DEPARTMENT OF THE ARMY
US ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND
ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
PICATINNY ARSENAL, NEW JERSEY 07806-5000

21 February 2014

RDAR-QES-F-RPO

MEMORANDUM FOR NUCLEAR REGULATORY COMMISSION; REGION I, ATTN: MS. LAURIE KAUFFMAN

SUBJECT: Response to Comments on Plan to Release Area 1222

1. Area 1222, also known as "the Gorge", is presently considered potentially contaminated with Depleted Uranium. As stated in our SUB 348 source materials license renewal application dated 20 June 2011, limited research and development testing with depleted uranium containing items was conducted in this test area 40 to 45 years ago. A small amount of radium contamination, most likely a fragment of a luminescent gauge or dial, was also found in the area during a survey performed in 2001.

2. The US Army Joint Munitions Command (JMC) has contracted Bering Sea Environmental, LLC (BSEn) doing business as (dba) Aleut World Solutions (AWS) to write a work plan that describes the methods proposed for site remediation, and the performance of final status radiological surveys and sampling in accordance with the guideline set forth in the Multi Agency Radiation Survey and Site Investigation Manual (MARSSIM).

3. The final objective of the MARSSIM final status survey and sampling in Area 1222 is for final release in accordance with the unrestricted release criteria outlined in 10 CFR Part 20.1402. The criteria states a site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a total effective dose equivalent (TEDE) to an average member of the critical group that does not exceed 25 mrem per year, including that from groundwater sources of drinking water, and the residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA).

4. ARDEC requested NRC review and concurrence of the release plan on 23 July 2013. The NRC provided comments on 28 January 2014 (Docket No:04006377, Control No.: 581537). The attached AWS plan to release Area 1222 of Picatinny Arsenal, NJ for unrestricted use has been updated to address the NRC comments. The plan also addresses comments provided by the New Jersey Department of Environmental Protection (NJDEP) on 12 February 2014.

5. The following changes were made to the plan:

5.1. NRC Comment (1): The licensee should apply the sum of fractions approach for each radionuclide or calculate a new Gross DCGL for total uranium that results in a dose less than the limit in 10 CFR Part 20 Subpart E. ***Response:*** *The plan has been changed to apply the sum of fractions approach for all nuclides resulting in a dose less than 15 mrem/year total effective dose equivalent (TEDE). A dose of less than 15 mrem/year TEDE should meet the NJDEP unrestricted release limits.*

5.2. NRC Comment (2): Please provide additional justification for application of the DCGL of 3 pCi/g for Ra-226. ***Response:*** *Utilizing RESRAD Version 6.5 Modeling Code and the sum of fractions approach, a new DCGL for Ra-226 has been developed in the updated release plan.*

5.3. A number of additional changes were made to the plan based on NJDEP comments. Changes include identification of vertical extent in the event contamination is found, changing DCGLs to comply with a TEDE of 15 mrem/year, changing DCGL's to account for a vertical extent of five (5) feet, application of the unity rule (sum of fractions) to determine DCGL's, utilizing triangular grid patterns to obtain samples, and clarification of when samples will be taken.

6. Based on the revised plan, we believe the planned level of residual radioactive soil concentrations in the proposed action will not exceed the radioactive soil concentration in Table 1 of the Memorandum of Understanding between the Environmental Protection Agency (EPA) and the NRC for Consultation and Finality on Decommissioning and Decontamination of Contaminated Sites.

7. The Point of Contact for this memorandum is the undersigned at 973.724.8842 or richard.w.lamoreaux.civ@mail.mil.

RICHARD W. LAMOREAUX
Radiation Safety Officer, ARDEC

Enclosure: AWS MARSSIM Survey and Sampling Work Plan/Open Detonation Pit and Hillside Areas, Picatinny Arsenal; Rev 4 dtd 30 January 2014

RDAR-QES-F-RPO
SUBJECT: **Request for Comment on Plan to Release Area 1222**

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CF:
ARDEC Radiation Protection Office

ALEUT WORLD SOLUTIONS

MARSSIM FINAL STATUS SURVEY AND SAMPLING WORK PLAN

Radiological Surveys and Sampling
Open Detonation Pit Area & Adjacent Hillside in Area 1222 (Gorge)
ARDEC, Picatinny Arsenal, New Jersey

Project No. USA 2013-006

Revision 4
January 30, 2014

Prepared by:

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MARSSIM FINAL STATUS SURVEY AND SAMPLING WORK PLAN

Radiological Surveys and Sampling
Open Detonation Pit Area & Adjacent Hillside in Area 1222 (Gorge)
ARDEC Picatinny Arsenal, New Jersey

Project No. USA 2013-006

Revision 4
January 30, 2014

Approvals

Prepared by: _____ Date: 01/30/2014
Dan Spicuzza, AWS Project Manager

Approved by: WG Haney Digitally signed by WG Haney DN: cn=WG Haney, c=US, o=AWS, LLC, ou=Field Operations, email=bhaney@aleutworldsolutions.com Date: 2014.02.19 16:12:32 -05'00' _____ Date: _____
Bill Haney, AWS Field Operations Manager

Approved by: _____ Date: 02/19/2014
Richard Lamoreaux, ARDEC Radiation Safety Officer

Approved by: HART.EARL.J.109864477 Digitally signed by HART.EARL.J.109864772 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=HART.EARL.J.109864772 Date: 2014.02.19 15:21:14 -06'00' _____ Date: _____
Joe Hart, U.S. Army JMC

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ACRONYMS AND ABBREVIATIONS

α	Alpha
AOC	Areas of concern
ALARA	As Low As Reasonably Achievable
ANSI	American National Standard Institute
AR 11-9	The Army Radiation Safety Program
ARDEC	Armaments Research, Development & Engineering Center
AREA 1222	The Gorge
ARP	Army Radiation Permit
ARPO	Army Radiation Protection Office
β	Beta
AWS	Aleut World Solutions, LLC
Bkgd	Background counts
Bgs	Below grade surface
Bi^{214}	Bismiuth-214 Uranium-238 Series
Bkg	Background
Cal	Calibration
Cm	Centimeter
cm^2	Square centimeter
Cpm	Counts per minute
Cs^{137}	Cesium-137 Check Source
DA PAM 385-24	Department of the Army Pamphlet 385-24
DAC	Derived Air Concentration
dba	doing business as
DCGL	Derived Concentration Guideline Limit
$DCGL_W$	Derived Concentration Guideline Limit (Weighted)
$DCGL_{EMC}$	Derived Concentration Guideline Limit (Elevated Measurement Comparison)
Δ	DCGL – LBGR
DOT	Department Of Transportation
Dpm	Disintegrations per minute
$dpm/100cm^2$	Disintegrations per minute per 100 square centimeters
DQO's	Data Quality Objectives
DU	Depleted Uranium
Eff	Efficiency
F	Relative fraction
FSS	Final Status Survey
Ft	Feet
Ft^2	Square feet
g	Gram
H_o	Null Hypothesis
HASP	Health and Safety Plan (HASP).
Inst	Instrument
IAW	In Accordance with
ISO	International Organization for Standardization

JMC	U.S. Army Joint Munitions Command
LBGR	Lower bound of gray region
LLD	Lower Level of Detection
M	Meters
m^2	Square meter
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
MDCR	Minimum Detectable Count Rate
mCi	Millicurie
mm	Millimeter
mrem	Millirem
mrem/yr	Millirem per year
N/A	Not applicable
NaI	Sodium iodide
NIST	National Institute of Standards and Technology
NMSS	Nuclear Regulatory Commission Office of Nuclear Material Safety and Safeguards
NRC	Nuclear Regulatory Commission
NUREG	Nuclear Regulatory Guide
NUREG-1505	Nuclear Regulatory Commission (NRC). 1998. A Nonparametric Statistical Methodology for the Design and Analysis of the Final Status Decommissioning Survey. NUREG-1505, Rev.1
NUREG-1575	MARSSIM
ODPA	open detonation pit area
$ODPA_{INT}$	open detonation pit interior area
$ODPA_{EXT}$	open detonation pit exterior area
OSHA	Occupational Safety and Health Administration
Pb^{214}	Lead-214 Uranium-238 Series
pCi	Picocurie
Ppm	Parts per million
QA/QC	Quality Assurance / Quality Control
Ra^{226}	Radium-226 Uranium-238 Series
RCRA	Resource Conservation and Recovery Act
Δ/σ	Relative shift
RPO	Radiation Protection Officer
RSO	Radiation Safety Officer
RWP	Radiation Work Permit
σ	Standard deviation
S/N	Serial number
Scan	Gamma detector response rate
SOP	Standing Operating Procedure
Surface samples	Defined as 0-15 cm below ground surface
TCLP	Toxicity Characteristic Leaching Procedure
TEDE	Total effective dose equivalent
Th^{234}	Thorium-234 – Uranium-238 Series
U^{234}	Uranium-234
U^{235}	Uranium-235
U^{238}	Uranium-238 (Depleted Uranium)
USACHPPM	US Army Center for Health Promotion Preventive Medicine
USAEHA	US Army Environmental Hygiene Agency
USA	U.S. Army

μR/hr	Microroentgen per hour
μCi	Microcurie
UXO	Unexploded Ordnance
SUXOS	Senior UXO Supervisor
Wilcoxon Rank Sum Test	Used to test the null hypothesis in statistics
WP	Work plan
WRS	Wilcoxon Rank Sum Test
ZnS(Ag)	Silver activated zinc sulfide

RECORD OF REVISIONS

Revision Number	Description	Date
0	Draft Final Status Survey and Sampling Work Plan	12/14/2012
1	Draft Final Status Survey and Sampling Work Plan	2/5/2013
2	Draft Final Status Survey and Sampling Work Plan	3/15/2013
3	Final Status Survey and Sampling Work Plan	4/2/2013
4	Final Status Survey and Sampling Work Plan	1/30/2014

1.0 INTRODUCTION

Bering Sea Environmental, LLC (BSEn) dba Aleut World Solutions (AWS) has been contracted by the U.S. Army Joint Munitions Command (JMC) to write this work plan that describes the methods to perform remediation, and MARSSIM final status radiological surveys and sampling in the open detonation pit area and adjacent hillside located in Area 1222 (The Gorge) at the Armaments Research, Development & Engineering Center (ARDEC), Picatinny Arsenal, NJ. The final status survey and sampling will be done in accordance with the guideline set forth in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM).

The final objective of the MARSSIM final status survey and sampling in these areas is for the unrestrictive release of the areas in accordance with the Nuclear Regulatory Commission's (NRC's) unrestricted release criteria outlined in 10 CFR Part 20.1402 which states a site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a total effective dose equivalent (TEDE) to an average member of the critical group that does not exceed 15 mrem per year, including that from groundwater sources of drinking water, and the residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA). The NRC's approval and/or review of this plan will be required before commencing work under this plan.

Work will be performed under reciprocity with the Nuclear Regulatory Commission (NRC) or equivalent agreement state regulatory agency under AWS's NRC Broad Scope Radioactive Materials License # 50-29273-01 which is presented in this plan as Attachment 1.

Figure 1 below presents a diagram of the open detonation pit interior and exterior areas in Area 1222 that will be surveyed and sampled for unrestricted release.

Figure 2 below presents a map of the adjacent hillside area in Area 1222 that will be surveyed and sampled for unrestricted release.

Figure 1 Open Detonation Pit Area Map

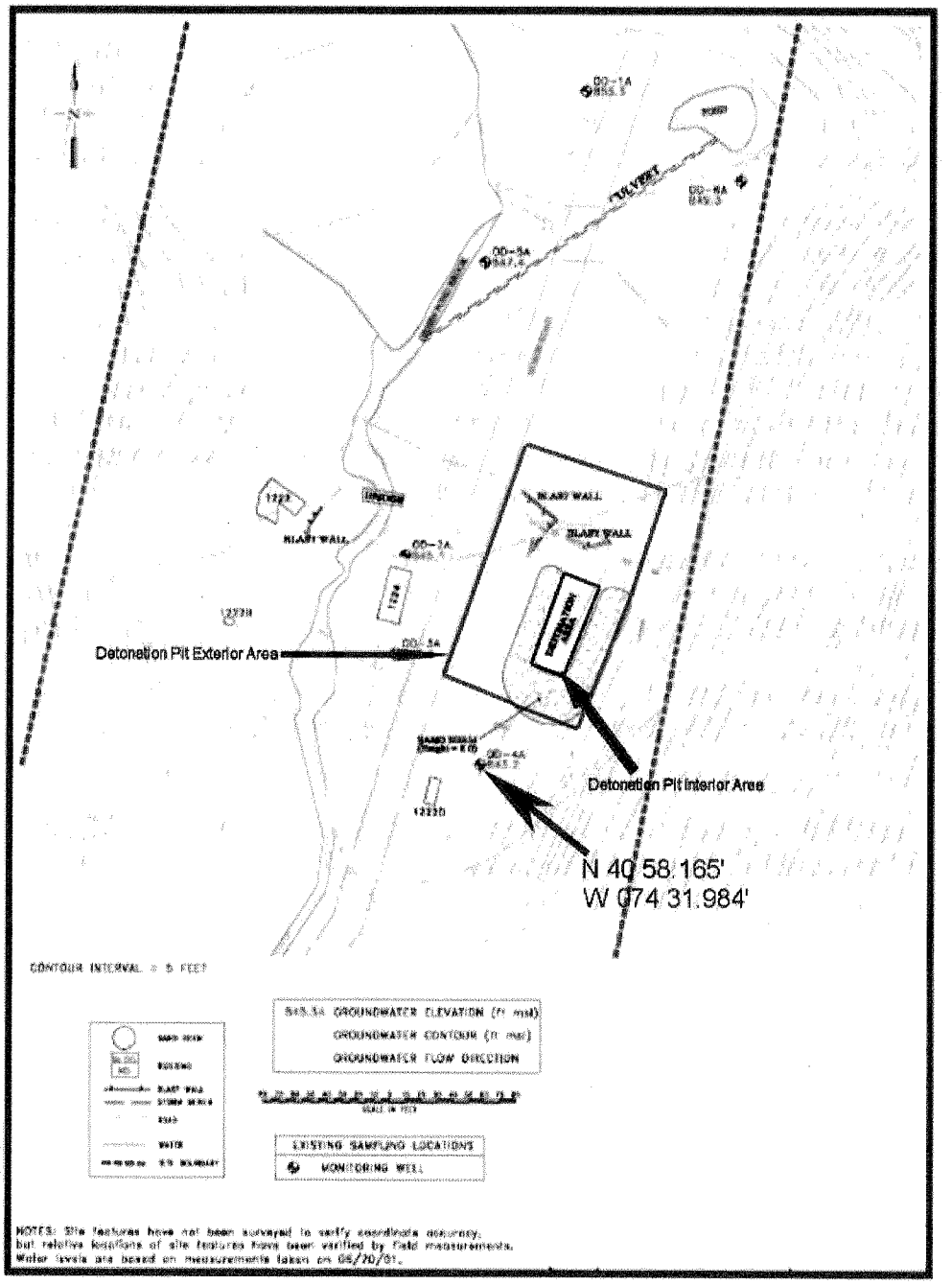
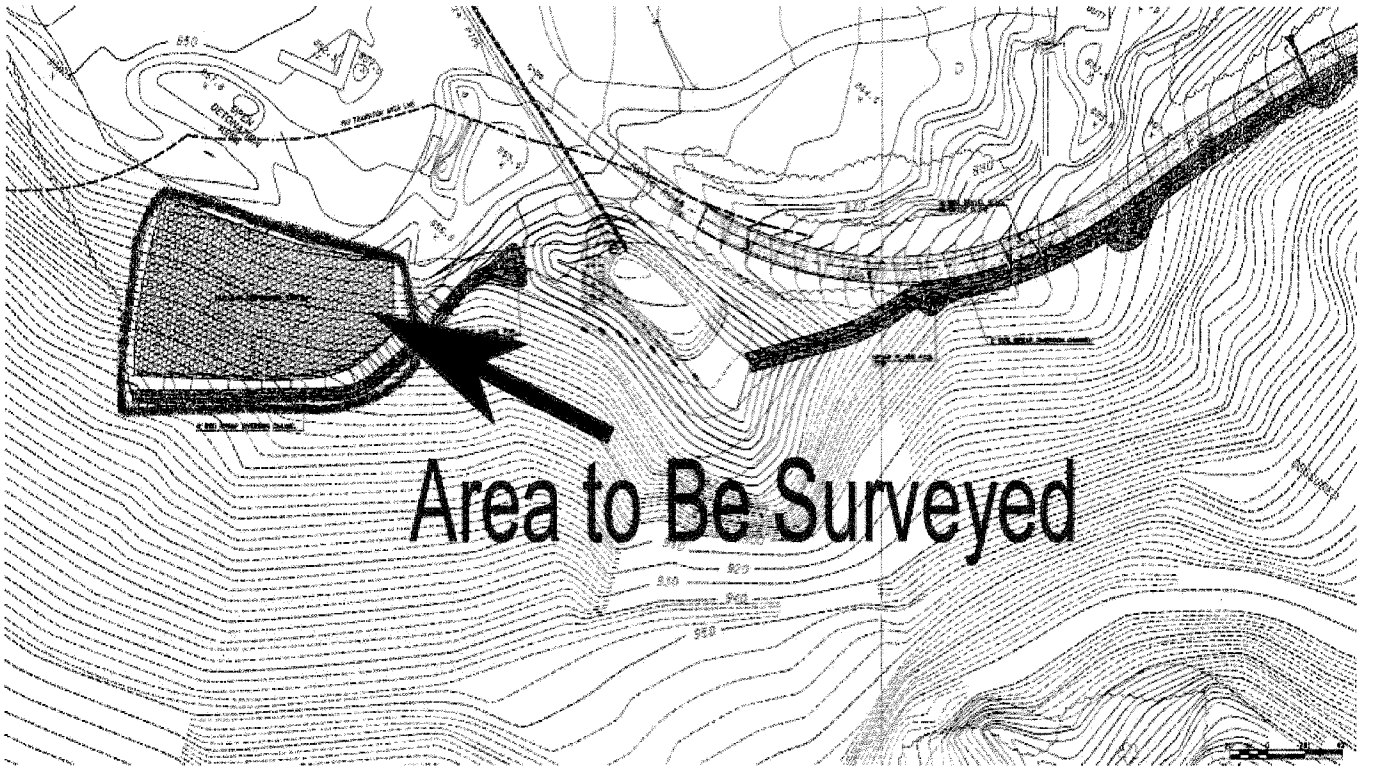


Figure 2 Adjacent Hillside Area To Be Surveyed



2.0 SITE INFORMATION

2.1 SITE DESCRIPTION

Area 1222, known as the Gorge, is located in the valley toward the northern end of the arsenal. It lies at the base of Copperas Mountain and is bounded by an unnamed mountain to the southeast. The areas to be surveyed and sampled for unrestricted release; the open detonation pit and the adjacent hillside area are located within Area 1222. The open detonation pit is also commonly referred to as the "open detonation/demilitarization pit".

Area 1222 is still operational. Picatinny demilitarization personnel use the open detonation pit area and other detonation areas in Area 1222 on a regular basis, and it is the only RCRA approved site available. Minimizing time in the interior areas of the open detonation pit and the development of a detailed schedule and coordination procedures will be crucial to the successful completion of the final status surveys in the area.

2.2 SITE HISTORY

The open detonation pit area (ODPA) was used for open detonation of munitions and as a demilitarization area. Records indicate that it was used to detonate a limited number of mines containing small quantities of depleted uranium (DU) approximately 40 years ago.

2.3 GORGE AREA

Records and correspondences indicate that the open detonation pit in the gorge area was used to detonate a limited number of mines containing small quantities of DU. AWS must coordinate with the personnel at Picatinny Arsenal so that all pertinent standing operating procedures (SOPs) dealing with unexploded ordnance (UXO) are adhered to.,

NOTE: THE DETONATION PIT WAS USED TO DETONATE A VERY LIMITED NUMBER OF MINES CONTAINING SMALL QUANTITIES OF DU. AWS PERSONNEL WILL COORDINATE WITH THE PROPER PERSONNEL AT PICATINNY ARSENAL SO THAT ALL PERTINENT STANDING OPERATING PROCEDURES (SOPS) DEALING WITH UNEXPLODED ORDNANCE (UXO) ARE ADHERED TO. AWS UXO PERSONNEL MUST BE PRESENT DURING ALL TIMES WHEN WORK IS BEING PERFORMED IN THIS AREA.

AWS will be required to obtain a Demo Permit for the area. Picatinny Arsenal UXO personnel will be required to review the credentials of the of the AWS personnel to ensure they are certified UXO Tech 2 or Tech 3's, and provide them with a Demo Permit.

Items of note:

- A U.S. Army Environmental Hygiene Agency (USAEHA) survey completed of the area (U.S. AEHA Report No. 27-43-EQ86-93) detected no concentrations of DU exceeding the minimum detectable activity (MDA). (USAEHA, 1993)

- A survey was performed by New World Technology, Inc. (NWT) in October/November of 2001 in the Open Detonation Pit area. Radium contamination (most likely a fragment of a luminescent gauge or dial) was found in Grid #27 located at the bottom of the hill. Radium contamination was found in Grid #24 and depleted uranium contamination was found in Grids #4 and #6 in the open detonation pit area. (NWT, 2006a)

  Figure 3 show the grids and locations where contamination was found and remediated during the above mentioned survey.

- A survey was performed by NWT in May of 2004 on the hill adjacent to the eastern boundary of the Open Detonation Pit area. The entire surface of the hill area forming the eastern boundary of the open detonation pit area was 100 % gamma scan surveyed. Five areas exceeded the gamma scan action level of 2,800 net-cpm or 14,800 cpm-gross. All other areas ranged between 11,000 cpm and 14,000 cpm.

  Figure 4 presents a map of the locations of the elevated activity areas found during the gamma scan survey of the open detonation pit area adjacent hillside. (NWT, 2006b)

- The five elevated areas of activity were remediated using hand tools. The depth required to remove the elevated areas was between six-inches and 18-inches. It was discovered during the investigation that discrete pieces of debris were the source of the elevated readings. The areas were re-surveyed following remediation, and found to be at background radiation levels. (NWT, 2006b)

Figure 3 Area Open Detonation Pit Survey Grid Map

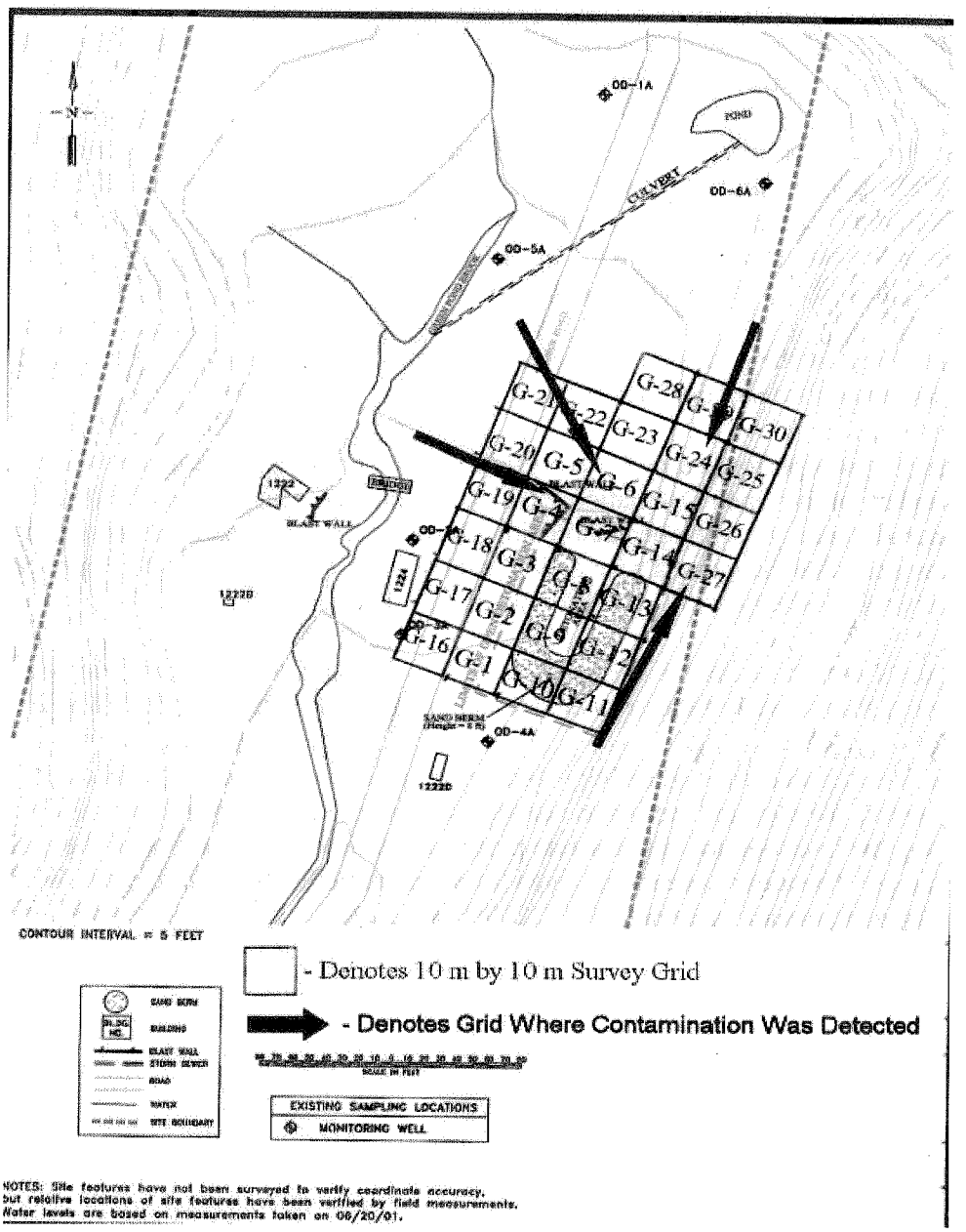
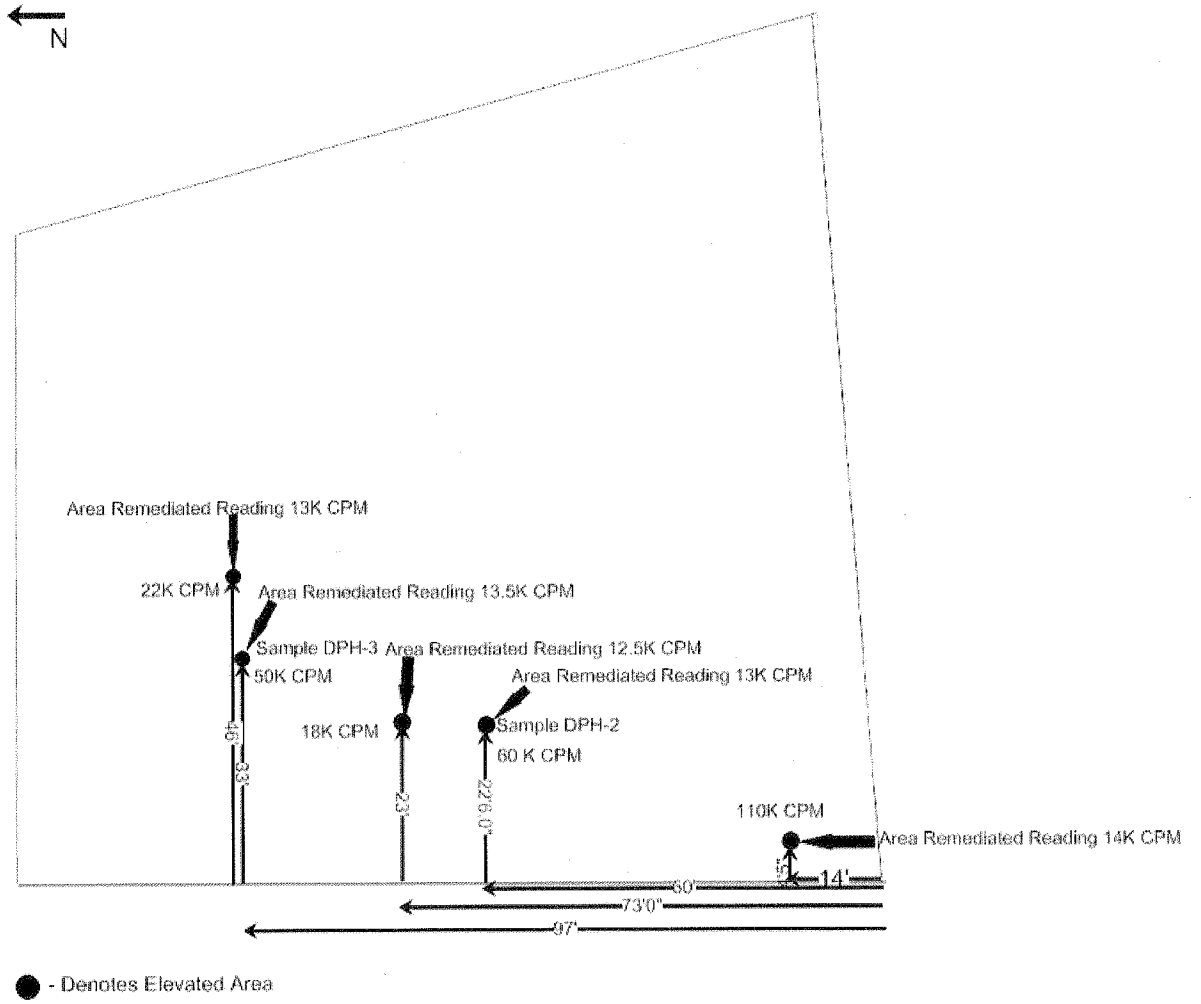


Figure 4 Open Detonation Pit Hill Elevated Area Location Map



2.4 ENVIRONMENTAL CONSIDERATIONS

Natural resources at the site will not be utilized or affected as a result of this project.

At this time, project activities are not anticipated to create any traffic impacts.

Noise generation from site activities may require the use of hearing protection in the immediate area. Due to the location of the site, it is not anticipated that noise associated with the site work will adversely impact personnel outside the work area.

No ecosystems or habitats that may provide refuge for sensitive, threatened, or endangered species located within a one-kilometer radius of the work site will be affected.

The hours for the issuance and return of the keys for the padlock on the entrance gate to Area 1222 are confined at the earliest to 0700 hours and at the latest to 1630 hours (M-T) and 0700 hours to 1520 hours on Friday.

Any survey and sampling interruptions will be contingent on the availability of the key custodians in Building 611 and the presence of the SUXOS.

2.5 GROUNDWATER AND SURFACE WATER

Groundwater and surface water in the area are not impacted by radioactive materials. Groundwater monitoring well and surface water sample results from the area in the past have indicated that groundwater and surface water in the area have not been impacted by radioactive materials. Results of the environmental sampling program will be addressed by the Picatinny Environmental Affairs group.

3.0 ORGANIZATION AND RESPONSIBILITIES

AWS will implement an integrated management approach that includes project management oversight and technical support. The full resources of AWS's Genoa, OH and Anchorage, AK office, will support the on-site crew to ensure successful project execution and completion. It is anticipated that this survey effort will take approximately 3 weeks to complete. This will depend on the amount of possible UXO anomalies encountered.

The on-site survey team will consist of a Project Manager/Supervisor, senior and junior HP technicians, equipment operators, and UXO personnel. These personnel will, as a minimum, be trained, qualified, and experienced in either field radiological survey procedures with current HAZWOPPER training or as a UXO specialist.

3.1 PROJECT MANAGER (ON-SITE)

The Project Manager is the primary point of contact and AWS interface. The minimum requirements for the Project Manager are 5-10 years of health physics experience including prior management experience.

He/she will be responsible for the supervision and coordinate the daily activities including the overview of the free release surveys. In order to ensure regulatory compliance, he/she will be qualified in the use of the survey instruments used and be familiar with the aspects of surveying as described in NUREG-1575 and this Survey and Sampling Work Plan.

3.2 HEALTH PHYSICS (HP) TECHNICIAN (S)

The HP Technicians will be responsible for performing the release surveys and collecting samples as necessary. They will be qualified in the use of the survey instruments and the performance of surveys in accordance with NUREG-1575 (MARSSIM) as well as this Survey and Sampling Work Plan.

3.3 HEAVY EQUIPMENT OPERATOR(S)

The heavy equipment operators will be responsible for the safe operation of any heavy equipment used at the site.

3.4 UXO PERSONNEL/SUXO SUPERVISOR

The UXO personnel and supervisor will be responsible for UXO anomaly avoidance and oversight during project activities.

4.0 RADIOLOGICAL CONTROL REQUIREMENTS

4.1 RADIATION WORK PERMIT

A Radiation Work Permit (RWP) shall be prepared and will specify the activities to be performed and all radiological safety requirements for the work. All personnel assigned to site work will be required to read and sign the RWP, acknowledging that they understand the requirements of the RWP, prior to beginning work.

The RWP will also be used as an information document for industrial safety. Hazards other than radiological may be included in the RWP so proper protective actions can be taken for all potential hazards. The RWP will clearly specify the need for a briefing on the radiological conditions present in the work environment.

The RWP shall list tasks and specific levels of protection for each worker covered by the RWP. The RWP shall also detail the dosimetry requirements, the protective clothing requirements, and the expected radiation and contamination levels to be encountered during the field survey activity.

Although the RWP is an AWS internal procedural document, a copy of the RWP will be provided to the appropriate Picatinny offices (Radiation Protection Office, ARDEC Risk Management Office, Garrison Safety Office, and Garrison Environmental Office) for approval.

4.2 PERSONNEL MONITORING AND DOSIMETRY

Even though the planned work consists of excavating soils, area surveys, and potential minor decontamination efforts, the likelihood that personnel will receive any external or internal exposure is considered minimal. Aleut World Solutions administrative policies require the use of external dosimetry on any field project that has the potential for exposure to radioactive material.

The Project Manager (or designee) is responsible for ensuring that all AWS personnel assigned to perform the work (employees, vendors, contractors, and visitors) are appropriately monitored for exposure to ionizing radiation. Each individual working at the site shall wear the dosimetry devices specified in the RWP. Personnel shall be issued a thermoluminescent dosimeter (TLD). The issuance of monitoring devices shall be documented on a Badge Issue Log and furnished to the vendor that processes the TLD's

4.3 PROPER LOCATION FOR WEARING DOSIMETRY DEVICES

Unless otherwise directed by the PM (or designee), personnel monitoring dosimetry shall be worn on the front of the body between the neck and the waist. When circumstances are such that other parts of the body could potentially receive a significantly greater dose, the PM may

instruct the individual to wear the dosimetry in a more representative location, or may specify additional dosimetric devices.

4.4 OFFICIAL EXPOSURE DETERMINATION AND PROJECT DOSE ESTIMATE

AWS will be responsible for distributing and collecting the dosimetric devices. The official and permanent record of accumulated external dose received by individuals is obtained from the processing of the personnel monitoring devices (TLDs) by an approved vendor. Once the processing of the personnel monitoring devices has been completed, personnel will be sent a hard copy record (NRC Form 5) of their exposure.

Due to the low exposure rates in the work areas, total crew Total Effective Dose Equivalent (TEDE) is expected to be < 10 mrem.

The NRC annual exposure limits for occupational exposure to radiation as found in 10 CFR Subpart C, Part 20.1201 are as follows:

5 Rem TEDE

50 Rem; Sum of Deep Dose Equivalent (DDE) and the Committed Dose Equivalent (CDE) to any individual organ or tissue other than the lens of the eye.

15 Rem; Lens Dose Equivalent (LDE) to the lens of the eye.

50 Rem; Shallow Dose Equivalent (SDE) to the skin of the whole body or to the skin of any extremity.

The AWS annual administrative exposure limits for occupational exposure to radiation are as follows:

500 millirem TEDE

5 Rem; Sum of Deep Dose Equivalent (DDE) and the Committed Dose Equivalent (CDE) to any individual organ or tissue other than the lens of the eye.

1,500 millirem; Lens Dose Equivalent (LDE) to the lens of the eye.

5 Rem; Shallow Dose Equivalent (SDE) to the skin of the whole body or to the skin of any extremity.

4.5 LOST OR DAMAGED DOSIMETRY DEVICES

Individuals shall immediately notify the PM (or designee) if they lose or damage their dosimeter. A thorough search shall be made for any dosimeter reported lost. Personnel whose exposures are being investigated shall be excluded from work in radiologically controlled areas until the investigation is completed and documented and dosimetry devices reissued. In the event of lost or damaged TLD devices, the PM shall investigate the exposure conditions and assign an external dose for the individual, with concurrence of AWS program management.

5.0 SITE PREPARATION, EQUIPMENT

5.1 ACCESSIBILITY

Access to the active work areas will be controlled using barricades, and/or boundary rope/tape. The appropriate postings will be displayed. This will limit access to only those personnel performing work in the areas.

5.2 OFFICE SPACE AND RESTROOM FACILITIES

Temporary office space and restroom facilities will be utilized during the task. AWS will provide temporary restrooms and a temporary office trailer for the duration of the work activities. The location and placement of the temporary restrooms and temporary office trailer will be approved by the appropriate Picatinny personnel prior to starting work activities.

5.3 ELECTRICAL POWER

Portable generators will be used to provide electrical power in the work areas where it is needed.

5.4 AREA POSTING AND ACCESS CONTROL

In order to minimize unauthorized access to, and/or removal from the site of radioactive material(s), application of appropriate security protective measures will be exercised (i.e., temporary fencing with locked gates, boundary ropes with warning signs). Licensed radioactive sources and devices, as well as non-exempt quantities of radioactive materials in non-permitted sources, must be routinely inventoried and documented as such. Identification of locations where radioactive materials are present will be accomplished with the use of conspicuous postings compliant with Title 10 Code of Federal Regulations (CFR) Part 20.

Only pre-authorized areas approved by the ARDEC Radiation Protection Office will be used to store radioactive materials at the Picatinny Arsenal. These areas will be selected with concurrence of the appropriate Picatinny Arsenal Base personnel. Security measures for these areas will be coordinated with the appropriate Picatinny Arsenal Base Personnel.

Radioactive material handling activities must be performed in a manner to ensure:

- Access to areas is restricted where radioactive materials are known to be present
- Surveys of radioactive materials storage areas are completed at least weekly

5.5 TRAINING

Prior to the start of work, all site personnel, including subcontractors, will attend a briefing that will discuss radiological conditions and radiological controls that will be implemented at the site. AWS will provide this training and attendance will be documented on the appropriate form. A safety inbrief will also be conducted with Picatinny personnel prior to the work commencing.

6.0 OPEN DETONATION PIT AREA, HILLSIDE AREA SURVEY APPROACH SUMMARY

6.1 HILLSIDE AREA

The hillside area was covered with an impervious membrane and riprap in 2005 for storm water and erosion control purposes. A 100 % walkover gamma scan survey will be conducted in this area in accordance with Sections 8.8.2, 8.8.3, and 8.8.4 of this plan. For remediation and soil sampling purposes, the riprap will be removed and the membrane breached over the areas to be remediated/sampled. It is not anticipated that any remediation will be required in this area. The riprap will be replaced after remediation/sampling activities. The membrane underneath the riprap will be repaired so integrity of the membrane is maintained. The areas will be patched with a material that is the equivalent of the membrane material. The survey unit and systematic sampling locations will be laid out in accordance with Sections 8.5 and 8.6 of this plan. Soil samples will be collected in accordance with Section 8.8.6 of this plan.

6.2 OPEN DETONATION PIT AREA INTERIOR AREAS

The interior (within the bermed area) of open detonation pit area ($ODPA_{INT}$) be surveyed in a different manner than the the open detonation pit exterior areas ($ODPA_{EXT}$) and hillside area since the probability of identifying the presence of subsurface (defined as below 6" of the existing grade surface) contamination, although unlikely, is highest in this area. Based on historical information gathered that UXO personnel typically dig 4' below grade surface (bgs) to bury explosives for detonation in the pit, it is currently planned that the surfaces in this area will be surveyed/sampled to a depth of 5' below the existing grade surface.

Due to potential levels of lead present in the area it is recommended that large scale movement of the soils out of the area not be done and a more localized approach of excavation be performed.

The area will be surveyed in ten foot by ten foot "cells". Each ten foot by ten foot cell will be excavated using a smooth bucket excavator in 1' lifts. Prior to each 1' lift being removed from the cell, the area will undergo a UXO sweep and a 100% walkover gamma scan survey. The walkover gamma scan survey will be conducted in accordance with Sections 8.8.2, 8.8.3, and 8.8.4 of this plan. The removed soils from the cell will be placed and spread onto the adjacent cell yet to be surveyed. After each bucket of soil is placed and spread in the adjacent cell another 100% walkover gamma scan survey will be performed. Areas found above the Action Level as defined in Section 8.8.4 of this plan will be investigated. Investigation may include:

- Remediation of the area (soil placed into B-25 box, or discrete item(s) placed into 55-gallon drum)
- Collection of a soil sample from the area

Once the soil has been excavated to a depth of 5' below the existing grade surface, the soils will be placed back into the cell. Excavation will then move onto the adjacent cell.

It is estimated that there will be a total of approximately 18 ten foot by ten foot cells inside the bermed area of the open detonation pit area (1,800 ft^2).

NOTE: An effort will be made to survey the cells from the inner cells working outward towards the berm areas to accommodate the ongoing mission at Picatinny.

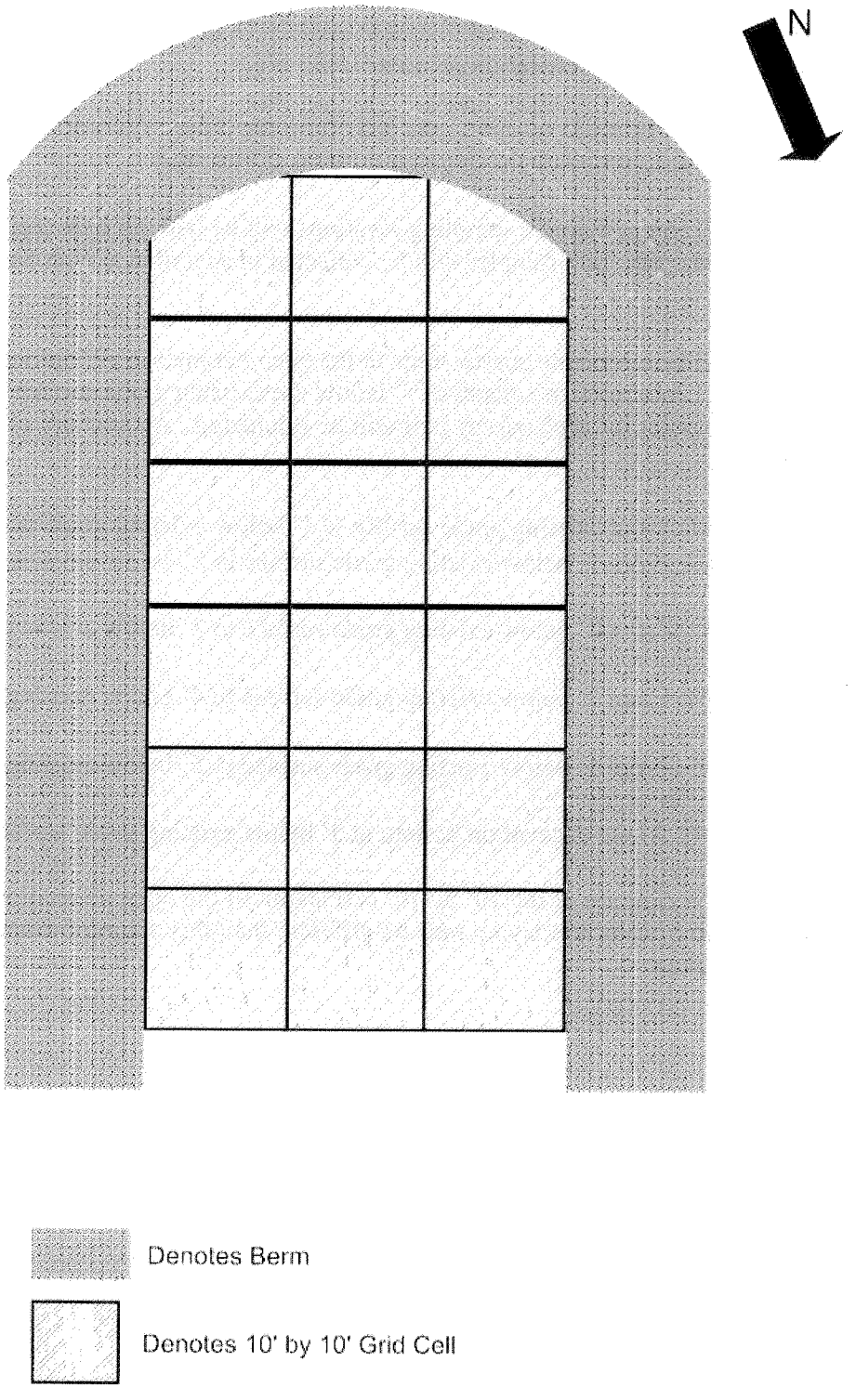
The survey unit(s) and systematic sampling locations will be laid out in accordance with Sections 8.5 and 8.6 of this plan. Soil samples will be collected in accordance with Section 8.8.6 of this plan.

NOTE: There will be 6 separate survey units in the open detonation pit interior area. Each survey unit will be 1 foot thick to a depth of 5' below the existing grade surface. A different random starting point for each survey unit will be calculated. A summary of the survey units is as follows:

- Survey Unit #1: From existing grade surface to 1' below existing grade surface.
- Survey Unit #2: From 1' below existing grade surface to 2' below existing grade surface.
- Survey Unit #3: From 2' below existing grade surface to 3' below existing grade surface.
- Survey Unit #4: From 3' below existing grade surface to 4' below existing grade surface.
- Survey Unit #5: From 4' below existing grade surface to 5' below existing grade surface.
- Survey Unit #6: At the excavation bottom at 5' below existing grade surface.

Figure 5 presents a diagram of the 10' by 10' cell layout of the open detonation pit interior area. The amount of cells and layout may be different than this diagram when actual field measurements are taken.

Figure 5 Interior Open Detonation Pit Area Cell Layout



6.3 OPEN DETONATION PIT AREA EXTERIOR AREAS

The open detonation pit exterior areas ($ODPA_{EXT}$) will have a 100% walkover surface gamma scan survey performed over the areas. Surface scans and surface soil samples will be collected in the exterior areas since the results of previous radiological investigations in these areas did not indicate subsurface contamination in these areas above the DCGL.

The survey unit(s) and systematic sampling locations will be laid out in accordance with Sections 8.5 and 8.6 of this plan. Soil samples will be collected in accordance with Section 8.8.6 of this plan.

6.4 STRUCTURE SURVEYS

There are numerous structures in and around the open detonation pit exterior area. These structures will be 100% alpha-beta/gamma scan surveyed in place. Gross alpha-beta/gamma direct measurements (static) will also be performed. The surveys will be conducted in accordance with Sections 8.1.3 and 8.1.4 of this plan. It is not anticipated that any of the structures will require any decontamination efforts.

Figure 6 presents a picture showing the structures to be surveyed.

Figure 6 Structure Picture

6.5 DUST SUPPRESSION

A water truck will be used to lightly wet the soils if dust levels increased during excavation activities.

6.6 AIR SAMPLING

Concentrations of radioactive material in air will be determined, as needed, by sampling the air. Air samples will be collected downwind during excavation activities in the immediate vicinity of the area being excavated. Air sampling will be conducted in accordance with the guidance provided in NRC Regulatory Guide 8.25, "Air Sampling in the Workplace", July 1992. The samples will be collected under known physical conditions (e.g. filter, sample time, flow rate). The flow meters of air samplers will be calibrated at least annually.

Air samples will be collected from general and localized areas when there was potential for generation of airborne radioactive material (during excavation activities) These samples will be used to verify that the confinement of radioactive material is effective, and provide warning of elevated concentrations for planning or response actions. In each case, the sampling point will be located in the airflow pathway near the known or suspected release point(s). If necessary, more than one air sample location will be used in order to provide a reasonable estimate of the general concentration of radioactive material in air.

The air sample filters will be analyzed onsite for gross alpha-beta/gamma activity with a Ludlum Model-2929 Dual Channel Scaler phoswich detector or equivalent.

The following equation will be used to calculate the initial and decayed count airborne activity:

$$A_F = \frac{(GrossCounts / CountTime) - BackgroundCountRate}{F * 2.22E+6 * V * \varepsilon_i * 2.83E+4}$$

Where,

A_F	Air Sample Activity in µCi/ml
F	Filter Efficiency Factor
V	Total Volume of Air Collected on Air Sample Filter in cubic feet
2.22E+6	Conversion Factor for dpm to µCi
ε_i	2 π Instrument Efficiency
2.83E+4	Conversion Factor for cubic feet to milliliter

The AWS Project Manager or his/her designee will apply professional judgment and experience to identify air sampling appropriate for the specific situation. Such judgment will be based on historical air sampling and characterization results, quantity of contamination of the material being handled, potential for release of contaminants based on physical form and activity, type of confinement or containment, and other factors specific to the activity.

An administrative action level will be established for breathing zone air samples of 10% of the derived air concentration (DAC); air sample results greater than this administrative action level shall be reported to the AWS Project Manager or his/her designee. Individual exposure greater than this action level will require the individual(s) to be restricted from work involving potential exposure to airborne radioactive material unless approved by the AWS RSO or his/her designee.

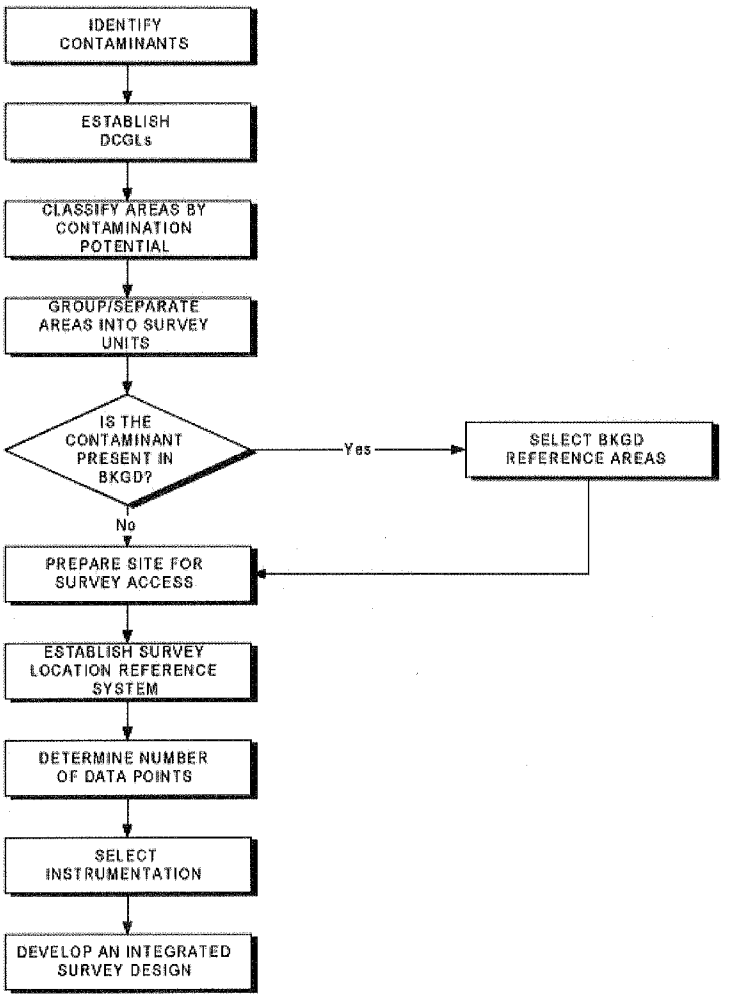
The 10% DAC value for Ra-226 is 3.0 E-11 μCi/ml which can be found in 10 CFR Part 20, Appendix B, Table 1, Column 3.

The 10% DAC value for U-238 is 2.0 E-12 μCi/ml which can be found in 10 CFR Part 20, Appendix B, Table 1, Column 3.

7.0 PLANNING PHASE OF RADIOLOGICAL SURVEYS

The MARSSIM roadmap was used as a guideline in developing the final status survey design. The flow diagram for the design of the final status survey is provided in Figure 7 below.

Figure 7 Flow Diagram for Designing a Final Status Survey



7.1 RADIONUCLIDE (S) OF CONCERN

Based upon historical information from previous investigations and soil sample analysis conducted at the open detonation pit area and adjacent hillside area, the radionuclides of concern are radium-226 (^{226}Ra), and uranium-238 (^{238}U). Table 1 lists the radionuclide of concern with the half-life and principle types of radiation (alpha, beta, or gamma).

Depleted uranium consists of three naturally occurring, long lived uranium isotopes, uranium-234, uranium-235, and uranium-238. Compared to naturally occurring uranium, depleted uranium contained less uranium-234 and uranium-235. The fractions in terms of activity concentrations of the three long lived uranium isotopes in depleted uranium are:

- U-234 0.305
- U-235 0.013
- U-238 0.682

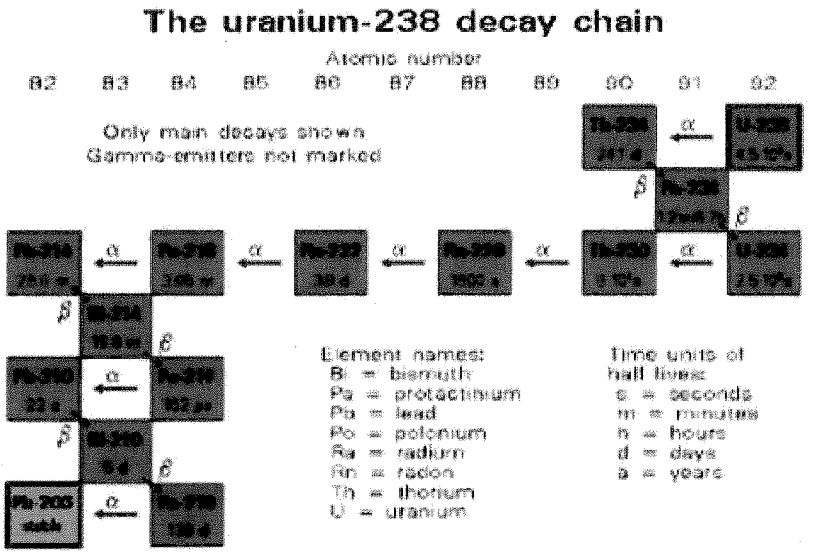
The radionuclides of concern are the radionuclides at a particular site that could contribute significantly to the dose received by the public.

Figure 8 presents an illustration of the uranium-238 decay series.

Table 1 Radionuclides of Concern

Radionuclide	Half-life	Radiations
Radium-226	1,600 years	Alpha (α)/gamma (γ)
Uranium-234	2.44×10^{5} years	Alpha (α)/gamma (γ)
Uranium-235	7.04×10^{8} years	Alpha (α)/gamma (γ)
Uranium-238	4.47×10^{9} years	Alpha (α)/gamma (γ)

Figure 8 U-238 Decay Series



Uranium-238 Decay Series		
Nuclide	**Half-Life**	**Radiation ***
U-238	$4.468 \cdot 10^9$ years	alpha
Th-234	24.1 days	beta
Pa-234m	1.17 minutes	beta
U-234	244,500 years	alpha
Th-230	77,000 years	alpha
Ra-226	1,600 years	alpha
Rn-222	3.8235 days	alpha
Po-218	3.05 minutes	alpha
Pb-214	26.8 minutes	beta
Bi-214	19.9 minutes	beta
Po-214	63.7 microseconds	alpha
Pb-210	22.26 years	beta
Bi-210	5.013 days	beta
Po-210	138.378 days	alpha
Pb-206	Stable	-

only major decays shown
* in addition, all decays emit gamma radiation

7.2 DATA QUALITY OBJECTIVES (DQO'S)

A multi-agency committee representing the Department of Defense (DOD), Department of Energy (DOE), the Environmental Protection Agency (EPA), and the Nuclear Regulatory Commission (NRC) has addressed this need by producing a guidance document known as the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM).

Published in December 1997, MARSSIM provides detailed guidance for planning, implementing and evaluating environmental and facility radiological surveys to demonstrate compliance with a dose- or risk-based regulation. MARSSIM focuses on the demonstration of compliance during the final status survey once scoping, characterization and any necessary remedial actions are completed.

MARSSIM provides a single, nationally consistent guide for verifying that radioactively contaminated sites have been cleaned up to standards. Combining this information into one manual has increased efficiency, and has eliminated the confusion that can result from contractors working from multiple manuals.

The surveys of the open detonation pit and hill areas will require sufficient detail to determine if the release criteria are met. The data from the Final Status Surveys that will be performed as defined in MARSSIM will meet the data quality objectives stated below.

The final status survey design process for the excavation bottom and overburden soil begins with development of data quality objectives (DQOs) in accordance with the guidelines outlined in Appendix D of MARSSIM and EPA QA/G4 "Guidance for the Data Quality Objectives Process" (EPA, 2000). The DQOs are then used in conjunction with the radiological conditions at the site to calculate the number and locations of measurement and sampling points to demonstrate compliance with the release criterion as discussed in Section 6.3. Survey techniques and analytical methodologies were selected to generate the required analytical data. Once the data is received from the surveys and laboratory and is validated, it will be evaluated using statistical techniques to test against the hypothesis stated in Section 7.9.2. Sampling, as discussed in this and subsequent sections, refers to the collection of measurement data. "Sampling" includes soil samples for off-site analysis, alpha/beta direct measurements, and swipe samples.

7.3 STATEMENT OF THE PROBLEM

For the Final Status Surveys of the open detonation pit and hillside areas it must be determined if the allowable release limits have been met or if investigation/remediation is warranted. Therefore, the decision to be made can be stated: "Do the Final Status Survey Units meet the allowable soil concentration release limit of 4.3 pCi/g for depleted uranium and 0.5 pCi/g for Ra-226. The null hypothesis (H_o) as required by MARSSIM is stated and tested in the negative form: "The median concentration in the survey unit exceeds the soil concentration release limit."

Final Status Surveys are surveys, measurements, and sampling, once performed that describe the radiological conditions of a site, following completion of decontamination/remediation activities (if any) in preparation for unrestricted release.

It is anticipated that successful completion of activities described in this Final Status Survey (FSS) Plan will provide sufficient data for the unrestricted release of the areas undergoing survey. Resources available to provide the necessary data include the following:

Activities outlined in this FSS Plan.

Guidance provided in the Multi Agency Radiation Survey & Site Investigation Manual (MARSSIM) for performing Final Status Surveys (FSS).

Process knowledge, inspections, and various radiological survey reports previously conducted in the areas.

Data obtained during previous surveys discussed in Section 2.3.

Statistical analysis of survey data collected during survey activities outlined in this FSS Plan.

7.4 IDENTIFICATION OF DECISIONS

The need to provide data for unrestricted release of the open detonation pit and hillside areas requires the performance of radiological surveys as specified in this FSS Plan.

The primary uses of the data expected to result from completion of this FSS Plan is to provide information and data to support the unrestricted release of the open detonation pit and hillside areas.

7.5 INPUTS TO THE DECISION

Radiological surveys and sampling required to support the unrestricted release of the areas will include:

Locate and survey background reference area(s) where meaningful background radiation levels can be determined;

100 % gamma scan surveys of the open detonation pit and hillside areas with Ludlum Model 2350-1 Data Loggers coupled to Ludlum Model 44-10 2-inch by 2-inch NaI detectors will be performed;

Systematic soil samples in the survey units;

Laboratory data validation and statistical analysis of collected data.

7.6 DEFINITION OF STUDY BOUNDARIES

The spatial boundary for this survey effort is the open detonation pit area which is ~ 23,000 ft^2 in size (which includes interior and exterior areas), and hillside areas. The hillside

area is ~ 17,222 ft^2 in size. The open detonation pit interior area is ~ 1,800 ft^2 in size and from current grade surface to 5' below grade surface (bgs). The exterior area of the open detonation area is ~ 21,200 ft^2 in size. Each survey unit will be 100 % gamma scan surveyed. Systematic soil samples will also be collected from each survey unit.

7.7 DEVELOPMENT OF A DECISION RULE

The Derived Concentration Guideline Level (DCGL) is defined in MARSSIM as the radionuclide specific concentration within a survey unit corresponding to the release criterion. As specified in the current regulations and regulatory guidance, the release criteria is dose based, and the Total Effective Dose Equivalent (TEDE) to an individual will not exceed 15 mrem/yr plus ALARA as a result of any residual contamination distinguishable from background.

The DCGL is dependent upon several factors including the radionuclides of interest, applicable dose pathways, area occupancy and the future use of the facility. Contained within the current regulations, specific average guidelines ($DCGL_Ws$) have been documented for a variety of radionuclides following typical default parameters for either residential or building occupancy scenarios. These guidelines are documented as concentration limits (pCi/g) which correspond to a TEDE of 15 mrem/yr.

For most radionuclides, the documented release criteria are easily achieved; however, issues are encountered when dealing with the naturally occurring radionuclides and alpha emitters such as uranium and radium at the Picatinny Arsenal due to the Redding Prong which is part of the Taconic Range and the larger Appalachian chain of eastern North America which runs across the Hudson southwestward, and terminates in Redding, Pennsylvania. The guideline levels using the default dose modeling codes have resulted in unachievable low DCGLs for radionuclides such as depleted uranium.

7.7.1 DCGLs for the Free Release of Structures, Tools and Equipment

As defined in: "Guidelines for Decontamination of Facilities and equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Materials (NRC 1987), Office of Nuclear Material Safety and Safeguards (NMSS)." The DCGL's for free release of structures, tools and equipment from the site are:

a) 5,000 dpm/100 cm^2 beta-gamma, averaged over 1 m^2.
b) 15,000 dpm/100 cm^2 beta-gamma, maximum.
c) 1,000 dpm/100 cm^2 beta-gamma, removable.
d) 100 dpm/100 cm^2 alpha, averaged over 1 m^2.
e) 300 dpm/100 cm^2 alpha, maximum.
f) 20 dpm/100 cm^2 alpha, removable.

7.7.2 Soil

7.7.2.1 Ra-226

The RESRAD Version 6.5 Modeling Code was used to develop the DCGL's for Ra-226 in soils. The calculated DCGL's are to comply with the NJDEP's unrestricted release criteria of 15 mrem/year TEDE.

7.7.2.2 Depleted Uranium (U-238)

The RESRAD Version 6.5 Modeling Code was used to develop the DCGL's for depleted uranium in soils. The calculated DCGL's are to comply with the New Jersey Department of Environmental Protection (NJDEP) unrestricted release criteria of 15 mrem/year TEDE.

The default "Residential Farmer" scenario parameters were used with the exception of the following site specific conditions:

"Contaminated Zone" was changed from the default parameter of 10,000 m^2 to the site-specific value of 2,200 m^2 (size of open detonation pit interior and exterior area (2,136 $m^{2)}$ conservatively rounded up).

"Thickness of Contaminated Zone" was changed from the default value of 2 meters to a site-specific value of 1.5 meters.

The pathway selection was set as follows:

- External Gamma Active
- Inhalation (w/o radon) Active
- Plant Ingestion Active
- Meat Ingestion Active
- Milk Ingestion Active
- Aquatic Foods Active
- Drinking Water Active
- Soil Ingestion Active
- Radon Suppressed
- Find peak pathway doses Active

In order to achieve ALARA, the following concentrations were input into RESRAD:

- U-234 9 pCi/g
- U-235 2 pCi/g
- U-238 9 pCi/g
- Ra-226 1 pCi/g

The resulting calculated maximum TEDE's were as follows:

- U-234 7.1 millirem @ 1,000 years
- U-235 1.5 millirem @ 1,000 years
- U-238 6.7 millirem @ 1,000 years
- Ra-226 14.3 millirem @ 43.6 years

Using guidance in Section 2.7 of NUREG-1757, Vol. 2, Rev. 1, the sum of the fraction rule was applied using International Atomic Energy Agency (IAEA) values for isotopic abundance by activity for depleted uranium of 15.2 % for U-234, 1.1% for U-235, and 83.7% for U-238. The following is the calculation:

$$\frac{1}{DCGL_{DU}} = \frac{.152}{DCGL_{U234}} + \frac{.011}{DCGL_{U235}} + \frac{.837}{DCGL_{U238}} = \frac{.152}{9} + \frac{.011}{2} + \frac{.837}{9} = 8.7$$

Using guidance in Section 2.7 of NUREG-1757, Vol. 2, Rev. 1, the sum of the fraction rule was applied for depleted uranium and Ra-226:

$$\frac{Concentration_{Ra226}}{DCGL_{Ra226}} + \frac{Concentration_{DU}}{DCGL_{DU}} \leq 1$$

Therefore;

$$\frac{0.5}{1} + \frac{4.3}{8.7} = 0.99$$

Copies of the RESRAD input and output files are provided in this plan in Attachment #2.

In accordance with ALARA, a remedial action level, based on the Minimum Detectable Activity (MDA) of the proposed scanning instrumentation will be established. The gamma scan action level (Section 8.8.4) will be used as the remedial action

level. Any surface anomalies soils identified during scanning which exceed this action level will be investigated and possibly remediated and/or biased samples will be collected. For the purposes of this survey effort, it is estimated that a maximum volume of 180 cubic feet (two B-25 boxes and one 30-gallon drum) of material will require remediation. The purpose of the remedial actions is to ensure that activity concentrations of samples collected during the Final Status Survey will not exceed the DCGL, thus eliminating the need for elevated measurement criteria.

The DCGL's are summarized in Table 2 below. Project personnel will compare the survey results with these values to assess the areas surveyed. This will determine the extent of any remediation, if required.

Table 2 Derived Concentration Guideline Levels

Radionuclide	Release Limit in pCi/g [1]
Radium-226	0.5
Depleted Uranium	4.3

[1] Above Established Background Levels

NOTE: Following completion of the final status surveys and the collection of soil sample data, dose calculations will be performed using the RESRAD Version 6.5 Modeling Code using actual soil concentrations from the soil samples collected during the final status survey effort.

7.8 LIMITS ON DECISION ERRORS

There are two types of decision error applied to analytical results: Type I (α) and Type II (β) errors. A Type I error, or false positive, is the probability that a survey result/measurement is above the release criteria when in fact it is not, while a Type II error, or false negative, is the probability of determining that a result/measurement is below the release criteria when it is not. The probability of making decision errors can be controlled by adopting an approach called hypothesis testing. The null hypothesis (H_0) is treated like a baseline condition and is defined by MARSSIM as:

H_0 = residual radioactivity in the survey exceeds the release criterion.

This means that the site or survey area is assumed contaminated until proven otherwise. For the purpose of this survey, both Type I and Type II, α and β, will be set at 0.05 or 5 percent.

7.9 OPTIMIZING DATA COLLECTION

7.9.1 Review Outputs and Existing Data for Consistency

Radioactive source readings will be used to check instruments for consistency prior to use in each daily shift. The instrument will only be used after readings are compared and agree within +/- 20 %. The Project Manager will review the information each day to verify equipment is operating satisfactorily.

The Project Manager will review the survey data on a daily basis. This will ensure an ongoing independent review for consistency of all survey data collected.

7.9.2 Determination of Scan Percentage

100% of the interior (inside bermed area) of the open detonation pit, exterior area of the open detonation pit, and hillside areas will be gamma scan surveyed. This is necessary to determine the extent, if any, of residual contamination that might be present.

7.9.3 Data Collection Decision Alternatives

The data collection design alternatives may change slightly based on conditions found in the field being different than the information furnished based on prior surveys and available information.

In the event that a survey unit classification is revised as a result of detecting unexpected contamination, the Army will be notified and changes to this survey plan will be required prior to resumption of survey activity.

7.9.4 Select Most Resource Effective Survey Design

As indicated above, the survey design specified for use in this survey plan was developed in accordance with best management practices and MARSSIM guidelines and will provide the necessary data for a radiological final status survey. Coupled with the use of experienced personnel and proper instrumentation, this design is the most efficient and resource effective.

7.9.5 Document Operational Details and Theoretical Assumptions

Operational details for the radiological survey process have been developed for and are included as part of this survey plan. The theoretical assumptions are based on guidelines contained in MARSSIM (MARSSIM, 2000). Specific assumptions regarding types of radiation measurements, instrument detection capabilities, quantities and locations of data to be collected, and action levels are contained in this survey plan.

7.9.6 Sampling Process Design

The sampling process design includes the following elements:

The *types of samples and sampling matrices* for the Final Status Survey of the areas are gamma scans, and soil samples.

The *sampling frequency* at the areas is set at a minimum of 24 soil samples for each of the survey units.

7.10 RELATIVE SHIFT

The relative shift is defined as Δ/σ where Δ is the DCGL - LBGR (Lower Bound of the Gray Region) and σ is the standard deviation of the contaminant distribution. In order to calculate the relative shift, the DCGL must be determined and two assumptions made to estimate the LBGR and the standard deviation of the measurement distribution. MARSSIM suggests that the LBGR be set at 50%, of the DCGL but can be adjusted later to provide a value for the relative shift between the range of 1 to 3. The standard deviation may be calculated from preliminary survey data, prior surveys of similar areas and materials or the standard deviation of a reference background area. It should be noted that σ represents the standard deviation prior to release after all area decontamination is thought to be complete. If no reference data is available to make a reasonable estimate, MARSSIM suggests using 30% of the mean survey unit background.

Table 3 below summarizes the soil sample results for thirty-eight samples analyzed for depleted uranium (U-238) from the open detonation pit area previously surveyed by NWT in November of 2001. The calculated standard deviation is 1.6. It should be noted that the maximum sample result (60 pCi/g) was excluded from the standard deviation calculation as this sample was a biased sample.

Table 3 Open Detonation Pit Area Soil Sample Summary Table

	U-238 Results in pCi/g	
1	1.2	
2	-0.4	
3	2.4	
4	8.1	
5	1.3	
6	0.5	
7	1.3	
8	0.5	
9	1.7	
10	1.3	
11	0.5	
12	0.9	
13	2.3	
14	0.7	
15	60.0	
16	0.8	
17	1.6	
18	0.9	
19	0.3	
20	3.1	
21	0.5	
22	1.5	
23	1.2	
24	0.9	
25	0.4	
26	1.4	
27	1.5	
28	0.8	
29	0.6	
30	-0.6	
31	-3.0	
32	1.8	
33	0.5	
34	4.1	
35	2.2	
36	1.4	
37	2.2	
38	1.2	
	3.2	Average

	60	Maximum
	0.3	Minimum
	1.6	Standard Deviation

Using a DCGL of 4.3 pCi/g for depleted uranium and a calculated standard deviation of 1.6 the LBGR must be adjusted in order to provide a relative shift in between 1 and 3. In this instance the LBGR is adjusted to a value of 1.3 to provide a value for the relative shift of 1.9. The following equation is used to calculate the relative shift using a DCGL value of 4.3 pCi/g, a standard deviation value of 1.6 and a LBGR value of 1.3:

$$\Delta/\sigma = \text{Relative Shift} = \frac{4.3-1.3}{1.6} = 1.9$$

7.11 NUMBER OF SAMPLES/MEASUREMENTS

Once the relative shift, Δ/σ, is determined the calculated value can be used to obtain the minimum number of measurements or samples necessary to reject the null hypothesis based upon the initial assumptions and justify that the survey unit meets the requirements for free release. Table 4 below contains the number of samples or measurements necessary for the given decision errors, α and β, and the calculated relative shift, Δ/σ, when dealing with non-radionuclide specific measurements or when the radionuclide is present in the background. The value N/2 from the Table 4 represents the number of samples or measurements to be collected in the survey unit and the background reference.

Based upon a relative shift of 1.9 and a Type I decision rate of 5 %, and a Type II decision rate of 5 %, the calculated number of samples for each survey unit and background reference area is 13. As a conservative measure, 24 samples will be collected from each survey unit and the background reference area.

7.12 DETERMINING DATA POINTS FOR SMALL AREAS OF ELEVATED ACTIVITY

The statistical test described above evaluates whether or not the residual radioactivity in an area exceeds the $DCGL_W$ for contamination conditions that are approximately uniform across the survey unit. In order to obtain reasonable assurance that any small areas of elevated residual radioactivity are not missed during the final status survey the total number of samples might have to be increased.

For example, the scan MDC has for ^{238}U has been determined to be 56 pCi/g. The area in between the 24 sampling points calculated above for the open detonation pit area is 6.5 m^2. Interpolating into Table 5.6 of MARSSIM gives an area factor for 6.5 m^2 of 13.2 for ^{238}U. This results in a $DCGL_{EMC}$ = ($DCGL_W$) = 4.3(13.2) = 57 pCi/g. The scan MDC of 56 pCi/g is less

than the $DCGL_{EMC}$ so no additional samples will be needed in order to find elevated areas of activity.

Table 4 Values of N/2 for Use with the Wilcoxon Rank Sum Test

	α=0.01					α=0.025					α=0.05					α=0.10					α=0.25				
	β					β					β					β					β				
Δ/σ	0.01	0.025	0.05	0.10	0.25	0.01	0.025	0.05	0.10	0.25	0.01	0.025	0.05	0.10	0.25	0.01	0.025	0.05	0.10	0.25	0.01	0.025	0.05	0.10	0.25
0.1	5452	4627	3972	3278	2268	4627	3870	3273	2646	1748	3972	3273	2726	2157	1355	3278	2646	2157	1655	964	2268	1748	1355	964	459
0.2	1370	1163	998	824	570	1163	973	823	665	440	998	823	685	542	341	824	665	542	416	243	570	440	341	243	116
0.3	614	521	448	370	256	521	436	369	298	197	448	369	307	243	153	370	298	243	187	109	256	197	153	109	52
0.4	350	297	255	211	146	297	248	210	170	112	255	210	175	139	87	211	170	139	106	62	146	112	87	62	30
0.5	227	193	166	137	95	193	162	137	111	73	166	137	114	90	57	137	111	90	69	41	95	73	57	41	20
0.6	161	137	117	97	67	137	114	97	78	52	117	97	81	64	40	97	78	64	49	29	67	52	40	29	14
0.7	121	103	88	73	51	103	86	73	59	39	88	73	61	48	30	73	59	48	37	22	51	39	30	22	11
0.8	95	81	69	57	40	81	68	57	46	31	69	57	48	38	24	57	46	38	29	17	40	31	24	17	8
0.9	77	66	56	47	32	66	55	46	38	25	56	46	39	31	20	47	38	31	24	14	32	25	20	14	7
1.0	64	55	47	39	27	55	46	39	32	21	47	39	32	26	16	39	32	26	20	12	27	21	16	12	6
1.1	55	47	40	33	23	47	39	33	27	18	40	33	28	22	14	33	27	22	17	10	23	18	14	10	5
1.2	48	41	35	29	20	41	34	29	24	16	35	29	24	19	12	29	24	19	15	9	20	16	12	9	4
1.3	43	36	31	26	18	36	30	26	21	14	31	26	22	17	11	26	21	17	13	8	18	14	11	8	4
1.4	38	32	28	23	16	32	27	23	19	13	28	23	19	15	10	23	19	15	12	7	16	13	10	7	4
1.5	35	30	25	21	15	30	25	21	17	11	25	21	18	14	9	21	17	14	11	7	15	11	9	7	3
1.6	32	27	23	19	14	27	23	19	16	11	23	19	16	13	8	19	16	13	10	6	14	11	8	6	3
1.7	30	25	22	18	13	25	21	18	15	10	22	18	15	12	8	18	15	12	9	6	13	10	8	6	3
1.8	28	24	20	17	12	24	20	17	14	9	20	17	14	11	7	17	14	11	9	5	12	9	7	5	3
1.9	26	22	19	16	11	22	19	16	13	9	19	16	13	11	7	16	13	11	8	5	11	9	7	5	3
2.0	25	21	18	15	11	21	18	15	12	8	18	15	13	10	7	15	12	10	8	5	11	8	7	5	3
2.25	22	19	16	14	10	19	16	14	11	8	16	14	11	9	6	14	11	9	7	4	10	8	6	4	2
2.5	21	18	15	13	9	18	15	13	10	7	15	13	11	9	6	13	10	9	7	4	9	7	6	4	2
2.75	20	17	15	12	9	17	14	12	10	7	15	12	10	8	5	12	10	8	6	4	9	7	5	4	2
3.0	19	16	14	12	8	16	14	12	10	6	14	12	10	8	5	12	10	8	6	4	8	6	5	4	2
3.5	18	16	13	11	8	16	13	11	9	6	13	11	9	8	5	11	9	8	6	4	8	6	5	4	2
4.0	18	15	13	11	8	15	13	11	9	6	13	11	9	7	5	11	9	7	6	4	8	6	5	4	2

8.0 SURVEY DESIGN AND IMPLEMENTATION

The objective of this survey is to demonstrate that residual radioactivity levels meet the release criterion. In demonstrating the objective is met, the null hypothesis (H_0) that residual contamination exceeds the release criterion is tested with the survey data using the Wilcoxon Rank Sum Test (WRS).

- Survey instrumentation will be set up and source checked to ensure proper operation.
- The Project Manger/Supervisor will perform preliminary inspections of the areas to identify additional specific survey requirements in accordance with the UXO anomaly avoidance protocol that will be agreed upon at the pre job briefing that will be held prior to the project starting.
- Survey personnel will grid the survey areas as specified by the agreed upon UXO anomaly avoidance protocol and the following survey protocols and mark or map the survey locations as applicable.
- Survey personnel will take survey measurements using appropriate calibrated instruments and perform daily source and background checks before each day's work.
- The Project Manager will review all survey data to ensure that all required surveys have been performed.
- The Project Manager will review the survey results to identify any areas exceeding the specified release criteria.

8.1 INSTRUMENT SELECTION

Instruments will be selected that are suitable for the physical and environmental conditions at the site. The instruments and measurement methods selected are able to detect the radionuclide of concern from the uranium-238 series and the radium-226 series or radiation types of interest i.e. alpha, beta, and/or gamma and are, in relation to the survey or analytical technique, capable of measuring levels that are equal to or less than the DCGL.

Several radiation detection methods will be used during the radiological surveys: gamma detector response rate (scan) measurements, and soil sampling and analysis.

8.1.1 Gamma Scans of Soil

Gamma count rate responses will be used to determine whether specific areas exhibit activity levels that are significantly above site-specific background. Gross gamma count rates will be measured using a 2" by 2" sodium iodide (NaI) gamma scintillation detector system (Ludlum Instruments Model 2350-1 Data Logger coupled to a Ludlum Instruments Model 44-10 NaI or the equivalent). This radiation detection system measures energies in the range of about 80 to 3,000 kilo electron volts (keV). This energy range includes gamma rays emitted by Radium-226, depleted uranium, and their decay products.

Static gamma measurements require positioning the detector assembly 4 inches (10 centimeters [cm]) above the designated surveillance surface and recording a stationary 60-second integrated count. NaI scintillation detectors are very sensitive to photon gamma radiation and are ideal for locating elevated radiation levels above background when performing gamma scans and static measurements.

Scan measurements will be obtained by traversing a path at a maximum speed (scan rate) of approximately 0.5 meters per second (m/s) and slowly sweeping the detector assembly in a serpentine (snakelike, S-shaped) pattern, while maintaining the detector between 2.5 to 4 inches (6 to 10 cm) above the area to be surveyed.

Field survey methodology, techniques, and terminology will be in accordance with the Federal guidance document MARSSIM (Rev. 1, August 2000). Chapters 5.3 and 5.5 provide specific details as to how the surveys will be performed.

8.1.2 Instrument for the Scan Surveys for Beta Surface Activity (Structures, Material, Equipment and Tools)

Surface scan surveys for beta radiation will be conducted with Ludlum Model 44-9 thin windowed pancake GM detectors or equivalent, coupled to Ludlum Model 3 Survey Meters. The detector will be moved over the surface being surveyed at a rate of 1.0 cm per second. The detector will be held within ½-inch of the surface being surveyed. Audible indicators will be used during the surveys.

8.1.3 Instrument for the Scan Surveys for Alpha and Beta Surface Activity (Structures, Material, Equipment and Tools)

Surface scan surveys for alpha and beta radiation will be conducted with Ludlum Model 43-89 large area scintillation probes coupled to Ludlum Model 2360 Data Loggers. The probes have 1.2 mg/cm^2 thick Mylar windows. The detector will be moved over the surface being surveyed at a rate of 0.5 to 1.0 cm per second. The detector will be held within ¼-inch of the surface being surveyed. Audible indicators will be used during the surveys.

8.1.4 Instrument for the Direct Measurements for Alpha and Beta Surface Activity (Structures, Material, Equipment and Tools)

Direct surface static contamination surveys for alpha and beta radiation will be conducted with Ludlum Model 43-89 large area scintillation probes coupled to Ludlum Model 2360 Data Loggers. The probes have 1.2 mg/cm^2 thick Mylar windows. Direct measurements will conducted with the detector within ¼" of the surface for a period of 1-2 minutes.

8.1.5 Gross Beta-Gamma-Alpha Loose Surface Contamination Surveys

Loose surface contamination surveys of alpha and beta/gamma emitters will be performed using cloth smears.

The swipe survey will be performed by wiping a cloth smear over an area of 100 cm^2 (approximately 4 inch by 4 inch) using moderate pressure.

The smears will be analyzed with a Ludlum Model-2929 Dual Channel Scaler and a Ludlum Model 3030 Dual Channel Scaler with phoswich detectors.

8.1.6 Instrument for Exposure Rate Surveys

Exposure rate measurements will be performed using a Ludlum Model 19 microR/meter. The Ludlum Model 19 is a high sensitivity gamma microR/meter employing an internally housed 1-inch diameter by 1-inch thick NaI crystal. The maximum exposure rate that can be measured with the microR/meter is 5,000 microR/hr.

8.2 INSTRUMENT CALIBRATION

The data loggers, associated detectors and all other portable instrumentation will calibrated on an annual basis using National Institute of Standards and Technology (NIST) traceable sources and calibration equipment. Calibration typically involves the ratemeter and the detector:

The ratemeter calibration includes:

- High Voltage calibration,
- Discriminator/threshold calibration,
- Window calibration,
- Alarm operation verification, and

The detector calibration includes:

- Operating voltage determination,

- Calibration constant determination, and
- Dead time correction determination

Calibration labels showing the instrument identification number, calibration date and calibration due date are attached to all portable field instruments.

8.3 RESPONSE CHECK SOURCES

All sources used for calibration or efficiency determinations for the survey will be representative of the instrument's response to the identified radionuclides and are traceable to NIST. The sources that will be used during the surveys are ^{232}Th, ^{99}Tc, and ^{137}Cs exempt quantity check sources which will be stored in a designated location agreed upon by Picatinny Arsenal personnel.

An ARP application IAW Paragraph 2-4 of DA PAM 385-24 will be submitted to Garrison Commander at Picatinny at least 30 days before the requested start date of the permit for all radioactive check sources brought on site.

8.4 SURVEY UNIT CLASSIFICATION

For the purposes of establishing the sampling and measurement frequency and pattern, the various site areas will be divided into impacted areas.

The impacted areas may be further subdivided into one of the three following classifications:

- *Class 1 Areas*: Areas that have, or had prior to remediation, a potential for radioactive contamination (based on site operational history) or known contamination (based on previous radiation surveys) above the DCGL. Examples of Class 1 areas include:

  1) site areas previously subjected to remedial actions
  2) locations where leaks or spills are known (or suspected) to have occurred
  3) former burial or disposal sites

- *Class 2 Areas*: Areas that have, or had prior to remediation, a potential for radioactive contamination or known contamination but are not expected to exceed the DCGL. To justify changing the classification from Class 1 to Class 2,

there should be measurement data that provides a high degree of confidence that no individual measurement would exceed the DCGL. Other justifications for reclassifying an area, as Class 2 may be appropriate, based on site-specific considerations. Examples of areas that might be classified as Class 2 include:

1) locations where radioactive materials were present in an unsealed form
2) potentially contaminated transport routes
3) areas downwind from the main areas of concern (AOC)
4) areas handling radioactive materials
5) areas on the perimeter of former contamination control areas

- *Class 3 Areas*: Any impacted areas that are not expected to contain any residual radioactivity, or are expected to contain levels of residual radioactivity at a small fraction of the DCGL, based on site operating history and previous radiation surveys. Examples of areas that might be classified as Class 3 include buffer zones around Class 1 or Class 2 areas and areas with very low potential for residual contamination but insufficient information to justify a non-impacted classification.

  For the purpose of this survey both the area on the hill adjacent to the open detonation pit and the open detonation pit interior and exterior areas will be classified as Class 1 areas.

8.5 SURVEY UNITS

The areas to be surveyed are approximately 1,800 ft^2, 21,200 ft^2 and 17,222 ft^2 in size.

If the areas when measured are larger than 21,527 ft^2 in size, additional Class 1 survey units will be established.

Survey units are limited in size based on classification, exposure pathway modeling assumptions, and site-specific conditions. MARSSIM recommends areas for survey units according to the following:

Classification	**Suggested Area**
Class 1 Open Land Areas	up to 2000 m^2 (21,527 ft^2)
Class 2 Open Land Areas	2000 to 10,000 m^2 (21,527 to 107,639 ft^2)
Class 3 Open Land Areas	no limit

8.6 REFERENCE COORDINATE SYSTEM

NOTE: The information below is for informational purposes only. The actual length of the measurement/sampling intervals for each of the survey units will be determined on site once the areas are measured and the survey unit sizes determined.

A reference coordinate system will be laid out for each of the survey units. A triangular shaped reference coordinate system will be used for the Final Status Surveys. The length, L, of a side of the grid was determined by the total number of samples or measurements to be taken. The length of the figure will determine the distance between direct measurement/soil sample location points. A random number generator will be used to generate the starting point for the sampling pattern for each 5' lift inside of the detonation pit area. The length or spacing of the sampling points will be calculated for each of the survey units using the following equation:

$$L = \sqrt{\frac{A}{0.866 * N}}$$

Where,

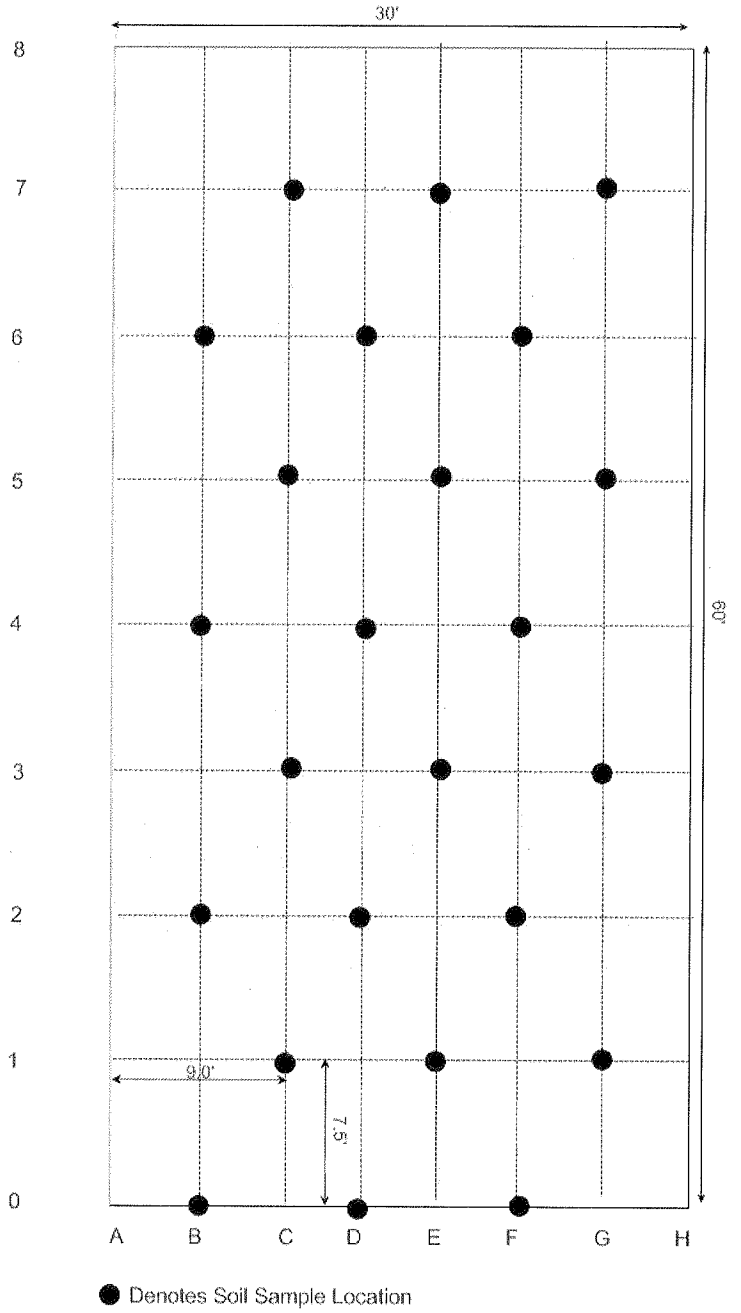
L = spacing between sampling points (ft);
A = surface area of the survey unit (ft^2); and
N = statistically calculated number of samples.

Figure 9 below is an illustrative example of how a survey unit would be laid out for an area that is 30 ft by 60 ft (the interior of the detonation pit area).

Note: A different random starting point will be selected for each separate survey (1 foot depth) unit using a random number generator. Samples will be collected prior to the excavation of the one foot lifts.

$$L = \sqrt{\frac{1800}{0.866 * 24}} = 9$$

Figure 9 Survey Unit Layout Example Diagram



8.7 BACKGROUND REFERENCE AREA

A background reference area non-impacted by former operations and that has similar physical, chemical, geological, natural radiological, and biological characteristics as the areas to be surveyed will be chosen.

A total of 14 surface background samples will be obtained from the surface (within 6 inches) at randomly selected locations within the background reference area described above.

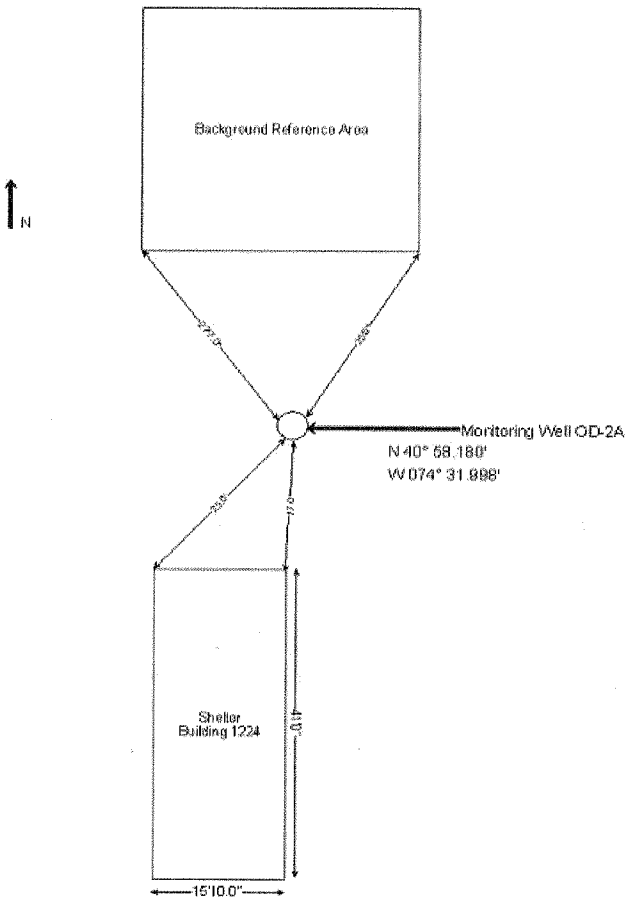
The samples will be sent to Test America's Inc. laboratory in Earth City, MO for gamma spectroscopy and isotopic uranium by alpha spectroscopy analysis as described under the heading of Measurements of Soil Contamination in Section 8.8.6 of this plan.

The site background count rate levels will be established for the final status surveys by obtaining sixteen, 1-minute static readings (with each instrument to be used), taken at 4" from the surface of soil and concrete surfaces for gamma surveys from areas unlikely to be affected by the residual radioactive materials that could be present at the different survey areas. The average value for these readings will be used as the area background radiation levels.

The UXO report and attachments will be provided to the on post Explosive Ordnance and Technology Division for action and also be included in the Final Report.

Figure 10 presents a map of the background reference area location previously used in Area 1222 during previous radiological investigations.

Figure 10 Background Reference Area Location Map



8.8 RADIOLOGICAL SURVEY METHODS (OPEN DETONATION PIT AND HILL AREA)

8.8.1 Summary

The open detonation pit areas and hillside will be 100 % gamma scan surveyed. Systematic surface soil samples will also be collected in these areas.

8.8.2 Gamma Scans of Land Areas

Gamma count rate response will be used to determine whether specific areas exhibit activity levels that are significantly above site-specific background. Gross gamma count rates will be measured using a 2" by 2" sodium iodide (NaI) gamma

scintillation detector system (Ludlum Instruments Model 2350-1 Data Logger coupled to a Ludlum Instruments Model 44-10 NaI or the equivalent). This radiation detection system measures energies in the range of about 80 to 3,000 kilo electron volts (keV).

Scanning speeds will be no greater than 0.5 m per second for gamma instruments. The detector will be held within proximity of four inches or less from the surface being surveyed. The detector will be moved back and forth in a serpentine pattern to ensure 100% coverage of the surface being surveyed. Audible indicators will be used to identify locations having elevated levels of direct radiation.

8.8.3 Scanning Minimum Detectable Count Rate (MDCR)

The minimum detectable number of net source counts in the interval is given by S_i. Therefore, for an ideal observer, the number of source counts required for a specified level of performance can be arrived at by multiplying the square root of the number of background counts (determined to be ~ 12,000 cpm) by the detectability value associated with the desired performance (as reflected in d') as shown in the equation below:

$$S_i = d' \sqrt{b_i}$$

Where:

d' = *index of sensitivity* (α *and* β *error*) *Table* 6.5 *of MARSSIM*
b_i = *number of background counts in scan time* interval

$$d' = 3.28$$

$$b_i = 12{,}000\ (2/60)$$

$$b_i = 400$$

Therefore:

$$S_i = 3.28\sqrt{400}$$

$$S_i = 66$$

The MDCR is then calculated using the formula below:

$$MDCR = S_i \; x(60/i)$$

Where:
i = *scan time interval*

Therefore:

$$MDCR = 66 \; x(60/2)$$
$$MDCR = 1980 \; cpm$$

The $MDCR_{surveyor}$ may then be calculated assuming a surveyor efficiency (p) of 0.5 as follows:

$$MDCR_{SURVEYOR} = 1980 / \sqrt{0.5}$$

$$MDCR_{SURVEYOR} = 2800 \; cpm$$

For example, the determined background count rate at Area 1222 is approximately 12,000 cpm. The instrumentation uses a two second scan interval. Using an index of sensitivity of 3.28 (95% true positive rate and 5% false positive rate); the $MDCR_{surveyor}$ is 2,800 cpm (or 14,800 cpm-gross).

8.8.4 Gamma Scan Action Level

The gamma scan Action Level will be set at the $MDCR_{SURVEYOR}$ (Section 8.8.3). Any areas exceeding the action level during the surveys will be further investigated. Soil samples may be collected in these areas and sent to the Test America Inc. laboratory for gamma spectroscopy analysis, and isotopic uranium by alpha spectroscopy analysis.

8.8.5 Gamma Scan Minimum Detectable Concentrations (MDCs)

The estimated scan MDC's obtained from Table 6.7 in MARSSIM for NaI 2" by 2" NaI detectors is:

2.8 pCi/g for Ra-226

56 pCi/g for depleted uranium

8.8.6 Measurements of Soil Contamination

Samples of soil and/or sand will be collected and sent to Test America Inc. for gamma spectroscopy and isotopic uranium by alpha spectroscopy analysis. The number of soil samples to be taken from each of the survey units of the Reference Coordinate System on the impacted Class 1 area of the hillside, and the impacted Class 1 areas of the open detonation pit, and the non impacted background area has been determined to be 24 for each as described under the heading of Number of Samples/ Measurements in Section 7.11 of this plan.

8.8.6.1 Surface Soil Samples

A minimum of 24 surface soil samples will be taken from the systematic locations in each survey unit (does not include biased samples). Surface samples (defined as 0-6.0-in. below ground surface) will be collected from each sampling location. A minimum of 24 soil samples will be obtained from each survey unit. The calculations that were used to obtain the number of required surface samples are presented under the heading "Number of Samples/Measurements" in Section 7.11 of this plan.

Sampling equipment and tools will be wiped down and surveyed after each sample to ensure no cross contamination occurs during the sampling process. If contamination is found above the minimum detectable count rate of the survey instrument, the equipment will be decontaminated.

Approximately 500 to 700 grams or 1.10 to 1.54 pounds of soil will be collected from each location. Samples will be prepared by removing vegetation, rocks, and foreign objects exceeding ¼ inch in diameter. The samples, once prepared, will be placed into an appropriate container. Collection methodology, chain of custody, and analysis requirements are detailed in AWS's Standard Operating Procedures (SOP's).

8.8.6.2 Minimum Detectable Activity

The samples will be sent to a State of New Jersey certified laboratory, Test America Inc's. laboratory in Earth City, MO for gamma spectroscopy and isotopic uranium by alpha spectroscopy analysis.

The samples will be counted at the laboratory for the period of time, determined *a priori*, to achieve a Minimum Detectable Activity (MDA) of less than or equal to ~ 0.5 pCi/gram for Ra-226 and ~ 0.05 pCi/g for U-234, U-235, and U-238.

Test America Inc's information is as follows:

Test America Laboratories, Inc.
13715 Rider Trail North
Earth City, MO 63045
DOD ELAP Cert # ADE-1430
State of New Jersey Laboratory Certification ID# MO002

8.8.7 Statistical Considerations

8.8.7.1 Demonstration of Compliance

When determining compliance with remediation goals, the entire site consisting of the survey units is examined. One measurement does not determine compliance. Rather, the site data are examined statistically. The three compliance tests are summarized in Table 5. They include the following:

- Compare the largest site measurement to the smallest background measurement.

- Compare the average site measurement to the average background measurement.

- Use the Wilcoxon rank sum test (MARSSIM, Revision 1, August 2000) to determine if the site data (less background) exceed the DCGL.

Table 5 Statistical Comparisons With The DCGL

SURVEY RESULT	CONCLUSION
Difference between the largest survey measurement and the smallest background measurement is less than the DCGL.	Site meets release criterion.
Difference between the average survey measurement and the average background measurement is greater than the DCGL.	Site does not meet release criterion.
Difference between the average survey measurement and the average background measurement is less than the DCGL, but the difference between any site measurement and any background measurement exceeds the DCGL.	Site meets release criterion if Wilcoxon rank sum test is negative.

8.8.7.2 Null Hypothesis

Using the MARSSIM methodology, the null hypothesis is stated as "the residual activity in the survey unit exceeds the release criteria" (Revision 1, August 2000). Thus, in order to pass the survey unit (that is, release the area), the null hypothesis must be rejected. If necessary, the Wilcoxon Rank-Sum test will be used on the soil data to test the null hypothesis.

8.8.7.3 Statistical Wilcoxon Rank Sum Test

The Wilcoxon Rank Sum test will be performed as described in MARSSIM, using $\alpha = 0.05$ and $\beta = 0.05$. Each Survey Unit meeting the third condition in Table 5 will be tested using this test. The test will determine if the survey area's median Ra-226 and depleted uranium concentration exceeds the background plus the DCGL.

The Wilcoxon Rank Sum test is used to compare two groups of data, to determine if there is a significant difference in the groups. Significance is measured by confidence levels (see Section 7.8).

For this case, the $DCGL_w$ is added to each of background soil sample results that were obtained in the background reference area to obtain the adjusted reference area measurement Z_i.

The *m* adjusted reference sample measurements, Z_i, from the reference area and the *n* sample measurements, Y_i, from the survey unit are pooled and ranked in order of increasing size from 1 to N, where N = *m*+*n*. For this case N=48.

If several measurements are tied *(i.e.*, have the same value), they are all assigned the average rank of that group of tied measurements.

If there are *t* "less than" values, they are all given the average of the ranks from 1 to *t*. Therefore, they are all assigned the rank t(t+1)/(2t) = (t+1)/2, which is the average of the first *t* integers. If there is more than one detection limit, all observations below the largest detection limit should be treated as "less than" values.

The ranks of the adjusted measurements from the background reference area are then summed, W_r.

Since the sum of the first N integers is N(N+1)/2, one can equivalently sum the ranks of the measurements from the survey unit, W_s, and compute $W_r = N(N+1)/2 - W_s$.

Compare W_r with the critical value given in Table I.4 found in Appendix I of MARSSIM for the appropriate values of n, m, and α. If W_r is greater than the critical value, the hypothesis that the survey unit exceeds the release criterion is rejected.

For this case *n*=24 *m*=24 and α=0.05.

The Critical Value from Table I.4 for this case is 668.

If the test shows that the first group is larger than the second, then the $DCGL_W$ is not met.

9.0 QUALITY CONTROL AND QUALITY ASSURANCE

The goal of quality assurance and quality control (QA/QC) is to identify and implement sampling and analytical methodologies that limit the introduction of error into analytical data. For the purposes of this plan, a system is required to ensure that the radiological survey data is of the type and quality to support their intended use. Both the project and the corporate QA/QC programs are constructed to ensure that all quality and regulatory requirements are satisfied. Quality assurance issues related to data verification and reliability will be handled according to approved and controlled Standard Operating Procedures (SOPs) and this Survey and Sampling Work Plan.

9.1 TRAINING

All project personnel will receive site specific training to identify the specific hazards present in the work and survey areas. Training will also include a briefing and review of the UXO anomaly avoidance protocol, this plan, AWS standard operating procedures (SOP's), and the Site Health and Safety Plan.

During site orientation and training, survey personnel as well as the UXO personnel will become familiar with site emergency procedures. In the event of an emergency, personnel will act in accordance with all applicable site emergency procedures and the Site Health and Safety Plan (HASP).

9.2 WRITTEN PROCEDURES

All survey tasks which are essential to survey data quality will be controlled by AWS's SOP's, this work plan, and the applicable Contractor's Safety Permit and Radiation Work Permit.

9.3 RADIOLOGICAL SURVEY EQUIPMENT

AWS has selected instruments proven to reliably detect the radionuclides in the Uranium-238 and Radium-226 series possibly present in the open detonation pit area and adjacent hillside area. Instruments will be calibrated by qualified vendors under approved procedures using calibration sources traceable to the National Institute of Standards and Technology (NIST).

The instruments and systems used for the work effort will be calibrated on an annual frequency using the manufacturer's calibration protocol to National Institute of Standards and Technology (NIST) traceable sources.

The survey instruments will be source checked each day prior to the start of the survey activities to verify proper operation of detectors and detection systems.

Control charts and/or source check criteria will be established at the beginning of the project for reference.

Procedures for calibration, maintenance, accountability, operation and quality control of radiation detection instruments implement the guidelines established in American National Standard Institute (ANSI) standard ANSI N323-1978 and ANSI N42.17A-1989.

9.4 SURVEY DATA MANAGEMENT

Survey packages will be the primary method of controlling and tracking the hard copy records of survey results. Records of surveys will be documented and maintained in the survey package for each area according to AWS procedures. Each survey measurement will be identified by the date, technician, instrument type and serial number, detector type and serial number, type of measurement, mode of instrument operation, and Quality Control (QC) sample number, as applicable.

9.5 SAMPLE CHAIN OF CUSTODY

AWS SOP's establish the guidelines and responsibility for the custody of samples from the time of collection until results are obtained. When samples are shipped off-site for analysis, they will be accompanied by a chain-of-custody record to track each sample.

9.6 DATA MANAGEMENT

Data will be maintained in the on-site office. Back up copies of data will be made routinely and maintained on the computer. Further, back up copies of survey and sample results will routinely be made to CDs or other electronic media.

9.7 REVIEW OF SURVEY RESULTS

The survey package and survey data from each area will be reviewed by two separate people to verify all documentation is complete and accurate. This will include the surveyor and either the Project Manager or his designee.

9.8 DATA ANALYSIS

The project manager will review data at the end of each survey to determine the validity of the results and adequate coverage of the survey area.

Basic statistical quantities will be calculated for the data in order to identify patterns, relationships and any type anomaly.

10.0 HEALTH AND SAFETY CONSIDERATIONS

The surveys, sampling, and removal of radiologically impacted soils at the open detonation pit area and adjacent hillside area will be conducted in accordance with the applicable sections of the AWS Health and Safety Plan. Excavation health and safety considerations will be described in this plan. All on site personnel shall read and understand the contents of the plan prior to beginning work on the project. All on-site workers shall sign a statement that they have read and understand the requirements of the HASP.

10.1 HAZARD ANALYSIS

The job hazard Analysis identifies potential safety, health and environmental hazards and provides for the protection of personnel, the community, and the environment.

10.1.1 Radiological Exposure

Residual amounts of low-level radioactive material may be present in the soil in the open detonation pit area and adjacent hillside area. Personnel performing the surveys and soil removal shall wear dosimetry and modified Level D PPE as described in Section 10.2.2 of this plan.

10.2 HAZARD CONTROLS

The following control measures will be implemented during the survey activities. The control measures are intended to supplement the HASP.

10.2.1 Radiation Work Permit

A Radiation Work Permit (RWP) shall be prepared and will specify the activities to be performed and all radiological control requirements and safety requirements for the work. All personnel assigned to site work will be required to read and sign the RWP acknowledging that they understand the requirements prior to beginning work.

The RWP will also be used as an information document for industrial safety. Hazards other than radiological may be included in the RWP so proper protection can be taken for all possible hazards from one controlling document. Implicit in any RWP is the need for a briefing on the radiological conditions present in the work environment.

The RWP shall list tasks and specific levels of protection for each worker covered by the RWP. The RWP shall also detail the dosimetry requirements, the

protective clothing requirements, and the expected radiation and contamination levels to be encountered during the job.

10.2.2 Personnel Protective Equipment (PPE)

Personnel performing the work in the open detonation pit area and adjacent hillside area will wear modified Level D PPE in accordance with the PPE selection matrix in the HASP.

The modified Level D PPE will consist of:

- Steel-toed shoes;
- Hard hat;
- Safety glasses;
- Rubber boots (when working in areas with lead contamination);
- Safety vests;
- Latex or equivalent gloves (when collecting soil samples).

10.2.3 Safety Equipment

In addition to other equipment specified in this work plan, the following safety equipment will be staged at the work site:

- First aid kit
- Eye wash kit

10.3 TRAINING

Personnel performing activities associated with the open detonation pit area and adjacent hillside work activities will receive training covering this work plan.

All on-site project personnel shall have completed at least 40 hours of hazardous waste operations-related training, as required by the Occupational Safety and Health administration (OSHA) Regulation 29 CFR Part 1910.120. Those personnel who have completed the 40-hour training more than 12 months prior to start of field activities shall have completed an 8-hour refresher course within the past twelve months.

The Project Manager shall have completed an additional 8 hours of relevant supervisory health and safety training.

Personnel operating the survey detection equipment will be qualified ANSI 3.1 Senior Health Physics Technicians based on training and experience outlined in Section 4.4.6 and 4.5.3.2 of ANSI standard ANSI/ANS-3.1-1993 (ANSI/ANS, 1993).

A formal review and documentation of the key personnel qualifications to perform the required work will be made by management and verified during the pre job briefing that will be conducted prior to start of work.

The personnel will be familiar with the handling and storage of radioactive materials, contamination controls, and the use of radiation survey equipment. In addition, any discrete radioactive devices found will be stored in 30-gallon drums and placed into a secured area of the site.

10.4 HAZARD COMMUNICATIONS

The Project Manager or designee shall ensure that crewmembers understand their obligation to safety and ensure that members are familiar with the elements of the Health and Safety Plan. A copy of this plan will be maintained in the on-site project office.

Daily tailgate safety meetings shall be conducted and documented as specified in the Health and Safety Plan. Material Safety Data Sheets (MSDSs) for all hazardous substances and materials that will be used on site will be maintained in the on-site project office.

11.0 WASTE MANAGEMENT

11.1 WASTE MATERIAL VOLUME ESTIMATE

Based upon past surveys and sampling conducted in the open detonation pit and adjacent hillside, it is estimated that there will be ~ 180 cubic feet of contaminated soil and one 30-gallon drum of discrete items of radioactive material.

11.2 PACKAGING OF WASTE MATERIALS

It is currently planned that soil will be packaged into two B-25 boxes. The container(s) shall meet all applicable Department of Transportation (DOT) requirements.
Discrete items found will be placed into a 30-gallon drum.

- B-25 boxes can contain ~ 90 cubic feet.

Once loaded, a radiological survey of the container's exterior surface will be performed and documented to ensure compliance with the applicable DOT regulations. The surveys will consist of exposure rate surveys and loose surface contamination surveys.

11.3 WASTE PROFILE SAMPLES

Representative composite waste profile soil samples will collected from the B-25 boxes and be sent to Test America, Inc. for Toxicity Characteristic Leaching Procedure (TCLP) analysis. In accordance with 40 CFR Part 261.21 through 40 CFR Part 261.24 the samples will be analyzed for:

- Volatiles
- Metals
- Semi-Volatiles
- PCB's
- Herbicides
- Pesticides
- Reactive Sulfide
- Reactive Cyanide
- pH

- Ignitability
- Gamma Spectroscopy
- Isotopic Uranium by Alpha Spectroscopy

The information for Test America is as follows:

Test America Laboratories, Inc.
13715 Rider Trail North
Earth City, MO 63045
DOD ELAP Cert # ADE-1430
State of New Jersey Laboratory Certification ID# MO002

Based upon review of the sample analysis, it will be determined if RCRA hazardous waste is present along with radioactive material.

11.4 SHIPMENT AND DISPOSAL OF THE WASTE MATERIALS

It is currently planned that the waste materials will be shipped shortly after receiving waste profile sample results to the Energy Solutions Inc. disposal facility in Clive, UT, the U.S. Ecology disposal facility located in Grandview, ID, or the Waste Control Specialist's disposal facility located in Andrews, TX. These are the possible disposal sites depending on the classification for this waste. Transportation is expected to be via truck.

AWS will transport the waste containers to Building 312 for storage prior to shipping. Prior to transport to Building 312, AWS will ensure that all exterior surfaces of the container(s) are free of removable contamination. AWS will also perform exposure rate surveys of the containers exterior surfaces prior to movement to Building 312.

The waste will be classified, and all shipping manifests, appropriate DOT labeling and shipping documentation will be completed by a JMC approved broker employed by AWS prior to the containers leaving the Picatinny Arsenal property.

Once the material is received by the disposal facility, manifests, and appropriate documents will be completed and then sent to AWS by the disposal facility. Copies of these documents will be summarized and included in the Final Report for the project.

It is currently anticipated that it will take anywhere from 45-60 days once the boxes and drum is loaded, for them to make their arrival at the disposal facility.

11.5 LIQUID RADIOACTIVE WASTE

It is anticipated that no liquid radioactive waste will be generated.

11.6 MIXED WASTE

It is anticipated that no mixed waste will be generated.

12.0 FINAL REPORT

After all measurements have been made and laboratory results are complete, the data will be analyzed and a report will be prepared within 30 days following completion of the project. The report will include this work plan, permits, all measurements, laboratory reports (including quality control results), SUXO report, and analysis of the data. A narrative of the work and conclusions drawn from the results will be presented. Any deviations from this work plan will be noted and explained.

Data and findings from previous radiological investigations in the area will also be referenced in the final report.

It is the objective that the narrative in the final report will conclude and state that the results of the MARSSIM final status survey of the open detonation pit and adjacent hillside area demonstrates that each of the survey units meet the release criterion and rejects the initial assumption that they are contaminated.

13.0 REFERENCES

American National Standards Institute/American Nuclear Society (ANSI/ANS), 1993. *Selection, Qualification, and Training of Personnel for Nuclear Power Plants*, ANSI/ANS, 1993.

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U.S. Nuclear Regulatory Commission (NRC), 2002. *Re-evaluation of the Indoor Resuspension Factor for the Screening Analysis of the Building Occupancy Scenario for NRC's License Termination Rule, NUREG-1720*, April, 2002.

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ATTACHMENT 1
AWS Broad Scope Radioactive Material License
50-29273-01

The contents of Attachment 1 have been removed because they contain Official Use Only – Security Related Information.

ATTACHMENT 2
RESRAD Version 6.5 Code Run
(Residential Farmer Scenario, Area 1222 Open Detonation Pit Site Specific Values)

Summary : RESRAD Default Parameters Resident Farmer Scenario
File : C:\RESRAD_FAMILY\RESRAD\6.5\PICATINNY GORGE AREA.RAD

Table of Contents

Part I: Mixture Sums and Single Radionuclide Guidelines

Dose Conversion Factor (and Related) Parameter Summary
Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	Ac-227 (Source: FGR 12)	4.951E-04	4.951E-04	DCF1(1)
A-1	At-218 (Source: FGR 12)	5.847E-03	5.847E-03	DCF1(2)
A-1	Bi-210 (Source: FGR 12)	3.606E-03	3.606E-03	DCF1(3)
A-1	Bi-211 (Source: FGR 12)	2.559E-01	2.559E-01	DCF1(4)
A-1	Bi-214 (Source: FGR 12)	9.808E+00	9.808E+00	DCF1(5)
A-1	Fr-223 (Source: FGR 12)	1.980E-01	1.980E-01	DCF1(6)
A-1	Pa-231 (Source: FGR 12)	1.906E-01	1.906E-01	DCF1(7)
A-1	Pa-234 (Source: FGR 12)	1.155E+01	1.155E+01	DCF1(8)
A-1	Pa-234m (Source: FGR 12)	8.967E-02	8.967E-02	DCF1(9)
A-1	Pb-210 (Source: FGR 12)	2.447E-03	2.447E-03	DCF1(10)
A-1	Pb-211 (Source: FGR 12)	3.064E-01	3.064E-01	DCF1(11)
A-1	Pb-214 (Source: FGR 12)	1.341E+00	1.341E+00	DCF1(12)
A-1	Po-210 (Source: FGR 12)	5.231E-05	5.231E-05	DCF1(13)
A-1	Po-211 (Source: FGR 12)	4.764E-02	4.764E-02	DCF1(14)
A-1	Po-214 (Source: FGR 12)	5.138E-04	5.138E-04	DCF1(15)
A-1	Po-215 (Source: FGR 12)	1.016E-03	1.016E-03	DCF1(16)
A-1	Po-218 (Source: FGR 12)	5.642E-05	5.642E-05	DCF1(17)
A-1	Ra-223 (Source: FGR 12)	6.034E-01	6.034E-01	DCF1(18)
A-1	Ra-226 (Source: FGR 12)	3.176E-02	3.176E-02	DCF1(19)
A-1	Rn-219 (Source: FGR 12)	3.083E-01	3.083E-01	DCF1(20)
A-1	Rn-222 (Source: FGR 12)	2.354E-03	2.354E-03	DCF1(21)
A-1	Th-227 (Source: FGR 12)	5.212E-01	5.212E-01	DCF1(22)
A-1	Th-230 (Source: FGR 12)	1.209E-03	1.209E-03	DCF1(23)
A-1	Th-231 (Source: FGR 12)	3.643E-02	3.643E-02	DCF1(24)
A-1	Th-234 (Source: FGR 12)	2.410E-02	2.410E-02	DCF1(25)
A-1	Tl-207 (Source: FGR 12)	1.980E-02	1.980E-02	DCF1(26)
A-1	Tl-210 (Source: no data)	0.000E+00	-2.000E+00	DCF1(27)
A-1	U-234 (Source: FGR 12)	4.017E-04	4.017E-04	DCF1(28)
A-1	U-235 (Source: FGR 12)	7.211E-01	7.211E-01	DCF1(29)
A-1	U-238 (Source: FGR 12)	1.031E-04	1.031E-04	DCF1(30)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(3)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(4)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(5)
B-1	U-234	1.320E-01	1.320E-01	DCF2(6)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(7)
B-1	U-238	1.180E-01	1.180E-01	DCF2(8)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(9)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(3)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(4)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(5)
D-1	U-234	2.830E-04	2.830E-04	DCF3(6)

Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(7)
D-1	U-238	2.550E-04	2.550E-04	DCF3(8)
D-1	U-238+D	2.687E-04	2.550E-04	DCF3(9)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34				
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34				
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(5,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(5,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(6,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(6,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(6,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(7,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(7,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(7,3)
D-34				
D-34	U-238 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(8,1)
D-34	U-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(8,2)
D-34	U-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(8,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)

Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(5,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(5,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(6,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(6,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(7,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(7,2)
D-5				
D-5	U-238 , fish	1.000E+01	1.000E+01	BIOFAC(8,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(8,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.
*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	2.200E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.500E+00	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRACT
R011	Length parallel to aquifer flow (m)	7.000E+01	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ra-226	1.000E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): U-234	9.000E+00	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): U-235	2.000E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): U-238	9.000E+00	0.000E+00	---	S1(8)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(8)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	4.500E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.300E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	2.000E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.000E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-02	2.000E-02	---	HGWT

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Saturated zone b parameter	5.300E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	4.000E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.500E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.000E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	5.300E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.924E-03	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.487E-03	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.487E-03	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.487E-03	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.363E-02	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.487E-03	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for daughter Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.750E-03	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for daughter Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.593E-06	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R017	Inhalation rate (m**3/yr)	8.400E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	5.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.500E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	-1.000E+00	1.000E+00	-1 shows non-circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	3.333E+00	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	6.667E+00	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	1.000E+01	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	1.333E+01	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	1.667E+01	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	2.000E+01	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	2.333E+01	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	2.667E+01	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	3.000E+01	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	3.333E+01	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	3.667E+01	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	4.000E+01	0.000E+00	---	RAD_SHAPE(12)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Fractions of annular areas within AREA:				
R017	Ring 1	1.000E+00	1.000E+00	---	FRACA(1)
R017	Ring 2	1.000E+00	2.732E-01	---	FRACA(2)
R017	Ring 3	1.000E+00	0.000E+00	---	FRACA(3)
R017	Ring 4	1.000E+00	0.000E+00	---	FRACA(4)
R017	Ring 5	9.400E-01	0.000E+00	---	FRACA(5)
R017	Ring 6	6.600E-01	0.000E+00	---	FRACA(6)
R017	Ring 7	5.100E-01	0.000E+00	---	FRACA(7)
R017	Ring 8	4.300E-01	0.000E+00	---	FRACA(8)
R017	Ring 9	3.700E-01	0.000E+00	---	FRACA(9)
R017	Ring 10	3.300E-01	0.000E+00	---	FRACA(10)
R017	Ring 11	2.200E-01	0.000E+00	---	FRACA(11)
R017	Ring 12	2.000E-02	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.600E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	1.400E+01	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	9.200E+01	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	6.300E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	5.400E+00	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	9.000E-01	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	5.100E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	5.000E-01	5.000E-01	---	FR9
R018	Contamination fraction of plant food	5.000E-01	-1	---	FPLANT
R018	Contamination fraction of meat	1.000E+00	-1	---	FMEAT
R018	Contamination fraction of milk	1.000E+00	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
0021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
0021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
0021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
0021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
0021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
0021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
0021	Diffusion coefficient for radon gas (m/sec):				
0021	in cover material	not used	2.000E-06	---	DIFCV
0021	in foundation material	not used	3.000E-07	---	DIFFL
0021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
0021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
0021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
0021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
0021	Building interior area factor	not used	0.000E+00	---	FAI
0021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
0021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
0021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
ITL	Number of graphical time points	32	---	---	NPTS

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	active
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	active

Summary : RESRAD Default Parameters Resident Farmer Scenario
File : C:\RESRAD_FAMILY\RESRAD\6.5\PICATINNY GORGE AREA.RAD

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	2200.00 square meters	Ra-226	1.000E+00
Thickness:	1.50 meters	U-234	9.000E+00
Cover Depth:	0.00 meters	U-235	2.000E+00
		U-238	9.000E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 1.500E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.467E+01	1.482E+01	1.510E+01	1.584E+01	1.663E+01	1.387E+01	9.900E+00	2.023E+01
M(t):	9.779E-01	9.881E-01	1.006E+00	1.056E+00	1.109E+00	9.246E-01	6.600E-01	1.349E+00

Maximum TDOSE(t): 2.893E+01 mrem/yr at t = 869 ± 2 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 8.690E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-nuclide / Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	1.375E-01	0.0048	1.771E-05	0.0000	0.000E+00	0.0000	1.791E-01	0.0062	1.316E-02	0.0005	9.882E-03	0.0003	5.571E-03	0.0002
U-234	8.194E-03	0.0003	3.506E-04	0.0000	0.000E+00	0.0000	1.354E-02	0.0005	1.025E-03	0.0000	1.263E-03	0.0000	1.099E-03	0.0000
U-235	7.403E-03	0.0003	9.676E-05	0.0000	0.000E+00	0.0000	3.229E-03	0.0001	1.073E-03	0.0000	1.544E-04	0.0000	3.104E-04	0.0000
U-238	6.302E-03	0.0002	2.138E-04	0.0000	0.000E+00	0.0000	3.137E-03	0.0001	2.730E-04	0.0000	6.767E-04	0.0000	5.626E-04	0.0000
Total	1.594E-01	0.0055	6.788E-04	0.0000	0.000E+00	0.0000	1.990E-01	0.0069	1.553E-02	0.0005	1.198E-02	0.0004	7.543E-03	0.0003

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 8.690E+02 years

Water Dependent Pathways

Radio-nuclide / Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	7.159E+00	0.2474	2.256E-02	0.0008	0.000E+00	0.0000	5.528E-01	0.0191	1.292E-01	0.0045	1.488E-01	0.0051	8.357E+00	0.2889
U-234	6.710E+00	0.2319	1.795E-03	0.0001	0.000E+00	0.0000	5.162E-01	0.0178	4.972E-02	0.0017	1.881E-01	0.0065	7.491E+00	0.2589
U-235	5.435E+00	0.1879	7.069E-03	0.0002	0.000E+00	0.0000	4.181E-01	0.0145	1.197E-01	0.0041	4.230E-02	0.0015	6.035E+00	0.2086
U-238	6.326E+00	0.2187	1.474E-03	0.0001	0.000E+00	0.0000	4.866E-01	0.0168	4.606E-02	0.0016	1.779E-01	0.0061	7.049E+00	0.2437
Total	2.563E+01	0.8859	3.289E-02	0.0011	0.000E+00	0.0000	1.974E+00	0.0682	3.446E-01	0.0119	5.571E-01	0.0193	2.893E+01	1.0000

Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	6.062E+00	0.4133	2.115E-04	0.0000	0.000E+00	0.0000	4.702E+00	0.3206	2.781E-01	0.0190	3.320E-01	0.0226	3.914E-02	0.0027
U-234	2.024E-03	0.0001	2.805E-02	0.0019	0.000E+00	0.0000	5.526E-01	0.0377	3.647E-02	0.0025	8.941E-02	0.0061	6.953E-02	0.0047
U-235	8.366E-01	0.0570	5.809E-03	0.0004	0.000E+00	0.0000	1.162E-01	0.0079	7.725E-03	0.0005	1.877E-02	0.0013	1.460E-02	0.0010
U-238	7.415E-01	0.0505	2.508E-02	0.0017	0.000E+00	0.0000	5.247E-01	0.0358	3.463E-02	0.0024	8.489E-02	0.0058	6.602E-02	0.0045
Total	7.643E+00	0.5210	5.916E-02	0.0040	0.000E+00	0.0000	5.896E+00	0.4019	3.570E-01	0.0243	5.250E-01	0.0358	1.893E-01	0.0129

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.141E+01	0.7781
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.781E-01	0.0530
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.997E-01	0.0682
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.477E+00	0.1007
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.467E+01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	6.036E+00	0.4073	2.270E-04	0.0000	0.000E+00	0.0000	4.875E+00	0.3289	2.906E-01	0.0196	3.371E-01	0.0227	4.494E-02	0.0030
U-234	2.013E-03	0.0001	2.790E-02	0.0019	0.000E+00	0.0000	5.496E-01	0.0371	3.628E-02	0.0024	8.892E-02	0.0060	6.915E-02	0.0047
U-235	8.320E-01	0.0561	5.779E-03	0.0004	0.000E+00	0.0000	1.160E-01	0.0078	7.847E-03	0.0005	1.867E-02	0.0013	1.454E-02	0.0010
U-238	7.374E-01	0.0498	2.495E-02	0.0017	0.000E+00	0.0000	5.219E-01	0.0352	3.445E-02	0.0023	8.443E-02	0.0057	6.566E-02	0.0044
Total	7.608E+00	0.5133	5.885E-02	0.0040	0.000E+00	0.0000	6.062E+00	0.4090	3.692E-01	0.0249	5.291E-01	0.0357	1.943E-01	0.0131

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.158E+01	0.7816
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.739E-01	0.0522
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.948E-01	0.0671
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.469E+00	0.0991
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.482E+01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	5.984E+00	0.3964	2.563E-04	0.0000	0.000E+00	0.0000	5.193E+00	0.3440	3.127E-01	0.0207	3.461E-01	0.0229	5.588E-02	0.0037
U-234	1.992E-03	0.0001	2.760E-02	0.0018	0.000E+00	0.0000	5.436E-01	0.0360	3.588E-02	0.0024	8.795E-02	0.0058	6.840E-02	0.0045
U-235	8.230E-01	0.0545	5.720E-03	0.0004	0.000E+00	0.0000	1.155E-01	0.0077	8.090E-03	0.0005	1.846E-02	0.0012	1.440E-02	0.0010
U-238	7.294E-01	0.0483	2.468E-02	0.0016	0.000E+00	0.0000	5.162E-01	0.0342	3.407E-02	0.0023	8.351E-02	0.0055	6.494E-02	0.0043
Total	7.538E+00	0.4994	5.825E-02	0.0039	0.000E+00	0.0000	6.368E+00	0.4219	3.907E-01	0.0259	5.361E-01	0.0355	2.036E-01	0.0135

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.189E+01	0.7878
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.655E-01	0.0507
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.851E-01	0.0653
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.453E+00	0.0962
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.510E+01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	5.805E+00	0.3665	3.416E-04	0.0000	0.000E+00	0.0000	6.109E+00	0.3858	3.766E-01	0.0238	3.715E-01	0.0235	8.795E-02	0.0056
U-234	1.928E-03	0.0001	2.656E-02	0.0017	0.000E+00	0.0000	5.232E-01	0.0330	3.453E-02	0.0022	8.464E-02	0.0053	6.583E-02	0.0042
U-235	7.920E-01	0.0500	5.521E-03	0.0003	0.000E+00	0.0000	1.139E-01	0.0072	8.891E-03	0.0006	1.777E-02	0.0011	1.396E-02	0.0009
U-238	7.019E-01	0.0443	2.375E-02	0.0015	0.000E+00	0.0000	4.967E-01	0.0314	3.279E-02	0.0021	8.037E-02	0.0051	6.250E-02	0.0039
Total	7.301E+00	0.4610	5.617E-02	0.0035	0.000E+00	0.0000	7.243E+00	0.4573	4.529E-01	0.0286	5.542E-01	0.0350	2.302E-01	0.0145

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.275E+01	0.8051
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.367E-01	0.0465
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.521E-01	0.0601
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.398E+00	0.0883
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.584E+01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	5.321E+00	0.3200	4.789E-04	0.0000	0.000E+00	0.0000	7.510E+00	0.4516	4.759E-01	0.0286	4.041E-01	0.0243	1.407E-01	0.0085
U-234	1.808E-03	0.0001	2.381E-02	0.0014	0.000E+00	0.0000	4.689E-01	0.0282	3.095E-02	0.0019	7.584E-02	0.0046	5.901E-02	0.0035
U-235	7.101E-01	0.0427	5.019E-03	0.0003	0.000E+00	0.0000	1.097E-01	0.0066	1.080E-02	0.0006	1.593E-02	0.0010	1.285E-02	0.0008
U-238	6.289E-01	0.0378	2.128E-02	0.0013	0.000E+00	0.0000	4.451E-01	0.0268	2.938E-02	0.0018	7.202E-02	0.0043	5.601E-02	0.0034
Total	6.662E+00	0.4006	5.059E-02	0.0030	0.000E+00	0.0000	8.534E+00	0.5132	5.470E-01	0.0329	5.679E-01	0.0341	2.686E-01	0.0162

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.385E+01	0.8330
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.604E-01	0.0397
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.644E-01	0.0520
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.253E+00	0.0753
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.663E+01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	3.923E+00	0.2829	4.858E-04	0.0000	0.000E+00	0.0000	7.067E+00	0.5095	4.554E-01	0.0328	3.489E-01	0.0252	1.519E-01	0.0110
U-234	1.953E-03	0.0001	1.625E-02	0.0012	0.000E+00	0.0000	3.205E-01	0.0231	2.114E-02	0.0015	5.170E-02	0.0037	4.027E-02	0.0029
U-235	4.852E-01	0.0350	3.664E-03	0.0003	0.000E+00	0.0000	9.436E-02	0.0068	1.411E-02	0.0010	1.088E-02	0.0008	9.739E-03	0.0007
U-238	4.283E-01	0.0309	1.450E-02	0.0010	0.000E+00	0.0000	3.032E-01	0.0219	2.001E-02	0.0014	4.906E-02	0.0035	3.815E-02	0.0028
Total	4.839E+00	0.3489	3.489E-02	0.0025	0.000E+00	0.0000	7.785E+00	0.5613	5.107E-01	0.0368	4.605E-01	0.0332	2.401E-01	0.0173

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.195E+01	0.8613
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.518E-01	0.0326
U-235	2.198E-09	0.0000	4.258E-12	0.0000	0.000E+00	0.0000	1.453E-10	0.0000	4.067E-13	0.0000	1.612E-12	0.0000	6.179E-01	0.0446
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.533E-01	0.0615
Total	2.198E-09	0.0000	4.258E-12	0.0000	0.000E+00	0.0000	1.453E-10	0.0000	4.067E-13	0.0000	1.612E-12	0.0000	1.387E+01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	1.641E+00	0.1658	2.113E-04	0.0000	0.000E+00	0.0000	3.049E+00	0.3080	1.969E-01	0.0199	1.490E-01	0.0151	6.646E-02	0.0067
U-234	4.229E-03	0.0004	5.496E-03	0.0006	0.000E+00	0.0000	1.132E-01	0.0114	7.443E-03	0.0008	1.754E-02	0.0018	1.370E-02	0.0014
U-235	1.635E-01	0.0165	1.477E-03	0.0001	0.000E+00	0.0000	5.060E-02	0.0051	1.113E-02	0.0011	3.662E-03	0.0004	4.242E-03	0.0004
U-238	1.429E-01	0.0144	4.841E-03	0.0005	0.000E+00	0.0000	1.013E-01	0.0102	6.683E-03	0.0007	1.638E-02	0.0017	1.274E-02	0.0013
Total	1.952E+00	0.1972	1.202E-02	0.0012	0.000E+00	0.0000	3.314E+00	0.3348	2.221E-01	0.0224	1.866E-01	0.0189	9.714E-02	0.0098

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.103E+00	0.5154
U-234	1.483E+00	0.1498	3.453E-04	0.0000	0.000E+00	0.0000	1.140E-01	0.0115	1.076E-02	0.0011	4.164E-02	0.0042	1.811E+00	0.1829
U-235	8.146E-01	0.0823	9.965E-04	0.0001	0.000E+00	0.0000	6.262E-02	0.0063	1.082E-02	0.0011	9.164E-03	0.0009	1.133E+00	0.1144
U-238	1.410E+00	0.1424	3.283E-04	0.0000	0.000E+00	0.0000	1.084E-01	0.0109	1.023E-02	0.0010	3.960E-02	0.0040	1.854E+00	0.1872
Total	3.707E+00	0.3745	1.670E-03	0.0002	0.000E+00	0.0000	2.850E-01	0.0288	3.181E-02	0.0032	9.040E-02	0.0091	9.900E+00	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	7.748E-02	0.0038	1.000E-05	0.0000	0.000E+00	0.0000	8.014E-02	0.0040	6.513E-03	0.0003	4.866E-03	0.0002	3.147E-03	0.0002
U-234	8.428E-03	0.0004	2.289E-04	0.0000	0.000E+00	0.0000	9.660E-03	0.0005	8.042E-04	0.0000	8.319E-04	0.0000	8.076E-04	0.0000
U-235	3.629E-03	0.0002	5.067E-05	0.0000	0.000E+00	0.0000	1.393E-03	0.0001	5.379E-04	0.0000	7.303E-05	0.0000	1.650E-04	0.0000
U-238	3.071E-03	0.0002	1.042E-04	0.0000	0.000E+00	0.0000	1.213E-03	0.0001	1.279E-04	0.0000	3.189E-04	0.0000	2.743E-04	0.0000
Total	9.261E-02	0.0046	3.938E-04	0.0000	0.000E+00	0.0000	9.240E-02	0.0046	7.983E-03	0.0004	6.089E-03	0.0003	4.394E-03	0.0002

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ra-226	7.157E+00	0.3538	2.256E-02	0.0011	0.000E+00	0.0000	5.527E-01	0.0273	1.291E-01	0.0064	1.487E-01	0.0073	8.182E+00	0.4044
U-234	3.941E+00	0.1948	1.258E-03	0.0001	0.000E+00	0.0000	3.032E-01	0.0150	2.999E-02	0.0015	1.100E-01	0.0054	4.406E+00	0.2178
U-235	3.216E+00	0.1589	4.094E-03	0.0002	0.000E+00	0.0000	2.475E-01	0.0122	7.843E-02	0.0039	2.443E-02	0.0012	3.576E+00	0.1768
U-238	3.651E+00	0.1805	8.510E-04	0.0000	0.000E+00	0.0000	2.809E-01	0.0139	2.661E-02	0.0013	1.027E-01	0.0051	4.067E+00	0.2010
Total	1.797E+01	0.8880	2.876E-02	0.0014	0.000E+00	0.0000	1.384E+00	0.0684	2.642E-01	0.0131	3.858E-01	0.0191	2.023E+01	1.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.128E+01	1.123E+01	1.113E+01	1.080E+01	9.899E+00	7.296E+00	3.052E+00	1.791E+00
Ra-226+D	Pb-210+D	1.000E+00	1.331E-01	3.517E-01	7.570E-01	1.950E+00	3.954E+00	4.650E+00	2.051E+00	6.391E+00
Ra-226+D	∑DSR(j)		1.141E+01	1.158E+01	1.189E+01	1.275E+01	1.385E+01	1.195E+01	5.103E+00	8.182E+00
U-234	U-234	1.000E+00	8.646E-02	8.599E-02	8.505E-02	8.184E-02	7.333E-02	4.993E-02	1.999E-01	4.728E-01
U-234	Th-230	1.000E+00	3.515E-07	1.010E-06	2.310E-06	6.747E-06	1.852E-05	5.087E-05	9.678E-05	8.998E-05
U-234	Ra-226+D	1.000E+00	6.917E-09	4.984E-08	2.656E-07	2.341E-06	1.854E-05	1.611E-04	7.940E-04	4.613E-03
U-234	Pb-210+D	1.000E+00	4.992E-11	6.448E-10	6.717E-09	1.558E-07	3.041E-06	5.763E-05	4.134E-04	1.199E-02
U-234	∑DSR(j)		8.646E-02	8.599E-02	8.505E-02	8.185E-02	7.337E-02	5.020E-02	2.012E-01	4.895E-01
U-235+D	U-235+D	1.000E+00	4.997E-01	4.970E-01	4.916E-01	4.730E-01	4.239E-01	2.887E-01	2.696E-01	4.497E-01
U-235+D	Pa-231	1.000E+00	1.314E-04	4.140E-04	9.739E-04	2.838E-03	7.408E-03	1.663E-02	6.292E-02	3.967E-01
U-235+D	Ac-227+D	1.000E+00	7.304E-07	4.366E-06	2.058E-05	1.549E-04	9.134E-04	3.647E-03	2.339E-01	9.416E-01
U-235+D	∑DSR(j)		4.999E-01	4.974E-01	4.926E-01	4.760E-01	4.322E-01	3.090E-01	5.664E-01	1.788E+00
U-238	U-238	5.400E-05	4.198E-06	4.175E-06	4.130E-06	3.974E-06	3.561E-06	2.425E-06	9.733E-06	2.307E-05
U-238+D	U-238+D	9.999E-01	1.641E-01	1.632E-01	1.614E-01	1.553E-01	1.392E-01	9.479E-02	2.058E-01	4.506E-01
U-238+D	U-234	9.999E-01	1.224E-07	3.655E-07	8.437E-07	2.436E-06	6.341E-06	1.423E-05	1.704E-04	1.343E-03
U-238+D	Th-230	9.999E-01	3.460E-13	2.277E-12	1.163E-11	9.990E-11	7.795E-10	6.588E-09	3.044E-08	5.475E-08
U-238+D	Ra-226+D	9.999E-01	4.812E-15	7.478E-14	8.836E-13	2.308E-11	5.251E-10	1.445E-08	1.968E-07	4.470E-06
U-238+D	Pb-210+D	9.999E-01	2.965E-17	7.879E-16	1.751E-14	1.187E-12	6.789E-11	4.373E-09	1.232E-07	1.331E-05
U-238+D	∑DSR(j)		1.641E-01	1.632E-01	1.614E-01	1.553E-01	1.392E-01	9.481E-02	2.059E-01	4.519E-01

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 1.500E+01 mrem/yr

Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226	1.314E+00	1.295E+00	1.261E+00	1.176E+00	1.083E+00	1.256E+00	2.940E+00	1.833E+00
U-234	1.735E+02	1.744E+02	1.764E+02	1.833E+02	2.044E+02	2.988E+02	7.455E+01	3.064E+01
U-235	3.001E+01	3.016E+01	3.045E+01	3.151E+01	3.471E+01	4.855E+01	2.648E+01	8.389E+00
U-238	9.141E+01	9.191E+01	9.293E+01	9.656E+01	1.078E+02	1.582E+02	7.283E+01	3.319E+01

Summary : RESRAD Default Parameters Resident Farmer Scenario
File : C:\RESRAD_FAMILY\RESRAD\6.5\PICATINNY GORGE AREA.RAD

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 869 ± 2 years

Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Ra-226	1.000E+00	38.01 ± 0.08	1.393E+01	1.077E+00	8.357E+00	1.795E+00
U-234	9.000E+00	905 ± 2	8.375E-01	1.791E+01	8.323E-01	1.802E+01
U-235	2.000E+00	857 ± 2	3.023E+00	4.962E+00	3.017E+00	4.971E+00
U-238	9.000E+00	905 ± 2	7.871E-01	1.906E+01	7.833E-01	1.915E+01

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226	Ra-226	1.000E+00	1.128E+01	1.123E+01	1.113E+01	1.080E+01	9.899E+00	7.296E+00	3.052E+00	1.791E+00
Ra-226	U-234	1.000E+00	6.225E-08	4.486E-07	2.391E-06	2.107E-05	1.669E-04	1.450E-03	7.146E-03	4.152E-02
Ra-226	U-238	9.999E-01	4.331E-14	6.730E-13	7.952E-12	2.077E-10	4.726E-09	1.300E-07	1.771E-06	4.023E-05
Ra-226	∑DOSE(j)		1.128E+01	1.123E+01	1.113E+01	1.080E+01	9.899E+00	7.298E+00	3.059E+00	1.833E+00
Pb-210	Ra-226	1.000E+00	1.331E-01	3.517E-01	7.570E-01	1.950E+00	3.954E+00	4.650E+00	2.051E+00	6.391E+00
Pb-210	U-234	1.000E+00	4.493E-10	5.804E-09	6.046E-08	1.402E-06	2.736E-05	5.187E-04	3.721E-03	1.079E-01
Pb-210	U-238	9.999E-01	2.669E-16	7.091E-15	1.576E-13	1.068E-11	6.110E-10	3.936E-08	1.108E-06	1.198E-04
Pb-210	∑DOSE(j)		1.331E-01	3.517E-01	7.570E-01	1.950E+00	3.954E+00	4.651E+00	2.054E+00	6.499E+00
U-234	U-234	1.000E+00	7.781E-01	7.739E-01	7.654E-01	7.366E-01	6.600E-01	4.494E-01	1.799E+00	4.256E+00
U-234	U-238	9.999E-01	1.102E-06	3.290E-06	7.594E-06	2.192E-05	5.707E-05	1.281E-04	1.533E-03	1.209E-02
U-234	∑DOSE(j)		7.781E-01	7.739E-01	7.655E-01	7.366E-01	6.600E-01	4.495E-01	1.801E+00	4.268E+00
Th-230	U-234	1.000E+00	3.164E-06	9.094E-06	2.079E-05	6.072E-05	1.667E-04	4.578E-04	8.710E-04	8.098E-04
Th-230	U-238	9.999E-01	3.114E-12	2.049E-11	1.046E-10	8.991E-10	7.015E-09	5.929E-08	2.740E-07	4.928E-07
Th-230	∑DOSE(j)		3.164E-06	9.094E-06	2.079E-05	6.072E-05	1.667E-04	4.579E-04	8.713E-04	8.103E-04
U-235	U-235	1.000E+00	9.994E-01	9.940E-01	9.831E-01	9.461E-01	8.478E-01	5.774E-01	5.392E-01	8.994E-01
Pa-231	U-235	1.000E+00	2.628E-04	8.279E-04	1.948E-03	5.676E-03	1.482E-02	3.326E-02	1.258E-01	7.935E-01
Ac-227	U-235	1.000E+00	1.461E-06	8.732E-06	4.116E-05	3.098E-04	1.827E-03	7.293E-03	4.678E-01	1.883E+00
U-238	U-238	5.400E-05	3.778E-05	3.758E-05	3.717E-05	3.577E-05	3.205E-05	2.183E-05	8.760E-05	2.077E-04
U-238	U-238	9.999E-01	1.477E+00	1.469E+00	1.453E+00	1.398E+00	1.253E+00	8.531E-01	1.852E+00	4.055E+00
U-238	∑DOSE(j)		1.477E+00	1.469E+00	1.453E+00	1.398E+00	1.253E+00	8.532E-01	1.852E+00	4.055E+00

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226	Ra-226	1.000E+00	1.000E+00	9.957E-01	9.870E-01	9.574E-01	8.775E-01	6.468E-01	2.706E-01	1.281E-02
Ra-226	U-234	1.000E+00	0.000E+00	1.749E-08	1.564E-07	1.698E-06	1.432E-05	1.272E-04	6.291E-04	1.387E-03
Ra-226	U-238	9.999E-01	0.000E+00	1.652E-14	4.426E-13	1.596E-11	3.992E-10	1.136E-08	1.488E-07	6.617E-07
Ra-226	∑S(j):		1.000E+00	9.957E-01	9.870E-01	9.574E-01	8.775E-01	6.469E-01	2.712E-01	1.420E-02
Pb-210	Ra-226	1.000E+00	0.000E+00	3.050E-02	8.809E-02	2.577E-01	5.431E-01	6.463E-01	2.853E-01	1.351E-02
Pb-210	U-234	1.000E+00	0.000E+00	1.799E-10	4.752E-09	1.633E-07	3.592E-06	7.100E-05	5.104E-04	1.267E-03
Pb-210	U-238	9.999E-01	0.000E+00	1.276E-16	1.014E-14	1.169E-12	7.853E-11	5.354E-09	1.121E-07	5.989E-07
Pb-210	∑S(j):		0.000E+00	3.050E-02	8.809E-02	2.577E-01	5.431E-01	6.463E-01	2.858E-01	1.478E-02
U-234	U-234	1.000E+00	9.000E+00	8.951E+00	8.853E+00	8.519E+00	7.633E+00	5.198E+00	1.734E+00	3.715E-02
U-234	U-238	9.999E-01	0.000E+00	2.537E-05	7.529E-05	2.415E-04	6.492E-04	1.474E-03	1.475E-03	1.055E-04
U-234	∑S(j):		9.000E+00	8.951E+00	8.853E+00	8.519E+00	7.634E+00	5.199E+00	1.735E+00	3.725E-02
Th-230	U-234	1.000E+00	0.000E+00	8.079E-05	2.411E-04	7.883E-04	2.240E-03	6.230E-03	1.188E-02	1.453E-02
Th-230	U-238	9.999E-01	0.000E+00	1.144E-10	1.022E-09	1.107E-08	9.266E-08	8.029E-07	3.729E-06	7.353E-06
Th-230	∑S(j):		0.000E+00	8.079E-05	2.411E-04	7.883E-04	2.241E-03	6.231E-03	1.189E-02	1.454E-02
U-235	U-235	1.000E+00	2.000E+00	1.989E+00	1.967E+00	1.893E+00	1.696E+00	1.155E+00	3.856E-01	8.278E-03
Pa-231	U-235	1.000E+00	0.000E+00	4.208E-05	1.249E-04	4.005E-04	1.076E-03	2.442E-03	2.440E-03	1.733E-04
Ac-227	U-235	1.000E+00	0.000E+00	6.611E-07	5.732E-06	5.605E-05	3.579E-04	1.467E-03	1.781E-03	1.346E-04
U-238	U-238	5.400E-05	4.860E-04	4.833E-04	4.781E-04	4.601E-04	4.122E-04	2.808E-04	9.369E-05	2.012E-06
U-238	U-238	9.999E-01	9.000E+00	8.950E+00	8.853E+00	8.519E+00	7.634E+00	5.199E+00	1.735E+00	3.725E-02
U-238	∑S(j):		9.000E+00	8.951E+00	8.853E+00	8.519E+00	7.634E+00	5.199E+00	1.735E+00	3.725E-02

THF(i) is the thread fraction of the parent nuclide.

RESCALC.EXE execution time = 11.98 seconds

Detailed: RESRAD Default Parameters Resident Farmer Scenario
File : C:\RESRAD_FAMILY\RESRAD\6.5\PICATINNY GORGE AREA.RAD

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Part II: Source Terms, Factors, and Parameters for Individual Pathways

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Part II: Source Terms, Factors, and Parameters for Individual Pathways

Iteration Log for Computation of the Time of Maximum Ra-226 Dose/Source Ratio
Pathway: Inhale (excluding Radon)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	5.37984E+01	5.25514E-04		
1	5.97826E+01	5.26523E-04	5.98423E+00	parabolic
2	5.91564E+01	5.26554E-04	-6.26222E-01	parabolic
3	5.88592E+01	5.26559E-04	-2.97179E-01	parabolic
4	5.88004E+01	5.26559E-04	-4.13358E-02	parabolic
5	5.87416E+01	5.26558E-04	-5.88004E-02	parabolic
6	5.88004E+01	5.26559E-04	0.00000E+00	direct

Notes:

1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum Ra-226 Dose/Source Ratio
Pathway: Plant (water independent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	5.37984E+01	7.85170E+00		
1	5.23212E+01	7.85477E+00	-1.47717E+00	parabolic
2	5.14114E+01	7.85546E+00	-9.09860E-01	parabolic
3	5.11761E+01	7.85549E+00	-2.35225E-01	parabolic
4	5.12273E+01	7.85549E+00	2.14128E-02	parabolic
5	5.12785E+01	7.85548E+00	5.12273E-02	parabolic
6	5.12273E+01	7.85549E+00	0.00000E+00	direct

Notes:
1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum Ra-226 Dose/Source Ratio
Pathway: Meat (water independent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	5.37984E+01	5.02930E-01		
1	5.44366E+01	5.02885E-01	6.38253E-01	parabolic
2	5.32808E+01	5.02945E-01	-5.17575E-01	parabolic
3	5.31353E+01	5.02945E-01	-1.45470E-01	parabolic
4	5.31885E+01	5.02945E-01	1.20653E-02	parabolic

Notes:

1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum Ra-226 Dose/Source Ratio
Pathway: Milk (water independent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	4.12463E+01	4.06090E-01		
1	3.87104E+01	4.06351E-01	-2.53585E+00	parabolic
2	3.83310E+01	4.06359E-01	-3.79447E-01	parabolic
3	3.81800E+01	4.06359E-01	-1.50991E-01	parabolic
4	3.82182E+01	4.06359E-01	1.63264E-02	parabolic
5	3.82564E+01	4.06359E-01	3.82182E-02	parabolic
6	3.82182E+01	4.06359E-01	0.00000E+00	direct

Notes:

1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum Ra-226 Dose/Source Ratio
Pathway: Soil

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.01704E+01	1.61728E-01		
1	6.48496E+01	1.62180E-01	-5.32074E+00	parabolic
2	6.40802E+01	1.62195E-01	-7.69466E-01	parabolic
3	6.35733E+01	1.62197E-01	-5.06857E-01	parabolic
4	6.36434E+01	1.62197E-01	7.00596E-02	parabolic
5	6.37070E+01	1.62197E-01	6.36434E-02	parabolic
6	6.36434E+01	1.62197E-01	0.00000E+00	direct

Notes:

1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum Ra-226 Dose/Source Ratio
All Pathways Summed

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	4.12463E+01	1.39149E+01		
1	3.84740E+01	1.39251E+01	-2.77227E+00	parabolic
2	3.81288E+01	1.39254E+01	-3.45190E-01	parabolic
3	3.79749E+01	1.39254E+01	-1.53945E-01	parabolic
4	3.80128E+01	1.39254E+01	9.20660E-03	parabolic
5	3.80508E+01	1.39254E+01	3.80128E-02	parabolic
6	3.80128E+01	1.39254E+01	0.00000E+00	direct

Notes:
1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-234 Dose/Source Ratio
Pathway: Water

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	7.26207E-01		
1	7.28976E+02	7.16050E-01	-3.77065E+01	parabolic
2	8.55802E+02	7.43554E-01	8.91194E+01	golden section
3	9.10881E+02	7.27831E-01	5.50788E+01	golden section
4	8.40472E+02	7.41097E-01	-1.53295E+01	parabolic
5	8.60793E+02	7.44315E-01	4.99155E+00	parabolic
6	8.79925E+02	7.47070E-01	1.91316E+01	golden section
7	8.91749E+02	7.48654E-01	1.18240E+01	golden section
8	8.99057E+02	7.49591E-01	7.30764E+00	golden section
9	9.03573E+02	7.50154E-01	4.51638E+00	golden section
10	9.06364E+02	7.46934E-01	2.79128E+00	golden section
11	9.01848E+02	7.49940E-01	-1.72509E+00	golden section
12	9.04639E+02	7.50286E-01	1.06617E+00	golden section

Notes:
1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-234 Dose/Source Ratio
Pathway: Fish

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	1.86819E-04		
1	7.67714E+02	1.86953E-04	1.03173E+00	parabolic
2	8.56439E+02	1.97979E-04	8.87254E+01	golden section
3	9.11275E+02	1.98716E-04	5.48353E+01	golden section
4	8.92570E+02	2.02287E-04	-1.87046E+01	parabolic
5	8.85046E+02	2.01394E-04	-7.52391E+00	parabolic
6	8.93834E+02	2.02437E-04	1.26419E+00	parabolic
7	9.00496E+02	2.03225E-04	6.66165E+00	golden section
8	9.04613E+02	2.03712E-04	4.11714E+00	golden section
9	9.07157E+02	2.02388E-04	2.54454E+00	golden section
10	9.03040E+02	2.03526E-04	-1.57260E+00	golden section
11	9.05585E+02	2.03691E-04	9.71934E-01	golden section
12	9.04613E+02	2.03712E-04	0.00000E+00	direct

Notes:
1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-234 Dose/Source Ratio
Pathway: Plant (water dependent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	5.58645E-02		
1	7.29005E+02	5.50835E-02	-3.76777E+01	parabolic
2	8.55802E+02	5.71999E-02	8.91194E+01	golden section
3	9.10881E+02	5.60008E-02	5.50788E+01	golden section
4	8.40634E+02	5.70128E-02	-1.51673E+01	parabolic
5	8.60919E+02	5.72600E-02	5.11739E+00	parabolic
6	8.80003E+02	5.74715E-02	1.90836E+01	golden section
7	8.91797E+02	5.75931E-02	1.17943E+01	golden section
8	8.99086E+02	5.76650E-02	7.28927E+00	golden section
9	9.03591E+02	5.77083E-02	4.50503E+00	golden section
10	9.06375E+02	5.74668E-02	2.78427E+00	golden section
11	9.01870E+02	5.76919E-02	-1.72076E+00	golden section
12	9.04655E+02	5.77184E-02	1.06349E+00	golden section

Notes:

1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-234 Dose/Source Ratio
Pathway: Meat (water dependent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	5.35353E-03		
1	7.33427E+02	5.28019E-03	-3.32553E+01	parabolic
2	8.55802E+02	5.50617E-03	8.91194E+01	golden section
3	9.10881E+02	5.41436E-03	5.50788E+01	golden section
4	8.47782E+02	5.49447E-03	-8.01941E+00	parabolic
5	8.66516E+02	5.52130E-03	1.07144E+01	parabolic
6	8.83462E+02	5.54414E-03	1.69457E+01	golden section
7	8.93935E+02	5.55765E-03	1.04730E+01	golden section
8	9.00408E+02	5.56578E-03	6.47270E+00	golden section
9	9.04408E+02	5.57073E-03	4.00034E+00	golden section
10	9.06880E+02	5.53614E-03	2.47233E+00	golden section
11	9.02880E+02	5.56885E-03	-1.52800E+00	golden section
12	9.05352E+02	5.57151E-03	9.44354E-01	golden section

Notes:
1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-234 Dose/Source Ratio
Pathway: Milk (water dependent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	2.03759E-02		
1	7.28278E+02	2.00911E-02	-3.84047E+01	parabolic
2	8.55802E+02	2.08466E-02	8.91194E+01	golden section
3	9.68886E+02	1.46092E-02	1.13084E+02	parabolic
4	8.98996E+02	2.10070E-02	4.31944E+01	golden section
5	9.25692E+02	1.87300E-02	2.66956E+01	golden section
6	8.82497E+02	2.09498E-02	-1.64988E+01	golden section
7	9.09193E+02	2.05987E-02	1.01968E+01	golden section
8	8.92694E+02	2.09857E-02	-6.30197E+00	golden section
9	9.02891E+02	2.10198E-02	3.89485E+00	golden section
10	9.05298E+02	2.10257E-02	2.40715E+00	golden section
11	9.06786E+02	2.08867E-02	1.48770E+00	golden section
12	9.04379E+02	2.10247E-02	-9.19455E-01	golden section
13	9.05298E+02	2.10257E-02	0.00000E+00	direct

Notes:

1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-234 Dose/Source Ratio
All Pathways Summed

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	8.11458E-01		
1	7.27763E+02	8.00086E-01	-3.89193E+01	parabolic
2	8.55802E+02	8.30201E-01	8.91194E+01	golden section
3	9.10881E+02	8.12481E-01	5.50788E+01	golden section
4	8.39743E+02	8.27417E-01	-1.60583E+01	parabolic
5	8.60228E+02	8.30931E-01	4.42642E+00	parabolic
6	8.79576E+02	8.33946E-01	1.93475E+01	golden section
7	8.91533E+02	8.35677E-01	1.19574E+01	golden section
8	8.98923E+02	8.36700E-01	7.39010E+00	golden section
9	9.03490E+02	8.37315E-01	4.56734E+00	golden section
10	9.06313E+02	8.33997E-01	2.82278E+00	golden section
11	9.01746E+02	8.37082E-01	-1.74456E+00	golden section
12	9.04569E+02	8.37459E-01	1.07820E+00	golden section

Notes:
1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-235 Dose/Source Ratio
Pathway: Meat (water independent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	1.19378E+02	7.18120E-03		
1	1.36532E+02	7.21232E-03	1.71543E+01	parabolic
2	1.36385E+02	7.21234E-03	-1.46554E-01	parabolic
3	1.35812E+02	7.21238E-03	-5.73606E-01	parabolic
4	1.35676E+02	7.21238E-03	-9.25823E-03	parabolic
5	1.35948E+02	7.21237E-03	1.35812E-01	parabolic
6	1.35812E+02	7.21238E-03	0.00000E+00	direct

Notes:
1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-235 Dose/Source Ratio
Pathway: Water

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	2.56059E+00		
1	7.72013E+02	2.57429E+00	5.33043E+00	parabolic
2	8.59096E+02	2.72294E+00	8.70834E+01	golden section
3	9.06972E+02	2.58583E+00	4.78759E+01	parabolic
4	8.40755E+02	2.71548E+00	-1.83412E+01	parabolic
5	8.54043E+02	2.72292E+00	-5.05269E+00	parabolic
6	8.56629E+02	2.72315E+00	-2.46724E+00	parabolic
7	8.55772E+02	2.72312E+00	-5.99162E-03	parabolic
8	8.57485E+02	2.72312E+00	8.56629E-01	parabolic
9	8.56629E+02	2.72315E+00	0.00000E+00	direct

Notes:

1) Step size always from t with current largest DSR(t) .

2) Parabolic step based on parabola maximum through the current best triplet.

3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.

4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-235 Dose/Source Ratio
Pathway: Fish

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	3.35536E-03		
1	7.77512E+02	3.39794E-03	1.08300E+01	parabolic
2	8.62495E+02	3.55285E-03	8.49827E+01	golden section
3	8.61425E+02	3.55520E-03	-1.07033E+00	parabolic
4	8.39033E+02	3.56885E-03	-2.23916E+01	parabolic
5	8.15534E+02	3.53044E-03	-2.34989E+01	golden section
6	8.45723E+02	3.57106E-03	6.69036E+00	parabolic
7	8.44878E+02	3.57104E-03	-5.86235E-01	parabolic
8	8.46569E+02	3.57100E-03	8.45724E-01	parabolic
9	8.45723E+02	3.57106E-03	0.00000E+00	direct

Notes:

1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-235 Dose/Source Ratio
Pathway: Plant (water dependent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	1.96976E-01		
1	7.72047E+02	1.98038E-01	5.36506E+00	parabolic
2	8.59117E+02	2.09481E-01	8.70702E+01	golden section
3	9.07012E+02	1.98941E-01	4.78947E+01	parabolic
4	8.40814E+02	2.08906E-01	-1.83031E+01	parabolic
5	8.54101E+02	2.09479E-01	-5.01622E+00	parabolic
6	8.56693E+02	2.09496E-01	-2.42481E+00	parabolic
7	8.55836E+02	2.09494E-01	-8.87918E-03	parabolic
8	8.57549E+02	2.09494E-01	8.56693E-01	parabolic
9	8.56693E+02	2.09496E-01	0.00000E+00	direct

Notes:
1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-235 Dose/Source Ratio
Pathway: Meat (water dependent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	5.22929E-02		
1	8.00812E+02	5.48840E-02	3.41293E+01	parabolic
2	8.41038E+02	5.78453E-02	4.02261E+01	parabolic
3	9.01756E+02	6.21012E-02	6.07182E+01	golden section
4	9.39282E+02	5.29481E-02	3.75259E+01	golden section
5	8.78564E+02	6.05111E-02	-2.31923E+01	golden section
6	9.16089E+02	5.92990E-02	1.43336E+01	golden section
7	8.95031E+02	6.16456E-02	-6.72457E+00	parabolic
8	9.07231E+02	6.19080E-02	5.47495E+00	golden section
9	9.02658E+02	6.21619E-02	6.48289E-01	parabolic
10	9.03707E+02	6.22325E-02	1.04956E+00	parabolic
11	9.05053E+02	6.23228E-02	1.34593E+00	golden section
12	9.05958E+02	6.22804E-02	8.31820E-01	golden section
13	9.05053E+02	6.23228E-02	0.00000E+00	direct

Notes:

1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-235 Dose/Source Ratio
Pathway: Milk (water dependent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	2.06211E-02		
1	7.31551E+02	2.03188E-02	-3.51315E+01	parabolic
2	8.55802E+02	2.11199E-02	8.91194E+01	golden section
3	9.26901E+02	1.86778E-02	7.10997E+01	parabolic
4	8.21761E+02	2.09809E-02	-3.40406E+01	golden section
5	8.82959E+02	2.11629E-02	2.71577E+01	golden section
6	8.88733E+02	2.11611E-02	5.77343E+00	parabolic
7	8.83842E+02	2.11629E-02	2.52082E-01	parabolic
8	8.84726E+02	2.11628E-02	8.83842E-01	parabolic
9	8.83842E+02	2.11629E-02	0.00000E+00	direct

Notes:
1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-235 Dose/Source Ratio
All Pathways Summed

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	2.84465E+00		
1	7.70563E+02	2.85644E+00	3.88039E+00	parabolic
2	8.58200E+02	3.02283E+00	8.76373E+01	golden section
3	8.90557E+02	2.96970E+00	3.23575E+01	parabolic
4	8.46554E+02	3.01904E+00	-1.16458E+01	parabolic
5	8.56022E+02	3.02283E+00	-2.17774E+00	parabolic
6	8.59058E+02	3.02274E+00	8.58200E-01	parabolic
7	8.57342E+02	3.02287E+00	-8.58200E-01	parabolic

Notes:

1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-238 Dose/Source Ratio
Pathway: Water

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	6.86763E-01		
1	7.26508E+02	6.77152E-01	-4.01741E+01	parabolic
2	8.55802E+02	7.01355E-01	8.91194E+01	golden section
3	9.51437E+02	5.39992E-01	9.56349E+01	parabolic
4	8.92331E+02	7.05408E-01	3.65293E+01	golden section
5	9.14907E+02	6.69028E-01	2.25763E+01	golden section
6	8.78378E+02	7.03964E-01	-1.39529E+01	golden section
7	9.00954E+02	7.06241E-01	8.62340E+00	golden section
8	9.06284E+02	7.03671E-01	5.32955E+00	golden section
9	8.97661E+02	7.05928E-01	-3.29385E+00	golden section
10	9.02990E+02	7.06431E-01	2.03570E+00	golden section
11	9.04248E+02	7.06547E-01	1.25813E+00	golden section
12	9.05152E+02	7.06597E-01	7.77570E-01	golden section

Notes:
1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-238 Dose/Source Ratio
Pathway: Fish

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	1.59991E-04		
1	7.26560E+02	1.57752E-04	-4.01217E+01	parabolic
2	8.55802E+02	1.63400E-04	8.91194E+01	golden section
3	9.51997E+02	1.25423E-04	9.61954E+01	parabolic
4	8.92545E+02	1.64353E-04	3.67434E+01	golden section
5	9.15254E+02	1.55577E-04	2.27087E+01	golden section
6	8.78510E+02	1.64013E-04	-1.40347E+01	golden section
7	9.01219E+02	1.64549E-04	8.67394E+00	golden section
8	9.06580E+02	1.63678E-04	5.36079E+00	golden section
9	8.97906E+02	1.64475E-04	-3.31315E+00	golden section
10	9.03267E+02	1.64593E-04	2.04764E+00	golden section
11	9.04532E+02	1.64621E-04	1.26552E+00	golden section
12	9.05437E+02	1.64577E-04	7.82140E-01	golden section
13	9.04532E+02	1.64621E-04	0.00000E+00	direct

Notes:

1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-238 Dose/Source Ratio
Pathway: Plant (water dependent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	5.28285E-02		
1	7.26525E+02	5.20894E-02	-4.01572E+01	parabolic
2	8.55802E+02	5.39512E-02	8.91194E+01	golden section
3	9.51442E+02	4.15445E-02	9.56407E+01	parabolic
4	8.92333E+02	5.42630E-02	3.65315E+01	golden section
5	9.14911E+02	5.14726E-02	2.25777E+01	golden section
6	8.78379E+02	5.41519E-02	-1.39538E+01	golden section
7	9.00957E+02	5.43271E-02	8.62391E+00	golden section
8	9.06287E+02	5.41380E-02	5.32988E+00	golden section
9	8.97663E+02	5.43030E-02	-3.29404E+00	golden section
10	9.02993E+02	5.43417E-02	2.03584E+00	golden section
11	9.04251E+02	5.43507E-02	1.25822E+00	golden section
12	9.05155E+02	5.43562E-02	7.77617E-01	golden section

Notes:
1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-238 Dose/Source Ratio
Pathway: Meat (water dependent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	5.00001E-03		
1	7.26600E+02	4.93014E-03	-4.00823E+01	parabolic
2	8.55802E+02	5.10638E-03	8.91194E+01	golden section
3	9.51521E+02	3.93328E-03	9.57188E+01	parabolic
4	8.92363E+02	5.13596E-03	3.65614E+01	golden section
5	9.14959E+02	4.87403E-03	2.25962E+01	golden section
6	8.78398E+02	5.12542E-03	-1.39652E+01	golden section
7	9.00994E+02	5.14204E-03	8.63098E+00	golden section
8	9.06328E+02	5.12662E-03	5.33424E+00	golden section
9	8.98047E+02	5.14000E-03	-2.94710E+00	parabolic
10	9.03031E+02	5.14343E-03	2.03749E+00	golden section
11	9.04291E+02	5.14428E-03	1.25925E+00	golden section
12	9.05195E+02	5.14482E-03	7.78246E-01	golden section

Notes:
1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-238 Dose/Source Ratio
Pathway: Milk (water dependent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	1.93089E-02		
1	7.26538E+02	1.90388E-02	-4.01445E+01	parabolic
2	8.55802E+02	1.97193E-02	8.91194E+01	golden section
3	9.51434E+02	1.51875E-02	9.56320E+01	parabolic
4	8.92330E+02	1.98332E-02	3.65282E+01	golden section
5	9.14906E+02	1.88166E-02	2.25756E+01	golden section
6	8.78377E+02	1.97926E-02	-1.39525E+01	golden section
7	9.00953E+02	1.98567E-02	8.62312E+00	golden section
8	9.06282E+02	1.97909E-02	5.32939E+00	golden section
9	8.97659E+02	1.98479E-02	-3.29373E+00	golden section
10	9.02989E+02	1.98620E-02	2.03565E+00	golden section
11	9.04247E+02	1.98653E-02	1.25811E+00	golden section
12	9.05151E+02	1.98671E-02	7.77547E-01	golden section

Notes:
1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum U-238 Dose/Source Ratio
All Pathways Summed

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	DSR(t) (mrem/yr)/(pCi/g)	Step Size (years)	Step Type
0	7.66682E+02	7.66338E-01		
1	7.24168E+02	7.55643E-01	-4.25142E+01	parabolic
2	8.55802E+02	7.81637E-01	8.91194E+01	golden section
3	9.52657E+02	5.97246E-01	9.68556E+01	parabolic
4	8.92797E+02	7.85932E-01	3.69955E+01	golden section
5	9.15662E+02	7.42007E-01	2.28645E+01	golden section
6	8.78666E+02	7.84404E-01	-1.41310E+01	golden section
7	9.01531E+02	7.86813E-01	8.73346E+00	golden section
8	9.06928E+02	7.80935E-01	5.39758E+00	golden section
9	8.98195E+02	7.86482E-01	-3.33588E+00	golden section
10	9.03592E+02	7.87014E-01	2.06169E+00	golden section
11	9.04867E+02	7.87137E-01	1.27419E+00	golden section
12	9.05771E+02	7.86063E-01	7.87502E-01	golden section
13	9.04867E+02	7.87137E-01	0.00000E+00	direct

Notes:

1) Step size always from t with current largest DSR(t) .
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but DSR(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum Total Dose
Pathway: Plant (water independent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	TDOSE(t) (mrem/yr)	Step Size (years)	Step Type
0	5.37984E+01	8.75888E+00		
1	4.76693E+01	8.78376E+00	-6.12911E+00	parabolic
2	4.76216E+01	8.78378E+00	-3.50642E-02	parabolic
3	4.73631E+01	8.78382E+00	-2.58536E-01	parabolic
4	4.50267E+01	8.78006E+00	-2.33641E+00	golden section
5	4.74104E+01	8.78382E+00	2.19314E-02	parabolic
6	4.74578E+01	8.78381E+00	4.74104E-02	parabolic
7	4.74104E+01	8.78382E+00	0.00000E+00	direct

Notes:

1) Step size always from t with current largest TDOSE(t).
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but TDOSE(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum Total Dose
Pathway: Meat (water independent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	TDOSE(t) (mrem/yr)	Step Size (years)	Step Type
0	5.37984E+01	5.68325E-01		
1	5.10987E+01	5.68815E-01	-2.69971E+00	parabolic
2	5.03770E+01	5.68850E-01	-7.21667E-01	parabolic
3	5.01118E+01	5.68852E-01	-2.65248E-01	parabolic
4	5.01619E+01	5.68852E-01	2.73485E-02	parabolic
5	5.00616E+01	5.68852E-01	-5.01118E-02	parabolic
6	5.01118E+01	5.68852E-01	0.00000E+00	direct

Notes:

1) Step size always from t with current largest TDOSE(t).
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but TDOSE(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum Total Dose
Pathway: Milk (water independent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	TDOSE(t) (mrem/yr)	Step Size (years)	Step Type
0	2.42446E+01	5.68400E-01		
1	2.62408E+01	5.68557E-01	1.99615E+00	parabolic
2	2.61474E+01	5.68558E-01	-9.34226E-02	parabolic
3	2.61031E+01	5.68558E-01	-4.42331E-02	parabolic
4	2.60770E+01	5.68558E-01	-2.61031E-02	parabolic
5	2.53771E+01	5.68534E-01	-6.99912E-01	golden section
6	2.58097E+01	5.68554E-01	-2.67343E-01	golden section
7	2.59749E+01	5.68557E-01	-1.02116E-01	golden section
8	2.60380E+01	5.68557E-01	-3.90047E-02	golden section
9	2.60770E+01	5.68558E-01	0.00000E+00	direct

Notes:
1) Step size always from t with current largest TDOSE(t).
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but TDOSE(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum Total Dose
Pathway: Soil

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	TDOSE(t) (mrem/yr)	Step Size (years)	Step Type
0	4.12463E+01	2.74529E-01		
1	4.59315E+01	2.74916E-01	4.68525E+00	parabolic
2	4.55943E+01	2.74922E-01	-3.37237E-01	parabolic
3	4.53991E+01	2.74923E-01	-1.95164E-01	parabolic
4	4.53537E+01	2.74923E-01	-1.83138E-02	parabolic
5	4.53084E+01	2.74922E-01	-4.53537E-02	parabolic
6	4.53537E+01	2.74923E-01	0.00000E+00	direct

Notes:

1) Step size always from t with current largest TDOSE(t).
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but TDOSE(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum Total Dose
Pathway: Water

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	TDOSE(t) (mrem/yr)	Step Size (years)	Step Type
0	7.66682E+02	2.47524E+01		
1	7.65916E+02	2.47419E+01	-5.03411E-02	parabolic
2	8.55802E+02	2.55928E+01	8.91194E+01	golden section
3	9.11023E+02	2.49595E+01	5.52212E+01	parabolic
4	8.43809E+02	2.55333E+01	-1.19926E+01	parabolic
5	8.59949E+02	2.56079E+01	4.14733E+00	parabolic
6	8.79457E+02	2.56334E+01	1.95085E+01	golden section
7	8.76327E+02	2.56350E+01	-3.13041E+00	parabolic
8	8.75451E+02	2.56350E+01	-7.28159E-01	parabolic
9	8.74575E+02	2.56349E+01	-8.75451E-01	parabolic
10	8.75451E+02	2.56350E+01	0.00000E+00	direct

Notes:
1) Step size always from t with current largest TDOSE(t).
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but TDOSE(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum Total Dose
Pathway: Fish

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	TDOSE(t) (mrem/yr)	Step Size (years)	Step Type
0	7.66682E+02	3.16062E-02		
1	8.34206E+02	3.27411E-02	6.75233E+01	parabolic
2	8.48501E+02	3.27755E-02	1.42950E+01	parabolic
3	8.47652E+02	3.27097E-02	-2.97737E-01	parabolic
4	9.06368E+02	3.24162E-02	5.78676E+01	golden section
5	8.70604E+02	3.28911E-02	2.21035E+01	golden section
6	8.84265E+02	3.28094E-02	1.36607E+01	golden section
7	8.67891E+02	3.28967E-02	-2.71262E+00	parabolic
8	8.65017E+02	3.28991E-02	-2.87451E+00	parabolic
9	8.64152E+02	3.28991E-02	-5.03125E-01	parabolic
10	8.63288E+02	3.28989E-02	-8.64152E-01	parabolic
11	8.64152E+02	3.28991E-02	0.00000E+00	direct

Notes:
1) Step size always from t with current largest TDOSE(t).
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but TDOSE(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum Total Dose
Pathway: Plant (water dependent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	TDOSE(t) (mrem/yr)	Step Size (years)	Step Type
0	7.66682E+02	1.90612E+00		
1	7.67449E+02	1.90693E+00	5.61631E-02	parabolic
2	8.56276E+02	1.97103E+00	8.88266E+01	golden section
3	9.10875E+02	1.92358E+00	5.45990E+01	parabolic
4	8.44398E+02	1.96656E+00	-1.18777E+01	parabolic
5	8.60381E+02	1.97216E+00	4.10512E+00	parabolic
6	8.79668E+02	1.97403E+00	1.92870E+01	golden section
7	8.76368E+02	1.97416E+00	-3.29964E+00	parabolic
8	8.75492E+02	1.97416E+00	-6.80273E-01	parabolic
9	8.74616E+02	1.97415E+00	-8.75492E-01	parabolic
10	8.75492E+02	1.97416E+00	0.00000E+00	direct

Notes:

1) Step size always from t with current largest TDOSE(t).
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but TDOSE(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum Total Dose
Pathway: Meat (water dependent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	TDOSE(t) (mrem/yr)	Step Size (years)	Step Type
0	7.66682E+02	3.22559E-01		
1	8.00120E+02	3.30652E-01	3.34376E+01	parabolic
2	8.32537E+02	3.37649E-01	3.24172E+01	parabolic
3	8.96502E+02	3.49382E-01	6.39652E+01	golden section
4	9.36035E+02	3.18512E-01	3.95327E+01	golden section
5	8.72070E+02	3.45202E-01	-2.44325E+01	golden section
6	9.11602E+02	3.44193E-01	1.51001E+01	golden section
7	8.90856E+02	3.48448E-01	-5.64654E+00	parabolic
8	9.02270E+02	3.50315E-01	5.76775E+00	golden section
9	9.05835E+02	3.50624E-01	3.56466E+00	golden section
10	9.09397E+02	3.46666E-01	3.56287E+00	parabolic
11	9.04473E+02	3.50667E-01	-1.36157E+00	golden section
12	9.03568E+02	3.50523E-01	-9.04473E-01	parabolic
13	9.04473E+02	3.50667E-01	0.00000E+00	direct

Notes:

1) Step size always from t with current largest TDOSE(t).
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but TDOSE(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum Total Dose
Pathway: Milk (water dependent)

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	TDOSE(t) (mrem/yr)	Step Size (years)	Step Type
0	7.66682E+02	5.42273E-01		
1	7.53296E+02	5.39348E-01	-1.33866E+01	parabolic
2	8.55802E+02	5.55800E-01	8.91194E+01	golden section
3	9.27849E+02	5.10015E-01	7.20469E+01	parabolic
4	8.21761E+02	5.51730E-01	-3.40406E+01	golden section
5	8.83321E+02	5.58228E-01	2.75195E+01	golden section
6	9.00329E+02	5.59357E-01	1.70080E+01	golden section
7	9.10841E+02	5.47410E-01	1.05115E+01	golden section
8	8.93833E+02	5.58960E-01	-6.49645E+00	golden section
9	9.04344E+02	5.59581E-01	4.01503E+00	golden section
10	9.06826E+02	5.56773E-01	2.48143E+00	golden section
11	9.02811E+02	5.59497E-01	-1.53360E+00	golden section
12	9.05292E+02	5.59595E-01	9.47828E-01	golden section

Notes:
1) Step size always from t with current largest TDOSE(t).
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but TDOSE(t) was smaller than the previous value.

Iteration Log for Computation of the Time of Maximum Total Dose
All Pathways Summed

Tolerance for tmax = 1.0E-03 (fractional accuracy)

Iteration Number	t (years)	TDOSE(t) (mrem/yr)	Step Size (years)	Step Type
0	7.66682E+02	2.82162E+01		
1	7.51854E+02	2.80313E+01	-1.48284E+01	parabolic
2	8.55802E+02	2.89157E+01	8.91194E+01	golden section
3	8.99633E+02	2.88044E+01	4.38312E+01	parabolic
4	8.61466E+02	2.89269E+01	5.66383E+00	parabolic
5	8.66970E+02	2.89318E+01	5.50416E+00	parabolic
6	8.68950E+02	2.89321E+01	1.98066E+00	parabolic
7	8.69819E+02	2.89320E+01	8.68950E-01	parabolic
8	8.68081E+02	2.89321E+01	-8.68950E-01	parabolic
9	8.68950E+02	2.89321E+01	0.00000E+00	direct

Notes:

1) Step size always from t with current largest TDOSE(t).
2) Parabolic step based on parabola maximum through the current best triplet.
3) Golden section step, 0.5*(3-SQRT(5)) of larger interval bracketing maximum, taken only if trial parabolic step fails.
4) Direct step to a previous t only on last iteration and only if prior iteration met convergence test but TDOSE(t) was smaller than the previous value.

Source Factors for Ingrowth and Decay
Radioactivity Factors Only
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	ID(j,t) = THF(j)*S1(j,t)/S1(i,0) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	9.996E-01	9.987E-01	9.957E-01	9.871E-01	9.576E-01	8.781E-01	6.484E-01
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	3.060E-02	8.897E-02	2.666E-01	6.019E-01	9.258E-01	8.904E-01	6.576E-01
U-234	U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01	9.997E-01	9.991E-01	9.972E-01
U-234	Th-230	1.000E+00	0.000E+00	9.002E-06	2.701E-05	9.001E-05	2.700E-04	8.997E-04	2.696E-03	8.949E-03
U-234	Ra-226+D	1.000E+00	0.000E+00	1.950E-09	1.754E-08	1.947E-07	1.747E-06	1.921E-05	1.679E-04	1.689E-03
U-234	Pb-210+D	1.000E+00	0.000E+00	2.004E-11	5.328E-10	1.870E-08	4.373E-07	1.068E-05	1.363E-04	1.591E-03
U-235+D	U-235+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Pa-231	1.000E+00	0.000E+00	2.116E-05	6.347E-05	2.116E-04	6.345E-04	2.114E-03	6.327E-03	2.094E-02
U-235+D	Ac-227+D	1.000E+00	0.000E+00	3.332E-07	2.937E-06	3.037E-05	2.258E-04	1.477E-03	5.667E-03	2.028E-02
U-238	U-238	5.400E-05	5.400E-05	5.400E-05	5.400E-05	5.400E-05	5.400E-05	5.400E-05	5.400E-05	5.400E-05
U-238+D	U-238+D	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01
U-238+D	U-234	9.999E-01	0.000E+00	2.835E-06	8.504E-06	2.835E-05	8.504E-05	2.834E-04	8.501E-04	2.831E-03
U-238+D	Th-230	9.999E-01	0.000E+00	1.276E-11	1.148E-10	1.276E-09	1.148E-08	1.275E-07	1.147E-06	1.271E-05
U-238+D	Ra-226+D	9.999E-01	0.000E+00	1.842E-15	4.973E-14	1.840E-12	4.958E-11	1.822E-09	4.813E-08	1.654E-06
U-238+D	Pb-210+D	9.999E-01	0.000E+00	1.423E-17	1.138E-15	1.346E-13	9.704E-12	8.486E-10	3.570E-08	1.509E-06

Source Factors for Ingrowth and Decay
Combined Radioactivity and Leaching Factors
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	SF(j,t) = THF(j)*S1(j,t)/S1(i,0) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	9.957E-01	9.870E-01	9.574E-01	8.775E-01	6.468E-01	2.706E-01	1.281E-02
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	3.050E-02	8.809E-02	2.577E-01	5.431E-01	6.463E-01	2.853E-01	1.351E-02
U-234	U-234	1.000E+00	1.000E+00	9.945E-01	9.837E-01	9.466E-01	8.481E-01	5.775E-01	1.926E-01	4.127E-03
U-234	Th-230	1.000E+00	0.000E+00	8.977E-06	2.678E-05	8.759E-05	2.489E-04	6.922E-04	1.320E-03	1.615E-03
U-234	Ra-226+D	1.000E+00	0.000E+00	1.943E-09	1.738E-08	1.887E-07	1.591E-06	1.414E-05	6.990E-05	1.542E-04
U-234	Pb-210+D	1.000E+00	0.000E+00	1.998E-11	5.280E-10	1.814E-08	3.991E-07	7.889E-06	5.671E-05	1.408E-04
U-235+D	U-235+D	1.000E+00	1.000E+00	9.945E-01	9.837E-01	9.466E-01	8.482E-01	5.777E-01	1.928E-01	4.139E-03
U-235+D	Pa-231	1.000E+00	0.000E+00	2.104E-05	6.244E-05	2.003E-04	5.382E-04	1.221E-03	1.220E-03	8.666E-05
U-235+D	Ac-227+D	1.000E+00	0.000E+00	3.305E-07	2.866E-06	2.802E-05	1.790E-04	7.337E-04	8.906E-04	6.730E-05
U-238	U-238	5.400E-05	5.400E-05	5.370E-05	5.312E-05	5.112E-05	4.580E-05	3.120E-05	1.041E-05	2.235E-07
U-238+D	U-238+D	9.999E-01	9.999E-01	9.945E-01	9.836E-01	9.466E-01	8.482E-01	5.777E-01	1.928E-01	4.139E-03
U-238+D	U-234	9.999E-01	0.000E+00	2.819E-06	8.366E-06	2.683E-05	7.213E-05	1.637E-04	1.639E-04	1.172E-05
U-238+D	Th-230	9.999E-01	0.000E+00	1.271E-11	1.136E-10	1.230E-09	1.030E-08	8.921E-08	4.143E-07	8.170E-07
U-238+D	Ra-226+D	9.999E-01	0.000E+00	1.835E-15	4.918E-14	1.773E-12	4.436E-11	1.262E-09	1.653E-08	7.352E-08
U-238+D	Pb-210+D	9.999E-01	0.000E+00	1.418E-17	1.126E-15	1.299E-13	8.726E-12	5.948E-10	1.245E-08	6.654E-08

The effect of volatilization was also considered when computing the source factors for H-3 and C-14.

Parameters Used for Calculating Cover Depth and Contaminated Zone Thicknesses

Cover Erosion rate (vcv): 0.001000 m/yr
Contaminated Zone Erosion rate (vcz): 0.001000 m/yr
Water Table Drop rate (vwt): 0.001000 m/yr
Precipitation rate (Pr): 1.300000 m/yr
Cover Removal Time (Tc): 0.000E+00 yr
Overhead irrigation rate (Irr): 0.200 m/yr
Runoff coefficient (Cr): 0.200
Evapotranspiration coeff. (Ce): 0.500
Infiltration rate (In): 0.620 m/yr
Bulk soil density (rhob): 1.500 g/cm**3
Effective porosity (pe): 0.000

Radio-nuclide (i)	Distribution Coefficient Kd(i),cm**3/g	Leaching Ratio q(i)
Ac-227	2.000000E+01	1.075E-02
Pa-231	5.000000E+01	4.328E-03
Pb-210	1.000000E+02	2.169E-03
Ra-226	7.000000E+01	3.095E-03
Th-230	6.000000E+04	3.623E-06
U-234	5.000000E+01	4.328E-03
U-235	5.000000E+01	4.328E-03
U-238	5.000000E+01	4.328E-03

Time Dependence of Source Geometry

Time Dependence of Cover Depth [Cd(i,t)]

Nuclide (i)	Cd(i,t) (meters) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Pa-231	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Pb-210	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Ra-226	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
Th-230	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U-234	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U-235	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U-238	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Time Dependence of Contaminated Zone Thicknesses [T(i,t)]

Nuclide	T(i,t) (meters)							
(i) t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227	1.5000E+00	1.4990E+00	1.4970E+00	1.4900E+00	1.4700E+00	1.4000E+00	1.2000E+00	5.0000E-01
Pa-231	1.5000E+00	1.4990E+00	1.4970E+00	1.4900E+00	1.4700E+00	1.4000E+00	1.2000E+00	5.0000E-01
Pb-210	1.5000E+00	1.4990E+00	1.4970E+00	1.4900E+00	1.4700E+00	1.4000E+00	1.2000E+00	5.0000E-01
Ra-226	1.5000E+00	1.4990E+00	1.4970E+00	1.4900E+00	1.4700E+00	1.4000E+00	1.2000E+00	5.0000E-01
Th-230	1.5000E+00	1.4990E+00	1.4970E+00	1.4900E+00	1.4700E+00	1.4000E+00	1.2000E+00	5.0000E-01
U-234	1.5000E+00	1.4990E+00	1.4970E+00	1.4900E+00	1.4700E+00	1.4000E+00	1.2000E+00	5.0000E-01
U-235	1.5000E+00	1.4990E+00	1.4970E+00	1.4900E+00	1.4700E+00	1.4000E+00	1.2000E+00	5.0000E-01
U-238	1.5000E+00	1.4990E+00	1.4970E+00	1.4900E+00	1.4700E+00	1.4000E+00	1.2000E+00	5.0000E-01

Occupancy, Cover/Depth, and Area Factors for Ground Pathway

Occupancy Factor (FO1):	0.600
Area (A):	2200. sq. meters
Initial cover depth (Cd):	0.000 meters
Initial contaminated zone thickness (T):	1.500 meters

Time Dependence of Cover/Depth Factor [FCTR_COV_DEPTH(i,t)]

Nuclide	FCTR_COV_DEPTH(i,t) (dimensionless)							
(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
At-218	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Bi-210	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Bi-211	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.998E-01
Bi-214	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.967E-01
Fr-223	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Pa-231	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.998E-01
Pa-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.988E-01
Pa-234m	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.990E-01
Pb-210	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Pb-211	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.993E-01
Pb-214	1.001E+00	1.001E+00	1.001E+00	1.001E+00	1.001E+00	1.001E+00	1.001E+00	1.001E+00
Po-210	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.989E-01
Po-211	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.989E-01
Po-214	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.988E-01
Po-215	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.995E-01
Po-218	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.988E-01
Ra-223	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01
Ra-226	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Rn-219	1.001E+00	1.001E+00	1.001E+00	1.001E+00	1.001E+00	1.001E+00	1.001E+00	1.001E+00
Rn-222	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.994E-01
Th-227	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01
Th-230	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Th-231	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Th-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Tl-207	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.994E-01
Tl-210	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

Time Dependence of Area Factor [FCTR_AREA(i,t)]

Nuclide	FCTR_AREA(i,t) (dimensionless)							
(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227	9.273E-01	9.273E-01	9.273E-01	9.273E-01	9.273E-01	9.273E-01	9.273E-01	9.273E-01
At-218	9.305E-01	9.305E-01	9.305E-01	9.305E-01	9.305E-01	9.305E-01	9.305E-01	9.305E-01
Bi-210	9.104E-01	9.104E-01	9.104E-01	9.104E-01	9.104E-01	9.104E-01	9.104E-01	9.104E-01
Bi-211	9.107E-01	9.107E-01	9.107E-01	9.107E-01	9.107E-01	9.107E-01	9.107E-01	9.107E-01
Bi-214	9.047E-01	9.047E-01	9.047E-01	9.047E-01	9.047E-01	9.047E-01	9.047E-01	9.047E-01
Fr-223	9.160E-01	9.160E-01	9.160E-01	9.160E-01	9.160E-01	9.160E-01	9.160E-01	9.160E-01
Pa-231	9.112E-01	9.112E-01	9.112E-01	9.112E-01	9.112E-01	9.112E-01	9.112E-01	9.112E-01
Pa-234	9.039E-01	9.039E-01	9.039E-01	9.039E-01	9.039E-01	9.039E-01	9.039E-01	9.039E-01
Pa-234m	9.028E-01	9.028E-01	9.028E-01	9.028E-01	9.028E-01	9.028E-01	9.028E-01	9.028E-01
Pb-210	9.383E-01	9.383E-01	9.383E-01	9.383E-01	9.383E-01	9.383E-01	9.383E-01	9.383E-01
Pb-211	9.027E-01	9.027E-01	9.027E-01	9.027E-01	9.027E-01	9.027E-01	9.027E-01	9.027E-01
Pb-214	9.096E-01	9.096E-01	9.096E-01	9.096E-01	9.096E-01	9.096E-01	9.096E-01	9.096E-01
Po-210	9.024E-01	9.024E-01	9.024E-01	9.024E-01	9.024E-01	9.024E-01	9.024E-01	9.024E-01
Po-211	8.971E-01	8.971E-01	8.971E-01	8.971E-01	8.971E-01	8.971E-01	8.971E-01	8.971E-01
Po-214	8.971E-01	8.971E-01	8.971E-01	8.971E-01	8.971E-01	8.971E-01	8.971E-01	8.971E-01
Po-215	9.029E-01	9.029E-01	9.029E-01	9.029E-01	9.029E-01	9.029E-01	9.029E-01	9.029E-01
Po-218	9.025E-01	9.025E-01	9.025E-01	9.025E-01	9.025E-01	9.025E-01	9.025E-01	9.025E-01
Ra-223	9.160E-01	9.160E-01	9.160E-01	9.160E-01	9.160E-01	9.160E-01	9.160E-01	9.160E-01
Ra-226	9.228E-01	9.228E-01	9.228E-01	9.228E-01	9.228E-01	9.228E-01	9.228E-01	9.228E-01
Rn-219	9.107E-01	9.107E-01	9.107E-01	9.107E-01	9.107E-01	9.107E-01	9.107E-01	9.107E-01
Rn-222	8.982E-01	8.982E-01	8.982E-01	8.982E-01	8.982E-01	8.982E-01	8.982E-01	8.982E-01
Th-227	9.197E-01	9.197E-01	9.197E-01	9.197E-01	9.197E-01	9.197E-01	9.197E-01	9.197E-01
Th-230	9.264E-01	9.264E-01	9.264E-01	9.264E-01	9.264E-01	9.264E-01	9.264E-01	9.264E-01
Th-231	9.291E-01	9.291E-01	9.291E-01	9.291E-01	9.291E-01	9.291E-01	9.291E-01	9.291E-01
Th-234	9.286E-01	9.286E-01	9.286E-01	9.286E-01	9.286E-01	9.286E-01	9.286E-01	9.286E-01
Tl-207	9.027E-01	9.027E-01	9.027E-01	9.027E-01	9.027E-01	9.027E-01	9.027E-01	9.027E-01
Tl-210	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	9.356E-01	9.356E-01	9.356E-01	9.356E-01	9.356E-01	9.356E-01	9.356E-01	9.356E-01
U-235	9.225E-01	9.225E-01	9.225E-01	9.225E-01	9.225E-01	9.225E-01	9.225E-01	9.225E-01
U-238	9.700E-01	9.700E-01	9.700E-01	9.700E-01	9.700E-01	9.700E-01	9.700E-01	9.700E-01

Dose Conversion and Environmental Transport Factors for the Ground Pathway (p=1)

Nuclide (i)	DCF(i,1)*	ETFG(i,t) At Time in Years (dimensionless)							
	t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227	4.951E-04	5.564E-01	5.564E-01	5.564E-01	5.564E-01	5.564E-01	5.564E-01	5.564E-01	5.564E-01
At-218	5.847E-03	5.583E-01	5.583E-01	5.583E-01	5.583E-01	5.583E-01	5.583E-01	5.583E-01	5.583E-01
Bi-210	3.606E-03	5.463E-01	5.463E-01	5.463E-01	5.463E-01	5.463E-01	5.463E-01	5.463E-01	5.462E-01
Bi-211	2.559E-01	5.464E-01	5.464E-01	5.464E-01	5.464E-01	5.464E-01	5.464E-01	5.464E-01	5.463E-01
Bi-214	9.808E+00	5.428E-01	5.428E-01	5.428E-01	5.428E-01	5.428E-01	5.428E-01	5.428E-01	5.410E-01
Fr-223	1.980E-01	5.496E-01	5.496E-01	5.496E-01	5.496E-01	5.496E-01	5.496E-01	5.496E-01	5.496E-01
Pa-231	1.906E-01	5.467E-01	5.467E-01	5.467E-01	5.467E-01	5.467E-01	5.467E-01	5.467E-01	5.466E-01
Pa-234	1.155E+01	5.423E-01	5.423E-01	5.423E-01	5.423E-01	5.423E-01	5.423E-01	5.423E-01	5.417E-01
Pa-234m	8.967E-02	5.417E-01	5.417E-01	5.417E-01	5.417E-01	5.417E-01	5.417E-01	5.417E-01	5.411E-01
Pb-210	2.447E-03	5.630E-01	5.630E-01	5.630E-01	5.630E-01	5.630E-01	5.630E-01	5.630E-01	5.630E-01
Pb-211	3.064E-01	5.416E-01	5.416E-01	5.416E-01	5.416E-01	5.416E-01	5.416E-01	5.416E-01	5.413E-01
Pb-214	1.341E+00	5.463E-01	5.463E-01	5.463E-01	5.463E-01	5.463E-01	5.463E-01	5.463E-01	5.462E-01
Po-210	5.231E-05	5.415E-01	5.415E-01	5.415E-01	5.415E-01	5.415E-01	5.415E-01	5.415E-01	5.409E-01
Po-211	4.764E-02	5.382E-01	5.382E-01	5.382E-01	5.382E-01	5.382E-01	5.382E-01	5.382E-01	5.377E-01
Po-214	5.138E-04	5.382E-01	5.382E-01	5.382E-01	5.382E-01	5.382E-01	5.382E-01	5.382E-01	5.376E-01
Po-215	1.016E-03	5.418E-01	5.418E-01	5.418E-01	5.418E-01	5.418E-01	5.418E-01	5.418E-01	5.415E-01
Po-218	5.642E-05	5.415E-01	5.415E-01	5.415E-01	5.415E-01	5.415E-01	5.415E-01	5.415E-01	5.408E-01
Ra-223	6.034E-01	5.496E-01	5.496E-01	5.496E-01	5.496E-01	5.496E-01	5.496E-01	5.496E-01	5.496E-01
Ra-226	3.176E-02	5.537E-01	5.537E-01	5.537E-01	5.537E-01	5.537E-01	5.537E-01	5.537E-01	5.537E-01
Rn-219	3.083E-01	5.469E-01	5.469E-01	5.469E-01	5.469E-01	5.469E-01	5.469E-01	5.469E-01	5.468E-01
Rn-222	2.354E-03	5.389E-01	5.389E-01	5.389E-01	5.389E-01	5.389E-01	5.389E-01	5.389E-01	5.386E-01
Th-227	5.212E-01	5.518E-01	5.518E-01	5.518E-01	5.518E-01	5.518E-01	5.518E-01	5.518E-01	5.517E-01
Th-230	1.209E-03	5.558E-01	5.558E-01	5.558E-01	5.558E-01	5.558E-01	5.558E-01	5.558E-01	5.558E-01
Th-231	3.643E-02	5.574E-01	5.574E-01	5.574E-01	5.574E-01	5.574E-01	5.574E-01	5.574E-01	5.574E-01
Th-234	2.410E-02	5.572E-01	5.572E-01	5.572E-01	5.572E-01	5.572E-01	5.572E-01	5.572E-01	5.572E-01
Tl-207	1.980E-02	5.416E-01	5.416E-01	5.416E-01	5.416E-01	5.416E-01	5.416E-01	5.416E-01	5.413E-01
Tl-210	0.000E+00	6.000E-01	6.000E-01	6.000E-01	6.000E-01	6.000E-01	6.000E-01	6.000E-01	6.000E-01
U-234	4.017E-04	5.614E-01	5.614E-01	5.614E-01	5.614E-01	5.614E-01	5.614E-01	5.614E-01	5.614E-01
U-235	7.211E-01	5.535E-01	5.535E-01	5.535E-01	5.535E-01	5.535E-01	5.535E-01	5.535E-01	5.535E-01
U-238	1.031E-04	5.820E-01	5.820E-01	5.820E-01	5.820E-01	5.820E-01	5.820E-01	5.820E-01	5.820E-01

* - Units are (mrem/yr)/(pCi/g) at infinite depth and area. Multiplication by ETFG(i,t) converts to site conditions.

Dose/Source Ratios for External Radiation from the Ground (p=1)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,1,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	6.062E+00	6.036E+00	5.984E+00	5.804E+00	5.320E+00	3.921E+00	1.640E+00	7.743E-02
Ra-226+D	Pb-210+D	1.000E+00	5.180E-05	1.528E-04	3.435E-04	9.051E-04	1.848E-03	2.179E-03	9.609E-04	4.550E-05
Ra-226+D	∑DSR(j)		6.062E+00	6.036E+00	5.984E+00	5.805E+00	5.321E+00	3.923E+00	1.641E+00	7.748E-02
U-234	U-234	1.000E+00	2.249E-04	2.237E-04	2.212E-04	2.129E-04	1.907E-04	1.299E-04	4.332E-05	9.282E-07
U-234	Th-230	1.000E+00	3.019E-09	9.035E-09	2.097E-08	6.172E-08	1.698E-07	4.669E-07	8.879E-07	1.085E-06
U-234	Ra-226+D	1.000E+00	3.939E-09	2.750E-08	1.444E-07	1.263E-06	9.976E-06	8.661E-05	4.255E-04	9.340E-04
U-234	Pb-210+D	1.000E+00	1.690E-14	2.512E-13	2.870E-12	7.067E-11	1.409E-09	2.692E-08	1.919E-07	4.753E-07
U-234	∑DSR(j)		2.249E-04	2.237E-04	2.214E-04	2.142E-04	2.009E-04	2.170E-04	4.699E-04	9.365E-04
U-235+D	U-235+D	1.000E+00	4.183E-01	4.160E-01	4.115E-01	3.960E-01	3.548E-01	2.416E-01	8.064E-02	1.731E-03
U-235+D	Pa-231	1.000E+00	1.098E-06	3.279E-06	7.569E-06	2.185E-05	5.686E-05	1.275E-04	1.270E-04	9.009E-06
U-235+D	Ac-227+D	1.000E+00	1.221E-07	8.409E-07	4.287E-06	3.378E-05	2.023E-04	8.121E-04	9.812E-04	7.404E-05
U-235+D	∑DSR(j)		4.183E-01	4.160E-01	4.115E-01	3.960E-01	3.551E-01	2.426E-01	8.175E-02	1.814E-03
U-238	U-238	5.400E-05	3.232E-09	3.214E-09	3.179E-09	3.059E-09	2.741E-09	1.867E-09	6.230E-10	1.338E-11
U-238+D	U-238+D	9.999E-01	8.239E-02	8.194E-02	8.104E-02	7.799E-02	6.988E-02	4.759E-02	1.588E-02	3.407E-04
U-238+D	U-234	9.999E-01	3.185E-10	9.507E-10	2.195E-09	6.336E-09	1.649E-08	3.701E-08	3.692E-08	2.636E-09
U-238+D	Th-230	9.999E-01	2.850E-15	1.989E-14	1.044E-13	9.104E-13	7.139E-12	6.045E-11	2.789E-10	5.491E-10
U-238+D	Ra-226+D	9.999E-01	2.790E-15	4.171E-14	4.831E-13	1.248E-11	2.827E-10	7.768E-09	1.007E-07	4.455E-07
U-238+D	Pb-210+D	9.999E-01	9.588E-21	2.948E-19	7.289E-18	5.328E-16	3.134E-14	2.041E-12	4.220E-11	2.247E-10
U-238+D	∑DSR(j)		8.239E-02	8.194E-02	8.104E-02	7.799E-02	6.988E-02	4.759E-02	1.588E-02	3.412E-04

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Inhalation Pathway, Excluding Radon (p=2)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,2,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	2.031E-04	2.022E-04	2.004E-04	1.944E-04	1.782E-04	1.313E-04	5.494E-05	2.601E-06
Ra-226+D	Pb-210+D	1.000E+00	8.428E-06	2.486E-05	5.589E-05	1.473E-04	3.007E-04	3.545E-04	1.563E-04	7.403E-06
Ra-226+D	∑DSR(j)		2.115E-04	2.270E-04	2.563E-04	3.416E-04	4.789E-04	4.858E-04	2.113E-04	1.000E-05
U-234	U-234	1.000E+00	3.117E-03	3.100E-03	3.066E-03	2.950E-03	2.644E-03	1.800E-03	6.004E-04	1.286E-05
U-234	Th-230	1.000E+00	3.468E-08	1.038E-07	2.409E-07	7.089E-07	1.951E-06	5.363E-06	1.020E-05	1.246E-05
U-234	Ra-226+D	1.000E+00	1.319E-13	9.210E-13	4.837E-12	4.230E-11	3.341E-10	2.901E-09	1.425E-08	3.137E-08
U-234	Pb-210+D	1.000E+00	2.750E-15	4.087E-14	4.670E-13	1.150E-11	2.293E-10	4.380E-09	3.122E-08	7.732E-08
U-234	∑DSR(j)		3.117E-03	3.100E-03	3.066E-03	2.951E-03	2.646E-03	1.805E-03	6.106E-04	2.544E-05
U-235+D	U-235+D	1.000E+00	2.904E-03	2.889E-03	2.857E-03	2.749E-03	2.464E-03	1.678E-03	5.599E-04	1.202E-05
U-235+D	Pa-231	1.000E+00	3.195E-07	9.537E-07	2.201E-06	6.355E-06	1.654E-05	3.709E-05	3.693E-05	2.620E-06
U-235+D	Ac-227+D	1.000E+00	1.762E-08	1.214E-07	6.189E-07	4.877E-06	2.921E-05	1.172E-04	1.417E-04	1.069E-05
U-235+D	∑DSR(j)		2.905E-03	2.890E-03	2.860E-03	2.761E-03	2.509E-03	1.832E-03	7.385E-04	2.533E-05
U-238	U-238	5.400E-05	1.505E-07	1.496E-07	1.480E-07	1.424E-07	1.276E-07	8.692E-08	2.901E-08	6.228E-10
U-238+D	U-238+D	9.999E-01	2.787E-03	2.772E-03	2.741E-03	2.638E-03	2.364E-03	1.610E-03	5.373E-04	1.154E-05
U-238+D	U-234	9.999E-01	4.414E-09	1.318E-08	3.042E-08	8.782E-08	2.286E-07	5.129E-07	5.117E-07	3.654E-08
U-238+D	Th-230	9.999E-01	3.274E-14	2.285E-13	1.199E-12	1.046E-11	8.200E-11	6.943E-10	3.204E-09	6.307E-09
U-238+D	Ra-226+D	9.999E-01	9.345E-20	1.397E-18	1.618E-17	4.178E-16	9.470E-15	2.602E-13	3.374E-12	1.496E-11
U-238+D	Pb-210+D	9.999E-01	1.560E-21	4.796E-20	1.186E-18	8.669E-17	5.099E-15	3.320E-13	6.865E-12	3.656E-11
U-238+D	∑DSR(j)		2.787E-03	2.772E-03	2.742E-03	2.638E-03	2.364E-03	1.611E-03	5.378E-04	1.158E-05

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Pathway Factors for the Inhalation Pathway (radon excluded)

Area (A):	2.2000E+03 m**2	Occupancy Factor (FO2):	4.5000E-01
Area Factor (FA2):	6.2640E-02	Annual Air Intake (F12):	8.4000E+03 m**3/yr
Cover Depth [Cd(0)]:	0.0000E+00 m	Mass Loading (ASR2):	1.0000E-04 g/m**3
Contaminated Zone Thickness [T(0)]:	1.5000E+00 m	FA2 * FO2 * F12 * ASR2:	2.3678E-02 g/yr

Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Depth Factor [FD(i,2,t)] (dimensionless)								
Ra-226	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
U-234	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
U-235	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
U-238	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00

Dose Conversion and Environmental Transport Factors for the Inhalation Pathway, Excluding Radon (p=2)

Parent (i)	Product (j)	DCF(j,2)*	ETF(j,2,t) At Time in Years (g/yr)							
			0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	8.594E-03	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02
Ra-226+D	Pb-210+D	2.320E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02
U-234	U-234	1.320E-01	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02
U-234	Th-230	3.260E-01	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02
U-234	Ra-226+D	8.594E-03	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02
U-234	Pb-210+D	2.320E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02
U-235+D	U-235+D	1.230E-01	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02
U-235+D	Pa-231	1.280E+00	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02
U-235+D	Ac-227+D	6.724E+00	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02
U-238	U-238	1.180E-01	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02
U-238+D	U-238+D	1.180E-01	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02
U-238+D	U-234	1.320E-01	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02
U-238+D	Th-230	3.260E-01	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02
U-238+D	Ra-226+D	8.594E-03	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02
U-238+D	Pb-210+D	2.320E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02	2.368E-02

* - The dose conversion factor units are mrem/pCi.

Parameters Used for Calculating Indoor and Outdoor Radon Flux

	*Floor Material	Cover Material	Contaminated Zone
Radon Diffusion Coefficient (m**2/s)	3.000E-07	2.000E-06	2.000E-06
Total Porosity	1.000E-01	4.000E-01	4.000E-01
Volumetric Water Content	3.000E-02	5.000E-02	3.260E-01
Bulk Density (g/cm**3)	2.400E+00	1.500E+00	1.500E+00
Rn-222 Emanation Coefficient	2.500E-01	2.500E-01	2.500E-01
Initial Thickness (m)	1.500E-01	0.000E+00	1.500E+00

Building Depth Below Ground Surface *(DMFL): -1.000E+00 (m)
Negative DMFL shows building depth adjusted (if necessary) for no penetration
of contaminated zone. Actual values used *(DMFLACT), m:

t=	0.0000E+00	1.0000E+00	3.0000E+00	1.0000E+01	3.0000E+01	1.0000E+02	3.0000E+02	1.0000E+03
DMFLACT=	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Building indoor area factor *(FAI): 0.000E+00
FAI <= 0.0 shows calculated time-dependent value based on amount of wall area
extending into the contaminated zone. Actual values used *(FAIACT):

t=	0.0000E+00	1.0000E+00	3.0000E+00	1.0000E+01	3.0000E+01	1.0000E+02	3.0000E+02	1.0000E+03
FAIACT =	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

* - Parameters are used only for indoor radon flux

Time Dependence of Outdoor Radon Flux [FLUXO(i,t)]

Nuclide (i)	FLUXO(i,t) (pCi/m**2/s) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U-234	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U-238	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Time Dependence of Indoor Radon Flux [FLUXI(i,t)]

Nuclide (i)	FLUXI(i,t) (pCi/m**2/s) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U-234	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U-238	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Parameters Used for Calculating Indoor and Outdoor Radon Concentration

Radon Vertical Dimension of Mixing (HMIX): 2.000E+00 (m)
Average Annual Wind Speed (WIND): 4.500E+00 (m/sec)
Building Room Height (HRM): 2.500E+00 (m)
Building Air Exchange Rate (REXG): 5.000E-01 (1/hr)

Time Dependence of Outdoor Radon Concentration [CRNO(i,t)]

Nuclide		CRNO(i,t) (pCi/m**3)							
(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U-234	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U-238	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Time Dependence of Indoor Radon Concentration [HCONC(i,r)]

Nuclide		HCONC(i,t) (pCi/m**3)							
(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U-234	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U-238	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Outdoor Working Levels of Radon [WLOTD(i,t)]

Nuclide		WLOTD(i,t) (WL)							
(i)	t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226		0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U-234		0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U-238		0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Indoor Working Levels of Radon [WLIND(i,t)]

Nuclide		WLIND(i,t) (WL)							
(i)	t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226		0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U-234		0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
U-238		0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

Fraction of Time Spent Outdoors (FOTD): 2.500E-01
Fraction of Time Spent Indoors (FIND): 5.000E-01

Dose/Source Ratios for Radon Pathway (p=9)
Subpathway: Outdoor and Indoor Radon Flux
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,9,t) - DSRRNW(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Radon Pathway (p=9)
Subpathway: Indoor Radon from Water Usage
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSRRNW(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Transport Time Parameters for Unsaturated Zone Stratum No. 1

Stratum thickness [h(1)]:	4.000000 m
Bulk soil material density [rhob(1)]:	1.500000 g/cm**3
Effective porosity [peuz(1)]:	0.200000
Hydraulic conductivity [Khuz(1)]:	10.000000 m/yr
Total porosity [ptuz(1)]:	0.400000
Soil specific b parameter [buz(1)]:	5.300000
Saturation ratio [sruz(1)]:	0.815089

Radio-nuclide (i)	Distribution Coefficient Kduz(i,1), cm**3/g	Retardation Factor Rduz(i,1)	Transport Time Dtuz(i,1), yr
Ac-227	2.0000E+01	9.3014E+01	9.7826E+01
Pa-231	5.0000E+01	2.3104E+02	2.4299E+02
Pb-210	1.0000E+02	4.6107E+02	4.8492E+02
Ra-226	7.0000E+01	3.2305E+02	3.3976E+02
Th-230	6.0000E+04	2.7604E+05	2.9032E+05
U-234	5.0000E+01	2.3104E+02	2.4299E+02
U-235	5.0000E+01	2.3104E+02	2.4299E+02
U-238	5.0000E+01	2.3104E+02	2.4299E+02

Transport Time Parameters for Unsaturated Zone created by the Falling Water Table

Water table drop rate [vwt]:	0.001000 m/yr
Bulk soil material density [rhobaq]:	1.500000 g/cm**3
Effective porosity [peaq]:	0.200000
Hydraulic conductivity [Khaq]:	100.000000 m/yr
Total porosity [ptaq]:	0.400000
Soil specific b parameter [baq]:	5.300000
Saturation ratio [sruaq]:	0.688139

Radio-nuclide (i)	Distribution Coefficient Kdaq(i), cm**3/g	Retardation Factor Rduaq(i)	Minimum Transport Time Dtuaq(i), yr
Ac-227	2.0000E+01	1.0999E+02	2.4482E+00
Pa-231	5.0000E+01	2.7347E+02	1.5704E+01
Pb-210	1.0000E+02	5.4595E+02	6.6872E+01
Ra-226	7.0000E+01	3.8246E+02	3.1522E+01
Th-230	6.0000E+04	3.2697E+05	Infinite
U-234	5.0000E+01	2.7347E+02	1.5704E+01
U-235	5.0000E+01	2.7347E+02	1.5704E+01
U-238	5.0000E+01	2.7347E+02	1.5704E+01

Dilution Factor and Rise Time Parameters for Nondispersion (ND) Model

Aquifer contamination depth at well (z):	2.17000E+01	m
Depth of water intake below water table (dw):	1.00000E+01	m
Infiltration rate (In):	6.20000E-01	m/yr
Aquifer water flow rate (Vwfr):	2.00000E+00	m/yr
Hydraulic gradient (J):	2.00000E-02	
Hydraulic conductivity of aquifer (Kszh):	1.00000E+02	m/yr
Contaminated zone extent parallel to gradient (l):	7.00000E+01	m
Distance below contaminated zone to water table (h):	0.40000E+01	m
Initial thickness of uncontaminated cover (Cd):	0.00000E+00	m
Initial thickness of contaminated zone (T):	0.15000E+01	m
Effective porosity of saturated zone (pesz):	0.20000E+00	

Radio-nuclide (i)	Dilution Factor f(i)	Retardation Factor Rdsz(i)	Horizontal Transport Time Onsite Tauh(i), yr	Rise Time dt(i), yr	Decay Time Parameter 1/lamda(i),yr
Ac-227	1.000E+00	7.600E+01	5.320E+02	2.452E+02	3.141E+01
Pa-231	1.000E+00	1.885E+02	1.320E+03	6.081E+02	4.726E+04
Pb-210	1.000E+00	3.760E+02	2.632E+03	1.213E+03	3.217E+01
Ra-226	1.000E+00	2.635E+02	1.845E+03	8.500E+02	2.308E+03
Th-230	1.000E+00	2.250E+05	1.575E+06	7.258E+05	1.111E+05
U-234	1.000E+00	1.885E+02	1.320E+03	6.081E+02	3.527E+05
U-235	1.000E+00	1.885E+02	1.320E+03	6.081E+02	1.015E+09
U-238	1.000E+00	1.885E+02	1.320E+03	6.081E+02	6.446E+09

Primary Parameters Used for Calculating Water/Soil
Concentration Ratios for Groundwater Pathway Segment

Model used: Nondispersion (ND)
Bulk soil density in contaminated zone (rhob): 1.500 g/cm**3

Radio-nuclide (i)	Dilution Factor f(i)	Retardation Factor Rdcz(i)	Breakthrough Time Chain year	Breakthrough Time Single Nuclide Dt(i), yr	Rise Time dt(i), yr
Ac-227	1.000E+00	9.301E+01	1.003E+02	1.003E+02	2.452E+02
Pa-231	1.000E+00	2.310E+02	2.587E+02	2.587E+02	6.081E+02
Pb-210	1.000E+00	4.611E+02	2.587E+02	5.518E+02	1.213E+03
Ra-226	1.000E+00	3.231E+02	2.587E+02	3.713E+02	8.500E+02
Th-230	1.000E+00	2.760E+05	2.587E+02	Infinite	7.258E+05
U-234	1.000E+00	2.310E+02	2.587E+02	2.587E+02	6.081E+02
U-235	1.000E+00	2.310E+02	2.587E+02	2.587E+02	6.081E+02
U-238	1.000E+00	2.310E+02	2.587E+02	2.587E+02	6.081E+02

Water/Soil Concentration Ratios [WSR(j,1,t)] for Groundwater Pathway Segment

Parent (i)	Product (j)	Thread Fraction	WSR(j,1,t) At Time in Years (pCi/L)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.169E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.535E+00
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.129E+00	2.952E+00
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.719E-07	2.046E-05
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.899E-06	4.165E-03
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.179E-07	2.759E-03
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.130E+00	2.960E+00
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.152E-03	6.197E-02
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.798E-02	1.157E-01
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.103E-05	1.599E-04
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.130E+00	2.960E+00
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.608E-04	8.380E-03
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.503E-10	4.050E-08
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.485E-08	4.908E-06
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.813E-09	3.146E-06

Water/Soil Concentration Ratios [WSR(j,2,t)] for Surface Water Pathway Segment

Watershed Area (Aw) = 1.0000E+06 m**2
Contaminated Zone Area (A) = 2.2000E+03 m**2
Dilution Factor (f') = 2.2000E-03
Soil Density (rhob) = 1.5000E+00 kg/m**3

Parent (i)	Product (j)	Thread Fraction	WSR(j,2,t) At Time in Years (pCi/L)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.772E-03
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.377E-03
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.484E-03	6.494E-03
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.781E-10	4.502E-08
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.377E-09	9.164E-06
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.799E-09	6.069E-06
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.487E-03	6.512E-03
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.573E-05	1.363E-04
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.155E-05	2.546E-04
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.343E-07	3.517E-07
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.486E-03	6.512E-03
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.114E-06	1.844E-05
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.307E-13	8.910E-11
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.267E-11	1.080E-08
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.159E-11	6.921E-09

Storage Times For Contaminated Foodstuffs

k	Food Item	STOR_T(k), days
1	non-leafy plants	14.
2	leafy plants	1.
3	milk	1.
4	meat	20.
5	fish	7.
6	crustacea	7.
7	well water	1.
8	surface water	1.
9	livestock fodder	45.

Storage Time Ingrowth and Decay Factors
Storage Time for k'th Foodstuff: t = STOR_T(k), days

Parent (i)	Product (j)	Thread Fraction	STOR_ID(i,j,t) = CONCE(i,j,t)/CONCE(i,i,0) t= 1.400E+01	1.000E+00	1.000E+00	2.000E+01	7.000E+00	7.000E+00	1.000E+00	1.000E+00	4.500E+01
Ac-227	Ac-227	1.000E+00	9.988E-01	9.999E-01	9.999E-01	9.983E-01	9.994E-01	9.994E-01	9.999E-01	9.999E-01	9.961E-01
Pa-231	Pa-231	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Pa-231	Ac-227	1.000E+00	1.219E-03	8.716E-05	8.716E-05	1.742E-03	6.099E-04	6.099E-04	8.716E-05	8.716E-05	3.915E-03
Pb-210	Pb-210	1.000E+00	9.988E-01	9.999E-01	9.999E-01	9.983E-01	9.994E-01	9.994E-01	9.999E-01	9.999E-01	9.962E-01
Ra-226	Ra-226	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01
Ra-226	Pb-210	1.000E+00	1.191E-03	8.510E-05	8.510E-05	1.701E-03	5.955E-04	5.955E-04	8.510E-05	8.510E-05	3.822E-03
Th-230	Th-230	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Th-230	Ra-226	1.000E+00	1.661E-05	1.186E-06	1.186E-06	2.372E-05	8.303E-06	8.303E-06	1.186E-06	1.186E-06	5.337E-05
Th-230	Pb-210	1.000E+00	9.888E-09	5.047E-11	5.047E-11	2.018E-08	2.472E-09	2.472E-09	5.047E-11	5.047E-11	1.021E-07
U-234	U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Th-230	1.000E+00	3.450E-07	2.465E-08	2.465E-08	4.929E-07	1.725E-07	1.725E-07	2.465E-08	2.465E-08	1.109E-06
U-234	Ra-226	1.000E+00	2.865E-12	1.462E-14	1.462E-14	5.846E-12	7.162E-13	7.162E-13	1.462E-14	1.462E-14	2.960E-11
U-234	Pb-210	1.000E+00	1.137E-15	4.146E-19	4.146E-19	3.315E-15	1.422E-16	1.422E-16	4.146E-19	4.146E-19	3.774E-14
U-235	U-235	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235	Pa-231	1.000E+00	8.110E-07	5.793E-08	5.793E-08	1.159E-06	4.055E-07	4.055E-07	5.793E-08	5.793E-08	2.607E-06
U-235	Ac-227	1.000E+00	4.946E-10	2.524E-12	2.524E-12	1.009E-09	1.237E-10	1.237E-10	2.524E-12	2.524E-12	5.105E-09
U-238	U-238	5.400E-05	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238	U-238	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238	U-234	1.000E+00	1.087E-07	7.762E-09	7.762E-09	1.552E-07	5.433E-08	5.433E-08	7.762E-09	7.762E-09	3.493E-07
U-238	Th-230	1.000E+00	1.875E-14	9.565E-17	9.565E-17	3.826E-14	4.687E-15	4.687E-15	9.565E-17	9.565E-17	1.937E-13
U-238	Ra-226	1.000E+00	1.038E-19	3.782E-23	3.782E-23	3.025E-19	1.297E-20	1.297E-20	3.782E-23	3.782E-23	3.446E-18
U-238	Pb-210	1.000E+00	3.090E-23	8.045E-28	8.045E-28	1.287E-22	1.931E-24	1.931E-24	8.045E-28	8.045E-28	3.296E-21

CONCE(i,j,t)/CONCE(i,i,0) is the concentration ratio of Product(j) at time t to Parent(i) at start of storage time.

Storage Time Correction Factors
Drinking Water from Well and/or Surface
Harvest Time = t - 2.74E-03 yr; Consumption Time = t yr

Parent (i)	Product (j)	Thread Fraction	CFWW(j,t,1)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Th-230	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.162E+00	1.004E+00
U-234	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	U-235+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Pa-231	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Ac-227+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01	1.000E+00
U-238	U-238	5.400E-05	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-238+D	U-238+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-238+D	U-234	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-238+D	Th-230	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.158E+00	1.005E+00
J-238+D	Ra-226+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-238+D	Pb-210+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors
Irrigation Water for Nonleafy Plants from Well and/or Surface
Harvest Time = t - 4.11E-02 yr; Consumption Time = t - 3.83E-02 yr

Parent (i)	Product (j)	Thread Fraction	CFWW(j,t,2)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Th-230	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.162E+00	1.004E+00
U-234	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	U-235+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Pa-231	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Ac-227+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01	1.000E+00
U-238	U-238	5.400E-05	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-238+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-234	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Th-230	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.166E+00	1.005E+00
U-238+D	Ra-226+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Pb-210+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors

Irrigation Water for Leafy Plants from Well and/or Surface

Harvest Time = t - 5.48E-03 yr; Consumption Time = t - 2.74E-03 yr

Parent (i)	Product (j)	Thread Fraction	CFWW(j,t,3)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-234	U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-234	Th-230	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.162E+00	1.004E+00
J-234	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-234	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-235+D	U-235+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-235+D	Pa-231	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-235+D	Ac-227+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01	1.000E+00
J-238	U-238	5.400E-05	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-238+D	U-238+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-238+D	U-234	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-238+D	Th-230	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.159E+00	1.005E+00
J-238+D	Ra-226+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-238+D	Pb-210+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors
Irrigation Water for Livestock (Milk) Fodder from Well and/or Surface
Harvest Time = t - 1.29E-01 yr; Consumption Time = t - 1.26E-01 yr

Parent (i)	Product (j)	Thread Fraction	CFWW(j,t,5)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Th-230	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.163E+00	1.004E+00
U-234	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	U-235+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Pa-231	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Ac-227+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01	1.000E+00
U-238	U-238	5.400E-05	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-238+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-234	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Th-230	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.170E+00	1.005E+00
U-238+D	Ra-226+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Pb-210+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors
Irrigation Water for Livestock (Meat) Fodder from Well and/or Surface
Harvest Time = t - 1.81E-01 yr; Consumption Time = t - 1.78E-01 yr

Parent (i)	Product (j)	Thread Fraction	CFWW(j,t,7)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Th-230	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.163E+00	1.004E+00
U-234	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	U-235+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Pa-231	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Ac-227+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01	1.000E+00
U-238	U-238	5.400E-05	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-238+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-234	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Th-230	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.178E+00	1.005E+00
U-238+D	Ra-226+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Pb-210+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors
Livestock (Milk) Water from Well and/or Surface
Harvest Time = t - 5.48E-03 yr; Consumption Time = t - 2.74E-03 yr

Parent (i)	Product (j)	Thread Fraction	CFWW(j,t,4)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Th-230	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.162E+00	1.004E+00
U-234	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	U-235+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Pa-231	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Ac-227+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01	1.000E+00
U-238	U-238	5.400E-05	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-238+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-234	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Th-230	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.159E+00	1.005E+00
U-238+D	Ra-226+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Pb-210+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors
Livestock (Meat) Water from Well and/or Surface
Harvest Time = t - 5.75E-02 yr; Consumption Time = t - 5.48E-02 yr

Parent (i)	Product (j)	Thread Fraction	CFWW(j,t,6)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Th-230	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.162E+00	1.004E+00
U-234	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	U-235+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Pa-231	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Ac-227+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01	1.000E+00
U-238	U-238	5.400E-05	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-238+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-234	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Th-230	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.168E+00	1.005E+00
U-238+D	Ra-226+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Pb-210+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors for Nonleafy Plants
Harvest Time = t - 3.83E-02 yr; Consumption Time = t yr

Parent (i)	Product (j)	Thread Fraction	CF3(j,1,t)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.001E+00
U-234	U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Th-230	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	2.954E+00	1.050E+00
U-234	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.003E+00	1.001E+00
U-235+D	U-235+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Pa-231	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Ac-227+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.991E-01	9.994E-01
U-238	U-238	5.400E-05	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-238+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-234	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Th-230	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	2.994E+00	1.071E+00
U-238+D	Ra-226+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Pb-210+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.001E+00	1.001E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors for Leafy Plants
Harvest Time = t - 2.74E-03 yr; Consumption Time = t yr

Parent (i)	Product (j)	Thread Fraction	CF3(j,2,t)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Th-230	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.139E+00	1.004E+00
U-234	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	U-235+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Pa-231	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Ac-227+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01	1.000E+00
U-238	U-238	5.400E-05	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

Storage Time Correction Factors for Leafy Plants
Harvest Time = t - 2.74E-03 yr; Consumption Time = t yr

Parent (i)	Product (j)	Thread Fraction	CF3(j,2,t)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
U-238+D	U-238+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-234	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Th-230	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.137E+00	1.005E+00
U-238+D	Ra-226+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Pb-210+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors for Livestock (Meat) Fodder
Harvest Time = t - 1.78E-01 yr; Consumption Time = t - 5.48E-02 yr

Parent (i)	Product (j)	Thread Fraction	CFLF(j,1,t)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.602E+00	1.178E+00	1.054E+00	1.021E+00	1.011E+00	1.011E+00	1.002E+00
J-234	U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-234	Th-230	1.000E+00	1.000E+00	1.373E+00	1.108E+00	1.030E+00	1.009E+00	1.002E+00	1.002E+00	1.006E+00
J-234	Ra-226+D	1.000E+00	1.000E+00	1.009E+00	1.002E+00	1.001E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-234	Pb-210+D	1.000E+00	1.000E+00	2.809E+00	1.531E+00	1.158E+00	1.057E+00	1.024E+00	1.015E+00	1.003E+00
J-235+D	U-235+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-235+D	Pa-231	1.000E+00	1.000E+00	1.037E+00	1.011E+00	1.003E+00	1.001E+00	1.000E+00	1.000E+00	1.000E+00
J-235+D	Ac-227+D	1.000E+00	1.000E+00	2.228E+00	1.360E+00	1.110E+00	1.043E+00	1.022E+00	9.979E-01	9.982E-01
J-238	U-238	5.400E-05	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-238+D	U-238+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-238+D	U-234	9.999E-01	1.000E+00	1.150E+00	1.044E+00	1.013E+00	1.004E+00	1.001E+00	1.000E+00	1.000E+00
J-238+D	Th-230	9.999E-01	1.000E+00	1.803E+00	1.222E+00	1.062E+00	1.020E+00	1.005E+00	1.006E+00	1.032E+00
J-238+D	Ra-226+D	9.999E-01	1.000E+00	1.016E+00	1.004E+00	1.001E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01
J-238+D	Pb-210+D	9.999E-01	1.000E+00	3.417E+00	1.706E+00	1.208E+00	1.074E+00	1.029E+00	1.016E+00	1.003E+00

Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors for Livestock (Milk) Fodder
Harvest Time = t - 1.26E-01 yr; Consumption Time = t - 2.74E-03 yr

Parent (i)	Product (j)	Thread Fraction	CFLF(j,2,t)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01	9.999E-01
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.566E+00	1.175E+00	1.054E+00	1.021E+00	1.011E+00	1.011E+00	1.002E+00
U-234	U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Th-230	1.000E+00	1.000E+00	1.351E+00	1.106E+00	1.030E+00	1.009E+00	1.002E+00	1.002E+00	1.006E+00
U-234	Ra-226+D	1.000E+00	1.000E+00	1.008E+00	1.002E+00	1.001E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Pb-210+D	1.000E+00	1.000E+00	2.702E+00	1.521E+00	1.157E+00	1.057E+00	1.024E+00	1.015E+00	1.003E+00
U-235+D	U-235+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Pa-231	1.000E+00	1.000E+00	1.035E+00	1.011E+00	1.003E+00	1.001E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Ac-227+D	1.000E+00	1.000E+00	2.154E+00	1.353E+00	1.109E+00	1.043E+00	1.022E+00	9.979E-01	9.982E-01
U-238	U-238	5.400E-05	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-238+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-234	9.999E-01	1.000E+00	1.141E+00	1.043E+00	1.012E+00	1.004E+00	1.001E+00	1.000E+00	1.000E+00
U-238+D	Th-230	9.999E-01	1.000E+00	1.752E+00	1.218E+00	1.062E+00	1.020E+00	1.005E+00	1.006E+00	1.032E+00
U-238+D	Ra-226+D	9.999E-01	1.000E+00	1.014E+00	1.004E+00	1.001E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01
U-238+D	Pb-210+D	9.999E-01	1.000E+00	3.273E+00	1.694E+00	1.207E+00	1.074E+00	1.029E+00	1.015E+00	1.003E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors for Meat
Harvest Time = t - 5.48E-02 yr; Consumption Time = t yr

Parent (i)	Product (j)	Thread Fraction	CF45(j,1,t)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.161E+00	1.060E+00	1.019E+00	1.008E+00	1.004E+00	1.004E+00	1.001E+00
U-234	U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Th-230	1.000E+00	1.000E+00	1.226E+00	1.073E+00	1.021E+00	1.007E+00	1.002E+00	1.001E+00	1.001E+00
U-234	Ra-226+D	1.000E+00	1.000E+00	1.003E+00	1.001E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Pb-210+D	1.000E+00	1.000E+00	1.319E+00	1.149E+00	1.054E+00	1.021E+00	1.009E+00	1.005E+00	1.002E+00
U-235+D	U-235+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Pa-231	1.000E+00	1.000E+00	1.002E+00	1.001E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Ac-227+D	1.000E+00	1.000E+00	4.251E+01	1.671E+01	6.362E+00	3.283E+00	2.268E+00	1.213E+00	1.233E+00
U-238	U-238	5.400E-05	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00

Storage Time Correction Factors for Meat
Harvest Time = t - 5.48E-02 yr; Consumption Time = t yr

Parent (i)	Product (j)	Thread Fraction	CF45(j,1,t)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
U-238+D	U-238+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-234	9.999E-01	1.000E+00	1.058E+00	1.019E+00	1.006E+00	1.002E+00	1.001E+00	1.000E+00	1.000E+00
U-238+D	Th-230	9.999E-01	1.000E+00	1.457E+00	1.148E+00	1.043E+00	1.014E+00	1.004E+00	1.002E+00	1.005E+00
U-238+D	Ra-226+D	9.999E-01	1.000E+00	1.005E+00	1.001E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Pb-210+D	9.999E-01	1.000E+00	1.368E+00	1.184E+00	1.069E+00	1.027E+00	1.010E+00	1.006E+00	1.002E+00

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors for Milk
Harvest Time = t - 2.74E-03 yr; Consumption Time = t yr

Parent (i)	Product (j)	Thread Fraction	CF45(j,2,t)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.020E+00	1.008E+00	1.003E+00	1.001E+00	1.001E+00	1.001E+00	1.000E+00
J-234	U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-234	Th-230	1.000E+00	1.000E+00	1.371E+00	1.124E+00	1.037E+00	1.012E+00	1.003E+00	1.002E+00	1.003E+00
J-234	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-234	Pb-210+D	1.000E+00	1.000E+00	1.041E+00	1.019E+00	1.007E+00	1.003E+00	1.001E+00	1.001E+00	1.000E+00
J-235+D	U-235+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-235+D	Pa-231	1.000E+00	1.000E+00	1.210E+00	1.068E+00	1.020E+00	1.007E+00	1.002E+00	1.001E+00	1.000E+00
J-235+D	Ac-227+D	1.000E+00	1.000E+00	1.002E+00	1.001E+00	1.000E+00	1.000E+00	1.000E+00	9.999E-01	9.999E-01
J-238	U-238	5.400E-05	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-238+D	U-238+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-238+D	U-234	9.999E-01	1.000E+00	1.003E+00	1.001E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-238+D	Th-230	9.999E-01	1.000E+00	1.731E+00	1.248E+00	1.074E+00	1.024E+00	1.006E+00	1.005E+00	1.015E+00
J-238+D	Ra-226+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
J-238+D	Pb-210+D	9.999E-01	1.000E+00	1.047E+00	1.023E+00	1.009E+00	1.003E+00	1.001E+00	1.001E+00	1.000E+00

Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Storage Time Correction Factors for Fish & Crustacea
Harvest Time = t - 1.92E-02 yr; Consumption Time = t yr

Parent (i)	Product (j)	Thread Fraction	CFF(j,1,t)# At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.995E-01
U-234	U-234	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Th-230	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.113E+00	1.002E+00
U-234	Ra-226+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-234	Pb-210+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.998E-01	9.996E-01
U-235+D	U-235+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Pa-231	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-235+D	Ac-227+D	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.995E-01	9.996E-01
U-238	U-238	5.400E-05	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-238+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	U-234	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Th-230	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.113E+00	1.004E+00
U-238+D	Ra-226+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00
U-238+D	Pb-210+D	9.999E-01	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	1.000E+00	9.996E-01	9.996E-01

#Correction factor = (concentration in media at consumption time)/(concentration at harvest time).

Area and Depth Factors for Plant (p=3), Meat (p=4), and Milk (p=5) Pathways
Root Uptake from Contaminated Soil (q=1)

Area Factor for Plant Foods [FA(3)] = 0.50

Nuclide		Depth Factor FD(i,1,t) (dimensionless)							
(i)	t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227		1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	5.5556E-01
Pa-231		1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	5.5556E-01
Pb-210		1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	5.5556E-01
Ra-226		1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	5.5556E-01
Th-230		1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	5.5556E-01
U-234		1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	5.5556E-01
U-235		1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	5.5556E-01
U-238		1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	5.5556E-01

Area and Depth Factors for Plant (p=3), Meat (p=4), and Milk (p=5) Pathways
Foliar Uptake from Contaminated Dust (q=2)

Area Factor for Plant Foods [FA(3)] = 0.50

Nuclide		Depth Factor FD(i,2,t) (dimensionless)							
(i)	t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227		1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
Pa-231		1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
Pb-210		1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
Ra-226		1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
Th-230		1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
U-234		1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
U-235		1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
U-238		1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00

Area and Depth Factors for Plant (p=3), Meat (p=4), and Milk (p=5) Pathways
Ditch Irrigation (q=3)

Area Factor for Plant Foods [FA(3)] = 0.50

Nuclide	Depth Factor FD(i,3,t) (dimensionless)							
(i) t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
Pa-231	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
Pb-210	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
Ra-226	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
Th-230	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
U-234	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
U-235	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00
U-238	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00	1.0000E+00

Area and Depth Factors for Plant (p=3), Meat (p=4), and Milk (p=5) Pathways
Overhead Irrigation (q=4)

Area Factor for Plant Foods [FA(3)] = 0.50

The Depth Factor Value
FD(i,p,q,t) = 1.0000E+00
is applicable for all radionuclides(i) and times(t).

Area and Depth Factors for Meat (p=4) and Milk (p=5) Pathways
Transfer from Livestock Water (q=5) and Soil (q=6) Intake

Area Factor for Meat and Milk [FA(p),p=4,5] = 1.00

The livestock water subpathway (q=5) and livestock soil intake subpathway (q=6)
occur only for the meat (p=4) and milk (p=5) pathways.

Dose Conversion and Environmental Transport Factors for the Plant Food Pathway (p=3)
Subpathway: Root Uptake from Contaminated Soil (q=1)

Parent (i)	Product (j)	DCF(j,3)*	ETF(j,3,1,t) At Time in Years (g/yr)							
			0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.321E-03	3.480E+03	3.465E+03	3.435E+03	3.332E+03	3.054E+03	2.251E+03	9.417E+02	2.477E+01
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	2.940E+01	7.948E+01	2.270E+02	4.751E+02	5.642E+02	2.490E+02	6.551E+00
J-234	U-234	2.830E-04	2.175E+02	2.164E+02	2.140E+02	2.059E+02	1.845E+02	1.256E+02	4.190E+01	4.989E-01
J-234	Th-230	5.480E-04	0.000E+00	8.225E-04	2.371E-03	7.659E-03	2.169E-02	6.025E-02	1.149E-01	7.805E-02
J-234	Ra-226+D	1.321E-03	0.000E+00	6.307E-06	5.909E-05	6.522E-04	5.525E-03	4.916E-02	2.432E-01	2.980E-01
J-234	Pb-210+D	7.276E-03	0.000E+00	2.251E-08	5.079E-07	1.632E-05	3.518E-04	6.905E-03	4.954E-02	6.830E-02
J-235+D	U-235+D	2.673E-04	2.175E+02	2.164E+02	2.140E+02	2.059E+02	1.845E+02	1.257E+02	4.194E+01	5.003E-01
J-235+D	Pa-231	1.060E-02	0.000E+00	1.782E-02	5.385E-02	1.738E-01	4.679E-01	1.062E+00	1.061E+00	4.189E-02
J-235+D	Ac-227+D	1.480E-02	0.000E+00	8.685E-05	6.690E-04	6.245E-03	3.934E-02	1.606E-01	1.947E-01	8.172E-03
J-238	U-238	2.550E-04	1.174E-02	1.168E-02	1.156E-02	1.112E-02	9.964E-03	6.786E-03	2.265E-03	2.702E-05
J-238+D	U-238+D	2.687E-04	2.175E+02	2.163E+02	2.140E+02	2.059E+02	1.845E+02	1.257E+02	4.194E+01	5.003E-01
J-238+D	U-234	2.830E-04	0.000E+00	6.133E-04	1.820E-03	5.838E-03	1.569E-02	3.562E-02	3.565E-02	1.416E-03
J-238+D	Th-230	5.480E-04	0.000E+00	1.222E-09	1.023E-08	1.081E-07	8.987E-07	7.768E-06	3.605E-05	3.949E-05
J-238+D	Ra-226+D	1.321E-03	0.000E+00	5.756E-12	1.653E-10	6.108E-09	1.539E-07	4.387E-06	5.750E-05	1.421E-04
J-238+D	Pb-210+D	7.276E-03	0.000E+00	1.697E-14	1.115E-12	1.181E-10	7.719E-09	5.212E-07	1.088E-05	3.229E-05

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Plant Food Pathway (p=3)
Subpathway: Foliar Uptake from Contaminated Dust (q=2)

Parent (i)	Product (j)	DCF(j,3)*	ETF(j,3,2,t) At Time in Years (g/yr)							
			0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
a-226+D	Ra-226+D	1.321E-03	3.880E-02	3.864E-02	3.830E-02	3.715E-02	3.405E-02	2.510E-02	1.050E-02	4.971E-04
a-226+D	Pb-210+D	7.276E-03	0.000E+00	1.183E-03	3.418E-03	1.000E-02	2.108E-02	2.508E-02	1.107E-02	5.242E-04
-234	U-234	2.830E-04	3.880E-02	3.860E-02	3.817E-02	3.674E-02	3.292E-02	2.241E-02	7.475E-03	1.602E-04
-234	Th-230	5.480E-04	0.000E+00	3.483E-07	1.039E-06	3.399E-06	9.659E-06	2.686E-05	5.124E-05	6.266E-05
-234	Ra-226+D	1.321E-03	0.000E+00	7.544E-11	6.744E-10	7.323E-09	6.175E-08	5.486E-07	2.713E-06	5.982E-06
-234	Pb-210+D	7.276E-03	0.000E+00	7.759E-13	2.049E-11	7.041E-10	1.549E-08	3.061E-07	2.201E-06	5.463E-06
-235+D	U-235+D	2.673E-04	3.880E-02	3.860E-02	3.817E-02	3.674E-02	3.292E-02	2.242E-02	7.482E-03	1.606E-04
-235+D	Pa-231	1.060E-02	0.000E+00	8.166E-07	2.423E-06	7.772E-06	2.089E-05	4.738E-05	4.734E-05	3.363E-06
-235+D	Ac-227+D	1.480E-02	0.000E+00	1.283E-08	1.112E-07	1.088E-06	6.947E-06	2.848E-05	3.457E-05	2.612E-06
-238	U-238	2.550E-04	2.095E-06	2.084E-06	2.061E-06	1.984E-06	1.778E-06	1.211E-06	4.040E-07	8.674E-09
-238+D	U-238+D	2.687E-04	3.880E-02	3.859E-02	3.817E-02	3.673E-02	3.292E-02	2.242E-02	7.481E-03	1.606E-04
-238+D	U-234	2.830E-04	0.000E+00	1.094E-07	3.247E-07	1.041E-06	2.799E-06	6.354E-06	6.360E-06	4.547E-07
-238+D	Th-230	5.480E-04	0.000E+00	4.934E-13	4.407E-12	4.773E-11	3.995E-10	3.462E-09	1.608E-08	3.170E-08
-238+D	Ra-226+D	1.321E-03	0.000E+00	7.127E-17	1.909E-15	6.881E-14	1.721E-12	4.897E-11	6.414E-10	2.853E-09
-238+D	Pb-210+D	7.276E-03	0.000E+00	5.509E-19	4.371E-17	5.042E-15	3.386E-13	2.308E-11	4.833E-10	2.582E-09

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Plant Food Pathway (p=3)
Subpathway: Ditch Irrigation (q=3)

Parent (i)	Product (j)	DCF(j,3)*	ETF(j,3,3,t) * SF(j,t) At Time in Years (g/yr)							
			0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.875E-01
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.578E-01
U-234	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.885E-02	7.550E-02
U-234	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.092E-08	2.317E-07
U-234	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.185E-06	1.704E-03
U-234	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.489E-08	2.837E-04
U-235+D	U-235+D	2.673E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.888E-02	7.571E-02
U-235+D	Pa-231	1.060E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.308E-04	6.340E-03
U-235+D	Ac-227+D	1.480E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.145E-04	2.961E-03
U-238	U-238	2.550E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.559E-06	4.088E-06
U-238+D	U-238+D	2.687E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.888E-02	7.571E-02
U-238+D	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.455E-05	2.143E-04
U-238+D	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.266E-12	4.793E-10
U-238+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.124E-09	2.011E-06
U-238+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.501E-10	3.241E-07

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Plant Food Pathway (p=3)
Subpathway: Overhead Irrigation (q=4)

Parent (i)	Product (j)	DCF(j,3)*	ETF(j,3,4,t) * SF(j,t) At Time in Years (g/yr)							
			0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.503E+01
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.021E+01
U-234	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.424E+01	1.158E+02
U-234	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.889E-05	8.341E-04
U-234	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.136E-04	1.633E-01
U-234	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.215E-05	1.082E-01
U-235+D	U-235+D	2.673E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.428E+01	1.161E+02
U-235+D	Pa-231	1.060E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.802E-01	2.430E+00
U-235+D	Ac-227+D	1.480E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.096E+00	4.536E+00
U-238	U-238	2.550E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.391E-03	6.268E-03
U-238+D	U-238+D	2.687E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.428E+01	1.161E+02
U-238+D	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.764E-02	3.286E-01
U-238+D	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.601E-08	1.678E-06
U-238+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.064E-07	1.926E-04
U-238+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.345E-07	1.235E-04

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Meat Pathway (p=4)
Subpathway: Fodder Root Uptake from Contaminated Soil (q=1)

Parent (i)	Product (j)	DCF(j,4)*	ETF(j,4,1,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.321E-03	1.714E+02	1.707E+02	1.693E+02	1.642E+02	1.505E+02	1.109E+02	4.640E+01	1.221E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	1.669E+00	3.638E+00	9.436E+00	1.917E+01	2.256E+01	9.951E+00	2.619E-01
J-234	U-234	2.830E-04	3.641E+00	3.625E+00	3.585E+00	3.450E+00	3.091E+00	2.105E+00	7.021E-01	8.361E-03
J-234	Th-230	5.480E-04	0.000E+00	6.132E-06	1.374E-05	3.970E-05	1.086E-04	2.979E-04	5.661E-04	3.845E-04
J-234	Ra-226+D	1.321E-03	0.000E+00	2.273E-07	2.643E-06	3.123E-05	2.696E-04	2.415E-03	1.197E-02	1.468E-02
J-234	Pb-210+D	7.276E-03	0.000E+00	1.456E-09	2.756E-08	7.355E-07	1.467E-05	2.793E-04	1.988E-03	2.736E-03
J-235+D	U-235+D	2.673E-04	3.641E+00	3.625E+00	3.585E+00	3.450E+00	3.092E+00	2.106E+00	7.027E-01	8.385E-03
J-235+D	Pa-231	1.060E-02	0.000E+00	3.852E-03	1.273E-02	4.231E-02	1.148E-01	2.614E-01	2.614E-01	1.032E-02
J-235+D	Ac-227+D	1.480E-02	0.000E+00	6.812E-06	2.292E-05	8.013E-05	2.396E-04	6.154E-04	6.491E-04	2.612E-05
J-238	U-238	2.550E-04	1.966E-04	1.958E-04	1.936E-04	1.863E-04	1.670E-04	1.137E-04	3.795E-05	4.528E-07
J-238+D	U-238+D	2.687E-04	3.641E+00	3.625E+00	3.585E+00	3.450E+00	3.092E+00	2.106E+00	7.027E-01	8.384E-03
J-238+D	U-234	2.830E-04	0.000E+00	1.028E-05	3.049E-05	9.781E-05	2.629E-04	5.968E-04	5.973E-04	2.374E-05
J-238+D	Th-230	5.480E-04	0.000E+00	1.157E-11	6.754E-11	5.883E-10	4.576E-09	3.859E-08	1.779E-07	1.945E-07
J-238+D	Ra-226+D	1.321E-03	0.000E+00	1.778E-13	7.046E-12	2.884E-10	7.474E-09	2.152E-07	2.829E-06	7.001E-06
J-238+D	Pb-210+D	7.276E-03	0.000E+00	1.061E-15	6.355E-14	5.499E-12	3.264E-10	2.118E-08	4.373E-07	1.294E-06

- The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Meat Pathway (p=4)
Subpathway: Fodder Foliar Uptake from Contaminated Dust (q=2)

Parent (i)	Product (j)	DCF(j,4)*	ETF(j,4,2,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
a-226+D	Ra-226+D	1.321E-03	7.691E-03	7.663E-03	7.596E-03	7.368E-03	6.753E-03	4.978E-03	2.082E-03	9.858E-05
a-226+D	Pb-210+D	7.276E-03	0.000E+00	1.903E-04	5.448E-04	1.589E-03	3.346E-03	3.980E-03	1.757E-03	8.319E-05
-234	U-234	2.830E-04	2.615E-03	2.603E-03	2.575E-03	2.478E-03	2.220E-03	1.512E-03	5.042E-04	1.080E-05
-234	Th-230	5.480E-04	0.000E+00	7.810E-09	2.150E-08	6.822E-08	1.922E-07	5.329E-07	1.016E-06	1.242E-06
-234	Ra-226+D	1.321E-03	0.000E+00	1.353E-11	1.294E-10	1.438E-09	1.220E-08	1.087E-07	5.378E-07	1.186E-06
-234	Pb-210+D	7.276E-03	0.000E+00	1.267E-13	3.291E-12	1.122E-10	2.461E-09	4.860E-08	3.492E-07	8.669E-07
-235+D	U-235+D	2.673E-04	2.615E-03	2.603E-03	2.575E-03	2.478E-03	2.220E-03	1.512E-03	5.046E-04	1.083E-05
-235+D	Pa-231	1.060E-02	0.000E+00	7.686E-07	2.362E-06	7.669E-06	2.068E-05	4.697E-05	4.694E-05	3.335E-06
-235+D	Ac-227+D	1.480E-02	0.000E+00	1.381E-09	4.537E-09	1.762E-08	6.347E-08	1.946E-07	2.188E-07	1.616E-08
-238	U-238	2.550E-04	1.412E-07	1.406E-07	1.390E-07	1.338E-07	1.199E-07	8.165E-08	2.725E-08	5.850E-10
-238+D	U-238+D	2.687E-04	2.615E-03	2.603E-03	2.574E-03	2.477E-03	2.220E-03	1.512E-03	5.046E-04	1.083E-05
-238+D	U-234	2.830E-04	0.000E+00	7.379E-09	2.190E-08	7.023E-08	1.888E-07	4.286E-07	4.289E-07	3.067E-08
-238+D	Th-230	5.480E-04	0.000E+00	1.228E-14	9.490E-14	9.704E-13	7.984E-12	6.876E-11	3.188E-10	6.283E-10
-238+D	Ra-226+D	1.321E-03	0.000E+00	1.218E-17	3.602E-16	1.345E-14	3.397E-13	9.697E-12	1.271E-10	5.657E-10
-238+D	Pb-210+D	7.276E-03	0.000E+00	9.011E-20	7.042E-18	8.042E-16	5.383E-14	3.665E-12	7.670E-11	4.098E-10

- The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Meat Pathway (p=4)
Subpathway: Ditch Irrigation (q=3)

Parent (i)	Product (j)	DCF(j,4)*	ETF(j,4,3,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.982E-02
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.884E-03
U-234	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.184E-04	5.738E-04
U-234	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.833E-10	9.266E-10
U-234	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.619E-08	3.804E-05
U-234	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.595E-09	5.193E-06
U-235+D	U-235+D	2.673E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.185E-04	5.754E-04
U-235+D	Pa-231	1.060E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.130E-05	7.085E-04
U-235+D	Ac-227+D	1.480E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.597E-07	2.560E-06
U-238	U-238	2.550E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.180E-08	3.107E-08
U-238+D	U-238+D	2.687E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.185E-04	5.754E-04
U-238+D	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.858E-07	1.629E-06
U-238+D	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.556E-13	2.239E-12
U-238+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.643E-11	4.487E-08
U-238+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.647E-12	5.936E-09

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Meat Pathway (p=4)
Subpathway: Overhead Irrigation (q=4)

Parent (i)	Product (j)	DCF(j,4)*	ETF(j,4,4,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.685E+01
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.570E+00
U-234	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.971E+00	7.808E+00
U-234	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.588E-06	2.235E-05
U-234	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.228E-05	3.235E-02
U-234	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.109E-06	1.720E-02
U-235+D	U-235+D	2.673E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.974E+00	7.830E+00
U-235+D	Pa-231	1.060E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.767E-01	2.411E+00
U-235+D	Ac-227+D	1.480E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.799E-03	2.214E-02
U-238	U-238	2.550E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.606E-04	4.228E-04
U-238+D	U-238+D	2.687E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.974E+00	7.829E+00
U-238+D	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.528E-03	2.216E-02
U-238+D	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.191E-09	4.978E-08
U-238+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.649E-08	3.816E-05
U-238+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.861E-08	1.965E-05

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Meat Pathway (p=4)
Subpathway: Livestock Water (q=5)

Parent (i)	Product (j)	DCF(j,4)*	ETF(j,4,5,t) * SF(j,t) At Time in Years (g/yr)							
			0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.832E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.873E+00
U-234	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.208E+00	3.163E+00
U-234	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.581E-07	8.027E-06
U-234	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.109E-06	1.312E-02
U-234	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.072E-06	6.962E-03
U-235+D	U-235+D	2.673E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.209E+00	3.172E+00
U-235+D	Pa-231	1.060E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.125E-01	9.764E-01
U-235+D	Ac-227+D	1.480E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.954E-03	8.981E-03
U-238	U-238	2.550E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.528E-05	1.713E-04
U-238+D	U-238+D	2.687E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.209E+00	3.171E+00
U-238+D	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.028E-03	8.978E-03
U-238+D	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.582E-10	1.725E-08
U-238+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.748E-08	1.550E-05
U-238+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.975E-08	7.963E-06

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Milk Pathway (p=5)
Subpathway: Fodder Root Uptake from Contaminated Soil (q=1)

Parent (i)	Product (j)	DCF(j,5)*	ETF(j,5,1,t) At Time in Years (g/yr)							
			0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.321E-03	2.024E+02	2.016E+02	1.999E+02	1.939E+02	1.777E+02	1.310E+02	5.479E+01	1.441E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	6.523E-01	1.525E+00	4.096E+00	8.415E+00	9.937E+00	4.383E+00	1.153E-01
U-234	U-234	2.830E-04	7.590E+00	7.554E+00	7.471E+00	7.190E+00	6.442E+00	4.386E+00	1.463E+00	1.742E-02
U-234	Th-230	5.480E-04	0.000E+00	4.546E-07	9.026E-07	2.432E-06	6.492E-06	1.764E-05	3.345E-05	2.270E-05
U-234	Ra-226+D	1.321E-03	0.000E+00	3.031E-07	3.236E-06	3.727E-05	3.195E-04	2.855E-03	1.414E-02	1.734E-02
U-234	Pb-210+D	7.276E-03	0.000E+00	5.739E-10	1.101E-08	3.104E-07	6.361E-06	1.225E-04	8.744E-04	1.204E-03
U-235+D	U-235+D	2.673E-04	7.590E+00	7.554E+00	7.471E+00	7.190E+00	6.442E+00	4.388E+00	1.464E+00	1.747E-02
U-235+D	Pa-231	1.060E-02	0.000E+00	5.258E-06	1.574E-05	5.064E-05	1.362E-04	3.091E-04	3.088E-04	1.219E-05
U-235+D	Ac-227+D	1.480E-02	0.000E+00	1.384E-07	9.041E-07	7.690E-06	4.695E-05	1.896E-04	2.293E-04	9.621E-06
U-238	U-238	2.550E-04	4.099E-04	4.079E-04	4.034E-04	3.882E-04	3.479E-04	2.369E-04	7.907E-05	9.434E-07
U-238+D	U-238+D	2.687E-04	7.590E+00	7.553E+00	7.471E+00	7.189E+00	6.442E+00	4.387E+00	1.464E+00	1.747E-02
U-238+D	U-234	2.830E-04	0.000E+00	2.141E-05	6.354E-05	2.038E-04	5.479E-04	1.244E-03	1.245E-03	4.945E-05
U-238+D	Th-230	5.480E-04	0.000E+00	9.580E-13	4.778E-12	3.725E-11	2.770E-10	2.294E-09	1.052E-08	1.149E-08
U-238+D	Ra-226+D	1.321E-03	0.000E+00	2.518E-13	8.787E-12	3.460E-10	8.872E-09	2.546E-07	3.343E-06	8.268E-06
U-238+D	Pb-210+D	7.276E-03	0.000E+00	4.331E-16	2.517E-14	2.296E-12	1.408E-10	9.272E-09	1.922E-07	5.693E-07

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Milk Pathway (p=5)
Subpathway: Fodder Foliar Uptake from Contaminated Dust (q=2)

Parent (i)	Product (j)	DCF(j,5)*	ETF(j,5,2,t) At Time in Years (g/yr)							
			0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.321E-03	9.084E-03	9.049E-03	8.970E-03	8.701E-03	7.975E-03	5.878E-03	2.459E-03	1.164E-04
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	8.367E-05	2.407E-04	7.031E-04	1.481E-03	1.762E-03	7.778E-04	3.683E-05
U-234	U-234	2.830E-04	5.450E-03	5.424E-03	5.365E-03	5.163E-03	4.626E-03	3.150E-03	1.051E-03	2.251E-05
U-234	Th-230	5.480E-04	0.000E+00	5.403E-10	1.348E-09	4.104E-09	1.142E-08	3.152E-08	6.000E-08	7.334E-08
U-234	Ra-226+D	1.321E-03	0.000E+00	1.757E-11	1.576E-10	1.714E-09	1.446E-08	1.285E-07	6.353E-07	1.401E-06
U-234	Pb-210+D	7.276E-03	0.000E+00	5.552E-14	1.449E-12	4.956E-11	1.089E-09	2.151E-08	1.546E-07	3.838E-07
U-235+D	U-235+D	2.673E-04	5.450E-03	5.424E-03	5.365E-03	5.163E-03	4.626E-03	3.151E-03	1.051E-03	2.258E-05
U-235+D	Pa-231	1.060E-02	0.000E+00	1.268E-09	3.146E-09	9.399E-09	2.473E-08	5.568E-08	5.550E-08	3.940E-09
U-235+D	Ac-227+D	1.480E-02	0.000E+00	5.991E-11	5.208E-10	5.097E-09	3.256E-08	1.335E-07	1.621E-07	1.225E-08
U-238	U-238	2.550E-04	2.943E-07	2.929E-07	2.897E-07	2.788E-07	2.498E-07	1.701E-07	5.678E-08	1.219E-09
U-238+D	U-238+D	2.687E-04	5.450E-03	5.424E-03	5.365E-03	5.162E-03	4.626E-03	3.151E-03	1.051E-03	2.257E-05
U-238+D	U-234	2.830E-04	0.000E+00	1.538E-08	4.563E-08	1.464E-07	3.934E-07	8.930E-07	8.938E-07	6.391E-08
U-238+D	Th-230	5.480E-04	0.000E+00	9.527E-16	6.273E-15	5.945E-14	4.772E-13	4.074E-12	1.884E-11	3.711E-11
U-238+D	Ra-226+D	1.321E-03	0.000E+00	1.654E-17	4.457E-16	1.610E-14	4.030E-13	1.147E-11	1.502E-10	6.682E-10
U-238+D	Pb-210+D	7.276E-03	0.000E+00	3.963E-20	3.096E-18	3.551E-16	2.381E-14	1.622E-12	3.396E-11	1.814E-10

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Milk Pathway (p=5)
Subpathway: Ditch Irrigation (q=3)

Parent (i)	Product (j)	DCF(j,5)*	ETF(j,5,3,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.341E-02
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.267E-03
U-234	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.557E-04	1.196E-03
U-234	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.570E-11	6.748E-11
U-234	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.082E-08	4.494E-05
U-234	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.920E-10	2.279E-06
U-235+D	U-235+D	2.673E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.561E-04	1.199E-03
U-235+D	Pa-231	1.060E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.619E-08	8.367E-07
U-235+D	Ac-227+D	1.480E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.766E-07	1.569E-06
U-238	U-238	2.550E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.463E-08	6.474E-08
U-238+D	U-238+D	2.687E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.560E-04	1.199E-03
U-238+D	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.877E-07	3.394E-06
U-238+D	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.335E-14	1.685E-13
U-238+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.358E-10	5.336E-08
U-238+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.689E-12	2.623E-09

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Milk Pathway (p=5)
Subpathway: Overhead Irrigation (q=4)

Parent (i)	Product (j)	DCF(j,5)*	ETF(j,5,4,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.991E+01
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.235E+00
U-234	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.201E+00	1.627E+01
U-234	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.192E-07	1.494E-06
U-234	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.621E-05	3.822E-02
U-234	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.257E-06	7.611E-03
U-235+D	U-235+D	2.673E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.206E+00	1.631E+01
U-235+D	Pa-231	1.060E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.276E-04	2.847E-03
U-235+D	Ac-227+D	1.480E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.111E-03	2.122E-02
U-238	U-238	2.550E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.351E-04	8.810E-04
U-238+D	U-238+D	2.687E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.206E+00	1.631E+01
U-238+D	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.275E-03	4.618E-02
U-238+D	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.862E-10	3.435E-09
U-238+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.155E-07	4.538E-05
U-238+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.233E-08	8.754E-06

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Milk Pathway (p=5)
Subpathway: Livestock Water (q=5)

Parent (i)	Product (j)	DCF(j,5)*	ETF(j,5,5,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.193E+01
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.781E+00
U-234	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.973E+00	2.607E+01
U-234	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.605E-07	2.154E-06
U-234	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.267E-05	6.131E-02
U-234	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.617E-06	1.219E-02
U-235+D	U-235+D	2.673E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.981E+00	2.615E+01
U-235+D	Pa-231	1.060E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.269E-04	4.563E-03
U-235+D	Ac-227+D	1.480E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.234E-03	3.407E-02
U-238	U-238	2.550E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.390E-04	1.412E-03
U-238+D	U-238+D	2.687E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.981E+00	2.614E+01
U-238+D	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.484E-03	7.401E-02
U-238+D	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.218E-10	4.820E-09
U-238+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.126E-07	7.226E-05
U-238+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.217E-08	1.390E-05

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Fish Pathway (p=6)

Parent (i)	Product (j)	DCF(j,6)*	ETF(j,6,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.181E+00
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.886E+00
U-234	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.341E-01	3.507E-01
U-234	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.101E-07	2.234E-05
U-234	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.578E-06	2.268E-03
U-234	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.539E-06	5.187E-03
U-235+D	U-235+D	2.673E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.342E-01	3.517E-01
U-235+D	Pa-231	1.060E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.203E-03	1.043E-02
U-235+D	Ac-227+D	1.480E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.016E-02	1.248E-01
U-238	U-238	2.550E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.248E-06	1.899E-05
U-238+D	U-238+D	2.687E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.342E-01	3.517E-01
U-238+D	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.141E-04	9.956E-04
U-238+D	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.791E-10	4.428E-08
U-238+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.334E-09	2.674E-06
U-238+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.674E-08	5.919E-06

* - The dose conversion factor units are mrem/pCi.

Dose Conversion and Environmental Transport Factors for the Drinking Water Pathway (p=7)

Parent (i)	Product (j)	DCF(j,7)*	ETF(j,7,t) * SF(j,t) At Time in Years (g/yr) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.106E+03
Ra-226+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.829E+02
U-234	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.759E+02	1.505E+03
U-234	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.018E-04	1.047E-02
U-234	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.478E-03	2.124E+00
U-234	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.173E-04	1.407E+00
U-235+D	U-235+D	2.673E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.764E+02	1.510E+03
U-235+D	Pa-231	1.060E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.647E+00	3.161E+01
U-235+D	Ac-227+D	1.480E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.427E+01	5.903E+01
U-238	U-238	2.550E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.113E-02	8.152E-02
U-238+D	U-238+D	2.687E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.764E+02	1.510E+03
U-238+D	U-234	2.830E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.900E-01	4.274E+00
U-238+D	Th-230	5.480E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.845E-08	2.076E-05
U-238+D	Ra-226+D	1.321E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.468E-06	2.503E-03
U-238+D	Pb-210+D	7.276E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.936E-06	1.605E-03

* - The dose conversion factor units are mrem/pCi.

Dose/Source Ratios for Internal Radiation from Ingestion of Plant Foods (p=3)
Subpathway: Root Uptake from Contaminated Soil (q=1)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,3,1t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	4.587E+00	4.567E+00	4.528E+00	4.392E+00	4.025E+00	2.967E+00	1.241E+00	3.262E-02
Ra-226+D	Pb-210+D	1.000E+00	1.150E-01	3.074E-01	6.648E-01	1.717E+00	3.485E+00	4.100E+00	1.808E+00	4.751E-02
Ra-226+D	∑DSR(j)		4.702E+00	4.875E+00	5.193E+00	6.109E+00	7.510E+00	7.067E+00	3.049E+00	8.013E-02
U-234	U-234	1.000E+00	6.139E-02	6.106E-02	6.039E-02	5.812E-02	5.207E-02	3.546E-02	1.183E-02	1.407E-04
U-234	Th-230	1.000E+00	2.336E-07	6.637E-07	1.510E-06	4.400E-06	1.207E-05	3.314E-05	6.300E-05	4.273E-05
U-234	Ra-226+D	1.000E+00	2.690E-09	1.990E-08	1.071E-07	9.492E-07	7.532E-06	6.549E-05	3.219E-04	3.933E-04
U-234	Pb-210+D	1.000E+00	4.360E-11	5.607E-10	5.868E-09	1.369E-07	2.677E-06	5.079E-05	3.613E-04	4.965E-04
U-234	∑DSR(j)		6.139E-02	6.106E-02	6.039E-02	5.812E-02	5.209E-02	3.561E-02	1.257E-02	1.073E-03
U-235+D	U-235+D	1.000E+00	5.800E-02	5.768E-02	5.705E-02	5.490E-02	4.920E-02	3.351E-02	1.118E-02	1.333E-04
U-235+D	Pa-231	1.000E+00	9.280E-05	2.851E-04	6.649E-04	1.929E-03	5.029E-03	1.128E-02	1.124E-02	4.426E-04
U-235+D	Ac-227+D	1.000E+00	4.616E-07	2.790E-06	1.330E-05	1.009E-04	5.967E-04	2.385E-03	2.878E-03	1.205E-04
U-235+D	∑DSR(j)		5.809E-02	5.797E-02	5.773E-02	5.693E-02	5.482E-02	4.718E-02	2.530E-02	6.964E-04
U-238	U-238	5.400E-05	2.987E-06	2.971E-06	2.939E-06	2.828E-06	2.534E-06	1.726E-06	5.759E-07	6.863E-09
U-238+D	U-238+D	9.999E-01	5.829E-02	5.797E-02	5.734E-02	5.518E-02	4.944E-02	3.367E-02	1.124E-02	1.339E-04
U-238+D	U-234	9.999E-01	8.694E-08	2.596E-07	5.991E-07	1.730E-06	4.502E-06	1.010E-05	1.008E-05	3.995E-07
U-238+D	Th-230	9.999E-01	2.329E-13	1.506E-12	7.627E-12	6.523E-11	5.082E-10	4.292E-09	1.979E-08	2.162E-08
U-238+D	Ra-226+D	9.999E-01	1.839E-15	2.959E-14	3.550E-13	9.347E-12	2.132E-10	5.872E-09	7.621E-08	1.876E-07
U-238+D	Pb-210+D	9.999E-01	2.606E-17	6.854E-16	1.527E-14	1.042E-12	5.975E-11	3.854E-09	7.948E-08	2.347E-07
U-238+D	∑DSR(j)		5.829E-02	5.797E-02	5.734E-02	5.518E-02	4.945E-02	3.368E-02	1.125E-02	1.348E-04

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Plant Foods (p=3)
Subpathway: Foliar Uptake from Contaminated Dust (q=2)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,3,2t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	5.115E-05	5.093E-05	5.048E-05	4.897E-05	4.488E-05	3.308E-05	1.384E-05	6.552E-07
Ra-226+D	Pb-210+D	1.000E+00	4.333E-06	1.278E-05	2.873E-05	7.570E-05	1.546E-04	1.822E-04	8.038E-05	3.806E-06
Ra-226+D	∑DSR(j)		5.548E-05	6.371E-05	7.922E-05	1.247E-04	1.995E-04	2.153E-04	9.422E-05	4.461E-06
U-234	U-234	1.000E+00	1.095E-05	1.089E-05	1.077E-05	1.037E-05	9.289E-06	6.325E-06	2.110E-06	4.521E-08
U-234	Th-230	1.000E+00	9.553E-11	2.859E-10	6.635E-10	1.953E-09	5.374E-09	1.477E-08	2.810E-08	3.434E-08
U-234	Ra-226+D	1.000E+00	3.325E-14	2.320E-13	1.218E-12	1.065E-11	8.417E-11	7.307E-10	3.590E-09	7.903E-09
U-234	Pb-210+D	1.000E+00	1.415E-15	2.102E-14	2.401E-13	5.911E-12	1.179E-10	2.252E-09	1.605E-08	3.975E-08
U-234	∑DSR(j)		1.095E-05	1.089E-05	1.077E-05	1.037E-05	9.295E-06	6.343E-06	2.157E-06	1.272E-07
U-235+D	U-235+D	1.000E+00	1.035E-05	1.029E-05	1.018E-05	9.795E-06	8.776E-06	5.977E-06	1.995E-06	4.283E-08
U-235+D	Pa-231	1.000E+00	4.336E-09	1.294E-08	2.988E-08	8.626E-08	2.245E-07	5.034E-07	5.013E-07	3.557E-08
U-235+D	Ac-227+D	1.000E+00	6.361E-11	4.380E-10	2.233E-09	1.760E-08	1.054E-07	4.230E-07	5.111E-07	3.857E-08
U-235+D	∑DSR(j)		1.035E-05	1.030E-05	1.021E-05	9.898E-06	9.106E-06	6.904E-06	3.007E-06	1.170E-07
U-238	U-238	5.400E-05	5.329E-10	5.300E-10	5.242E-10	5.045E-10	4.520E-10	3.079E-10	1.027E-10	2.206E-12
U-238+D	U-238+D	9.999E-01	1.040E-05	1.034E-05	1.023E-05	9.844E-06	8.821E-06	6.007E-06	2.005E-06	4.304E-08
U-238+D	U-234	9.999E-01	1.551E-11	4.630E-11	1.069E-10	3.086E-10	8.032E-10	1.802E-09	1.798E-09	1.284E-10
U-238+D	Th-230	9.999E-01	9.024E-17	6.294E-16	3.303E-15	2.881E-14	2.259E-13	1.913E-12	8.826E-12	1.737E-11
U-238+D	Ra-226+D	9.999E-01	2.357E-20	3.520E-19	4.076E-18	1.053E-16	2.385E-15	6.554E-14	8.500E-13	3.770E-12
U-238+D	Pb-210+D	9.999E-01	8.037E-22	2.467E-20	6.097E-19	4.457E-17	2.621E-15	1.707E-13	3.529E-12	1.879E-11
U-238+D	∑DSR(j)		1.040E-05	1.034E-05	1.023E-05	9.844E-06	8.821E-06	6.009E-06	2.007E-06	4.321E-08

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Plant Foods (p=3)
Subpathway: Ditch Irrigation (q=3)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,3,3t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.172E-03
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.148E-03
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.321E-03
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.253E-06	2.130E-05
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.063E-12	1.270E-10
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.620E-09	2.254E-06
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.433E-10	2.067E-06
U-234	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.255E-06	2.562E-05
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.803E-06	2.018E-05
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.842E-06	6.704E-05
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.552E-14	1.064E-05	4.371E-05
U-235+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.552E-14	2.628E-05	1.309E-04
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.019E-10	1.039E-09
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.842E-06	2.028E-05
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.033E-09	6.051E-08
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.155E-15	2.627E-13
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.711E-12	2.661E-09
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.124E-12	2.362E-09
U-238+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.849E-06	2.035E-05

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Plant Foods (p=3)
Subpathway: Overhead Irrigation (q=4)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,3,4t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.123E-01
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.381E-01
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.504E-01
J-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.266E-02	3.266E-02
J-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.051E-08	4.572E-07
J-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.552E-07	2.159E-04
J-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.438E-07	7.883E-04
J-234	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.266E-02	3.367E-02
J-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.197E-02	3.094E-02
J-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.007E-03	2.570E-02
J-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.260E-11	1.631E-02	6.696E-02
J-235+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.260E-11	3.128E-02	1.236E-01
J-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.163E-07	1.594E-06
J-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.203E-02	3.110E-02
J-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.078E-05	9.277E-05
J-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.916E-12	9.203E-10
J-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.403E-10	2.550E-07
J-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.325E-09	9.009E-07
J-238+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.204E-02	3.119E-02

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Plant Foods (p=3)
Total for All Subpathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,3,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	4.587E+00	4.568E+00	4.528E+00	4.392E+00	4.025E+00	2.967E+00	1.241E+00	1.461E-01
Ra-226+D	Pb-210+D	1.000E+00	1.150E-01	3.074E-01	6.649E-01	1.717E+00	3.485E+00	4.100E+00	1.808E+00	4.867E-01
Ra-226+D	∑DSR(j)		4.702E+00	4.875E+00	5.193E+00	6.109E+00	7.510E+00	7.067E+00	3.049E+00	6.328E-01
U-234	U-234	1.000E+00	6.140E-02	6.107E-02	6.040E-02	5.813E-02	5.208E-02	3.546E-02	2.449E-02	3.282E-02
U-234	Th-230	1.000E+00	2.337E-07	6.640E-07	1.511E-06	4.402E-06	1.207E-05	3.315E-05	6.304E-05	4.322E-05
U-234	Ra-226+D	1.000E+00	2.690E-09	1.990E-08	1.071E-07	9.492E-07	7.532E-06	6.549E-05	3.221E-04	6.115E-04
U-234	Pb-210+D	1.000E+00	4.360E-11	5.607E-10	5.869E-09	1.369E-07	2.677E-06	5.079E-05	3.615E-04	1.287E-03
U-234	∑DSR(j)		6.141E-02	6.107E-02	6.041E-02	5.813E-02	5.210E-02	3.561E-02	2.524E-02	3.476E-02
U-235+D	U-235+D	1.000E+00	5.801E-02	5.769E-02	5.706E-02	5.491E-02	4.921E-02	3.351E-02	2.316E-02	3.110E-02
U-235+D	Pa-231	1.000E+00	9.281E-05	2.851E-04	6.649E-04	1.929E-03	5.029E-03	1.128E-02	1.425E-02	2.621E-02
U-235+D	Ac-227+D	1.000E+00	4.617E-07	2.790E-06	1.330E-05	1.009E-04	5.968E-04	2.385E-03	1.920E-02	6.712E-02
U-235+D	∑DSR(j)		5.810E-02	5.798E-02	5.774E-02	5.694E-02	5.483E-02	4.718E-02	5.661E-02	1.244E-01
U-238	U-238	5.400E-05	2.988E-06	2.972E-06	2.939E-06	2.828E-06	2.534E-06	1.726E-06	1.193E-06	1.602E-06
U-238+D	U-238+D	9.999E-01	5.830E-02	5.798E-02	5.735E-02	5.519E-02	4.945E-02	3.368E-02	2.327E-02	3.125E-02
U-238+D	U-234	9.999E-01	8.696E-08	2.596E-07	5.992E-07	1.730E-06	4.503E-06	1.010E-05	2.087E-05	9.323E-05
U-238+D	Th-230	9.999E-01	2.330E-13	1.507E-12	7.630E-12	6.526E-11	5.084E-10	4.294E-09	1.981E-08	2.256E-08
U-238+D	Ra-226+D	9.999E-01	1.839E-15	2.959E-14	3.550E-13	9.347E-12	2.132E-10	5.872E-09	7.685E-08	4.453E-07
U-238+D	Pb-210+D	9.999E-01	2.607E-17	6.854E-16	1.527E-14	1.042E-12	5.975E-11	3.854E-09	8.182E-08	1.138E-06
U-238+D	∑DSR(j)		5.830E-02	5.798E-02	5.735E-02	5.519E-02	4.946E-02	3.369E-02	2.329E-02	3.135E-02

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Meat (p=4)
Subpathway: Fodder Root Uptake from Contaminated Soil (q=1)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,4,1t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	2.260E-01	2.250E-01	2.231E-01	2.164E-01	1.983E-01	1.462E-01	6.115E-02	1.607E-03
Ra-226+D	Pb-210+D	1.000E+00	7.709E-03	1.582E-02	2.987E-02	7.124E-02	1.406E-01	1.640E-01	7.225E-02	1.899E-03
Ra-226+D	∑DSR(j)		2.337E-01	2.409E-01	2.530E-01	2.876E-01	3.389E-01	3.101E-01	1.334E-01	3.507E-03
U-234	U-234	1.000E+00	1.029E-03	1.023E-03	1.012E-03	9.737E-04	8.725E-04	5.941E-04	1.981E-04	2.357E-06
U-234	Th-230	1.000E+00	2.127E-09	4.406E-09	8.561E-09	2.275E-08	6.040E-08	1.638E-07	3.104E-07	2.105E-07
U-234	Ra-226+D	1.000E+00	8.338E-11	8.086E-10	4.863E-09	4.552E-08	3.676E-07	3.217E-06	1.584E-05	1.937E-05
U-234	Pb-210+D	1.000E+00	2.727E-12	3.415E-11	3.083E-10	6.134E-09	1.115E-07	2.054E-06	1.450E-05	1.989E-05
U-234	∑DSR(j)		1.029E-03	1.023E-03	1.012E-03	9.738E-04	8.730E-04	5.995E-04	2.288E-04	4.183E-05
U-235+D	U-235+D	1.000E+00	9.717E-04	9.665E-04	9.559E-04	9.199E-04	8.243E-04	5.614E-04	1.874E-04	2.233E-06
U-235+D	Pa-231	1.000E+00	1.797E-05	6.454E-05	1.582E-04	4.699E-04	1.234E-03	2.777E-03	2.768E-03	1.091E-04
U-235+D	Ac-227+D	1.000E+00	4.299E-08	1.602E-07	3.990E-07	1.246E-06	3.601E-06	9.131E-06	9.595E-06	3.852E-07
U-235+D	∑DSR(j)		9.897E-04	1.031E-03	1.115E-03	1.391E-03	2.062E-03	3.348E-03	2.965E-03	1.117E-04
U-238	U-238	5.400E-05	5.005E-08	4.978E-08	4.924E-08	4.738E-08	4.246E-08	2.892E-08	9.650E-09	1.150E-10
U-238+D	U-238+D	9.999E-01	9.766E-04	9.713E-04	9.607E-04	9.245E-04	8.284E-04	5.642E-04	1.883E-04	2.245E-06
U-238+D	U-234	9.999E-01	1.457E-09	4.349E-09	1.004E-08	2.898E-08	7.544E-08	1.693E-07	1.689E-07	6.695E-09
U-238+D	Th-230	9.999E-01	2.571E-15	1.207E-14	4.854E-14	3.532E-13	2.586E-12	2.132E-11	9.765E-11	1.065E-10
U-238+D	Ra-226+D	9.999E-01	4.883E-17	1.104E-15	1.548E-14	4.423E-13	1.036E-11	2.881E-10	3.749E-09	9.240E-09
U-238+D	Pb-210+D	9.999E-01	1.529E-18	4.262E-17	8.422E-16	4.820E-14	2.524E-12	1.566E-10	3.194E-09	9.406E-09
U-238+D	∑DSR(j)		9.766E-04	9.714E-04	9.608E-04	9.246E-04	8.285E-04	5.644E-04	1.885E-04	2.270E-06

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Meat (p=4)
Subpathway: Fodder Foliar Uptake from Contaminated Dust (q=2)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,4,2t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.014E-05	1.010E-05	1.001E-05	9.711E-06	8.901E-06	6.561E-06	2.744E-06	1.299E-07
Ra-226+D	Pb-210+D	1.000E+00	7.036E-07	2.046E-06	4.577E-06	1.203E-05	2.454E-05	2.892E-05	1.276E-05	6.040E-07
Ra-226+D	∑DSR(j)		1.085E-05	1.215E-05	1.459E-05	2.174E-05	3.344E-05	3.548E-05	1.550E-05	7.339E-07
U-234	U-234	1.000E+00	7.386E-07	7.346E-07	7.266E-07	6.992E-07	6.265E-07	4.266E-07	1.423E-07	3.049E-09
U-234	Th-230	1.000E+00	2.319E-12	6.162E-12	1.364E-11	3.918E-11	1.069E-10	2.931E-10	5.569E-10	6.805E-10
U-234	Ra-226+D	1.000E+00	5.695E-15	4.316E-14	2.349E-13	2.093E-12	1.664E-11	1.448E-10	7.117E-10	1.567E-09
U-234	Pb-210+D	1.000E+00	2.316E-16	3.403E-15	3.850E-14	9.416E-13	1.873E-11	3.575E-10	2.547E-09	6.309E-09
U-234	∑DSR(j)		7.386E-07	7.346E-07	7.266E-07	6.993E-07	6.267E-07	4.274E-07	1.461E-07	1.160E-08
U-235+D	U-235+D	1.000E+00	6.977E-07	6.940E-07	6.864E-07	6.606E-07	5.919E-07	4.031E-07	1.345E-07	2.888E-09
U-235+D	Pa-231	1.000E+00	3.925E-09	1.240E-08	2.920E-08	8.514E-08	2.223E-07	4.990E-07	4.971E-07	3.528E-08
U-235+D	Ac-227+D	1.000E+00	9.506E-12	3.173E-11	7.955E-11	2.760E-10	9.568E-10	2.889E-09	3.234E-09	2.386E-10
U-235+D	∑DSR(j)		7.017E-07	7.065E-07	7.157E-07	7.460E-07	8.151E-07	9.050E-07	6.348E-07	3.840E-08
U-238	U-238	5.400E-05	3.594E-11	3.575E-11	3.536E-11	3.402E-11	3.049E-11	2.076E-11	6.929E-12	1.488E-13
U-238+D	U-238+D	9.999E-01	7.012E-07	6.975E-07	6.899E-07	6.639E-07	5.949E-07	4.052E-07	1.352E-07	2.903E-09
U-238+D	U-234	9.999E-01	1.046E-12	3.123E-12	7.208E-12	2.081E-11	5.417E-11	1.216E-10	1.213E-10	8.660E-12
U-238+D	Th-230	9.999E-01	2.445E-18	1.454E-17	7.029E-17	5.849E-16	4.514E-15	3.799E-14	1.750E-13	3.444E-13
U-238+D	Ra-226+D	9.999E-01	3.842E-21	6.366E-20	7.753E-19	2.058E-17	4.708E-16	1.298E-14	1.685E-13	7.474E-13
U-238+D	Pb-210+D	9.999E-01	1.314E-22	4.007E-21	9.804E-20	7.107E-18	4.167E-16	2.710E-14	5.602E-13	2.983E-12
U-238+D	∑DSR(j)		7.012E-07	6.975E-07	6.899E-07	6.639E-07	5.949E-07	4.053E-07	1.353E-07	2.916E-09

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Meat (p=4)
Subpathway: Ditch Irrigation (q=3)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,4,3t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.617E-05
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.099E-05
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.716E-05
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.246E-08	1.619E-07
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.015E-13	5.071E-13
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.581E-11	5.031E-08
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.209E-11	3.783E-08
U-234	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.251E-08	2.500E-07
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.906E-08	1.534E-07
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.725E-07	7.492E-06
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.669E-18	6.858E-09	3.779E-08
U-235+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.669E-18	9.384E-07	7.683E-06
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.042E-12	7.900E-12
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.935E-08	1.541E-07
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.323E-11	4.598E-10
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.642E-17	1.226E-15
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.418E-13	5.934E-11
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.941E-14	4.299E-11
U-238+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.941E-08	1.547E-07

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Meat (p=4)
Subpathway: Overhead Irrigation (q=4)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,4,4t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.226E-02
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.963E-02
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.189E-02
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.499E-04	2.203E-03
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.434E-09	1.224E-08
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.045E-08	4.278E-05
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.874E-08	1.253E-04
U-234	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.500E-04	2.371E-03
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.036E-04	2.087E-03
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.969E-03	2.549E-02
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.044E-13	7.150E-05	3.268E-04
U-235+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.044E-13	3.844E-03	2.790E-02
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.139E-08	1.075E-07
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.076E-04	2.098E-03
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.243E-07	6.257E-06
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.219E-12	2.727E-11
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.206E-10	5.046E-08
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.287E-10	1.423E-07
U-238+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.084E-04	2.104E-03

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Meat (p=4)
Subpathway: Livestock Water (q=5)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,4,5t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.024E-03
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.818E-02
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.721E-02
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.455E-04	8.924E-04
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.649E-10	4.398E-09
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.245E-08	1.735E-05
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.570E-08	5.072E-05
U-234	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.455E-04	9.604E-04
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.267E-04	8.454E-04
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.207E-03	1.032E-02
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.893E-14	2.911E-05	1.326E-04
U-235+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.893E-14	1.563E-03	1.130E-02
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.682E-08	4.354E-08
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.283E-04	8.496E-04
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.944E-07	2.535E-06
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.105E-13	9.451E-12
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.179E-11	2.048E-08
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.510E-10	5.796E-08
U-238+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.286E-04	8.523E-04

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Meat (p=4)
Total for All Subpathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,4,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	2.675E-01	2.664E-01	2.641E-01	2.561E-01	2.348E-01	1.730E-01	7.239E-02	3.345E-02
Ra-226+D	Pb-210+D	1.000E+00	1.059E-02	2.420E-02	4.862E-02	1.205E-01	2.411E-01	2.824E-01	1.245E-01	1.022E-01
Ra-226+D	∑DSR(j)		2.781E-01	2.906E-01	3.127E-01	3.766E-01	4.759E-01	4.554E-01	1.969E-01	1.357E-01
U-234	U-234	1.000E+00	4.053E-03	4.031E-03	3.987E-03	3.836E-03	3.438E-03	2.341E-03	1.976E-03	3.110E-03
U-234	Th-230	1.000E+00	1.162E-08	2.965E-08	6.444E-08	1.832E-07	4.985E-07	1.365E-06	2.594E-06	3.015E-06
U-234	Ra-226+D	1.000E+00	1.067E-10	9.853E-10	5.825E-09	5.409E-08	4.357E-07	3.810E-06	1.880E-05	8.597E-05
U-234	Pb-210+D	1.000E+00	3.675E-12	4.809E-11	4.660E-10	9.990E-09	1.882E-07	3.519E-06	2.498E-05	2.218E-04
U-234	∑DSR(j)		4.053E-03	4.031E-03	3.987E-03	3.837E-03	3.439E-03	2.349E-03	2.023E-03	3.421E-03
U-235+D	U-235+D	1.000E+00	3.829E-03	3.808E-03	3.766E-03	3.624E-03	3.248E-03	2.212E-03	1.868E-03	2.947E-03
U-235+D	Pa-231	1.000E+00	3.404E-05	1.153E-04	2.777E-04	8.185E-04	2.144E-03	4.820E-03	8.980E-03	3.607E-02
U-235+D	Ac-227+D	1.000E+00	8.190E-08	2.901E-07	7.247E-07	2.376E-06	7.517E-06	2.095E-05	1.234E-04	4.608E-04
U-235+D	∑DSR(j)		3.863E-03	3.923E-03	4.045E-03	4.445E-03	5.399E-03	7.053E-03	1.097E-02	3.948E-02
U-238	U-238	5.400E-05	1.972E-07	1.961E-07	1.940E-07	1.867E-07	1.673E-07	1.139E-07	9.624E-08	1.518E-07
U-238+D	U-238+D	9.999E-01	3.848E-03	3.827E-03	3.785E-03	3.643E-03	3.264E-03	2.223E-03	1.878E-03	2.962E-03
U-238+D	U-234	9.999E-01	5.739E-09	1.713E-08	3.955E-08	1.142E-07	2.972E-07	6.669E-07	1.684E-06	8.834E-06
U-238+D	Th-230	9.999E-01	1.259E-14	7.163E-14	3.365E-13	2.750E-12	2.108E-11	1.770E-10	8.162E-10	1.554E-09
U-238+D	Ra-226+D	9.999E-01	6.456E-17	1.365E-15	1.866E-14	5.265E-13	1.229E-11	3.412E-10	4.611E-09	8.330E-08
U-238+D	Pb-210+D	9.999E-01	2.067E-18	5.903E-17	1.244E-15	7.731E-14	4.231E-12	2.676E-10	5.968E-09	2.219E-07
U-238+D	∑DSR(j)		3.848E-03	3.827E-03	3.785E-03	3.643E-03	3.264E-03	2.224E-03	1.880E-03	2.971E-03

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Milk (p=5)
Subpathway: Fodder Root Uptake from Contaminated Soil (q=1)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,5,1t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	2.669E-01	2.657E-01	2.634E-01	2.555E-01	2.342E-01	1.726E-01	7.221E-02	1.898E-03
Ra-226+D	Pb-210+D	1.000E+00	2.874E-03	6.376E-03	1.261E-02	3.095E-02	6.171E-02	7.220E-02	3.183E-02	8.366E-04
Ra-226+D	∑DSR(j)		2.698E-01	2.721E-01	2.760E-01	2.865E-01	2.959E-01	2.448E-01	1.040E-01	2.735E-03
J-234	U-234	1.000E+00	2.143E-03	2.132E-03	2.109E-03	2.029E-03	1.818E-03	1.238E-03	4.129E-04	4.912E-06
J-234	Th-230	1.000E+00	1.690E-10	3.107E-10	5.556E-10	1.392E-09	3.610E-09	9.705E-09	1.834E-08	1.243E-08
J-234	Ra-226+D	1.000E+00	1.179E-10	1.027E-09	5.922E-09	5.430E-08	4.356E-07	3.803E-06	1.872E-05	2.288E-05
J-234	Pb-210+D	1.000E+00	1.113E-12	1.338E-11	1.242E-10	2.593E-09	4.837E-08	9.009E-07	6.377E-06	8.754E-06
J-234	∑DSR(j)		2.143E-03	2.132E-03	2.109E-03	2.029E-03	1.819E-03	1.243E-03	4.380E-04	3.656E-05
J-235+D	U-235+D	1.000E+00	2.025E-03	2.014E-03	1.992E-03	1.917E-03	1.718E-03	1.170E-03	3.904E-04	4.653E-06
J-235+D	Pa-231	1.000E+00	2.766E-08	8.371E-08	1.942E-07	5.620E-07	1.464E-06	3.284E-06	3.270E-06	1.288E-07
J-235+D	Ac-227+D	1.000E+00	7.689E-10	4.127E-09	1.766E-08	1.240E-07	7.119E-07	2.815E-06	3.390E-06	1.419E-07
J-235+D	∑DSR(j)		2.025E-03	2.014E-03	1.992E-03	1.918E-03	1.720E-03	1.176E-03	3.971E-04	4.924E-06
J-238	U-238	5.400E-05	1.043E-07	1.037E-07	1.026E-07	9.873E-08	8.847E-08	6.025E-08	2.011E-08	2.397E-10
J-238+D	U-238+D	9.999E-01	2.035E-03	2.024E-03	2.002E-03	1.927E-03	1.726E-03	1.176E-03	3.924E-04	4.677E-06
J-238+D	U-234	9.999E-01	3.035E-09	9.062E-09	2.092E-08	6.039E-08	1.572E-07	3.527E-07	3.519E-07	1.395E-08
J-238+D	Th-230	9.999E-01	2.282E-16	9.342E-16	3.369E-15	2.230E-14	1.565E-13	1.268E-12	5.775E-12	6.289E-12
J-238+D	Ra-226+D	9.999E-01	7.333E-17	1.449E-15	1.914E-14	5.302E-13	1.230E-11	3.407E-10	4.430E-09	1.091E-08
J-238+D	Pb-210+D	9.999E-01	6.511E-19	1.681E-17	3.357E-16	2.016E-14	1.089E-12	6.855E-11	1.404E-09	4.139E-09
J-238+D	∑DSR(j)		2.035E-03	2.024E-03	2.002E-03	1.927E-03	1.726E-03	1.176E-03	3.927E-04	4.706E-06

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Milk (p=5)
Subpathway: Fodder Foliar Uptake from Contaminated Dust (q=2)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,5,2t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	1.198E-05	1.193E-05	1.182E-05	1.147E-05	1.051E-05	7.747E-06	3.241E-06	1.534E-07
Ra-226+D	Pb-210+D	1.000E+00	3.077E-07	9.018E-07	2.022E-06	5.322E-06	1.086E-05	1.280E-05	5.648E-06	2.674E-07
Ra-226+D	∑DSR(j)		1.229E-05	1.283E-05	1.385E-05	1.679E-05	2.137E-05	2.055E-05	8.888E-06	4.209E-07
U-234	U-234	1.000E+00	1.539E-06	1.531E-06	1.514E-06	1.457E-06	1.306E-06	8.890E-07	2.965E-07	6.353E-09
U-234	Th-230	1.000E+00	1.740E-13	4.071E-13	8.483E-13	2.355E-12	6.352E-12	1.734E-11	3.290E-11	4.019E-11
U-234	Ra-226+D	1.000E+00	7.721E-15	5.414E-14	2.849E-13	2.494E-12	1.971E-11	1.711E-10	8.408E-10	1.851E-09
U-234	Pb-210+D	1.000E+00	1.018E-16	1.494E-15	1.696E-14	4.161E-13	8.287E-12	1.583E-10	1.128E-09	2.793E-09
U-234	∑DSR(j)		1.539E-06	1.531E-06	1.514E-06	1.457E-06	1.306E-06	8.893E-07	2.985E-07	1.104E-08
U-235+D	U-235+D	1.000E+00	1.454E-06	1.446E-06	1.430E-06	1.376E-06	1.233E-06	8.400E-07	2.803E-07	6.019E-09
U-235+D	Pa-231	1.000E+00	7.906E-12	1.845E-11	3.825E-11	1.042E-10	2.657E-10	5.915E-10	5.877E-10	4.167E-11
U-235+D	Ac-227+D	1.000E+00	2.964E-13	2.048E-12	1.046E-11	8.246E-11	4.940E-10	1.983E-09	2.396E-09	1.808E-10
U-235+D	∑DSR(j)		1.454E-06	1.446E-06	1.430E-06	1.377E-06	1.234E-06	8.426E-07	2.833E-07	6.241E-09
U-238	U-238	5.400E-05	7.489E-11	7.449E-11	7.367E-11	7.090E-11	6.353E-11	4.327E-11	1.444E-11	3.100E-13
U-238+D	U-238+D	9.999E-01	1.461E-06	1.453E-06	1.438E-06	1.383E-06	1.240E-06	8.442E-07	2.817E-07	6.049E-09
U-238+D	U-234	9.999E-01	2.180E-12	6.507E-12	1.502E-11	4.337E-11	1.129E-10	2.533E-10	2.527E-10	1.804E-11
U-238+D	Th-230	9.999E-01	2.063E-19	1.044E-18	4.577E-18	3.577E-17	2.698E-16	2.251E-15	1.034E-14	2.034E-14
U-238+D	Ra-226+D	9.999E-01	5.453E-21	8.200E-20	9.523E-19	2.463E-17	5.585E-16	1.535E-14	1.991E-13	8.828E-13
U-238+D	Pb-210+D	9.999E-01	5.812E-23	1.759E-21	4.314E-20	3.139E-18	1.843E-16	1.200E-14	2.480E-13	1.321E-12
U-238+D	∑DSR(j)		1.461E-06	1.453E-06	1.438E-06	1.383E-06	1.240E-06	8.445E-07	2.820E-07	6.069E-09

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Milk (p=5)
Subpathway: Ditch Irrigation (q=3)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,5,3t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.092E-05
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.216E-06
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.013E-05
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.303E-07	3.373E-07
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.699E-15	3.692E-14
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.246E-11	5.943E-08
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.259E-12	1.660E-08
U-234	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.304E-07	4.134E-07
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.232E-07	3.196E-07
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.032E-09	8.847E-09
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.325E-17	5.608E-09	2.316E-08
U-235+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.325E-17	1.299E-07	3.516E-07
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.347E-12	1.646E-11
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.239E-07	3.212E-07
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.111E-10	9.581E-10
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.409E-18	9.219E-17
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.668E-13	7.018E-11
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.635E-14	1.900E-11
U-238+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.240E-07	3.222E-07

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Milk (p=5)
Subpathway: Overhead Irrigation (q=4)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,5,4t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.629E-02
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.081E-02
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.710E-02
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.774E-03	4.590E-03
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.215E-10	8.178E-10
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.611E-08	5.054E-05
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.715E-08	5.545E-05
U-234	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.774E-03	4.696E-03
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.677E-03	4.349E-03
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.516E-06	3.011E-05
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.803E-13	7.610E-05	3.132E-04
U-235+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.803E-13	1.757E-03	4.692E-03
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.637E-08	2.240E-07
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.685E-03	4.371E-03
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.511E-06	1.304E-05
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.034E-13	1.880E-12
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.419E-10	5.969E-08
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.548E-10	6.340E-08
U-238+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.687E-03	4.384E-03

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Milk (p=5)
Subpathway: Livestock Water (q=5)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,5,5t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.217E-02
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.934E-02
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.151E-02
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.852E-03	7.356E-03
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.444E-10	1.180E-09
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.837E-08	8.108E-05
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.748E-08	8.878E-05
U-234	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.853E-03	7.526E-03
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.697E-03	6.969E-03
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.654E-06	4.825E-05
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.255E-13	1.226E-04	5.029E-04
U-235+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.255E-13	2.825E-03	7.520E-03
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.389E-07	3.590E-07
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.711E-03	7.004E-03
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.431E-06	2.089E-05
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.230E-13	2.640E-12
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.366E-10	9.577E-08
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.575E-10	1.015E-07
U-238+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.713E-03	7.025E-03

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from Ingestion of Milk (p=5)
Total for All Subpathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,5,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	3.275E-01	3.261E-01	3.233E-01	3.136E-01	2.874E-01	2.118E-01	8.862E-02	7.117E-02
Ra-226+D	Pb-210+D	1.000E+00	4.432E-03	1.094E-02	2.285E-02	5.789E-02	1.167E-01	1.370E-01	6.042E-02	8.235E-02
Ra-226+D	∑DSR(j)		3.320E-01	3.371E-01	3.461E-01	3.715E-01	4.041E-01	3.489E-01	1.490E-01	1.535E-01
U-234	U-234	1.000E+00	9.934E-03	9.880E-03	9.772E-03	9.404E-03	8.426E-03	5.737E-03	6.540E-03	1.198E-02
U-234	Th-230	1.000E+00	1.050E-09	2.372E-09	4.852E-09	1.332E-08	3.579E-08	9.751E-08	1.852E-07	2.180E-07
U-234	Ra-226+D	1.000E+00	1.570E-10	1.302E-09	7.365E-09	6.692E-08	5.354E-07	4.670E-06	2.307E-05	1.639E-04
U-234	Pb-210+D	1.000E+00	1.629E-12	2.094E-11	2.101E-10	4.700E-09	9.033E-08	1.702E-06	1.213E-05	1.671E-04
U-234	∑DSR(j)		9.934E-03	9.880E-03	9.772E-03	9.404E-03	8.427E-03	5.744E-03	6.575E-03	1.232E-02
U-235+D	U-235+D	1.000E+00	9.385E-03	9.334E-03	9.232E-03	8.884E-03	7.961E-03	5.422E-03	6.183E-03	1.135E-02
U-235+D	Pa-231	1.000E+00	6.767E-08	1.771E-07	3.878E-07	1.089E-06	2.809E-06	6.277E-06	1.541E-05	7.871E-05
U-235+D	Ac-227+D	1.000E+00	2.268E-09	1.448E-08	7.053E-08	5.409E-07	3.210E-06	1.284E-05	2.142E-04	8.172E-04
U-235+D	∑DSR(j)		9.385E-03	9.334E-03	9.232E-03	8.886E-03	7.967E-03	5.441E-03	6.413E-03	1.225E-02
U-238	U-238	5.400E-05	4.834E-07	4.807E-07	4.755E-07	4.576E-07	4.100E-07	2.792E-07	3.185E-07	5.848E-07
U-238+D	U-238+D	9.999E-01	9.432E-03	9.381E-03	9.278E-03	8.929E-03	8.001E-03	5.449E-03	6.214E-03	1.141E-02
U-238+D	U-234	9.999E-01	1.407E-08	4.200E-08	9.695E-08	2.799E-07	7.285E-07	1.635E-06	5.573E-06	3.404E-05
U-238+D	Th-230	9.999E-01	1.273E-15	6.223E-15	2.655E-14	2.035E-13	1.523E-12	1.267E-11	5.839E-11	1.138E-10
U-238+D	Ra-226+D	9.999E-01	1.009E-16	1.865E-15	2.396E-14	6.549E-13	1.512E-11	4.184E-10	5.816E-09	1.709E-07
U-238+D	Pb-210+D	9.999E-01	9.456E-19	2.572E-17	5.541E-16	3.606E-14	2.023E-12	1.293E-10	3.072E-09	1.758E-07
U-238+D	∑DSR(j)		9.432E-03	9.381E-03	9.278E-03	8.929E-03	8.001E-03	5.451E-03	6.220E-03	1.145E-02

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from the Ingestion of Fish (p=6)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,6,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.560E-03
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.100E-02
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.256E-02
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.836E-05	9.896E-05
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.177E-10	1.225E-08
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.157E-09	2.999E-06
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.168E-08	3.779E-05
U-234	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.837E-05	1.398E-04
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.627E-05	9.375E-05
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.291E-05	1.103E-04
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.129E-12	4.491E-04	1.843E-03
U-235+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.129E-12	4.983E-04	2.047E-03
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.868E-09	4.829E-09
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.645E-05	9.422E-05
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.269E-08	2.811E-07
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.925E-14	2.428E-11
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.849E-12	3.542E-09
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.108E-10	4.319E-08
U-238+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.648E-05	9.455E-05

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose/Source Ratios for Internal Radiation from the Ingestion of Drinking Water (p=7)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,7,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.461E+00
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.696E+00
Ra-226+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.157E+00
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.647E-01	4.248E-01
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.702E-08	5.742E-06
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.023E-06	2.809E-03
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.171E-06	1.025E-02
U-234	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.647E-01	4.379E-01
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.557E-01	4.024E-01
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.914E-02	3.342E-01
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.099E-09	2.124E-01	8.713E-01
U-235+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.099E-09	4.073E-01	1.608E+00
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.022E-06	2.073E-05
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.565E-01	4.045E-01
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.404E-04	1.206E-03
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.815E-11	1.139E-08
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.176E-09	3.318E-06
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.966E-08	1.172E-05
U-238+D	∑DSR(j)		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.567E-01	4.057E-01

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Plant/Air and Plant/Water Concentration Ratios

Mass loading [ASR(3)]: 1.000E-04 g/m**3
Area Factor for Mass Loading [FA(2)]: 6.264E-02

Nuclide (i)	FAR(i,3,2,1) m**3/g	FAR(i,3,2,2) m**3/g	FWR(i,3,3,1) L/g	FWR(i,3,3,2) L/g	FWR(i,3,4,1) L/g	FWR(i,3,4,2) L/g
Ac-227	5.4545E-02	2.6156E-01	2.8300E-07	4.1596E-07	3.4522E-04	1.6554E-03
Pa-231	5.4545E-02	2.6156E-01	1.1328E-06	1.6655E-06	3.4522E-04	1.6554E-03
Pb-210	5.4545E-02	2.6156E-01	1.1330E-06	1.6662E-06	3.4522E-04	1.6554E-03
Ra-226	5.4545E-02	2.6156E-01	4.5318E-06	6.6635E-06	3.4522E-04	1.6554E-03
Th-230	5.4545E-02	2.6156E-01	1.1248E-07	1.6439E-07	3.4522E-04	1.6554E-03
U-234	5.4545E-02	2.6156E-01	2.8320E-07	4.1637E-07	3.4522E-04	1.6554E-03
U-235	5.4545E-02	2.6156E-01	2.8320E-07	4.1637E-07	3.4522E-04	1.6554E-03
U-238	5.4545E-02	2.6156E-01	2.8320E-07	4.1637E-07	3.4522E-04	1.6554E-03

FAR(i,p,q,k) is the plant/air concentration ratio for airborne contaminated dust, and FWR(i,p,q,k) is the plant/water concentration ratio. See groundwater displays for water/soil concentration ratios.

Plant/Soil Concentration Ratios, FSR(i,3,q,k,t)

Root Uptake (q=1) and Foliar Dust Deposition (q=2)
Nonleafy (k=1) and/or Leafy (k=2) Vegetables

Nuclide(i) Parent	Product	FSR(i,3,1,k)	FSR(i,3,2,1)	FSR(i,3,2,2)
Ra-226+D	Ra-226+D	4.0000E-02	3.4167E-07	1.6384E-06
Ra-226+D	Pb-210+D	1.0000E-02	3.4167E-07	1.6384E-06
U-234	U-234	2.5000E-03	3.4167E-07	1.6384E-06
U-234	Th-230	1.0000E-03	3.4167E-07	1.6384E-06
U-234	Ra-226+D	4.0000E-02	3.4167E-07	1.6384E-06
U-234	Pb-210+D	1.0000E-02	3.4167E-07	1.6384E-06
U-235+D	U-235+D	2.5000E-03	3.4167E-07	1.6384E-06
U-235+D	Pa-231	1.0000E-02	3.4167E-07	1.6384E-06
U-235+D	Ac-227+D	2.5000E-03	3.4167E-07	1.6384E-06
U-238	U-238	2.5000E-03	3.4167E-07	1.6384E-06
U-238+D	U-238+D	2.5000E-03	3.4167E-07	1.6384E-06
U-238+D	U-234	2.5000E-03	3.4167E-07	1.6384E-06
U-238+D	Th-230	1.0000E-03	3.4167E-07	1.6384E-06
U-238+D	Ra-226+D	4.0000E-02	3.4167E-07	1.6384E-06
U-238+D	Pb-210+D	1.0000E-02	3.4167E-07	1.6384E-06

Plant/Soil Concentration Ratio, FSR(j,3,q,k,t)
Ditch Irrigation (q=3)

Parent (i)	Product (j)	Thread Fraction	FSR(j,3,3,k,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.829E-06
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.739E-06
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.195E-07	8.362E-07
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.242E-14	2.310E-12
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.313E-11	1.887E-08
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.271E-13	3.125E-09
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.198E-07	8.385E-07
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.093E-09	7.022E-08
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.913E-09	3.276E-08
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.727E-11	4.528E-11
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.198E-07	8.385E-07
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.718E-10	2.374E-09
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.869E-17	4.579E-15
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.563E-14	2.228E-11
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.178E-15	3.570E-12

Plant/Soil Concentration Ratio, FSR(j,3,q,k,t)
Overhead Irrigation (q=4) and Nonleafy Vegetables (k=1)

Parent (i)	Product (j)	Thread Fraction	FSR(j,3,4,1,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.488E-04
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.299E-04
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.895E-04	1.019E-03
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.882E-11	7.089E-09
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.000E-09	1.438E-06
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.825E-10	9.523E-07
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.898E-04	1.022E-03
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.466E-06	2.140E-05
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.652E-06	3.996E-05
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.105E-08	5.520E-08

Plant/Soil Concentration Ratio, FSR(j,3,q,k,t)
Overhead Irrigation (q=4) and Nonleafy Vegetables (k=1)

Parent (i)	Product (j)	Thread Fraction	FSR(j,3,4,1,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
J-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.898E-04	1.022E-03
J-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.313E-07	2.894E-06
J-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.736E-14	1.405E-11
J-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.238E-12	1.697E-09
J-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.797E-12	1.088E-09

Plant/Soil Concentration Ratio, FSR(j,3,q,k,t)
Overhead Irrigation (q=4) and Leafy Vegetables (k=2)

Parent (i)	Product (j)	Thread Fraction	FSR(j,3,4,2,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.591E-03
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.541E-03
J-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.869E-03	4.887E-03
J-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.305E-10	3.400E-08
J-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.799E-09	6.895E-06
J-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.354E-09	4.567E-06
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.871E-03	4.901E-03
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.184E-05	1.026E-04
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.631E-05	1.916E-04
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.010E-07	2.646E-07
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.871E-03	4.900E-03
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.590E-06	1.387E-05
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.861E-13	6.738E-11
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.391E-11	8.127E-09
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.580E-11	5.209E-09

Meat/Fodder, Milk/Fodder, Fodder/Air and Fodder/Water Concentration Ratios

FI(4,q): 68.0 kg/day FI(5,q): 55.0 kg/day q=1,2,3,4
FI(4,q): 50.0 L/day FI(5,q): 160.0 L/day q=5
FI(4,q): 0.5 kg/day FI(5,q):

Nuclide (i)	FQR(i,4) d/kg	FQR(i,5) d/kg	FAR(i,3,2,3) m**3/g	FWR(i,3,3,3) L/g	FWR(i,3,4,3) L/g
Ac-227	2.0000E-05	2.0000E-05	2.8659E-01	1.3326E-07	1.8139E-03
Pa-231	5.0000E-03	5.0000E-06	2.8659E-01	5.3320E-07	1.8139E-03
Pb-210	8.0000E-04	3.0000E-04	2.8659E-01	5.3327E-07	1.8139E-03
Ra-226	1.0000E-03	1.0000E-03	2.8659E-01	2.1329E-06	1.8139E-03
Th-230	1.0000E-04	5.0000E-06	2.8659E-01	5.1914E-08	1.8139E-03
U-234	3.4000E-04	6.0000E-04	2.8659E-01	1.3330E-07	1.8139E-03
U-235	3.4000E-04	6.0000E-04	2.8659E-01	1.3330E-07	1.8139E-03
U-238	3.4000E-04	6.0000E-04	2.8659E-01	1.3330E-07	1.8139E-03

FI(p,q) are the fodder (q=1,2,3,4), livestock water (q=5) and soil (q=6) intake rates; FQR(i,p) are the transfer coefficients from contaminated fodder of livestock water to meat (p=4) or milk (p=5). FAR(i,3,2,3) are the fodder/air concentration ratios, and FWR(i,3,3,3) and FWR(i,3,4,3) are the fodder/water concentration ratios for ditch and overhead irrigation, respectively.

Fodder/Soil Concentration Ratios, QSR(i,p,q,t), for Meat and Milk Pathways
Root Uptake (q=1) and Foliar Dust Deposition (q=2)

Nuclide(i) Parent	Product	QSR(i,p,1)	QSR(i,p,2)
Ra-226+D	Ra-226+D	4.0000E-02	1.7952E-06
Ra-226+D	Pb-210+D	1.0000E-02	1.7952E-06
U-234	U-234	2.5000E-03	1.7952E-06
U-234	Th-230	1.0000E-03	1.7952E-06
U-234	Ra-226+D	4.0000E-02	1.7952E-06
U-234	Pb-210+D	1.0000E-02	1.7952E-06
U-235+D	U-235+D	2.5000E-03	1.7952E-06
U-235+D	Pa-231	1.0000E-02	1.7952E-06
U-235+D	Ac-227+D	2.5000E-03	1.7952E-06
U-238	U-238	2.5000E-03	1.7952E-06
U-238+D	U-238+D	2.5000E-03	1.7952E-06
U-238+D	U-234	2.5000E-03	1.7952E-06
U-238+D	Th-230	1.0000E-03	1.7952E-06
U-238+D	Ra-226+D	4.0000E-02	1.7952E-06
U-238+D	Pb-210+D	1.0000E-02	1.7952E-06

Fodder/Soil Concentration Ratio, QSR(j,p,q,t),for Meat and Milk Pathways
Ditch Irrigation (q=3)

Parent (i)	Product (j)	Thread Fraction	QSR(j,p,3,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.626E-06
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.186E-07
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.499E-07	3.939E-07
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.028E-14	1.066E-12
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.114E-12	8.880E-09
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.316E-13	1.471E-09
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.500E-07	3.950E-07
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.795E-09	3.308E-08
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.719E-09	1.544E-08
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.102E-12	2.133E-11

Fodder/Soil Concentration Ratio, QSR(j,p,q,t),for Meat and Milk Pathways
Ditch Irrigation (q=3)

Parent (i)	Product (j)	Thread Fraction	QSR(j,p,3,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.500E-07	3.950E-07
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.275E-10	1.118E-09
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.094E-18	2.113E-15
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.551E-14	1.048E-11
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.444E-15	1.679E-12

Fodder/Soil Concentration Ratio, QSR(j,p,q,t),for Meat and Milk Pathways
Overhead Irrigation (q=4)

Parent (i)	Product (j)	Thread Fraction	QSR(j,p,4,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.934E-03
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.784E-03
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.040E-03	5.360E-03
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.593E-10	3.724E-08
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.200E-09	7.552E-06
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.468E-09	5.002E-06
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.042E-03	5.375E-03
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.291E-05	1.125E-04
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.062E-05	2.101E-04
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.103E-07	2.903E-07
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.042E-03	5.375E-03
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.735E-06	1.521E-05
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.828E-13	7.382E-11
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.319E-11	8.909E-09
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.314E-12	5.711E-09

Fodder/Soil Concentration Ratio, QSR(j,p,q,t),for Meat and Milk Pathways
Livestock Water (q=5)

Parent (i)	Product (j)	Thread Fraction	QSR(j,p,5,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.169E-03
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.535E-03
J-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.128E-03	2.953E-03
J-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.992E-10	2.053E-08
J-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.892E-09	4.165E-06
J-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.177E-10	2.758E-06
J-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.129E-03	2.961E-03
J-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.141E-06	6.199E-05
J-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.795E-05	1.158E-04
J-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.095E-08	1.599E-07
J-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.129E-03	2.961E-03
J-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.594E-07	8.382E-06
J-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.642E-13	4.072E-11
J-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.190E-11	4.921E-09
J-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.827E-12	3.155E-09

Meat/Soil Concentration Ratios, FSR(i,4,q,t)
Root Uptake (q=1) and Foliar Dust Deposition (q=2)

Nuclide(i) Parent	Product	FSR(i,4,1)	FSR(i,4,2)
Ra-226+D	Ra-226+D	2.7200E-03	1.2207E-07
Ra-226+D	Pb-210+D	0.0000E+00	0.0000E+00
U-234	U-234	5.7800E-05	4.1505E-08
U-234	Th-230	0.0000E+00	0.0000E+00
U-234	Ra-226+D	0.0000E+00	0.0000E+00
U-234	Pb-210+D	0.0000E+00	0.0000E+00
U-235+D	U-235+D	5.7800E-05	4.1505E-08
U-235+D	Pa-231	0.0000E+00	0.0000E+00
U-235+D	Ac-227+D	0.0000E+00	0.0000E+00
U-238	U-238	3.1212E-09	2.2413E-12
U-238+D	U-238+D	5.7797E-05	4.1503E-08
U-238+D	U-234	0.0000E+00	0.0000E+00
U-238+D	Th-230	0.0000E+00	0.0000E+00
U-238+D	Ra-226+D	0.0000E+00	0.0000E+00
U-238+D	Pb-210+D	0.0000E+00	0.0000E+00

Meat/Soil Concentration Ratio, FSR(j,4,q,t)
Ditch Irrigation (q=3)

Parent (i)	Product (j)	Thread Fraction	FSR(j,4,3,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.146E-07
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.532E-08
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.466E-09	9.107E-09
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.201E-15	1.022E-14
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.158E-13	6.038E-10
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.466E-14	8.154E-11
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.469E-09	9.133E-09
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.291E-09	1.125E-08
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.058E-12	2.109E-11
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.873E-13	4.932E-13

Meat/Soil Concentration Ratio, FSR(j,4,q,t)
Ditch Irrigation (q=3)

Parent (i)	Product (j)	Thread Fraction	FSR(j,4,3,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.469E-09	9.133E-09
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.948E-12	2.585E-11
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.017E-18	2.280E-17
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.054E-15	7.123E-13
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.357E-16	9.317E-14

Meat/Soil Concentration Ratio, FSR(j,4,q,t)
Overhead Irrigation (q=4)

Parent (i)	Product (j)	Thread Fraction	FSR(j,4,4,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.675E-04
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.517E-04
J-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.716E-05	1.239E-04
J-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.783E-11	2.937E-10
J-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.536E-10	5.135E-07
J-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.063E-11	2.726E-07
J-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.720E-05	1.243E-04
J-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.391E-06	3.826E-05
J-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.865E-08	2.853E-07
J-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.549E-09	6.711E-09
J-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.720E-05	1.243E-04
J-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.012E-08	3.518E-07
J-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.501E-14	6.168E-13
J-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.967E-13	6.058E-10
J-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.533E-13	3.113E-10

Meat/Soil Concentration Ratio, FSR(j,4,q,t)
Livestock Water (q=5)

Parent (i)	Product (j)	Thread Fraction	FSR(j,4,5,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.084E-04
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.140E-05
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.917E-05	5.020E-05
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.960E-13	1.027E-10
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.446E-10	2.082E-07
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.271E-11	1.103E-07
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.919E-05	5.034E-05
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.785E-06	1.550E-05
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.795E-08	1.158E-07
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.036E-09	2.718E-09
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.919E-05	5.034E-05
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.631E-08	1.425E-07
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.211E-16	2.036E-13
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.949E-13	2.461E-10
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.131E-13	1.262E-10

Milk/Soil Concentration Ratios, FSR(i,5,q,t)
Root Uptake (q=1) and Foliar Dust Deposition (q=2)

Nuclide(i) Parent	Product	FSR(i,5,1)	FSR(i,5,2)
Ra-226+D	Ra-226+D	2.2000E-03	9.8736E-08
Ra-226+D	Pb-210+D	0.0000E+00	0.0000E+00
U-234	U-234	8.2500E-05	5.9242E-08
U-234	Th-230	0.0000E+00	0.0000E+00
U-234	Ra-226+D	0.0000E+00	0.0000E+00
U-234	Pb-210+D	0.0000E+00	0.0000E+00
U-235+D	U-235+D	8.2500E-05	5.9242E-08
U-235+D	Pa-231	0.0000E+00	0.0000E+00
U-235+D	Ac-227+D	0.0000E+00	0.0000E+00
U-238	U-238	4.4550E-09	3.1990E-12
U-238+D	U-238+D	8.2496E-05	5.9238E-08
U-238+D	U-234	0.0000E+00	0.0000E+00
U-238+D	Th-230	0.0000E+00	0.0000E+00
U-238+D	Ra-226+D	0.0000E+00	0.0000E+00
U-238+D	Pb-210+D	0.0000E+00	0.0000E+00

Milk/Soil Concentration Ratio, FSR(j,5,q,t)
Ditch Irrigation (q=3)

Parent (i)	Product (j)	Thread Fraction	FSR(j,5,3,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
ta-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.544E-07
ta-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.375E-08
-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.953E-09	1.300E-08
-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.861E-17	4.132E-16
-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.350E-13	4.884E-10
-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.494E-15	2.473E-11
-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.957E-09	1.303E-08
-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.045E-12	9.094E-12
-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.094E-12	1.705E-11
-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.677E-13	7.037E-13

Milk/Soil Concentration Ratio, FSR(j,5,q,t)
Ditch Irrigation (q=3)

Parent (i)	Product (j)	Thread Fraction	FSR(j,5,3,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.957E-09	1.303E-08
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.214E-12	3.689E-11
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.126E-20	9.226E-19
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.476E-15	5.800E-13
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.259E-17	2.846E-14

Milk/Soil Concentration Ratio, FSR(j,5,q,t)
Overhead Irrigation (q=4)

Parent (i)	Product (j)	Thread Fraction	FSR(j,5,4,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.164E-04
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.602E-05
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.740E-05	1.768E-04
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.219E-13	1.188E-11
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.849E-10	4.154E-07
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.451E-11	8.270E-08
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.746E-05	1.773E-04
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.557E-09	3.094E-08
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.556E-08	2.307E-07
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.643E-09	9.576E-09
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.745E-05	1.773E-04
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.734E-08	5.020E-07
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.108E-16	2.496E-14
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.255E-12	4.933E-10
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.426E-13	9.512E-11

Milk/Soil Concentration Ratio, FSR(j,5,q,t)
Livestock Water (q=5)

Parent (i)	Product (j)	Thread Fraction	FSR(j,5,5,t) * SF(j,t) At Time in Years 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.470E-04
Ra-226+D	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.368E-05
U-234	U-234	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.084E-04	2.834E-04
U-234	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.597E-13	1.643E-11
U-234	Ra-226+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.638E-10	6.664E-07
U-234	Pb-210+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.927E-11	1.324E-07
U-235+D	U-235+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.085E-04	2.842E-04
U-235+D	Pa-231	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.720E-09	4.958E-08
U-235+D	Ac-227+D	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.951E-08	3.704E-07
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.858E-09	1.535E-08
U-238+D	U-238+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.085E-04	2.842E-04
U-238+D	U-234	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.222E-08	8.045E-07
U-238+D	Th-230	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.383E-16	3.256E-14
U-238+D	Ra-226+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.311E-12	7.854E-10
U-238+D	Pb-210+D	9.999E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.582E-13	1.510E-10

Dose/Source Ratios for Soil Ingestion Pathway (p=8)
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,8,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.000E+00	3.608E-02	3.592E-02	3.561E-02	3.454E-02	3.166E-02	2.334E-02	9.762E-03	4.622E-04
Ra-226+D	Pb-210+D	1.000E+00	3.057E-03	9.016E-03	2.027E-02	5.340E-02	1.091E-01	1.286E-01	5.670E-02	2.685E-03
Ra-226+D	∑DSR(j)		3.914E-02	4.494E-02	5.588E-02	8.795E-02	1.407E-01	1.519E-01	6.646E-02	3.147E-03
U-234	U-234	1.000E+00	7.726E-03	7.684E-03	7.600E-03	7.313E-03	6.553E-03	4.462E-03	1.488E-03	3.189E-05
U-234	Th-230	1.000E+00	6.740E-08	2.017E-07	4.681E-07	1.378E-06	3.792E-06	1.042E-05	1.982E-05	2.422E-05
U-234	Ra-226+D	1.000E+00	2.344E-11	1.637E-10	8.595E-10	7.516E-09	5.938E-08	5.155E-07	2.533E-06	5.575E-06
U-234	Pb-210+D	1.000E+00	9.973E-13	1.482E-11	1.694E-10	4.170E-09	8.315E-08	1.589E-06	1.132E-05	2.804E-05
U-234	∑DSR(j)		7.726E-03	7.684E-03	7.600E-03	7.315E-03	6.557E-03	4.474E-03	1.522E-03	8.973E-05
U-235+D	U-235+D	1.000E+00	7.299E-03	7.259E-03	7.179E-03	6.909E-03	6.191E-03	4.216E-03	1.407E-03	3.021E-05
U-235+D	Pa-231	1.000E+00	3.059E-06	9.131E-06	2.108E-05	6.085E-05	1.583E-04	3.551E-04	3.536E-04	2.509E-05
U-235+D	Ac-227+D	1.000E+00	4.484E-08	3.089E-07	1.575E-06	1.241E-05	7.432E-05	2.983E-04	3.604E-04	2.720E-05
U-235+D	∑DSR(j)		7.302E-03	7.268E-03	7.202E-03	6.982E-03	6.424E-03	4.870E-03	2.121E-03	8.250E-05
U-238	U-238	5.400E-05	3.759E-07	3.739E-07	3.698E-07	3.558E-07	3.189E-07	2.172E-07	7.247E-08	1.556E-09
U-238+D	U-238+D	9.999E-01	7.335E-03	7.295E-03	7.216E-03	6.944E-03	6.222E-03	4.238E-03	1.414E-03	3.036E-05
U-238+D	U-234	9.999E-01	1.094E-08	3.266E-08	7.539E-08	2.177E-07	5.666E-07	1.271E-06	1.268E-06	9.057E-08
U-238+D	Th-230	9.999E-01	6.363E-14	4.440E-13	2.330E-12	2.032E-11	1.594E-10	1.349E-09	6.227E-09	1.226E-08
U-238+D	Ra-226+D	9.999E-01	1.661E-17	2.483E-16	2.875E-15	7.425E-14	1.683E-12	4.623E-11	5.996E-10	2.659E-09
U-238+D	Pb-210+D	9.999E-01	5.657E-19	1.739E-17	4.301E-16	3.144E-14	1.849E-12	1.204E-10	2.490E-09	1.326E-08
U-238+D	∑DSR(j)		7.335E-03	7.295E-03	7.216E-03	6.944E-03	6.223E-03	4.239E-03	1.415E-03	3.048E-05

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Dose Conversion and Environmental Transport Factors for the Soil Ingestion Pathway (p=8)

Parent (i)	Product (j)	DCF(j,8)*	ETF(j,8,t) At Time in Years (g/yr)							
			0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ra-226+D	Ra-226+D	1.321E-03	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01
Ra-226+D	Pb-210+D	7.276E-03	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01
U-234	U-234	2.830E-04	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01
U-234	Th-230	5.480E-04	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01
U-234	Ra-226+D	1.321E-03	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01
U-234	Pb-210+D	7.276E-03	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01
U-235+D	U-235+D	2.673E-04	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01
U-235+D	Pa-231	1.060E-02	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01
U-235+D	Ac-227+D	1.480E-02	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01
U-238	U-238	2.550E-04	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01
U-238+D	U-238+D	2.687E-04	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01
U-238+D	U-234	2.830E-04	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01
U-238+D	Th-230	5.480E-04	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01
U-238+D	Ra-226+D	1.321E-03	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01
U-238+D	Pb-210+D	7.276E-03	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01	2.738E+01

* - The dose conversion factor units are mrem/pCi.