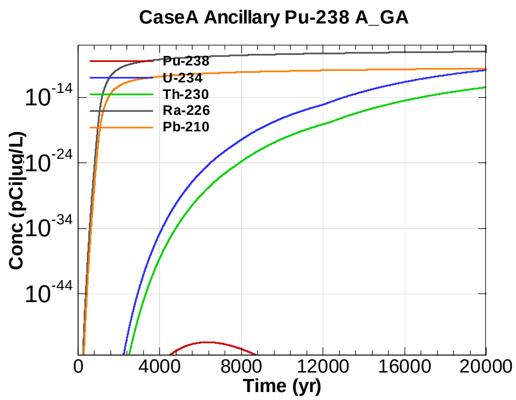

Figure E-2561 - 100m Aquifer Concentration for CaseA Ancillary Pu-238 A_GA

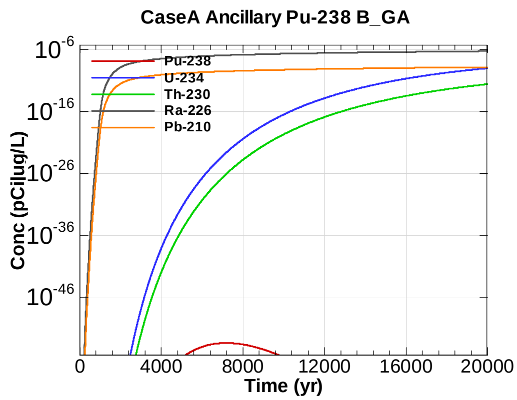

Figure E-2562 - 100m Aquifer Concentration for CaseA Ancillary Pu-238 B_GA

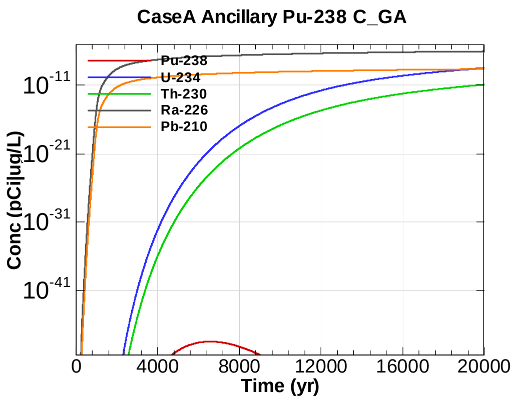

Figure E-2563 - 100m Aquifer Concentration for CaseA Ancillary Pu-238 C_GA

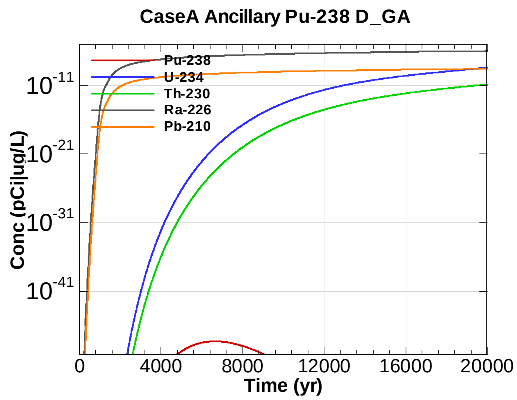

Figure E-2564 - 100m Aquifer Concentration for CaseA Ancillary Pu-238 D_GA

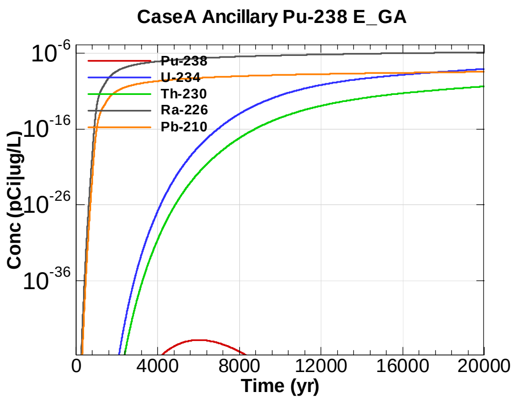

Figure E-2565 - 100m Aquifer Concentration for CaseA Ancillary Pu-238 E_GA

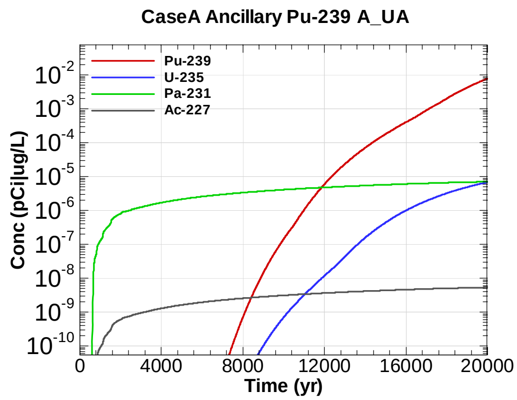

Figure E-2566 - 100m Aquifer Concentration for CaseA Ancillary Pu-239 A_UA

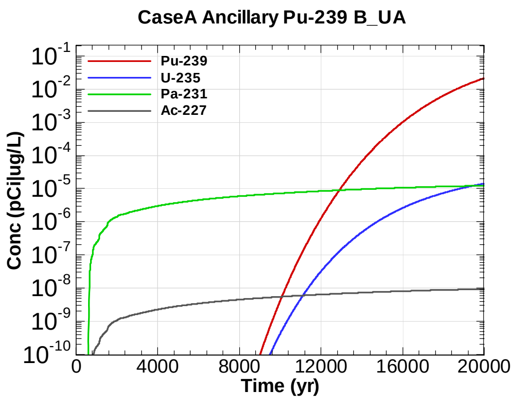

Figure E-2567 - 100m Aquifer Concentration for CaseA Ancillary Pu-239 B_UA

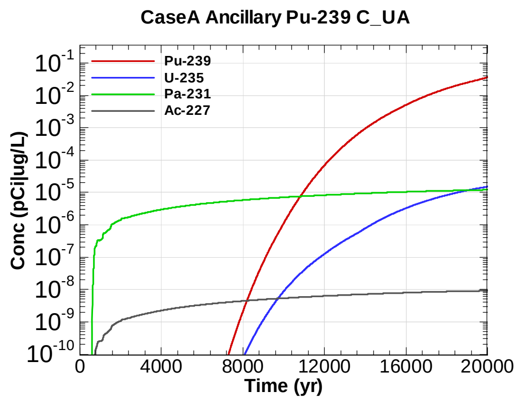

Figure E-2568 - 100m Aquifer Concentration for CaseA Ancillary Pu-239 C_UA

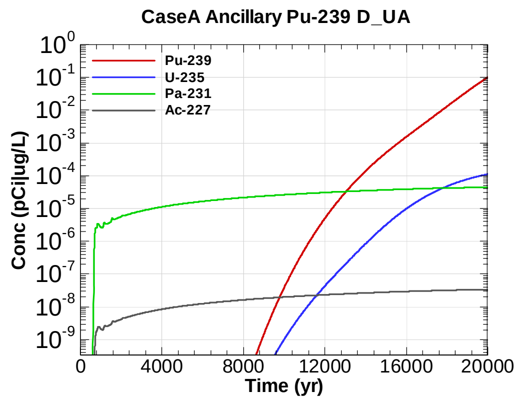

Figure E-2569 - 100m Aquifer Concentration for CaseA Ancillary Pu-239 D_UA

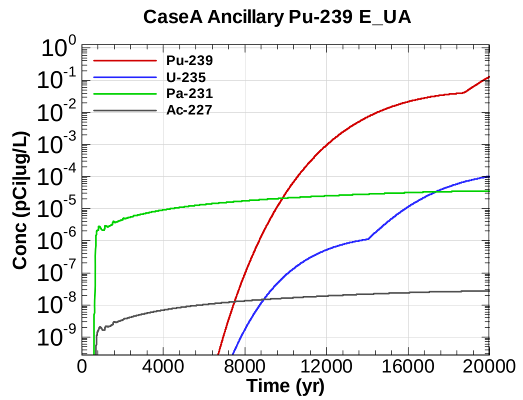

Figure E-2570 - 100m Aquifer Concentration for CaseA Ancillary Pu-239 E_UA

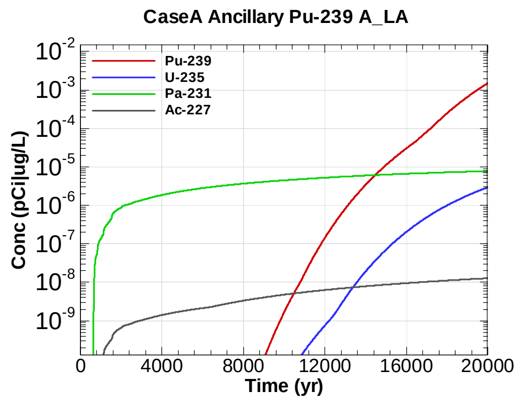

Figure E-2571 - 100m Aquifer Concentration for CaseA Ancillary Pu-239 A_LA

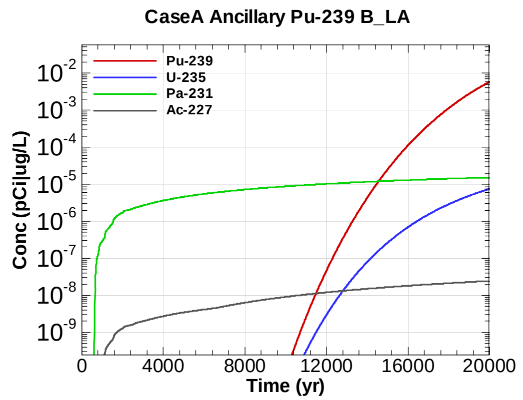

Figure E-2572 - 100m Aquifer Concentration for CaseA Ancillary Pu-239 B_LA

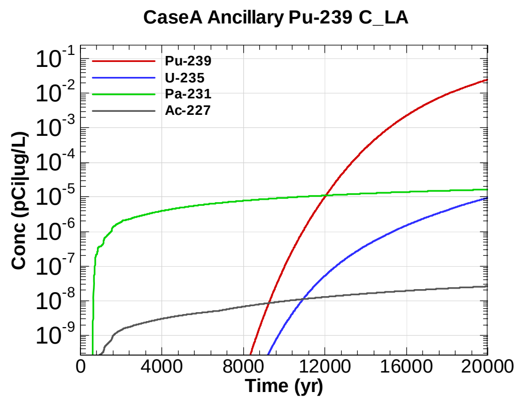

Figure E-2573 - 100m Aquifer Concentration for CaseA Ancillary Pu-239 C_LA

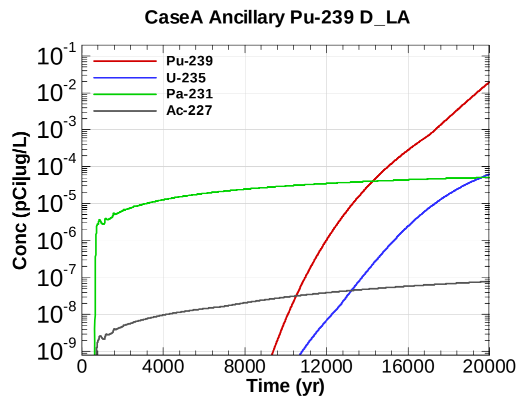

Figure E-2574 - 100m Aquifer Concentration for CaseA Ancillary Pu-239 D_LA

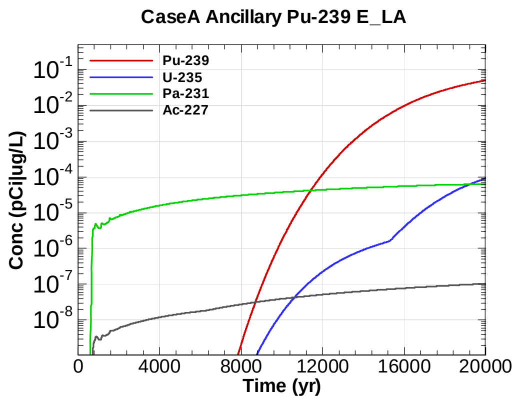

Figure E-2575 - 100m Aquifer Concentration for CaseA Ancillary Pu-239 E_LA

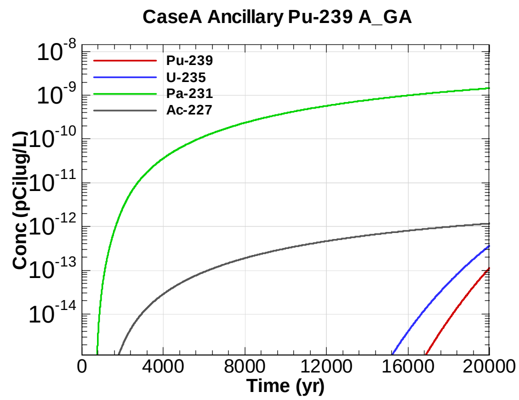

Figure E-2576 - 100m Aquifer Concentration for CaseA Ancillary Pu-239 A_GA

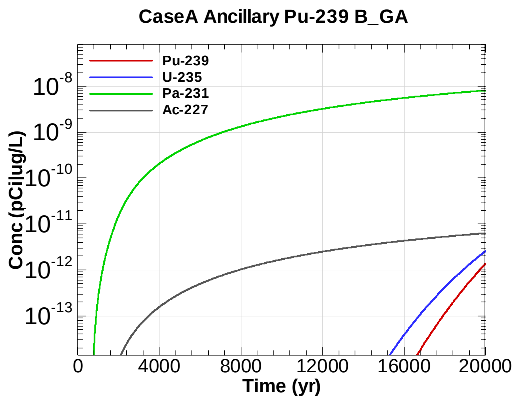

Figure E-2577 - 100m Aquifer Concentration for CaseA Ancillary Pu-239 B_GA

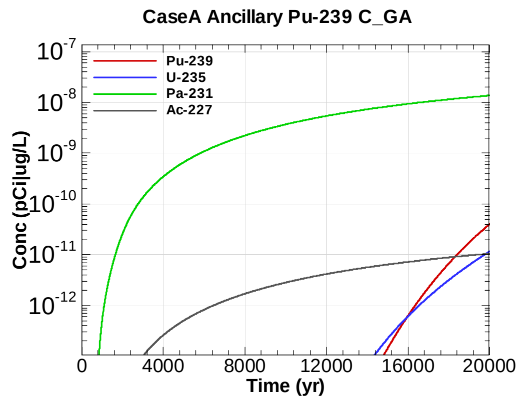

Figure E-2578 - 100m Aquifer Concentration for CaseA Ancillary Pu-239 C_GA

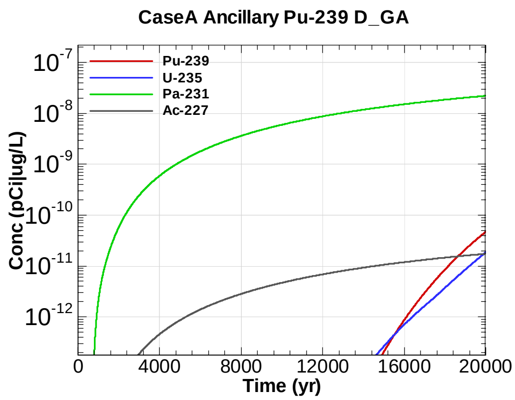

Figure E-2579 - 100m Aquifer Concentration for CaseA Ancillary Pu-239 D_GA

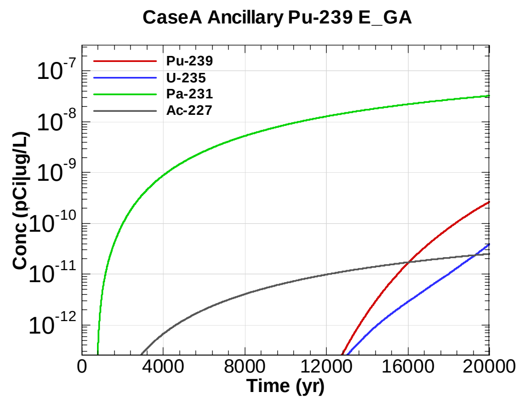

Figure E-2580 - 100m Aquifer Concentration for CaseA Ancillary Pu-239 E_GA

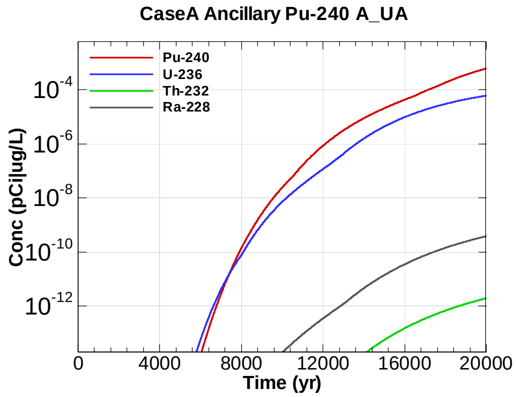

Figure E-2581 - 100m Aquifer Concentration for CaseA Ancillary Pu-240 A_UA

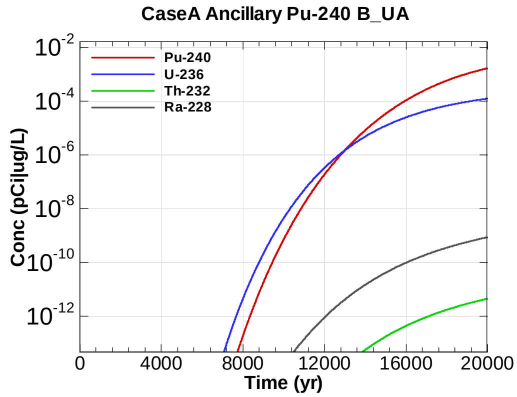

Figure E-2582 - 100m Aquifer Concentration for CaseA Ancillary Pu-240 B_UA

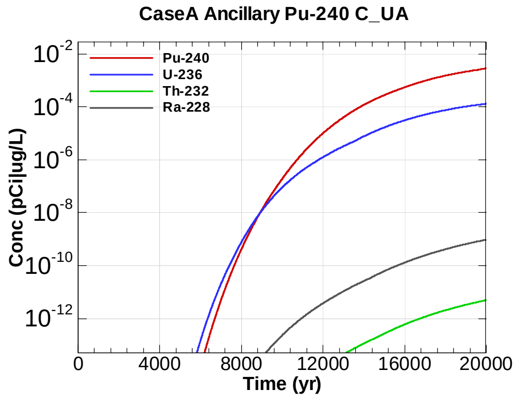

Figure E-2583 - 100m Aquifer Concentration for CaseA Ancillary Pu-240 C_UA

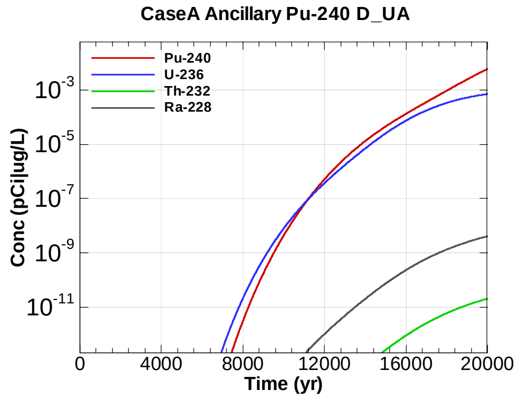

Figure E-2584 - 100m Aquifer Concentration for CaseA Ancillary Pu-240 D_UA

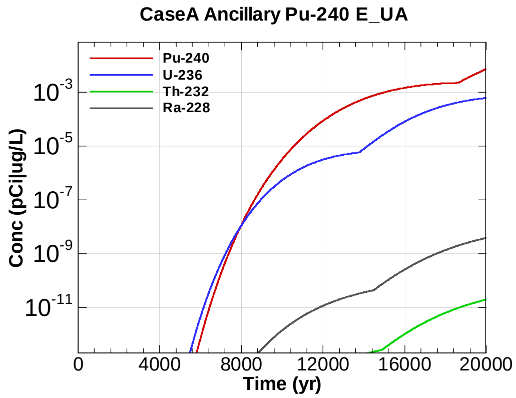

Figure E-2585 - 100m Aquifer Concentration for CaseA Ancillary Pu-240 E_UA

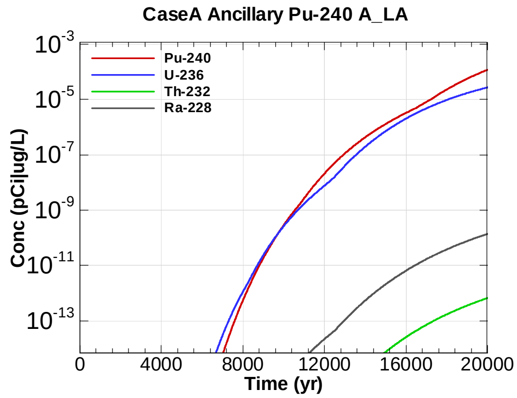

Figure E-2586 - 100m Aquifer Concentration for CaseA Ancillary Pu-240 A_LA

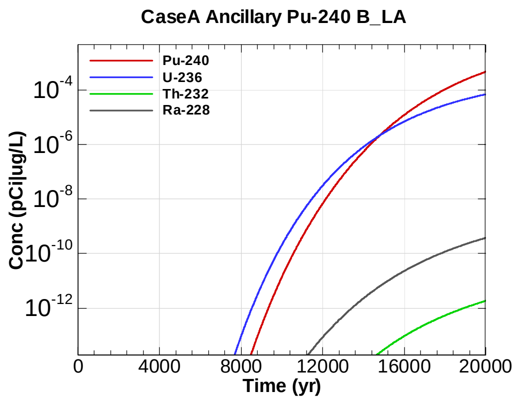

Figure E-2587 - 100m Aquifer Concentration for CaseA Ancillary Pu-240 B_LA

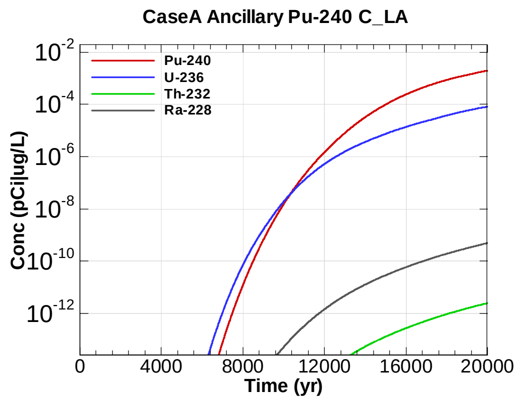

Figure E-2588 - 100m Aquifer Concentration for CaseA Ancillary Pu-240 C_LA

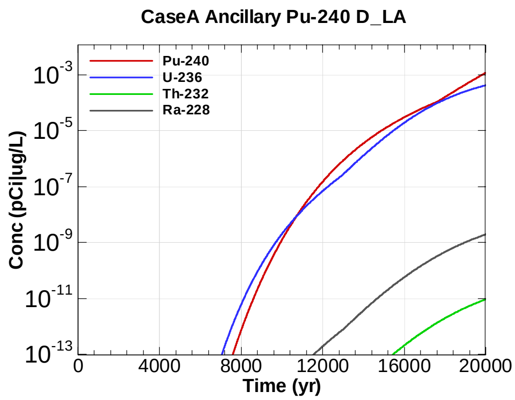

Figure E-2589 - 100m Aquifer Concentration for CaseA Ancillary Pu-240 D_LA

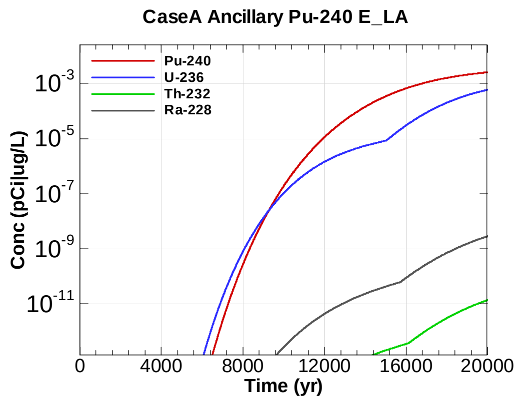

Figure E-2590 - 100m Aquifer Concentration for CaseA Ancillary Pu-240 E_LA

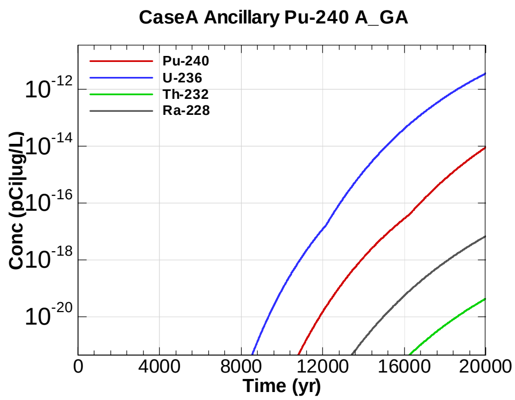

Figure E-2591 - 100m Aquifer Concentration for CaseA Ancillary Pu-240 A_GA

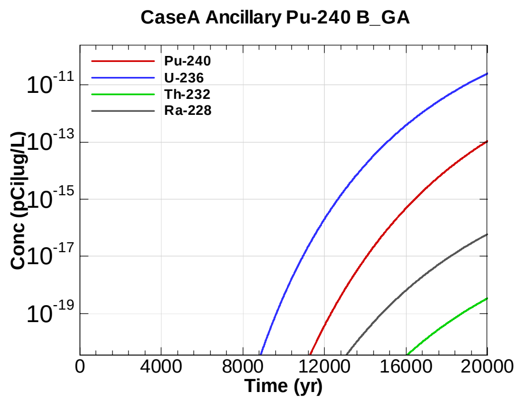

Figure E-2592 - 100m Aquifer Concentration for CaseA Ancillary Pu-240 B_GA

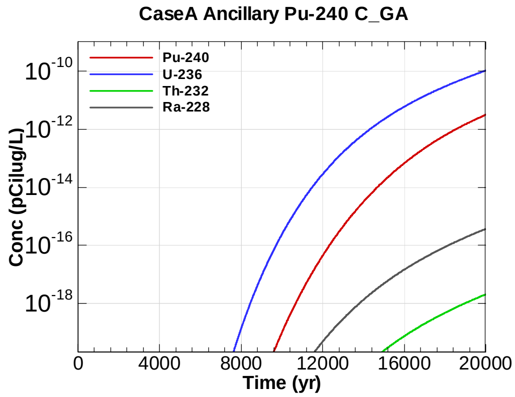

Figure E-2593 - 100m Aquifer Concentration for CaseA Ancillary Pu-240 C_GA

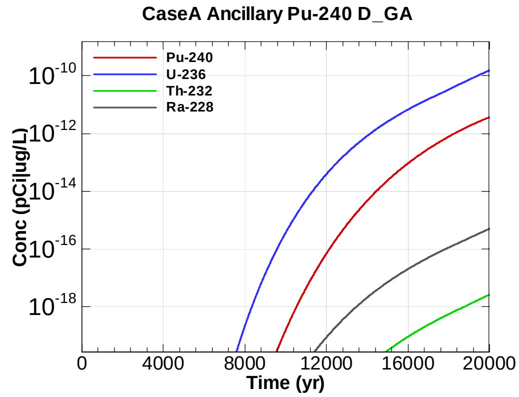

Figure E-2594 - 100m Aquifer Concentration for CaseA Ancillary Pu-240 D_GA

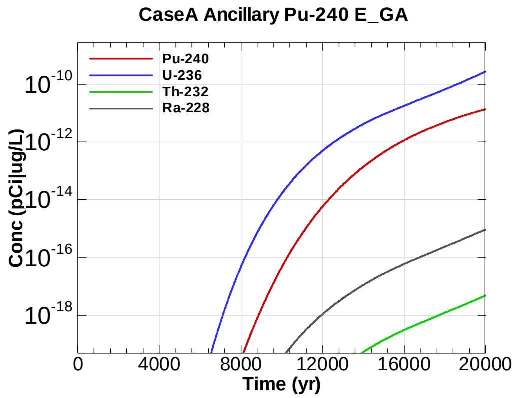

Figure E-2595 - 100m Aquifer Concentration for CaseA Ancillary Pu-240 E_GA

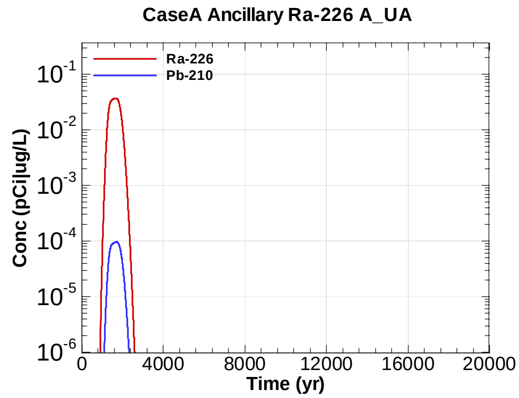

Figure E-2596 - 100m Aquifer Concentration for CaseA Ancillary Ra-226 A_UA

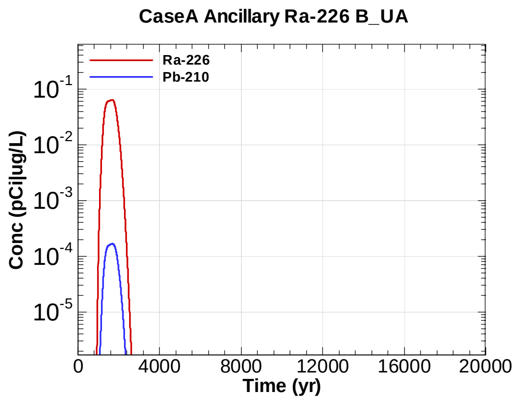

Figure E-2597 - 100m Aquifer Concentration for CaseA Ancillary Ra-226 B_UA

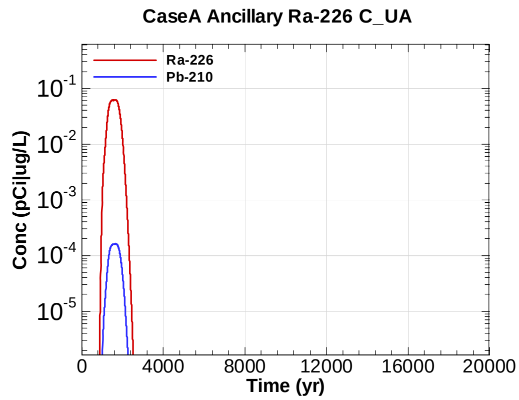

Figure E-2598 - 100m Aquifer Concentration for CaseA Ancillary Ra-226 C_UA

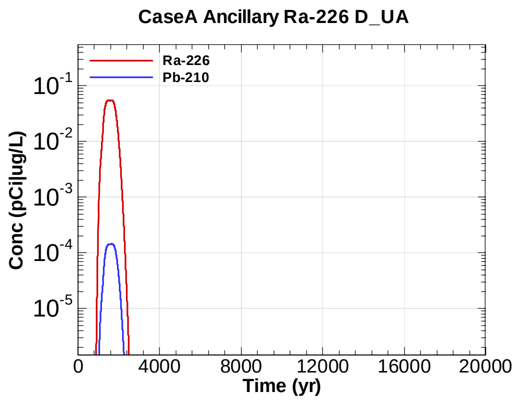

Figure E-2599 - 100m Aquifer Concentration for CaseA Ancillary Ra-226 D_UA

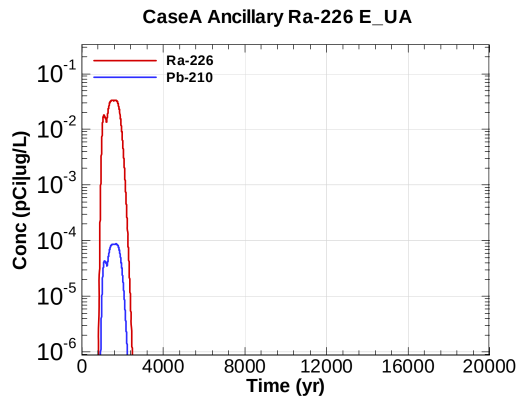

Figure E-2600 - 100m Aquifer Concentration for CaseA Ancillary Ra-226 E_UA

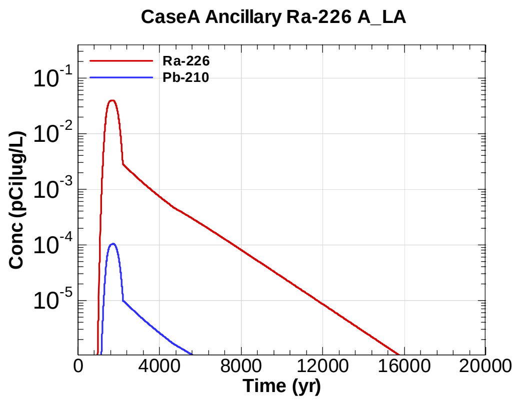

Figure E-2601 - 100m Aquifer Concentration for CaseA Ancillary Ra-226 A_LA

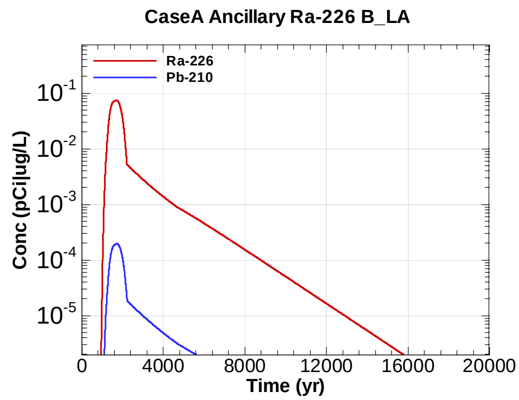

Figure E-2602 - 100m Aquifer Concentration for CaseA Ancillary Ra-226 B_LA

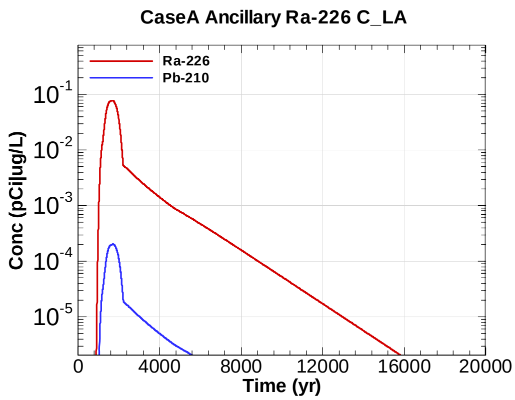

Figure E-2603 - 100m Aquifer Concentration for CaseA Ancillary Ra-226 C_LA

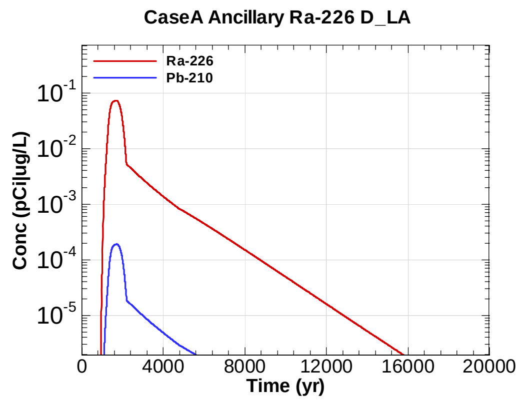

Figure E-2604 - 100m Aquifer Concentration for CaseA Ancillary Ra-226 D_LA

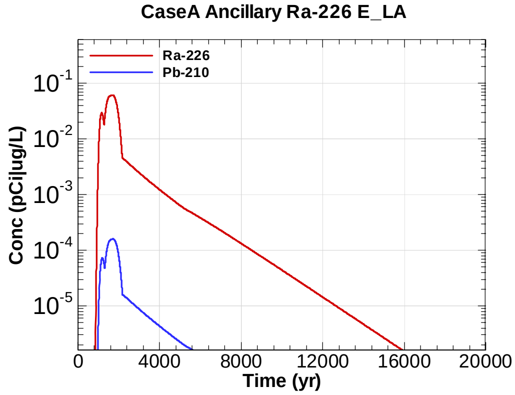

Figure E-2605 - 100m Aquifer Concentration for CaseA Ancillary Ra-226 E_LA

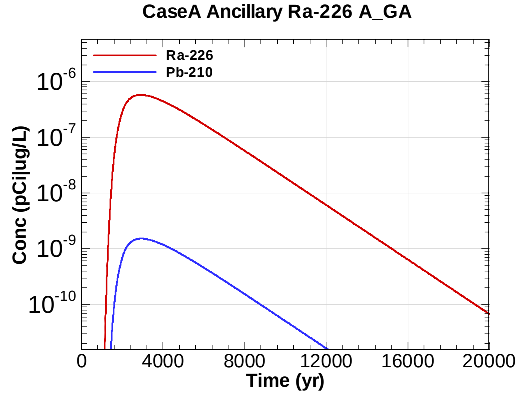

Figure E-2606 - 100m Aquifer Concentration for CaseA Ancillary Ra-226 A_GA

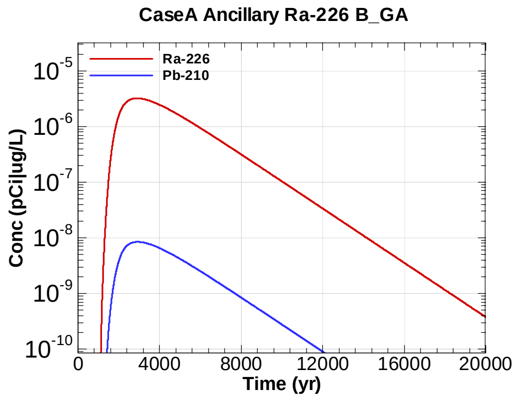

Figure E-2607 - 100m Aquifer Concentration for CaseA Ancillary Ra-226 B_GA

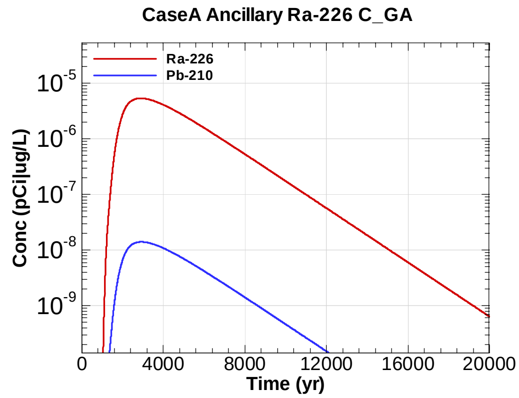

Figure E-2608 - 100m Aquifer Concentration for CaseA Ancillary Ra-226 C_GA

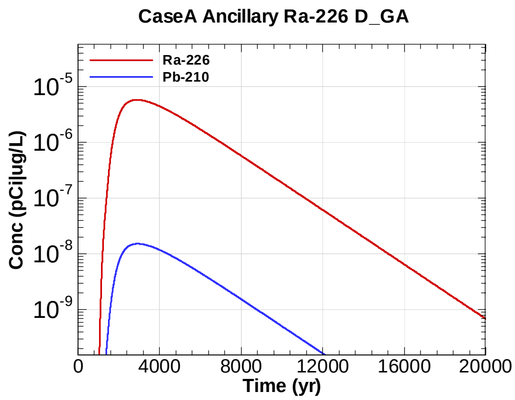

Figure E-2609 - 100m Aquifer Concentration for CaseA Ancillary Ra-226 D_GA

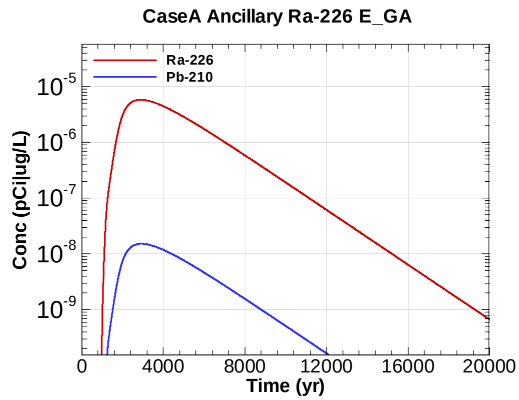

Figure E-2610 - 100m Aquifer Concentration for CaseA Ancillary Ra-226 E_GA

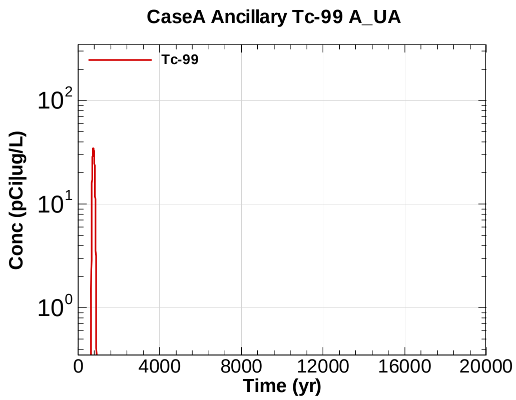

Figure E-2611 - 100m Aquifer Concentration for CaseA Ancillary Tc-99 A_UA

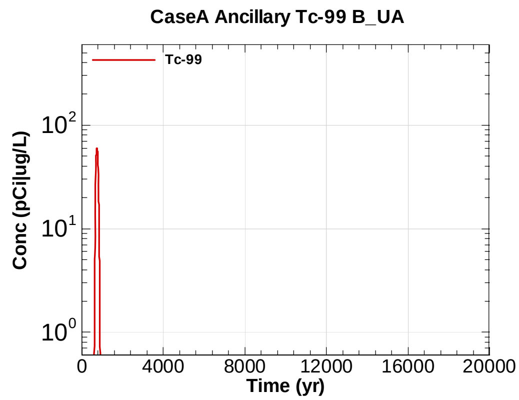

Figure E-2612 - 100m Aquifer Concentration for CaseA Ancillary Tc-99 B_UA

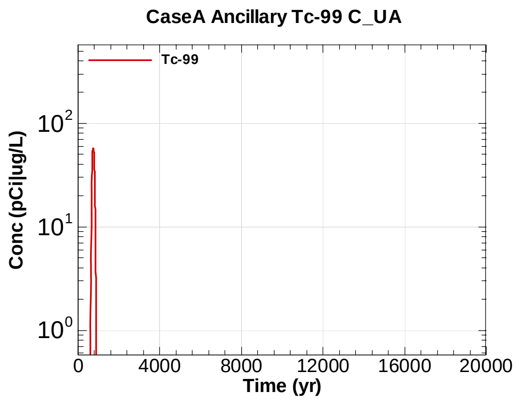

Figure E-2613 - 100m Aquifer Concentration for CaseA Ancillary Tc-99 C_UA

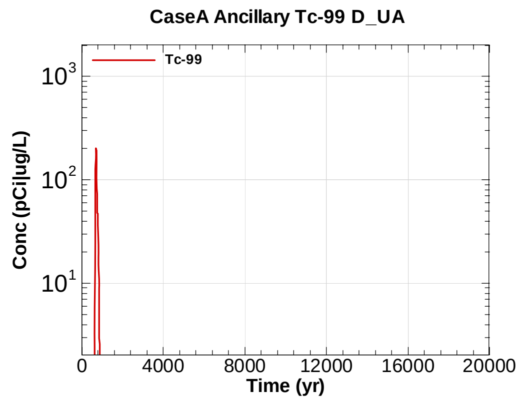

Figure E-2614 - 100m Aquifer Concentration for CaseA Ancillary Tc-99 D_UA

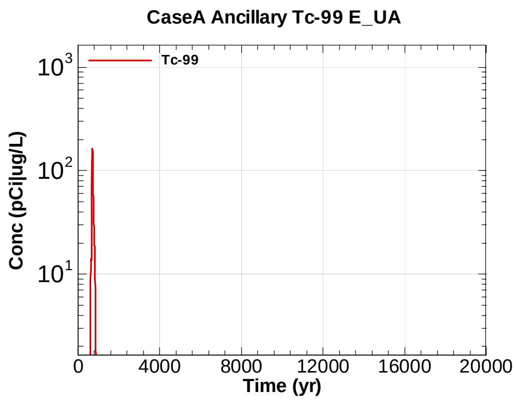

Figure E-2615 - 100m Aquifer Concentration for CaseA Ancillary Tc-99 E_UA

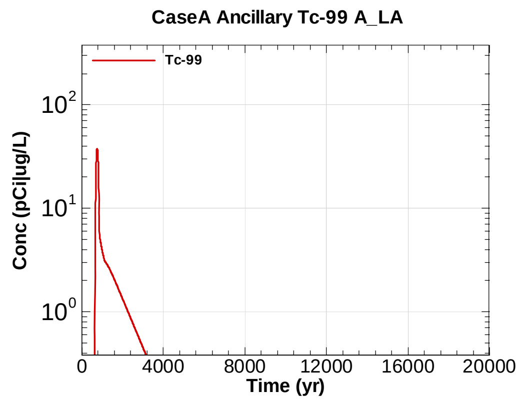

Figure E-2616 - 100m Aquifer Concentration for CaseA Ancillary Tc-99 A_LA

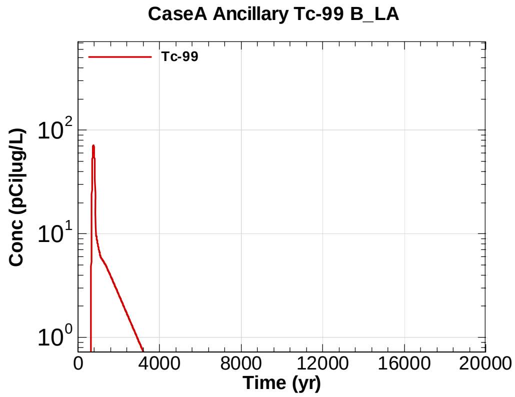

Figure E-2617 - 100m Aquifer Concentration for CaseA Ancillary Tc-99 B_LA

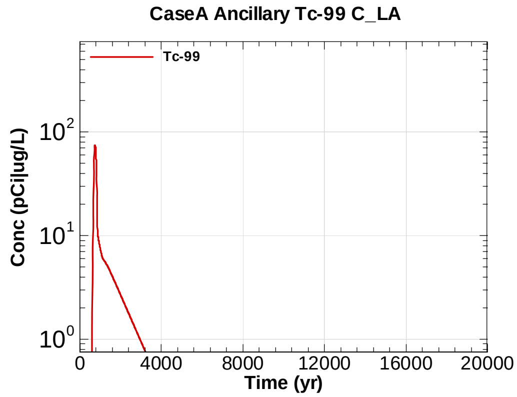

Figure E-2618 - 100m Aquifer Concentration for CaseA Ancillary Tc-99 C_LA

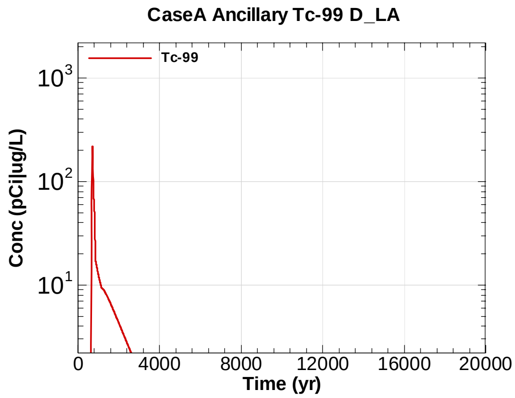

Figure E-2619 - 100m Aquifer Concentration for CaseA Ancillary Tc-99 D_LA

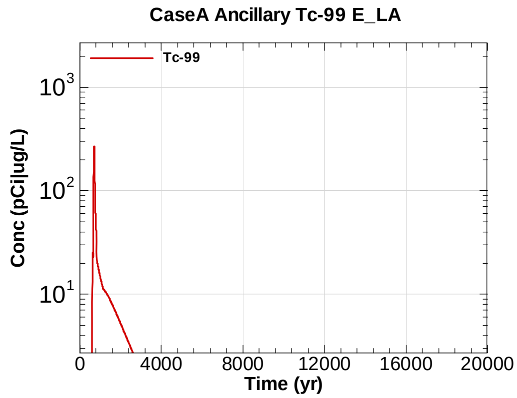

Figure E-2620 - 100m Aquifer Concentration for CaseA Ancillary Tc-99 E_LA

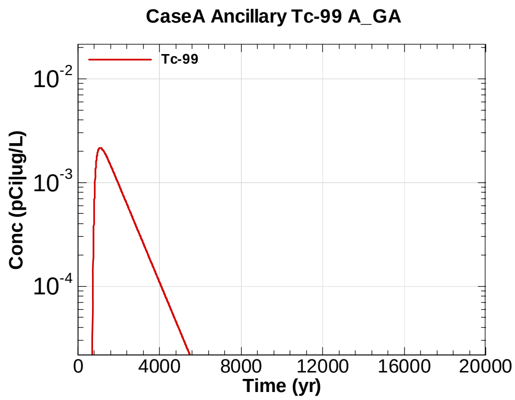

Figure E-2621 - 100m Aquifer Concentration for CaseA Ancillary Tc-99 A_GA

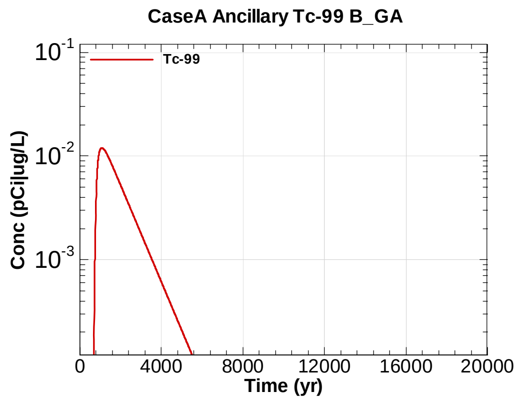

Figure E-2622 - 100m Aquifer Concentration for CaseA Ancillary Tc-99 B_GA

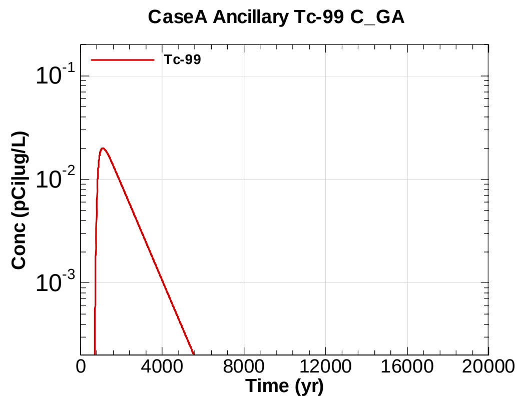

Figure E-2623 - 100m Aquifer Concentration for CaseA Ancillary Tc-99 C_GA

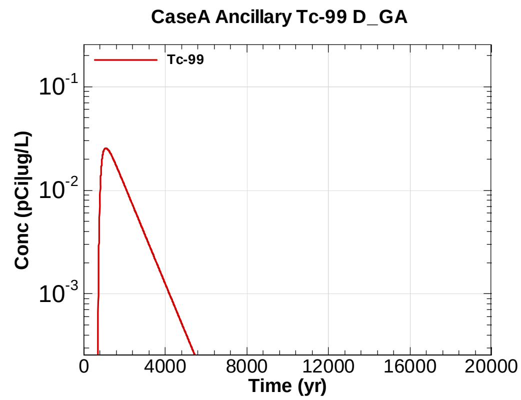

Figure E-2624 - 100m Aquifer Concentration for CaseA Ancillary Tc-99 D_GA

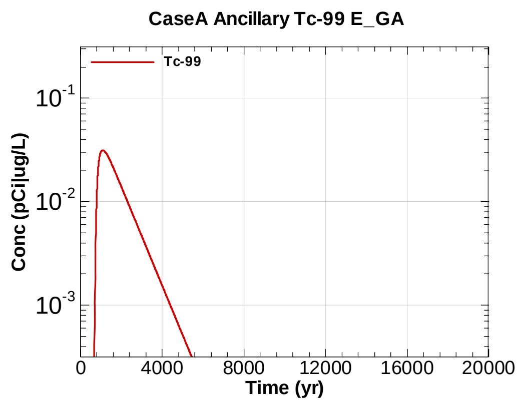

Figure E-2625 - 100m Aquifer Concentration for CaseA Ancillary Tc-99 E_GA

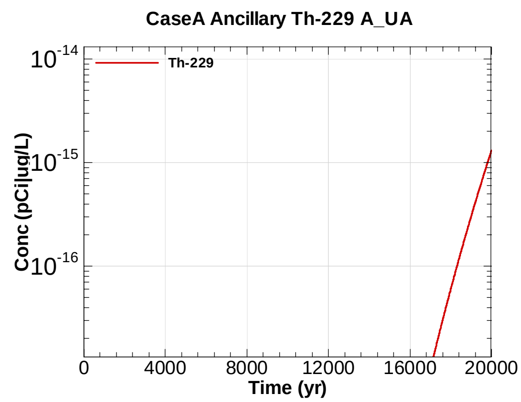

Figure E-2626 - 100m Aquifer Concentration for CaseA Ancillary Th-229 A_UA

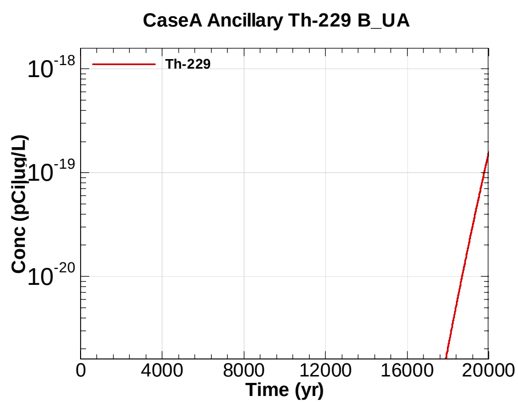

Figure E-2627 - 100m Aquifer Concentration for CaseA Ancillary Th-229 B_UA

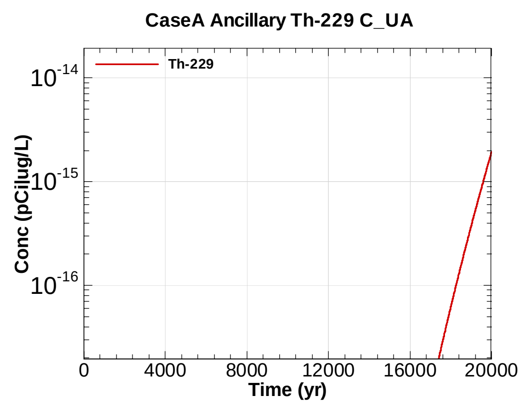

Figure E-2628 - 100m Aquifer Concentration for CaseA Ancillary Th-229 C_UA

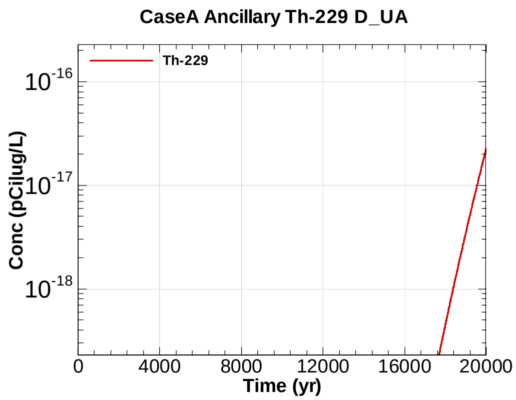

Figure E-2629 - 100m Aquifer Concentration for CaseA Ancillary Th-229 D_UA

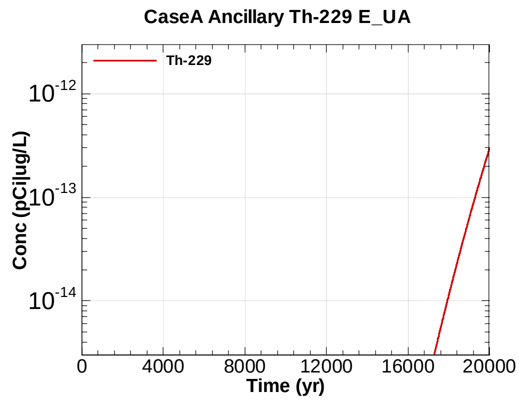

Figure E-2630 - 100m Aquifer Concentration for CaseA Ancillary Th-229 E_UA

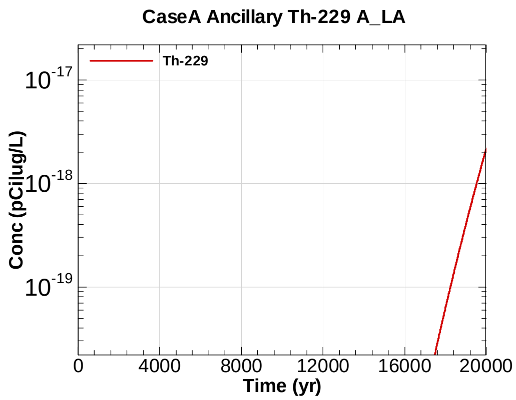

Figure E-2631 - 100m Aquifer Concentration for CaseA Ancillary Th-229 A_LA

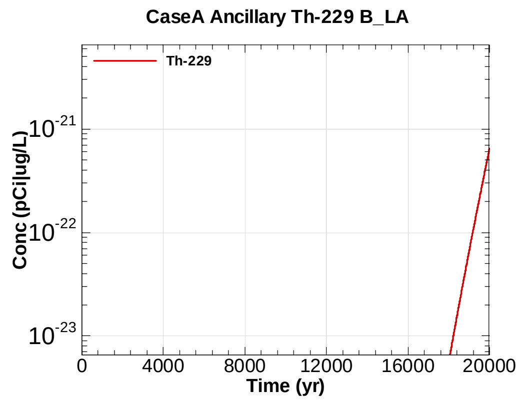

Figure E-2632 - 100m Aquifer Concentration for CaseA Ancillary Th-229 B_LA

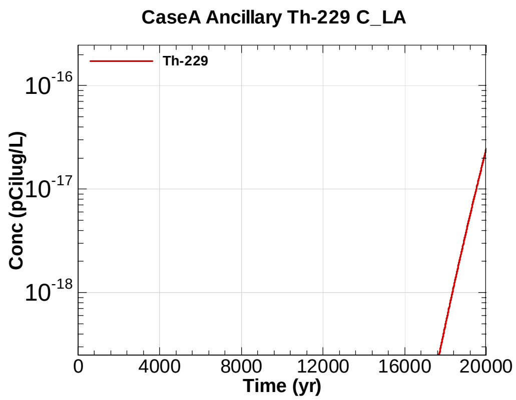

Figure E-2633 - 100m Aquifer Concentration for CaseA Ancillary Th-229 C_LA

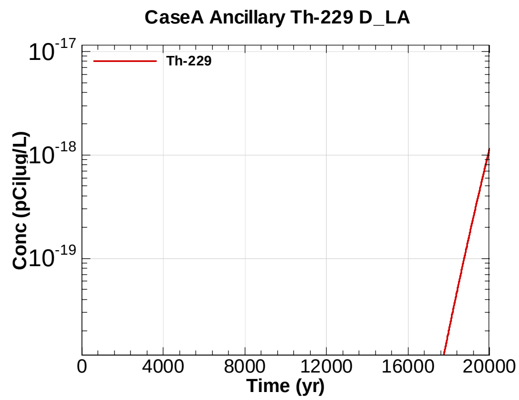

Figure E-2634 - 100m Aquifer Concentration for CaseA Ancillary Th-229 D_LA

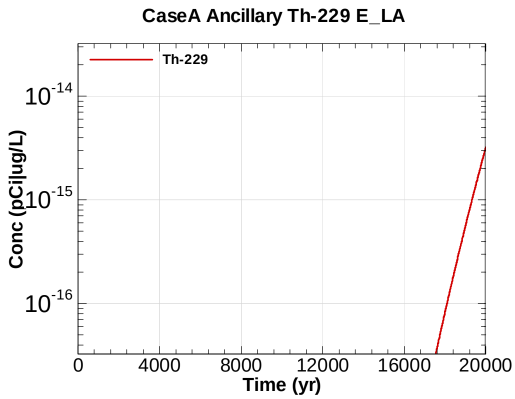

Figure E-2635 - 100m Aquifer Concentration for CaseA Ancillary Th-229 E_LA

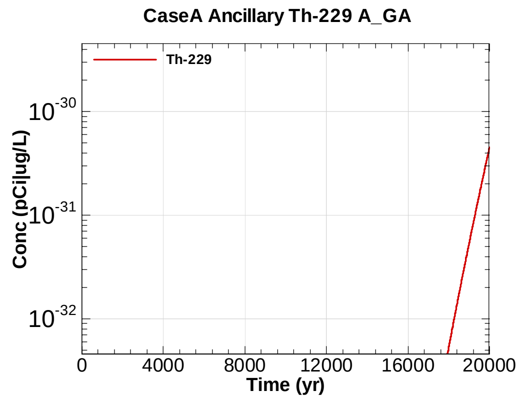

Figure E-2636 - 100m Aquifer Concentration for CaseA Ancillary Th-229 A_GA

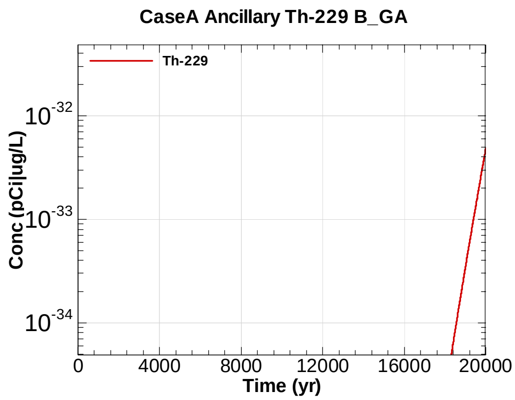

Figure E-2637 - 100m Aquifer Concentration for CaseA Ancillary Th-229 B_GA

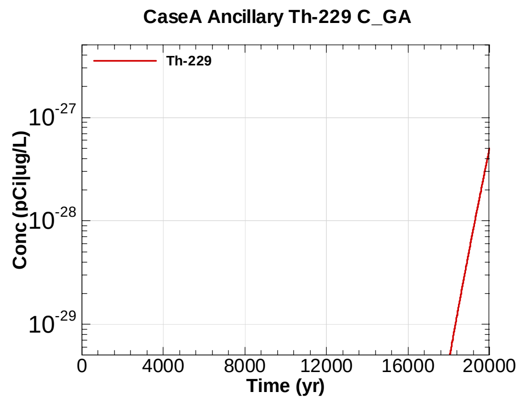

Figure E-2638 - 100m Aquifer Concentration for CaseA Ancillary Th-229 C_GA

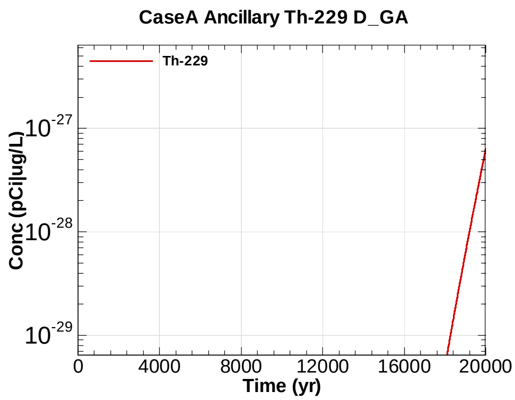

Figure E-2639 - 100m Aquifer Concentration for CaseA Ancillary Th-229 D_GA

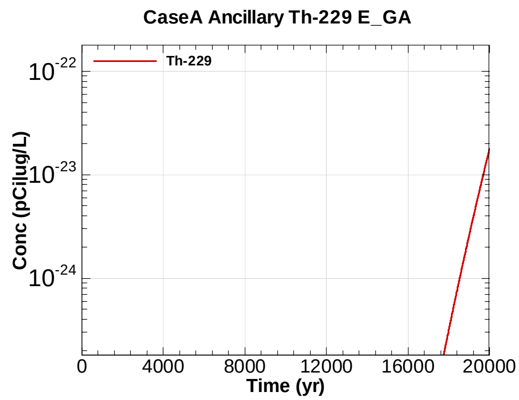

Figure E-2640 - 100m Aquifer Concentration for CaseA Ancillary Th-229 E_GA

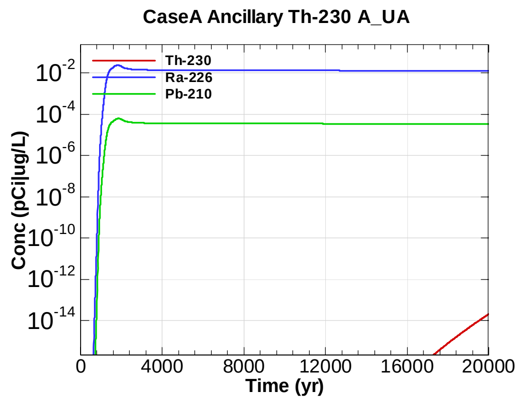

Figure E-2641 - 100m Aquifer Concentration for CaseA Ancillary Th-230 A_UA

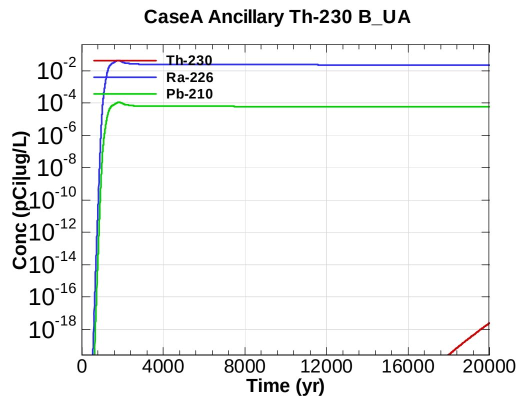

Figure E-2642 - 100m Aquifer Concentration for CaseA Ancillary Th-230 B_UA

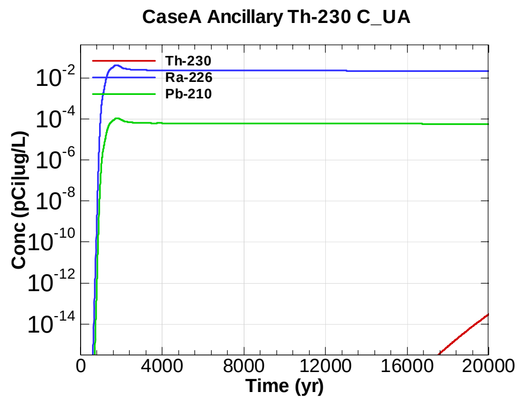

Figure E-2643 - 100m Aquifer Concentration for CaseA Ancillary Th-230 C_UA

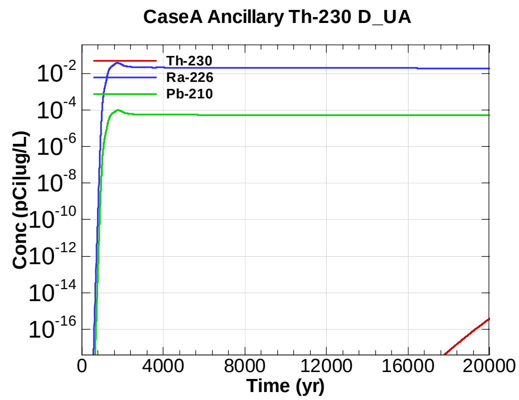

Figure E-2644 - 100m Aquifer Concentration for CaseA Ancillary Th-230 D_UA

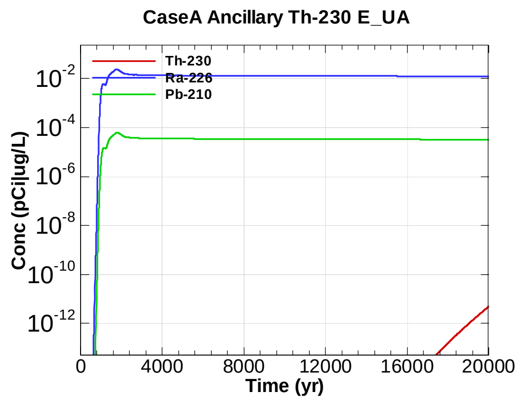

Figure E-2645 - 100m Aquifer Concentration for CaseA Ancillary Th-230 E_UA

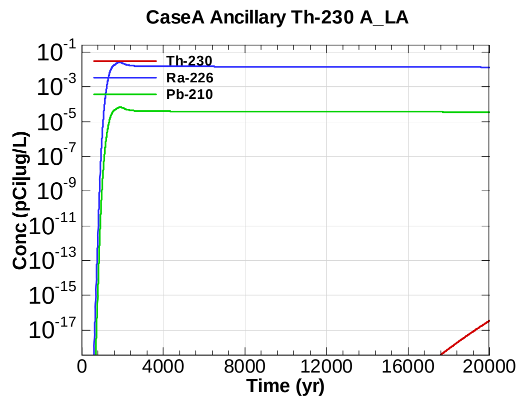

Figure E-2646 - 100m Aquifer Concentration for CaseA Ancillary Th-230 A_LA

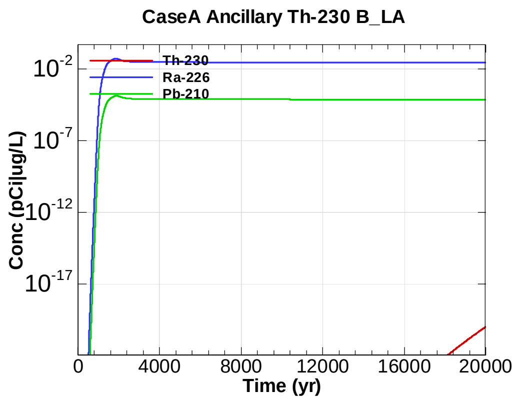

Figure E-2647 - 100m Aquifer Concentration for CaseA Ancillary Th-230 B_LA

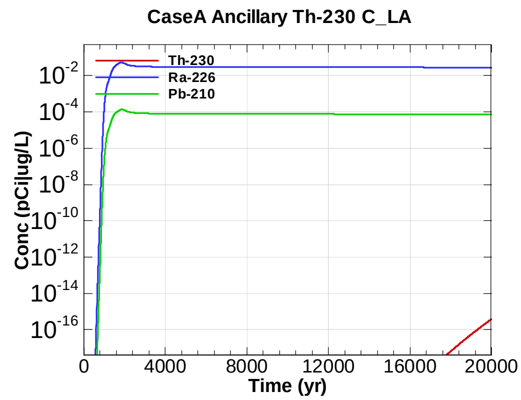

Figure E-2648 - 100m Aquifer Concentration for CaseA Ancillary Th-230 C_LA

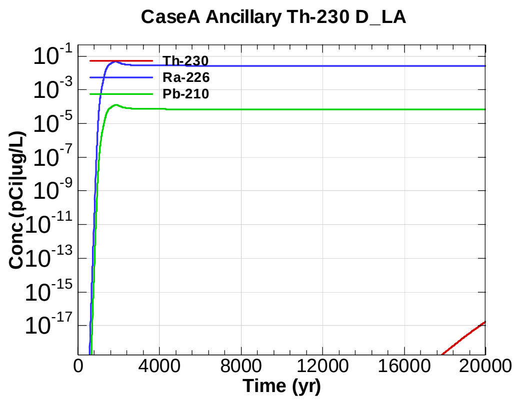

Figure E-2649 - 100m Aquifer Concentration for CaseA Ancillary Th-230 D_LA

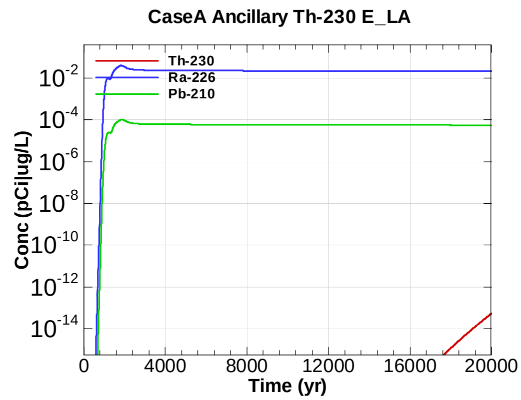

Figure E-2650 - 100m Aquifer Concentration for CaseA Ancillary Th-230 E_LA

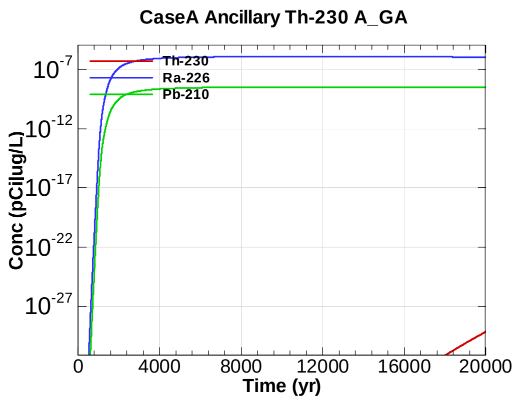

Figure E-2651 - 100m Aquifer Concentration for CaseA Ancillary Th-230 A_GA

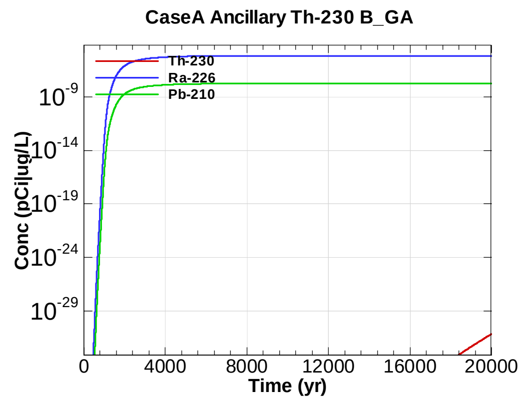

Figure E-2652 - 100m Aquifer Concentration for CaseA Ancillary Th-230 B_GA

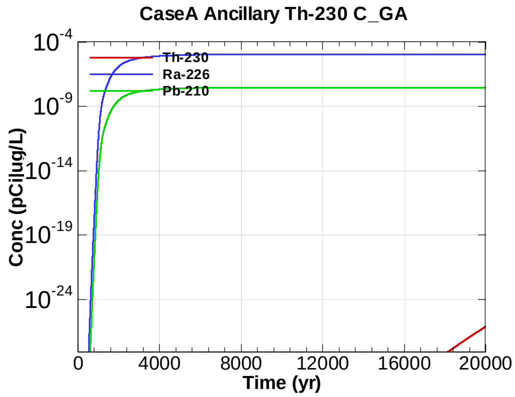

Figure E-2653 - 100m Aquifer Concentration for CaseA Ancillary Th-230 C_GA

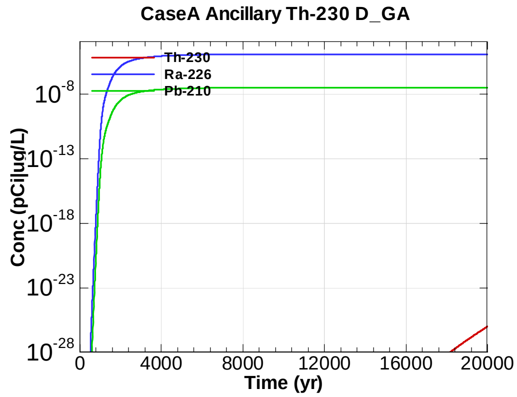

Figure E-2654 - 100m Aquifer Concentration for CaseA Ancillary Th-230 D_GA

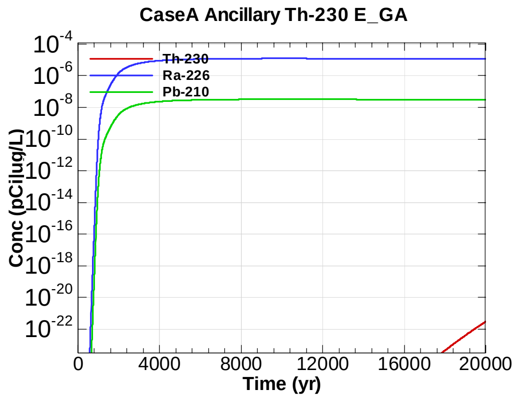

Figure E-2655 - 100m Aquifer Concentration for CaseA Ancillary Th-230 E_GA

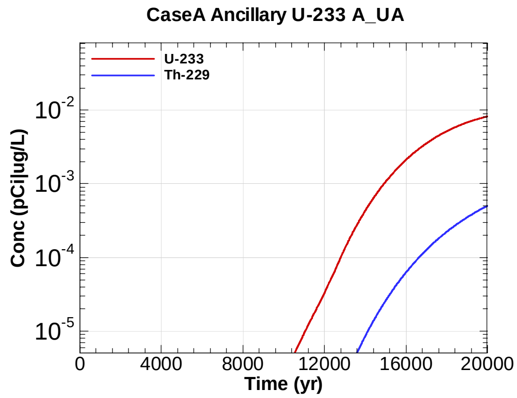

Figure E-2656 - 100m Aquifer Concentration for CaseA Ancillary U-233 A_UA

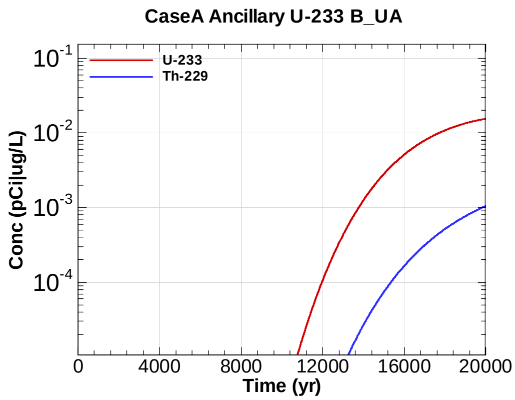

Figure E-2657 - 100m Aquifer Concentration for CaseA Ancillary U-233 B_UA

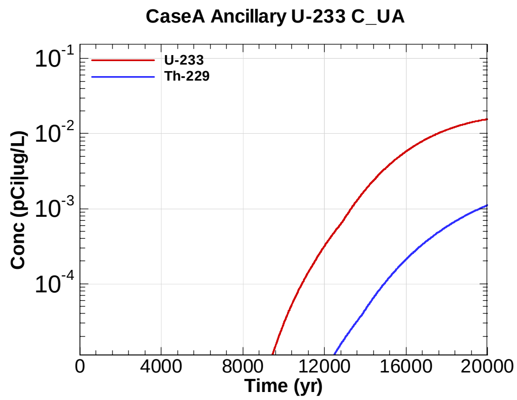

Figure E-2658 - 100m Aquifer Concentration for CaseA Ancillary U-233 C_UA

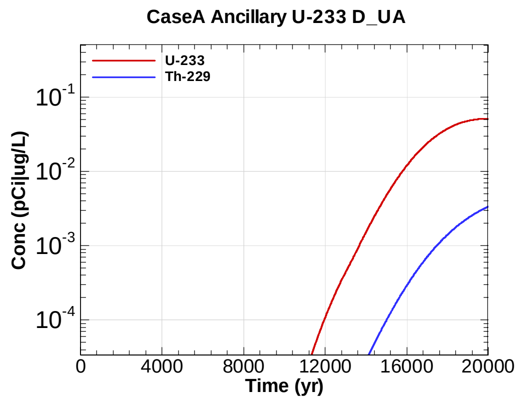

Figure E-2659 - 100m Aquifer Concentration for CaseA Ancillary U-233 D_UA

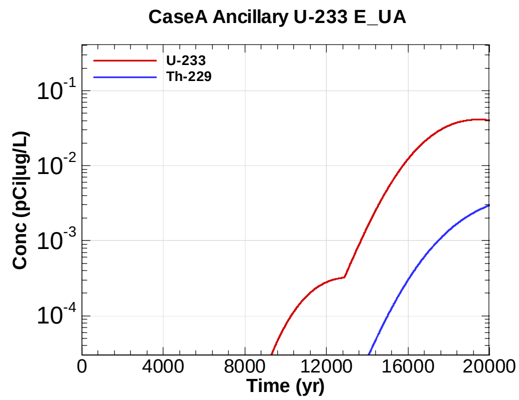

Figure E-2660 - 100m Aquifer Concentration for CaseA Ancillary U-233 E_UA

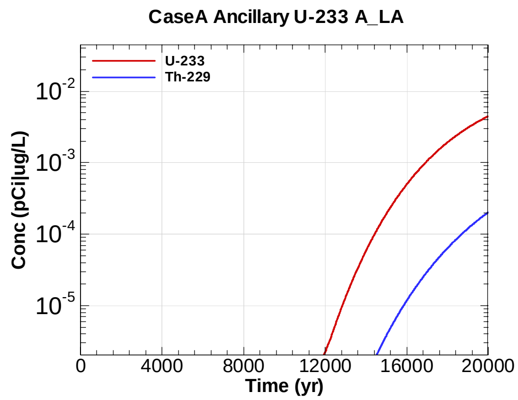

Figure E-2661 - 100m Aquifer Concentration for CaseA Ancillary U-233 A_LA

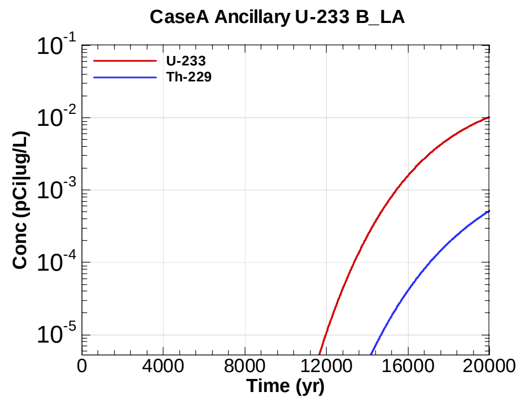

Figure E-2662 - 100m Aquifer Concentration for CaseA Ancillary U-233 B_LA

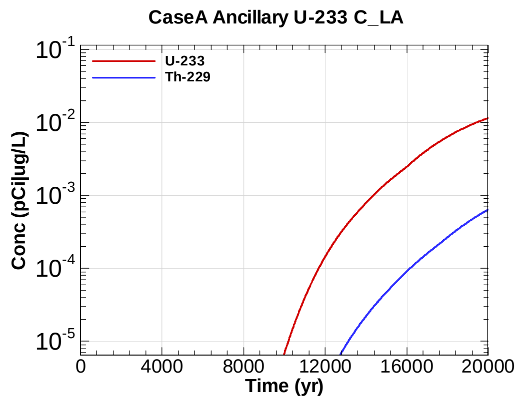

Figure E-2663 - 100m Aquifer Concentration for CaseA Ancillary U-233 C_LA

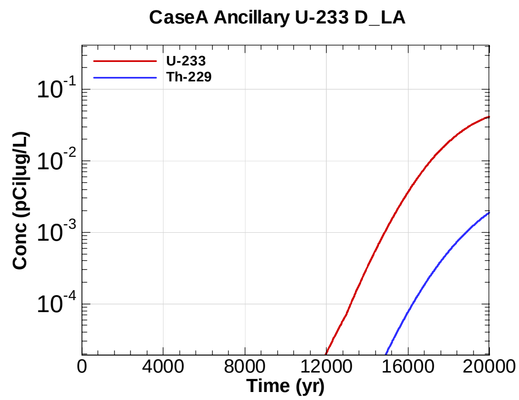

Figure E-2664 - 100m Aquifer Concentration for CaseA Ancillary U-233 D_LA

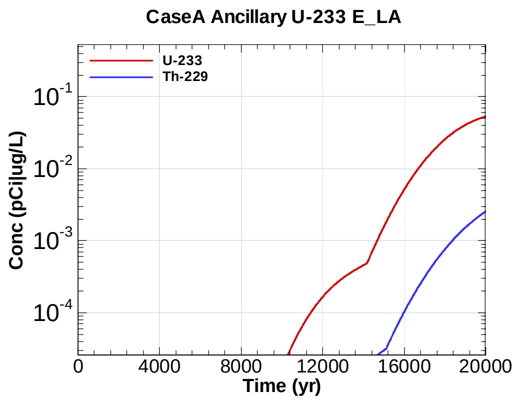

Figure E-2665 - 100m Aquifer Concentration for CaseA Ancillary U-233 E_LA

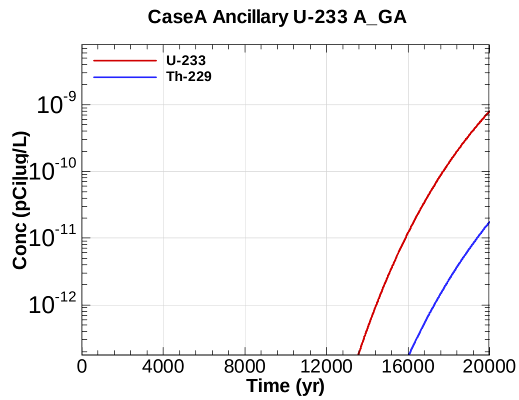

Figure E-2666 - 100m Aquifer Concentration for CaseA Ancillary U-233 A_GA

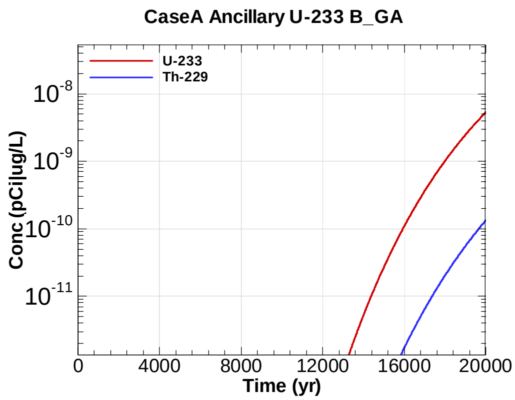

Figure E-2667 - 100m Aquifer Concentration for CaseA Ancillary U-233 B_GA

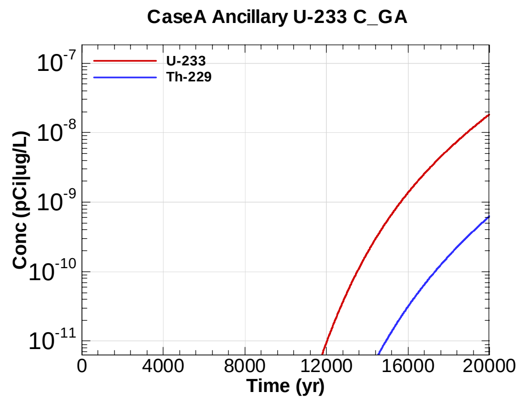

Figure E-2668 - 100m Aquifer Concentration for CaseA Ancillary U-233 C_GA

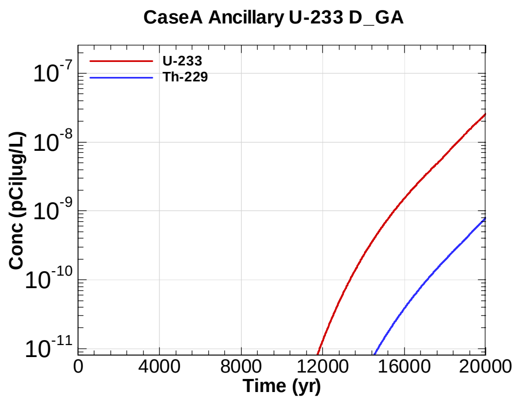

Figure E-2669 - 100m Aquifer Concentration for CaseA Ancillary U-233 D_GA

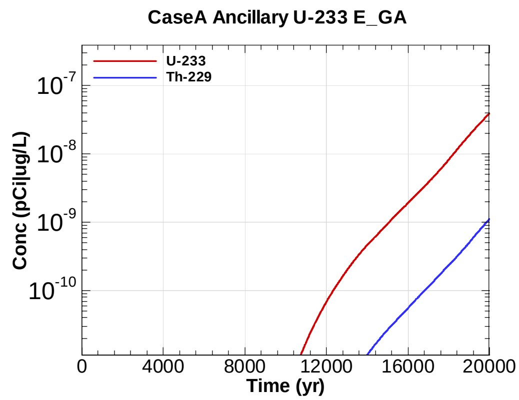

Figure E-2670 - 100m Aquifer Concentration for CaseA Ancillary U-233 E_GA

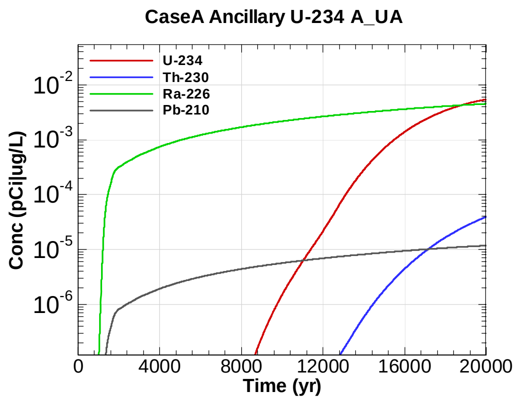

Figure E-2671 - 100m Aquifer Concentration for CaseA Ancillary U-234 A_UA

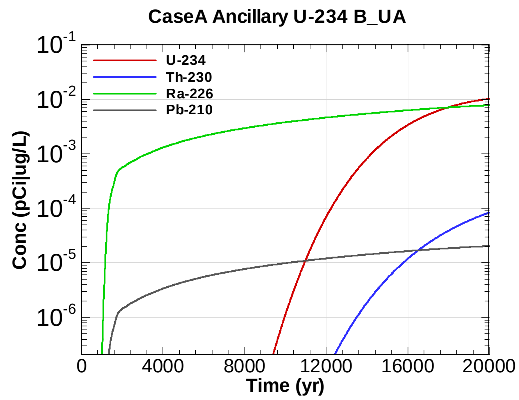

Figure E-2672 - 100m Aquifer Concentration for CaseA Ancillary U-234 B_UA

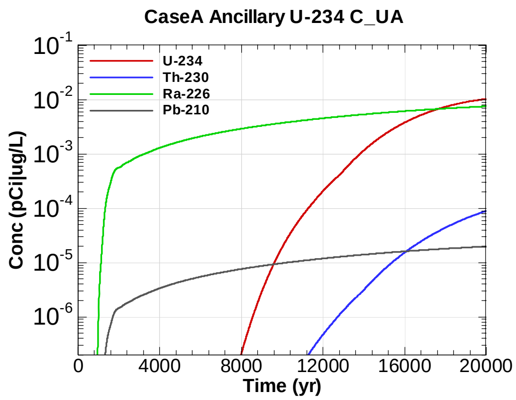

Figure E-2673 - 100m Aquifer Concentration for CaseA Ancillary U-234 C_UA

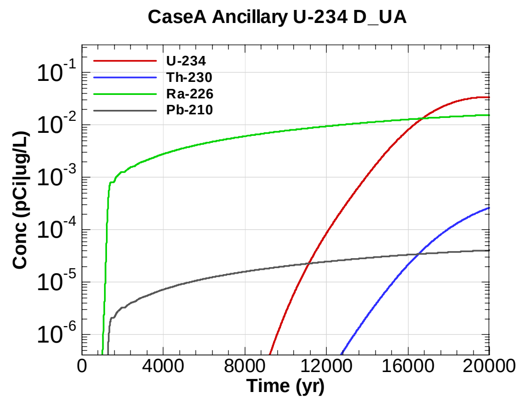

Figure E-2674 - 100m Aquifer Concentration for CaseA Ancillary U-234 D_UA

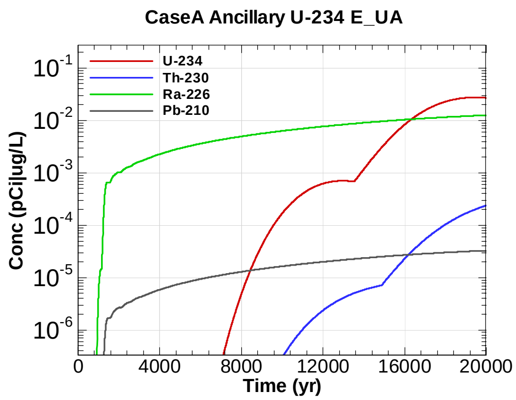

Figure E-2675 - 100m Aquifer Concentration for CaseA Ancillary U-234 E_UA

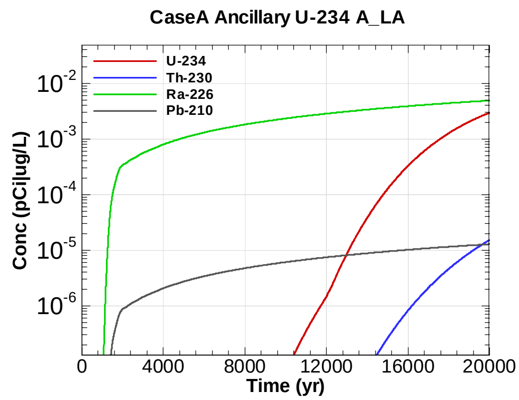

Figure E-2676 - 100m Aquifer Concentration for CaseA Ancillary U-234 A_LA

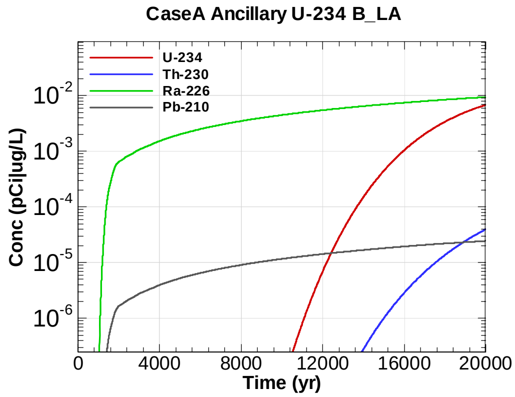

Figure E-2677 - 100m Aquifer Concentration for CaseA Ancillary U-234 B_LA

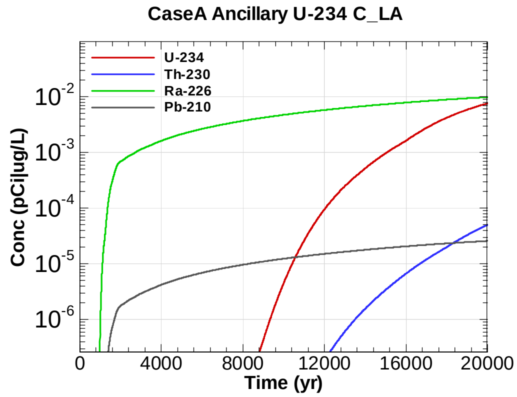

Figure E-2678 - 100m Aquifer Concentration for CaseA Ancillary U-234 C_LA

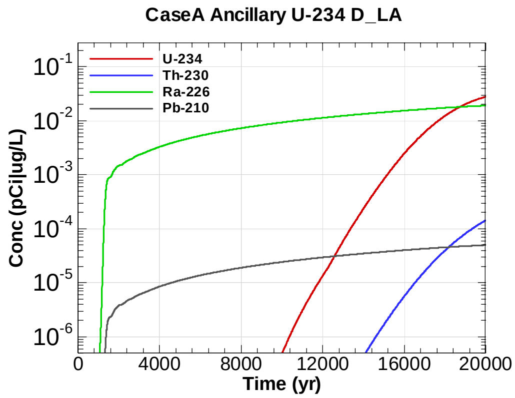

Figure E-2679 - 100m Aquifer Concentration for CaseA Ancillary U-234 D_LA

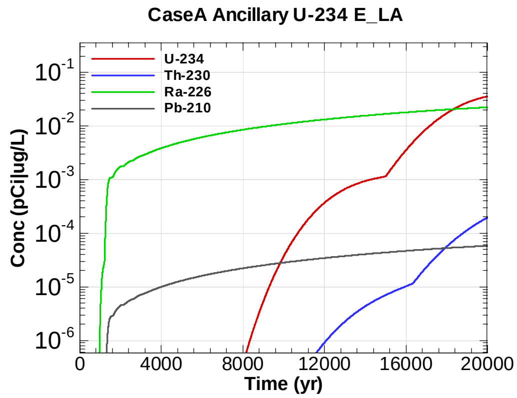

Figure E-2680 - 100m Aquifer Concentration for CaseA Ancillary U-234 E_LA

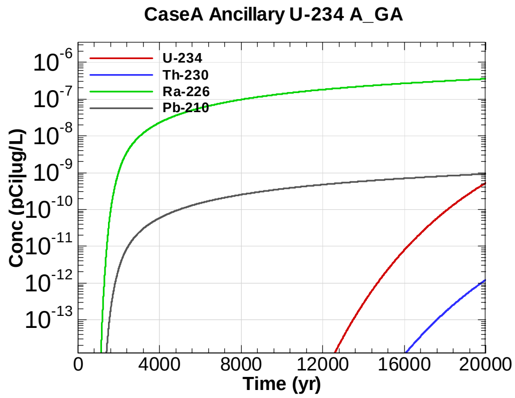

Figure E-2681 - 100m Aquifer Concentration for CaseA Ancillary U-234 A_GA

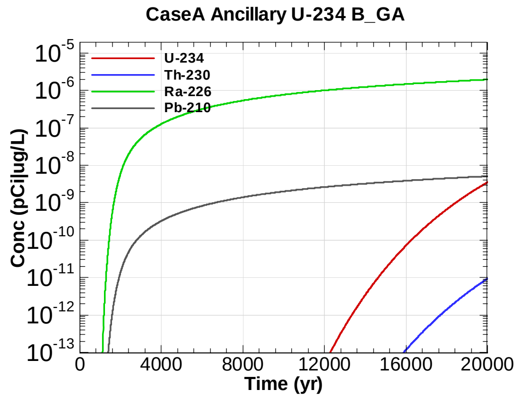

Figure E-2682 - 100m Aquifer Concentration for CaseA Ancillary U-234 B_GA

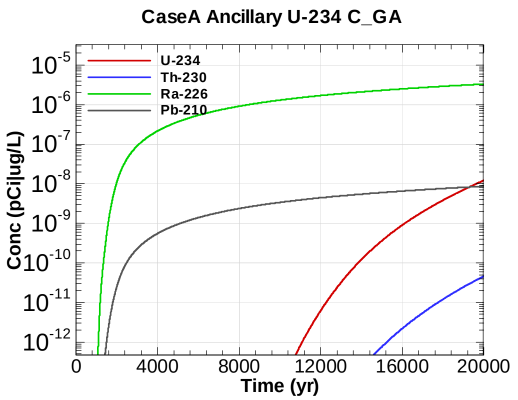

Figure E-2683 - 100m Aquifer Concentration for CaseA Ancillary U-234 C_GA

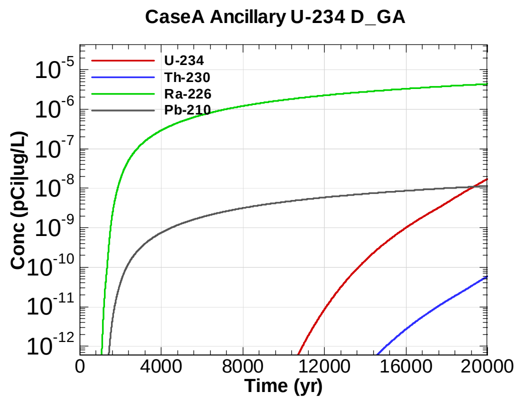

Figure E-2684 - 100m Aquifer Concentration for CaseA Ancillary U-234 D_GA

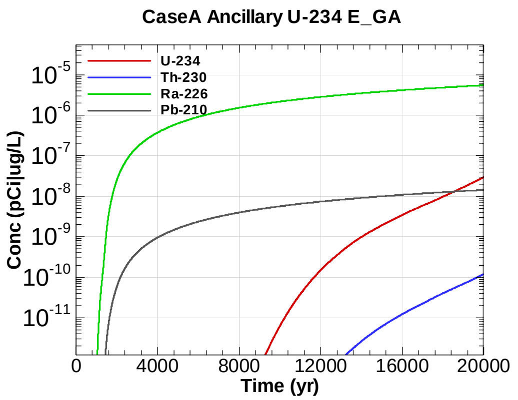

Figure E-2685 - 100m Aquifer Concentration for CaseA Ancillary U-234 E_GA

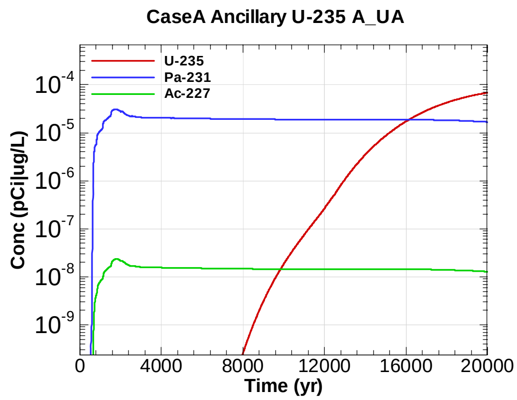

Figure E-2686 - 100m Aquifer Concentration for CaseA Ancillary U-235 A_UA

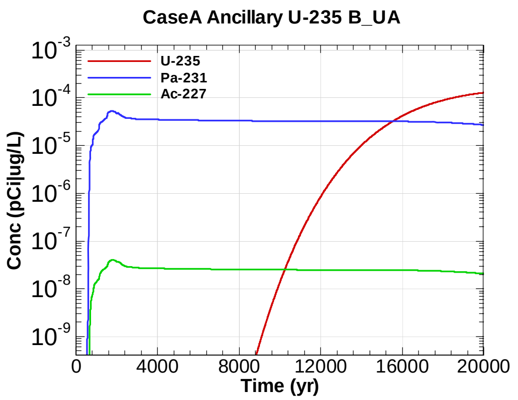

Figure E-2687 - 100m Aquifer Concentration for CaseA Ancillary U-235 B_UA

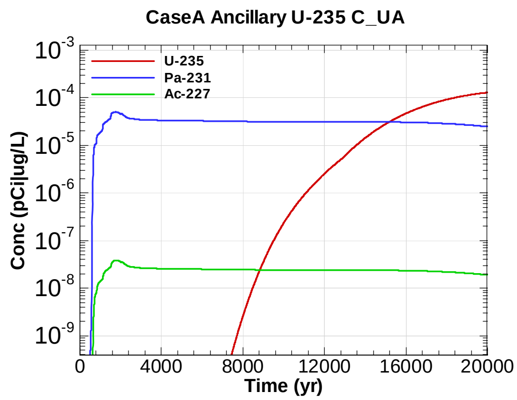

Figure E-2688 - 100m Aquifer Concentration for CaseA Ancillary U-235 C_UA

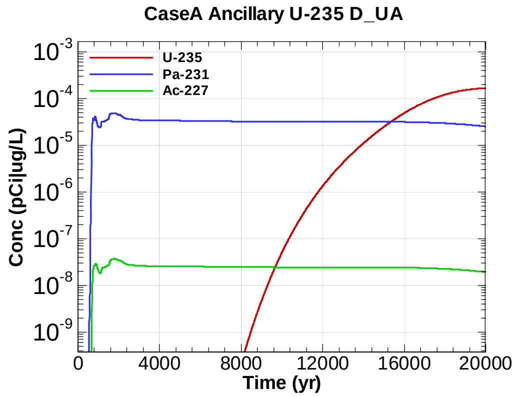

Figure E-2689 - 100m Aquifer Concentration for CaseA Ancillary U-235 D_UA

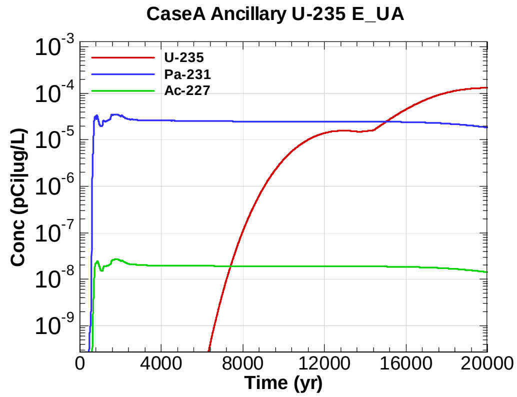

Figure E-2690 - 100m Aquifer Concentration for CaseA Ancillary U-235 E_UA

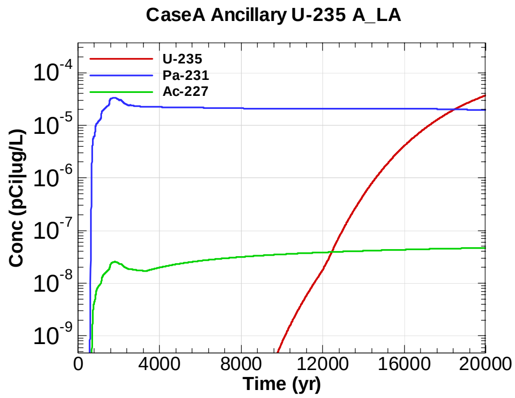

Figure E-2691 - 100m Aquifer Concentration for CaseA Ancillary U-235 A_LA

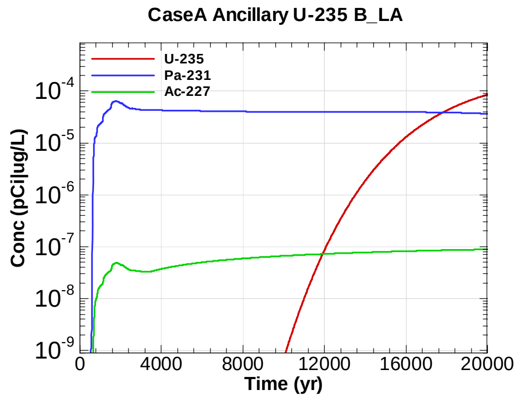

Figure E-2692 - 100m Aquifer Concentration for CaseA Ancillary U-235 B_LA

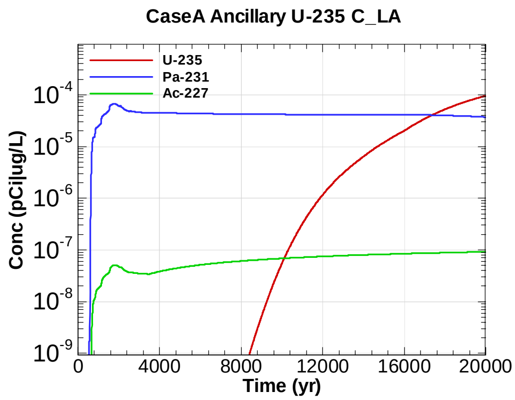

Figure E-2693 - 100m Aquifer Concentration for CaseA Ancillary U-235 C_LA

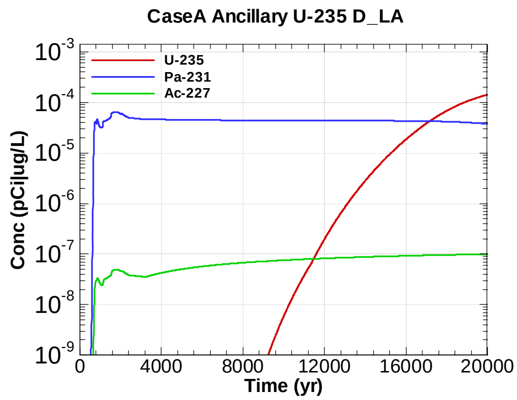

Figure E-2694 - 100m Aquifer Concentration for CaseA Ancillary U-235 D_LA

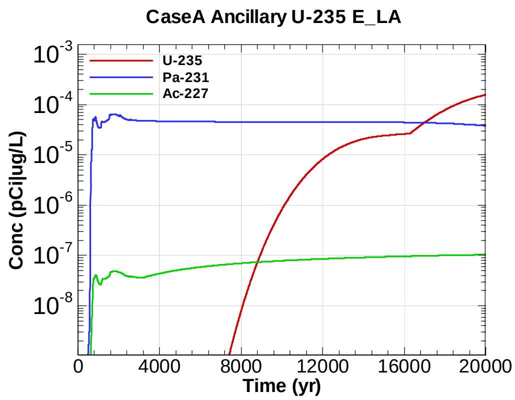

Figure E-2695 - 100m Aquifer Concentration for CaseA Ancillary U-235 E_LA

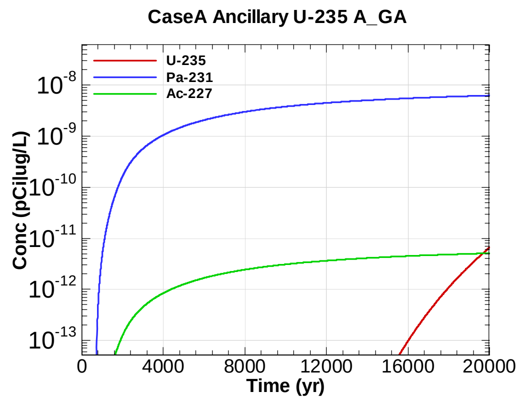

Figure E-2696 - 100m Aquifer Concentration for CaseA Ancillary U-235 A_GA

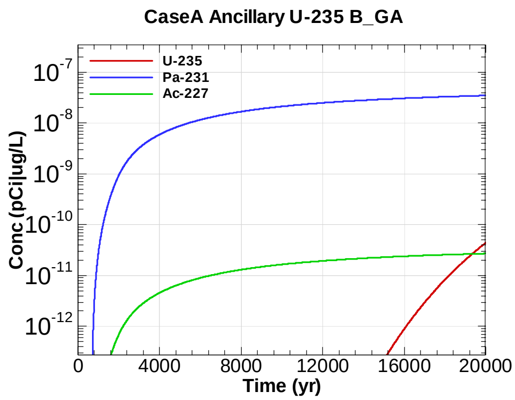

Figure E-2697 - 100m Aquifer Concentration for CaseA Ancillary U-235 B_GA

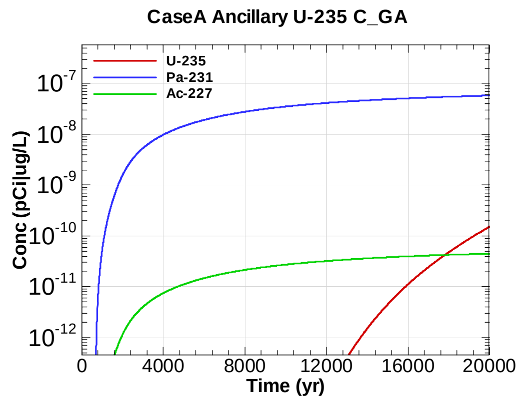

Figure E-2698 - 100m Aquifer Concentration for CaseA Ancillary U-235 C_GA

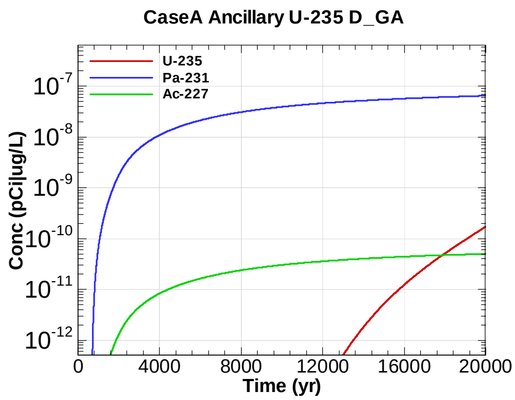

Figure E-2699 - 100m Aquifer Concentration for CaseA Ancillary U-235 D_GA

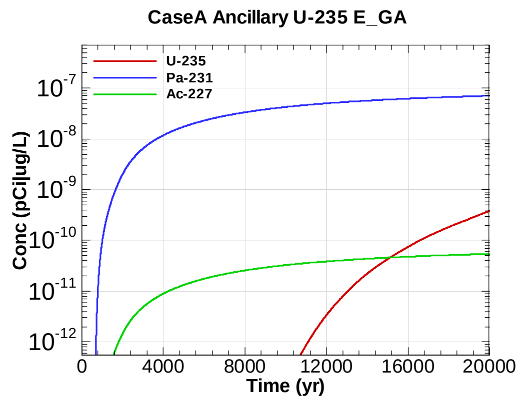

Figure E-2700 - 100m Aquifer Concentration for CaseA Ancillary U-235 E_GA

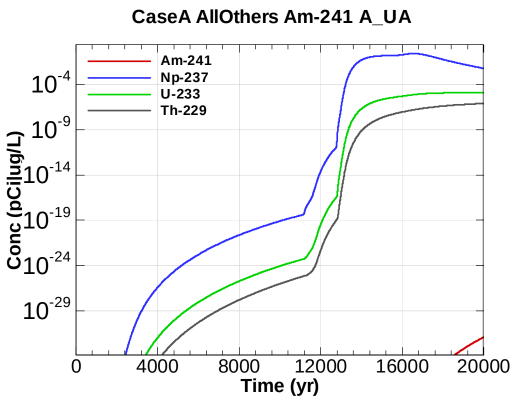

Figure E-2701 - 100m Aquifer Concentration for CaseA AllOthers Am-241 A_UA

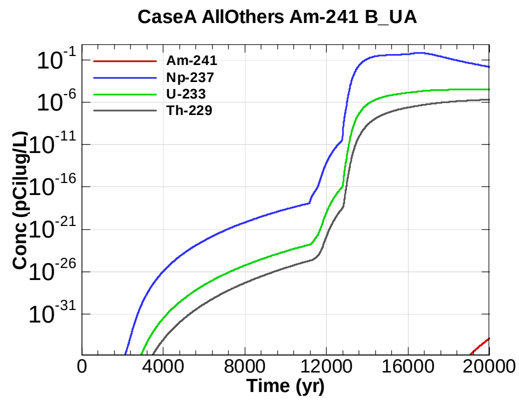

Figure E-2702 - 100m Aquifer Concentration for CaseA AllOthers Am-241 B_UA

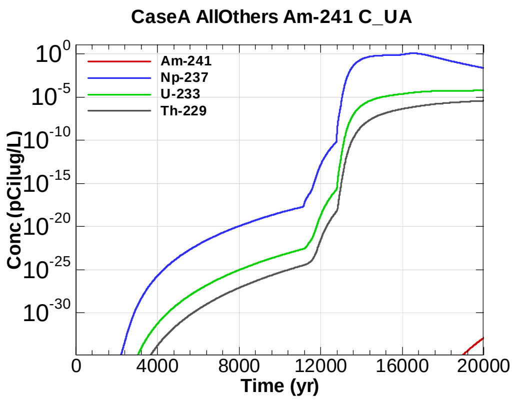

Figure E-2703 - 100m Aquifer Concentration for CaseA AllOthers Am-241 C_UA

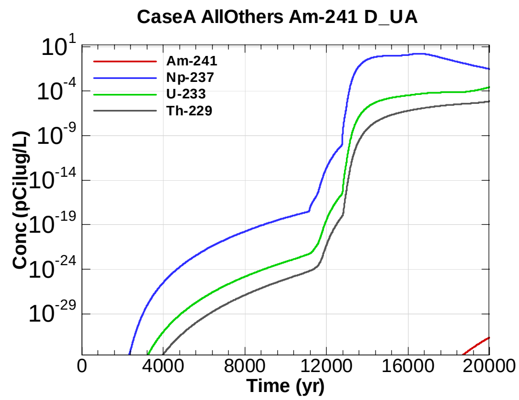

Figure E-2704 - 100m Aquifer Concentration for CaseA AllOthers Am-241 D_UA

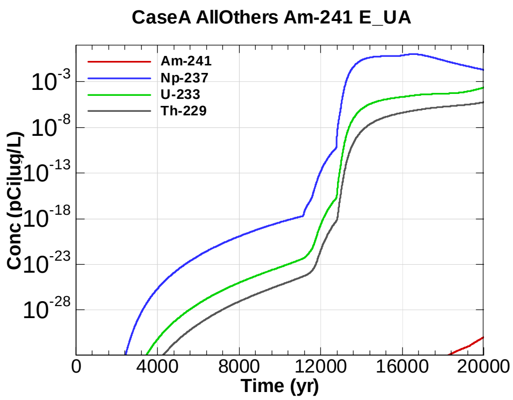

Figure E-2705 - 100m Aquifer Concentration for CaseA AllOthers Am-241 E_UA

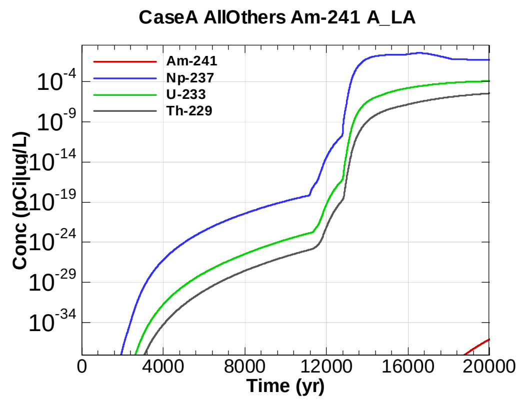

Figure E-2706 - 100m Aquifer Concentration for CaseA AllOthers Am-241 A_LA

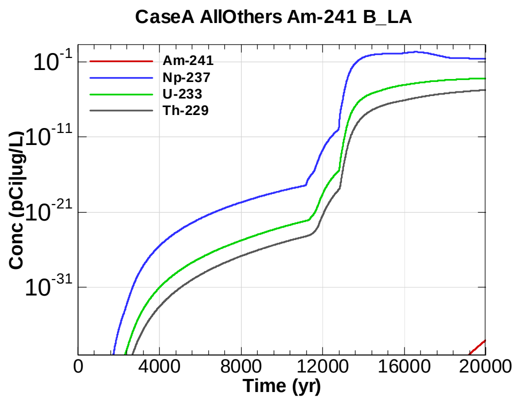

Figure E-2707 - 100m Aquifer Concentration for CaseA AllOthers Am-241 B_LA

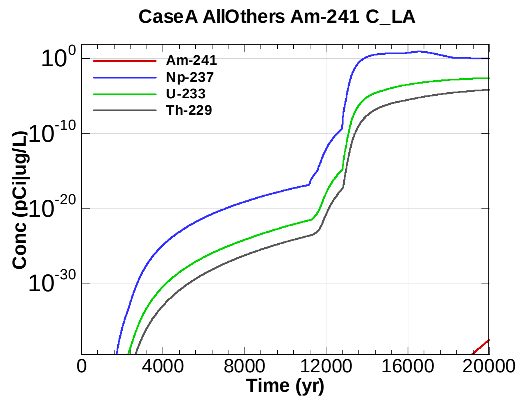

Figure E-2708 - 100m Aquifer Concentration for CaseA AllOthers Am-241 C_LA

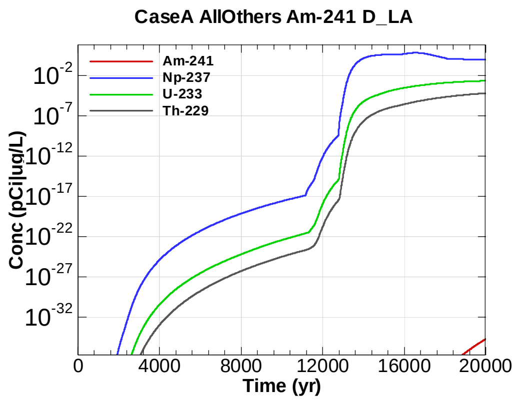

Figure E-2709 - 100m Aquifer Concentration for CaseA AllOthers Am-241 D_LA

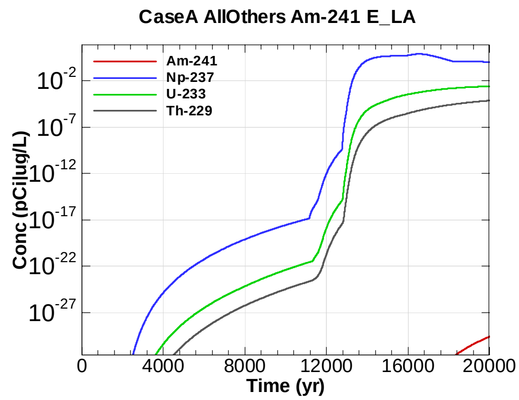

Figure E-2710 - 100m Aquifer Concentration for CaseA AllOthers Am-241 E_LA

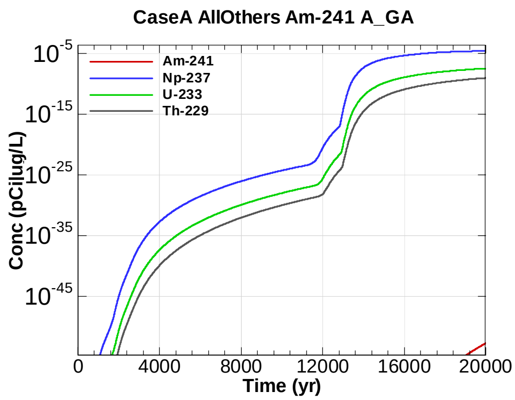

Figure E-2711 - 100m Aquifer Concentration for CaseA AllOthers Am-241 A_GA

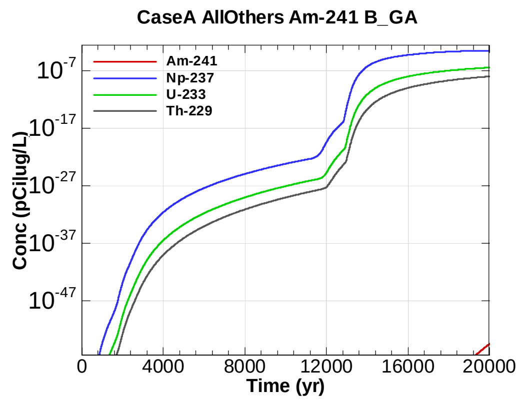

Figure E-2712 - 100m Aquifer Concentration for CaseA AllOthers Am-241 B_GA

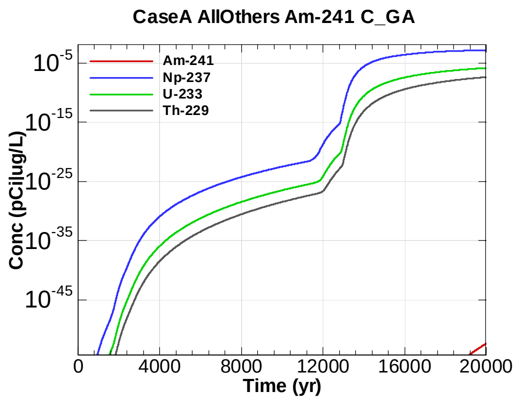

Figure E-2713 - 100m Aquifer Concentration for CaseA AllOthers Am-241 C_GA

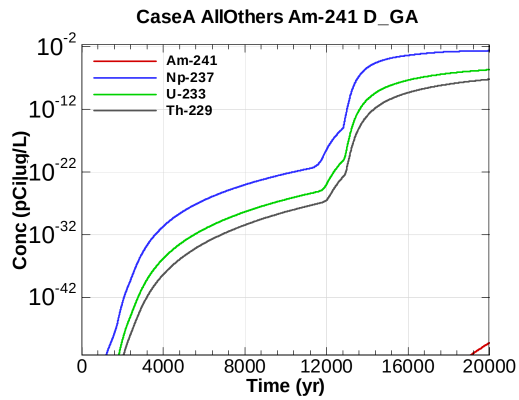

Figure E-2714 - 100m Aquifer Concentration for CaseA AllOthers Am-241 D_GA

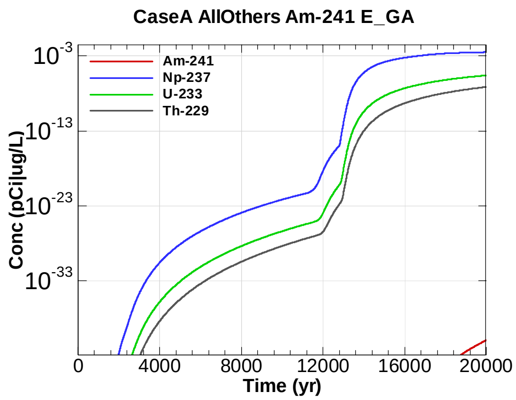

Figure E-2715 - 100m Aquifer Concentration for CaseA AllOthers Am-241 E_GA

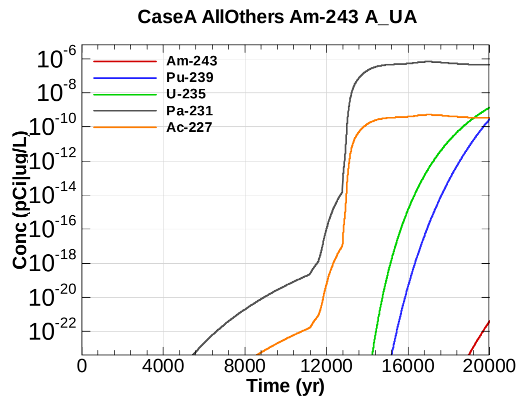

Figure E-2716 - 100m Aquifer Concentration for CaseA AllOthers Am-243 A_UA

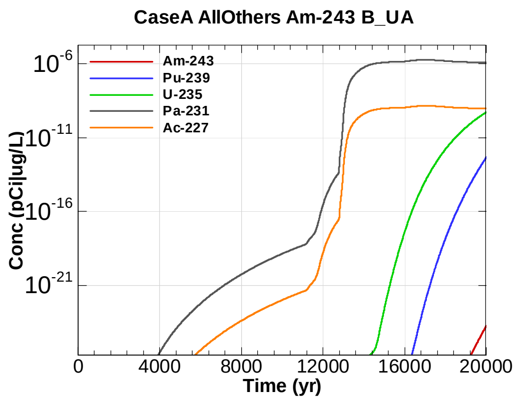

Figure E-2717 - 100m Aquifer Concentration for CaseA AllOthers Am-243 B_UA

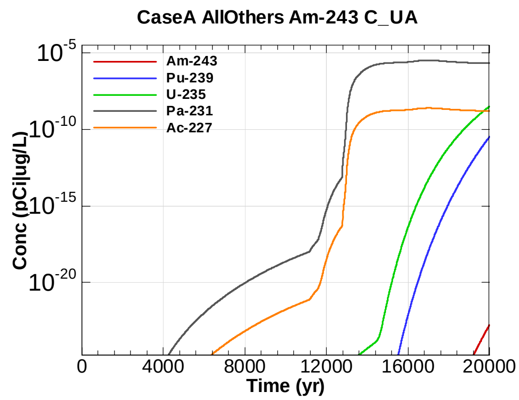

Figure E-2718 - 100m Aquifer Concentration for CaseA AllOthers Am-243 C_UA

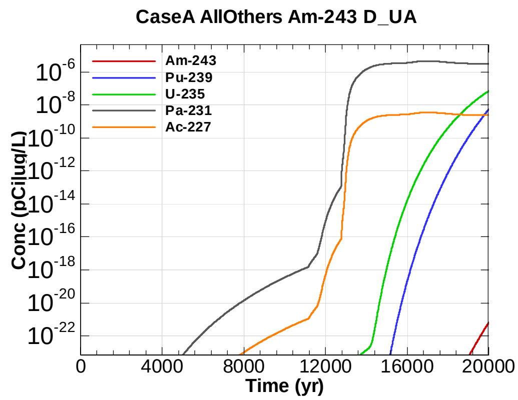

Figure E-2719 - 100m Aquifer Concentration for CaseA AllOthers Am-243 D_UA

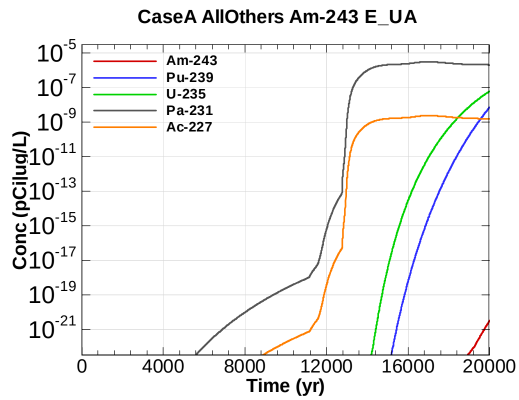

Figure E-2720 - 100m Aquifer Concentration for CaseA AllOthers Am-243 E_UA

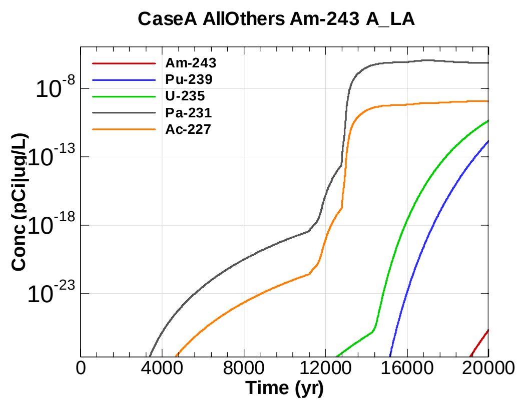

Figure E-2721 - 100m Aquifer Concentration for CaseA AllOthers Am-243 A_LA

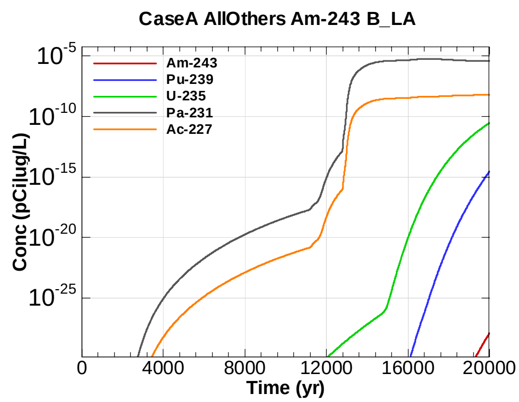

Figure E-2722 - 100m Aquifer Concentration for CaseA AllOthers Am-243 B_LA

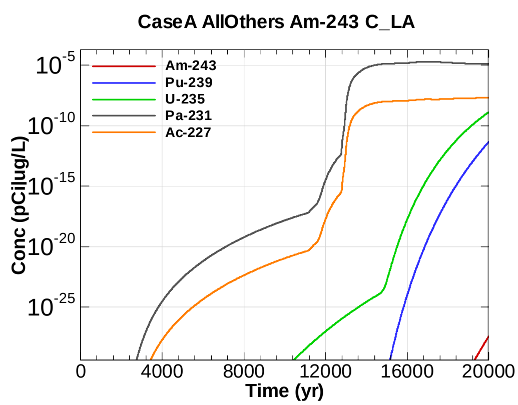

Figure E-2723 - 100m Aquifer Concentration for CaseA AllOthers Am-243 C_LA

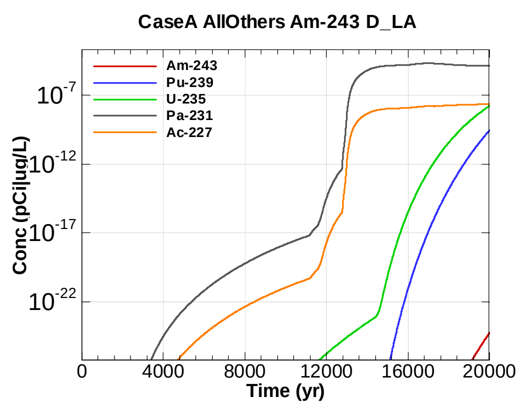

Figure E-2724 - 100m Aquifer Concentration for CaseA AllOthers Am-243 D_LA

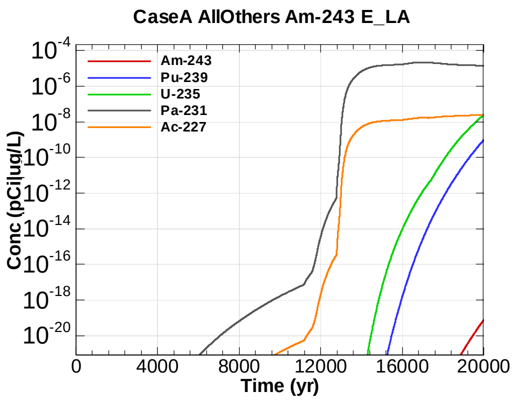

Figure E-2725 - 100m Aquifer Concentration for CaseA AllOthers Am-243 E_LA

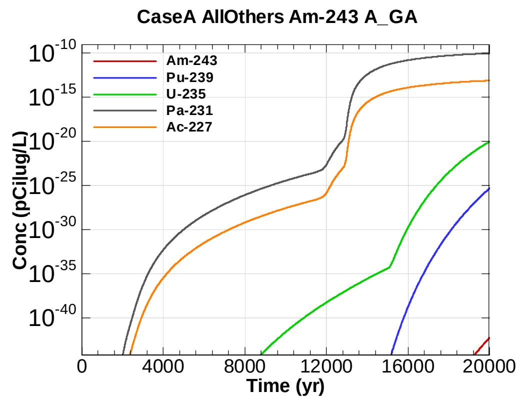

Figure E-2726 - 100m Aquifer Concentration for CaseA AllOthers Am-243 A_GA

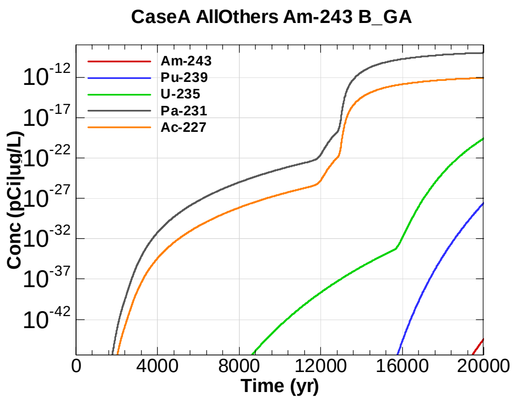

Figure E-2727 - 100m Aquifer Concentration for CaseA AllOthers Am-243 B_GA

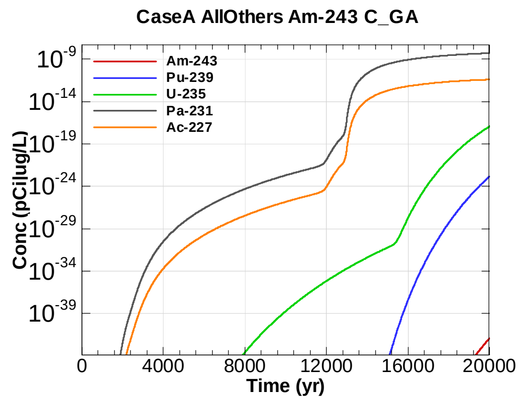

Figure E-2728 - 100m Aquifer Concentration for CaseA AllOthers Am-243 C_GA

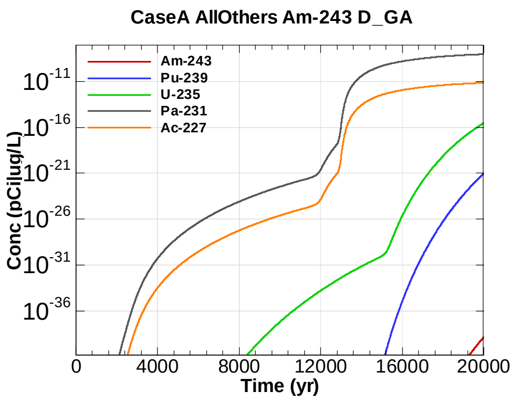

Figure E-2729 - 100m Aquifer Concentration for CaseA AllOthers Am-243 D_GA

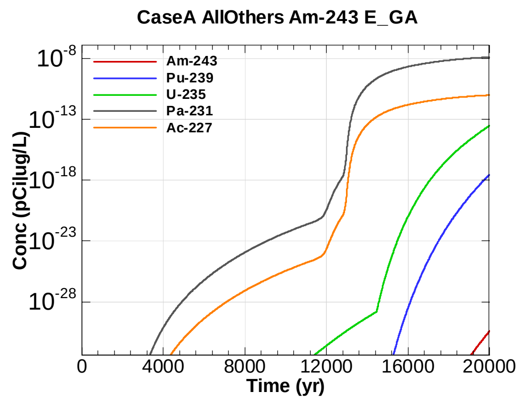

Figure E-2730 - 100m Aquifer Concentration for CaseA AllOthers Am-243 E_GA

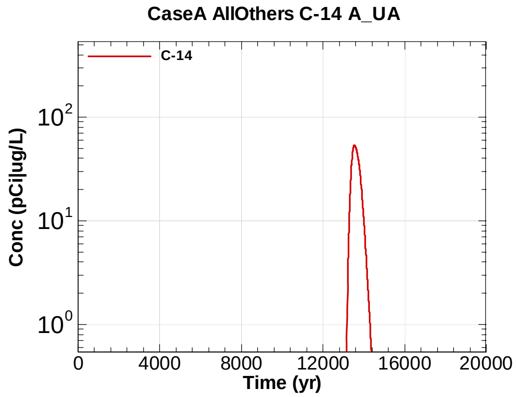

Figure E-2731 - 100m Aquifer Concentration for CaseA AllOthers C-14 A_UA

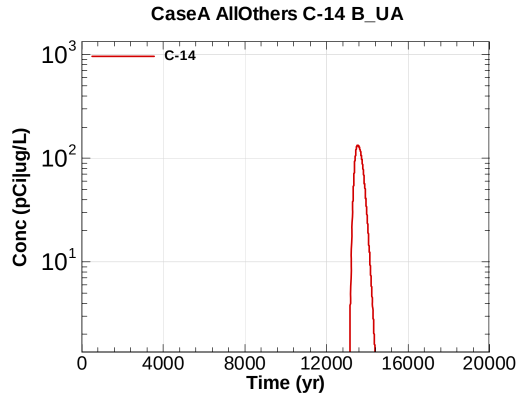

Figure E-2732 - 100m Aquifer Concentration for CaseA AllOthers C-14 B_UA

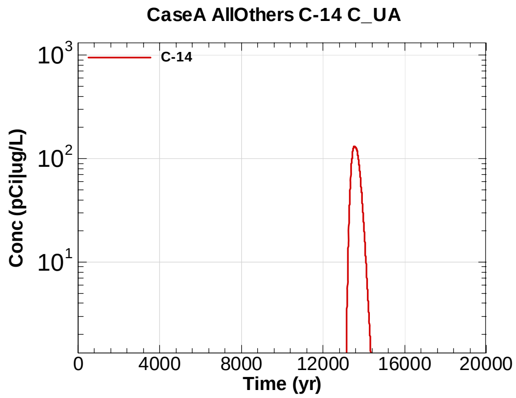

Figure E-2733 - 100m Aquifer Concentration for CaseA AllOthers C-14 C_UA

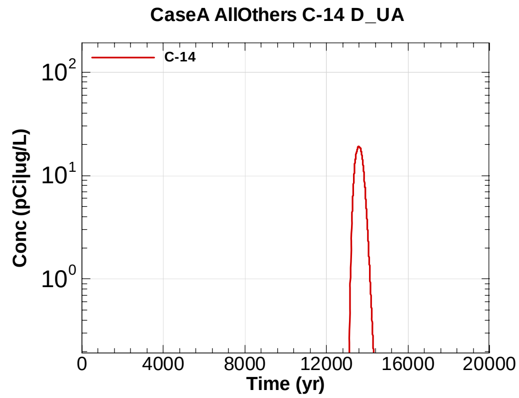

Figure E-2734 - 100m Aquifer Concentration for CaseA AllOthers C-14 D_UA

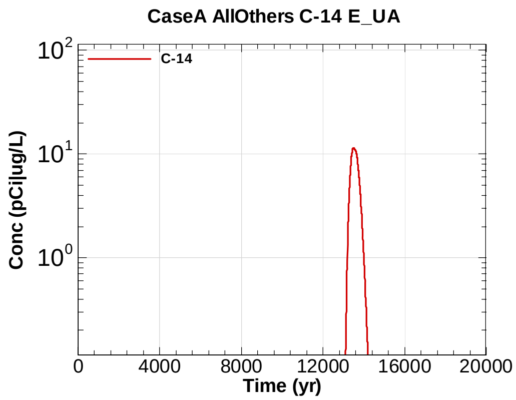

Figure E-2735 - 100m Aquifer Concentration for CaseA AllOthers C-14 E_UA

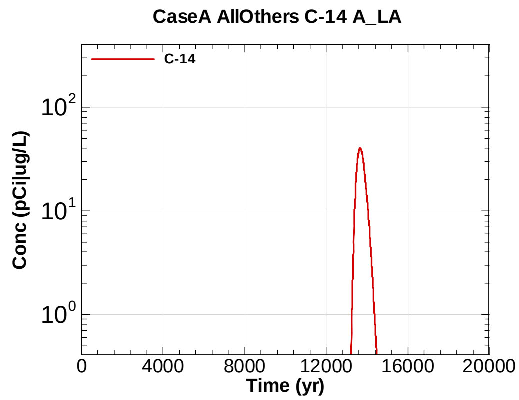

Figure E-2736 - 100m Aquifer Concentration for CaseA AllOthers C-14 A_LA

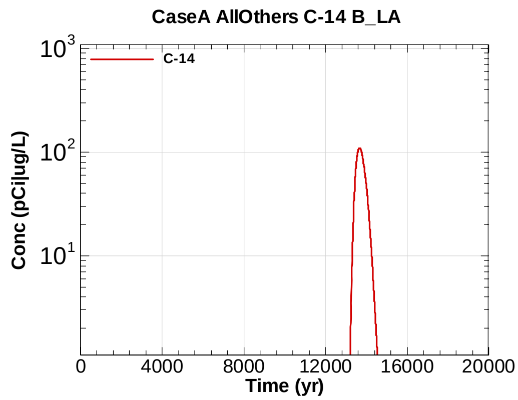

Figure E-2737 - 100m Aquifer Concentration for CaseA AllOthers C-14 B_LA

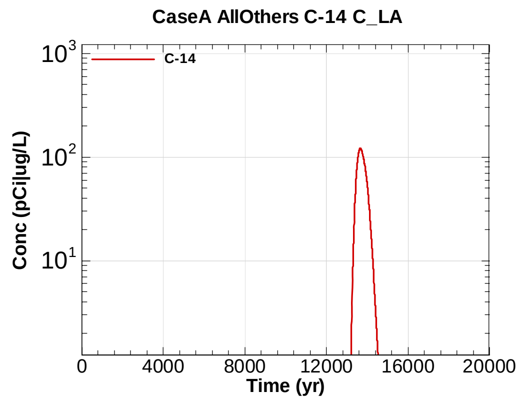

Figure E-2738 - 100m Aquifer Concentration for CaseA AllOthers C-14 C_LA

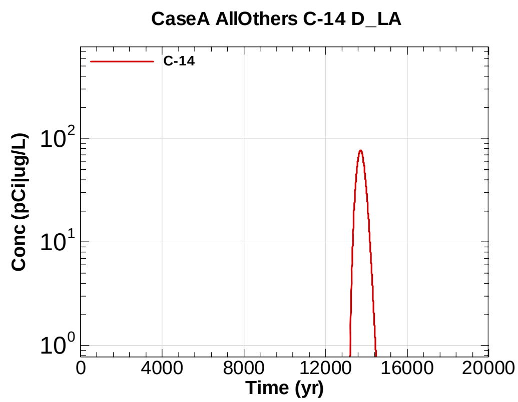

Figure E-2739 - 100m Aquifer Concentration for CaseA AllOthers C-14 D_LA

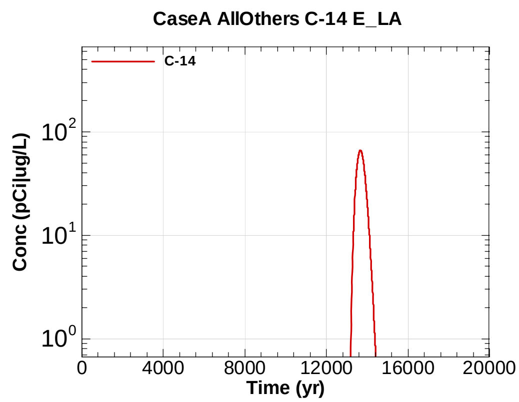

Figure E-2740 - 100m Aquifer Concentration for CaseA AllOthers C-14 E_LA

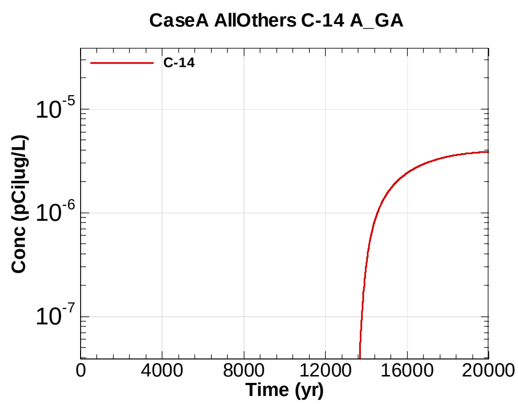

Figure E-2741 - 100m Aquifer Concentration for CaseA AllOthers C-14 A_GA

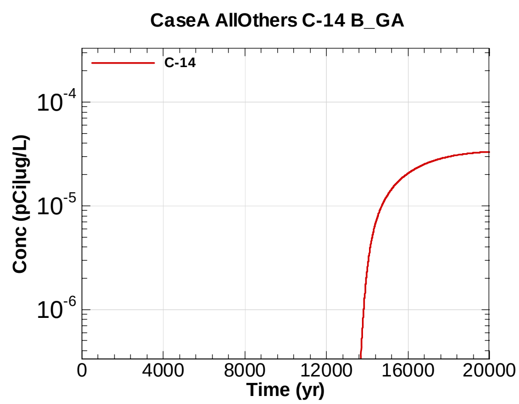

Figure E-2742 - 100m Aquifer Concentration for CaseA AllOthers C-14 B_GA

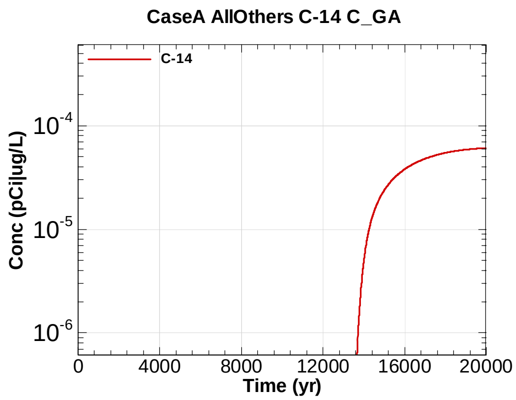

Figure E-2743 - 100m Aquifer Concentration for CaseA AllOthers C-14 C_GA

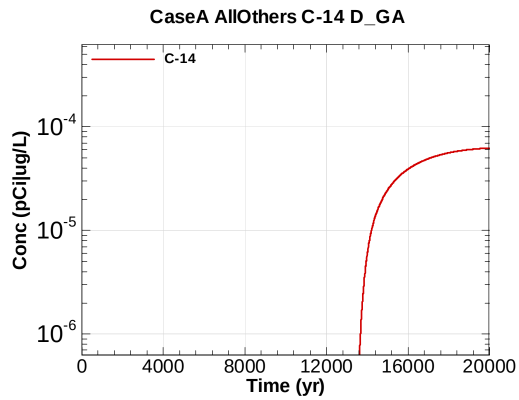

Figure E-2744 - 100m Aquifer Concentration for CaseA AllOthers C-14 D_GA

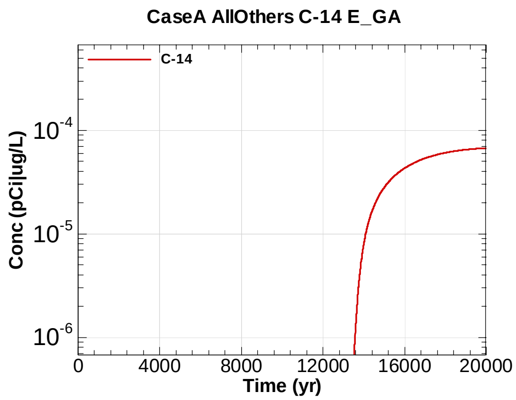

Figure E-2745 - 100m Aquifer Concentration for CaseA AllOthers C-14 E_GA

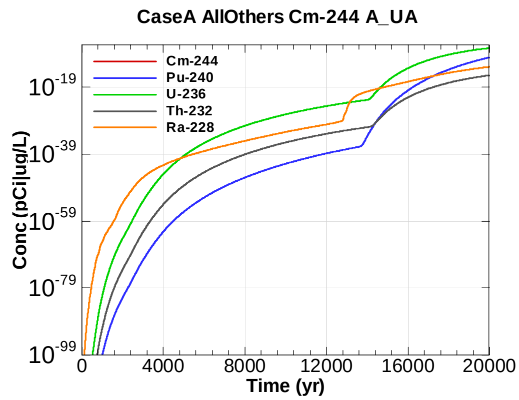

Figure E-2746 - 100m Aquifer Concentration for CaseA AllOthers Cm-244 A_UA

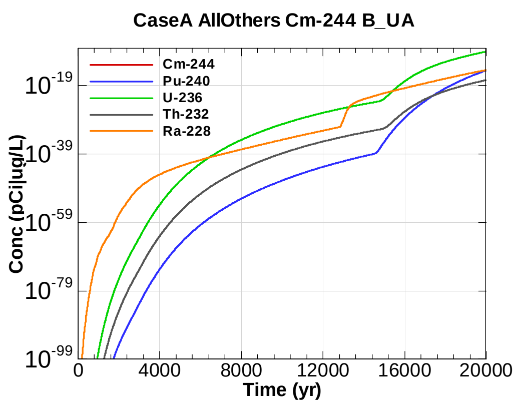

Figure E-2747 - 100m Aquifer Concentration for CaseA AllOthers Cm-244 B_UA

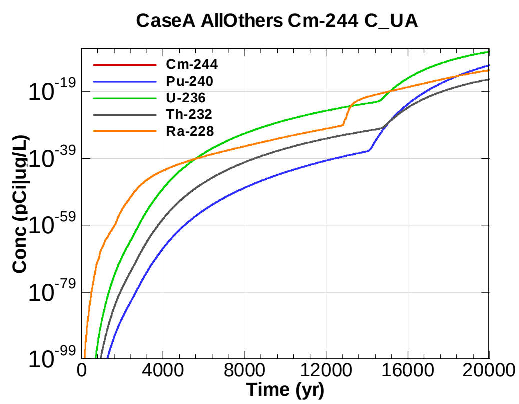

Figure E-2748 - 100m Aquifer Concentration for CaseA AllOthers Cm-244 C_UA

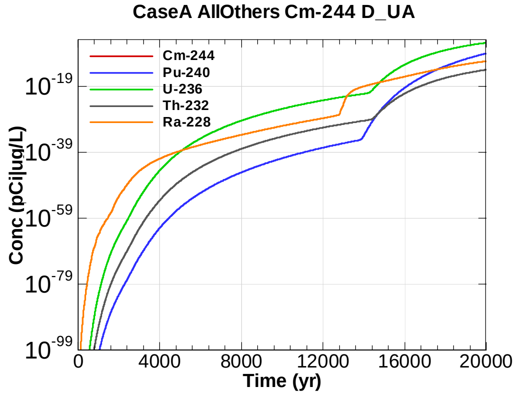

Figure E-2749 - 100m Aquifer Concentration for CaseA AllOthers Cm-244 D_UA

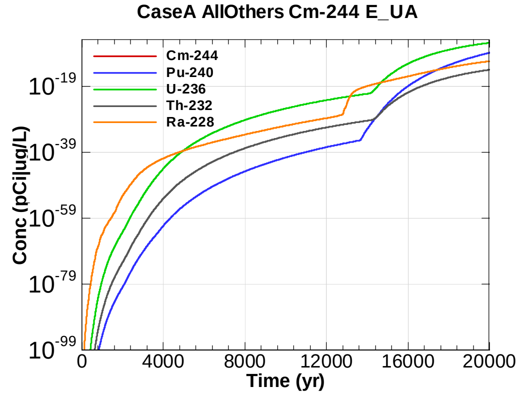

Figure E-2750 - 100m Aquifer Concentration for CaseA AllOthers Cm-244 E_UA

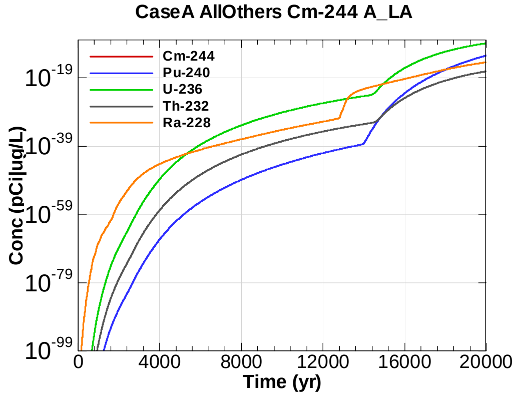

Figure E-2751 - 100m Aquifer Concentration for CaseA AllOthers Cm-244 A_LA

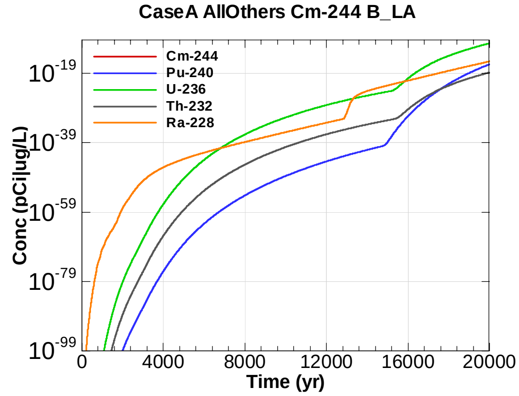

Figure E-2752 - 100m Aquifer Concentration for CaseA AllOthers Cm-244 B_LA

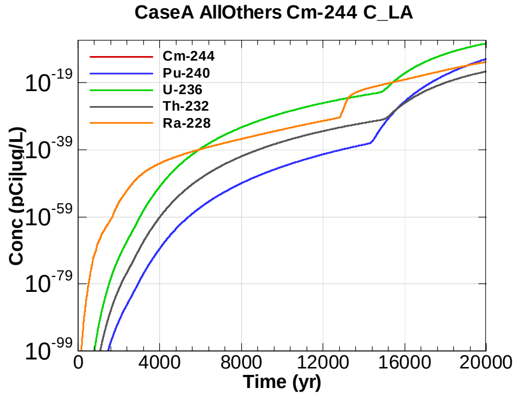

Figure E-2753 - 100m Aquifer Concentration for CaseA AllOthers Cm-244 C_LA

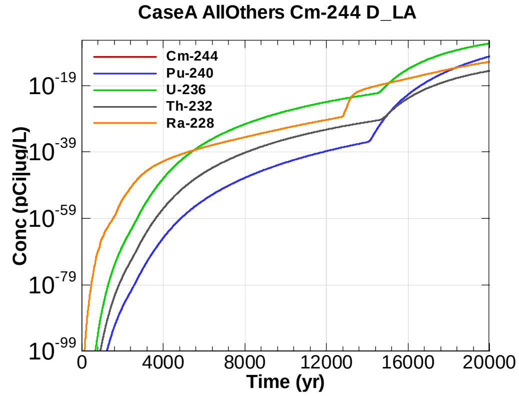

Figure E-2754 - 100m Aquifer Concentration for CaseA AllOthers Cm-244 D_LA

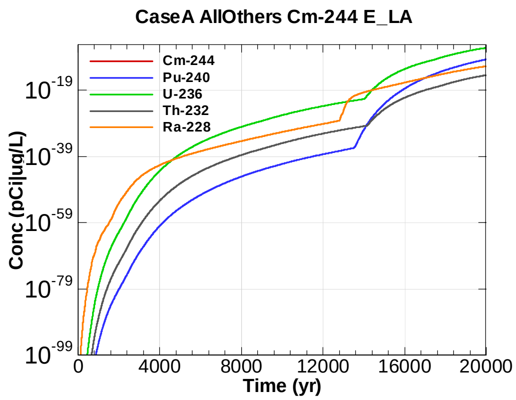

Figure E-2755 - 100m Aquifer Concentration for CaseA AllOthers Cm-244 E_LA

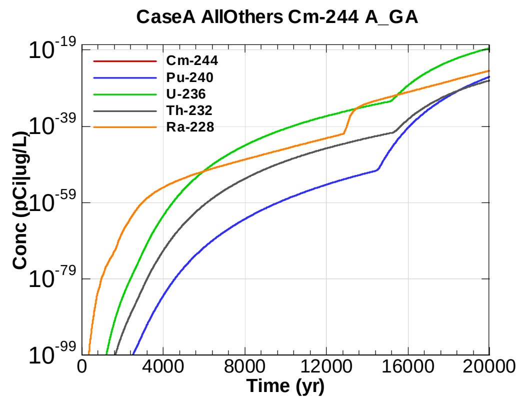

Figure E-2756 - 100m Aquifer Concentration for CaseA AllOthers Cm-244 A_GA

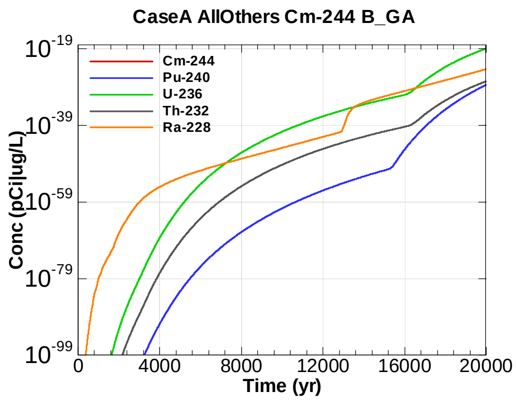

Figure E-2757 - 100m Aquifer Concentration for CaseA AllOthers Cm-244 B_GA

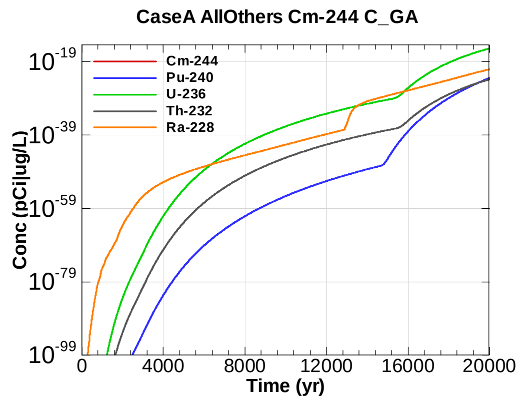

Figure E-2758 - 100m Aquifer Concentration for CaseA AllOthers Cm-244 C_GA

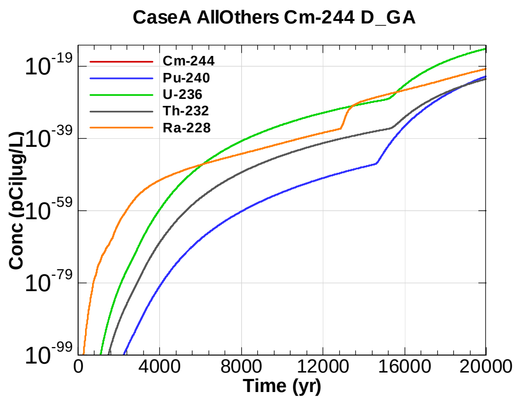

Figure E-2759 - 100m Aquifer Concentration for CaseA AllOthers Cm-244 D_GA

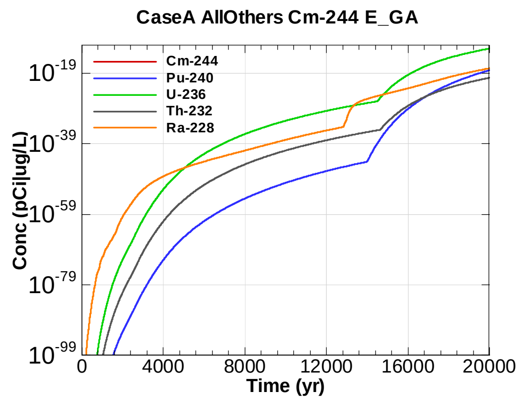

Figure E-2760 - 100m Aquifer Concentration for CaseA AllOthers Cm-244 E_GA

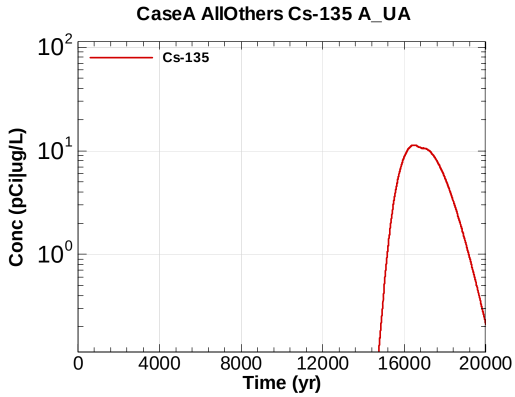

Figure E-2761 - 100m Aquifer Concentration for CaseA AllOthers Cs-135 A_UA

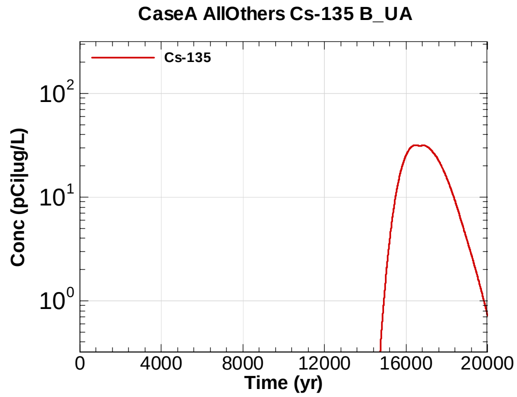

Figure E-2762 - 100m Aquifer Concentration for CaseA AllOthers Cs-135 B_UA

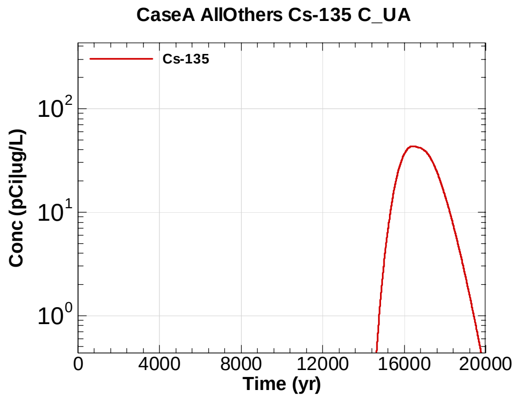

Figure E-2763 - 100m Aquifer Concentration for CaseA AllOthers Cs-135 C_UA

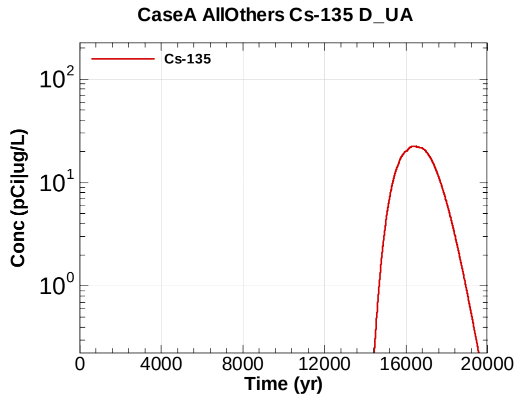

Figure E-2764 - 100m Aquifer Concentration for CaseA AllOthers Cs-135 D_UA

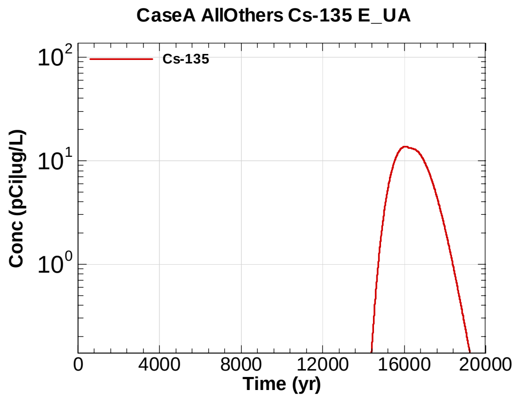

Figure E-2765 - 100m Aquifer Concentration for CaseA AllOthers Cs-135 E_UA

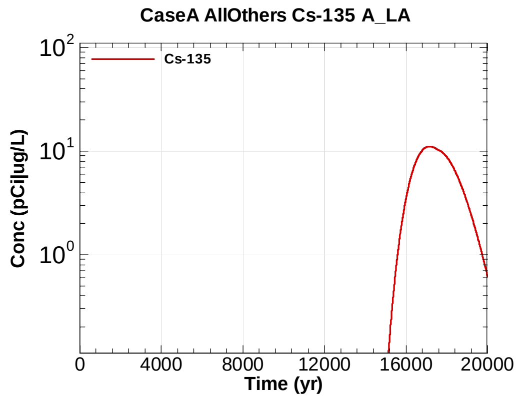

Figure E-2766 - 100m Aquifer Concentration for CaseA AllOthers Cs-135 A_LA

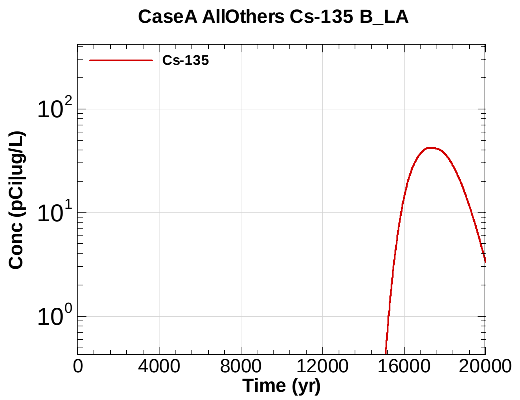

Figure E-2767 - 100m Aquifer Concentration for CaseA AllOthers Cs-135 B_LA

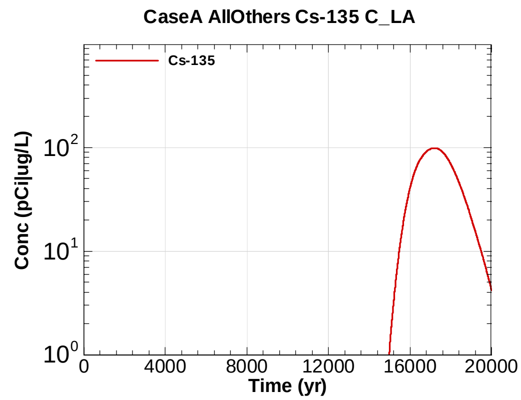

Figure E-2768 - 100m Aquifer Concentration for CaseA AllOthers Cs-135 C_LA

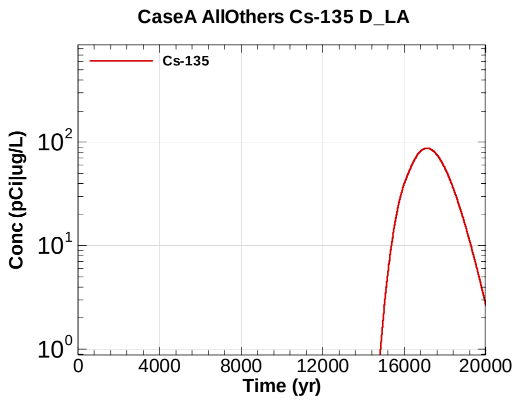

Figure E-2769 - 100m Aquifer Concentration for CaseA AllOthers Cs-135 D_LA

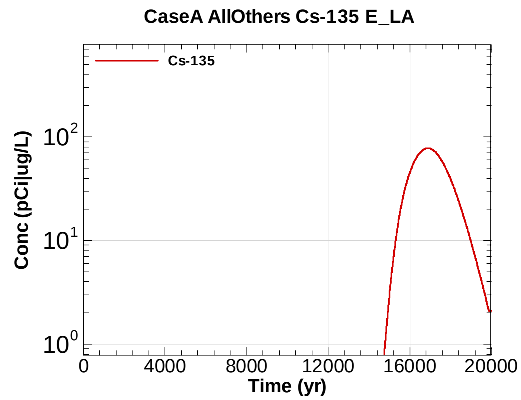

Figure E-2770 - 100m Aquifer Concentration for CaseA AllOthers Cs-135 E_LA

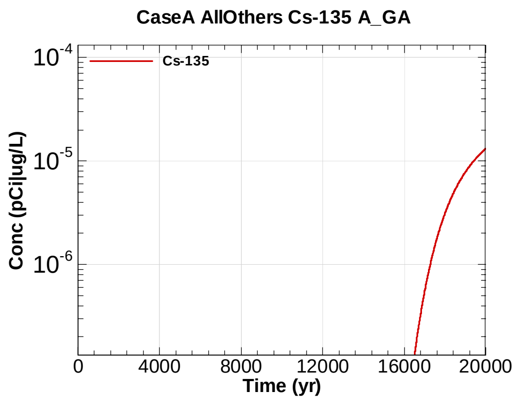

Figure E-2771 - 100m Aquifer Concentration for CaseA AllOthers Cs-135 A_GA

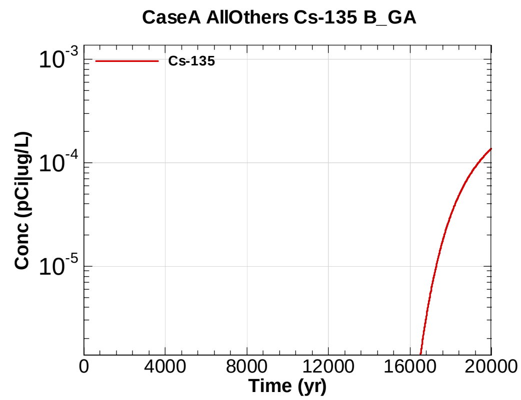

Figure E-2772 - 100m Aquifer Concentration for CaseA AllOthers Cs-135 B_GA

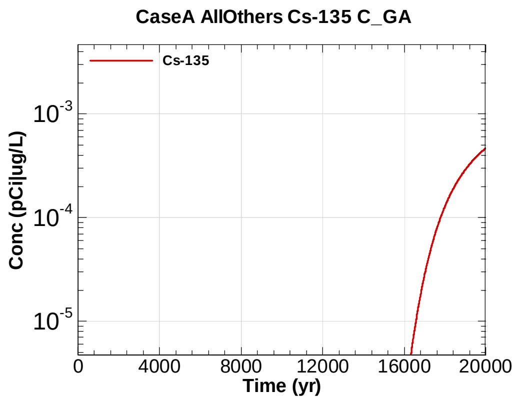

Figure E-2773 - 100m Aquifer Concentration for CaseA AllOthers Cs-135 C_GA

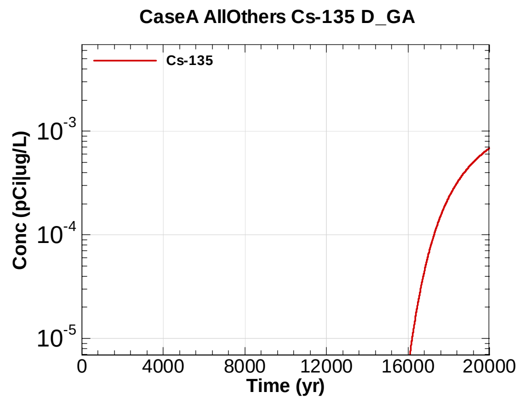

Figure E-2774 - 100m Aquifer Concentration for CaseA AllOthers Cs-135 D_GA

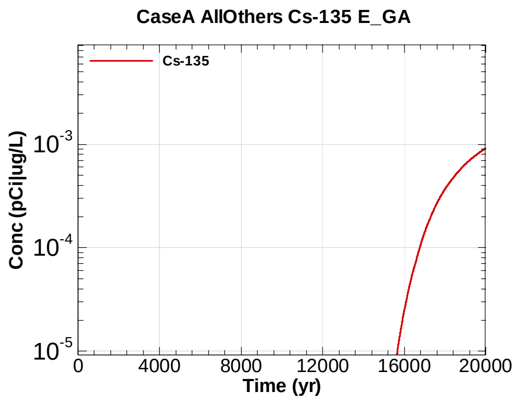

Figure E-2775 - 100m Aquifer Concentration for CaseA AllOthers Cs-135 E_GA

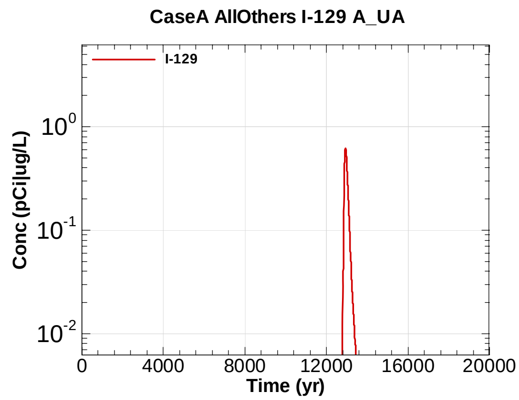

Figure E-2776 - 100m Aquifer Concentration for CaseA AllOthers I-129 A_UA

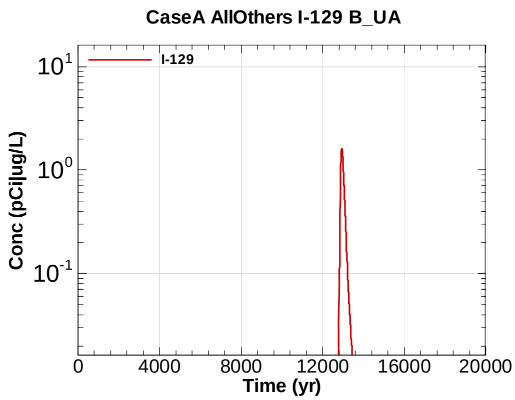

Figure E-2777 - 100m Aquifer Concentration for CaseA AllOthers I-129 B_UA

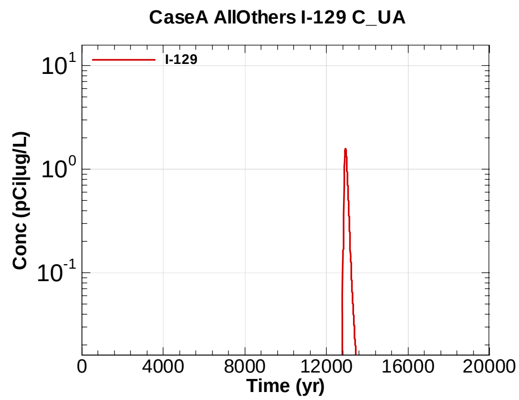

Figure E-2778 - 100m Aquifer Concentration for CaseA AllOthers I-129 C_UA

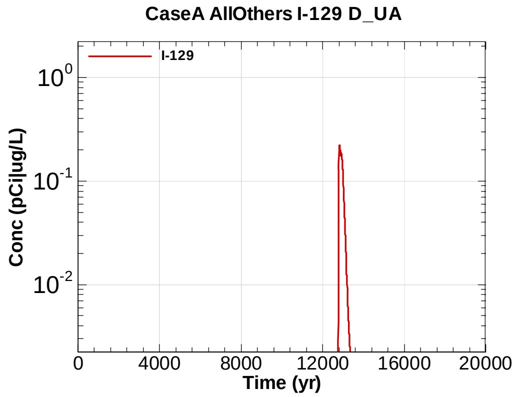

Figure E-2779 - 100m Aquifer Concentration for CaseA AllOthers I-129 D_UA

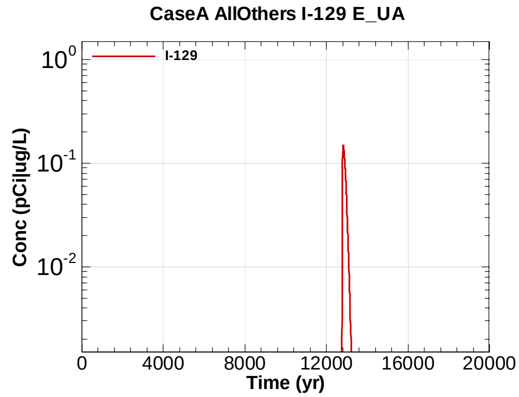

Figure E-2780 - 100m Aquifer Concentration for CaseA AllOthers I-129 E_UA

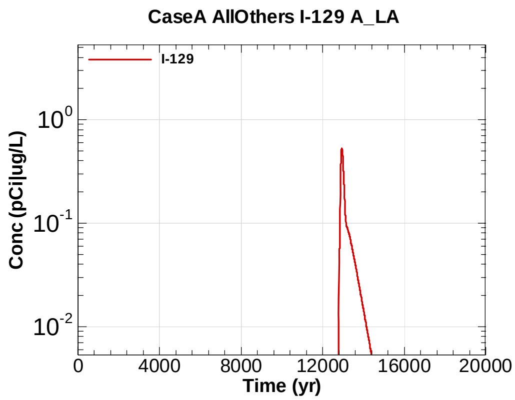

Figure E-2781 - 100m Aquifer Concentration for CaseA AllOthers I-129 A_LA

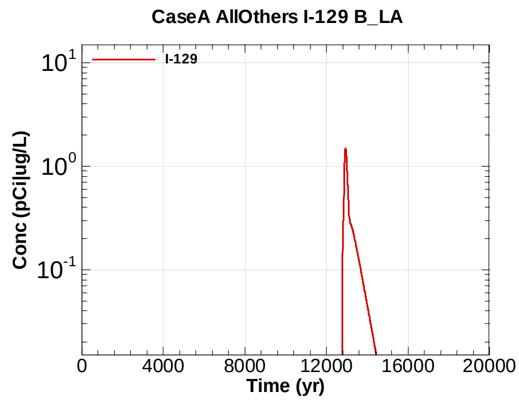

Figure E-2782 - 100m Aquifer Concentration for CaseA AllOthers I-129 B_LA

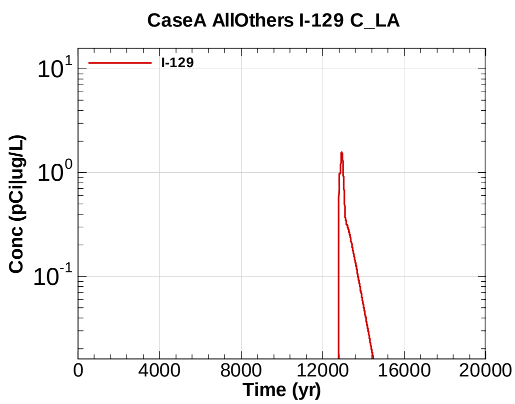

Figure E-2783 - 100m Aquifer Concentration for CaseA AllOthers I-129 C_LA

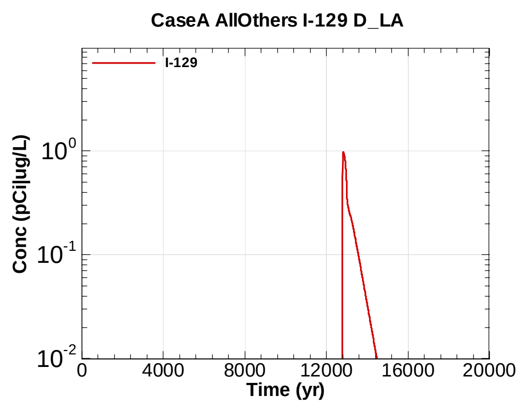

Figure E-2784 - 100m Aquifer Concentration for CaseA AllOthers I-129 D_LA

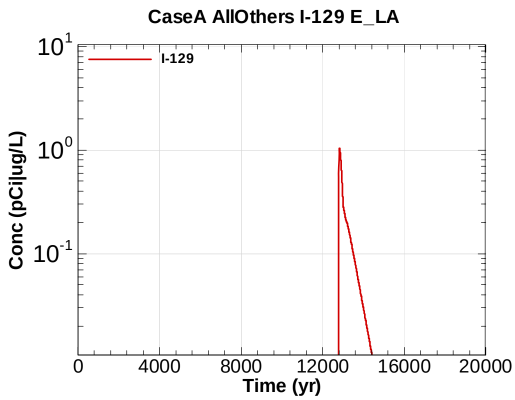

Figure E-2785 - 100m Aquifer Concentration for CaseA AllOthers I-129 E_LA

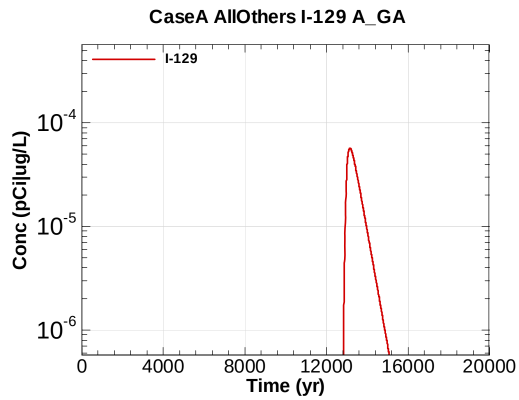

Figure E-2786 - 100m Aquifer Concentration for CaseA AllOthers I-129 A_GA

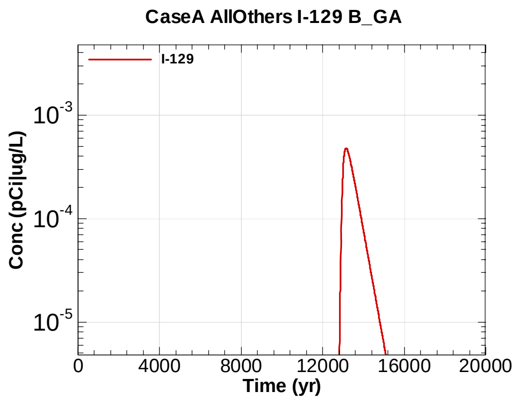

Figure E-2787 - 100m Aquifer Concentration for CaseA AllOthers I-129 B_GA

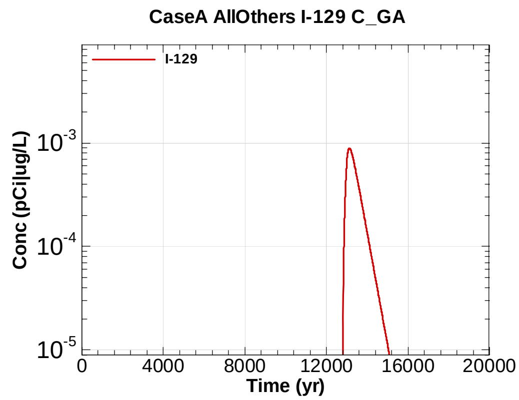

Figure E-2788 - 100m Aquifer Concentration for CaseA AllOthers I-129 C_GA

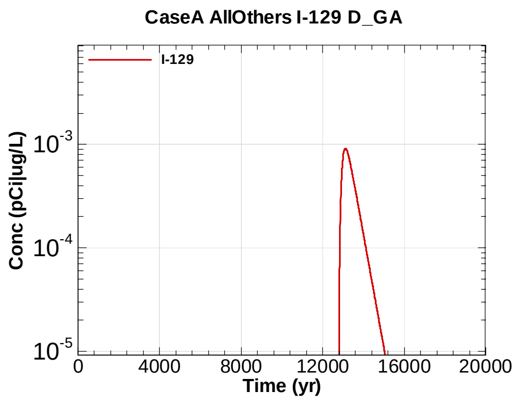

Figure E-2789 - 100m Aquifer Concentration for CaseA AllOthers I-129 D_GA

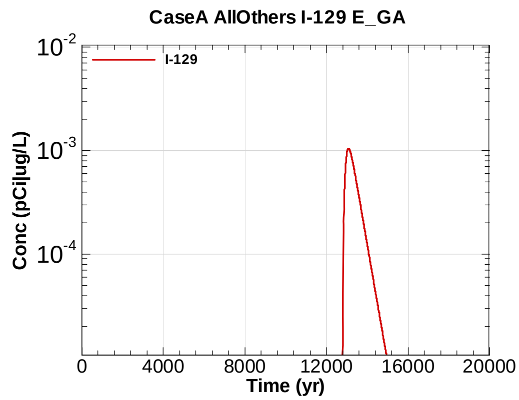

Figure E-2790 - 100m Aquifer Concentration for CaseA AllOthers I-129 E_GA

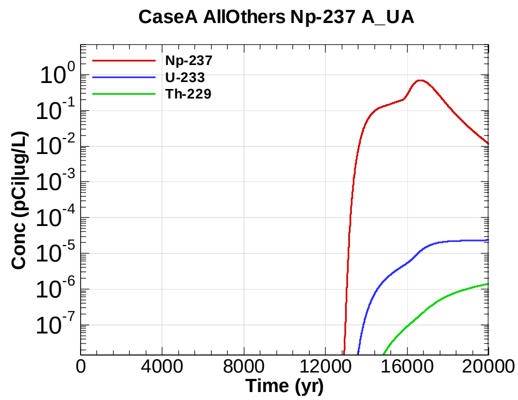

Figure E-2791 - 100m Aquifer Concentration for CaseA AllOthers Np-237 A_UA

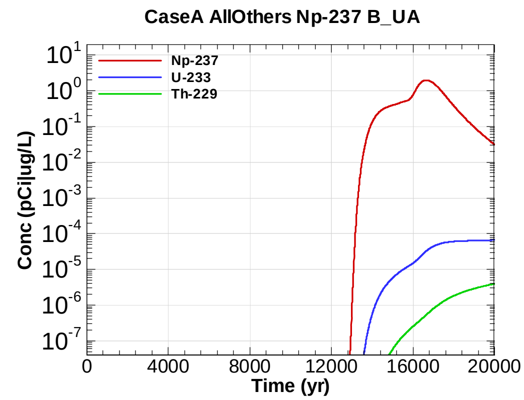

Figure E-2792 - 100m Aquifer Concentration for CaseA AllOthers Np-237 B_UA

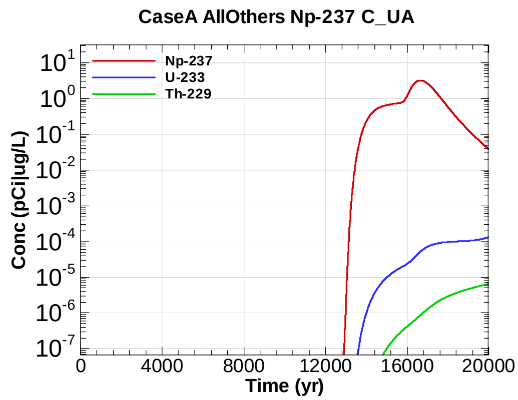

Figure E-2793 - 100m Aquifer Concentration for CaseA AllOthers Np-237 C_UA

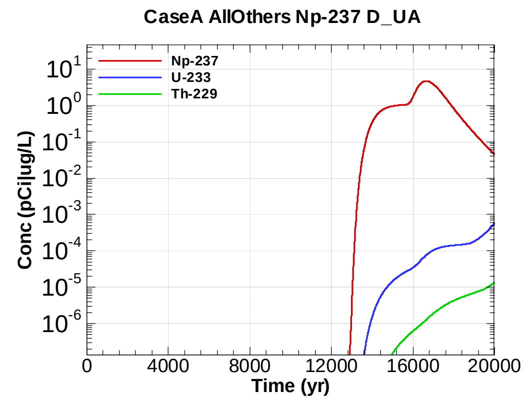

Figure E-2794 - 100m Aquifer Concentration for CaseA AllOthers Np-237 D_UA

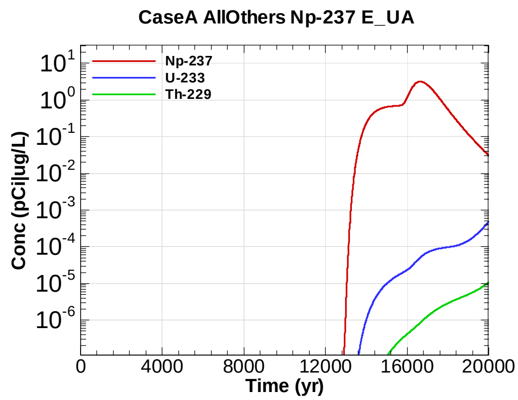

Figure E-2795 - 100m Aquifer Concentration for CaseA AllOthers Np-237 E_UA

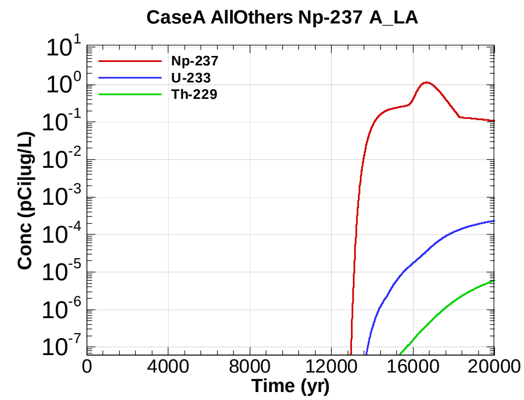

Figure E-2796 - 100m Aquifer Concentration for CaseA AllOthers Np-237 A_LA

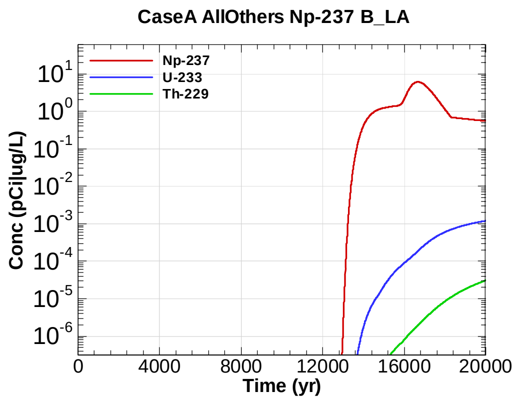

Figure E-2797 - 100m Aquifer Concentration for CaseA AllOthers Np-237 B_LA

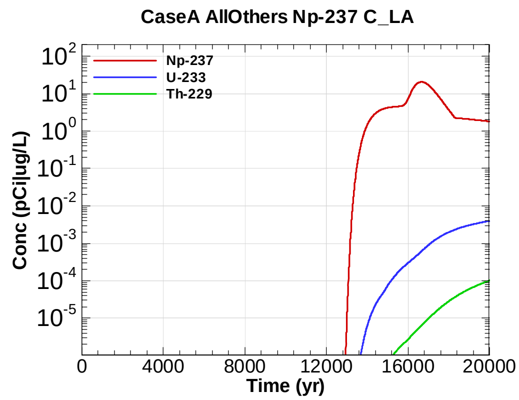

Figure E-2798 - 100m Aquifer Concentration for CaseA AllOthers Np-237 C_LA

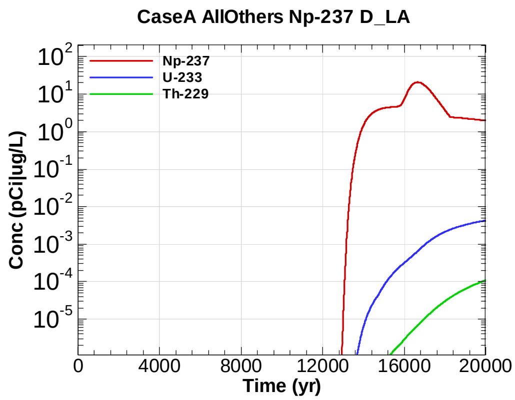

Figure E-2799 - 100m Aquifer Concentration for CaseA AllOthers Np-237 D_LA

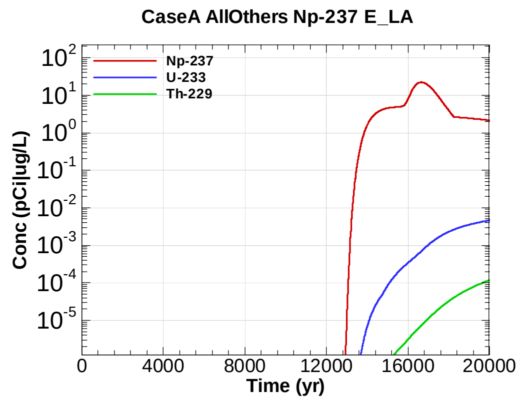

Figure E-2800 - 100m Aquifer Concentration for CaseA AllOthers Np-237 E_LA

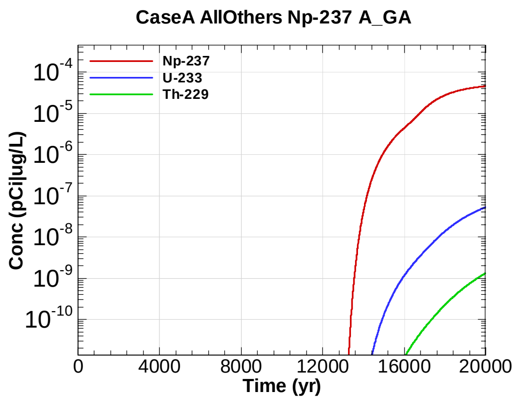

Figure E-2801 - 100m Aquifer Concentration for CaseA AllOthers Np-237 A_GA

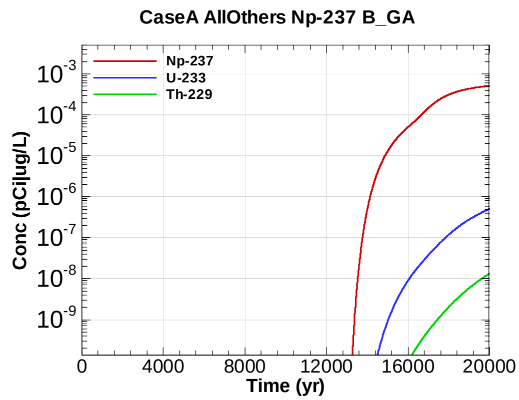

Figure E-2802 - 100m Aquifer Concentration for CaseA AllOthers Np-237 B_GA

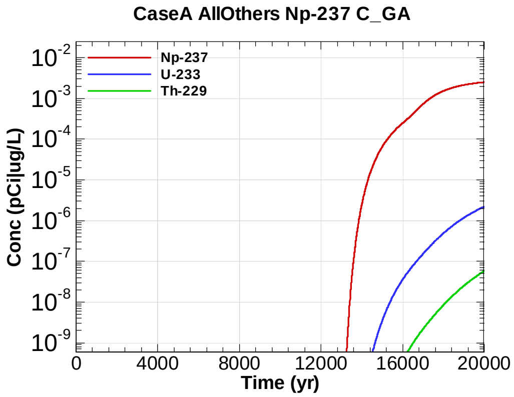

Figure E-2803 - 100m Aquifer Concentration for CaseA AllOthers Np-237 C_GA

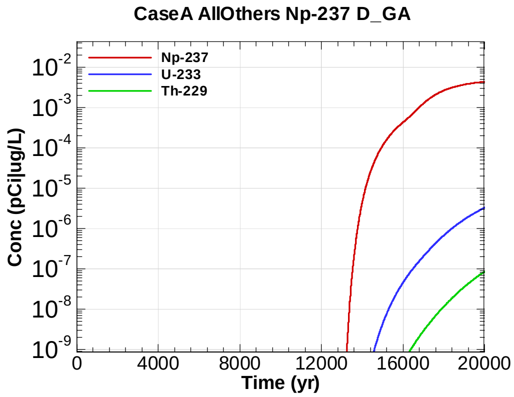

Figure E-2804 - 100m Aquifer Concentration for CaseA AllOthers Np-237 D_GA

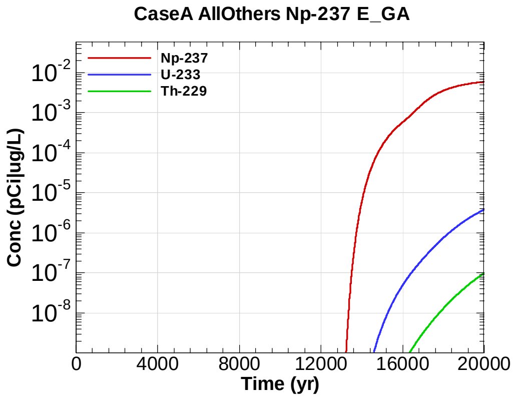

Figure E-2805 - 100m Aquifer Concentration for CaseA AllOthers Np-237 E_GA

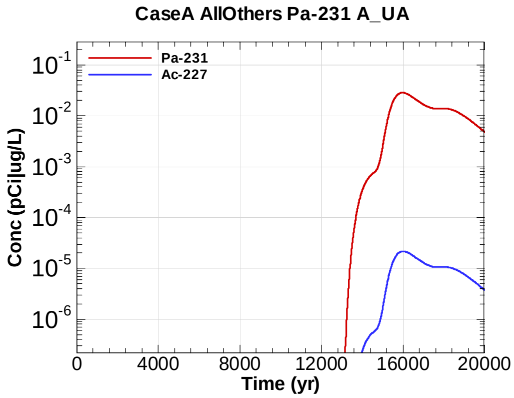

Figure E-2806 - 100m Aquifer Concentration for CaseA AllOthers Pa-231 A_UA

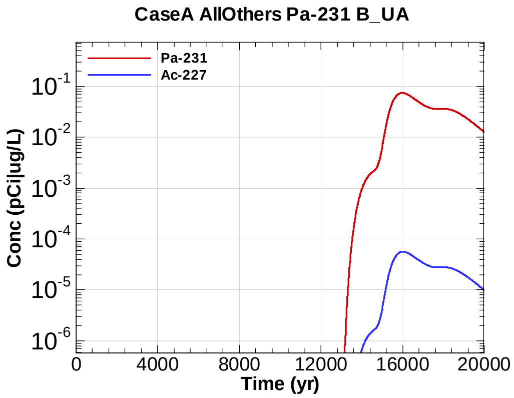

Figure E-2807 - 100m Aquifer Concentration for CaseA AllOthers Pa-231 B_UA

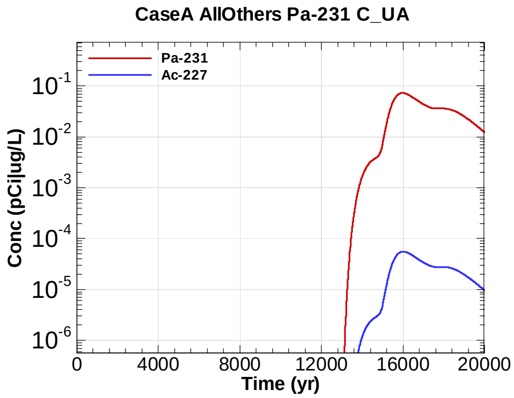

Figure E-2808 - 100m Aquifer Concentration for CaseA AllOthers Pa-231 C_UA

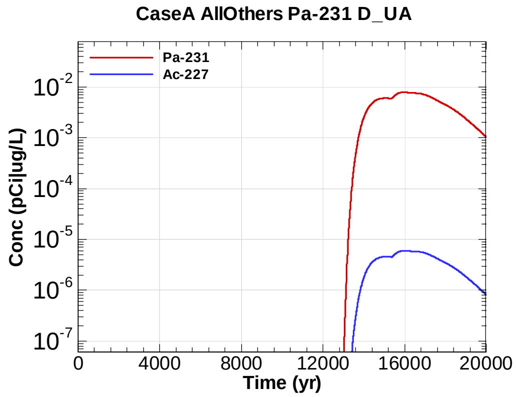

Figure E-2809 - 100m Aquifer Concentration for CaseA AllOthers Pa-231 D_UA

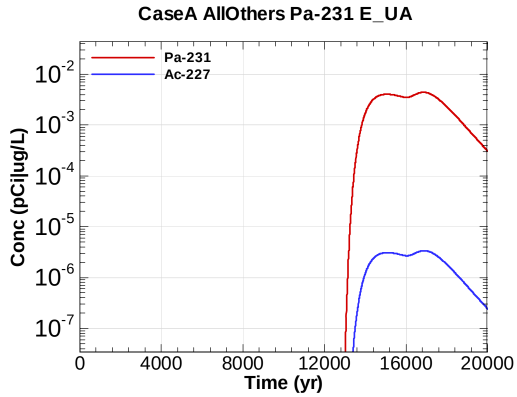

Figure E-2810 - 100m Aquifer Concentration for CaseA AllOthers Pa-231 E_UA

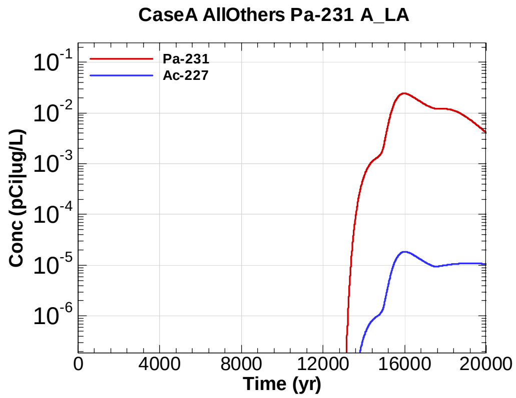

Figure E-2811 - 100m Aquifer Concentration for CaseA AllOthers Pa-231 A_LA

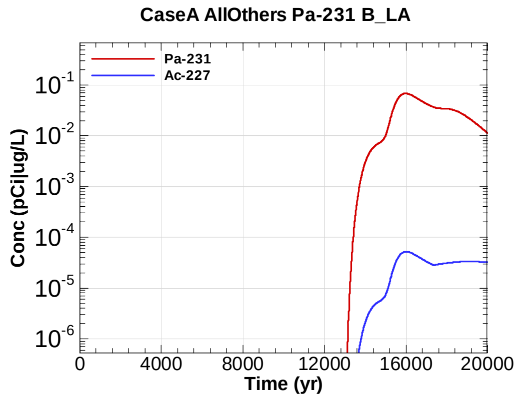

Figure E-2812 - 100m Aquifer Concentration for CaseA AllOthers Pa-231 B_LA

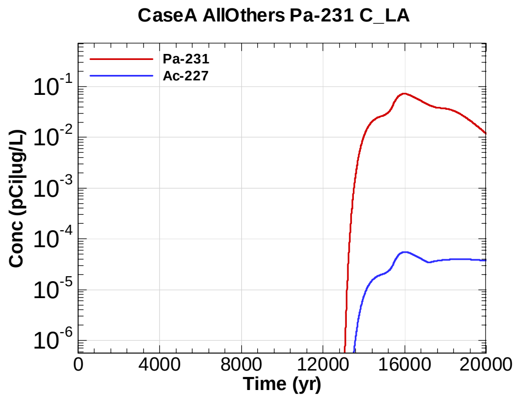

Figure E-2813 - 100m Aquifer Concentration for CaseA AllOthers Pa-231 C_LA

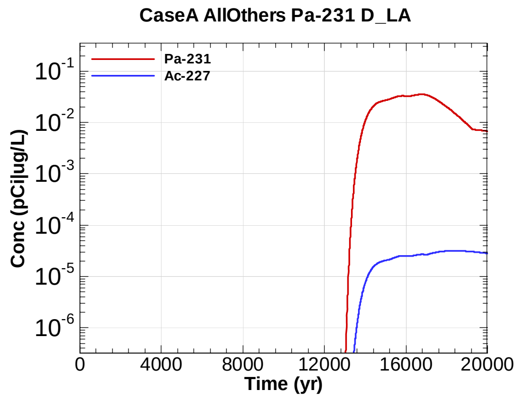

Figure E-2814 - 100m Aquifer Concentration for CaseA AllOthers Pa-231 D_LA

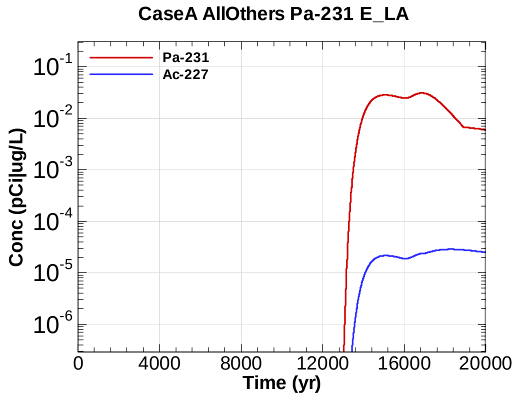

Figure E-2815 - 100m Aquifer Concentration for CaseA AllOthers Pa-231 E_LA

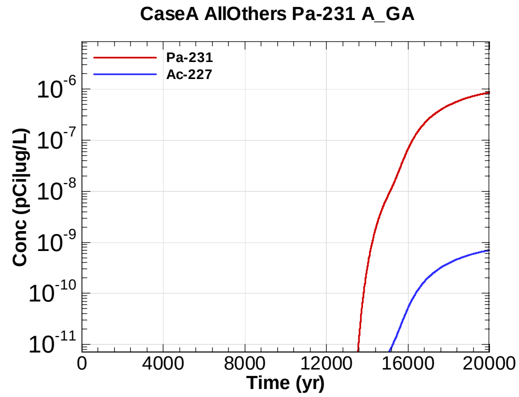

Figure E-2816 - 100m Aquifer Concentration for CaseA AllOthers Pa-231 A_GA

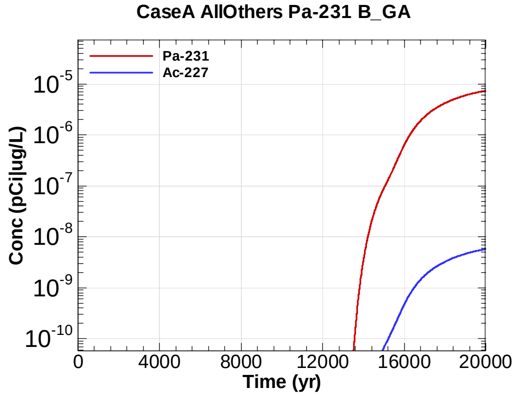

Figure E-2817 - 100m Aquifer Concentration for CaseA AllOthers Pa-231 B_GA

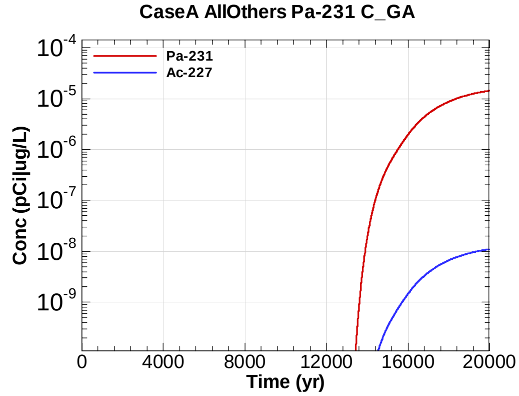

Figure E-2818 - 100m Aquifer Concentration for CaseA AllOthers Pa-231 C_GA

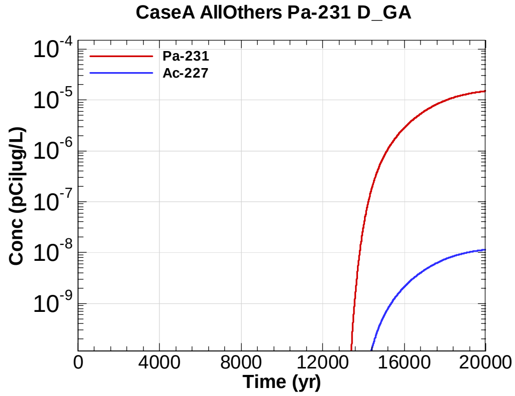

Figure E-2819 - 100m Aquifer Concentration for CaseA AllOthers Pa-231 D_GA

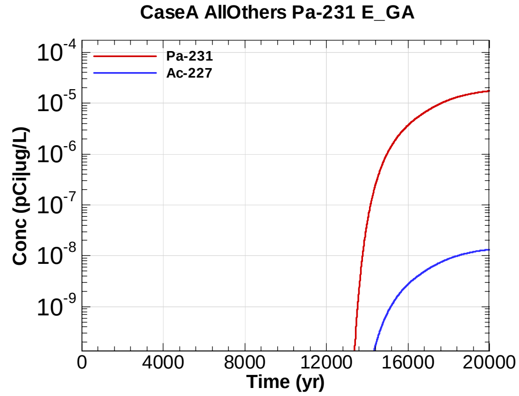

Figure E-2820 - 100m Aquifer Concentration for CaseA AllOthers Pa-231 E_GA

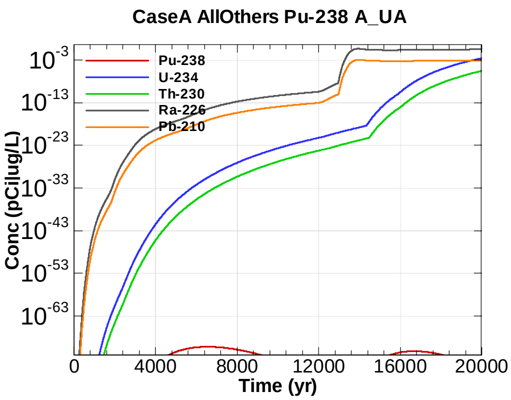

Figure E-2821 - 100m Aquifer Concentration for CaseA AllOthers Pu-238 A_UA

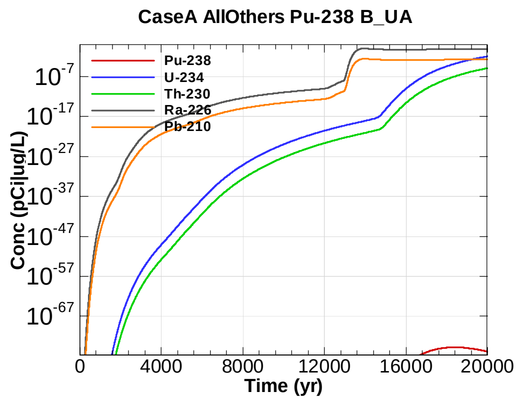

Figure E-2822 - 100m Aquifer Concentration for CaseA AllOthers Pu-238 B_UA

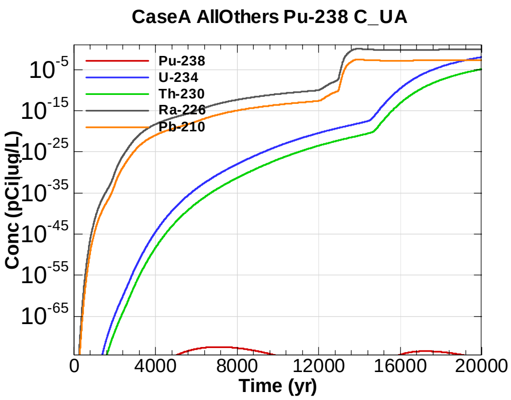

Figure E-2823 - 100m Aquifer Concentration for CaseA AllOthers Pu-238 C_UA

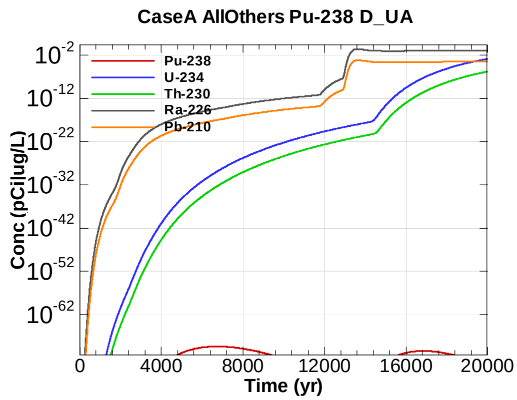

Figure E-2824 - 100m Aquifer Concentration for CaseA AllOthers Pu-238 D_UA

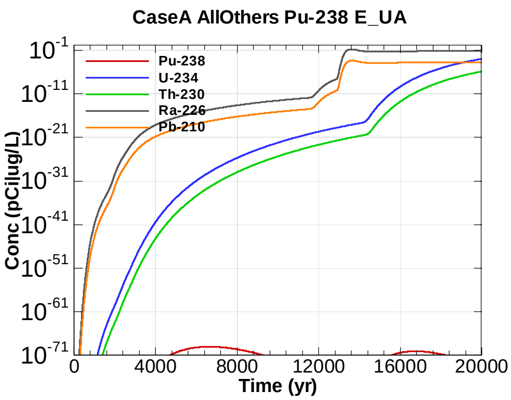

Figure E-2825 - 100m Aquifer Concentration for CaseA AllOthers Pu-238 E_UA

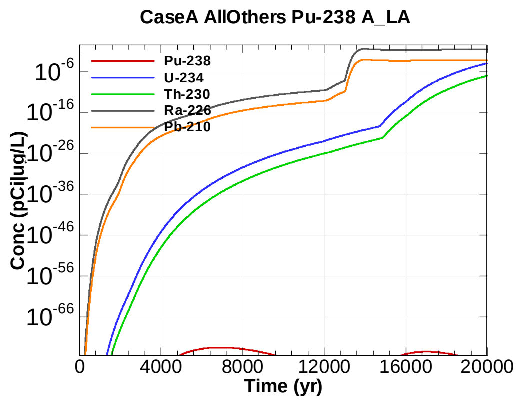

Figure E-2826 - 100m Aquifer Concentration for CaseA AllOthers Pu-238 A_LA

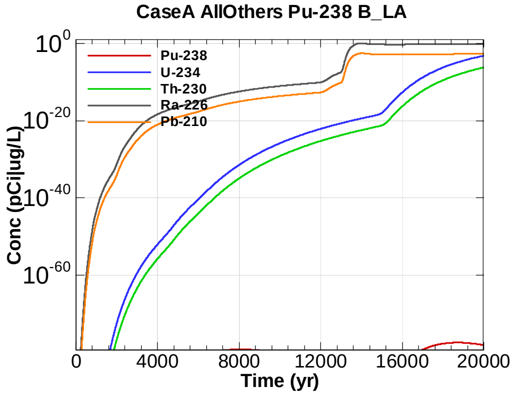

Figure E-2827 - 100m Aquifer Concentration for CaseA AllOthers Pu-238 B_LA

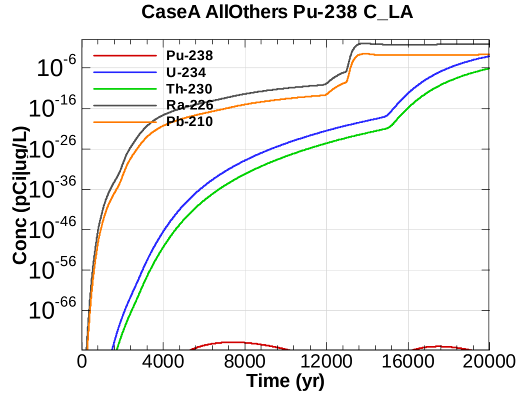

Figure E-2828 - 100m Aquifer Concentration for CaseA AllOthers Pu-238 C_LA

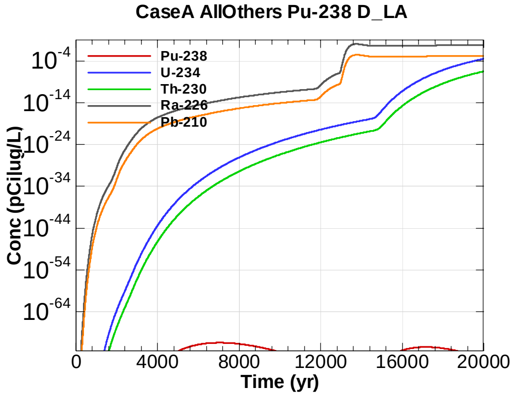

Figure E-2829 - 100m Aquifer Concentration for CaseA AllOthers Pu-238 D_LA

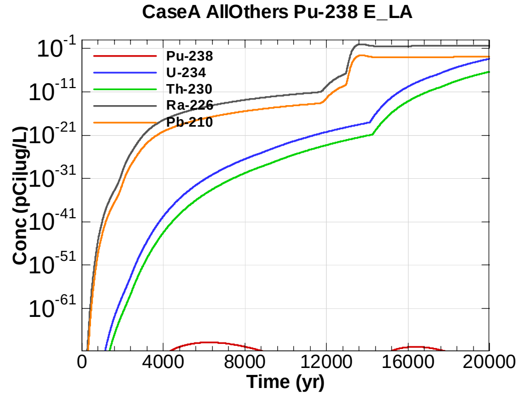

Figure E-2830 - 100m Aquifer Concentration for CaseA AllOthers Pu-238 E_LA

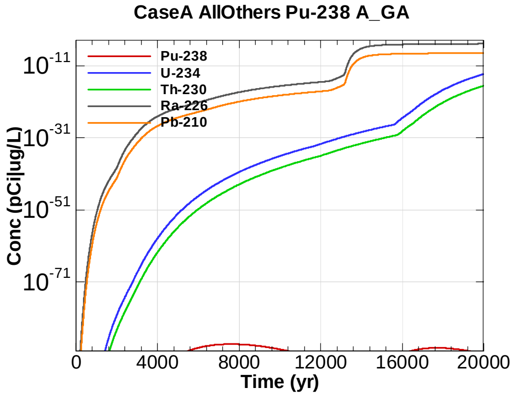

Figure E-2831 - 100m Aquifer Concentration for CaseA AllOthers Pu-238 A_GA

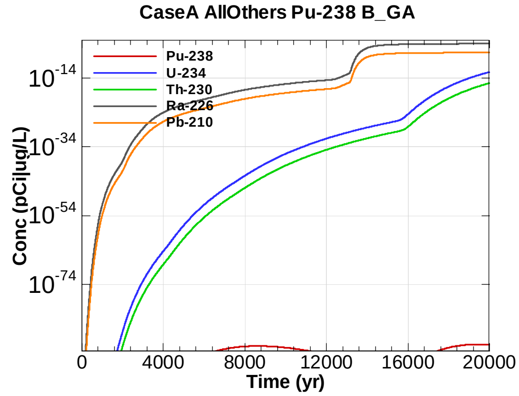

Figure E-2832 - 100m Aquifer Concentration for CaseA AllOthers Pu-238 B_GA

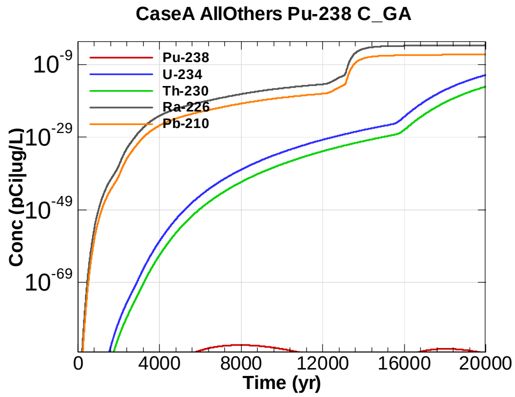

Figure E-2833 - 100m Aquifer Concentration for CaseA AllOthers Pu-238 C_GA

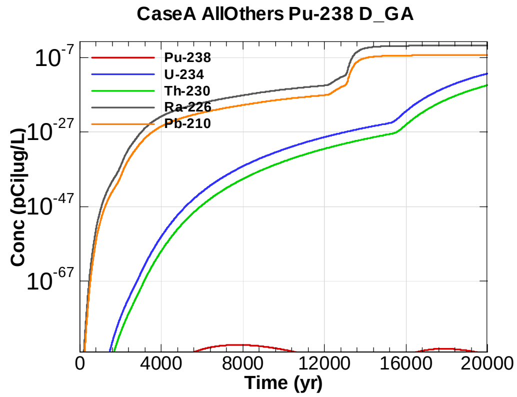

Figure E-2834 - 100m Aquifer Concentration for CaseA AllOthers Pu-238 D_GA

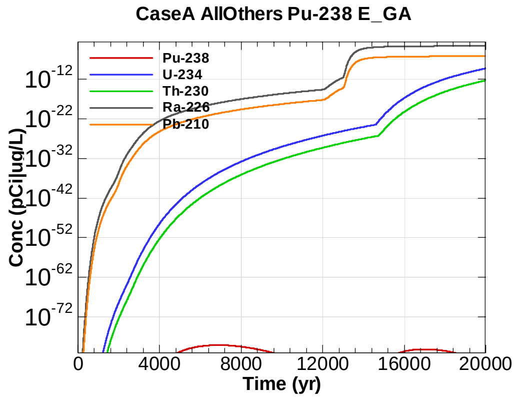

Figure E-2835 - 100m Aquifer Concentration for CaseA AllOthers Pu-238 E_GA

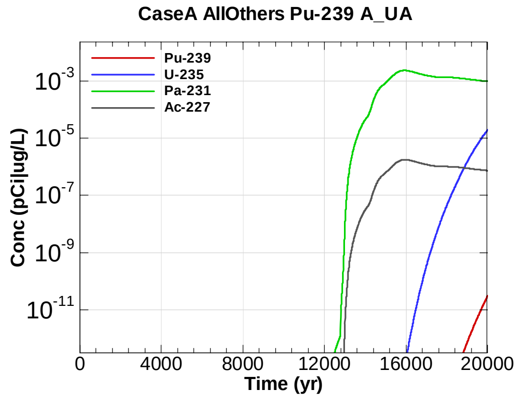

Figure E-2836 - 100m Aquifer Concentration for CaseA AllOthers Pu-239 A_UA

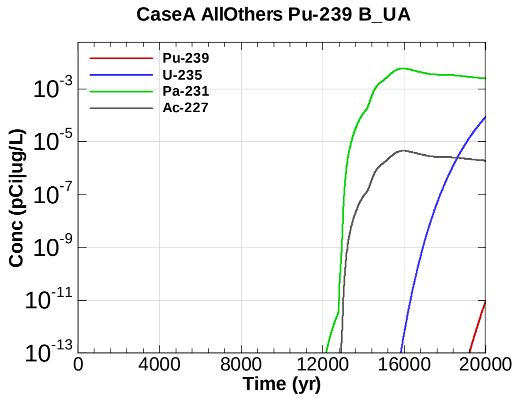

Figure E-2837 - 100m Aquifer Concentration for CaseA AllOthers Pu-239 B_UA

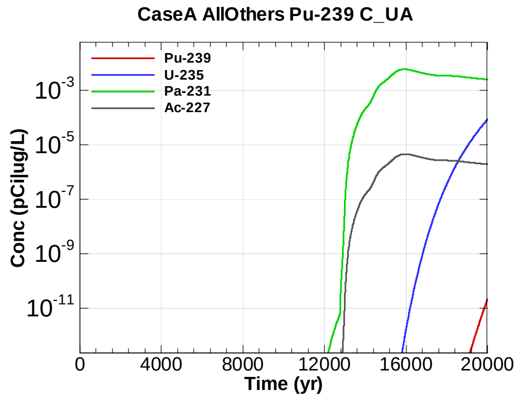

Figure E-2838 - 100m Aquifer Concentration for CaseA AllOthers Pu-239 C_UA

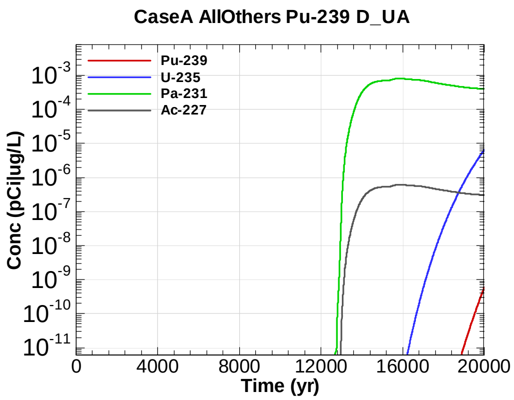

Figure E-2839 - 100m Aquifer Concentration for CaseA AllOthers Pu-239 D_UA

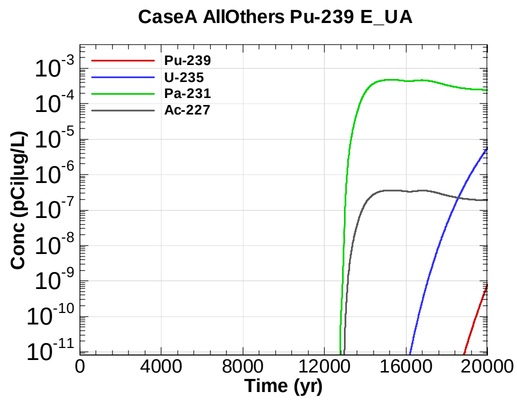

Figure E-2840 - 100m Aquifer Concentration for CaseA AllOthers Pu-239 E_UA

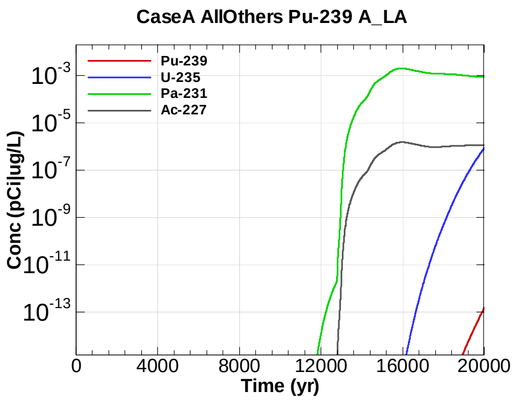

Figure E-2841 - 100m Aquifer Concentration for CaseA AllOthers Pu-239 A_LA

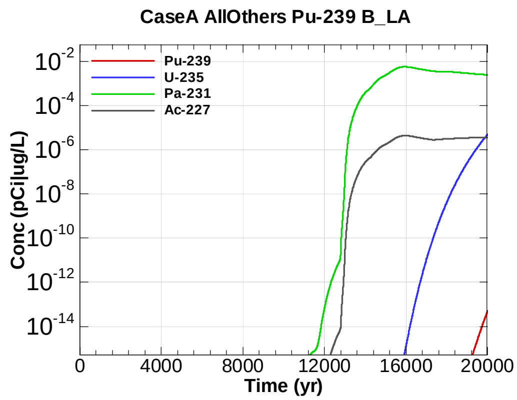

Figure E-2842 - 100m Aquifer Concentration for CaseA AllOthers Pu-239 B_LA

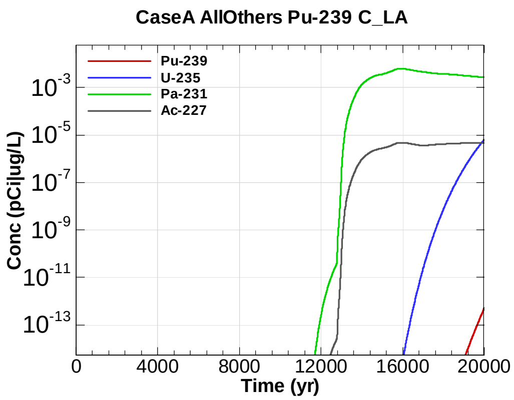

Figure E-2843 - 100m Aquifer Concentration for CaseA AllOthers Pu-239 C_LA

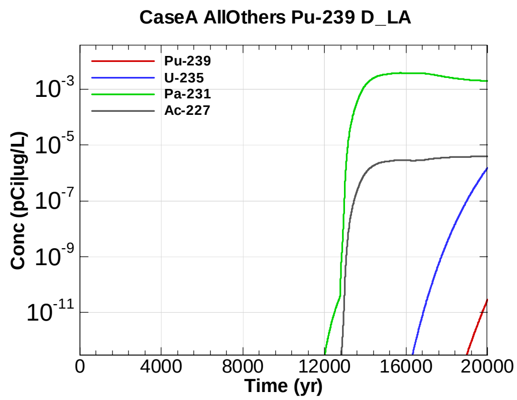

Figure E-2844 - 100m Aquifer Concentration for CaseA AllOthers Pu-239 D_LA

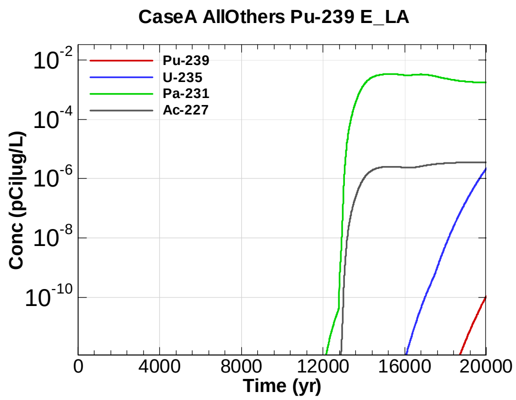

Figure E-2845 - 100m Aquifer Concentration for CaseA AllOthers Pu-239 E_LA

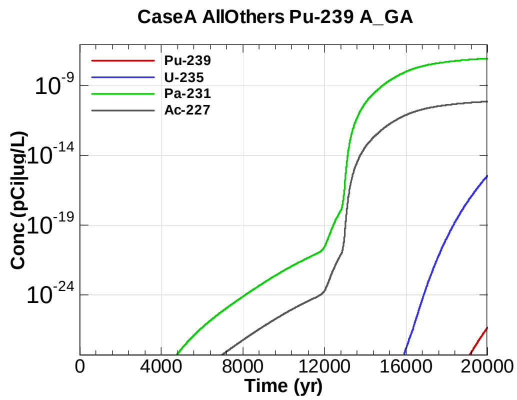

Figure E-2846 - 100m Aquifer Concentration for CaseA AllOthers Pu-239 A_GA

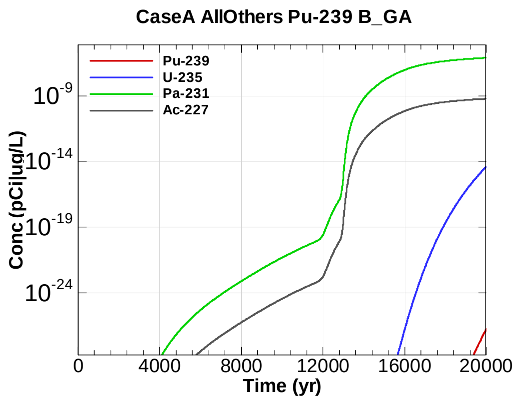

Figure E-2847 - 100m Aquifer Concentration for CaseA AllOthers Pu-239 B_GA

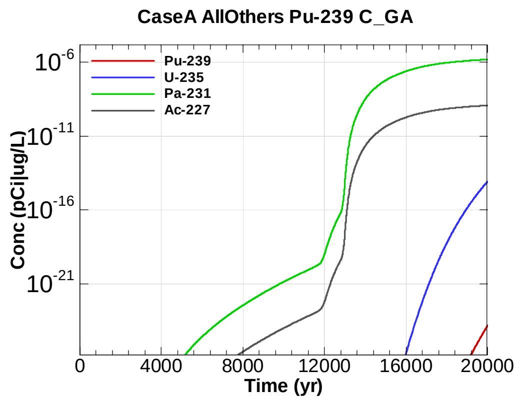

Figure E-2848 - 100m Aquifer Concentration for CaseA AllOthers Pu-239 C_GA

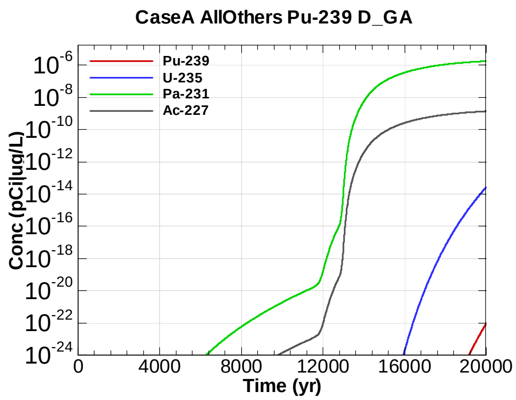

Figure E-2849 - 100m Aquifer Concentration for CaseA AllOthers Pu-239 D_GA

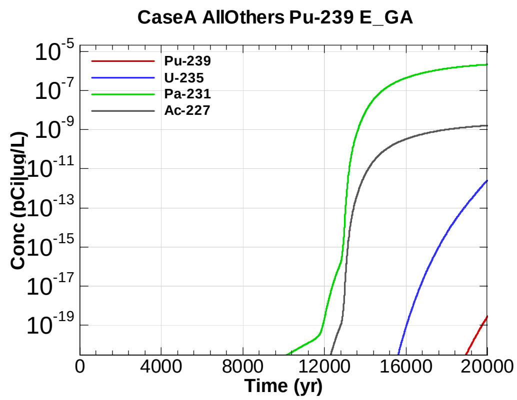

Figure E-2850 - 100m Aquifer Concentration for CaseA AllOthers Pu-239 E_GA

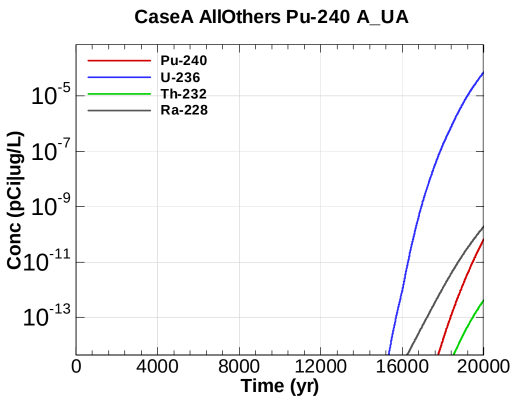

Figure E-2851 - 100m Aquifer Concentration for CaseA AllOthers Pu-240 A_UA

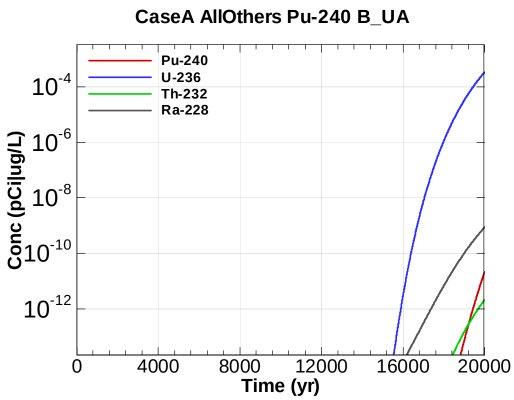

Figure E-2852 - 100m Aquifer Concentration for CaseA AllOthers Pu-240 B_UA

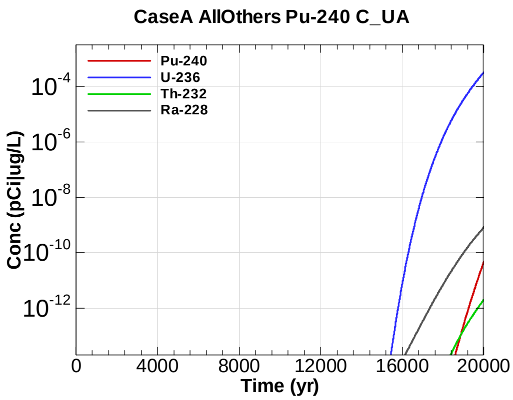

Figure E-2853 - 100m Aquifer Concentration for CaseA AllOthers Pu-240 C_UA

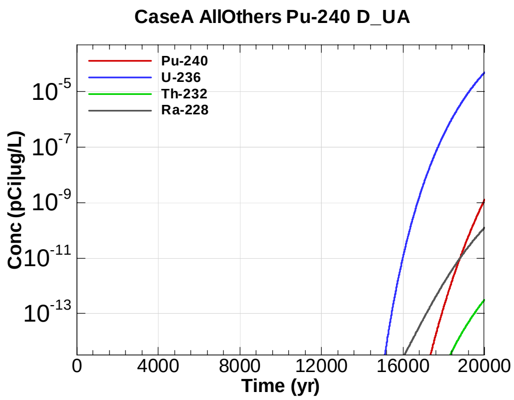

Figure E-2854 - 100m Aquifer Concentration for CaseA AllOthers Pu-240 D_UA

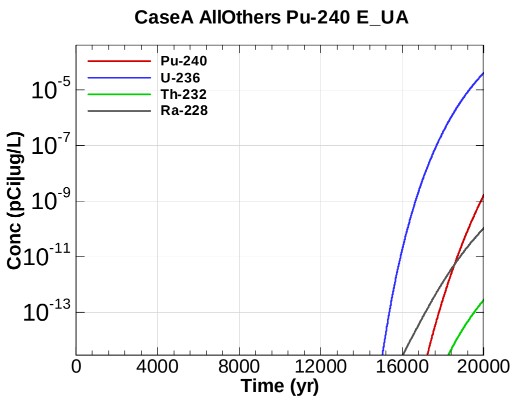

Figure E-2855 - 100m Aquifer Concentration for CaseA AllOthers Pu-240 E_UA

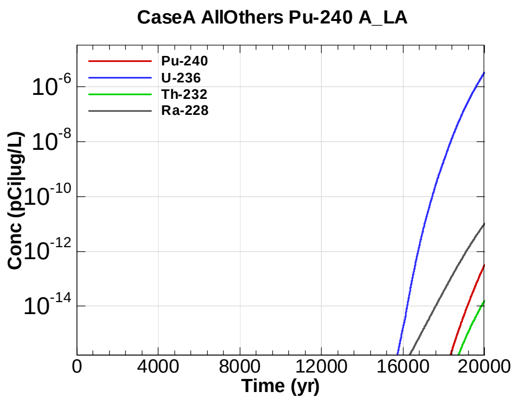

Figure E-2856 - 100m Aquifer Concentration for CaseA AllOthers Pu-240 A_LA

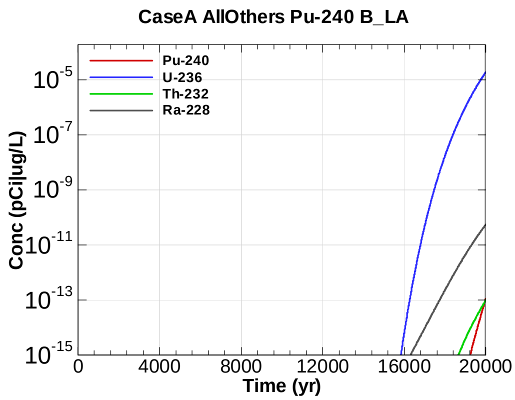

Figure E-2857 - 100m Aquifer Concentration for CaseA AllOthers Pu-240 B_LA

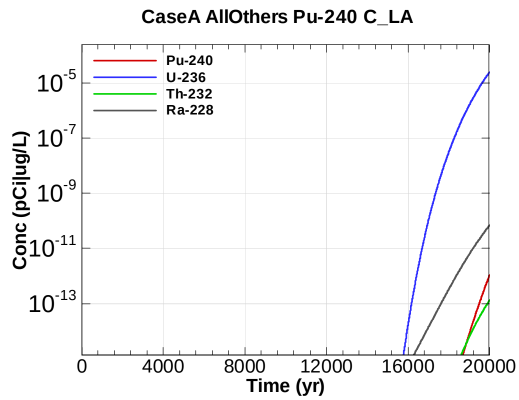

Figure E-2858 - 100m Aquifer Concentration for CaseA AllOthers Pu-240 C_LA

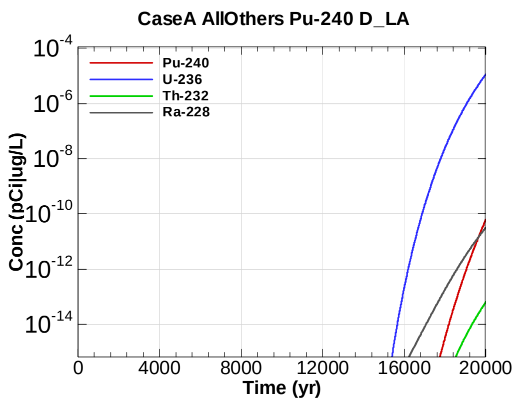

Figure E-2859 - 100m Aquifer Concentration for CaseA AllOthers Pu-240 D_LA

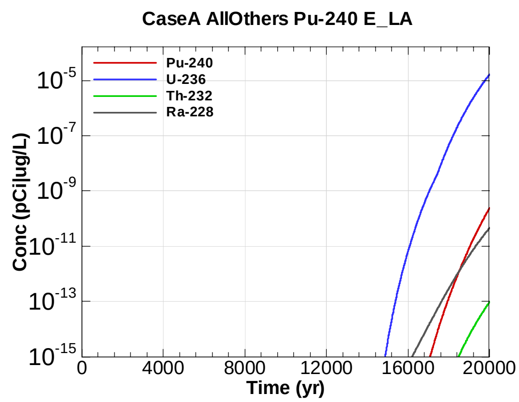

Figure E-2860 - 100m Aquifer Concentration for CaseA AllOthers Pu-240 E_LA

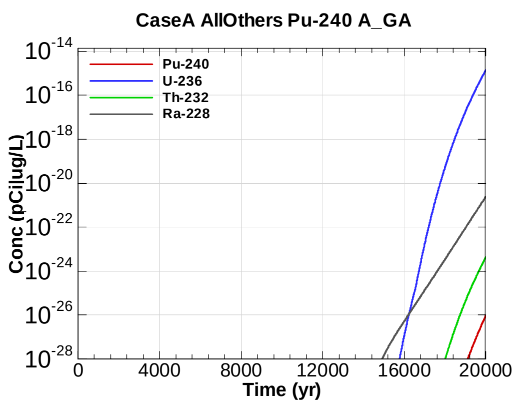

Figure E-2861 - 100m Aquifer Concentration for CaseA AllOthers Pu-240 A_GA

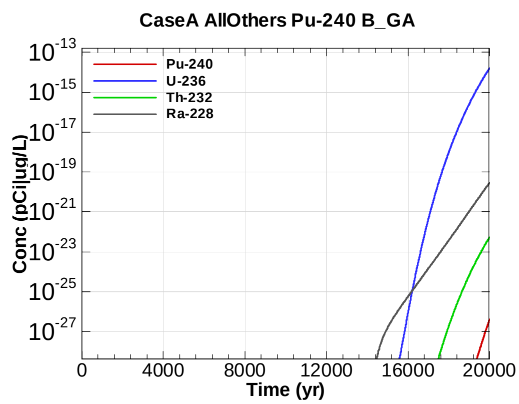

Figure E-2862 - 100m Aquifer Concentration for CaseA AllOthers Pu-240 B_GA

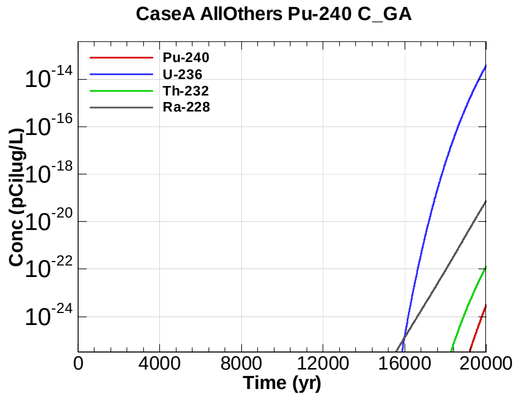

Figure E-2863 - 100m Aquifer Concentration for CaseA AllOthers Pu-240 C_GA

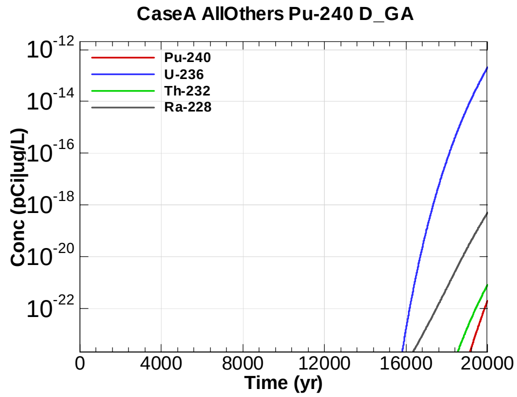

Figure E-2864 - 100m Aquifer Concentration for CaseA AllOthers Pu-240 D_GA

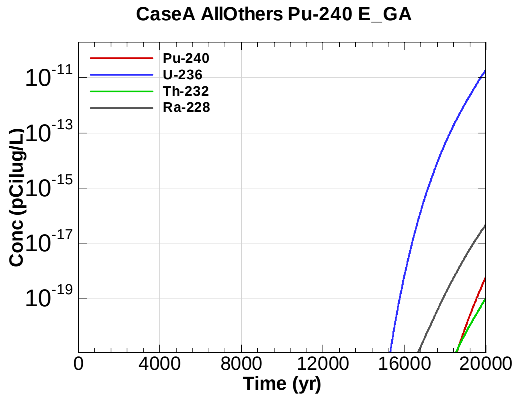

Figure E-2865 - 100m Aquifer Concentration for CaseA AllOthers Pu-240 E_GA

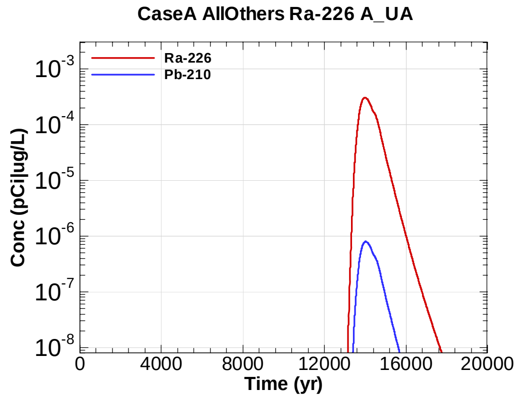

Figure E-2866 - 100m Aquifer Concentration for CaseA AllOthers Ra-226 A_UA

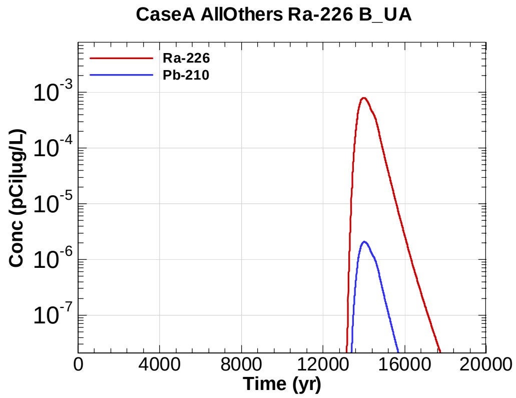

Figure E-2867 - 100m Aquifer Concentration for CaseA AllOthers Ra-226 B_UA

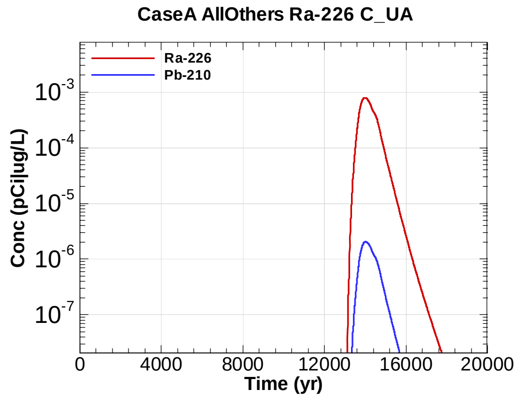

Figure E-2868 - 100m Aquifer Concentration for CaseA AllOthers Ra-226 C_UA

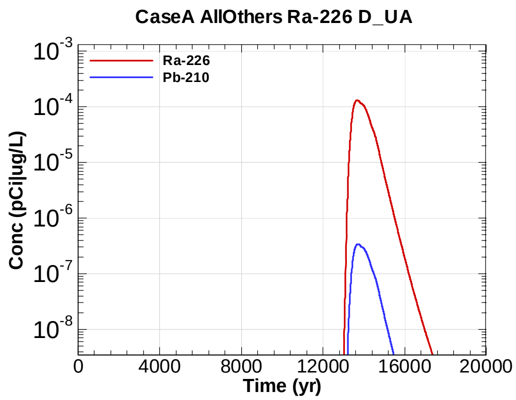

Figure E-2869 - 100m Aquifer Concentration for CaseA AllOthers Ra-226 D_UA

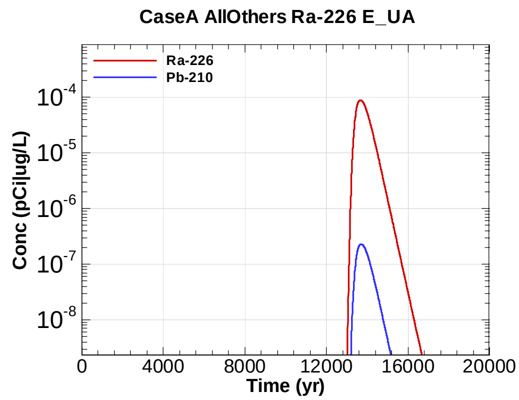

Figure E-2870 - 100m Aquifer Concentration for CaseA AllOthers Ra-226 E_UA

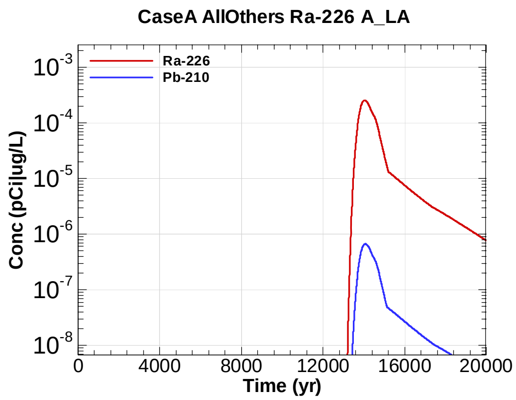

Figure E-2871 - 100m Aquifer Concentration for CaseA AllOthers Ra-226 A_LA

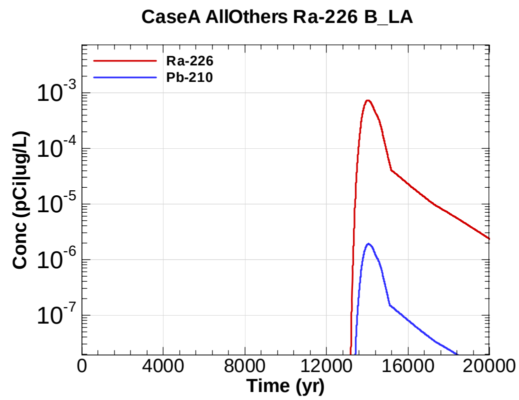

Figure E-2872 - 100m Aquifer Concentration for CaseA AllOthers Ra-226 B_LA

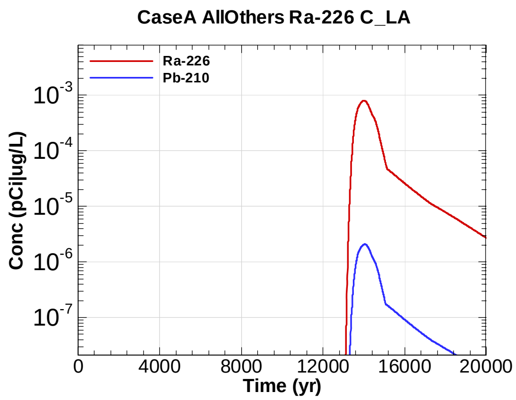

Figure E-2873 - 100m Aquifer Concentration for CaseA AllOthers Ra-226 C_LA

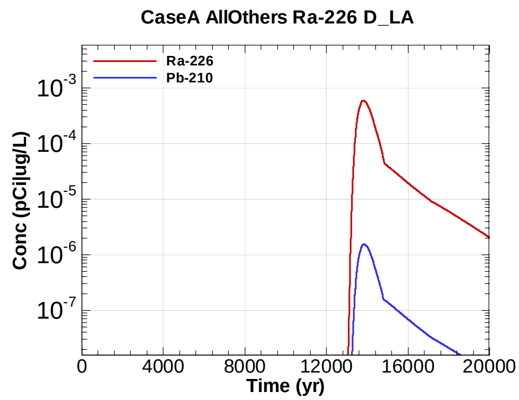

Figure E-2874 - 100m Aquifer Concentration for CaseA AllOthers Ra-226 D_LA

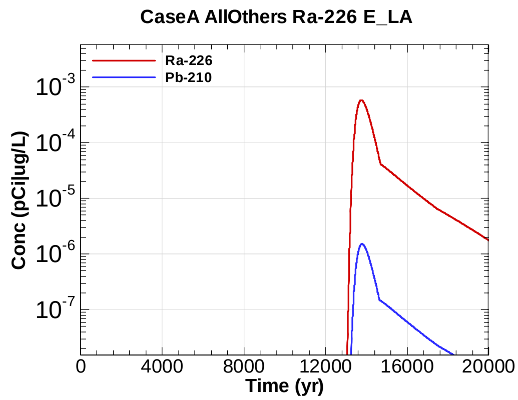

Figure E-2875 - 100m Aquifer Concentration for CaseA AllOthers Ra-226 E_LA

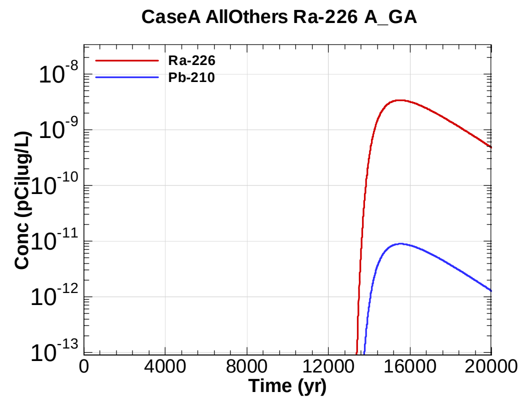

Figure E-2876 - 100m Aquifer Concentration for CaseA AllOthers Ra-226 A_GA

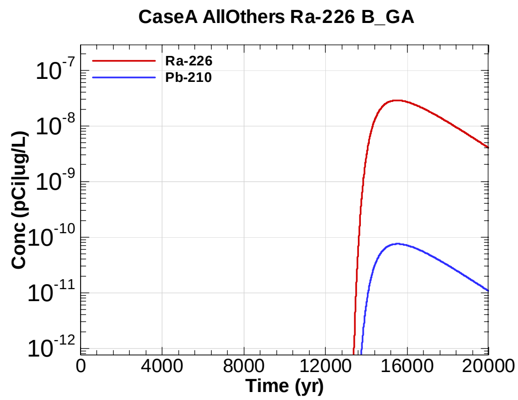

Figure E-2877 - 100m Aquifer Concentration for CaseA AllOthers Ra-226 B_GA

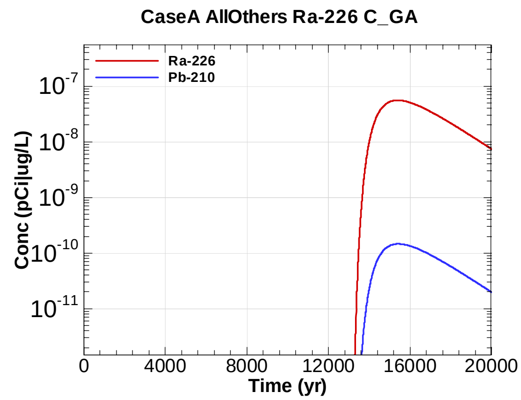

Figure E-2878 - 100m Aquifer Concentration for CaseA AllOthers Ra-226 C_GA

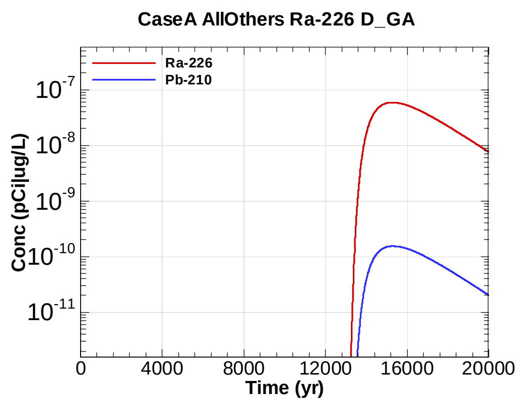

Figure E-2879 - 100m Aquifer Concentration for CaseA AllOthers Ra-226 D_GA

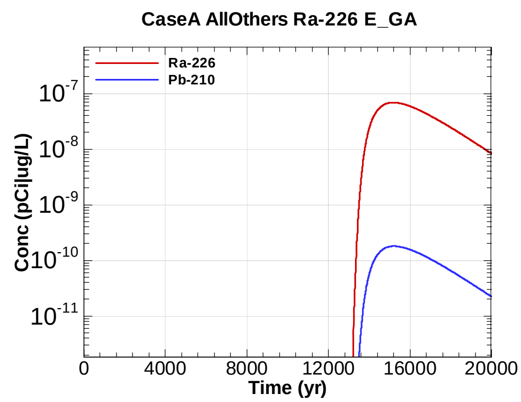

Figure E-2880 - 100m Aquifer Concentration for CaseA AllOthers Ra-226 E_GA

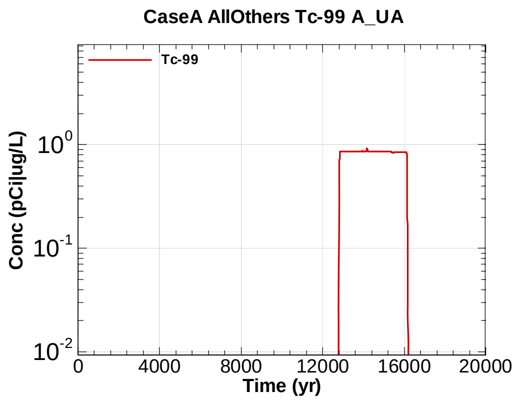

Figure E-2881 - 100m Aquifer Concentration for CaseA AllOthers Tc-99 A_UA

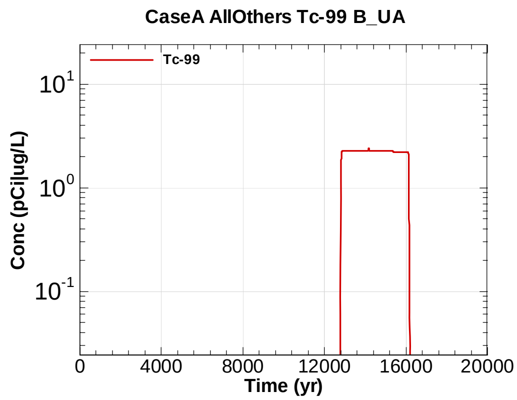

Figure E-2882 - 100m Aquifer Concentration for CaseA AllOthers Tc-99 B_UA

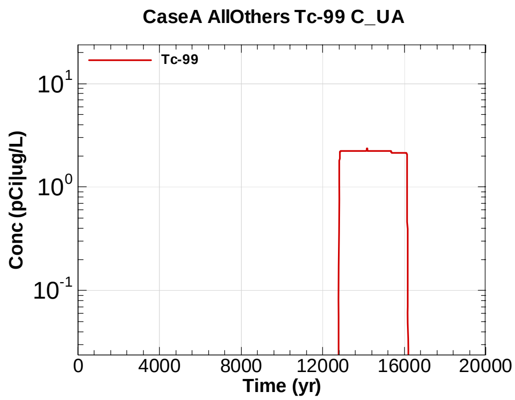

Figure E-2883 - 100m Aquifer Concentration for CaseA AllOthers Tc-99 C_UA

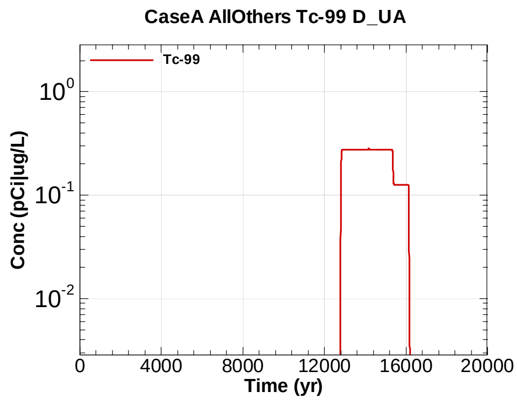

Figure E-2884 - 100m Aquifer Concentration for CaseA AllOthers Tc-99 D_UA

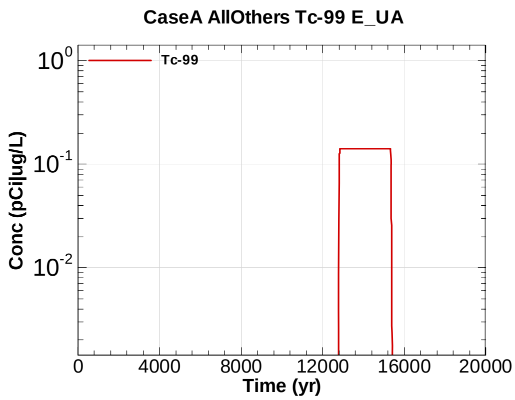

Figure E-2885 - 100m Aquifer Concentration for CaseA AllOthers Tc-99 E_UA

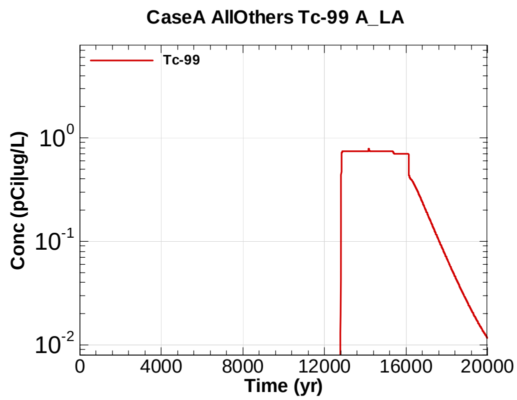

Figure E-2886 - 100m Aquifer Concentration for CaseA AllOthers Tc-99 A_LA

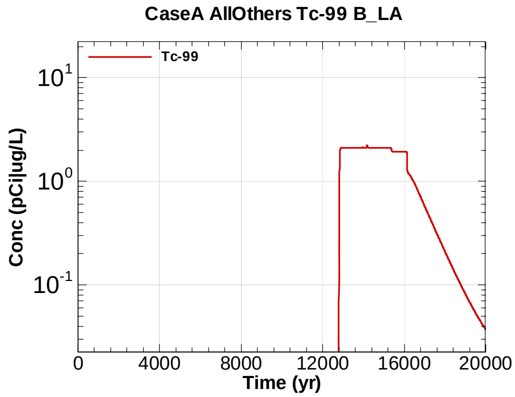

Figure E-2887 - 100m Aquifer Concentration for CaseA AllOthers Tc-99 B_LA

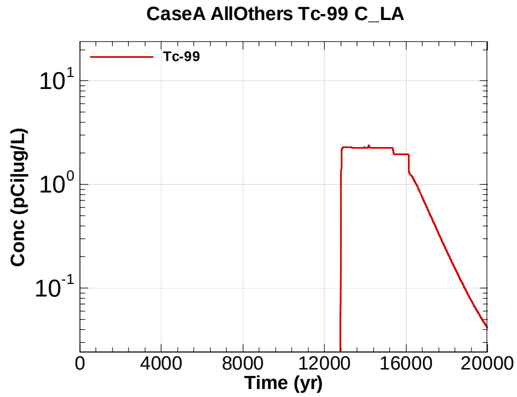

Figure E-2888 - 100m Aquifer Concentration for CaseA AllOthers Tc-99 C_LA

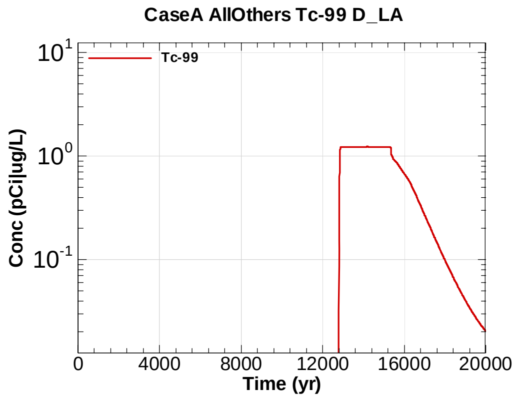

Figure E-2889 - 100m Aquifer Concentration for CaseA AllOthers Tc-99 D_LA

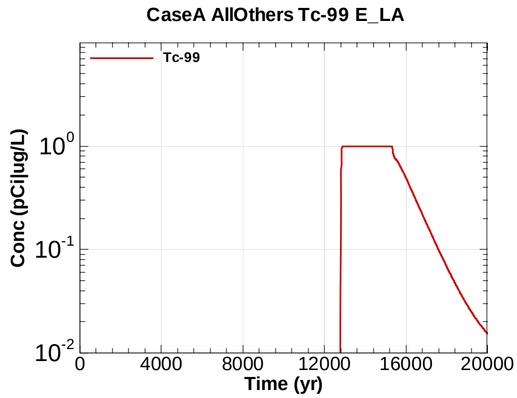

Figure E-2890 - 100m Aquifer Concentration for CaseA AllOthers Tc-99 E_LA

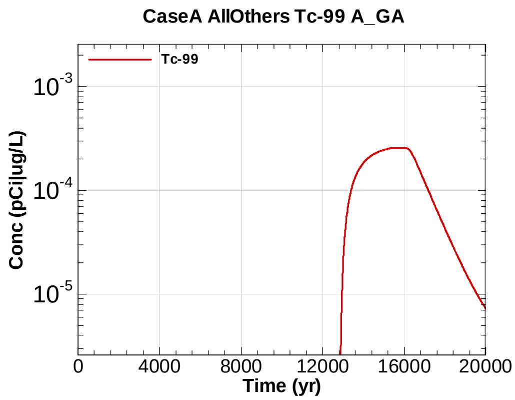

Figure E-2891 - 100m Aquifer Concentration for CaseA AllOthers Tc-99 A_GA

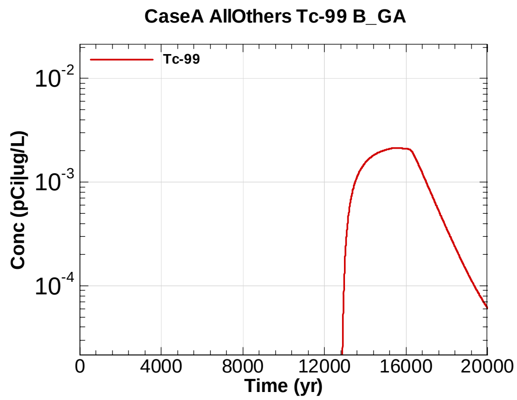

Figure E-2892 - 100m Aquifer Concentration for CaseA AllOthers Tc-99 B_GA

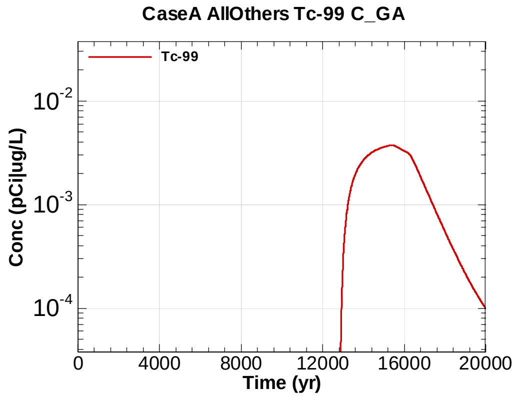

Figure E-2893 - 100m Aquifer Concentration for CaseA AllOthers Tc-99 C_GA

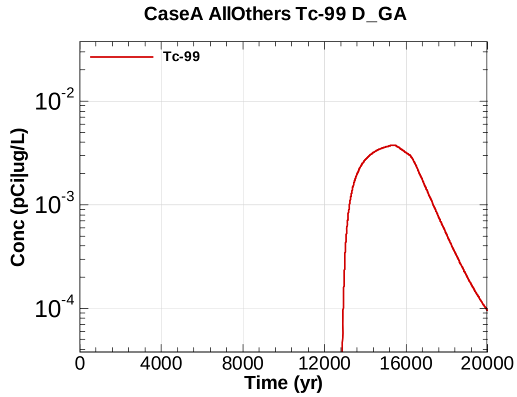

Figure E-2894 - 100m Aquifer Concentration for CaseA AllOthers Tc-99 D_GA

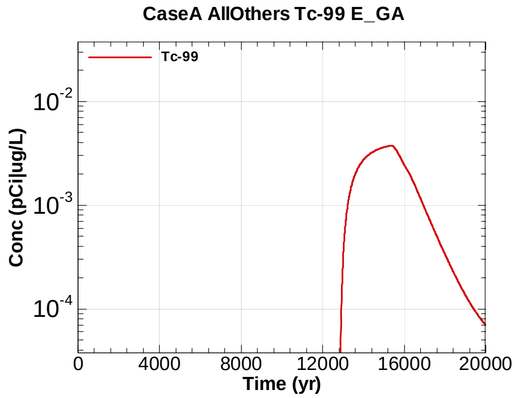

Figure E-2895 - 100m Aquifer Concentration for CaseA AllOthers Tc-99 E_GA

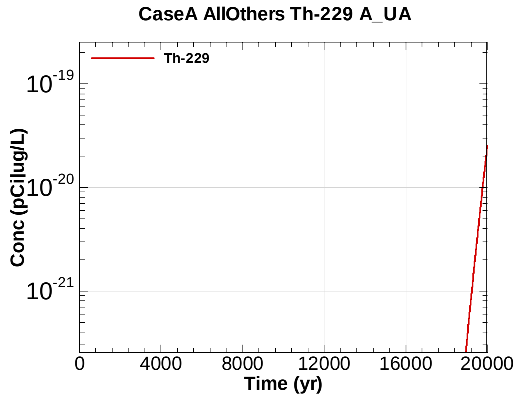

Figure E-2896 - 100m Aquifer Concentration for CaseA AllOthers Th-229 A_UA

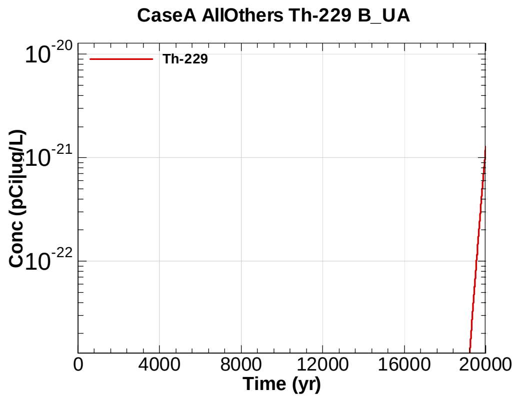

Figure E-2897 - 100m Aquifer Concentration for CaseA AllOthers Th-229 B_UA

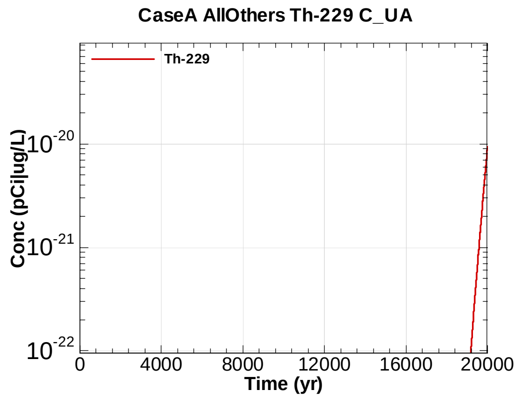

Figure E-2898 - 100m Aquifer Concentration for CaseA AllOthers Th-229 C_UA

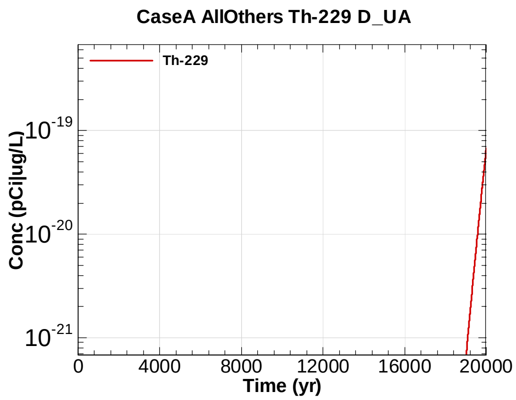

Figure E-2899 - 100m Aquifer Concentration for CaseA AllOthers Th-229 D_UA

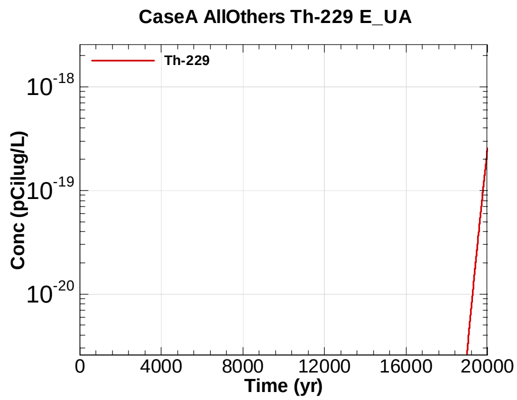

Figure E-2900 - 100m Aquifer Concentration for CaseA AllOthers Th-229 E_UA

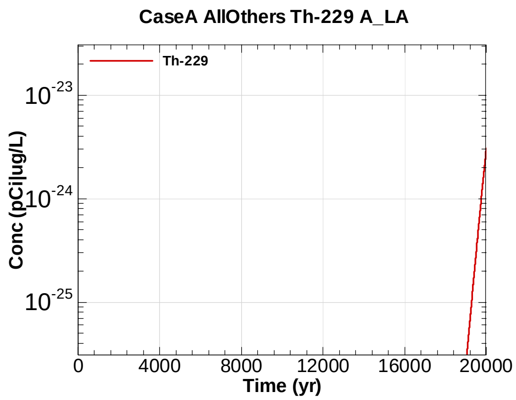

Figure E-2901 - 100m Aquifer Concentration for CaseA AllOthers Th-229 A_LA

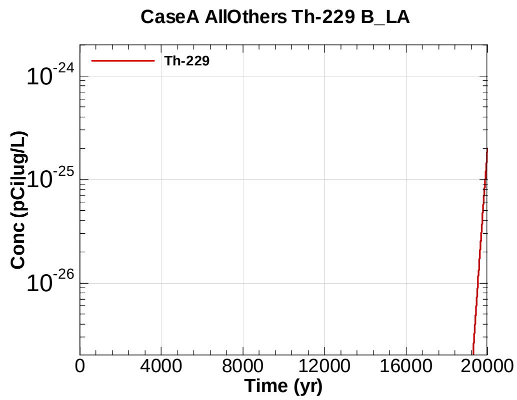

Figure E-2902 - 100m Aquifer Concentration for CaseA AllOthers Th-229 B_LA

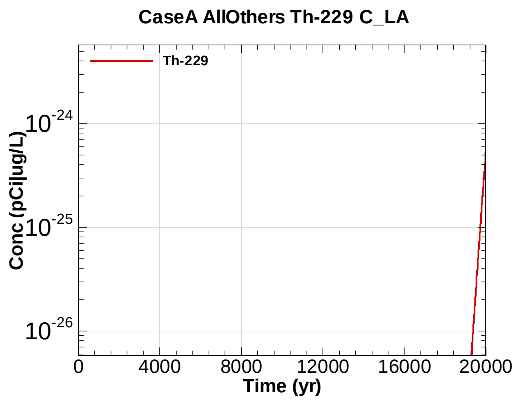

Figure E-2903 - 100m Aquifer Concentration for CaseA AllOthers Th-229 C_LA

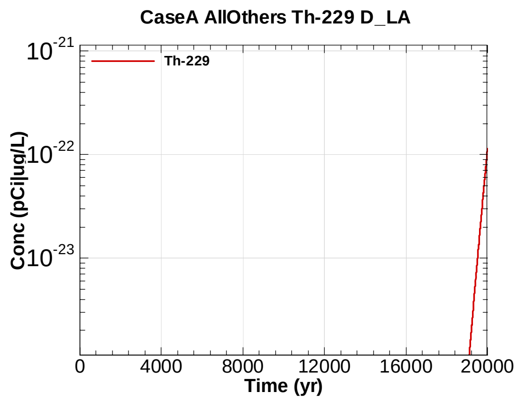

Figure E-2904 - 100m Aquifer Concentration for CaseA AllOthers Th-229 D_LA

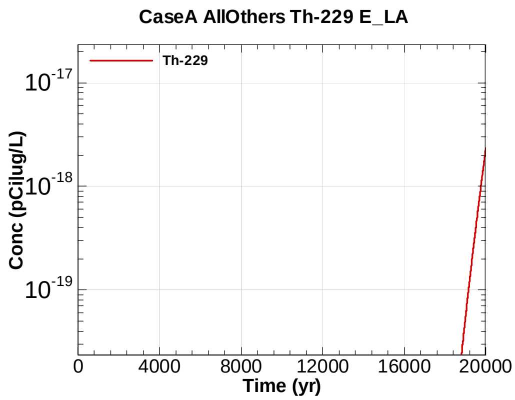

Figure E-2905 - 100m Aquifer Concentration for CaseA AllOthers Th-229 E_LA

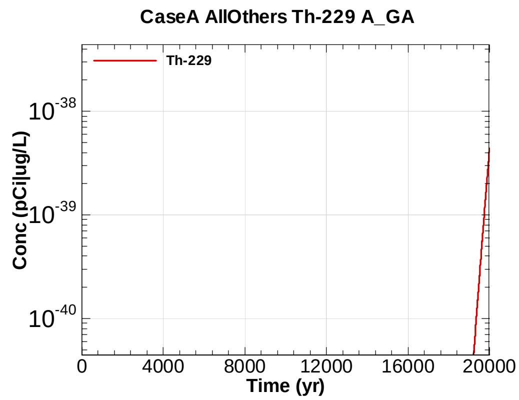

Figure E-2906 - 100m Aquifer Concentration for CaseA AllOthers Th-229 A_GA

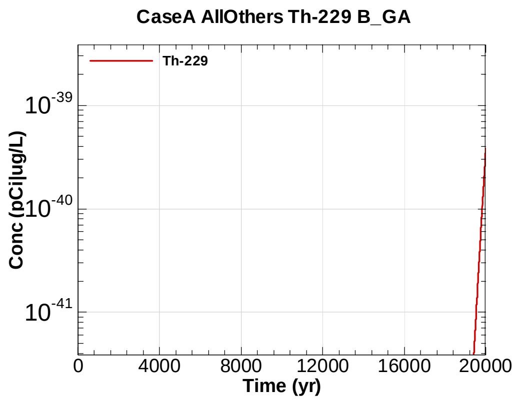

Figure E-2907 - 100m Aquifer Concentration for CaseA AllOthers Th-229 B_GA

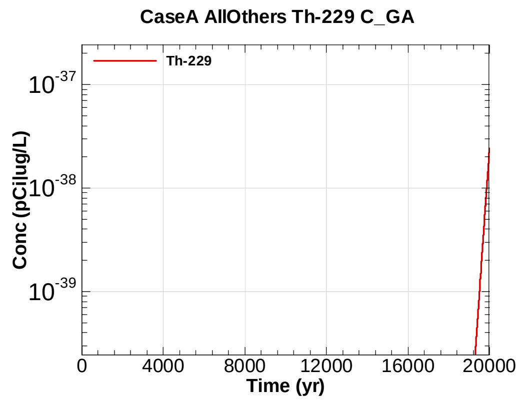

Figure E-2908 - 100m Aquifer Concentration for CaseA AllOthers Th-229 C_GA

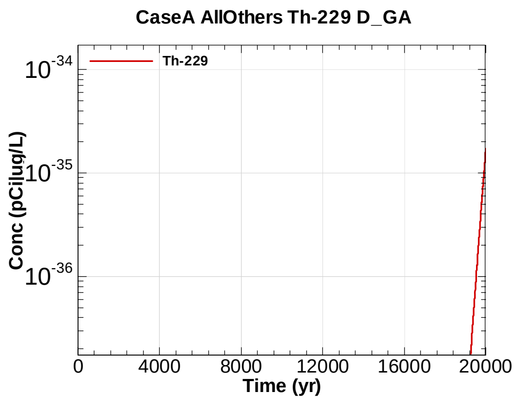

Figure E-2909 - 100m Aquifer Concentration for CaseA AllOthers Th-229 D_GA

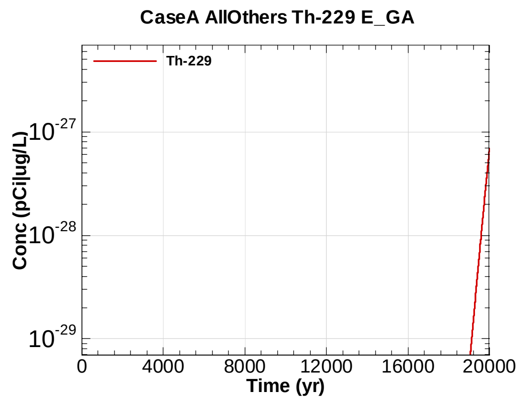

Figure E-2910 - 100m Aquifer Concentration for CaseA AllOthers Th-229 E_GA

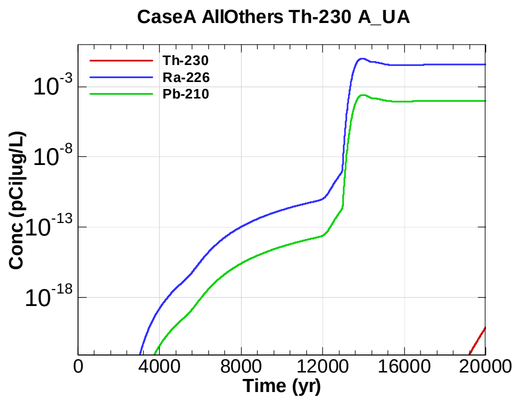

Figure E-2911 - 100m Aquifer Concentration for CaseA AllOthers Th-230 A_UA

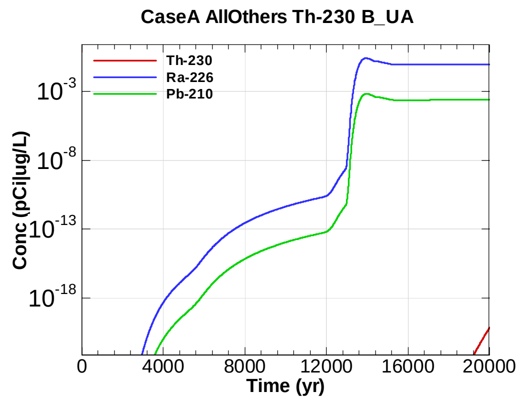

Figure E-2912 - 100m Aquifer Concentration for CaseA AllOthers Th-230 B_UA

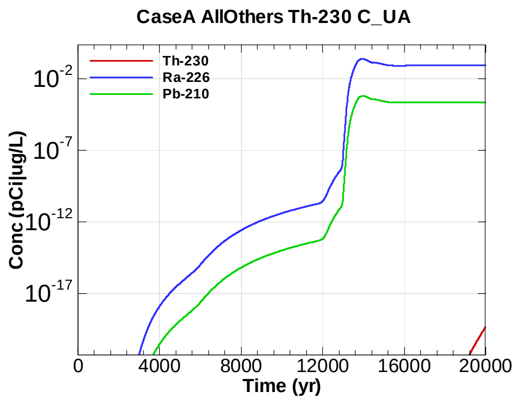

Figure E-2913 - 100m Aquifer Concentration for CaseA AllOthers Th-230 C_UA

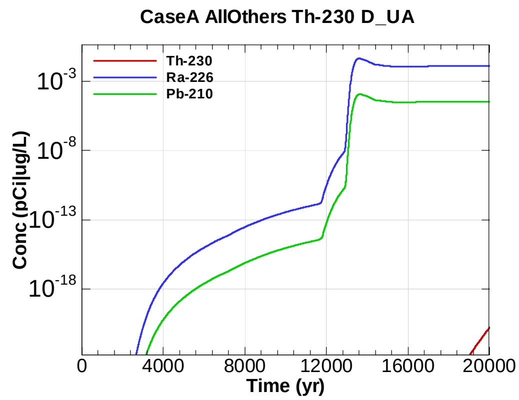

Figure E-2914 - 100m Aquifer Concentration for CaseA AllOthers Th-230 D_UA

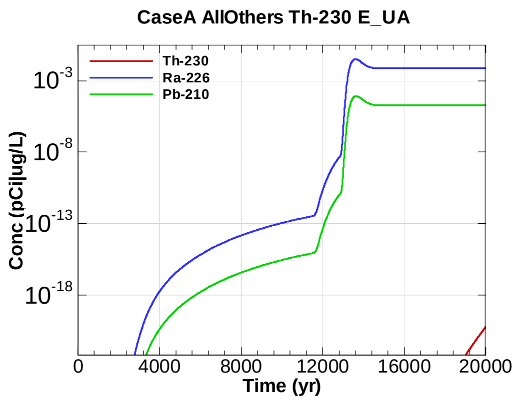

Figure E-2915 - 100m Aquifer Concentration for CaseA AllOthers Th-230 E_UA

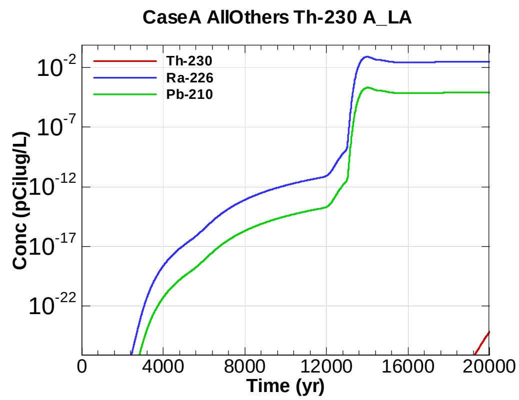

Figure E-2916 - 100m Aquifer Concentration for CaseA AllOthers Th-230 A_LA

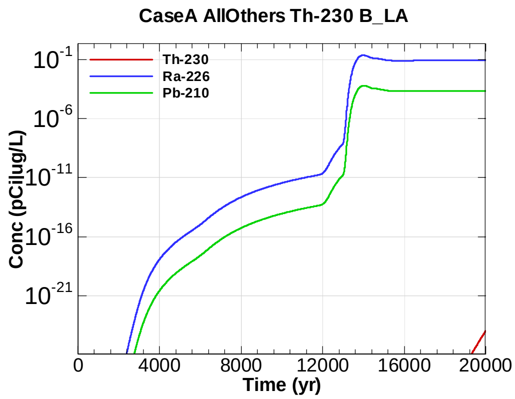

Figure E-2917 - 100m Aquifer Concentration for CaseA AllOthers Th-230 B_LA

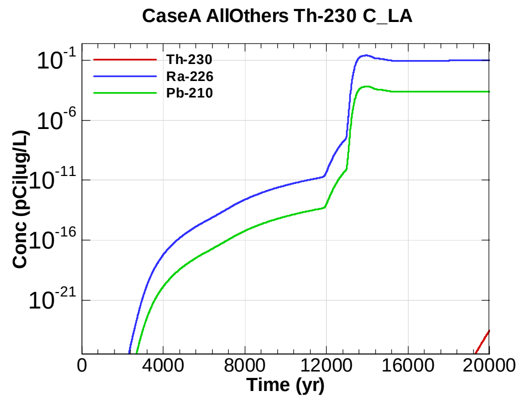

Figure E-2918 - 100m Aquifer Concentration for CaseA AllOthers Th-230 C_LA

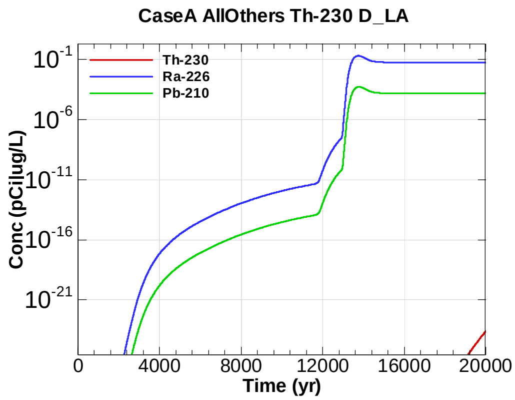

Figure E-2919 - 100m Aquifer Concentration for CaseA AllOthers Th-230 D_LA

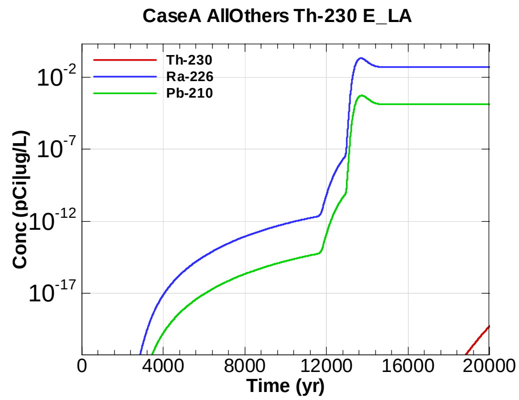

Figure E-2920 - 100m Aquifer Concentration for CaseA AllOthers Th-230 E_LA

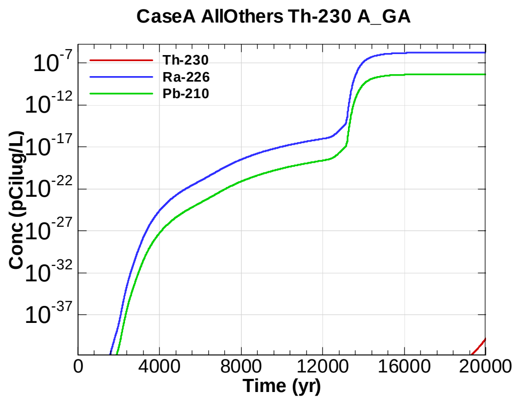

Figure E-2921 - 100m Aquifer Concentration for CaseA AllOthers Th-230 A_GA

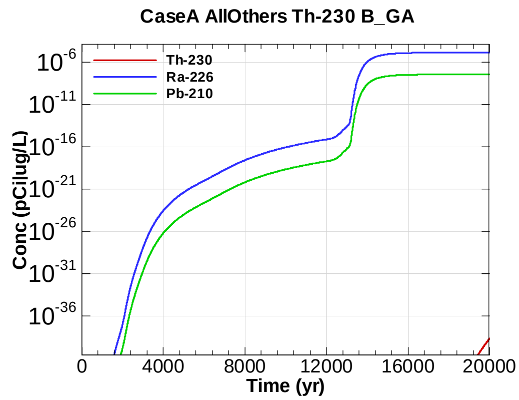

Figure E-2922 - 100m Aquifer Concentration for CaseA AllOthers Th-230 B_GA

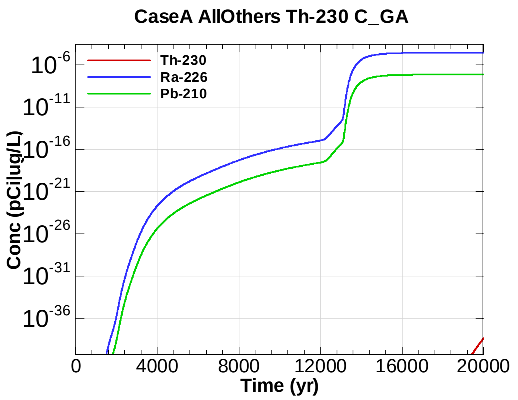

Figure E-2923 - 100m Aquifer Concentration for CaseA AllOthers Th-230 C_GA

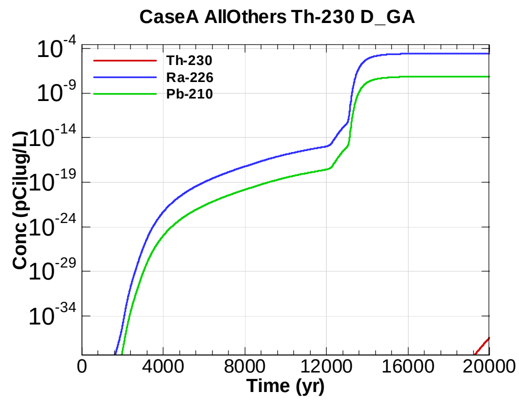

Figure E-2924 - 100m Aquifer Concentration for CaseA AllOthers Th-230 D_GA

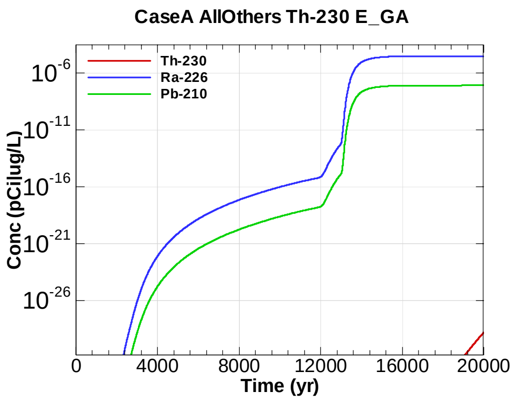

Figure E-2925 - 100m Aquifer Concentration for CaseA AllOthers Th-230 E_GA

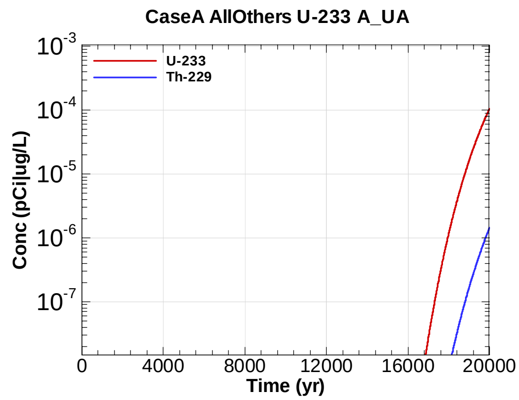

Figure E-2926 - 100m Aquifer Concentration for CaseA AllOthers U-233 A_UA

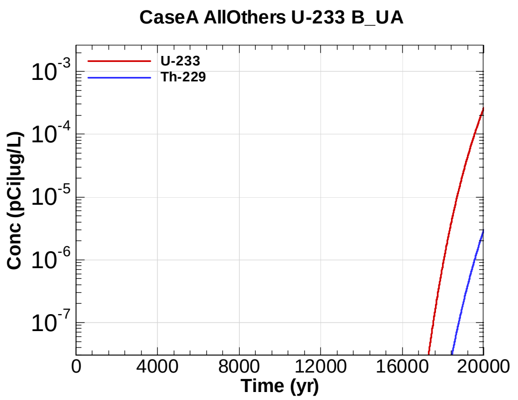

Figure E-2927 - 100m Aquifer Concentration for CaseA AllOthers U-233 B_UA

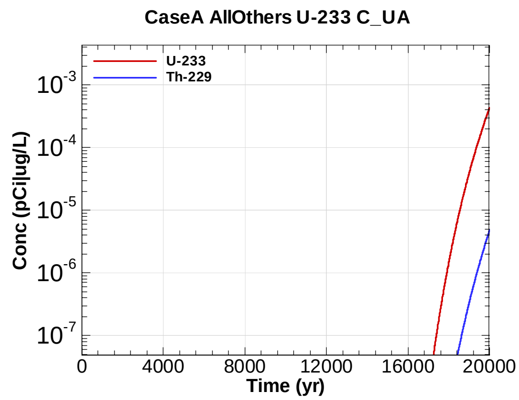

Figure E-2928 - 100m Aquifer Concentration for CaseA AllOthers U-233 C_UA

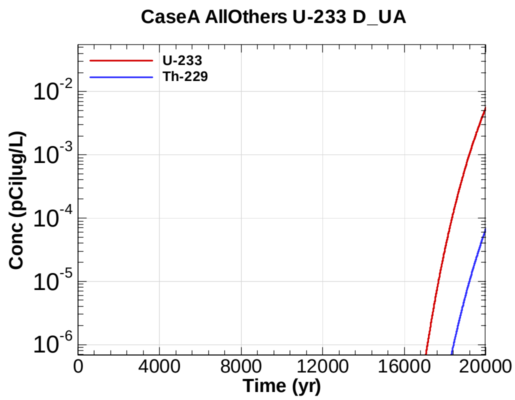

Figure E-2929 - 100m Aquifer Concentration for CaseA AllOthers U-233 D_UA

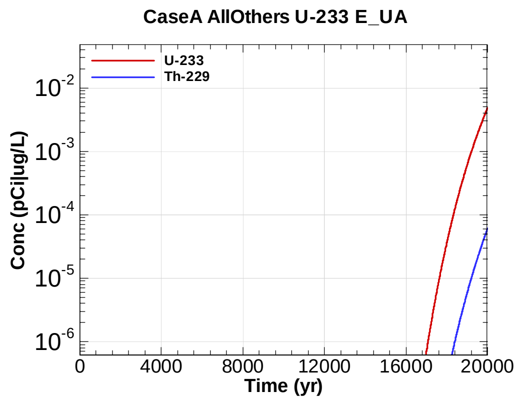

Figure E-2930 - 100m Aquifer Concentration for CaseA AllOthers U-233 E_UA

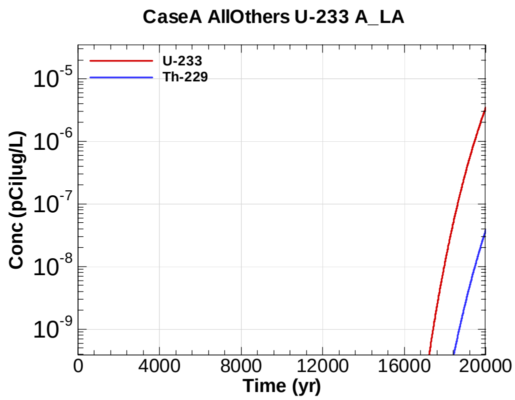

Figure E-2931 - 100m Aquifer Concentration for CaseA AllOthers U-233 A_LA

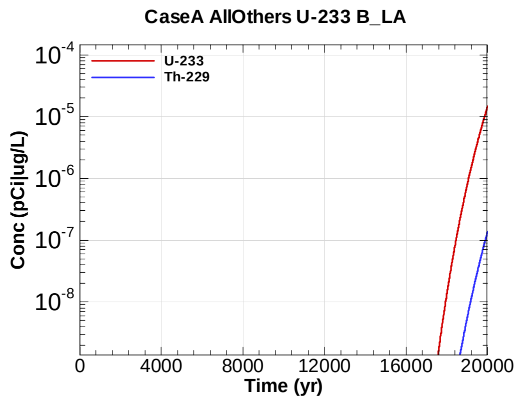

Figure E-2932 - 100m Aquifer Concentration for CaseA AllOthers U-233 B_LA

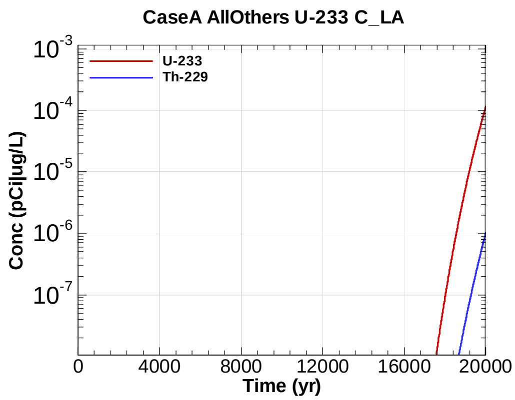

Figure E-2933 - 100m Aquifer Concentration for CaseA AllOthers U-233 C_LA

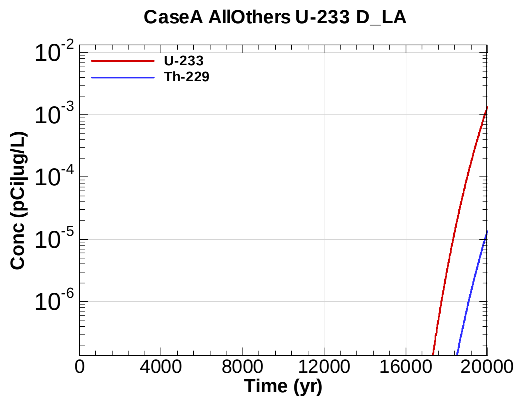

Figure E-2934 - 100m Aquifer Concentration for CaseA AllOthers U-233 D_LA

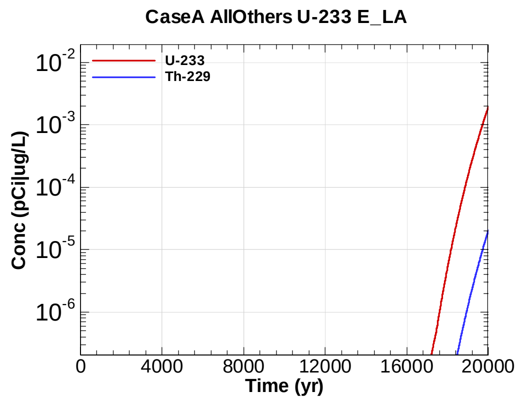

Figure E-2935 - 100m Aquifer Concentration for CaseA AllOthers U-233 E_LA

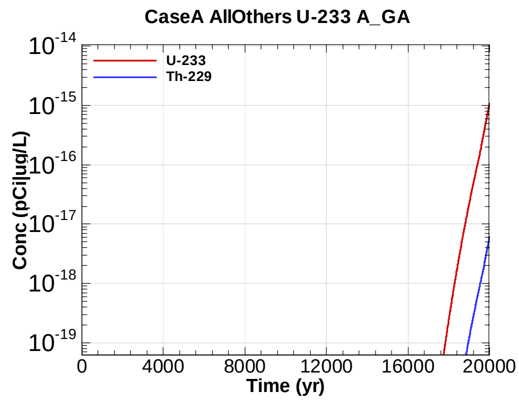

Figure E-2936 - 100m Aquifer Concentration for CaseA AllOthers U-233 A_GA

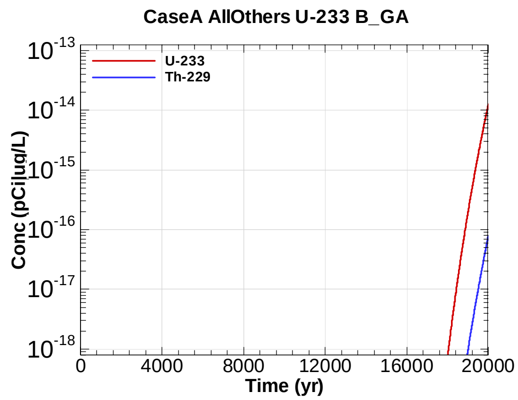

Figure E-2937 - 100m Aquifer Concentration for CaseA AllOthers U-233 B_GA

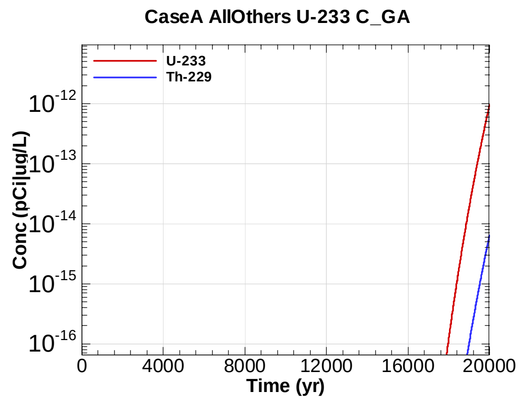

Figure E-2938 - 100m Aquifer Concentration for CaseA AllOthers U-233 C_GA

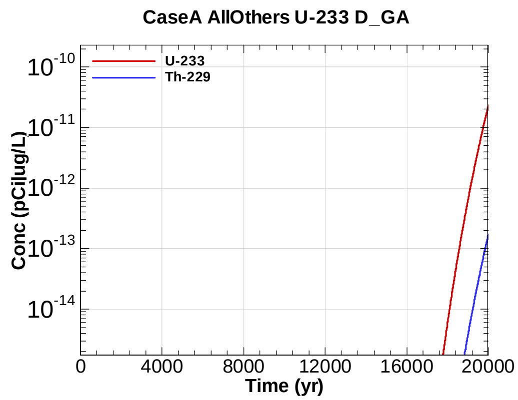

Figure E-2939 - 100m Aquifer Concentration for CaseA AllOthers U-233 D_GA

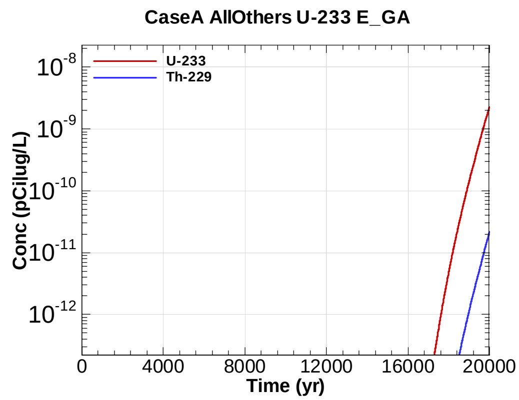

Figure E-2940 - 100m Aquifer Concentration for CaseA AllOthers U-233 E_GA

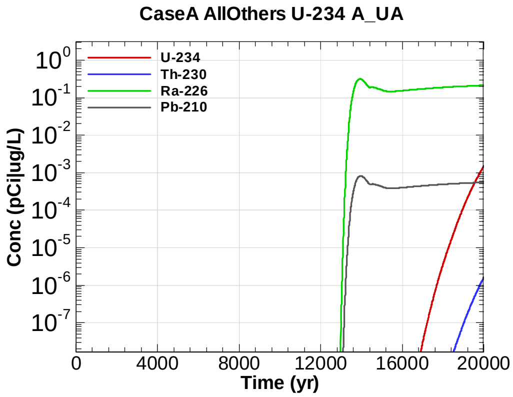

Figure E-2941 - 100m Aquifer Concentration for CaseA AllOthers U-234 A_UA

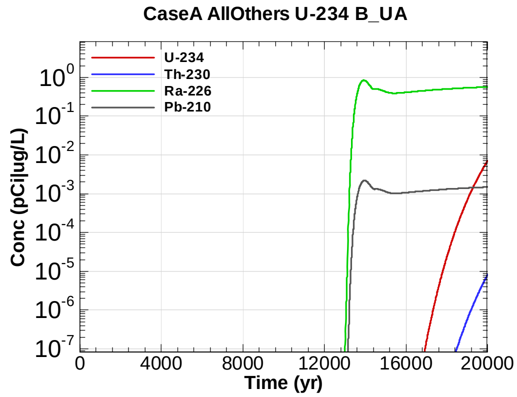

Figure E-2942 - 100m Aquifer Concentration for CaseA AllOthers U-234 B_UA

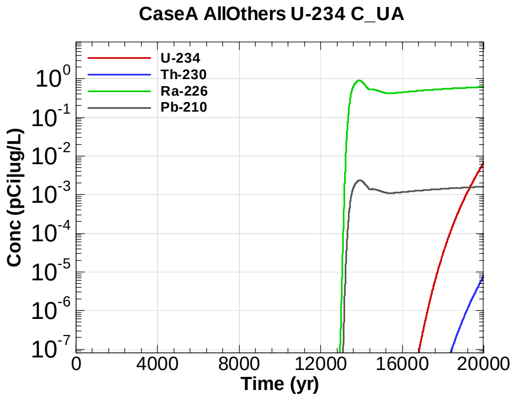

Figure E-2943 - 100m Aquifer Concentration for CaseA AllOthers U-234 C_UA

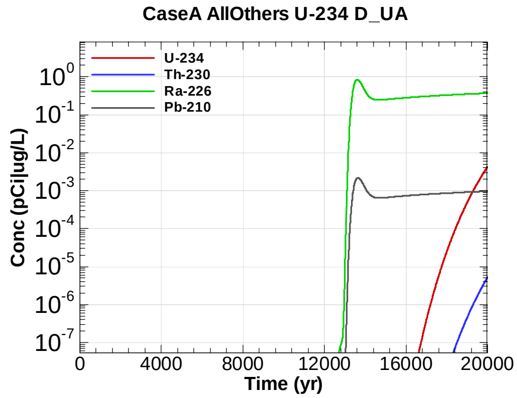

Figure E-2944 - 100m Aquifer Concentration for CaseA AllOthers U-234 D_UA

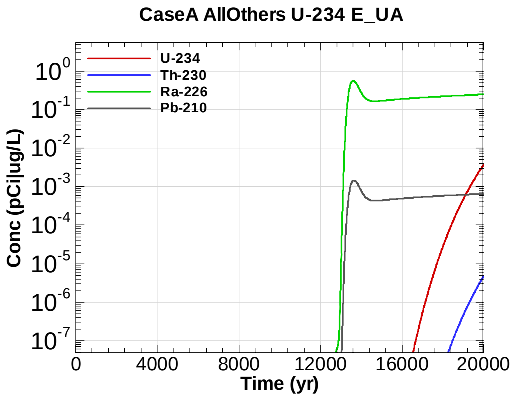

Figure E-2945 - 100m Aquifer Concentration for CaseA AllOthers U-234 E_UA

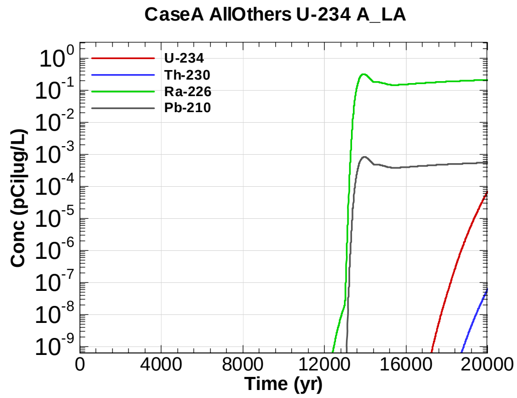

Figure E-2946 - 100m Aquifer Concentration for CaseA AllOthers U-234 A_LA

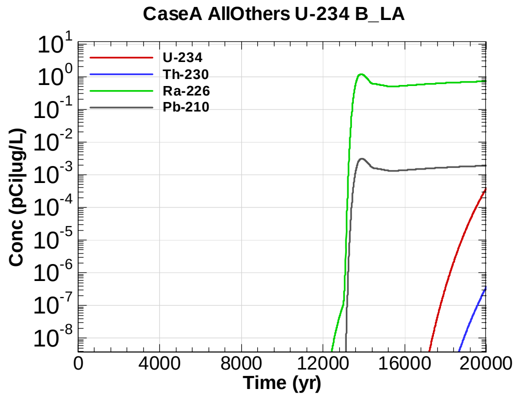

Figure E-2947 - 100m Aquifer Concentration for CaseA AllOthers U-234 B_LA

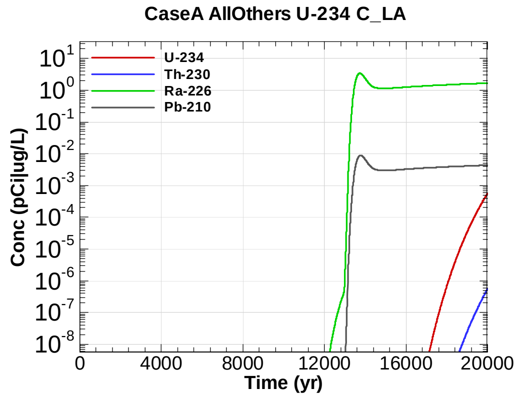

Figure E-2948 - 100m Aquifer Concentration for CaseA AllOthers U-234 C_LA

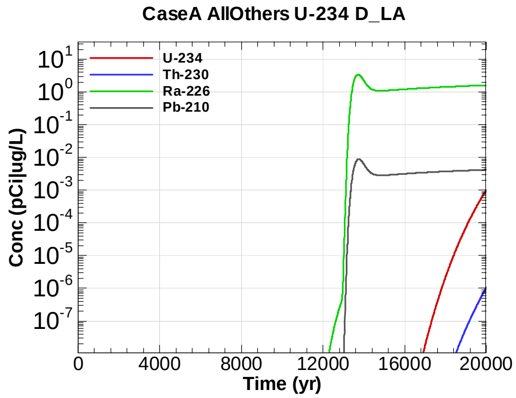

Figure E-2949 - 100m Aquifer Concentration for CaseA AllOthers U-234 D_LA

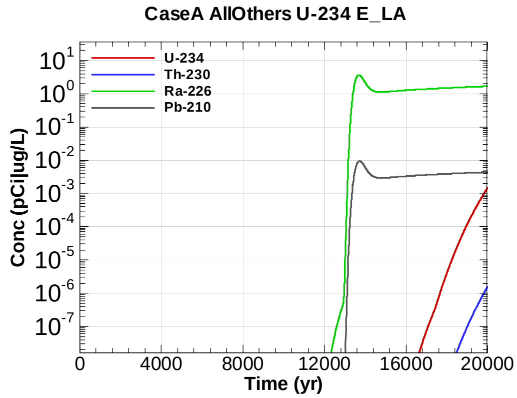

Figure E-2950 - 100m Aquifer Concentration for CaseA AllOthers U-234 E_LA

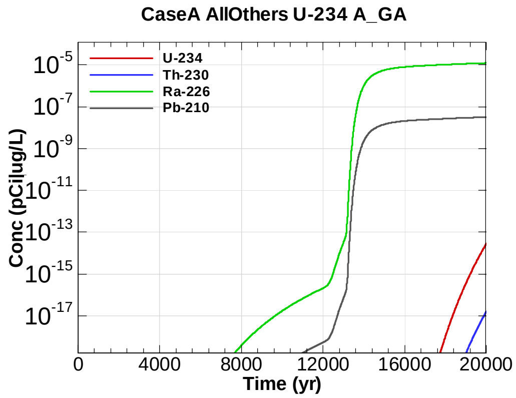

Figure E-2951 - 100m Aquifer Concentration for CaseA AllOthers U-234 A_GA

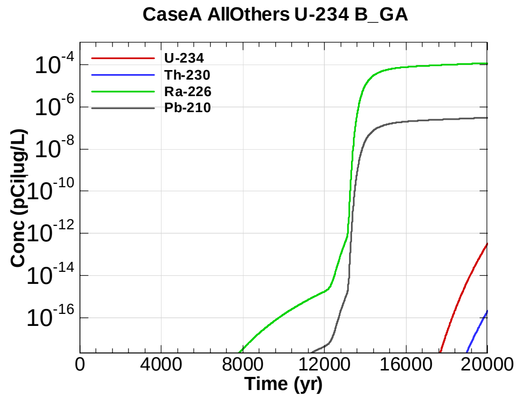

Figure E-2952 - 100m Aquifer Concentration for CaseA AllOthers U-234 B_GA

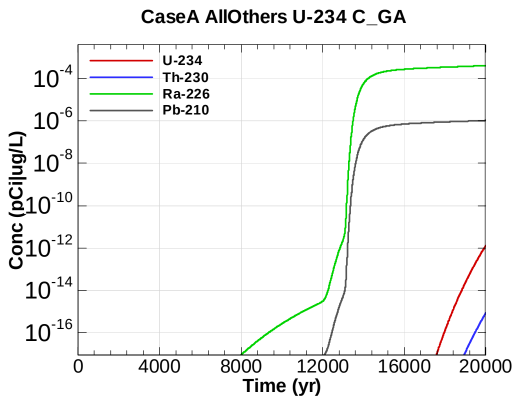

Figure E-2953 - 100m Aquifer Concentration for CaseA AllOthers U-234 C_GA

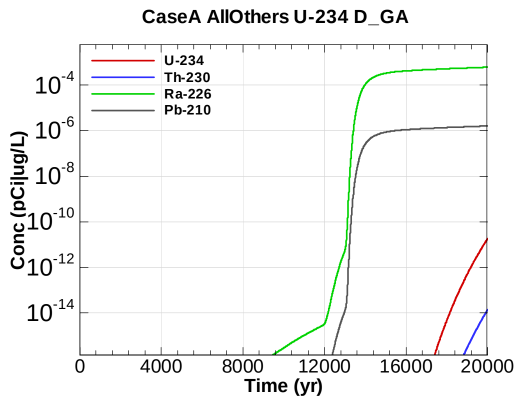

Figure E-2954 - 100m Aquifer Concentration for CaseA AllOthers U-234 D_GA

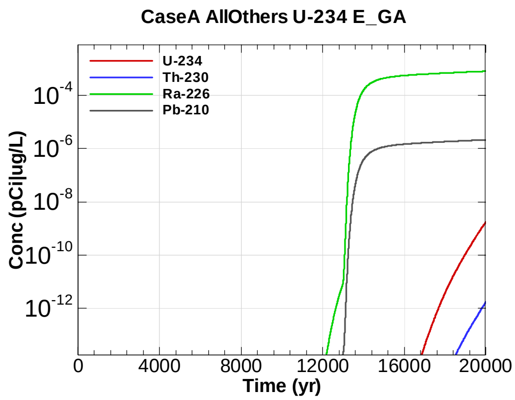

Figure E-2955 - 100m Aquifer Concentration for CaseA AllOthers U-234 E_GA

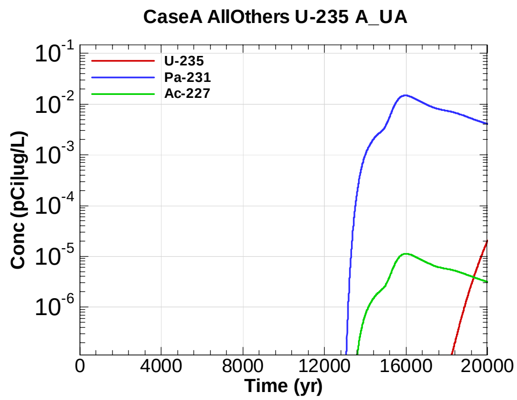

Figure E-2956 - 100m Aquifer Concentration for CaseA AllOthers U-235 A_UA

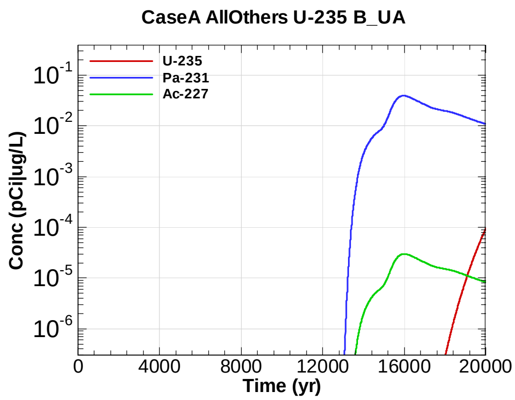

Figure E-2957 - 100m Aquifer Concentration for CaseA AllOthers U-235 B_UA

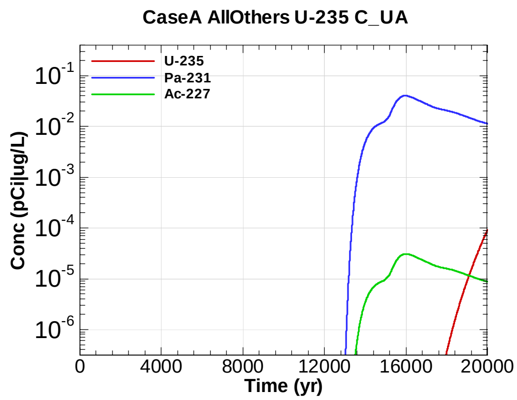

Figure E-2958 - 100m Aquifer Concentration for CaseA AllOthers U-235 C_UA

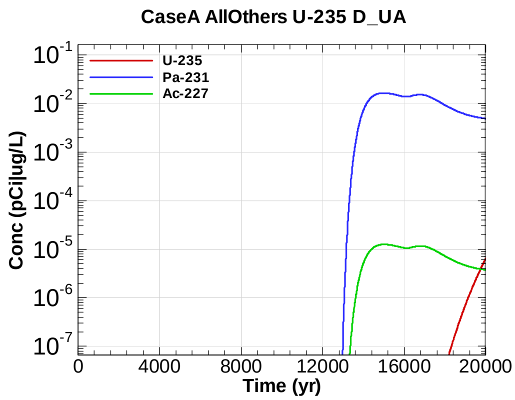

Figure E-2959 - 100m Aquifer Concentration for CaseA AllOthers U-235 D_UA

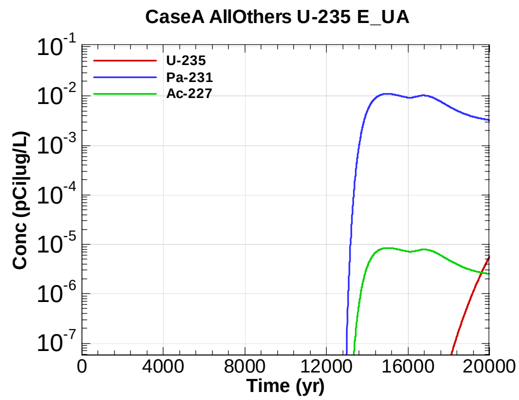

Figure E-2960 - 100m Aquifer Concentration for CaseA AllOthers U-235 E_UA

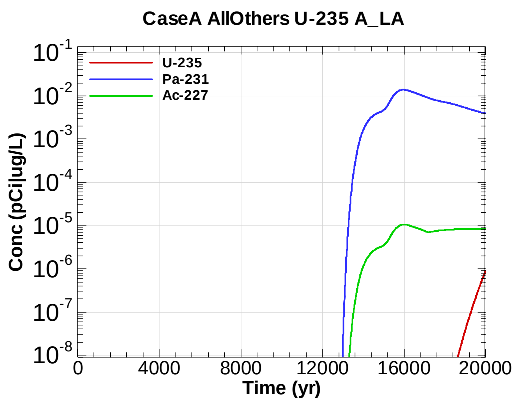

Figure E-2961 - 100m Aquifer Concentration for CaseA AllOthers U-235 A_LA

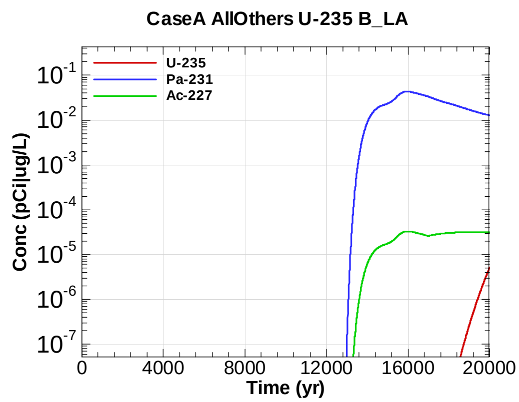

Figure E-2962 - 100m Aquifer Concentration for CaseA AllOthers U-235 B_LA

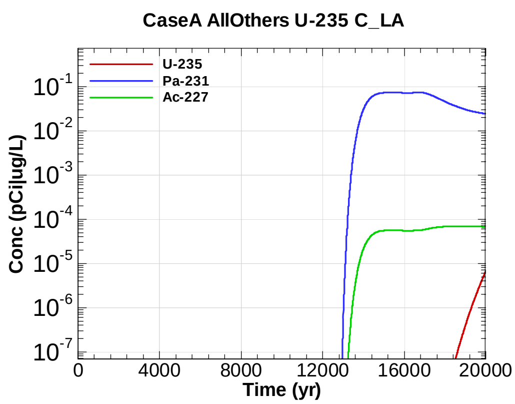

Figure E-2963 - 100m Aquifer Concentration for CaseA AllOthers U-235 C_LA

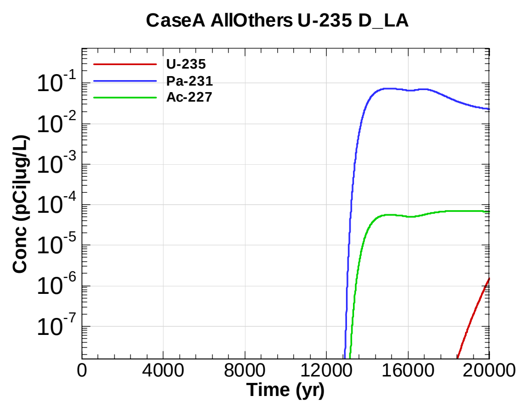

Figure E-2964 - 100m Aquifer Concentration for CaseA AllOthers U-235 D_LA

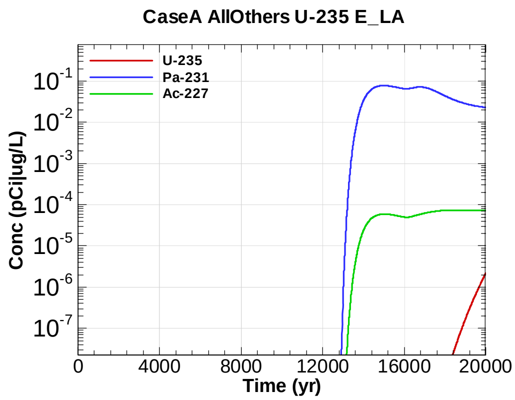

Figure E-2965 - 100m Aquifer Concentration for CaseA AllOthers U-235 E_LA

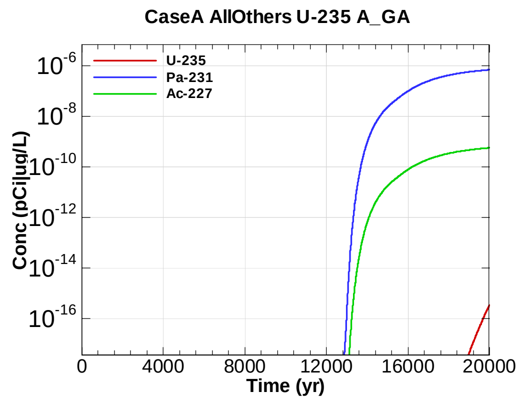

Figure E-2966 - 100m Aquifer Concentration for CaseA AllOthers U-235 A_GA

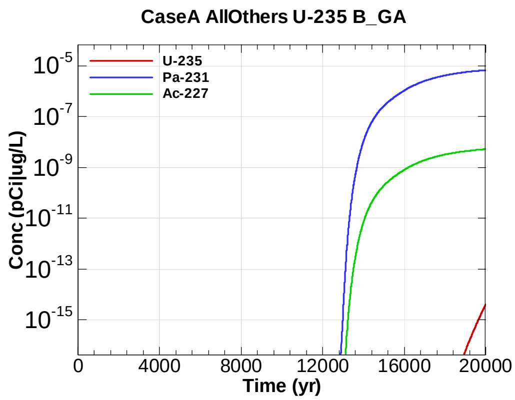

Figure E-2967 - 100m Aquifer Concentration for CaseA AllOthers U-235 B_GA

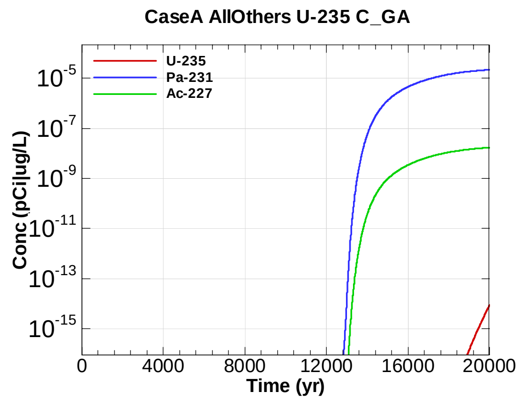

Figure E-2968 - 100m Aquifer Concentration for CaseA AllOthers U-235 C_GA

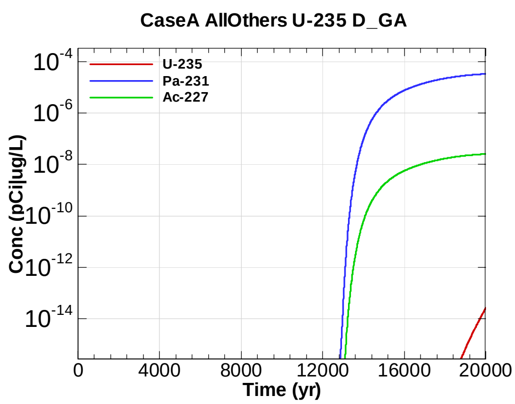

Figure E-2969 - 100m Aquifer Concentration for CaseA AllOthers U-235 D_GA

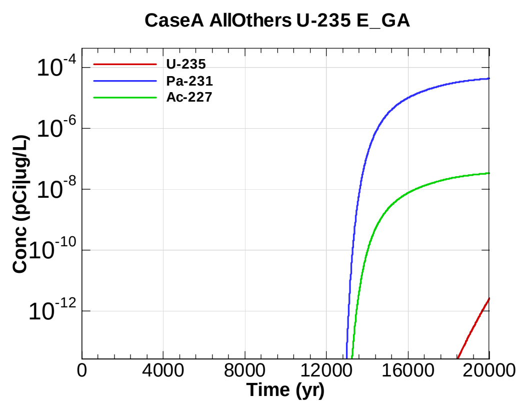

Figure E-2970 - 100m Aquifer Concentration for CaseA AllOthers U-235 E_GA

Appendix F.1
COMPARISON OF SEEPLINE PEAK CONCENTRATIONS

Appendix F.1 is a comparison of sensitivity run radionuclide peak concentrations at the seepline. The concentrations are for the Base Case (Case/Configuration A).

<u>Key</u>

UTR = Upper Three Runs
FMB = Fourmile Branch

Table F.1-1: Sensitivity Run Radionuclide Peak Concentrations FMB Seepline Comparisons

Nuclide	20,000 Years Fourmile Branch (pCi/L)	UTR-Upper Sector A - 100 Meter (pCi/L)	Fourmile Branch/ Sector A	UTR-Upper Sector B - 100 Meter (pCi/L)	Fourmile Branch/ Sector B
Am-241	2.69E-27	1.68E-15	N/A	3.47E-12	N/A
Am-243	5.94E-16	9.39E-17	N/A	1.90E-13	N/A
C-14	4.58E+00	6.85E+01	6.7%	1.38E+02	3.3%
Cm-244	8.33E-82	6.02E-85	N/A	9.80E-83	N/A
Cs-135	3.35E+00	3.91E+01	8.6%	3.88E+01	8.6%
I-129	1.20E-01	8.60E-01	14.0%	1.68E+00	7.1%
Np-237	1.15E+00	5.72E+00	20.1%	4.29E+00	26.7%
Pa-231	9.90E-03	6.24E-02	15.9%	1.26E-01	7.9%
Pu-238	1.93E-41	1.26E-33	N/A	2.33E-34	N/A
Pu-239	3.33E-06	7.85E-03	0.0%	2.14E-02	0.0%
Pu-240	4.07E-07	6.21E-04	0.1%	1.72E-03	0.0%
Ra-226	1.73E-01	1.25E+00	13.9%	2.45E+00	7.1%
Tc-99	5.39E+00	3.48E+01	15.5%	5.99E+01	9.0%
Th-229	8.40E-06	5.35E-04	1.6%	1.12E-03	0.8%
Th-230	1.19E-07	5.62E-05	0.2%	1.33E-04	0.1%
U-233	1.77E-04	1.04E-02	1.7%	1.66E-02	1.1%
U-234	2.56E-05	1.32E-02	0.2%	3.27E-02	0.1%
U-235	1.75E-07	1.15E-04	0.2%	3.29E-04	0.1%
		Average	**7.0%**	**Average**	**5.1%**

Note: N/A indicates Not Applicable because the concentrations are not significant.

Table F.1-2: Sensitivity Run Radionuclide Peak Concentrations UTR Seepline Comparisons

Nuclide	20,000 Years UTR Seepline (pCi/L)	UTR-Upper Sector C - 100 Meter (pCi/L)	UTR / Sector C	UTR-Upper Sector D - 100 Meter (pCi/L)	UTR / Sector D	UTR-Upper Sector E - 100 Meter (pCi/L)	UTR / Sector E
Am-241	1.37E-28	3.63E-05	N/A	4.90E-02	N/A	7.20E-03	N/A
Am-243	1.05E-18	2.21E-06	N/A	3.23E-03	N/A	4.62E-04	N/A
C-14	3.07E+00	1.34E+02	2.29%	2.17E+02	1.42%	1.21E+02	2.53%
Cm-244	6.16E-91	1.02E-65	N/A	6.69E-55	N/A	1.29E-56	N/A
Cs-135	2.15E+00	5.18E+01	4.15%	1.17E+02	1.83%	6.59E+01	3.26%
I-129	8.51E-02	1.62E+00	5.26%	5.54E-01	15.37%	3.08E-01	27.66%
Np-237	2.47E+00	7.97E+00	31.04%	1.52E+01	16.33%	2.24E+01	11.06%
Pa-231	1.03E-02	1.24E-01	8.35%	5.45E-02	18.97%	5.19E-02	19.94%
Pu-238	2.27E-45	5.06E-26	N/A	2.76E-21	N/A	9.85E-23	N/A
Pu-239	1.85E-06	1.13E-01	0.00%	9.50E-01	0.00%	7.67E-01	0.00%
Pu-240	1.49E-06	9.26E-02	0.00%	1.31E+00	0.00%	1.40E+00	0.00%
Ra-226	3.11E-01	2.54E+00	12.25%	2.98E+00	10.47%	3.33E+00	9.36%
Tc-99	5.86E+00	5.76E+01	10.17%	2.02E+02	2.89%	1.64E+02	3.57%
Th-229	1.18E-04	6.55E-02	0.18%	1.05E+00	0.01%	1.42E+00	0.01%
Th-230	7.60E-06	1.87E-03	0.41%	6.48E-02	0.01%	9.45E-02	0.01%
U-233	3.53E-03	5.81E-01	0.61%	1.05E+01	0.03%	1.50E+01	0.02%
U-234	2.02E-03	1.14E-01	1.77%	4.28E+00	0.05%	6.43E+00	0.03%
U-235	3.94E-06	1.07E-03	0.37%	1.45E-02	0.03%	1.90E-02	0.02%
		Average	**5.5%**	**Average**	**4.8%**	**Average**	**5.5%**

Note: N/A indicates Not Applicable because the concentrations are not significant.

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Appendix F.2
COMPARISON OF SENSITIVITY RUN RADIONUCLIDE CONCENTRATIONS AT VARIOUS AQUIFER DEPTHS

Appendix F.2 is a comparison of sensitivity run radionuclide peak concentrations at various aquifer depths in Sectors A, B, C, D, and E at 100 meters. The concentrations are for the Base Case (Case/Configuration A).

Key

UTR-U= Upper Three Runs – Upper Zone
UTR-L = Upper Three Runs – Lower Zone

Table F.2-1: Sensitivity Run Radionuclide Peak Concentrations Aquifer Comparisons, Sector A

Nuclide	UTR-Upper (pCi/L)	UTR-Lower (pCi/L)	Gordon (pCi/L)	UTR-L/UTR-U	Gordon/UTR-U
Am-241	1.68E-15	4.69E-18	7.59E-31	0.3%	0.000%
Am-243	9.39E-17	2.40E-19	3.88E-32	0.3%	0.000%
C-14	6.85E+01	6.19E+01	8.67E-06	90.3%	0.000%
Cm-244	6.02E-85	2.23E-92	9.67E-115	0.0%	0.000%
Cs-135	3.91E+01	4.41E+01	6.49E-05	112.8%	0.000%
I-129	8.60E-01	8.79E-01	1.29E-04	102.1%	0.015%
Np-237	5.72E+00	5.65E+00	4.27E-04	98.8%	0.007%
Pa-231	6.24E-02	6.41E-02	3.37E-06	102.7%	0.005%
Pu-238	1.26E-33	7.36E-37	5.05E-52	0.1%	0.000%
Pu-239	7.85E-03	1.51E-03	1.14E-13	19.2%	0.000%
Pu-240	6.21E-04	1.19E-04	9.01E-15	19.2%	0.000%
Ra-226	1.25E+00	1.31E+00	6.25E-05	104.6%	0.005%
Tc-99	3.48E+01	3.79E+01	2.16E-03	108.9%	0.006%
Th-229	5.35E-04	2.42E-04	1.01E-08	45.3%	0.002%
Th-230	5.62E-05	2.02E-05	1.62E-12	35.9%	0.000%
U-233	1.04E-02	6.17E-03	3.98E-07	59.5%	0.004%
U-234	1.32E-02	4.07E-03	6.93E-10	30.8%	0.000%
U-235	1.15E-04	4.18E-05	6.98E-12	36.4%	0.000%
			Average	**53.7%**	**0.003%**

Table F.2-2: Sensitivity Run Radionuclide Peak Concentrations Aquifer Comparisons, Sector B

Nuclide	UTR-Upper (pCi/L)	UTR-Lower (pCi/L)	Gordon (pCi/L)	UTR-L/UTR-U	Gordon/UTR-U
Am-241	3.47E-12	1.92E-14	1.21E-26	0.6%	0.000%
Am-243	1.90E-13	1.01E-15	6.32E-28	0.5%	0.000%
C-14	1.38E+02	1.18E+02	4.53E-05	85.3%	0.000%
Cm-244	9.80E-83	1.65E-90	3.05E-111	0.0%	0.000%
Cs-135	3.88E+01	5.44E+01	2.56E-04	140.4%	0.001%
I-129	1.68E+00	1.63E+00	6.59E-04	97.1%	0.039%
Np-237	4.29E+00	1.15E+01	1.75E-03	267.0%	0.041%
Pa-231	1.26E-01	1.30E-01	1.99E-05	103.6%	0.016%
Pu-238	2.33E-34	6.19E-37	3.28E-50	0.3%	0.000%
Pu-239	2.14E-02	5.82E-03	1.38E-12	27.2%	0.000%
Pu-240	1.72E-03	4.66E-04	1.11E-13	27.2%	0.000%
Ra-226	2.45E+00	2.90E+00	3.43E-04	118.4%	0.014%
Tc-99	5.99E+01	7.18E+01	1.20E-02	119.9%	0.020%
Th-229	1.12E-03	6.31E-04	4.46E-08	56.5%	0.004%
Th-230	1.33E-04	5.39E-05	1.28E-11	40.4%	0.000%
U-233	1.66E-02	1.37E-02	1.50E-06	82.6%	0.009%
U-234	3.27E-02	1.01E-02	4.76E-09	31.0%	0.000%
U-235	3.29E-04	1.04E-04	4.80E-11	31.6%	0.000%
			Average	**68.3%**	**0.008%**

Table F.2-3: Sensitivity Run Radionuclide Peak Concentrations Aquifer Comparisons, Sector C

Nuclide	UTR-Upper (pCi/L)	UTR-Lower (pCi/L)	Gordon (pCi/L)	UTR-L/UTR-U	Gordon/UTR-U
Am-241	3.63E-05	3.99E-07	5.60E-19	1.1%	0.000%
Am-243	2.21E-06	2.31E-08	3.13E-20	1.0%	0.000%
C-14	1.34E+02	1.36E+02	8.22E-05	101.5%	0.000%
Cm-244	1.02E-65	3.99E-74	3.20E-95	0.0%	0.000%
Cs-135	5.18E+01	1.40E+02	7.05E-04	270.8%	0.001%
I-129	1.62E+00	1.67E+00	1.20E-03	103.3%	0.074%
Np-237	7.97E+00	4.47E+01	6.24E-03	560.5%	0.078%
Pa-231	1.24E-01	1.92E-01	5.28E-05	155.1%	0.043%
Pu-238	5.06E-26	1.05E-28	2.72E-42	0.2%	0.000%
Pu-239	1.13E-01	5.26E-02	5.46E-11	46.6%	0.000%
Pu-240	9.26E-02	3.57E-02	1.54E-11	38.5%	0.000%
Ra-226	2.54E+00	7.60E+00	9.10E-04	299.1%	0.036%
Tc-99	5.76E+01	7.48E+01	2.01E-02	129.9%	0.035%
Th-229	6.55E-02	4.12E-02	1.90E-07	62.9%	0.000%
Th-230	1.87E-03	9.99E-04	4.21E-10	53.4%	0.000%
U-233	5.81E-01	3.60E-01	6.29E-06	61.9%	0.001%
U-234	1.14E-01	7.30E-02	1.09E-07	64.0%	0.000%
U-235	1.07E-03	6.71E-04	1.13E-09	62.7%	0.000%
			Average	**111.8%**	**0.015%**

Table F.2-4: Sensitivity Run Radionuclide Peak Concentrations Aquifer Comparisons, Sector D

Nuclide	UTR-Upper (pCi/L)	UTR-Lower (pCi/L)	Gordon (pCi/L)	UTR-L/UTR-U	Gordon/UTR-U
Am-241	4.90E-02	1.70E-03	6.50E-15	3.5%	0.000%
Am-243	3.23E-03	1.06E-04	3.80E-16	3.3%	0.000%
C-14	2.17E+02	1.77E+02	1.16E-04	81.9%	0.000%
Cm-244	6.69E-55	7.95E-64	3.58E-85	0.0%	0.000%
Cs-135	1.17E+02	1.39E+02	1.56E-03	118.4%	0.001%
I-129	5.54E-01	1.79E+00	1.47E-03	323.2%	0.266%
Np-237	1.52E+01	5.14E+01	1.20E-02	339.5%	0.079%
Pa-231	5.45E-02	1.91E-01	8.83E-05	350.3%	0.162%
Pu-238	2.76E-21	5.71E-24	9.42E-38	0.2%	0.000%
Pu-239	9.50E-01	7.34E-01	1.49E-09	77.2%	0.000%
Pu-240	1.31E+00	8.02E-01	1.37E-09	61.4%	0.000%
Ra-226	2.98E+00	8.90E+00	1.56E-03	299.0%	0.052%
Tc-99	2.02E+02	2.20E+02	2.55E-02	108.5%	0.013%
Th-229	1.05E+00	8.03E-01	1.64E-06	76.8%	0.000%
Th-230	6.48E-02	4.16E-02	3.79E-08	64.2%	0.000%
U-233	1.05E+01	7.43E+00	3.87E-05	70.6%	0.000%
U-234	4.28E+00	2.63E+00	7.40E-06	61.4%	0.000%
U-235	1.45E-02	1.07E-02	3.99E-08	73.7%	0.000%
			Average	**117.4%**	**0.032%**

Table F.2-5: Sensitivity Run Radionuclide Peak Concentrations Aquifer Comparisons, Sector E

Nuclide	UTR-Upper (pCi/L)	UTR-Lower (pCi/L)	Gordon (pCi/L)	UTR-L/UTR-U	Gordon/UTR-U
Am-241	7.20E-03	3.44E-04	4.72E-15	4.8%	0.000%
Am-243	4.62E-04	2.10E-05	2.70E-16	4.5%	0.000%
C-14	1.21E+02	1.49E+02	1.42E-04	123.1%	0.000%
Cm-244	1.29E-56	5.84E-64	5.43E-83	0.0%	0.000%
Cs-135	6.59E+01	1.25E+02	2.11E-03	188.9%	0.003%
I-129	3.08E-01	1.70E+00	1.74E-03	551.4%	0.566%
Np-237	2.24E+01	4.88E+01	1.65E-02	218.1%	0.074%
Pa-231	5.19E-02	1.92E-01	1.22E-04	370.7%	0.236%
Pu-238	9.85E-23	5.53E-25	7.25E-38	0.6%	0.000%
Pu-239	7.67E-01	7.18E-01	2.58E-09	93.6%	0.000%
Pu-240	1.40E+00	1.05E+00	3.10E-09	75.2%	0.000%
Ra-226	3.33E+00	9.56E+00	2.29E-03	287.3%	0.069%
Tc-99	1.64E+02	2.70E+02	3.15E-02	164.5%	0.019%
Th-229	1.42E+00	1.68E+00	5.86E-06	119.0%	0.000%
Th-230	9.45E-02	1.07E-01	2.81E-07	113.1%	0.000%
U-233	1.50E+01	1.67E+01	1.20E-04	111.3%	0.001%
U-234	6.43E+00	6.83E+00	4.57E-05	106.3%	0.001%
U-235	1.90E-02	1.78E-02	1.03E-07	93.5%	0.001%
			Average	**145.9%**	**0.054%**

Appendix G.1
1-METER RADIOLOGICAL AND CHEMICAL CONCENTRATIONS AT THE UPPER THREE RUNS AQUIFER – UPPER

Appendix G.1 contains curves showing the one-meter radiological and chemical concentrations for all of FTF (tank and ancillary inventories) for the Base Case (Case/Configuration A). 20,000 year concentration results are presented from the Upper Three Runs Aquifer-Upper Zone for Sectors A through D.

Graph heading example "CaseA All Ag 1A_UA"

Key

CaseA = scenario case/configuration
All = all FTF inventory source
Ag = radionuclide or chemical of concern
1A = One-meter. Sector of concern (see sector map with stream traces)
UA = aquifer of concern

- UA = Upper Three Runs – Upper Zone
- LA = Upper Three Runs – Lower Zone
- GA = Gordon

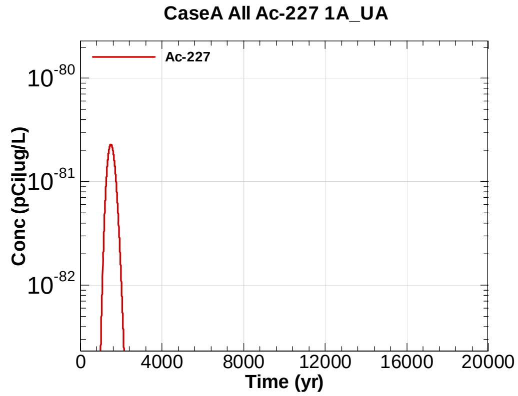

Figure G.1-1 - 1m Aquifer Concentration for CaseA All Ac-227 1A_UA

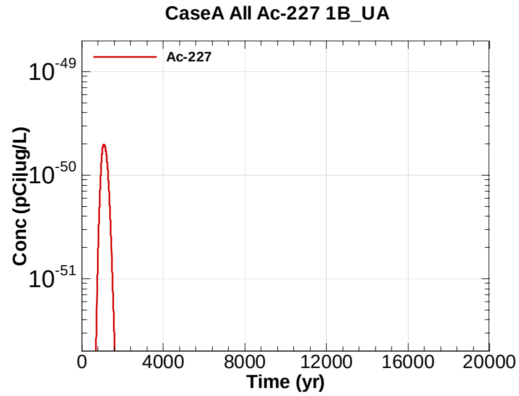

Figure G.1-2 - 1m Aquifer Concentration for CaseA All Ac-227 1B_UA

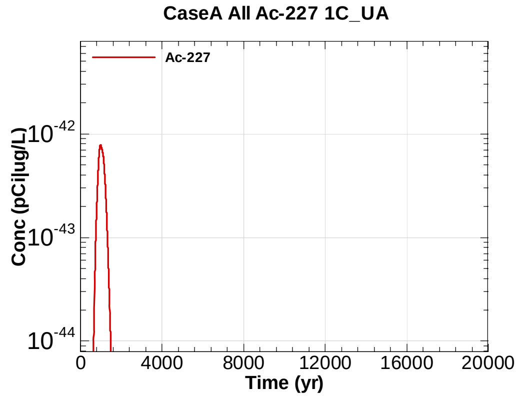

Figure G.1-3 - 1m Aquifer Concentration for CaseA All Ac-227 1C_UA

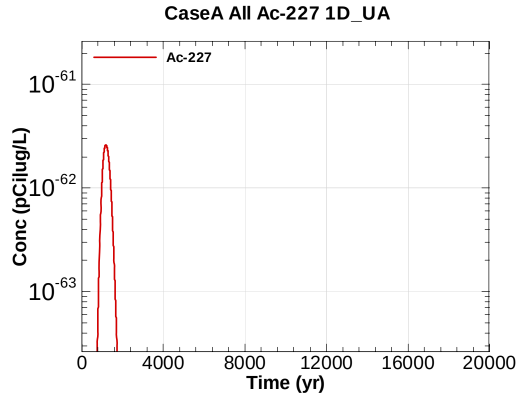

Figure G.1-4 - 1m Aquifer Concentration for CaseA All Ac-227 1D_UA

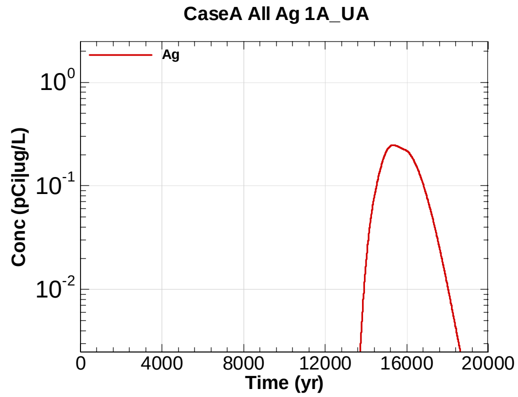

Figure G.1-5 - 1m Aquifer Concentration for CaseA All Ag 1A_UA

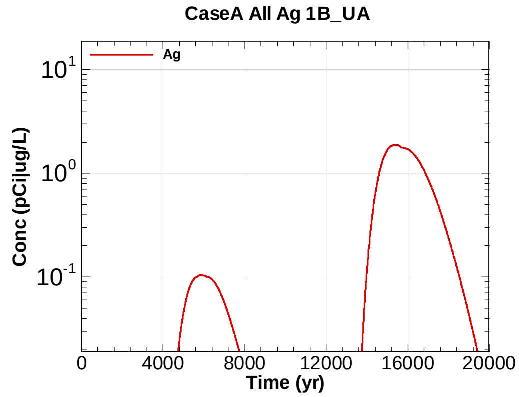

Figure G.1-6 - 1m Aquifer Concentration for CaseA All Ag 1B_UA

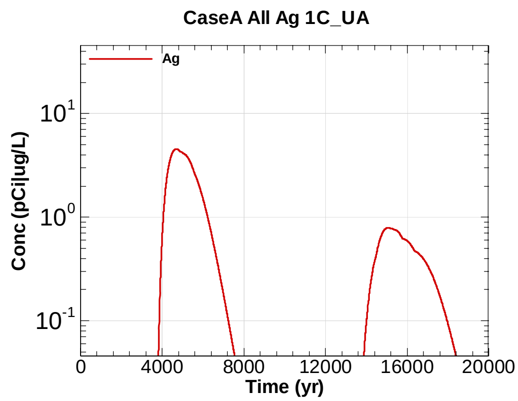

Figure G.1-7 - 1m Aquifer Concentration for CaseA All Ag 1C_UA

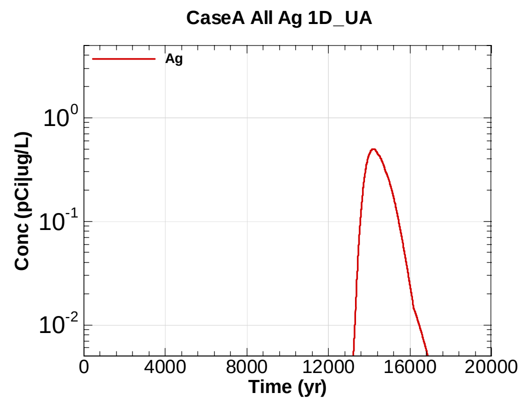

Figure G.1-8 - 1m Aquifer Concentration for CaseA All Ag 1D_UA

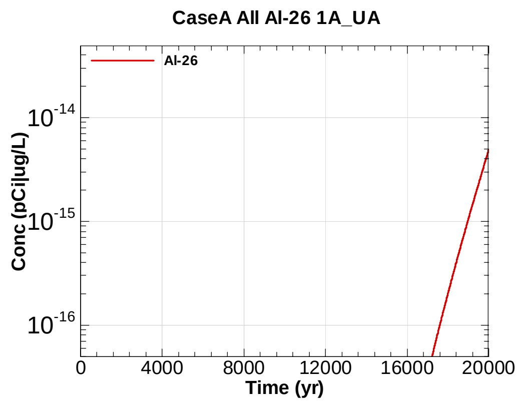

Figure G.1-9 - 1m Aquifer Concentration for CaseA All Al-26 1A_UA

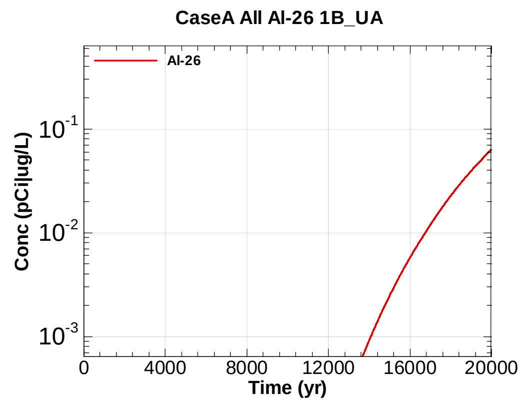

Figure G.1-10 - 1m Aquifer Concentration for CaseA All Al-26 1B_UA

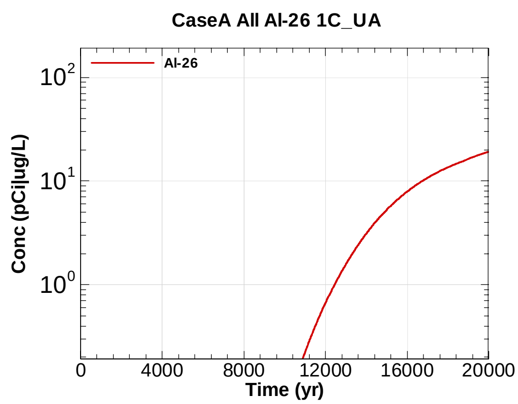

Figure G.1-11 - 1m Aquifer Concentration for CaseA All Al-26 1C_UA

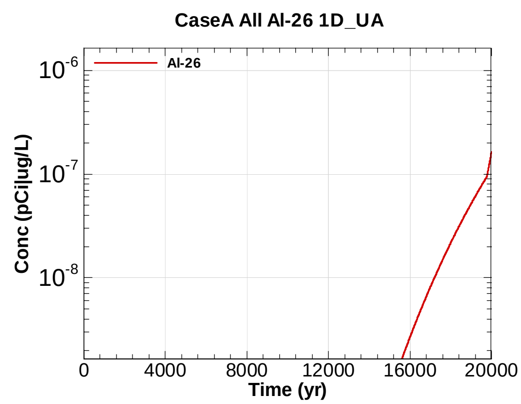

Figure G.1-12 - 1m Aquifer Concentration for CaseA All Al-26 1D_UA

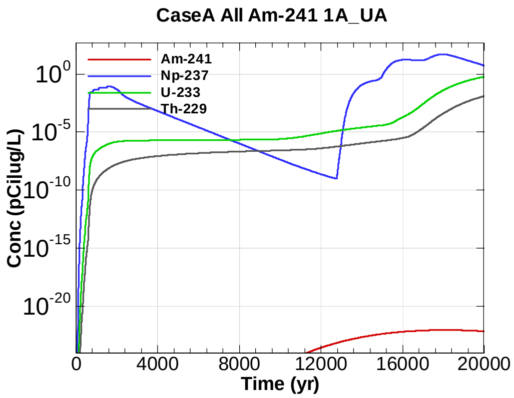

Figure G.1-13 - 1m Aquifer Concentration for CaseA All Am-241 1A_UA

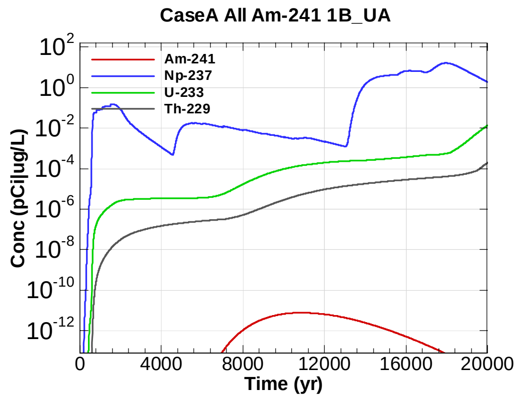

Figure G.1-14 - 1m Aquifer Concentration for CaseA All Am-241 1B_UA

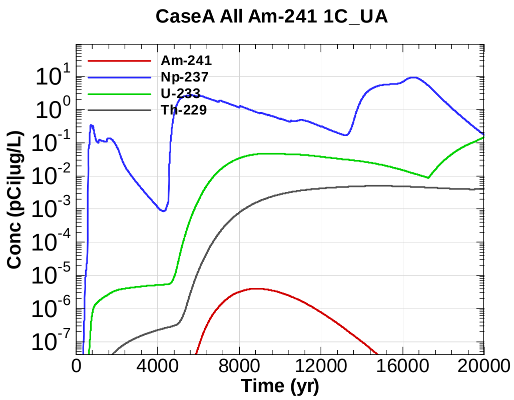

Figure G.1-15 - 1m Aquifer Concentration for CaseA All Am-241 1C_UA

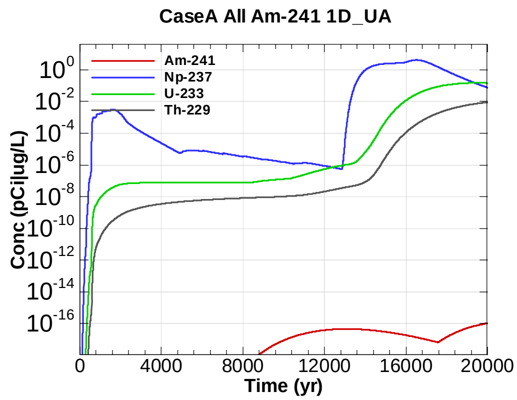

Figure G.1-16 - 1m Aquifer Concentration for CaseA All Am-241 1D_UA

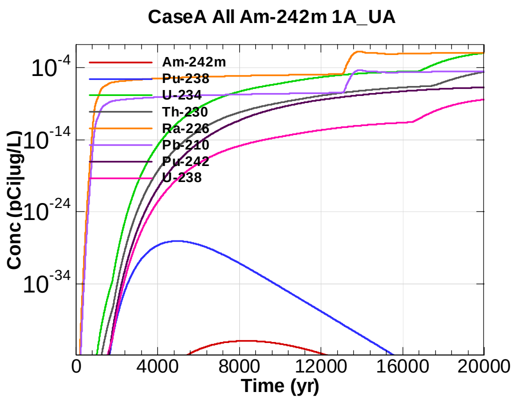

Figure G.1-17 - 1m Aquifer Concentration for CaseA All Am-242m 1A_UA

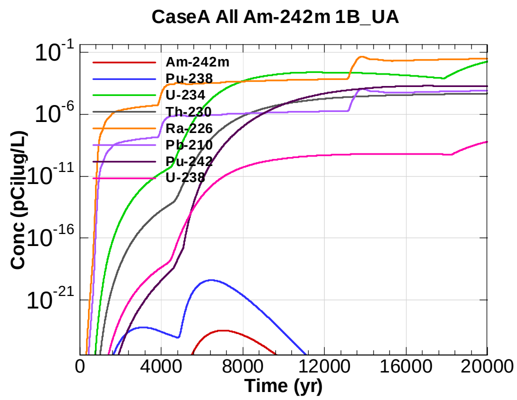

Figure G.1-18 - 1m Aquifer Concentration for CaseA All Am-242m 1B_UA

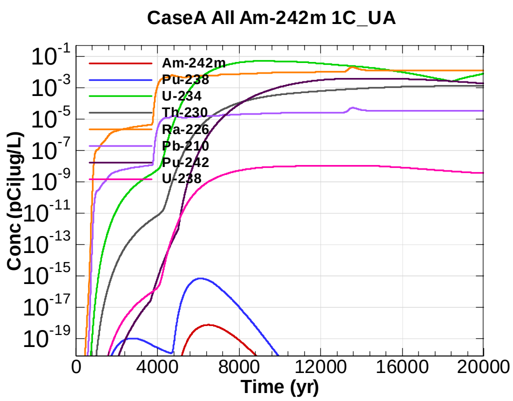

Figure G.1-19 - 1m Aquifer Concentration for CaseA All Am-242m 1C_UA

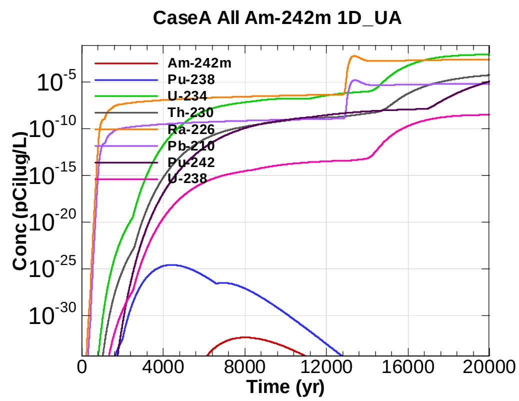

Figure G.1-20 - 1m Aquifer Concentration for CaseA All Am-242m 1D_UA

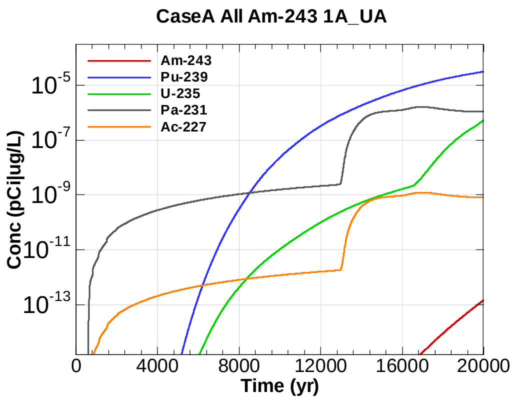

Figure G.1-21 - 1m Aquifer Concentration for CaseA All Am-243 1A_UA

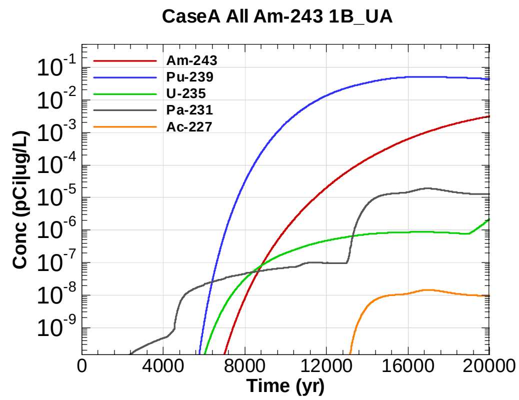

Figure G.1-22 - 1m Aquifer Concentration for CaseA All Am-243 1B_UA

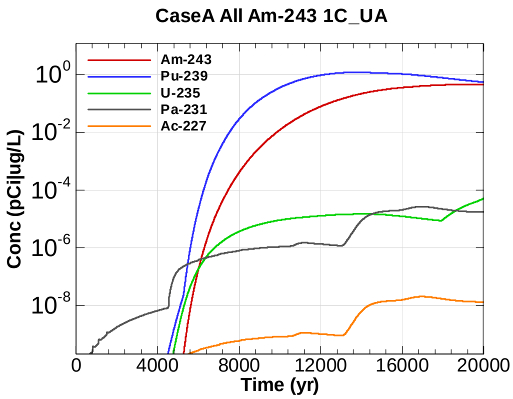

Figure G.1-23 - 1m Aquifer Concentration for CaseA All Am-243 1C_UA

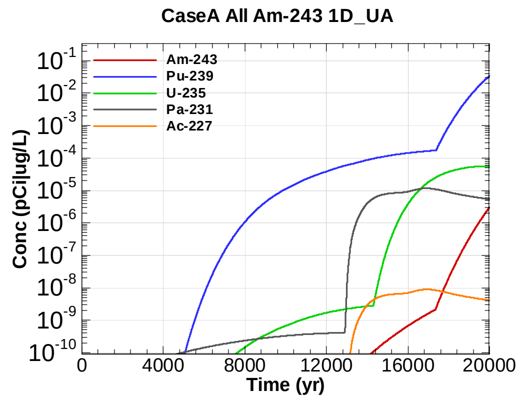

Figure G.1-24 - 1m Aquifer Concentration for CaseA All Am-243 1D_UA

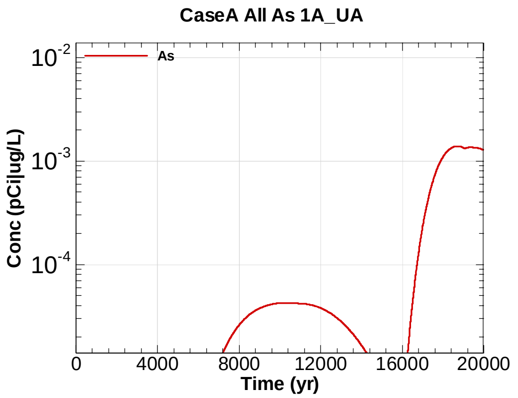

Figure G.1-25 - 1m Aquifer Concentration for CaseA All As 1A_UA

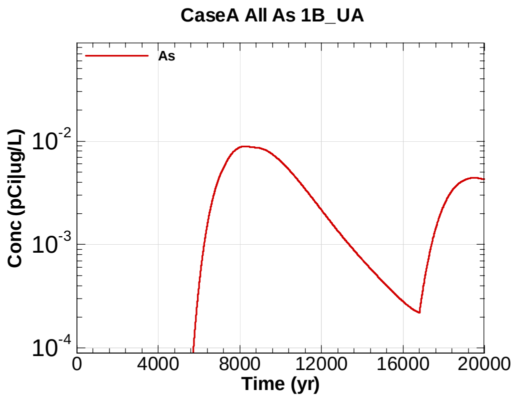

Figure G.1-26 - 1m Aquifer Concentration for CaseA All As 1B_UA

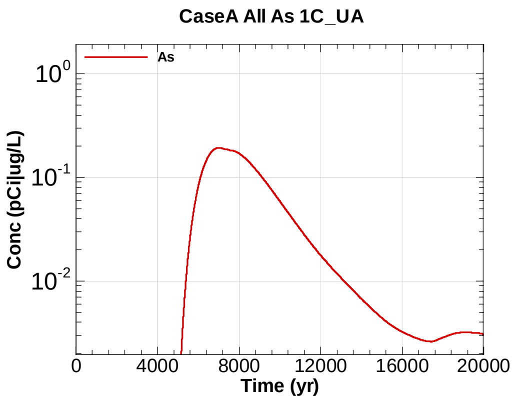

Figure G.1-27 - 1m Aquifer Concentration for CaseA All As 1C_UA

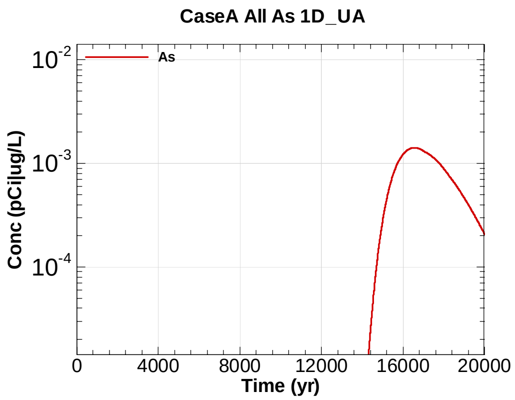

Figure G.1-28 - 1m Aquifer Concentration for CaseA All As 1D_UA

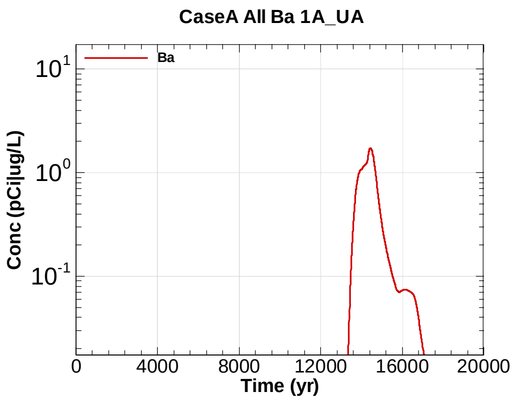

Figure G.1-29 - 1m Aquifer Concentration for CaseA All Ba 1A_UA

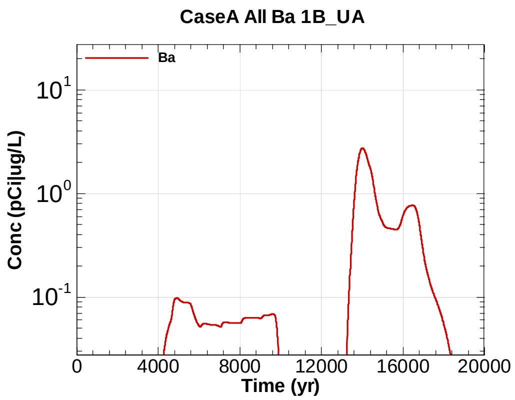

Figure G.1-30 - 1m Aquifer Concentration for CaseA All Ba 1B_UA

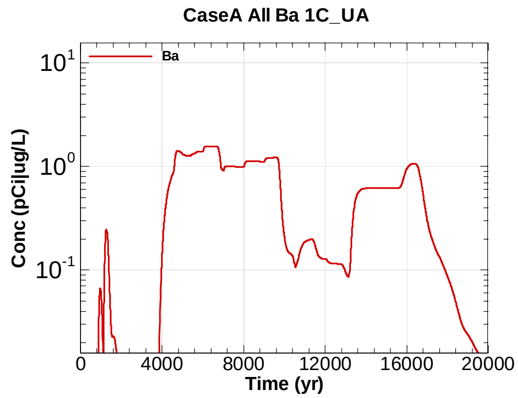

Figure G.1-31 - 1m Aquifer Concentration for CaseA All Ba 1C_UA

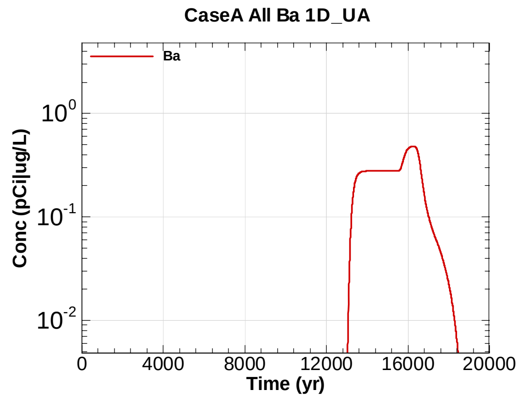

Figure G.1-32 - 1m Aquifer Concentration for CaseA All Ba 1D_UA

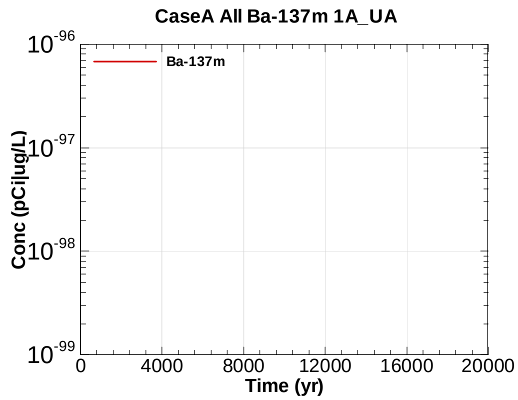

Figure G.1-33 - 1m Aquifer Concentration for CaseA All Ba-137m 1A_UA

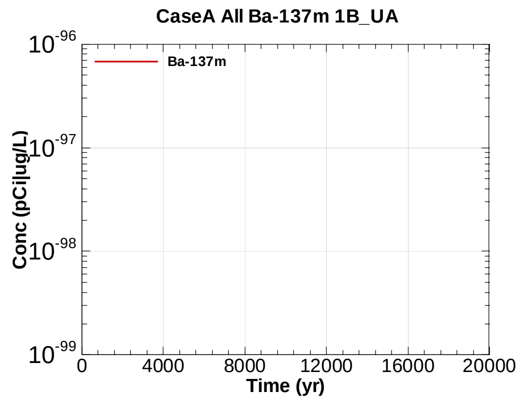

Figure G.1-34 - 1m Aquifer Concentration for CaseA All Ba-137m 1B_UA

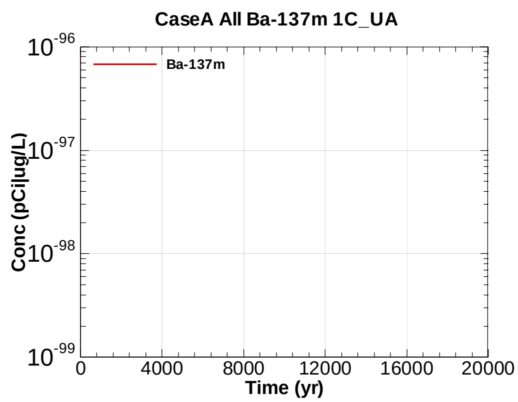

Figure G.1-35 - 1m Aquifer Concentration for CaseA All Ba-137m 1C_UA

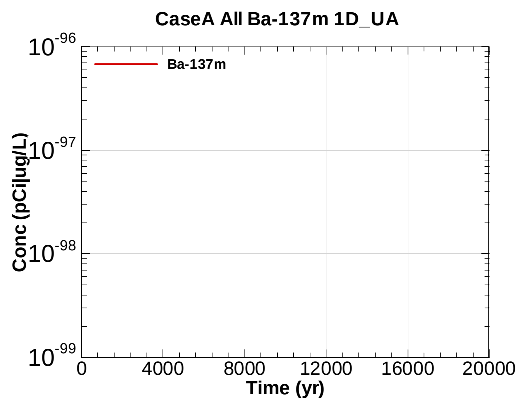

Figure G.1-36 - 1m Aquifer Concentration for CaseA All Ba-137m 1D_UA

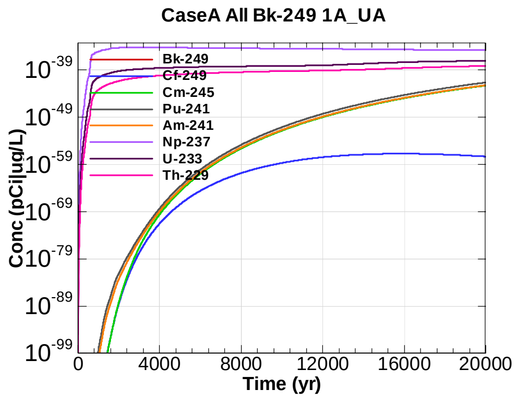

Figure G.1-37 - 1m Aquifer Concentration for CaseA All Bk-249 1A_UA

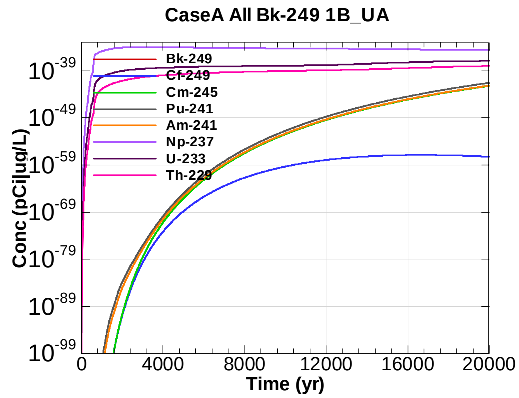

Figure G.1-38 - 1m Aquifer Concentration for CaseA All Bk-249 1B_UA

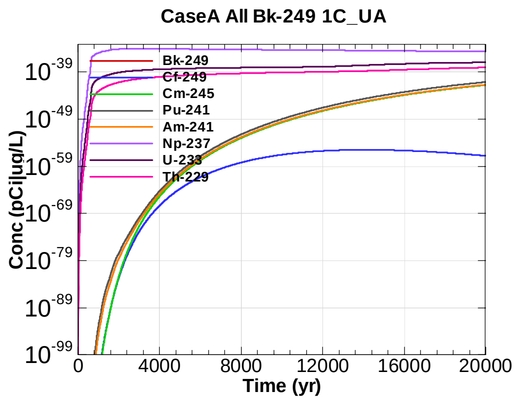

Figure G.1-39 - 1m Aquifer Concentration for CaseA All Bk-249 1C_UA

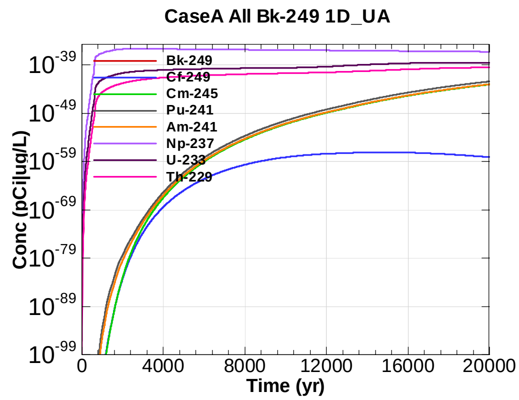

Figure G.1-40 - 1m Aquifer Concentration for CaseA All Bk-249 1D_UA

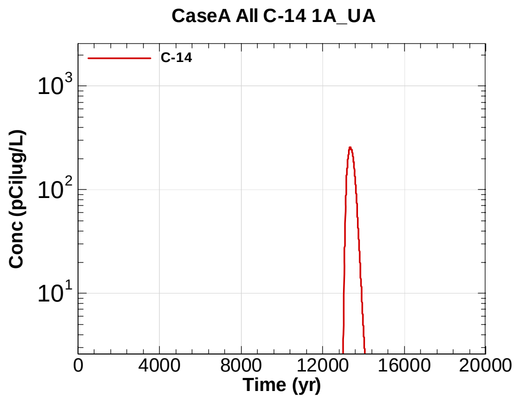

Figure G.1-41 - 1m Aquifer Concentration for CaseA All C-14 1A_UA

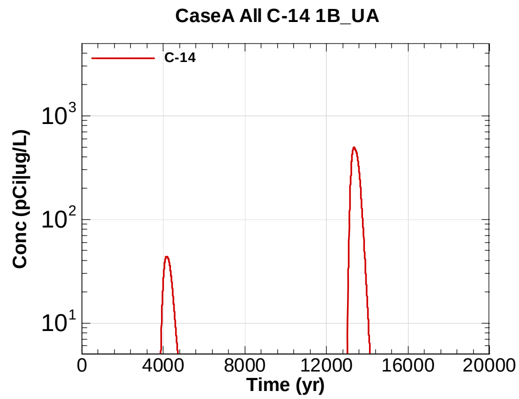

Figure G.1-42 - 1m Aquifer Concentration for CaseA All C-14 1B_UA

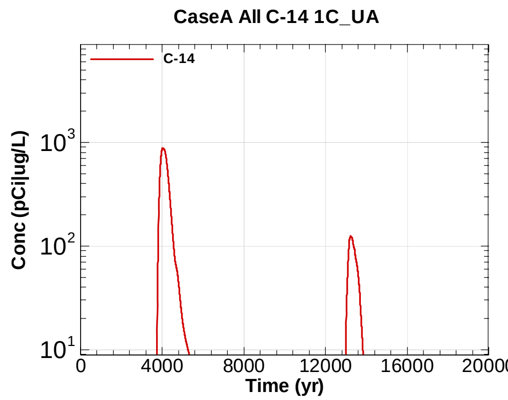

Figure G.1-43 - 1m Aquifer Concentration for CaseA All C-14 1C_UA

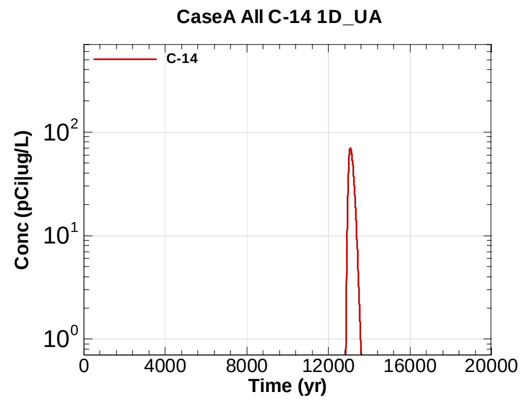

Figure G.1-44 - 1m Aquifer Concentration for CaseA All C-14 1D_UA

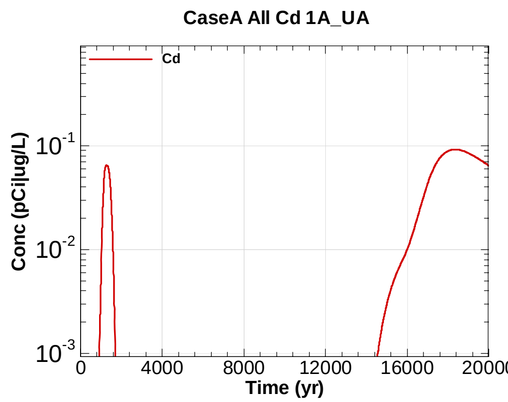

Figure G.1-45 - 1m Aquifer Concentration for CaseA All Cd 1A_UA

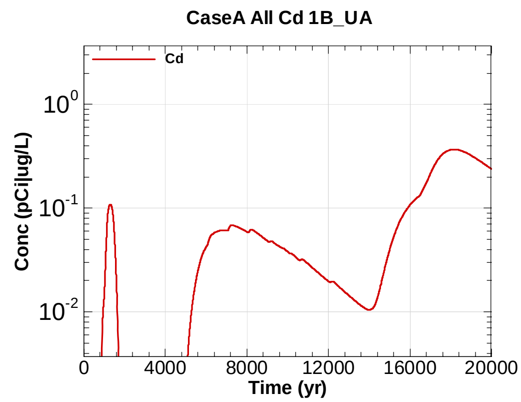

Figure G.1-46 - 1m Aquifer Concentration for CaseA All Cd 1B_UA

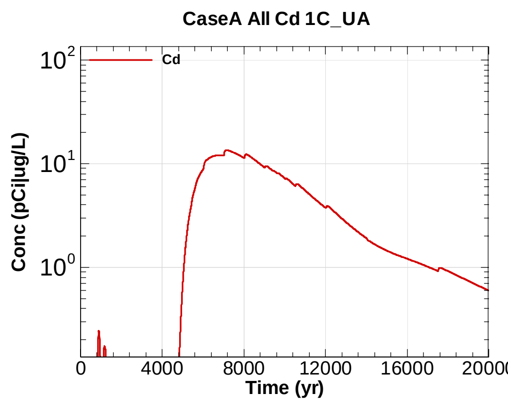

Figure G.1-47 - 1m Aquifer Concentration for CaseA All Cd 1C_UA

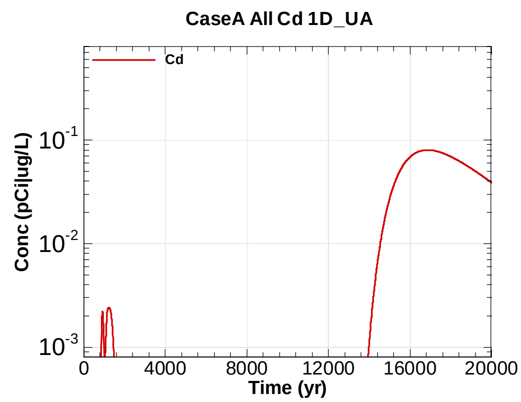

Figure G.1-48 - 1m Aquifer Concentration for CaseA All Cd 1D_UA

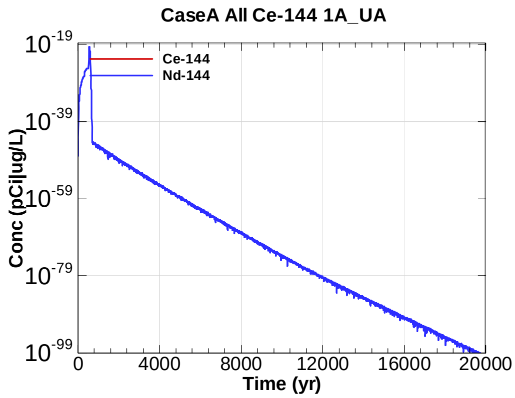

Figure G.1-49 - 1m Aquifer Concentration for CaseA All Ce-144 1A_UA

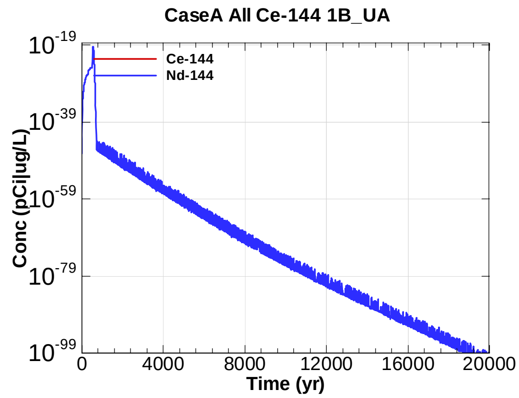

Figure G.1-50 - 1m Aquifer Concentration for CaseA All Ce-144 1B_UA

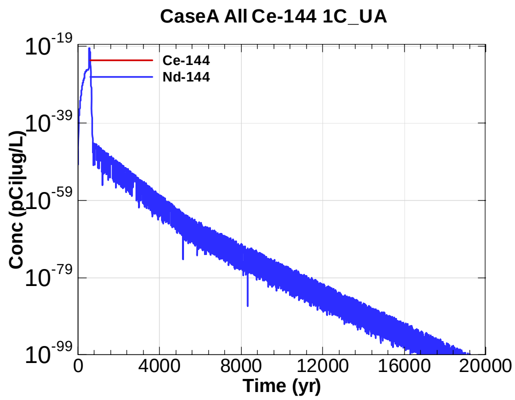

Figure G.1-51 - 1m Aquifer Concentration for CaseA All Ce-144 1C_UA

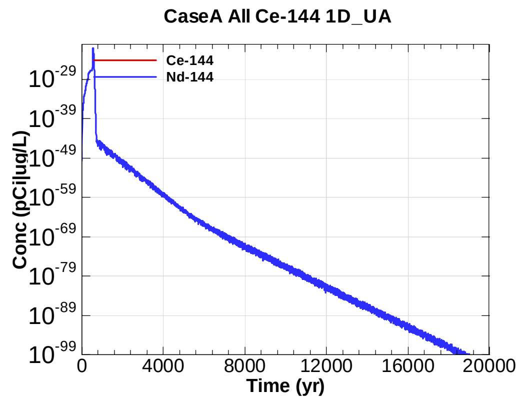

Figure G.1-52 - 1m Aquifer Concentration for CaseA All Ce-144 1D_UA

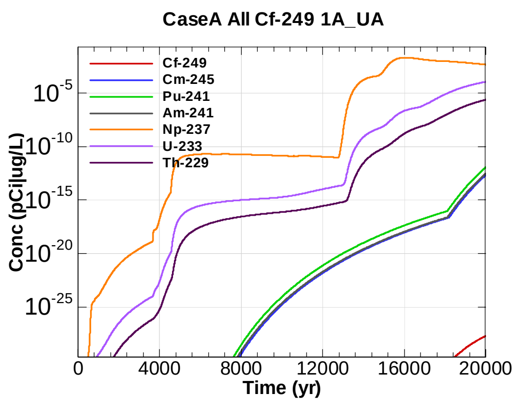

Figure G.1-53 - 1m Aquifer Concentration for CaseA All Cf-249 1A_UA

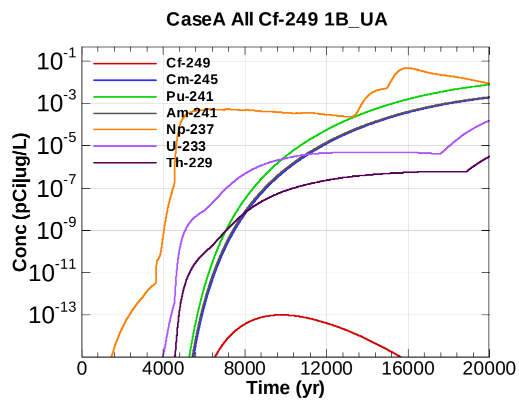

Figure G.1-54 - 1m Aquifer Concentration for CaseA All Cf-249 1B_UA

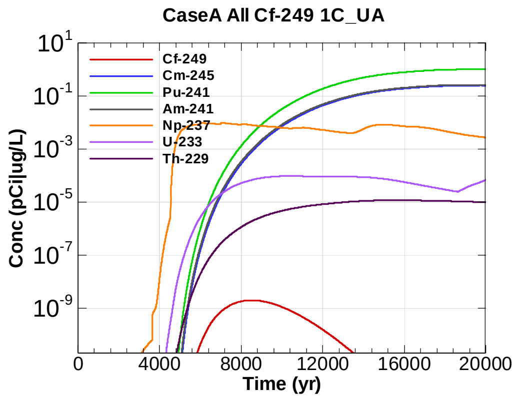

Figure G.1-55 - 1m Aquifer Concentration for CaseA All Cf-249 1C_UA

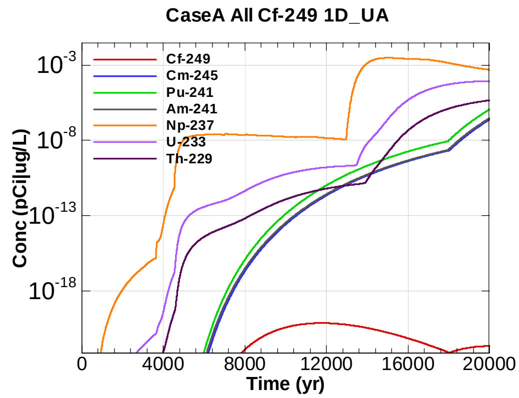

Figure G.1-56 - 1m Aquifer Concentration for CaseA All Cf-249 1D_UA

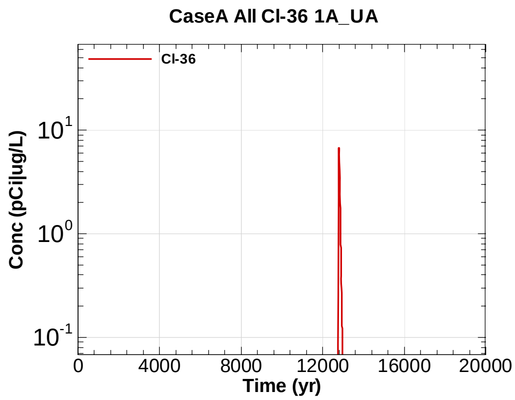

Figure G.1-57 - 1m Aquifer Concentration for CaseA All Cl-36 1A_UA

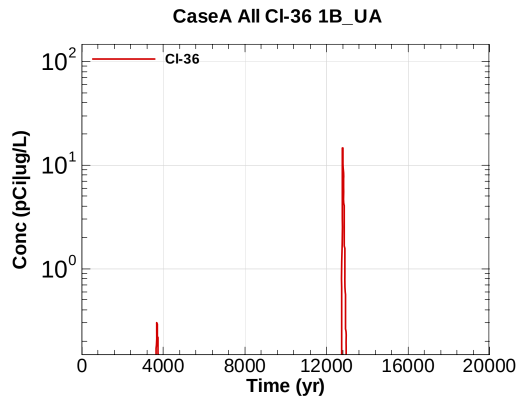

Figure G.1-58 - 1m Aquifer Concentration for CaseA All Cl-36 1B_UA

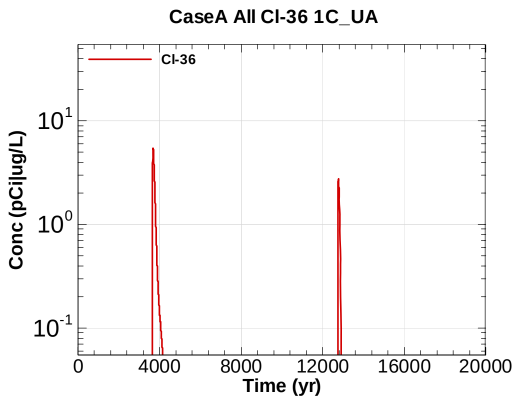

Figure G.1-59 - 1m Aquifer Concentration for CaseA All Cl-36 1C_UA

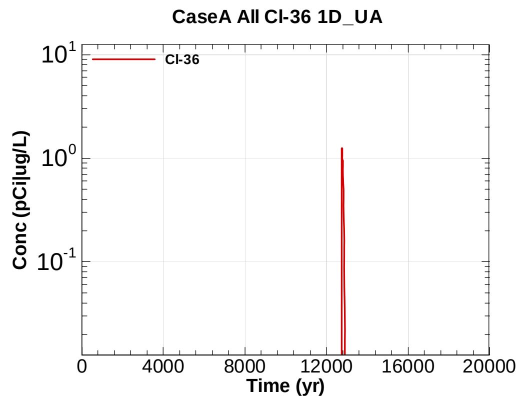

Figure G.1-60 - 1m Aquifer Concentration for CaseA All Cl-36 1D_UA

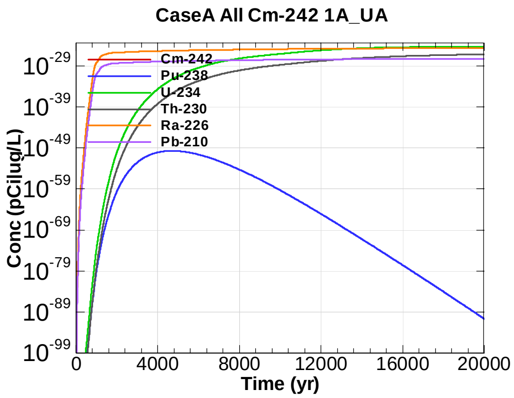

Figure G.1-61 - 1m Aquifer Concentration for CaseA All Cm-242 1A_UA

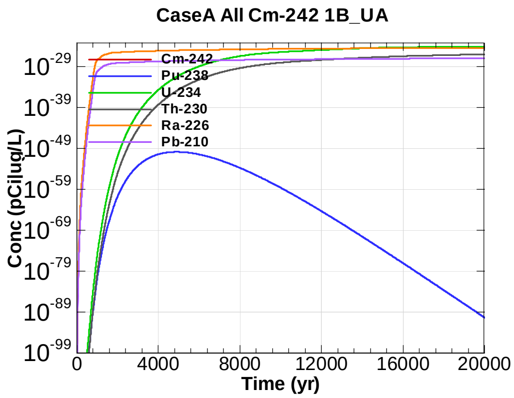

Figure G.1-62 - 1m Aquifer Concentration for CaseA All Cm-242 1B_UA

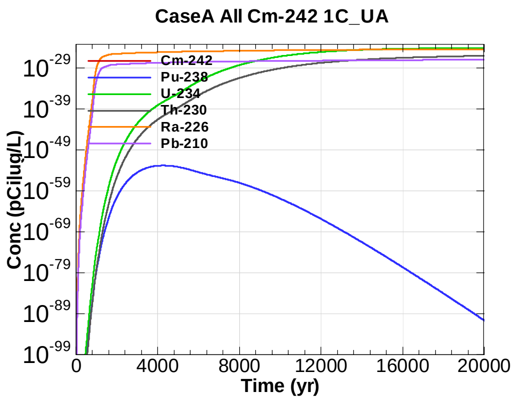

Figure G.1-63 - 1m Aquifer Concentration for CaseA All Cm-242 1C_UA

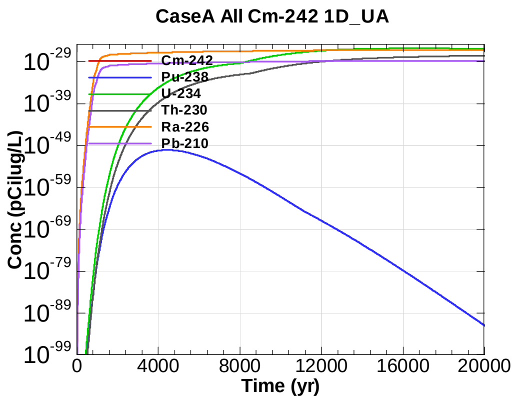

Figure G.1-64 - 1m Aquifer Concentration for CaseA All Cm-242 1D_UA

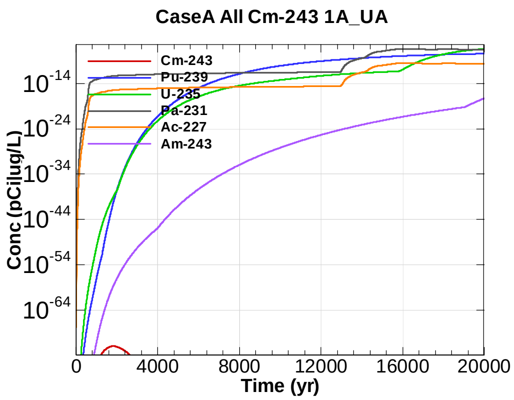

Figure G.1-65 - 1m Aquifer Concentration for CaseA All Cm-243 1A_UA

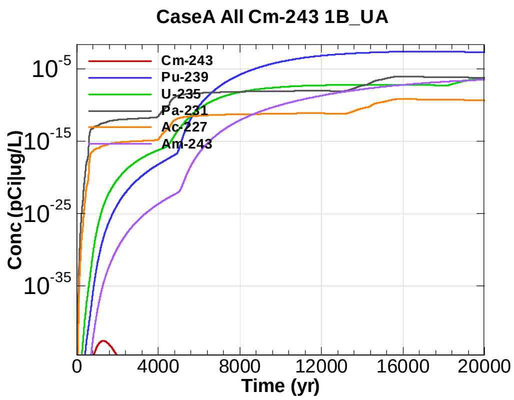

Figure G.1-66 - 1m Aquifer Concentration for CaseA All Cm-243 1B_UA

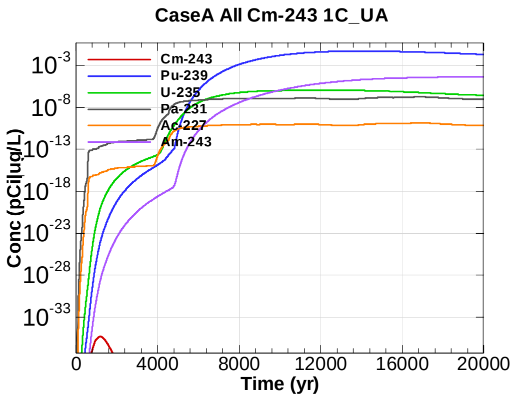

Figure G.1-67 - 1m Aquifer Concentration for CaseA All Cm-243 1C_UA

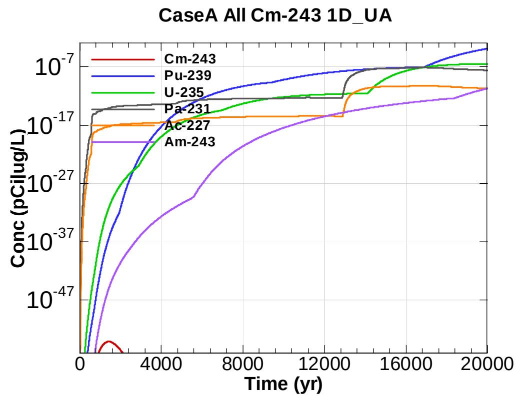

Figure G.1-68 - 1m Aquifer Concentration for CaseA All Cm-243 1D_UA

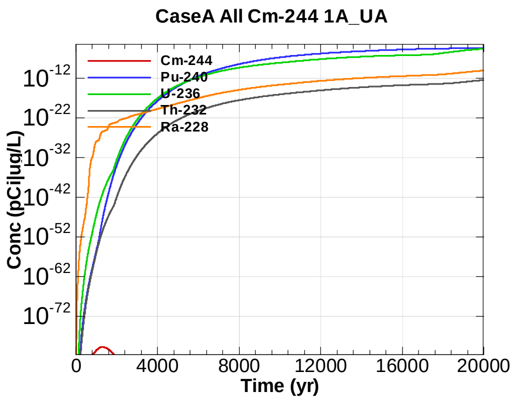

Figure G.1-69 - 1m Aquifer Concentration for CaseA All Cm-244 1A_UA

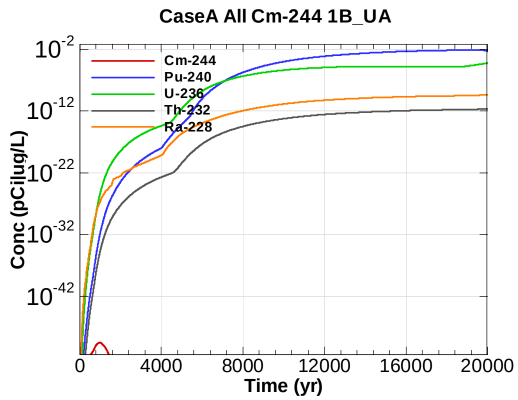

Figure G.1-70 - 1m Aquifer Concentration for CaseA All Cm-244 1B_UA

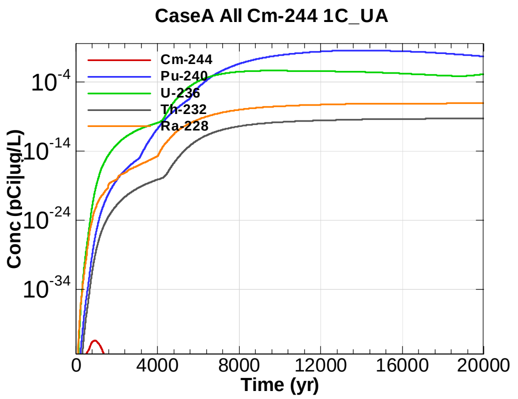

Figure G.1-71 - 1m Aquifer Concentration for CaseA All Cm-244 1C_UA

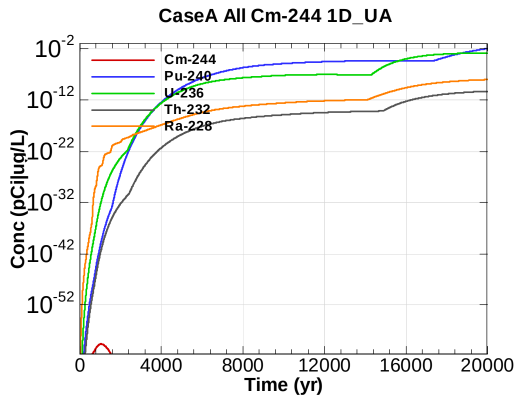

Figure G.1-72 - 1m Aquifer Concentration for CaseA All Cm-244 1D_UA

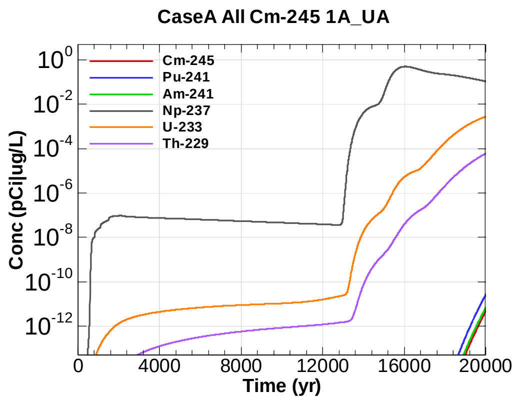

Figure G.1-73 - 1m Aquifer Concentration for CaseA All Cm-245 1A_UA

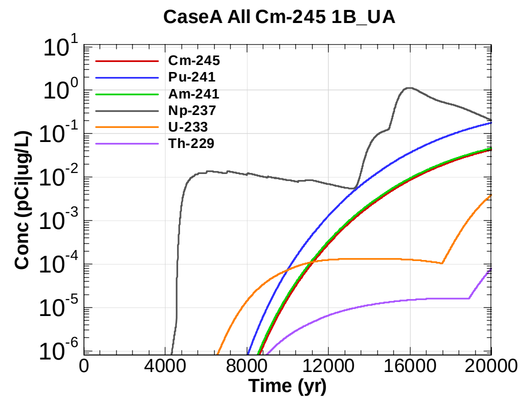

Figure G.1-74 - 1m Aquifer Concentration for CaseA All Cm-245 1B_UA

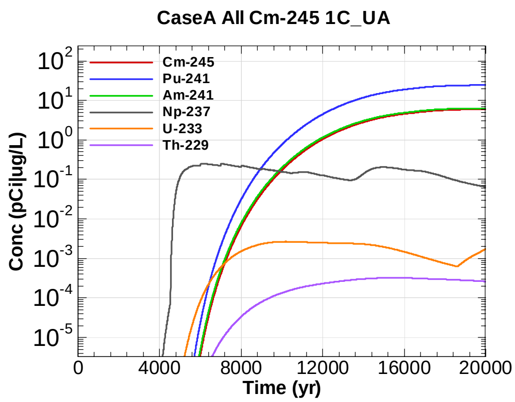

Figure G.1-75 - 1m Aquifer Concentration for CaseA All Cm-245 1C_UA

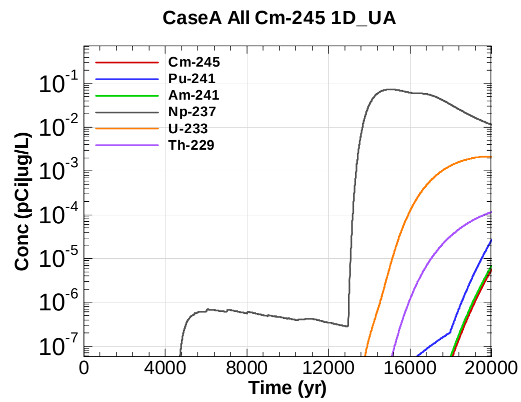

Figure G.1-76 - 1m Aquifer Concentration for CaseA All Cm-245 1D_UA

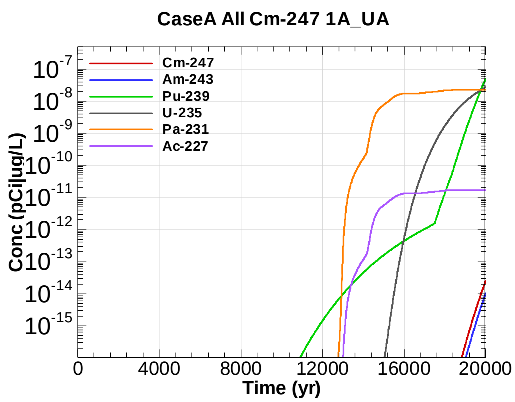

Figure G.1-77 - 1m Aquifer Concentration for CaseA All Cm-247 1A_UA

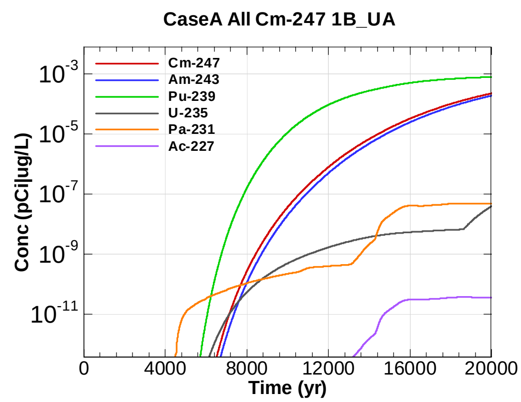

Figure G.1-78 - 1m Aquifer Concentration for CaseA All Cm-247 1B_UA

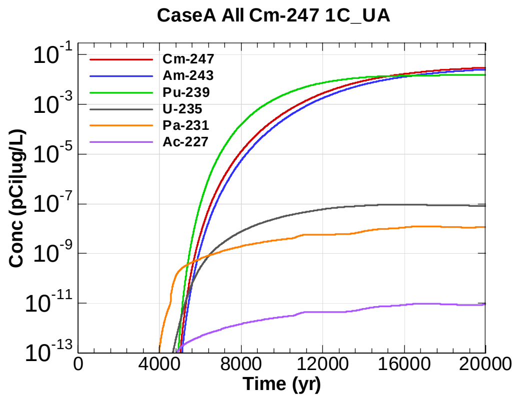

Figure G.1-79 - 1m Aquifer Concentration for CaseA All Cm-247 1C_UA

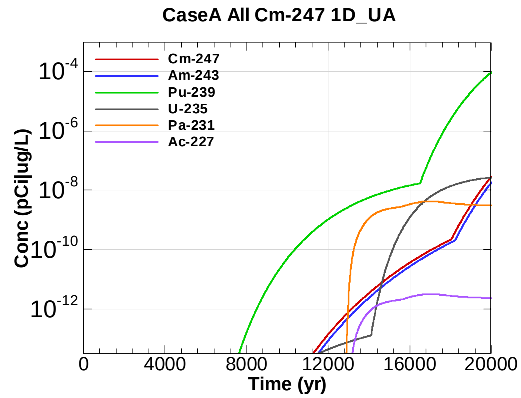

Figure G.1-80 - 1m Aquifer Concentration for CaseA All Cm-247 1D_UA

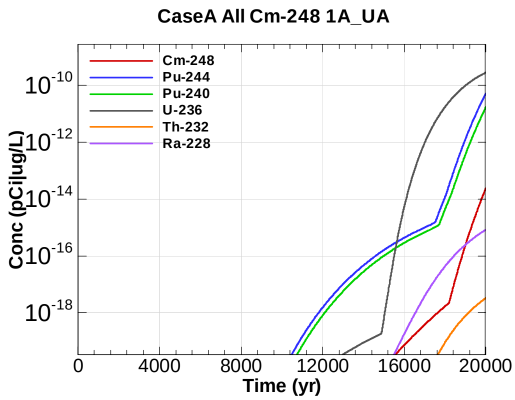

Figure G.1-81 - 1m Aquifer Concentration for CaseA All Cm-248 1A_UA

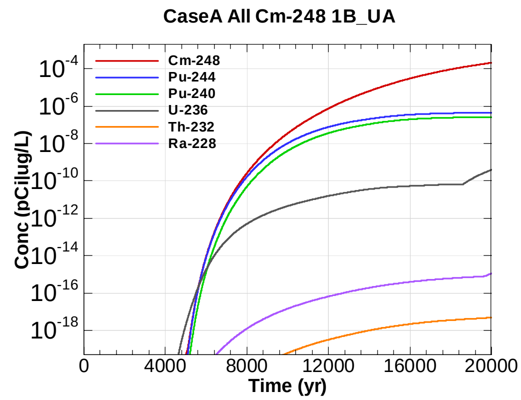

Figure G.1-82 - 1m Aquifer Concentration for CaseA All Cm-248 1B_UA

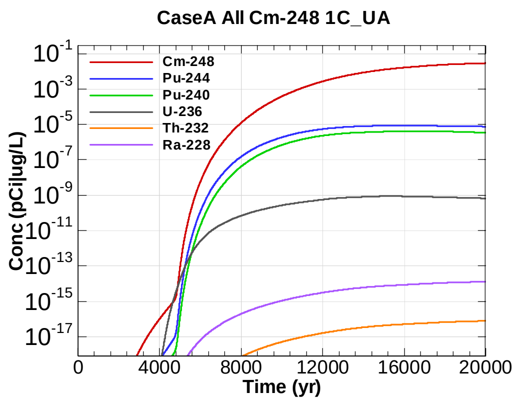

Figure G.1-83 - 1m Aquifer Concentration for CaseA All Cm-248 1C_UA

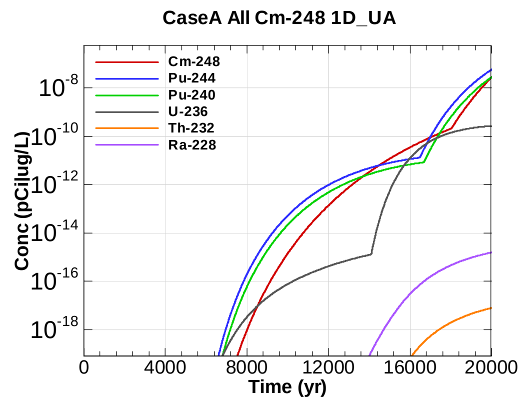

Figure G.1-84 - 1m Aquifer Concentration for CaseA All Cm-248 1D_UA

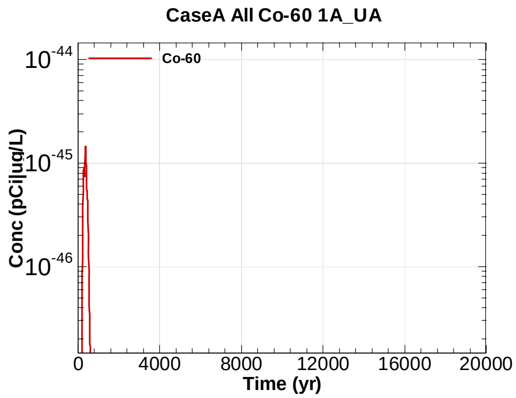

Figure G.1-85 - 1m Aquifer Concentration for CaseA All Co-60 1A_UA

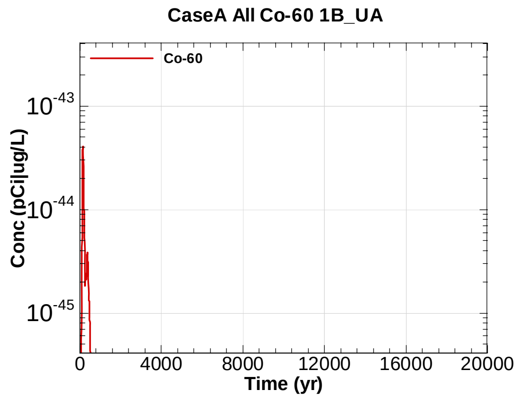

Figure G.1-86 - 1m Aquifer Concentration for CaseA All Co-60 1B_UA

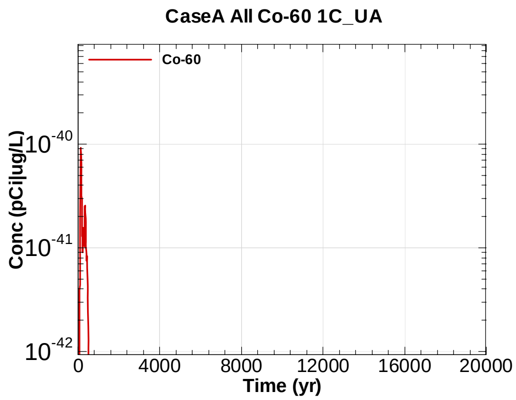

Figure G.1-87 - 1m Aquifer Concentration for CaseA All Co-60 1C_UA

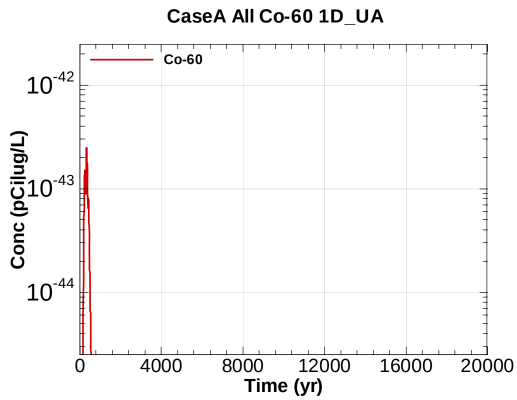

Figure G.1-88 - 1m Aquifer Concentration for CaseA All Co-60 1D_UA

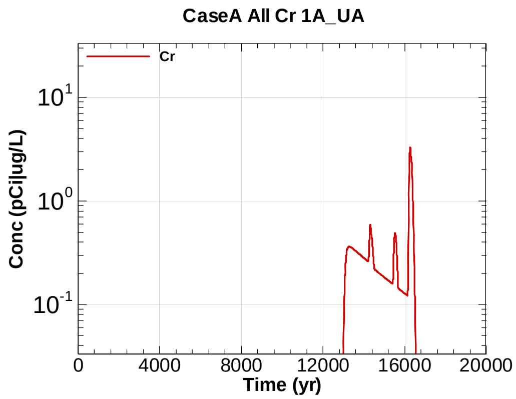

Figure G.1-89 - 1m Aquifer Concentration for CaseA All Cr 1A_UA

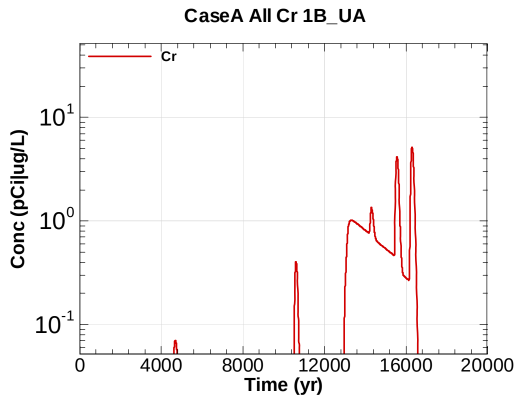

Figure G.1-90 - 1m Aquifer Concentration for CaseA All Cr 1B_UA

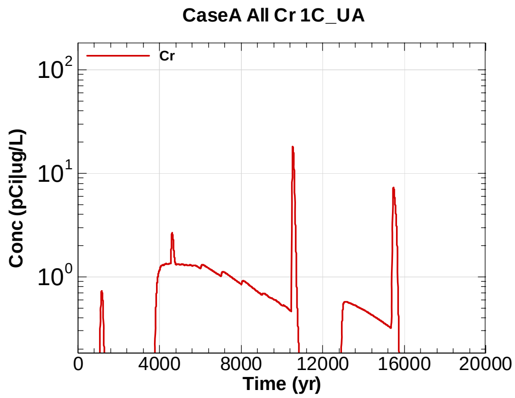

Figure G.1-91 - 1m Aquifer Concentration for CaseA All Cr 1C_UA

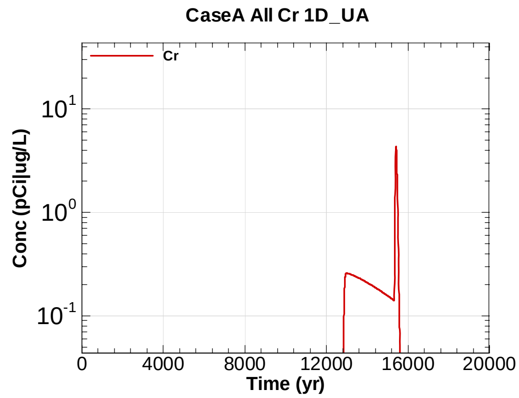

Figure G.1-92 - 1m Aquifer Concentration for CaseA All Cr 1D_UA

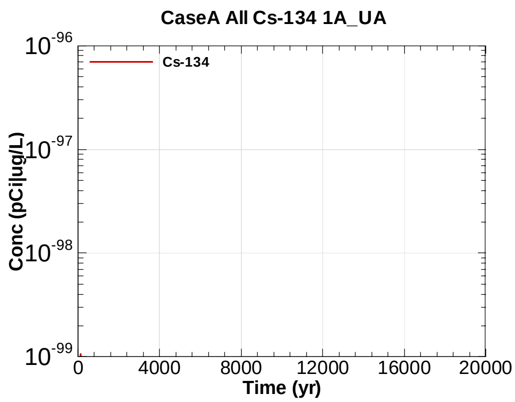

Figure G.1-93 - 1m Aquifer Concentration for CaseA All Cs-134 1A_UA

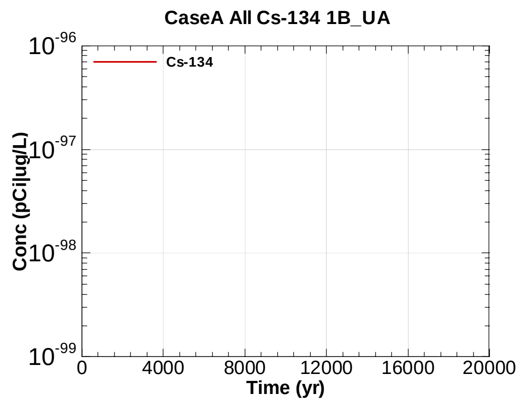

Figure G.1-94 - 1m Aquifer Concentration for CaseA All Cs-134 1B_UA

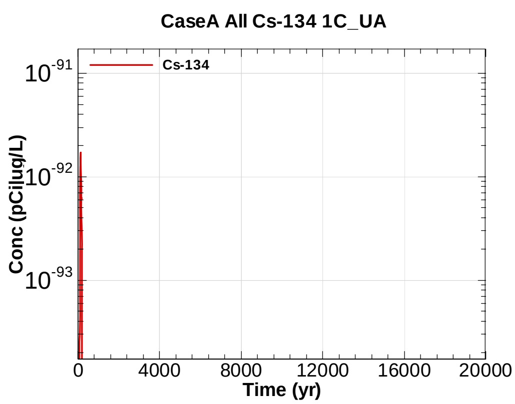

Figure G.1-95 - 1m Aquifer Concentration for CaseA All Cs-134 1C_UA

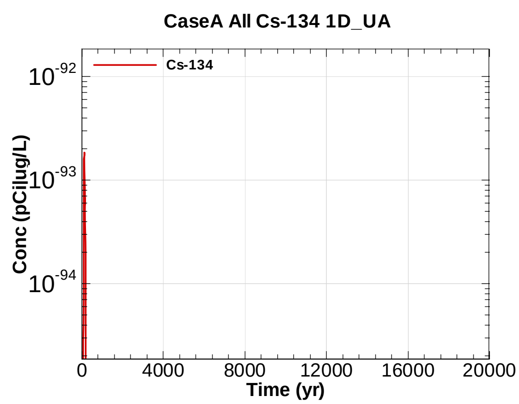

Figure G.1-96 - 1m Aquifer Concentration for CaseA All Cs-134 1D_UA

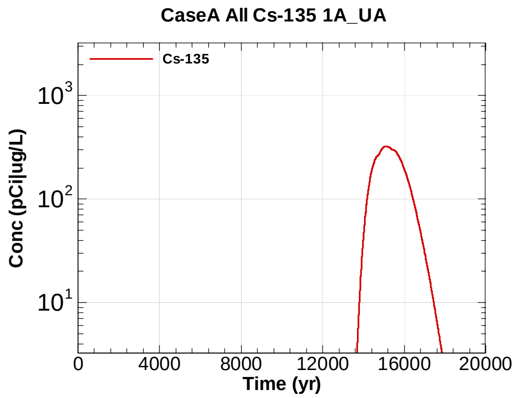

Figure G.1-97 - 1m Aquifer Concentration for CaseA All Cs-135 1A_UA

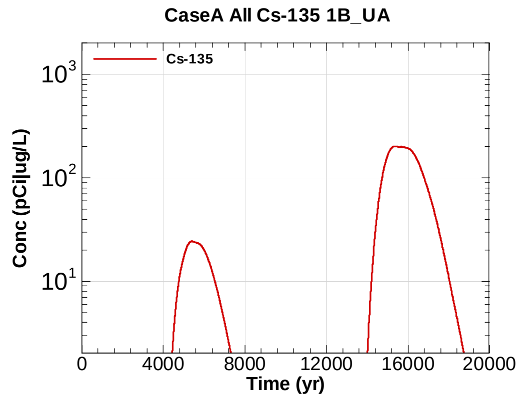

Figure G.1-98 - 1m Aquifer Concentration for CaseA All Cs-135 1B_UA

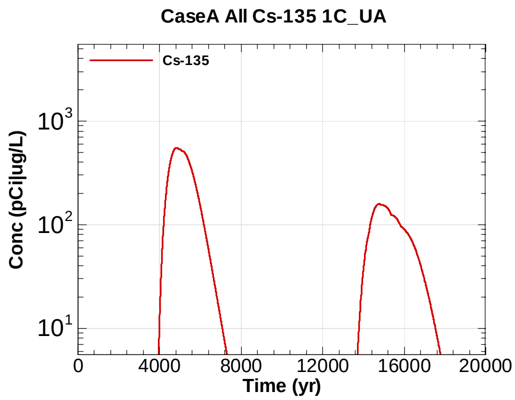

Figure G.1-99 - 1m Aquifer Concentration for CaseA All Cs-135 1C_UA

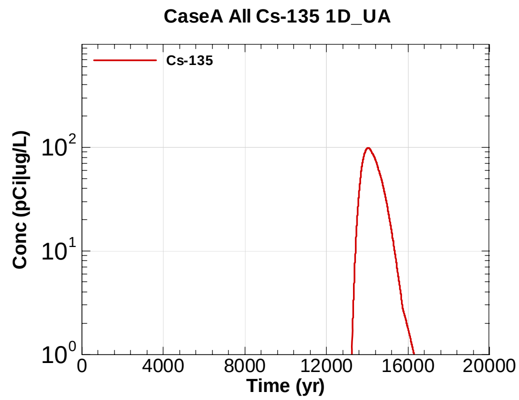

Figure G.1-100 - 1m Aquifer Concentration for CaseA All Cs-135 1D_UA

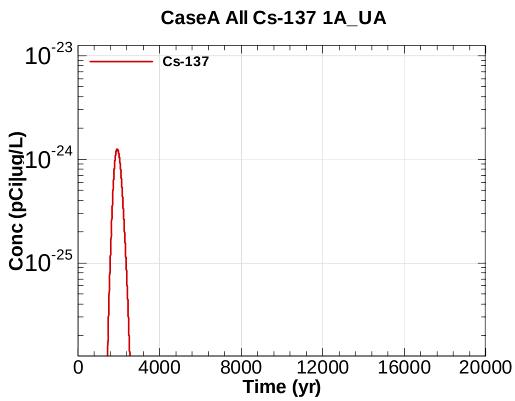

Figure G.1-101 - 1m Aquifer Concentration for CaseA All Cs-137 1A_UA

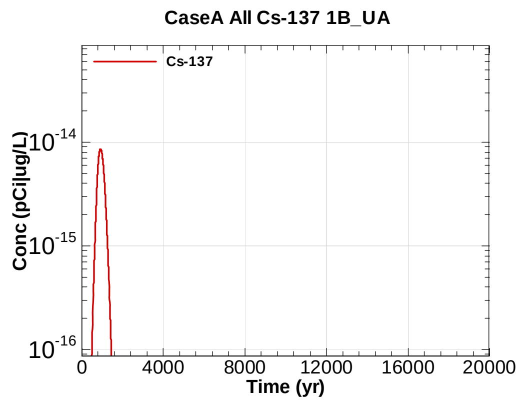

Figure G.1-102 - 1m Aquifer Concentration for CaseA All Cs-137 1B_UA

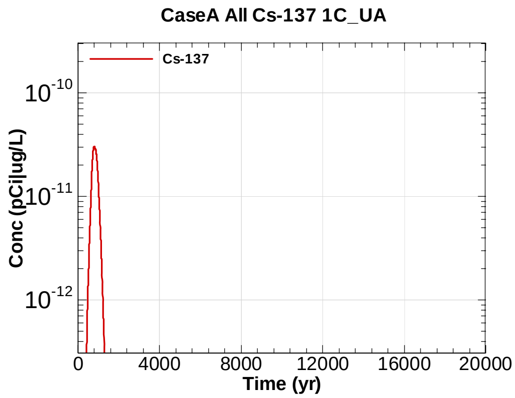

Figure G.1-103 - 1m Aquifer Concentration for CaseA All Cs-137 1C_UA

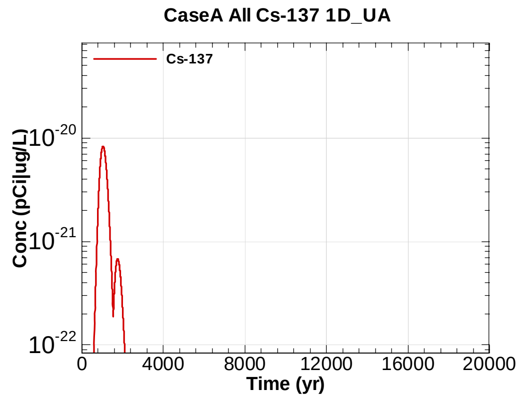

Figure G.1-104 - 1m Aquifer Concentration for CaseA All Cs-137 1D_UA

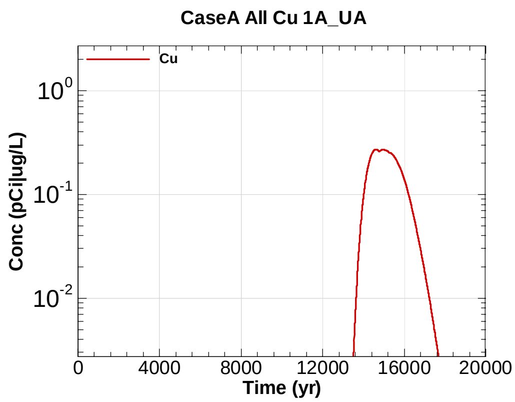

Figure G.1-105 - 1m Aquifer Concentration for CaseA All Cu 1A_UA

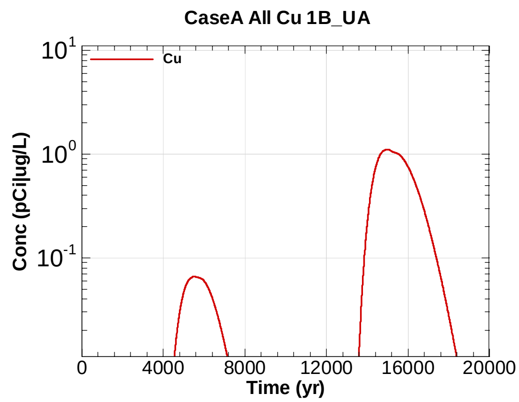

Figure G.1-106 - 1m Aquifer Concentration for CaseA All Cu 1B_UA

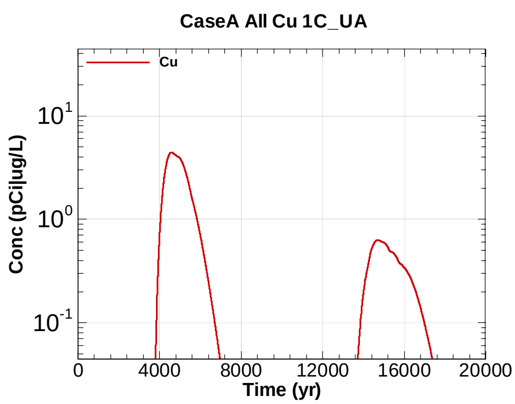

Figure G.1-107 - 1m Aquifer Concentration for CaseA All Cu 1C_UA

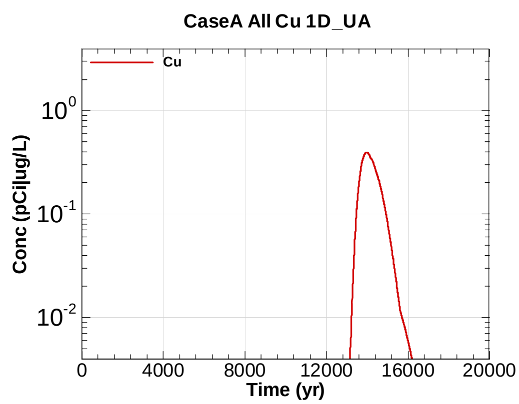

Figure G.1-108 - 1m Aquifer Concentration for CaseA All Cu 1D_UA

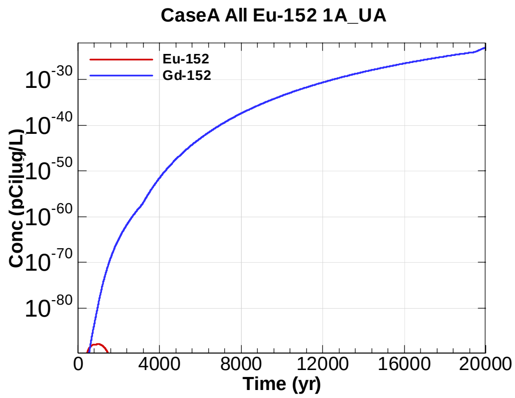

Figure G.1-109 - 1m Aquifer Concentration for CaseA All Eu-152 1A_UA

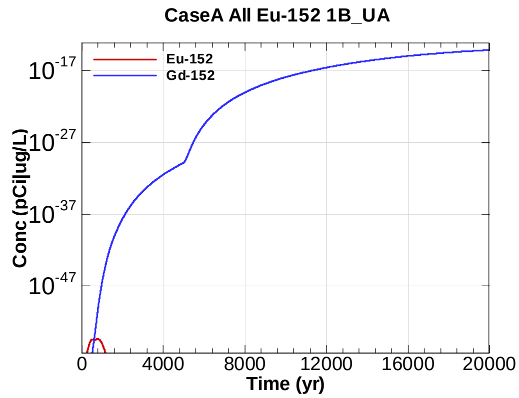

Figure G.1-110 - 1m Aquifer Concentration for CaseA All Eu-152 1B_UA

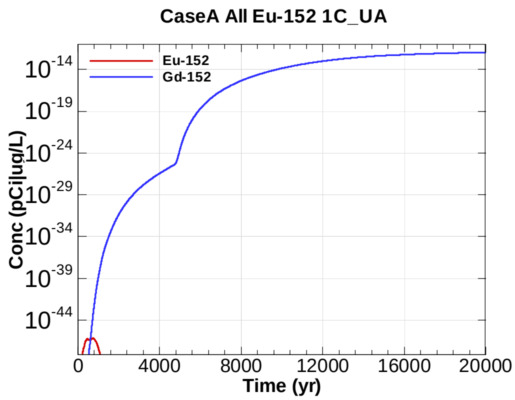

Figure G.1-111 - 1m Aquifer Concentration for CaseA All Eu-152 1C_UA

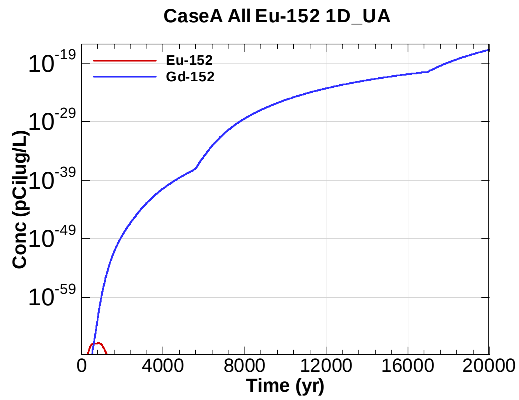

Figure G.1-112 - 1m Aquifer Concentration for CaseA All Eu-152 1D_UA

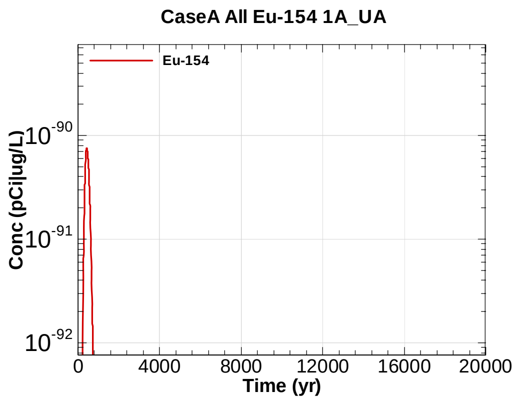

Figure G.1-113 - 1m Aquifer Concentration for CaseA All Eu-154 1A_UA

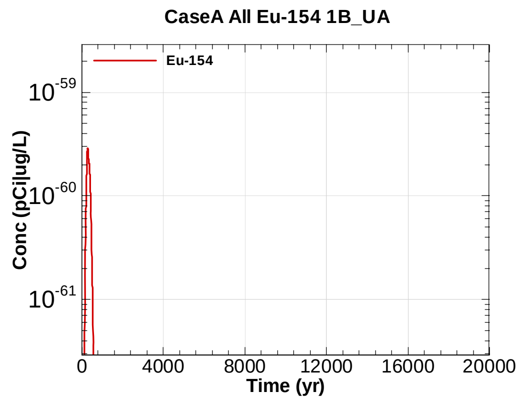

Figure G.1-114 - 1m Aquifer Concentration for CaseA All Eu-154 1B_UA

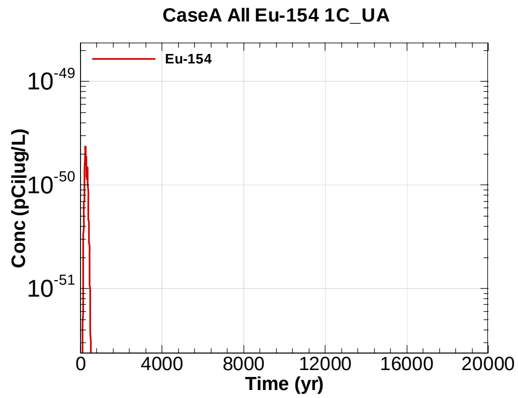

Figure G.1-115 - 1m Aquifer Concentration for CaseA All Eu-154 1C_UA

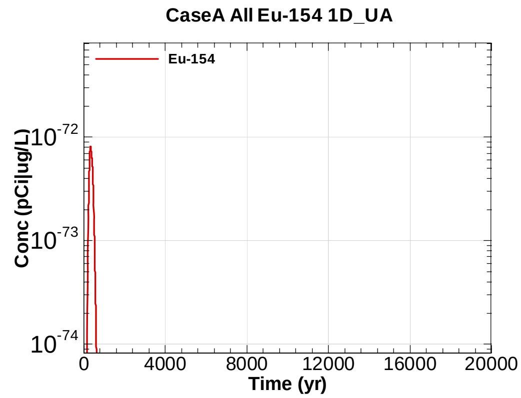

Figure G.1-116 - 1m Aquifer Concentration for CaseA All Eu-154 1D_UA

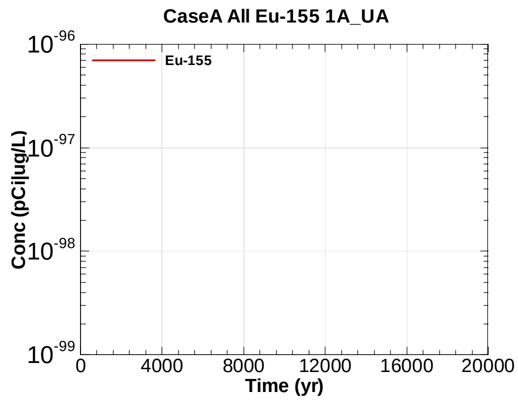

Figure G.1-117 - 1m Aquifer Concentration for CaseA All Eu-155 1A_UA

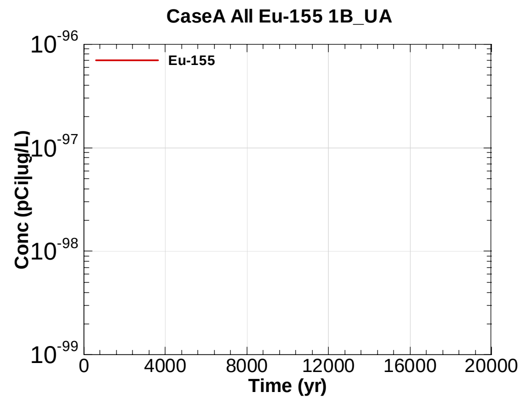

Figure G.1-118 - 1m Aquifer Concentration for CaseA All Eu-155 1B_UA

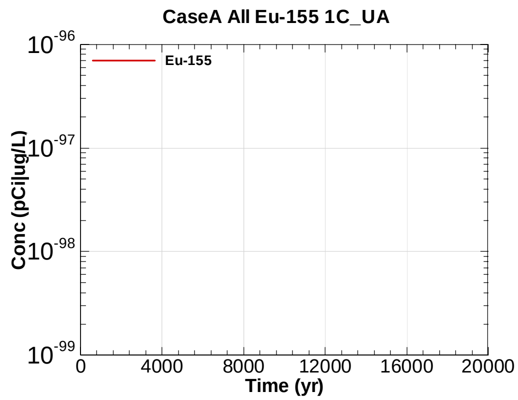

Figure G.1-119 - 1m Aquifer Concentration for CaseA All Eu-155 1C_UA

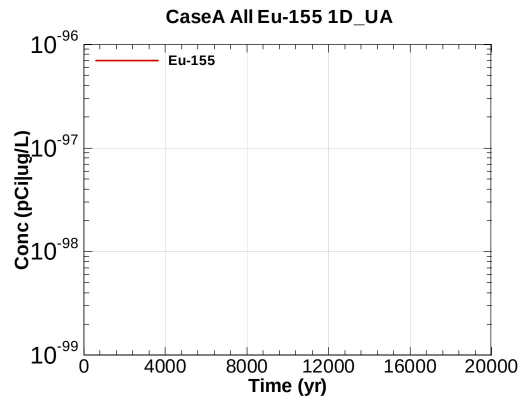

Figure G.1-120 - 1m Aquifer Concentration for CaseA All Eu-155 1D_UA

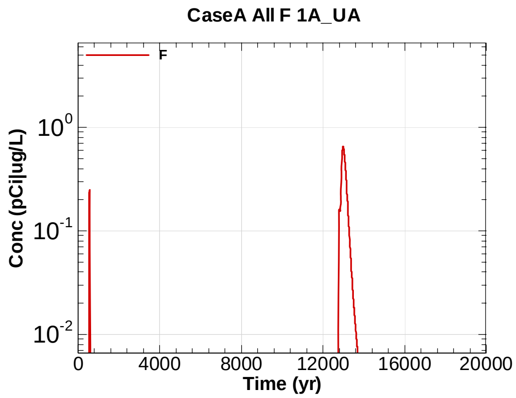

Figure G.1-121 - 1m Aquifer Concentration for CaseA All F 1A_UA

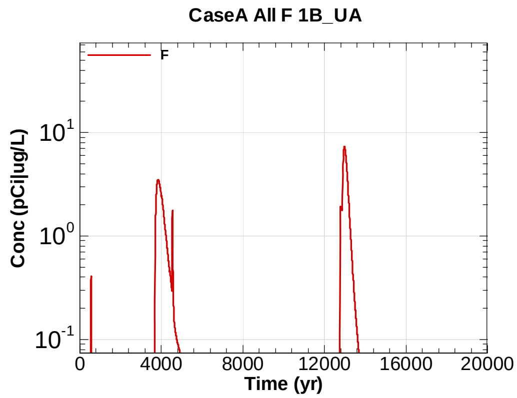

Figure G.1-122 - 1m Aquifer Concentration for CaseA All F 1B_UA

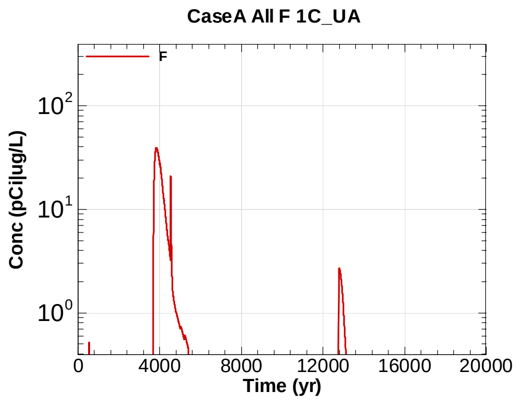

Figure G.1-123 - 1m Aquifer Concentration for CaseA All F 1C_UA

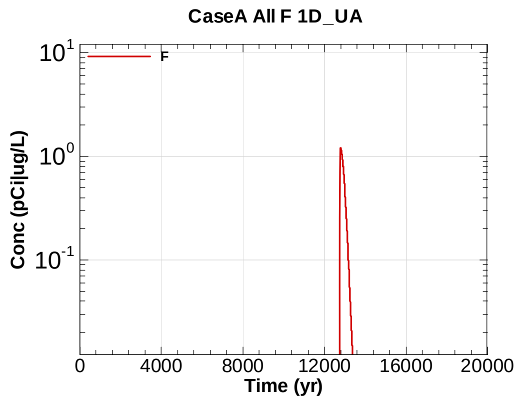

Figure G.1-124 - 1m Aquifer Concentration for CaseA All F 1D_UA

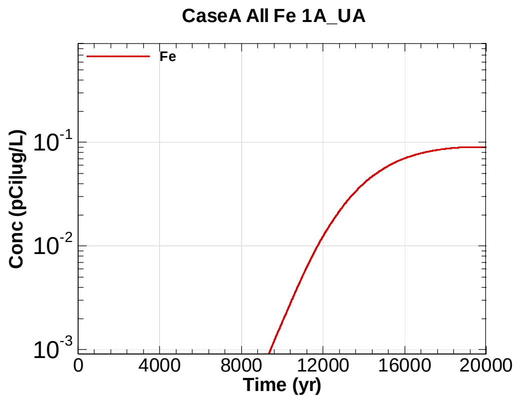

Figure G.1-125 - 1m Aquifer Concentration for CaseA All Fe 1A_UA

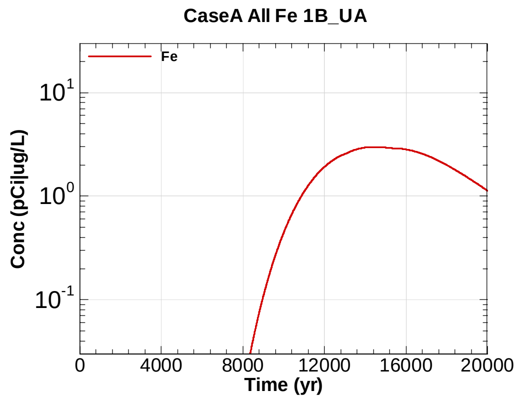

Figure G.1-126 - 1m Aquifer Concentration for CaseA All Fe 1B_UA

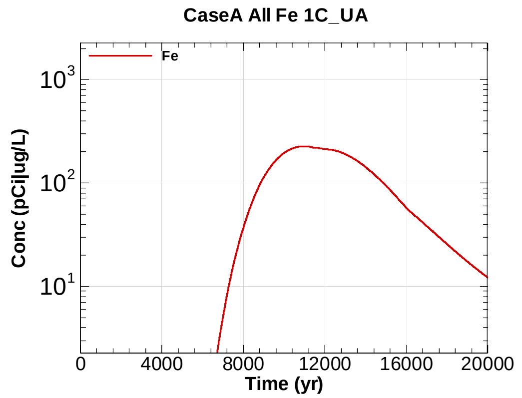

Figure G.1-127 - 1m Aquifer Concentration for CaseA All Fe 1C_UA

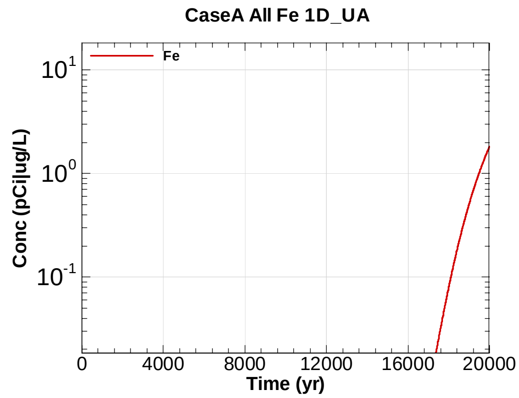

Figure G.1-128 - 1m Aquifer Concentration for CaseA All Fe 1D_UA

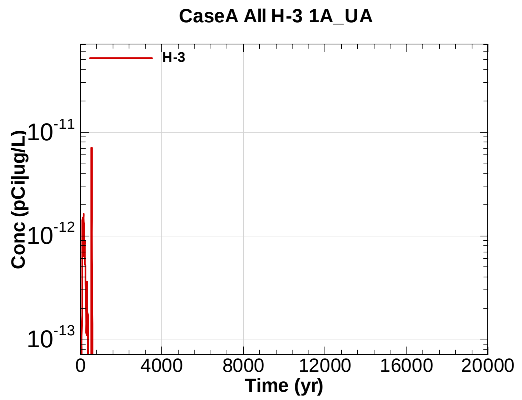

Figure G.1-129 - 1m Aquifer Concentration for CaseA All H-3 1A_UA

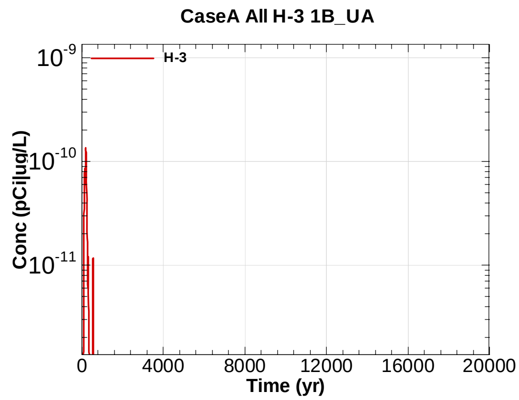

Figure G.1-130 - 1m Aquifer Concentration for CaseA All H-3 1B_UA

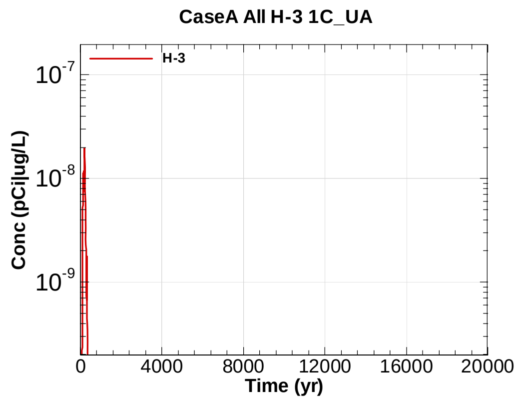

Figure G.1-131 - 1m Aquifer Concentration for CaseA All H-3 1C_UA

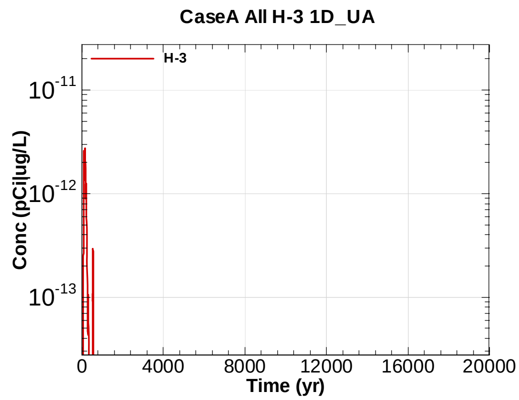

Figure G.1-132 - 1m Aquifer Concentration for CaseA All H-3 1D_UA

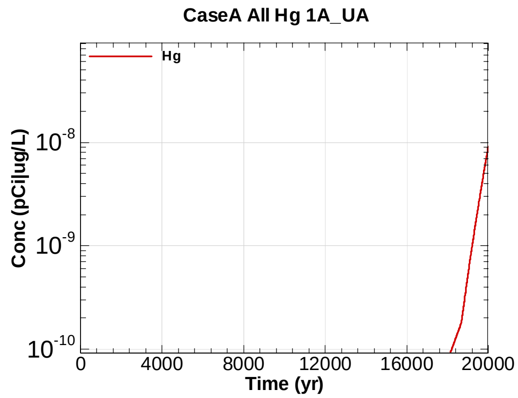

Figure G.1-133 - 1m Aquifer Concentration for CaseA All Hg 1A_UA

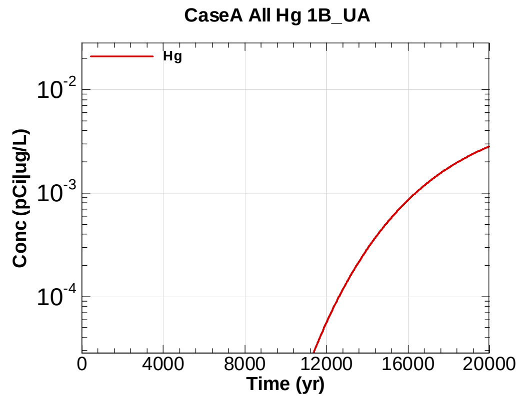

Figure G.1-134 - 1m Aquifer Concentration for CaseA All Hg 1B_UA

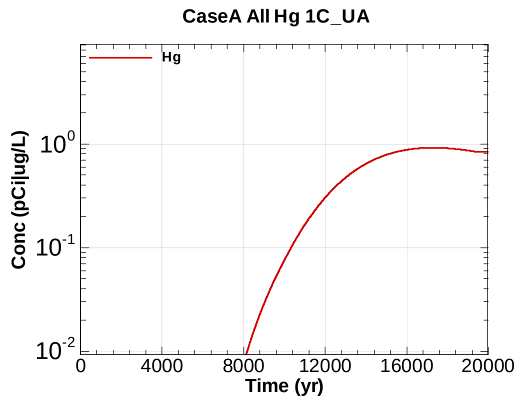

Figure G.1-135 - 1m Aquifer Concentration for CaseA All Hg 1C_UA

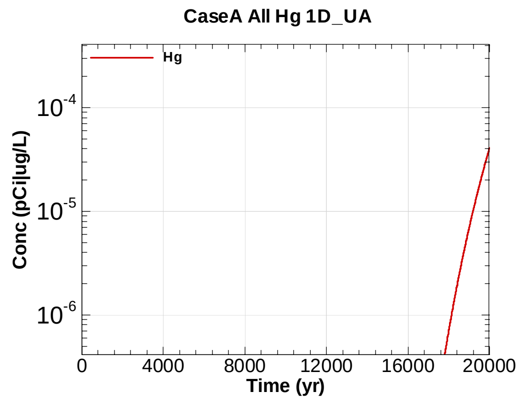

Figure G.1-136 - 1m Aquifer Concentration for CaseA All Hg 1D_UA

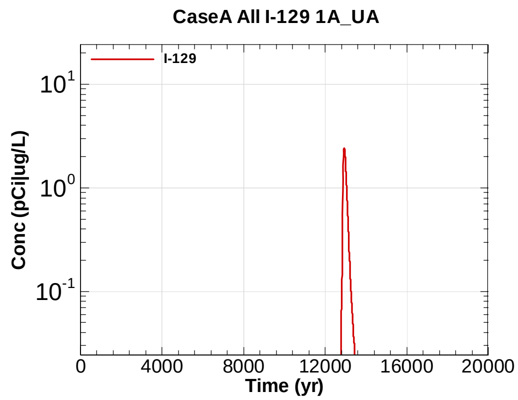

Figure G.1-137 - 1m Aquifer Concentration for CaseA All I-129 1A_UA

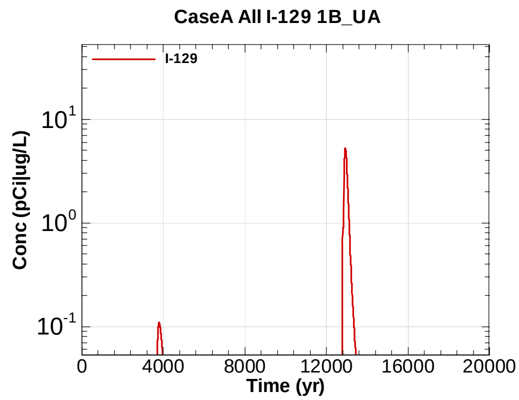

Figure G.1-138 - 1m Aquifer Concentration for CaseA All I-129 1B_UA

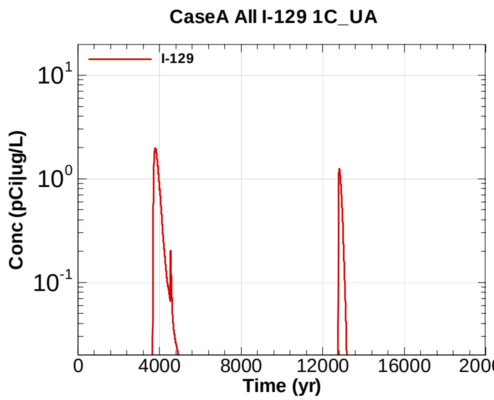

Figure G.1-139 - 1m Aquifer Concentration for CaseA All I-129 1C_UA

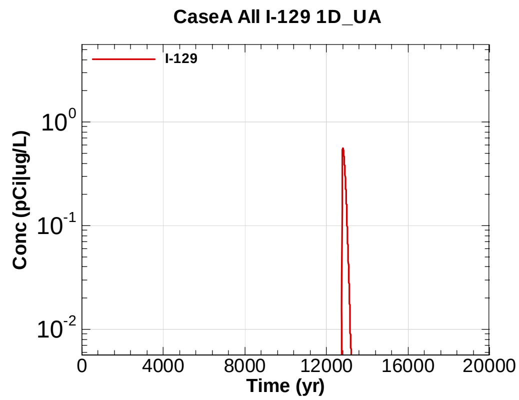

Figure G.1-140 - 1m Aquifer Concentration for CaseA All I-129 1D_UA

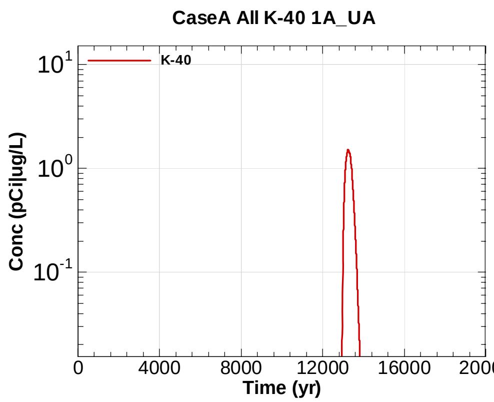

Figure G.1-141 - 1m Aquifer Concentration for CaseA All K-40 1A_UA

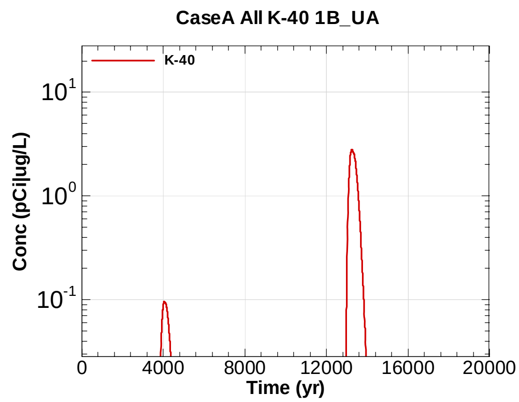

Figure G.1-142 - 1m Aquifer Concentration for CaseA All K-40 1B_UA

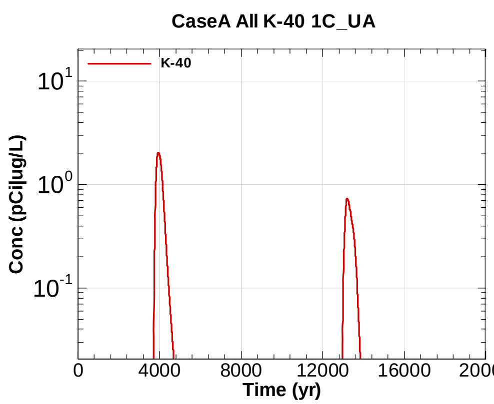

Figure G.1-143 - 1m Aquifer Concentration for CaseA All K-40 1C_UA

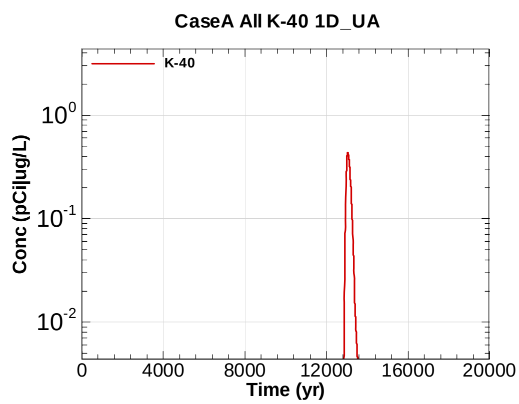

Figure G.1-144 - 1m Aquifer Concentration for CaseA All K-40 1D_UA

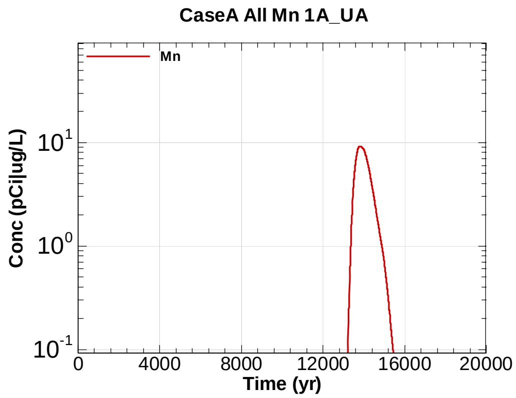

Figure G.1-145 - 1m Aquifer Concentration for CaseA All Mn 1A_UA

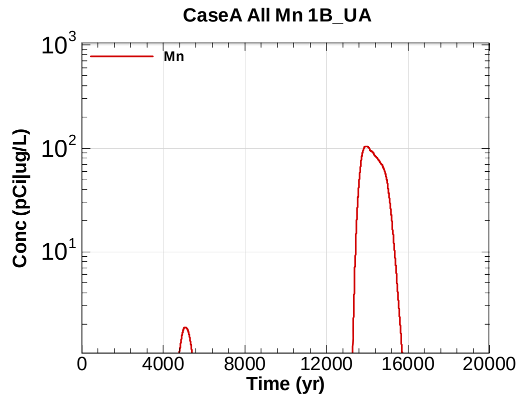

Figure G.1-146 - 1m Aquifer Concentration for CaseA All Mn 1B_UA

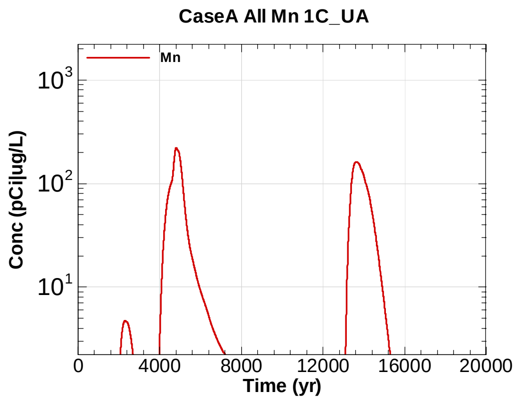

Figure G.1-147 - 1m Aquifer Concentration for CaseA All Mn 1C_UA

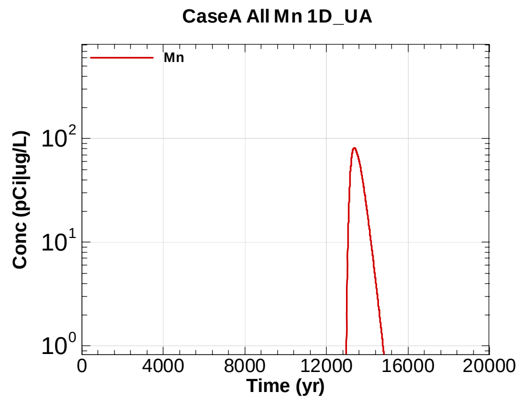

Figure G.1-148 - 1m Aquifer Concentration for CaseA All Mn 1D_UA

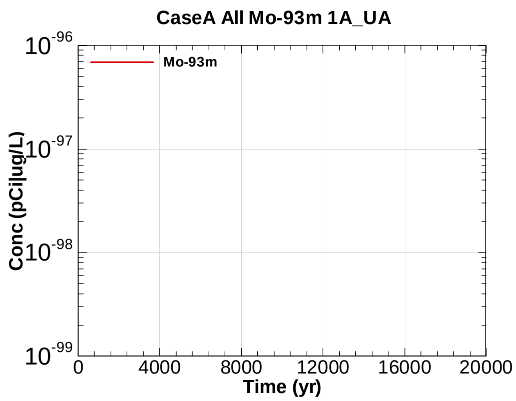

Figure G.1-149 - 1m Aquifer Concentration for CaseA All Mo-93m 1A_UA

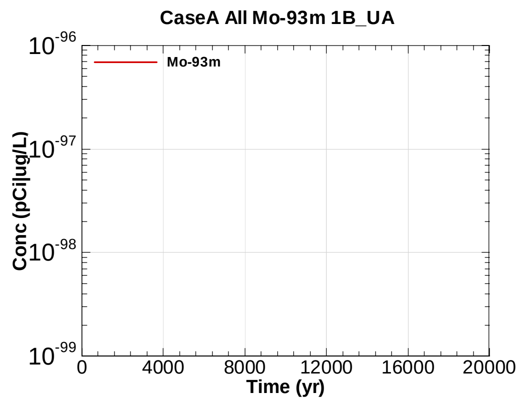

Figure G.1-150 - 1m Aquifer Concentration for CaseA All Mo-93m 1B_UA

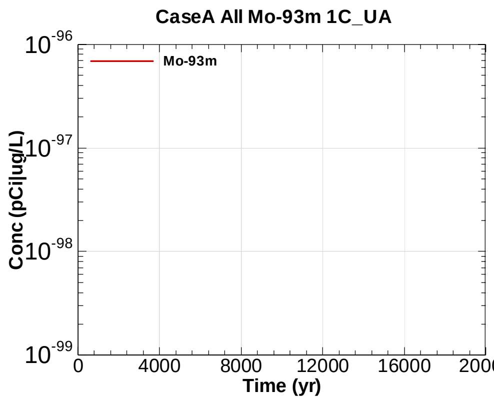

Figure G.1-151 - 1m Aquifer Concentration for CaseA All Mo-93m 1C_UA

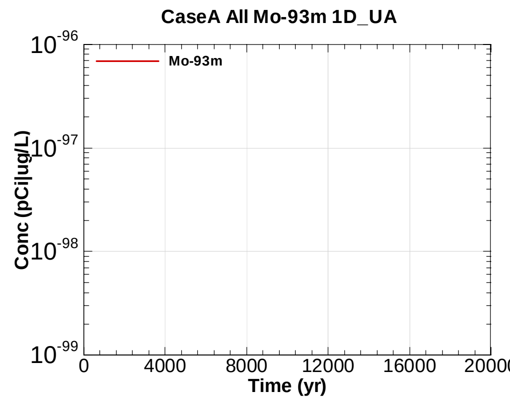

Figure G.1-152 - 1m Aquifer Concentration for CaseA All Mo-93m 1D_UA

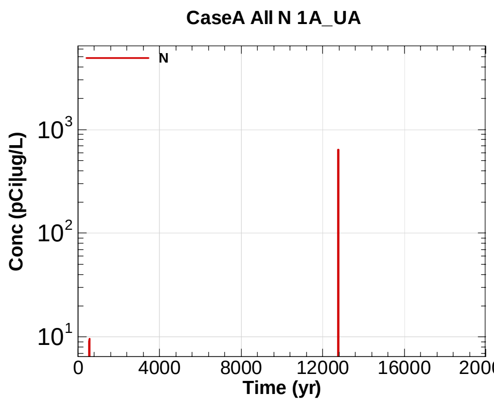

Figure G.1-153 - 1m Aquifer Concentration for CaseA All N 1A_UA

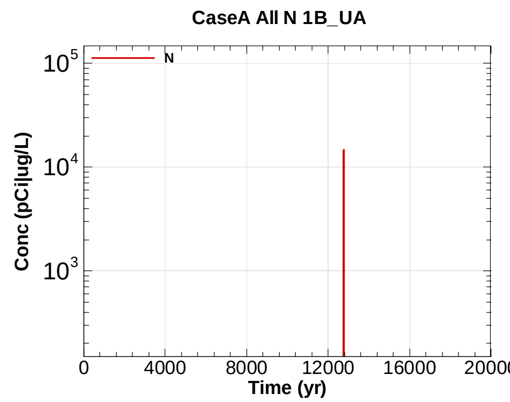

Figure G.1-154 - 1m Aquifer Concentration for CaseA All N 1B_UA

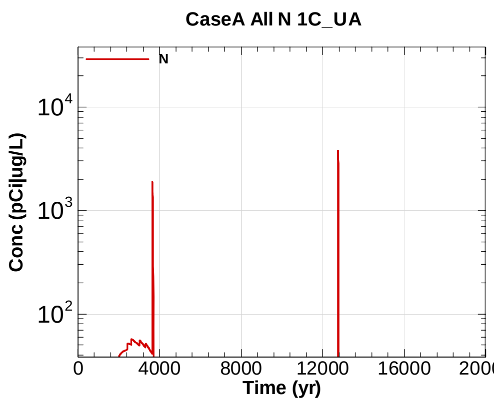

Figure G.1-155 - 1m Aquifer Concentration for CaseA All N 1C_UA

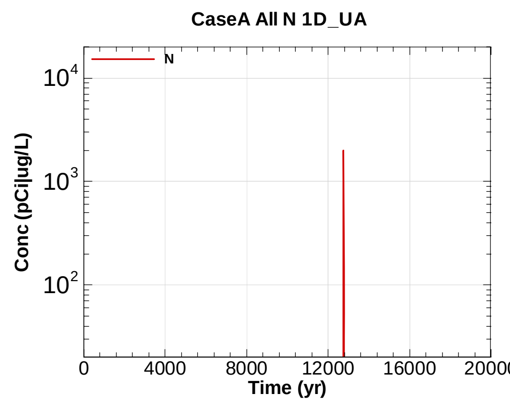

Figure G.1-156 - 1m Aquifer Concentration for CaseA All N 1D_UA

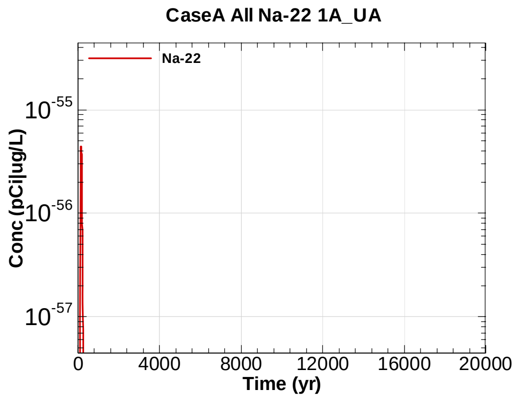

Figure G.1-157 - 1m Aquifer Concentration for CaseA All Na-22 1A_UA

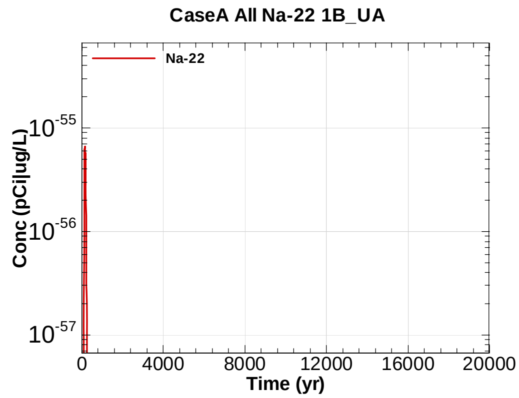

Figure G.1-158 - 1m Aquifer Concentration for CaseA All Na-22 1B_UA

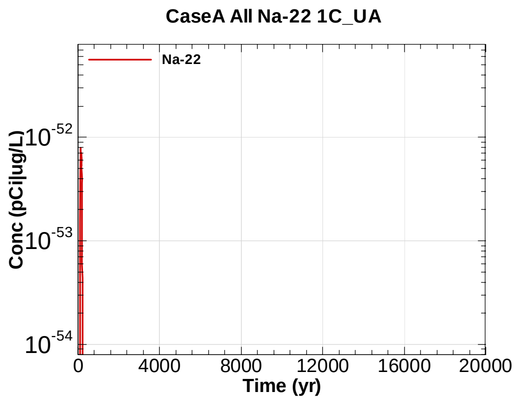

Figure G.1-159 - 1m Aquifer Concentration for CaseA All Na-22 1C_UA

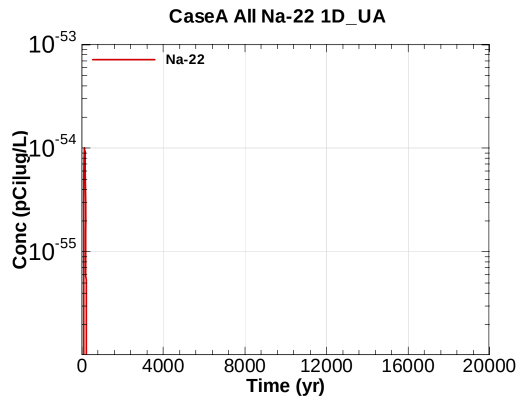

Figure G.1-160 - 1m Aquifer Concentration for CaseA All Na-22 1D_UA

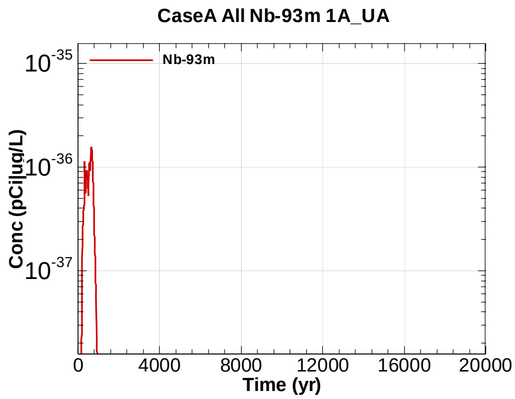

Figure G.1-161 - 1m Aquifer Concentration for CaseA All Nb-93m 1A_UA

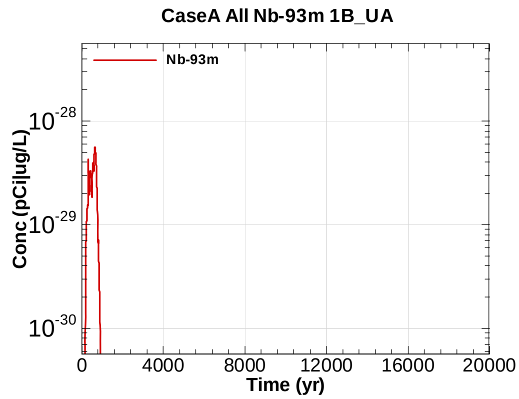

Figure G.1-162 - 1m Aquifer Concentration for CaseA All Nb-93m 1B_UA

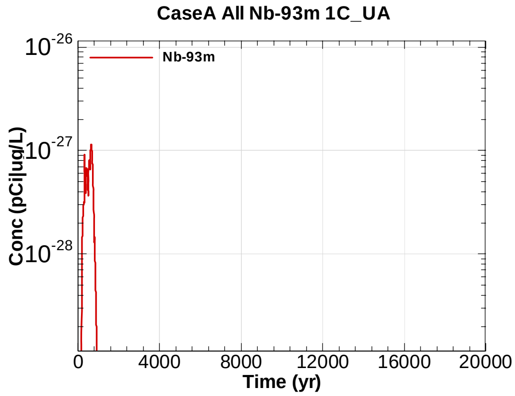

Figure G.1-163 - 1m Aquifer Concentration for CaseA All Nb-93m 1C_UA

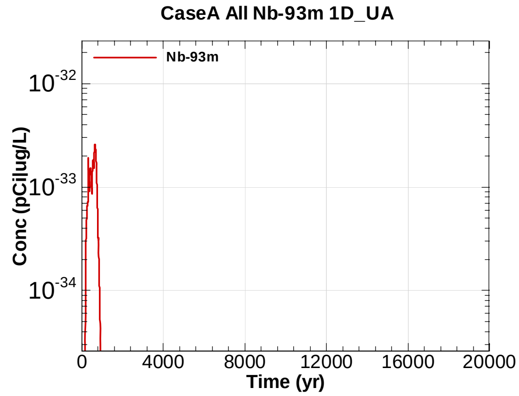

Figure G.1-164 - 1m Aquifer Concentration for CaseA All Nb-93m 1D_UA

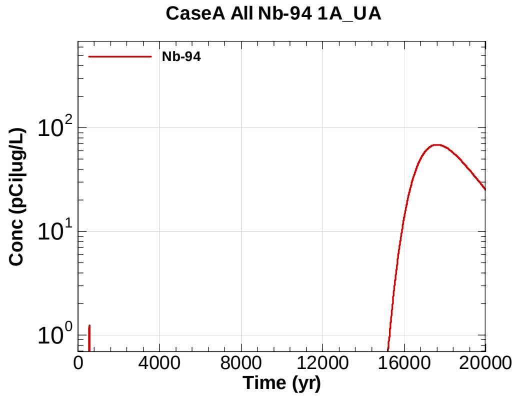

Figure G.1-165 - 1m Aquifer Concentration for CaseA All Nb-94 1A_UA

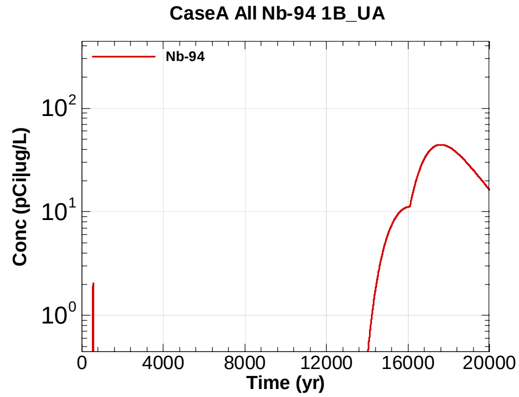

Figure G.1-166 - 1m Aquifer Concentration for CaseA All Nb-94 1B_UA

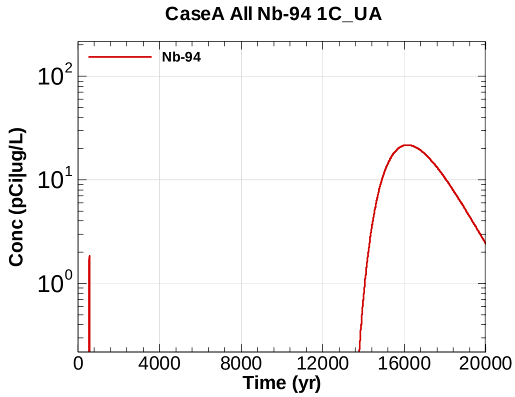

Figure G.1-167 - 1m Aquifer Concentration for CaseA All Nb-94 1C_UA

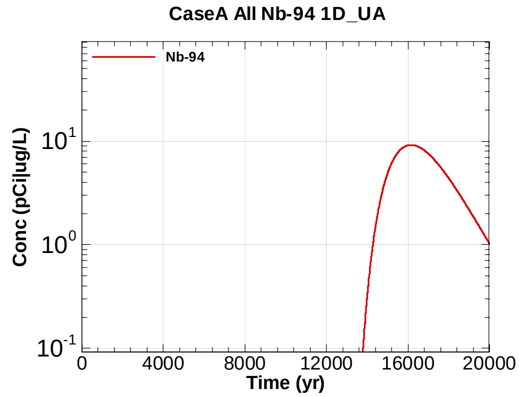

Figure G.1-168 - 1m Aquifer Concentration for CaseA All Nb-94 1D_UA

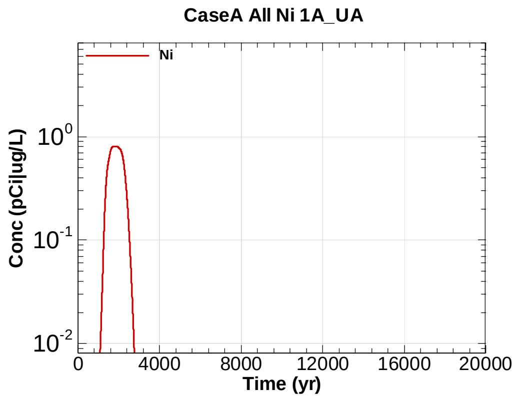

Figure G.1-169 - 1m Aquifer Concentration for CaseA All Ni 1A_UA

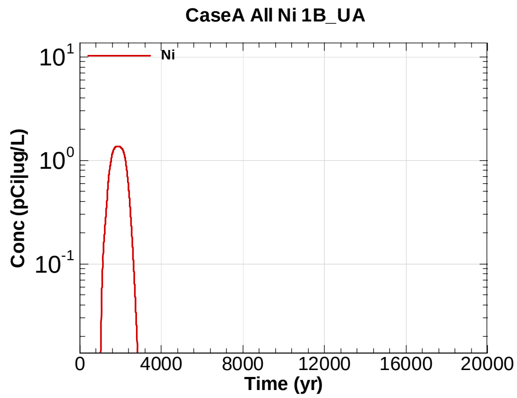

Figure G.1-170 - 1m Aquifer Concentration for CaseA All Ni 1B_UA

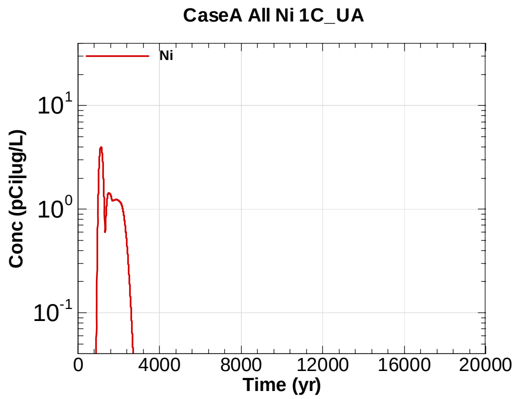

Figure G.1-171 - 1m Aquifer Concentration for CaseA All Ni 1C_UA

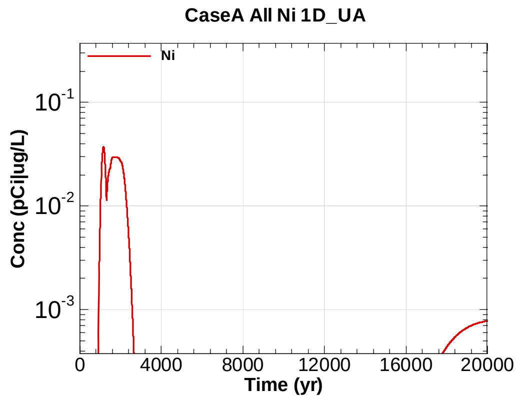

Figure G.1-172 - 1m Aquifer Concentration for CaseA All Ni 1D_UA

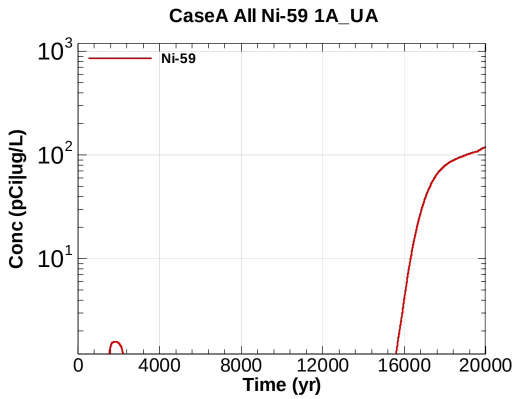

Figure G.1-173 - 1m Aquifer Concentration for CaseA All Ni-59 1A_UA

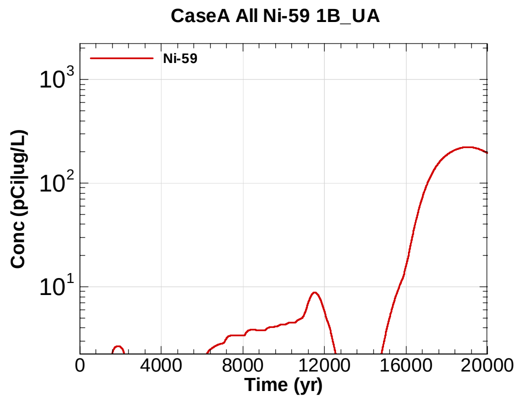

Figure G.1-174 - 1m Aquifer Concentration for CaseA All Ni-59 1B_UA

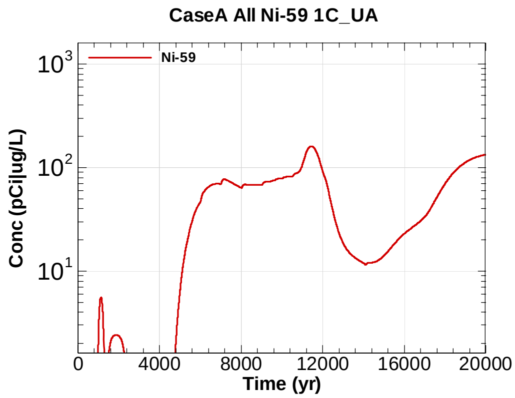

Figure G.1-175 - 1m Aquifer Concentration for CaseA All Ni-59 1C_UA

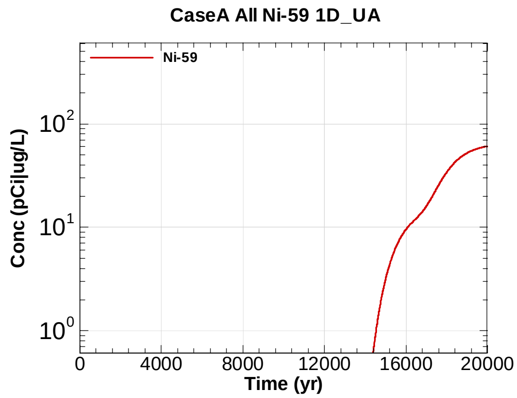

Figure G.1-176 - 1m Aquifer Concentration for CaseA All Ni-59 1D_UA

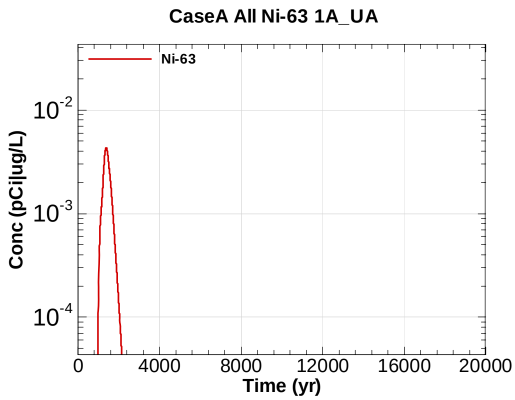

Figure G.1-177 - 1m Aquifer Concentration for CaseA All Ni-63 1A_UA

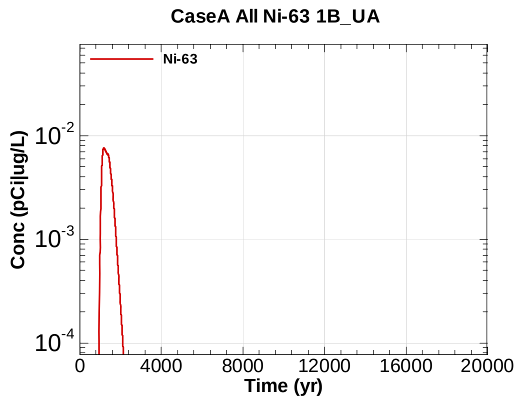

Figure G.1-178 - 1m Aquifer Concentration for CaseA All Ni-63 1B_UA

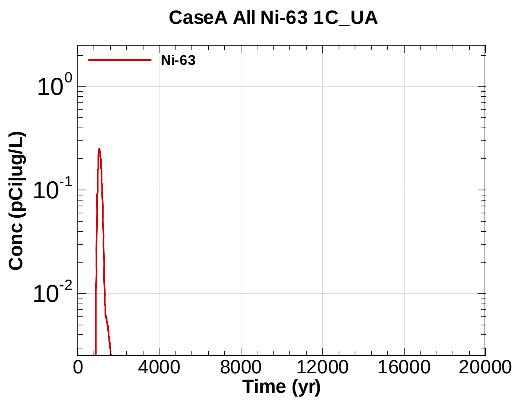

Figure G.1-179 - 1m Aquifer Concentration for CaseA All Ni-63 1C_UA

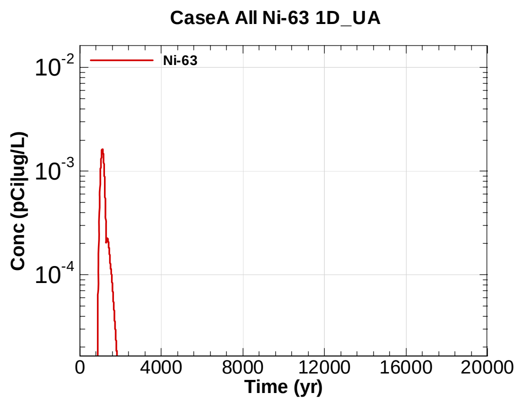

Figure G.1-180 - 1m Aquifer Concentration for CaseA All Ni-63 1D_UA

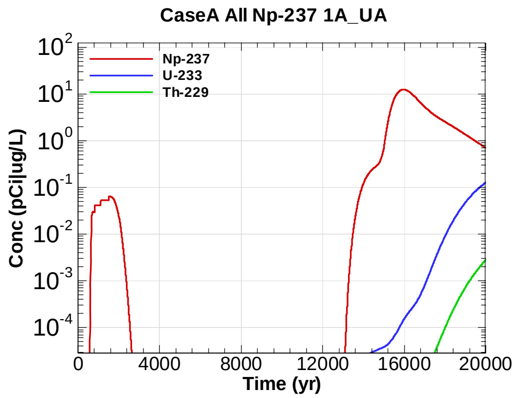

Figure G.1-181 - 1m Aquifer Concentration for CaseA All Np-237 1A_UA

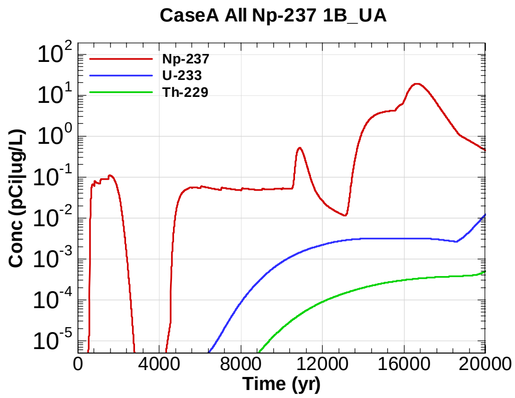

Figure G.1-182 - 1m Aquifer Concentration for CaseA All Np-237 1B_UA

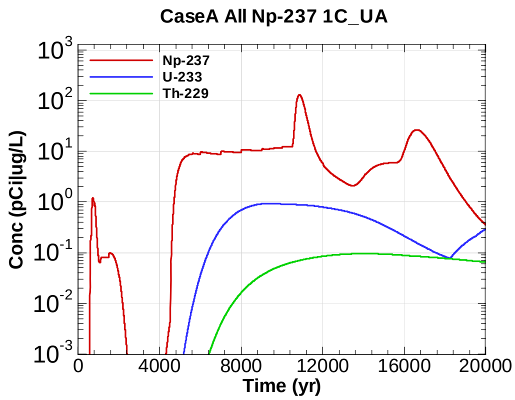

Figure G.1-183 - 1m Aquifer Concentration for CaseA All Np-237 1C_UA

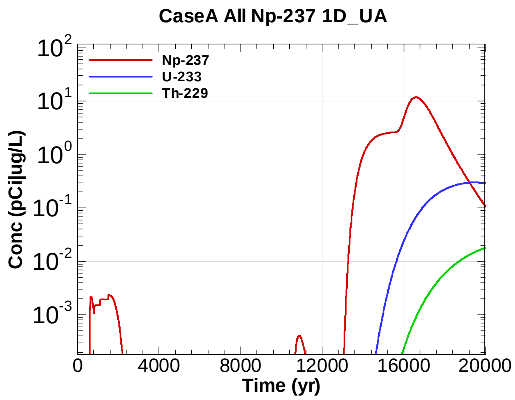

Figure G.1-184 - 1m Aquifer Concentration for CaseA All Np-237 1D_UA

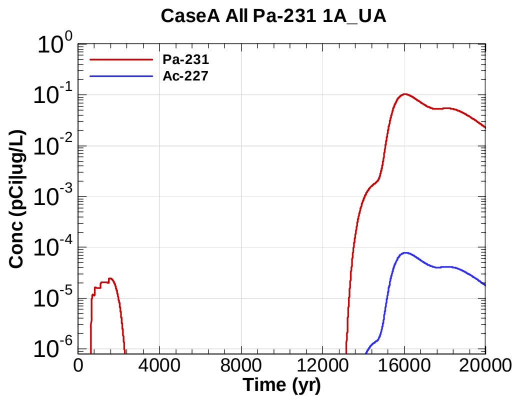

Figure G.1-185 - 1m Aquifer Concentration for CaseA All Pa-231 1A_UA

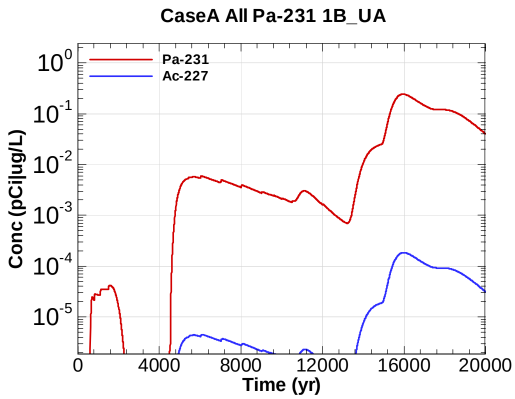

Figure G.1-186 - 1m Aquifer Concentration for CaseA All Pa-231 1B_UA

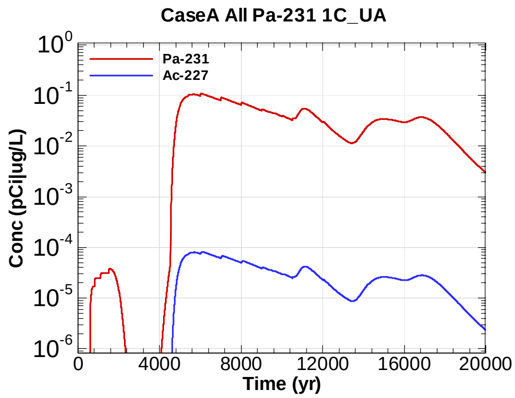

Figure G.1-187 - 1m Aquifer Concentration for CaseA All Pa-231 1C_UA

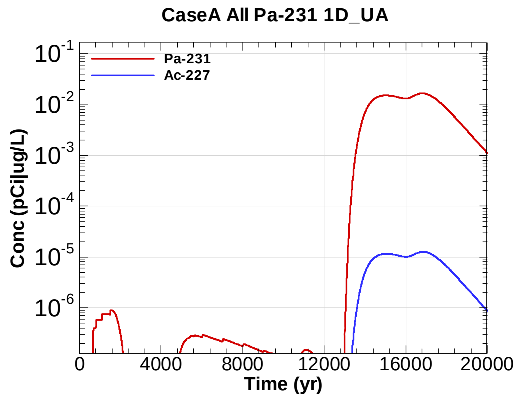

Figure G.1-188 - 1m Aquifer Concentration for CaseA All Pa-231 1D_UA

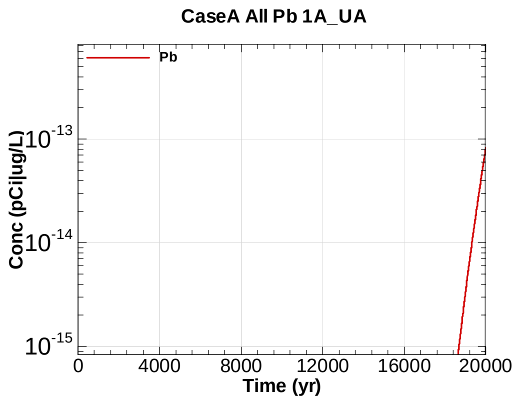

Figure G.1-189 - 1m Aquifer Concentration for CaseA All Pb 1A_UA

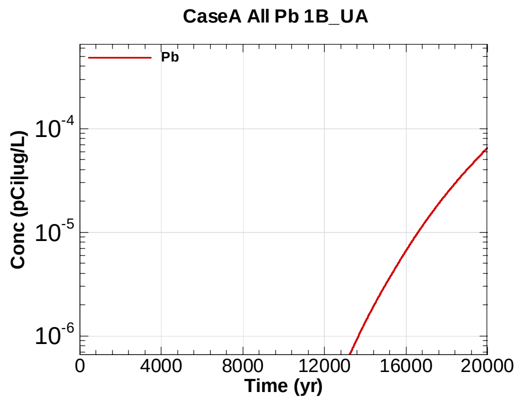

Figure G.1-190 - 1m Aquifer Concentration for CaseA All Pb 1B_UA

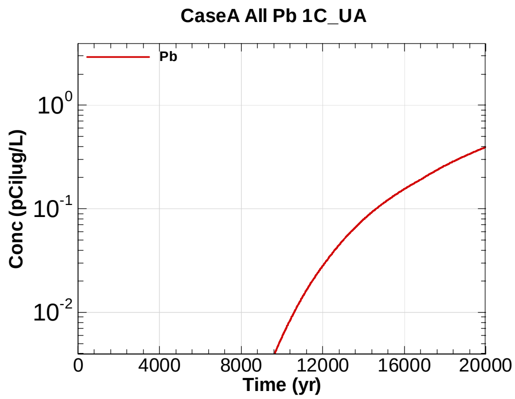

Figure G.1-191 - 1m Aquifer Concentration for CaseA All Pb 1C_UA

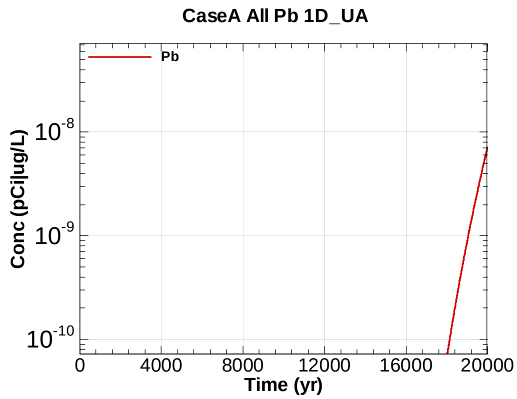

Figure G.1-192 - 1m Aquifer Concentration for CaseA All Pb 1D_UA

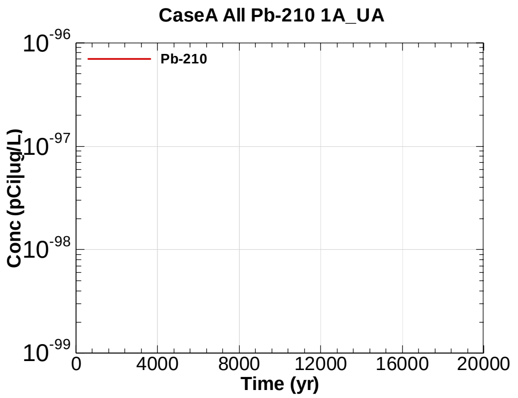

Figure G.1-193 - 1m Aquifer Concentration for CaseA All Pb-210 1A_UA

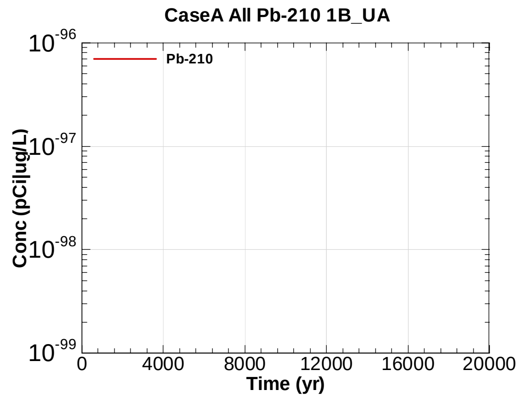

Figure G.1-194 - 1m Aquifer Concentration for CaseA All Pb-210 1B_UA

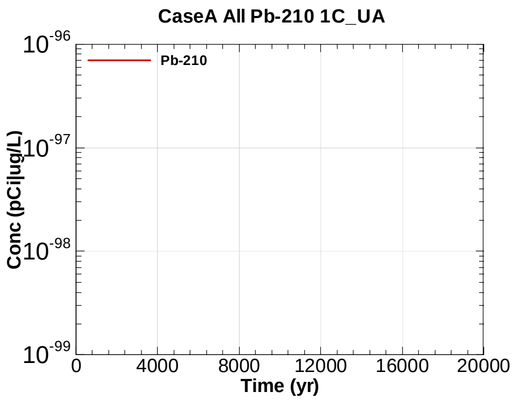

Figure G.1-195 - 1m Aquifer Concentration for CaseA All Pb-210 1C_UA

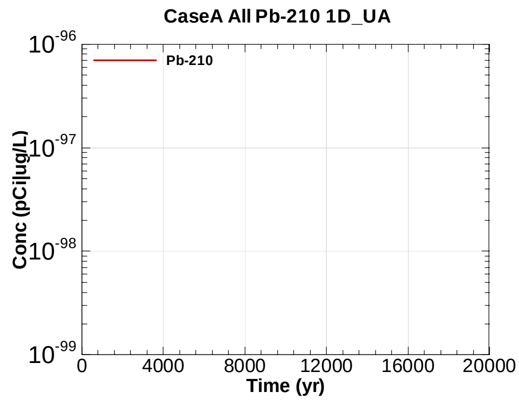

Figure G.1-196 - 1m Aquifer Concentration for CaseA All Pb-210 1D_UA

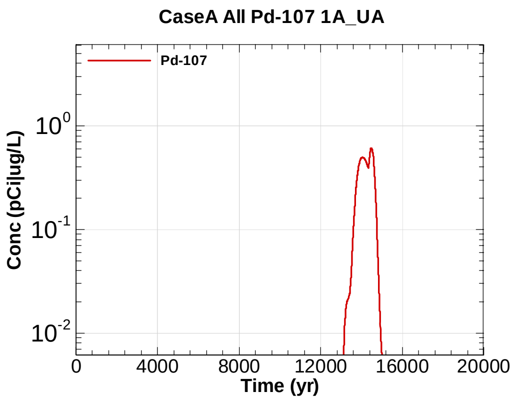

Figure G.1-197 - 1m Aquifer Concentration for CaseA All Pd-107 1A_UA

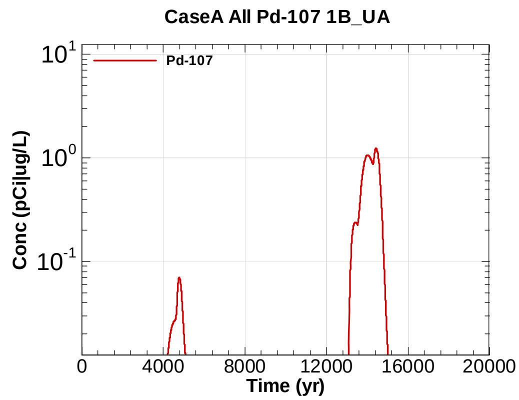

Figure G.1-198 - 1m Aquifer Concentration for CaseA All Pd-107 1B_UA

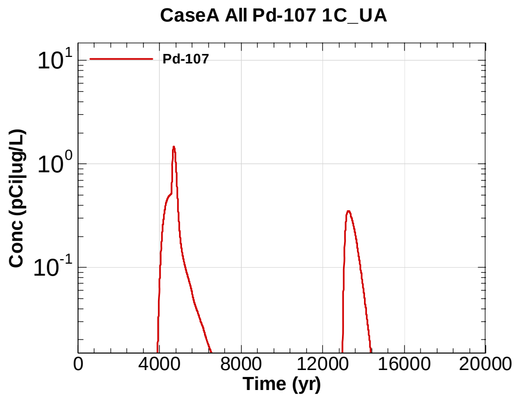

Figure G.1-199 - 1m Aquifer Concentration for CaseA All Pd-107 1C_UA

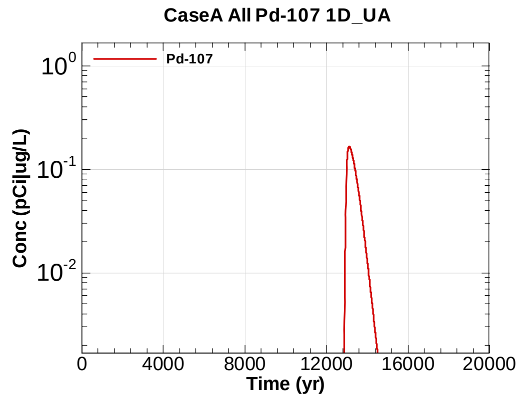

Figure G.1-200 - 1m Aquifer Concentration for CaseA All Pd-107 1D_UA

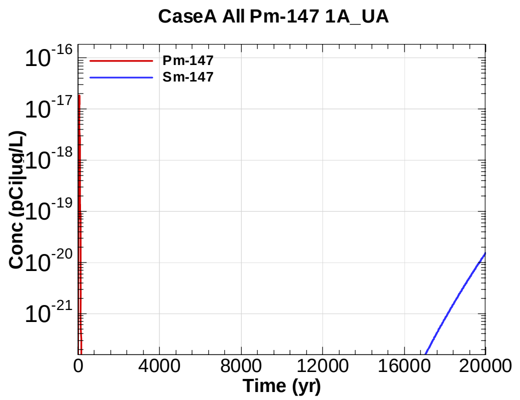

Figure G.1-201 - 1m Aquifer Concentration for CaseA All Pm-147 1A_UA

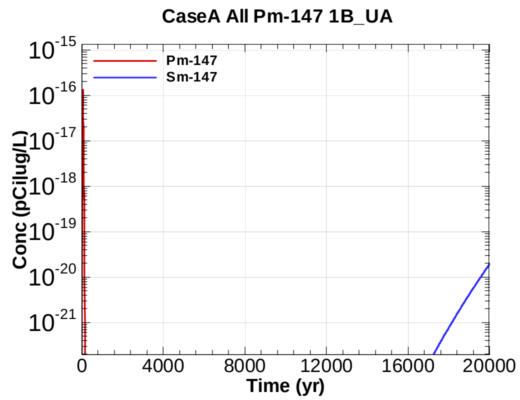

Figure G.1-202 - 1m Aquifer Concentration for CaseA All Pm-147 1B_UA

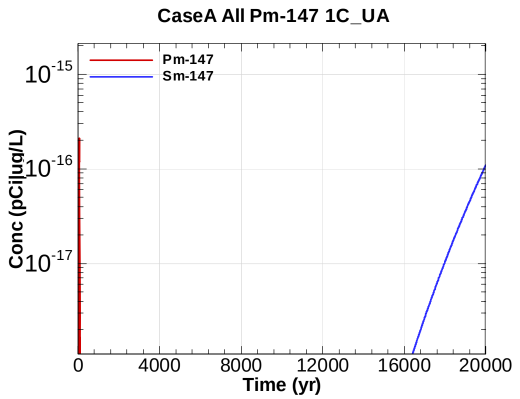

Figure G.1-203 - 1m Aquifer Concentration for CaseA All Pm-147 1C_UA

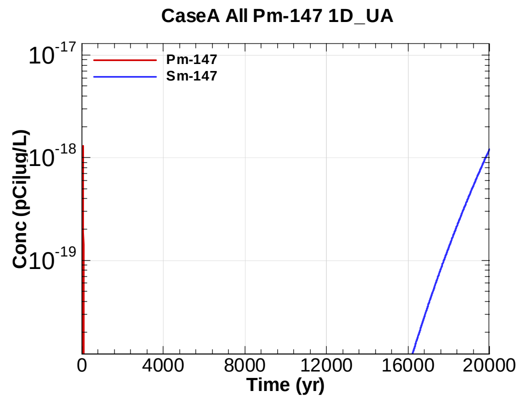

Figure G.1-204 - 1m Aquifer Concentration for CaseA All Pm-147 1D_UA

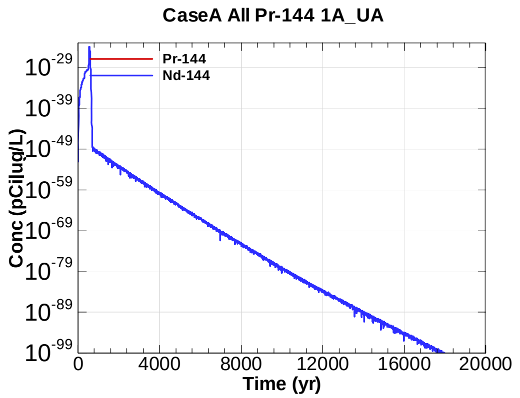

Figure G.1-205 - 1m Aquifer Concentration for CaseA All Pr-144 1A_UA

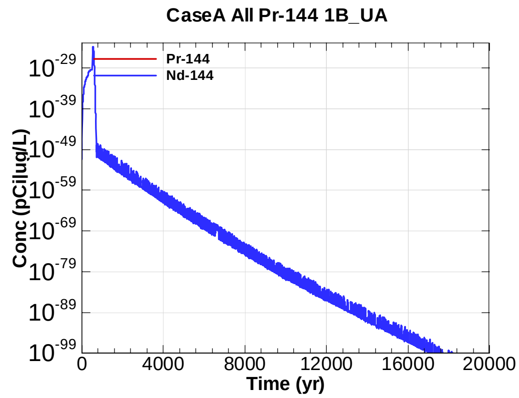

Figure G.1-206 - 1m Aquifer Concentration for CaseA All Pr-144 1B_UA

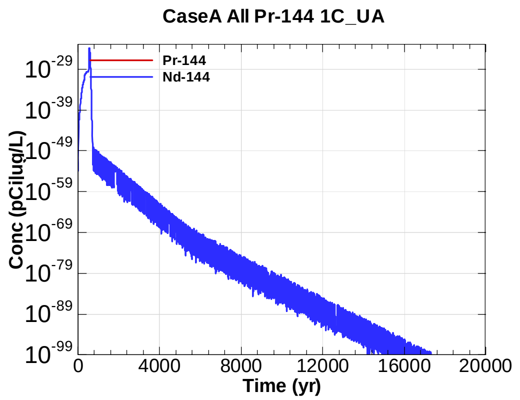

Figure G.1-207 - 1m Aquifer Concentration for CaseA All Pr-144 1C_UA

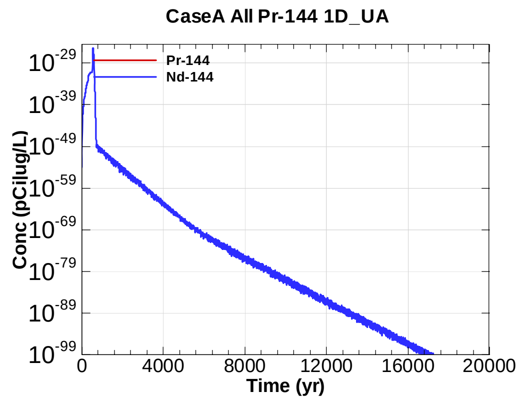

Figure G.1-208 - 1m Aquifer Concentration for CaseA All Pr-144 1D_UA

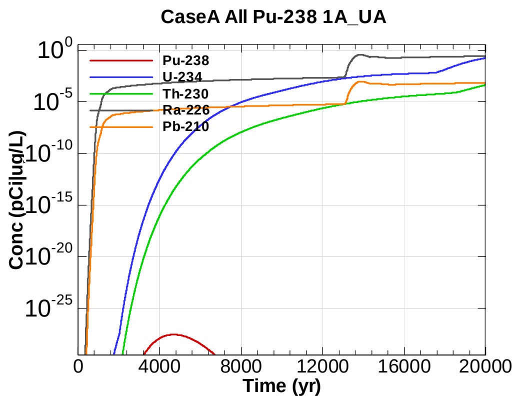

Figure G.1-209 - 1m Aquifer Concentration for CaseA All Pu-238 1A_UA

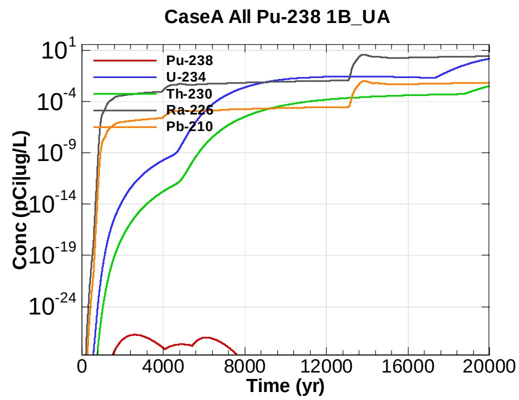

Figure G.1-210 - 1m Aquifer Concentration for CaseA All Pu-238 1B_UA

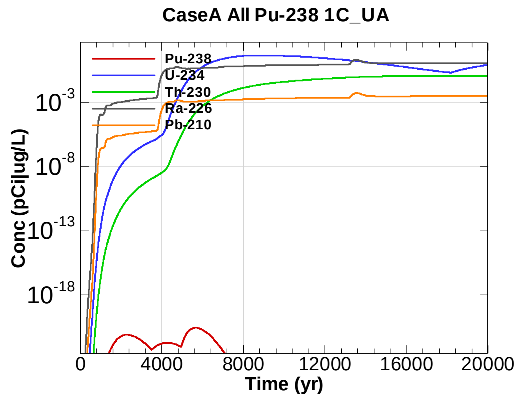

Figure G.1-211 - 1m Aquifer Concentration for CaseA All Pu-238 1C_UA

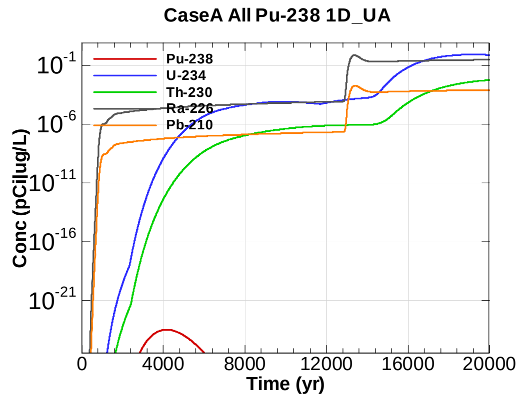

Figure G.1-212 - 1m Aquifer Concentration for CaseA All Pu-238 1D_UA

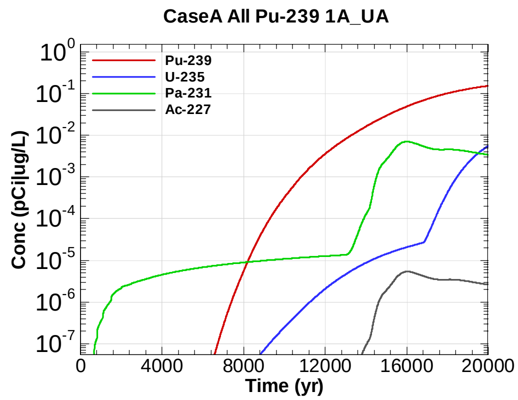

Figure G.1-213 - 1m Aquifer Concentration for CaseA All Pu-239 1A_UA

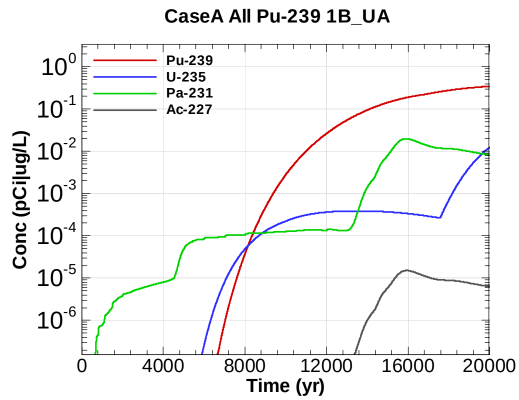

Figure G.1-214 - 1m Aquifer Concentration for CaseA All Pu-239 1B_UA

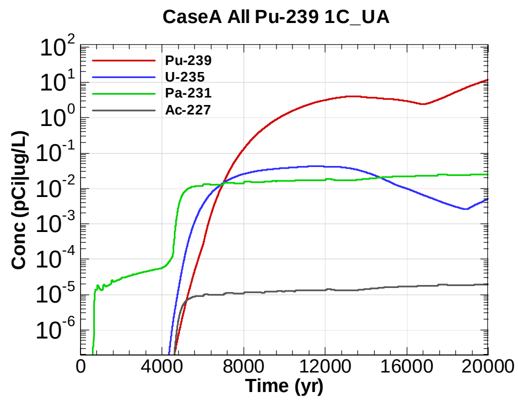

Figure G.1-215 - 1m Aquifer Concentration for CaseA All Pu-239 1C_UA

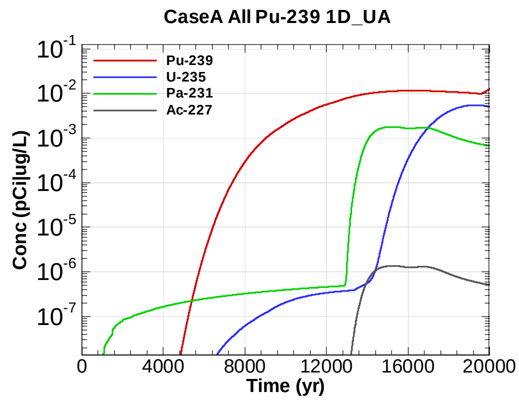

Figure G.1-216 - 1m Aquifer Concentration for CaseA All Pu-239 1D_UA

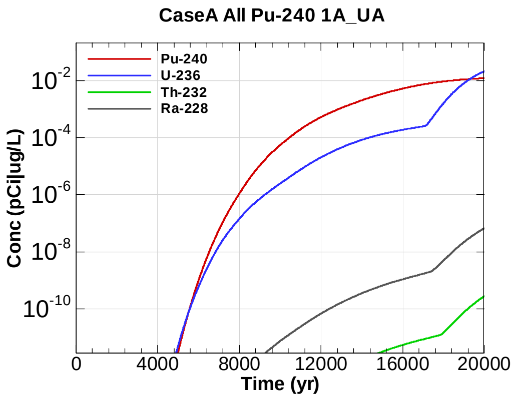

Figure G.1-217 - 1m Aquifer Concentration for CaseA All Pu-240 1A_UA

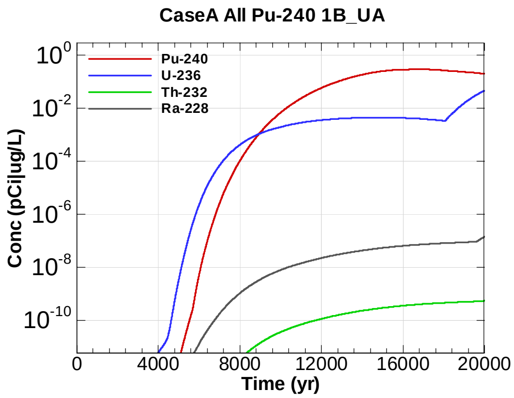

Figure G.1-218 - 1m Aquifer Concentration for CaseA All Pu-240 1B_UA

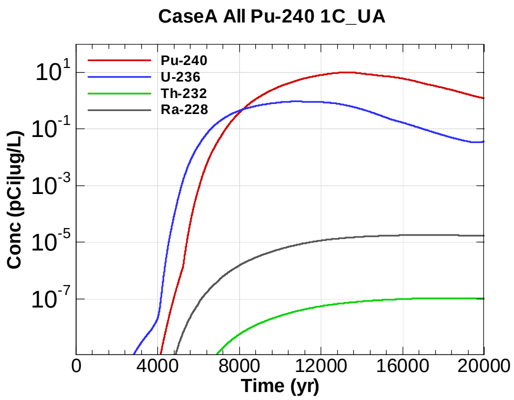

Figure G.1-219 - 1m Aquifer Concentration for CaseA All Pu-240 1C_UA

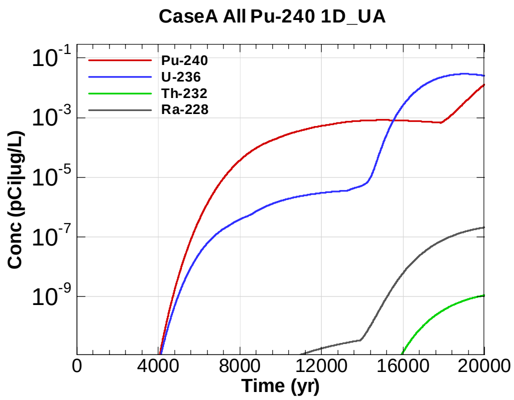

Figure G.1-220 - 1m Aquifer Concentration for CaseA All Pu-240 1D_UA

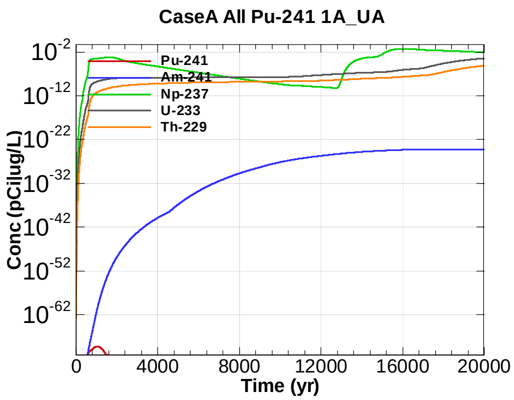

Figure G.1-221 - 1m Aquifer Concentration for CaseA All Pu-241 1A_UA

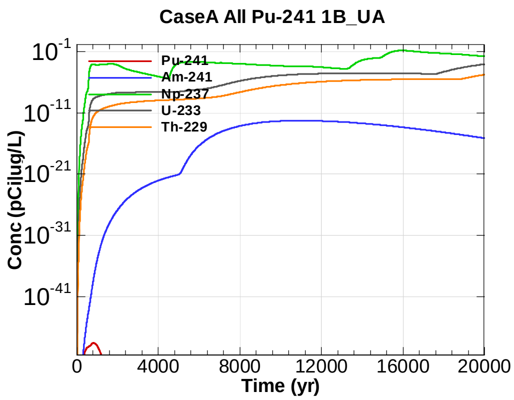

Figure G.1-222 - 1m Aquifer Concentration for CaseA All Pu-241 1B_UA

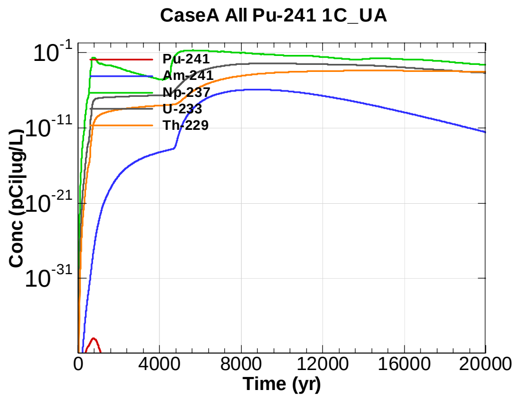

Figure G.1-223 - 1m Aquifer Concentration for CaseA All Pu-241 1C_UA

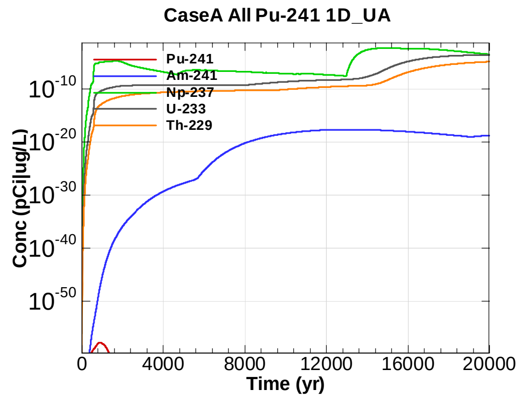

Figure G.1-224 - 1m Aquifer Concentration for CaseA All Pu-241 1D_UA

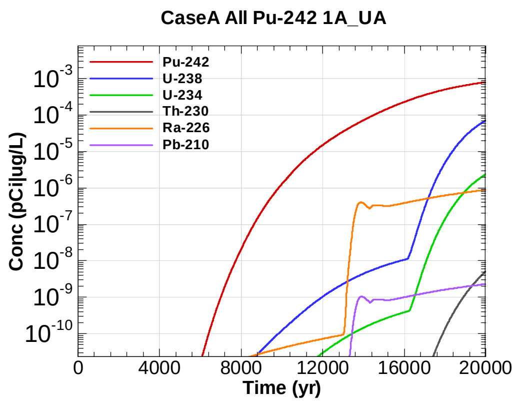

Figure G.1-225 - 1m Aquifer Concentration for CaseA All Pu-242 1A_UA

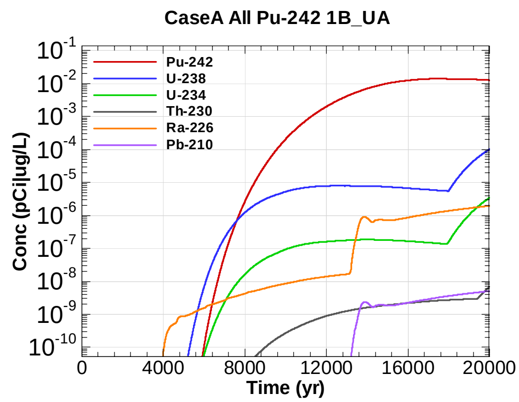

Figure G.1-226 - 1m Aquifer Concentration for CaseA All Pu-242 1B_UA

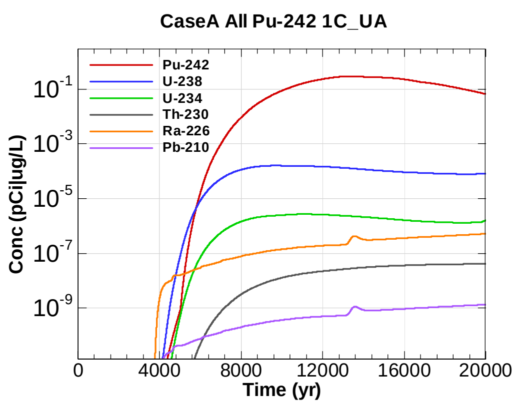

Figure G.1-227 - 1m Aquifer Concentration for CaseA All Pu-242 1C_UA

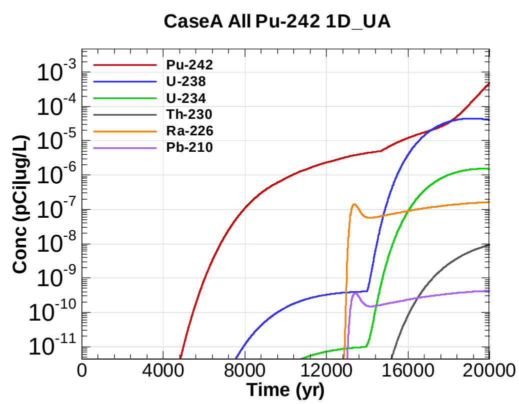

Figure G.1-228 - 1m Aquifer Concentration for CaseA All Pu-242 1D_UA

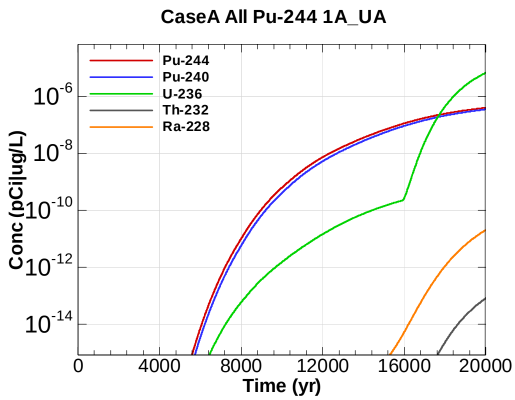

Figure G.1-229 - 1m Aquifer Concentration for CaseA All Pu-244 1A_UA

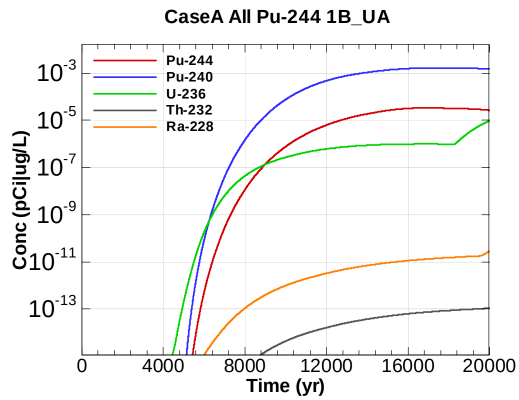

Figure G.1-230 - 1m Aquifer Concentration for CaseA All Pu-244 1B_UA

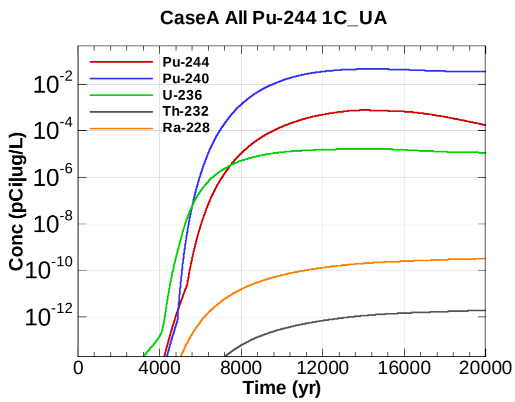

Figure G.1-231 - 1m Aquifer Concentration for CaseA All Pu-244 1C_UA

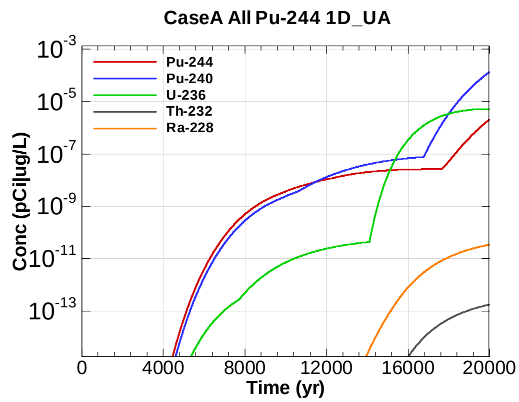

Figure G.1-232 - 1m Aquifer Concentration for CaseA All Pu-244 1D_UA

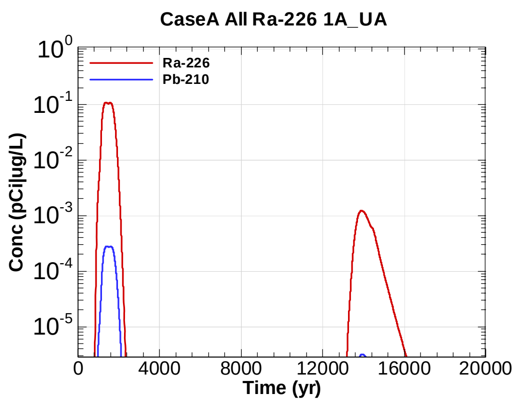

Figure G.1-233 - 1m Aquifer Concentration for CaseA All Ra-226 1A_UA

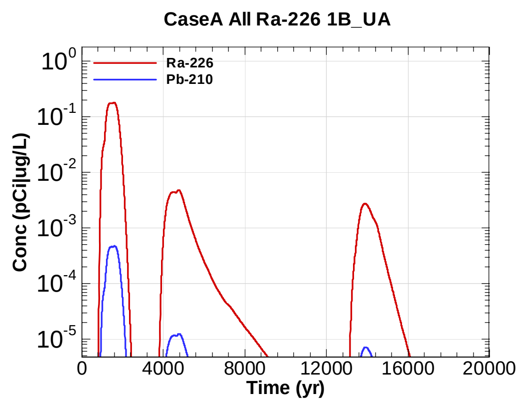

Figure G.1-234 - 1m Aquifer Concentration for CaseA All Ra-226 1B_UA

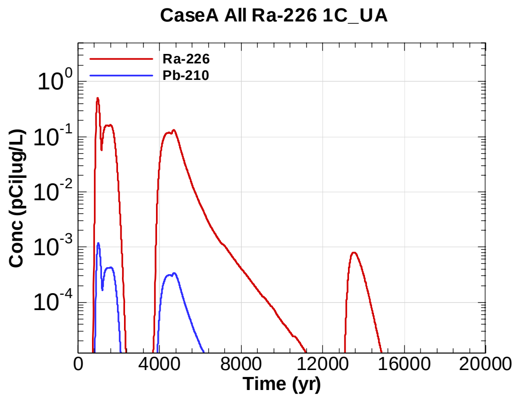

Figure G.1-235 - 1m Aquifer Concentration for CaseA All Ra-226 1C_UA

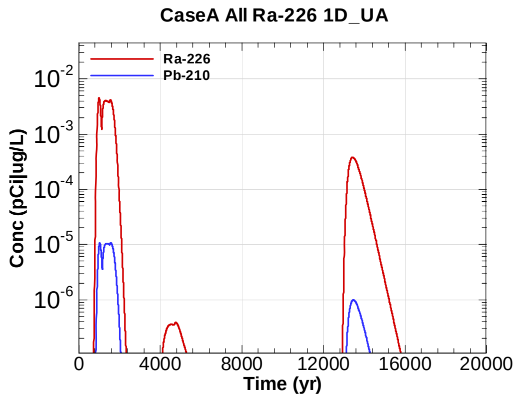

Figure G.1-236 - 1m Aquifer Concentration for CaseA All Ra-226 1D_UA

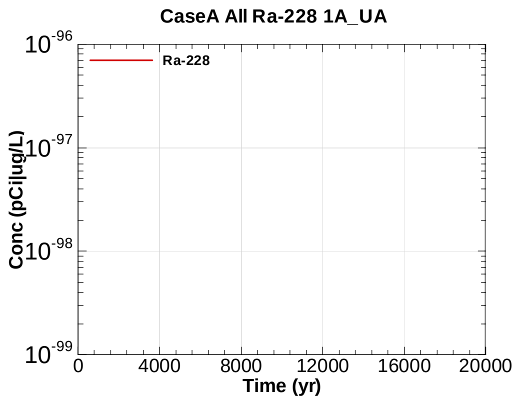

Figure G.1-237 - 1m Aquifer Concentration for CaseA All Ra-228 1A_UA

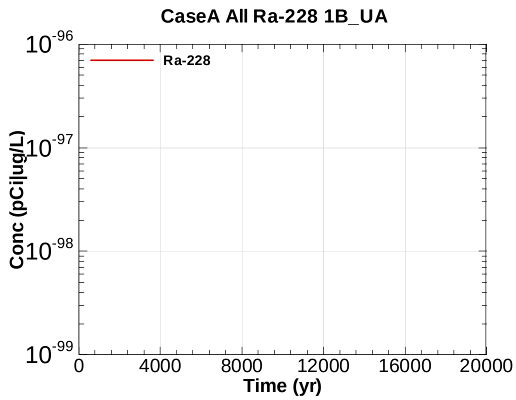

Figure G.1-238 - 1m Aquifer Concentration for CaseA All Ra-228 1B_UA

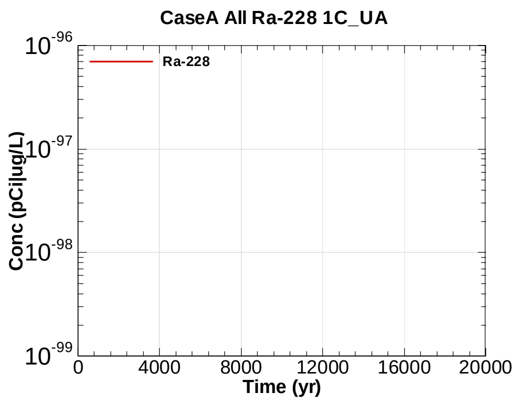

Figure G.1-239 - 1m Aquifer Concentration for CaseA All Ra-228 1C_UA

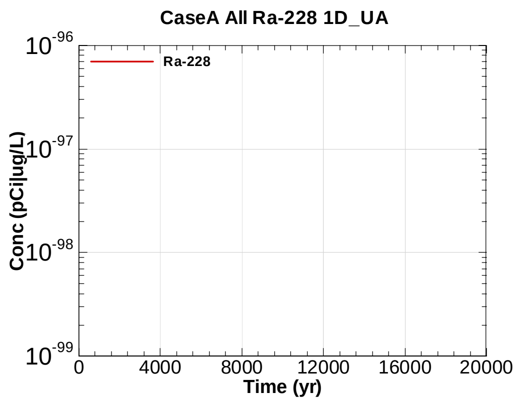

Figure G.1-240 - 1m Aquifer Concentration for CaseA All Ra-228 1D_UA

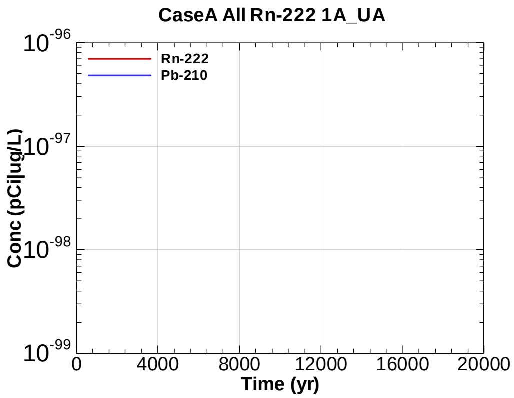

Figure G.1-241 - 1m Aquifer Concentration for CaseA All Rn-222 1A_UA

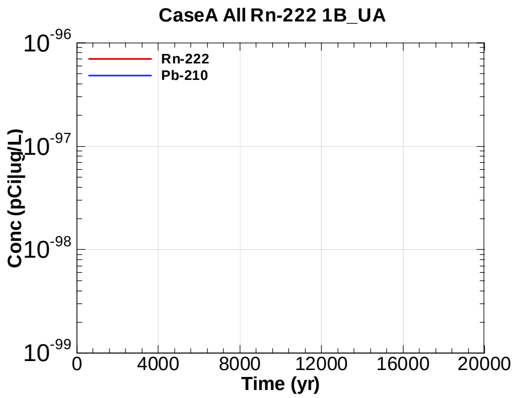

Figure G.1-242 - 1m Aquifer Concentration for CaseA All Rn-222 1B_UA

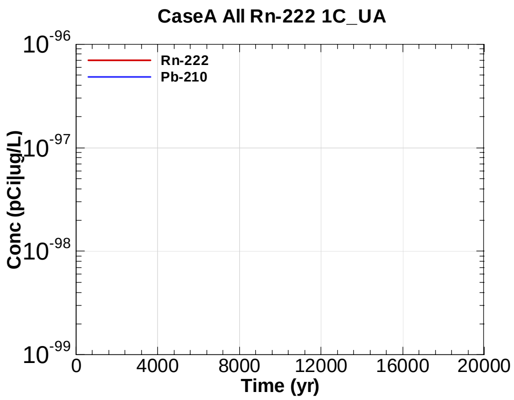

Figure G.1-243 - 1m Aquifer Concentration for CaseA All Rn-222 1C_UA

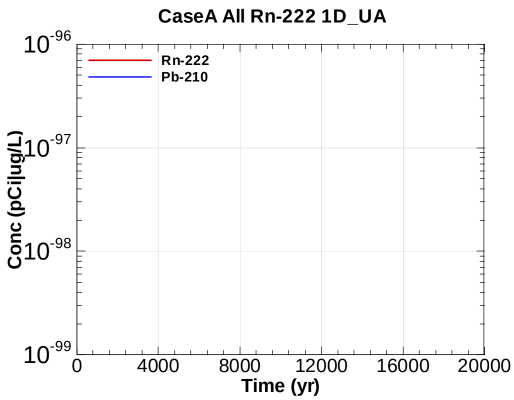

Figure G.1-244 - 1m Aquifer Concentration for CaseA All Rn-222 1D_UA

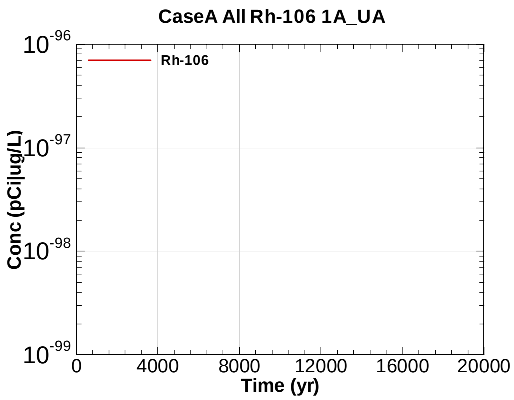

Figure G.1-245 - 1m Aquifer Concentration for CaseA All Rh-106 1A_UA

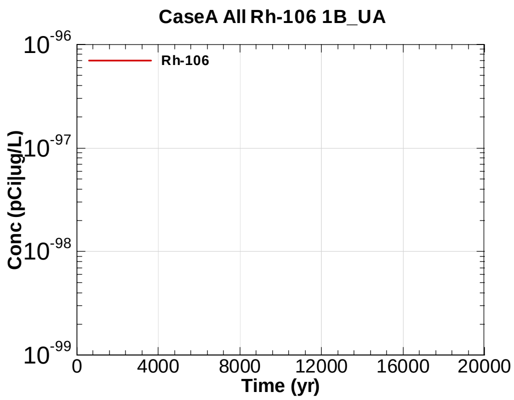

Figure G.1-246 - 1m Aquifer Concentration for CaseA All Rh-106 1B_UA

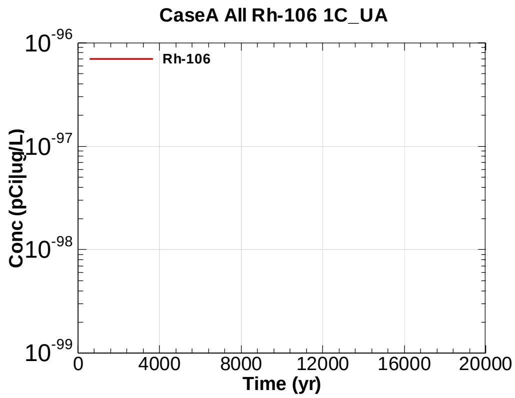

Figure G.1-247 - 1m Aquifer Concentration for CaseA All Rh-106 1C_UA

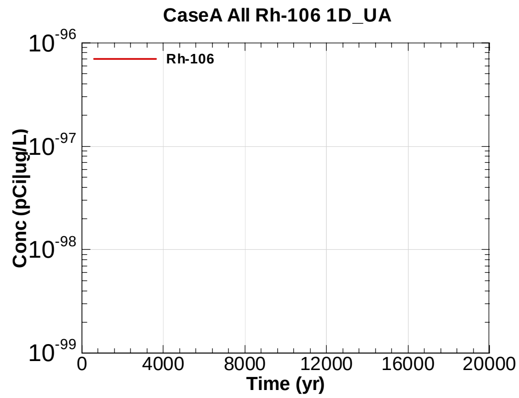

Figure G.1-248 - 1m Aquifer Concentration for CaseA All Rh-106 1D_UA

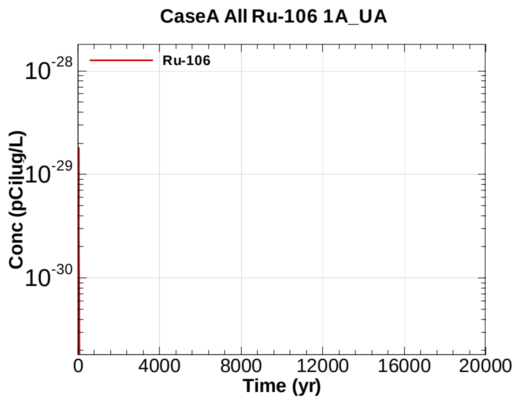

Figure G.1-249 - 1m Aquifer Concentration for CaseA All Ru-106 1A_UA

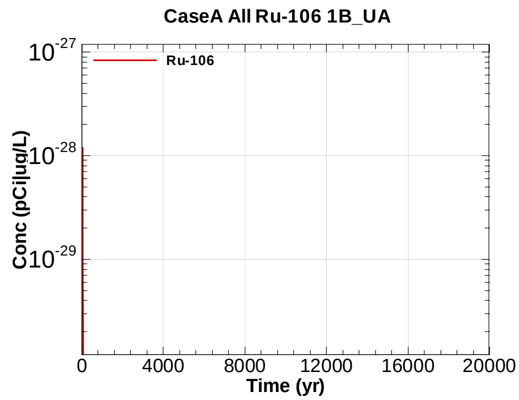

Figure G.1-250 - 1m Aquifer Concentration for CaseA All Ru-106 1B_UA

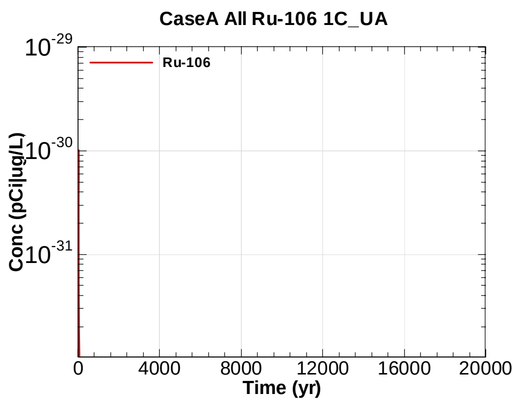

Figure G.1-251 - 1m Aquifer Concentration for CaseA All Ru-106 1C_UA

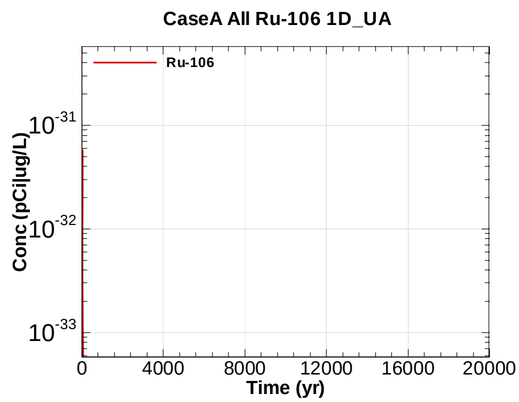

Figure G.1-252 - 1m Aquifer Concentration for CaseA All Ru-106 1D_UA

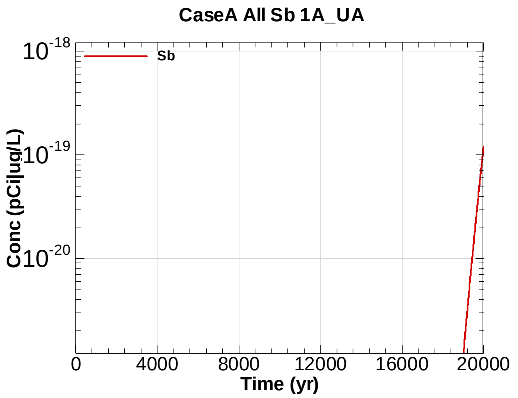

Figure G.1-253 - 1m Aquifer Concentration for CaseA All Sb 1A_UA

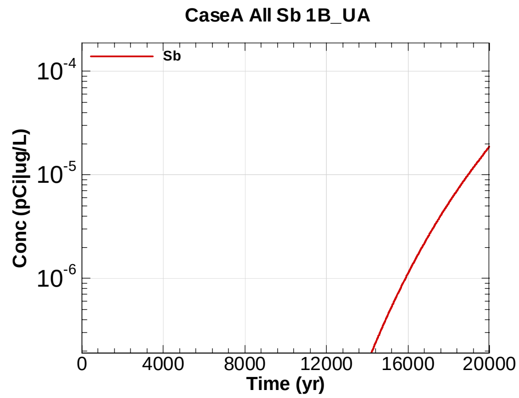

Figure G.1-254 - 1m Aquifer Concentration for CaseA All Sb 1B_UA

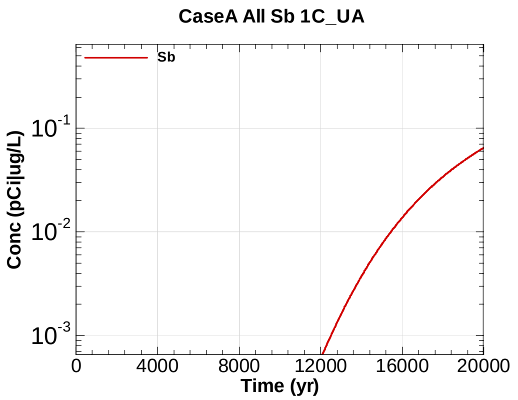

Figure G.1-255 - 1m Aquifer Concentration for CaseA All Sb 1C_UA

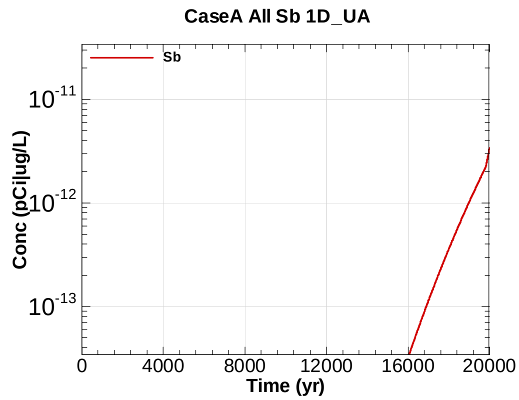

Figure G.1-256 - 1m Aquifer Concentration for CaseA All Sb 1D_UA

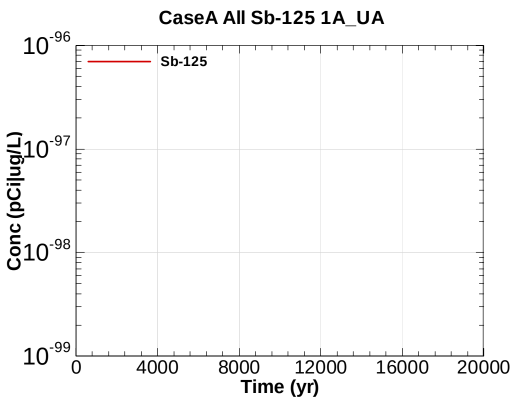

Figure G.1-257 - 1m Aquifer Concentration for CaseA All Sb-125 1A_UA

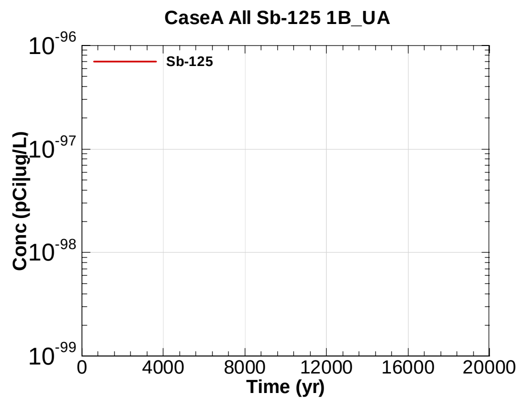

Figure G.1-258 - 1m Aquifer Concentration for CaseA All Sb-125 1B_UA

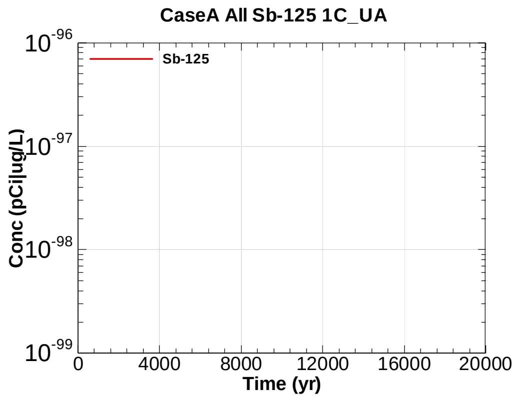

Figure G.1-259 - 1m Aquifer Concentration for CaseA All Sb-125 1C_UA

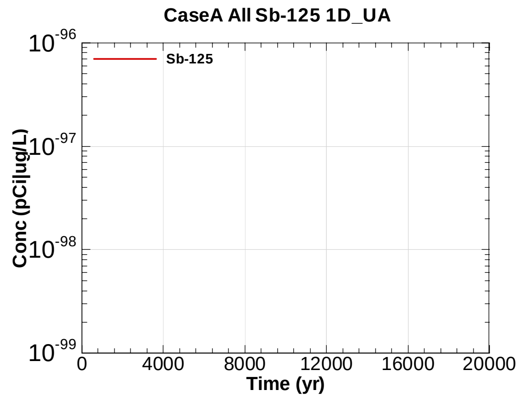

Figure G.1-260 - 1m Aquifer Concentration for CaseA All Sb-125 1D_UA

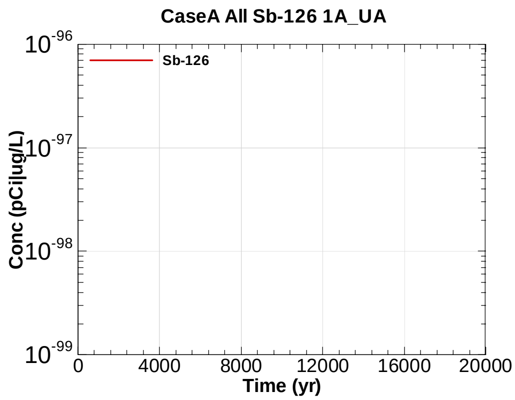

Figure G.1-261 - 1m Aquifer Concentration for CaseA All Sb-126 1A_UA

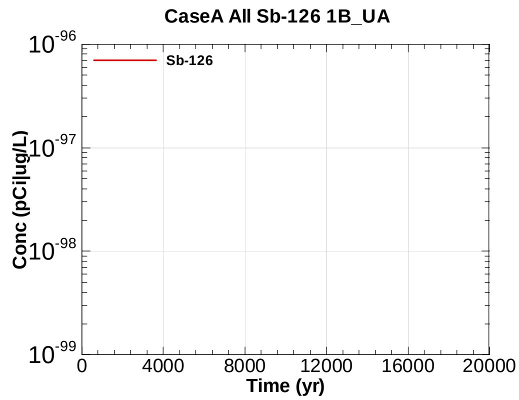

Figure G.1-262 - 1m Aquifer Concentration for CaseA All Sb-126 1B_UA

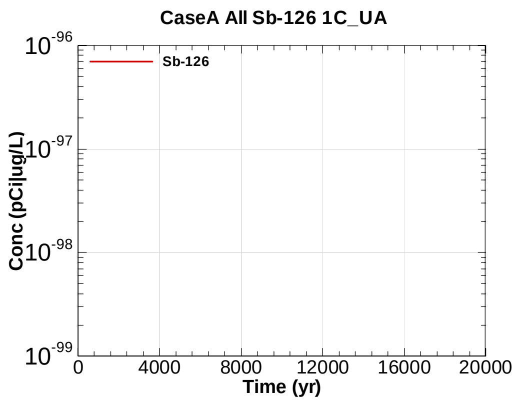

Figure G.1-263 - 1m Aquifer Concentration for CaseA All Sb-126 1C_UA

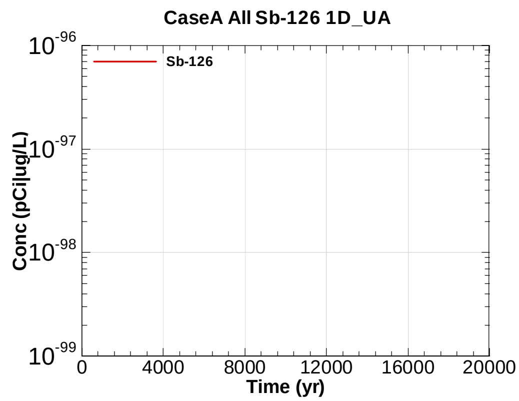

Figure G.1-264 - 1m Aquifer Concentration for CaseA All Sb-126 1D_UA

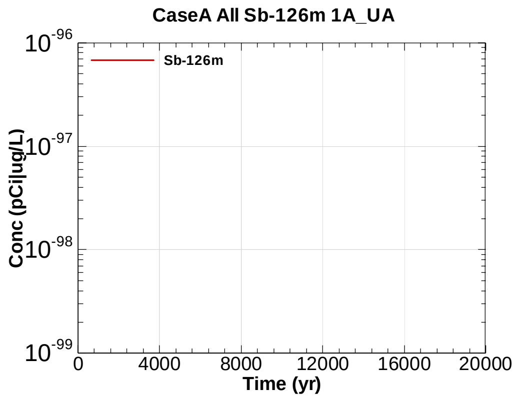

Figure G.1-265 - 1m Aquifer Concentration for CaseA All Sb-126m 1A_UA

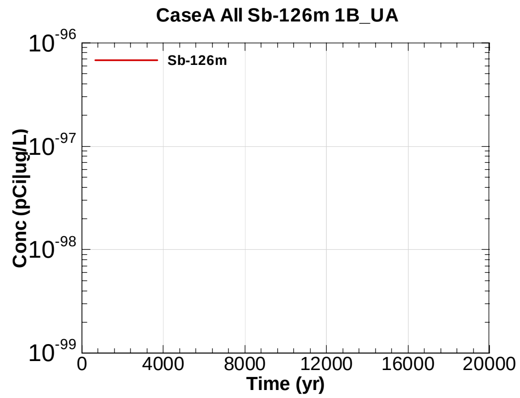

Figure G.1-266 - 1m Aquifer Concentration for CaseA All Sb-126m 1B_UA

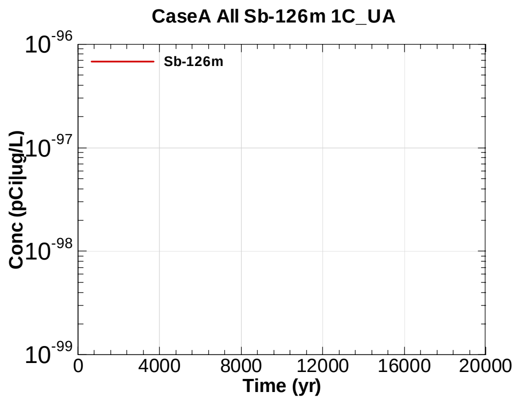

Figure G.1-267 - 1m Aquifer Concentration for CaseA All Sb-126m 1C_UA

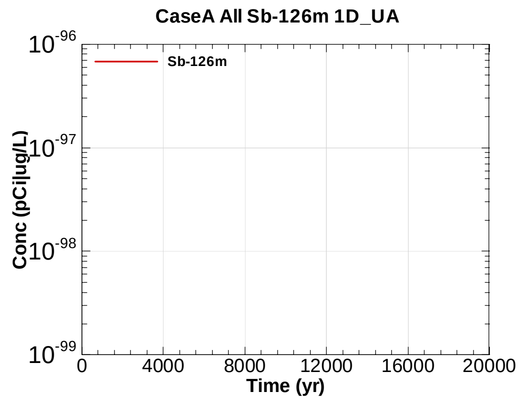

Figure G.1-268 - 1m Aquifer Concentration for CaseA All Sb-126m 1D_UA

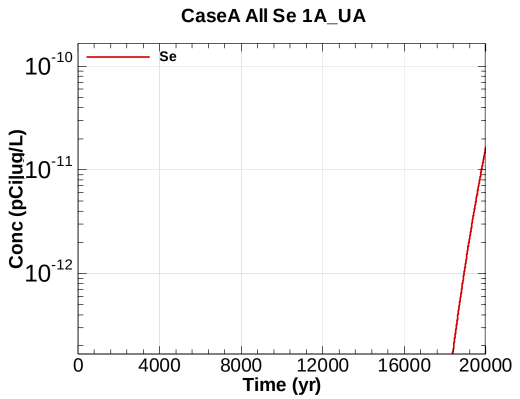

Figure G.1-269 - 1m Aquifer Concentration for CaseA All Se 1A_UA

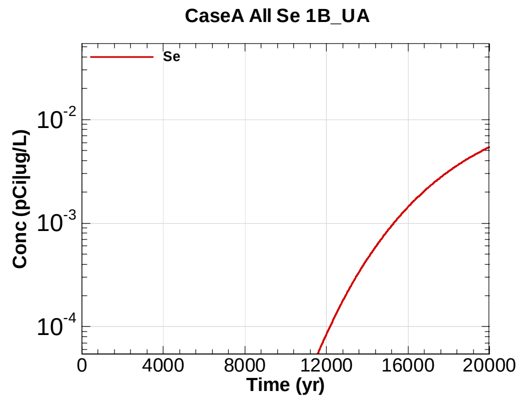

Figure G.1-270 - 1m Aquifer Concentration for CaseA All Se 1B_UA

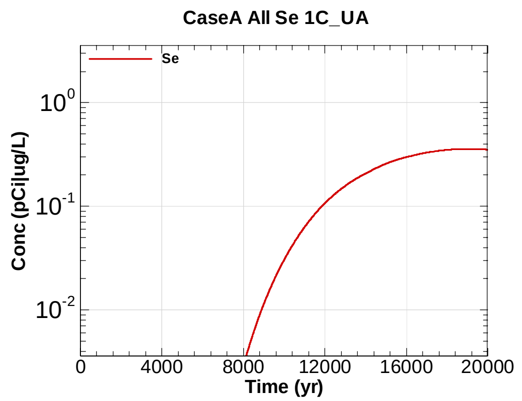

Figure G.1-271 - 1m Aquifer Concentration for CaseA All Se 1C_UA

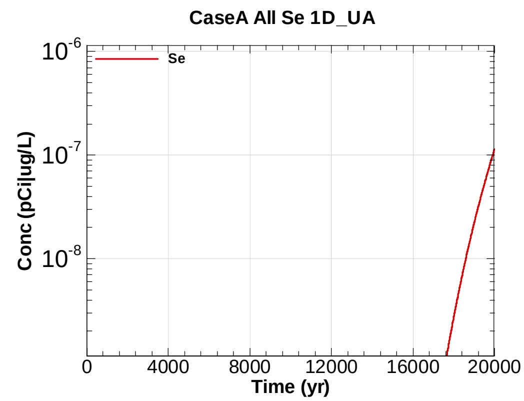

Figure G.1-272 - 1m Aquifer Concentration for CaseA All Se 1D_UA

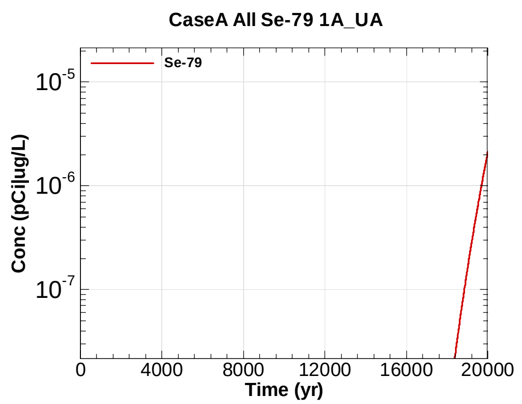

Figure G.1-273 - 1m Aquifer Concentration for CaseA All Se-79 1A_UA

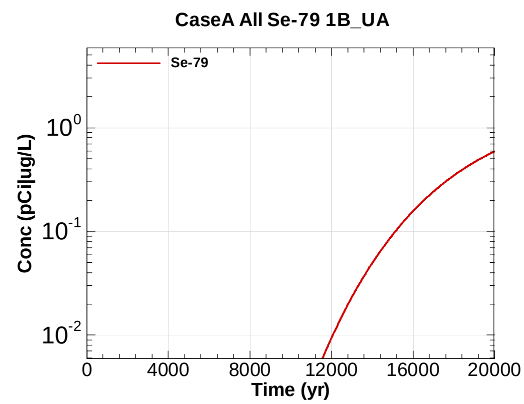

Figure G.1-274 - 1m Aquifer Concentration for CaseA All Se-79 1B_UA

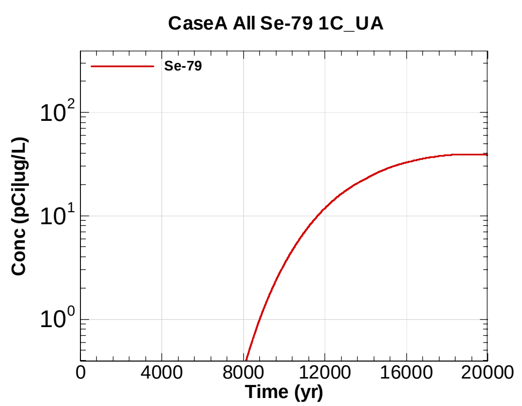

Figure G.1-275 - 1m Aquifer Concentration for CaseA All Se-79 1C_UA

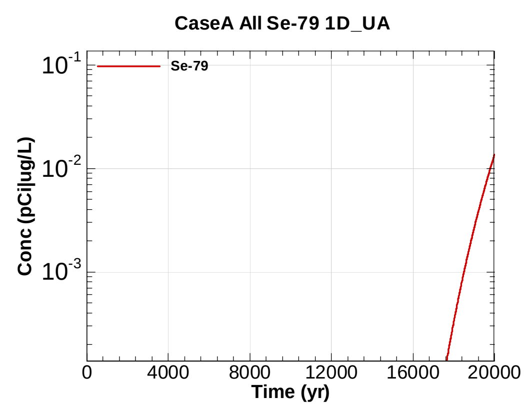

Figure G.1-276 - 1m Aquifer Concentration for CaseA All Se-79 1D_UA

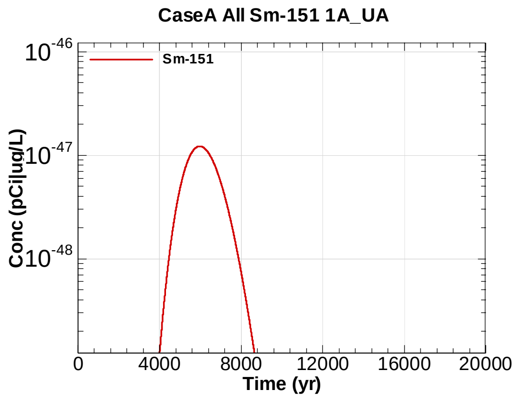

Figure G.1-277 - 1m Aquifer Concentration for CaseA All Sm-151 1A_UA

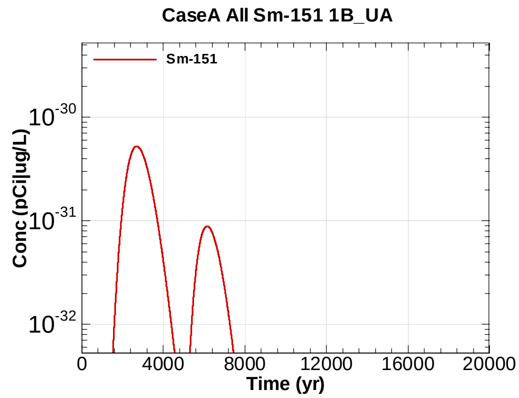

Figure G.1-278 - 1m Aquifer Concentration for CaseA All Sm-151 1B_UA

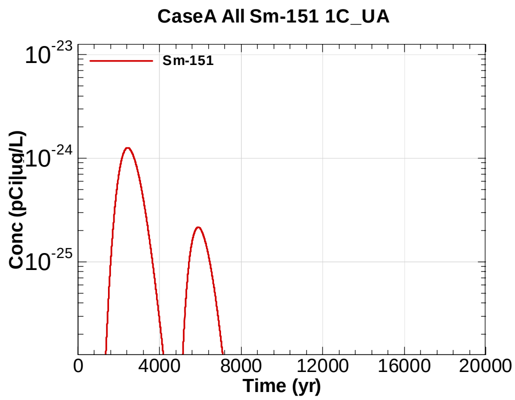

Figure G.1-279 - 1m Aquifer Concentration for CaseA All Sm-151 1C_UA

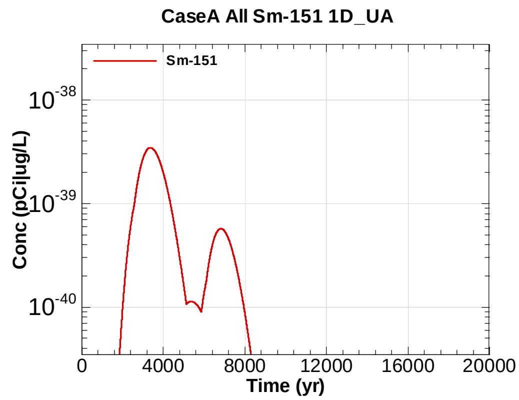

Figure G.1-280 - 1m Aquifer Concentration for CaseA All Sm-151 1D_UA

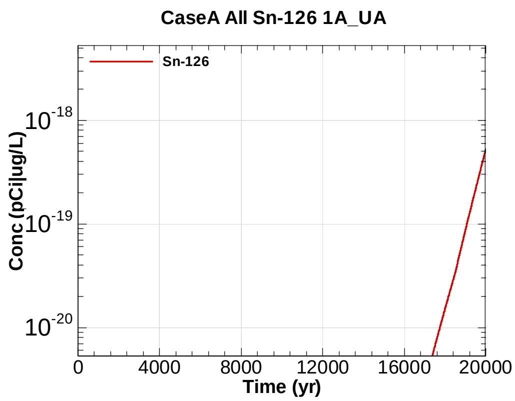

Figure G.1-281 - 1m Aquifer Concentration for CaseA All Sn-126 1A_UA

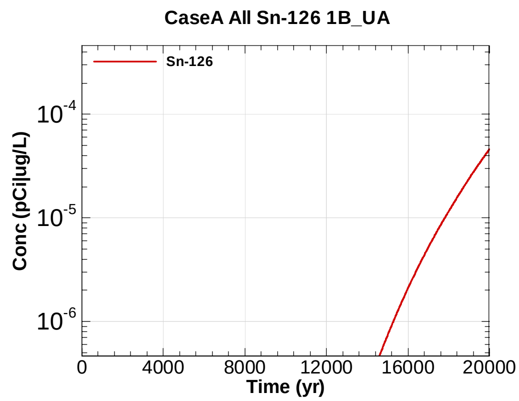

Figure G.1-282 - 1m Aquifer Concentration for CaseA All Sn-126 1B_UA

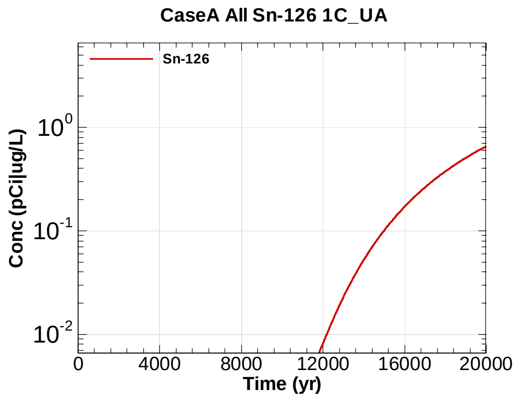

Figure G.1-283 - 1m Aquifer Concentration for CaseA All Sn-126 1C_UA

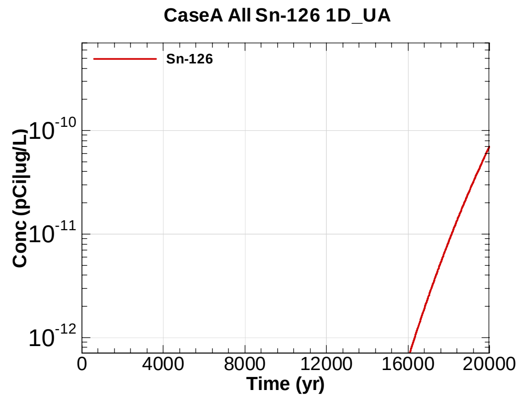

Figure G.1-284 - 1m Aquifer Concentration for CaseA All Sn-126 1D_UA

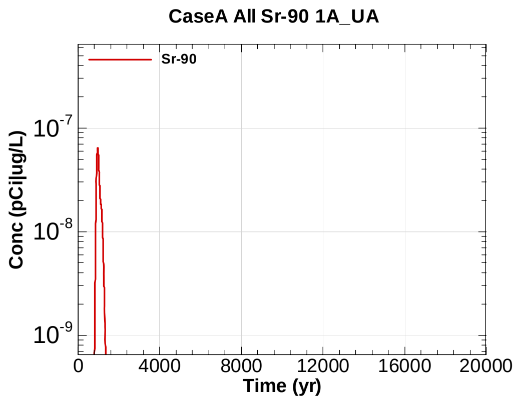

Figure G.1-285 - 1m Aquifer Concentration for CaseA All Sr-90 1A_UA

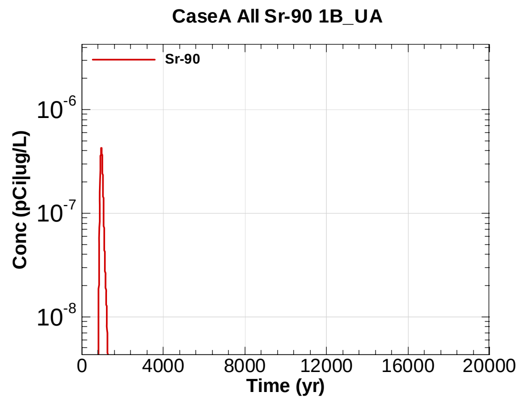

Figure G.1-286 - 1m Aquifer Concentration for CaseA All Sr-90 1B_UA

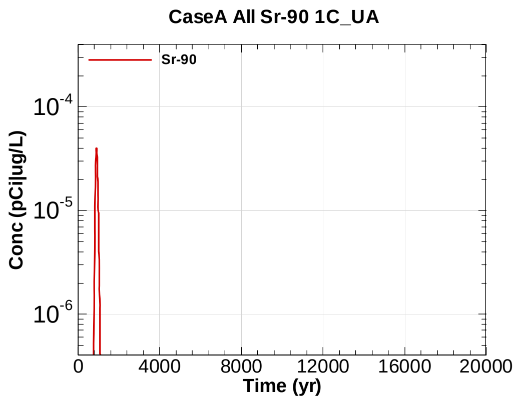

Figure G.1-287 - 1m Aquifer Concentration for CaseA All Sr-90 1C_UA

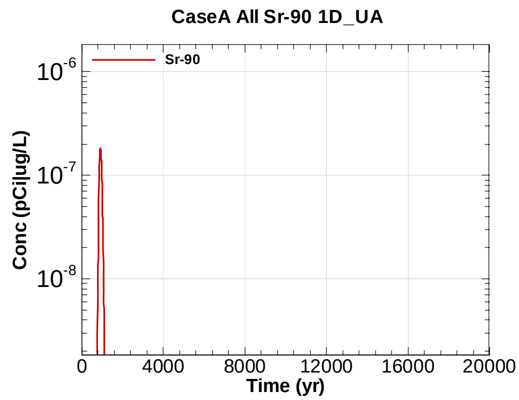

Figure G.1-288 - 1m Aquifer Concentration for CaseA All Sr-90 1D_UA

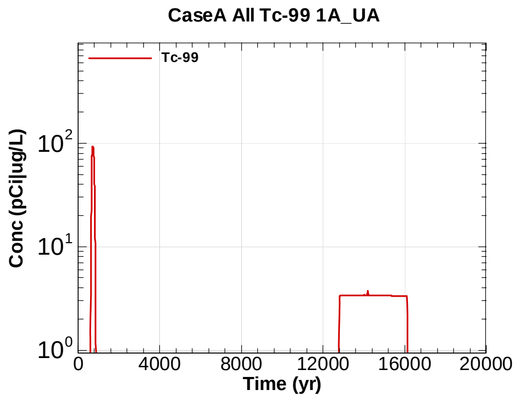

Figure G.1-289 - 1m Aquifer Concentration for CaseA All Tc-99 1A_UA

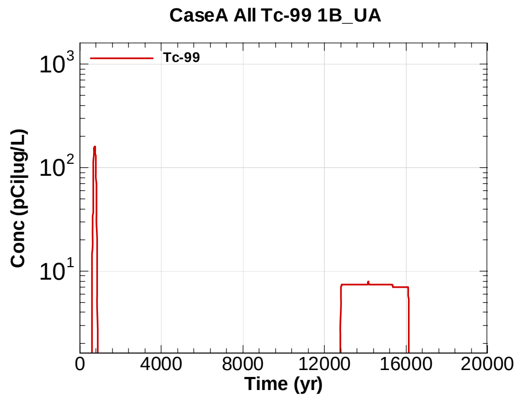

Figure G.1-290 - 1m Aquifer Concentration for CaseA All Tc-99 1B_UA

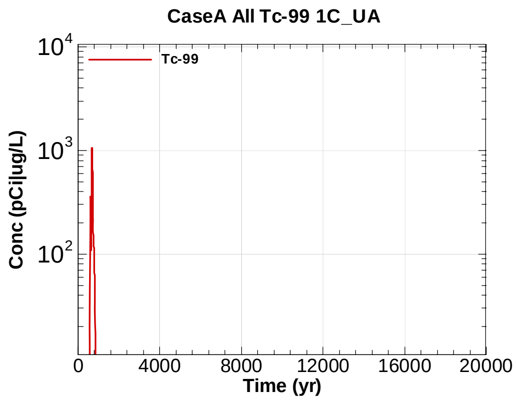

Figure G.1-291 - 1m Aquifer Concentration for CaseA All Tc-99 1C_UA

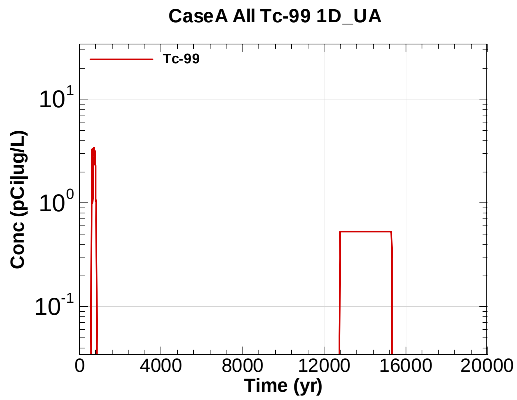

Figure G.1-292 - 1m Aquifer Concentration for CaseA All Tc-99 1D_UA

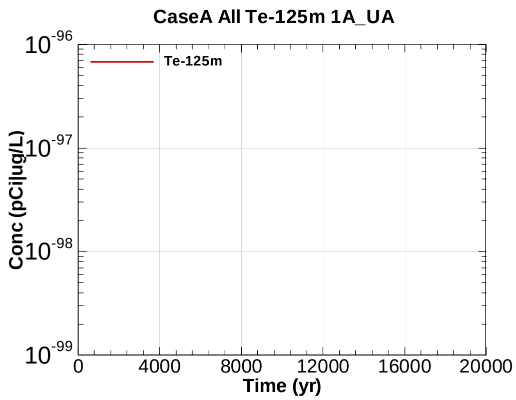

Figure G.1-293 - 1m Aquifer Concentration for CaseA All Te-125m 1A_UA

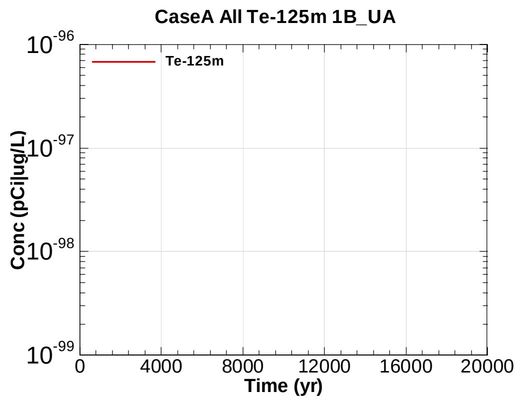

Figure G.1-294 - 1m Aquifer Concentration for CaseA All Te-125m 1B_UA

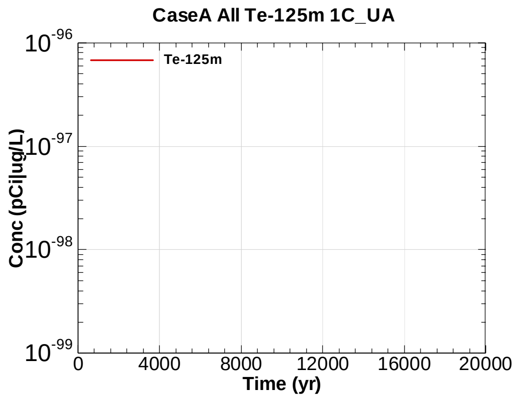

Figure G.1-295 - 1m Aquifer Concentration for CaseA All Te-125m 1C_UA

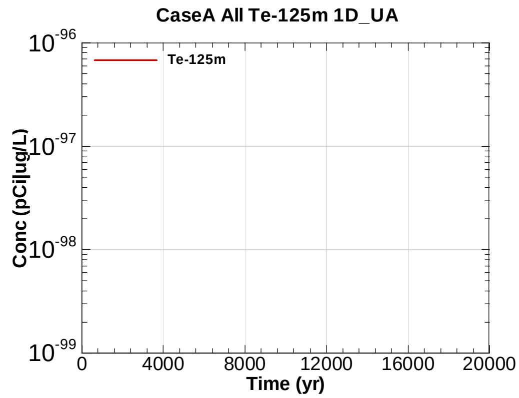

Figure G.1-296 - 1m Aquifer Concentration for CaseA All Te-125m 1D_UA

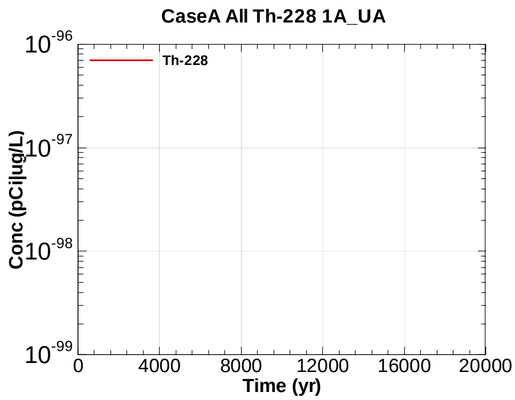

Figure G.1-297 - 1m Aquifer Concentration for CaseA All Th-228 1A_UA

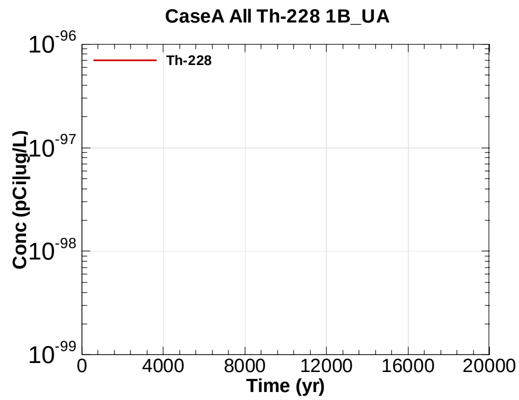

Figure G.1-298 - 1m Aquifer Concentration for CaseA All Th-228 1B_UA

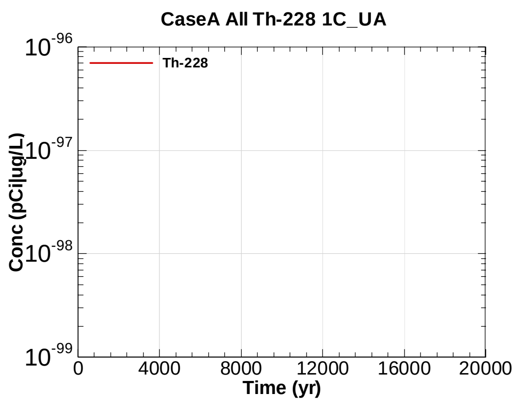

Figure G.1-299 - 1m Aquifer Concentration for CaseA All Th-228 1C_UA

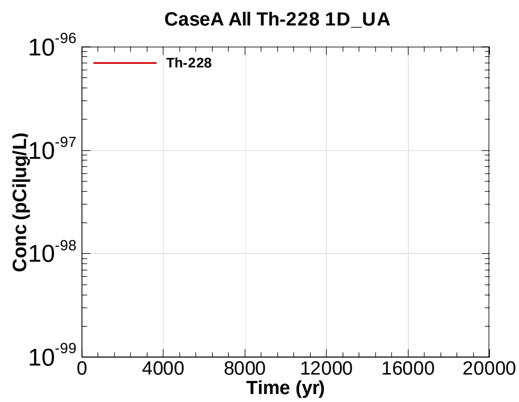

Figure G.1-300 - 1m Aquifer Concentration for CaseA All Th-228 1D_UA

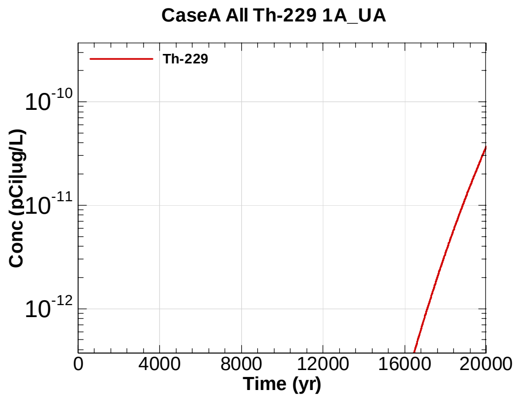

Figure G.1-301 - 1m Aquifer Concentration for CaseA All Th-229 1A_UA

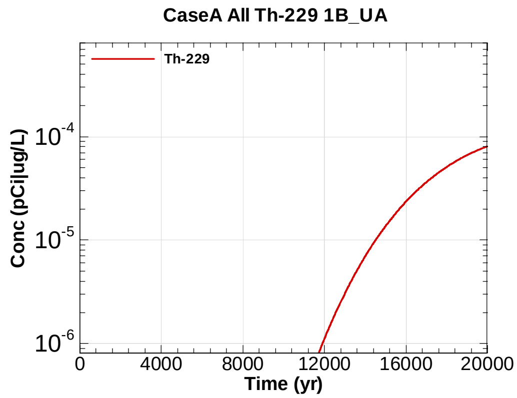

Figure G.1-302 - 1m Aquifer Concentration for CaseA All Th-229 1B_UA

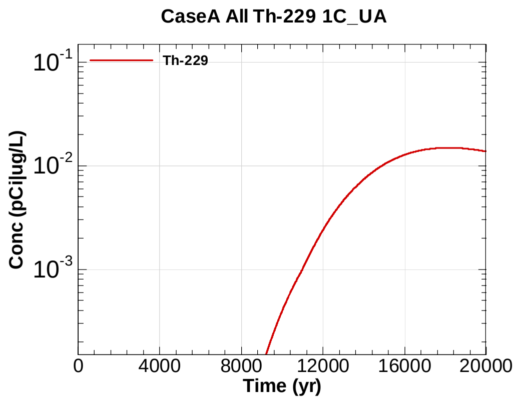

Figure G.1-303 - 1m Aquifer Concentration for CaseA All Th-229 1C_UA

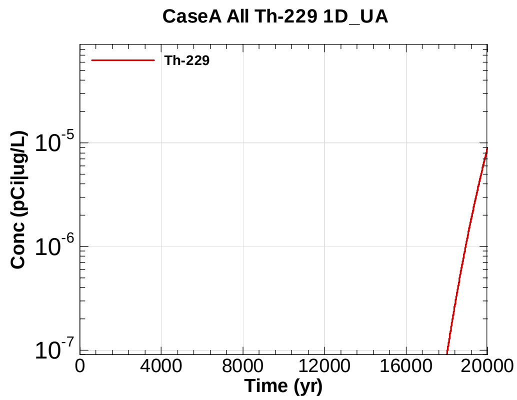

Figure G.1-304 - 1m Aquifer Concentration for CaseA All Th-229 1D_UA

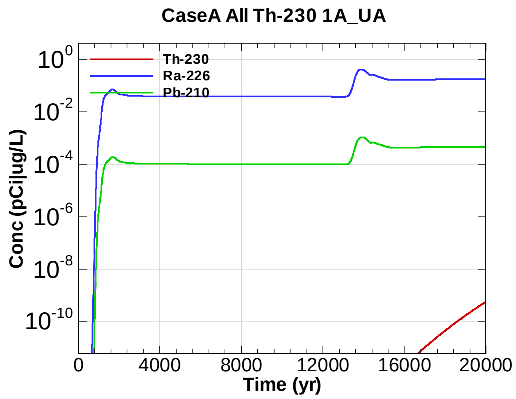

Figure G.1-305 - 1m Aquifer Concentration for CaseA All Th-230 1A_UA

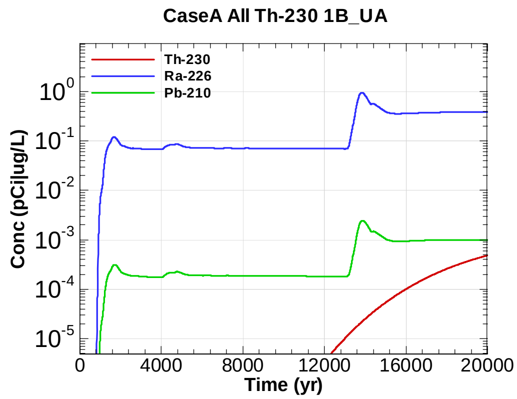

Figure G.1-306 - 1m Aquifer Concentration for CaseA All Th-230 1B_UA

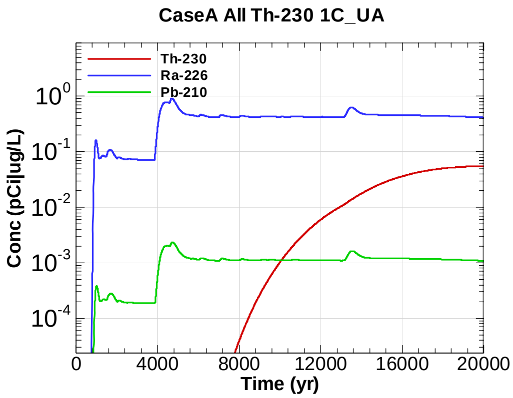

Figure G.1-307 - 1m Aquifer Concentration for CaseA All Th-230 1C_UA

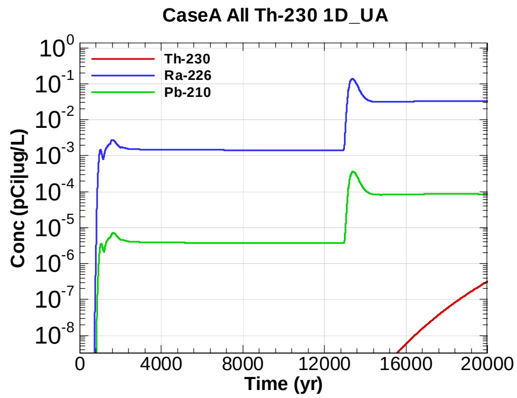

Figure G.1-308 - 1m Aquifer Concentration for CaseA All Th-230 1D_UA

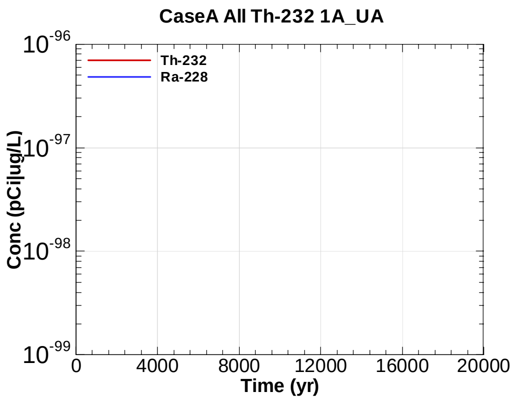

Figure G.1-309 - 1m Aquifer Concentration for CaseA All Th-232 1A_UA

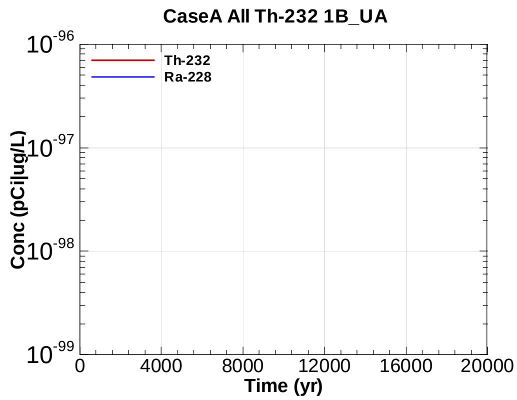

Figure G.1-310 - 1m Aquifer Concentration for CaseA All Th-232 1B_UA

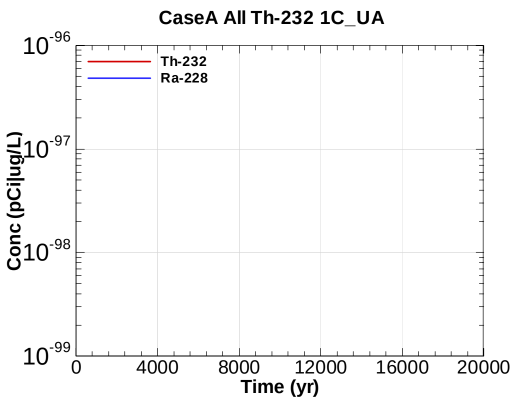

Figure G.1-311 - 1m Aquifer Concentration for CaseA All Th-232 1C_UA

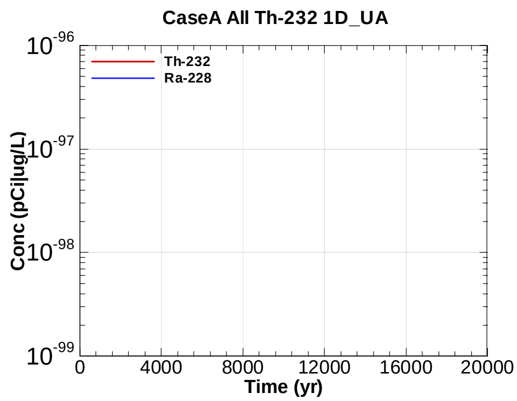

Figure G.1-312 - 1m Aquifer Concentration for CaseA All Th-232 1D_UA

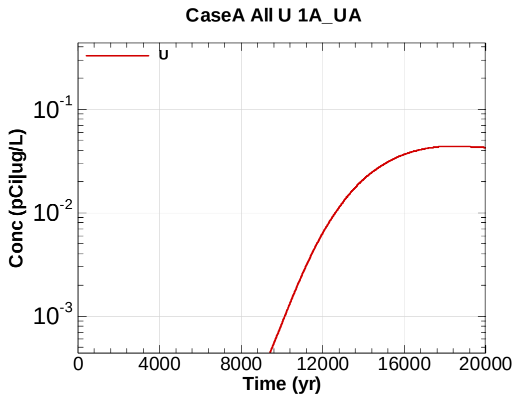

Figure G.1-313 - 1m Aquifer Concentration for CaseA All U 1A_UA

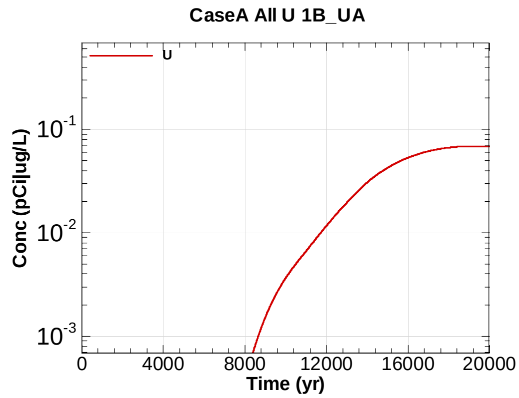

Figure G.1-314 - 1m Aquifer Concentration for CaseA All U 1B_UA

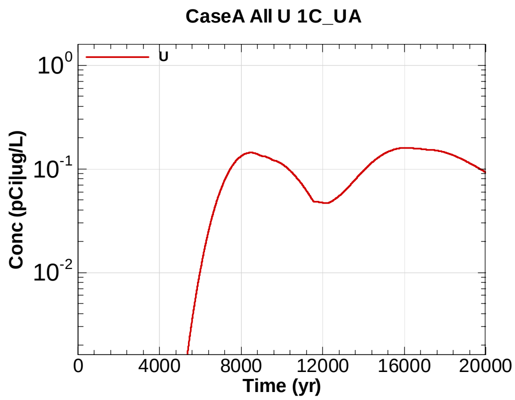

Figure G.1-315 - 1m Aquifer Concentration for CaseA All U 1C_UA

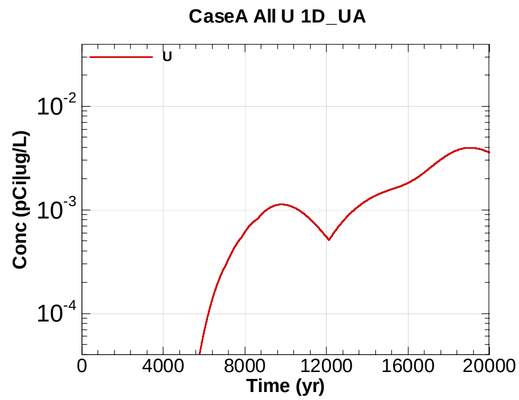

Figure G.1-316 - 1m Aquifer Concentration for CaseA All U 1D_UA

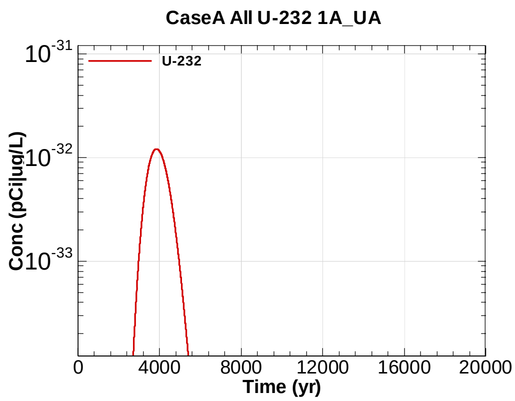

Figure G.1-317 - 1m Aquifer Concentration for CaseA All U-232 1A_UA

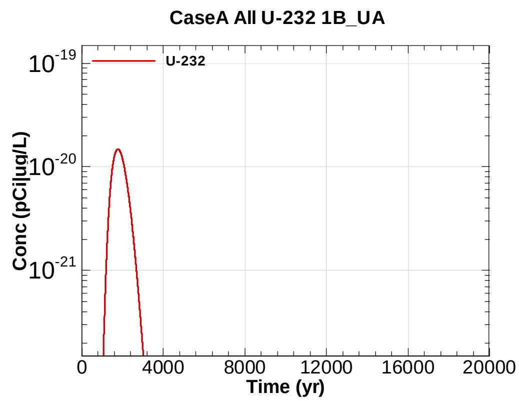

Figure G.1-318 - 1m Aquifer Concentration for CaseA All U-232 1B_UA

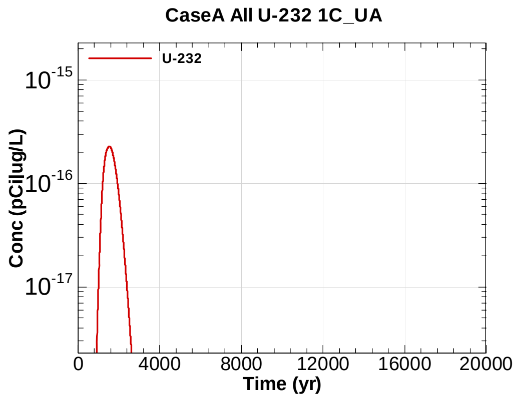

Figure G.1-319 - 1m Aquifer Concentration for CaseA All U-232 1C_UA

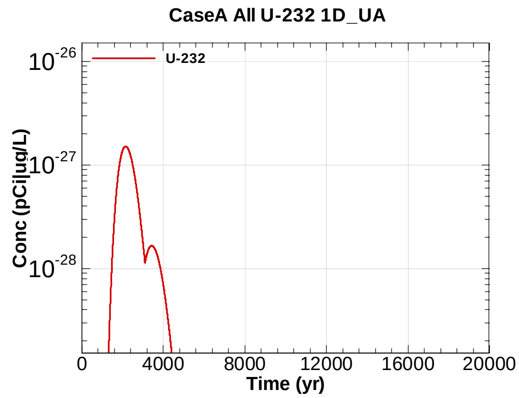

Figure G.1-320 - 1m Aquifer Concentration for CaseA All U-232 1D_UA

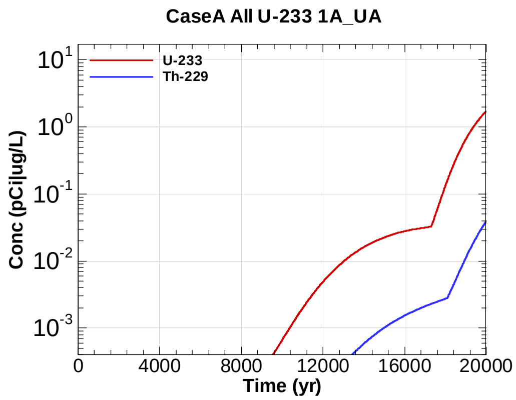

Figure G.1-321 - 1m Aquifer Concentration for CaseA All U-233 1A_UA

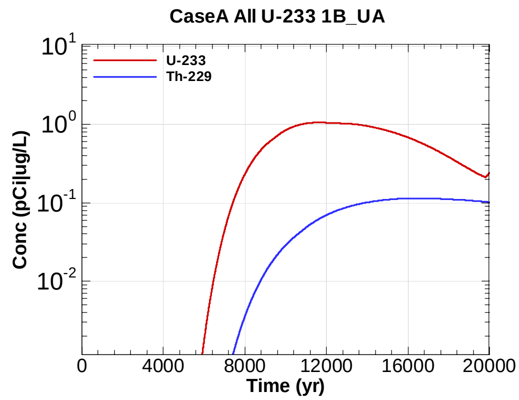

Figure G.1-322 - 1m Aquifer Concentration for CaseA All U-233 1B_UA

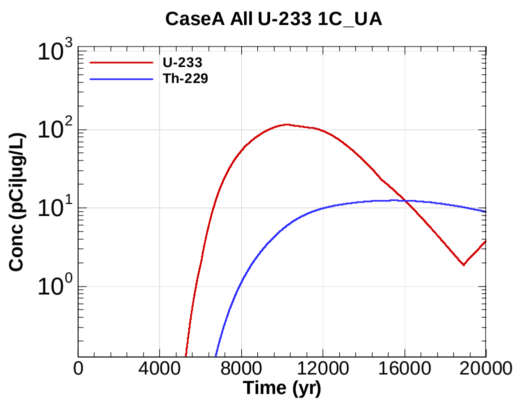

Figure G.1-323 - 1m Aquifer Concentration for CaseA All U-233 1C_UA

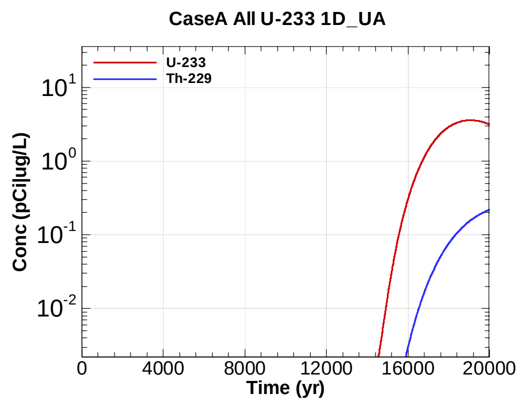

Figure G.1-324 - 1m Aquifer Concentration for CaseA All U-233 1D_UA

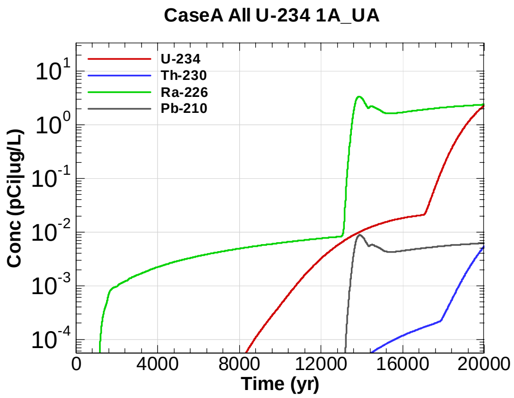

Figure G.1-325 - 1m Aquifer Concentration for CaseA All U-234 1A_UA

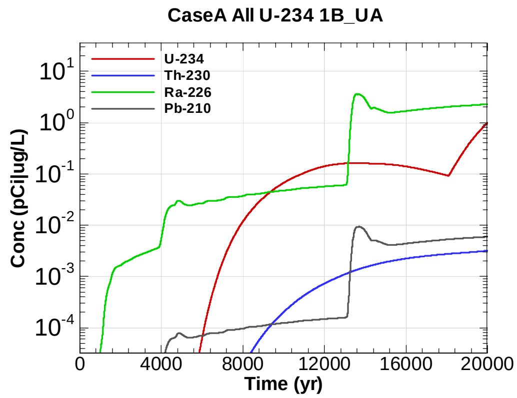

Figure G.1-326 - 1m Aquifer Concentration for CaseA All U-234 1B_UA

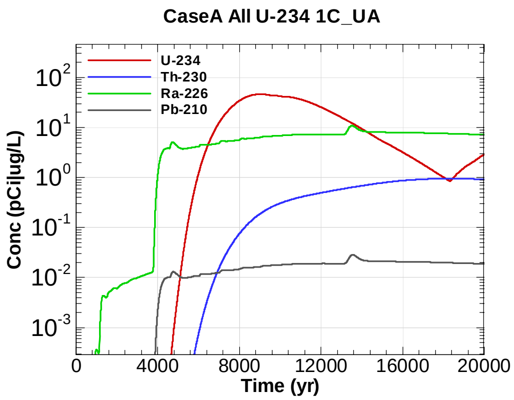

Figure G.1-327 - 1m Aquifer Concentration for CaseA All U-234 1C_UA

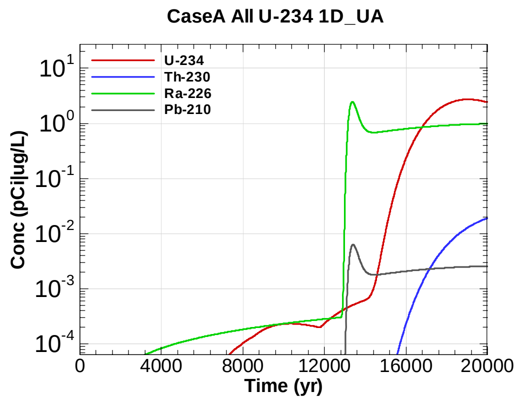

Figure G.1-328 - 1m Aquifer Concentration for CaseA All U-234 1D_UA

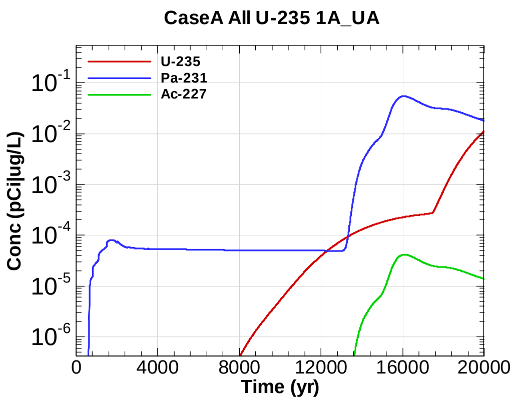

Figure G.1-329 - 1m Aquifer Concentration for CaseA All U-235 1A_UA

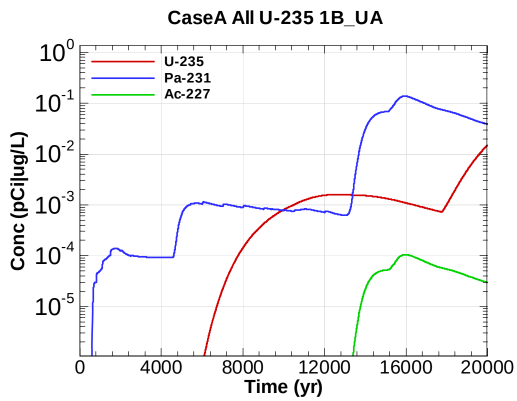

Figure G.1-330 - 1m Aquifer Concentration for CaseA All U-235 1B_UA

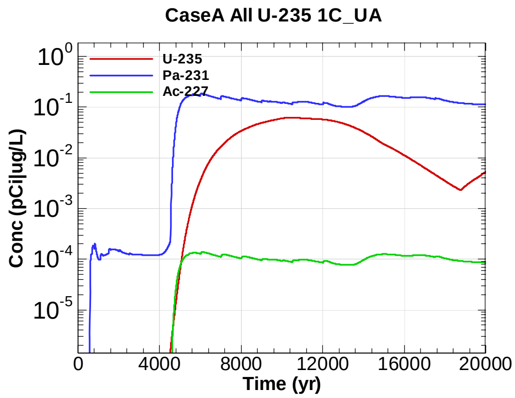

Figure G.1-331 - 1m Aquifer Concentration for CaseA All U-235 1C_UA

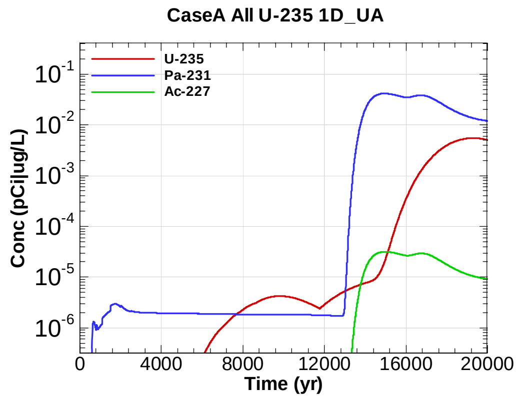

Figure G.1-332 - 1m Aquifer Concentration for CaseA All U-235 1D_UA

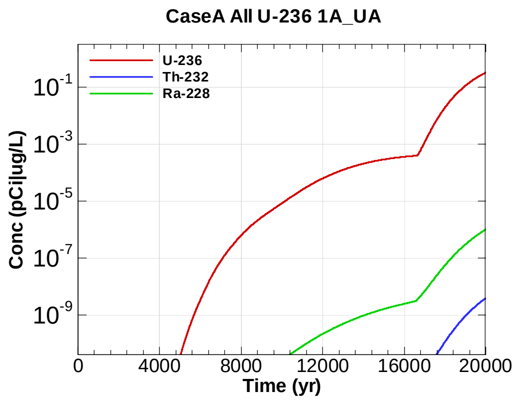

Figure G.1-333 - 1m Aquifer Concentration for CaseA All U-236 1A_UA

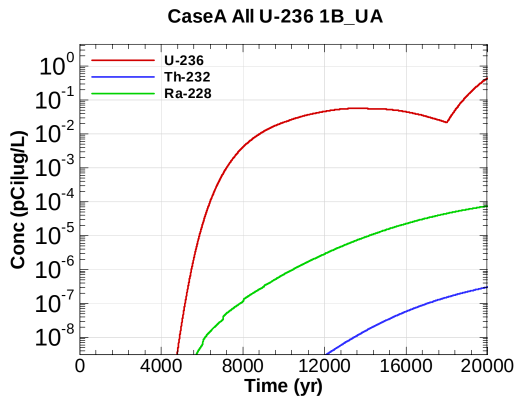

Figure G.1-334 - 1m Aquifer Concentration for CaseA All U-236 1B_UA

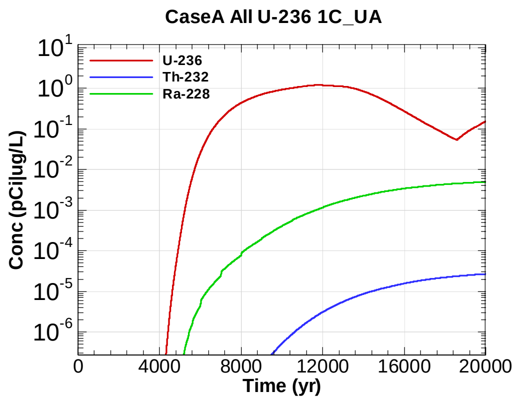

Figure G.1-335 - 1m Aquifer Concentration for CaseA All U-236 1C_UA

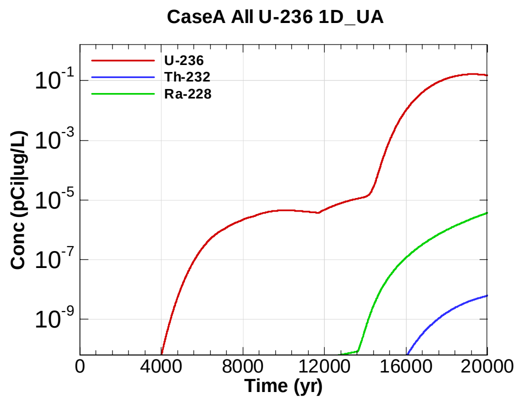

Figure G.1-336 - 1m Aquifer Concentration for CaseA All U-236 1D_UA

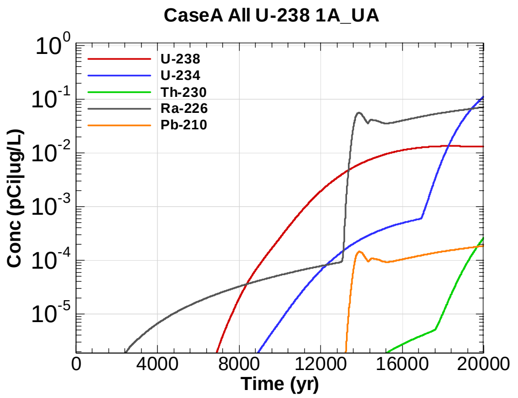

Figure G.1-337 - 1m Aquifer Concentration for CaseA All U-238 1A_UA

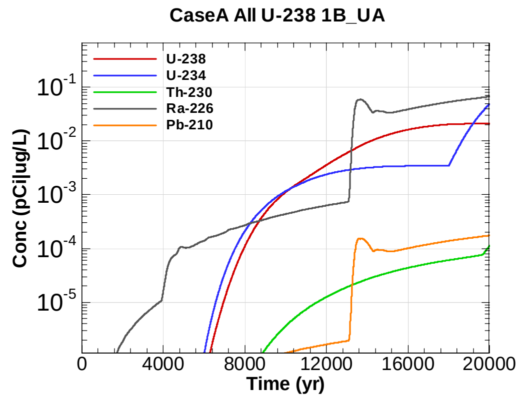

Figure G.1-338 - 1m Aquifer Concentration for CaseA All U-238 1B_UA

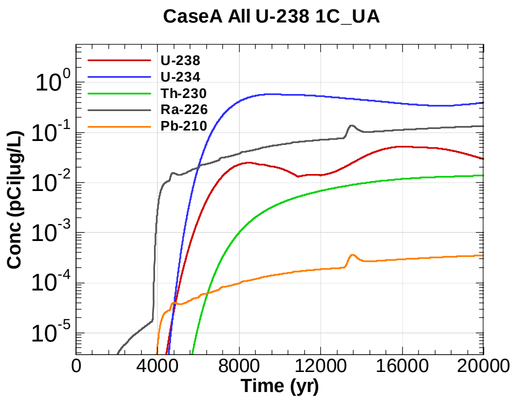

Figure G.1-339 - 1m Aquifer Concentration for CaseA All U-238 1C_UA

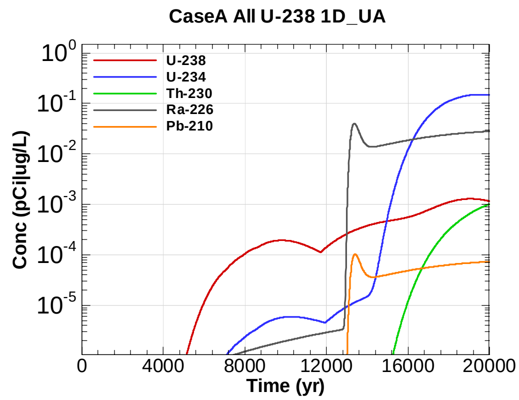

Figure G.1-340 - 1m Aquifer Concentration for CaseA All U-238 1D_UA

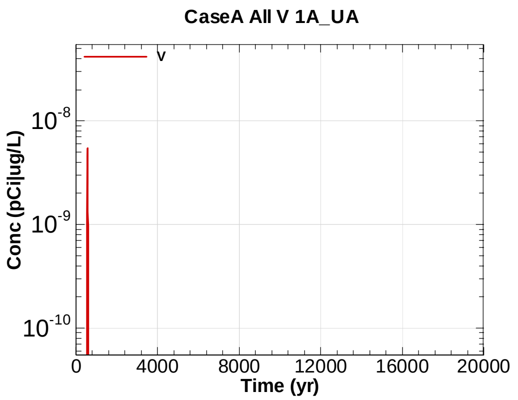

Figure G.1-341 - 1m Aquifer Concentration for CaseA All V 1A_UA

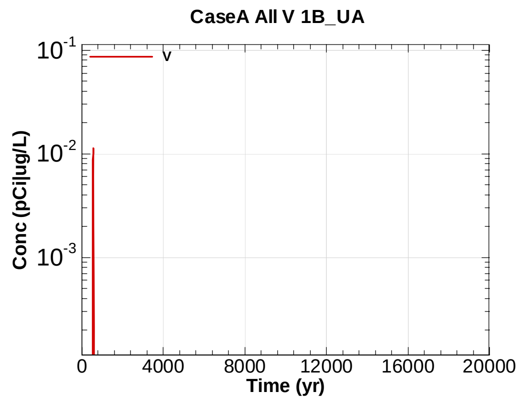

Figure G.1-342 - 1m Aquifer Concentration for CaseA All V 1B_UA

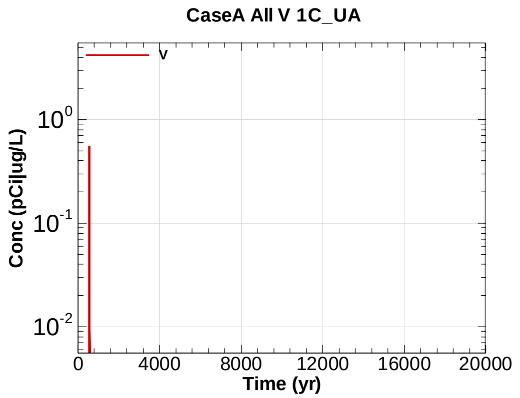

Figure G.1-343 - 1m Aquifer Concentration for CaseA All V 1C_UA

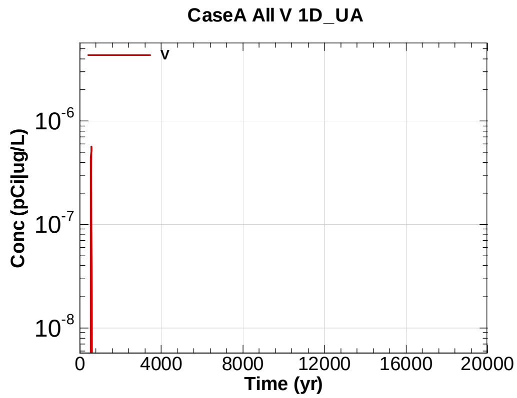

Figure G.1-344 - 1m Aquifer Concentration for CaseA All V 1D_UA

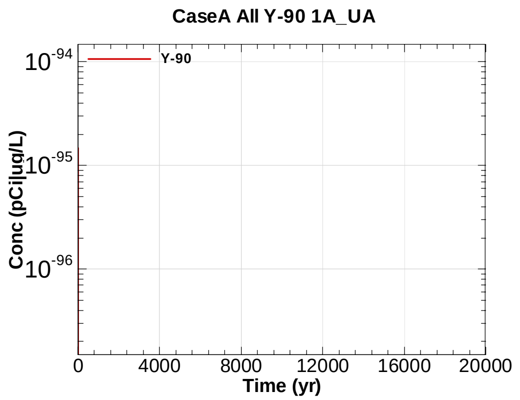

Figure G.1-345 - 1m Aquifer Concentration for CaseA All Y-90 1A_UA

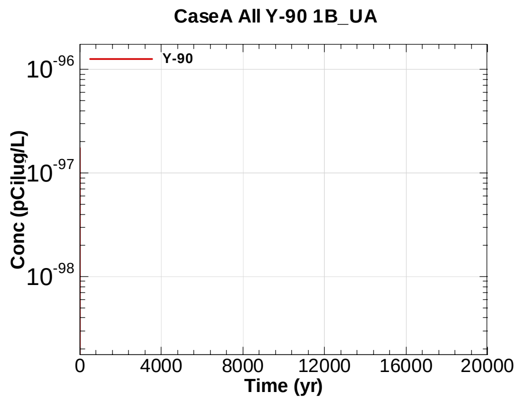

Figure G.1-346 - 1m Aquifer Concentration for CaseA All Y-90 1B_UA

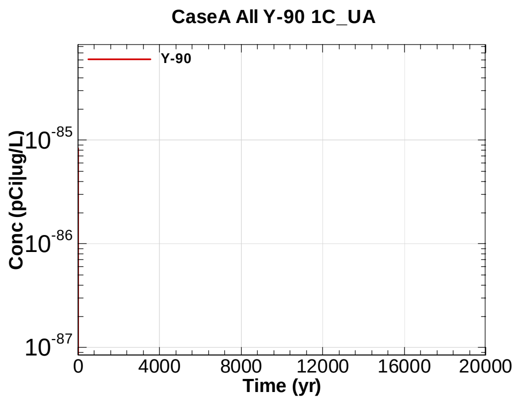

Figure G.1-347 - 1m Aquifer Concentration for CaseA All Y-90 1C_UA

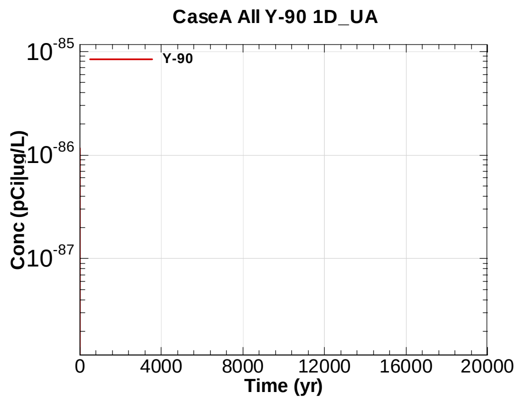

Figure G.1-348 - 1m Aquifer Concentration for CaseA All Y-90 1D_UA

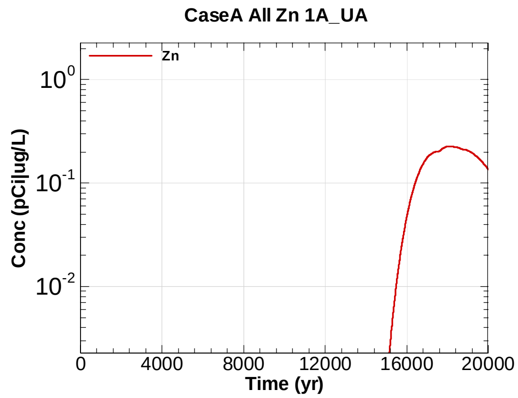

Figure G.1-349 - 1m Aquifer Concentration for CaseA All Zn 1A_UA

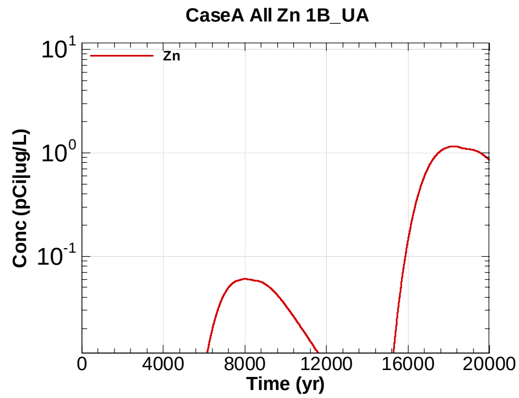

Figure G.1-350 - 1m Aquifer Concentration for CaseA All Zn 1B_UA

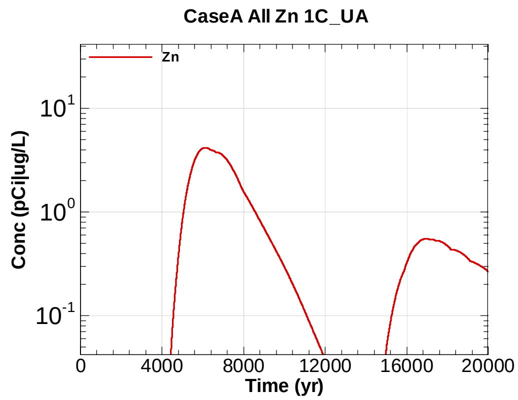

Figure G.1-351 - 1m Aquifer Concentration for CaseA All Zn 1C_UA

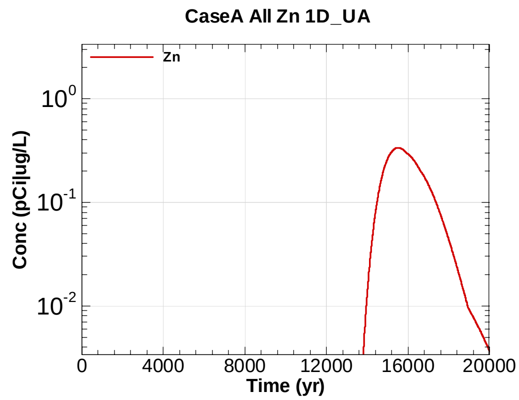

Figure G.1-352 - 1m Aquifer Concentration for CaseA All Zn 1D_UA

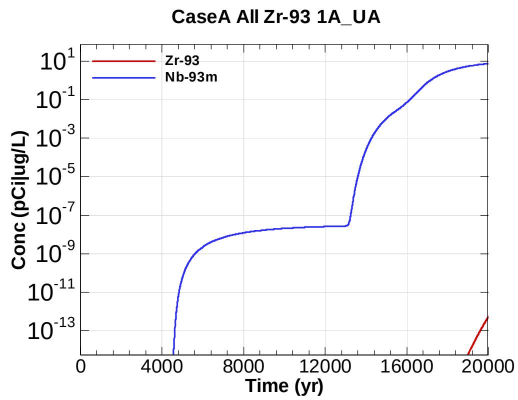

Figure G.1-353 - 1m Aquifer Concentration for CaseA All Zr-93 1A_UA

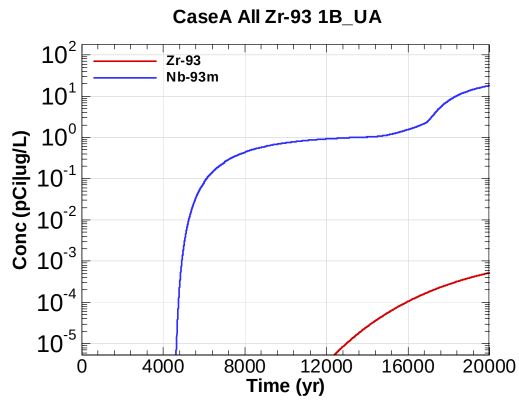

Figure G.1-354 - 1m Aquifer Concentration for CaseA All Zr-93 1B_UA

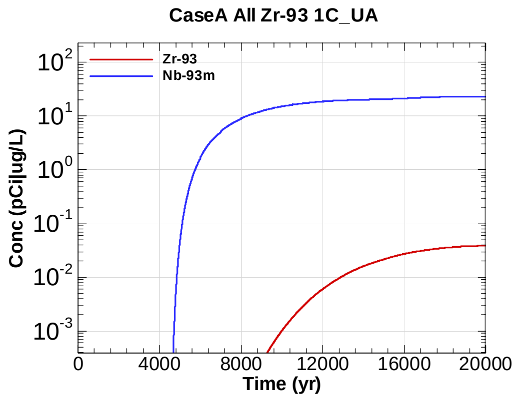

Figure G.1-355 - 1m Aquifer Concentration for CaseA All Zr-93 1C_UA

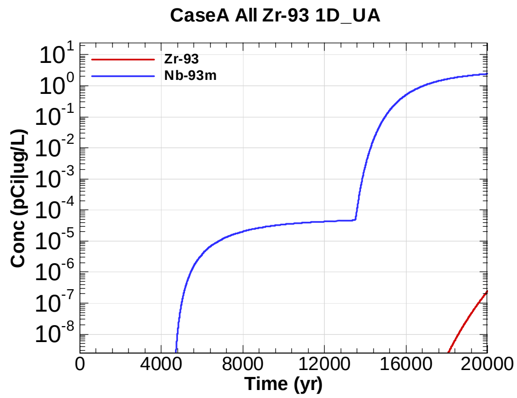

Figure G.1-356 - 1m Aquifer Concentration for CaseA All Zr-93 1D_UA

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Appendix G.2
1-METER RADIOLOGICAL AND CHEMICAL CONCENTRATIONS AT THE UPPER THREE RUNS AQUIFER - LOWER

Appendix G.2 contains curves showing the one-meter radiological and chemical concentrations for all of FTF (tank and ancillary inventories) for the Base Case (Case/Configuration A). 20,000 year concentration results are presented from the Upper Three Runs Aquifer- Lower Zone for Sectors A through D.

Graph heading example "CaseA All Ag 1A_LA"

Key

CaseA = scenario case/configuration
All = all FTF inventory source
Ag = radionuclide or chemical of concern
1A = One-meter. Sector of concern (see sector map with stream traces)
LA = aquifer of concern

UA = Upper Three Runs – Upper Zone
LA = Upper Three Runs – Lower Zone
GA = Gordon

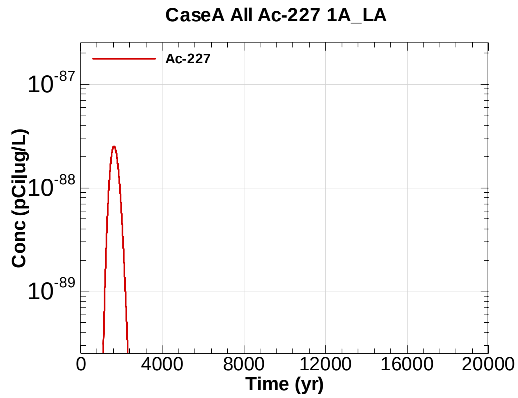

Figure G.2-1 - 1m Aquifer Concentration for CaseA All Ac-227 1A_LA

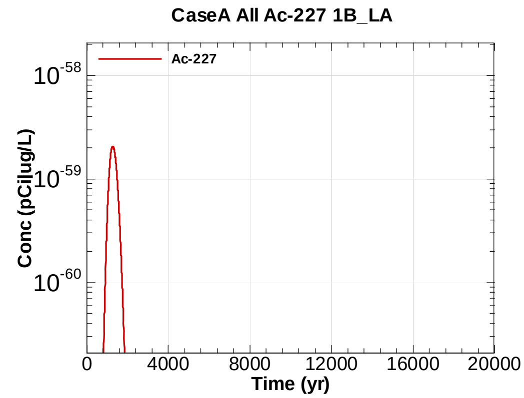

Figure G.2-2 - 1m Aquifer Concentration for CaseA All Ac-227 1B_LA

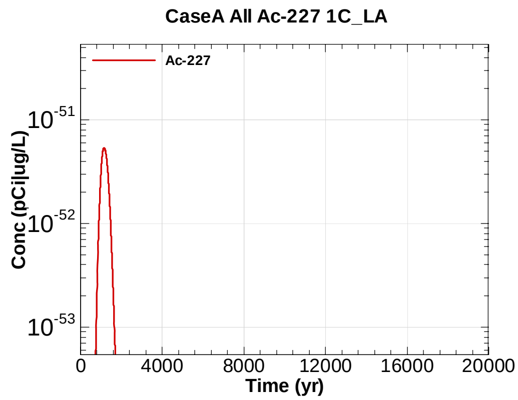

Figure G.2-3 - 1m Aquifer Concentration for CaseA All Ac-227 1C_LA

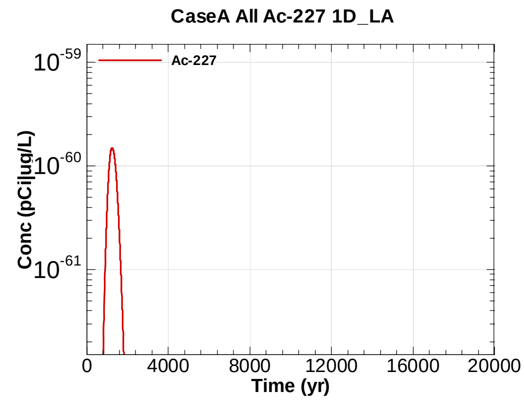

Figure G.2-4 - 1m Aquifer Concentration for CaseA All Ac-227 1D_LA

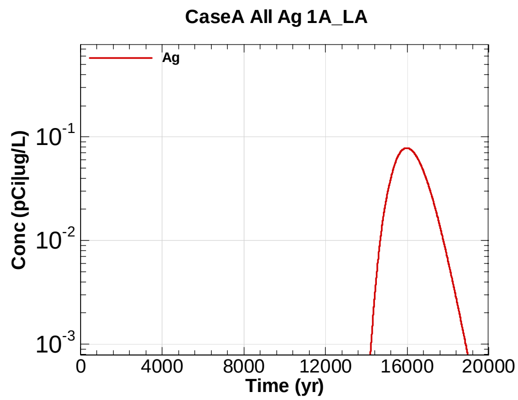

Figure G.2-5 - 1m Aquifer Concentration for CaseA All Ag 1A_LA

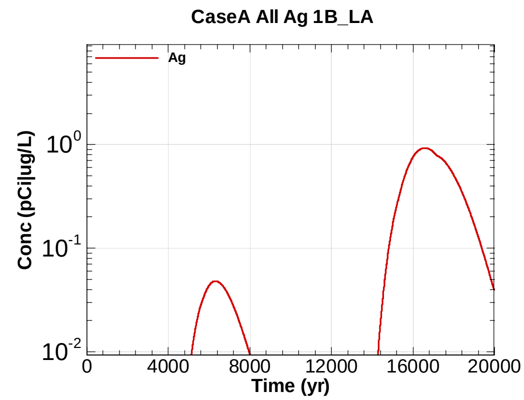

Figure G.2-6 - 1m Aquifer Concentration for CaseA All Ag 1B_LA

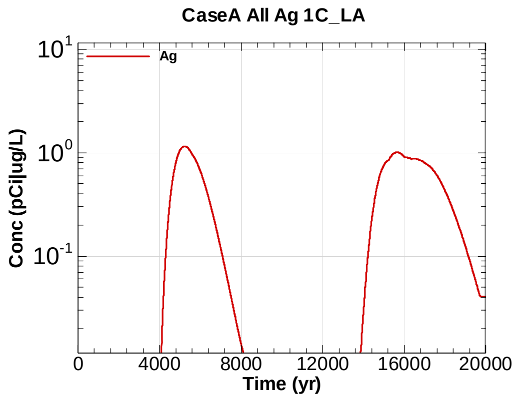

Figure G.2-7 - 1m Aquifer Concentration for CaseA All Ag 1C_LA

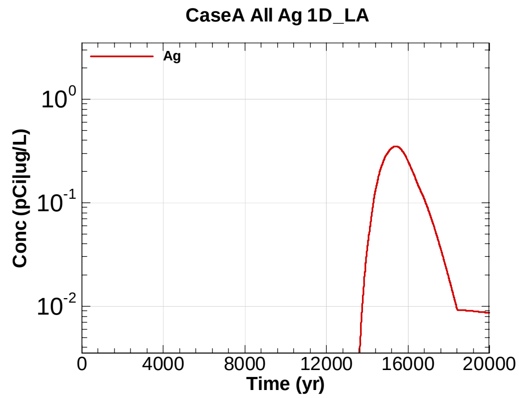

Figure G.2-8 - 1m Aquifer Concentration for CaseA All Ag 1D_LA

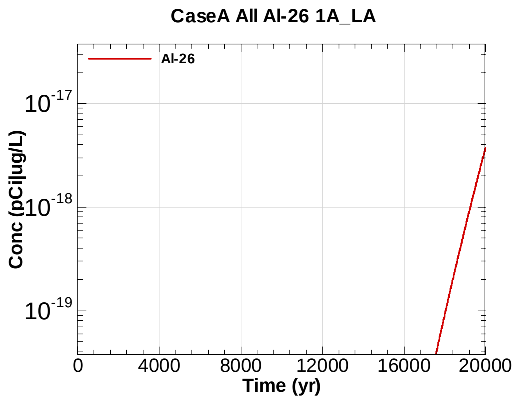

Figure G.2-9 - 1m Aquifer Concentration for CaseA All Al-26 1A_LA

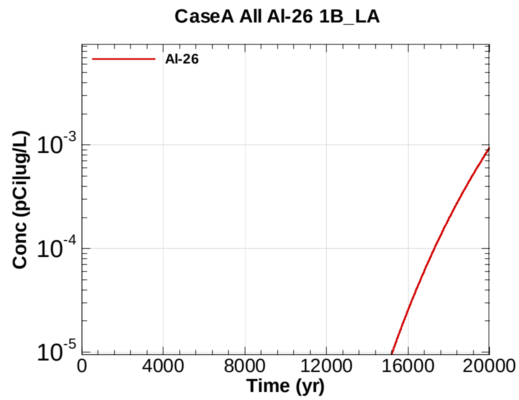

Figure G.2-10 - 1m Aquifer Concentration for CaseA All Al-26 1B_LA

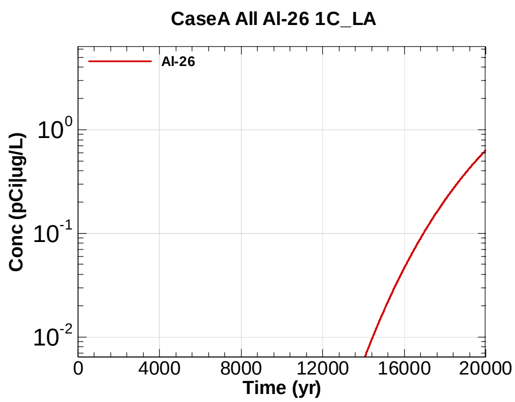

Figure G.2-11 - 1m Aquifer Concentration for CaseA All Al-26 1C_LA

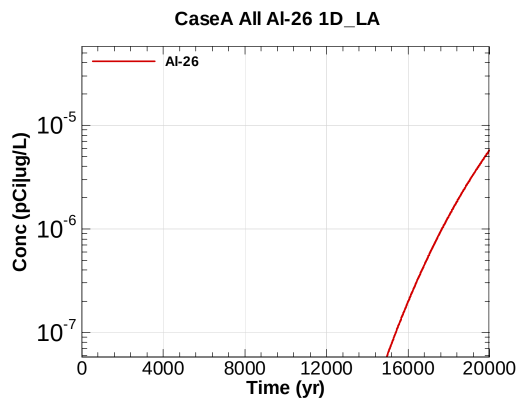

Figure G.2-12 - 1m Aquifer Concentration for CaseA All Al-26 1D_LA

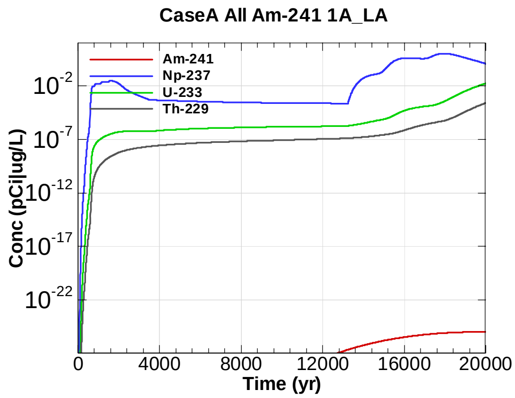

Figure G.2-13 - 1m Aquifer Concentration for CaseA All Am-241 1A_LA

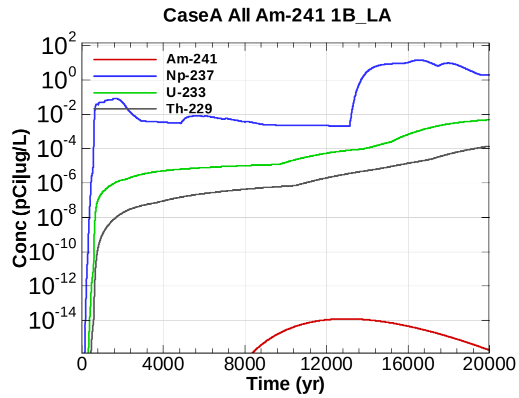

Figure G.2-14 - 1m Aquifer Concentration for CaseA All Am-241 1B_LA

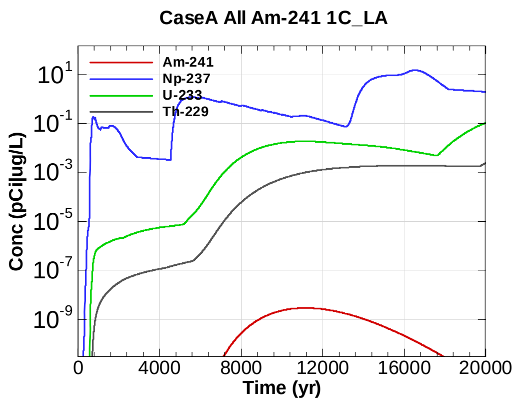

Figure G.2-15 - 1m Aquifer Concentration for CaseA All Am-241 1C_LA

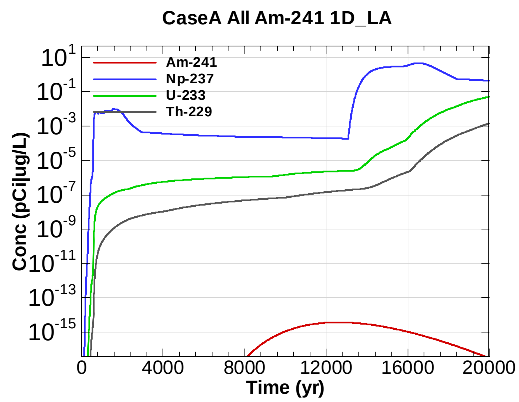

Figure G.2-16 - 1m Aquifer Concentration for CaseA All Am-241 1D_LA

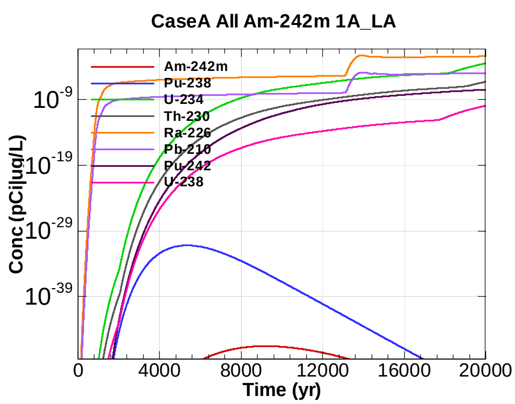

Figure G.2-17 - 1m Aquifer Concentration for CaseA All Am-242m 1A_LA

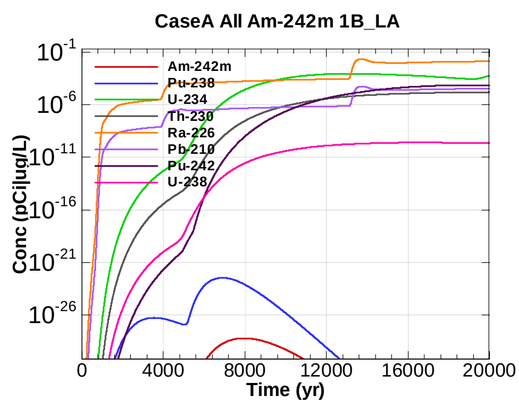

Figure G.2-18 - 1m Aquifer Concentration for CaseA All Am-242m 1B_LA

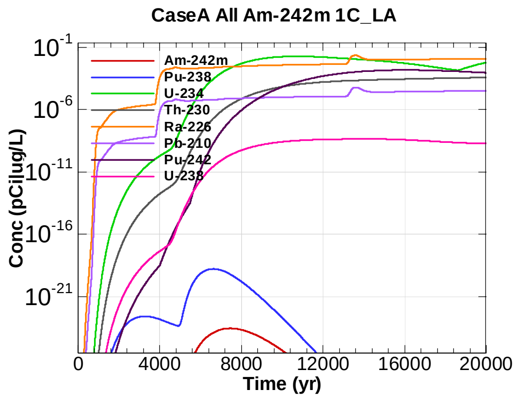

Figure G.2-19 - 1m Aquifer Concentration for CaseA All Am-242m 1C_LA

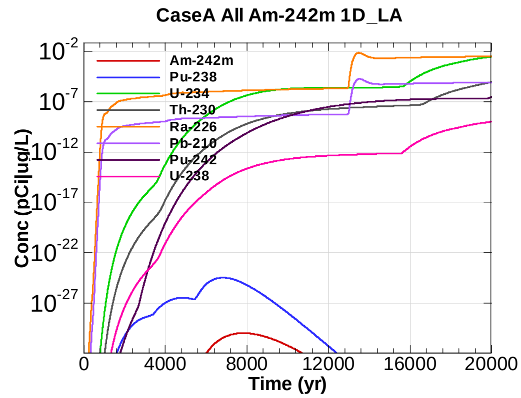

Figure G.2-20 - 1m Aquifer Concentration for CaseA All Am-242m 1D_LA

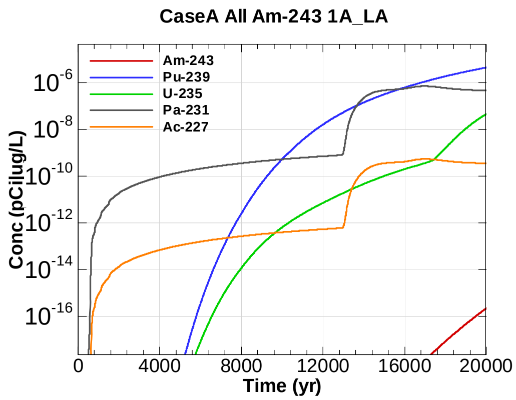

Figure G.2-21 - 1m Aquifer Concentration for CaseA All Am-243 1A_LA

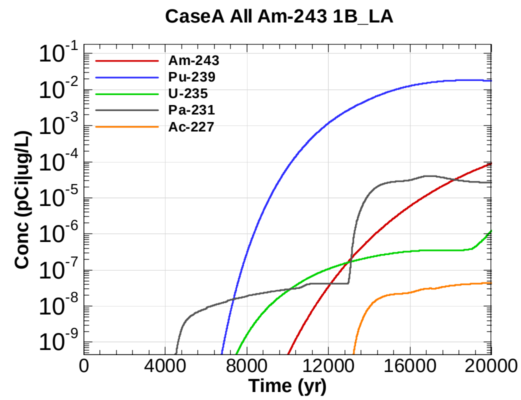

Figure G.2-22 - 1m Aquifer Concentration for CaseA All Am-243 1B_LA

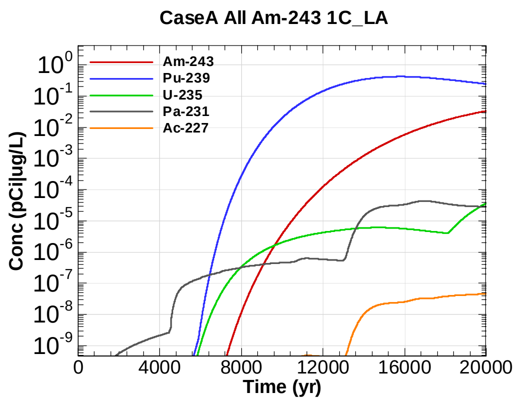

Figure G.2-23 - 1m Aquifer Concentration for CaseA All Am-243 1C_LA

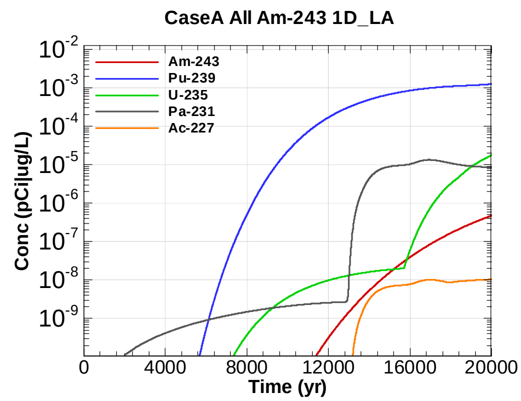

Figure G.2-24 - 1m Aquifer Concentration for CaseA All Am-243 1D_LA

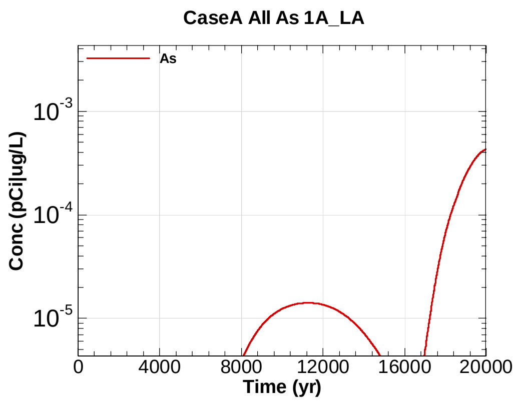

Figure G.2-25 - 1m Aquifer Concentration for CaseA All As 1A_LA

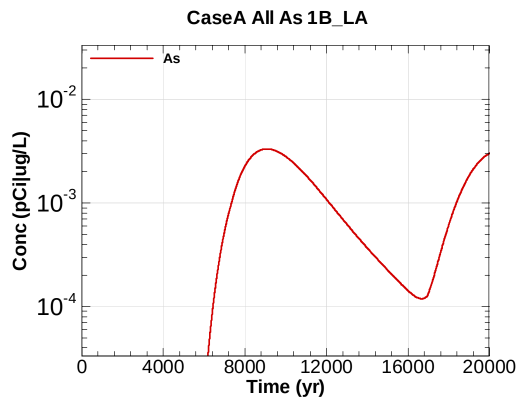

Figure G.2-26 - 1m Aquifer Concentration for CaseA All As 1B_LA

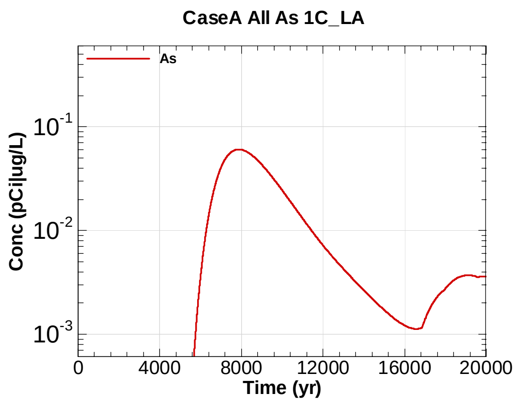

Figure G.2-27 - 1m Aquifer Concentration for CaseA All As 1C_LA

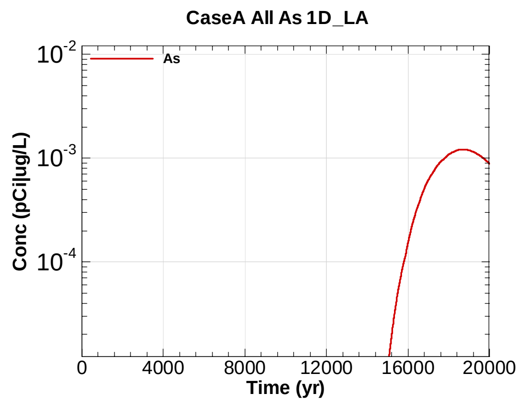

Figure G.2-28 - 1m Aquifer Concentration for CaseA All As 1D_LA

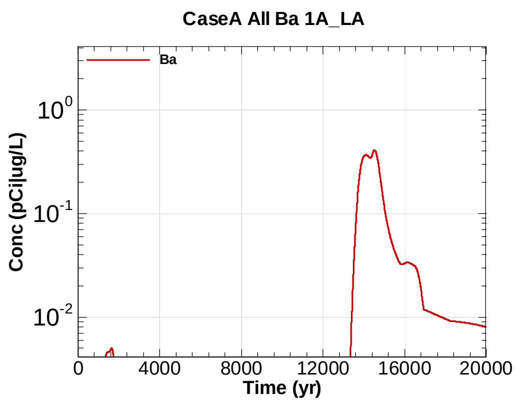

Figure G.2-29 - 1m Aquifer Concentration for CaseA All Ba 1A_LA

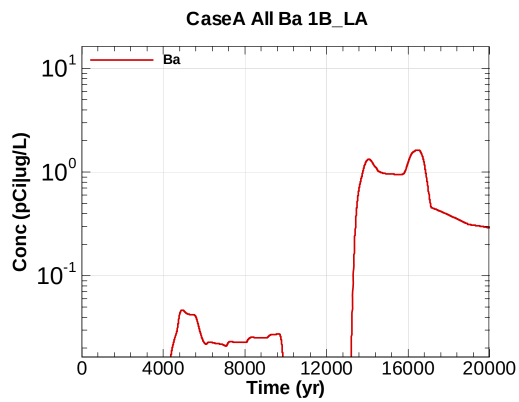

Figure G.2-30 - 1m Aquifer Concentration for CaseA All Ba 1B_LA

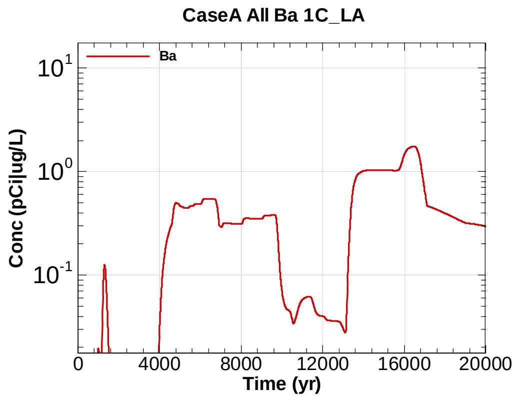

Figure G.2-31 - 1m Aquifer Concentration for CaseA All Ba 1C_LA

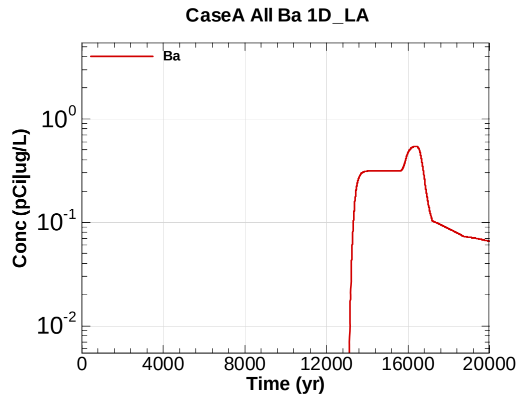

Figure G.2-32 - 1m Aquifer Concentration for CaseA All Ba 1D_LA

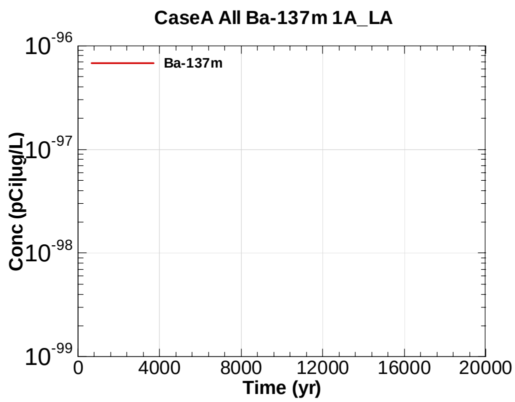

Figure G.2-33 - 1m Aquifer Concentration for CaseA All Ba-137m 1A_LA

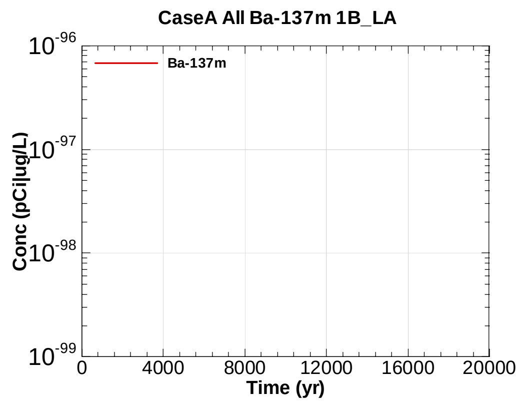

Figure G.2-34 - 1m Aquifer Concentration for CaseA All Ba-137m 1B_LA

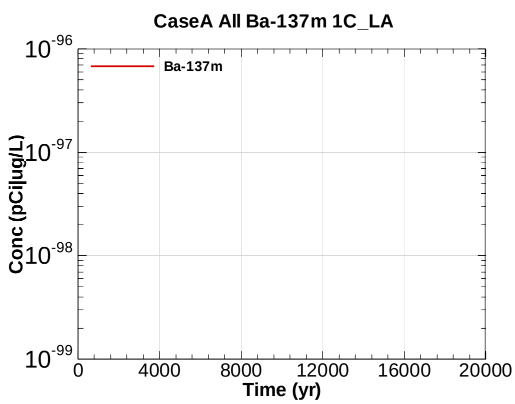

Figure G.2-35 - 1m Aquifer Concentration for CaseA All Ba-137m 1C_LA

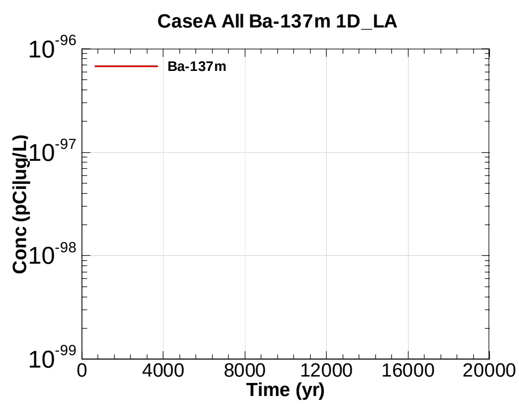

Figure G.2-36 - 1m Aquifer Concentration for CaseA All Ba-137m 1D_LA

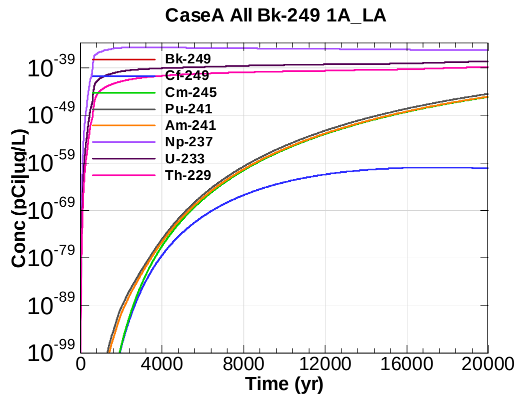

Figure G.2-37 - 1m Aquifer Concentration for CaseA All Bk-249 1A_LA

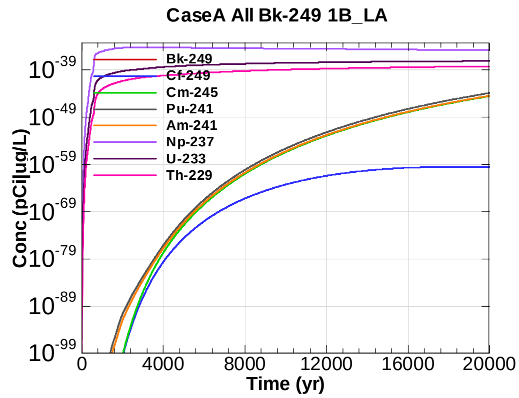

Figure G.2-38 - 1m Aquifer Concentration for CaseA All Bk-249 1B_LA

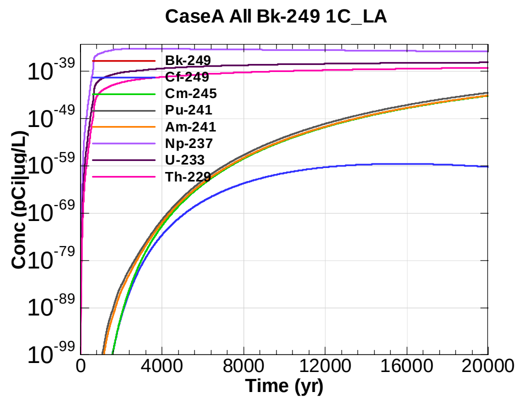

Figure G.2-39 - 1m Aquifer Concentration for CaseA All Bk-249 1C_LA

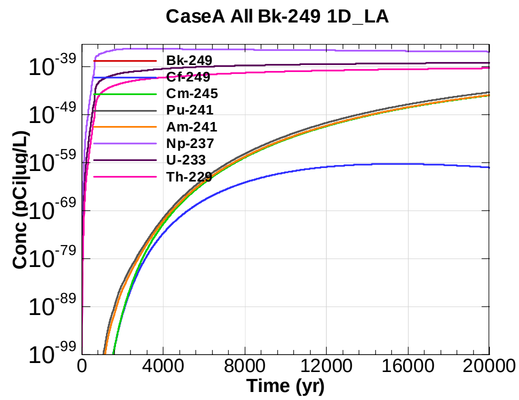

Figure G.2-40 - 1m Aquifer Concentration for CaseA All Bk-249 1D_LA

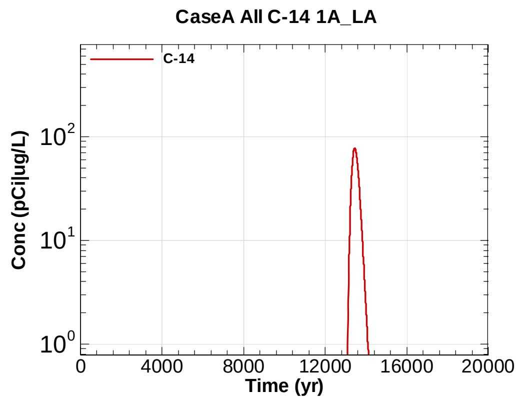

Figure G.2-41 - 1m Aquifer Concentration for CaseA All C-14 1A_LA

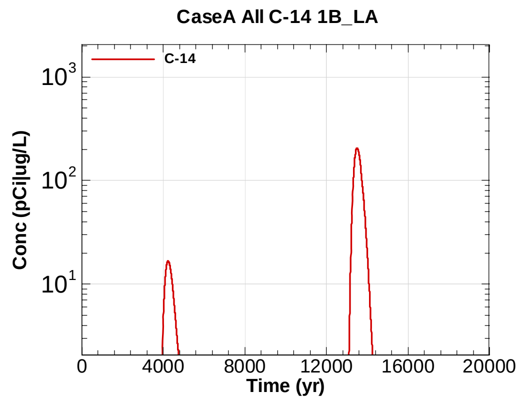

Figure G.2-42 - 1m Aquifer Concentration for CaseA All C-14 1B_LA

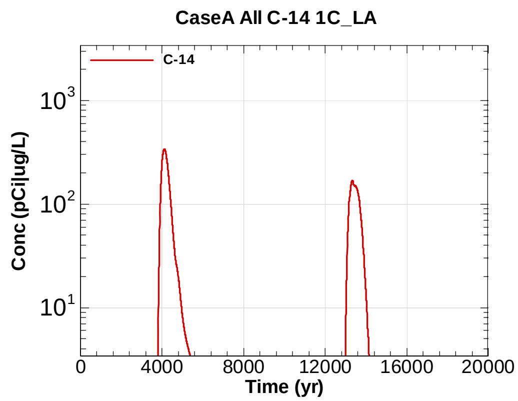

Figure G.2-43 - 1m Aquifer Concentration for CaseA All C-14 1C_LA

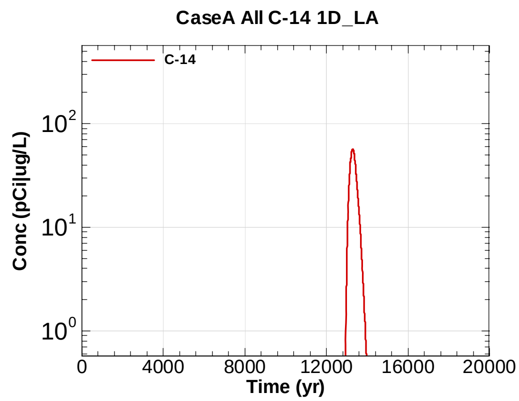

Figure G.2-44 - 1m Aquifer Concentration for CaseA All C-14 1D_LA

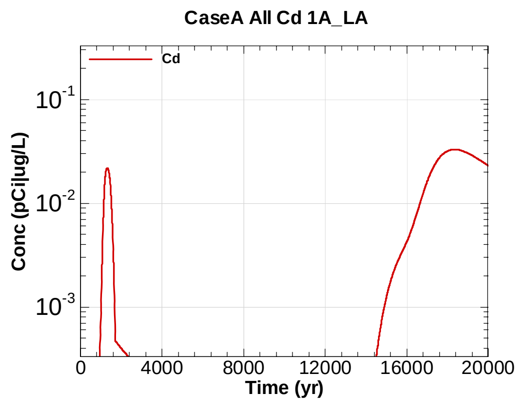

Figure G.2-45 - 1m Aquifer Concentration for CaseA All Cd 1A_LA

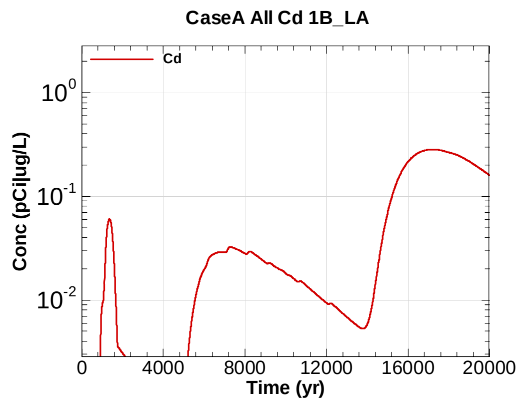

Figure G.2-46 - 1m Aquifer Concentration for CaseA All Cd 1B_LA

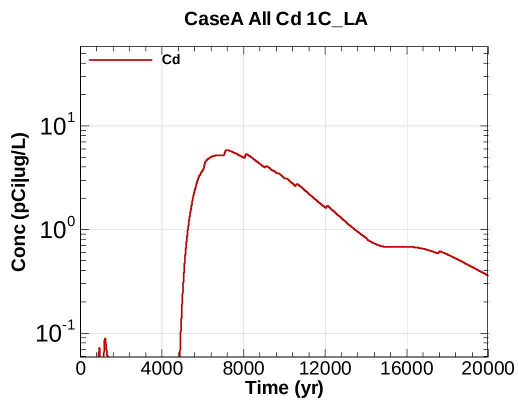

Figure G.2-47 - 1m Aquifer Concentration for CaseA All Cd 1C_LA

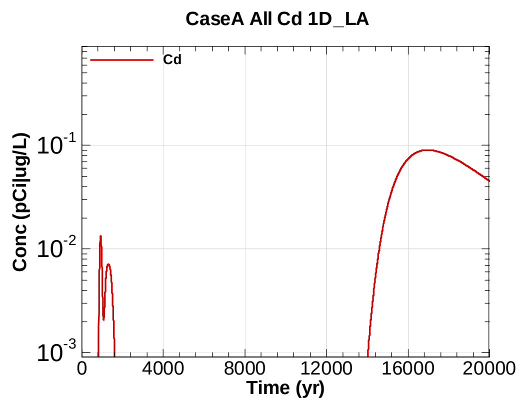

Figure G.2-48 - 1m Aquifer Concentration for CaseA All Cd 1D_LA

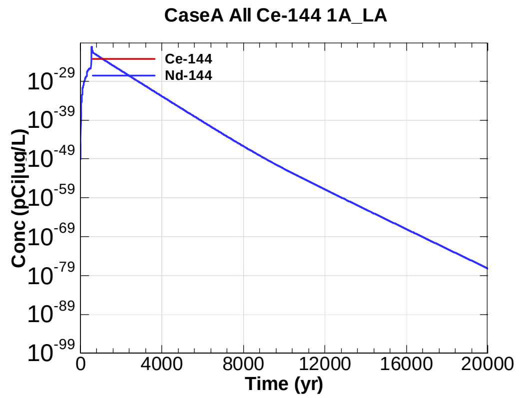

Figure G.2-49 - 1m Aquifer Concentration for CaseA All Ce-144 1A_LA

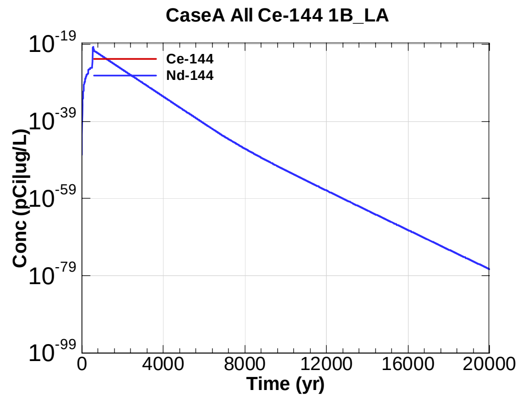

Figure G.2-50 - 1m Aquifer Concentration for CaseA All Ce-144 1B_LA

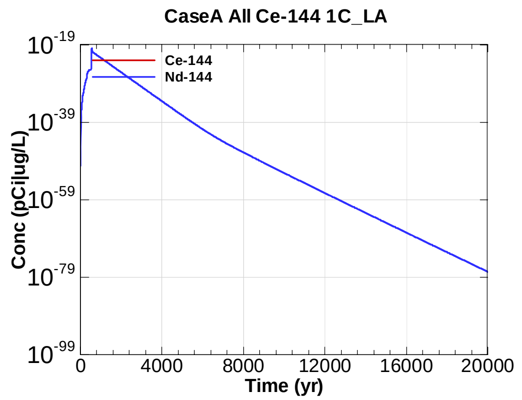

Figure G.2-51 - 1m Aquifer Concentration for CaseA All Ce-144 1C_LA

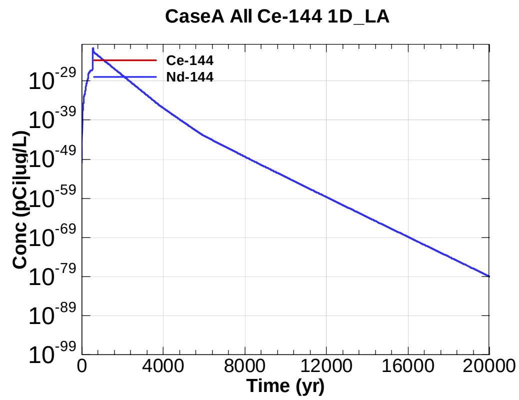

Figure G.2-52 - 1m Aquifer Concentration for CaseA All Ce-144 1D_LA

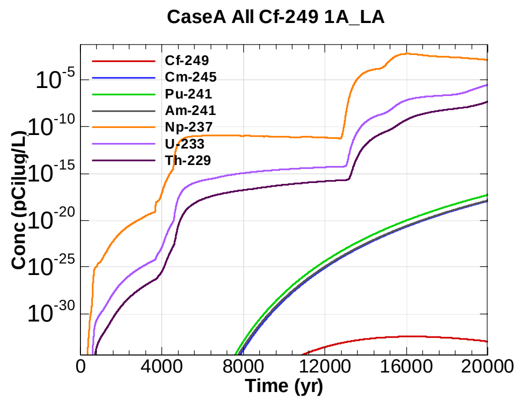

Figure G.2-53 - 1m Aquifer Concentration for CaseA All Cf-249 1A_LA

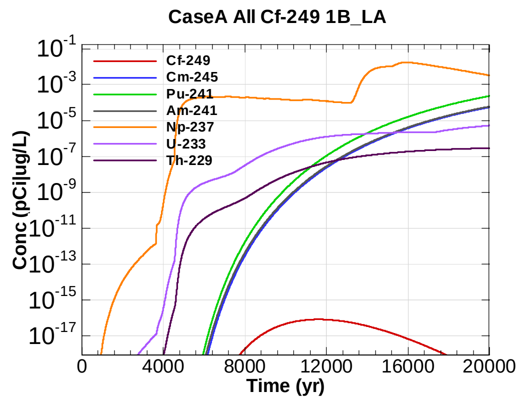

Figure G.2-54 - 1m Aquifer Concentration for CaseA All Cf-249 1B_LA

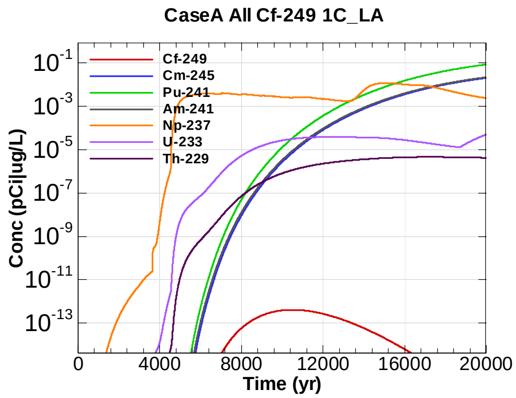

Figure G.2-55 - 1m Aquifer Concentration for CaseA All Cf-249 1C_LA

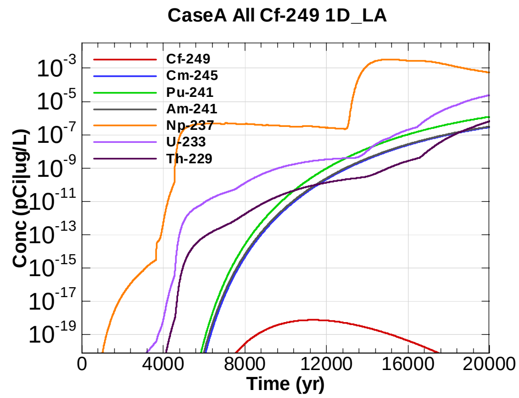

Figure G.2-56 - 1m Aquifer Concentration for CaseA All Cf-249 1D_LA

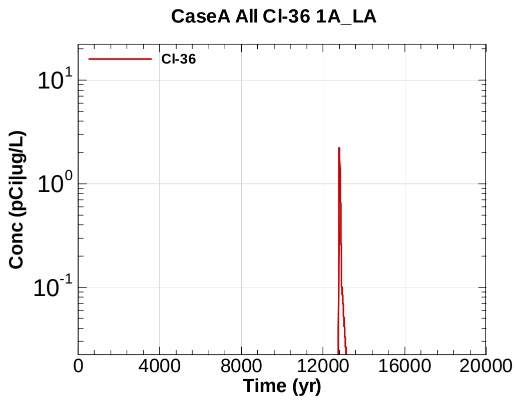

Figure G.2-57 - 1m Aquifer Concentration for CaseA All Cl-36 1A_LA

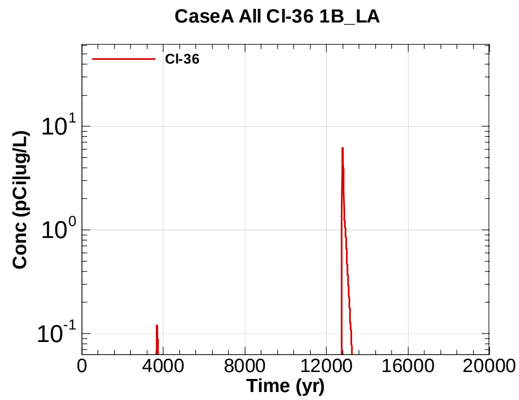

Figure G.2-58 - 1m Aquifer Concentration for CaseA All Cl-36 1B_LA

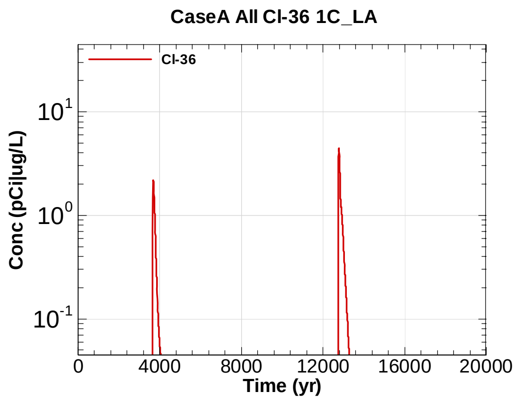

Figure G.2-59 - 1m Aquifer Concentration for CaseA All Cl-36 1C_LA

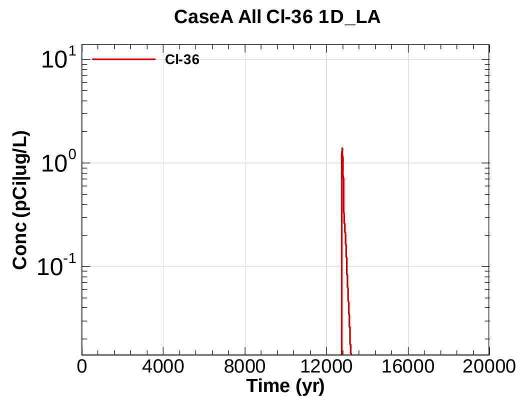

Figure G.2-60 - 1m Aquifer Concentration for CaseA All Cl-36 1D_LA

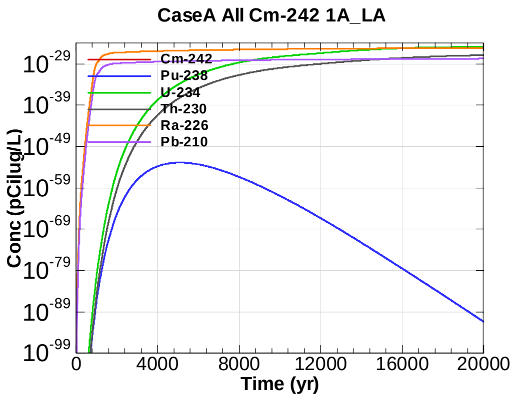

Figure G.2-61 - 1m Aquifer Concentration for CaseA All Cm-242 1A_LA

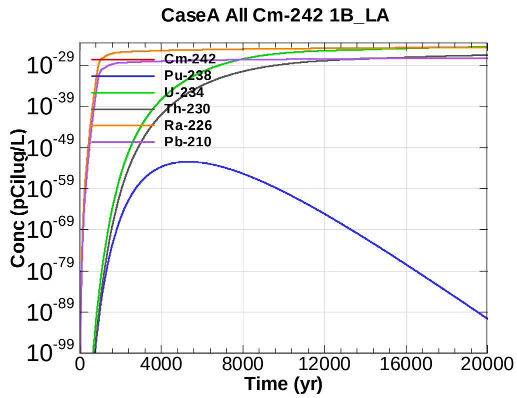

Figure G.2-62 - 1m Aquifer Concentration for CaseA All Cm-242 1B_LA

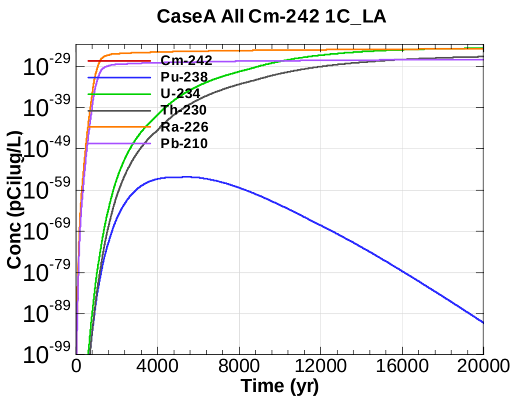

Figure G.2-63 - 1m Aquifer Concentration for CaseA All Cm-242 1C_LA

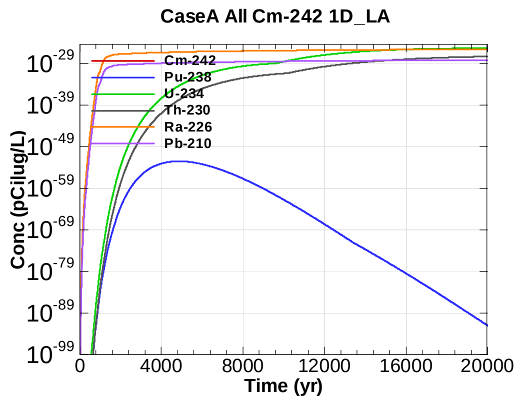

Figure G.2-64 - 1m Aquifer Concentration for CaseA All Cm-242 1D_LA

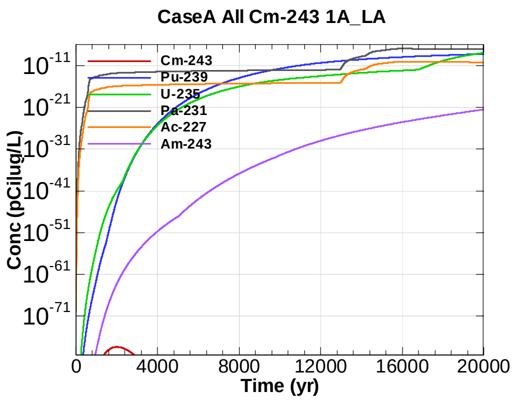

Figure G.2-65 - 1m Aquifer Concentration for CaseA All Cm-243 1A_LA

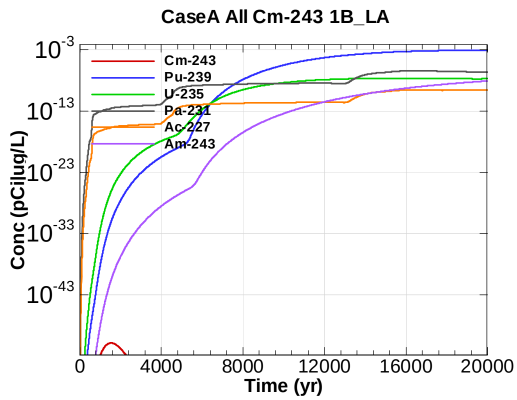

Figure G.2-66 - 1m Aquifer Concentration for CaseA All Cm-243 1B_LA

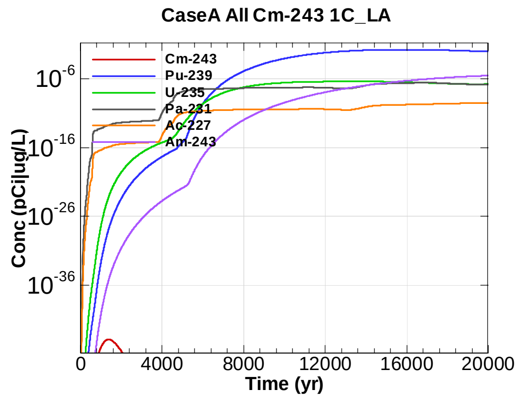

Figure G.2-67 - 1m Aquifer Concentration for CaseA All Cm-243 1C_LA

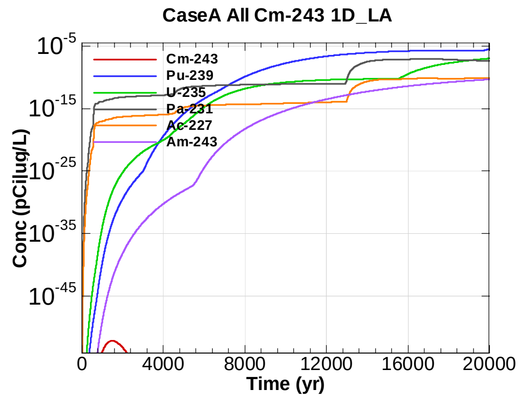

Figure G.2-68 - 1m Aquifer Concentration for CaseA All Cm-243 1D_LA

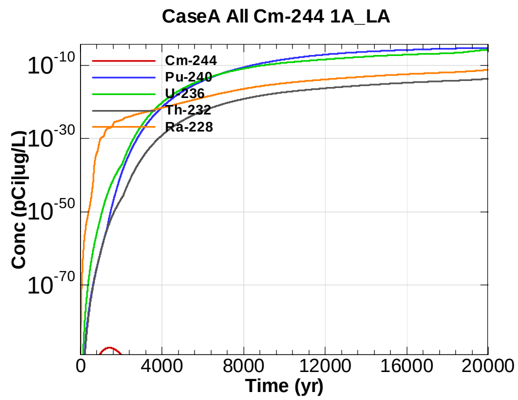

Figure G.2-69 - 1m Aquifer Concentration for CaseA All Cm-244 1A_LA

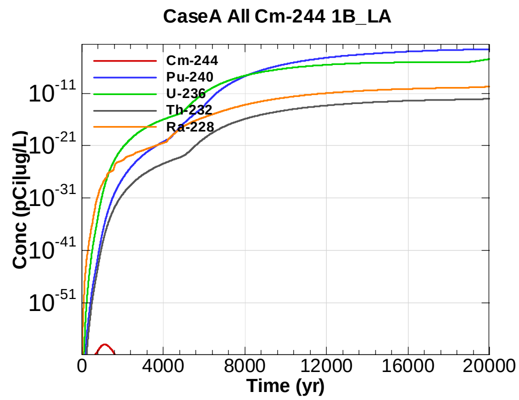

Figure G.2-70 - 1m Aquifer Concentration for CaseA All Cm-244 1B_LA

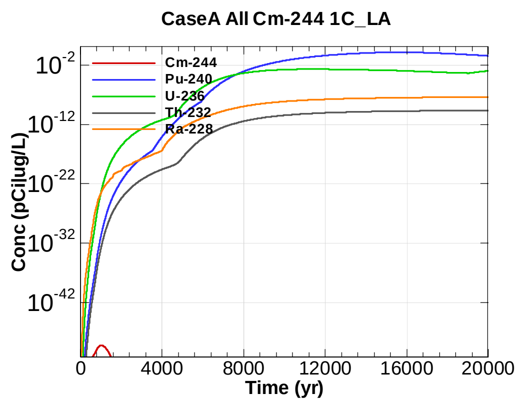

Figure G.2-71 - 1m Aquifer Concentration for CaseA All Cm-244 1C_LA

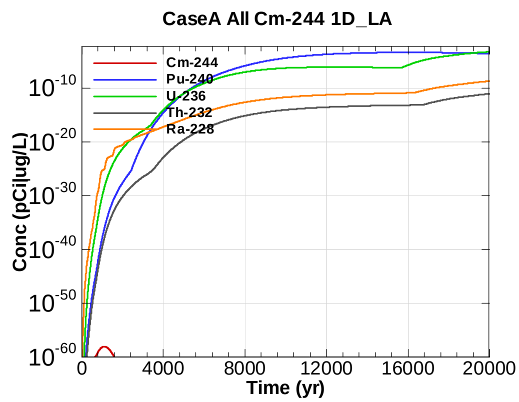

Figure G.2-72 - 1m Aquifer Concentration for CaseA All Cm-244 1D_LA

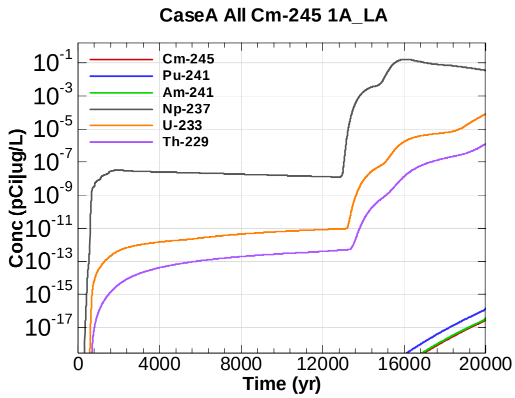

Figure G.2-73 - 1m Aquifer Concentration for CaseA All Cm-245 1A_LA

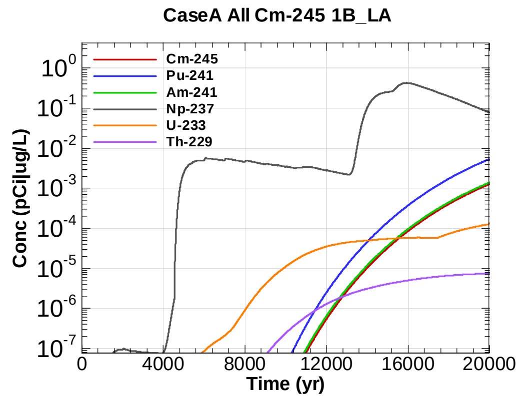

Figure G.2-74 - 1m Aquifer Concentration for CaseA All Cm-245 1B_LA

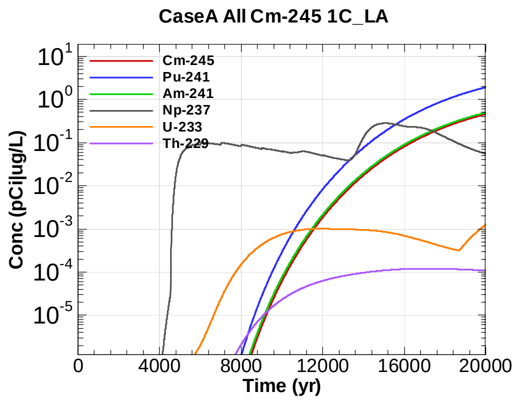

Figure G.2-75 - 1m Aquifer Concentration for CaseA All Cm-245 1C_LA

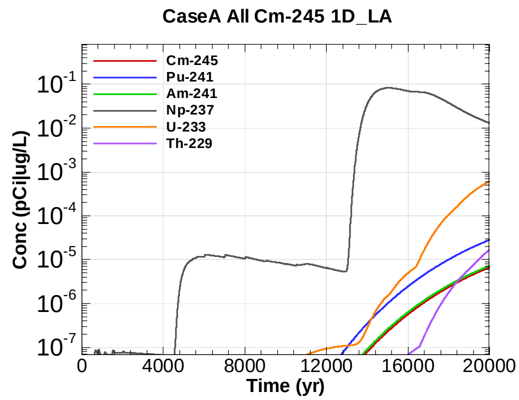

Figure G.2-76 - 1m Aquifer Concentration for CaseA All Cm-245 1D_LA

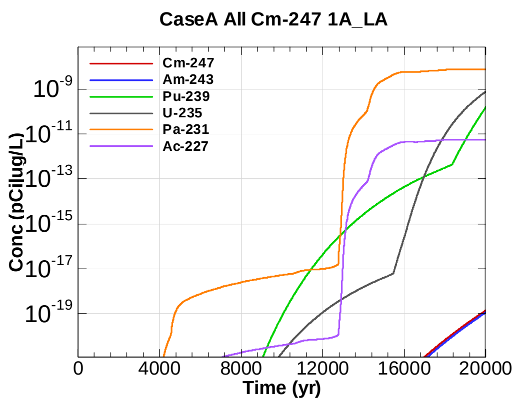

Figure G.2-77 - 1m Aquifer Concentration for CaseA All Cm-247 1A_LA

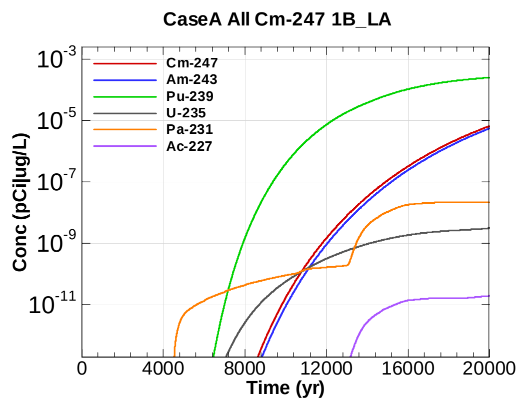

Figure G.2-78 - 1m Aquifer Concentration for CaseA All Cm-247 1B_LA

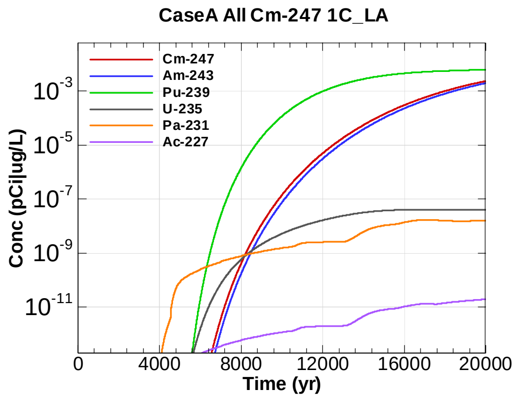

Figure G.2-79 - 1m Aquifer Concentration for CaseA All Cm-247 1C_LA

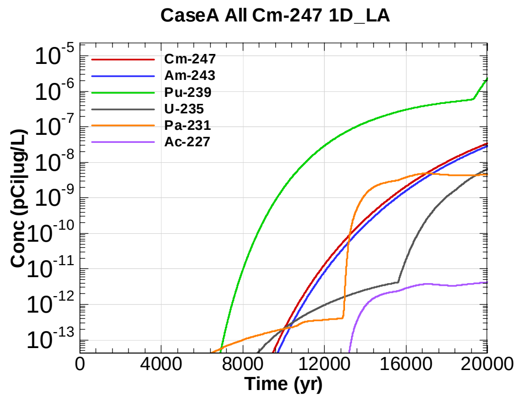

Figure G.2-80 - 1m Aquifer Concentration for CaseA All Cm-247 1D_LA

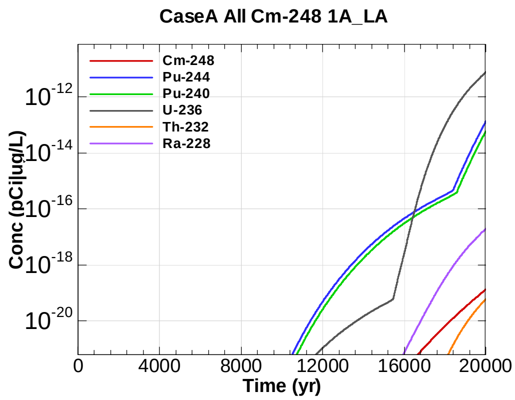

Figure G.2-81 - 1m Aquifer Concentration for CaseA All Cm-248 1A_LA

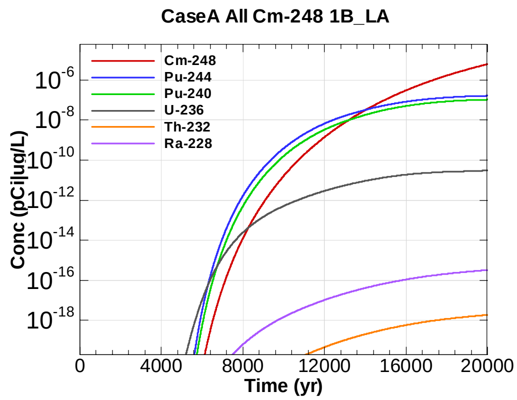

Figure G.2-82 - 1m Aquifer Concentration for CaseA All Cm-248 1B_LA

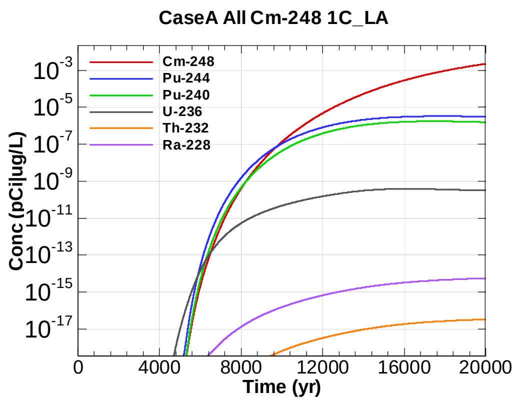

Figure G.2-83 - 1m Aquifer Concentration for CaseA All Cm-248 1C_LA

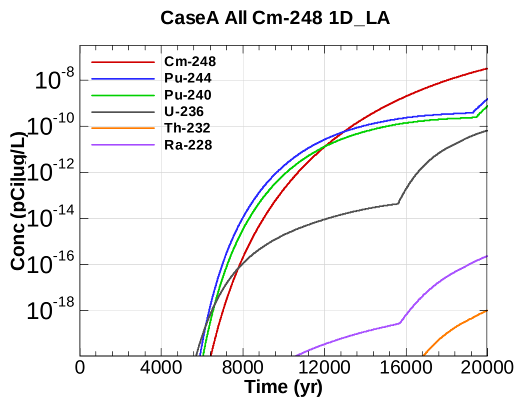

Figure G.2-84 - 1m Aquifer Concentration for CaseA All Cm-248 1D_LA

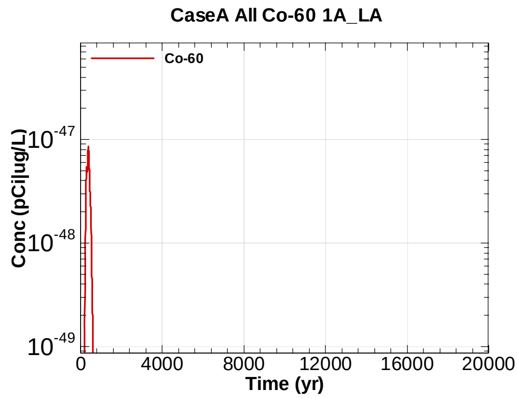

Figure G.2-85 - 1m Aquifer Concentration for CaseA All Co-60 1A_LA

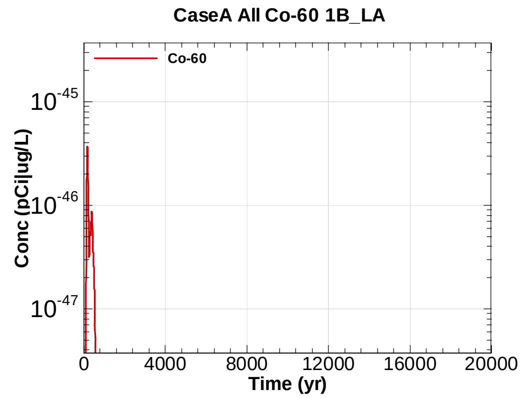

Figure G.2-86 - 1m Aquifer Concentration for CaseA All Co-60 1B_LA

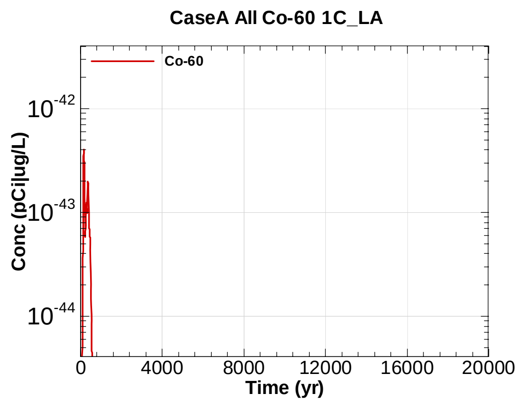

Figure G.2-87 - 1m Aquifer Concentration for CaseA All Co-60 1C_LA

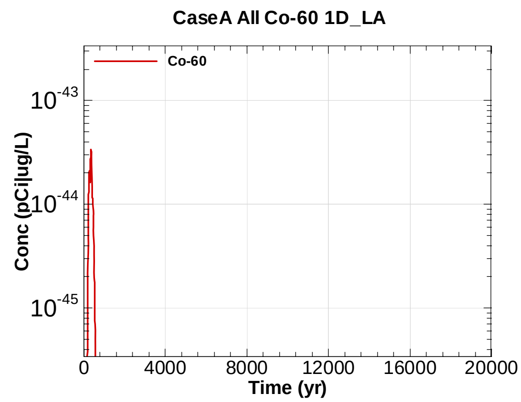

Figure G.2-88 - 1m Aquifer Concentration for CaseA All Co-60 1D_LA

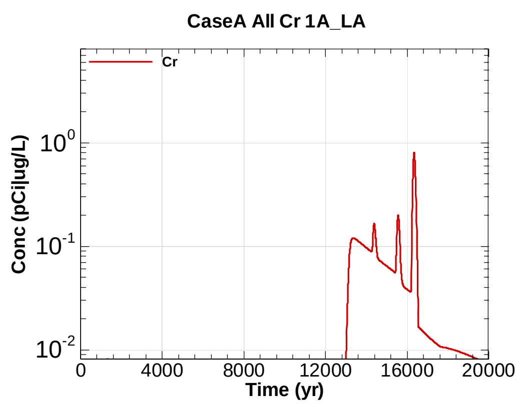

Figure G.2-89 - 1m Aquifer Concentration for CaseA All Cr 1A_LA

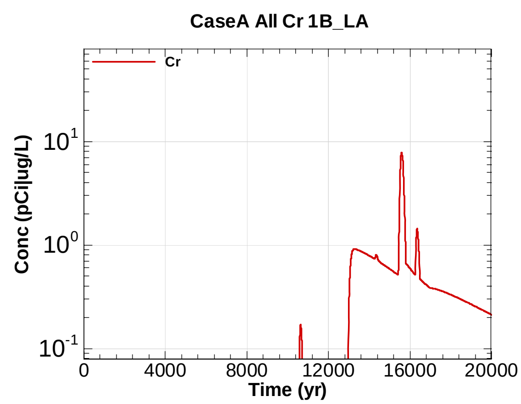

Figure G.2-90 - 1m Aquifer Concentration for CaseA All Cr 1B_LA

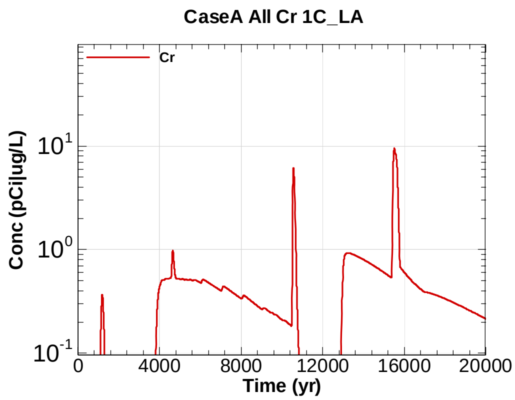

Figure G.2-91 - 1m Aquifer Concentration for CaseA All Cr 1C_LA

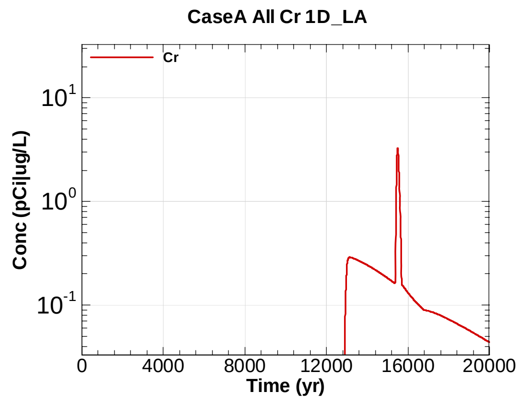

Figure G.2-92 - 1m Aquifer Concentration for CaseA All Cr 1D_LA

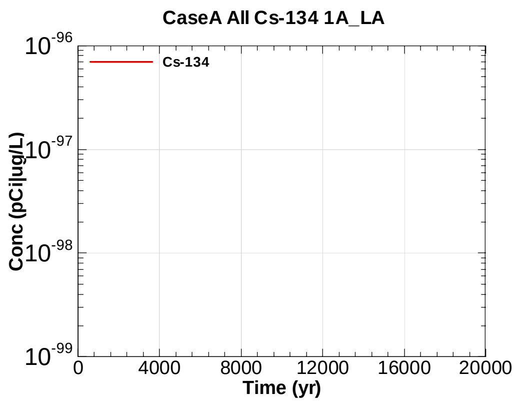

Figure G.2-93 - 1m Aquifer Concentration for CaseA All Cs-134 1A_LA

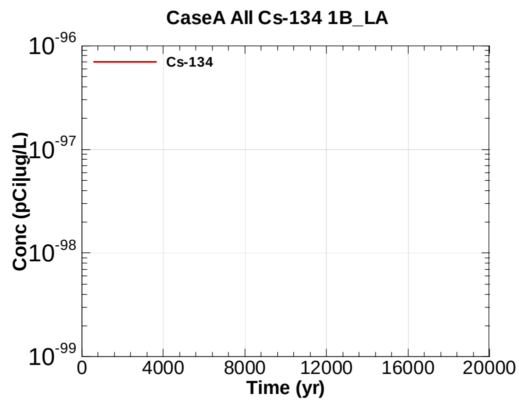

Figure G.2-94 - 1m Aquifer Concentration for CaseA All Cs-134 1B_LA

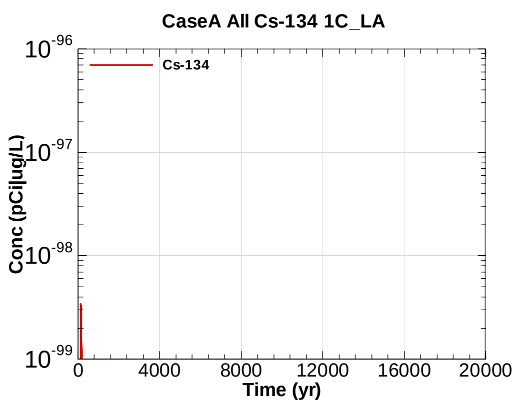

Figure G.2-95 - 1m Aquifer Concentration for CaseA All Cs-134 1C_LA

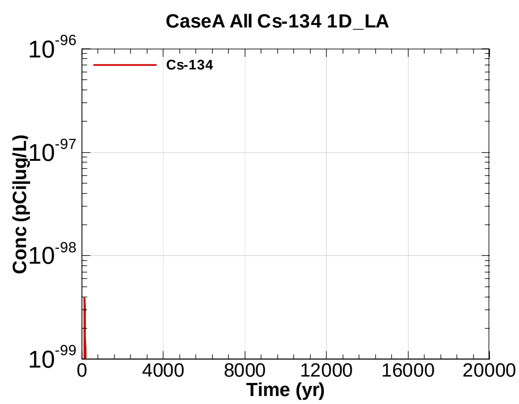

Figure G.2-96 - 1m Aquifer Concentration for CaseA All Cs-134 1D_LA

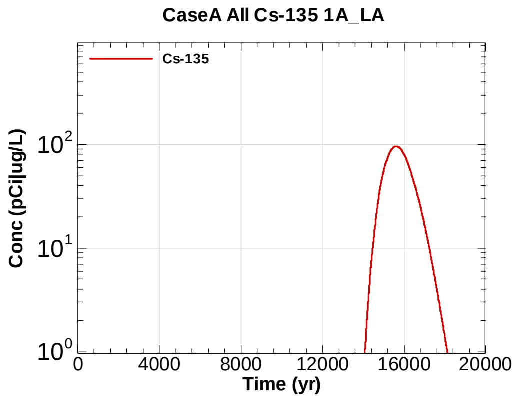

Figure G.2-97 - 1m Aquifer Concentration for CaseA All Cs-135 1A_LA

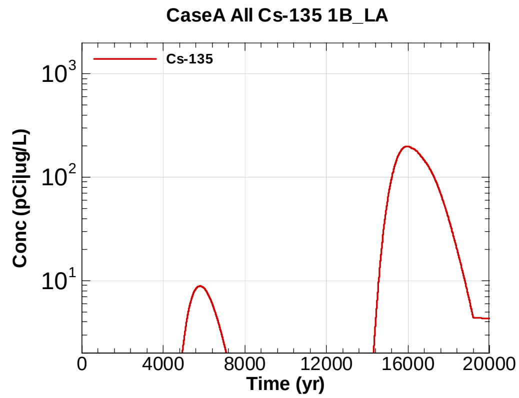

Figure G.2-98 - 1m Aquifer Concentration for CaseA All Cs-135 1B_LA

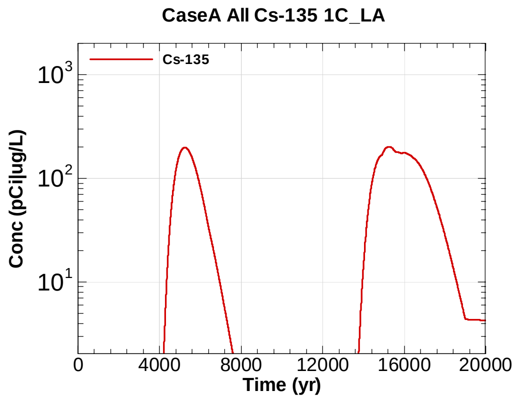

Figure G.2-99 - 1m Aquifer Concentration for CaseA All Cs-135 1C_LA

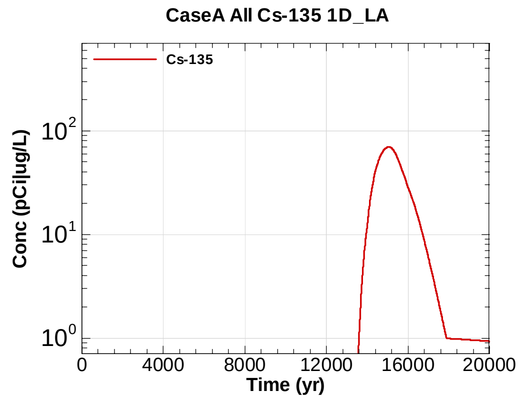

Figure G.2-100 - 1m Aquifer Concentration for CaseA All Cs-135 1D_LA

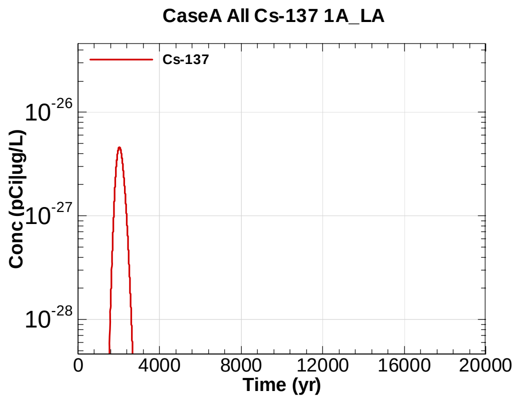

Figure G.2-101 - 1m Aquifer Concentration for CaseA All Cs-137 1A_LA

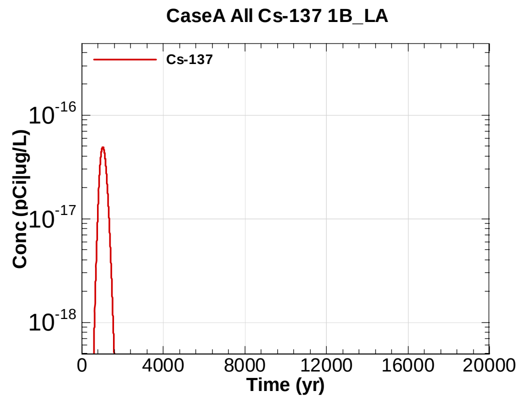

Figure G.2-102 - 1m Aquifer Concentration for CaseA All Cs-137 1B_LA

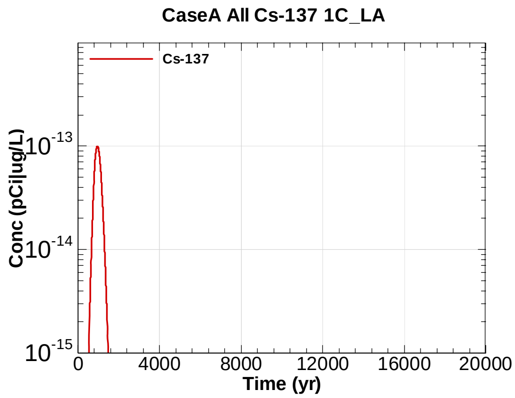

Figure G.2-103 - 1m Aquifer Concentration for CaseA All Cs-137 1C_LA

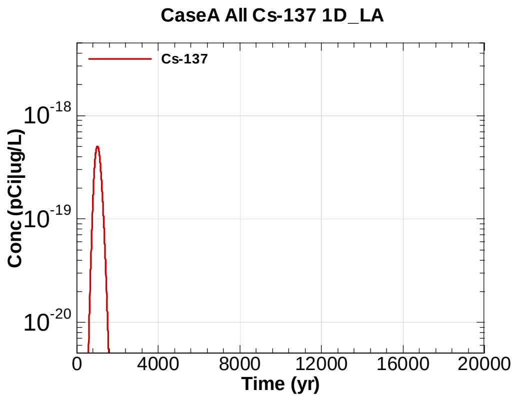

Figure G.2-104 - 1m Aquifer Concentration for CaseA All Cs-137 1D_LA

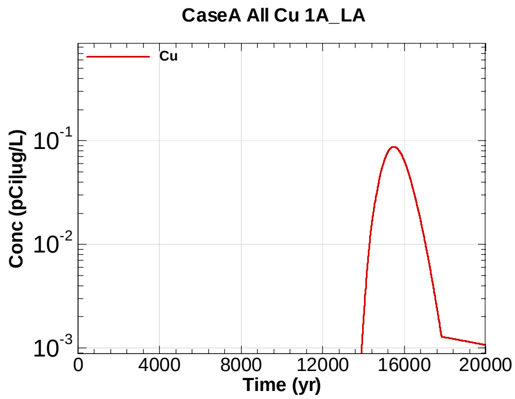

Figure G.2-105 - 1m Aquifer Concentration for CaseA All Cu 1A_LA

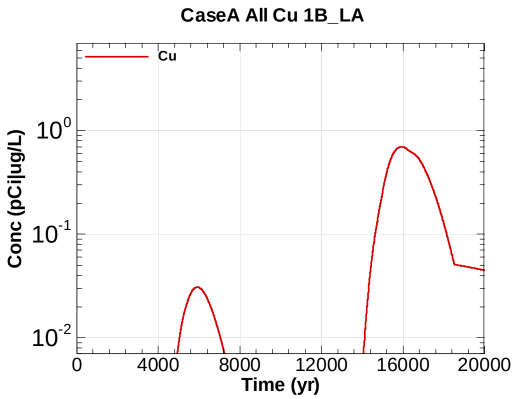

Figure G.2-106 - 1m Aquifer Concentration for CaseA All Cu 1B_LA

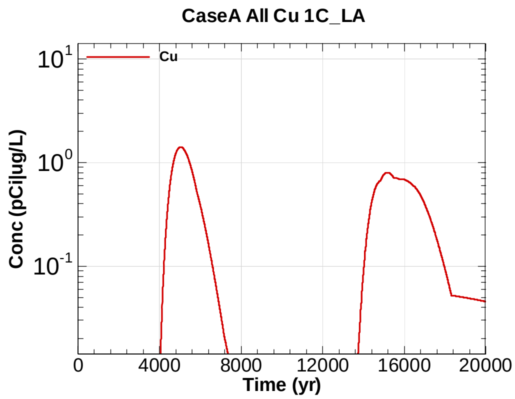

Figure G.2-107 - 1m Aquifer Concentration for CaseA All Cu 1C_LA

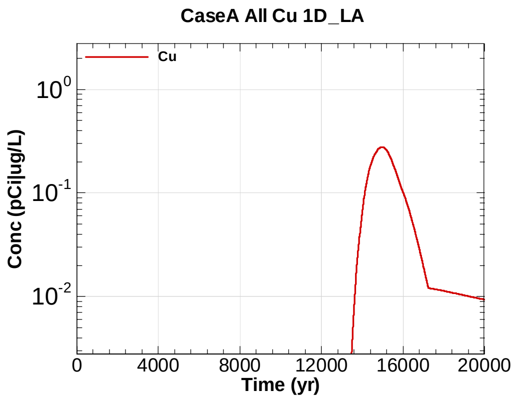

Figure G.2-108 - 1m Aquifer Concentration for CaseA All Cu 1D_LA

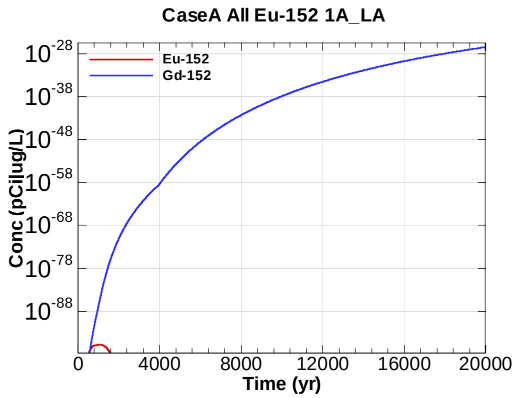

Figure G.2-109 - 1m Aquifer Concentration for CaseA All Eu-152 1A_LA

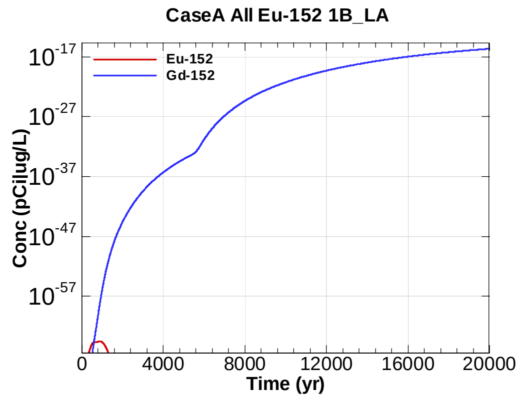

Figure G.2-110 - 1m Aquifer Concentration for CaseA All Eu-152 1B_LA

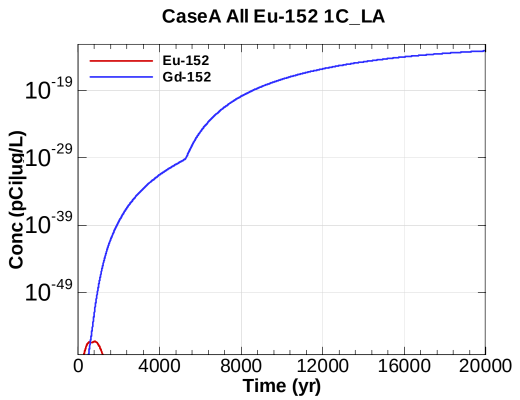

Figure G.2-111 - 1m Aquifer Concentration for CaseA All Eu-152 1C_LA

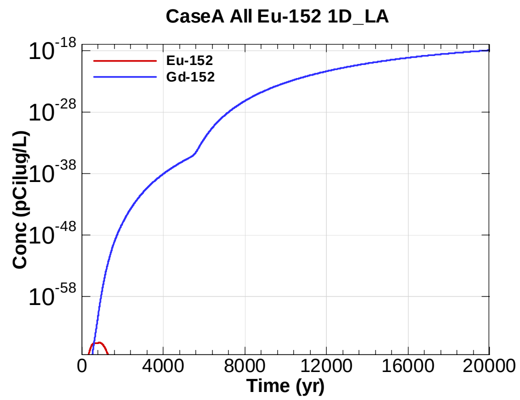

Figure G.2-112 - 1m Aquifer Concentration for CaseA All Eu-152 1D_LA

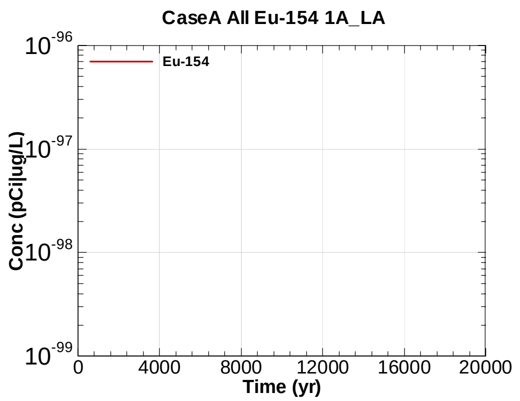

Figure G.2-113 - 1m Aquifer Concentration for CaseA All Eu-154 1A_LA

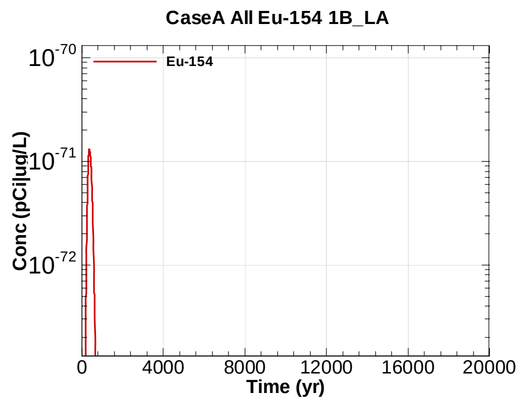

Figure G.2-114 - 1m Aquifer Concentration for CaseA All Eu-154 1B_LA

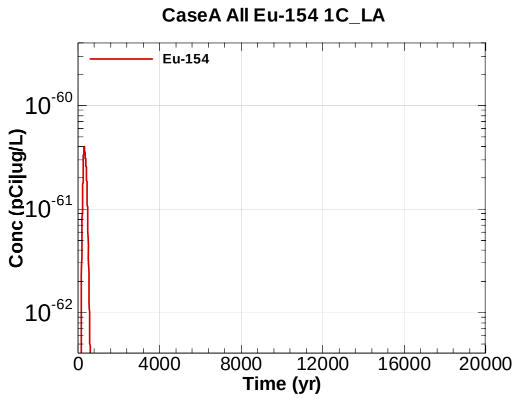

Figure G.2-115 - 1m Aquifer Concentration for CaseA All Eu-154 1C_LA

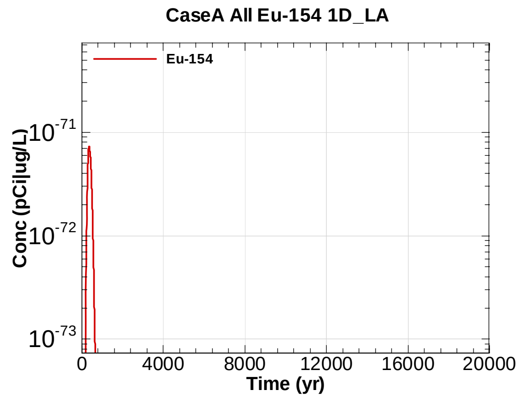

Figure G.2-116 - 1m Aquifer Concentration for CaseA All Eu-154 1D_LA

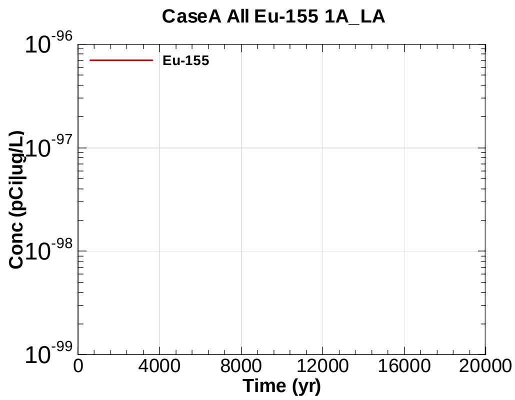

Figure G.2-117 - 1m Aquifer Concentration for CaseA All Eu-155 1A_LA

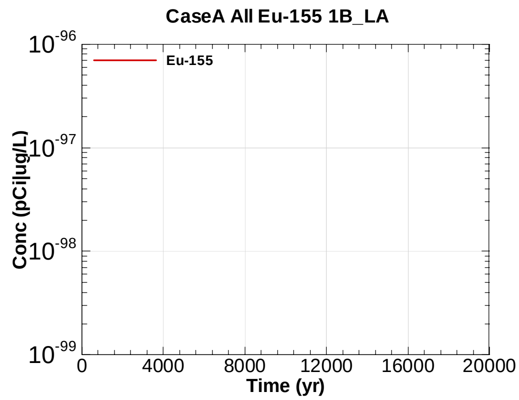

Figure G.2-118 - 1m Aquifer Concentration for CaseA All Eu-155 1B_LA

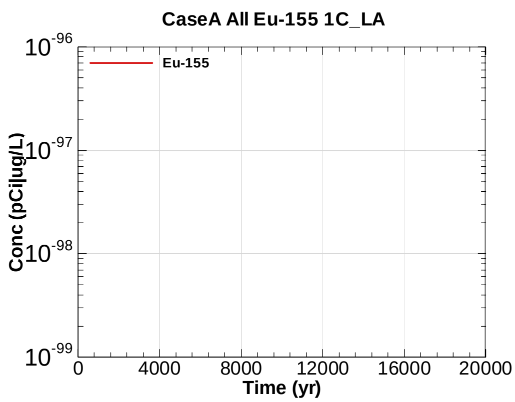

Figure G.2-119 - 1m Aquifer Concentration for CaseA All Eu-155 1C_LA

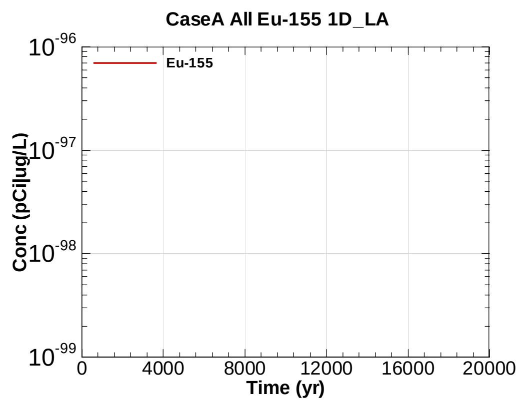

Figure G.2-120 - 1m Aquifer Concentration for CaseA All Eu-155 1D_LA

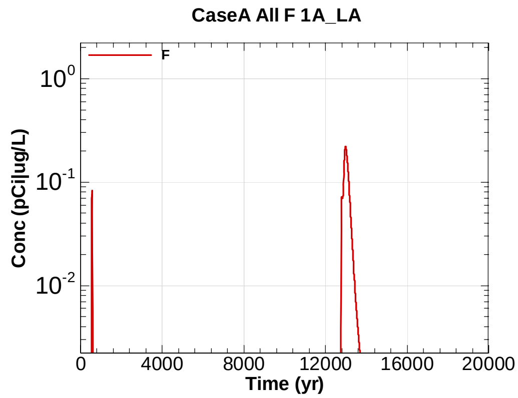

Figure G.2-121 - 1m Aquifer Concentration for CaseA All F 1A_LA

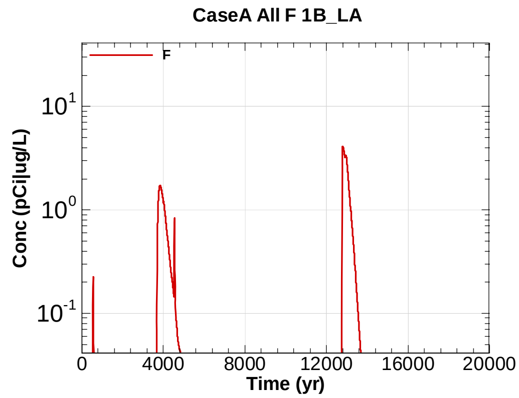

Figure G.2-122 - 1m Aquifer Concentration for CaseA All F 1B_LA

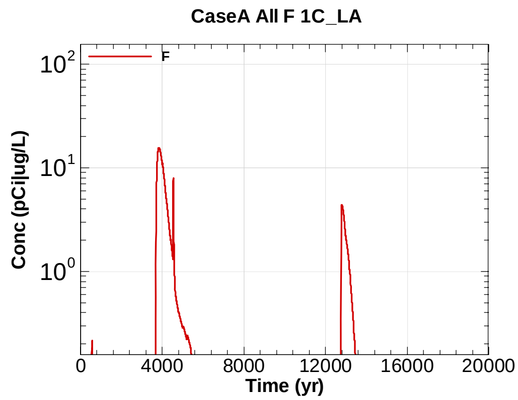

Figure G.2-123 - 1m Aquifer Concentration for CaseA All F 1C_LA

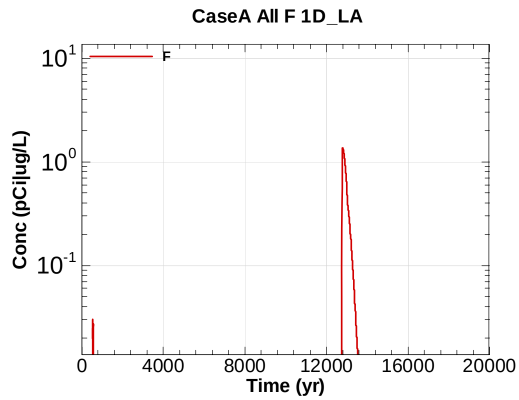

Figure G.2-124 - 1m Aquifer Concentration for CaseA All F 1D_LA

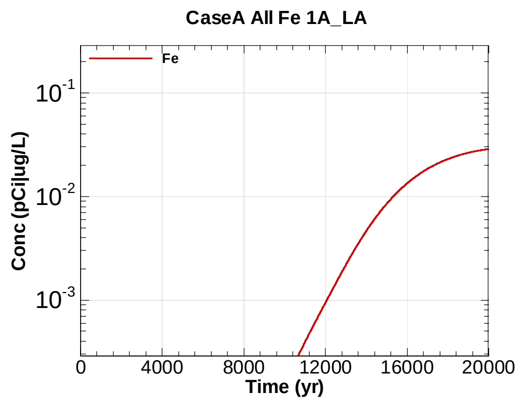

Figure G.2-125 - 1m Aquifer Concentration for CaseA All Fe 1A_LA

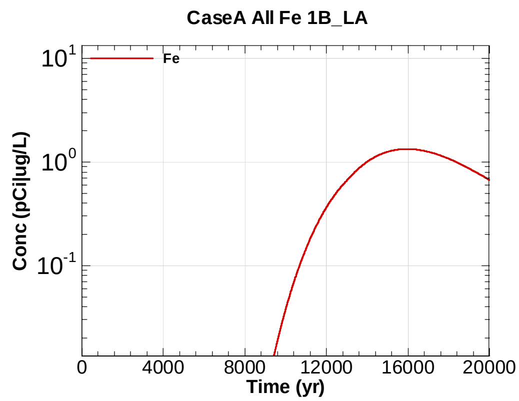

Figure G.2-126 - 1m Aquifer Concentration for CaseA All Fe 1B_LA

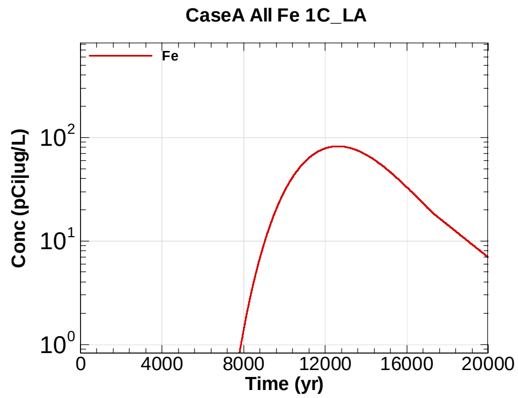

Figure G.2-127 - 1m Aquifer Concentration for CaseA All Fe 1C_LA

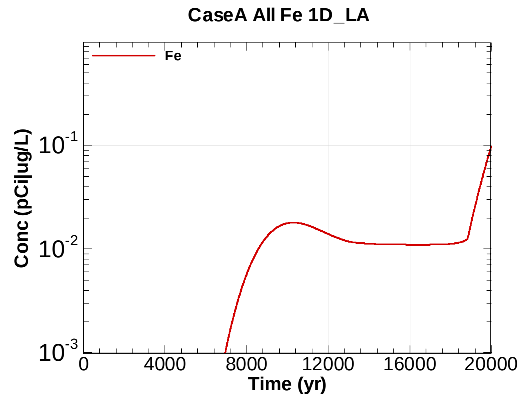

Figure G.2-128 - 1m Aquifer Concentration for CaseA All Fe 1D_LA

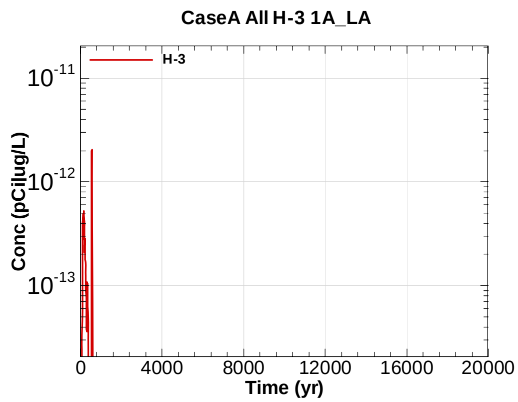

Figure G.2-129 - 1m Aquifer Concentration for CaseA All H-3 1A_LA

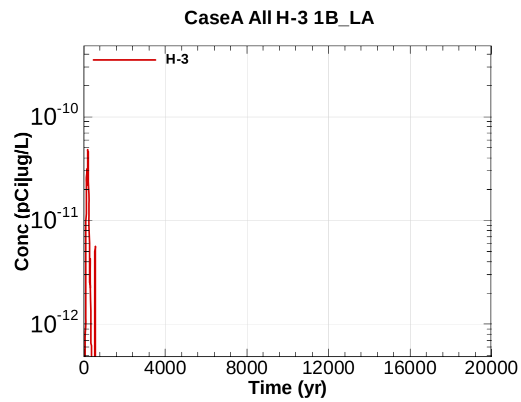

Figure G.2-130 - 1m Aquifer Concentration for CaseA All H-3 1B_LA

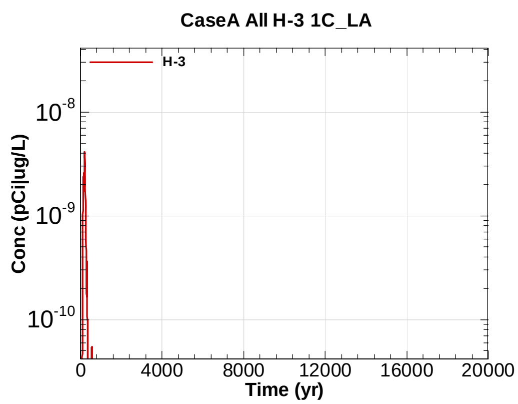

Figure G.2-131 - 1m Aquifer Concentration for CaseA All H-3 1C_LA

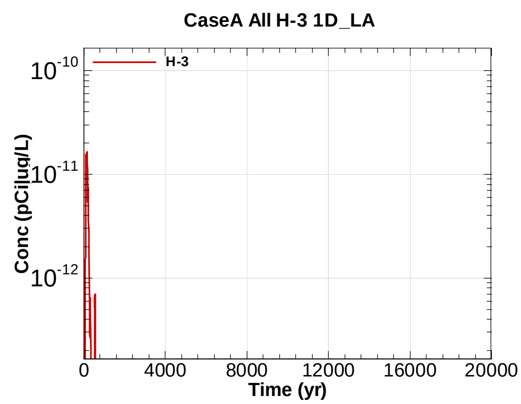

Figure G.2-132 - 1m Aquifer Concentration for CaseA All H-3 1D_LA

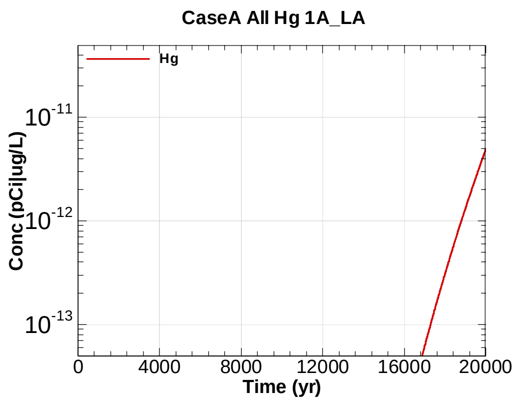

Figure G.2-133 - 1m Aquifer Concentration for CaseA All Hg 1A_LA

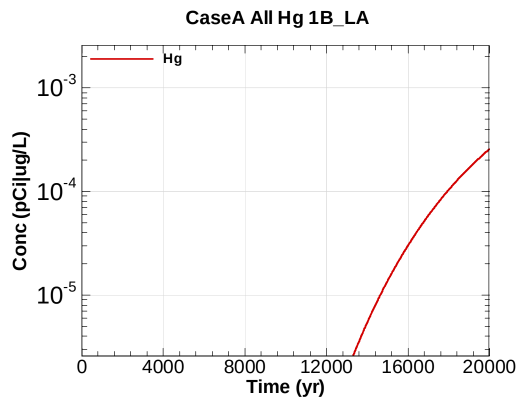

Figure G.2-134 - 1m Aquifer Concentration for CaseA All Hg 1B_LA

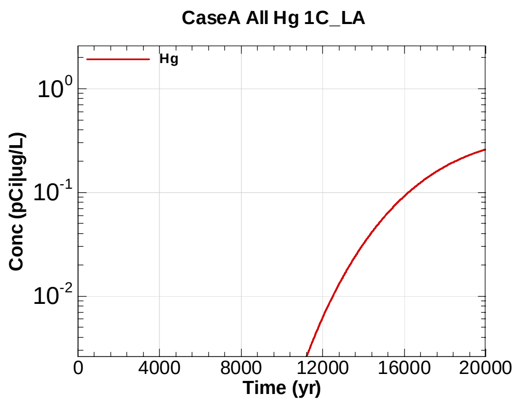

Figure G.2-135 - 1m Aquifer Concentration for CaseA All Hg 1C_LA

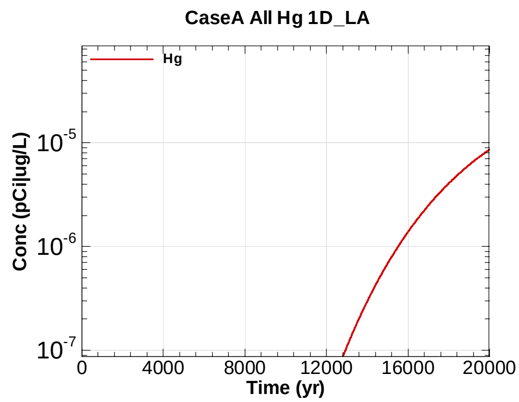

Figure G.2-136 - 1m Aquifer Concentration for CaseA All Hg 1D_LA

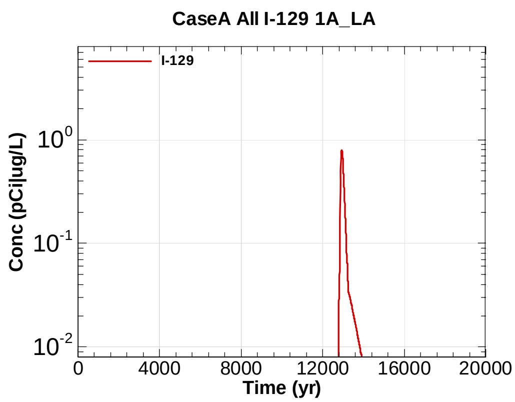

Figure G.2-137 - 1m Aquifer Concentration for CaseA All I-129 1A_LA

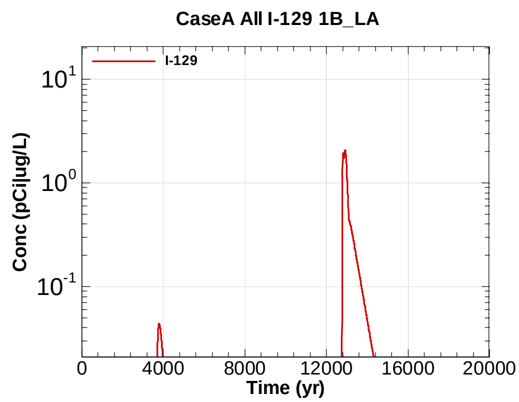

Figure G.2-138 - 1m Aquifer Concentration for CaseA All I-129 1B_LA

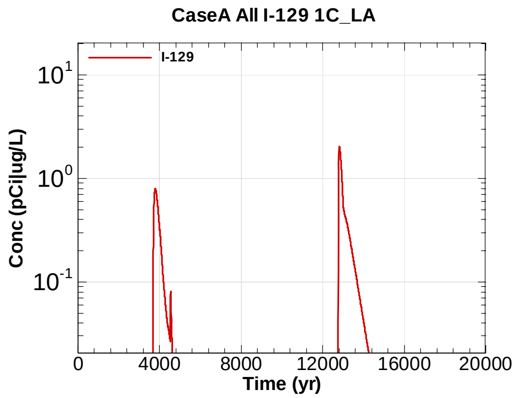

Figure G.2-139 - 1m Aquifer Concentration for CaseA All I-129 1C_LA

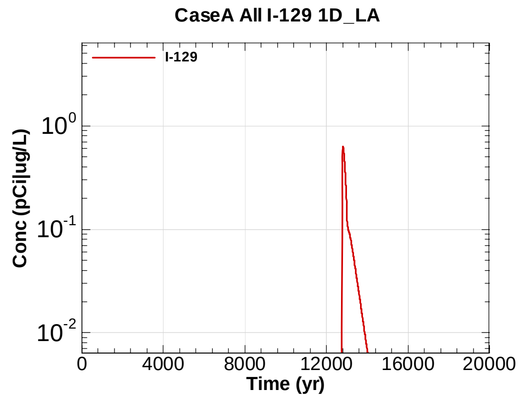

Figure G.2-140 - 1m Aquifer Concentration for CaseA All I-129 1D_LA

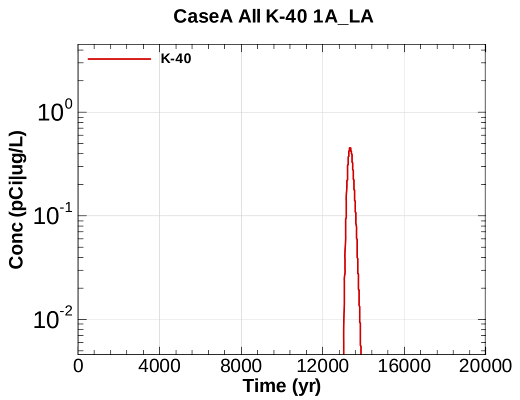

Figure G.2-141 - 1m Aquifer Concentration for CaseA All K-40 1A_LA

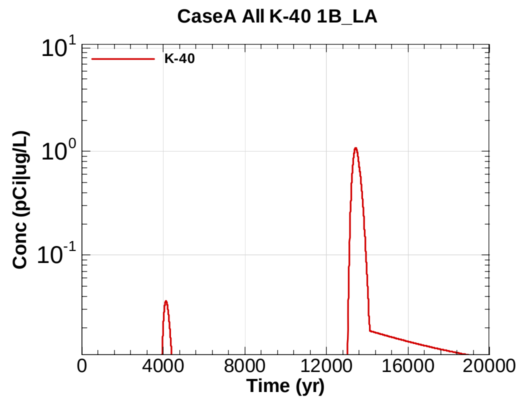

Figure G.2-142 - 1m Aquifer Concentration for CaseA All K-40 1B_LA

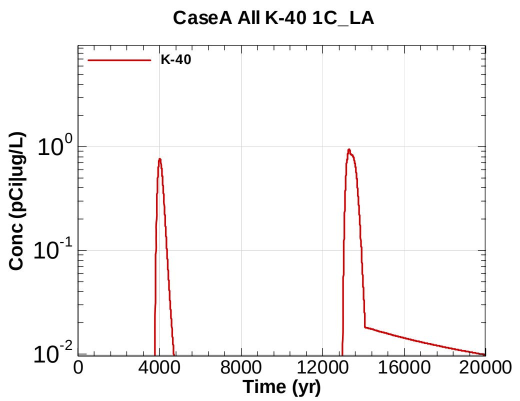

Figure G.2-143 - 1m Aquifer Concentration for CaseA All K-40 1C_LA

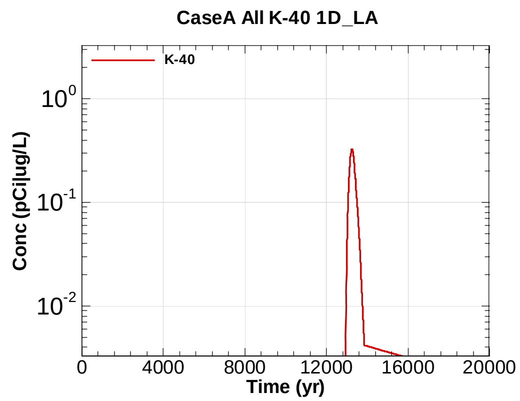

Figure G.2-144 - 1m Aquifer Concentration for CaseA All K-40 1D_LA

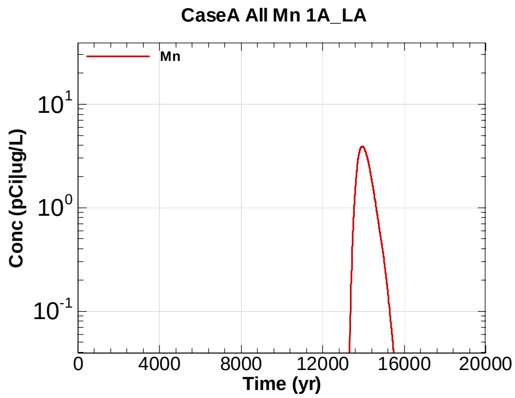

Figure G.2-145 - 1m Aquifer Concentration for CaseA All Mn 1A_LA

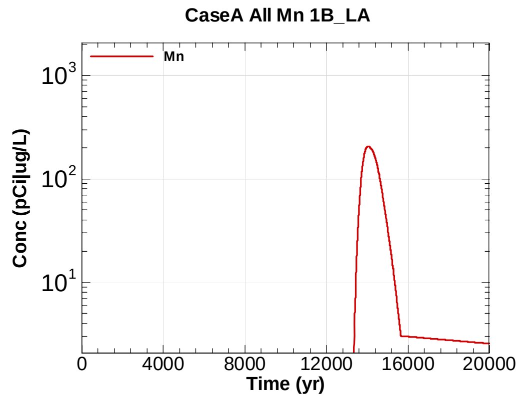

Figure G.2-146 - 1m Aquifer Concentration for CaseA All Mn 1B_LA

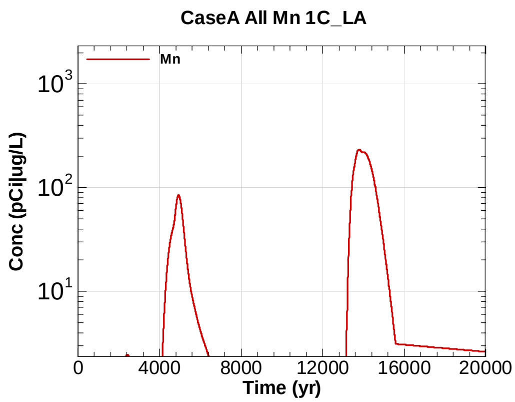

Figure G.2-147 - 1m Aquifer Concentration for CaseA All Mn 1C_LA

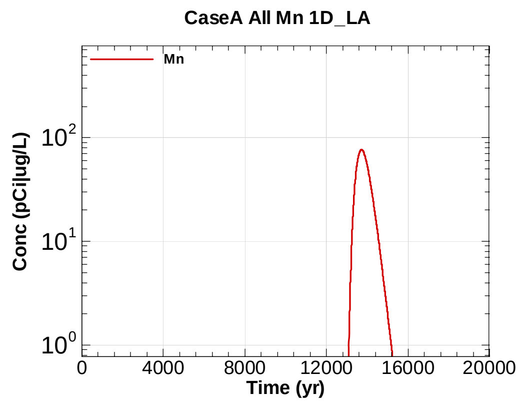

Figure G.2-148 - 1m Aquifer Concentration for CaseA All Mn 1D_LA

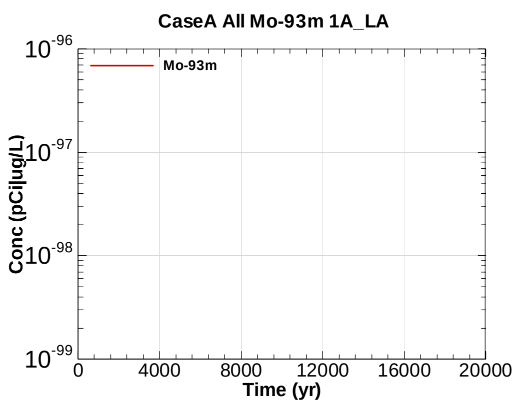

Figure G.2-149 - 1m Aquifer Concentration for CaseA All Mo-93m 1A_LA

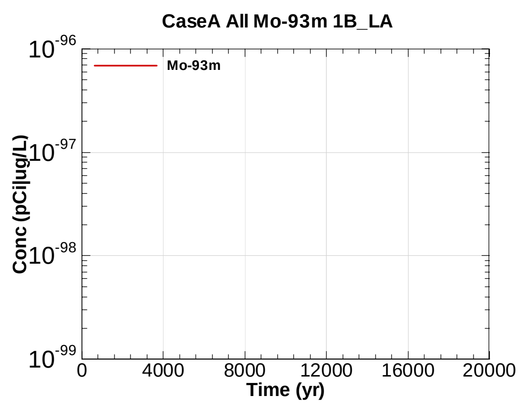

Figure G.2-150 - 1m Aquifer Concentration for CaseA All Mo-93m 1B_LA

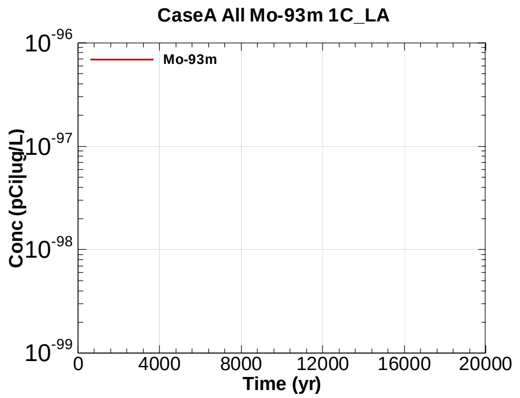

Figure G.2-151 - 1m Aquifer Concentration for CaseA All Mo-93m 1C_LA

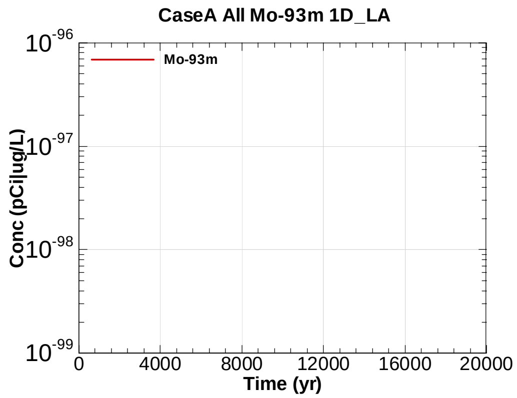

Figure G.2-152 - 1m Aquifer Concentration for CaseA All Mo-93m 1D_LA

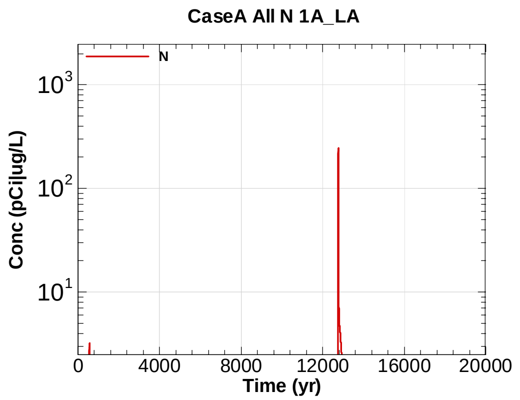

Figure G.2-153 - 1m Aquifer Concentration for CaseA All N 1A_LA

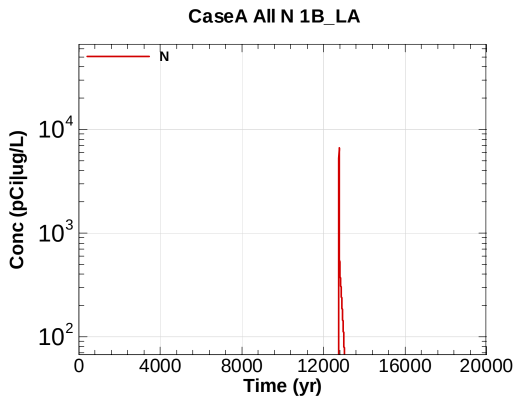

Figure G.2-154 - 1m Aquifer Concentration for CaseA All N 1B_LA

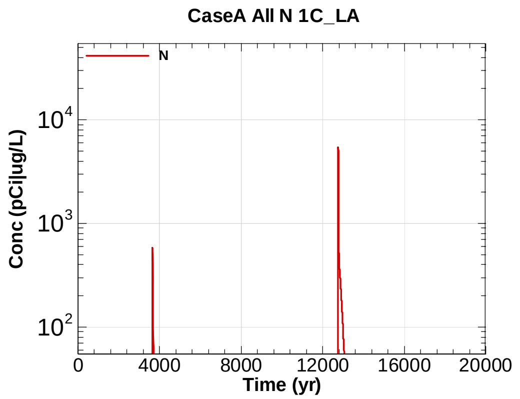

Figure G.2-155 - 1m Aquifer Concentration for CaseA All N 1C_LA

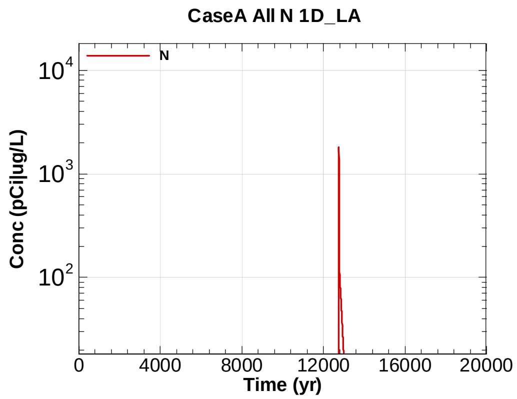

Figure G.2-156 - 1m Aquifer Concentration for CaseA All N 1D_LA

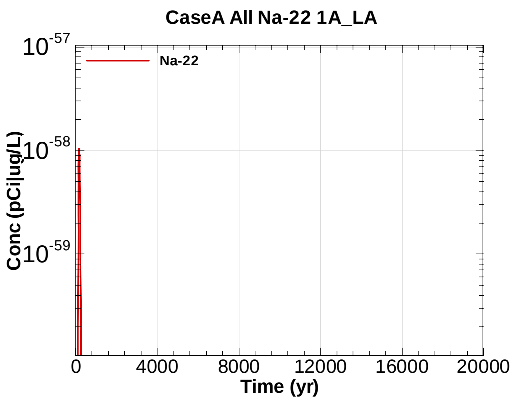

Figure G.2-157 - 1m Aquifer Concentration for CaseA All Na-22 1A_LA

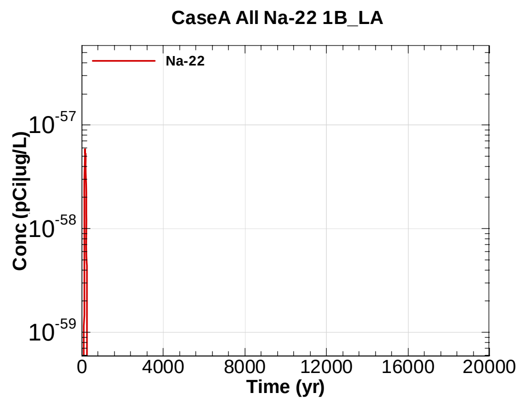

Figure G.2-158 - 1m Aquifer Concentration for CaseA All Na-22 1B_LA

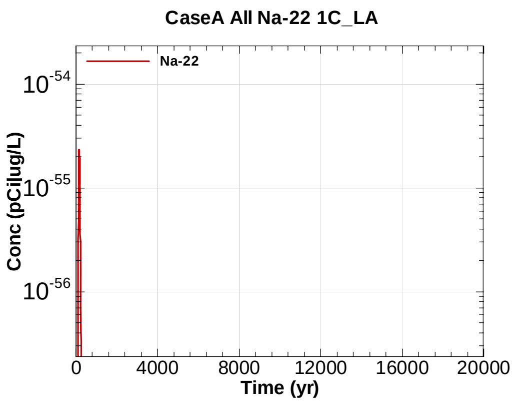

Figure G.2-159 - 1m Aquifer Concentration for CaseA All Na-22 1C_LA

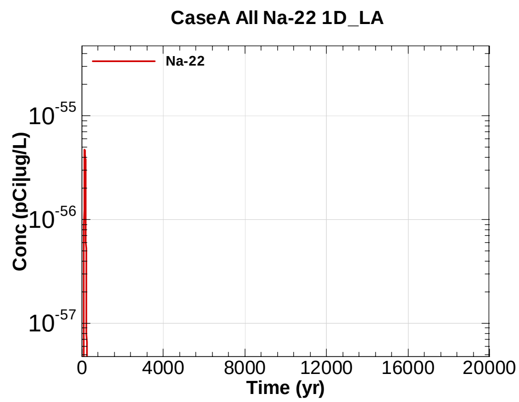

Figure G.2-160 - 1m Aquifer Concentration for CaseA All Na-22 1D_LA

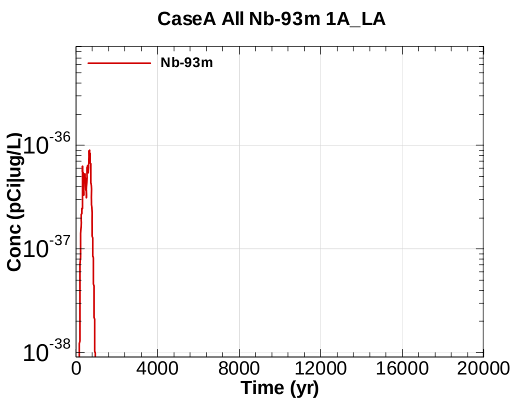

Figure G.2-161 - 1m Aquifer Concentration for CaseA All Nb-93m 1A_LA

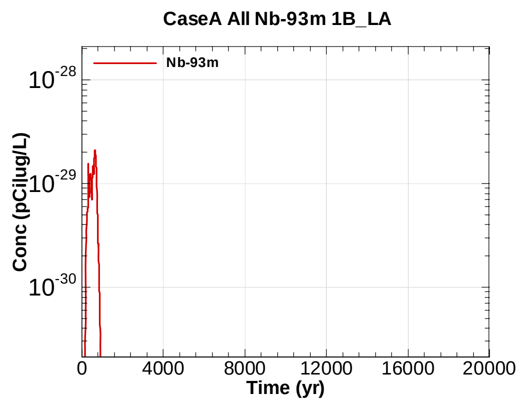

Figure G.2-162 - 1m Aquifer Concentration for CaseA All Nb-93m 1B_LA

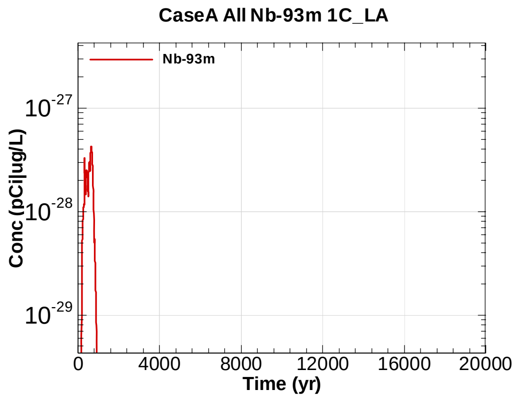

Figure G.2-163 - 1m Aquifer Concentration for CaseA All Nb-93m 1C_LA

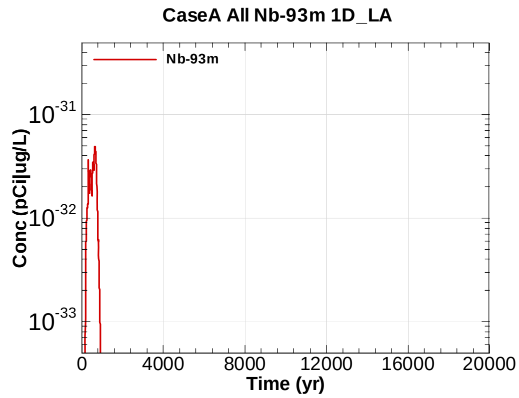

Figure G.2-164 - 1m Aquifer Concentration for CaseA All Nb-93m 1D_LA

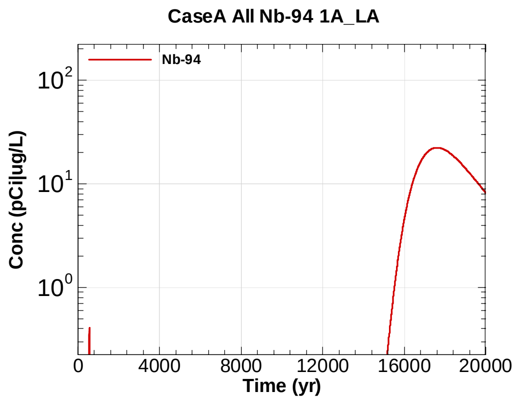

Figure G.2-165 - 1m Aquifer Concentration for CaseA All Nb-94 1A_LA

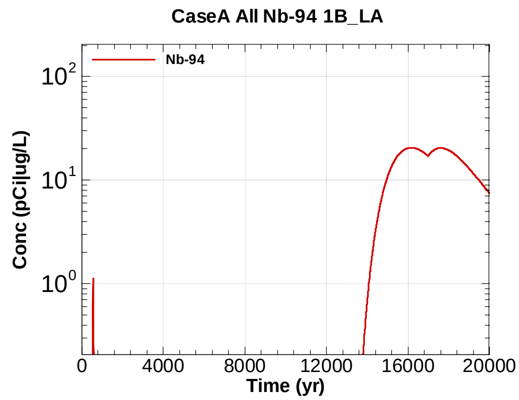

Figure G.2-166 - 1m Aquifer Concentration for CaseA All Nb-94 1B_LA

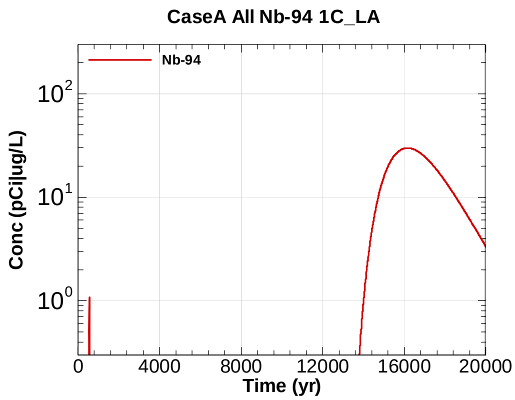

Figure G.2-167 - 1m Aquifer Concentration for CaseA All Nb-94 1C_LA

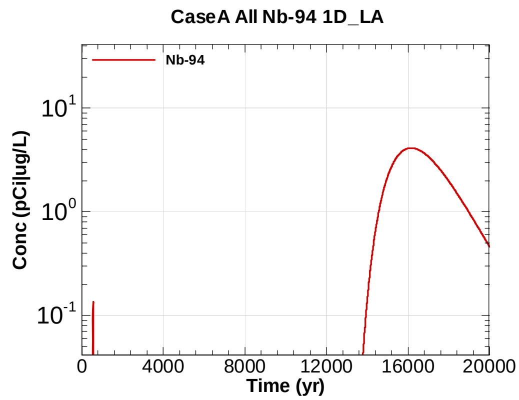

Figure G.2-168 - 1m Aquifer Concentration for CaseA All Nb-94 1D_LA

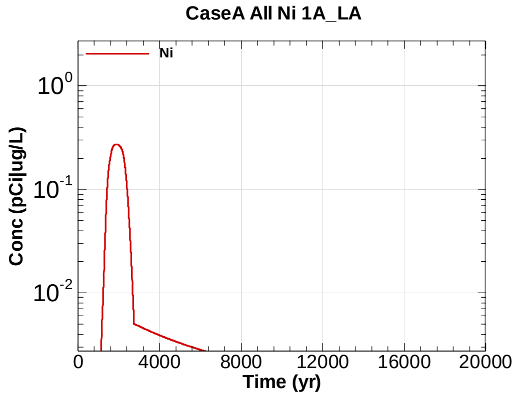

Figure G.2-169 - 1m Aquifer Concentration for CaseA All Ni 1A_LA

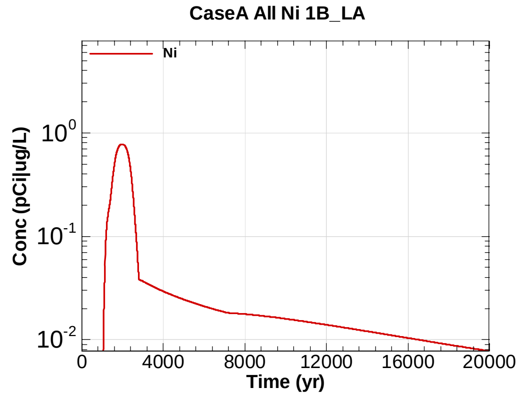

Figure G.2-170 - 1m Aquifer Concentration for CaseA All Ni 1B_LA

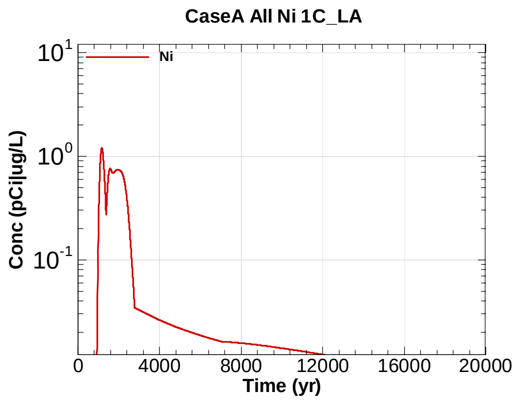

Figure G.2-171 - 1m Aquifer Concentration for CaseA All Ni 1C_LA

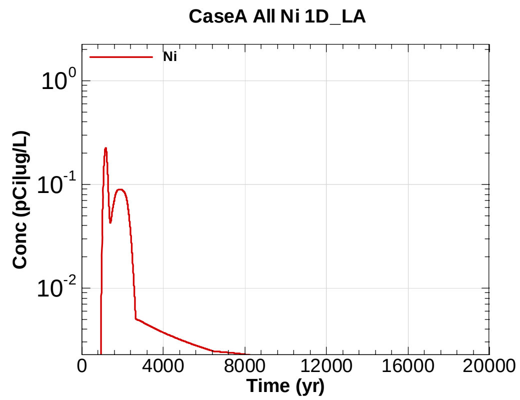

Figure G.2-172 - 1m Aquifer Concentration for CaseA All Ni 1D_LA

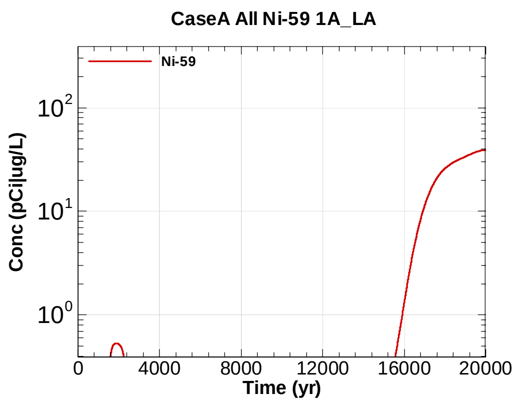

Figure G.2-173 - 1m Aquifer Concentration for CaseA All Ni-59 1A_LA

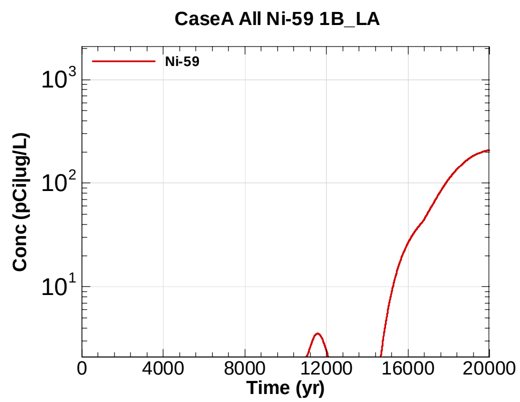

Figure G.2-174 - 1m Aquifer Concentration for CaseA All Ni-59 1B_LA

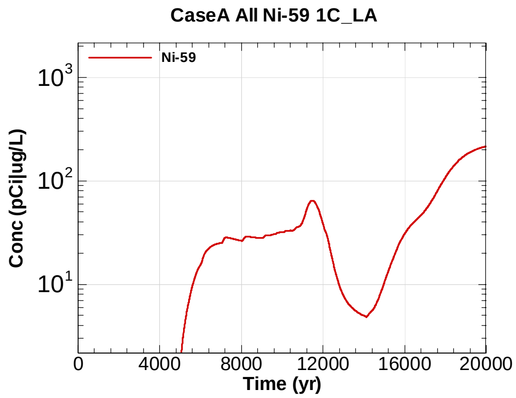

Figure G.2-175 - 1m Aquifer Concentration for CaseA All Ni-59 1C_LA

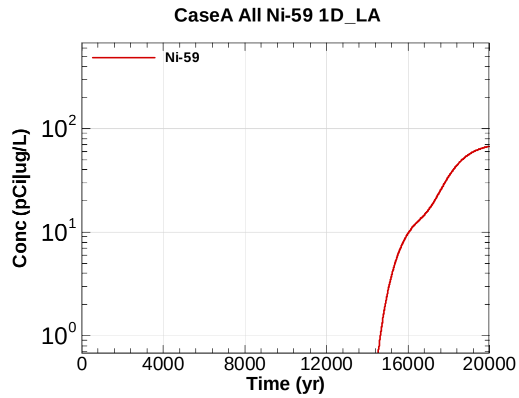

Figure G.2-176 - 1m Aquifer Concentration for CaseA All Ni-59 1D_LA

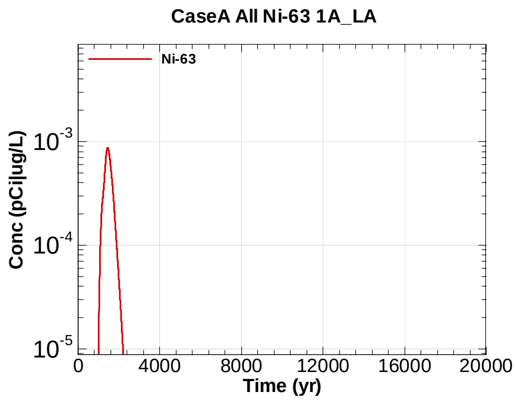

Figure G.2-177 - 1m Aquifer Concentration for CaseA All Ni-63 1A_LA

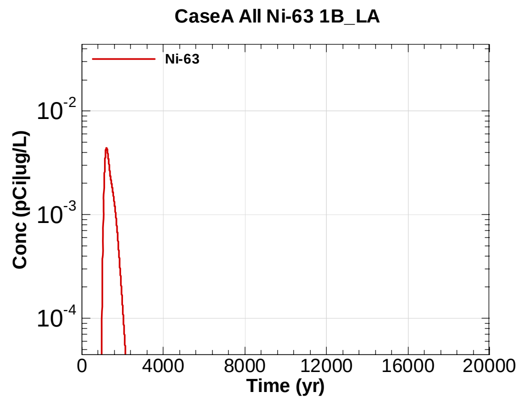

Figure G.2-178 - 1m Aquifer Concentration for CaseA All Ni-63 1B_LA

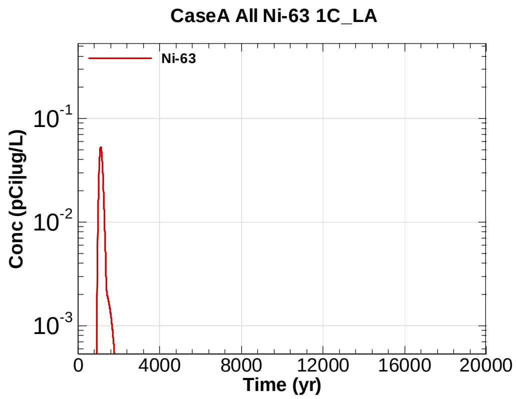

Figure G.2-179 - 1m Aquifer Concentration for CaseA All Ni-63 1C_LA

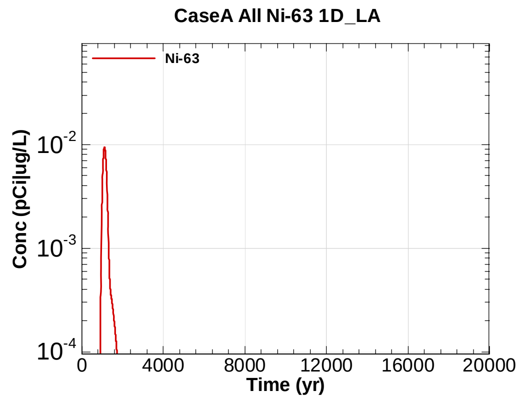

Figure G.2-180 - 1m Aquifer Concentration for CaseA All Ni-63 1D_LA

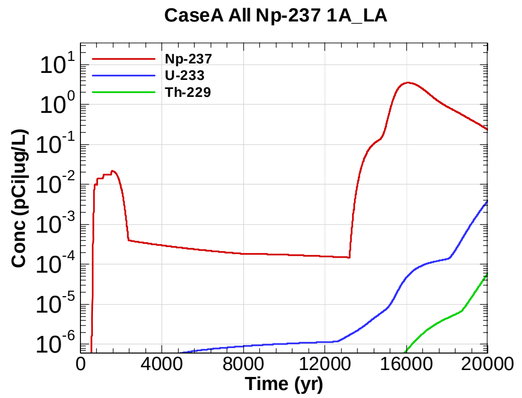

Figure G.2-181 - 1m Aquifer Concentration for CaseA All Np-237 1A_LA

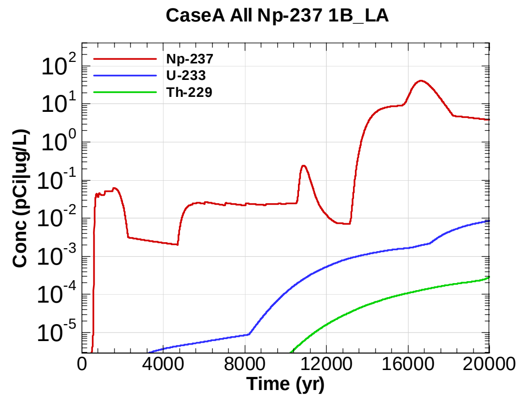

Figure G.2-182 - 1m Aquifer Concentration for CaseA All Np-237 1B_LA

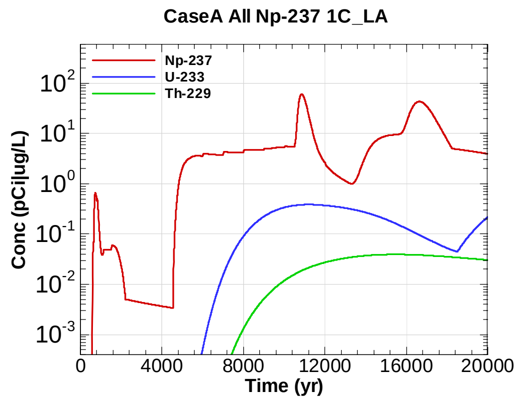

Figure G.2-183 - 1m Aquifer Concentration for CaseA All Np-237 1C_LA

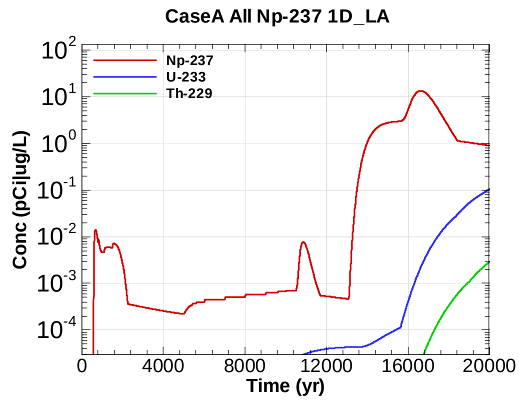

Figure G.2-184 - 1m Aquifer Concentration for CaseA All Np-237 1D_LA

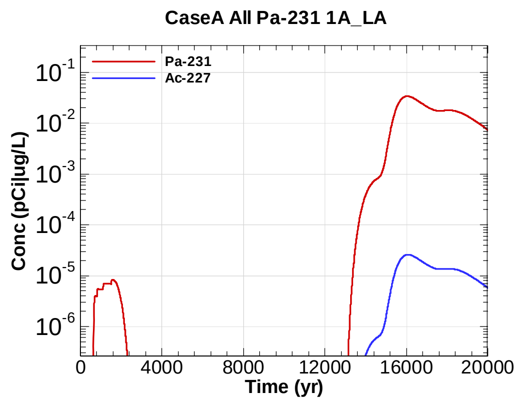

Figure G.2-185 - 1m Aquifer Concentration for CaseA All Pa-231 1A_LA

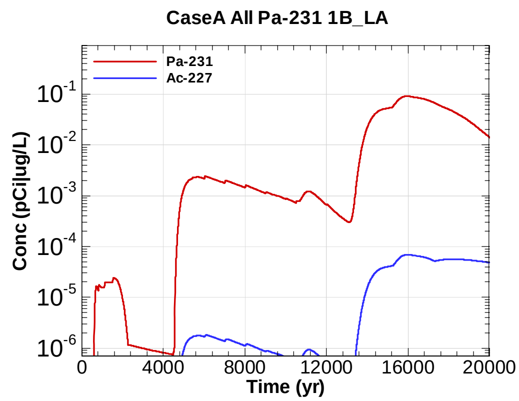

Figure G.2-186 - 1m Aquifer Concentration for CaseA All Pa-231 1B_LA

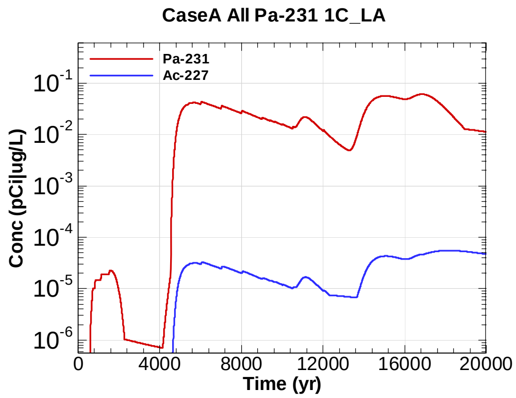

Figure G.2-187 - 1m Aquifer Concentration for CaseA All Pa-231 1C_LA

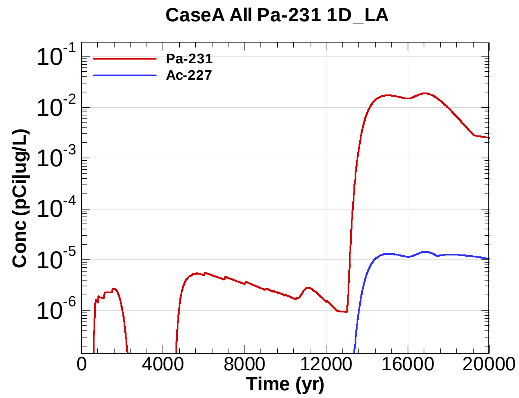

Figure G.2-188 - 1m Aquifer Concentration for CaseA All Pa-231 1D_LA

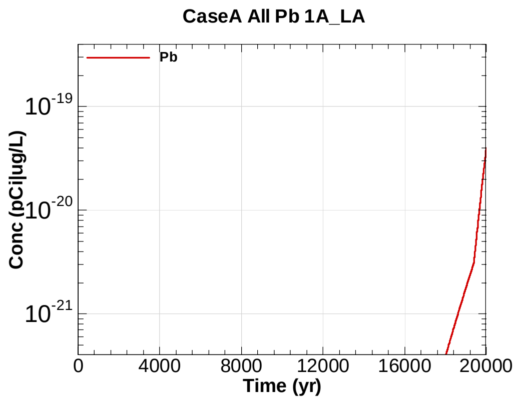

Figure G.2-189 - 1m Aquifer Concentration for CaseA All Pb 1A_LA

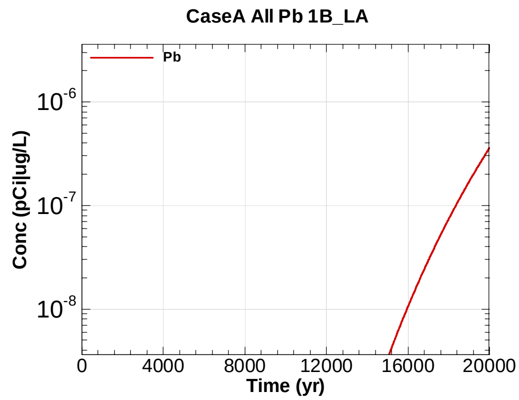

Figure G.2-190 - 1m Aquifer Concentration for CaseA All Pb 1B_LA

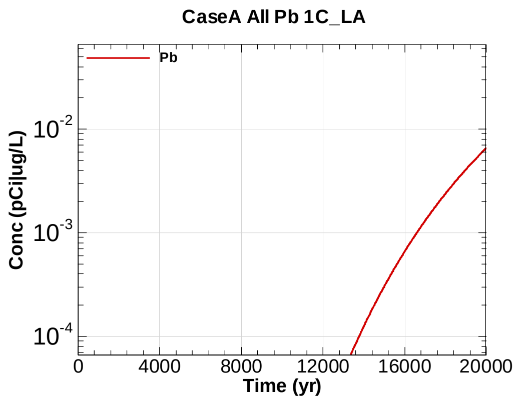

Figure G.2-191 - 1m Aquifer Concentration for CaseA All Pb 1C_LA

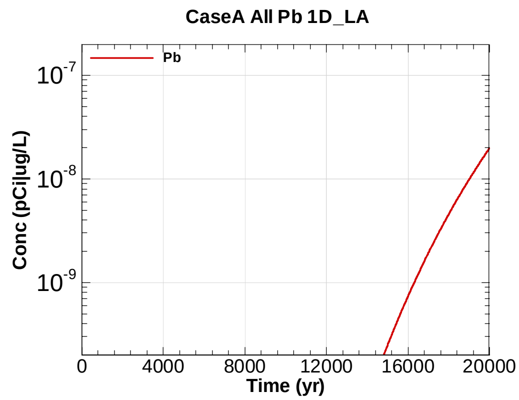

Figure G.2-192 - 1m Aquifer Concentration for CaseA All Pb 1D_LA

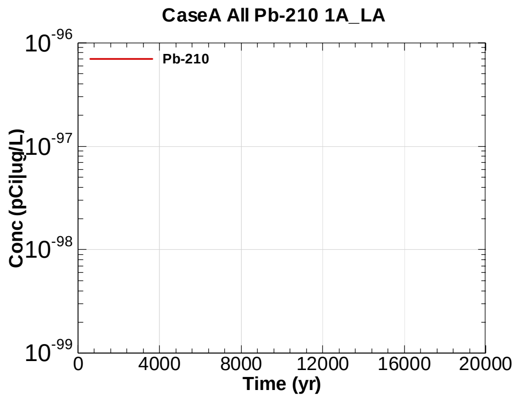

Figure G.2-193 - 1m Aquifer Concentration for CaseA All Pb-210 1A_LA

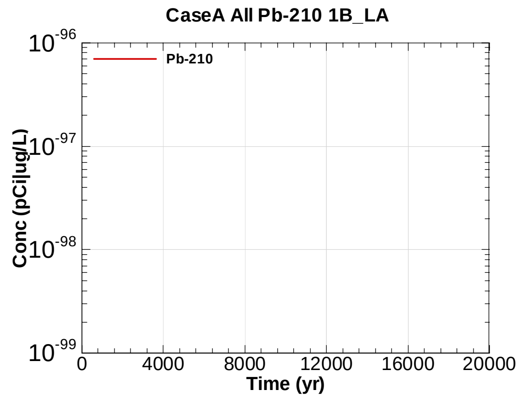

Figure G.2-194 - 1m Aquifer Concentration for CaseA All Pb-210 1B_LA

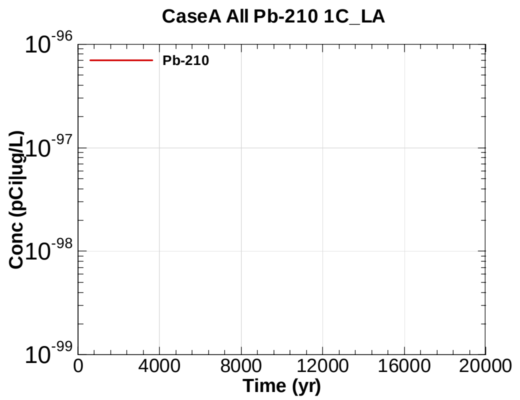

Figure G.2-195 - 1m Aquifer Concentration for CaseA All Pb-210 1C_LA

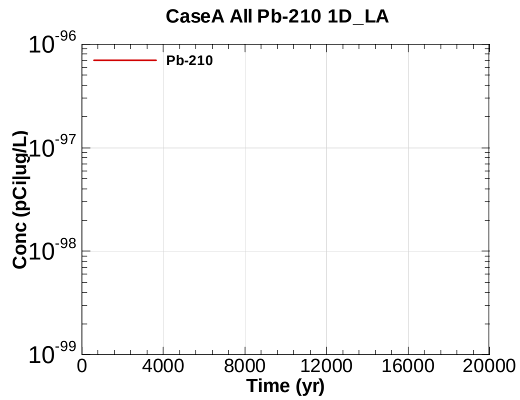

Figure G.2-196 - 1m Aquifer Concentration for CaseA All Pb-210 1D_LA

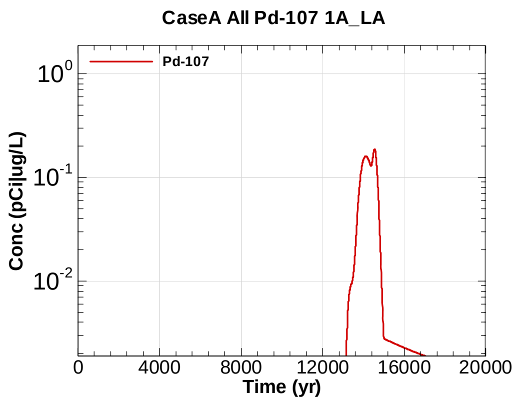

Figure G.2-197 - 1m Aquifer Concentration for CaseA All Pd-107 1A_LA

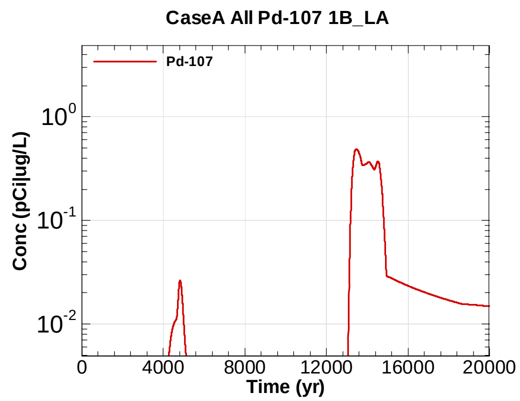

Figure G.2-198 - 1m Aquifer Concentration for CaseA All Pd-107 1B_LA

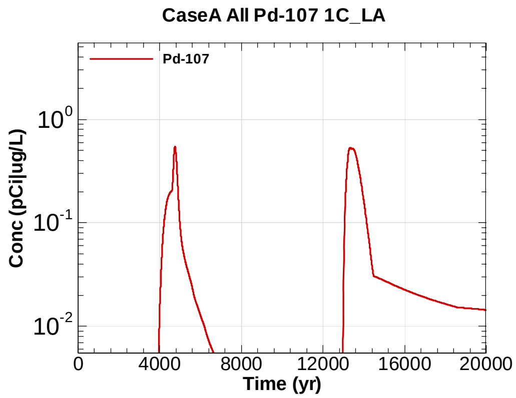

Figure G.2-199 - 1m Aquifer Concentration for CaseA All Pd-107 1C_LA

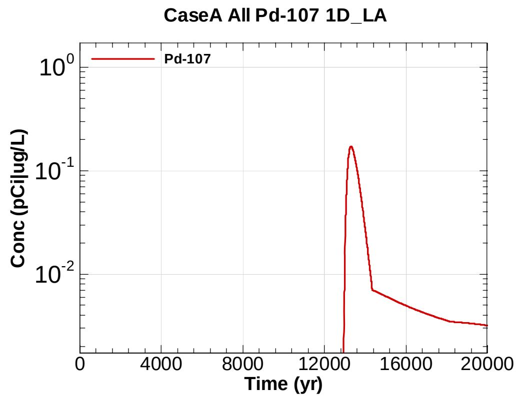

Figure G.2-200 - 1m Aquifer Concentration for CaseA All Pd-107 1D_LA

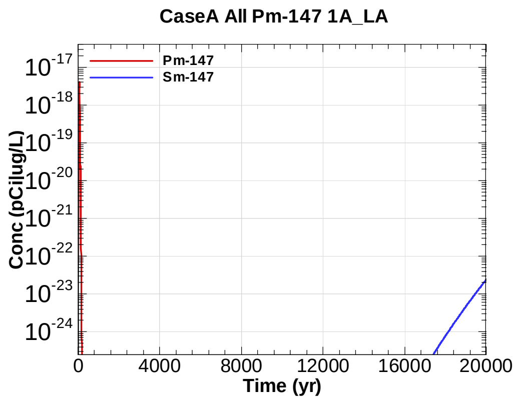

Figure G.2-201 - 1m Aquifer Concentration for CaseA All Pm-147 1A_LA

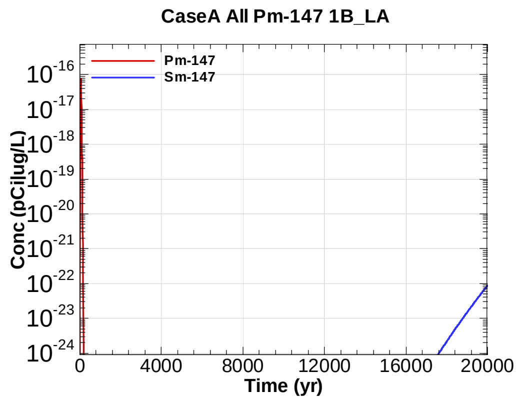

Figure G.2-202 - 1m Aquifer Concentration for CaseA All Pm-147 1B_LA

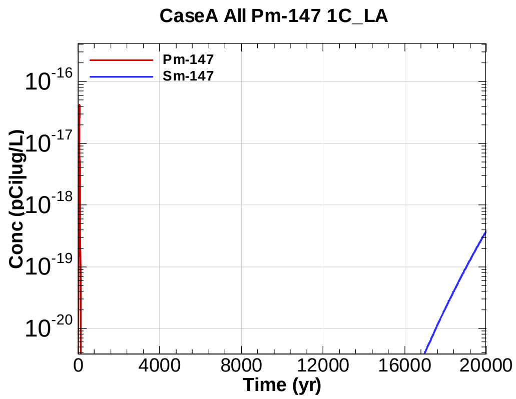

Figure G.2-203 - 1m Aquifer Concentration for CaseA All Pm-147 1C_LA

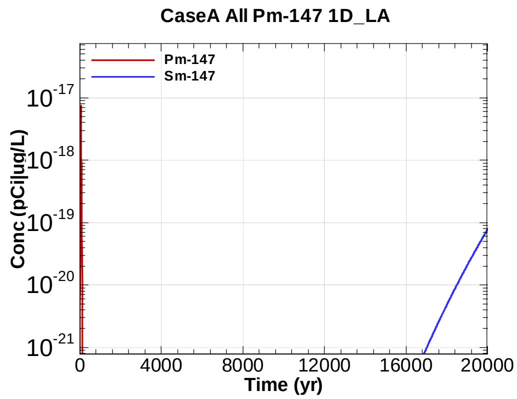

Figure G.2-204 - 1m Aquifer Concentration for CaseA All Pm-147 1D_LA

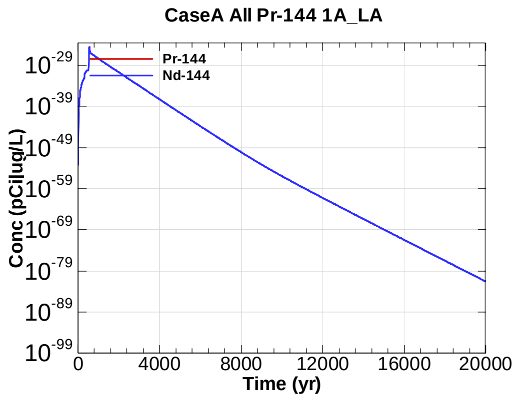

Figure G.2-205 - 1m Aquifer Concentration for CaseA All Pr-144 1A_LA

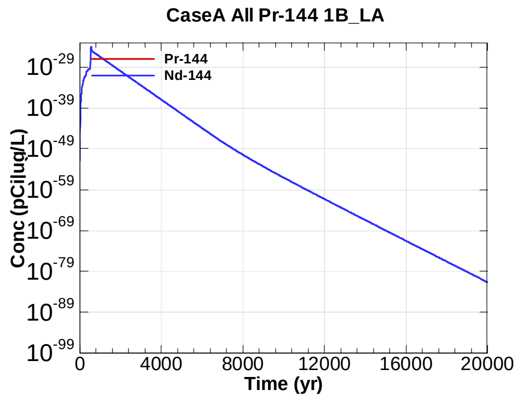

Figure G.2-206 - 1m Aquifer Concentration for CaseA All Pr-144 1B_LA

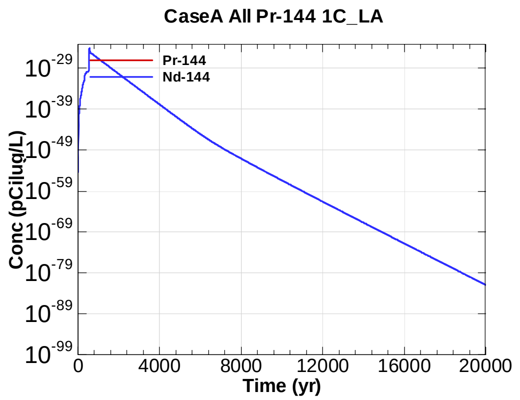

Figure G.2-207 - 1m Aquifer Concentration for CaseA All Pr-144 1C_LA

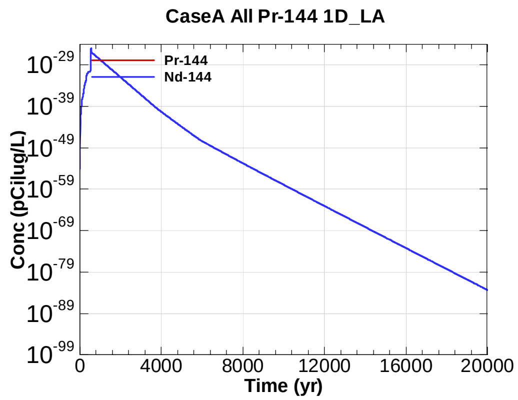

Figure G.2-208 - 1m Aquifer Concentration for CaseA All Pr-144 1D_LA

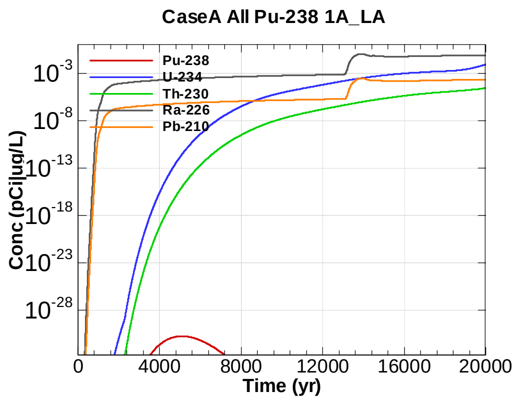

Figure G.2-209 - 1m Aquifer Concentration for CaseA All Pu-238 1A_LA

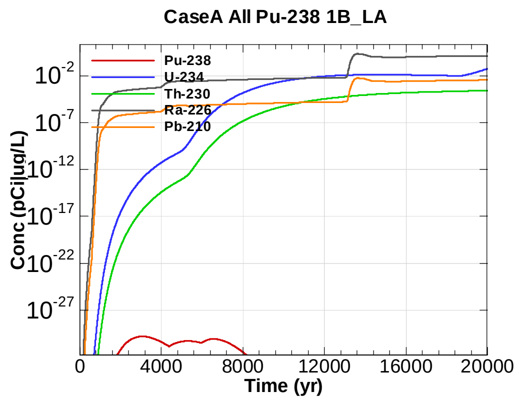

Figure G.2-210 - 1m Aquifer Concentration for CaseA All Pu-238 1B_LA

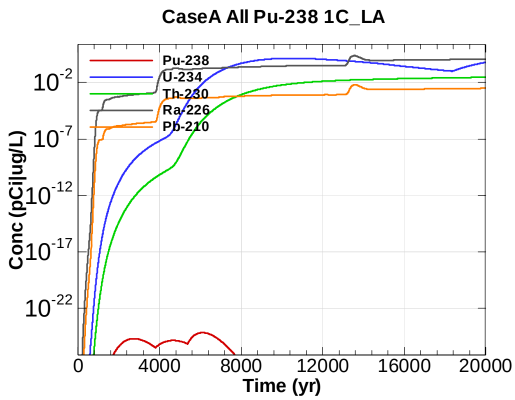

Figure G.2-211 - 1m Aquifer Concentration for CaseA All Pu-238 1C_LA

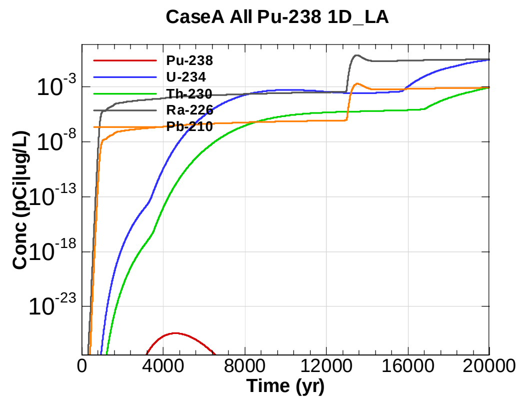

Figure G.2-212 - 1m Aquifer Concentration for CaseA All Pu-238 1D_LA

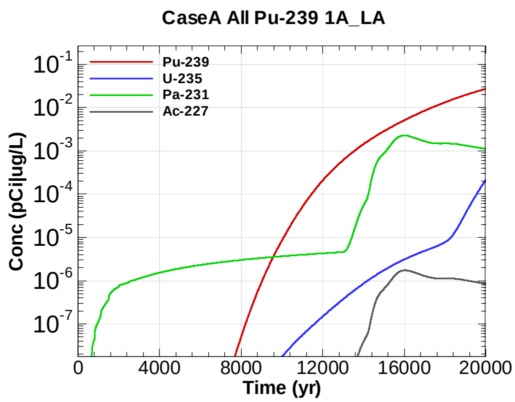

Figure G.2-213 - 1m Aquifer Concentration for CaseA All Pu-239 1A_LA

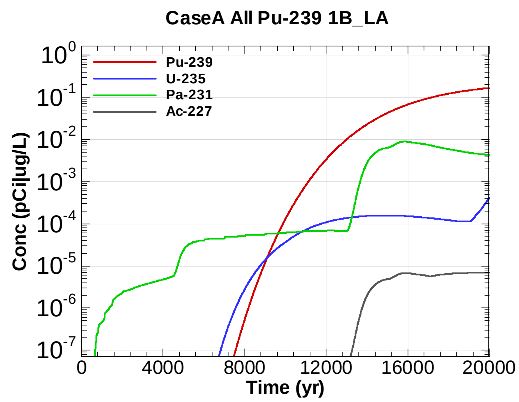

Figure G.2-214 - 1m Aquifer Concentration for CaseA All Pu-239 1B_LA

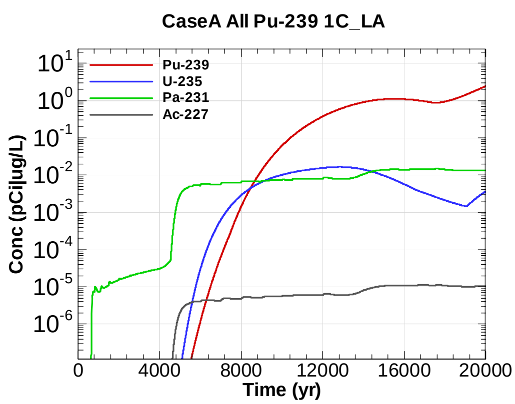

Figure G.2-215 - 1m Aquifer Concentration for CaseA All Pu-239 1C_LA

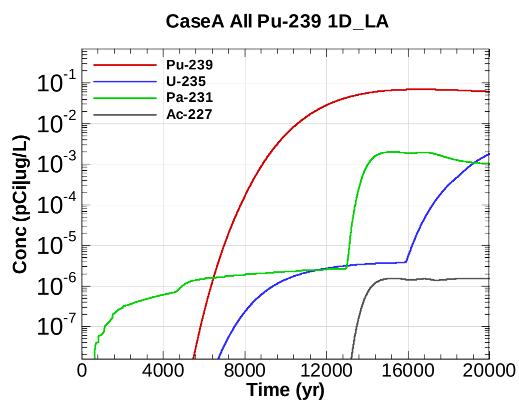

Figure G.2-216 - 1m Aquifer Concentration for CaseA All Pu-239 1D_LA

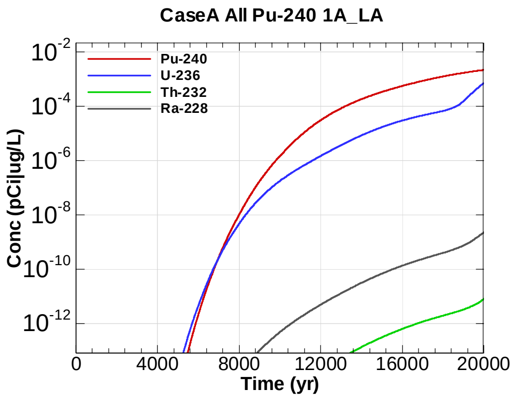

Figure G.2-217 - 1m Aquifer Concentration for CaseA All Pu-240 1A_LA

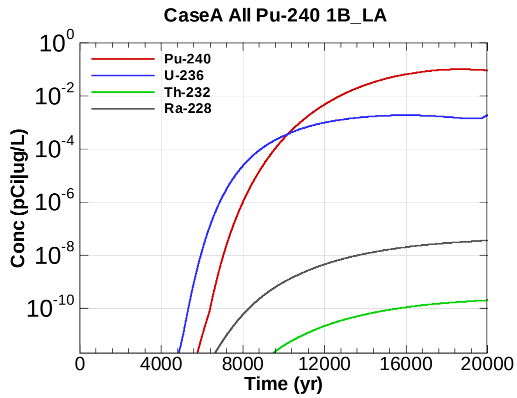

Figure G.2-218 - 1m Aquifer Concentration for CaseA All Pu-240 1B_LA

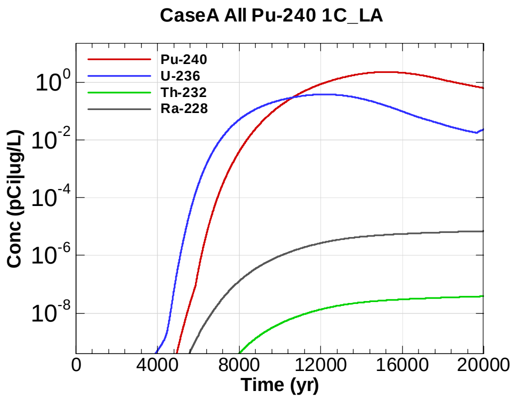

Figure G.2-219 - 1m Aquifer Concentration for CaseA All Pu-240 1C_LA

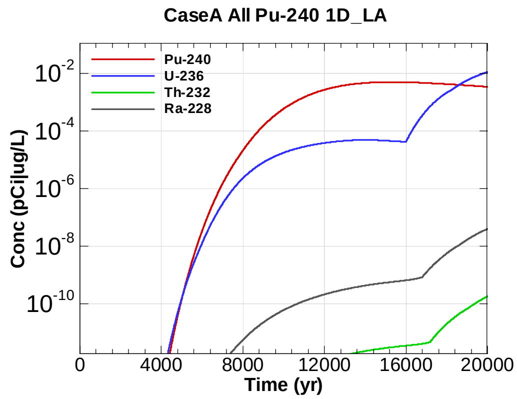

Figure G.2-220 - 1m Aquifer Concentration for CaseA All Pu-240 1D_LA

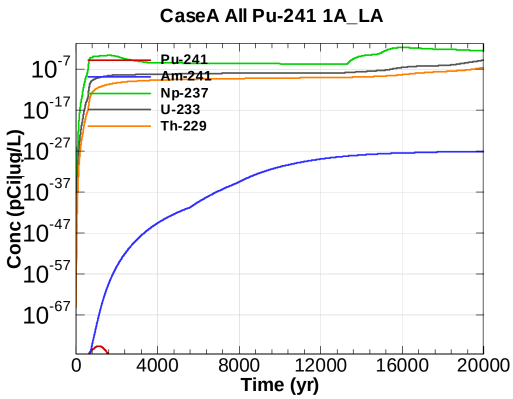

Figure G.2-221 - 1m Aquifer Concentration for CaseA All Pu-241 1A_LA

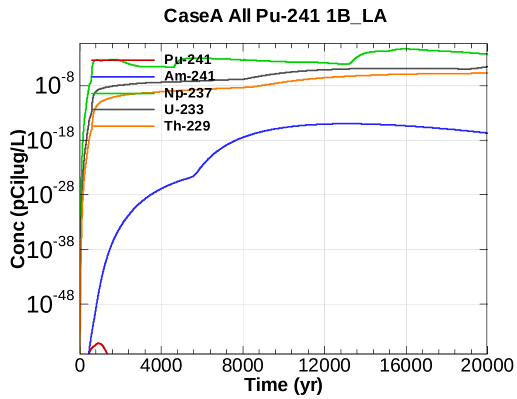

Figure G.2-222 - 1m Aquifer Concentration for CaseA All Pu-241 1B_LA

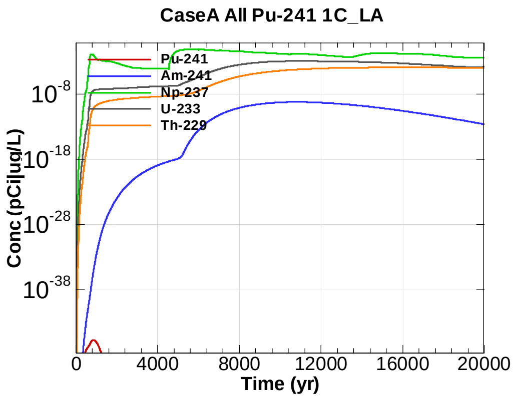

Figure G.2-223 - 1m Aquifer Concentration for CaseA All Pu-241 1C_LA

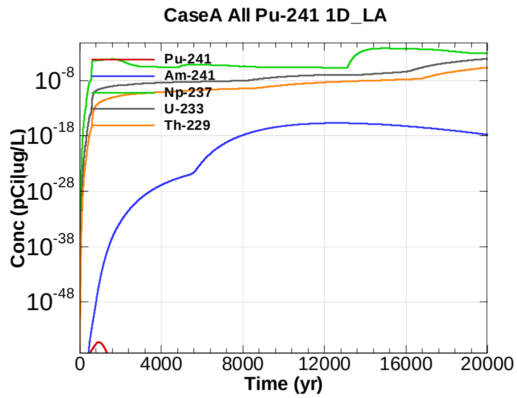

Figure G.2-224 - 1m Aquifer Concentration for CaseA All Pu-241 1D_LA

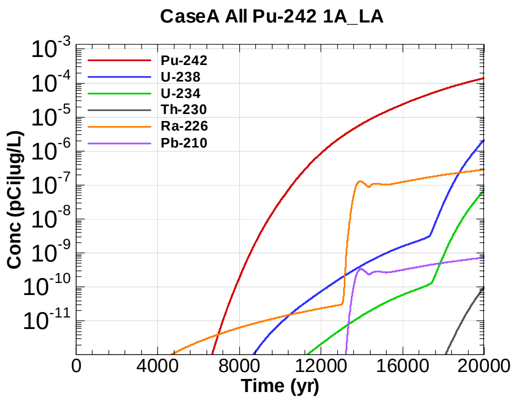

Figure G.2-225 - 1m Aquifer Concentration for CaseA All Pu-242 1A_LA

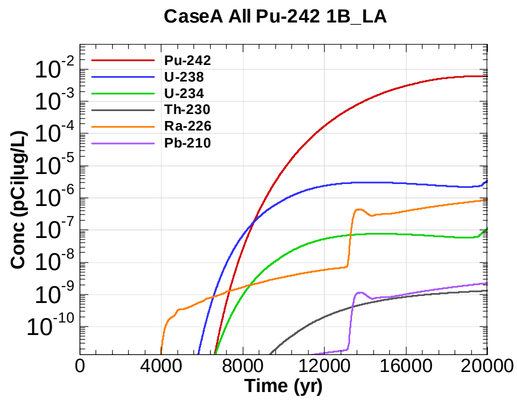

Figure G.2-226 - 1m Aquifer Concentration for CaseA All Pu-242 1B_LA

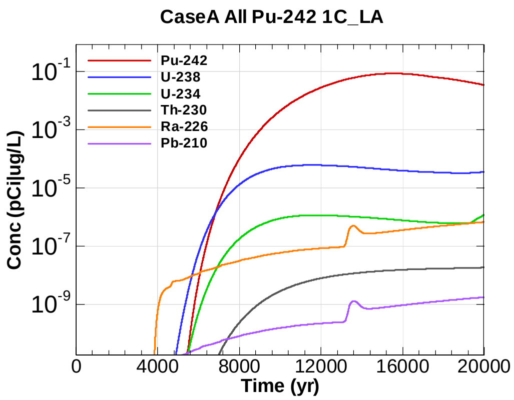

Figure G.2-227 - 1m Aquifer Concentration for CaseA All Pu-242 1C_LA

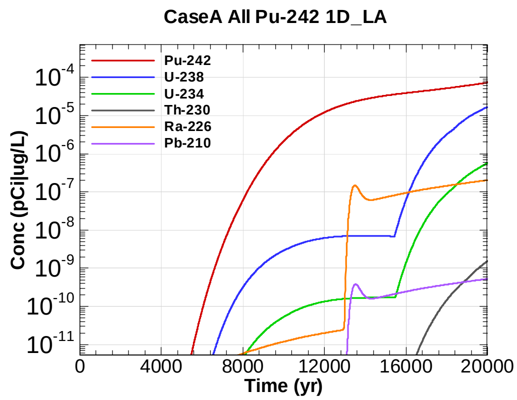

Figure G.2-228 - 1m Aquifer Concentration for CaseA All Pu-242 1D_LA

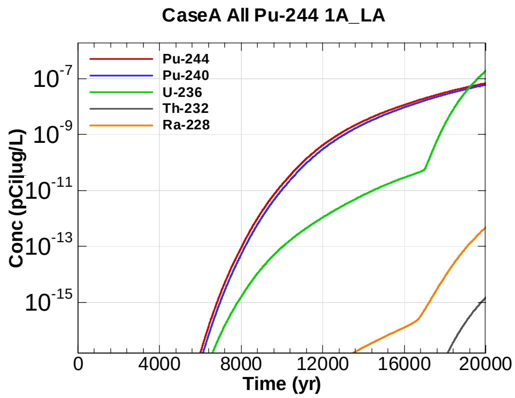

Figure G.2-229 - 1m Aquifer Concentration for CaseA All Pu-244 1A_LA

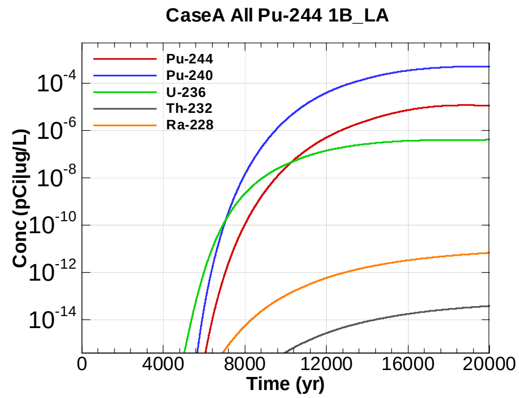

Figure G.2-230 - 1m Aquifer Concentration for CaseA All Pu-244 1B_LA

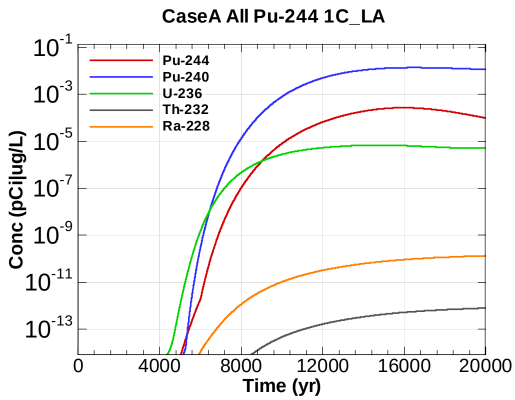

Figure G.2-231 - 1m Aquifer Concentration for CaseA All Pu-244 1C_LA

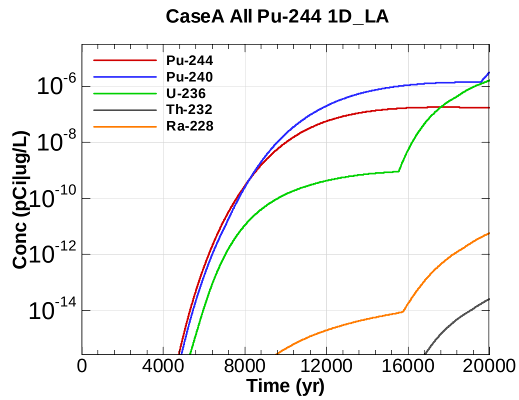

Figure G.2-232 - 1m Aquifer Concentration for CaseA All Pu-244 1D_LA

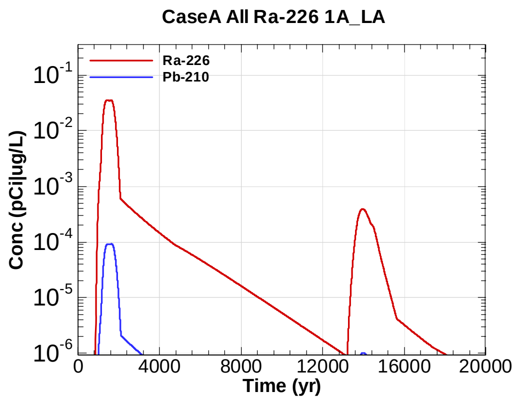

Figure G.2-233 - 1m Aquifer Concentration for CaseA All Ra-226 1A_LA

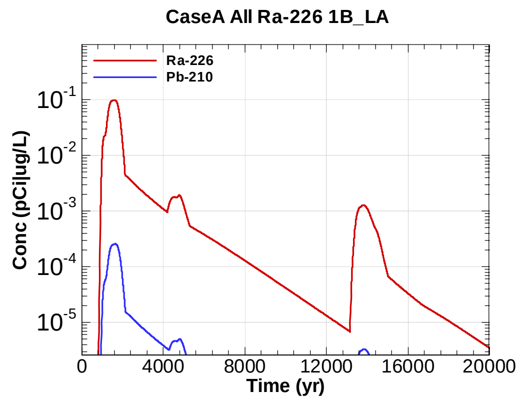

Figure G.2-234 - 1m Aquifer Concentration for CaseA All Ra-226 1B_LA

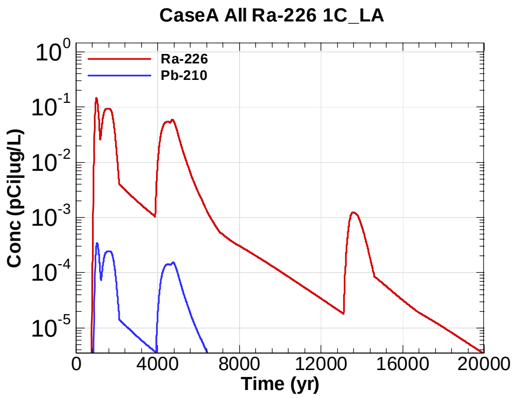

Figure G.2-235 - 1m Aquifer Concentration for CaseA All Ra-226 1C_LA

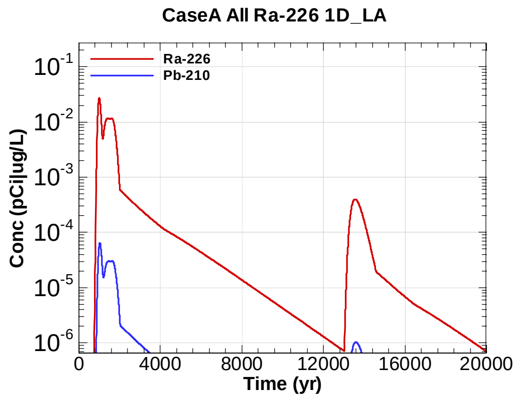

Figure G.2-236 - 1m Aquifer Concentration for CaseA All Ra-226 1D_LA

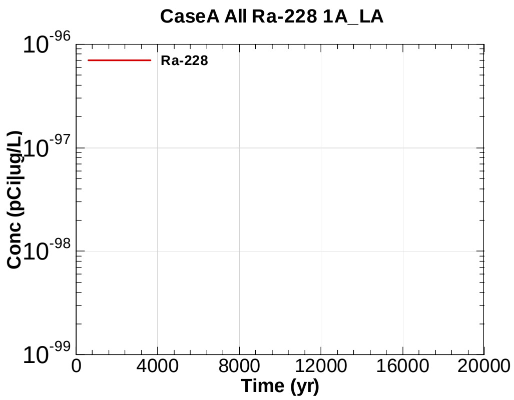

Figure G.2-237 - 1m Aquifer Concentration for CaseA All Ra-228 1A_LA

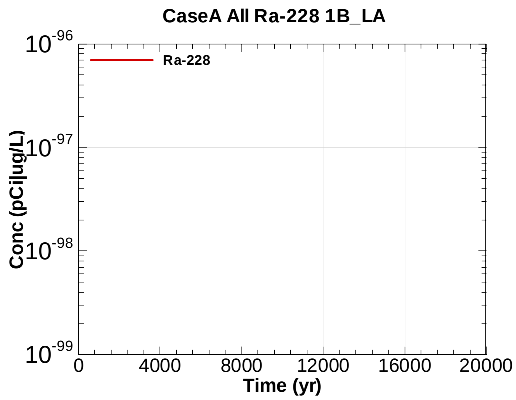

Figure G.2-238 - 1m Aquifer Concentration for CaseA All Ra-228 1B_LA

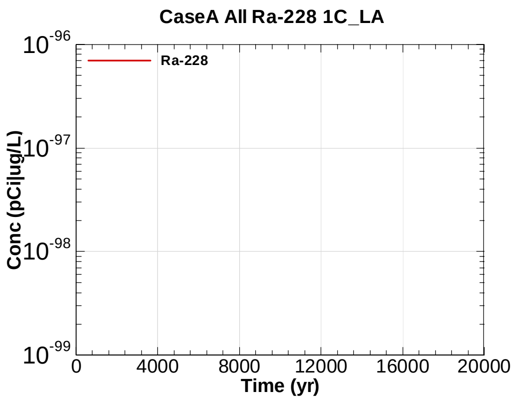

Figure G.2-239 - 1m Aquifer Concentration for CaseA All Ra-228 1C_LA

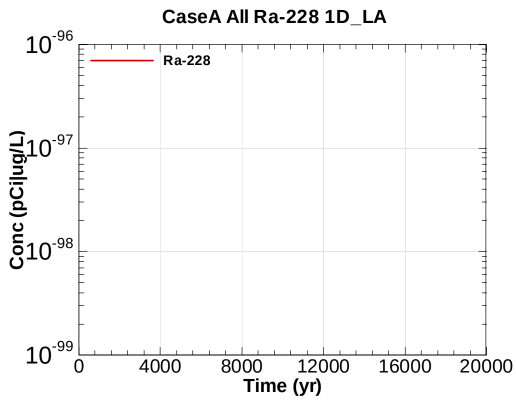

Figure G.2-240 - 1m Aquifer Concentration for CaseA All Ra-228 1D_LA

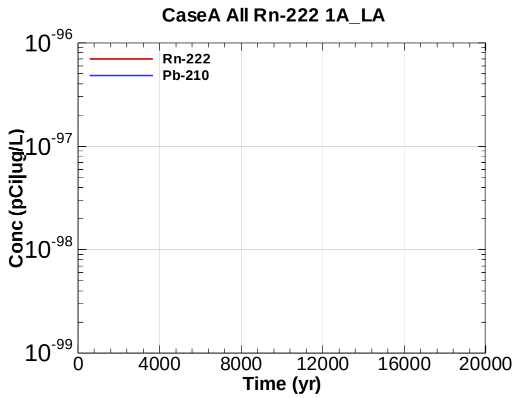

Figure G.2-241 - 1m Aquifer Concentration for CaseA All Rn-222 1A_LA

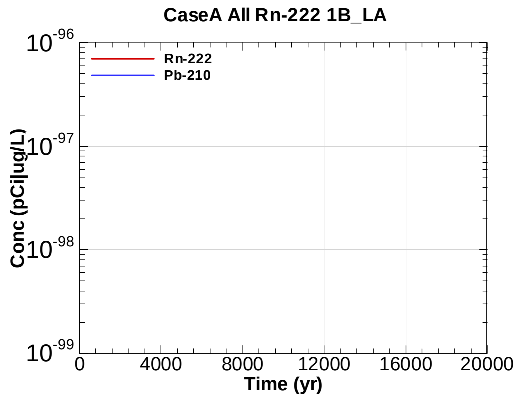

Figure G.2-242 - 1m Aquifer Concentration for CaseA All Rn-222 1B_LA

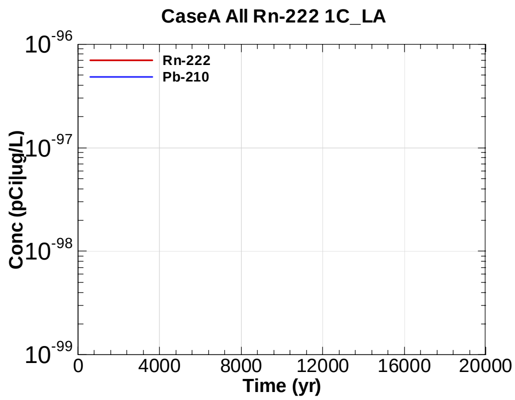

Figure G.2-243 - 1m Aquifer Concentration for CaseA All Rn-222 1C_LA

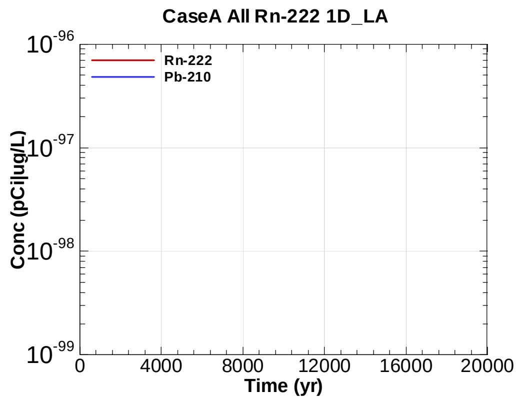

Figure G.2-244 - 1m Aquifer Concentration for CaseA All Rn-222 1D_LA

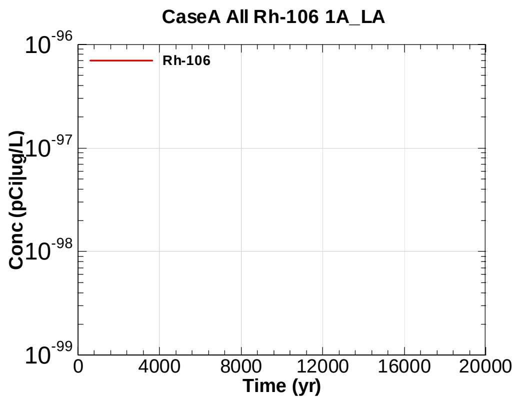

Figure G.2-245 - 1m Aquifer Concentration for CaseA All Rh-106 1A_LA

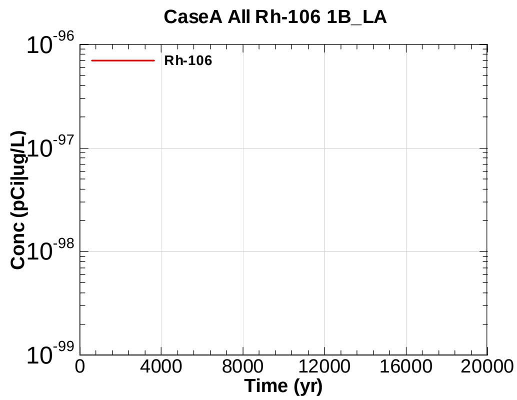

Figure G.2-246 - 1m Aquifer Concentration for CaseA All Rh-106 1B_LA

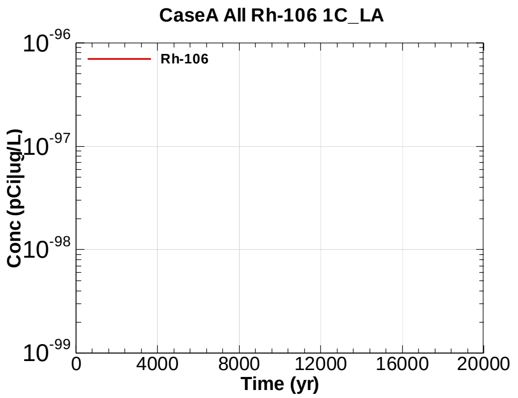

Figure G.2-247 - 1m Aquifer Concentration for CaseA All Rh-106 1C_LA

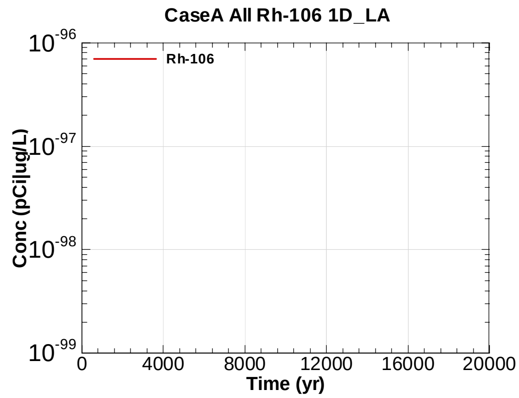

Figure G.2-248 - 1m Aquifer Concentration for CaseA All Rh-106 1D_LA

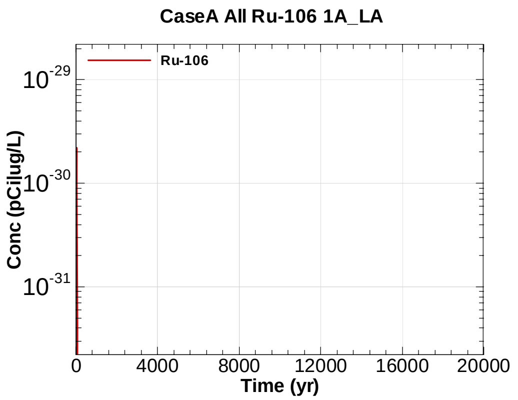

Figure G.2-249 - 1m Aquifer Concentration for CaseA All Ru-106 1A_LA

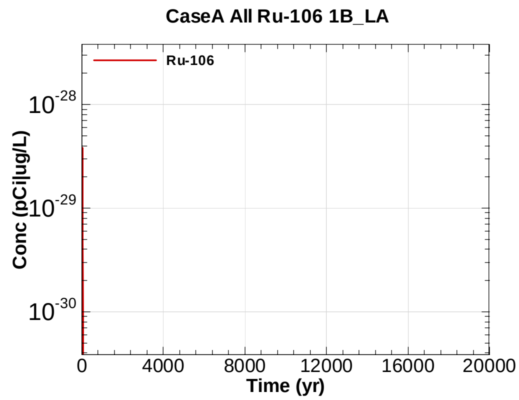

Figure G.2-250 - 1m Aquifer Concentration for CaseA All Ru-106 1B_LA

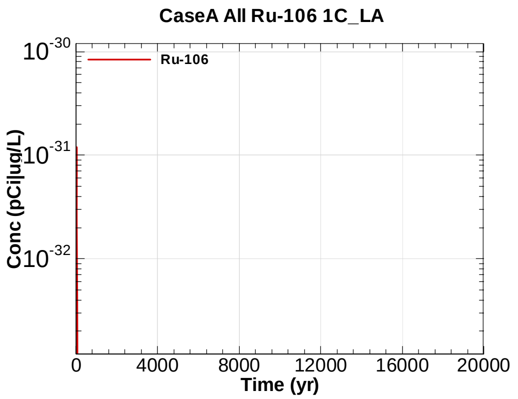

Figure G.2-251 - 1m Aquifer Concentration for CaseA All Ru-106 1C_LA

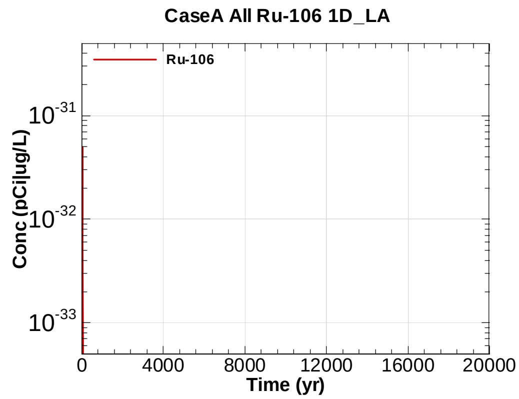

Figure G.2-252 - 1m Aquifer Concentration for CaseA All Ru-106 1D_LA

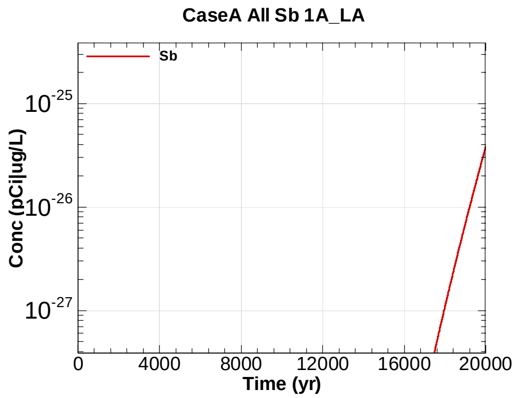

Figure G.2-253 - 1m Aquifer Concentration for CaseA All Sb 1A_LA

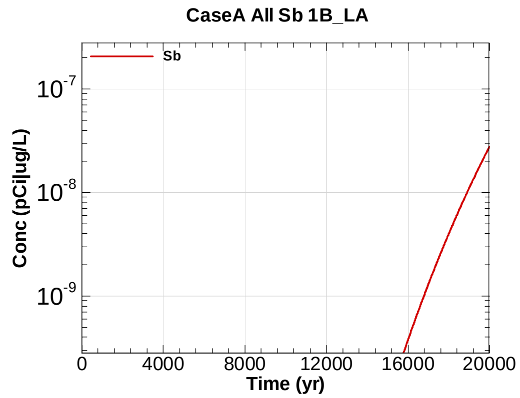

Figure G.2-254 - 1m Aquifer Concentration for CaseA All Sb 1B_LA

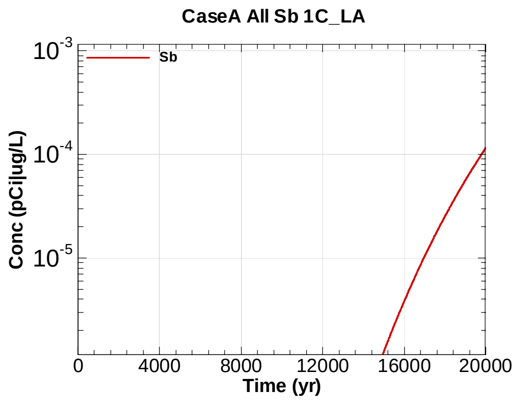

Figure G.2-255 - 1m Aquifer Concentration for CaseA All Sb 1C_LA

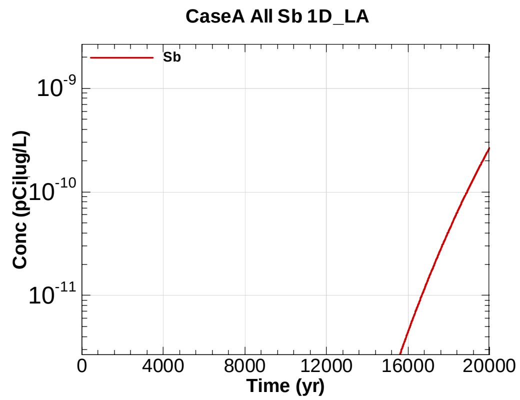

Figure G.2-256 - 1m Aquifer Concentration for CaseA All Sb 1D_LA

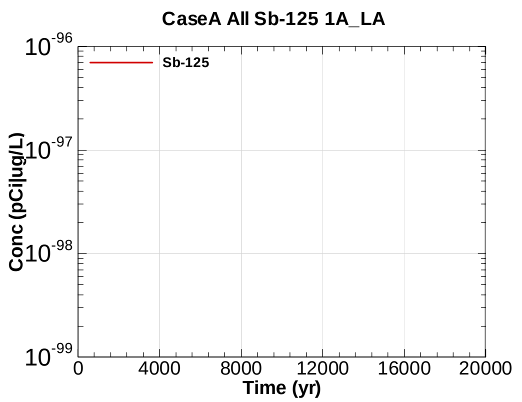

Figure G.2-257 - 1m Aquifer Concentration for CaseA All Sb-125 1A_LA

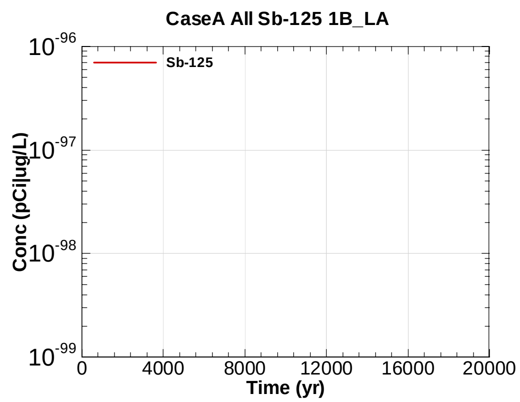

Figure G.2-258 - 1m Aquifer Concentration for CaseA All Sb-125 1B_LA

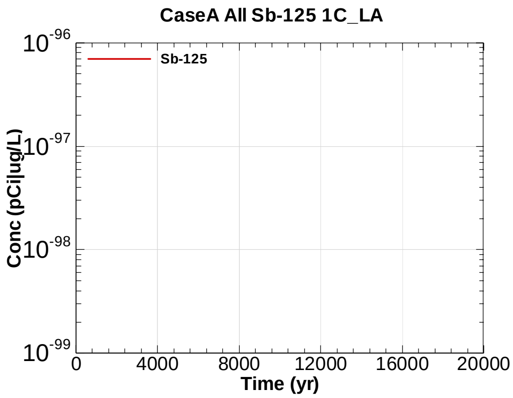

Figure G.2-259 - 1m Aquifer Concentration for CaseA All Sb-125 1C_LA

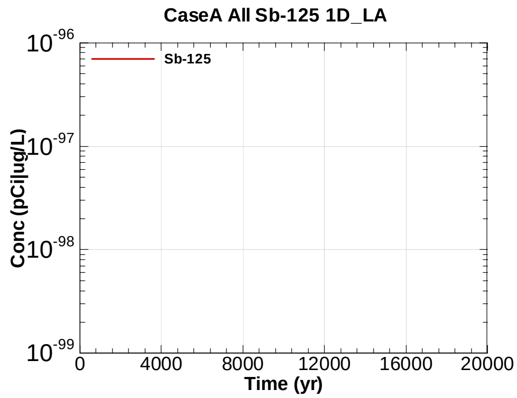

Figure G.2-260 - 1m Aquifer Concentration for CaseA All Sb-125 1D_LA

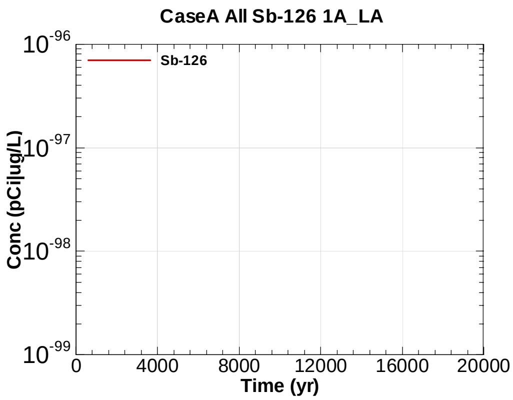

Figure G.2-261 - 1m Aquifer Concentration for CaseA All Sb-126 1A_LA

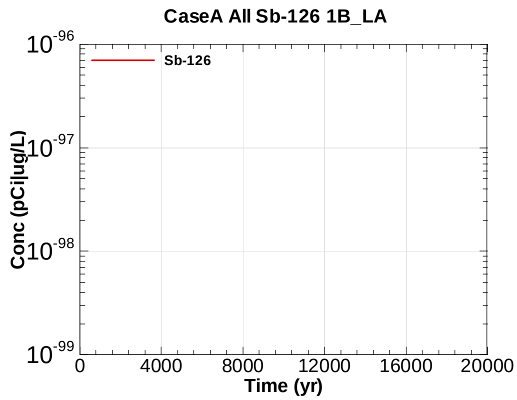

Figure G.2-262 - 1m Aquifer Concentration for CaseA All Sb-126 1B_LA

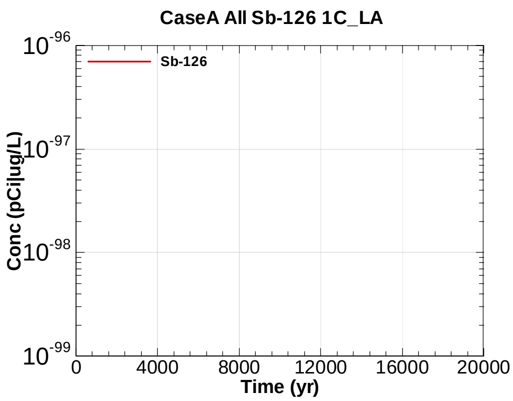

Figure G.2-263 - 1m Aquifer Concentration for CaseA All Sb-126 1C_LA

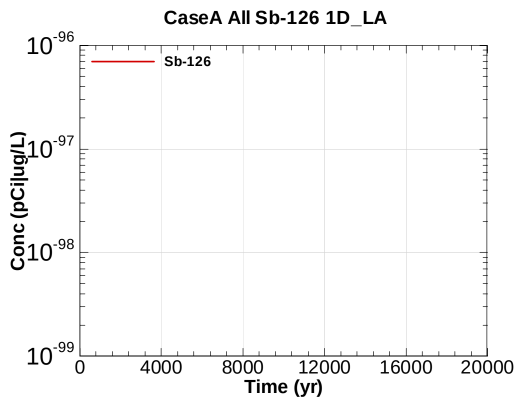

Figure G.2-264 - 1m Aquifer Concentration for CaseA All Sb-126 1D_LA

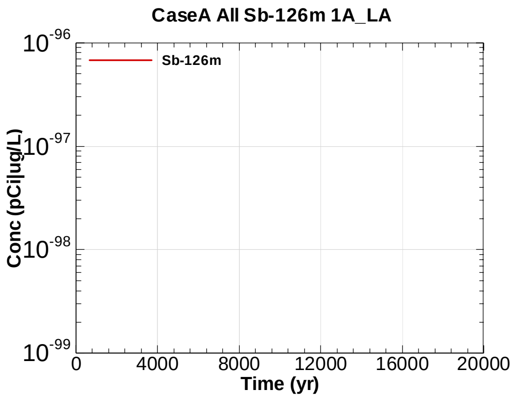

Figure G.2-265 - 1m Aquifer Concentration for CaseA All Sb-126m 1A_LA

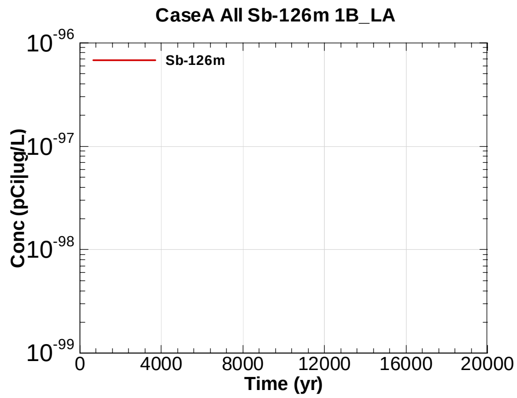

Figure G.2-266 - 1m Aquifer Concentration for CaseA All Sb-126m 1B_LA

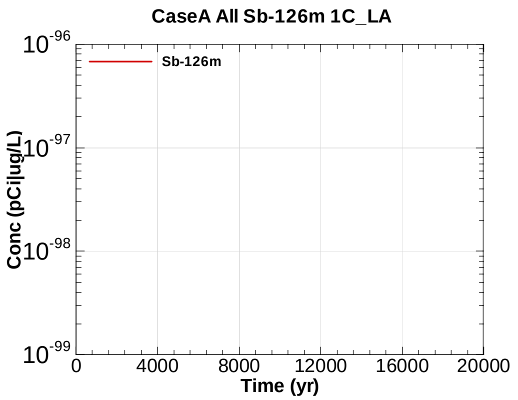

Figure G.2-267 - 1m Aquifer Concentration for CaseA All Sb-126m 1C_LA

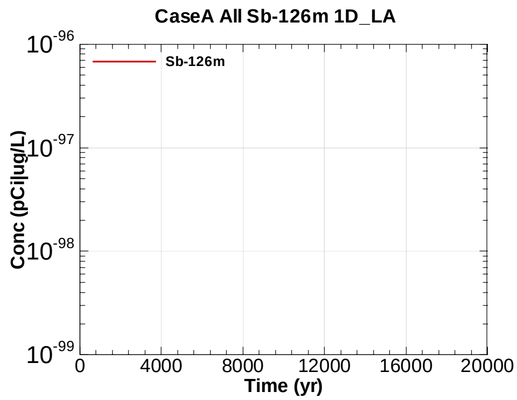

Figure G.2-268 - 1m Aquifer Concentration for CaseA All Sb-126m 1D_LA

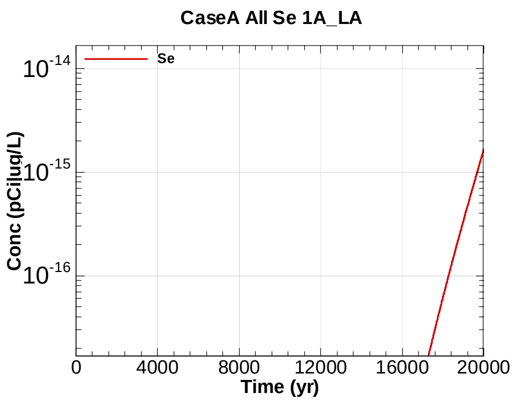

Figure G.2-269 - 1m Aquifer Concentration for CaseA All Se 1A_LA

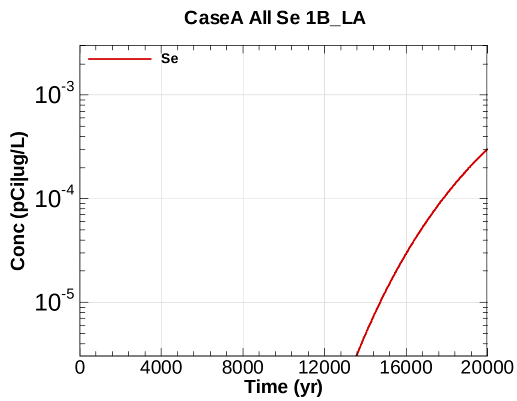

Figure G.2-270 - 1m Aquifer Concentration for CaseA All Se 1B_LA

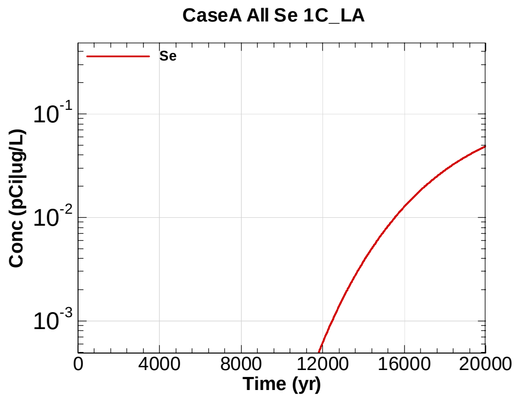

Figure G.2-271 - 1m Aquifer Concentration for CaseA All Se 1C_LA

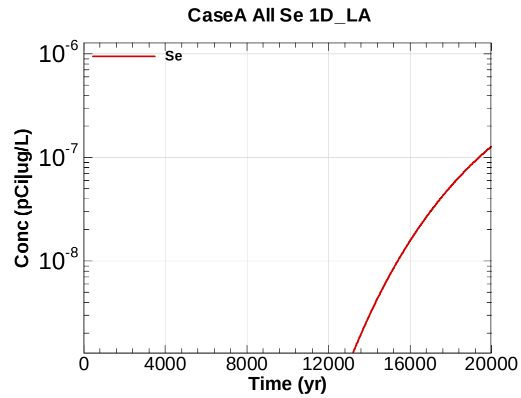

Figure G.2-272 - 1m Aquifer Concentration for CaseA All Se 1D_LA

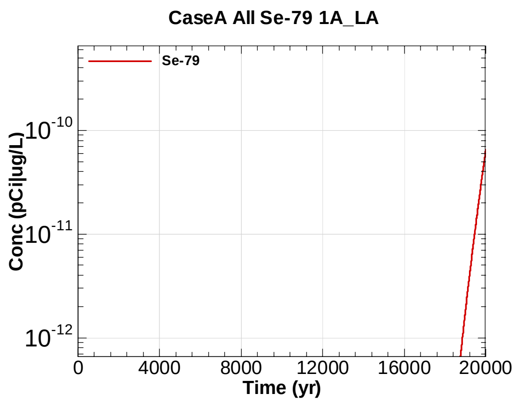

Figure G.2-273 - 1m Aquifer Concentration for CaseA All Se-79 1A_LA

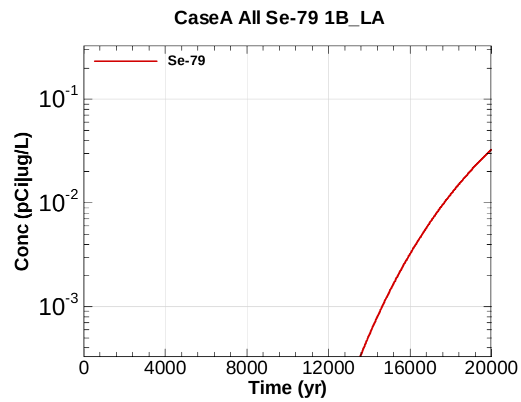

Figure G.2-274 - 1m Aquifer Concentration for CaseA All Se-79 1B_LA

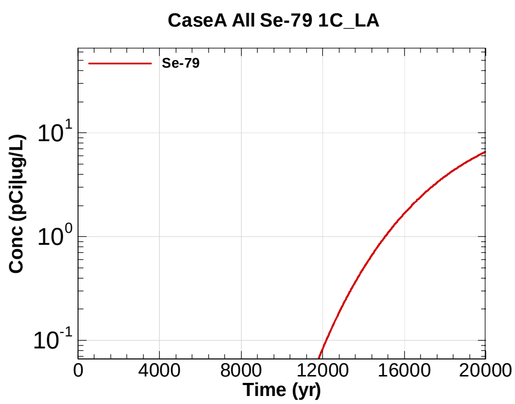

Figure G.2-275 - 1m Aquifer Concentration for CaseA All Se-79 1C_LA

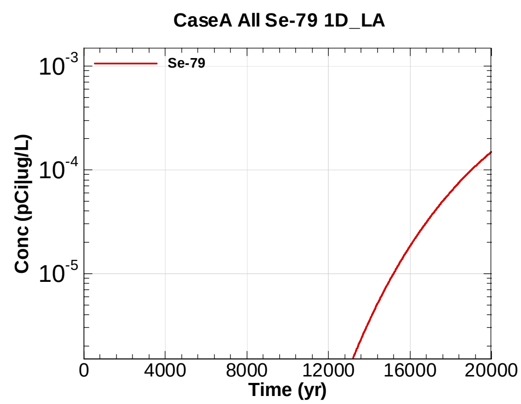

Figure G.2-276 - 1m Aquifer Concentration for CaseA All Se-79 1D_LA

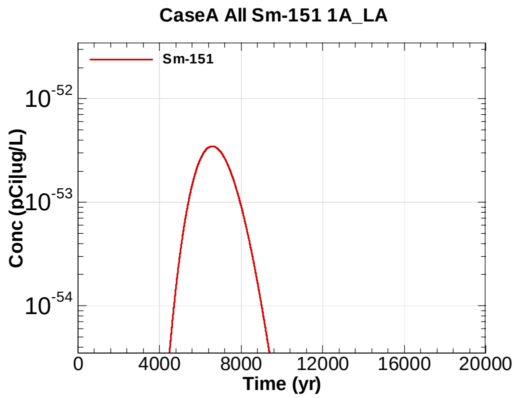

Figure G.2-277 - 1m Aquifer Concentration for CaseA All Sm-151 1A_LA

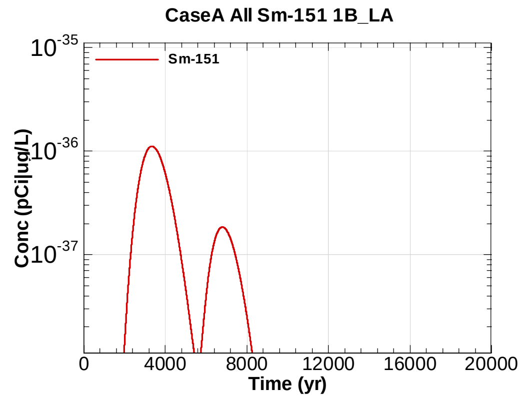

Figure G.2-278 - 1m Aquifer Concentration for CaseA All Sm-151 1B_LA

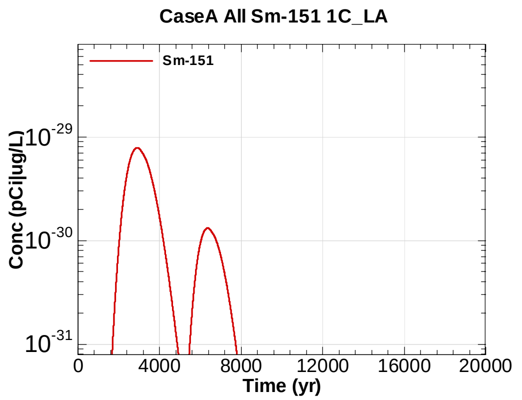

Figure G.2-279 - 1m Aquifer Concentration for CaseA All Sm-151 1C_LA

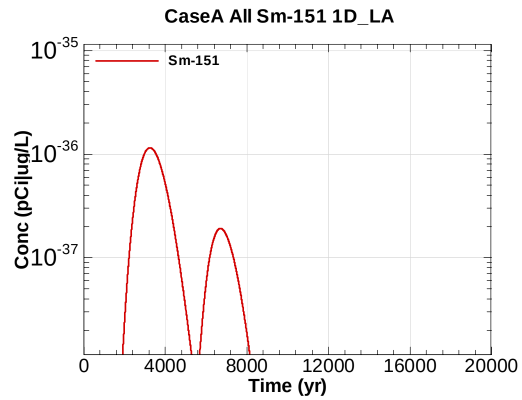

Figure G.2-280 - 1m Aquifer Concentration for CaseA All Sm-151 1D_LA

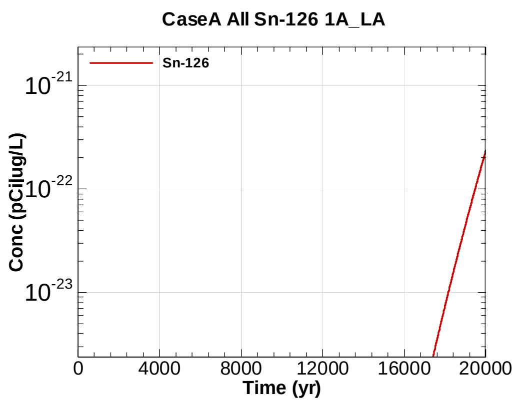

Figure G.2-281 - 1m Aquifer Concentration for CaseA All Sn-126 1A_LA

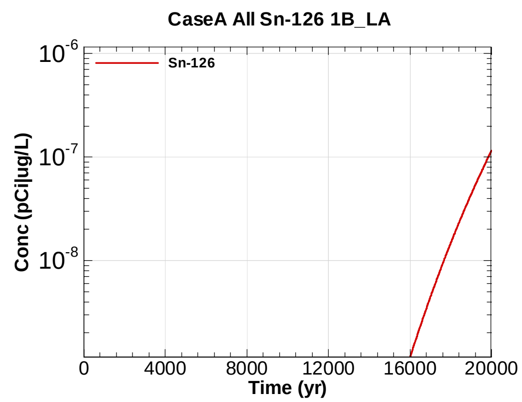

Figure G.2-282 - 1m Aquifer Concentration for CaseA All Sn-126 1B_LA

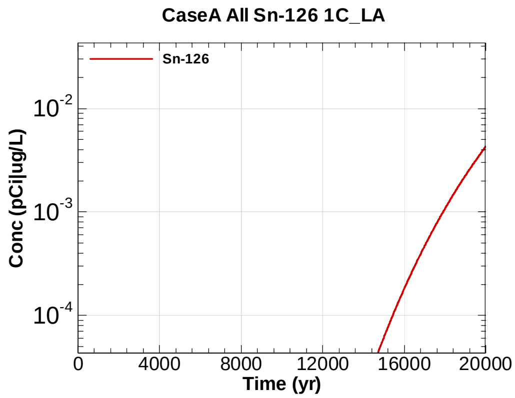

Figure G.2-283 - 1m Aquifer Concentration for CaseA All Sn-126 1C_LA

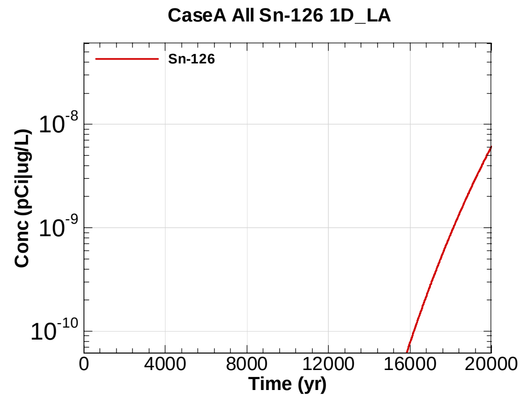

Figure G.2-284 - 1m Aquifer Concentration for CaseA All Sn-126 1D_LA

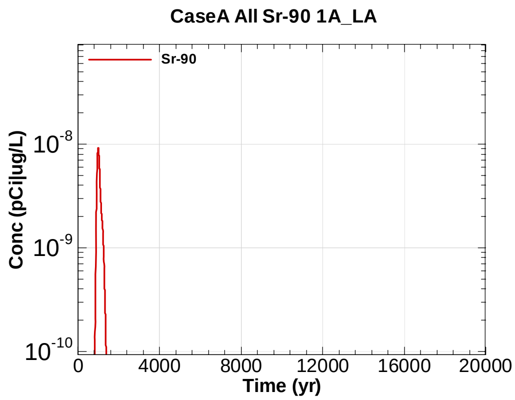

Figure G.2-285 - 1m Aquifer Concentration for CaseA All Sr-90 1A_LA

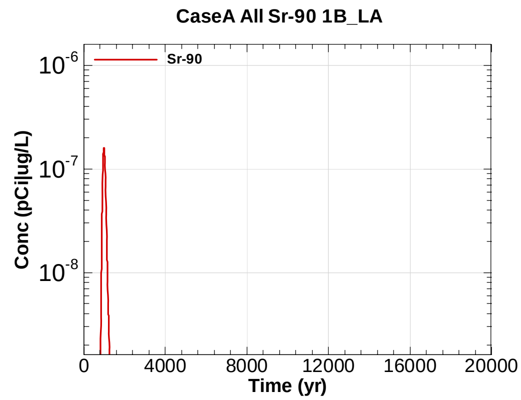

Figure G.2-286 - 1m Aquifer Concentration for CaseA All Sr-90 1B_LA

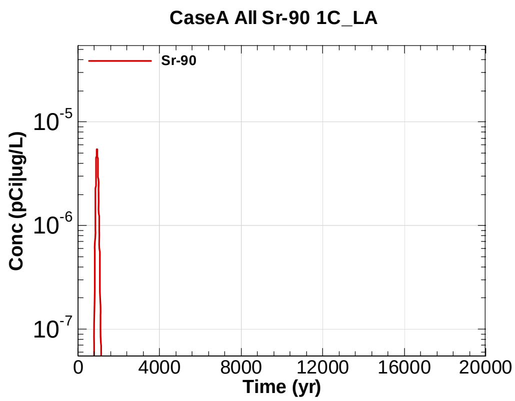

Figure G.2-287 - 1m Aquifer Concentration for CaseA All Sr-90 1C_LA

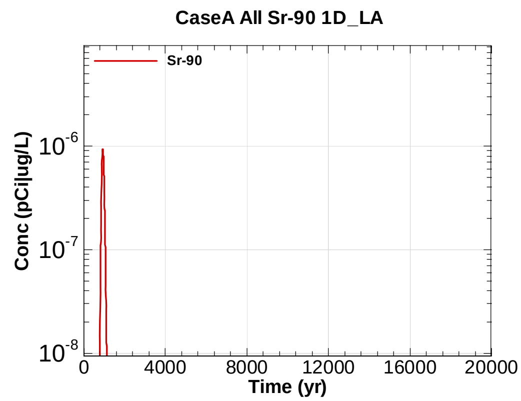

Figure G.2-288 - 1m Aquifer Concentration for CaseA All Sr-90 1D_LA

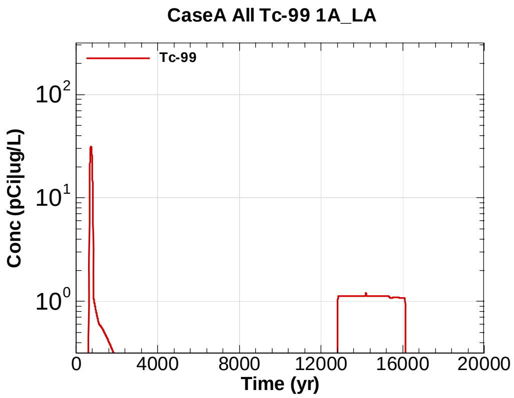

Figure G.2-289 - 1m Aquifer Concentration for CaseA All Tc-99 1A_LA

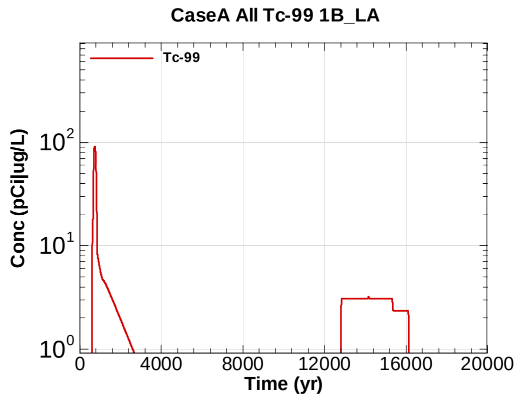

Figure G.2-290 - 1m Aquifer Concentration for CaseA All Tc-99 1B_LA

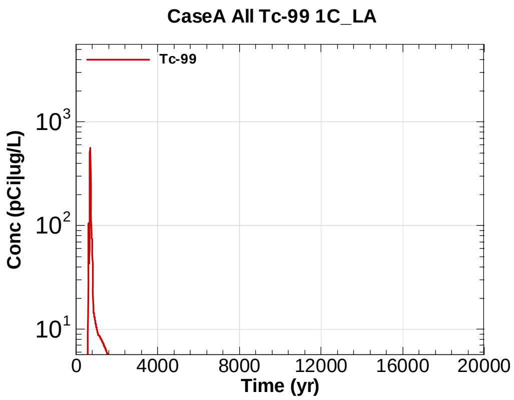

Figure G.2-291 - 1m Aquifer Concentration for CaseA All Tc-99 1C_LA

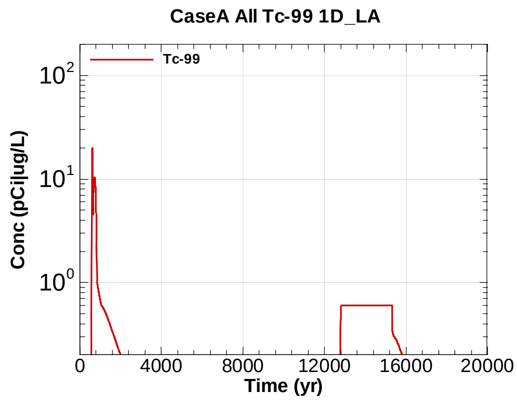

Figure G.2-292 - 1m Aquifer Concentration for CaseA All Tc-99 1D_LA

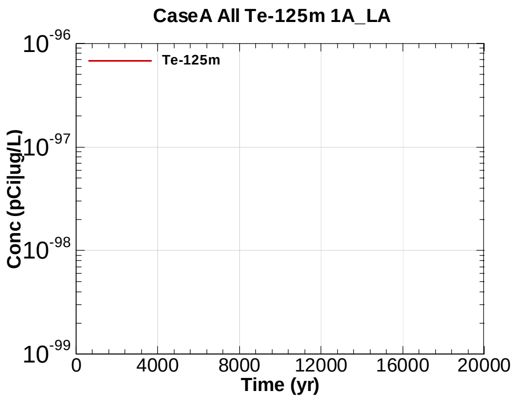

Figure G.2-293 - 1m Aquifer Concentration for CaseA All Te-125m 1A_LA

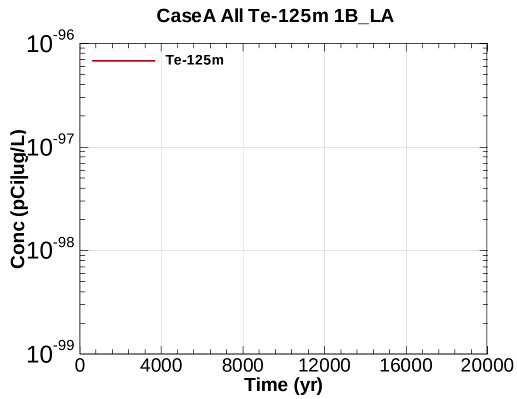

Figure G.2-294 - 1m Aquifer Concentration for CaseA All Te-125m 1B_LA

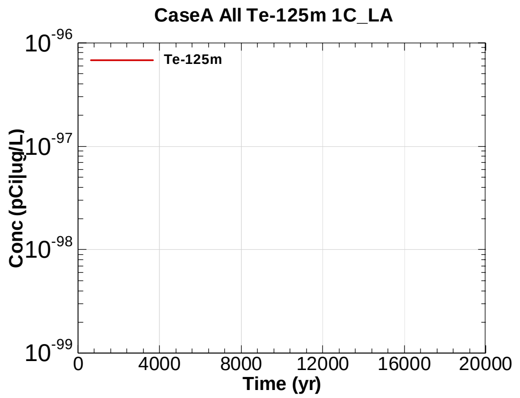

Figure G.2-295 - 1m Aquifer Concentration for CaseA All Te-125m 1C_LA

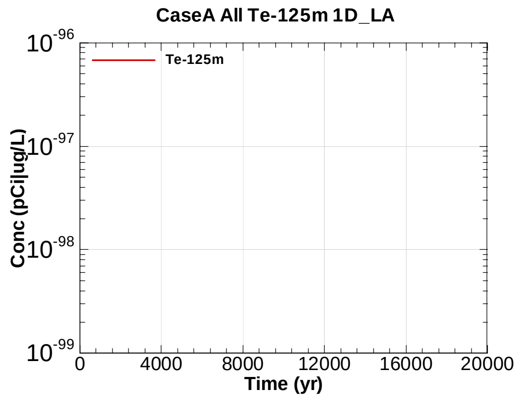

Figure G.2-296 - 1m Aquifer Concentration for CaseA All Te-125m 1D_LA

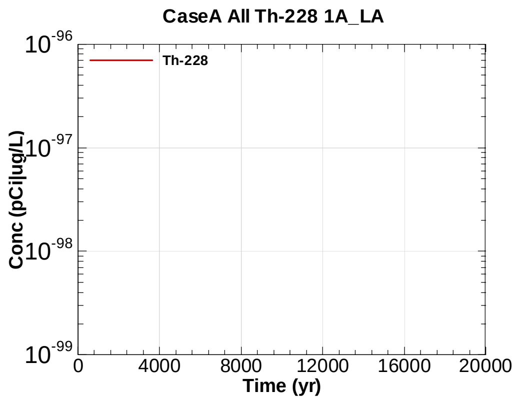

Figure G.2-297 - 1m Aquifer Concentration for CaseA All Th-228 1A_LA

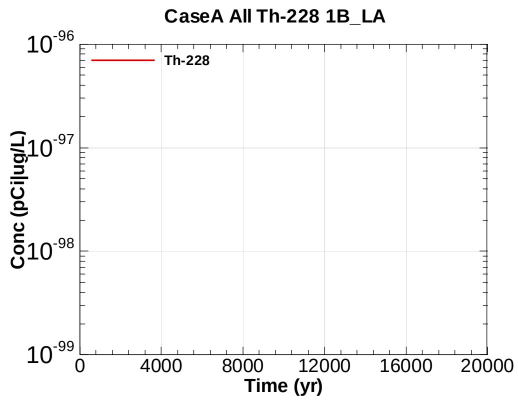

Figure G.2-298 - 1m Aquifer Concentration for CaseA All Th-228 1B_LA

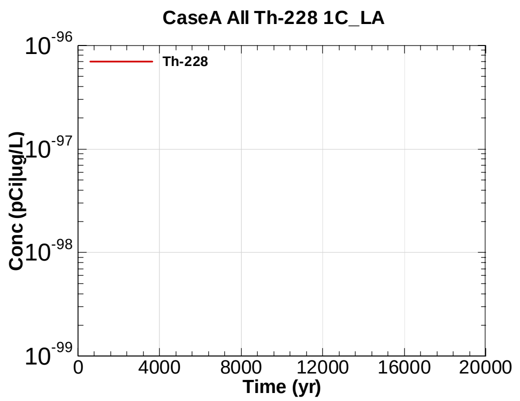

Figure G.2-299 - 1m Aquifer Concentration for CaseA All Th-228 1C_LA

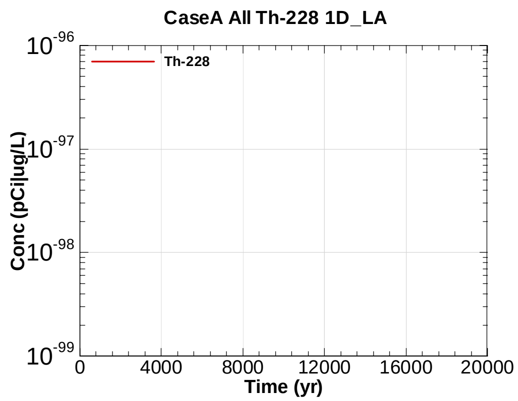

Figure G.2-300 - 1m Aquifer Concentration for CaseA All Th-228 1D_LA

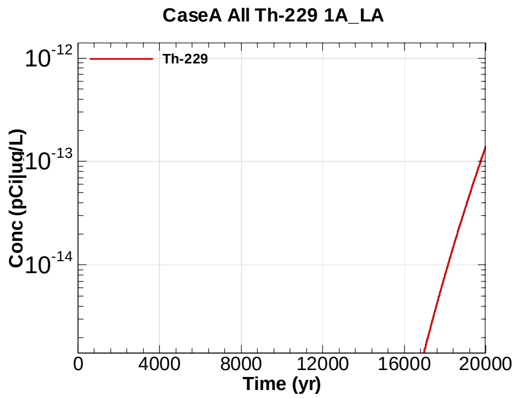

Figure G.2-301 - 1m Aquifer Concentration for CaseA All Th-229 1A_LA

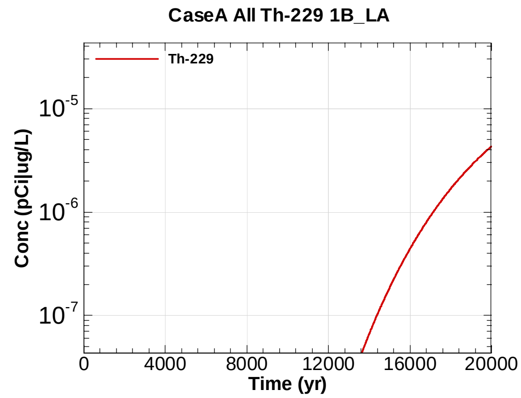

Figure G.2-302 - 1m Aquifer Concentration for CaseA All Th-229 1B_LA

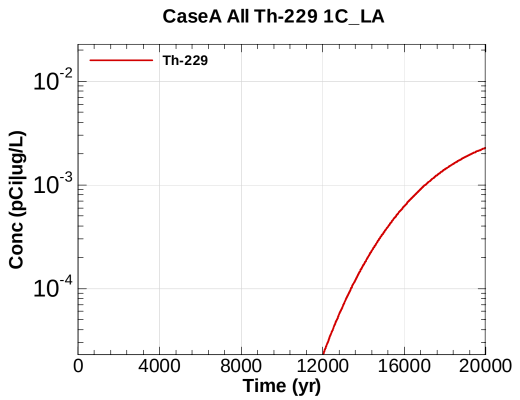

Figure G.2-303 - 1m Aquifer Concentration for CaseA All Th-229 1C_LA

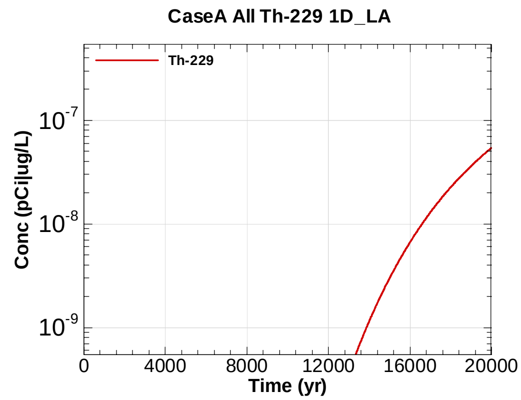

Figure G.2-304 - 1m Aquifer Concentration for CaseA All Th-229 1D_LA

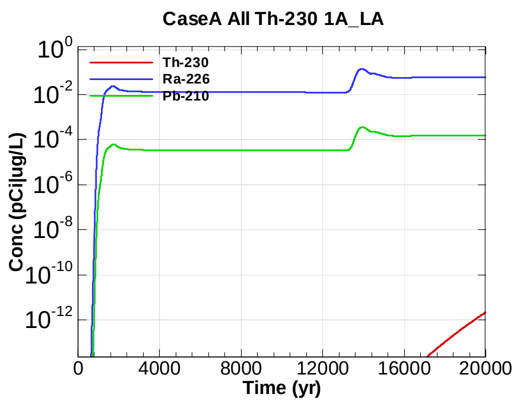

Figure G.2-305 - 1m Aquifer Concentration for CaseA All Th-230 1A_LA

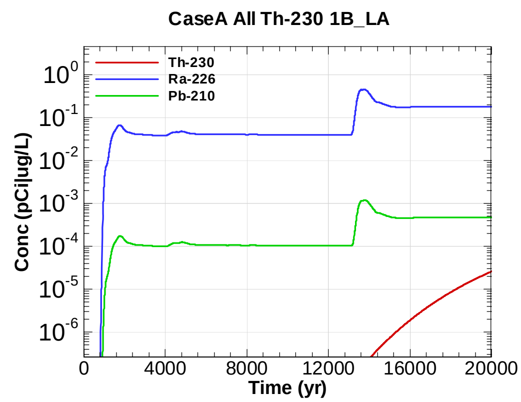

Figure G.2-306 - 1m Aquifer Concentration for CaseA All Th-230 1B_LA

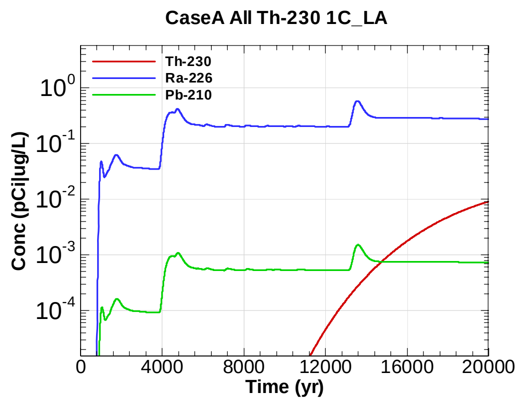

Figure G.2-307 - 1m Aquifer Concentration for CaseA All Th-230 1C_LA

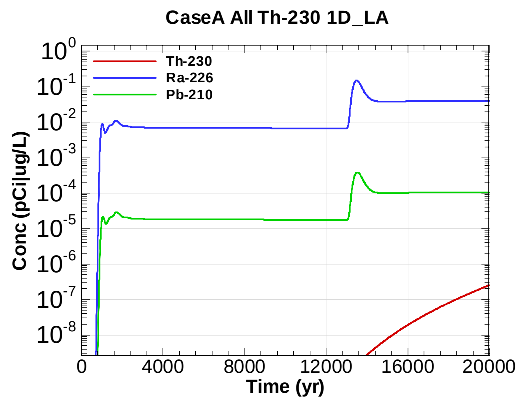

Figure G.2-308 - 1m Aquifer Concentration for CaseA All Th-230 1D_LA

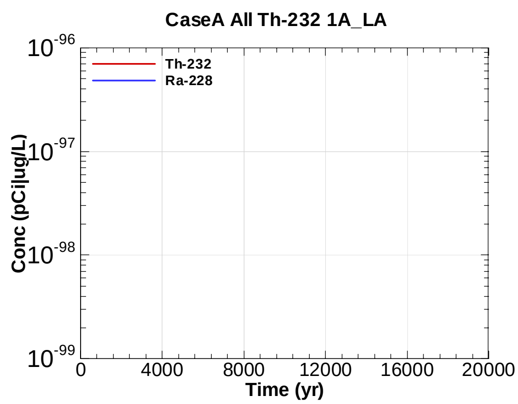

Figure G.2-309 - 1m Aquifer Concentration for CaseA All Th-232 1A_LA

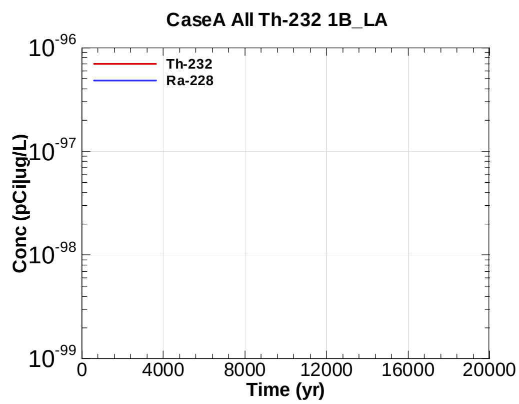

Figure G.2-310 - 1m Aquifer Concentration for CaseA All Th-232 1B_LA

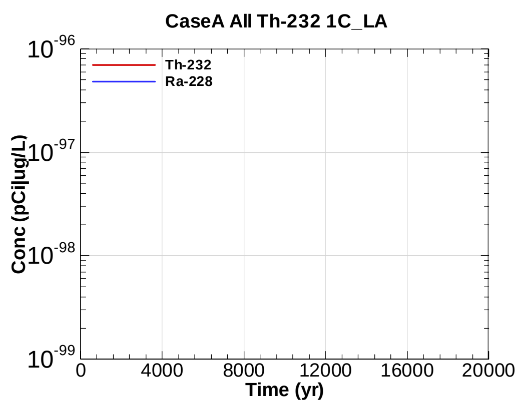

Figure G.2-311 - 1m Aquifer Concentration for CaseA All Th-232 1C_LA

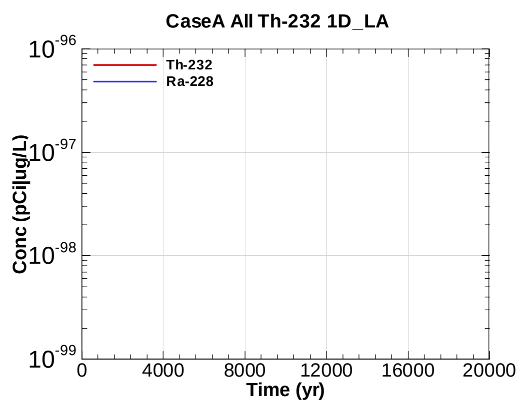

Figure G.2-312 - 1m Aquifer Concentration for CaseA All Th-232 1D_LA

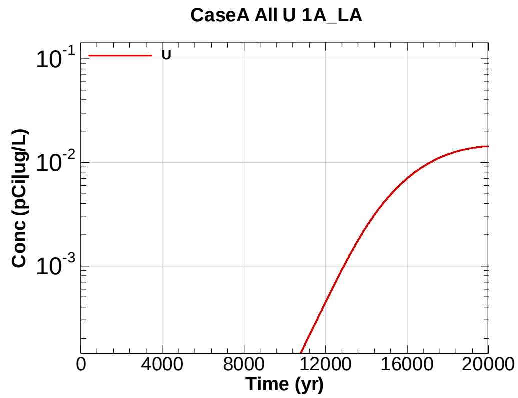

Figure G.2-313 - 1m Aquifer Concentration for CaseA All U 1A_LA

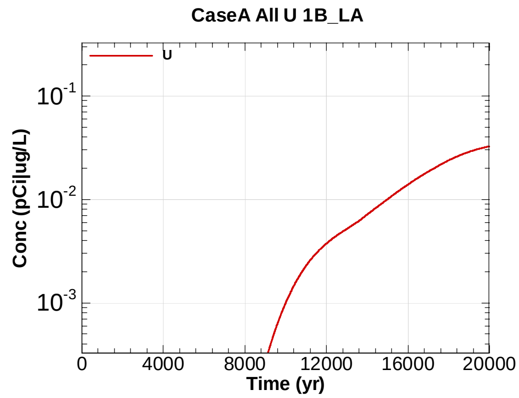

Figure G.2-314 - 1m Aquifer Concentration for CaseA All U 1B_LA

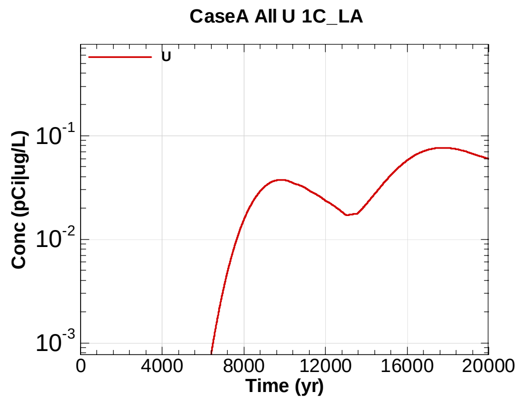

Figure G.2-315 - 1m Aquifer Concentration for CaseA All U 1C_LA

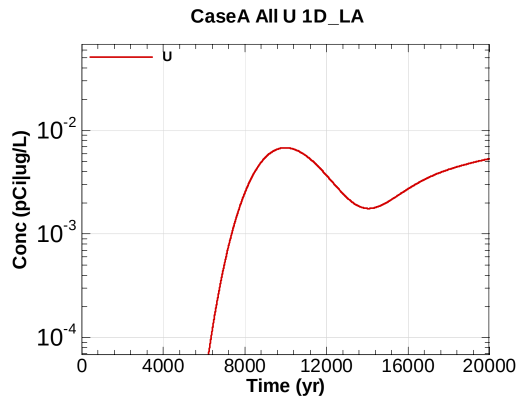

Figure G.2-316 - 1m Aquifer Concentration for CaseA All U 1D_LA

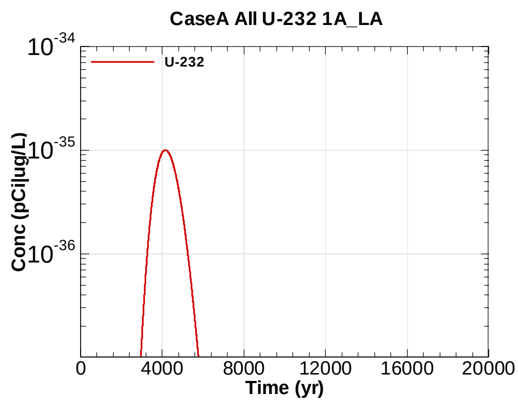

Figure G.2-317 - 1m Aquifer Concentration for CaseA All U-232 1A_LA

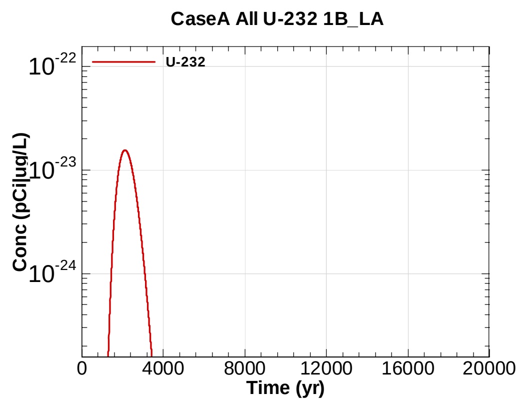

Figure G.2-318 - 1m Aquifer Concentration for CaseA All U-232 1B_LA

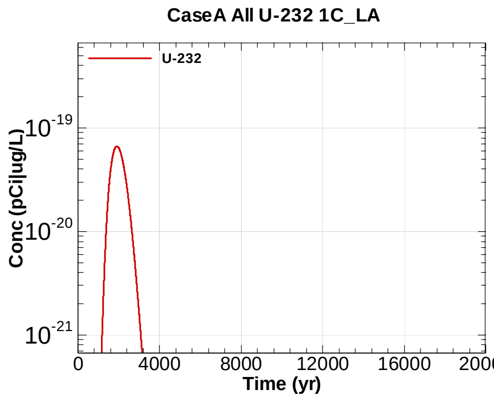

Figure G.2-319 - 1m Aquifer Concentration for CaseA All U-232 1C_LA

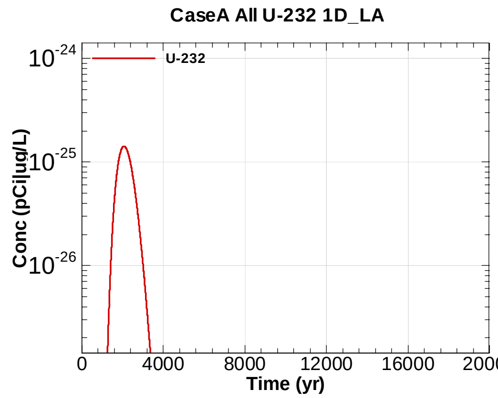

Figure G.2-320 - 1m Aquifer Concentration for CaseA All U-232 1D_LA

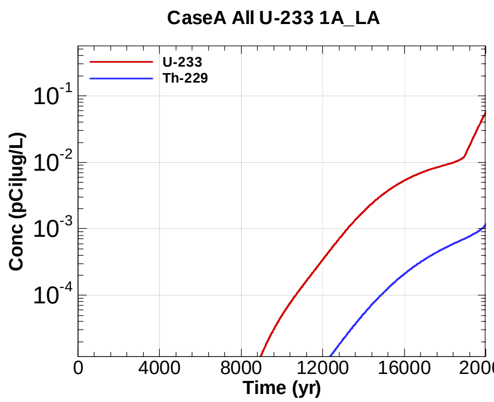

Figure G.2-321 - 1m Aquifer Concentration for CaseA All U-233 1A_LA

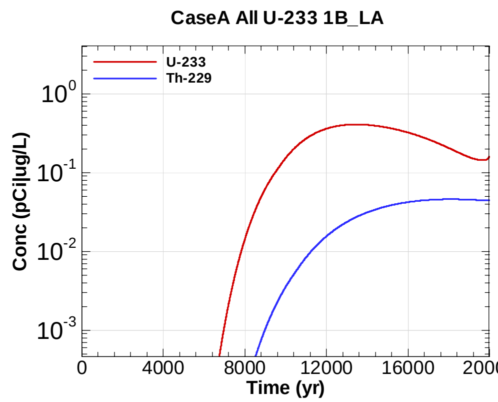

Figure G.2-322 - 1m Aquifer Concentration for CaseA All U-233 1B_LA

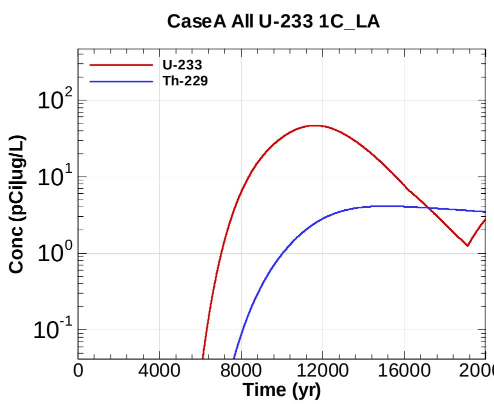

Figure G.2-323 - 1m Aquifer Concentration for CaseA All U-233 1C_LA

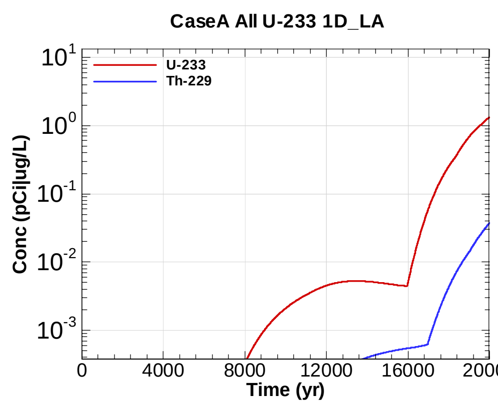

Figure G.2-324 - 1m Aquifer Concentration for CaseA All U-233 1D_LA

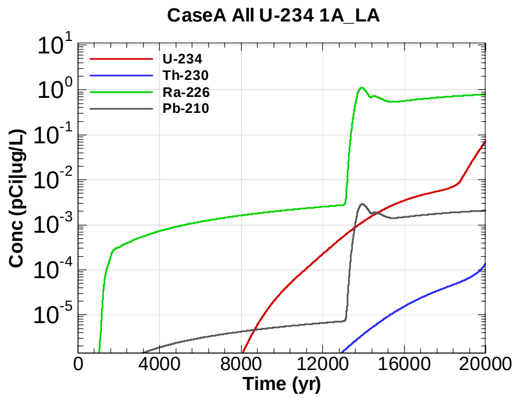

Figure G.2-325 - 1m Aquifer Concentration for CaseA All U-234 1A_LA

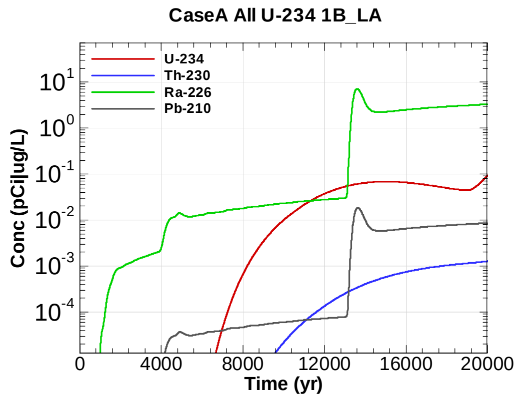

Figure G.2-326 - 1m Aquifer Concentration for CaseA All U-234 1B_LA

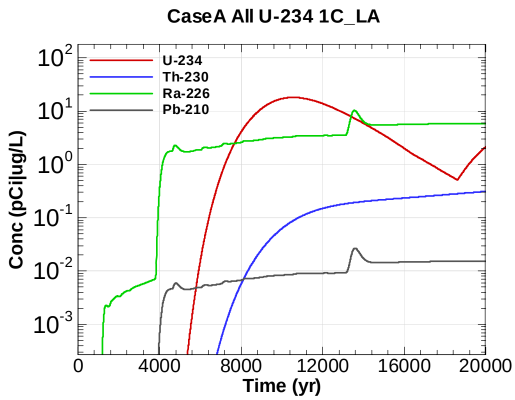

Figure G.2-327 - 1m Aquifer Concentration for CaseA All U-234 1C_LA

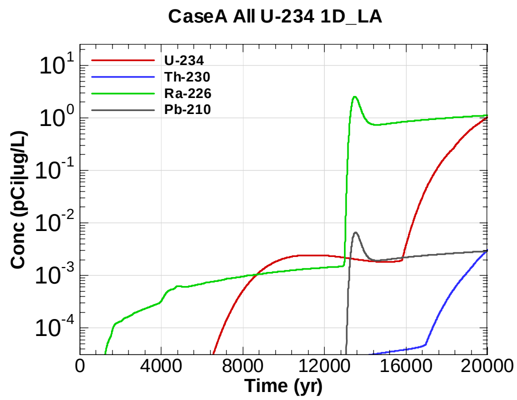

Figure G.2-328 - 1m Aquifer Concentration for CaseA All U-234 1D_LA

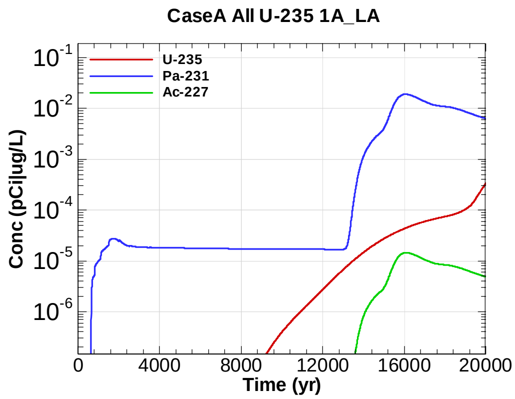

Figure G.2-329 - 1m Aquifer Concentration for CaseA All U-235 1A_LA

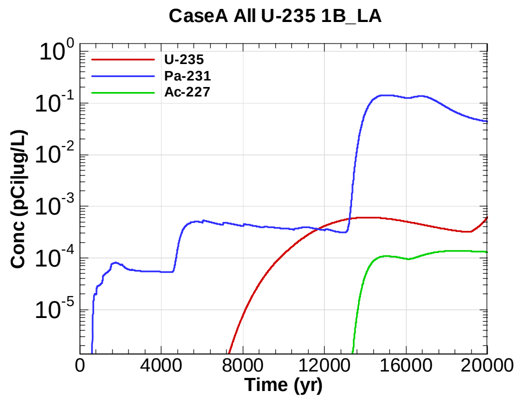

Figure G.2-330 - 1m Aquifer Concentration for CaseA All U-235 1B_LA

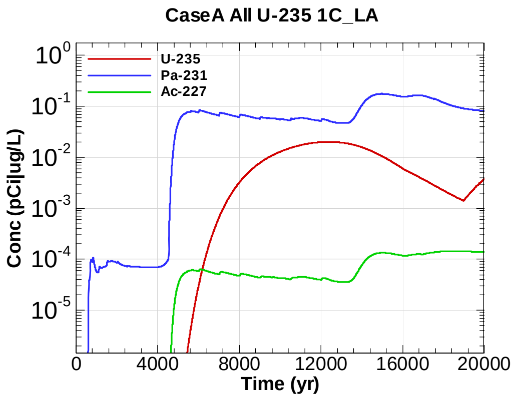

Figure G.2-331 - 1m Aquifer Concentration for CaseA All U-235 1C_LA

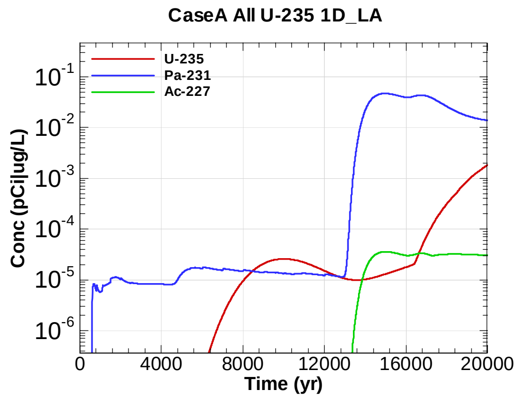

Figure G.2-332 - 1m Aquifer Concentration for CaseA All U-235 1D_LA

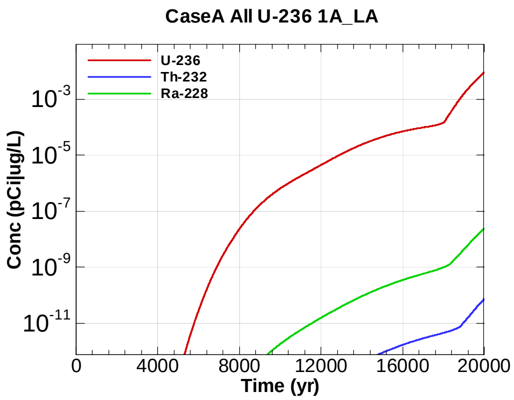

Figure G.2-333 - 1m Aquifer Concentration for CaseA All U-236 1A_LA

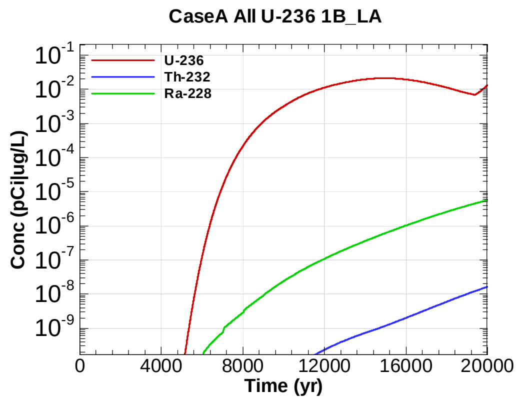

Figure G.2-334 - 1m Aquifer Concentration for CaseA All U-236 1B_LA

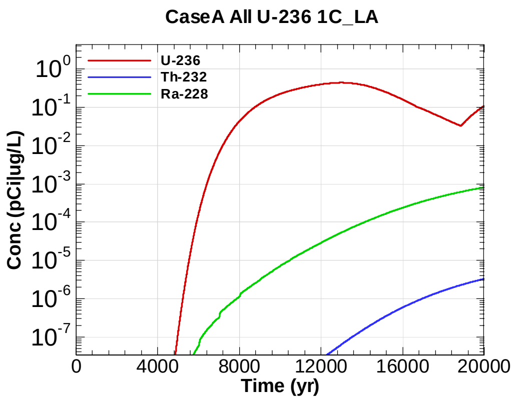

Figure G.2-335 - 1m Aquifer Concentration for CaseA All U-236 1C_LA

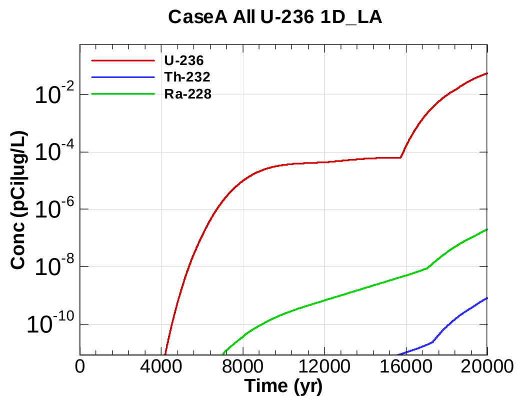

Figure G.2-336 - 1m Aquifer Concentration for CaseA All U-236 1D_LA

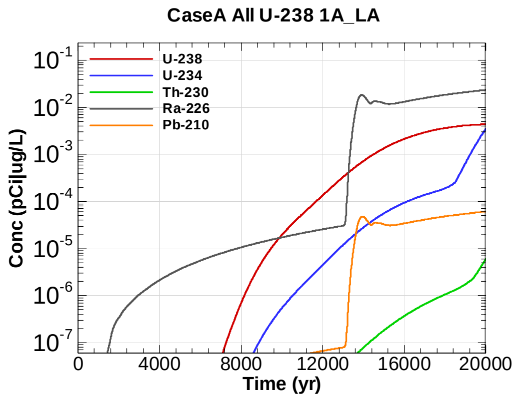

Figure G.2-337 - 1m Aquifer Concentration for CaseA All U-238 1A_LA

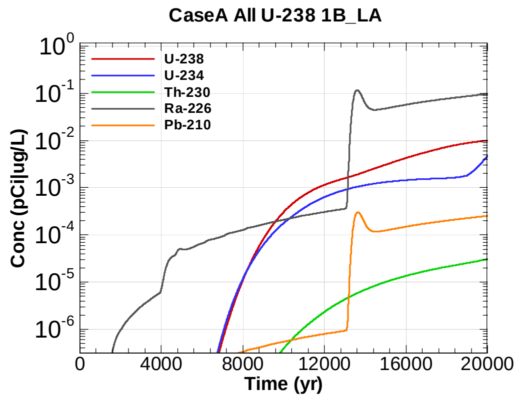

Figure G.2-338 - 1m Aquifer Concentration for CaseA All U-238 1B_LA

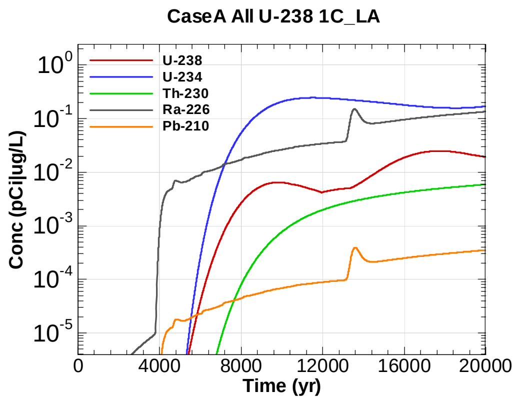

Figure G.2-339 - 1m Aquifer Concentration for CaseA All U-238 1C_LA

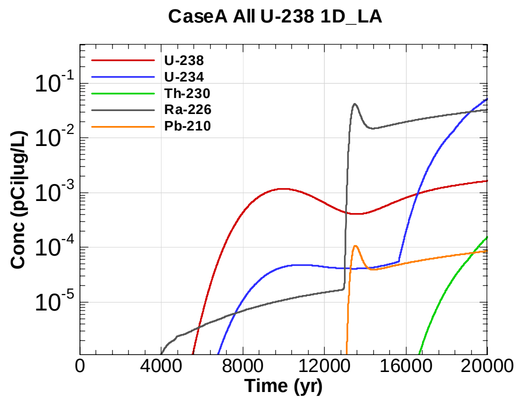

Figure G.2-340 - 1m Aquifer Concentration for CaseA All U-238 1D_LA

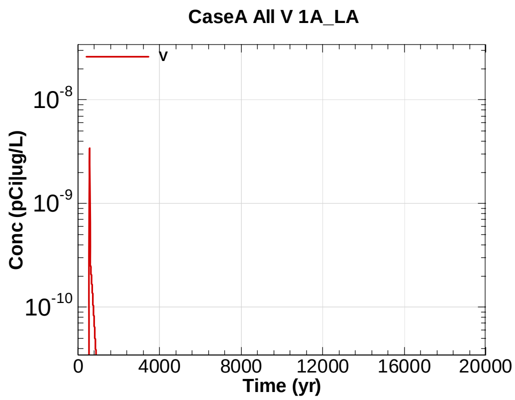

Figure G.2-341 - 1m Aquifer Concentration for CaseA All V 1A_LA

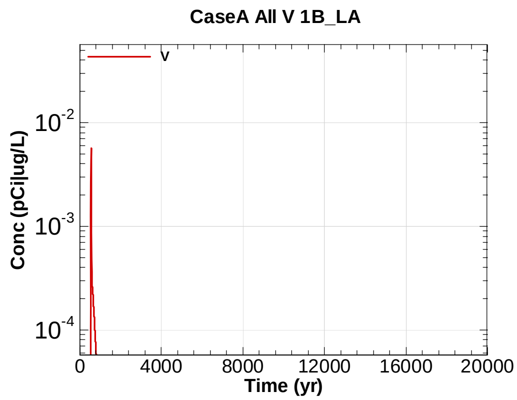

Figure G.2-342 - 1m Aquifer Concentration for CaseA All V 1B_LA

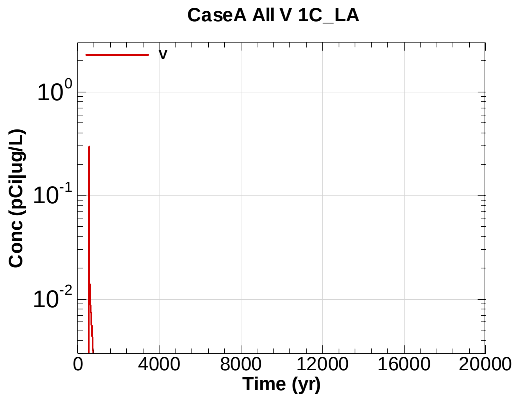

Figure G.2-343 - 1m Aquifer Concentration for CaseA All V 1C_LA

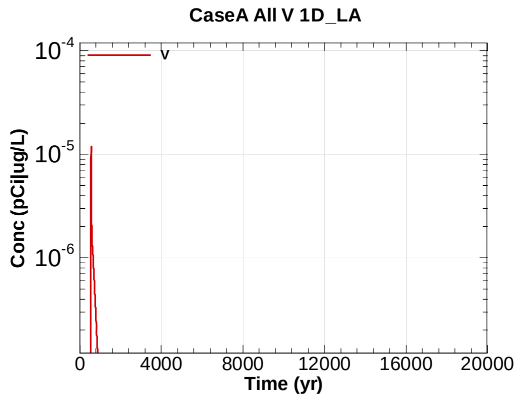

Figure G.2-344 - 1m Aquifer Concentration for CaseA All V 1D_LA

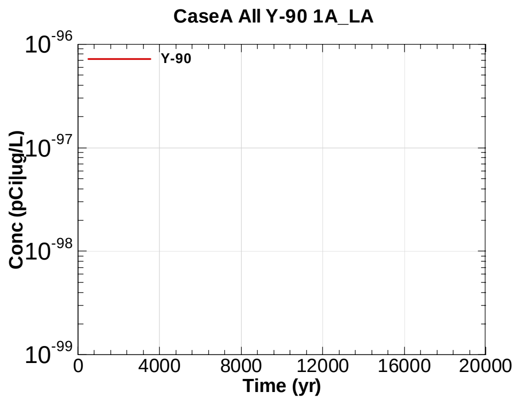

Figure G.2-345 - 1m Aquifer Concentration for CaseA All Y-90 1A_LA

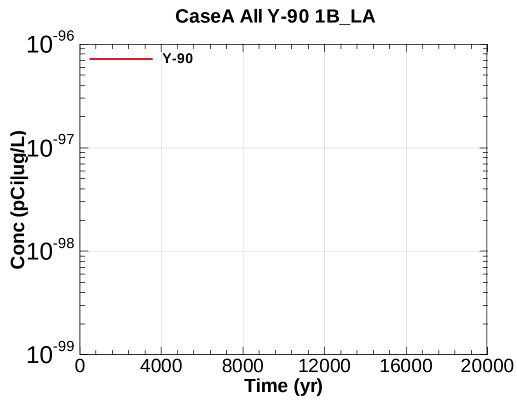

Figure G.2-346 - 1m Aquifer Concentration for CaseA All Y-90 1B_LA

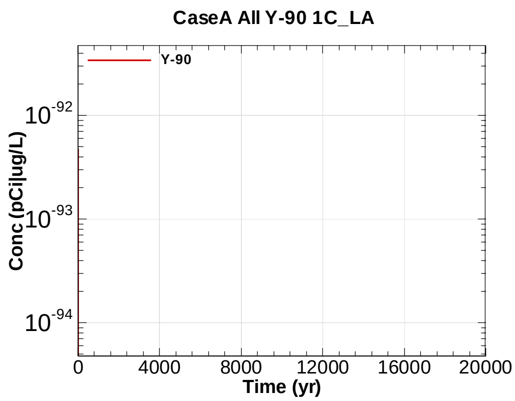

Figure G.2-347 - 1m Aquifer Concentration for CaseA All Y-90 1C_LA

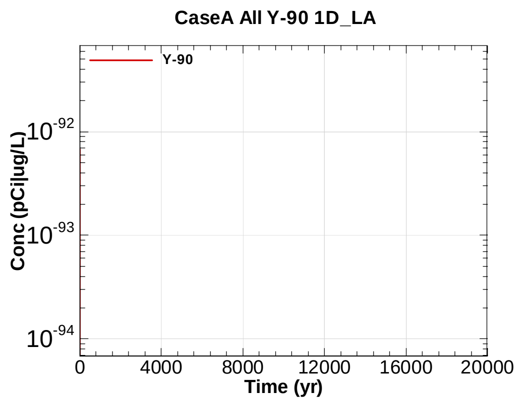

Figure G.2-348 - 1m Aquifer Concentration for CaseA All Y-90 1D_LA

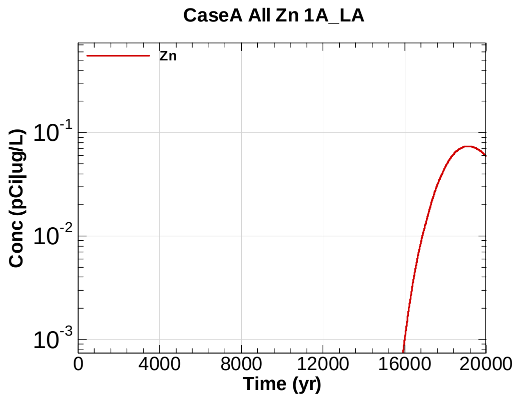

Figure G.2-349 - 1m Aquifer Concentration for CaseA All Zn 1A_LA

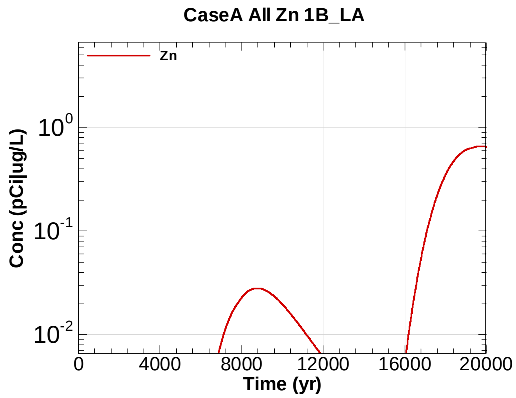

Figure G.2-350 - 1m Aquifer Concentration for CaseA All Zn 1B_LA

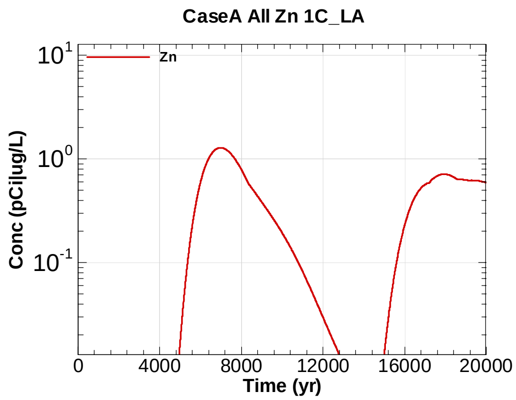

Figure G.2-351 - 1m Aquifer Concentration for CaseA All Zn 1C_LA

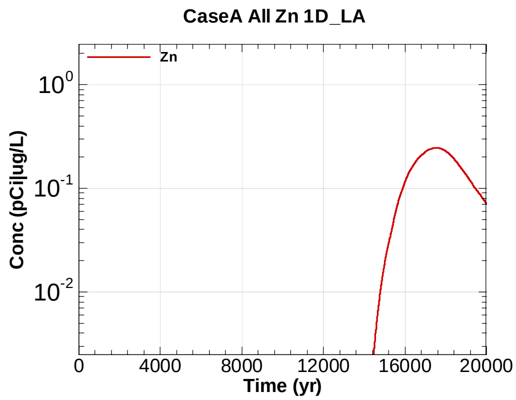

Figure G.2-352 - 1m Aquifer Concentration for CaseA All Zn 1D_LA

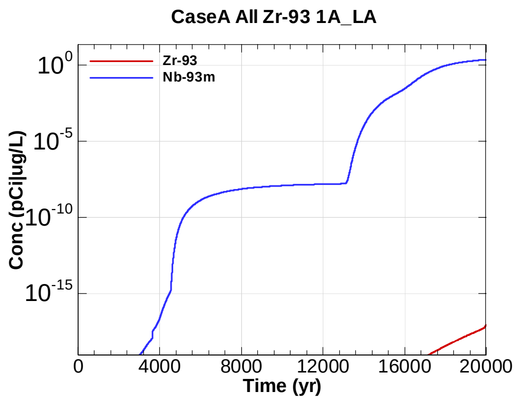

Figure G.2-353 - 1m Aquifer Concentration for CaseA All Zr-93 1A_LA

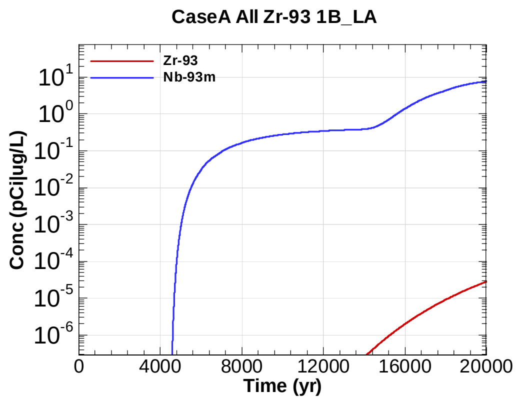

Figure G.2-354 - 1m Aquifer Concentration for CaseA All Zr-93 1B_LA

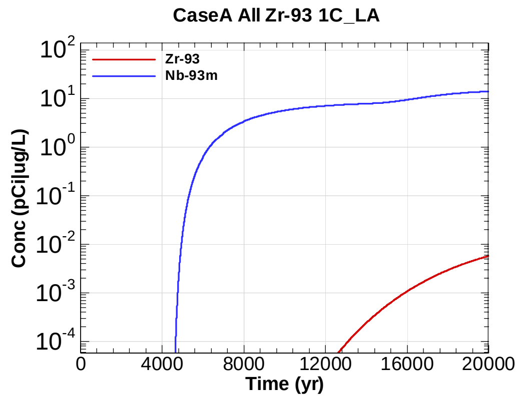

Figure G.2-355 - 1m Aquifer Concentration for CaseA All Zr-93 1C_LA

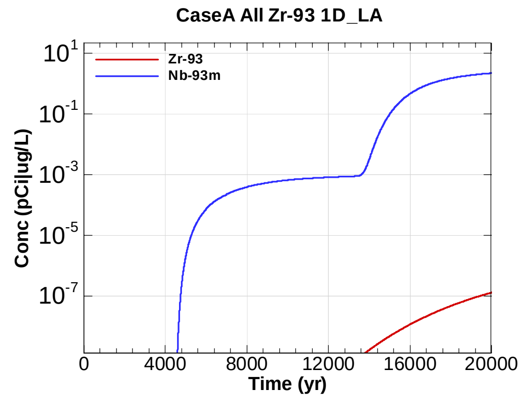

Figure G.2-356 - 1m Aquifer Concentration for CaseA All Zr-93 1D_LA

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Appendix G.3
1-METER RADIOLOGICAL AND CHEMICAL CONCENTRATIONS AT THE GORDON AQUIFER

Appendix G.3 contains curves showing the one- meter radiological and chemical concentrations for all of FTF (tank and ancillary inventories) for the Base Case (Case/Configuration A). 20,000 year concentration results are presented from the Gordon Aquifer for Sectors A through D.

Graph heading example "CaseA All Ac-227 1A_GA"

<u>Key</u>

CaseA = scenario case/configuration
All = all FTF inventory source
Ac-227 = radionuclide or chemical of concern
1A = One-meter. Sector of concern (see sector map with stream traces)
GA = aquifer of concern
UA = Upper Three Runs – Upper Zone
LA = Upper Three Runs – Lower Zone
GA = Gordon

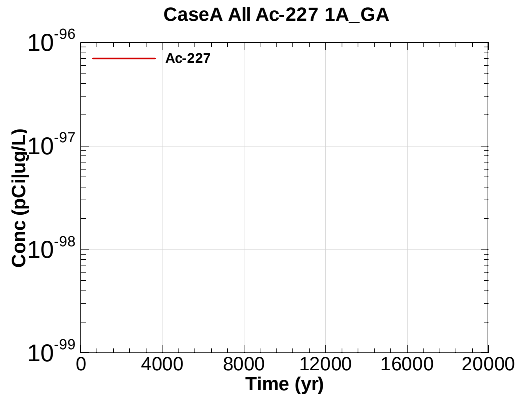

Figure G.3-1 - 1m Aquifer Concentration for CaseA All Ac-227 1A_GA

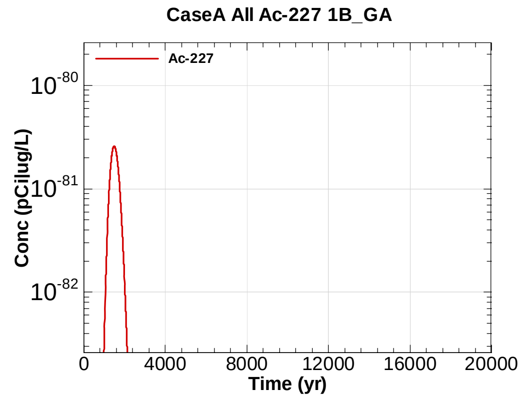

Figure G.3-2 - 1m Aquifer Concentration for CaseA All Ac-227 1B_GA

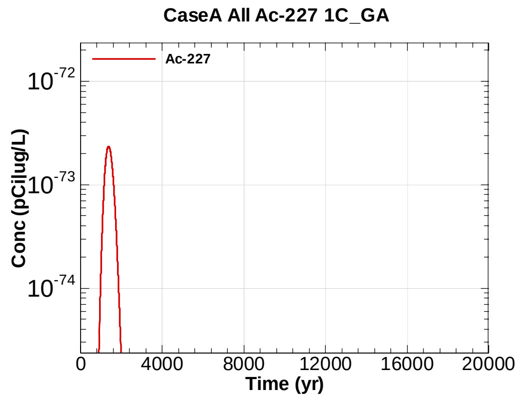

Figure G.3-3 - 1m Aquifer Concentration for CaseA All Ac-227 1C_GA

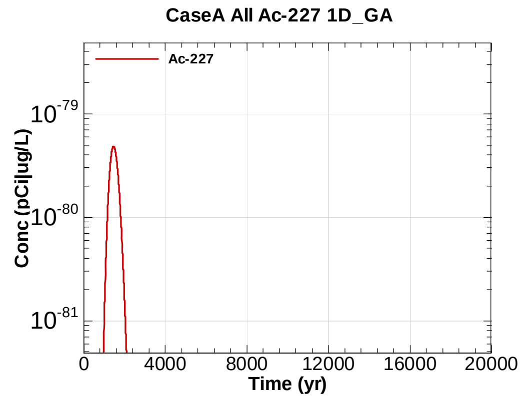

Figure G.3-4 - 1m Aquifer Concentration for CaseA All Ac-227 1D_GA

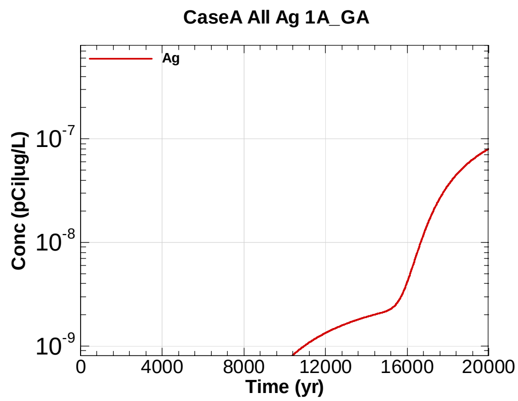

Figure G.3-5 - 1m Aquifer Concentration for CaseA All Ag 1A_GA

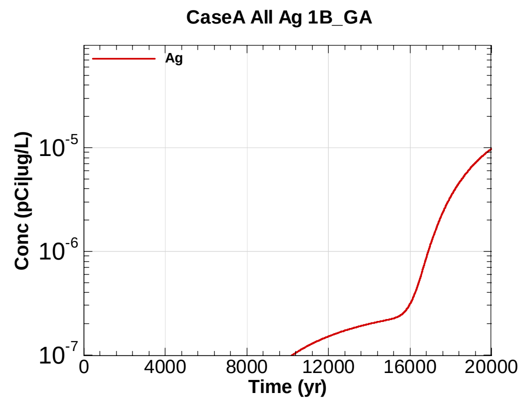

Figure G.3-6 - 1m Aquifer Concentration for CaseA All Ag 1B_GA

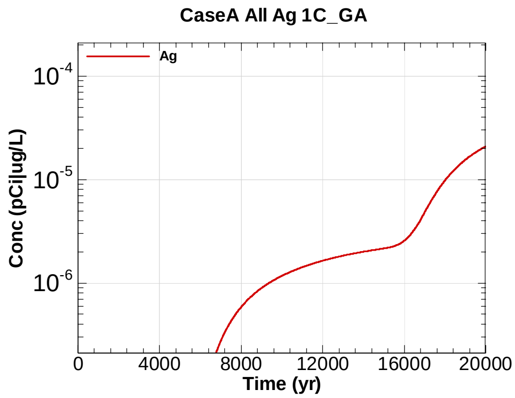

Figure G.3-7 - 1m Aquifer Concentration for CaseA All Ag 1C_GA

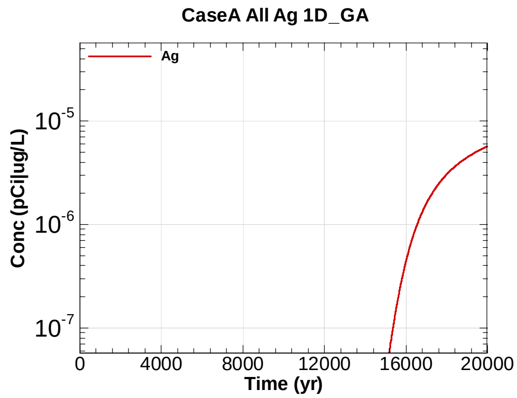

Figure G.3-8 - 1m Aquifer Concentration for CaseA All Ag 1D_GA

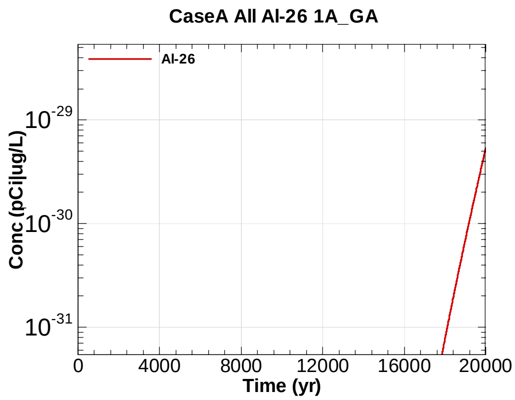

Figure G.3-9 - 1m Aquifer Concentration for CaseA All Al-26 1A_GA

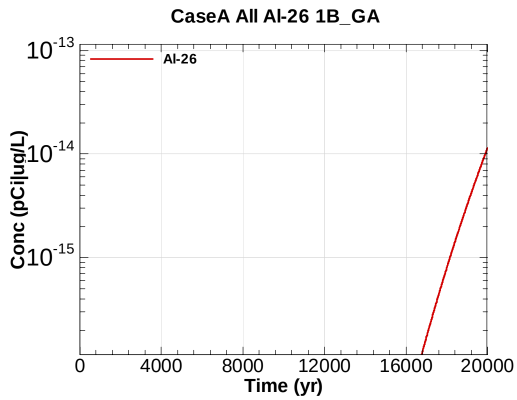

Figure G.3-10 - 1m Aquifer Concentration for CaseA All Al-26 1B_GA

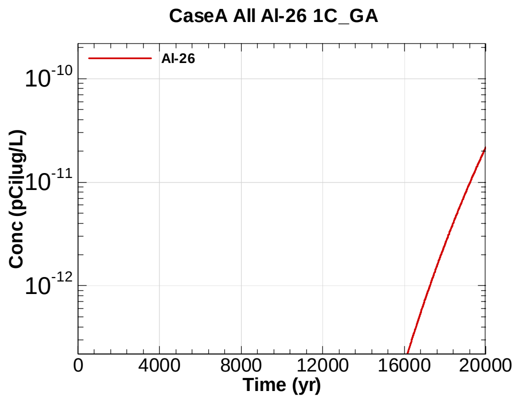

Figure G.3-11 - 1m Aquifer Concentration for CaseA All Al-26 1C_GA

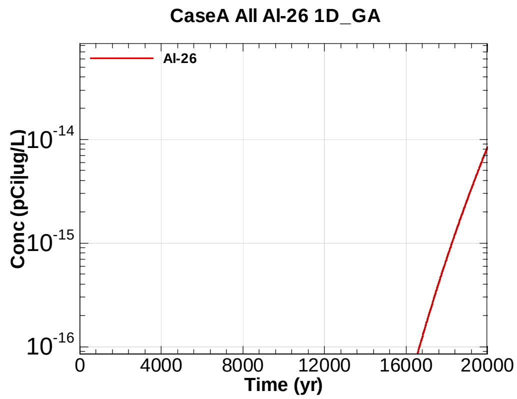

Figure G.3-12 - 1m Aquifer Concentration for CaseA All Al-26 1D_GA

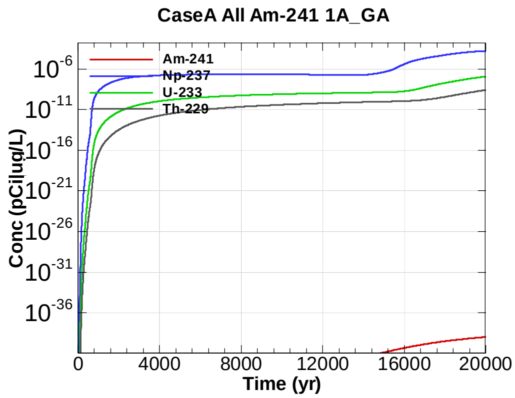

Figure G.3-13 - 1m Aquifer Concentration for CaseA All Am-241 1A_GA

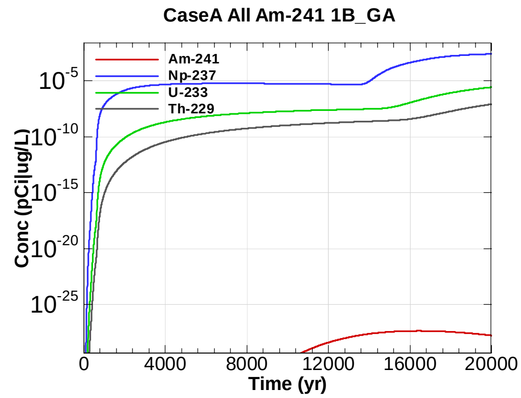

Figure G.3-14 - 1m Aquifer Concentration for CaseA All Am-241 1B_GA

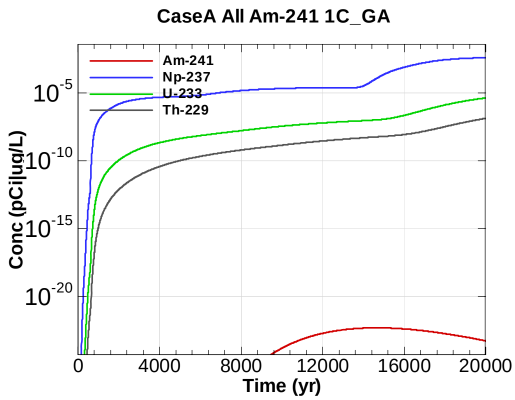

Figure G.3-15 - 1m Aquifer Concentration for CaseA All Am-241 1C_GA

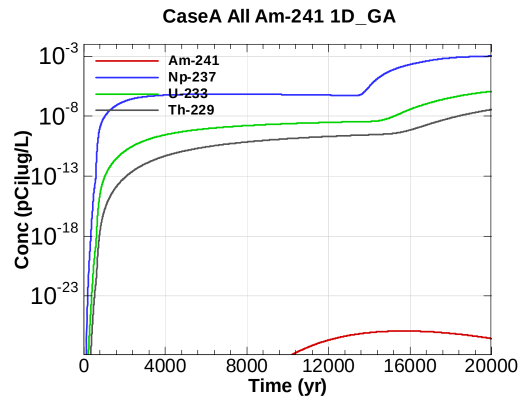

Figure G.3-16 - 1m Aquifer Concentration for CaseA All Am-241 1D_GA

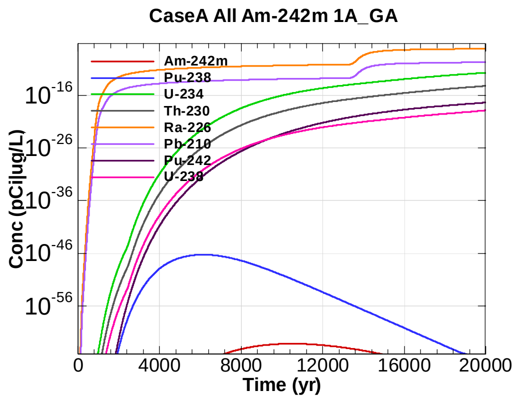

Figure G.3-17 - 1m Aquifer Concentration for CaseA All Am-242m 1A_GA

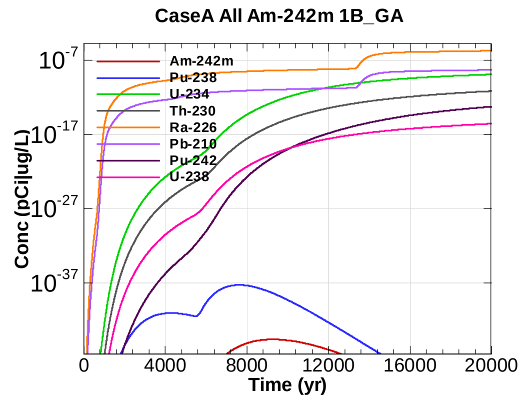

Figure G.3-18 - 1m Aquifer Concentration for CaseA All Am-242m 1B_GA

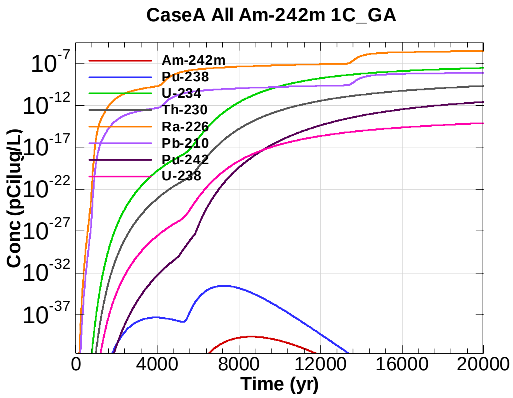

Figure G.3-19 - 1m Aquifer Concentration for CaseA All Am-242m 1C_GA

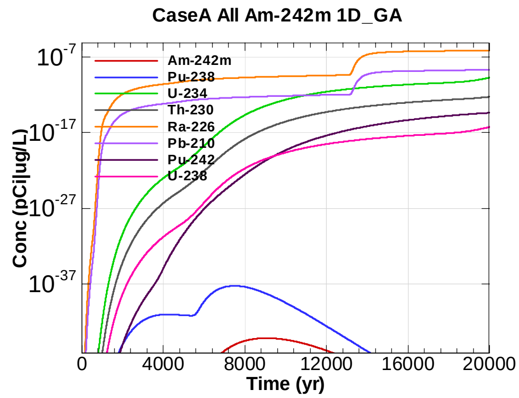

Figure G.3-20 - 1m Aquifer Concentration for CaseA All Am-242m 1D_GA

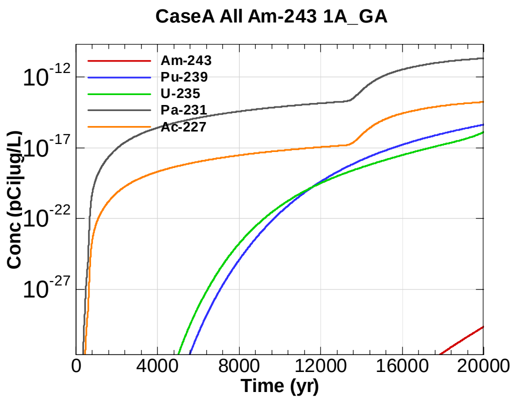

Figure G.3-21 - 1m Aquifer Concentration for CaseA All Am-243 1A_GA

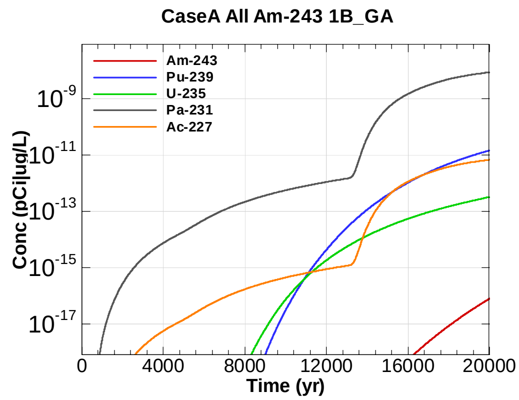

Figure G.3-22 - 1m Aquifer Concentration for CaseA All Am-243 1B_GA

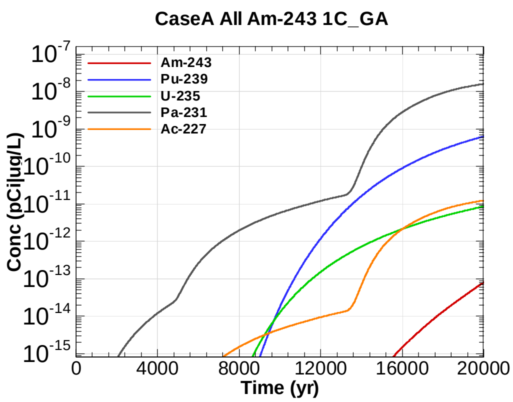

Figure G.3-23 - 1m Aquifer Concentration for CaseA All Am-243 1C_GA

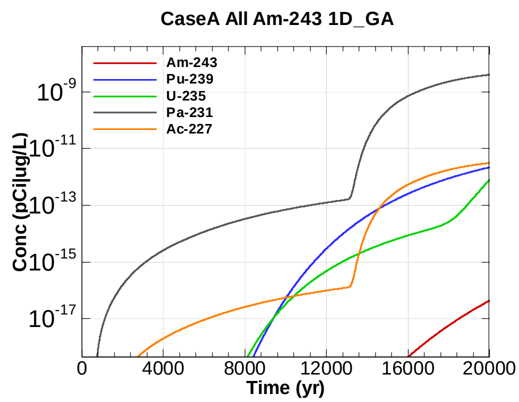

Figure G.3-24 - 1m Aquifer Concentration for CaseA All Am-243 1D_GA

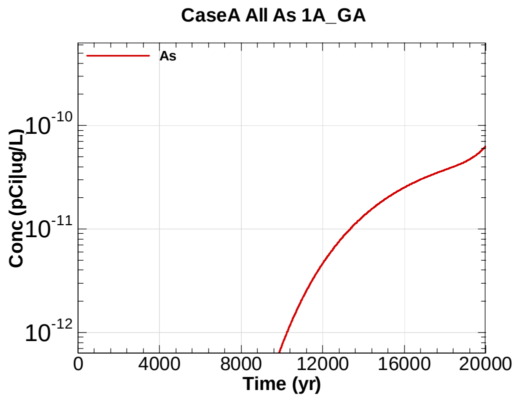

Figure G.3-25 - 1m Aquifer Concentration for CaseA All As 1A_GA

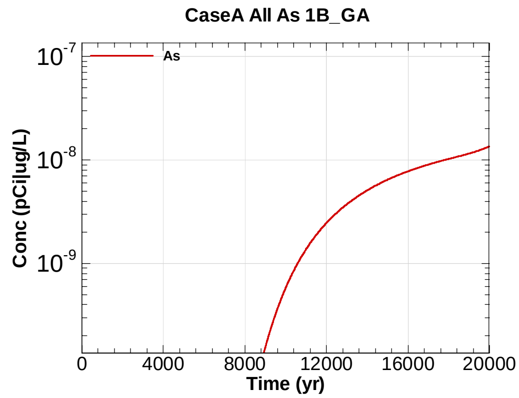

Figure G.3-26 - 1m Aquifer Concentration for CaseA All As 1B_GA

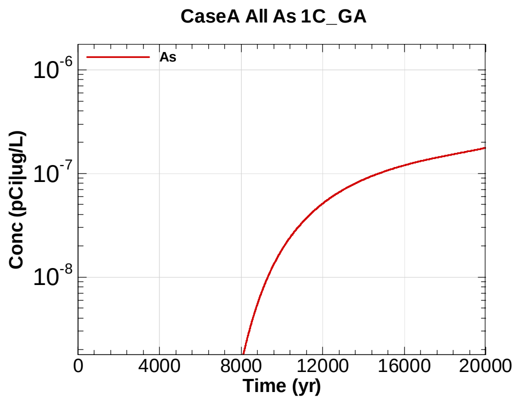

Figure G.3-27 - 1m Aquifer Concentration for CaseA All As 1C_GA

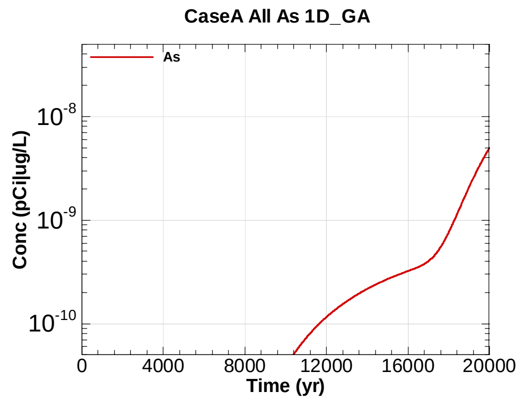

Figure G.3-28 - 1m Aquifer Concentration for CaseA All As 1D_GA

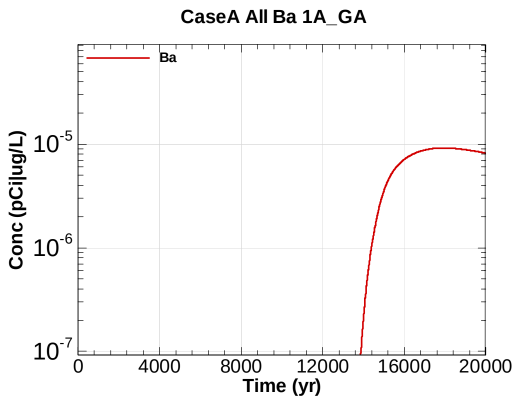

Figure G.3-29 - 1m Aquifer Concentration for CaseA All Ba 1A_GA

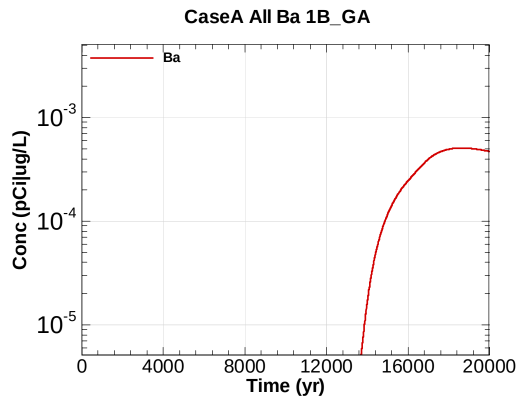

Figure G.3-30 - 1m Aquifer Concentration for CaseA All Ba 1B_GA

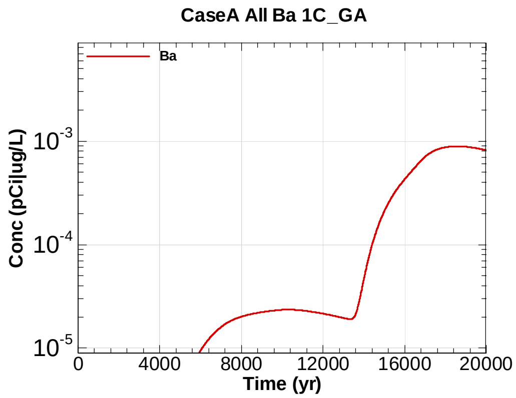

Figure G.3-31 - 1m Aquifer Concentration for CaseA All Ba 1C_GA

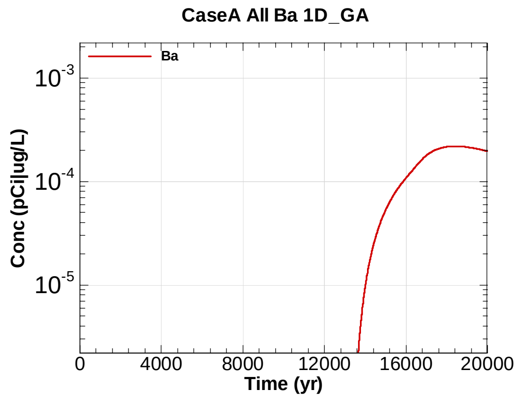

Figure G.3-32 - 1m Aquifer Concentration for CaseA All Ba 1D_GA

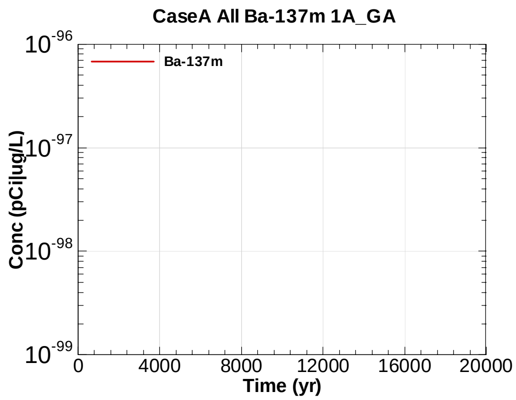

Figure G.3-33 - 1m Aquifer Concentration for CaseA All Ba-137m 1A_GA

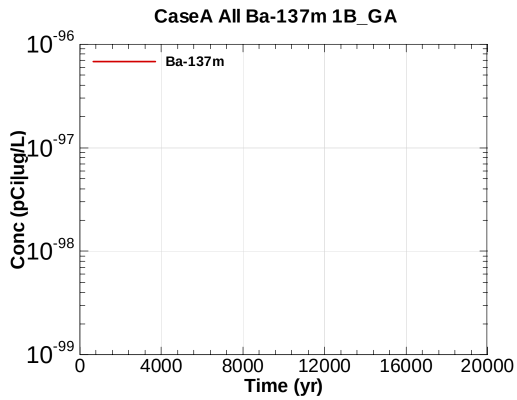

Figure G.3-34 - 1m Aquifer Concentration for CaseA All Ba-137m 1B_GA

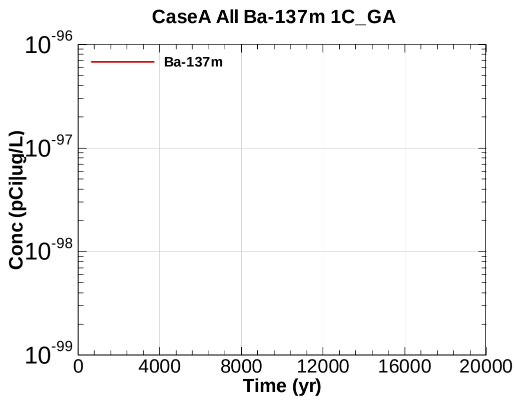

Figure G.3-35 - 1m Aquifer Concentration for CaseA All Ba-137m 1C_GA

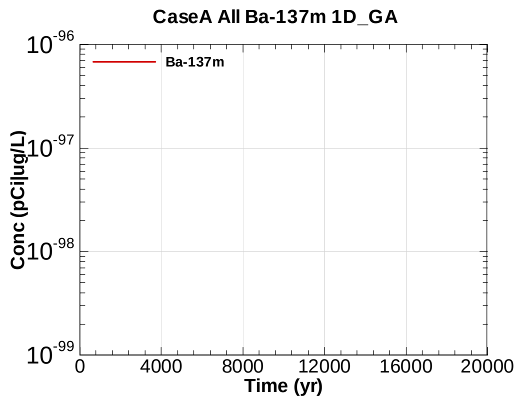

Figure G.3-36 - 1m Aquifer Concentration for CaseA All Ba-137m 1D_GA

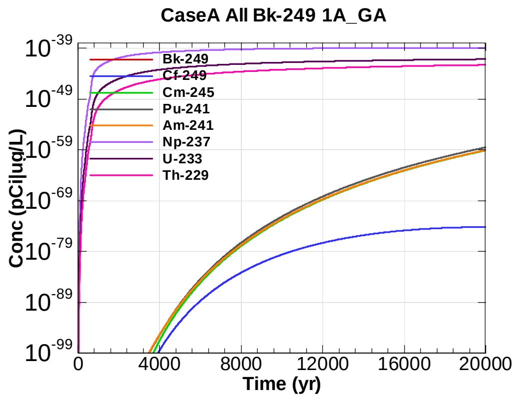

Figure G.3-37 - 1m Aquifer Concentration for CaseA All Bk-249 1A_GA

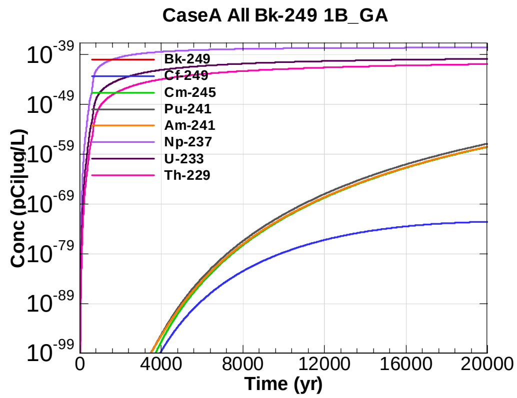

Figure G.3-38 - 1m Aquifer Concentration for CaseA All Bk-249 1B_GA

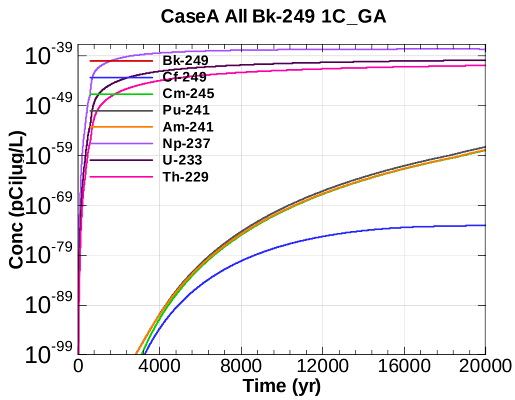

Figure G.3-39 - 1m Aquifer Concentration for CaseA All Bk-249 1C_GA

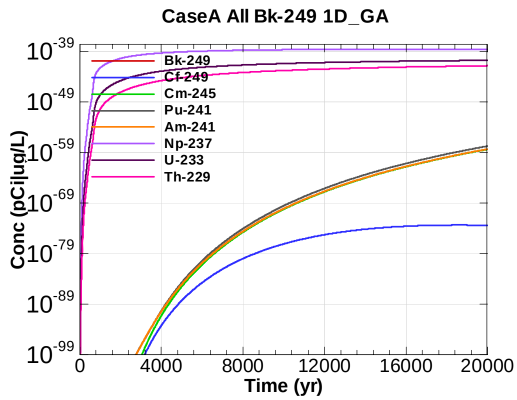

Figure G.3-40 - 1m Aquifer Concentration for CaseA All Bk-249 1D_GA

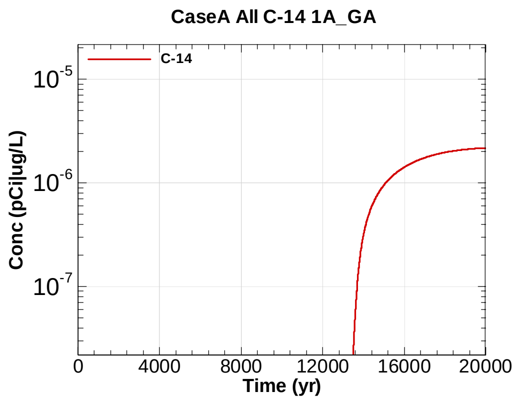

Figure G.3-41 - 1m Aquifer Concentration for CaseA All C-14 1A_GA

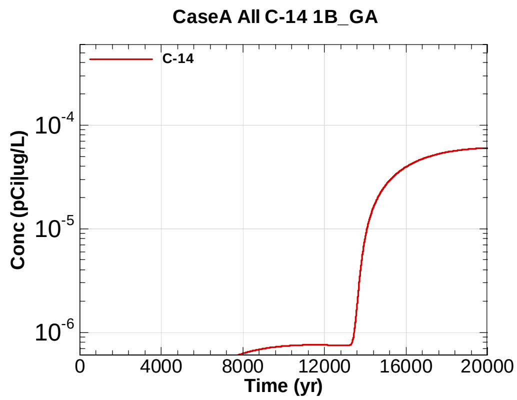

Figure G.3-42 - 1m Aquifer Concentration for CaseA All C-14 1B_GA

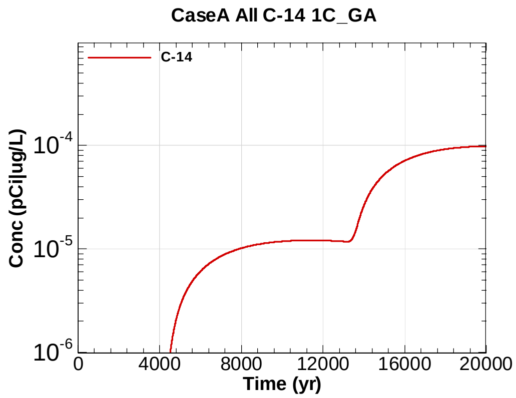

Figure G.3-43 - 1m Aquifer Concentration for CaseA All C-14 1C_GA

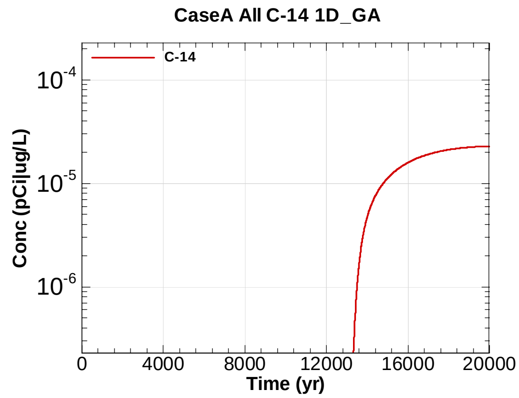

Figure G.3-44 - 1m Aquifer Concentration for CaseA All C-14 1D_GA

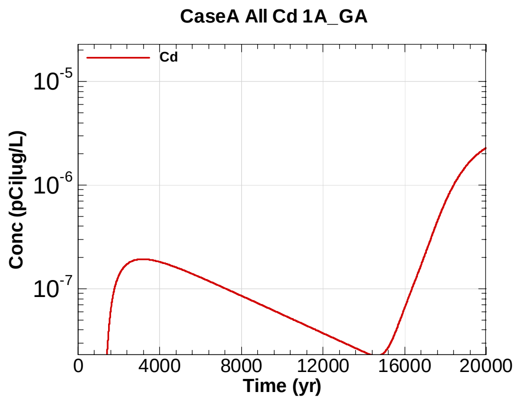

Figure G.3-45 - 1m Aquifer Concentration for CaseA All Cd 1A_GA

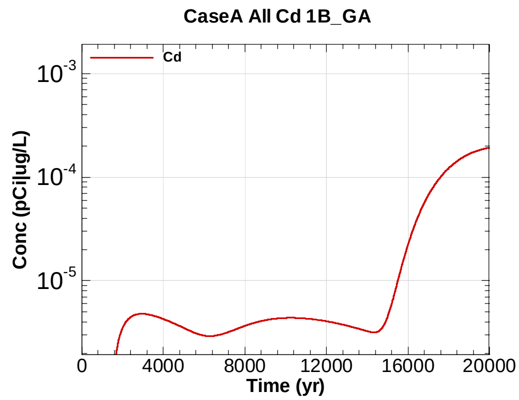

Figure G.3-46 - 1m Aquifer Concentration for CaseA All Cd 1B_GA

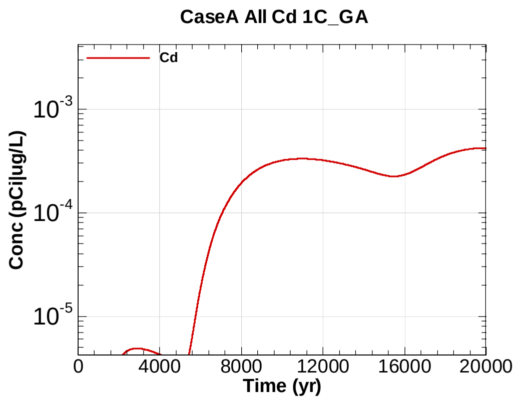

Figure G.3-47 - 1m Aquifer Concentration for CaseA All Cd 1C_GA

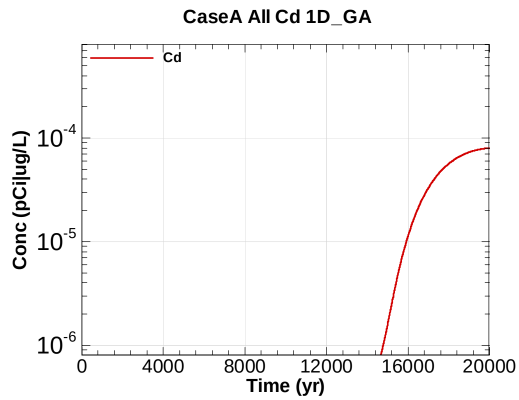

Figure G.3-48 - 1m Aquifer Concentration for CaseA All Cd 1D_GA

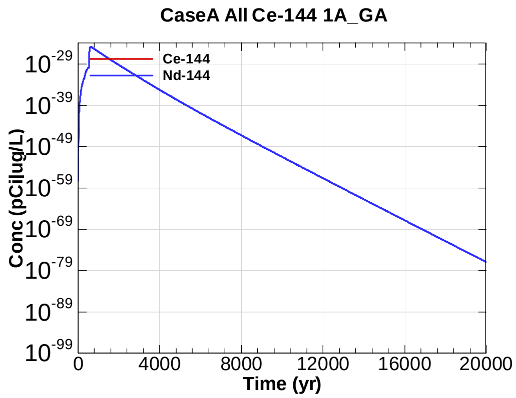

Figure G.3-49 - 1m Aquifer Concentration for CaseA All Ce-144 1A_GA

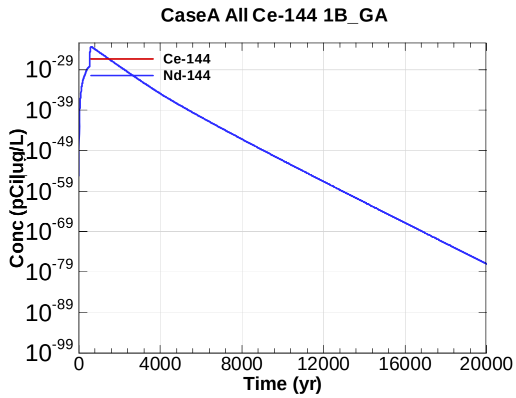

Figure G.3-50 - 1m Aquifer Concentration for CaseA All Ce-144 1B_GA

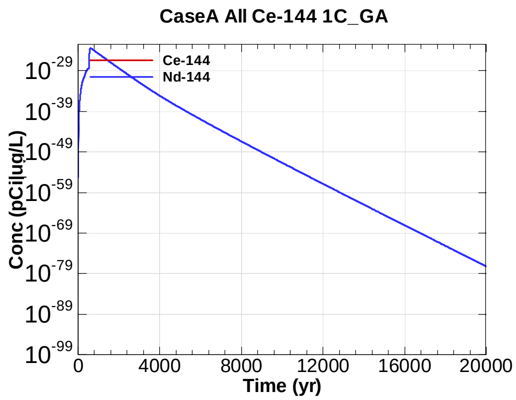

Figure G.3-51 - 1m Aquifer Concentration for CaseA All Ce-144 1C_GA

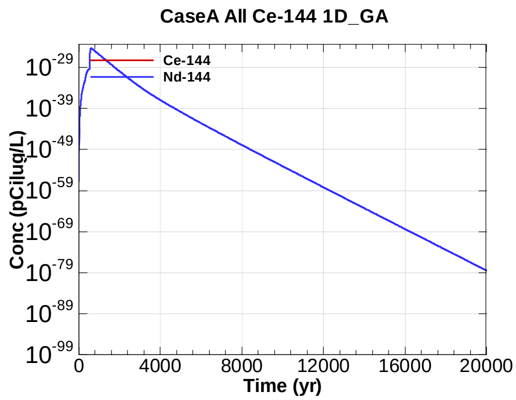

Figure G.3-52 - 1m Aquifer Concentration for CaseA All Ce-144 1D_GA

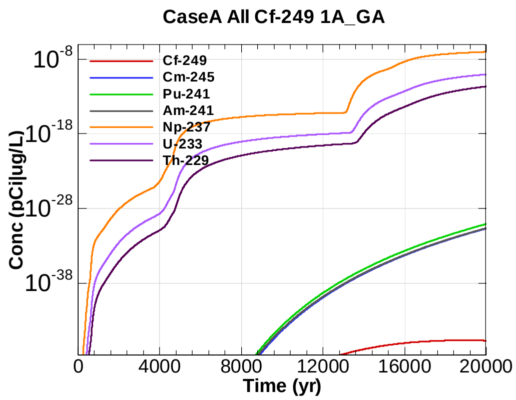

Figure G.3-53 - 1m Aquifer Concentration for CaseA All Cf-249 1A_GA

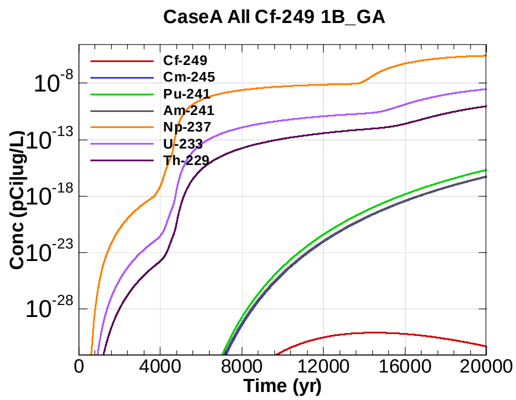

Figure G.3-54 - 1m Aquifer Concentration for CaseA All Cf-249 1B_GA

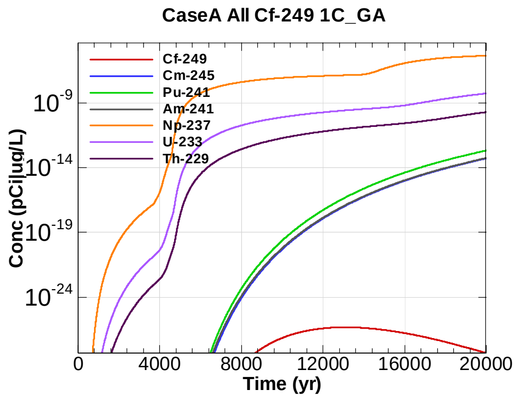

Figure G.3-55 - 1m Aquifer Concentration for CaseA All Cf-249 1C_GA

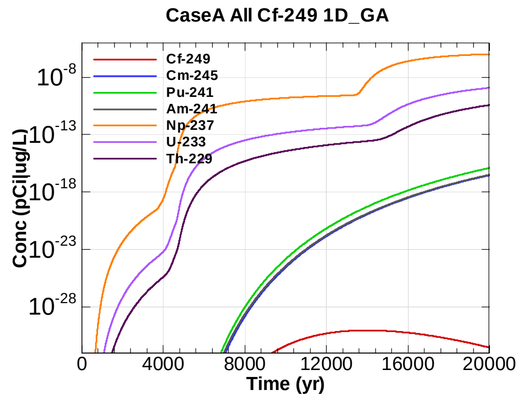

Figure G.3-56 - 1m Aquifer Concentration for CaseA All Cf-249 1D_GA

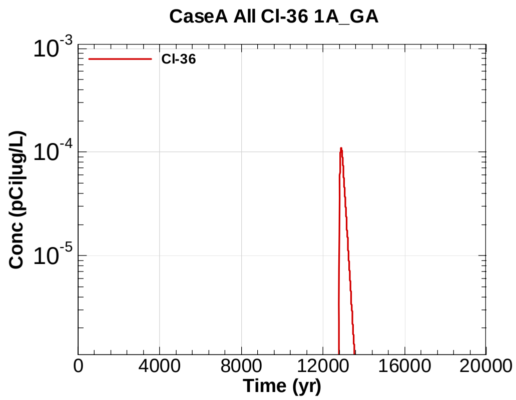

Figure G.3-57 - 1m Aquifer Concentration for CaseA All Cl-36 1A_GA

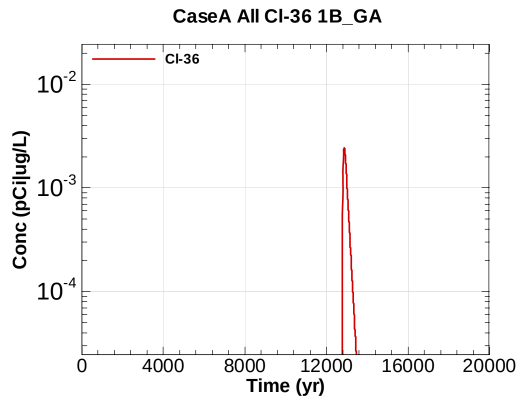

Figure G.3-58 - 1m Aquifer Concentration for CaseA All Cl-36 1B_GA

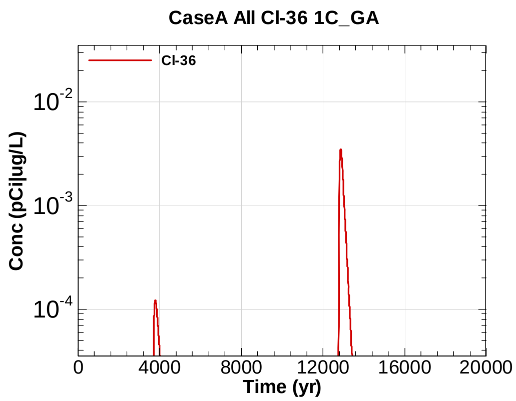

Figure G.3-59 - 1m Aquifer Concentration for CaseA All Cl-36 1C_GA

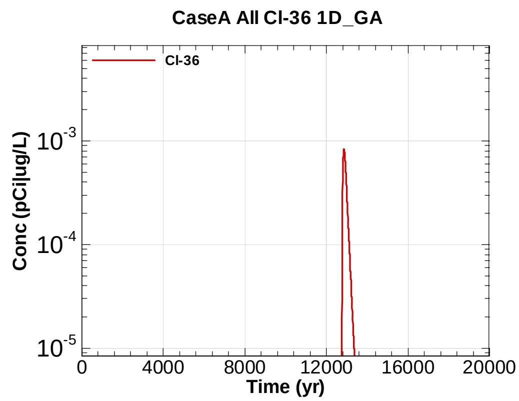

Figure G.3-60 - 1m Aquifer Concentration for CaseA All Cl-36 1D_GA

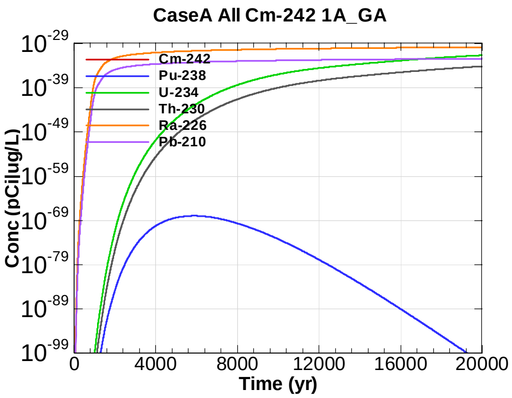

Figure G.3-61 - 1m Aquifer Concentration for CaseA All Cm-242 1A_GA

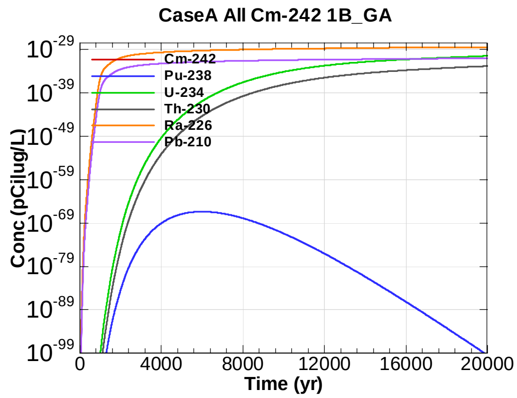

Figure G.3-62 - 1m Aquifer Concentration for CaseA All Cm-242 1B_GA

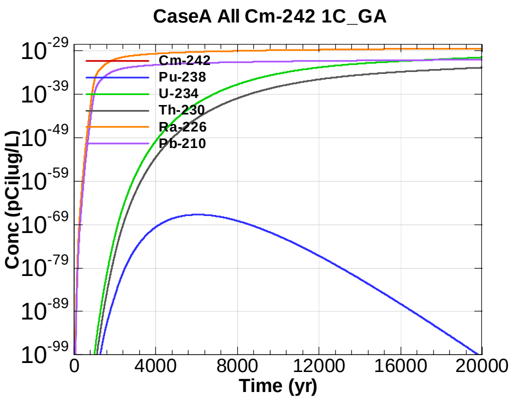

Figure G.3-63 - 1m Aquifer Concentration for CaseA All Cm-242 1C_GA

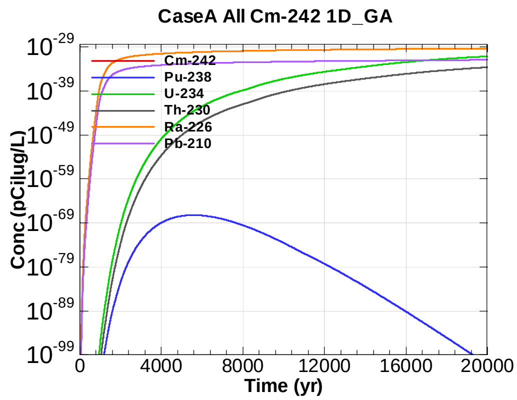

Figure G.3-64 - 1m Aquifer Concentration for CaseA All Cm-242 1D_GA

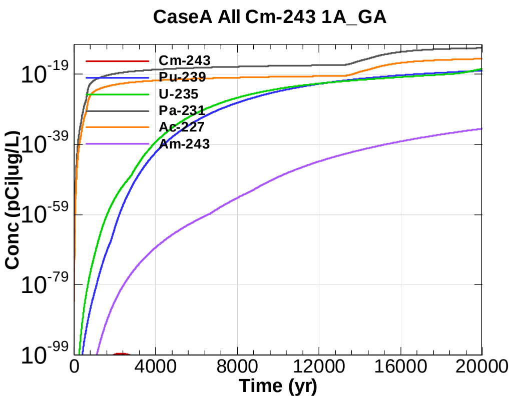

Figure G.3-65 - 1m Aquifer Concentration for CaseA All Cm-243 1A_GA

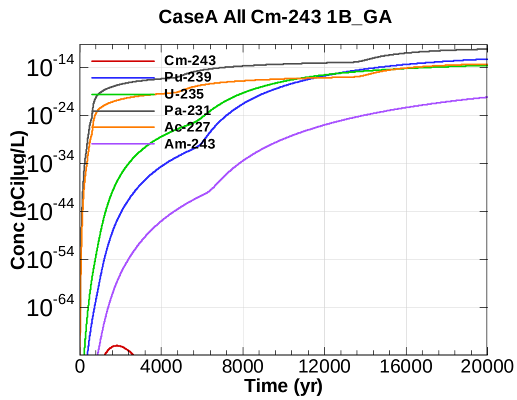

Figure G.3-66 - 1m Aquifer Concentration for CaseA All Cm-243 1B_GA

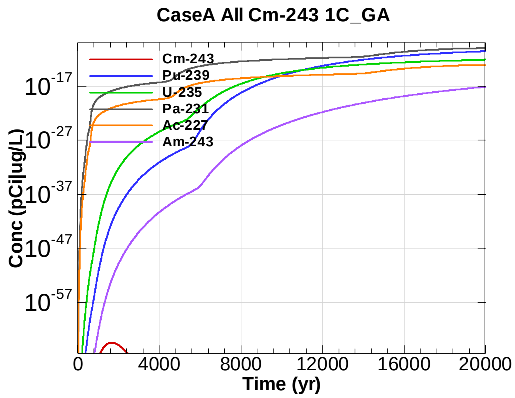

Figure G.3-67 - 1m Aquifer Concentration for CaseA All Cm-243 1C_GA

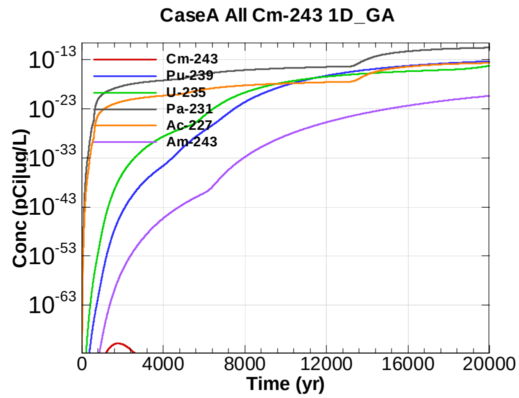

Figure G.3-68 - 1m Aquifer Concentration for CaseA All Cm-243 1D_GA

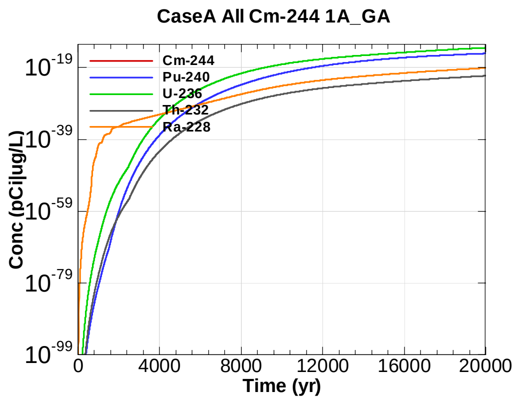

Figure G.3-69 - 1m Aquifer Concentration for CaseA All Cm-244 1A_GA

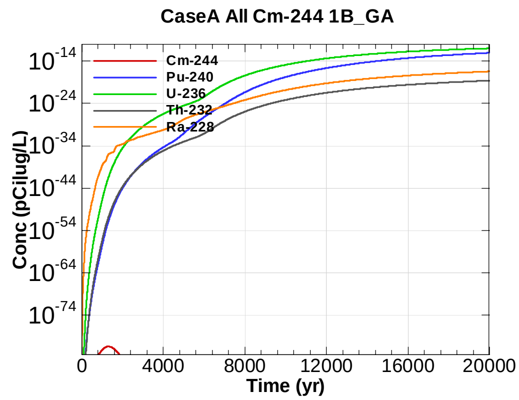

Figure G.3-70 - 1m Aquifer Concentration for CaseA All Cm-244 1B_GA

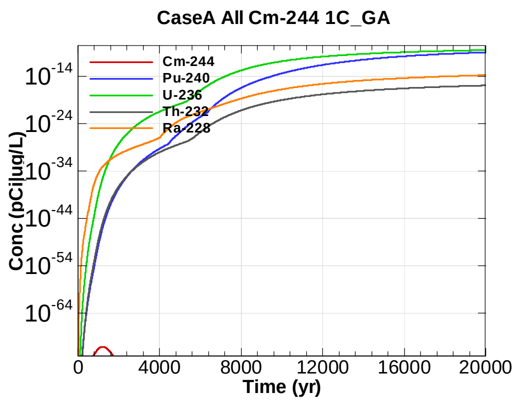

Figure G.3-71 - 1m Aquifer Concentration for CaseA All Cm-244 1C_GA

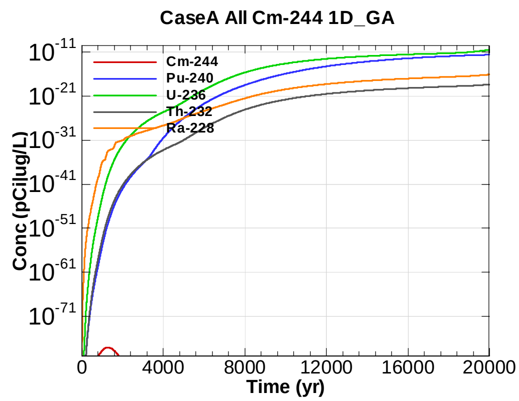

Figure G.3-72 - 1m Aquifer Concentration for CaseA All Cm-244 1D_GA

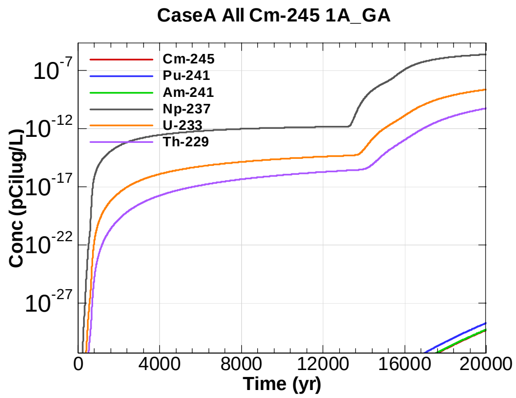

Figure G.3-73 - 1m Aquifer Concentration for CaseA All Cm-245 1A_GA

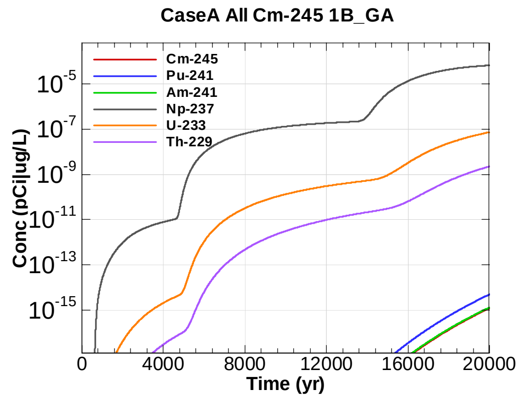

Figure G.3-74 - 1m Aquifer Concentration for CaseA All Cm-245 1B_GA

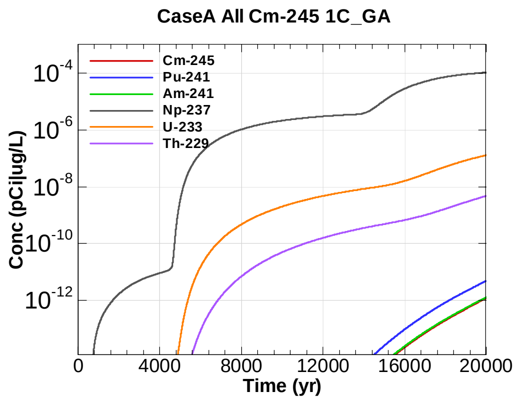

Figure G.3-75 - 1m Aquifer Concentration for CaseA All Cm-245 1C_GA

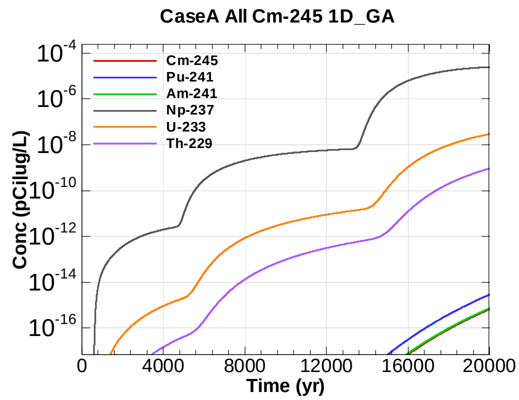

Figure G.3-76 - 1m Aquifer Concentration for CaseA All Cm-245 1D_GA

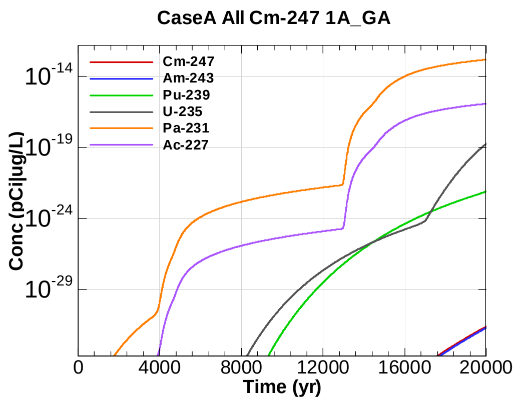

Figure G.3-77 - 1m Aquifer Concentration for CaseA All Cm-247 1A_GA

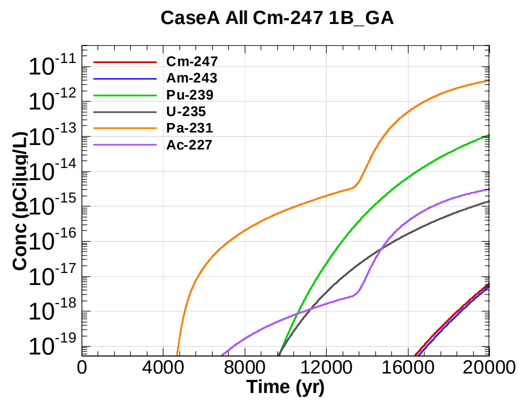

Figure G.3-78 - 1m Aquifer Concentration for CaseA All Cm-247 1B_GA

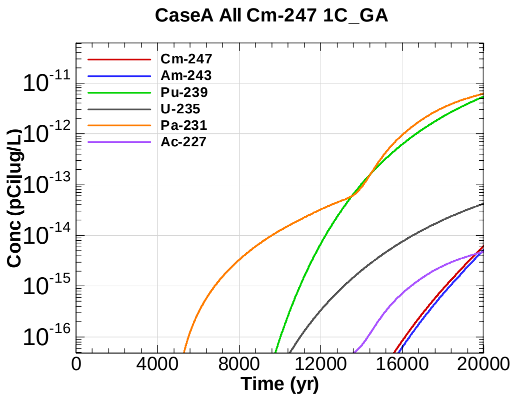

Figure G.3-79 - 1m Aquifer Concentration for CaseA All Cm-247 1C_GA

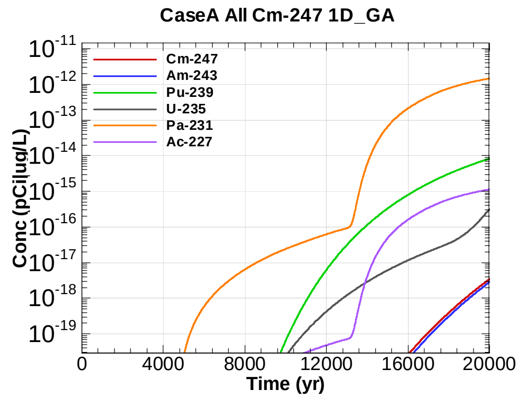

Figure G.3-80 - 1m Aquifer Concentration for CaseA All Cm-247 1D_GA

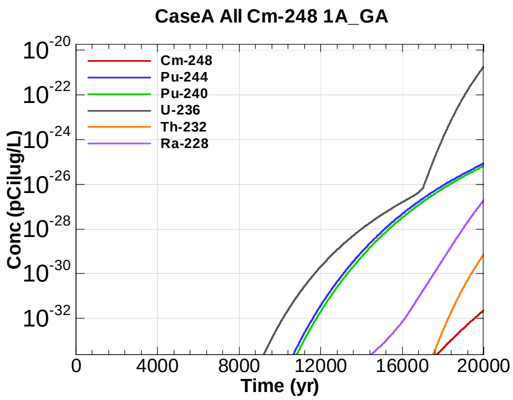

Figure G.3-81 - 1m Aquifer Concentration for CaseA All Cm-248 1A_GA

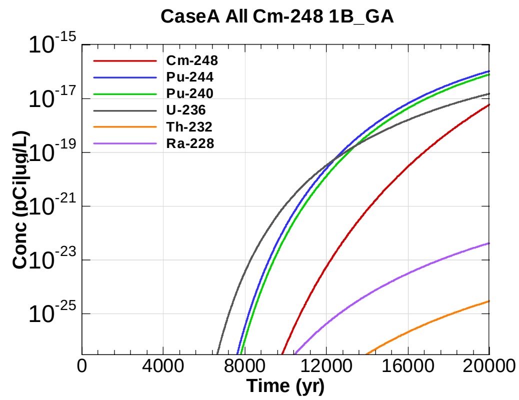

Figure G.3-82 - 1m Aquifer Concentration for CaseA All Cm-248 1B_GA

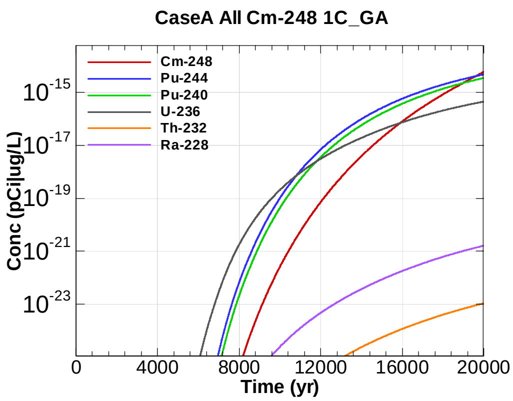

Figure G.3-83 - 1m Aquifer Concentration for CaseA All Cm-248 1C_GA

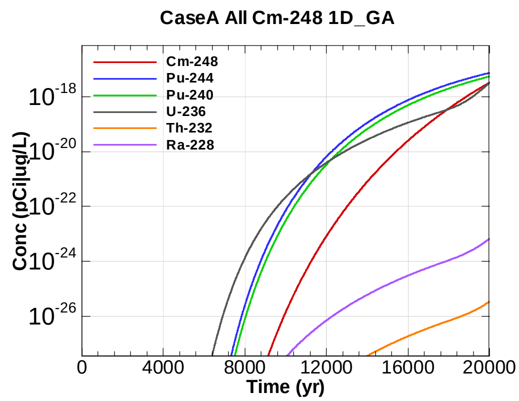

Figure G.3-84 - 1m Aquifer Concentration for CaseA All Cm-248 1D_GA

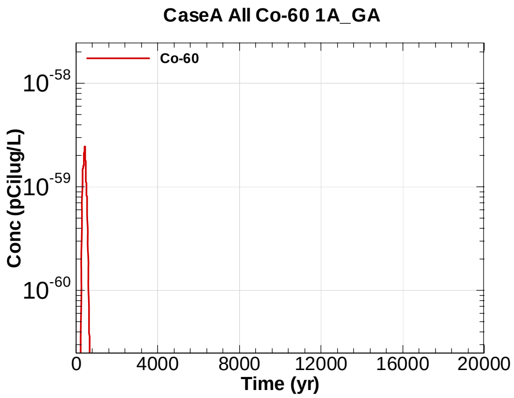

Figure G.3-85 - 1m Aquifer Concentration for CaseA All Co-60 1A_GA

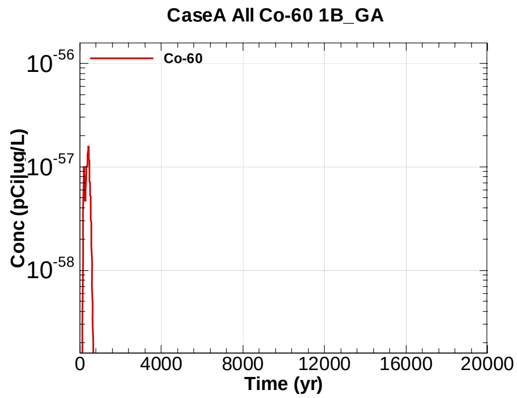

Figure G.3-86 - 1m Aquifer Concentration for CaseA All Co-60 1B_GA

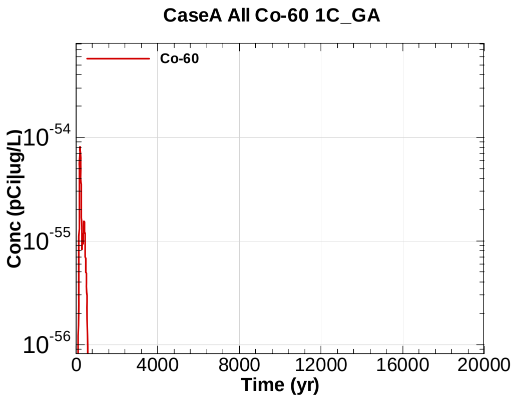

Figure G.3-87 - 1m Aquifer Concentration for CaseA All Co-60 1C_GA

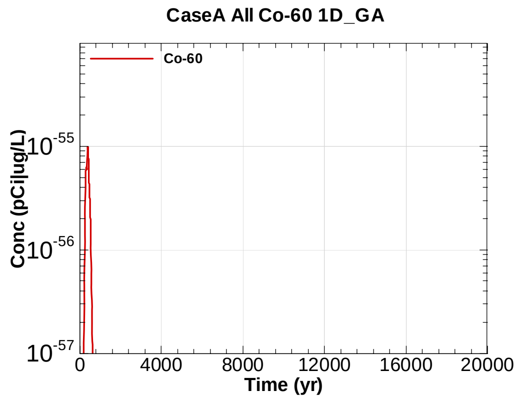

Figure G.3-88 - 1m Aquifer Concentration for CaseA All Co-60 1D_GA

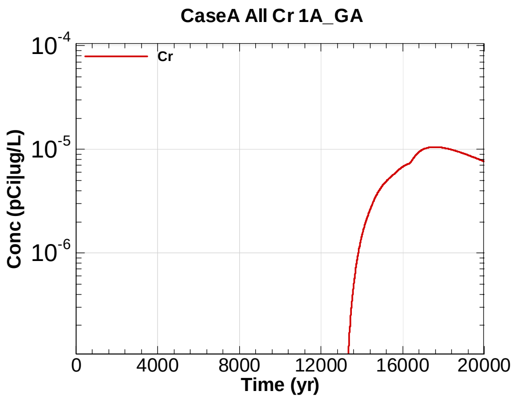

Figure G.3-89 - 1m Aquifer Concentration for CaseA All Cr 1A_GA

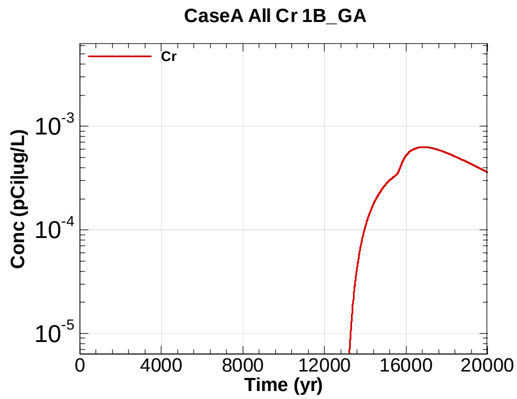

Figure G.3-90 - 1m Aquifer Concentration for CaseA All Cr 1B_GA

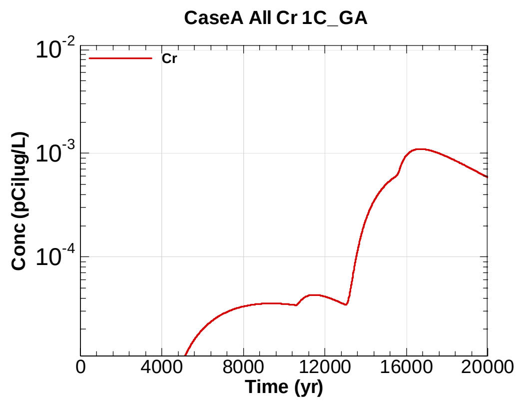

Figure G.3-91 - 1m Aquifer Concentration for CaseA All Cr 1C_GA

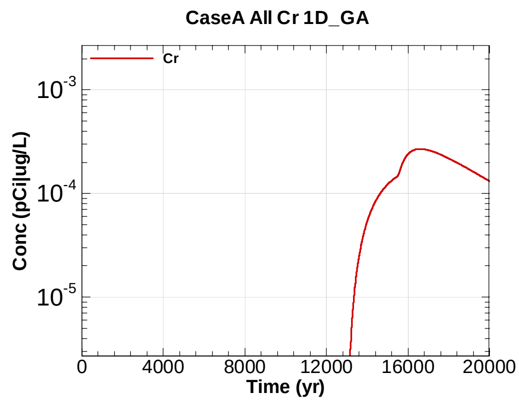

Figure G.3-92 - 1m Aquifer Concentration for CaseA All Cr 1D_GA

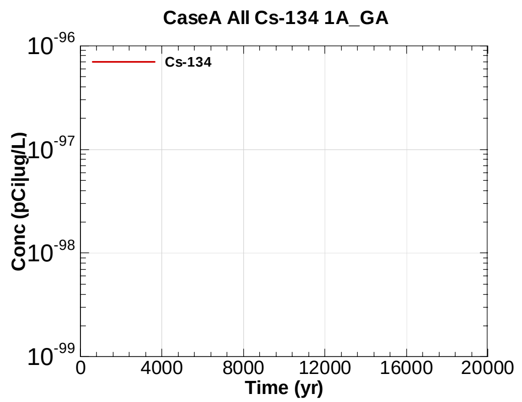

Figure G.3-93 - 1m Aquifer Concentration for CaseA All Cs-134 1A_GA

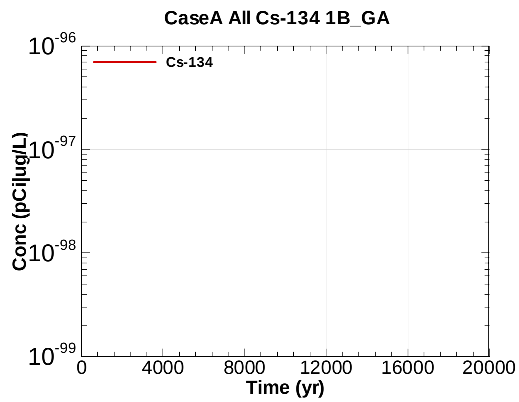

Figure G.3-94 - 1m Aquifer Concentration for CaseA All Cs-134 1B_GA

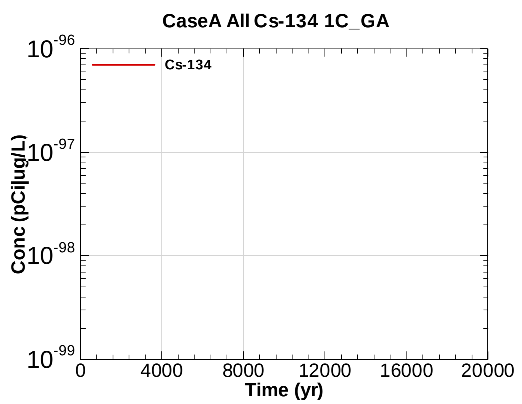

Figure G.3-95 - 1m Aquifer Concentration for CaseA All Cs-134 1C_GA

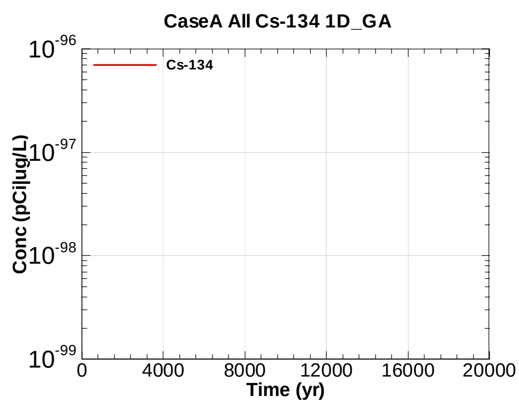

Figure G.3-96 - 1m Aquifer Concentration for CaseA All Cs-134 1D_GA

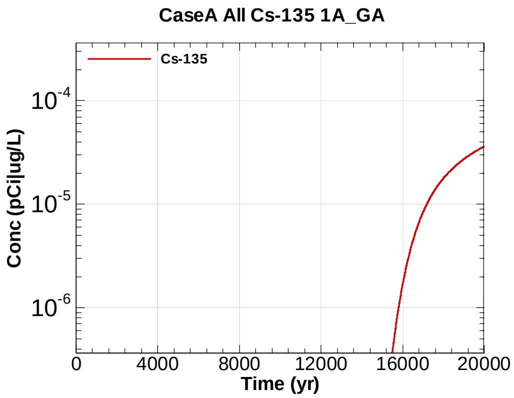

Figure G.3-97 - 1m Aquifer Concentration for CaseA All Cs-135 1A_GA

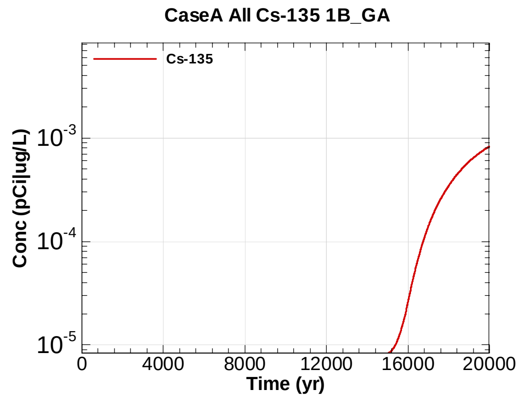

Figure G.3-98 - 1m Aquifer Concentration for CaseA All Cs-135 1B_GA

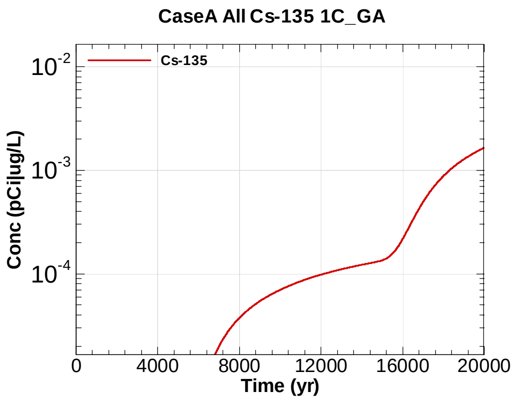

Figure G.3-99 - 1m Aquifer Concentration for CaseA All Cs-135 1C_GA

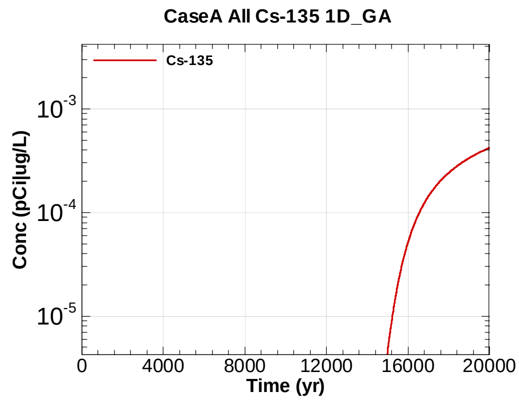

Figure G.3-100 - 1m Aquifer Concentration for CaseA All Cs-135 1D_GA

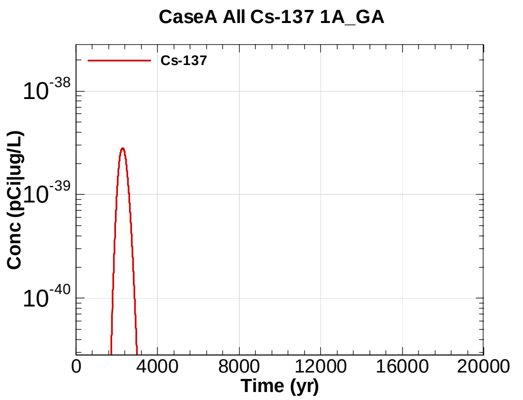

Figure G.3-101 - 1m Aquifer Concentration for CaseA All Cs-137 1A_GA

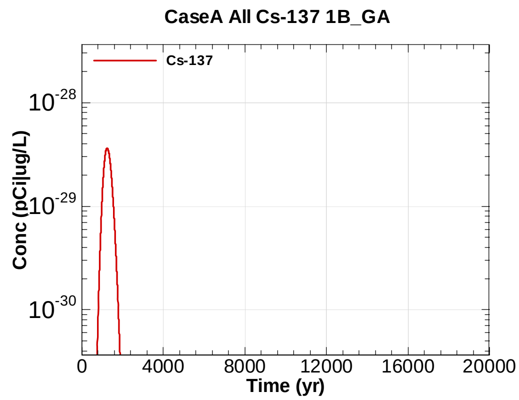

Figure G.3-102 - 1m Aquifer Concentration for CaseA All Cs-137 1B_GA

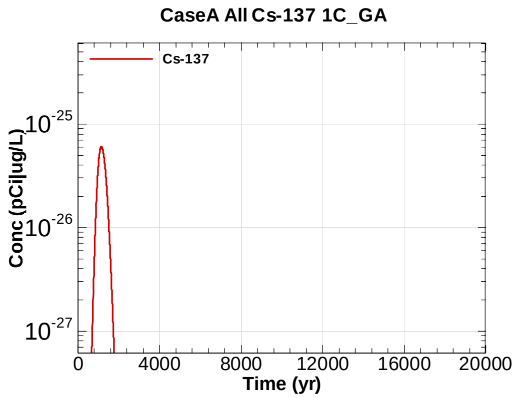

Figure G.3-103 - 1m Aquifer Concentration for CaseA All Cs-137 1C_GA

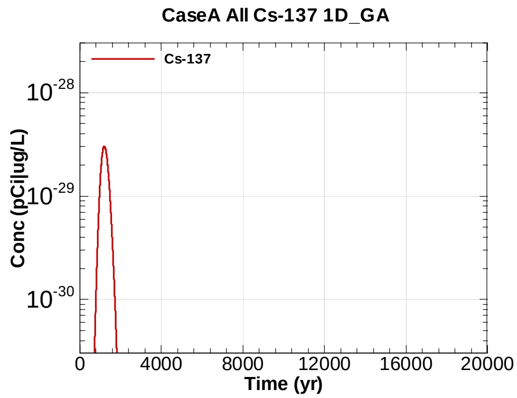

Figure G.3-104 - 1m Aquifer Concentration for CaseA All Cs-137 1D_GA

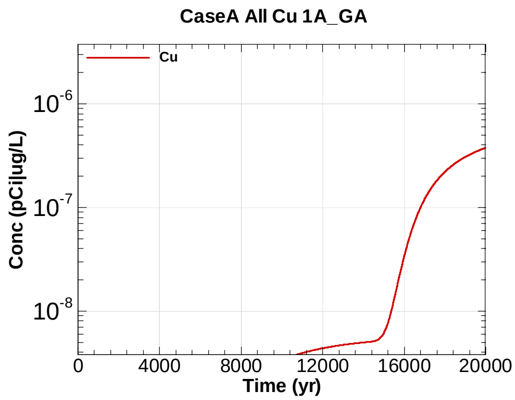

Figure G.3-105 - 1m Aquifer Concentration for CaseA All Cu 1A_GA

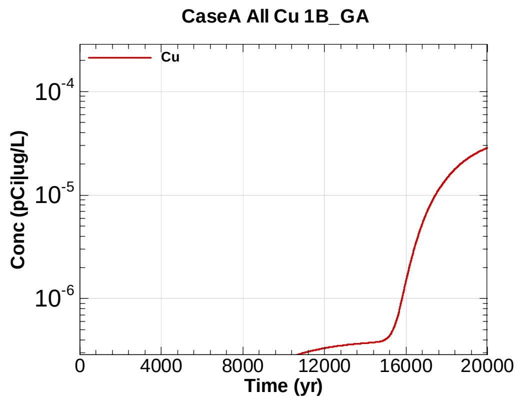

Figure G.3-106 - 1m Aquifer Concentration for CaseA All Cu 1B_GA

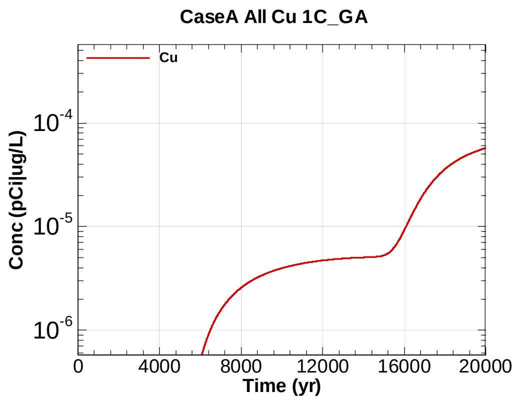

Figure G.3-107 - 1m Aquifer Concentration for CaseA All Cu 1C_GA

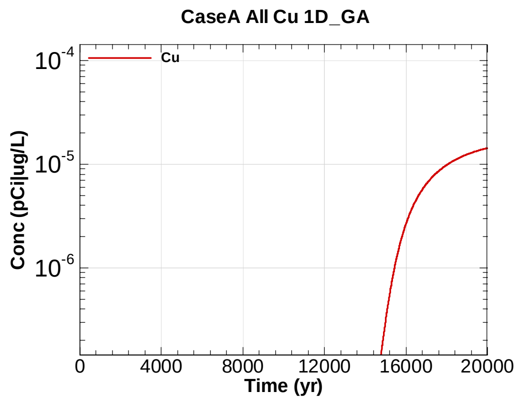

Figure G.3-108 - 1m Aquifer Concentration for CaseA All Cu 1D_GA

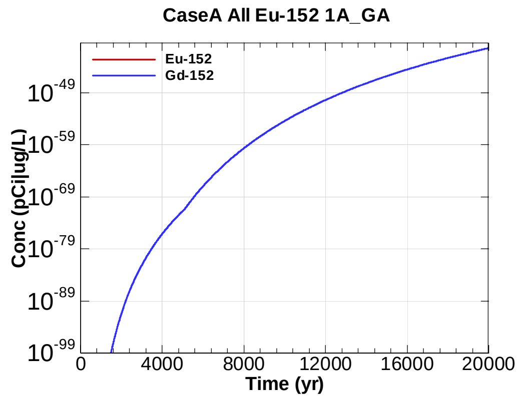

Figure G.3-109 - 1m Aquifer Concentration for CaseA All Eu-152 1A_GA

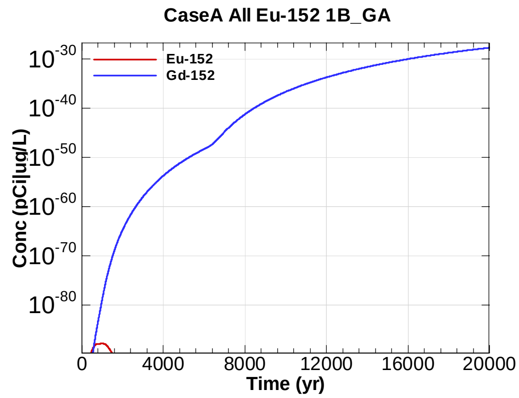

Figure G.3-110 - 1m Aquifer Concentration for CaseA All Eu-152 1B_GA

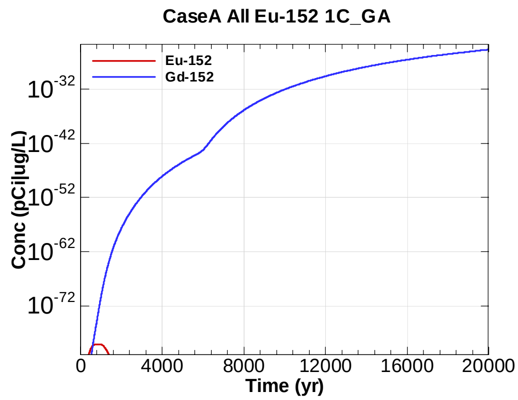

Figure G.3-111 - 1m Aquifer Concentration for CaseA All Eu-152 1C_GA

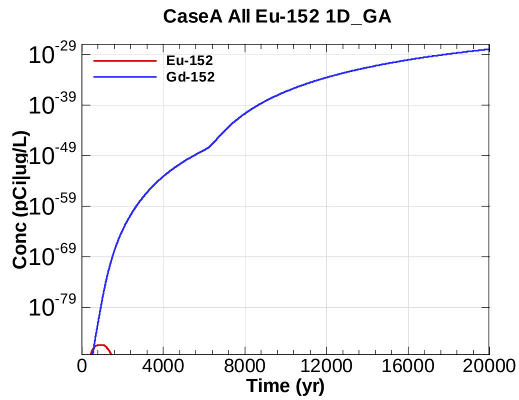

Figure G.3-112 - 1m Aquifer Concentration for CaseA All Eu-152 1D_GA

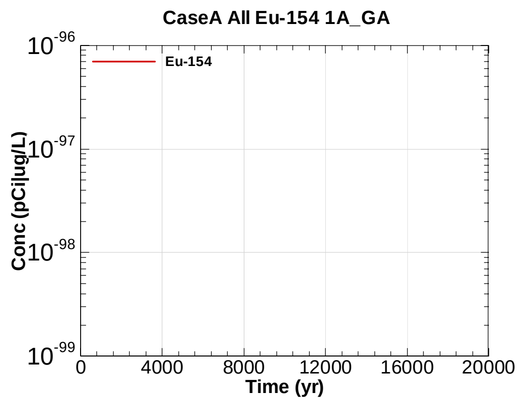

Figure G.3-113 - 1m Aquifer Concentration for CaseA All Eu-154 1A_GA

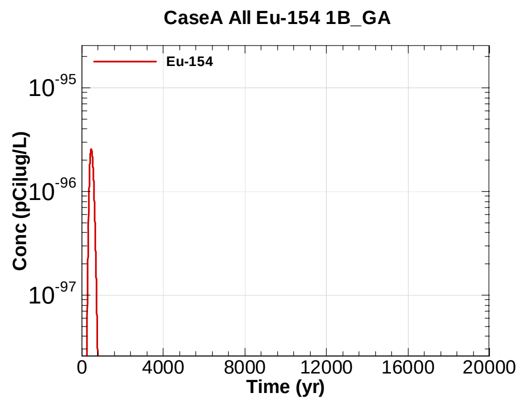

Figure G.3-114 - 1m Aquifer Concentration for CaseA All Eu-154 1B_GA

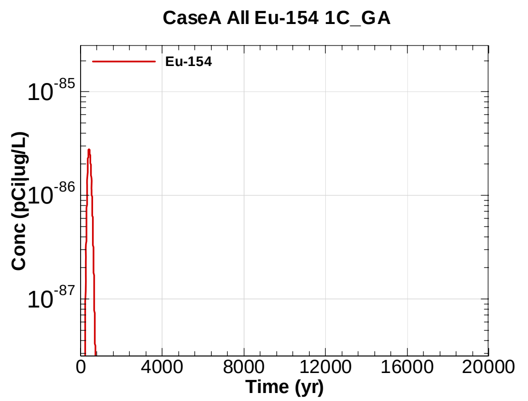

Figure G.3-115 - 1m Aquifer Concentration for CaseA All Eu-154 1C_GA

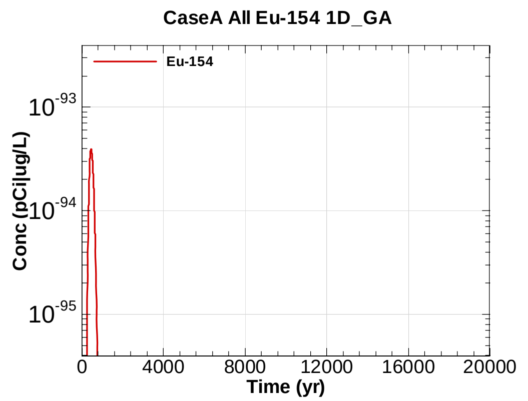

Figure G.3-116 - 1m Aquifer Concentration for CaseA All Eu-154 1D_GA

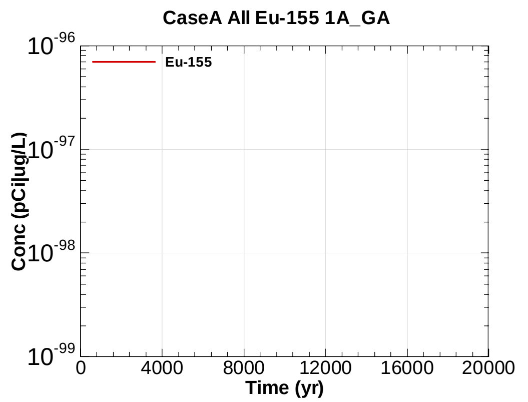

Figure G.3-117 - 1m Aquifer Concentration for CaseA All Eu-155 1A_GA

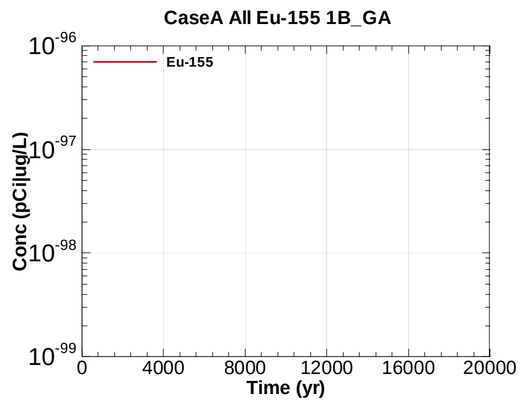

Figure G.3-118 - 1m Aquifer Concentration for CaseA All Eu-155 1B_GA

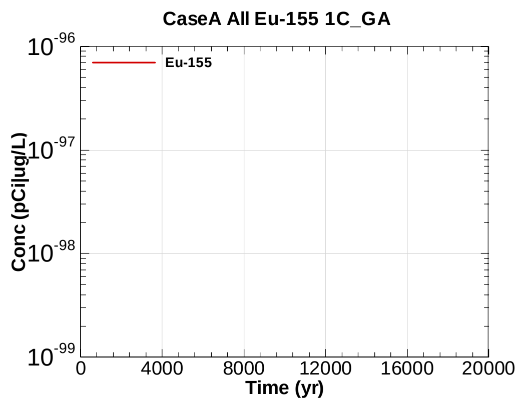

Figure G.3-119 - 1m Aquifer Concentration for CaseA All Eu-155 1C_GA

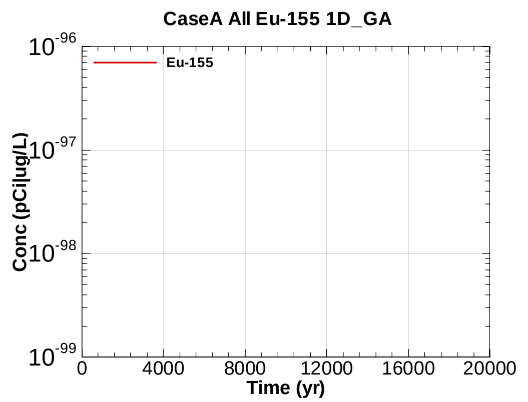

Figure G.3-120 - 1m Aquifer Concentration for CaseA All Eu-155 1D_GA

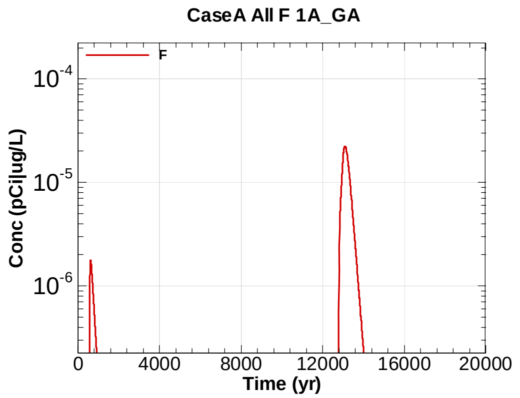

Figure G.3-121 - 1m Aquifer Concentration for CaseA All F 1A_GA

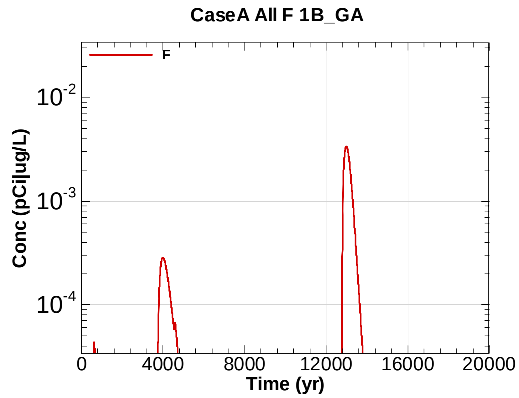

Figure G.3-122 - 1m Aquifer Concentration for CaseA All F 1B_GA

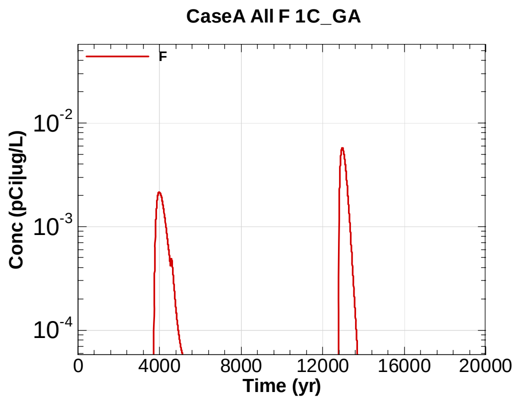

Figure G.3-123 - 1m Aquifer Concentration for CaseA All F 1C_GA

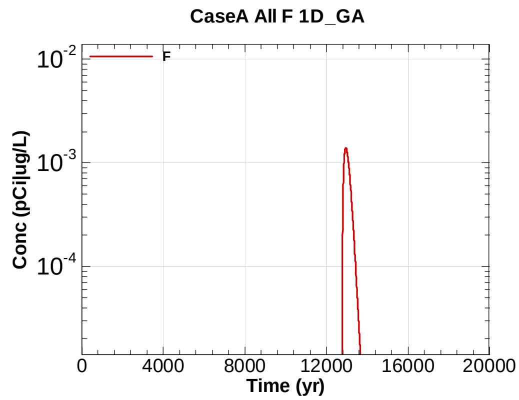

Figure G.3-124 - 1m Aquifer Concentration for CaseA All F 1D_GA

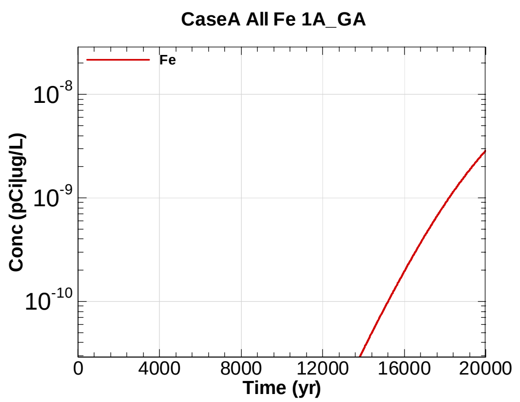

Figure G.3-125 - 1m Aquifer Concentration for CaseA All Fe 1A_GA

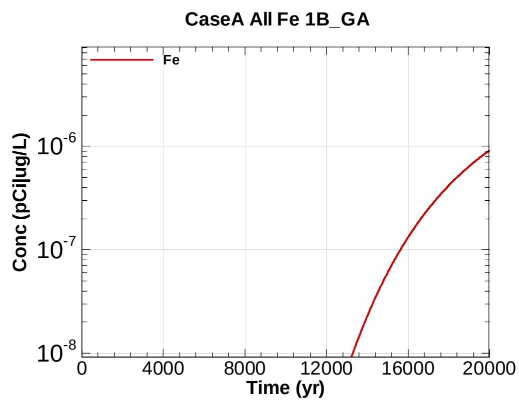

Figure G.3-126 - 1m Aquifer Concentration for CaseA All Fe 1B_GA

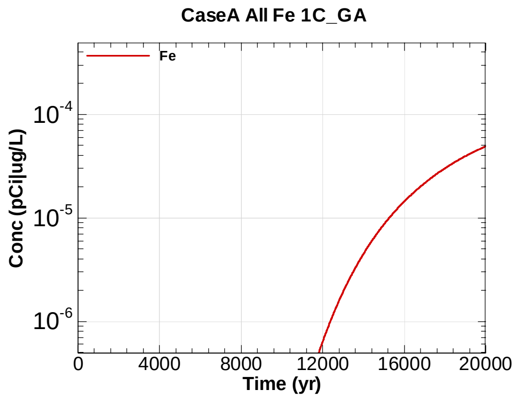

Figure G.3-127 - 1m Aquifer Concentration for CaseA All Fe 1C_GA

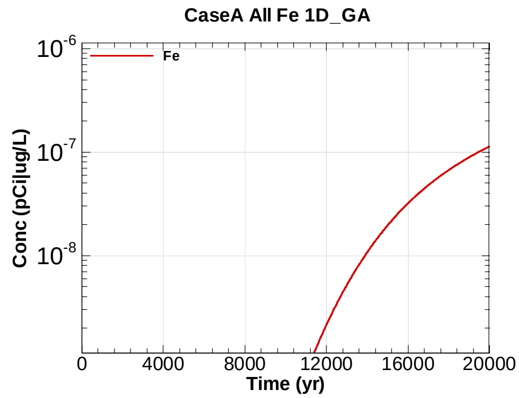

Figure G.3-128 - 1m Aquifer Concentration for CaseA All Fe 1D_GA

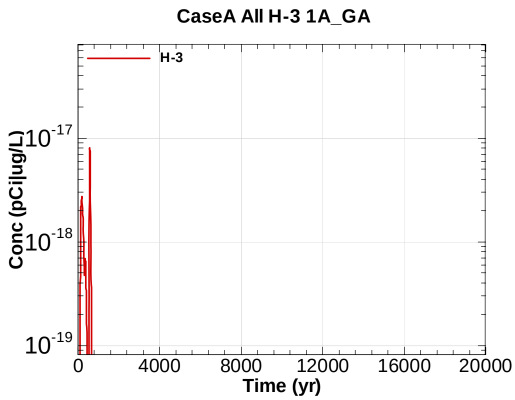

Figure G.3-129 - 1m Aquifer Concentration for CaseA All H-3 1A_GA

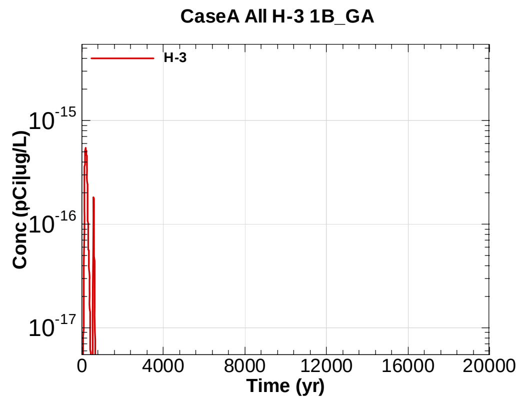

Figure G.3-130 - 1m Aquifer Concentration for CaseA All H-3 1B_GA

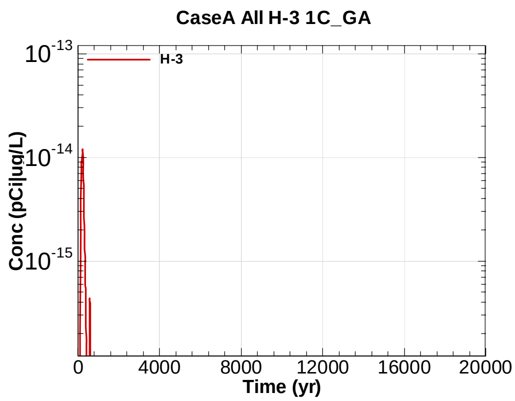

Figure G.3-131 - 1m Aquifer Concentration for CaseA All H-3 1C_GA

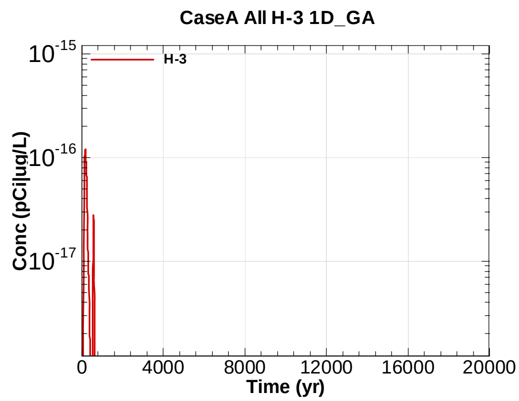

Figure G.3-132 - 1m Aquifer Concentration for CaseA All H-3 1D_GA

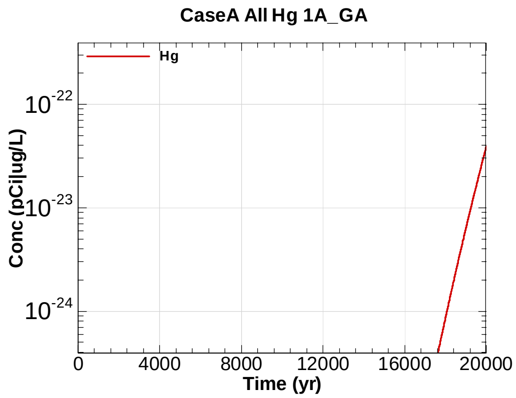

Figure G.3-133 - 1m Aquifer Concentration for CaseA All Hg 1A_GA

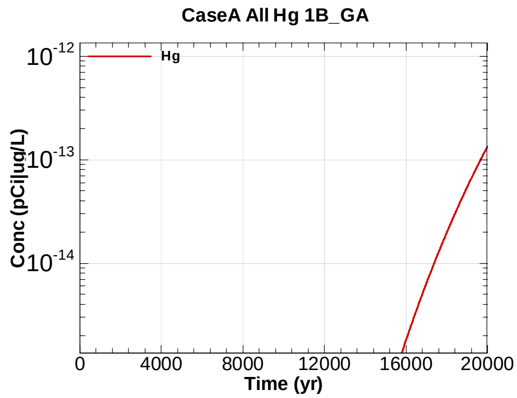

Figure G.3-134 - 1m Aquifer Concentration for CaseA All Hg 1B_GA

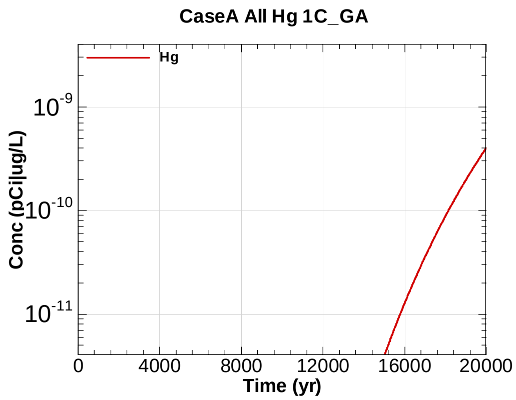

Figure G.3-135 - 1m Aquifer Concentration for CaseA All Hg 1C_GA

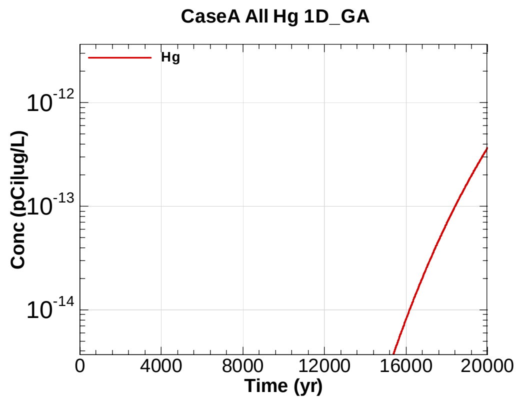

Figure G.3-136 - 1m Aquifer Concentration for CaseA All Hg 1D_GA

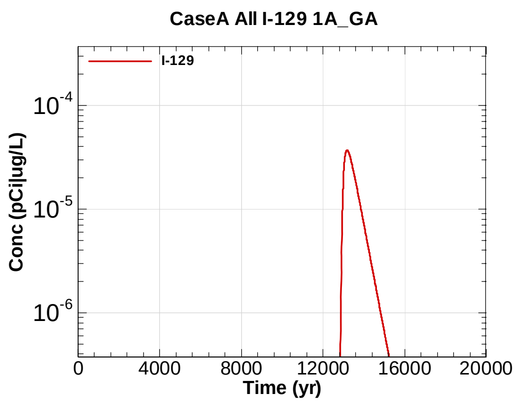

Figure G.3-137 - 1m Aquifer Concentration for CaseA All I-129 1A_GA

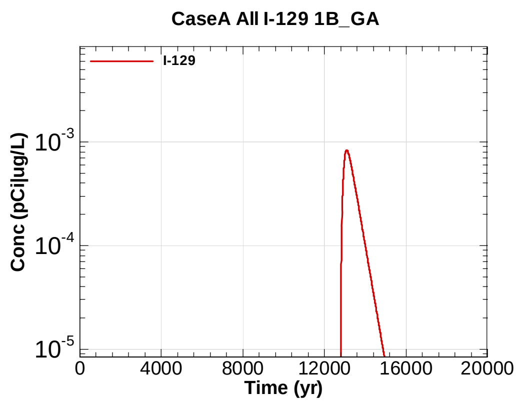

Figure G.3-138 - 1m Aquifer Concentration for CaseA All I-129 1B_GA

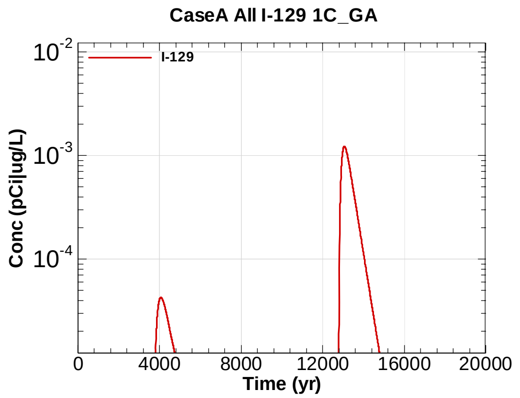

Figure G.3-139 - 1m Aquifer Concentration for CaseA All I-129 1C_GA

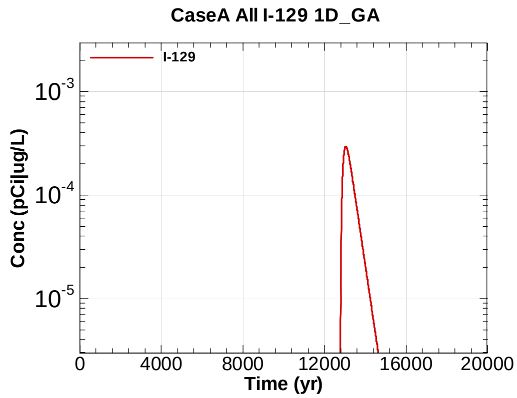

Figure G.3-140 - 1m Aquifer Concentration for CaseA All I-129 1D_GA

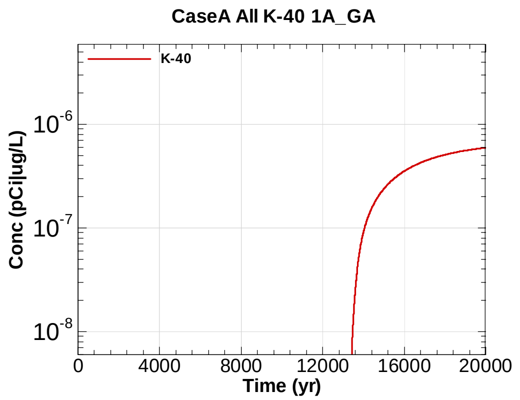

Figure G.3-141 - 1m Aquifer Concentration for CaseA All K-40 1A_GA

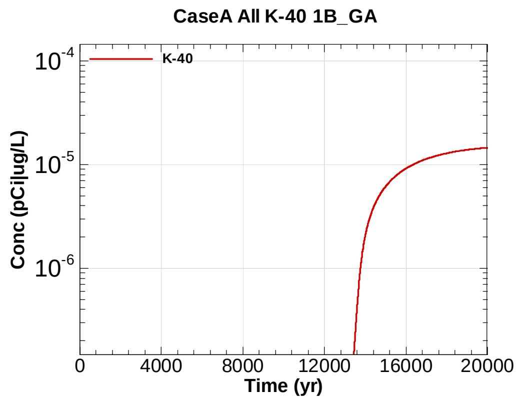

Figure G.3-142 - 1m Aquifer Concentration for CaseA All K-40 1B_GA

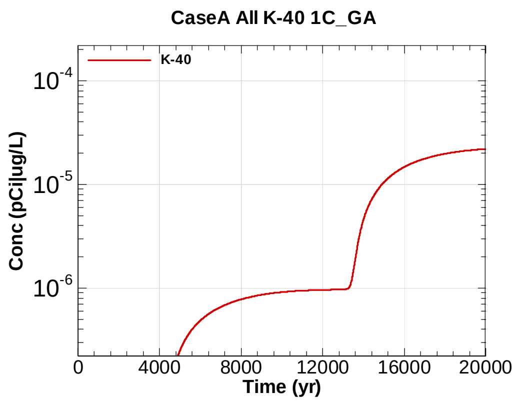

Figure G.3-143 - 1m Aquifer Concentration for CaseA All K-40 1C_GA

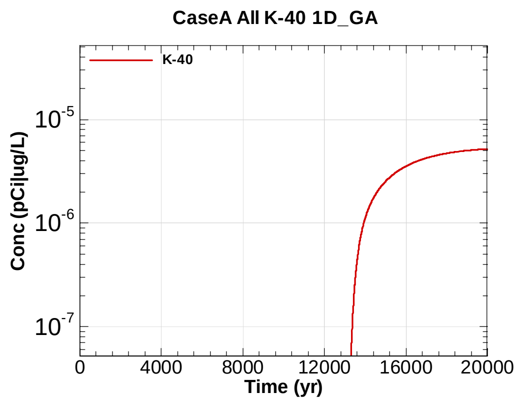

Figure G.3-144 - 1m Aquifer Concentration for CaseA All K-40 1D_GA

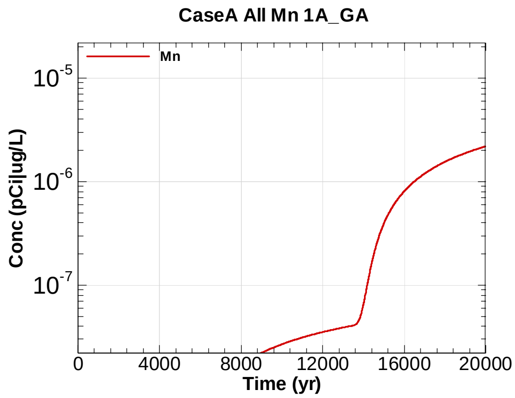

Figure G.3-145 - 1m Aquifer Concentration for CaseA All Mn 1A_GA

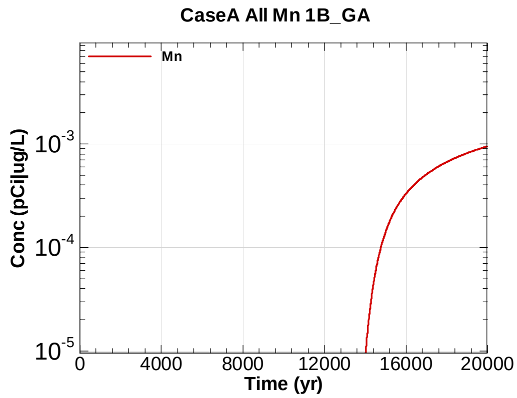

Figure G.3-146 - 1m Aquifer Concentration for CaseA All Mn 1B_GA

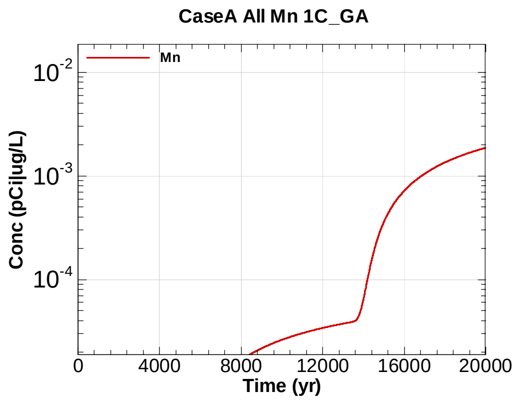

Figure G.3-147 - 1m Aquifer Concentration for CaseA All Mn 1C_GA

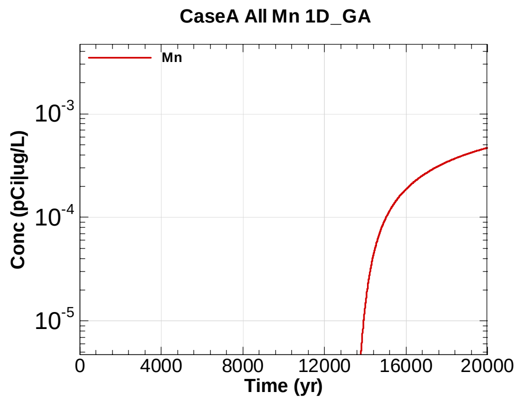

Figure G.3-148 - 1m Aquifer Concentration for CaseA All Mn 1D_GA

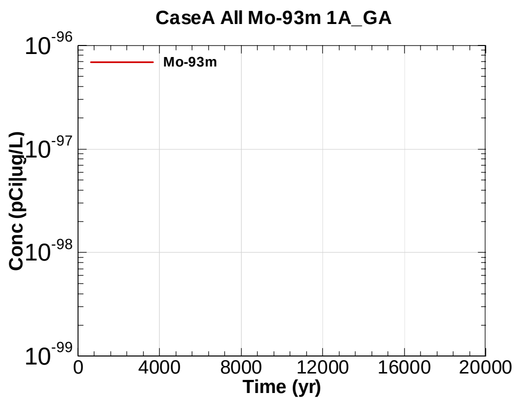

Figure G.3-149 - 1m Aquifer Concentration for CaseA All Mo-93m 1A_GA

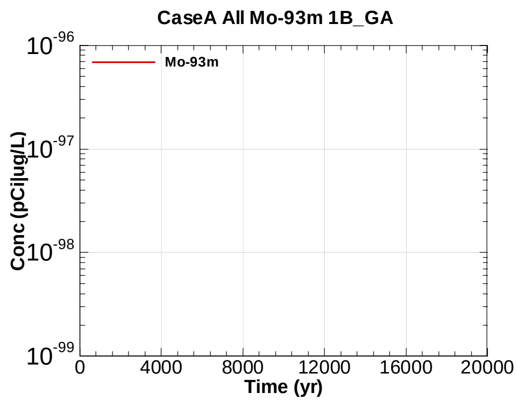

Figure G.3-150 - 1m Aquifer Concentration for CaseA All Mo-93m 1B_GA

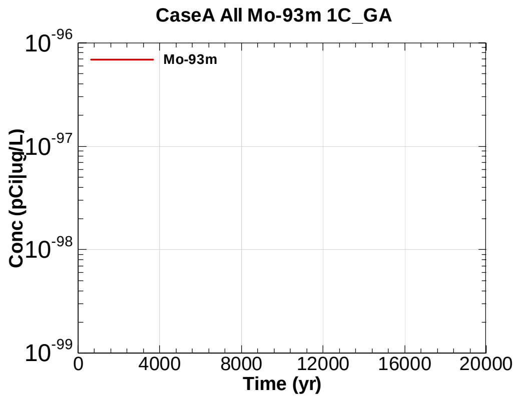

Figure G.3-151 - 1m Aquifer Concentration for CaseA All Mo-93m 1C_GA

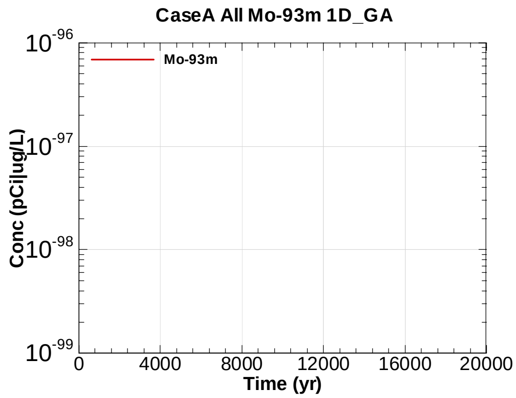

Figure G.3-152 - 1m Aquifer Concentration for CaseA All Mo-93m 1D_GA

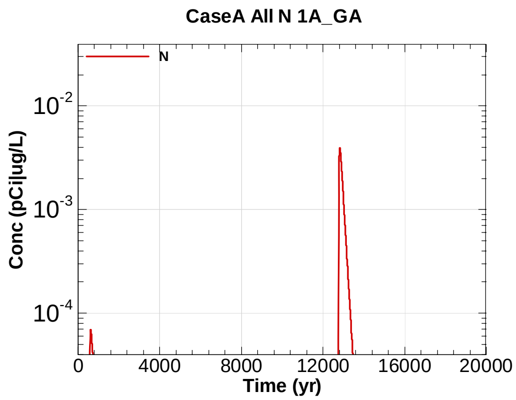

Figure G.3-153 - 1m Aquifer Concentration for CaseA All N 1A_GA

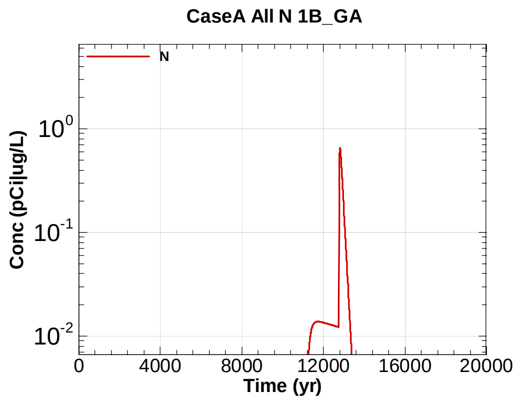

Figure G.3-154 - 1m Aquifer Concentration for CaseA All N 1B_GA

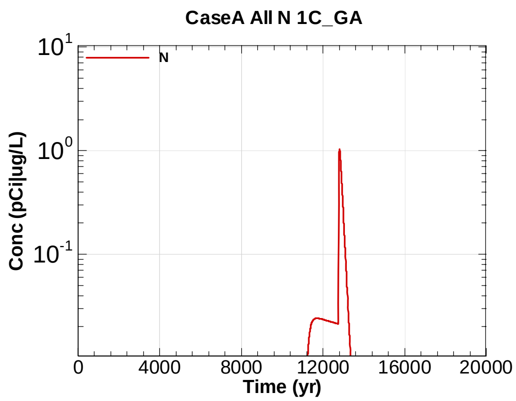

Figure G.3-155 - 1m Aquifer Concentration for CaseA All N 1C_GA

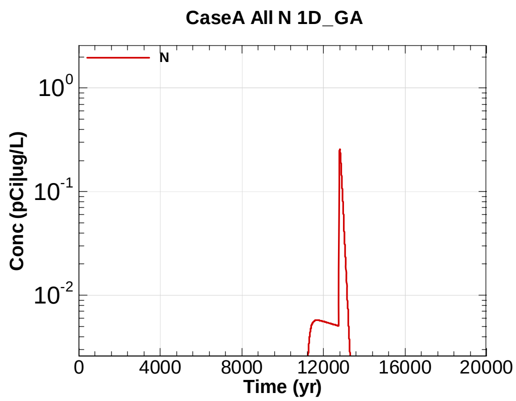

Figure G.3-156 - 1m Aquifer Concentration for CaseA All N 1D_GA

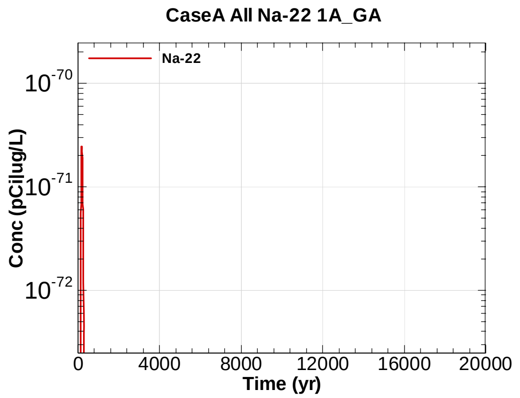

Figure G.3-157 - 1m Aquifer Concentration for CaseA All Na-22 1A_GA

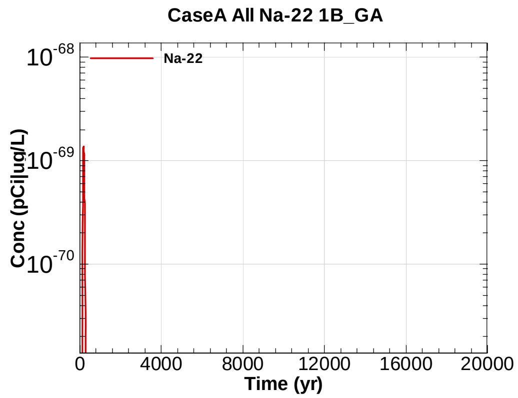

Figure G.3-158 - 1m Aquifer Concentration for CaseA All Na-22 1B_GA

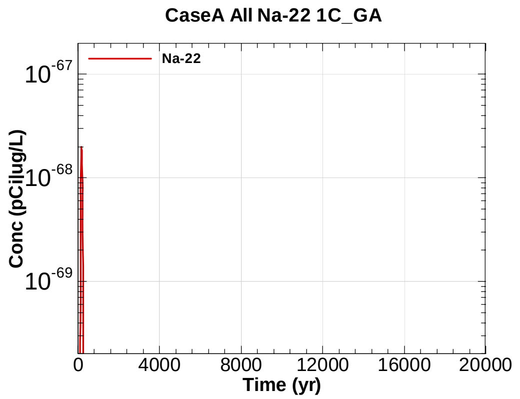

Figure G.3-159 - 1m Aquifer Concentration for CaseA All Na-22 1C_GA

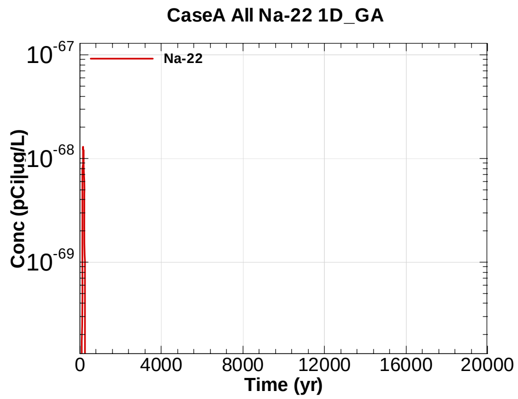

Figure G.3-160 - 1m Aquifer Concentration for CaseA All Na-22 1D_GA

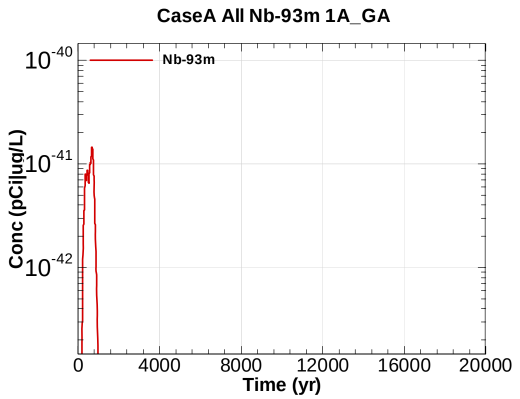

Figure G.3-161 - 1m Aquifer Concentration for CaseA All Nb-93m 1A_GA

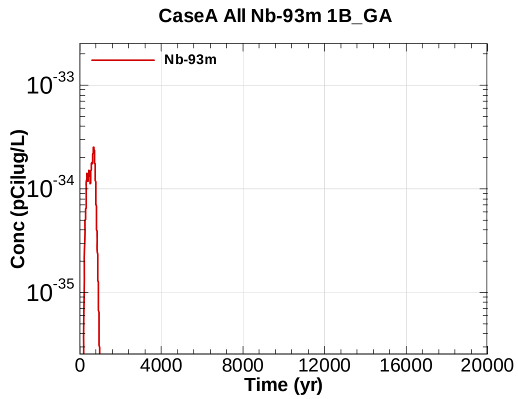

Figure G.3-162 - 1m Aquifer Concentration for CaseA All Nb-93m 1B_GA

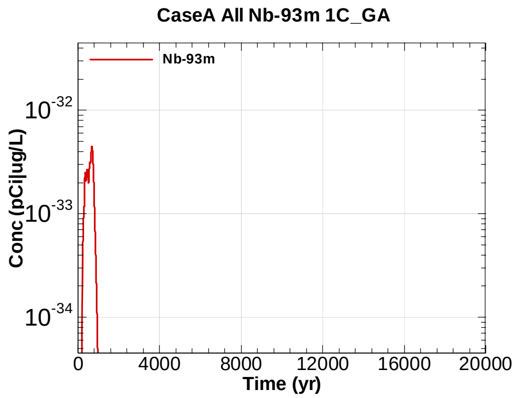

Figure G.3-163 - 1m Aquifer Concentration for CaseA All Nb-93m 1C_GA

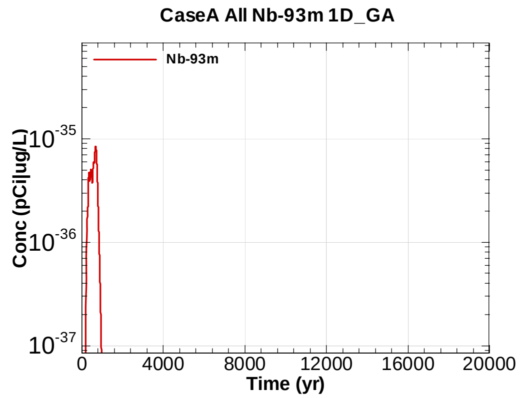

Figure G.3-164 - 1m Aquifer Concentration for CaseA All Nb-93m 1D_GA

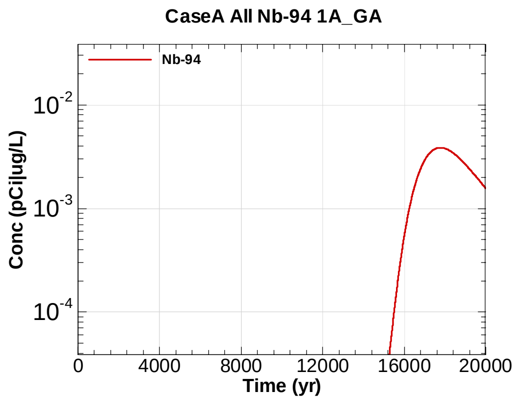

Figure G.3-165 - 1m Aquifer Concentration for CaseA All Nb-94 1A_GA

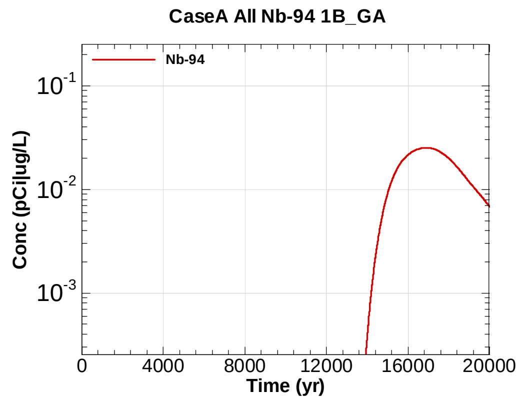

Figure G.3-166 - 1m Aquifer Concentration for CaseA All Nb-94 1B_GA

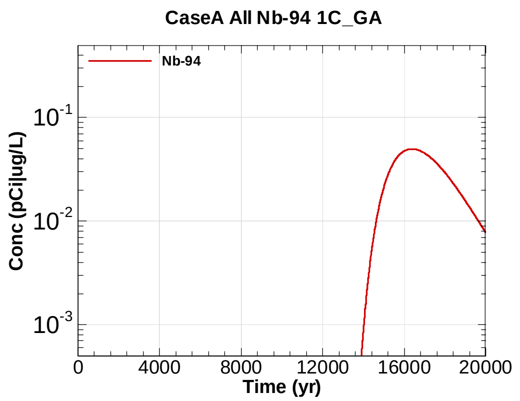

Figure G.3-167 - 1m Aquifer Concentration for CaseA All Nb-94 1C_GA

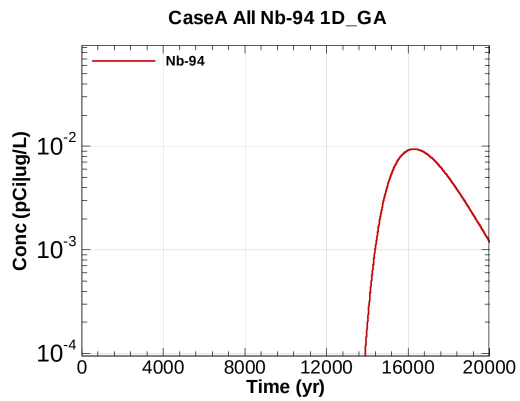

Figure G.3-168 - 1m Aquifer Concentration for CaseA All Nb-94 1D_GA

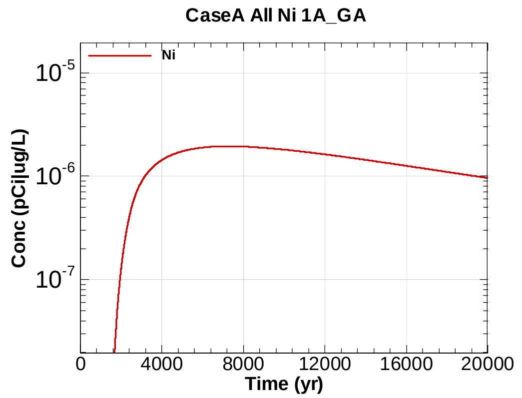

Figure G.3-169 - 1m Aquifer Concentration for CaseA All Ni 1A_GA

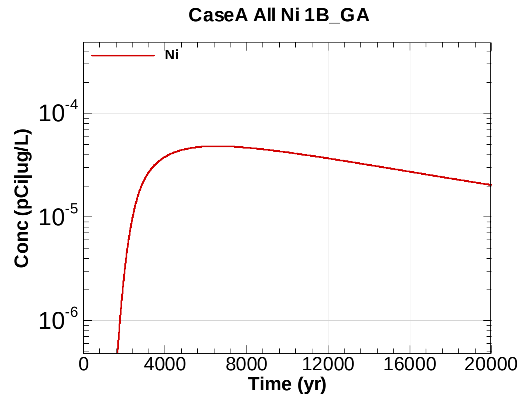

Figure G.3-170 - 1m Aquifer Concentration for CaseA All Ni 1B_GA

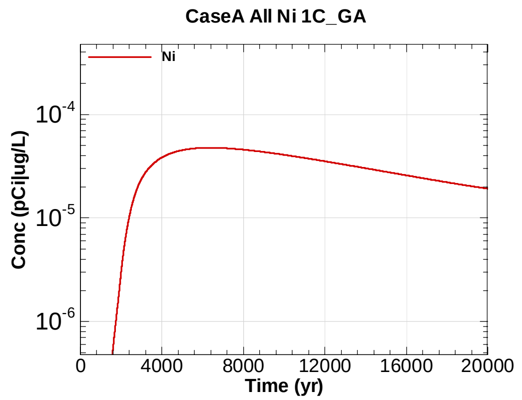

Figure G.3-171 - 1m Aquifer Concentration for CaseA All Ni 1C_GA

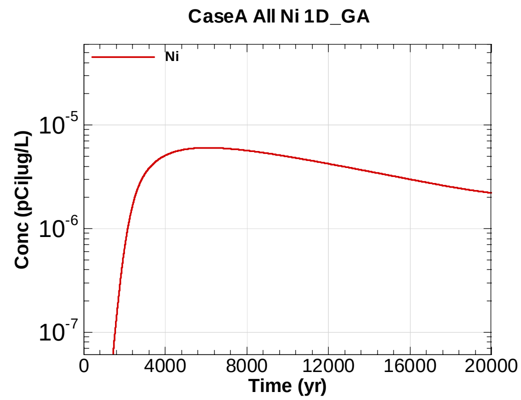

Figure G.3-172 - 1m Aquifer Concentration for CaseA All Ni 1D_GA

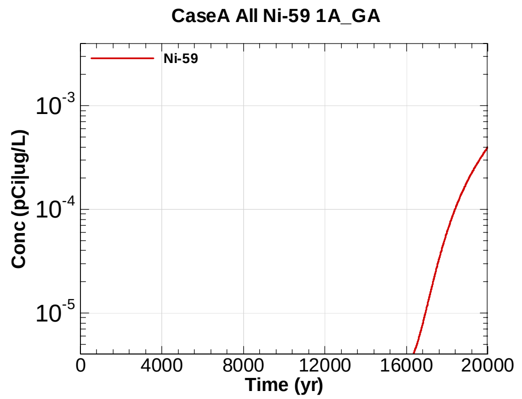

Figure G.3-173 - 1m Aquifer Concentration for CaseA All Ni-59 1A_GA

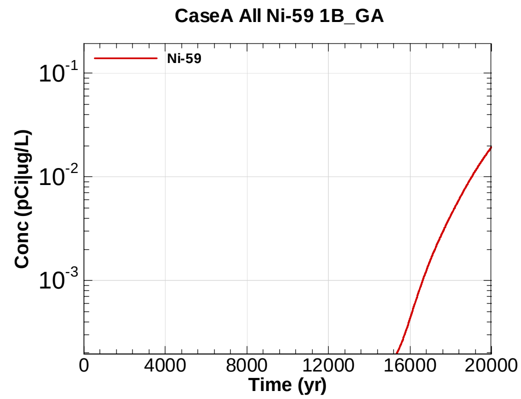

Figure G.3-174 - 1m Aquifer Concentration for CaseA All Ni-59 1B_GA

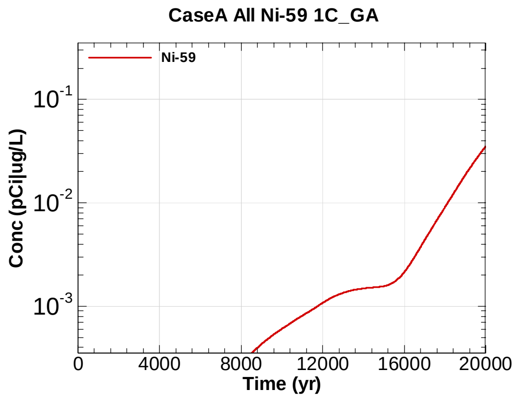

Figure G.3-175 - 1m Aquifer Concentration for CaseA All Ni-59 1C_GA

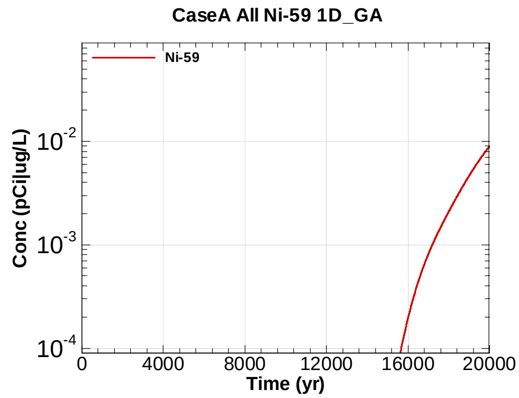

Figure G.3-176 - 1m Aquifer Concentration for CaseA All Ni-59 1D_GA

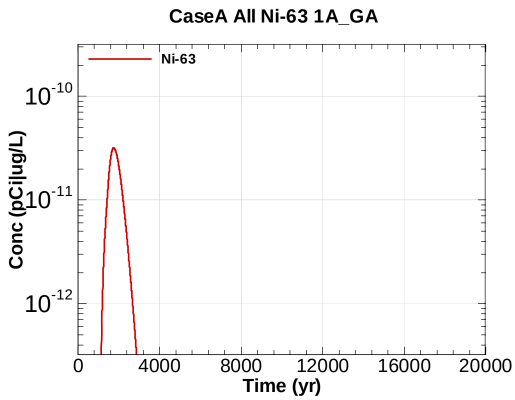

Figure G.3-177 - 1m Aquifer Concentration for CaseA All Ni-63 1A_GA

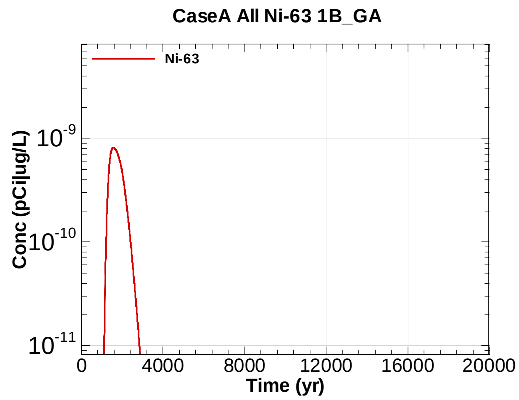

Figure G.3-178 - 1m Aquifer Concentration for CaseA All Ni-63 1B_GA

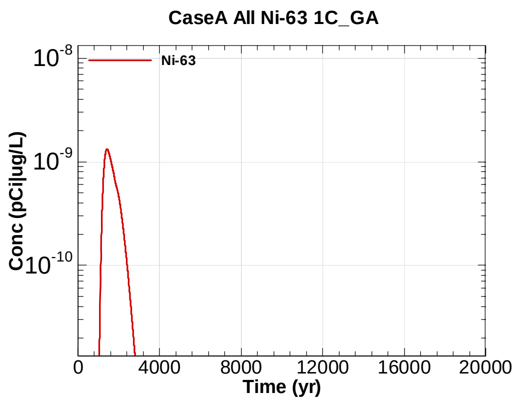

Figure G.3-179 - 1m Aquifer Concentration for CaseA All Ni-63 1C_GA

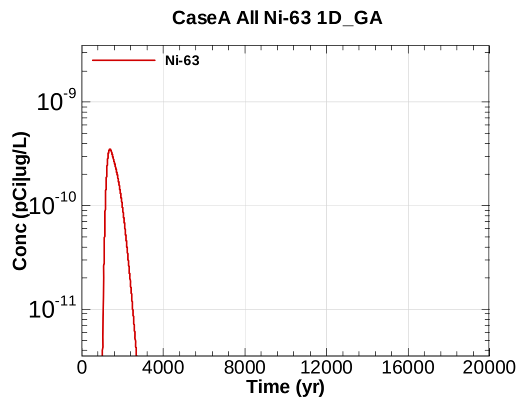

Figure G.3-180 - 1m Aquifer Concentration for CaseA All Ni-63 1D_GA

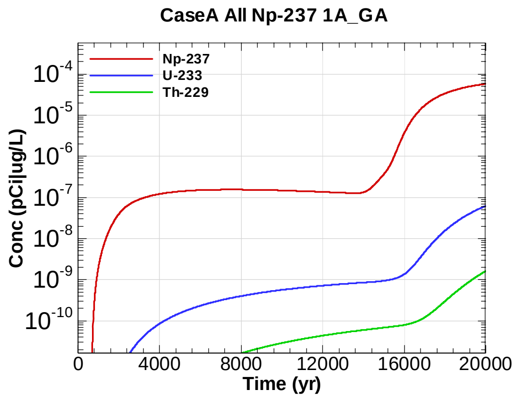

Figure G.3-181 - 1m Aquifer Concentration for CaseA All Np-237 1A_GA

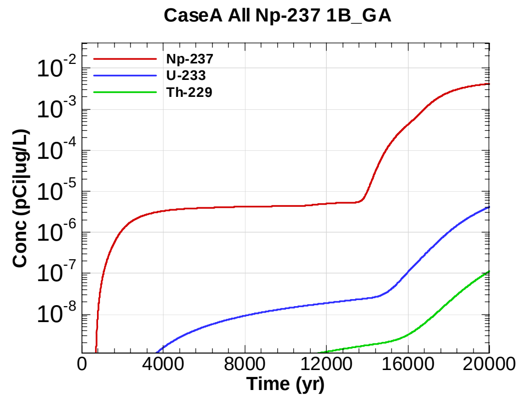

Figure G.3-182 - 1m Aquifer Concentration for CaseA All Np-237 1B_GA

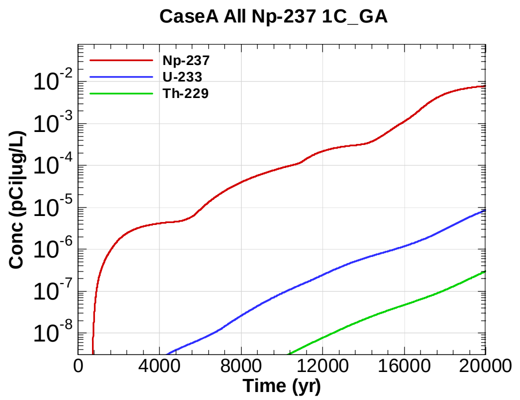

Figure G.3-183 - 1m Aquifer Concentration for CaseA All Np-237 1C_GA

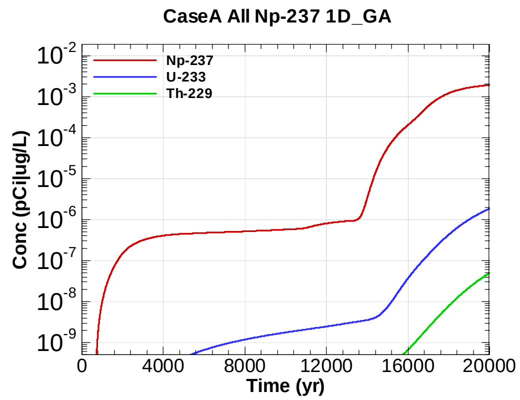

Figure G.3-184 - 1m Aquifer Concentration for CaseA All Np-237 1D_GA

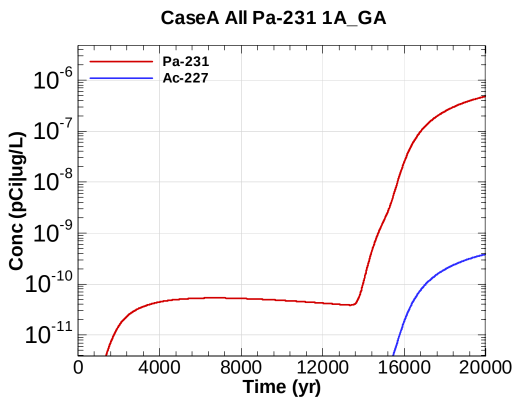

Figure G.3-185 - 1m Aquifer Concentration for CaseA All Pa-231 1A_GA

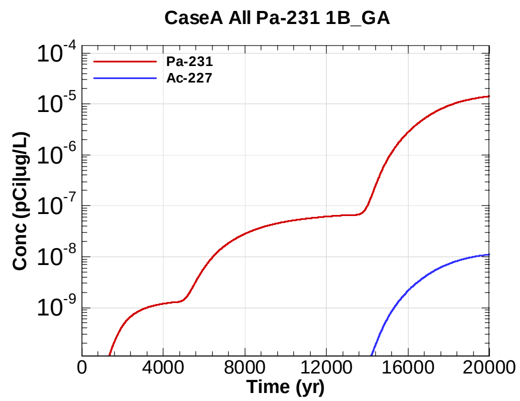

Figure G.3-186 - 1m Aquifer Concentration for CaseA All Pa-231 1B_GA

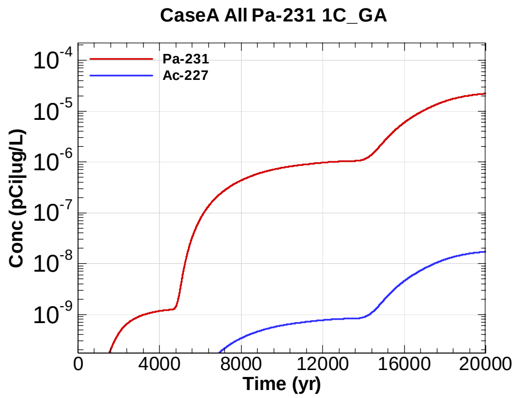

Figure G.3-187 - 1m Aquifer Concentration for CaseA All Pa-231 1C_GA

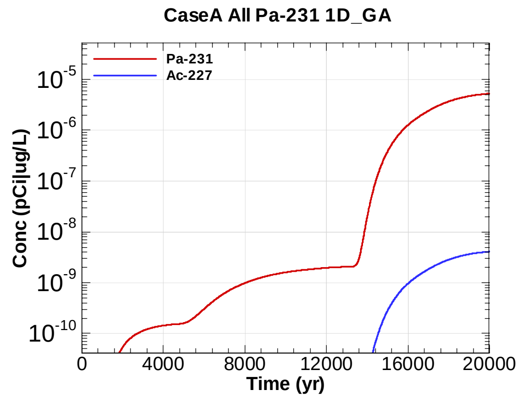

Figure G.3-188 - 1m Aquifer Concentration for CaseA All Pa-231 1D_GA

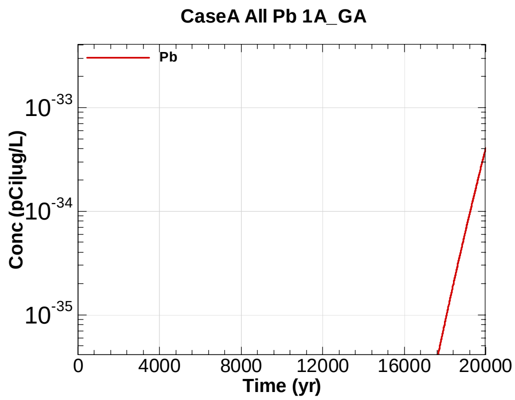

Figure G.3-189 - 1m Aquifer Concentration for CaseA All Pb 1A_GA

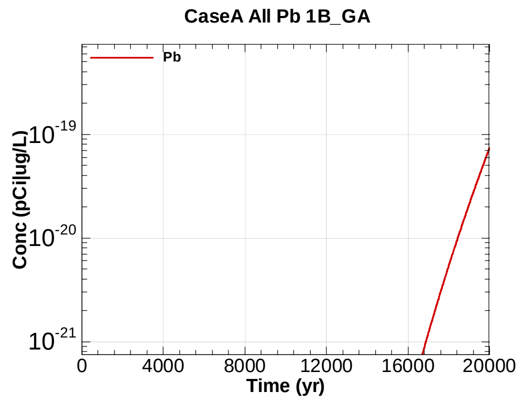

Figure G.3-190 - 1m Aquifer Concentration for CaseA All Pb 1B_GA

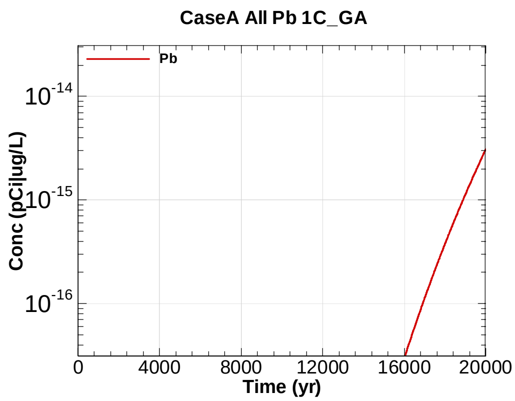

Figure G.3-191 - 1m Aquifer Concentration for CaseA All Pb 1C_GA

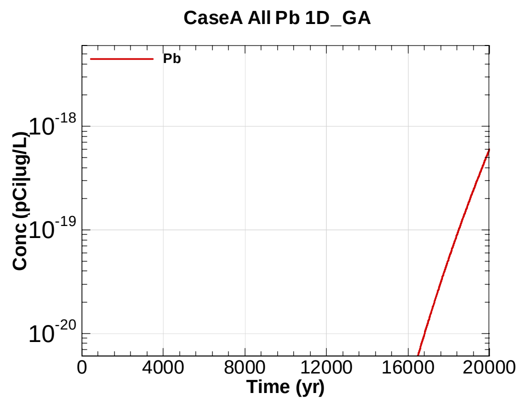

Figure G.3-192 - 1m Aquifer Concentration for CaseA All Pb 1D_GA

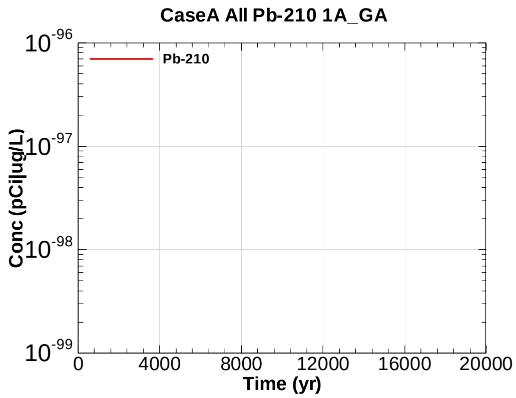

Figure G.3-193 - 1m Aquifer Concentration for CaseA All Pb-210 1A_GA

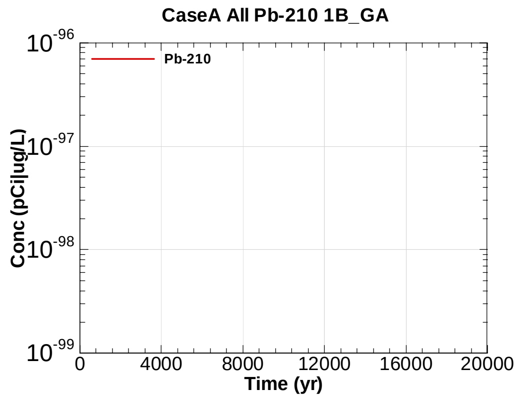

Figure G.3-194 - 1m Aquifer Concentration for CaseA All Pb-210 1B_GA

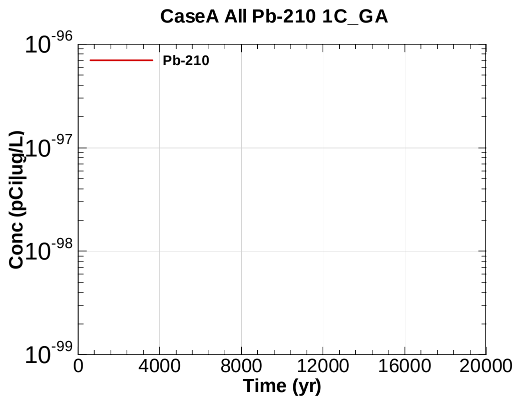

Figure G.3-195 - 1m Aquifer Concentration for CaseA All Pb-210 1C_GA

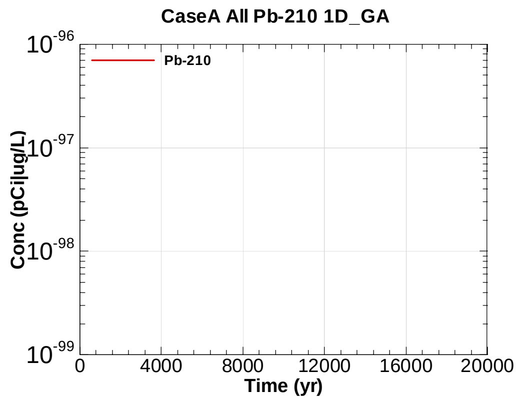

Figure G.3-196 - 1m Aquifer Concentration for CaseA All Pb-210 1D_GA

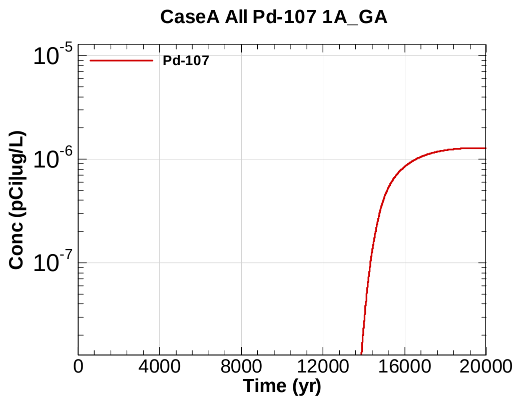

Figure G.3-197 - 1m Aquifer Concentration for CaseA All Pd-107 1A_GA

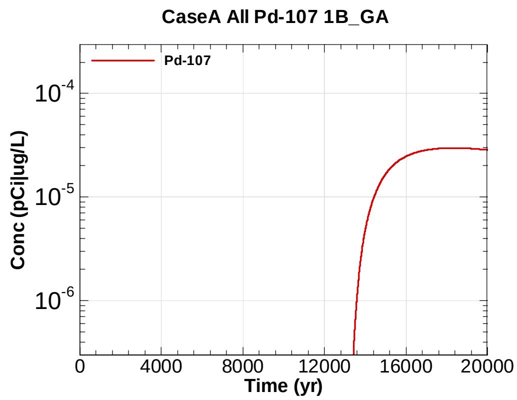

Figure G.3-198 - 1m Aquifer Concentration for CaseA All Pd-107 1B_GA

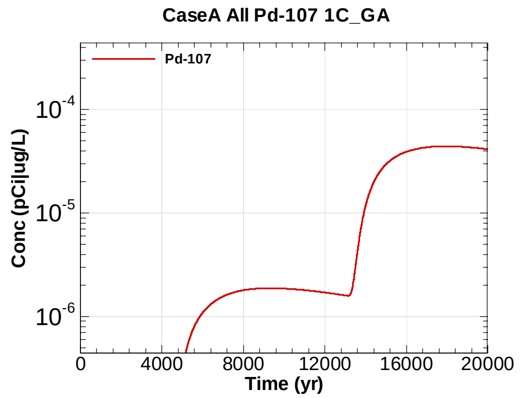

Figure G.3-199 - 1m Aquifer Concentration for CaseA All Pd-107 1C_GA

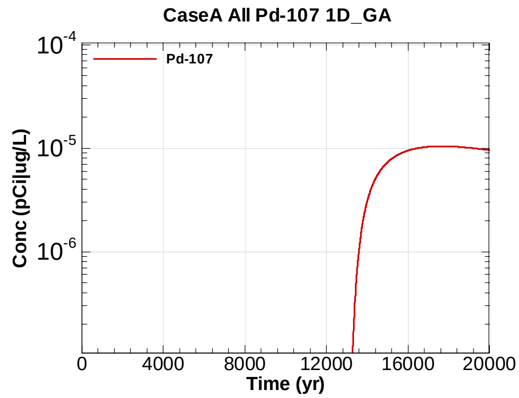

Figure G.3-200 - 1m Aquifer Concentration for CaseA All Pd-107 1D_GA

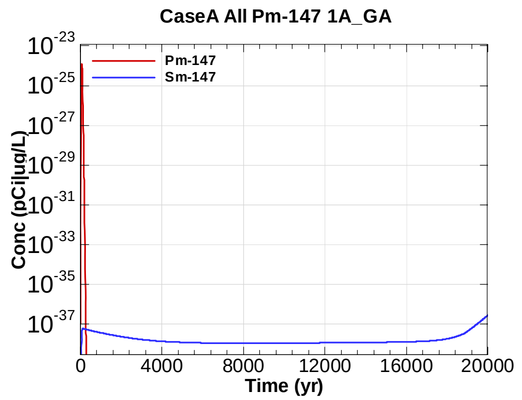

Figure G.3-201 - 1m Aquifer Concentration for CaseA All Pm-147 1A_GA

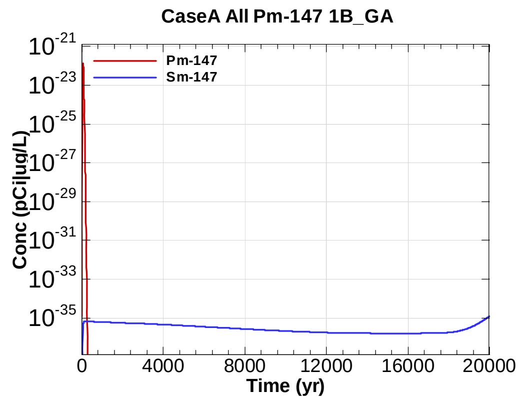

Figure G.3-202 - 1m Aquifer Concentration for CaseA All Pm-147 1B_GA

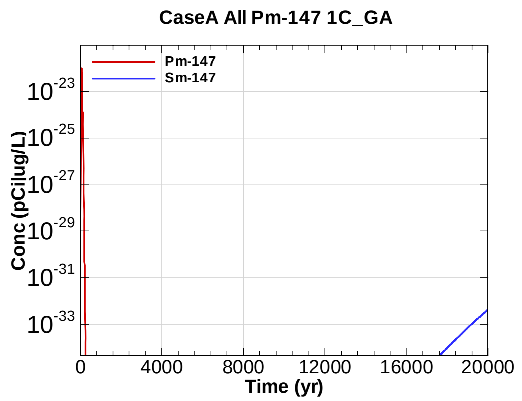

Figure G.3-203 - 1m Aquifer Concentration for CaseA All Pm-147 1C_GA

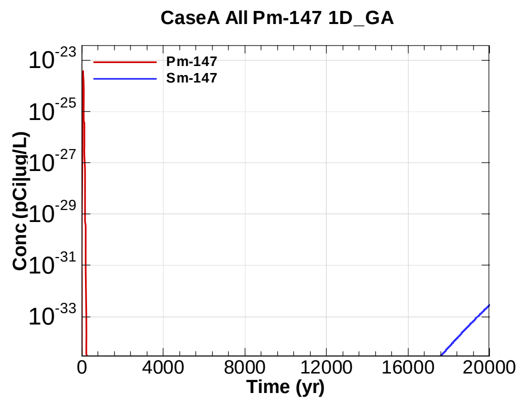

Figure G.3-204 - 1m Aquifer Concentration for CaseA All Pm-147 1D_GA

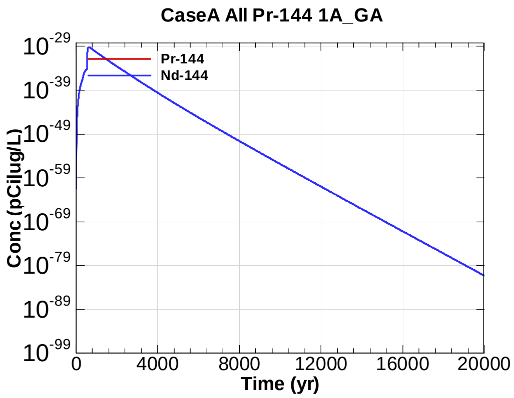

Figure G.3-205 - 1m Aquifer Concentration for CaseA All Pr-144 1A_GA

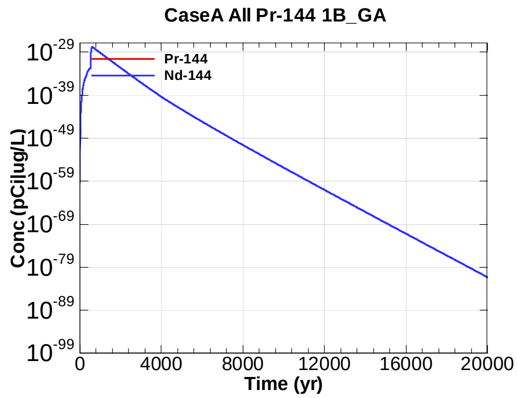

Figure G.3-206 - 1m Aquifer Concentration for CaseA All Pr-144 1B_GA

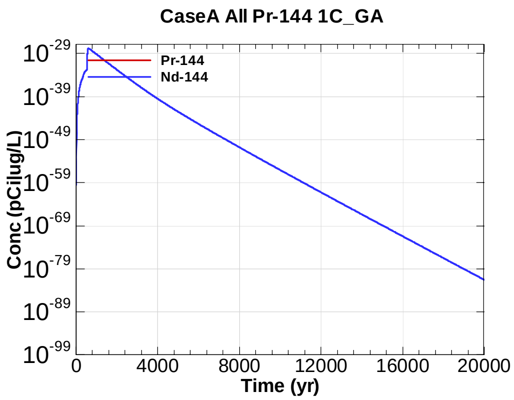

Figure G.3-207 - 1m Aquifer Concentration for CaseA All Pr-144 1C_GA

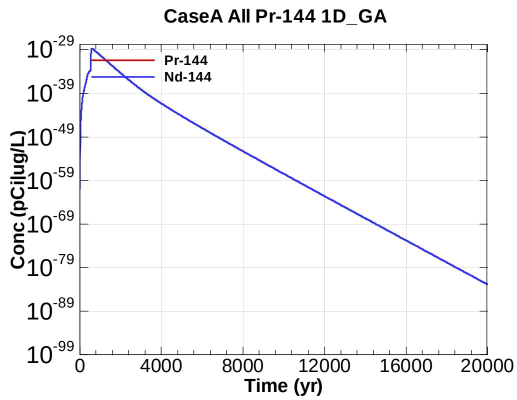

Figure G.3-208 - 1m Aquifer Concentration for CaseA All Pr-144 1D_GA

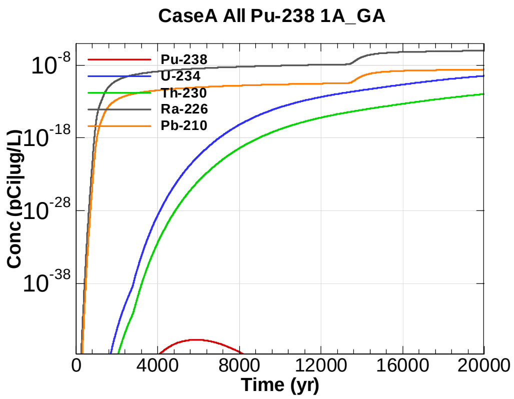

Figure G.3-209 - 1m Aquifer Concentration for CaseA All Pu-238 1A_GA

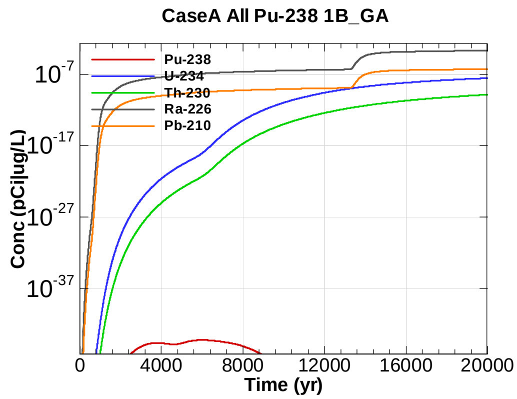

Figure G.3-210 - 1m Aquifer Concentration for CaseA All Pu-238 1B_GA

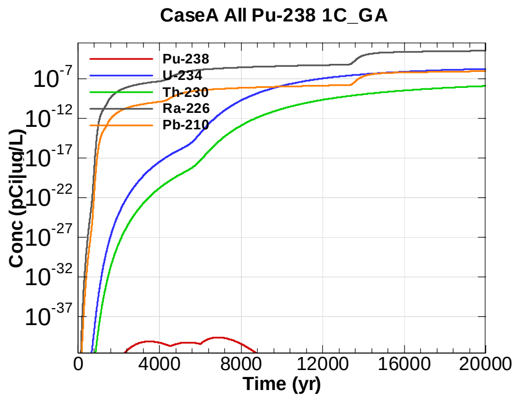

Figure G.3-211 - 1m Aquifer Concentration for CaseA All Pu-238 1C_GA

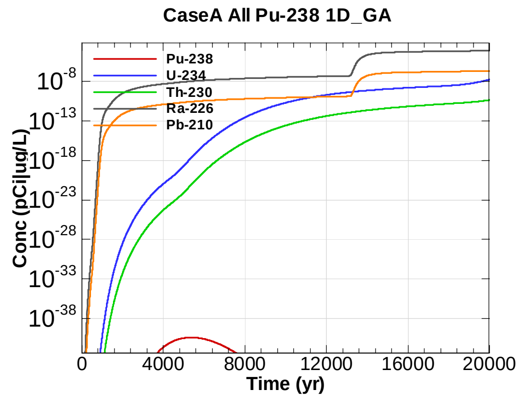

Figure G.3-212 - 1m Aquifer Concentration for CaseA All Pu-238 1D_GA

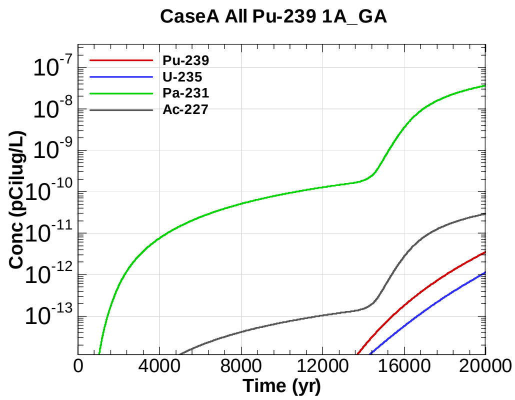

Figure G.3-213 - 1m Aquifer Concentration for CaseA All Pu-239 1A_GA

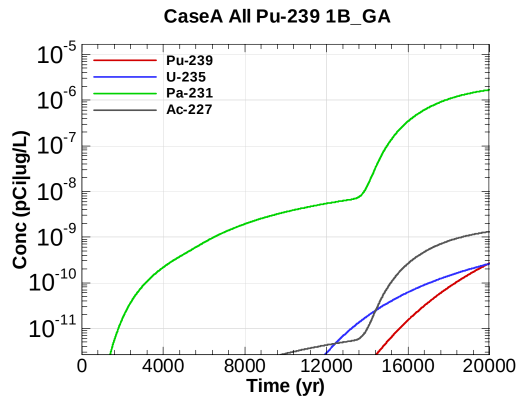

Figure G.3-214 - 1m Aquifer Concentration for CaseA All Pu-239 1B_GA

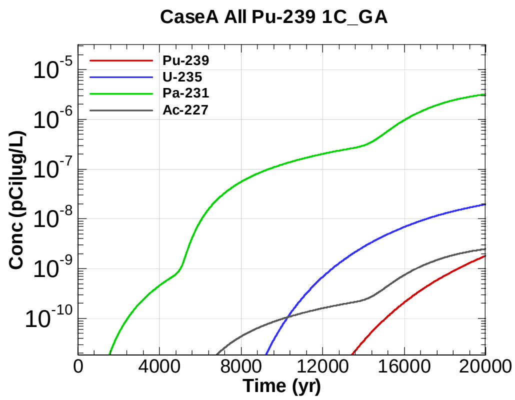

Figure G.3-215 - 1m Aquifer Concentration for CaseA All Pu-239 1C_GA

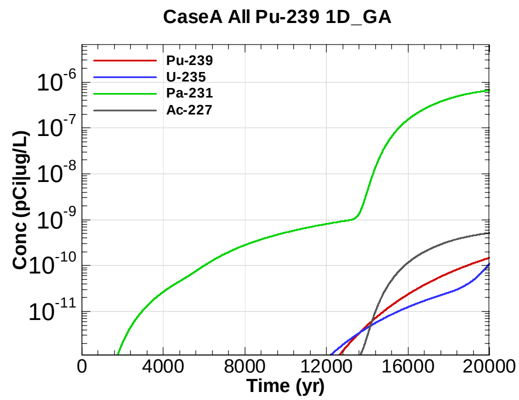

Figure G.3-216 - 1m Aquifer Concentration for CaseA All Pu-239 1D_GA

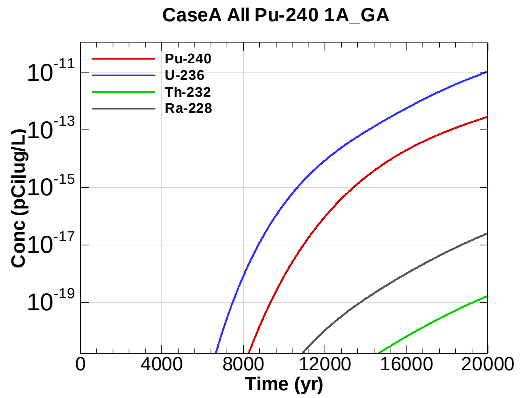

Figure G.3-217 - 1m Aquifer Concentration for CaseA All Pu-240 1A_GA

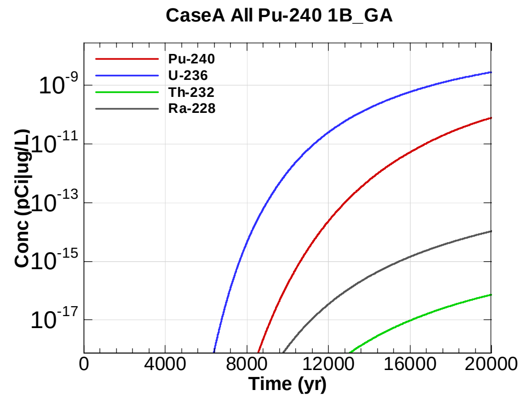

Figure G.3-218 - 1m Aquifer Concentration for CaseA All Pu-240 1B_GA

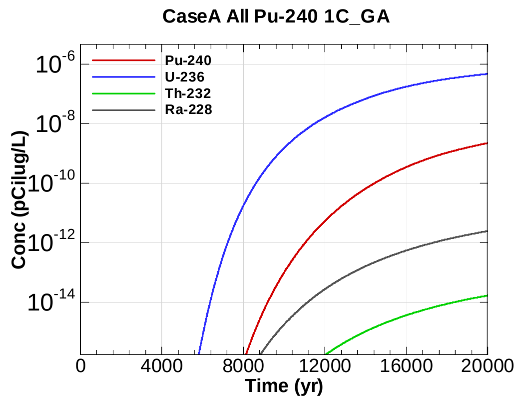

Figure G.3-219 - 1m Aquifer Concentration for CaseA All Pu-240 1C_GA

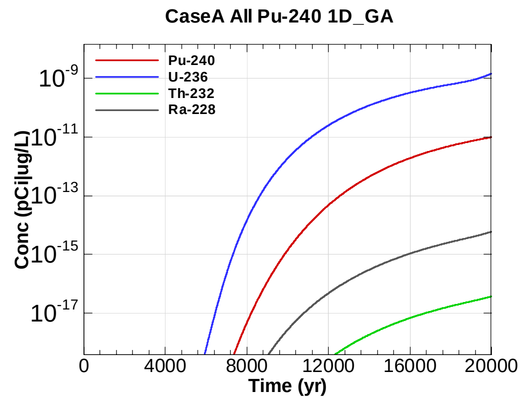

Figure G.3-220 - 1m Aquifer Concentration for CaseA All Pu-240 1D_GA

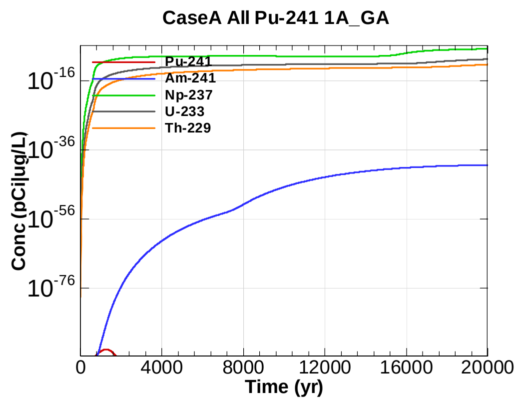

Figure G.3-221 - 1m Aquifer Concentration for CaseA All Pu-241 1A_GA

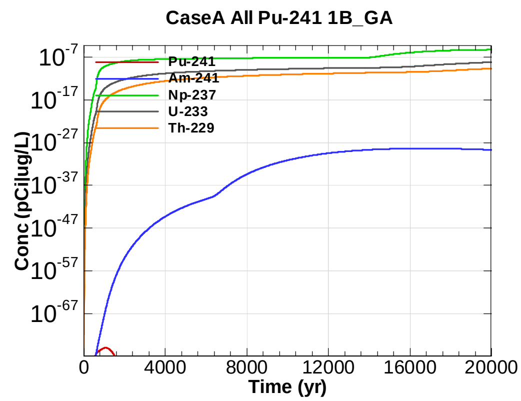

Figure G.3-222 - 1m Aquifer Concentration for CaseA All Pu-241 1B_GA

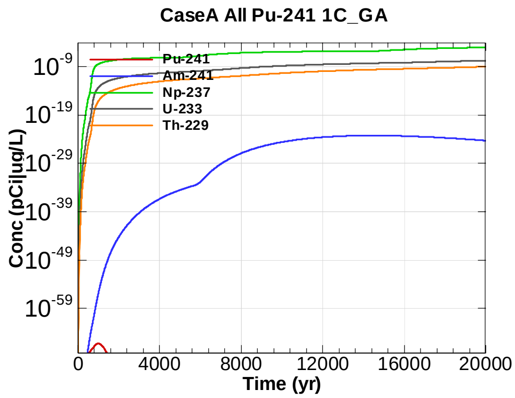

Figure G.3-223 - 1m Aquifer Concentration for CaseA All Pu-241 1C_GA

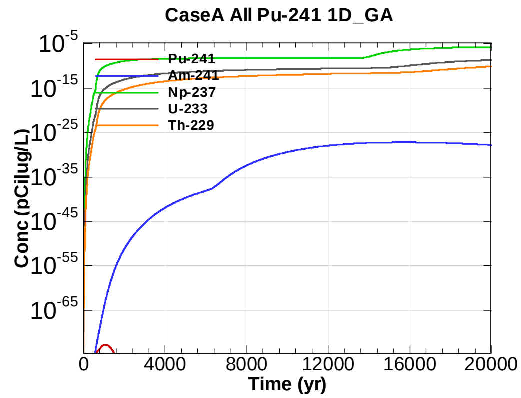

Figure G.3-224 - 1m Aquifer Concentration for CaseA All Pu-241 1D_GA

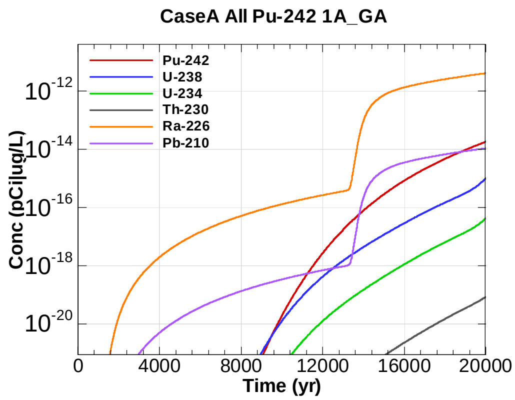

Figure G.3-225 - 1m Aquifer Concentration for CaseA All Pu-242 1A_GA

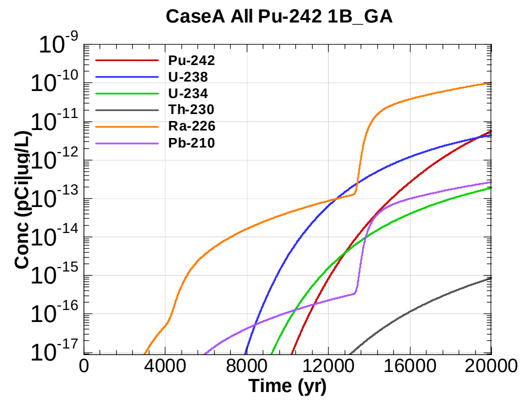

Figure G.3-226 - 1m Aquifer Concentration for CaseA All Pu-242 1B_GA

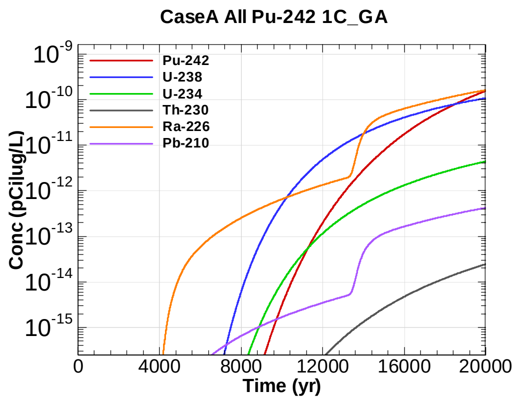

Figure G.3-227 - 1m Aquifer Concentration for CaseA All Pu-242 1C_GA

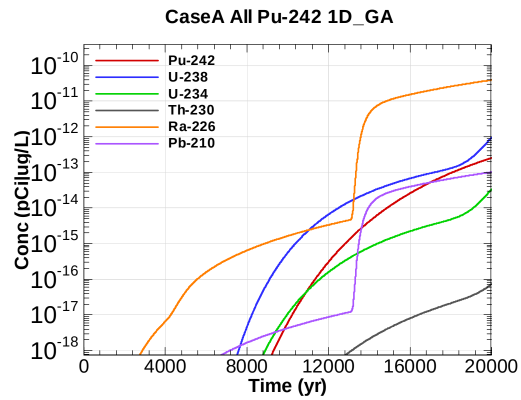

Figure G.3-228 - 1m Aquifer Concentration for CaseA All Pu-242 1D_GA

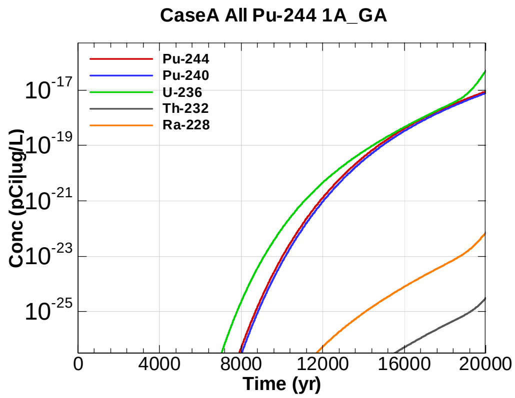

Figure G.3-229 - 1m Aquifer Concentration for CaseA All Pu-244 1A_GA

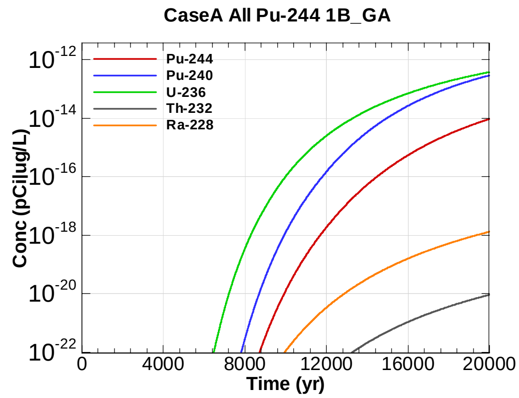

Figure G.3-230 - 1m Aquifer Concentration for CaseA All Pu-244 1B_GA

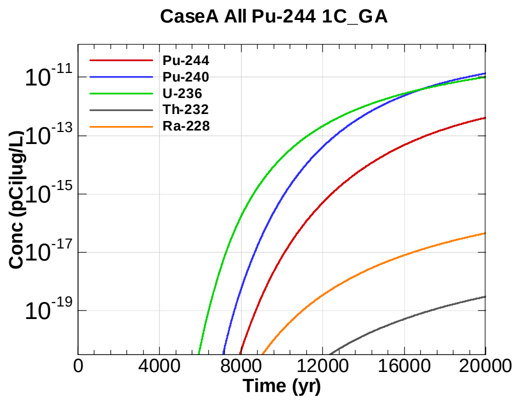

Figure G.3-231 - 1m Aquifer Concentration for CaseA All Pu-244 1C_GA

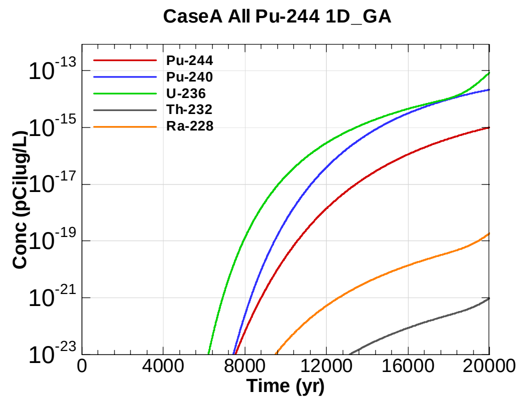

Figure G.3-232 - 1m Aquifer Concentration for CaseA All Pu-244 1D_GA

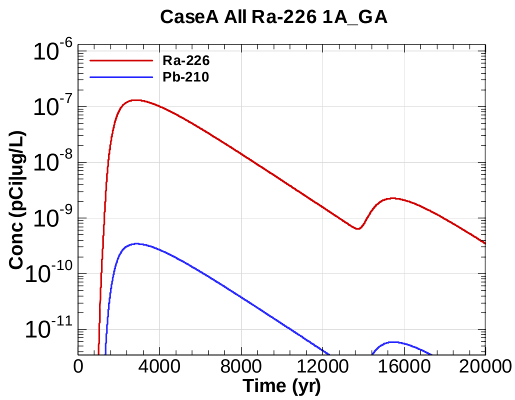

Figure G.3-233 - 1m Aquifer Concentration for CaseA All Ra-226 1A_GA

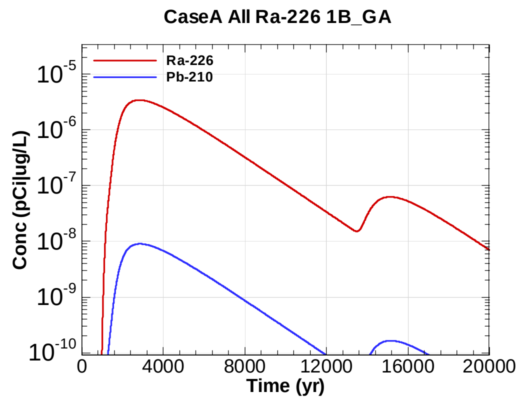

Figure G.3-234 - 1m Aquifer Concentration for CaseA All Ra-226 1B_GA

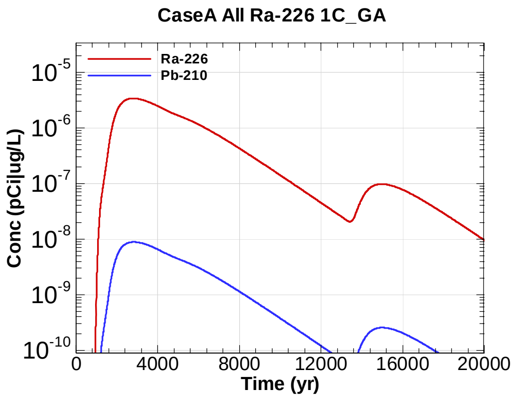

Figure G.3-235 - 1m Aquifer Concentration for CaseA All Ra-226 1C_GA

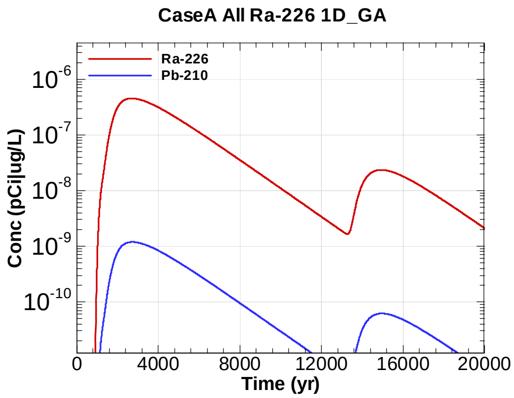

Figure G.3-236 - 1m Aquifer Concentration for CaseA All Ra-226 1D_GA

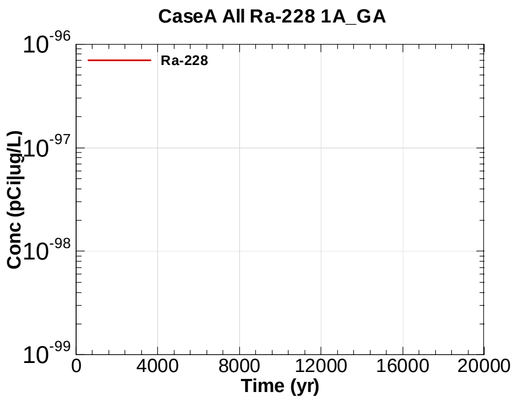

Figure G.3-237 - 1m Aquifer Concentration for CaseA All Ra-228 1A_GA

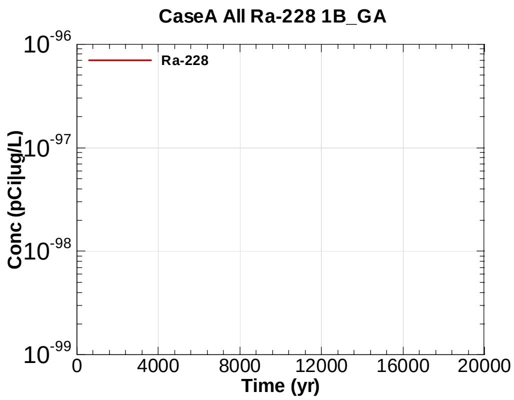

Figure G.3-238 - 1m Aquifer Concentration for CaseA All Ra-228 1B_GA

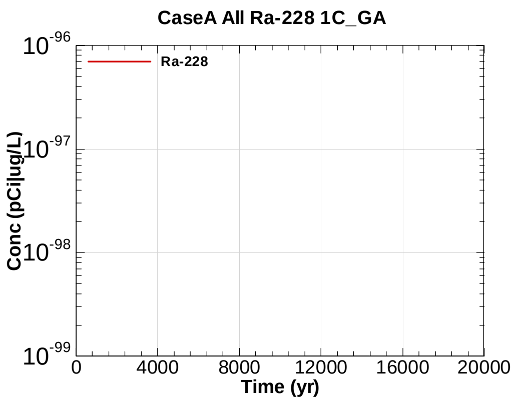

Figure G.3-239 - 1m Aquifer Concentration for CaseA All Ra-228 1C_GA

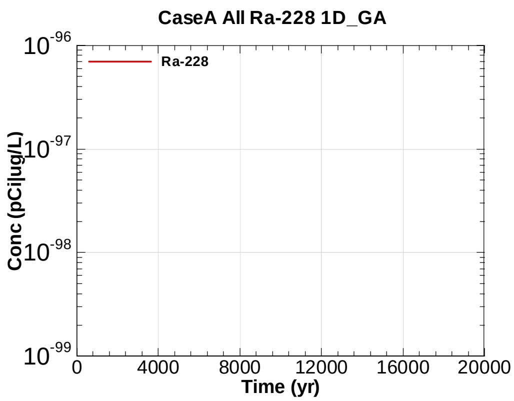

Figure G.3-240 - 1m Aquifer Concentration for CaseA All Ra-228 1D_GA

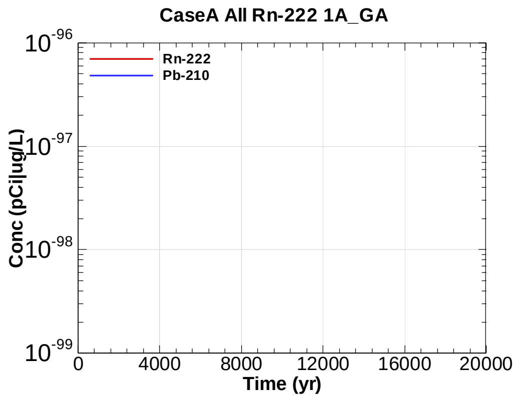

Figure G.3-241 - 1m Aquifer Concentration for CaseA All Rn-222 1A_GA

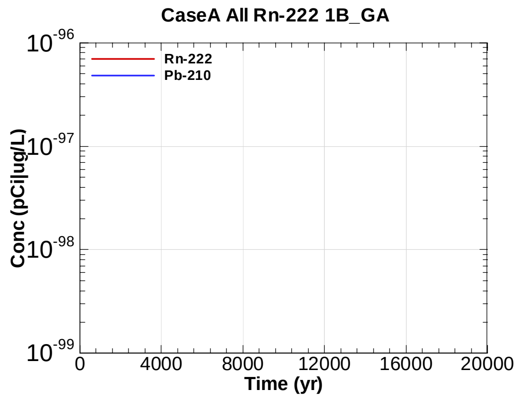

Figure G.3-242 - 1m Aquifer Concentration for CaseA All Rn-222 1B_GA

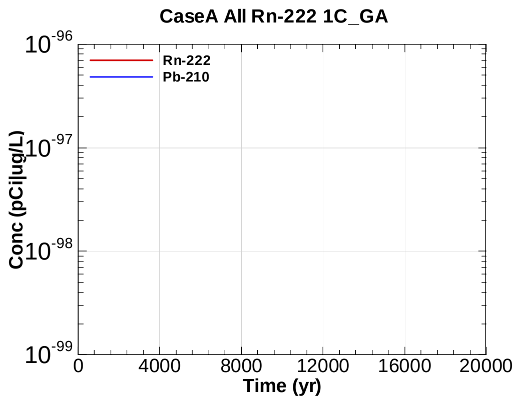

Figure G.3-243 - 1m Aquifer Concentration for CaseA All Rn-222 1C_GA

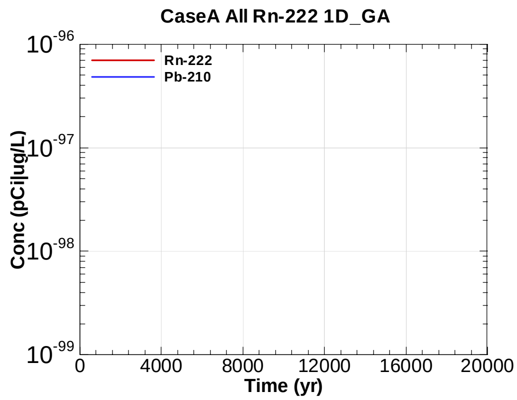

Figure G.3-244 - 1m Aquifer Concentration for CaseA All Rn-222 1D_GA

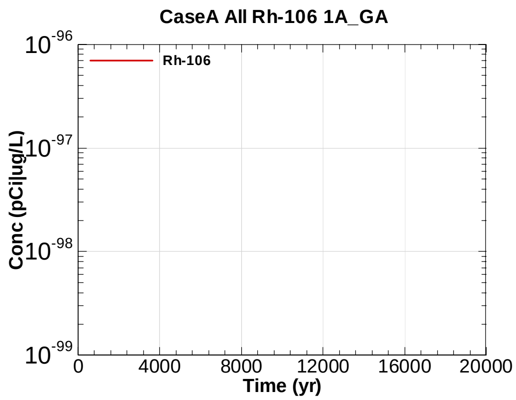

Figure G.3-245 - 1m Aquifer Concentration for CaseA All Rh-106 1A_GA

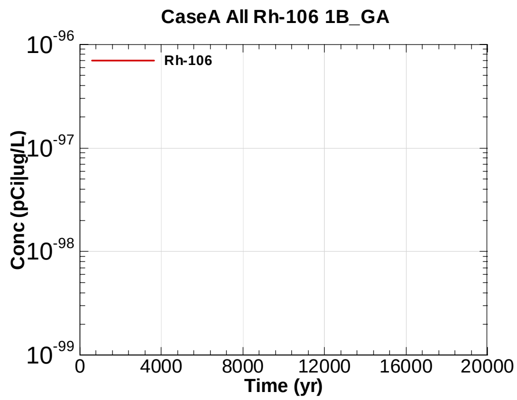

Figure G.3-246 - 1m Aquifer Concentration for CaseA All Rh-106 1B_GA

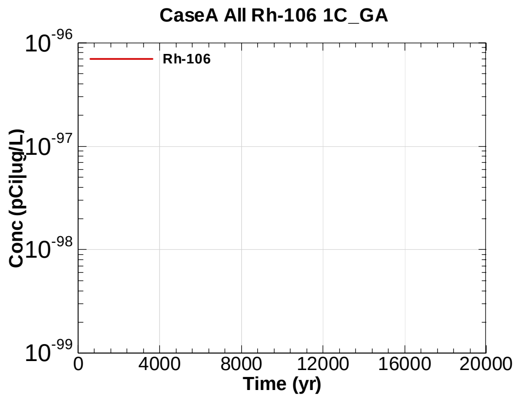

Figure G.3-247 - 1m Aquifer Concentration for CaseA All Rh-106 1C_GA

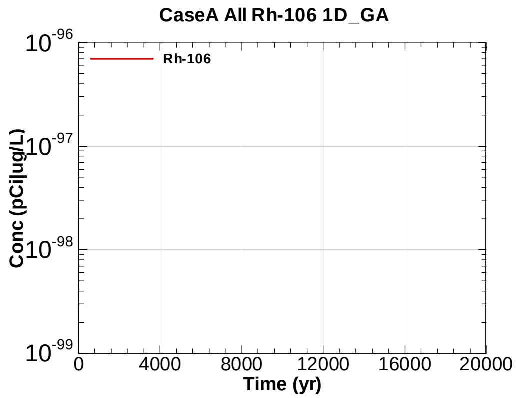

Figure G.3-248 - 1m Aquifer Concentration for CaseA All Rh-106 1D_GA

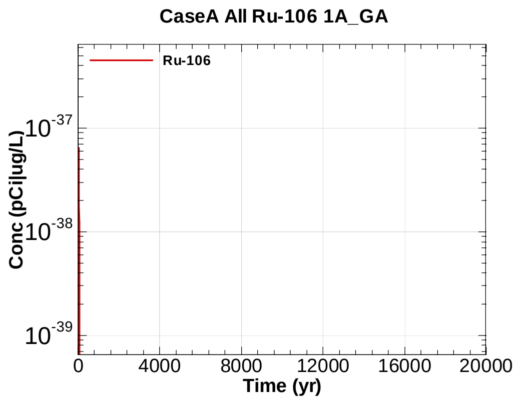

Figure G.3-249 - 1m Aquifer Concentration for CaseA All Ru-106 1A_GA

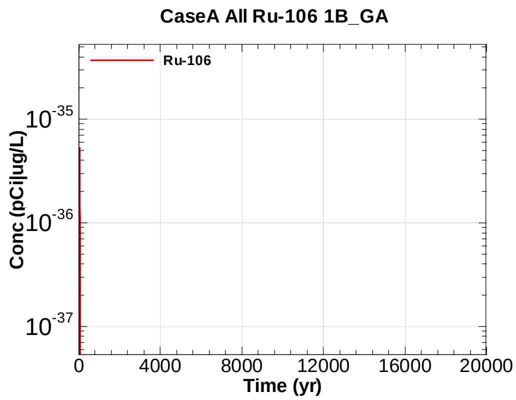

Figure G.3-250 - 1m Aquifer Concentration for CaseA All Ru-106 1B_GA

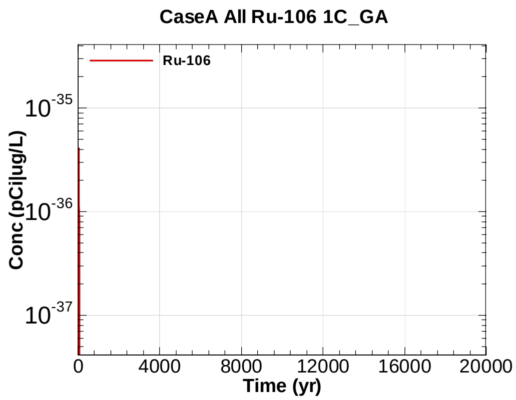

Figure G.3-251 - 1m Aquifer Concentration for CaseA All Ru-106 1C_GA

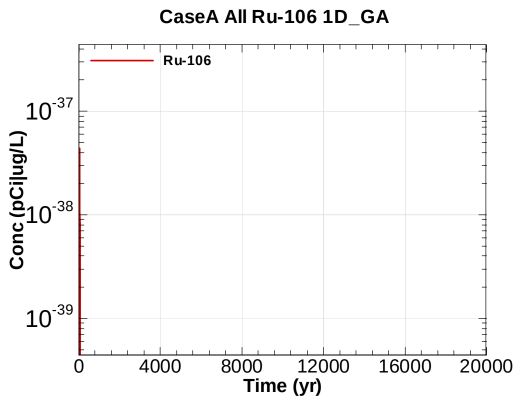

Figure G.3-252 - 1m Aquifer Concentration for CaseA All Ru-106 1D_GA

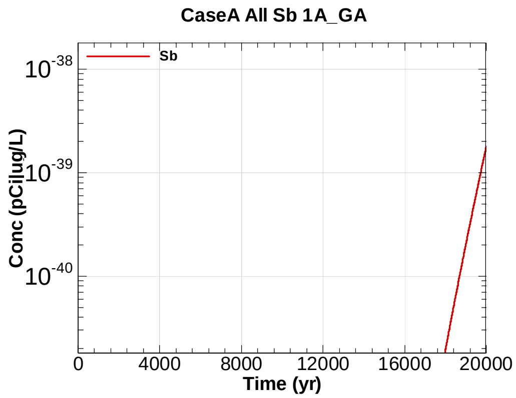

Figure G.3-253 - 1m Aquifer Concentration for CaseA All Sb 1A_GA

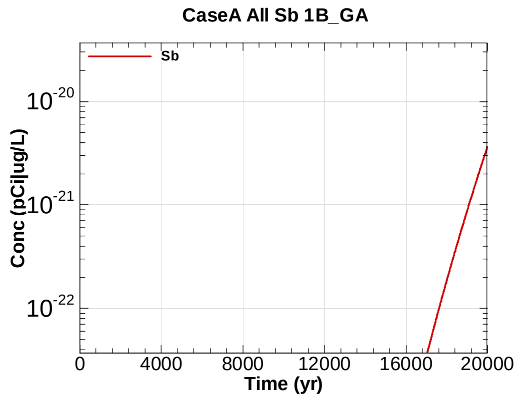

Figure G.3-254 - 1m Aquifer Concentration for CaseA All Sb 1B_GA

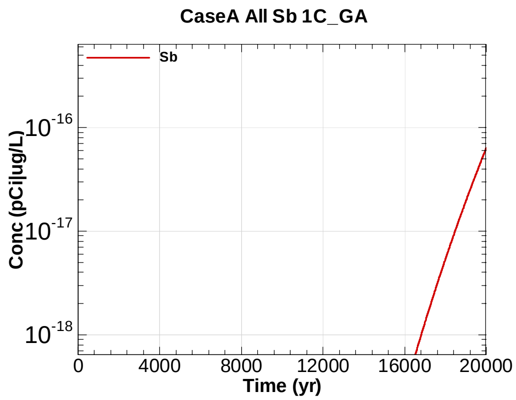

Figure G.3-255 - 1m Aquifer Concentration for CaseA All Sb 1C_GA

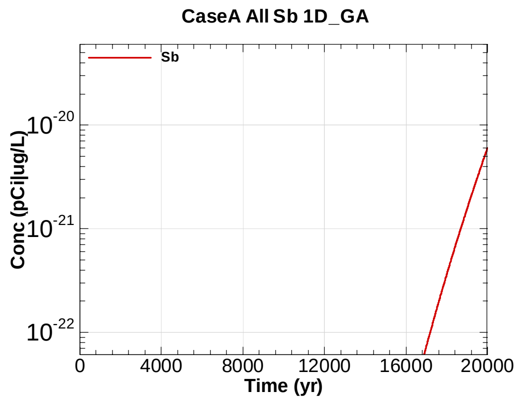

Figure G.3-256 - 1m Aquifer Concentration for CaseA All Sb 1D_GA

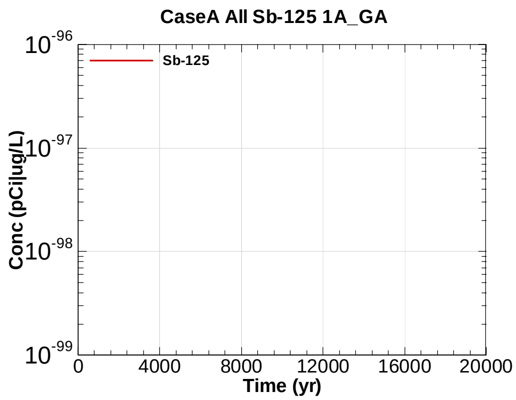

Figure G.3-257 - 1m Aquifer Concentration for CaseA All Sb-125 1A_GA

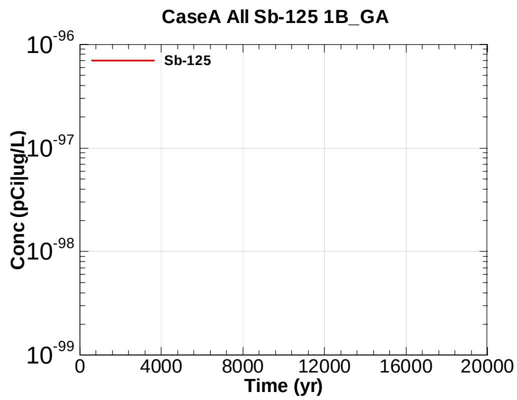

Figure G.3-258 - 1m Aquifer Concentration for CaseA All Sb-125 1B_GA

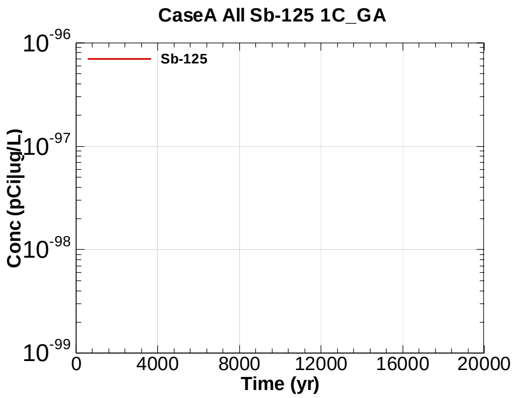

Figure G.3-259 - 1m Aquifer Concentration for CaseA All Sb-125 1C_GA

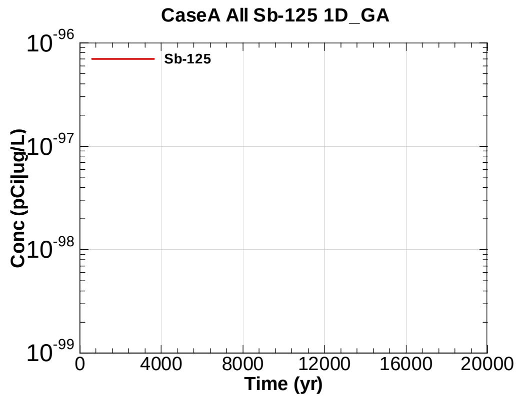

Figure G.3-260 - 1m Aquifer Concentration for CaseA All Sb-125 1D_GA

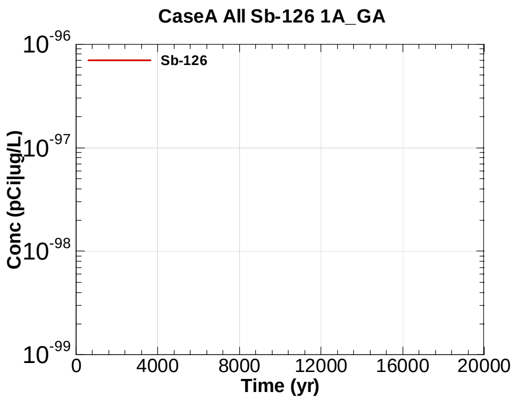

Figure G.3-261 - 1m Aquifer Concentration for CaseA All Sb-126 1A_GA

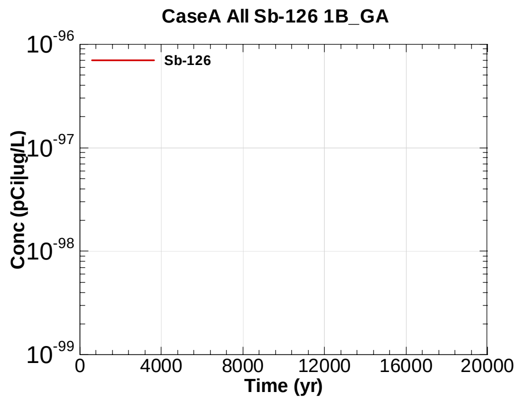

Figure G.3-262 - 1m Aquifer Concentration for CaseA All Sb-126 1B_GA

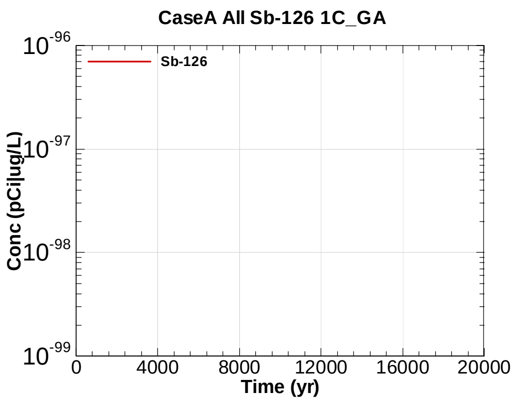

Figure G.3-263 - 1m Aquifer Concentration for CaseA All Sb-126 1C_GA

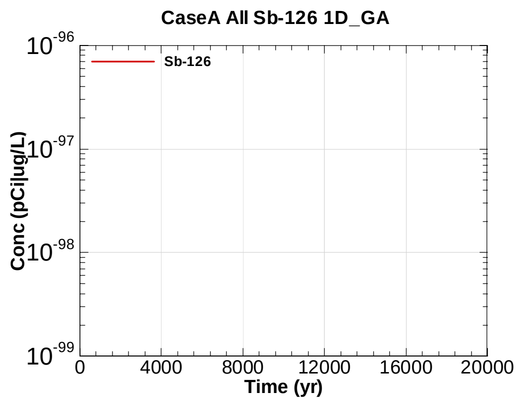

Figure G.3-264 - 1m Aquifer Concentration for CaseA All Sb-126 1D_GA

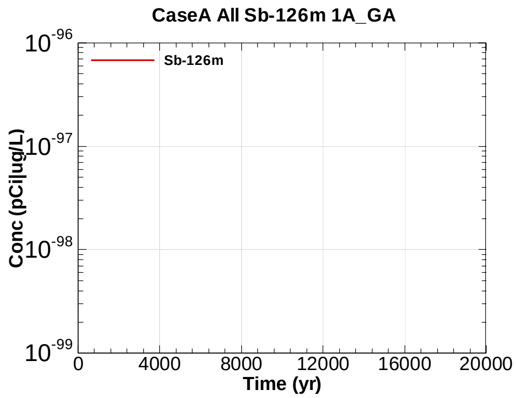

Figure G.3-265 - 1m Aquifer Concentration for CaseA All Sb-126m 1A_GA

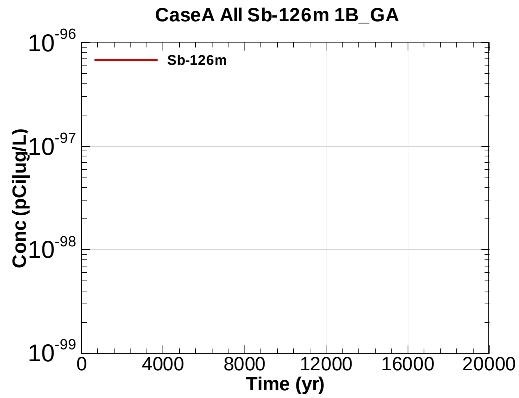

Figure G.3-266 - 1m Aquifer Concentration for CaseA All Sb-126m 1B_GA

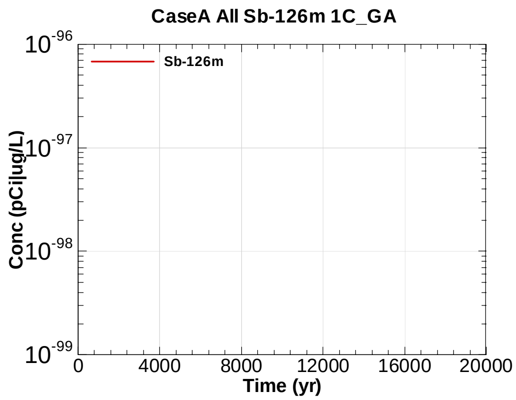

Figure G.3-267 - 1m Aquifer Concentration for CaseA All Sb-126m 1C_GA

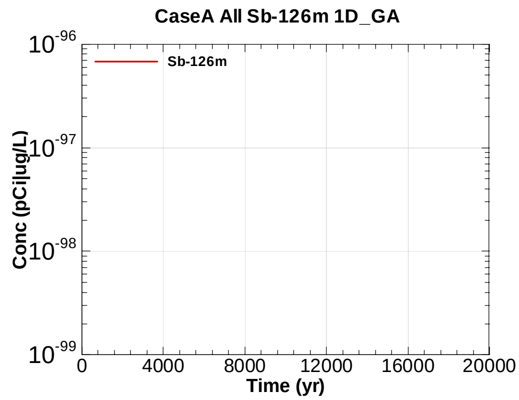

Figure G.3-268 - 1m Aquifer Concentration for CaseA All Sb-126m 1D_GA

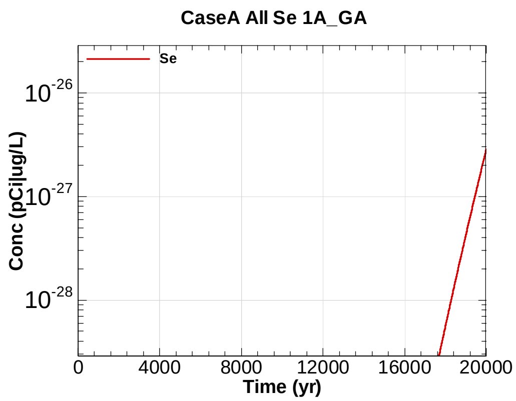

Figure G.3-269 - 1m Aquifer Concentration for CaseA All Se 1A_GA

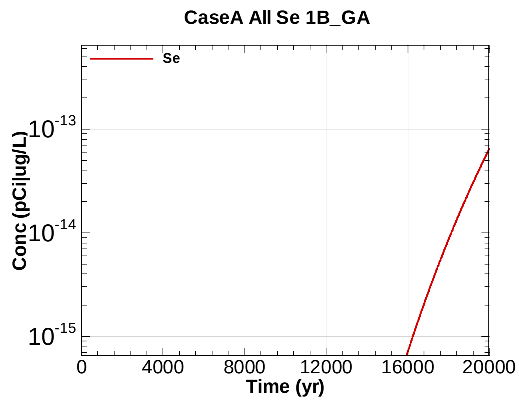

Figure G.3-270 - 1m Aquifer Concentration for CaseA All Se 1B_GA

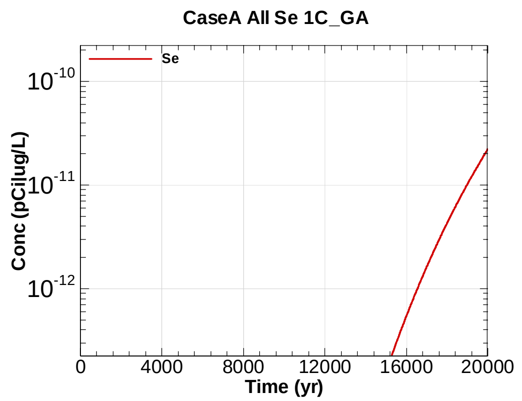

Figure G.3-271 - 1m Aquifer Concentration for CaseA All Se 1C_GA

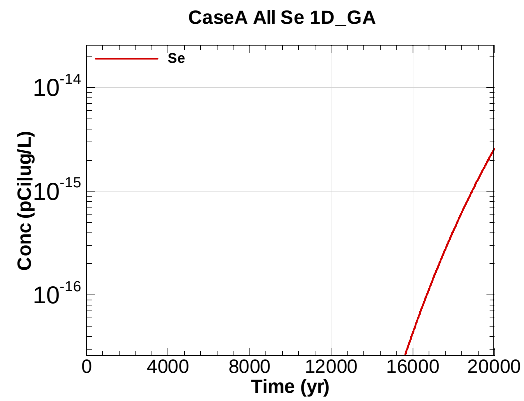

Figure G.3-272 - 1m Aquifer Concentration for CaseA All Se 1D_GA

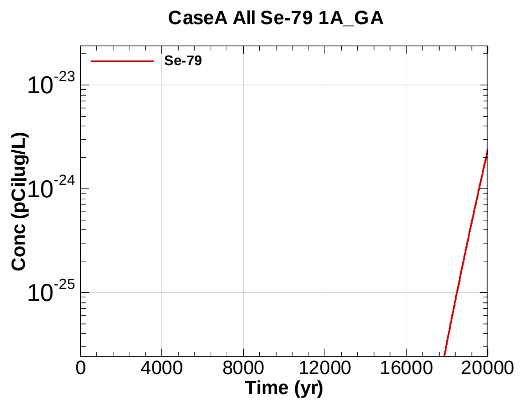

Figure G.3-273 - 1m Aquifer Concentration for CaseA All Se-79 1A_GA

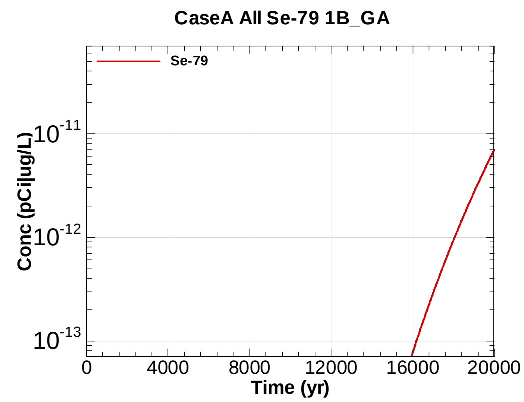

Figure G.3-274 - 1m Aquifer Concentration for CaseA All Se-79 1B_GA

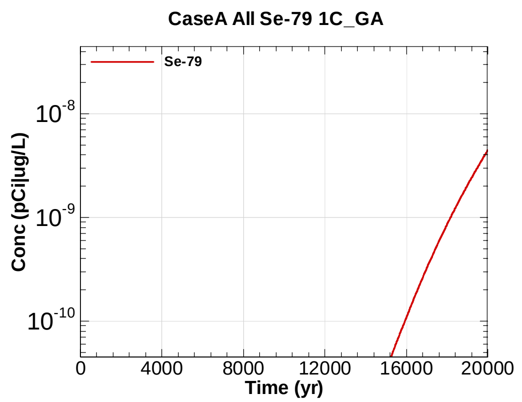

Figure G.3-275 - 1m Aquifer Concentration for CaseA All Se-79 1C_GA

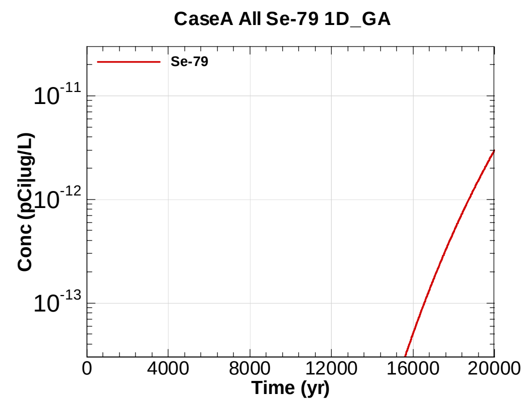

Figure G.3-276 - 1m Aquifer Concentration for CaseA All Se-79 1D_GA

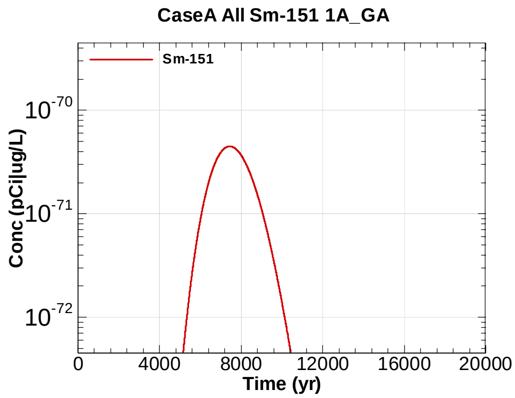

Figure G.3-277 - 1m Aquifer Concentration for CaseA All Sm-151 1A_GA

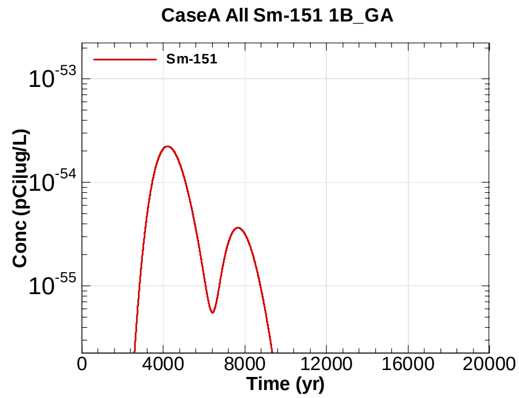

Figure G.3-278 - 1m Aquifer Concentration for CaseA All Sm-151 1B_GA

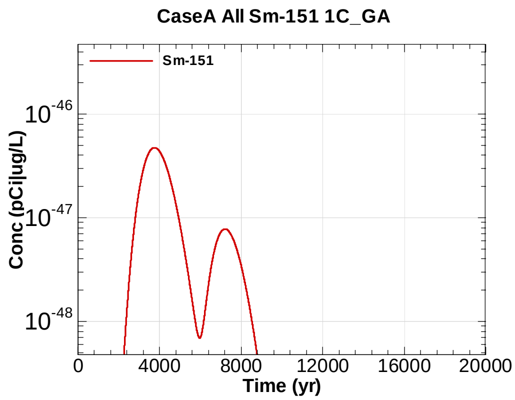

Figure G.3-279 - 1m Aquifer Concentration for CaseA All Sm-151 1C_GA

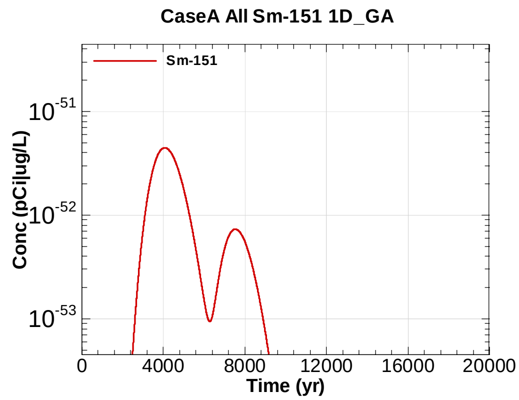

Figure G.3-280 - 1m Aquifer Concentration for CaseA All Sm-151 1D_GA

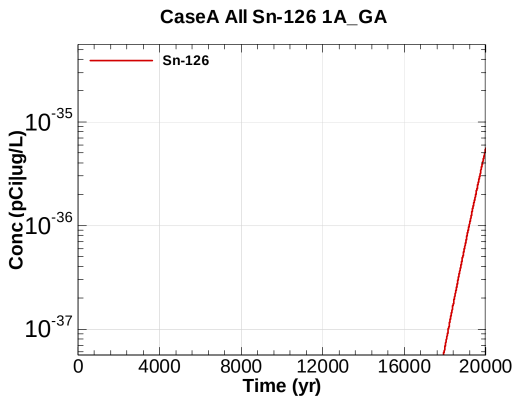

Figure G.3-281 - 1m Aquifer Concentration for CaseA All Sn-126 1A_GA

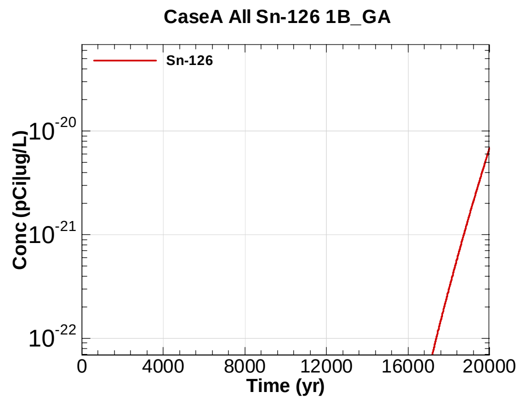

Figure G.3-282 - 1m Aquifer Concentration for CaseA All Sn-126 1B_GA

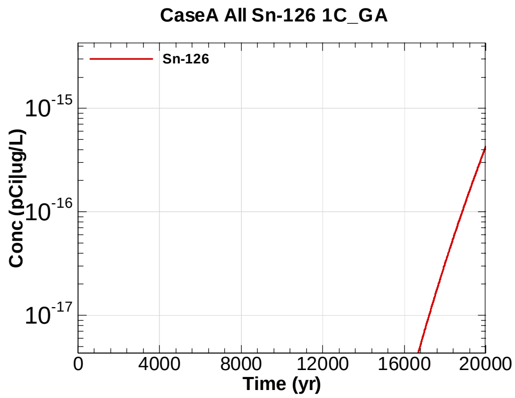

Figure G.3-283 - 1m Aquifer Concentration for CaseA All Sn-126 1C_GA

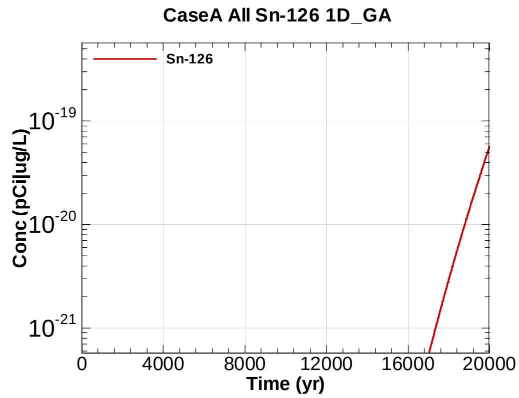

Figure G.3-284 - 1m Aquifer Concentration for CaseA All Sn-126 1D_GA

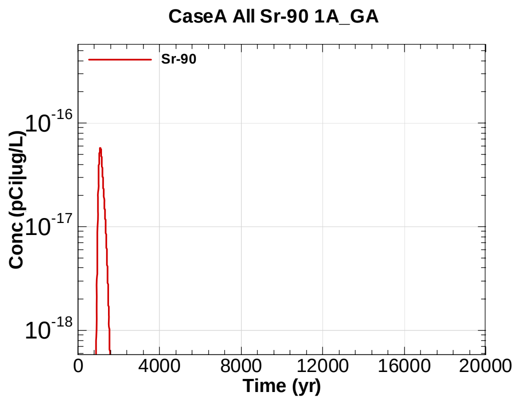

Figure G.3-285 - 1m Aquifer Concentration for CaseA All Sr-90 1A_GA

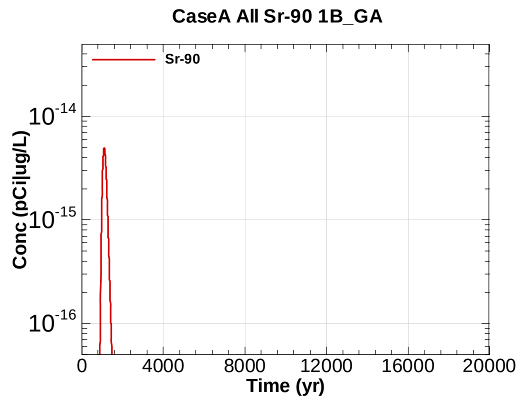

Figure G.3-286 - 1m Aquifer Concentration for CaseA All Sr-90 1B_GA

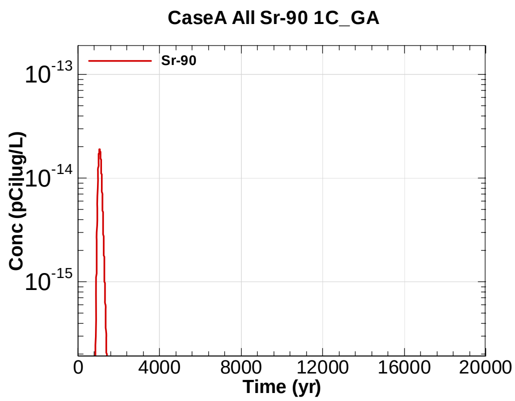

Figure G.3-287 - 1m Aquifer Concentration for CaseA All Sr-90 1C_GA

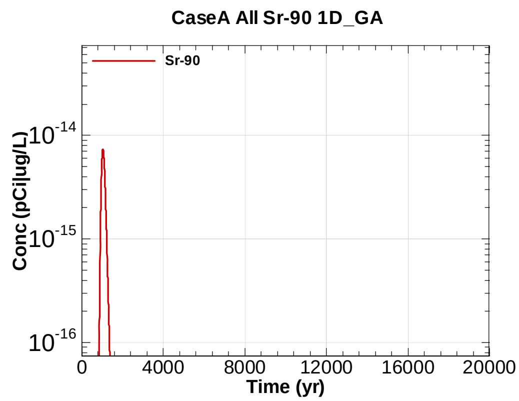

Figure G.3-288 - 1m Aquifer Concentration for CaseA All Sr-90 1D_GA

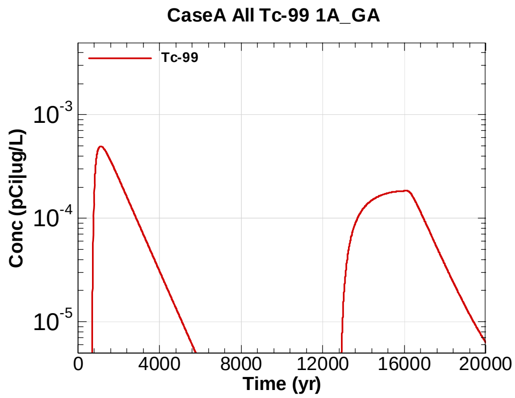

Figure G.3-289 - 1m Aquifer Concentration for CaseA All Tc-99 1A_GA

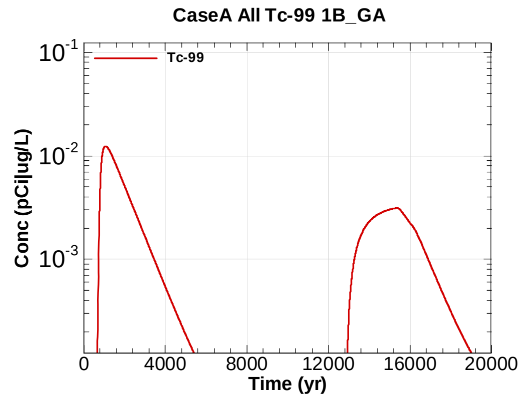

Figure G.3-290 - 1m Aquifer Concentration for CaseA All Tc-99 1B_GA

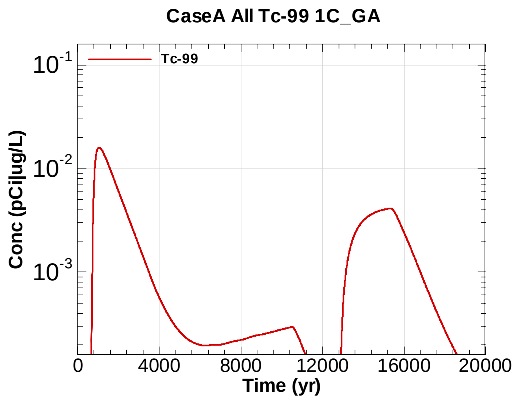

Figure G.3-291 - 1m Aquifer Concentration for CaseA All Tc-99 1C_GA

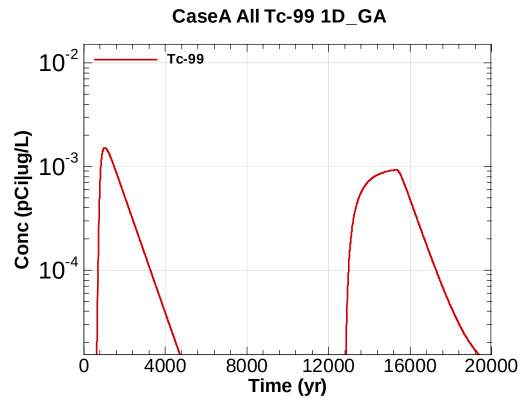

Figure G.3-292 - 1m Aquifer Concentration for CaseA All Tc-99 1D_GA

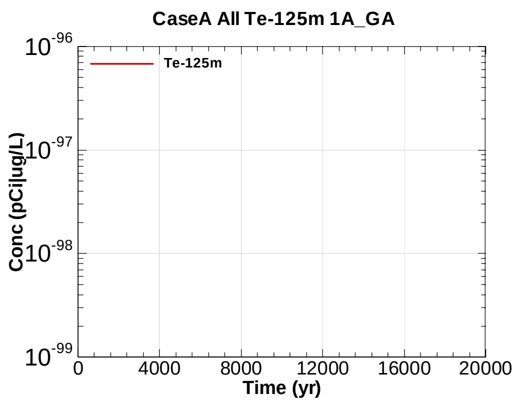

Figure G.3-293 - 1m Aquifer Concentration for CaseA All Te-125m 1A_GA

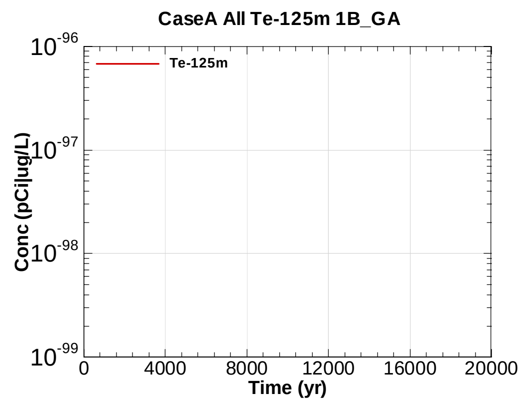

Figure G.3-294 - 1m Aquifer Concentration for CaseA All Te-125m 1B_GA

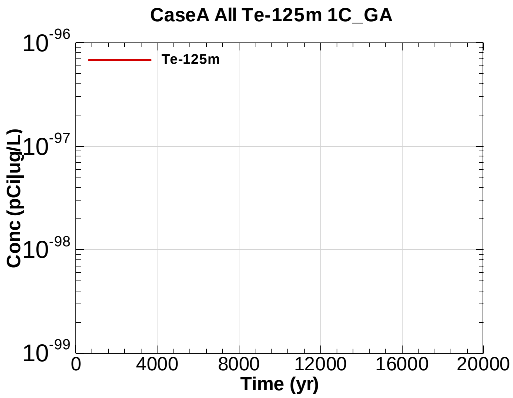

Figure G.3-295 - 1m Aquifer Concentration for CaseA All Te-125m 1C_GA

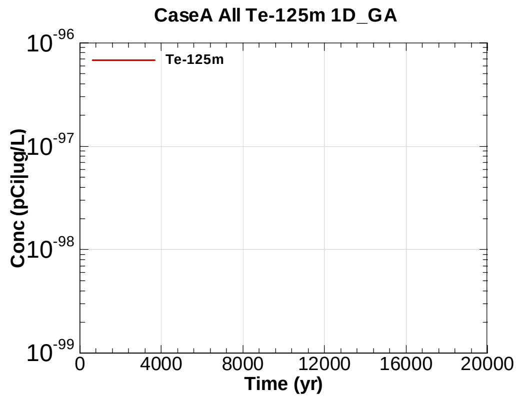

Figure G.3-296 - 1m Aquifer Concentration for CaseA All Te-125m 1D_GA

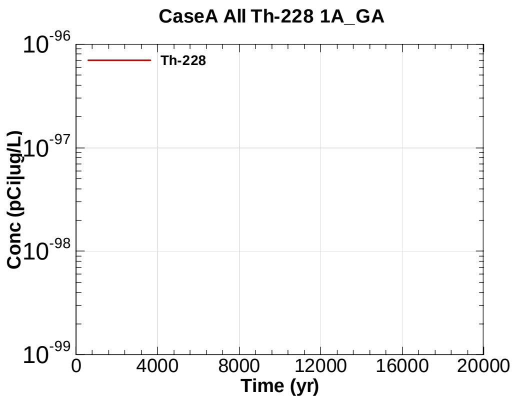

Figure G.3-297 - 1m Aquifer Concentration for CaseA All Th-228 1A_GA

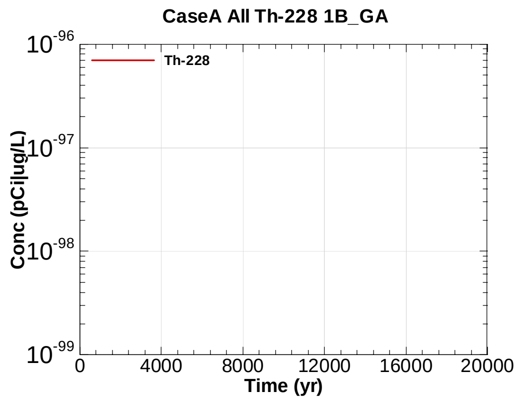

Figure G.3-298 - 1m Aquifer Concentration for CaseA All Th-228 1B_GA

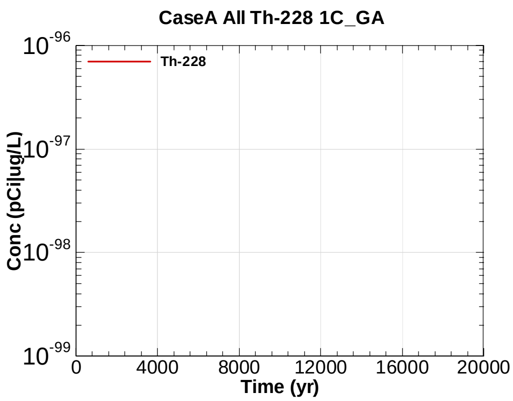

Figure G.3-299 - 1m Aquifer Concentration for CaseA All Th-228 1C_GA

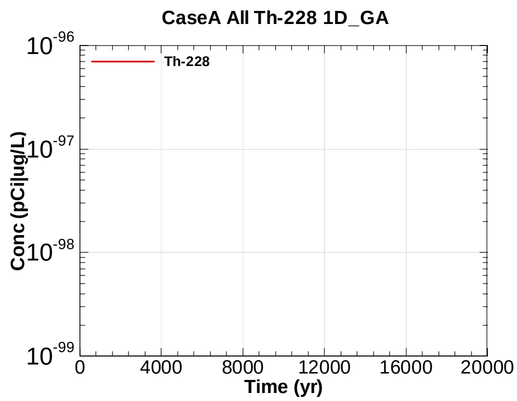

Figure G.3-300 - 1m Aquifer Concentration for CaseA All Th-228 1D_GA

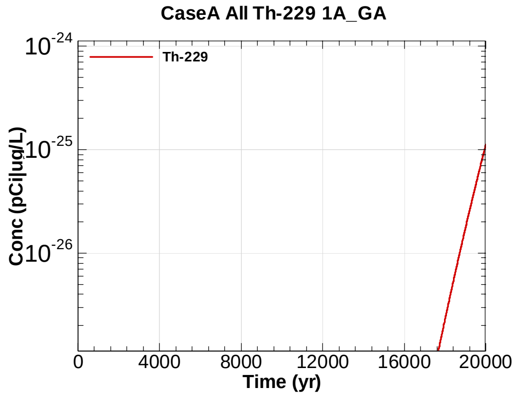

Figure G.3-301 - 1m Aquifer Concentration for CaseA All Th-229 1A_GA

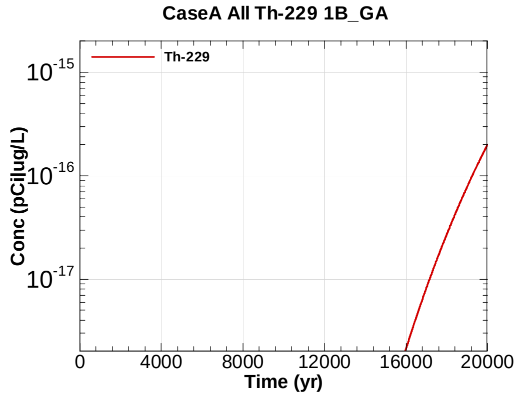

Figure G.3-302 - 1m Aquifer Concentration for CaseA All Th-229 1B_GA

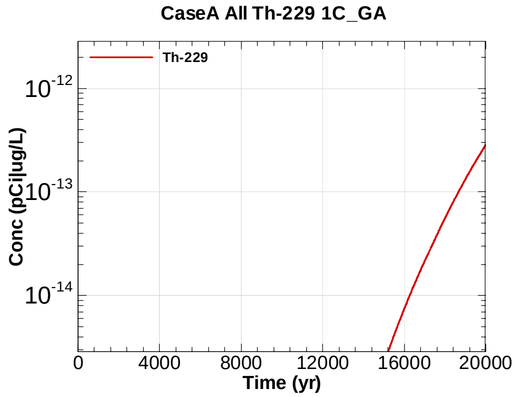

Figure G.3-303 - 1m Aquifer Concentration for CaseA All Th-229 1C_GA

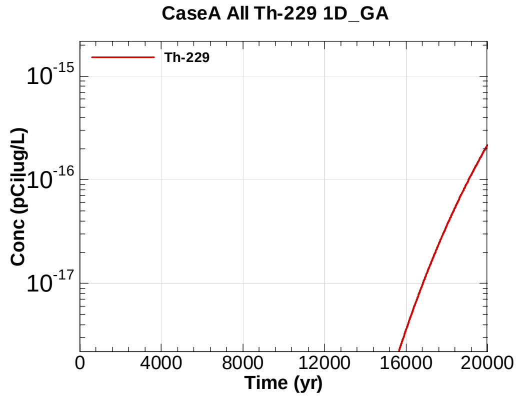

Figure G.3-304 - 1m Aquifer Concentration for CaseA All Th-229 1D_GA

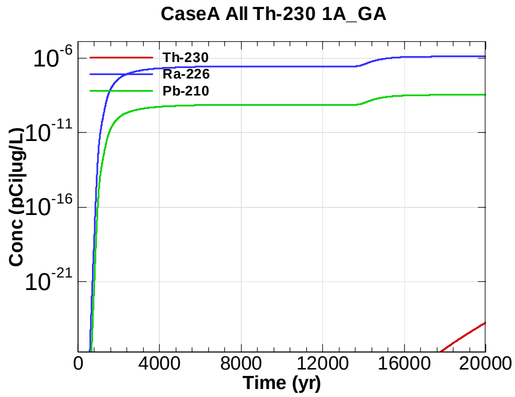

Figure G.3-305 - 1m Aquifer Concentration for CaseA All Th-230 1A_GA

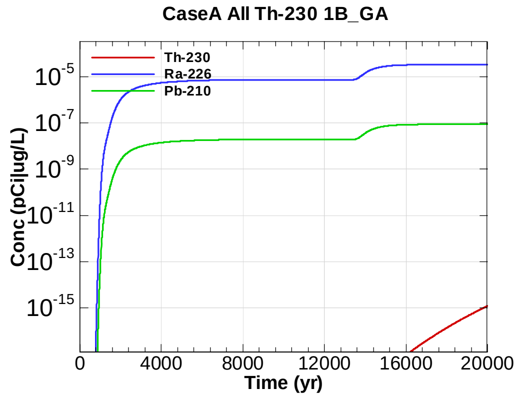

Figure G.3-306 - 1m Aquifer Concentration for CaseA All Th-230 1B_GA

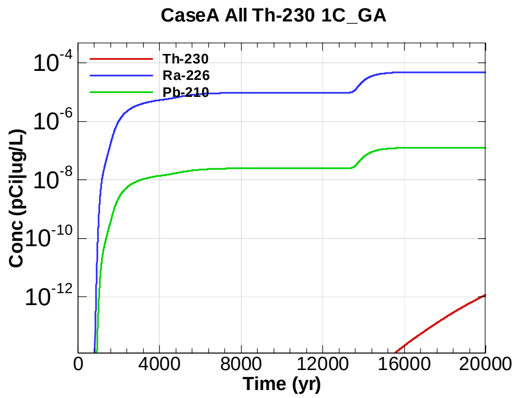

Figure G.3-307 - 1m Aquifer Concentration for CaseA All Th-230 1C_GA

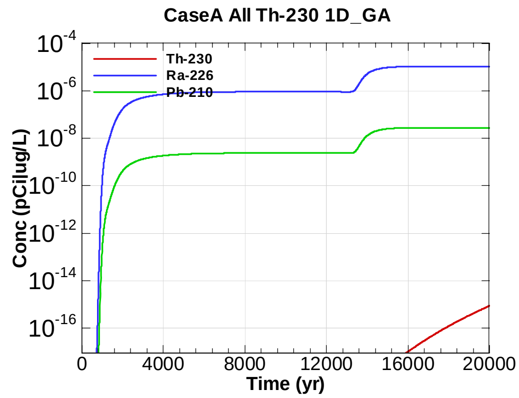

Figure G.3-308 - 1m Aquifer Concentration for CaseA All Th-230 1D_GA

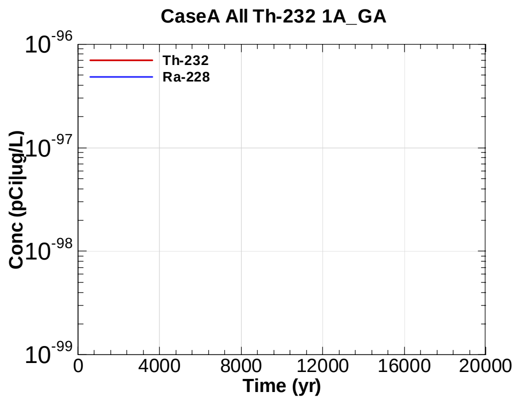

Figure G.3-309 - 1m Aquifer Concentration for CaseA All Th-232 1A_GA

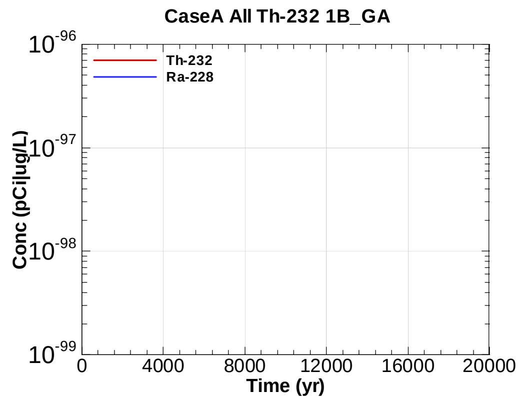

Figure G.3-310 - 1m Aquifer Concentration for CaseA All Th-232 1B_GA

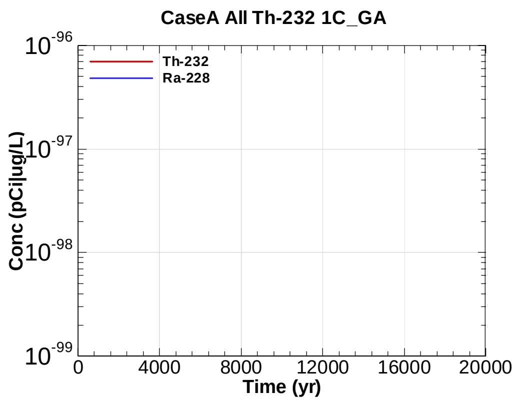

Figure G.3-311 - 1m Aquifer Concentration for CaseA All Th-232 1C_GA

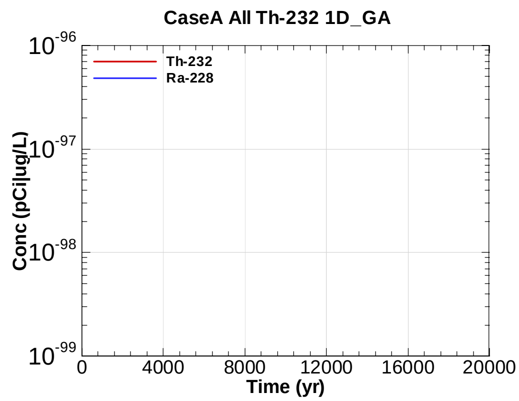

Figure G.3-312 - 1m Aquifer Concentration for CaseA All Th-232 1D_GA

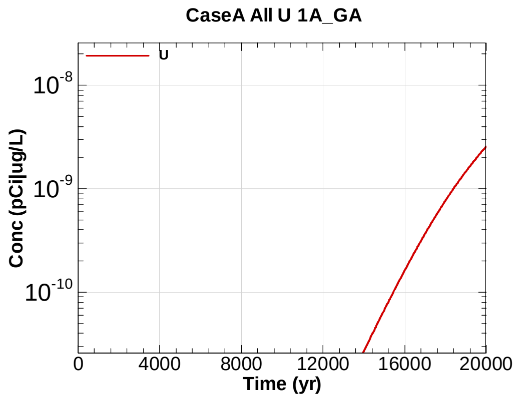

Figure G.3-313 - 1m Aquifer Concentration for CaseA All U 1A_GA

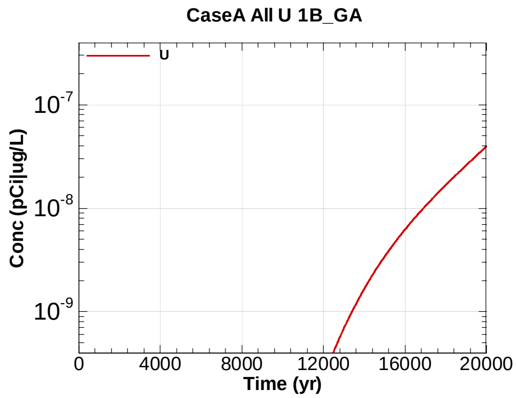

Figure G.3-314 - 1m Aquifer Concentration for CaseA All U 1B_GA

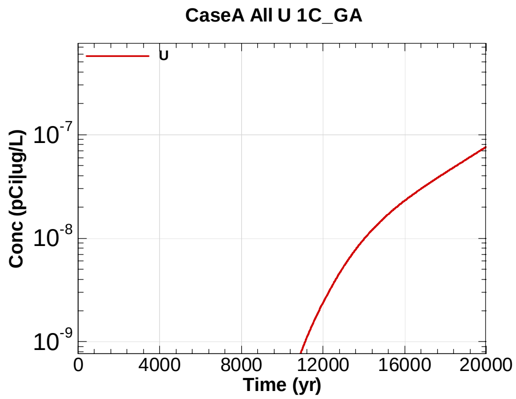

Figure G.3-315 - 1m Aquifer Concentration for CaseA All U 1C_GA

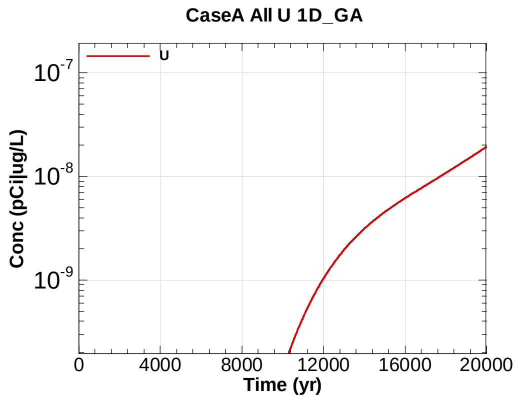

Figure G.3-316 - 1m Aquifer Concentration for CaseA All U 1D_GA

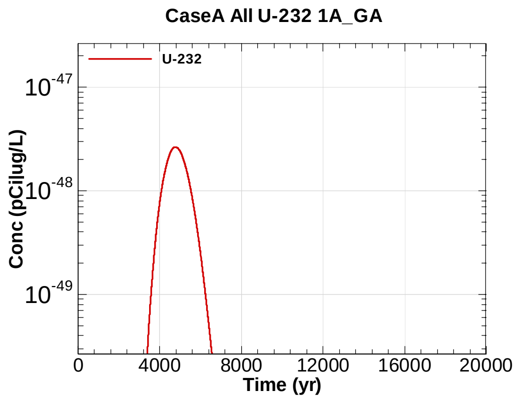

Figure G.3-317 - 1m Aquifer Concentration for CaseA All U-232 1A_GA

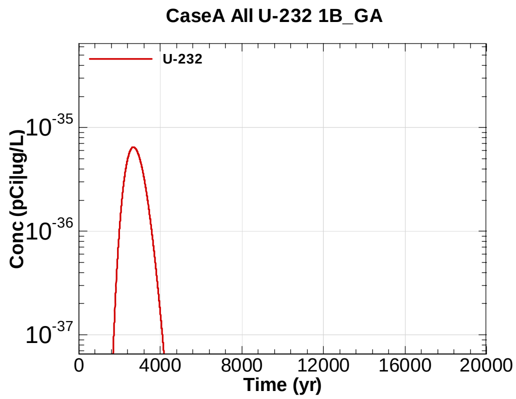

Figure G.3-318 - 1m Aquifer Concentration for CaseA All U-232 1B_GA

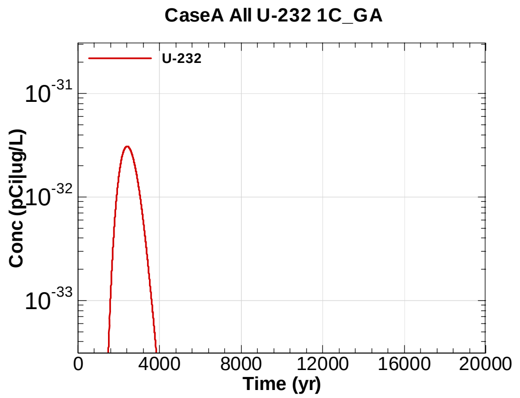

Figure G.3-319 - 1m Aquifer Concentration for CaseA All U-232 1C_GA

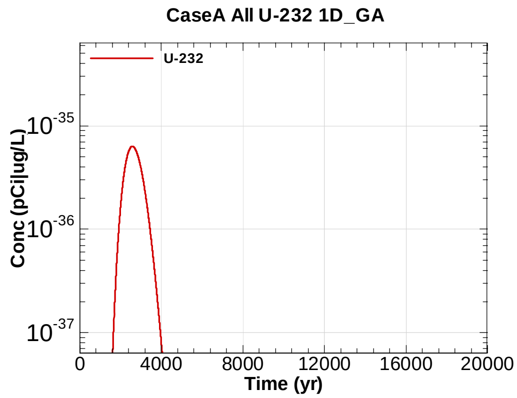

Figure G.3-320 - 1m Aquifer Concentration for CaseA All U-232 1D_GA

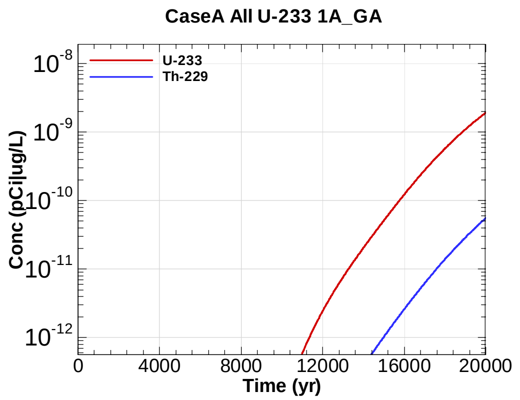

Figure G.3-321 - 1m Aquifer Concentration for CaseA All U-233 1A_GA

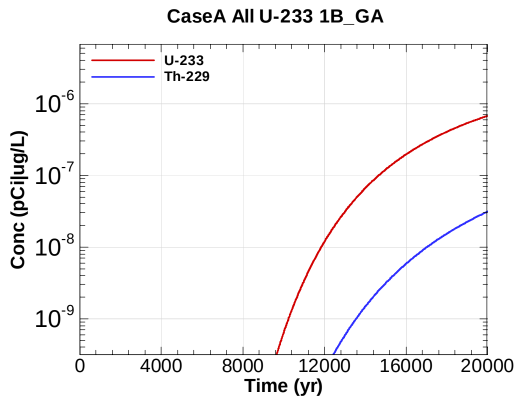

Figure G.3-322 - 1m Aquifer Concentration for CaseA All U-233 1B_GA

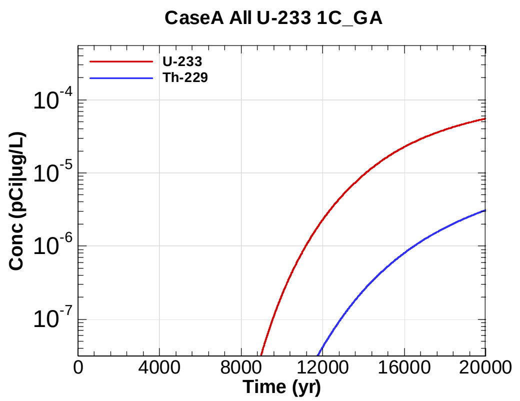

Figure G.3-323 - 1m Aquifer Concentration for CaseA All U-233 1C_GA

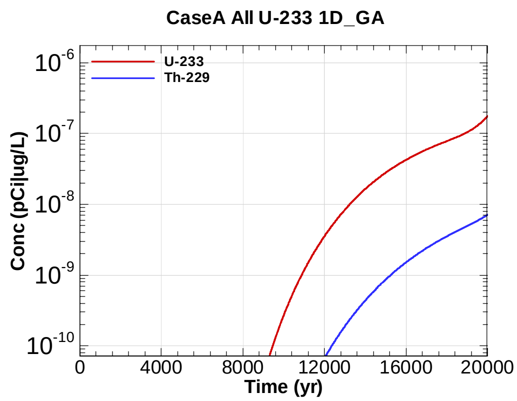

Figure G.3-324 - 1m Aquifer Concentration for CaseA All U-233 1D_GA

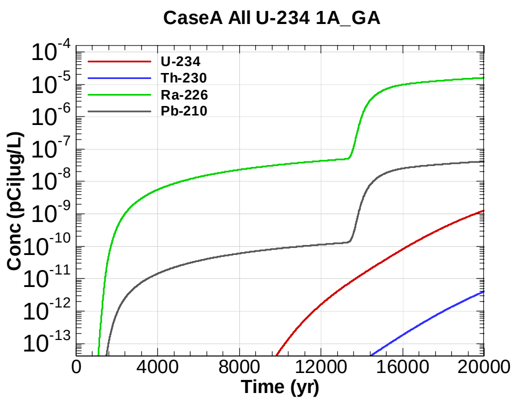

Figure G.3-325 - 1m Aquifer Concentration for CaseA All U-234 1A_GA

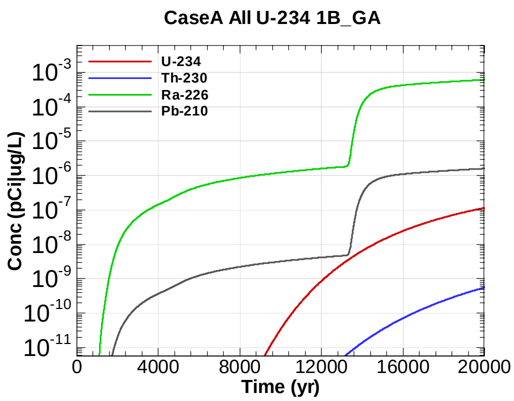

Figure G.3-326 - 1m Aquifer Concentration for CaseA All U-234 1B_GA

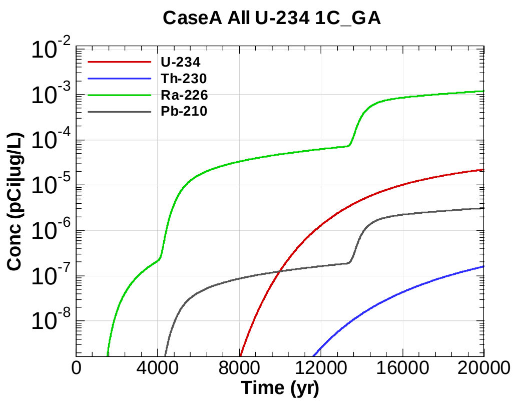

Figure G.3-327 - 1m Aquifer Concentration for CaseA All U-234 1C_GA

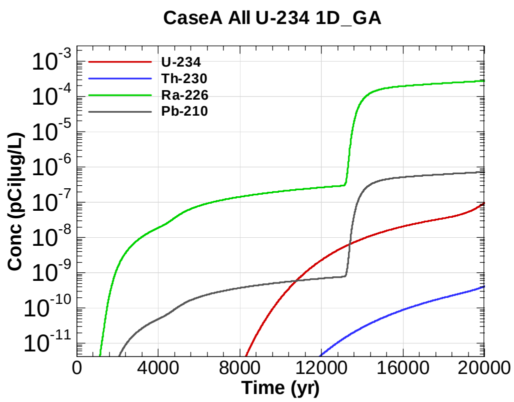

Figure G.3-328 - 1m Aquifer Concentration for CaseA All U-234 1D_GA

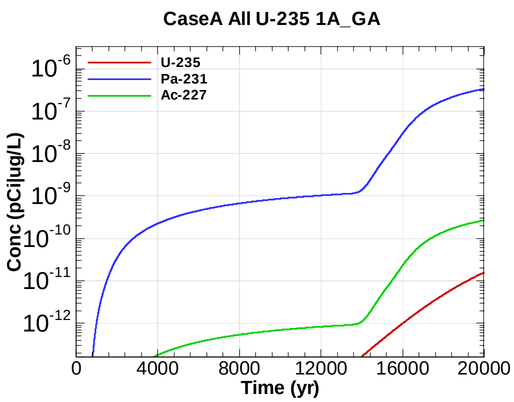

Figure G.3-329 - 1m Aquifer Concentration for CaseA All U-235 1A_GA

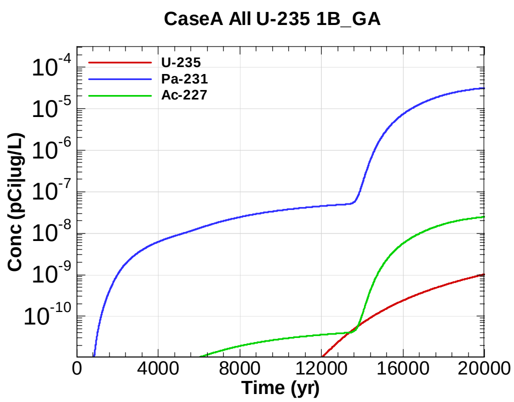

Figure G.3-330 - 1m Aquifer Concentration for CaseA All U-235 1B_GA

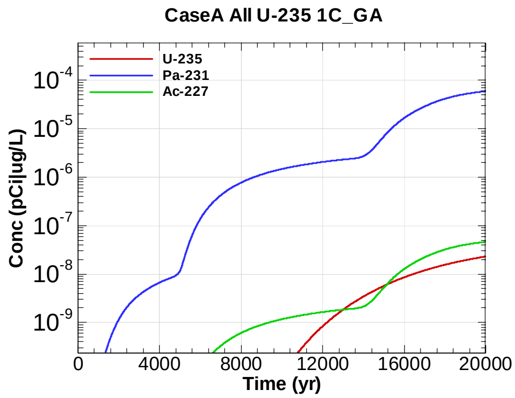

Figure G.3-331 - 1m Aquifer Concentration for CaseA All U-235 1C_GA

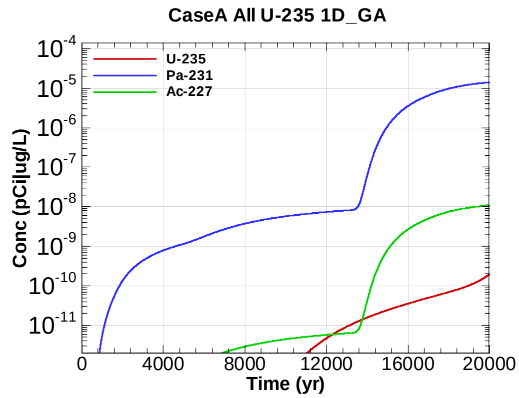

Figure G.3-332 - 1m Aquifer Concentration for CaseA All U-235 1D_GA

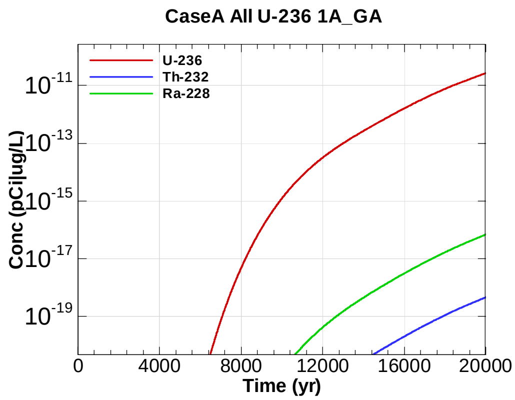

Figure G.3-333 - 1m Aquifer Concentration for CaseA All U-236 1A_GA

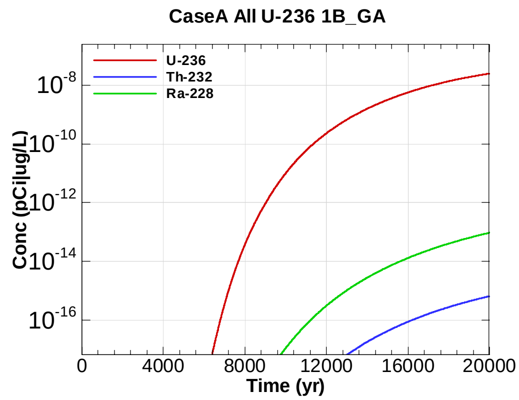

Figure G.3-334 - 1m Aquifer Concentration for CaseA All U-236 1B_GA

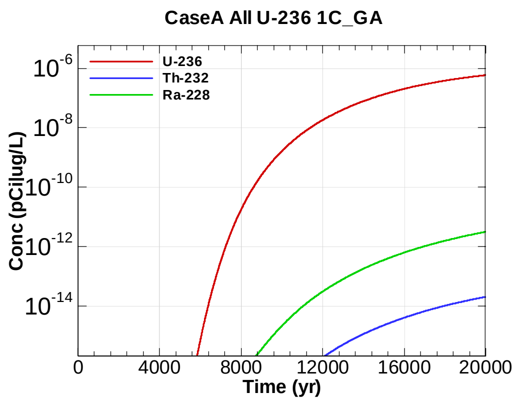

Figure G.3-335 - 1m Aquifer Concentration for CaseA All U-236 1C_GA

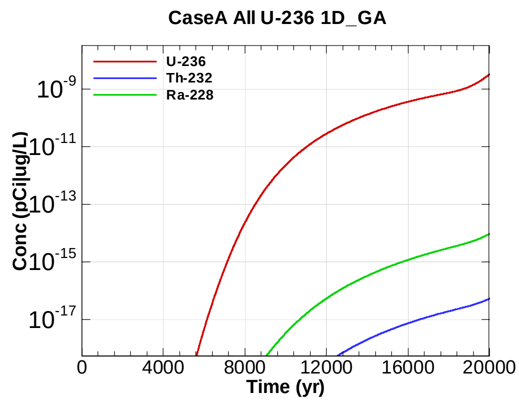

Figure G.3-336 - 1m Aquifer Concentration for CaseA All U-236 1D_GA

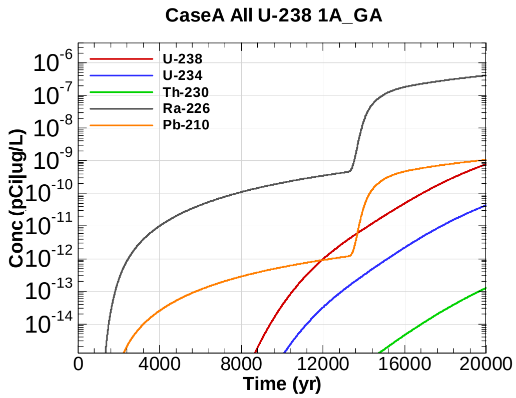

Figure G.3-337 - 1m Aquifer Concentration for CaseA All U-238 1A_GA

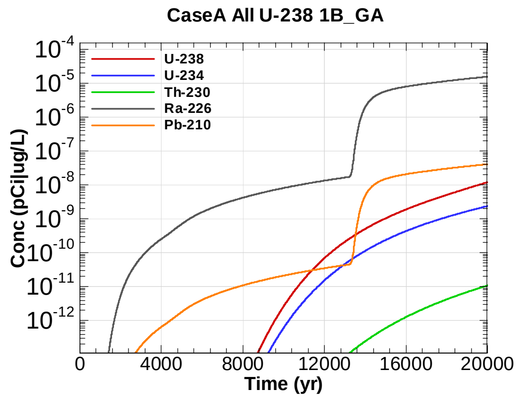

Figure G.3-338 - 1m Aquifer Concentration for CaseA All U-238 1B_GA

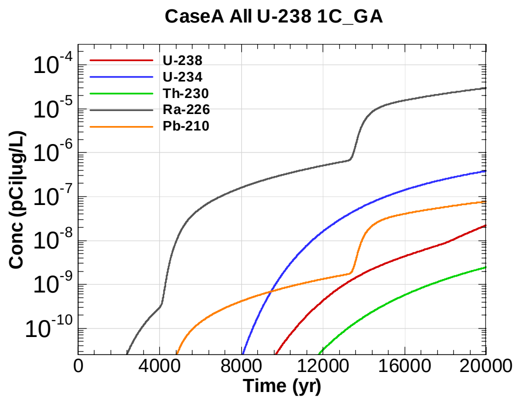

Figure G.3-339 - 1m Aquifer Concentration for CaseA All U-238 1C_GA

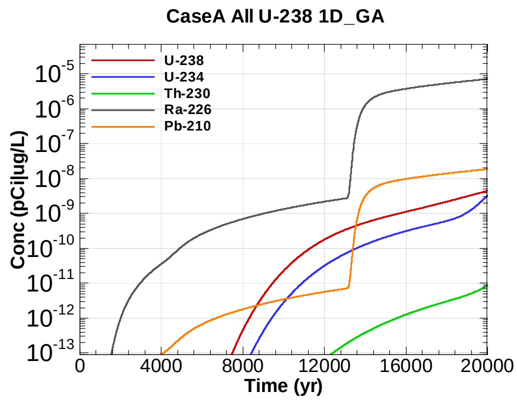

Figure G.3-340 - 1m Aquifer Concentration for CaseA All U-238 1D_GA

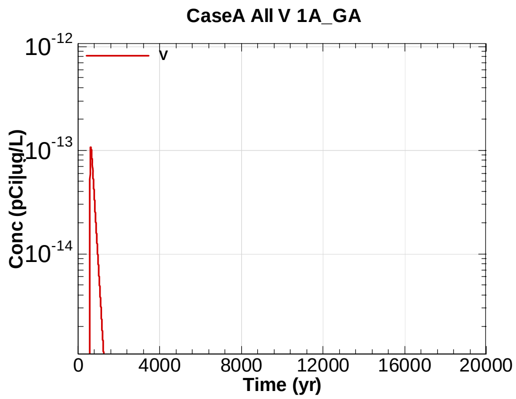

Figure G.3-341 - 1m Aquifer Concentration for CaseA All V 1A_GA

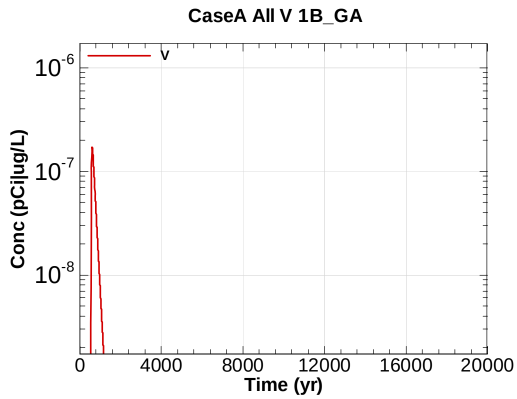

Figure G.3-342 - 1m Aquifer Concentration for CaseA All V 1B_GA

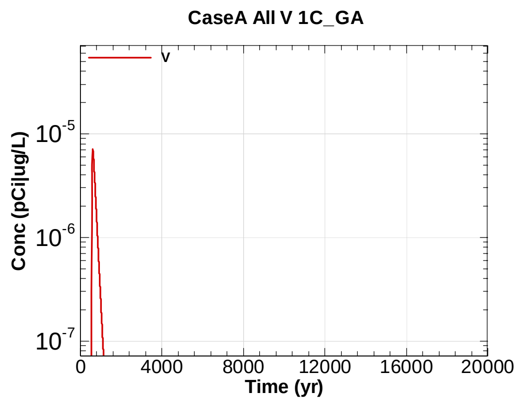

Figure G.3-343 - 1m Aquifer Concentration for CaseA All V 1C_GA

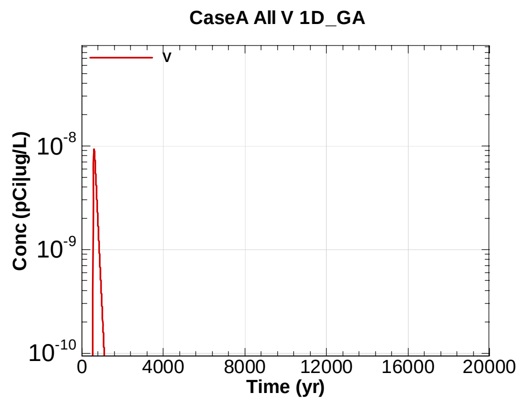

Figure G.3-344 - 1m Aquifer Concentration for CaseA All V 1D_GA

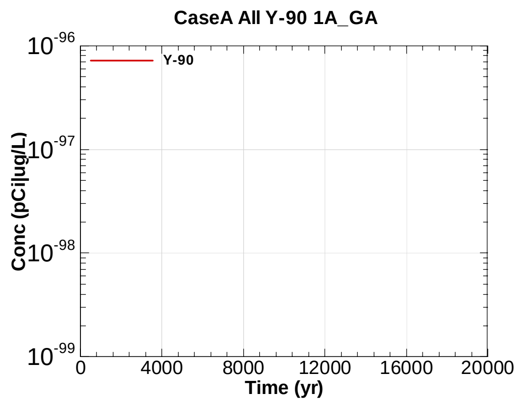

Figure G.3-345 - 1m Aquifer Concentration for CaseA All Y-90 1A_GA

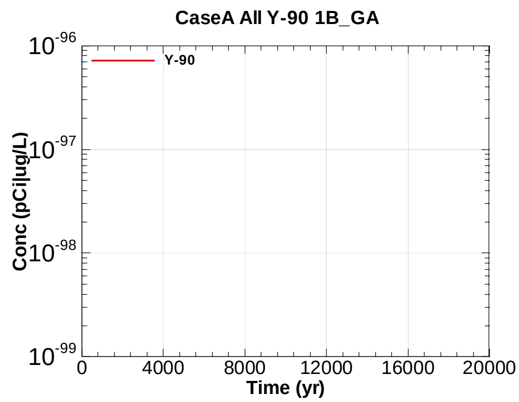

Figure G.3-346 - 1m Aquifer Concentration for CaseA All Y-90 1B_GA

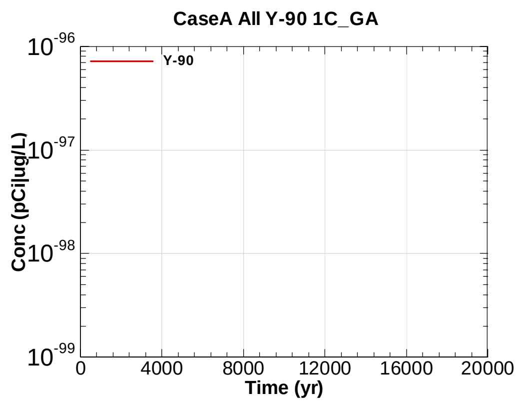

Figure G.3-347 - 1m Aquifer Concentration for CaseA All Y-90 1C_GA

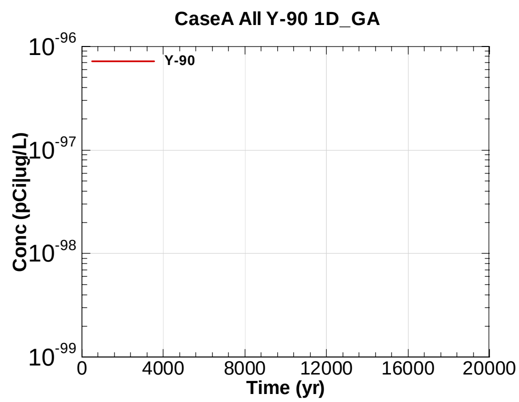

Figure G.3-348 - 1m Aquifer Concentration for CaseA All Y-90 1D_GA

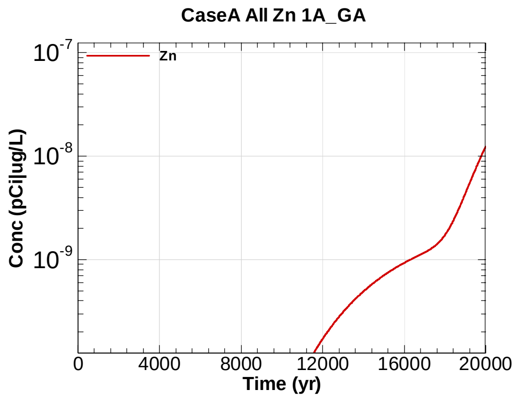

Figure G.3-349 - 1m Aquifer Concentration for CaseA All Zn 1A_GA

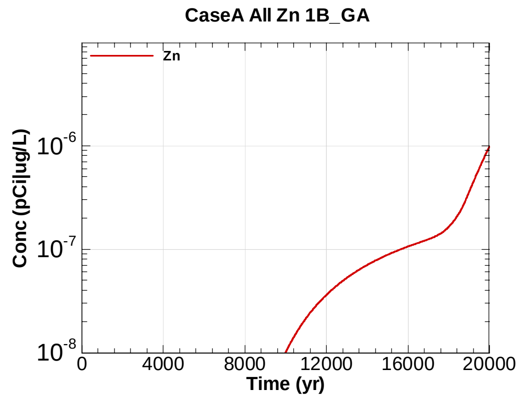

Figure G.3-350 - 1m Aquifer Concentration for CaseA All Zn 1B_GA

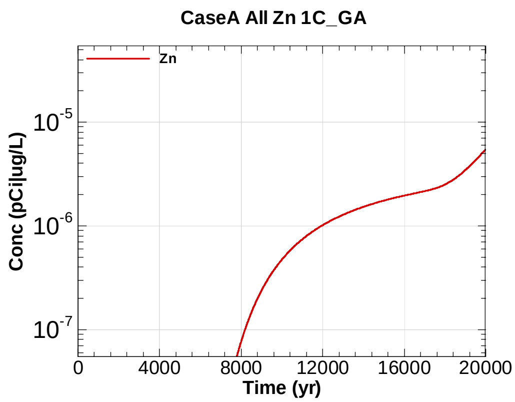

Figure G.3-351 - 1m Aquifer Concentration for CaseA All Zn 1C_GA

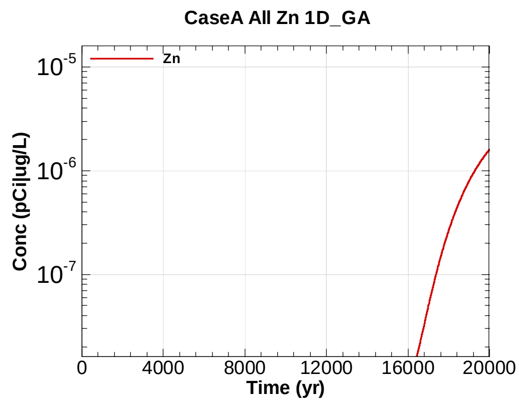

Figure G.3-352 - 1m Aquifer Concentration for CaseA All Zn 1D_GA

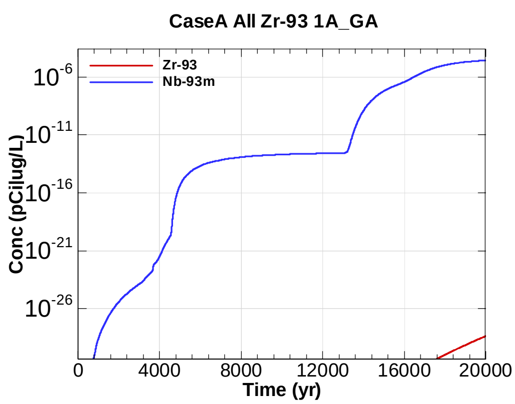

Figure G.3-353 - 1m Aquifer Concentration for CaseA All Zr-93 1A_GA

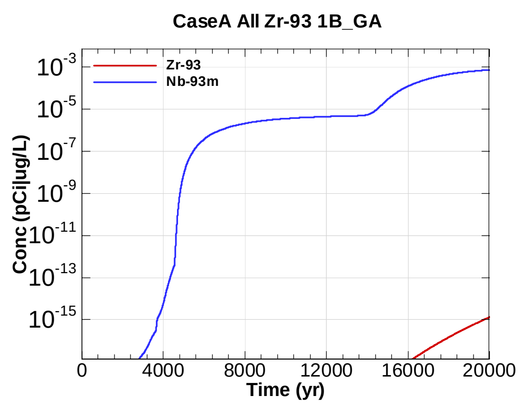

Figure G.3-354 - 1m Aquifer Concentration for CaseA All Zr-93 1B_GA

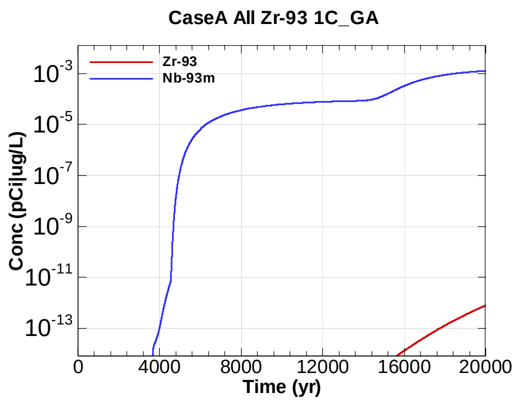

Figure G.3-355 - 1m Aquifer Concentration for CaseA All Zr-93 1C_GA

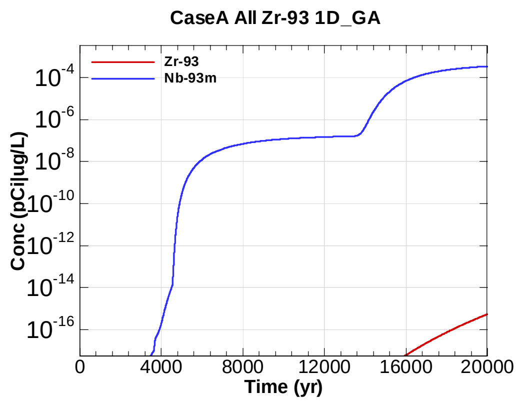

Figure G.3-356 - 1m Aquifer Concentration for CaseA All Zr-93 1D_GA

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Appendix H
DATA VERIFICATION

Appendix H contains documentation pertaining to the verification of the data input used for the modeling of the analysis conducted for the FTF PA.

TABLE OF CONTENTS

LIST OF TABLES

Purpose

The purpose of this appendix is to document the verification of the data input used for the modeling of the PORFLOW analysis being conducted by SRNL personnel for the FTF PA. In addition, parameters originating from this set of data that are utilized by SRNL personnel to conduct GoldSim simulation runs are verified within the GoldSim application. Finally, this data used in PORFLOW and in GoldSim is further verified that it has been successfully transcribed into the FTF PA.

Note: Not included in this appendix is the radiological dose pathway methodology used to determine radiological exposure used in GoldSim.

Methodology

Data provided by SRNL for performing PORFLOW computer simulations is verified by checking the data from references cited elsewhere in the FTF PA.

Parameters used in the GoldSim simulation runs are verified by checking the data presented within the FTF PA to the values contained in the files (containers) within GoldSim. These parameters include:

- Ingestion and immersion dose conversion factors
- Buffer distance from each respective FTF waste tank to the 100m well periphery
- Ranges of values for parameters of interest to develop a stochastic model of potential radiological exposure

  Notes:

  1. Names of files or containers within the GoldSim application will be presented in *italics* font.
  2. Because the non-radiological (chemical) PA is based on concentration and not calculated "exposures", GoldSim is not utilized to determine non-radiological PA. Therefore, input provided in GoldSim related to chemical attributes will not be verified.
  3. As discussed in FTF PA Section 4.4.4.2.1, the following radionuclides are not included in the GoldSim inventory: Ba-137m, Bk-249, Ce-144, Cm-242, Cs-134, Eu-155, Na-22, Pm-147, Pr-144, Rh-106, Ru-106, Sb-125, Sb-126, Sb-126m, Te-125m, Y-90.
  4. The data in two GoldSim models were checked for consistency: GoldSim model "FTF_v2.3 (used for stochastic analysis) and model "FTF_DOSE_v1.3c CaseA 100m" (used as a dose calculator utilizing PORFLOW output concentrations). Within this appendix GoldSim model "FTF_v2.3" will be labeled as model "v2.3stoch" and "FTF_DOSE_v1.3c CaseA 100m" will be labeled "v1.3dose".

H1 Infiltration Rate through Engineered Closure Cap

Two conditions are analyzed in the PORFLOW model, the proposed engineered cap design (Configuration 1A) and a "soils only" closure cap model provided in WSRC-STI-2007-00184_OUO.

Table H1-1: Infiltration Rate from the FTF Engineered Closure Cap

Time After Closure (years)	Annual Average Infiltration Rate			
	With Engineered Cap (1)		With Soils Only Cap (2)	
	(in/yr)	(cm/yr)	(in/yr)	(cm/yr)
0	0.00088	0.0022	16.45	41.78
100	0.01	0.025	16.45	41.78
180	0.17	0.43	16.45	41.78
290	0.37	0.94	16.45	41.78
300	0.50	1.27	16.45	41.78
340	1.00	2.54	16.45	41.78
380	1.46	3.71	16.45	41.78
560	3.23	8.20	16.45	41.78
1,000	7.01	17.81	16.45	41.78
1,800	10.65	27.05	16.45	41.78
2,623	11.47	29.13	16.45	41.78
3,200	11.53	29.29	16.45	41.78
5,600	11.63	29.54	16.45	41.78
10,000	11.67	29.64	16.45	41.78

(1) FTF PA, Table 3.2-10, obtained from WSRC-STI-2007-00184_OUO, Table 81, in "in/yr".
(2) FTF PA, Section 4.4.2.6, obtained from WSRC-STI-2007-00184_OUO, Table 31, in "in/yr".
Note 1: Rate in "cm/yr" obtained by multiplying "in/yr" by 2.54 cm/in.
Note 2: GoldSim does not utilize the cap infiltration rates; rather it uses flow results from PORFLOW.

H2 Chemistry Data

<u>*Atomic Weight*</u>

The atomic weights for the elements of concern for the chemical evaluation of the FTF PA were provided to SRNL and are obtained from Nuclear Wallet Cards 2005. [PIT-MISC-0072] Table H2-1 provides the atomic weights for the chemical elements of concern.

Table H2-1: Atomic Weights for Chemical Release Assessment

Element	Standard Atomic Weight	Element	Standard Atomic Weight
Ag	107.8682	N	14.00674
As	74.9216	Ni	58.6934
Ba	137.327	NO_2 [b]	46.0055
Cd	112.411	NO_3 [a]	62.0049
Cr	51.9961	Pb	207.2
Cu	63.546	Sb	121.76
F	18.9984032	Se	78.96
Fe	55.845	U	238.0289
Hg	200.59	V	50.9415
Mn	54.938049	Zn	65.39

Atomic weights obtained from Nuclear Wallet Cards [PIT-MISC-0072]

[a] $NO_3 = 14.0067 + 3 \times 15.9994 = 62.0049$

[b] $NO_2 = 14.0067 + 2 \times 15.9994 = 46.0055$

Atomic Weights used for radiological assessments are provided within the *Materials/Species* container in GoldSim.

<u>*Solubility Controls*</u>

The transport of contaminants from the closed FTF to the environment occurs from the leaching of contaminants from the CZ, the residual material in the concrete matrix at the bottom of the waste tank, by the pore fluid that infiltrates the CZ. This leaching mechanism is modeled using solubility controls with the aging of the concrete within the CZ. The aging of the concrete is dependent on the quantity of pore volumes of infiltrate from the cap through the CZ. The solubility model is described in detail in WSRC-STI-2007-00544. The reducing capacity of the grout is exhausted after 371 pore volumes, Appendix B of WSRC-STI-2007-00544. The pH of the grout is expected to remain above 11, parameter used to distinguish between Region II (middle age) and Region III (old age), for 2,063 pore volumes, Appendix B of WSRC-STI-2007-00544. Solubility values for the various elements are provided in Table H2-2.

WSRC-STI-2007-00544 also provides solubility values for Np, Pu, Tc, and U for differing conditions that will be used in GoldSim simulations. These values are presented in Section H2.1.

Solubility values are listed in GoldSim under *OxidizedWasteRegions* and *ReducedWasteRegions* within the *WaterInWaste* container. Within GoldSim, an element without solubility control is assumed to be released instantaneously and is assigned a value of "-1".

Within the *WaterInWaste* container of GoldSim are distribution functions for the number of pore volumes to exit the reducing region – *Flushes*; and the number of pore volumes to exit Region II (middle age) and to enter Region III (old age) – *Flushes_1*. The mean value is the deterministic value for each of these distribution functions with 371 for *Flushes* and 2,063 for *Flushes_1*. For GoldSim model v2.3stoch, the files identified as *Flushes* and *Flushes_1* are named *Flushes_1st* and *Flushes_2nd*, respectively.

FTF PA Section 4.2.2.6 addresses the chemical degradation of reducing grout and the estimated pore volumes of 371 and 2,063.

Table H2-2: Solubility Values (moles/L)

Element	Oxidized Concrete (1)		Reduced Concrete (1)	
	Region II	Region III	Region II	Region III
Ac	5.00E-05	1.60E-08	5.10E-05	1.40E-08
Al	Not reported – assumed to be released instantaneously			
Am	2.40E-09	4.90E-08	2.40E-09	7.70E-08
Ba	3.50E-07	8.70E-09	2.00E-07	5.60E-09
Bk	Not Provided (3)			
C	1.10E-11	Isotopic exchange – no solubility controls		
Ce	9.2E-07	3.4E-04	9.20E-07	4.50E-05
Cf	Not Provided (4)			
Cm	2.40E-09	4.90E-08	2.40E-09	7.70E-08
Co	8.80E-09	5.90E-13	9.40E-09	5.40E-13
Cs	No solubility controls (5)			
Eu	1.90E-07	1.20E-06	2.00E-07	1.20E-06
H	Not reported – assumed to be released instantaneously			
I	No solubility controls (5)			
Na	Not reported – assumed to be released instantaneously			
Nb	No solubility controls (5)			
Ni	1.40E-09	1.20E-07	3.40E-10	1.20E-10
Np	2.20E-05	1.10E-04	1.60E-09	1.60E-09
Pa	No solubility controls (5)			
Pm	1.30E-08	1.80E-07	1.30E-08	1.80E-07
Pr	2.70E-06	9.70E-08	9.20E-05	9.50E-08
Pu	4.0 E-14 (2)	5.70E-05	4.1 E-12 (2)	2.90E-09
Ra	1.10E-05	3.80E-06	1.30E-05	4.60E-04
Rh	Not Provided (3)			
Ru	6.20E-04	7.60E-07	6.80E-15	9.00E-11
Sb	3.40E-07	8.00E-08	3.50E-07	8.00E-08
Se	No solubility controls (5)		2.40E-02	2.40E-02
Sm	9.80E-05	4.40E-06	1.00E-04	2.60E-04
Sn	2.70E-08	2.70E-08	2.70E-08	2.70E-08
Sr	1.00E-04	4.07E-06	9.90E-05	2.70E-06
Tc	3.0 E-13 (2)	No solubility controls (5)	3.1 E-11 (2)	2.79E-38
Te	Not Provided (3)			
Th	4.20E-07	4.20E-07	4.20E-07	4.20E-07
U	1.6 E-11 (2)	3.40E-05	1.7 E-09 (2)	3.50E-05
Y	2.70E-07	5.10E-05	2.90E-07	1.80E-04

[FTF PA, Table 4.2-10]

Notes for Table H2-2:

(1) Solubility values obtained from Table 4 of WSRC-STI-2007-00544, except as noted in (2). Reducing capacity is exhausted after 371 pore volumes and Region III is entered after 2,063 pore volumes - Appendix B of WSRC-STI-2007-00544.

(2) Solubility values for Pu, Tc, and U based on co-precipitation with Fe, the largest value reported from Table 10 of WSRC-STI-2007-00544 is used. See Section H2.1.

(3) No solubility control calculated because of its short half-life, instantaneous release

(4) No solubility control calculated because of its small inventory, instantaneous release

(5) No solubility controls, assumed instantaneous release

H2.1 Solubility Control for Np, Pu, Tc, and U During Region II

Because of the different phases that the Np, Pu, Tc, and U compounds may exist within the CZ, probabilities have been assigned to the various phases of Np, Pu, Tc, and U which have their own solubility value as provided in Table 6 of WSRC-STI-2007-00544. Also co-precipitation with iron (Fe) is expected and has been considered in the solubility of Pu, Tc, and U. Table 10 of WSRC-STI-2007-00544 provides solubility values for Pu, Tc and U with co-precipitation with Fe being considered for Tanks 18 and 20, the largest value reported from Table 10 is used in the analysis that follows.

The Oxidizing Region II values and the Reducing Region II values for Np (Table H2-3) are shown in FTF PA Tables 4.2-14 and 4.2-13, respectively. The Oxidizing Region II values with iron co-precipitation and the Reducing Region II values with iron co-precipitation for Tc (Table H2-4), Pu (Table H2-5), and U (Table H2-6) are shown in FTF PA Tables 4.2-14 and 4.2-13, respectively.

Table H2-3: Solubility of Np During Region II

Phase	**Oxidizing Region II**		**Reducing Region II**	
	Probability	**Solubility**	**Probability**	**Solubility**
$NpO_2(OH)$	0.7	2.2E-05	- -	- -
Np_2O_5	0.2	7.1E-05	- -	- -
NpO_2	0.1	1.1E-07	0.8	1.60 E-09
Np(OH)4	- -	- -	0.2	4.00 E-18
Distributions are presented in GoldSim as *NpOR2* and *NpRR2*				

[WSRC-STI-2007-00544, Table 6]

Table H2-4: Solubility of Tc During Region II

Phase	Oxidizing Region II		Reducing Region II	
	Probability	Solubility	Probability	Solubility
Condition 1 – No Co-precipitation with Iron [a]				
Assumed value [c]	1.0	2.95E-06	- -	- -
Tc_2S_7	- -	- -	0.8	9.9 E-38
$TcO_2 . 2H_20$	- -	- -	0.2	3.3 E-08
Condition 2 – With Co-precipitation with Iron				
Assumed value [c]	0.5	2.95E-06 [c]	- -	- -
Fe Co-Precip.	0.5	3.0 E-13 [b]	0.5	3.1 E-11 [b]
Tc_2S_7	- -	- -	0.4	9.9 E-38
$TcO_2 . 2H_20$	- -	- -	0.1	3.3 E-08
Distributions for Condition 2 are provided in GoldSim as *TcOR2* and *TcRR2*				

(a) WSRC-STI-2007-00544, Table 4 (Oxidized Region) and Table 6 (Reduced Region)
(b) WSRC-STI-2007-00544, Table 10
(c) Value assumed in the PA analysis as stated in PA Table 4.2-14

Table H2-5: Solubility of Pu During Region II

Phase	Oxidizing Region II		Reducing Region II	
	Probability	Solubility	Probability	Solubility
Condition 1 – No Fe Co-Precipitation [a]				
$Pu(OH)_4$	0.7	1.4 E-07	0.8	1.7 E-09
PuO_2	0.2	1.2 E-15	0.2	1.3 E-17
$PuO_2(OH)_2$	0.1	3.4 E-11	- -	
Condition 2 – Multiple Phases with Fe Co-Precipitation				
$Pu(OH)_4$	0.35	1.4 E-07 [a]	0.4	1.7 E-09 [a]
PuO_2	0.1	1.2 E-15 [a]	0.1	1.3 E-17 [a]
$PuO_2(OH)_2$	0.05	3.4 E-11 [a]	- -	
Fe Co-Precip.	0.5	4.0 E-14 [b]	0.5	4.1 E-12 [b]
Distributions for Condition 2 are provided in GoldSim as *PuOR2* and *PuRR2*				

(a) WSRC-STI-2007-00544, Table 6
(b) WSRC-STI-2007-00544, Table 10

Table H2-6: Solubility of U During Region II

Phase	Oxidizing Region II		Reducing Region II	
	Probability	Solubility	Probability	Solubility
Condition 1 – No Fe Co-Precipitation [a]				
Becquerelite	0.5	1.5E-05	- -	
$CaUO_4$	0.3	3.0E-15	- -	
Schoepite	0.2	1.0E-03	- -	
UO_2 (am)	- -		0.5	3.5 E-05 [a]
Uraninite	- -		0.3	3.9 E-10 [a]
$CaUO_4$	- -		0.2	2.9 E-08 [a]
Condition 2 – Multiple Phases with Fe Co-Precipitation				
Becquerelite	0.25	1.5E-05 [a]	- -	
$CaUO_4$	0.15	3.0E-15 [a]	- -	
Schoepite	0.1	1.0E-03 [a]	- -	
UO_2 (am)	- -		0.25	3.5 E-05 [a]
Uraninite	- -		0.15	3.9 E-10 [a]
$CaUO_4$	- -		0.1	2.9 E-08 [a]
Fe Co-Precip.	0.5	1.6 E-11 [b]	0.5	1.7 E-09 [b]
Distributions for Condition 4 are provided in GoldSim as *UOR2* and *URR2*				

(a) WSRC-STI-2007-00544, Table 6
(b) WSRC-STI-2007-00544, Table 10

<u>K_d Values for Elemental Transport</u>

The transport of elements through the various soil and cementitious layers is governed by K_d values that are developed through literature reviews, laboratory studies and analyses. Table H2-7 provides the K_d values used in the FTF PA.

Table H2-7: K_d Values for Elements in Soils and Cementitious Media

Element	Soils Media				Oxidizing Cementitious Media						Reducing Cementitious Media					
	Sandy (mL/g)	Ref.	Clayey (mL/g)	Ref.	Young Age (mL/g)	Ref.	Middle Age (mL/g)	Ref.	Old Age (mL/g)	Ref.	Young Age (mL/g)	Ref.	Middle Age (mL/g)	Ref.	Old Age (mL/g)	Ref.
Ac	1,100	a	8,500	a	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d
Ag (3)	60	e	150	e	1	e	1	e	0.1	e	1	e	1	e	0.1	e
Al	1,300	e	1,300	e	5,000	e	5,000	e	1,000	e	5,000	e	5,000	e	1,000	e
Am	1,100	a	8,500	a	6,000	g	6,000	g	600	g	5,000	g	5,000	g	1,000	g
Ar	0	a	0	a	0	b	0	b	0	b	0	d	0	d	0	d
As (3)	100	e	200	e	1,000	e	1,000	e	100	e	1,000	e	1,000	e	100	e
At	0	a	0.6	a	8	b	20	b	0	b	8	d	20	d	0	d
Ba (1)	5	a	17	a	100	b	100	b	70	b	100	d	100	d	70	d
Bk	1,100	a	8,500	a	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d
C	10	k	400	k	20	b	10	b	0	b	20	d	10	d	0	d
Cd (3)	4	e	10	e	5,000	g	5,000	g	500	g	5,000	g	5,000	g	1,000	g
Ce	1,000	e	1,500	e	6,000	g	6,000	g	600	g	5,000	g	5,000	g	1,000	g
Cf	1,100	a	8,500	a	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d
Cl	0	a	0	a	0.8	b	2	b	0	b	0.8	d	2	d	0	d
Cm	1,100	a	8,500	a	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d
Co	7	a	30	a	4,000	g	4,000	g	1,000	g	5,000	g	5,000	g	1,000	g
Cr (3)	4	e	10	e	20	e	20	e	2	e	5,000	e	5,000	e	1,000	e
Cs	50	a	250	a	2	g	20	g	10	g	0	g	2	g	10	g
Cu (3)	50	e	70	e	1	e	1	e	1	e	1	e	1	e	1	e
Eu	1,100	a	8,500	a	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d
F (3)	0	e	0	e	20	e	20	e	2	e	20	e	20	e	2	e
Fe (3)	200	e	400	e	5,000	f	5,000	f	1,000	f	1,000	f	1,000	f	500	f
Fr	50	a	250	a	2	b	4	b	2	b	2	d	4	d	2	d
Gd	1,100	a	8,500	a	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d
H	0	a	0	a	0	b	0	b	0	b	0	d	0	d	0	d
Hg (3)	800	e	1,000	e	300	g	300	g	300	g	1,000	g	1,000	g	300	g

Table H2-7: K_d Values for Elements in Soils and Cementitious Media (Continued)

Element	Soils Media				Oxidizing Cementitious Media						Reducing Cementitious Media					
	Sandy (mL/g)	Ref.	Clayey (mL/g)	Ref.	Young Age (mL/g)	Ref.	Middle Age (mL/g)	Ref.	Old Age (mL/g)	Ref.	Young Age (mL/g)	Ref.	Middle Age (mL/g)	Ref.	Old Age (mL/g)	Ref.
I	0	a	0.6	a	8	g	15	g	4	g	2	g	10	g	4	g
K	10	e	60	e	1	e	2	e	2	e	1	e	2	e	2	e
Kr	0	a	0	a	0	b	0	b	0	b	0	d	0	d	0	d
Mn (3)	15	e	200	e	100	e	100	e	10	e	100	e	100	e	10	e
Mo	6	e	120	e	0.1	e	0.1	e	0.1	e	0.1	e	0.1	e	0.1	e
N (3)	0	e	0	e	0	e	0	e	0	e	0	e	0	e	0	e
Na	5	e	25	e	0.5	e	1	e	0.5	e	0.5	e	1	e	0.5	e
Nb	0	a	0	a	1,000	b	1,000	b	500	b	1,000	d	1,000	d	500	d
Ni (1)	7	a	30	a	1,000	b	1,000	b	500	b	1,000	d	1,000	d	500	d
Np	0.6	a	35	a	1,600	g	1,600	g	250	g	3,000	g	3,000	g	300	g
Pa	0.6	a	35	a	1,600	g	1,600	g	250	g	5,000	g	5,000	g	500	g
Pb (1)	2,000	a	5,000	a	500	b	500	b	250	b	500	d	500	d	250	d
Pd	7	e	30	e	100	e	100	e	10	e	100	e	100	e	10	e
Pm	0	h	0	h	0	h	0	h	0	h	0	h	0	h	0	h
Po	2,000	a	5,000	a	500	b	500	b	250	b	500	d	500	d	250	d
Pr	0	h	0	h	0	h	0	h	0	h	0	h	0	h	0	h
Pt	900	l	2,000	l	5,000	l	5,000	l	500	l	5,000	l	5,000	l	500	l
Pu (2)	270	i	5,900	i	10,000	i	10,000	i	1,000	i	10,000	i	10,000	i	1,000	i
Pu_4 (2)	300	i	6,000	i	10,000	i	10,000	i	1,000	i	10,000	i	10,000	i	1,000	i
Pu_5 (2)	16	i	5,000	i	10,000	i	10,000	i	1,000	i	10,000	i	10,000	i	1,000	i
Ra	5	a	17	a	100	b	100	b	70	b	100	d	100	d	70	d
Rb	50	a	250	a	2	c	4	c	2	c	2	c	4	c	2	c
Re	0.1	a	0.2	a	0	b	0	b	0	b	5,000	d	5,000	d	5,000	d
Rh	0	h	0	h	0	h	0	h	0	h	0	h	0	h	0	h
Rn	0	a	0	a	0	b	0	b	0	b	0	d	0	d	0	d
Ru	0	h	0	h	0	h	0	h	0	h	0	h	0	h	0	h

Table H2-7: K_d Values for Elements in Soils and Cementitious Media (Continued)

Element	**Soils Media**				**Oxidizing Cementitious Media**						**Reducing Cementitious Media**					
	Sandy (mL/g)	**Ref.**	**Clayey (mL/g)**	**Ref.**	**Young Age (mL/g)**	**Ref.**	**Middle Age (mL/g)**	**Ref.**	**Old Age (mL/g)**	**Ref.**	**Young Age (mL/g)**	**Ref.**	**Middle Age (mL/g)**	**Ref.**	**Old Age (mL/g)**	**Ref.**
Sb (1)	2,500	e	2,500	e	5,000	e	5,000	e	500	e	5,000	e	5,000	e	500	e
Se (1)	1,000	a	1,000	a	300	b	300	b	150	b	300	d	300	d	150	d
Sm	1,100	a	8,500	a	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d
Sn	2,000	a	5,000	a	4,000	g	4,000	g	2,000	g	5,000	g	5,000	g	2,000	g
Sr	5	a	17	a	3	g	30	g	15	g	0.5	g	3	g	20	g
Tc	0.6	i	1.8	i	0.8	g	0.8	g	0.5	g	5,000	d	5,000	d	5,000	d
Te	1,000	a	1,000	a	300	b	300	b	150	b	300	d	300	d	150	d
Th	900	a	2,000	a	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d
U (1)	200	a	300	a	250	g	250	g	70	g	2,500	g	2,500	g	2,500	g
V (3)	0	h	0	h	0	h	0	h	0	h	0	h	0	h	0	h
Y (4)	0	h	0	h	5,000	g	5,000	g	500	g	5,000	g	5,000	g	1,000	g
Zn (3)	100	f	200	f	100	e	100	e	10	e	100	e	100	e	10	e
Zr	900	a	2,000	a	5,000	b	5,000	b	500	b	5,000	d	5,000	d	500	d

(As presented in FTF PA Tables 4.2-29 and 4.2-33)

Notes for Table H2-7:

Reference a:	WSRC-TR-2006-00004, Table 10, Best Value
Reference b:	WSRC-TR-2006-00004, Table 13, Best Value
Reference c:	WSRC-TR-2006-00004, Page 22
Reference d:	WSRC-TR-2006-00004, Table 14, Best Value
Reference e:	SRNL-RPA-2007-00006
Reference f:	SRS-REG-2007-00036
Reference g:	WSRC-RP-2007-01122
Reference h:	Assigned a value of zero (conservative assumption)
Reference i:	SRNL-TR-2009-00019 [Note: the reference states 10,000 for Reduced Old Age – however discussion with the author confirmed that the appropriate value should be 1,000 which is what is used in the model.]
Reference k:	SRNS-STI-2008-00445
Reference l:	Values assigned the same values as Zr.

(1) Elements analyzed for both radiological and chemical concentrations.

(2) Pu a combination of the oxidation states Pu_4 (reduced species) and Pu_5 (oxidized species) [SRNL-TR-2009-00019] FTF PA model utilizes the combination state of Pu.

(3) Elements analyzed only for chemical PA

(4) Not included in the data to SRNL because it was not listed in the original set and its dose factor is usually incorporated in the dose factor for Sr-90.

Within GoldSim, the K_d values are located in the following files under *Materials*:
SandySoilKds / *GreaterThan1000* / (and *LessThan1000*) *SandyMedian*
ClayeySoilKds / *GreaterThan1000* / (and *LessThanEqual1000*) / *xMedian*
Concrete_Kds_Oxidizing / *young_concrete_kds_ox* / *GreaterThanEqual1000* / (and *LessThan1000*) / *xMedian*
Concrete_Kds_Oxidizing / *middle_concrete_kds_ox* / *GreaterThan1000* / (and *LessThanEqual1000*) / *xMedian*
Concrete_Kds_Oxidizing / *old_concrete_kds_ox* / *GreaterThan1000* / (and *LessThanEqual1000*) / *xMedian*
Concrete_Kds_Reducing / *young_concrete_kds_red* / *GreaterThan1000* / (and *LessThanEqual1000*) / *YoungRedMedian*
Concrete_Kds_Reducing / *middle_concrete_kds_red* / *GreaterThan1000* / (and *LessThanEqual1000*) / *xMedian*
Concrete_Kds_Reducing / *old_concrete_kds_red* / *GreaterThan1000* / (and *LessThanEqual1000*) / *xMedian*
Note: Values shown as 0 (zero) in Table H2-7 are given a value of 1E-9 in GoldSim.

H3 Hydraulic Properties of Materials

The transport of elements through the various cementitious and soil media is also influenced by the hydraulic properties of the media. Table H3-1 provides the material hydraulic properties for the various media used in the analysis. Permeability (or hydraulic conductivity) and the diffusion coefficient change as the cementitious media degrades via various mechanisms described in WSRC-STI-2007-00607. Because of the varying thicknesses of cementitious media for the different tank types, the period of degradation occurs at different times for the various tank types and cementitious media type. Table H3-2 provides the time periods of cementitious media degradation for the different tank types obtained from SRS-REG-2007-00027.

Table H3-1: Hydraulic Properties of Materials

Material	Bulk Density (g/cc)	Particle Density (g/cc)	Effective Porosity	Permeability (cm/sec)	Diffusion Coefficient (cm^2/sec)
Reducing Grout	1.81[a]	2.51[a]	26.6 % [a]	3.6E-8 [a, b]	8.0E-7 [c, d]
Tank Basemat	2.06[a]	2.51[a]	16.8 % [a]	3.5E-8 [a, b]	8.0E-7 [c, d]
Backfill [e]	1.71	2.63	35 %	7.6E-5 (horiz.) 4.1E-5 (vertical)	5.3E-6
Lower Vadose [f]	1.62	2.66	39 %	3.3E-4 (horiz.) 9.1E-5 (vertical)	5.3E-6
Saturated Zone [g]	1.04	1.39	25 %	N/A	Sandy – 5.3E-6 Clayey – 4.0E-6
Working Slab [h]	2.06	2.61	21.1 %	1.0E-8	8.0E-7

[a] Values obtained from Table 20, WSRC-STI-2007-00369

[b] Degraded condition value is 100 times larger based on WSRC-STI-2007-00607. Timing for degraded condition occurs as shown in Table H3-3

[c] Value obtained from SRNL-ESB-2007-00034, Table 2

[d] Degraded condition value is assumed to be seven times larger. Timing for degraded condition occurs as shown in Table H3-3

[e] Control compacted backfill from Table 5-18, WSRC-STI-2006-00198 [FTF PA, Table 4.2-27]

[f] Lower Vadose Zone from Table 5-18, WSRC-STI-2006-00198 (FTF PA Table 4.2-28)

[g] Obtained from Table 5-18, WSRC-STI-2006-00198 [FTF PA ,Table 4.2-37]

[h] WSRC-STI-2006-00198, Table 6-47, for Low Quality Concrete – not currently used in the analysis but is provided to acknowledge working slab properties [FTF PA, Table 4.2-25]

Hydraulic parameters for reducing grout and tank basemat are shown in FTF PA, Table 4.2-31.

Characteristic curves (relative permeability and suction head as functions of saturation) are developed for the cementitious media and the soil media. The data used to develop those curves is obtained from WSRC-STI-2007-00369, and is not reproduced here. The data tables for upper and lower vadose zones, backfill, reducing grout, and basemat are provided in Tables 5-19 and 5-21 from WSRC-STI-2006-00198, and Tables D.2 and D.5 of WSRC-STI-2007-00369.

The Characteristic Curves are identified below with their reference.

FTF PA, Figure 4.2-22 – Working Slab (Low Quality Concrete): WSRC-STI-2006-00198, Figure 6-2 for Hanford Concrete

FTF PA, Figure 4.2-23 – Backfill: Based on data from WSRC-STI-2006-00198, Table 5-21 for Controlled Compacted Backfill

FTF PA, Figure 4.2-24 – Lower Vadose Zone: Based on data from WSRC-STI-2006-00198, Table 5-19 for Lower Vadose Zone

FTF PA, Figure 4.2-25 – Reducing Fill Grout and Basemat: WSRC-STI-2007-00369, Figure 23.

Table H3-2 provides a link to the information in Table H3-1 to GoldSim.

Table H3-2: Material Properties in GoldSim

Container: *Materials* GoldSim File	**Table H3-1 Material**	**Deterministic (and Mean) Value in GoldSim**		
		Dry Bulk Density	**Particle Density**	**Porosity**
ConcreteProperties	Tank Basemat	2.1 g / cm^3	2.53 g / cm^3	0.17
SandySoilProperties	Lower Vadose	1.62 g / cm^3	2.66 g / cm^3	0.391
SatSandySoilProperties	Saturated Zone	1.0425 g / cm^3	1.39 g / cm^3	0.25
ClayeySoilProperties [a]	Not Shown	2 g / cm^3	2.7 g / cm^3	0.259
SatClayeySoilProperties [a]	Not Shown	2 g / cm^3	Not provided	0.259

[a] Parameters used within the GoldSim model that are developed by the GoldSim modelers.

Table H3-3: Degradation Times for Cementitious Media in the Various Tanks

	Years Before Degradation	Period of Degradation (years)	Year Full Degradation Begins
Tank Type I			
Reducing Grout	2,600	10,400	13,000
Tank Basemat	1,300	1,300	2,600
Tank Type III			
Reducing Grout	5,000	13,900	18,900
Tank Basemat	2,500	2,500	5,000
Tank Type IIIA			
Reducing Grout	4,800	13,900	18,700
Tank Basemat	2,400	2,400	4,800
Tank Type IV			
Reducing Grout	800	63,000	63,800
Tank Basemat	400	400	800

Data obtained from SRS-REG-2007-00027.
FTF PA, Table 4.2-32 presents the data shown in Table H3-3.

The above data is used by PORFLOW and the results from PORFLOW are used in GoldSim; thus GoldSim does not use these values directly.

H4 Tank Data

This section provides the data obtained from various sources for tank physical data including site locations, elevations, and tank structural parameters. Table H4-1 provides tank physical location data. Table H4-2 provides tank steel dimensional data. Table H4-3 provides tank concrete dimensional data.

Of interest in the model is the thickness of soil between the bottom of the waste tank and the closest aquifer, the area called the lower vadose zone. Table H4-4 provides the depth of the lower vadose zone for each waste tank.

Table H4-1: Tank Physical Location Data

Tank No	North Location	East Location	Reference	Excavation Elevation	Reference
1	77385	53116	W145491	240.57	W145491
2	77385	53220	W145491	240.57	W145491
3	77285	53116	W145491	239.15	W145491
4	77285	53220	W145491	239.15	W145491
5	77185	53116	W145491	237.73	W145491
6	77185	53220	W145491	237.73	W145491
7	77085	53116	W145491	236.31	W145491
8	77085	53220	W145491	236.31	W145491
17	77385	52723	W166430,	228.31	W167482
18	77385	52835	W166430	228.31	W167482,
19	77273	52723	W166430	227.39	W167482
20	77273	52835	W166430	227.39	W167482
25	77070	52785	W700283	243.95	W700283
26	76940	52785	W700283	245.30	W700283
27	76815	52785	W700283	245.30	W700283
28	76695	52785	W700283	243.95	W700283
33	76723.33	53040.5	W238154	243.67	W238154
34	76723.33	53155.5	W238154	243.67	W238154
44	77070	52585	W700598	243.63	W700598
45	76940	52585	W700598	245.06	W700598
46	76815	52585	W700598	245.06	W700598
47	76695	52585	W700598	243.63	W700598

Table H4-2: Tank Steel Dimensional Data

Tank Nos	Type	Primary Steel Tank Dimensions				Secondary Tank (Annulus) Dimensions			
		Inside Radius	Height	Thickness	Reference	Length	Thickness	Height	Reference
1-8	I	37’- 6”	24’- 6”	0.5 inch	W145379	2’- 6”	0.5 inch	5’- 0”	W145573
17-20	IV	42’- 6”	34’- 6.750” (Note 1)	0.375 inch	W167808 W167486	Not applicable for Type IV tanks			
25-28	IIIA	42’-6”	33’- 0”	0.5 inch min	W700321	90 feet (OD)	0.375 inch	33’+	W238161
33-34	III	42’- 6”	33’- 0”	0.5 inch min	W700321	90 feet (OD)	0.375 inch	33’+″	W238161
44-47	IIIA	42’- 6”	33’- 0”	0.5 inch min	W700321	90 feet (OD)	0.375 inch	33’+″	W238161

Note 1: Height to springline – a self-supporting reinforced concrete domed roof extends to approximately 10 feet 7.5 inches at the center of the tank..

Note 2: Dimensional data for the primary steel tank for Tank Types III and IIIA are the same.

Note 3: Dimensional data for the secondary steel tank for Type IIIA tanks 25-28 and 44-47 are the same.

Note 4: Height of the secondary tank for tank Type III and IIIA are greater than 33 feet. FTF PA modeling assumes 33 feet conservatism.

Table H4-3: Tank Concrete Dimensional Data

Tank Nos	Type	Concrete Dimensions						
		Structural Concrete Dimensions				Working Slab		Reference
		Base Slab Radius	Wall Thick-ness	Roof Thick-ness	Bottom Thickness	Radius	Thickness	
1–8	I	41'- 11"	1'- 10"	1'-10"	2"- 6"	42'-5"	7 inches (Note 2)	W145293
17-20	IV	42' – 6.375" (Note 1)	7" min	7" min	4" min	2.926 inches (Note 3)		W167482, W167486, W167477
25-28	IIIA	45'- 0"	2'- 6"	4'-0"	3'- 5" (Note 4)	Extends beyond base slab	4 inches	W703133, W238163
33-34	III	45' - 0"	2'- 6"	4'-0"	3'- 6"		4 inches	
44-47	IIIA	45'- 0"	2'- 6"	4'-0"	3'- 5" (Note 4)		4 inches	

Note 1: Radius is for cement topping layer. Additional concrete extends beyond the tank footprint but is not modeled in the FTF PA

Note 2: Includes 4 inch thick working slab and three inches of lean concrete above the excavation elevation. See note 5 of W145491.

Note 3: Concrete pipe chase for leak detection exists below the base slab but is not modeled in the FTF PA. Additional 3 inch of concrete topping exists between the steel liner and the base slab with channels etched into the topping at a depth of 1.625 feet. Effective thickness of this topping is calculated to be 2.926 inches (see Section H4.1).

Note 4: Actual minimum thickness is 3 feet – 7 inches [W703133] but 2" deep leak detection channels are etched into the top of the base slab [W703786] and 2 inches is subtracted from the base slab thickness for input to the model.

Note 5: Dimensional data for the base slab, wall thickness, and roof thickness for the Type III and IIIA tanks are the same.

Note 6: Dimensional data for the Type IIIA tanks 25-28 and 44-47 are the same.

Table H4-4: Thickness of Lower Vadose Zone under Each F-Area Tank

Tank No	Tank Type	Parameters (feet)				Depth of Vadose Zone (feet)		
		Excavation Elevation (1)	Depth of Working Slab (2)	Elevation Bottom of Base Slab (3)	Water Table Elevation (4)	Soil + other material (5)	Native Soil (6)	PORFLOW Model (7)
1	I	240.57	0.708	241.28	227.1	14.18	13.5	11.2
2	I	240.57	0.708	241.28	227.5	13.78	13.1	11.2
3	I	239.15	0.708	239.86	227.1	12.76	12.1	11.2
4	I	239.15	0.708	239.86	227.5	12.36	11.7	11.2
5	I	237.73	0.708	238.44	227.0	11.44	10.6	11.2
6	I	237.73	0.708	238.44	227.4	11.04	10.2	11.2
7	I	236.31	0.708	237.02	226.9	10.12	9.4	11.2
8	I	236.31	0.708	237.02	227.3	9.72	9.0	11.2
17	IV	228.31	0	228.31	225.8	2.51	2.5	1.875
18	IV	228.31	0	228.31	226.2	2.11	2.1	1.875
19	IV	227.39	0	227.39	225.7	1.69	1.7 (8)	1.875
20	IV	227.39	0	227.39	226.2	1.19	1.2 (8)	1.875
25	IIIA	243.95	0.33	244.28	225.9	18.38	18.1	19.0125
26	IIIA	245.30	0.33	245.63	225.8	19.83	19.5	19.0125
27	IIIA	245.30	0.33	245.63	225.7	19.93	19.6	19.0125
28	IIIA	243.95	0.33	244.28	225.6	18.68	18.4	19.0125
33	III	243.67	0.33	244	226.3	17.7	17.4	17.25
34	III	243.67	0.33	244	226.6	17.4	17.1	17.25
44	IIIA	243.63	0.33	243.96	225.3	18.66	18.3	19.0125

Table H4-4: Thickness of Lower Vadose Zone under Each F-Area Tank (Continued)

Tank No	Tank Type	Parameters (feet)				Depth of Vadose Zone (feet)		
		Excavation Elevation (1)	Depth of Working Slab (2)	Elevation Bottom of Base Slab (3)	Water Table Elevation (4)	Soil + other material (5)	Native Soil (6)	PORFLOW Model (7)
45	IIIA	245.06	0.33	245.39	225.3	20.09	19.8	19.0125
46	IIIA	245.06	0.33	245.39	225.2	20.19	19.9	19.0125
47	IIIA	243.63	0.33	243.96	225.1	18.86	18.5	19.0125

(1) From Table H4-1, MSL Reported in FTF PA, Table 4.2-23 – see Note (9)
(2) Based on information from Table H4-3
(3) Sum of Columns 3 and 4 (reported in FTF PA, Table 3.2-1)
(4) From SRNL-ESB-2007-00008, Table 2
(5) Difference of Column 6 and Column 5 - includes depth of working slab and other material described in Table H4-3
(6) Obtained from SRNL-ESB-2007-00008, Table 2 [except Tanks 19 and 20, (8) below]
(7) PORFLOW model input uses arithmetic average for each Tank Type [FTF PA Section 4.4.4.1]
(8) These values updated to reflect excavation elevation shown in Table H4-1.
(9) FTF PA Table 4.2-23 presents the excavation elevation provided in the above table based on SRNL-ESB-2007-00008 with the exception of Tanks 18 and 19, as noted above. Note that the excavation elevations shown for Tanks 5 and 6 differ from those provided in SRNL-ESB-2007-00008 and FTF PA Table 4.2-23 with no impact on the FTF PA analysis.

Table H4-5: Tank Dimension FTF PA Input Summary

Parameter	**Type I (Tanks 1-8)**	**Type IV (Tanks 17-20)**	**Type III (Tanks 33& 34)**	**Type IIIA (Tanks 25-28; 44-47)**
Primary Tank Interior Height	24’-6”	34’-6.375”	33’-0”	33’-0”
Primary Tank Inside Radius	37’-6”	42’-6”	42’-6”	42’-6”
Tank Floor Area [a] , ft^2	4,418	5,675	5,675	5,675
Primary Tank Steel Thickness	0.5”	0.375”	0.5”	0.5”
Secondary Tank Interior Height	N/A	N/A	33’-7.375”	33’-9.3758”
Secondary Tank Outside Radius	N/A	N/A	45’-0”	45’-0”
Secondary Tank Steel Thickness	N/A	N/A	0.375”	0.375”
Annulus Width	2’-6”	N/A	N/A	N/A
Annulus Height	5’-0”	N/A	N/A	N/A
Annulus Steel Thickness	0.5”	N/A	N/A	N/A
Concrete Roof Thickness	1’-10”	7”	4’-0”	4’-0”
Concrete Wall Thickness	1’-10”	7”	2’-6”	2’-6”
Concrete Floor Thickness	2”-6”	6.926” [b]	3’-6”	3’-5”
Reference Figure [c]	4.4-1	4.4-4	4.4-2	4.4-3

[a] The area is calculated by the expression Area = 3.1416 x $(\text{Inner Radius})^2$ without accounting for the areas of the footprints of the columns inside the various waste tanks.

[b] Thickness is sum of 4 inch base slab and effective thickness of the 3 inch concrete topping as described in Note 3 of Table H4-3. FTF PA Tables 4.2-30 and 5.2-1 present a value of 6.9025.

[c] Data is provided in the Figures that are referenced with the exception of the waste tank area and secondary tank interior height (Types III and IIIA).

The ISCM for the release of contaminants from the closed FTF assumes that no waste is released to the surrounding environment until the steel that encompasses the waste tanks has degraded. Table H4-6 summarizes the time for steel degradation based on WSRC-STI-2007-00061 for the tanks and WSRC-STI-2007-00460 for the piping.

Table H4-6: Life Estimation for Steel

<table>
<tr><th rowspan="3">Material</th><th rowspan="3">Media</th><th rowspan="3">Thickness</th><th colspan="4">Time to Steel Failure (years)</th></tr>
<tr><th colspan="2">No Fast Flow Conditions</th><th colspan="2">Fast Flow Condition Exist</th></tr>
<tr><th>Median Value (1)</th><th>Probability Function (2)</th><th>Median Value (3)</th><th>Probability Function (4)</th></tr>
<tr><td>Type I Tank carbon steel</td><td>Concrete</td><td>0.5”</td><td>12,747</td><td>Table 3</td><td>1,140</td><td>Table 32</td></tr>
<tr><td>Type III/IIIA Tank carbon steel</td><td>Concrete</td><td>0.5”</td><td>12,751</td><td>Table 3</td><td>2,077</td><td>Table 35</td></tr>
<tr><td>Type IV Tank carbon steel</td><td>Concrete</td><td>0.375”</td><td>3,638</td><td>Table 3</td><td>75</td><td>Table 38</td></tr>
<tr><td>Stainless Steel (pipe)</td><td>Soil</td><td>0.116” (minimum wall for 1” Sch 40)</td><td colspan="4">510 – 25% pit penetration from WSRC-STI-2007-00460. For a probabilistic analysis a triangular distribution should be used as follows: (5)
Least likely – 116 years (first pit penetration, pg 16)
Most likely – 510 years (25 % pit penetration, Fig 1)
Maximum – 1,000 years (100 % pit penetration, Fig 8)</td></tr>
</table>

Notes for Table H4-6

(1) Median value of the probability distribution analysis obtained from WSRC-STI-2007-00061, Table 3. Identified as the deterministic value in FTF PA Table 4.2-35.
(2) Table provided in WSRC-STI-2007-00061
(3) Median value obtained from table referenced under Probability Function. Identified as the deterministic value in FTF PA Table 4.2-35.
(4) Tables provided in WSRC-STI-2007-00061, with O_2 diffusion coefficient = 0.0001
(5) The probability distribution is presented in GoldSim as discussed following Table H4-7.

FTF PA Table 4.2-36 provides the results from WSRC-STI-2007-00460 for 2 inch and 3 inch piping as well. Because the model assumes the conservative case of all piping to be 1 inch, the other parameters are not provided in this appendix.

Note: Carbon steel piping degradation is evaluated in WSRC-STI-2007-00460, but is not included in the FTF PA model and is not provided in this appendix.

Tank Data in GoldSim

The degradation of steel (Table H4-6) and cementitious material (Table H3-3) is utilized by PORFLOW to determine the rate of flow through the waste zone, the vadose zone, and finally into the saturated zone as a function of time. Various configurations are defined to evaluate differing rates of change for the degradation of steel and GoldSim performs a Monte Carlo simulation of the various parameters to develop a probabilistic assessment of potential radiological exposure. Table H4-7 identifies the probability distribution profiles, located in GoldSim container *Configuration_Cases* under *TankData*, for the degradation of steel for the tanks that is used in GoldSim which are based on Table H4-6.

Table H4-7: Probability Distribution Functions in GoldSim for Steel Failure Times (Years)

Prob Level	TypeIAB	TypeIIIAB	TypeIVAB	TypeICDE	TypeIIICDE	TypeIVCDE
0	3,717	6,789	152	86	117	38
0.005	12,250	12,255	444	175	281	42
0.025	12,270	12,275	655	238	400	45
0.1	12,346	12,351	1,071	364	634	49
0.25	12,495	12,500	1,805	586	1,047	56
0.5	12,747	12,751	3,638	1,140	2,077	75
0.75	12,999	13,000	8,819	2,707	4,986	126
0.9	13,149	13,150	9,639	7,363	11,891	280
0.975	13,225	13,225	10,012	12,269	12,920	1,041
0.995	13,245	13,245	10,102	13,162	13,180	2,119
1	13,250	13,250	10,125	13,250	13,250	10,124

Distributions for TypeIAB, TypeIIIAB, and TypeIVAB are taken from Table 3 of WSRC-STI-2007-00061, as indicated in Table H4-6 and are shown in FTF PA Figure 4.2-26. Distributions for TypeICDE, TypeIIICDE, and TypeIVCDE are taken from Table 32, Table 35, and Table 38, respectively, of WSRC-STI-2007-00061, as indicated in Table H4-6.

The steel failure rate for ancillary equipment is taken from Table H4-6 for stainless steel pipe using a triangular distribution as described in Table H4-6 and is presented in the GoldSim file *AncillaryReleaseTime* which is common to all ancillary equipment and is found in the *WasteLayer* container under each type of ancillary equipment. Note that in GoldSim the deterministic value is assigned the most likely value of 510 as shown in Table H4-6.

In addition to the data presented above, GoldSim requires additional data to simulate the flow of contaminants from the waste zone based on output from PORFLOW. FTF PA Figure 4.4-13 depicts the streaming data from PORFLOW for the various waste tanks to the 100m well periphery. Distances from each waste tank to the 100m well periphery were estimated based on measuring the length of the stream lines. Table H4-8 presents the dimensions measured and the resulting distance based on a scale of 1 inch = approximately 20.3m from an enlarged version of FTF PA Figure 4.4-13.

Table H4-8: Distance to 100m Well Periphery

Tank No.	Distance	
	Measured (inches)	Scaled (meter)
1	11	224
2	12.1875	248
3	12	244
4	13.5	274
5	13	264
6	14.750	300
7	13.5	274
8	15.250	310
17	5.5	112
18	6.5	132
19	6.250	127
20	7.5	152
25	9	183
26	8.5	173
27	8.750	178
28	7.875	160
33	12	244
34	12	244
44	5.5	112
45	5.250	104
46	5.5	112
47	5.875	119

[FTF PA, Table 5.2-2]

The waste tank data extracted from the above tables for input into GoldSim is identified in Table H4-9.

Table H4-9: Tank Data Files in GoldSim

Container: *TheTanks* **Container: *TankData*** **GoldSim File**	**Table Reference**	**Type I (Tanks 1 – 8)**	**Type III (Tanks 33 & 34)**	**Type IIIA (Tanks 25-28, 44-47)**	**Type IV (Tanks 17 -20)**
Basemat_Thickness	H4-5 [a]	30 inches	42 inches	41 inches	6.9025 inches
Grout_Heights	H4-5 [b]	24.5 ft [d]	33 feet	33 feet	34.56 feet
Tank_Areas	H4-5 [c]	4,418	5,675	5,675	5,675
UZThickness_table	H4-4	Native Soil value of Vadose Zone depth per tank			
BufferDistance_table	H4-8	Reported value in Table H4-8 per tank			

Notes from H4-9:

[a] Shown as floor thickness in Table H4-5. Values indicate the deterministic value in GoldSim. See Table H4-10 for the range of tank floor thicknesses used in the GoldSim model.
[b] Shown as interior height in Table H4-5.
[c] Shown as tank floor area in Table H4-5.
[d] In the GoldSim model the grout height was set to 50 ft to account for the height of the dome

To evaluate the potential radiological exposures based on varying parameters of concern, probability distribution functions have been developed for use in GoldSim. The floor thickness for the various tanks is varied based on assumed construction tolerances and crediting other construction materials not assumed for the deterministic value. Section H4.1 presents the analysis conducted for Type IV Tanks.

The stochastic model in GoldSim for the tank floor thickness is identified in Table H4-10 and is based on Section H4.1 for Type I tanks and all are given a triangular distribution. The Mean is the arithmetic average of the Minimum, Most Likely, and Maximum values.

Table H4-10: Range of Floor Thicknesses for the Various Tank Types

Tank Type	**GoldSim File under *Basemat_Thickness***	**Minimum**	**Most Likely (Nominal)**	**Maximum**	**Mean**
Type I [a]	*TypeIBasematThickness*	29	30	38.5	32.5
Type III [a]	*TypeIIIBasematThickness*	41.5	42	46.5	43.33
Type IIIA [a]	*TypeIIIABasematThickness*	40.5	41	45.5	42.33
Type IV [b]	*TypeIVBasematThickness*	6.5275	6.9025	7.5275	6.9858
Type IV [c]	Not used	6.5517	6.926	7.5517	7.0098

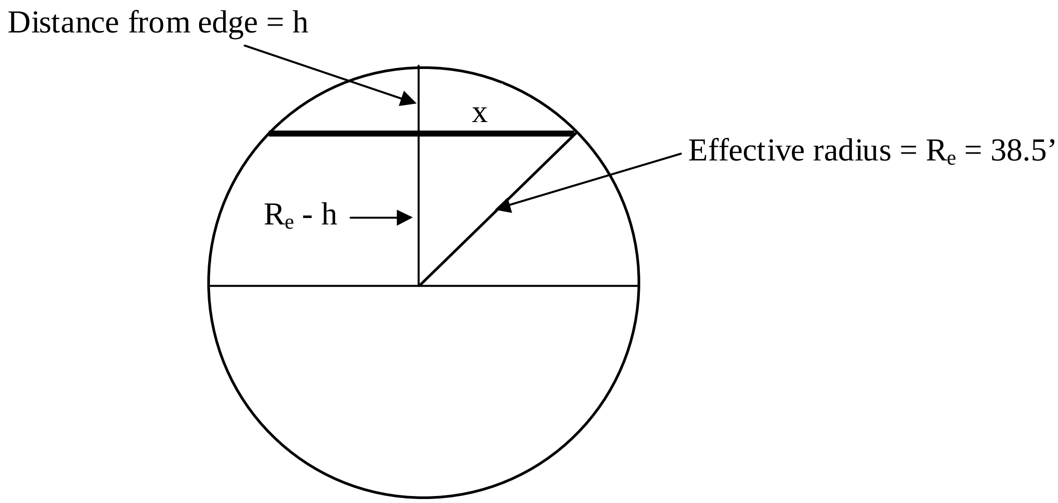
[a] Presented in FTF PA, Section 5.6.3.5.
[b] Current values in the GoldSim file (based on FTF PA, Section 5.6.3.5)
[c] Based on Section H4.1 – These values are greater than what is used in GoldSim so the results will be conservative.

The stochastic methodology in GoldSim for the depth of the vadose zone under each waste tank is computed in the following way: The depth of the vadose zone beneath each tank (shown in Table H4-4) varies in the stochastic model based on the thickness of the saturated zone. The GoldSim model restricts the minimum thickness of the vadose zone to 0.1 foot. The variability of the thickness of the saturated zone is presented in GoldSim by *SatThickness* as a normal distribution with a standard deviation of 2.3 feet and a mean of 5 meters. The PA description is provided in PA Sections 5.6.3.9 and 5.6.3.12.

H4.1 Determination of Effective Basemat Thickness for Type IV Tanks

Data obtained from: W167482,
Cross-sectional area of channel: 1.625” x 3.625” x 3.125” (trapezoid) = 0.0381 square feet
Vertical (north – south) Channels: 2 @ 5.33 feet long = 10.66 feet
17 @ 9.5 feet long = 161.5 feet
Horizontal (east-west) Channels:
From Figure below a channel at distance “ h “ from the edge of the circle has a half-length “ x “ and the overall length is 2 times “ x “.

Overall length = 2 x $\sqrt{38.5^2 - (38.5 - h)^2}$ (1)



Using Equation (1) the table below provides the length of horizontal channel in the upper half:

h (ft)	Length (ft)
5.33	39.09
14.83	60.73
24.33	71.60
33.83	76.43
Total	247.85

Total length (upper and lower halves) of horizontal channels = 2 x 247.85 = 495.7 feet
Circumferential length of channel = 2 x 38.5 π = 241.9 feet
Total length of channels = 10.66 + 161.5 + 495.7 + 241.9 = 909.76 feet
Total volume of channels = 909.76 feet x 0.0381 square feet = 34.66 cubic feet
Volume of 3 inch slab with 42.5 foot radius = 1,418.6 cubic feet
Effective volume of concrete = 1418.6 – 34.66 = 1383.93 cubic feet
Effective thickness = 12 x (1383.93 / (42.5^2 π) = 2.926 inches
Nominal concrete thickness = 4.0 + 2.926 = 6.926 inches

Range of Thickness – Minimum and Maximum

The minimum thickness would be based on the maximum negative construction tolerance for the thickness of the slab and cement topping and the maximum positive tolerance for the depth and breadth of the channel cut-outs. Based on Specification Number 3552, Section 3.32, the slab has a tolerance of +0.5" and – 0.250" , the cement topping is assumed to have a tolerance of +/-0.125 inch, and the cut-outs are assumed to have no tolerance.

Minimum concrete thickness:

Volume of channels = 34.66 cubic feet (from above)

Volume of 2.875 inch thick slab with 42.5 foot radius = 1,359.52 cubic feet

Effective volume of concrete = 1359.52 - 34.66 = 1324.86 cubic feet

Minimum depth of topping = 12 x (1324.85 / (42.5^2 π) = 2.8017

Minimum slab thickness = 3.75 inches

Minimum concrete thickness = 3.75 + 2.8017 = 6.5517 inches

Maximum concrete thickness:

Volume of channels = 34.66 cubic feet (from above)

Volume of 3.125 inch thick slab with 42.5 foot radius = 1,477.73 cubic feet

Effective volume of concrete = 1,477.73 - 34.66 = 1,443.07 cubic feet

Maximum depth of topping = 12 x (1443.07 / (42.5^2 π) = 3.0517

Maximum slab thickness = 4.5 inches

Maximum concrete thickness = 4.5 + 3.0517 = 7.5517 inches

Table H4-11: Range of Floor Thickness for Types I, III, and IIIA Tanks

Parameter	Minimum	Nominal	Maximum
Type I Tank Floor Thickness Variations			
Basemat Thickness with assumed 1 inch tolerance [a]	29	30	31
Working Slab Thickness with 0.5” tolerance [a]	- -	- -	4.5
Grout layer [b]	- -	- -	3
Total thickness	29	30	38.5
Type III Tank Floor Thickness Variations			
Basemat Thickness with assumed 0.5 inch tolerance [a]	41.5	42	42.5
Working Slab Thickness with no tolerance [a]	- -	- -	4
Total thickness	41.5	42	46.5
Type IIIA Tank Floor Thickness Variations			
Basemat Thickness with assumed 0.5 inch tolerance [a]	40.5	41	41.5
Working Slab Thickness with no tolerance [a]	- -	- -	4
Total thickness	40.5	41	45.5

[a] Based on Table H4-3 with the assumed tolerances
[b] W145573

H5 Radionuclide and Chemical Inventory

Inventory in the tanks and ancillary equipment are presented in the tables that follow. For Revision 1, the inventories have changed in the FTF Tanks for the radionuclides and chemicals. Thus Tables H5-1, H5-2, H5-4 and H5-5 have been replaced in their entirety. Tables H5-3 and H5-6 have also been revised as necessary. The tank inventories are based on SRR-CWDA-2009-00045. The inventory in the ancillary equipment has not been revised for Revision 1 of the PA.

The inventories are presented in the FTF PA as follows:

Radionuclide inventory in tanks: FTF PA, Table 3.3-2
Non-radionuclide inventory in tanks: FTF PA, Table 3.3-3
Radionuclide inventory in transfer lines: FTF PA, Table 3.3-13
Non-radionuclide inventory in transfer lines: FTF PA, Table 3.3-14
Radionuclide inventory in pump tanks and catch tank: FTF PA, Table 3.3-16
Non-radionuclide inventory in pump tanks and catch tank: FTF PA, Table 3.3-17
Radionuclide inventory in CTS and evaporators: FTF PA, Table 3.3-20
Non-radionuclide inventory in CTS and evaporators: FTF PA, Table 3.3-21

The inventory files within GoldSim are identified below and have been verified that they contain the radionuclide inventory data presented in the inventory tables that follow with the exception of the following which have not been input into the GoldSim model: Ba-137m, Bk-249, Ce-144, Cm-242, Cs-134, Eu-155, Na-22, Pm-147, Pr-144, Pt-193, Rh-106, Ru-106, Sb-125, Sb-126, Sb-126m, Te-125m, and Y-90.

FTF tank radionuclide inventory (Tables H5-1 and H5-2) – GoldSim file *FTF_Tank_inventories*.

FTF ancillary radionuclide inventory (Table H5-3) – GoldSim file *FTF_Ancillary_inventories*.

In addition to the baseline radionuclide inventories in the waste tanks presented in Tables H5-1 and H5-2, an inventory stochastic was developed for each waste tank in SRR-CWDA-2009-00045 as discussed in PA Section 5.6.3.2.

Within the GoldSim model the inventory stochastic is presented for each tank under

TheTanks/Tankxx/InventoryDistributions/Rad_Dist_by_Rady and the data elements *Rad_Maxy* and *Rad_Miny* which are also provided under *TheTanks/Tankxx/InventoryDistributions* where "xx" and "y" are the Tank number. The data provided in SRR-CWDA-2009-00045 and in PA Section 5.6.3.2 is consistent with the data provided in the GoldSim model.

Table H5-1: Radionuclide Inventory by Waste Tank (Tanks 1 through 19) [Curies]

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6	Tank 7	Tank 8	Tank 17	Tank 18	Tank 19
Ac-227	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03
Al-26	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	NE	1.0E+00	1.0E+00
Am-241	6.0E+02	6.0E+02	6.0E+02	6.0E+02	6.0E+02	6.0E+02	6.0E+02	6.0E+02	8.4E+00	8.2E+01	2.3E+00
Am-242m	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	NE	1.0E+00	1.0E+00
Am-243	1.4E+00	1.4E+00	1.4E+00	1.4E+00	1.4E+00	1.4E+00	1.4E+00	1.4E+00	NE	1.0E-01	1.0E-01
Ba-137m	8.7E+03	8.7E+03	8.7E+03	8.7E+03	8.7E+03	8.7E+03	8.7E+03	8.7E+03	1.0E+01	9.1E+03	6.2E+03
C-14	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	NE	1.0E+00	1.0E+00
Cf-249	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	NE	1.0E+00	1.0E+00
Cl-36	1.2E+02	1.2E+02	1.2E+02	1.2E+02	1.2E+02	1.2E+02	1.2E+02	1.2E+02	2.9E-04	1.0E+02	1.0E+00
Cm-243	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03
Cm-244	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03
Cm-245	1.8E+01	1.8E+01	1.8E+01	1.8E+01	1.8E+01	1.8E+01	1.8E+01	1.8E+01	3.4E-02	1.0E+00	1.0E+00
Cm-247	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.7E-04	1.0E+00	1.0E+00
Cm-248	9.2E+03	9.2E+03	9.2E+03	9.2E+03	9.2E+03	9.2E+03	9.2E+03	9.2E+03	1.1E+01	9.7E+03	6.5E+03
Co-60	1.9E+01	1.9E+01	1.9E+01	1.9E+01	1.9E+01	1.9E+01	1.9E+01	1.9E+01	NE	1.0E+00	1.0E+00
Cs-135	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	5.8E+00	1.0E+00	1.0E+00
Cs-137	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.3E-06	1.0E-03	1.0E-03
Eu-152	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03
Eu-154	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03
H-3	6.3E+00	6.3E+00	6.3E+00	6.3E+00	6.3E+00	6.3E+00	6.3E+00	6.3E+00	1.8E-01	1.0E+00	1.0E+00
I-129	4.9E+02	4.9E+02	4.9E+02	4.9E+02	4.9E+02	4.9E+02	4.9E+02	4.9E+02	NE	8.2E+01	1.4E+01
K-40	2.3E-01	2.3E-01	2.3E-01	2.3E-01	2.3E-01	2.3E-01	2.3E-01	2.3E-01	1.4E-02	2.4E-01	2.2E-03
Nb-93m	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03
Nb-94	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	NE	1.0E-03	1.0E+00
Ni-59	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03
Ni-63	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	NE	1.0E+00	1.0E+00
Np-237	6.0E+02	6.0E+02	6.0E+02	6.0E+02	6.0E+02	6.0E+02	6.0E+02	6.0E+02	8.4E+00	8.2E+01	2.3E+00
Pa-231	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	NE	1.0E+00	1.0E+00
Pd107	1.4E+00	1.4E+00	1.4E+00	1.4E+00	1.4E+00	1.4E+00	1.4E+00	1.4E+00	NE	1.0E-01	1.0E-01
Pt-193	8.7E+03	8.7E+03	8.7E+03	8.7E+03	8.7E+03	8.7E+03	8.7E+03	8.7E+03	1.0E+01	9.1E+03	6.2E+03

Table H5-1: Radionuclide Inventory by Waste Tank (Tanks 1 through 19) [Curies] (Continued)

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6	Tank 7	Tank 8	Tank 17	Tank 18	Tank 19
Pu-238	1.4E+02	1.4E+02	1.4E+02	1.4E+02	1.4E+02	1.4E+02	1.4E+02	1.4E+02	5.4E+01	7.0E+01	4.4E+00
Pu-239	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	1.5E+01	1.6E+02	6.4E+00
Pu-240	7.2E+00	7.2E+00	7.2E+00	7.2E+00	7.2E+00	7.2E+00	7.2E+00	7.2E+00	3.4E+00	4.9E+01	2.3E+00
Pu-241	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	9.3E+01	1.3E+02	4.6E+00
Pu-242	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	5.3E-03	1.0E+00	1.0E+00
Pu-244	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03
Ra-226	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	NE	1.9E-03	1.1E-03
Sb-126	1.2E+04	1.2E+04	1.2E+04	1.2E+04	1.2E+04	1.2E+04	1.2E+04	1.2E+04	NE	4.6E+01	1.0E+00
Sb-126m	6.7E-01	1.8E-01	1.5E-01	1.8E-01	7.1E-01	8.4E-01	2.1E-02	5.1E-02	2.8E-02	1.6E-01	2.6E-02
Se-79	1.3E+05	1.3E+05	1.3E+05	1.3E+05	1.3E+05	1.3E+05	1.3E+05	1.3E+05	6.6E+01	1.1E+03	5.2E+00
Sm-151	7.9E+01	7.9E+01	7.9E+01	7.9E+01	7.9E+01	7.9E+01	7.9E+01	7.9E+01	9.0E-01	1.0E+00	1.4E+00
Sn-126	2.4E-01	2.4E-01	2.4E-01	2.4E-01	2.4E-01	2.4E-01	2.4E-01	2.4E-01	NE	2.6E-03	1.0E-03
Sr-90	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	NE	1.9E-03	1.1E-03
Tc-99	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	3.7E-05	1.0E+00	1.0E+00
Th-229	1.7E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01	NE	3.8E-01	1.1E-02
Th-230	5.8E-03	5.8E-03	5.8E-03	5.8E-03	5.8E-03	5.8E-03	5.8E-03	5.8E-03	3.0E-04	8.4E-03	2.6E-04
U-232	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	NE	1.0E+00	1.0E+00
U-233	1.7E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01	1.7E-01	6.4E-03	2.2E-01	8.7E-03
U-234	1.3E+05	1.3E+05	1.3E+05	1.3E+05	1.3E+05	1.3E+05	1.3E+05	1.3E+05	6.6E+01	1.1E+03	5.2E+00
U-235	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	NE	1.0E-03	1.0E-03
U-236	1.4E+02	1.4E+02	1.4E+02	1.4E+02	1.4E+02	1.4E+02	1.4E+02	1.4E+02	5.4E+01	7.0E+01	4.4E+00
U-238	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	1.5E+01	1.6E+02	6.4E+00
Y-90	7.2E+00	7.2E+00	7.2E+00	7.2E+00	7.2E+00	7.2E+00	7.2E+00	7.2E+00	3.4E+00	4.9E+01	2.3E+00
Zr93	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	3.2E+01	9.3E+01	1.3E+02	4.6E+00

NOTE: “NE” in Table H5-1 indicates “NOT ESTIMATED”.

Table H5-2: Radionuclide Inventory by Tank (Tanks 20 through 47) [Curies]

	Tank 20	Tank 25	Tank 26	Tank 27	Tank 28	Tank 33	Tank 34	Tank 44	Tank 45	Tank 46	Tank 47
Ac-227	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Al-26	NE	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Am-241	1.6E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	6.3E+01	1.6E+03	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Am-242m	NE	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Am-243	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Ba-137m	2.3E+01	4.9E+03	4.9E+03	4.9E+03	4.9E+03	9.0E+02	3.7E+03	4.9E+03	4.9E+03	4.9E+03	4.9E+03
C-14	NE	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cf-249	NE	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cl-36	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E+00	1.0E+00	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Cm-243	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Cm-244	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Cm-245	4.8E-03	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.7E+01	4.7E+01	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cm-247	3.6E-05	1.0E+00	1.0E-03	1.0E+00	1.0E-03	1.0E+00	1.0E+00	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Cm-248	2.4E+01	5.2E+03	5.2E+03	5.2E+03	5.2E+03	9.5E+02	3.9E+03	5.2E+03	5.2E+03	5.2E+03	5.2E+03
Co-60	NE	1.0E+00	1.0E+00	1.0E+00	1.0E+00	3.5E+00	1.3E+01	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cs-135	NE	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Cs-137	2.6E-07	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Eu-152	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Eu-154	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
H-3	3.9E-02	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.8E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
I-129	NE	2.4E+01	2.4E+01	2.4E+01	2.4E+01	3.8E+01	1.6E+02	2.4E+01	2.4E+01	2.4E+01	2.4E+01
K40	7.2E-04	1.0E-03	1.0E-03	1.0E-03	1.0E-03	2.5E-02	6.8E-02	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Nb93m	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Nb-94	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Ni-59	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Ni63	NE	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Np237	1.6E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	6.3E+01	1.6E+03	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Pa-231	NE	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Pd107	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Pt-193	2.3E+01	4.9E+03	4.9E+03	4.9E+03	4.9E+03	9.0E+02	3.7E+03	4.9E+03	4.9E+03	4.9E+03	4.9E+03

Table H5-2: Radionuclide Inventory by Tank (Tanks 20 through 47) [Curies] (Continued)

	Tank 20	Tank 25	Tank 26	Tank 27	Tank 28	Tank 33	Tank 34	Tank 44	Tank 45	Tank 46	Tank 47
Pu-238	6.1E+00	1.2E+02	1.2E+02	1.2E+02	1.2E+02	3.6E+01	1.0E+00	1.2E+02	1.2E+02	1.2E+02	1.2E+02
Pu-239	8.5E-01	2.2E+01	2.2E+01	2.2E+01	2.2E+01	2.2E+01	1.4E+01	2.2E+01	2.2E+01	2.2E+01	2.2E+01
Pu-240	1.8E-01	4.8E+00	4.8E+00	4.8E+00	4.8E+00	3.9E+00	3.2E+00	4.8E+00	4.8E+00	4.8E+00	4.8E+00
Pu-241	1.6E+01	5.4E+01	5.4E+01	5.4E+01	5.4E+01	5.5E+01	3.1E+01	5.4E+01	5.4E+01	5.4E+01	5.4E+01
Pu-242	1.6E-03	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Pu-244	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Ra-226	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Sb-126	NE	7.1E+01	7.1E+01	7.1E+01	7.1E+01	9.3E+02	4.0E+03	7.1E+01	7.1E+01	7.1E+01	7.1E+01
Sb-126m	5.9E-03	2.4E-03	4.2E-03	2.0E-03	4.2E-03	5.5E-01	2.4E+00	4.2E-03	4.2E-03	4.2E-03	4.2E-03
Se-79	2.3E+01	1.0E+03	1.0E+03	1.0E+03	1.0E+03	1.4E+04	5.5E+04	1.0E+03	1.0E+03	1.0E+03	1.0E+03
Sm-151	8.5E-01	1.0E+00	1.0E+00	1.0E+00	1.0E+00	5.1E+00	2.2E+01	1.0E+00	1.0E+00	1.0E+00	1.0E+00
Sn-126	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Sr-90	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
Tc-99	8.3E-04	6.2E-04	5.8E-04	5.8E-04	5.8E-04	7.7E-02	3.4E-01	5.8E-04	5.8E-04	5.8E-04	5.8E-04
Th-229	NE	2.6E-02	2.6E-02	2.6E-02	2.6E-02	7.9E-02	8.8E-02	2.6E-02	2.6E-02	2.6E-02	2.6E-02
Th-230	1.9E-05	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.2E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
U-232	2.7E-05	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0E+00
U-233	5.6E-04	2.6E-02	2.6E-02	2.6E-02	2.6E-02	7.9E-02	8.8E-02	2.6E-02	2.6E-02	2.6E-02	2.6E-02
U-234	2.3E+01	1.0E+03	1.0E+03	1.0E+03	1.0E+03	1.4E+04	5.5E+04	1.0E+03	1.0E+03	1.0E+03	1.0E+03
U-235	NE	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-03
U-236	6.1E+00	1.2E+02	1.2E+02	1.2E+02	1.2E+02	3.6E+01	1.0E+00	1.2E+02	1.2E+02	1.2E+02	1.2E+02
U-238	8.5E-01	2.2E+01	2.2E+01	2.2E+01	2.2E+01	2.2E+01	1.4E+01	2.2E+01	2.2E+01	2.2E+01	2.2E+01
Y-90	1.8E-01	4.8E+00	4.8E+00	4.8E+00	4.8E+00	3.9E+00	3.2E+00	4.8E+00	4.8E+00	4.8E+00	4.8E+00
Zr93	1.6E+01	5.4E+01	5.4E+01	5.4E+01	5.4E+01	5.5E+01	3.1E+01	5.4E+01	5.4E+01	5.4E+01	5.4E+01

NOTE: "NE" in Tables H5-2 and H5-3 indicates "NOT ESTIMATED".

Table H5-3: Radionuclide Inventory for Ancillary Equipment and Total FTF [Curies]

	Transfer Lines	FPT-1	FPT-2	FPT-3	Catch Tank	242-3F Tank	Evaporator 242-F	Evaporator 242-16F	Total Ancillary	Total Tanks	Total FTF	% Tanks
Ac-227	2.71E-08	1.43E-10	1.43E-10	1.43E-10	8.86E-10	0.00E+00	0.00E+00	0.00E+00	2.84E-08	2.00E-02	2.00E-02	100.0
Al-26	2.64E-04	1.40E-06	1.40E-06	1.40E-06	2.48E-06	0.00E+00	0.00E+00	0.00E+00	2.71E-04	2.00E+01	2.00E+01	100.0
Am-241	2.07E+01	1.09E-01	1.09E-01	1.09E-01	1.31E-01	1.01E+00	4.01E-03	4.01E-03	2.22E+01	6.57E+03	6.59E+03	99.7
Am-242m	2.97E-02	1.57E-04	1.57E-04	1.57E-04	1.35E-04	0.00E+00	0.00E+00	0.00E+00	3.03E-02	2.00E+01	2.00E+01	99.8
Am-243	3.37E-03	1.79E-05	1.79E-05	1.79E-05	1.79E-03	0.00E+00	0.00E+00	0.00E+00	5.21E-03	1.14E+01	1.14E+01	100.0
Ba-137m	1.93E+02	1.02E+00	1.02E+00	1.02E+00	1.73E+00	4.43E+02	6.16E-01	6.16E-01	6.42E+02	1.29E+05	1.29E+05	99.5
Bk-249	7.78E-29	4.12E-31	4.12E-31	4.12E-31	3.43E-35	0.00E+00	0.00E+00	0.00E+00	7.90E-29	0	7.90E-29	0.0
C-14	1.51E-03	7.97E-06	7.97E-06	7.97E-06	3.84E-05	0.00E+00	0.00E+00	0.00E+00	1.57E-03	2.00E+01	2.00E+01	100.0
Ce-144	6.74E-08	3.57E-10	3.57E-10	3.57E-10	5.30E-15	0.00E+00	0.00E+00	0.00E+00	6.85E-08	0	6.85E-08	0.0
Cf-249	2.86E-20	1.51E-22	1.51E-22	1.51E-22	8.20E-22	0.00E+00	0.00E+00	0.00E+00	2.99E-20	2.00E+01	2.00E+01	100.0
Cl-36	NE	NE	NE	NE	NE	NE	NE	NE	NE	2.00E-02	2.00E-02	100.0
Cm-242	8.51E-20	4.51E-22	4.51E-22	4.51E-22	1.67E-30	0.00E+00	0.00E+00	0.00E+00	8.65E-20	0	8.65E-20	0.0
Cm-243	4.98E-04	2.63E-06	2.63E-06	2.63E-06	3.43E-06	0.00E+00	0.00E+00	0.00E+00	5.09E-04	2.00E+01	2.00E+01	100.0
Cm-244	9.55E-01	5.05E-03	5.05E-03	5.05E-03	1.33E-01	0.00E+00	0.00E+00	0.00E+00	1.10E+00	1.06E+03	1.06E+03	99.9
Cm-245	1.23E-05	6.48E-08	6.48E-08	6.48E-08	4.38E-06	0.00E+00	0.00E+00	0.00E+00	1.68E-05	2.00E+01	2.00E+01	100.0
Cm-247	4.56E-18	2.41E-20	2.41E-20	2.41E-20	1.33E-19	0.00E+00	0.00E+00	0.00E+00	4.77E-18	2.00E-02	2.00E-02	100.0
Cm-248	1.05E-18	5.57E-21	5.57E-21	5.57E-21	3.07E-20	0.00E+00	0.00E+00	0.00E+00	1.10E-18	2.00E-02	2.00E-02	100.0
Co-60	8.24E-01	4.36E-03	4.36E-03	4.36E-03	4.83E-03	0.00E+00	1.53E-04	1.53E-04	8.42E-01	2.18E+02	2.19E+02	99.6
Cs-134	4.58E-04	2.42E-06	2.42E-06	2.42E-06	8.58E-08	0.00E+00	0.00E+00	0.00E+00	4.65E-04	0	4.65E-04	0.0
Cs-135	5.80E-04	3.07E-06	3.07E-06	3.07E-06	1.00E-05	0.00E+00	0.00E+00	0.00E+00	5.99E-04	1.40E+01	1.40E+01	100.0
Cs-137	2.07E+02	1.09E+00	1.09E+00	1.09E+00	1.83E+00	4.73E+02	6.59E-01	6.59E-01	6.86E+02	1.36E+05	1.37E+05	99.5
Eu-152	2.34E-01	1.24E-03	1.24E-03	1.24E-03	3.97E-03	0.00E+00	0.00E+00	0.00E+00	2.42E-01	1.79E+02	1.79E+02	99.9
Eu-154	2.56E+00	1.35E-02	1.35E-02	1.35E-02	3.06E-02	0.00E+00	0.00E+00	0.00E+00	2.63E+00	1.25E+03	1.25E+03	99.8
Eu-155	2.27E+00	1.20E-02	1.20E-02	1.20E-02	1.21E-02	0.00E+00	0.00E+00	0.00E+00	2.32E+00	0	2.32E+00	0.0
H-3	1.12E-01	1.53E-04	1.53E-04	1.53E-04	8.64E-04	6.66E-02	0.00E+00	0.00E+00	1.80E-01	2.58E+01	2.60E+01	99.3
I-129	2.51E-06	1.33E-08	1.33E-08	1.33E-08	7.15E-08	0.00E+00	0.00E+00	0.00E+00	2.62E-06	2.00E-02	2.00E-02	100.0
K-40	NE	NE	NE	NE	NE	NE	NE NE	NE	NE	2.00E-02	2.00E-02	100.0
Na-22	4.14E-04	2.19E-06	2.19E-06	2.19E-06	7.88E-08	0.00E+00	0.00E+00	0.00E+00	4.21E-04	0	4.21E-04	0.0
Nb-93m	NE	NE	NE	NE	NE	NE	NE	NE	NE	2.00E-02	2.00E-02	100.0
Nb-94	1.33E-03	7.06E-06	7.06E-06	7.06E-06	6.48E-07	0.00E+00	0.00E+00	0.00E+00	1.36E-03	5.02E+00	5.02E+00	100.0
Ni-59	5.93E-02	3.14E-04	3.14E-04	3.14E-04	1.35E-03	0.00E+00	0.00E+00	0.00E+00	6.16E-02	6.34E+01	6.35E+01	99.9
Ni-63	4.91E+00	2.60E-02	2.60E-02	2.60E-02	1.06E-01	0.00E+00	0.00E+00	0.00E+00	5.10E+00	4.41E+03	4.41E+03	99.9
Np-237	2.79E-03	1.48E-05	1.48E-05	1.48E-05	4.07E-05	4.74E-04	3.62E-06	3.62E-06	3.36E-03	2.20E+00	2.20E+00	99.8

Table H5-3: Radionuclide Inventory for Ancillary Equipment and Total FTF [Curies] (Continued)

	Transfer Lines	FPT-1	FPT-2	FPT-3	Catch Tank	242-3F Tank	Evaporator 242-F	Evaporator 242-16F	Total Ancillary	Total Tanks	Total FTF	% Tanks
Pa-231	1.11E-06	5.85E-09	5.85E-09	5.85E-09	1.87E-09	0.00E+00	0.00E+00	0.00E+00	1.12E-06	2.00E-02	2.00E-02	100.0
Pd-107	NE	NE	NE	NE	NE	NE	NE	NE	NE	2.00E-02	2.00E-02	100.0
Pm-147	2.21E+00	1.17E-02	1.17E-02	1.17E-02	1.90E-03	0.00E+00	0.00E+00	0.00E+00	2.24E+00	0	2.24E+00	0.0
Pr-144	6.74E-08	3.57E-10	3.57E-10	3.57E-10	5.30E-15	0.00E+00	0.00E+00	0.00E+00	6.85E-08	0	6.85E-08	0.0
Pt-193	NE	NE	NE	NE	NE	NE	NE	NE	NE	1.02E+00	1.02E+00	100.0
Pu-238	6.49E+00	3.43E-02	3.43E-02	3.43E-02	1.04E-01	9.17E-01	4.72E-03	4.72E-03	7.62E+00	2.25E+03	2.26E+03	99.7
Pu-239	2.55E+00	1.35E-02	1.35E-02	1.35E-02	2.56E-02	1.47E+00	1.40E-02	1.40E-02	4.11E+00	6.50E+02	6.54E+02	99.4
Pu-240	9.37E-01	4.96E-03	4.96E-03	4.96E-03	6.04E-03	3.84E-01	3.08E-03	3.08E-03	1.35E+00	1.58E+02	1.59E+02	99.2
Pu-241	4.40E+00	2.33E-02	2.33E-02	2.33E-02	2.73E-02	2.48E+00	2.05E-02	2.05E-02	7.02E+00	1.02E+03	1.02E+03	99.3
Pu-242	7.71E-03	4.08E-05	4.08E-05	4.08E-05	7.62E-06	1.31E-03	4.47E-06	4.47E-06	9.16E-03	2.00E+01	2.00E+01	100.0
Pu-244	3.63E-06	1.92E-08	1.92E-08	1.92E-08	3.46E-08	0.00E+00	0.00E+00	0.00E+00	3.72E-06	2.00E-02	2.00E-02	100.0
Ra-226	5.10E-03	2.70E-05	2.70E-05	2.70E-05	1.31E-04	0.00E+00	0.00E+00	0.00E+00	5.31E-03	2.10E-02	2.63E-02	79.8
Rh-106	5.24E-06	2.77E-08	2.77E-08	2.77E-08	8.04E-12	0.00E+00	0.00E+00	0.00E+00	5.32E-06	0	5.32E-06	0.0
Ru-106	5.24E-06	2.77E-08	2.77E-08	2.77E-08	8.04E-12	0.00E+00	0.00E+00	0.00E+00	5.32E-06	0	5.32E-06	0.0
Sb-125	1.45E-01	7.65E-04	7.65E-04	7.65E-04	1.45E-04	0.00E+00	0.00E+00	0.00E+00	1.47E-01	0	1.47E-01	0.0
Sb-126	7.88E-03	4.17E-05	4.17E-05	4.17E-05	2.26E-04	0.00E+00	0.00E+00	0.00E+00	8.24E-03	8.24E-01	8.32E-01	99.0
Sb-126m	5.62E-02	2.97E-04	2.97E-04	2.97E-04	1.61E-03	0.00E+00	0.00E+00	0.00E+00	5.87E-02	5.88E+00	5.94E+00	99.0
Se-79	3.00E-02	1.59E-04	1.59E-04	1.59E-04	8.67E-04	1.77E-06	7.70E-09	7.70E-09	3.14E-02	4.83E+01	4.84E+01	99.9
Sm-151	8.73E+01	4.62E-01	4.62E-01	4.62E-01	2.38E+00	0.00E+00	0.00E+00	0.00E+00	9.10E+01	1.02E+05	1.02E+05	99.9
Sn-126	5.62E-02	2.97E-04	2.97E-04	2.97E-04	1.61E-03	0.00E+00	0.00E+00	0.00E+00	5.87E-02	6.00E+00	6.06E+00	99.0
Sr-90	1.11E+03	5.87E+00	5.87E+00	5.87E+00	2.56E+01	3.65E+01	3.76E-02	3.76E-02	1.19E+03	1.12E+06	1.12E+06	99.9
Tc-99	5.30E-01	2.81E-03	2.81E-03	2.81E-03	1.50E-02	1.10E-01	1.28E-03	1.28E-03	6.66E-01	6.71E+02	6.72E+02	99.9
Te-125m	3.53E-02	1.87E-04	1.87E-04	1.87E-04	3.56E-05	0.00E+00	0.00E+00	0.00E+00	3.59E-02	0	3.59E-02	0.0
Th-229	1.78E-03	9.41E-06	9.41E-06	9.41E-06	4.29E-05	0.00E+00	0.00E+00	0.00E+00	1.85E-03	2.03E+00	2.03E+00	99.9
Th-230	5.06E-03	2.68E-05	2.68E-05	2.68E-05	1.30E-04	0.00E+00	0.00E+00	0.00E+00	5.27E-03	2.10E-02	2.63E-02	79.9
U-232	2.63E-05	1.39E-07	1.39E-07	1.39E-07	6.35E-07	0.00E+00	0.00E+00	0.00E+00	2.74E-05	2.00E+01	2.00E+01	100.0
U-233	1.32E-02	6.96E-05	6.96E-05	6.96E-05	4.09E-05	3.22E-03	1.12E-05	1.12E-05	1.67E-02	3.23E+00	3.25E+00	99.5
U-234	8.46E-03	4.48E-05	4.48E-05	4.48E-05	8.99E-05	2.09E-03	7.08E-06	7.08E-06	1.08E-02	2.13E+00	2.14E+00	99.5
U-235	1.00E-04	5.30E-07	5.30E-07	5.30E-07	1.95E-06	5.23E-06	8.12E-08	8.12E-08	1.09E-04	6.56E-02	6.57E-02	99.8
U-236	1.62E-04	8.55E-07	8.55E-07	8.55E-07	1.84E-06	2.16E-05	1.37E-07	1.37E-07	1.88E-04	2.00E+01	2.00E+01	100.0
U-238	4.95E-03	2.62E-05	2.62E-05	2.62E-05	8.99E-05	3.92E-04	7.50E-06	7.50E-06	5.53E-03	1.97E+00	1.98E+00	99.7
Y-90	1.11E+03	5.87E+00	5.87E+00	5.87E+00	2.56E+01	3.65E+01	3.76E-02	3.76E-02	1.19E+03	1.12E+06	1.12E+06	99.9
Zr-93	NE	NE	NE	NE	NE	NE	NE	NE	NE	2.00E-02	2.00E-02	100.0

Table H5-4: Chemical Inventory by Tank (Tanks 1 through 19) [Kg]

	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5	Tank 6	Tank 7	Tank 8	Tank 17	Tank 18	Tank 19
Ag	5.9E+00	5.9E+00	5.9E+00	5.9E+00	5.9E+00	5.9E+00	5.9E+00	5.9E+00	6.6E+00	3.2E+00	1.2E+00
As	4.5E-02	4.5E-02	4.5E-02	4.5E-02	4.5E-02	4.5E-02	4.5E-02	4.5E-02	NE	8.2E-01	9.7E-01
Ba	1.3E+01	1.3E+01	1.3E+01	1.3E+01	1.3E+01	1.3E+01	1.3E+01	1.3E+01	3.9E+00	3.8E+00	9.9E+00
Cd	4.7E+00	4.7E+00	4.7E+00	4.7E+00	4.7E+00	4.7E+00	4.7E+00	4.7E+00	1.8E+01	1.2E+02	1.1E+00
Cr	9.7E+00	9.7E+00	9.7E+00	9.7E+00	9.7E+00	9.7E+00	9.7E+00	9.7E+00	4.7E+00	1.1E+01	4.2E+00
Cu	3.9E+00	3.9E+00	3.9E+00	3.9E+00	3.9E+00	3.9E+00	3.9E+00	3.9E+00	3.3E+00	5.1E+00	5.1E-01
F	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	2.9E+00	3.5E+00	7.2E-01	1.8E+01
Fe	8.1E+02	8.1E+02	8.1E+02	8.1E+02	8.1E+02	8.1E+02	8.1E+02	8.1E+02	5.4E+02	1.7E+03	2.1E+02
Hg	6.3E+00	6.3E+00	6.3E+00	6.3E+00	6.3E+00	6.3E+00	6.3E+00	6.3E+00	1.4E+00	2.0E+01	2.0E+00
Mn	5.7E+02	5.7E+02	5.7E+02	5.7E+02	5.7E+02	5.7E+02	5.7E+02	5.7E+02	4.8E+01	2.1E+02	1.5E+01
NO3	4.3E+01	4.3E+01	4.3E+01	4.3E+01	4.3E+01	4.3E+01	4.3E+01	4.3E+01	NE	7.8E+00	5.5E+02
NO2	9.0E+02	9.0E+02	9.0E+02	9.0E+02	9.0E+02	9.0E+02	9.0E+02	9.0E+02	NE	4.6E+00	3.8E+02
Ni	3.1E+02	3.1E+02	3.1E+02	3.1E+02	3.1E+02	3.1E+02	3.1E+02	3.1E+02	8.3E-01	1.9E+01	1.6E+00
Pb	1.3E+01	1.3E+01	1.3E+01	1.3E+01	1.3E+01	1.3E+01	1.3E+01	1.3E+01	5.5E+00	4.0E+01	5.3E+00
Sb	1.9E+00	1.9E+00	1.9E+00	1.9E+00	1.9E+00	1.9E+00	1.9E+00	1.9E+00	NE	2.5E+01	2.2E+01
Se	3.6E-02	3.6E-02	3.6E-02	3.6E-02	3.6E-02	3.6E-02	3.6E-02	3.6E-02	NE	8.2E-01	8.8E+00
U	5.1E+02	5.1E+02	5.1E+02	5.1E+02	5.1E+02	5.1E+02	5.1E+02	5.1E+02	5.6E+01	5.4E+02	1.9E+01
Zn	7.1E+00	7.1E+00	7.1E+00	7.1E+00	7.1E+00	7.1E+00	7.1E+00	7.1E+00	6.6E+00	9.0E+00	7.1E-01

NOTE: “NE” in Tables H5-4 indicates “NOT ESTIMATED”.
[FTF PA, Table 3.3-3]

Table H5-5: Chemical Inventory by Tank (Tanks 20 through 47) [Kg]

	Tank 20	Tank 25	Tank 26	Tank 27	Tank 28	Tank 33	Tank 34	Tank 44	Tank 45	Tank 46	Tank 47
Ag	3.1E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	9.5E-01	6.0E-01	3.7E+00	3.7E+00	3.7E+00	3.7E+00
As	0.0E+00	1.5E-02	1.5E-02	1.5E-02	1.5E-02	7.4E-03	1.2E-02	1.5E-02	1.5E-02	1.5E-02	1.5E-02
Ba	1.8E+00	2.2E+00	2.2E+00	2.2E+00	2.2E+00	1.6E+00	4.5E+00	2.2E+00	2.2E+00	2.2E+00	2.2E+00
Cd	1.8E+00	1.6E+00	1.6E+00	1.6E+00	1.6E+00	7.8E-01	1.3E+00	1.6E+00	1.6E+00	1.6E+00	1.6E+00
Cr	2.5E+00	2.6E+00	2.6E+00	2.6E+00	2.6E+00	1.4E+00	3.3E+00	2.6E+00	2.6E+00	2.6E+00	2.6E+00
Cu	1.5E+00	1.8E+00	1.8E+00	1.8E+00	1.8E+00	6.4E-01	9.7E-01	1.8E+00	1.8E+00	1.8E+00	1.8E+00
F	2.4E+01	1.9E+00	1.9E+00	1.9E+00	1.9E+00	4.7E-01	1.8E-01	1.9E+00	1.9E+00	1.9E+00	1.9E+00
Fe	2.5E+02	3.0E+02	3.0E+02	3.0E+02	3.0E+02	1.2E+02	2.4E+02	3.0E+02	3.0E+02	3.0E+02	3.0E+02
Hg	6.3E-01	7.6E-01	7.6E-01	7.6E-01	7.6E-01	6.9E-01	2.2E+00	7.6E-01	7.6E-01	7.6E-01	7.6E-01
Mn	1.2E+01	5.7E+01	5.7E+01	5.7E+01	5.7E+01	1.3E+00	1.2E-01	5.7E+01	5.7E+01	5.7E+01	5.7E+01
NO3	1.7E+01	2.0E+01	2.0E+01	2.0E+01	2.0E+01	7.0E+00	1.1E+01	2.0E+01	2.0E+01	2.0E+01	2.0E+01
NO2	0.0E+00	6.8E+02	6.8E+02	6.8E+02	6.8E+02	3.8E+01	6.3E+01	6.8E+02	6.8E+02	6.8E+02	6.8E+02
Ni	8.0E-01	6.8E+02	6.8E+02	6.8E+02	6.8E+02	1.1E+01	6.8E+01	6.8E+02	6.8E+02	6.8E+02	6.8E+02
Pb	2.6E+00	3.9E+01	3.9E+01	3.9E+01	3.9E+01	1.7E+00	4.3E+00	3.9E+01	3.9E+01	3.9E+01	3.9E+01
Sb	0.0E+00	6.4E-01	6.4E-01	6.4E-01	6.4E-01	3.1E-01	5.1E-01	6.4E-01	6.4E-01	6.4E-01	6.4E-01
Se	0.0E+00	1.2E-02	1.2E-02	1.2E-02	1.2E-02	5.9E-03	9.6E-03	1.2E-02	1.2E-02	1.2E-02	1.2E-02
U	1.7E+01	7.7E+01	7.7E+01	7.7E+01	7.7E+01	2.3E+02	2.5E+02	7.7E+01	7.7E+01	7.7E+01	7.7E+01
Zn	3.1E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00	1.2E+00	1.5E+00	3.7E+00	3.7E+00	3.7E+00	3.7E+00

NOTE: “NE” in Tables H5-5 indicates “NOT ESTIMATED”.
[FTF PA, Table 3.3-3]

Table H5-6: Chemical Inventory for Ancillary Equipment and Total FTF [Kg]

	Transfer Lines	FPT-1	FPT-2	FPT-3	Catch Tank	242-3F Tank	Evaporator 242-F	Evaporator 242-16F	Total Ancillary	Total Tanks	Total FTF	% Tanks
Ag	2.9E-01	1.5E-03	1.5E-03	1.5E-03	9.3E-03	6.2E-03	2.2E-04	2.2E-04	3.1E-01	9.2E+01	9.3E+01	99.7
As	9.8E-03	5.2E-05	5.2E-05	5.2E-05	3.1E-04	1.1E-02	2.1E-05	2.1E-05	2.2E-02	2.3E+00	2.3E+00	99.1
Ba	3.6E-01	1.9E-03	1.9E-03	1.9E-03	1.1E-02	9.1E-02	7.4E-04	7.4E-04	4.7E-01	1.5E+02	1.5E+02	99.7
Cd	1.0E+00	5.4E-03	5.4E-03	5.4E-03	3.3E-02	3.5E-02	3.0E-04	3.0E-04	1.1E+00	1.9E+02	1.9E+02	99.4
Cr	3.8E-01	2.0E-03	2.0E-03	2.0E-03	1.2E-02	2.3E-01	2.5E-03	2.5E-03	6.3E-01	1.3E+02	1.3E+02	99.5
Cu	1.9E-01	1.0E-03	1.0E-03	1.0E-03	6.2E-03	2.5E-01	8.4E-04	8.4E-04	4.5E-01	5.8E+01	5.8E+01	99.2
F	2.6E-01	1.4E-03	1.4E-03	1.4E-03	8.4E-03	0.0E+00	0.0E+00	0.0E+00	2.7E-01	8.5E+01	8.6E+01	99.7
Fe	4.1E+01	2.2E-01	2.2E-01	2.2E-01	1.3E+00	5.3E+01	2.2E-01	2.2E-01	9.7E+01	1.2E+04	1.2E+04	99.2
Hg	2.8E-01	1.5E-03	1.5E-03	1.5E-03	8.9E-03	9.1E-02	1.0E-03	1.0E-03	3.8E-01	8.3E+01	8.4E+01	99.5
Mn	7.4E+00	3.9E-02	3.9E-02	3.9E-02	2.4E-01	6.2E+00	8.7E-03	8.7E-03	1.4E+01	5.3E+03	5.3E+03	99.7
Ni	3.0E+01	1.6E-01	1.6E-01	1.6E-01	9.6E-01	3.9E-01	3.0E-03	3.0E-03	3.2E+01	1.1E+03	1.1E+03	97.2
NO_2	3.1E+01	1.7E-01	1.7E-01	1.7E-01	1.0E+00	0.0E+00	0.0E+00	0.0E+00	3.3E+01	1.3E+04	1.3E+04	99.8
NO_3	3.1E+00	1.7E-02	1.7E-02	1.7E-02	1.0E-01	0.0E+00	0.0E+00	0.0E+00	3.3E+00	8.0E+03	8.0E+03	100.0
Pb	2.1E+00	1.1E-02	1.1E-02	1.1E-02	6.8E-02	3.8E-01	1.6E-03	1.6E-03	2.6E+00	4.8E+02	4.8E+02	99.5
Sb	2.3E-01	1.2E-03	1.2E-03	1.2E-03	7.5E-03	2.4E-01	8.2E-04	8.2E-04	4.8E-01	6.8E+01	6.9E+01	99.3
Se	3.0E-02	1.6E-04	1.6E-04	1.6E-04	9.6E-04	1.1E-02	2.1E-05	2.1E-05	4.3E-02	1.0E+01	1.0E+01	99.6
U	1.6E+01	8.6E-02	8.6E-02	8.6E-02	5.2E-01	1.2E+00	2.2E-02	2.2E-02	1.8E+01	5.8E+03	5.8E+03	99.7
V	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.6E-02	5.0E-05	5.0E-05	2.7E-02	0.0E+00	2.7E-02	0.0
Zn	3.6E-01	1.9E-03	1.9E-03	1.9E-03	1.2E-02	1.2E+00	2.8E-03	2.8E-03	1.6E+00	1.1E+02	1.1E+02	98.6

H6 Dose Conversion Factors and Dose Pathway Factors

Dose conversion factors are used by GoldSim to compute the dose from various pathways and at various locations. Two different GoldSim models are used. GoldSim model v2.3stoch is used to develop the sensitivity analyses for the various probability distributions of parameters and thus uses the flow results from PORFLOW as the starting point of its analysis. GoldSim model v1.3dose is used to calculate the baseline case, by only using the baseline (deterministic) values for the various parameters. Thus GoldSim v1.3dose uses the actual PORFLOW concentrations of the various radionuclides at discrete locations to determine radiological exposure.

Table H6-1 provides the dose factors for the isotopes of interest in the PA modeling which are developed within FTF PA Section 4.7.1.1 (for internal dose) and FTF PA Section 4.7.1.2 (for external dose). FTF PA Table 4.7-1 lists the internal and the external dose conversion factors for a large number of radionuclides. Table H6-1 is a subset of FTF PA Table 4.7-1 and only includes those radionuclides of importance in the FTF PA modeling.

Note that the conversion factors for Ba-137m, Bk-249, Ce-144, Cm-242, Cs-134, Eu-155, Na-22, Pm-147, Pr-144, Rh-106, Ru-106, Sb-125, Sb-126, Sb-126m, Te-125m, Y-90 are included in Table H6-1 but are not explicitly included in the GoldSim models. The dose conversion factors for Pt-193 are not included in Table H6-1 and are not presented in the PA. Pt-193 is not included because of its half-life of 50 years.

The GoldSim model does not individually track the transport of all the isotopes produced from the radioactive decay of the parent isotopes; rather the dose conversion factors for a number of parent isotopes are modified to account for daughter production during their decay during transport. Table H6.1 annotates the isotopes with modified dose conversion factors that are used in the GoldSim model. Table H6.2 provides the modified dose conversion factors that are used in the GoldSim model. Both GoldSim models v2.3stoch and 1.3dose were reviewed and both models use the same dose conversion factors presented either in Tables H6.1 or H6.2.

The ingestion dose factors listed in Tables H6-1 and H6-2 are located in GoldSim under *DoseAssessment/DoseParameters/LADTAP_Factors/DoseFactorIngestion*. The inhalation dose factors listed in Tables H6-1 and H6-2 are located in GoldSim under *DoseAssessment/DoseParameters/LADTAP_Factors/DoseFactorInhalation*. The external – infinite soil depth dose factors in Table H6-1 are located in GoldSim under *DoseAssessment/ IHI/ EXIntSloil_no*. The infinite depth external dose factors shown in Tables H6-1 and H6-2 are not used in the GoldSim models. The external – 15 cm soil depth dose factors in Tables H6-1 and H6-2 are located in GoldSim under *DoseAssessment/ IHI/ EX15cmSoil*.

The water immersion dose factors in Tables H6-1 and H6-2 are located in GoldSim under *DoseAssessment/DoseParameters/LADTAP_Factors/DFSubmerged.*

Table H6-1: Dose Conversion Factors for Ingestion, Inhalation and External Exposure

Isotope	Ingestion (rem/µCi)	Inhalation (rem/µCi)	External – Infinite (rem/yr per µCi /m^3)	External – 15 cm depth (rem/yr per µCi /m^3)	Water Immersion (rem/yr per µCi /m^3)
Ac-227 (1)	4.07E+00	2.04E+03	3.10E-07	3.06E-07	1.52E-06
Al-26	1.30E-02	7.40E-02	1.09E-02	9.03E-03	3.43E-02
Am-241	7.40E-01	1.55E+02	2.73E-05	2.73E-05	2.20E-04
Am-242m (1)	7.03E-01	1.37E+02	1.06E-06	1.05E-06	8.50E-06
Am-243 (1)	7.40E-01	1.52E+02	8.88E-05	8.88E-05	5.77E-04
Ba-137m	--	--	2.25E-03	2.00E-03	7.31E-03
Bk-249	3.59E-03	5.92E-01	2.91E-09	2.90E-09	1.89E-08
C-14	2.15E-03	7.40E-03	8.41E-09	8.41E-09	5.13E-08
Ce-144	1.92E-02	1.33E-01	4.49E-05	4.44E-05	2.23E-04
Cf-249	1.30E+00	2.59E+02	1.16E-03	1.07E-03	4.03E-03
Cl-36	3.44E-03	2.70E-02	1.50E-06	1.42E-06	5.23E-06
Cm-242	4.44E-02	1.92E+01	1.07E-07	1.06E-07	1.55E-06
Cm-243	5.55E-01	1.15E+02	3.64E-04	3.53E-04	1.52E-03
Cm-244	4.44E-01	9.99E+01	7.87E-08	7.87E-08	1.34E-06
Cm-245	7.77E-01	1.55E+02	2.13E-04	2.10E-04	1.03E-03
Cm-247 (1)	7.03E-01	1.44E+02	1.11E-03	1.03E-03	3.82E-03
Cm-248	2.85E+00	5.55E+02	5.49E-08	5.49E-08	9.30E-07
Co-60	1.26E-02	3.70E-02	1.01E-02	8.47E-03	3.20E-02
Cs-134	7.03E-02	2.44E-02	5.92E-03	5.22E-03	1.92E-02
Cs-135	7.40E-03	2.55E-03	2.39E-08	2.40E-08	1.28E-07
Cs-137 (1)	4.81E-02	1.70E-02	4.70E-07	4.60E-07	1.74E-06
Eu-152	5.18E-03	1.55E-01	4.38E-03	3.76E-03	1.44E-02
Eu-154	7.40E-03	1.96E-01	4.80E-03	4.11E-03	1.55E-02
Eu-155	1.18E-03	2.55E-02	1.14E-04	1.14E-04	6.55E-04

Table H6-1: Dose Conversion Factors for Ingestion, Inhalation and External Exposure (Continued)

Isotope	**Ingestion (rem/µCi)**	**Inhalation (rem/µCi)**	**External – Infinite (rem/yr per µCi /m^3)**	**External – 15 cm depth (rem/yr per µCi /m^3)**	**Water Immersion (rem/yr per µCi /m^3)**
H-3	6.66E-05	1.67E-04	0.00E+00	0.00E+00	0.00E+00
I-129	4.07E-01	1.33E-01	8.10E-06	8.10E-06	1.04E-04
K-40	2.29E-02	7.77E-03	6.51E-04	5.34E-04	2.03E-03
Na-22	1.18E-02	4.81E-03	8.55E-03	7.37E-03	2.74E-04
Nb-93m	4.44E-04	1.89E-03	6.50E-08	6.50E-08	1.21E-06
Nb-94	6.29E-03	4.07E-02	6.05E-03	5.29E-03	1.95E-02
Ni-59	2.33E-04	4.81E-04	0.00E+00	0.00E+00	0.00E+00
Ni-63	5.55E-04	1.78E-03	0.00E+00	0.00E+00	0.00E+00
Np-237 (1)	4.07E-01	8.51E+01	4.87E-05	4.86E-05	2.71E-04
Pa-231	2.63E+00	5.18E+02	1.19E-04	1.12E-04	4.42E-04
Pb-210	2.55E+00	4.07E+00	1.53E-06	1.53E-06	1.53E-05
Pd-107	1.37E-04	2.18E-03	0.00E+00	0.00E+00	0.00E+00
Pm-147	9.62E-04	1.85E-02	3.13E-08	3.12E-08	1.64E-07
Pr-144	1.85E-04	6.66E-05	1.58E-04	1.32E-04	4.85E-04
Pu-238	8.51E-01	1.70E+02	9.46E-08	9.43E-08	1.33E-06
Pu-239	9.25E-01	1.85E+02	1.85E-07	1.78E-07	1.12E-06
Pu-240	9.25E-01	1.85E+02	9.17E-08	9.16E-08	1.30E-06
Pu-241	1.78E-02	3.33E+00	3.69E-09	3.68E-09	1.89E-08
Pu-242	8.88E-01	1.78E+02	8.00E-08	8.00E-08	1.09E-06
Pu-244 (1)	8.88E-01	1.74E+02	4.72E-08	4.72E-08	8.13E-07
Ra-226	1.04E+00	1.30E+01	1.99E-05	1.93E-05	8.12E-05
Ra-228 (1)	2.55E+00	9.62E+00	0.00E+00	0.00E+00	0.00E+00
Rh-106	5.92E-04	4.07E-04	8.07E-04	9.79E-03	2.62E-03

Table H6-1: Dose Conversion Factors for Ingestion, Inhalation and External Exposure (Continued)

Isotope	Ingestion (rem/µCi)	Inhalation (rem/µCi)	External – Infinite (rem/yr per µCi /m^3)	External – 15 cm depth (rem/yr per µCi /m^3)	Water Immersion (rem/yr per µCi /m^3)
Rn-222 (1)	--	--	1.47E-06	1.33E-06	4.86E-06
Ru-106	2.59E-02	1.04E-01	--	--	--
Sb-125	4.07E-03	1.78E-02	1.53E-03	1.38E-03	5.13E-03
Sb-126	8.88E-03	1.04E-02	1.07E-02	9.50E-03	3.49E-02
Sb-126m	1.33E-04	7.03E-05	5.82E-03	5.19E-03	1.90E-02
Se-79	1.07E-02	4.07E-03	1.16E-08	1.16E-08	6.93E-08
Sm-151	3.63E-04	1.48E-02	6.15E-10	6.15E-10	9.93E-09
Sn-126 (1)	1.74E-02	1.04E-01	9.22E-05	9.22E-05	5.56E-04
Sr-90 (1)	1.04E-01	1.33E-01	4.40E-07	4.34E-07	1.71E-06
Tc-99	2.37E-03	1.48E-02	7.85E-08	7.82E-08	3.67E-07
Te-125m	3.22E-03	1.26E-02	9.47E-06	9.46E-06	1.24E-04
Th-228	2.66E-01	1.48E+02	4.96E-06	4.87E-06	2.39E-05
Th-229 (1)	1.81E+00	2.63E+02	2.01E-04	1.99E-04	1.00E-03
Th-230	7.77E-01	5.18E+01	7.56E-07	7.46E-07	4.60E-06
Th-232	8.51E-01	9.25E+01	3.26E-07	3.25E-07	2.32E-06
U-232	1.22E+00	2.89E+01	5.64E-07	5.57E-07	3.76E-06
U-233	1.89E-01	1.33E+01	8.74E-07	8.46E-07	4.25E-06
U-234	1.81E-01	1.30E+01	2.51E-07	2.50E-07	2.04E-06
U-235 (1)	1.74E-01	1.15E+01	4.51E-04	4.38E-04	1.86E-03
U-236	1.74E-01	1.18E+01	1.34E-07	1.33E-07	1.35E-06
U-238 (1)	1.67E-01	1.07E+01	6.45E-08	6.45E-08	9.29E-07
Y-90	9.99E-03	5.55E-03	1.50E-05	1.40E-05	4.24E-05
Zr-93	4.07E-03	3.70E-02	0.00E+00	0.00E+00	0.00E+00

(1) These isotopes have dose conversion factors that are modified to reflect decay production of daughter isotopes.

Table H6-2: Modified Dose Conversion Factors Utilized in GoldSim for Selected Isotopes

Isotope	**Ingestion (rem/µCi)**	**Inhalation (rem/µCi)**	**External – Infinite (rem/yr per µCi /m^3)**	**External – 15 cm depth (rem/yr per µCi /m^3)**	**Water Immersion (rem/yr per µCi /m^3)**
Ac-227	6.23E+00	2.33E+03	1.13E-03	1.07E-03	4.50E-03
Am-242m	7.41E-01	1.53E+02	4.21E-05	4.07E-05	2.02E-04
Am-243	7.43E-01	1.52E+02	5.60E-04	5.45E-04	2.57E-03
Cm-247	7.03E-01	1.44E+02	1.16E-03	1.08E-03	4.09E-03
Cs-137	4.81E-02	1.70E-02	2.13E-03	1.89E-03	6.92E-03
Np-237	4.10E-01	8.51E+01	6.87E-04	6.52E-04	2.66E-03
Pu-244	8.92E-01	1.74E+02	1.27E-03	1.12E-03	4.13E-03
Ra-228	3.08E+00	1.70E+02	1.01E-02	8.37E-03	3.25E-02
Rn-222	9.25E-04	1.04E-01	6.97E-03	5.87E-03	2.24E-02
Sn-126	1.88E-02	1.06E-01	7.41E-03	6.61E-03	2.44E-02
Sr-90	1.14E-01	1.39E-01	1.54E-05	1.44E-05	4.41E-05
Th-229	2.27E+00	3.18E+02	9.99E-04	9.23E-04	3.82E-03
U-235	1.75E-01	1.15E+01	4.74E-04	4.61E-04	2.00E-03
U-238	1.80E-01	1.07E+01	8.28E-05	7.42E-05	3.06E-04

Dose Pathway factors are those factors used in the model to simulate the uptake of radionuclides from various pathways and include parameters associated with the transfer of radionuclides from the groundwater to the soil and into the food chain.

The factors used in GoldSim are compared to the values presented in FTF PA, Section 4.6.2 which are based on WSRC-STI-2007-00004.

Table H6-3: Crop Exposure Times and Productivity

Parameter	Deterministic Value	Min	Max	GoldSim Reference
Pasture exposure time to irrigation (days)	30	30	90	GrassExposureTime [a,e]
Vegetable crop exposure times to irrigation (days)	70	60	90	VeggieExposureTime [a]
Soil exposure time period to irrigation (days)	183	60	365	SoilBuildupTime [a]
Productivity				
Pasture grass (kg/m^2)	1.8	0.7	2	Not used in the model
Agricultural (veg/produce) (kg/m^2)	0.7	0.5	4	Not used in the model
Vegetable crop yield (kg/m^2)	0.7	0.2	4	VegetationProductionYield [a]
Fraction of Foodstuff Produced Locally				
Vegetables - Local	0.173	0	0.5	LocalGrown [b]
Meat - Local	0.306	0	0.5	FracLocalBeef_MOP [c]
Milk - Local	0.207	0	0.5	FracLocalMilk_MOP [c]
Vegetables - intruder	0.308	0	0.5	FracLocalVeggie [d]
Meat - intruder	0.319	0	0.5	FracLocalMeat [d]
Milk - intruder	0.254	0	0.5	FracLocalMilk [d]
Dilution Factor for mixing of stabilized contaminants in vegetable garden				
Agricultural Scenario	0.2	0.2	0.2	Not used in the model
Post-Drilling Scenario	0.02	0.002	0.02	Not used in the model

(FTF PA Tables 4.6-5 and 5.6-7)
All data obtained from Table 3-1 of WSRC-STI-2007-00004
a GoldSim file located in DoseAssessment/DoseParameters/IRRIDOSE_Factors
b. GoldSim file located in DoseAssessment/Doses_by_Well/IRRIDOSE/LeeValues
c. GoldSim file located in DoseAssessment/Doses_by_Well/IRRIDOSE; in GoldSim model v1.3dose these vaules are reported as LocalMeatFrac_MOP and LocalMilkFrac_MOP, respectively
d. GoldSim file located in DoseAssessment/IHI.
e. The stochastic distribution is not used in GoldSim v2.3stoch.

Note that two different GoldSim models were reviewed: v2.3stoch and v1.3dose. The GoldSim model v1.3dose only utilizes the deterministic value.
Files identified within container named Doses_by_Well in GoldSim model v2.3stoch is named Doses_by_Region in GoldSim model v1.3dose.

Table H6-4: Physical Parameters

Parameter	Value [a]	Min	Max	GoldSim Reference
Areal density of soil (kg/m^2)	240	180	270	SurfaceSoilDensity [b,f]
Atmospheric mass loading of soil (kg/m^3)				
while working in garden	1.0E-07	1.0E-09	3.0E-07	AirMassLoadingSoil [c,d,f]
while residing in home	1.0E-08	1.0E-09	3.0E-08	Note 1
Depth of garden (cm)	15	15	61	TillDepth [e]
Garden irrigation rate (L/d/m^2)	3.6	2.08	5.5	IrrigationRate [b]
Fraction of the year that crops are irrigated	0.2	0.2	0.25	FracYearIrrigate [b]
Crop weathering constant (L/d)	0.0495	0.03	0.0495	WeatherandDecayConst [b,f]
Fractional retention of deposition on leaves	0.25	0.2	0.25	LeafRetention [b,f]
Area of garden for family of four (m^2)	100	100	1000	GardenSize [e]

(FTF PA, Tables 4.6-6 and 5.6-8)
All data obtained from Table 3-2 of WSRC-STI-2007-00004.

a. Value is used as the baseline, or deterministic, value.
b. GoldSim file located in DoseAssessment/DoseParameters/IRRIDOSE_Factors
c. GoldSim file located in DoseAssessment / IHI
d. Model (v1.3dose) uses only one value for both garden and home and uses the conservative garden values.
e. GoldSim file located in DoseAssessment/IHI/ResidentScenarioOutputs
f. The stochastic distribution is not used in GoldSim v2.3stoch

Note 1:
Model v2.3stoch uses the atmospheric mass loading values while residing in home for the values while working in the garden. The models do not differentiate between the mass loading in the garden and in the home.

Table H6-5: Individual Exposure Times and Consumption Rates

Consumption Rates	Value	Min	Max	GoldSim Reference
Breathing rate (m^3/year)	5,548	1,267	11,600	AirIntake [a]
Soil (kg/year)	0.0365	0.0008	0.05	ConsumptionSoil [a, i] DirtConsumption [b, i]
Leafy vegetable (kg/year)	21	18	43	Leafy [c]
Other vegetable (kg/year)	163	90	276	Veg [c]; ConsumptionVeggies [a]
Meat (kg/year)	43	26	81	Beef [c]
Finfish (kg/year)	9	2.2	19	AnnualAquaticFoodConsumption [d]
Seafood (kg/year)	0	0	5	Not used in the model
Milk (L/year)	120	73.7	230	Milk [c]
Water (L/year)	337	184	730	ConsumptionWater [a] WaterConsumptionRate [d]
Fodder-Beef cattle (kg/day)	36	27	50	ConsumptionFodderBeef [e]
Fodder-Milk cattle (kg/day)	52	36	55	ConsumptionFodderMilk [e]
Fraction of milk-cow intake from pasture	0.56	0.5	1	FodderFractionMilk [e]
Fraction of beef-cow intake from pasture	0.75	0.5	1	FodderFractionBeef [e]
Water (beef cow) (Liter/day)	28	28	50	CattleWaterConsumptionBeef [e]
Water (milk cow) (Liter/day)	50	50	60	CattleWaterConsumptionMilk [e]
Exposure Times				
Shoreline (hour/years)	23	11	35	AnnualUsageFactor [d]
Swimming (hours/year)	8.9	8.9	13	AnnualSwimming [d, i]
Boating (hours/year)	21	9.1	21	AnnualBoating [d, i]
Showering (fraction year)	0.0069	0.0069	0.021	ExposureFractionShower [f]
Fraction of year working in garden (per year)	0.01	0.01	0.08	ExposureFractionGarden [a, i]
Fraction of year residing in home (per year)	0.7	0.3	0.7	ExposureFractionHome [a, i]
Fraction of time cattle on pasture (per year)	1	1 [h]	1	Not Used
Transport Times (days)				
Vegetables	6	6	14	VegetableHoldupTime [e, i]
Feed-milk-man transport	3	1	4	MilkTime [e, i]
Time from slaughter to consumption	6	6	20	BeefTime [e, i]

[FTF PA, Tables 4.6-7 and 5.6-9]
All data obtained from Table 4-1 of WSRC-STI-2007-00004.

Notes for Table H6-5:

a GoldSim file located in DoseAssessment/IHI
b GoldSim file located in DoseAssessment/Doses_by_Well/IRRIDOSE
c GoldSim file located in DoseAssessment/Doses_by_Well/IRRIDOSE/LeeValues
d GoldSim file located in DoseAssessment/Doses_by_Well/LADTAP_Wells
e GoldSim file located in DoseAssessment/DoseParameters/IRRIDOSE_Factors
f GoldSim file located in DoseAssessment/Doses_by_Well/Inhalation - as fraction of a year – conversion to minutes per day: 10, 10, 30.
g. Not used
h. The value reported in the table is greater than the value reported in WSRC-STI-2007-00004. Note: because the value of unity is assumed, this parameter is not used in the model.
i. The stochastic distribution is not used in GoldSim v2.3stoch

Note that two different GoldSim models were reviewed: v2.3stoch and v1.3dose.

Files identified within container named Doses_by_Well in GoldSim model v2.3stoch is named Doses_by_Region in GoldSim model v1.3dose. Likewise the file named LADTAP_Wells in GoldSim model v.10stoch is named LADTAP_Regions in GoldSim model v1.3dose.

Bioaccumulation Radionuclide Transfer Factors

Bioaccumulation radionuclide transfer factors are obtained from WSRC-STI-2007-00004 and are presented in FTF PA Section 4.6.1.1. Table H6-6 identifies the GoldSim files that contain the bioaccumulation radionuclide transfer factors used in the GoldSim models. The transfer factors in the GoldSim models were checked for consistency with the values reported in FTF PA Section 4.6.1.1. No discrepancies were found in either model GoldSim v1.3dose or v2,3stoch.

Table H6-6: Bioaccumulation Radionuclide Transfer Factors

Transfer Factor	**FTF PA Table**	**GoldSim Reference**
Soil To Plant	4.6-1	*DoseAssessment/DoseParameters/ IRRIDOSE_Factors/ PlantToSoilRatio*
Feed To Milk	4.6-2	*DoseAssessment/DoseParameters/ IRRIDOSE_Factors/ TransferFractionMilk*
Feed to Meat	4.6-3	*DoseAssessment/DoseParameters/ IRRIDOSE_Factors/ TransferFractionBeef*
Water To Fish	4.6-4	*DoseAssessment/DoseParameters/ LADTAP_Factors/BioaccumulationFactorAq*

Institutional Control Period

The period of institutional control marks the time that decay and release modeling begins within the computer models. As stated in FTF PA Section 2.3, institutional control is assumed to occur for 100 years after final waste tank closure and the installation of the engineered closure cap. This parameter, and its value of 100 years, is used in the GoldSim model v2.3stoch as, *SimulationSettings / InstitutionalControl and in* GoldSim model v1.3dose as *SimulationSettings / IC_Active*.

H7 Summary

Table H7-1 presents a summary of the input data verified for the PORFLOW and GoldSim modeling and the information presented in this FTF PA. No inconsistencies were found between the data and the various computer models reviewed for the FTF PA analysis.

Table H7-1: Summary of Data Input Verified

Parameter	Appendix Ref.	Source of Data	POR-FLOW	GoldSim Container Input (v2.3stoch unless otherwise noted)	FTF PA Section / Table / Figure Reference	Notes
Atomic weight for non-radioactive elements	Table H2-1	Nuclear Wallet Cards 2005	Input	Materials / Species	Not presented	None
Period of institutional control	Section H6	Assumption for modeling	Input	SimulationSettings / InstitutionalControl and SimulationSettings / IC_Active - GoldSim v1.3dose	Section 2.3	None
Tank location	Table H4-1	W145491; W166430 W238154; W700598; W700283	Input	Incorporated within GoldSim modeling – not validated	Section 3.2.1 Table 3.2-1	None
Type I tank dimensional data	Table H4-5	W145379; W145573; W145293; W145491	Input	TheTanks / TankData / BasematThickness TheTanks / TankData / Grout_Heights TheTanks / TankData / Tank_Areas	Section 3.2.1.1 Fig. 3.2-2 Figs. 4.4-14, -15	None
Type III tank dimensional data	Table H4-5	W238161; W238163; W700321; W703133; W703786	Input	TheTanks / TankData / BasematThickness TheTanks / TankData / Grout_Heights TheTanks / TankData / Tank_Areas	Section 3.2.1.2 Fig. 3.2-13 Figs. 4.4-16, -17	None
Type IIIA tank dimensional data	Table H4-5		Input	TheTanks / TankData / BasematThickness TheTanks / TankData / Grout_Heights TheTanks / TankData / Tank_Areas	Section 3.2.1.2 Fig. 3.2-14 Figs. 4.4-16, -17	None
Type IV tank dimensional data	Table H4-5	W167482; W167808; W167486; W167477	Input	TheTanks / TankData / BasematThickness TheTanks / TankData / Grout_Heights TheTanks / TankData / Tank_Areas	Section 3.2.1.3 Fig. 3.2-30 Figs. 4.4-18, -19	None
Infiltration rate through closure cap	Table H1-1	WSRC-STI-2007-00184_OUO, Tables 31 and 81	Input	Not used – flow results from PORFLOW used as input to GoldSim	Section 3.2.4.7 Table 3.2-10 Section 4.4.2.6	None
Radionuclide inventory in tanks	Table H5-1 Table H5-2	Developed within Section 3.3.2	Input	Inventory / FTF_Tank_Inventories	Section 3.3.2 Table 3.3-2	None
Chemical inventory in tanks	Table H5-4 Table H5-5	Developed within Section 3.3.2	Input	Data in GoldSim but not validated because GoldSim is not used for chemical assessment.	Section 3.3.2 Table 3.3-3	None
Radionuclide inventory in transfer lines	Table H5-3	Developed within Section 3.3.3.1	Input	Inventory / FTF_Ancillary_Inventories (Matrix column Xfer)	Section 3.3.3.1 Table 3.3-13	None

Table H7-1: Summary of Data Input Verified (Continued)

Parameter	Appendix Ref.	Source of Data	POR-FLOW	GoldSim Container Input (v2.3stoch unless otherwise noted)	FTF PA Section / Table / Figure Reference	Notes
Chemical inventory in transfer lines	Table H5-6	Developed within Section 3.3.3.1	Input	Not used by GoldSim	Section 3.3.3.1 Table 3.3-14	None
Radionuclide inventory in pump tanks and catch tank	Table H5-3	Developed within Section 3.3.3.2	Input	Inventory / FTF_Ancillary_Inventories (Matrix columns FPT1, FPT2, FPT3, and FTFCatch)	Section 3.3.3.2 Table 3.3-16	None
Chemical inventory in pump tanks and catch tank	Table H5-4	Developed within Section 3.3.3.2	Input	Not used by GoldSim	Section 3.3.3.2 Table 3.3-17	None
Radionuclide inventory in evaporators and CTS	Table H5-3	Developed within Section 3.3.3.3	Input	Inventory / FTF_Ancillary_Inventories (Matrix columns E242F, E242_16F, and CTS)	Section 3.3.3.3 Table 3.3-20	None
Chemical inventory in evaporators and CTS	Table H5-6	Developed within Section 3.3.3.3	Input	Not used by GoldSim	Section 3.3.3.3 Table 3.3-21	None
Degradation time for carbon steel (used for tanks)	Table H4-6	WSRC-STI-2007-00061	Input	GoldSim uses output from PORFLOW and does not use this data directly.	Section 4.2 Section 4.2.3.2.5 Table 4.2-35	None
Degradation time for stainless steel	Table H4-6	WSRC-STI-2007-00460	Input	GoldSim uses output from PORFLOW and does not use this data directly.	Section 4.2 Section 4.2.3.2.5 Table 4.2-36	None
Pore volumes for change in concrete	Section H2	WSRC-STI-2007-00544	Input	WaterInWaste / Flushes_1st WaterInWaste / Flushes_2nd	Section 4.2, Section 4.2.2.6,	None
Solubility values in oxidized concrete	Table H2-2	WSRC-STI-2007-00544	Input	WaterInWaste / OxidizedWasteRegions	Section 4.2.2.1 Table 4.2-10	None
Solubility values in reduced concrete	Table H2-2	WSRC-STI-2007-00544	Input	WaterInWaste / ReducedWasteRegions	Section 4.2.2.1 Table 4.2-10	None
Np solubility distribution	Table H2-3	WSRC-STI-2007-00544	Input	WaterInWaste / OxidizedDistribution / NpOR2 WaterInWaste / ReducedDistribution / NpRR2	Section 4.2.2.3 Table 4.2-14 Table 4.2-13	None
Tc solubility distribution	Table H2-4	WSRC-STI-2007-00544	Input	WaterInWaste / OxidizedDistribution / TcOR2 WaterInWaste / ReducedDistribution / TcRR2	Section 4.2.2.3 Table 4.2-14 Table 4.2-13	None

Table H7-1: Summary of Data Input Verified (Continued)

Parameter	Appendix Ref.	Source of Data	POR-FLOW	GoldSim Container Input (v2.3stoch unless otherwise noted)	FTF PA Section / Table / Figure Reference	Notes
Pu solubility distribution	Table H2-5	WSRC-STI-2007-00544	Input	WaterInWaste / OxidizedDistribution / PuOR2 WaterInWaste / ReducedDistribution / PuRR2	Section 4.2.2.3 Table 4.2-14 Table 4.2-13	None
U solubility distribution	Table H2-6	WSRC-STI-2007-00544	Input	WaterInWaste / OxidizedDistribution / UOR2 WaterInWaste / ReducedDistribution / URR2	Section 4.2.2.3 Table 4.2-14 Table 4.2-13	None
Hydraulic properties of backfill	Table H3-1	WSRC-STI-2006-00198	Input	Not used – uses flow results from PORFLOW	Section 4.2.3.2.2 Table 4.2-27 Table 4.4-6 - backfill	None
Hydraulic properties of lower vadose zone	Table H3-1	WSRC-STI-2006-00198	Input	Materials / SandySoilProperties	Section 4.2.3.2.2 Table 4.2-28 Table 4.4-6 – native_soil	None
Hydraulic properties of working slab	Table H3-1	WSRC-STI-2006-00198	Not used	Not used – information provided in FTF PA – but not used in the current FTF PA model.	Section 4.2.3.2.2 Table 4.2-25	None
K_d values for sandy soil	Table H2-7	WSRC-TR-2006-00004 SRNL-RPA-2007-00006 SRS-REG-2007-00036	Input	Materials / SandySoilKds / GreaterThan1000 / SandyMedian Materials / SandySoilKds / LessThan1000 / SandyMedian	Section 4.2.3.2.2 Table 4.2-29 – Vadose Zone	None
K_d values for clayey soil	Table H2-7	WSRC-TR-2006-00004 SRNL-RPA-2007-00006 SRS-REG-2007-00036	Input	Materials / ClayeySoilKds / GreaterThan1000 / xMedian Materials / ClayeySoilKds / LessThan1000 / xMedian	Section 4.2.3.2.2 Table 4.2-29 – Backfill Soil	None
Vadose zone thickness	Table H4-4	SRNL-ESB-2007-00008 (with corrections for Tanks 19 and 20)	Input	TheTanks / TankData / UZ_Thickness / UZThickness_table	Section 4.2.3.2.2 Table 4.2-23	None
Degradation times for cementitious media	Table H3-3	SRS-REG-2007-00027	Input	Not used – GoldSim uses flow results from the PORFLOW runs to account for the degradation of cementitious media	Section 4.2.3.2.3 Table 4.2-32	None

Table H7-1: Summary of Data Input Verified (Continued)

Parameter	Appendix Ref.	Source of Data	POR-FLOW	GoldSim Container Input (v2.3stoch unless otherwise noted)	FTF PA Section / Table / Figure Reference	Notes
Hydraulic properties of reducing (fill) grout	Table H3-1	WSRC-STI-2007-00369 WSRC-STI-2007-00607 SRNL-ESB-2007-00034	Input	Not used – uses flow results from PORFLOW	Section 4.2.3.2.3 Table 4.2-31 Table 4.4-6 - grout	None
Hydraulic properties of tank basemat	Table H3-1	WSRC-STI-2007-00369 WSRC-STI-2007-00607 SRNL-ESB-2007-00034	Input	Materials / ConcreteProperties	Section 4.2.3.2.3 Table 4.2-31 Table 4.4-6 - basemat	None
K_d values for oxidized concrete	Table H2-7	WSRC-TR-2006-00004 SRNL-RPA-2007-00006 SRS-REG-2007-00036 WSRC-RP-2007-01122	Input	Materials / Concretre_Kds_Oxidizing / young_concrete_kds_ox / GreaterThanEqual1000 / xMedian Materials / Concretre_Kds_Oxidizing / young_concrete_kds_ox / LessThan1000 / xMedian; Materials / Concretre_Kds_Oxidizing / middle_concrete_kds_ox / GreaterThan1000 / xMedian Materials / Concretre_Kds_Oxidizing / middle_concrete_kds_ox / LessThanEqual1000 / xMedian; Materials / Concretre_Kds_Oxidizing / old_concrete_kds_ox / GreaterThan1000 / xMedian Materials / Concretre_Kds_Oxidizing / old_concrete_kds_ox / LessThanEqual1000 / xMedian	Section 4.2.3.2.3 Table 4.2-33 – Oxidizing Cementitious Media	None

Table H7-1: Summary of Data Input Verified (Continued)

Parameter	Appendix Ref.	Source of Data	POR-FLOW	GoldSim Container Input (v2.3stoch unless otherwise noted)	FTF PA Section / Table / Figure Reference	Notes
K_d values for reduced concrete	Table H2-7	WSRC-TR-2006-00004 SRNL-RPA-2007-00006 SRS-REG-2007-00036 WSRC-RP-2007-01122	Input	Materials / Concretre_Kds_Reducing / young_concrete_kds_red / GreaterThan1000 / YoungRedMedian Materials / Concretre_Kds_Reducing / young_concrete_kds_red / LessThanEqual1000 / YoungRedMedian; Materials / Concretre_Kds_Reducing / middle_concrete_kds_red / GreaterThan1000 / xMedian Materials / Concretre_Kds_Reducing / middle_concrete_kds_red / LessThanEqual1000 / xMedian; Materials / Concretre_Kds_Reducing / old_concrete_kds_red / GreaterThan1000 / xMedian Materials / Concretre_Kds_Reducing / old_concrete_kds_red / LessThanEqual1000 / xMedian	Section 4.2.3.2.3 Table 4.2-33 – Reducing Cementitious Media	None
Tank floor thickness distribution	Table H4-10	Developed within Section 5.6.3.5	Not used	TheTanks / TankData / Basemat_Thickness / TypeIBasematThickness TheTanks / TankData / Basemat_Thickness / TypeIIIABasematThickness TheTanks / TankData / Basemat_Thickness / TypeIIIBasematThickness TheTanks / TankData / Basemat_Thickness / TypeIVBasematThickness	Section 5.6.3.5	None
Hydraulic properties of saturated zone	Table H3-1	WSRC-STI-2006-00198	Input	Materials / SatSandySoilProperties	Section 4.2.3.2.6 Table 4.2-37	None
Carbon steel failure time distribution	Table H4-7	WSRC-STI-2007-00061	Not used	TheTanks / TankData / Configuration_Cases (TypeIAB, TypeICDE, TypeIIIAB, TypeIIICDE, TypeIVAB, and TypeIVCDE)	Section 4.2.3.2.5 Figure 4.2-26 Table 4.2-35	None

Table H7-1: Summary of Data Input Verified (Continued)

Parameter	Appendix Ref.	Source of Data	POR-FLOW	GoldSim Container Input (v2.3stoch unless otherwise noted)	FTF PA Section / Table / Figure Reference	Notes
Stainless steel failure time distribution	Table H4-6	WSRC-STI-2007-00460	Not used	AncillaryEquipment / CTS / WasteLayer / AncillaryReleaseTime (Typical for each piece of ancillary equipment)	Section 4.2.3.2.5 Table 4.2-36	None
Bioaccumulation Radionuclide Transfer Factors	Table H6-6	WSRC-STI-2007-00004	Not used	DoseAssessment/DoseParameters/ IRRIDOSE_Factors/ PlantToSoilRatio DoseAssessment/DoseParameters/ IRRIDOSE_Factors/ TransferFractionMilk DoseAssessment/DoseParameters/ IRRIDOSE_Factors/ TransferFractionBeef DoseAssessment/DoseParameters/ LADTAP_Factors/ BioaccumulationFactorAq	Section 4.6.1.1 Table 4.6-1 Table 4.6-2 Table 4.6-3 Table 4.6-4	None
Crop exposure times and productivity	Table H6-3	WSRC-STI-2007-00004	Not used	Specific file locations for parameters are identified in Table H6.-3.	Section 4.6.2.1 Table 4.6-5	None
Physical parameters for exposure pathways	Table H6-4	WSRC-STI-2007-00004	Not used	Specific file locations for parameters are identified in Table H6-4.	Section 4.6.2.1 Table 4.6-6	None
Dose pathway exposure times and consumption rates	Table H6-5	WSRC-STI-2007-00004	Not used	Specific file locations for parameters are identified in Table H6-5.	Section 4.6.2.1 Table 4.6-7	None
Dose conversion factors	Tables H6-1 and H6-2	Developed within Section 4.7.1	Not used	DoseAssessment / DoseParameters/ LADTAP_Factors/ DoseFactorIngestion DoseAssessment / DoseParameters/ LADTAP_Factors/ DoseFactorInhalation DoseAssessment / DoseParameters/ LADTAP_Factors/ DFSubmerged DoseAssessment/ IHI/ EXIntSloil_no DoseAssessment/ IHI/ EX15cmSoil	Section 4.7.1 Table 4.7-1	None
Distance to 100m periphery	Table H4-8	Generated from PORFLOW output	Output	TheTanks / TankData / UZ_Thickness / BufferDistance_table	Section 5.2.1 Table 5.2.2	None

Appendix I
K_d SENSITIVITY

Appendix I contains curves showing the contaminant flux (in Ci/year) entering the Upper Three Runs – Upper Zone (i.e., water table) for basemat K_d and soil K_d sensitivity runs for Tc-99 and Pu-239 in Tanks 5, 34 and 18 for 20,000 years.

Graph heading example "CaseA_base_high Tank05 Pu-239"

Key

CaseA = scenario case/configuration
base = basemat
high = elevated K_d*
low = lowered K_d*
Tank05 = inventory source is Tank 05
Pu-239= radionuclide of concern

* Elevated K_d - If the K_d is greater than or equal to 1000, then the elevated K_d is 5X higher than the baseline K_d. If the K_d is less than 1000, then the elevated Kd is 2X higher than the baseline K_d.

* Lowered K_d - If the K_d is greater than or equal to 1000, then the lowered K_d is 5X less than the baseline K_d. If the K_d is less than 1000, then the lowered K_d is 2X less than the baseline K_d.

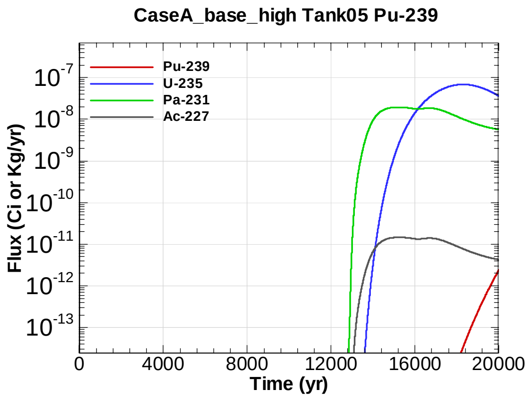


Figure I-1 - Water Table Flux for CaseA_base_high Tank05 Pu-239

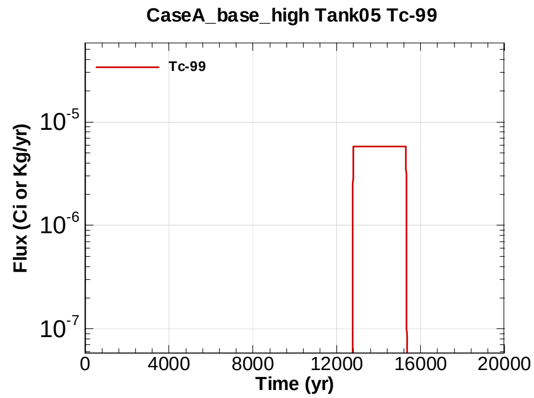


Figure I-2 - Water Table Flux for CaseA_base_high Tank05 Tc-99

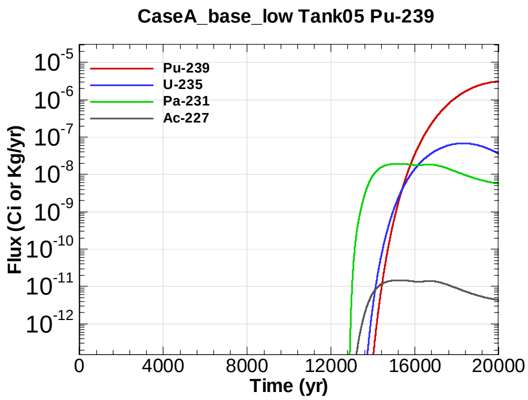


Figure I-3 - Water Table Flux for CaseA_base_low Tank05 Pu-239

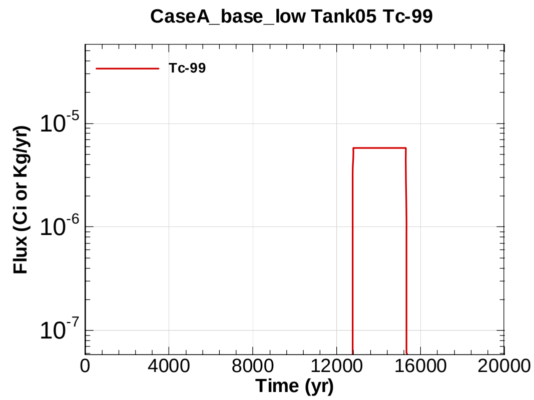


Figure I-4 - Water Table Flux for CaseA_base_low Tank05 Tc-99

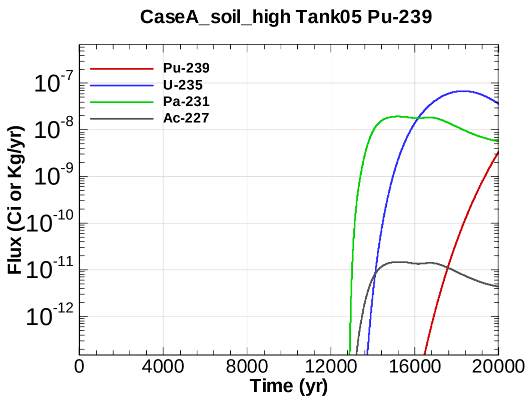


Figure I-5 - Water Table Flux for CaseA_soil_high Tank05 Pu-239

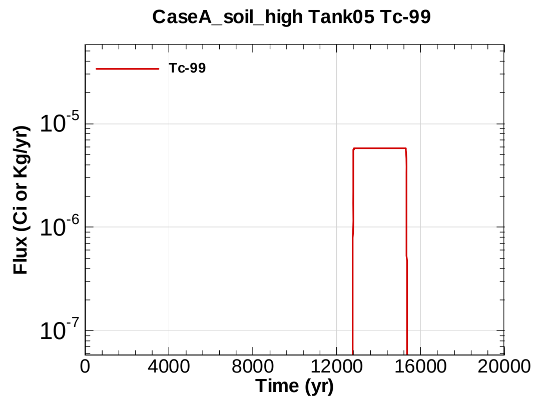


Figure I-6 - Water Table Flux for CaseA_soil_high Tank05 Tc-99

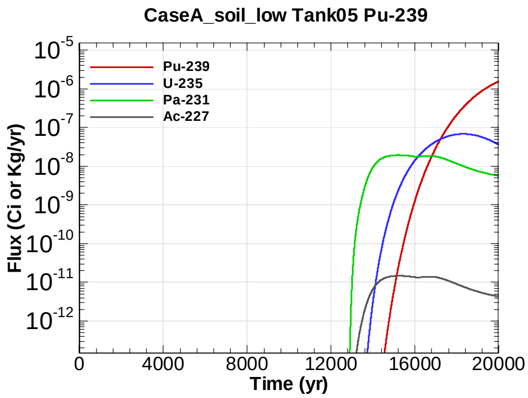


Figure I-7 - Water Table Flux for CaseA_soil_low Tank05 Pu-239

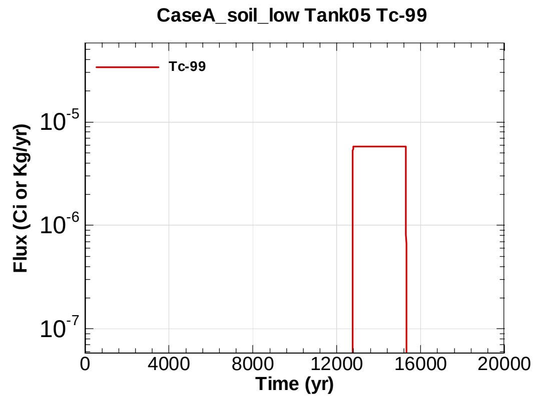


Figure I-8 - Water Table Flux for CaseA_soil_low Tank05 Tc-99

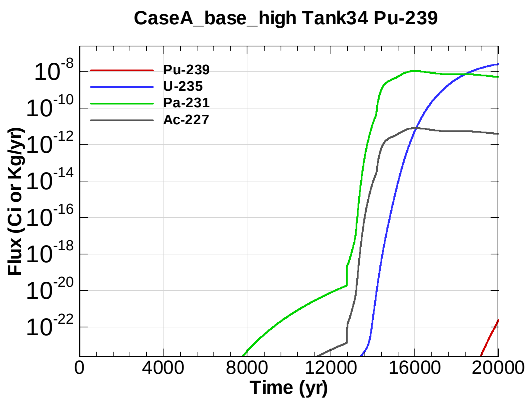


Figure I-9 - Water Table Flux for CaseA_base_high Tank34 Pu-239

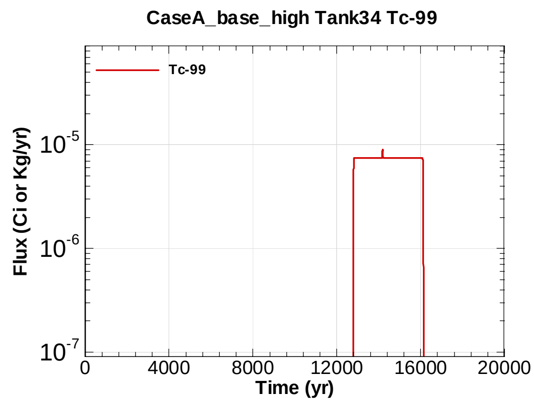


Figure I-10 - Water Table Flux for CaseA_base_high Tank34 Tc-99

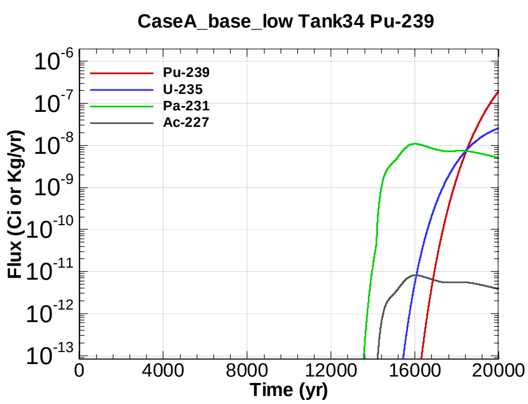


Figure I-11 - Water Table Flux for CaseA_base_low Tank34 Pu-239

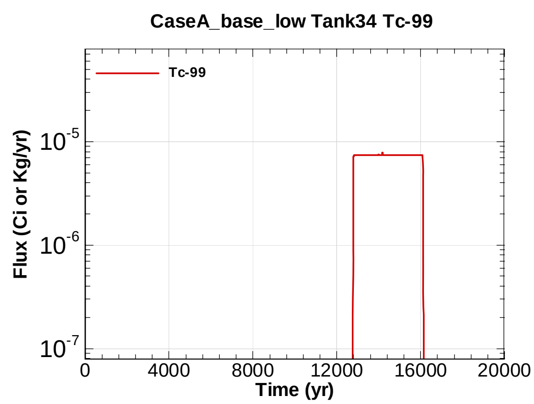


Figure I-12 - Water Table Flux for CaseA_base_low Tank34 Tc-99

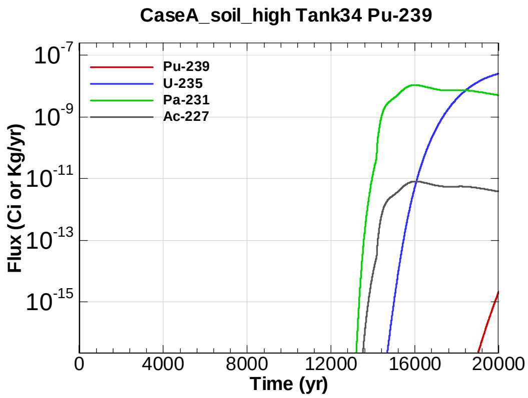


Figure I-13 - Water Table Flux for CaseA_soil_high Tank34 Pu-239

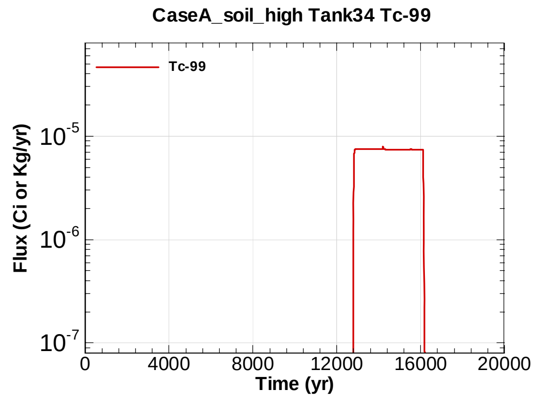


Figure I-14 - Water Table Flux for CaseA_soil_high Tank34 Tc-99

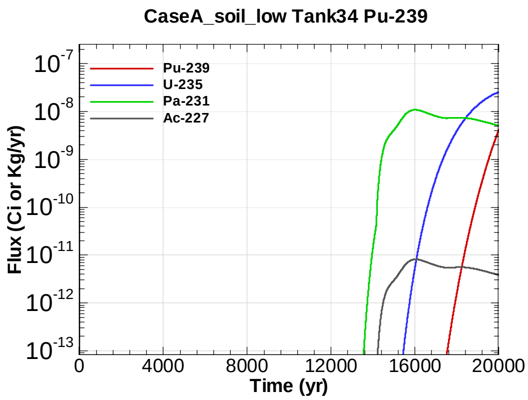


Figure I-15 - Water Table Flux for CaseA_soil_low Tank34 Pu-239

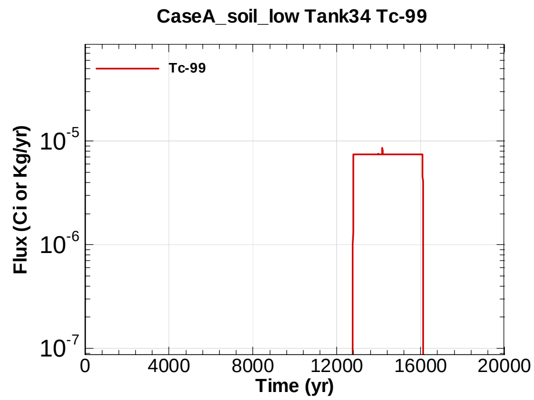


Figure I-16 - Water Table Flux for CaseA_soil_low Tank34 Tc-99

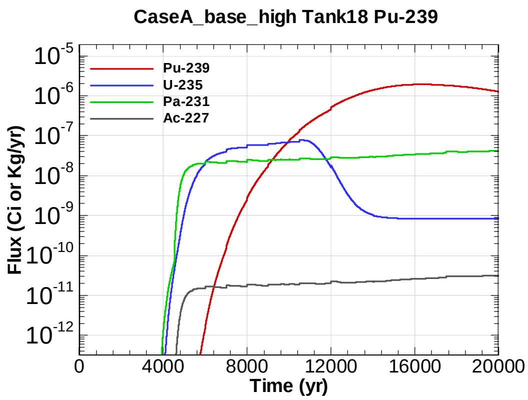


Figure I-17 - Water Table Flux for CaseA_base_high Tank18 Pu-239

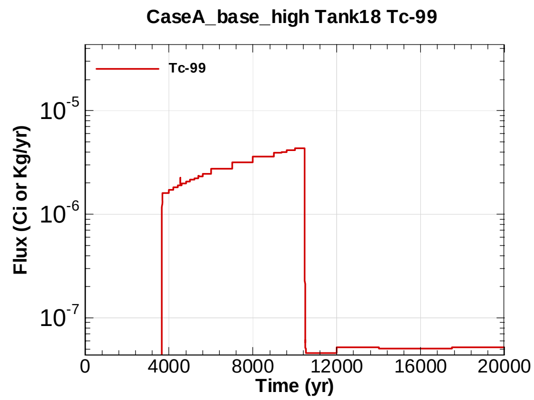


Figure I-18 - Water Table Flux for CaseA_base_high Tank18 Tc-99

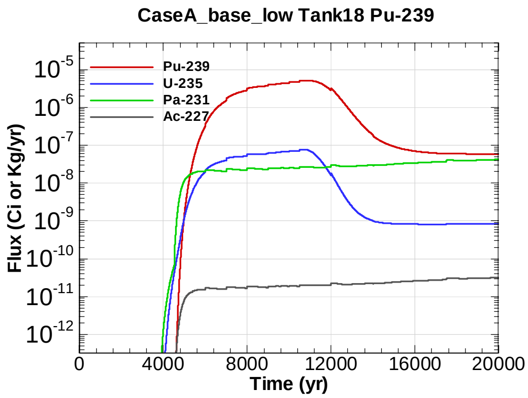


Figure I-19 - Water Table Flux for CaseA_base_low Tank18 Pu-239

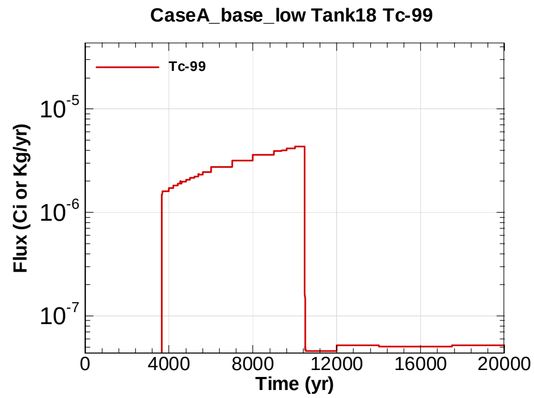


Figure I-20 - Water Table Flux for CaseA_base_low Tank18 Tc-99

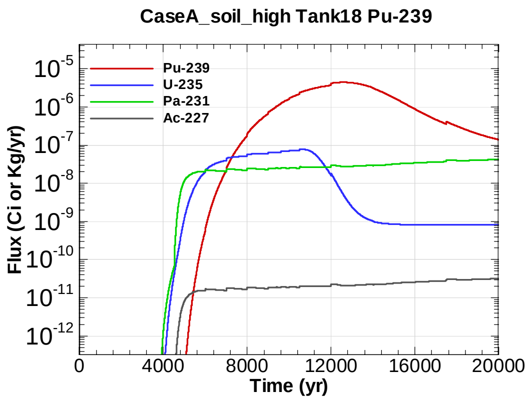


Figure I-21 - Water Table Flux for CaseA_soil_high Tank18 Pu-239

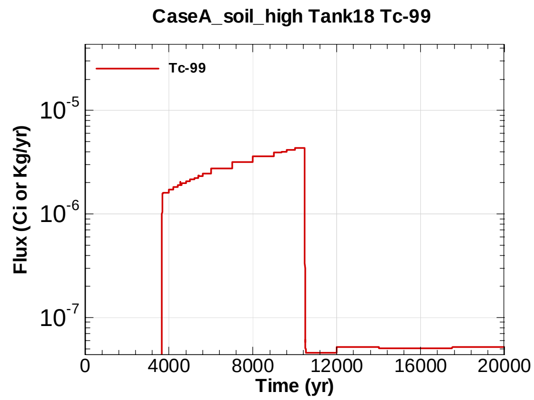


Figure I-22 - Water Table Flux for CaseA_soil_high Tank18 Tc-99

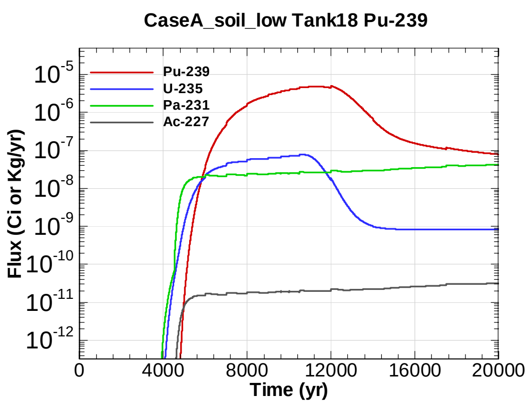


Figure I-23 - Water Table Flux for CaseA_soil_low Tank18 Pu-239

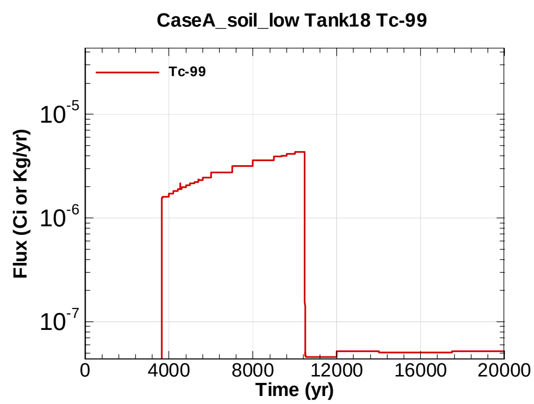


Figure I-24 - Water Table Flux for CaseA_soil_low Tank18 Tc-99

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Appendix J
INVENTORY SENSITIVITY

Appendix J contains curves showing the contaminant flux (in Ci/year) entering the Upper Three Runs – Upper Zone (i.e., water table) for sensitivity run radionuclide inventory for Tanks 5, 6, 18 and 19 for 20,000 years.

Graph heading example “CaseA_inv_high Tank05 Am-241”

Key

CaseA = scenario case/configuration
inv_high = higher inventory*
inv_low = lower inventory*
Tank05 = inventory source is Tank 05
Am-241 = radionuclide of concern

* Higher inventory – The value for the radionuclide of concern is 1.5X the baseline value.

* Lower inventory - The value for the radionuclide of concern is 0.5X the baseline value.

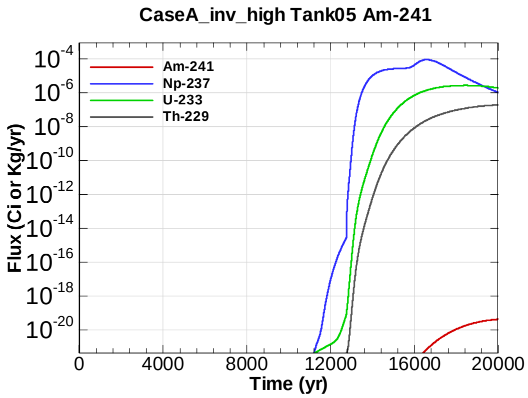

Figure J-1 - Water Table Flux for CaseA_inv_high Tank05 Am-241

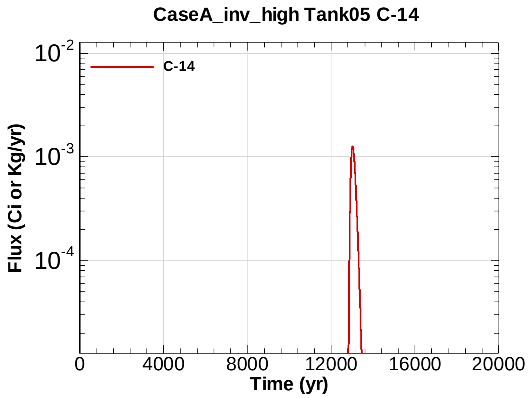

Figure J-2 - Water Table Flux for CaseA_inv_high Tank05 C-14

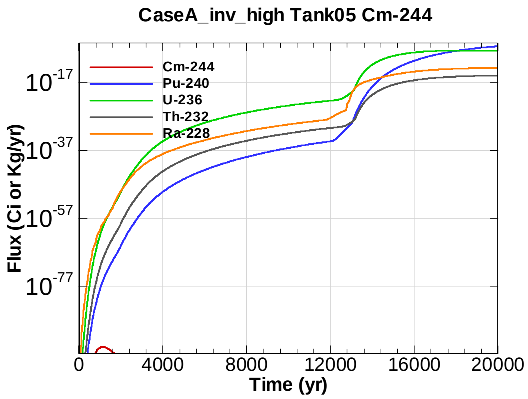

Figure J-3 - Water Table Flux for CaseA_inv_high Tank05 Cm-244

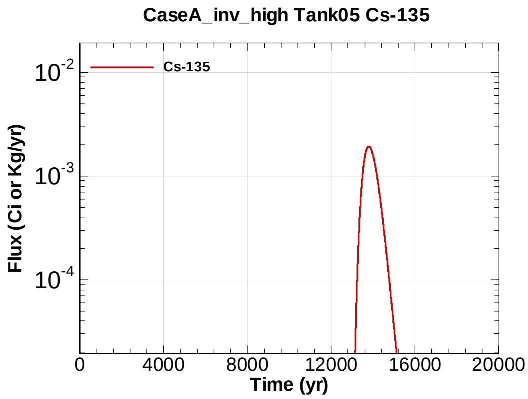

Figure J-4 - Water Table Flux for CaseA_inv_high Tank05 Cs-135

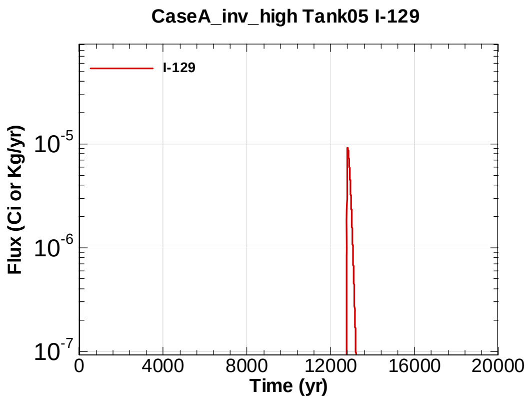

Figure J-5 - Water Table Flux for CaseA_inv_high Tank05 I-129

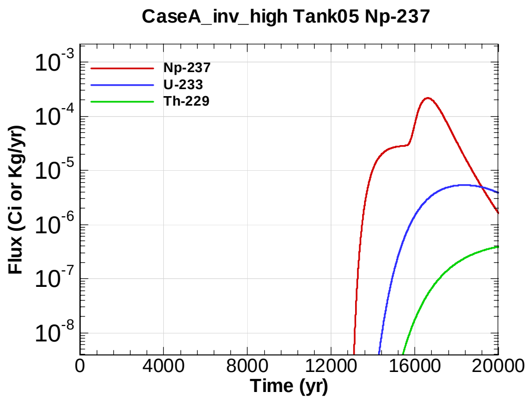

Figure J-6 - Water Table Flux for CaseA_inv_high Tank05 Np-237

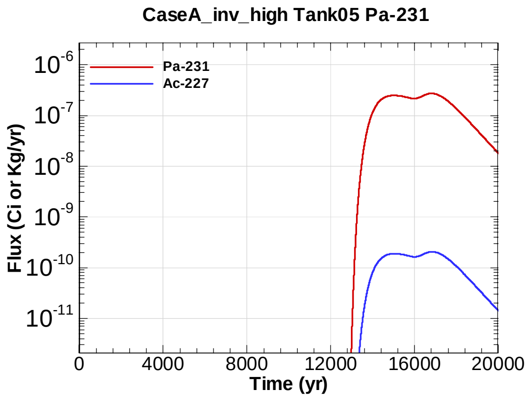

Figure J-7 - Water Table Flux for CaseA_inv_high Tank05 Pa-231

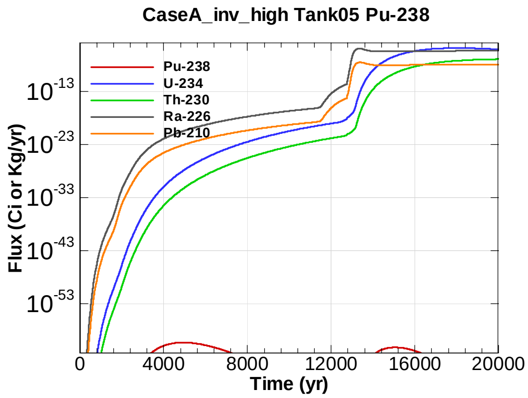

Figure J-8 - Water Table Flux for CaseA_inv_high Tank05 Pu-238

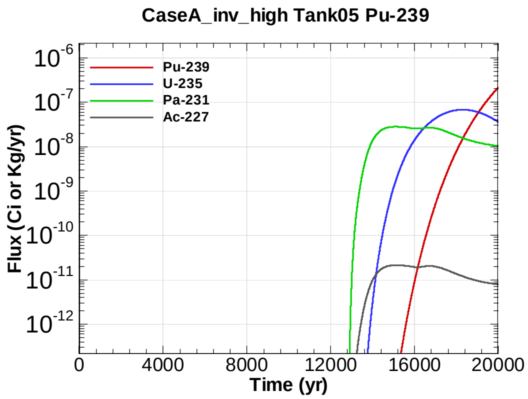

Figure J-9 - Water Table Flux for CaseA_inv_high Tank05 Pu-239

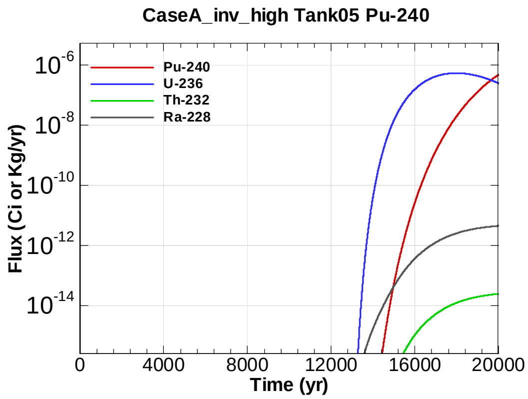

Figure J-10 - Water Table Flux for CaseA_inv_high Tank05 Pu-240

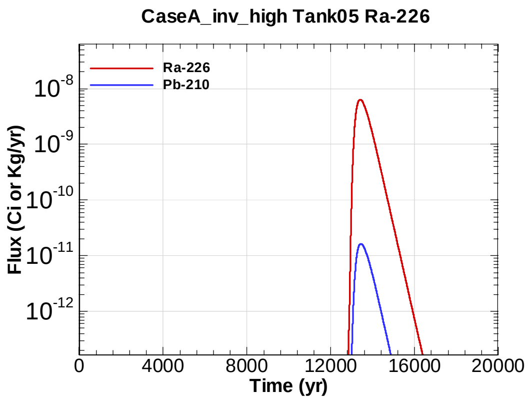

Figure J-11 - Water Table Flux for CaseA_inv_high Tank05 Ra-226

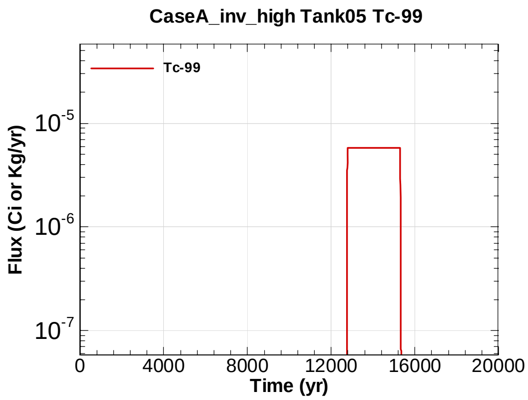

Figure J-12 - Water Table Flux for CaseA_inv_high Tank05 Tc-99

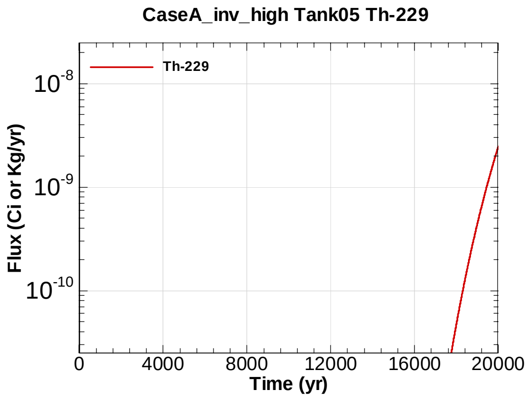

Figure J-13 - Water Table Flux for CaseA_inv_high Tank05 Th-229

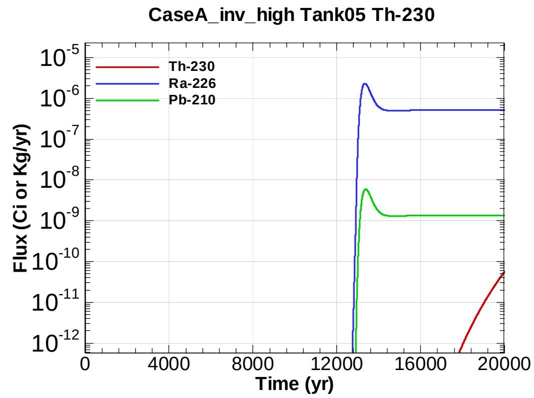

Figure J-14 - Water Table Flux for CaseA_inv_high Tank05 Th-230

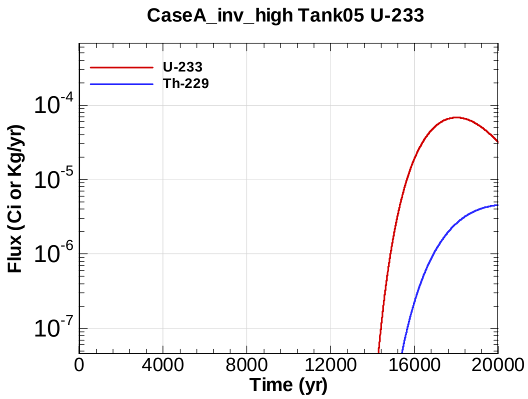

Figure J-15 - Water Table Flux for CaseA_inv_high Tank05 U-233

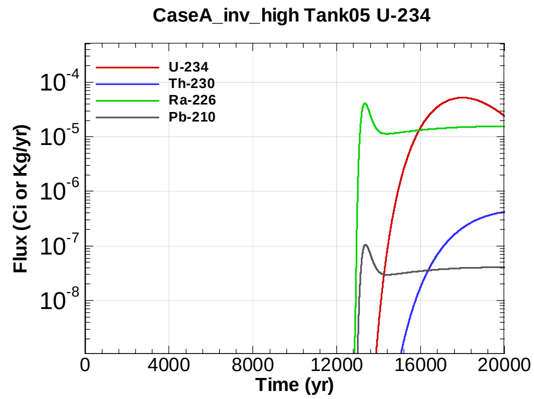

Figure J-16 - Water Table Flux for CaseA_inv_high Tank05 U-234

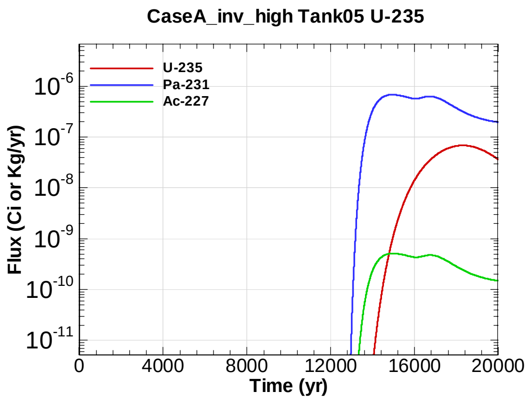

Figure J-17 - Water Table Flux for CaseA_inv_high Tank05 U-235

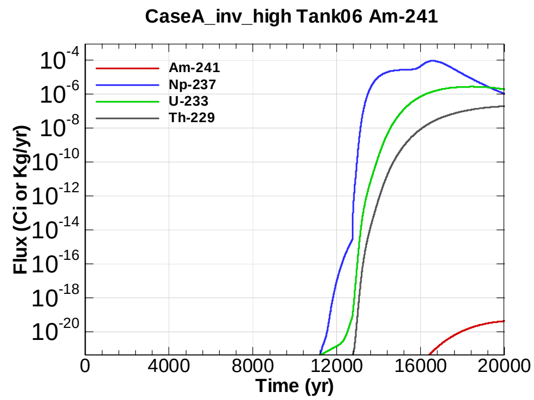

Figure J-18 - Water Table Flux for CaseA_inv_high Tank06 Am-241

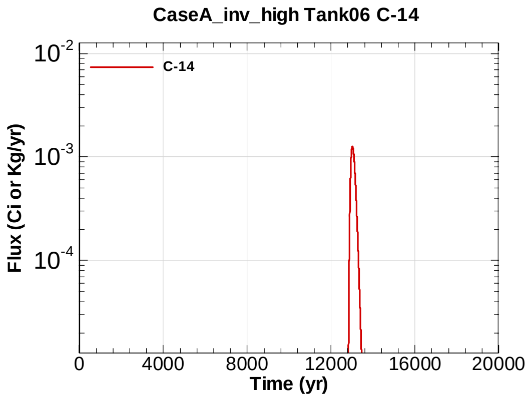

Figure J-19 - Water Table Flux for CaseA_inv_high Tank06 C-14

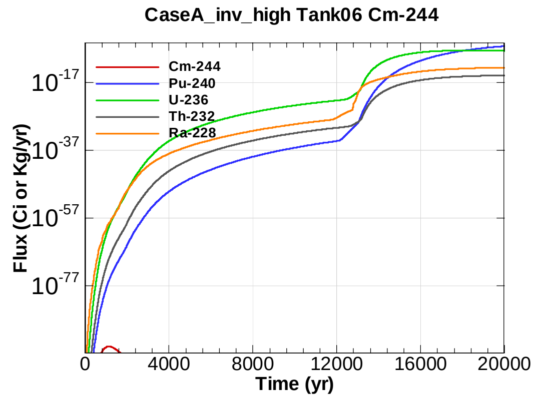

Figure J-20 - Water Table Flux for CaseA_inv_high Tank06 Cm-244

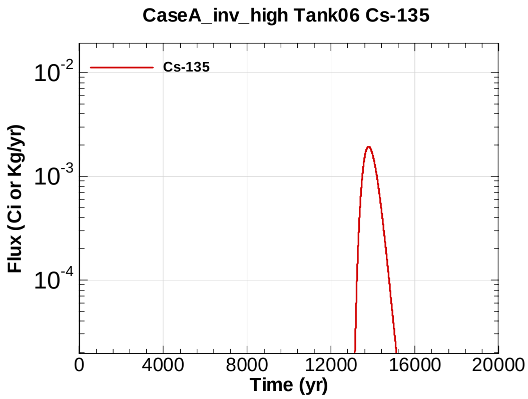

Figure J-21 - Water Table Flux for CaseA_inv_high Tank06 Cs-135

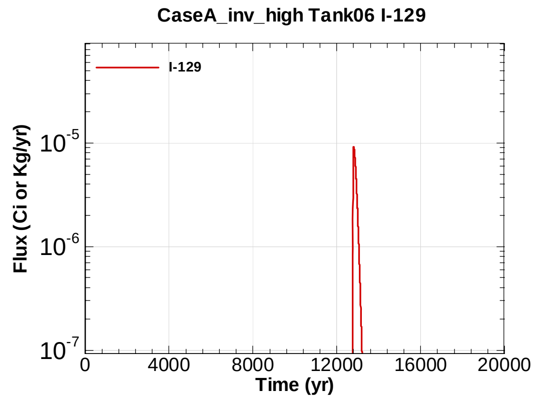

Figure J-22 - Water Table Flux for CaseA_inv_high Tank06 I-129

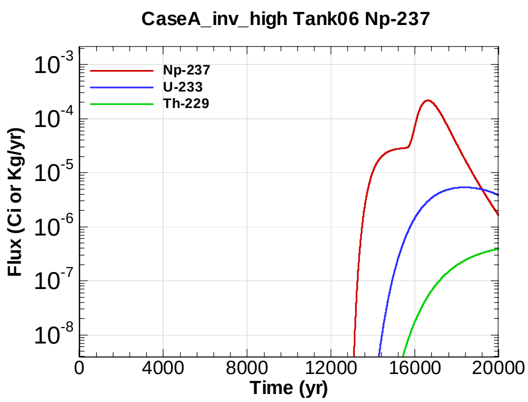

Figure J-23 - Water Table Flux for CaseA_inv_high Tank06 Np-237

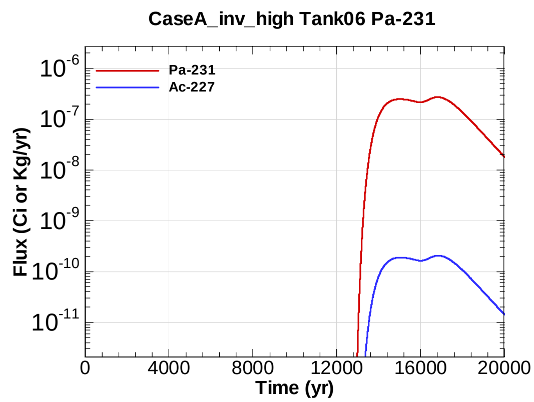

Figure J-24 - Water Table Flux for CaseA_inv_high Tank06 Pa-231

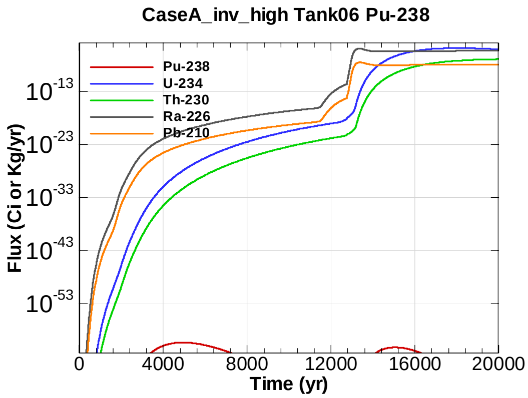

Figure J-25 - Water Table Flux for CaseA_inv_high Tank06 Pu-238

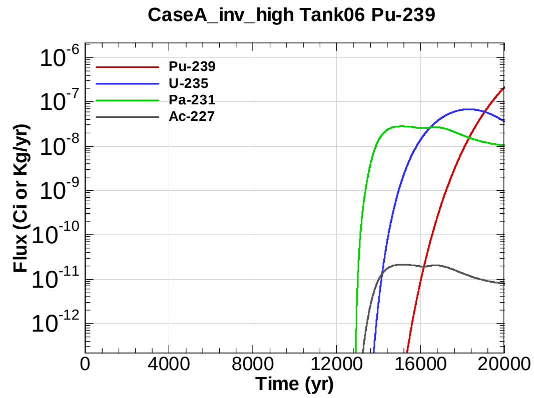

Figure J-26 - Water Table Flux for CaseA_inv_high Tank06 Pu-239

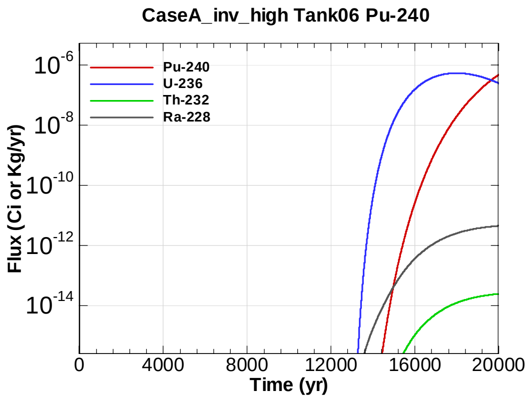

Figure J-27 - Water Table Flux for CaseA_inv_high Tank06 Pu-240

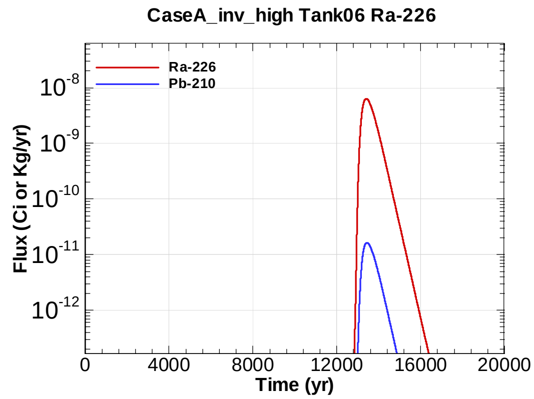

Figure J-28 - Water Table Flux for CaseA_inv_high Tank06 Ra-226

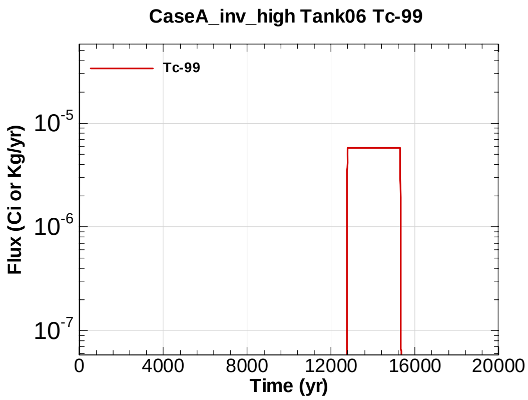

Figure J-29 - Water Table Flux for CaseA_inv_high Tank06 Tc-99

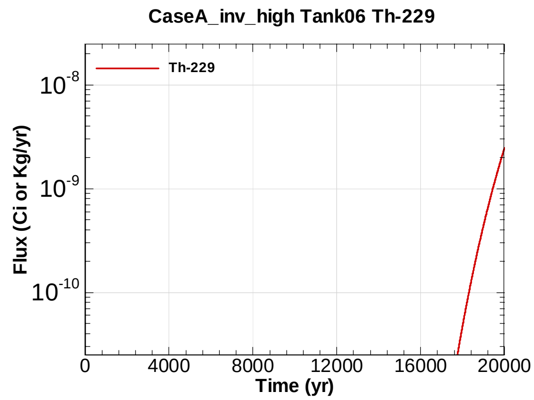

Figure J-30 - Water Table Flux for CaseA_inv_high Tank06 Th-229

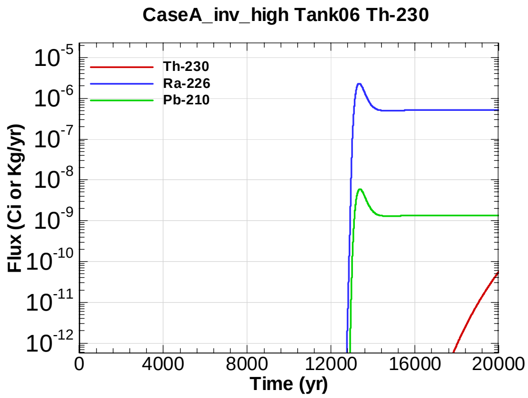

Figure J-31 - Water Table Flux for CaseA_inv_high Tank06 Th-230

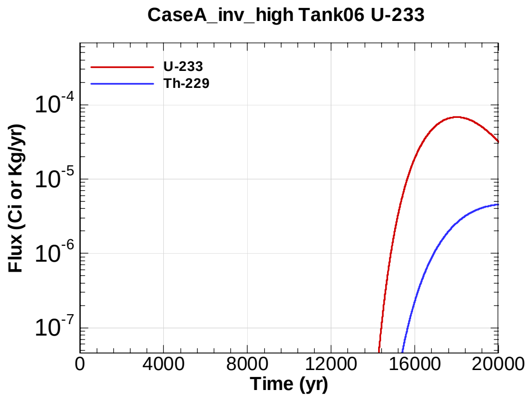

Figure J-32 - Water Table Flux for CaseA_inv_high Tank06 U-233

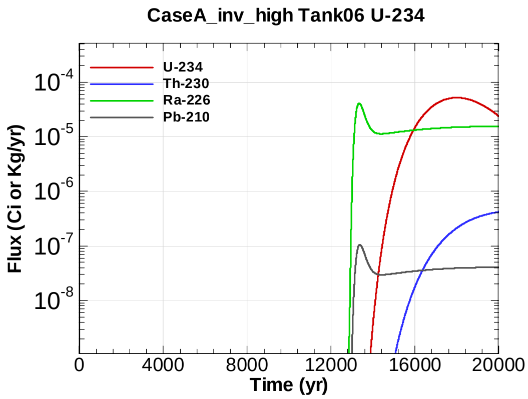

Figure J-33 - Water Table Flux for CaseA_inv_high Tank06 U-234

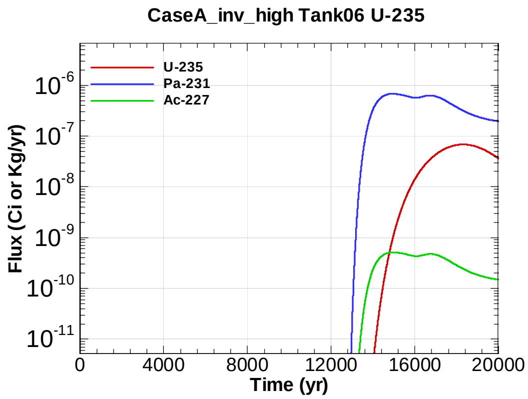

Figure J-34 - Water Table Flux for CaseA_inv_high Tank06 U-235

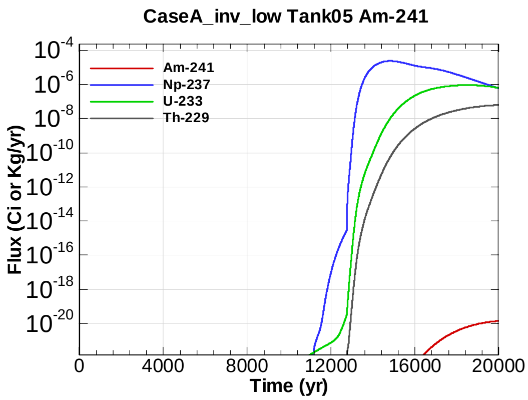

Figure J-35 - Water Table Flux for CaseA_inv_low Tank05 Am-241

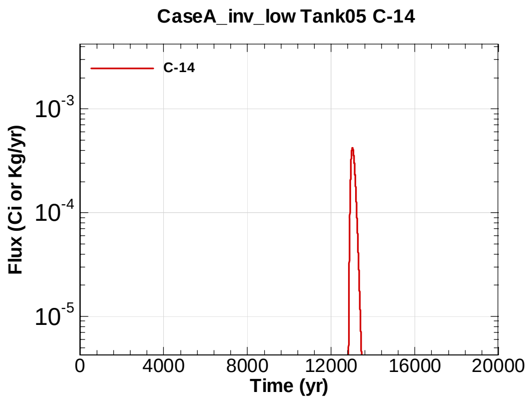

Figure J-36 - Water Table Flux for CaseA_inv_low Tank05 C-14

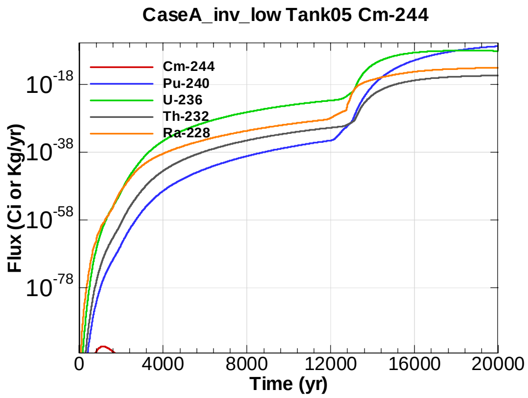

Figure J-37 - Water Table Flux for CaseA_inv_low Tank05 Cm-244

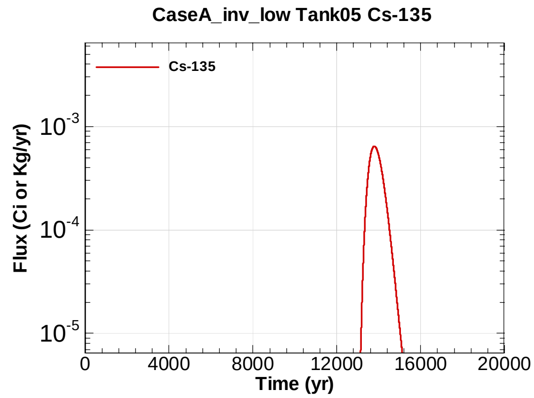

Figure J-38 - Water Table Flux for CaseA_inv_low Tank05 Cs-135

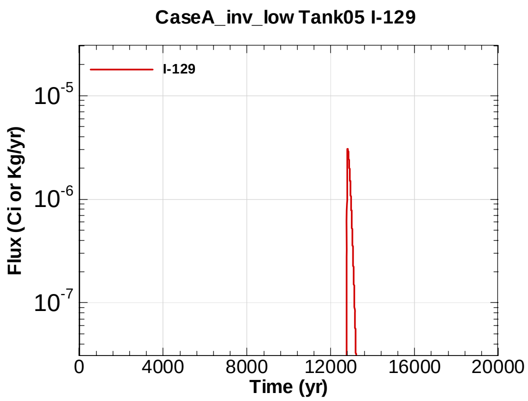

Figure J-39 - Water Table Flux for CaseA_inv_low Tank05 I-129

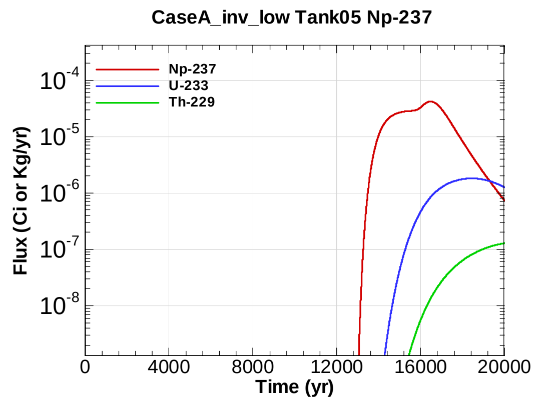

Figure J-40 - Water Table Flux for CaseA_inv_low Tank05 Np-237

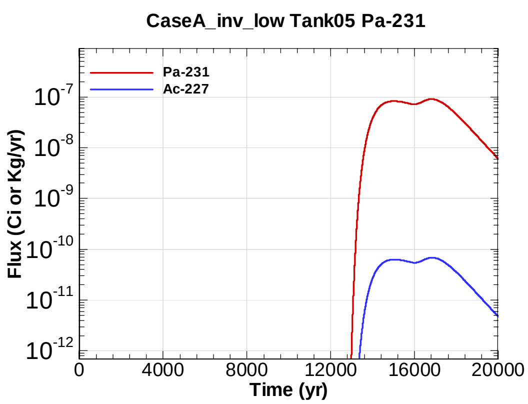

Figure J-41 - Water Table Flux for CaseA_inv_low Tank05 Pa-231

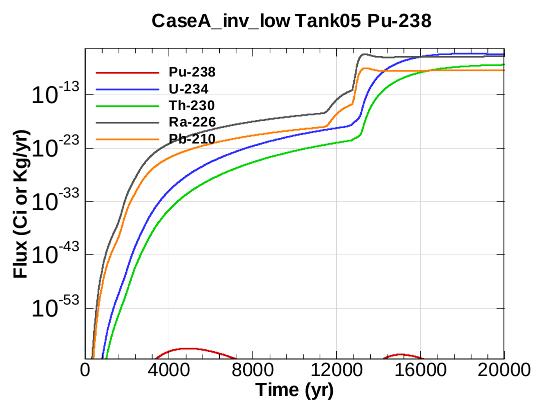

Figure J-42 - Water Table Flux for CaseA_inv_low Tank05 Pu-238

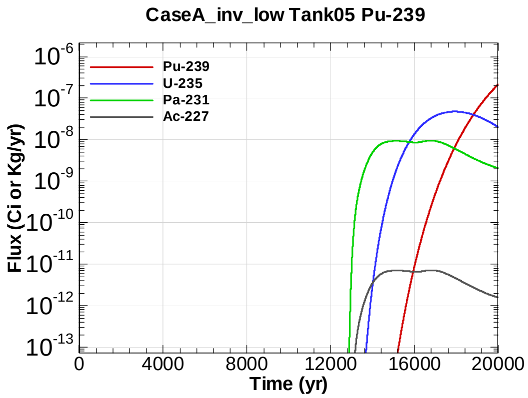

Figure J-43 - Water Table Flux for CaseA_inv_low Tank05 Pu-239

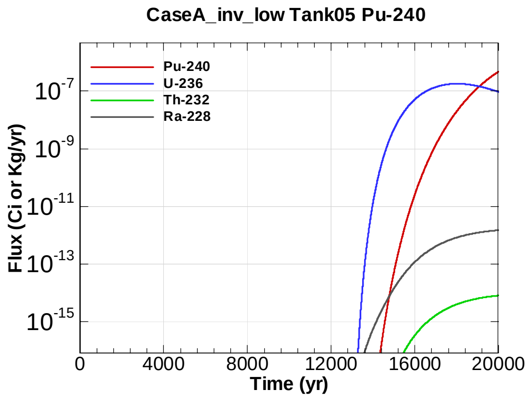

Figure J-44 - Water Table Flux for CaseA_inv_low Tank05 Pu-240

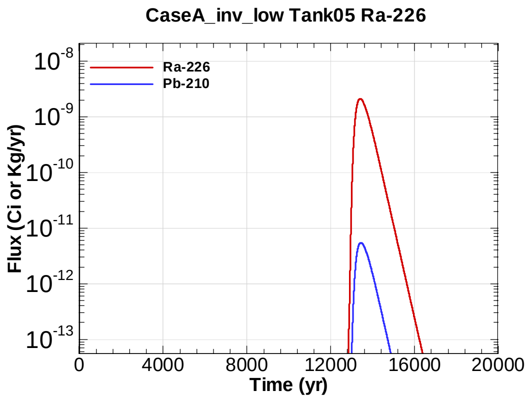

Figure J-45 - Water Table Flux for CaseA_inv_low Tank05 Ra-226

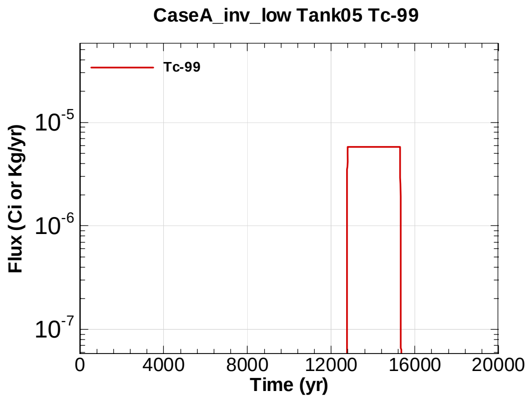

Figure J-46 - Water Table Flux for CaseA_inv_low Tank05 Tc-99

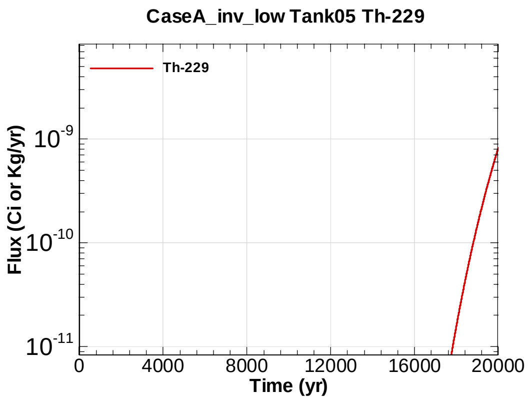

Figure J-47 - Water Table Flux for CaseA_inv_low Tank05 Th-229

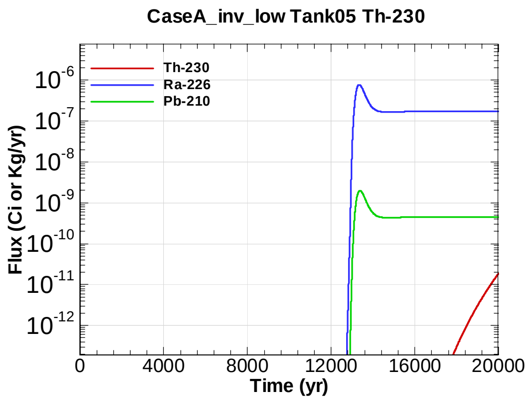

Figure J-48 - Water Table Flux for CaseA_inv_low Tank05 Th-230

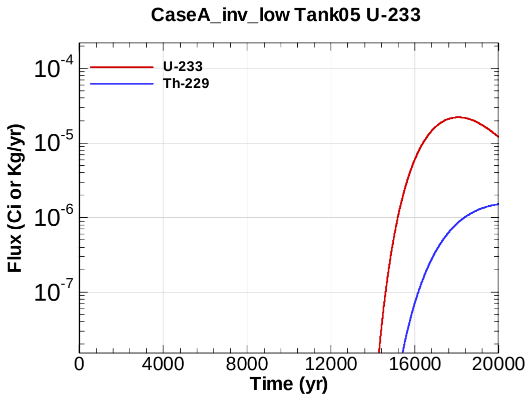

Figure J-49 - Water Table Flux for CaseA_inv_low Tank05 U-233

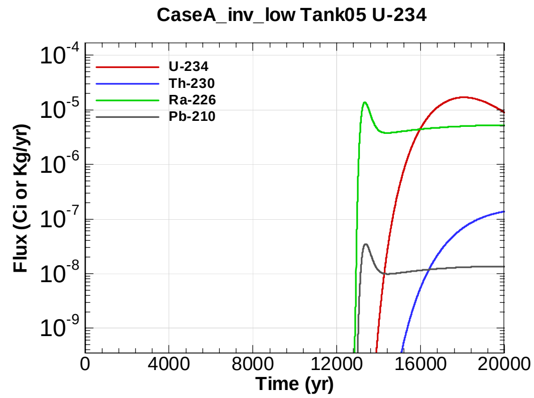

Figure J-50 - Water Table Flux for CaseA_inv_low Tank05 U-234

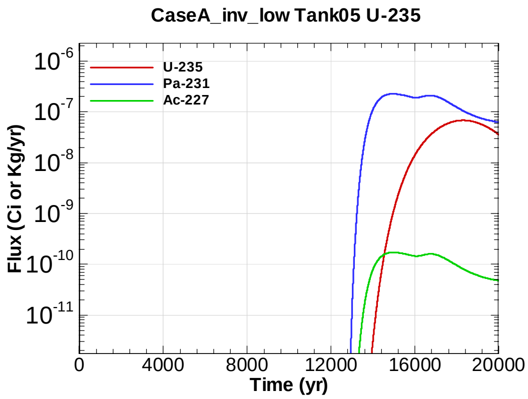

Figure J-51 - Water Table Flux for CaseA_inv_low Tank05 U-235

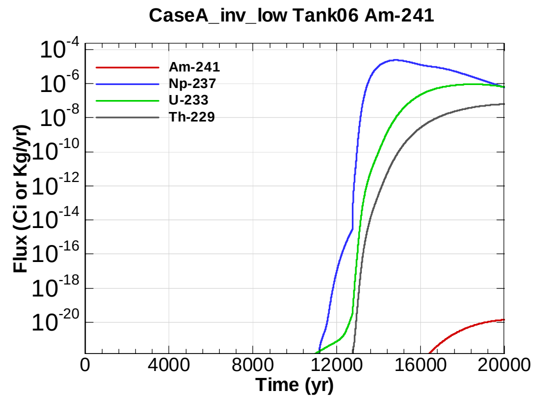

Figure J-52 - Water Table Flux for CaseA_inv_low Tank06 Am-241

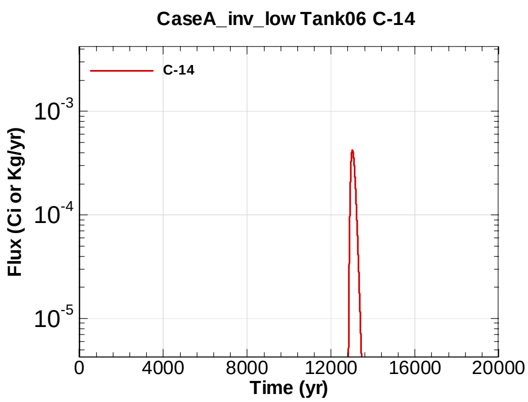

Figure J-53 - Water Table Flux for CaseA_inv_low Tank06 C-14

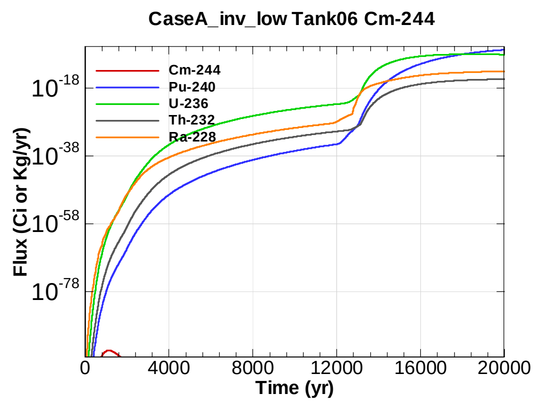

Figure J-54 - Water Table Flux for CaseA_inv_low Tank06 Cm-244

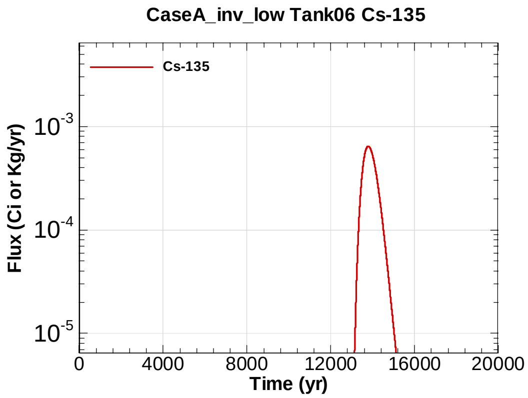

Figure J-55 - Water Table Flux for CaseA_inv_low Tank06 Cs-135

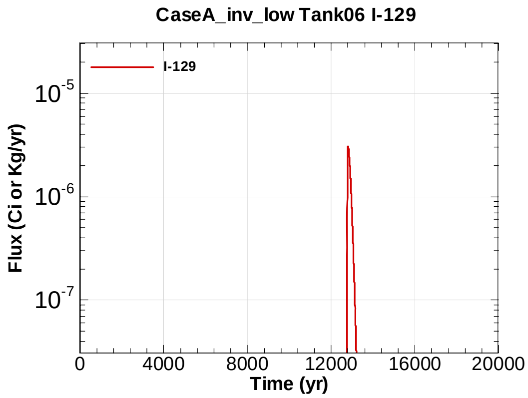

Figure J-56 - Water Table Flux for CaseA_inv_low Tank06 I-129

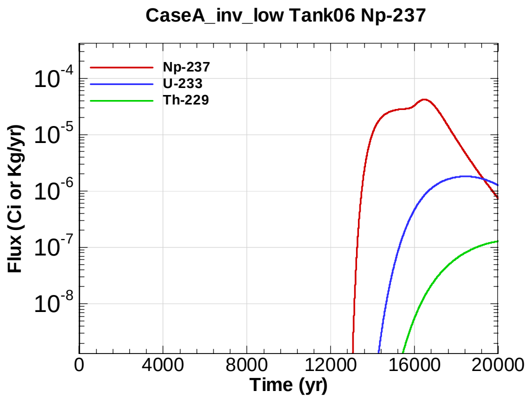

Figure J-57 - Water Table Flux for CaseA_inv_low Tank06 Np-237

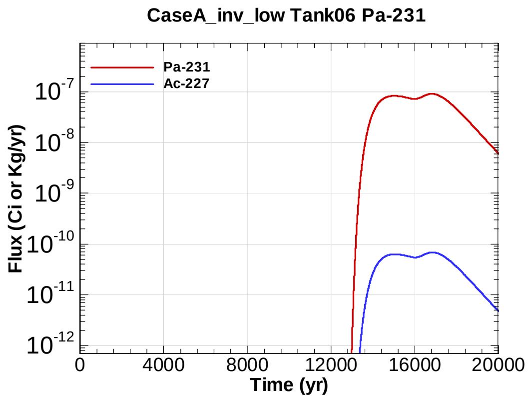

Figure J-58 - Water Table Flux for CaseA_inv_low Tank06 Pa-231

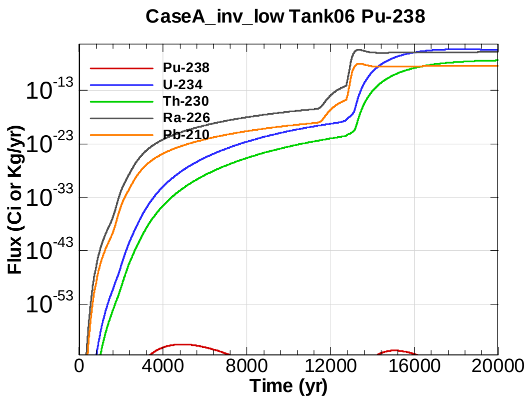

Figure J-59 - Water Table Flux for CaseA_inv_low Tank06 Pu-238

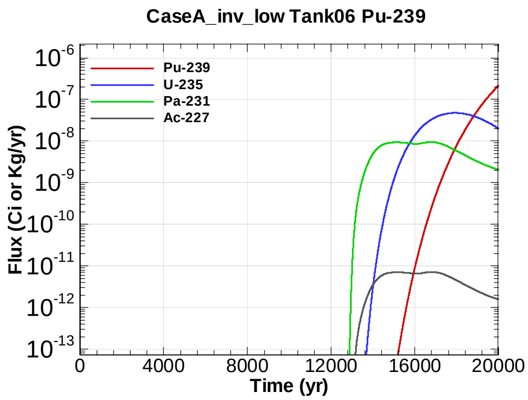

Figure J-60 - Water Table Flux for CaseA_inv_low Tank06 Pu-239

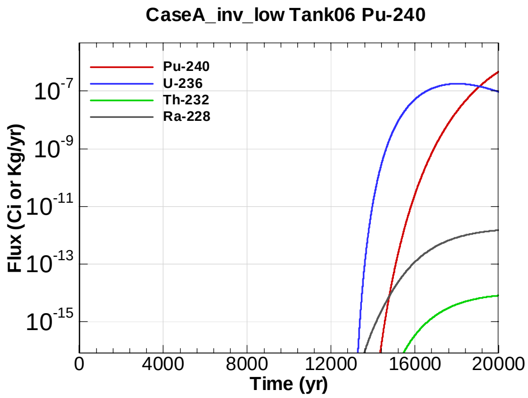

Figure J-61 - Water Table Flux for CaseA_inv_low Tank06 Pu-240

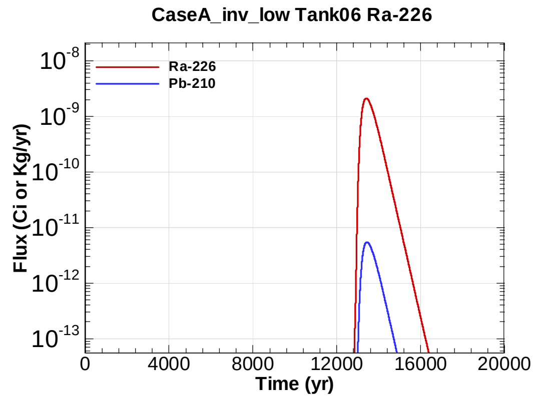

Figure J-62 - Water Table Flux for CaseA_inv_low Tank06 Ra-226

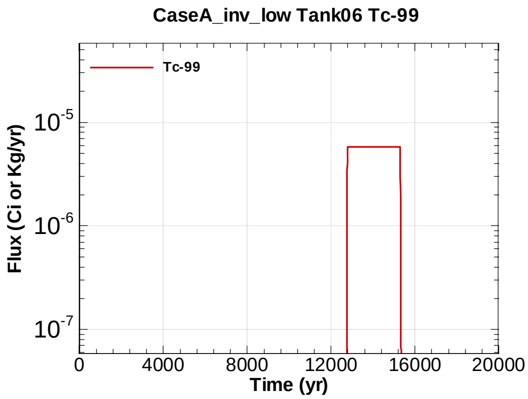

Figure J-63 - Water Table Flux for CaseA_inv_low Tank06 Tc-99

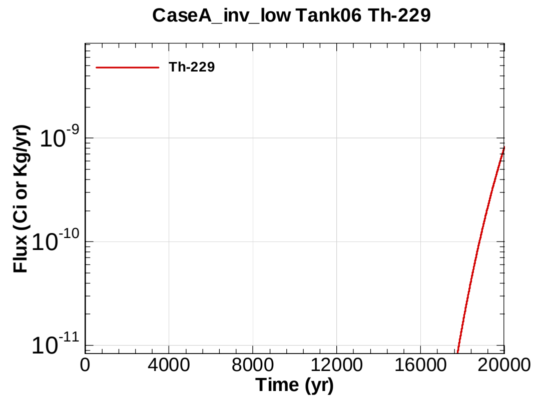

Figure J-64 - Water Table Flux for CaseA_inv_low Tank06 Th-229

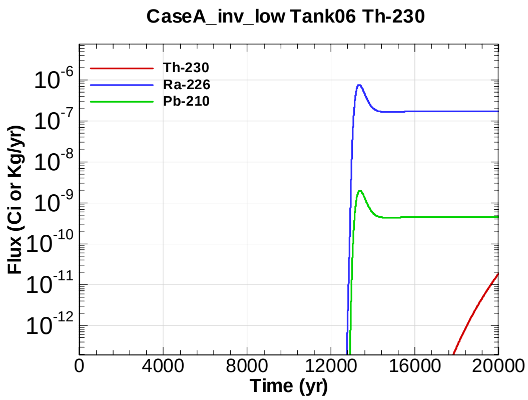

Figure J-65 - Water Table Flux for CaseA_inv_low Tank06 Th-230

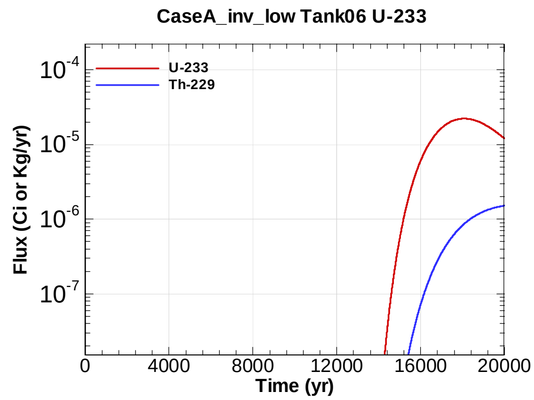

Figure J-66 - Water Table Flux for CaseA_inv_low Tank06 U-233

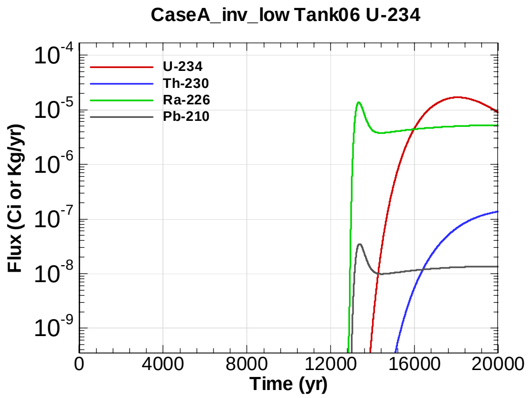

Figure J-67 - Water Table Flux for CaseA_inv_low Tank06 U-234

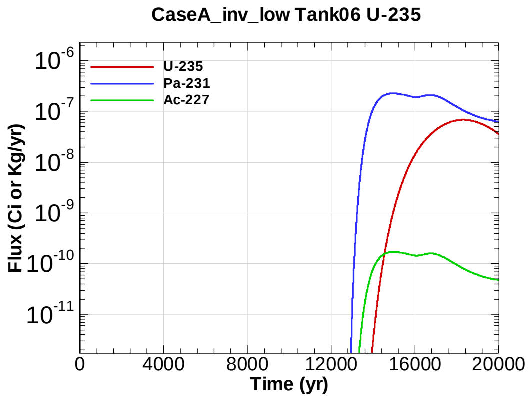

Figure J-68 - Water Table Flux for CaseA_inv_low Tank06 U-235

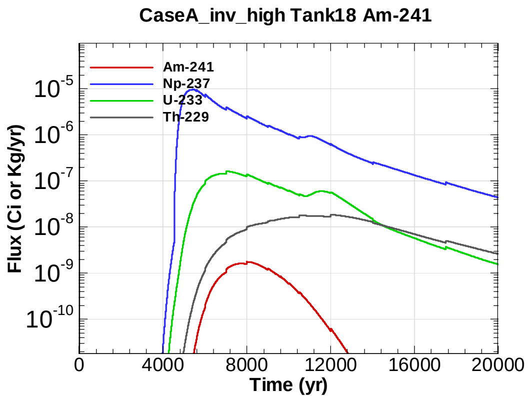

Figure J-69 - Water Table Flux for CaseA_inv_high Tank18 Am-241

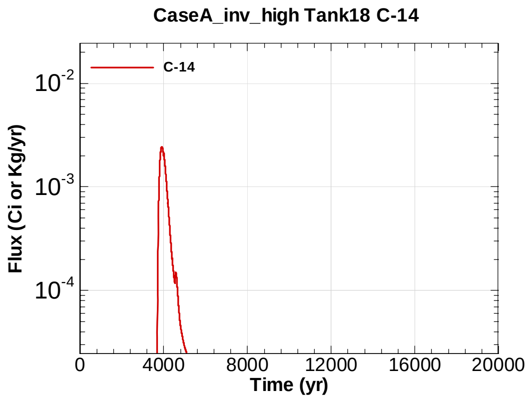

Figure J-70 - Water Table Flux for CaseA_inv_high Tank18 C-14

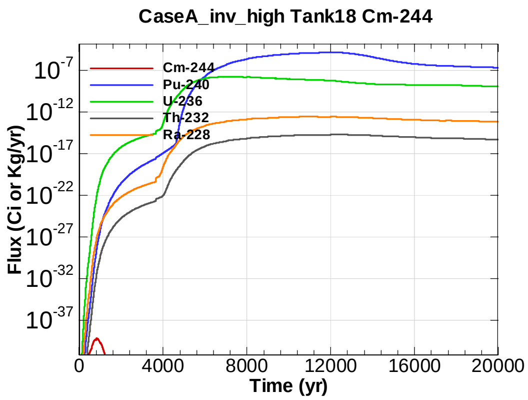

Figure J-71 - Water Table Flux for CaseA_inv_high Tank18 Cm-244

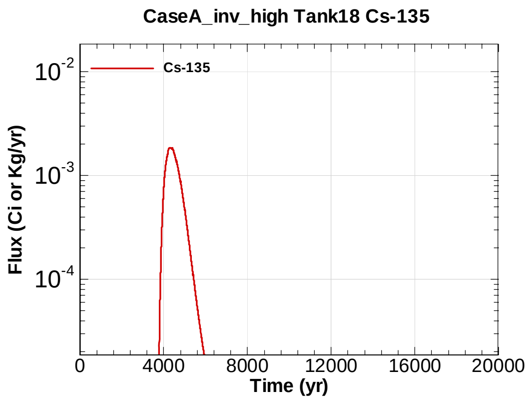

Figure J-72 - Water Table Flux for CaseA_inv_high Tank18 Cs-135

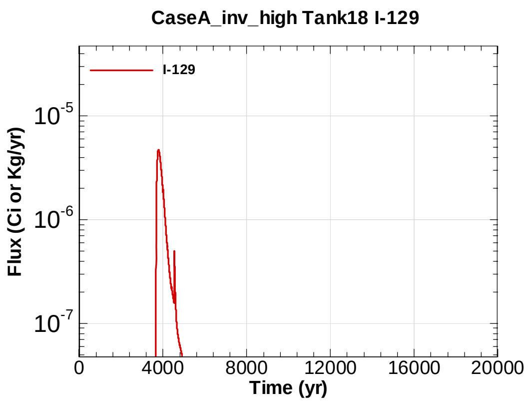

Figure J-73 - Water Table Flux for CaseA_inv_high Tank18 I-129

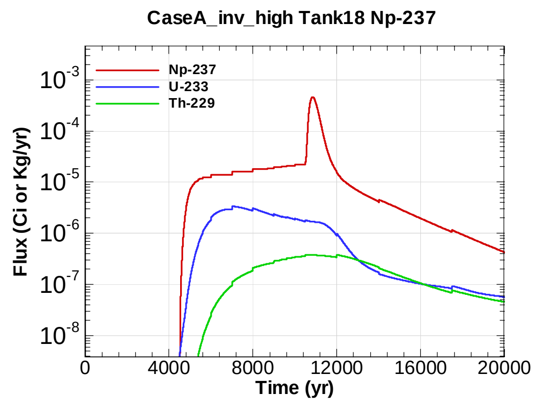

Figure J-74 - Water Table Flux for CaseA_inv_high Tank18 Np-237

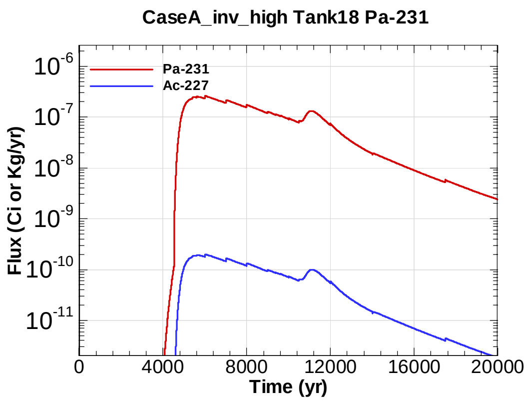

Figure J-75 - Water Table Flux for CaseA_inv_high Tank18 Pa-231

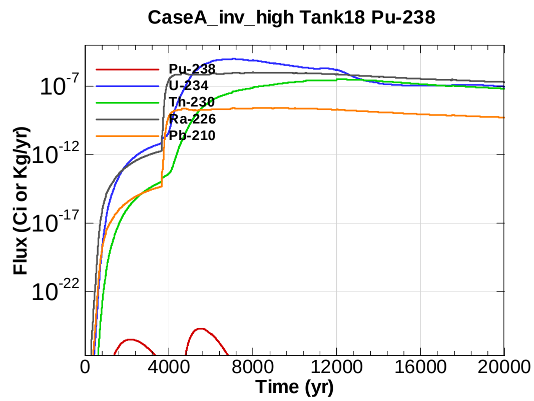

Figure J-76 - Water Table Flux for CaseA_inv_high Tank18 Pu-238

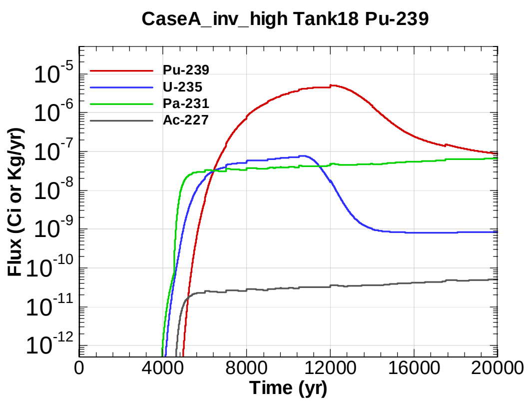

Figure J-77 - Water Table Flux for CaseA_inv_high Tank18 Pu-239

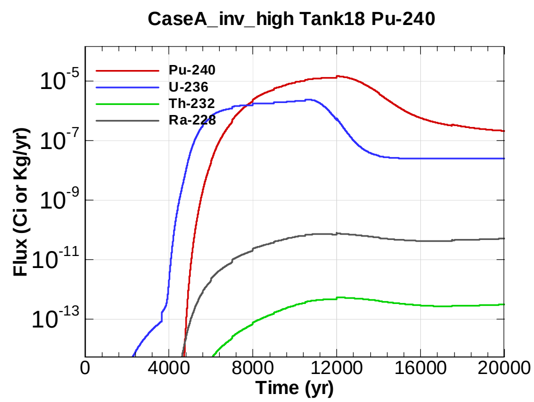

Figure J-78 - Water Table Flux for CaseA_inv_high Tank18 Pu-240

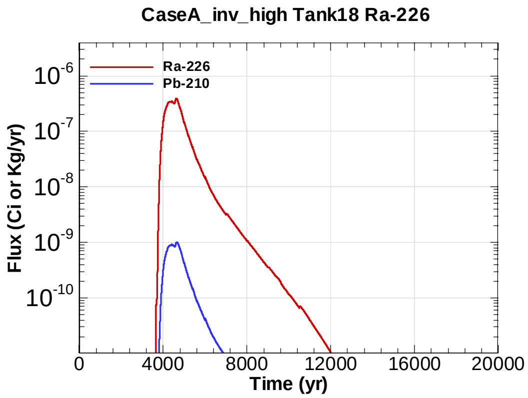

Figure J-79 - Water Table Flux for CaseA_inv_high Tank18 Ra-226

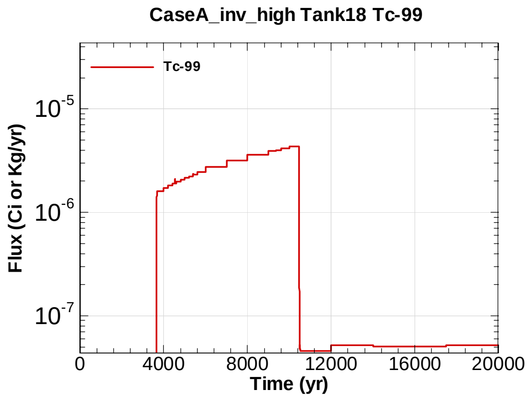

Figure J-80 - Water Table Flux for CaseA_inv_high Tank18 Tc-99

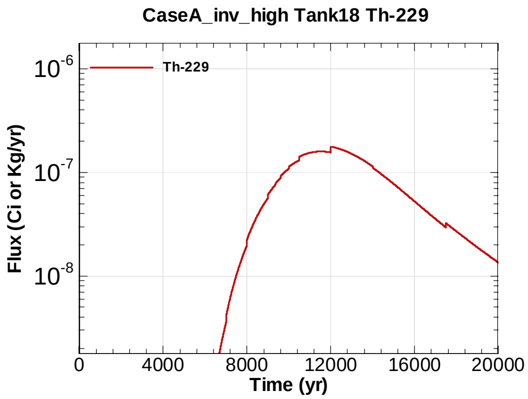

Figure J-81 - Water Table Flux for CaseA_inv_high Tank18 Th-229

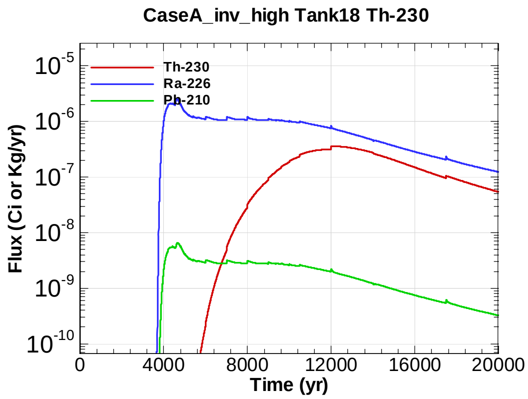

Figure J-82 - Water Table Flux for CaseA_inv_high Tank18 Th-230

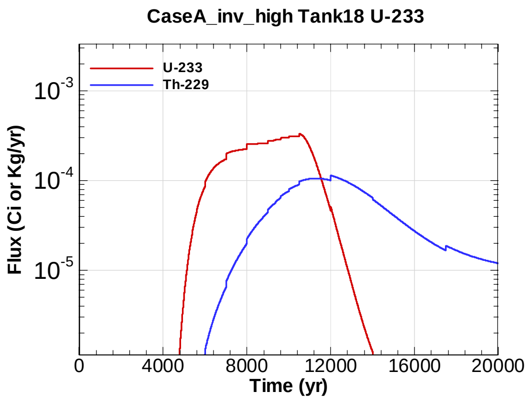

Figure J-83 - Water Table Flux for CaseA_inv_high Tank18 U-233

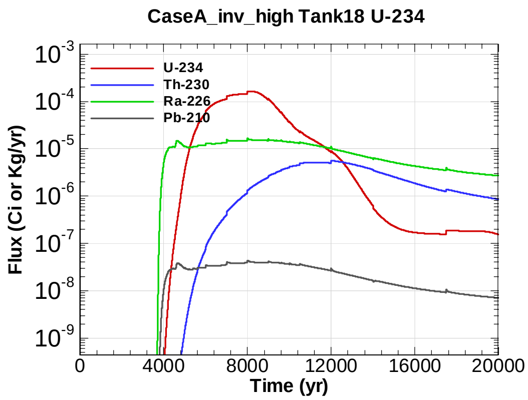

Figure J-84 - Water Table Flux for CaseA_inv_high Tank18 U-234

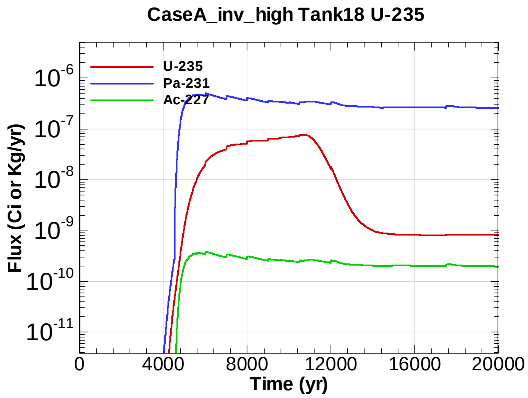

Figure J-85 - Water Table Flux for CaseA_inv_high Tank18 U-235

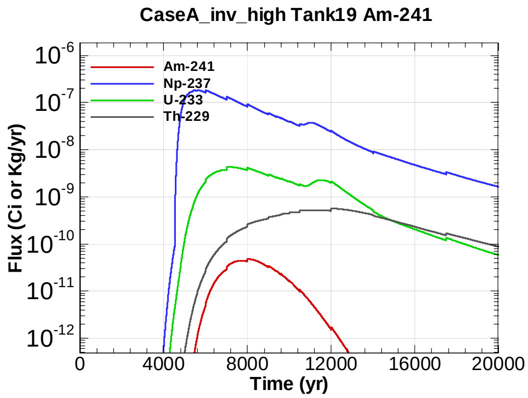

Figure J-86 - Water Table Flux for CaseA_inv_high Tank19 Am-241

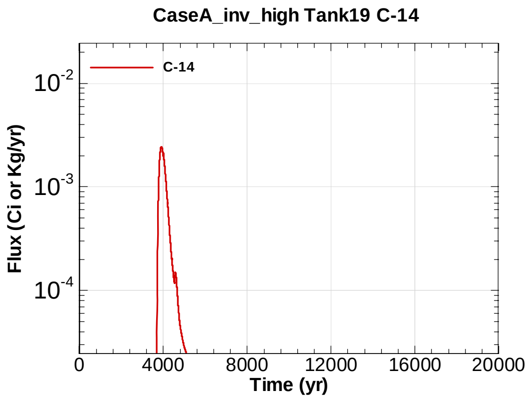

Figure J-87 - Water Table Flux for CaseA_inv_high Tank19 C-14

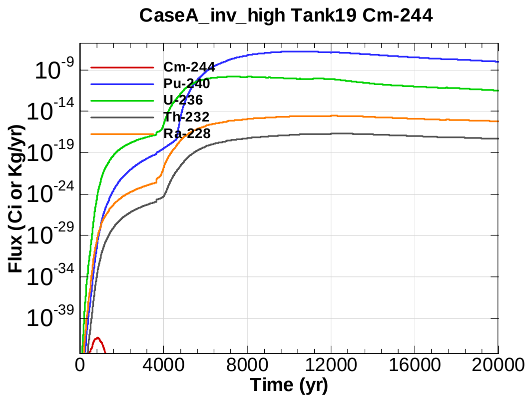

Figure J-88 - Water Table Flux for CaseA_inv_high Tank19 Cm-244

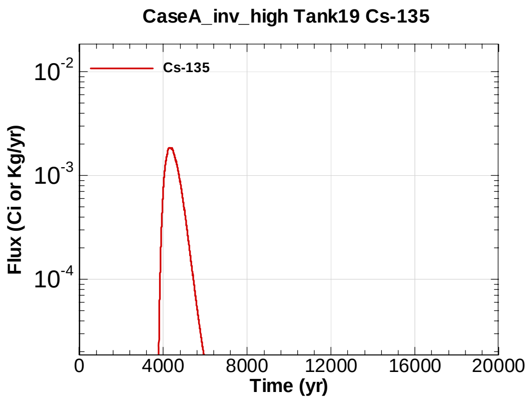

Figure J-89 - Water Table Flux for CaseA_inv_high Tank19 Cs-135

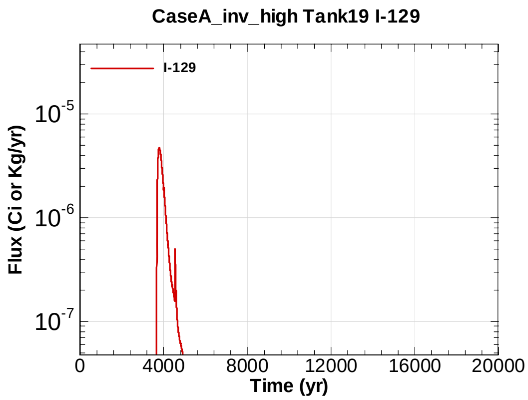

Figure J-90 - Water Table Flux for CaseA_inv_high Tank19 I-129

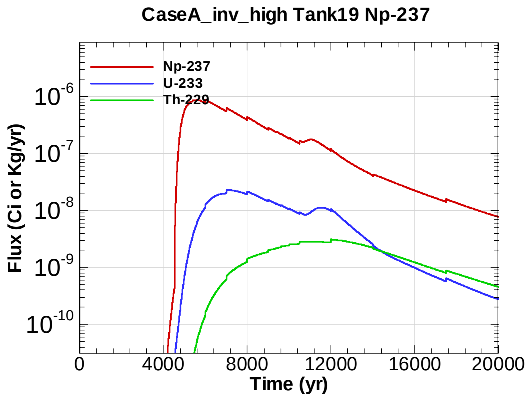

Figure J-91 - Water Table Flux for CaseA_inv_high Tank19 Np-237

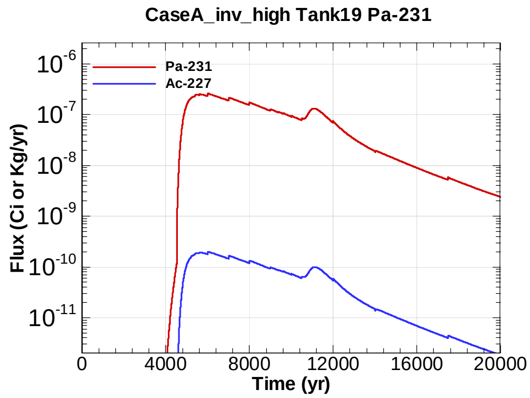

Figure J-92 - Water Table Flux for CaseA_inv_high Tank19 Pa-231

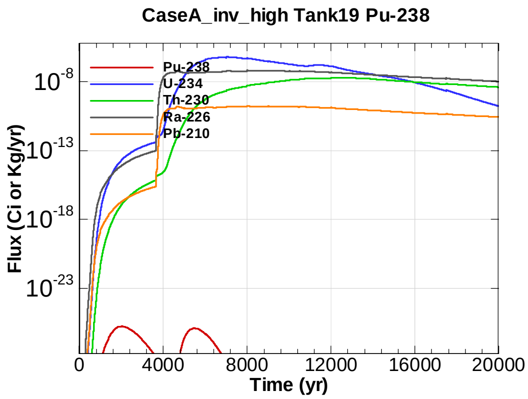

Figure J-93 - Water Table Flux for CaseA_inv_high Tank19 Pu-238

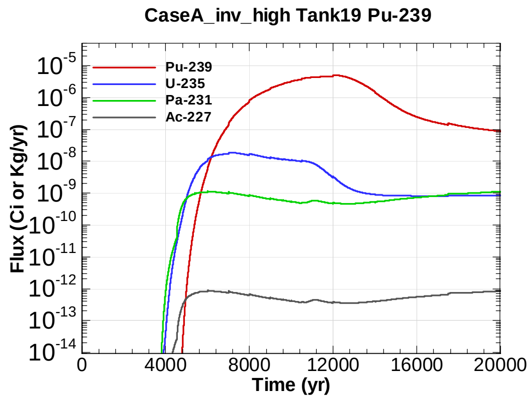

Figure J-94 - Water Table Flux for CaseA_inv_high Tank19 Pu-239

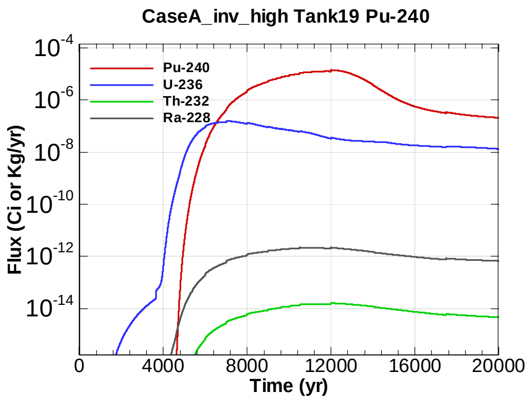

Figure J-95 - Water Table Flux for CaseA_inv_high Tank19 Pu-240

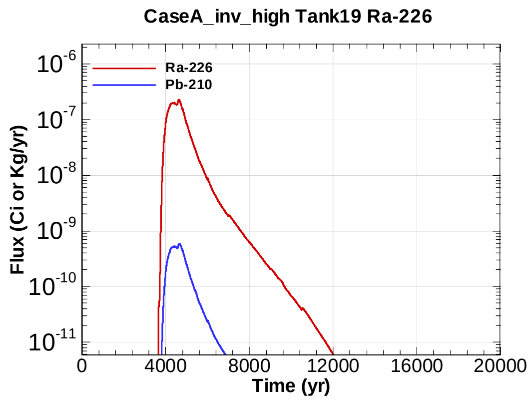

Figure J-96 - Water Table Flux for CaseA_inv_high Tank19 Ra-226

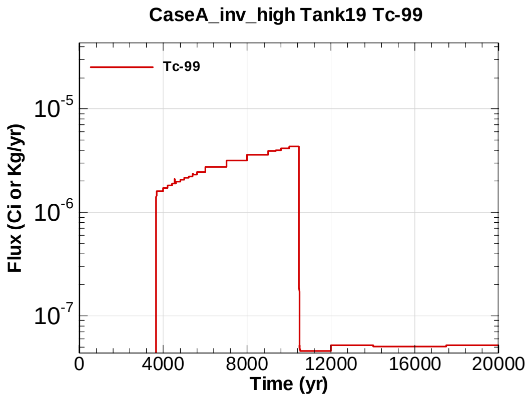

Figure J-97 - Water Table Flux for CaseA_inv_high Tank19 Tc-99

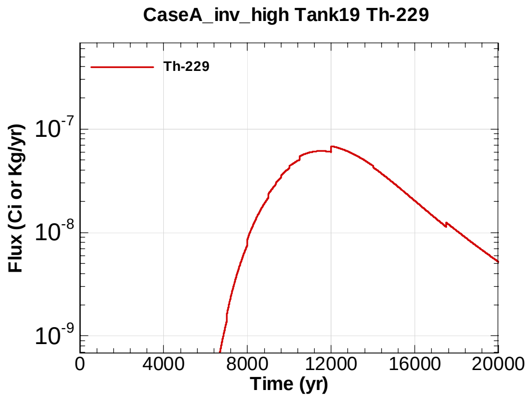

Figure J-98 - Water Table Flux for CaseA_inv_high Tank19 Th-229

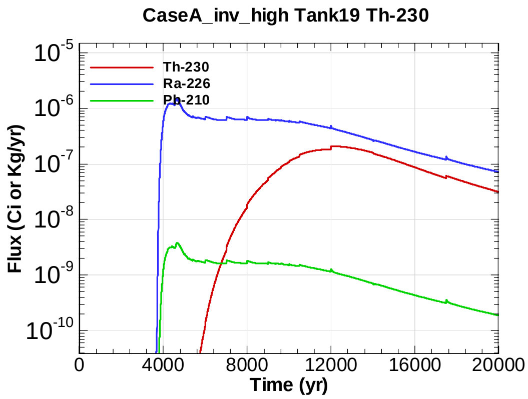

Figure J-99 - Water Table Flux for CaseA_inv_high Tank19 Th-230

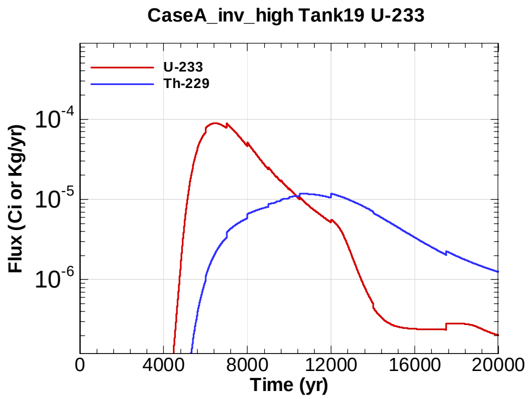

Figure J-100 - Water Table Flux for CaseA_inv_high Tank19 U-233

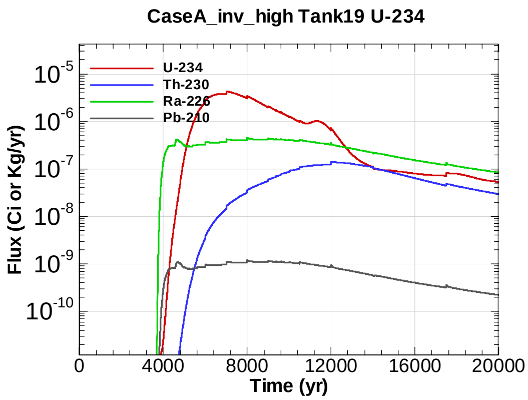

Figure J-101 - Water Table Flux for CaseA_inv_high Tank19 U-234

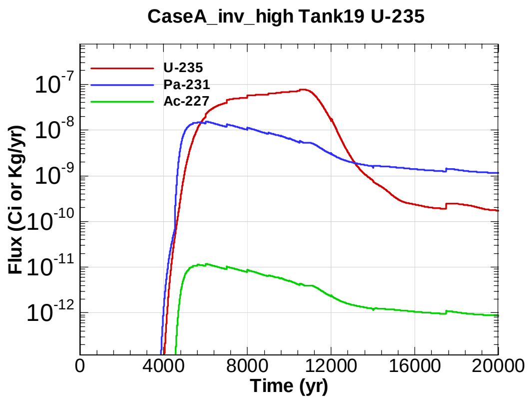

Figure J-102 - Water Table Flux for CaseA_inv_high Tank19 U-235

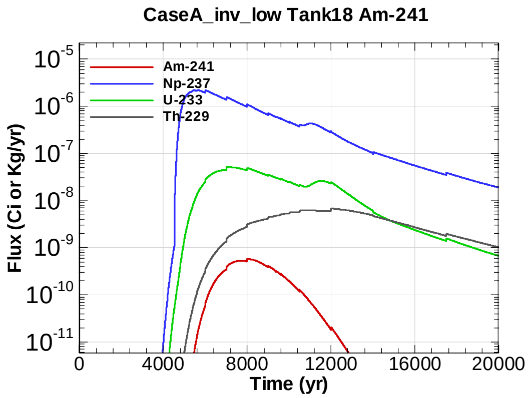

Figure J-103 - Water Table Flux for CaseA_inv_low Tank18 Am-241

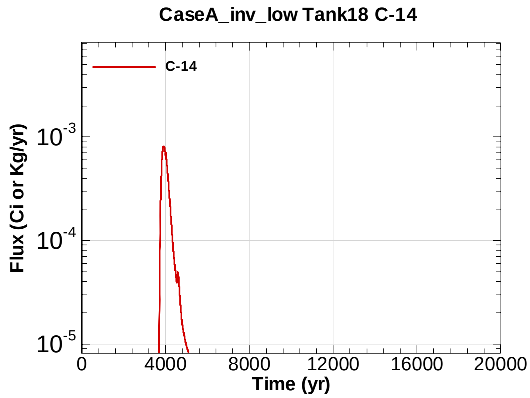

Figure J-104 - Water Table Flux for CaseA_inv_low Tank18 C-14

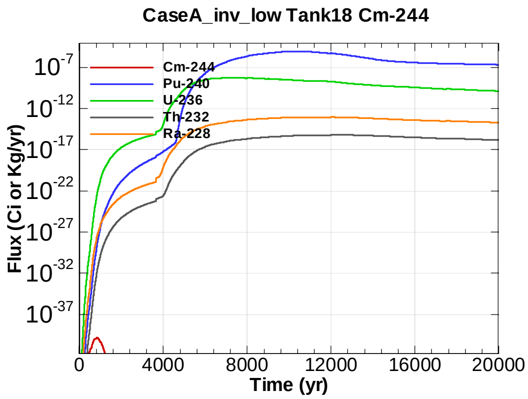

Figure J-105 - Water Table Flux for CaseA_inv_low Tank18 Cm-244

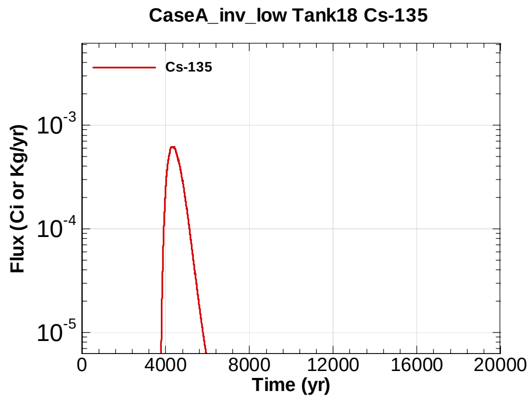

Figure J-106 - Water Table Flux for CaseA_inv_low Tank18 Cs-135

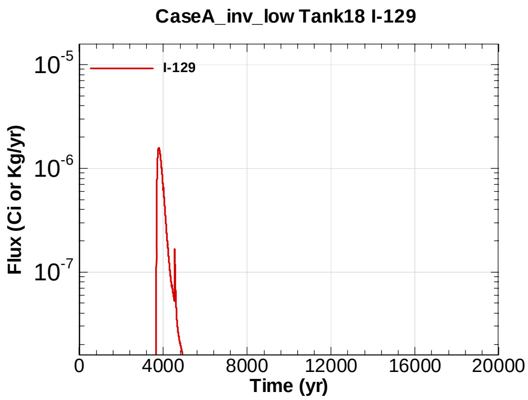

Figure J-107 - Water Table Flux for CaseA_inv_low Tank18 I-129

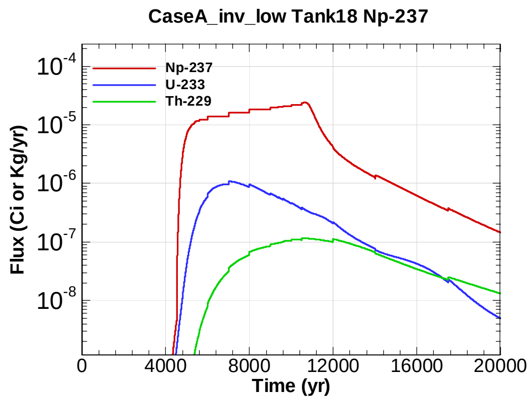

Figure J-108 - Water Table Flux for CaseA_inv_low Tank18 Np-237

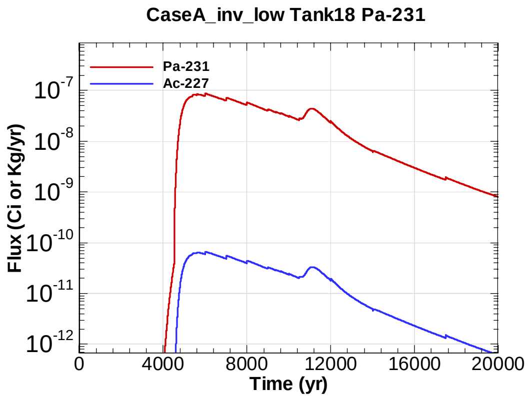

Figure J-109 - Water Table Flux for CaseA_inv_low Tank18 Pa-231

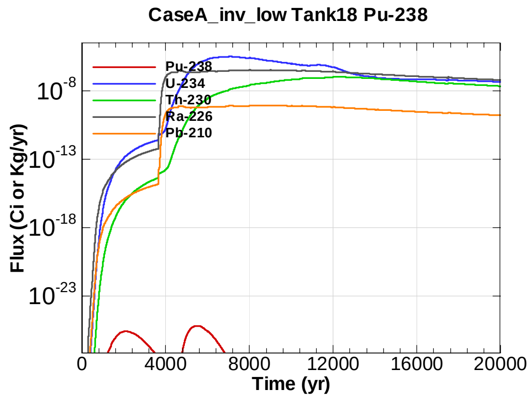

Figure J-110 - Water Table Flux for CaseA_inv_low Tank18 Pu-238

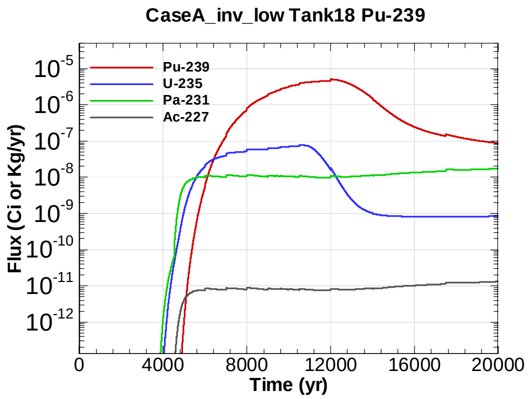

Figure J-111 - Water Table Flux for CaseA_inv_low Tank18 Pu-239

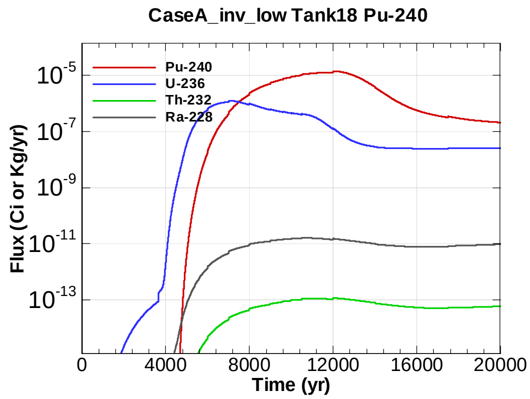

Figure J-112 - Water Table Flux for CaseA_inv_low Tank18 Pu-240

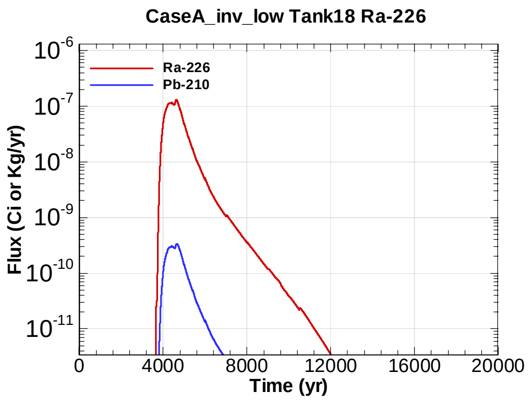

Figure J-113 - Water Table Flux for CaseA_inv_low Tank18 Ra-226

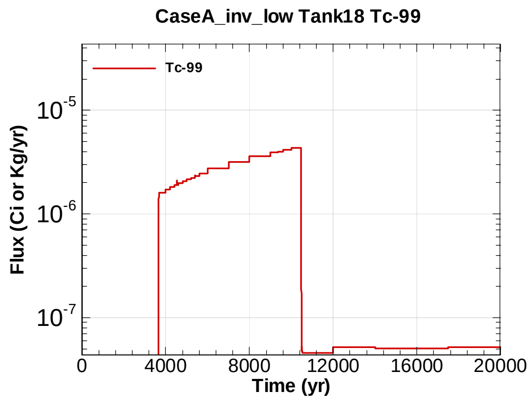

Figure J-114 - Water Table Flux for CaseA_inv_low Tank18 Tc-99

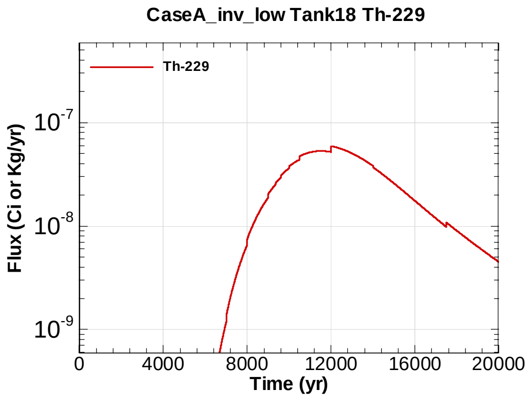

Figure J-115 - Water Table Flux for CaseA_inv_low Tank18 Th-229

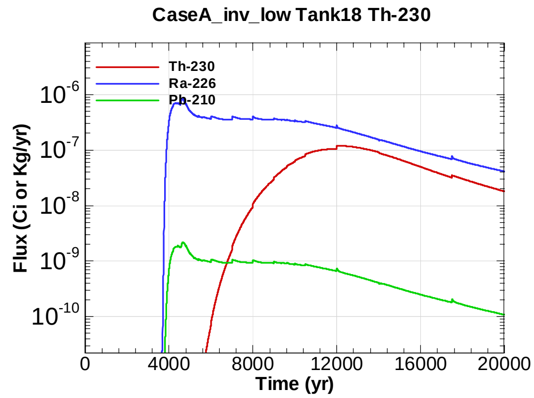

Figure J-116 - Water Table Flux for CaseA_inv_low Tank18 Th-230

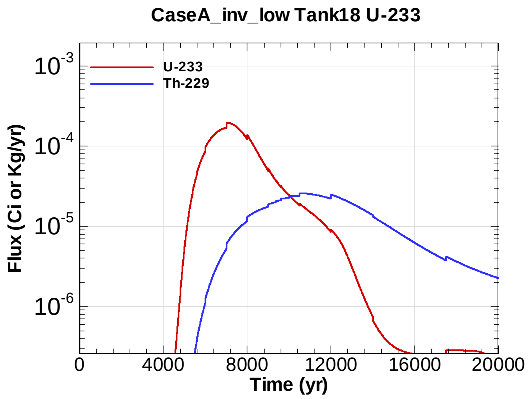

Figure J-117 - Water Table Flux for CaseA_inv_low Tank18 U-233

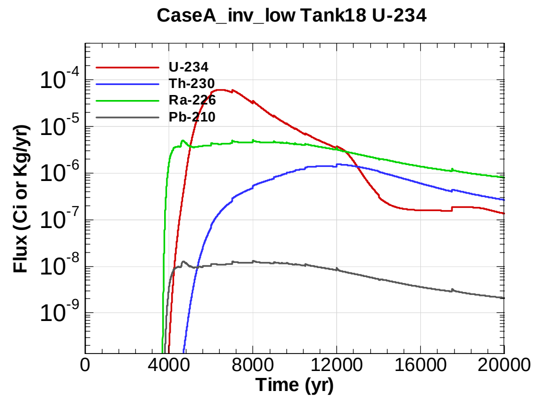

Figure J-118 - Water Table Flux for CaseA_inv_low Tank18 U-234

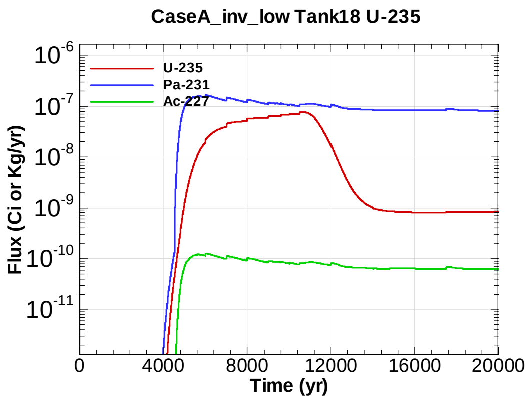

Figure J-119 - Water Table Flux for CaseA_inv_low Tank18 U-235

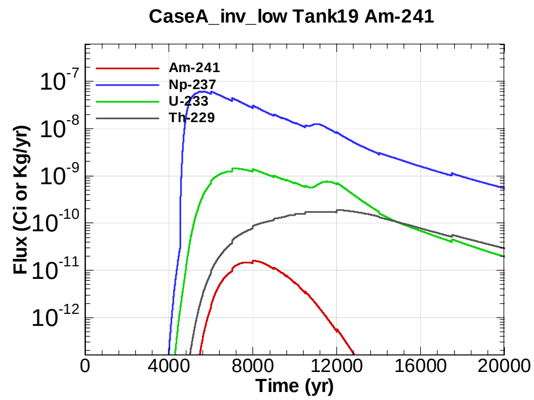

Figure J-120 - Water Table Flux for CaseA_inv_low Tank19 Am-241

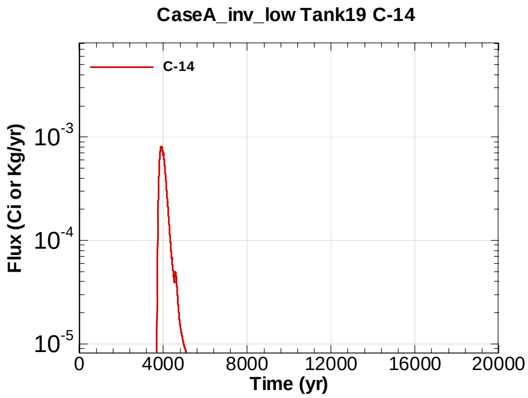

Figure J-121 - Water Table Flux for CaseA_inv_low Tank19 C-14

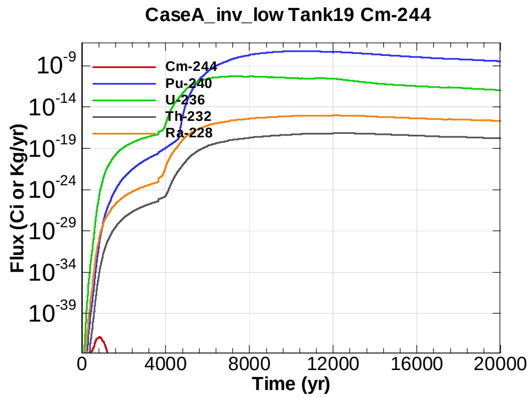

Figure J-122 - Water Table Flux for CaseA_inv_low Tank19 Cm-244

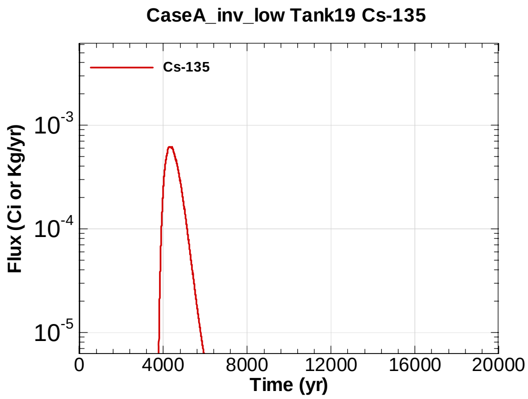

Figure J-123 - Water Table Flux for CaseA_inv_low Tank19 Cs-135

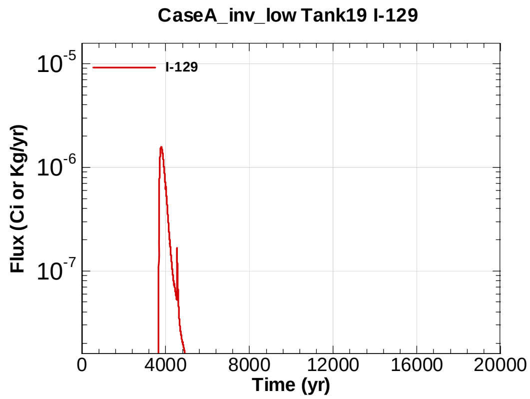

Figure J-124 - Water Table Flux for CaseA_inv_low Tank19 I-129

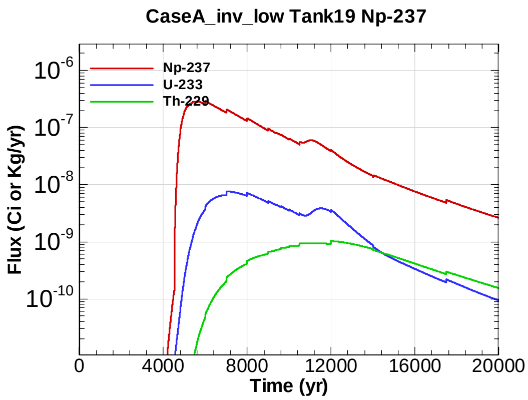

Figure J-125 - Water Table Flux for CaseA_inv_low Tank19 Np-237

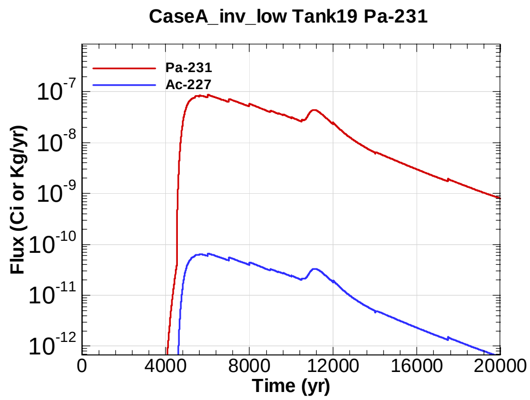

Figure J-126 - Water Table Flux for CaseA_inv_low Tank19 Pa-231

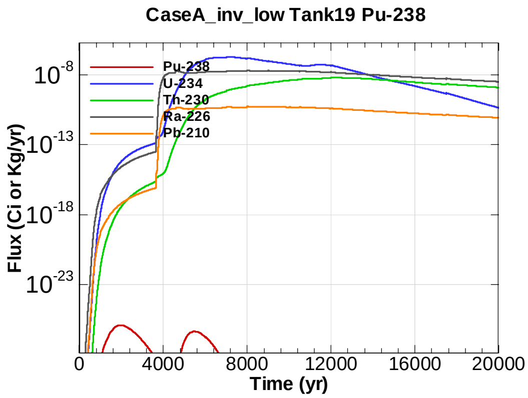

Figure J-127 - Water Table Flux for CaseA_inv_low Tank19 Pu-238

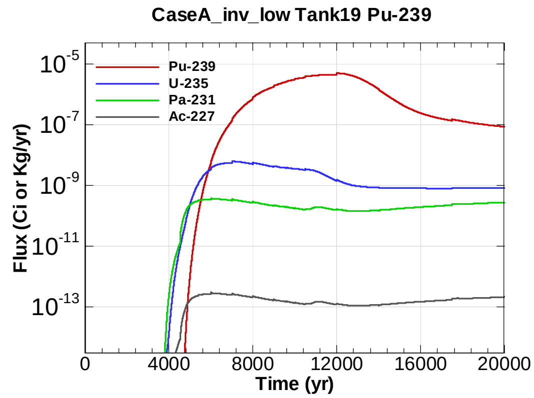

Figure J-128 - Water Table Flux for CaseA_inv_low Tank19 Pu-239

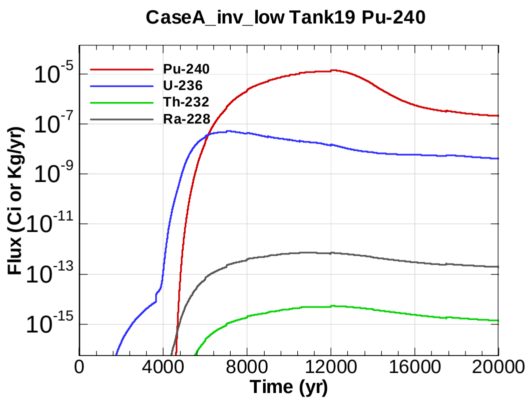

Figure J-129 - Water Table Flux for CaseA_inv_low Tank19 Pu-240

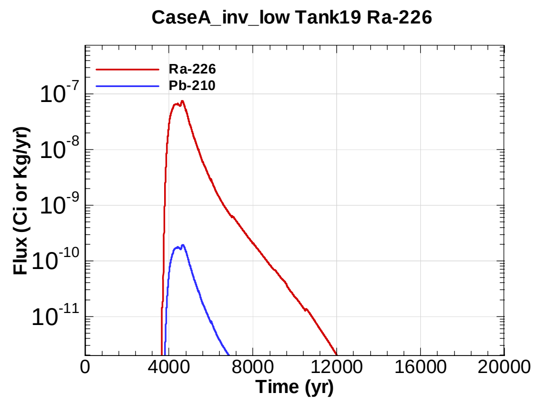

Figure J-130 - Water Table Flux for CaseA_inv_low Tank19 Ra-226

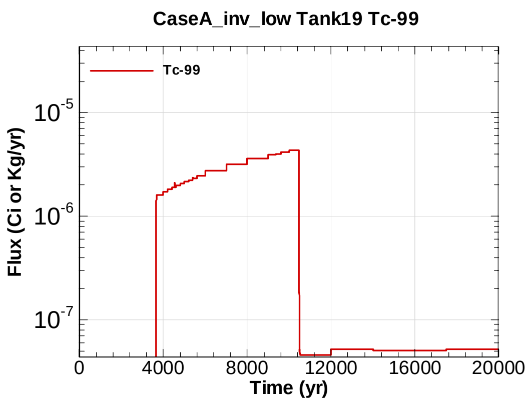

Figure J-131 - Water Table Flux for CaseA_inv_low Tank19 Tc-99

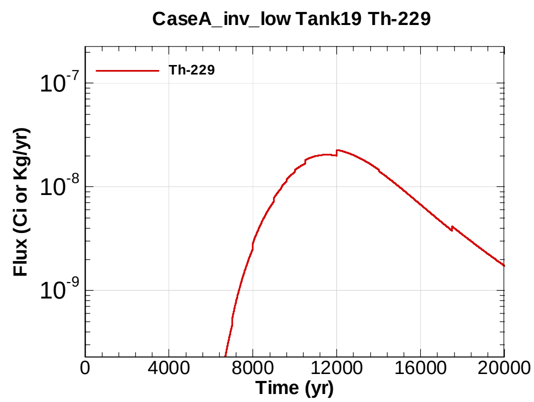

Figure J-132 - Water Table Flux for CaseA_inv_low Tank19 Th-229

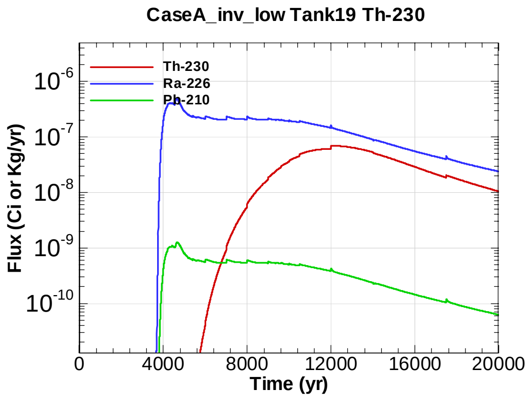

Figure J-133 - Water Table Flux for CaseA_inv_low Tank19 Th-230

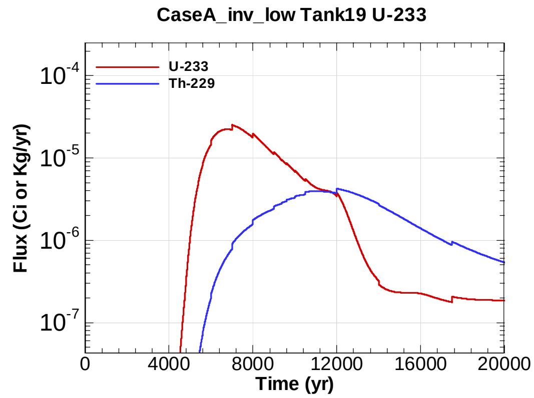

Figure J-134 - Water Table Flux for CaseA_inv_low Tank19 U-233

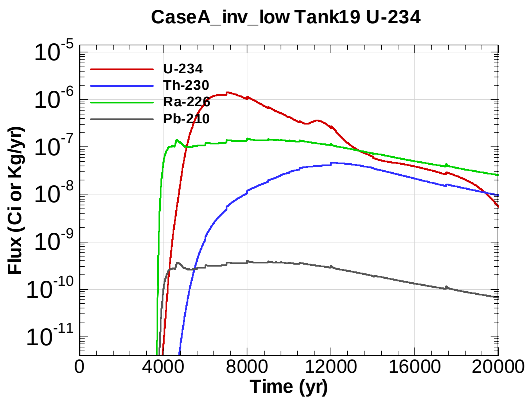

Figure J-135 - Water Table Flux for CaseA_inv_low Tank19 U-234

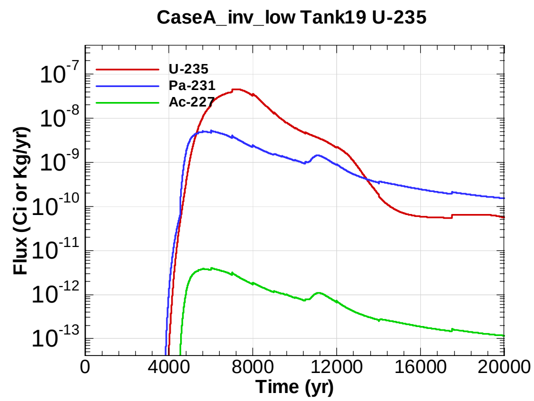

Figure J-136 - Water Table Flux for CaseA_inv_low Tank19 U-235

Appendix K.1
FLUX AT WATER TABLE FOR BARRIER ANALYSIS – CASE 1 – BASE CASE

Appendix K.1 contains curves showing the flux (in Ci/year) at the water table for barrier analysis – Case 1 – Base Case for Tanks 5, 18 and 33. The flux is provided for selected radionuclides.

Graph heading example "CaseA Tank05 Am-241"

Key

CaseA = scenario case/configuration
Tank05 = inventory source is Tank 05
Am-241 = radionuclide or chemical of concern

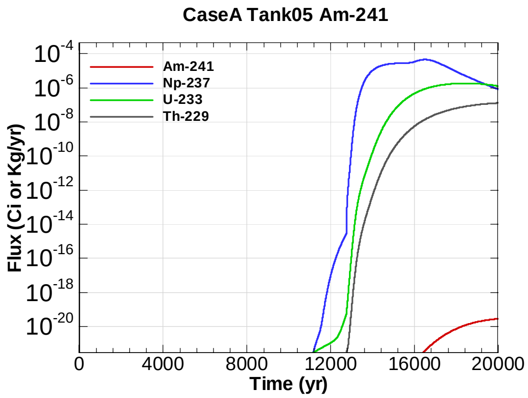

Figure K.1-1 - Water Table Flux for CaseA Tank05 Am-241

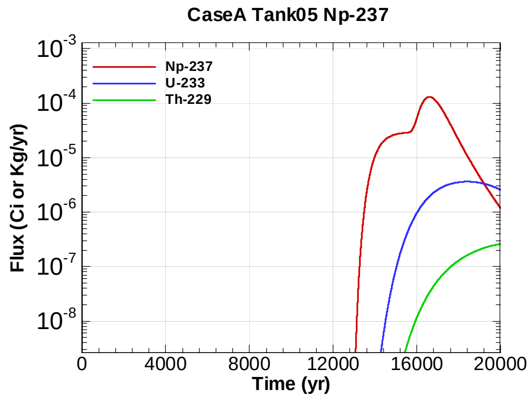

Figure K.1-2 - Water Table Flux for CaseA Tank05 Np-237

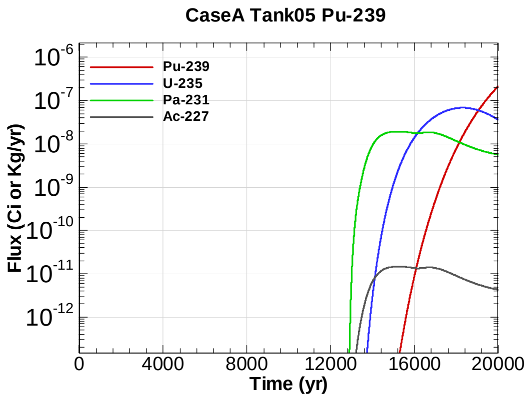

Figure K.1-3 - Water Table Flux for CaseA Tank05 Pu-239

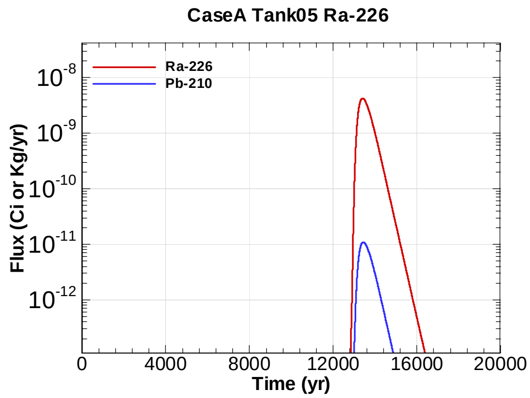

Figure K.1-4 - Water Table Flux for CaseA Tank05 Ra-226

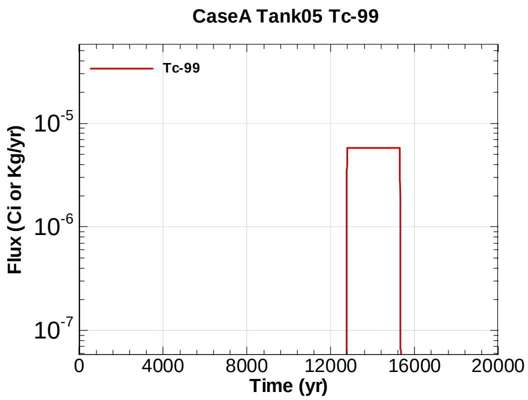

Figure K.1-5 - Water Table Flux for CaseA Tank05 Tc-99

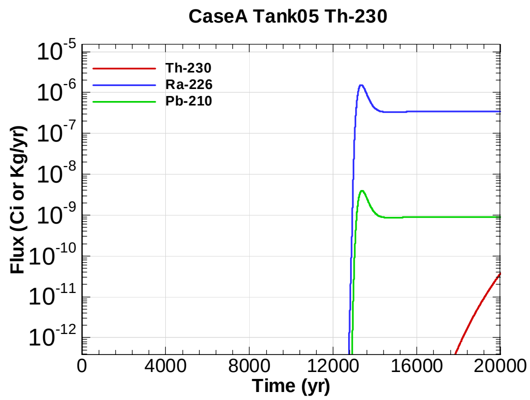

Figure K.1-6 - Water Table Flux for CaseA Tank05 Th-230

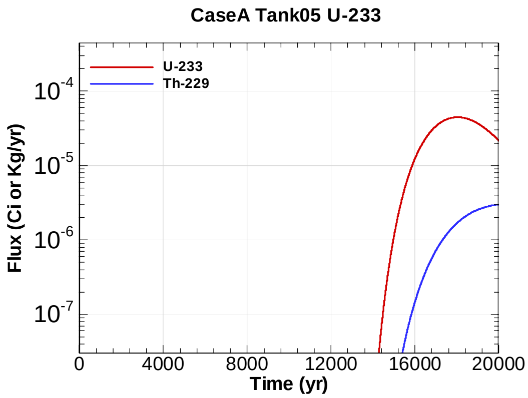

Figure K.1-7 - Water Table Flux for CaseA Tank05 U-233

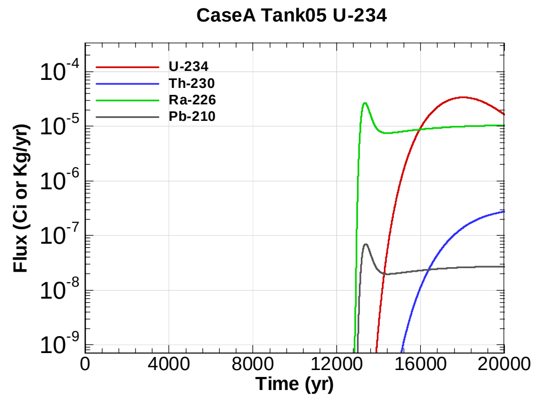

Figure K.1-8 - Water Table Flux for CaseA Tank05 U-234

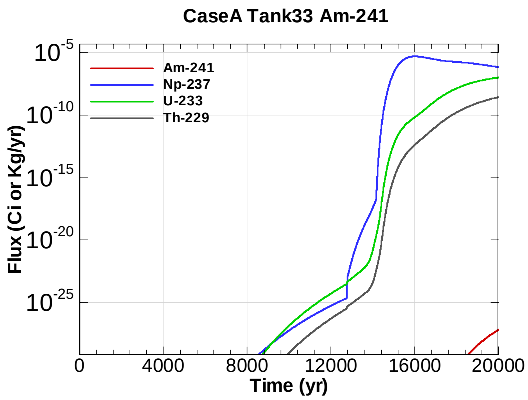

Figure K.1-9 - Water Table Flux for CaseA Tank33 Am-241

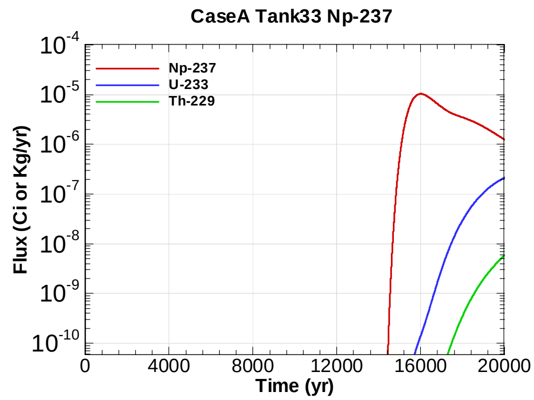

Figure K.1-10 - Water Table Flux for CaseA Tank33 Np-237

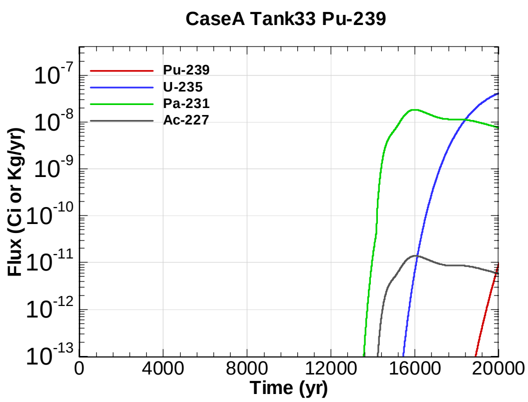

Figure K.1-11 - Water Table Flux for CaseA Tank33 Pu-239

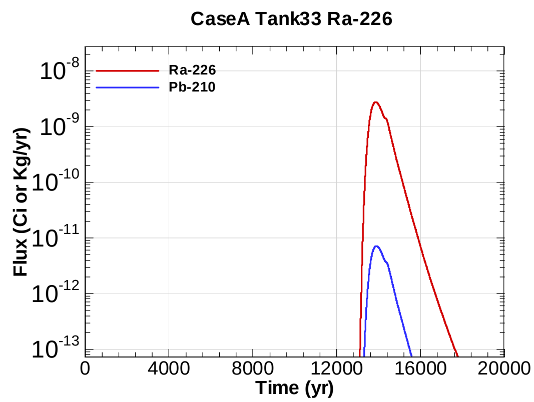

Figure K.1-12 - Water Table Flux for CaseA Tank33 Ra-226

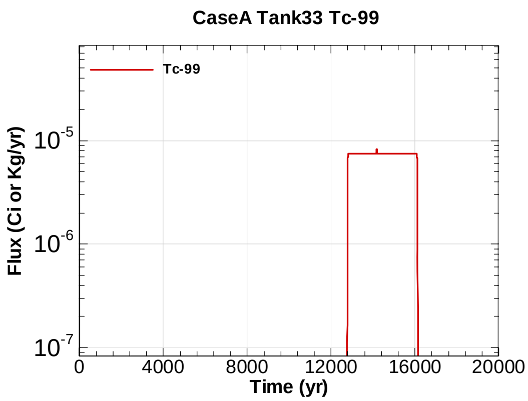

Figure K.1-13 - Water Table Flux for CaseA Tank33 Tc-99

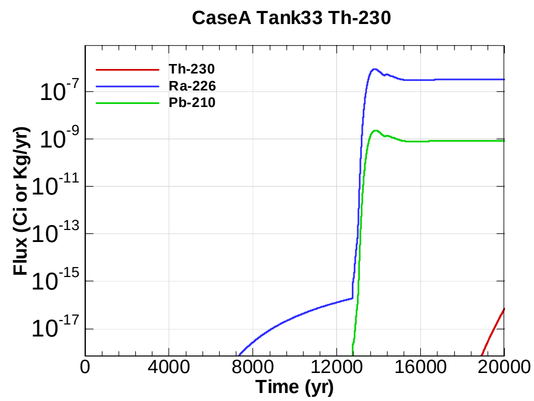

Figure K.1-14 - Water Table Flux for CaseA Tank33 Th-230

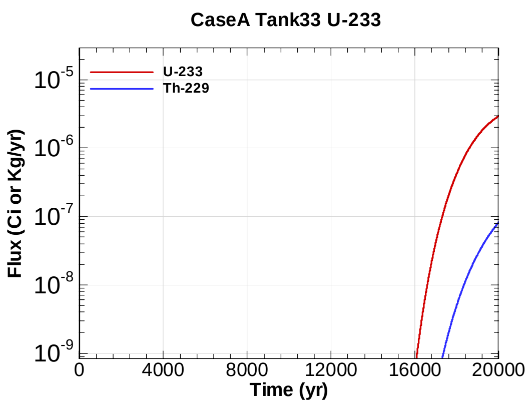

Figure K.1-15 - Water Table Flux for CaseA Tank33 U-233

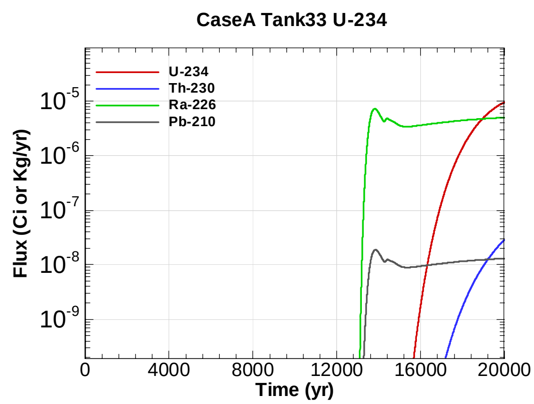

Figure K.1-16 - Water Table Flux for CaseA Tank33 U-234

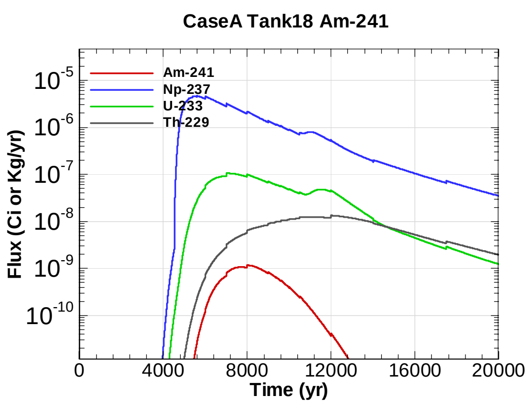

Figure K.1-17 - Water Table Flux for CaseA Tank18 Am-241

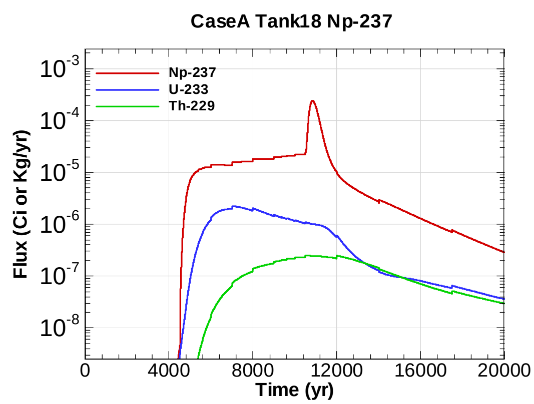

Figure K.1-18 - Water Table Flux for CaseA Tank18 Np-237

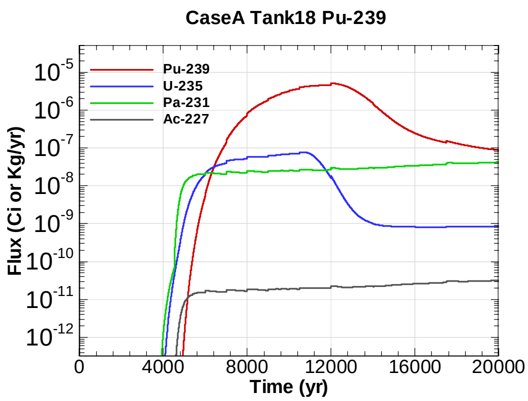

Figure K.1-19 - Water Table Flux for CaseA Tank18 Pu-239

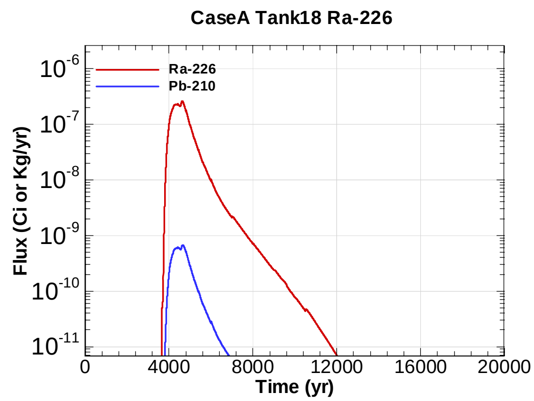

Figure K.1-20 - Water Table Flux for CaseA Tank18 Ra-226

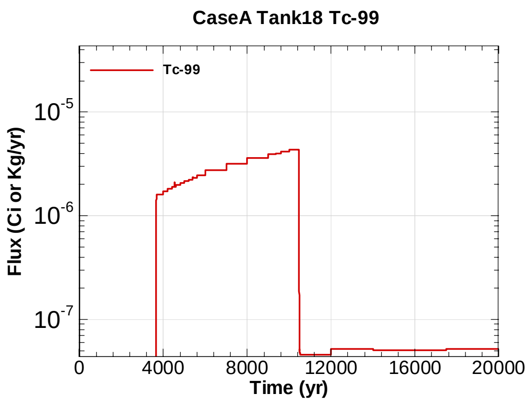

Figure K.1-21 - Water Table Flux for CaseA Tank18 Tc-99

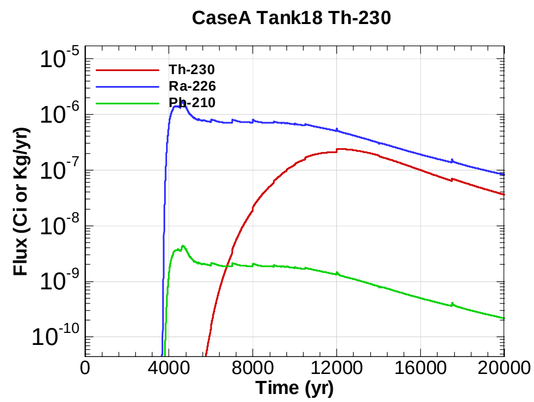

Figure K.1-22 - Water Table Flux for CaseA Tank18 Th-230

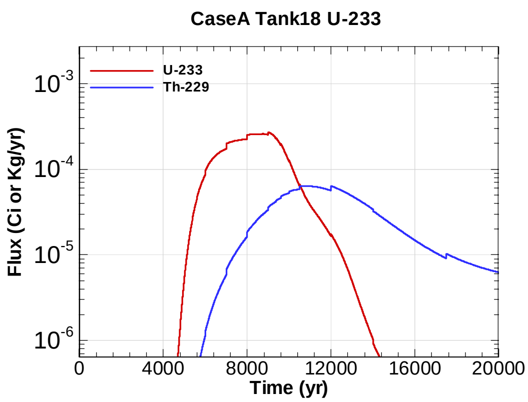

Figure K.1-23 - Water Table Flux for CaseA Tank18 U-233

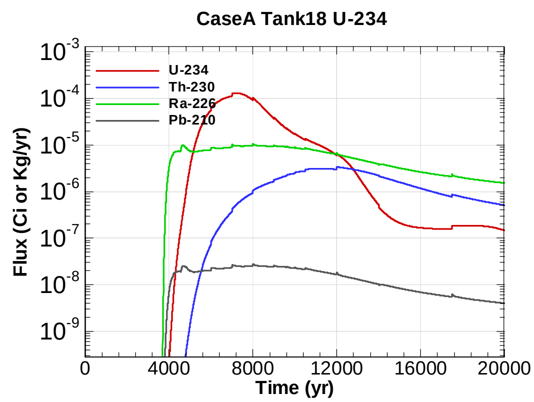

Figure K.1-24 - Water Table Flux for CaseA Tank18 U-234

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Appendix K.2
FLUX AT WATER TABLE FOR BARRIER ANALYSIS – BARRIER CASE 2

Appendix K.2 contains curves showing the flux (in Ci/year) at the water table for barrier analysis – Barrier Case 2 for Tanks 5, 18 and 33. The flux is provided for selected radionuclides.

Graph heading example "Case_barrier_2 Tank05 Am-241"

Key

Case_barrier_2= scenario case/configuration
Tank05 = inventory source is Tank 05
Am-241 = radionuclide or chemical of concern

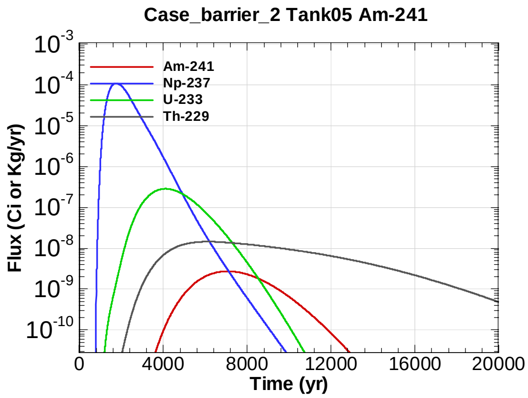

Figure K.2-1 - Water Table Flux for Case_barrier_2 Tank05 Am-241

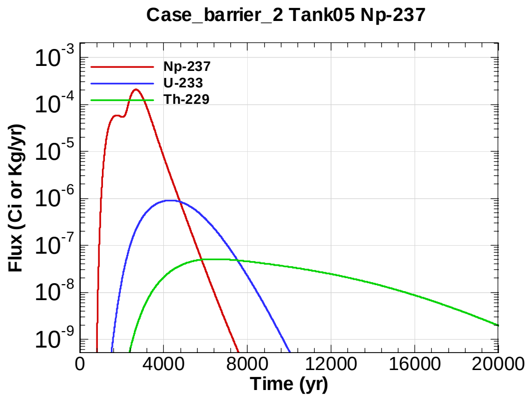

Figure K.2-2 - Water Table Flux for Case_barrier_2 Tank05 Np-237

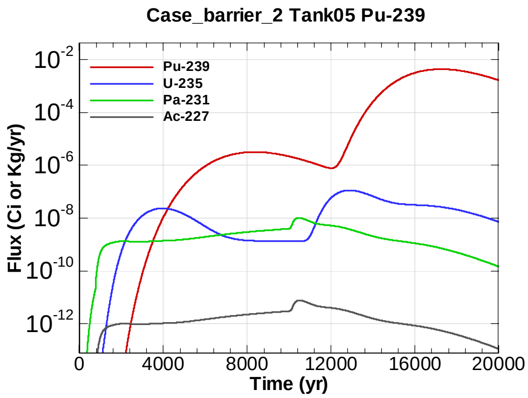

Figure K.2-3 - Water Table Flux for Case_barrier_2 Tank05 Pu-239

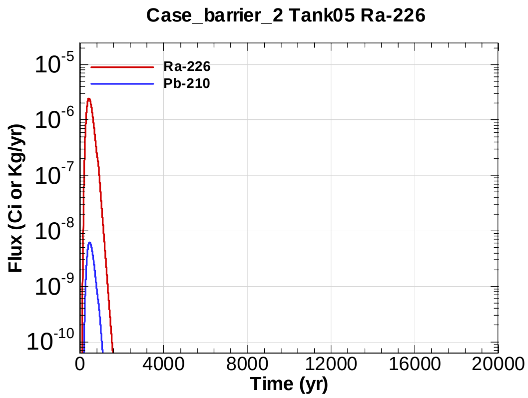

Figure K.2-4 - Water Table Flux for Case_barrier_2 Tank05 Ra-226

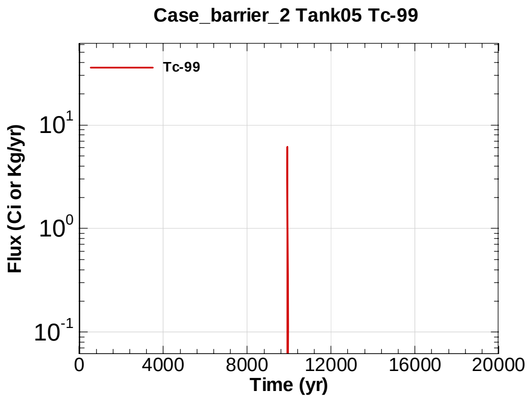

Figure K.2-5 - Water Table Flux for Case_barrier_2 Tank05 Tc-99

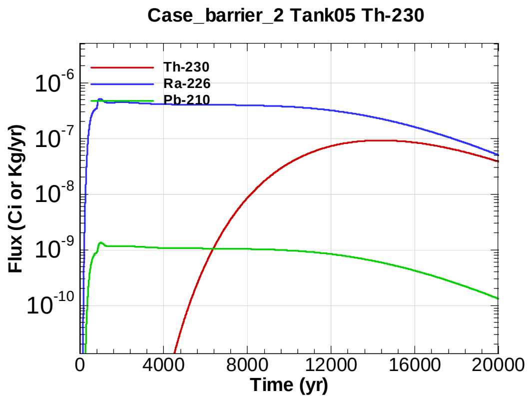

Figure K.2-6 - Water Table Flux for Case_barrier_2 Tank05 Th-230

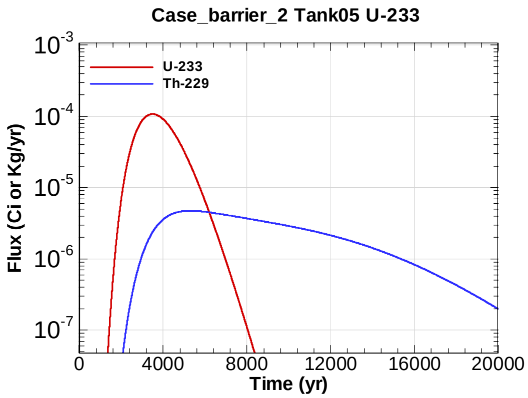

Figure K.2-7 - Water Table Flux for Case_barrier_2 Tank05 U-233

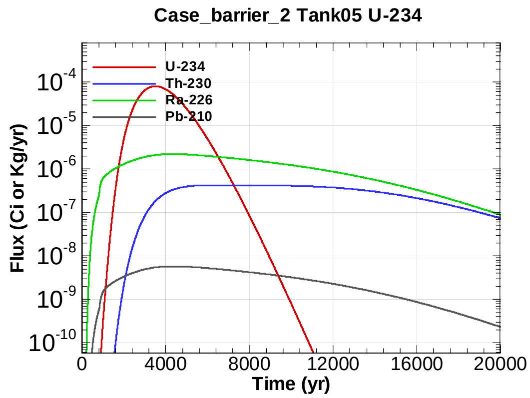

Figure K.2-8 - Water Table Flux for Case_barrier_2 Tank05 U-234

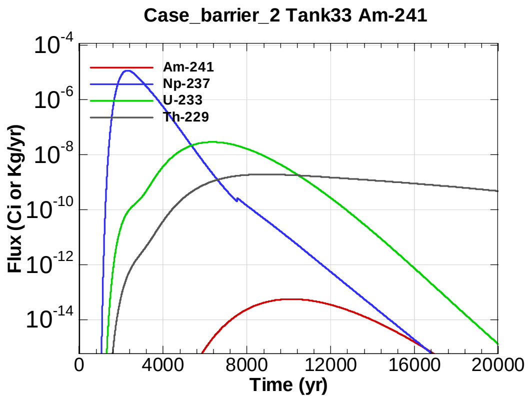

Figure K.2-9 - Water Table Flux for Case_barrier_2 Tank33 Am-241

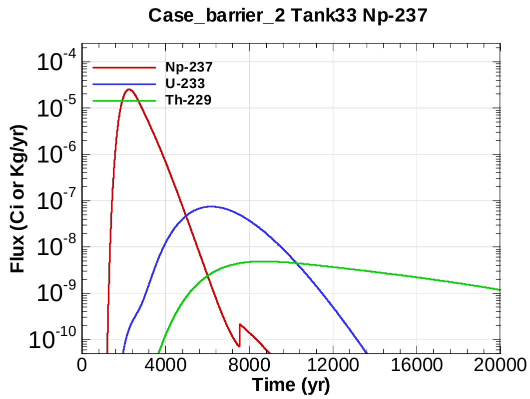

Figure K.2-10 - Water Table Flux for Case_barrier_2 Tank33 Np-237

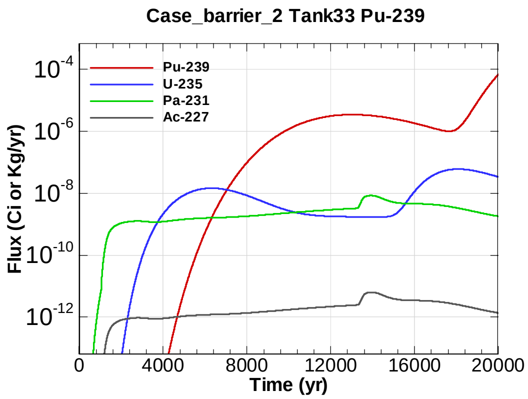

Figure K.2-11 - Water Table Flux for Case_barrier_2 Tank33 Pu-239

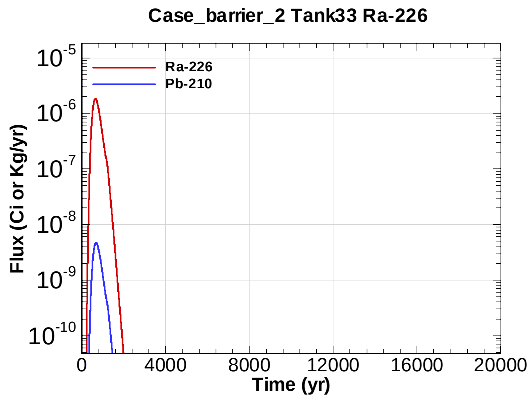

Figure K.2-12 - Water Table Flux for Case_barrier_2 Tank33 Ra-226

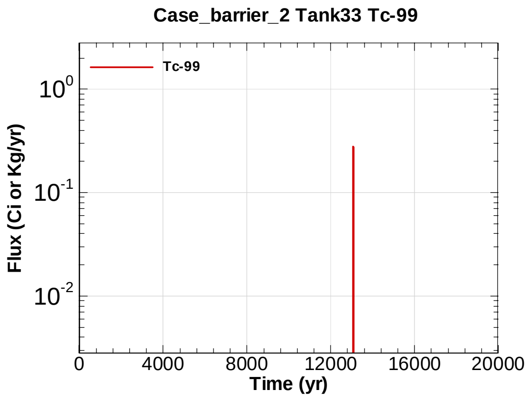

Figure K.2-13 - Water Table Flux for Case_barrier_2 Tank33 Tc-99

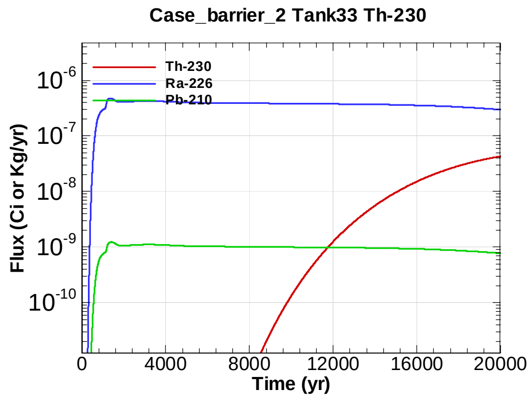

Figure K.2-14 - Water Table Flux for Case_barrier_2 Tank33 Th-230

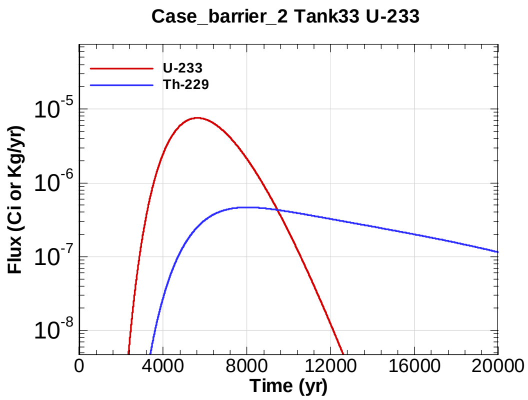

Figure K.2-15 - Water Table Flux for Case_barrier_2 Tank33 U-233

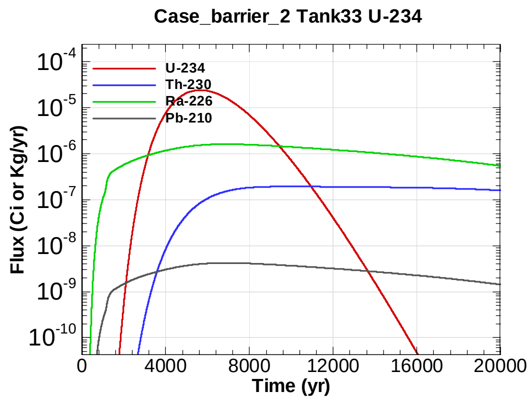

Figure K.2-16 - Water Table Flux for Case_barrier_2 Tank33 U-234

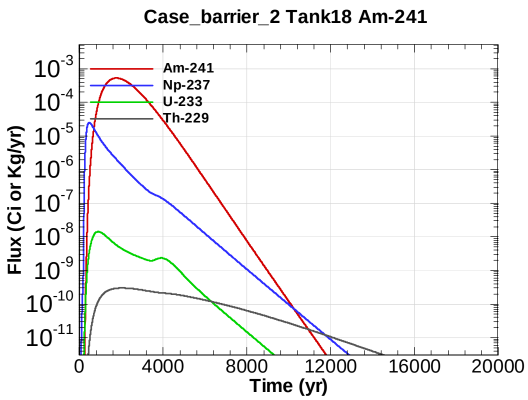

Figure K.2-17 - Water Table Flux for Case_barrier_2 Tank18 Am-241

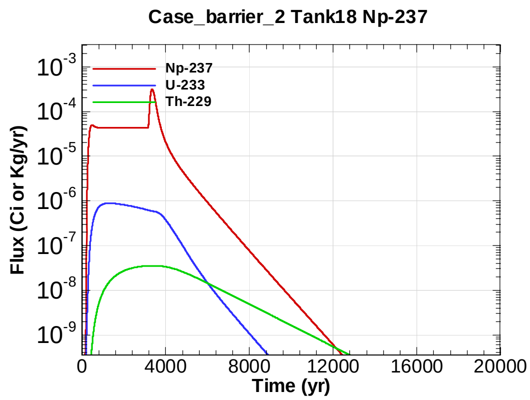

Figure K.2-18 - Water Table Flux for Case_barrier_2 Tank18 Np-237

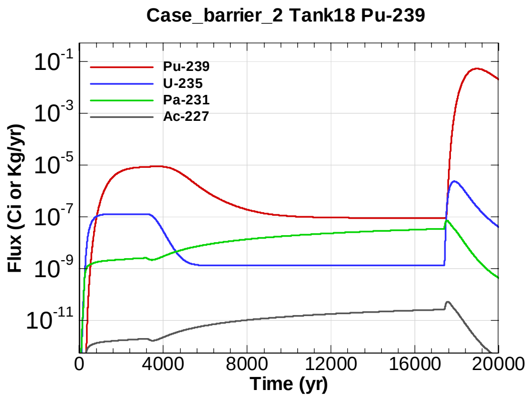

Figure K.2-19 - Water Table Flux for Case_barrier_2 Tank18 Pu-239

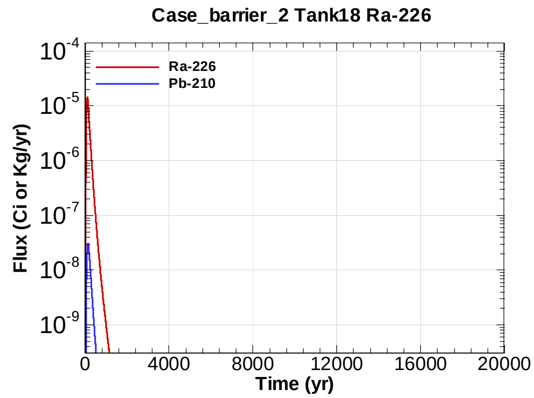

Figure K.2-20 - Water Table Flux for Case_barrier_2 Tank18 Ra-226

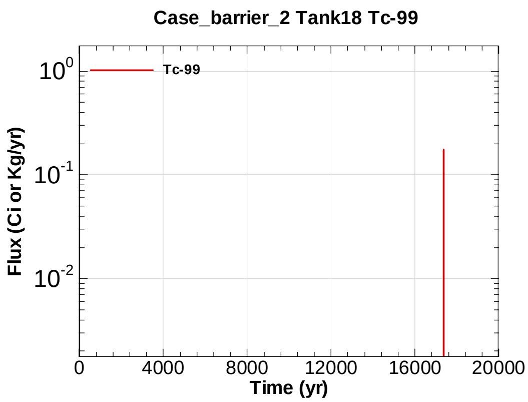

Figure K.2-21 - Water Table Flux for Case_barrier_2 Tank18 Tc-99

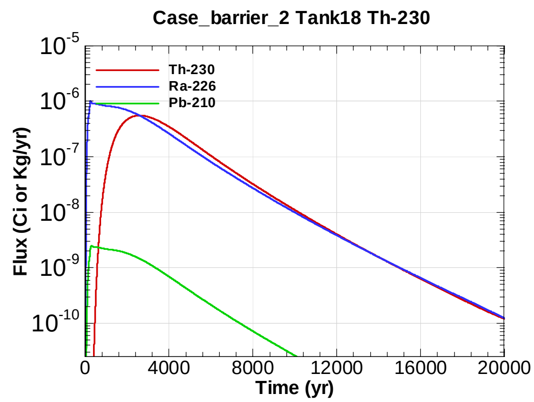

Figure K.2-22 - Water Table Flux for Case_barrier_2 Tank18 Th-230

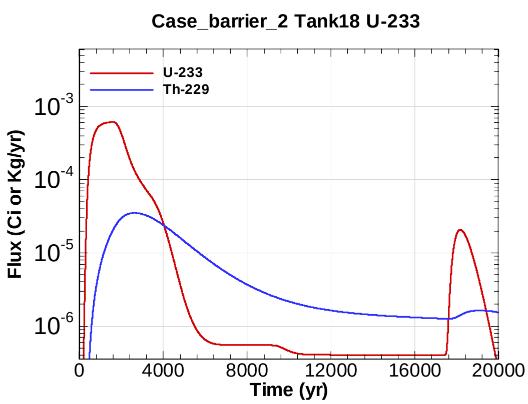

Figure K.2-23 - Water Table Flux for Case_barrier_2 Tank18 U-233

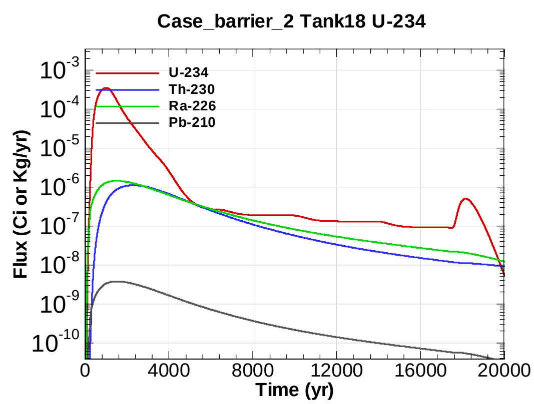

Figure K.2-24 - Water Table Flux for Case_barrier_2 Tank18 U-234

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Appendix K.3
FLUX AT WATER TABLE FOR BARRIER ANALYSIS – BARRIER CASE 3

Appendix K.3 contains curves showing the flux (in Ci/year) at the water table for barrier analysis – Barrier Case 3 for Tanks 5, 18 and 33. The flux is provided for selected radionuclides.

Graph heading example "Case_barrier_3 Tank05 Am-241"

Key

Case_barrier_3 = scenario case/configuration
Tank05 = inventory source is Tank 05
Am-241 = radionuclide or chemical of concern

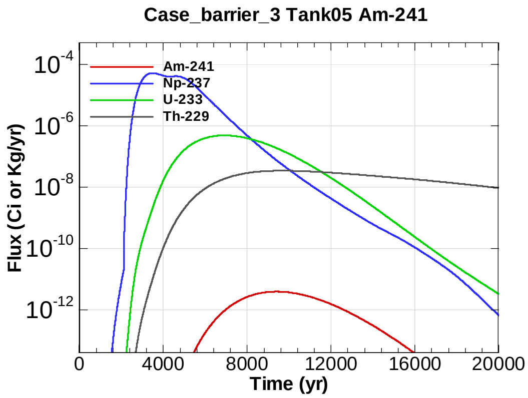

Figure K.3-1 - Water Table Flux for Case_barrier_3 Tank05 Am-241

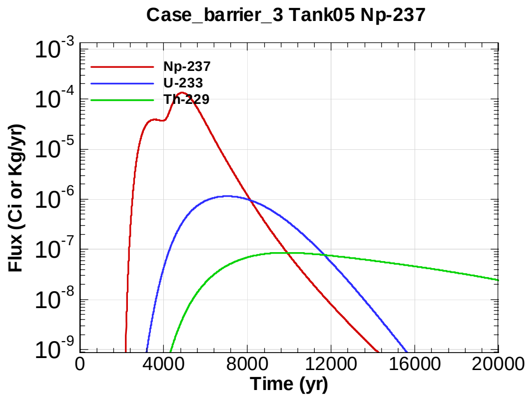

Figure K.3-2 - Water Table Flux for Case_barrier_3 Tank05 Np-237

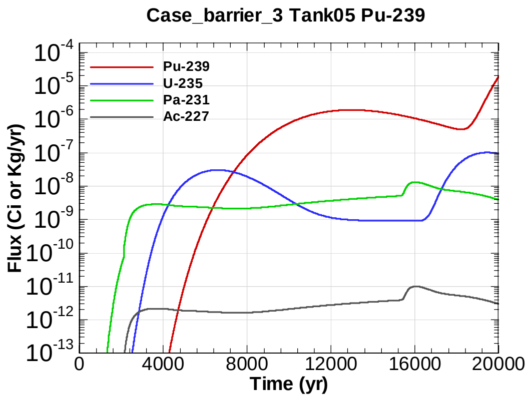

Figure K.3-3 - Water Table Flux for Case_barrier_3 Tank05 Pu-239

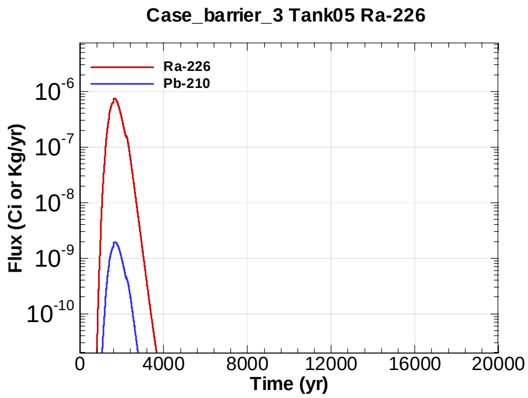

Figure K.3-4 - Water Table Flux for Case_barrier_3 Tank05 Ra-226

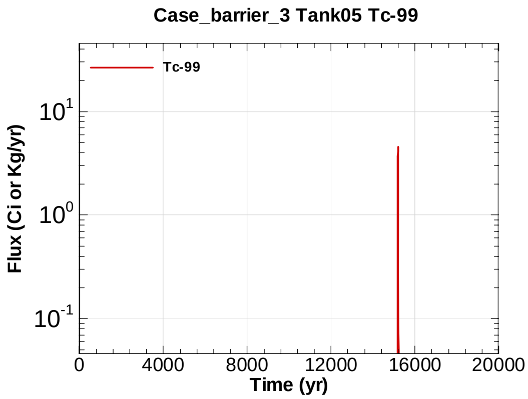

Figure K.3-5 - Water Table Flux for Case_barrier_3 Tank05 Tc-99

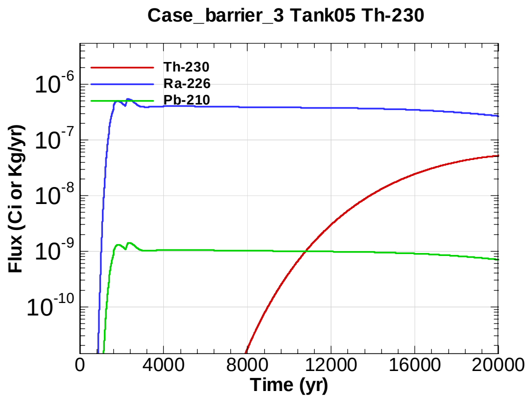

Figure K.3-6 - Water Table Flux for Case_barrier_3 Tank05 Th-230

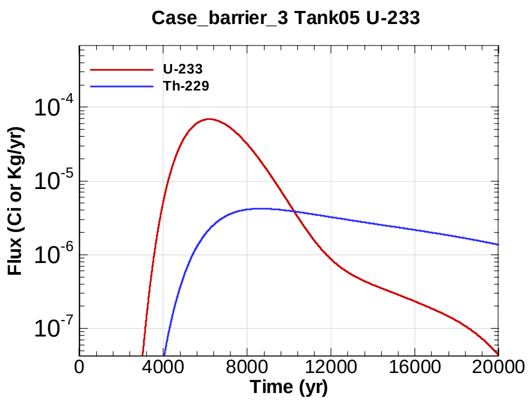

Figure K.3-7 - Water Table Flux for Case_barrier_3 Tank05 U-233

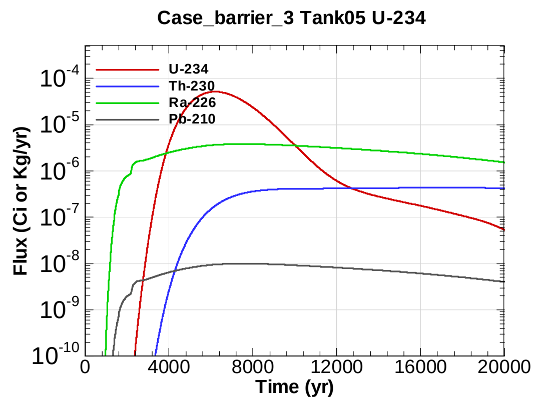

Figure K.3-8 - Water Table Flux for Case_barrier_3 Tank05 U-234

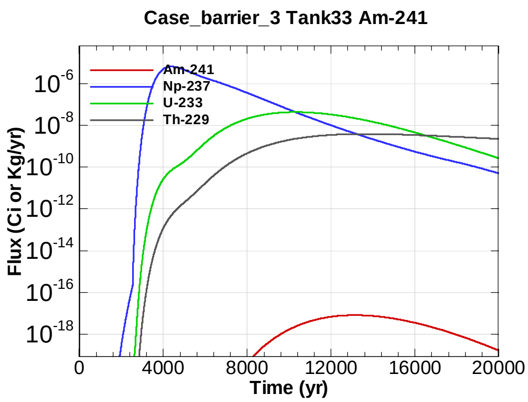

Figure K.3-9 - Water Table Flux for Case_barrier_3 Tank33 Am-241

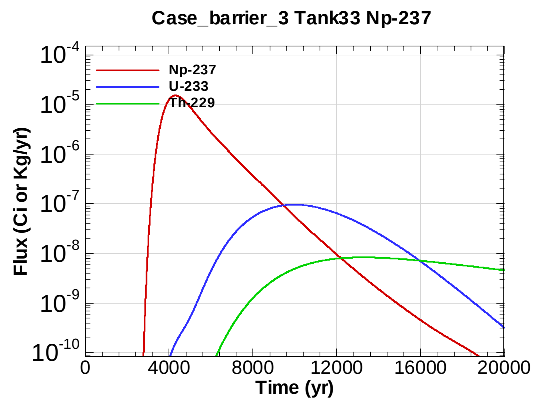

Figure K.3-10 - Water Table Flux for Case_barrier_3 Tank33 Np-237

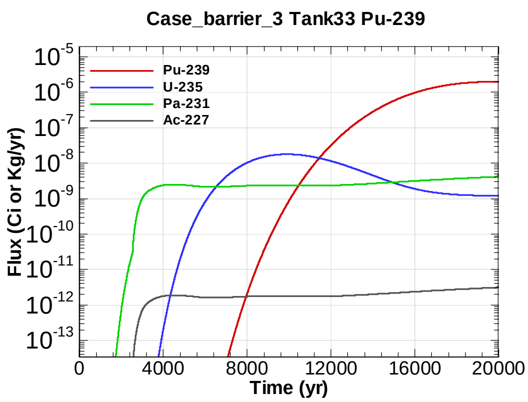

Figure K.3-11 - Water Table Flux for Case_barrier_3 Tank33 Pu-239

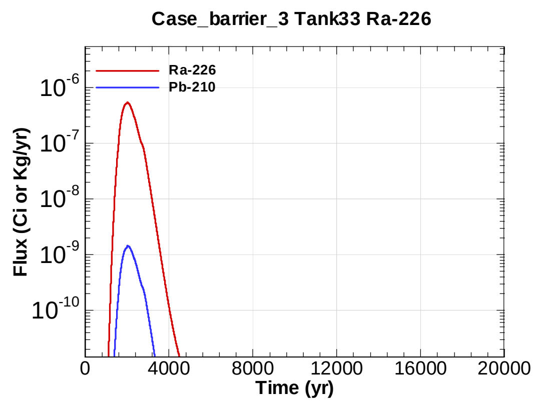

Figure K.3-12 - Water Table Flux for Case_barrier_3 Tank33 Ra-226

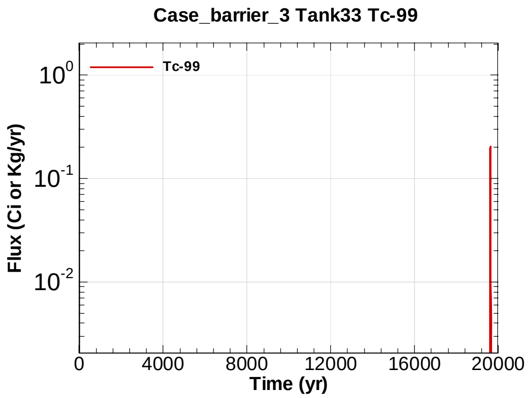

Figure K.3-13 - Water Table Flux for Case_barrier_3 Tank33 Tc-99

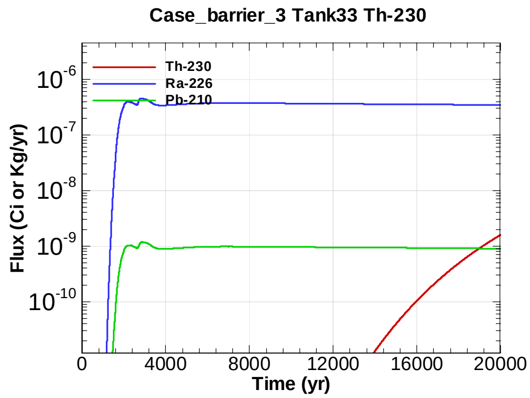

Figure K.3-14 - Water Table Flux for Case_barrier_3 Tank33 Th-230

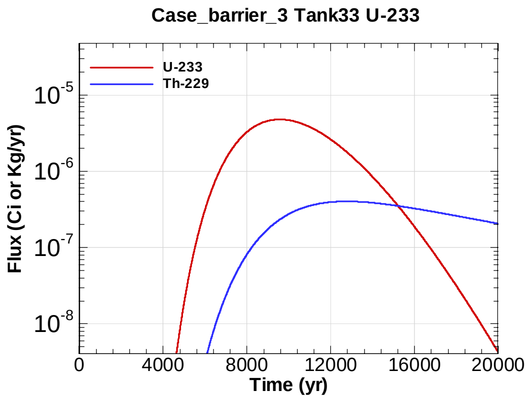

Figure K.3-15 - Water Table Flux for Case_barrier_3 Tank33 U-233

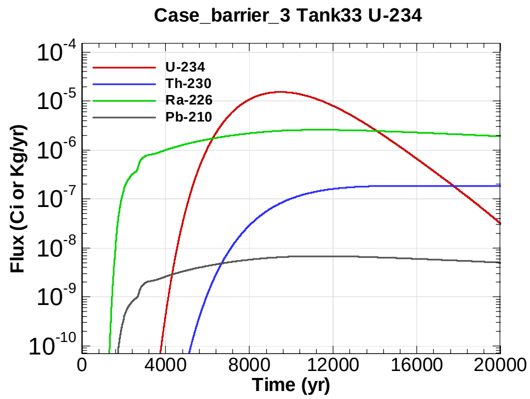

Figure K.3-16 - Water Table Flux for Case_barrier_3 Tank33 U-234

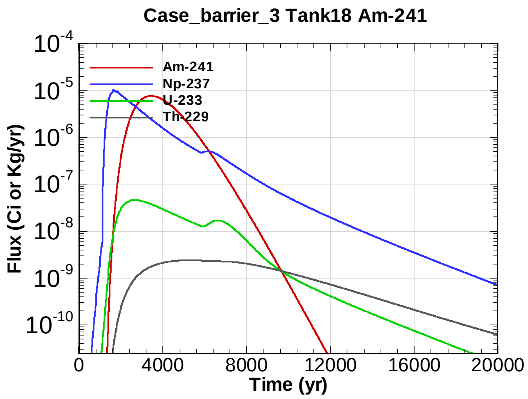

Figure K.3-17 - Water Table Flux for Case_barrier_3 Tank18 Am-241

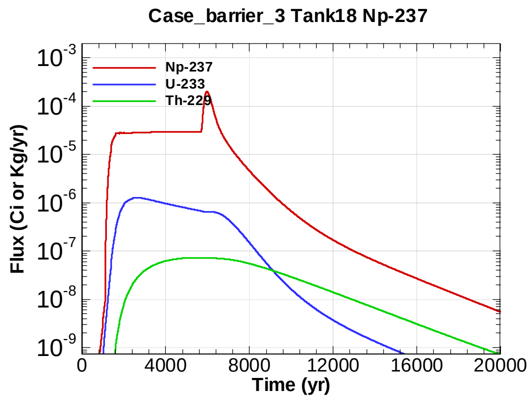

Figure K.3-18 - Water Table Flux for Case_barrier_3 Tank18 Np-237

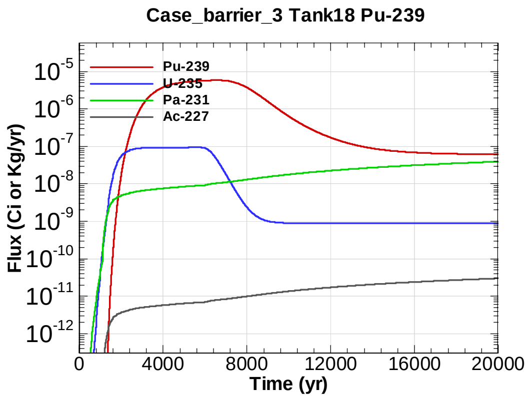

Figure K.3-19 - Water Table Flux for Case_barrier_3 Tank18 Pu-239

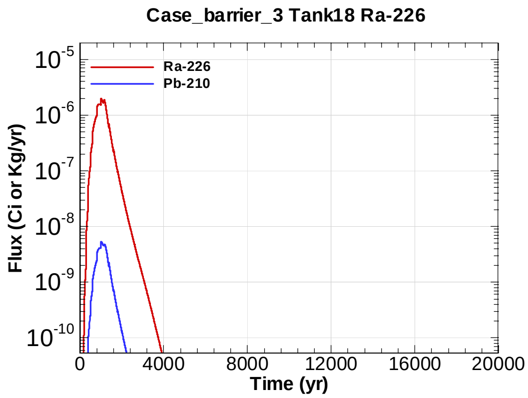

Figure K.3-20 - Water Table Flux for Case_barrier_3 Tank18 Ra-226

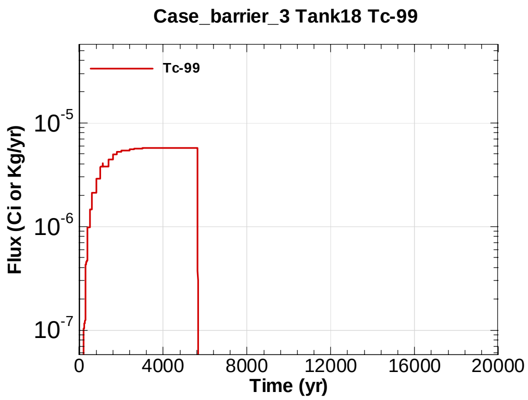

Figure K.3-21 - Water Table Flux for Case_barrier_3 Tank18 Tc-99

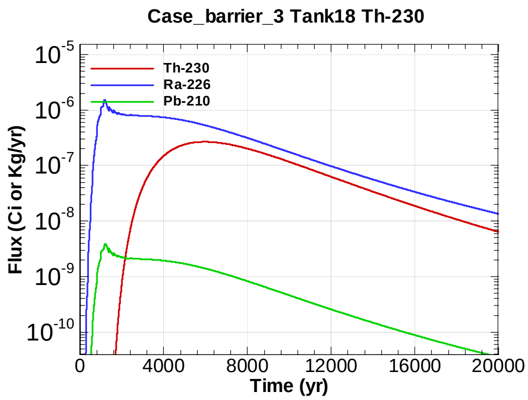

Figure K.3-22 - Water Table Flux for Case_barrier_3 Tank18 Th-230

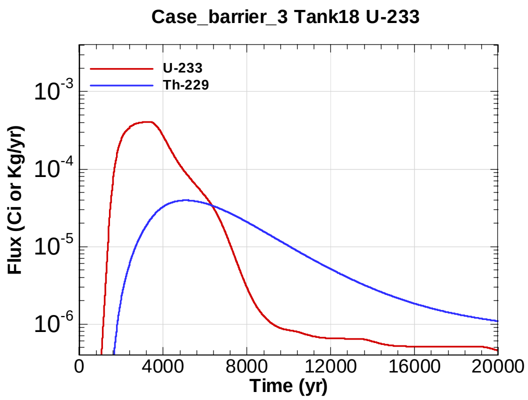

Figure K.3-23 - Water Table Flux for Case_barrier_3 Tank18 U-233

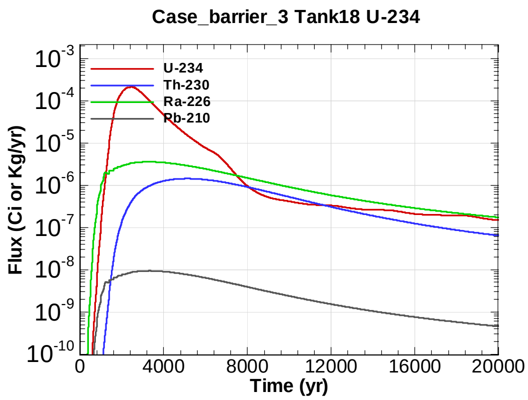

Figure K.3-24 - Water Table Flux for Case_barrier_3 Tank18 U-234

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Appendix K.4
FLUX AT WATER TABLE FOR BARRIER ANALYSIS – BARRIER CASE 4

Appendix K.4 contains curves showing the flux (in Ci/year) at the water table for barrier analysis – Barrier Case 4 for Tanks 5, 18 and 33. The flux is provided for selected radionuclides.

Graph heading example "Case_barrier_4 Tank05 Am-241"

Key

Case_barrier_4 = scenario case/configuration
Tank05 = inventory source is Tank 05
Am-241 = radionuclide or chemical of concern

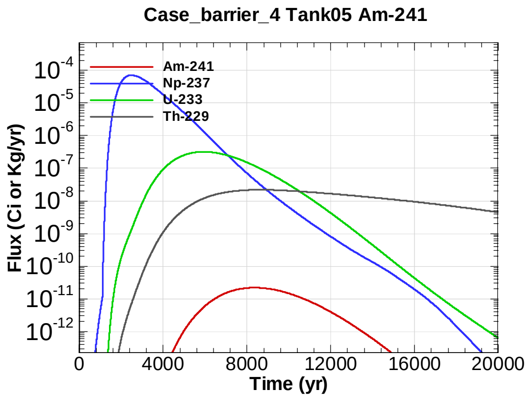

Figure K.4-1 - Water Table Flux for Case_barrier_4 Tank05 Am-241

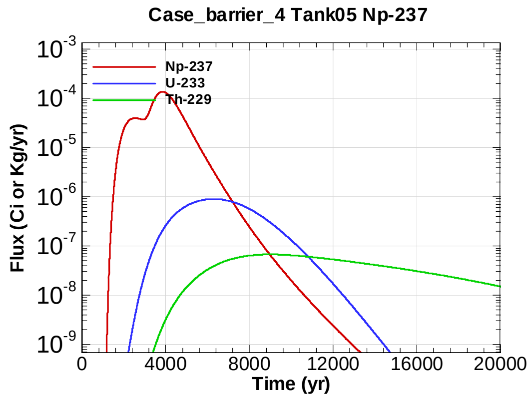

Figure K.4-2 - Water Table Flux for Case_barrier_4 Tank05 Np-237

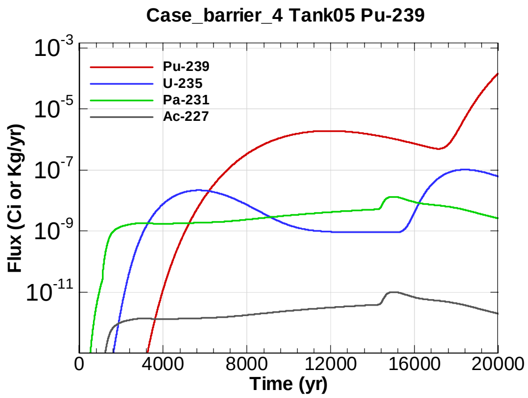

Figure K.4-3 - Water Table Flux for Case_barrier_4 Tank05 Pu-239

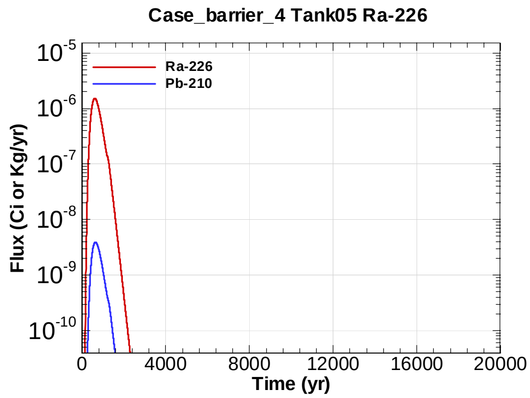

Figure K.4-4 - Water Table Flux for Case_barrier_4 Tank05 Ra-226

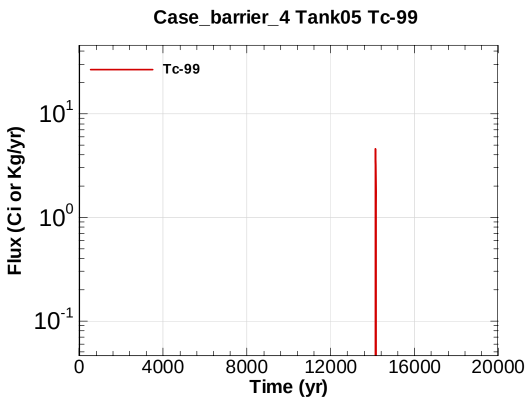

Figure K.4-5 - Water Table Flux for Case_barrier_4 Tank05 Tc-99

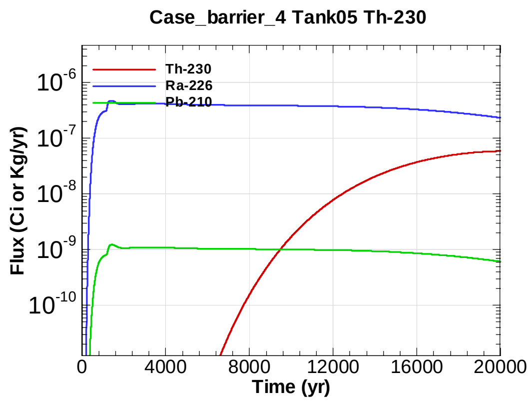

Figure K.4-6 - Water Table Flux for Case_barrier_4 Tank05 Th-230

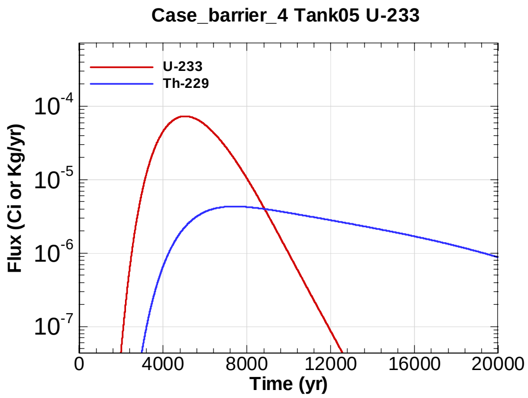

Figure K.4-7 - Water Table Flux for Case_barrier_4 Tank05 U-233

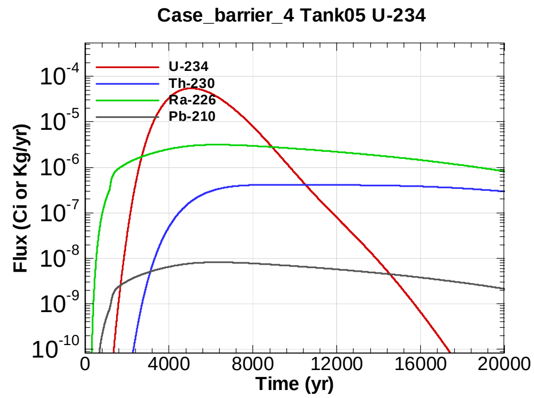

Figure K.4-8 - Water Table Flux for Case_barrier_4 Tank05 U-234

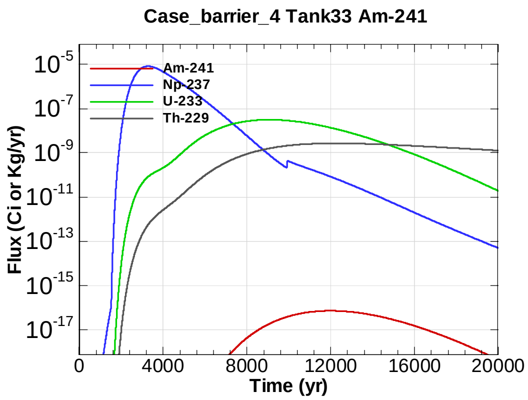

Figure K.4-9 - Water Table Flux for Case_barrier_4 Tank33 Am-241

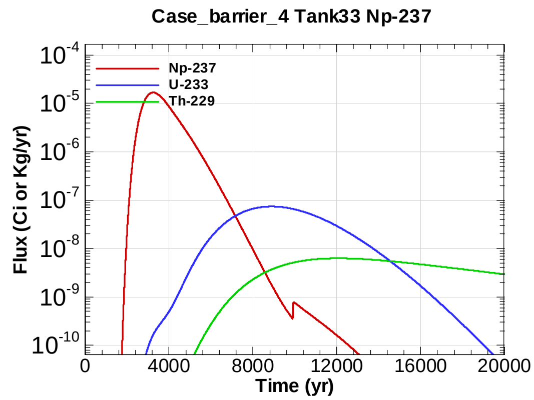

Figure K.4-10 - Water Table Flux for Case_barrier_4 Tank33 Np-237

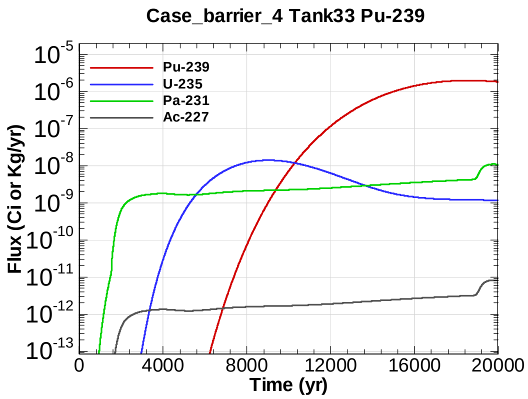

Figure K.4-11 - Water Table Flux for Case_barrier_4 Tank33 Pu-239

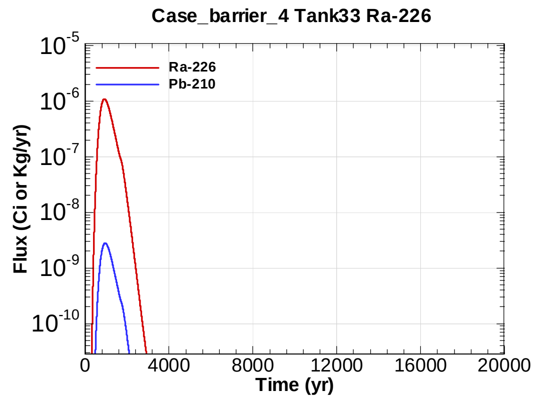

Figure K.4-12 - Water Table Flux for Case_barrier_4 Tank33 Ra-226

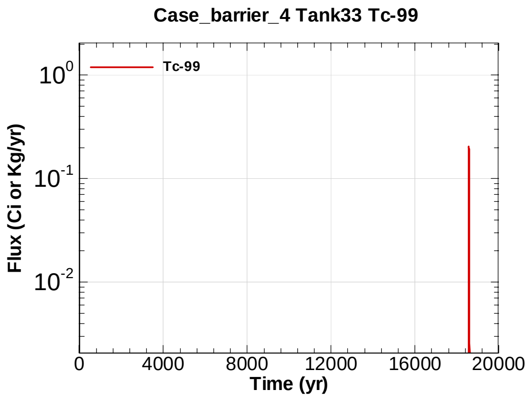

Figure K.4-13 - Water Table Flux for Case_barrier_4 Tank33 Tc-99

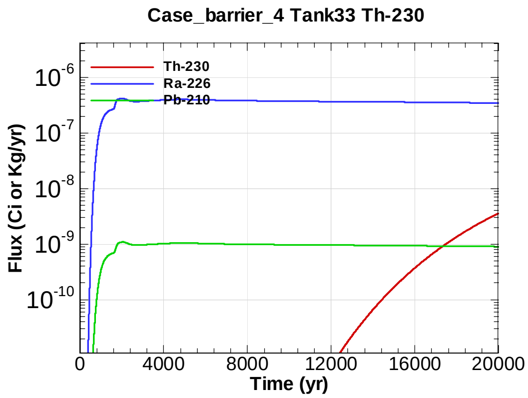

Figure K.4-14 - Water Table Flux for Case_barrier_4 Tank33 Th-230

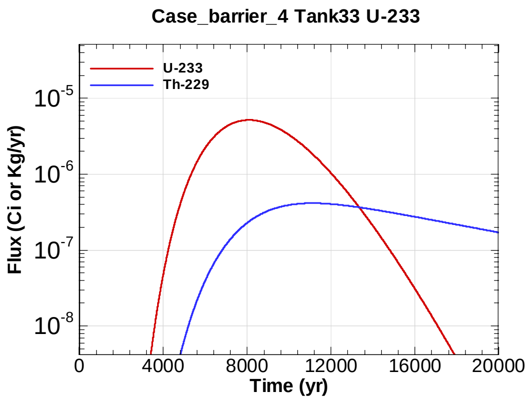

Figure K.4-15 - Water Table Flux for Case_barrier_4 Tank33 U-233

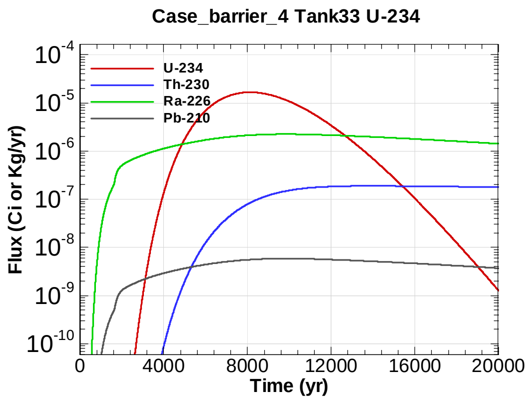

Figure K.4-16 - Water Table Flux for Case_barrier_4 Tank33 U-234

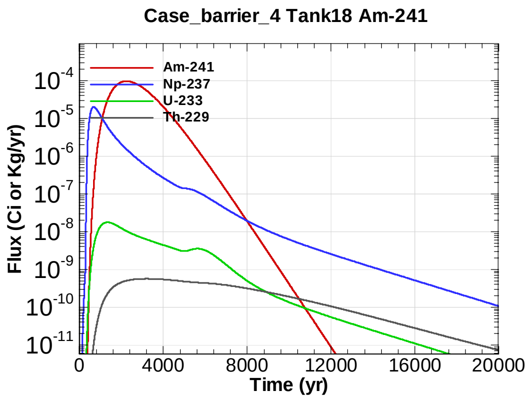

Figure K.4-17 - Water Table Flux for Case_barrier_4 Tank18 Am-241

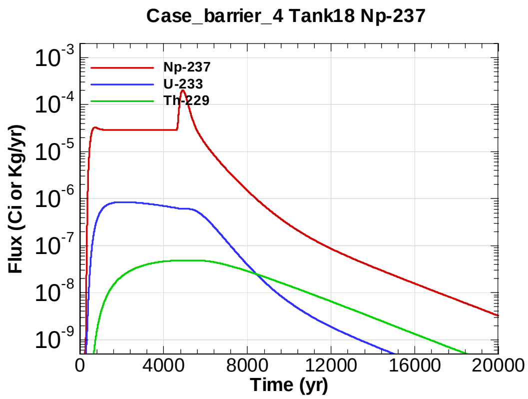

Figure K.4-18 - Water Table Flux for Case_barrier_4 Tank18 Np-237

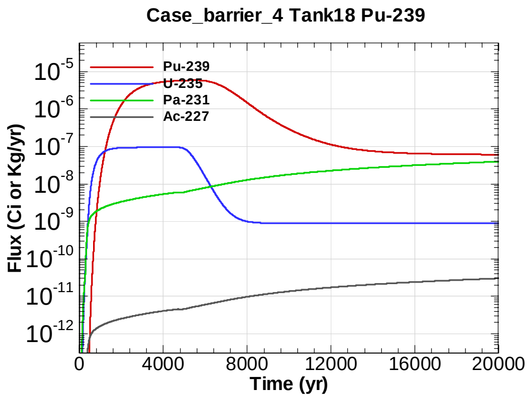

Figure K.4-19 - Water Table Flux for Case_barrier_4 Tank18 Pu-239

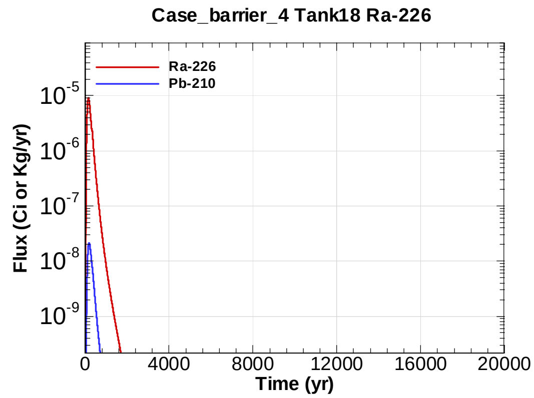

Figure K.4-20 - Water Table Flux for Case_barrier_4 Tank18 Ra-226

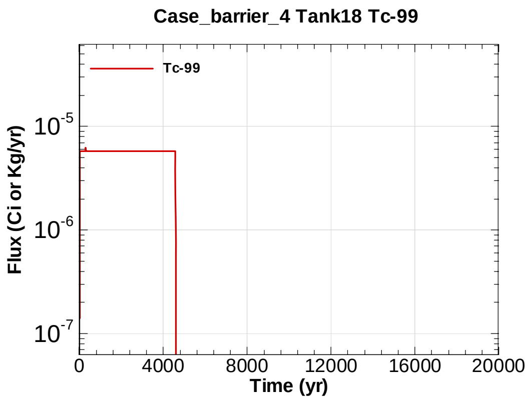

Figure K.4-21 - Water Table Flux for Case_barrier_4 Tank18 Tc-99

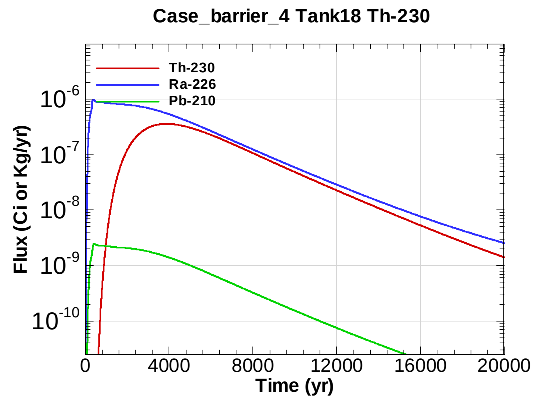

Figure K.4-22 - Water Table Flux for Case_barrier_4 Tank18 Th-230

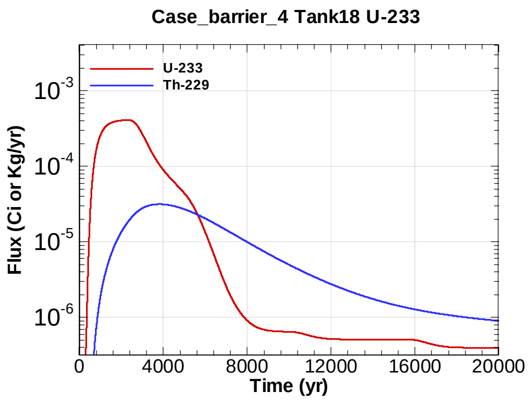

Figure K.4-23 - Water Table Flux for Case_barrier_4 Tank18 U-233

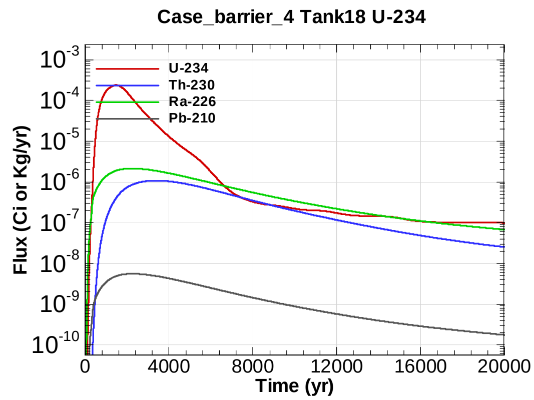

Figure K.4-24 - Water Table Flux for Case_barrier_4 Tank18 U-234

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Appendix K.5
FLUX AT WATER TABLE FOR BARRIER ANALYSIS – BARRIER CASE 5

Appendix K.5 contains curves showing the flux (in Ci/year) at the water table for barrier analysis – Barrier Case 5 for Tanks 5, 18 and 33. The flux is provided for selected radionuclides.

Graph heading example "Case_barrier_5 Tank05 Am-241"

Key

Case_barrier_5 = scenario case/configuration
Tank05 = inventory source is Tank 05
Am-241 = radionuclide or chemical of concern

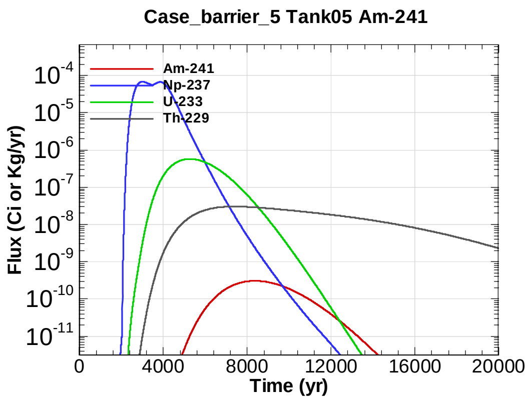

Figure K.5-1 - Water Table Flux for Case_barrier_5 Tank05 Am-241

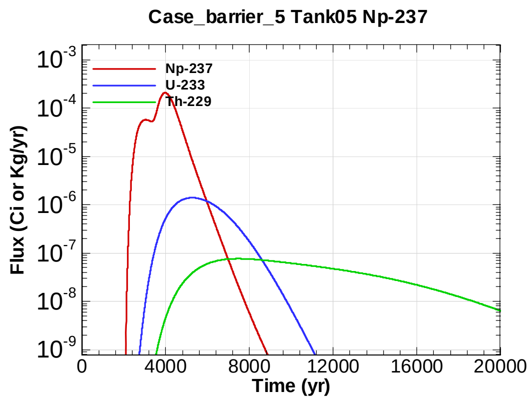

Figure K.5-2 - Water Table Flux for Case_barrier_5 Tank05 Np-237

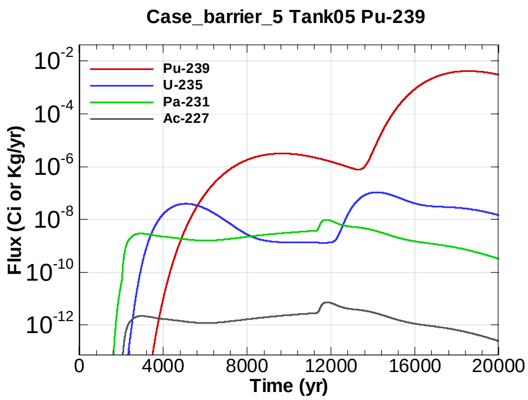

Figure K.5-3 - Water Table Flux for Case_barrier_5 Tank05 Pu-239

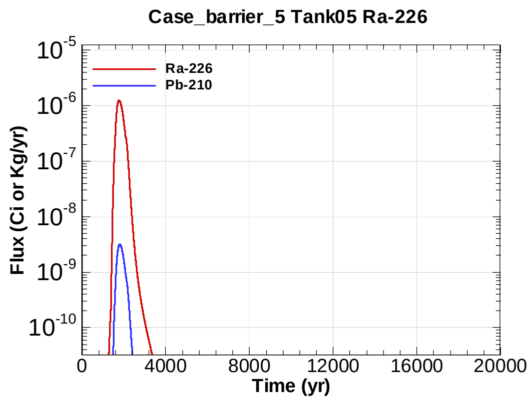

Figure K.5-4 - Water Table Flux for Case_barrier_5 Tank05 Ra-226

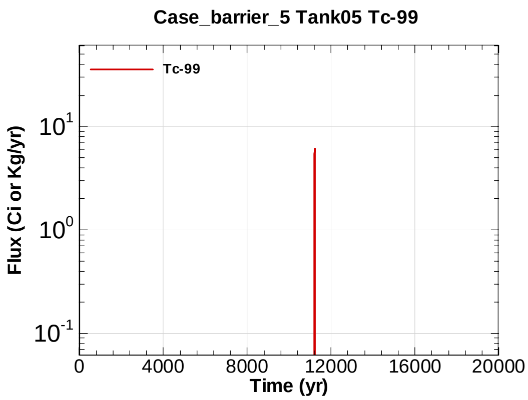

Figure K.5-5 - Water Table Flux for Case_barrier_5 Tank05 Tc-99

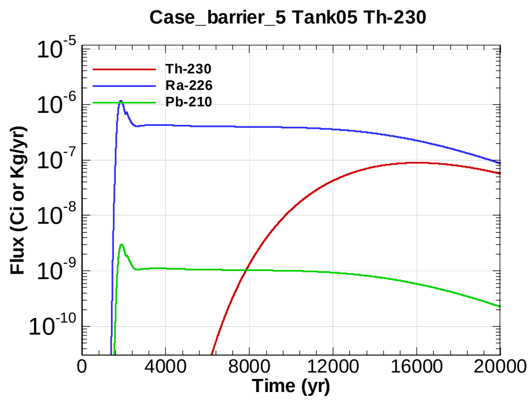

Figure K.5-6 - Water Table Flux for Case_barrier_5 Tank05 Th-230

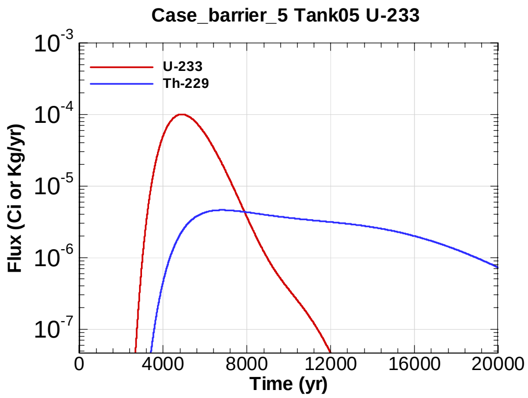

Figure K.5-7 - Water Table Flux for Case_barrier_5 Tank05 U-233

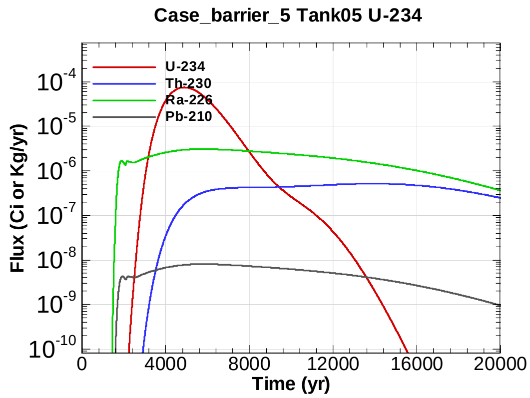

Figure K.5-8 - Water Table Flux for Case_barrier_5 Tank05 U-234

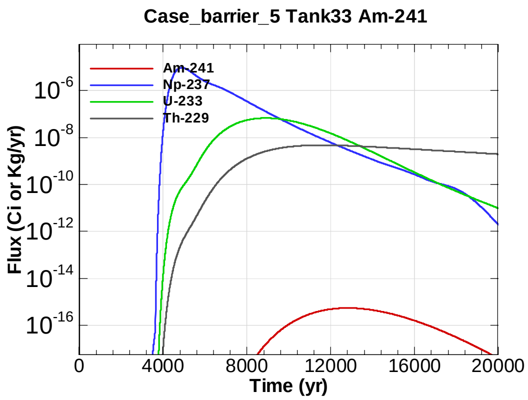

Figure K.5-9 - Water Table Flux for Case_barrier_5 Tank33 Am-241

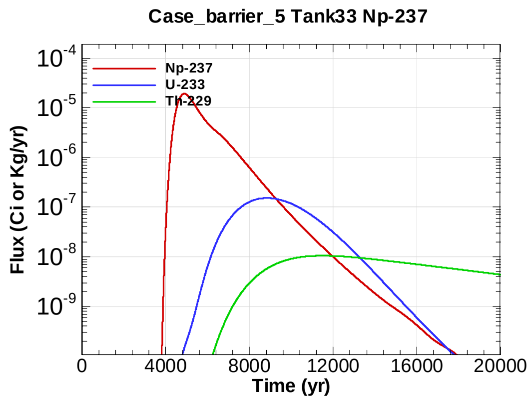

Figure K.5-10 - Water Table Flux for Case_barrier_5 Tank33 Np-237

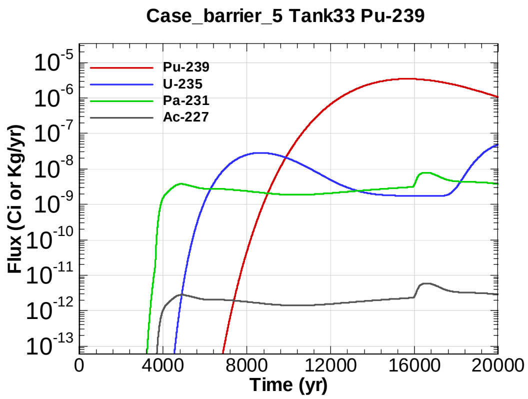

Figure K.5-11 - Water Table Flux for Case_barrier_5 Tank33 Pu-239

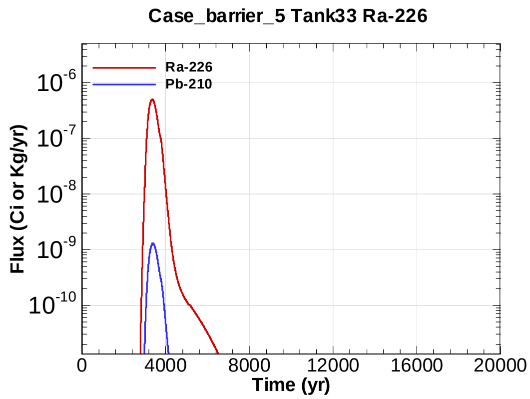

Figure K.5-12 - Water Table Flux for Case_barrier_5 Tank33 Ra-226

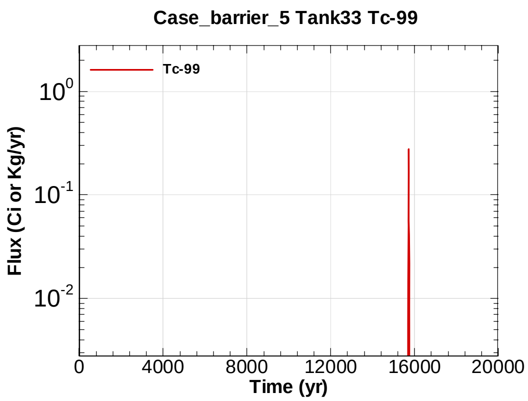

Figure K.5-13 - Water Table Flux for Case_barrier_5 Tank33 Tc-99

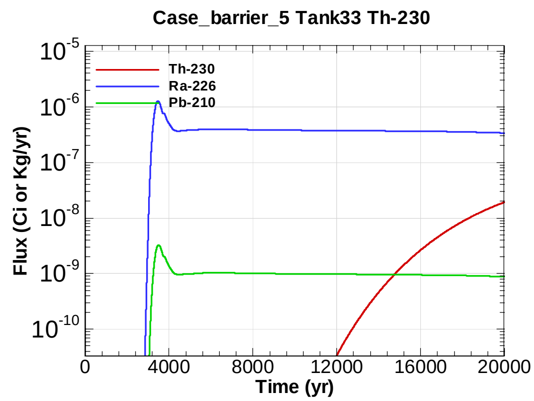

Figure K.5-14 - Water Table Flux for Case_barrier_5 Tank33 Th-230

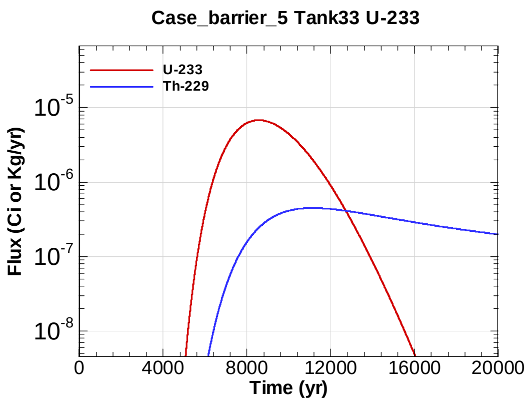

Figure K.5-15 - Water Table Flux for Case_barrier_5 Tank33 U-233

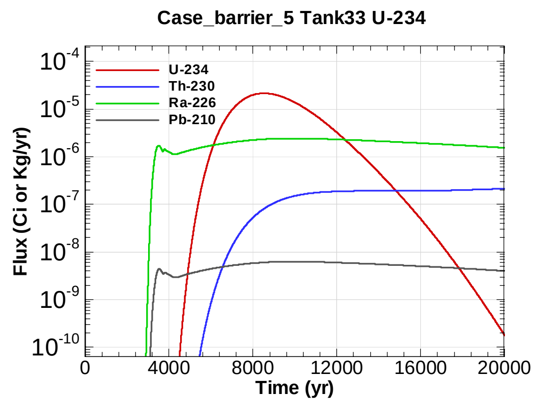

Figure K.5-16 - Water Table Flux for Case_barrier_5 Tank33 U-234

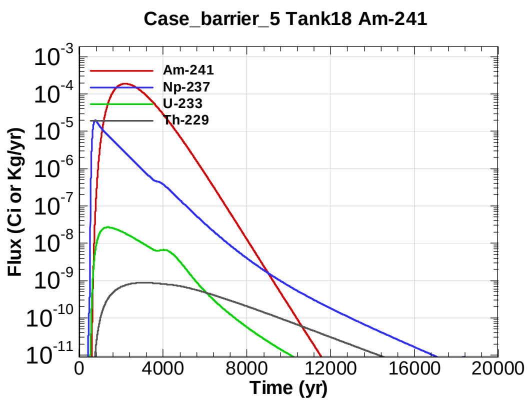

Figure K.5-17 - Water Table Flux for Case_barrier_5 Tank18 Am-241

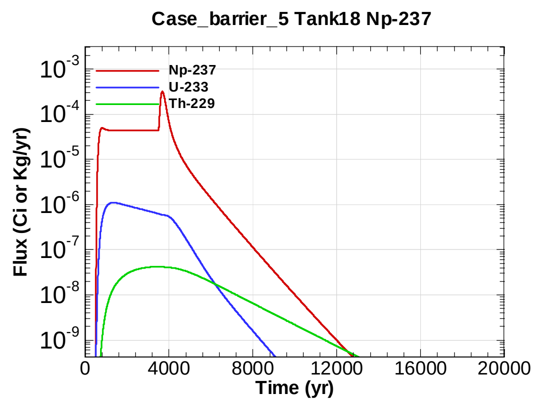

Figure K.5-18 - Water Table Flux for Case_barrier_5 Tank18 Np-237

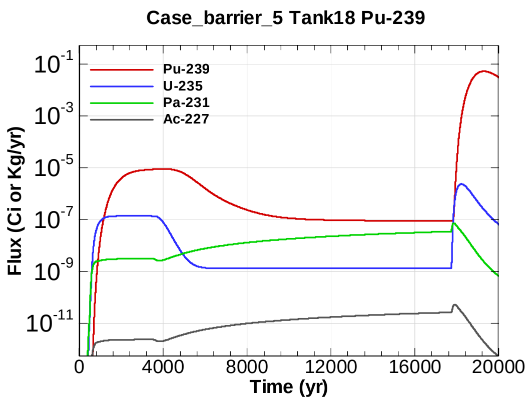

Figure K.5-19 - Water Table Flux for Case_barrier_5 Tank18 Pu-239

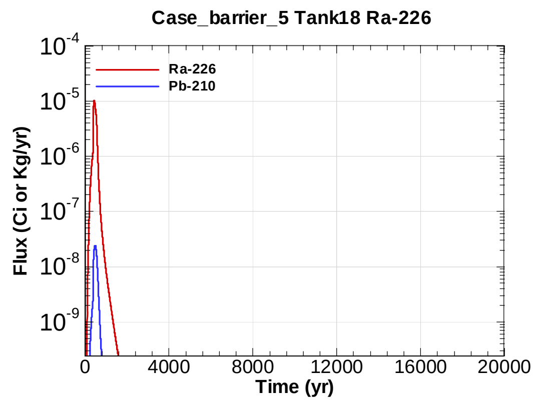

Figure K.5-20 - Water Table Flux for Case_barrier_5 Tank18 Ra-226

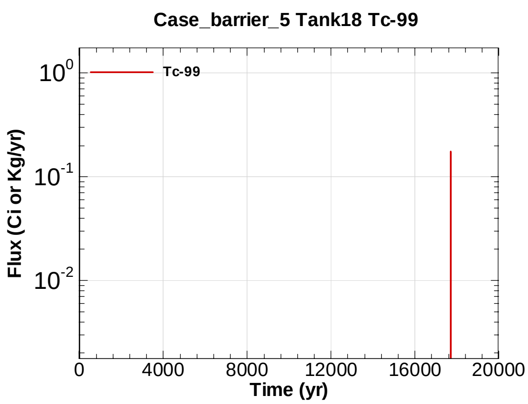

Figure K.5-21 - Water Table Flux for Case_barrier_5 Tank18 Tc-99

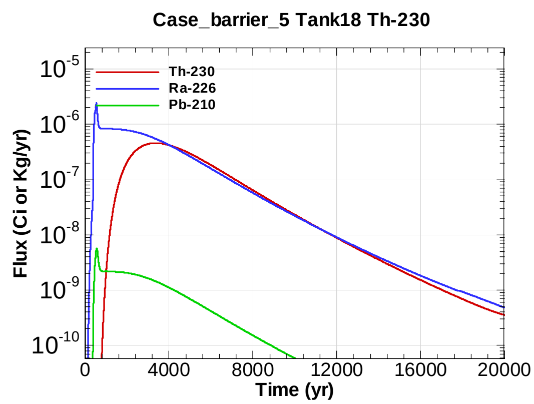

Figure K.5-22 - Water Table Flux for Case_barrier_5 Tank18 Th-230

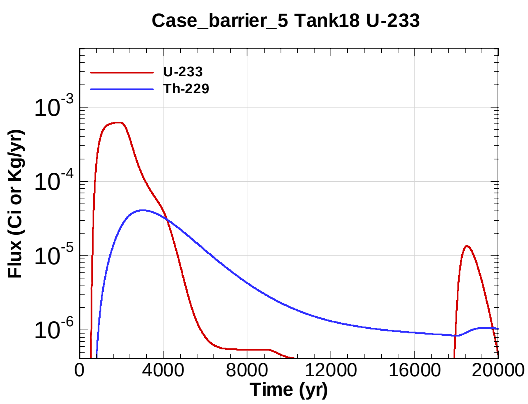

Figure K.5-23 - Water Table Flux for Case_barrier_5 Tank18 U-233

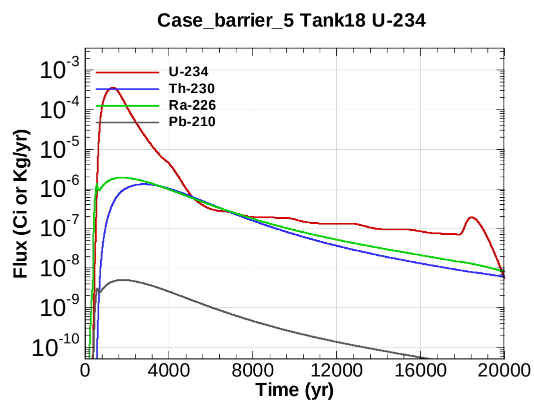

Figure K.5-24 - Water Table Flux for Case_barrier_5 Tank18 U-234

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Appendix K.6
FLUX AT WATER TABLE FOR BARRIER ANALYSIS – BARRIER CASE 6

Appendix K.6 contains curves showing the flux (in Ci/year) at the water table for barrier analysis – Barrier Case 6 for Tanks 5, 18 and 33. The flux is provided for selected radionuclides.

Graph heading example "Case_barrier_6 Tank05 Am-241"

Key

Case_barrier_6 = scenario case/configuration
Tank05 = inventory source is Tank 05
Am-241 = radionuclide or chemical of concern

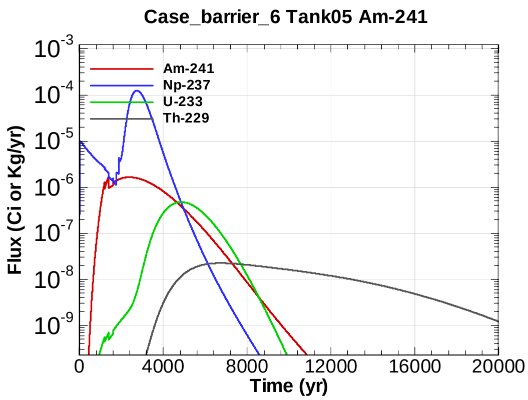

Figure K.6-1 - Water Table Flux for Case_barrier_6 Tank05 Am-241

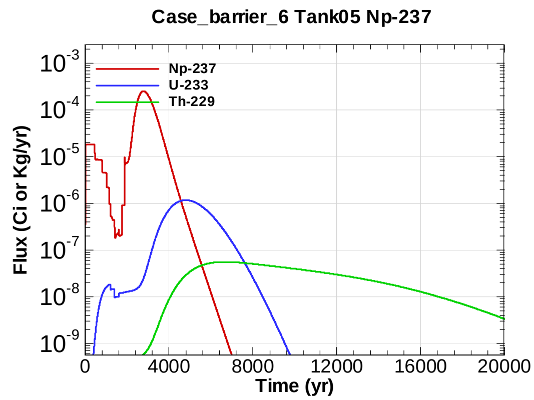

Figure K.6-2 - Water Table Flux for Case_barrier_6 Tank05 Np-237

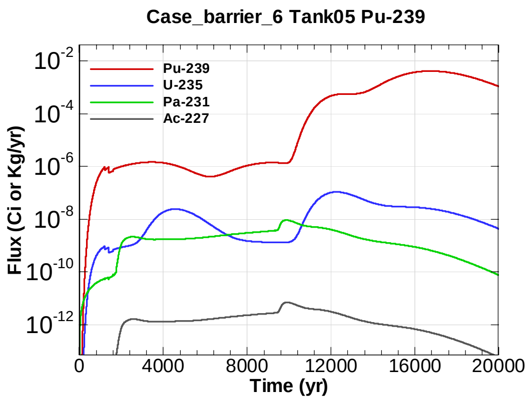

Figure K.6-3 - Water Table Flux for Case_barrier_6 Tank05 Pu-239

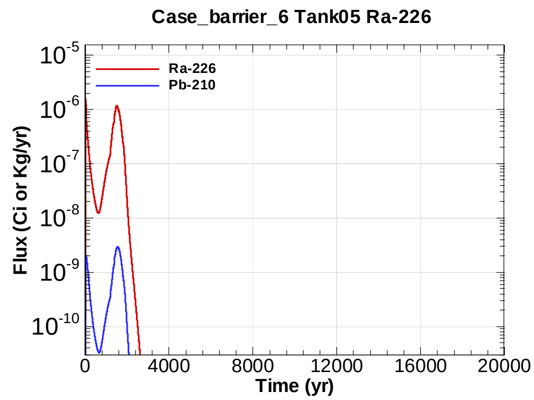

Figure K.6-4 - Water Table Flux for Case_barrier_6 Tank05 Ra-226

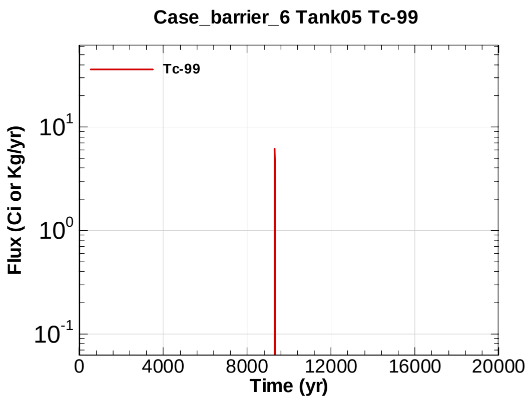

Figure K.6-5 - Water Table Flux for Case_barrier_6 Tank05 Tc-99

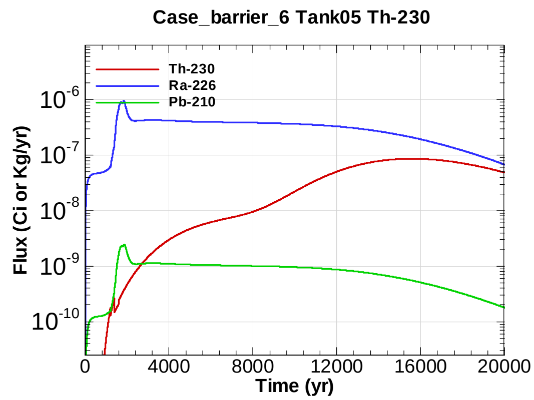

Figure K.6-6 - Water Table Flux for Case_barrier_6 Tank05 Th-230

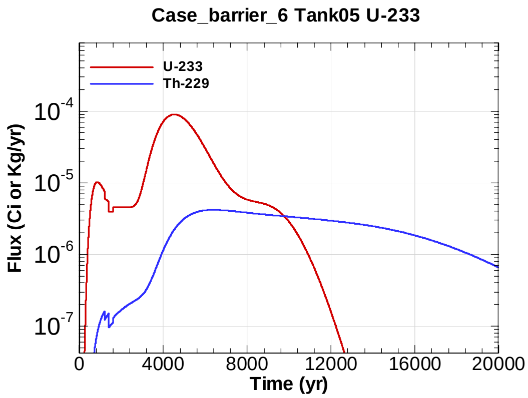

Figure K.6-7 - Water Table Flux for Case_barrier_6 Tank05 U-233

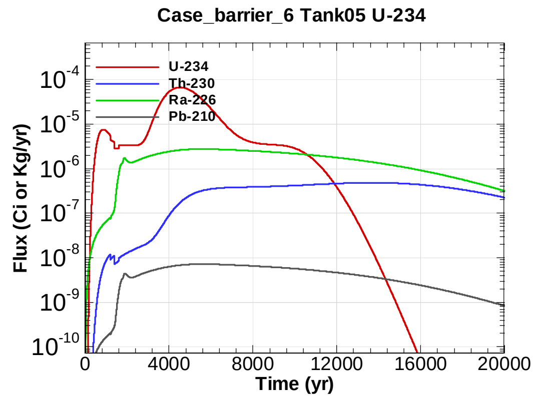

Figure K.6-8 - Water Table Flux for Case_barrier_6 Tank05 U-234

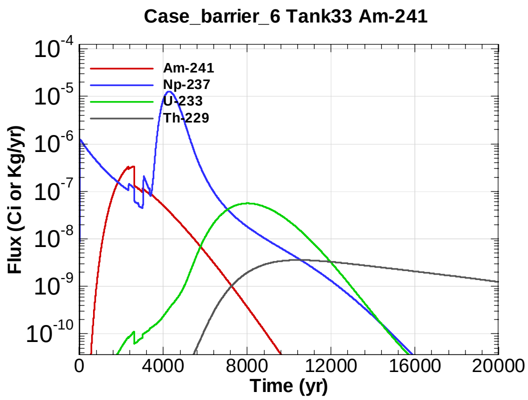

Figure K.6-9 - Water Table Flux for Case_barrier_6 Tank33 Am-241

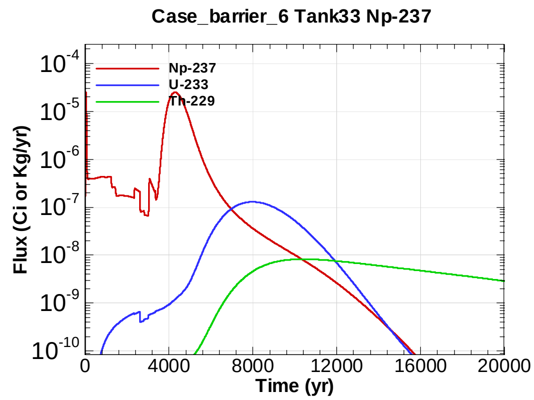

Figure K.6-10 - Water Table Flux for Case_barrier_6 Tank33 Np-237

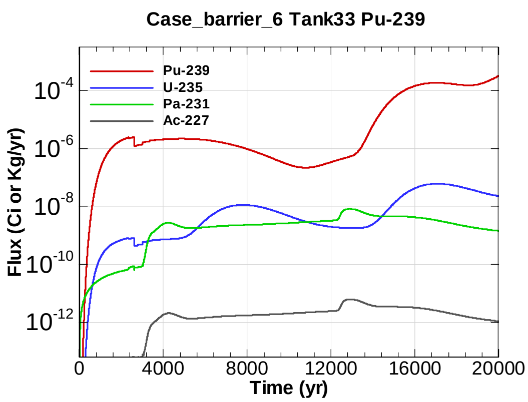

Figure K.6-11 - Water Table Flux for Case_barrier_6 Tank33 Pu-239

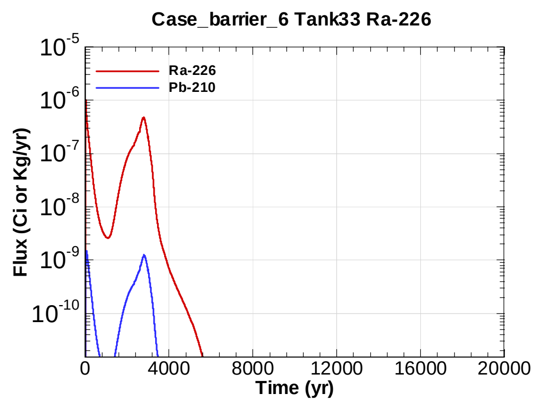

Figure K.6-12 - Water Table Flux for Case_barrier_6 Tank33 Ra-226

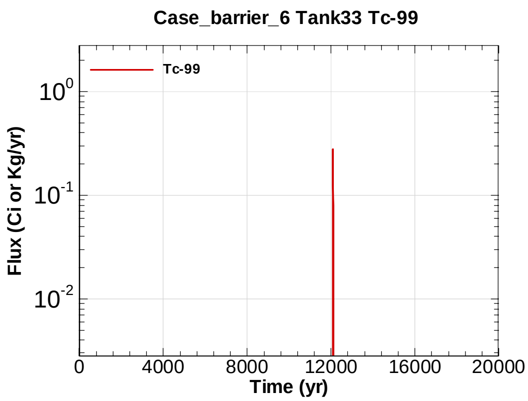

Figure K.6-13 - Water Table Flux for Case_barrier_6 Tank33 Tc-99

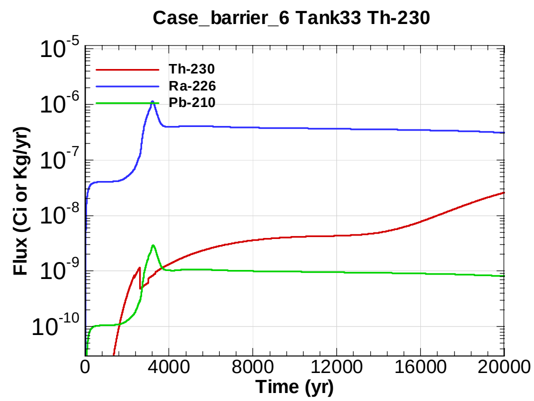

Figure K.6-14 - Water Table Flux for Case_barrier_6 Tank33 Th-230

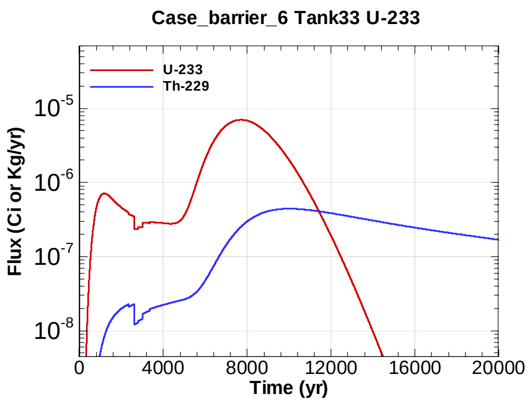

Figure K.6-15 - Water Table Flux for Case_barrier_6 Tank33 U-233

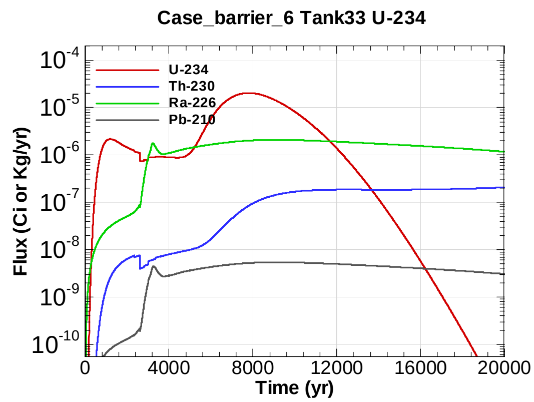

Figure K.6-16 - Water Table Flux for Case_barrier_6 Tank33 U-234

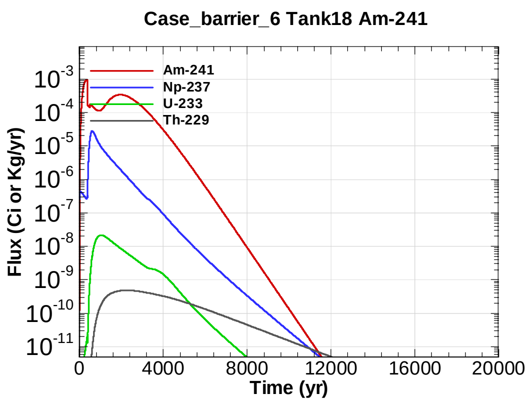

Figure K.6-17 - Water Table Flux for Case_barrier_6 Tank18 Am-241

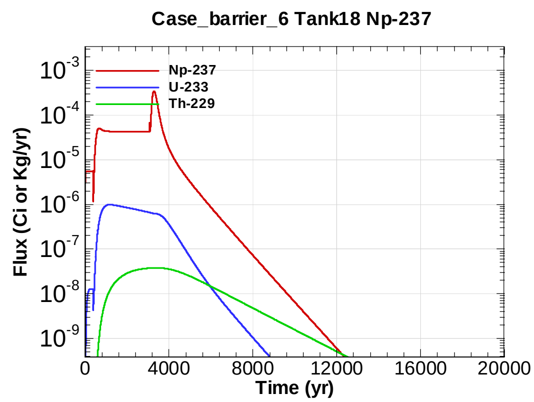

Figure K.6-18 - Water Table Flux for Case_barrier_6 Tank18 Np-237

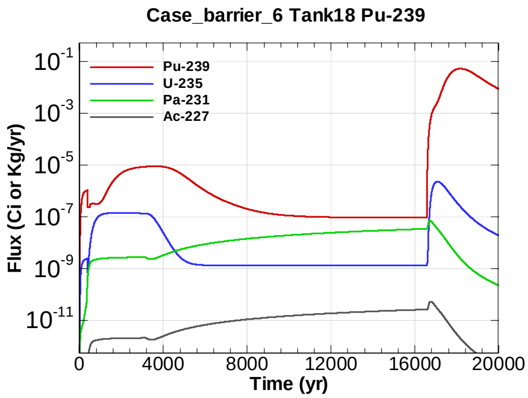

Figure K.6-19 - Water Table Flux for Case_barrier_6 Tank18 Pu-239

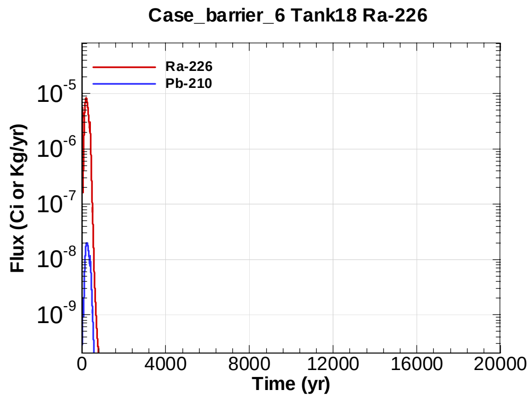

Figure K.6-20 - Water Table Flux for Case_barrier_6 Tank18 Ra-226

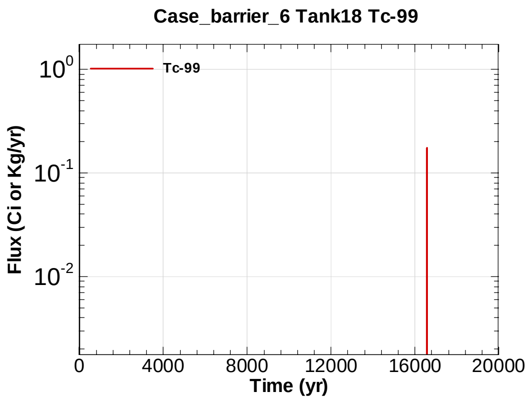

Figure K.6-21 - Water Table Flux for Case_barrier_6 Tank18 Tc-99

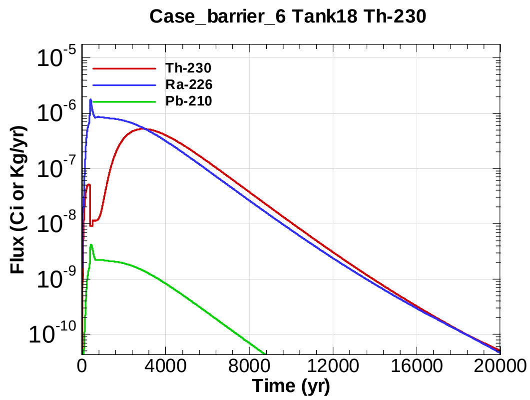

Figure K.6-22 - Water Table Flux for Case_barrier_6 Tank18 Th-230

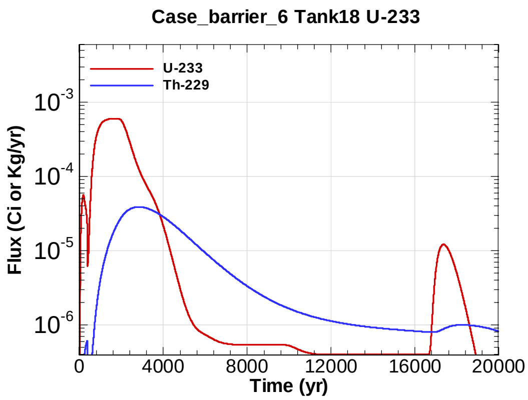

Figure K.6-23 - Water Table Flux for Case_barrier_6 Tank18 U-233

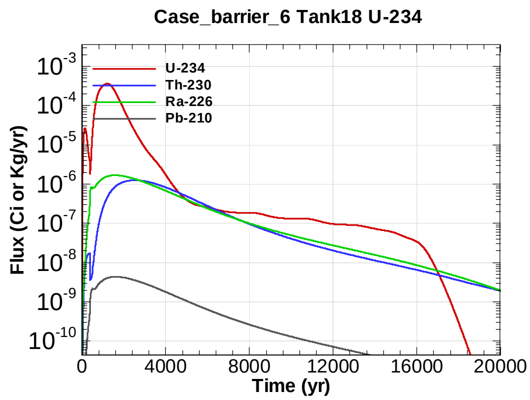

Figure K.6-24 - Water Table Flux for Case_barrier_6 Tank18 U-234

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Appendix K.7
FLUX AT WATER TABLE FOR BARRIER ANALYSIS – BARRIER CASE 7

Appendix K.7 contains curves showing the flux (in Ci/year) at the water table for barrier analysis – Barrier Case 7 for Tanks 5, 18 and 33. The flux is provided for selected radionuclides.

Graph heading example "Case_barrier_7 Tank05 Am-241"

Key

Case_barrier_7 = scenario case/configuration
Tank05 = inventory source is Tank 05
Am-241 = radionuclide or chemical of concern

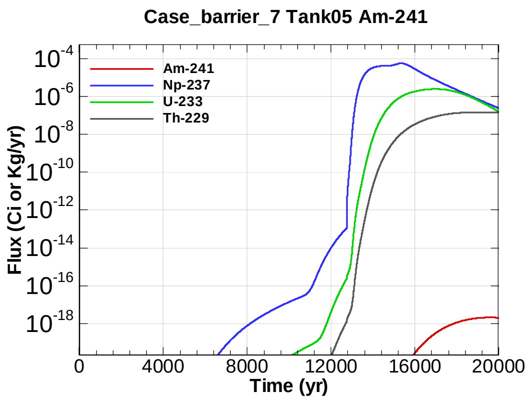

Figure K.7-1 - Water Table Flux for Case_barrier_7 Tank05 Am-241

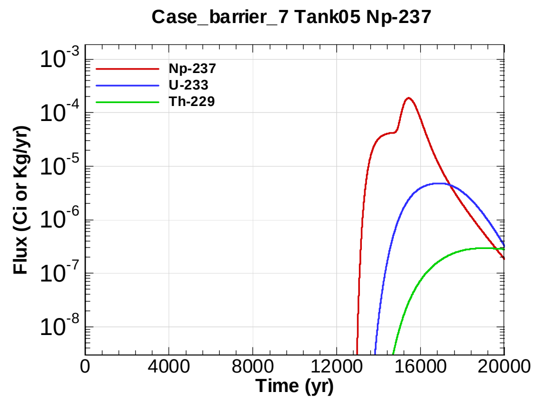

Figure K.7-2 - Water Table Flux for Case_barrier_7 Tank05 Np-237

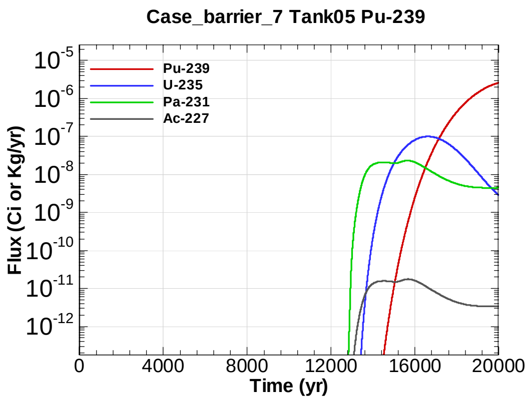

Figure K.7-3 - Water Table Flux for Case_barrier_7 Tank05 Pu-239

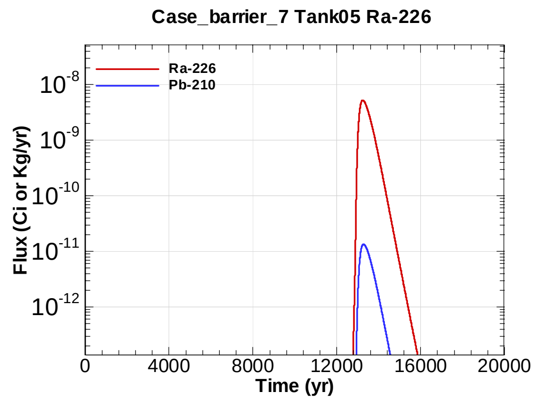

Figure K.7-4 - Water Table Flux for Case_barrier_7 Tank05 Ra-226

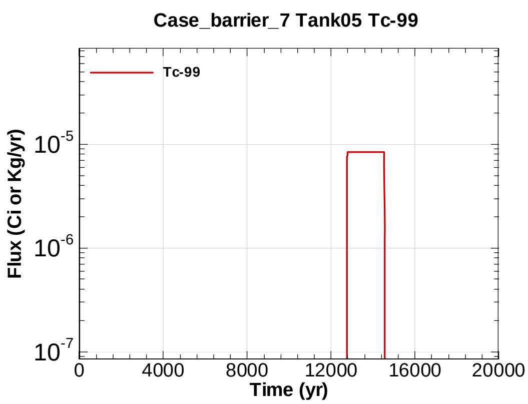

Figure K.7-5 - Water Table Flux for Case_barrier_7 Tank05 Tc-99

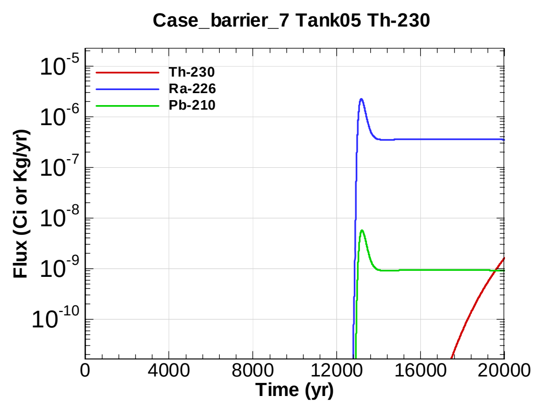

Figure K.7-6 - Water Table Flux for Case_barrier_7 Tank05 Th-230

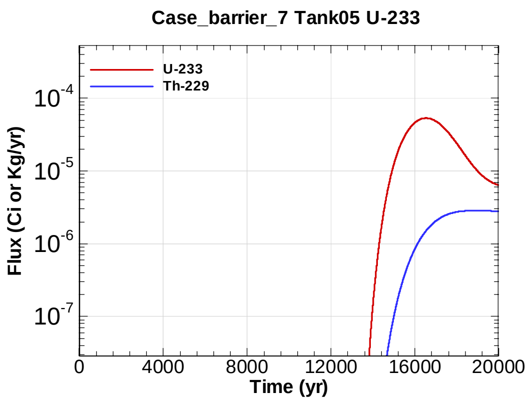

Figure K.7-7 - Water Table Flux for Case_barrier_7 Tank05 U-233

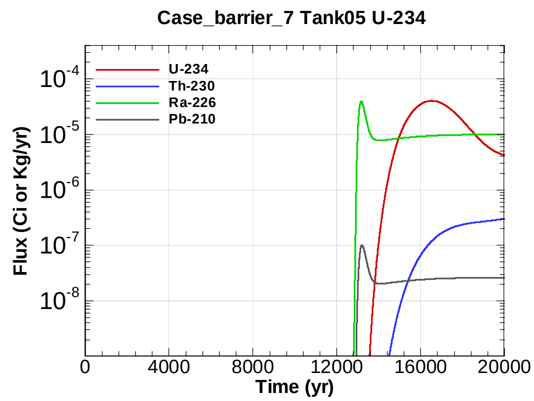

Figure K.7-8 - Water Table Flux for Case_barrier_7 Tank05 U-234

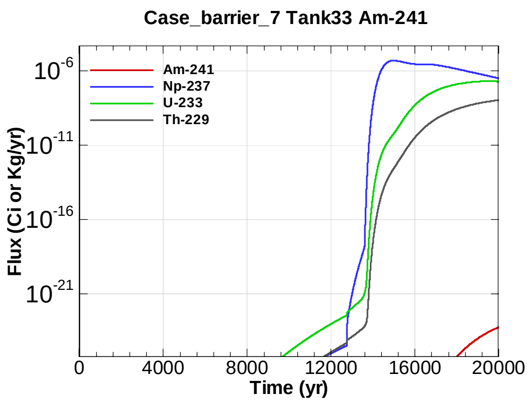

Figure K.7-9 - Water Table Flux for Case_barrier_7 Tank33 Am-241

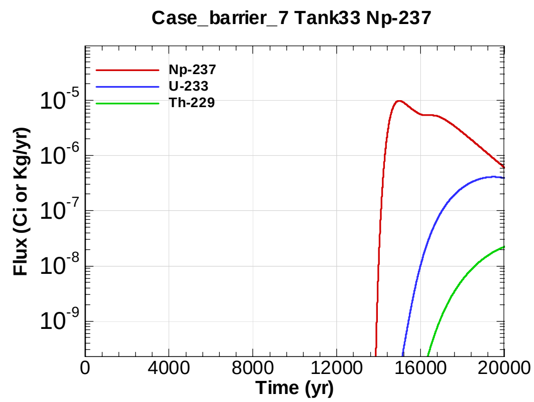

Figure K.7-10 - Water Table Flux for Case_barrier_7 Tank33 Np-237

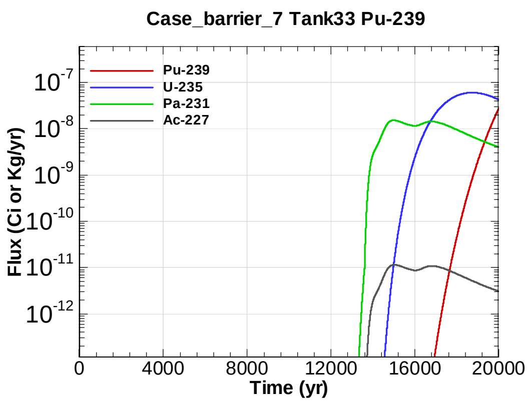

Figure K.7-11 - Water Table Flux for Case_barrier_7 Tank33 Pu-239

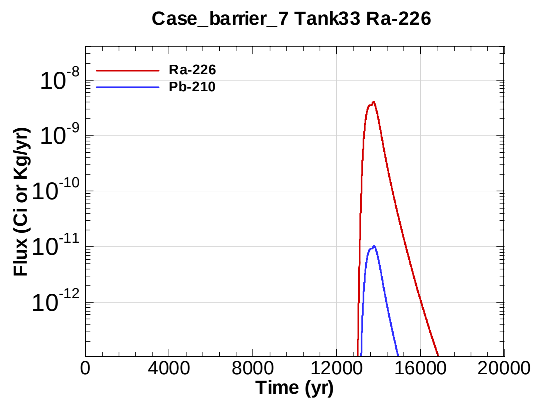

Figure K.7-12 - Water Table Flux for Case_barrier_7 Tank33 Ra-226

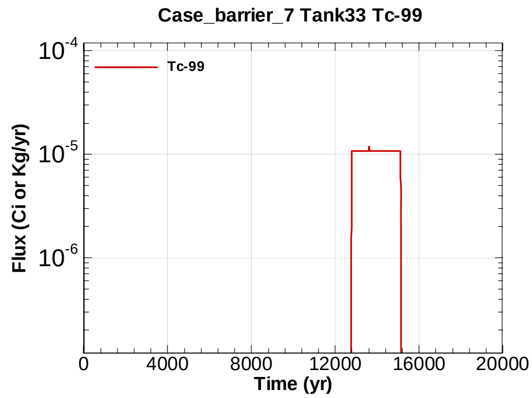

Figure K.7-13 - Water Table Flux for Case_barrier_7 Tank33 Tc-99

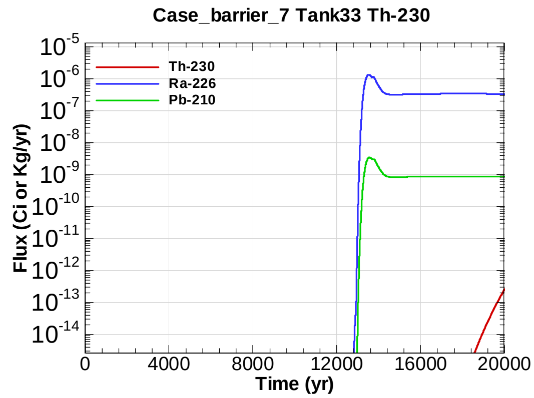

Figure K.7-14 - Water Table Flux for Case_barrier_7 Tank33 Th-230

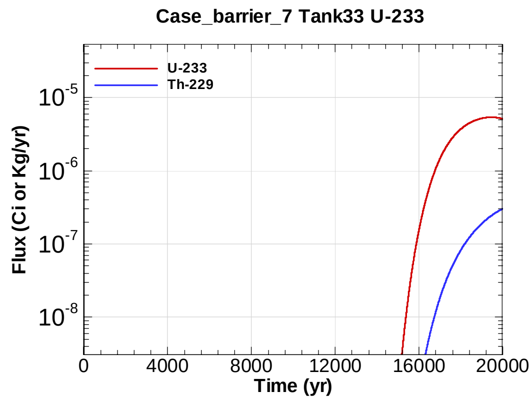

Figure K.7-15 - Water Table Flux for Case_barrier_7 Tank33 U-233

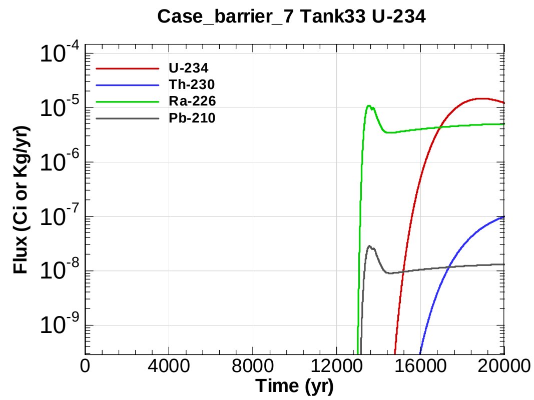

Figure K.7-16 - Water Table Flux for Case_barrier_7 Tank33 U-234

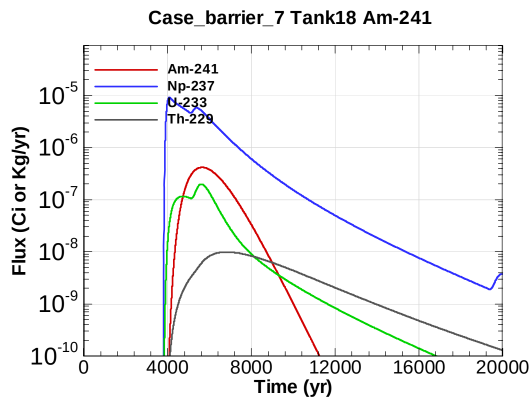

Figure K.7-17 - Water Table Flux for Case_barrier_7 Tank18 Am-241

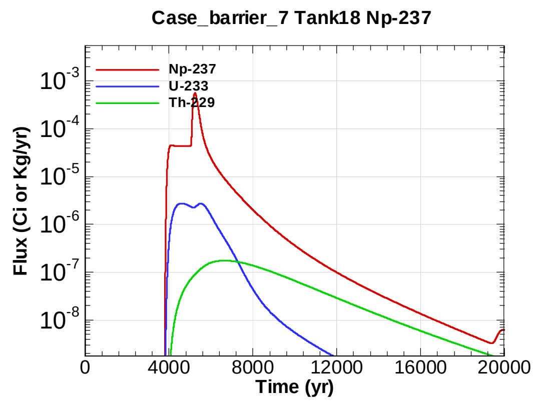

Figure K.7-18 - Water Table Flux for Case_barrier_7 Tank18 Np-237

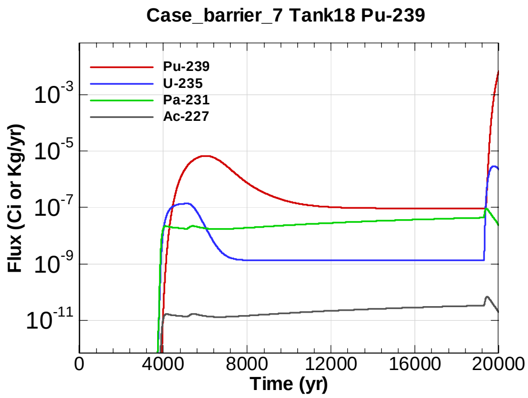

Figure K.7-19 - Water Table Flux for Case_barrier_7 Tank18 Pu-239

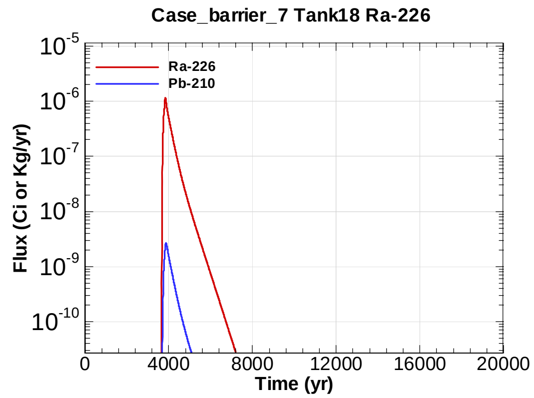

Figure K.7-20 - Water Table Flux for Case_barrier_7 Tank18 Ra-226

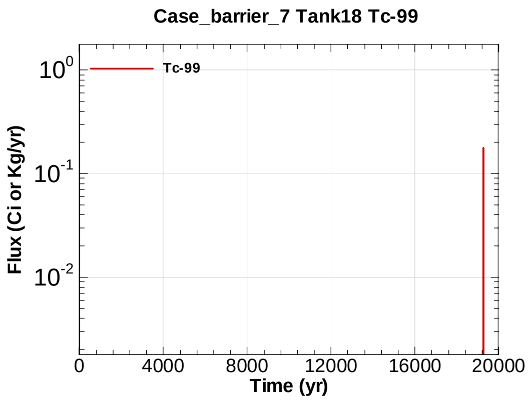

Figure K.7-21 - Water Table Flux for Case_barrier_7 Tank18 Tc-99

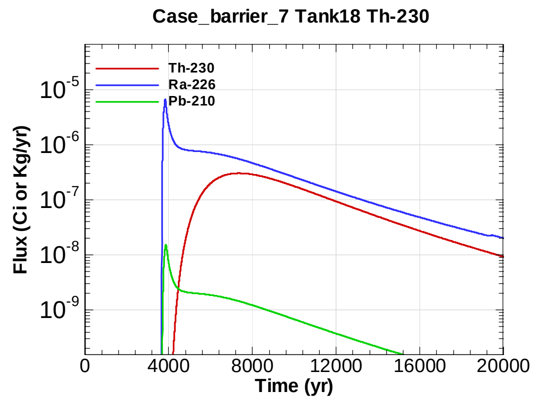

Figure K.7-22 - Water Table Flux for Case_barrier_7 Tank18 Th-230

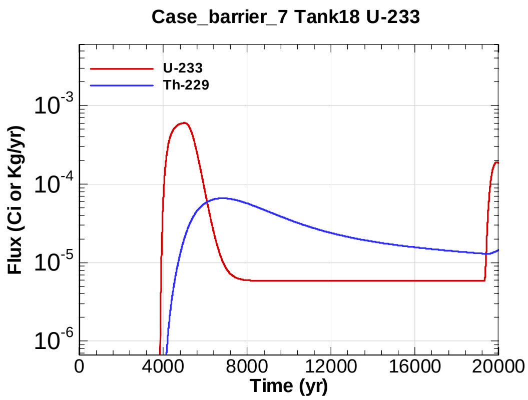

Figure K.7-23 - Water Table Flux for Case_barrier_7 Tank18 U-233

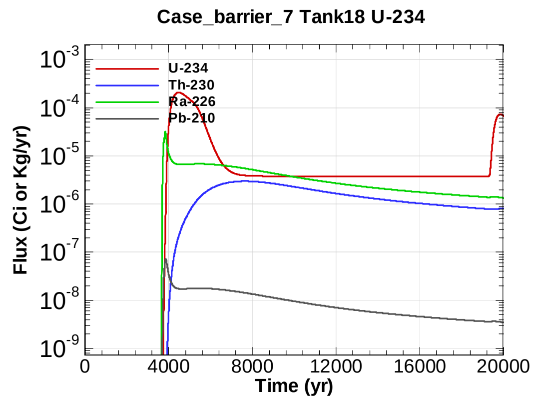

Figure K.7-24 - Water Table Flux for Case_barrier_7 Tank18 U-234

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Appendix K.8
FLUX AT WATER TABLE FOR BARRIER ANALYSIS – BARRIER CASE 8

Appendix K.8 contains curves showing the flux (in Ci/year) at the water table for barrier analysis – Barrier Case 8 for Tanks 5, 18 and 33. The flux is provided for selected radionuclides.

Graph heading example "Case_barrier_8 Tank05 Am-241"

Key

Case_barrier_8 = scenario case/configuration
Tank05 = inventory source is Tank 05
Am-241 = radionuclide or chemical of concern

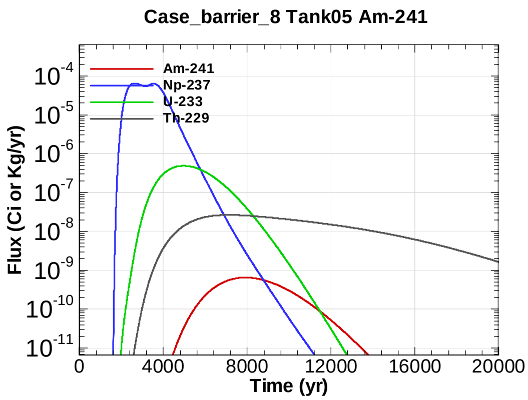

Figure K.8-1 - Water Table Flux for Case_barrier_8 Tank05 Am-241

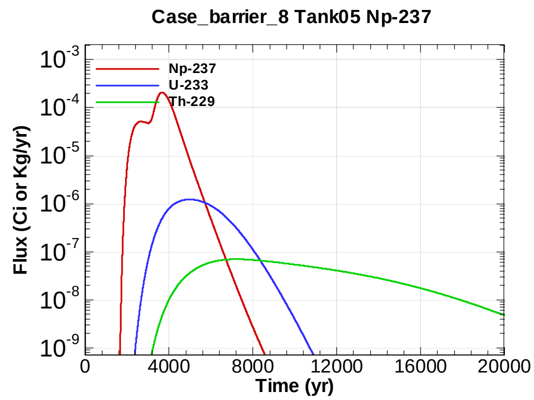

Figure K.8-2 - Water Table Flux for Case_barrier_8 Tank05 Np-237

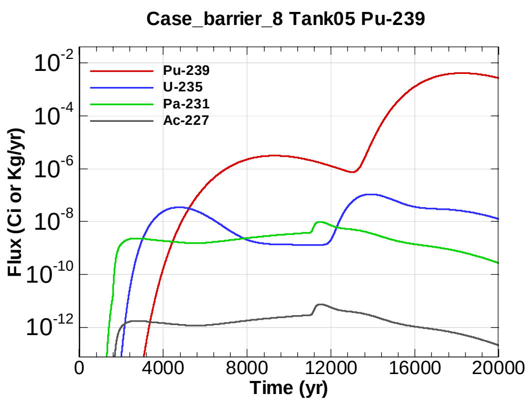

Figure K.8-3 - Water Table Flux for Case_barrier_8 Tank05 Pu-239

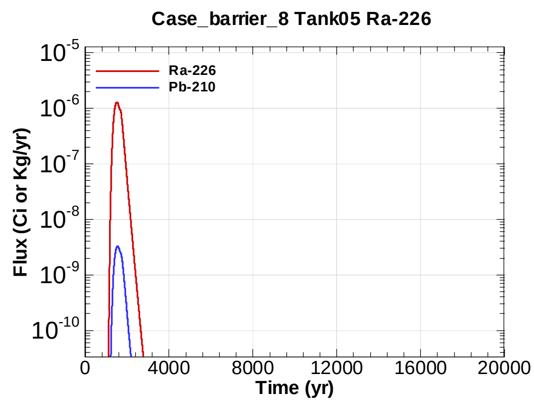

Figure K.8-4 - Water Table Flux for Case_barrier_8 Tank05 Ra-226

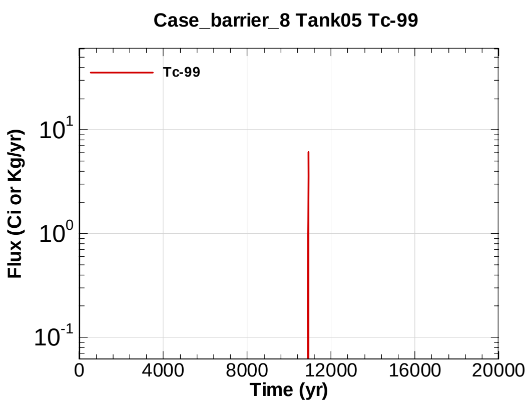

Figure K.8-5 - Water Table Flux for Case_barrier_8 Tank05 Tc-99

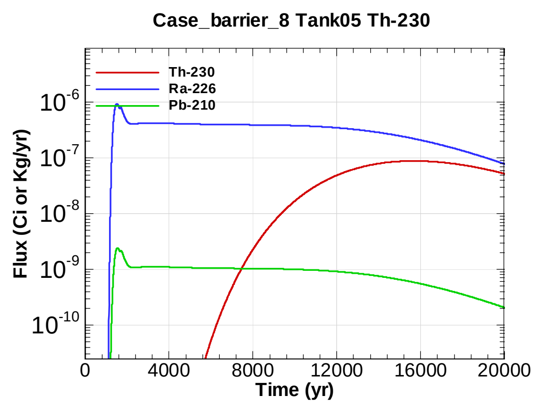

Figure K.8-6 - Water Table Flux for Case_barrier_8 Tank05 Th-230

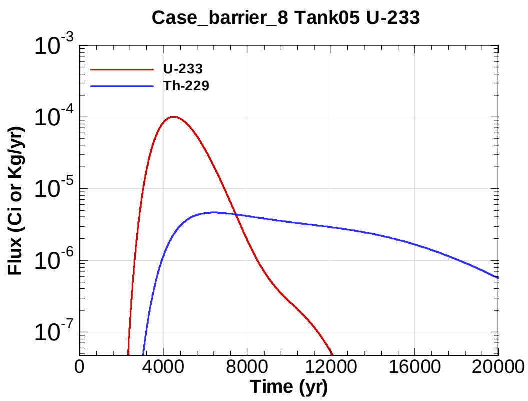

Figure K.8-7 - Water Table Flux for Case_barrier_8 Tank05 U-233

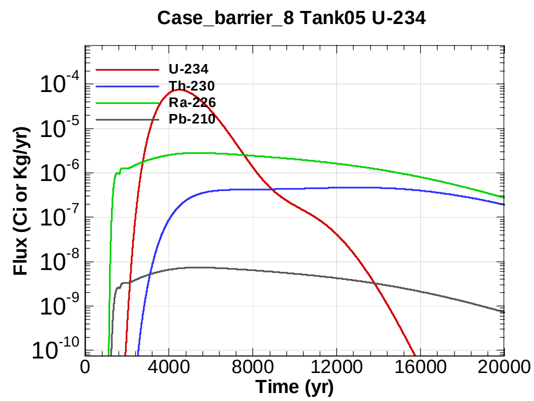

Figure K.8-8 - Water Table Flux for Case_barrier_8 Tank05 U-234

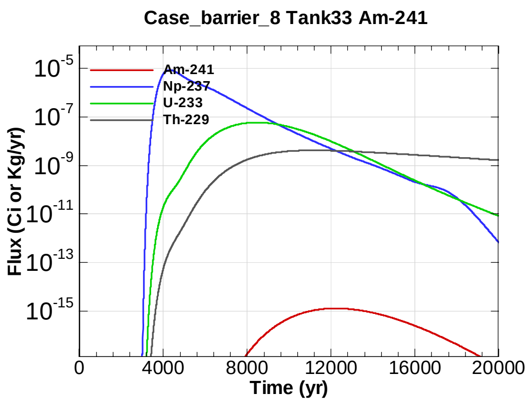

Figure K.8-9 - Water Table Flux for Case_barrier_8 Tank33 Am-241

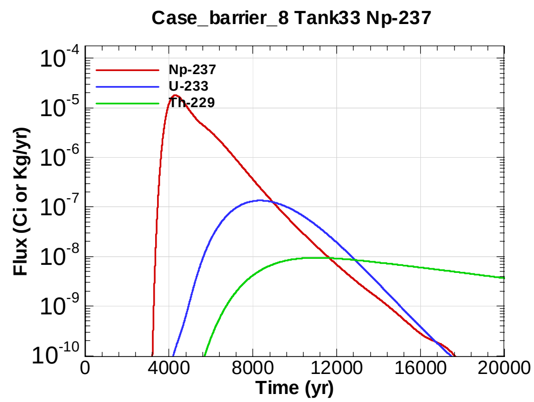

Figure K.8-10 - Water Table Flux for Case_barrier_8 Tank33 Np-237

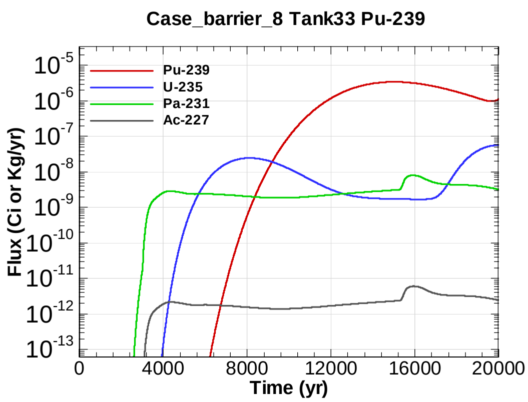

Figure K.8-11 - Water Table Flux for Case_barrier_8 Tank33 Pu-239

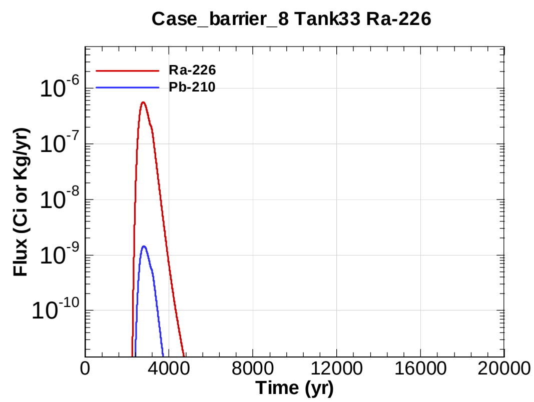

Figure K.8-12 - Water Table Flux for Case_barrier_8 Tank33 Ra-226

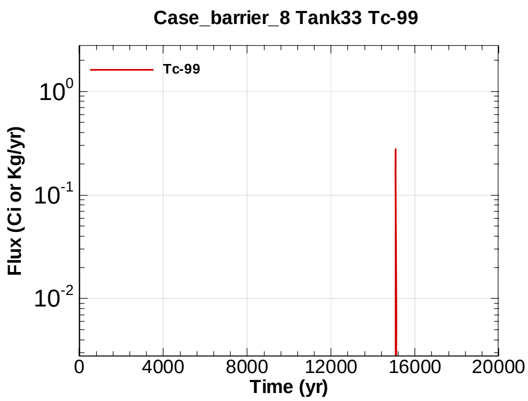

Figure K.8-13 - Water Table Flux for Case_barrier_8 Tank33 Tc-99

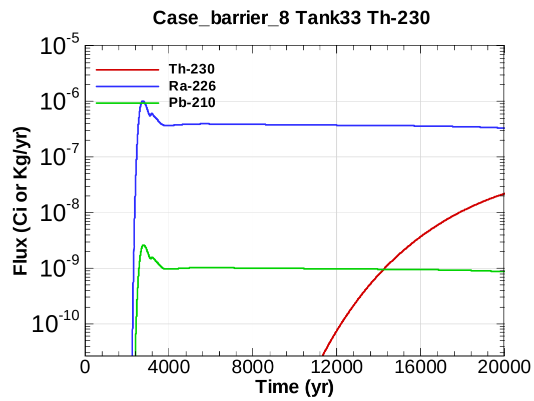

Figure K.8-14 - Water Table Flux for Case_barrier_8 Tank33 Th-230

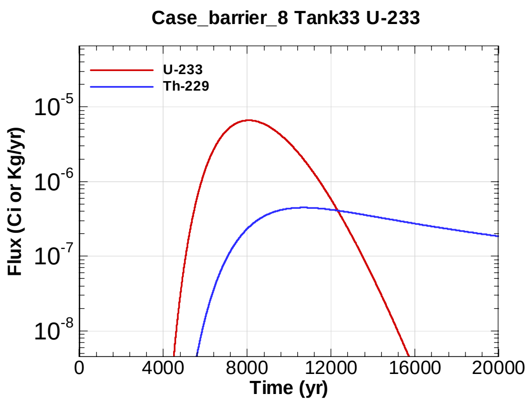

Figure K.8-15 - Water Table Flux for Case_barrier_8 Tank33 U-233

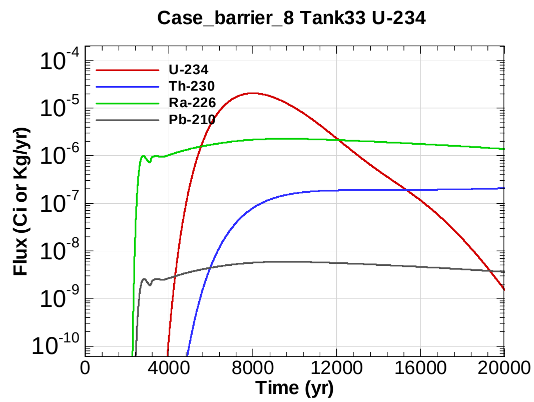

Figure K.8-16 - Water Table Flux for Case_barrier_8 Tank33 U-234

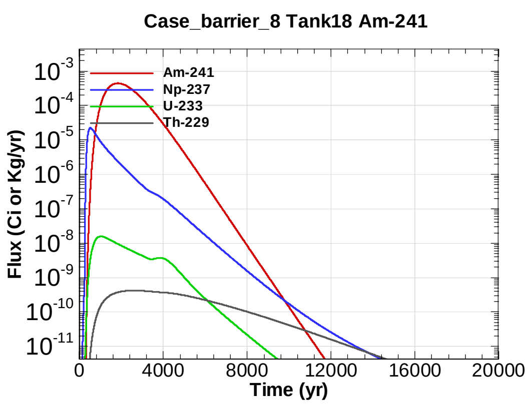

Figure K.8-17 - Water Table Flux for Case_barrier_8 Tank18 Am-241

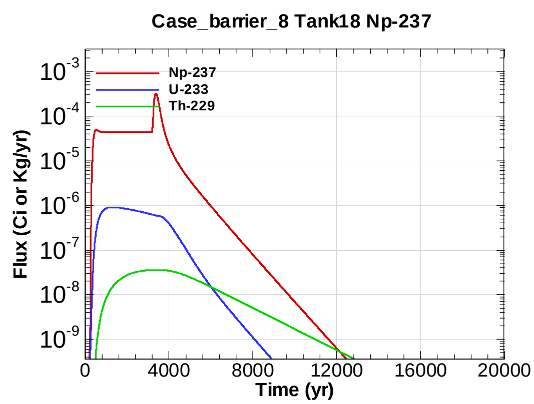

Figure K.8-18 - Water Table Flux for Case_barrier_8 Tank18 Np-237

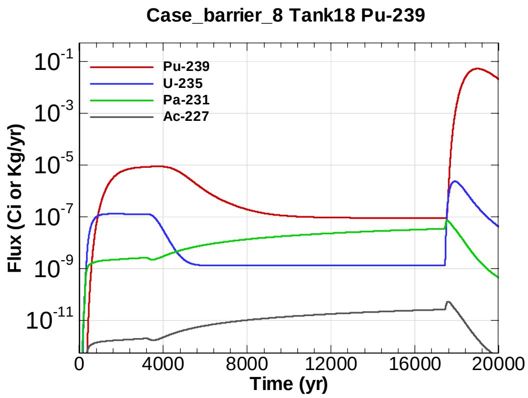

Figure K.8-19 - Water Table Flux for Case_barrier_8 Tank18 Pu-239

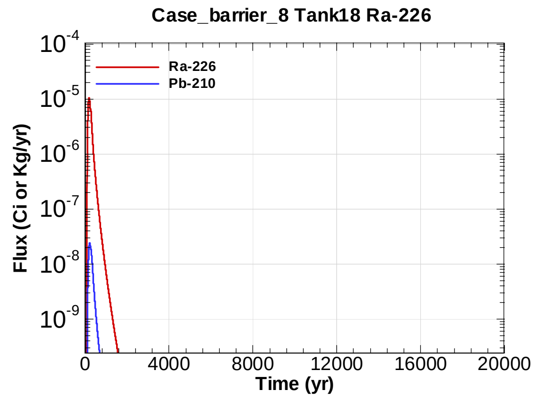

Figure K.8-20 - Water Table Flux for Case_barrier_8 Tank18 Ra-226

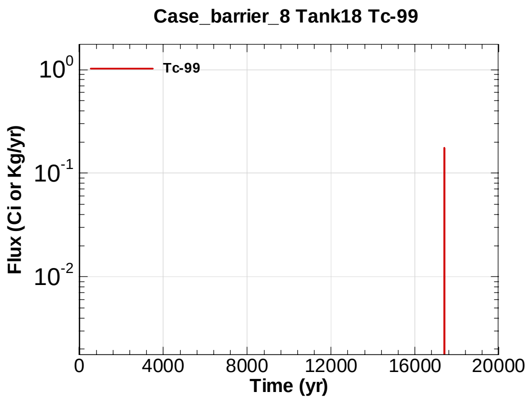

Figure K.8-21 - Water Table Flux for Case_barrier_8 Tank18 Tc-99

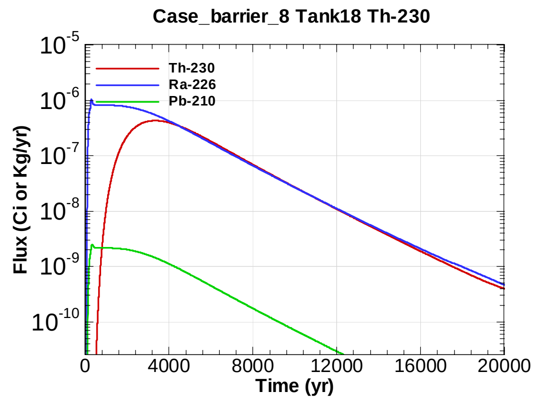

Figure K.8-22 - Water Table Flux for Case_barrier_8 Tank18 Th-230

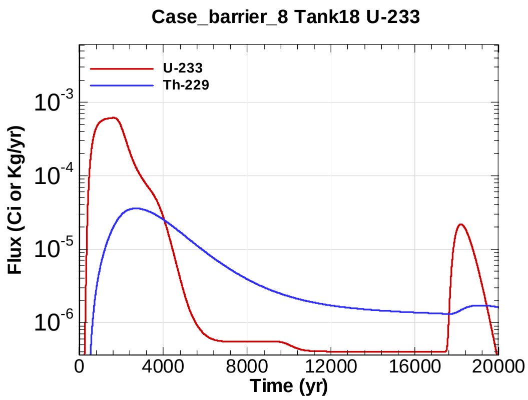

Figure K.8-23 - Water Table Flux for Case_barrier_8 Tank18 U-233

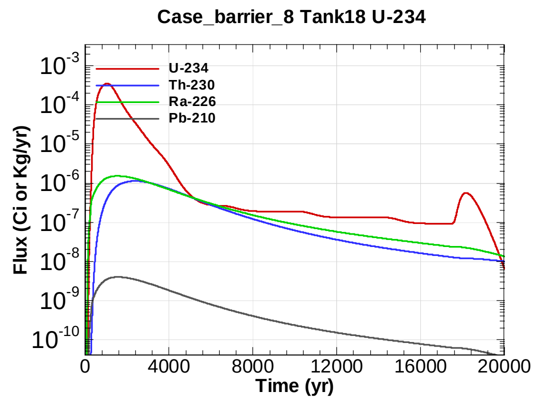

Figure K.8-24 - Water Table Flux for Case_barrier_8 Tank18 U-234

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Appendix K.9
FLUX AT WATER TABLE FOR BARRIER ANALYSIS – BARRIER CASE 9

Appendix K.9 contains curves showing the flux (in Ci/year) at the water table for barrier analysis – Barrier Case 9 for Tanks 5, 18 and 33. The flux is provided for selected radionuclides.

Graph heading example "Case_barrier_9 Tank05 Am-241"

Key

Case_barrier_9 = scenario case/configuration
Tank05 = inventory source is Tank 05
Am-241 = radionuclide or chemical of concern

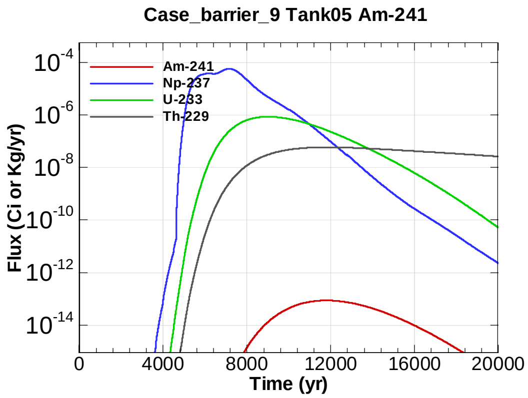

Figure K.9-1 - Water Table Flux for Case_barrier_9 Tank05 Am-241

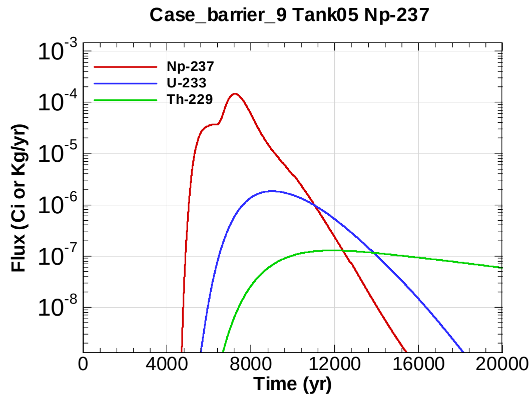

Figure K.9-2 - Water Table Flux for Case_barrier_9 Tank05 Np-237

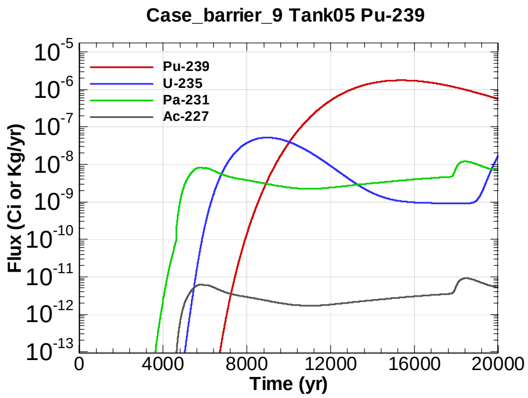

Figure K.9-3 - Water Table Flux for Case_barrier_9 Tank05 Pu-239

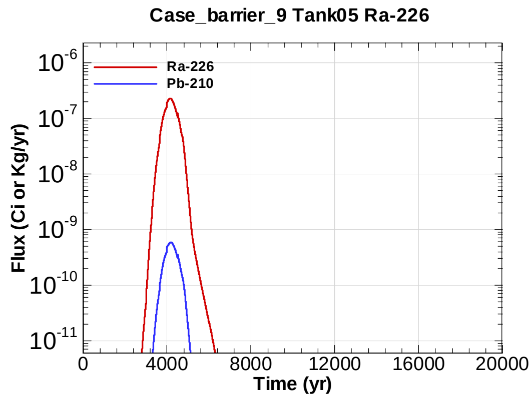

Figure K.9-4 - Water Table Flux for Case_barrier_9 Tank05 Ra-226

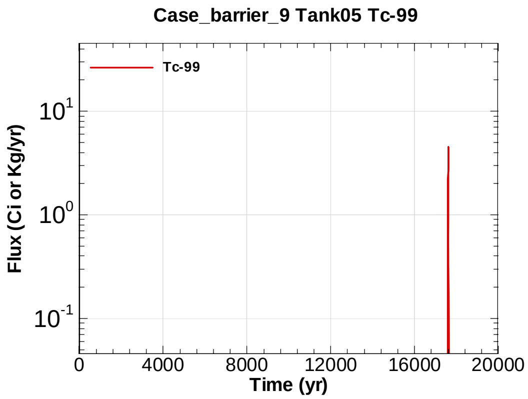

Figure K.9-5 - Water Table Flux for Case_barrier_9 Tank05 Tc-99

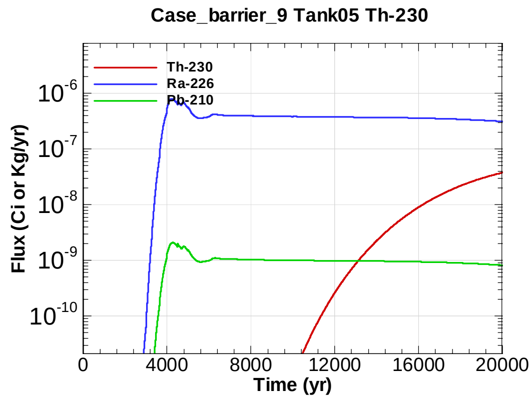

Figure K.9-6 - Water Table Flux for Case_barrier_9 Tank05 Th-230

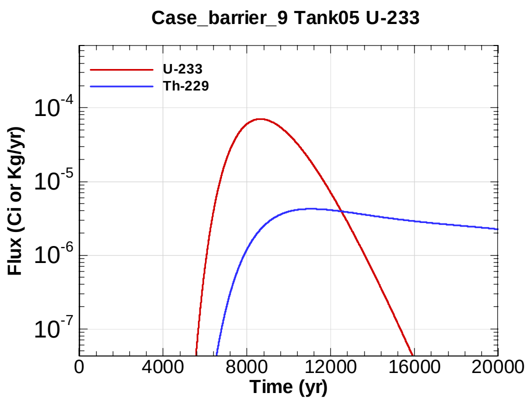

Figure K.9-7 - Water Table Flux for Case_barrier_9 Tank05 U-233

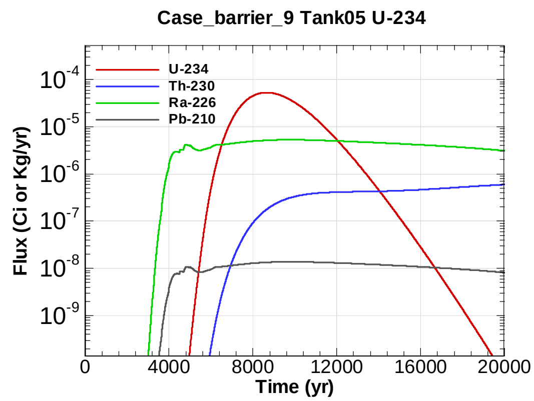

Figure K.9-8 - Water Table Flux for Case_barrier_9 Tank05 U-234

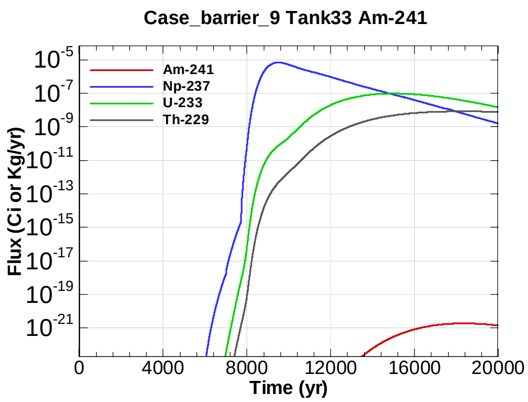

Figure K.9-9 - Water Table Flux for Case_barrier_9 Tank33 Am-241

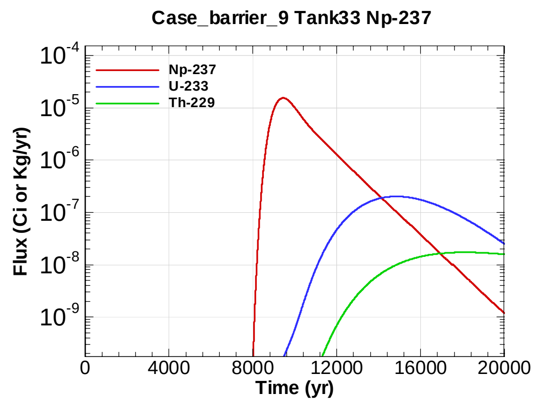

Figure K.9-10 - Water Table Flux for Case_barrier_9 Tank33 Np-237

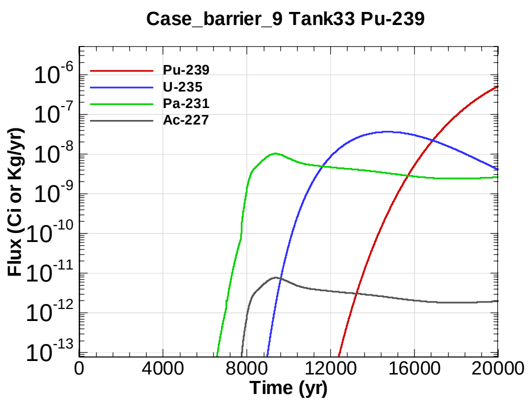

Figure K.9-11 - Water Table Flux for Case_barrier_9 Tank33 Pu-239

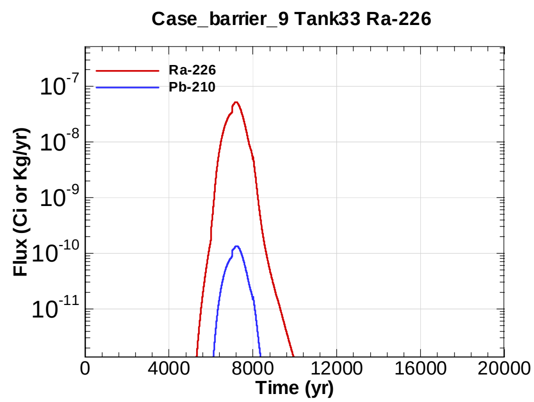

Figure K.9-12 - Water Table Flux for Case_barrier_9 Tank33 Ra-226

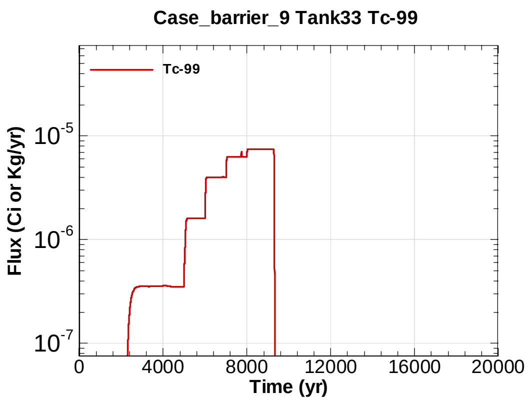

Figure K.9-13 - Water Table Flux for Case_barrier_9 Tank33 Tc-99

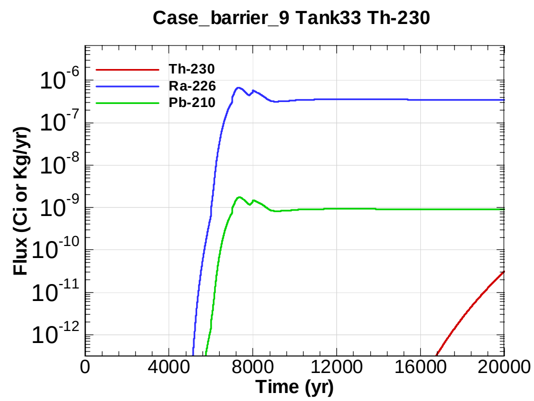

Figure K.9-14 - Water Table Flux for Case_barrier_9 Tank33 Th-230

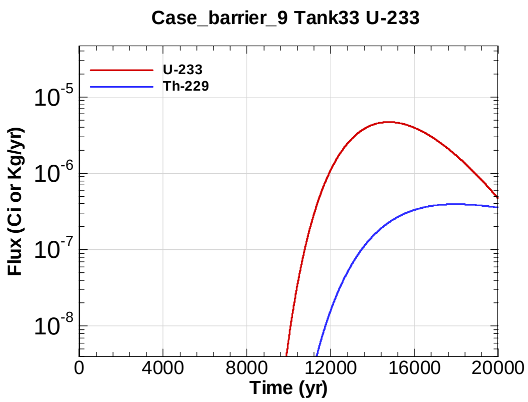

Figure K.9-15 - Water Table Flux for Case_barrier_9 Tank33 U-233

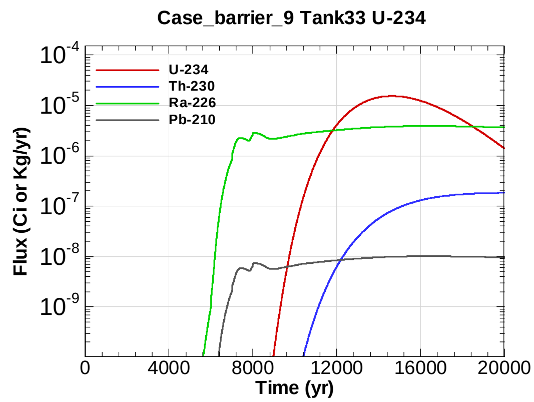

Figure K.9-16 - Water Table Flux for Case_barrier_9 Tank33 U-234

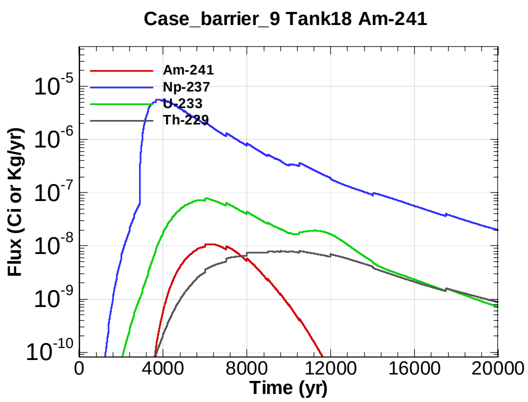

Figure K.9-17 - Water Table Flux for Case_barrier_9 Tank18 Am-241

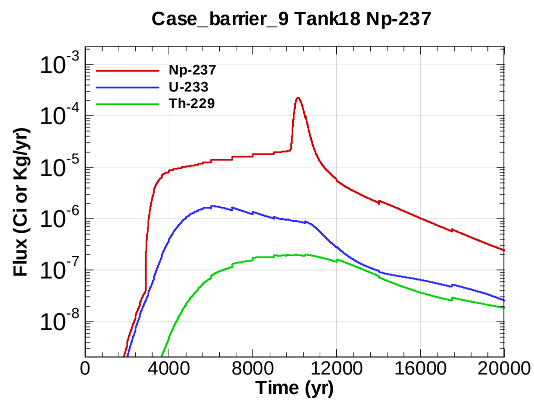

Figure K.9-18 - Water Table Flux for Case_barrier_9 Tank18 Np-237

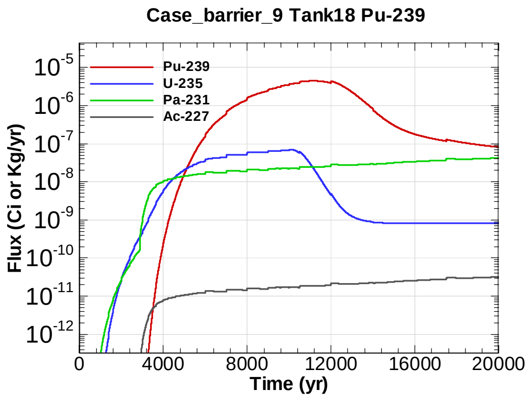

Figure K.9-19 - Water Table Flux for Case_barrier_9 Tank18 Pu-239

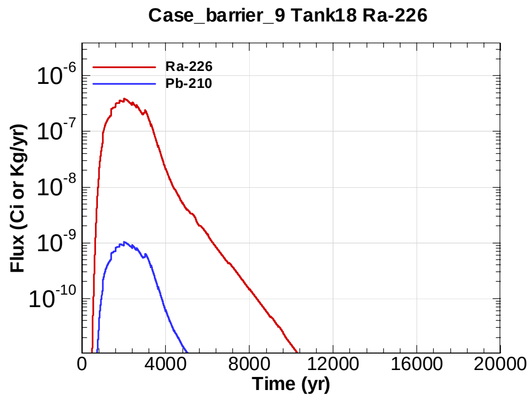

Figure K.9-20 - Water Table Flux for Case_barrier_9 Tank18 Ra-226

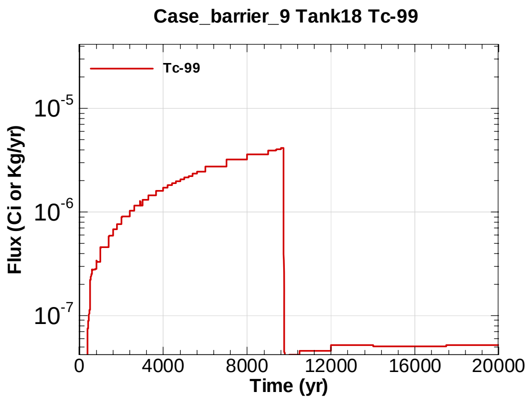

Figure K.9-21 - Water Table Flux for Case_barrier_9 Tank18 Tc-99

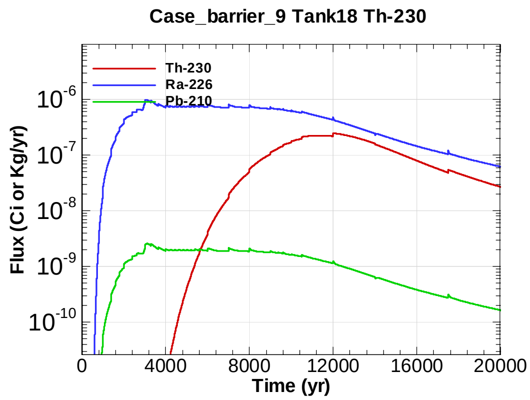

Figure K.9-22 - Water Table Flux for Case_barrier_9 Tank18 Th-230

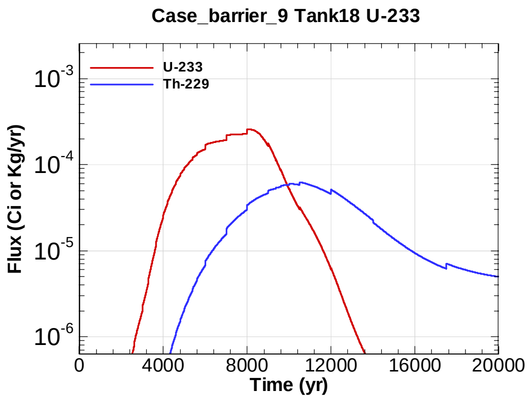

Figure K.9-23 - Water Table Flux for Case_barrier_9 Tank18 U-233

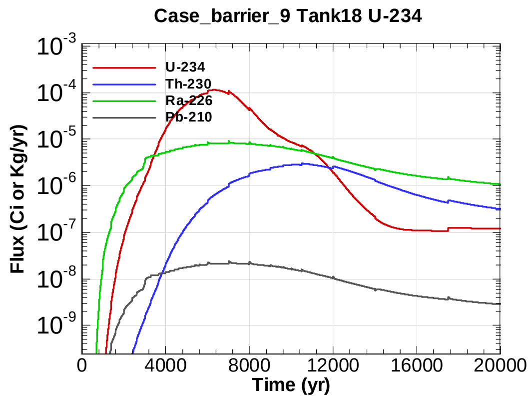

Figure K.9-24 - Water Table Flux for Case_barrier_9 Tank18 U-234

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Appendix K.10
FLUX AT WATER TABLE FOR BARRIER ANALYSIS – BARRIER CASE 10

Appendix K.10 contains curves showing the flux (in Ci/year) at the water table for barrier analysis – Barrier Case 10 for Tanks 5, 18 and 33. The flux is provided for selected radionuclides.

Graph heading example "Case_barrier_10 Tank05 Am-241"

Key

Case_barrier_10 = scenario case/configuration
Tank05 = inventory source is Tank 05
Am-241 = radionuclide or chemical of concern

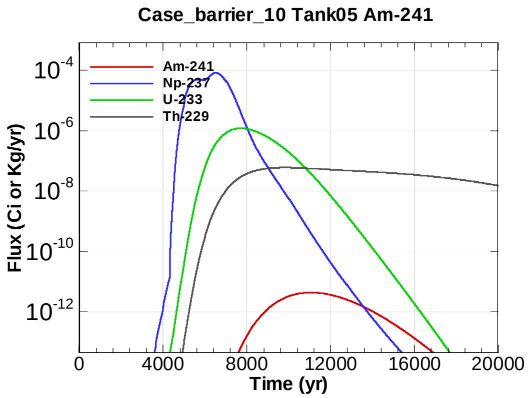

Figure K.10-1 - Water Table Flux for Case_barrier_10 Tank05 Am-241

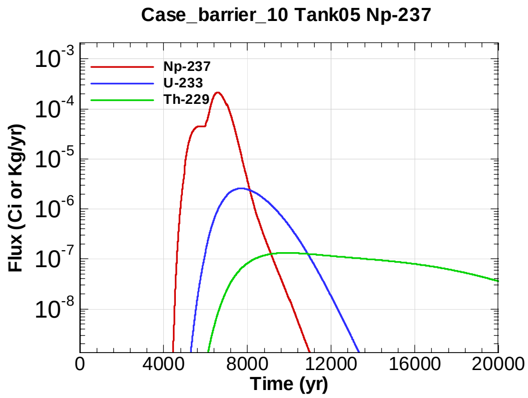

Figure K.10-2 - Water Table Flux for Case_barrier_10 Tank05 Np-237

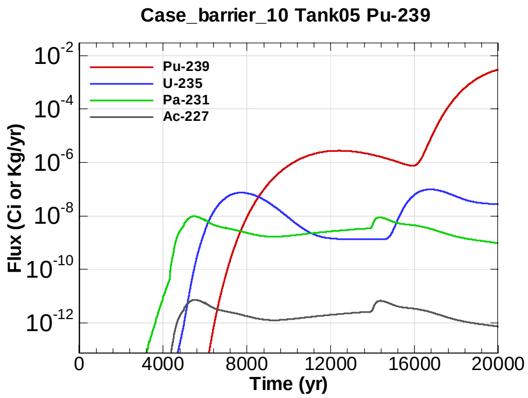

Figure K.10-3 - Water Table Flux for Case_barrier_10 Tank05 Pu-239

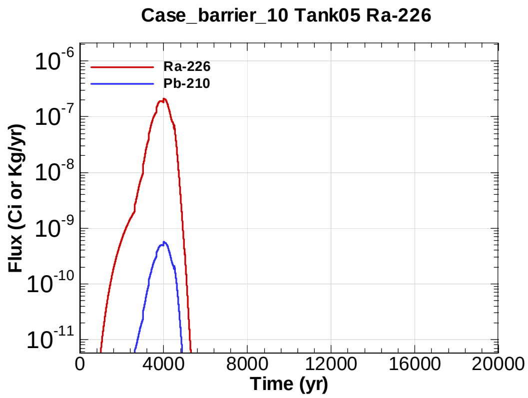

Figure K.10-4 - Water Table Flux for Case_barrier_10 Tank05 Ra-226

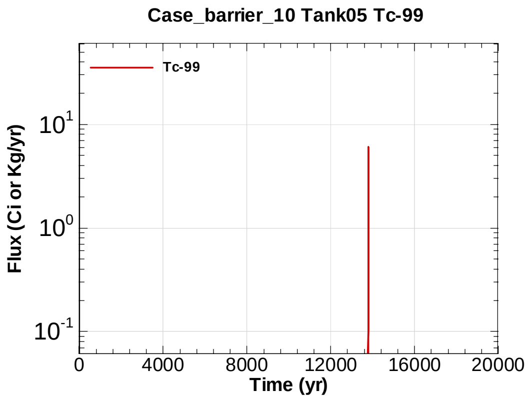

Figure K.10-5 - Water Table Flux for Case_barrier_10 Tank05 Tc-99

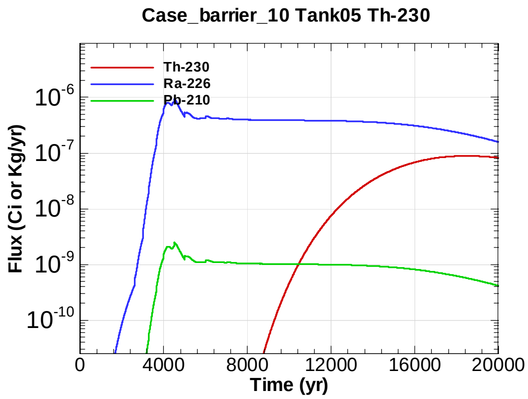

Figure K.10-6 - Water Table Flux for Case_barrier_10 Tank05 Th-230

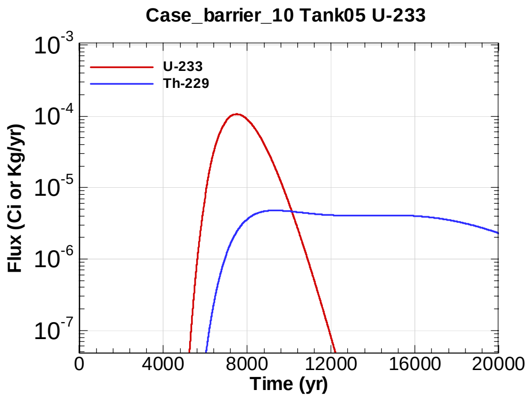

Figure K.10-7 - Water Table Flux for Case_barrier_10 Tank05 U-233

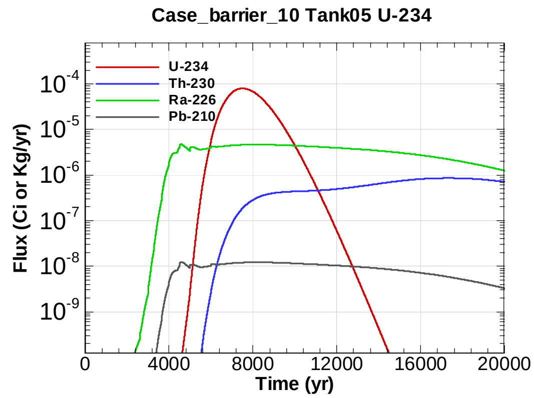

Figure K.10-8 - Water Table Flux for Case_barrier_10 Tank05 U-234

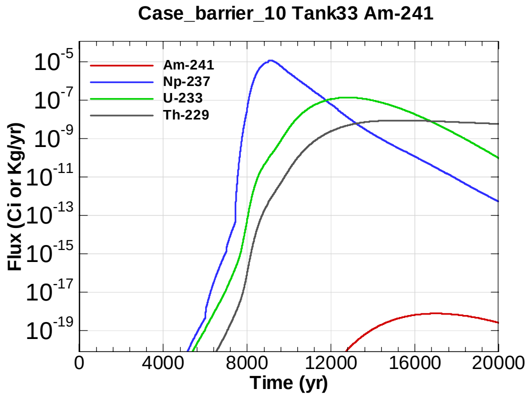

Figure K.10-9 - Water Table Flux for Case_barrier_10 Tank33 Am-241

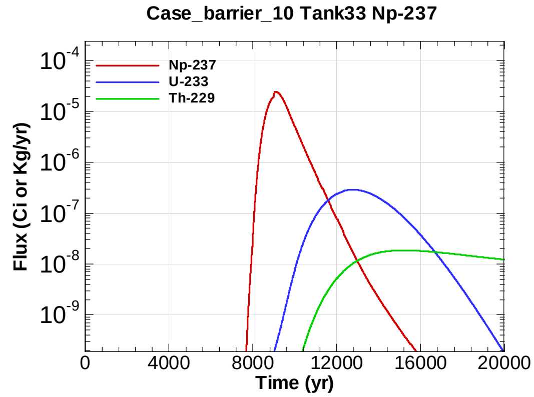

Figure K.10-10 - Water Table Flux for Case_barrier_10 Tank33 Np-237

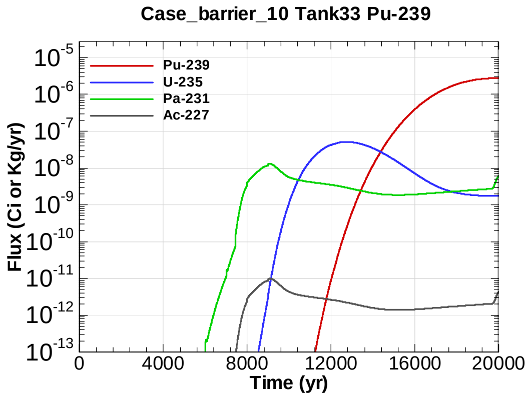

Figure K.10-11 - Water Table Flux for Case_barrier_10 Tank33 Pu-239

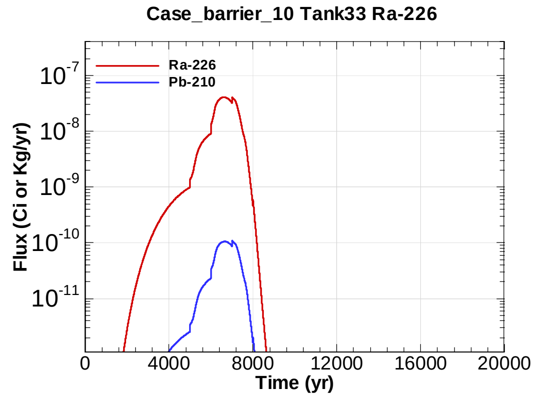

Figure K.10-12 - Water Table Flux for Case_barrier_10 Tank33 Ra-226

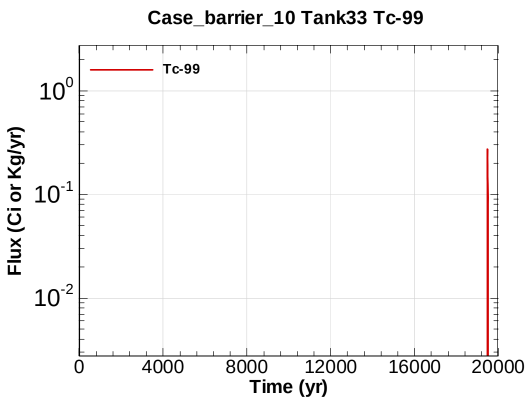

Figure K.10-13 - Water Table Flux for Case_barrier_10 Tank33 Tc-99

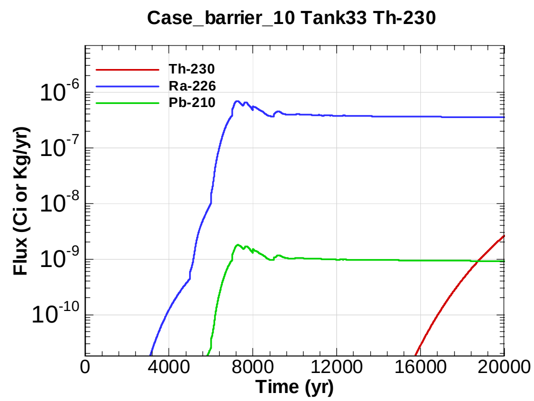

Figure K.10-14 - Water Table Flux for Case_barrier_10 Tank33 Th-230

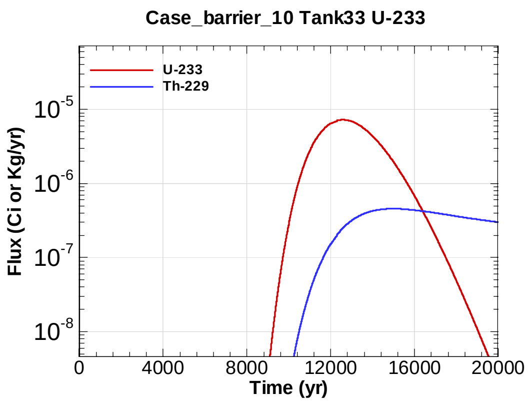

Figure K.10-15 - Water Table Flux for Case_barrier_10 Tank33 U-233

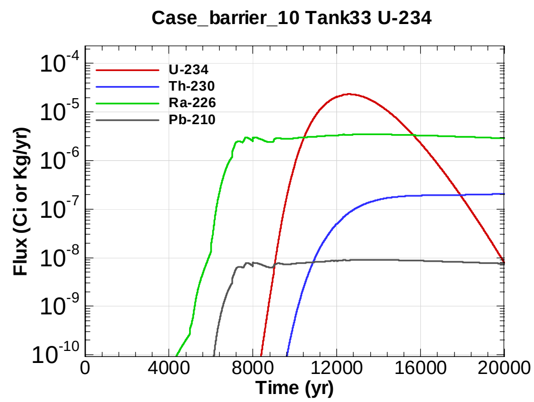

Figure K.10-16 - Water Table Flux for Case_barrier_10 Tank33 U-234

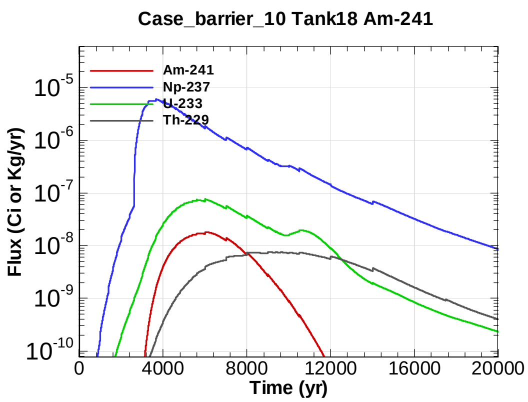

Figure K.10-17 - Water Table Flux for Case_barrier_10 Tank18 Am-241

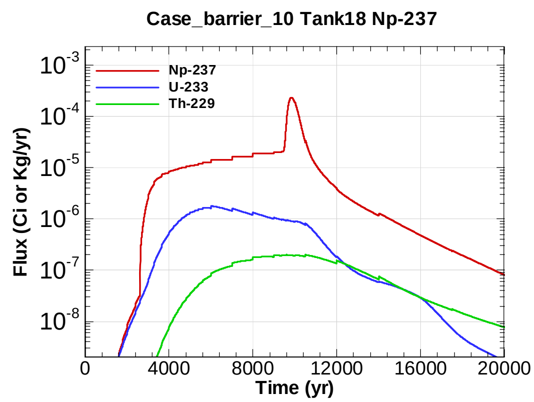

Figure K.10-18 - Water Table Flux for Case_barrier_10 Tank18 Np-237

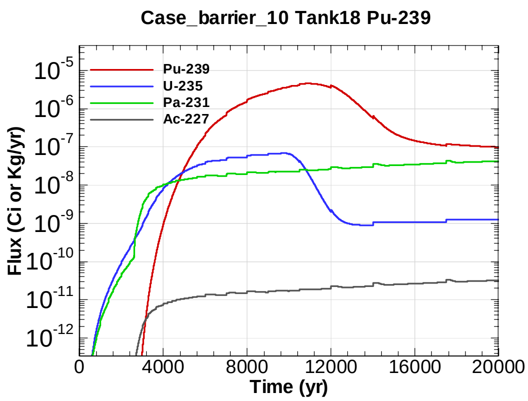

Figure K.10-19 - Water Table Flux for Case_barrier_10 Tank18 Pu-239

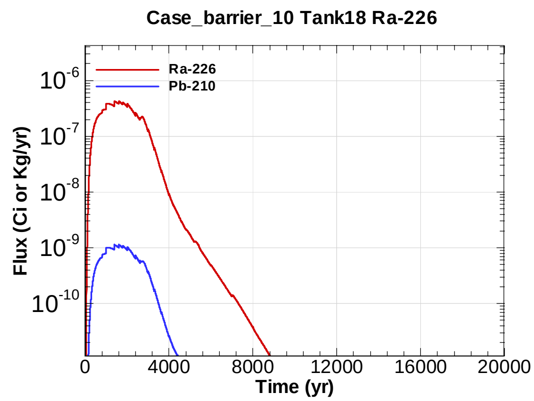

Figure K.10-20 - Water Table Flux for Case_barrier_10 Tank18 Ra-226

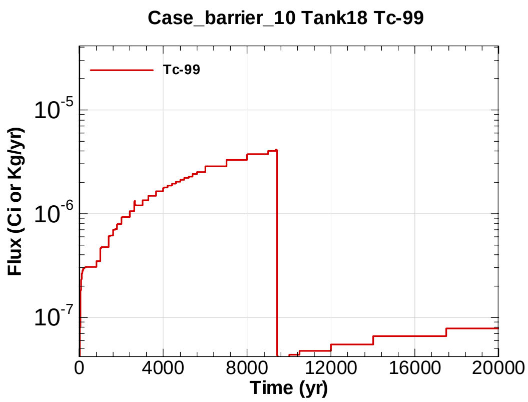

Figure K.10-21 - Water Table Flux for Case_barrier_10 Tank18 Tc-99

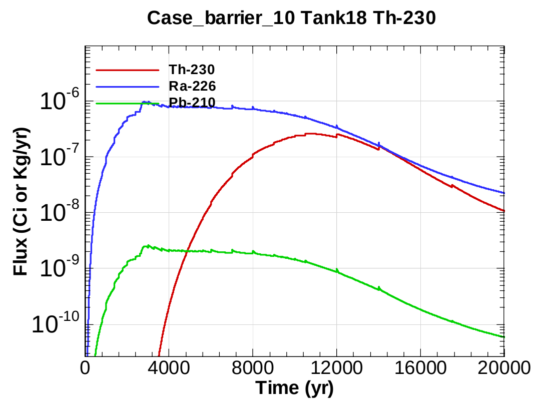

Figure K.10-22 - Water Table Flux for Case_barrier_10 Tank18 Th-230

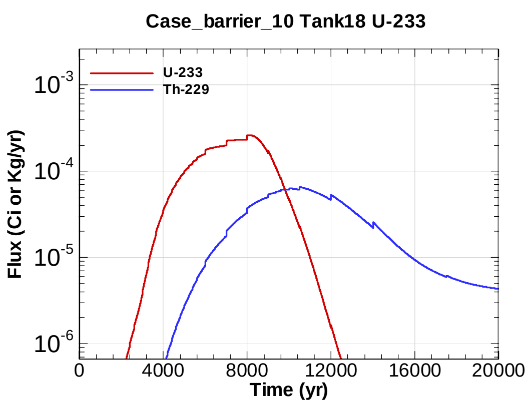

Figure K.10-23 - Water Table Flux for Case_barrier_10 Tank18 U-233

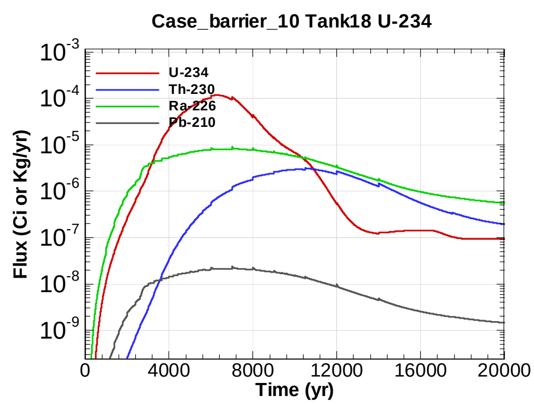

Figure K.10-24 - Water Table Flux for Case_barrier_10 Tank18 U-234

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Appendix K.11
FLUX AT WATER TABLE FOR BARRIER ANALYSIS – BARRIER CASE 11

Appendix K.11 contains curves showing the flux (in Ci/year) at the water table for barrier analysis – Barrier Case 11 for Tanks 5, 18 and 33. The flux is provided for selected radionuclides.

Graph heading example "Case_barrier_11 Tank05 Am-241"

Key

Case_barrier_11 = scenario case/configuration
Tank05 = inventory source is Tank 05
Am-241 = radionuclide or chemical of concern

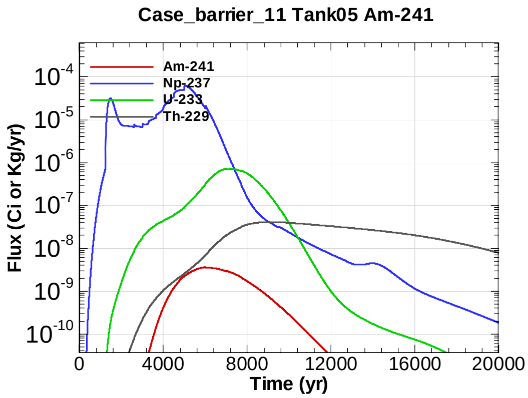

Figure K.11-1 - Water Table Flux for Case_barrier_11 Tank05 Am-241

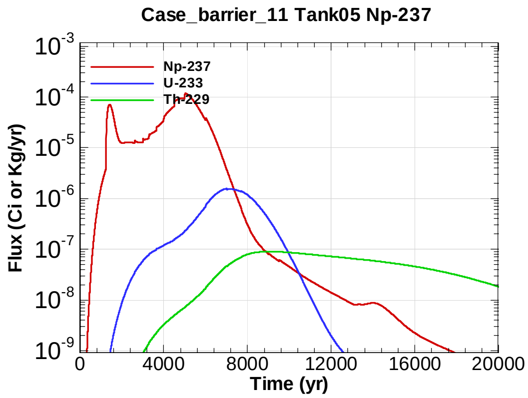

Figure K.11-2 - Water Table Flux for Case_barrier_11 Tank05 Np-237

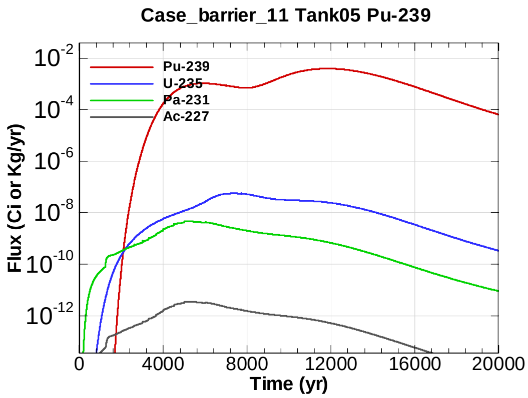

Figure K.11-3 - Water Table Flux for Case_barrier_11 Tank05 Pu-239

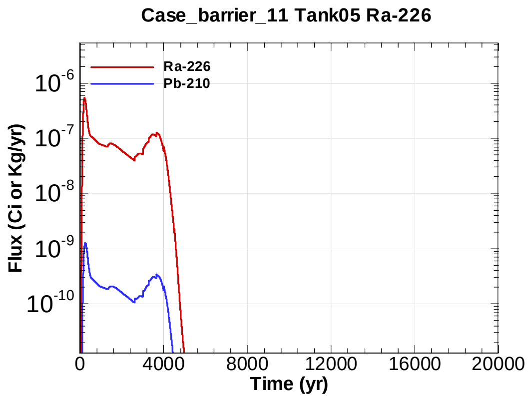

Figure K.11-4 - Water Table Flux for Case_barrier_11 Tank05 Ra-226

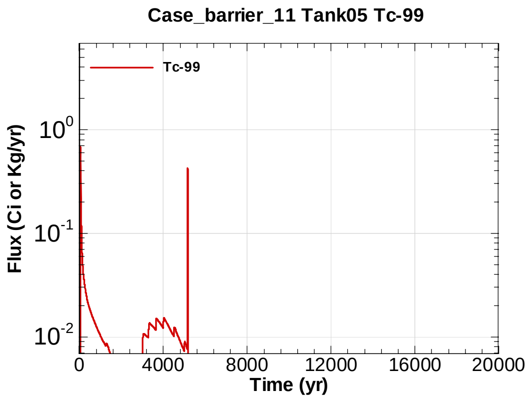

Figure K.11-5 - Water Table Flux for Case_barrier_11 Tank05 Tc-99

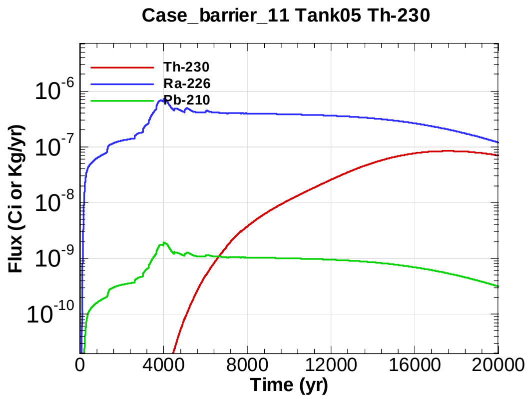

Figure K.11-6 - Water Table Flux for Case_barrier_11 Tank05 Th-230

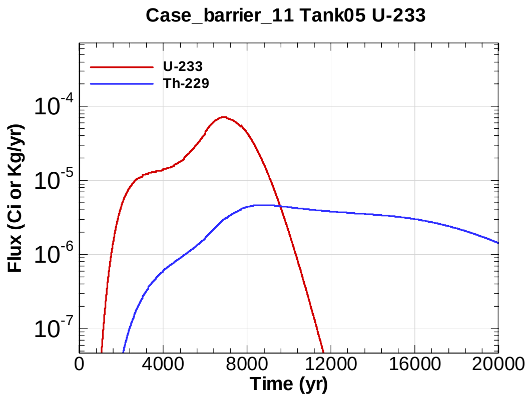

Figure K.11-7 - Water Table Flux for Case_barrier_11 Tank05 U-233

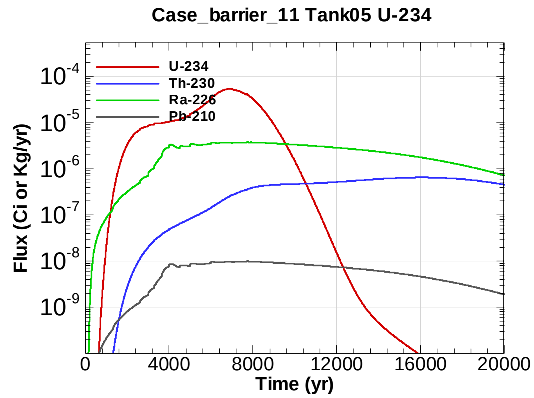

Figure K.11-8 - Water Table Flux for Case_barrier_11 Tank05 U-234

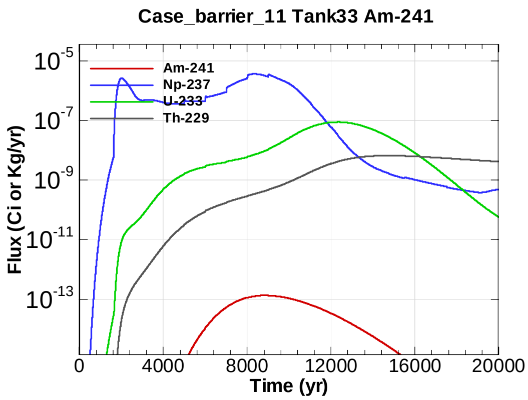

Figure K.11-9 - Water Table Flux for Case_barrier_11 Tank33 Am-241

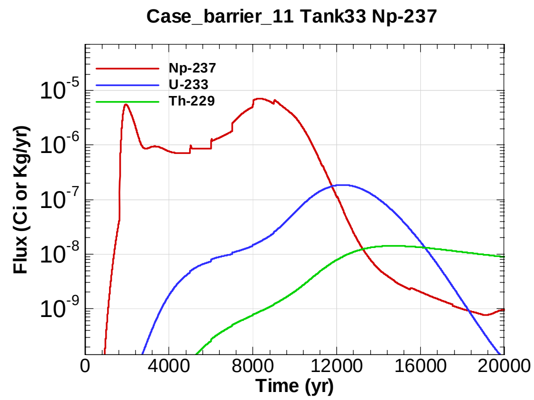

Figure K.11-10 - Water Table Flux for Case_barrier_11 Tank33 Np-237

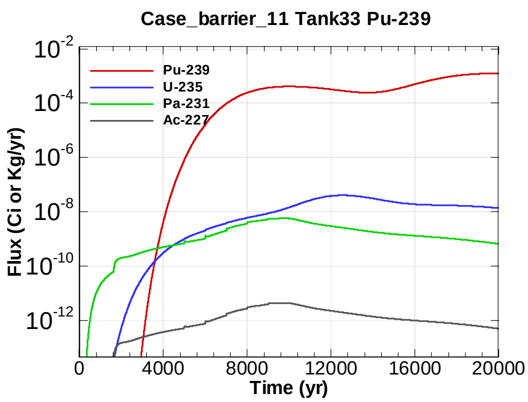

Figure K.11-11 - Water Table Flux for Case_barrier_11 Tank33 Pu-239

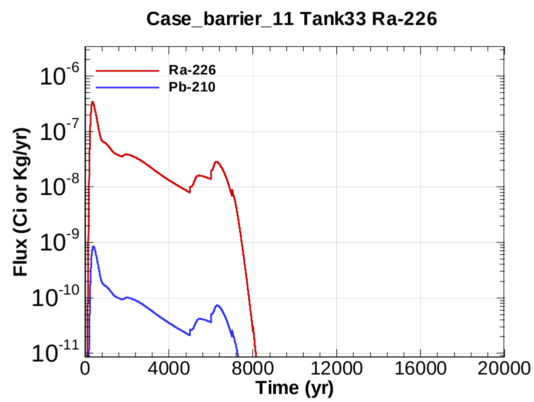

Figure K.11-12 - Water Table Flux for Case_barrier_11 Tank33 Ra-226

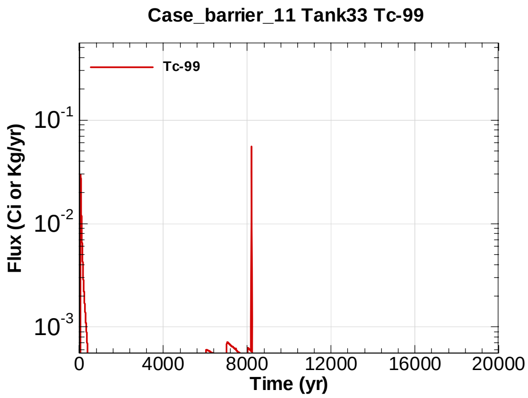

Figure K.11-13 - Water Table Flux for Case_barrier_11 Tank33 Tc-99

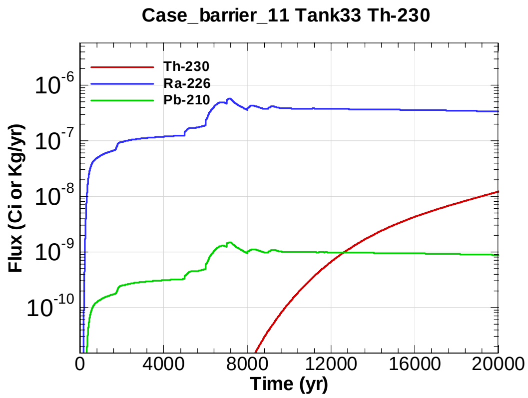

Figure K.11-14 - Water Table Flux for Case_barrier_11 Tank33 Th-230

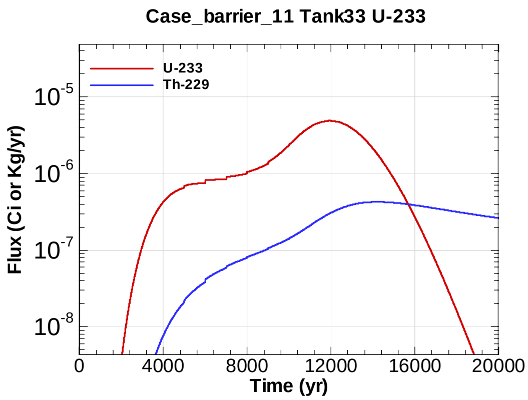

Figure K.11-15 - Water Table Flux for Case_barrier_11 Tank33 U-233

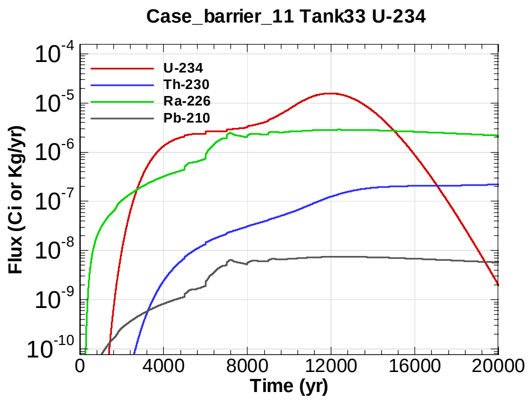

Figure K.11-16 - Water Table Flux for Case_barrier_11 Tank33 U-234

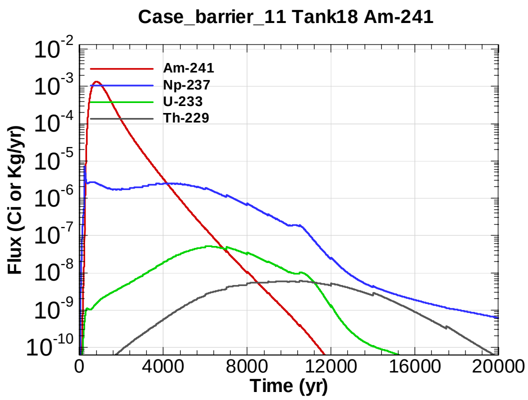

Figure K.11-17 - Water Table Flux for Case_barrier_11 Tank18 Am-241

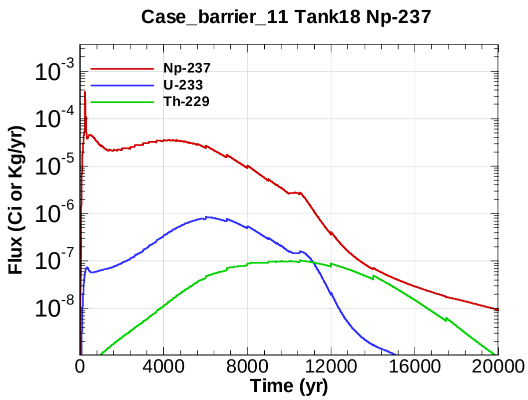

Figure K.11-18 - Water Table Flux for Case_barrier_11 Tank18 Np-237

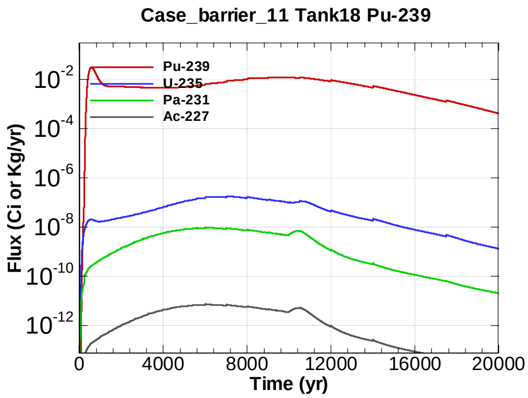

Figure K.11-19 - Water Table Flux for Case_barrier_11 Tank18 Pu-239

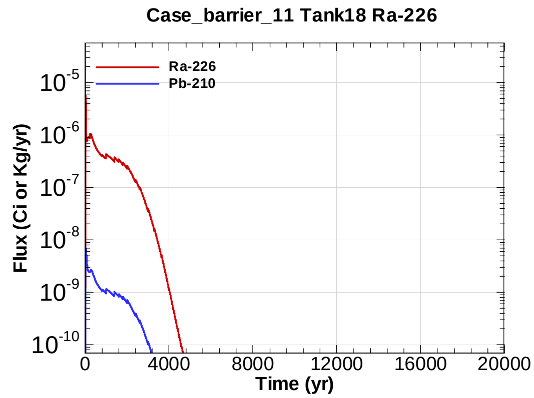

Figure K.11-20 - Water Table Flux for Case_barrier_11 Tank18 Ra-226

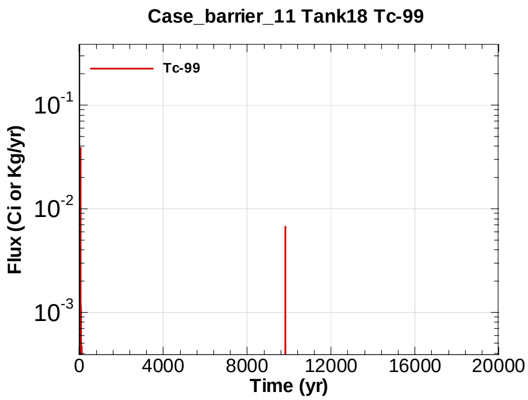

Figure K.11-21 - Water Table Flux for Case_barrier_11 Tank18 Tc-99

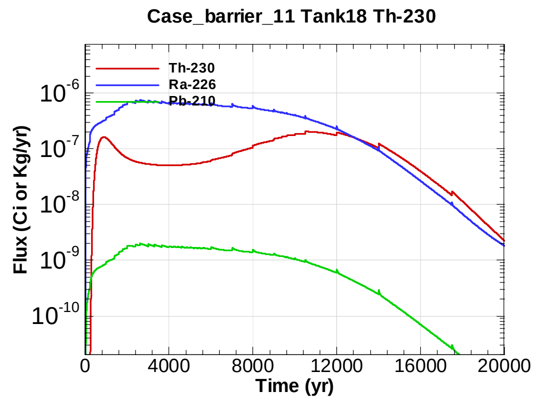

Figure K.11-22 - Water Table Flux for Case_barrier_11 Tank18 Th-230

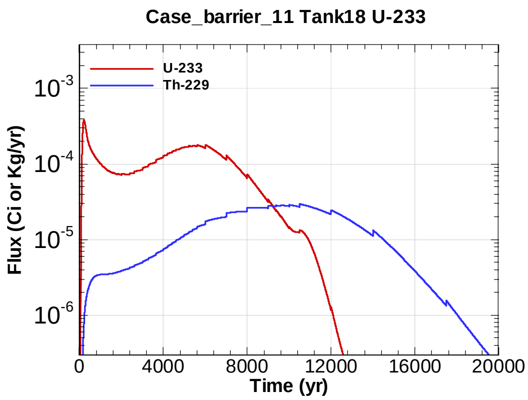

Figure K.11-23 - Water Table Flux for Case_barrier_11 Tank18 U-233

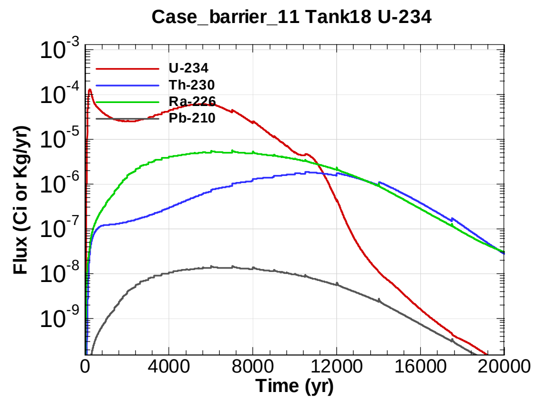

Figure K.11-24 - Water Table Flux for Case_barrier_11 Tank18 U-234

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Appendix K.12
FLUX AT WATER TABLE FOR BARRIER ANALYSIS – BARRIER CASE 12

Appendix K.12 contains curves showing the flux (in Ci/year) at the water table for barrier analysis – Barrier Case 12 for Tanks 5, 18 and 33. The flux is provided for selected radionuclides.

Graph heading example "Case_barrier_12 Tank05 Am-241"

Key

Case_barrier_12 = scenario case/configuration
Tank05 = inventory source is Tank 05
Am-241 = radionuclide or chemical of concern

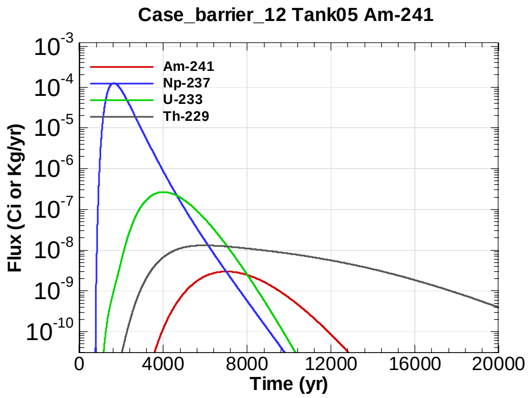

Figure K.12-1 - Water Table Flux for Case_barrier_12 Tank05 Am-241

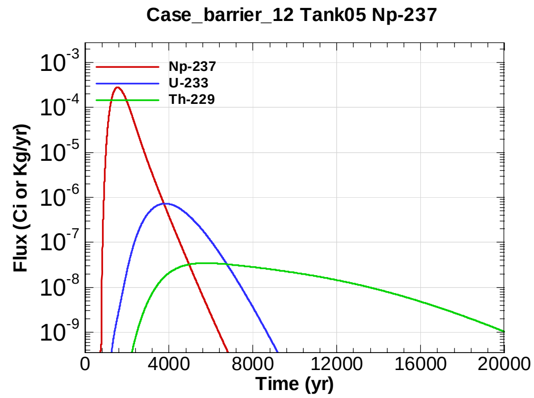

Figure K.12-2 - Water Table Flux for Case_barrier_12 Tank05 Np-237

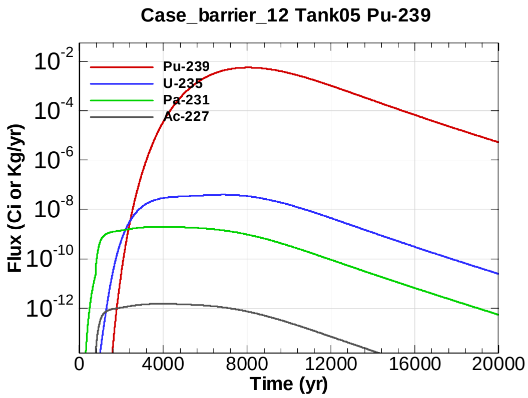

Figure K.12-3 - Water Table Flux for Case_barrier_12 Tank05 Pu-239

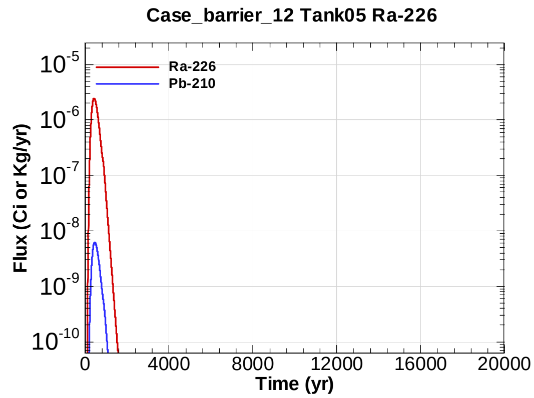

Figure K.12-4 - Water Table Flux for Case_barrier_12 Tank05 Ra-226

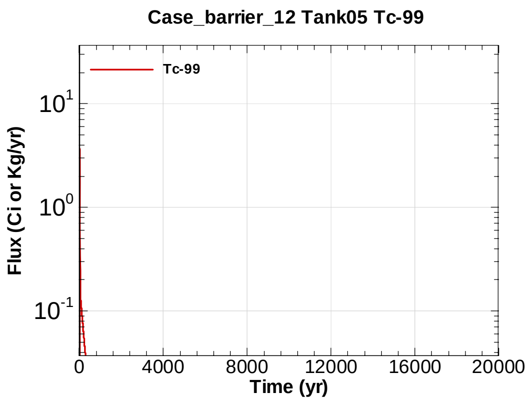

Figure K.12-5 - Water Table Flux for Case_barrier_12 Tank05 Tc-99

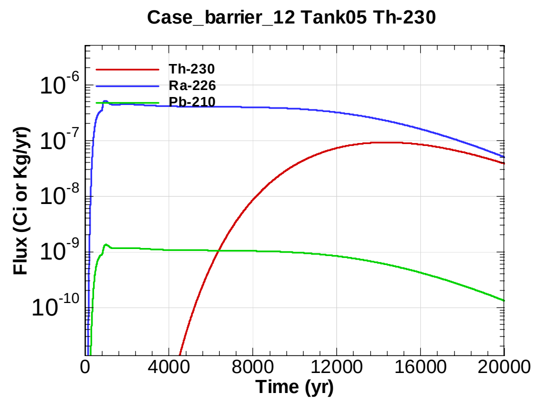

Figure K.12-6 - Water Table Flux for Case_barrier_12 Tank05 Th-230

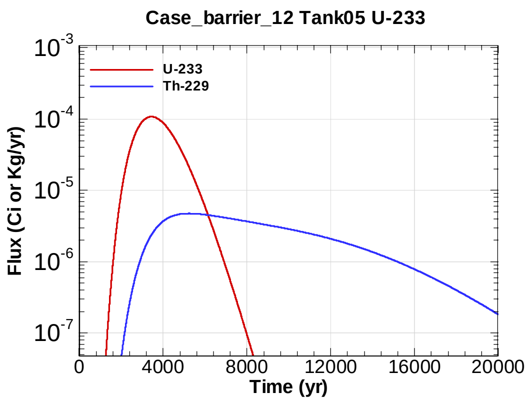

Figure K.12-7 - Water Table Flux for Case_barrier_12 Tank05 U-233

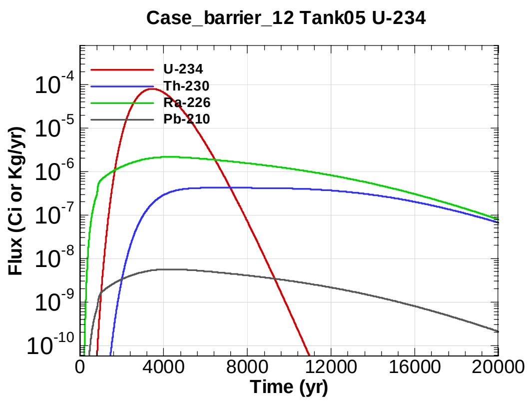

Figure K.12-8 - Water Table Flux for Case_barrier_12 Tank05 U-234

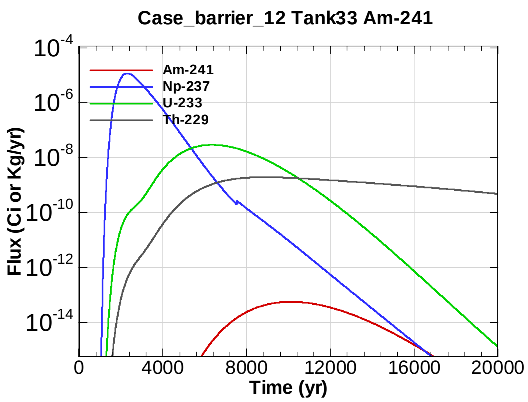

Figure K.12-9 - Water Table Flux for Case_barrier_12 Tank33 Am-241

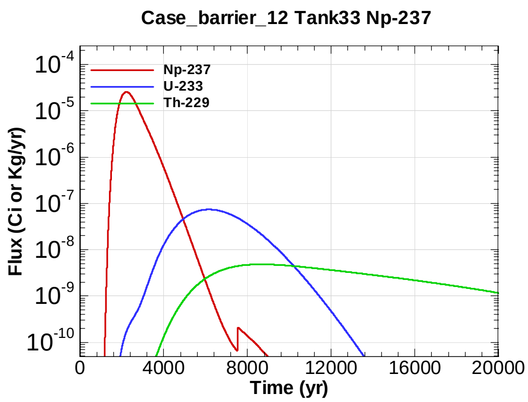

Figure K.12-10 - Water Table Flux for Case_barrier_12 Tank33 Np-237

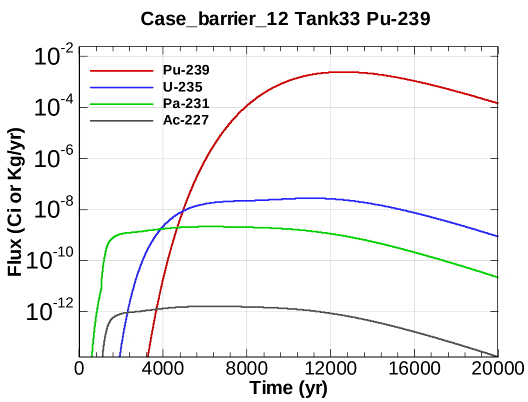

Figure K.12-11 - Water Table Flux for Case_barrier_12 Tank33 Pu-239

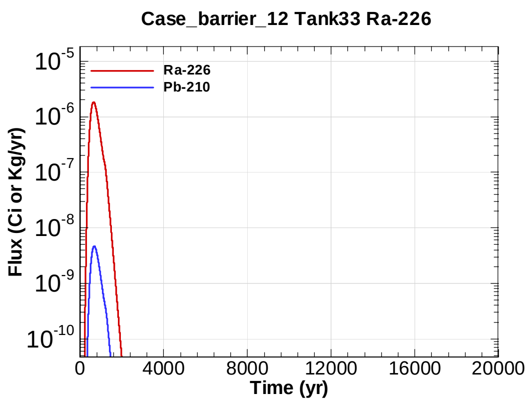

Figure K.12-12 - Water Table Flux for Case_barrier_12 Tank33 Ra-226

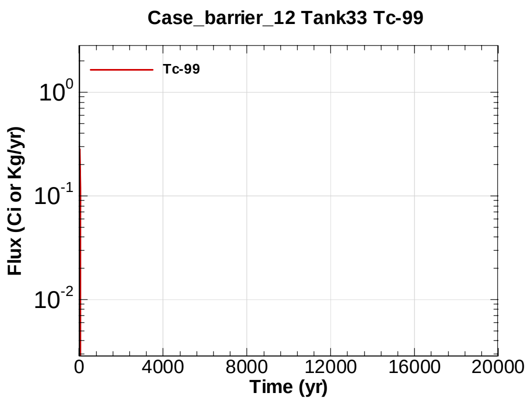

Figure K.12-13 - Water Table Flux for Case_barrier_12 Tank33 Tc-99

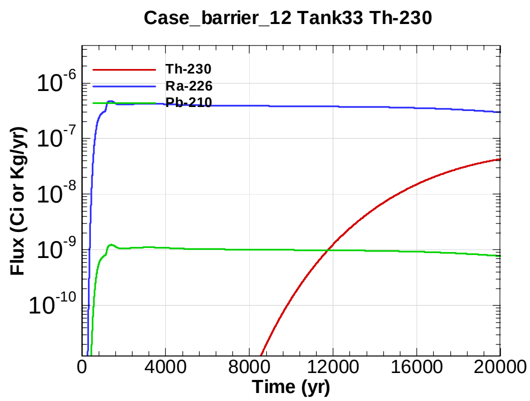

Figure K.12-14 - Water Table Flux for Case_barrier_12 Tank33 Th-230

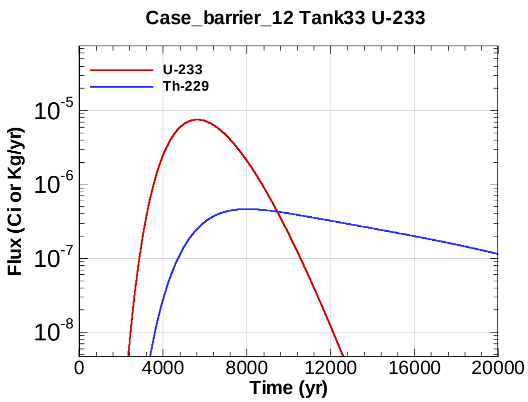

Figure K.12-15 - Water Table Flux for Case_barrier_12 Tank33 U-233

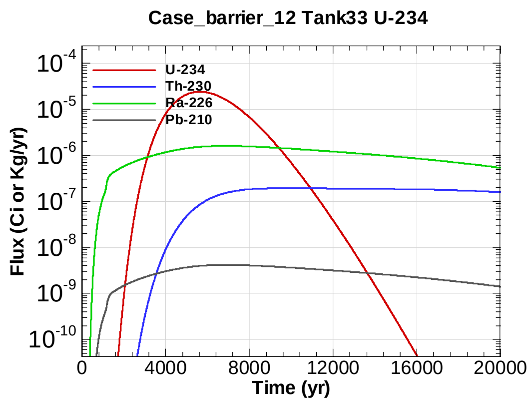

Figure K.12-16 - Water Table Flux for Case_barrier_12 Tank33 U-234

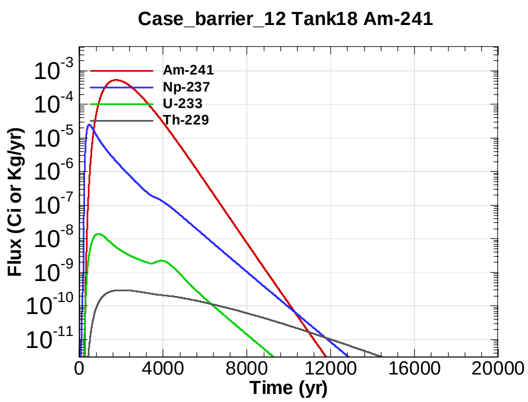

Figure K.12-17 - Water Table Flux for Case_barrier_12 Tank18 Am-241

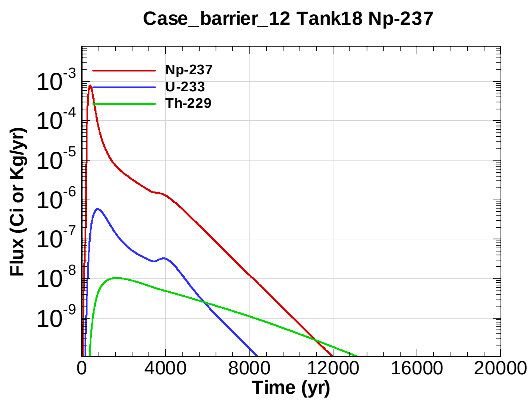

Figure K.12-18 - Water Table Flux for Case_barrier_12 Tank18 Np-237

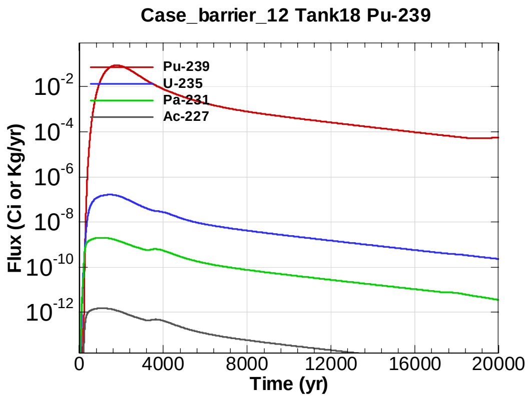

Figure K.12-19 - Water Table Flux for Case_barrier_12 Tank18 Pu-239

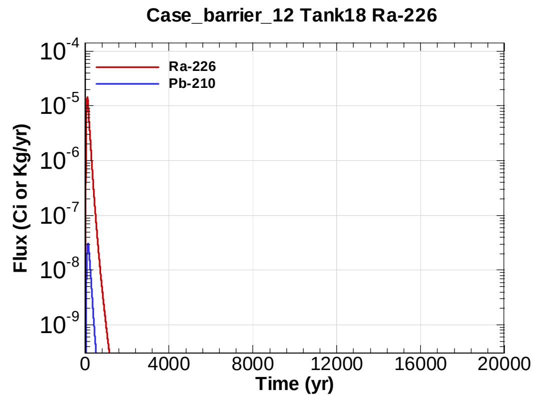

Figure K.12-20 - Water Table Flux for Case_barrier_12 Tank18 Ra-226

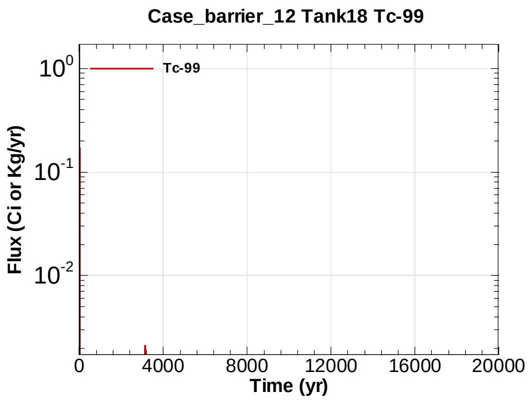

Figure K.12-21 - Water Table Flux for Case_barrier_12 Tank18 Tc-99

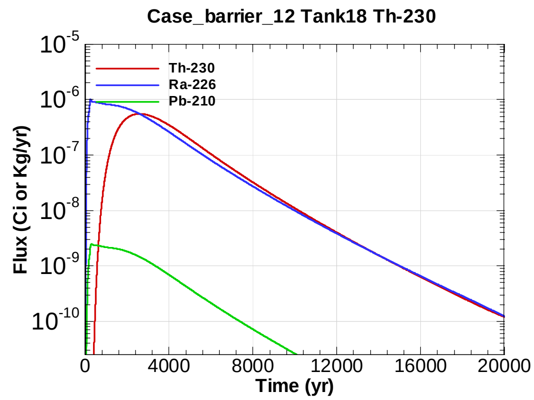

Figure K.12-22 - Water Table Flux for Case_barrier_12 Tank18 Th-230

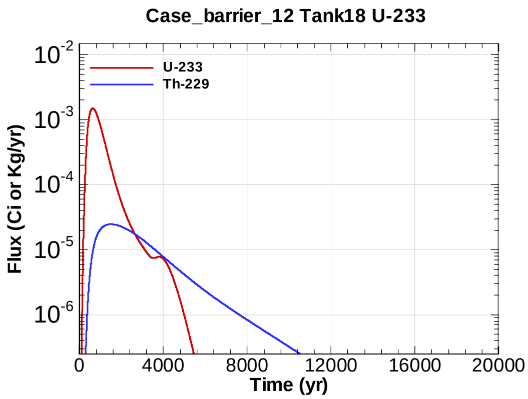

Figure K.12-23 - Water Table Flux for Case_barrier_12 Tank18 U-233

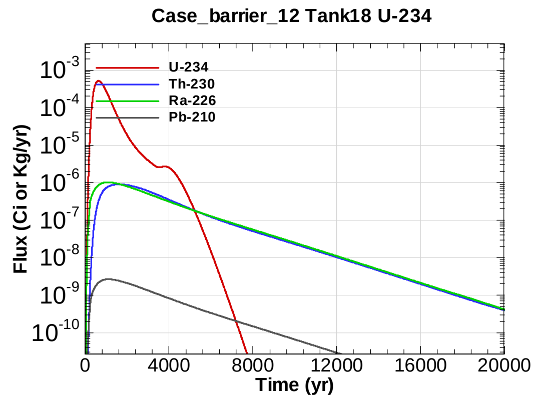

Figure K.12-24 - Water Table Flux for Case_barrier_12 Tank18 U-234

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Appendix K.13
FLUX AT WATER TABLE FOR BARRIER ANALYSIS – BARRIER CASE 13

Appendix K.13 contains curves showing the flux (in Ci/year) at the water table for barrier analysis – Barrier Case 13 for Tanks 5, 18 and 33. The flux is provided for selected radionuclides.

Graph heading example "Case_barrier_13 Tank05 Am-241"

Key

Case_barrier_13 = scenario case/configuration
Tank05 = inventory source is Tank 05
Am-241 = radionuclide or chemical of concern

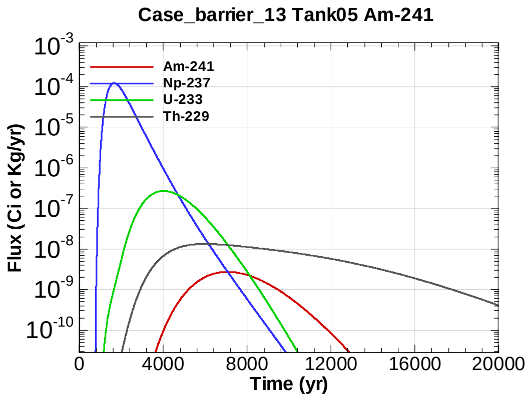

Figure K.13-1 - Water Table Flux for Case_barrier_13 Tank05 Am-241

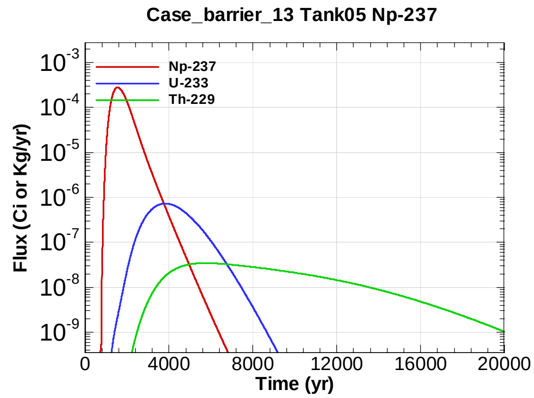

Figure K.13-2 - Water Table Flux for Case_barrier_13 Tank05 Np-237

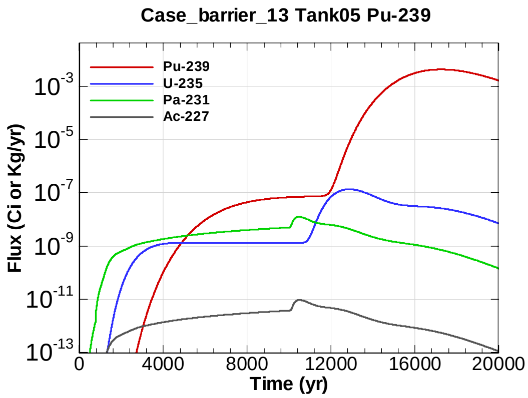

Figure K.13-3 - Water Table Flux for Case_barrier_13 Tank05 Pu-239

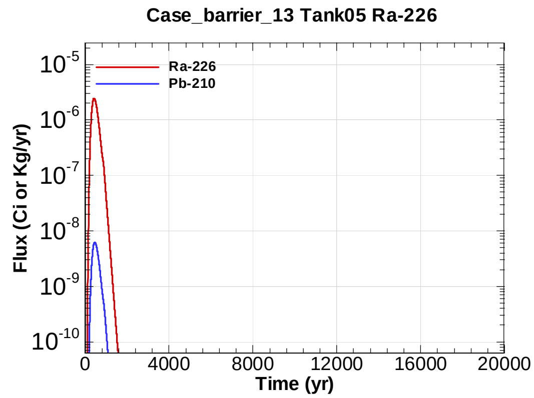

Figure K.13-4 - Water Table Flux for Case_barrier_13 Tank05 Ra-226

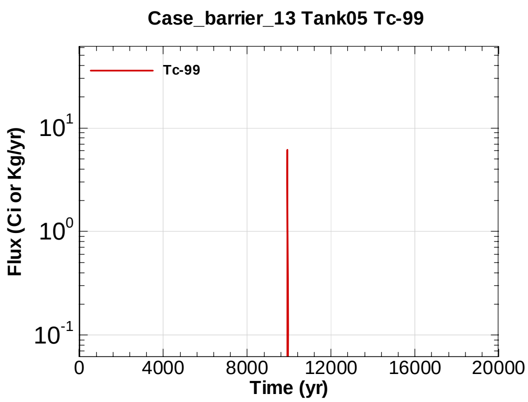

Figure K.13-5 - Water Table Flux for Case_barrier_13 Tank05 Tc-99

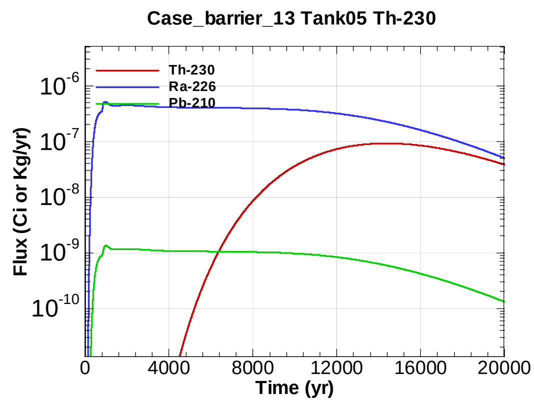

Figure K.13-6 - Water Table Flux for Case_barrier_13 Tank05 Th-230

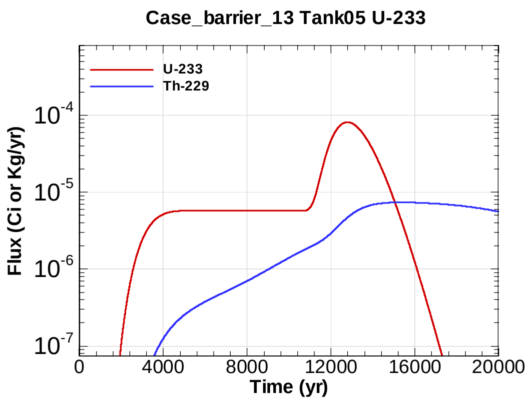

Figure K.13-7 - Water Table Flux for Case_barrier_13 Tank05 U-233

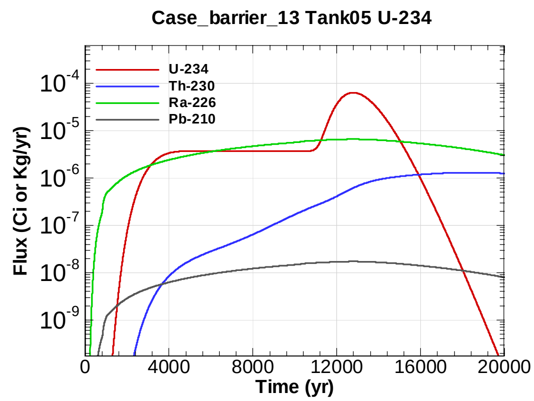

Figure K.13-8 - Water Table Flux for Case_barrier_13 Tank05 U-234

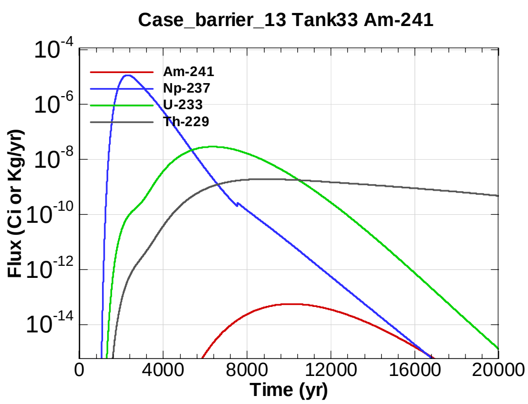

Figure K.13-9 - Water Table Flux for Case_barrier_13 Tank33 Am-241

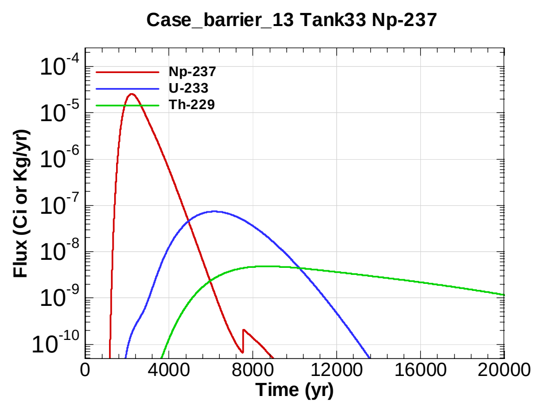

Figure K.13-10 - Water Table Flux for Case_barrier_13 Tank33 Np-237

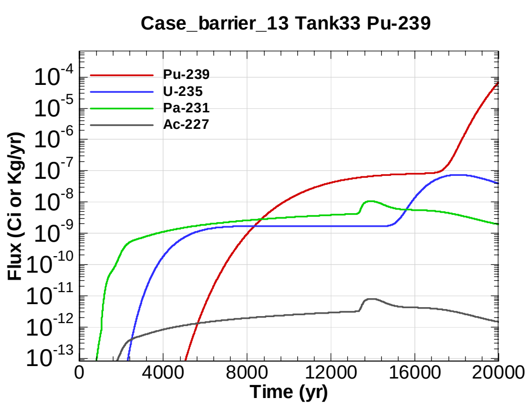

Figure K.13-11 - Water Table Flux for Case_barrier_13 Tank33 Pu-239

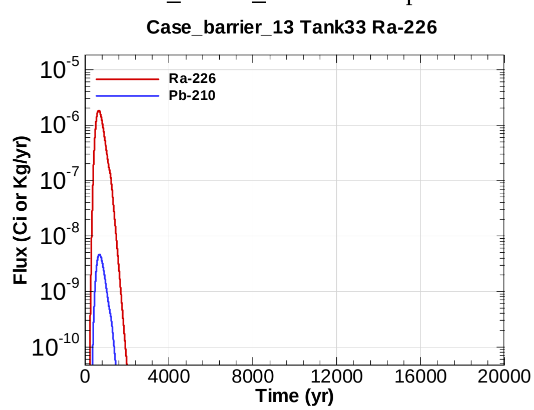

Figure K.13-12 - Water Table Flux for Case_barrier_13 Tank33 Ra-226

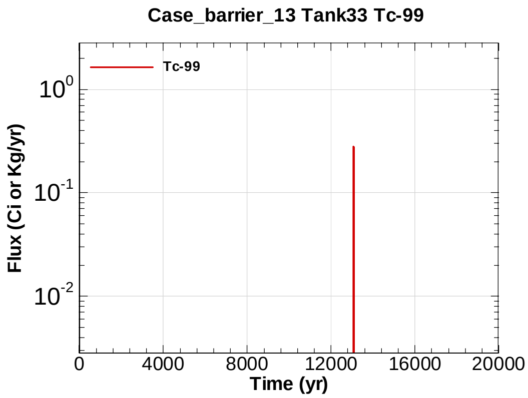

Figure K.13-13 - Water Table Flux for Case_barrier_13 Tank33 Tc-99

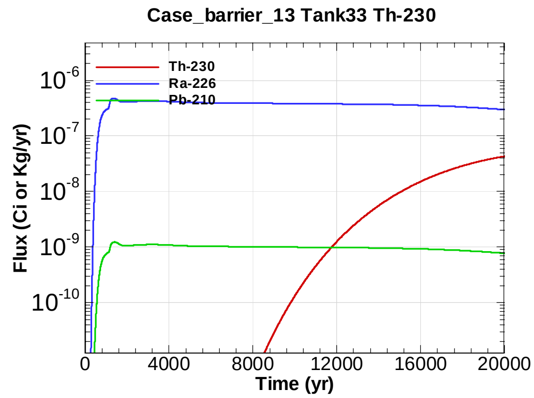

Figure K.13-14 - Water Table Flux for Case_barrier_13 Tank33 Th-230

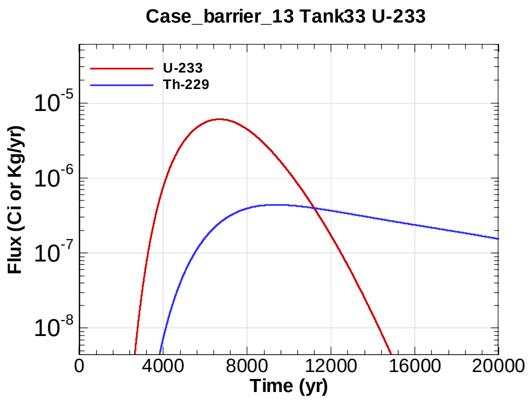

Figure K.13-15 - Water Table Flux for Case_barrier_13 Tank33 U-233

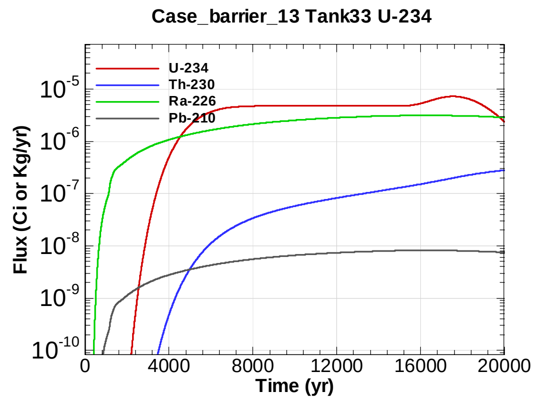

Figure K.13-16 - Water Table Flux for Case_barrier_13 Tank33 U-234

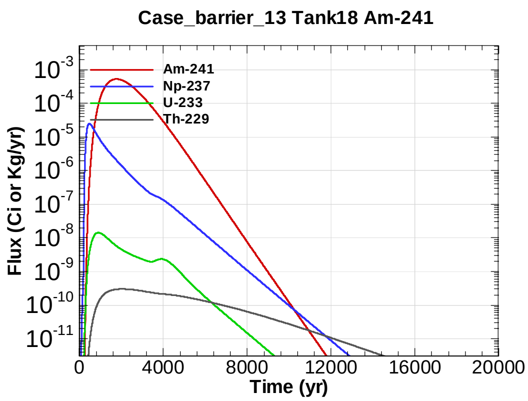

Figure K.13-17 - Water Table Flux for Case_barrier_13 Tank18 Am-241

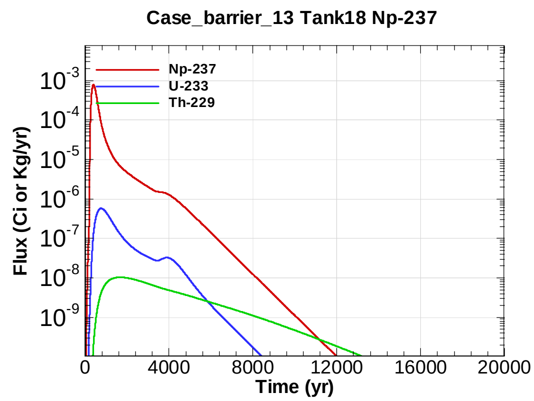

Figure K.13-18 - Water Table Flux for Case_barrier_13 Tank18 Np-237

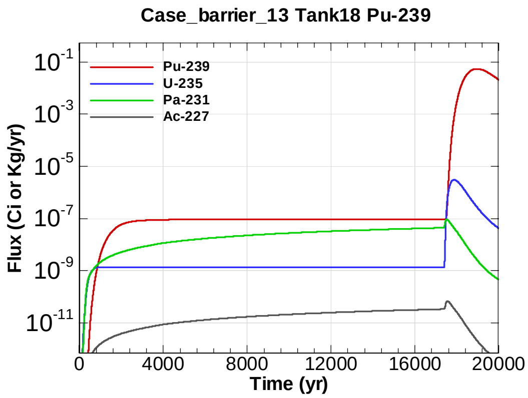

Figure K.13-19 - Water Table Flux for Case_barrier_13 Tank18 Pu-239

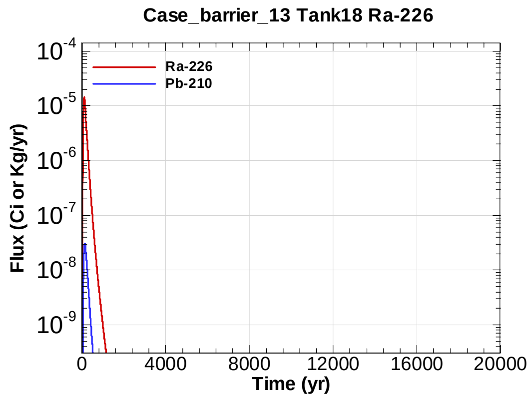

Figure K.13-20 - Water Table Flux for Case_barrier_13 Tank18 Ra-226

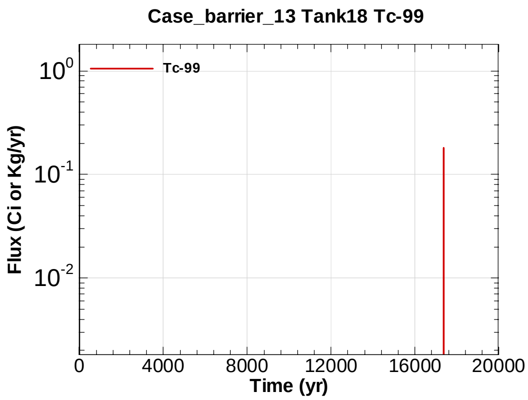

Figure K.13-21 - Water Table Flux for Case_barrier_13 Tank18 Tc-99

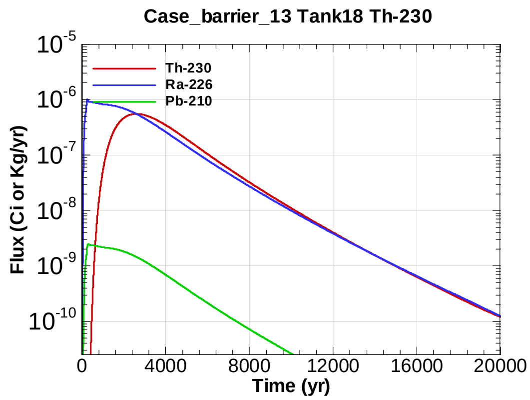

Figure K.13-22 - Water Table Flux for Case_barrier_13 Tank18 Th-230

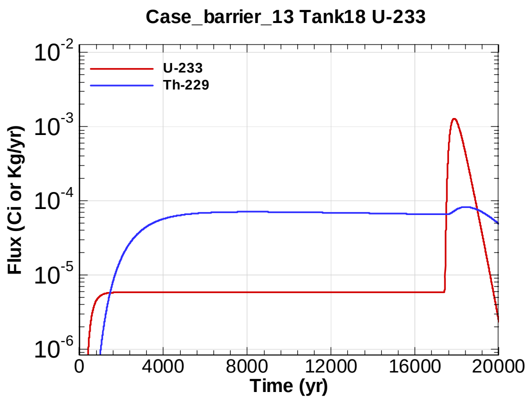

Figure K.13-23 - Water Table Flux for Case_barrier_13 Tank18 U-233

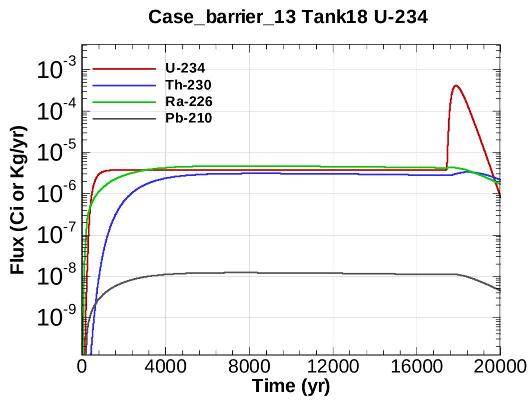

Figure K.13-24 - Water Table Flux for Case_barrier_13 Tank18 U-234

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Appendix K.14
FLUX AT WATER TABLE FOR BARRIER ANALYSIS – BARRIER CASE 14

Appendix K.14 contains curves showing the flux (in Ci/year) at the water table for barrier analysis – Barrier Case 14 for Tanks 5, 18 and 33. The flux is provided for selected radionuclides.

Graph heading example "Case_barrier_14 Tank05 Am-241"

Key

Case_barrier_14 = scenario case/configuration
Tank05 = inventory source is Tank 05
Am-241 = radionuclide or chemical of concern

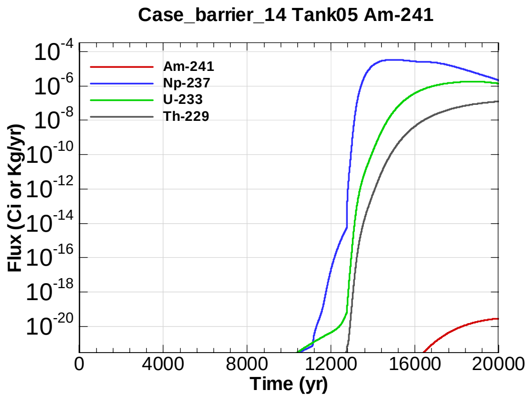

Figure K.14-1 - Water Table Flux for Case_barrier_14 Tank05 Am-241

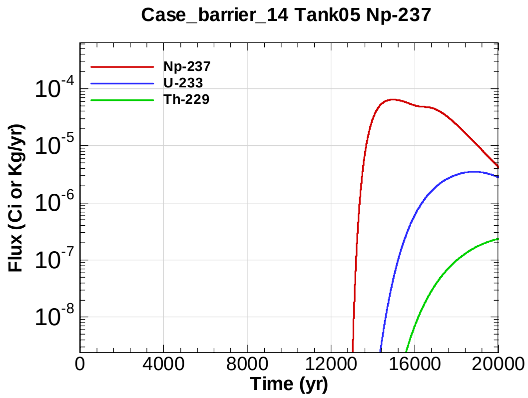

Figure K.14-2 - Water Table Flux for Case_barrier_14 Tank05 Np-237

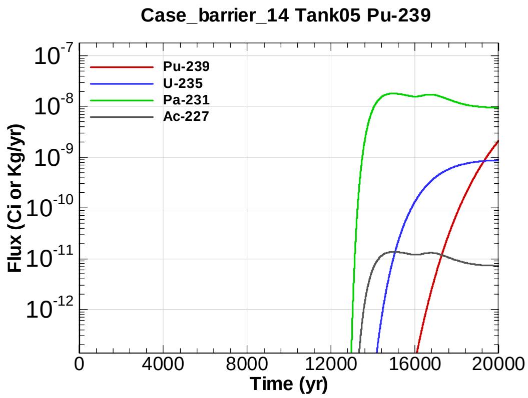

Figure K.14-3 - Water Table Flux for Case_barrier_14 Tank05 Pu-239

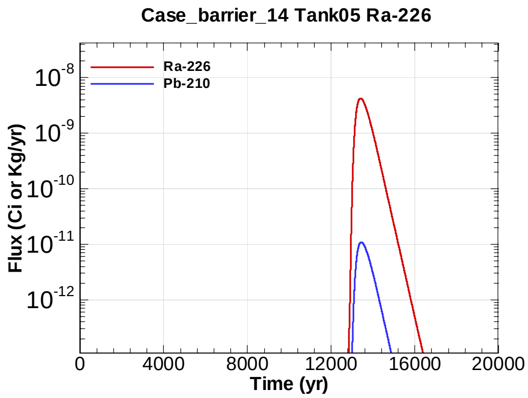

Figure K.14-4 - Water Table Flux for Case_barrier_14 Tank05 Ra-226

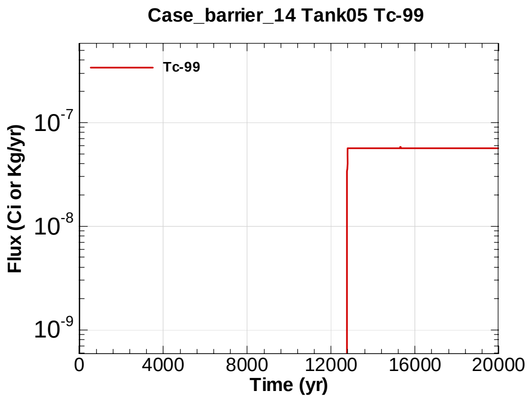

Figure K.14-5 - Water Table Flux for Case_barrier_14 Tank05 Tc-99

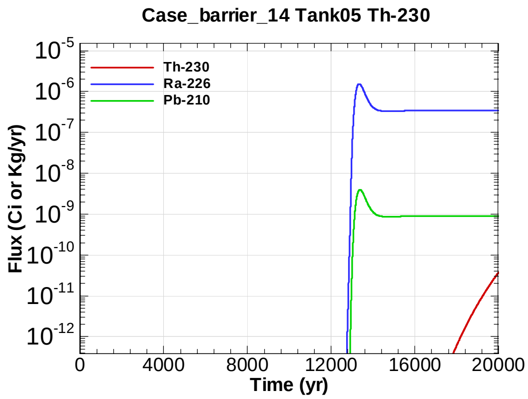

Figure K.14-6 - Water Table Flux for Case_barrier_14 Tank05 Th-230

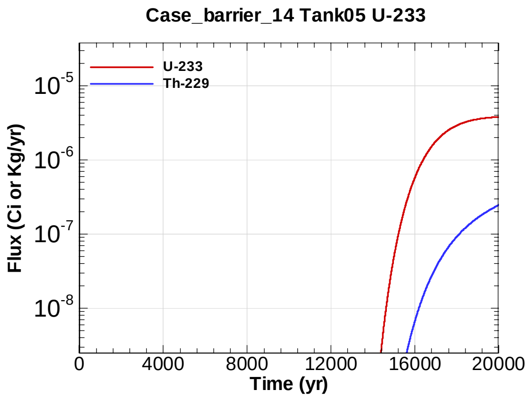

Figure K.14-7 - Water Table Flux for Case_barrier_14 Tank05 U-233

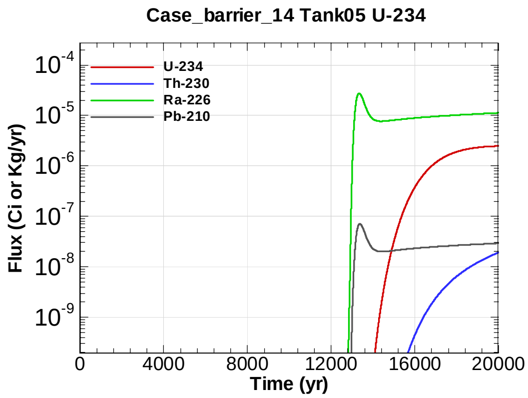

Figure K.14-8 - Water Table Flux for Case_barrier_14 Tank05 U-234

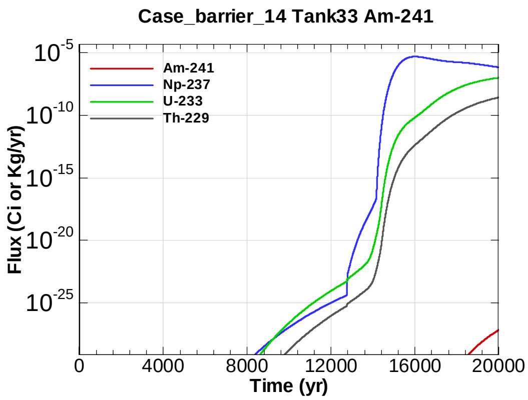

Figure K.14-9 - Water Table Flux for Case_barrier_14 Tank33 Am-241

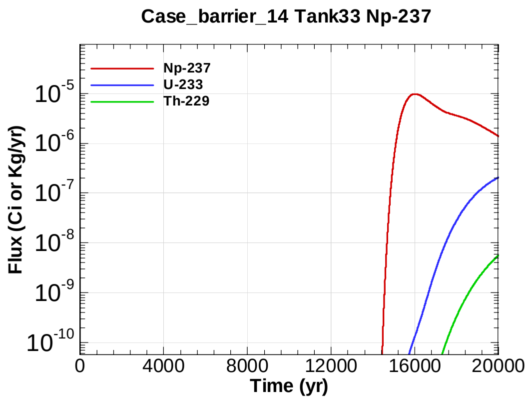

Figure K.14-10 - Water Table Flux for Case_barrier_14 Tank33 Np-237

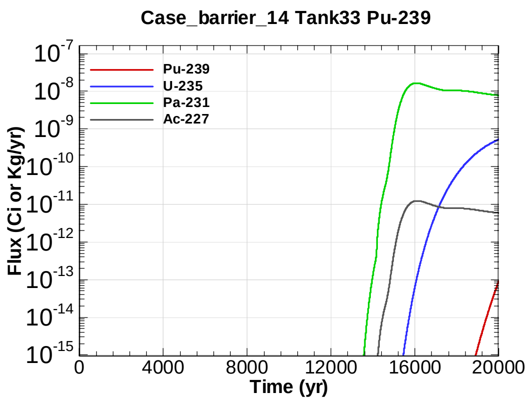

Figure K.14-11 - Water Table Flux for Case_barrier_14 Tank33 Pu-239

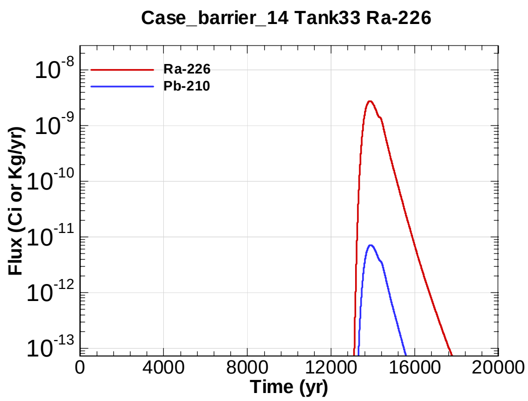

Figure K.14-12 - Water Table Flux for Case_barrier_14 Tank33 Ra-226

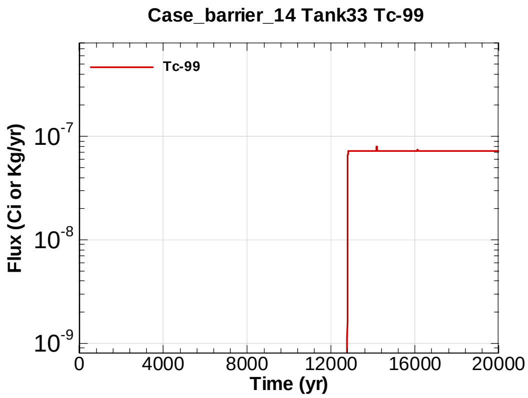

Figure K.14-13 - Water Table Flux for Case_barrier_14 Tank33 Tc-99

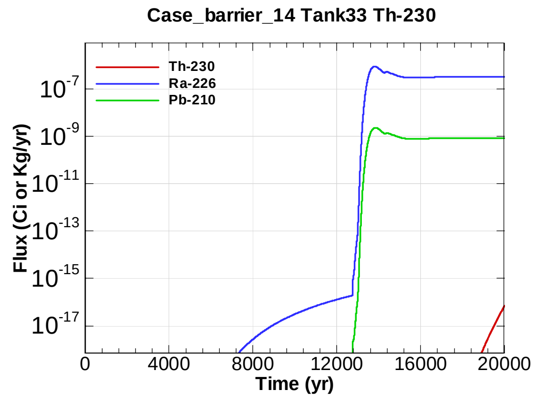

Figure K.14-14 - Water Table Flux for Case_barrier_14 Tank33 Th-230

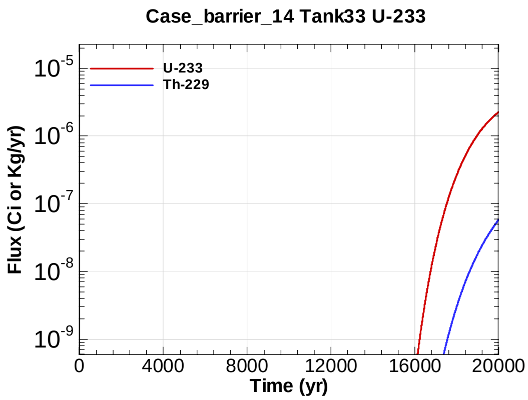

Figure K.14-15 - Water Table Flux for Case_barrier_14 Tank33 U-233

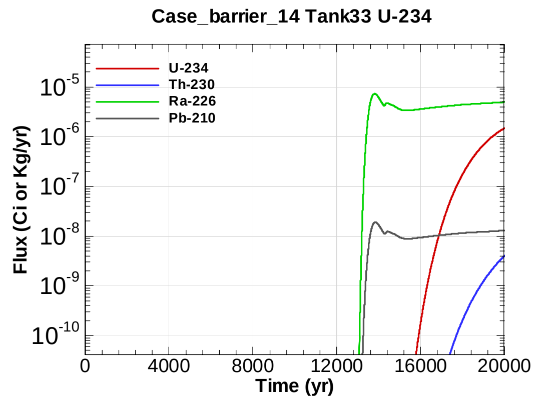

Figure K.14-16 - Water Table Flux for Case_barrier_14 Tank33 U-234

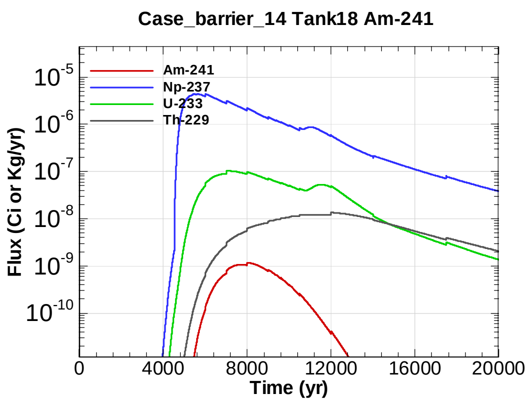

Figure K.14-17 - Water Table Flux for Case_barrier_14 Tank18 Am-241

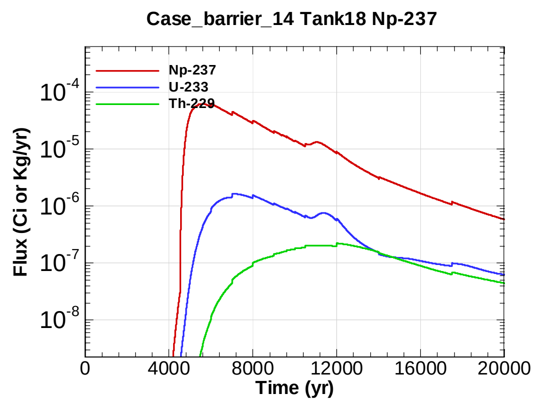

Figure K.14-18 - Water Table Flux for Case_barrier_14 Tank18 Np-237

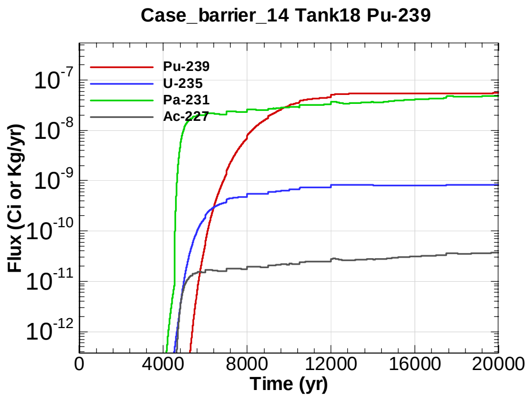

Figure K.14-19 - Water Table Flux for Case_barrier_14 Tank18 Pu-239

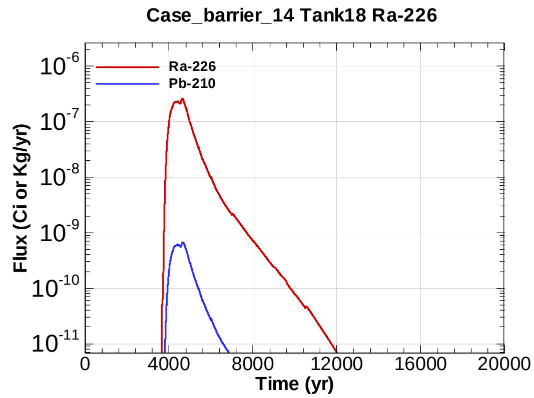

Figure K.14-20 - Water Table Flux for Case_barrier_14 Tank18 Ra-226

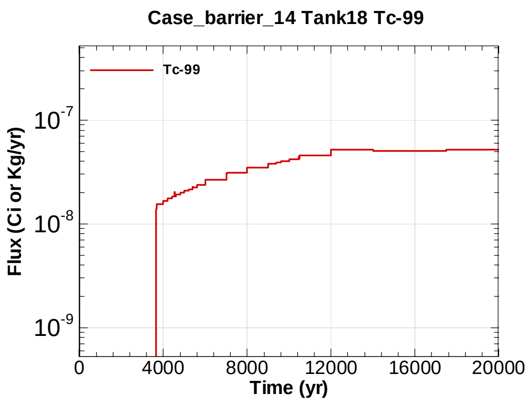

Figure K.14-21 - Water Table Flux for Case_barrier_14 Tank18 Tc-99

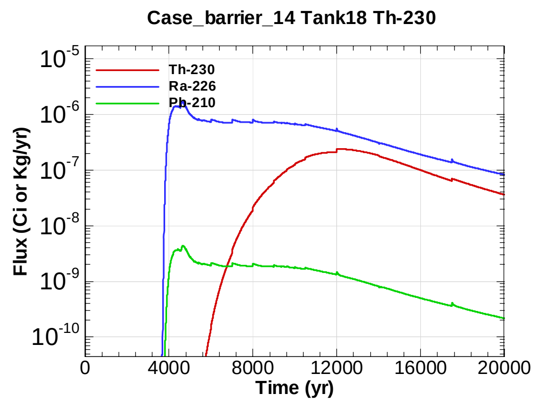

Figure K.14-22 - Water Table Flux for Case_barrier_14 Tank18 Th-230

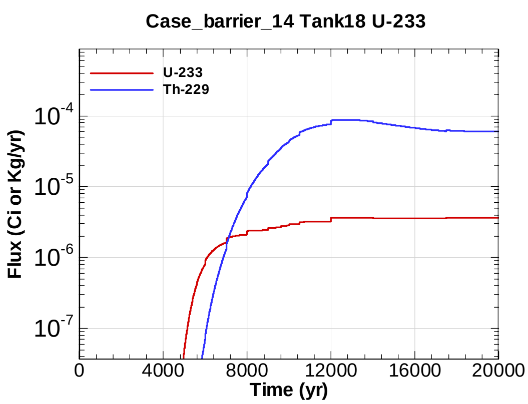

Figure K.14-23 - Water Table Flux for Case_barrier_14 Tank18 U-233

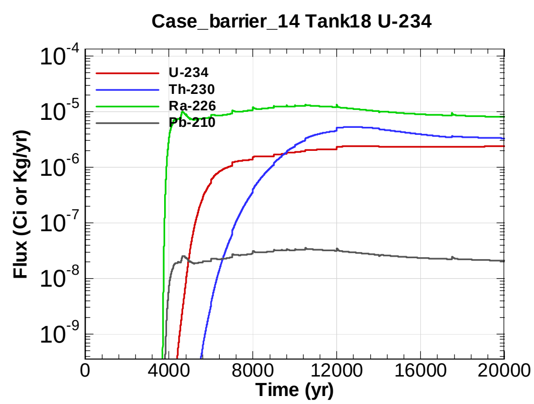

Figure K.14-24 - Water Table Flux for Case_barrier_14 Tank18 U-234

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Appendix K.15
FLUX AT WATER TABLE FOR BARRIER ANALYSIS – BARRIER CASE 15

Appendix K.15 contains curves showing the flux (in Ci/year) at the water table for barrier analysis – Barrier Case 15 for Tanks 5, 18 and 33. The flux is provided for selected radionuclides.

Graph heading example "Case_barrier_15 Tank05 Am-241"

Key

Case_barrier_15 = scenario case/configuration
Tank05 = inventory source is Tank 05
Am-241 = radionuclide or chemical of concern

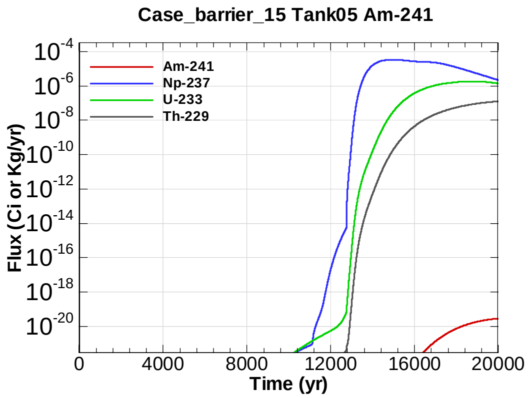

Figure K.15-1 - Water Table Flux for Case_barrier_15 Tank05 Am-241

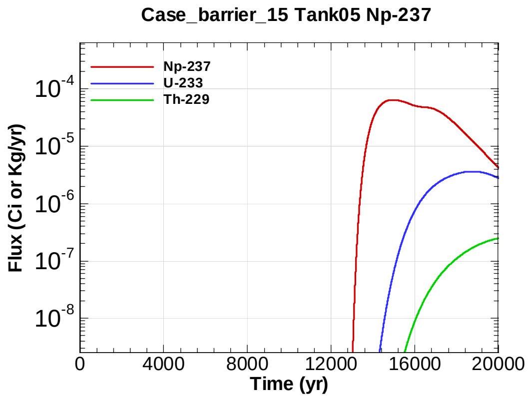

Figure K.15-2 - Water Table Flux for Case_barrier_15 Tank05 Np-237

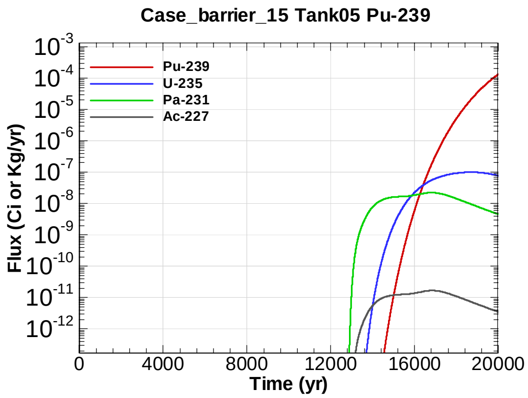

Figure K.15-3 - Water Table Flux for Case_barrier_15 Tank05 Pu-239

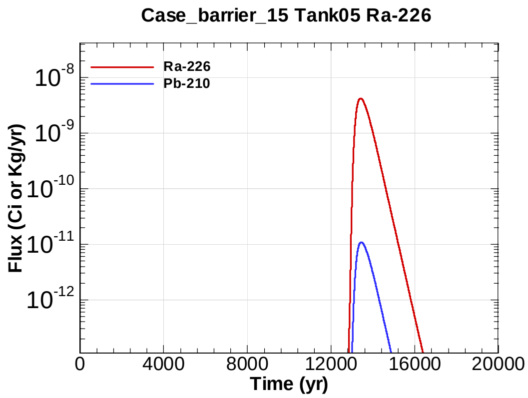

Figure K.15-4 - Water Table Flux for Case_barrier_15 Tank05 Ra-226

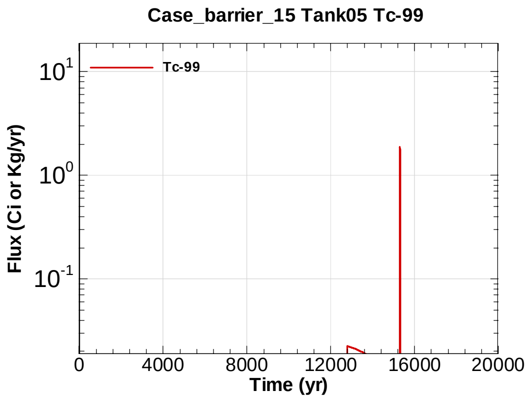

Figure K.15-5 - Water Table Flux for Case_barrier_15 Tank05 Tc-99

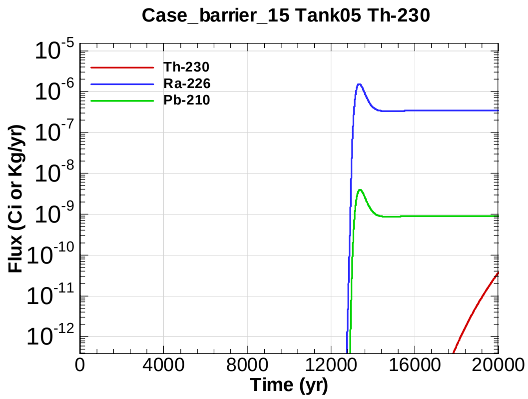

Figure K.15-6 - Water Table Flux for Case_barrier_15 Tank05 Th-230

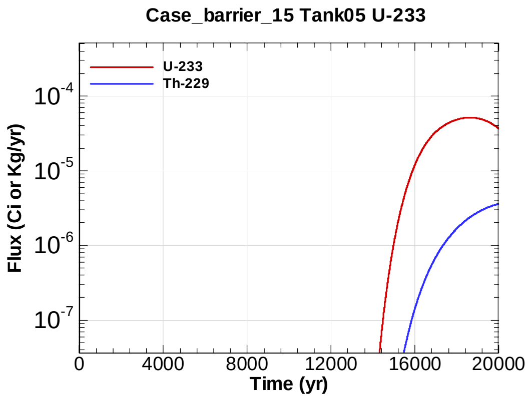

Figure K.15-7 - Water Table Flux for Case_barrier_15 Tank05 U-233

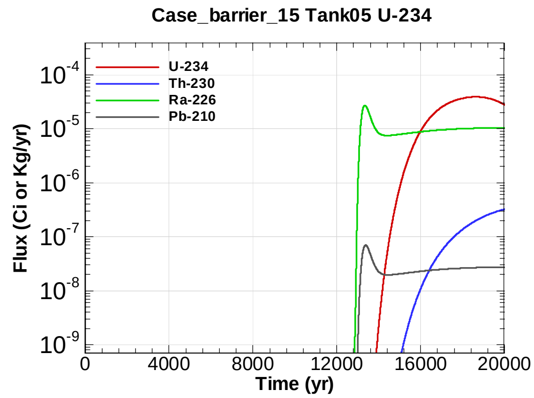

Figure K.15-8 - Water Table Flux for Case_barrier_15 Tank05 U-234

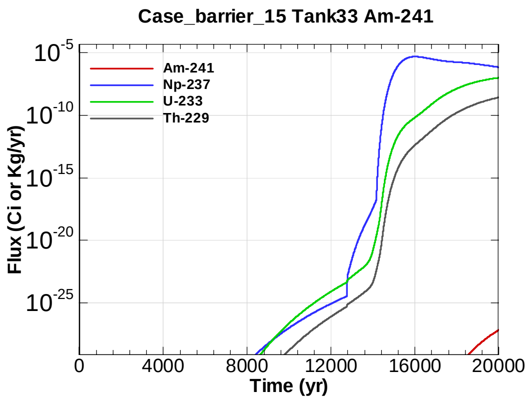

Figure K.15-9 - Water Table Flux for Case_barrier_15 Tank33 Am-241

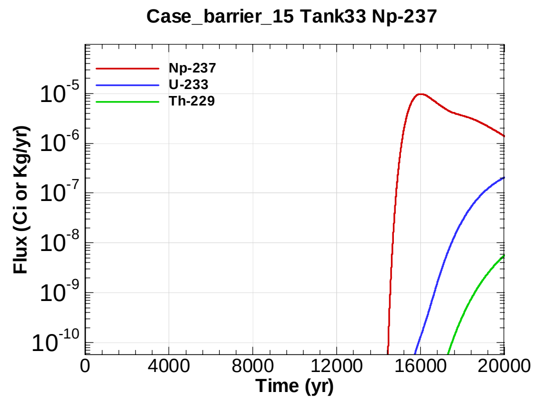

Figure K.15-10 - Water Table Flux for Case_barrier_15 Tank33 Np-237

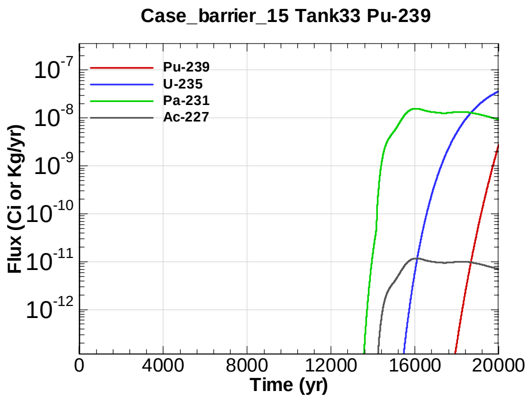

Figure K.15-11 - Water Table Flux for Case_barrier_15 Tank33 Pu-239

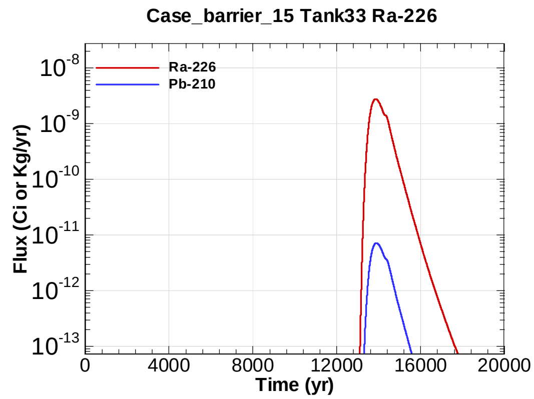

Figure K.15-12 - Water Table Flux for Case_barrier_15 Tank33 Ra-226

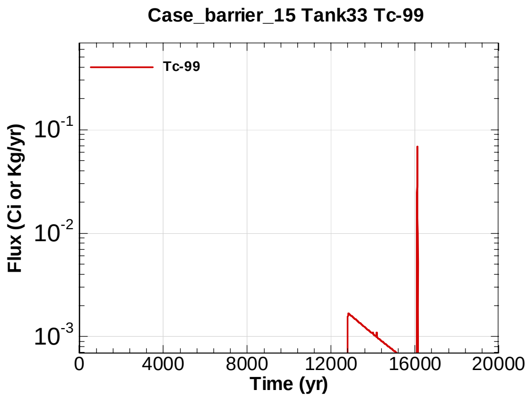

Figure K.15-13 - Water Table Flux for Case_barrier_15 Tank33 Tc-99

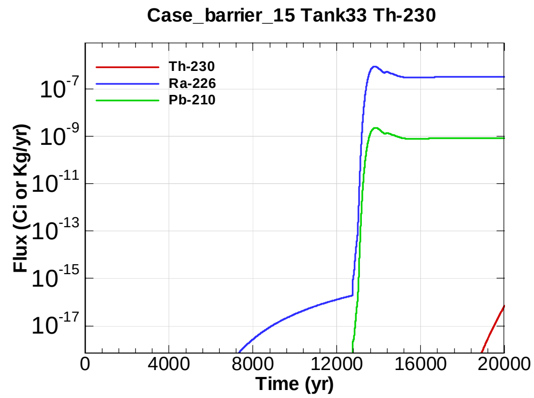

Figure K.15-14 - Water Table Flux for Case_barrier_15 Tank33 Th-230

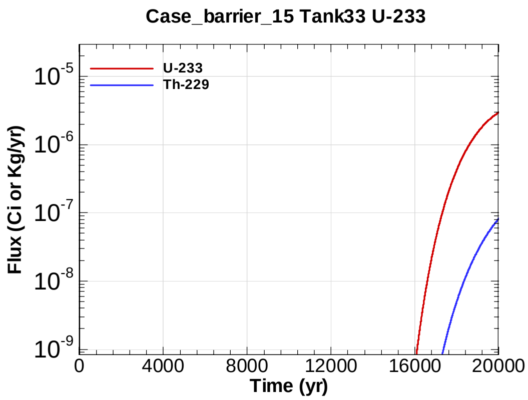

Figure K.15-15 - Water Table Flux for Case_barrier_15 Tank33 U-233

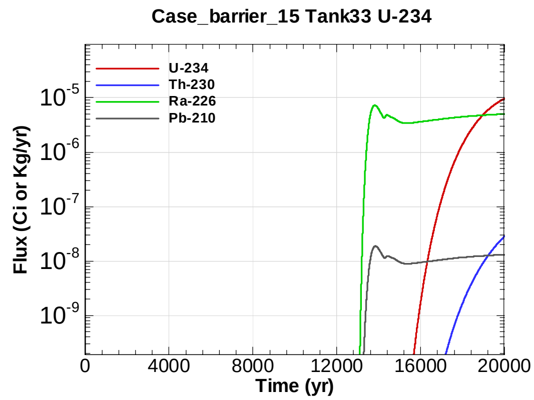

Figure K.15-16 - Water Table Flux for Case_barrier_15 Tank33 U-234

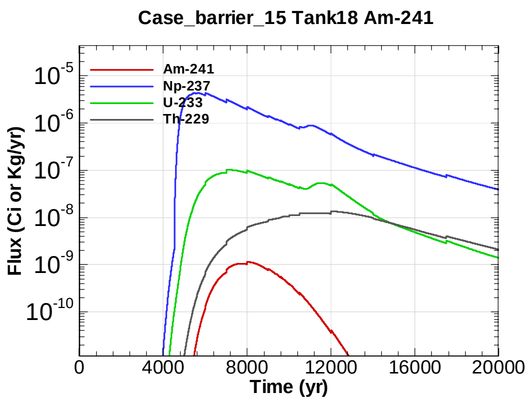

Figure K.15-17 - Water Table Flux for Case_barrier_15 Tank18 Am-241

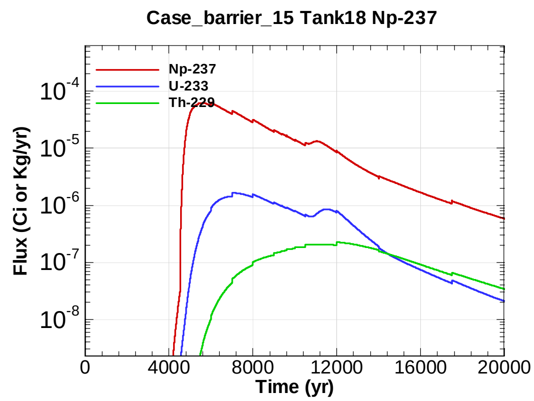

Figure K.15-18 - Water Table Flux for Case_barrier_15 Tank18 Np-237

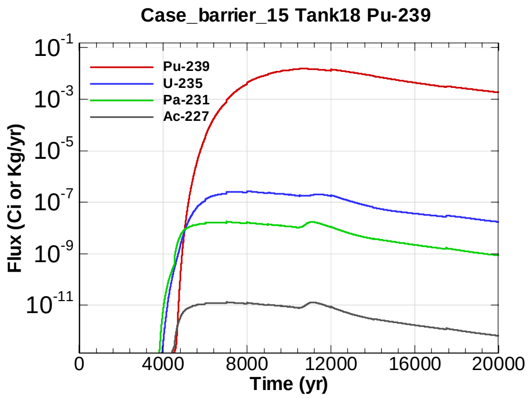

Figure K.15-19 - Water Table Flux for Case_barrier_15 Tank18 Pu-239

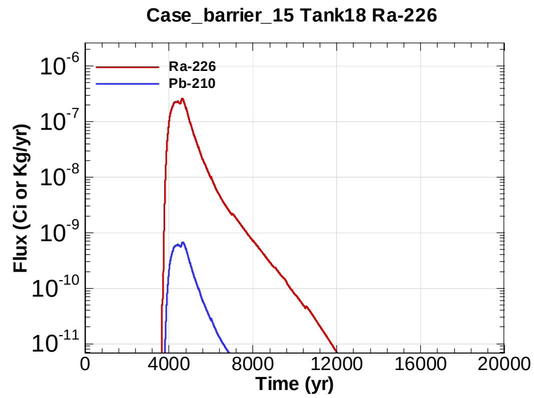

Figure K.15-20 - Water Table Flux for Case_barrier_15 Tank18 Ra-226

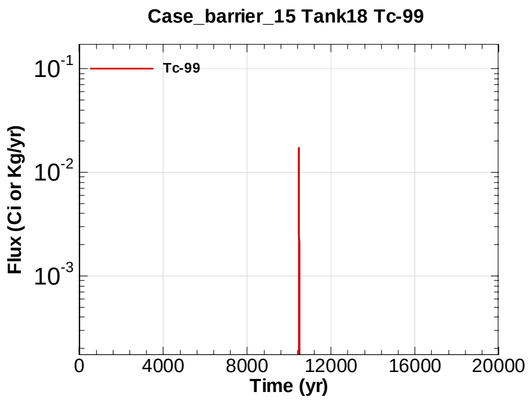

Figure K.15-21 - Water Table Flux for Case_barrier_15 Tank18 Tc-99

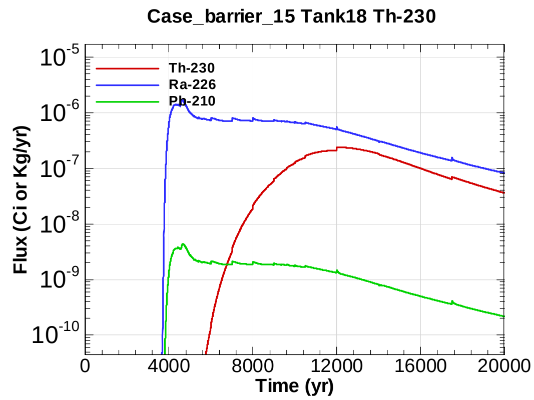

Figure K.15-22 - Water Table Flux for Case_barrier_15 Tank18 Th-230

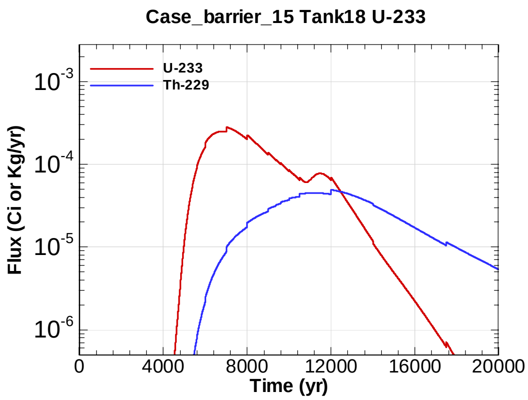

Figure K.15-23 - Water Table Flux for Case_barrier_15 Tank18 U-233

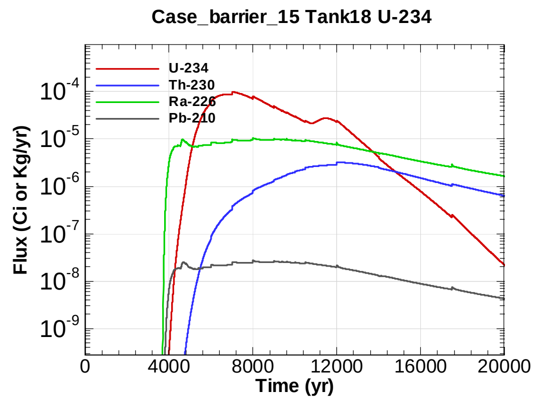

Figure K.15-24 - Water Table Flux for Case_barrier_15 Tank18 U-234

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Appendix L
100-METER SENSITIVITY RUN RADIONUCLIDE CONCENTRATIONS FOR CASE D

Appendix L contains curves showing the one-hundred meter radiological concentrations (sensitivity run radionuclides only) for the Base Case (Case/Configuration D). 20,000 year concentration results are presented from the three aquifers of concern (Upper Three Runs Aquifer-Upper Zone, Upper Three Runs-Lower Zone, and Gordon Aquifer) for Sectors A through E.

Graph heading example "CaseD All Am-241 A_UA"

Key

CaseD = scenario case/configuration
All = all FTF inventory source
Am-241 = radionuclide of concern
A = sector of concern (see sector map with stream traces)
UA = aquifer of concern
- UA = Upper Three Runs – Upper Zone
- LA = Upper Three Runs – Lower Zone
- GA = Gordon

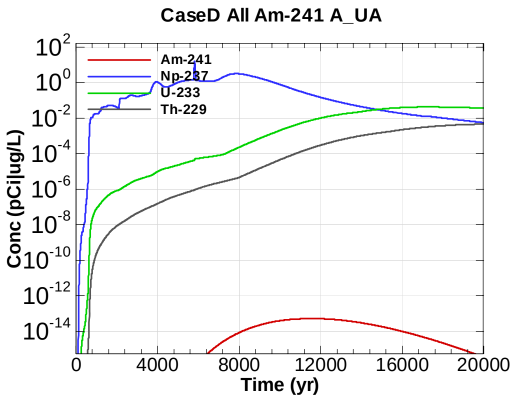

Figure L-1 - 100m Aquifer Concentration for CaseD All Am-241 A_UA

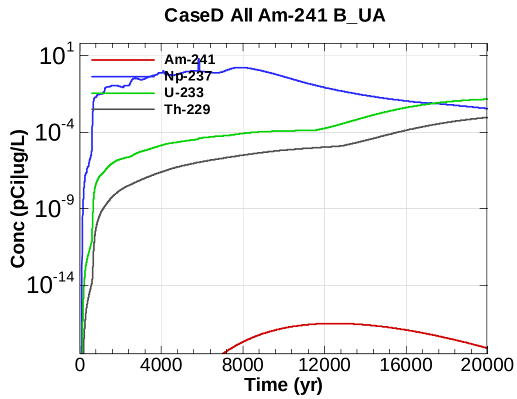

Figure L-2 - 100m Aquifer Concentration for CaseD All Am-241 B_UA

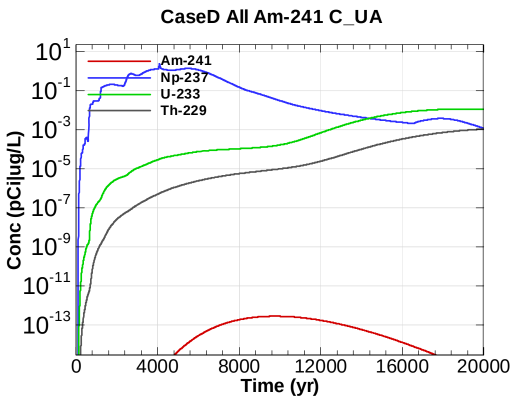

Figure L-3 - 100m Aquifer Concentration for CaseD All Am-241 C_UA

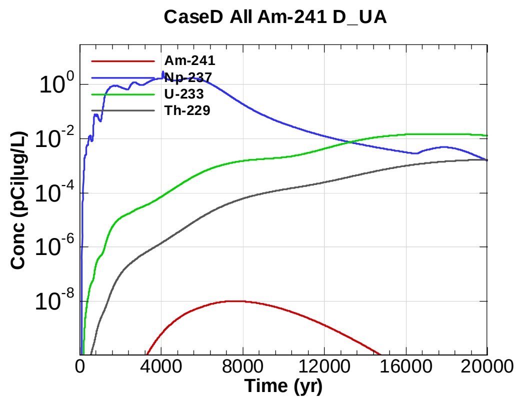

Figure L-4 - 100m Aquifer Concentration for CaseD All Am-241 D_UA

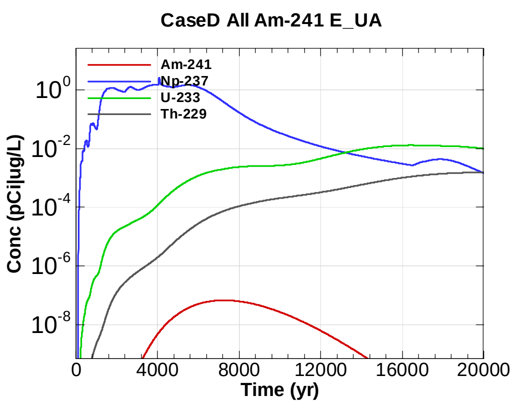

Figure L-5 - 100m Aquifer Concentration for CaseD All Am-241 E_UA

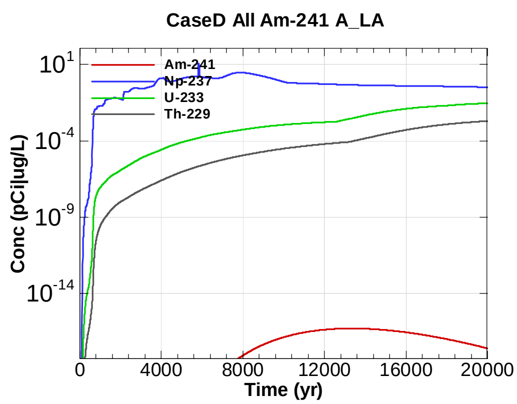

Figure L-6 - 100m Aquifer Concentration for CaseD All Am-241 A_LA

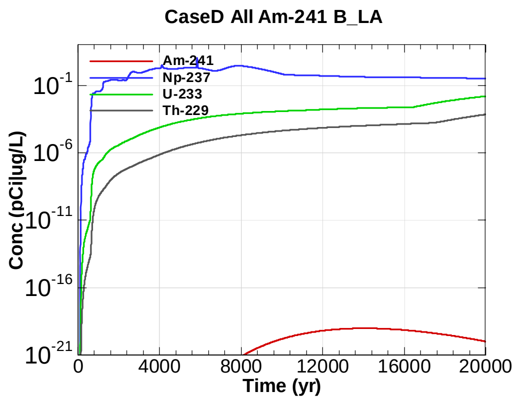

Figure L-7 - 100m Aquifer Concentration for CaseD All Am-241 B_LA

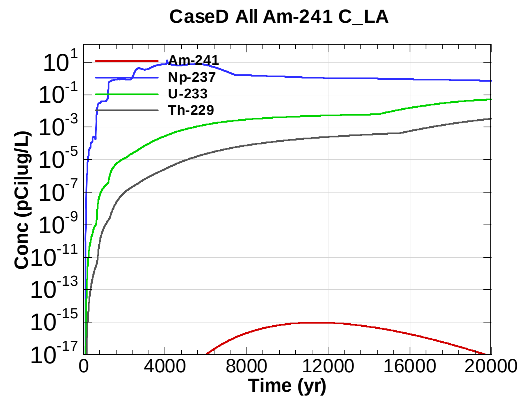

Figure L-8 - 100m Aquifer Concentration for CaseD All Am-241 C_LA

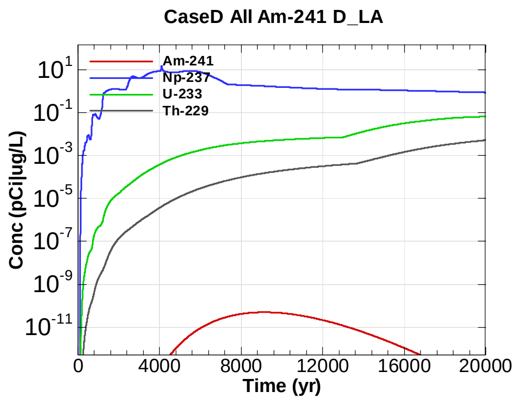

Figure L-9 - 100m Aquifer Concentration for CaseD All Am-241 D_LA

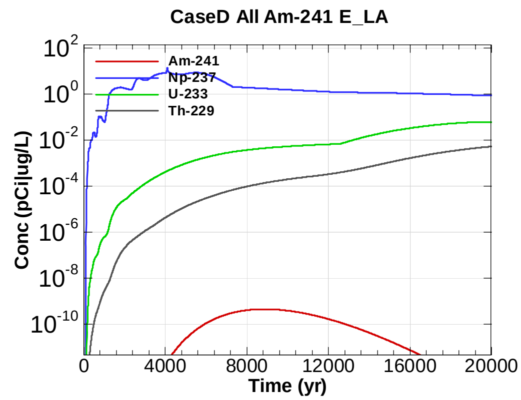

Figure L-10 - 100m Aquifer Concentration for CaseD All Am-241 E_LA

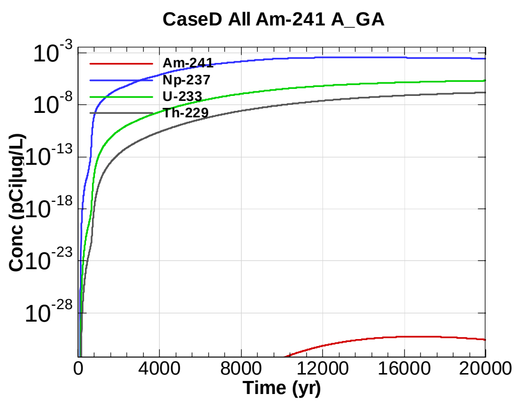

Figure L-11 - 100m Aquifer Concentration for CaseD All Am-241 A_GA

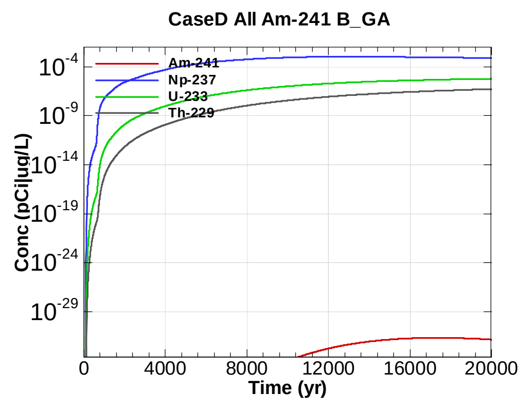

Figure L-12 - 100m Aquifer Concentration for CaseD All Am-241 B_GA

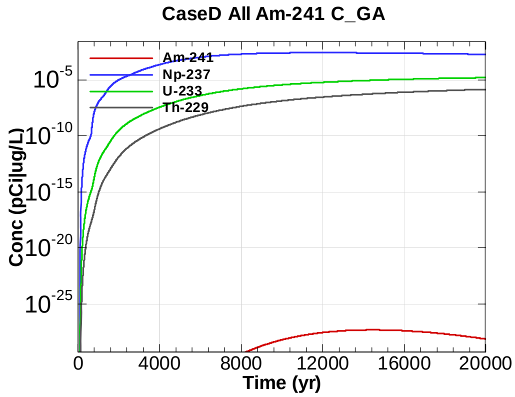

Figure L-13 - 100m Aquifer Concentration for CaseD All Am-241 C_GA

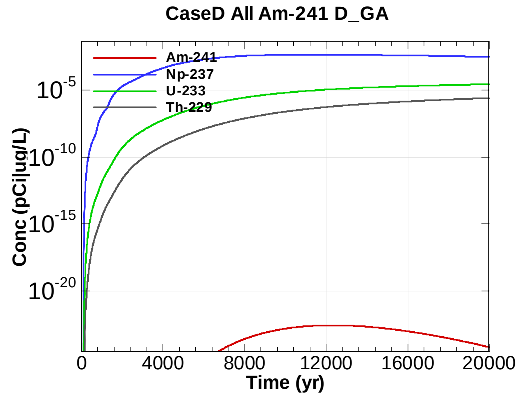

Figure L-14 - 100m Aquifer Concentration for CaseD All Am-241 D_GA

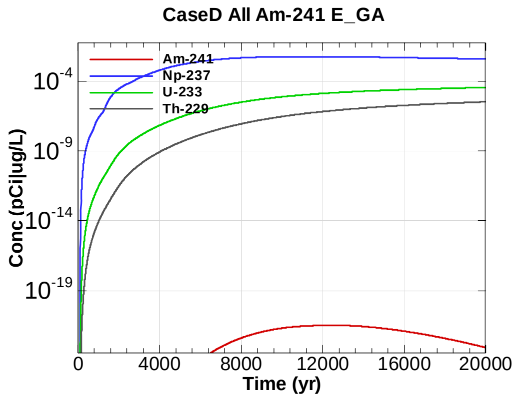

Figure L-15 - 100m Aquifer Concentration for CaseD All Am-241 E_GA

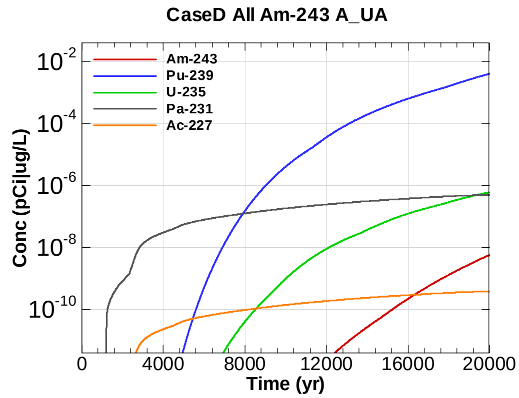

Figure L-16 - 100m Aquifer Concentration for CaseD All Am-243 A_UA

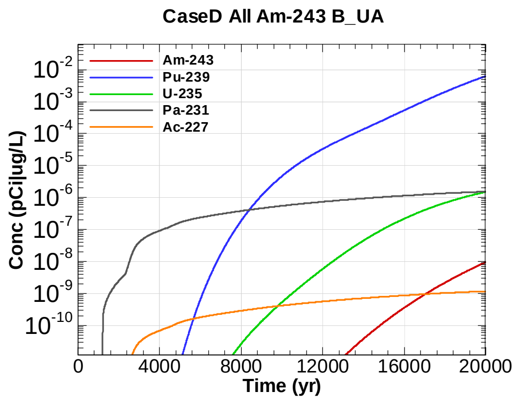

Figure L-17 - 100m Aquifer Concentration for CaseD All Am-243 B_UA

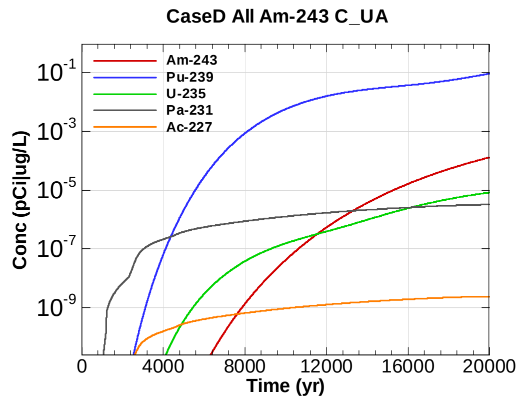

Figure L-18 - 100m Aquifer Concentration for CaseD All Am-243 C_UA

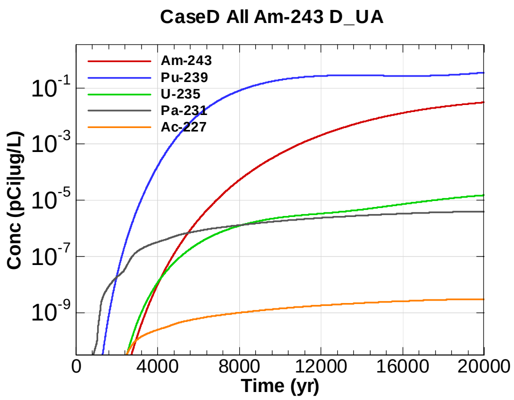

Figure L-19 - 100m Aquifer Concentration for CaseD All Am-243 D_UA

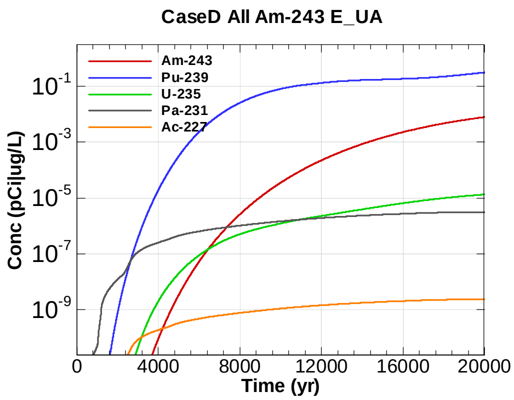

Figure L-20 - 100m Aquifer Concentration for CaseD All Am-243 E_UA

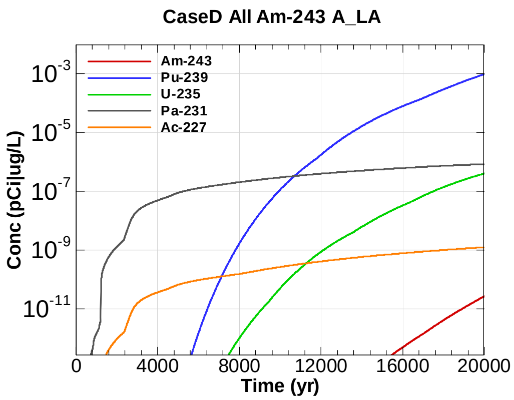

Figure L-21 - 100m Aquifer Concentration for CaseD All Am-243 A_LA

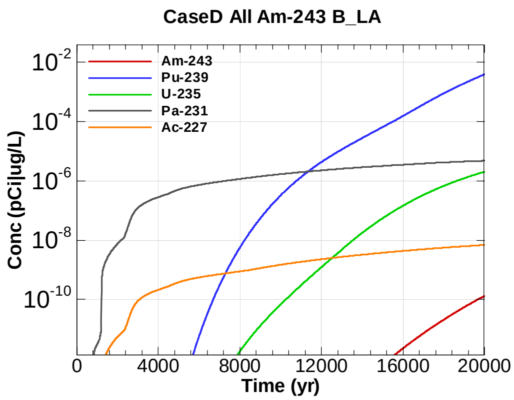

Figure L-22 - 100m Aquifer Concentration for CaseD All Am-243 B_LA

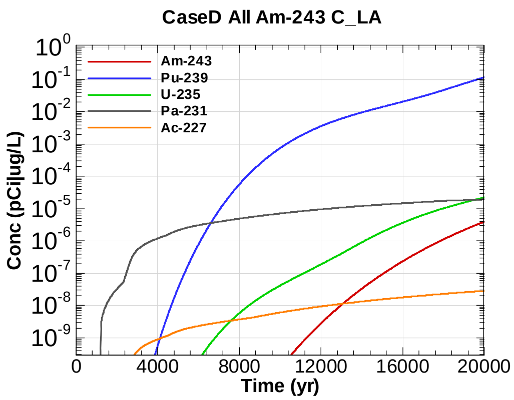

Figure L-23 - 100m Aquifer Concentration for CaseD All Am-243 C_LA

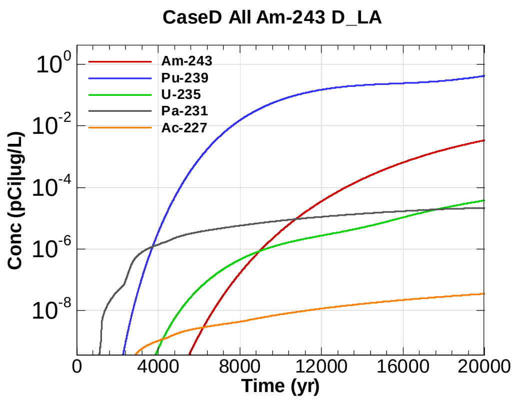

Figure L-24 - 100m Aquifer Concentration for CaseD All Am-243 D_LA

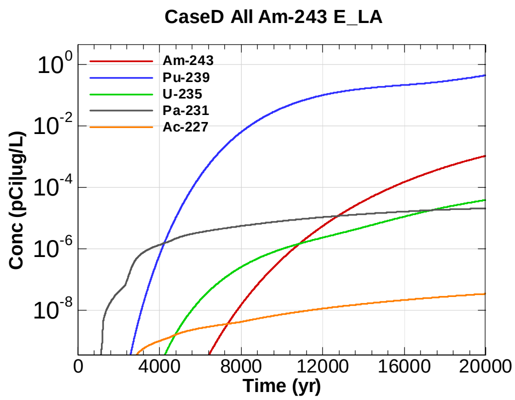

Figure L-25 - 100m Aquifer Concentration for CaseD All Am-243 E_LA

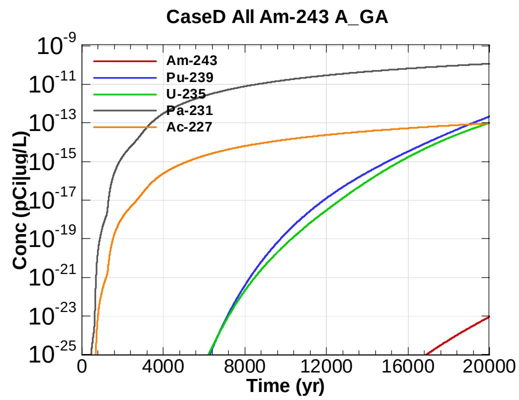

Figure L-26 - 100m Aquifer Concentration for CaseD All Am-243 A_GA

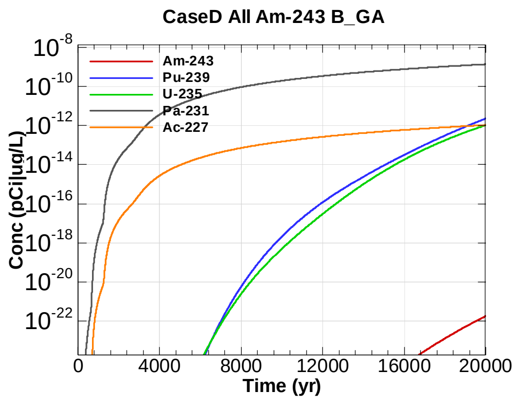

Figure L-27 - 100m Aquifer Concentration for CaseD All Am-243 B_GA

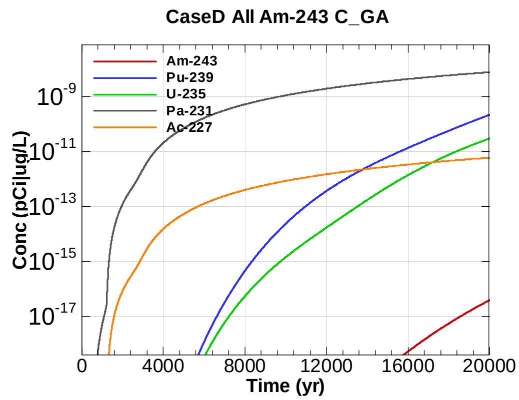

Figure L-28 - 100m Aquifer Concentration for CaseD All Am-243 C_GA

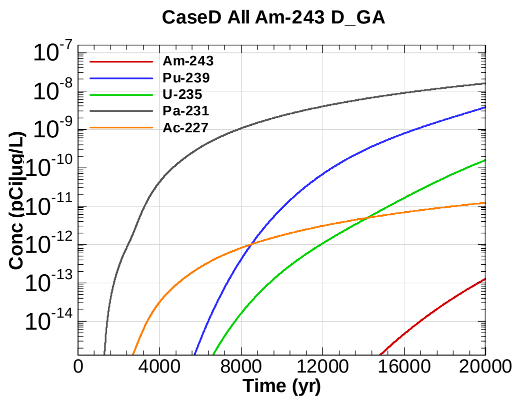

Figure L-29 - 100m Aquifer Concentration for CaseD All Am-243 D_GA

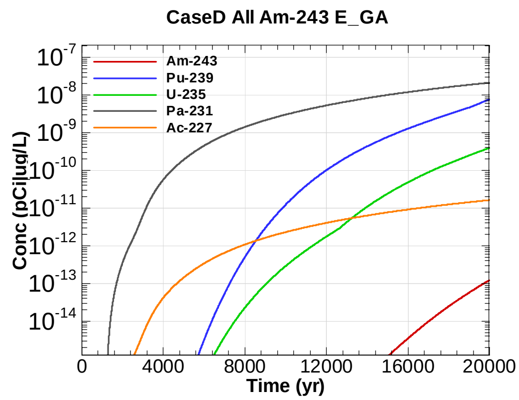

Figure L-30 - 100m Aquifer Concentration for CaseD All Am-243 E_GA

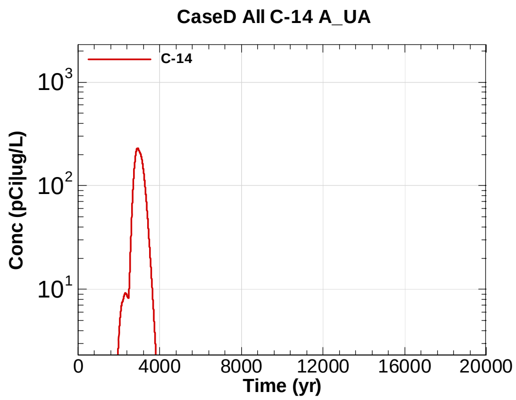

Figure L-31 - 100m Aquifer Concentration for CaseD All C-14 A_UA

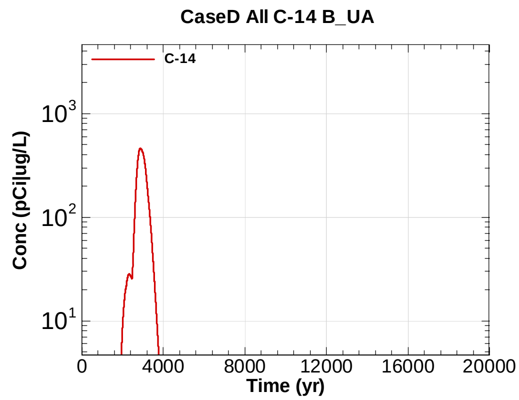

Figure L-32 - 100m Aquifer Concentration for CaseD All C-14 B_UA

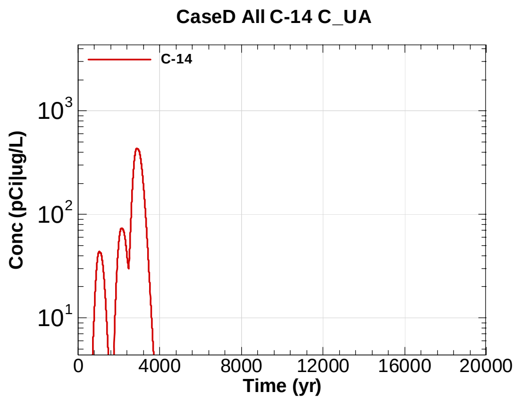

Figure L-33 - 100m Aquifer Concentration for CaseD All C-14 C_UA

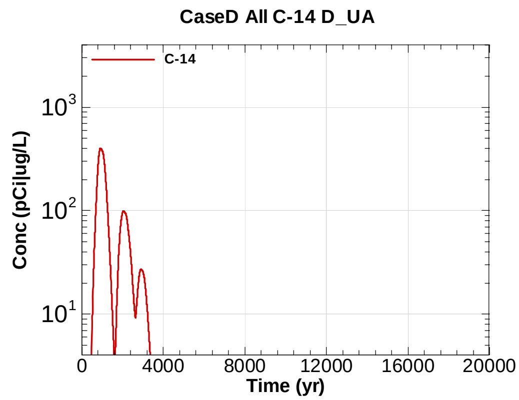

Figure L-34 - 100m Aquifer Concentration for CaseD All C-14 D_UA

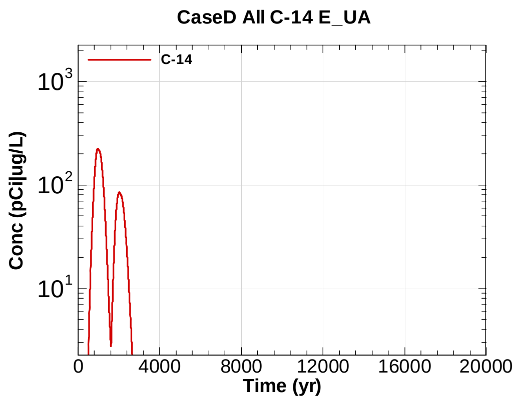

Figure L-35 - 100m Aquifer Concentration for CaseD All C-14 E_UA

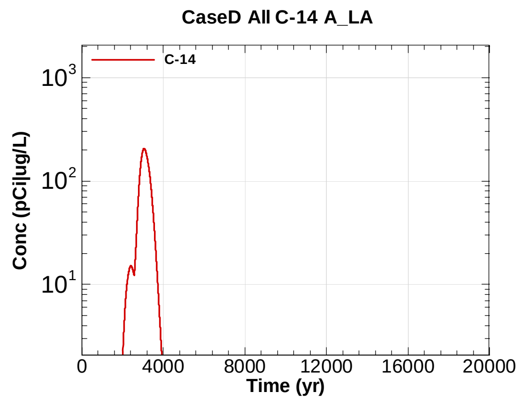

Figure L-36 - 100m Aquifer Concentration for CaseD All C-14 A_LA

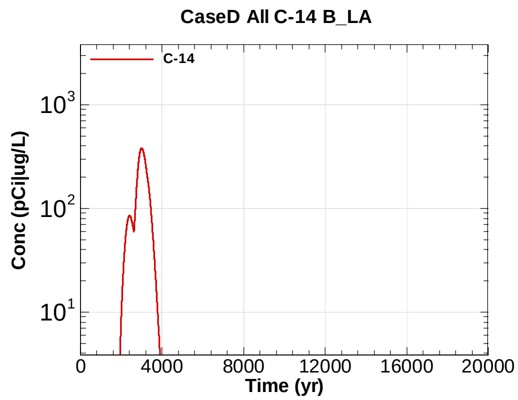

Figure L-37 - 100m Aquifer Concentration for CaseD All C-14 B_LA

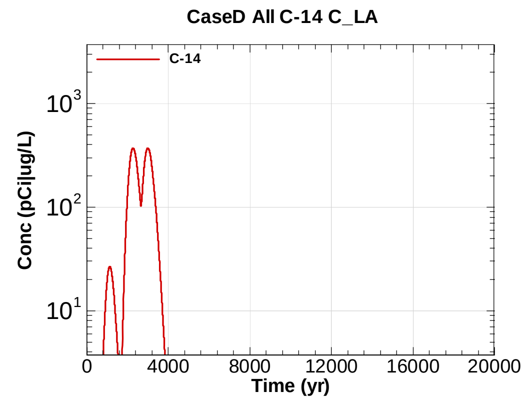

Figure L-38 - 100m Aquifer Concentration for CaseD All C-14 C_LA

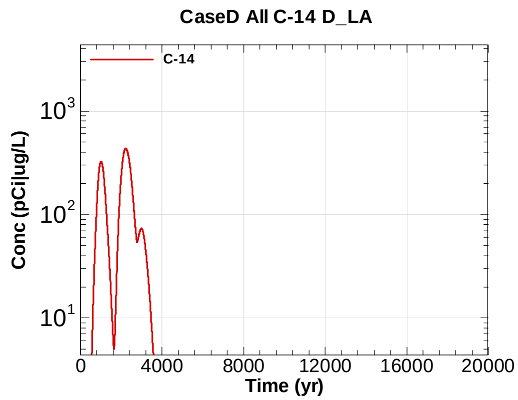

Figure L-39 - 100m Aquifer Concentration for CaseD All C-14 D_LA

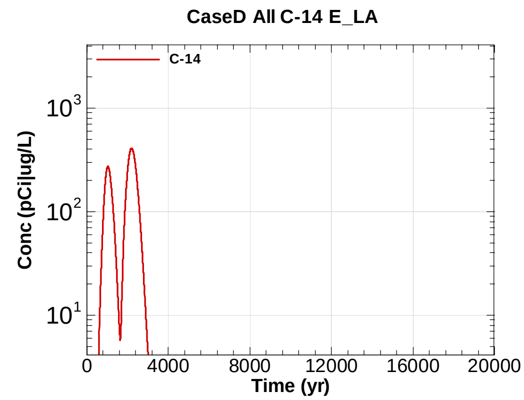

Figure L-40 - 100m Aquifer Concentration for CaseD All C-14 E_LA

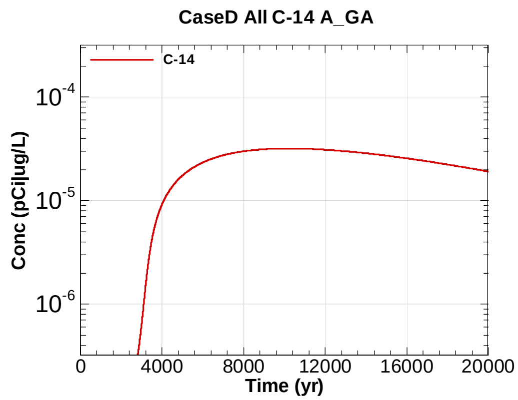

Figure L-41 - 100m Aquifer Concentration for CaseD All C-14 A_GA

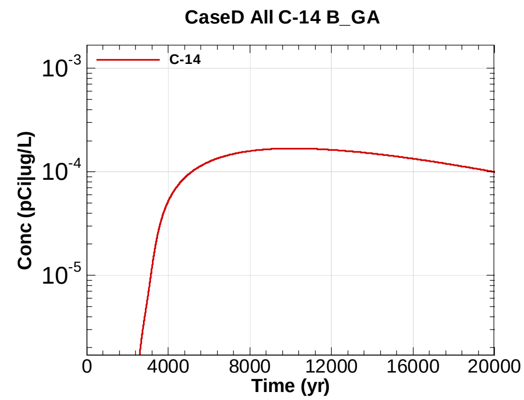

Figure L-42 - 100m Aquifer Concentration for CaseD All C-14 B_GA

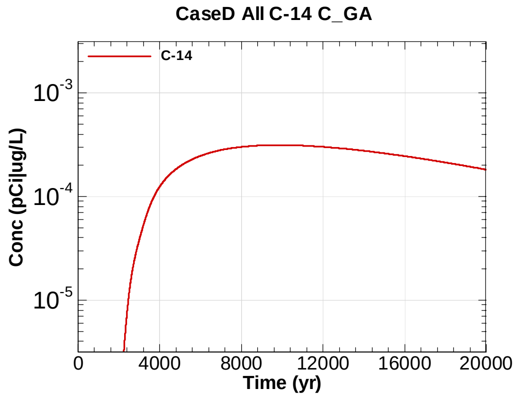

Figure L-43 - 100m Aquifer Concentration for CaseD All C-14 C_GA

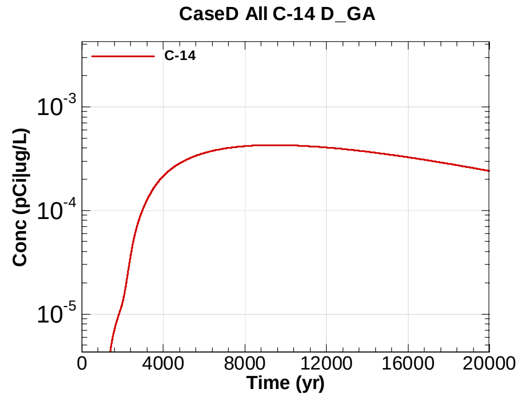

Figure L-44 - 100m Aquifer Concentration for CaseD All C-14 D_GA

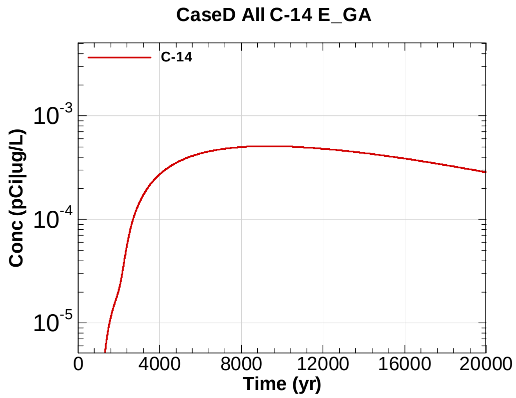

Figure L-45 - 100m Aquifer Concentration for CaseD All C-14 E_GA

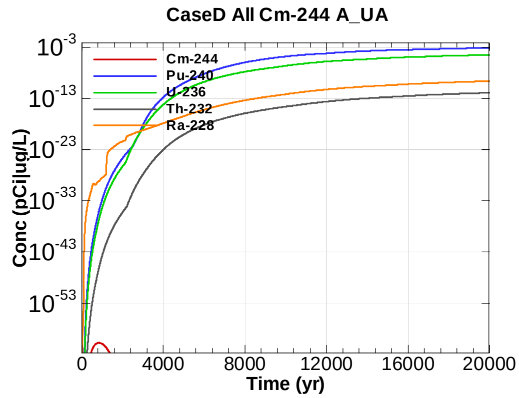

Figure L-46 - 100m Aquifer Concentration for CaseD All Cm-244 A_UA

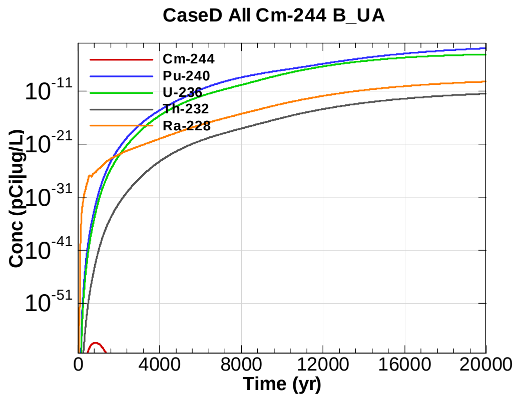

Figure L-47 - 100m Aquifer Concentration for CaseD All Cm-244 B_UA

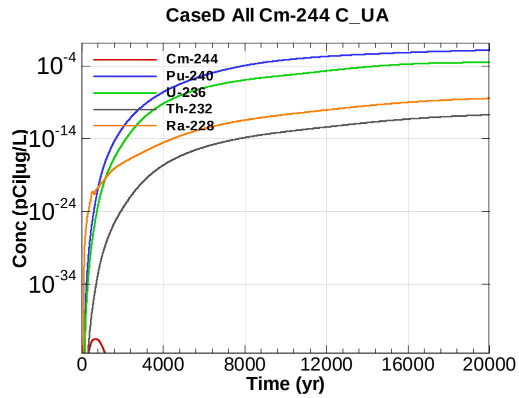

Figure L-48 - 100m Aquifer Concentration for CaseD All Cm-244 C_UA

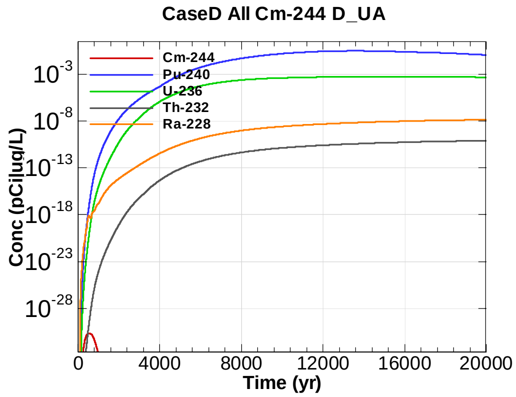

Figure L-49 - 100m Aquifer Concentration for CaseD All Cm-244 D_UA

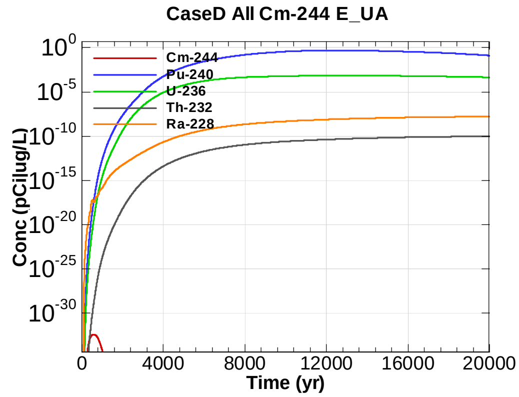

Figure L-50 - 100m Aquifer Concentration for CaseD All Cm-244 E_UA

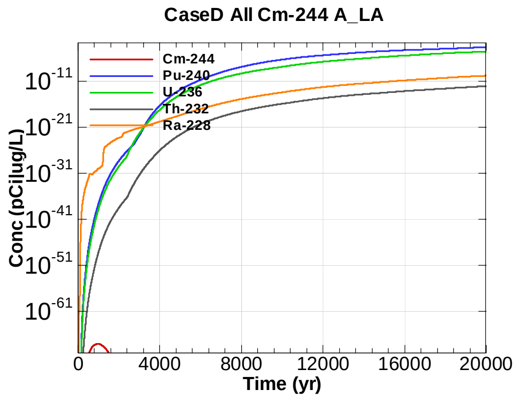

Figure L-51 - 100m Aquifer Concentration for CaseD All Cm-244 A_LA

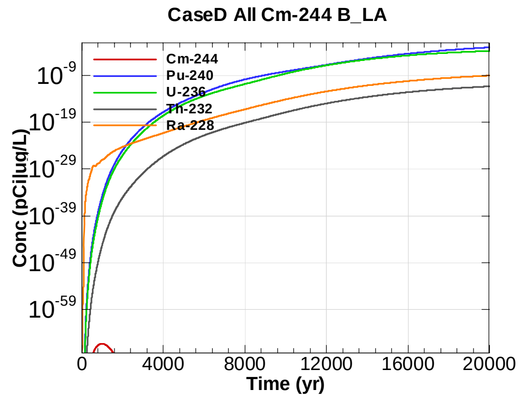

Figure L-52 - 100m Aquifer Concentration for CaseD All Cm-244 B_LA

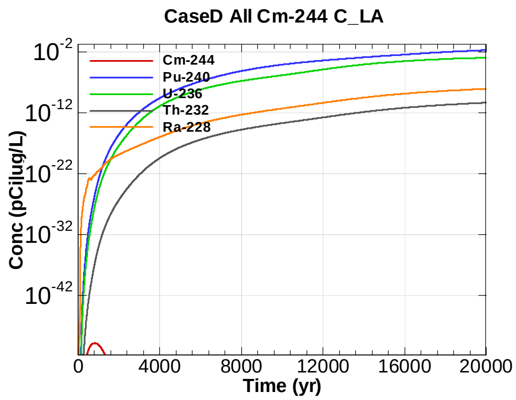

Figure L-53 - 100m Aquifer Concentration for CaseD All Cm-244 C_LA

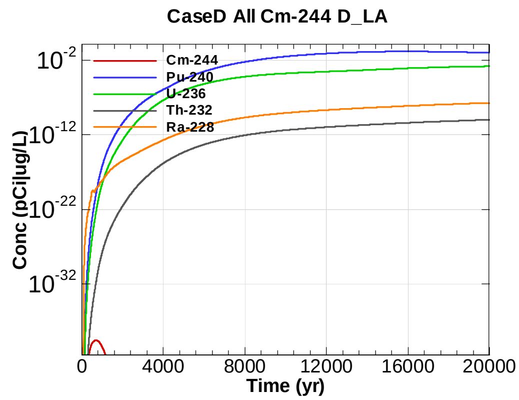

Figure L-54 - 100m Aquifer Concentration for CaseD All Cm-244 D_LA

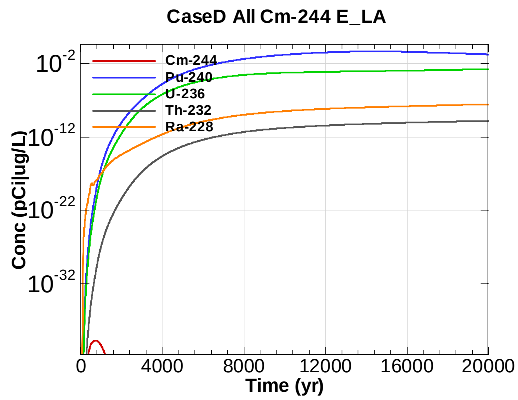

Figure L-55 - 100m Aquifer Concentration for CaseD All Cm-244 E_LA

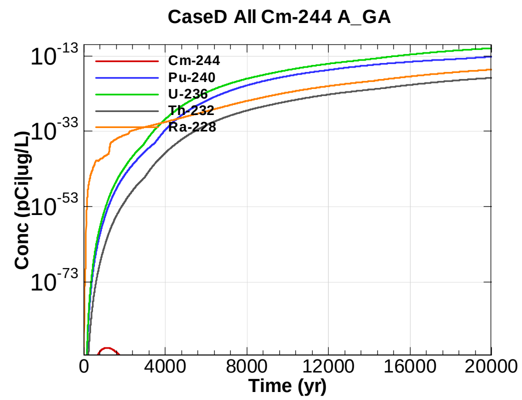

Figure L-56 - 100m Aquifer Concentration for CaseD All Cm-244 A_GA

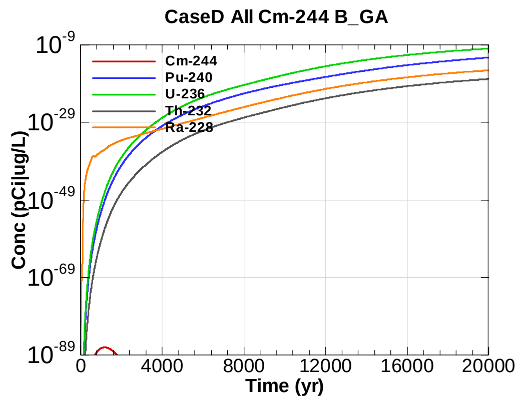

Figure L-57 - 100m Aquifer Concentration for CaseD All Cm-244 B_GA

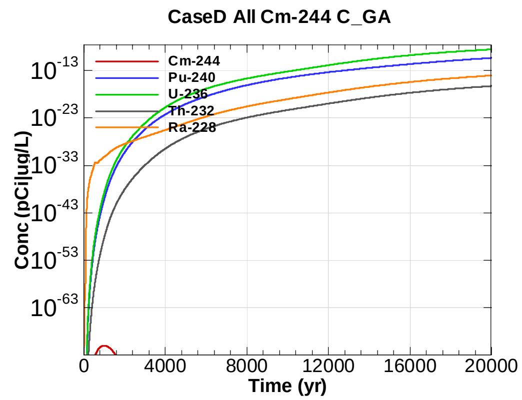

Figure L-58 - 100m Aquifer Concentration for CaseD All Cm-244 C_GA

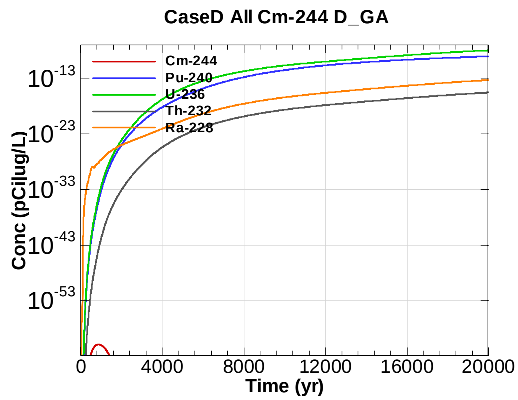

Figure L-59 - 100m Aquifer Concentration for CaseD All Cm-244 D_GA

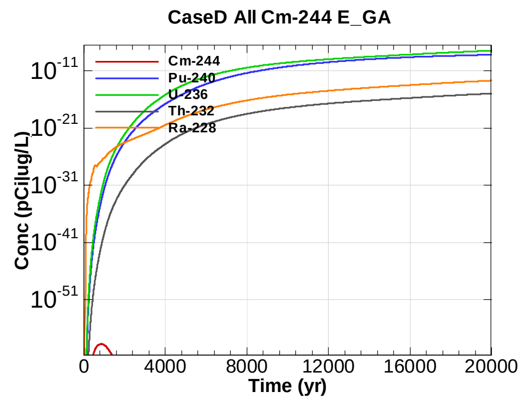

Figure L-60 - 100m Aquifer Concentration for CaseD All Cm-244 E_GA

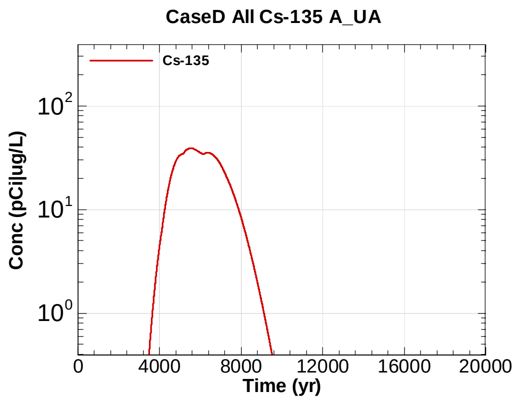

Figure L-61 - 100m Aquifer Concentration for CaseD All Cs-135 A_UA

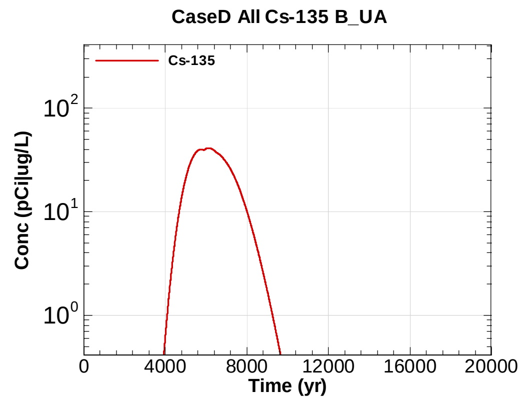

Figure L-62 - 100m Aquifer Concentration for CaseD All Cs-135 B_UA

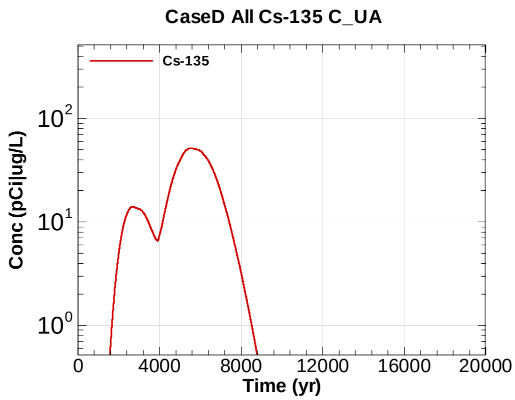

Figure L-63 - 100m Aquifer Concentration for CaseD All Cs-135 C_UA

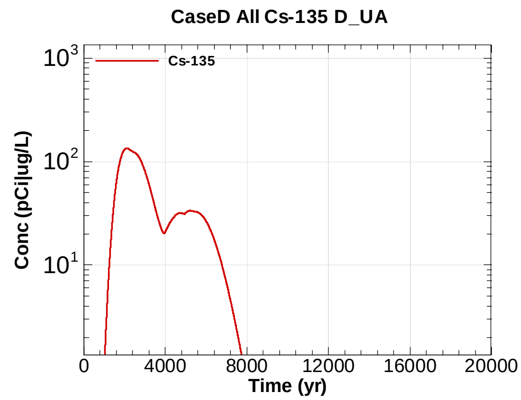

Figure L-64 - 100m Aquifer Concentration for CaseD All Cs-135 D_UA

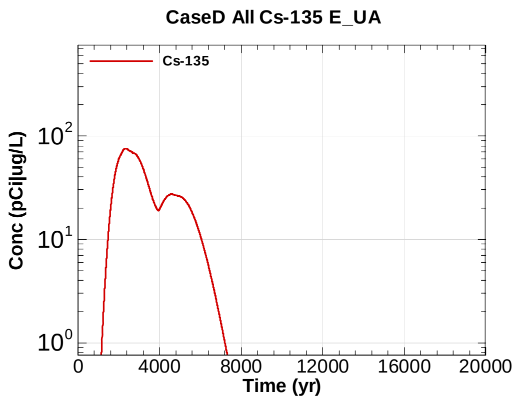

Figure L-65 - 100m Aquifer Concentration for CaseD All Cs-135 E_UA

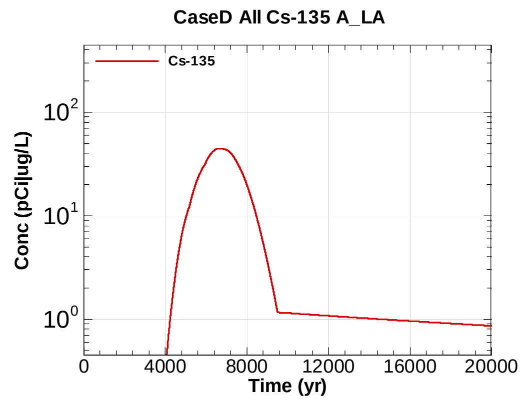

Figure L-66 - 100m Aquifer Concentration for CaseD All Cs-135 A_LA

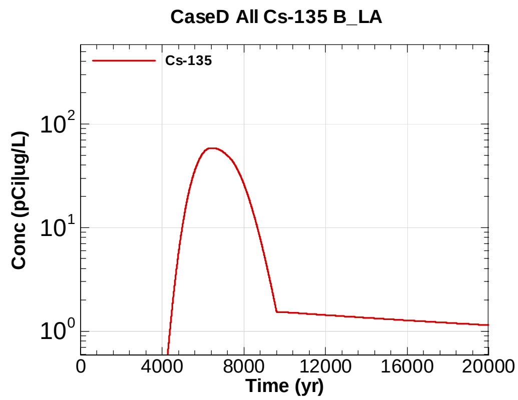

Figure L-67 - 100m Aquifer Concentration for CaseD All Cs-135 B_LA

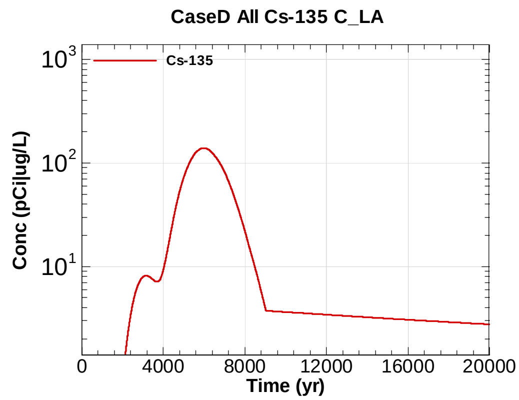

Figure L-68 - 100m Aquifer Concentration for CaseD All Cs-135 C_LA

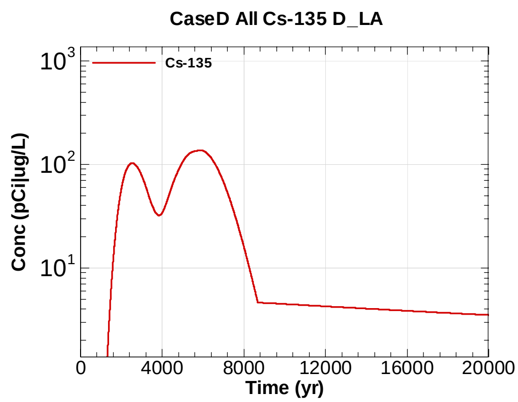

Figure L-69 - 100m Aquifer Concentration for CaseD All Cs-135 D_LA

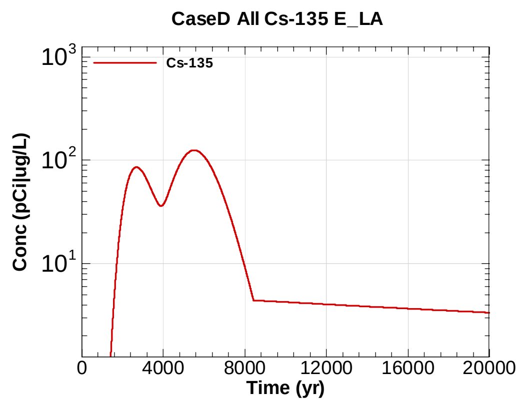

Figure L-70 - 100m Aquifer Concentration for CaseD All Cs-135 E_LA

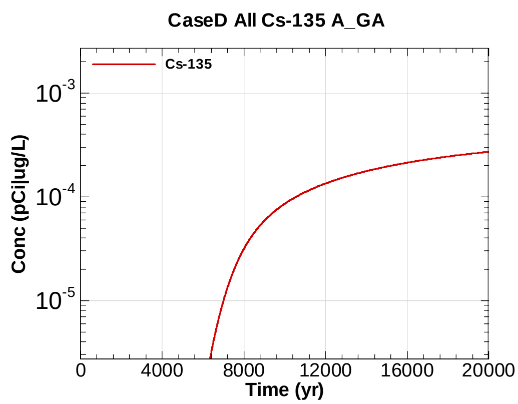

Figure L-71 - 100m Aquifer Concentration for CaseD All Cs-135 A_GA

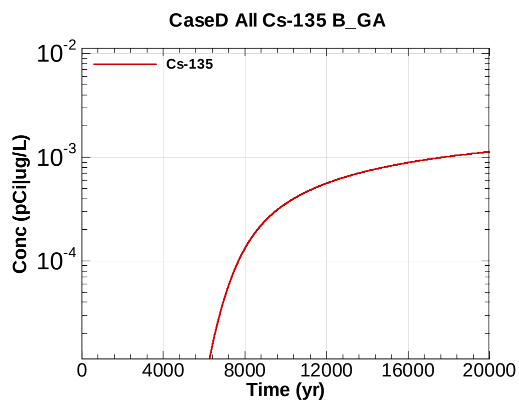

Figure L-72 - 100m Aquifer Concentration for CaseD All Cs-135 B_GA

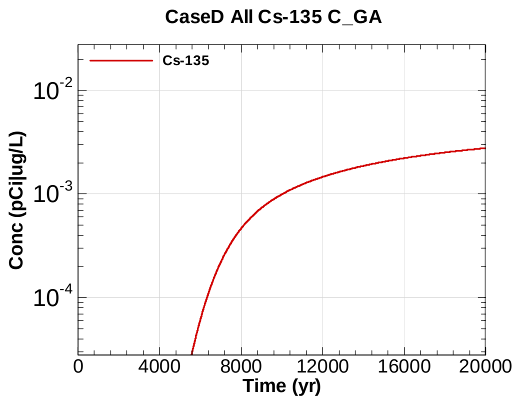

Figure L-73 - 100m Aquifer Concentration for CaseD All Cs-135 C_GA

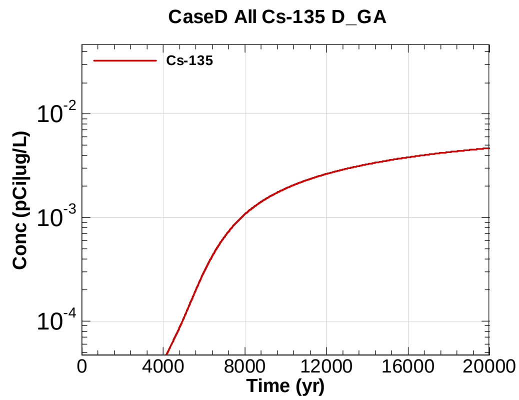

Figure L-74 - 100m Aquifer Concentration for CaseD All Cs-135 D_GA

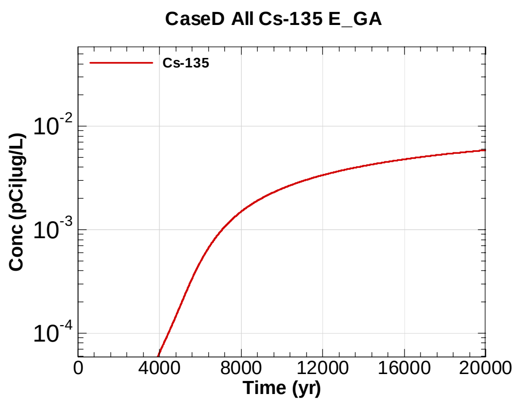

Figure L-75 - 100m Aquifer Concentration for CaseD All Cs-135 E_GA

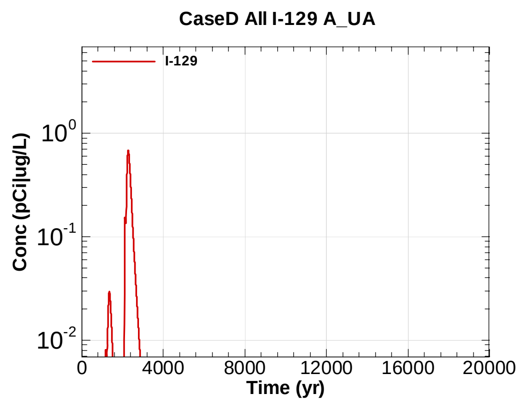

Figure L-76 - 100m Aquifer Concentration for CaseD All I-129 A_UA

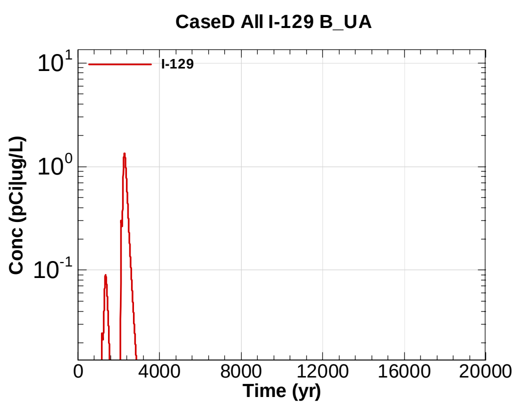

Figure L-77 - 100m Aquifer Concentration for CaseD All I-129 B_UA

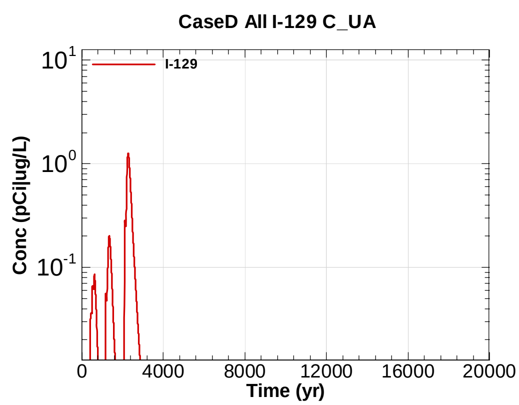

Figure L-78 - 100m Aquifer Concentration for CaseD All I-129 C_UA

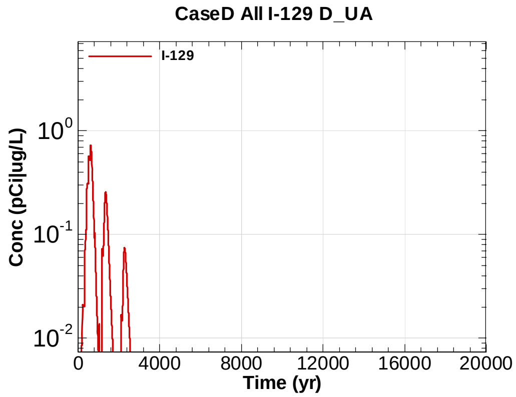

Figure L-79 - 100m Aquifer Concentration for CaseD All I-129 D_UA

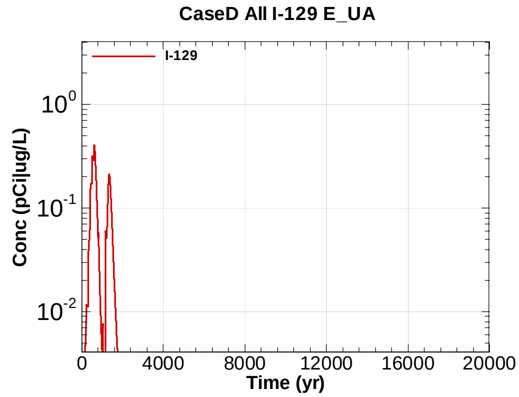

Figure L-80 - 100m Aquifer Concentration for CaseD All I-129 E_UA

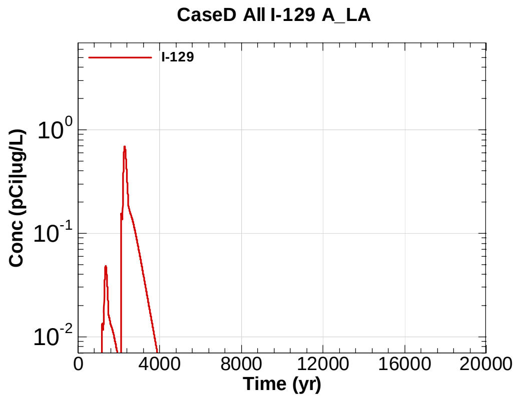

Figure L-81 - 100m Aquifer Concentration for CaseD All I-129 A_LA

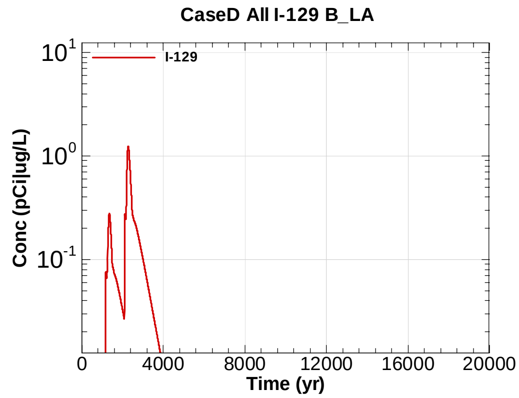

Figure L-82 - 100m Aquifer Concentration for CaseD All I-129 B_LA

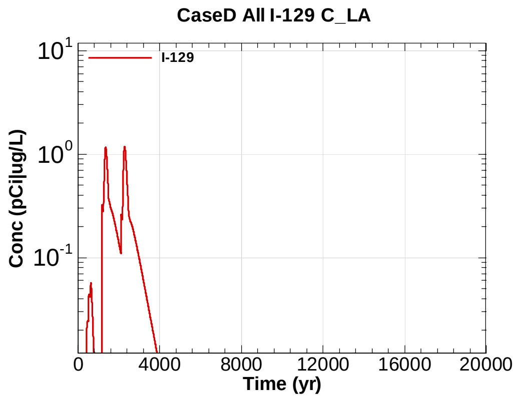

Figure L-83 - 100m Aquifer Concentration for CaseD All I-129 C_LA

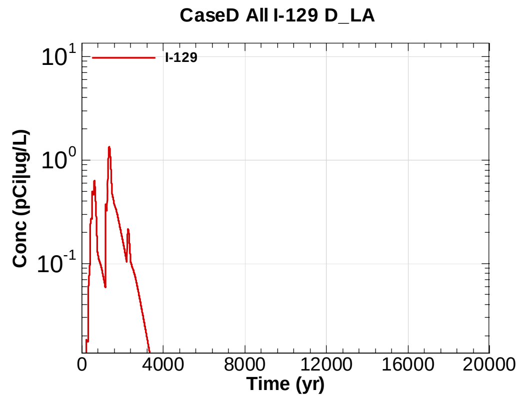

Figure L-84 - 100m Aquifer Concentration for CaseD All I-129 D_LA

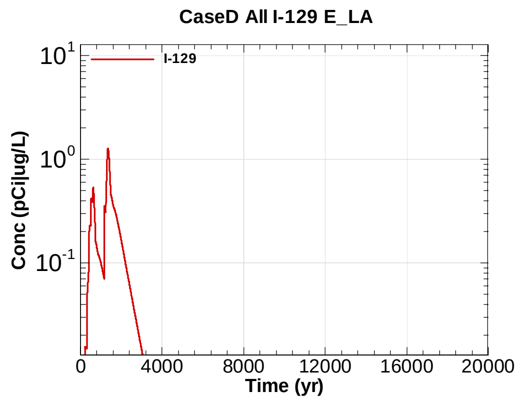

Figure L-85 - 100m Aquifer Concentration for CaseD All I-129 E_LA

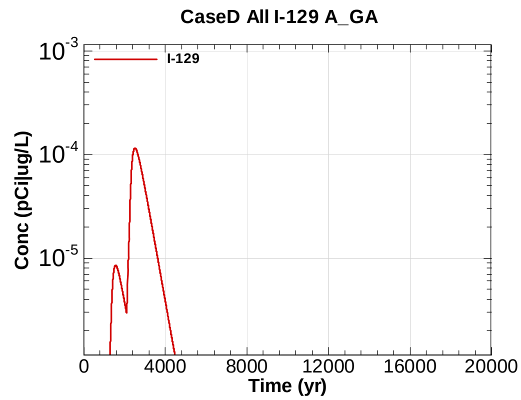

Figure L-86 - 100m Aquifer Concentration for CaseD All I-129 A_GA

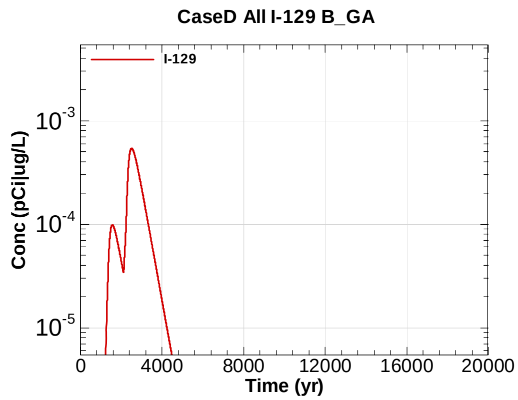

Figure L-87 - 100m Aquifer Concentration for CaseD All I-129 B_GA

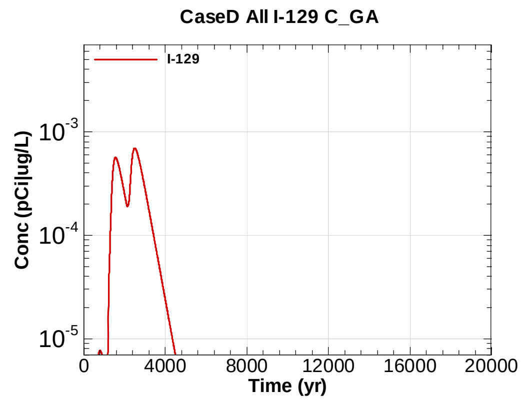

Figure L-88 - 100m Aquifer Concentration for CaseD All I-129 C_GA

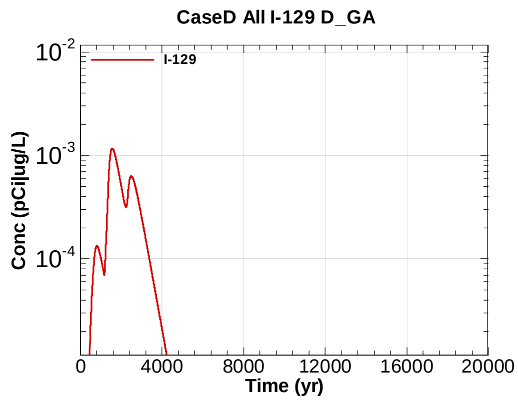

Figure L-89 - 100m Aquifer Concentration for CaseD All I-129 D_GA

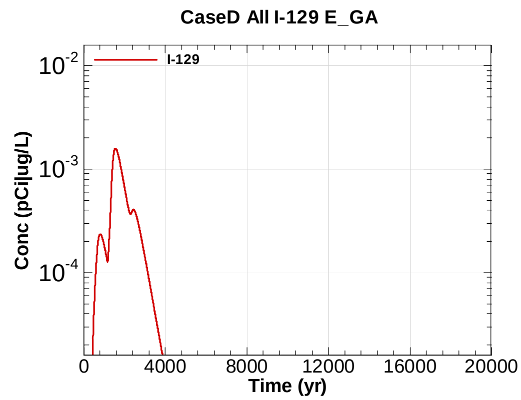

Figure L-90 - 100m Aquifer Concentration for CaseD All I-129 E_GA

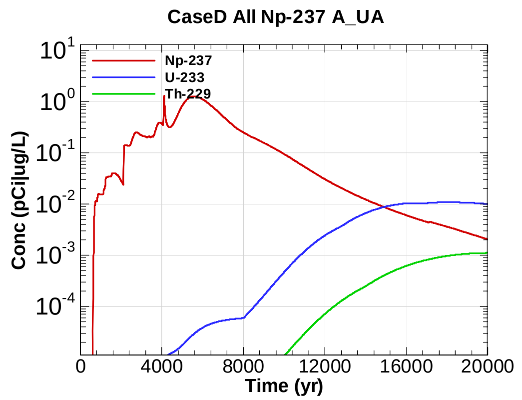

Figure L-91 - 100m Aquifer Concentration for CaseD All Np-237 A_UA

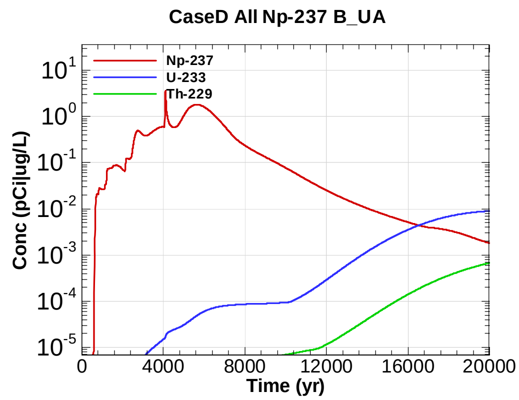

Figure L-92 - 100m Aquifer Concentration for CaseD All Np-237 B_UA

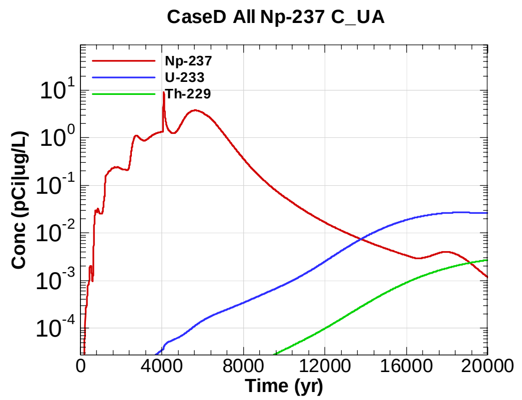

Figure L-93 - 100m Aquifer Concentration for CaseD All Np-237 C_UA

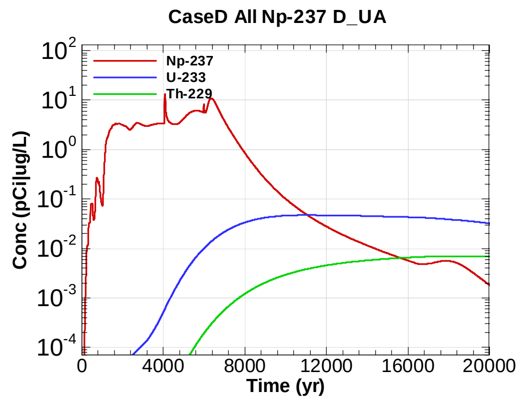

Figure L-94 - 100m Aquifer Concentration for CaseD All Np-237 D_UA

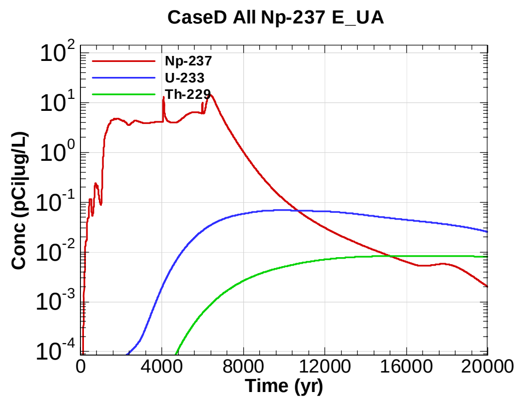

Figure L-95 - 100m Aquifer Concentration for CaseD All Np-237 E_UA

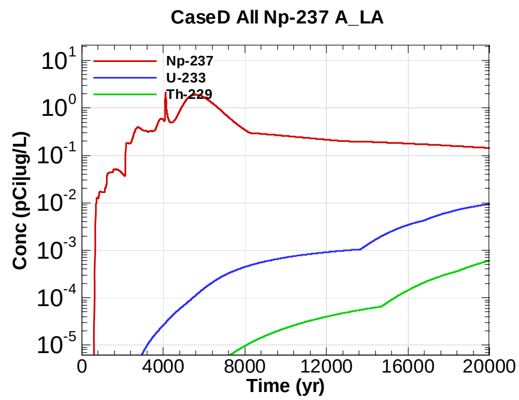

Figure L-96 - 100m Aquifer Concentration for CaseD All Np-237 A_LA

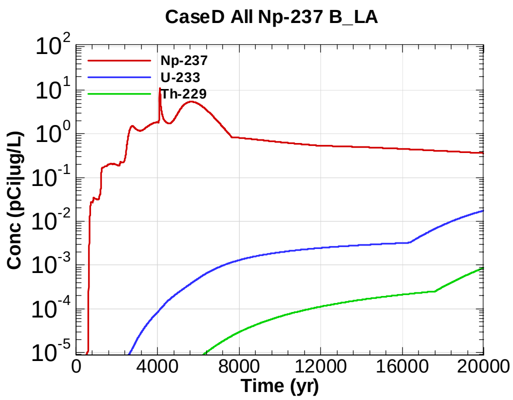

Figure L-97 - 100m Aquifer Concentration for CaseD All Np-237 B_LA

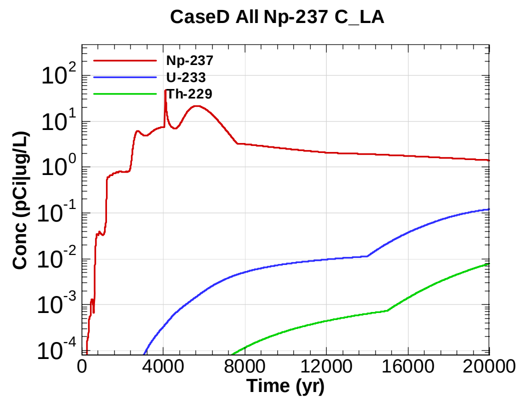

Figure L-98 - 100m Aquifer Concentration for CaseD All Np-237 C_LA

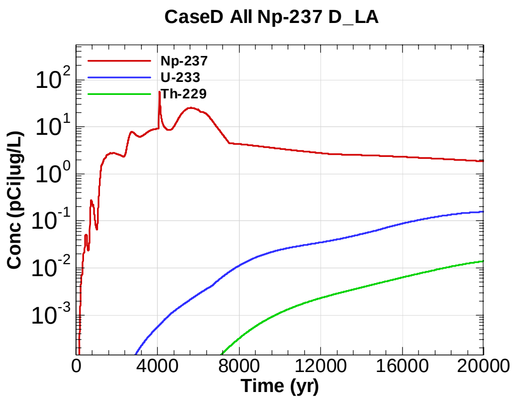

Figure L-99 - 100m Aquifer Concentration for CaseD All Np-237 D_LA

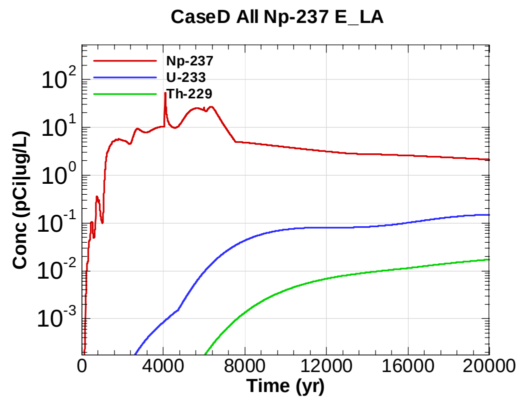

Figure L-100 - 100m Aquifer Concentration for CaseD All Np-237 E_LA

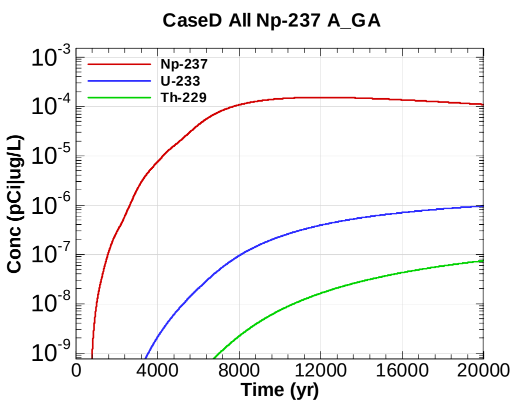

Figure L-101 - 100m Aquifer Concentration for CaseD All Np-237 A_GA

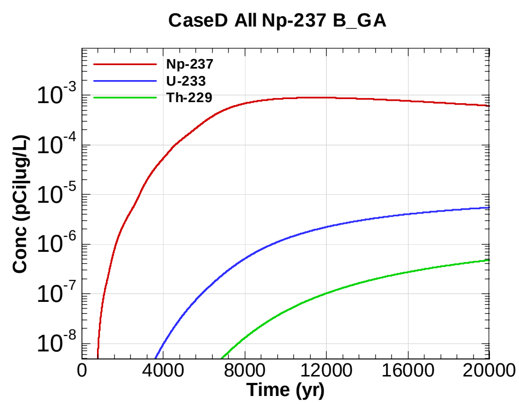

Figure L-102 - 100m Aquifer Concentration for CaseD All Np-237 B_GA

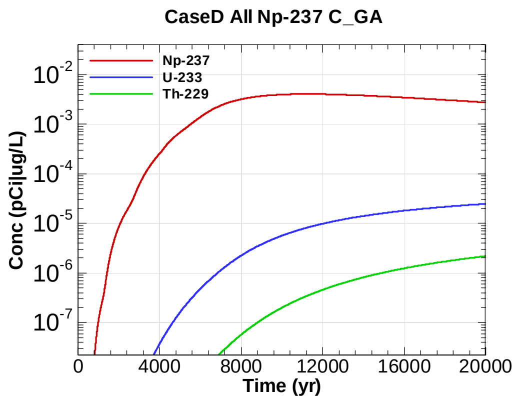

Figure L-103 - 100m Aquifer Concentration for CaseD All Np-237 C_GA

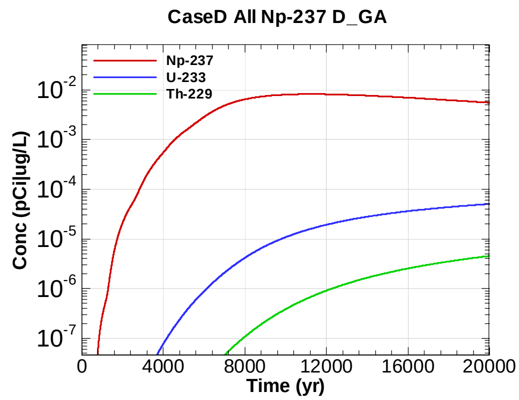

Figure L-104 - 100m Aquifer Concentration for CaseD All Np-237 D_GA

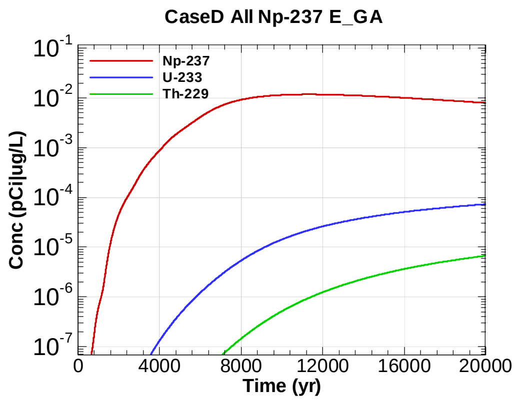

Figure L-105 - 100m Aquifer Concentration for CaseD All Np-237 E_GA

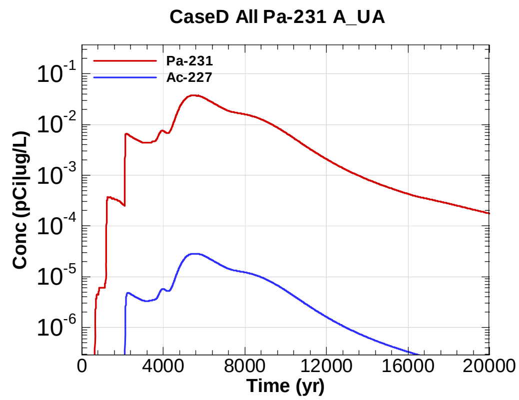

Figure L-106 - 100m Aquifer Concentration for CaseD All Pa-231 A_UA

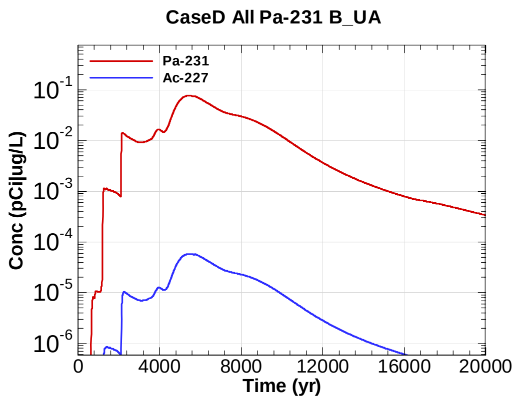

Figure L-107 - 100m Aquifer Concentration for CaseD All Pa-231 B_UA

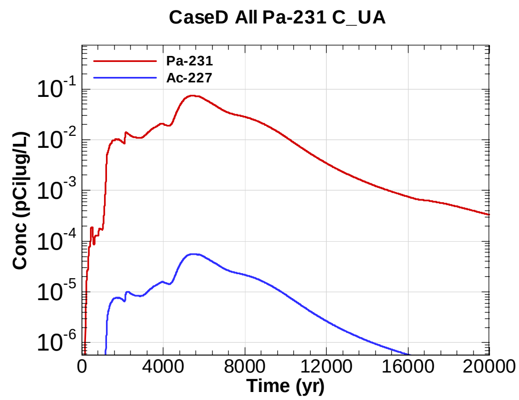

Figure L-108 - 100m Aquifer Concentration for CaseD All Pa-231 C_UA

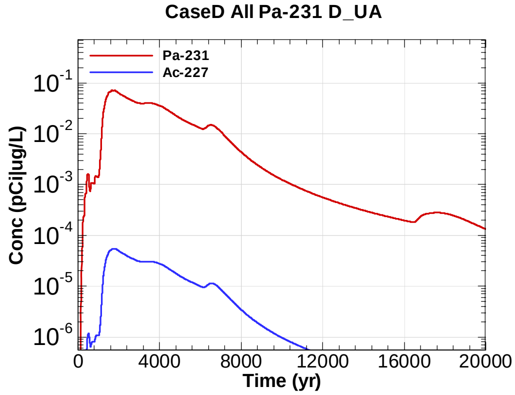

Figure L-109 - 100m Aquifer Concentration for CaseD All Pa-231 D_UA

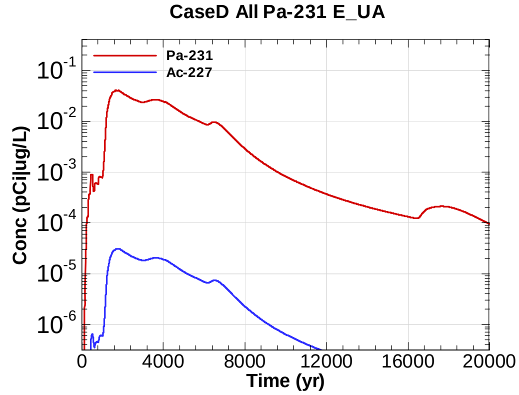

Figure L-110 - 100m Aquifer Concentration for CaseD All Pa-231 E_UA

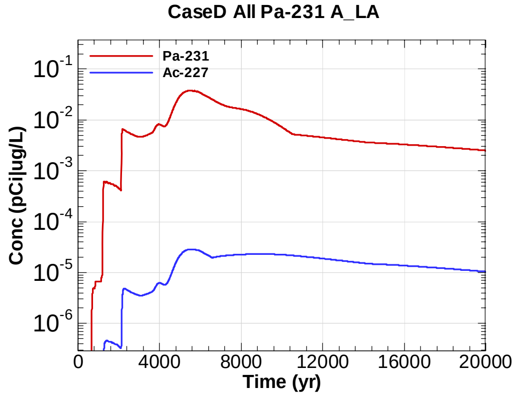

Figure L-111 - 100m Aquifer Concentration for CaseD All Pa-231 A_LA

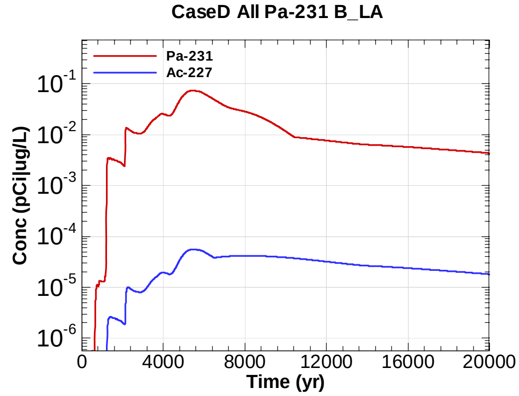

Figure L-112 - 100m Aquifer Concentration for CaseD All Pa-231 B_LA

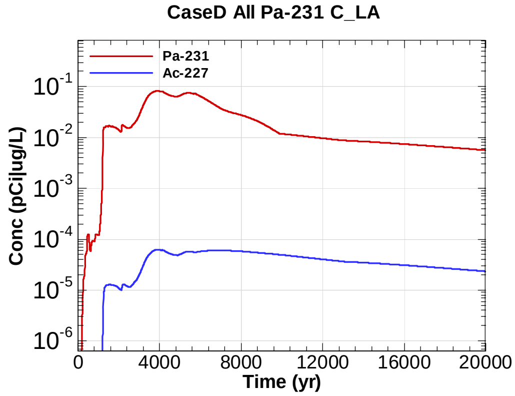

Figure L-113 - 100m Aquifer Concentration for CaseD All Pa-231 C_LA

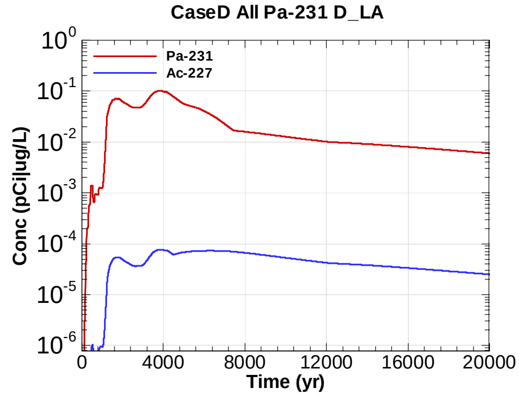

Figure L-114 - 100m Aquifer Concentration for CaseD All Pa-231 D_LA

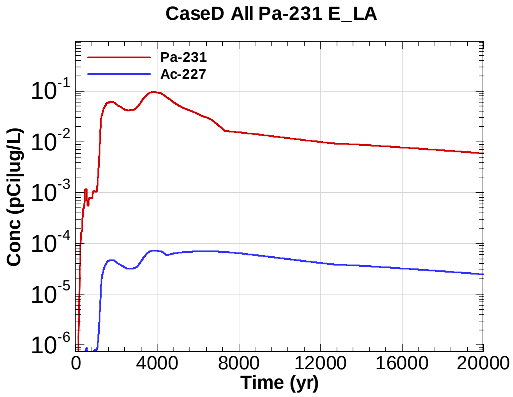

Figure L-115 - 100m Aquifer Concentration for CaseD All Pa-231 E_LA

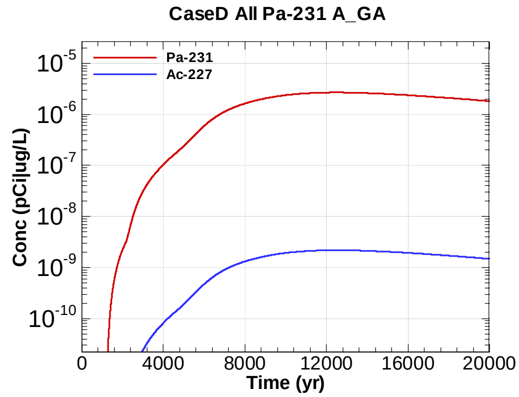

Figure L-116 - 100m Aquifer Concentration for CaseD All Pa-231 A_GA

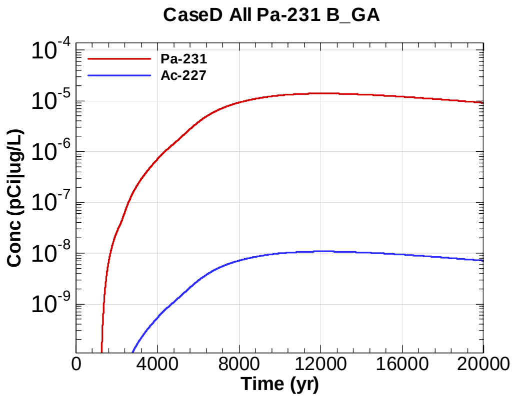

Figure L-117 - 100m Aquifer Concentration for CaseD All Pa-231 B_GA

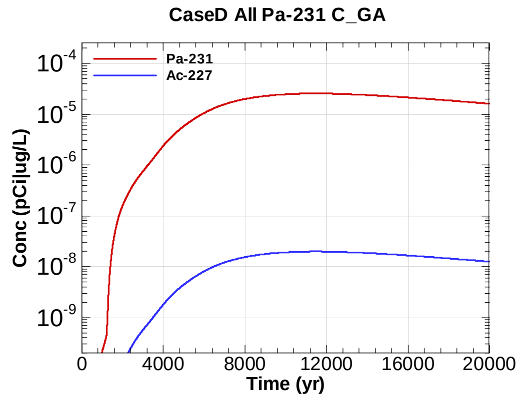

Figure L-118 - 100m Aquifer Concentration for CaseD All Pa-231 C_GA

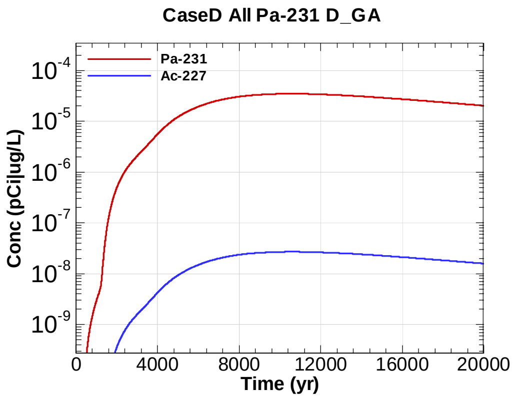

Figure L-119 - 100m Aquifer Concentration for CaseD All Pa-231 D_GA

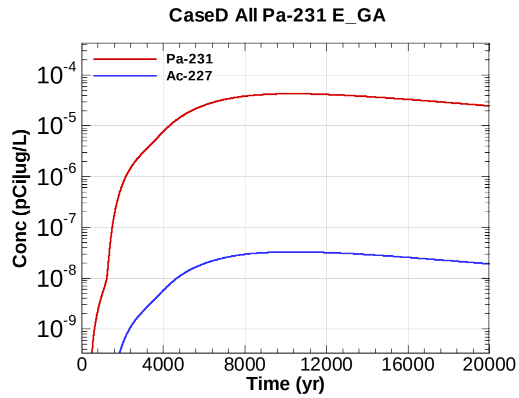

Figure L-120 - 100m Aquifer Concentration for CaseD All Pa-231 E_GA

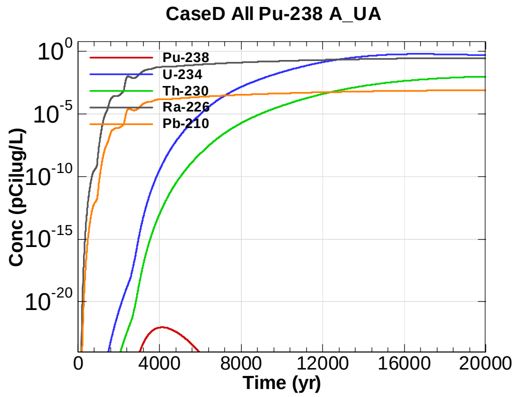

Figure L-121 - 100m Aquifer Concentration for CaseD All Pu-238 A_UA

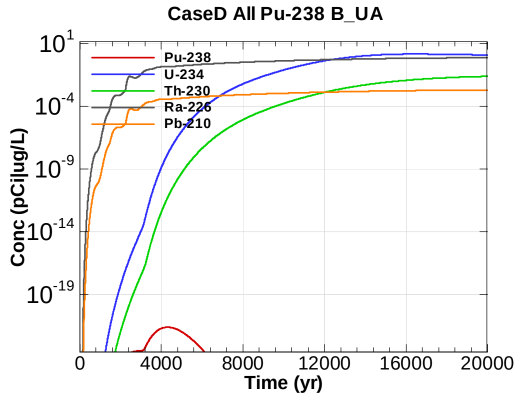

Figure L-122 - 100m Aquifer Concentration for CaseD All Pu-238 B_UA

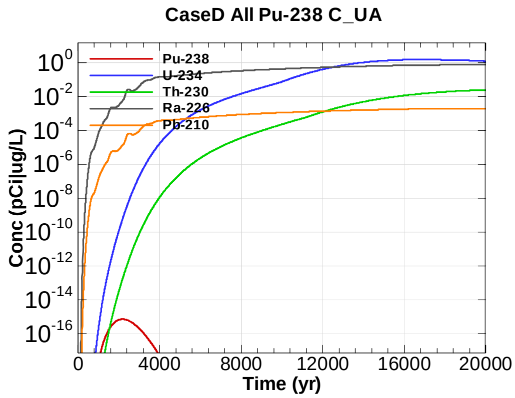

Figure L-123 - 100m Aquifer Concentration for CaseD All Pu-238 C_UA

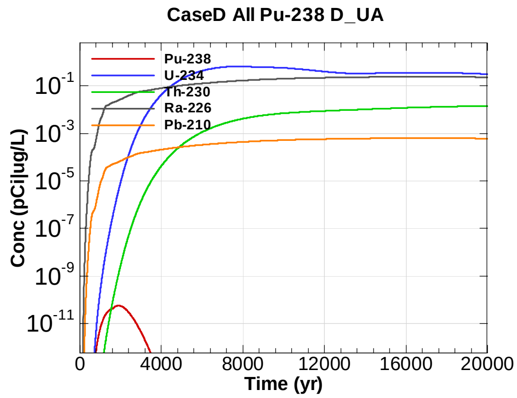

Figure L-124 - 100m Aquifer Concentration for CaseD All Pu-238 D_UA

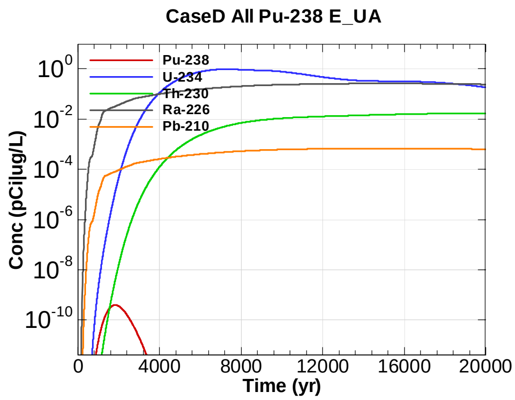

Figure L-125 - 100m Aquifer Concentration for CaseD All Pu-238 E_UA

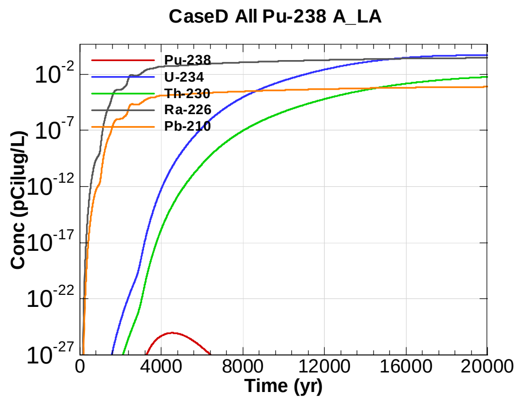

Figure L-126 - 100m Aquifer Concentration for CaseD All Pu-238 A_LA

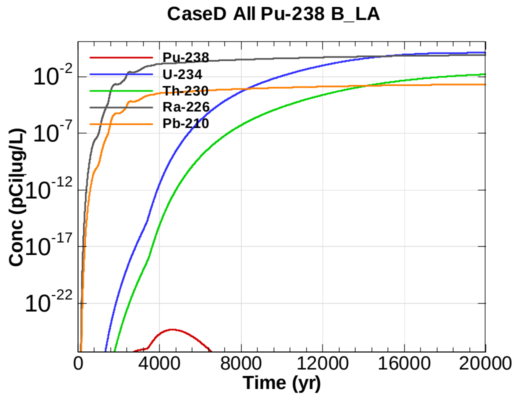

Figure L-127 - 100m Aquifer Concentration for CaseD All Pu-238 B_LA

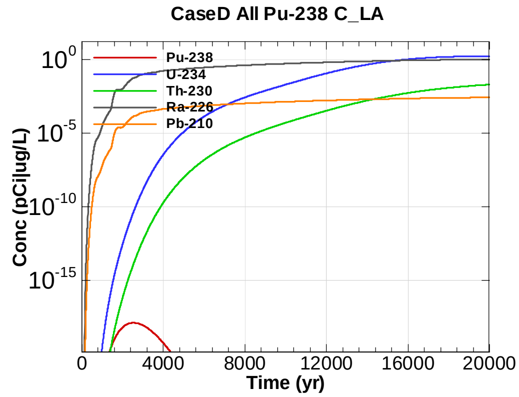

Figure L-128 - 100m Aquifer Concentration for CaseD All Pu-238 C_LA

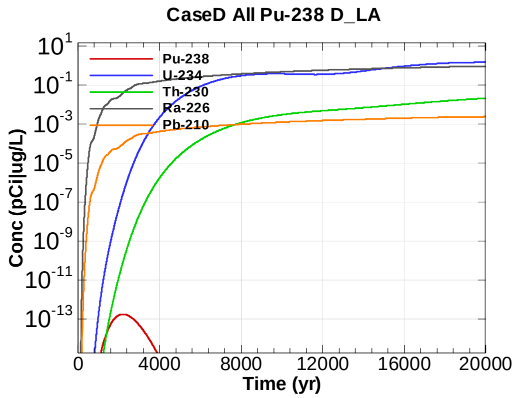

Figure L-129 - 100m Aquifer Concentration for CaseD All Pu-238 D_LA

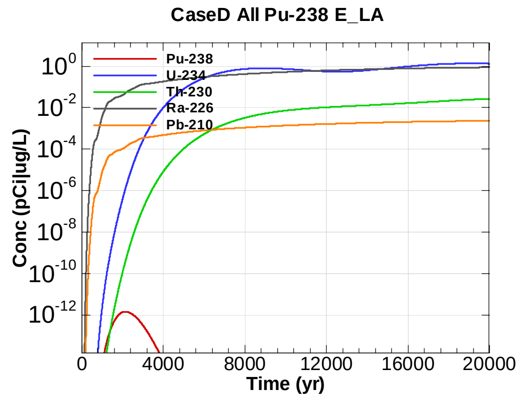

Figure L-130 - 100m Aquifer Concentration for CaseD All Pu-238 E_LA

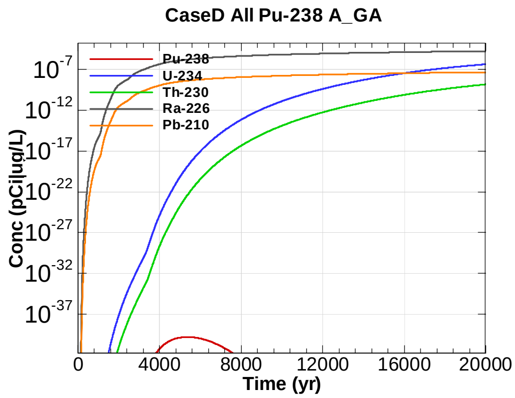

Figure L-131 - 100m Aquifer Concentration for CaseD All Pu-238 A_GA

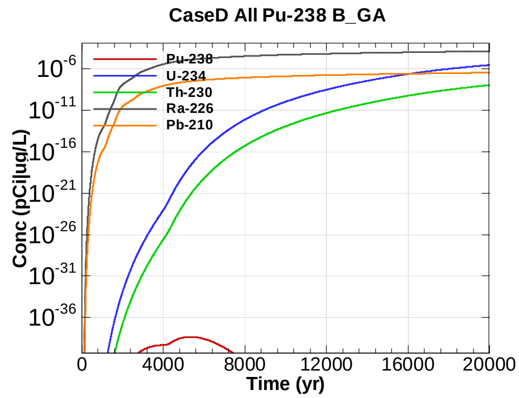

Figure L-132 - 100m Aquifer Concentration for CaseD All Pu-238 B_GA

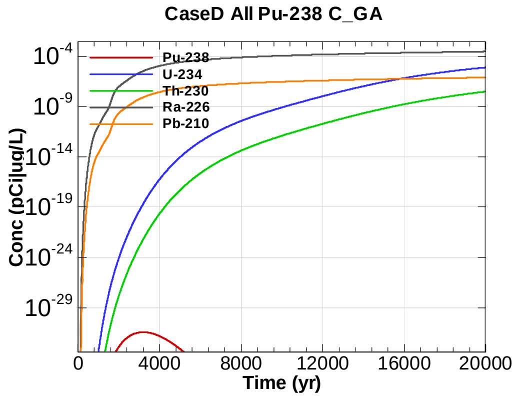

Figure L-133 - 100m Aquifer Concentration for CaseD All Pu-238 C_GA

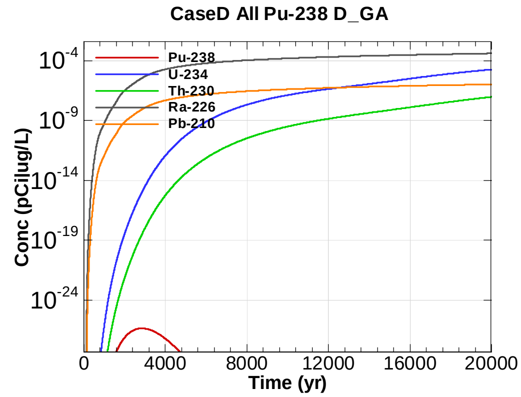

Figure L-134 - 100m Aquifer Concentration for CaseD All Pu-238 D_GA

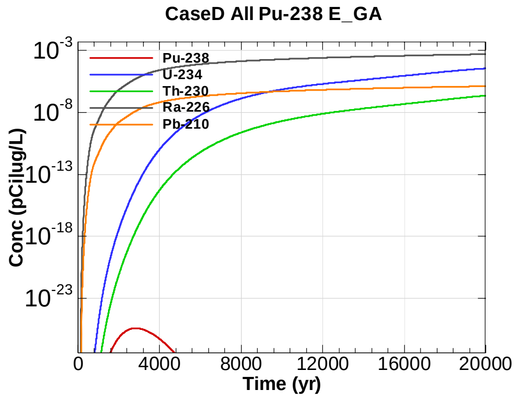

Figure L-135 - 100m Aquifer Concentration for CaseD All Pu-238 E_GA

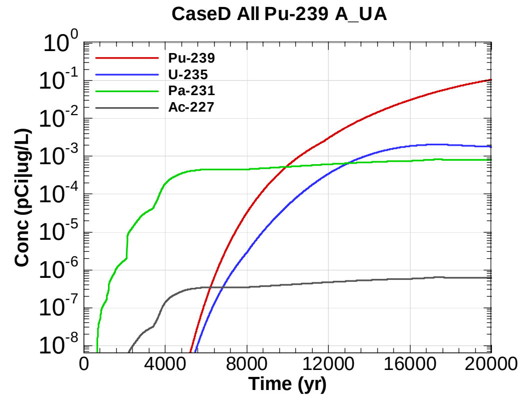

Figure L-136 - 100m Aquifer Concentration for CaseD All Pu-239 A_UA

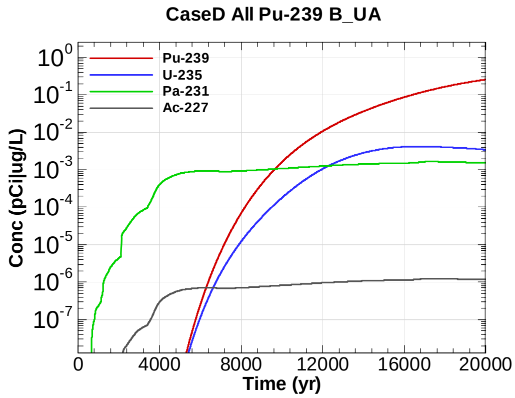

Figure L-137 - 100m Aquifer Concentration for CaseD All Pu-239 B_UA

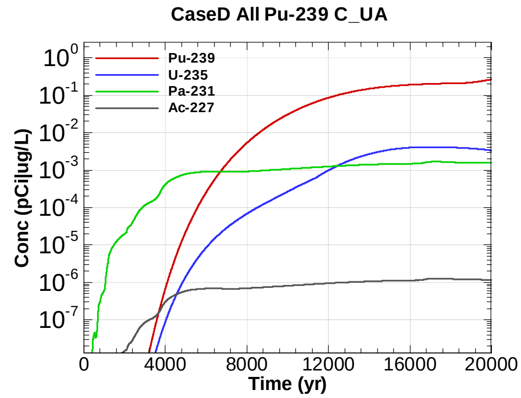

Figure L-138 - 100m Aquifer Concentration for CaseD All Pu-239 C_UA

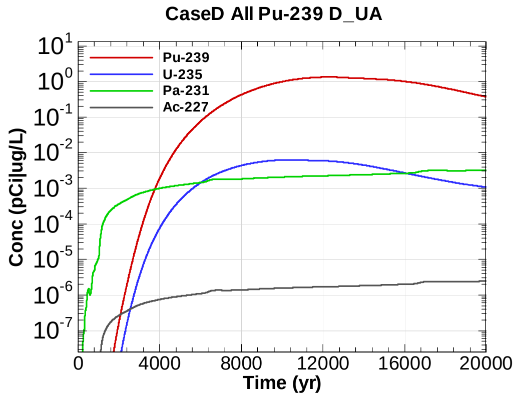

Figure L-139 - 100m Aquifer Concentration for CaseD All Pu-239 D_UA

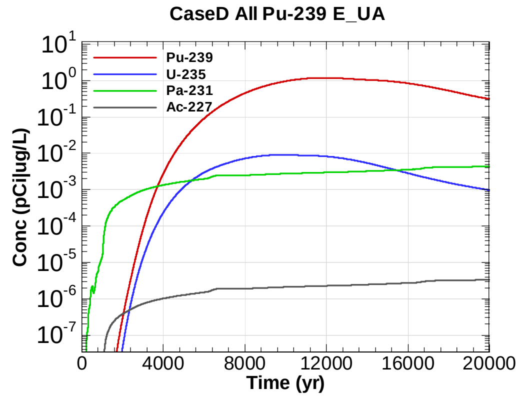

Figure L-140 - 100m Aquifer Concentration for CaseD All Pu-239 E_UA

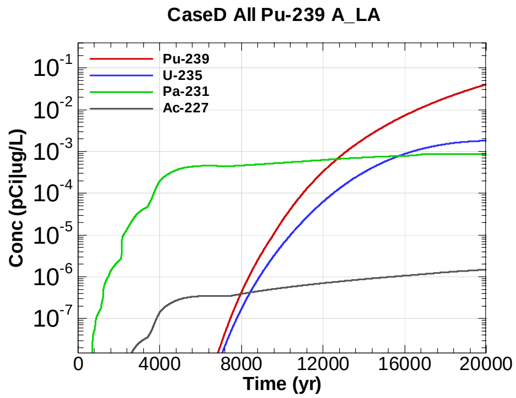

Figure L-141 - 100m Aquifer Concentration for CaseD All Pu-239 A_LA

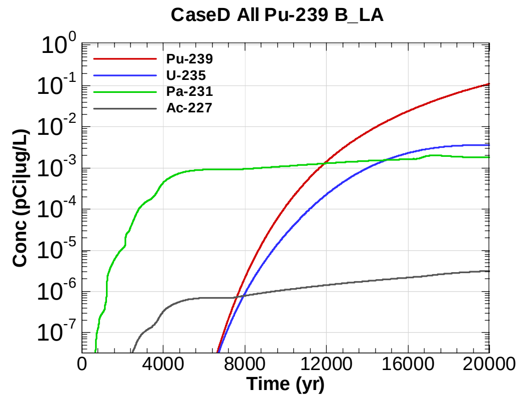

Figure L-142 - 100m Aquifer Concentration for CaseD All Pu-239 B_LA

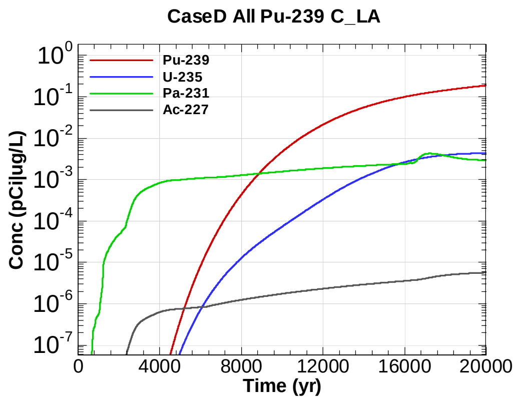

Figure L-143 - 100m Aquifer Concentration for CaseD All Pu-239 C_LA

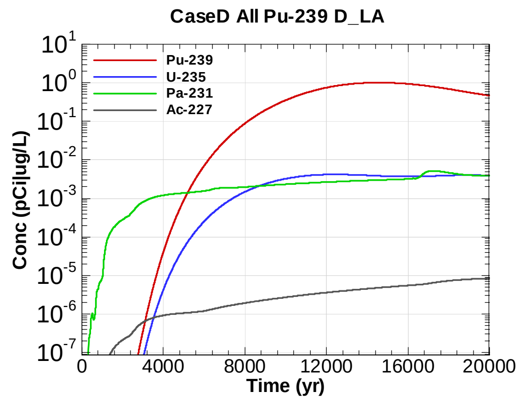

Figure L-144 - 100m Aquifer Concentration for CaseD All Pu-239 D_LA

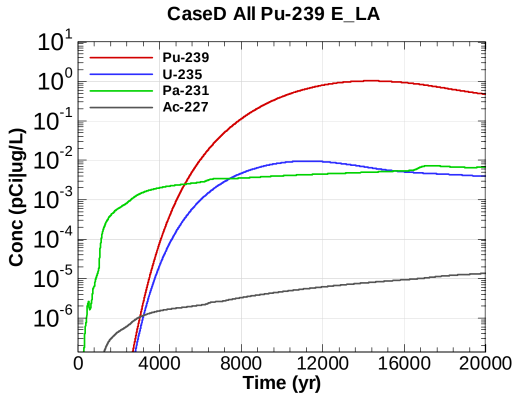

Figure L-145 - 100m Aquifer Concentration for CaseD All Pu-239 E_LA

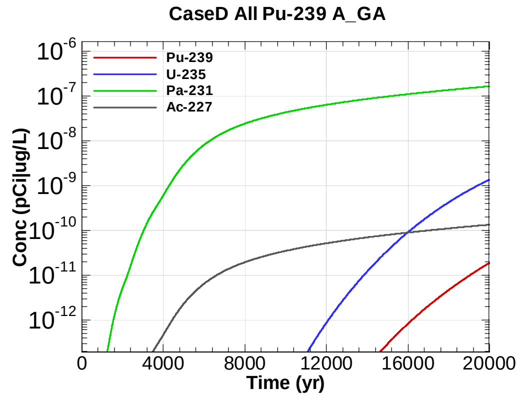

Figure L-146 - 100m Aquifer Concentration for CaseD All Pu-239 A_GA

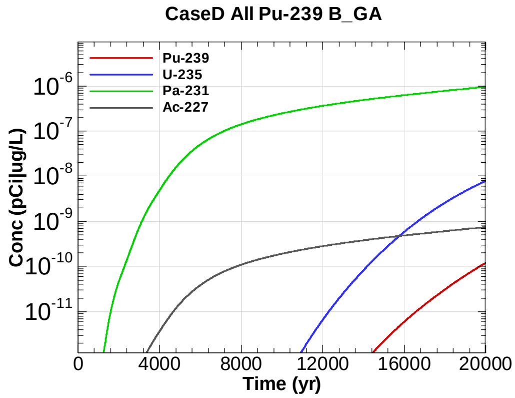

Figure L-147 - 100m Aquifer Concentration for CaseD All Pu-239 B_GA

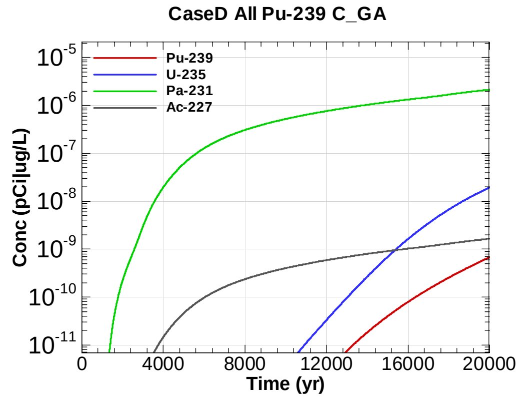

Figure L-148 - 100m Aquifer Concentration for CaseD All Pu-239 C_GA

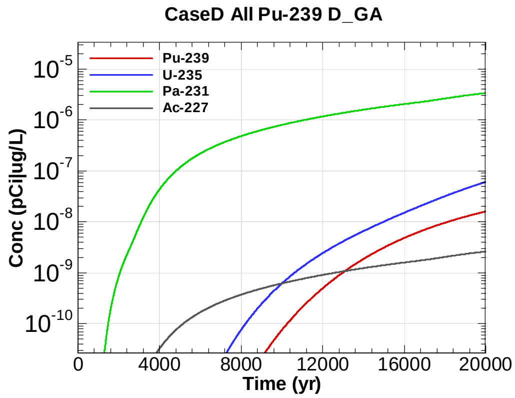

Figure L-149 - 100m Aquifer Concentration for CaseD All Pu-239 D_GA

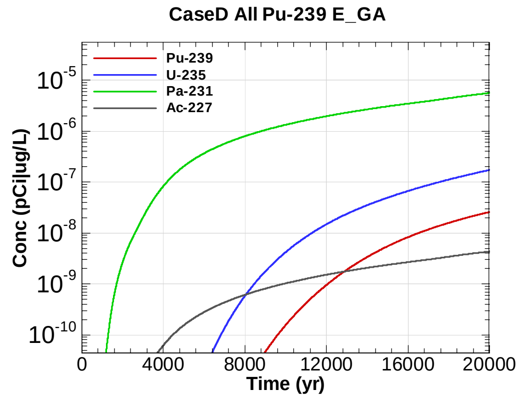

Figure L-150 - 100m Aquifer Concentration for CaseD All Pu-239 E_GA

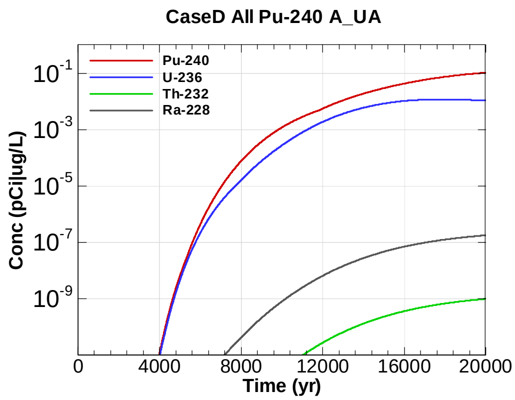

Figure L-151 - 100m Aquifer Concentration for CaseD All Pu-240 A_UA

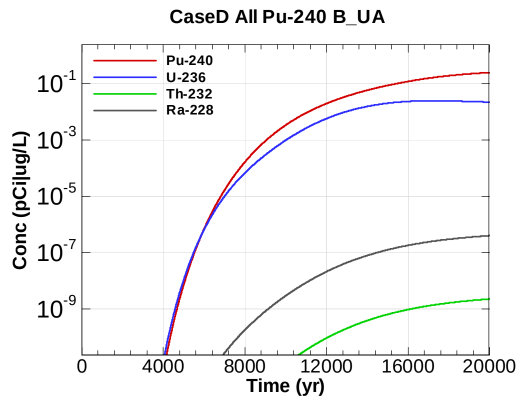

Figure L-152 - 100m Aquifer Concentration for CaseD All Pu-240 B_UA

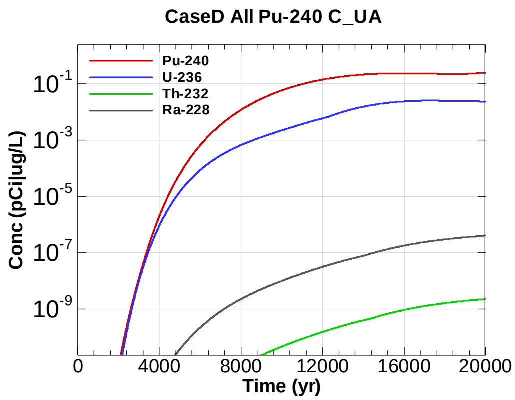

Figure L-153 - 100m Aquifer Concentration for CaseD All Pu-240 C_UA

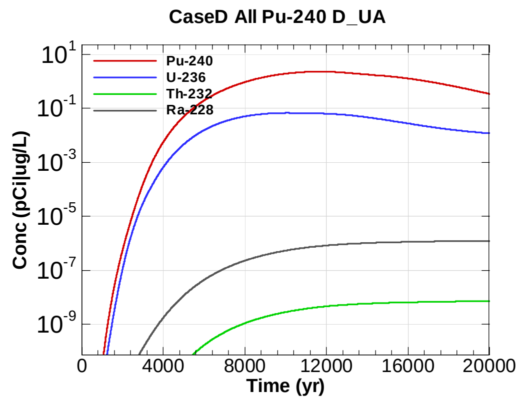

Figure L-154 - 100m Aquifer Concentration for CaseD All Pu-240 D_UA

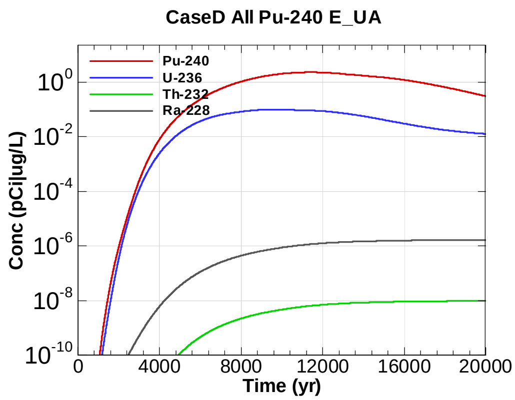

Figure L-155 - 100m Aquifer Concentration for CaseD All Pu-240 E_UA

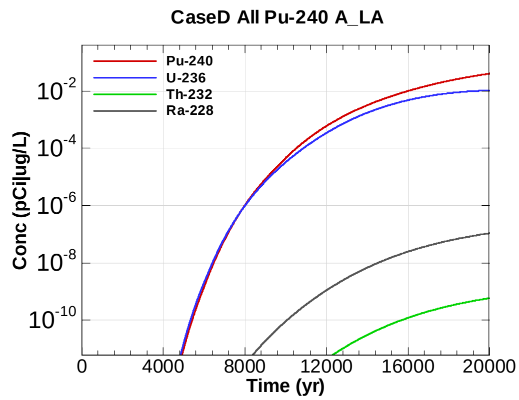

Figure L-156 - 100m Aquifer Concentration for CaseD All Pu-240 A_LA

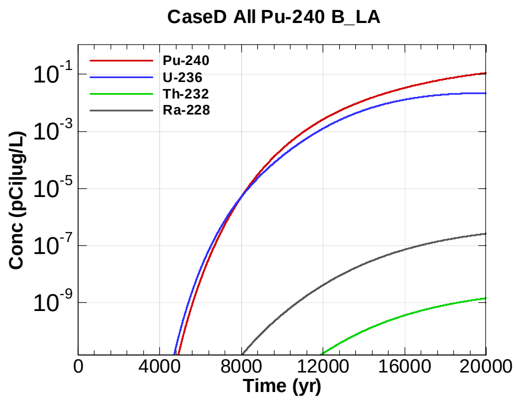

Figure L-157 - 100m Aquifer Concentration for CaseD All Pu-240 B_LA

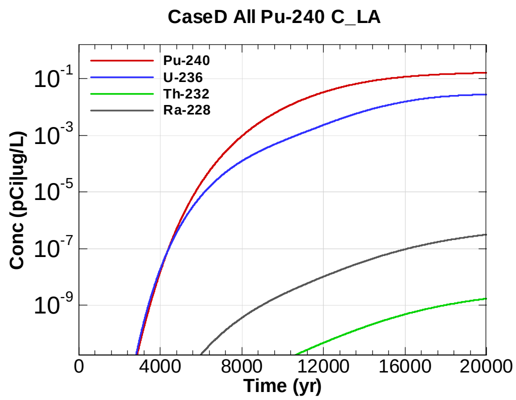

Figure L-158 - 100m Aquifer Concentration for CaseD All Pu-240 C_LA

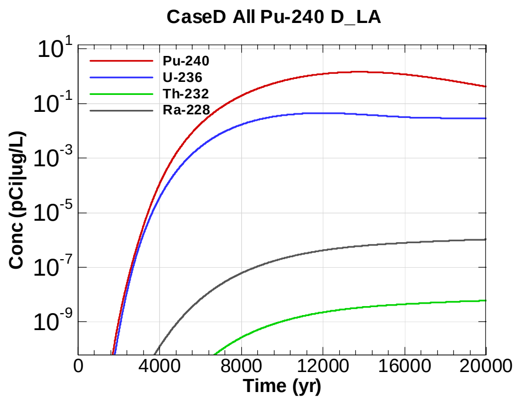

Figure L-159 - 100m Aquifer Concentration for CaseD All Pu-240 D_LA

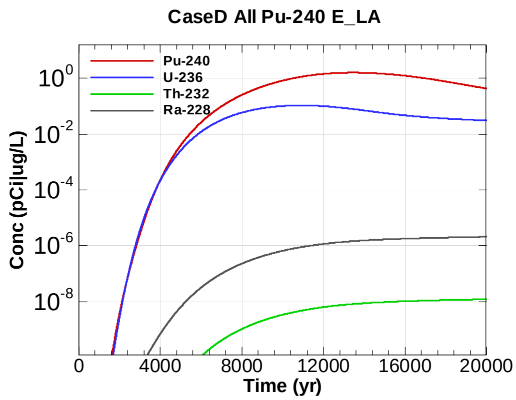

Figure L-160 - 100m Aquifer Concentration for CaseD All Pu-240 E_LA

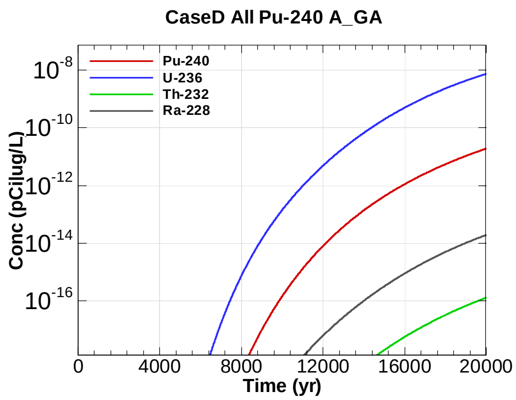

Figure L-161 - 100m Aquifer Concentration for CaseD All Pu-240 A_GA

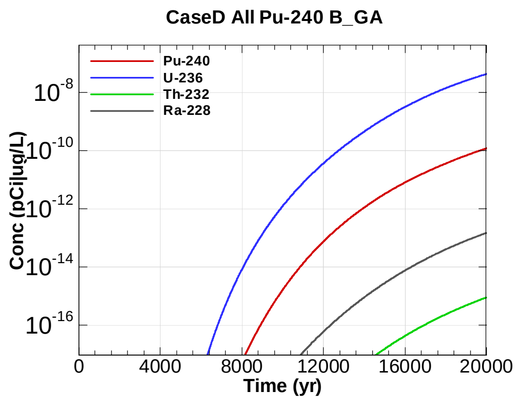

Figure L-162 - 100m Aquifer Concentration for CaseD All Pu-240 B_GA

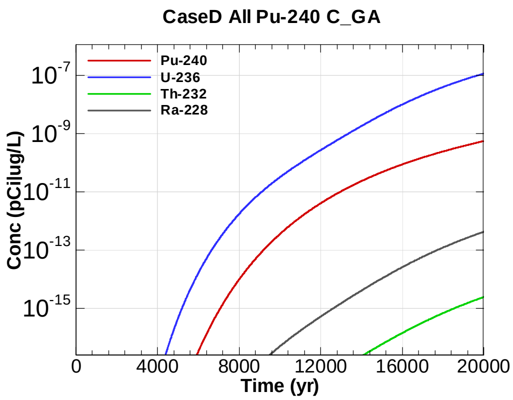

Figure L-163 - 100m Aquifer Concentration for CaseD All Pu-240 C_GA

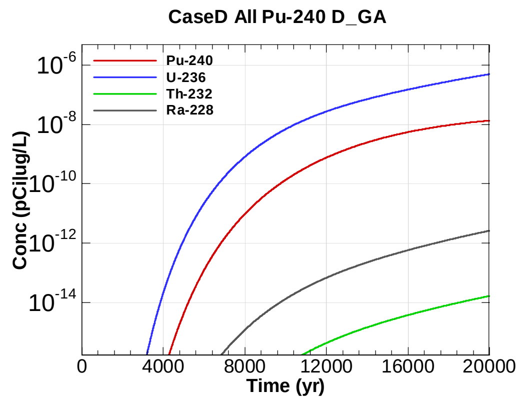

Figure L-164 - 100m Aquifer Concentration for CaseD All Pu-240 D_GA

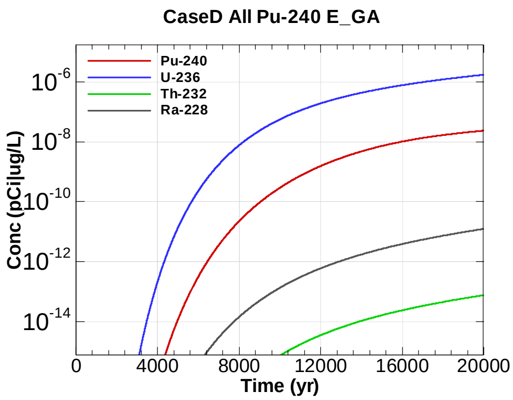

Figure L-165 - 100m Aquifer Concentration for CaseD All Pu-240 E_GA

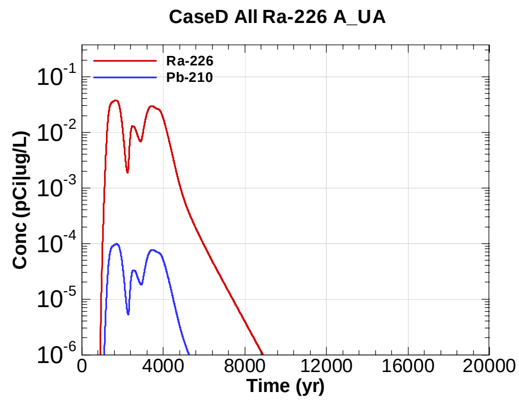

Figure L-166 - 100m Aquifer Concentration for CaseD All Ra-226 A_UA

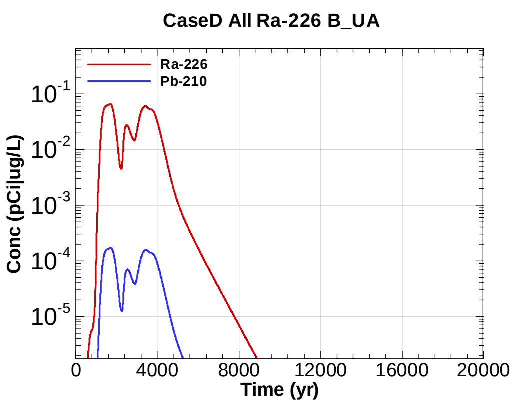

Figure L-167 - 100m Aquifer Concentration for CaseD All Ra-226 B_UA

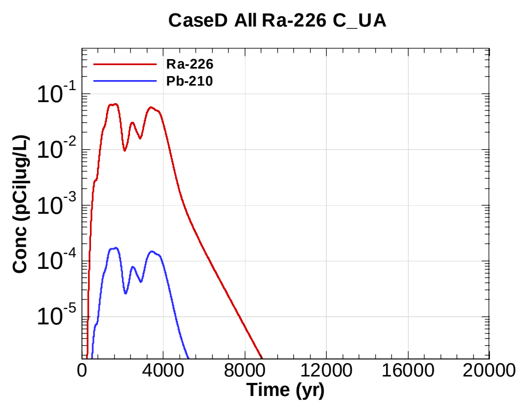

Figure L-168 - 100m Aquifer Concentration for CaseD All Ra-226 C_UA

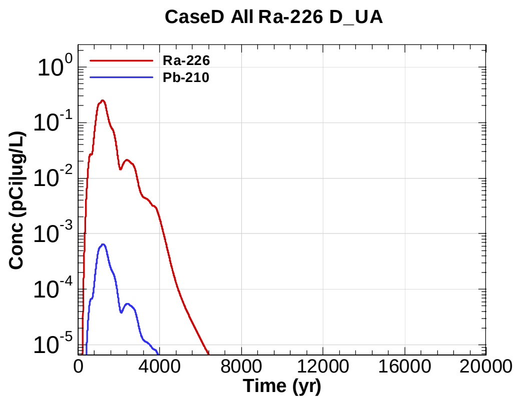

Figure L-169 - 100m Aquifer Concentration for CaseD All Ra-226 D_UA

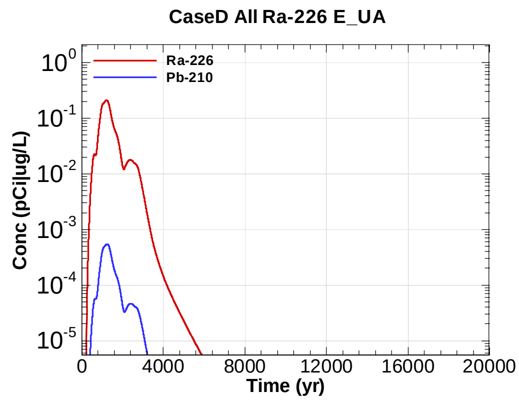

Figure L-170 - 100m Aquifer Concentration for CaseD All Ra-226 E_UA

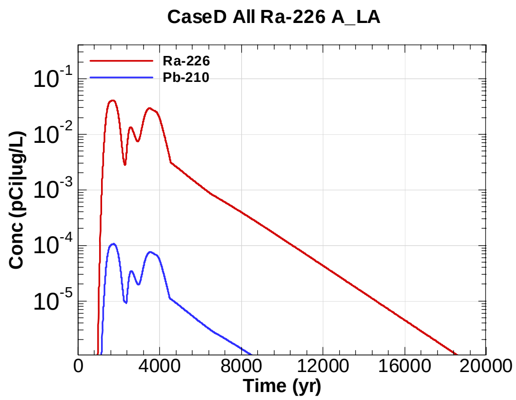

Figure L-171 - 100m Aquifer Concentration for CaseD All Ra-226 A_LA

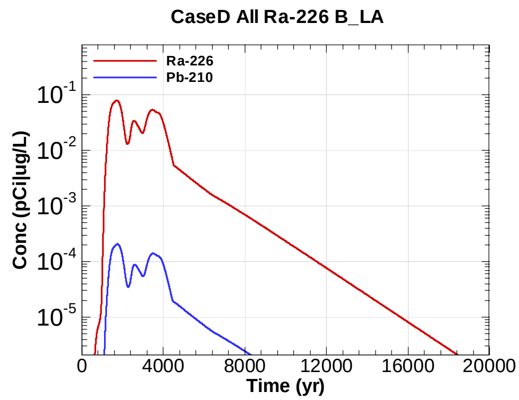

Figure L-172 - 100m Aquifer Concentration for CaseD All Ra-226 B_LA

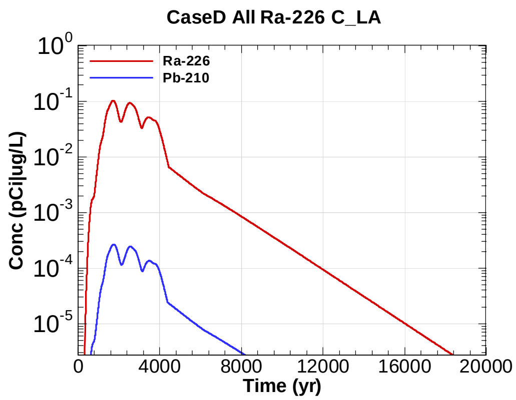

Figure L-173 - 100m Aquifer Concentration for CaseD All Ra-226 C_LA

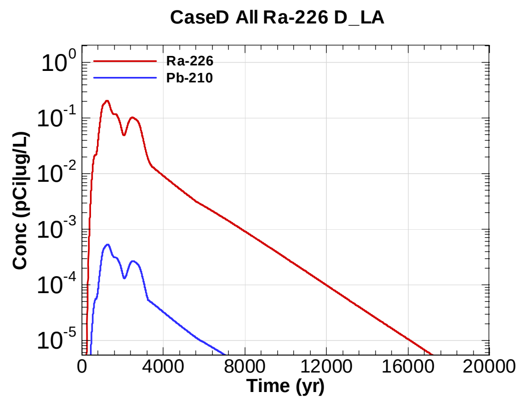

Figure L-174 - 100m Aquifer Concentration for CaseD All Ra-226 D_LA

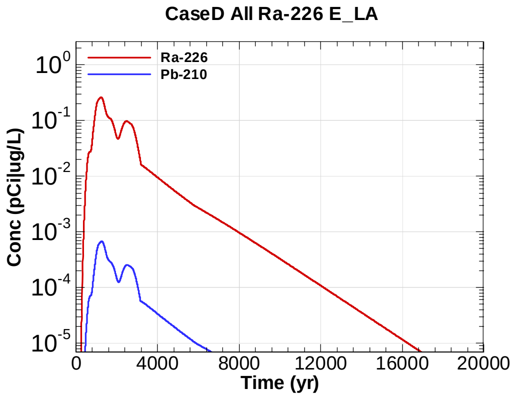

Figure L-175 - 100m Aquifer Concentration for CaseD All Ra-226 E_LA

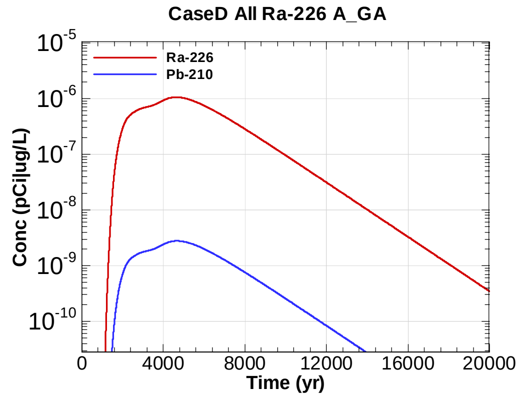

Figure L-176 - 100m Aquifer Concentration for CaseD All Ra-226 A_GA

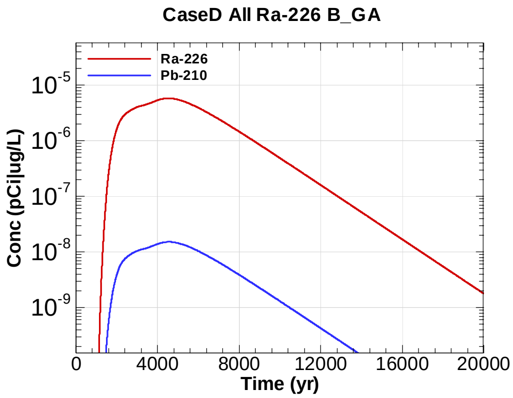

Figure L-177 - 100m Aquifer Concentration for CaseD All Ra-226 B_GA

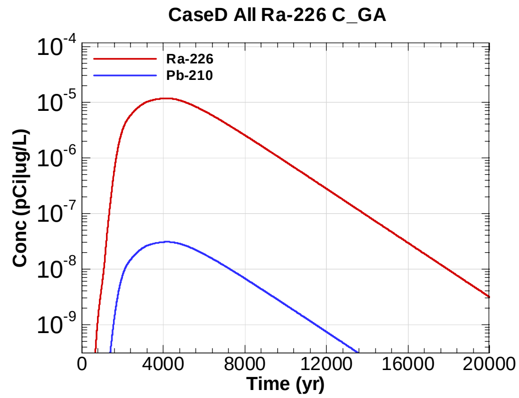

Figure L-178 - 100m Aquifer Concentration for CaseD All Ra-226 C_GA

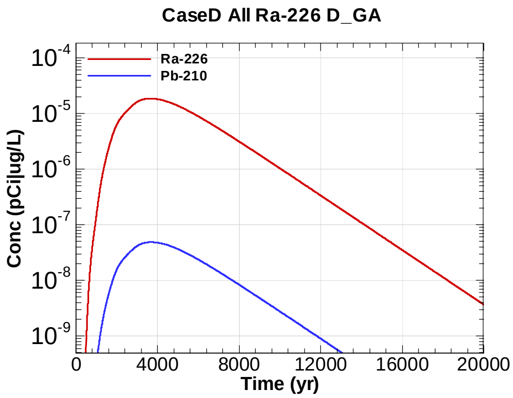

Figure L-179 - 100m Aquifer Concentration for CaseD All Ra-226 D_GA

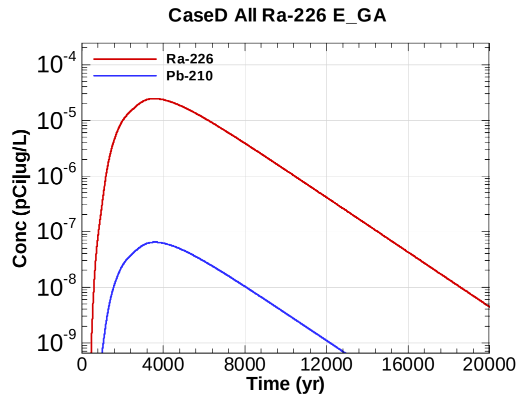

Figure L-180 - 100m Aquifer Concentration for CaseD All Ra-226 E_GA

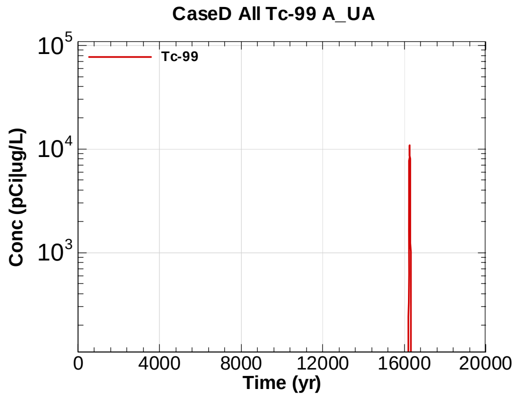

Figure L-181 - 100m Aquifer Concentration for CaseD All Tc-99 A_UA

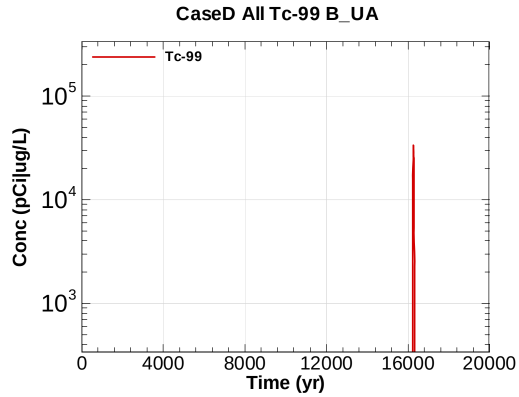

Figure L-182 - 100m Aquifer Concentration for CaseD All Tc-99 B_UA

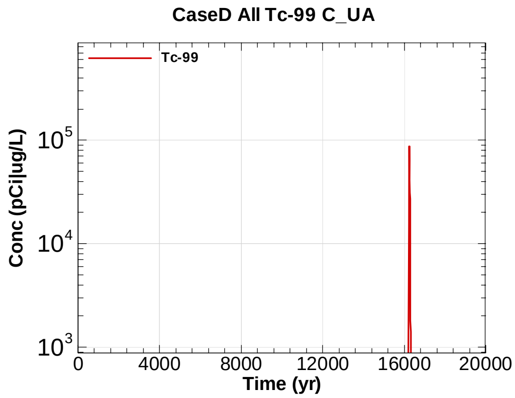

Figure L-183 - 100m Aquifer Concentration for CaseD All Tc-99 C_UA

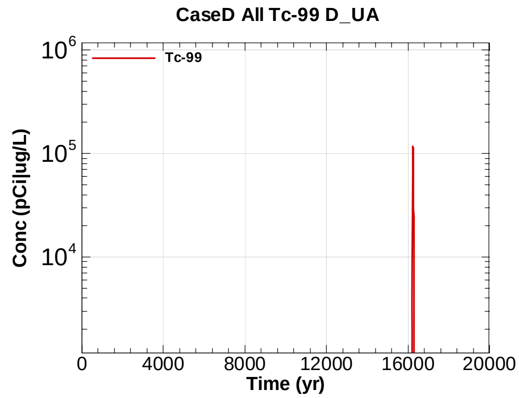

Figure L-184 - 100m Aquifer Concentration for CaseD All Tc-99 D_UA

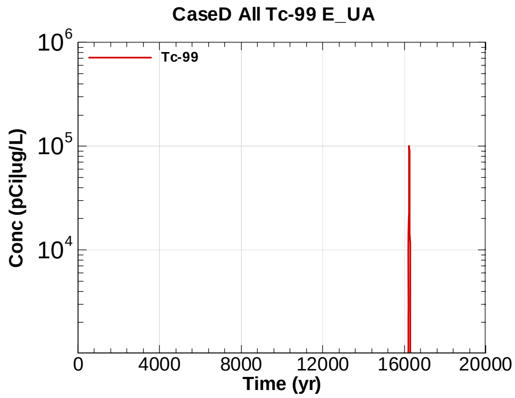

Figure L-185 - 100m Aquifer Concentration for CaseD All Tc-99 E_UA

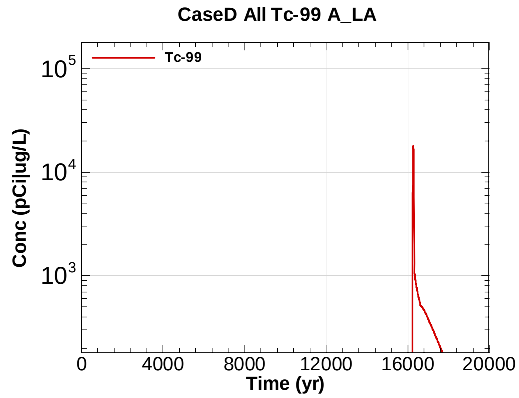

Figure L-186 - 100m Aquifer Concentration for CaseD All Tc-99 A_LA

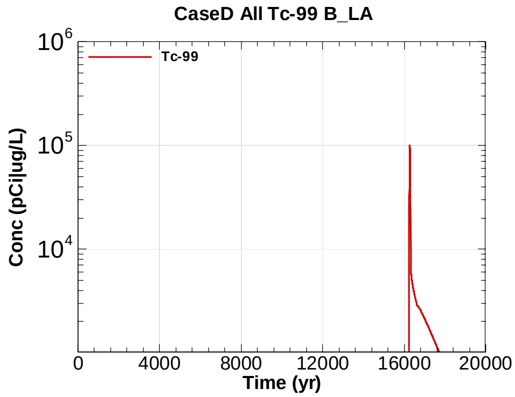

Figure L-187 - 100m Aquifer Concentration for CaseD All Tc-99 B_LA

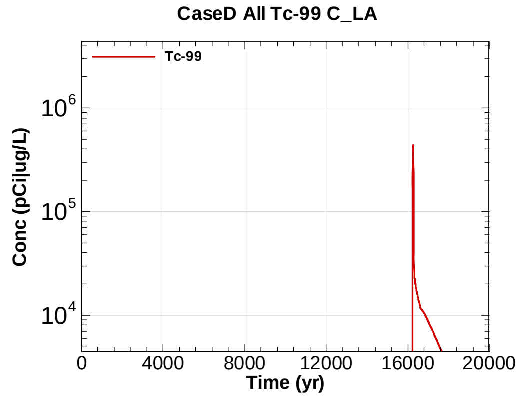

Figure L-188 - 100m Aquifer Concentration for CaseD All Tc-99 C_LA

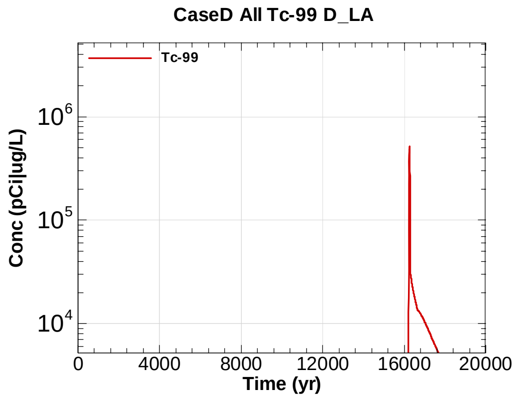

Figure L-189 - 100m Aquifer Concentration for CaseD All Tc-99 D_LA

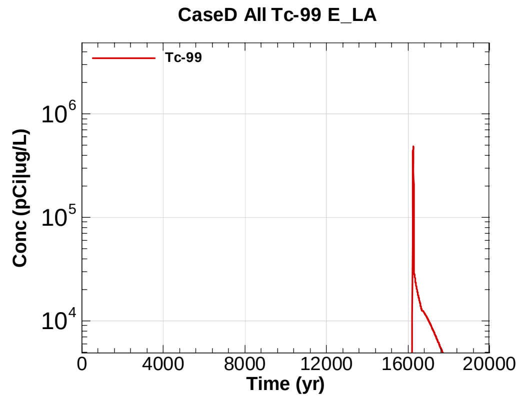

Figure L-190 - 100m Aquifer Concentration for CaseD All Tc-99 E_LA

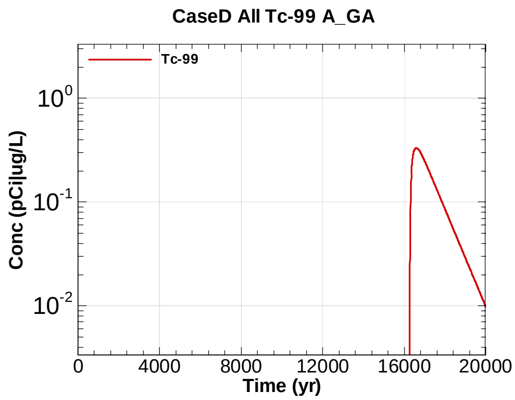

Figure L-191 - 100m Aquifer Concentration for CaseD All Tc-99 A_GA

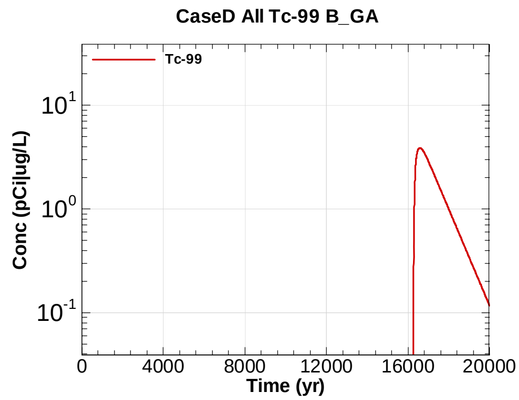

Figure L-192 - 100m Aquifer Concentration for CaseD All Tc-99 B_GA

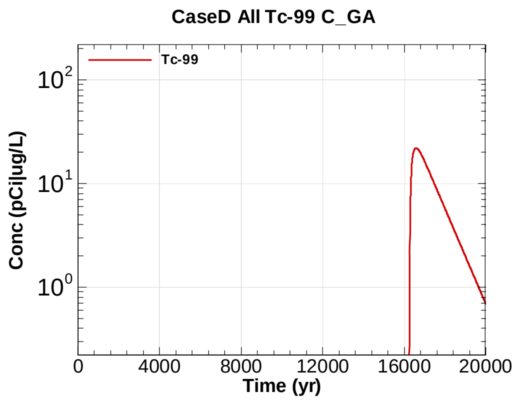

Figure L-193 - 100m Aquifer Concentration for CaseD All Tc-99 C_GA

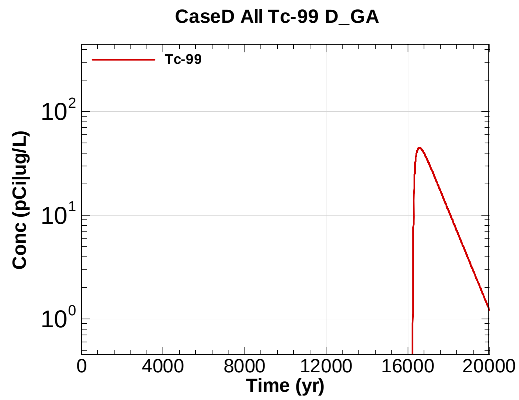

Figure L-194 - 100m Aquifer Concentration for CaseD All Tc-99 D_GA

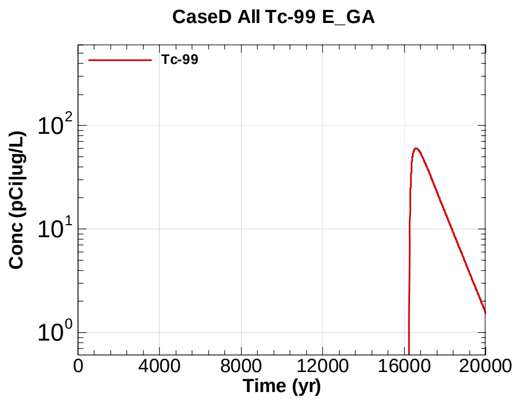

Figure L-195 - 100m Aquifer Concentration for CaseD All Tc-99 E_GA

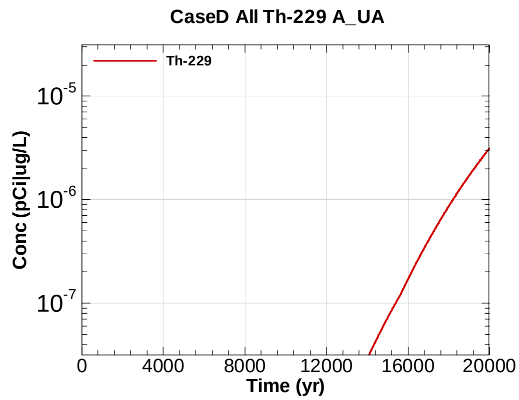

Figure L-196 - 100m Aquifer Concentration for CaseD All Th-229 A_UA

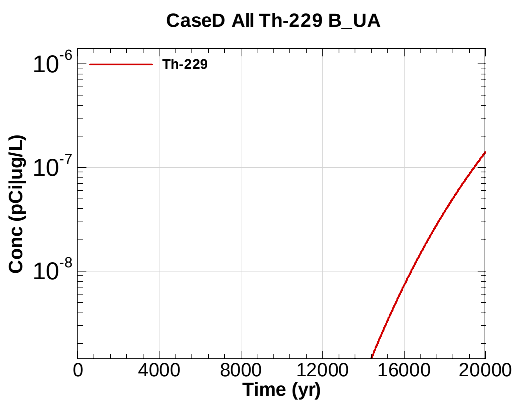

Figure L-197 - 100m Aquifer Concentration for CaseD All Th-229 B_UA

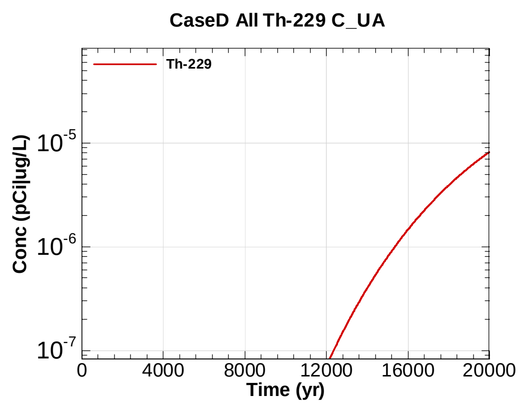

Figure L-198 - 100m Aquifer Concentration for CaseD All Th-229 C_UA

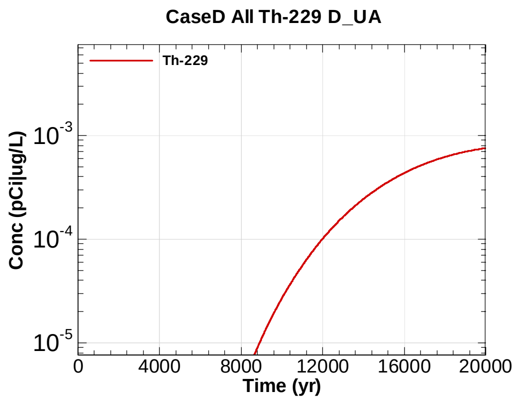

Figure L-199 - 100m Aquifer Concentration for CaseD All Th-229 D_UA

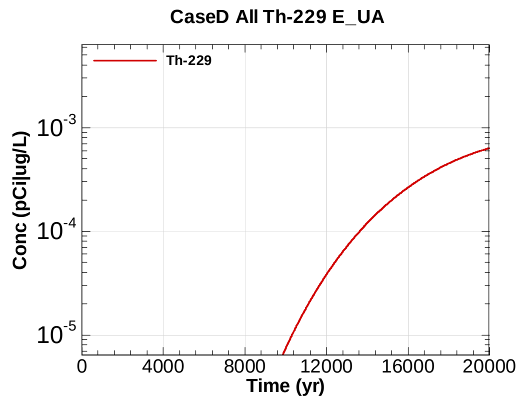

Figure L-200 - 100m Aquifer Concentration for CaseD All Th-229 E_UA

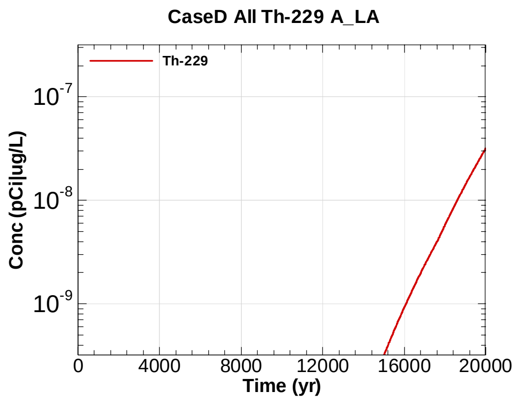

Figure L-201 - 100m Aquifer Concentration for CaseD All Th-229 A_LA

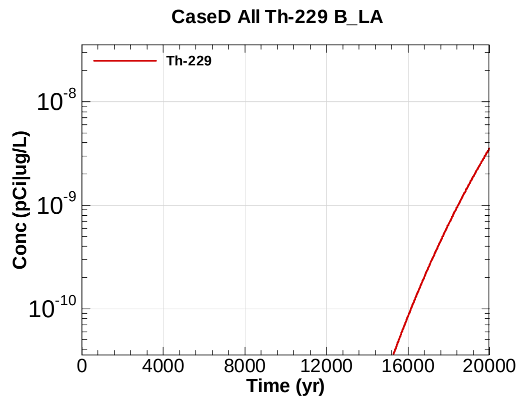

Figure L-202 - 100m Aquifer Concentration for CaseD All Th-229 B_LA

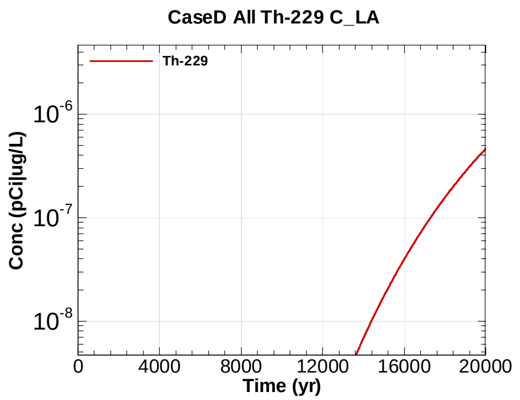

Figure L-203 - 100m Aquifer Concentration for CaseD All Th-229 C_LA

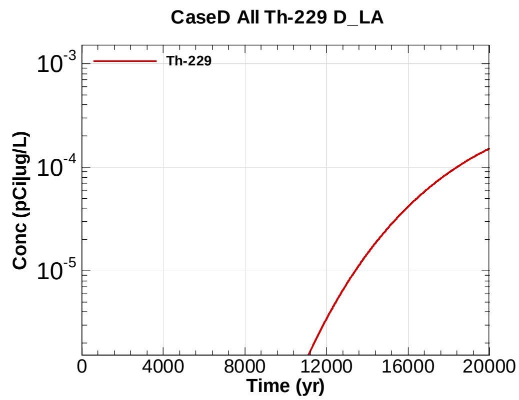

Figure L-204 - 100m Aquifer Concentration for CaseD All Th-229 D_LA

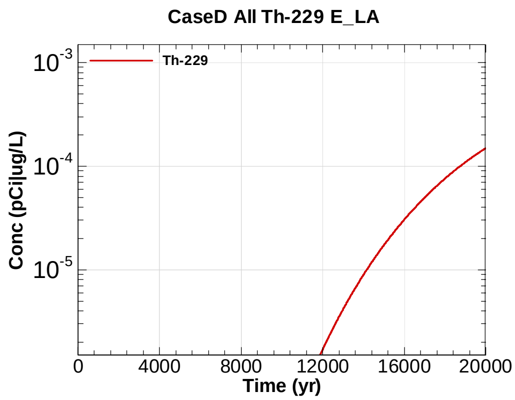

Figure L-205 - 100m Aquifer Concentration for CaseD All Th-229 E_LA

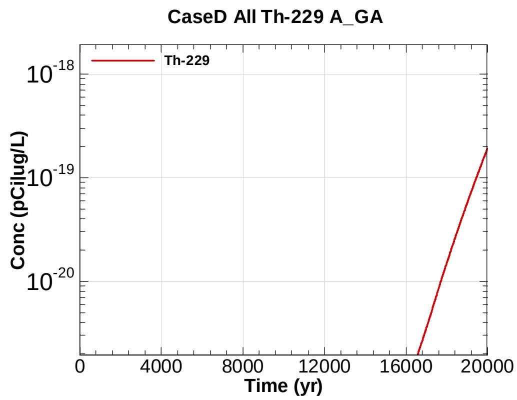

Figure L-206 - 100m Aquifer Concentration for CaseD All Th-229 A_GA

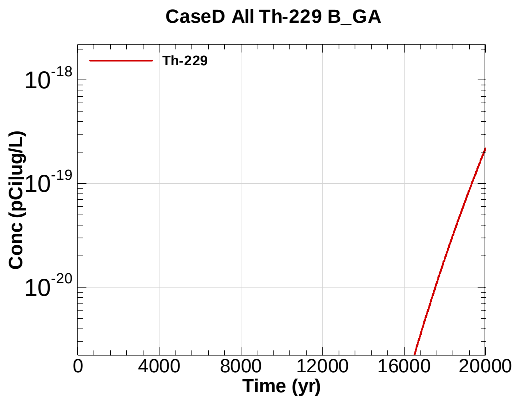

Figure L-207 - 100m Aquifer Concentration for CaseD All Th-229 B_GA

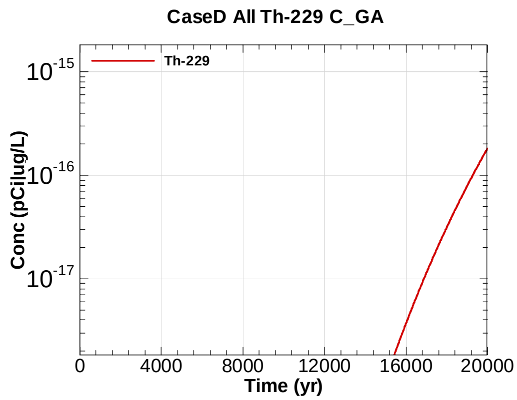

Figure L-208 - 100m Aquifer Concentration for CaseD All Th-229 C_GA

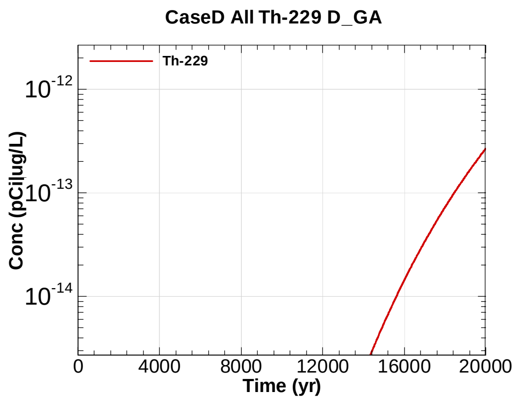

Figure L-209 - 100m Aquifer Concentration for CaseD All Th-229 D_GA

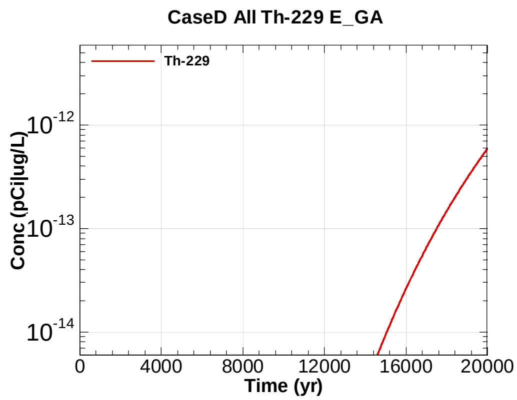

Figure L-210 - 100m Aquifer Concentration for CaseD All Th-229 E_GA

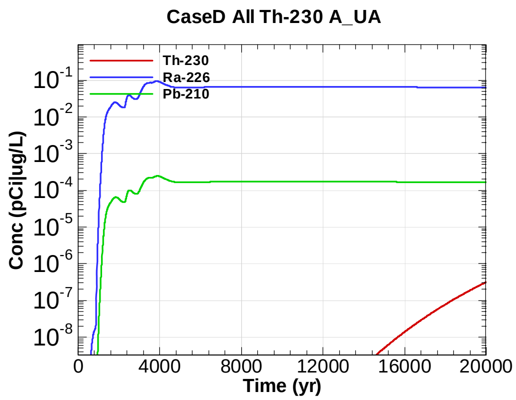

Figure L-211 - 100m Aquifer Concentration for CaseD All Th-230 A_UA

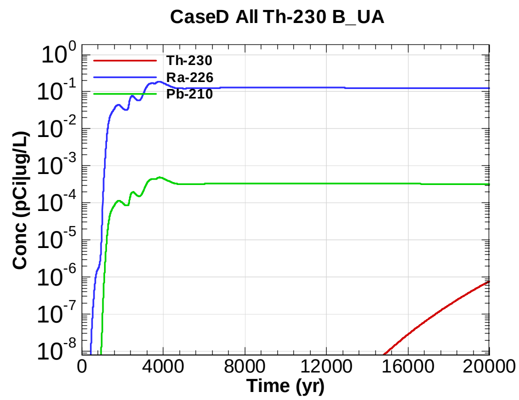

Figure L-212 - 100m Aquifer Concentration for CaseD All Th-230 B_UA

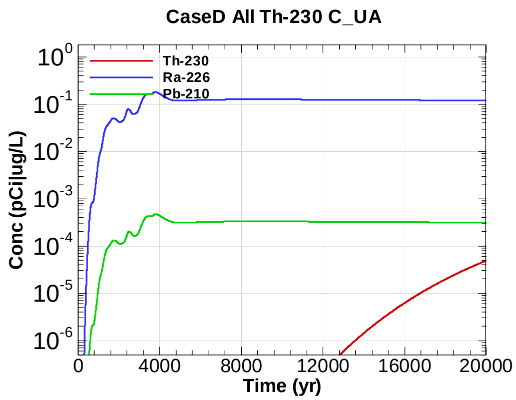

Figure L-213 - 100m Aquifer Concentration for CaseD All Th-230 C_UA

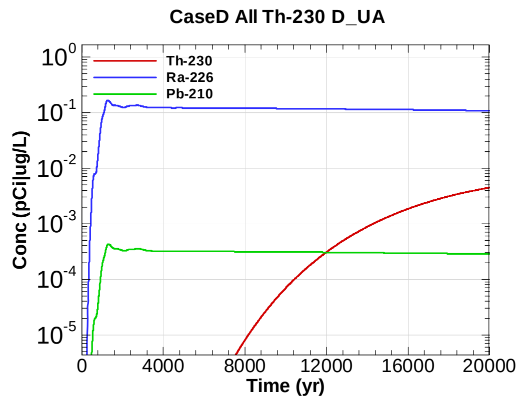

Figure L-214 - 100m Aquifer Concentration for CaseD All Th-230 D_UA

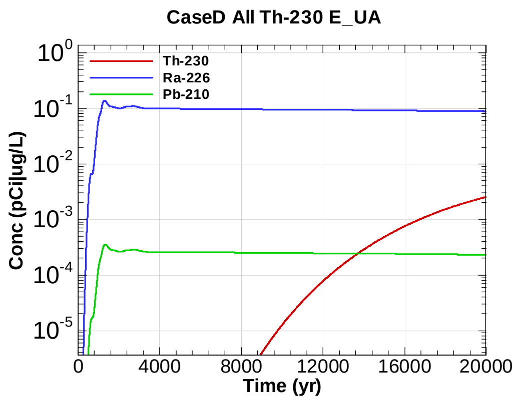

Figure L-215 - 100m Aquifer Concentration for CaseD All Th-230 E_UA

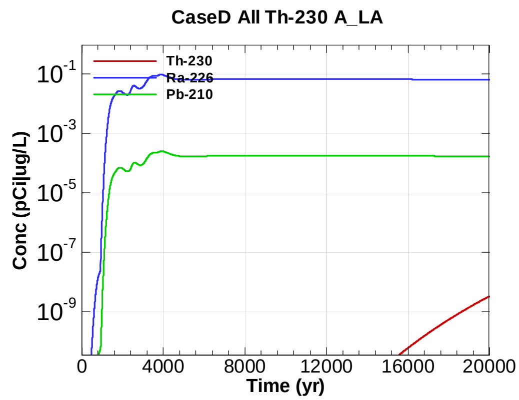

Figure L-216 - 100m Aquifer Concentration for CaseD All Th-230 A_LA

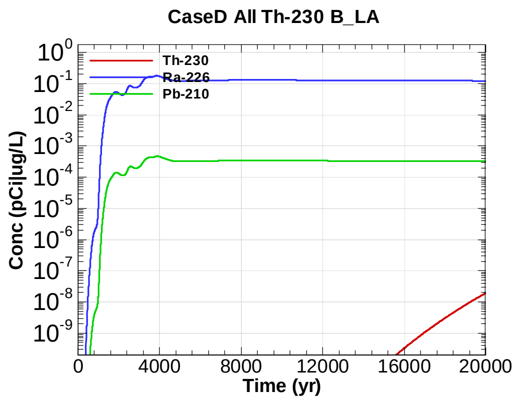

Figure L-217 - 100m Aquifer Concentration for CaseD All Th-230 B_LA

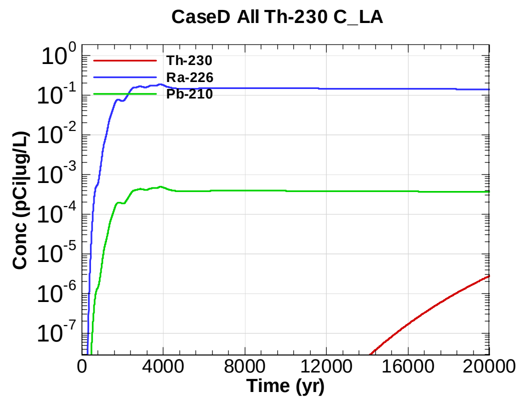

Figure L-218 - 100m Aquifer Concentration for CaseD All Th-230 C_LA

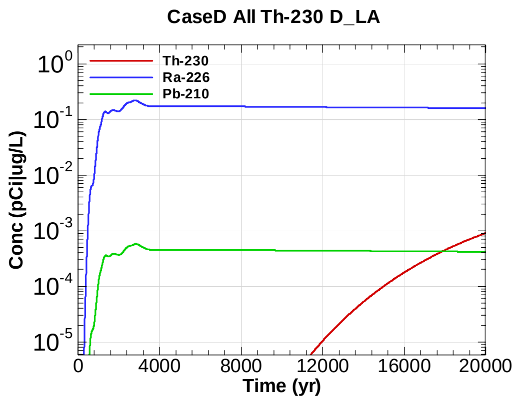

Figure L-219 - 100m Aquifer Concentration for CaseD All Th-230 D_LA

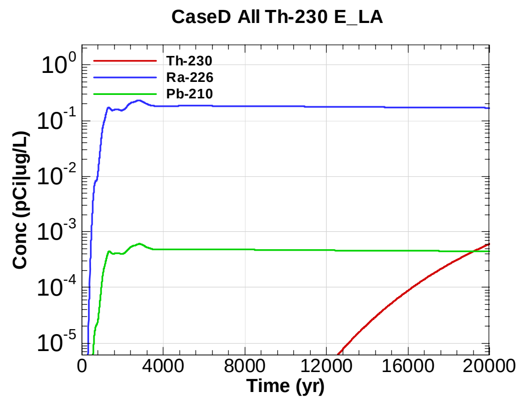

Figure L-220 - 100m Aquifer Concentration for CaseD All Th-230 E_LA

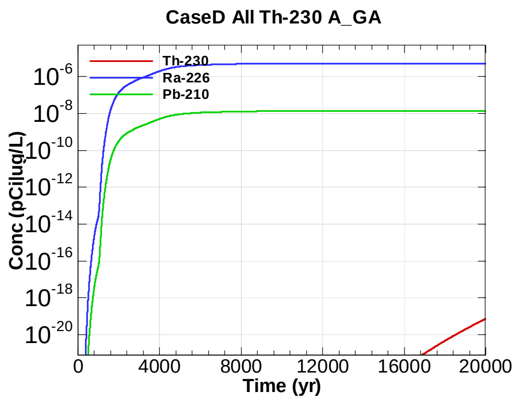

Figure L-221 - 100m Aquifer Concentration for CaseD All Th-230 A_GA

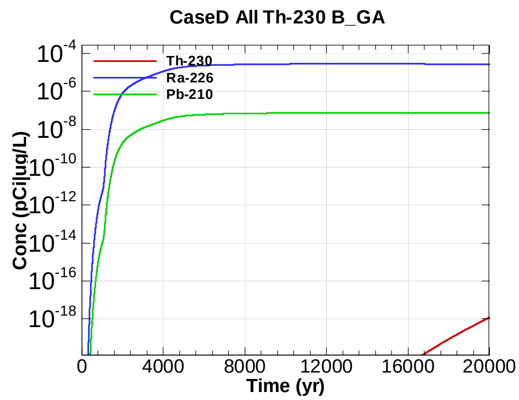

Figure L-222 - 100m Aquifer Concentration for CaseD All Th-230 B_GA

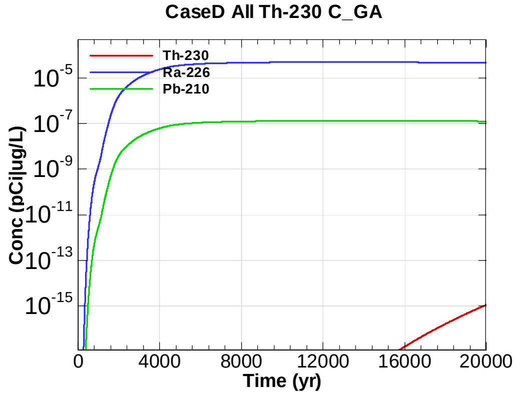

Figure L-223 - 100m Aquifer Concentration for CaseD All Th-230 C_GA

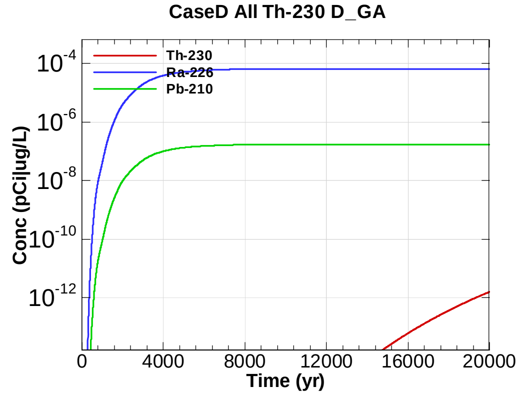

Figure L-224 - 100m Aquifer Concentration for CaseD All Th-230 D_GA

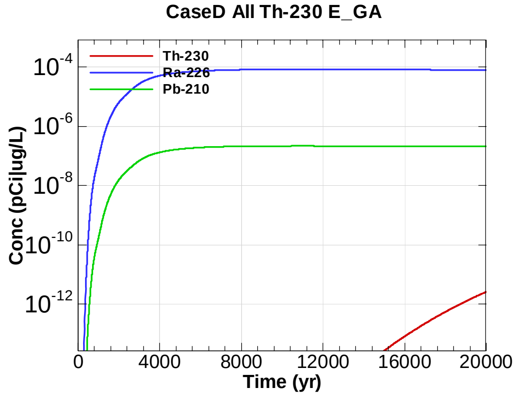

Figure L-225 - 100m Aquifer Concentration for CaseD All Th-230 E_GA

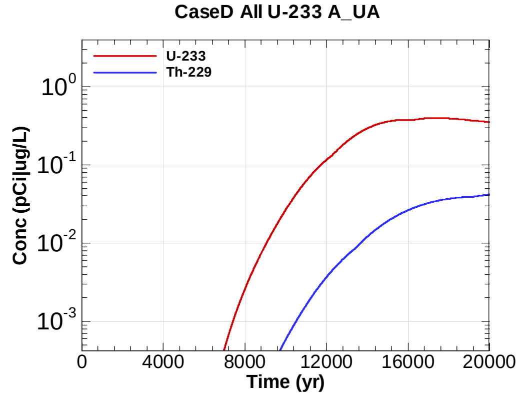

Figure L-226 - 100m Aquifer Concentration for CaseD All U-233 A_UA

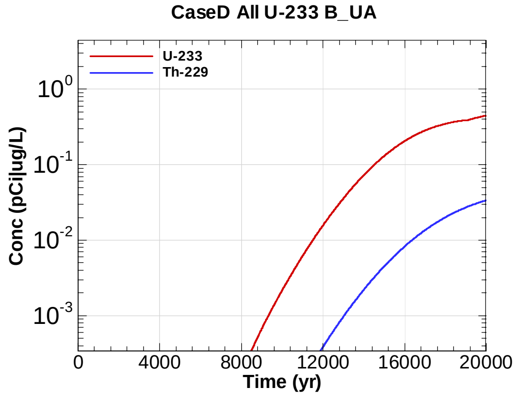

Figure L-227 - 100m Aquifer Concentration for CaseD All U-233 B_UA

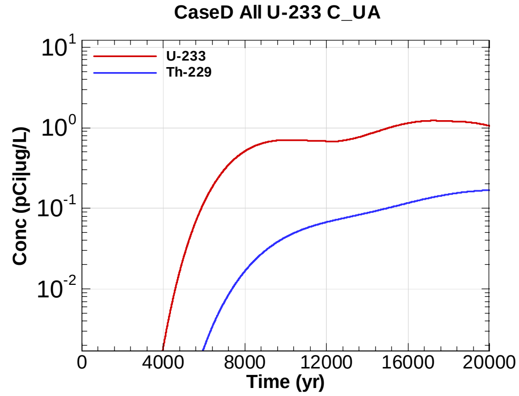

Figure L-228 - 100m Aquifer Concentration for CaseD All U-233 C_UA

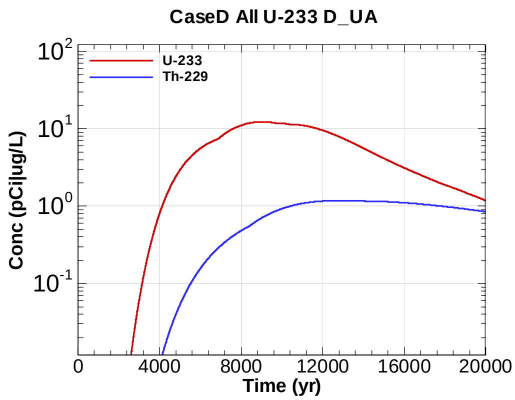

Figure L-229 - 100m Aquifer Concentration for CaseD All U-233 D_UA

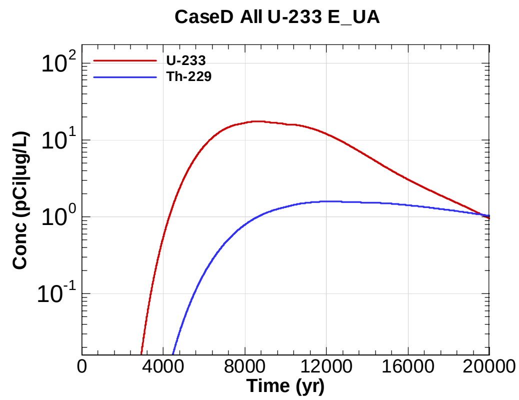

Figure L-230 - 100m Aquifer Concentration for CaseD All U-233 E_UA

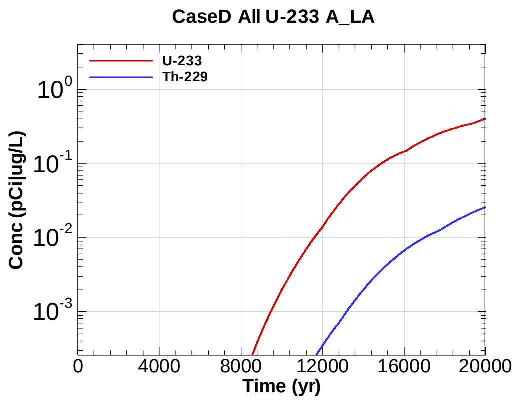

Figure L-231 - 100m Aquifer Concentration for CaseD All U-233 A_LA

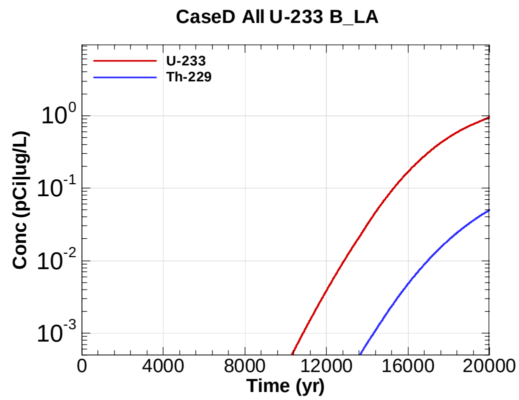

Figure L-232 - 100m Aquifer Concentration for CaseD All U-233 B_LA

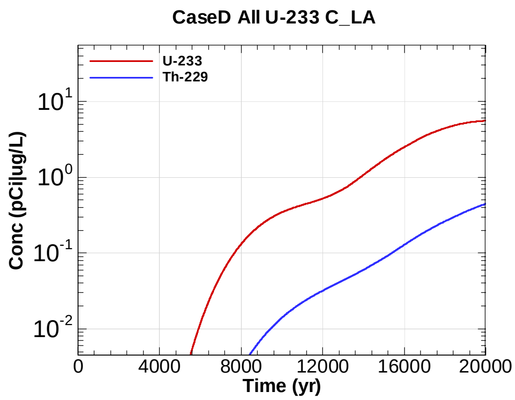

Figure L-233 - 100m Aquifer Concentration for CaseD All U-233 C_LA

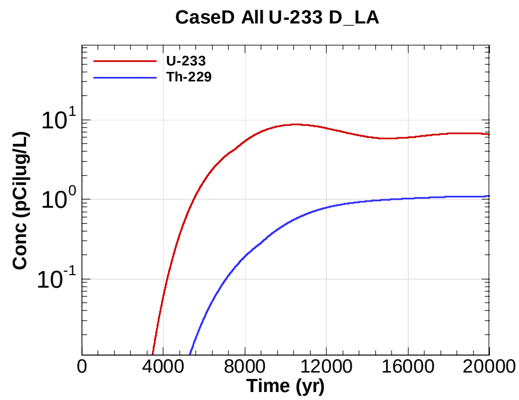

Figure L-234 - 100m Aquifer Concentration for CaseD All U-233 D_LA

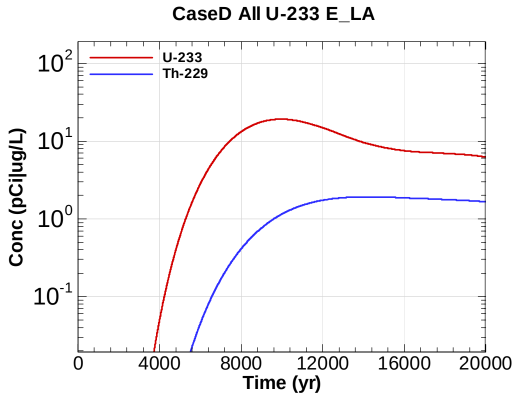

Figure L-235 - 100m Aquifer Concentration for CaseD All U-233 E_LA

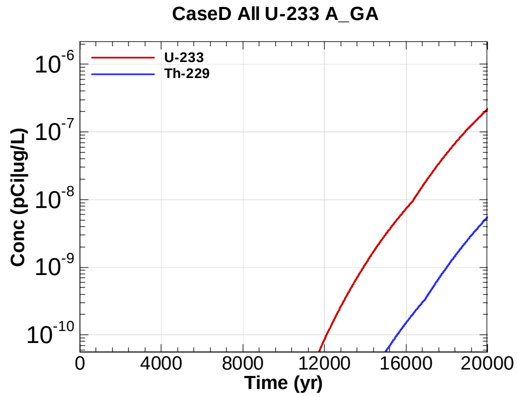

Figure L-236 - 100m Aquifer Concentration for CaseD All U-233 A_GA

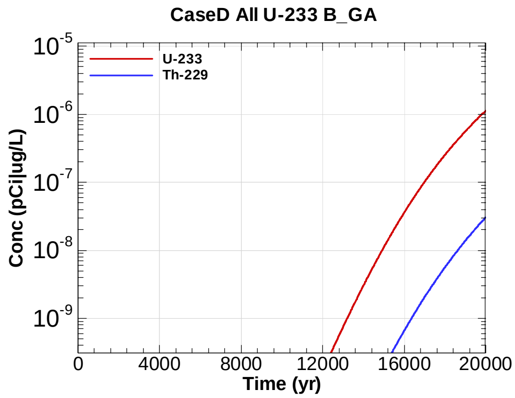

Figure L-237 - 100m Aquifer Concentration for CaseD All U-233 B_GA

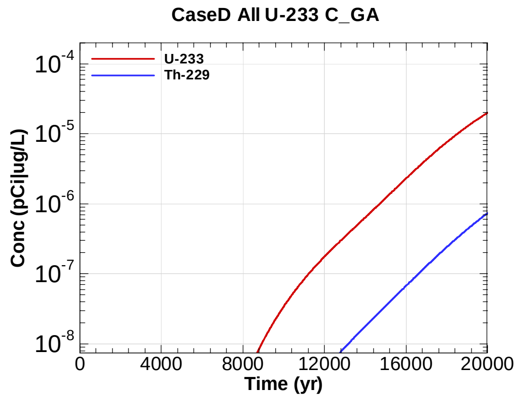

Figure L-238 - 100m Aquifer Concentration for CaseD All U-233 C_GA

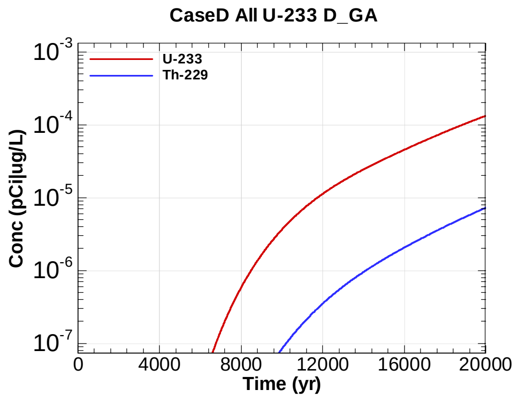

Figure L-239 - 100m Aquifer Concentration for CaseD All U-233 D_GA

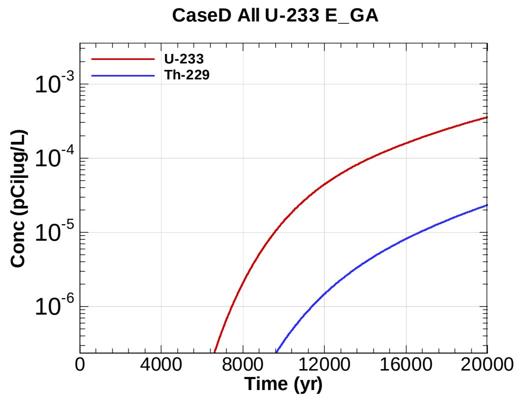

Figure L-240 - 100m Aquifer Concentration for CaseD All U-233 E_GA

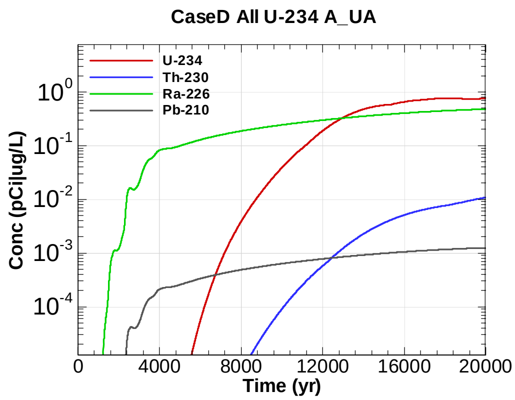

Figure L-241 - 100m Aquifer Concentration for CaseD All U-234 A_UA

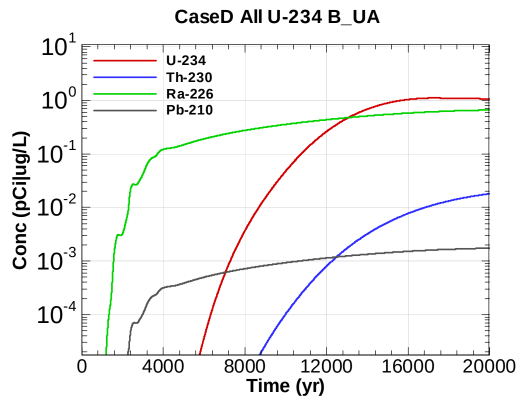

Figure L-242 - 100m Aquifer Concentration for CaseD All U-234 B_UA

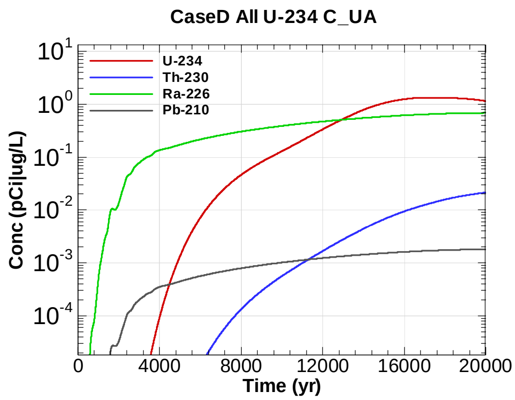

Figure L-243 - 100m Aquifer Concentration for CaseD All U-234 C_UA

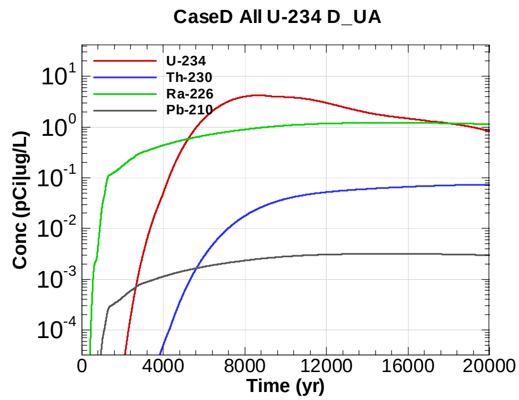

Figure L-244 - 100m Aquifer Concentration for CaseD All U-234 D_UA

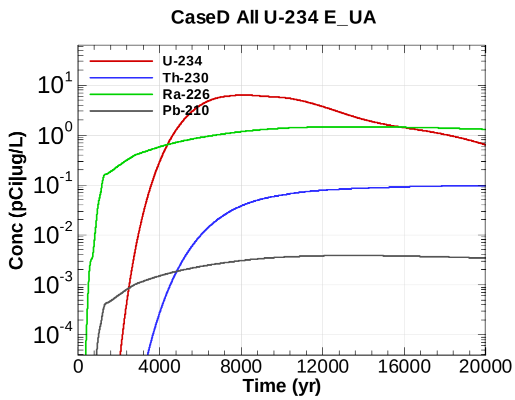

Figure L-245 - 100m Aquifer Concentration for CaseD All U-234 E_UA

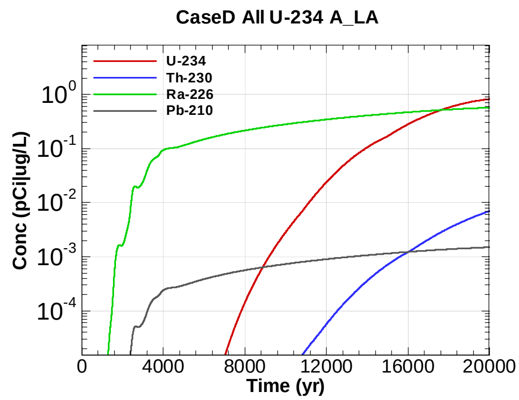

Figure L-246 - 100m Aquifer Concentration for CaseD All U-234 A_LA

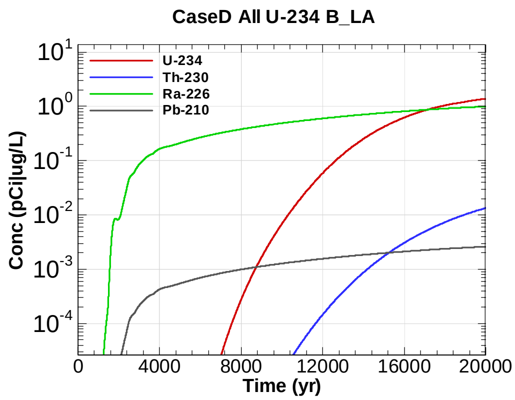

Figure L-247 - 100m Aquifer Concentration for CaseD All U-234 B_LA

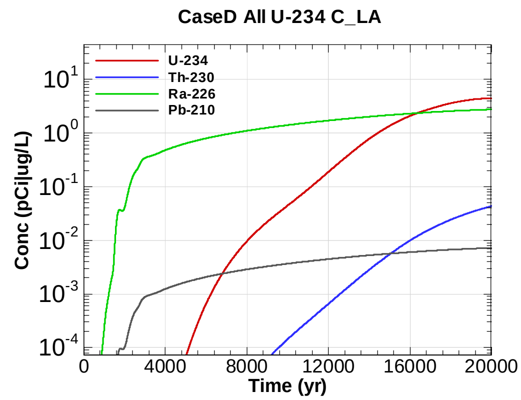

Figure L-248 - 100m Aquifer Concentration for CaseD All U-234 C_LA

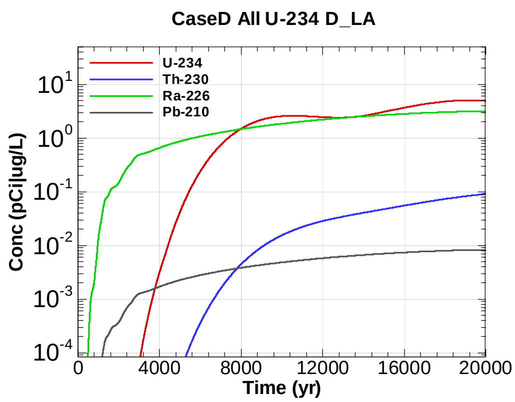

Figure L-249 - 100m Aquifer Concentration for CaseD All U-234 D_LA

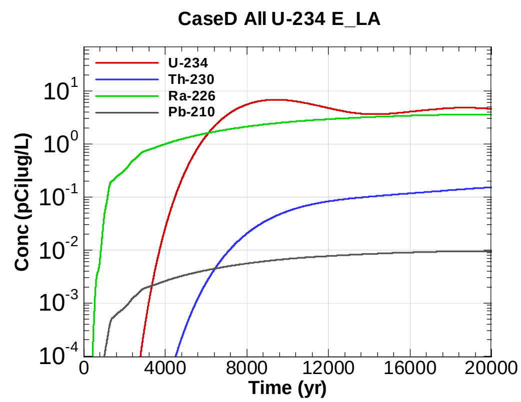

Figure L-250 - 100m Aquifer Concentration for CaseD All U-234 E_LA

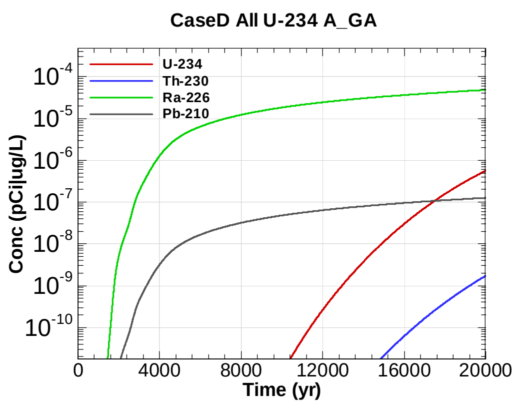

Figure L-251 - 100m Aquifer Concentration for CaseD All U-234 A_GA

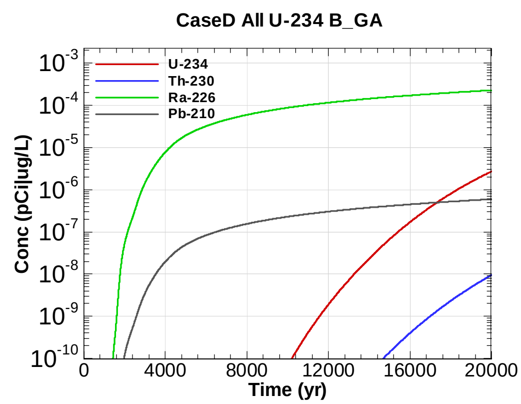

Figure L-252 - 100m Aquifer Concentration for CaseD All U-234 B_GA

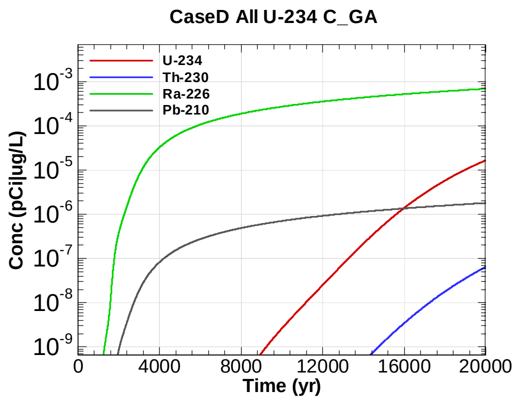

Figure L-253 - 100m Aquifer Concentration for CaseD All U-234 C_GA

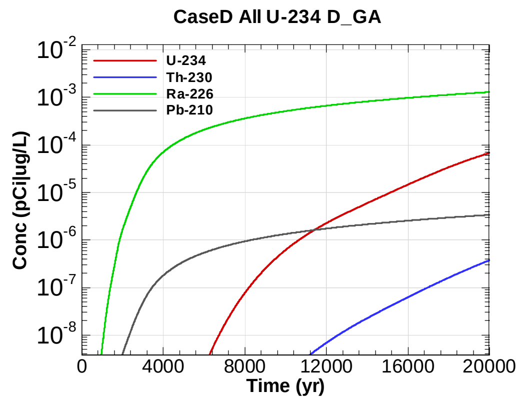

Figure L-254 - 100m Aquifer Concentration for CaseD All U-234 D_GA

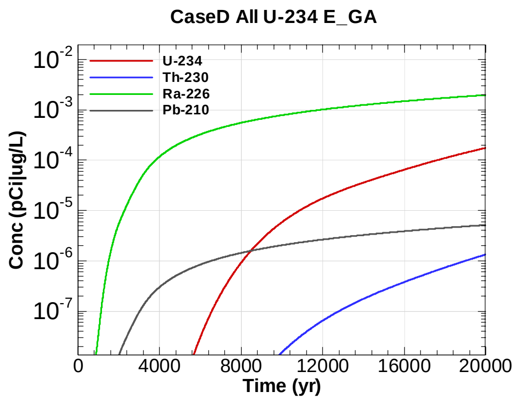

Figure L-255 - 100m Aquifer Concentration for CaseD All U-234 E_GA

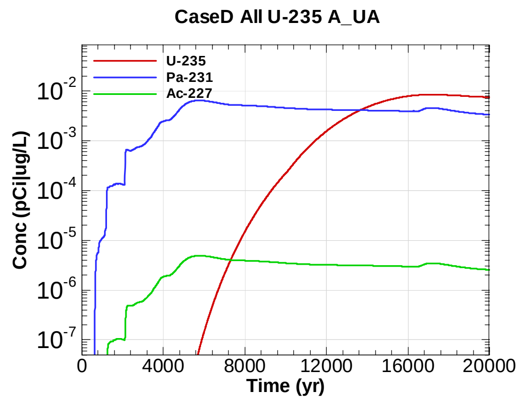

Figure L-256 - 100m Aquifer Concentration for CaseD All U-235 A_UA

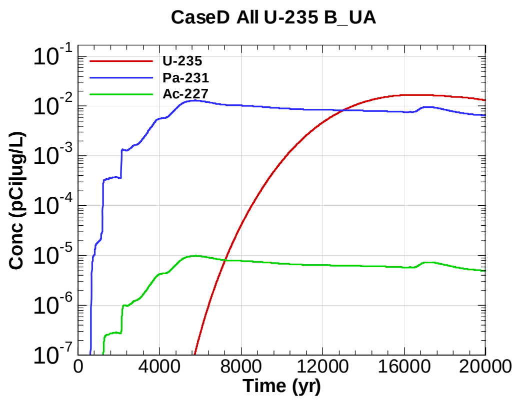

Figure L-257 - 100m Aquifer Concentration for CaseD All U-235 B_UA

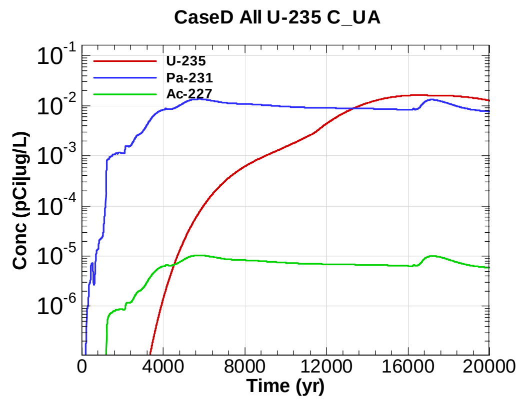

Figure L-258 - 100m Aquifer Concentration for CaseD All U-235 C_UA

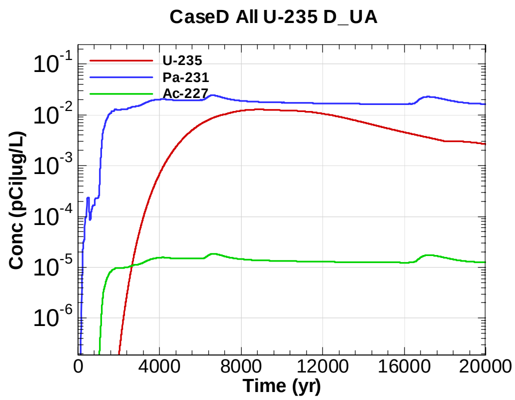

Figure L-259 - 100m Aquifer Concentration for CaseD All U-235 D_UA

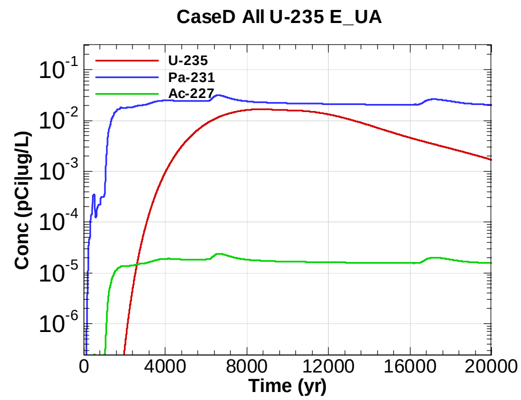

Figure L-260 - 100m Aquifer Concentration for CaseD All U-235 E_UA

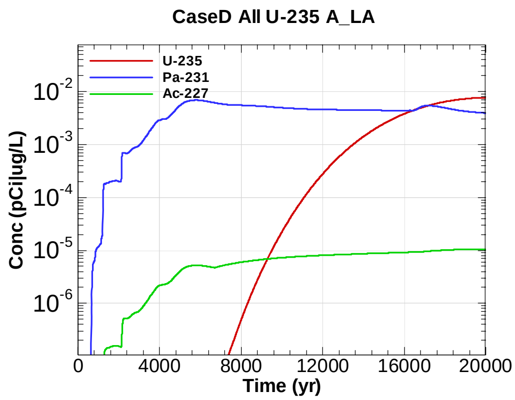

Figure L-261 - 100m Aquifer Concentration for CaseD All U-235 A_LA

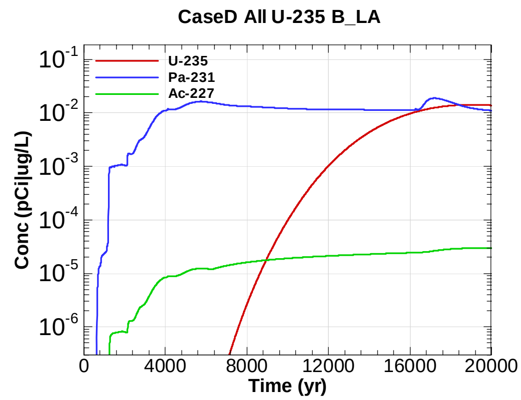

Figure L-262 - 100m Aquifer Concentration for CaseD All U-235 B_LA

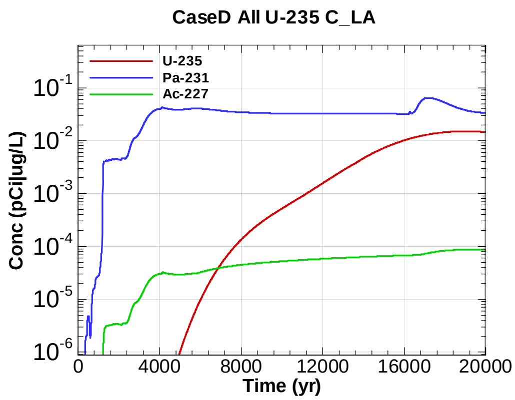

Figure L-263 - 100m Aquifer Concentration for CaseD All U-235 C_LA

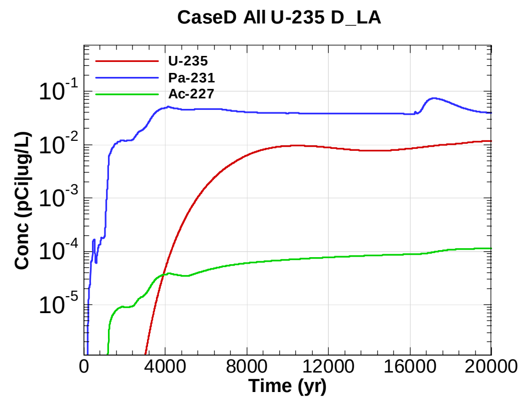

Figure L-264 - 100m Aquifer Concentration for CaseD All U-235 D_LA

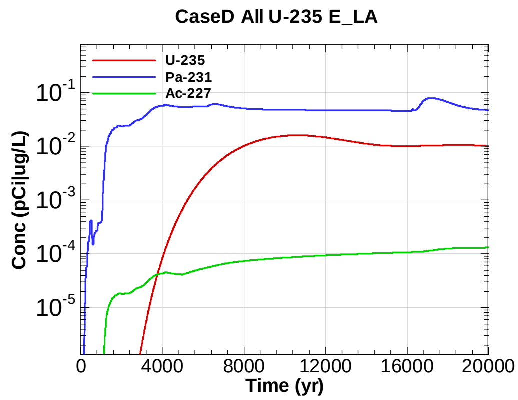

Figure L-265 - 100m Aquifer Concentration for CaseD All U-235 E_LA

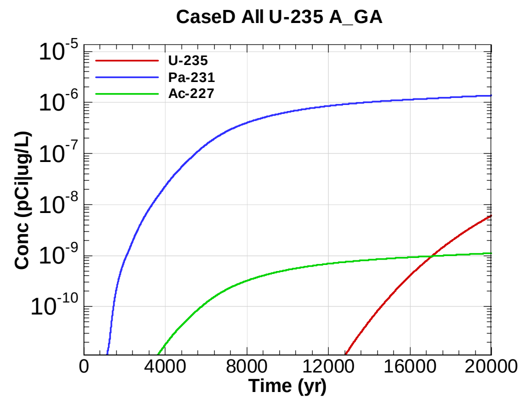

Figure L-266 - 100m Aquifer Concentration for CaseD All U-235 A_GA

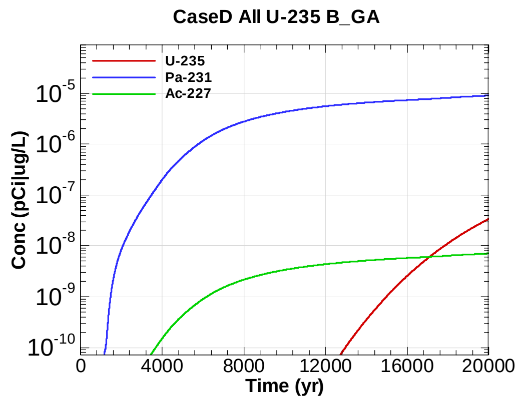

Figure L-267 - 100m Aquifer Concentration for CaseD All U-235 B_GA

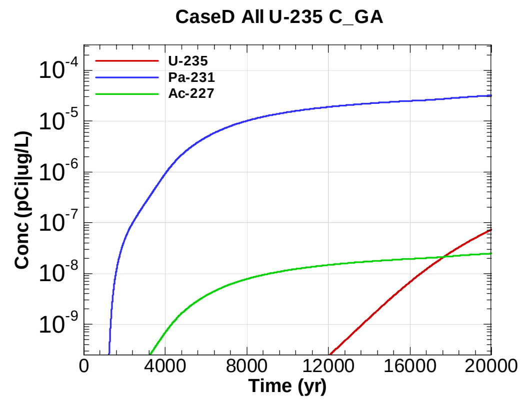

Figure L-268 - 100m Aquifer Concentration for CaseD All U-235 C_GA

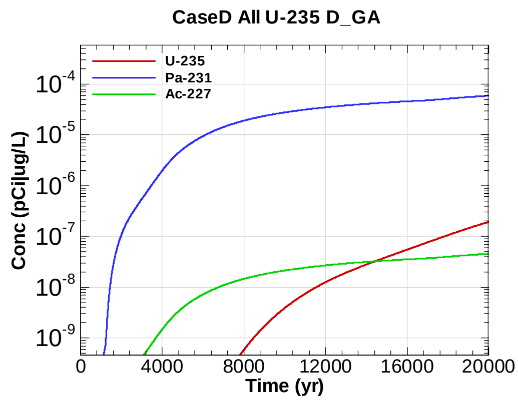

Figure L-269 - 100m Aquifer Concentration for CaseD All U-235 D_GA

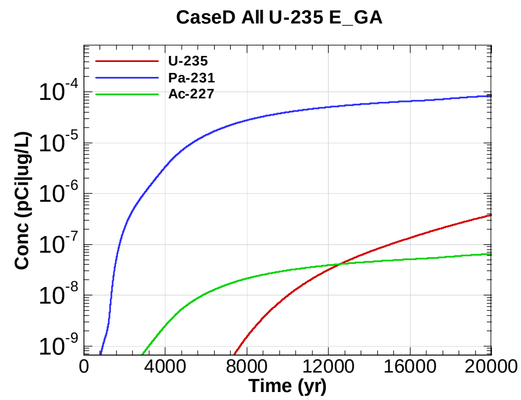

Figure L-270 - 100m Aquifer Concentration for CaseD All U-235 E_GA

Appendix M
100-METER SENSITIVITY RUN RADIONUCLIDE CONCENTRATIONS FOR CASE B

Appendix M contains curves showing the one-hundred meter radiological concentrations (sensitivity run radionuclides only) for the Base Case (Case/Configuration B). 20,000 year concentration results are presented from the three aquifers of concern (Upper Three Runs Aquifer-Upper Zone, Upper Three Runs-Lower Zone, and Gordon Aquifer) for Sectors A through E.

Graph heading example "CaseB All Am-241 A_UA"

Key

CaseB = scenario case/configuration
All = all FTF inventory source
Am-241 = radionuclide of concern
A = sector of concern (see sector map with stream traces)
UA = aquifer of concern
- UA = Upper Three Runs – Upper Zone
- LA = Upper Three Runs – Lower Zone
- GA = Gordon

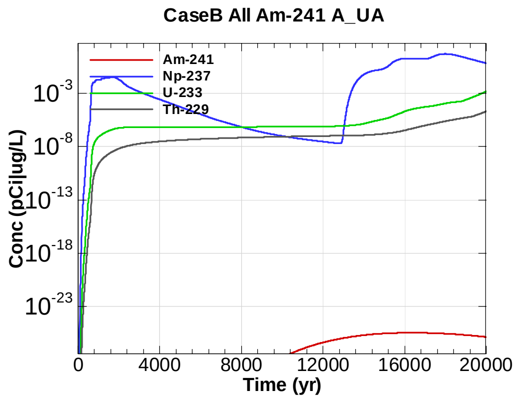

Figure M-1 - 100m Aquifer Concentration for CaseB All Am-241 A_UA

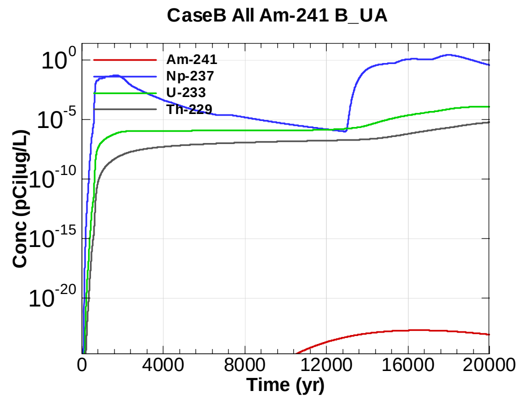

Figure M-2 - 100m Aquifer Concentration for CaseB All Am-241 B_UA

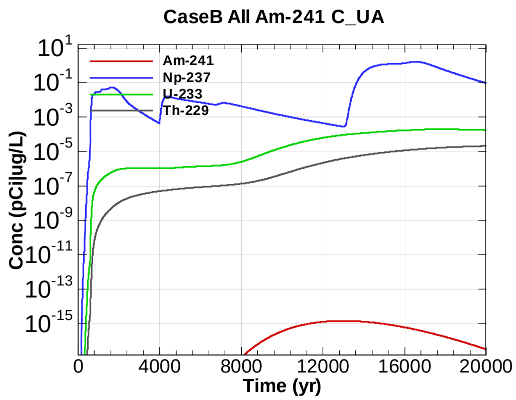

Figure M-3 - 100m Aquifer Concentration for CaseB All Am-241 C_UA

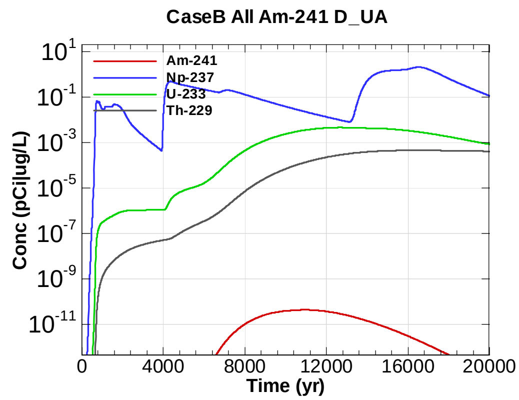

Figure M-4 - 100m Aquifer Concentration for CaseB All Am-241 D_UA

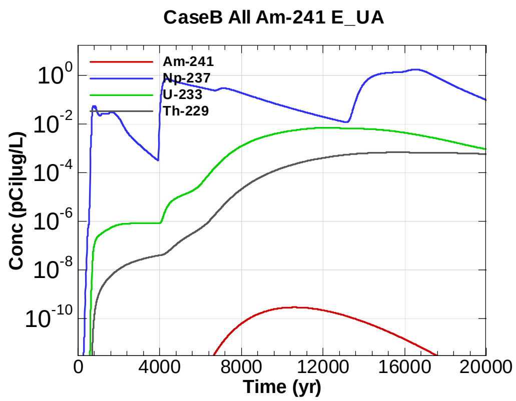

Figure M-5 - 100m Aquifer Concentration for CaseB All Am-241 E_UA

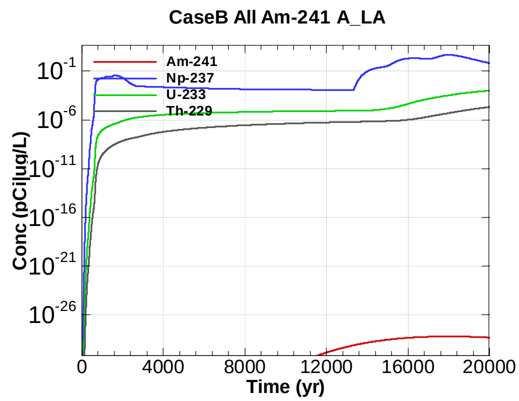

Figure M-6 - 100m Aquifer Concentration for CaseB All Am-241 A_LA

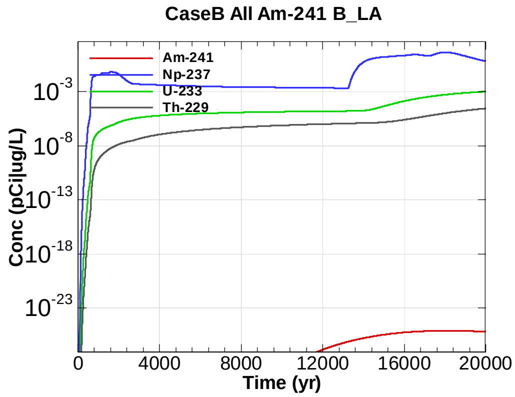

Figure M-7 - 100m Aquifer Concentration for CaseB All Am-241 B_LA

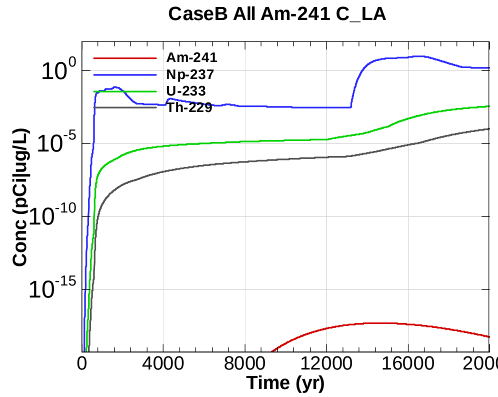

Figure M-8 - 100m Aquifer Concentration for CaseB All Am-241 C_LA

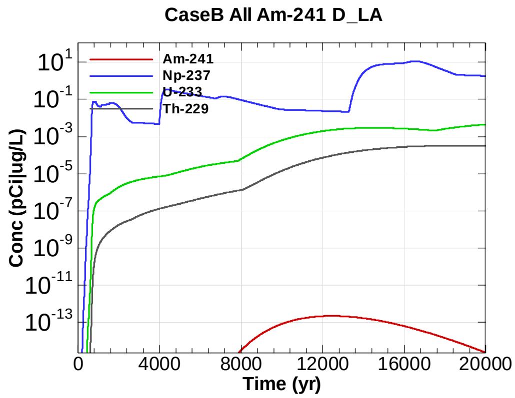

Figure M-9 - 100m Aquifer Concentration for CaseB All Am-241 D_LA

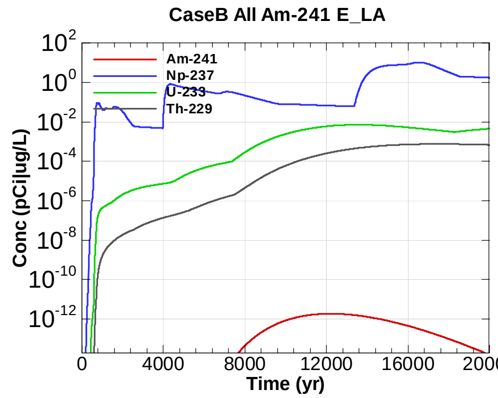

Figure M-10 - 100m Aquifer Concentration for CaseB All Am-241 E_LA

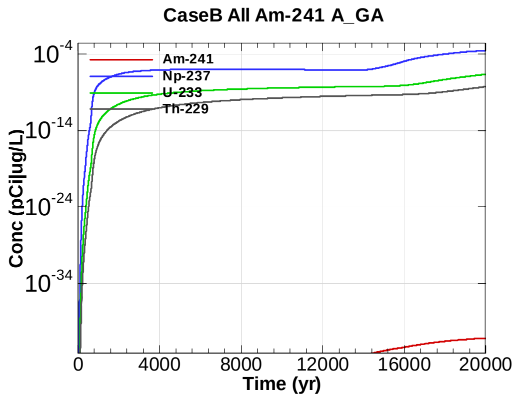

Figure M-11 - 100m Aquifer Concentration for CaseB All Am-241 A_GA

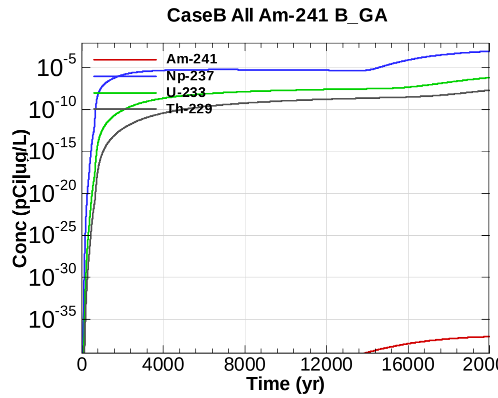

Figure M-12 - 100m Aquifer Concentration for CaseB All Am-241 B_GA

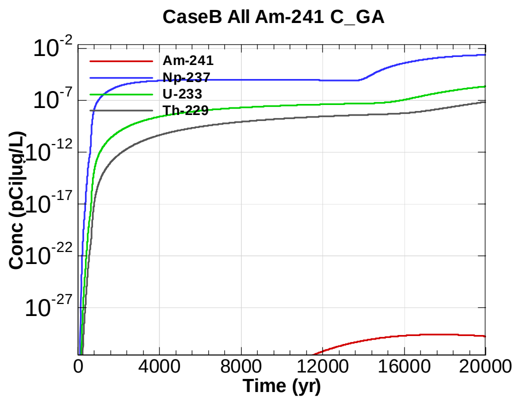

Figure M-13 - 100m Aquifer Concentration for CaseB All Am-241 C_GA

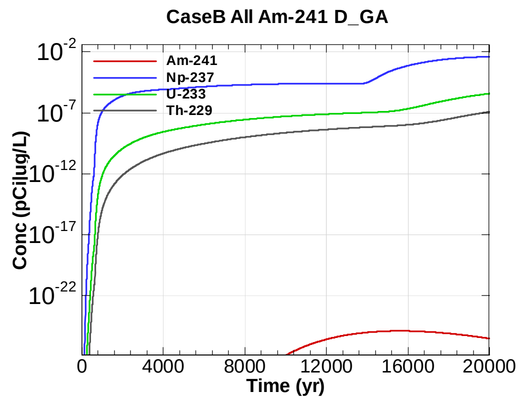

Figure M-14 - 100m Aquifer Concentration for CaseB All Am-241 D_GA

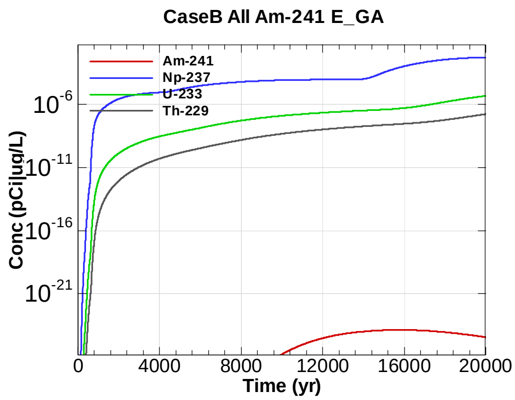

Figure M-15 - 100m Aquifer Concentration for CaseB All Am-241 E_GA

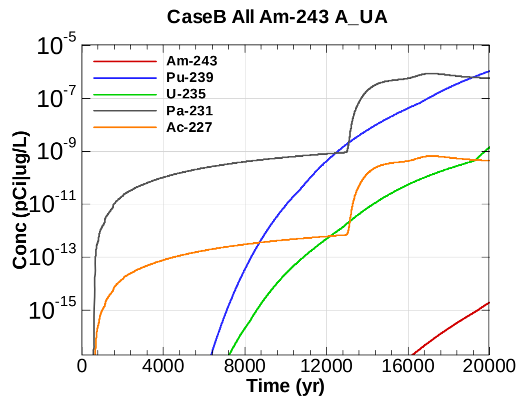

Figure M-16 - 100m Aquifer Concentration for CaseB All Am-243 A_UA

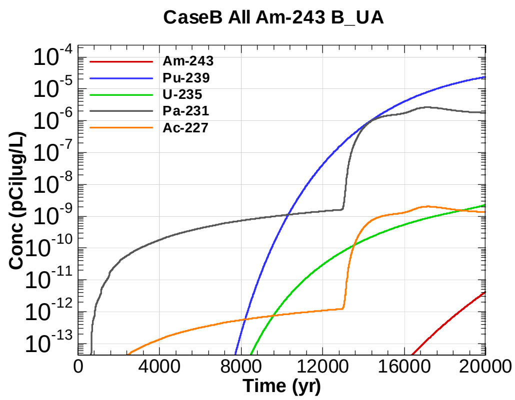

Figure M-17 - 100m Aquifer Concentration for CaseB All Am-243 B_UA

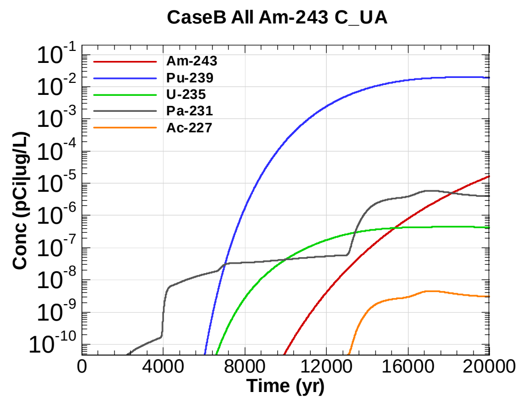

Figure M-18 - 100m Aquifer Concentration for CaseB All Am-243 C_UA

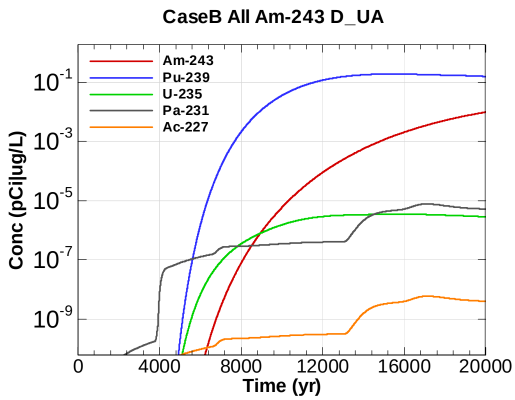

Figure M-19 - 100m Aquifer Concentration for CaseB All Am-243 D_UA

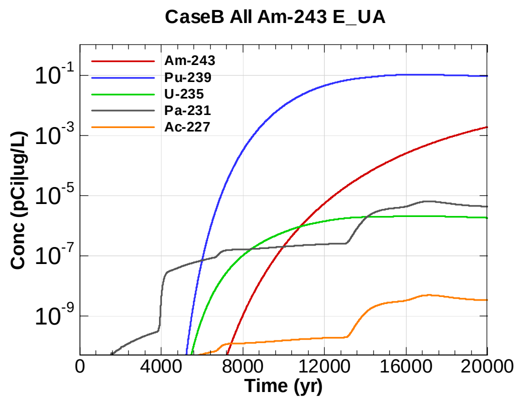

Figure M-20 - 100m Aquifer Concentration for CaseB All Am-243 E_UA

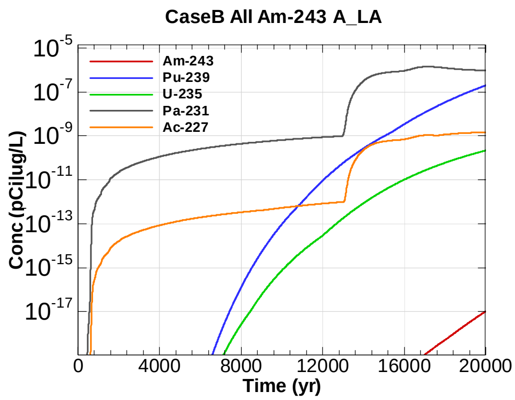

Figure M-21 - 100m Aquifer Concentration for CaseB All Am-243 A_LA

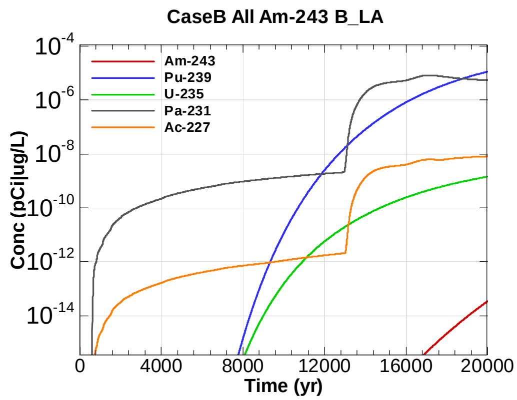

Figure M-22 - 100m Aquifer Concentration for CaseB All Am-243 B_LA

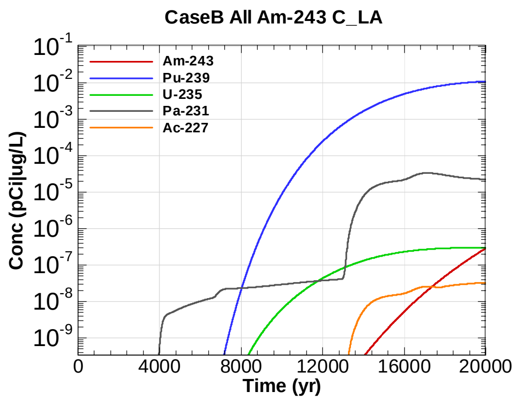

Figure M-23 - 100m Aquifer Concentration for CaseB All Am-243 C_LA

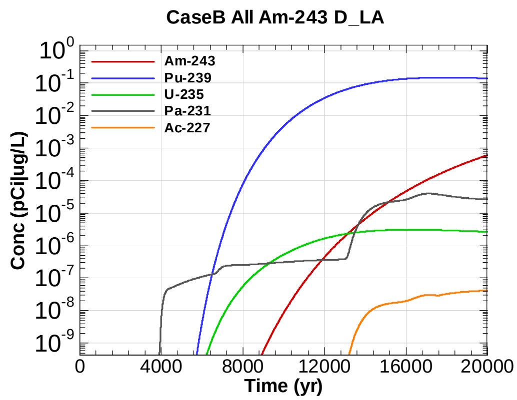

Figure M-24 - 100m Aquifer Concentration for CaseB All Am-243 D_LA

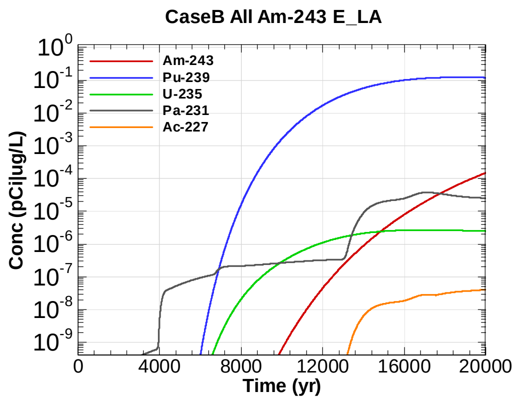

Figure M-25 - 100m Aquifer Concentration for CaseB All Am-243 E_LA

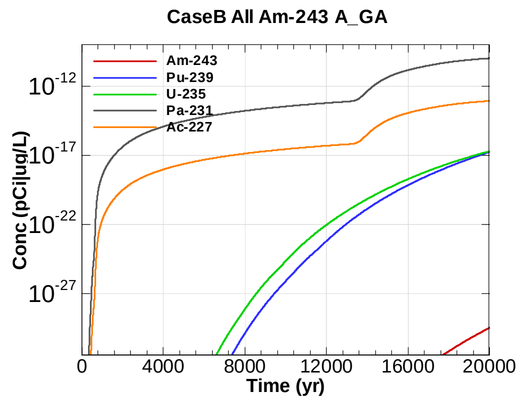

Figure M-26 - 100m Aquifer Concentration for CaseB All Am-243 A_GA

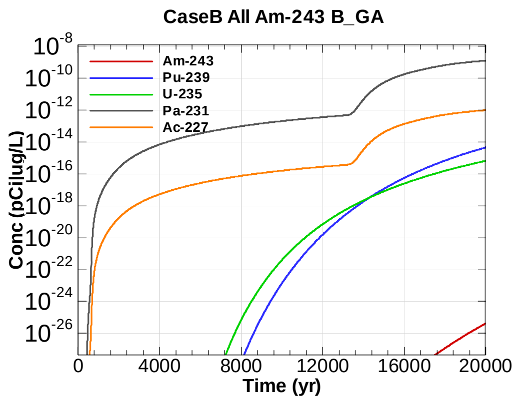

Figure M-27 - 100m Aquifer Concentration for CaseB All Am-243 B_GA

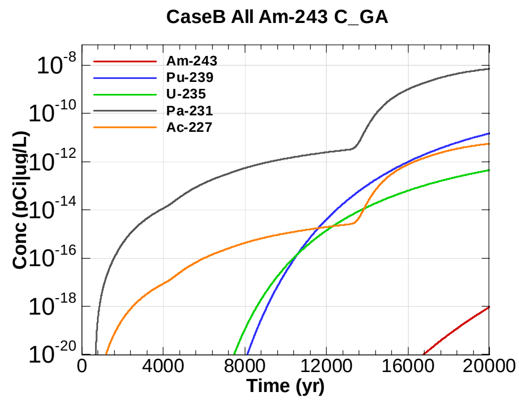

Figure M-28 - 100m Aquifer Concentration for CaseB All Am-243 C_GA

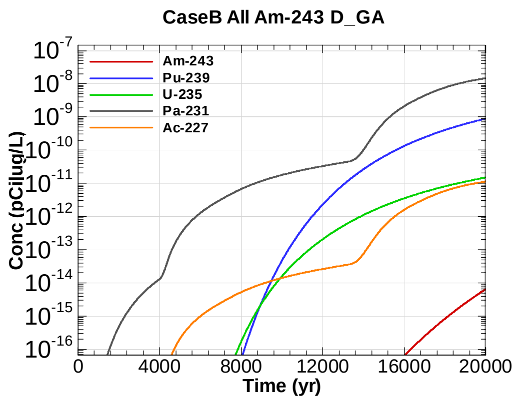

Figure M-29 - 100m Aquifer Concentration for CaseB All Am-243 D_GA

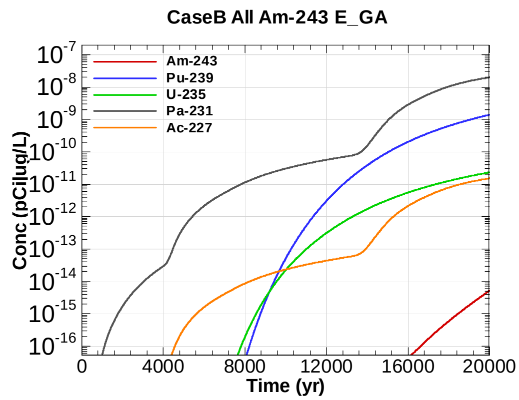

Figure M-30 - 100m Aquifer Concentration for CaseB All Am-243 E_GA

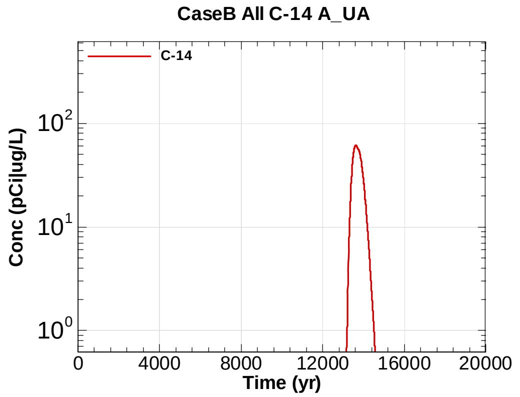

Figure M-31 - 100m Aquifer Concentration for CaseB All C-14 A_UA

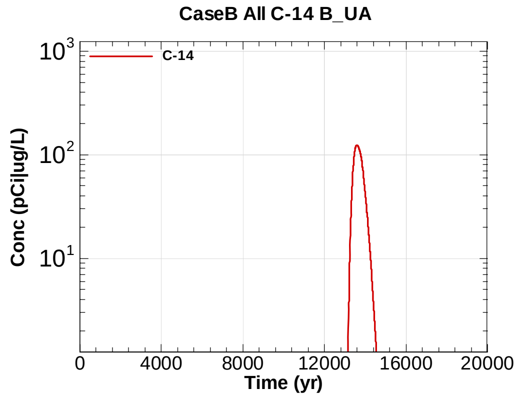

Figure M-32 - 100m Aquifer Concentration for CaseB All C-14 B_UA

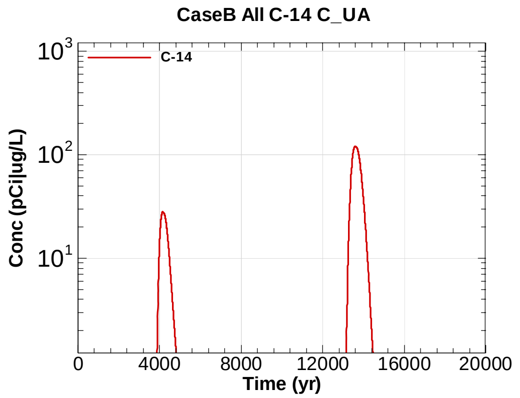

Figure M-33 - 100m Aquifer Concentration for CaseB All C-14 C_UA

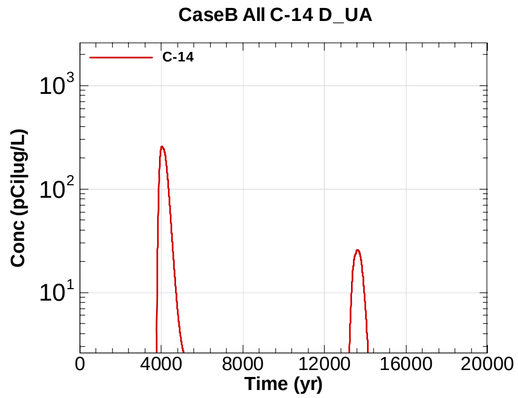

Figure M-34 - 100m Aquifer Concentration for CaseB All C-14 D_UA

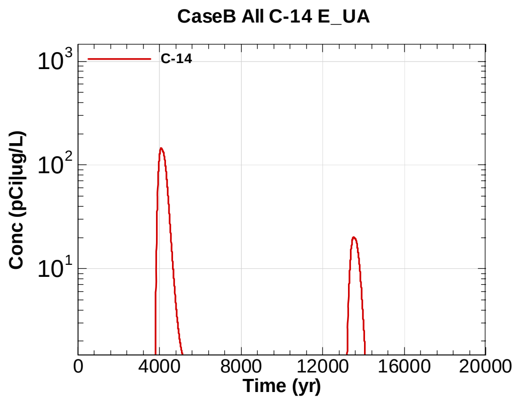

Figure M-35 - 100m Aquifer Concentration for CaseB All C-14 E_UA

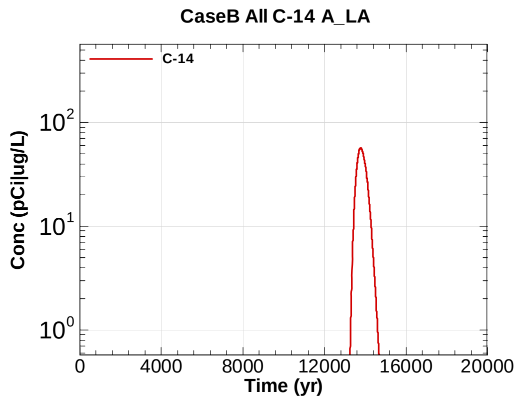

Figure M-36 - 100m Aquifer Concentration for CaseB All C-14 A_LA

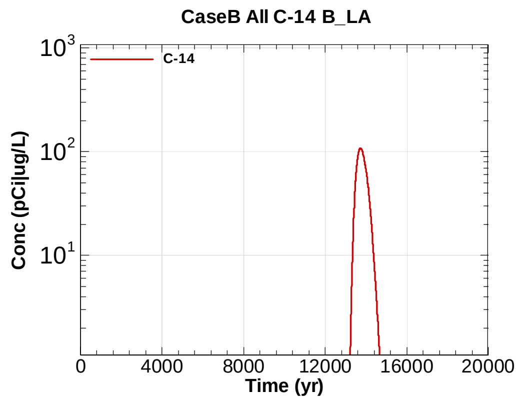

Figure M-37 - 100m Aquifer Concentration for CaseB All C-14 B_LA

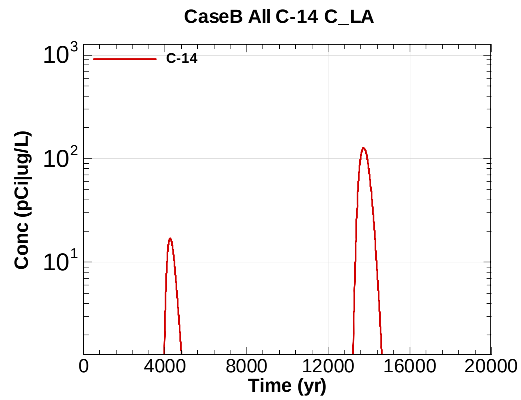

Figure M-38 - 100m Aquifer Concentration for CaseB All C-14 C_LA

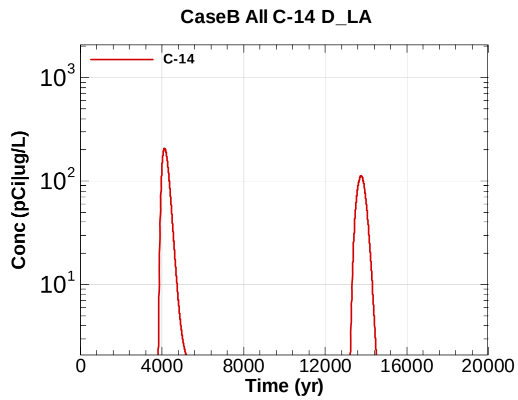

Figure M-39 - 100m Aquifer Concentration for CaseB All C-14 D_LA

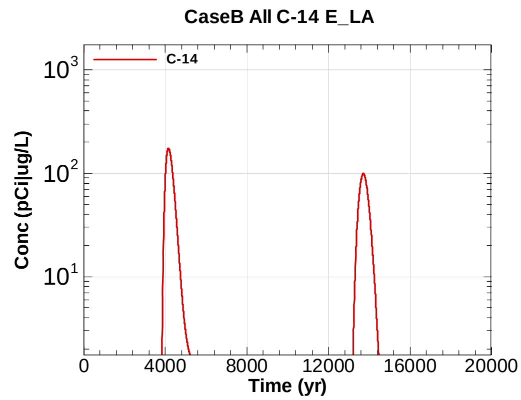

Figure M-40 - 100m Aquifer Concentration for CaseB All C-14 E_LA

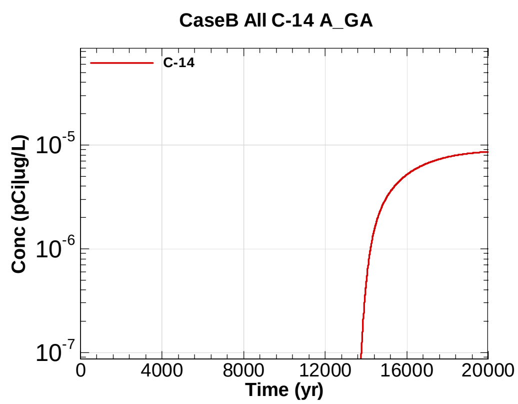

Figure M-41 - 100m Aquifer Concentration for CaseB All C-14 A_GA

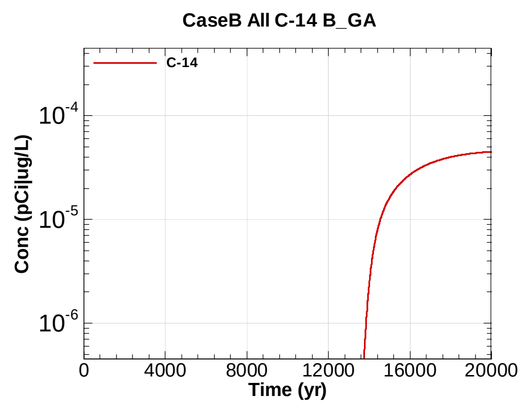

Figure M-42 - 100m Aquifer Concentration for CaseB All C-14 B_GA

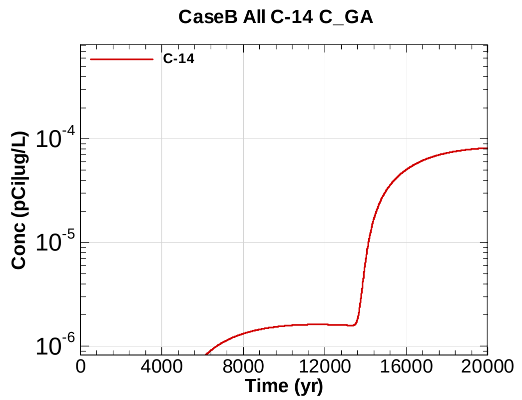

Figure M-43 - 100m Aquifer Concentration for CaseB All C-14 C_GA

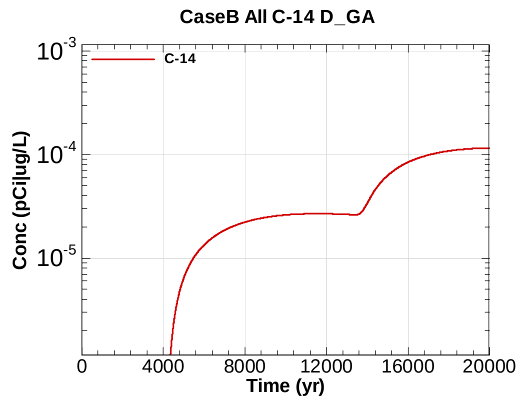

Figure M-44 - 100m Aquifer Concentration for CaseB All C-14 D_GA

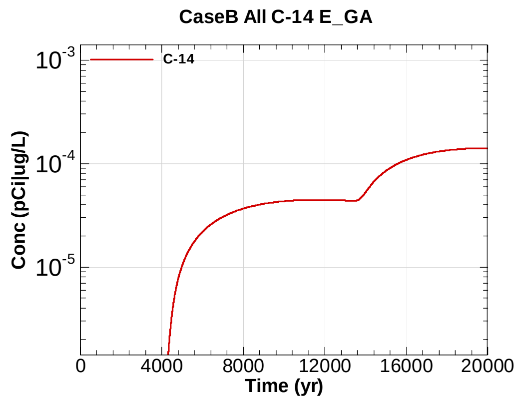

Figure M-45 - 100m Aquifer Concentration for CaseB All C-14 E_GA

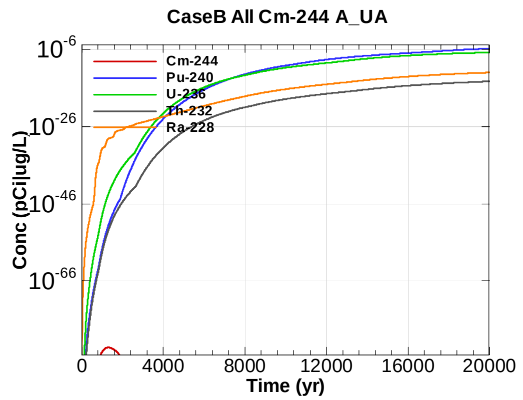

Figure M-46 - 100m Aquifer Concentration for CaseB All Cm-244 A_UA

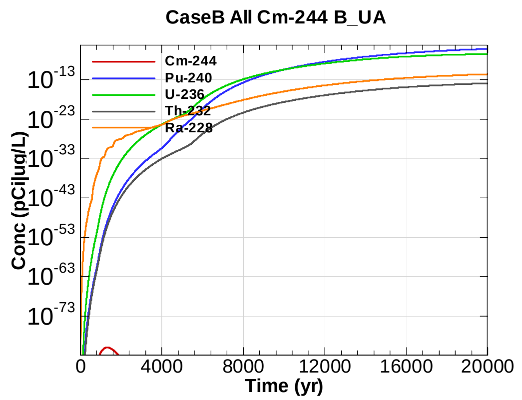

Figure M-47 - 100m Aquifer Concentration for CaseB All Cm-244 B_UA

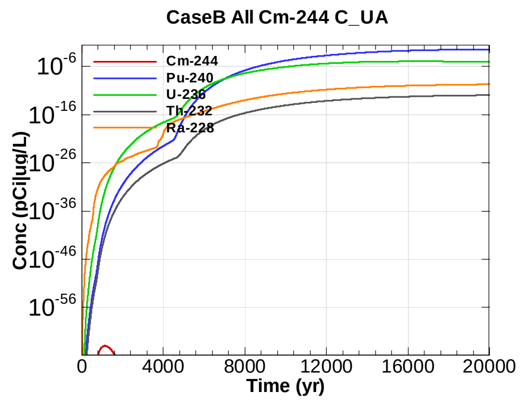

Figure M-48 - 100m Aquifer Concentration for CaseB All Cm-244 C_UA

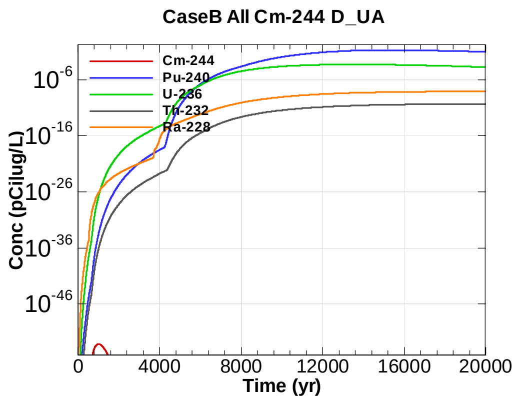

Figure M-49 - 100m Aquifer Concentration for CaseB All Cm-244 D_UA

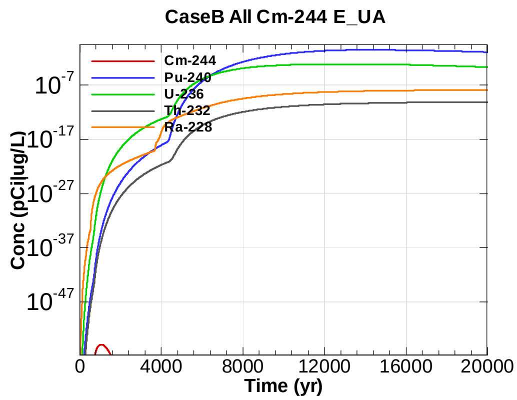

Figure M-50 - 100m Aquifer Concentration for CaseB All Cm-244 E_UA

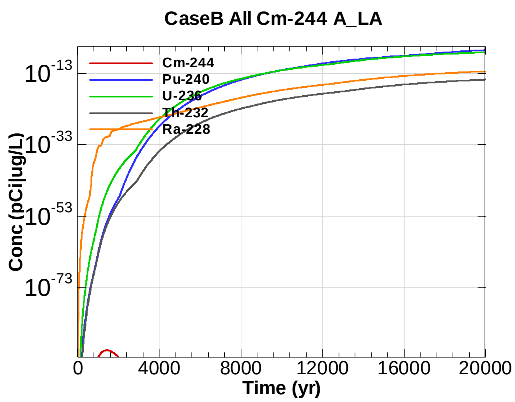

Figure M-51 - 100m Aquifer Concentration for CaseB All Cm-244 A_LA

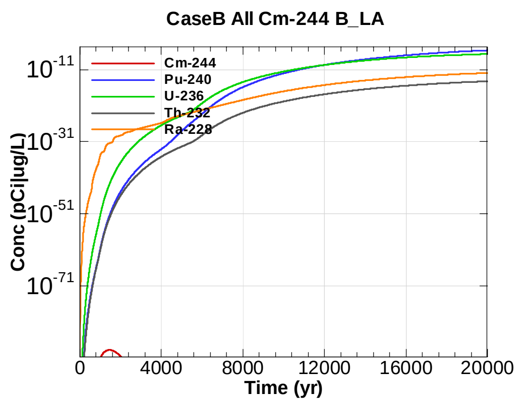

Figure M-52 - 100m Aquifer Concentration for CaseB All Cm-244 B_LA

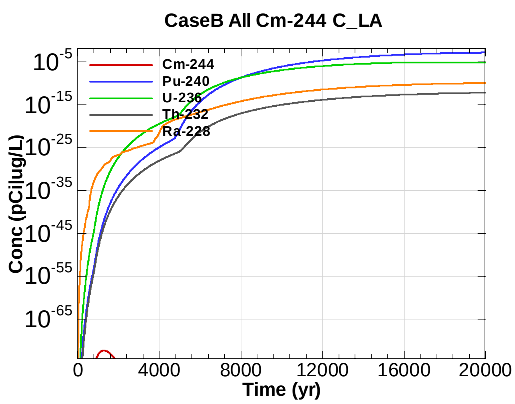

Figure M-53 - 100m Aquifer Concentration for CaseB All Cm-244 C_LA

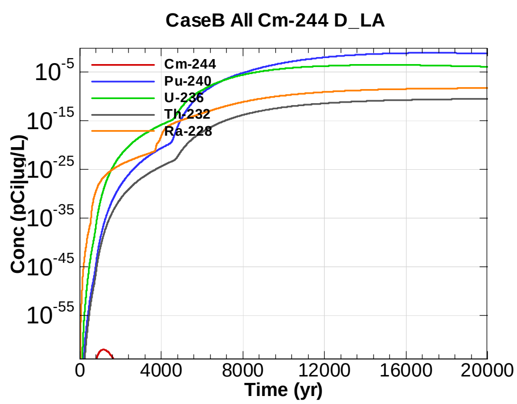

Figure M-54 - 100m Aquifer Concentration for CaseB All Cm-244 D_LA

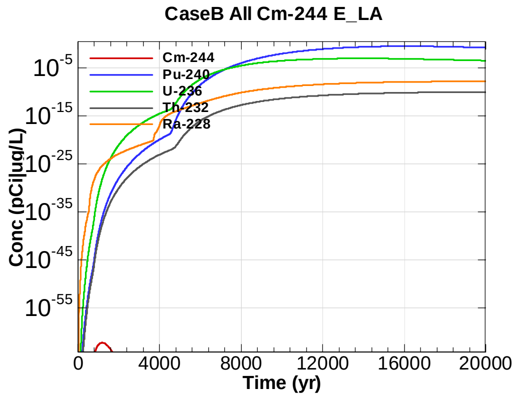

Figure M-55 - 100m Aquifer Concentration for CaseB All Cm-244 E_LA

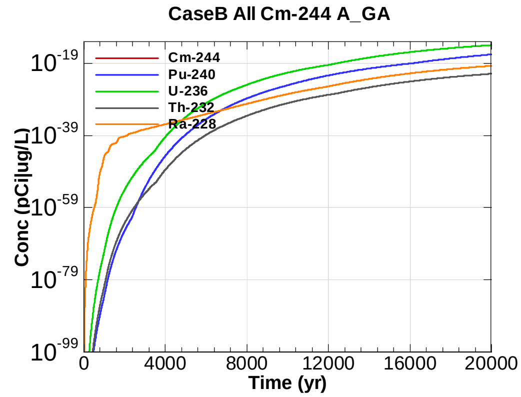

Figure M-56 - 100m Aquifer Concentration for CaseB All Cm-244 A_GA

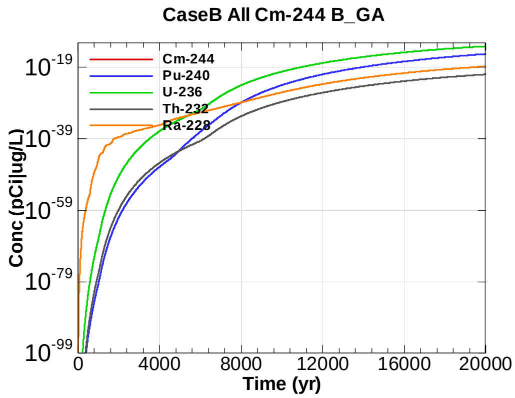

Figure M-57 - 100m Aquifer Concentration for CaseB All Cm-244 B_GA

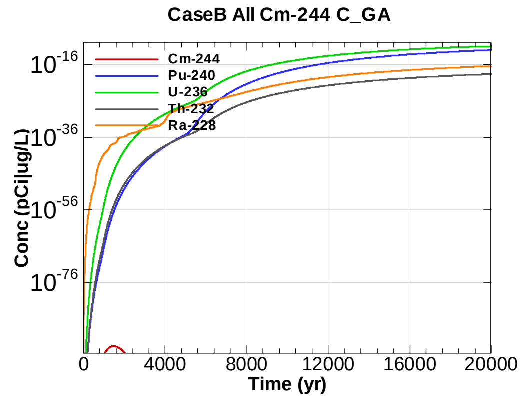

Figure M-58 - 100m Aquifer Concentration for CaseB All Cm-244 C_GA

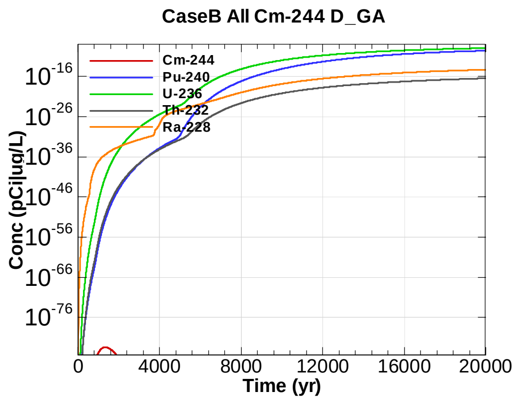

Figure M-59 - 100m Aquifer Concentration for CaseB All Cm-244 D_GA

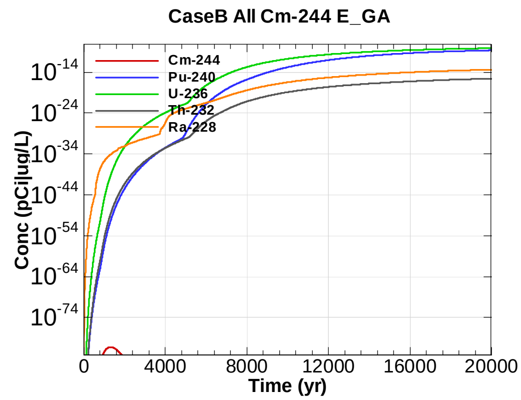

Figure M-60 - 100m Aquifer Concentration for CaseB All Cm-244 E_GA

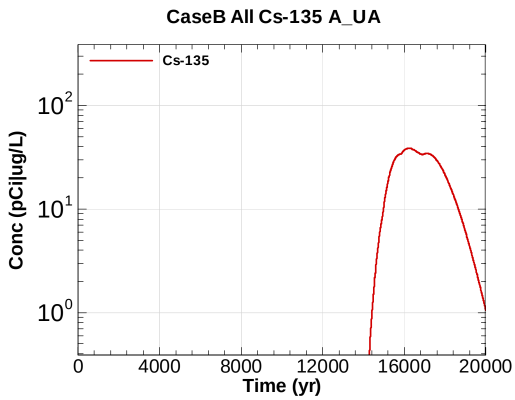

Figure M-61 - 100m Aquifer Concentration for CaseB All Cs-135 A_UA

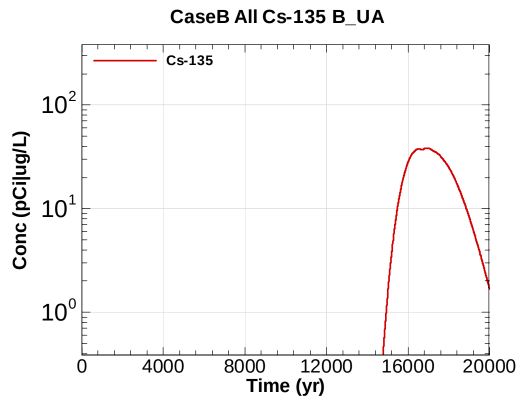

Figure M-62 - 100m Aquifer Concentration for CaseB All Cs-135 B_UA

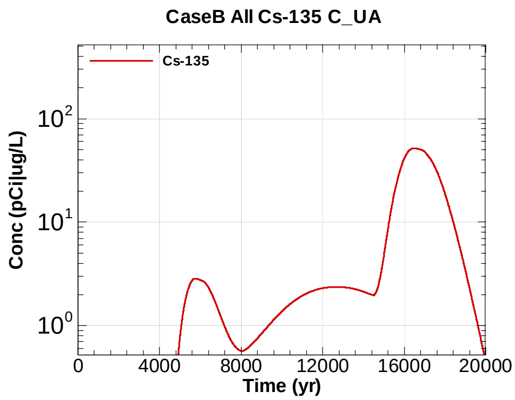

Figure M-63 - 100m Aquifer Concentration for CaseB All Cs-135 C_UA

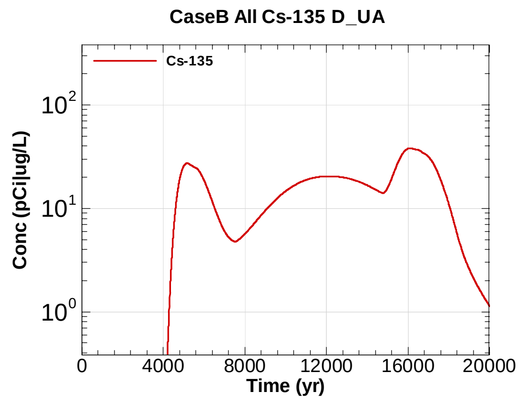

Figure M-64 - 100m Aquifer Concentration for CaseB All Cs-135 D_UA

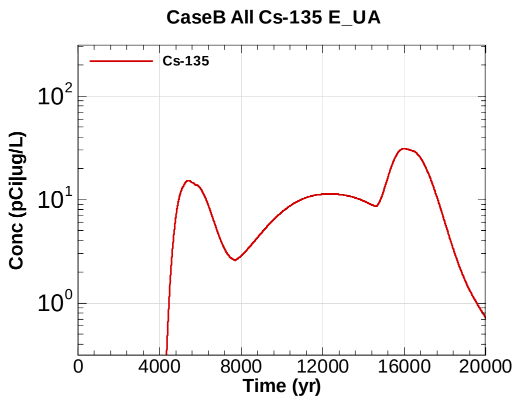

Figure M-65 - 100m Aquifer Concentration for CaseB All Cs-135 E_UA

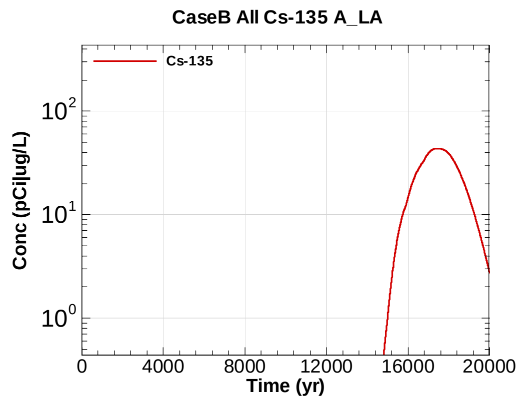

Figure M-66 - 100m Aquifer Concentration for CaseB All Cs-135 A_LA

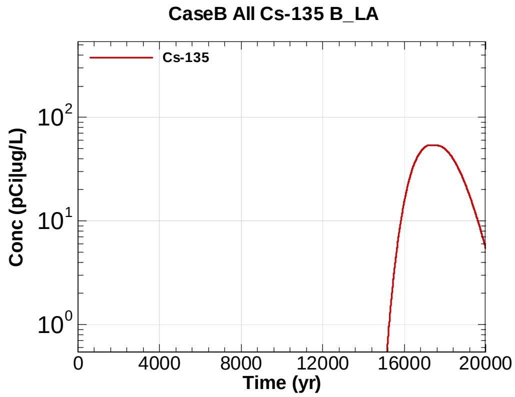

Figure M-67 - 100m Aquifer Concentration for CaseB All Cs-135 B_LA

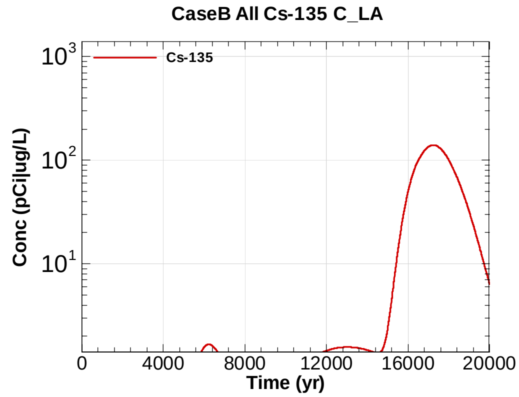

Figure M-68 - 100m Aquifer Concentration for CaseB All Cs-135 C_LA

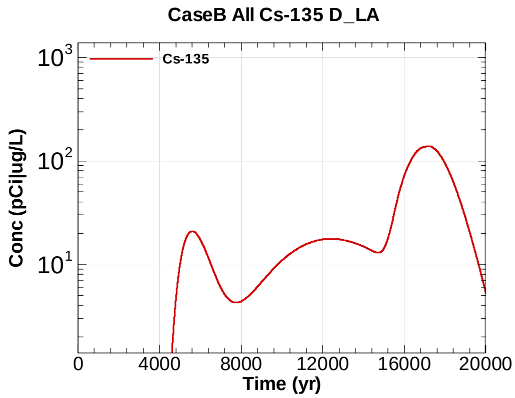

Figure M-69 - 100m Aquifer Concentration for CaseB All Cs-135 D_LA

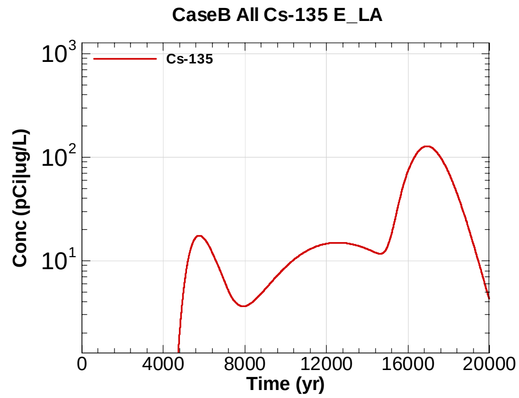

Figure M-70 - 100m Aquifer Concentration for CaseB All Cs-135 E_LA

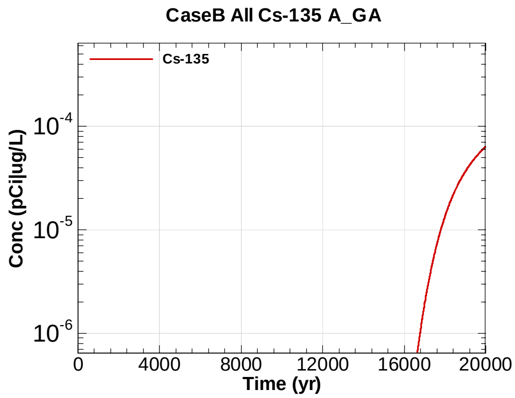

Figure M-71 - 100m Aquifer Concentration for CaseB All Cs-135 A_GA

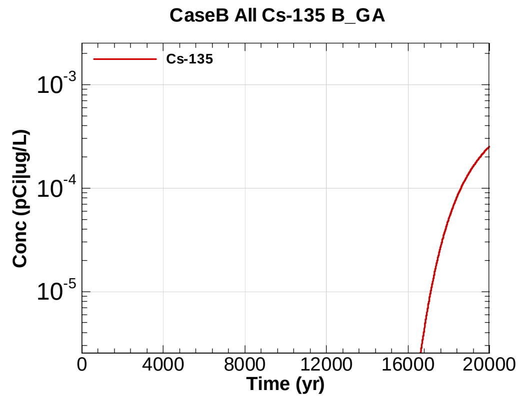

Figure M-72 - 100m Aquifer Concentration for CaseB All Cs-135 B_GA

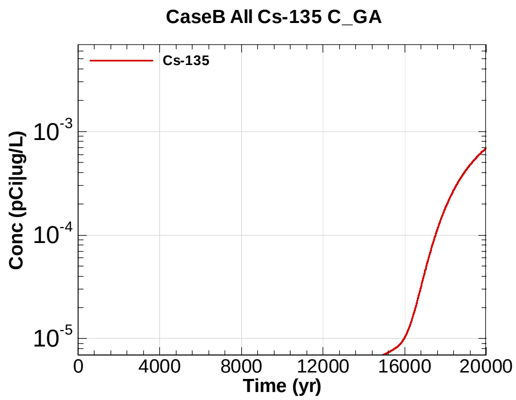

Figure M-73 - 100m Aquifer Concentration for CaseB All Cs-135 C_GA

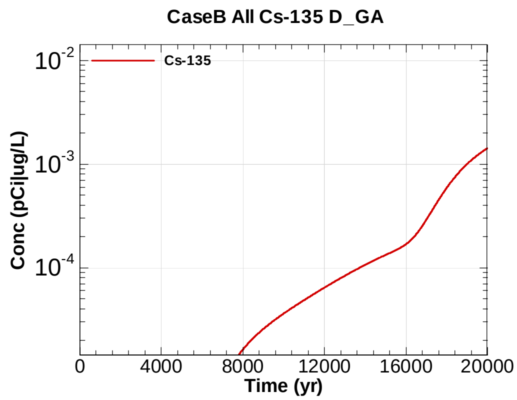

Figure M-74 - 100m Aquifer Concentration for CaseB All Cs-135 D_GA

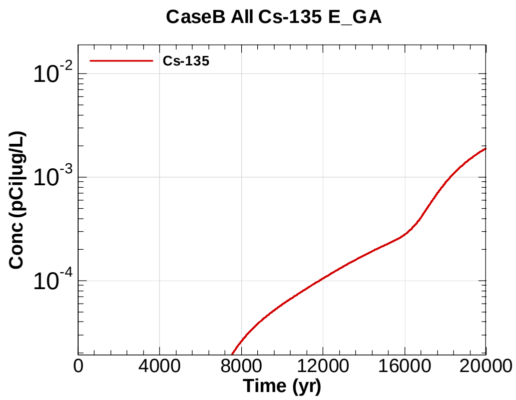

Figure M-75 - 100m Aquifer Concentration for CaseB All Cs-135 E_GA

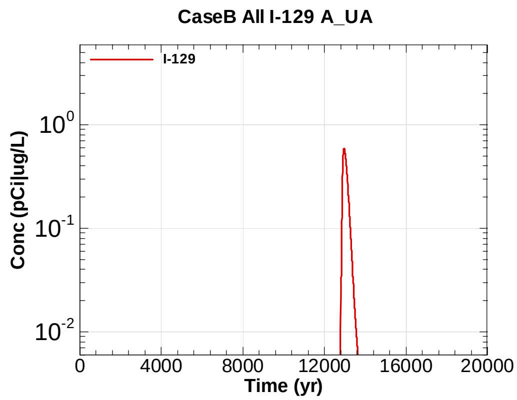

Figure M-76 - 100m Aquifer Concentration for CaseB All I-129 A_UA

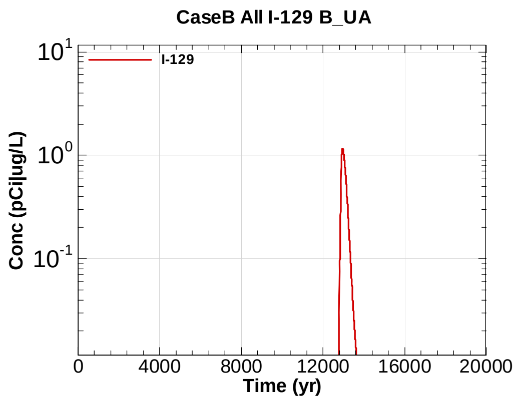

Figure M-77 - 100m Aquifer Concentration for CaseB All I-129 B_UA

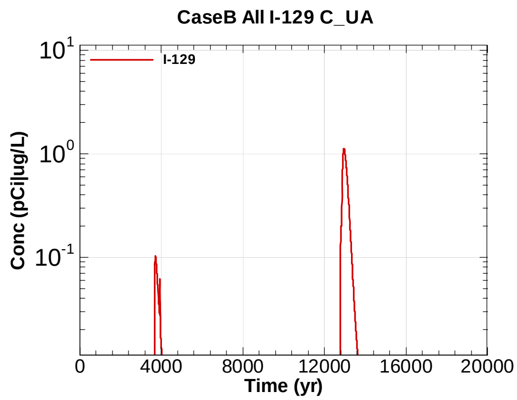

Figure M-78 - 100m Aquifer Concentration for CaseB All I-129 C_UA

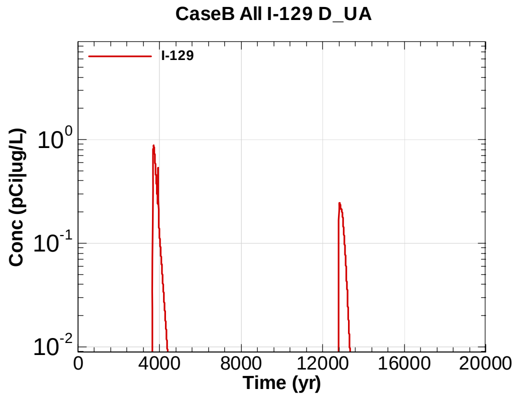

Figure M-79 - 100m Aquifer Concentration for CaseB All I-129 D_UA

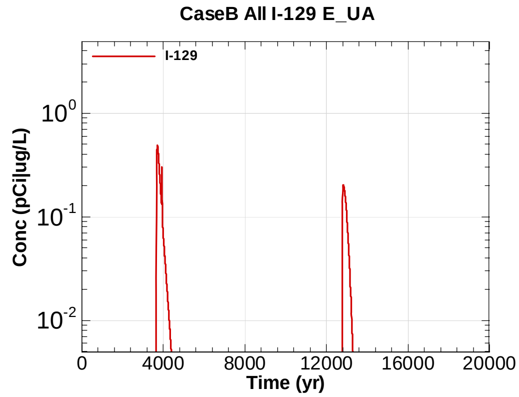

Figure M-80 - 100m Aquifer Concentration for CaseB All I-129 E_UA

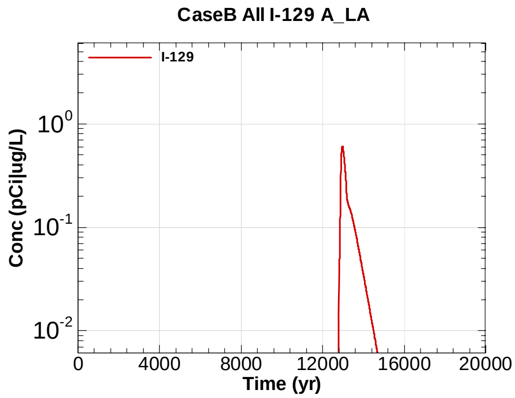

Figure M-81 - 100m Aquifer Concentration for CaseB All I-129 A_LA

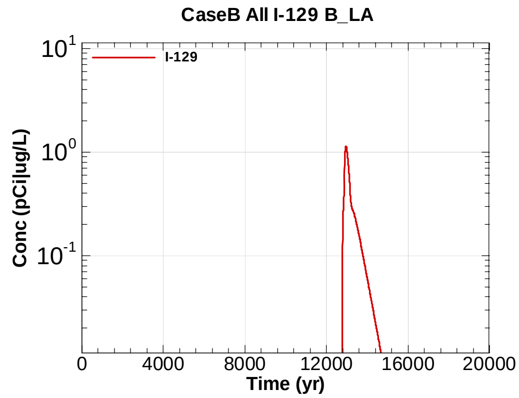

Figure M-82 - 100m Aquifer Concentration for CaseB All I-129 B_LA

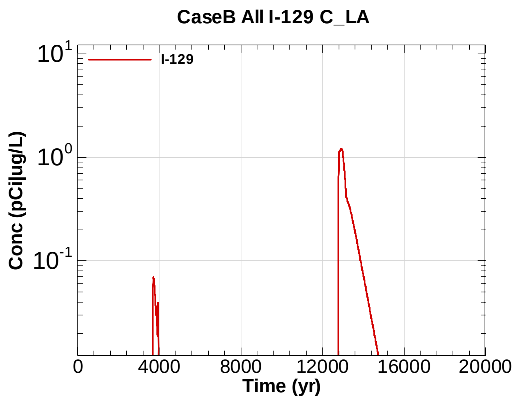

Figure M-83 - 100m Aquifer Concentration for CaseB All I-129 C_LA

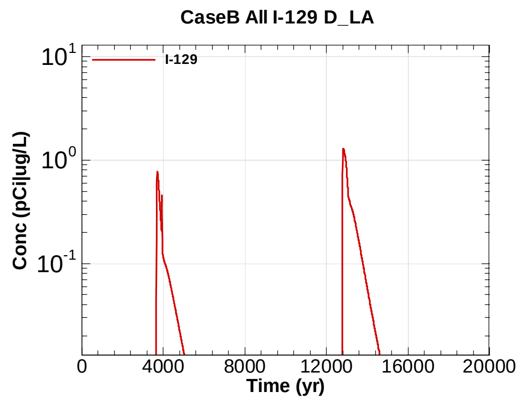

Figure M-84 - 100m Aquifer Concentration for CaseB All I-129 D_LA

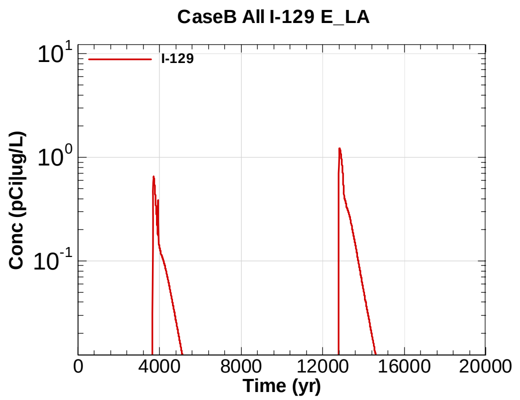

Figure M-85 - 100m Aquifer Concentration for CaseB All I-129 E_LA

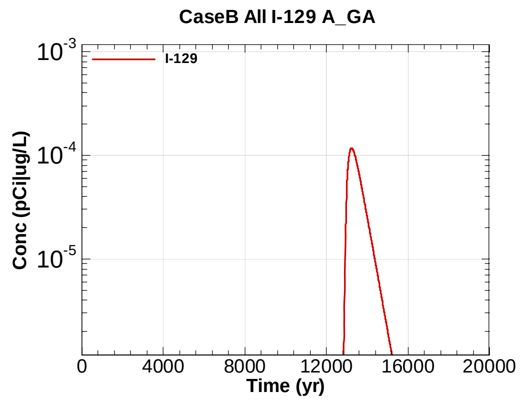

Figure M-86 - 100m Aquifer Concentration for CaseB All I-129 A_GA

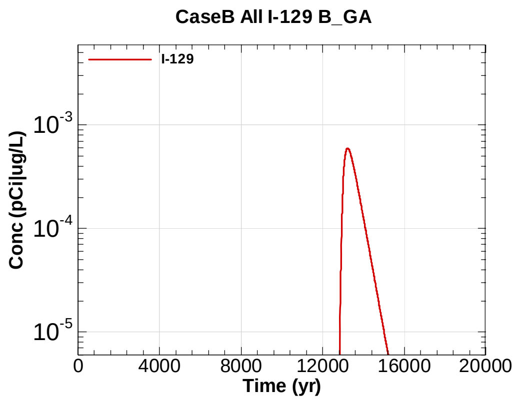

Figure M-87 - 100m Aquifer Concentration for CaseB All I-129 B_GA

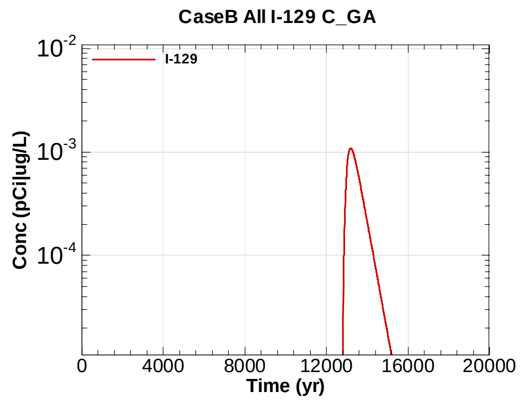

Figure M-88 - 100m Aquifer Concentration for CaseB All I-129 C_GA

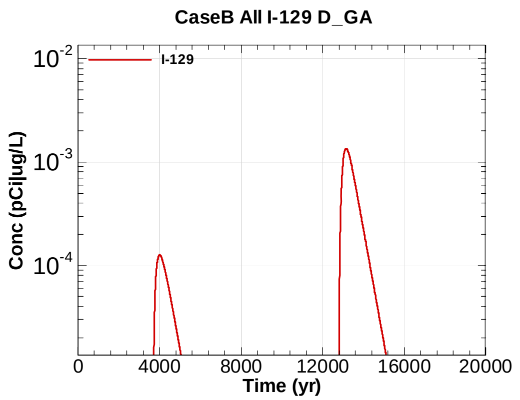

Figure M-89 - 100m Aquifer Concentration for CaseB All I-129 D_GA

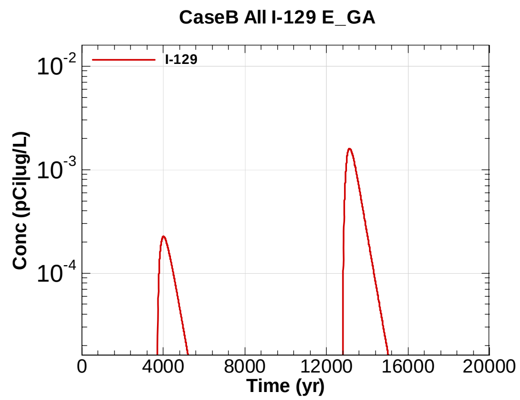

Figure M-90 - 100m Aquifer Concentration for CaseB All I-129 E_GA

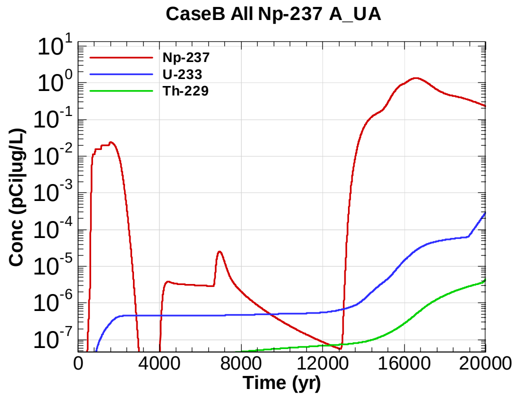

Figure M-91 - 100m Aquifer Concentration for CaseB All Np-237 A_UA

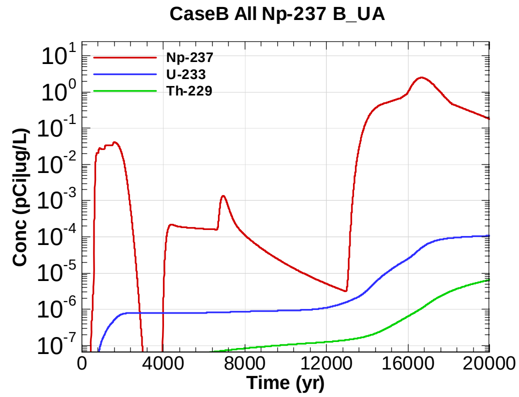

Figure M-92 - 100m Aquifer Concentration for CaseB All Np-237 B_UA

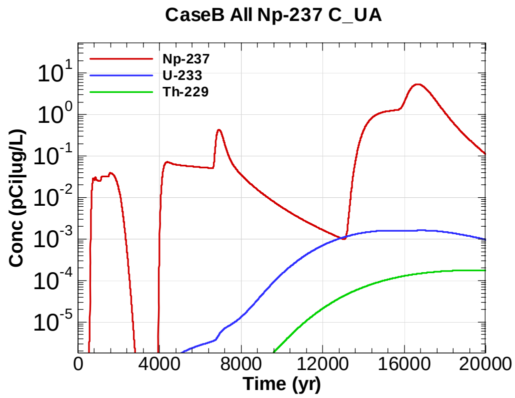

Figure M-93 - 100m Aquifer Concentration for CaseB All Np-237 C_UA

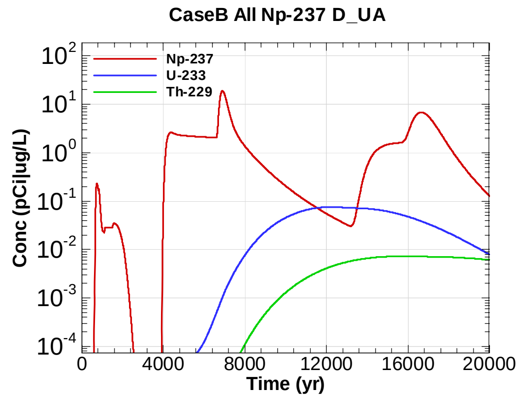

Figure M-94 - 100m Aquifer Concentration for CaseB All Np-237 D_UA

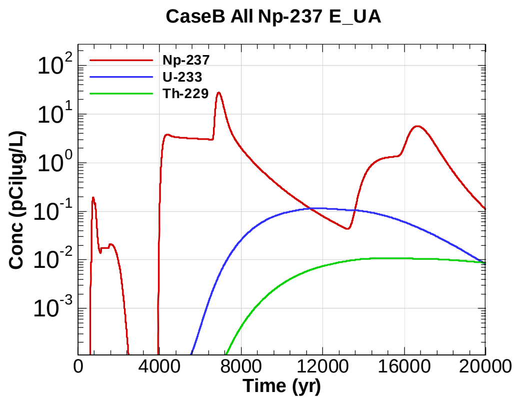

Figure M-95 - 100m Aquifer Concentration for CaseB All Np-237 E_UA

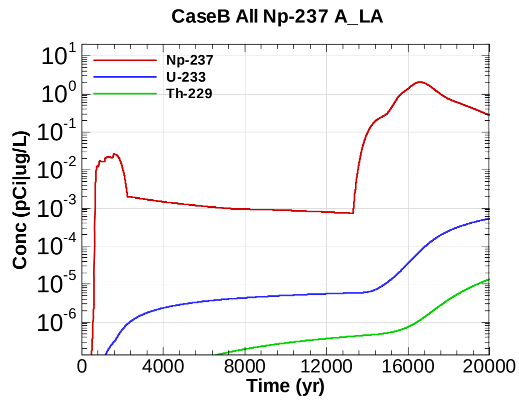

Figure M-96 - 100m Aquifer Concentration for CaseB All Np-237 A_LA

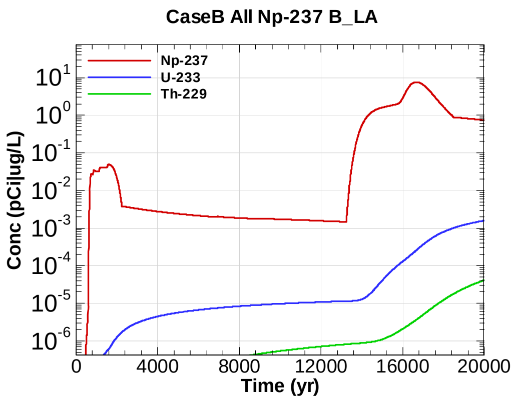

Figure M-97 - 100m Aquifer Concentration for CaseB All Np-237 B_LA

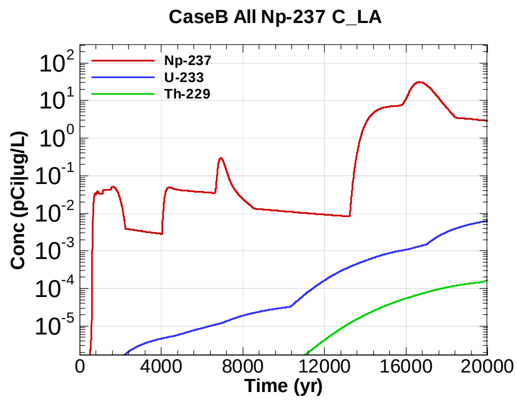

Figure M-98 - 100m Aquifer Concentration for CaseB All Np-237 C_LA

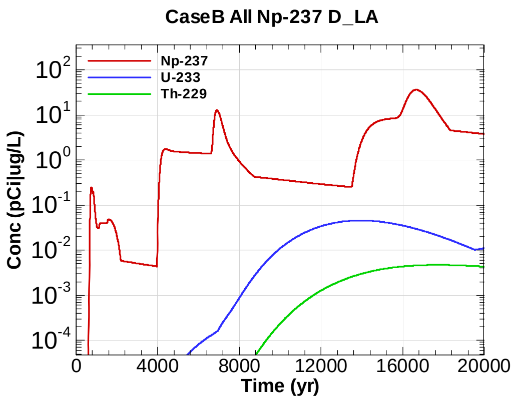

Figure M-99 - 100m Aquifer Concentration for CaseB All Np-237 D_LA

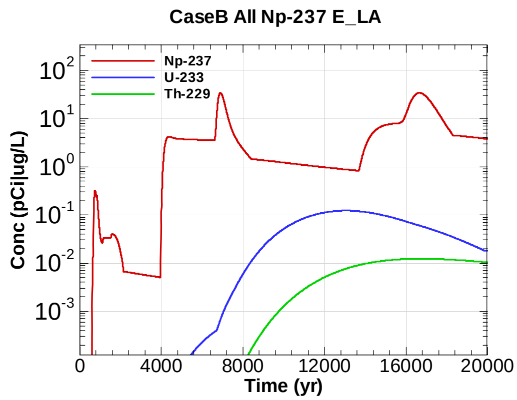

Figure M-100 - 100m Aquifer Concentration for CaseB All Np-237 E_LA

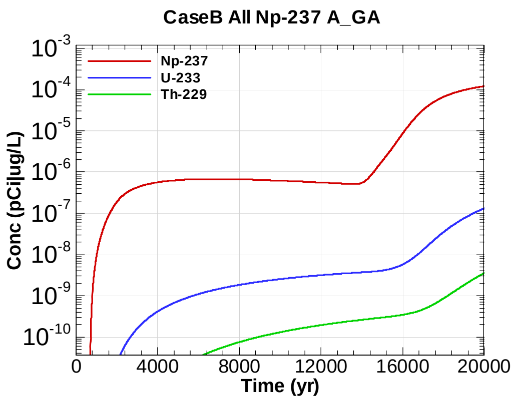

Figure M-101 - 100m Aquifer Concentration for CaseB All Np-237 A_GA

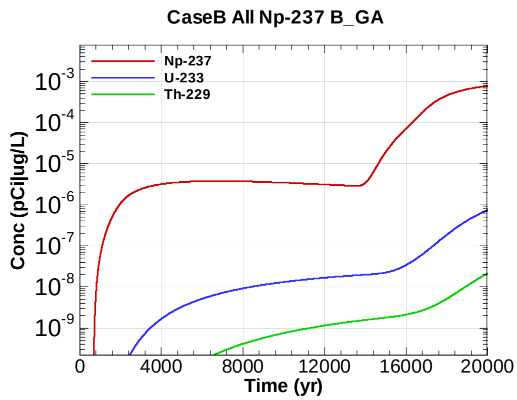

Figure M-102 - 100m Aquifer Concentration for CaseB All Np-237 B_GA

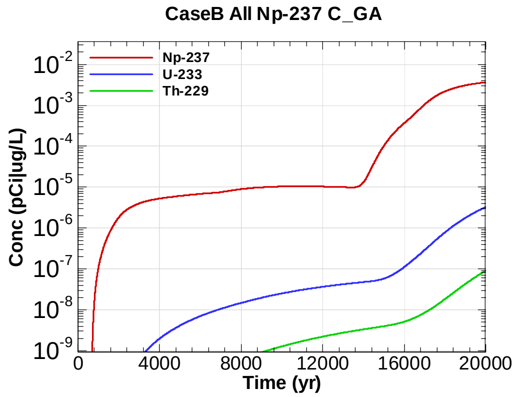

Figure M-103 - 100m Aquifer Concentration for CaseB All Np-237 C_GA

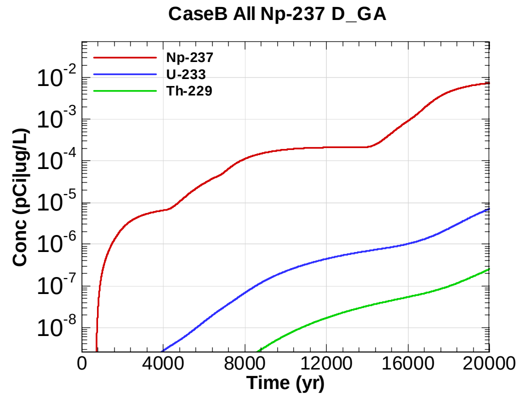

Figure M-104 - 100m Aquifer Concentration for CaseB All Np-237 D_GA

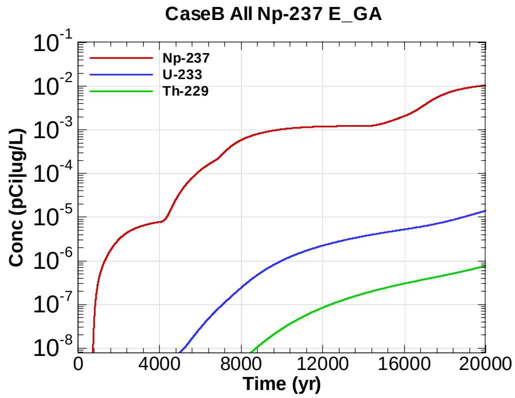

Figure M-105 - 100m Aquifer Concentration for CaseB All Np-237 E_GA

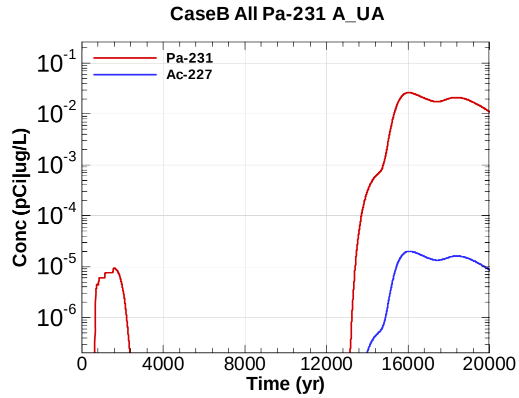

Figure M-106 - 100m Aquifer Concentration for CaseB All Pa-231 A_UA

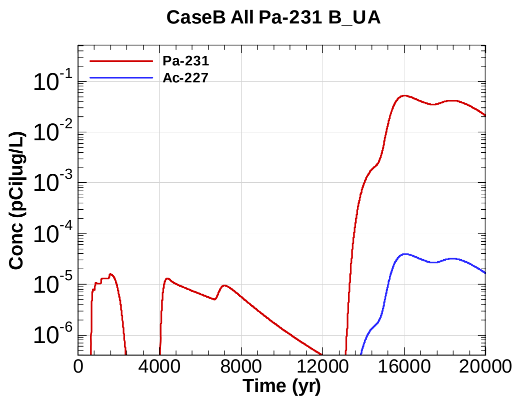

Figure M-107 - 100m Aquifer Concentration for CaseB All Pa-231 B_UA

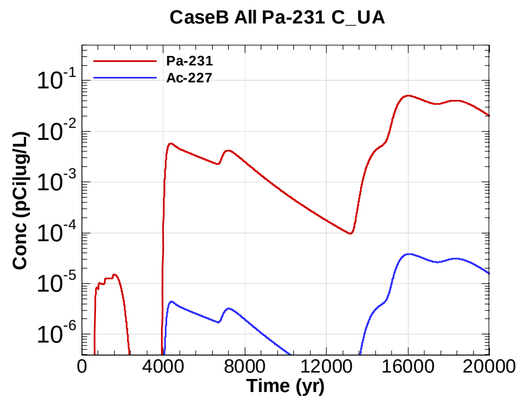

Figure M-108 - 100m Aquifer Concentration for CaseB All Pa-231 C_UA

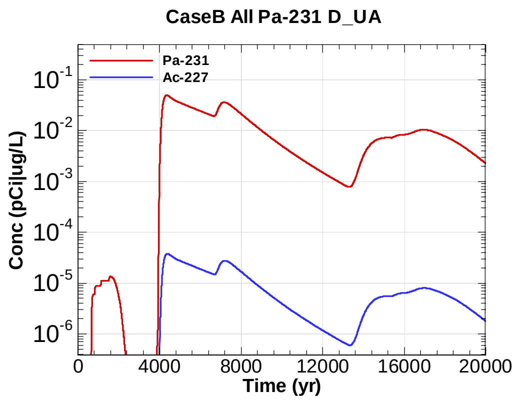

Figure M-109 - 100m Aquifer Concentration for CaseB All Pa-231 D_UA

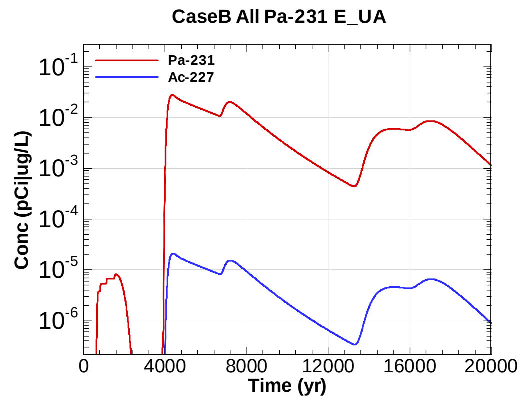

Figure M-110 - 100m Aquifer Concentration for CaseB All Pa-231 E_UA

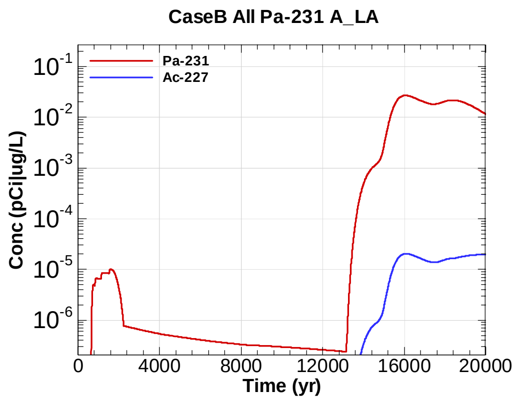

Figure M-111 - 100m Aquifer Concentration for CaseB All Pa-231 A_LA

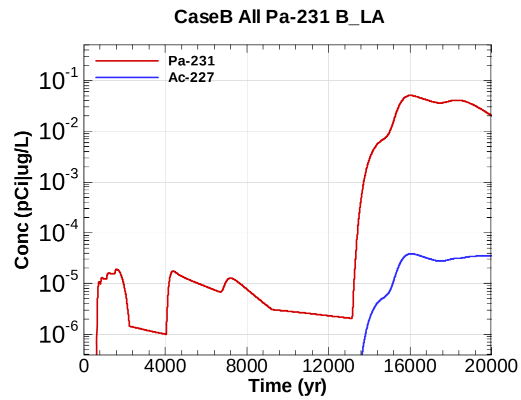

Figure M-112 - 100m Aquifer Concentration for CaseB All Pa-231 B_LA

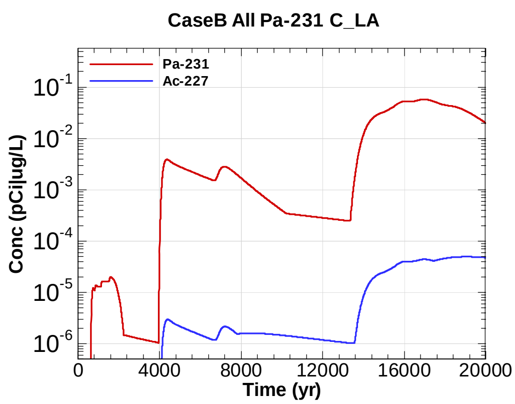

Figure M-113 - 100m Aquifer Concentration for CaseB All Pa-231 C_LA

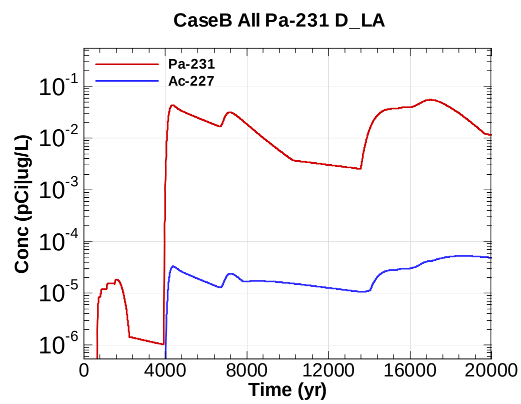

Figure M-114 - 100m Aquifer Concentration for CaseB All Pa-231 D_LA

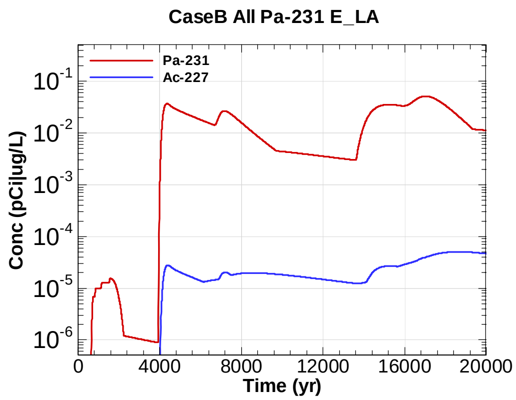

Figure M-115 - 100m Aquifer Concentration for CaseB All Pa-231 E_LA

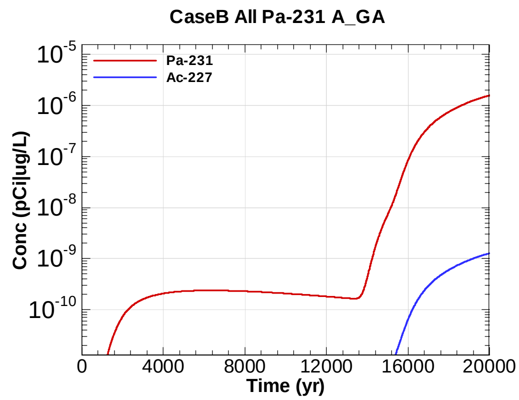

Figure M-116 - 100m Aquifer Concentration for CaseB All Pa-231 A_GA

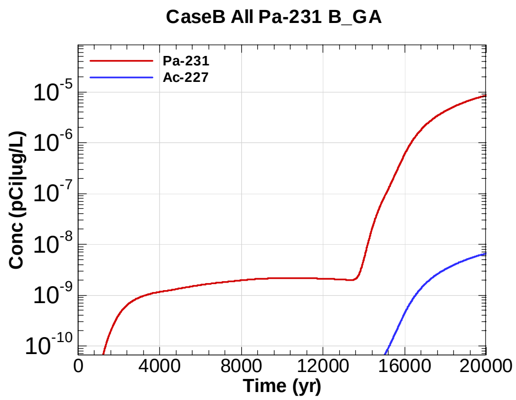

Figure M-117 - 100m Aquifer Concentration for CaseB All Pa-231 B_GA

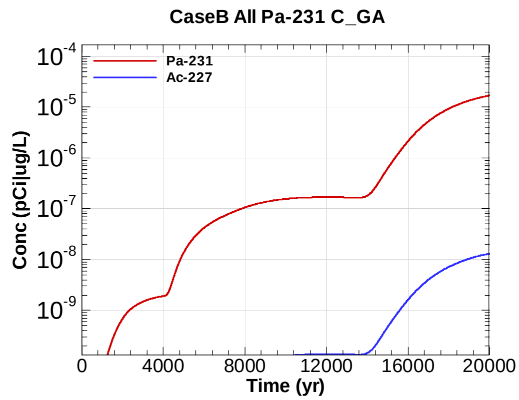

Figure M-118 - 100m Aquifer Concentration for CaseB All Pa-231 C_GA

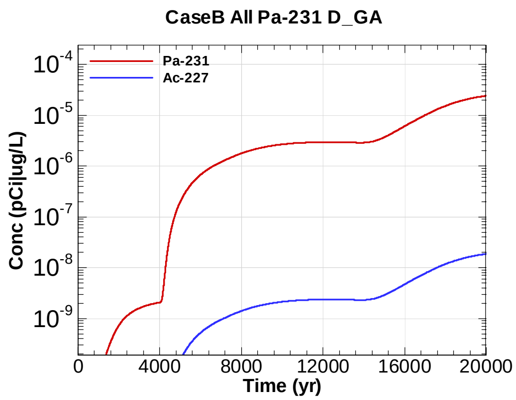

Figure M-119 - 100m Aquifer Concentration for CaseB All Pa-231 D_GA

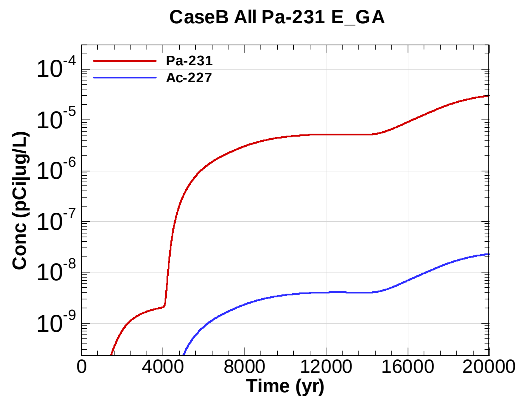

Figure M-120 - 100m Aquifer Concentration for CaseB All Pa-231 E_GA

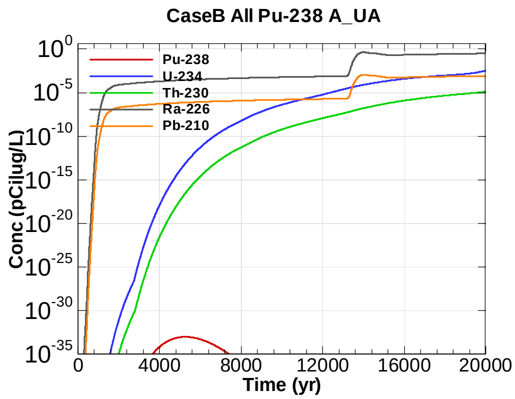

Figure M-121 - 100m Aquifer Concentration for CaseB All Pu-238 A_UA

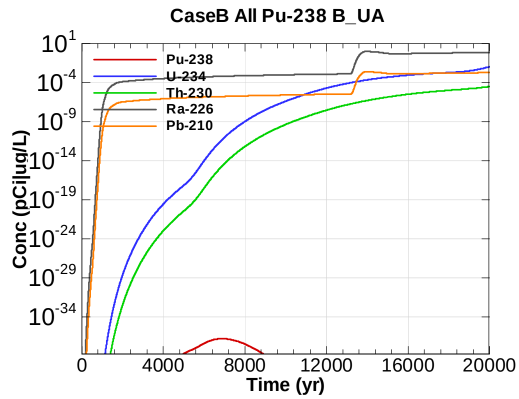

Figure M-122 - 100m Aquifer Concentration for CaseB All Pu-238 B_UA

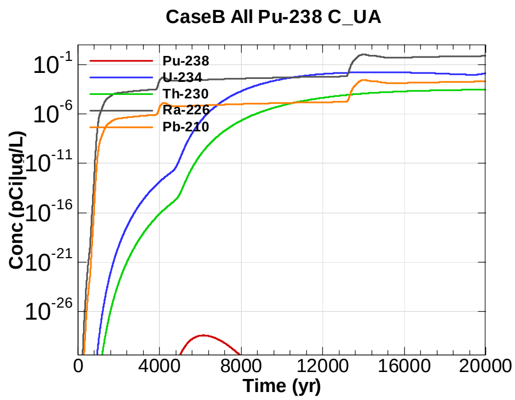

Figure M-123 - 100m Aquifer Concentration for CaseB All Pu-238 C_UA

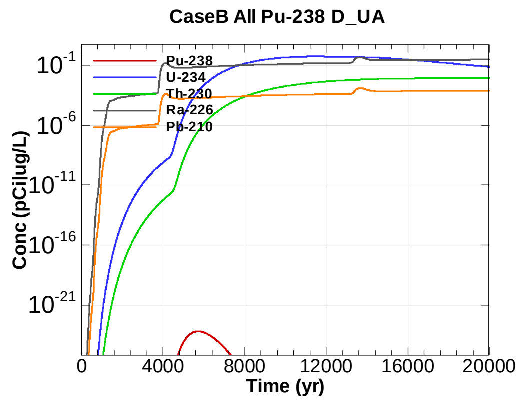

Figure M-124 - 100m Aquifer Concentration for CaseB All Pu-238 D_UA

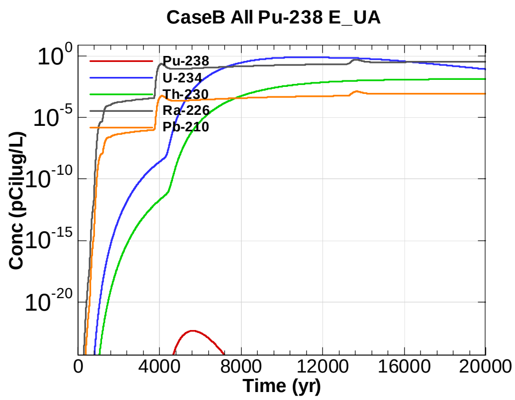

Figure M-125 - 100m Aquifer Concentration for CaseB All Pu-238 E_UA

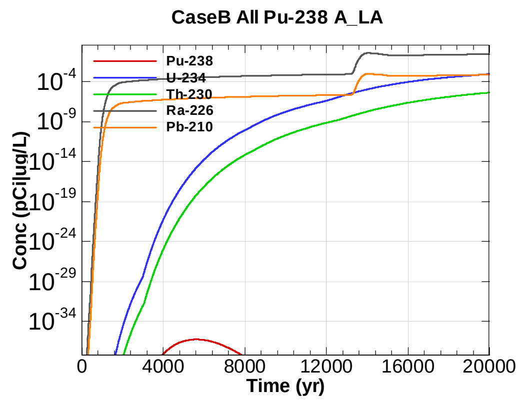

Figure M-126 - 100m Aquifer Concentration for CaseB All Pu-238 A_LA

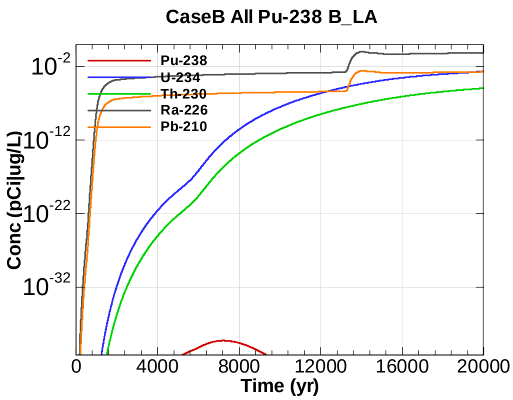

Figure M-127 - 100m Aquifer Concentration for CaseB All Pu-238 B_LA

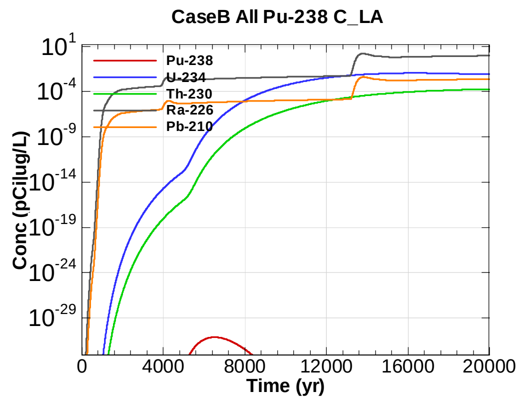

Figure M-128 - 100m Aquifer Concentration for CaseB All Pu-238 C_LA

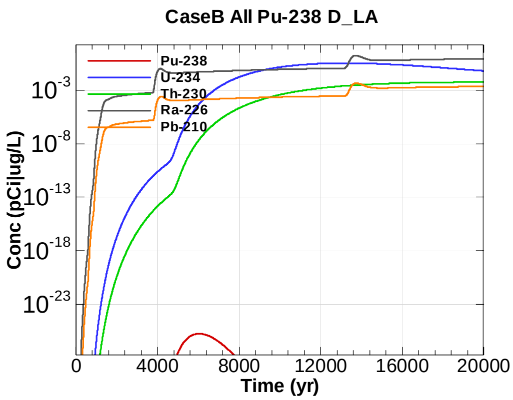

Figure M-129 - 100m Aquifer Concentration for CaseB All Pu-238 D_LA

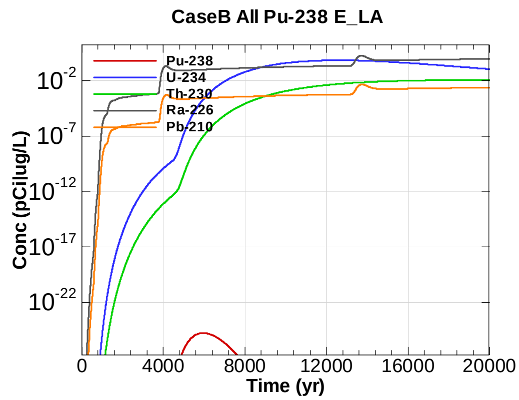

Figure M-130 - 100m Aquifer Concentration for CaseB All Pu-238 E_LA

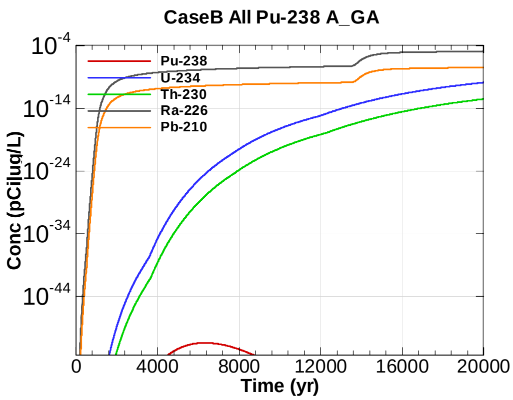

Figure M-131 - 100m Aquifer Concentration for CaseB All Pu-238 A_GA

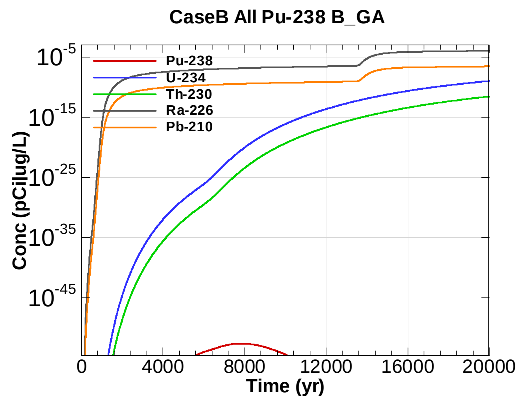

Figure M-132 - 100m Aquifer Concentration for CaseB All Pu-238 B_GA

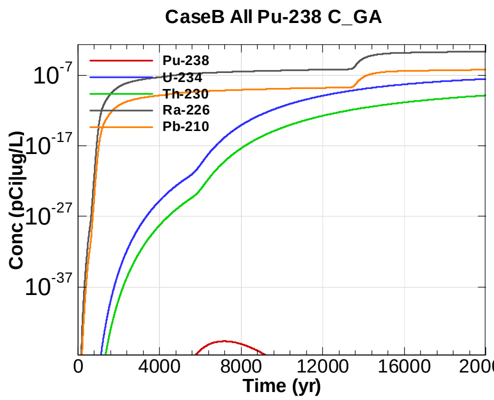

Figure M-133 - 100m Aquifer Concentration for CaseB All Pu-238 C_GA

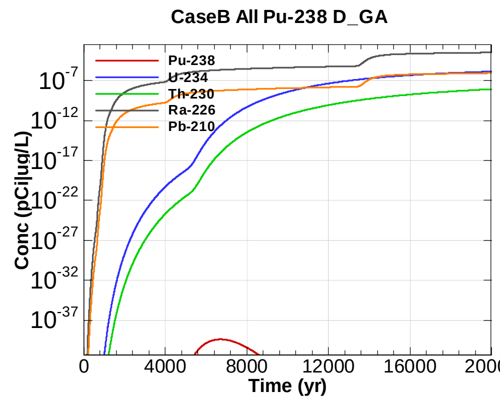

Figure M-134 - 100m Aquifer Concentration for CaseB All Pu-238 D_GA

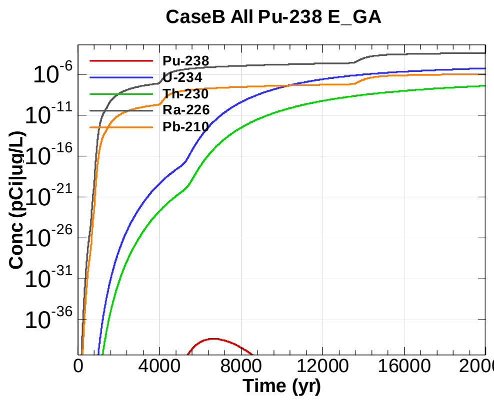

Figure M-135 - 100m Aquifer Concentration for CaseB All Pu-238 E_GA

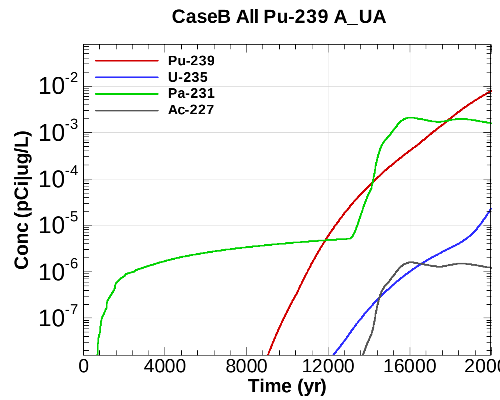

Figure M-136 - 100m Aquifer Concentration for CaseB All Pu-239 A_UA

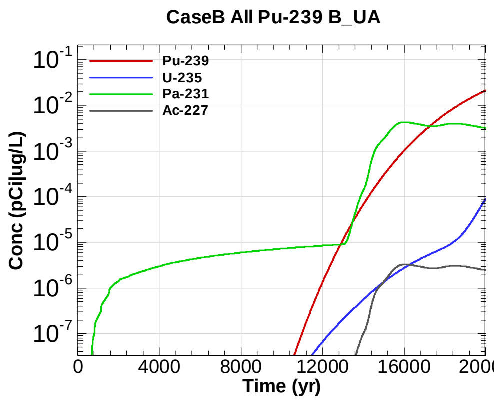

Figure M-137 - 100m Aquifer Concentration for CaseB All Pu-239 B_UA

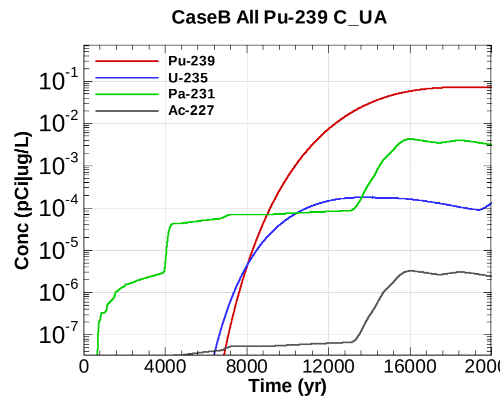

Figure M-138 - 100m Aquifer Concentration for CaseB All Pu-239 C_UA

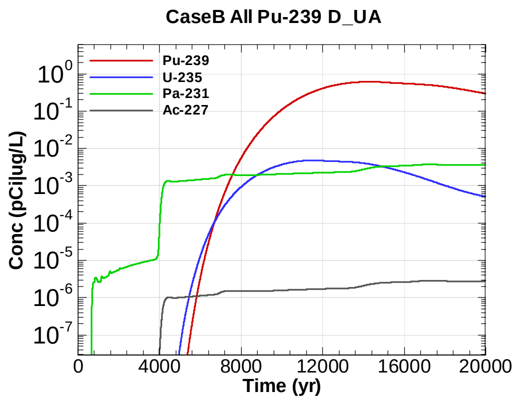

Figure M-139 - 100m Aquifer Concentration for CaseB All Pu-239 D_UA

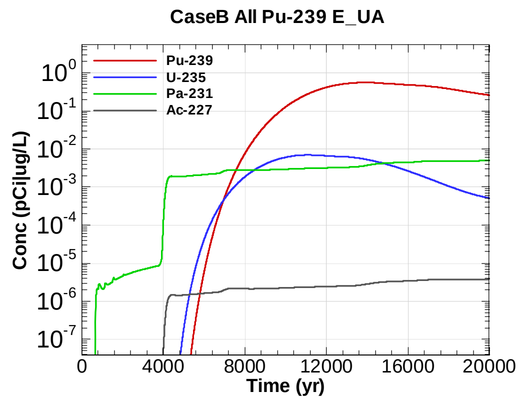

Figure M-140 - 100m Aquifer Concentration for CaseB All Pu-239 E_UA

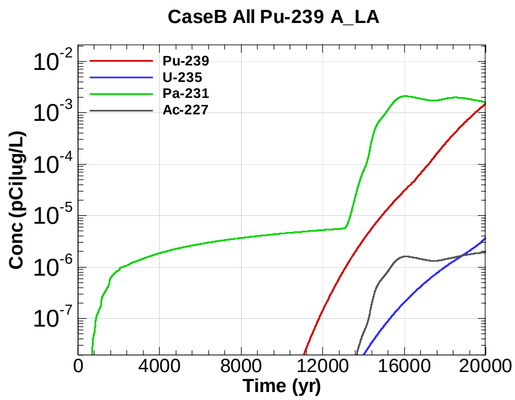

Figure M-141 - 100m Aquifer Concentration for CaseB All Pu-239 A_LA

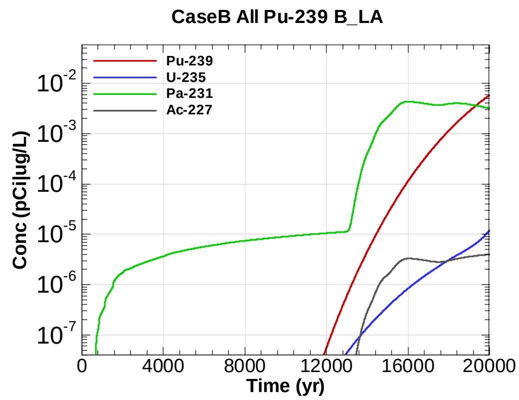

Figure M-142 - 100m Aquifer Concentration for CaseB All Pu-239 B_LA

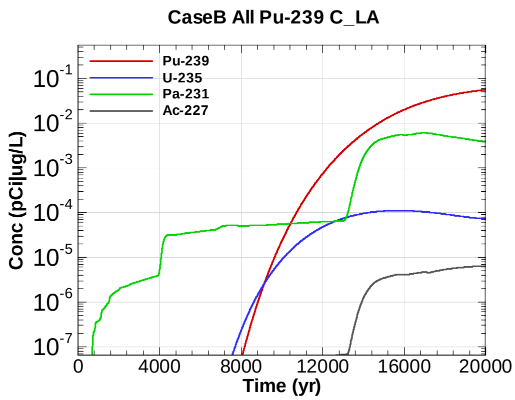

Figure M-143 - 100m Aquifer Concentration for CaseB All Pu-239 C_LA

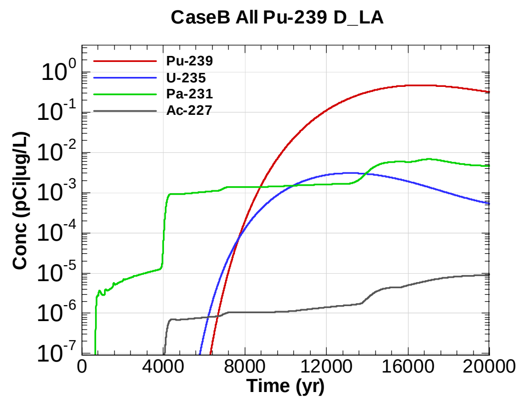

Figure M-144 - 100m Aquifer Concentration for CaseB All Pu-239 D_LA

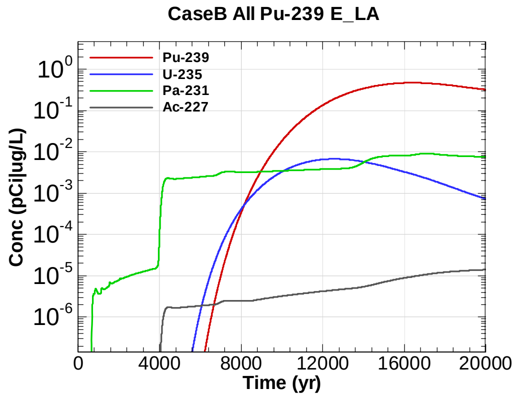

Figure M-145 - 100m Aquifer Concentration for CaseB All Pu-239 E_LA

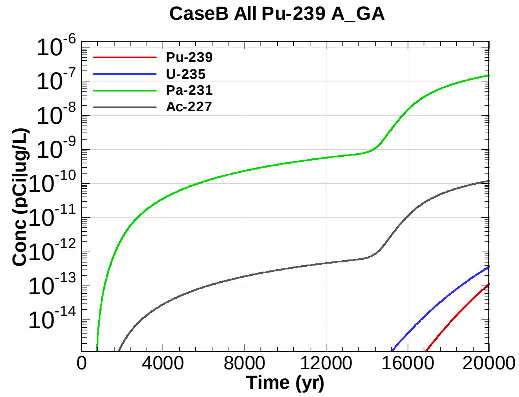

Figure M-146 - 100m Aquifer Concentration for CaseB All Pu-239 A_GA

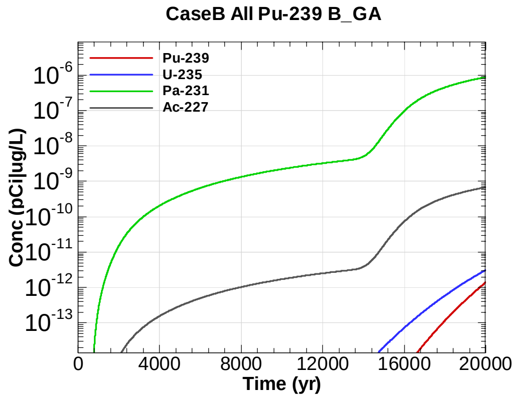

Figure M-147 - 100m Aquifer Concentration for CaseB All Pu-239 B_GA

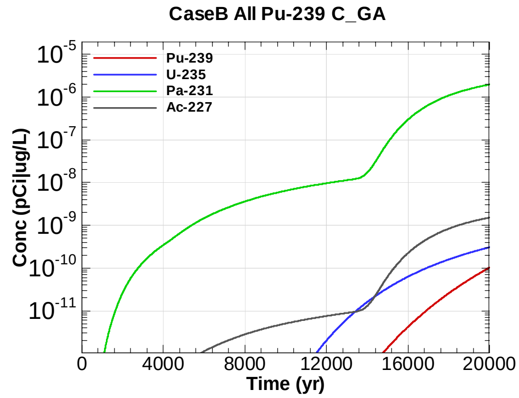

Figure M-148 - 100m Aquifer Concentration for CaseB All Pu-239 C_GA

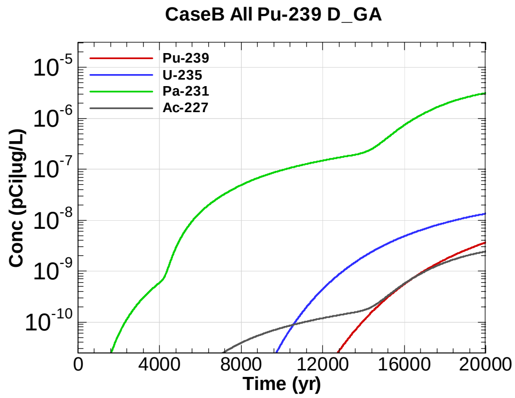

Figure M-149 - 100m Aquifer Concentration for CaseB All Pu-239 D_GA

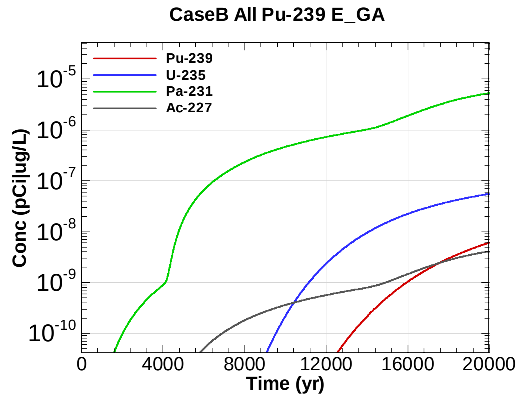

Figure M-150 - 100m Aquifer Concentration for CaseB All Pu-239 E_GA

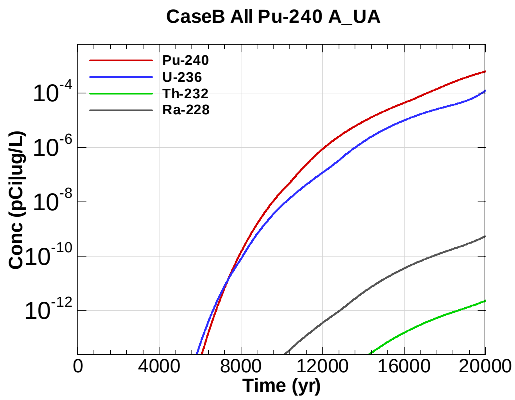

Figure M-151 - 100m Aquifer Concentration for CaseB All Pu-240 A_UA

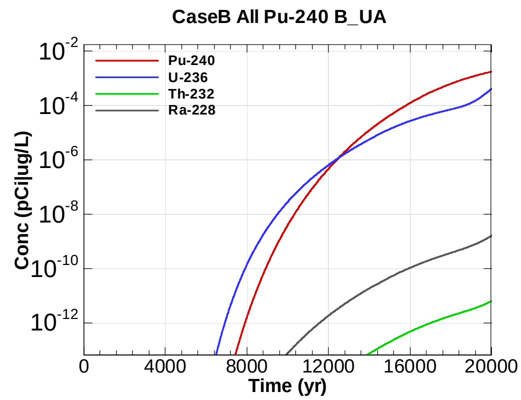

Figure M-152 - 100m Aquifer Concentration for CaseB All Pu-240 B_UA

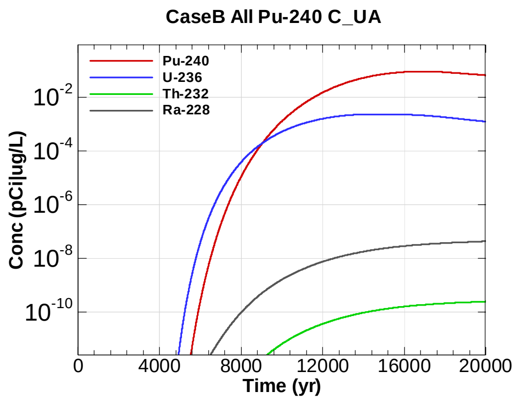

Figure M-153 - 100m Aquifer Concentration for CaseB All Pu-240 C_UA

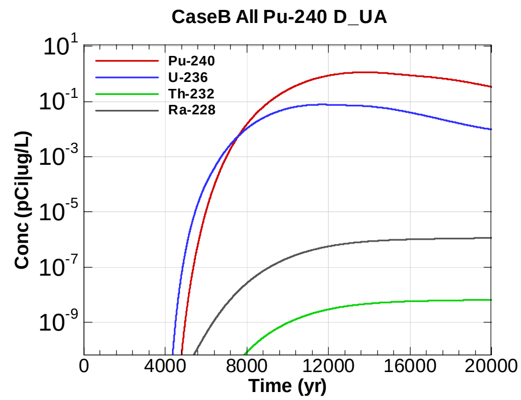

Figure M-154 - 100m Aquifer Concentration for CaseB All Pu-240 D_UA

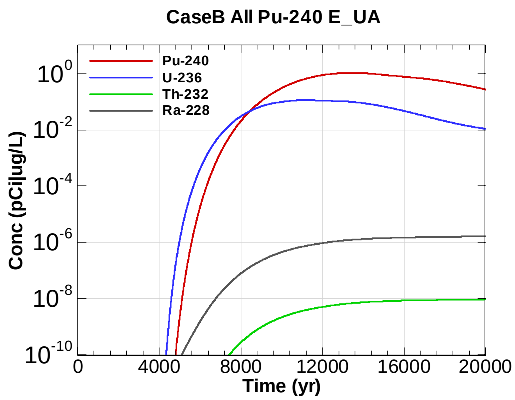

Figure M-155 - 100m Aquifer Concentration for CaseB All Pu-240 E_UA

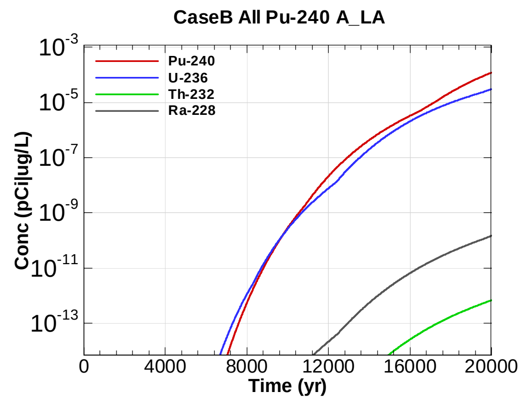

Figure M-156 - 100m Aquifer Concentration for CaseB All Pu-240 A_LA

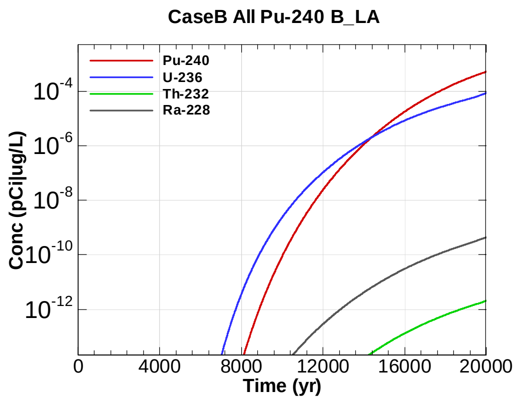

Figure M-157 - 100m Aquifer Concentration for CaseB All Pu-240 B_LA

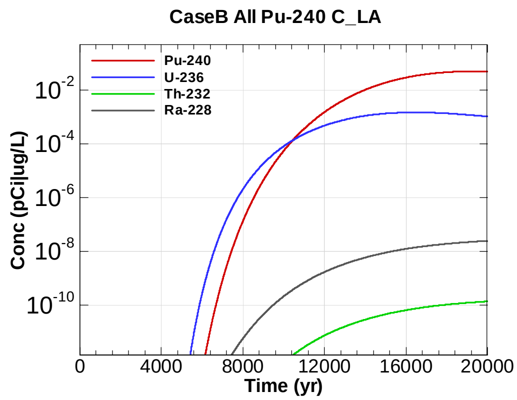

Figure M-158 - 100m Aquifer Concentration for CaseB All Pu-240 C_LA

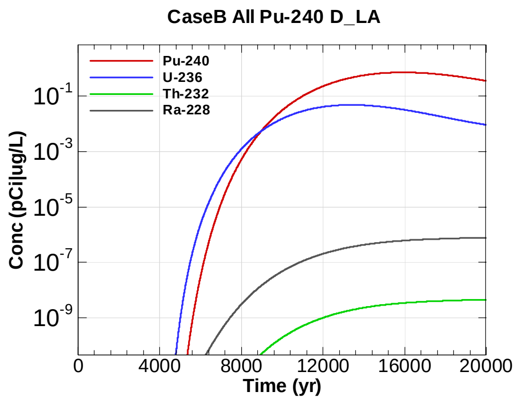

Figure M-159 - 100m Aquifer Concentration for CaseB All Pu-240 D_LA

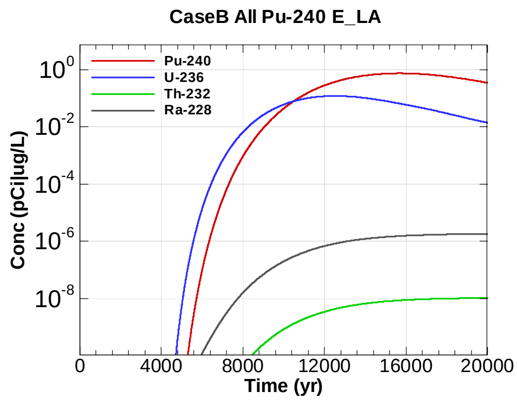

Figure M-160 - 100m Aquifer Concentration for CaseB All Pu-240 E_LA

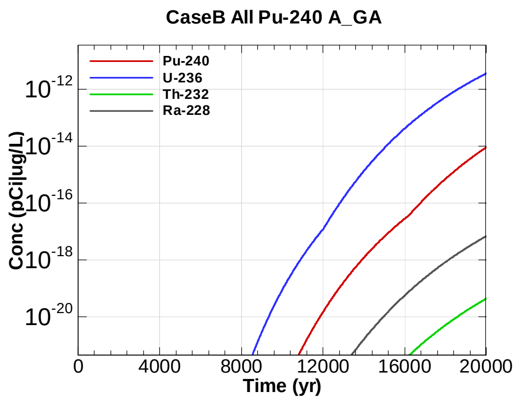

Figure M-161 - 100m Aquifer Concentration for CaseB All Pu-240 A_GA

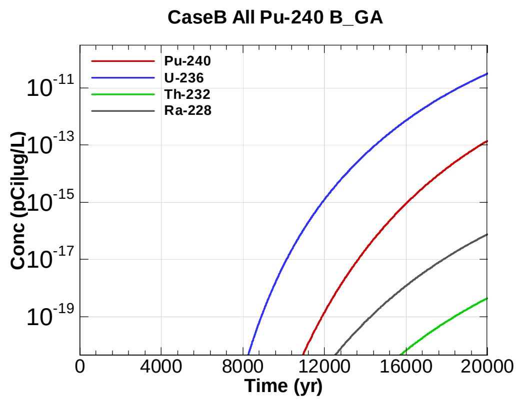

Figure M-162 - 100m Aquifer Concentration for CaseB All Pu-240 B_GA

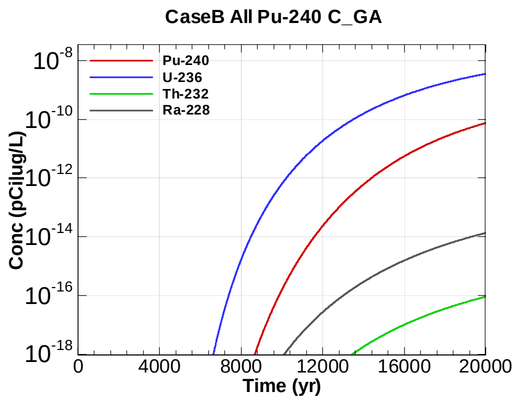

Figure M-163 - 100m Aquifer Concentration for CaseB All Pu-240 C_GA

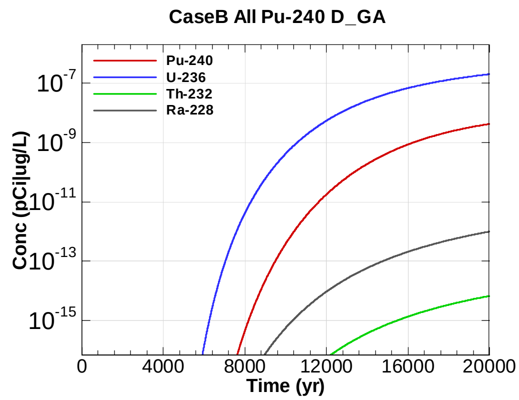

Figure M-164 - 100m Aquifer Concentration for CaseB All Pu-240 D_GA

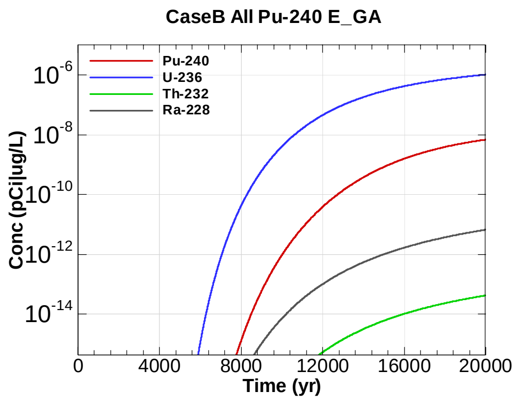

Figure M-165 - 100m Aquifer Concentration for CaseB All Pu-240 E_GA

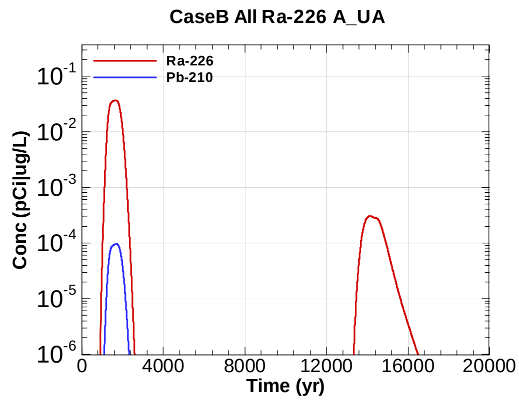

Figure M-166 - 100m Aquifer Concentration for CaseB All Ra-226 A_UA

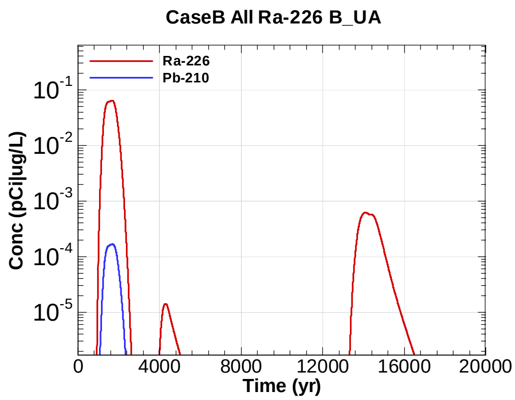

Figure M-167 - 100m Aquifer Concentration for CaseB All Ra-226 B_UA

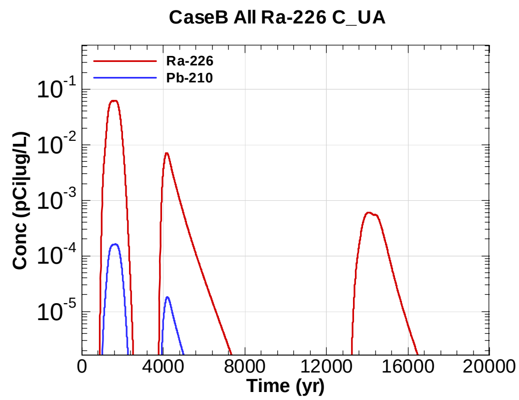

Figure M-168 - 100m Aquifer Concentration for CaseB All Ra-226 C_UA

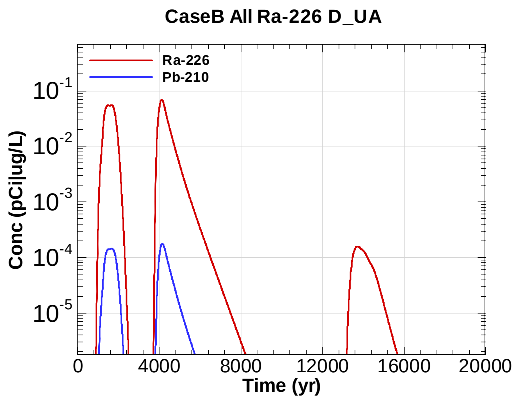

Figure M-169 - 100m Aquifer Concentration for CaseB All Ra-226 D_UA

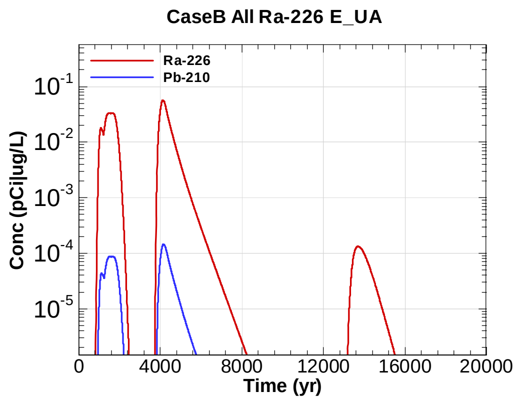

Figure M-170 - 100m Aquifer Concentration for CaseB All Ra-226 E_UA

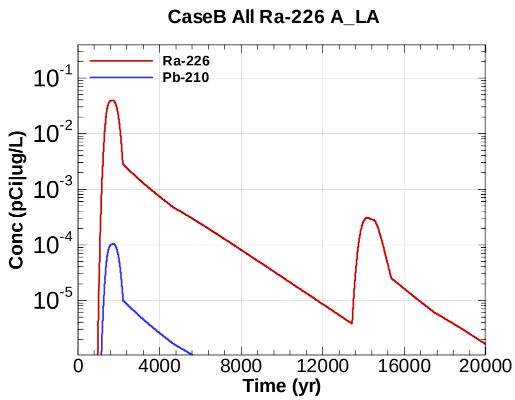

Figure M-171 - 100m Aquifer Concentration for CaseB All Ra-226 A_LA

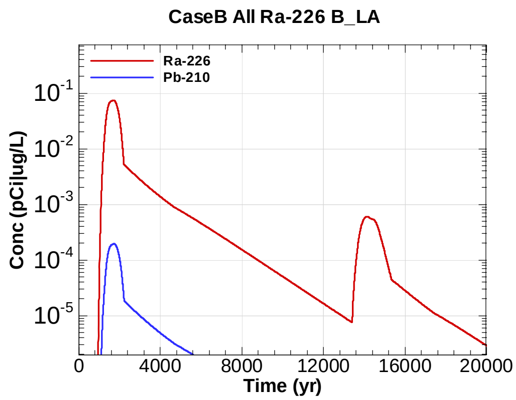

Figure M-172 - 100m Aquifer Concentration for CaseB All Ra-226 B_LA

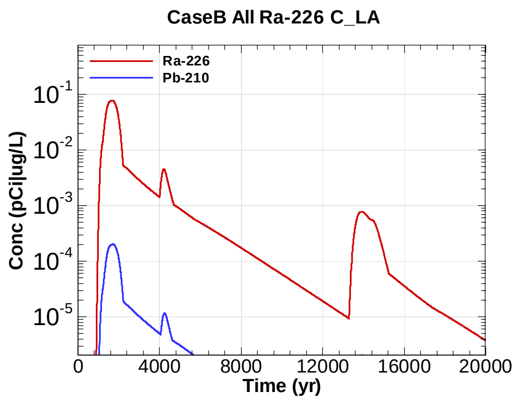

Figure M-173 - 100m Aquifer Concentration for CaseB All Ra-226 C_LA

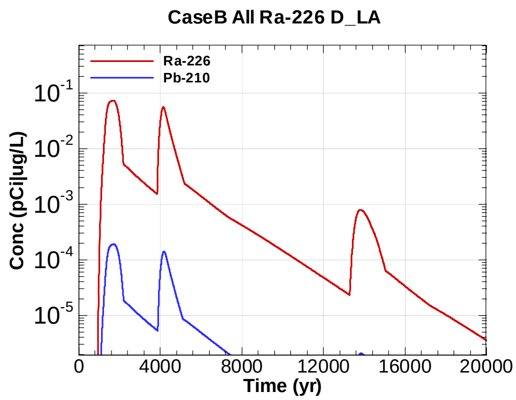

Figure M-174 - 100m Aquifer Concentration for CaseB All Ra-226 D_LA

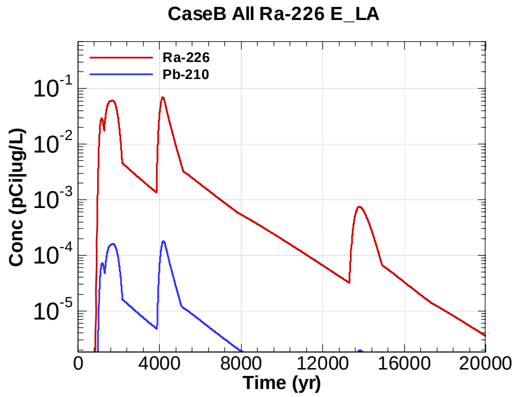

Figure M-175 - 100m Aquifer Concentration for CaseB All Ra-226 E_LA

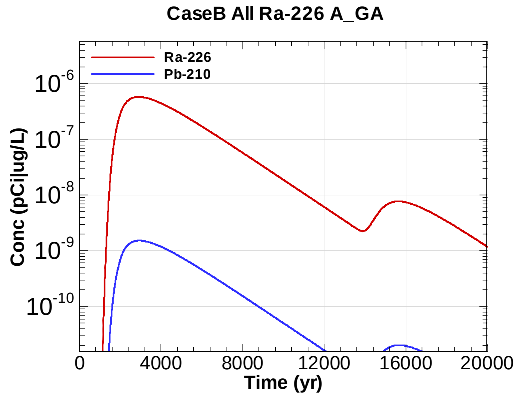

Figure M-176 - 100m Aquifer Concentration for CaseB All Ra-226 A_GA

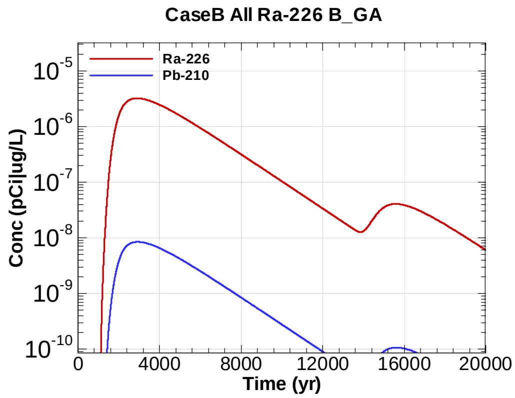

Figure M-177 - 100m Aquifer Concentration for CaseB All Ra-226 B_GA

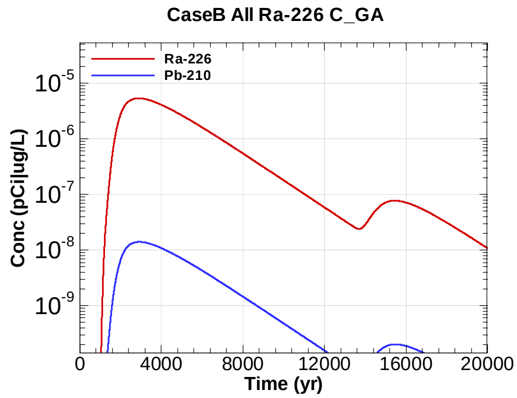

Figure M-178 - 100m Aquifer Concentration for CaseB All Ra-226 C_GA

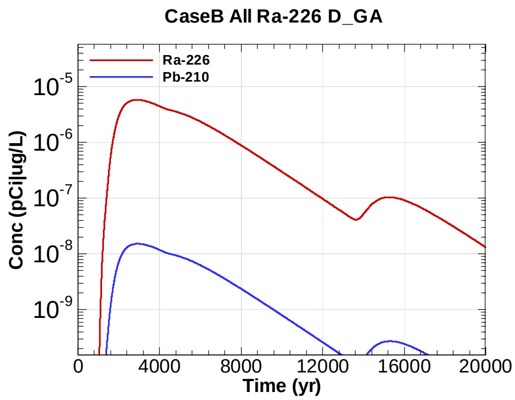

Figure M-179 - 100m Aquifer Concentration for CaseB All Ra-226 D_GA

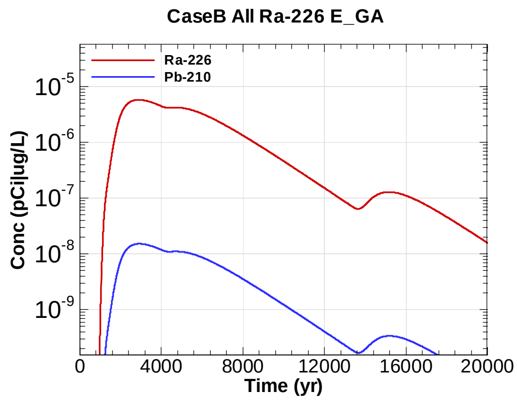

Figure M-180 - 100m Aquifer Concentration for CaseB All Ra-226 E_GA

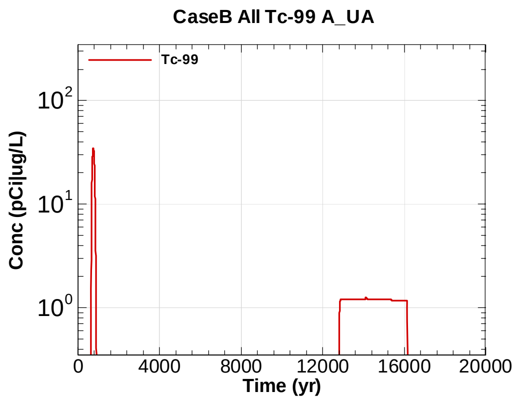

Figure M-181 - 100m Aquifer Concentration for CaseB All Tc-99 A_UA

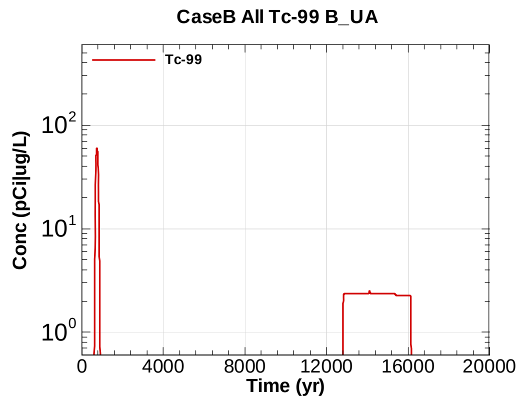

Figure M-182 - 100m Aquifer Concentration for CaseB All Tc-99 B_UA

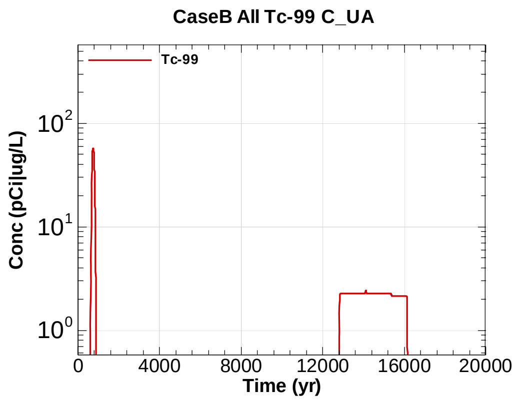

Figure M-183 - 100m Aquifer Concentration for CaseB All Tc-99 C_UA

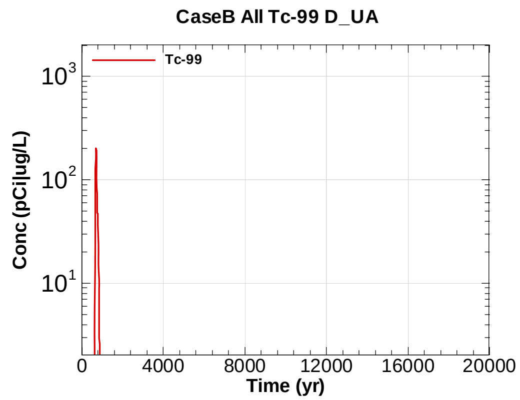

Figure M-184 - 100m Aquifer Concentration for CaseB All Tc-99 D_UA

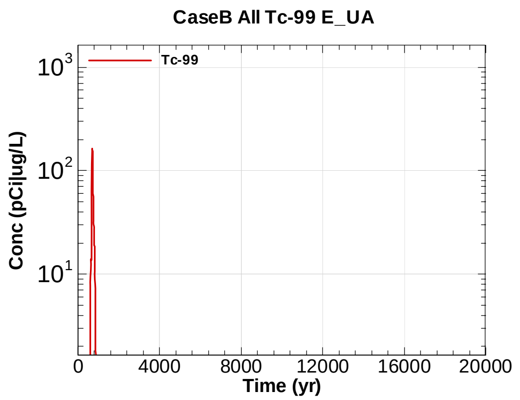

Figure M-185 - 100m Aquifer Concentration for CaseB All Tc-99 E_UA

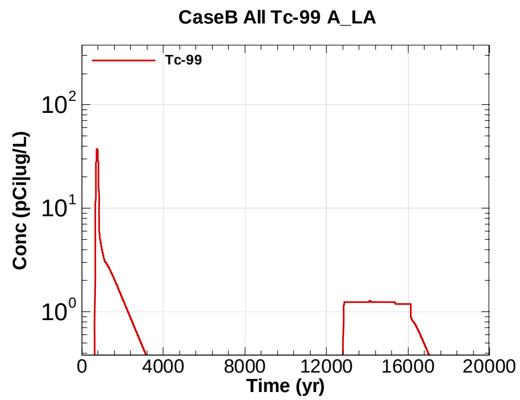

Figure M-186 - 100m Aquifer Concentration for CaseB All Tc-99 A_LA

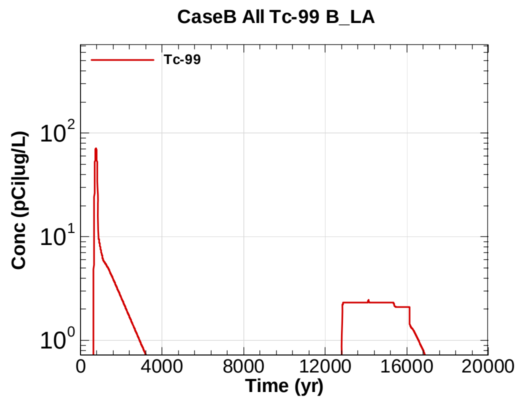

Figure M-187 - 100m Aquifer Concentration for CaseB All Tc-99 B_LA

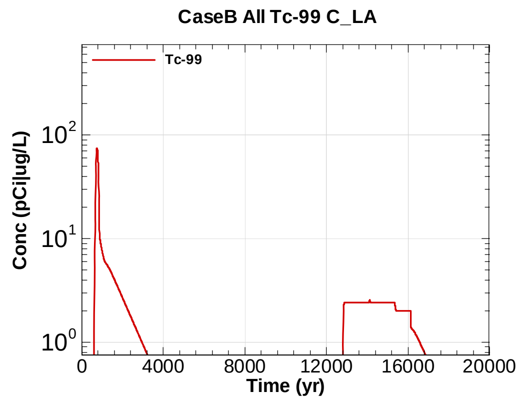

Figure M-188 - 100m Aquifer Concentration for CaseB All Tc-99 C_LA

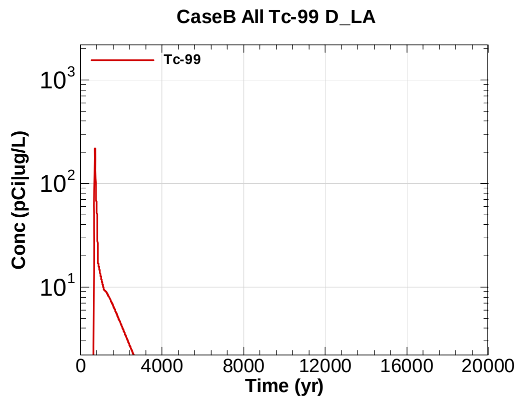

Figure M-189 - 100m Aquifer Concentration for CaseB All Tc-99 D_LA

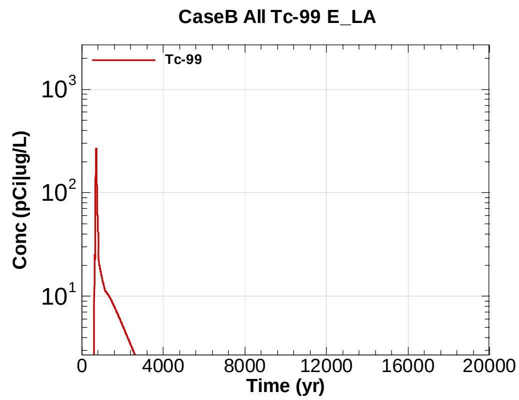

Figure M-190 - 100m Aquifer Concentration for CaseB All Tc-99 E_LA

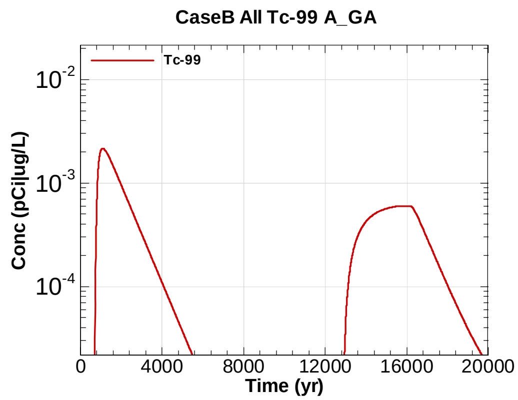

Figure M-191 - 100m Aquifer Concentration for CaseB All Tc-99 A_GA

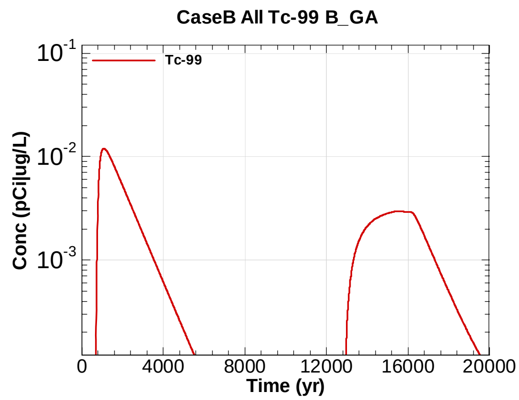

Figure M-192 - 100m Aquifer Concentration for CaseB All Tc-99 B_GA

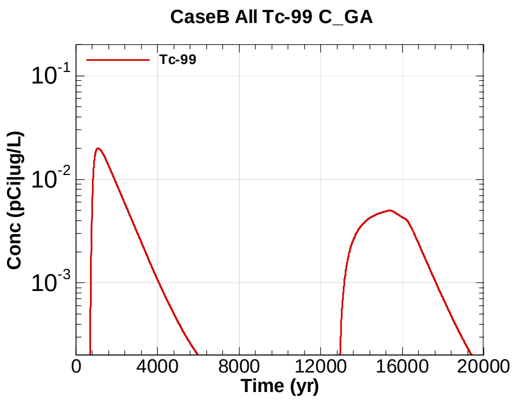

Figure M-193 - 100m Aquifer Concentration for CaseB All Tc-99 C_GA

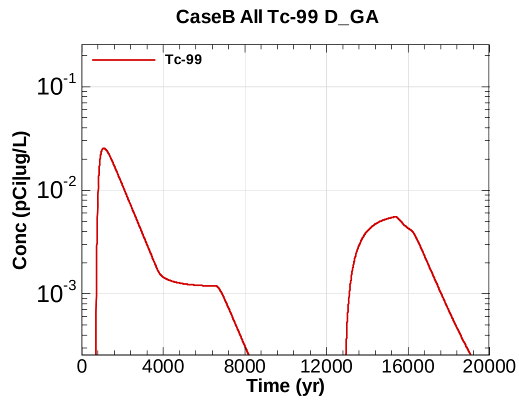

Figure M-194 - 100m Aquifer Concentration for CaseB All Tc-99 D_GA

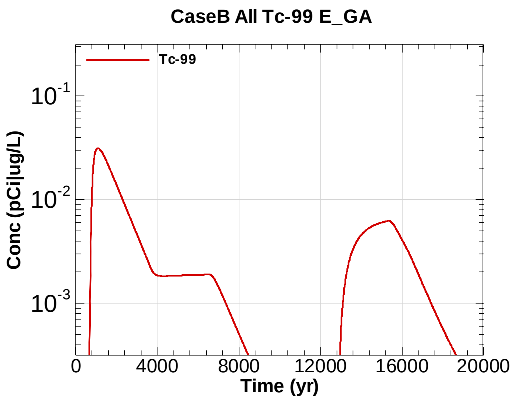

Figure M-195 - 100m Aquifer Concentration for CaseB All Tc-99 E_GA

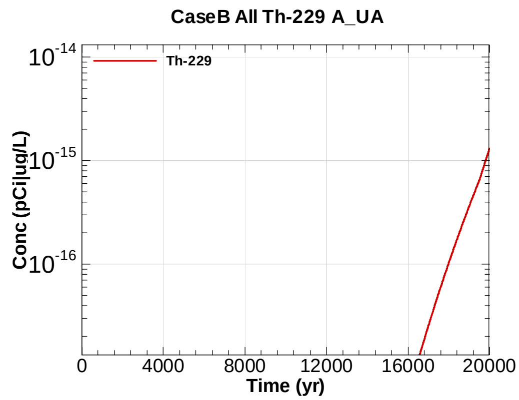

Figure M-196 - 100m Aquifer Concentration for CaseB All Th-229 A_UA

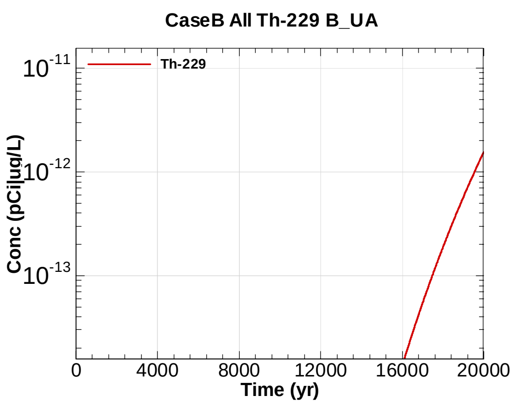

Figure M-197 - 100m Aquifer Concentration for CaseB All Th-229 B_UA

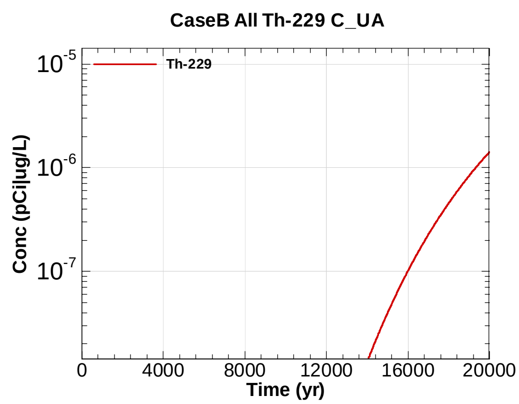

Figure M-198 - 100m Aquifer Concentration for CaseB All Th-229 C_UA

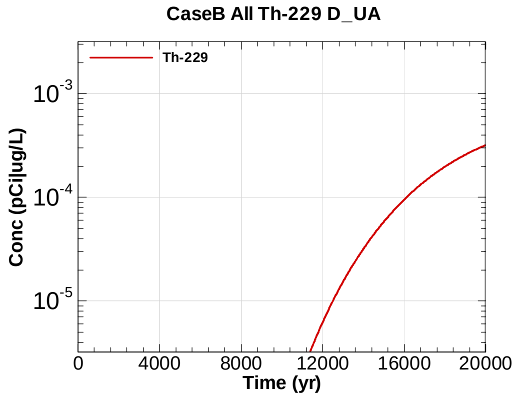

Figure M-199 - 100m Aquifer Concentration for CaseB All Th-229 D_UA

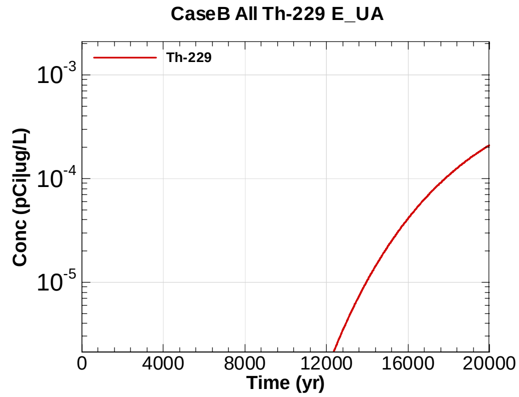

Figure M-200 - 100m Aquifer Concentration for CaseB All Th-229 E_UA

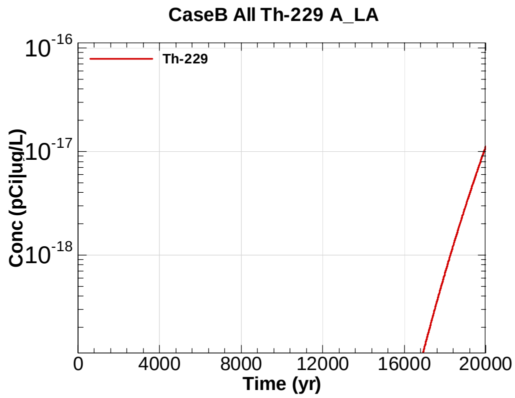

Figure M-201 - 100m Aquifer Concentration for CaseB All Th-229 A_LA

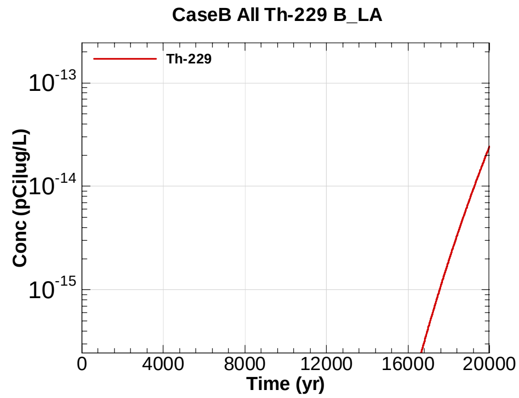

Figure M-202 - 100m Aquifer Concentration for CaseB All Th-229 B_LA

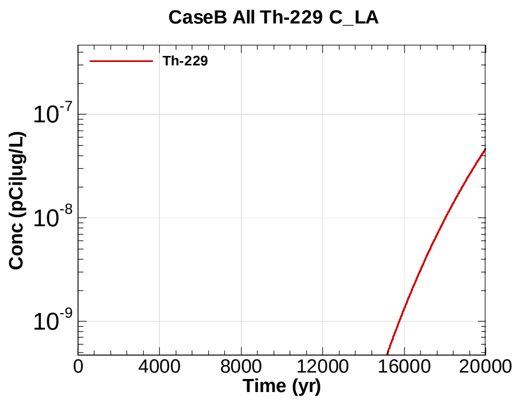

Figure M-203 - 100m Aquifer Concentration for CaseB All Th-229 C_LA

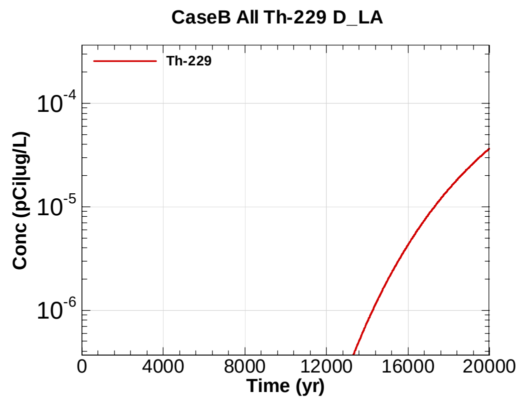

Figure M-204 - 100m Aquifer Concentration for CaseB All Th-229 D_LA

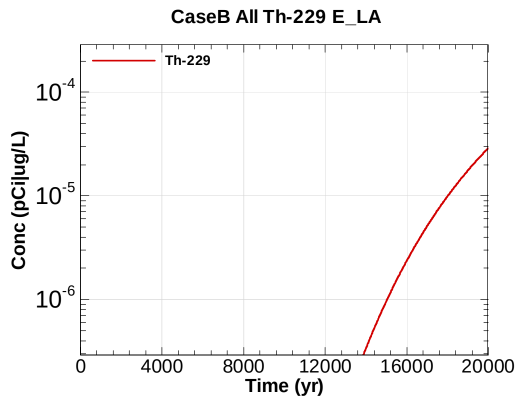

Figure M-205 - 100m Aquifer Concentration for CaseB All Th-229 E_LA

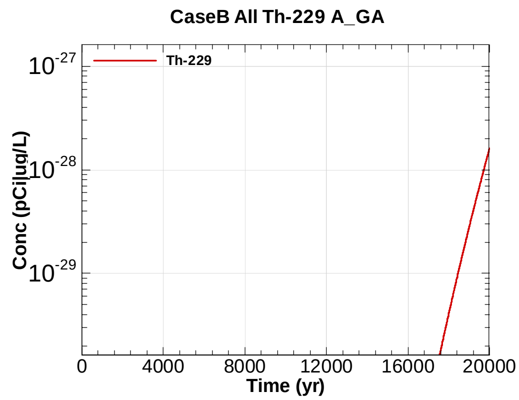

Figure M-206 - 100m Aquifer Concentration for CaseB All Th-229 A_GA

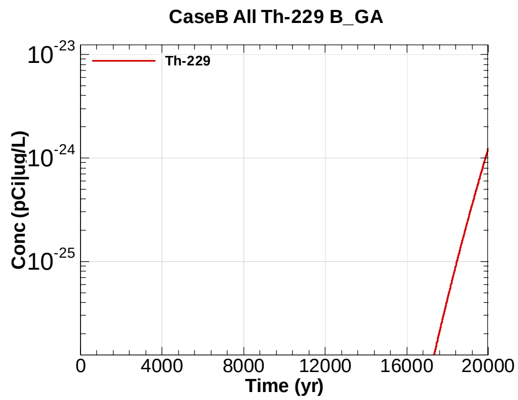

Figure M-207 - 100m Aquifer Concentration for CaseB All Th-229 B_GA

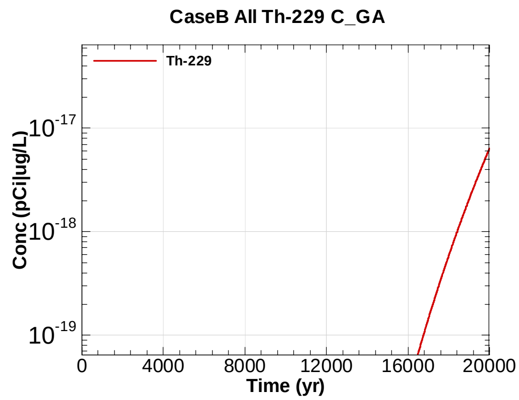

Figure M-208 - 100m Aquifer Concentration for CaseB All Th-229 C_GA

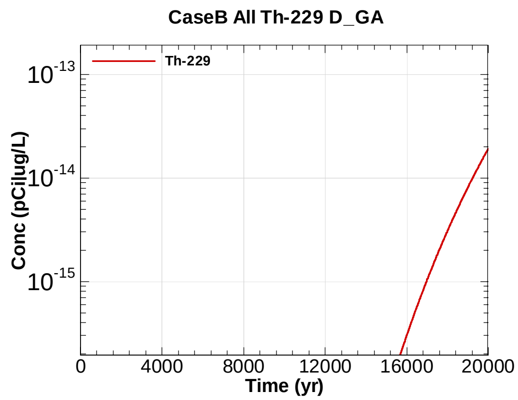

Figure M-209 - 100m Aquifer Concentration for CaseB All Th-229 D_GA

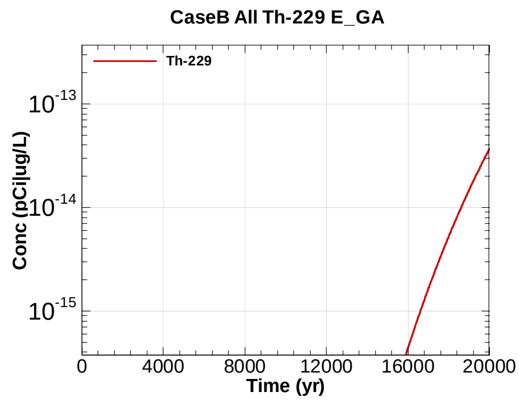

Figure M-210 - 100m Aquifer Concentration for CaseB All Th-229 E_GA

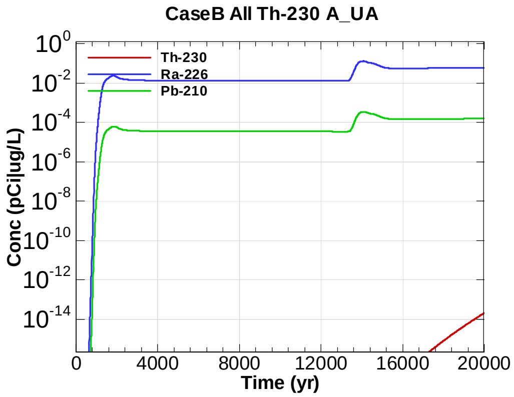

Figure M-211 - 100m Aquifer Concentration for CaseB All Th-230 A_UA

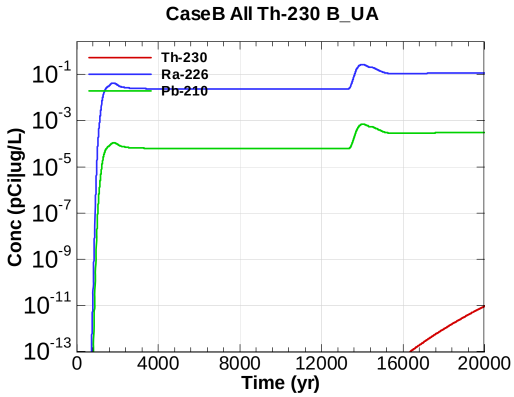

Figure M-212 - 100m Aquifer Concentration for CaseB All Th-230 B_UA

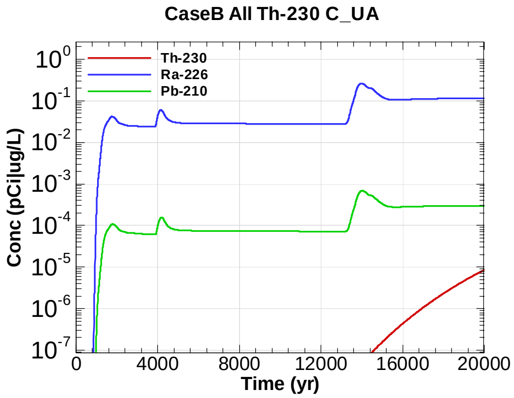

Figure M-213 - 100m Aquifer Concentration for CaseB All Th-230 C_UA

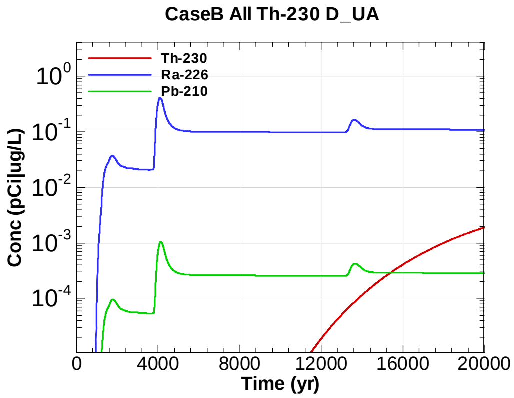

Figure M-214 - 100m Aquifer Concentration for CaseB All Th-230 D_UA

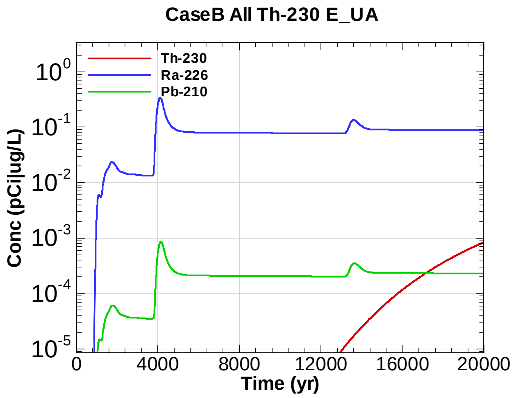

Figure M-215 - 100m Aquifer Concentration for CaseB All Th-230 E_UA

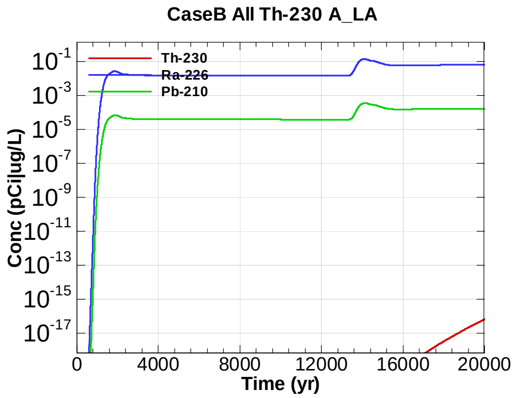

Figure M-216 - 100m Aquifer Concentration for CaseB All Th-230 A_LA

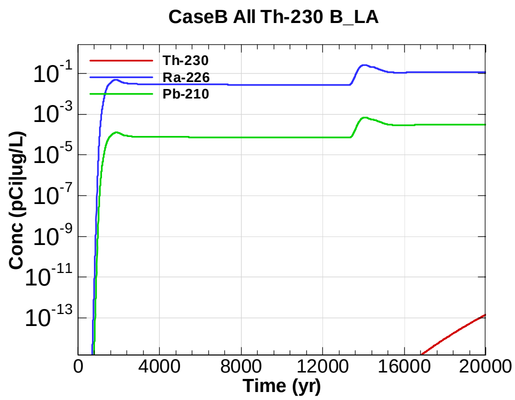

Figure M-217 - 100m Aquifer Concentration for CaseB All Th-230 B_LA

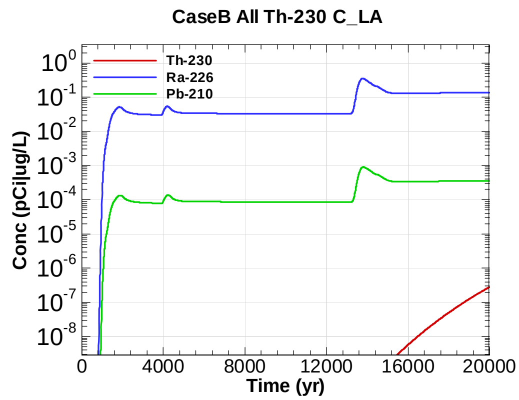

Figure M-218 - 100m Aquifer Concentration for CaseB All Th-230 C_LA

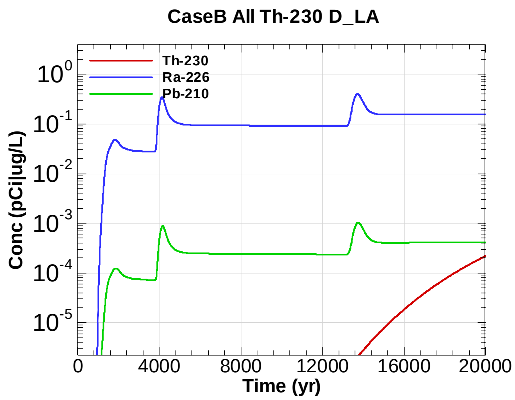

Figure M-219 - 100m Aquifer Concentration for CaseB All Th-230 D_LA

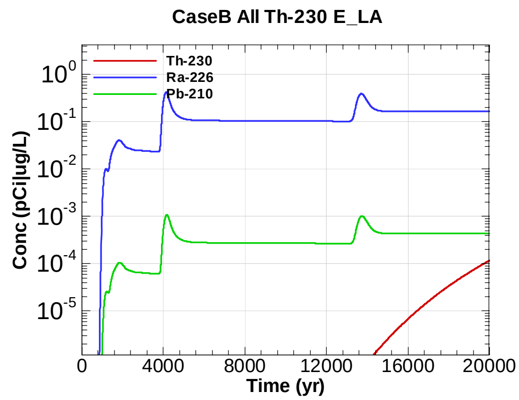

Figure M-220 - 100m Aquifer Concentration for CaseB All Th-230 E_LA

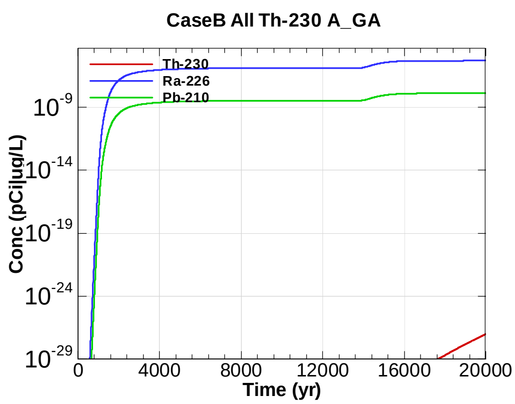

Figure M-221 - 100m Aquifer Concentration for CaseB All Th-230 A_GA

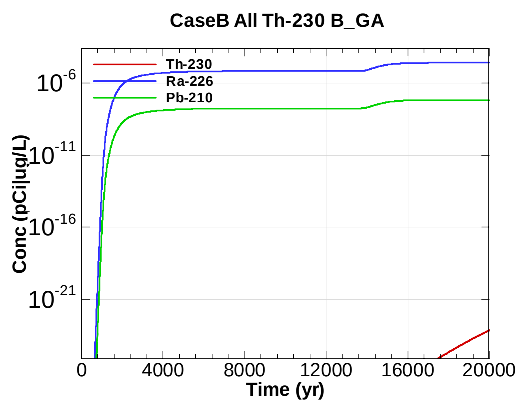

Figure M-222 - 100m Aquifer Concentration for CaseB All Th-230 B_GA

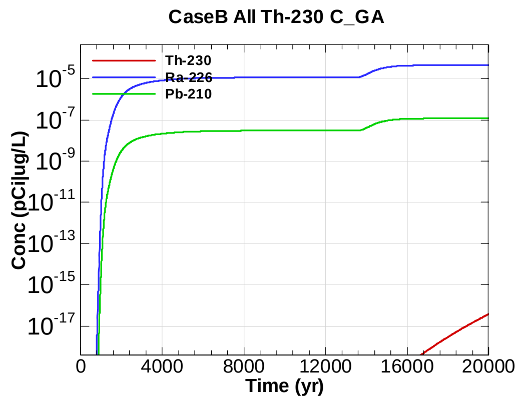

Figure M-223 - 100m Aquifer Concentration for CaseB All Th-230 C_GA

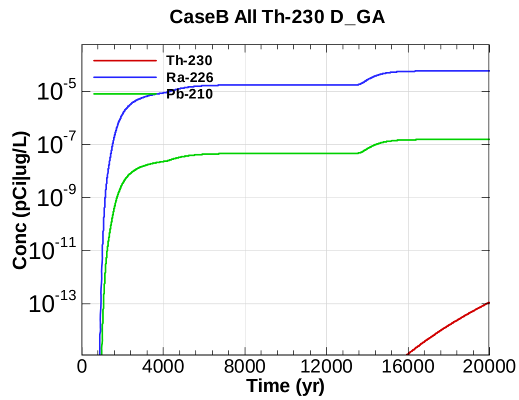

Figure M-224 - 100m Aquifer Concentration for CaseB All Th-230 D_GA

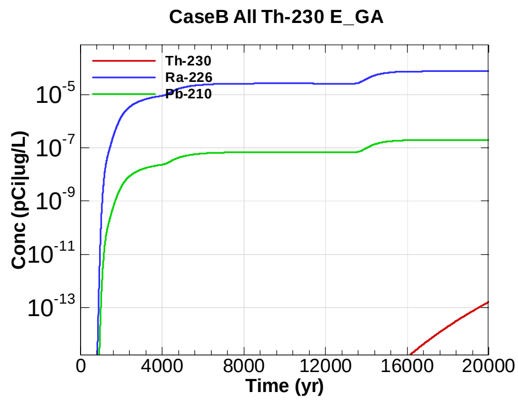

Figure M-225 - 100m Aquifer Concentration for CaseB All Th-230 E_GA

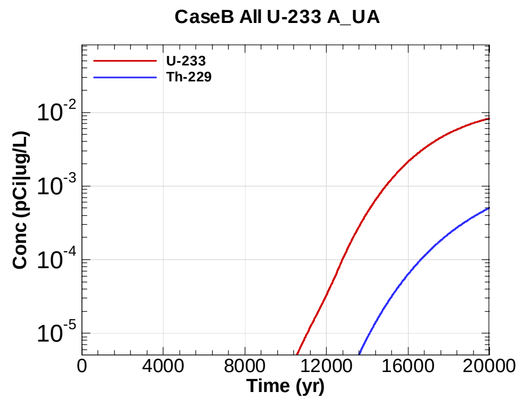

Figure M-226 - 100m Aquifer Concentration for CaseB All U-233 A_UA

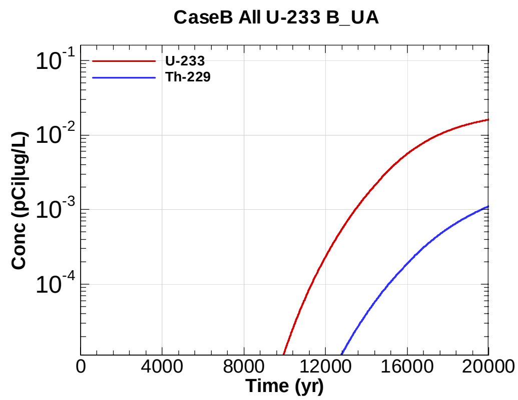

Figure M-227 - 100m Aquifer Concentration for CaseB All U-233 B_UA

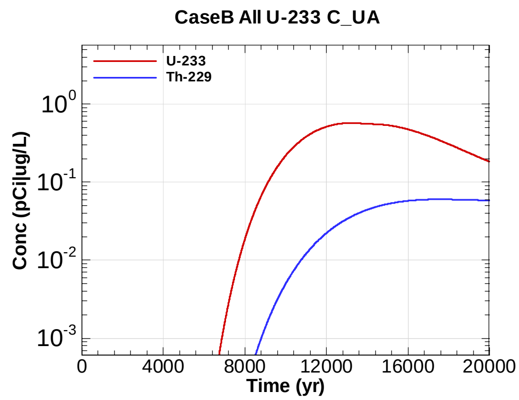

Figure M-228 - 100m Aquifer Concentration for CaseB All U-233 C_UA

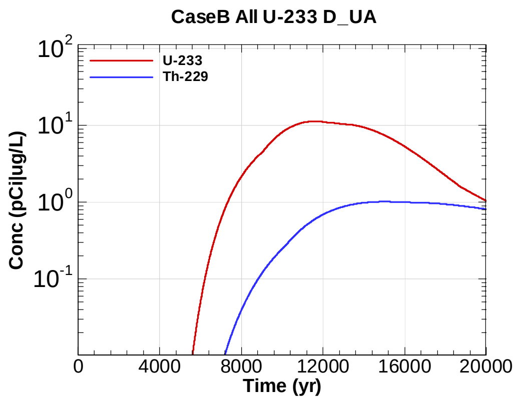

Figure M-229 - 100m Aquifer Concentration for CaseB All U-233 D_UA

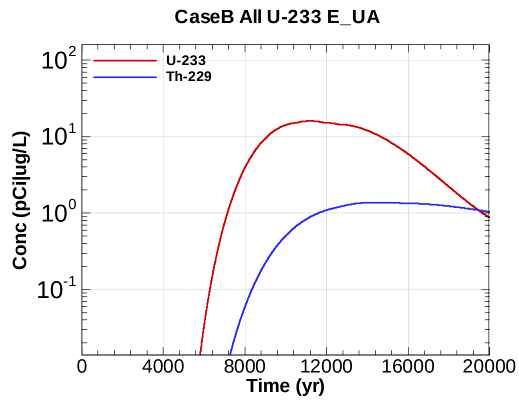

Figure M-230 - 100m Aquifer Concentration for CaseB All U-233 E_UA

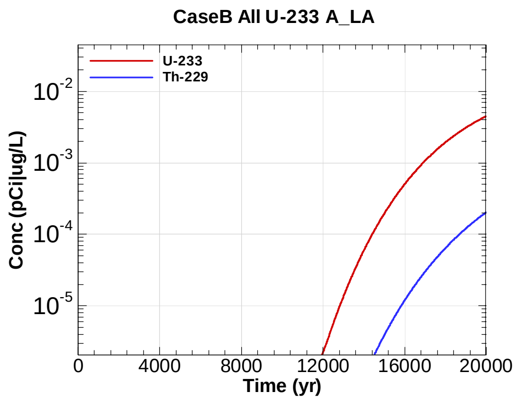

Figure M-231 - 100m Aquifer Concentration for CaseB All U-233 A_LA

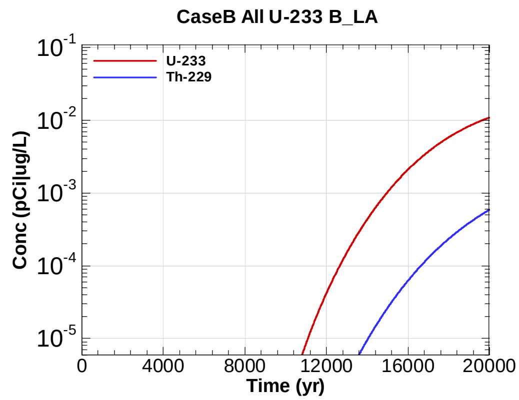

Figure M-232 - 100m Aquifer Concentration for CaseB All U-233 B_LA

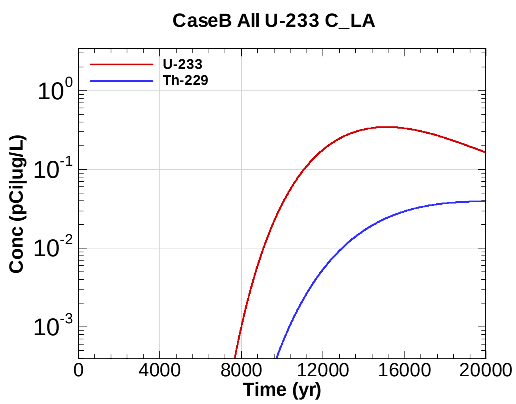

Figure M-233 - 100m Aquifer Concentration for CaseB All U-233 C_LA

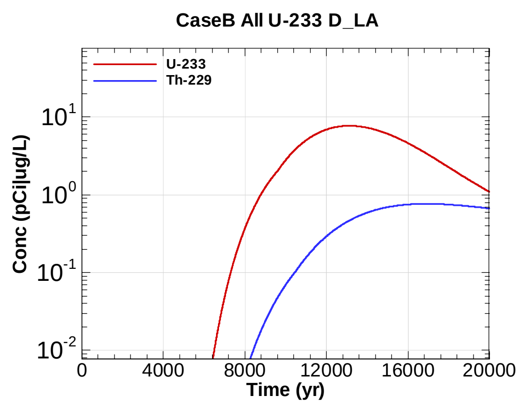

Figure M-234 - 100m Aquifer Concentration for CaseB All U-233 D_LA

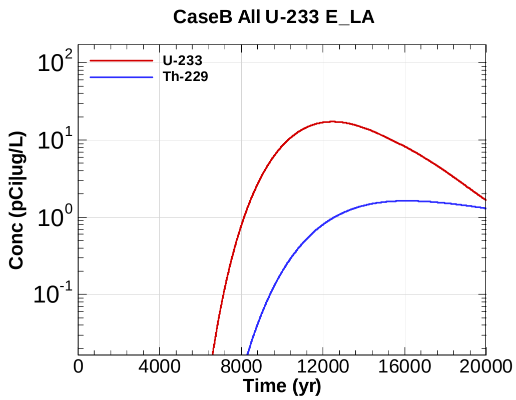

Figure M-235 - 100m Aquifer Concentration for CaseB All U-233 E_LA

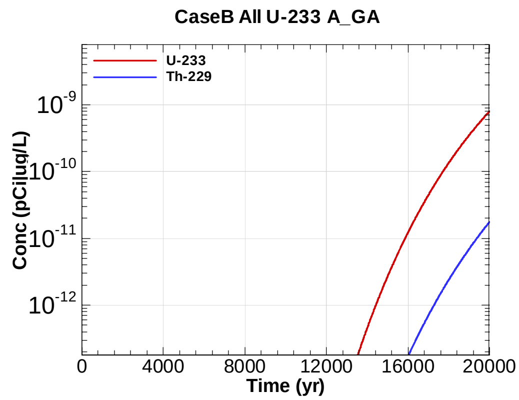

Figure M-236 - 100m Aquifer Concentration for CaseB All U-233 A_GA

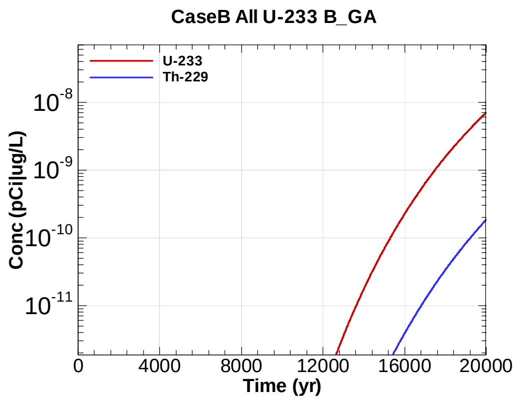

Figure M-237 - 100m Aquifer Concentration for CaseB All U-233 B_GA

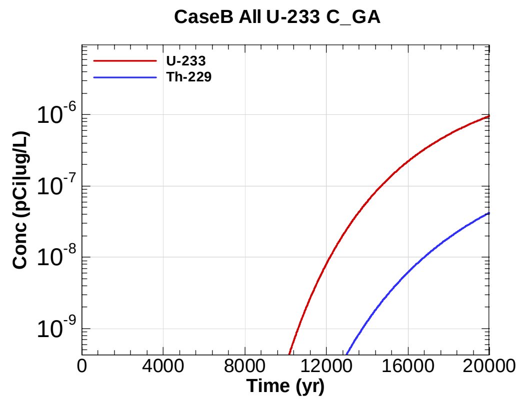

Figure M-238 - 100m Aquifer Concentration for CaseB All U-233 C_GA

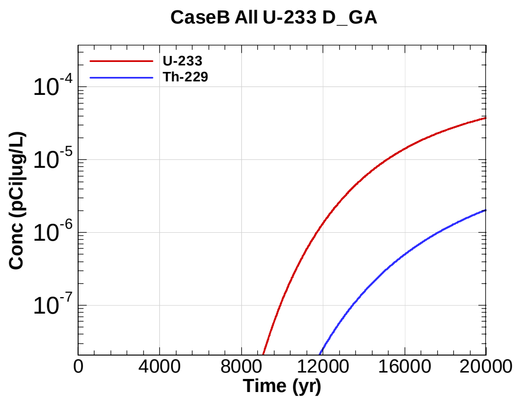

Figure M-239 - 100m Aquifer Concentration for CaseB All U-233 D_GA

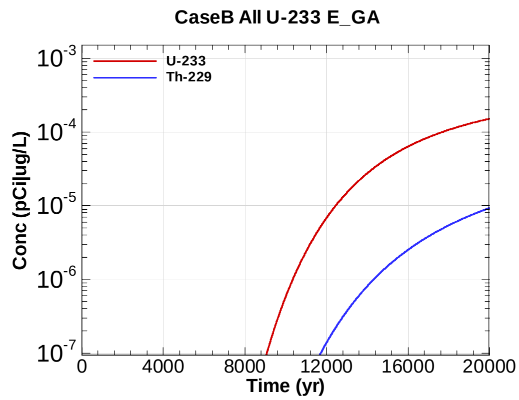

Figure M-240 - 100m Aquifer Concentration for CaseB All U-233 E_GA

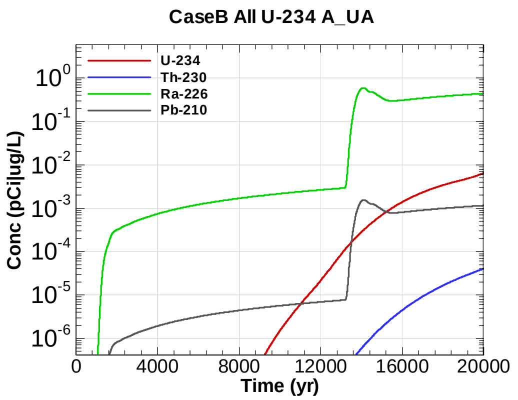

Figure M-241 - 100m Aquifer Concentration for CaseB All U-234 A_UA

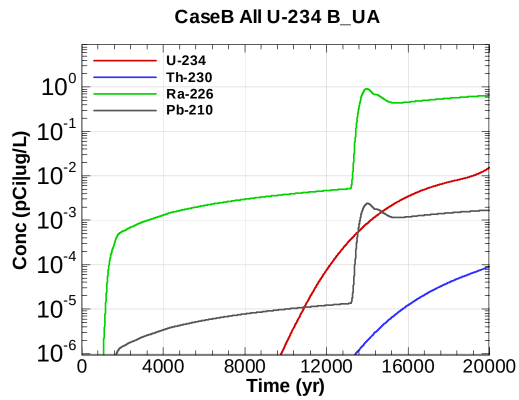

Figure M-242 - 100m Aquifer Concentration for CaseB All U-234 B_UA

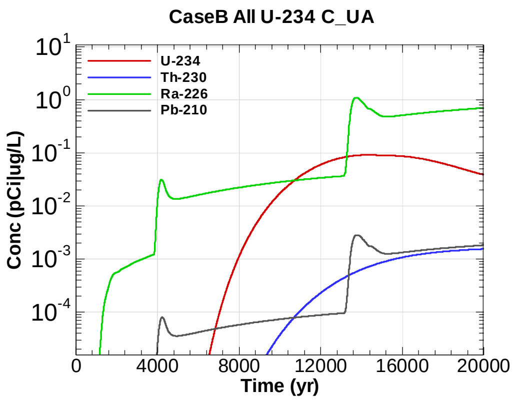

Figure M-243 - 100m Aquifer Concentration for CaseB All U-234 C_UA

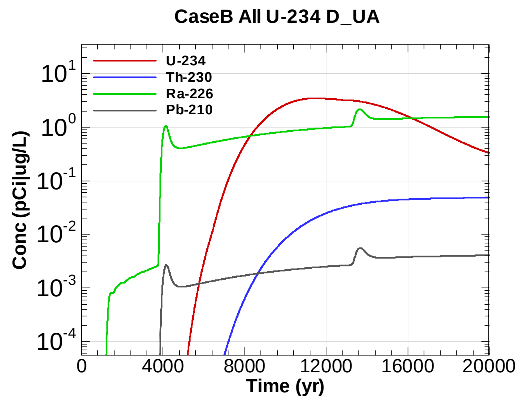

Figure M-244 - 100m Aquifer Concentration for CaseB All U-234 D_UA

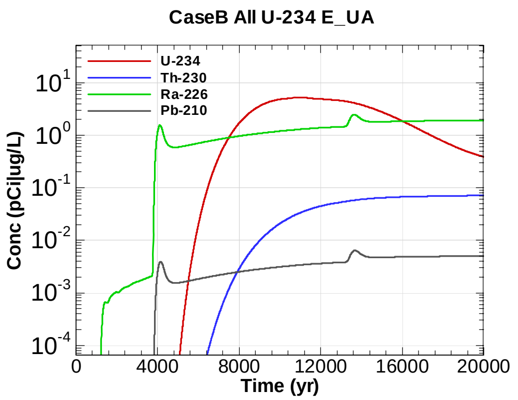

Figure M-245 - 100m Aquifer Concentration for CaseB All U-234 E_UA

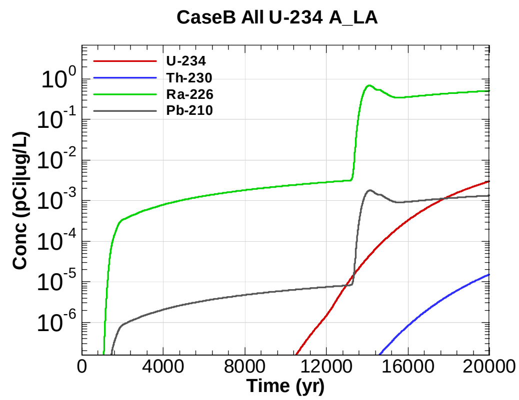

Figure M-246 - 100m Aquifer Concentration for CaseB All U-234 A_LA

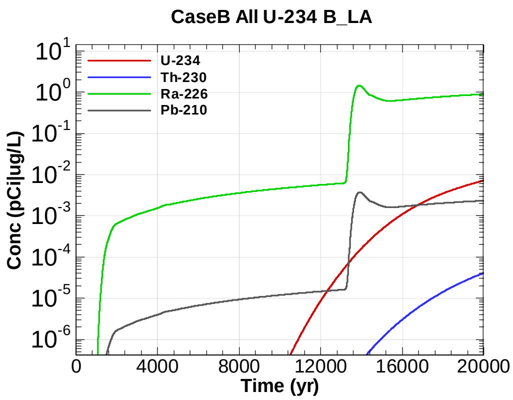

Figure M-247 - 100m Aquifer Concentration for CaseB All U-234 B_LA

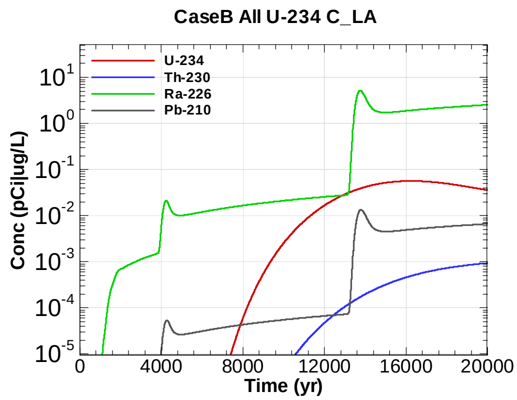

Figure M-248 - 100m Aquifer Concentration for CaseB All U-234 C_LA

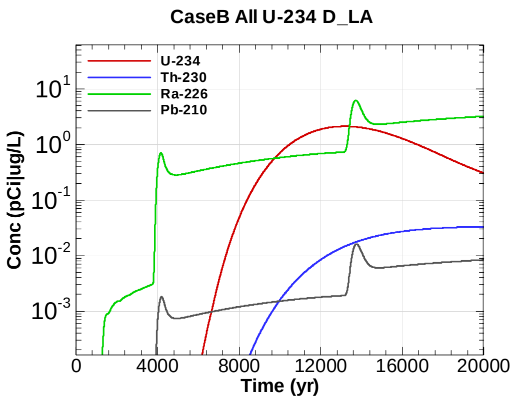

Figure M-249 - 100m Aquifer Concentration for CaseB All U-234 D_LA

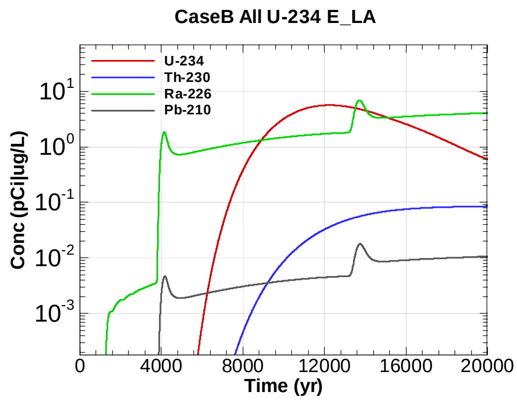

Figure M-250 - 100m Aquifer Concentration for CaseB All U-234 E_LA

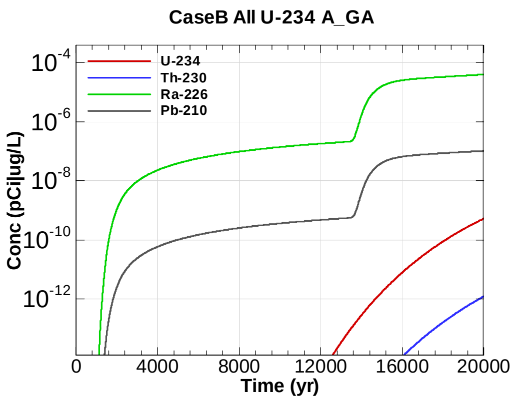

Figure M-251 - 100m Aquifer Concentration for CaseB All U-234 A_GA

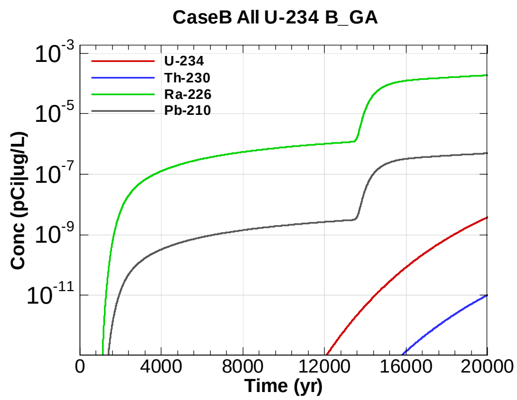

Figure M-252 - 100m Aquifer Concentration for CaseB All U-234 B_GA

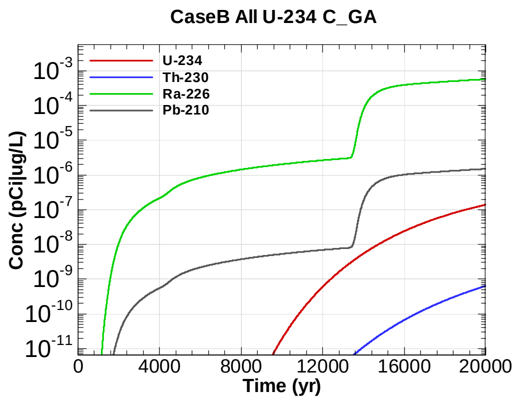

Figure M-253 - 100m Aquifer Concentration for CaseB All U-234 C_GA

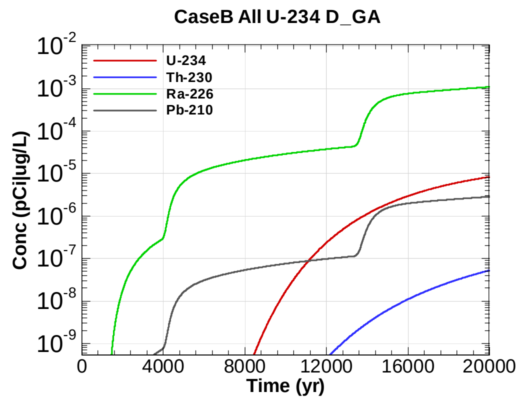

Figure M-254 - 100m Aquifer Concentration for CaseB All U-234 D_GA

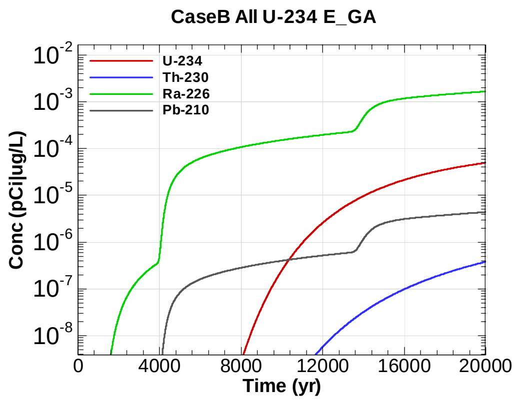

Figure M-255 - 100m Aquifer Concentration for CaseB All U-234 E_GA

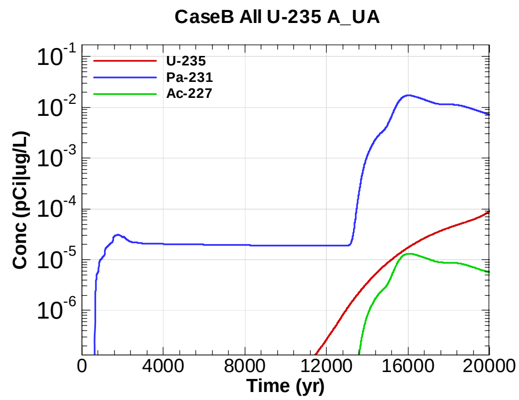

Figure M-256 - 100m Aquifer Concentration for CaseB All U-235 A_UA

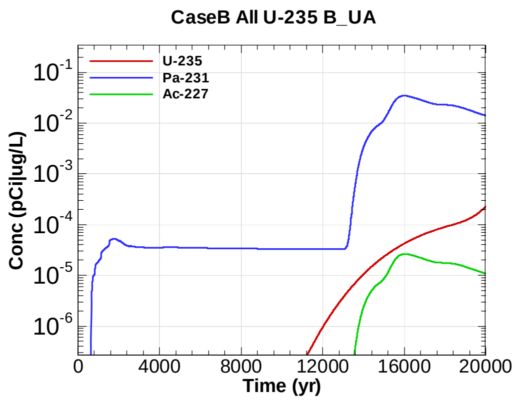

Figure M-257 - 100m Aquifer Concentration for CaseB All U-235 B_UA

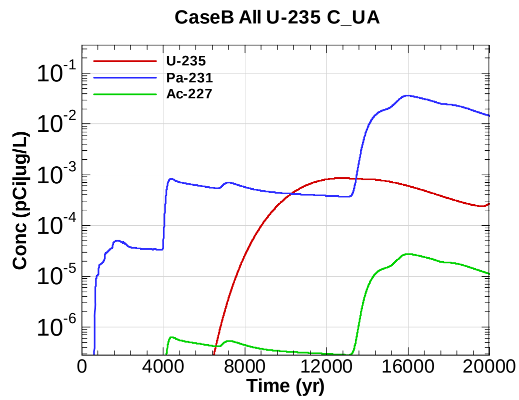

Figure M-258 - 100m Aquifer Concentration for CaseB All U-235 C_UA

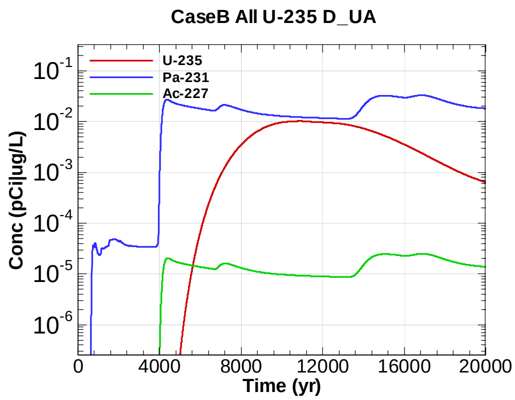

Figure M-259 - 100m Aquifer Concentration for CaseB All U-235 D_UA

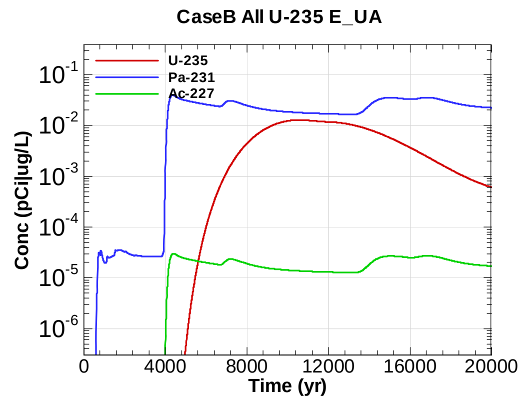

Figure M-260 - 100m Aquifer Concentration for CaseB All U-235 E_UA

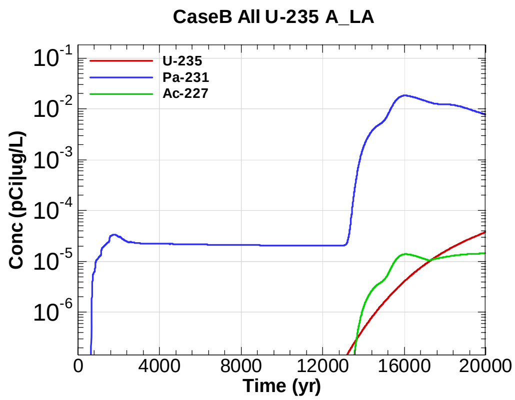

Figure M-261 - 100m Aquifer Concentration for CaseB All U-235 A_LA

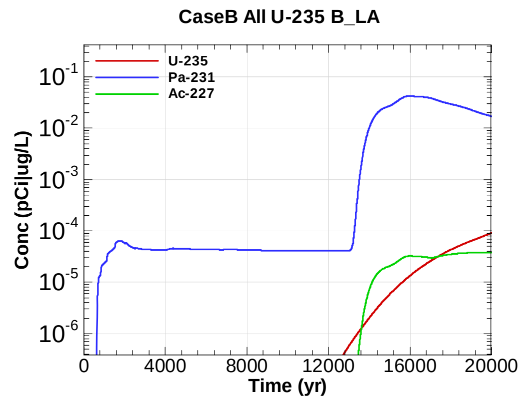

Figure M-262 - 100m Aquifer Concentration for CaseB All U-235 B_LA

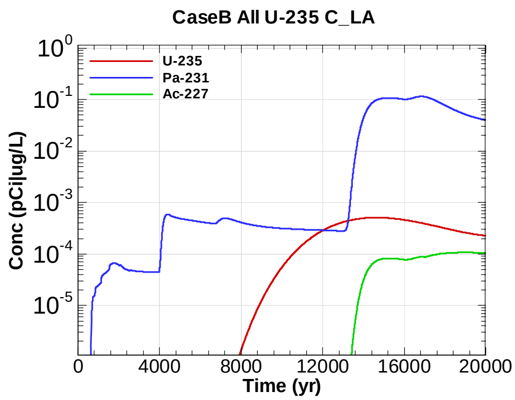

Figure M-263 - 100m Aquifer Concentration for CaseB All U-235 C_LA

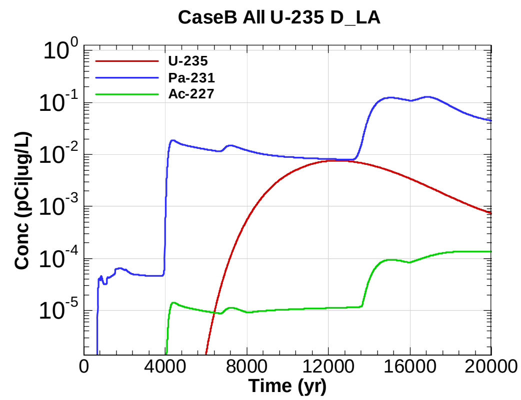

Figure M-264 - 100m Aquifer Concentration for CaseB All U-235 D_LA

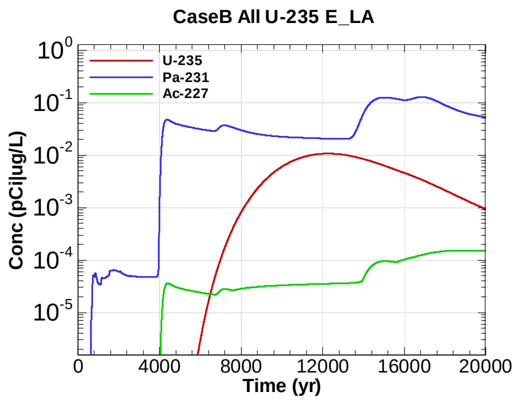

Figure M-265 - 100m Aquifer Concentration for CaseB All U-235 E_LA

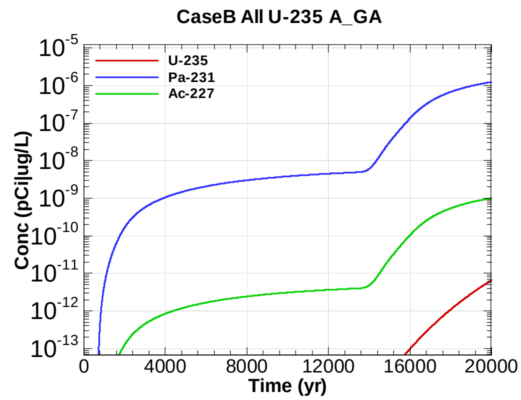

Figure M-266 - 100m Aquifer Concentration for CaseB All U-235 A_GA

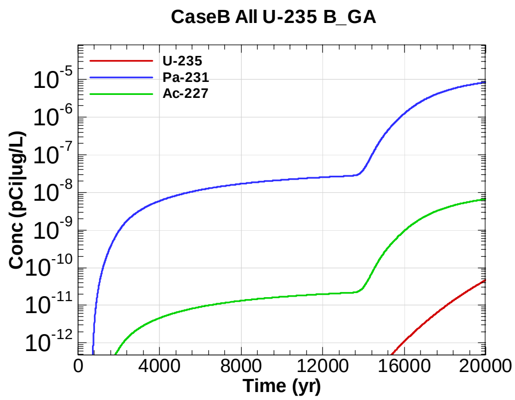

Figure M-267 - 100m Aquifer Concentration for CaseB All U-235 B_GA

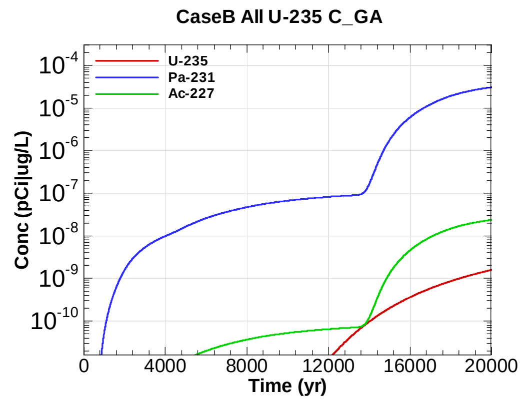

Figure M-268 - 100m Aquifer Concentration for CaseB All U-235 C_GA

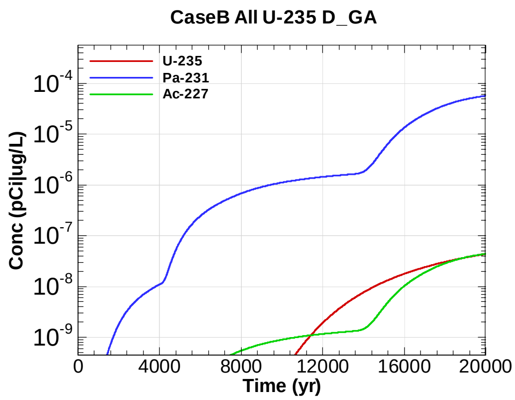

Figure M-269 - 100m Aquifer Concentration for CaseB All U-235 D_GA

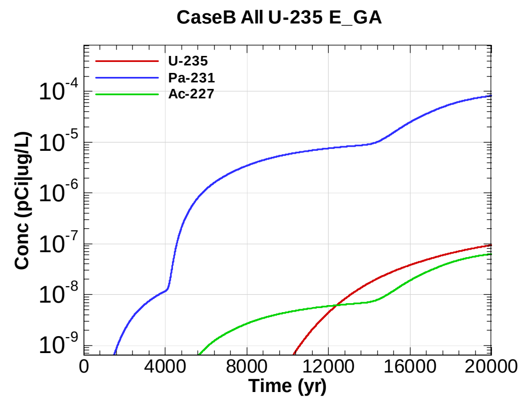

Figure M-270 - 100m Aquifer Concentration for CaseB All U-235 E_GA

Appendix N
100-METER SENSITIVITY RUN RADIONUCLIDE CONCENTRATIONS FOR CASE C

Appendix N contains curves showing the one-hundred meter radiological concentrations (sensitivity run radionuclides only) for the Base Case (Case/Configuration C). 20,000 year concentration results are presented from the three aquifers of concern (Upper Three Runs Aquifer-Upper Zone, Upper Three Runs-Lower Zone, and Gordon Aquifer) for Sectors A through E.

Graph heading example "CaseC All Am-241 A_UA"

Key

CaseC = scenario case/configuration
All = all FTF inventory source
Am-241 = radionuclide of concern
A = sector of concern (see sector map with stream traces)
UA = aquifer of concern

- UA = Upper Three Runs – Upper Zone
- LA = Upper Three Runs – Lower Zone
- GA = Gordon

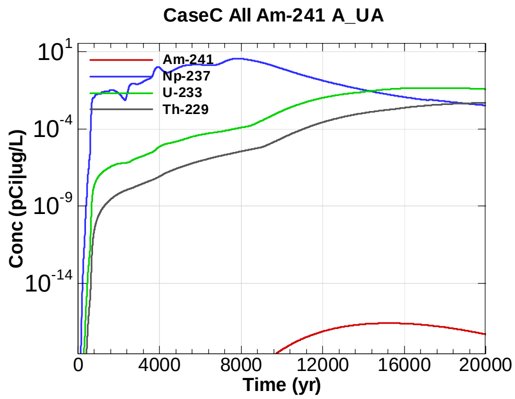

Figure N-1 - 100m Aquifer Concentration for CaseC All Am-241 A_UA

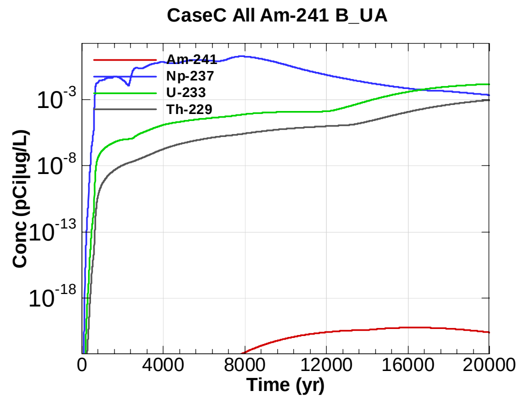

Figure N-2 - 100m Aquifer Concentration for CaseC All Am-241 B_UA

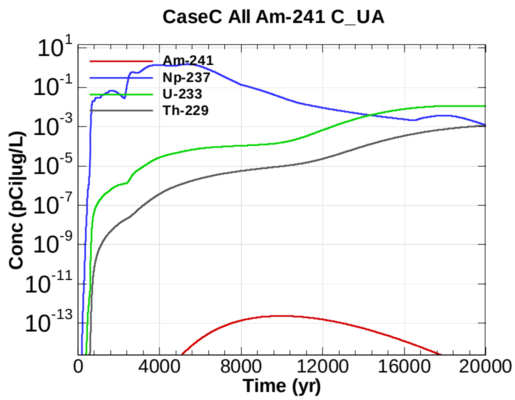

Figure N-3 - 100m Aquifer Concentration for CaseC All Am-241 C_UA

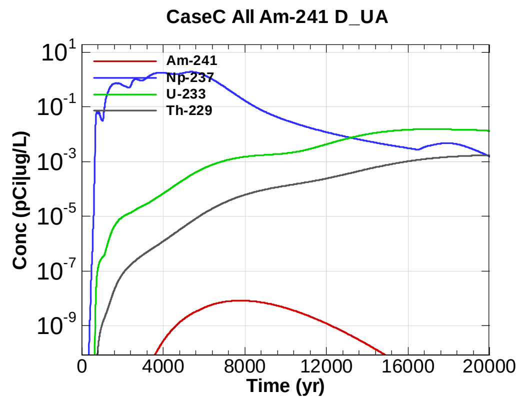

Figure N-4 - 100m Aquifer Concentration for CaseC All Am-241 D_UA

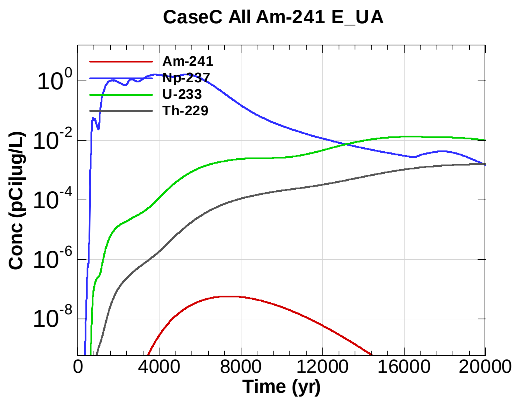

Figure N-5 - 100m Aquifer Concentration for CaseC All Am-241 E_UA

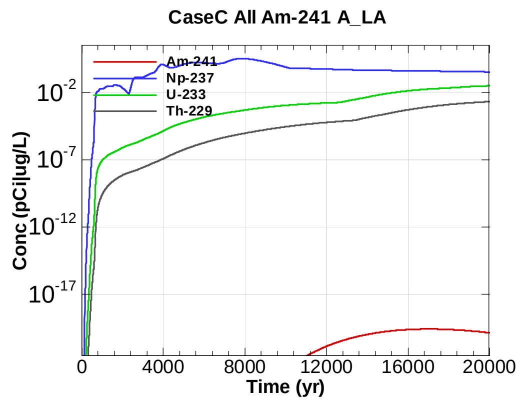

Figure N-6 - 100m Aquifer Concentration for CaseC All Am-241 A_LA

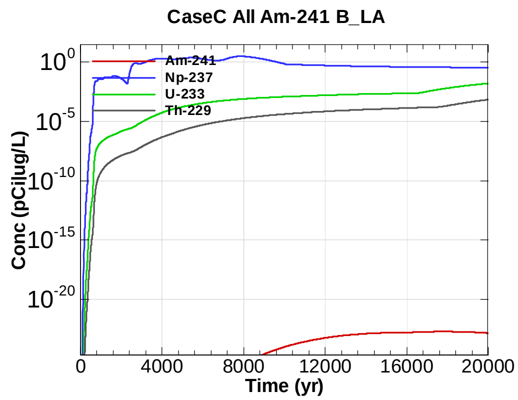

Figure N-7 - 100m Aquifer Concentration for CaseC All Am-241 B_LA

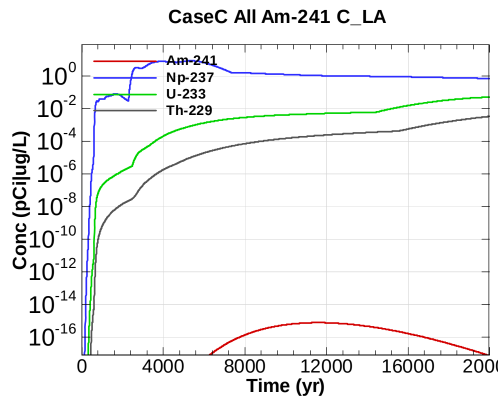

Figure N-8 - 100m Aquifer Concentration for CaseC All Am-241 C_LA

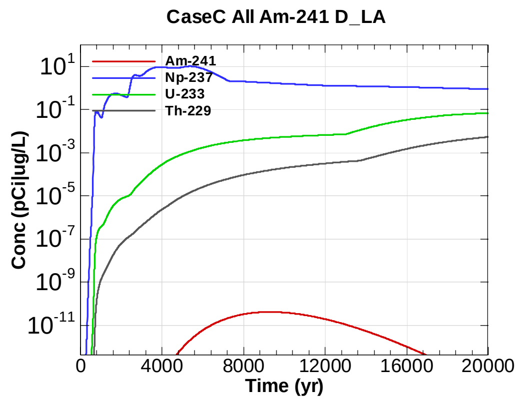

Figure N-9 - 100m Aquifer Concentration for CaseC All Am-241 D_LA

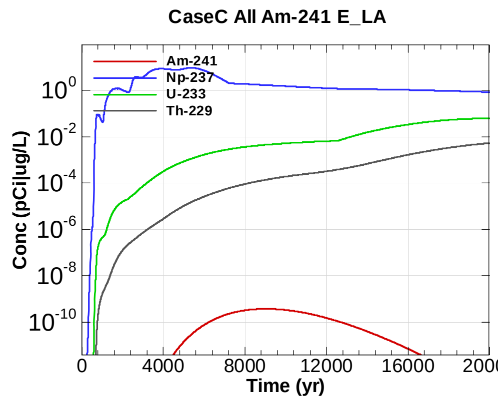

Figure N-10 - 100m Aquifer Concentration for CaseC All Am-241 E_LA

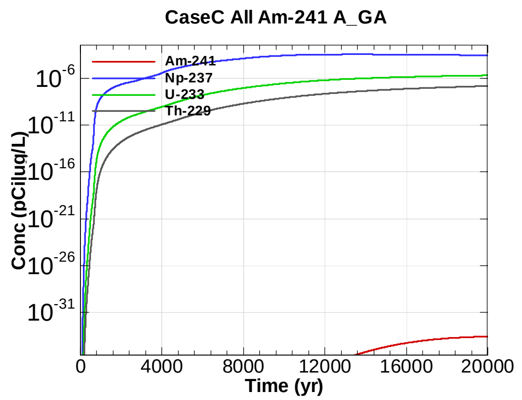

Figure N-11 - 100m Aquifer Concentration for CaseC All Am-241 A_GA

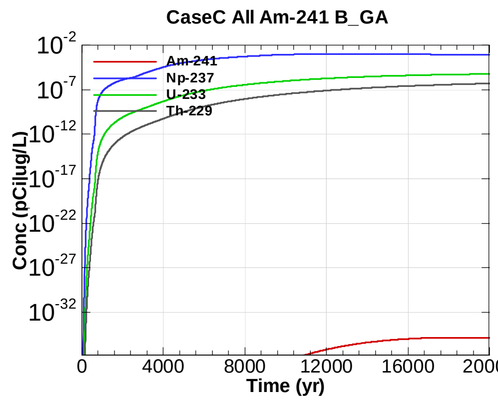

Figure N-12 - 100m Aquifer Concentration for CaseC All Am-241 B_GA

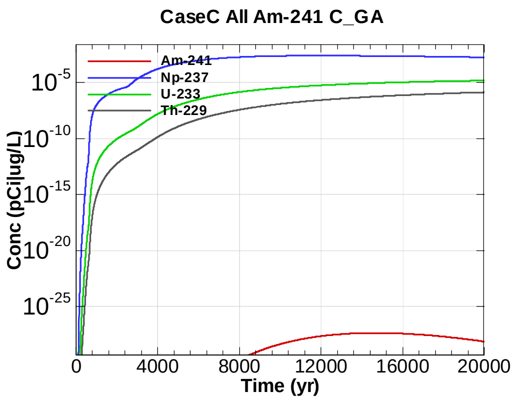

Figure N-13 - 100m Aquifer Concentration for CaseC All Am-241 C_GA

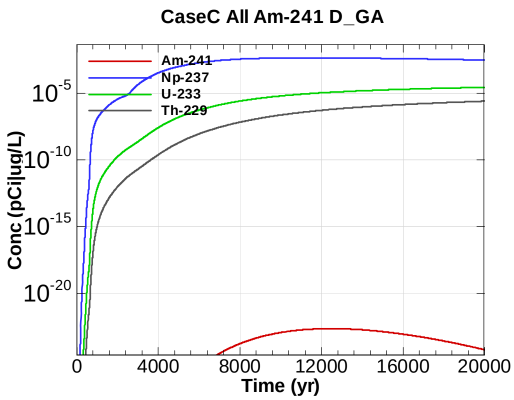

Figure N-14 - 100m Aquifer Concentration for CaseC All Am-241 D_GA

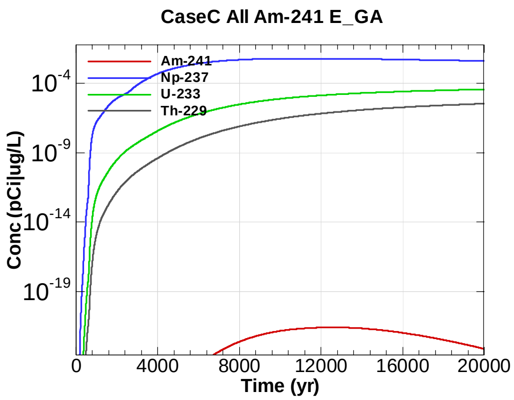

Figure N-15 - 100m Aquifer Concentration for CaseC All Am-241 E_GA

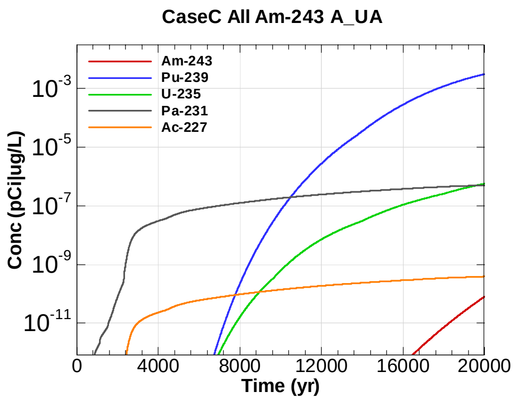

Figure N-16 - 100m Aquifer Concentration for CaseC All Am-243 A_UA

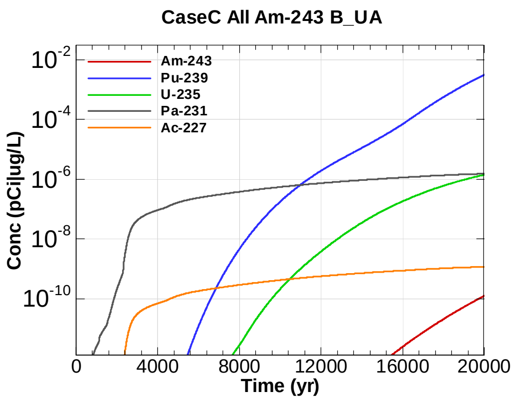

Figure N-17 - 100m Aquifer Concentration for CaseC All Am-243 B_UA

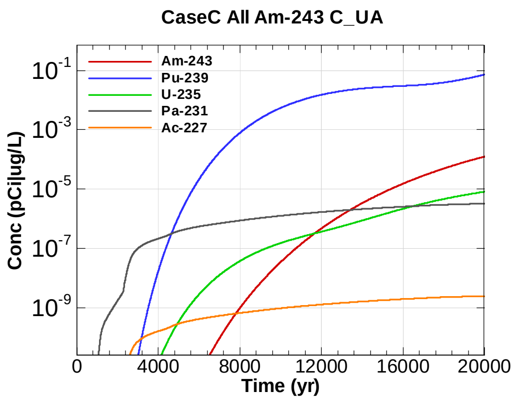

Figure N-18 - 100m Aquifer Concentration for CaseC All Am-243 C_UA

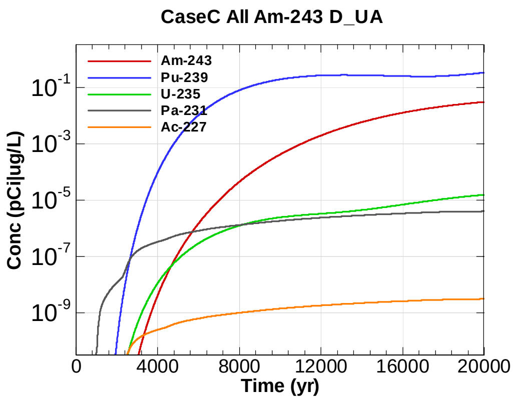

Figure N-19 - 100m Aquifer Concentration for CaseC All Am-243 D_UA

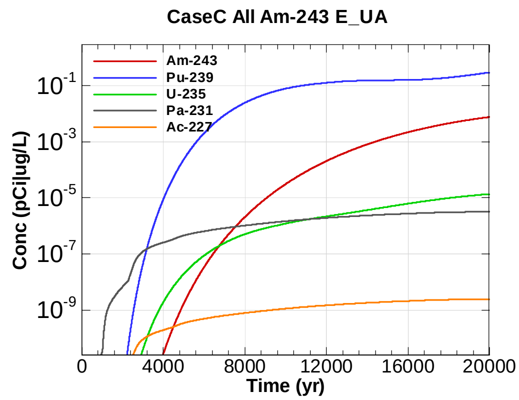

Figure N-20 - 100m Aquifer Concentration for CaseC All Am-243 E_UA

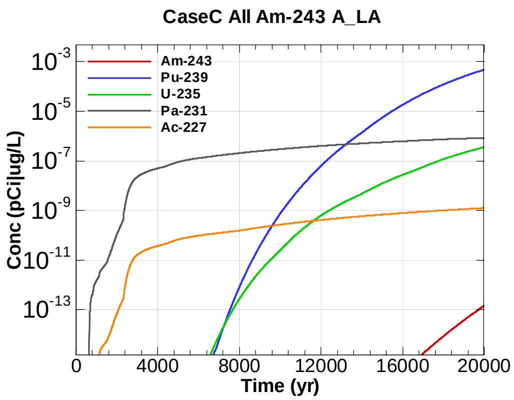

Figure N-21 - 100m Aquifer Concentration for CaseC All Am-243 A_LA

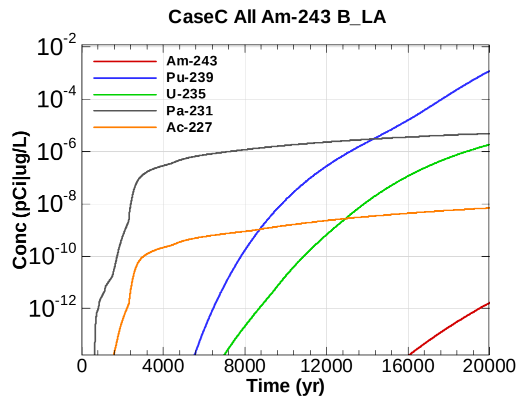

Figure N-22 - 100m Aquifer Concentration for CaseC All Am-243 B_LA

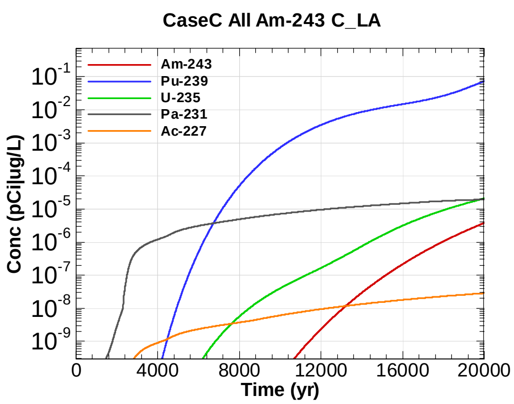

Figure N-23 - 100m Aquifer Concentration for CaseC All Am-243 C_LA

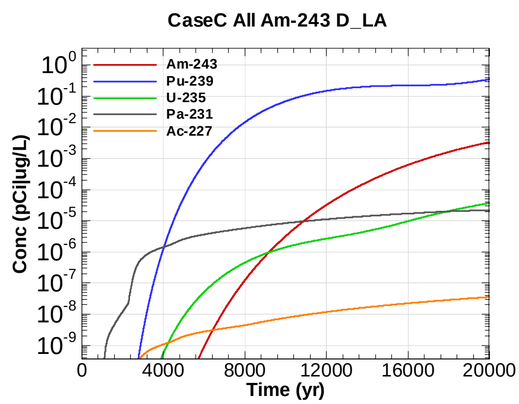

Figure N-24 - 100m Aquifer Concentration for CaseC All Am-243 D_LA

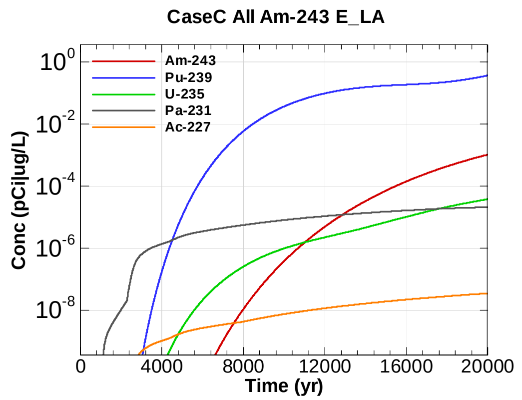

Figure N-25 - 100m Aquifer Concentration for CaseC All Am-243 E_LA

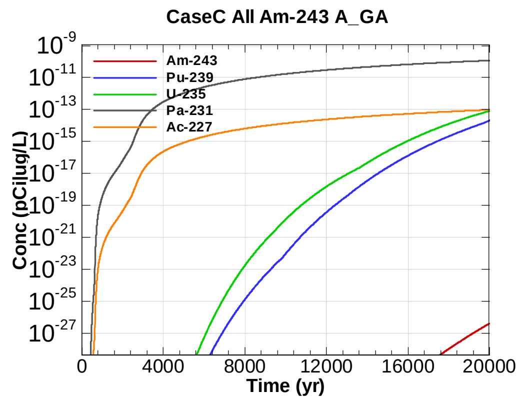

Figure N-26 - 100m Aquifer Concentration for CaseC All Am-243 A_GA

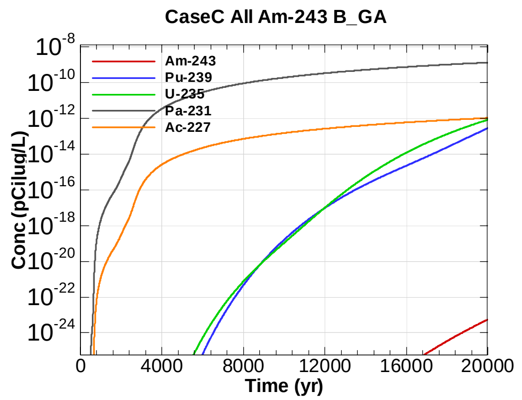

Figure N-27 - 100m Aquifer Concentration for CaseC All Am-243 B_GA

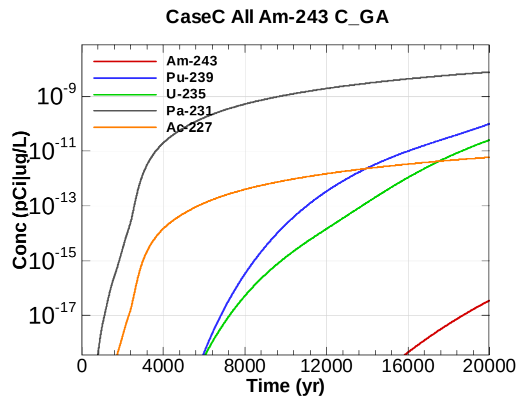

Figure N-28 - 100m Aquifer Concentration for CaseC All Am-243 C_GA

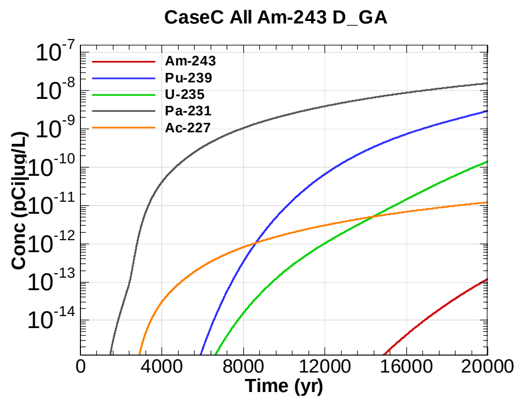

Figure N-29 - 100m Aquifer Concentration for CaseC All Am-243 D_GA

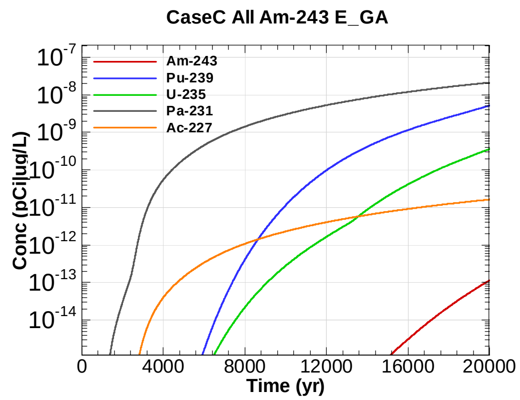

Figure N-30 - 100m Aquifer Concentration for CaseC All Am-243 E_GA

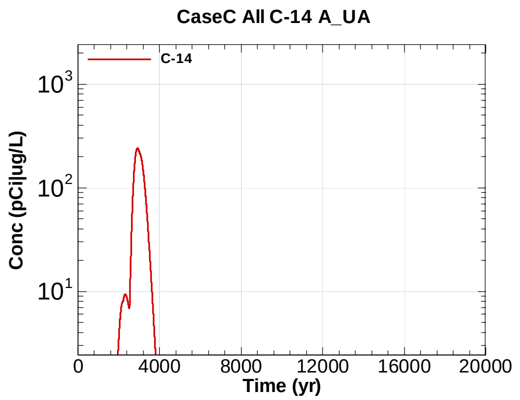

Figure N-31 - 100m Aquifer Concentration for CaseC All C-14 A_UA

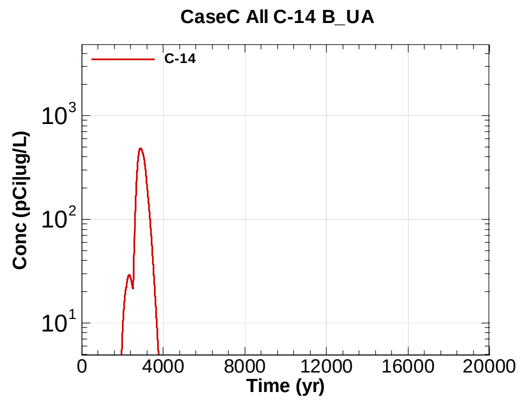

Figure N-32 - 100m Aquifer Concentration for CaseC All C-14 B_UA

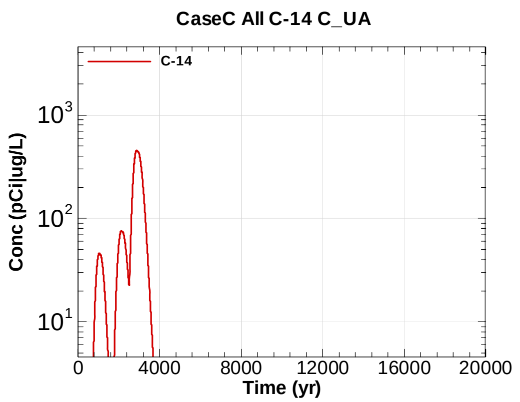

Figure N-33 - 100m Aquifer Concentration for CaseC All C-14 C_UA

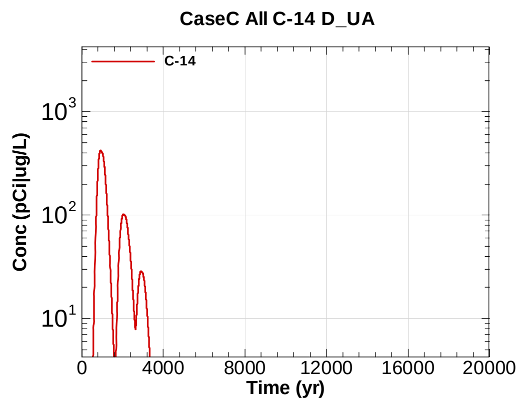

Figure N-34 - 100m Aquifer Concentration for CaseC All C-14 D_UA

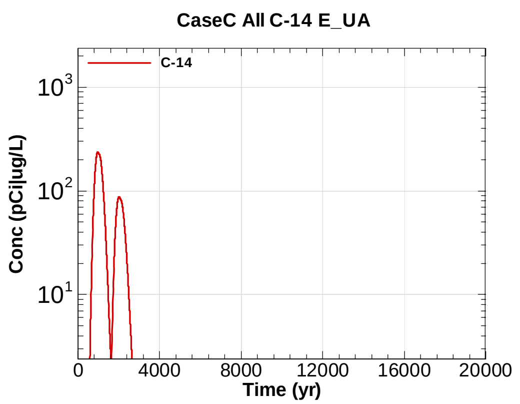

Figure N-35 - 100m Aquifer Concentration for CaseC All C-14 E_UA

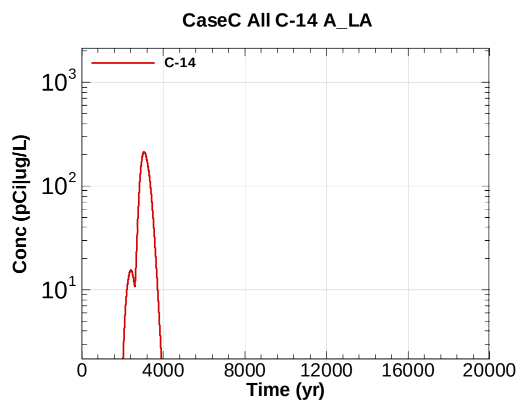

Figure N-36 - 100m Aquifer Concentration for CaseC All C-14 A_LA

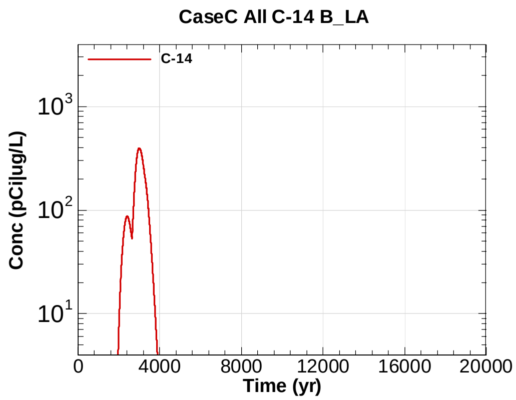

Figure N-37 - 100m Aquifer Concentration for CaseC All C-14 B_LA

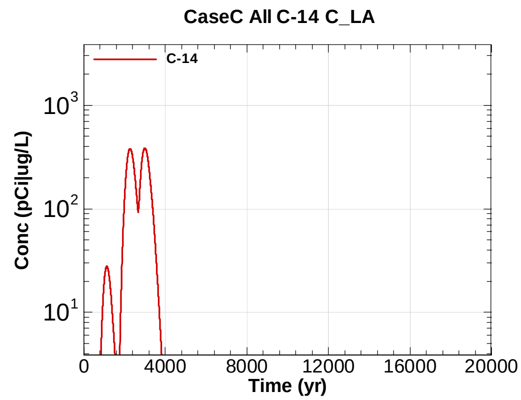

Figure N-38 - 100m Aquifer Concentration for CaseC All C-14 C_LA

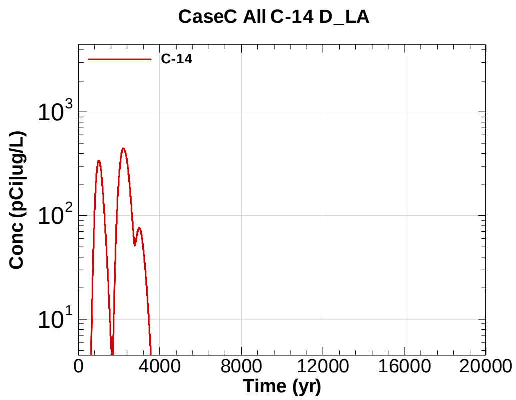

Figure N-39 - 100m Aquifer Concentration for CaseC All C-14 D_LA

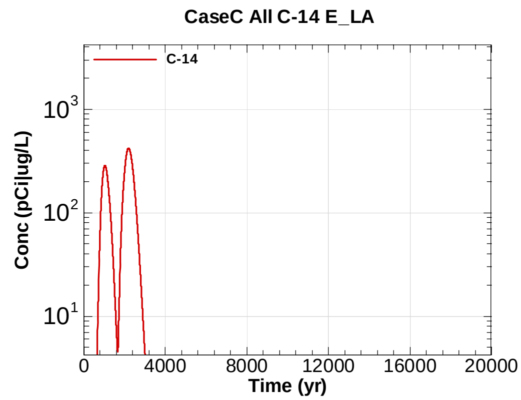

Figure N-40 - 100m Aquifer Concentration for CaseC All C-14 E_LA

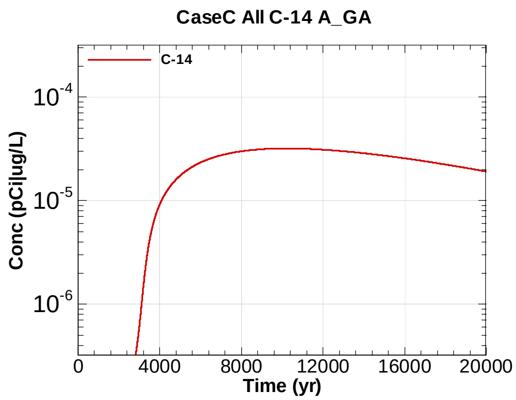

Figure N-41 - 100m Aquifer Concentration for CaseC All C-14 A_GA

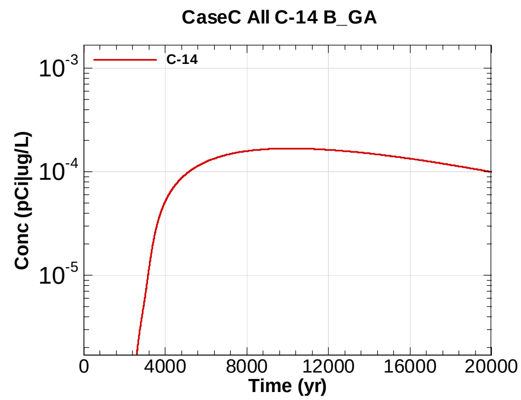

Figure N-42 - 100m Aquifer Concentration for CaseC All C-14 B_GA

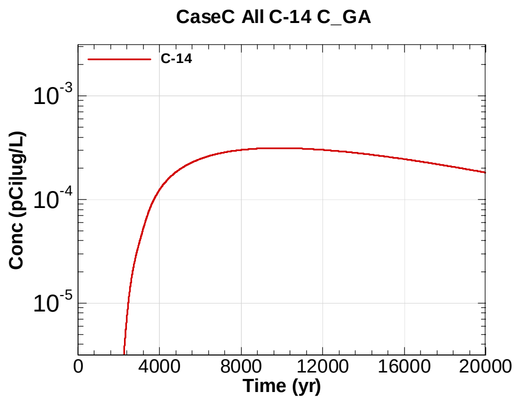

Figure N-43 - 100m Aquifer Concentration for CaseC All C-14 C_GA

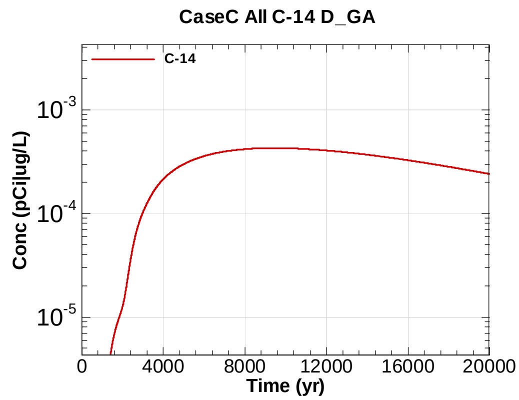

Figure N-44 - 100m Aquifer Concentration for CaseC All C-14 D_GA

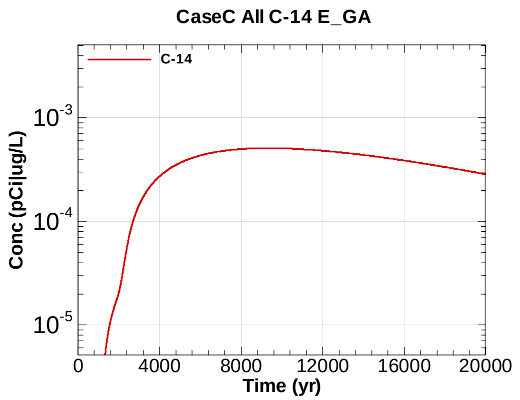

Figure N-45 - 100m Aquifer Concentration for CaseC All C-14 E_GA

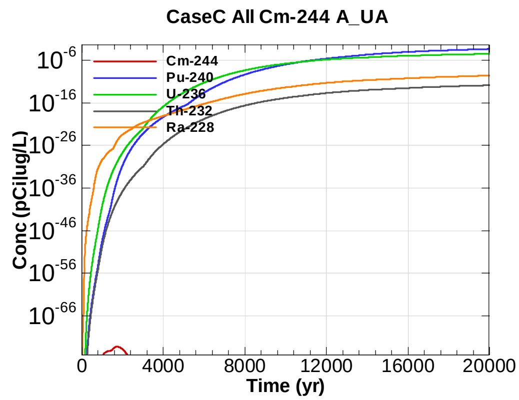

Figure N-46 - 100m Aquifer Concentration for CaseC All Cm-244 A_UA

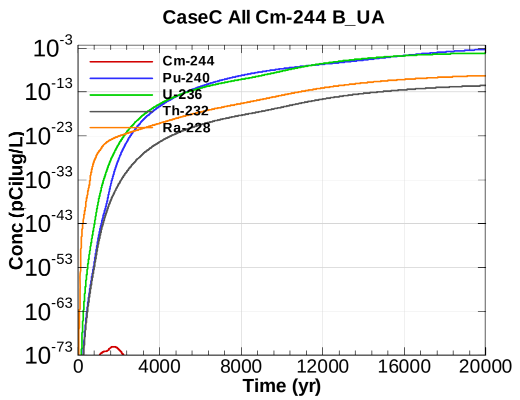

Figure N-47 - 100m Aquifer Concentration for CaseC All Cm-244 B_UA

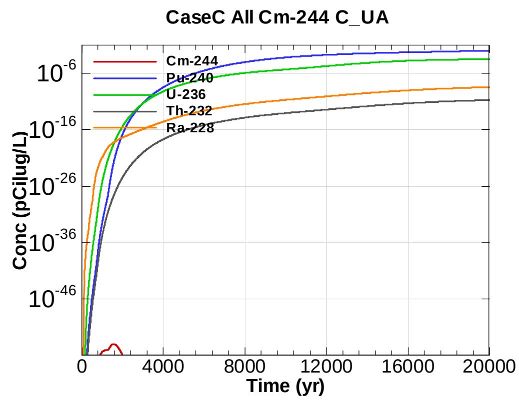

Figure N-48 - 100m Aquifer Concentration for CaseC All Cm-244 C_UA

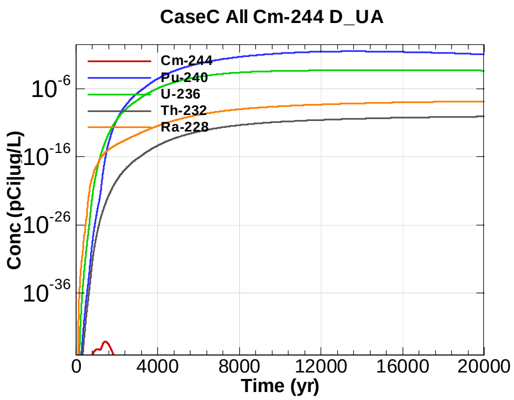

Figure N-49 - 100m Aquifer Concentration for CaseC All Cm-244 D_UA

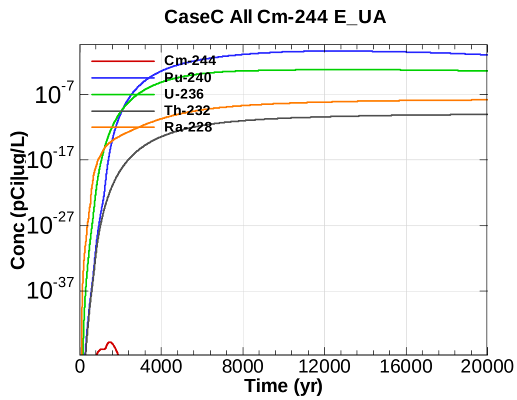

Figure N-50 - 100m Aquifer Concentration for CaseC All Cm-244 E_UA

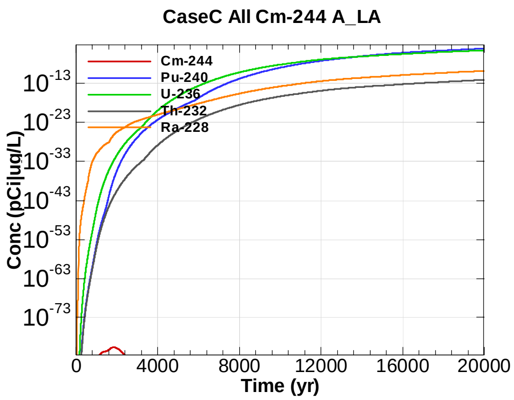

Figure N-51 - 100m Aquifer Concentration for CaseC All Cm-244 A_LA

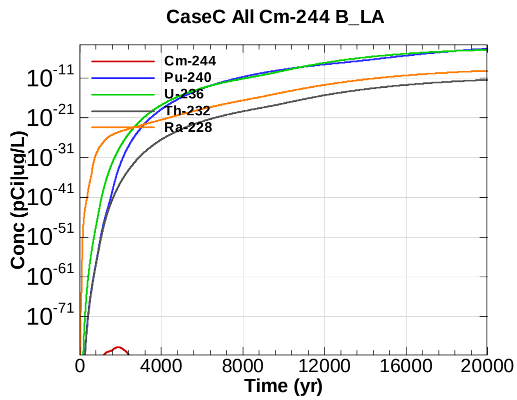

Figure N-52 - 100m Aquifer Concentration for CaseC All Cm-244 B_LA

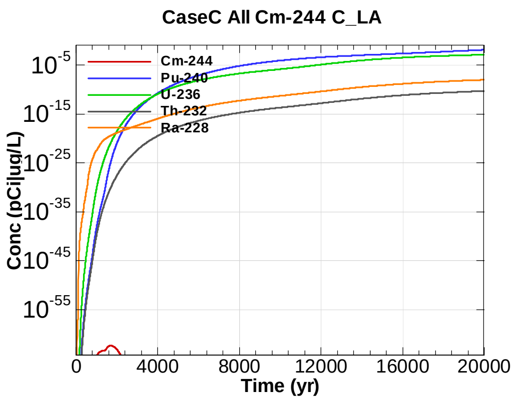

Figure N-53 - 100m Aquifer Concentration for CaseC All Cm-244 C_LA

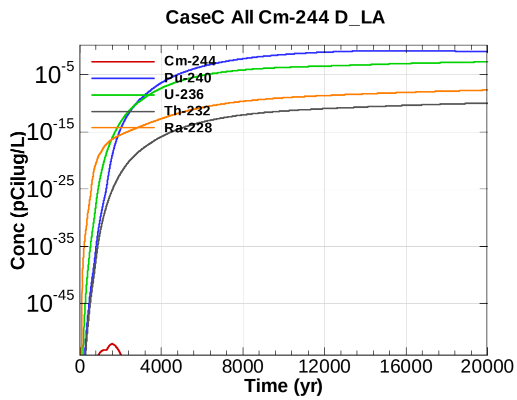

Figure N-54 - 100m Aquifer Concentration for CaseC All Cm-244 D_LA

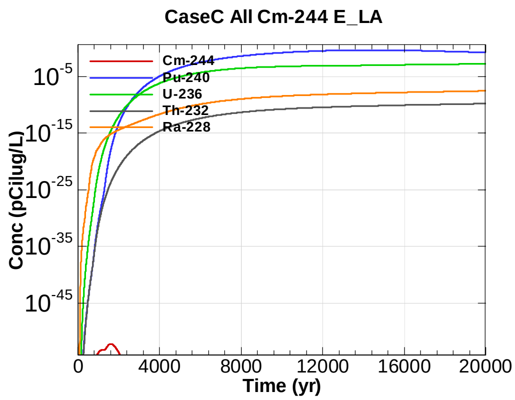

Figure N-55 - 100m Aquifer Concentration for CaseC All Cm-244 E_LA

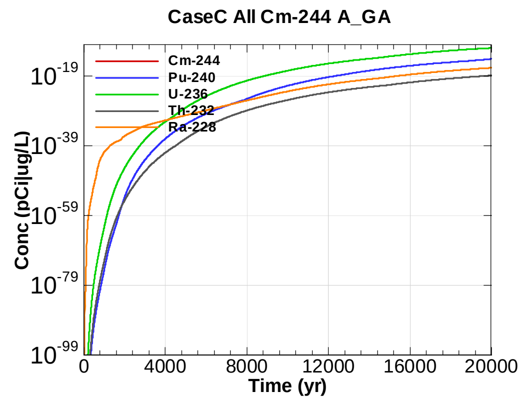

Figure N-56 - 100m Aquifer Concentration for CaseC All Cm-244 A_GA

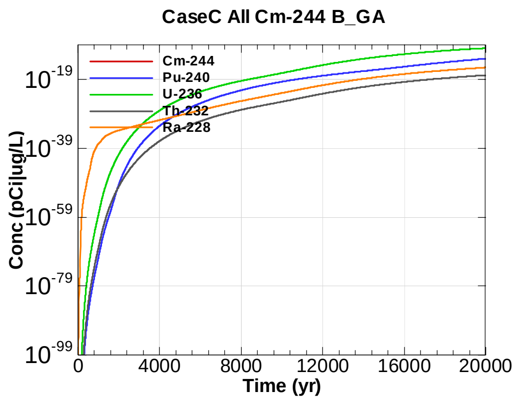

Figure N-57 - 100m Aquifer Concentration for CaseC All Cm-244 B_GA

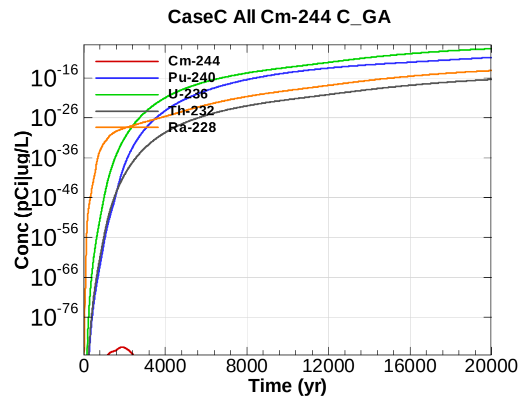

Figure N-58 - 100m Aquifer Concentration for CaseC All Cm-244 C_GA

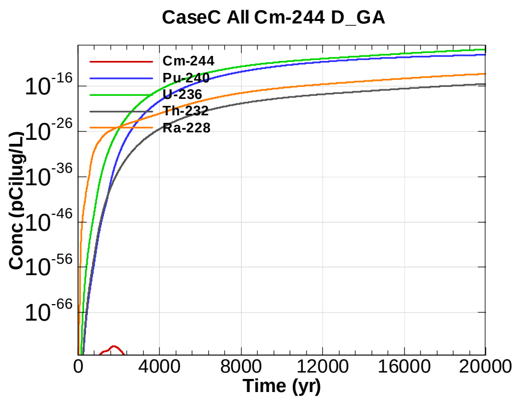

Figure N-59 - 100m Aquifer Concentration for CaseC All Cm-244 D_GA

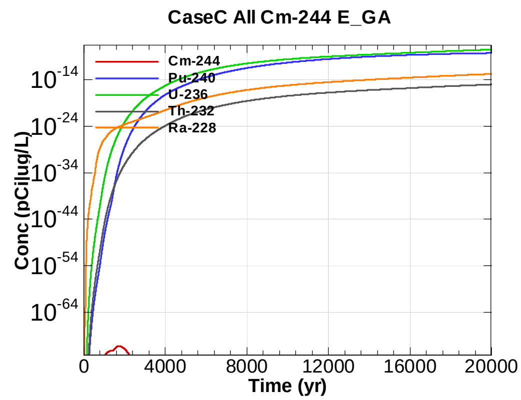

Figure N-60 - 100m Aquifer Concentration for CaseC All Cm-244 E_GA

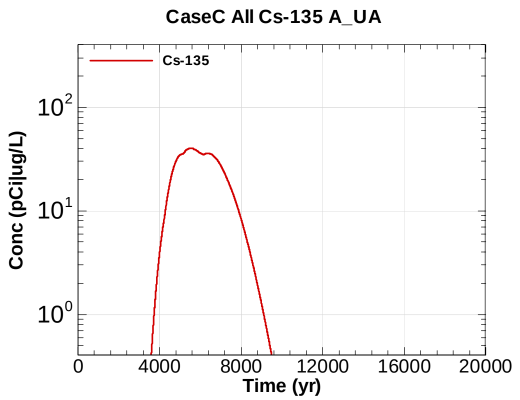

Figure N-61 - 100m Aquifer Concentration for CaseC All Cs-135 A_UA

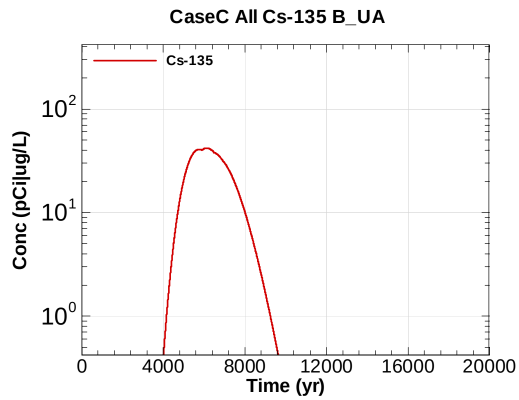

Figure N-62 - 100m Aquifer Concentration for CaseC All Cs-135 B_UA

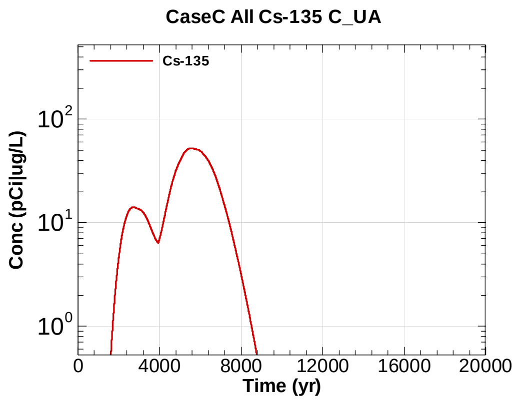

Figure N-63 - 100m Aquifer Concentration for CaseC All Cs-135 C_UA

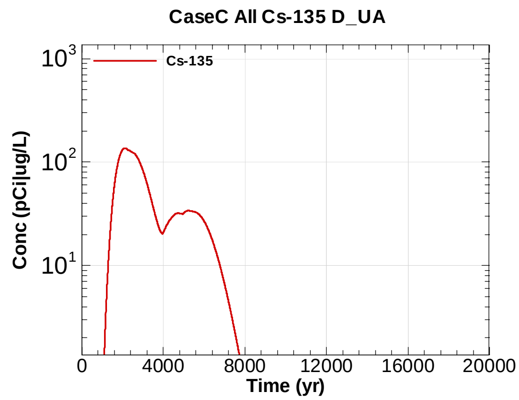

Figure N-64 - 100m Aquifer Concentration for CaseC All Cs-135 D_UA

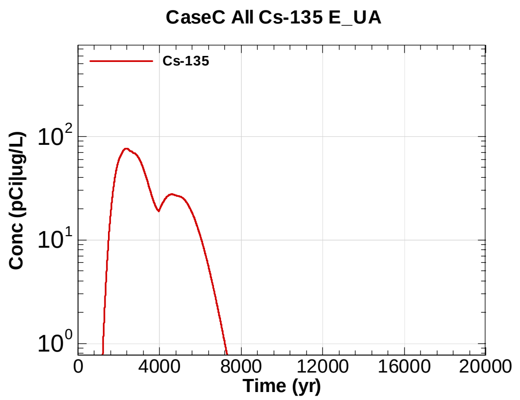

Figure N-65 - 100m Aquifer Concentration for CaseC All Cs-135 E_UA

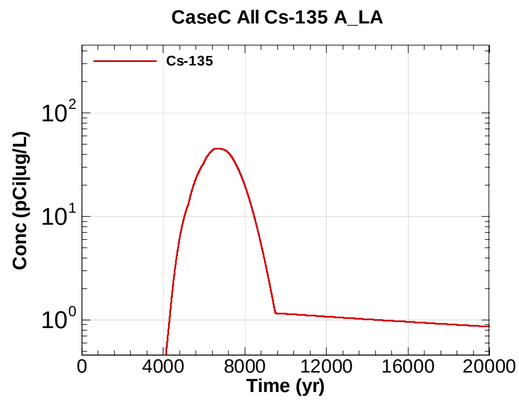

Figure N-66 - 100m Aquifer Concentration for CaseC All Cs-135 A_LA

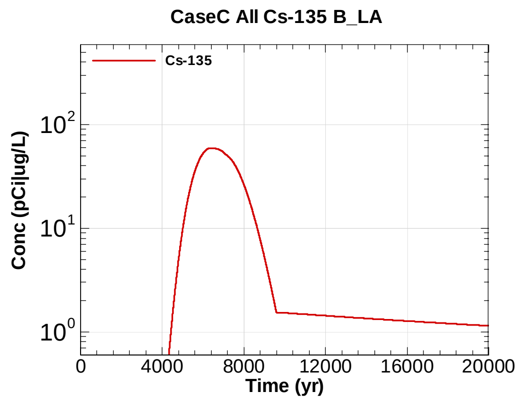

Figure N-67 - 100m Aquifer Concentration for CaseC All Cs-135 B_LA

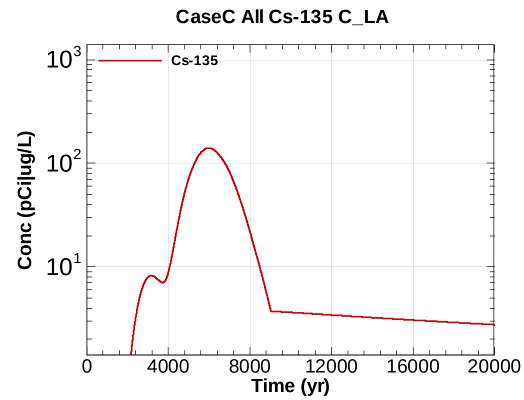

Figure N-68 - 100m Aquifer Concentration for CaseC All Cs-135 C_LA

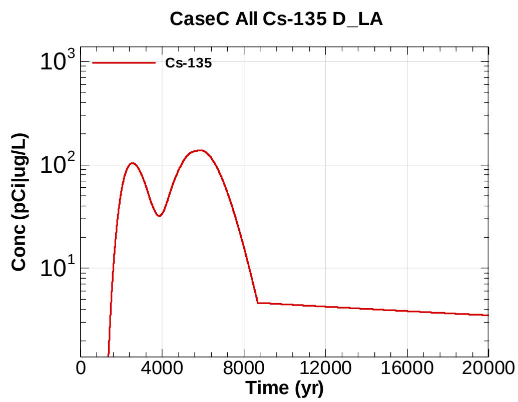

Figure N-69 - 100m Aquifer Concentration for CaseC All Cs-135 D_LA

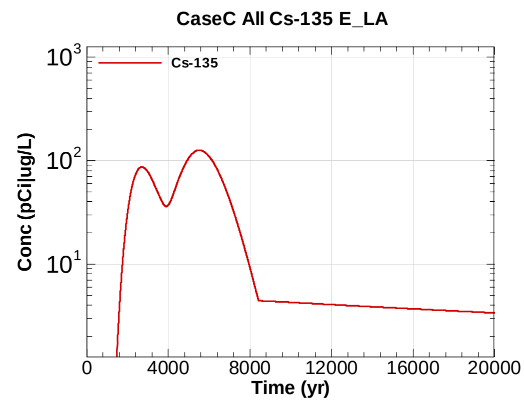

Figure N-70 - 100m Aquifer Concentration for CaseC All Cs-135 E_LA

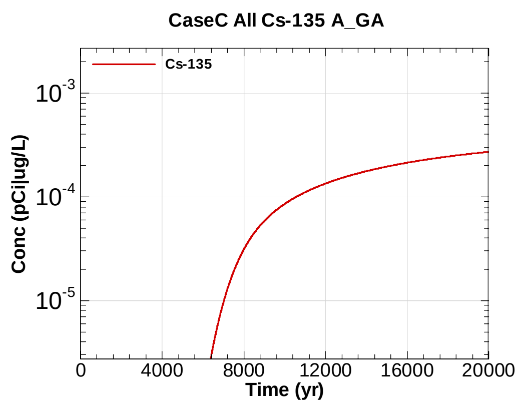

Figure N-71 - 100m Aquifer Concentration for CaseC All Cs-135 A_GA

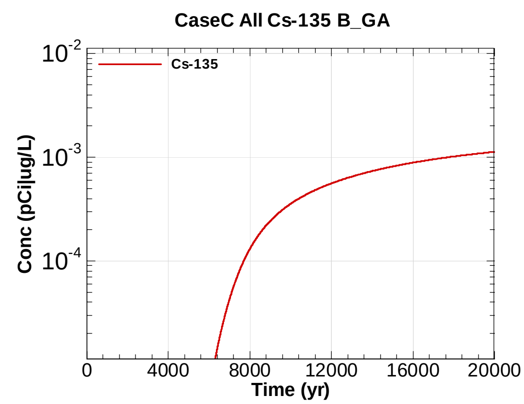

Figure N-72 - 100m Aquifer Concentration for CaseC All Cs-135 B_GA

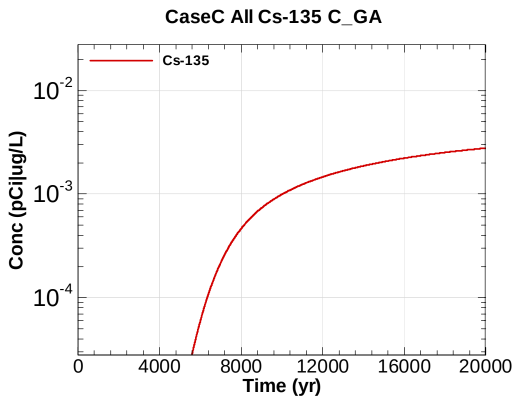

Figure N-73 - 100m Aquifer Concentration for CaseC All Cs-135 C_GA

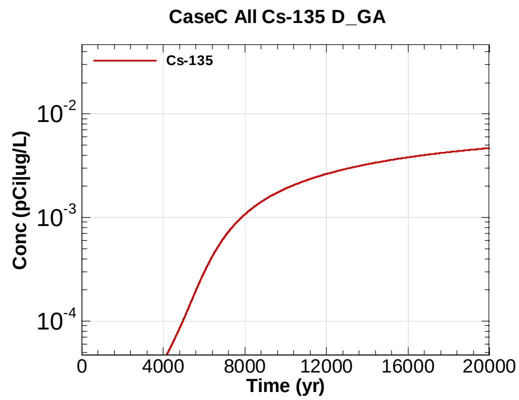

Figure N-74 - 100m Aquifer Concentration for CaseC All Cs-135 D_GA

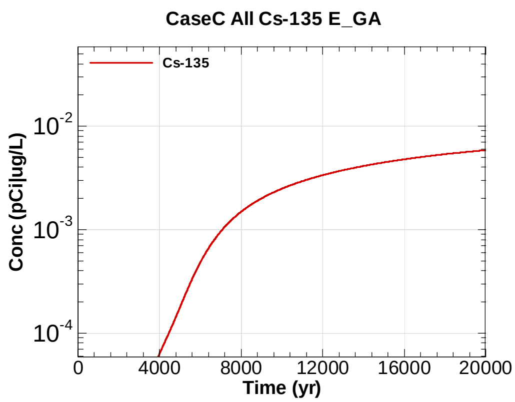

Figure N-75 - 100m Aquifer Concentration for CaseC All Cs-135 E_GA

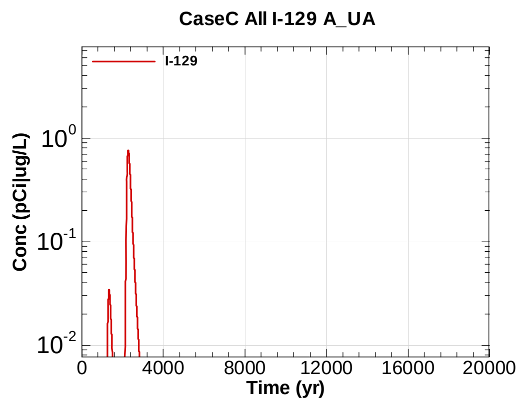

Figure N-76 - 100m Aquifer Concentration for CaseC All I-129 A_UA

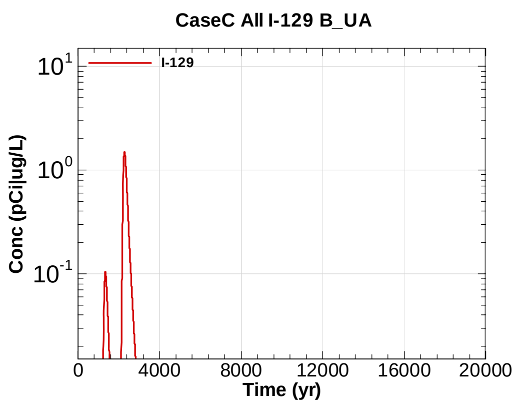

Figure N-77 - 100m Aquifer Concentration for CaseC All I-129 B_UA

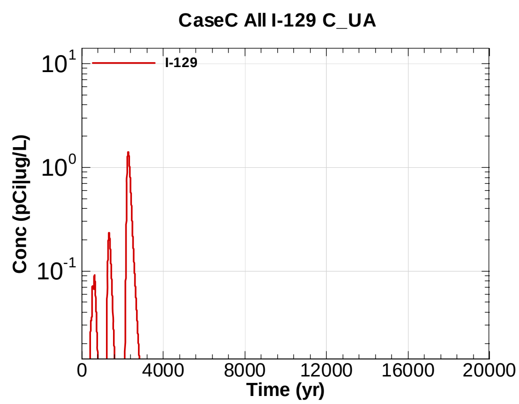

Figure N-78 - 100m Aquifer Concentration for CaseC All I-129 C_UA

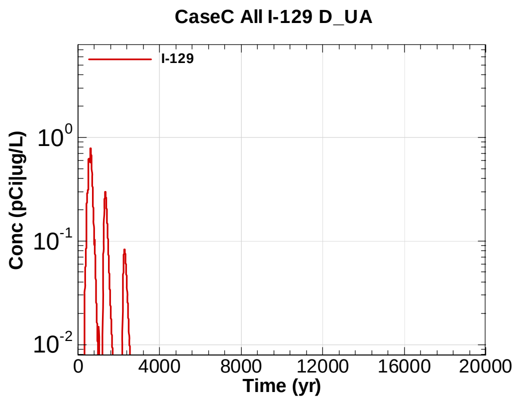

Figure N-79 - 100m Aquifer Concentration for CaseC All I-129 D_UA

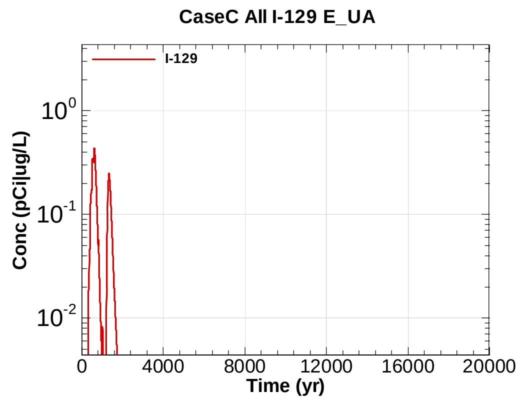

Figure N-80 - 100m Aquifer Concentration for CaseC All I-129 E_UA

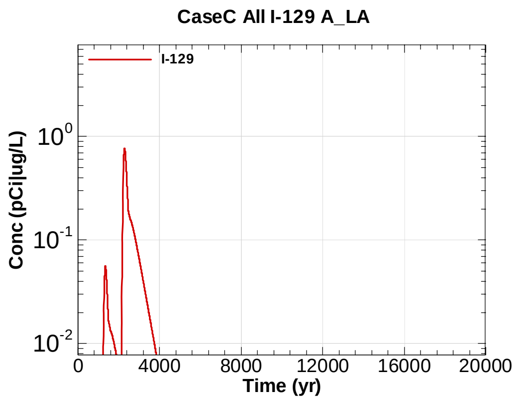

Figure N-81 - 100m Aquifer Concentration for CaseC All I-129 A_LA

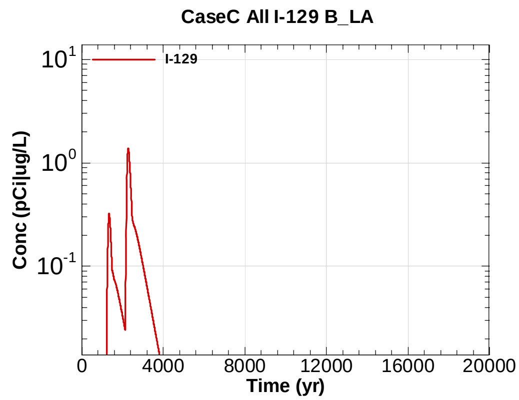

Figure N-82 - 100m Aquifer Concentration for CaseC All I-129 B_LA

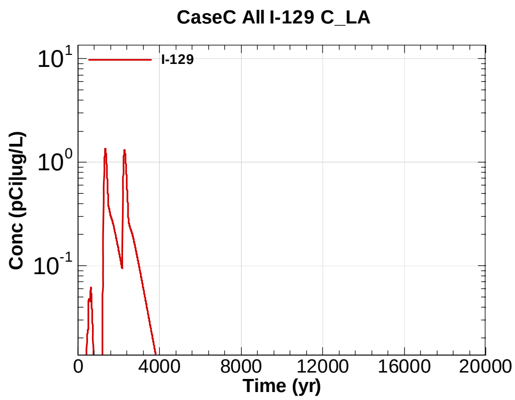

Figure N-83 - 100m Aquifer Concentration for CaseC All I-129 C_LA

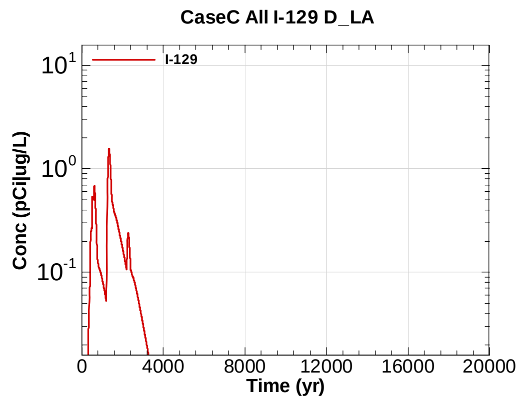

Figure N-84 - 100m Aquifer Concentration for CaseC All I-129 D_LA

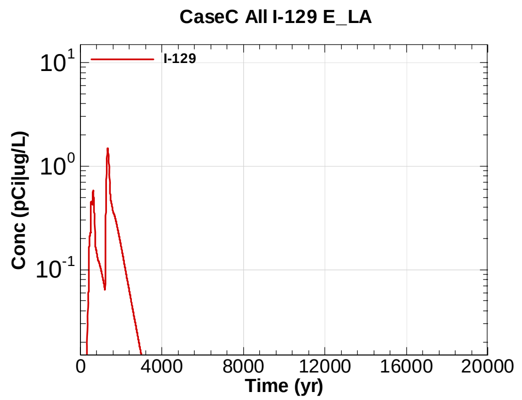

Figure N-85 - 100m Aquifer Concentration for CaseC All I-129 E_LA

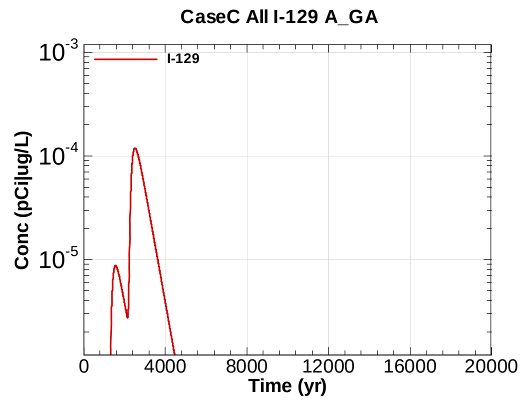

Figure N-86 - 100m Aquifer Concentration for CaseC All I-129 A_GA

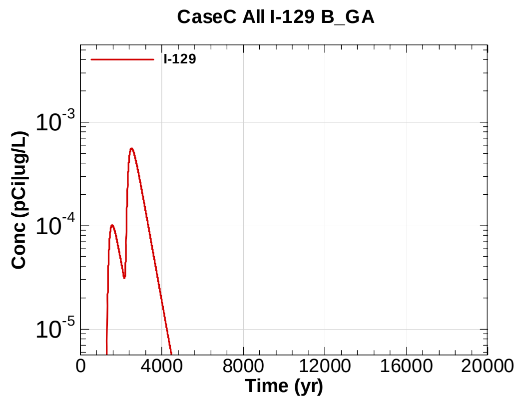

Figure N-87 - 100m Aquifer Concentration for CaseC All I-129 B_GA

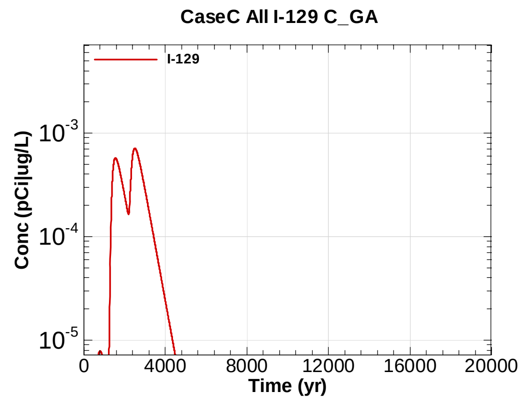

Figure N-88 - 100m Aquifer Concentration for CaseC All I-129 C_GA

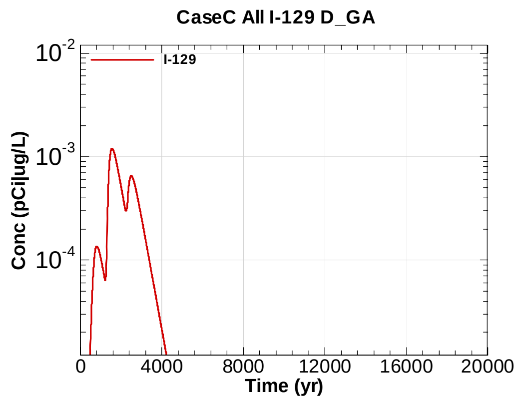

Figure N-89 - 100m Aquifer Concentration for CaseC All I-129 D_GA

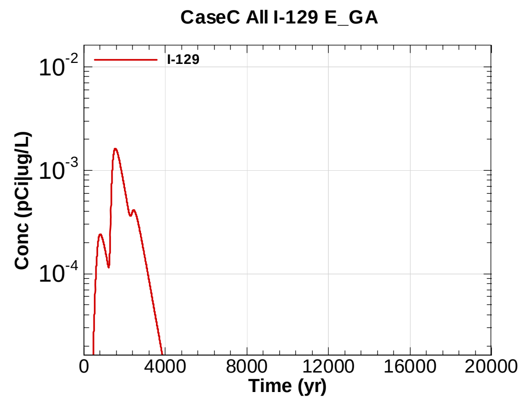

Figure N-90 - 100m Aquifer Concentration for CaseC All I-129 E_GA

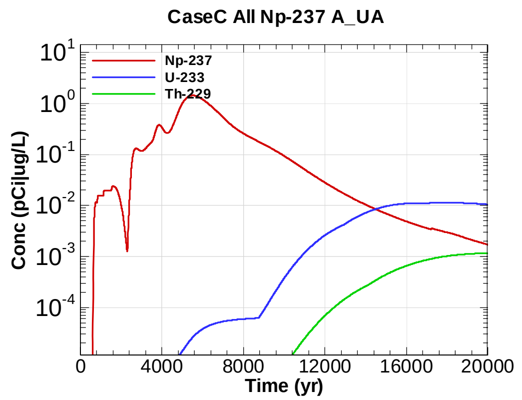

Figure N-91 - 100m Aquifer Concentration for CaseC All Np-237 A_UA

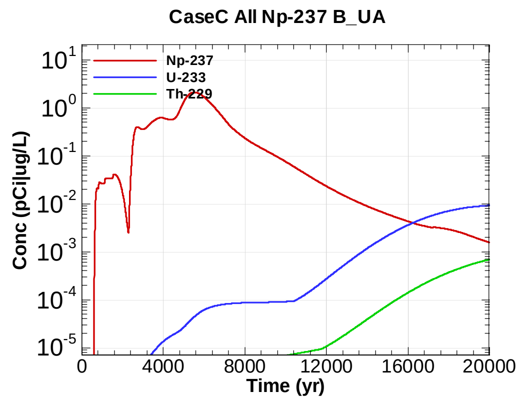

Figure N-92 - 100m Aquifer Concentration for CaseC All Np-237 B_UA

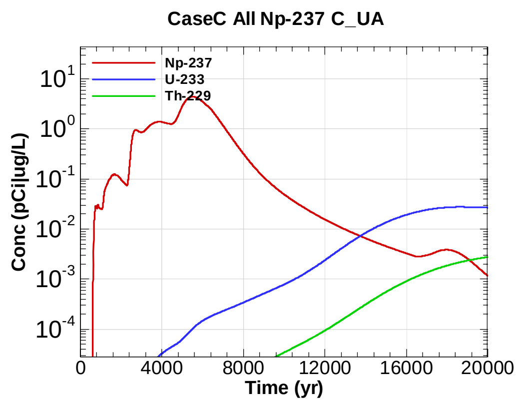

Figure N-93 - 100m Aquifer Concentration for CaseC All Np-237 C_UA

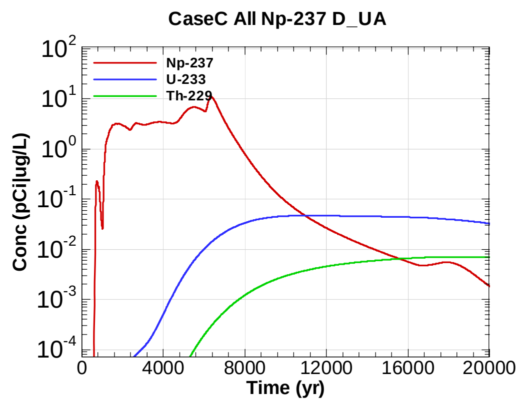

Figure N-94 - 100m Aquifer Concentration for CaseC All Np-237 D_UA

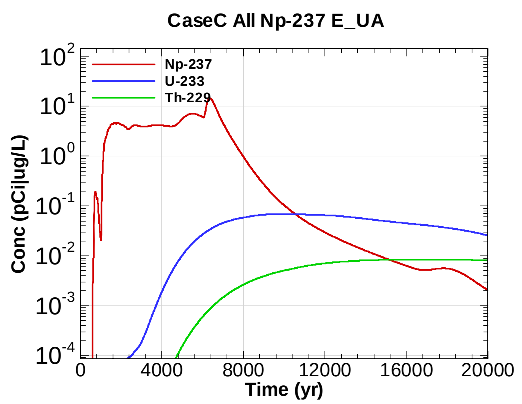

Figure N-95 - 100m Aquifer Concentration for CaseC All Np-237 E_UA

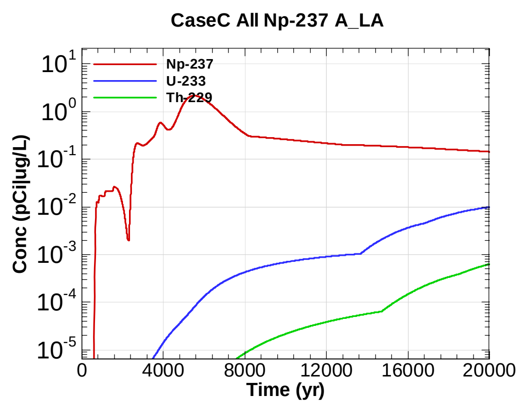

Figure N-96 - 100m Aquifer Concentration for CaseC All Np-237 A_LA

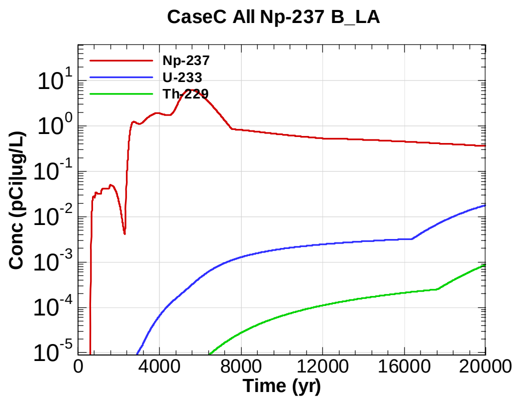

Figure N-97 - 100m Aquifer Concentration for CaseC All Np-237 B_LA

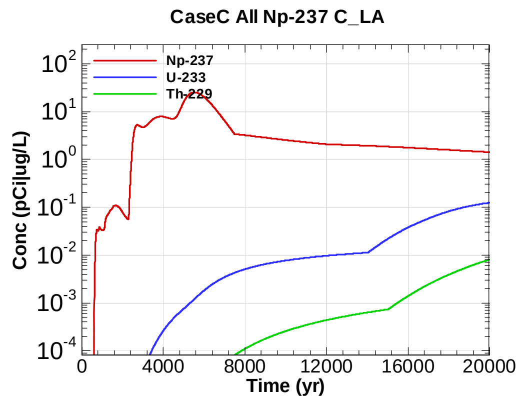

Figure N-98 - 100m Aquifer Concentration for CaseC All Np-237 C_LA

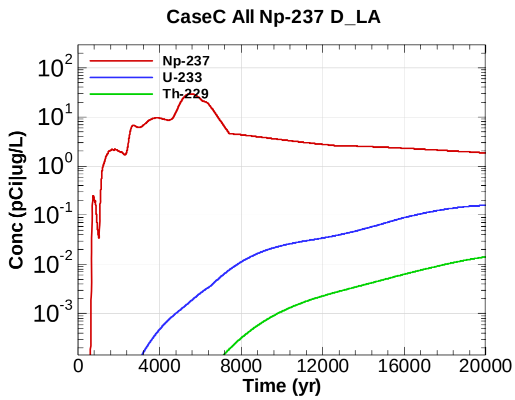

Figure N-99 - 100m Aquifer Concentration for CaseC All Np-237 D_LA

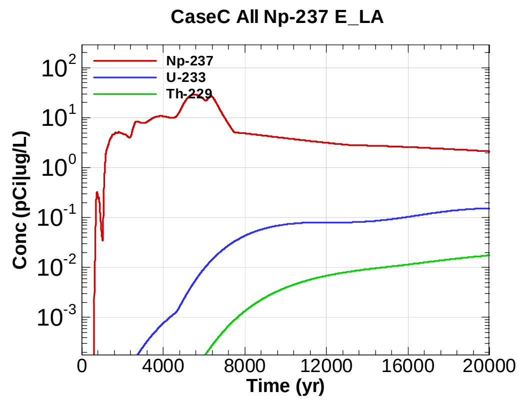

Figure N-100 - 100m Aquifer Concentration for CaseC All Np-237 E_LA

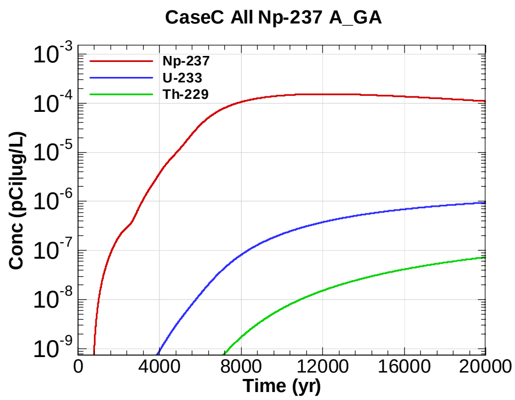

Figure N-101 - 100m Aquifer Concentration for CaseC All Np-237 A_GA

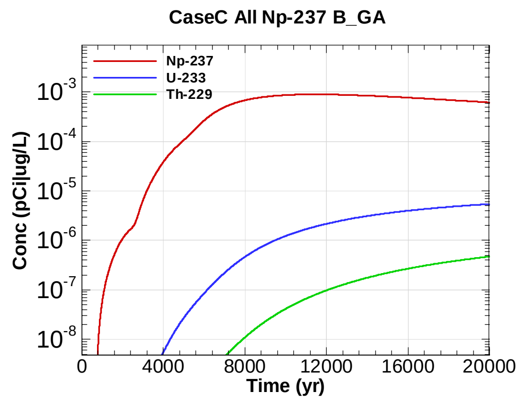

Figure N-102 - 100m Aquifer Concentration for CaseC All Np-237 B_GA

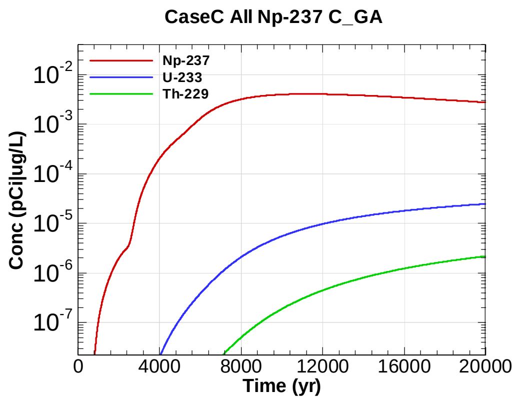

Figure N-103 - 100m Aquifer Concentration for CaseC All Np-237 C_GA

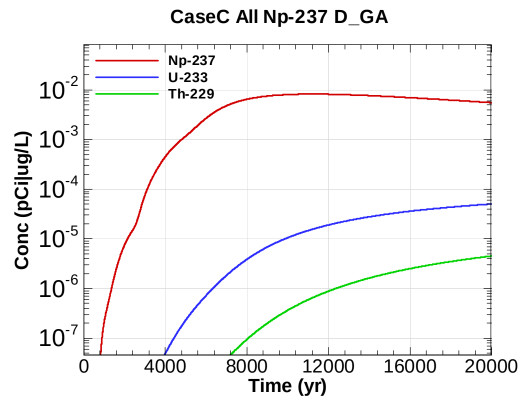

Figure N-104 - 100m Aquifer Concentration for CaseC All Np-237 D_GA

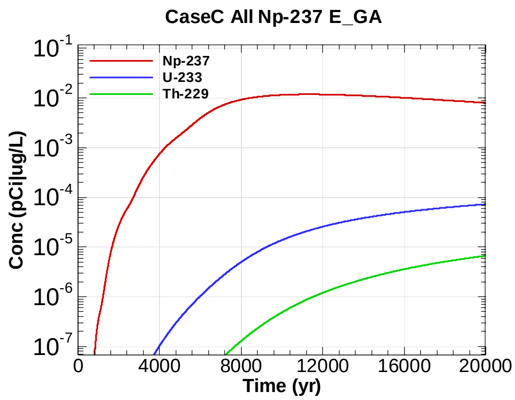

Figure N-105 - 100m Aquifer Concentration for CaseC All Np-237 E_GA

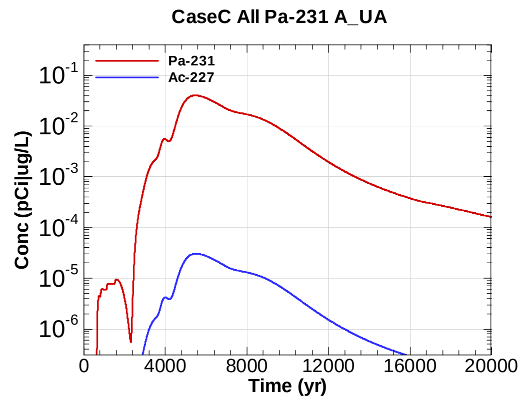

Figure N-106 - 100m Aquifer Concentration for CaseC All Pa-231 A_UA

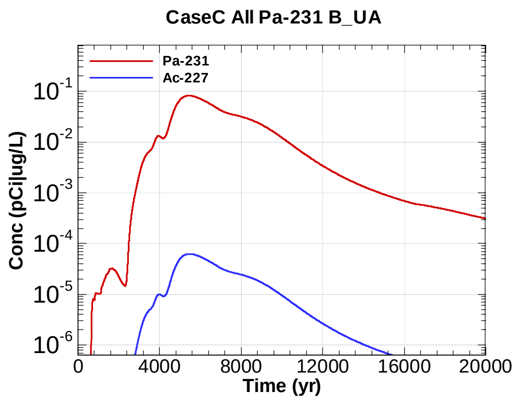

Figure N-107 - 100m Aquifer Concentration for CaseC All Pa-231 B_UA

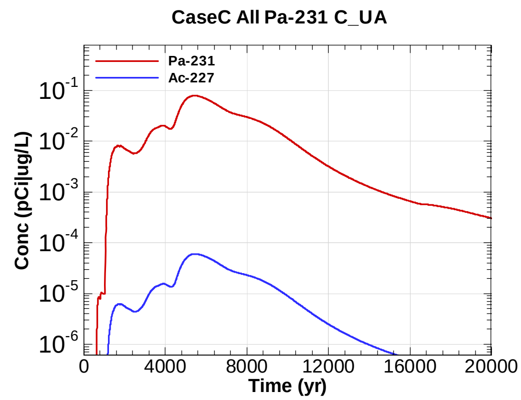

Figure N-108 - 100m Aquifer Concentration for CaseC All Pa-231 C_UA

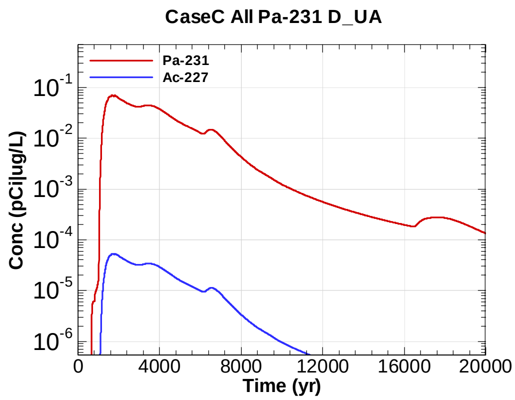

Figure N-109 - 100m Aquifer Concentration for CaseC All Pa-231 D_UA

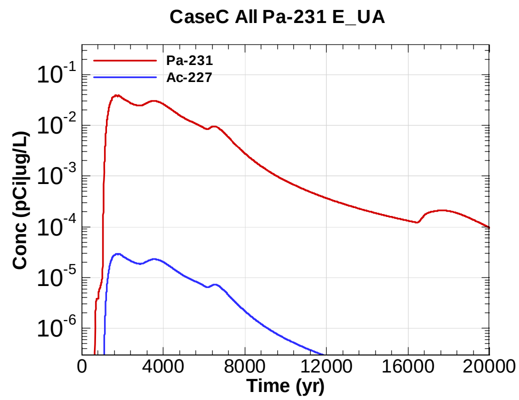

Figure N-110 - 100m Aquifer Concentration for CaseC All Pa-231 E_UA

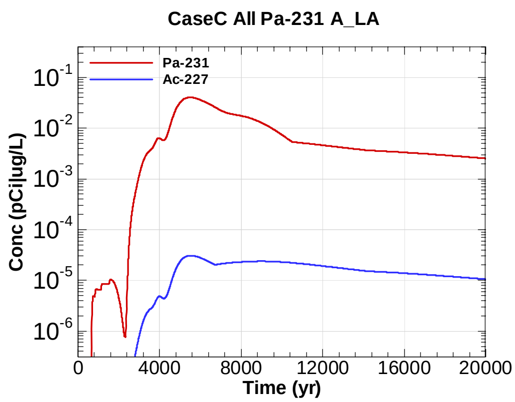

Figure N-111 - 100m Aquifer Concentration for CaseC All Pa-231 A_LA

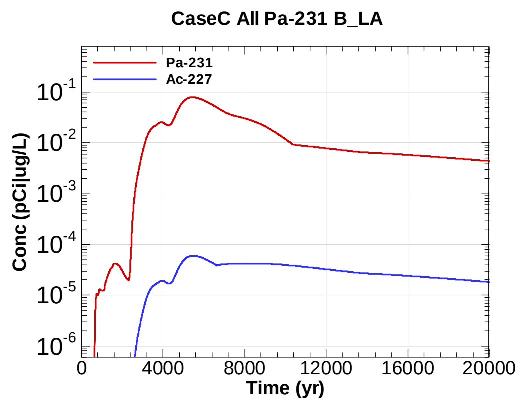

Figure N-112 - 100m Aquifer Concentration for CaseC All Pa-231 B_LA

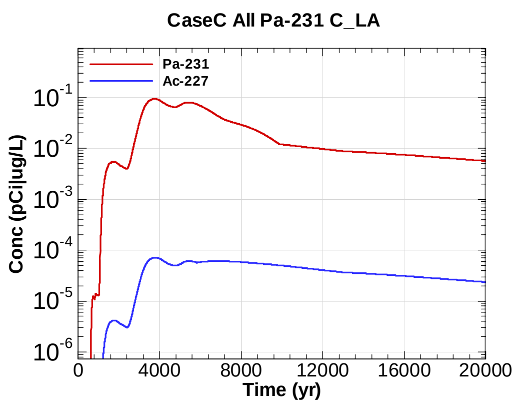

Figure N-113 - 100m Aquifer Concentration for CaseC All Pa-231 C_LA

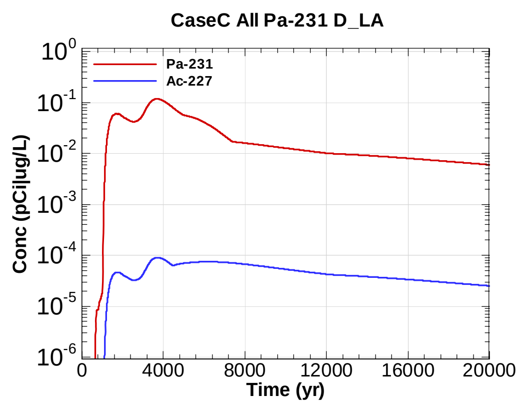

Figure N-114 - 100m Aquifer Concentration for CaseC All Pa-231 D_LA

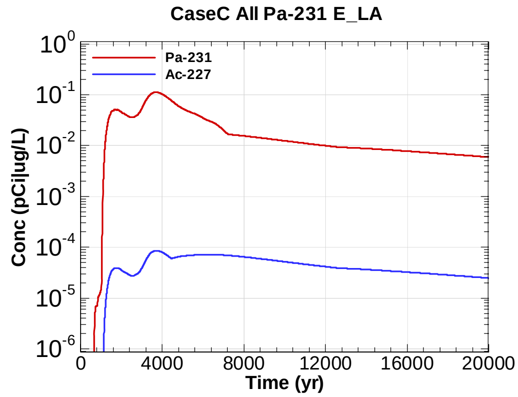

Figure N-115 - 100m Aquifer Concentration for CaseC All Pa-231 E_LA

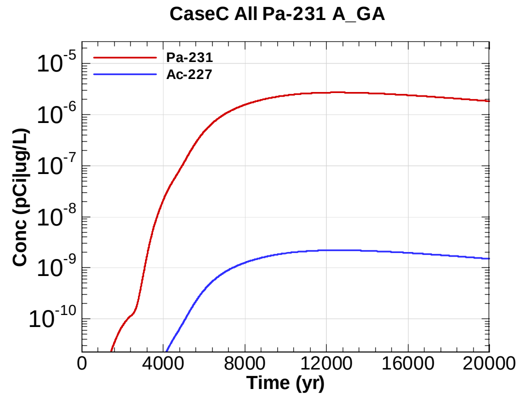

Figure N-116 - 100m Aquifer Concentration for CaseC All Pa-231 A_GA

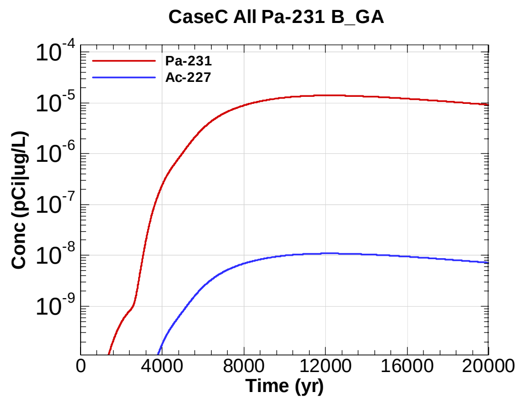

Figure N-117 - 100m Aquifer Concentration for CaseC All Pa-231 B_GA

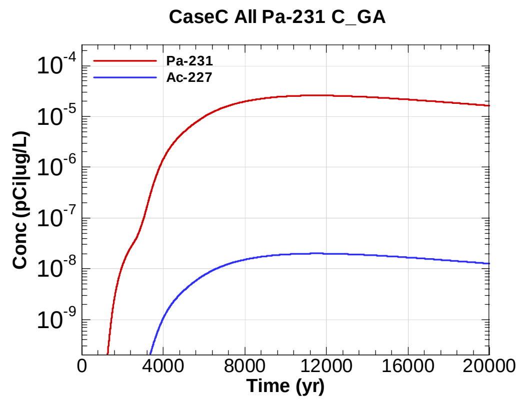

Figure N-118 - 100m Aquifer Concentration for CaseC All Pa-231 C_GA

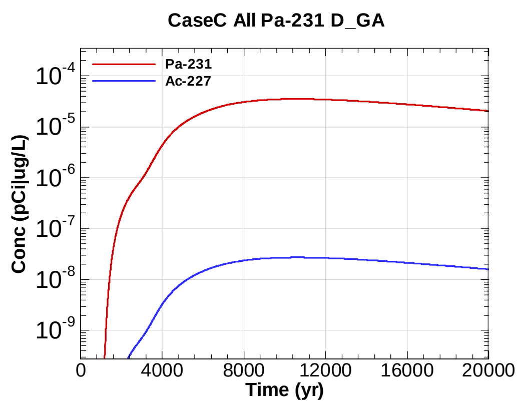

Figure N-119 - 100m Aquifer Concentration for CaseC All Pa-231 D_GA

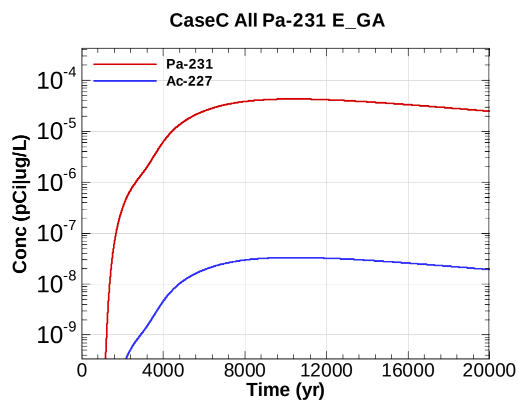

Figure N-120 - 100m Aquifer Concentration for CaseC All Pa-231 E_GA

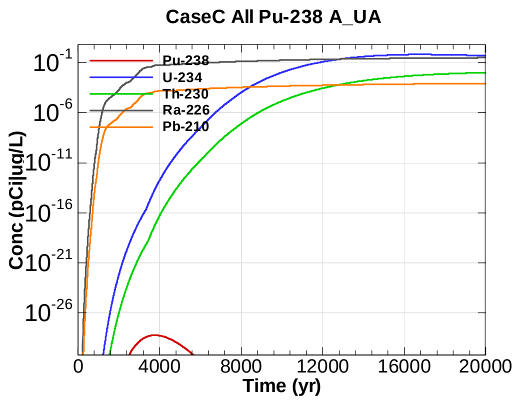

Figure N-121 - 100m Aquifer Concentration for CaseC All Pu-238 A_UA

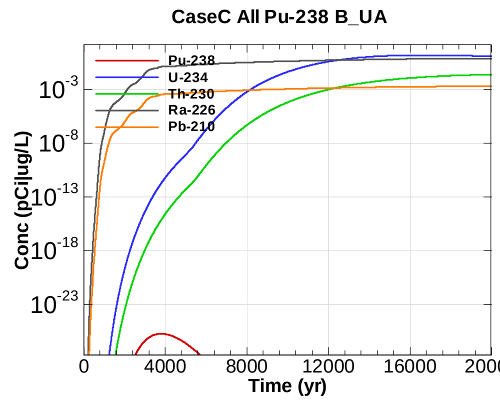

Figure N-122 - 100m Aquifer Concentration for CaseC All Pu-238 B_UA

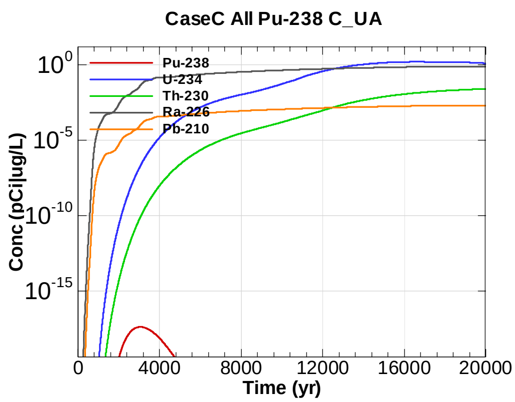

Figure N-123 - 100m Aquifer Concentration for CaseC All Pu-238 C_UA

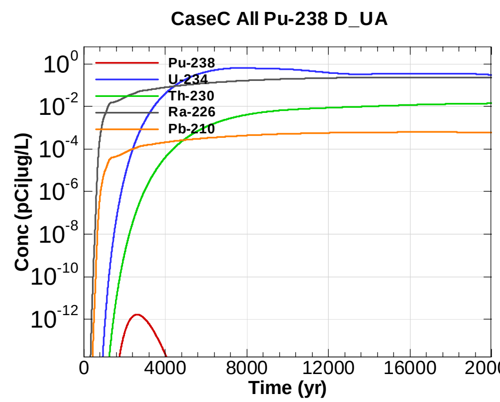

Figure N-124 - 100m Aquifer Concentration for CaseC All Pu-238 D_UA

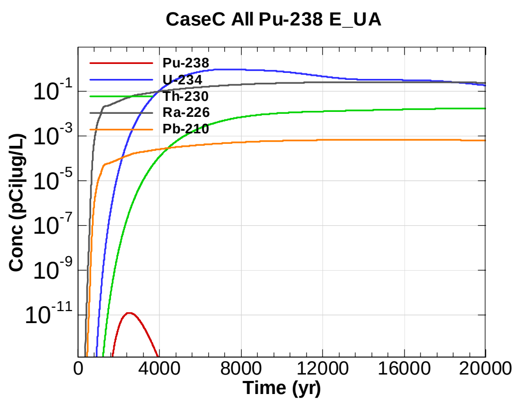

Figure N-125 - 100m Aquifer Concentration for CaseC All Pu-238 E_UA

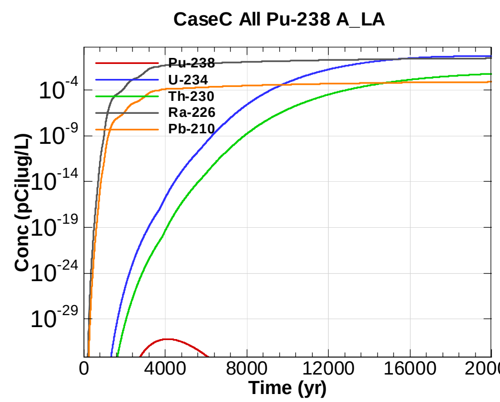

Figure N-126 - 100m Aquifer Concentration for CaseC All Pu-238 A_LA

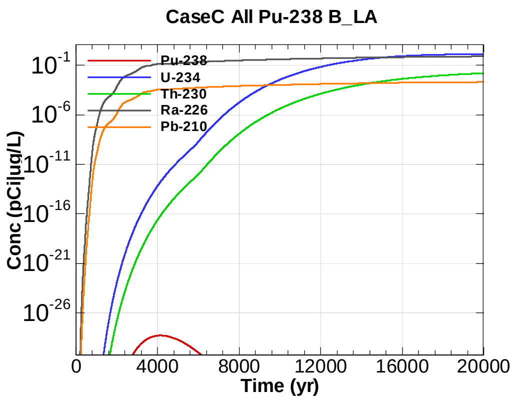

Figure N-127 - 100m Aquifer Concentration for CaseC All Pu-238 B_LA

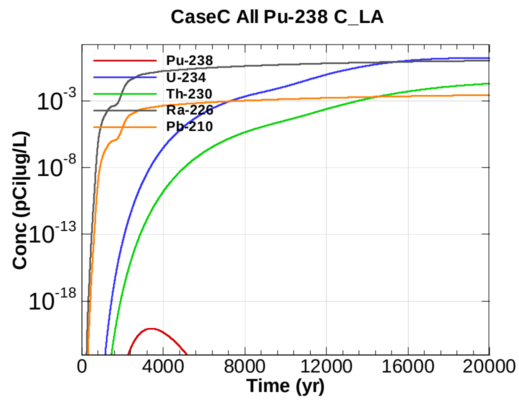

Figure N-128 - 100m Aquifer Concentration for CaseC All Pu-238 C_LA

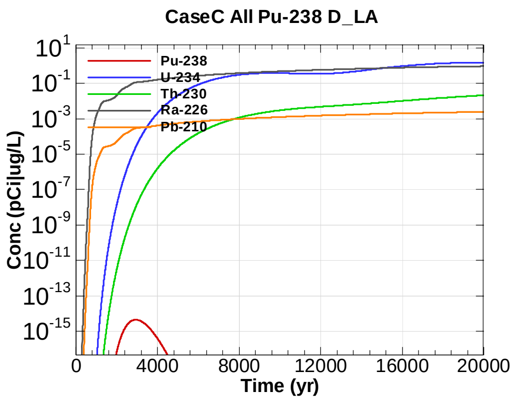

Figure N-129 - 100m Aquifer Concentration for CaseC All Pu-238 D_LA

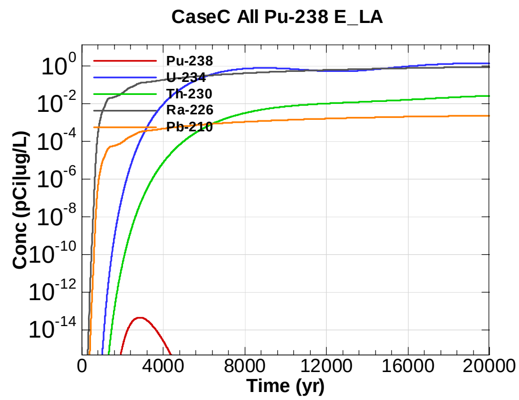

Figure N-130 - 100m Aquifer Concentration for CaseC All Pu-238 E_LA

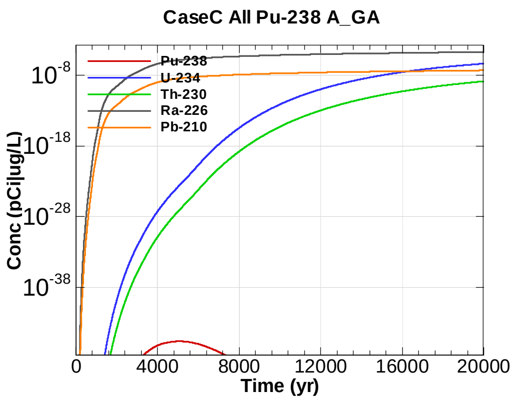

Figure N-131 - 100m Aquifer Concentration for CaseC All Pu-238 A_GA

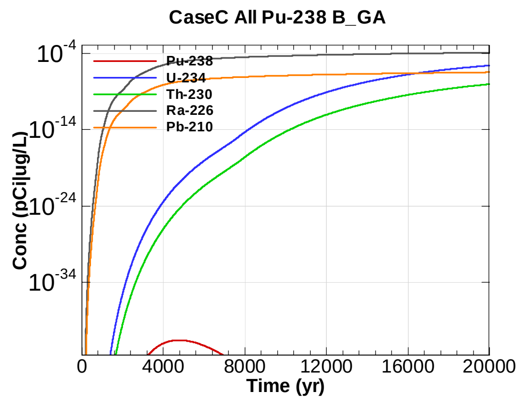

Figure N-132 - 100m Aquifer Concentration for CaseC All Pu-238 B_GA

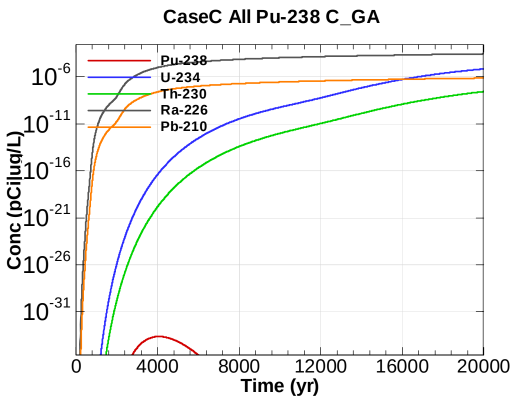

Figure N-133 - 100m Aquifer Concentration for CaseC All Pu-238 C_GA

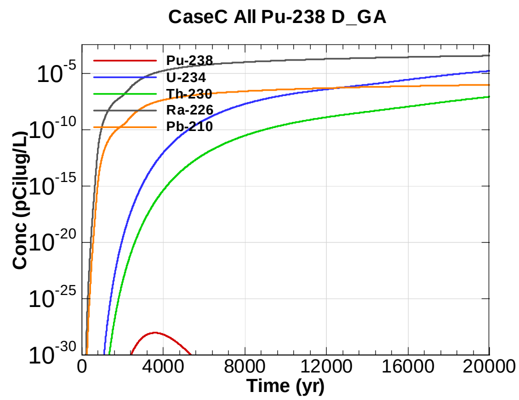

Figure N-134 - 100m Aquifer Concentration for CaseC All Pu-238 D_GA

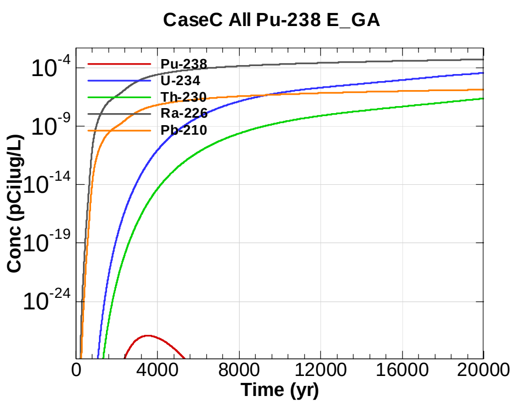

Figure N-135 - 100m Aquifer Concentration for CaseC All Pu-238 E_GA

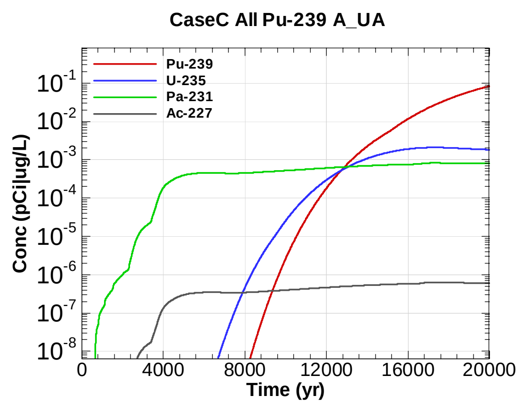

Figure N-136 - 100m Aquifer Concentration for CaseC All Pu-239 A_UA

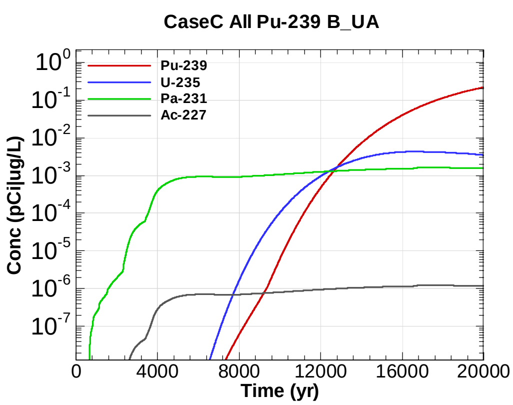

Figure N-137 - 100m Aquifer Concentration for CaseC All Pu-239 B_UA

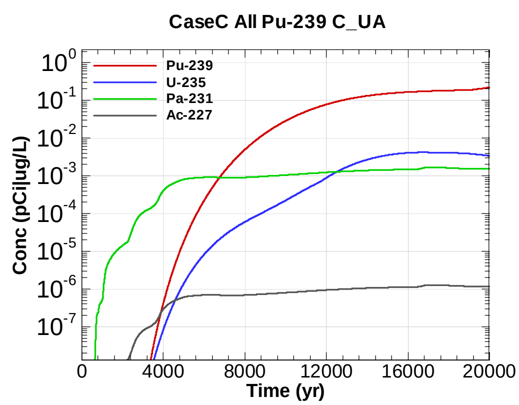

Figure N-138 - 100m Aquifer Concentration for CaseC All Pu-239 C_UA

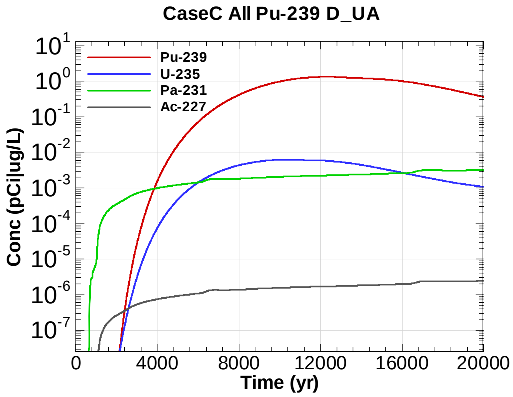

Figure N-139 - 100m Aquifer Concentration for CaseC All Pu-239 D_UA

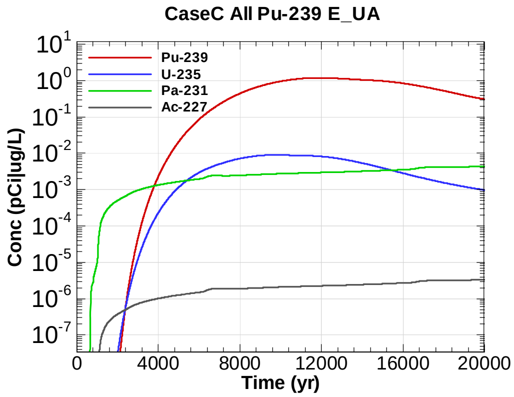

Figure N-140 - 100m Aquifer Concentration for CaseC All Pu-239 E_UA

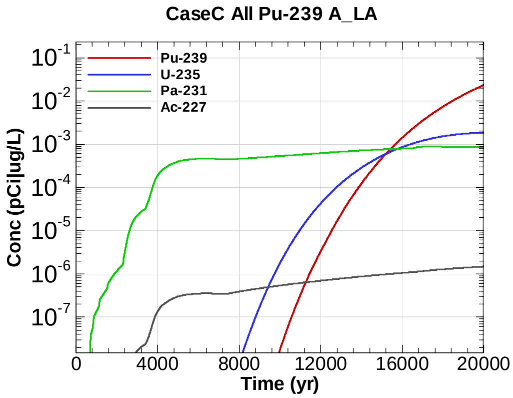

Figure N-141 - 100m Aquifer Concentration for CaseC All Pu-239 A_LA

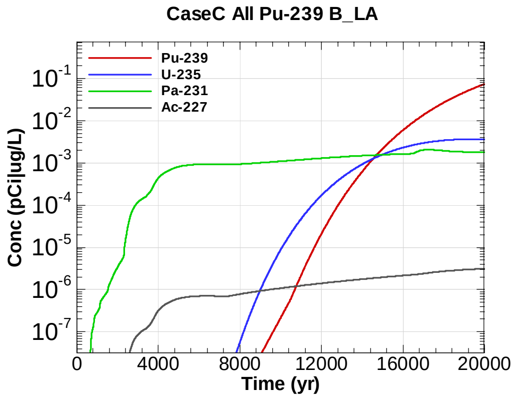

Figure N-142 - 100m Aquifer Concentration for CaseC All Pu-239 B_LA

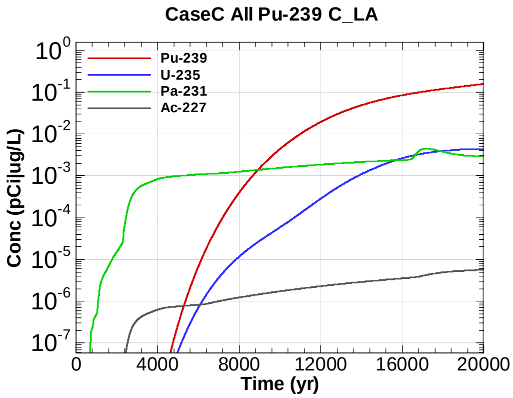

Figure N-143 - 100m Aquifer Concentration for CaseC All Pu-239 C_LA

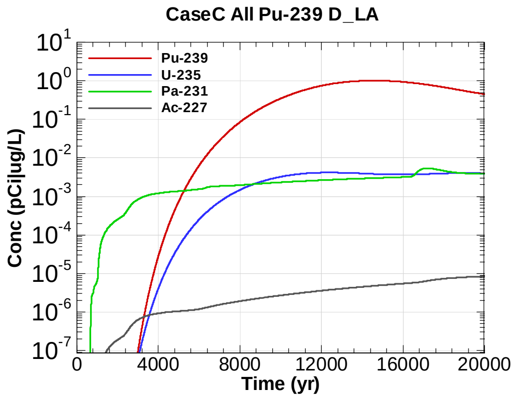

Figure N-144 - 100m Aquifer Concentration for CaseC All Pu-239 D_LA

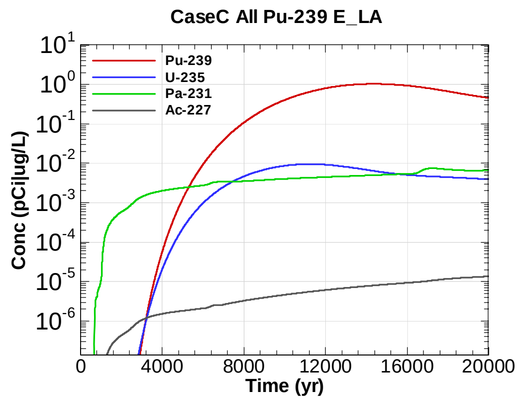

Figure N-145 - 100m Aquifer Concentration for CaseC All Pu-239 E_LA

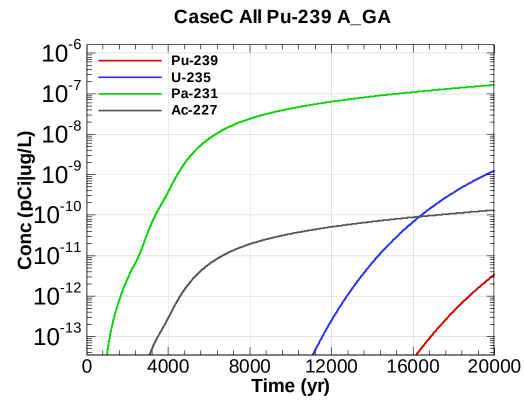

Figure N-146 - 100m Aquifer Concentration for CaseC All Pu-239 A_GA

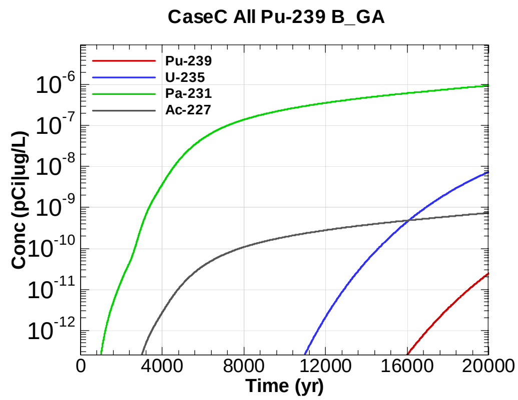

Figure N-147 - 100m Aquifer Concentration for CaseC All Pu-239 B_GA

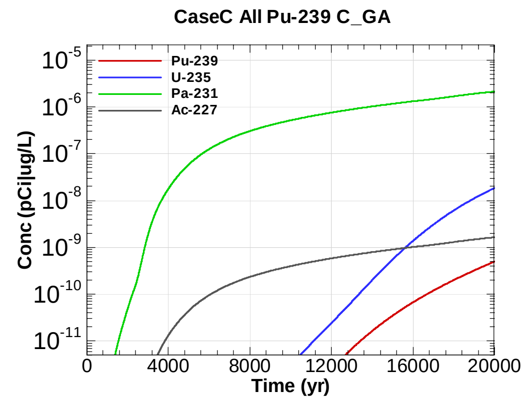

Figure N-148 - 100m Aquifer Concentration for CaseC All Pu-239 C_GA

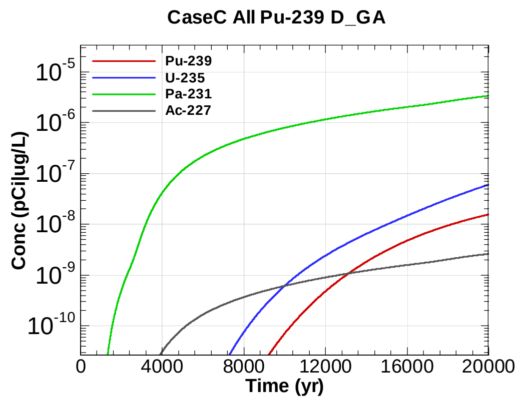

Figure N-149 - 100m Aquifer Concentration for CaseC All Pu-239 D_GA

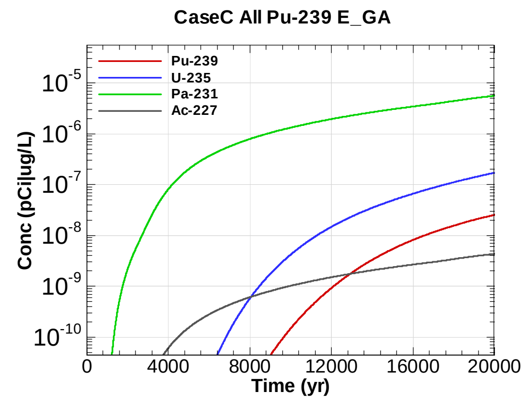

Figure N-150 - 100m Aquifer Concentration for CaseC All Pu-239 E_GA

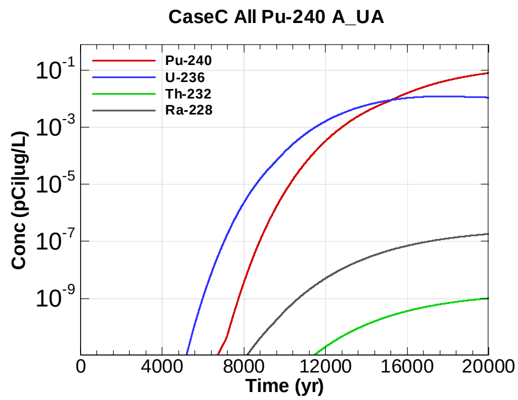

Figure N-151 - 100m Aquifer Concentration for CaseC All Pu-240 A_UA

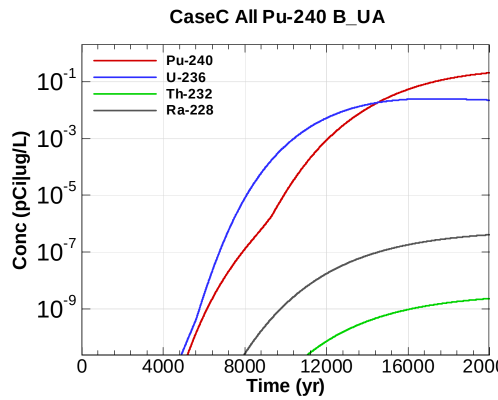

Figure N-152 - 100m Aquifer Concentration for CaseC All Pu-240 B_UA

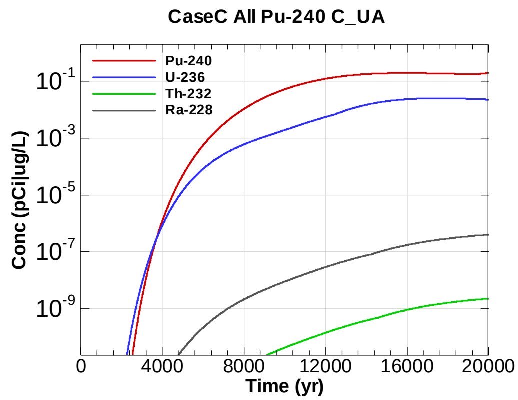

Figure N-153 - 100m Aquifer Concentration for CaseC All Pu-240 C_UA

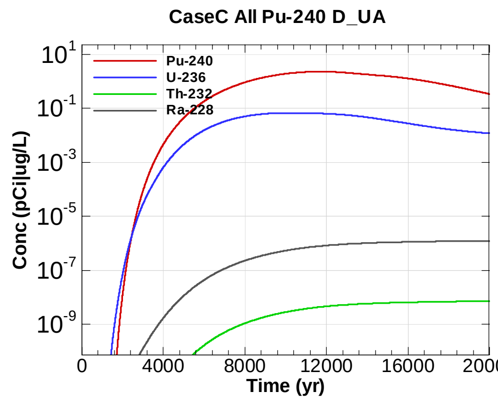

Figure N-154 - 100m Aquifer Concentration for CaseC All Pu-240 D_UA

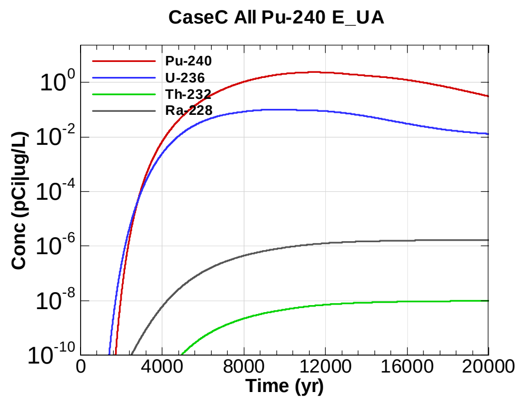

Figure N-155 - 100m Aquifer Concentration for CaseC All Pu-240 E_UA

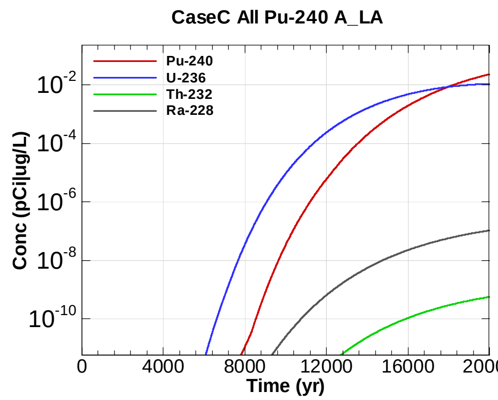

Figure N-156 - 100m Aquifer Concentration for CaseC All Pu-240 A_LA

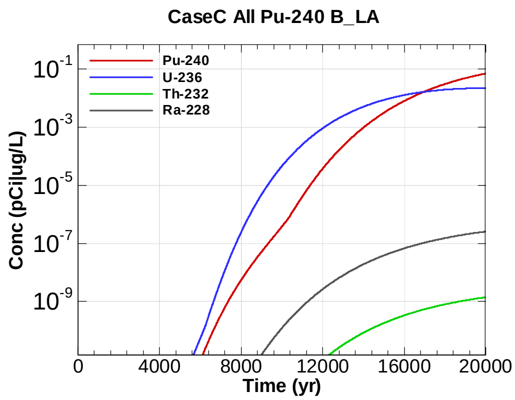

Figure N-157 - 100m Aquifer Concentration for CaseC All Pu-240 B_LA

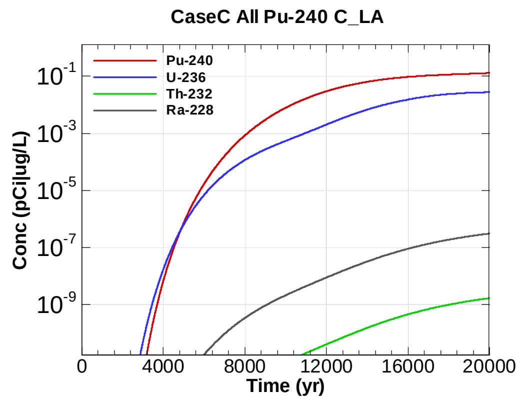

Figure N-158 - 100m Aquifer Concentration for CaseC All Pu-240 C_LA

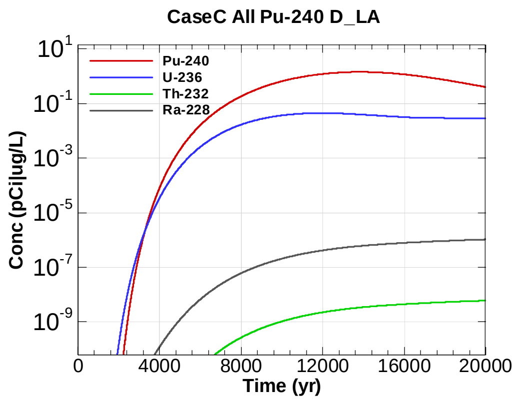

Figure N-159 - 100m Aquifer Concentration for CaseC All Pu-240 D_LA

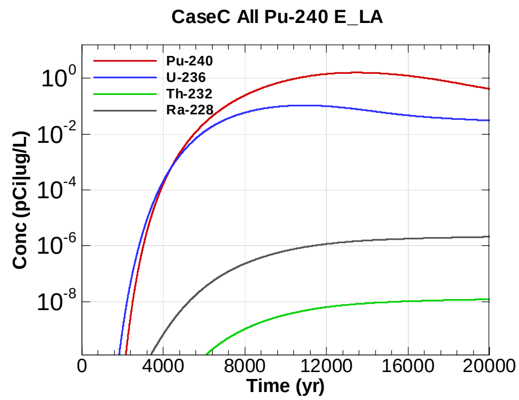

Figure N-160 - 100m Aquifer Concentration for CaseC All Pu-240 E_LA

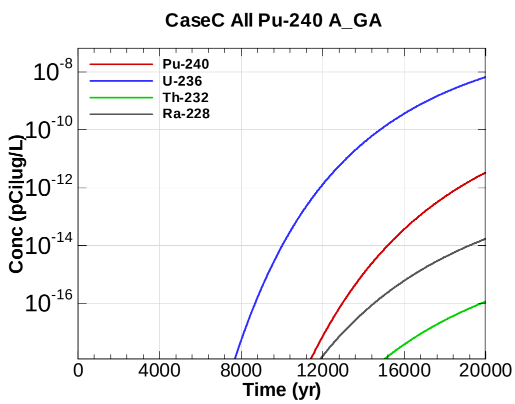

Figure N-161 - 100m Aquifer Concentration for CaseC All Pu-240 A_GA

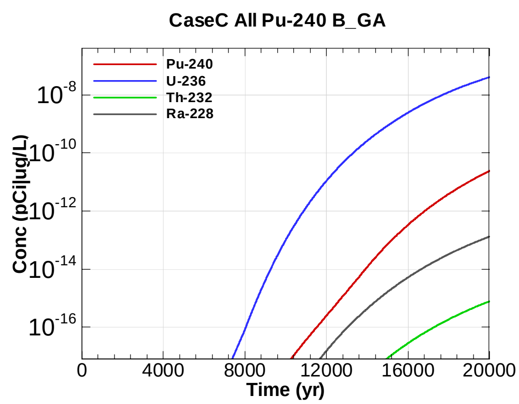

Figure N-162 - 100m Aquifer Concentration for CaseC All Pu-240 B_GA

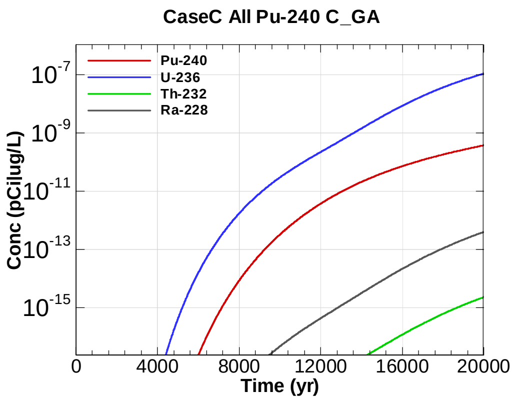

Figure N-163 - 100m Aquifer Concentration for CaseC All Pu-240 C_GA

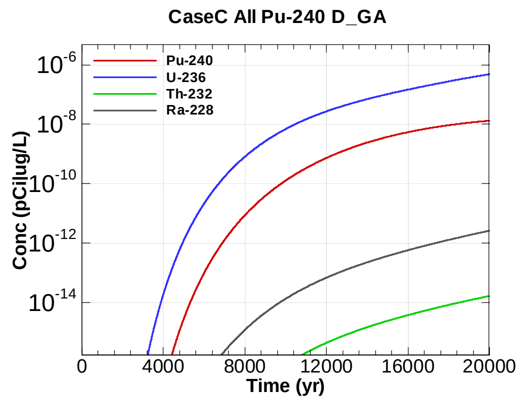

Figure N-164 - 100m Aquifer Concentration for CaseC All Pu-240 D_GA

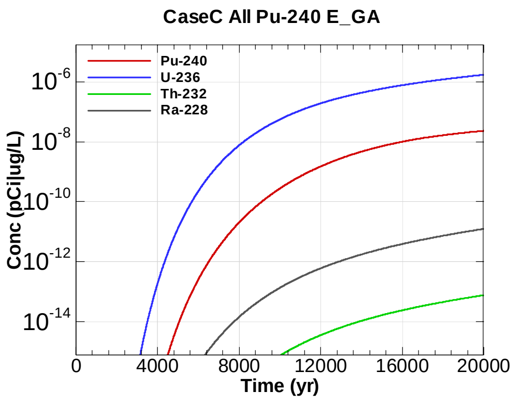

Figure N-165 - 100m Aquifer Concentration for CaseC All Pu-240 E_GA

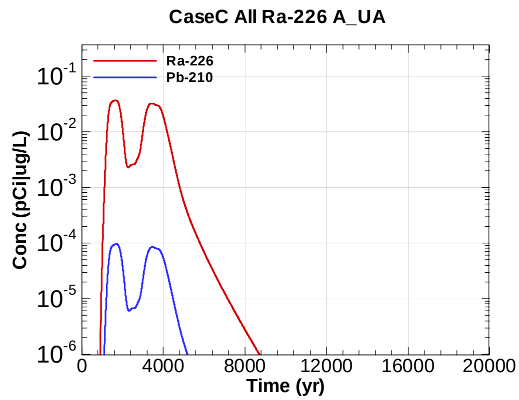

Figure N-166 - 100m Aquifer Concentration for CaseC All Ra-226 A_UA

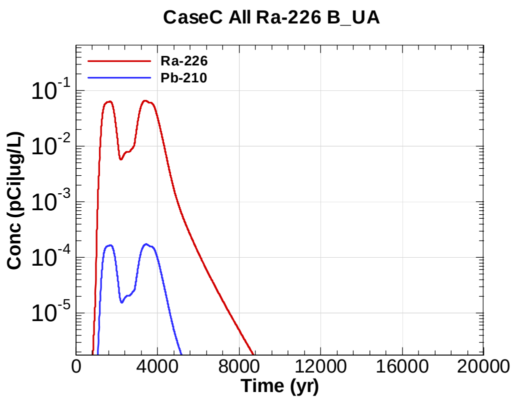

Figure N-167 - 100m Aquifer Concentration for CaseC All Ra-226 B_UA

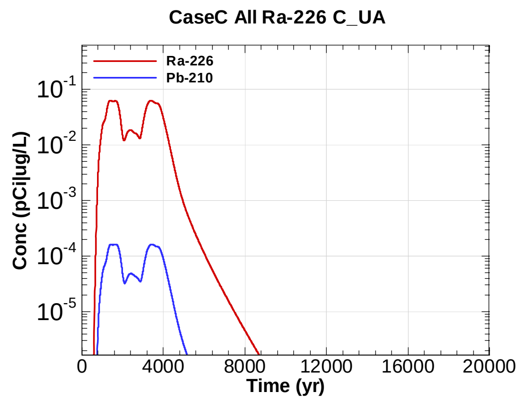

Figure N-168 - 100m Aquifer Concentration for CaseC All Ra-226 C_UA

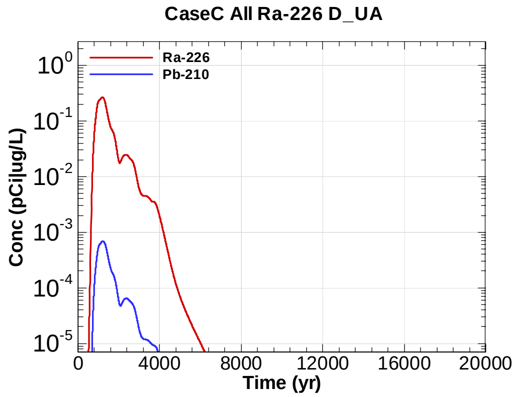

Figure N-169 - 100m Aquifer Concentration for CaseC All Ra-226 D_UA

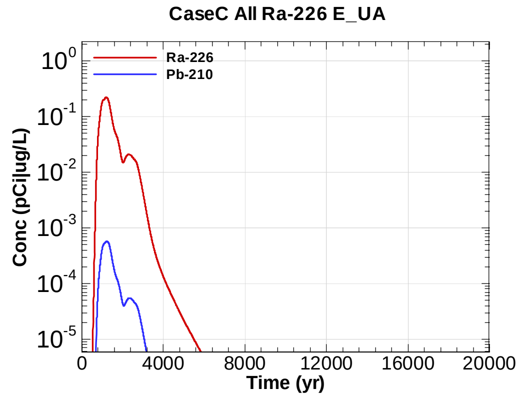

Figure N-170 - 100m Aquifer Concentration for CaseC All Ra-226 E_UA

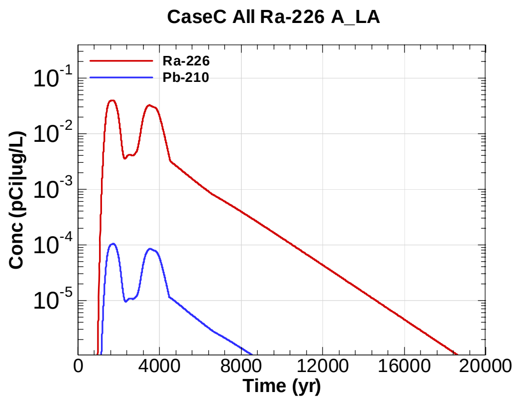

Figure N-171 - 100m Aquifer Concentration for CaseC All Ra-226 A_LA

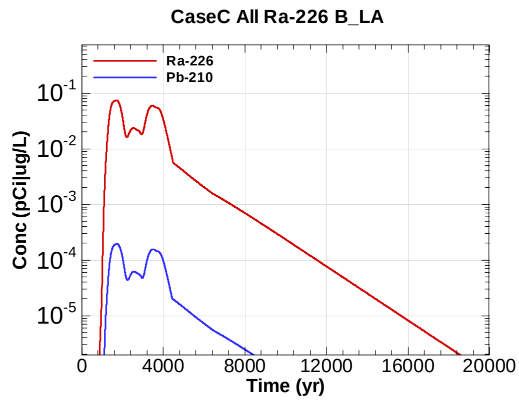

Figure N-172 - 100m Aquifer Concentration for CaseC All Ra-226 B_LA

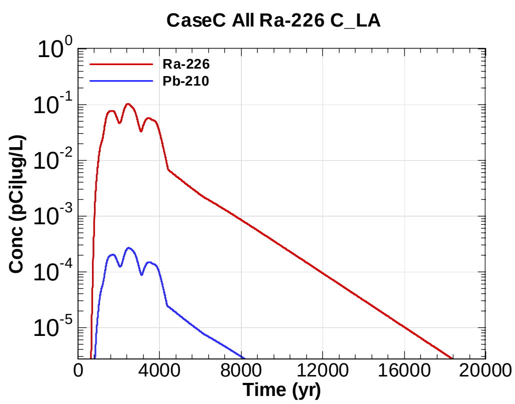

Figure N-173 - 100m Aquifer Concentration for CaseC All Ra-226 C_LA

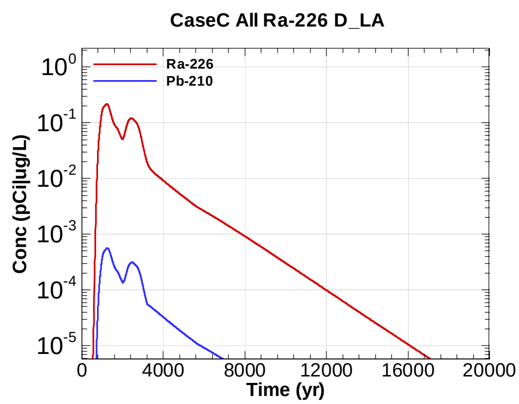

Figure N-174 - 100m Aquifer Concentration for CaseC All Ra-226 D_LA

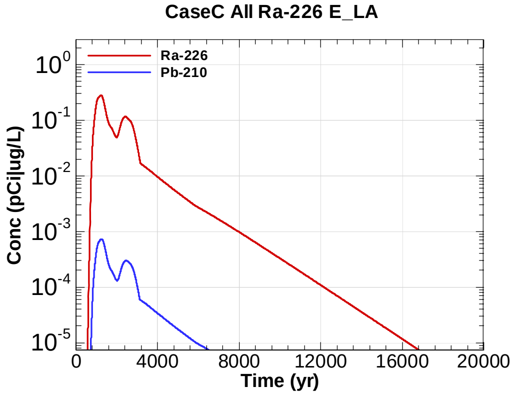

Figure N-175 - 100m Aquifer Concentration for CaseC All Ra-226 E_LA

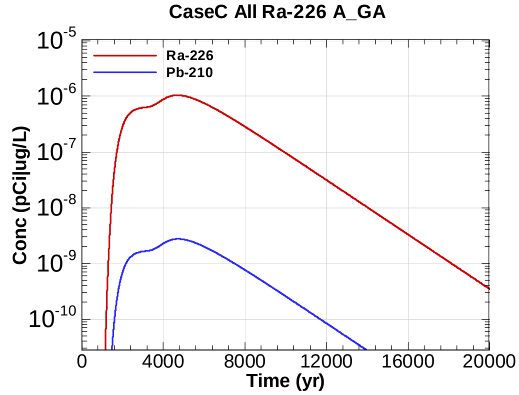

Figure N-176 - 100m Aquifer Concentration for CaseC All Ra-226 A_GA

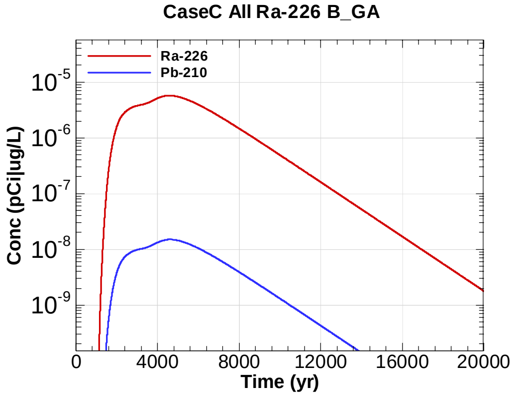

Figure N-177 - 100m Aquifer Concentration for CaseC All Ra-226 B_GA

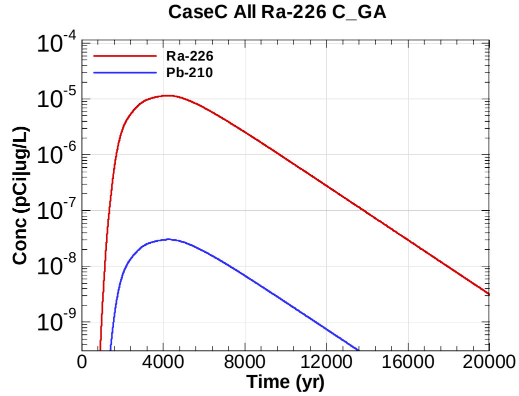

Figure N-178 - 100m Aquifer Concentration for CaseC All Ra-226 C_GA

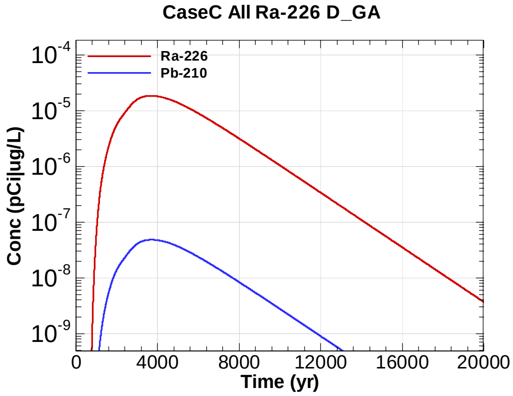

Figure N-179 - 100m Aquifer Concentration for CaseC All Ra-226 D_GA

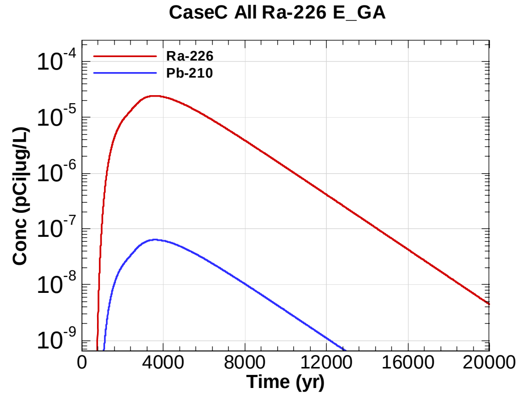

Figure N-180 - 100m Aquifer Concentration for CaseC All Ra-226 E_GA

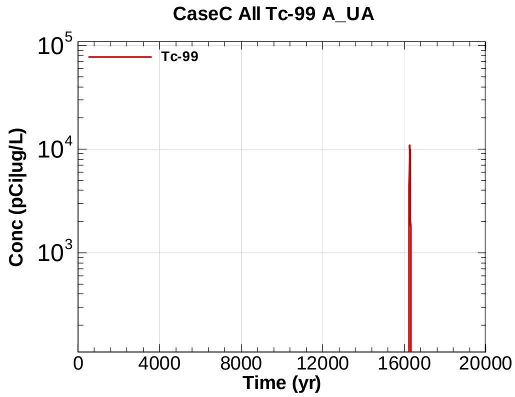

Figure N-181 - 100m Aquifer Concentration for CaseC All Tc-99 A_UA

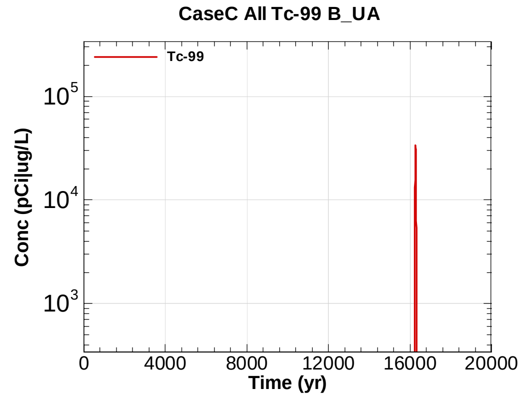

Figure N-182 - 100m Aquifer Concentration for CaseC All Tc-99 B_UA

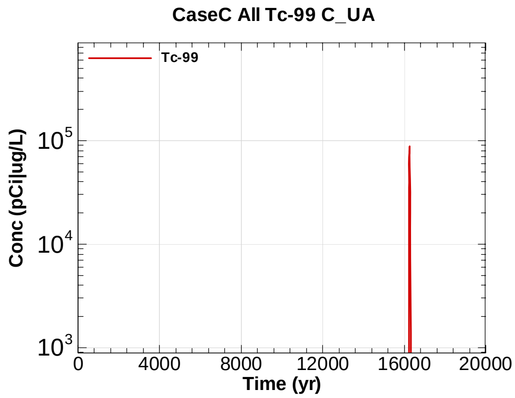

Figure N-183 - 100m Aquifer Concentration for CaseC All Tc-99 C_UA

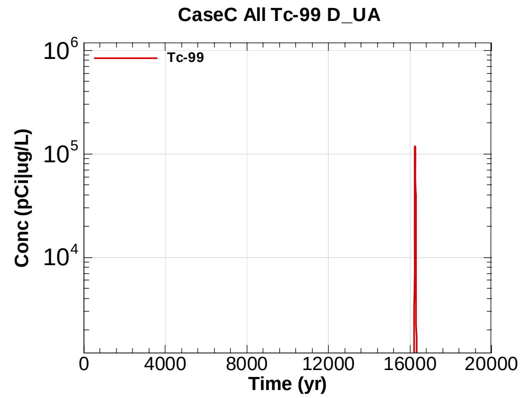

Figure N-184 - 100m Aquifer Concentration for CaseC All Tc-99 D_UA

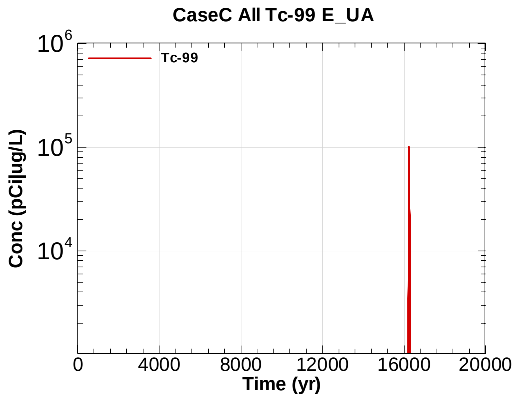

Figure N-185 - 100m Aquifer Concentration for CaseC All Tc-99 E_UA

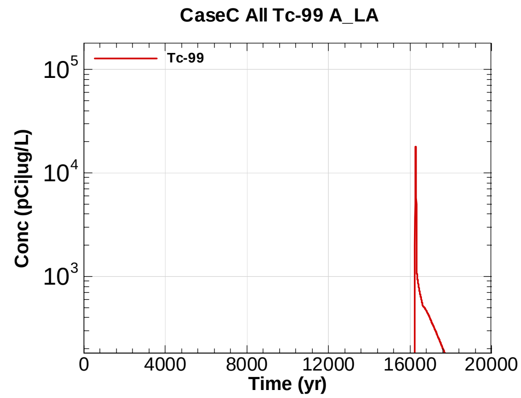

Figure N-186 - 100m Aquifer Concentration for CaseC All Tc-99 A_LA

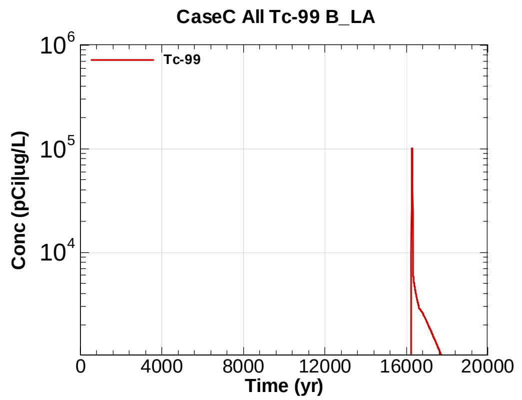

Figure N-187 - 100m Aquifer Concentration for CaseC All Tc-99 B_LA

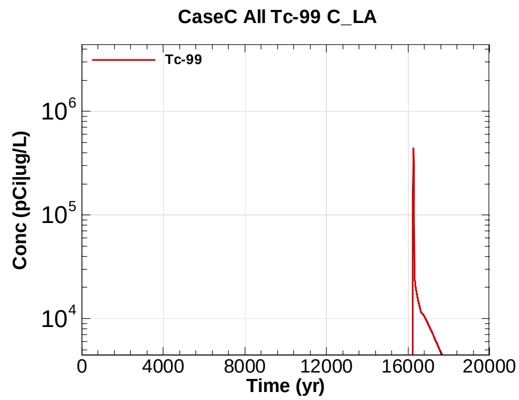

Figure N-188 - 100m Aquifer Concentration for CaseC All Tc-99 C_LA

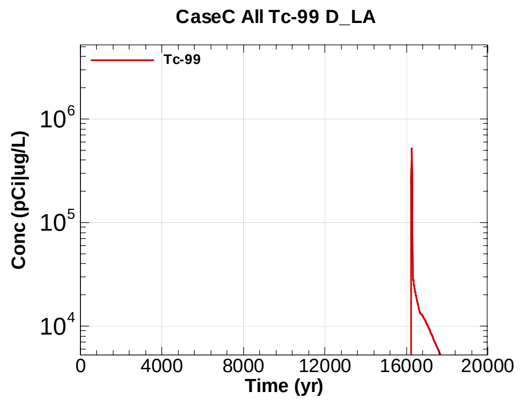

Figure N-189 - 100m Aquifer Concentration for CaseC All Tc-99 D_LA

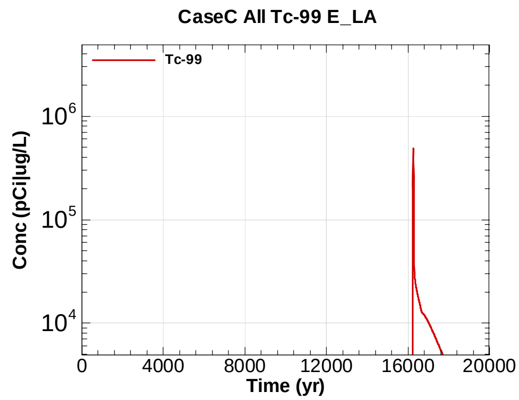

Figure N-190 - 100m Aquifer Concentration for CaseC All Tc-99 E_LA

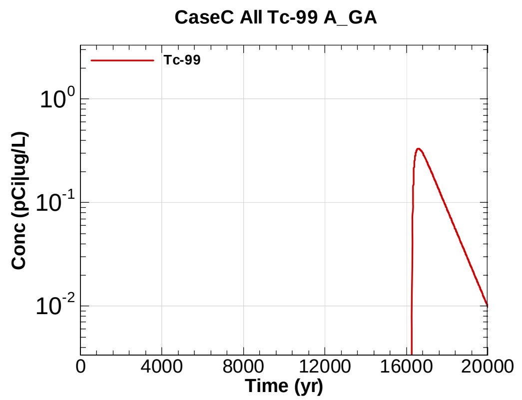

Figure N-191 - 100m Aquifer Concentration for CaseC All Tc-99 A_GA

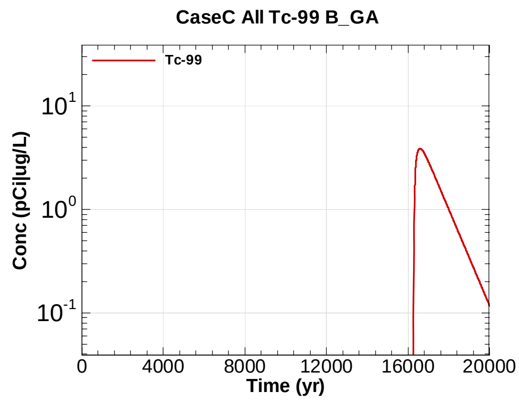

Figure N-192 - 100m Aquifer Concentration for CaseC All Tc-99 B_GA

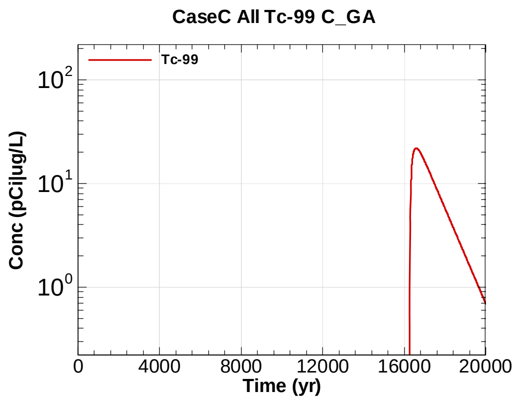

Figure N-193 - 100m Aquifer Concentration for CaseC All Tc-99 C_GA

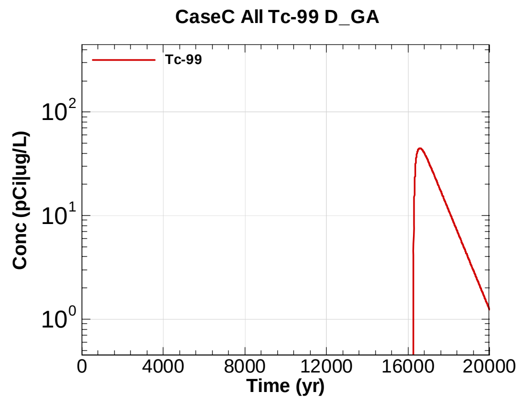

Figure N-194 - 100m Aquifer Concentration for CaseC All Tc-99 D_GA

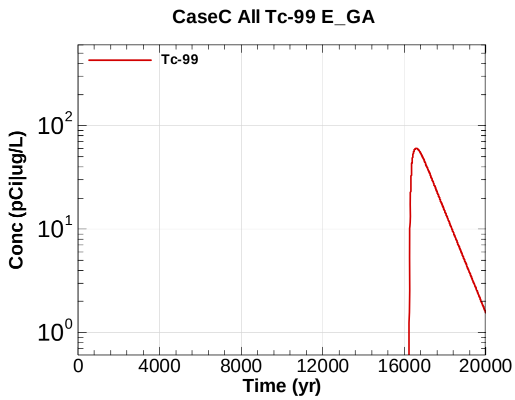

Figure N-195 - 100m Aquifer Concentration for CaseC All Tc-99 E_GA

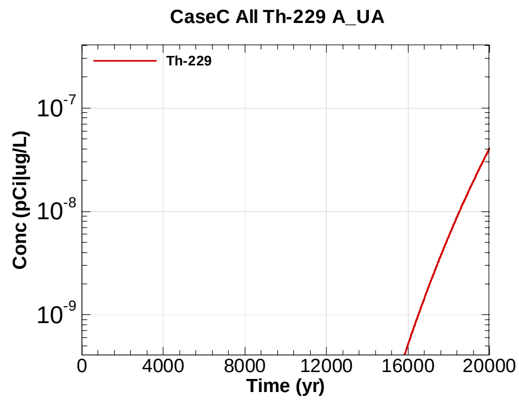

Figure N-196 - 100m Aquifer Concentration for CaseC All Th-229 A_UA

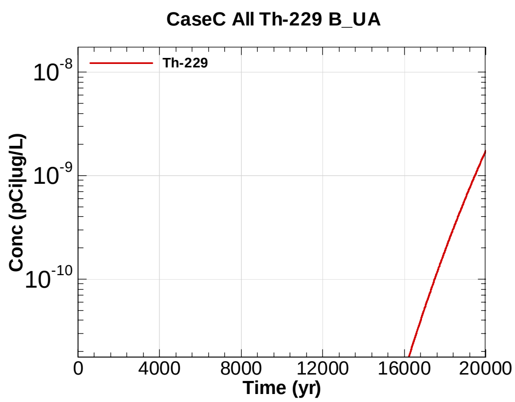

Figure N-197 - 100m Aquifer Concentration for CaseC All Th-229 B_UA

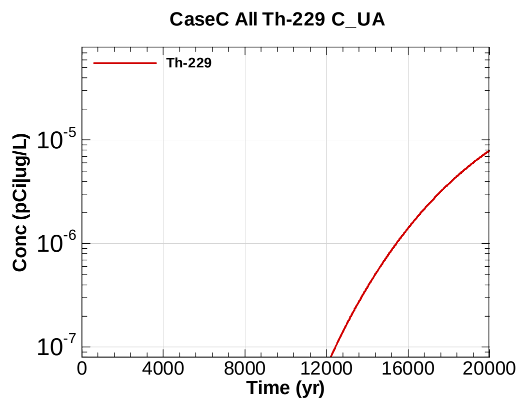

Figure N-198 - 100m Aquifer Concentration for CaseC All Th-229 C_UA

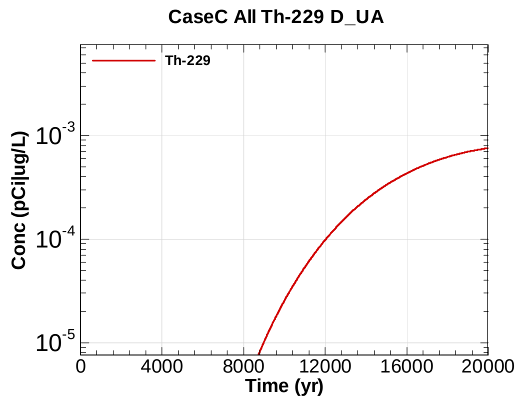

Figure N-199 - 100m Aquifer Concentration for CaseC All Th-229 D_UA

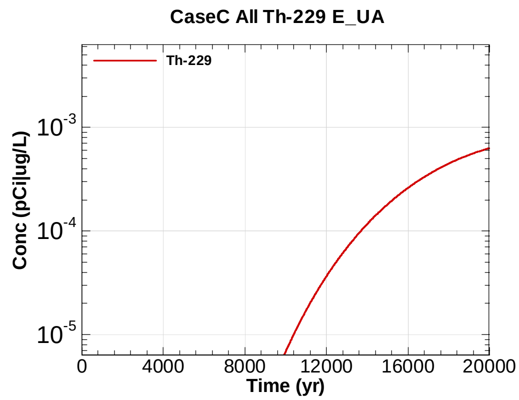

Figure N-200 - 100m Aquifer Concentration for CaseC All Th-229 E_UA

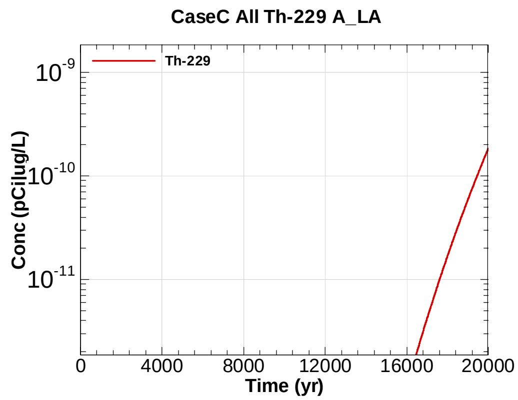

Figure N-201 - 100m Aquifer Concentration for CaseC All Th-229 A_LA

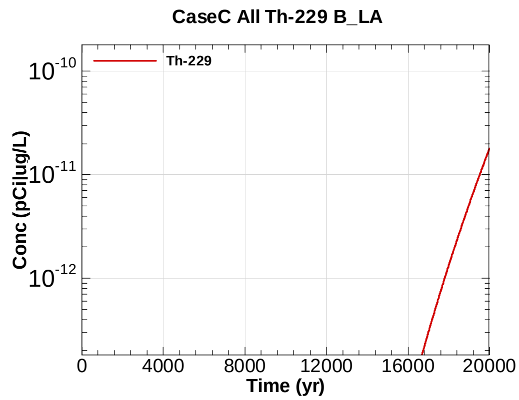

Figure N-202 - 100m Aquifer Concentration for CaseC All Th-229 B_LA

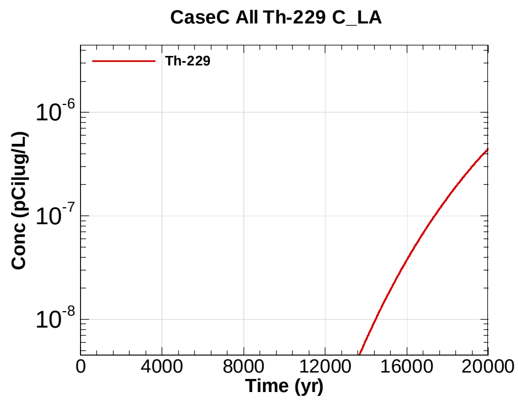

Figure N-203 - 100m Aquifer Concentration for CaseC All Th-229 C_LA

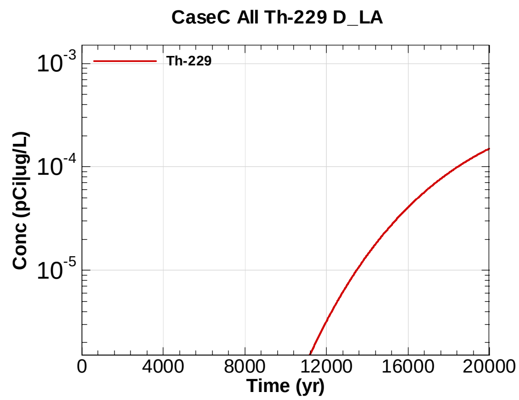

Figure N-204 - 100m Aquifer Concentration for CaseC All Th-229 D_LA

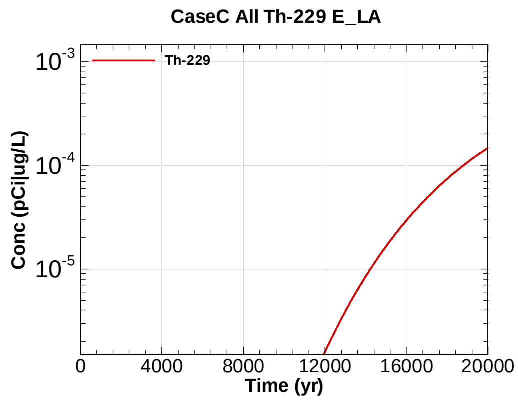

Figure N-205 - 100m Aquifer Concentration for CaseC All Th-229 E_LA

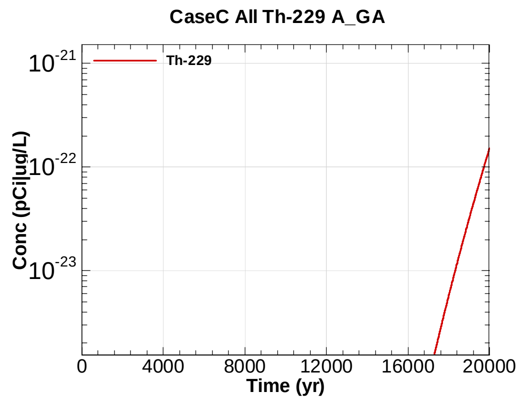

Figure N-206 - 100m Aquifer Concentration for CaseC All Th-229 A_GA

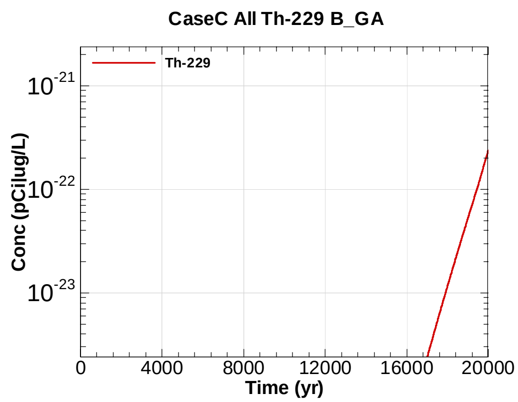

Figure N-207 - 100m Aquifer Concentration for CaseC All Th-229 B_GA

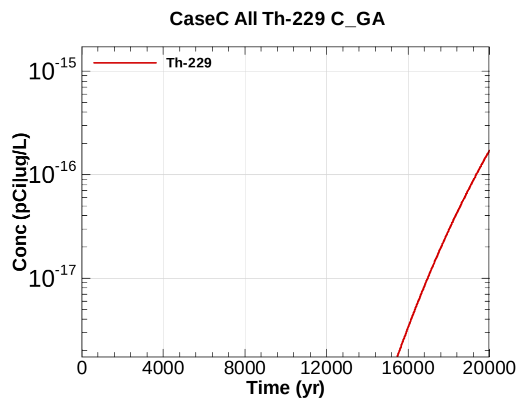

Figure N-208 - 100m Aquifer Concentration for CaseC All Th-229 C_GA

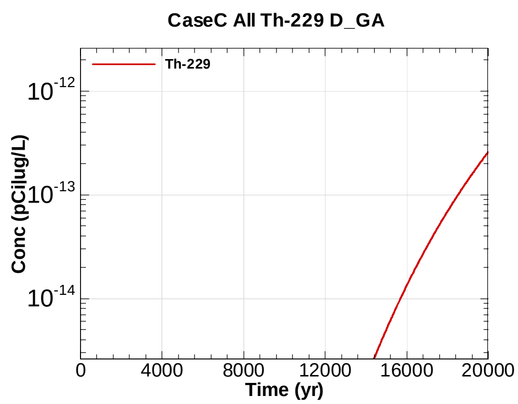

Figure N-209 - 100m Aquifer Concentration for CaseC All Th-229 D_GA

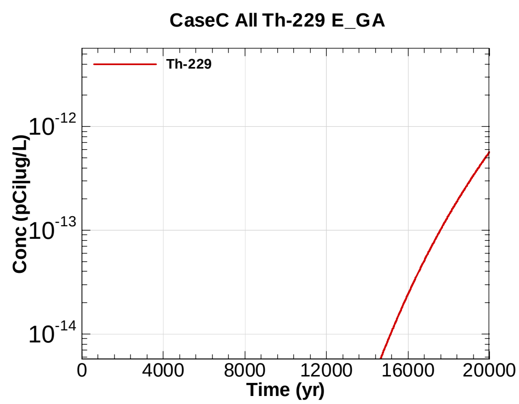

Figure N-210 - 100m Aquifer Concentration for CaseC All Th-229 E_GA

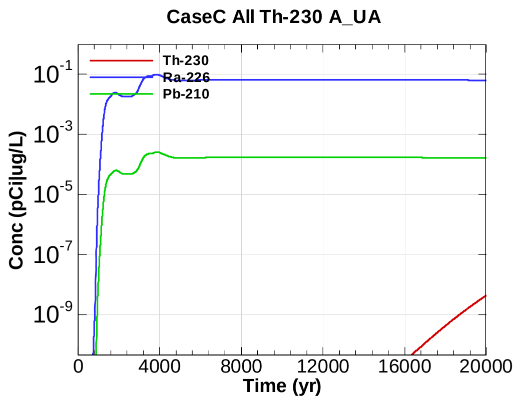

Figure N-211 - 100m Aquifer Concentration for CaseC All Th-230 A_UA

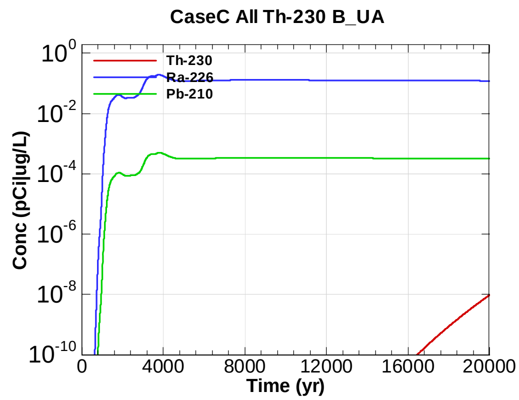

Figure N-212 - 100m Aquifer Concentration for CaseC All Th-230 B_UA

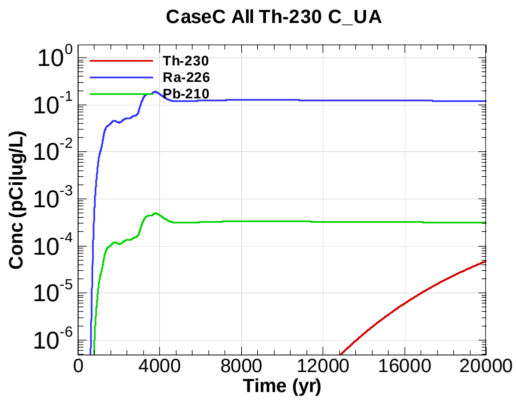

Figure N-213 - 100m Aquifer Concentration for CaseC All Th-230 C_UA

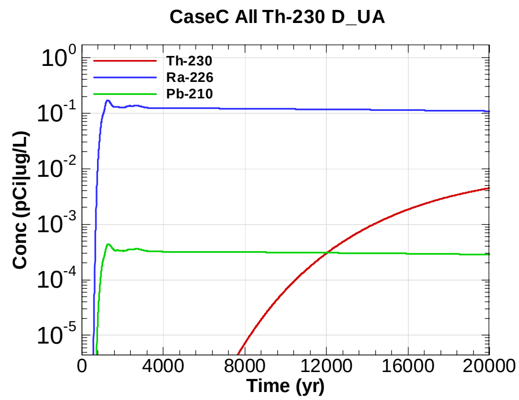

Figure N-214 - 100m Aquifer Concentration for CaseC All Th-230 D_UA

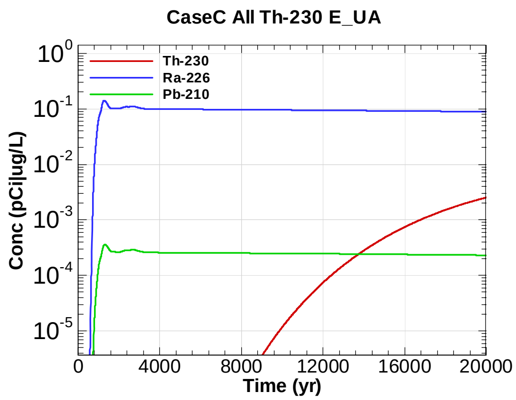

Figure N-215 - 100m Aquifer Concentration for CaseC All Th-230 E_UA

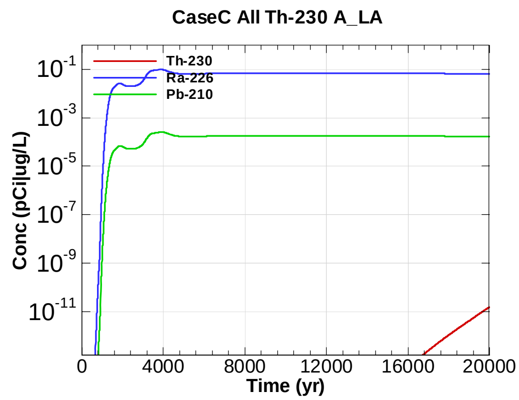

Figure N-216 - 100m Aquifer Concentration for CaseC All Th-230 A_LA

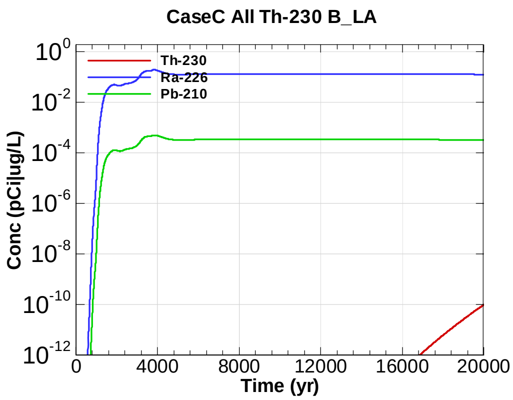

Figure N-217 - 100m Aquifer Concentration for CaseC All Th-230 B_LA

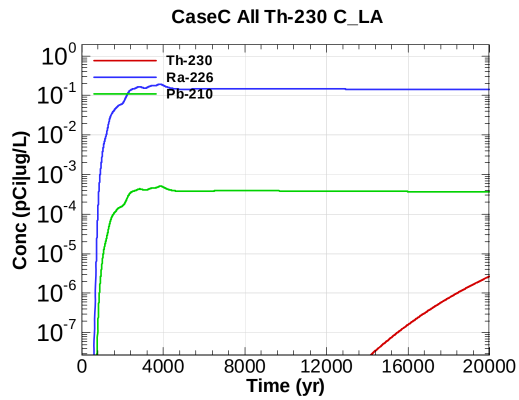

Figure N-218 - 100m Aquifer Concentration for CaseC All Th-230 C_LA

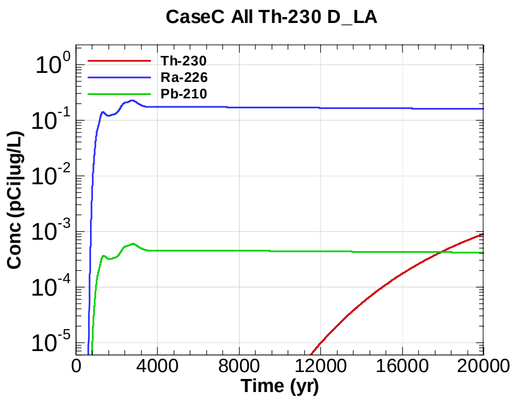

Figure N-219 - 100m Aquifer Concentration for CaseC All Th-230 D_LA

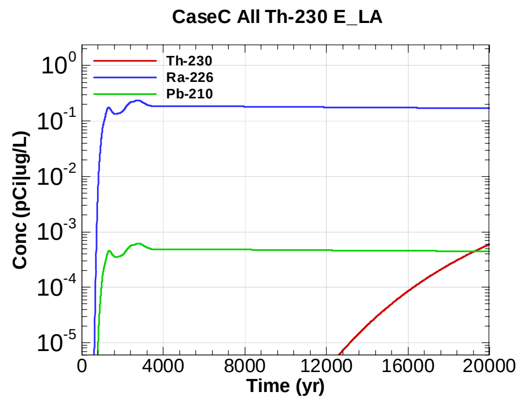

Figure N-220 - 100m Aquifer Concentration for CaseC All Th-230 E_LA

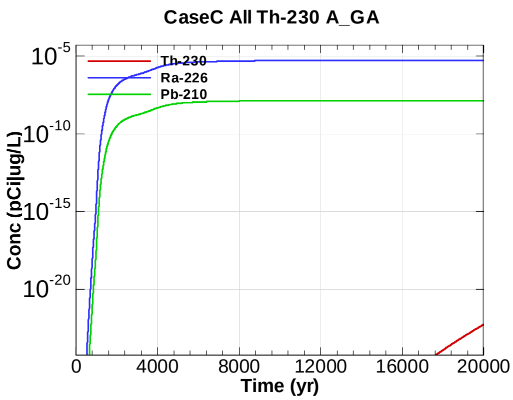

Figure N-221 - 100m Aquifer Concentration for CaseC All Th-230 A_GA

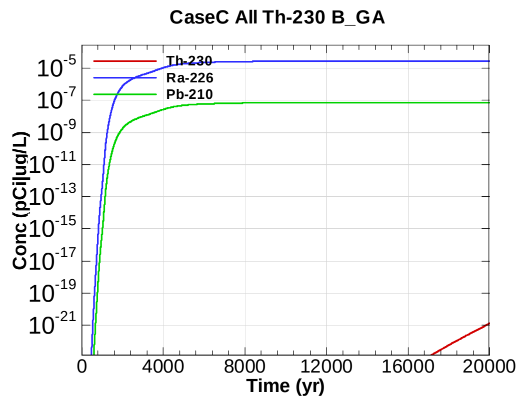

Figure N-222 - 100m Aquifer Concentration for CaseC All Th-230 B_GA

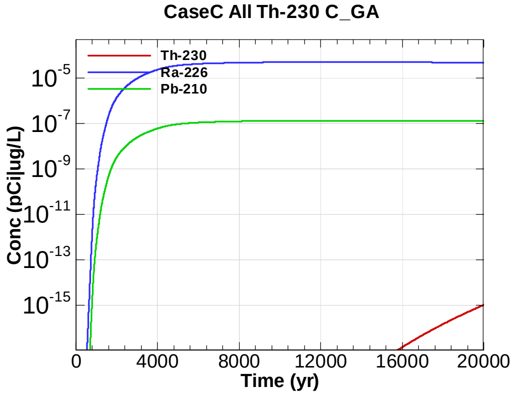

Figure N-223 - 100m Aquifer Concentration for CaseC All Th-230 C_GA

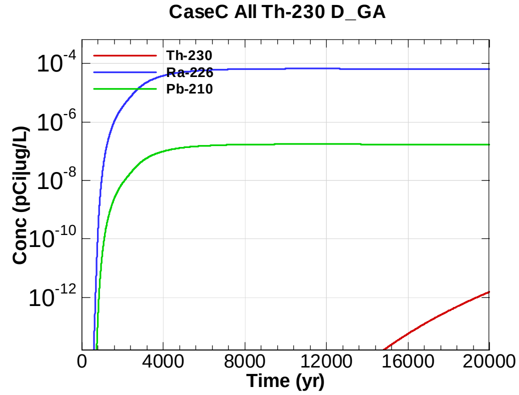

Figure N-224 - 100m Aquifer Concentration for CaseC All Th-230 D_GA

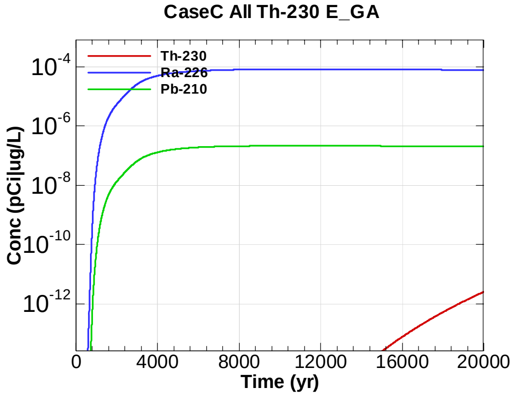

Figure N-225 - 100m Aquifer Concentration for CaseC All Th-230 E_GA

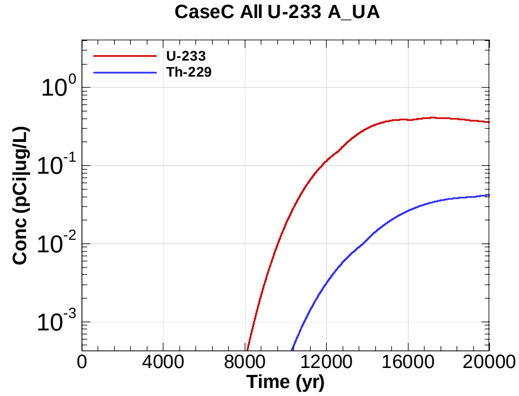

Figure N-226 - 100m Aquifer Concentration for CaseC All U-233 A_UA

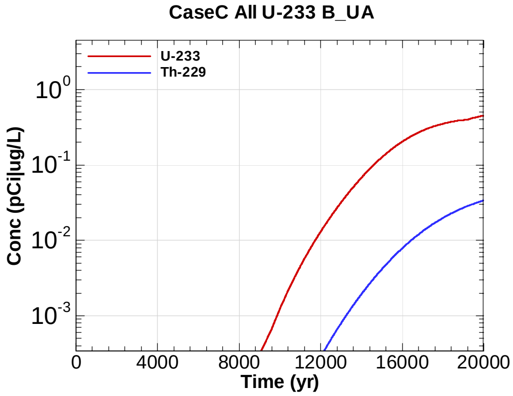

Figure N-227 - 100m Aquifer Concentration for CaseC All U-233 B_UA

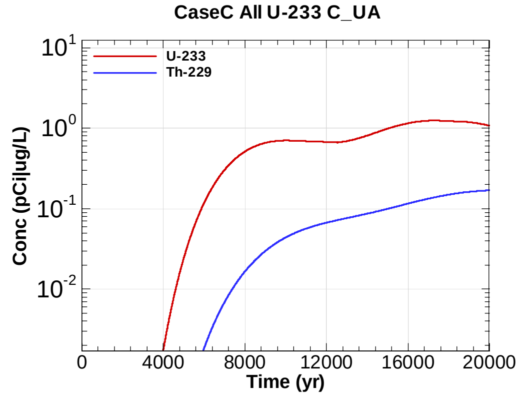

Figure N-228 - 100m Aquifer Concentration for CaseC All U-233 C_UA

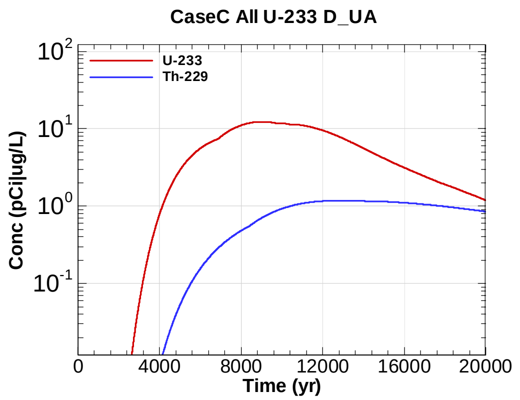

Figure N-229 - 100m Aquifer Concentration for CaseC All U-233 D_UA

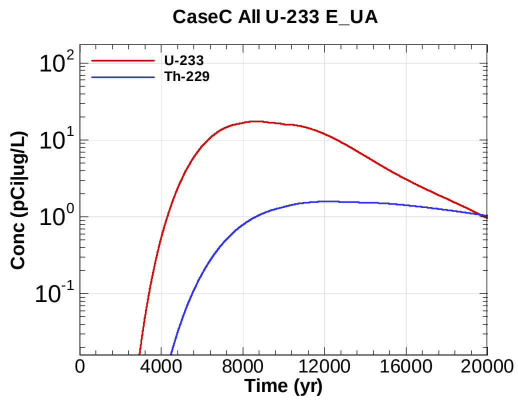

Figure N-230 - 100m Aquifer Concentration for CaseC All U-233 E_UA

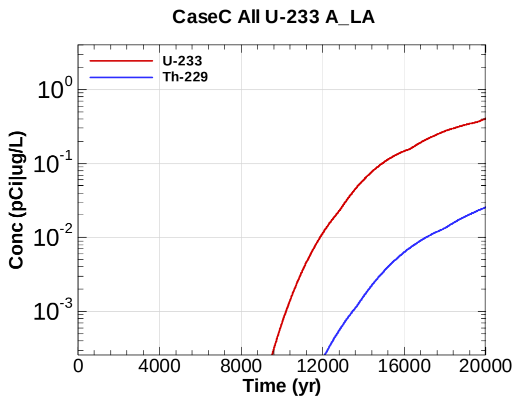

Figure N-231 - 100m Aquifer Concentration for CaseC All U-233 A_LA

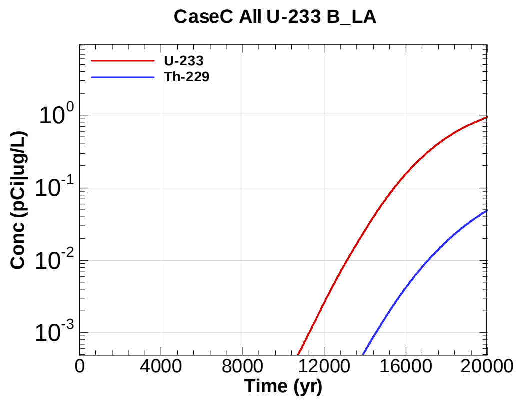

Figure N-232 - 100m Aquifer Concentration for CaseC All U-233 B_LA

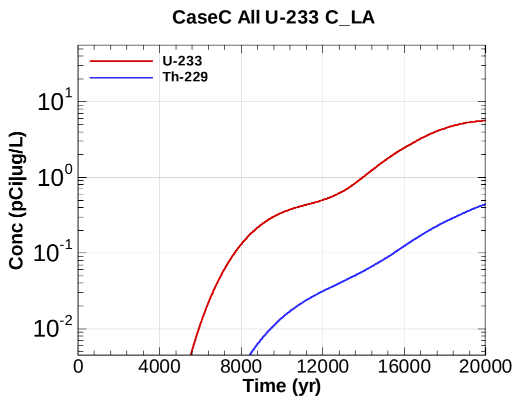

Figure N-233 - 100m Aquifer Concentration for CaseC All U-233 C_LA

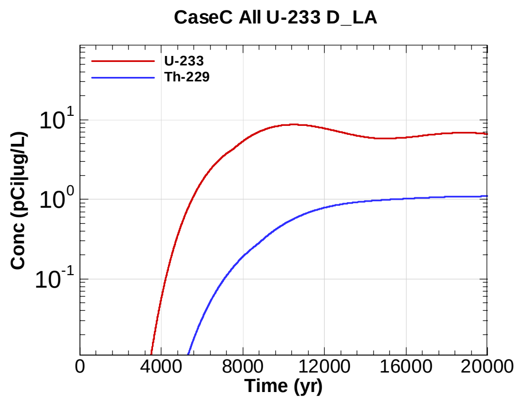

Figure N-234 - 100m Aquifer Concentration for CaseC All U-233 D_LA

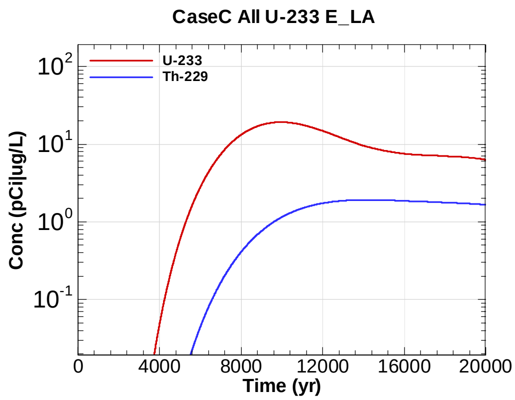

Figure N-235 - 100m Aquifer Concentration for CaseC All U-233 E_LA

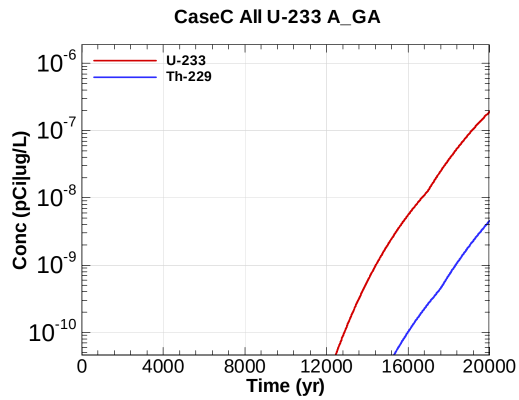

Figure N-236 - 100m Aquifer Concentration for CaseC All U-233 A_GA

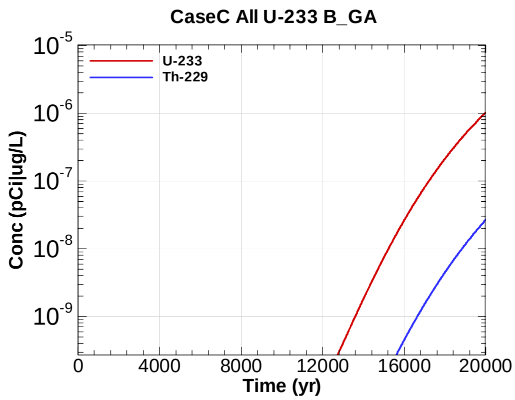

Figure N-237 - 100m Aquifer Concentration for CaseC All U-233 B_GA

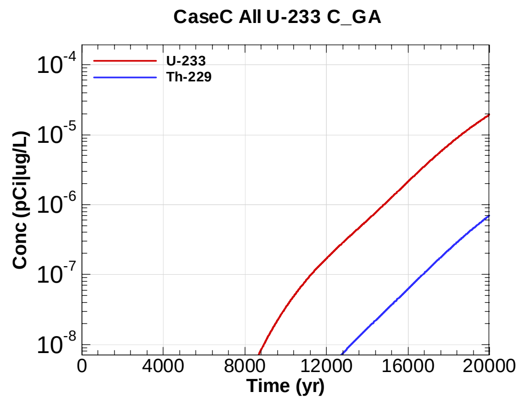

Figure N-238 - 100m Aquifer Concentration for CaseC All U-233 C_GA

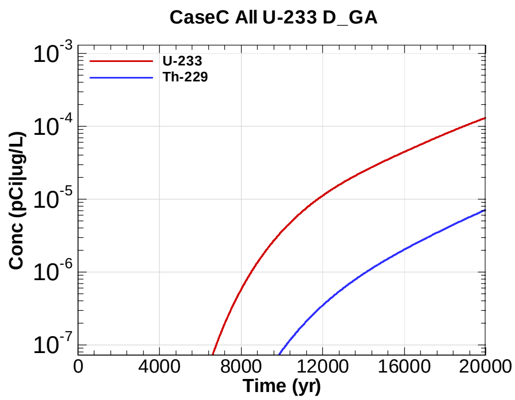

Figure N-239 - 100m Aquifer Concentration for CaseC All U-233 D_GA

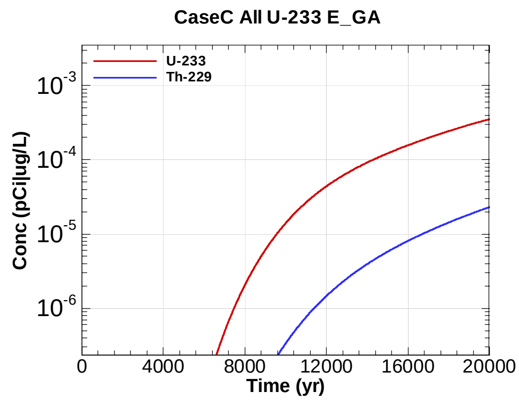

Figure N-240 - 100m Aquifer Concentration for CaseC All U-233 E_GA

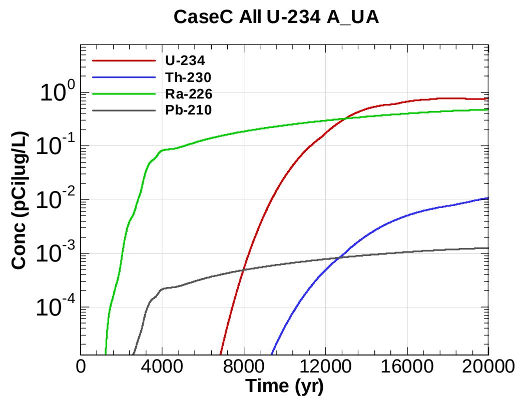

Figure N-241 - 100m Aquifer Concentration for CaseC All U-234 A_UA

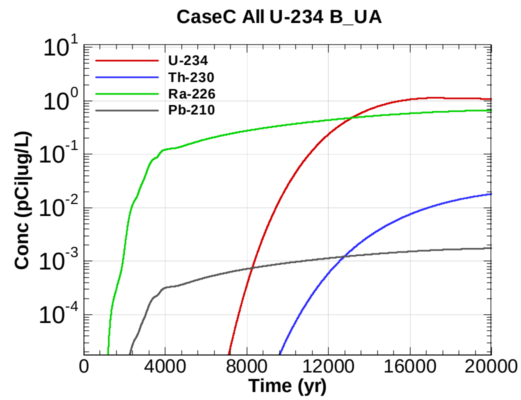

Figure N-242 - 100m Aquifer Concentration for CaseC All U-234 B_UA

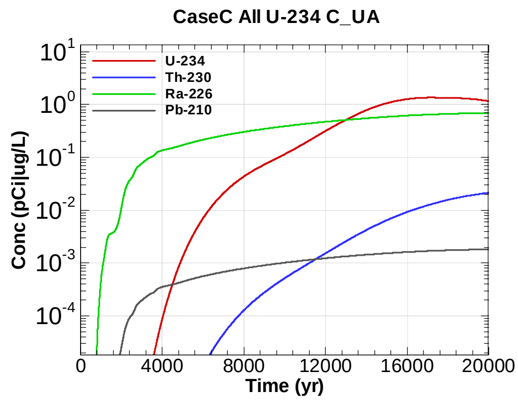

Figure N-243 - 100m Aquifer Concentration for CaseC All U-234 C_UA

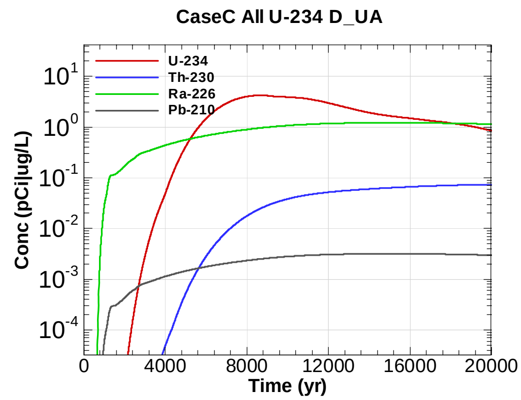

Figure N-244 - 100m Aquifer Concentration for CaseC All U-234 D_UA

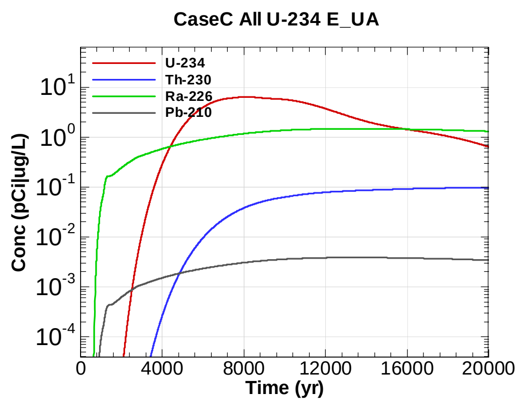

Figure N-245 - 100m Aquifer Concentration for CaseC All U-234 E_UA

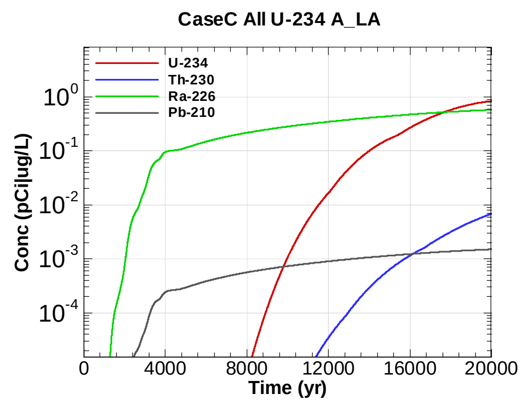

Figure N-246 - 100m Aquifer Concentration for CaseC All U-234 A_LA

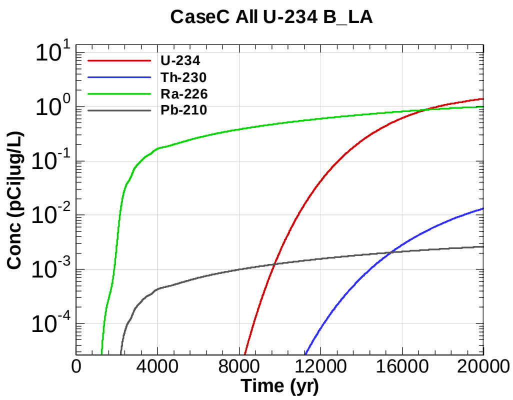

Figure N-247 - 100m Aquifer Concentration for CaseC All U-234 B_LA

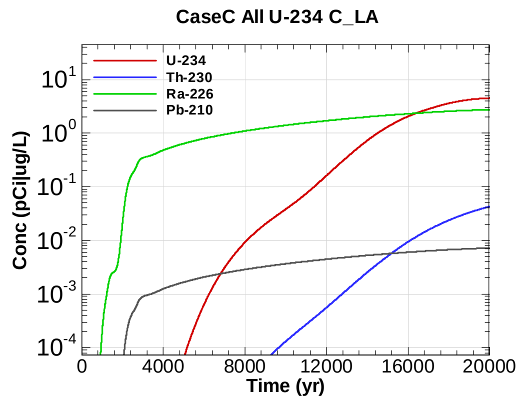

Figure N-248 - 100m Aquifer Concentration for CaseC All U-234 C_LA

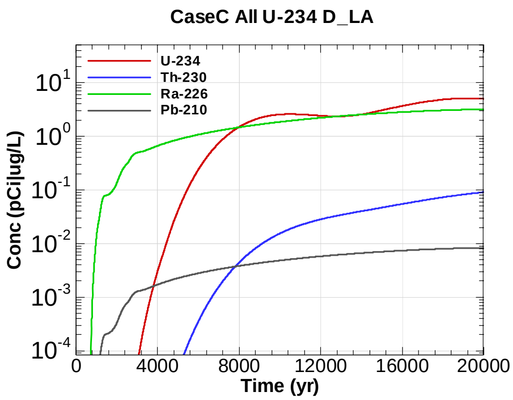

Figure N-249 - 100m Aquifer Concentration for CaseC All U-234 D_LA

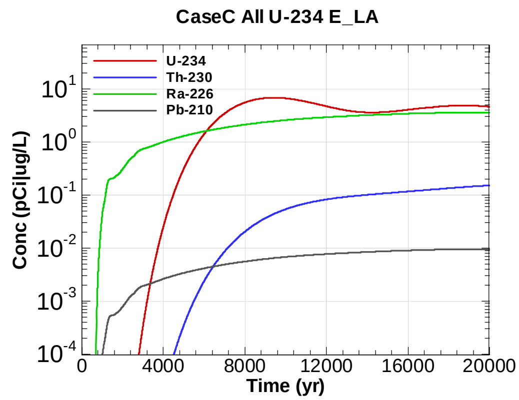

Figure N-250 - 100m Aquifer Concentration for CaseC All U-234 E_LA

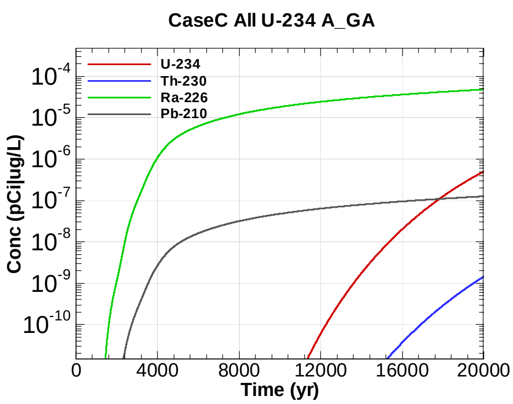

Figure N-251 - 100m Aquifer Concentration for CaseC All U-234 A_GA

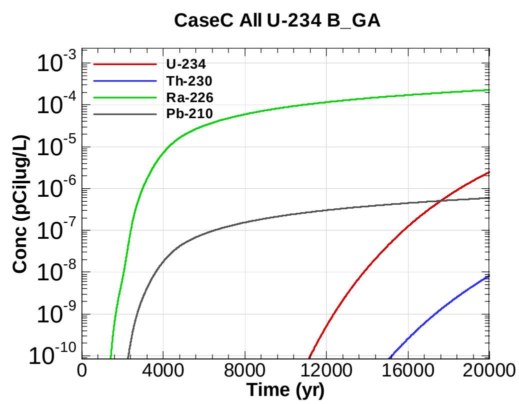

Figure N-252 - 100m Aquifer Concentration for CaseC All U-234 B_GA

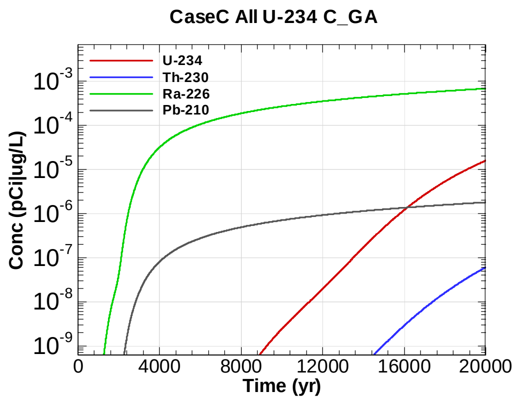

Figure N-253 - 100m Aquifer Concentration for CaseC All U-234 C_GA

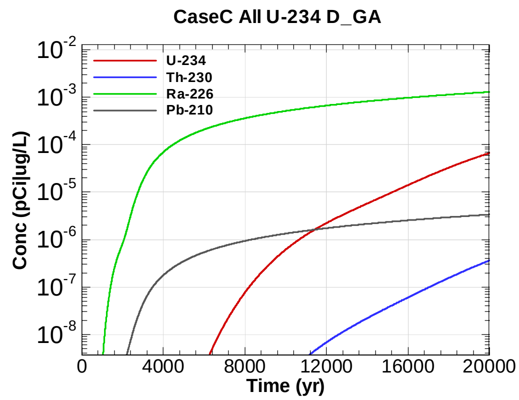

Figure N-254 - 100m Aquifer Concentration for CaseC All U-234 D_GA

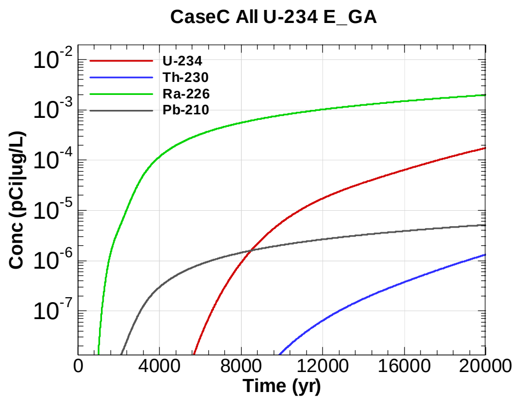

Figure N-255 - 100m Aquifer Concentration for CaseC All U-234 E_GA

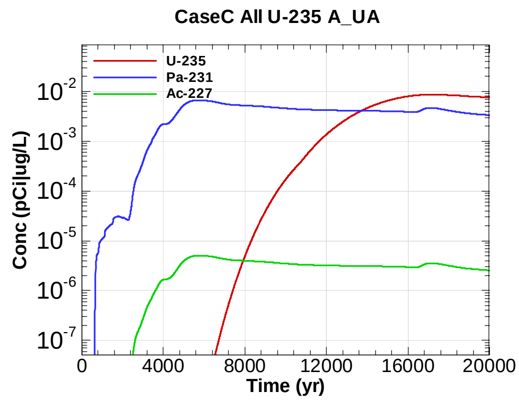

Figure N-256 - 100m Aquifer Concentration for CaseC All U-235 A_UA

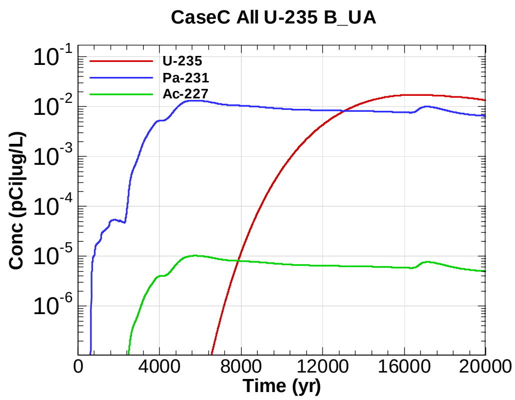

Figure N-257 - 100m Aquifer Concentration for CaseC All U-235 B_UA

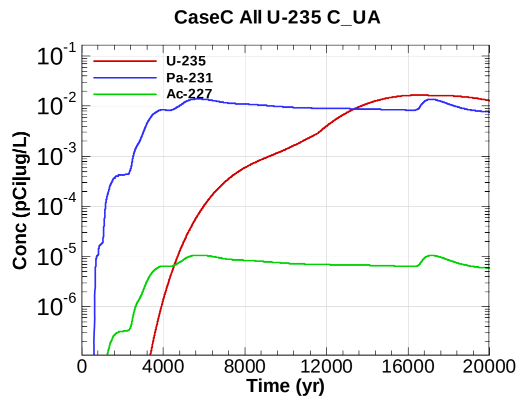

Figure N-258 - 100m Aquifer Concentration for CaseC All U-235 C_UA

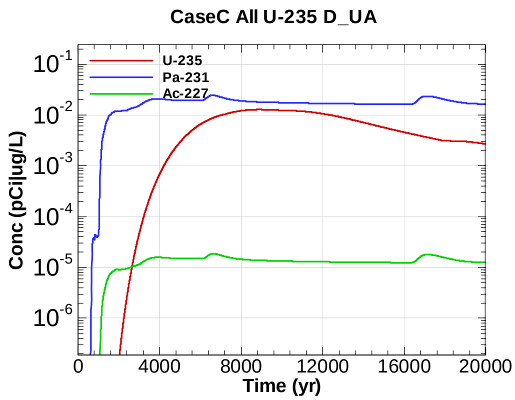

Figure N-259 - 100m Aquifer Concentration for CaseC All U-235 D_UA

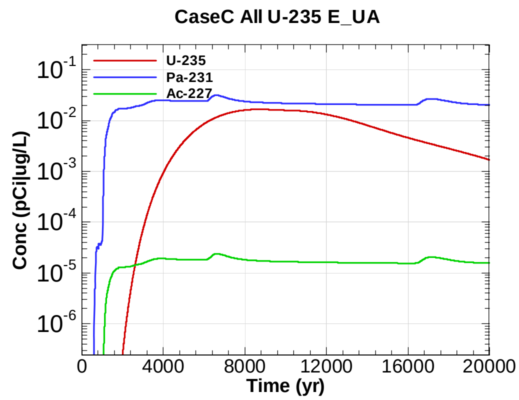

Figure N-260 - 100m Aquifer Concentration for CaseC All U-235 E_UA

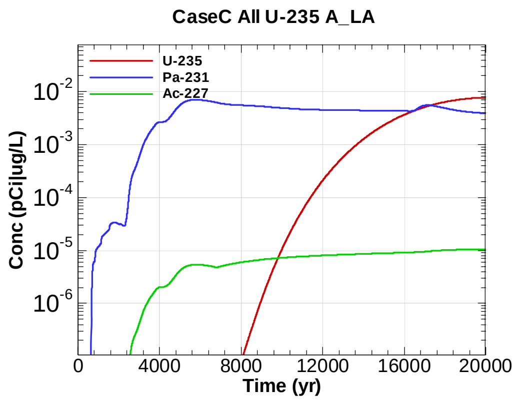

Figure N-261 - 100m Aquifer Concentration for CaseC All U-235 A_LA

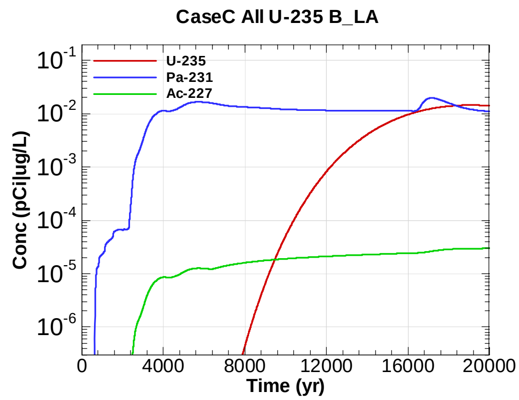

Figure N-262 - 100m Aquifer Concentration for CaseC All U-235 B_LA

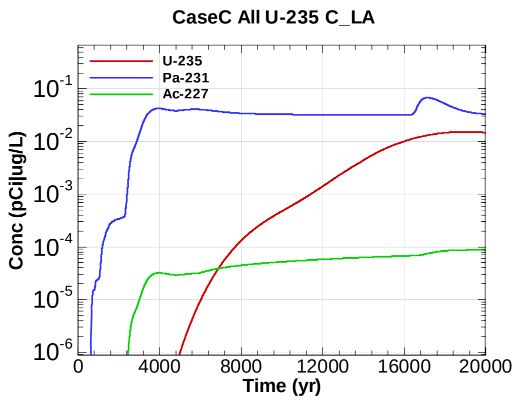

Figure N-263 - 100m Aquifer Concentration for CaseC All U-235 C_LA

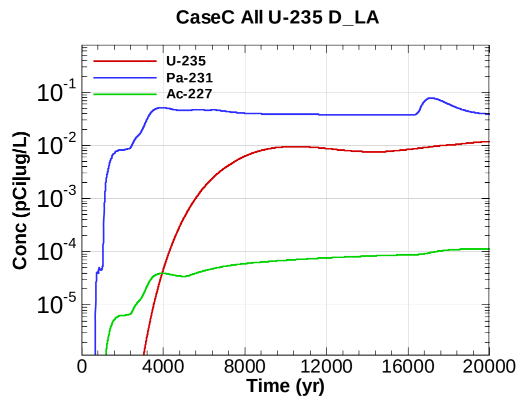

Figure N-264 - 100m Aquifer Concentration for CaseC All U-235 D_LA

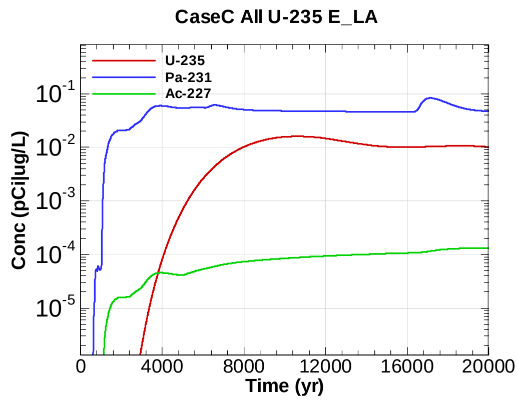

Figure N-265 - 100m Aquifer Concentration for CaseC All U-235 E_LA

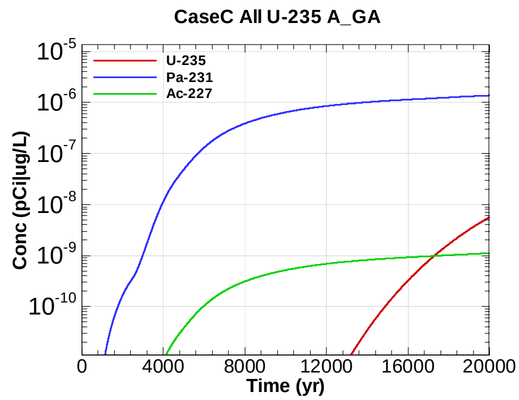

Figure N-266 - 100m Aquifer Concentration for CaseC All U-235 A_GA

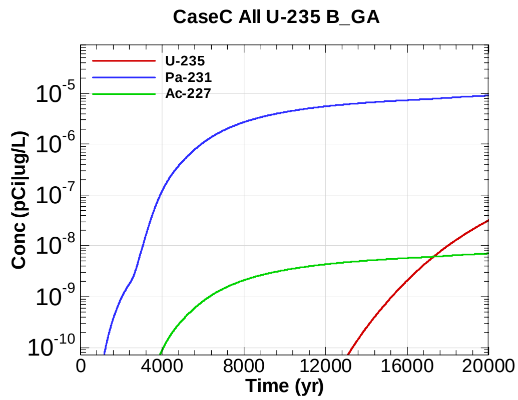

Figure N-267 - 100m Aquifer Concentration for CaseC All U-235 B_GA

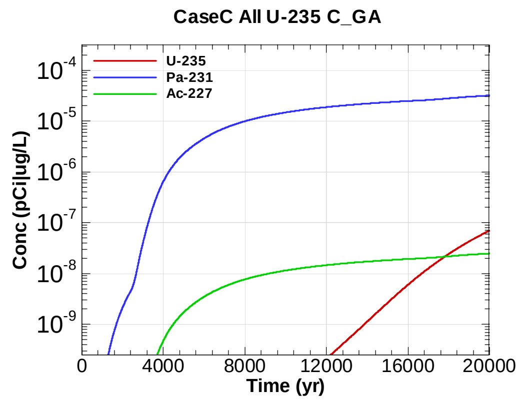

Figure N-268 - 100m Aquifer Concentration for CaseC All U-235 C_GA

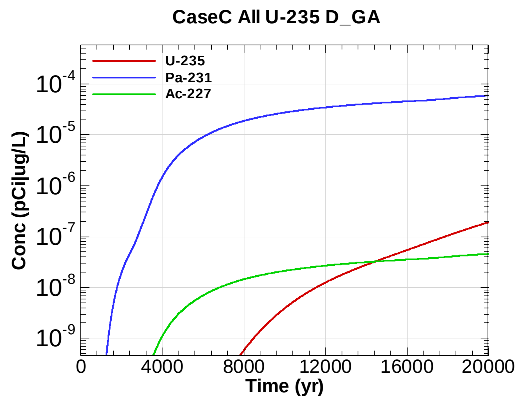

Figure N-269 - 100m Aquifer Concentration for CaseC All U-235 D_GA

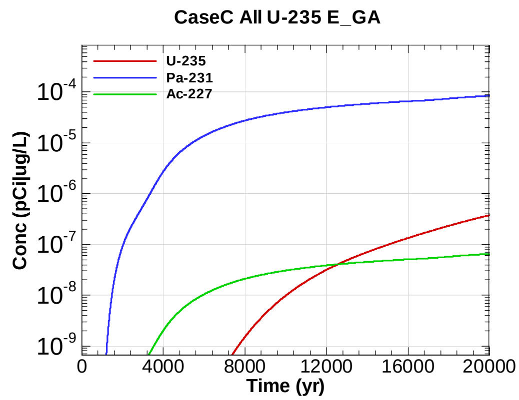

Figure N-270 - 100m Aquifer Concentration for CaseC All U-235 E_GA

Appendix O
100-METER SENSITIVITY RUN RADIONUCLIDE CONCENTRATIONS FOR CASE E

Appendix O contains curves showing the one-hundred meter radiological concentrations (sensitivity run radionuclides only) for the Base Case (Case/Configuration E). 20,000 year concentration results are presented from the three aquifers of concern (Upper Three Runs Aquifer-Upper Zone, Upper Three Runs-Lower Zone, and Gordon Aquifer) for Sectors A through E.

Graph heading example "CaseE All Am-241 A_UA"

Key

CaseE = scenario case/configuration
All = all FTF inventory source
Am-241 = radionuclide of concern
A = sector of concern (see sector map with stream traces)
UA = aquifer of concern

- UA = Upper Three Runs – Upper Zone
- LA = Upper Three Runs – Lower Zone
- GA = Gordon

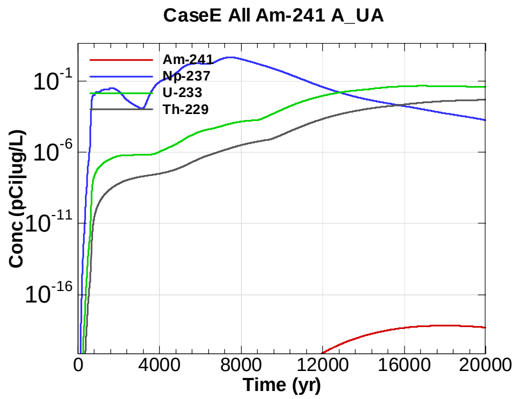

Figure O-1 - 100m Aquifer Concentration for CaseE All Am-241 A_UA

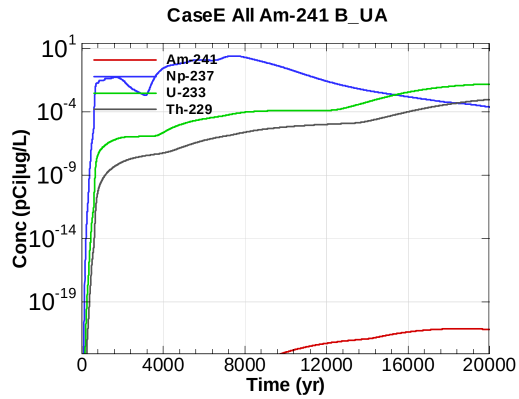

Figure O-2 - 100m Aquifer Concentration for CaseE All Am-241 B_UA

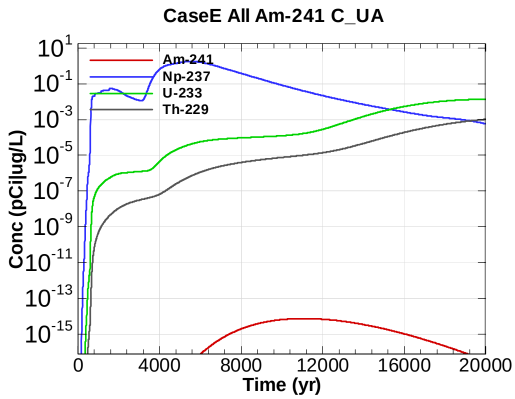

Figure O-3 - 100m Aquifer Concentration for CaseE All Am-241 C_UA

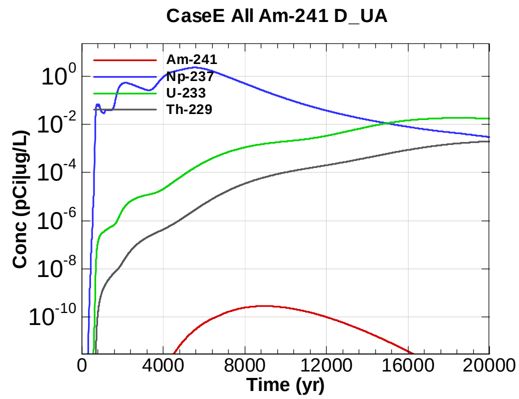

Figure O-4 - 100m Aquifer Concentration for CaseE All Am-241 D_UA

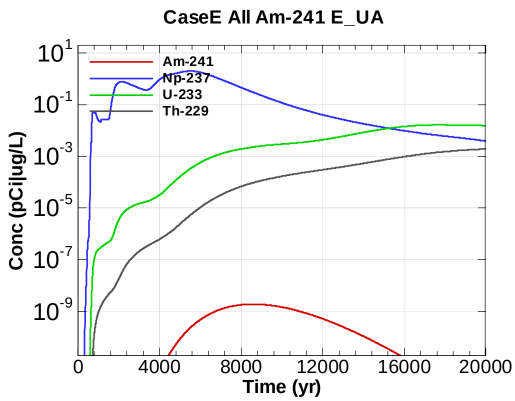

Figure O-5 - 100m Aquifer Concentration for CaseE All Am-241 E_UA

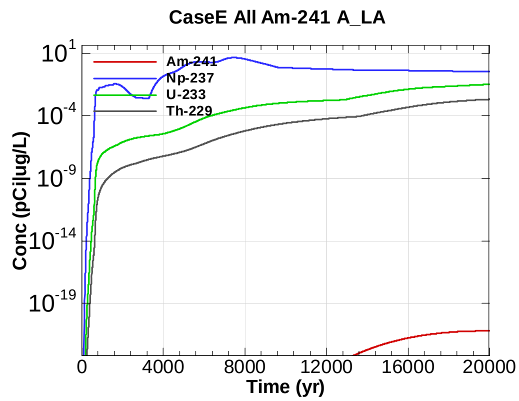

Figure O-6 - 100m Aquifer Concentration for CaseE All Am-241 A_LA

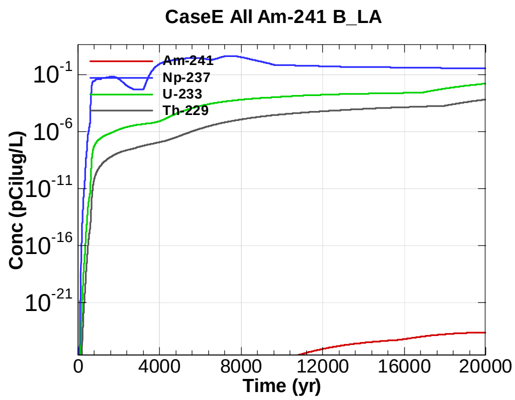

Figure O-7 - 100m Aquifer Concentration for CaseE All Am-241 B_LA

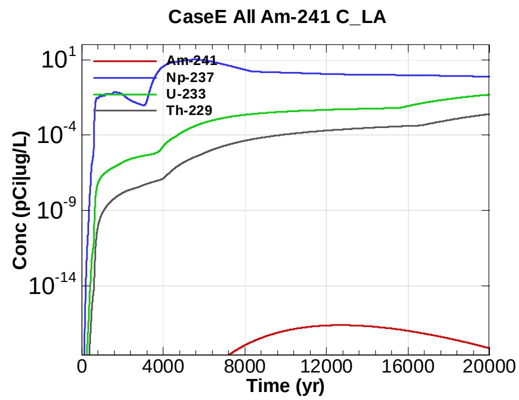

Figure O-8 - 100m Aquifer Concentration for CaseE All Am-241 C_LA

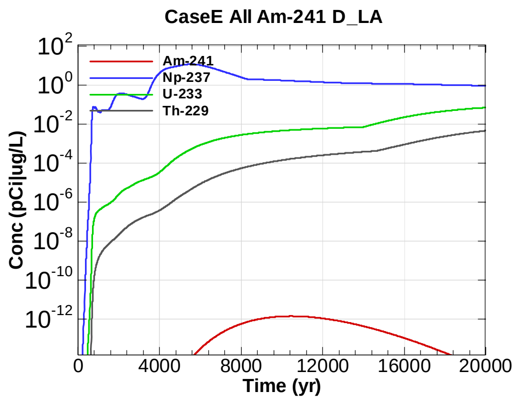

Figure O-9 - 100m Aquifer Concentration for CaseE All Am-241 D_LA

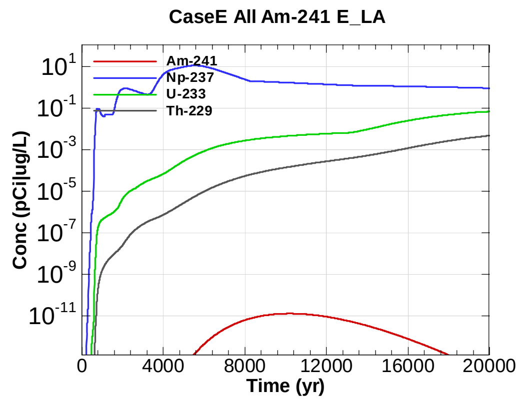

Figure O-10 - 100m Aquifer Concentration for CaseE All Am-241 E_LA

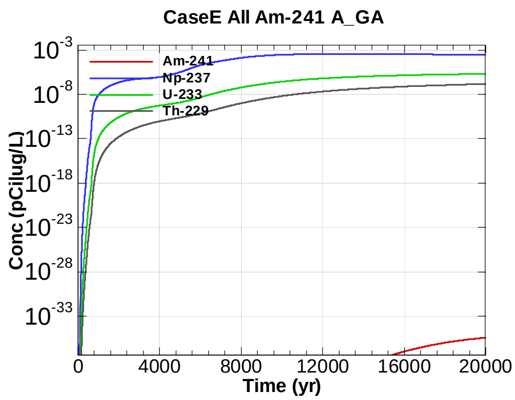

Figure O-11 - 100m Aquifer Concentration for CaseE All Am-241 A_GA

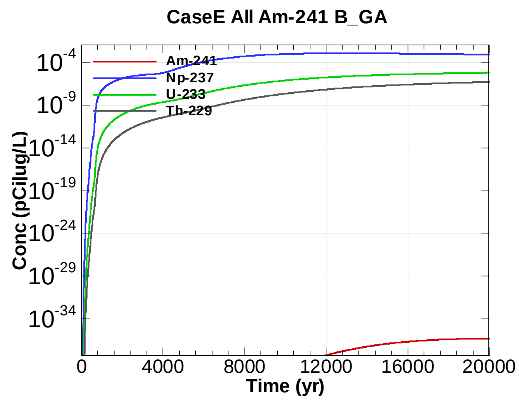

Figure O-12 - 100m Aquifer Concentration for CaseE All Am-241 B_GA

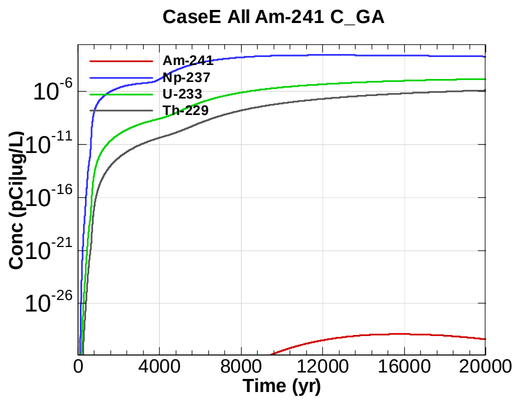

Figure O-13 - 100m Aquifer Concentration for CaseE All Am-241 C_GA

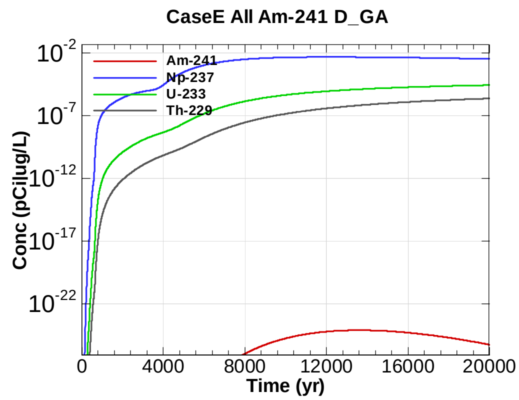

Figure O-14 - 100m Aquifer Concentration for CaseE All Am-241 D_GA

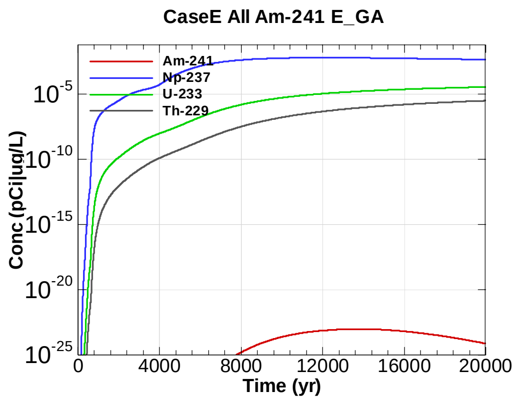

Figure O-15 - 100m Aquifer Concentration for CaseE All Am-241 E_GA

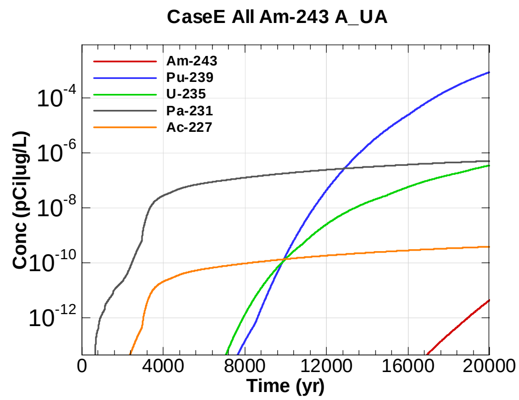

Figure O-16 - 100m Aquifer Concentration for CaseE All Am-243 A_UA

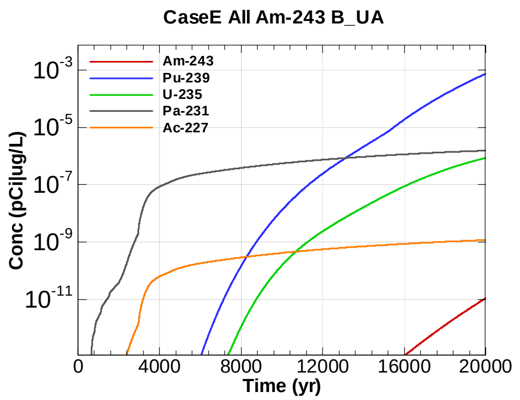

Figure O-17 - 100m Aquifer Concentration for CaseE All Am-243 B_UA

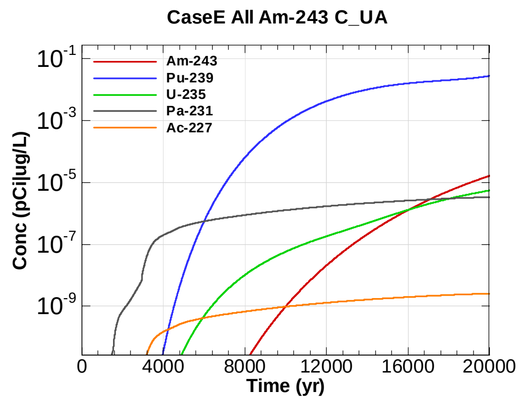

Figure O-18 - 100m Aquifer Concentration for CaseE All Am-243 C_UA

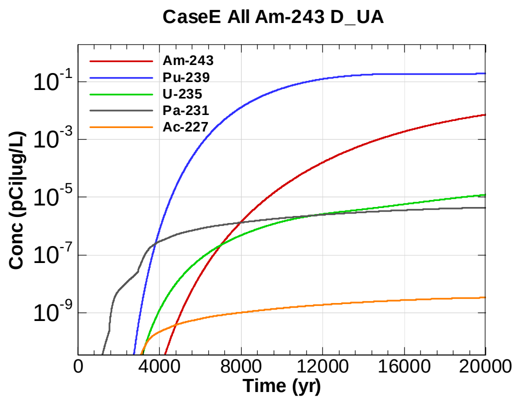

Figure O-19 - 100m Aquifer Concentration for CaseE All Am-243 D_UA

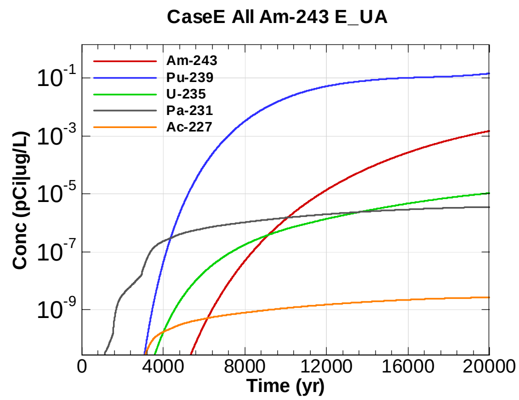

Figure O-20 - 100m Aquifer Concentration for CaseE All Am-243 E_UA

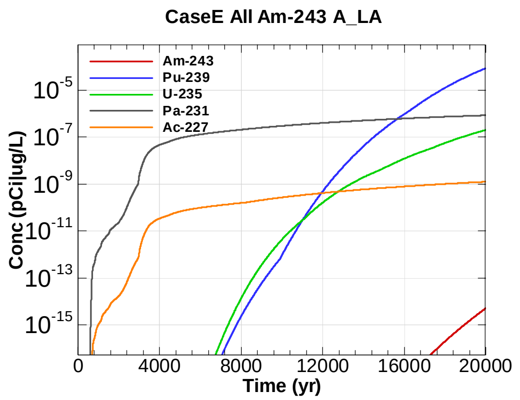

Figure O-21 - 100m Aquifer Concentration for CaseE All Am-243 A_LA

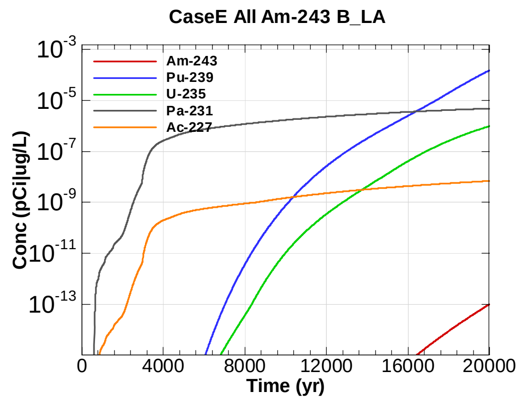

Figure O-22 - 100m Aquifer Concentration for CaseE All Am-243 B_LA

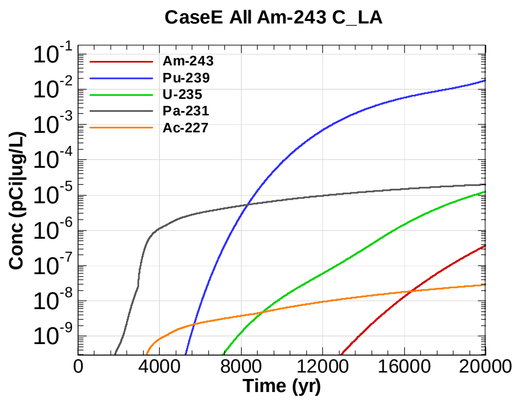

Figure O-23 - 100m Aquifer Concentration for CaseE All Am-243 C_LA

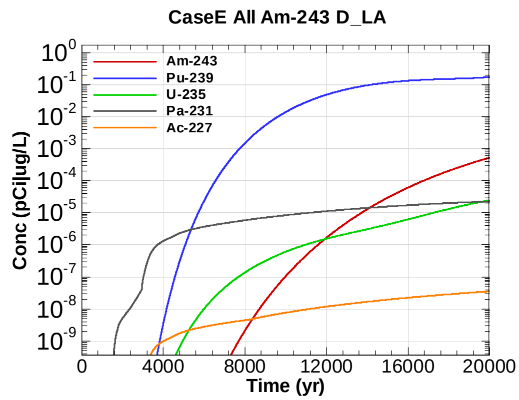

Figure O-24 - 100m Aquifer Concentration for CaseE All Am-243 D_LA

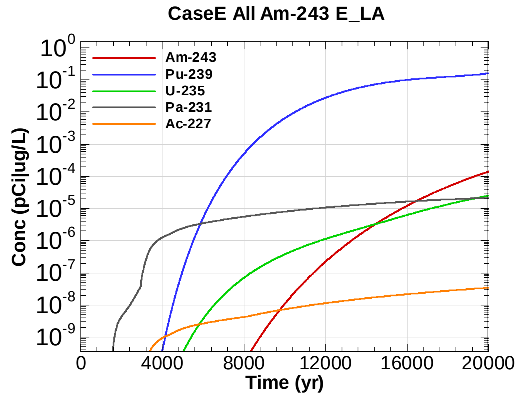

Figure O-25 - 100m Aquifer Concentration for CaseE All Am-243 E_LA

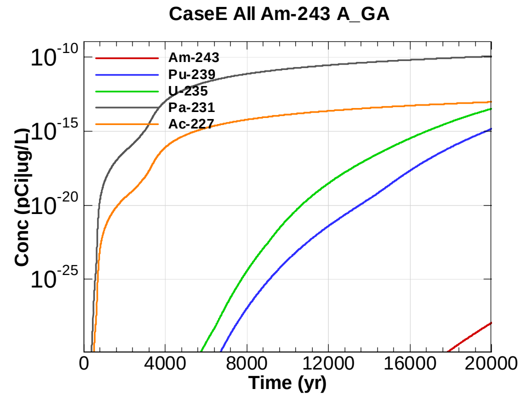

Figure O-26 - 100m Aquifer Concentration for CaseE All Am-243 A_GA

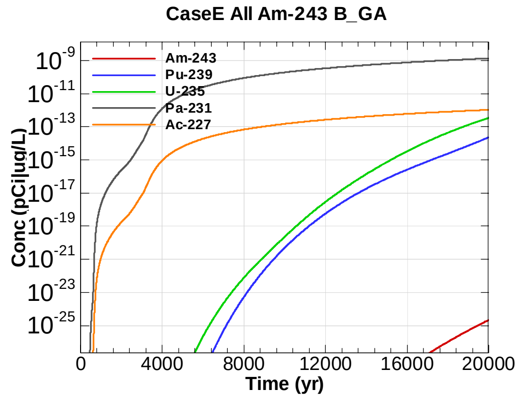

Figure O-27 - 100m Aquifer Concentration for CaseE All Am-243 B_GA

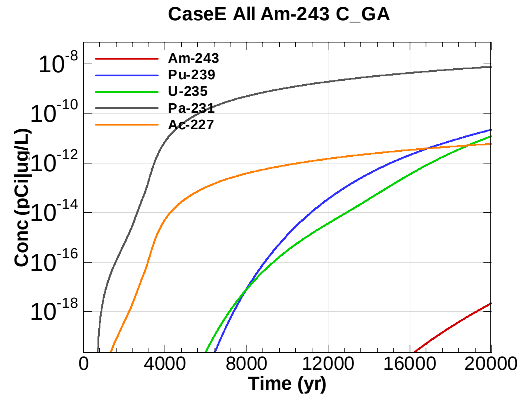

Figure O-28 - 100m Aquifer Concentration for CaseE All Am-243 C_GA

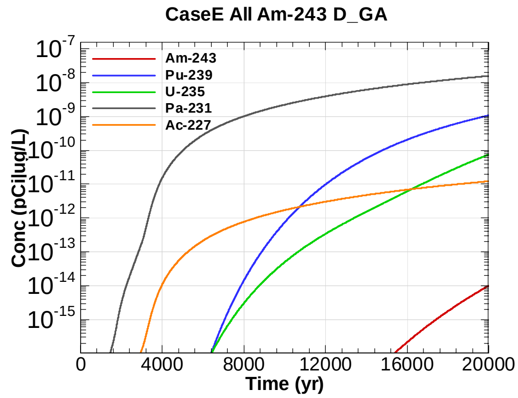

Figure O-29 - 100m Aquifer Concentration for CaseE All Am-243 D_GA

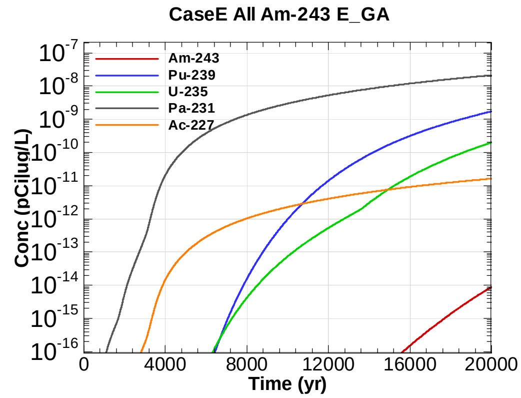

Figure O-30 - 100m Aquifer Concentration for CaseE All Am-243 E_GA

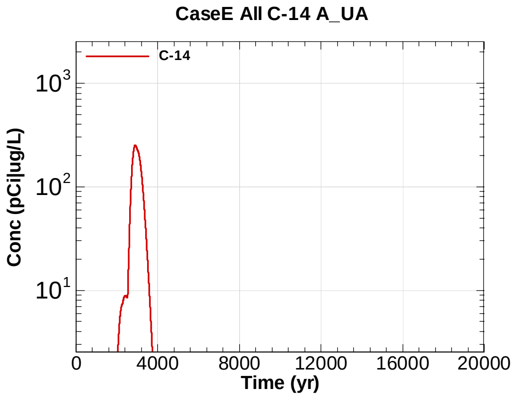

Figure O-31 - 100m Aquifer Concentration for CaseE All C-14 A_UA

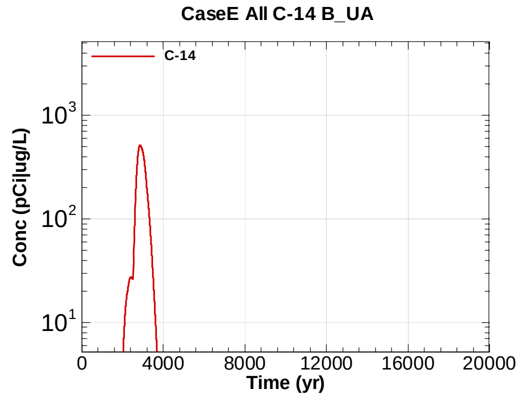

Figure O-32 - 100m Aquifer Concentration for CaseE All C-14 B_UA

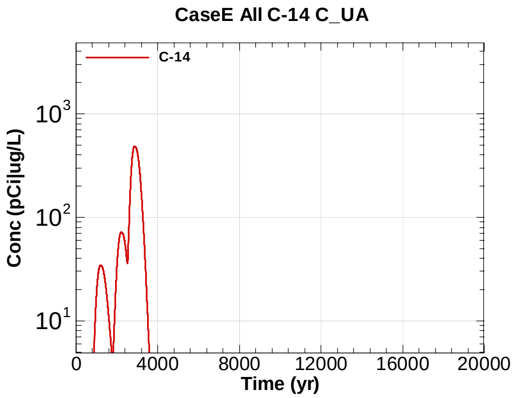

Figure O-33 - 100m Aquifer Concentration for CaseE All C-14 C_UA

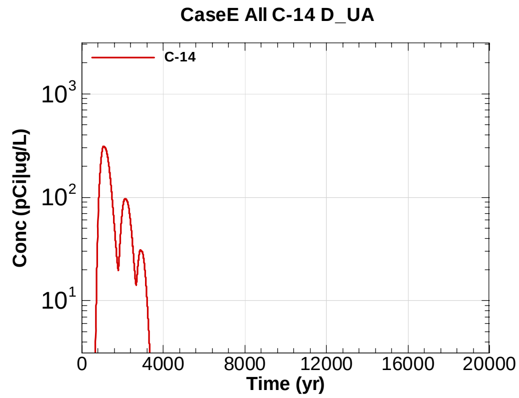

Figure O-34 - 100m Aquifer Concentration for CaseE All C-14 D_UA

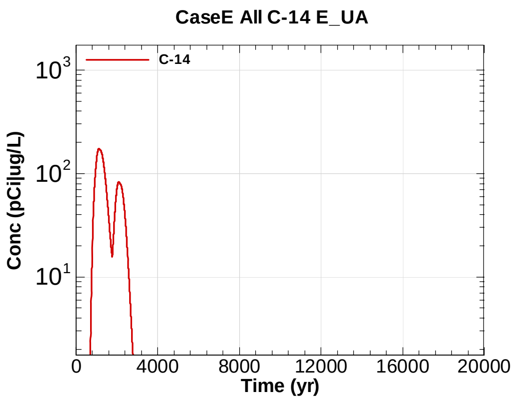

Figure O-35 - 100m Aquifer Concentration for CaseE All C-14 E_UA

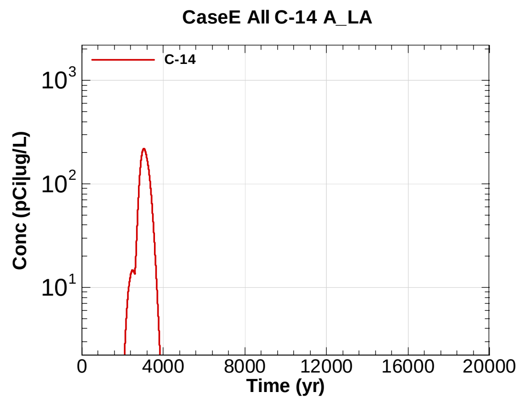

Figure O-36 - 100m Aquifer Concentration for CaseE All C-14 A_LA

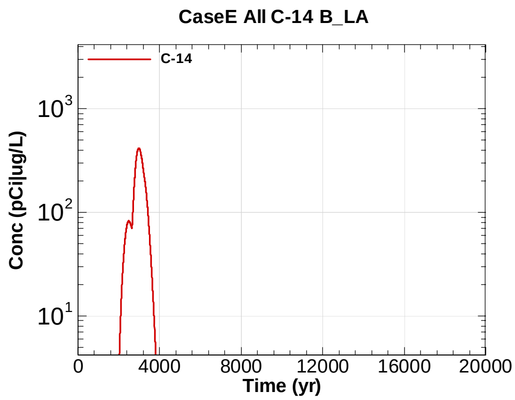

Figure O-37 - 100m Aquifer Concentration for CaseE All C-14 B_LA

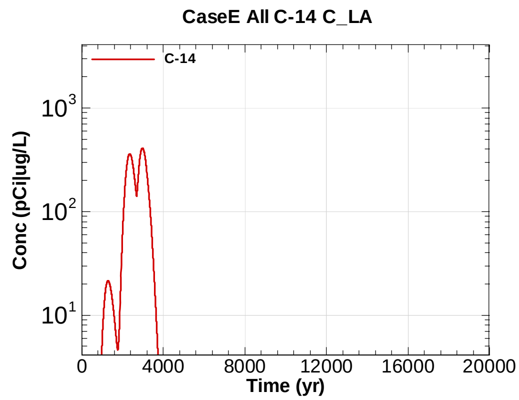

Figure O-38 - 100m Aquifer Concentration for CaseE All C-14 C_LA

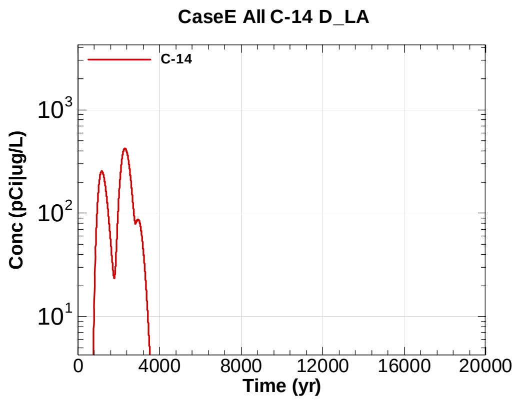

Figure O-39 - 100m Aquifer Concentration for CaseE All C-14 D_LA

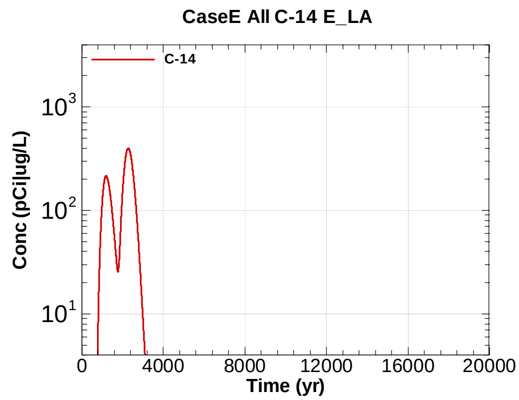

Figure O-40 - 100m Aquifer Concentration for CaseE All C-14 E_LA

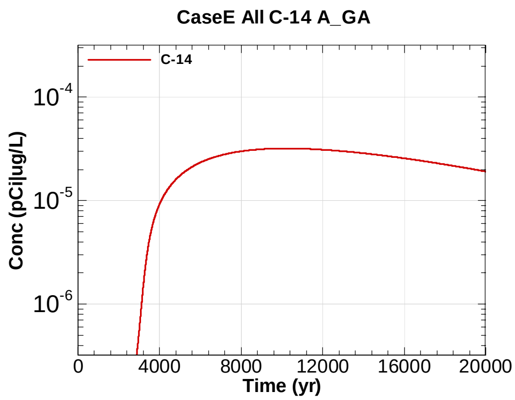

Figure O-41 - 100m Aquifer Concentration for CaseE All C-14 A_GA

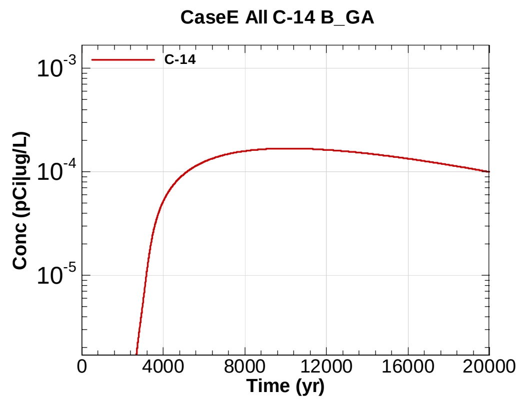

Figure O-42 - 100m Aquifer Concentration for CaseE All C-14 B_GA

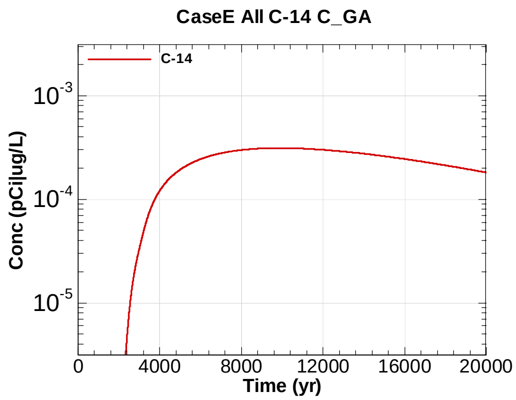

Figure O-43 - 100m Aquifer Concentration for CaseE All C-14 C_GA

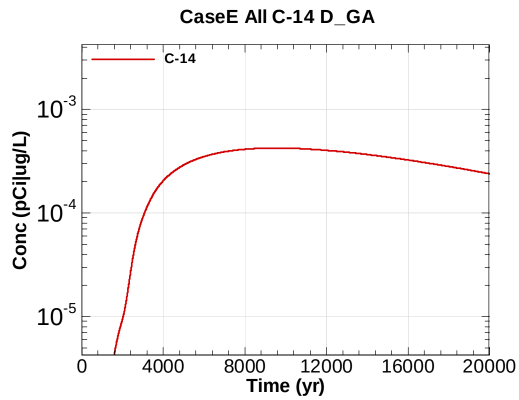

Figure O-44 - 100m Aquifer Concentration for CaseE All C-14 D_GA

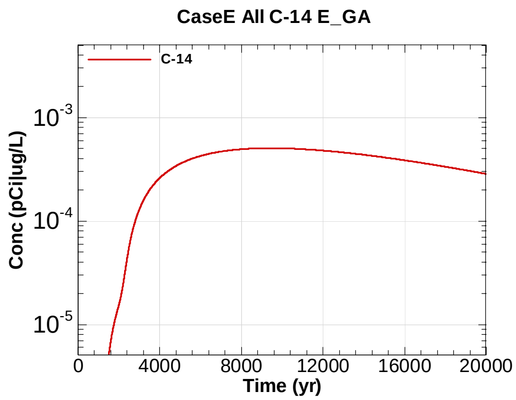

Figure O-45 - 100m Aquifer Concentration for CaseE All C-14 E_GA

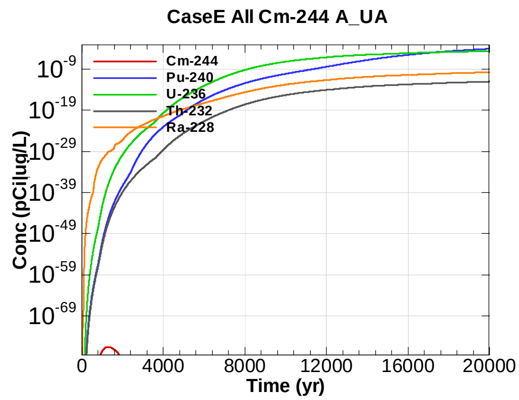

Figure O-46 - 100m Aquifer Concentration for CaseE All Cm-244 A_UA

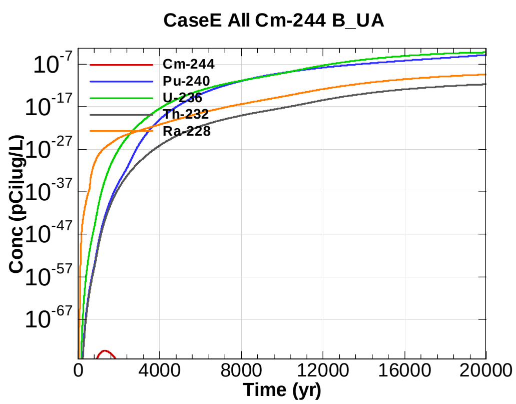

Figure O-47 - 100m Aquifer Concentration for CaseE All Cm-244 B_UA

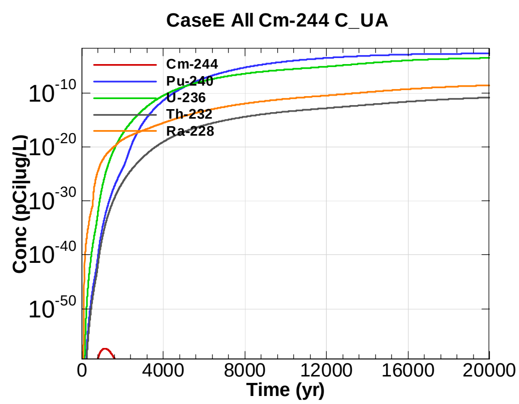

Figure O-48 - 100m Aquifer Concentration for CaseE All Cm-244 C_UA

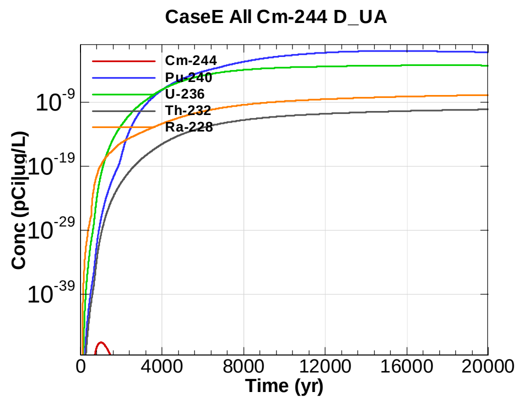

Figure O-49 - 100m Aquifer Concentration for CaseE All Cm-244 D_UA

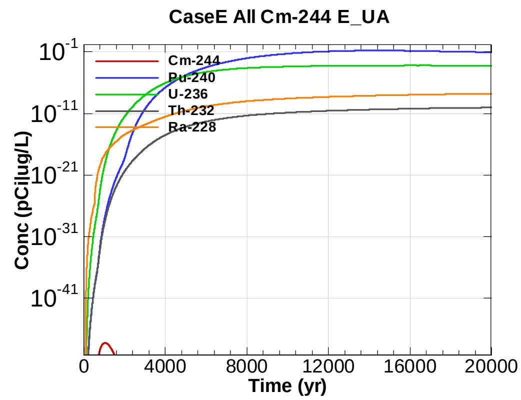

Figure O-50 - 100m Aquifer Concentration for CaseE All Cm-244 E_UA

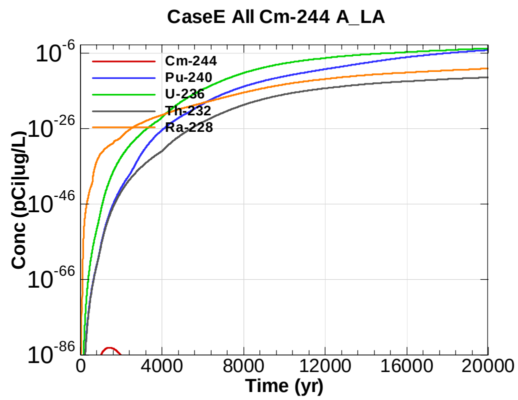

Figure O-51 - 100m Aquifer Concentration for CaseE All Cm-244 A_LA

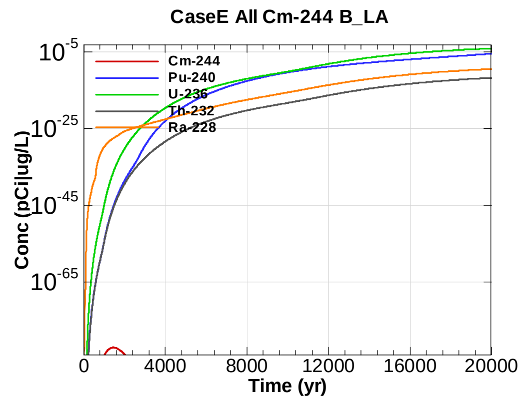

Figure O-52 - 100m Aquifer Concentration for CaseE All Cm-244 B_LA

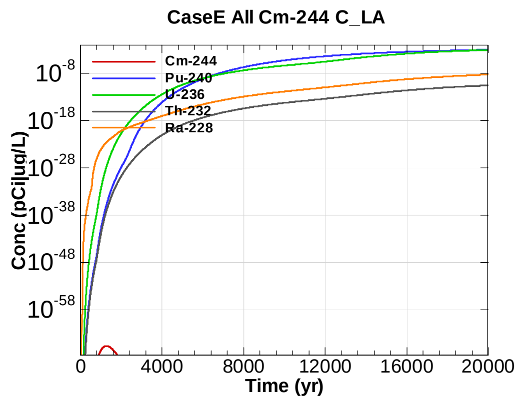

Figure O-53 - 100m Aquifer Concentration for CaseE All Cm-244 C_LA

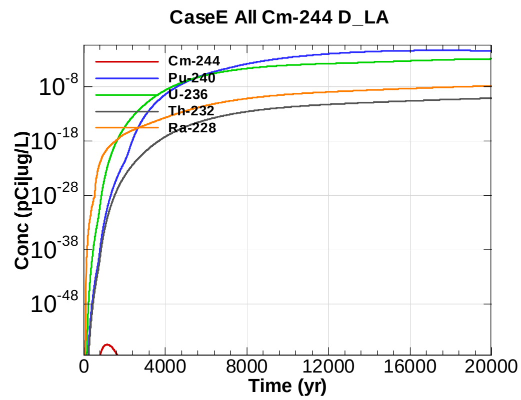

Figure O-54 - 100m Aquifer Concentration for CaseE All Cm-244 D_LA

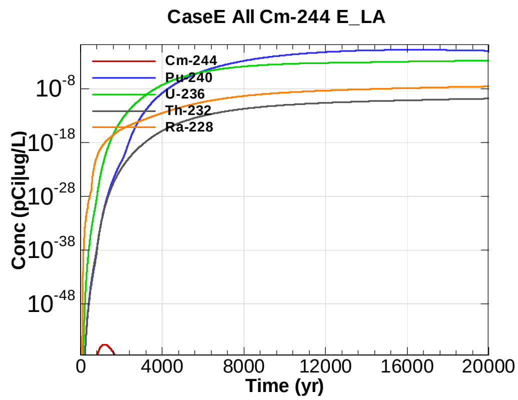

Figure O-55 - 100m Aquifer Concentration for CaseE All Cm-244 E_LA

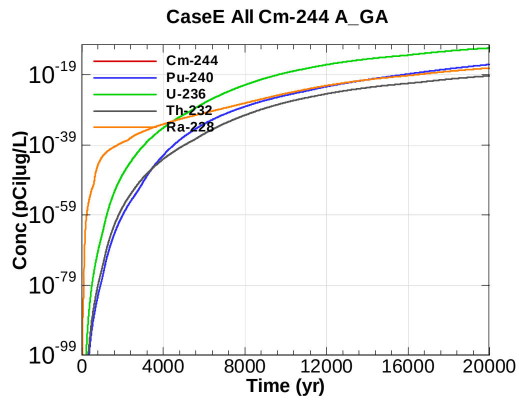

Figure O-56 - 100m Aquifer Concentration for CaseE All Cm-244 A_GA

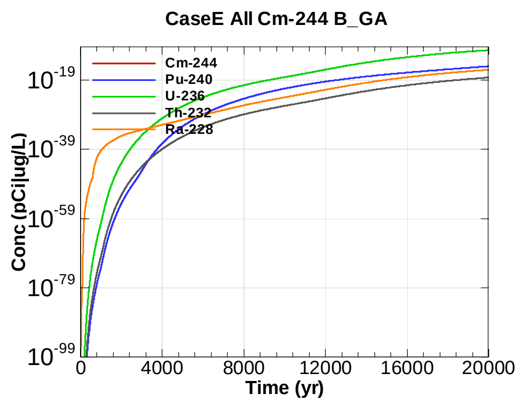

Figure O-57 - 100m Aquifer Concentration for CaseE All Cm-244 B_GA

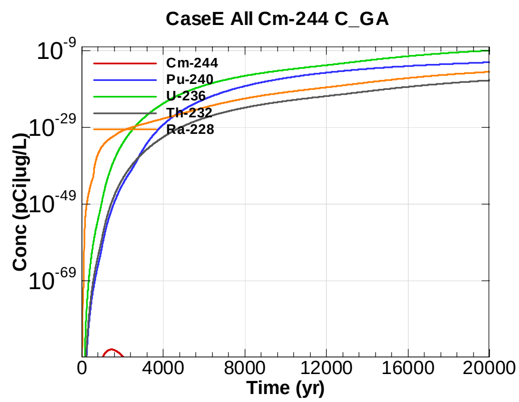

Figure O-58 - 100m Aquifer Concentration for CaseE All Cm-244 C_GA

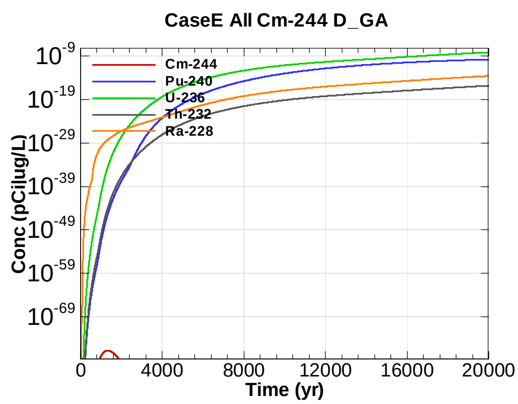

Figure O-59 - 100m Aquifer Concentration for CaseE All Cm-244 D_GA

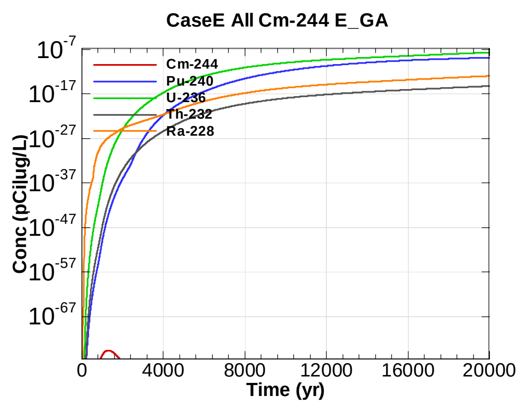

Figure O-60 - 100m Aquifer Concentration for CaseE All Cm-244 E_GA

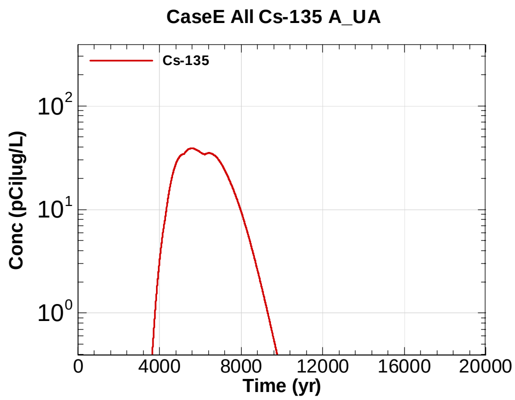

Figure O-61 - 100m Aquifer Concentration for CaseE All Cs-135 A_UA

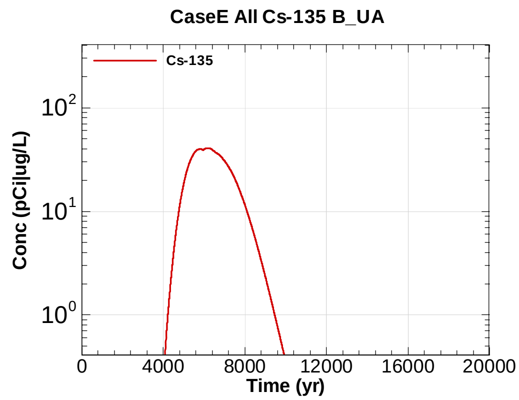

Figure O-62 - 100m Aquifer Concentration for CaseE All Cs-135 B_UA

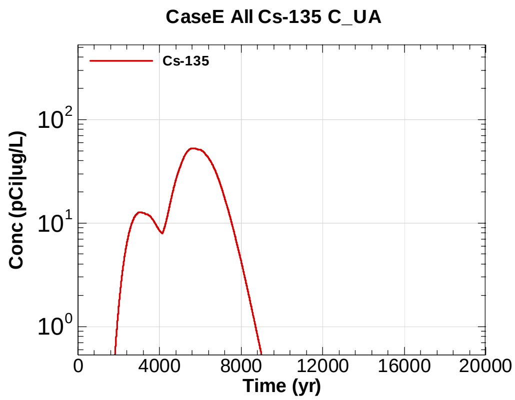

Figure O-63 - 100m Aquifer Concentration for CaseE All Cs-135 C_UA

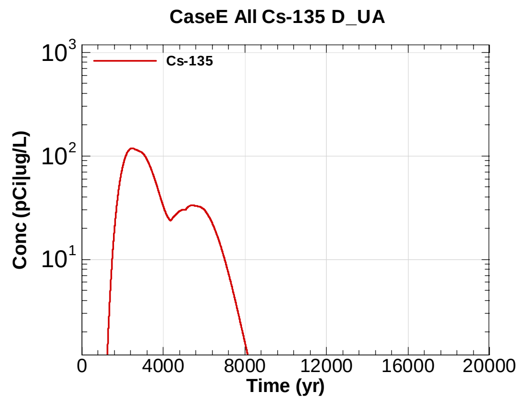

Figure O-64 - 100m Aquifer Concentration for CaseE All Cs-135 D_UA

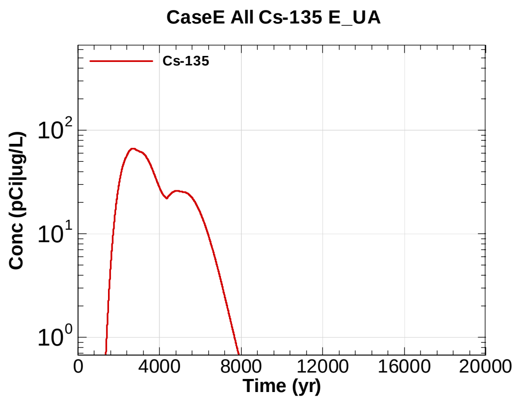

Figure O-65 - 100m Aquifer Concentration for CaseE All Cs-135 E_UA

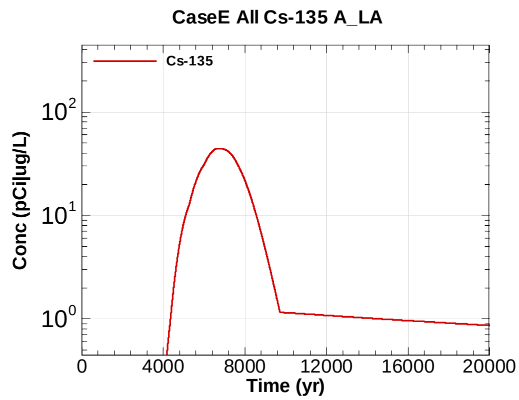

Figure O-66 - 100m Aquifer Concentration for CaseE All Cs-135 A_LA

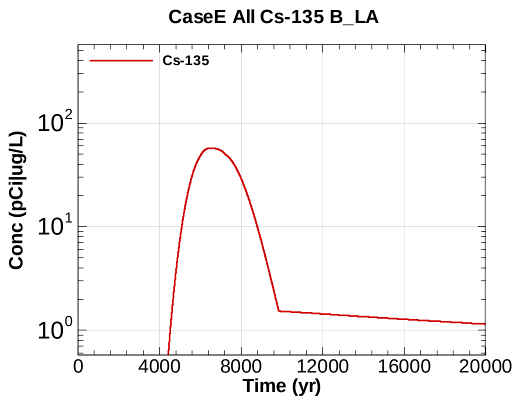

Figure O-67 - 100m Aquifer Concentration for CaseE All Cs-135 B_LA

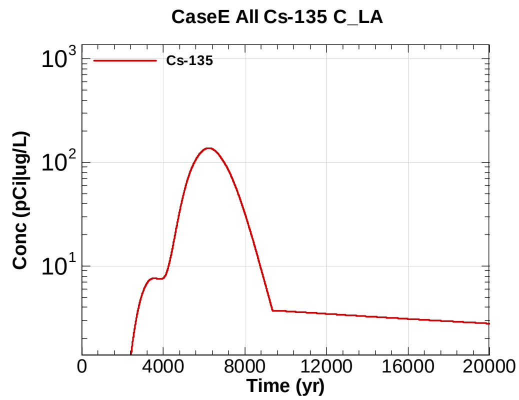

Figure O-68 - 100m Aquifer Concentration for CaseE All Cs-135 C_LA

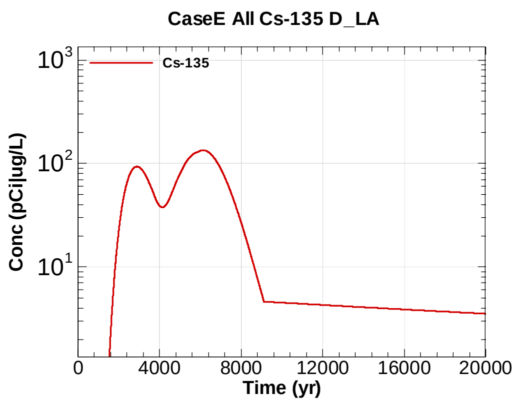

Figure O-69 - 100m Aquifer Concentration for CaseE All Cs-135 D_LA

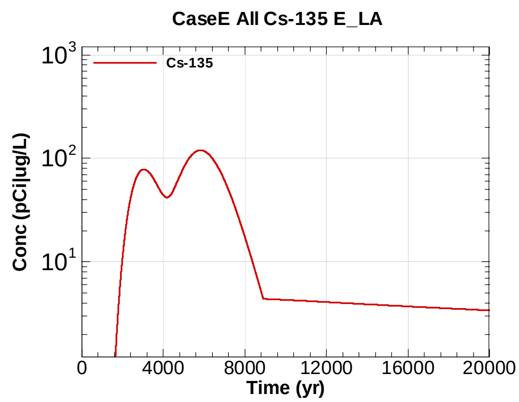

Figure O-70 - 100m Aquifer Concentration for CaseE All Cs-135 E_LA

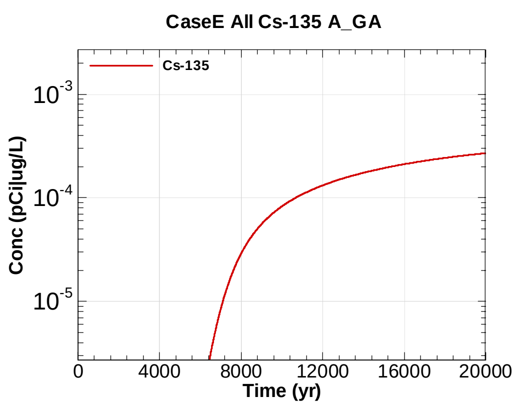

Figure O-71 - 100m Aquifer Concentration for CaseE All Cs-135 A_GA

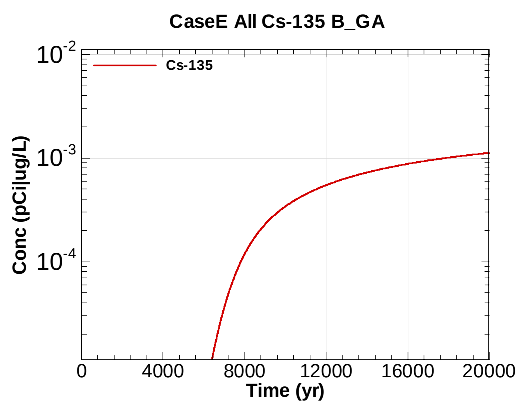

Figure O-72 - 100m Aquifer Concentration for CaseE All Cs-135 B_GA

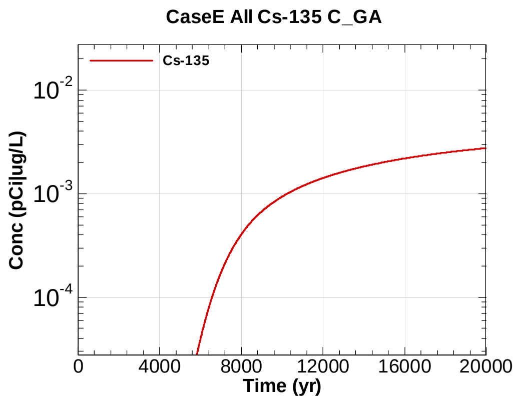

Figure O-73 - 100m Aquifer Concentration for CaseE All Cs-135 C_GA

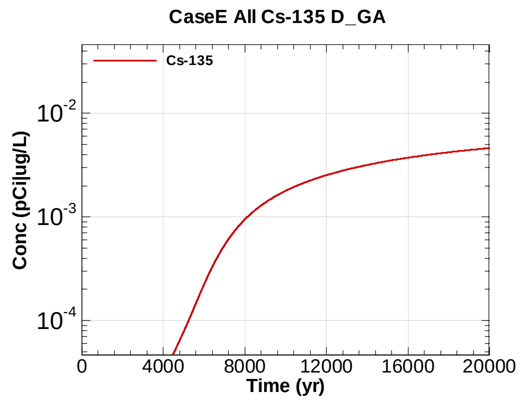

Figure O-74 - 100m Aquifer Concentration for CaseE All Cs-135 D_GA

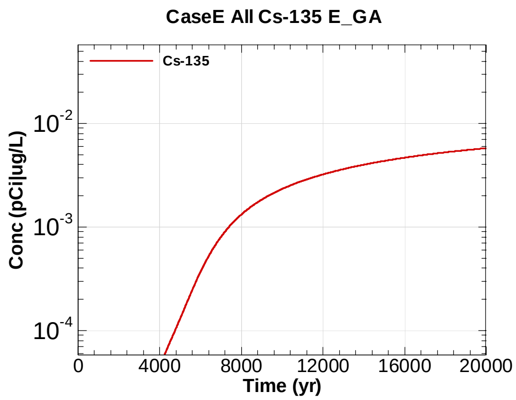

Figure O-75 - 100m Aquifer Concentration for CaseE All Cs-135 E_GA

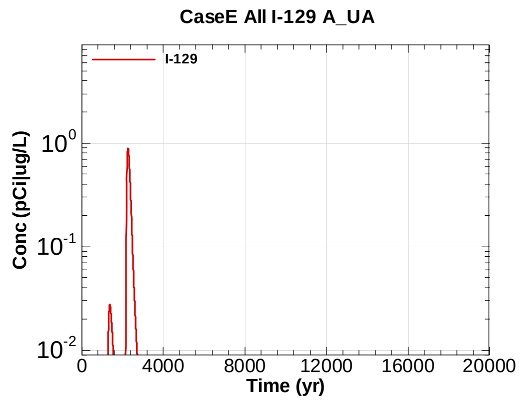

Figure O-76 - 100m Aquifer Concentration for CaseE All I-129 A_UA

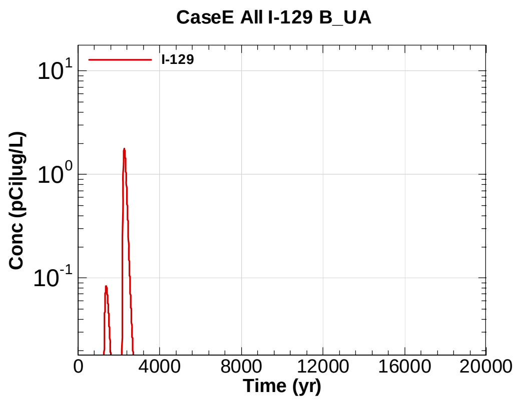

Figure O-77 - 100m Aquifer Concentration for CaseE All I-129 B_UA

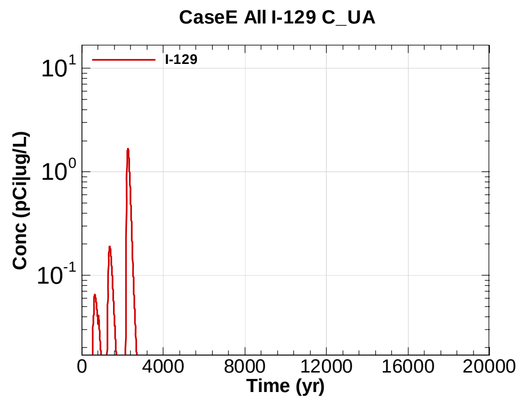

Figure O-78 - 100m Aquifer Concentration for CaseE All I-129 C_UA

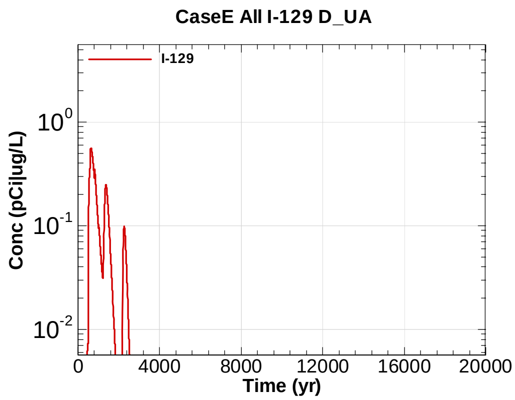

Figure O-79 - 100m Aquifer Concentration for CaseE All I-129 D_UA

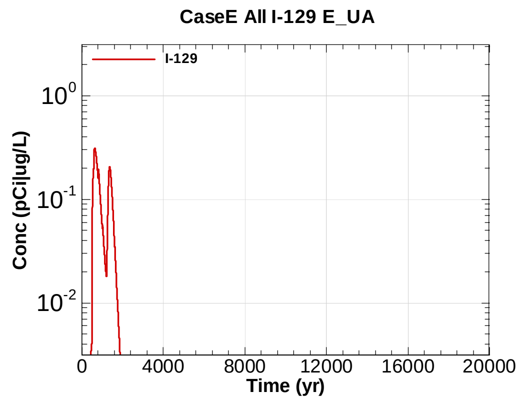

Figure O-80 - 100m Aquifer Concentration for CaseE All I-129 E_UA

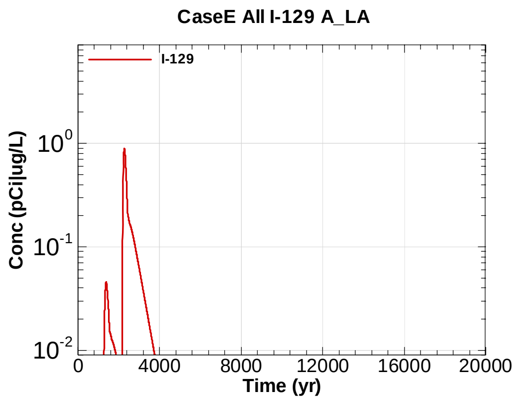

Figure O-81 - 100m Aquifer Concentration for CaseE All I-129 A_LA

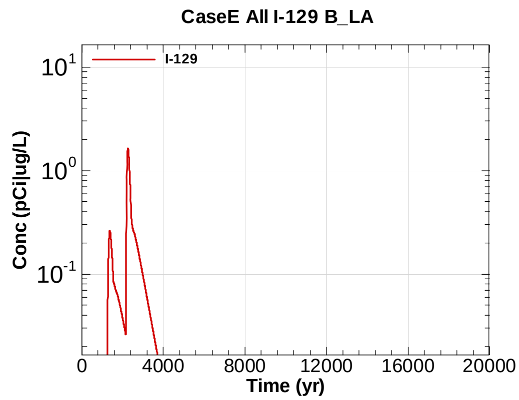

Figure O-82 - 100m Aquifer Concentration for CaseE All I-129 B_LA

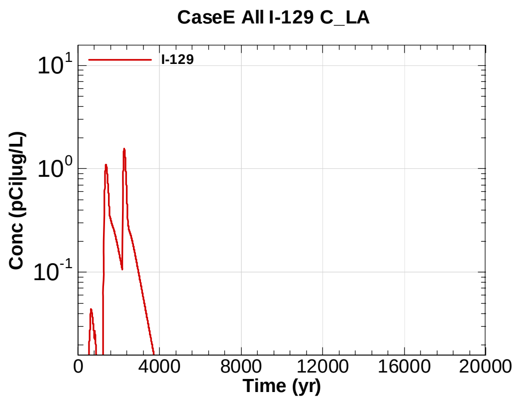

Figure O-83 - 100m Aquifer Concentration for CaseE All I-129 C_LA

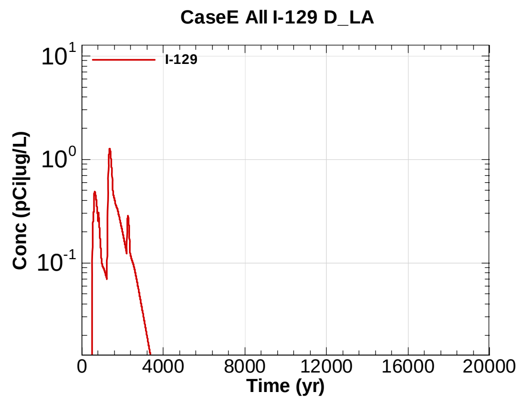

Figure O-84 - 100m Aquifer Concentration for CaseE All I-129 D_LA

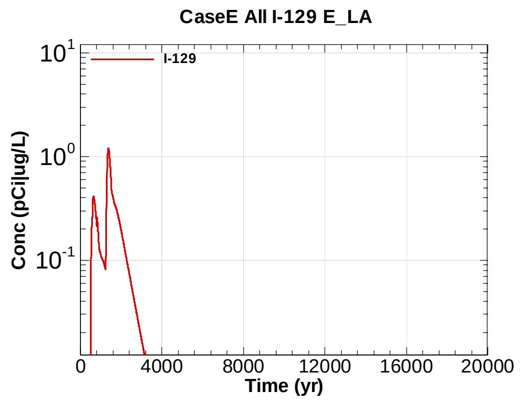

Figure O-85 - 100m Aquifer Concentration for CaseE All I-129 E_LA

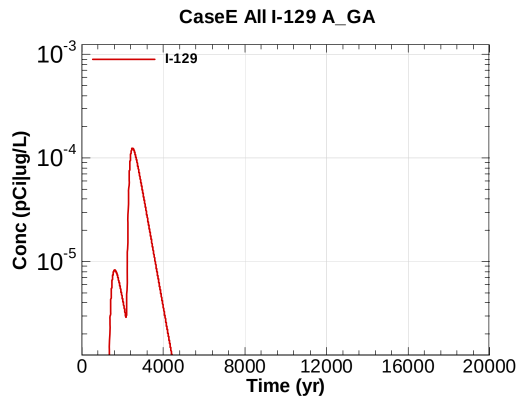

Figure O-86 - 100m Aquifer Concentration for CaseE All I-129 A_GA

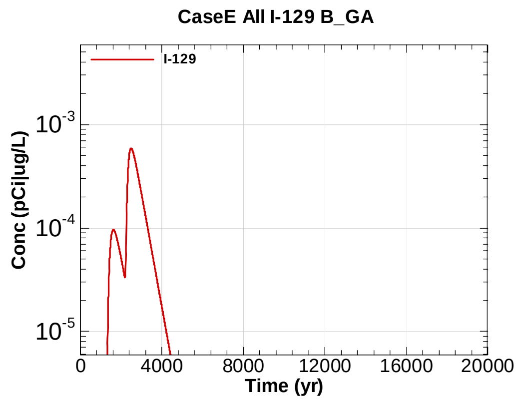

Figure O-87 - 100m Aquifer Concentration for CaseE All I-129 B_GA

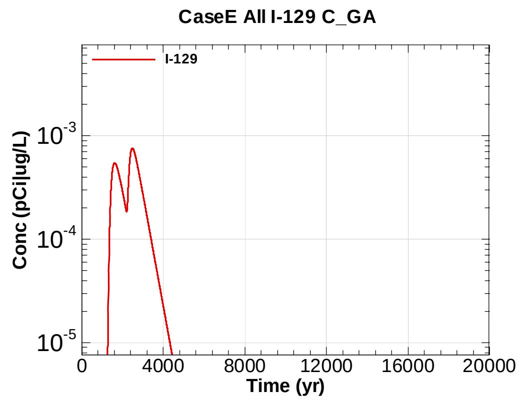

Figure O-88 - 100m Aquifer Concentration for CaseE All I-129 C_GA

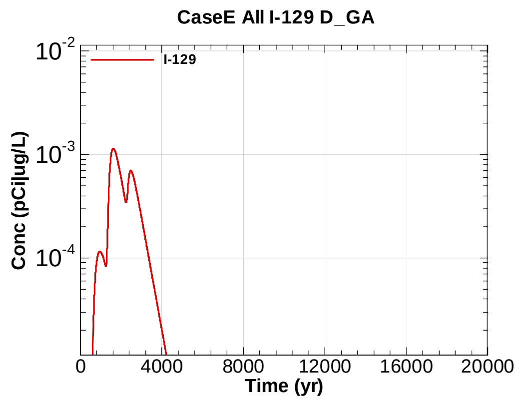

Figure O-89 - 100m Aquifer Concentration for CaseE All I-129 D_GA

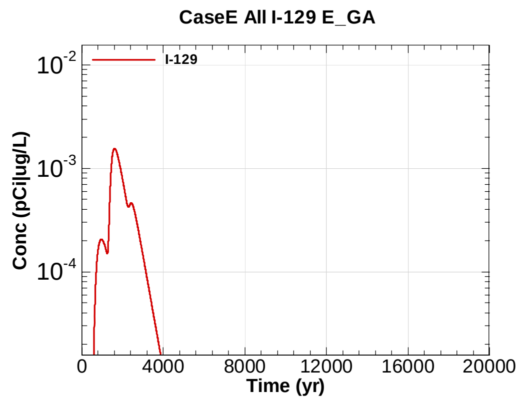

Figure O-90 - 100m Aquifer Concentration for CaseE All I-129 E_GA

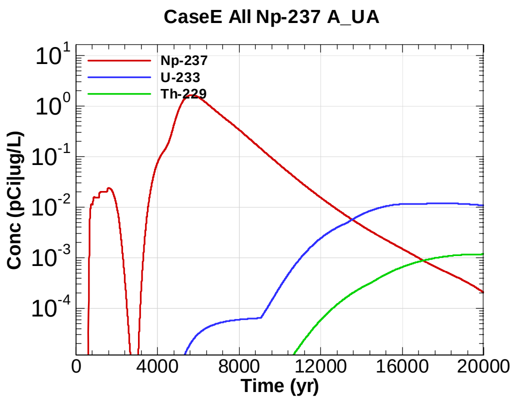

Figure O-91 - 100m Aquifer Concentration for CaseE All Np-237 A_UA

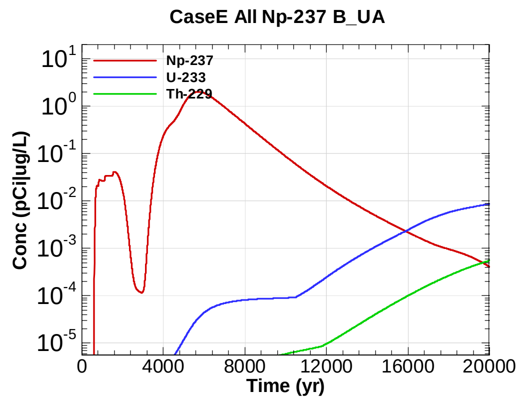

Figure O-92 - 100m Aquifer Concentration for CaseE All Np-237 B_UA

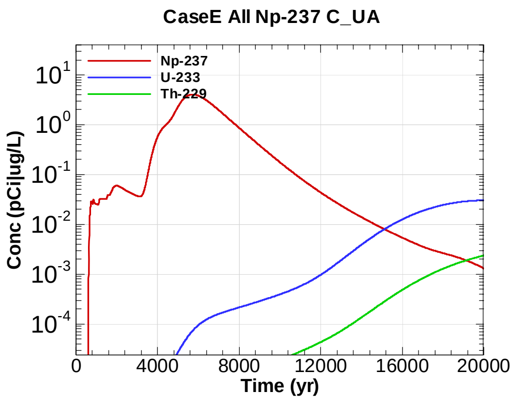

Figure O-93 - 100m Aquifer Concentration for CaseE All Np-237 C_UA

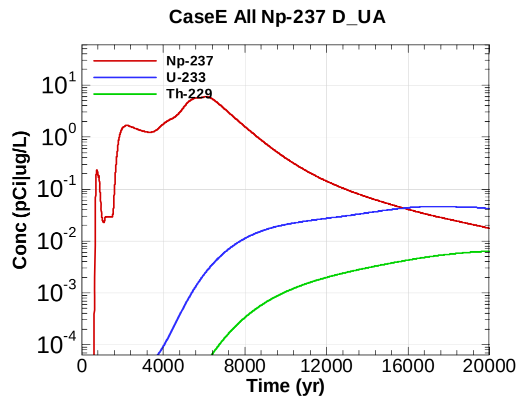

Figure O-94 - 100m Aquifer Concentration for CaseE All Np-237 D_UA

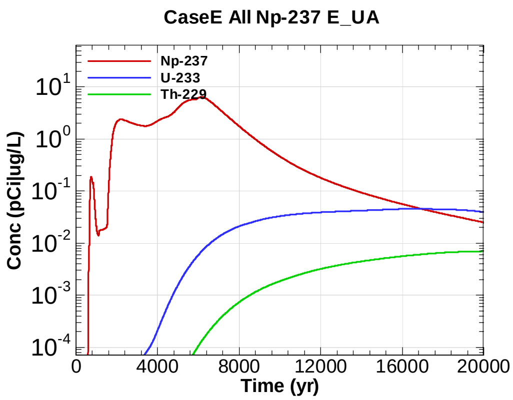

Figure O-95 - 100m Aquifer Concentration for CaseE All Np-237 E_UA

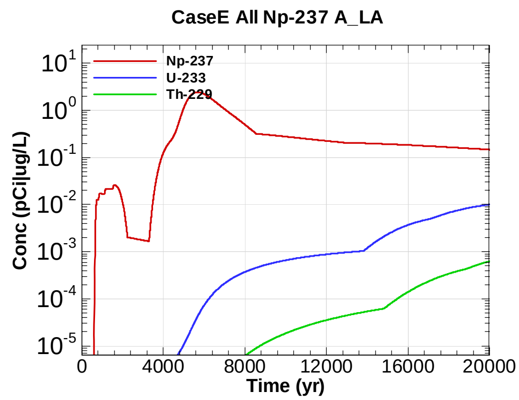

Figure O-96 - 100m Aquifer Concentration for CaseE All Np-237 A_LA

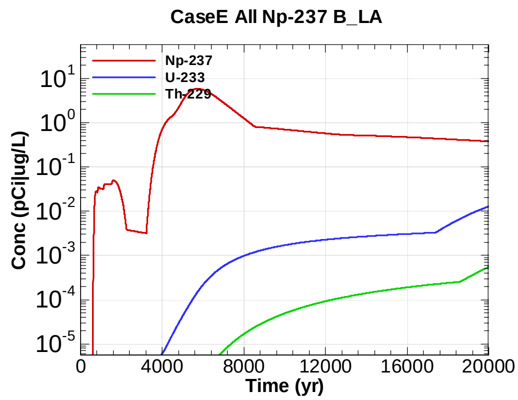

Figure O-97 - 100m Aquifer Concentration for CaseE All Np-237 B_LA

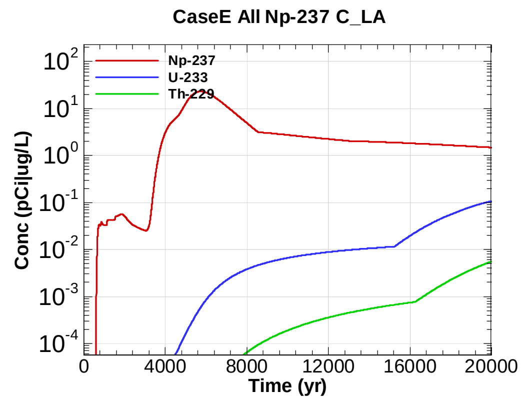

Figure O-98 - 100m Aquifer Concentration for CaseE All Np-237 C_LA

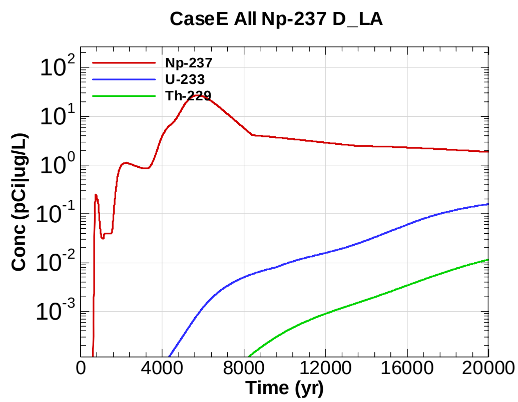

Figure O-99 - 100m Aquifer Concentration for CaseE All Np-237 D_LA

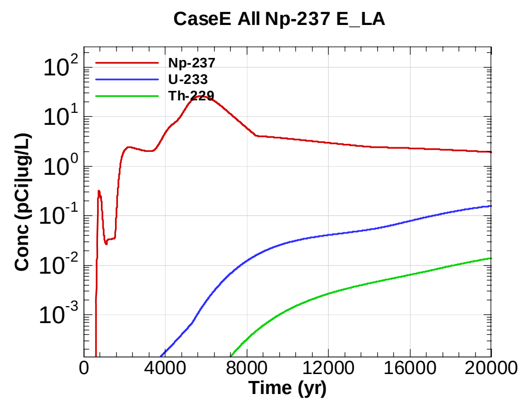

Figure O-100 - 100m Aquifer Concentration for CaseE All Np-237 E_LA

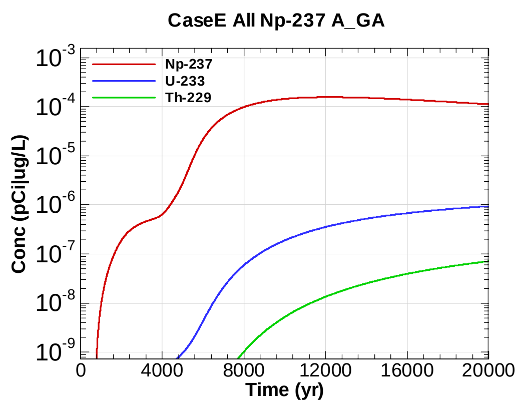

Figure O-101 - 100m Aquifer Concentration for CaseE All Np-237 A_GA

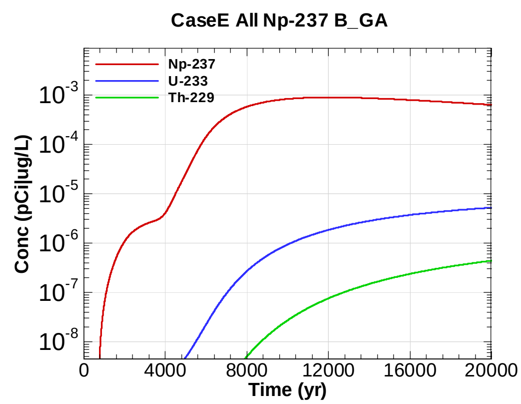

Figure O-102 - 100m Aquifer Concentration for CaseE All Np-237 B_GA

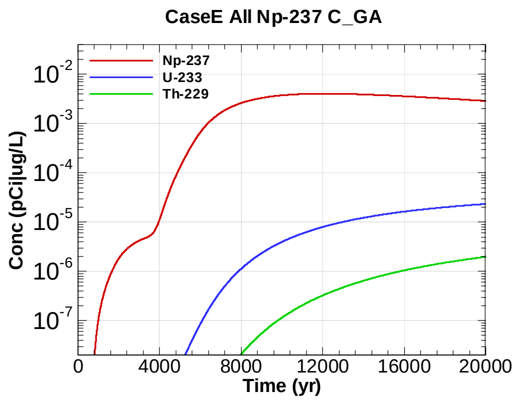

Figure O-103 - 100m Aquifer Concentration for CaseE All Np-237 C_GA

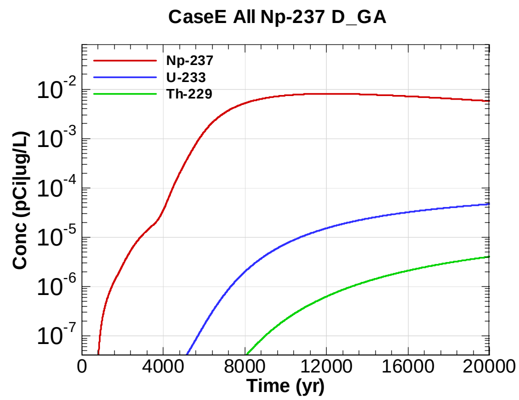

Figure O-104 - 100m Aquifer Concentration for CaseE All Np-237 D_GA

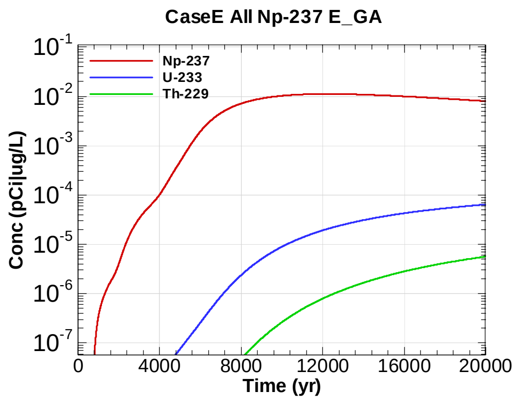

Figure O-105 - 100m Aquifer Concentration for CaseE All Np-237 E_GA

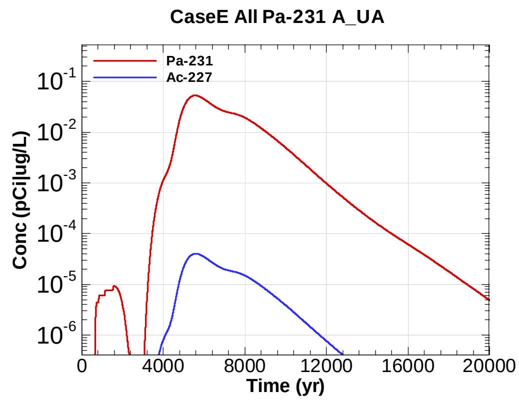

Figure O-106 - 100m Aquifer Concentration for CaseE All Pa-231 A_UA

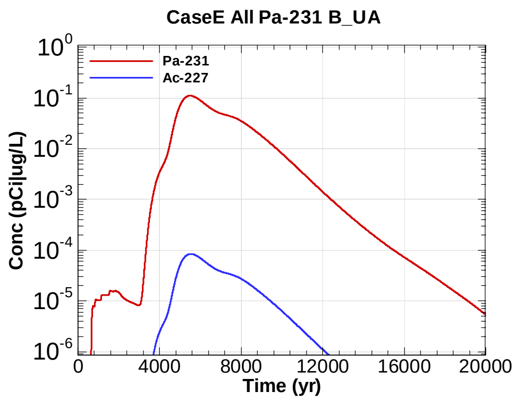

Figure O-107 - 100m Aquifer Concentration for CaseE All Pa-231 B_UA

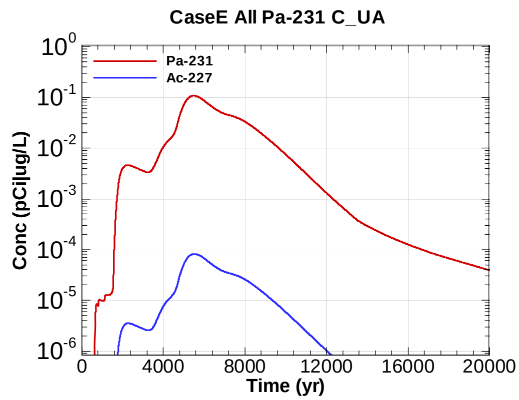

Figure O-108 - 100m Aquifer Concentration for CaseE All Pa-231 C_UA

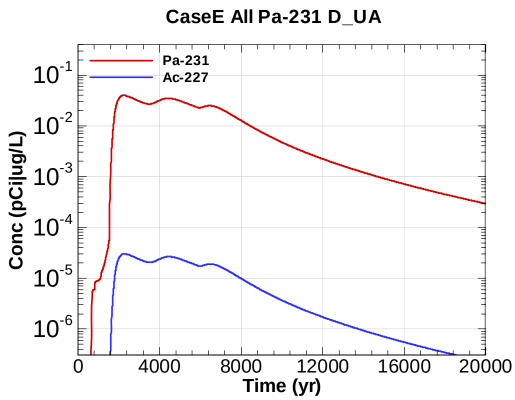

Figure O-109 - 100m Aquifer Concentration for CaseE All Pa-231 D_UA

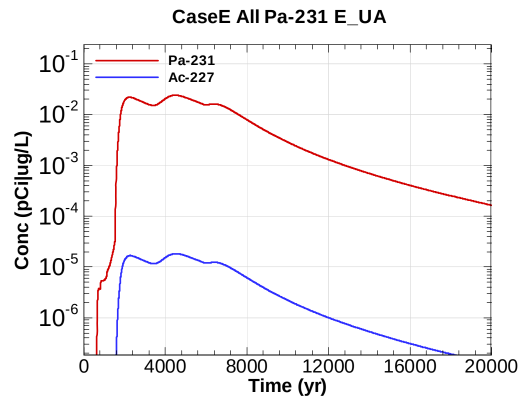

Figure O-110 - 100m Aquifer Concentration for CaseE All Pa-231 E_UA

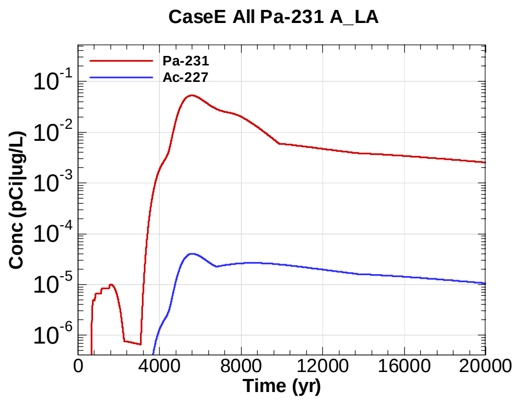

Figure O-111 - 100m Aquifer Concentration for CaseE All Pa-231 A_LA

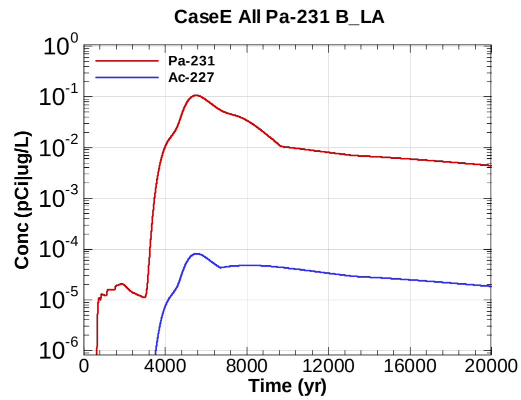

Figure O-112 - 100m Aquifer Concentration for CaseE All Pa-231 B_LA

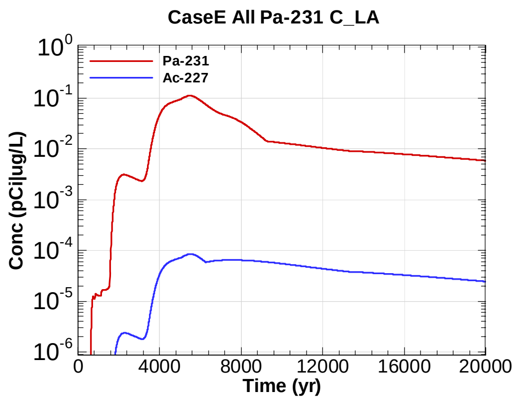

Figure O-113 - 100m Aquifer Concentration for CaseE All Pa-231 C_LA

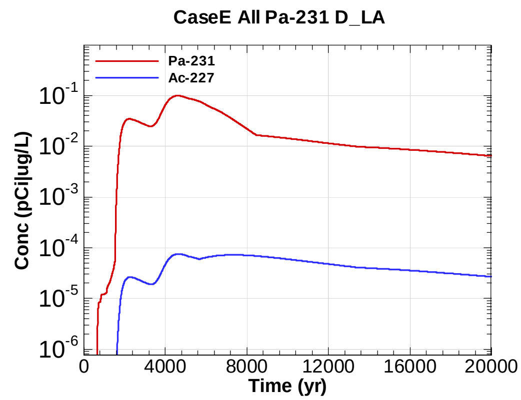

Figure O-114 - 100m Aquifer Concentration for CaseE All Pa-231 D_LA

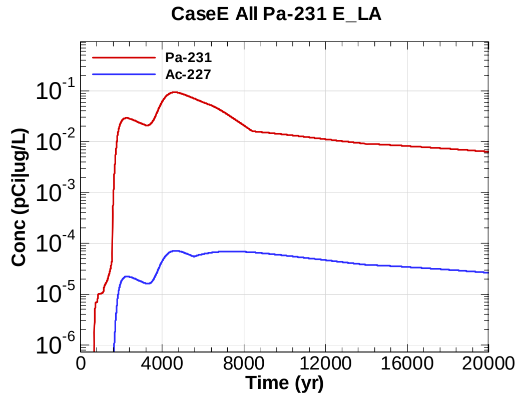

Figure O-115 - 100m Aquifer Concentration for CaseE All Pa-231 E_LA

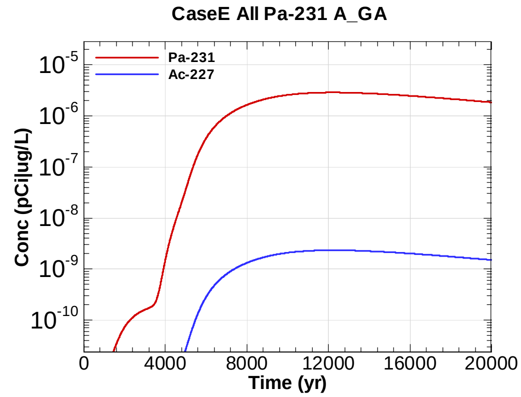

Figure O-116 - 100m Aquifer Concentration for CaseE All Pa-231 A_GA

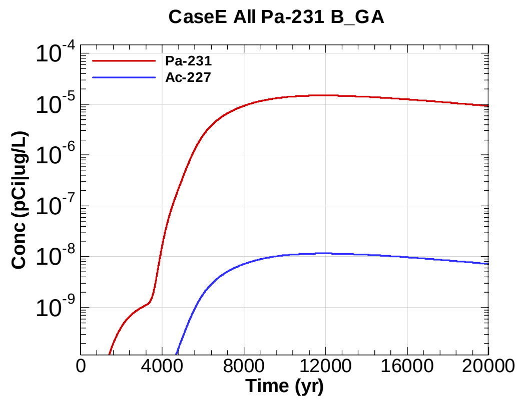

Figure O-117 - 100m Aquifer Concentration for CaseE All Pa-231 B_GA

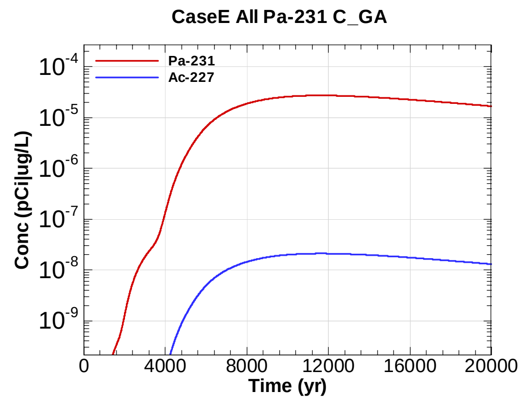

Figure O-118 - 100m Aquifer Concentration for CaseE All Pa-231 C_GA

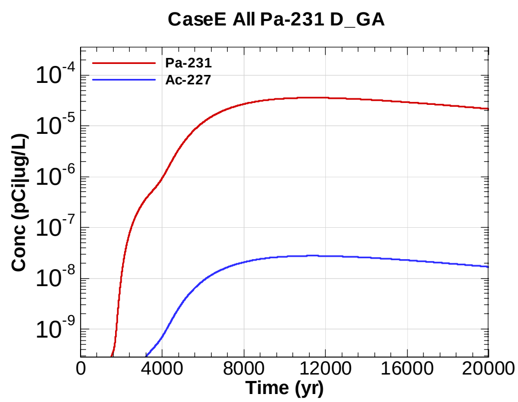

Figure O-119 - 100m Aquifer Concentration for CaseE All Pa-231 D_GA

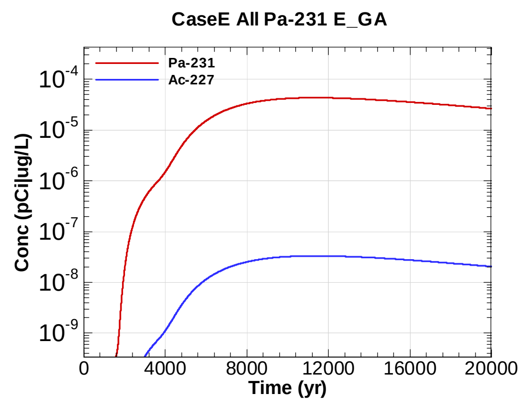

Figure O-120 - 100m Aquifer Concentration for CaseE All Pa-231 E_GA

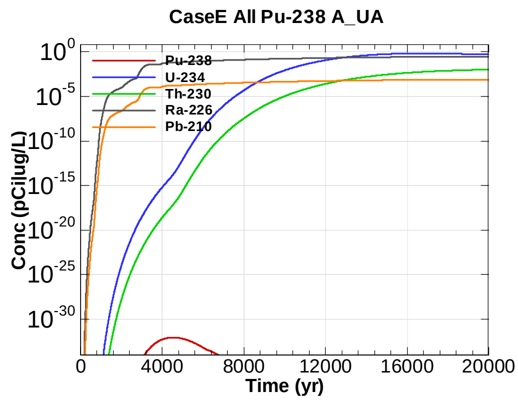

Figure O-121 - 100m Aquifer Concentration for CaseE All Pu-238 A_UA

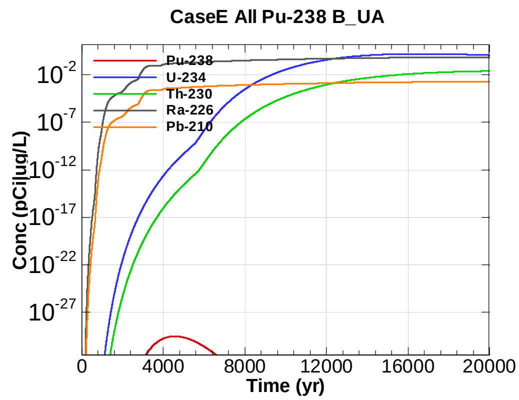

Figure O-122 - 100m Aquifer Concentration for CaseE All Pu-238 B_UA

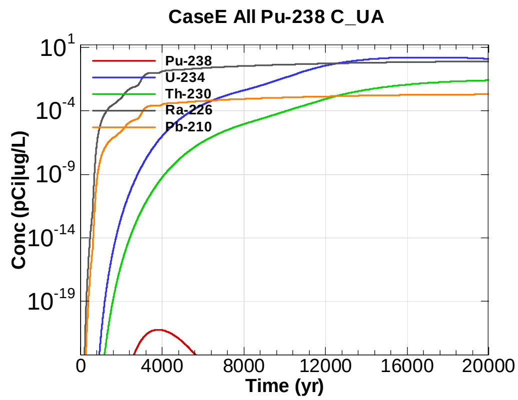

Figure O-123 - 100m Aquifer Concentration for CaseE All Pu-238 C_UA

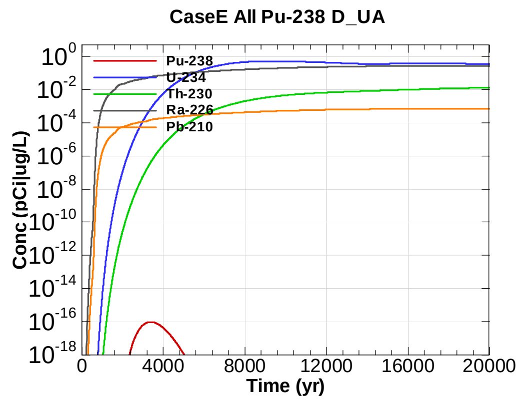

Figure O-124 - 100m Aquifer Concentration for CaseE All Pu-238 D_UA

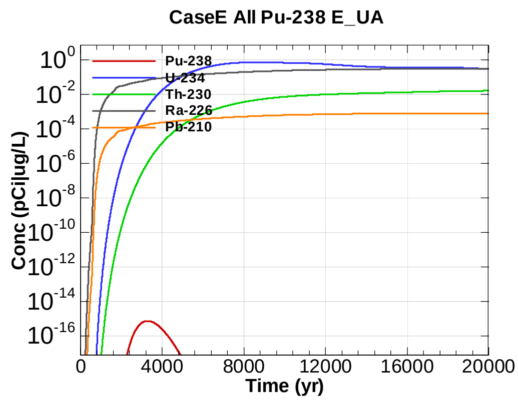

Figure O-125 - 100m Aquifer Concentration for CaseE All Pu-238 E_UA

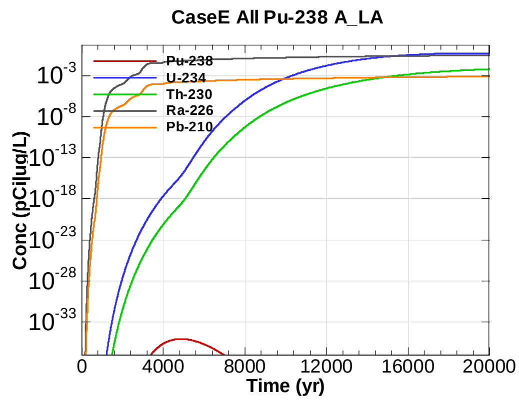

Figure O-126 - 100m Aquifer Concentration for CaseE All Pu-238 A_LA

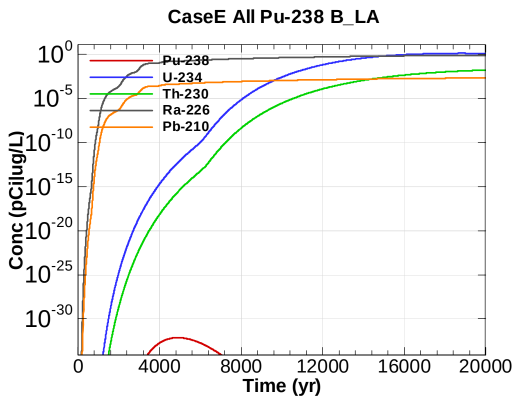

Figure O-127 - 100m Aquifer Concentration for CaseE All Pu-238 B_LA

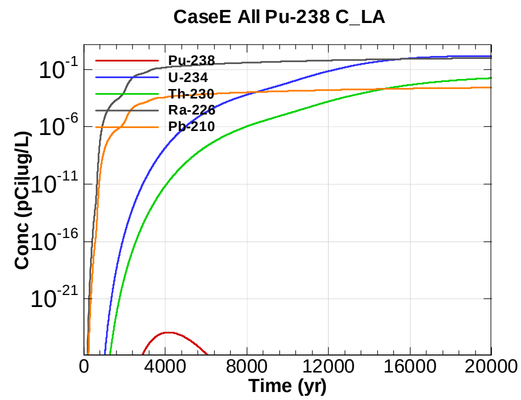

Figure O-128 - 100m Aquifer Concentration for CaseE All Pu-238 C_LA

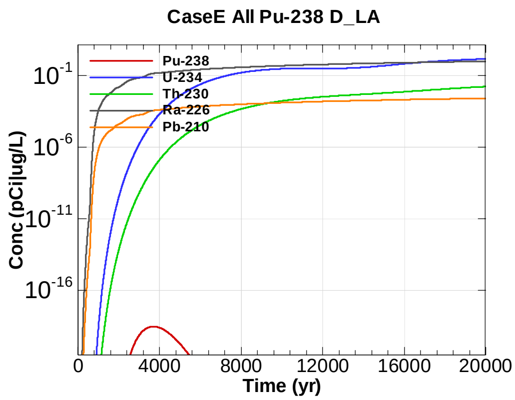

Figure O-129 - 100m Aquifer Concentration for CaseE All Pu-238 D_LA

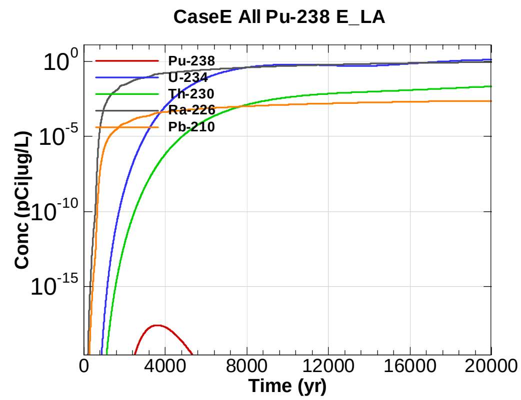

Figure O-130 - 100m Aquifer Concentration for CaseE All Pu-238 E_LA

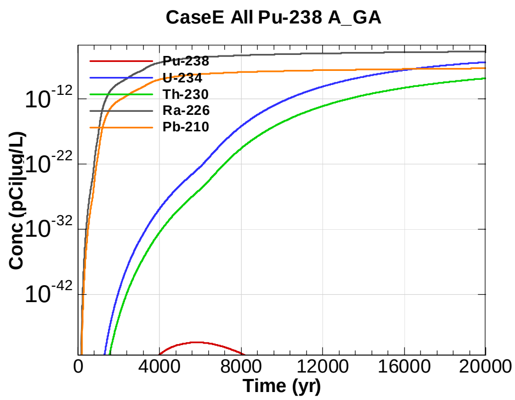

Figure O-131 - 100m Aquifer Concentration for CaseE All Pu-238 A_GA

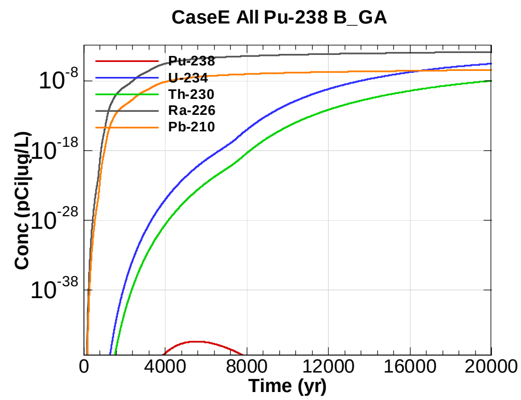

Figure O-132 - 100m Aquifer Concentration for CaseE All Pu-238 B_GA

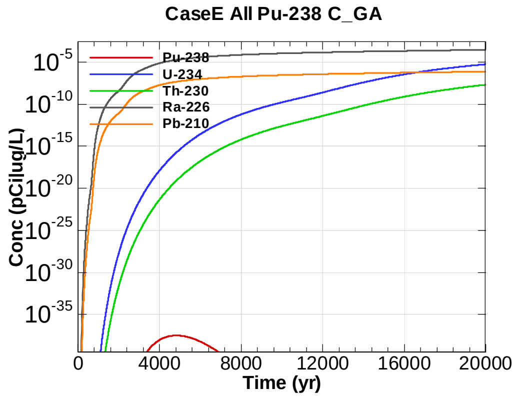

Figure O-133 - 100m Aquifer Concentration for CaseE All Pu-238 C_GA

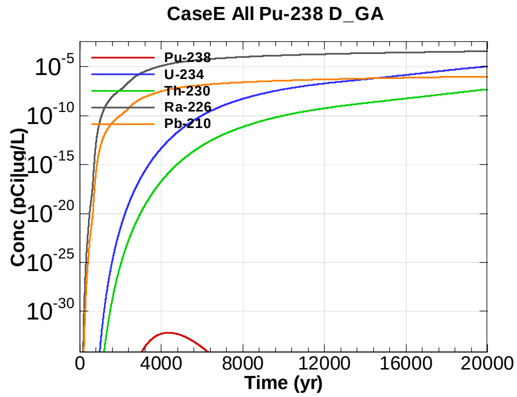

Figure O-134 - 100m Aquifer Concentration for CaseE All Pu-238 D_GA

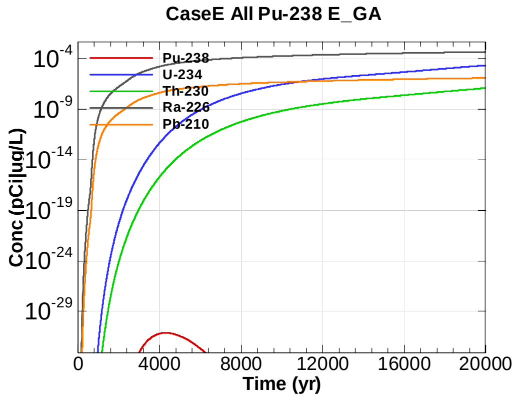

Figure O-135 - 100m Aquifer Concentration for CaseE All Pu-238 E_GA

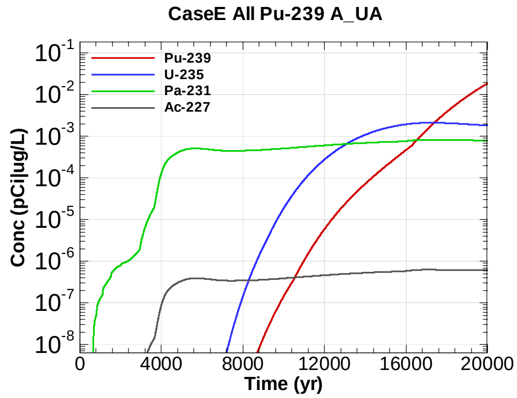

Figure O-136 - 100m Aquifer Concentration for CaseE All Pu-239 A_UA

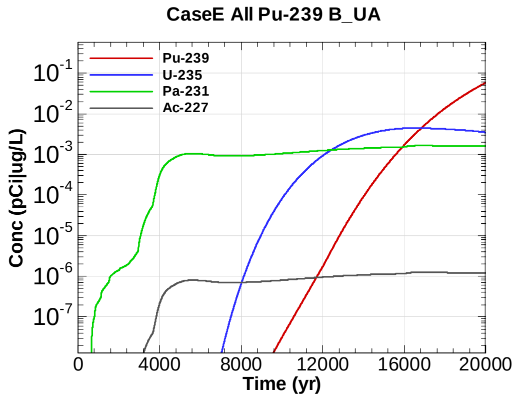

Figure O-137 - 100m Aquifer Concentration for CaseE All Pu-239 B_UA

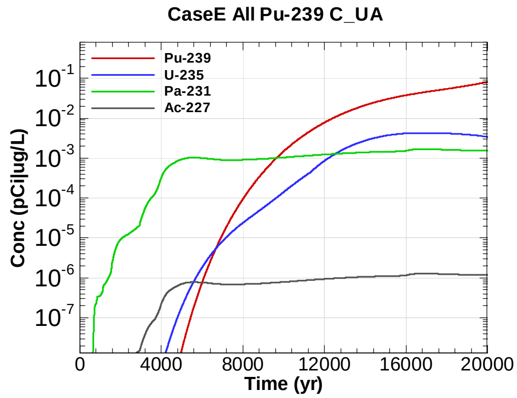

Figure O-138 - 100m Aquifer Concentration for CaseE All Pu-239 C_UA

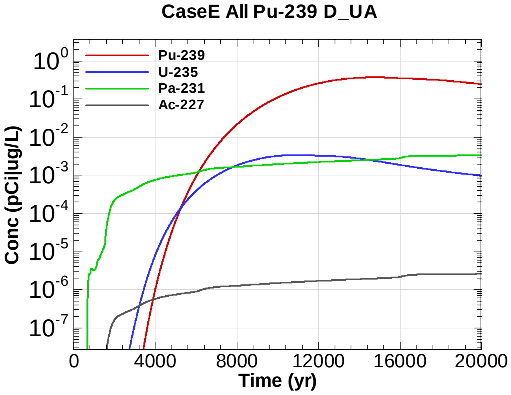

Figure O-139 - 100m Aquifer Concentration for CaseE All Pu-239 D_UA

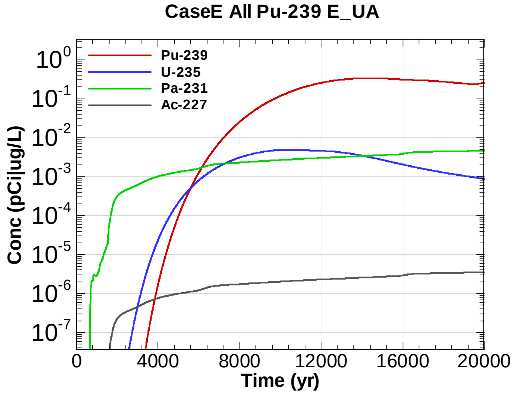

Figure O-140 - 100m Aquifer Concentration for CaseE All Pu-239 E_UA

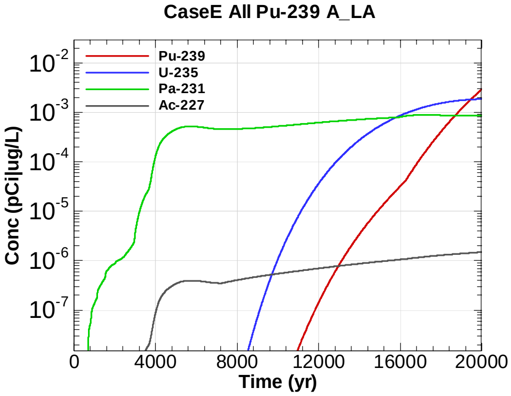

Figure O-141 - 100m Aquifer Concentration for CaseE All Pu-239 A_LA

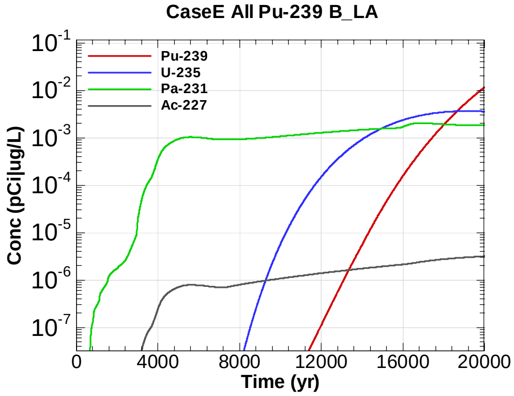

Figure O-142 - 100m Aquifer Concentration for CaseE All Pu-239 B_LA

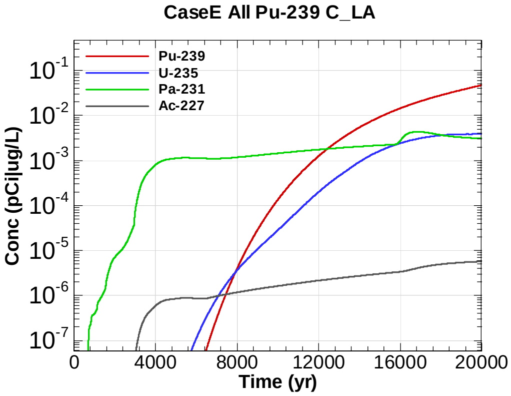

Figure O-143 - 100m Aquifer Concentration for CaseE All Pu-239 C_LA

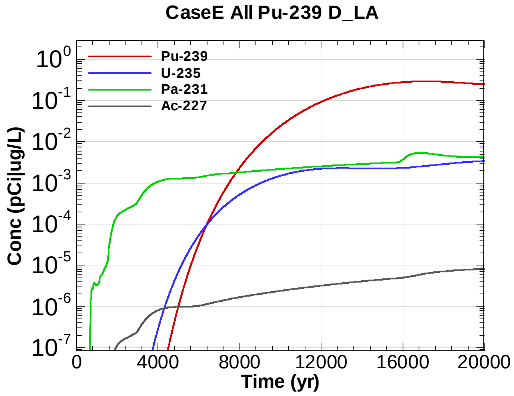

Figure O-144 - 100m Aquifer Concentration for CaseE All Pu-239 D_LA

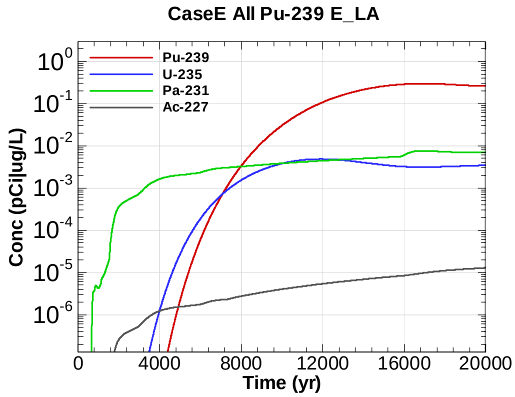

Figure O-145 - 100m Aquifer Concentration for CaseE All Pu-239 E_LA

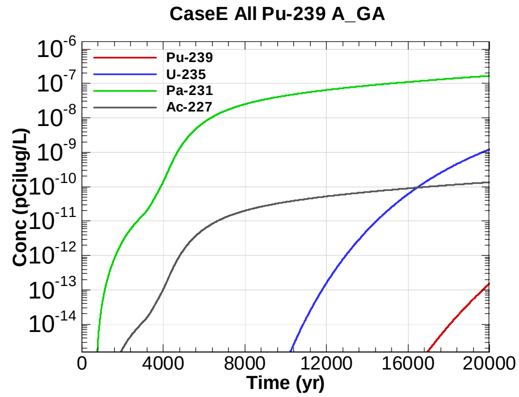

Figure O-146 - 100m Aquifer Concentration for CaseE All Pu-239 A_GA

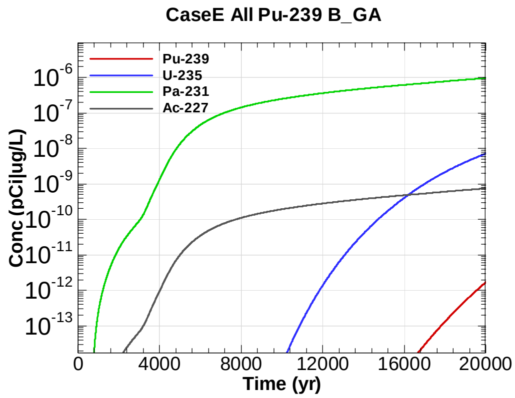

Figure O-147 - 100m Aquifer Concentration for CaseE All Pu-239 B_GA

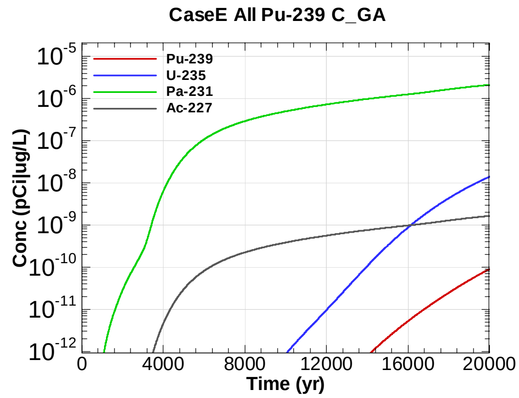

Figure O-148 - 100m Aquifer Concentration for CaseE All Pu-239 C_GA

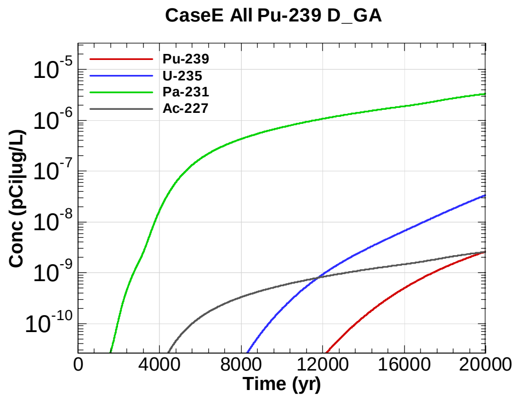

Figure O-149 - 100m Aquifer Concentration for CaseE All Pu-239 D_GA

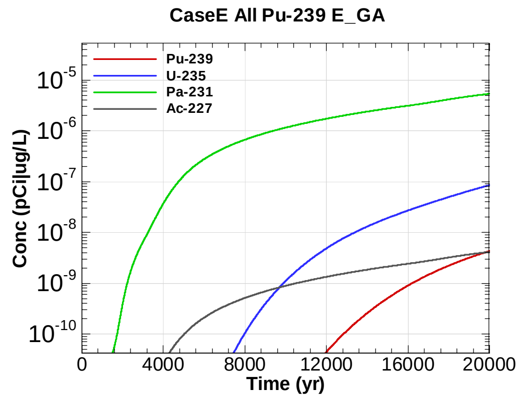

Figure O-150 - 100m Aquifer Concentration for CaseE All Pu-239 E_GA

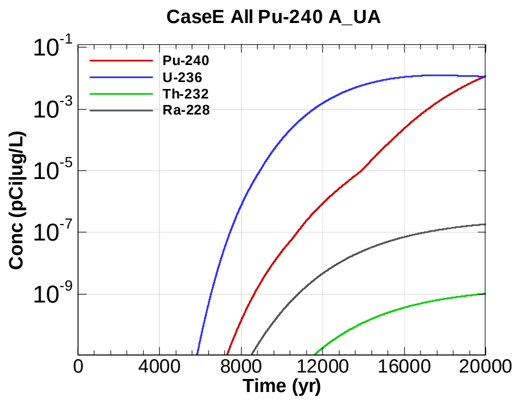

Figure O-151 - 100m Aquifer Concentration for CaseE All Pu-240 A_UA

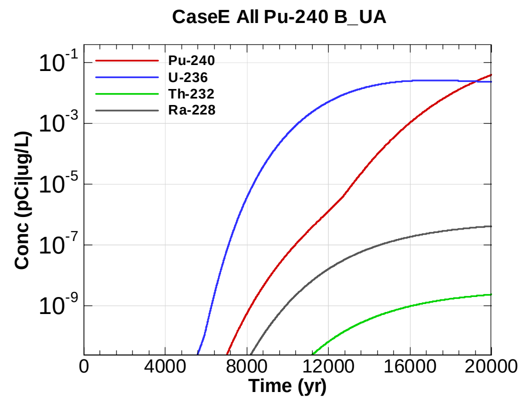

Figure O-152 - 100m Aquifer Concentration for CaseE All Pu-240 B_UA

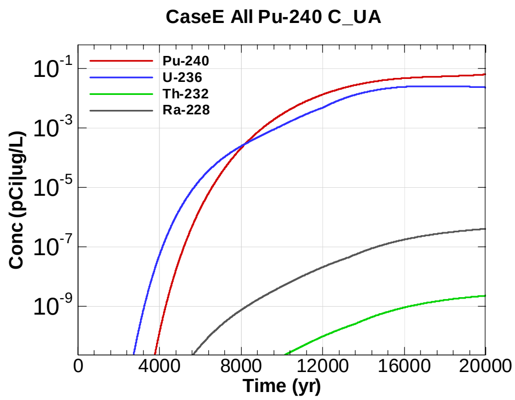

Figure O-153 - 100m Aquifer Concentration for CaseE All Pu-240 C_UA

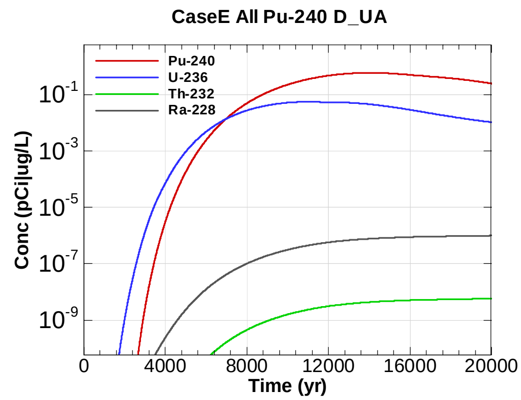

Figure O-154 - 100m Aquifer Concentration for CaseE All Pu-240 D_UA

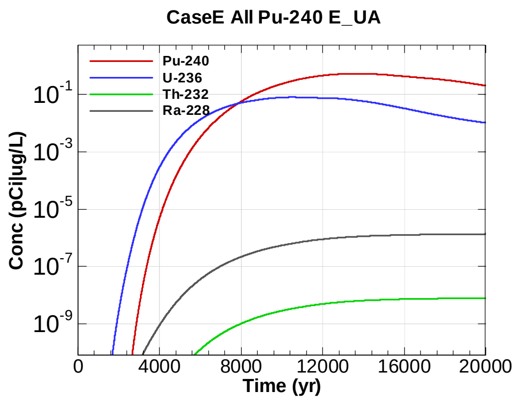

Figure O-155 - 100m Aquifer Concentration for CaseE All Pu-240 E_UA

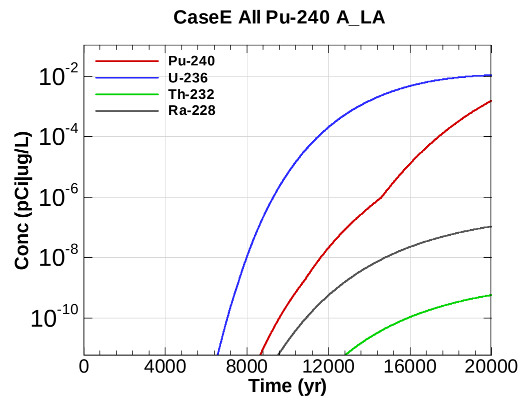

Figure O-156 - 100m Aquifer Concentration for CaseE All Pu-240 A_LA

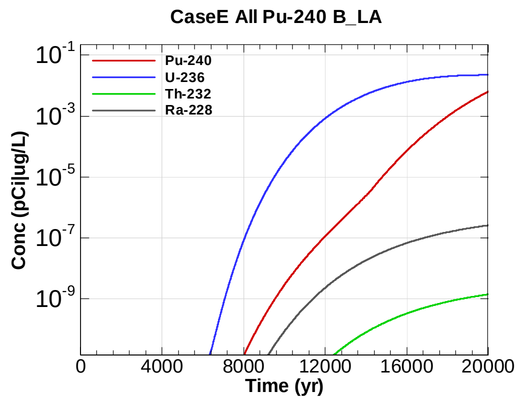

Figure O-157 - 100m Aquifer Concentration for CaseE All Pu-240 B_LA

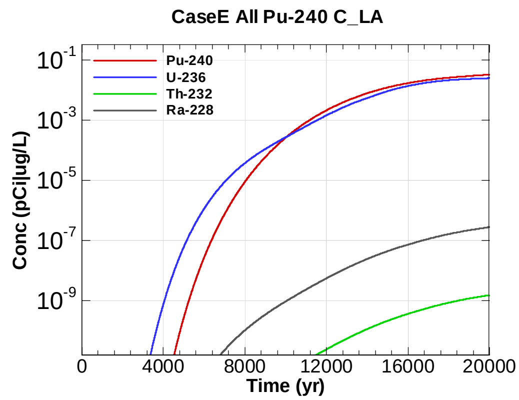

Figure O-158 - 100m Aquifer Concentration for CaseE All Pu-240 C_LA

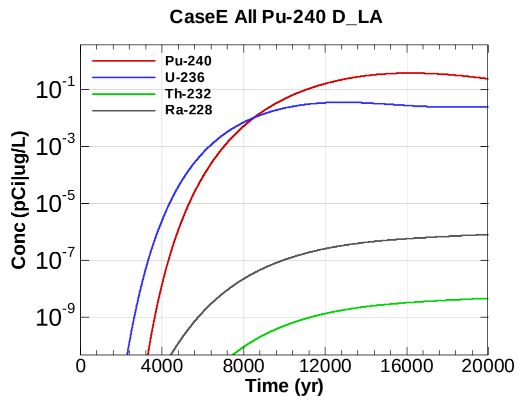

Figure O-159 - 100m Aquifer Concentration for CaseE All Pu-240 D_LA

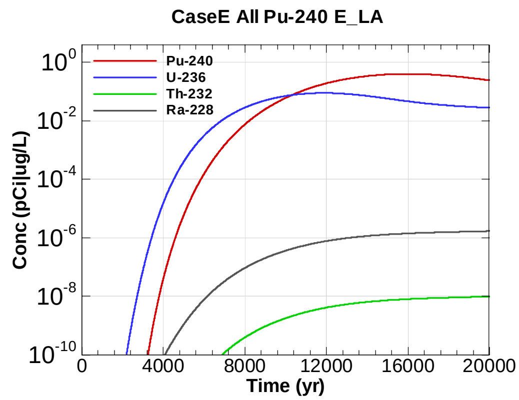

Figure O-160 - 100m Aquifer Concentration for CaseE All Pu-240 E_LA

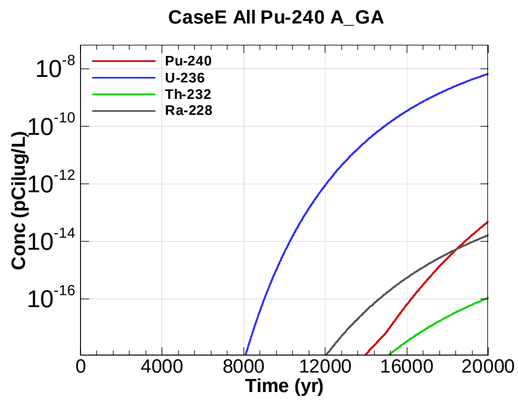

Figure O-161 - 100m Aquifer Concentration for CaseE All Pu-240 A_GA

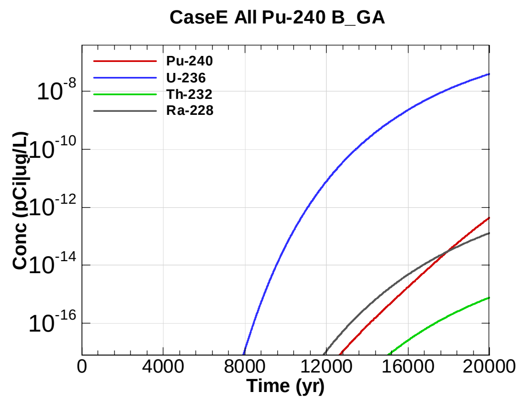

Figure O-162 - 100m Aquifer Concentration for CaseE All Pu-240 B_GA

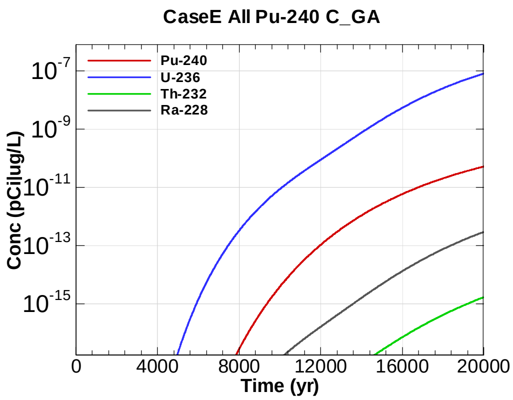

Figure O-163 - 100m Aquifer Concentration for CaseE All Pu-240 C_GA

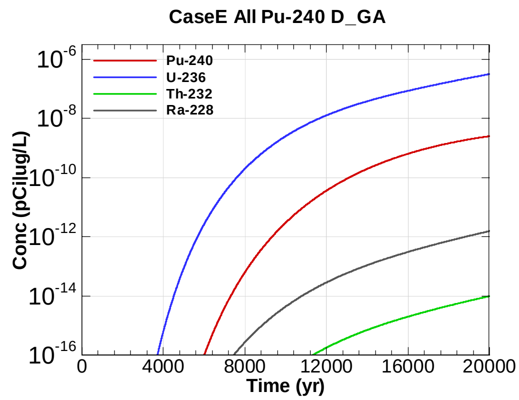

Figure O-164 - 100m Aquifer Concentration for CaseE All Pu-240 D_GA

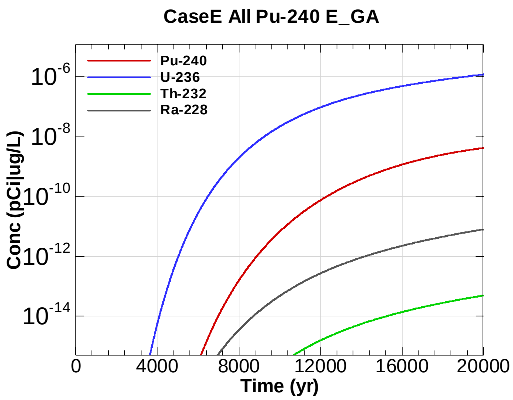

Figure O-165 - 100m Aquifer Concentration for CaseE All Pu-240 E_GA

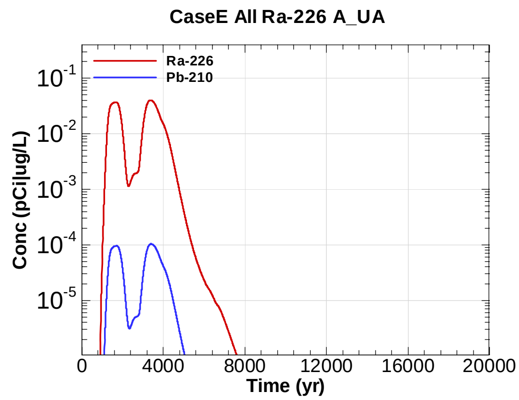

Figure O-166 - 100m Aquifer Concentration for CaseE All Ra-226 A_UA

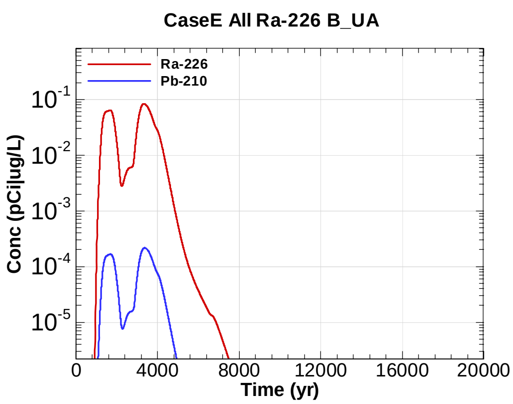

Figure O-167 - 100m Aquifer Concentration for CaseE All Ra-226 B_UA

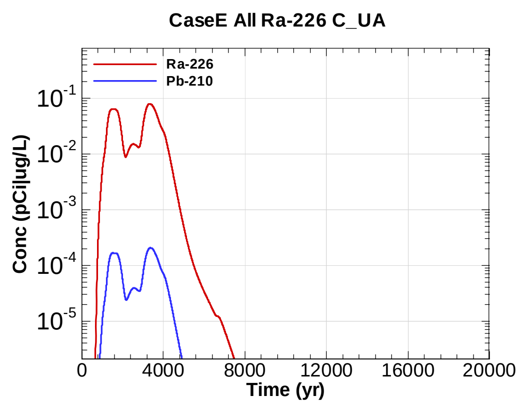

Figure O-168 - 100m Aquifer Concentration for CaseE All Ra-226 C_UA

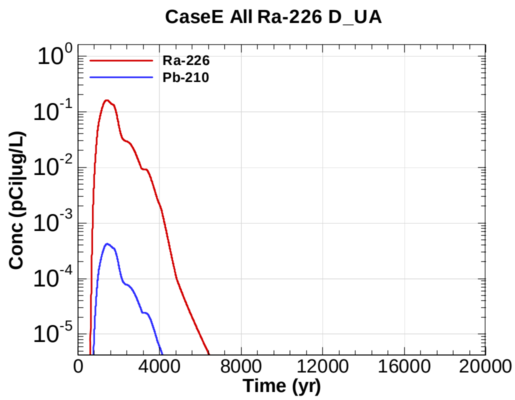

Figure O-169 - 100m Aquifer Concentration for CaseE All Ra-226 D_UA

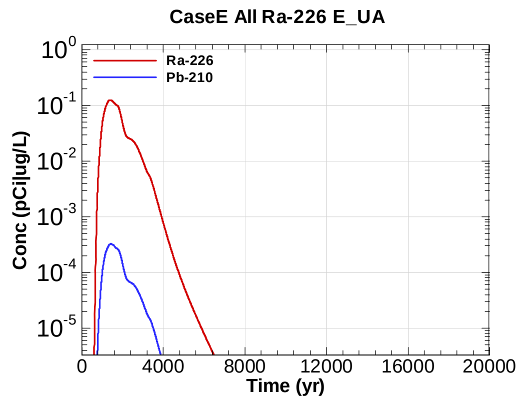

Figure O-170 - 100m Aquifer Concentration for CaseE All Ra-226 E_UA

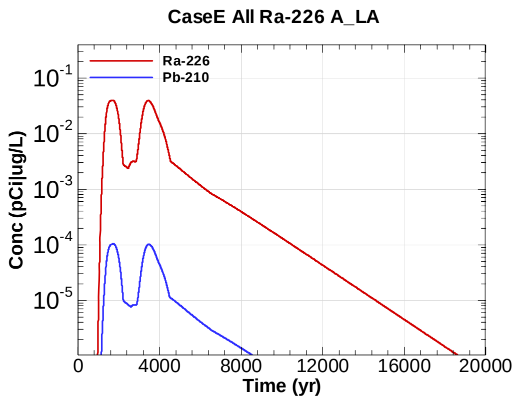

Figure O-171 - 100m Aquifer Concentration for CaseE All Ra-226 A_LA

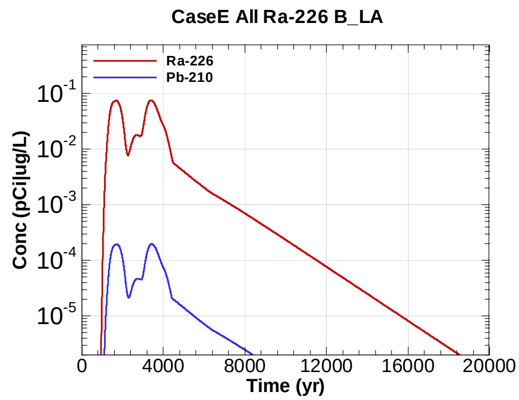

Figure O-172 - 100m Aquifer Concentration for CaseE All Ra-226 B_LA

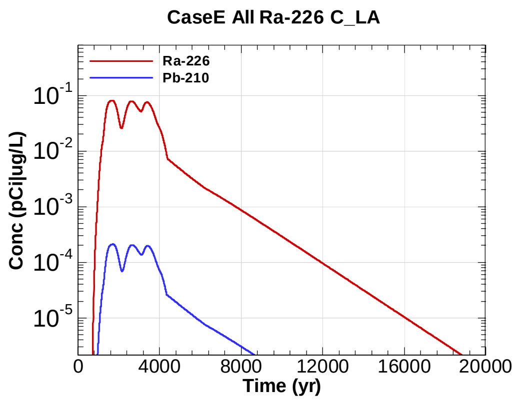

Figure O-173 - 100m Aquifer Concentration for CaseE All Ra-226 C_LA

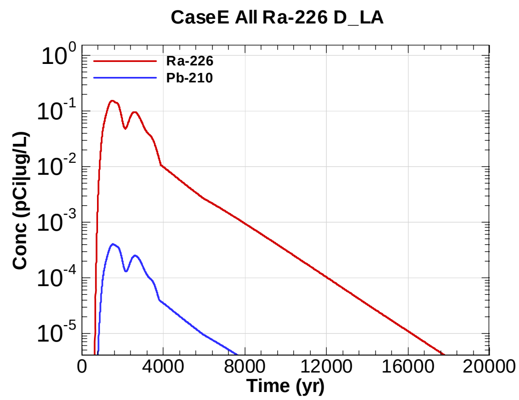

Figure O-174 - 100m Aquifer Concentration for CaseE All Ra-226 D_LA

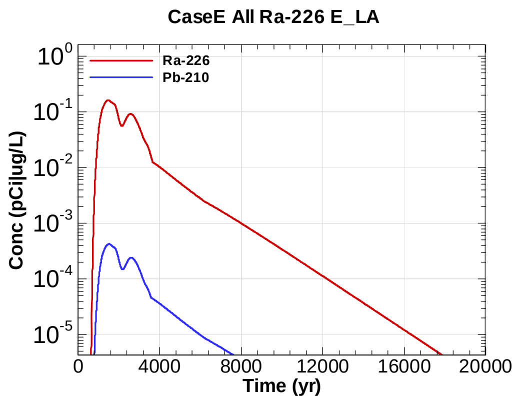

Figure O-175 - 100m Aquifer Concentration for CaseE All Ra-226 E_LA

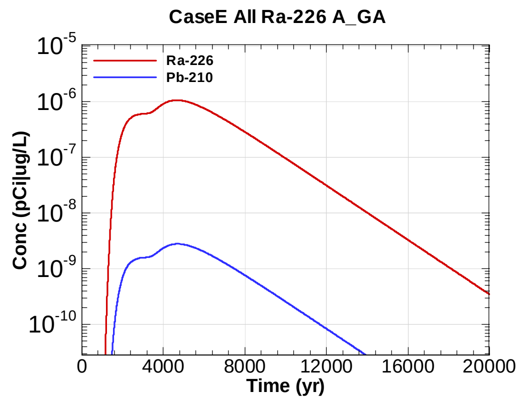

Figure O-176 - 100m Aquifer Concentration for CaseE All Ra-226 A_GA

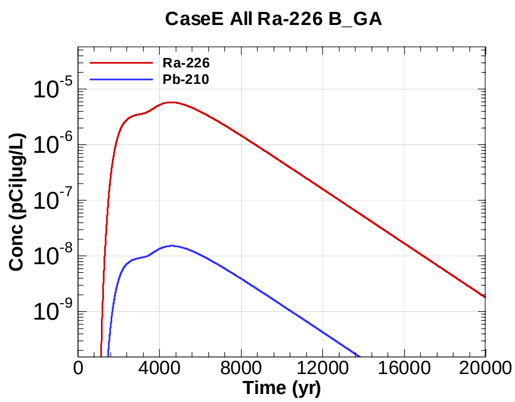

Figure O-177 - 100m Aquifer Concentration for CaseE All Ra-226 B_GA

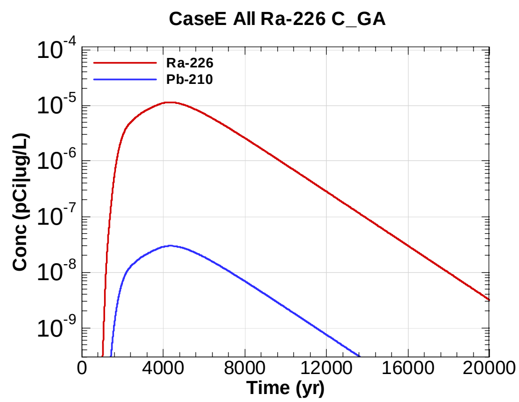

Figure O-178 - 100m Aquifer Concentration for CaseE All Ra-226 C_GA

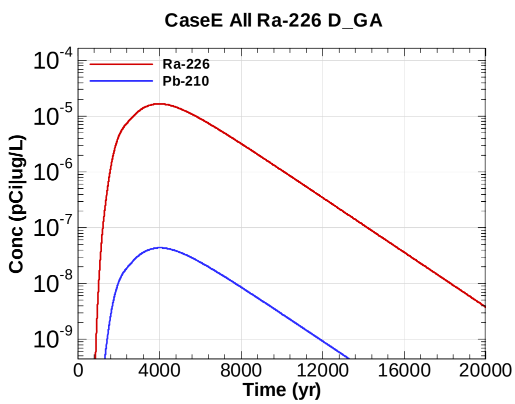

Figure O-179 - 100m Aquifer Concentration for CaseE All Ra-226 D_GA

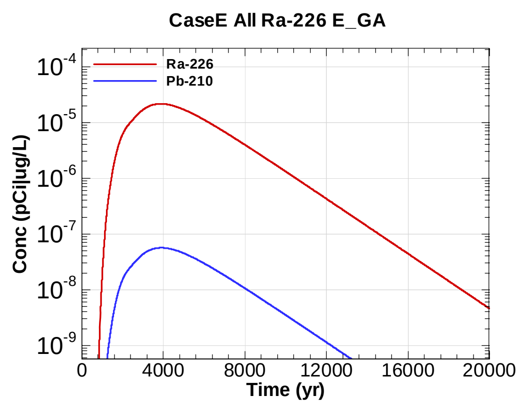

Figure O-180 - 100m Aquifer Concentration for CaseE All Ra-226 E_GA

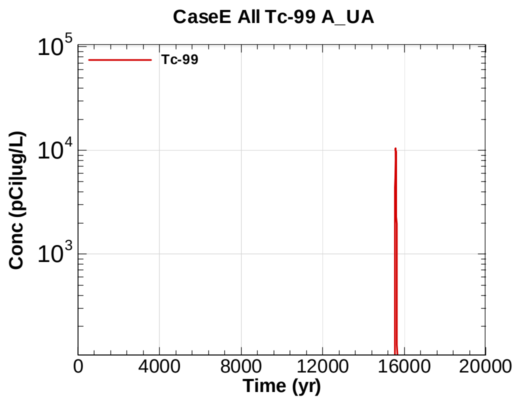

Figure O-181 - 100m Aquifer Concentration for CaseE All Tc-99 A_UA

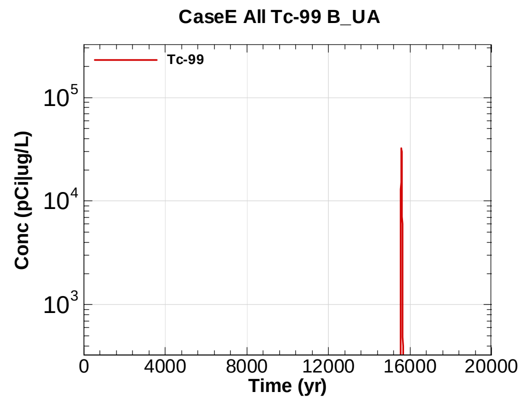

Figure O-182 - 100m Aquifer Concentration for CaseE All Tc-99 B_UA

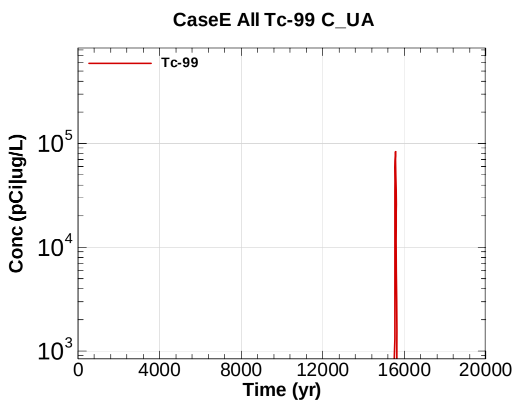

Figure O-183 - 100m Aquifer Concentration for CaseE All Tc-99 C_UA

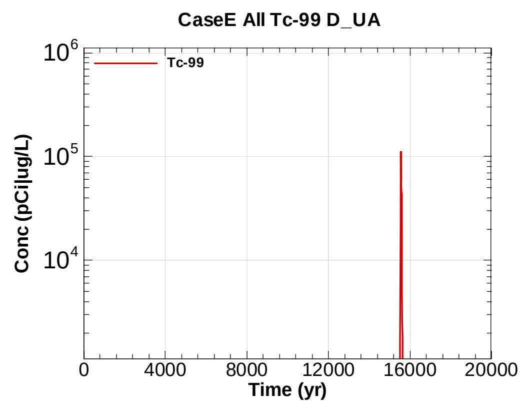

Figure O-184 - 100m Aquifer Concentration for CaseE All Tc-99 D_UA

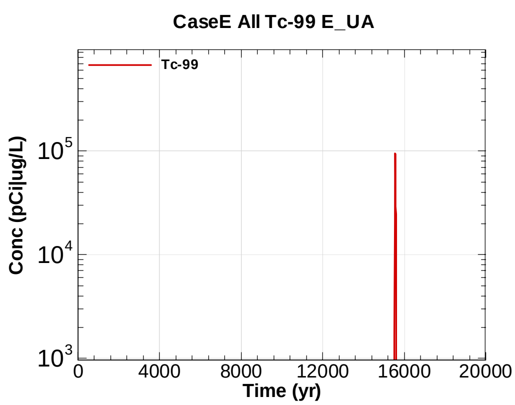

Figure O-185 - 100m Aquifer Concentration for CaseE All Tc-99 E_UA

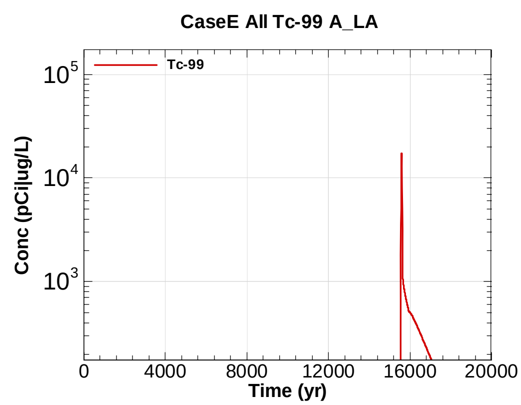

Figure O-186 - 100m Aquifer Concentration for CaseE All Tc-99 A_LA

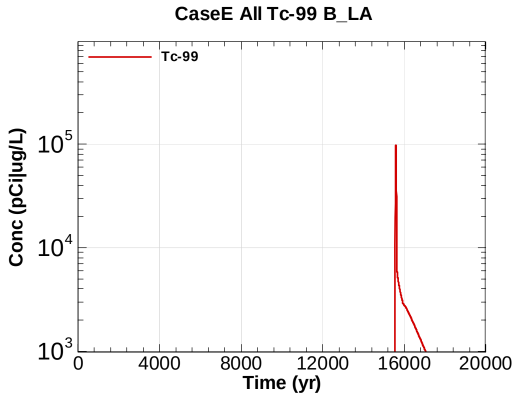

Figure O-187 - 100m Aquifer Concentration for CaseE All Tc-99 B_LA

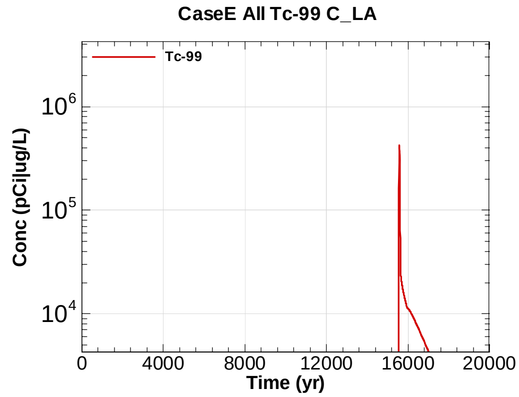

Figure O-188 - 100m Aquifer Concentration for CaseE All Tc-99 C_LA

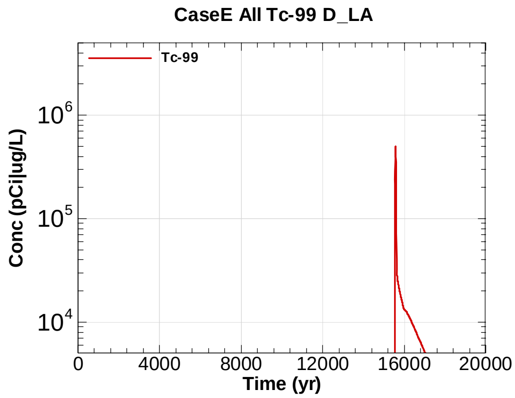

Figure O-189 - 100m Aquifer Concentration for CaseE All Tc-99 D_LA

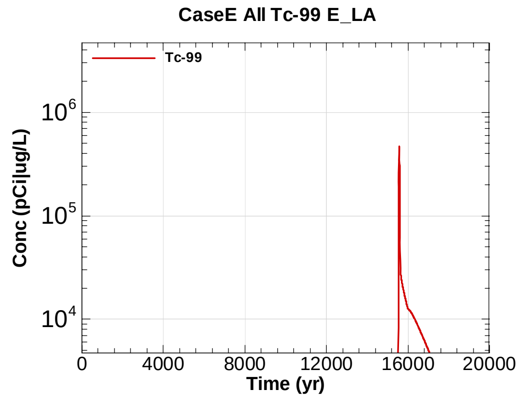

Figure O-190 - 100m Aquifer Concentration for CaseE All Tc-99 E_LA

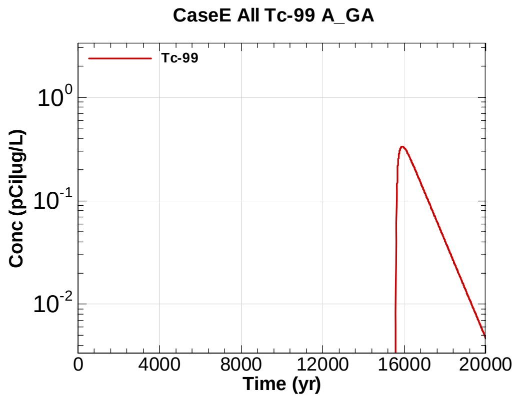

Figure O-191 - 100m Aquifer Concentration for CaseE All Tc-99 A_GA

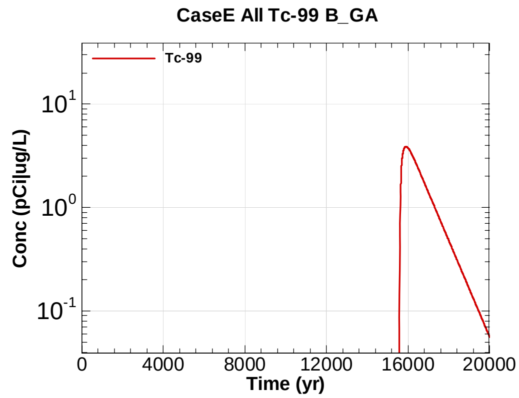

Figure O-192 - 100m Aquifer Concentration for CaseE All Tc-99 B_GA

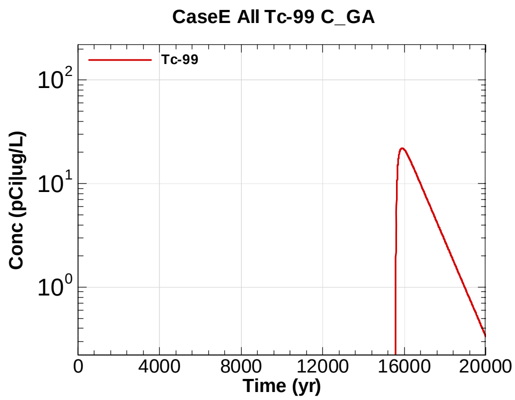

Figure O-193 - 100m Aquifer Concentration for CaseE All Tc-99 C_GA

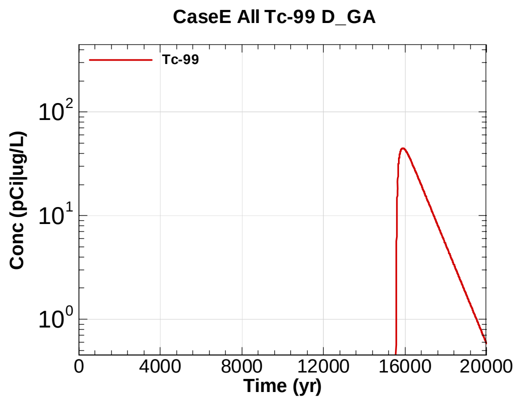

Figure O-194 - 100m Aquifer Concentration for CaseE All Tc-99 D_GA

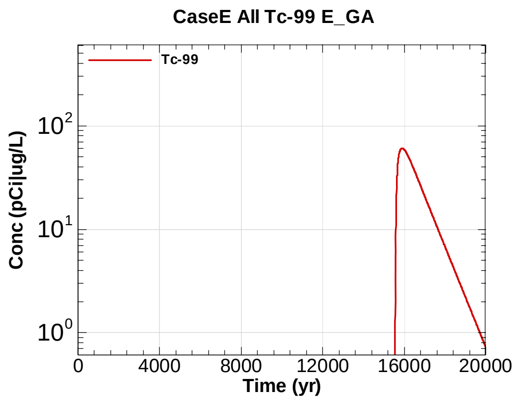

Figure O-195 - 100m Aquifer Concentration for CaseE All Tc-99 E_GA

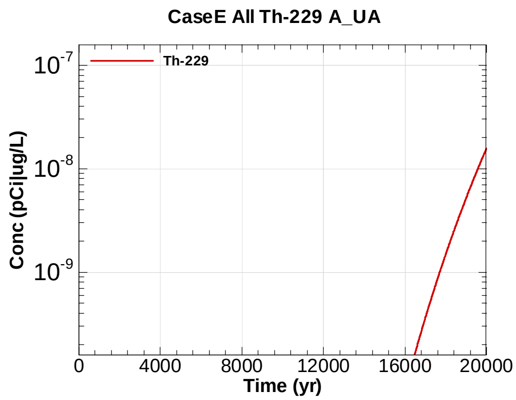

Figure O-196 - 100m Aquifer Concentration for CaseE All Th-229 A_UA

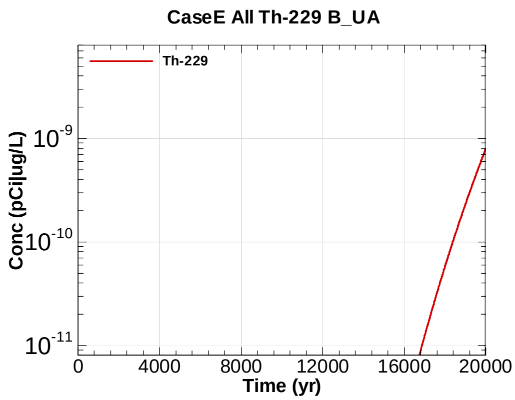

Figure O-197 - 100m Aquifer Concentration for CaseE All Th-229 B_UA

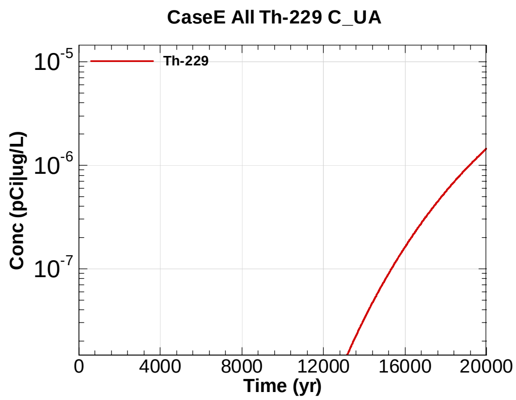

Figure O-198 - 100m Aquifer Concentration for CaseE All Th-229 C_UA

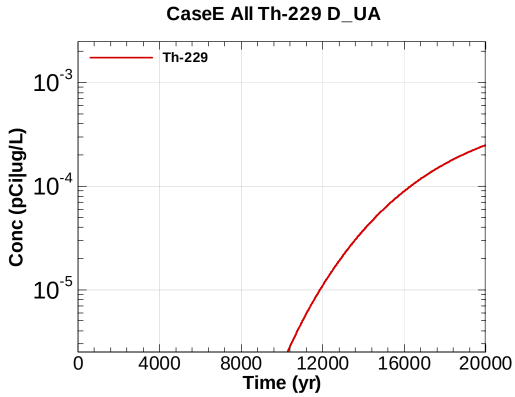

Figure O-199 - 100m Aquifer Concentration for CaseE All Th-229 D_UA

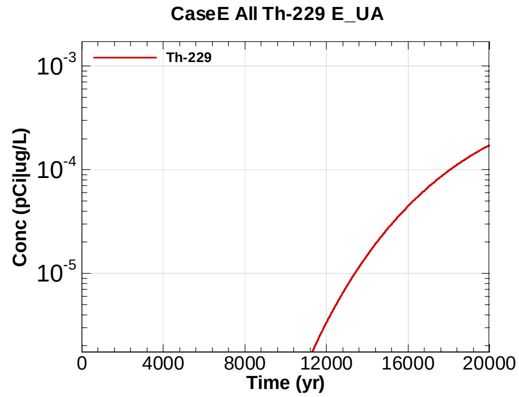

Figure O-200 - 100m Aquifer Concentration for CaseE All Th-229 E_UA

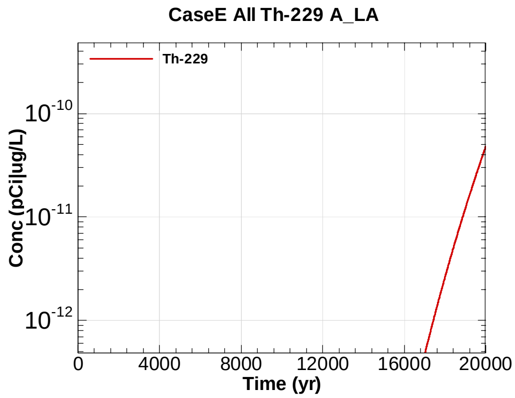

Figure O-201 - 100m Aquifer Concentration for CaseE All Th-229 A_LA

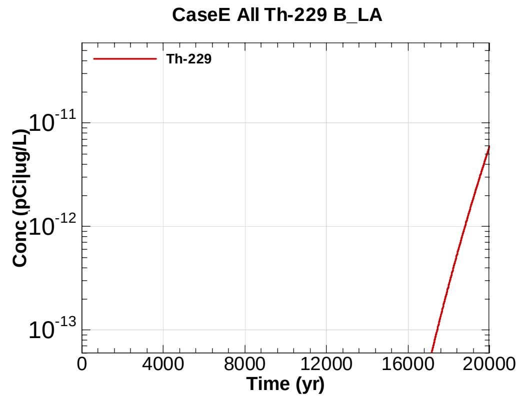

Figure O-202 - 100m Aquifer Concentration for CaseE All Th-229 B_LA

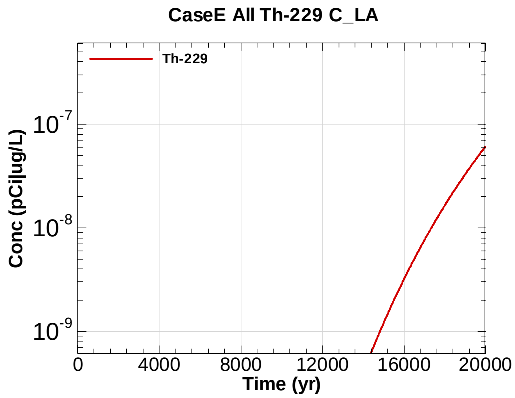

Figure O-203 - 100m Aquifer Concentration for CaseE All Th-229 C_LA

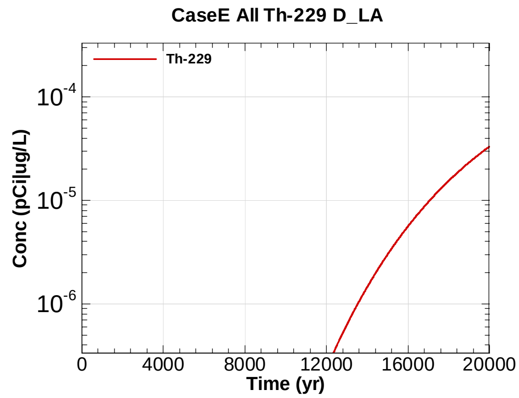

Figure O-204 - 100m Aquifer Concentration for CaseE All Th-229 D_LA

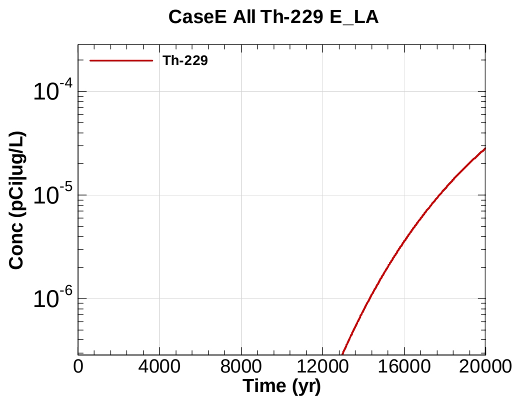

Figure O-205 - 100m Aquifer Concentration for CaseE All Th-229 E_LA

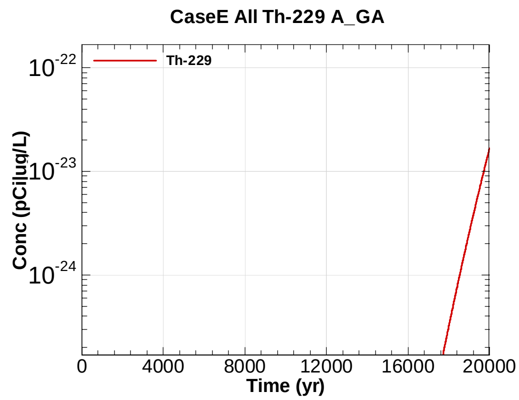

Figure O-206 - 100m Aquifer Concentration for CaseE All Th-229 A_GA

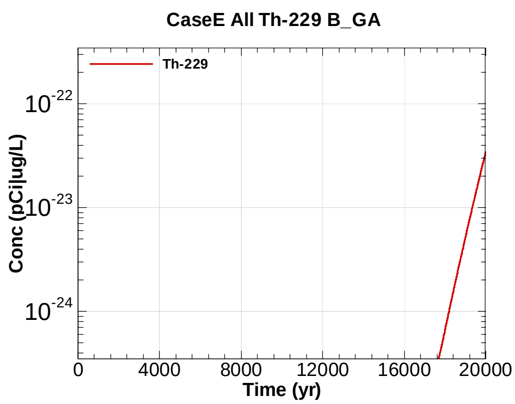

Figure O-207 - 100m Aquifer Concentration for CaseE All Th-229 B_GA

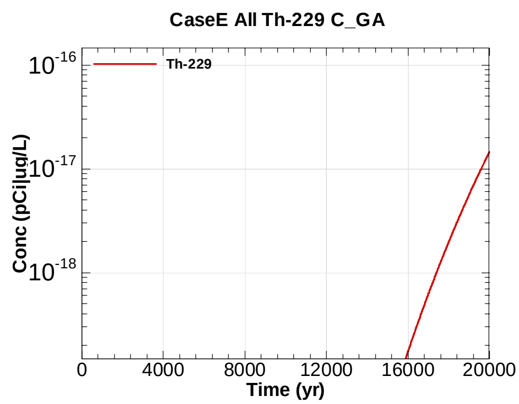

Figure O-208 - 100m Aquifer Concentration for CaseE All Th-229 C_GA

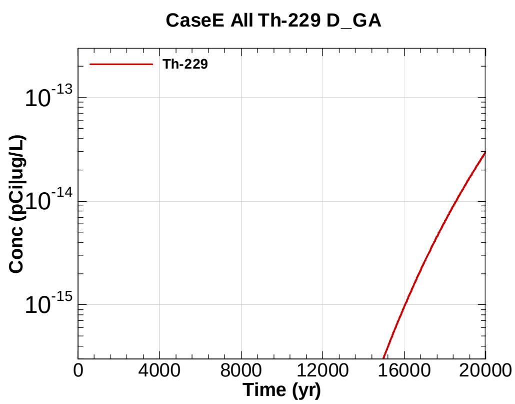

Figure O-209 - 100m Aquifer Concentration for CaseE All Th-229 D_GA

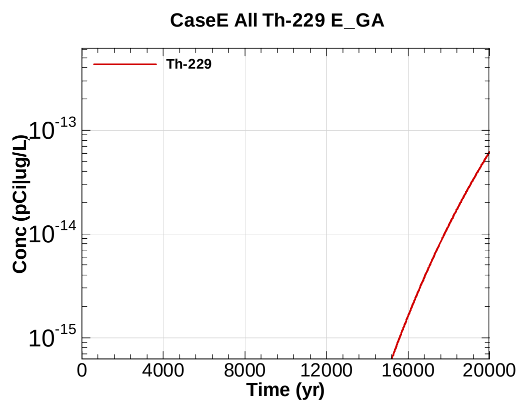

Figure O-210 - 100m Aquifer Concentration for CaseE All Th-229 E_GA

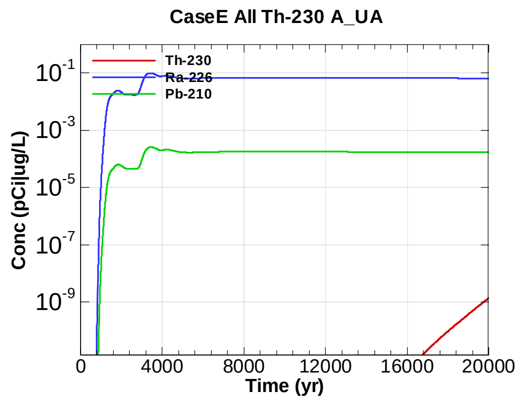

Figure O-211 - 100m Aquifer Concentration for CaseE All Th-230 A_UA

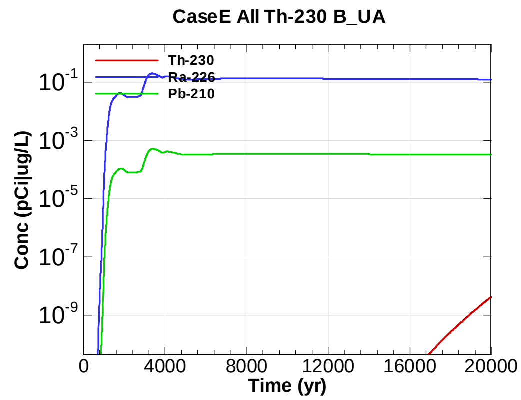

Figure O-212 - 100m Aquifer Concentration for CaseE All Th-230 B_UA

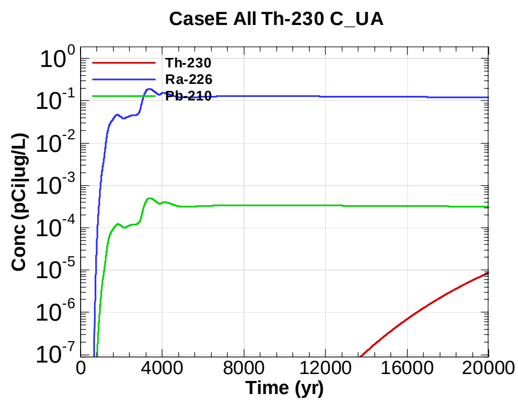

Figure O-213 - 100m Aquifer Concentration for CaseE All Th-230 C_UA

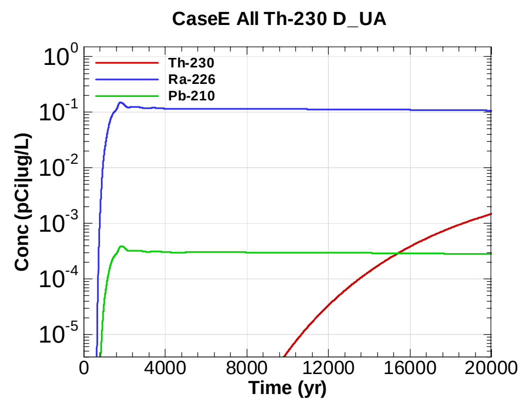

Figure O-214 - 100m Aquifer Concentration for CaseE All Th-230 D_UA

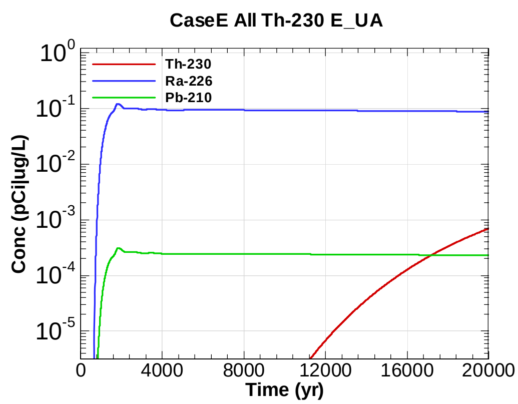

Figure O-215 - 100m Aquifer Concentration for CaseE All Th-230 E_UA

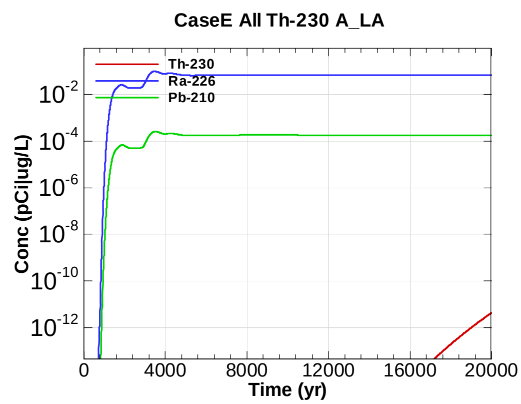

Figure O-216 - 100m Aquifer Concentration for CaseE All Th-230 A_LA

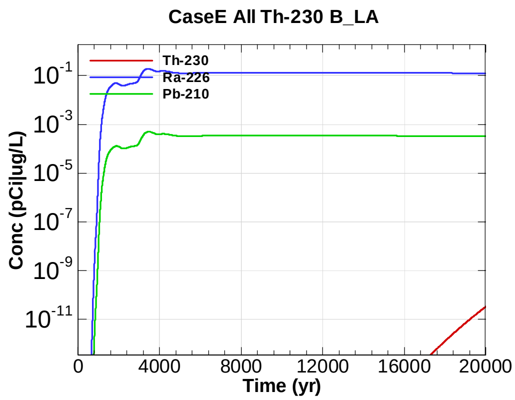

Figure O-217 - 100m Aquifer Concentration for CaseE All Th-230 B_LA

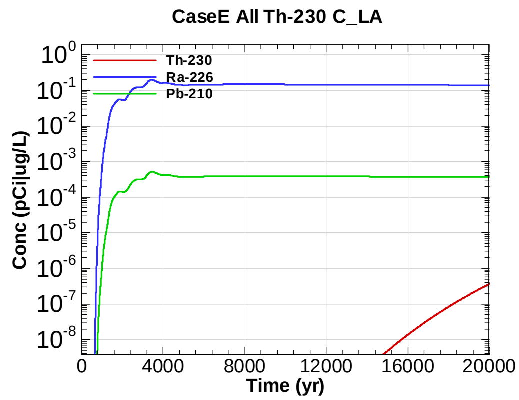

Figure O-218 - 100m Aquifer Concentration for CaseE All Th-230 C_LA

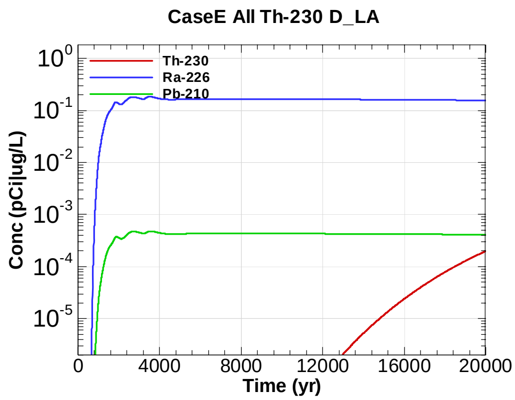

Figure O-219 - 100m Aquifer Concentration for CaseE All Th-230 D_LA

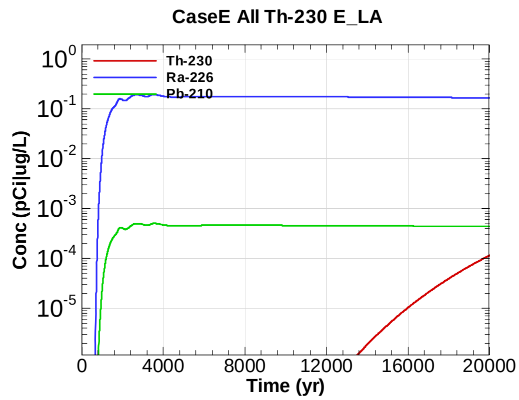

Figure O-220 - 100m Aquifer Concentration for CaseE All Th-230 E_LA

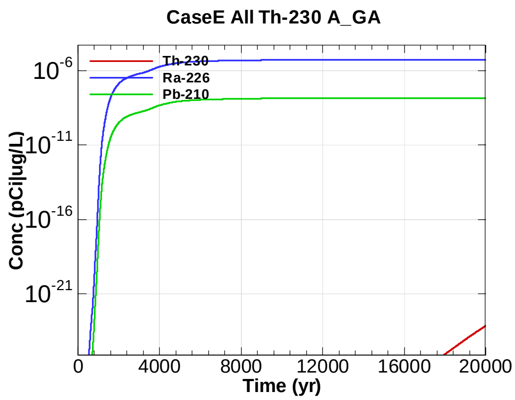

Figure O-221 - 100m Aquifer Concentration for CaseE All Th-230 A_GA

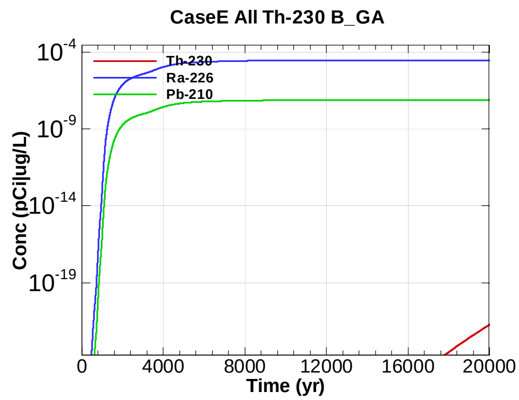

Figure O-222 - 100m Aquifer Concentration for CaseE All Th-230 B_GA

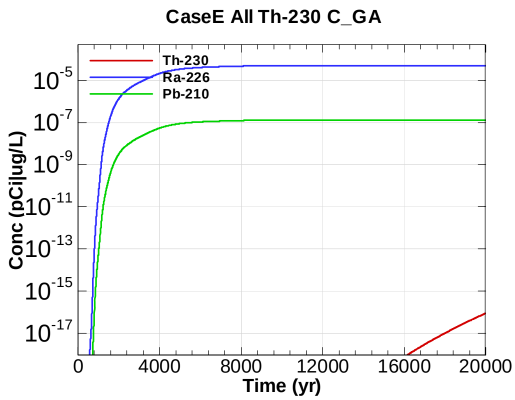

Figure O-223 - 100m Aquifer Concentration for CaseE All Th-230 C_GA

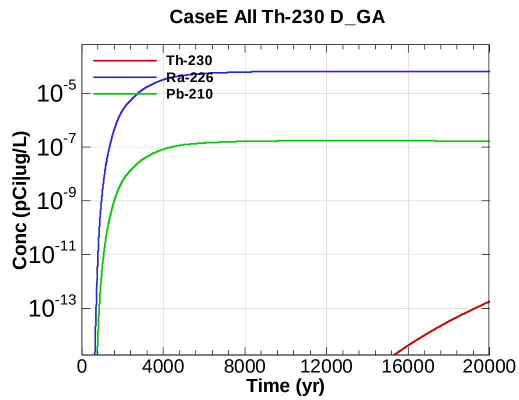

Figure O-224 - 100m Aquifer Concentration for CaseE All Th-230 D_GA

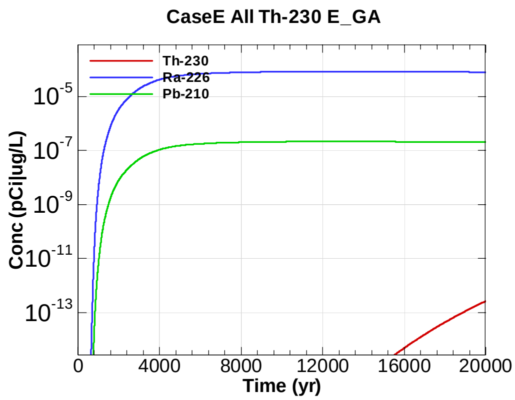

Figure O-225 - 100m Aquifer Concentration for CaseE All Th-230 E_GA

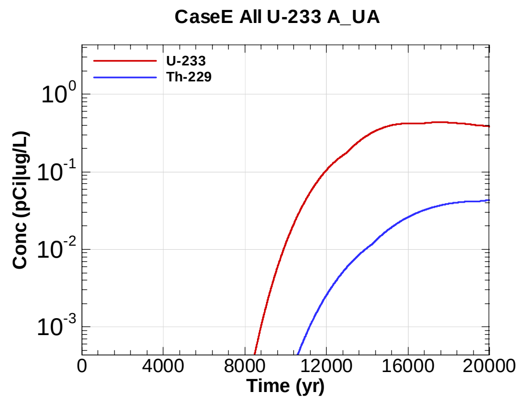

Figure O-226 - 100m Aquifer Concentration for CaseE All U-233 A_UA

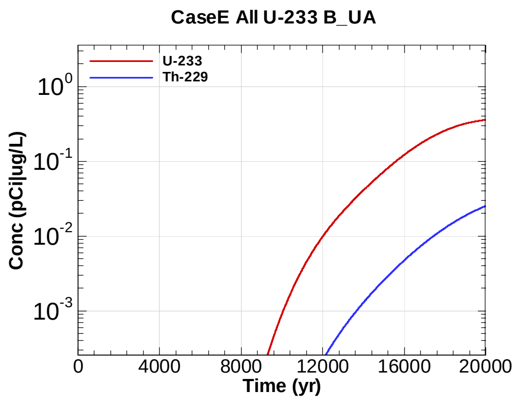

Figure O-227 - 100m Aquifer Concentration for CaseE All U-233 B_UA

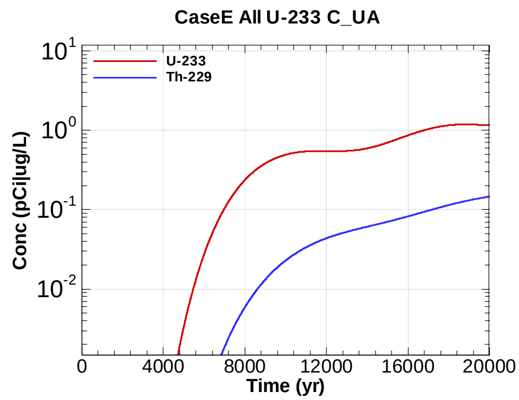

Figure O-228 - 100m Aquifer Concentration for CaseE All U-233 C_UA

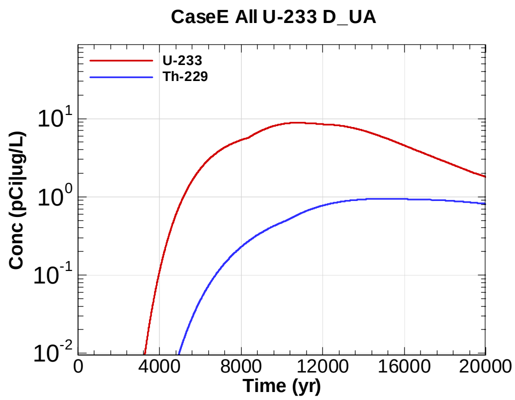

Figure O-229 - 100m Aquifer Concentration for CaseE All U-233 D_UA

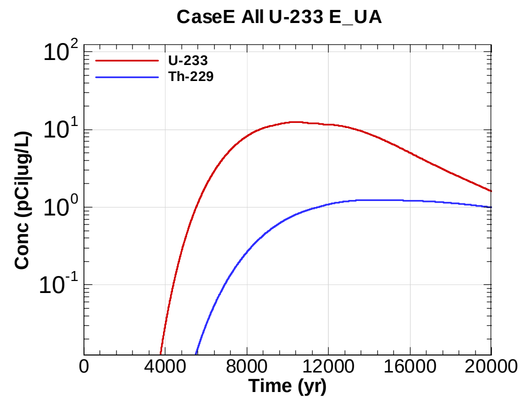

Figure O-230 - 100m Aquifer Concentration for CaseE All U-233 E_UA

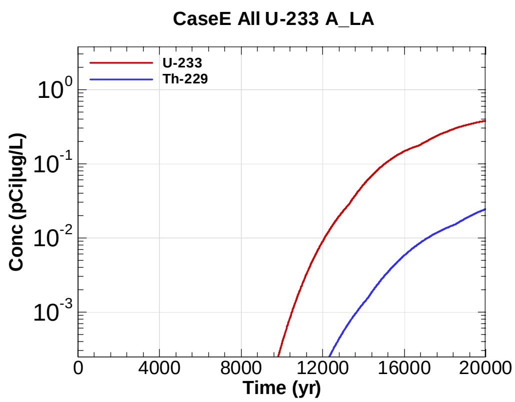

Figure O-231 - 100m Aquifer Concentration for CaseE All U-233 A_LA

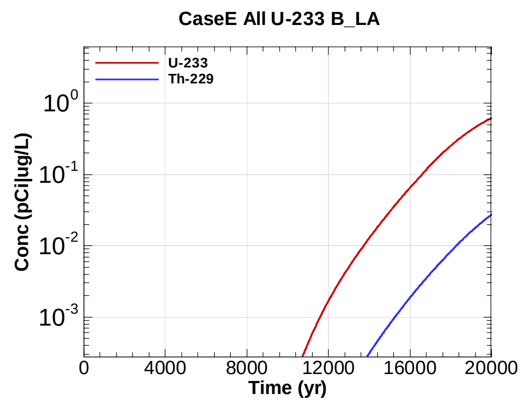

Figure O-232 - 100m Aquifer Concentration for CaseE All U-233 B_LA

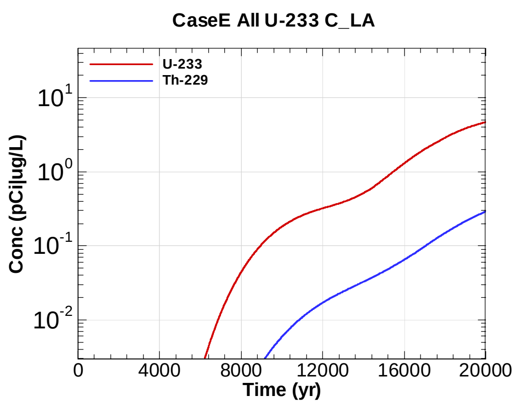

Figure O-233 - 100m Aquifer Concentration for CaseE All U-233 C_LA

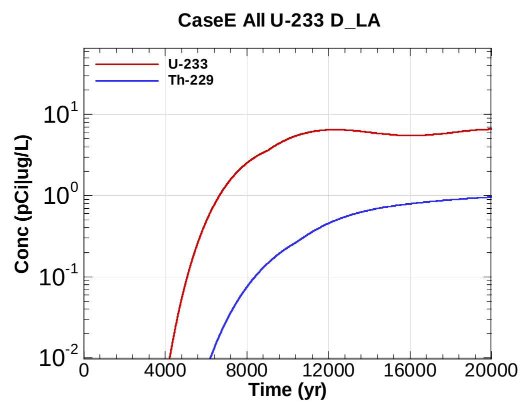

Figure O-234 - 100m Aquifer Concentration for CaseE All U-233 D_LA

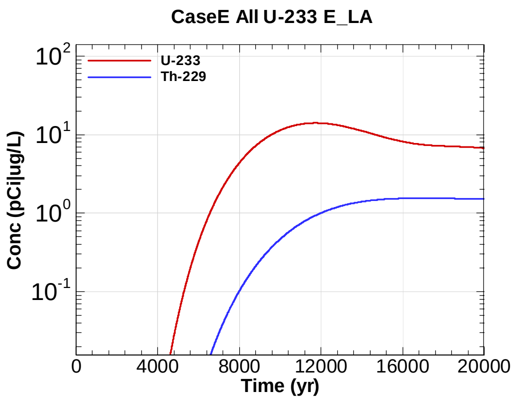

Figure O-235 - 100m Aquifer Concentration for CaseE All U-233 E_LA

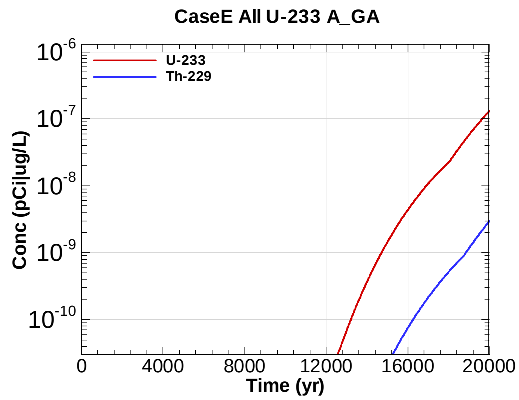

Figure O-236 - 100m Aquifer Concentration for CaseE All U-233 A_GA

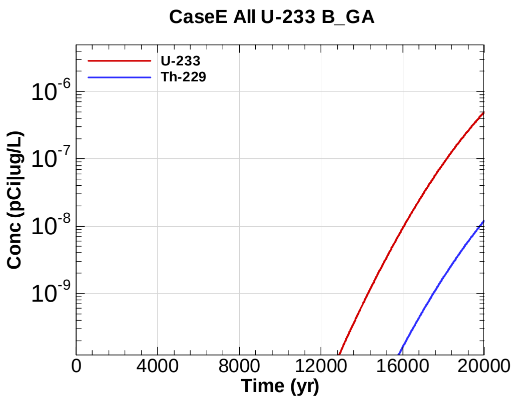

Figure O-237 - 100m Aquifer Concentration for CaseE All U-233 B_GA

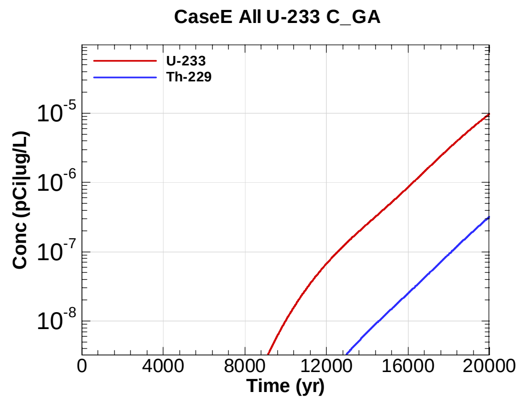

Figure O-238 - 100m Aquifer Concentration for CaseE All U-233 C_GA

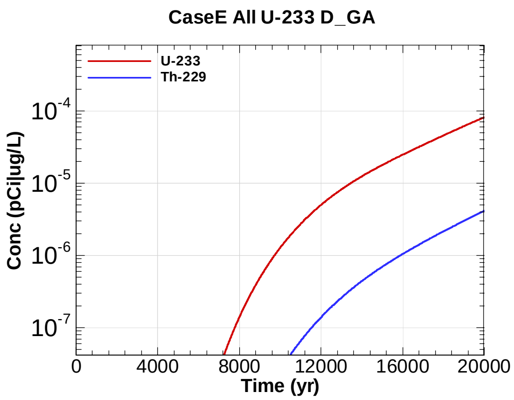

Figure O-239 - 100m Aquifer Concentration for CaseE All U-233 D_GA

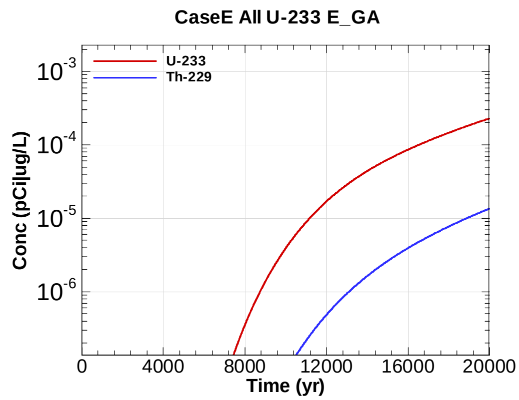

Figure O-240 - 100m Aquifer Concentration for CaseE All U-233 E_GA

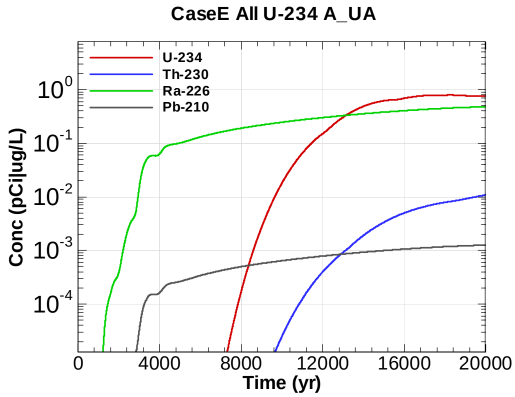

Figure O-241 - 100m Aquifer Concentration for CaseE All U-234 A_UA

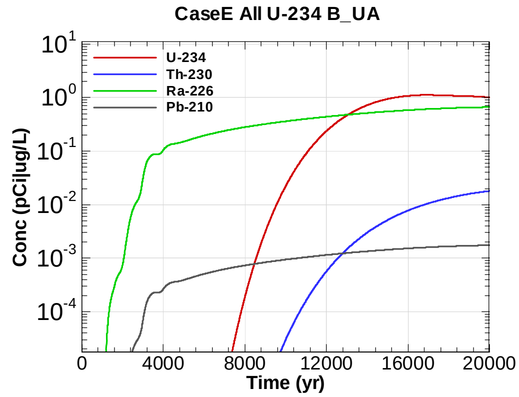

Figure O-242 - 100m Aquifer Concentration for CaseE All U-234 B_UA

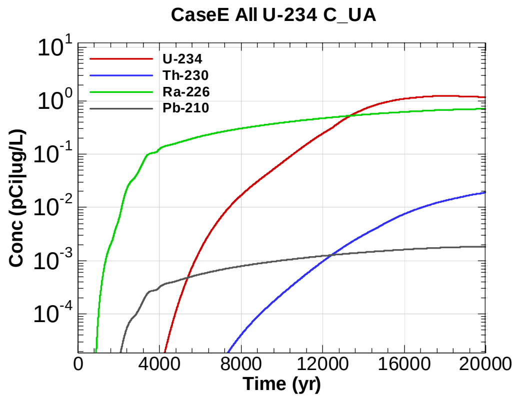

Figure O-243 - 100m Aquifer Concentration for CaseE All U-234 C_UA

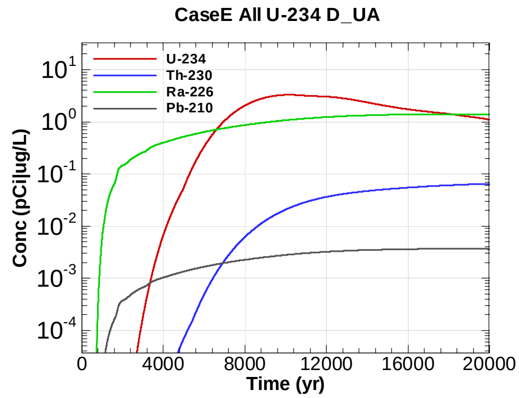

Figure O-244 - 100m Aquifer Concentration for CaseE All U-234 D_UA

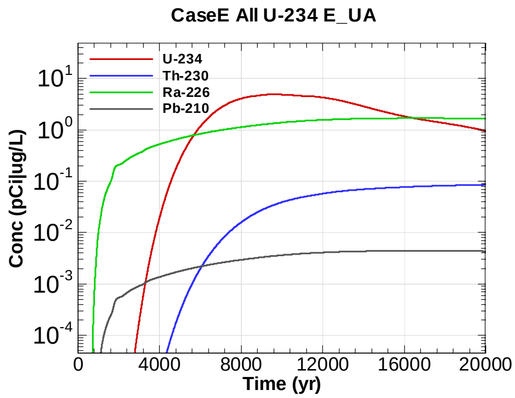

Figure O-245 - 100m Aquifer Concentration for CaseE All U-234 E_UA

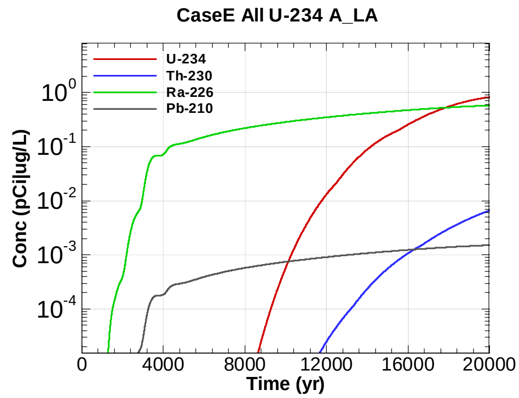

Figure O-246 - 100m Aquifer Concentration for CaseE All U-234 A_LA

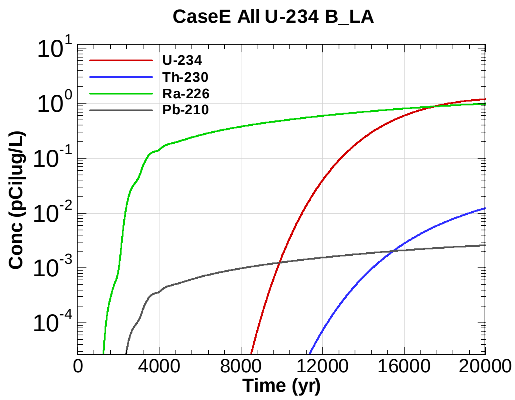

Figure O-247 - 100m Aquifer Concentration for CaseE All U-234 B_LA

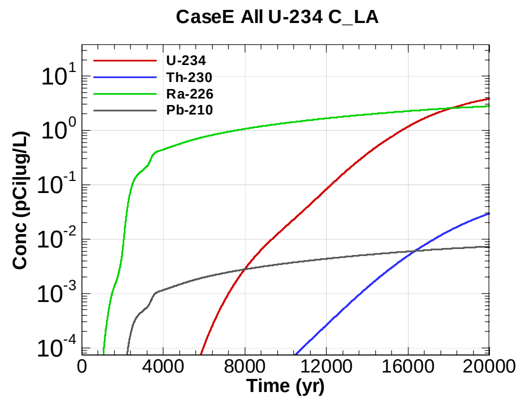

Figure O-248 - 100m Aquifer Concentration for CaseE All U-234 C_LA

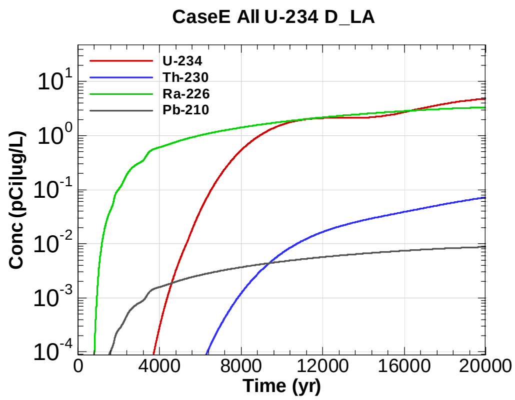

Figure O-249 - 100m Aquifer Concentration for CaseE All U-234 D_LA

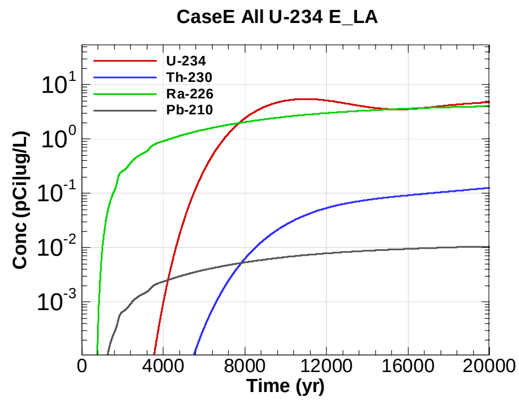

Figure O-250 - 100m Aquifer Concentration for CaseE All U-234 E_LA

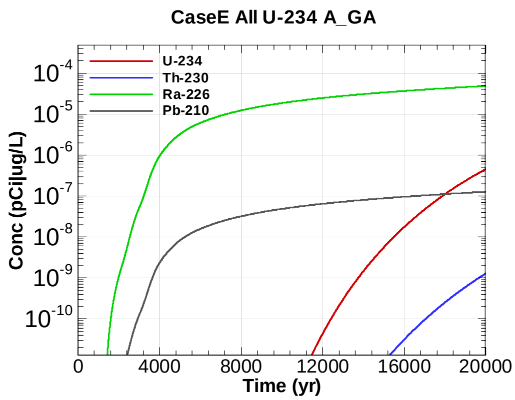

Figure O-251 - 100m Aquifer Concentration for CaseE All U-234 A_GA

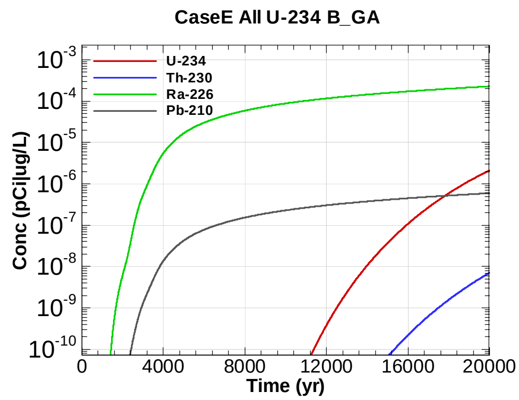

Figure O-252 - 100m Aquifer Concentration for CaseE All U-234 B_GA

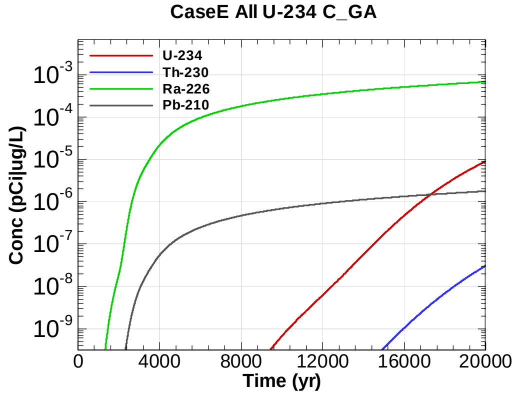

Figure O-253 - 100m Aquifer Concentration for CaseE All U-234 C_GA

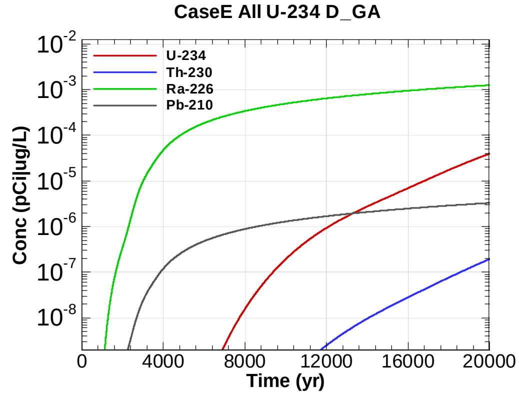

Figure O-254 - 100m Aquifer Concentration for CaseE All U-234 D_GA

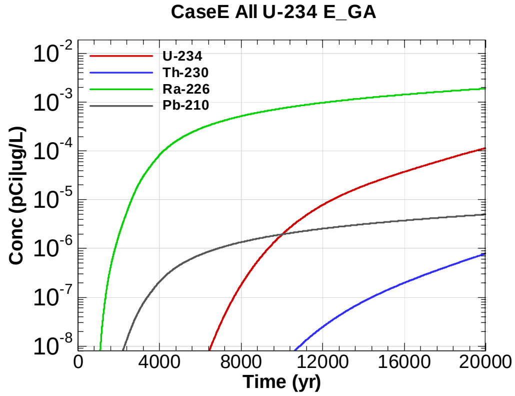

Figure O-255 - 100m Aquifer Concentration for CaseE All U-234 E_GA

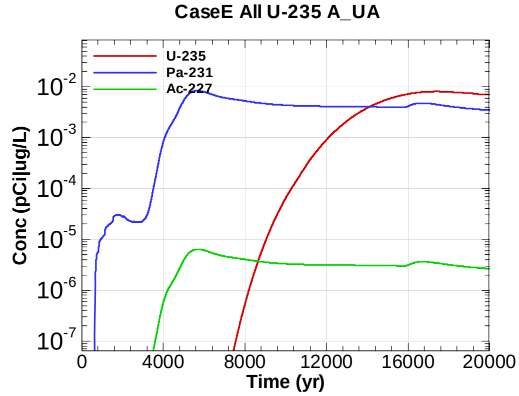

Figure O-256 - 100m Aquifer Concentration for CaseE All U-235 A_UA

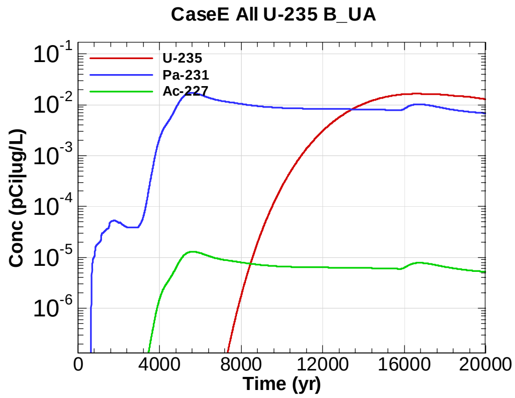

Figure O-257 - 100m Aquifer Concentration for CaseE All U-235 B_UA

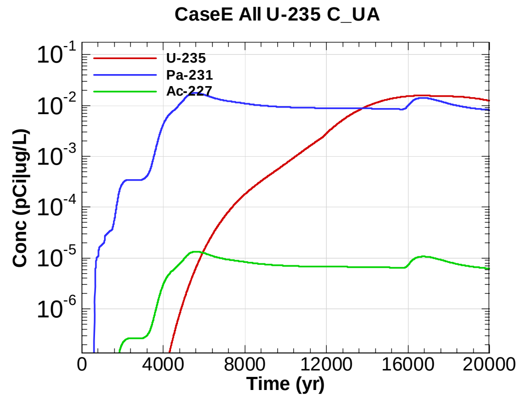

Figure O-258 - 100m Aquifer Concentration for CaseE All U-235 C_UA

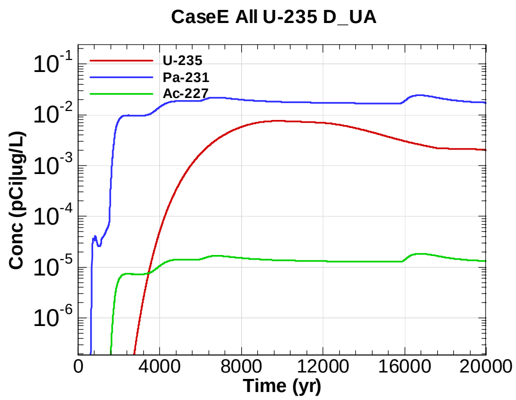

Figure O-259 - 100m Aquifer Concentration for CaseE All U-235 D_UA

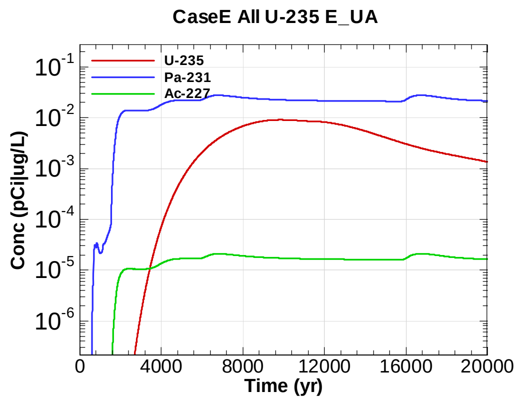

Figure O-260 - 100m Aquifer Concentration for CaseE All U-235 E_UA

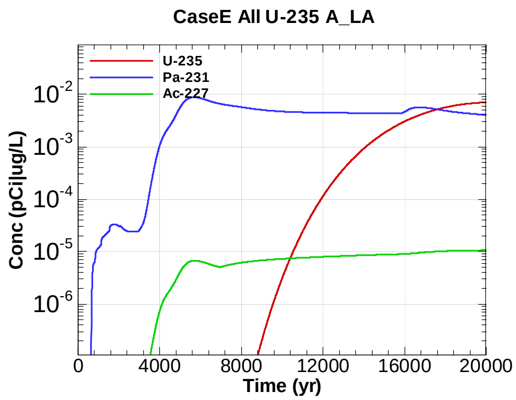

Figure O-261 - 100m Aquifer Concentration for CaseE All U-235 A_LA

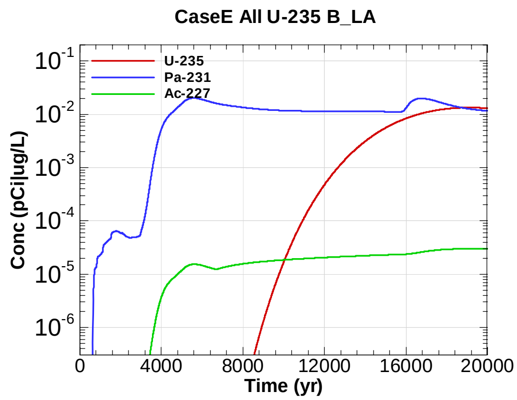

Figure O-262 - 100m Aquifer Concentration for CaseE All U-235 B_LA

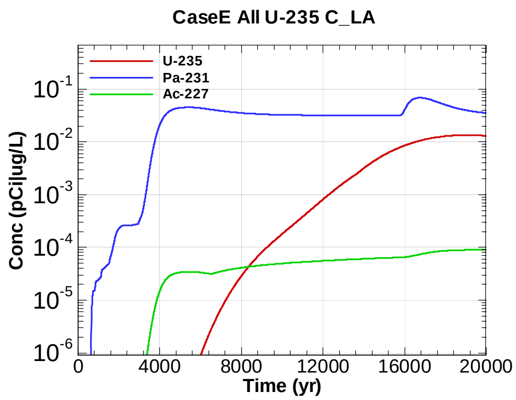

Figure O-263 - 100m Aquifer Concentration for CaseE All U-235 C_LA

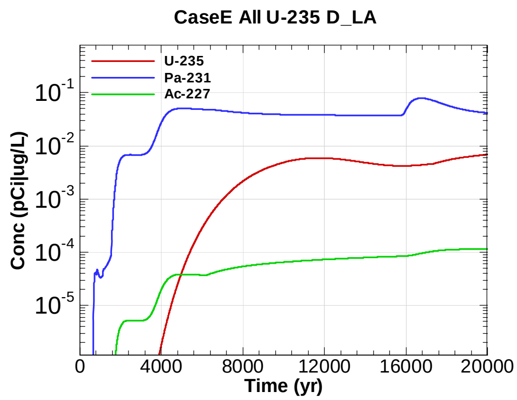

Figure O-264 - 100m Aquifer Concentration for CaseE All U-235 D_LA

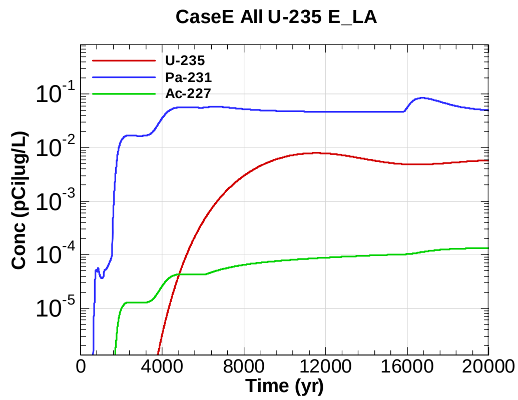

Figure O-265 - 100m Aquifer Concentration for CaseE All U-235 E_LA

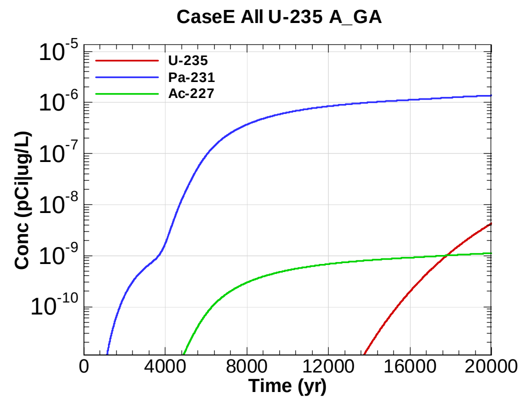

Figure O-266 - 100m Aquifer Concentration for CaseE All U-235 A_GA

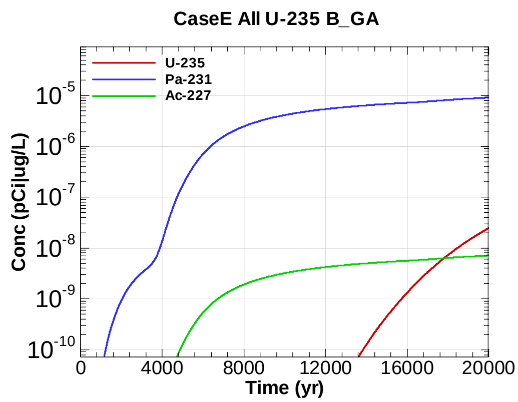

Figure O-267 - 100m Aquifer Concentration for CaseE All U-235 B_GA

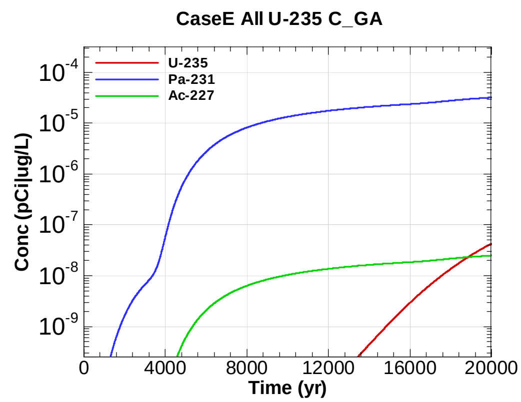

Figure O-268 - 100m Aquifer Concentration for CaseE All U-235 C_GA

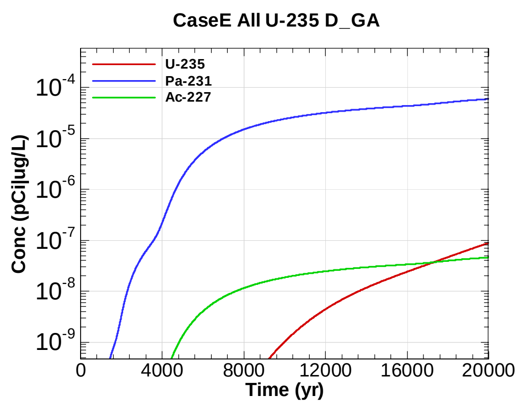

Figure O-269 - 100m Aquifer Concentration for CaseE All U-235 D_GA

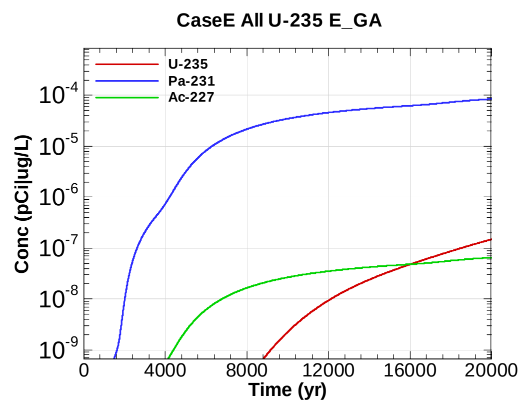

Figure O-270 - 100m Aquifer Concentration for CaseE All U-235 E_GA

Appendix P
100-METER SENSITIVITY RUN RADIONUCLIDE CONCENTRATIONS FOR CASE F

Appendix P contains curves showing the one-hundred meter radiological concentrations (sensitivity run radionuclides only) for the Base Case (Case/Configuration F). 20,000 year concentration results are presented from the three aquifers of concern (Upper Three Runs Aquifer-Upper Zone, Upper Three Runs-Lower Zone, and Gordon Aquifer) for Sectors A through E.

Graph heading example “CaseF All Am-241 A_UA”

Key

CaseF = scenario case/configuration
All = all FTF inventory source
Am-241 = radionuclide of concern
A = sector of concern (see sector map with stream traces)
UA = aquifer of concern
UA = Upper Three Runs – Upper Zone
LA = Upper Three Runs – Lower Zone
GA = Gordon

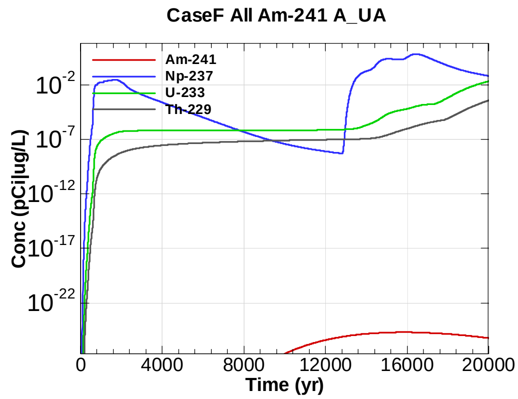

Figure P-1 - 100m Aquifer Concentration for CaseF All Am-241 A_UA

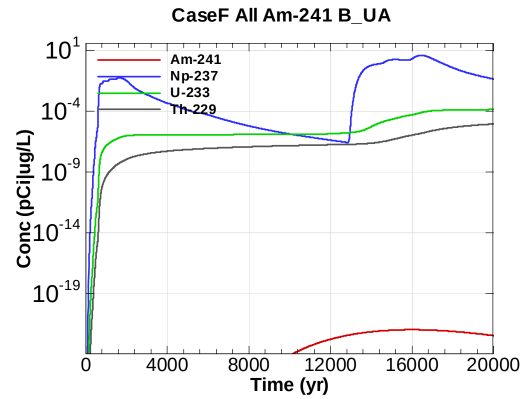

Figure P-2 - 100m Aquifer Concentration for CaseF All Am-241 B_UA

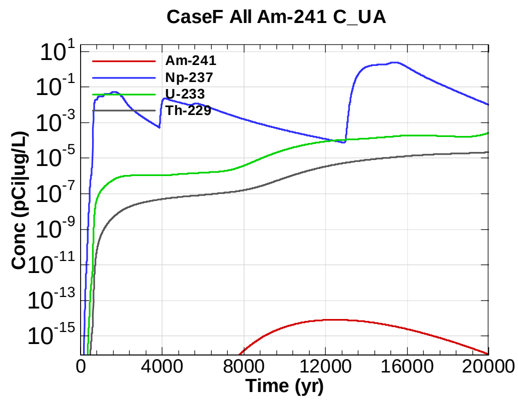

Figure P-3 - 100m Aquifer Concentration for CaseF All Am-241 C_UA

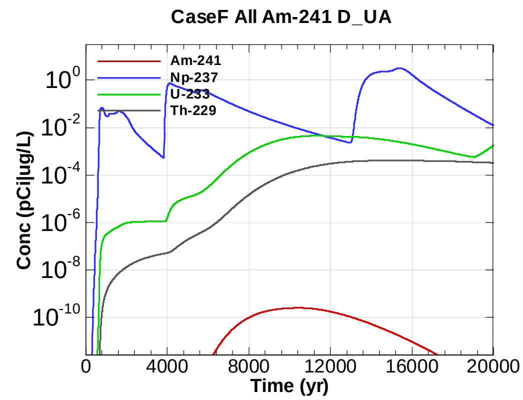

Figure P-4 - 100m Aquifer Concentration for CaseF All Am-241 D_UA

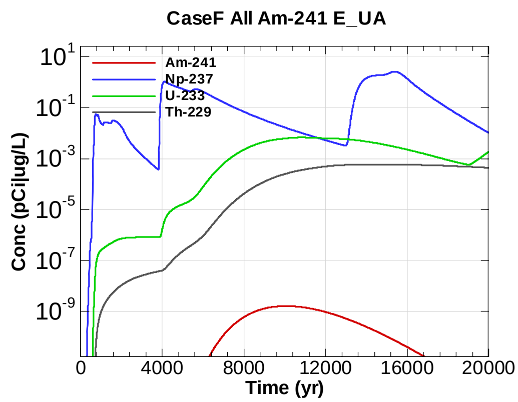

Figure P-5 - 100m Aquifer Concentration for CaseF All Am-241 E_UA

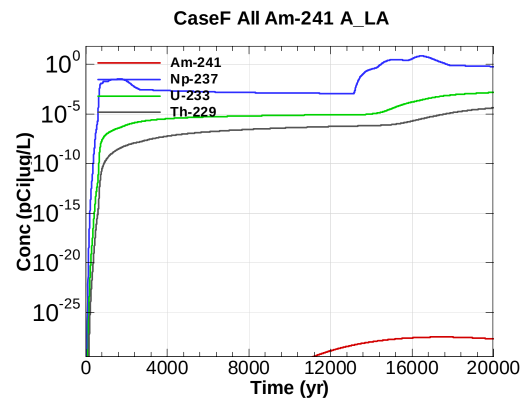

Figure P-6 - 100m Aquifer Concentration for CaseF All Am-241 A_LA

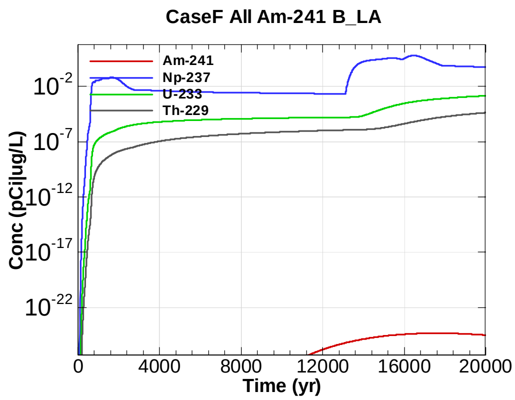

Figure P-7 - 100m Aquifer Concentration for CaseF All Am-241 B_LA

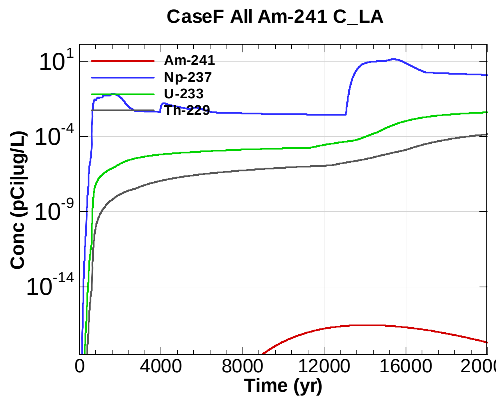

Figure P-8 - 100m Aquifer Concentration for CaseF All Am-241 C_LA

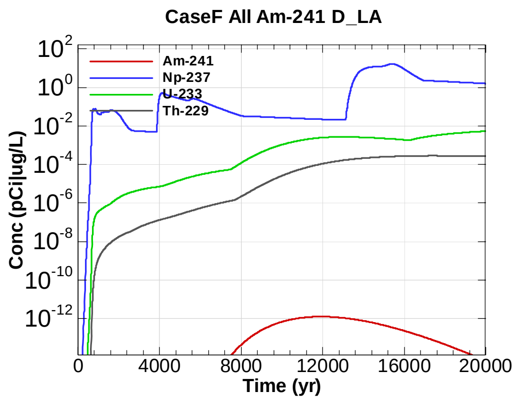

Figure P-9 - 100m Aquifer Concentration for CaseF All Am-241 D_LA

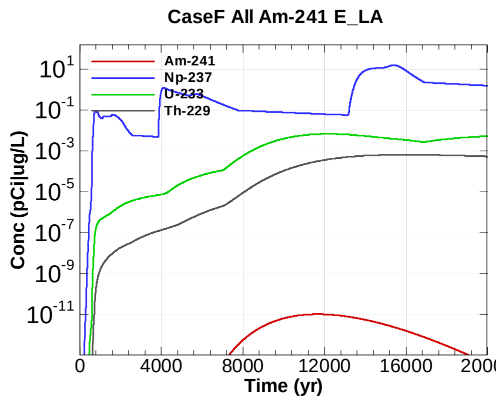

Figure P-10 - 100m Aquifer Concentration for CaseF All Am-241 E_LA

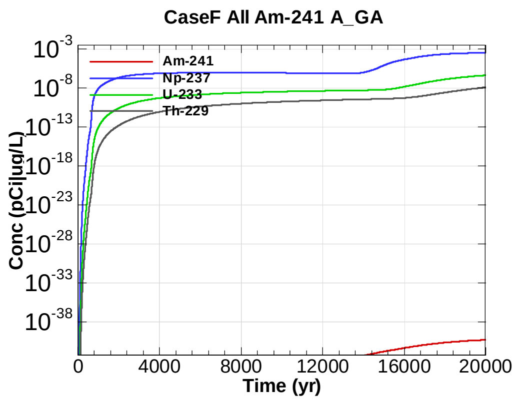

Figure P-11 - 100m Aquifer Concentration for CaseF All Am-241 A_GA

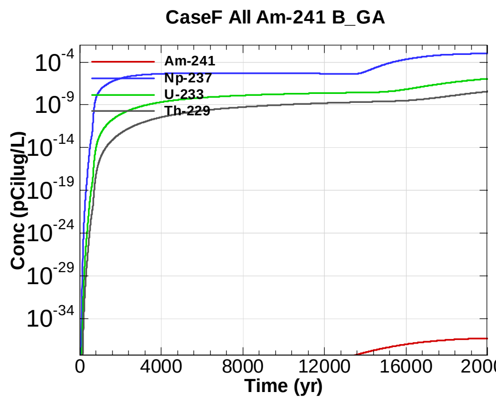

Figure P-12 - 100m Aquifer Concentration for CaseF All Am-241 B_GA

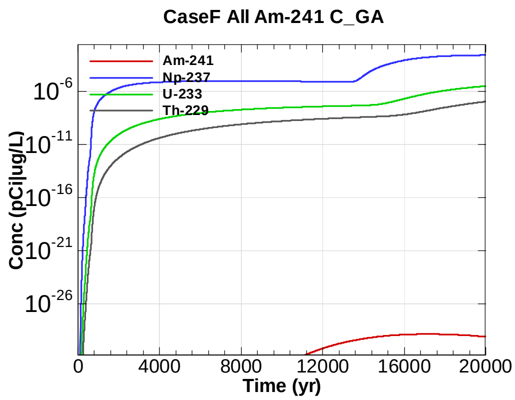

Figure P-13 - 100m Aquifer Concentration for CaseF All Am-241 C_GA

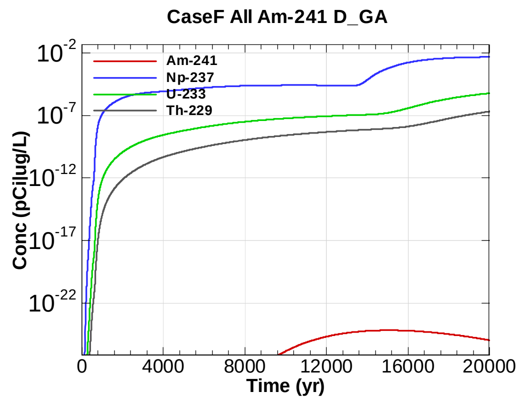

Figure P-14 - 100m Aquifer Concentration for CaseF All Am-241 D_GA

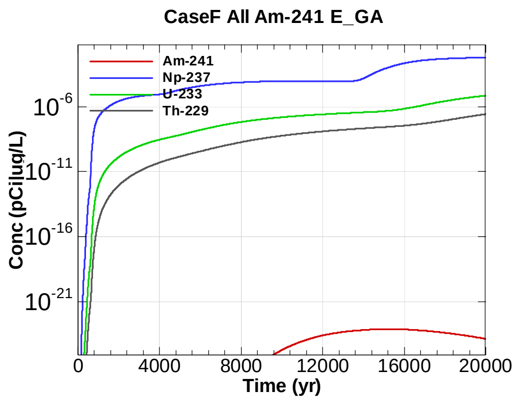

Figure P-15 - 100m Aquifer Concentration for CaseF All Am-241 E_GA

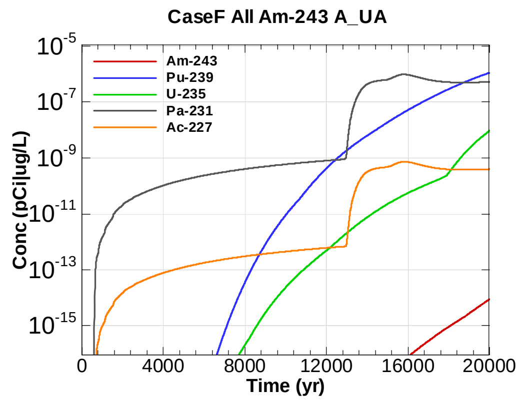

Figure P-16 - 100m Aquifer Concentration for CaseF All Am-243 A_UA

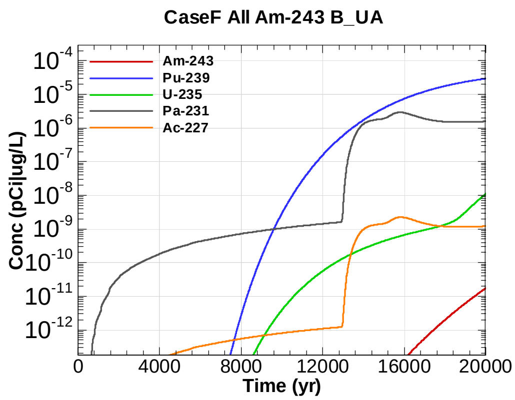

Figure P-17 - 100m Aquifer Concentration for CaseF All Am-243 B_UA

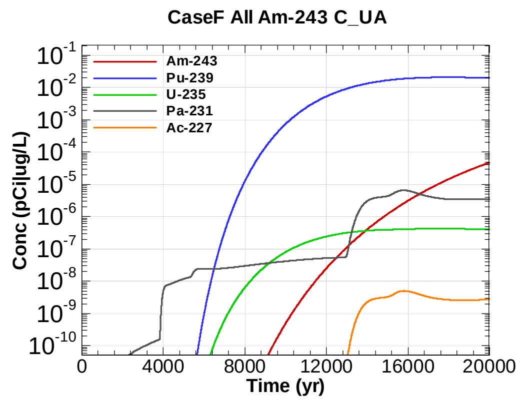

Figure P-18 - 100m Aquifer Concentration for CaseF All Am-243 C_UA

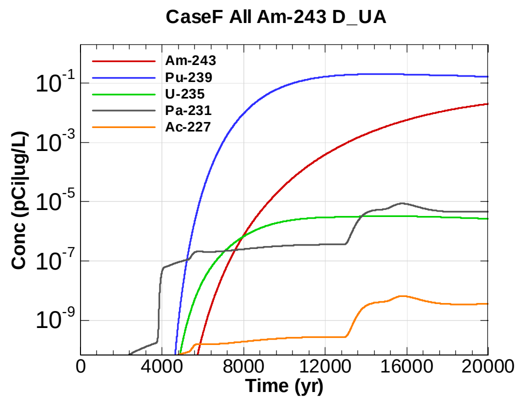

Figure P-19 - 100m Aquifer Concentration for CaseF All Am-243 D_UA

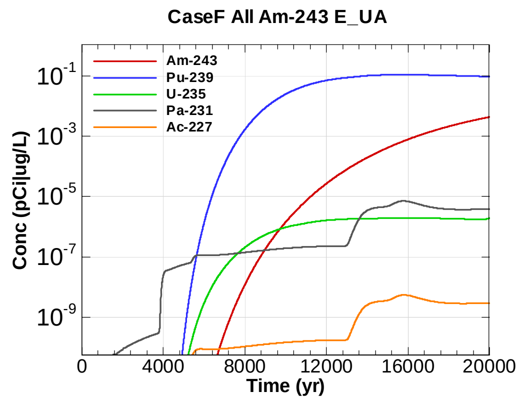

Figure P-20 - 100m Aquifer Concentration for CaseF All Am-243 E_UA

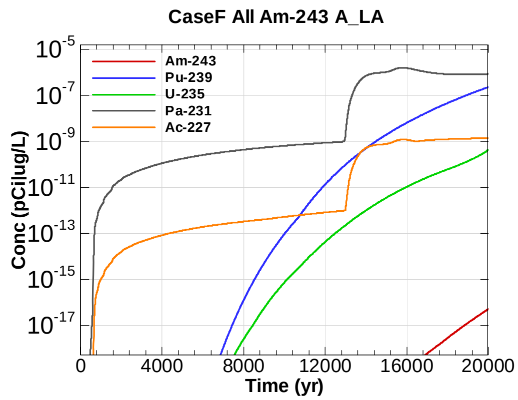

Figure P-21 - 100m Aquifer Concentration for CaseF All Am-243 A_LA

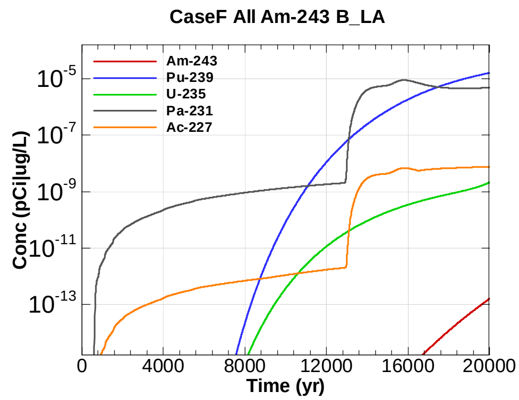

Figure P-22 - 100m Aquifer Concentration for CaseF All Am-243 B_LA

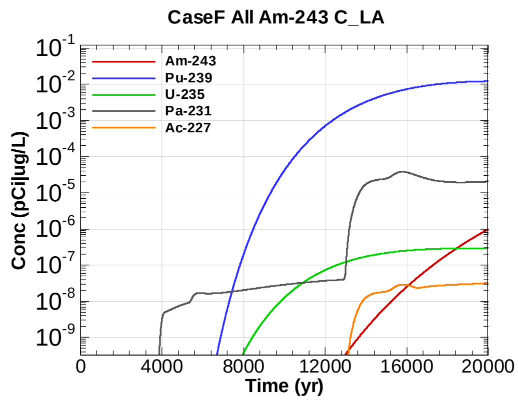

Figure P-23 - 100m Aquifer Concentration for CaseF All Am-243 C_LA

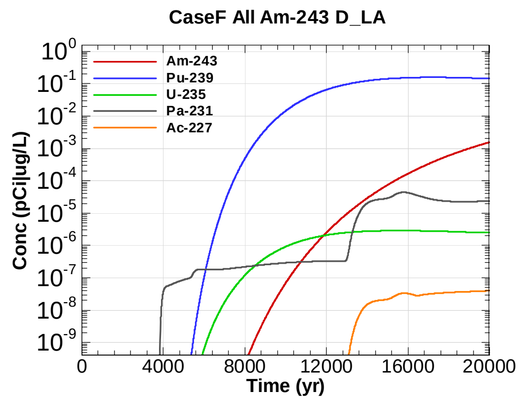

Figure P-24 - 100m Aquifer Concentration for CaseF All Am-243 D_LA

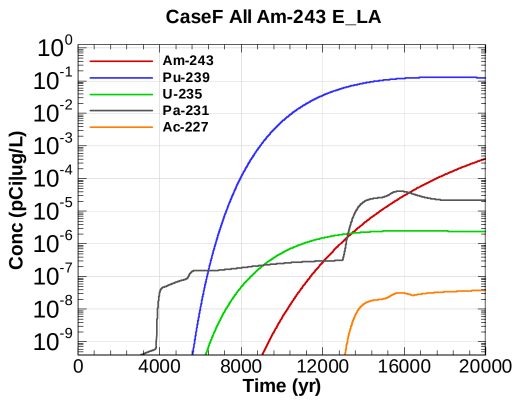

Figure P-25 - 100m Aquifer Concentration for CaseF All Am-243 E_LA

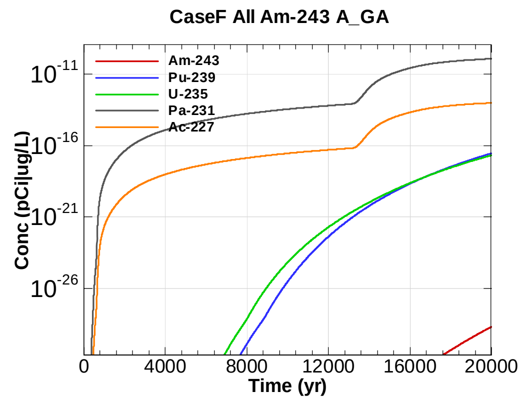

Figure P-26 - 100m Aquifer Concentration for CaseF All Am-243 A_GA

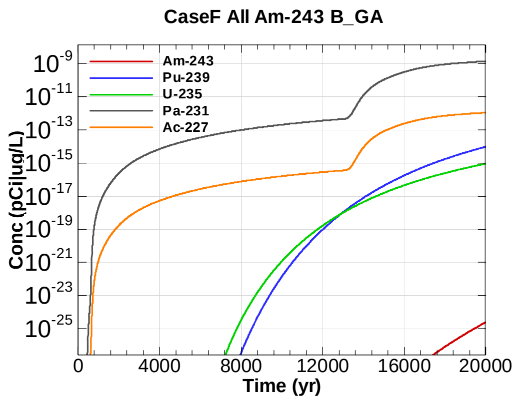

Figure P-27 - 100m Aquifer Concentration for CaseF All Am-243 B_GA

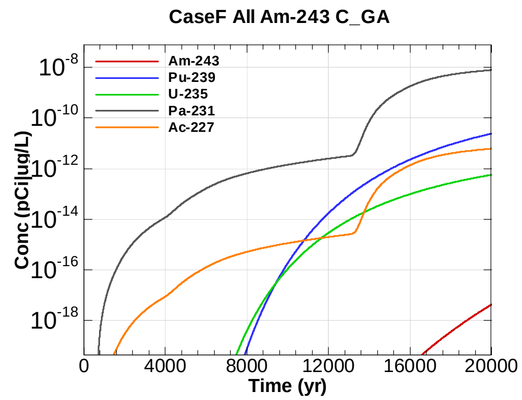

Figure P-28 - 100m Aquifer Concentration for CaseF All Am-243 C_GA

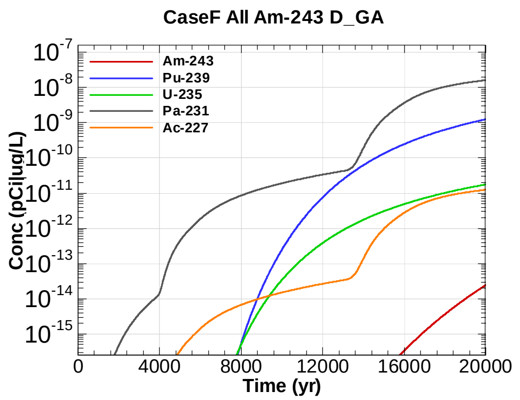

Figure P-29 - 100m Aquifer Concentration for CaseF All Am-243 D_GA

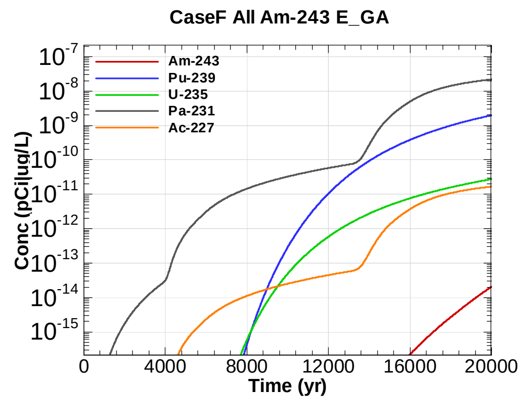

Figure P-30 - 100m Aquifer Concentration for CaseF All Am-243 E_GA

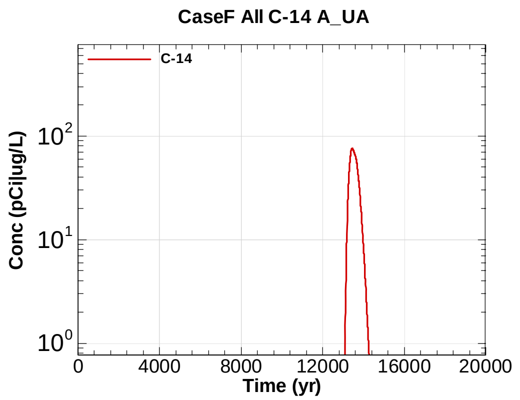

Figure P-31 - 100m Aquifer Concentration for CaseF All C-14 A_UA

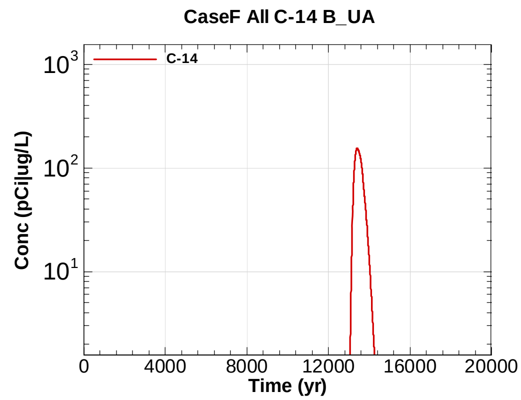

Figure P-32 - 100m Aquifer Concentration for CaseF All C-14 B_UA

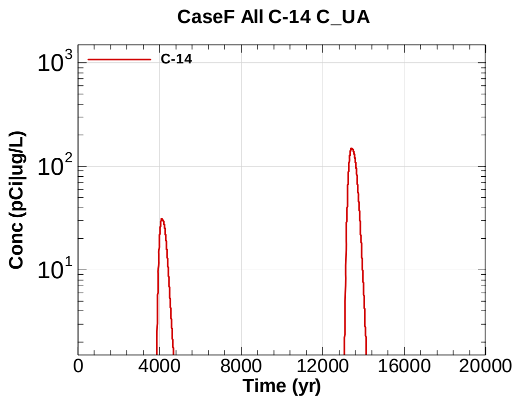

Figure P-33 - 100m Aquifer Concentration for CaseF All C-14 C_UA

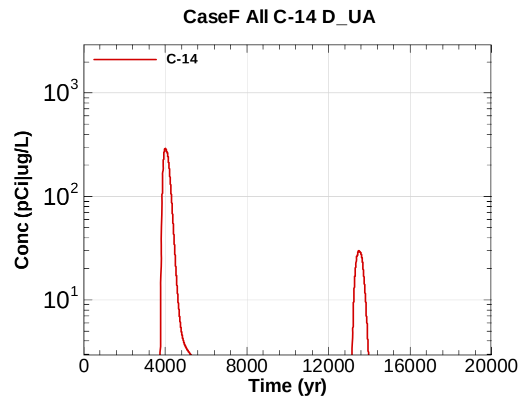

Figure P-34 - 100m Aquifer Concentration for CaseF All C-14 D_UA

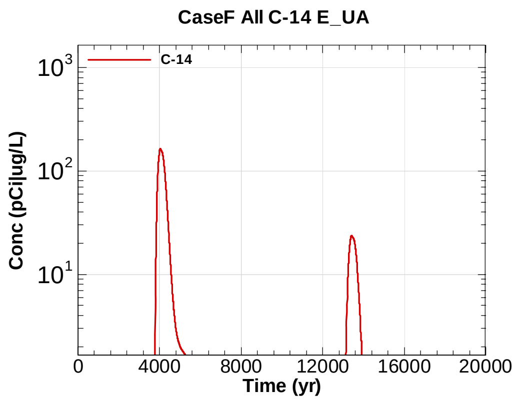

Figure P-35 - 100m Aquifer Concentration for CaseF All C-14 E_UA

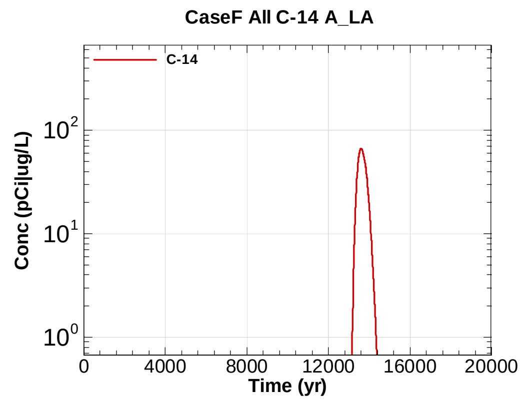

Figure P-36 - 100m Aquifer Concentration for CaseF All C-14 A_LA

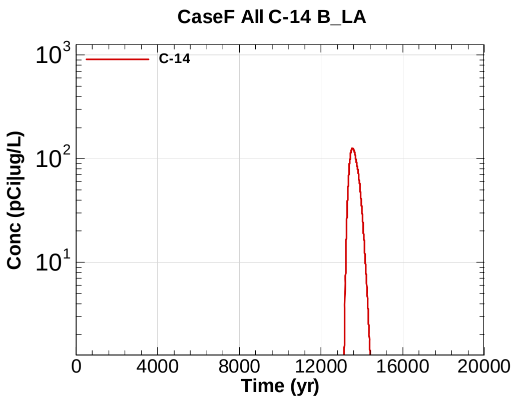

Figure P-37 - 100m Aquifer Concentration for CaseF All C-14 B_LA

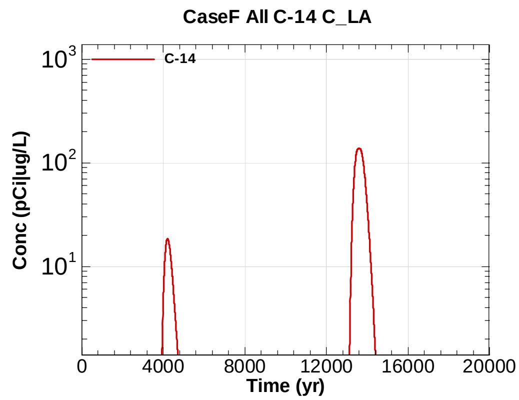

Figure P-38 - 100m Aquifer Concentration for CaseF All C-14 C_LA

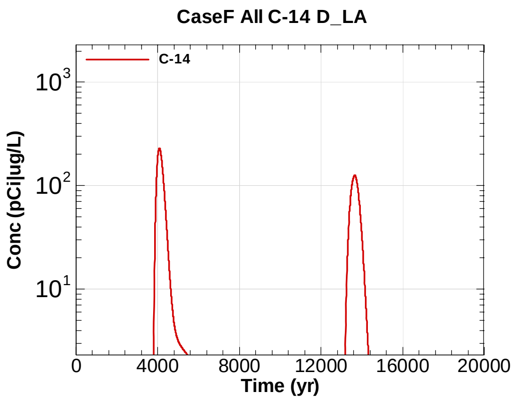

Figure P-39 - 100m Aquifer Concentration for CaseF All C-14 D_LA

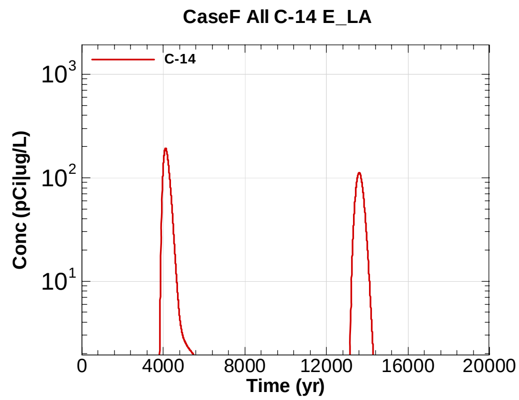

Figure P-40 - 100m Aquifer Concentration for CaseF All C-14 E_LA

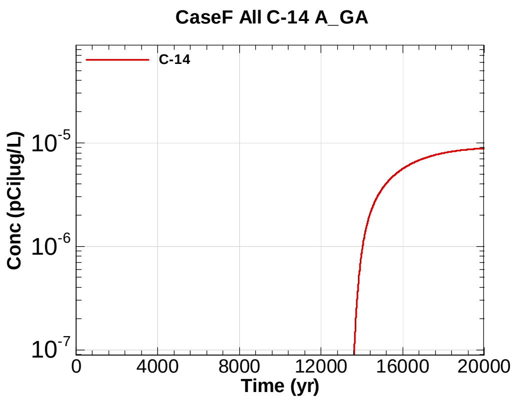

Figure P-41 - 100m Aquifer Concentration for CaseF All C-14 A_GA

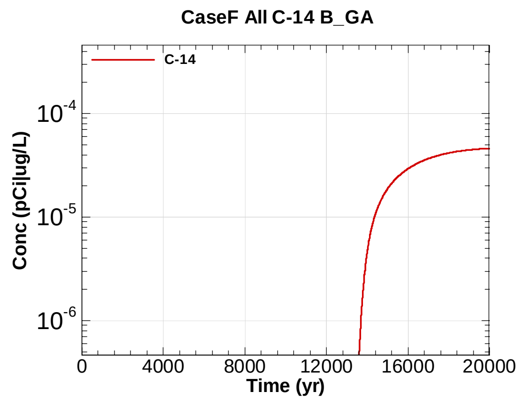

Figure P-42 - 100m Aquifer Concentration for CaseF All C-14 B_GA

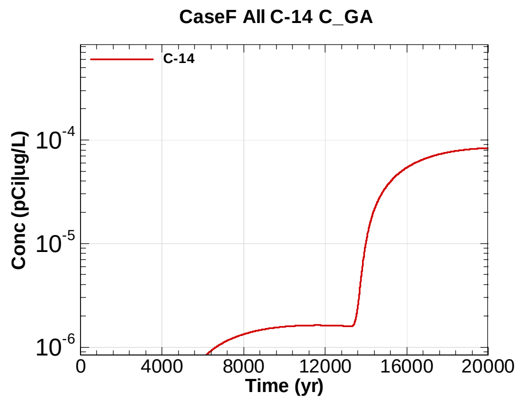

Figure P-43 - 100m Aquifer Concentration for CaseF All C-14 C_GA

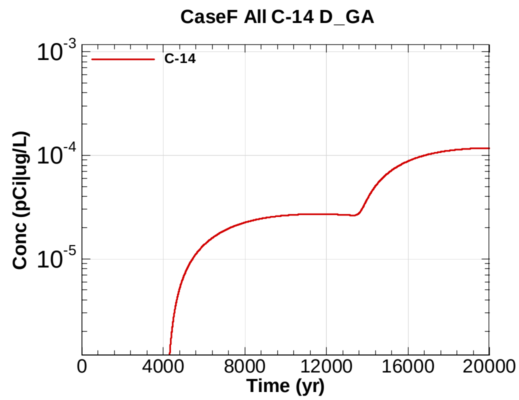

Figure P-44 - 100m Aquifer Concentration for CaseF All C-14 D_GA

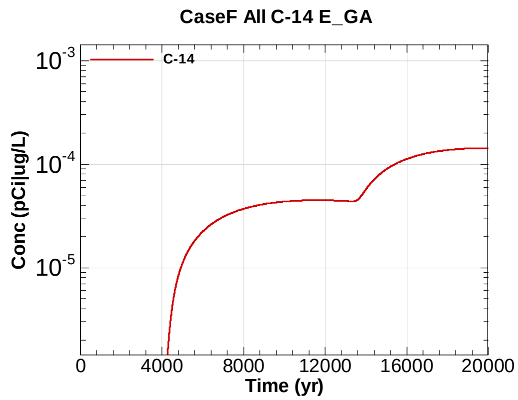

Figure P-45 - 100m Aquifer Concentration for CaseF All C-14 E_GA

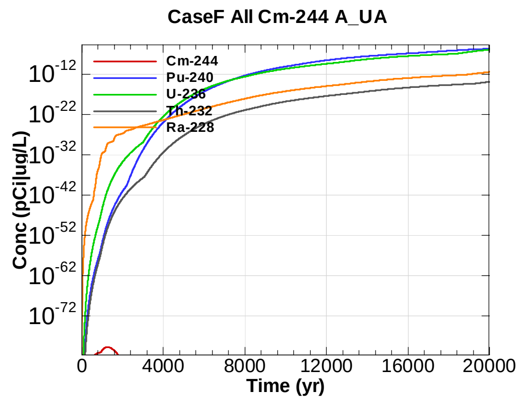

Figure P-46 - 100m Aquifer Concentration for CaseF All Cm-244 A_UA

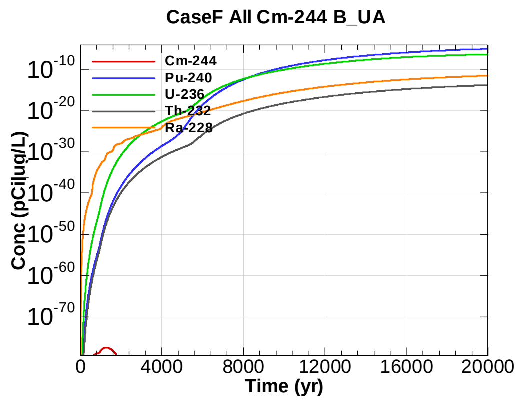

Figure P-47 - 100m Aquifer Concentration for CaseF All Cm-244 B_UA

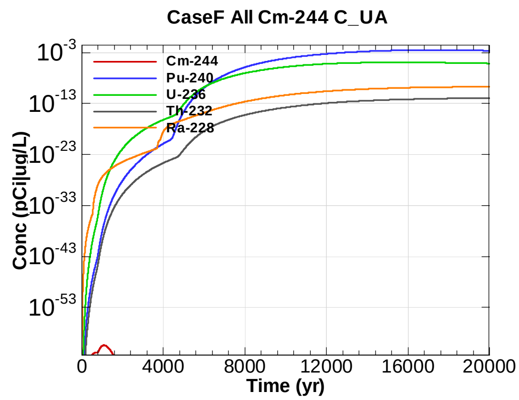

Figure P-48 - 100m Aquifer Concentration for CaseF All Cm-244 C_UA

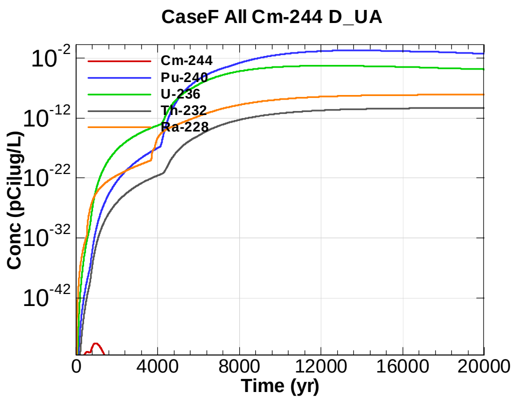

Figure P-49 - 100m Aquifer Concentration for CaseF All Cm-244 D_UA

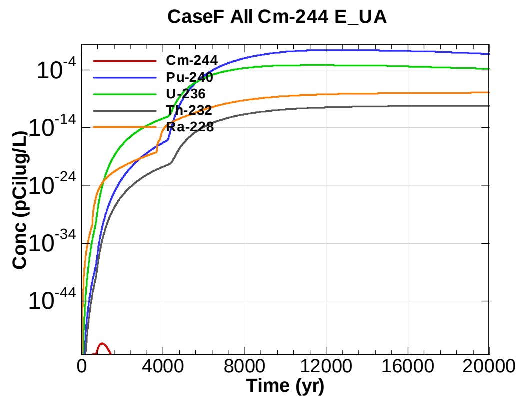

Figure P-50 - 100m Aquifer Concentration for CaseF All Cm-244 E_UA

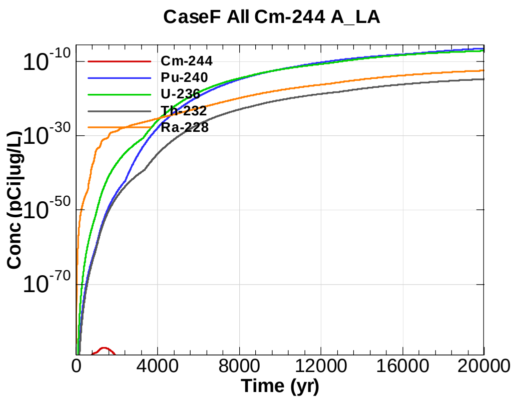

Figure P-51 - 100m Aquifer Concentration for CaseF All Cm-244 A_LA

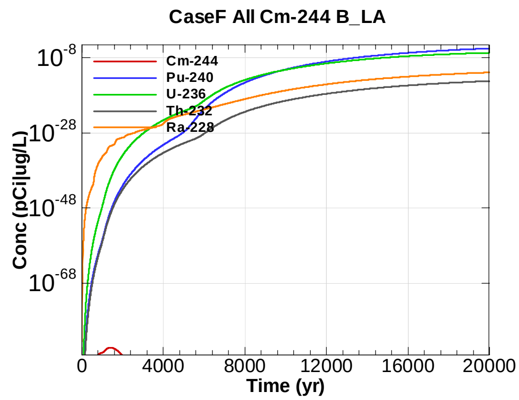

Figure P-52 - 100m Aquifer Concentration for CaseF All Cm-244 B_LA

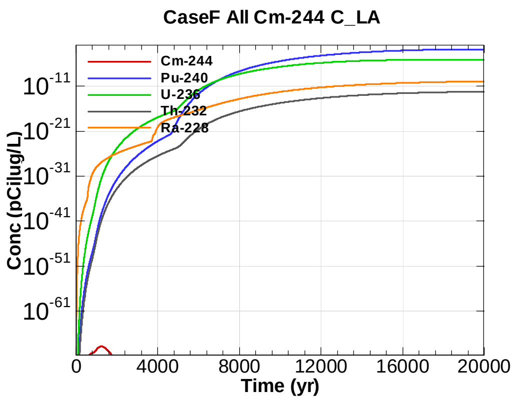

Figure P-53 - 100m Aquifer Concentration for CaseF All Cm-244 C_LA

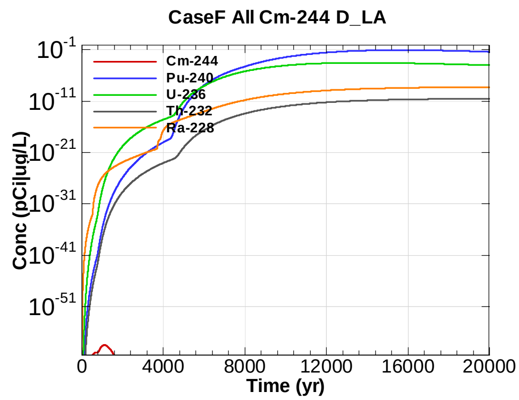

Figure P-54 - 100m Aquifer Concentration for CaseF All Cm-244 D_LA

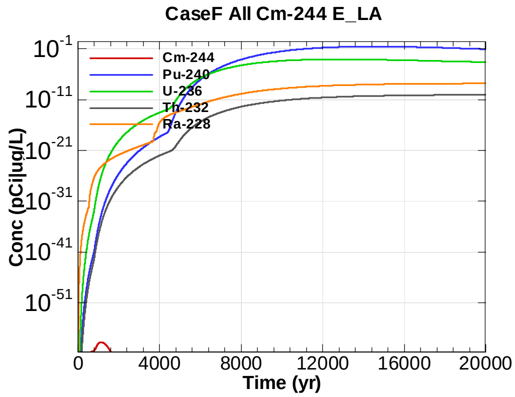

Figure P-55 - 100m Aquifer Concentration for CaseF All Cm-244 E_LA

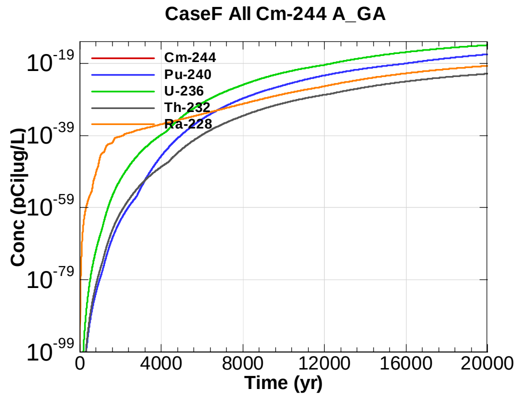

Figure P-56 - 100m Aquifer Concentration for CaseF All Cm-244 A_GA

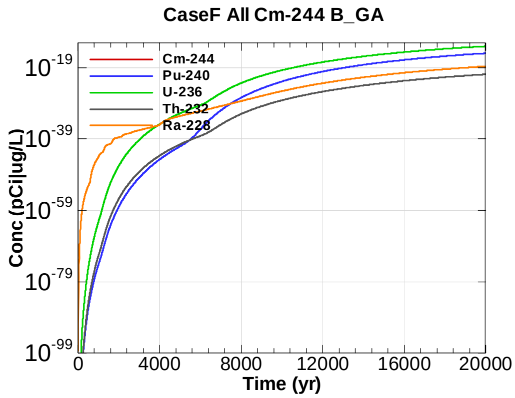

Figure P-57 - 100m Aquifer Concentration for CaseF All Cm-244 B_GA

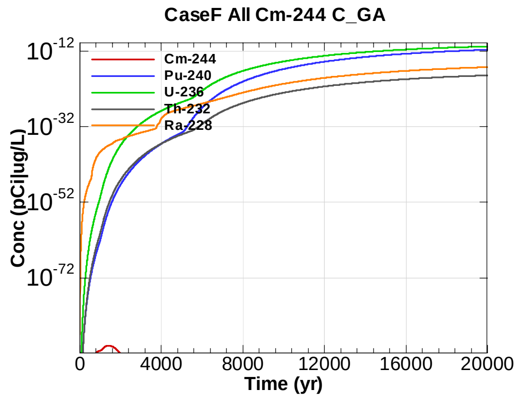

Figure P-58 - 100m Aquifer Concentration for CaseF All Cm-244 C_GA

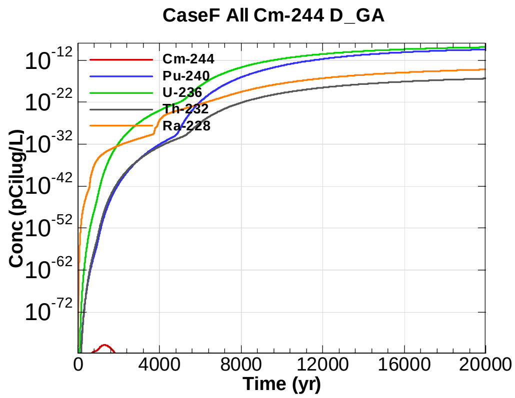

Figure P-59 - 100m Aquifer Concentration for CaseF All Cm-244 D_GA

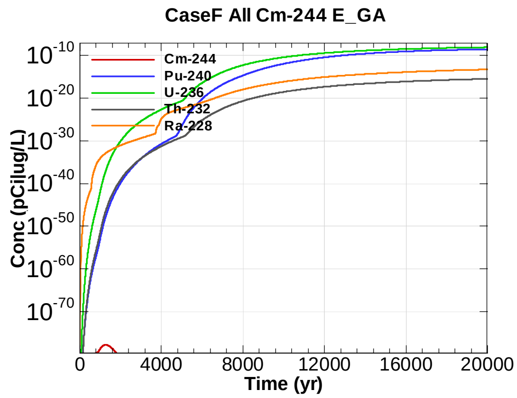

Figure P-60 - 100m Aquifer Concentration for CaseF All Cm-244 E_GA

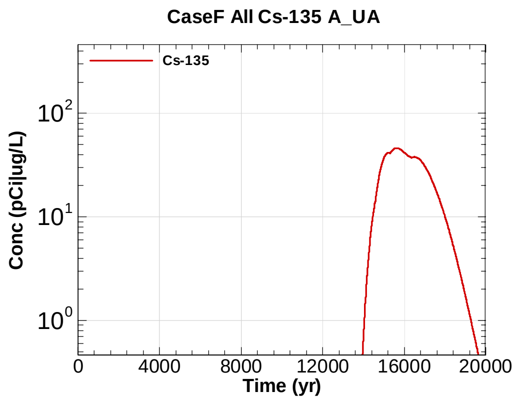

Figure P-61 - 100m Aquifer Concentration for CaseF All Cs-135 A_UA

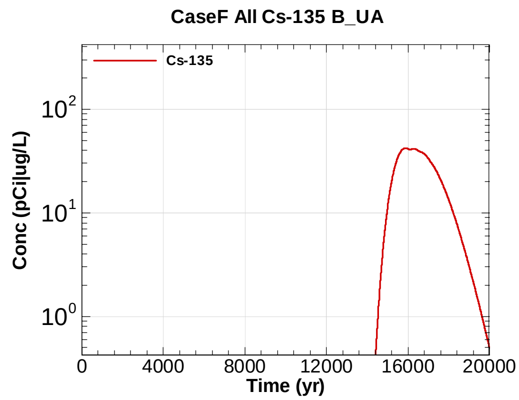

Figure P-62 - 100m Aquifer Concentration for CaseF All Cs-135 B_UA

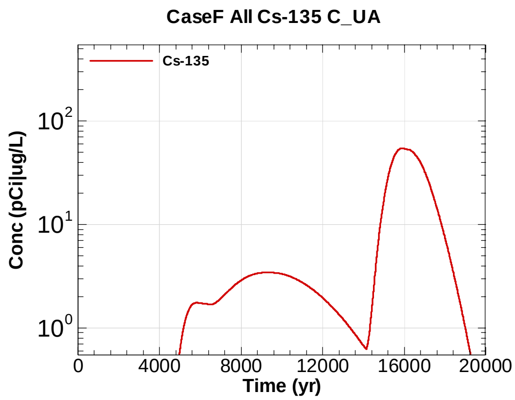

Figure P-63 - 100m Aquifer Concentration for CaseF All Cs-135 C_UA

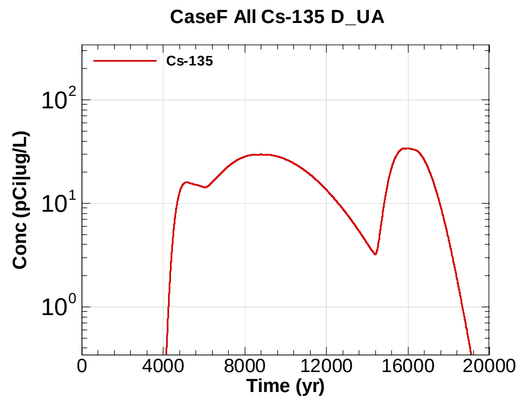

Figure P-64 - 100m Aquifer Concentration for CaseF All Cs-135 D_UA

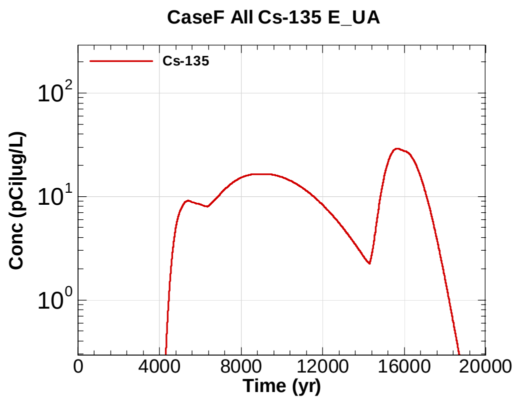

Figure P-65 - 100m Aquifer Concentration for CaseF All Cs-135 E_UA

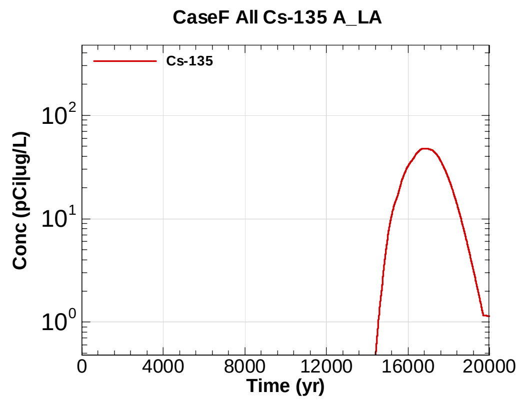

Figure P-66 - 100m Aquifer Concentration for CaseF All Cs-135 A_LA

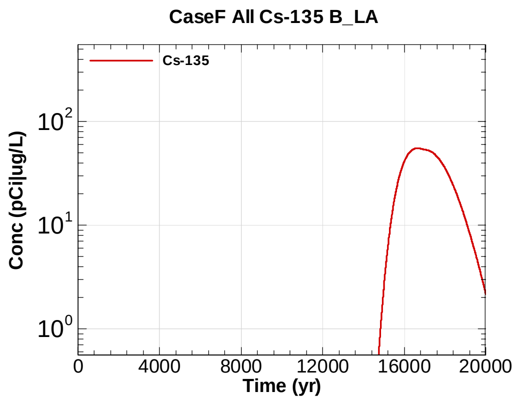

Figure P-67 - 100m Aquifer Concentration for CaseF All Cs-135 B_LA

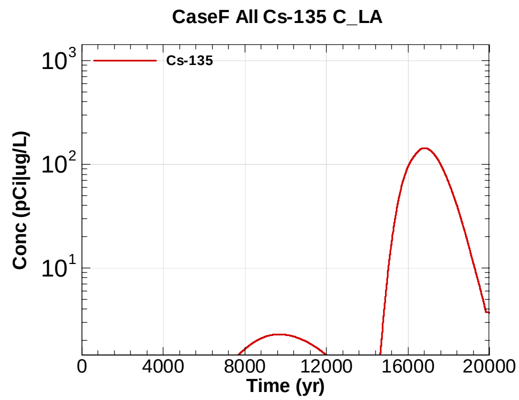

Figure P-68 - 100m Aquifer Concentration for CaseF All Cs-135 C_LA

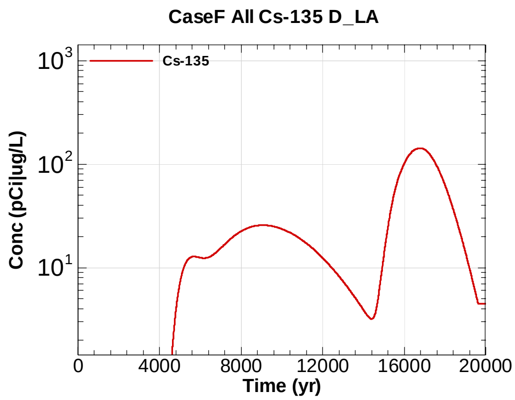

Figure P-69 - 100m Aquifer Concentration for CaseF All Cs-135 D_LA

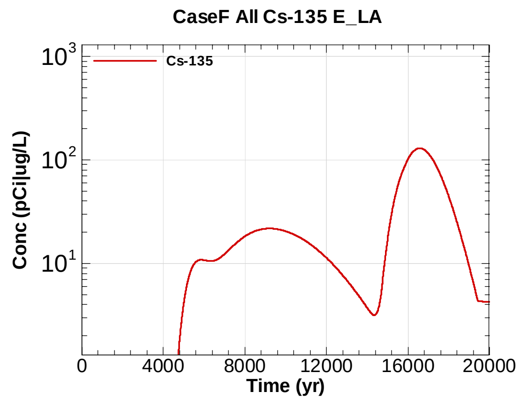

Figure P-70 - 100m Aquifer Concentration for CaseF All Cs-135 E_LA

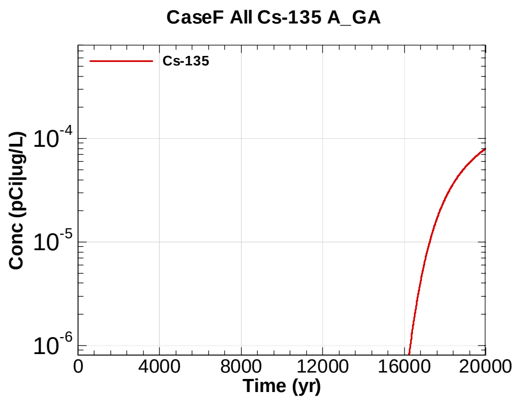

Figure P-71 - 100m Aquifer Concentration for CaseF All Cs-135 A_GA

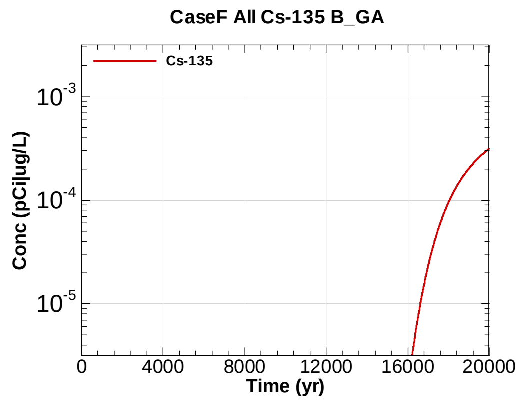

Figure P-72 - 100m Aquifer Concentration for CaseF All Cs-135 B_GA

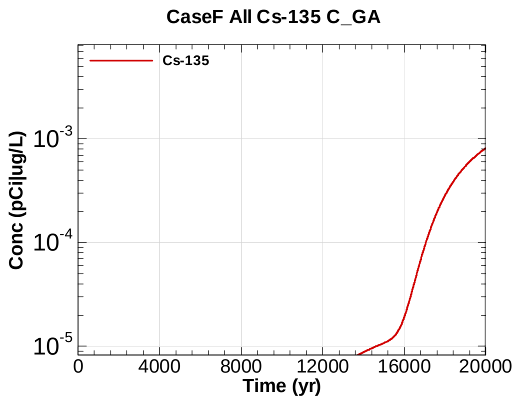

Figure P-73 - 100m Aquifer Concentration for CaseF All Cs-135 C_GA

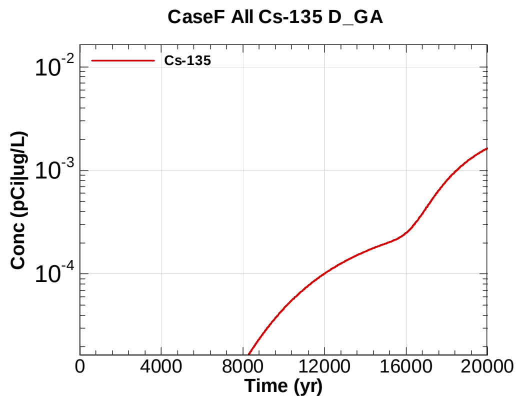

Figure P-74 - 100m Aquifer Concentration for CaseF All Cs-135 D_GA

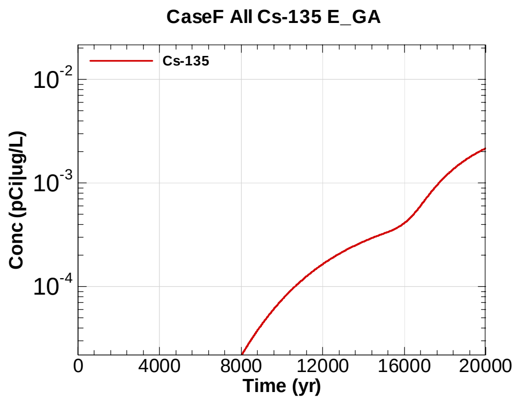

Figure P-75 - 100m Aquifer Concentration for CaseF All Cs-135 E_GA

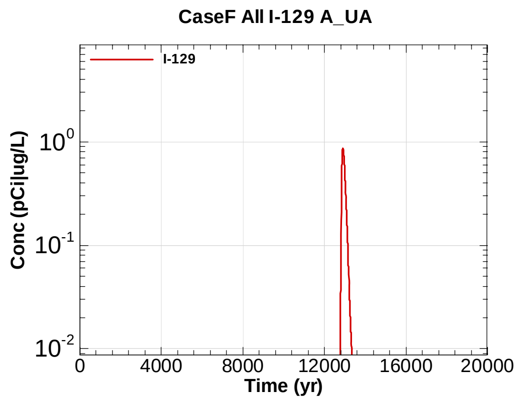

Figure P-76 - 100m Aquifer Concentration for CaseF All I-129 A_UA

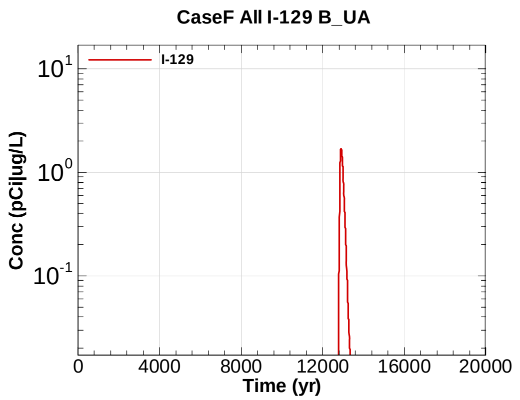

Figure P-77 - 100m Aquifer Concentration for CaseF All I-129 B_UA

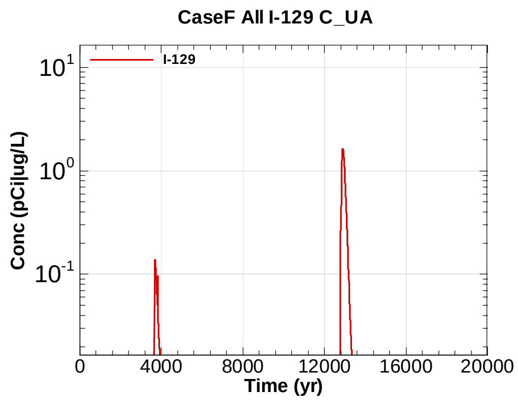

Figure P-78 - 100m Aquifer Concentration for CaseF All I-129 C_UA

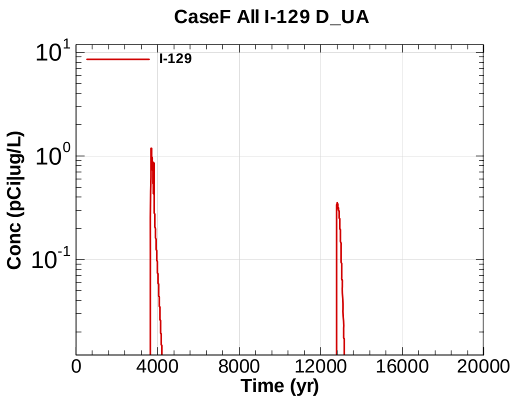

Figure P-79 - 100m Aquifer Concentration for CaseF All I-129 D_UA

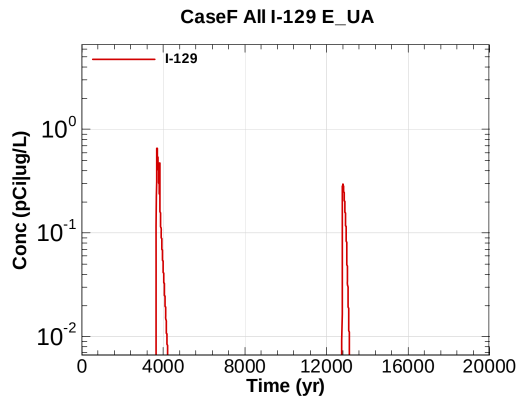

Figure P-80 - 100m Aquifer Concentration for CaseF All I-129 E_UA

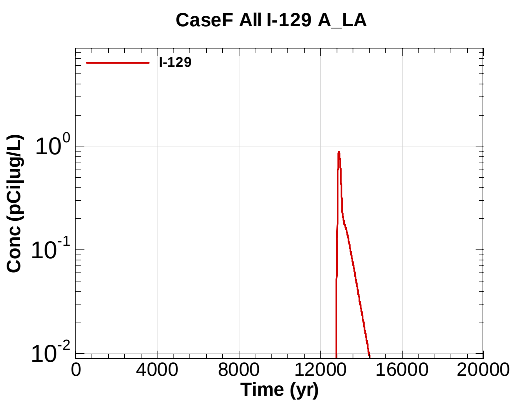

Figure P-81 - 100m Aquifer Concentration for CaseF All I-129 A_LA

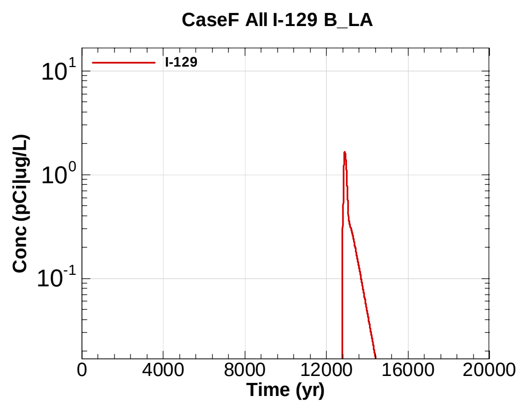

Figure P-82 - 100m Aquifer Concentration for CaseF All I-129 B_LA

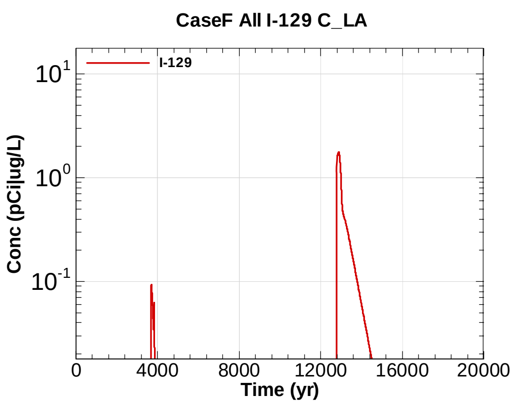

Figure P-83 - 100m Aquifer Concentration for CaseF All I-129 C_LA

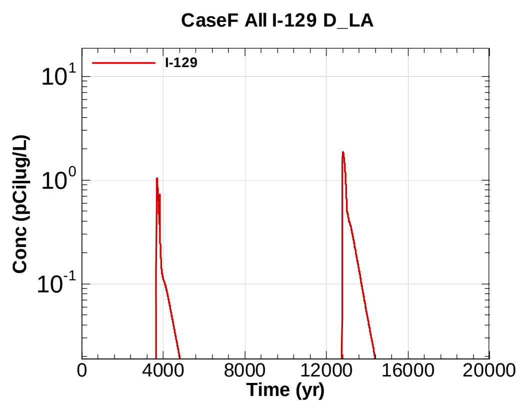

Figure P-84 - 100m Aquifer Concentration for CaseF All I-129 D_LA

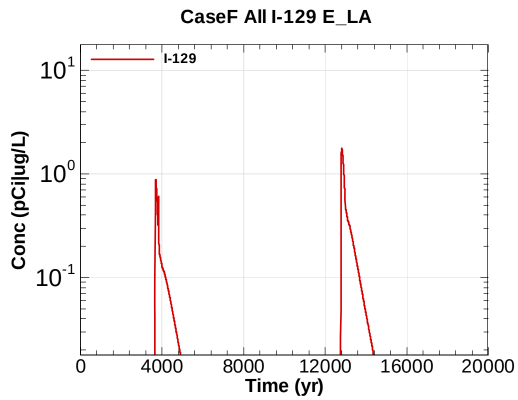

Figure P-85 - 100m Aquifer Concentration for CaseF All I-129 E_LA

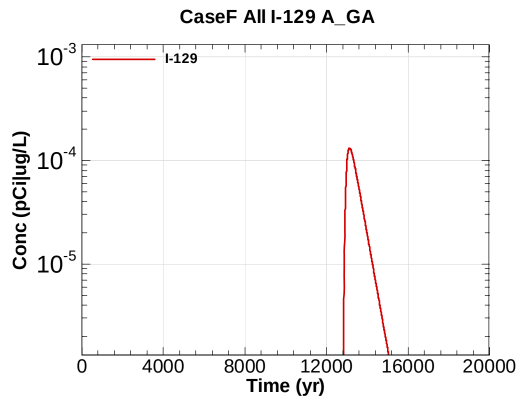

Figure P-86 - 100m Aquifer Concentration for CaseF All I-129 A_GA

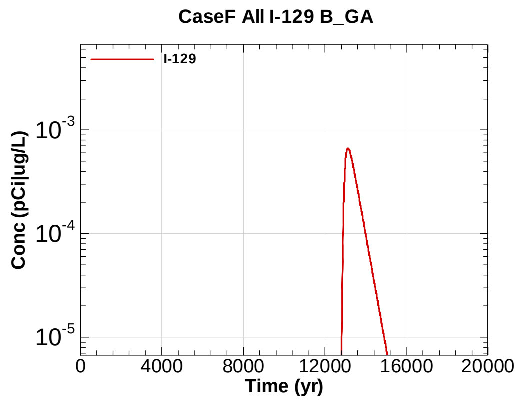

Figure P-87 - 100m Aquifer Concentration for CaseF All I-129 B_GA

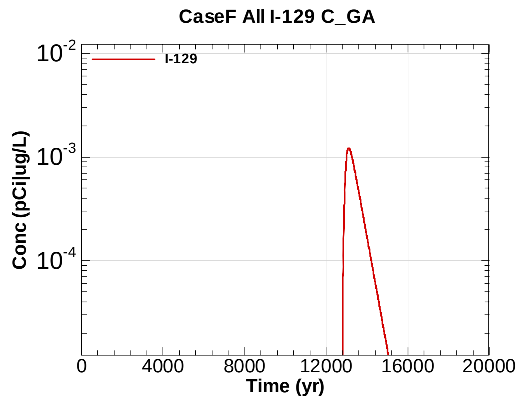

Figure P-88 - 100m Aquifer Concentration for CaseF All I-129 C_GA

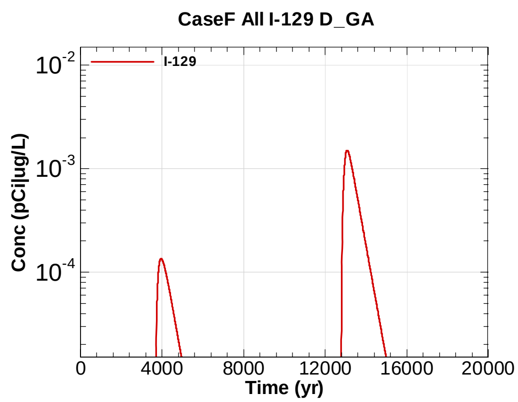

Figure P-89 - 100m Aquifer Concentration for CaseF All I-129 D_GA

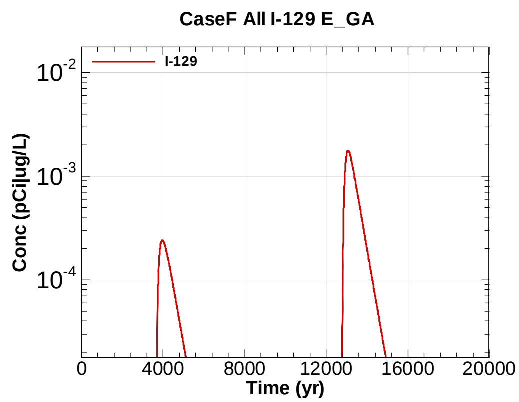

Figure P-90 - 100m Aquifer Concentration for CaseF All I-129 E_GA

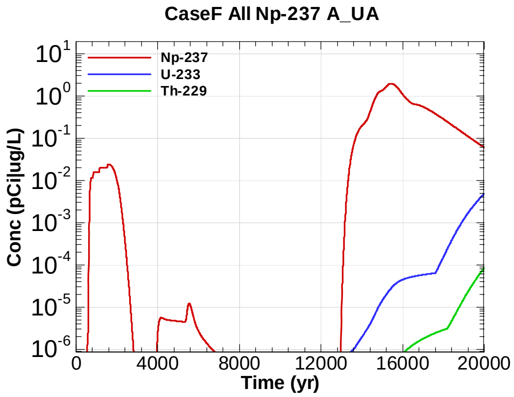

Figure P-91 - 100m Aquifer Concentration for CaseF All Np-237 A_UA

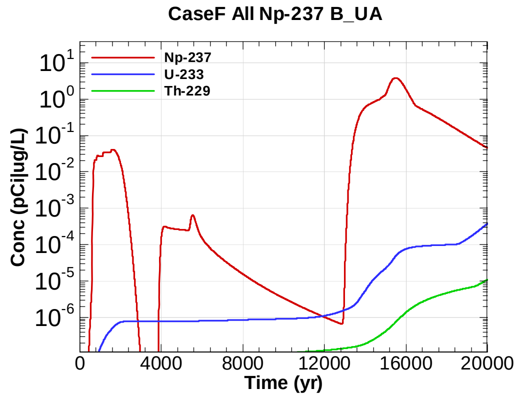

Figure P-92 - 100m Aquifer Concentration for CaseF All Np-237 B_UA

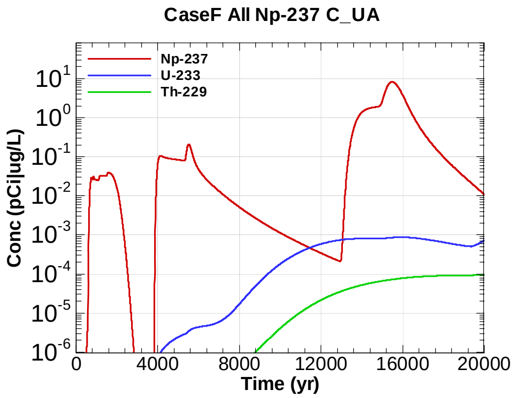

Figure P-93 - 100m Aquifer Concentration for CaseF All Np-237 C_UA

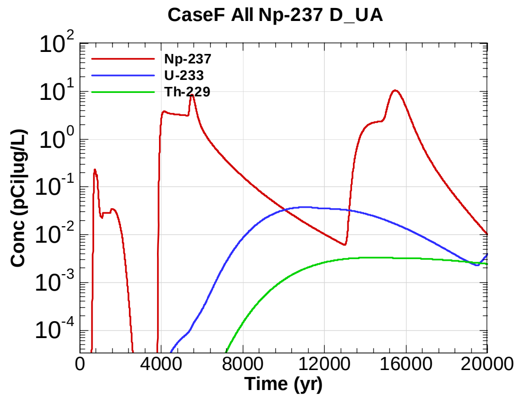

Figure P-94 - 100m Aquifer Concentration for CaseF All Np-237 D_UA

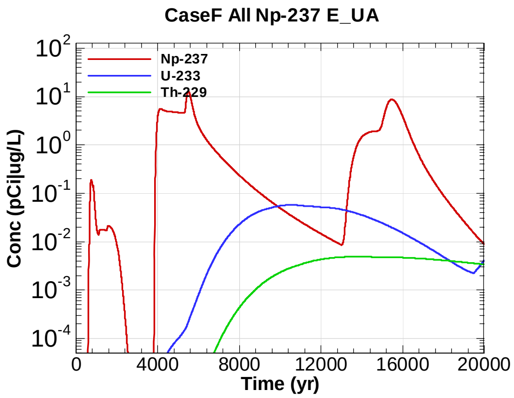

Figure P-95 - 100m Aquifer Concentration for CaseF All Np-237 E_UA

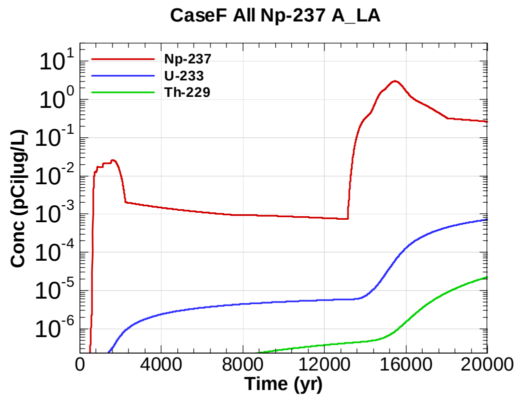

Figure P-96 - 100m Aquifer Concentration for CaseF All Np-237 A_LA

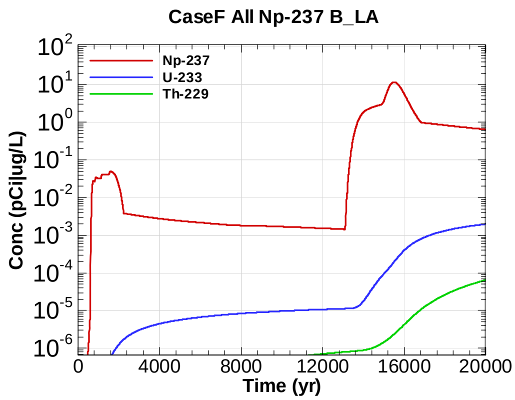

Figure P-97 - 100m Aquifer Concentration for CaseF All Np-237 B_LA

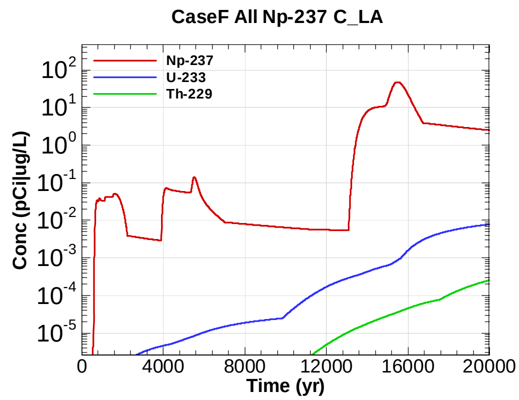

Figure P-98 - 100m Aquifer Concentration for CaseF All Np-237 C_LA

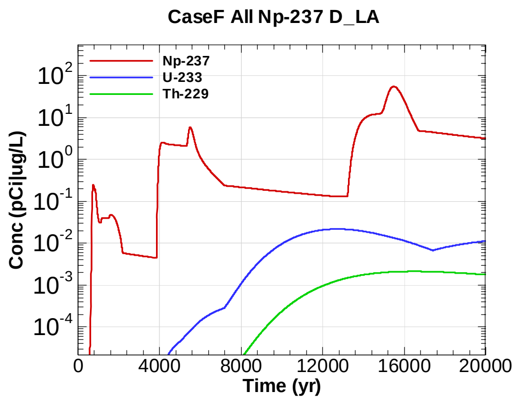

Figure P-99 - 100m Aquifer Concentration for CaseF All Np-237 D_LA

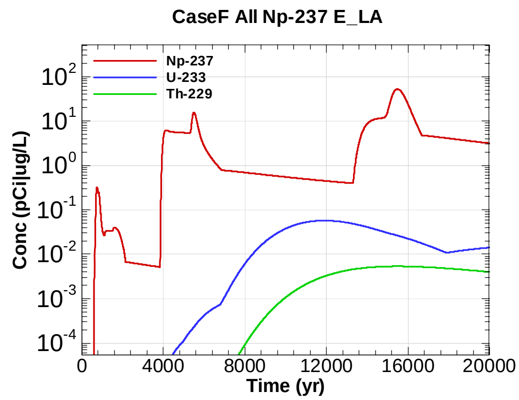

Figure P-100 - 100m Aquifer Concentration for CaseF All Np-237 E_LA

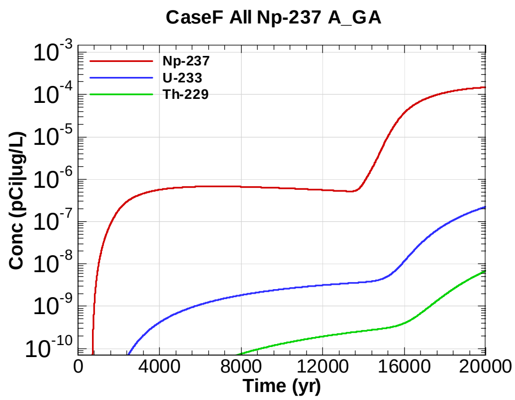

Figure P-101 - 100m Aquifer Concentration for CaseF All Np-237 A_GA

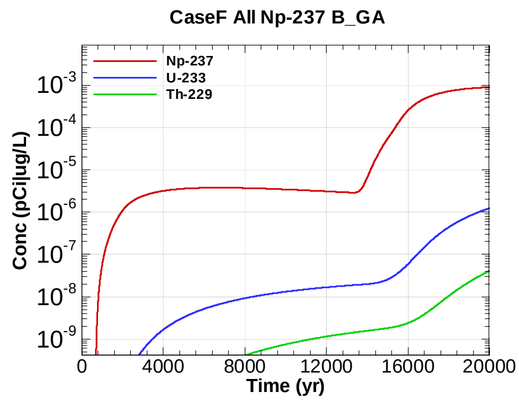

Figure P-102 - 100m Aquifer Concentration for CaseF All Np-237 B_GA

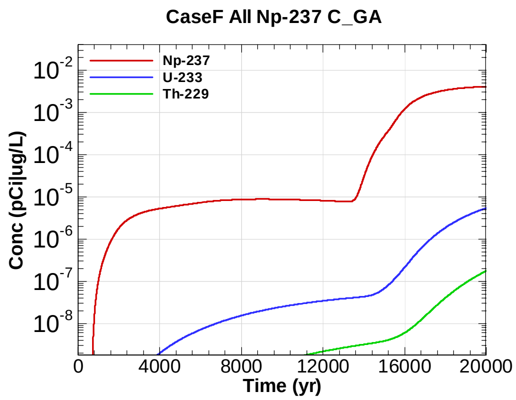

Figure P-103 - 100m Aquifer Concentration for CaseF All Np-237 C_GA

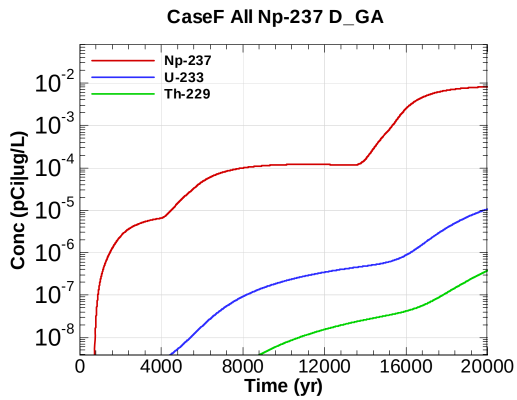

Figure P-104 - 100m Aquifer Concentration for CaseF All Np-237 D_GA

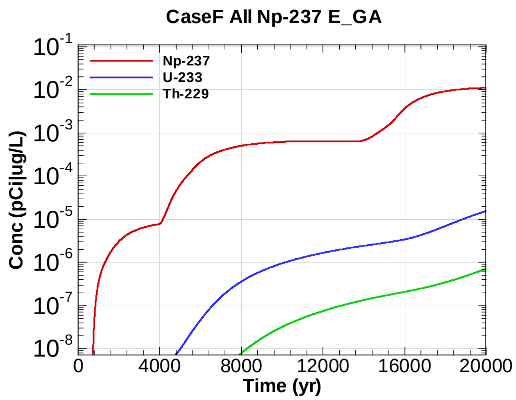

Figure P-105 - 100m Aquifer Concentration for CaseF All Np-237 E_GA

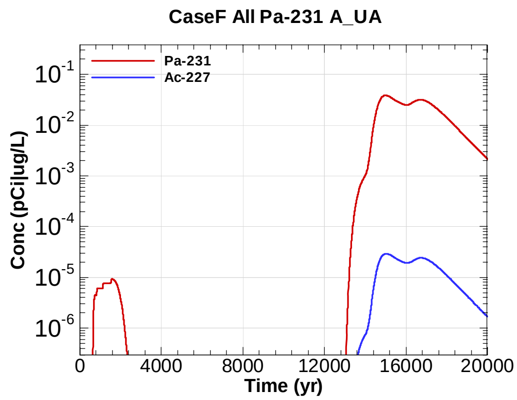

Figure P-106 - 100m Aquifer Concentration for CaseF All Pa-231 A_UA

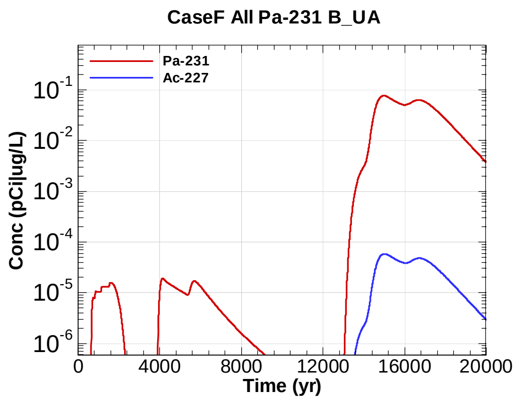

Figure P-107 - 100m Aquifer Concentration for CaseF All Pa-231 B_UA

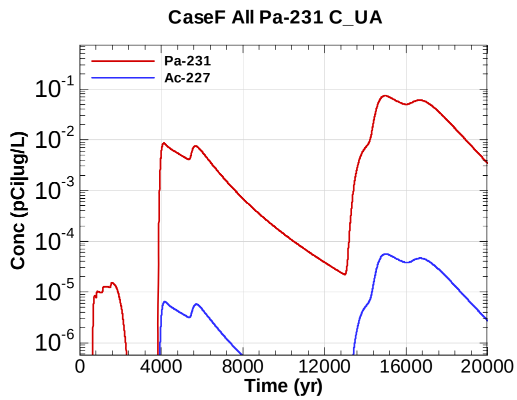

Figure P-108 - 100m Aquifer Concentration for CaseF All Pa-231 C_UA

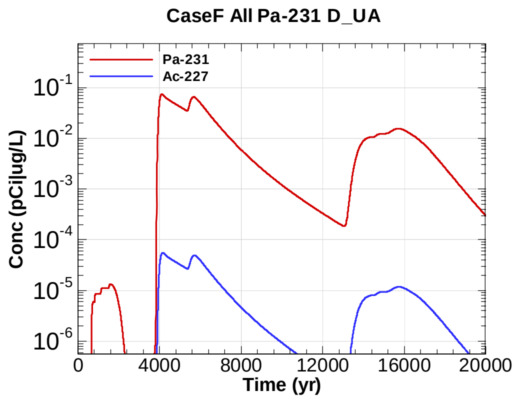

Figure P-109 - 100m Aquifer Concentration for CaseF All Pa-231 D_UA

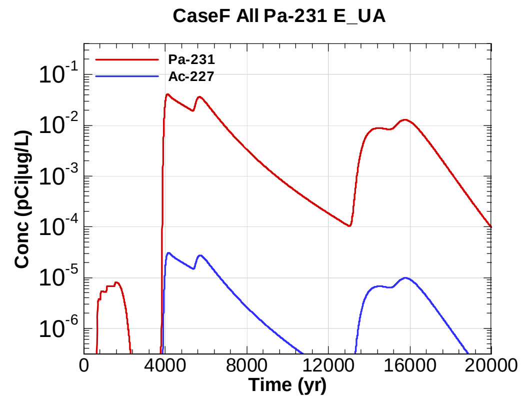

Figure P-110 - 100m Aquifer Concentration for CaseF All Pa-231 E_UA

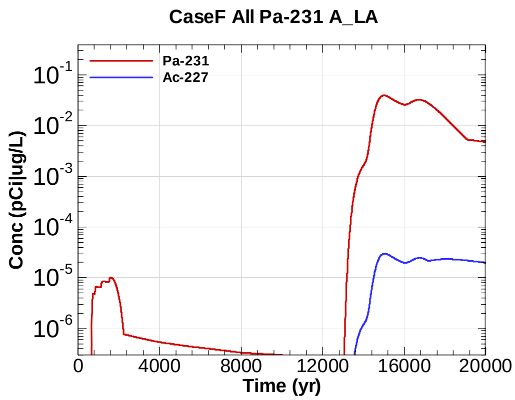

Figure P-111 - 100m Aquifer Concentration for CaseF All Pa-231 A_LA

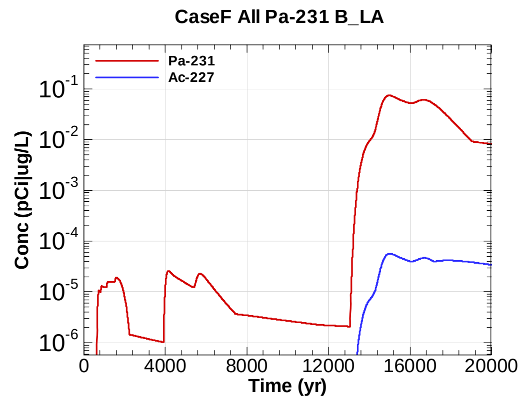

Figure P-112 - 100m Aquifer Concentration for CaseF All Pa-231 B_LA

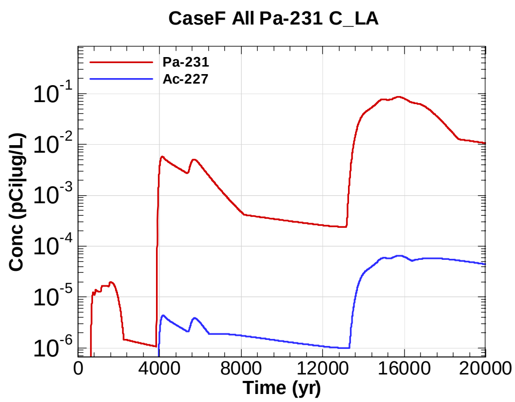

Figure P-113 - 100m Aquifer Concentration for CaseF All Pa-231 C_LA

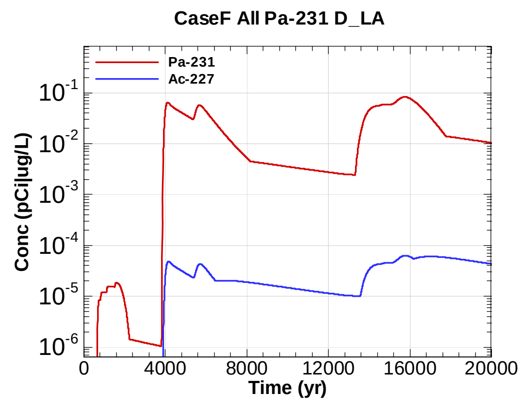

Figure P-114 - 100m Aquifer Concentration for CaseF All Pa-231 D_LA

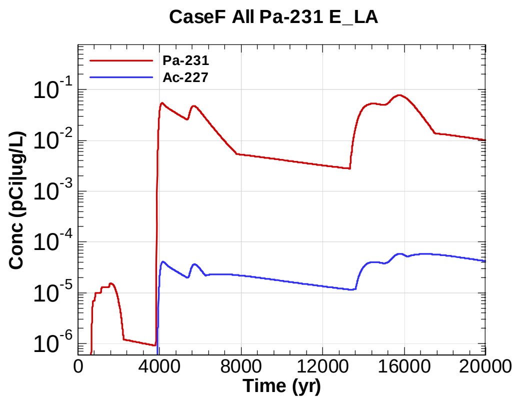

Figure P-115 - 100m Aquifer Concentration for CaseF All Pa-231 E_LA

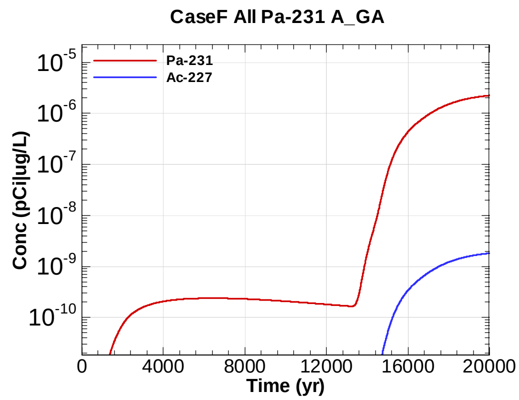

Figure P-116 - 100m Aquifer Concentration for CaseF All Pa-231 A_GA

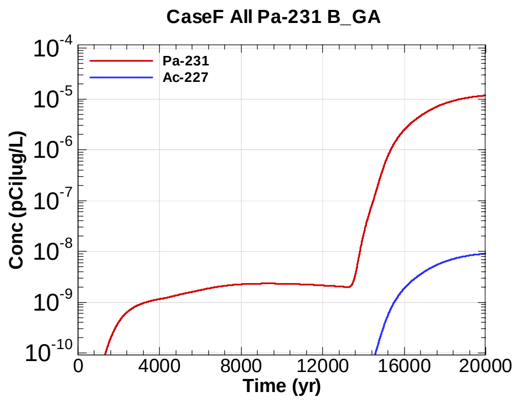

Figure P-117 - 100m Aquifer Concentration for CaseF All Pa-231 B_GA

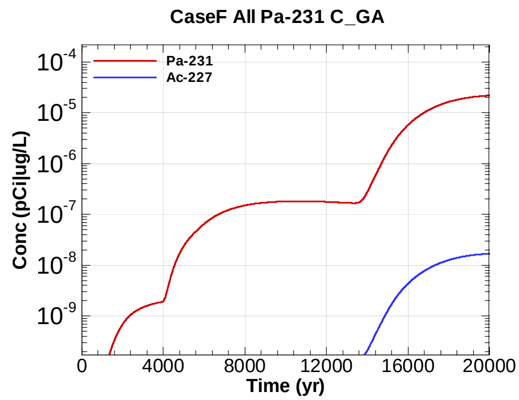

Figure P-118 - 100m Aquifer Concentration for CaseF All Pa-231 C_GA

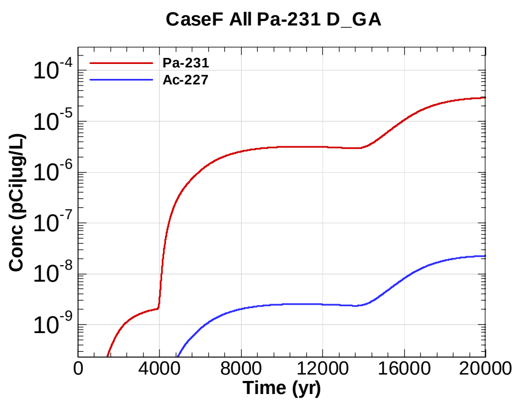

Figure P-119 - 100m Aquifer Concentration for CaseF All Pa-231 D_GA

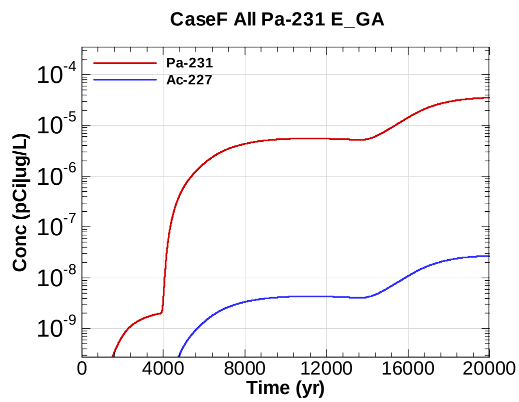

Figure P-120 - 100m Aquifer Concentration for CaseF All Pa-231 E_GA

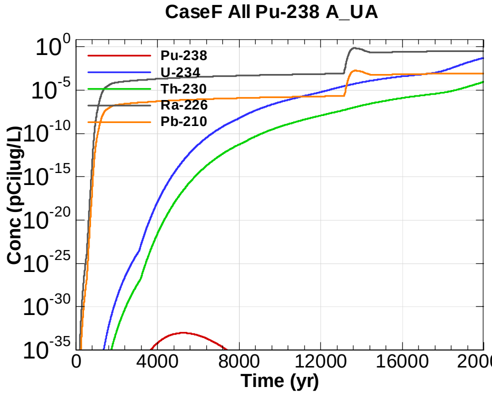

Figure P-121 - 100m Aquifer Concentration for CaseF All Pu-238 A_UA

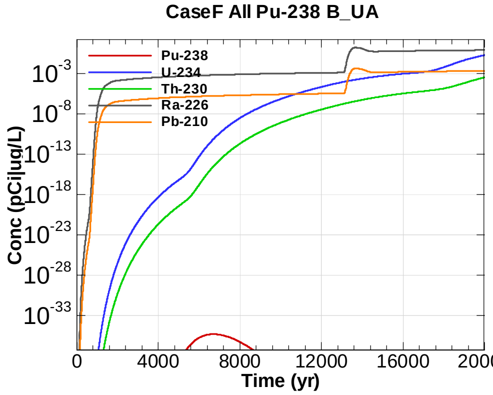

Figure P-122 - 100m Aquifer Concentration for CaseF All Pu-238 B_UA

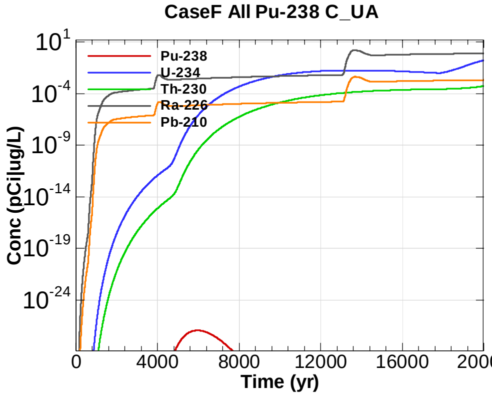

Figure P-123 - 100m Aquifer Concentration for CaseF All Pu-238 C_UA

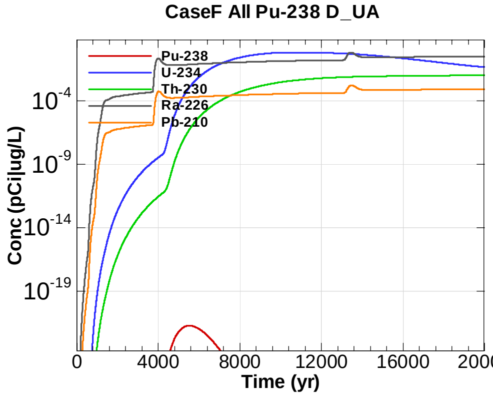

Figure P-124 - 100m Aquifer Concentration for CaseF All Pu-238 D_UA

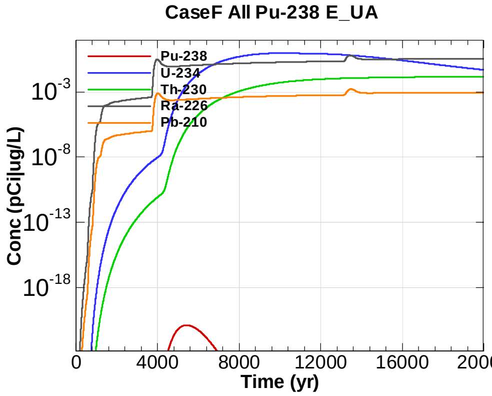

Figure P-125 - 100m Aquifer Concentration for CaseF All Pu-238 E_UA

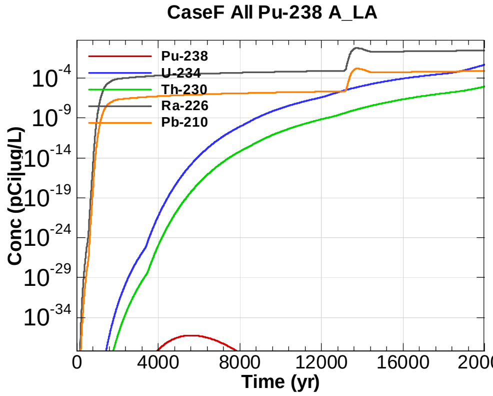

Figure P-126 - 100m Aquifer Concentration for CaseF All Pu-238 A_LA

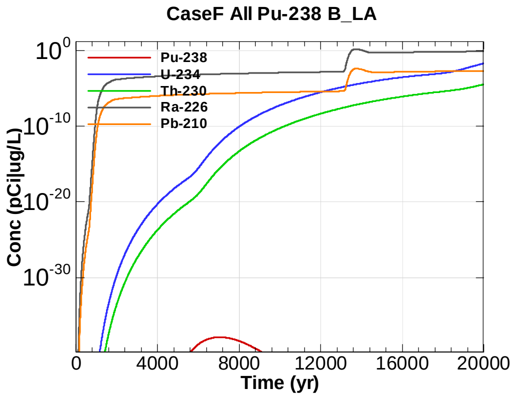

Figure P-127 - 100m Aquifer Concentration for CaseF All Pu-238 B_LA

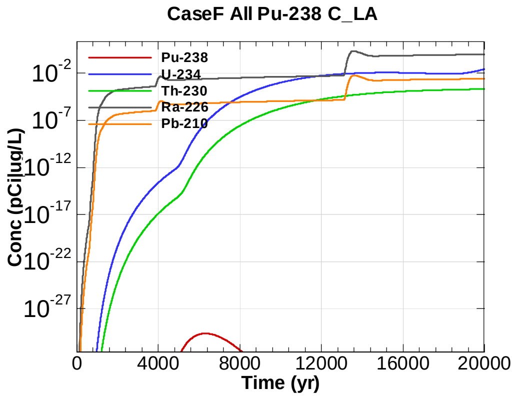

Figure P-128 - 100m Aquifer Concentration for CaseF All Pu-238 C_LA

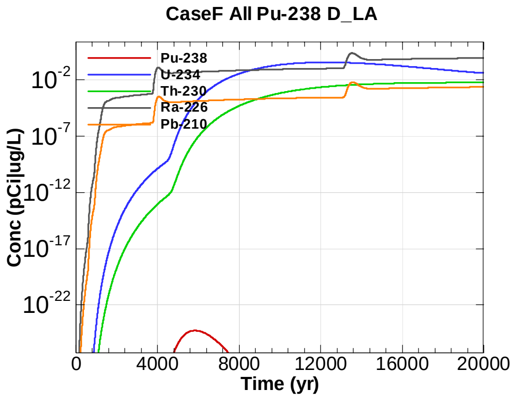

Figure P-129 - 100m Aquifer Concentration for CaseF All Pu-238 D_LA

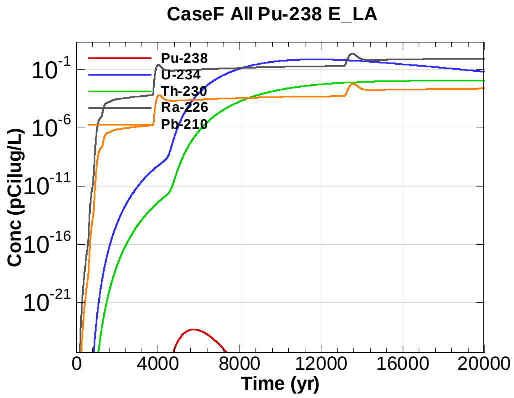

Figure P-130 - 100m Aquifer Concentration for CaseF All Pu-238 E_LA

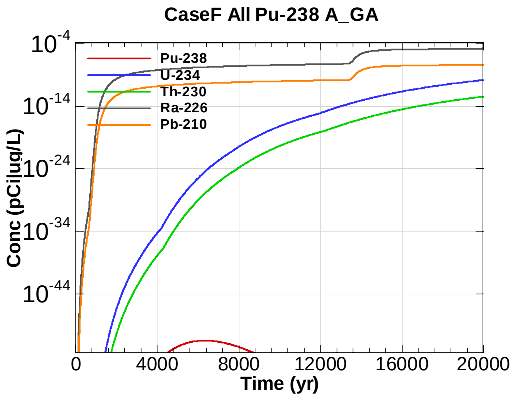

Figure P-131 - 100m Aquifer Concentration for CaseF All Pu-238 A_GA

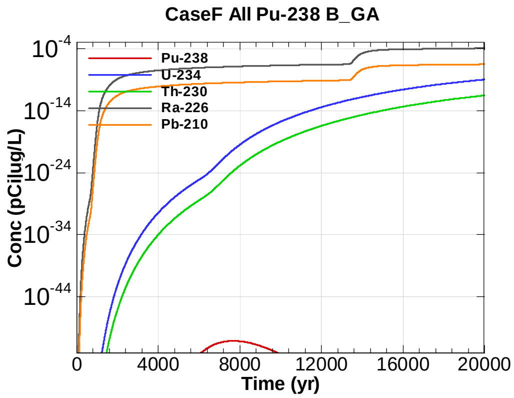

Figure P-132 - 100m Aquifer Concentration for CaseF All Pu-238 B_GA

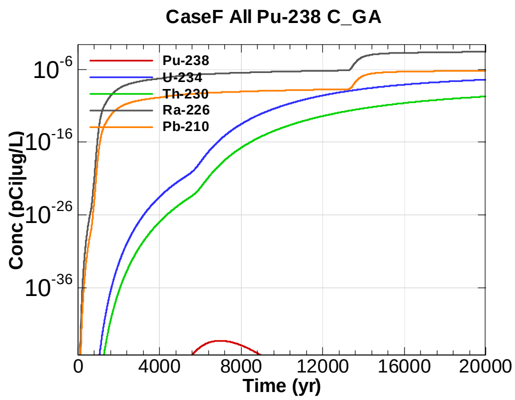

Figure P-133 - 100m Aquifer Concentration for CaseF All Pu-238 C_GA

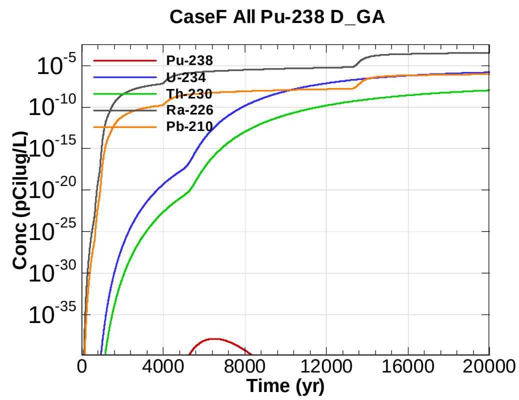

Figure P-134 - 100m Aquifer Concentration for CaseF All Pu-238 D_GA

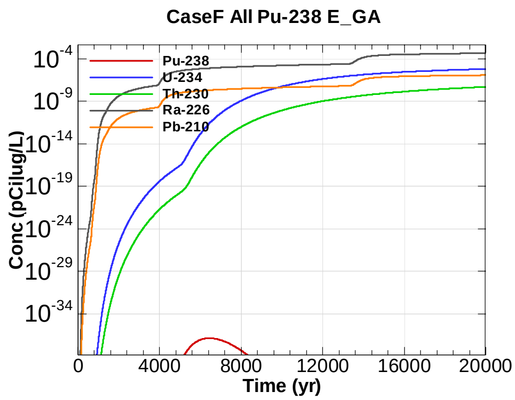

Figure P-135 - 100m Aquifer Concentration for CaseF All Pu-238 E_GA

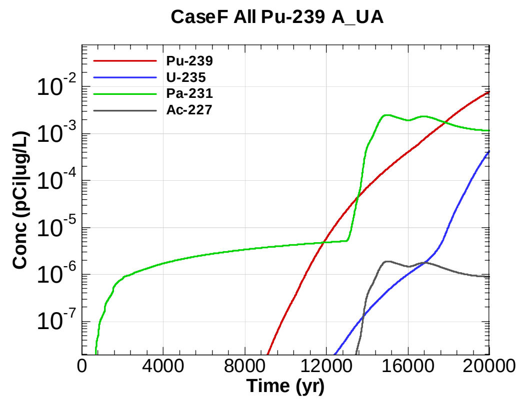

Figure P-136 - 100m Aquifer Concentration for CaseF All Pu-239 A_UA

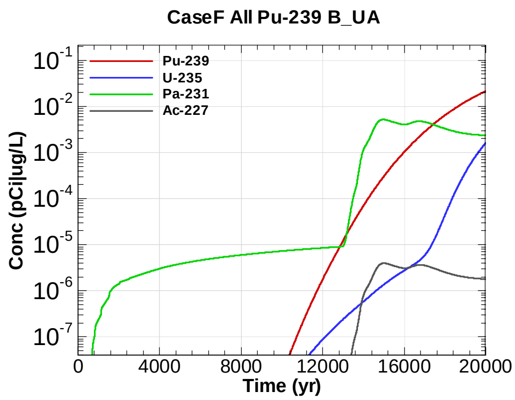

Figure P-137 - 100m Aquifer Concentration for CaseF All Pu-239 B_UA

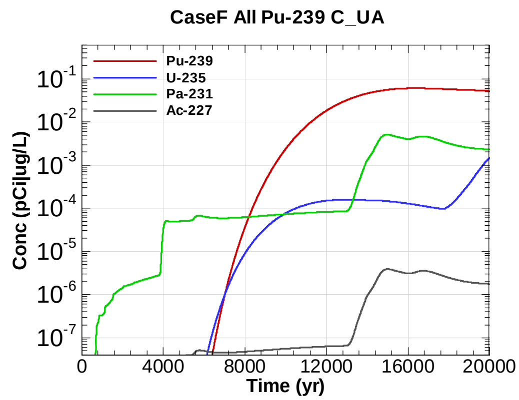

Figure P-138 - 100m Aquifer Concentration for CaseF All Pu-239 C_UA

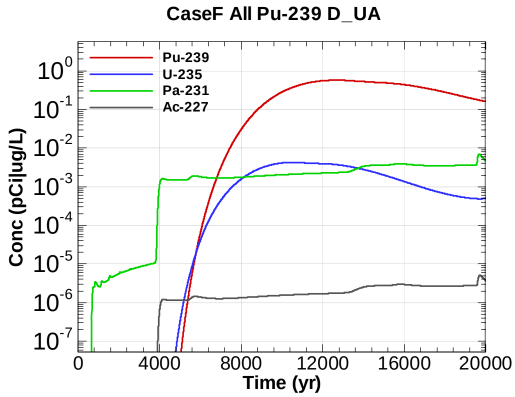

Figure P-139 - 100m Aquifer Concentration for CaseF All Pu-239 D_UA

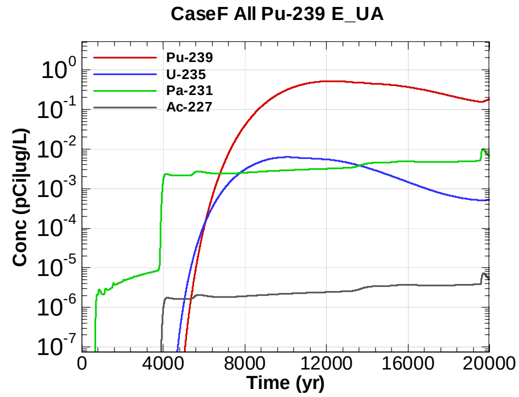

Figure P-140 - 100m Aquifer Concentration for CaseF All Pu-239 E_UA

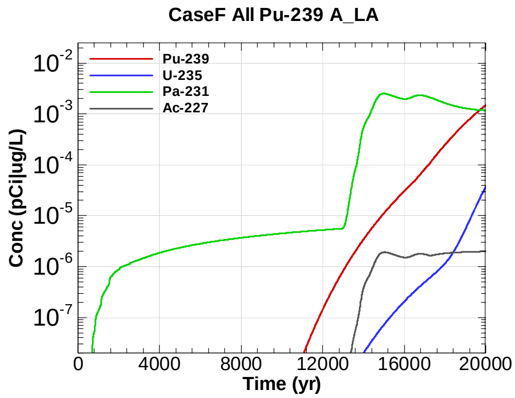

Figure P-141 - 100m Aquifer Concentration for CaseF All Pu-239 A_LA

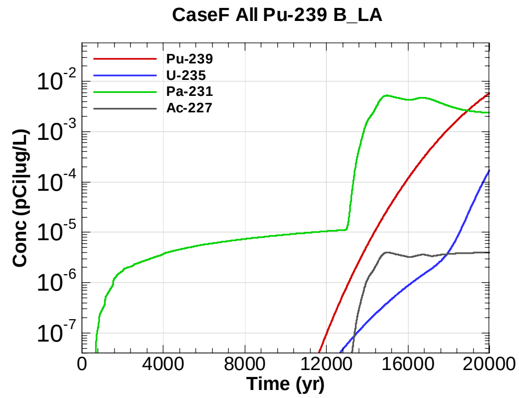

Figure P-142 - 100m Aquifer Concentration for CaseF All Pu-239 B_LA

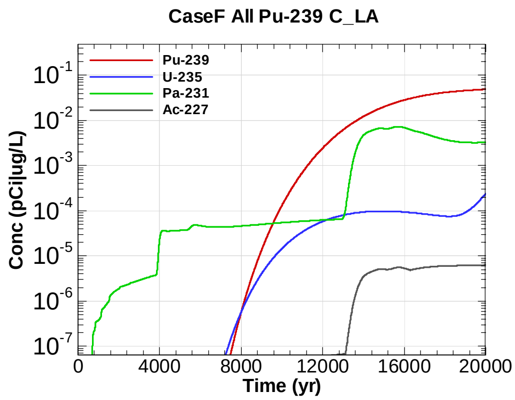

Figure P-143 - 100m Aquifer Concentration for CaseF All Pu-239 C_LA

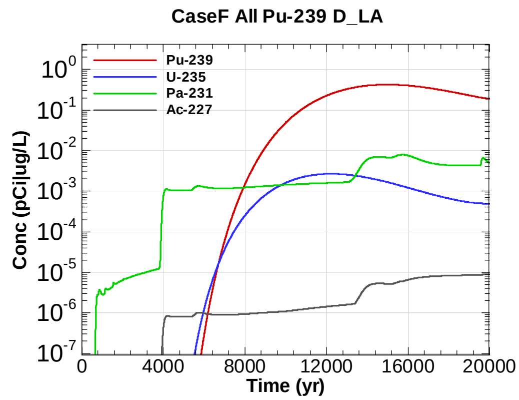

Figure P-144 - 100m Aquifer Concentration for CaseF All Pu-239 D_LA

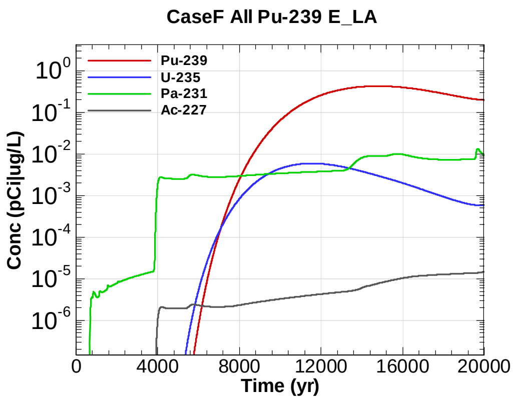

Figure P-145 - 100m Aquifer Concentration for CaseF All Pu-239 E_LA

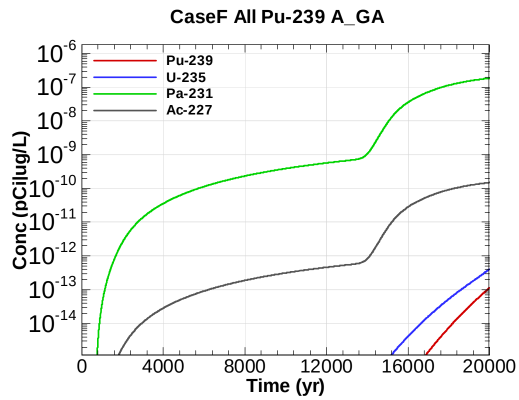

Figure P-146 - 100m Aquifer Concentration for CaseF All Pu-239 A_GA

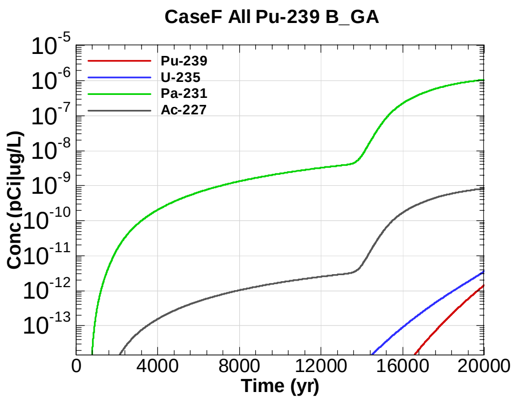

Figure P-147 - 100m Aquifer Concentration for CaseF All Pu-239 B_GA

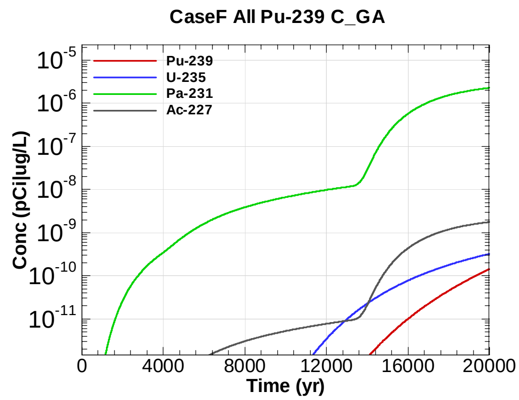

Figure P-148 - 100m Aquifer Concentration for CaseF All Pu-239 C_GA

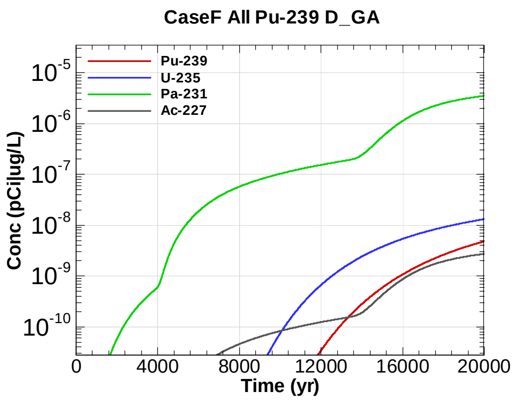

Figure P-149 - 100m Aquifer Concentration for CaseF All Pu-239 D_GA

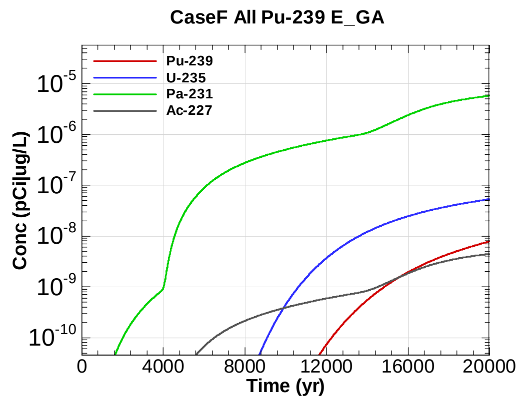

Figure P-150 - 100m Aquifer Concentration for CaseF All Pu-239 E_GA

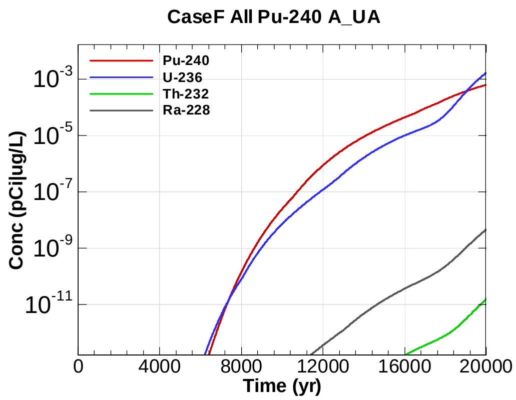

Figure P-151 - 100m Aquifer Concentration for CaseF All Pu-240 A_UA

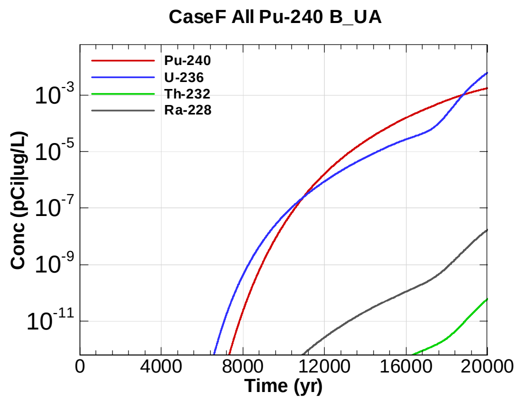

Figure P-152 - 100m Aquifer Concentration for CaseF All Pu-240 B_UA

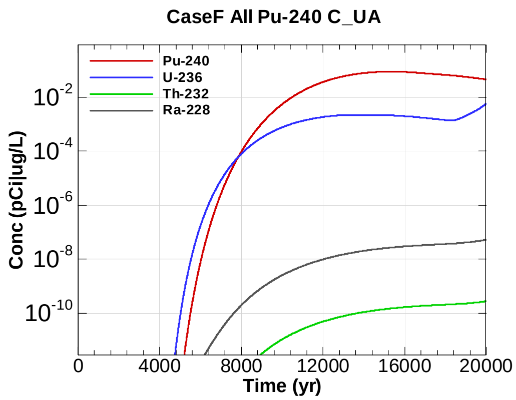

Figure P-153 - 100m Aquifer Concentration for CaseF All Pu-240 C_UA

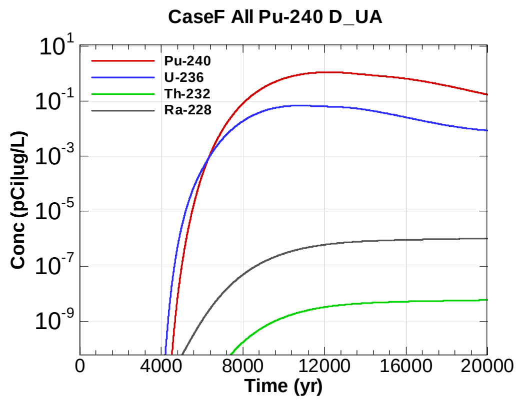

Figure P-154 - 100m Aquifer Concentration for CaseF All Pu-240 D_UA

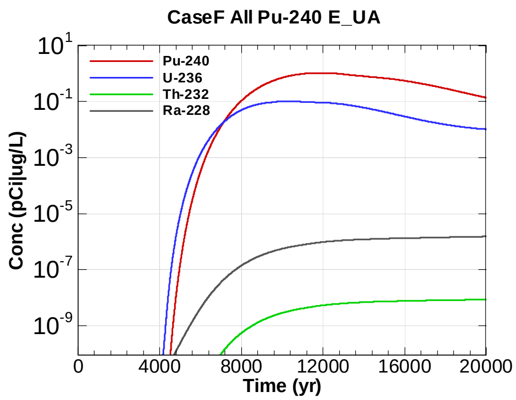

Figure P-155 - 100m Aquifer Concentration for CaseF All Pu-240 E_UA

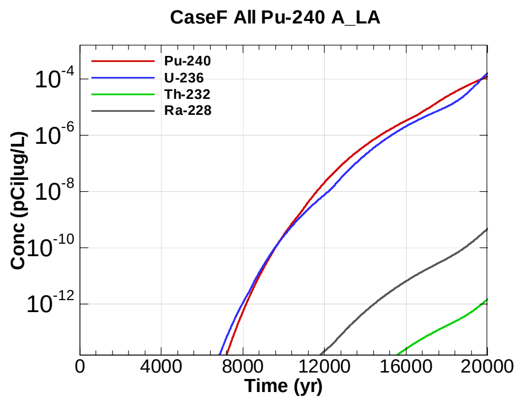

Figure P-156 - 100m Aquifer Concentration for CaseF All Pu-240 A_LA

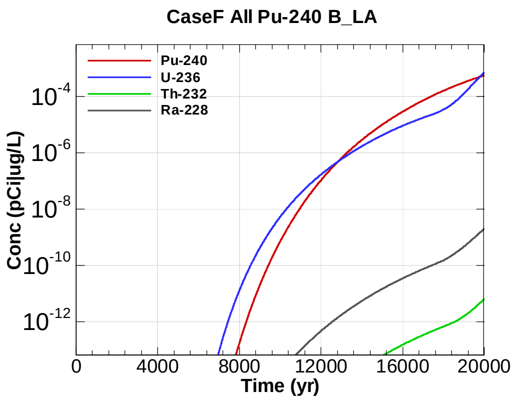

Figure P-157 - 100m Aquifer Concentration for CaseF All Pu-240 B_LA

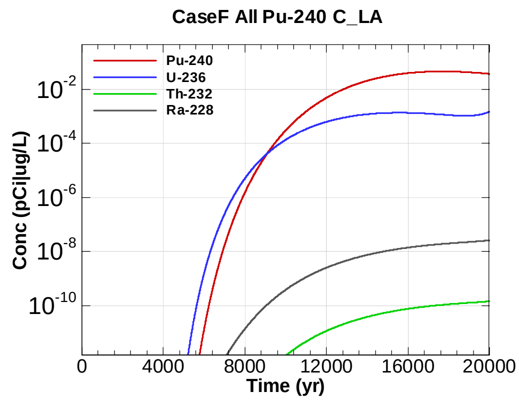

Figure P-158 - 100m Aquifer Concentration for CaseF All Pu-240 C_LA

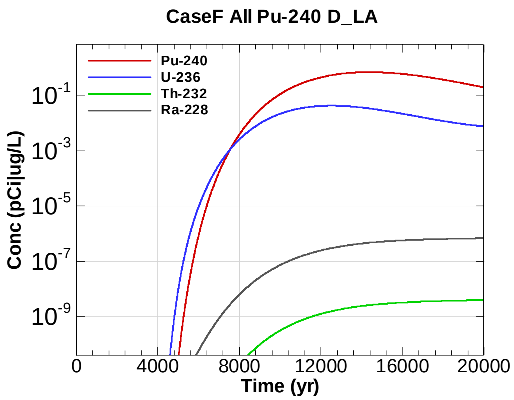

Figure P-159 - 100m Aquifer Concentration for CaseF All Pu-240 D_LA

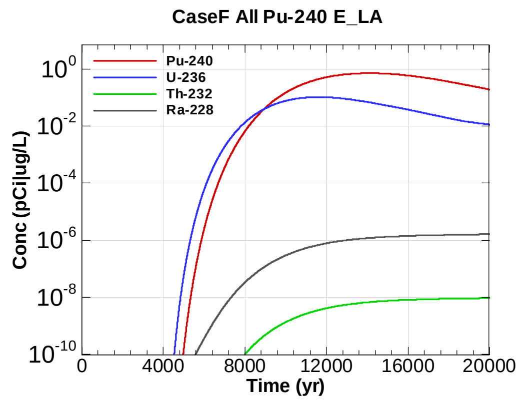

Figure P-160 - 100m Aquifer Concentration for CaseF All Pu-240 E_LA

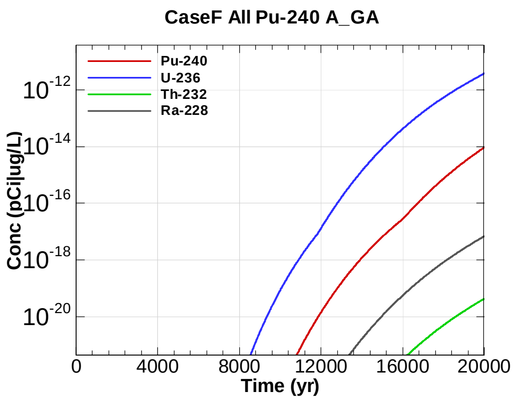

Figure P-161 - 100m Aquifer Concentration for CaseF All Pu-240 A_GA

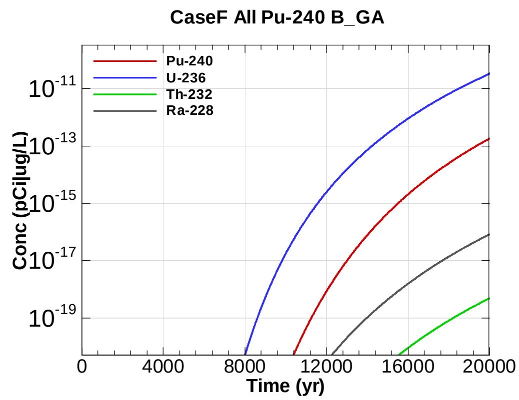

Figure P-162 - 100m Aquifer Concentration for CaseF All Pu-240 B_GA

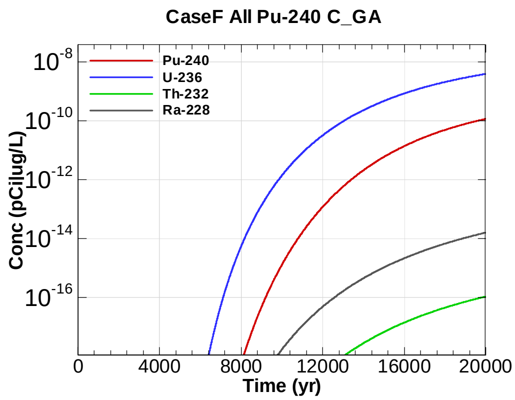

Figure P-163 - 100m Aquifer Concentration for CaseF All Pu-240 C_GA

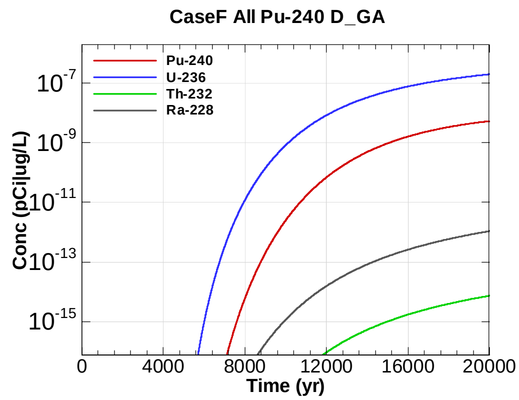

Figure P-164 - 100m Aquifer Concentration for CaseF All Pu-240 D_GA

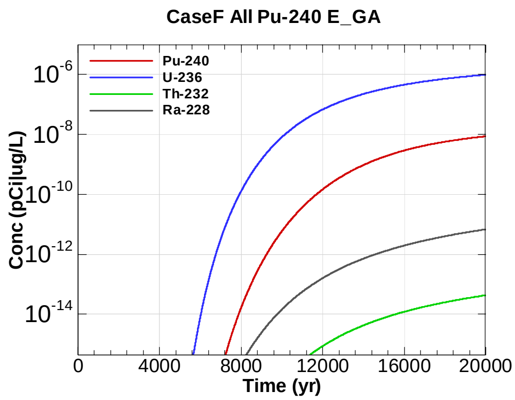

Figure P-165 - 100m Aquifer Concentration for CaseF All Pu-240 E_GA

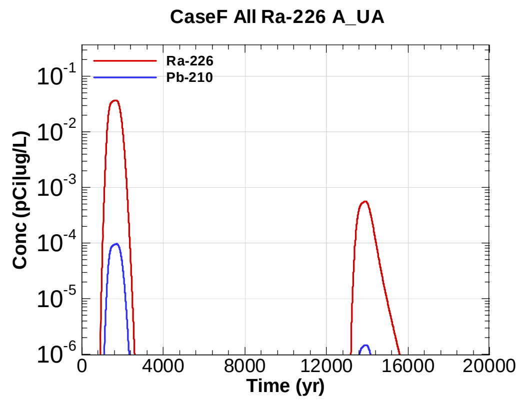

Figure P-166 - 100m Aquifer Concentration for CaseF All Ra-226 A_UA

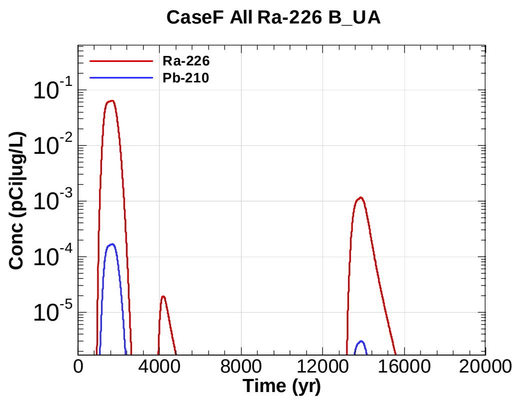

Figure P-167 - 100m Aquifer Concentration for CaseF All Ra-226 B_UA

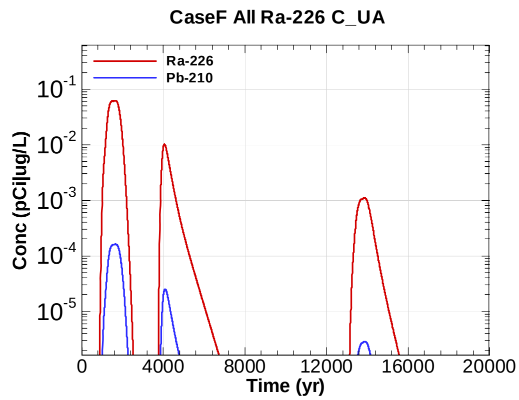

Figure P-168 - 100m Aquifer Concentration for CaseF All Ra-226 C_UA

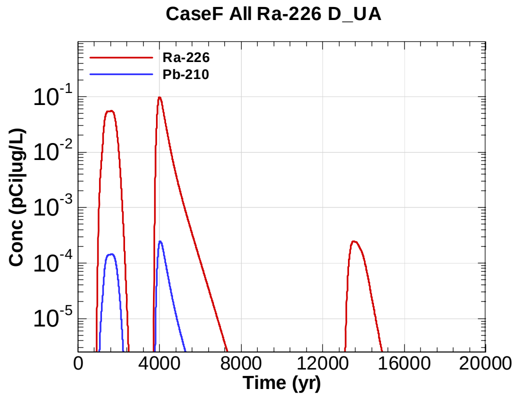

Figure P-169 - 100m Aquifer Concentration for CaseF All Ra-226 D_UA

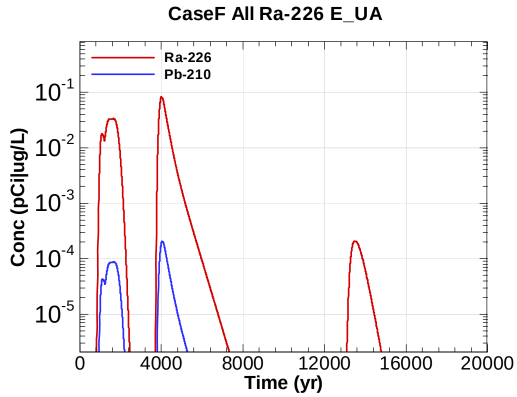

Figure P-170 - 100m Aquifer Concentration for CaseF All Ra-226 E_UA

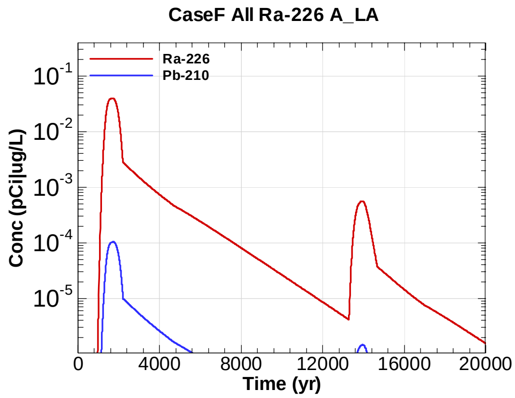

Figure P-171 - 100m Aquifer Concentration for CaseF All Ra-226 A_LA

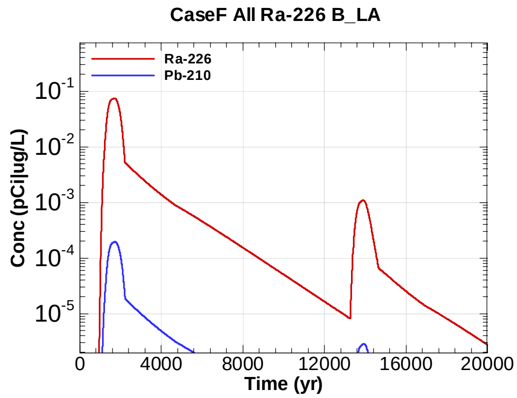

Figure P-172 - 100m Aquifer Concentration for CaseF All Ra-226 B_LA

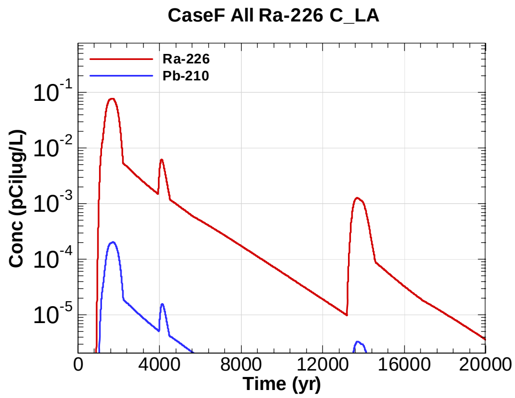

Figure P-173 - 100m Aquifer Concentration for CaseF All Ra-226 C_LA

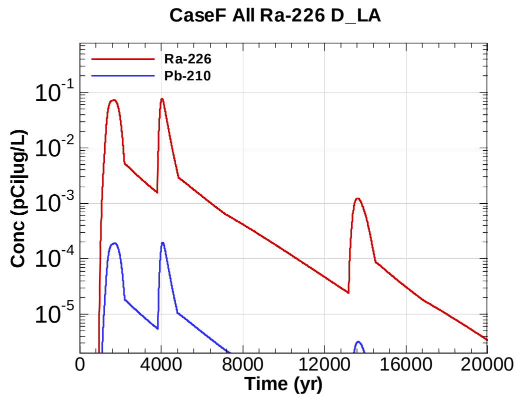

Figure P-174 - 100m Aquifer Concentration for CaseF All Ra-226 D_LA

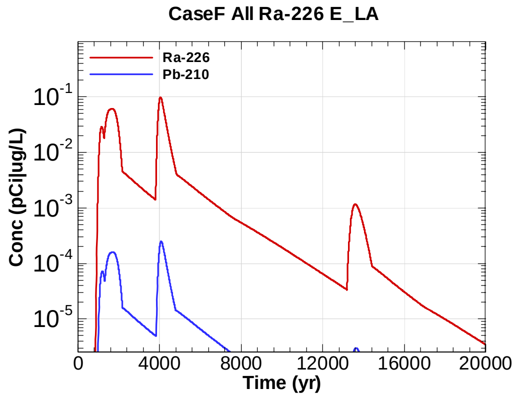

Figure P-175 - 100m Aquifer Concentration for CaseF All Ra-226 E_LA

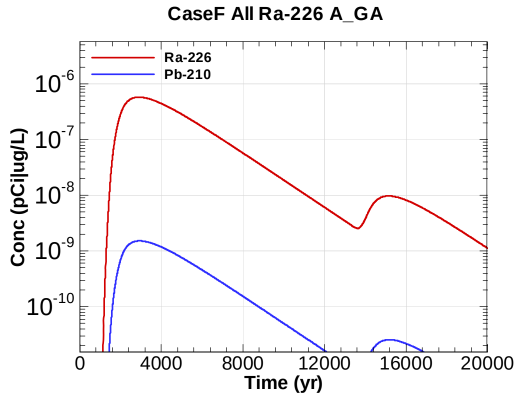

Figure P-176 - 100m Aquifer Concentration for CaseF All Ra-226 A_GA

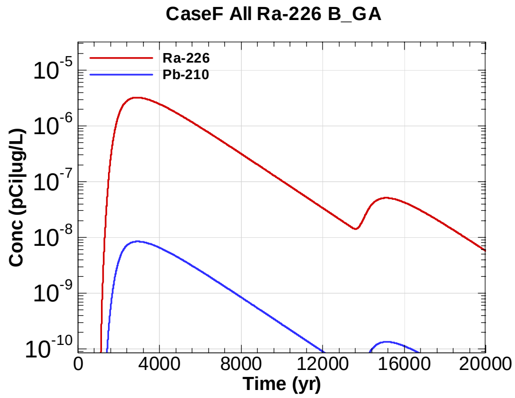

Figure P-177 - 100m Aquifer Concentration for CaseF All Ra-226 B_GA

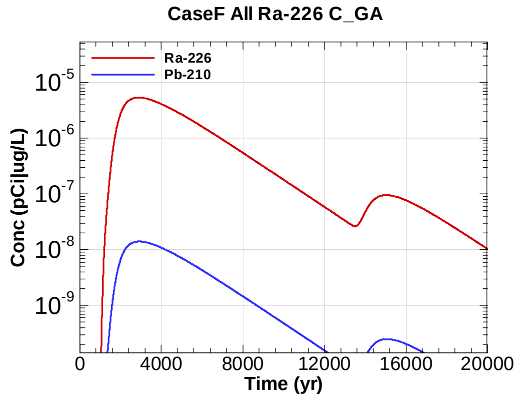

Figure P-178 - 100m Aquifer Concentration for CaseF All Ra-226 C_GA

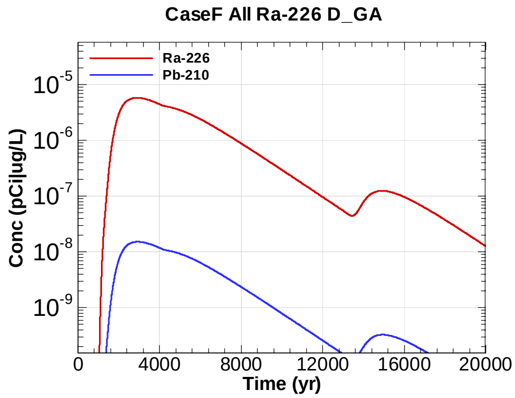

Figure P-179 - 100m Aquifer Concentration for CaseF All Ra-226 D_GA

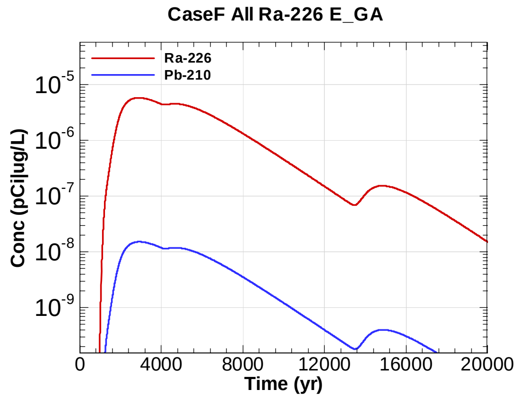

Figure P-180 - 100m Aquifer Concentration for CaseF All Ra-226 E_GA

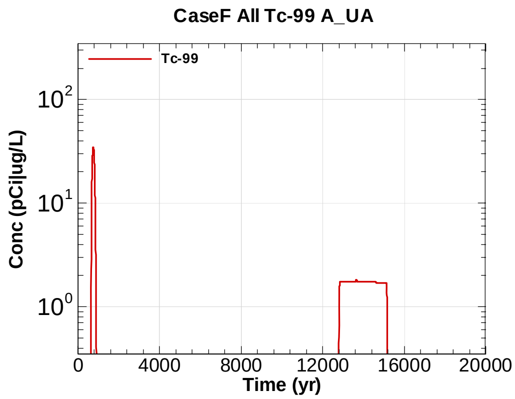

Figure P-181 - 100m Aquifer Concentration for CaseF All Tc-99 A_UA

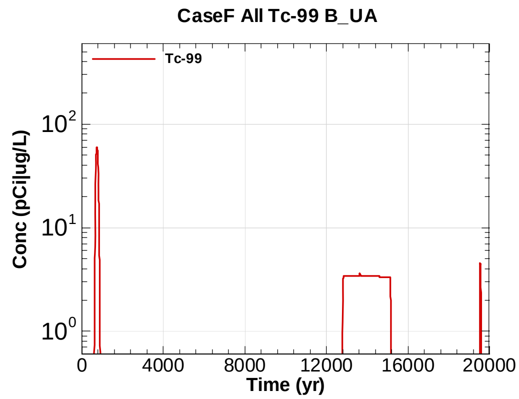

Figure P-182 - 100m Aquifer Concentration for CaseF All Tc-99 B_UA

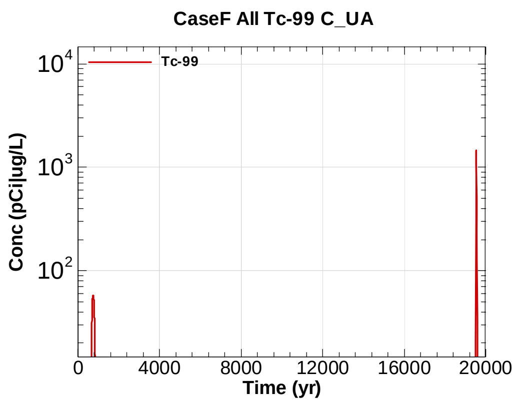

Figure P-183 - 100m Aquifer Concentration for CaseF All Tc-99 C_UA

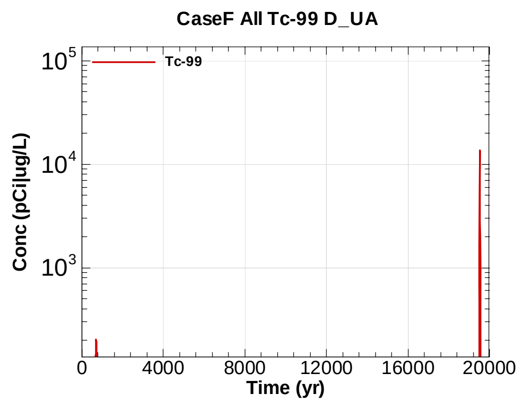

Figure P-184 - 100m Aquifer Concentration for CaseF All Tc-99 D_UA

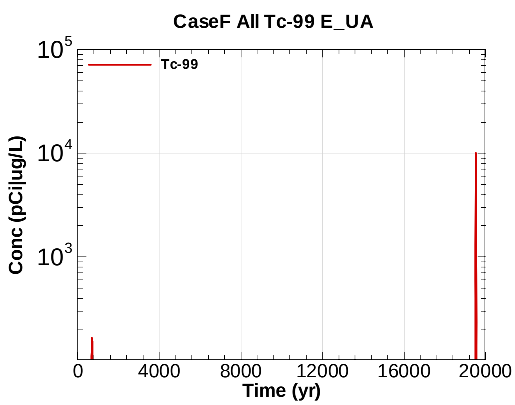

Figure P-185 - 100m Aquifer Concentration for CaseF All Tc-99 E_UA

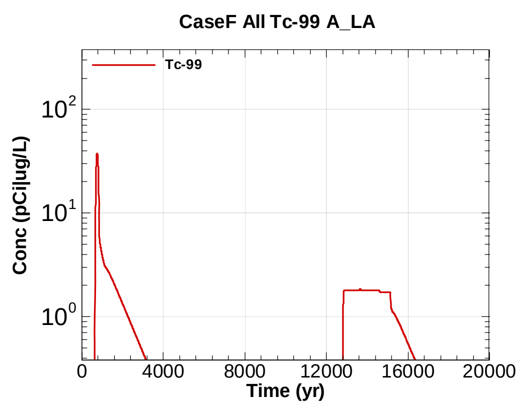

Figure P-186 - 100m Aquifer Concentration for CaseF All Tc-99 A_LA

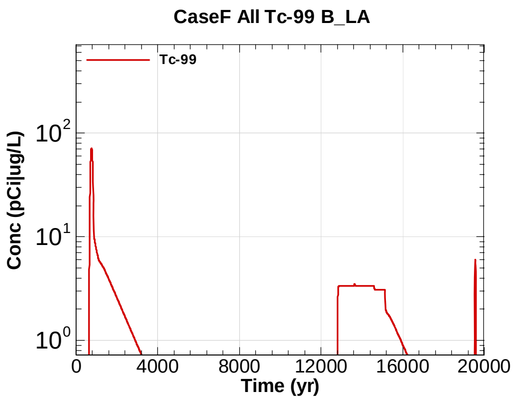

Figure P-187 - 100m Aquifer Concentration for CaseF All Tc-99 B_LA

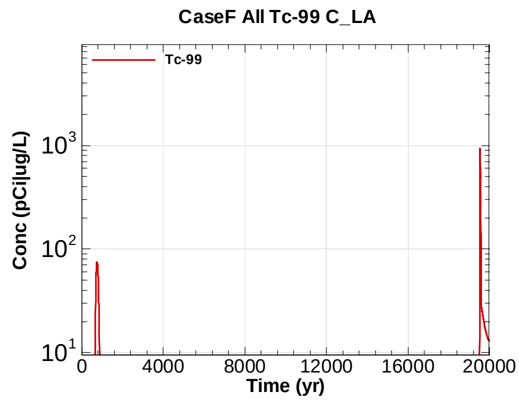

Figure P-188 - 100m Aquifer Concentration for CaseF All Tc-99 C_LA

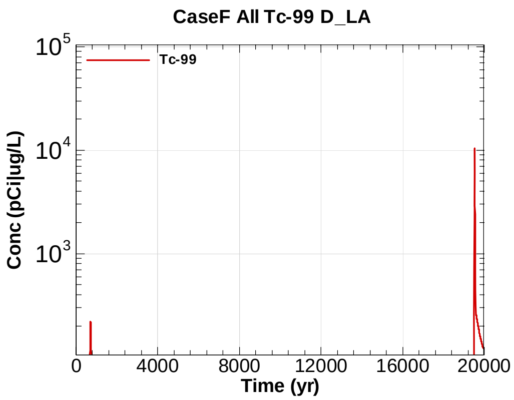

Figure P-189 - 100m Aquifer Concentration for CaseF All Tc-99 D_LA

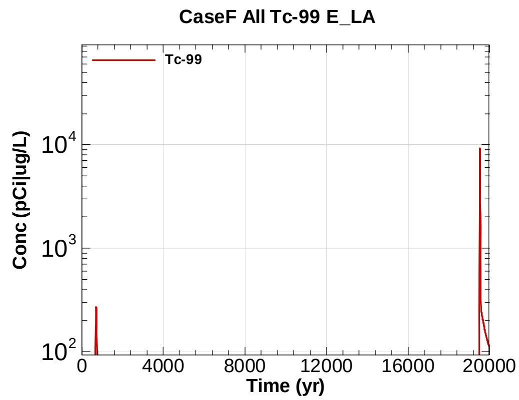

Figure P-190 - 100m Aquifer Concentration for CaseF All Tc-99 E_LA

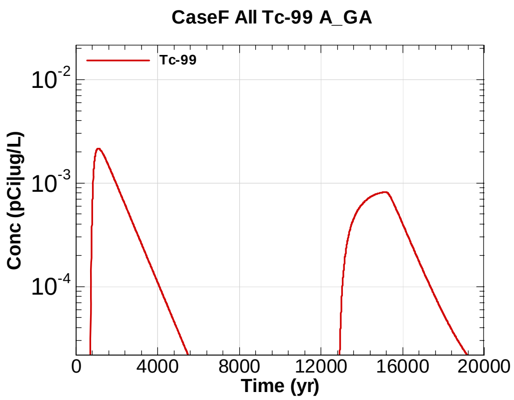

Figure P-191 - 100m Aquifer Concentration for CaseF All Tc-99 A_GA

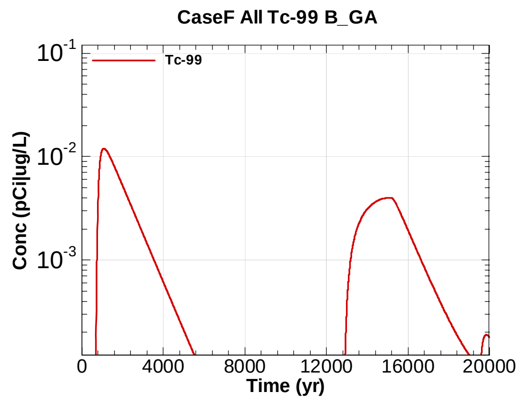

Figure P-192 - 100m Aquifer Concentration for CaseF All Tc-99 B_GA

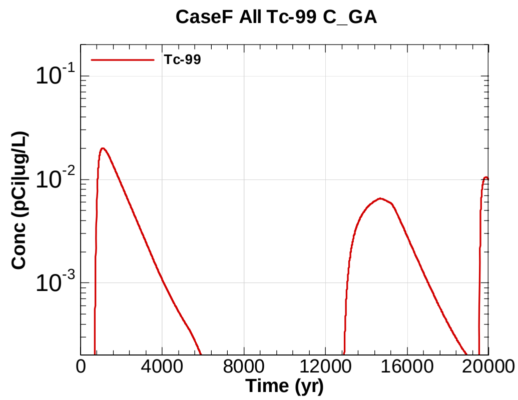

Figure P-193 - 100m Aquifer Concentration for CaseF All Tc-99 C_GA

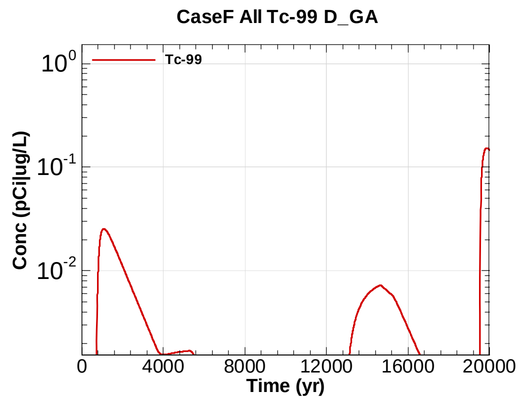

Figure P-194 - 100m Aquifer Concentration for CaseF All Tc-99 D_GA

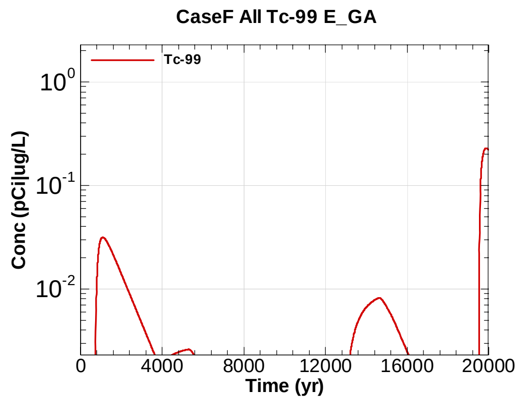

Figure P-195 - 100m Aquifer Concentration for CaseF All Tc-99 E_GA

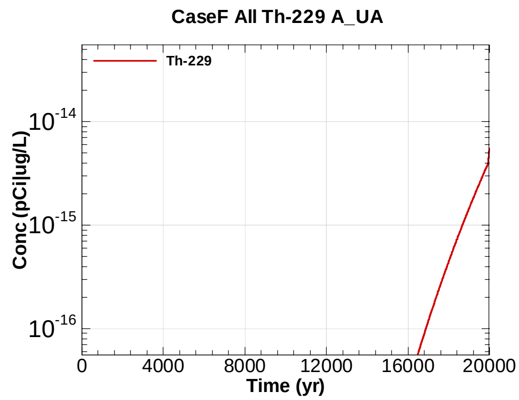

Figure P-196 - 100m Aquifer Concentration for CaseF All Th-229 A_UA

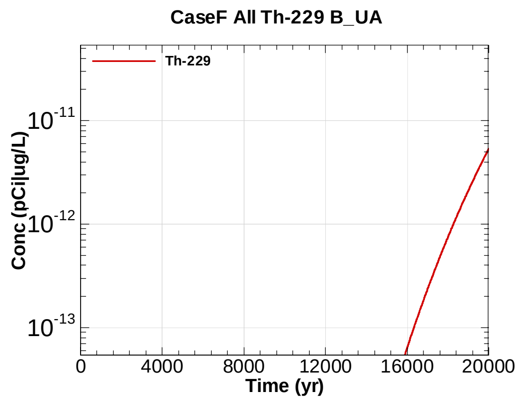

Figure P-197 - 100m Aquifer Concentration for CaseF All Th-229 B_UA

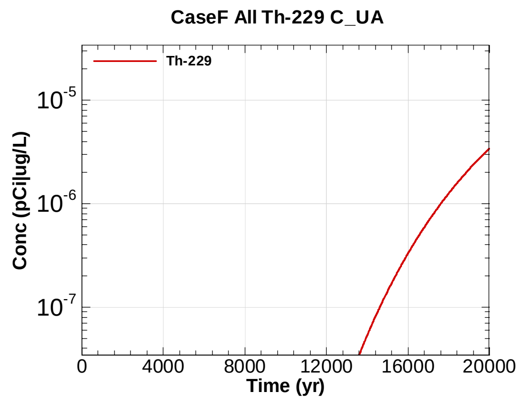

Figure P-198 - 100m Aquifer Concentration for CaseF All Th-229 C_UA

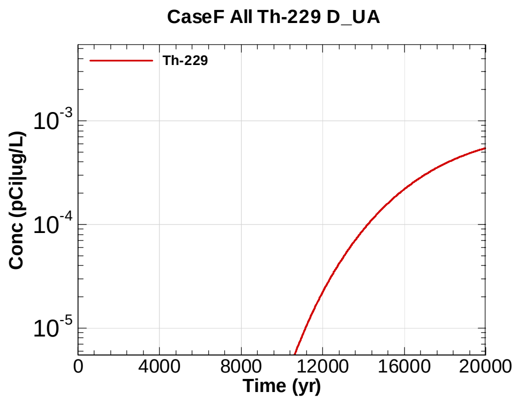

Figure P-199 - 100m Aquifer Concentration for CaseF All Th-229 D_UA

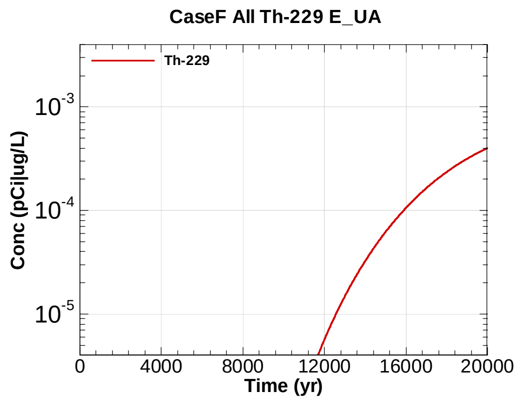

Figure P-200 - 100m Aquifer Concentration for CaseF All Th-229 E_UA

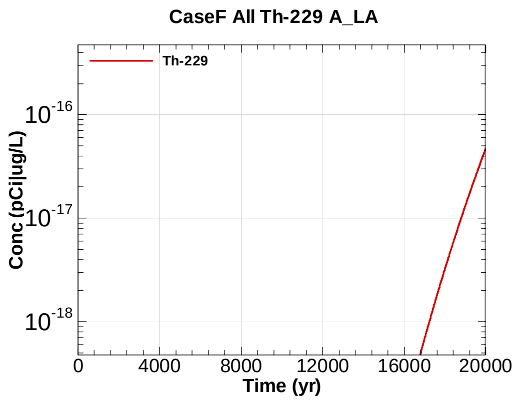

Figure P-201 - 100m Aquifer Concentration for CaseF All Th-229 A_LA

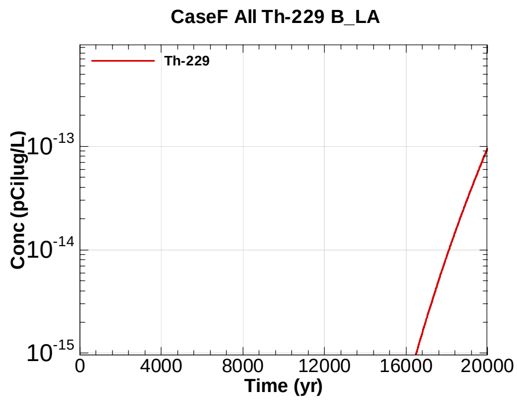

Figure P-202 - 100m Aquifer Concentration for CaseF All Th-229 B_LA

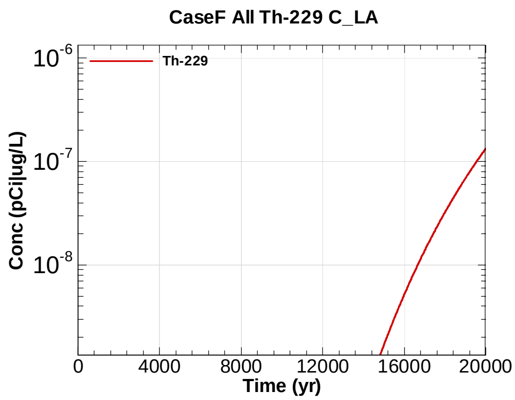

Figure P-203 - 100m Aquifer Concentration for CaseF All Th-229 C_LA

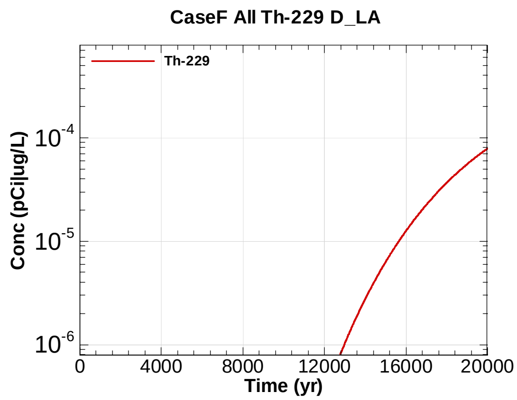

Figure P-204 - 100m Aquifer Concentration for CaseF All Th-229 D_LA

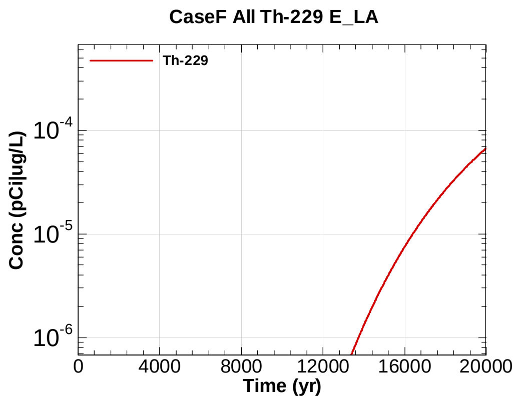

Figure P-205 - 100m Aquifer Concentration for CaseF All Th-229 E_LA

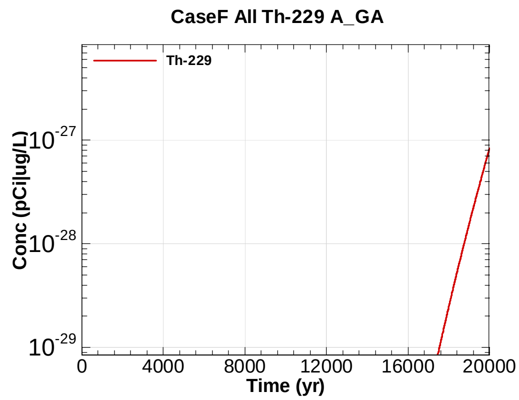

Figure P-206 - 100m Aquifer Concentration for CaseF All Th-229 A_GA

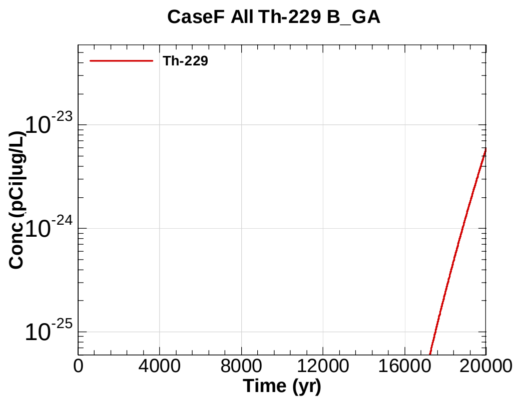

Figure P-207 - 100m Aquifer Concentration for CaseF All Th-229 B_GA

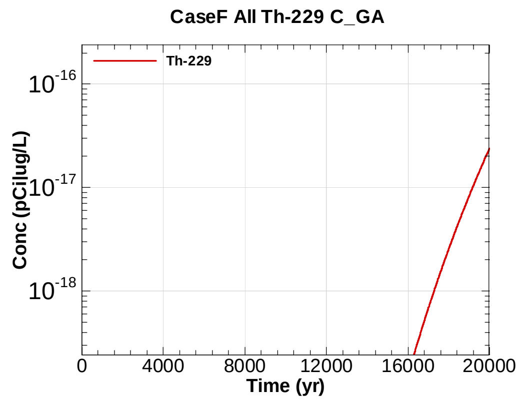

Figure P-208 - 100m Aquifer Concentration for CaseF All Th-229 C_GA

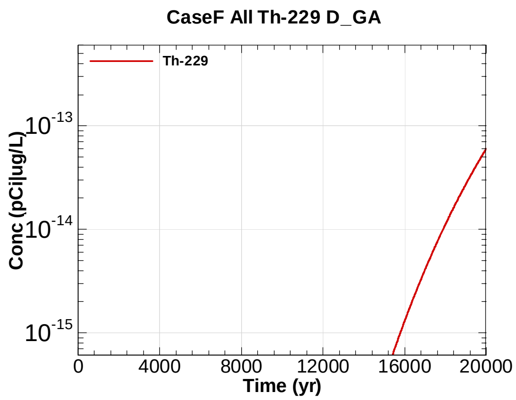

Figure P-209 - 100m Aquifer Concentration for CaseF All Th-229 D_GA

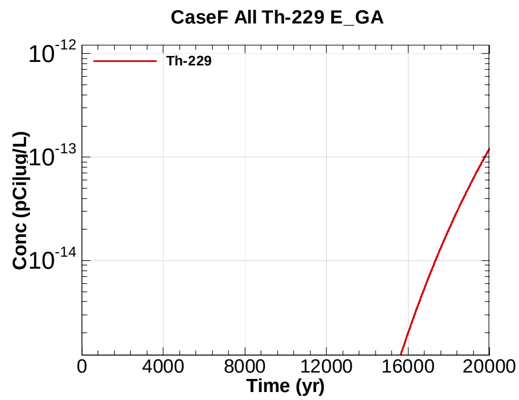

Figure P-210 - 100m Aquifer Concentration for CaseF All Th-229 E_GA

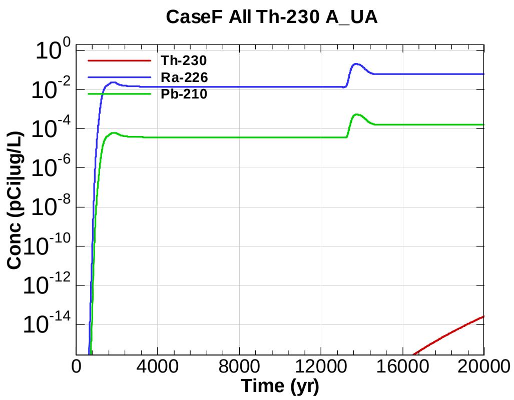

Figure P-211 - 100m Aquifer Concentration for CaseF All Th-230 A_UA

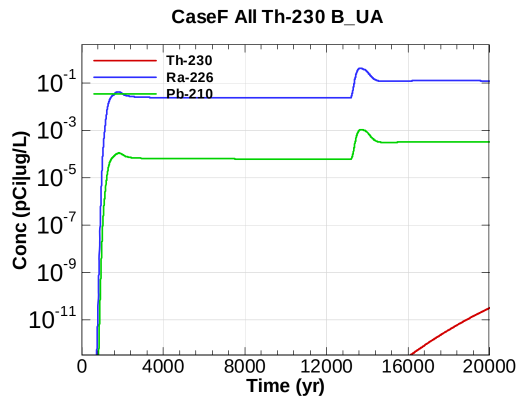

Figure P-212 - 100m Aquifer Concentration for CaseF All Th-230 B_UA

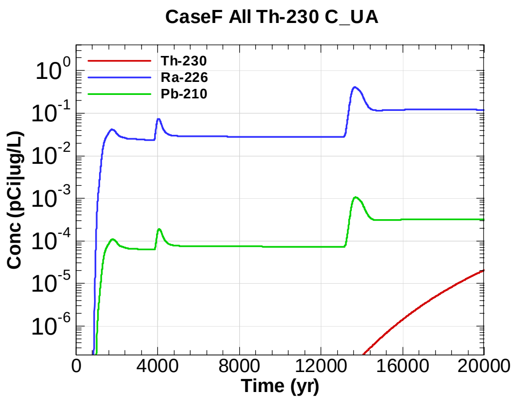

Figure P-213 - 100m Aquifer Concentration for CaseF All Th-230 C_UA

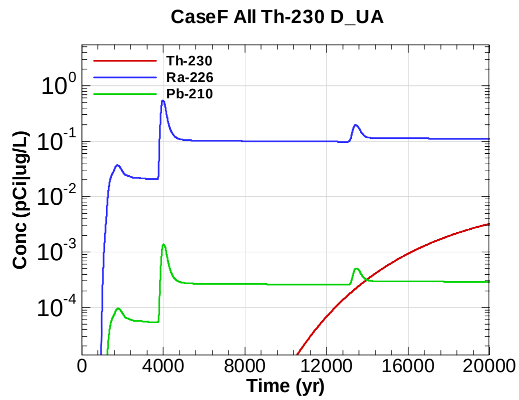

Figure P-214 - 100m Aquifer Concentration for CaseF All Th-230 D_UA

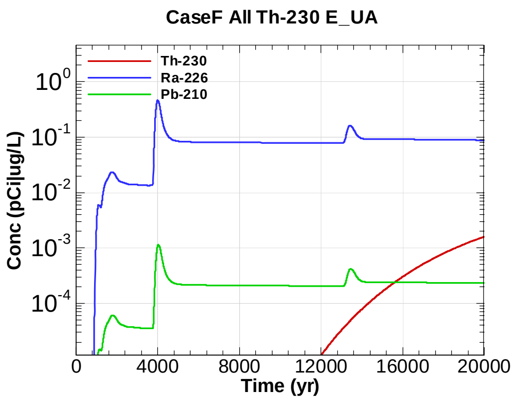

Figure P-215 - 100m Aquifer Concentration for CaseF All Th-230 E_UA

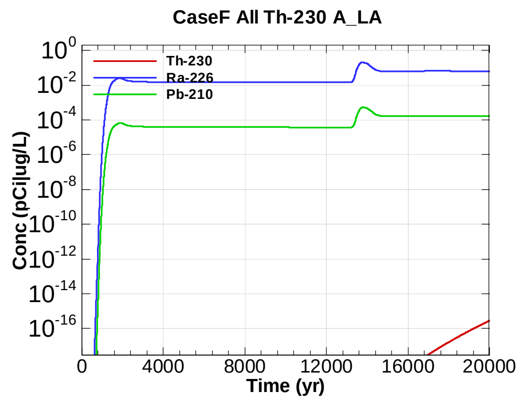

Figure P-216 - 100m Aquifer Concentration for CaseF All Th-230 A_LA

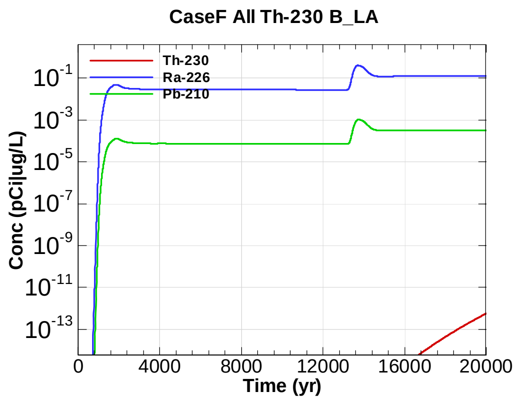

Figure P-217 - 100m Aquifer Concentration for CaseF All Th-230 B_LA

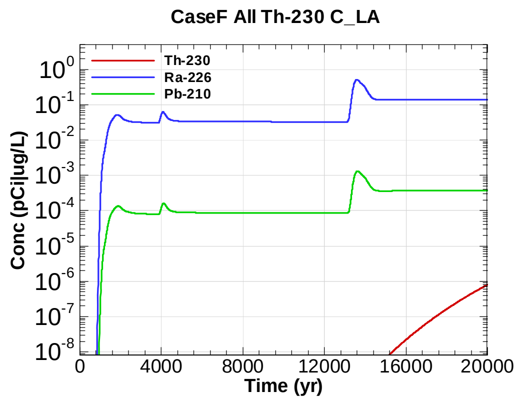

Figure P-218 - 100m Aquifer Concentration for CaseF All Th-230 C_LA

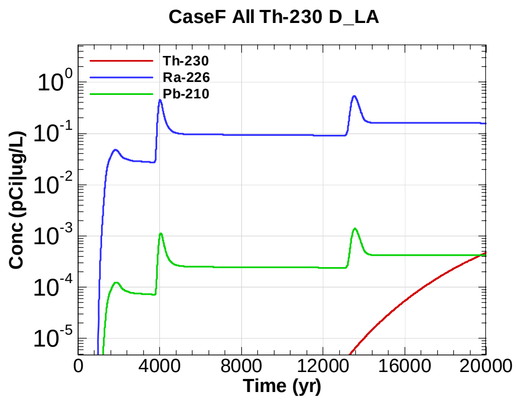

Figure P-219 - 100m Aquifer Concentration for CaseF All Th-230 D_LA

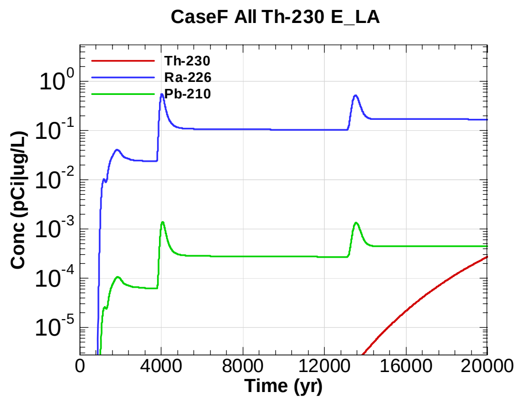

Figure P-220 - 100m Aquifer Concentration for CaseF All Th-230 E_LA

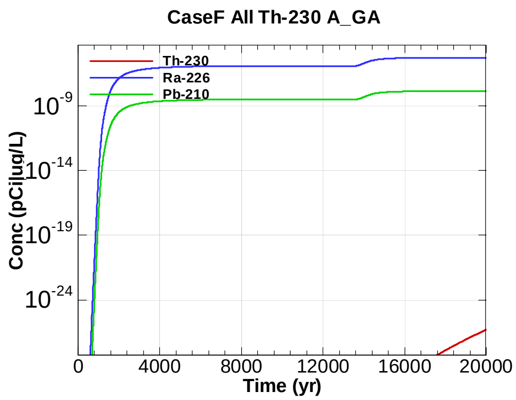

Figure P-221 - 100m Aquifer Concentration for CaseF All Th-230 A_GA

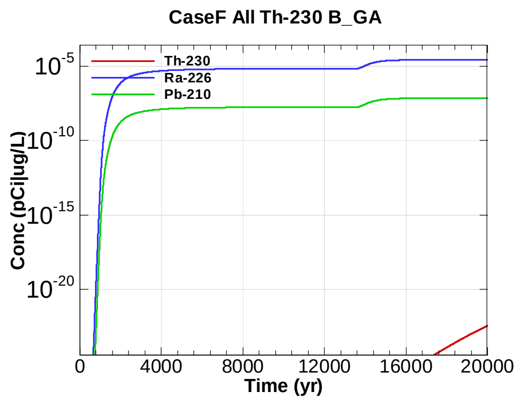

Figure P-222 - 100m Aquifer Concentration for CaseF All Th-230 B_GA

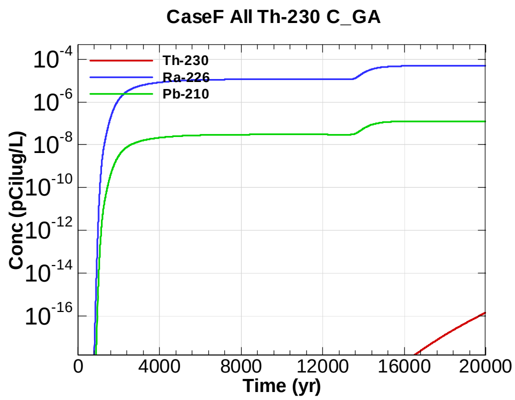

Figure P-223 - 100m Aquifer Concentration for CaseF All Th-230 C_GA

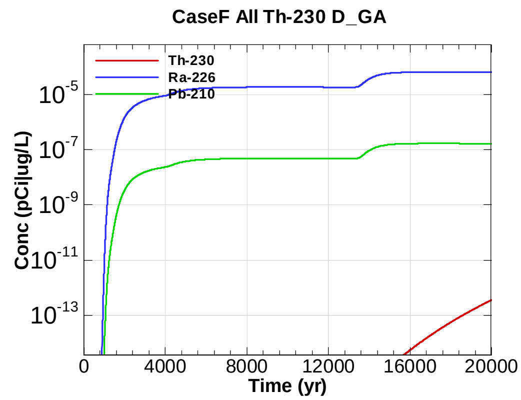

Figure P-224 - 100m Aquifer Concentration for CaseF All Th-230 D_GA

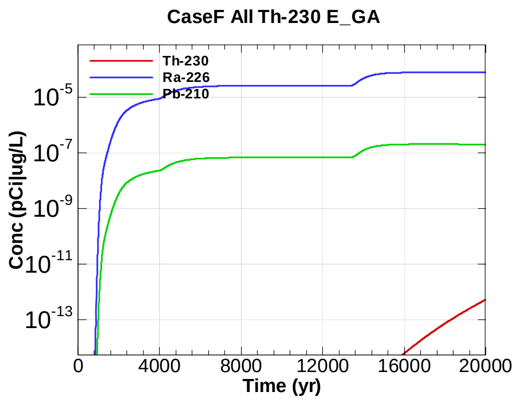

Figure P-225 - 100m Aquifer Concentration for CaseF All Th-230 E_GA

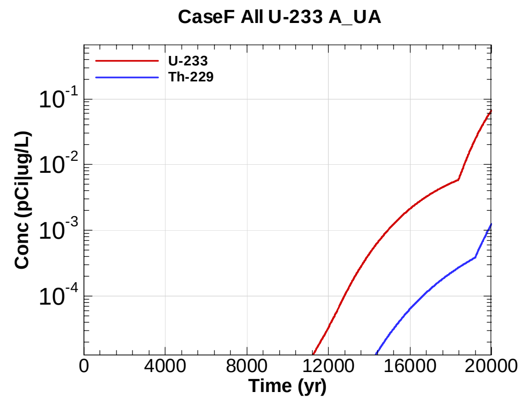

Figure P-226 - 100m Aquifer Concentration for CaseF All U-233 A_UA

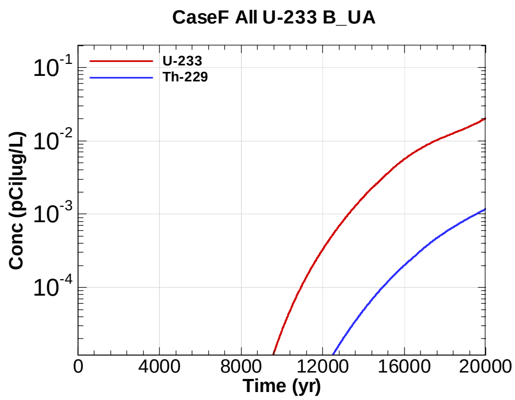

Figure P-227 - 100m Aquifer Concentration for CaseF All U-233 B_UA

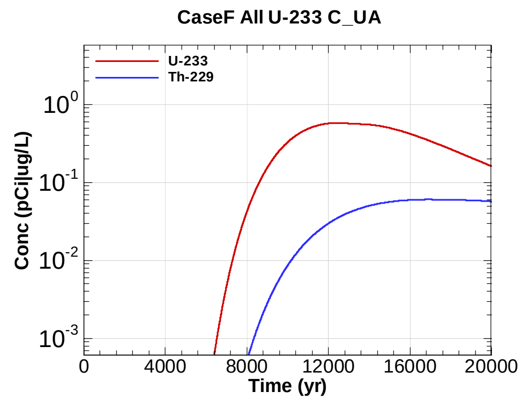

Figure P-228 - 100m Aquifer Concentration for CaseF All U-233 C_UA

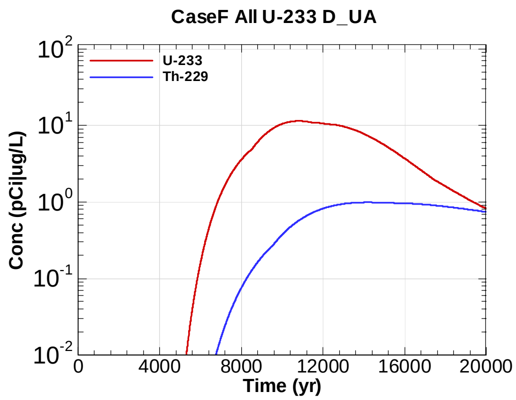

Figure P-229 - 100m Aquifer Concentration for CaseF All U-233 D_UA

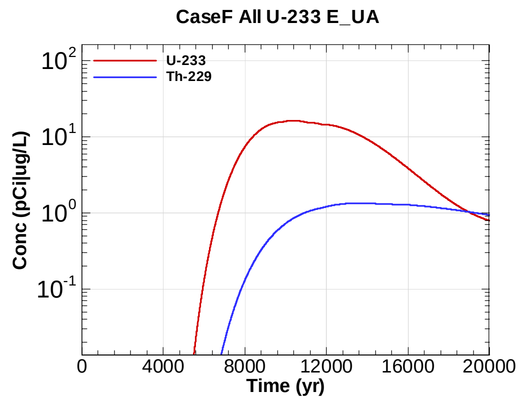

Figure P-230 - 100m Aquifer Concentration for CaseF All U-233 E_UA

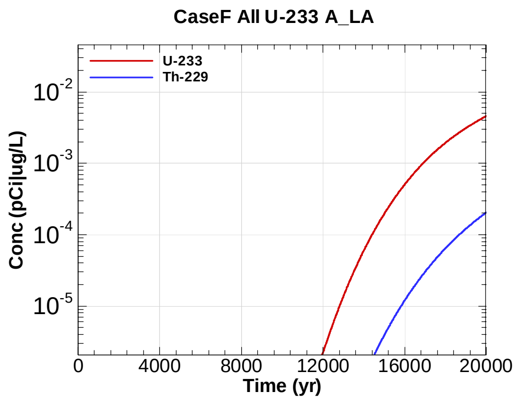

Figure P-231 - 100m Aquifer Concentration for CaseF All U-233 A_LA

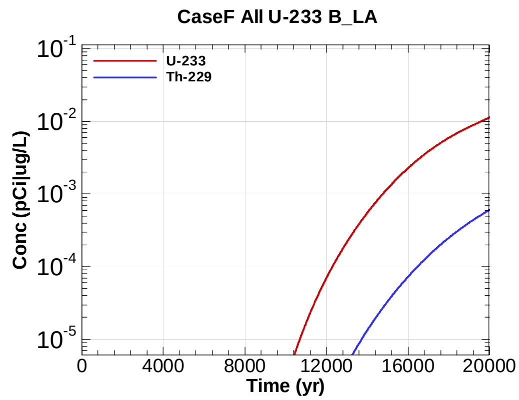

Figure P-232 - 100m Aquifer Concentration for CaseF All U-233 B_LA

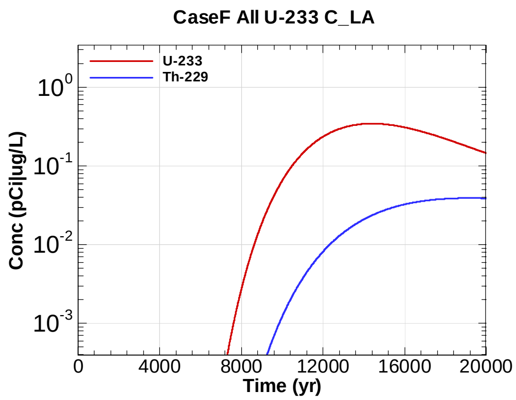

Figure P-233 - 100m Aquifer Concentration for CaseF All U-233 C_LA

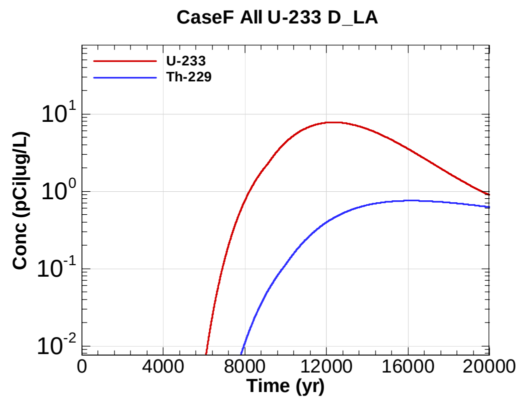

Figure P-234 - 100m Aquifer Concentration for CaseF All U-233 D_LA

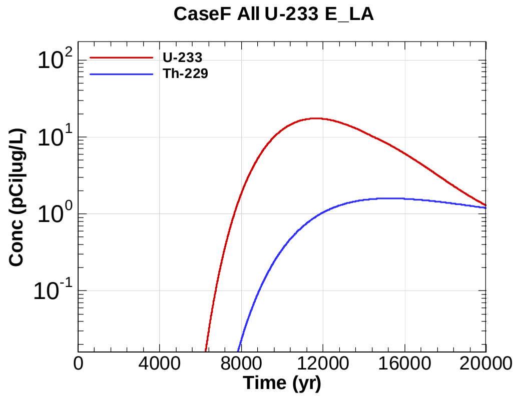

Figure P-235 - 100m Aquifer Concentration for CaseF All U-233 E_LA

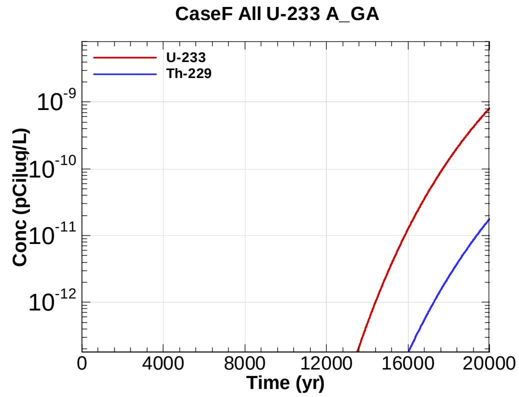

Figure P-236 - 100m Aquifer Concentration for CaseF All U-233 A_GA

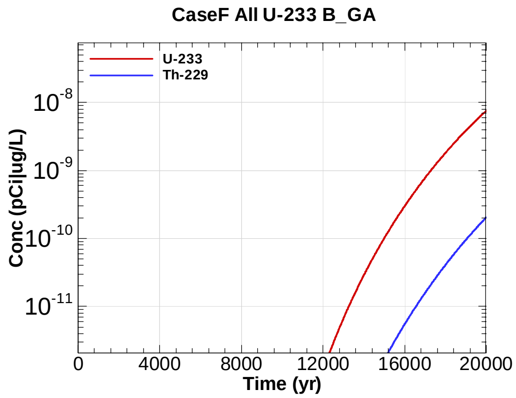

Figure P-237 - 100m Aquifer Concentration for CaseF All U-233 B_GA

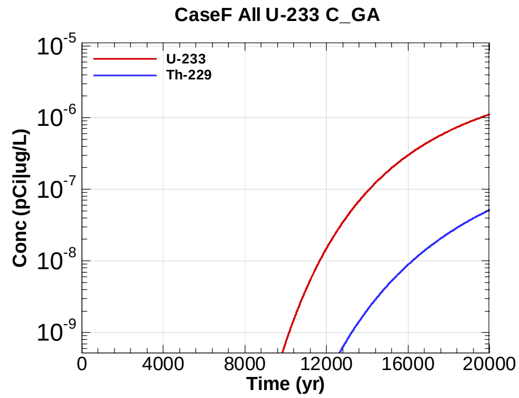

Figure P-238 - 100m Aquifer Concentration for CaseF All U-233 C_GA

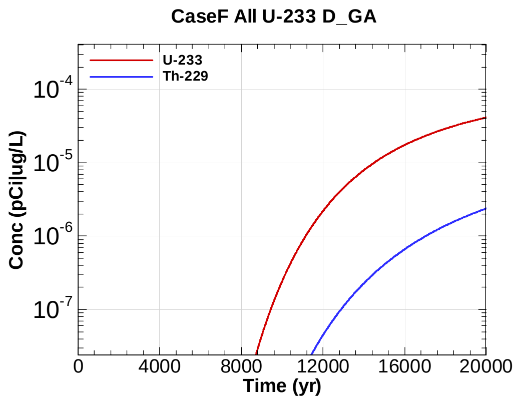

Figure P-239 - 100m Aquifer Concentration for CaseF All U-233 D_GA

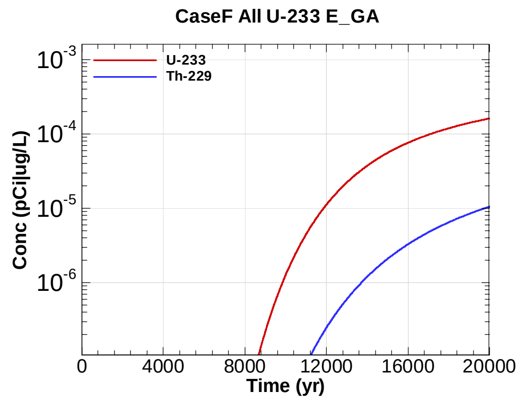

Figure P-240 - 100m Aquifer Concentration for CaseF All U-233 E_GA

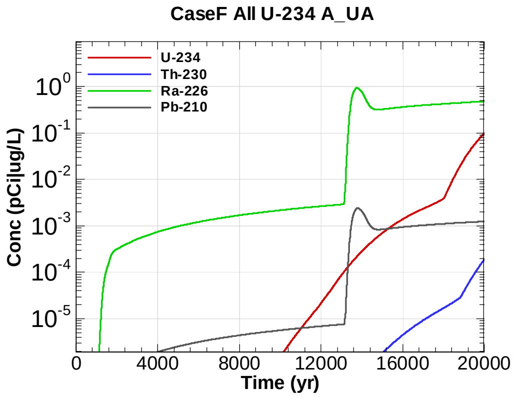

Figure P-241 - 100m Aquifer Concentration for CaseF All U-234 A_UA

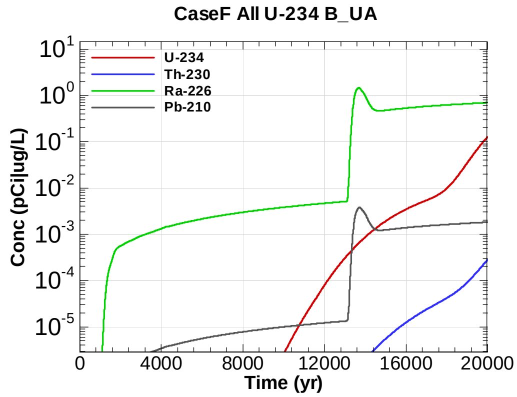

Figure P-242 - 100m Aquifer Concentration for CaseF All U-234 B_UA

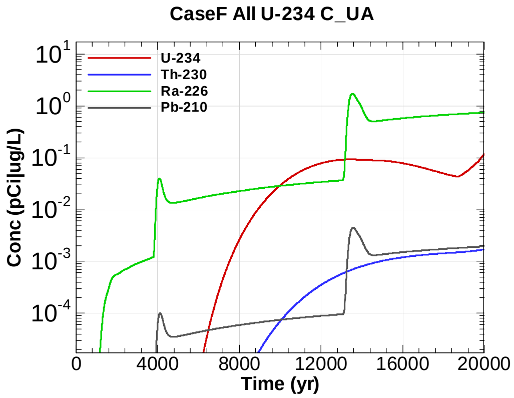

Figure P-243 - 100m Aquifer Concentration for CaseF All U-234 C_UA

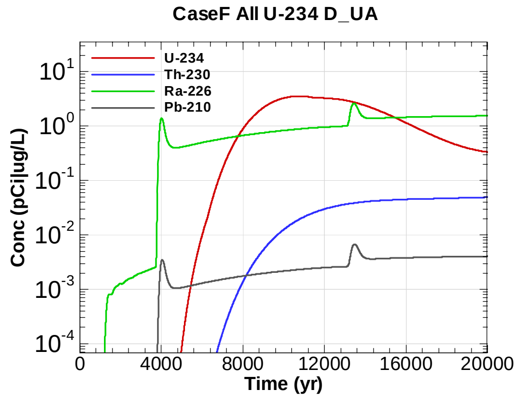

Figure P-244 - 100m Aquifer Concentration for CaseF All U-234 D_UA

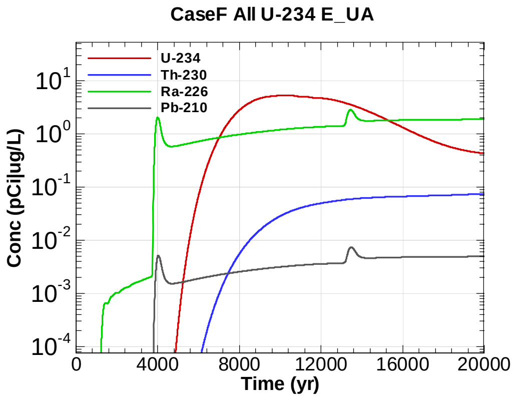

Figure P-245 - 100m Aquifer Concentration for CaseF All U-234 E_UA

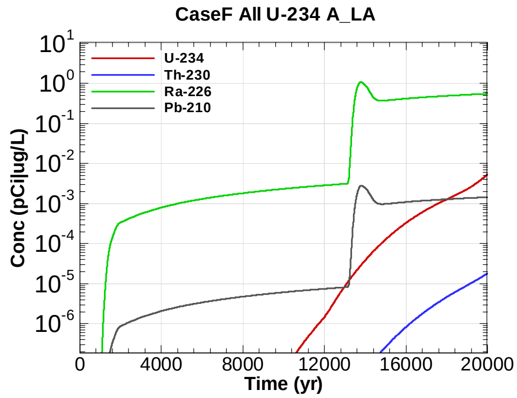

Figure P-246 - 100m Aquifer Concentration for CaseF All U-234 A_LA

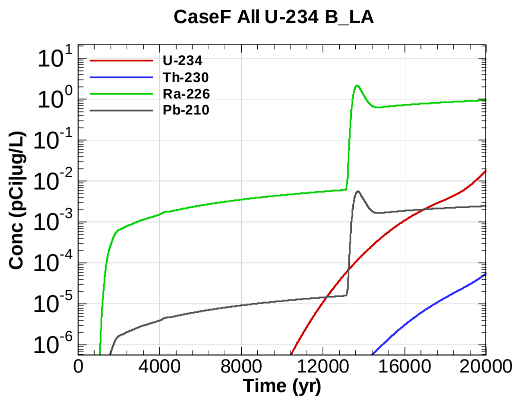

Figure P-247 - 100m Aquifer Concentration for CaseF All U-234 B_LA

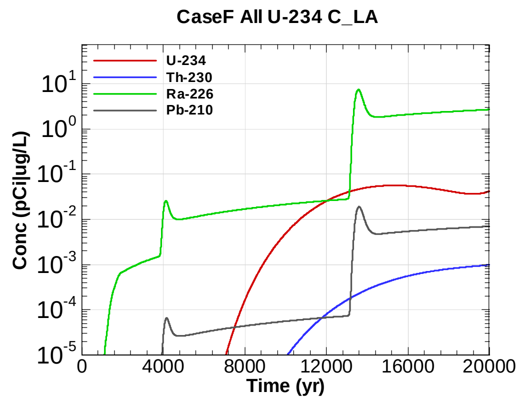

Figure P-248 - 100m Aquifer Concentration for CaseF All U-234 C_LA

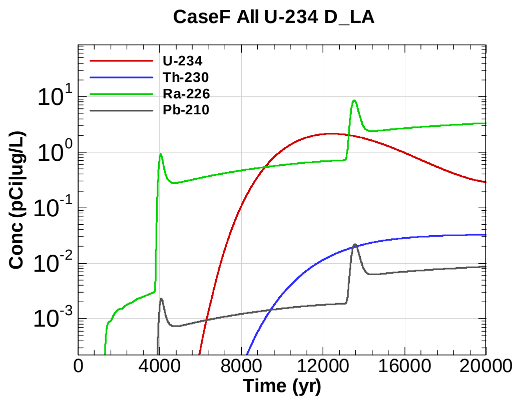

Figure P-249 - 100m Aquifer Concentration for CaseF All U-234 D_LA

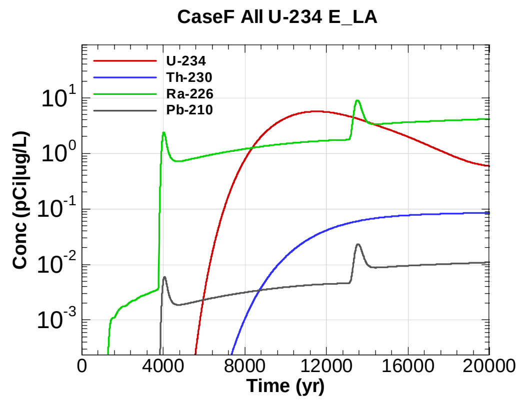

Figure P-250 - 100m Aquifer Concentration for CaseF All U-234 E_LA

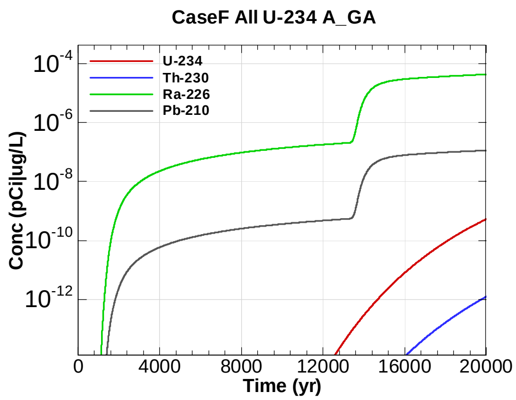

Figure P-251 - 100m Aquifer Concentration for CaseF All U-234 A_GA

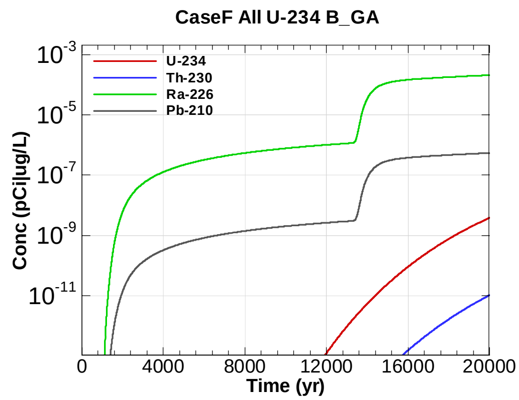

Figure P-252 - 100m Aquifer Concentration for CaseF All U-234 B_GA

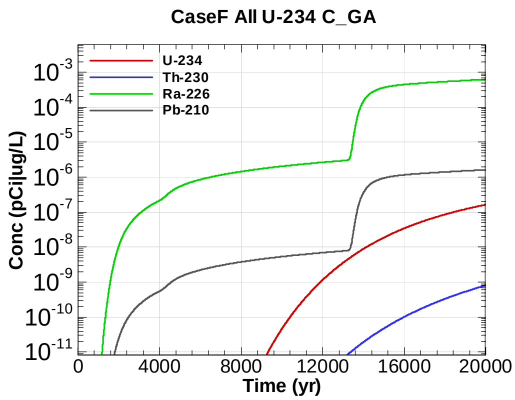

Figure P-253 - 100m Aquifer Concentration for CaseF All U-234 C_GA

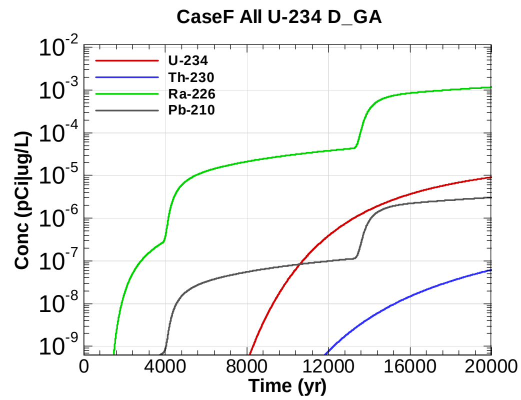

Figure P-254 - 100m Aquifer Concentration for CaseF All U-234 D_GA

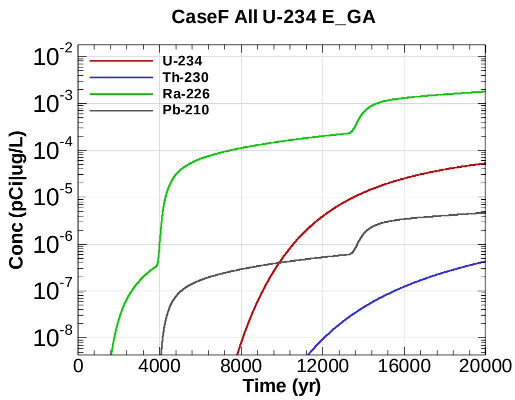

Figure P-255 - 100m Aquifer Concentration for CaseF All U-234 E_GA

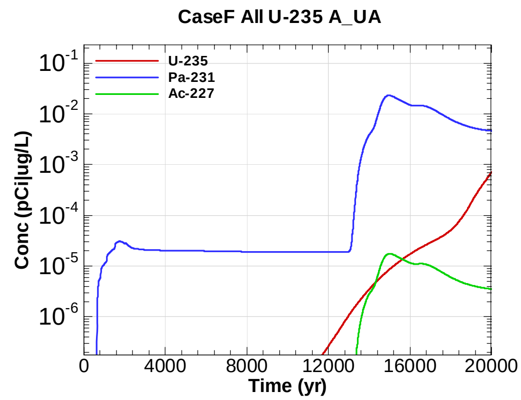

Figure P-256 - 100m Aquifer Concentration for CaseF All U-235 A_UA

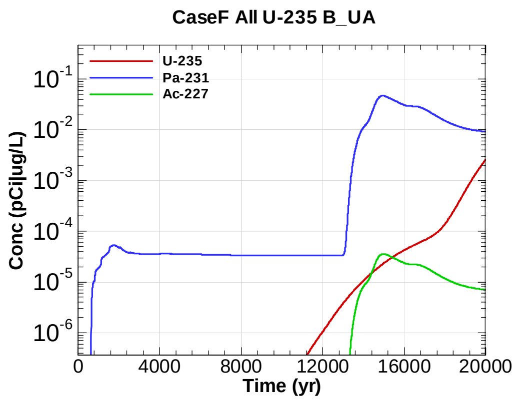

Figure P-257 - 100m Aquifer Concentration for CaseF All U-235 B_UA

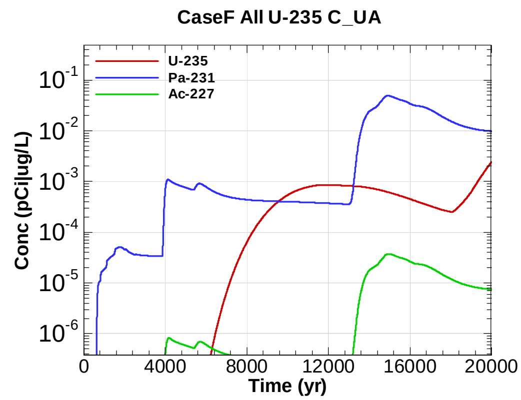

Figure P-258 - 100m Aquifer Concentration for CaseF All U-235 C_UA

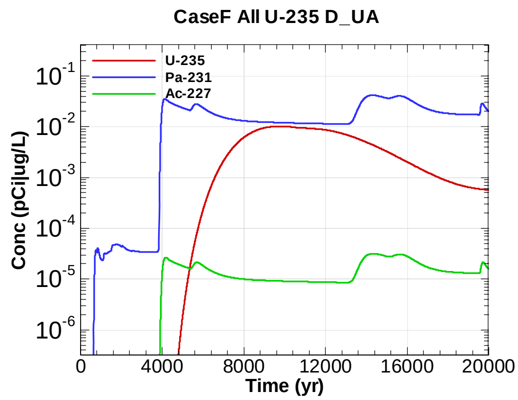

Figure P-259 - 100m Aquifer Concentration for CaseF All U-235 D_UA

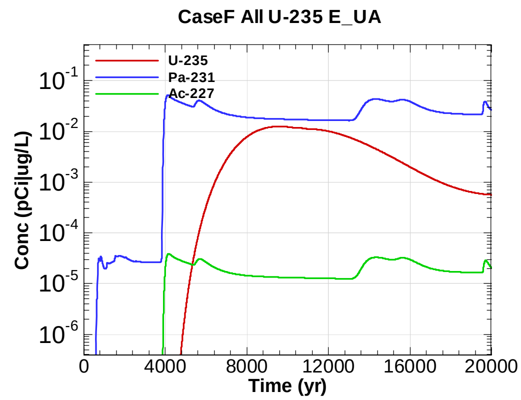

Figure P-260 - 100m Aquifer Concentration for CaseF All U-235 E_UA

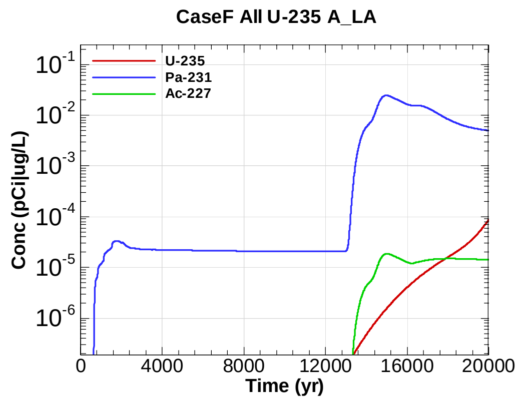

Figure P-261 - 100m Aquifer Concentration for CaseF All U-235 A_LA

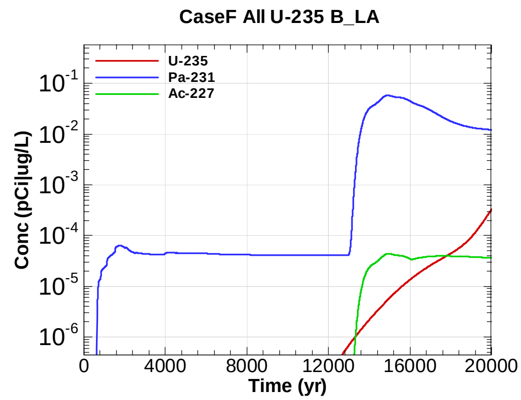

Figure P-262 - 100m Aquifer Concentration for CaseF All U-235 B_LA

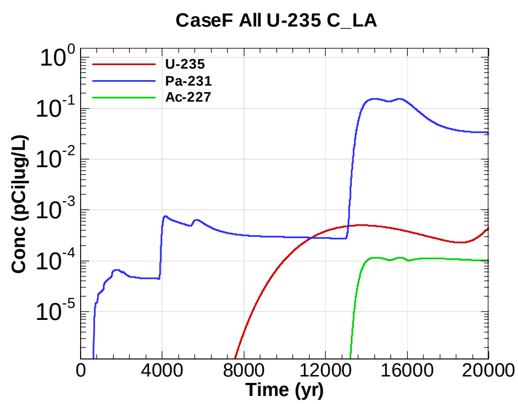

Figure P-263 - 100m Aquifer Concentration for CaseF All U-235 C_LA

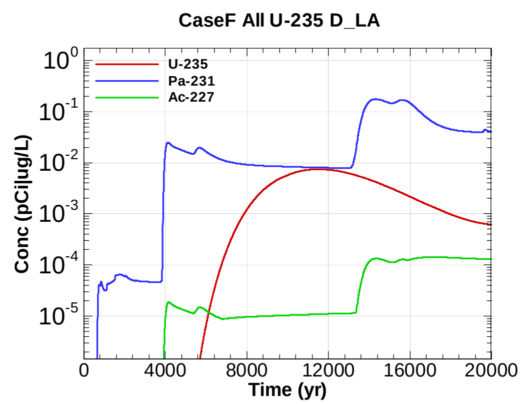

Figure P-264 - 100m Aquifer Concentration for CaseF All U-235 D_LA

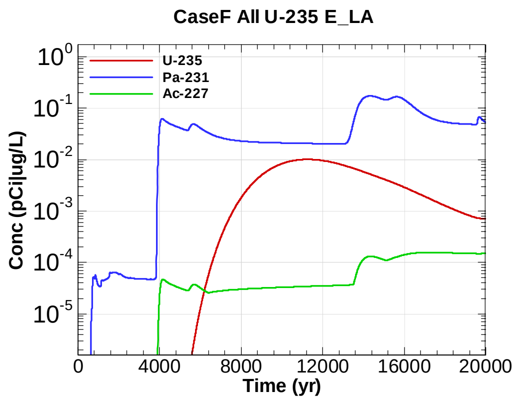

Figure P-265 - 100m Aquifer Concentration for CaseF All U-235 E_LA

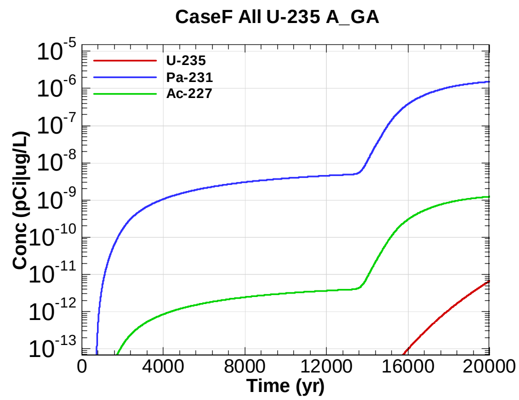

Figure P-266 - 100m Aquifer Concentration for CaseF All U-235 A_GA

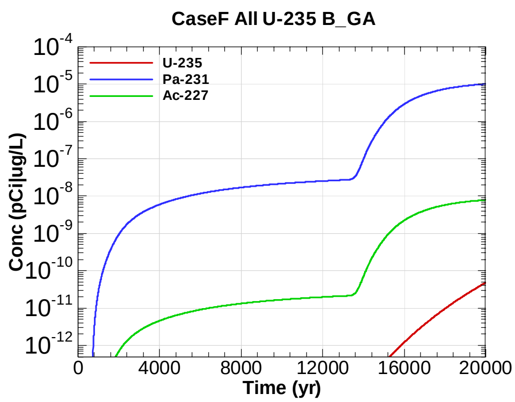

Figure P-267 - 100m Aquifer Concentration for CaseF All U-235 B_GA

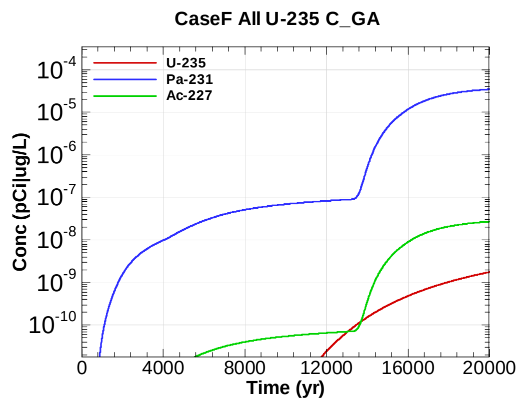

Figure P-268 - 100m Aquifer Concentration for CaseF All U-235 C_GA

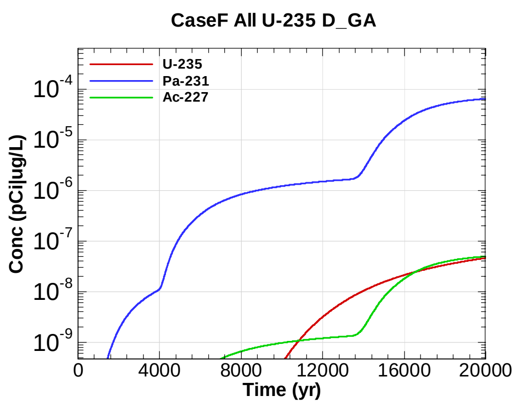

Figure P-269 - 100m Aquifer Concentration for CaseF All U-235 D_GA

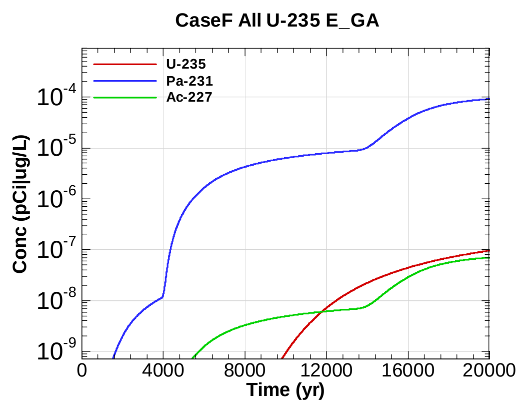

Figure P-270 - 100m Aquifer Concentration for CaseF All U-235 E_GA