# YANKEE ATOMIC ELECTRIC COMPANY

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December 22, 2004
BYR 2004-136

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D C 20555

Reference: (a) License No. DPR-3 (Docket 50-29)

Subject: Yankee Nuclear Power Station - Request for Approval of Proposed Procedures in accordance with 10 CFR 20.2002

Yankee Atomic Electric Company (YAEC) proposes to transfer certain of its solid waste from decommissioning of the Yankee Nuclear Power Station (YNPS) facilities (e.g., structures and buildings) to a disposal facility. Specifically, YAEC proposes to dispose of demolition debris from decommissioning of the YNPS facilities to the Waste Control Specialists (WCS), LLC Facility, located in Andrews, Texas. The purpose of this letter is to request NRC approval of proposed procedures for disposal of certain demolition debris in accordance with the provisions of 10 CFR 20.2002.

A description of the waste material for disposal that potentially contains licensed material is provided in Attachment 1. This description includes the physical and chemical properties important to risk evaluation and the proposed manner and conditions of waste disposal. In addition, YAEC has performed a conservative radiological assessment of the demolition debris material and determined that the potential dose to workers involved in the transportation and placement of the waste at the site and to members of the public after closure of the facility as a consequence of the proposed waste disposal will be no more than a few millirem per year Total Effective Dose Equivalent (TEDE) and a small fraction of NRC limits for exposure to members of the public of 25 millirem/yr TEDE.

YAEC hereby requests expedited review and approval of this request by April 31, 2005 to support our decommissioning activities at the YNPS.

If you should have any questions regarding this submittal, please contact me at (413)-424-2217.

Sincerely,

YANKEE ATOMIC ELECTRIC COMPANY

J. A. Kay

J. A. Kay
Principal Licensing Engineer

NMSS01

Attachments:

(1) Evaluation in Support of Alternate Waste Disposal Procedure in Accordance with 10 CFR 20.2002
(2) Waste Characterization Data (Steel, Soil & Concrete)
(3) Resident/Farmer Dose Assessment

cc: S. J. Collins, NRC Region 1 Administrator
J. Hickman, NRC Senior Project Manager, NMSS, SFPO
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R. Walker, Director, MADPH

Docket No. 50-29
BYR 2004-136

# Attachment 1

## Yankee Nuclear Power Station

## Evaluation in Support of Alternate Waste Disposal Procedures In Accordance with 10 CFR 20.2002

December 2004

# Yankee Nuclear Power Station
# Evaluation in Support of Alternate Waste Disposal Procedures
# In accordance with 10 CFR 20.2002

## 1.0 INTRODUCTION

Approval of the proposed disposal procedures in accordance with the provisions of 10 CFR 20.2002 would allow Yankee Atomic Electric Company (YAEC) to dispose of demolition debris from the Yankee Nuclear Power Station (YNPS) decommissioning activities at the WCS Facility in Andrews, Texas. This attachment provides a conservative assessment of the radiological impacts of the proposed disposal. The following Sections describe disposal site characteristics, the waste material, the radiological assessment and conclusions. The main conclusion is that the potential dose to workers involved in the transportation and placement of the waste at the site and to members of the public after closure of the facility as a consequence of the proposed waste disposal will be no more than a few millirem per year Total Effective Dose Equivalent (TEDE) and a small fraction of NRC limits for exposure to members of the public of 25 millirem/yr TEDE.

## 2.0 DISPOSAL SITE CHARACTERISTICS

This section describes the features of the disposal facility of importance in radiological assessment. It describes in turn the geographical and physical environment of the facility, the engineered features, the permits under which the site operates, site operations, radiation monitoring, and post-closure plans. A complete description of the site is provided in documents submitted to the US NRC in support of an application for license to authorize near-surface land disposal of low-level radioactive waste (Proposed Radioactive License Number RW-4100). A description of the key features in detail sufficient to support radiological analysis is provided herein.

### 2.1 Environment and Facility Design

The WCS site is located near Andrews, Texas on the Texas and New Mexico border. Andrews is approximately 77 miles northwest of Midland, Texas. The disposal site address is 9998 West Highway 176 Andrews, Texas 79714.

The most significant natural site features that appear to limit the transport of radioactive material are the low precipitation rate and the long vertical distance to groundwater. The precipitation rate in this arid location is 0.355 meters per year (Reference 6.4 - WCS Radiological Environmental Monitoring Summary Report for 2002). The depth to groundwater accommodates a 5-meter thick cover, a 22.86 -meter thick disposal zone, and a 300-meter thick unsaturated zone between the base of the disposal cell and groundwater (Reference 6.5 Permit No. HW-50358).

A number of engineered features designed to enhance confinement performance has been incorporated in the facility. The most important from the standpoint of radioactive material confinement is the 5-meter thick, low permeability, erosion resistant cover to be constructed at cell closure. This final cover is to be constructed of compacted red bed clay in conjunction with a 40-mil HDPE liner. The HDPE cover liner is to be integrated with a similar liner along the sides and bottom of the cell. The confinement effectiveness of the HDPE liner is ignored in this analysis to assure that projections of potential radiation dose are conservatively maximal.

Together, the low precipitation rate, the thick, low-permeability cover, and the thick unsaturated zone minimize the potential for long term infiltration, dissolution, and transport of constituents to groundwater. The thick cover also minimizes the potential for exposure of waste material radionuclides by erosion or intrusion and minimizes release of radon gas to the atmosphere (although the dose due to the release of radon is shown to be insignificant in these analyses).

Other facility design features and operating procedures provide shorter term confinement of radioactive materials and limit the potential for radiation exposure during receipt of material and emplacement of materials in the cell. WCS adheres to ALARA (Reference 6.8 WCS Radiation Safety Program).

The total capacity of the cell which would receive the YNPS waste is approximately 127,426 cubic meters. The surface area of the cell is approximately 5,574 square meters. The material that YAEC proposes for disposal if occupying the full depth of this cell would have a surface area of approximately 750 square meters. This means that the YNPS material would occupy a small percentage of the total volume of this disposal cell.

**2.2 Permits**

The WCS site is a Subtitle C RCRA hazardous waste disposal facility permitted under the Texas Administrative Code (TAC), RCRA and TSCA. WCS holds a radioactive material license issued by the State of Texas Department of State Health Services. In accordance with its regulations and permit conditions, the site has been receiving certain radioactive materials exempt from Nuclear Regulatory Commission licensing requirements, including material from Honeywell, Mallickrodt Chemical, Molycorp and US EPA region IV since 2001.

Disposal of radioactive materials at the WCS site is regulated under the State of Texas, Texas Department of Health (TDH) or Texas Commission of Environmental Quality (TECQ). These regulations establish radiation protection standards and permit conditions for disposal of these materials at a permitted disposal facility under the authority of 25 Texas Administrative Code 289.201, "General Provisions for Radioactive Material".

Under the State of Texas TDH general protection standards, all owners and operators disposing of radioactive materials are required to conduct operations in a manner consistent with 25 Texas Administrative Code 289.202, "Standards for Protection

Against Radiation from Radioactive Material." In addition, no owner or operator may operate in a manner such that any member of the public would receive an annual TEDE in excess of 100 millirem per year. In addition, no person may release radioactive material for unrestricted use in such a manner that the reasonable maximally exposed individual would receive an annual TEDE greater than 10 millirem per year.

The facility owner or operator is also required to comply with each of the following license conditions:

- Waste acceptance criteria for radioactive material;

- An environmental monitoring program that monitors air, ground water, surface water and soil for radionuclides and ambient radiation levels in the environs of the facility, and which demonstrates that no member of the general public is likely to exceed a radiation dose of 100 millirem per year from operations conducted at the site.

As previously mentioned, the analysis to follow will show that the YNPS material proposed for disposal at the WCS facility will result in doses that are a small fraction of the applicable limits.

**2.3 Operations**

WCS site accepts only wastes that conform to documented waste acceptance criteria. This is implemented in the form of a two-step pre-acceptance protocol. In the first step, the generator prepares a chemical and physical characterization of the waste stream on a WCS standard form. The second step is an evaluation performed by WCS to determine the acceptability of the waste. No waste is shipped until the waste is determined to be acceptable by WCS.

Waste acceptance criteria applicable to the material intended for disposal are as follows:

- WCS Waste Acceptance Criteria (Reference 6.6)
- WCS Waste Acceptance Plan ( Reference 6.7)

WCS is required by condition of its license to operate in a way that assures that the highest potential dose to a member of the public is 100 millirem TEDE per year from operations or 10 millirem TEDE per year from release of radioactive materials for unrestricted use.

To meet these requirements, WCS conducts its operations in accordance with its Radiation Safety Program (Reference 6.8) and other operating procedures. These procedures include measures for minimizing release of material in receipt and handling. Workers use mechanized equipment to transfer and deposit material in the disposal cell. Dust suppression techniques are used daily for materials placed in the cell to minimize the potential for release of radioactive materials to the atmosphere.

To assist in demonstrating compliance with these requirements, WCS also operates a radiation monitoring program. The program includes:

- Personnel dosimetry and bioassay program,
- Periodic collection of grab air samples collected at selected locations in and around the site with analysis for radon,
- Radon progeny, beta and gamma radionuclides,
- Periodic samples of any liquid effluent from within contaminated areas prior to release to offsite bodies, such as sanitary or storm drains,
- Periodic deployment and collection and analysis of passive track-etch detectors with analysis for radon concentration, and,
- Periodic deployment and collection of passive dosimeters at locations around the perimeter of the cell with analysis for direct radiation exposure.

The following samples are analyzed for isotopic uranium and thorium, Ra-226, gamma isotopic, Gross Alpha and Gross Beta radioactivity:

- Periodic collection of grab air samples during material transfer
- operations,
- Periodic collection of continuous air samples from the admin/lab area,
- Periodic collection of soil samples from locations downwind of the disposal area, and,
- Periodic collection of groundwater samples from 18 monitoring wells (8 up gradient and 10 down gradient) with analysis for gross activity.

**2.4 Post-Closure Plan**

As required by the State of Texas, Texas Commission on Environmental Quality (TCEQ), WCS maintains an approved closure plan, submitted as part of its permit application (Reference 6.5). The plan conforms to all standard closure and post-closure requirements applicable to RCRA disposal facilities, including post-closure monitoring and financial assurance.

The plan provides reasonable assurance that the general radiation protection standard for the public (TEDE of 10 millirem per year) will not be exceeded. It should be noted that this standard for post closure exposure to a member of the public is set below the NRC standard for unconditional release of an NRC licensed facility which is 25 millirem per year TEDE.

## 3.0 DESCRIPTION OF WASTE

### 3.1 Physical Properties

The waste material intended for disposal includes structural steel, soils associated with foundation excavations and PCB remediation, and concrete and/or pavement or other similar solid materials. The waste material proposed for disposal at the WCS facility will originate from the demolition and removal of structures and paved surfaces at the YNPS plant site, after the structure/surface has been decontaminated to remove areas that are contaminated.

The physical form of this demolition debris will be that of bulk material of various sizes ranging from the size of sand grains up to occasional monoliths with a volume of several cubic feet. YAEC, for the purpose of calculations, assumed the material to be a homogeneous mixture with a specific density of 1 gram per cubic centimeter during shipment and 1.5 grams per cubic centimeter after compaction in the disposal cell at WCS. The material will be dry solid waste containing no absorbents or chelating agents.

### 3.2 Estimated Waste Volume

It is estimated that the mass of demolition debris originating from the decommissioning of the YNPS will total approximately 60 million pounds. A breakdown of this waste by source is shown below in Table 3.2.1.

**Table 3.2 .1**

| Source of Waste | Estimated Waste Weight (pounds) |
|---|---|
| Steel | 5,000,000 |
| Soil and Asphalt | 15,000,000 |
| Reactor Support Structure (RSS) Concrete | 30,000,000 |
| Other Concrete | 10,000,000 |
| Total | 60,000,000 |

With an assumed density of 1.51 grams per cubic centimeter, (after compaction at the disposal site) the estimated volume of material to be disposed of at the WCS facility is approximately 250,000 cubic feet. This represents a small percentage of the annual volume of waste at the WCS facility. It will be conservatively assumed that all the YNPS waste material is shipped to and received at the WCS facility in one year starting in 2005. Each shipment will be assumed to at the maximum road weight of 45,000 lb. Based on a shipping capacity, obtained from the shipping contractor, of 36 shipments per week, a total waste mass of approximately 84 million pounds will be considered in this analysis.

The material will not be isolated or dedicated to a single burial cell at the WCS facility. Rather, it will be co-mingled with other radioactive and non radioactive waste material. The material will be covered at the end of each workday with an appropriate spray to lockdown contamination in accordance with WCS facility requirements.

### 3.3 Radiological Characterization of Waste

#### 3.3.1 Background

YAEC is conducting extensive characterization of the remaining contaminated structures and soils on the site. The remaining structures have undergone extensive remediation over the course of the decommissioning and only low levels of residual contamination remain. The radioisotopic distributions presented in Attachment 2, Tables 1-4 represent typical radionuclide fractions for the waste form categories listed in Table 3.2.1. To ensure proper characterization of waste prior to shipment, specific and/or additional characterization data will be used as appropriate.

Structural materials are expected to have only low levels of surface contamination. Any rebar encased in concrete is also expected to be much less than the surface contamination levels as it is located below the depth to which most of the surface contamination is located and therefore can be treated the same as the concrete.

#### 3.3.2 Characterization Results

Table 3.2.1 provides the estimated quantities of waste materials from the below sources. The information provided below represents some typical characterization data for each expected waste form. However, this radiological evaluation will result in the use of a volumetric contamination limit (pCi/g). This limit will be applied to all material that is shipped to WCS by using the Yankee truck monitoring system. This system contains 8 collimated high purity germanium detectors (HPGe) capable of detecting well below the limits established in this evaluation.

The data in Table 3.2.1 will be compared to the limits established in this evaluation to provide an estimate of the doses to members of the public from the transport and disposal of this waste. Details of the waste forms that Yankee proposes to dispose of at the WCS facility are as follows:

<u>Steel</u>

As noted in Table 3.2.1, 5 million pounds of steel is estimated for disposal at the WCS facility. The majority of the estimate consists of ~1 inch thick plate steel from the containment shell and plate steel walkways which were within the containment structure. These steel surfaces have been surveyed during dismantlement and have contamination levels in the range of 1000-2000 dpm/100sqcm. Other steel components in this category include steel beams, pipe, and framework which also have contamination levels in the

range of 1000-2000 dpm/100sqcm. Attachment 2, Table 1 presents a conservative isotopic distribution to represent this material category.

Soil and Asphalt

As noted in Table 3.2.1, 15 million pounds of soil and asphalt is estimated for disposal at the WCS facility. The soil and asphalt in this category originate from a number of areas on site and will contain low concentrations of radionuclides and may also contain PCB's. Attachment 2, Table 2 presents a conservative isotopic distribution to represent this material category.

Reactor Support Structure (RSS) Concrete

As noted in Table 3.2.1, 30 million pounds of concrete from the RSS is estimated for disposal at the WCS facility. The RSS has undergone extensive remediation and is currently ready for demolition. As a point of reference, extensive direct measurement surveys and characterization results indicate that the RSS would meet NRC Final Status Survey (FSS) unrestricted release requirements if it were to remain on site. Surveys indicate that in general, contamination levels are below 5000 dpm/100sqcm with small areas that exceed this level. Attachment 2, Table 3 presents a representative isotopic distribution that can be applied to this material category.

Other Concrete

As noted in Table 3.2.1, 10 million pounds of concrete in this material category is estimated for disposal at the WCS facility. Concrete in this material category originates from the Spent Fuel Pool (SFP), the Ion Exchange Pit (IXP), the Primary Auxiliary Building (PAB), and miscellaneous slabs. Attachment 2, Table 4 presents an isotopic distribution from the SFP that conservatively represents the concrete in this material category.

## 4.0 RADIOLOGICAL ASSESSMENTS

### 4.1 Transport Worker Dose Assessment

The Transportation Scenario Maximally Exposed Individual (MEI) dose equivalent will not exceed a few (e.g., five (5)) millirem/yr. This standard of a "few mrem/yr" to a member of the public prior to license termination is defined in NRC Regulatory Issue Summary 2004-08 (Reference 6.4). The transportation workers and worker at the WCS site are treated as members of the public as the WCS site is not licensed by the NRC. Evaluations of both internal and external dose hazards to the transportation worker are discussed below.

Each conveyance will be a strong-tight container and will be verified to be in compliance with Department of Transportation (DOT) external loose surface contamination limits

prior to shipment. Therefore, there are no internal dose hazards associated with the Transportation Scenario.

The conservative average activity concentration for each container was calculated using the penetrating gamma dose rates associated with cobalt-60 and cesium-137. The geometry model was based on a container with dimensions of 215.9 cm (7'10") length, 584.2 cm (19' 2") width, and 154.94 cm (5' 1") height with a volume of 19.5 cubic meters or 25 cubic yards. Three waste medias were used to calculate gamma exposures to the Maximally Exposed Individual (MEI), concrete rubble, soil with some moisture content, and scrap iron. Worst-case exposures were used in the resultant dose rate model, which in this case is from scrap iron. Using Microshield©, the following dose receptor points were modeled for cobalt-60 and cesium-137 separately:

- A worst case, approximately 1 meter (3 feet) receptor point adjacent center of the length or "side view" of the container for workers loading and securing the shipment;

- A typical 1.5 meter (5 feet) receptor point adjacent to the center of the length or "side view" of the container for miscellaneous worker tasks such as inspection and off loading; and

- A theoretical "driver" receptor point of 3 meters (10 feet) for transport to the TSD facility.

The resultant dose rates to each of these receptor points for cobalt-60 are 0.863 uR/hr, 0.553 uR/hr, and 0.238 uR/hr, respectively. For cesium-137, the dose rates for the same receptor points are 0.165 uR/hr, 0.106 uR/hr and 0.0455 uR/hr .

The assessment of dose to typical MEIs was modeled with a "time and motion" task analysis, some of which was provided by the WCS facillity. It is expected that 36 containers a week for 52 weeks a year will be sent to WCS for subsequent disposal. This represents 84 million pounds. Soil concentrations of 1 pCi/g for each radionuclide of concern were used to calculate exposure rates. Based upon these parameters, the calculated exposure times and rates to each MEI is provided in Table 4.1.2.

**Table 4.1.2:**
**Estimated Exposure for Waste Transport for 1 pCi/g Co-60 and Cs-137**

| Maximum Exposed Individual | Hours/ year | Co-60 Max. Exposure Rate (mR/hr) | Max. Exposure (mR/yr) | Cs-137 Max. Exposure Rate (mR/hr) | Max. Exposure (mR/yr) |
|---|---|---|---|---|---|
| Driver-load truck | 104 | 0.000863 | 0.0898 | 0.000165 | 0.0171 |
| Driver-load truck | 260 | 0.000238 | 0.0618 | 0.0000455 | 0.0118 |
| Driver Total Exposure | - | - | 0.152 | - | 0.0290 |
| Rail yard worker | 156 | 0.000863 | 0.135 | 0.000165 | 0.0257 |
| Railroad engineer | 104 | 0.000553 | 0.0575 | 0.000106 | 0.0110 |
| Landfill driver | 936 | 0.000553 | 0.517 | 0.000106 | 0.099 |
| Landfill operator | 468 | 0.000553 | 0.259 | 0.000106 | 0.0495 |

As demonstrated in Table 4.1.2, based on the 1 pCi/g concentration, the Maximum Exposed Individual is the "Landfill Driver" with an exposure time of 936 hours and 0.517 mR/yr dose for Co-60 and 0.099 mR/yr dose for Cs-137. It is qualitatively judged to be non-credible that the Transportation and Disposal Scenario Maximum Exposed Individual (MEI) (e.g. transportation worker, disposal facility worker or any other member of the public interacting with the transport and disposal activity) would exceed these occupancy times. Additionally, this dose assumes that the same individual provides this function for each load. Based on the personnel staffing levels at the WCS facility, this dose is expected to be divided among approximately 10 workers. However, this analysis will maintain a major portion of this conservatism since this exposure will be shared by only two workers.

Therefore, based upon the landfill driver MEI scenario, soil radionuclide concentrations that equate to a 5 mR/yr exposure is a maximum radionuclide concentration value of 20 pCi/g for Co-60, and for Cs-137, a value of 100 pCi/g. For waste containing mixtures of Co-60 and Cs-137, the sum of the fraction or unity equation would be applied, results not to exceed unity or "1". These limits will be implemented at the Yankee site for each conveyance using the truck monitor as described above.

In support of the operating permit issued by the State of Texas, WCS maintains a Radiation Protection Program including routine performance of radiation, contamination, and airborne radioactive material surveys. The facility currently conducts disposal activities involving materials similar to those described in Section 3, except that they are contaminated with source material, which has been exempted under 10CFR40. These source material isotopes (i.e., 238U and 232Th) are present in concentrations greater than, and have Derived Air Concentration (DAC) and Annual Limit on Intake (ALI) values several orders of magnitude more restrictive than the primary isotopes of concern. Despite this much larger internal dose hazard, the site has had no significant internal dose exposures. Therefore, operating experience indicates that there would be no internal dose

hazards associated with the disposal activities described herein, and on-site monitoring will be used to demonstrate and control compliance with all applicable limits

### 4.2 Resident/Farmer Dose Assessment

The RESRAD computer code was used to calculate the projected effect of the proposed disposal activity on future residents at the disposal site. Each of the LTP-identified radionuclides was included at a soil concentration of one (1) pCi/g, such that the resultant calculated dose equivalent to the maximum exposed individual (Resident Farmer) could be determined. A comprehensive report describing the methodology, input parameter selection, and calculation results is included as Attachment 3.

The results of the calculation show that the only radionuclide for which dose is greater than the RESRAD lower cutoff value of 1.0E-30 mrem/yr is Pu-238 indicating a maximum resident farmer dose at 1000 years post placement of 7.4E-7 mrem/pCi/g. This dose is due primarily to radon production from the decay of Pu-238 and is from the disposal of the concrete mass previously described.

Applying the isotopic distributions and results for each of the waste categories as summarized in Attachment 2, Tables 1 – 4 to the above RESRAD results, a total dose of < 2E-6 mrem/yr has been calculated. Based on this value, and a limit of between 30 and 100 pCi/g for Co-60 and Cs-137, respectively, it is extremely unlikely that the waste stream contemplated in this analysis could result in a dose that could approach the "few millirem" criteria. Therefore, this pathway need not be considered further in this dose analysis.

## 5.0 CONCLUSIONS

Based on the above assessment, it can be concluded that the calculated potential dose to members of the public (i.e., workers involved in the transportation to and placement of the waste and residents after closure of the site) as a consequence of the proposed waste disposal from the decommissioning activities at the YNPS at the WCS facility will be an insignificant fraction of the 25 millirem per year limit. Therefore, YAEC concludes that the proposed request for approval in accordance with 10 CFR 20.2002 will not have a significant impact on the workers, public, or the environment, and is acceptable.

## 6.0 REFERENCES

6.1 Texas Department of Health License Requirements

6.2 Texas Commission on Environmental Quality

6.3 NRC Regulatory Issue Summary 2004-08, Results of the License Termination Rule Analysis, dated May 28, 2004.

6.4 WCS Radiological Environmental Monitoring Summary Report for 2002

6.5 WCS RCRA Permit No. HW-50358

6.6 WCS Waste Acceptance Criteria

6.7 WCS Waste Analysis Plan

6.8 WCS Radiation Safety Program

Docket No. 50-29
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# Attachment 2

# Yankee Nuclear Power Station

# Waste Characterization Data
# (Steel, Soil & Concrete)

December 2004

## Table 1: Steel - Typical Nuclide Fraction[1]

| NUCLIDE | Halflife (y) | Activity[2] |
|---|---|---|
| H-3 | 1.23E+01 | n/d |
| C-14 | 5.73E+03 | n/d |
| Fe-55 | 2.70E+00 | 33.321% |
| Ni-63 | 1.00E+02 | 28.905% |
| Sr-90 | 2.86E+01 | 0.369% |
| Tc-99 | 2.13E+05 | n/d |
| Pu-238 | 8.78E+01 | 0.009% |
| Pu-239/240 | 2.41E+04 | 0.019% |
| Pu-241 | 1.44E+01 | 0.516% |
| Am-241 | 4.32E+02 | 0.024% |
| Cm-243/244 | 2.85E+01 | 0.027% |
| Co-60 | 5.27E+00 | 35.675% |
| Nb-94 | 2.03E+04 | n/d |
| Ag-108m | 1.27E+02 | 0.077% |
| Sb-Tem125 | 2.77E+00 | n/d |
| Cs-134 | 2.06E+00 | n/d |
| Cs-137 | 3.02E+01 | 1.058% |
| Eu-152 | 1.36E+01 | n/d |
| Eu-154 | 8.80E+00 | n/d |
| Eu-155 | 4.96E+00 | n/d |
| TOTAL | | 100% |

[1] RFIL 10 2604 SFP Composite Wipes, Analyzed by Framatome ANP Environmental Laboratory, Reference Date 6/29/04

[2] n/d = not detected. H-3 results in units of pCi/g, and H-3 concentration is independent of concentration of other nuclides. Nuclides other than H-3 results are given in percent detected activity.

## Table 2: Soil - Typical Nuclide Fraction[1]

| NUCLIDE | Halflife (y) | Activity[2] |
|---|---|---|
| H-3 | 1.23E+01 | n/d |
| C-14 | 5.73E+03 | n/d |
| Fe-55 | 2.70E+00 | n/d |
| Ni-63 | 1.00E+02 | n/d |
| Sr-90 | 2.86E+01 | n/d |
| Tc-99 | 2.13E+05 | n/d |
| Pu-238 | 8.78E+01 | n/d |
| Pu-239/240 | 2.41E+04 | n/d |
| Pu-241 | 1.44E+01 | n/d |
| Am-241 | 4.32E+02 | n/d |
| Cm-243/244 | 2.85E+01 | n/d |
| Co-60 | 5.27E+00 | 0.065% |
| Nb-94 | 2.03E+04 | n/d |
| Ag-108m | 1.27E+02 | n/d |
| Sb-Tem125 | 2.77E+00 | n/d |
| Cs-134 | 2.06E+00 | 0.187% |
| Cs-137 | 3.02E+01 | 99.748% |
| Eu-152 | 1.36E+01 | n/d |
| Eu-154 | 8.80E+00 | n/d |
| Eu-155 | 4.96E+00 | n/d |
| TOTAL | | 100% |

[1] SFP-GP-03-08, Analyzed by Framatome ANP Environmental Laboratory, Reference Date 11/4/03

[2] n/d = not detected. H-3 results in units of pCi/g, and H-3 concentration is independent of concentration of other nuclides. Nuclides other than H-3 results are given in percent detected activity.

## Table 3: RSS Concrete – Typical Nuclide Fraction[1]

| NUCLIDE | Halflife (y) | Activity[2] |
|---|---|---|
| H-3 | 1.23E+01 | 198 pCi/g |
| C-14 | 5.73E+03 | 8.195% |
| Fe-55 | 2.70E+00 | n/d |
| Ni-63 | 1.00E+02 | n/d |
| Sr-90 | 2.86E+01 | n/d |
| Tc-99 | 2.13E+05 | n/d |
| Pu-238 | 8.78E+01 | n/d |
| Pu-239/240 | 2.41E+04 | n/d |
| Pu-241 | 1.44E+01 | n/d |
| Am-241 | 4.32E+02 | n/d |
| Cm-243/244 | 2.85E+01 | n/d |
| Co-60 | 5.27E+00 | 17.779% |
| Nb-94 | 2.03E+04 | n/d |
| Ag-108m | 1.27E+02 | n/d |
| Sb-Tem125 | 2.77E+00 | n/d |
| Cs-134 | 2.06E+00 | 0.234% |
| Cs-137 | 3.02E+01 | 73.791% |
| Eu-152 | 1.36E+01 | n/d |
| Eu-154 | 8.80E+00 | n/d |
| Eu-155 | 4.96E+00 | n/d |
| TOTAL | | 100% |

[1] RSS-CB-Floor-1, Analyzed by Framatome ANP Environmental Laboratory, Reference Date 10/6/04

[2] n/d = not detected. H-3 results in units of pCi/g, and H-3 concentration is independent of concentration of other nuclides. Nuclides other than H-3 results are given in percent detected activity.

## Table 4: Other Concrete - Typical Nuclide Fraction[1]

| NUCLIDE | Halflife (y) | Activity[2] |
|---|---|---|
| H-3 | 1.23E+01 | 89.6 pCi/g |
| C-14 | 5.73E+03 | 0.004% |
| Fe-55 | 2.70E+00 | n/d |
| Ni-63 | 1.00E+02 | 72.448% |
| Sr-90 | 2.86E+01 | 0.020% |
| Tc-99 | 2.13E+05 | n/d |
| Pu-238 | 8.78E+01 | n/d |
| Pu-239/240 | 2.41E+04 | n/d |
| Pu-241 | 1.44E+01 | n/d |
| Am-241 | 4.32E+02 | n/d |
| Cm-243/244 | 2.85E+01 | n/d |
| Co-60 | 5.27E+00 | 1.749% |
| Nb-94 | 2.03E+04 | n/d |
| Ag-108m | 1.27E+02 | 0.007% |
| Sb-Tem125 | 2.77E+00 | n/d |
| Cs-134 | 2.06E+00 | 0.008% |
| Cs-137 | 3.02E+01 | 25.765% |
| Eu-152 | 1.36E+01 | n/d |
| Eu-154 | 8.80E+00 | n/d |
| Eu-155 | 4.96E+00 | n/d |
| TOTAL | | 100% |

[1] NFV-CB-02-05-10.5 Part-61 Results, Analyzed by Framatome ANP Environmental Laboratory, Reference Date 10/28/03

[2] n/d = not detected. H-3 results in units of pCi/g, and H-3 concentration is independent of concentration of other nuclides. Nuclides other than H-3 results are given in percent detected activity.

Docket No. 50-29
BYR 2004-136

# Attachment 3

# Yankee Nuclear Power Station

# Resident/Farmer Dose Assessment

December 2004

# CALCULATION TITLE PAGE

Analysis of Dose to Future Residents from Soil, Concrete, and Steel Debris Deposited at the Waste Control Specialists Disposal Facility

**Title**

YA-CALC-00-004-04

**Calculation Number**

**Executive Summary:**
Three dose analyses were performed using RESRAD Version 6.21 to assess the dose from residual radioactivity in soil, concrete, and steel debris to the future hypothetical resident farmer at the Waste Control Specialists, LLC hazardous waste landfill. This calculation presents the methodology used to define key input parameters for the analyses and presents the results.

| **Approvals** | (Print & Sign Name) | |
|---|---|---|
| Preparer: Cynthia Harrington | | Date: |
| Preparer: Estella Keefer | | Date: |
| Reviewer: Ron Cardarelli Ron Cardarelli | Sections: A-E, Attachment 2 | Date: 12-22-04 |
| Reviewer: ALICE CARSON Alice C | Section: all | Date: 12/22/04 |
| Reviewer: | Section: | Date: |
| Approver (Cognizant Manager): GM Babineau / GM Babineau | | Date: 12/22/04 |

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| Approvals | (Print & Sign Name) | | |
|---|---|---|---|
| Preparer: Cynthia Harrington | Cynthia L. Harrington | | Date: 12/22/04 |
| Preparer: Estella Keefer | | | Date: |
| Reviewer: | | Section: | Date: |
| Reviewer: | | Section: | Date: |
| Reviewer: | | Section: | Date: |
| Approver (Cognizant Manager): | | | Date: |

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|---|---|---|
| Preparer: Cynthia Harrington | | Date: |
| Preparer: Estella Keefer Estella Keefer | | Date: 12-23-04 |
| Reviewer: Ron Cardarelli | Sections: A-E, Attachment 2 | Date: 12-22-04 |
| Reviewer: | Section: | Date: |
| Reviewer: | Section: | Date: |
| Approver (Cognizant Manager): | | Date: |

# TABLE OF CONTENTS



## TABLES



## ATTACHMENTS

## A. PURPOSE:

The purpose of this calculation is to identify key input parameters used in the RESRAD Resident Farmer Scenario and to present the results of dose analyses for soil, concrete, and steel debris. The debris originated from decommissioning activities at the Yankee Rowe site. The dose analysis results will be used to evaluate the possibility of alternative disposal of the debris at the Waste Control Specialists, LLC hazardous waste landfill, in accordance with 10CFR20.2002 (Ref. 1).

## B. SUMMARY OF RESULTS:

The maximum hypothetical doses to the critical group, for all three media, are due to radon. The radon water independent pathway doses are attributable to the burial of waste containing Pu-238 and are maximized at 1000 years. Ratios for all other radionuclides of importance at the Yankee Rowe site (Table 2) are less than 1.0E-30 mrem/year per pCi/g. The dose conversion factors or dose/source ratios (mrem/year per pCi/g) from the soil, concrete, and steel are given in Table 1 below.

Table 1
Dose/Source Ratios for YNPS Debris Materials

| Nuclide | Soil mrem/yr per pCi/g | Concrete mrem/yr per pCi/g | Steel mrem/yr per pCi/g |
|---|---|---|---|
| Ag-108m | 1.1E-40 | 1.1E-40 | 1.1E-40 |
| Am-241 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| C-14 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| Cm-243 | 0.0E+00 | 0.0E+00 | 0.00E+00 |
| Co-60 | 1.6E-32 | 1.6E-32 | 1.6E-32 |
| Cs-134 | 4.3E-39 | 4.3E-39 | 4.3E-39 |
| Cs-137 | 2.6E-40 | 2.6E-40 | 2.6E-40 |
| Eu-152 | 1.5E-35 | 1.5E-35 | 1.5E-35 |
| Eu-154 | 1.6E-34 | 1.6E-34 | 1.6E-34 |
| Eu-155 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| Fe-55 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| H-3 | 1.1E-32* | 6.0E-29 | 2.8E-33* |
| Nb-94 | 3.6E-38 | 3.6E-38 | 3.6E-38 |
| Ni-63 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| Pu-238 | 6.2E-07* | 1.2E-06 | 3.6E-07* |
| Pu-239 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| Pu-241 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| Sb-125 | 1.0E-42 | 1.0E-42 | 1.0E-42 |
| Sr-90 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| Tc-99 | 0.0E+00 | 0.0E+00 | 0.0E+00 |

* Dose at t = 1000 years. All other doses are at t = 0 years.

## C. REFERENCES:

1. CFR Title 10, Section 20.2002, "Method for Obtaining Approval of Proposed Disposal Procedures."

2. "Petition for Adoption of Rules," submitted by Waste Controls Specialists, LLC to the Texas Department of Health, July 26, 2002.

3. YA-REPT-00-001-03, "Radionuclide Selection for DCGL Determination," October 2003.

4. NUREG/CR-5512, "Residual Radioactive Contamination From Decommissioning"

   Volume 1: "Technical Basis for Translating Contamination Levels to Annual TEDE," October 1992.

   Volume 2: "User's Manual DandD Version 2.1," April 2001.

   Volume 3: "Parameter Analysis, Draft Report for Comment," October 1999.

5. ANL/EAD-4, "Users Manual for RESRAD Version 6.0," Yu, C. et al., July 2001.

6. YA-CALC-01-001-03, " RESRAD 6.21 Sensitivity Analysis for Resident Farmer Scenario-Soil," December 2003.

7. YA-CALC-00-002-04, "RESRAD 6.21 Sensitivity Analysis and Derived Concentration Guideline Levels (DCGLs) for Concrete Debris," September 2004.

8. Attachment 1, Internal Communication, 2004.

9. "Data Collection Handbook to Support Modeling Impacts of Radioactive Material in Soil," Yu, C., et al, Argonne National Laboratory, April 1993.

## D. ASSUMPTIONS:

1. Waste Control Specialist (WCS) Waste Disposal Facility Description

WCS operates a RCRA Subtitle C disposal facility in Andrews County in western Texas. This facility has submitted a proposal to the Texas Department of Health to request the ability to dispose of certain low activity licensed radioactive material in a RCRA disposal cell. The site characteristics, taken from the proposal (Ref. 2), are consistent with a "dry" waste site classification and have been used to determine site-specific input parameter values for the dose analysis. The site is described as being comprised of a RCRA compliant cell underlain by a compacted-clay unsaturated zone extending 300 m. The assumed media for the saturated zone is sand, with clay assumed as the cover material for cell closure.

2. YNPS Debris Description

Three types of debris, soil, concrete, and steel, are being considered for disposal at the WCS site. The five million pounds of soil being modeled is representative of the soil type identified for the YNPS site in Reference 6. The assumptions concerning the characteristics of the concrete debris are consistent with those made for the evaluation of concrete that is expected to remain at the YNPS site (Ref. 7) and for the density and weight information found in Reference 8. For the steel debris, the assumption is made that the contamination resides on the surface of the steel, and will be immediately transferred to surrounding soil at the WCS site, upon burial. Thus, the WCS contaminated zone soil type is applied to the steel analysis, and a volume of soil equal to the volume of steel is assumed.

3. Radionuclide List

The dose analysis runs for the RESRAD Resident Farmer scenario were performed for the radionuclides listed in Table 2. This list of radionuclides was developed by consideration of historical data for the Rowe site, waste stream analyses, and source terms in NUREG guidance to encompass the radionuclides that may present a significant dose impact (Ref. 3).

Table 2
YNPS Radionuclide List

| | | |
|---|---|---|
| H-3 | Tc-99 | Eu-155 |
| C-14 | Ag-108m | Pu-238 |
| Fe-55 | Sb-125 | Pu-239 |
| Co-60 | Cs-134 | Pu-241 |
| Ni-63 | Cs-137 | Am-241 |
| Sr-90 | Eu-152 | Cm-243 |
| Nb-94 | Eu-154 | |

4. Dose Model: The Resident Farmer Scenario of RESRAD 6.21

The dose model used to perform the analyses and to calculate subsequent dose conversion factors (mrem/yr per pCi/g) is based upon the Resident Farmer Scenario defined in NUREG/CR-5512 Volumes 1, 2, and 3 (Ref. 4). The dose model translates residual soil radioactivity into potential radiation dose and is defined by the scenario, exposure pathways, and the critical group. The resident farmer scenario is a reasonably conservative bounding scenario, which generally overestimates (rather than underestimates) potential dose.

In this scenario, it is assumed that the land containing the residual radioactivity will be used for residential and light farming activities. The residential farming family is postulated to live onsite, raise crops and livestock for consumption, and drink water from a ground water source onsite. The dose from residual radionuclides in the soil is evaluated for the average member of the critical group. The critical group represents the group reasonably expected to receive the greatest exposure, given the scenario, to residual radioactivity.

The potential exposure pathways that define the residential farmer scenario are:

1. Direct exposure to external radiation from radionuclides in the soil,
2. Internal dose from inhalation of airborne radionuclides, and
3. Internal dose from ingestion of radionuclides in
   a. Crops grown on the property and irrigated with water obtained onsite,
   b. Meat and milk obtained from livestock fed fodder and water produced onsite,
   c. Drinking water from an onsite well,
   d. Soil.

### 5. Conceptual Model Underlying the Dose Model

The conceptual model used in the code is based on the Yankee Rowe waste and WCS site characteristics. The model is comprised of a contaminated zone underlain by an unsaturated zone underlain by a saturated zone. The contaminated zone is covered by 4.6 meters of uncontaminated material and the ground water is initially uncontaminated. The contaminated zone area and depth are determined from the estimated waste volume, in accordance with Attachment 2. The actual dimensions of the RCRA disposal cell are 183m by 30m with a depth of 21m, (600' x 100' x 70', Reference 8, Attachment 1.1). Preliminary analyses were conducted to determine the contaminated zone configuration, within the physical confines of the cell, which would result in the most conservative results. The soil and steel analyses resulted in a configuration that assumes the RESRAD default depth of 2 m and an area based on the volume of material. For the concrete analysis, the volume of debris is determined from the sum of the weights given in Reference 8 (refer to 1.2 and 1.3). For this volume, the most conservative contaminated zone configuration assumes that the material was deposited to the actual depth of the disposal cell. The model is consistent with that described by Yu et al., 1993 (Ref. 5). All pathways were included in the model except the aquatic foods pathway. Reference 2 indicates that typically no surface water exists within 50 miles of the WCS dry landfill site.

## E. METHOD / BODY OF CALCULATION:

### 1. Parameter Selection Process

The dose and conceptual models are quantified by a set of input parameters. Site-specific parameters were used where available for the WCS "dry" site in Andrews, Texas. These parameters, derived from Reference 2, are listed in Attachments 3 – 5. The contaminated zone area and length parallel to the aquifer were calculated based on the RESRAD default depth and the volume of debris. Because YNPS is considering the disposal of three types of debris: soil, steel, and concrete, media specific parameters (hydrological data and distribution coefficients) were used for the waste in the contaminated zone. The soil debris parameter values were based on the YNPS specific soil parameters found in Reference 6. The values for the concrete debris were obtained from Reference 7. The parameters for the steel analysis were consistent with the contaminated zone parameters assumed for he WCS site (Ref. 2), as indicated in Section D, above. The media specific parameters are also included in Attachments 3 - 5. All other input parameters were assigned the RESRAD default values.

Table 3 summarizes the WCS RESRAD input parameters and YNPS specific waste types.

Table 3
WCS and YNPS Specific Parameters

| | Parameter | Parameter value | Basis |
|---|---|---|---|
| Parameters specific to WCS | Cover thickness | 4.6m | Ref. 2 |
| | Cover soil type | red-bed clay | Ref. 2 |
| | Cover density | 2.1gm/cm$^3$ | Attachment 1, 1.1 |
| | Cover erosion rate | 1.83E-06 m/yr | Ref. 2 |
| | Evapotranspiration coefficient | 0.95 | Ref. 2 |
| | Precipitation | 0.355 m/yr | Ref. 2 |
| | Runoff coefficient | 0.4 | Ref. 2, Ref. 9 |
| | Unsaturated zone thickness | 300m | Ref. 2 |
| | Unsaturated zone soil type | red bed clay | Ref. 2 |
| | Unsaturated zone density | 2.1 gm/cm$^3$ | Attachment 1, 1.1 |
| | Unsaturated zone effective porosity | 0.06 | Ref. 2, Ref. 5 |
| | Unsaturated zone hydraulic conductivity | 1E-06 | Ref. 2 |
| | Contaminated/saturated zone soil type | sand | Ref. 2 |
| Parameters specific to YR | | | |
| Waste: Soil | | | |
| | YR soil type | sand | Ref. 6 |
| | Weight | 5E+06 lb | Attachment 1, 1.2 |
| Waste: Concrete | | | |
| | YR media type | concrete/gravel | Ref. 7 |
| | Weight | 3.48E+07 lb | Attachment 1, 1.2 and 1.3 |
| Waste: Steel | | | |
| | WCS soil type | sand | Ref. 2 |
| | Weight: | 2E+06 lb | Attachment 1, 1.2 |

## 2. Results

The Dose/Source Ratios (DSRs), mrem/yr per pCi/gm, shown in Table 4 were obtained from pages 36 and 37 of the RESRAD summary.rep result report for each media type. The non-zero values may be applied to the nuclide activity concentrations identified in the Rowe waste. Table 4 presents the DSRs for all nuclides of interest at YNPS, for each debris type, at the time of the maximum dose. Excerpts from the result reports and the input echoes are given in Attachment 6.

Table 4
Dose/Source Ratios for YNPS Debris Materials

| Nuclide | Soil mrem/yr per pCi/g | Concrete mrem/yr per pCi/g | Steel mrem/yr per pCi/g |
|---|---|---|---|
| Ag-108m | 1.083E-40 | 1.083E-40 | 1.083E-40 |
| Am-241 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| C-14 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Co-60 | 1.592E-32 | 1.592E-32 | 1.592E-32 |
| Cs-134 | 4.310E-39 | 4.310E-39 | 4.310E-39 |
| Cs-137 | 2.620E-40 | 2.620E-40 | 2.620E-40 |
| Eu-152 | 1.546E-35 | 1.546E-35 | 1.546E-35 |
| Eu-154 | 1.572E-34 | 1.572E-34 | 1.572E-34 |
| Eu-155 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Fe-55 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| H-3 | 1.117E-32* | 5.984E-29 | 2.786E-33* |
| Nb-94 | 3.585E-38 | 3.585E-38 | 3.585E-38 |
| Ni-63 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Pu-238 | 6.21E-07* | 1.208E-06 | 3.59E-07* |
| Pu-239 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Pu-241 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Sb-125 | 1.037E-42 | 1.037E-42 | 1.037E-42 |
| Sr-90 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Tc-99 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

* Dose at t = 1000 years. All other doses are at t = 0 years.

# Attachment 1

# Internal Communications

**Reference 1.1**

-----Original Message-----
**From:** Bill Dornsife [mailto:w.dornsife@worldnet.att.net]
**Sent:** Thursday, December 02, 2004 4:11 PM
**To:** e.keefer@comcast.net
***Subject:*** Fw: WCS Site

This is the data you requested. Sorry it took so long to get.
----- Original Message -----
**From:** Kent Hunter
**To:** Bill Dornsife
**Sent:** Thursday, December 02, 2004 3:40 PM
**Subject:** Re: WCS Site

**Current Cell size is about 600' x 100' x 70' deep.**

**Red Bed Clay ranges from 1.8 to 2.3 gm/cc with 2.1 being average.**

**Reference 1.2**

From: Greg Babineau [mailto:babineau@yankee.com]
Sent: Thursday, November 11, 2004 5:23 PM
To: acarson1967@comcast.net; edarois@aol.com
Subject: 20.2002 exemptioin stuff

Alice & Eric,

Joe Darmon and I worked with Rod Dee this afternoon and have what I think can be the initial info needed for the process. Joe will be e-mailing you three part61 analyses that we feel are representative of steel, soil, and concrete. We have taken an additional soil sample that is out for part61 analysis to confirm the soil one. I'll put together the waste type stuff and forward that in the morning. **Basically we are looking at 2 million lbs of steel, 5 million lbs of concrete, and 5 million lbs of soil.** WCS will be the home for rad material that is also >50 ppm PCB's. Looks like all our other stuff is going to RACE (for the most part).

Eric, has the guy I ordered for you arrived yet?

Greg

**Reference 1.3**

-----Original Message-----
From: Marty [mailto:erickson@yankee.com]
Sent: Wednesday, December 15, 2004 7:15 AM
To: acarson1967@comcast.net
Subject: RSS Information

Bill Barley asked me to provide you with this information. Any questions please feel free to call me for supporting info.

Marty

| Component | tot surface activity in *pci* | **wt in lbs** | wt in gms |
|---|---|---|---|
| Upper biowall | 1.56E+07 | 1.86E+06 | 8.45E+08 |
| lower outer cylinder | 1.75E+07 | 7.80E+06 | 3.54E+09 |
| slope floor and bdb | 1.64E+07 | 2.79E+06 | 1.27E+09 |
| chg floor | 3.89E+07 | 6.45E+05 | 2.93E+08 |
| | | | |
| radial walls | 6.85E+06 | 4.04E+05 | 1.83E+08 |
| RCP slabs | 1.70E+06 | 4.28E+05 | 1.94E+08 |
| | | | |
| upper inner cylinder | 4.93E+06 | 8.13E+06 | 3.69E+09 |
| nozzle area | 3.42E+06 | 8.19E+05 | 3.72E+08 |
| lower inner cylinder walls | 1.65E+08 | 4.65E+06 | 2.11E+09 |
| lower inner cylinder floor | 5.70E+07 | 5.66E+05 | 2.57E+08 |
| RSS Inner Legs | | 3.58E+05 | 1.63E+08 |
| RSS Outer Legs | | 1.35E+06 | 6.13E+08 |
| | Total | **2.98E+07** | 1.35E+10 |

The following values were calculated from information gathered from previous studies and from prints. If one wanted to determine the volume of the RSS a rule of thumb **use 150 lbs/ft$^3$ for 4000lb compression strength concrete**. Surface activity values were calculated based upon scan survey results that were averaged and then applied across the particular component of the RSS. Surface areas were computed by using cylindrical and trapezoidal geometric modeling of the individual components. Although these surface areas are not exact they err on the conservative side. Individual spreadsheets are available for the scan survey results. Any questions feel free to call me.

Marty Erickson

# ATTACHMENT 2

## RESRAD Parameter Calculations

## 1. Area of the Contaminated Zone

The area of the contaminated zone was determined from the estimated weight of the debris provided in Reference 8 according to the equation below. An area was calculated for each debris type.

$$\text{area} = \frac{\text{weight(lb)} * 453.59(\text{gm/lb}) * 1\text{x}10^{-06}(\text{cm}^3/\text{m}^3)}{\text{density}(\text{gm/cm}^3) * \text{depth(m)}}$$

The length parallel to the aquifer was calculated as the diameter of a circular contaminated zone, for the soil and steel analyses. Because of the larger volume of concrete, the length parallel to the aquifer was calculated from the diagonal distance across a rectangular contaminated zone, based on the actual width of the disposal cell.

## 2. Field Capacity: Contaminated Zone, Unsaturated Zone 1 and Saturated Zone

The "Data Collection Handbook to Support Modeling the Impacts of Radioactive Material in Soil," (Ref. 9) defines the relationship of field capacity (residual water content) to effective porosity. The field capacity is the ratio of the volume of water retained in the soil sample, after all drainage has ceased, to the total volume of the soil sample. Equation 4.4 of Reference 9 relates Total and Effective Porosity to Field Capacity as follows:

Effective Porosity = Total Porosity - Field Capacity

Rearranging this equation:

Field Capacity = Total Porosity - Effective Porosity

The total and effective porosity values for the various zones are the mean values of the NUREG/CR-6697 distributions for sand.

# Attachment 3

## RESRA D 6.21- Input Parameters for Soil Analysis
## Scenario: Resident Farmer

## Table 3-1
## Input Parameters for Soil Analysis
Resident Farmer Scenario

| Parameter | Basis | Values | | |
|---|---|---|---|---|
| **Soil Concentrations** | | | | |
| Basic radiation dose limit (mrem/yr) | Proposed dose-based release standard | 1 | | |
| Initial principal radionuclide (pCi/g) | Unit Value | 1 | | |
| **Distribution Coefficients ($cm^3/g$)** | **Basis** | **Values** | | |
| | | **Contaminated Zone** | **Saturated Zone** | **Unsaturated Zone** |
| Ac-227+D | Contaminated Zone: Values from Ref. 1 (YR soil type), based on median of distribution (Table 3.91, Ref. 2). Saturated Zone: sand (WCS soil type) from Ref. 3, based on Table E.3, Ref. 4). Unsaturated Zone: clay (WCS soil type) from Ref. 3, based on Table E.3, Ref. 4). | 825 | 450 | 2400 |
| Ag-108m | | 216 | 90 | 180 |
| Am-241 | | 1445 | 1900 | 8400 |
| Am-243+D | | 1445 | 1900 | 8400 |
| C-14 | | 11 | 5 | 1 |
| Cm-243 | | 6761 | 4000 | 6000 |
| Co-60 | | 235 | 60 | 550 |
| Cs-134 | | 446 | 280 | 1900 |
| Cs-137+D | | 446 | 280 | 1900 |
| Eu-152 | | 825 | -1[a] | -1[a] |
| Eu-154 | | 825 | -1[a] | -1[a] |
| Eu-155 | | 825 | -1[a] | -1[a] |
| Fe-55 | | 209 | 220 | 165 |
| Gd-152 | | 825 | -1[a] | -1[a] |
| H-3 | | 0.06 | 0 | 0 |
| Nb-94 | | 380 | 160 | 900 |
| Ni-63 | | 424 | 400 | 650 |
| Np-237+D | | 17 | 5 | 55 |
| Pa-231 | | 380 | 550 | 2700 |
| Po-210 | | 181[b] | 150 | 3000 |
| Pb-210+D | | 2392 | 270 | 550 |
| Pu-238 | | 953 | 550 | 5100 |

## Table 3-1
## Input Parameters for Soil Analysis
Resident Farmer Scenario

| Parameter | Basis | Values | | |
|---|---|---|---|---|
| Pu-239 | | 953 | 550 | 5100 |
| Pu-241+D | | 953 | 550 | 5100 |
| Ra-226+D | | 3533 | 500 | 9100 |
| Sb-125 | | 380 | 45 | 250 |
| Sr-90+D | | 32 | 15 | 110 |
| Tc-99 | | 0.51 | 0.1 | 1 |
| Te-125m | | 38[b] | 125 | 720 |
| Th-229+D | | 5884 | 3200 | 5800 |
| Th-230 | | 5884 | 3200 | 5800 |
| U-233 | | 126 | 35 | 1600 |
| U-234 | | 126 | 35 | 1600 |
| U-235+D | | 126 | 35 | 1600 |
| **Contaminated Zone** | **Basis** | **Values** | | |
| Area of contaminated zone ($m^2$) | WCS site-specific- area based on the volume of material (Att. 2, Ref. 7) | 750 | | |
| Thickness of contaminated zone (m) | RESRAD default value | 2 | | |
| Length parallel to aquifer flow (m) | Based on the diameter of a circular contaminated zone area (Att. 2). | 31 | | |
| **Cover and Contaminated Zone Hydrological Data** | **Basis** | **Values** | | |
| Cover depth (m) | WCS site-specific value (Ref. 3) | 4.6 | | |
| Density of cover material (g/cm**3) | WCS site-specific value (Ref. 5) | 2.1 | | |
| Cover erosion rate (m/yr) | WCS site-specific value (Ref. 3) | 1.83 E-06 | | |
| Density of contaminated zone (g/cm**3) | Value from Ref. 1 (YR soil type), based on median of dist. for sand (Section 3.1, Ref. 2). | 1.51 | | |
| Contaminated zone total porosity | Value from Ref. 1 (YR soil type), based on median of dist. for sand (Section 3.2, Ref. 2). | 0.43 | | |
| Contaminated zone field capacity | YR soil specific value calculated using Equation 4.4 from Ref. 6. | 0.05 | | |
| Contaminated zone hydraulic conductivity (m/yr) | Value from Ref. 1 (YR soil type), based on median of dist. for sand (Section 3.4, Ref. 2). | 2506 | | |
| Contaminated zone b parameter | Value from Ref. 1 (YR soil type), based on median of dist. for sand (Section 3.5, Ref. 2). | 0.975 | | |

## Table 3-1
## Input Parameters for Soil Analysis
Resident Farmer Scenario

| Parameter | Basis | Values |
|---|---|---|
| Evapotranspiration coefficient | WCS site-specific value (Ref. 3) | 0.95 |
| Precipitation (m/yr) | WCS site-specific value (Ref. 3) | 0.355 |
| Runoff coefficient | WCS site-specific value from Ref. 3, based on Table E.1 of Ref. 4 | 0.4 |
| **Saturated Zone Hydrological Data** | **Basis** | **Values** |
| Density of saturated zone (g/cm**3) | Soil type from Ref. 3, based on Table 2.1 of Ref. 6 - sand | 1.52 |
| Saturated zone total porosity | Soil type from Ref. 3, RESRAD default is within the range from Table E.8 of Ref. 4 - sand | 0.4 |
| Saturated zone effective porosity | Soil type from Ref. 3, based on Table E.8 of Ref. 4 - medium sand | 0.32 |
| Saturated zone field capacity | Calculated using Equation 4.4 from Ref. 6 | 0.08 |
| Saturated zone hydraulic conductivity (m/yr) | Soil type from Ref. 3, based on Table E.2 of Ref. 4 - sand | 5500 |
| Saturated zone b parameter | Soil type from Ref. 3, based on Table E.2 of Ref. 4 - sand | 4.05 |
| **Unsaturated Zone Hydrological Data** | **Basis** | **Values** |
| Unsat. zone thickness (m) | WCS site-specific value (Ref. 3) | 300 |
| Unsat. zone soil density (g/cm**3) | WCS site-specific value (Ref. 5) | 2.1 |
| Unsat. zone total porosity | Soil type from Ref. 3, based on Table E.8 of Ref. 4 - clay | 0.42 |
| Unsat. zone effective porosity | Soil type from Ref. 3, based on Table E.8 of Ref. 4 - clay | 0.06 |
| Unsat. zone field capacity | Calculated using Equation 4.4 from Ref. 6 | 0.36 |
| Unsat. zone hydraulic conductivity (m/yr) | WCS site-specific value (Ref. 3) | 1 E-03 |
| Unsat. zone soil-specific b parameter | Soil type from Ref. 3, based on Table E.2 of Ref. 4 - clay | 11.4 |

Notes:

[a] Value is calculated by RESRAD.
[b] Value is taken from Table 3.9-1 of Ref. 2.

References:

1. YA-CALC-01-001-03, "RESRAD 6.21 Sensitivity Analysis for Resident Farmer Scenario-Soil," December 2003.
2. Yu, C. et al., NUREG/CR-6697, "Development of Probabilistic RESRAD 6.0 and RESRAD-BUILD 3.0 Computer Codes," Argonne National Laboratory, November 2000.
3. "Petition for Adoption of Rules," submitted by Waste Controls Specialists, LLC to the Texas Department of Health, July 26, 2002.
4. Yu, C. et al., "User's Manual for RESRAD Version 6," US Department of Energy – Argonne National Laboratory, July 2001.
5. Attachment 1, Reference 1.1, Email from Bill Dornsife, WCS to Estella Keefer, December 2, 2004.
6. Yu, C. et al., "Data Collection Handbook to Support Modeling the Impacts of Radioactive Material in Soil," US Department of Energy – Argonne National Laboratory, April 1993.
7. Attachment 1, Reference 1.2, Email from Greg Babineau to Eric Darois and Alice Carson, November 11, 2004.

# Attachment 4

## RESRA D 6.21- Input Parameters for Concrete Analysis
## Scenario: Resident Farmer

## Table 4-1
## Input Parameters for Concrete Analysis
Resident Farmer Scenario

| Parameter | Basis | Values | | |
|---|---|---|---|---|
| **Soil Concentrations** | | | | |
| Basic radiation dose limit (mrem/yr) | Proposed dose-based release standard | 1 | | |
| Initial principal radionuclide (pCi/g) | Unit Value | 1 | | |
| **Distribution Coefficients ($cm^3/g$)** | **Basis** | **Values** | | |
| | | **Contaminated Zone** | **Saturated Zone** | **Unsaturated Zone** |
| Ac-227+D | Contaminated Zone: Values from Ref. 1 (concrete). Saturated Zone: sand (WCS soil type) from Ref. 3, based on Table E.3, Ref. 4) Unsaturated Zone: clay (WCS soil type) from Ref. 3, based on Table E.3, Ref. 4) | 1000 | 450 | 2400 |
| Ag-108m | | 6500 | 90 | 180 |
| Am-241 | | 1000 | 1900 | 8400 |
| Am-243+D | | 1000 | 1900 | 8400 |
| C-14 | | 70.7 | 5 | 1 |
| Cm-243 | | 600 | 4000 | 6000 |
| Co-60 | | 282 | 60 | 550 |
| Cs-134 | | 137 | 280 | 1900 |
| Cs-137+D | | 137 | 280 | 1900 |
| Eu-152 | | 1000 | -1[a] | -1[a] |
| Eu-154 | | 1000 | -1[a] | -1[a] |
| Eu-155 | | 1000 | -1[a] | -1[a] |
| Fe-55 | | 12.5 | 220 | 165 |
| Gd-152 | | 1000 | -1[a] | -1[a] |
| H-3 | | 0 | 0 | 0 |
| Nb-94 | | 316 | 160 | 900 |
| Ni-63 | | 35.5 | 400 | 650 |
| Np-237+D | | 707 | 5 | 55 |
| Pa-231 | | 316 | 550 | 2700 |
| Pb-210+D | | 47600 | 270 | 550 |
| Po-210 | | 10[c] | 150 | 3000 |
| Pu-238 | | 1580 | 550 | 5100 |
| Pu-239 | | 1580 | 550 | 5100 |
| Pu-241+D | | 1580 | 550 | 5100 |
| Ra-226+D | | 100 | 500 | 9100 |
| Sb-125 | | 1550 | 45 | 250 |

# Table 4-1
## Input Parameters for Concrete Analysis
Resident Farmer Scenario

| Parameter | Basis | Values | | |
|---|---|---|---|---|
| Sr-90+D | | 10.5 | 15 | 110 |
| Tc-99 | | 13.5 | 0.1 | 1 |
| Te-125m | | 38[b] | 125 | 720 |
| Th-229+D | | 1580 | 3200 | 5800 |
| Th-230 | | 1580 | 3200 | 5800 |
| U-233 | | 147 | 35 | 1600 |
| U-234 | | 147 | 35 | 1600 |
| U-235+D | | 147 | 35 | 1600 |
| **Contaminated Zone** | **Basis** | **Values** | | |
| Area of contaminated zone ($m^2$) | WCS site-specific- area based on the volume of material (Att. 2, Ref. 7) | 313 | | |
| Thickness of contaminated zone (m) | WCS site-specific depth of cell (Ref. 5) | 21 | | |
| Length parallel to aquifer flow (m) | Based on the diagonal distance across a rectangular contaminated zone (Att. 2) | 32 | | |
| **Cover and Contaminated Zone Hydrological Data** | **Basis** | **Values** | | |
| Cover depth (m) | WCS site-specific value (Ref. 3) | 4.6 | | |
| Density of cover material (g/cm**3) | WCS site-specific value (Ref. 5) | 2.1 | | |
| Cover erosion rate (m/yr) | WCS site-specific value (Ref. 3) | 1.83 E-06 | | |
| Density of contaminated zone (g/cm**3) | Value from Ref. 8 | 2.4 | | |
| Contaminated zone total porosity | Value from Ref. 1, based on median of dist. for course gravel (Table 3.2, Ref. 6) | 0.3 | | |
| Contaminated zone field capacity | Value from Ref. 1 | 0.07 | | |
| Contaminated zone hydraulic conductivity (m/yr) | Value from Ref. 1, based on median of dist. for course gravel (Table 5.1, Ref. 6) | 316000 | | |
| Contaminated zone b parameter | Value from Ref. 1, based on median of dist. for sand (Section 3.5, Ref. 2) | 0.975 | | |
| Evapotranspiration coefficient | WCS site-specific value (Ref. 3) | 0.95 | | |
| Precipitation (m/yr) | WCS site-specific value (Ref. 3) | 0.355 | | |
| Runoff coefficient | WCS site-specific value from Ref. 3, based on Table E.1 of Ref. 4 | 0.4 | | |
| **Saturated Zone Hydrological Data** | **Basis** | **Values** | | |
| Density of saturated zone (g/cm**3) | Soil type from Ref. 3, based on Table 2.1 of Ref. 6 - sand | 1.52 | | |

# Table 4-1
## Input Parameters for Concrete Analysis
Resident Farmer Scenario

| Parameter | Basis | Values |
|---|---|---|
| Saturated zone total porosity | Soil type from Ref. 3, RESRAD default is within the range from Table E.8 of Ref. 4 - sand | 0.4 |
| Saturated zone effective porosity | Soil type from Ref. 3, based on Table E.8 of Ref. 4 - medium sand | 0.32 |
| Saturated zone field capacity | Calculated using Equation 4.4 from Ref. 6 | 0.08 |
| Saturated zone hydraulic conductivity (m/yr) | Soil type from Ref. 3, based on Table E.2 of Ref. 4 - sand | 5500 |
| Saturated zone b parameter | Soil type from Ref. 3, based on Table E.2 of Ref. 4 - sand | 4.05 |
| **Unsaturated Zone Hydrological Data** | **Basis** | **Values** |
| Unsat. zone thickness (m) | WCS site-specific value (Ref. 3) | 300 |
| Unsat. zone soil density (g/cm**3) | WCS site-specific value (Ref. 5) | 2.1 |
| Unsat. zone total porosity | Soil type from Ref. 3, based on Table E.8 of Ref. 4 - clay | 0.42 |
| Unsat. zone effective porosity | Soil type from Ref. 3, based on Table E.8 of Ref. 4 – clay | 0.06 |
| Unsat. zone field capacity | Calculated using Equation 4.4 from Ref. 6 | 0.36 |
| Unsat. zone hydraulic conductivity (m/yr) | WCS site-specific value (Ref. 3) | 1 E-03 |
| Unsat. zone soil-specific b parameter | Soil type from Ref. 3, based on Table E.2 of Ref. 4 - clay | 11.4 |
| **Plant Transfer Factors (pCi/g media)/(pCi/g waste)** | **Basis** | **Values** |
| Ac-227+D | Plant: median values of dist. from Ref. 1 | 1.87E-04 |
| Ag-108m | | 1.47E-05 |
| Am-241 | | 1.87E-04 |
| Am-243+D | | 1.87E-04 |
| C-14 | | 2.12E-02 |
| Cm-243 | | 1.75E-03 |
| Co-60 | | 2.50E-03 |
| Cs-134 | | 4.03E-02 |
| Cs-137+D | | 4.03E-02 |
| Eu-152 | | 1.87E-04 |
| Eu-154 | | 1.87E-04 |
| Eu-155 | | 1.87E-04 |
| Fe-55 | | 7.80E-01 |
| Gd-152 | | 1.87E-04 |
| H-3 | | 4.8E+00 |
| Nb-94 | | 1.46E-03 |

## Table 4-1
## Input Parameters for Concrete Analysis
Resident Farmer Scenario

| Parameter | Basis | Values |
|---|---|---|
| Ni-63 | | 3.62E-01 |
| Np-237+D | | 3.47E-04 |
| Pa-231 | | 1.46E-03 |
| Pb-210+D | | 1.88E-07 |
| Po-210 | | 0.001[c] |
| Pu-238 | | 8.24E-05 |
| Pu-239 | | 8.24E-05 |
| Pu-241+D | | 8.24E-05 |
| Ra-226+D | | 4.0E-02 |
| Sb-125 | | 8.50E-05 |
| Sr-90+D | | 6.42E-01 |
| Tc-99 | | 9.60E-01 |
| Te-125m | | 0.6[c] |
| Th-229+D | | 8.24E-05 |
| Th-230 | | 8.24E-05 |
| U-233 | | 5.71E-03 |
| U-234 | | 5.71E-03 |
| U-235+D | | 5.71E-03 |

Notes:

[a] Value is calculated by RESRAD.
[b] Value is taken from Table 3.9-1 of Ref. 2.
[c] RESRAD default

References:

1. YA-CALC-02-004, "RESRAD 6.21 Sensitivity Analysis and Derived Concentration Guideline Levels (DCGLs) for Concrete Debris," September 2004.
2. Yu, C. et al., NUREG/CR-6697, "Development of Probabilistic RESRAD 6.0 and RESRAD-BUILD 3.0 Computer Codes," Argonne National Laboratory, November 2000.
3. "Petition for Adoption of Rules," submitted by Waste Controls Specialists, LLC to the Texas Department of Health, July 26, 2002.
4. Yu, C. et al., "User's Manual for RESRAD Version 6," US Department of Energy – Argonne National Laboratory, July 2001.
5. Attachment 1, Reference 1.1, Email from Bill Domsife to Estella Keefer, December 2, 2004.
6. Yu, C. et al., "Data Collection Handbook to Support Modeling the Impacts of Radioactive Material in Soil," US Department of Energy – Argonne National Laboratory, April 1993.
7. Attachment 1, Reference 1.2, Email from Greg Babineau to Eric Darois and Alice Carson, November 11, 2004.
8. Attachment 1, Reference 1.3, Email from Marty Ericson to Alice Carson, December 15, 2004.

# Attachment 5

## RESRA D 6.21- Input Parameters for Steel Analysis
## Scenario: Resident Farmer

## Table 5-1
## Input Parameters for Steel Analysis
Resident Farmer Scenario

| Parameter | Basis | Values | | |
|---|---|---|---|---|
| **Soil Concentrations** | | | | |
| Basic radiation dose limit (mrem/yr) | Proposed dose-based release standard | 1 | | |
| Initial principal radionuclide (pCi/g) | . Unit Value | 1 | | |
| **Distribution Coefficients ($cm^3/g$)** | **Basis** | **Values** | | |
| | | **Contaminated Zone** | **Saturated Zone** | **Unsaturated Zone** |
| Ac-227+D | Contaminated Zone: Values from Ref.1 (YR soil type), based on median of distribution (Table 3.91, Ref. 2) Saturated Zone: sand (WCS soil type) from Ref 3, based on Table E.3, Ref. 4) Unsaturated Zone: clay (WCS soil type) from Ref 3, based on Table E.3, Ref. 4) | 825 | 450 | 2400 |
| Ag-108m | | 216 | 90 | 180 |
| Am-241 | | 1445 | 1900 | 8400 |
| Am-243+D | | 1445 | 1900 | 8400 |
| C-14 | | 11 | 5 | 1 |
| Cm-243 | | 6761 | 4000 | 6000 |
| Co-60 | | 235 | 60 | 550 |
| Cs-134 | | 446 | 280 | 1900 |
| Cs-137+D | | 446 | 280 | 1900 |
| Eu-152 | | 825 | -1[a] | -1[a] |
| Eu-154 | | 825 | -1[a] | -1[a] |
| Eu-155 | | 825 | -1[a] | -1[a] |
| Fe-55 | | 209 | 220 | 165 |
| Gd-152 | | 825 | -1[a] | -1[a] |
| H-3 | | 0.06 | 0 | 0 |
| Nb-94 | | 380 | 160 | 900 |
| Ni-63 | | 424 | 400 | 650 |
| Np-237+D | | 17 | 5 | 55 |
| Pa-231 | | 380 | 550 | 2700 |
| Po-210 | | 181[b] | 150 | 3000 |
| Pb-210+D | | 2392 | 270 | 550 |
| Pu-238 | | 953 | 550 | 5100 |
| Pu-239 | | 953 | 550 | 5100 |
| Pu-241+D | | 953 | 550 | 5100 |
| Ra-226+D | | 3533 | 500 | 9100 |
| Sb-125 | | 380 | 45 | 250 |

## Table 5-1
## Input Parameters for Steel Analysis
Resident Farmer Scenario

| Parameter | Basis | Values | | |
|---|---|---|---|---|
| Sr-90+D | | 32 | 15 | 110 |
| Tc-99 | | 0.51 | 0.1 | 1 |
| Te-125m | | 38[b] | 125 | 720 |
| Th-229+D | | 5884 | 3200 | 5800 |
| Th-230 | | 5884 | 3200 | 5800 |
| U-233 | | 126 | 35 | 1600 |
| U-234 | | 126 | 35 | 1600 |
| U-235+D | | 126 | 35 | 1600 |
| **Contaminated Zone** | **Basis** | **Values** | | |
| Area of contaminated zone ($m^2$) | WCS site-specific- area based on the volume of material (Att. 2, Ref. 7) | 58 | | |
| Thickness of contaminated zone (m) | RESRAD default value | 2 | | |
| Length parallel to aquifer flow (m) | Based on the diameter of a circular contaminated zone area (Att. 2) | 9 | | |
| **Cover and Contaminated Zone Hydrological Data** | **Basis** | **Values** | | |
| Cover depth (m) | WCS site-specific value (Ref. 3) | 4.6 | | |
| Density of cover material (g/cm**3) | WCS site-specific value (Ref. 5) | 2.1 | | |
| Cover erosion rate (m/yr) | WCS site-specific value (Ref. 3) | 1.83 E-06 | | |
| Density of contaminated zone (g/cm**3) | Value from Ref. 1 (YR soil type), based on median of dist. for sand (Section 3.1, Ref. 2) | 1.51 | | |
| Contaminated zone total porosity | Value from Ref. 1 (YR soil type), based on median of dist. for sand (Section 3.2, Ref. 2) | 0.43 | | |
| Contaminated zone field capacity | YR soil specific value calculated using Equation 4.4 from Ref. 6 | 0.05 | | |
| Contaminated zone hydraulic conductivity (m/yr) | Value from Ref. 1 (YR soil type), based on median of dist. for sand (Section 3.4, Ref. 2) | 2506 | | |
| Contaminated zone b parameter | Value from Ref. 1 (YR soil type), based on median of dist. for sand (Section 3.5, Ref. 2) | 0.975 | | |
| Evapotranspiration coefficient | WCS site-specific value (Ref. 3) | 0.95 | | |
| Precipitation (m/yr) | WCS site-specific value (Ref. 3) | 0.355 | | |
| Runoff coefficient | WCS site-specific value from Ref. 3, based on Table E.1 of Ref. 4 | 0.4 | | |
| **Saturated Zone Hydrological Data** | **Basis** | **Values** | | |

## Table 5-1
## Input Parameters for Steel Analysis
Resident Farmer Scenario

| Parameter | Basis | Values |
|---|---|---|
| Density of saturated zone (g/cm**3) | Soil type from Ref. 3, based on Table 2.1 of Ref. 6 - sand | 1.52 |
| Saturated zone total porosity | Soil type from Ref. 3, RESRAD default is within the range from Table E.8 of Ref. 4 - sand | 0.4 |
| Saturated zone effective porosity | Soil type from Ref. 3, based on Table E.8 of Ref. 4 - medium sand | 0.32 |
| Saturated zone field capacity | Calculated using Equation 4.4 from Ref. 6 | 0.08 |
| Saturated zone hydraulic conductivity (m/yr) | Soil type from Ref. 3, based on Table E.2 of Ref. 4 - sand | 5500 |
| Saturated zone b parameter | Soil type from Ref. 3, based on Table E.2 of Ref. 4 - sand | 4.05 |
| **Unsaturated Zone Hydrological Data** | **Basis** | **Values** |
| Unsat. zone thickness (m) | WCS site-specific value (Ref. 3) | 300 |
| Unsat. zone soil density (g/cm**3) | WCS site-specific value (Ref. 5) | 2.1 |
| Unsat. zone total porosity | Soil type from Ref. 3, based on Table E.8 of Ref. 4 - clay | 0.42 |
| Unsat. zone effective porosity | Soil type from Ref. 3, based on Table E.8 of Ref. 4 - clay | 0.06 |
| Unsat. zone field capacity | Calculated using Equation 4.4 from Ref. 6 | 0.36 |
| Unsat. zone hydraulic conductivity (m/yr) | WCS site-specific value (Ref. 3) | 1 E-03 |
| Unsat. zone soil-specific b parameter | Soil type from Ref. 3, based on Table E.2 of Ref. 4 - clay | 11.4 |

Notes:

[a] Value is calculated by RESRAD.
[b] Value is taken from Table 3.9-1 of Ref. 2.

References:

1. YA-CALC-01-001-03, " RESRAD 6.21 Sensitivity Analysis for Resident Farmer Scenario-Soil," December 2003.
2. Yu, C. et al., NUREG/CR-6697, "Development of Probabilistic RESRAD 6.0 and RESRAD-BUILD 3.0 Computer Codes," Argonne National Laboratory, November 2000.
3. "Petition for Adoption of Rules," submitted by Waste Controls Specialists, LLC to the Texas Department of Health, July 26, 2002.
4. Yu, C. et al., "User's Manual for RESRAD Version 6," US Department of Energy – Argonne National Laboratory, July 2001.
5. Attachment 1, Reference 1.1, Email from Bill Dornsife to Estella Keefer, December 2, 2004.
6. Yu, C. et al., "Data Collection Handbook to Support Modeling the Impacts of Radioactive Material in Soil," US Department of Energy – Argonne National Laboratory, April 1993.
7. Attachment 1, Reference 1.2, Email from Greg Babineau to Eric Darois and Alice Carson, November 11, 2004.

# Attachment 6
# RESRAD Input/0utput Files for Analysis of Soil, Concrete, and Steel Debris

Table of Contents

Part I: Mixture Sums and Single Radionuclide Guidelines

Dose Conversion Factor (and Related) Parameter Summary
File: FGR 13 Morbidity

| 0 Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| B-1 | Dose conversion factors for inhalation, mrem/pCi: | | | |
| B-1 | Ac-227+D | 6.720E+00 | 6.720E+00 | DCF2( 1) |
| B-1 | Ag-108m+D | 2.830E-04 | 2.830E-04 | DCF2( 2) |
| B-1 | Am-241 | 4.440E-01 | 4.440E-01 | DCF2( 3) |
| B-1 | Am-243+D | 4.400E-01 | 4.400E-01 | DCF2( 4) |
| B-1 | C-14 | 2.090E-06 | 2.090E-06 | DCF2( 5) |
| B-1 | Cm-243 | 3.070E-01 | 3.070E-01 | DCF2( 6) |
| B-1 | Co-60 | 2.190E-04 | 2.190E-04 | DCF2( 8) |
| B-1 | Cs-134 | 4.630E-05 | 4.630E-05 | DCF2( 9) |
| B-1 | Cs-137+D | 3.190E-05 | 3.190E-05 | DCF2(10) |
| B-1 | Eu-152 | 2.210E-04 | 2.210E-04 | DCF2(11) |
| B-1 | Eu-154 | 2.860E-04 | 2.860E-04 | DCF2(13) |
| B-1 | Eu-155 | 4.140E-05 | 4.140E-05 | DCF2(14) |
| B-1 | Fe-55 | 2.690E-06 | 2.690E-06 | DCF2(15) |
| B-1 | Gd-152 | 2.430E-01 | 2.430E-01 | DCF2(16) |
| B-1 | H-3 | 6.400E-08 | 6.400E-08 | DCF2(17) |
| B-1 | Nb-94 | 4.140E-04 | 4.140E-04 | DCF2(18) |
| B-1 | Ni-63 | 6.290E-06 | 6.290E-06 | DCF2(19) |
| B-1 | Np-237+D | 5.400E-01 | 5.400E-01 | DCF2(20) |
| B-1 | Pa-231 | 1.280E+00 | 1.280E+00 | DCF2(21) |
| B-1 | Pb-210+D | 1.380E-02 | 1.380E-02 | DCF2(22) |
| B-1 | Po-210 | 9.400E-03 | 9.400E-03 | DCF2(23) |
| B-1 | Pu-238 | 3.920E-01 | 3.920E-01 | DCF2(24) |
| B-1 | Pu-239 | 4.290E-01 | 4.290E-01 | DCF2(25) |
| B-1 | Pu-241+D | 8.250E-03 | 8.250E-03 | DCF2(26) |
| B-1 | Ra-226+D | 8.600E-03 | 8.600E-03 | DCF2(28) |
| B-1 | Sb-125 | 1.220E-05 | 1.220E-05 | DCF2(29) |
| B-1 | Sr-90+D | 1.310E-03 | 1.310E-03 | DCF2(31) |
| B-1 | Tc-99 | 8.330E-06 | 8.330E-06 | DCF2(32) |
| B-1 | Te-125m | 7.290E-06 | 7.290E-06 | DCF2(33) |
| B-1 | Th-229+D | 2.160E+00 | 2.160E+00 | DCF2(34) |
| B-1 | Th-230 | 3.260E-01 | 3.260E-01 | DCF2(35) |
| B-1 | U-233 | 1.350E-01 | 1.350E-01 | DCF2(36) |
| B-1 | U-234 | 1.320E-01 | 1.320E-01 | DCF2(37) |
| B-1 | U-235+D | 1.230E-01 | 1.230E-01 | DCF2(38) |
| D-1 | Dose conversion factors for ingestion, mrem/pCi: | | | |
| D-1 | Ac-227+D | 1.480E-02 | 1.480E-02 | DCF3( 1) |
| D-1 | Ag-108m+D | 7.620E-06 | 7.620E-06 | DCF3( 2) |
| D-1 | Am-241 | 3.640E-03 | 3.640E-03 | DCF3( 3) |
| D-1 | Am-243+D | 3.630E-03 | 3.630E-03 | DCF3( 4) |
| D-1 | C-14 | 2.090E-06 | 2.090E-06 | DCF3( 5) |
| D-1 | Cm-243 | 2.510E-03 | 2.510E-03 | DCF3( 6) |
| D-1 | Co-60 | 2.690E-05 | 2.690E-05 | DCF3( 8) |
| D-1 | Cs-134 | 7.330E-05 | 7.330E-05 | DCF3( 9) |
| D-1 | Cs-137+D | 5.000E-05 | 5.000E-05 | DCF3(10) |
| D-1 | Eu-152 | 6.480E-06 | 6.480E-06 | DCF3(11) |
| D-1 | Eu-154 | 9.550E-06 | 9.550E-06 | DCF3(13) |
| D-1 | Eu-155 | 1.530E-06 | 1.530E-06 | DCF3(14) |
| D-1 | Fe-55 | 6.070E-07 | 6.070E-07 | DCF3(15) |
| D-1 | Gd-152 | 1.610E-04 | 1.610E-04 | DCF3(16) |

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 Morbidity

| Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-1 | H-3 | 6.400E-08 | 6.400E-08 | DCF3(17) |
| D-1 | Nb-94 | 7.140E-06 | 7.140E-06 | DCF3(18) |
| D-1 | Ni-63 | 5.770E-07 | 5.770E-07 | DCF3(19) |
| D-1 | Np-237+D | 4.440E-03 | 4.440E-03 | DCF3(20) |
| D-1 | Pa-231 | 1.060E-02 | 1.060E-02 | DCF3(21) |
| D-1 | Pb-210+D | 5.370E-03 | 5.370E-03 | DCF3(22) |
| D-1 | Po-210 | 1.900E-03 | 1.900E-03 | DCF3(23) |
| D-1 | Pu-238 | 3.200E-03 | 3.200E-03 | DCF3(24) |
| D-1 | Pu-239 | 3.540E-03 | 3.540E-03 | DCF3(25) |
| D-1 | Pu-241+D | 6.850E-05 | 6.850E-05 | DCF3(26) |
| D-1 | Ra-226+D | 1.330E-03 | 1.330E-03 | DCF3(28) |
| D-1 | Sb-125 | 2.810E-06 | 2.810E-06 | DCF3(29) |
| D-1 | Sr-90+D | 1.530E-04 | 1.530E-04 | DCF3(31) |
| D-1 | Tc-99 | 1.460E-06 | 1.460E-06 | DCF3(32) |
| D-1 | Te-125m | 3.670E-06 | 3.670E-06 | DCF3(33) |
| D-1 | Th-229+D | 4.030E-03 | 4.030E-03 | DCF3(34) |
| D-1 | Th-230 | 5.480E-04 | 5.480E-04 | DCF3(35) |
| D-1 | U-233 | 2.890E-04 | 2.890E-04 | DCF3(36) |
| D-1 | U-234 | 2.830E-04 | 2.830E-04 | DCF3(37) |
| D-1 | U-235+D | 2.670E-04 | 2.670E-04 | DCF3(38) |
| | | | | |
| 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 | Ag-108m+D, plant/soil concentration ratio, dimensionless | 1.500E-01 | 1.500E-01 | RTF( 2,1) |
| D-34 | Ag-108m+D, beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.000E-03 | 3.000E-03 | RTF( 2,2) |
| D-34 | Ag-108m+D, milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.500E-02 | 2.500E-02 | RTF( 2,3) |
| D-34 | | | | |
| D-34 | Am-241 , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF( 3,1) |
| D-34 | Am-241 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 5.000E-05 | 5.000E-05 | RTF( 3,2) |
| D-34 | Am-241 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-06 | 2.000E-06 | RTF( 3,3) |
| D-34 | | | | |
| D-34 | Am-243+D , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF( 4,1) |
| D-34 | Am-243+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 5.000E-05 | 5.000E-05 | RTF( 4,2) |
| D-34 | Am-243+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-06 | 2.000E-06 | RTF( 4,3) |
| D-34 | | | | |
| D-34 | C-14 , plant/soil concentration ratio, dimensionless | 5.500E+00 | 5.500E+00 | RTF( 5,1) |
| D-34 | C-14 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.100E-02 | 3.100E-02 | RTF( 5,2) |
| D-34 | C-14 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.200E-02 | 1.200E-02 | RTF( 5,3) |
| D-34 | | | | |
| D-34 | Cm-243 , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF( 6,1) |
| D-34 | Cm-243 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-05 | 2.000E-05 | RTF( 6,2) |
| D-34 | Cm-243 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-06 | 2.000E-06 | RTF( 6,3) |
| D-34 | | | | |
| D-34 | Co-60 , plant/soil concentration ratio, dimensionless | 8.000E-02 | 8.000E-02 | RTF( 8,1) |
| D-34 | Co-60 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-02 | 2.000E-02 | RTF( 8,2) |
| D-34 | Co-60 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF( 8,3) |
| D-34 | | | | |

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 Morbidity

| 0 Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-34 | Cs-134 , plant/soil concentration ratio, dimensionless | 4.000E-02 | 4.000E-02 | RTF( 9,1) |
| D-34 | Cs-134 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.000E-02 | 3.000E-02 | RTF( 9,2) |
| D-34 | Cs-134 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 8.000E-03 | 8.000E-03 | RTF( 9,3) |
| D-34 | | | | |
| D-34 | Cs-137+D , plant/soil concentration ratio, dimensionless | 4.000E-02 | 4.000E-02 | RTF(10,1) |
| D-34 | Cs-137+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.000E-02 | 3.000E-02 | RTF(10,2) |
| D-34 | Cs-137+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 8.000E-03 | 8.000E-03 | RTF(10,3) |
| D-34 | | | | |
| D-34 | Eu-152 , plant/soil concentration ratio, dimensionless | 2.500E-03 | 2.500E-03 | RTF(11,1) |
| D-34 | Eu-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF(11,2) |
| D-34 | Eu-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-05 | 2.000E-05 | RTF(11,3) |
| D-34 | | | | |
| D-34 | Eu-154 , plant/soil concentration ratio, dimensionless | 2.500E-03 | 2.500E-03 | RTF(13,1) |
| D-34 | Eu-154 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF(13,2) |
| D-34 | Eu-154 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-05 | 2.000E-05 | RTF(13,3) |
| D-34 | | | | |
| D-34 | Eu-155 , plant/soil concentration ratio, dimensionless | 2.500E-03 | 2.500E-03 | RTF(14,1) |
| D-34 | Eu-155 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF(14,2) |
| D-34 | Eu-155 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-05 | 2.000E-05 | RTF(14,3) |
| D-34 | | | | |
| D-34 | Fe-55 , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF(15,1) |
| D-34 | Fe-55 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-02 | 2.000E-02 | RTF(15,2) |
| D-34 | Fe-55 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 3.000E-04 | 3.000E-04 | RTF(15,3) |
| D-34 | | | | |
| D-34 | Gd-152 , plant/soil concentration ratio, dimensionless | 2.500E-03 | 2.500E-03 | RTF(16,1) |
| D-34 | Gd-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF(16,2) |
| D-34 | Gd-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-05 | 2.000E-05 | RTF(16,3) |
| D-34 | | | | |
| D-34 | H-3 , plant/soil concentration ratio, dimensionless | 4.800E+00 | 4.800E+00 | RTF(17,1) |
| D-34 | H-3 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.200E-02 | 1.200E-02 | RTF(17,2) |
| D-34 | H-3 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-02 | 1.000E-02 | RTF(17,3) |
| D-34 | | | | |
| D-34 | Nb-94 , plant/soil concentration ratio, dimensionless | 1.000E-02 | 1.000E-02 | RTF(18,1) |
| D-34 | Nb-94 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.000E-07 | 3.000E-07 | RTF(18,2) |
| D-34 | Nb-94 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-06 | 2.000E-06 | RTF(18,3) |
| D-34 | | | | |
| D-34 | Ni-63 , plant/soil concentration ratio, dimensionless | 5.000E-02 | 5.000E-02 | RTF(19,1) |
| D-34 | Ni-63 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 5.000E-03 | 5.000E-03 | RTF(19,2) |
| D-34 | Ni-63 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-02 | 2.000E-02 | RTF(19,3) |
| D-34 | | | | |
| D-34 | Np-237+D , plant/soil concentration ratio, dimensionless | 2.000E-02 | 2.000E-02 | RTF(20,1) |
| D-34 | Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF(20,2) |
| D-34 | Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 5.000E-06 | 5.000E-06 | RTF(20,3) |
| D-34 | | | | |
| D-34 | Pa-231 , plant/soil concentration ratio, dimensionless | 1.000E-02 | 1.000E-02 | RTF(21,1) |
| D-34 | Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 5.000E-03 | 5.000E-03 | RTF(21,2) |
| D-34 | Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 5.000E-06 | 5.000E-06 | RTF(21,3) |
| D-34 | | | | |
| D-34 | Pb-210+D , plant/soil concentration ratio, dimensionless | 1.000E-02 | 1.000E-02 | RTF(22,1) |
| D-34 | Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 8.000E-04 | 8.000E-04 | RTF(22,2) |
| D-34 | Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 3.000E-04 | 3.000E-04 | RTF(22,3) |

Dose Conversion Factor (and Related) Parameter Summary (continued)
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| 0 Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-34 | Po-210 , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF(23,1) |
| D-34 | Po-210 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 5.000E-03 | 5.000E-03 | RTF(23,2) |
| D-34 | Po-210 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 3.400E-04 | 3.400E-04 | RTF(23,3) |
| D-34 | | | | |
| D-34 | Pu-238 , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF(24,1) |
| D-34 | Pu-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(24,2) |
| D-34 | Pu-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-06 | 1.000E-06 | RTF(24,3) |
| D-34 | | | | |
| D-34 | Pu-239 , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF(25,1) |
| D-34 | Pu-239 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(25,2) |
| D-34 | Pu-239 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-06 | 1.000E-06 | RTF(25,3) |
| D-34 | | | | |
| D-34 | Pu-241+D , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF(26,1) |
| D-34 | Pu-241+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(26,2) |
| D-34 | Pu-241+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-06 | 1.000E-06 | RTF(26,3) |
| D-34 | | | | |
| D-34 | Ra-226+D , plant/soil concentration ratio, dimensionless | 4.000E-02 | 4.000E-02 | RTF(28,1) |
| D-34 | Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF(28,2) |
| D-34 | Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF(28,3) |
| D-34 | | | | |
| D-34 | Sb-125 , plant/soil concentration ratio, dimensionless | 1.000E-02 | 1.000E-02 | RTF(29,1) |
| D-34 | Sb-125 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF(29,2) |
| D-34 | Sb-125 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(29,3) |
| D-34 | | | | |
| D-34 | Sr-90+D , plant/soil concentration ratio, dimensionless | 3.000E-01 | 3.000E-01 | RTF(31,1) |
| D-34 | Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 8.000E-03 | 8.000E-03 | RTF(31,2) |
| D-34 | Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF(31,3) |
| D-34 | | | | |
| D-34 | Tc-99 , plant/soil concentration ratio, dimensionless | 5.000E+00 | 5.000E+00 | RTF(32,1) |
| D-34 | Tc-99 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(32,2) |
| D-34 | Tc-99 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF(32,3) |
| D-34 | | | | |
| D-34 | Te-125m , plant/soil concentration ratio, dimensionless | 6.000E-01 | 6.000E-01 | RTF(33,1) |
| D-34 | Te-125m , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 7.000E-03 | 7.000E-03 | RTF(33,2) |
| D-34 | Te-125m , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 5.000E-04 | 5.000E-04 | RTF(33,3) |
| D-34 | | | | |
| D-34 | Th-229+D , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF(34,1) |
| D-34 | Th-229+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(34,2) |
| D-34 | Th-229+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 5.000E-06 | 5.000E-06 | RTF(34,3) |
| D-34 | | | | |
| D-34 | Th-230 , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF(35,1) |
| D-34 | Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(35,2) |
| D-34 | Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 5.000E-06 | 5.000E-06 | RTF(35,3) |
| D-34 | | | | |
| D-34 | U-233 , plant/soil concentration ratio, dimensionless | 2.500E-03 | 2.500E-03 | RTF(36,1) |
| D-34 | U-233 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.400E-04 | 3.400E-04 | RTF(36,2) |
| D-34 | U-233 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 6.000E-04 | 6.000E-04 | RTF(36,3) |
| D-34 | | | | |
| D-34 | U-234 , plant/soil concentration ratio, dimensionless | 2.500E-03 | 2.500E-03 | RTF(37,1) |
| D-34 | U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.400E-04 | 3.400E-04 | RTF(37,2) |
| D-34 | U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 6.000E-04 | 6.000E-04 | RTF(37,3) |

Dose Conversion Factor (and Related) Parameter Summary (continued)
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| Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-34 | U-235+D , plant/soil concentration ratio, dimensionless | 2.500E-03 | 2.500E-03 | RTF(38,1) |
| D-34 | U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.400E-04 | 3.400E-04 | RTF(38,2) |
| D-34 | U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 6.000E-04 | 6.000E-04 | RTF(38,3) |
| 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 | Ag-108m+D, fish | 5.000E+00 | 5.000E+00 | BIOFAC( 2,1) |
| D-5 | Ag-108m+D, crustacea and mollusks | 7.700E+02 | 7.700E+02 | BIOFAC( 2,2) |
| D-5 | Am-241 , fish | 3.000E+01 | 3.000E+01 | BIOFAC( 3,1) |
| D-5 | Am-241 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC( 3,2) |
| D-5 | Am-243+D , fish | 3.000E+01 | 3.000E+01 | BIOFAC( 4,1) |
| D-5 | Am-243+D , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC( 4,2) |
| D-5 | C-14 , fish | 5.000E+04 | 5.000E+04 | BIOFAC( 5,1) |
| D-5 | C-14 , crustacea and mollusks | 9.100E+03 | 9.100E+03 | BIOFAC( 5,2) |
| D-5 | Cm-243 , fish | 3.000E+01 | 3.000E+01 | BIOFAC( 6,1) |
| D-5 | Cm-243 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC( 6,2) |
| D-5 | Co-60 , fish | 3.000E+02 | 3.000E+02 | BIOFAC( 8,1) |
| D-5 | Co-60 , crustacea and mollusks | 2.000E+02 | 2.000E+02 | BIOFAC( 8,2) |
| D-5 | Cs-134 , fish | 2.000E+03 | 2.000E+03 | BIOFAC( 9,1) |
| D-5 | Cs-134 , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC( 9,2) |
| D-5 | Cs-137+D , fish | 2.000E+03 | 2.000E+03 | BIOFAC(10,1) |
| D-5 | Cs-137+D , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(10,2) |
| D-5 | Eu-152 , fish | 5.000E+01 | 5.000E+01 | BIOFAC(11,1) |
| D-5 | Eu-152 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC(11,2) |
| D-5 | Eu-154 , fish | 5.000E+01 | 5.000E+01 | BIOFAC(13,1) |
| D-5 | Eu-154 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC(13,2) |
| D-5 | Eu-155 , fish | 5.000E+01 | 5.000E+01 | BIOFAC(14,1) |
| D-5 | Eu-155 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC(14,2) |
| D-5 | Fe-55 , fish | 2.000E+02 | 2.000E+02 | BIOFAC(15,1) |
| D-5 | Fe-55 , crustacea and mollusks | 3.200E+03 | 3.200E+03 | BIOFAC(15,2) |
| D-5 | Gd-152 , fish | 2.500E+01 | 2.500E+01 | BIOFAC(16,1) |
| D-5 | Gd-152 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC(16,2) |
| D-5 | H-3 , fish | 1.000E+00 | 1.000E+00 | BIOFAC(17,1) |
| D-5 | H-3 , crustacea and mollusks | 1.000E+00 | 1.000E+00 | BIOFAC(17,2) |

Dose Conversion Factor (and Related) Parameter Summary (continued)
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| 0 Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-5 | Nb-94 , fish | 3.000E+02 | 3.000E+02 | BIOFAC(18,1) |
| D-5 | Nb-94 , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(18,2) |
| D-5 | | | | |
| D-5 | Ni-63 , fish | 1.000E+02 | 1.000E+02 | BIOFAC(19,1) |
| D-5 | Ni-63 , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(19,2) |
| D-5 | | | | |
| D-5 | Np-237+D , fish | 3.000E+01 | 3.000E+01 | BIOFAC(20,1) |
| D-5 | Np-237+D , crustacea and mollusks | 4.000E+02 | 4.000E+02 | BIOFAC(20,2) |
| D-5 | | | | |
| D-5 | Pa-231 , fish | 1.000E+01 | 1.000E+01 | BIOFAC(21,1) |
| D-5 | Pa-231 , crustacea and mollusks | 1.100E+02 | 1.100E+02 | BIOFAC(21,2) |
| D-5 | | | | |
| D-5 | Pb-210+D , fish | 3.000E+02 | 3.000E+02 | BIOFAC(22,1) |
| D-5 | Pb-210+D , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(22,2) |
| D-5 | | | | |
| D-5 | Po-210 , fish | 1.000E+02 | 1.000E+02 | BIOFAC(23,1) |
| D-5 | Po-210 , crustacea and mollusks | 2.000E+04 | 2.000E+04 | BIOFAC(23,2) |
| D-5 | | | | |
| D-5 | Pu-238 , fish | 3.000E+01 | 3.000E+01 | BIOFAC(24,1) |
| D-5 | Pu-238 , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(24,2) |
| D-5 | | | | |
| D-5 | Pu-239 , fish | 3.000E+01 | 3.000E+01 | BIOFAC(25,1) |
| D-5 | Pu-239 , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(25,2) |
| D-5 | | | | |
| D-5 | Pu-241+D , fish | 3.000E+01 | 3.000E+01 | BIOFAC(26,1) |
| D-5 | Pu-241+D , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(26,2) |
| D-5 | | | | |
| D-5 | Ra-226+D , fish | 5.000E+01 | 5.000E+01 | BIOFAC(28,1) |
| D-5 | Ra-226+D , crustacea and mollusks | 2.500E+02 | 2.500E+02 | BIOFAC(28,2) |
| D-5 | | | | |
| D-5 | Sb-125 , fish | 1.000E+02 | 1.000E+02 | BIOFAC(29,1) |
| D-5 | Sb-125 , crustacea and mollusks | 1.000E+01 | 1.000E+01 | BIOFAC(29,2) |
| D-5 | | | | |
| D-5 | Sr-90+D , fish | 6.000E+01 | 6.000E+01 | BIOFAC(31,1) |
| D-5 | Sr-90+D , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(31,2) |
| D-5 | | | | |
| D-5 | Tc-99 , fish | 2.000E+01 | 2.000E+01 | BIOFAC(32,1) |
| D-5 | Tc-99 , crustacea and mollusks | 5.000E+00 | 5.000E+00 | BIOFAC(32,2) |
| D-5 | | | | |
| D-5 | Te-125m , fish | 4.000E+02 | 4.000E+02 | BIOFAC(33,1) |
| D-5 | Te-125m , crustacea and mollusks | 7.500E+01 | 7.500E+01 | BIOFAC(33,2) |
| D-5 | | | | |
| D-5 | Th-229+D , fish | 1.000E+02 | 1.000E+02 | BIOFAC(34,1) |
| D-5 | Th-229+D , crustacea and mollusks | 5.000E+02 | 5.000E+02 | BIOFAC(34,2) |
| D-5 | | | | |
| D-5 | Th-230 , fish | 1.000E+02 | 1.000E+02 | BIOFAC(35,1) |
| D-5 | Th-230 , crustacea and mollusks | 5.000E+02 | 5.000E+02 | BIOFAC(35,2) |
| D-5 | | | | |
| D-5 | U-233 , fish | 1.000E+01 | 1.000E+01 | BIOFAC(36,1) |
| D-5 | U-233 , crustacea and mollusks | 6.000E+01 | 6.000E+01 | BIOFAC(36,2) |
| D-5 | | | | |

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 Morbidity

| Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-5 | U-234 , fish | 1.000E+01 | 1.000E+01 | BIOFAC(37,1) |
| D-5 | U-234 , crustacea and mollusks | 6.000E+01 | 6.000E+01 | BIOFAC(37,2) |
| D-5 | | | | |
| D-5 | U-235+D , fish | 1.000E+01 | 1.000E+01 | BIOFAC(38,1) |
| D-5 | U-235+D , crustacea and mollusks | 6.000E+01 | 6.000E+01 | BIOFAC(38,2) |

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) | | 7.500E+02 | 1.000E+04 | --- | AREA |
| R011 | Thickness of contaminated zone (m) | | 2.000E+00 | 2.000E+00 | --- | THICK0 |
| R011 | Length parallel to aquifer flow (m) | | 3.100E+01 | 1.000E+02 | --- | LCZPAQ |
| R011 | Basic radiation dose limit (mrem/yr) | | 1.000E+00 | 2.500E+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): | Ag-108m | 1.000E+00 | 0.000E+00 | --- | S1( 2) |
| R012 | Initial principal radionuclide (pCi/g): | Am-241 | 1.000E+00 | 0.000E+00 | --- | S1( 3) |
| R012 | Initial principal radionuclide (pCi/g): | C-14 | 1.000E+00 | 0.000E+00 | --- | S1( 5) |
| R012 | Initial principal radionuclide (pCi/g): | Cm-243 | 1.000E+00 | 0.000E+00 | --- | S1( 6) |
| R012 | Initial principal radionuclide (pCi/g): | Co-60 | 1.000E+00 | 0.000E+00 | --- | S1( 8) |
| R012 | Initial principal radionuclide (pCi/g): | Cs-134 | 1.000E+00 | 0.000E+00 | --- | S1( 9) |
| R012 | Initial principal radionuclide (pCi/g): | Cs-137 | 1.000E+00 | 0.000E+00 | --- | S1(10) |
| R012 | Initial principal radionuclide (pCi/g): | Eu-152 | 1.000E+00 | 0.000E+00 | --- | S1(11) |
| R012 | Initial principal radionuclide (pCi/g): | Eu-154 | 1.000E+00 | 0.000E+00 | --- | S1(13) |
| R012 | Initial principal radionuclide (pCi/g): | Eu-155 | 1.000E+00 | 0.000E+00 | --- | S1(14) |
| R012 | Initial principal radionuclide (pCi/g): | Fe-55 | 1.000E+00 | 0.000E+00 | --- | S1(15) |
| R012 | Initial principal radionuclide (pCi/g): | H-3 | 1.000E+00 | 0.000E+00 | --- | S1(17) |
| R012 | Initial principal radionuclide (pCi/g): | Nb-94 | 1.000E+00 | 0.000E+00 | --- | S1(18) |
| R012 | Initial principal radionuclide (pCi/g): | Ni-63 | 1.000E+00 | 0.000E+00 | --- | S1(19) |
| R012 | Initial principal radionuclide (pCi/g): | Pu-238 | 1.000E+00 | 0.000E+00 | --- | S1(24) |
| R012 | Initial principal radionuclide (pCi/g): | Pu-239 | 1.000E+00 | 0.000E+00 | --- | S1(25) |
| R012 | Initial principal radionuclide (pCi/g): | Pu-241 | 1.000E+00 | 0.000E+00 | --- | S1(26) |
| R012 | Initial principal radionuclide (pCi/g): | Sb-125 | 1.000E+00 | 0.000E+00 | --- | S1(29) |
| R012 | Initial principal radionuclide (pCi/g): | Sr-90 | 1.000E+00 | 0.000E+00 | --- | S1(31) |
| R012 | Initial principal radionuclide (pCi/g): | Tc-99 | 1.000E+00 | 0.000E+00 | --- | S1(32) |
| R012 | Concentration in groundwater (pCi/L): | Ag-108m | not used | 0.000E+00 | --- | W1( 2) |
| R012 | Concentration in groundwater (pCi/L): | Am-241 | not used | 0.000E+00 | --- | W1( 3) |
| R012 | Concentration in groundwater (pCi/L): | C-14 | not used | 0.000E+00 | --- | W1( 5) |
| R012 | Concentration in groundwater (pCi/L): | Cm-243 | not used | 0.000E+00 | --- | W1( 6) |
| R012 | Concentration in groundwater (pCi/L): | Co-60 | not used | 0.000E+00 | --- | W1( 8) |
| R012 | Concentration in groundwater (pCi/L): | Cs-134 | not used | 0.000E+00 | --- | W1( 9) |
| R012 | Concentration in groundwater (pCi/L): | Cs-137 | not used | 0.000E+00 | --- | W1(10) |
| R012 | Concentration in groundwater (pCi/L): | Eu-152 | not used | 0.000E+00 | --- | W1(11) |
| R012 | Concentration in groundwater (pCi/L): | Eu-154 | not used | 0.000E+00 | --- | W1(13) |
| R012 | Concentration in groundwater (pCi/L): | Eu-155 | not used | 0.000E+00 | --- | W1(14) |
| R012 | Concentration in groundwater (pCi/L): | Fe-55 | not used | 0.000E+00 | --- | W1(15) |
| R012 | Concentration in groundwater (pCi/L): | H-3 | not used | 0.000E+00 | --- | W1(17) |
| R012 | Concentration in groundwater (pCi/L): | Nb-94 | not used | 0.000E+00 | --- | W1(18) |
| R012 | Concentration in groundwater (pCi/L): | Ni-63 | not used | 0.000E+00 | --- | W1(19) |
| R012 | Concentration in groundwater (pCi/L): | Pu-238 | not used | 0.000E+00 | --- | W1(24) |
| R012 | Concentration in groundwater (pCi/L): | Pu-239 | not used | 0.000E+00 | --- | W1(25) |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R012 | Concentration in groundwater (pCi/L): Pu-241 | not used | 0.000E+00 | --- | W1(26) |
| R012 | Concentration in groundwater (pCi/L): Sb-125 | not used | 0.000E+00 | --- | W1(29) |
| R012 | Concentration in groundwater (pCi/L): Sr-90 | not used | 0.000E+00 | --- | W1(31) |
| R012 | Concentration in groundwater (pCi/L): Tc-99 | not used | 0.000E+00 | --- | W1(32) |
| R013 | Cover depth (m) | 4.600E+00 | 0.000E+00 | --- | COVER0 |
| R013 | Density of cover material (g/cm**3) | 2.100E+00 | 1.500E+00 | --- | DENSCV |
| R013 | Cover depth erosion rate (m/yr) | 1.830E-06 | 1.000E-03 | --- | VCV |
| R013 | Density of contaminated zone (g/cm**3) | 1.510E+00 | 1.500E+00 | --- | DENSCZ |
| R013 | Contaminated zone erosion rate (m/yr) | 1.000E-03 | 1.000E-03 | --- | VCZ |
| R013 | Contaminated zone total porosity | 4.300E-01 | 4.000E-01 | --- | TPCZ |
| R013 | Contaminated zone field capacity | 5.000E-02 | 2.000E-01 | --- | FCCZ |
| R013 | Contaminated zone hydraulic conductivity (m/yr) | 2.506E+03 | 1.000E+01 | --- | HCCZ |
| R013 | Contaminated zone b parameter | 9.750E-01 | 5.300E+00 | --- | BCZ |
| R013 | Average annual wind speed (m/sec) | 2.000E+00 | 2.000E+00 | --- | WIND |
| R013 | Humidity in air (g/m**3) | 8.000E+00 | 8.000E+00 | --- | HUMID |
| R013 | Evapotranspiration coefficient | 9.500E-01 | 5.000E-01 | --- | EVAPTR |
| R013 | Precipitation (m/yr) | 3.550E-01 | 1.000E+00 | --- | PRECIP |
| R013 | Irrigation (m/yr) | 2.000E-01 | 2.000E-01 | --- | RI |
| R013 | Irrigation mode | overhead | overhead | --- | IDITCH |
| R013 | Runoff coefficient | 4.000E-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) | 1.520E+00 | 1.500E+00 | --- | DENSAQ |
| R014 | Saturated zone total porosity | 4.000E-01 | 4.000E-01 | --- | TPSZ |
| R014 | Saturated zone effective porosity | 3.200E-01 | 2.000E-01 | --- | EPSZ |
| R014 | Saturated zone field capacity | 8.000E-02 | 2.000E-01 | --- | FCSZ |
| R014 | Saturated zone hydraulic conductivity (m/yr) | 5.500E+03 | 1.000E+02 | --- | HCSZ |
| R014 | Saturated zone hydraulic gradient | 2.000E-02 | 2.000E-02 | --- | HGWT |
| R014 | Saturated zone b parameter | 4.050E+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) | 3.000E+02 | 4.000E+00 | --- | H(1) |
| R015 | Unsat. zone 1, soil density (g/cm**3) | 2.100E+00 | 1.500E+00 | --- | DENSUZ(1) |
| R015 | Unsat. zone 1, total porosity | 4.200E-01 | 4.000E-01 | --- | TPUZ(1) |
| R015 | Unsat. zone 1, effective porosity | 6.000E-02 | 2.000E-01 | --- | EPUZ(1) |
| R015 | Unsat. zone 1, field capacity | 3.600E-01 | 2.000E-01 | --- | FCUZ(1) |
| R015 | Unsat. zone 1, soil-specific b parameter | 1.140E+01 | 5.300E+00 | --- | BUZ(1) |
| R015 | Unsat. zone 1, hydraulic conductivity (m/yr) | 1.000E-03 | 1.000E+01 | --- | HCUZ(1) |
| R016 | Distribution coefficients for Ag-108m | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.160E+02 | 0.000E+00 | --- | DCNUCC( 2) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.800E+02 | 0.000E+00 | --- | DCNUCU( 2,1) |
| R016 | Saturated zone (cm**3/g) | 9.000E+01 | 0.000E+00 | --- | DCNUCS( 2) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 3.165E-05 | ALEACH( 2) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 2) |

Site-Specific Parameter Summary (continued)

| 0 Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for Am-241 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.445E+03 | 2.000E+01 | --- | DCNUCC( 3) |
| R016 | Unsaturated zone 1 (cm**3/g) | 8.400E+03 | 2.000E+01 | --- | DCNUCU( 3,1) |
| R016 | Saturated zone (cm**3/g) | 1.900E+03 | 2.000E+01 | --- | DCNUCS( 3) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 4.732E-06 | ALEACH( 3) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 3) |
| R016 | Distribution coefficients for C-14 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.100E+01 | 0.000E+00 | --- | DCNUCC( 5) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+00 | 0.000E+00 | --- | DCNUCU( 5,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+00 | 0.000E+00 | --- | DCNUCS( 5) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.197E-04 | ALEACH( 5) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 5) |
| R016 | Distribution coefficients for Cm-243 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.761E+03 | -1.000E+00 | --- | DCNUCC( 6) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+03 | -1.000E+00 | --- | DCNUCU( 6,1) |
| R016 | Saturated zone (cm**3/g) | 4.000E+03 | -1.000E+00 | --- | DCNUCS( 6) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.011E-06 | ALEACH( 6) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 6) |
| R016 | Distribution coefficients for Co-60 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.350E+02 | 1.000E+03 | --- | DCNUCC( 8) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.500E+02 | 1.000E+03 | --- | DCNUCU( 8,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+01 | 1.000E+03 | --- | DCNUCS( 8) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.909E-05 | ALEACH( 8) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 8) |
| R016 | Distribution coefficients for Cs-134 | | | | |
| R016 | Contaminated zone (cm**3/g) | 4.460E+02 | 1.000E+03 | --- | DCNUCC( 9) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.900E+03 | 1.000E+03 | --- | DCNUCU( 9,1) |
| R016 | Saturated zone (cm**3/g) | 2.800E+02 | 1.000E+03 | --- | DCNUCS( 9) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.533E-05 | ALEACH( 9) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 9) |
| R016 | Distribution coefficients for Cs-137 | | | | |
| R016 | Contaminated zone (cm**3/g) | 4.460E+02 | 1.000E+03 | --- | DCNUCC(10) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.900E+03 | 1.000E+03 | --- | DCNUCU(10,1) |
| R016 | Saturated zone (cm**3/g) | 2.800E+02 | 1.000E+03 | --- | DCNUCS(10) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.533E-05 | ALEACH(10) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(10) |
| R016 | Distribution coefficients for Eu-152 | | | | |
| R016 | Contaminated zone (cm**3/g) | 8.250E+02 | -1.000E+00 | 8.249E+02 | DCNUCC(11) |
| R016 | Unsaturated zone 1 (cm**3/g) | -1.000E+00 | -1.000E+00 | 8.249E+02 | DCNUCU(11,1) |
| R016 | Saturated zone (cm**3/g) | -1.000E+00 | -1.000E+00 | 8.249E+02 | DCNUCS(11) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 8.289E-06 | ALEACH(11) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(11) |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for Eu-154 | | | | |
| R016 | Contaminated zone (cm**3/g) | 8.250E+02 | -1.000E+00 | 8.249E+02 | DCNUCC(13) |
| R016 | Unsaturated zone 1 (cm**3/g) | -1.000E+00 | -1.000E+00 | 8.249E+02 | DCNUCU(13,1) |
| R016 | Saturated zone (cm**3/g) | -1.000E+00 | -1.000E+00 | 8.249E+02 | DCNUCS(13) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 8.289E-06 | ALEACH(13) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(13) |
| R016 | Distribution coefficients for Eu-155 | | | | |
| R016 | Contaminated zone (cm**3/g) | 8.250E+02 | -1.000E+00 | 8.249E+02 | DCNUCC(14) |
| R016 | Unsaturated zone 1 (cm**3/g) | -1.000E+00 | -1.000E+00 | 8.249E+02 | DCNUCU(14,1) |
| R016 | Saturated zone (cm**3/g) | -1.000E+00 | -1.000E+00 | 8.249E+02 | DCNUCS(14) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 8.289E-06 | ALEACH(14) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(14) |
| R016 | Distribution coefficients for Fe-55 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.090E+02 | 1.000E+03 | --- | DCNUCC(15) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.650E+02 | 1.000E+03 | --- | DCNUCU(15,1) |
| R016 | Saturated zone (cm**3/g) | 2.200E+02 | 1.000E+03 | --- | DCNUCS(15) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 3.271E-05 | ALEACH(15) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(15) |
| R016 | Distribution coefficients for H-3 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E-02 | 0.000E+00 | --- | DCNUCC(17) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCNUCU(17,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCNUCS(17) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 7.344E-02 | ALEACH(17) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(17) |
| R016 | Distribution coefficients for Nb-94 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.800E+02 | 0.000E+00 | --- | DCNUCC(18) |
| R016 | Unsaturated zone 1 (cm**3/g) | 9.000E+02 | 0.000E+00 | --- | DCNUCU(18,1) |
| R016 | Saturated zone (cm**3/g) | 1.600E+02 | 0.000E+00 | --- | DCNUCS(18) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.799E-05 | ALEACH(18) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(18) |
| R016 | Distribution coefficients for Ni-63 | | | | |
| R016 | Contaminated zone (cm**3/g) | 4.240E+02 | 1.000E+03 | --- | DCNUCC(19) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.500E+02 | 1.000E+03 | --- | DCNUCU(19,1) |
| R016 | Saturated zone (cm**3/g) | 4.000E+02 | 1.000E+03 | --- | DCNUCS(19) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.613E-05 | ALEACH(19) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(19) |
| R016 | Distribution coefficients for Pu-238 | | | | |
| R016 | Contaminated zone (cm**3/g) | 9.530E+02 | 2.000E+03 | --- | DCNUCC(24) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.100E+03 | 2.000E+03 | --- | DCNUCU(24,1) |
| R016 | Saturated zone (cm**3/g) | 5.500E+02 | 2.000E+03 | --- | DCNUCS(24) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 7.175E-06 | ALEACH(24) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(24) |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for Pu-239 | | | | |
| R016 | Contaminated zone (cm**3/g) | 9.530E+02 | 2.000E+03 | --- | DCNUCC(25) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.100E+03 | 2.000E+03 | --- | DCNUCU(25,1) |
| R016 | Saturated zone (cm**3/g) | 5.500E+02 | 2.000E+03 | --- | DCNUCS(25) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 7.175E-06 | ALEACH(25) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(25) |
| R016 | Distribution coefficients for Pu-241 | | | | |
| R016 | Contaminated zone (cm**3/g) | 9.530E+02 | 2.000E+03 | --- | DCNUCC(26) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.100E+03 | 2.000E+03 | --- | DCNUCU(26,1) |
| R016 | Saturated zone (cm**3/g) | 5.500E+02 | 2.000E+03 | --- | DCNUCS(26) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 7.175E-06 | ALEACH(26) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(26) |
| R016 | Distribution coefficients for Sb-125 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.800E+02 | 0.000E+00 | --- | DCNUCC(29) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.500E+02 | 0.000E+00 | --- | DCNUCU(29,1) |
| R016 | Saturated zone (cm**3/g) | 4.500E+01 | 0.000E+00 | --- | DCNUCS(29) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.799E-05 | ALEACH(29) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(29) |
| R016 | Distribution coefficients for Sr-90 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.200E+01 | 3.000E+01 | --- | DCNUCC(31) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.100E+02 | 3.000E+01 | --- | DCNUCU(31,1) |
| R016 | Saturated zone (cm**3/g) | 1.500E+01 | 3.000E+01 | --- | DCNUCS(31) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.135E-04 | ALEACH(31) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(31) |
| R016 | Distribution coefficients for Tc-99 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.100E-01 | 0.000E+00 | --- | DCNUCC(32) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+00 | 0.000E+00 | --- | DCNUCU(32,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E-01 | 0.000E+00 | --- | DCNUCS(32) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.259E-02 | ALEACH(32) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(32) |
| R016 | Distribution coefficients for daughter Ac-227 | | | | |
| R016 | Contaminated zone (cm**3/g) | 8.250E+02 | 2.000E+01 | --- | DCNUCC( 1) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.400E+03 | 2.000E+01 | --- | DCNUCU( 1,1) |
| R016 | Saturated zone (cm**3/g) | 4.500E+02 | 2.000E+01 | --- | DCNUCS( 1) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 8.288E-06 | ALEACH( 1) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 1) |
| R016 | Distribution coefficients for daughter Am-243 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.445E+03 | 2.000E+01 | --- | DCNUCC( 4) |
| R016 | Unsaturated zone 1 (cm**3/g) | 8.400E+03 | 2.000E+01 | --- | DCNUCU( 4,1) |
| R016 | Saturated zone (cm**3/g) | 1.900E+03 | 2.000E+01 | --- | DCNUCS( 4) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 4.732E-06 | ALEACH( 4) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 4) |

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 Gd-152 | | | | |
| R016 | Contaminated zone (cm**3/g) | 8.250E+02 | -1.000E+00 | 8.249E+02 | DCNUCC(16) |
| R016 | Unsaturated zone 1 (cm**3/g) | -1.000E+00 | -1.000E+00 | 8.249E+02 | DCNUCU(16,1) |
| R016 | Saturated zone (cm**3/g) | -1.000E+00 | -1.000E+00 | 8.249E+02 | DCNUCS(16) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 8.289E-06 | ALEACH(16) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(16) |
| R016 | Distribution coefficients for daughter Np-237 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.700E+01 | -1.000E+00 | --- | DCNUCC(20) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.500E+01 | -1.000E+00 | --- | DCNUCU(20,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+00 | -1.000E+00 | --- | DCNUCS(20) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 4.014E-04 | ALEACH(20) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(20) |
| R016 | Distribution coefficients for daughter Pa-231 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.800E+02 | 5.000E+01 | --- | DCNUCC(21) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.700E+03 | 5.000E+01 | --- | DCNUCU(21,1) |
| R016 | Saturated zone (cm**3/g) | 5.500E+02 | 5.000E+01 | --- | DCNUCS(21) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.799E-05 | ALEACH(21) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(21) |
| R016 | Distribution coefficients for daughter Pb-210 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.392E+03 | 1.000E+02 | --- | DCNUCC(22) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.500E+02 | 1.000E+02 | --- | DCNUCU(22,1) |
| R016 | Saturated zone (cm**3/g) | 2.700E+02 | 1.000E+02 | --- | DCNUCS(22) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.859E-06 | ALEACH(22) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(22) |
| R016 | Distribution coefficients for daughter Po-210 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.810E+02 | 1.000E+01 | --- | DCNUCC(23) |
| R016 | Unsaturated zone 1 (cm**3/g) | 3.000E+03 | 1.000E+01 | --- | DCNUCU(23,1) |
| R016 | Saturated zone (cm**3/g) | 1.500E+02 | 1.000E+01 | --- | DCNUCS(23) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 3.777E-05 | ALEACH(23) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(23) |
| R016 | Distribution coefficients for daughter Ra-226 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.533E+03 | 7.000E+01 | --- | DCNUCC(28) |
| R016 | Unsaturated zone 1 (cm**3/g) | 9.100E+03 | 7.000E+01 | --- | DCNUCU(28,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+02 | 7.000E+01 | --- | DCNUCS(28) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.935E-06 | ALEACH(28) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(28) |
| R016 | Distribution coefficients for daughter Te-125m | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.800E+01 | 0.000E+00 | --- | DCNUCC(33) |
| R016 | Unsaturated zone 1 (cm**3/g) | 7.200E+02 | 0.000E+00 | --- | DCNUCU(33,1) |
| R016 | Saturated zone (cm**3/g) | 1.250E+02 | 0.000E+00 | --- | DCNUCS(33) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.798E-04 | ALEACH(33) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(33) |

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 Th-229 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.884E+03 | 6.000E+04 | --- | DCNUCC(34) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.800E+03 | 6.000E+04 | --- | DCNUCU(34,1) |
| R016 | Saturated zone (cm**3/g) | 3.200E+03 | 6.000E+04 | --- | DCNUCS(34) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.162E-06 | ALEACH(34) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(34) |
| R016 | Distribution coefficients for daughter Th-230 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.884E+03 | 6.000E+04 | --- | DCNUCC(35) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.800E+03 | 6.000E+04 | --- | DCNUCU(35,1) |
| R016 | Saturated zone (cm**3/g) | 3.200E+03 | 6.000E+04 | --- | DCNUCS(35) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.162E-06 | ALEACH(35) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(35) |
| R016 | Distribution coefficients for daughter U-233 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.260E+02 | 5.000E+01 | --- | DCNUCC(36) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.600E+03 | 5.000E+01 | --- | DCNUCU(36,1) |
| R016 | Saturated zone (cm**3/g) | 3.500E+01 | 5.000E+01 | --- | DCNUCS(36) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 5.425E-05 | ALEACH(36) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(36) |
| R016 | Distribution coefficients for daughter U-234 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.260E+02 | 5.000E+01 | --- | DCNUCC(37) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.600E+03 | 5.000E+01 | --- | DCNUCU(37,1) |
| R016 | Saturated zone (cm**3/g) | 3.500E+01 | 5.000E+01 | --- | DCNUCS(37) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 5.425E-05 | ALEACH(37) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(37) |
| R016 | Distribution coefficients for daughter U-235 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.260E+02 | 5.000E+01 | --- | DCNUCC(38) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.600E+03 | 5.000E+01 | --- | DCNUCU(38,1) |
| R016 | Saturated zone (cm**3/g) | 3.500E+01 | 5.000E+01 | --- | DCNUCS(38) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 5.425E-05 | ALEACH(38) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(38) |
| 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 | >0 shows circular AREA. | FS |

Site-Specific Parameter Summary (continued)

| 0 Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R017 | Radii of shape factor array (used if FS = -1): | | | | |
| R017 | Outer annular radius (m), ring 1: | not used | 5.000E+01 | --- | RAD_SHAPE( 1) |
| R017 | Outer annular radius (m), ring 2: | not used | 7.071E+01 | --- | RAD_SHAPE( 2) |
| R017 | Outer annular radius (m), ring 3: | not used | 0.000E+00 | --- | RAD_SHAPE( 3) |
| R017 | Outer annular radius (m), ring 4: | not used | 0.000E+00 | --- | RAD_SHAPE( 4) |
| R017 | Outer annular radius (m), ring 5: | not used | 0.000E+00 | --- | RAD_SHAPE( 5) |
| R017 | Outer annular radius (m), ring 6: | not used | 0.000E+00 | --- | RAD_SHAPE( 6) |
| R017 | Outer annular radius (m), ring 7: | not used | 0.000E+00 | --- | RAD_SHAPE( 7) |
| R017 | Outer annular radius (m), ring 8: | not used | 0.000E+00 | --- | RAD_SHAPE( 8) |
| R017 | Outer annular radius (m), ring 9: | not used | 0.000E+00 | --- | RAD_SHAPE( 9) |
| R017 | Outer annular radius (m), ring 10: | not used | 0.000E+00 | --- | RAD_SHAPE(10) |
| R017 | Outer annular radius (m), ring 11: | not used | 0.000E+00 | --- | RAD_SHAPE(11) |
| R017 | Outer annular radius (m), ring 12: | not used | 0.000E+00 | --- | RAD_SHAPE(12) |
| R017 | Fractions of annular areas within AREA: | | | | |
| R017 | Ring 1 | not used | 1.000E+00 | --- | FRACA( 1) |
| R017 | Ring 2 | not used | 2.732E-01 | --- | FRACA( 2) |
| R017 | Ring 3 | not used | 0.000E+00 | --- | FRACA( 3) |
| R017 | Ring 4 | not used | 0.000E+00 | --- | FRACA( 4) |
| R017 | Ring 5 | not used | 0.000E+00 | --- | FRACA( 5) |
| R017 | Ring 6 | not used | 0.000E+00 | --- | FRACA( 6) |
| R017 | Ring 7 | not used | 0.000E+00 | --- | FRACA( 7) |
| R017 | Ring 8 | not used | 0.000E+00 | --- | FRACA( 8) |
| R017 | Ring 9 | not used | 0.000E+00 | --- | FRACA( 9) |
| R017 | Ring 10 | not used | 0.000E+00 | --- | FRACA(10) |
| R017 | Ring 11 | not used | 0.000E+00 | --- | FRACA(11) |
| R017 | Ring 12 | not used | 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) | not used | 5.400E+00 | --- | DIET(5) |
| R018 | Other seafood consumption (kg/yr) | not used | 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 | 1.000E+00 | 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 | not used | 5.000E-01 | --- | FR9 |
| R018 | Contamination fraction of plant food | -1 | -1 | 0.375E+00 | FPLANT |
| R018 | Contamination fraction of meat | -1 | -1 | 0.375E-01 | FMEAT |
| R018 | Contamination fraction of milk | -1 | -1 | 0.375E-01 | 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 |

Site-Specific Parameter Summary (continued)

| 0 Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| 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 | 1.000E+00 | 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) |
| 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) | 2.000E-05 | 2.000E-05 | --- | C12WTR |
| C14 | C-12 concentration in contaminated soil (g/g) | 3.000E-02 | 3.000E-02 | --- | C12CZ |
| C14 | Fraction of vegetation carbon from soil | 2.000E-02 | 2.000E-02 | --- | CSOIL |
| C14 | Fraction of vegetation carbon from air | 9.800E-01 | 9.800E-01 | --- | CAIR |
| C14 | C-14 evasion layer thickness in soil (m) | 3.000E-01 | 3.000E-01 | --- | DMC |
| C14 | C-14 evasion flux rate from soil (1/sec) | 7.000E-07 | 7.000E-07 | --- | EVSN |
| C14 | C-12 evasion flux rate from soil (1/sec) | 1.000E-10 | 1.000E-10 | --- | REVSN |
| C14 | Fraction of grain in beef cattle feed | 8.000E-01 | 8.000E-01 | --- | AVFG4 |
| C14 | Fraction of grain in milk cow feed | 2.000E-01 | 2.000E-01 | --- | AVFG5 |
| C14 | DCF correction factor for gaseous forms of C14 | 8.894E+01 | 8.894E+01 | --- | CO2F |
| | | | | | |
| 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) |
| | | | | | |
| R021 | Thickness of building foundation (m) | 1.500E-01 | 1.500E-01 | --- | FLOOR1 |
| R021 | Bulk density of building foundation (g/cm**3) | 2.400E+00 | 2.400E+00 | --- | DENSFL |
| R021 | Total porosity of the cover material | 4.000E-01 | 4.000E-01 | --- | TPCV |
| R021 | Total porosity of the building foundation | 1.000E-01 | 1.000E-01 | --- | TPFL |
| R021 | Volumetric water content of the cover material | 5.000E-02 | 5.000E-02 | --- | PH2OCV |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R021 | Volumetric water content of the foundation | 3.000E-02 | 3.000E-02 | --- | PH2OFL |
| R021 | Diffusion coefficient for radon gas (m/sec): | | | | |
| R021 | in cover material | 2.000E-06 | 2.000E-06 | --- | DIFCV |
| R021 | in foundation material | 3.000E-07 | 3.000E-07 | --- | DIFFL |
| R021 | in contaminated zone soil | 2.000E-06 | 2.000E-06 | --- | DIFCZ |
| R021 | Radon vertical dimension of mixing (m) | 2.000E+00 | 2.000E+00 | --- | HMIX |
| R021 | Average building air exchange rate (1/hr) | 5.000E-01 | 5.000E-01 | --- | REXG |
| R021 | Height of the building (room) (m) | 2.500E+00 | 2.500E+00 | --- | HRM |
| R021 | Building interior area factor | 0.000E+00 | 0.000E+00 | code computed (time dependent) | FAI |
| R021 | Building depth below ground surface (m) | -1.000E+00 | -1.000E+00 | code computed (time dependent) | DMFL |
| R021 | Emanating power of Rn-222 gas | 2.500E-01 | 2.500E-01 | --- | EMANA(1) |
| R021 | Emanating power of Rn-220 gas | not used | 1.500E-01 | --- | EMANA(2) |
| | | | | | |
| TITL | Number of graphical time points | 32 | --- | --- | NPTS |
| TITL | Maximum number of integration points for dose | 17 | --- | --- | LYMAX |
| TITL | Maximum number of integration points for risk | 1 | --- | --- | 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 | suppressed |
| 7 -- drinking water | active |
| 8 -- soil ingestion | active |
| 9 -- radon | active |
| Find peak pathway doses | active |

Contaminated Zone Dimensions

| | |
|---|---|
| Area: | 750.00 square meters |
| Thickness: | 2.00 meters |
| Cover Depth: | 4.60 meters |

Initial Soil Concentrations, pCi/g

| | |
|---|---|
| Ag-108m | 1.000E+00 |
| Am-241 | 1.000E+00 |
| C-14 | 1.000E+00 |
| Cm-243 | 1.000E+00 |
| Co-60 | 1.000E+00 |
| Cs-134 | 1.000E+00 |
| Cs-137 | 1.000E+00 |
| Eu-152 | 1.000E+00 |
| Eu-154 | 1.000E+00 |
| Eu-155 | 1.000E+00 |
| Fe-55 | 1.000E+00 |
| H-3 | 1.000E+00 |
| Nb-94 | 1.000E+00 |
| Ni-63 | 1.000E+00 |
| Pu-238 | 1.000E+00 |
| Pu-239 | 1.000E+00 |
| Pu-241 | 1.000E+00 |
| Sb-125 | 1.000E+00 |
| Sr-90 | 1.000E+00 |
| Tc-99 | 1.000E+00 |

0

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 1.000E+00 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): | 6.056E-16 | 9.068E-15 | 1.054E-13 | 2.754E-12 | 6.466E-11 | 2.016E-09 | 3.829E-08 | 6.206E-07 |
| M(t): | 6.056E-16 | 9.068E-15 | 1.054E-13 | 2.754E-12 | 6.466E-11 | 2.016E-09 | 3.829E-08 | 6.206E-07 |

0Maximum TDOSE(t): 6.206E-07 mrem/yr at t = 1.000E+03 years

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Summary : YR Material to WCS - soil run File: YR to WCS_soil.RAD

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

| 0Parent (i) | Product (j) | Branch Fraction* | t= | DSR(j,t) (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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ag-108m | Ag-108m | 1.000E+00 | | 1.083E-40 | 1.077E-40 | 1.066E-40 | 1.026E-40 | 9.199E-41 | 6.280E-41 | 2.111E-41 | 4.652E-43 |
| 0Am-241 | Am-241 | 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 |
| Am-241 | Np-237 | 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 |
| Am-241 | U-233 | 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 |
| Am-241 | Th-229 | 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 |
| Am-241 | ΣDSR(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 |
| 0C-14 | C-14 | 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 |
| 0Cm-243 | Cm-243 | 9.976E-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 |
| Cm-243 | Pu-239 | 9.976E-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 |
| Cm-243 | U-235 | 9.976E-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 |
| Cm-243 | Pa-231 | 9.976E-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 |
| Cm-243 | Ac-227 | 9.976E-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 |
| Cm-243 | ΣDSR(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 |
| 0Cm-243 | Cm-243 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | Am-243 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | Pu-239 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | U-235 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | Pa-231 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | Ac-227 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | ΣDSR(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 |
| 0Co-60 | Co-60 | 1.000E+00 | | 1.592E-32 | 1.396E-32 | 1.073E-32 | 4.273E-33 | 3.080E-34 | 3.096E-38 | 0.000E+00 | 0.000E+00 |
| 0Cs-134 | Cs-134 | 1.000E+00 | | 4.310E-39 | 3.080E-39 | 1.572E-39 | 1.495E-40 | 1.794E-43 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 0Cs-137 | Cs-137 | 1.000E+00 | | 2.620E-40 | 2.560E-40 | 2.444E-40 | 2.080E-40 | 1.311E-40 | 2.605E-41 | 2.578E-43 | 0.000E+00 |
| 0Eu-152 | Eu-152 | 7.208E-01 | | 1.546E-35 | 1.467E-35 | 1.322E-35 | 9.191E-36 | 3.250E-36 | 8.548E-38 | 2.615E-42 | 0.000E+00 |
| 0Eu-152 | Eu-152 | 2.792E-01 | | 5.987E-36 | 5.684E-36 | 5.122E-36 | 3.560E-36 | 1.259E-36 | 3.311E-38 | 1.013E-42 | 0.000E+00 |
| Eu-152 | Gd-152 | 2.792E-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 |
| Eu-152 | ΣDSR(j) | | | 5.987E-36 | 5.684E-36 | 5.122E-36 | 3.560E-36 | 1.259E-36 | 3.311E-38 | 1.013E-42 | 0.000E+00 |
| 0Eu-154 | Eu-154 | 1.000E+00 | | 1.572E-34 | 1.453E-34 | 1.241E-34 | 7.154E-35 | 1.481E-35 | 5.981E-38 | 8.408E-45 | 0.000E+00 |
| 0Eu-155 | Eu-155 | 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 |
| 0Fe-55 | Fe-55 | 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 |
| 0H-3 | H-3 | 1.000E+00 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.117E-32 |
| 0Nb-94 | Nb-94 | 1.000E+00 | | 3.585E-38 | 3.585E-38 | 3.585E-38 | 3.584E-38 | 3.583E-38 | 3.579E-38 | 3.567E-38 | 3.524E-38 |

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Summary : YR Material to WCS - soil run File: YR to WCS_soil.RAD

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

| 0Parent (i) | Product (j) | Branch Fraction* | t= | DSR(j,t) (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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ni-63 | Ni-63 | 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 |
| 0Pu-238 | Pu-238 | 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 |
| Pu-238 | 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 |
| Pu-238 | 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 |
| Pu-238 | Ra-226 | 1.000E+00 | | 6.056E-16 | 9.068E-15 | 1.054E-13 | 2.754E-12 | 6.466E-11 | 2.016E-09 | 3.829E-08 | 6.206E-07 |
| Pu-238 | Pb-210 | 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 |
| Pu-238 | Po-210 | 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 |
| Pu-238 | ΣDSR(j) | | | 6.056E-16 | 9.068E-15 | 1.054E-13 | 2.754E-12 | 6.466E-11 | 2.016E-09 | 3.829E-08 | 6.206E-07 |
| 0Pu-239 | Pu-239 | 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 |
| Pu-239 | U-235 | 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 |
| Pu-239 | 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 |
| Pu-239 | Ac-227 | 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 |
| Pu-239 | ΣDSR(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 |
| 0Pu-241 | Pu-241 | 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 |
| Pu-241 | Am-241 | 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 |
| Pu-241 | Np-237 | 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 |
| Pu-241 | U-233 | 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 |
| Pu-241 | Th-229 | 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 |
| Pu-241 | ΣDSR(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 |
| 0Pu-241 | Pu-241 | 2.450E-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 |
| Pu-241 | Np-237 | 2.450E-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 |
| Pu-241 | U-233 | 2.450E-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 |
| Pu-241 | Th-229 | 2.450E-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 |
| Pu-241 | ΣDSR(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 |
| 0Sb-125 | Sb-125 | 7.720E-01 | | 1.037E-42 | 8.085E-43 | 4.905E-43 | 8.548E-44 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 0Sb-125 | Sb-125 | 2.280E-01 | | 3.069E-43 | 2.396E-43 | 1.457E-43 | 2.522E-44 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Sb-125 | Te-125m | 2.280E-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 |
| Sb-125 | ΣDSR(j) | | | 3.069E-43 | 2.396E-43 | 1.457E-43 | 2.522E-44 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 0Sr-90 | Sr-90 | 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 |
| 0Tc-99 | Tc-99 | 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 |

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
The DSR includes contributions from associated (half-life 6 30 days) daughters.

Table of Contents

Part I: Mixture Sums and Single Radionuclide Guidelines

1RESRAD, Version 6.21 T« Limit = 30 days 12/20/2004 11:40 Page 2
Summary : YR Material to WCS - concrete run File: YR to WCS_concrete.RAD

Dose Conversion Factor (and Related) Parameter Summary
File: YP concrete

| Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| B-1 | Dose conversion factors for inhalation, mrem/pCi: | | | |
| B-1 | Ac-227+D | 6.720E+00 | 6.720E+00 | DCF2( 1) |
| B-1 | Ag-108m+D | 2.830E-04 | 2.830E-04 | DCF2( 2) |
| B-1 | Am-241 | 4.440E-01 | 4.440E-01 | DCF2( 3) |
| B-1 | Am-243+D | 4.400E-01 | 4.400E-01 | DCF2( 4) |
| B-1 | C-14 | 2.090E-06 | 2.090E-06 | DCF2( 5) |
| B-1 | Cm-243 | 3.070E-01 | 3.070E-01 | DCF2( 6) |
| B-1 | Co-60 | 2.190E-04 | 2.190E-04 | DCF2( 8) |
| B-1 | Cs-134 | 4.630E-05 | 4.630E-05 | DCF2( 9) |
| B-1 | Cs-137+D | 3.190E-05 | 3.190E-05 | DCF2(10) |
| B-1 | Eu-152 | 2.210E-04 | 2.210E-04 | DCF2(11) |
| B-1 | Eu-154 | 2.860E-04 | 2.860E-04 | DCF2(13) |
| B-1 | Eu-155 | 4.140E-05 | 4.140E-05 | DCF2(14) |
| B-1 | Fe-55 | 2.690E-06 | 2.690E-06 | DCF2(15) |
| B-1 | Gd-152 | 2.430E-01 | 2.430E-01 | DCF2(16) |
| B-1 | H-3 | 6.400E-08 | 6.400E-08 | DCF2(17) |
| B-1 | Nb-94 | 4.140E-04 | 4.140E-04 | DCF2(18) |
| B-1 | Ni-63 | 6.290E-06 | 6.290E-06 | DCF2(19) |
| B-1 | Np-237+D | 5.400E-01 | 5.400E-01 | DCF2(20) |
| B-1 | Pa-231 | 1.280E+00 | 1.280E+00 | DCF2(21) |
| B-1 | Pb-210+D | 1.380E-02 | 1.380E-02 | DCF2(22) |
| B-1 | Po-210 | 9.400E-03 | 9.400E-03 | DCF2(23) |
| B-1 | Pu-238 | 3.920E-01 | 3.920E-01 | DCF2(24) |
| B-1 | Pu-239 | 4.290E-01 | 4.290E-01 | DCF2(25) |
| B-1 | Pu-241+D | 8.250E-03 | 8.250E-03 | DCF2(26) |
| B-1 | Ra-226+D | 8.600E-03 | 8.600E-03 | DCF2(28) |
| B-1 | Sb-125 | 1.220E-05 | 1.220E-05 | DCF2(29) |
| B-1 | Sr-90+D | 1.310E-03 | 1.310E-03 | DCF2(31) |
| B-1 | Tc-99 | 8.330E-06 | 8.330E-06 | DCF2(32) |
| B-1 | Te-125m | 7.290E-06 | 7.290E-06 | DCF2(33) |
| B-1 | Th-229+D | 2.160E+00 | 2.160E+00 | DCF2(34) |
| B-1 | Th-230 | 3.260E-01 | 3.260E-01 | DCF2(35) |
| B-1 | U-233 | 1.350E-01 | 1.350E-01 | DCF2(36) |
| B-1 | U-234 | 1.320E-01 | 1.320E-01 | DCF2(37) |
| B-1 | U-235+D | 1.230E-01 | 1.230E-01 | DCF2(38) |
| D-1 | Dose conversion factors for ingestion, mrem/pCi: | | | |
| D-1 | Ac-227+D | 1.480E-02 | 1.480E-02 | DCF3( 1) |
| D-1 | Ag-108m+D | 7.620E-06 | 7.620E-06 | DCF3( 2) |
| D-1 | Am-241 | 3.640E-03 | 3.640E-03 | DCF3( 3) |
| D-1 | Am-243+D | 3.630E-03 | 3.630E-03 | DCF3( 4) |
| D-1 | C-14 | 2.090E-06 | 2.090E-06 | DCF3( 5) |
| D-1 | Cm-243 | 2.510E-03 | 2.510E-03 | DCF3( 6) |
| D-1 | Co-60 | 2.690E-05 | 2.690E-05 | DCF3( 8) |
| D-1 | Cs-134 | 7.330E-05 | 7.330E-05 | DCF3( 9) |
| D-1 | Cs-137+D | 5.000E-05 | 5.000E-05 | DCF3(10) |
| D-1 | Eu-152 | 6.480E-06 | 6.480E-06 | DCF3(11) |
| D-1 | Eu-154 | 9.550E-06 | 9.550E-06 | DCF3(13) |
| D-1 | Eu-155 | 1.530E-06 | 1.530E-06 | DCF3(14) |
| D-1 | Fe-55 | 6.070E-07 | 6.070E-07 | DCF3(15) |
| D-1 | Gd-152 | 1.610E-04 | 1.610E-04 | DCF3(16) |

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: YP concrete

| Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-1 | H-3 | 6.400E-08 | 6.400E-08 | DCF3(17) |
| D-1 | Nb-94 | 7.140E-06 | 7.140E-06 | DCF3(18) |
| D-1 | Ni-63 | 5.770E-07 | 5.770E-07 | DCF3(19) |
| D-1 | Np-237+D | 4.440E-03 | 4.440E-03 | DCF3(20) |
| D-1 | Pa-231 | 1.060E-02 | 1.060E-02 | DCF3(21) |
| D-1 | Pb-210+D | 5.370E-03 | 5.370E-03 | DCF3(22) |
| D-1 | Po-210 | 1.900E-03 | 1.900E-03 | DCF3(23) |
| D-1 | Pu-238 | 3.200E-03 | 3.200E-03 | DCF3(24) |
| D-1 | Pu-239 | 3.540E-03 | 3.540E-03 | DCF3(25) |
| D-1 | Pu-241+D | 6.850E-05 | 6.850E-05 | DCF3(26) |
| D-1 | Ra-226+D | 1.330E-03 | 1.330E-03 | DCF3(28) |
| D-1 | Sb-125 | 2.810E-06 | 2.810E-06 | DCF3(29) |
| D-1 | Sr-90+D | 1.530E-04 | 1.530E-04 | DCF3(31) |
| D-1 | Tc-99 | 1.460E-06 | 1.460E-06 | DCF3(32) |
| D-1 | Te-125m | 3.670E-06 | 3.670E-06 | DCF3(33) |
| D-1 | Th-229+D | 4.030E-03 | 4.030E-03 | DCF3(34) |
| D-1 | Th-230 | 5.480E-04 | 5.480E-04 | DCF3(35) |
| D-1 | U-233 | 2.890E-04 | 2.890E-04 | DCF3(36) |
| D-1 | U-234 | 2.830E-04 | 2.830E-04 | DCF3(37) |
| D-1 | U-235+D | 2.670E-04 | 2.670E-04 | DCF3(38) |
| D-34 | Food transfer factors: | | | |
| D-34 | Ac-227+D , plant/soil concentration ratio, dimensionless | 1.870E-04 | 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 | Ag-108m+D, plant/soil concentration ratio, dimensionless | 1.470E-05 | 1.500E-01 | RTF( 2,1) |
| D-34 | Ag-108m+D, beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.000E-03 | 3.000E-03 | RTF( 2,2) |
| D-34 | Ag-108m+D, milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.500E-02 | 2.500E-02 | RTF( 2,3) |
| D-34 | Am-241 , plant/soil concentration ratio, dimensionless | 1.870E-04 | 1.000E-03 | RTF( 3,1) |
| D-34 | Am-241 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 5.000E-05 | 5.000E-05 | RTF( 3,2) |
| D-34 | Am-241 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-06 | 2.000E-06 | RTF( 3,3) |
| D-34 | Am-243+D , plant/soil concentration ratio, dimensionless | 1.870E-04 | 1.000E-03 | RTF( 4,1) |
| D-34 | Am-243+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 5.000E-05 | 5.000E-05 | RTF( 4,2) |
| D-34 | Am-243+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-06 | 2.000E-06 | RTF( 4,3) |
| D-34 | C-14 , plant/soil concentration ratio, dimensionless | 2.120E-02 | 5.500E+00 | RTF( 5,1) |
| D-34 | C-14 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.100E-02 | 3.100E-02 | RTF( 5,2) |
| D-34 | C-14 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.200E-02 | 1.200E-02 | RTF( 5,3) |
| D-34 | Cm-243 , plant/soil concentration ratio, dimensionless | 1.750E-03 | 1.000E-03 | RTF( 6,1) |
| D-34 | Cm-243 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-05 | 2.000E-05 | RTF( 6,2) |
| D-34 | Cm-243 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-06 | 2.000E-06 | RTF( 6,3) |
| D-34 | Co-60 , plant/soil concentration ratio, dimensionless | 2.500E-03 | 8.000E-02 | RTF( 8,1) |
| D-34 | Co-60 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-02 | 2.000E-02 | RTF( 8,2) |
| D-34 | Co-60 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF( 8,3) |

Dose Conversion Factor (and Related) Parameter Summary (continued)
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| 0 Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-34 | Cs-134 , plant/soil concentration ratio, dimensionless | 4.030E-02 | 4.000E-02 | RTF( 9,1) |
| D-34 | Cs-134 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.000E-02 | 3.000E-02 | RTF( 9,2) |
| D-34 | Cs-134 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 8.000E-03 | 8.000E-03 | RTF( 9,3) |
| D-34 | | | | |
| D-34 | Cs-137+D , plant/soil concentration ratio, dimensionless | 4.030E-02 | 4.000E-02 | RTF(10,1) |
| D-34 | Cs-137+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.000E-02 | 3.000E-02 | RTF(10,2) |
| D-34 | Cs-137+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 8.000E-03 | 8.000E-03 | RTF(10,3) |
| D-34 | | | | |
| D-34 | Eu-152 , plant/soil concentration ratio, dimensionless | 1.870E-04 | 2.500E-03 | RTF(11,1) |
| D-34 | Eu-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF(11,2) |
| D-34 | Eu-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-05 | 2.000E-05 | RTF(11,3) |
| D-34 | | | | |
| D-34 | Eu-154 , plant/soil concentration ratio, dimensionless | 1.870E-04 | 2.500E-03 | RTF(13,1) |
| D-34 | Eu-154 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF(13,2) |
| D-34 | Eu-154 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-05 | 2.000E-05 | RTF(13,3) |
| D-34 | | | | |
| D-34 | Eu-155 , plant/soil concentration ratio, dimensionless | 1.870E-04 | 2.500E-03 | RTF(14,1) |
| D-34 | Eu-155 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF(14,2) |
| D-34 | Eu-155 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-05 | 2.000E-05 | RTF(14,3) |
| D-34 | | | | |
| D-34 | Fe-55 , plant/soil concentration ratio, dimensionless | 7.800E-01 | 1.000E-03 | RTF(15,1) |
| D-34 | Fe-55 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-02 | 2.000E-02 | RTF(15,2) |
| D-34 | Fe-55 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 3.000E-04 | 3.000E-04 | RTF(15,3) |
| D-34 | | | | |
| D-34 | Gd-152 , plant/soil concentration ratio, dimensionless | 1.870E-04 | 2.500E-03 | RTF(16,1) |
| D-34 | Gd-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF(16,2) |
| D-34 | Gd-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-05 | 2.000E-05 | RTF(16,3) |
| D-34 | | | | |
| D-34 | H-3 , plant/soil concentration ratio, dimensionless | 4.800E+00 | 4.800E+00 | RTF(17,1) |
| D-34 | H-3 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.200E-02 | 1.200E-02 | RTF(17,2) |
| D-34 | H-3 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-02 | 1.000E-02 | RTF(17,3) |
| D-34 | | | | |
| D-34 | Nb-94 , plant/soil concentration ratio, dimensionless | 1.460E-03 | 1.000E-02 | RTF(18,1) |
| D-34 | Nb-94 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.000E-07 | 3.000E-07 | RTF(18,2) |
| D-34 | Nb-94 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-06 | 2.000E-06 | RTF(18,3) |
| D-34 | | | | |
| D-34 | Ni-63 , plant/soil concentration ratio, dimensionless | 3.620E-01 | 5.000E-02 | RTF(19,1) |
| D-34 | Ni-63 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 5.000E-03 | 5.000E-03 | RTF(19,2) |
| D-34 | Ni-63 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-02 | 2.000E-02 | RTF(19,3) |
| D-34 | | | | |
| D-34 | Np-237+D , plant/soil concentration ratio, dimensionless | 3.470E-04 | 2.000E-02 | RTF(20,1) |
| D-34 | Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF(20,2) |
| D-34 | Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 5.000E-06 | 5.000E-06 | RTF(20,3) |
| D-34 | | | | |
| D-34 | Pa-231 , plant/soil concentration ratio, dimensionless | 1.460E-03 | 1.000E-02 | RTF(21,1) |
| D-34 | Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 5.000E-03 | 5.000E-03 | RTF(21,2) |
| D-34 | Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 5.000E-06 | 5.000E-06 | RTF(21,3) |
| D-34 | | | | |
| D-34 | Pb-210+D , plant/soil concentration ratio, dimensionless | 1.880E-07 | 1.000E-02 | RTF(22,1) |
| D-34 | Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 8.000E-04 | 8.000E-04 | RTF(22,2) |
| D-34 | Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 3.000E-04 | 3.000E-04 | RTF(22,3) |

Dose Conversion Factor (and Related) Parameter Summary (continued)
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| 0 Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-34 | Po-210 , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF(23,1) |
| D-34 | Po-210 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 5.000E-03 | 5.000E-03 | RTF(23,2) |
| D-34 | Po-210 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 3.400E-04 | 3.400E-04 | RTF(23,3) |
| D-34 | | | | |
| D-34 | Pu-238 , plant/soil concentration ratio, dimensionless | 8.240E-05 | 1.000E-03 | RTF(24,1) |
| D-34 | Pu-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(24,2) |
| D-34 | Pu-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-06 | 1.000E-06 | RTF(24,3) |
| D-34 | | | | |
| D-34 | Pu-239 , plant/soil concentration ratio, dimensionless | 8.240E-05 | 1.000E-03 | RTF(25,1) |
| D-34 | Pu-239 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(25,2) |
| D-34 | Pu-239 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-06 | 1.000E-06 | RTF(25,3) |
| D-34 | | | | |
| D-34 | Pu-241+D , plant/soil concentration ratio, dimensionless | 8.240E-05 | 1.000E-03 | RTF(26,1) |
| D-34 | Pu-241+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(26,2) |
| D-34 | Pu-241+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-06 | 1.000E-06 | RTF(26,3) |
| D-34 | | | | |
| D-34 | Ra-226+D , plant/soil concentration ratio, dimensionless | 4.000E-02 | 4.000E-02 | RTF(28,1) |
| D-34 | Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF(28,2) |
| D-34 | Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF(28,3) |
| D-34 | | | | |
| D-34 | Sb-125 , plant/soil concentration ratio, dimensionless | 8.500E-05 | 1.000E-02 | RTF(29,1) |
| D-34 | Sb-125 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF(29,2) |
| D-34 | Sb-125 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(29,3) |
| D-34 | | | | |
| D-34 | Sr-90+D , plant/soil concentration ratio, dimensionless | 6.420E-01 | 3.000E-01 | RTF(31,1) |
| D-34 | Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 8.000E-03 | 8.000E-03 | RTF(31,2) |
| D-34 | Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF(31,3) |
| D-34 | | | | |
| D-34 | Tc-99 , plant/soil concentration ratio, dimensionless | 9.600E-01 | 5.000E+00 | RTF(32,1) |
| D-34 | Tc-99 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(32,2) |
| D-34 | Tc-99 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF(32,3) |
| D-34 | | | | |
| D-34 | Te-125m , plant/soil concentration ratio, dimensionless | 6.000E-01 | 6.000E-01 | RTF(33,1) |
| D-34 | Te-125m , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 7.000E-03 | 7.000E-03 | RTF(33,2) |
| D-34 | Te-125m , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 5.000E-04 | 5.000E-04 | RTF(33,3) |
| D-34 | | | | |
| D-34 | Th-229+D , plant/soil concentration ratio, dimensionless | 8.240E-05 | 1.000E-03 | RTF(34,1) |
| D-34 | Th-229+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(34,2) |
| D-34 | Th-229+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 5.000E-06 | 5.000E-06 | RTF(34,3) |
| D-34 | | | | |
| D-34 | Th-230 , plant/soil concentration ratio, dimensionless | 8.240E-05 | 1.000E-03 | RTF(35,1) |
| D-34 | Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(35,2) |
| D-34 | Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 5.000E-06 | 5.000E-06 | RTF(35,3) |
| D-34 | | | | |
| D-34 | U-233 , plant/soil concentration ratio, dimensionless | 5.710E-03 | 2.500E-03 | RTF(36,1) |
| D-34 | U-233 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.400E-04 | 3.400E-04 | RTF(36,2) |
| D-34 | U-233 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 6.000E-04 | 6.000E-04 | RTF(36,3) |
| D-34 | | | | |
| D-34 | U-234 , plant/soil concentration ratio, dimensionless | 5.710E-03 | 2.500E-03 | RTF(37,1) |
| D-34 | U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.400E-04 | 3.400E-04 | RTF(37,2) |
| D-34 | U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 6.000E-04 | 6.000E-04 | RTF(37,3) |

*Dose Conversion Factor (and Related) Parameter Summary (continued)*
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| 0 Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-34 | U-235+D , plant/soil concentration ratio, dimensionless | 5.710E-03 | 2.500E-03 | RTF(38,1) |
| D-34 | U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.400E-04 | 3.400E-04 | RTF(38,2) |
| D-34 | U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 6.000E-04 | 6.000E-04 | RTF(38,3) |
| 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 | Ag-108m+D, fish | 5.000E+00 | 5.000E+00 | BIOFAC( 2,1) |
| D-5 | Ag-108m+D, crustacea and mollusks | 7.700E+02 | 7.700E+02 | BIOFAC( 2,2) |
| D-5 | Am-241 , fish | 3.000E+01 | 3.000E+01 | BIOFAC( 3,1) |
| D-5 | Am-241 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC( 3,2) |
| D-5 | Am-243+D , fish | 3.000E+01 | 3.000E+01 | BIOFAC( 4,1) |
| D-5 | Am-243+D , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC( 4,2) |
| D-5 | C-14 , fish | 5.000E+04 | 5.000E+04 | BIOFAC( 5,1) |
| D-5 | C-14 , crustacea and mollusks | 9.100E+03 | 9.100E+03 | BIOFAC( 5,2) |
| D-5 | Cm-243 , fish | 3.000E+01 | 3.000E+01 | BIOFAC( 6,1) |
| D-5 | Cm-243 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC( 6,2) |
| D-5 | Co-60 , fish | 3.000E+02 | 3.000E+02 | BIOFAC( 8,1) |
| D-5 | Co-60 , crustacea and mollusks | 2.000E+02 | 2.000E+02 | BIOFAC( 8,2) |
| D-5 | Cs-134 , fish | 2.000E+03 | 2.000E+03 | BIOFAC( 9,1) |
| D-5 | Cs-134 , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC( 9,2) |
| D-5 | Cs-137+D , fish | 2.000E+03 | 2.000E+03 | BIOFAC(10,1) |
| D-5 | Cs-137+D , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(10,2) |
| D-5 | Eu-152 , fish | 5.000E+01 | 5.000E+01 | BIOFAC(11,1) |
| D-5 | Eu-152 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC(11,2) |
| D-5 | Eu-154 , fish | 5.000E+01 | 5.000E+01 | BIOFAC(13,1) |
| D-5 | Eu-154 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC(13,2) |
| D-5 | Eu-155 , fish | 5.000E+01 | 5.000E+01 | BIOFAC(14,1) |
| D-5 | Eu-155 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC(14,2) |
| D-5 | Fe-55 , fish | 2.000E+02 | 2.000E+02 | BIOFAC(15,1) |
| D-5 | Fe-55 , crustacea and mollusks | 3.200E+03 | 3.200E+03 | BIOFAC(15,2) |
| D-5 | Gd-152 , fish | 2.500E+01 | 2.500E+01 | BIOFAC(16,1) |
| D-5 | Gd-152 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC(16,2) |
| D-5 | H-3 , fish | 1.000E+00 | 1.000E+00 | BIOFAC(17,1) |
| D-5 | H-3 , crustacea and mollusks | 1.000E+00 | 1.000E+00 | BIOFAC(17,2) |

*Dose Conversion Factor (and Related) Parameter Summary (continued)*
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| Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-5 | Nb-94 , fish | 3.000E+02 | 3.000E+02 | BIOFAC(18,1) |
| D-5 | Nb-94 , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(18,2) |
| D-5 | | | | |
| D-5 | Ni-63 , fish | 9.900E+01 | 1.000E+02 | BIOFAC(19,1) |
| D-5 | Ni-63 , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(19,2) |
| D-5 | | | | |
| D-5 | Np-237+D , fish | 3.000E+01 | 3.000E+01 | BIOFAC(20,1) |
| D-5 | Np-237+D , crustacea and mollusks | 4.000E+02 | 4.000E+02 | BIOFAC(20,2) |
| D-5 | | | | |
| D-5 | Pa-231 , fish | 1.000E+01 | 1.000E+01 | BIOFAC(21,1) |
| D-5 | Pa-231 , crustacea and mollusks | 1.100E+02 | 1.100E+02 | BIOFAC(21,2) |
| D-5 | | | | |
| D-5 | Pb-210+D , fish | 3.000E+02 | 3.000E+02 | BIOFAC(22,1) |
| D-5 | Pb-210+D , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(22,2) |
| D-5 | | | | |
| D-5 | Po-210 , fish | 1.000E+02 | 1.000E+02 | BIOFAC(23,1) |
| D-5 | Po-210 , crustacea and mollusks | 2.000E+04 | 2.000E+04 | BIOFAC(23,2) |
| D-5 | | | | |
| D-5 | Pu-238 , fish | 3.000E+01 | 3.000E+01 | BIOFAC(24,1) |
| D-5 | Pu-238 , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(24,2) |
| D-5 | | | | |
| D-5 | Pu-239 , fish | 3.000E+01 | 3.000E+01 | BIOFAC(25,1) |
| D-5 | Pu-239 , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(25,2) |
| D-5 | | | | |
| D-5 | Pu-241+D , fish | 3.000E+01 | 3.000E+01 | BIOFAC(26,1) |
| D-5 | Pu-241+D , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(26,2) |
| D-5 | | | | |
| D-5 | Ra-226+D , fish | 5.000E+01 | 5.000E+01 | BIOFAC(28,1) |
| D-5 | Ra-226+D , crustacea and mollusks | 2.500E+02 | 2.500E+02 | BIOFAC(28,2) |
| D-5 | | | | |
| D-5 | Sb-125 , fish | 1.000E+02 | 1.000E+02 | BIOFAC(29,1) |
| D-5 | Sb-125 , crustacea and mollusks | 1.000E+01 | 1.000E+01 | BIOFAC(29,2) |
| D-5 | | | | |
| D-5 | Sr-90+D , fish | 6.000E+01 | 6.000E+01 | BIOFAC(31,1) |
| D-5 | Sr-90+D , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(31,2) |
| D-5 | | | | |
| D-5 | Tc-99 , fish | 2.000E+01 | 2.000E+01 | BIOFAC(32,1) |
| D-5 | Tc-99 , crustacea and mollusks | 5.000E+00 | 5.000E+00 | BIOFAC(32,2) |
| D-5 | | | | |
| D-5 | Te-125m , fish | 4.000E+02 | 4.000E+02 | BIOFAC(33,1) |
| D-5 | Te-125m , crustacea and mollusks | 7.500E+01 | 7.500E+01 | BIOFAC(33,2) |
| D-5 | | | | |
| D-5 | Th-229+D , fish | 1.000E+02 | 1.000E+02 | BIOFAC(34,1) |
| D-5 | Th-229+D , crustacea and mollusks | 5.000E+02 | 5.000E+02 | BIOFAC(34,2) |
| D-5 | | | | |
| D-5 | Th-230 , fish | 1.000E+02 | 1.000E+02 | BIOFAC(35,1) |
| D-5 | Th-230 , crustacea and mollusks | 5.000E+02 | 5.000E+02 | BIOFAC(35,2) |
| D-5 | | | | |
| D-5 | U-233 , fish | 1.000E+01 | 1.000E+01 | BIOFAC(36,1) |
| D-5 | U-233 , crustacea and mollusks | 6.000E+01 | 6.000E+01 | BIOFAC(36,2) |
| D-5 | | | | |

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: YP concrete

| Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-5 | U-234 , fish | 1.000E+01 | 1.000E+01 | BIOFAC(37,1) |
| D-5 | U-234 , crustacea and mollusks | 6.000E+01 | 6.000E+01 | BIOFAC(37,2) |
| D-5 | | | | |
| D-5 | U-235+D , fish | 1.000E+01 | 1.000E+01 | BIOFAC(38,1) |
| D-5 | U-235+D , crustacea and mollusks | 6.000E+01 | 6.000E+01 | BIOFAC(38,2) |

Site-Specific Parameter Summary

| 0 Menu | Parameter | | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|---|
| R011 | Area of contaminated zone (m**2) | | 3.130E+02 | 1.000E+04 | --- | AREA |
| R011 | Thickness of contaminated zone (m) | | 2.100E+01 | 2.000E+00 | --- | THICK0 |
| R011 | Length parallel to aquifer flow (m) | | 3.200E+01 | 1.000E+02 | --- | LCZPAQ |
| R011 | Basic radiation dose limit (mrem/yr) | | 1.000E+00 | 2.500E+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): | Ag-108m | 1.000E+00 | 0.000E+00 | --- | S1( 2) |
| R012 | Initial principal radionuclide (pCi/g): | Am-241 | 1.000E+00 | 0.000E+00 | --- | S1( 3) |
| R012 | Initial principal radionuclide (pCi/g): | C-14 | 1.000E+00 | 0.000E+00 | --- | S1( 5) |
| R012 | Initial principal radionuclide (pCi/g): | Cm-243 | 1.000E+00 | 0.000E+00 | --- | S1( 6) |
| R012 | Initial principal radionuclide (pCi/g): | Co-60 | 1.000E+00 | 0.000E+00 | --- | S1( 8) |
| R012 | Initial principal radionuclide (pCi/g): | Cs-134 | 1.000E+00 | 0.000E+00 | --- | S1( 9) |
| R012 | Initial principal radionuclide (pCi/g): | Cs-137 | 1.000E+00 | 0.000E+00 | --- | S1(10) |
| R012 | Initial principal radionuclide (pCi/g): | Eu-152 | 1.000E+00 | 0.000E+00 | --- | S1(11) |
| R012 | Initial principal radionuclide (pCi/g): | Eu-154 | 1.000E+00 | 0.000E+00 | --- | S1(13) |
| R012 | Initial principal radionuclide (pCi/g): | Eu-155 | 1.000E+00 | 0.000E+00 | --- | S1(14) |
| R012 | Initial principal radionuclide (pCi/g): | Fe-55 | 1.000E+00 | 0.000E+00 | --- | S1(15) |
| R012 | Initial principal radionuclide (pCi/g): | H-3 | 1.000E+00 | 0.000E+00 | --- | S1(17) |
| R012 | Initial principal radionuclide (pCi/g): | Nb-94 | 1.000E+00 | 0.000E+00 | --- | S1(18) |
| R012 | Initial principal radionuclide (pCi/g): | Ni-63 | 1.000E+00 | 0.000E+00 | --- | S1(19) |
| R012 | Initial principal radionuclide (pCi/g): | Pu-238 | 1.000E+00 | 0.000E+00 | --- | S1(24) |
| R012 | Initial principal radionuclide (pCi/g): | Pu-239 | 1.000E+00 | 0.000E+00 | --- | S1(25) |
| R012 | Initial principal radionuclide (pCi/g): | Pu-241 | 1.000E+00 | 0.000E+00 | --- | S1(26) |
| R012 | Initial principal radionuclide (pCi/g): | Sb-125 | 1.000E+00 | 0.000E+00 | --- | S1(29) |
| R012 | Initial principal radionuclide (pCi/g): | Sr-90 | 1.000E+00 | 0.000E+00 | --- | S1(31) |
| R012 | Initial principal radionuclide (pCi/g): | Tc-99 | 1.000E+00 | 0.000E+00 | --- | S1(32) |
| R012 | Concentration in groundwater (pCi/L): | Ag-108m | not used | 0.000E+00 | --- | W1( 2) |
| R012 | Concentration in groundwater (pCi/L): | Am-241 | not used | 0.000E+00 | --- | W1( 3) |
| R012 | Concentration in groundwater (pCi/L): | C-14 | not used | 0.000E+00 | --- | W1( 5) |
| R012 | Concentration in groundwater (pCi/L): | Cm-243 | not used | 0.000E+00 | --- | W1( 6) |
| R012 | Concentration in groundwater (pCi/L): | Co-60 | not used | 0.000E+00 | --- | W1( 8) |
| R012 | Concentration in groundwater (pCi/L): | Cs-134 | not used | 0.000E+00 | --- | W1( 9) |
| R012 | Concentration in groundwater (pCi/L): | Cs-137 | not used | 0.000E+00 | --- | W1(10) |
| R012 | Concentration in groundwater (pCi/L): | Eu-152 | not used | 0.000E+00 | --- | W1(11) |
| R012 | Concentration in groundwater (pCi/L): | Eu-154 | not used | 0.000E+00 | --- | W1(13) |
| R012 | Concentration in groundwater (pCi/L): | Eu-155 | not used | 0.000E+00 | --- | W1(14) |
| R012 | Concentration in groundwater (pCi/L): | Fe-55 | not used | 0.000E+00 | --- | W1(15) |
| R012 | Concentration in groundwater (pCi/L): | H-3 | not used | 0.000E+00 | --- | W1(17) |
| R012 | Concentration in groundwater (pCi/L): | Nb-94 | not used | 0.000E+00 | --- | W1(18) |
| R012 | Concentration in groundwater (pCi/L): | Ni-63 | not used | 0.000E+00 | --- | W1(19) |
| R012 | Concentration in groundwater (pCi/L): | Pu-238 | not used | 0.000E+00 | --- | W1(24) |
| R012 | Concentration in groundwater (pCi/L): | Pu-239 | not used | 0.000E+00 | --- | W1(25) |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R012 | Concentration in groundwater (pCi/L): Pu-241 | not used | 0.000E+00 | --- | W1(26) |
| R012 | Concentration in groundwater (pCi/L): Sb-125 | not used | 0.000E+00 | --- | W1(29) |
| R012 | Concentration in groundwater (pCi/L): Sr-90 | not used | 0.000E+00 | --- | W1(31) |
| R012 | Concentration in groundwater (pCi/L): Tc-99 | not used | 0.000E+00 | --- | W1(32) |
| R013 | Cover depth (m) | 4.600E+00 | 0.000E+00 | --- | COVER0 |
| R013 | Density of cover material (g/cm**3) | 2.100E+00 | 1.500E+00 | --- | DENSCV |
| R013 | Cover depth erosion rate (m/yr) | 1.830E-06 | 1.000E-03 | --- | VCV |
| R013 | Density of contaminated zone (g/cm**3) | 2.400E+00 | 1.500E+00 | --- | DENSCZ |
| R013 | Contaminated zone erosion rate (m/yr) | 1.000E-03 | 1.000E-03 | --- | VCZ |
| R013 | Contaminated zone total porosity | 3.000E-01 | 4.000E-01 | --- | TPCZ |
| R013 | Contaminated zone field capacity | 7.000E-02 | 2.000E-01 | --- | FCCZ |
| R013 | Contaminated zone hydraulic conductivity (m/yr) | 3.160E+05 | 1.000E+01 | --- | HCCZ |
| R013 | Contaminated zone b parameter | 9.750E-01 | 5.300E+00 | --- | BCZ |
| R013 | Average annual wind speed (m/sec) | 2.000E+00 | 2.000E+00 | --- | WIND |
| R013 | Humidity in air (g/m**3) | 8.000E+00 | 8.000E+00 | --- | HUMID |
| R013 | Evapotranspiration coefficient | 9.500E-01 | 5.000E-01 | --- | EVAPTR |
| R013 | Precipitation (m/yr) | 3.550E-01 | 1.000E+00 | --- | PRECIP |
| R013 | Irrigation (m/yr) | 2.000E-01 | 2.000E-01 | --- | RI |
| R013 | Irrigation mode | overhead | overhead | --- | IDITCH |
| R013 | Runoff coefficient | 4.000E-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) | 1.520E+00 | 1.500E+00 | --- | DENSAQ |
| R014 | Saturated zone total porosity | 4.000E-01 | 4.000E-01 | --- | TPSZ |
| R014 | Saturated zone effective porosity | 3.200E-01 | 2.000E-01 | --- | EPSZ |
| R014 | Saturated zone field capacity | 8.000E-02 | 2.000E-01 | --- | FCSZ |
| R014 | Saturated zone hydraulic conductivity (m/yr) | 5.500E+03 | 1.000E+02 | --- | HCSZ |
| R014 | Saturated zone hydraulic gradient | 2.000E-02 | 2.000E-02 | --- | HGWT |
| R014 | Saturated zone b parameter | 4.050E+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) | 3.000E+02 | 4.000E+00 | --- | H(1) |
| R015 | Unsat. zone 1, soil density (g/cm**3) | 2.100E+00 | 1.500E+00 | --- | DENSUZ(1) |
| R015 | Unsat. zone 1, total porosity | 4.200E-01 | 4.000E-01 | --- | TPUZ(1) |
| R015 | Unsat. zone 1, effective porosity | 6.000E-02 | 2.000E-01 | --- | EPUZ(1) |
| R015 | Unsat. zone 1, field capacity | 3.600E-01 | 2.000E-01 | --- | FCUZ(1) |
| R015 | Unsat. zone 1, soil-specific b parameter | 1.140E+01 | 5.300E+00 | --- | BUZ(1) |
| R015 | Unsat. zone 1, hydraulic conductivity (m/yr) | 1.000E-03 | 1.000E+01 | --- | HCUZ(1) |
| R016 | Distribution coefficients for Ag-108m | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.500E+03 | 0.000E+00 | --- | DCNUCC( 2) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.800E+02 | 0.000E+00 | --- | DCNUCU( 2,1) |
| R016 | Saturated zone (cm**3/g) | 9.000E+01 | 0.000E+00 | --- | DCNUCS( 2) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.303E-08 | ALEACH( 2) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 2) |

Site-Specific Parameter Summary (continued)

| 0 Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for Am-241 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | 2.000E+01 | --- | DCNUCC( 3) |
| R016 | Unsaturated zone 1 (cm**3/g) | 8.400E+03 | 2.000E+01 | --- | DCNUCU( 3,1) |
| R016 | Saturated zone (cm**3/g) | 1.900E+03 | 2.000E+01 | --- | DCNUCS( 3) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 4.097E-07 | ALEACH( 3) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 3) |
| R016 | Distribution coefficients for C-14 | | | | |
| R016 | Contaminated zone (cm**3/g) | 7.070E+01 | 0.000E+00 | --- | DCNUCC( 5) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+00 | 0.000E+00 | --- | DCNUCU( 5,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+00 | 0.000E+00 | --- | DCNUCS( 5) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 5.793E-06 | ALEACH( 5) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 5) |
| R016 | Distribution coefficients for Cm-243 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E+02 | -1.000E+00 | --- | DCNUCC( 6) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+03 | -1.000E+00 | --- | DCNUCU( 6,1) |
| R016 | Saturated zone (cm**3/g) | 4.000E+03 | -1.000E+00 | --- | DCNUCS( 6) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.828E-07 | ALEACH( 6) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 6) |
| R016 | Distribution coefficients for Co-60 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.820E+02 | 1.000E+03 | --- | DCNUCC( 8) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.500E+02 | 1.000E+03 | --- | DCNUCU( 8,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+01 | 1.000E+03 | --- | DCNUCS( 8) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.453E-06 | ALEACH( 8) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 8) |
| R016 | Distribution coefficients for Cs-134 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.370E+02 | 1.000E+03 | --- | DCNUCC( 9) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.900E+03 | 1.000E+03 | --- | DCNUCU( 9,1) |
| R016 | Saturated zone (cm**3/g) | 2.800E+02 | 1.000E+03 | --- | DCNUCS( 9) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.990E-06 | ALEACH( 9) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 9) |
| R016 | Distribution coefficients for Cs-137 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.370E+02 | 1.000E+03 | --- | DCNUCC(10) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.900E+03 | 1.000E+03 | --- | DCNUCU(10,1) |
| R016 | Saturated zone (cm**3/g) | 2.800E+02 | 1.000E+03 | --- | DCNUCS(10) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.990E-06 | ALEACH(10) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(10) |
| R016 | Distribution coefficients for Eu-152 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | -1.000E+00 | 3.524E+03 | DCNUCC(11) |
| R016 | Unsaturated zone 1 (cm**3/g) | -1.000E+00 | -1.000E+00 | 3.524E+03 | DCNUCU(11,1) |
| R016 | Saturated zone (cm**3/g) | -1.000E+00 | -1.000E+00 | 3.524E+03 | DCNUCS(11) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.163E-07 | ALEACH(11) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(11) |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for Eu-154 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | -1.000E+00 | 3.524E+03 | DCNUCC(13) |
| R016 | Unsaturated zone 1 (cm**3/g) | -1.000E+00 | -1.000E+00 | 3.524E+03 | DCNUCU(13,1) |
| R016 | Saturated zone (cm**3/g) | -1.000E+00 | -1.000E+00 | 3.524E+03 | DCNUCS(13) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.163E-07 | ALEACH(13) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(13) |
| R016 | Distribution coefficients for Eu-155 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | -1.000E+00 | 3.524E+03 | DCNUCC(14) |
| R016 | Unsaturated zone 1 (cm**3/g) | -1.000E+00 | -1.000E+00 | 3.524E+03 | DCNUCU(14,1) |
| R016 | Saturated zone (cm**3/g) | -1.000E+00 | -1.000E+00 | 3.524E+03 | DCNUCS(14) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.163E-07 | ALEACH(14) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(14) |
| R016 | Distribution coefficients for Fe-55 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.250E+01 | 1.000E+03 | --- | DCNUCC(15) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.650E+02 | 1.000E+03 | --- | DCNUCU(15,1) |
| R016 | Saturated zone (cm**3/g) | 2.200E+02 | 1.000E+03 | --- | DCNUCS(15) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 3.270E-05 | ALEACH(15) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(15) |
| R016 | Distribution coefficients for H-3 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCNUCC(17) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCNUCU(17,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCNUCS(17) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.405E-02 | ALEACH(17) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(17) |
| R016 | Distribution coefficients for Nb-94 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.160E+02 | 0.000E+00 | --- | DCNUCC(18) |
| R016 | Unsaturated zone 1 (cm**3/g) | 9.000E+02 | 0.000E+00 | --- | DCNUCU(18,1) |
| R016 | Saturated zone (cm**3/g) | 1.600E+02 | 0.000E+00 | --- | DCNUCS(18) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.296E-06 | ALEACH(18) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(18) |
| R016 | Distribution coefficients for Ni-63 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.550E+01 | 1.000E+03 | --- | DCNUCC(19) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.500E+02 | 1.000E+03 | --- | DCNUCU(19,1) |
| R016 | Saturated zone (cm**3/g) | 4.000E+02 | 1.000E+03 | --- | DCNUCS(19) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.153E-05 | ALEACH(19) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(19) |
| R016 | Distribution coefficients for Pu-238 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.580E+03 | 2.000E+03 | --- | DCNUCC(24) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.100E+03 | 2.000E+03 | --- | DCNUCU(24,1) |
| R016 | Saturated zone (cm**3/g) | 5.500E+02 | 2.000E+03 | --- | DCNUCS(24) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.593E-07 | ALEACH(24) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(24) |

Site-Specific Parameter Summary (continued)

| 0 Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for Pu-239 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.580E+03 | 2.000E+03 | --- | DCNUCC(25) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.100E+03 | 2.000E+03 | --- | DCNUCU(25,1) |
| R016 | Saturated zone (cm**3/g) | 5.500E+02 | 2.000E+03 | --- | DCNUCS(25) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.593E-07 | ALEACH(25) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(25) |
| R016 | Distribution coefficients for Pu-241 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.580E+03 | 2.000E+03 | --- | DCNUCC(26) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.100E+03 | 2.000E+03 | --- | DCNUCU(26,1) |
| R016 | Saturated zone (cm**3/g) | 5.500E+02 | 2.000E+03 | --- | DCNUCS(26) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.593E-07 | ALEACH(26) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(26) |
| R016 | Distribution coefficients for Sb-125 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.550E+03 | 0.000E+00 | --- | DCNUCC(29) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.500E+02 | 0.000E+00 | --- | DCNUCU(29,1) |
| R016 | Saturated zone (cm**3/g) | 4.500E+01 | 0.000E+00 | --- | DCNUCS(29) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.643E-07 | ALEACH(29) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(29) |
| R016 | Distribution coefficients for Sr-90 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.050E+01 | 3.000E+01 | --- | DCNUCC(31) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.100E+02 | 3.000E+01 | --- | DCNUCU(31,1) |
| R016 | Saturated zone (cm**3/g) | 1.500E+01 | 3.000E+01 | --- | DCNUCS(31) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 3.891E-05 | ALEACH(31) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(31) |
| R016 | Distribution coefficients for Tc-99 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.350E+01 | 0.000E+00 | --- | DCNUCC(32) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+00 | 0.000E+00 | --- | DCNUCU(32,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E-01 | 0.000E+00 | --- | DCNUCS(32) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 3.028E-05 | ALEACH(32) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(32) |
| R016 | Distribution coefficients for daughter Ac-227 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | 2.000E+01 | --- | DCNUCC( 1) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.400E+03 | 2.000E+01 | --- | DCNUCU( 1,1) |
| R016 | Saturated zone (cm**3/g) | 4.500E+02 | 2.000E+01 | --- | DCNUCS( 1) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 4.097E-07 | ALEACH( 1) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 1) |
| R016 | Distribution coefficients for daughter Am-243 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | 2.000E+01 | --- | DCNUCC( 4) |
| R016 | Unsaturated zone 1 (cm**3/g) | 8.400E+03 | 2.000E+01 | --- | DCNUCU( 4,1) |
| R016 | Saturated zone (cm**3/g) | 1.900E+03 | 2.000E+01 | --- | DCNUCS( 4) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 4.097E-07 | ALEACH( 4) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 4) |

Site-Specific Parameter Summary (continued)

| 0 Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for daughter Gd-152 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | -1.000E+00 | 3.524E+03 | DCNUCC(16) |
| R016 | Unsaturated zone 1 (cm**3/g) | -1.000E+00 | -1.000E+00 | 3.524E+03 | DCNUCU(16,1) |
| R016 | Saturated zone (cm**3/g) | -1.000E+00 | -1.000E+00 | 3.524E+03 | DCNUCS(16) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.163E-07 | ALEACH(16) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(16) |
| R016 | Distribution coefficients for daughter Np-237 | | | | |
| R016 | Contaminated zone (cm**3/g) | 7.070E+02 | -1.000E+00 | --- | DCNUCC(20) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.500E+01 | -1.000E+00 | --- | DCNUCU(20,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+00 | -1.000E+00 | --- | DCNUCS(20) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 5.795E-07 | ALEACH(20) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(20) |
| R016 | Distribution coefficients for daughter Pa-231 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.160E+02 | 5.000E+01 | --- | DCNUCC(21) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.700E+03 | 5.000E+01 | --- | DCNUCU(21,1) |
| R016 | Saturated zone (cm**3/g) | 5.500E+02 | 5.000E+01 | --- | DCNUCS(21) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.296E-06 | ALEACH(21) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(21) |
| R016 | Distribution coefficients for daughter Pb-210 | | | | |
| R016 | Contaminated zone (cm**3/g) | 4.760E+04 | 1.000E+02 | --- | DCNUCC(22) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.500E+02 | 1.000E+02 | --- | DCNUCU(22,1) |
| R016 | Saturated zone (cm**3/g) | 2.700E+02 | 1.000E+02 | --- | DCNUCS(22) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 8.608E-09 | ALEACH(22) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(22) |
| R016 | Distribution coefficients for daughter Po-210 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+01 | 1.000E+01 | --- | DCNUCC(23) |
| R016 | Unsaturated zone 1 (cm**3/g) | 3.000E+03 | 1.000E+01 | --- | DCNUCU(23,1) |
| R016 | Saturated zone (cm**3/g) | 1.500E+02 | 1.000E+01 | --- | DCNUCS(23) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 4.085E-05 | ALEACH(23) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(23) |
| R016 | Distribution coefficients for daughter Ra-226 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+02 | 7.000E+01 | --- | DCNUCC(28) |
| R016 | Unsaturated zone 1 (cm**3/g) | 9.100E+03 | 7.000E+01 | --- | DCNUCU(28,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+02 | 7.000E+01 | --- | DCNUCS(28) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 4.096E-06 | ALEACH(28) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(28) |
| R016 | Distribution coefficients for daughter Te-125m | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.800E+01 | 0.000E+00 | --- | DCNUCC(33) |
| R016 | Unsaturated zone 1 (cm**3/g) | 7.200E+02 | 0.000E+00 | --- | DCNUCU(33,1) |
| R016 | Saturated zone (cm**3/g) | 1.250E+02 | 0.000E+00 | --- | DCNUCS(33) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.077E-05 | ALEACH(33) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(33) |

Site-Specific Parameter Summary (continued)

| 0 Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for daughter Th-229 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.580E+03 | 6.000E+04 | --- | DCNUCC(34) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.800E+03 | 6.000E+04 | --- | DCNUCU(34,1) |
| R016 | Saturated zone (cm**3/g) | 3.200E+03 | 6.000E+04 | --- | DCNUCS(34) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.593E-07 | ALEACH(34) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(34) |
| R016 | Distribution coefficients for daughter Th-230 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.580E+03 | 6.000E+04 | --- | DCNUCC(35) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.800E+03 | 6.000E+04 | --- | DCNUCU(35,1) |
| R016 | Saturated zone (cm**3/g) | 3.200E+03 | 6.000E+04 | --- | DCNUCS(35) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.593E-07 | ALEACH(35) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(35) |
| R016 | Distribution coefficients for daughter U-233 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.470E+02 | 5.000E+01 | --- | DCNUCC(36) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.600E+03 | 5.000E+01 | --- | DCNUCU(36,1) |
| R016 | Saturated zone (cm**3/g) | 3.500E+01 | 5.000E+01 | --- | DCNUCS(36) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.787E-06 | ALEACH(36) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(36) |
| R016 | Distribution coefficients for daughter U-234 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.470E+02 | 5.000E+01 | --- | DCNUCC(37) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.600E+03 | 5.000E+01 | --- | DCNUCU(37,1) |
| R016 | Saturated zone (cm**3/g) | 3.500E+01 | 5.000E+01 | --- | DCNUCS(37) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.787E-06 | ALEACH(37) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(37) |
| R016 | Distribution coefficients for daughter U-235 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.470E+02 | 5.000E+01 | --- | DCNUCC(38) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.600E+03 | 5.000E+01 | --- | DCNUCU(38,1) |
| R016 | Saturated zone (cm**3/g) | 3.500E+01 | 5.000E+01 | --- | DCNUCS(38) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.787E-06 | ALEACH(38) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(38) |
| 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 | >0 shows circular AREA. | FS |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R017 | Radii of shape factor array (used if FS = -1): | | | | |
| R017 | Outer annular radius (m), ring 1: | not used | 5.000E+01 | --- | RAD_SHAPE( 1) |
| R017 | Outer annular radius (m), ring 2: | not used | 7.071E+01 | --- | RAD_SHAPE( 2) |
| R017 | Outer annular radius (m), ring 3: | not used | 0.000E+00 | --- | RAD_SHAPE( 3) |
| R017 | Outer annular radius (m), ring 4: | not used | 0.000E+00 | --- | RAD_SHAPE( 4) |
| R017 | Outer annular radius (m), ring 5: | not used | 0.000E+00 | --- | RAD_SHAPE( 5) |
| R017 | Outer annular radius (m), ring 6: | not used | 0.000E+00 | --- | RAD_SHAPE( 6) |
| R017 | Outer annular radius (m), ring 7: | not used | 0.000E+00 | --- | RAD_SHAPE( 7) |
| R017 | Outer annular radius (m), ring 8: | not used | 0.000E+00 | --- | RAD_SHAPE( 8) |
| R017 | Outer annular radius (m), ring 9: | not used | 0.000E+00 | --- | RAD_SHAPE( 9) |
| R017 | Outer annular radius (m), ring 10: | not used | 0.000E+00 | --- | RAD_SHAPE(10) |
| R017 | Outer annular radius (m), ring 11: | not used | 0.000E+00 | --- | RAD_SHAPE(11) |
| R017 | Outer annular radius (m), ring 12: | not used | 0.000E+00 | --- | RAD_SHAPE(12) |
| R017 | Fractions of annular areas within AREA: | | | | |
| R017 | Ring 1 | not used | 1.000E+00 | --- | FRACA( 1) |
| R017 | Ring 2 | not used | 2.732E-01 | --- | FRACA( 2) |
| R017 | Ring 3 | not used | 0.000E+00 | --- | FRACA( 3) |
| R017 | Ring 4 | not used | 0.000E+00 | --- | FRACA( 4) |
| R017 | Ring 5 | not used | 0.000E+00 | --- | FRACA( 5) |
| R017 | Ring 6 | not used | 0.000E+00 | --- | FRACA( 6) |
| R017 | Ring 7 | not used | 0.000E+00 | --- | FRACA( 7) |
| R017 | Ring 8 | not used | 0.000E+00 | --- | FRACA( 8) |
| R017 | Ring 9 | not used | 0.000E+00 | --- | FRACA( 9) |
| R017 | Ring 10 | not used | 0.000E+00 | --- | FRACA(10) |
| R017 | Ring 11 | not used | 0.000E+00 | --- | FRACA(11) |
| R017 | Ring 12 | not used | 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) | not used | 5.400E+00 | --- | DIET(5) |
| R018 | Other seafood consumption (kg/yr) | not used | 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 | 1.000E+00 | 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 | not used | 5.000E-01 | --- | FR9 |
| R018 | Contamination fraction of plant food | -1 | -1 | 0.157E+00 | FPLANT |
| R018 | Contamination fraction of meat | -1 | -1 | 0.157E-01 | FMEAT |
| R018 | Contamination fraction of milk | -1 | -1 | 0.157E-01 | 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 |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| 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 | 1.000E+00 | 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) |
| 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) | 2.000E-05 | 2.000E-05 | --- | C12WTR |
| C14 | C-12 concentration in contaminated soil (g/g) | 3.000E-02 | 3.000E-02 | --- | C12CZ |
| C14 | Fraction of vegetation carbon from soil | 2.000E-02 | 2.000E-02 | --- | CSOIL |
| C14 | Fraction of vegetation carbon from air | 9.800E-01 | 9.800E-01 | --- | CAIR |
| C14 | C-14 evasion layer thickness in soil (m) | 3.000E-01 | 3.000E-01 | --- | DMC |
| C14 | C-14 evasion flux rate from soil (1/sec) | 7.000E-07 | 7.000E-07 | --- | EVSN |
| C14 | C-12 evasion flux rate from soil (1/sec) | 1.000E-10 | 1.000E-10 | --- | REVSN |
| C14 | Fraction of grain in beef cattle feed | 8.000E-01 | 8.000E-01 | --- | AVFG4 |
| C14 | Fraction of grain in milk cow feed | 2.000E-01 | 2.000E-01 | --- | AVFG5 |
| C14 | DCF correction factor for gaseous forms of C14 | 8.894E+01 | 8.894E+01 | --- | CO2F |
| | | | | | |
| 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) |
| | | | | | |
| R021 | Thickness of building foundation (m) | 1.500E-01 | 1.500E-01 | --- | FLOOR1 |
| R021 | Bulk density of building foundation (g/cm**3) | 2.400E+00 | 2.400E+00 | --- | DENSFL |
| R021 | Total porosity of the cover material | 4.000E-01 | 4.000E-01 | --- | TPCV |
| R021 | Total porosity of the building foundation | 1.000E-01 | 1.000E-01 | --- | TPFL |
| R021 | Volumetric water content of the cover material | 5.000E-02 | 5.000E-02 | --- | PH2OCV |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R021 | Volumetric water content of the foundation | 3.000E-02 | 3.000E-02 | --- | PH2OFL |
| R021 | Diffusion coefficient for radon gas (m/sec): | | | | |
| R021 | in cover material | 2.000E-06 | 2.000E-06 | --- | DIFCV |
| R021 | in foundation material | 3.000E-07 | 3.000E-07 | --- | DIFFL |
| R021 | in contaminated zone soil | 2.000E-06 | 2.000E-06 | --- | DIFCZ |
| R021 | Radon vertical dimension of mixing (m) | 2.000E+00 | 2.000E+00 | --- | HMIX |
| R021 | Average building air exchange rate (1/hr) | 5.000E-01 | 5.000E-01 | --- | REXG |
| R021 | Height of the building (room) (m) | 2.500E+00 | 2.500E+00 | --- | HRM |
| R021 | Building interior area factor | 0.000E+00 | 0.000E+00 | code computed (time dependent) | FAI |
| R021 | Building depth below ground surface (m) | -1.000E+00 | -1.000E+00 | code computed (time dependent) | DMFL |
| R021 | Emanating power of Rn-222 gas | 2.500E-01 | 2.500E-01 | --- | EMANA(1) |
| R021 | Emanating power of Rn-220 gas | not used | 1.500E-01 | --- | EMANA(2) |
| | | | | | |
| TITL | Number of graphical time points | 32 | --- | --- | NPTS |
| TITL | Maximum number of integration points for dose | 17 | --- | --- | LYMAX |
| TITL | Maximum number of integration points for risk | 1 | --- | --- | 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 | suppressed |
| 7 -- drinking water | active |
| 8 -- soil ingestion | active |
| 9 -- radon | active |
| Find peak pathway doses | active |

1RESRAD, Version 6.21 T« Limit = 30 days 12/20/2004 11:40 Page 19
Summary : YR Material to WCS - concrete run File: YR to WCS_concrete.RAD

Contaminated Zone Dimensions

| | |
|---|---|
| Area: | 313.00 square meters |
| Thickness: | 21.00 meters |
| Cover Depth: | 4.60 meters |

Initial Soil Concentrations, pCi/g

| | |
|---|---|
| Ag-108m | 1.000E+00 |
| Am-241 | 1.000E+00 |
| C-14 | 1.000E+00 |
| Cm-243 | 1.000E+00 |
| Co-60 | 1.000E+00 |
| Cs-134 | 1.000E+00 |
| Cs-137 | 1.000E+00 |
| Eu-152 | 1.000E+00 |
| Eu-154 | 1.000E+00 |
| Eu-155 | 1.000E+00 |
| Fe-55 | 1.000E+00 |
| H-3 | 1.000E+00 |
| Nb-94 | 1.000E+00 |
| Ni-63 | 1.000E+00 |
| Pu-238 | 1.000E+00 |
| Pu-239 | 1.000E+00 |
| Pu-241 | 1.000E+00 |
| Sb-125 | 1.000E+00 |
| Sr-90 | 1.000E+00 |
| Tc-99 | 1.000E+00 |

0

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 1.000E+00 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): | 1.160E-15 | 1.737E-14 | 2.018E-13 | 5.275E-12 | 1.239E-10 | 3.867E-09 | 7.366E-08 | 1.208E-06 |
| M(t): | 1.160E-15 | 1.737E-14 | 2.018E-13 | 5.275E-12 | 1.239E-10 | 3.867E-09 | 7.366E-08 | 1.208E-06 |

0Maximum TDOSE(t): 1.208E-06 mrem/yr at t = 1.000E+03 years

1RESRAD, Version 6.21 T« Limit = 30 days 12/20/2004 11:40 Page 36
Summary : YR Material to WCS - concrete run File: YR to WCS_concrete.RAD

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

| 0Parent (i) | Product (j) | Branch Fraction* | t= | DSR(j,t) (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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ag-108m | Ag-108m | 1.000E+00 | | 1.083E-40 | 1.078E-40 | 1.066E-40 | 1.026E-40 | 9.208E-41 | 6.300E-41 | 2.131E-41 | 4.792E-43 |
| 0Am-241 | Am-241 | 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 |
| Am-241 | Np-237 | 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 |
| Am-241 | U-233 | 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 |
| Am-241 | Th-229 | 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 |
| Am-241 | ΣDSR(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 |
| 0C-14 | C-14 | 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 |
| 0Cm-243 | Cm-243 | 9.976E-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 |
| Cm-243 | Pu-239 | 9.976E-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 |
| Cm-243 | U-235 | 9.976E-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 |
| Cm-243 | Pa-231 | 9.976E-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 |
| Cm-243 | Ac-227 | 9.976E-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 |
| Cm-243 | ΣDSR(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 |
| 0Cm-243 | Cm-243 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | Am-243 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | Pu-239 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | U-235 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | Pa-231 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | Ac-227 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | ΣDSR(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 |
| 0Co-60 | Co-60 | 1.000E+00 | | 1.592E-32 | 1.396E-32 | 1.073E-32 | 4.275E-33 | 3.083E-34 | 3.105E-38 | 0.000E+00 | 0.000E+00 |
| 0Cs-134 | Cs-134 | 1.000E+00 | | 4.310E-39 | 3.080E-39 | 1.572E-39 | 1.495E-40 | 1.808E-43 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 0Cs-137 | Cs-137 | 1.000E+00 | | 2.620E-40 | 2.560E-40 | 2.445E-40 | 2.080E-40 | 1.311E-40 | 2.608E-41 | 2.578E-43 | 0.000E+00 |
| 0Eu-152 | Eu-152 | 7.208E-01 | | 1.546E-35 | 1.467E-35 | 1.322E-35 | 9.192E-36 | 3.251E-36 | 8.555E-38 | 2.620E-42 | 0.000E+00 |
| 0Eu-152 | Eu-152 | 2.792E-01 | | 5.987E-36 | 5.684E-36 | 5.123E-36 | 3.561E-36 | 1.259E-36 | 3.314E-38 | 1.015E-42 | 0.000E+00 |
| Eu-152 | Gd-152 | 2.792E-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 |
| Eu-152 | ΣDSR(j) | | | 5.987E-36 | 5.684E-36 | 5.123E-36 | 3.561E-36 | 1.259E-36 | 3.314E-38 | 1.015E-42 | 0.000E+00 |
| 0Eu-154 | Eu-154 | 1.000E+00 | | 1.572E-34 | 1.453E-34 | 1.242E-34 | 7.155E-35 | 1.482E-35 | 5.986E-38 | 8.408E-45 | 0.000E+00 |
| 0Eu-155 | Eu-155 | 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 |
| 0Fe-55 | Fe-55 | 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 |
| 0H-3 | H-3 | 1.000E+00 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 5.984E-29 |
| 0Nb-94 | Nb-94 | 1.000E+00 | | 3.585E-38 | 3.585E-38 | 3.585E-38 | 3.585E-38 | 3.585E-38 | 3.585E-38 | 3.584E-38 | 3.583E-38 |

1RESRAD, Version 6.21 T« Limit = 30 days 12/20/2004 11:40 Page 37
Summary : YR Material to WCS - concrete run File: YR to WCS_concrete.RAD

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

| 0Parent (i) | Product (j) | Branch Fraction* | t= | DSR(j,t) (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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ni-63 | Ni-63 | 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 |
| 0Pu-238 | Pu-238 | 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 |
| Pu-238 | 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 |
| Pu-238 | 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 |
| Pu-238 | Ra-226 | 1.000E+00 | | 1.160E-15 | 1.737E-14 | 2.018E-13 | 5.275E-12 | 1.239E-10 | 3.867E-09 | 7.366E-08 | 1.208E-06 |
| Pu-238 | Pb-210 | 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 |
| Pu-238 | Po-210 | 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 |
| Pu-238 | ãDSR(j) | | | 1.160E-15 | 1.737E-14 | 2.018E-13 | 5.275E-12 | 1.239E-10 | 3.867E-09 | 7.366E-08 | 1.208E-06 |
| 0Pu-239 | Pu-239 | 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 |
| Pu-239 | U-235 | 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 |
| Pu-239 | 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 |
| Pu-239 | Ac-227 | 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 |
| Pu-239 | ãDSR(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 |
| 0Pu-241 | Pu-241 | 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 |
| Pu-241 | Am-241 | 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 |
| Pu-241 | Np-237 | 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 |
| Pu-241 | U-233 | 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 |
| Pu-241 | Th-229 | 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 |
| Pu-241 | ãDSR(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 |
| 0Pu-241 | Pu-241 | 2.450E-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 |
| Pu-241 | Np-237 | 2.450E-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 |
| Pu-241 | U-233 | 2.450E-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 |
| Pu-241 | Th-229 | 2.450E-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 |
| Pu-241 | ãDSR(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 |
| 0Sb-125 | Sb-125 | 7.720E-01 | | 1.037E-42 | 8.085E-43 | 4.905E-43 | 8.548E-44 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 0Sb-125 | Sb-125 | 2.280E-01 | | 3.069E-43 | 2.396E-43 | 1.457E-43 | 2.522E-44 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Sb-125 | Te-125m | 2.280E-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 |
| Sb-125 | ãDSR(j) | | | 3.069E-43 | 2.396E-43 | 1.457E-43 | 2.522E-44 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 0Sr-90 | Sr-90 | 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 |
| 0Tc-99 | Tc-99 | 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 |

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
The DSR includes contributions from associated (half-life ó 30 days) daughters.

Table of Contents

Part I: Mixture Sums and Single Radionuclide Guidelines

Dose Conversion Factor (and Related) Parameter Summary
File: FGR 13 Morbidity

| Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| B-1 | Dose conversion factors for inhalation, mrem/pCi: | | | |
| B-1 | Ac-227+D | 6.720E+00 | 6.720E+00 | DCF2( 1) |
| B-1 | Ag-108m+D | 2.830E-04 | 2.830E-04 | DCF2( 2) |
| B-1 | Am-241 | 4.440E-01 | 4.440E-01 | DCF2( 3) |
| B-1 | Am-243+D | 4.400E-01 | 4.400E-01 | DCF2( 4) |
| B-1 | C-14 | 2.090E-06 | 2.090E-06 | DCF2( 5) |
| B-1 | Cm-243 | 3.070E-01 | 3.070E-01 | DCF2( 6) |
| B-1 | Co-60 | 2.190E-04 | 2.190E-04 | DCF2( 8) |
| B-1 | Cs-134 | 4.630E-05 | 4.630E-05 | DCF2( 9) |
| B-1 | Cs-137+D | 3.190E-05 | 3.190E-05 | DCF2(10) |
| B-1 | Eu-152 | 2.210E-04 | 2.210E-04 | DCF2(11) |
| B-1 | Eu-154 | 2.860E-04 | 2.860E-04 | DCF2(13) |
| B-1 | Eu-155 | 4.140E-05 | 4.140E-05 | DCF2(14) |
| B-1 | Fe-55 | 2.690E-06 | 2.690E-06 | DCF2(15) |
| B-1 | Gd-152 | 2.430E-01 | 2.430E-01 | DCF2(16) |
| B-1 | H-3 | 6.400E-08 | 6.400E-08 | DCF2(17) |
| B-1 | Nb-94 | 4.140E-04 | 4.140E-04 | DCF2(18) |
| B-1 | Ni-63 | 6.290E-06 | 6.290E-06 | DCF2(19) |
| B-1 | Np-237+D | 5.400E-01 | 5.400E-01 | DCF2(20) |
| B-1 | Pa-231 | 1.280E+00 | 1.280E+00 | DCF2(21) |
| B-1 | Pb-210+D | 1.380E-02 | 1.380E-02 | DCF2(22) |
| B-1 | Po-210 | 9.400E-03 | 9.400E-03 | DCF2(23) |
| B-1 | Pu-238 | 3.920E-01 | 3.920E-01 | DCF2(24) |
| B-1 | Pu-239 | 4.290E-01 | 4.290E-01 | DCF2(25) |
| B-1 | Pu-241+D | 8.250E-03 | 8.250E-03 | DCF2(26) |
| B-1 | Ra-226+D | 8.600E-03 | 8.600E-03 | DCF2(28) |
| B-1 | Sb-125 | 1.220E-05 | 1.220E-05 | DCF2(29) |
| B-1 | Sr-90+D | 1.310E-03 | 1.310E-03 | DCF2(31) |
| B-1 | Tc-99 | 8.330E-06 | 8.330E-06 | DCF2(32) |
| B-1 | Te-125m | 7.290E-06 | 7.290E-06 | DCF2(33) |
| B-1 | Th-229+D | 2.160E+00 | 2.160E+00 | DCF2(34) |
| B-1 | Th-230 | 3.260E-01 | 3.260E-01 | DCF2(35) |
| B-1 | U-233 | 1.350E-01 | 1.350E-01 | DCF2(36) |
| B-1 | U-234 | 1.320E-01 | 1.320E-01 | DCF2(37) |
| B-1 | U-235+D | 1.230E-01 | 1.230E-01 | DCF2(38) |
| D-1 | Dose conversion factors for ingestion, mrem/pCi: | | | |
| D-1 | Ac-227+D | 1.480E-02 | 1.480E-02 | DCF3( 1) |
| D-1 | Ag-108m+D | 7.620E-06 | 7.620E-06 | DCF3( 2) |
| D-1 | Am-241 | 3.640E-03 | 3.640E-03 | DCF3( 3) |
| D-1 | Am-243+D | 3.630E-03 | 3.630E-03 | DCF3( 4) |
| D-1 | C-14 | 2.090E-06 | 2.090E-06 | DCF3( 5) |
| D-1 | Cm-243 | 2.510E-03 | 2.510E-03 | DCF3( 6) |
| D-1 | Co-60 | 2.690E-05 | 2.690E-05 | DCF3( 8) |
| D-1 | Cs-134 | 7.330E-05 | 7.330E-05 | DCF3( 9) |
| D-1 | Cs-137+D | 5.000E-05 | 5.000E-05 | DCF3(10) |
| D-1 | Eu-152 | 6.480E-06 | 6.480E-06 | DCF3(11) |
| D-1 | Eu-154 | 9.550E-06 | 9.550E-06 | DCF3(13) |
| D-1 | Eu-155 | 1.530E-06 | 1.530E-06 | DCF3(14) |
| D-1 | Fe-55 | 6.070E-07 | 6.070E-07 | DCF3(15) |
| D-1 | Gd-152 | 1.610E-04 | 1.610E-04 | DCF3(16) |

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 Morbidity

| 0 Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-1 | H-3 | 6.400E-08 | 6.400E-08 | DCF3(17) |
| D-1 | Nb-94 | 7.140E-06 | 7.140E-06 | DCF3(18) |
| D-1 | Ni-63 | 5.770E-07 | 5.770E-07 | DCF3(19) |
| D-1 | Np-237+D | 4.440E-03 | 4.440E-03 | DCF3(20) |
| D-1 | Pa-231 | 1.060E-02 | 1.060E-02 | DCF3(21) |
| D-1 | Pb-210+D | 5.370E-03 | 5.370E-03 | DCF3(22) |
| D-1 | Po-210 | 1.900E-03 | 1.900E-03 | DCF3(23) |
| D-1 | Pu-238 | 3.200E-03 | 3.200E-03 | DCF3(24) |
| D-1 | Pu-239 | 3.540E-03 | 3.540E-03 | DCF3(25) |
| D-1 | Pu-241+D | 6.850E-05 | 6.850E-05 | DCF3(26) |
| D-1 | Ra-226+D | 1.330E-03 | 1.330E-03 | DCF3(28) |
| D-1 | Sb-125 | 2.810E-06 | 2.810E-06 | DCF3(29) |
| D-1 | Sr-90+D | 1.530E-04 | 1.530E-04 | DCF3(31) |
| D-1 | Tc-99 | 1.460E-06 | 1.460E-06 | DCF3(32) |
| D-1 | Te-125m | 3.670E-06 | 3.670E-06 | DCF3(33) |
| D-1 | Th-229+D | 4.030E-03 | 4.030E-03 | DCF3(34) |
| D-1 | Th-230 | 5.480E-04 | 5.480E-04 | DCF3(35) |
| D-1 | U-233 | 2.890E-04 | 2.890E-04 | DCF3(36) |
| D-1 | U-234 | 2.830E-04 | 2.830E-04 | DCF3(37) |
| D-1 | U-235+D | 2.670E-04 | 2.670E-04 | DCF3(38) |
| | | | | |
| 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 | Ag-108m+D, plant/soil concentration ratio, dimensionless | 1.500E-01 | 1.500E-01 | RTF( 2,1) |
| D-34 | Ag-108m+D, beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.000E-03 | 3.000E-03 | RTF( 2,2) |
| D-34 | Ag-108m+D, milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.500E-02 | 2.500E-02 | RTF( 2,3) |
| D-34 | | | | |
| D-34 | Am-241 , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF( 3,1) |
| D-34 | Am-241 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 5.000E-05 | 5.000E-05 | RTF( 3,2) |
| D-34 | Am-241 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-06 | 2.000E-06 | RTF( 3,3) |
| D-34 | | | | |
| D-34 | Am-243+D , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF( 4,1) |
| D-34 | Am-243+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 5.000E-05 | 5.000E-05 | RTF( 4,2) |
| D-34 | Am-243+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-06 | 2.000E-06 | RTF( 4,3) |
| D-34 | | | | |
| D-34 | C-14 , plant/soil concentration ratio, dimensionless | 5.500E+00 | 5.500E+00 | RTF( 5,1) |
| D-34 | C-14 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.100E-02 | 3.100E-02 | RTF( 5,2) |
| D-34 | C-14 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.200E-02 | 1.200E-02 | RTF( 5,3) |
| D-34 | | | | |
| D-34 | Cm-243 , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF( 6,1) |
| D-34 | Cm-243 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-05 | 2.000E-05 | RTF( 6,2) |
| D-34 | Cm-243 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-06 | 2.000E-06 | RTF( 6,3) |
| D-34 | | | | |
| D-34 | Co-60 , plant/soil concentration ratio, dimensionless | 8.000E-02 | 8.000E-02 | RTF( 8,1) |
| D-34 | Co-60 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-02 | 2.000E-02 | RTF( 8,2) |
| D-34 | Co-60 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF( 8,3) |
| D-34 | | | | |

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 Morbidity

| 0 Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-34 | Cs-134 , plant/soil concentration ratio, dimensionless | 4.000E-02 | 4.000E-02 | RTF( 9,1) |
| D-34 | Cs-134 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.000E-02 | 3.000E-02 | RTF( 9,2) |
| D-34 | Cs-134 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 8.000E-03 | 8.000E-03 | RTF( 9,3) |
| D-34 | | | | |
| D-34 | Cs-137+D , plant/soil concentration ratio, dimensionless | 4.000E-02 | 4.000E-02 | RTF(10,1) |
| D-34 | Cs-137+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.000E-02 | 3.000E-02 | RTF(10,2) |
| D-34 | Cs-137+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 8.000E-03 | 8.000E-03 | RTF(10,3) |
| D-34 | | | | |
| D-34 | Eu-152 , plant/soil concentration ratio, dimensionless | 2.500E-03 | 2.500E-03 | RTF(11,1) |
| D-34 | Eu-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF(11,2) |
| D-34 | Eu-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-05 | 2.000E-05 | RTF(11,3) |
| D-34 | | | | |
| D-34 | Eu-154 , plant/soil concentration ratio, dimensionless | 2.500E-03 | 2.500E-03 | RTF(13,1) |
| D-34 | Eu-154 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF(13,2) |
| D-34 | Eu-154 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-05 | 2.000E-05 | RTF(13,3) |
| D-34 | | | | |
| D-34 | Eu-155 , plant/soil concentration ratio, dimensionless | 2.500E-03 | 2.500E-03 | RTF(14,1) |
| D-34 | Eu-155 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF(14,2) |
| D-34 | Eu-155 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-05 | 2.000E-05 | RTF(14,3) |
| D-34 | | | | |
| D-34 | Fe-55 , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF(15,1) |
| D-34 | Fe-55 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-02 | 2.000E-02 | RTF(15,2) |
| D-34 | Fe-55 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 3.000E-04 | 3.000E-04 | RTF(15,3) |
| D-34 | | | | |
| D-34 | Gd-152 , plant/soil concentration ratio, dimensionless | 2.500E-03 | 2.500E-03 | RTF(16,1) |
| D-34 | Gd-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF(16,2) |
| D-34 | Gd-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-05 | 2.000E-05 | RTF(16,3) |
| D-34 | | | | |
| D-34 | H-3 , plant/soil concentration ratio, dimensionless | 4.800E+00 | 4.800E+00 | RTF(17,1) |
| D-34 | H-3 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.200E-02 | 1.200E-02 | RTF(17,2) |
| D-34 | H-3 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-02 | 1.000E-02 | RTF(17,3) |
| D-34 | | | | |
| D-34 | Nb-94 , plant/soil concentration ratio, dimensionless | 1.000E-02 | 1.000E-02 | RTF(18,1) |
| D-34 | Nb-94 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.000E-07 | 3.000E-07 | RTF(18,2) |
| D-34 | Nb-94 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-06 | 2.000E-06 | RTF(18,3) |
| D-34 | | | | |
| D-34 | Ni-63 , plant/soil concentration ratio, dimensionless | 5.000E-02 | 5.000E-02 | RTF(19,1) |
| D-34 | Ni-63 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 5.000E-03 | 5.000E-03 | RTF(19,2) |
| D-34 | Ni-63 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-02 | 2.000E-02 | RTF(19,3) |
| D-34 | | | | |
| D-34 | Np-237+D , plant/soil concentration ratio, dimensionless | 2.000E-02 | 2.000E-02 | RTF(20,1) |
| D-34 | Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF(20,2) |
| D-34 | Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 5.000E-06 | 5.000E-06 | RTF(20,3) |
| D-34 | | | | |
| D-34 | Pa-231 , plant/soil concentration ratio, dimensionless | 1.000E-02 | 1.000E-02 | RTF(21,1) |
| D-34 | Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 5.000E-03 | 5.000E-03 | RTF(21,2) |
| D-34 | Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 5.000E-06 | 5.000E-06 | RTF(21,3) |
| D-34 | | | | |
| D-34 | Pb-210+D , plant/soil concentration ratio, dimensionless | 1.000E-02 | 1.000E-02 | RTF(22,1) |
| D-34 | Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 8.000E-04 | 8.000E-04 | RTF(22,2) |
| D-34 | Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 3.000E-04 | 3.000E-04 | RTF(22,3) |

Dose Conversion Factor (and Related) Parameter Summary (continued)
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| Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-34 | Po-210 , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF(23,1) |
| D-34 | Po-210 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 5.000E-03 | 5.000E-03 | RTF(23,2) |
| D-34 | Po-210 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 3.400E-04 | 3.400E-04 | RTF(23,3) |
| D-34 | | | | |
| D-34 | Pu-238 , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF(24,1) |
| D-34 | Pu-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(24,2) |
| D-34 | Pu-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-06 | 1.000E-06 | RTF(24,3) |
| D-34 | | | | |
| D-34 | Pu-239 , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF(25,1) |
| D-34 | Pu-239 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(25,2) |
| D-34 | Pu-239 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-06 | 1.000E-06 | RTF(25,3) |
| D-34 | | | | |
| D-34 | Pu-241+D , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF(26,1) |
| D-34 | Pu-241+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(26,2) |
| D-34 | Pu-241+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-06 | 1.000E-06 | RTF(26,3) |
| D-34 | | | | |
| D-34 | Ra-226+D , plant/soil concentration ratio, dimensionless | 4.000E-02 | 4.000E-02 | RTF(28,1) |
| D-34 | Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF(28,2) |
| D-34 | Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF(28,3) |
| D-34 | | | | |
| D-34 | Sb-125 , plant/soil concentration ratio, dimensionless | 1.000E-02 | 1.000E-02 | RTF(29,1) |
| D-34 | Sb-125 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF(29,2) |
| D-34 | Sb-125 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(29,3) |
| D-34 | | | | |
| D-34 | Sr-90+D , plant/soil concentration ratio, dimensionless | 3.000E-01 | 3.000E-01 | RTF(31,1) |
| D-34 | Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 8.000E-03 | 8.000E-03 | RTF(31,2) |
| D-34 | Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 2.000E-03 | 2.000E-03 | RTF(31,3) |
| D-34 | | | | |
| D-34 | Tc-99 , plant/soil concentration ratio, dimensionless | 5.000E+00 | 5.000E+00 | RTF(32,1) |
| D-34 | Tc-99 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(32,2) |
| D-34 | Tc-99 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 1.000E-03 | 1.000E-03 | RTF(32,3) |
| D-34 | | | | |
| D-34 | Te-125m , plant/soil concentration ratio, dimensionless | 6.000E-01 | 6.000E-01 | RTF(33,1) |
| D-34 | Te-125m , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 7.000E-03 | 7.000E-03 | RTF(33,2) |
| D-34 | Te-125m , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 5.000E-04 | 5.000E-04 | RTF(33,3) |
| D-34 | | | | |
| D-34 | Th-229+D , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF(34,1) |
| D-34 | Th-229+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(34,2) |
| D-34 | Th-229+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 5.000E-06 | 5.000E-06 | RTF(34,3) |
| D-34 | | | | |
| D-34 | Th-230 , plant/soil concentration ratio, dimensionless | 1.000E-03 | 1.000E-03 | RTF(35,1) |
| D-34 | Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04 | 1.000E-04 | RTF(35,2) |
| D-34 | Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 5.000E-06 | 5.000E-06 | RTF(35,3) |
| D-34 | | | | |
| D-34 | U-233 , plant/soil concentration ratio, dimensionless | 2.500E-03 | 2.500E-03 | RTF(36,1) |
| D-34 | U-233 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.400E-04 | 3.400E-04 | RTF(36,2) |
| D-34 | U-233 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 6.000E-04 | 6.000E-04 | RTF(36,3) |
| D-34 | | | | |
| D-34 | U-234 , plant/soil concentration ratio, dimensionless | 2.500E-03 | 2.500E-03 | RTF(37,1) |
| D-34 | U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.400E-04 | 3.400E-04 | RTF(37,2) |
| D-34 | U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 6.000E-04 | 6.000E-04 | RTF(37,3) |

Dose Conversion Factor (and Related) Parameter Summary (continued)
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| 0 Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-34 | U-235+D , plant/soil concentration ratio, dimensionless | 2.500E-03 | 2.500E-03 | RTF(38,1) |
| D-34 | U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.400E-04 | 3.400E-04 | RTF(38,2) |
| D-34 | U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) | 6.000E-04 | 6.000E-04 | RTF(38,3) |
| 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 | Ag-108m+D, fish | 5.000E+00 | 5.000E+00 | BIOFAC( 2,1) |
| D-5 | Ag-108m+D, crustacea and mollusks | 7.700E+02 | 7.700E+02 | BIOFAC( 2,2) |
| D-5 | Am-241 , fish | 3.000E+01 | 3.000E+01 | BIOFAC( 3,1) |
| D-5 | Am-241 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC( 3,2) |
| D-5 | Am-243+D , fish | 3.000E+01 | 3.000E+01 | BIOFAC( 4,1) |
| D-5 | Am-243+D , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC( 4,2) |
| D-5 | C-14 , fish | 5.000E+04 | 5.000E+04 | BIOFAC( 5,1) |
| D-5 | C-14 , crustacea and mollusks | 9.100E+03 | 9.100E+03 | BIOFAC( 5,2) |
| D-5 | Cm-243 , fish | 3.000E+01 | 3.000E+01 | BIOFAC( 6,1) |
| D-5 | Cm-243 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC( 6,2) |
| D-5 | Co-60 , fish | 3.000E+02 | 3.000E+02 | BIOFAC( 8,1) |
| D-5 | Co-60 , crustacea and mollusks | 2.000E+02 | 2.000E+02 | BIOFAC( 8,2) |
| D-5 | Cs-134 , fish | 2.000E+03 | 2.000E+03 | BIOFAC( 9,1) |
| D-5 | Cs-134 , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC( 9,2) |
| D-5 | Cs-137+D , fish | 2.000E+03 | 2.000E+03 | BIOFAC(10,1) |
| D-5 | Cs-137+D , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(10,2) |
| D-5 | Eu-152 , fish | 5.000E+01 | 5.000E+01 | BIOFAC(11,1) |
| D-5 | Eu-152 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC(11,2) |
| D-5 | Eu-154 , fish | 5.000E+01 | 5.000E+01 | BIOFAC(13,1) |
| D-5 | Eu-154 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC(13,2) |
| D-5 | Eu-155 , fish | 5.000E+01 | 5.000E+01 | BIOFAC(14,1) |
| D-5 | Eu-155 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC(14,2) |
| D-5 | Fe-55 , fish | 2.000E+02 | 2.000E+02 | BIOFAC(15,1) |
| D-5 | Fe-55 , crustacea and mollusks | 3.200E+03 | 3.200E+03 | BIOFAC(15,2) |
| D-5 | Gd-152 , fish | 2.500E+01 | 2.500E+01 | BIOFAC(16,1) |
| D-5 | Gd-152 , crustacea and mollusks | 1.000E+03 | 1.000E+03 | BIOFAC(16,2) |
| D-5 | H-3 , fish | 1.000E+00 | 1.000E+00 | BIOFAC(17,1) |
| D-5 | H-3 , crustacea and mollusks | 1.000E+00 | 1.000E+00 | BIOFAC(17,2) |

Dose Conversion Factor (and Related) Parameter Summary (continued)
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| 0 Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-5 | Nb-94 , fish | 3.000E+02 | 3.000E+02 | BIOFAC(18,1) |
| D-5 | Nb-94 , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(18,2) |
| D-5 | | | | |
| D-5 | Ni-63 , fish | 1.000E+02 | 1.000E+02 | BIOFAC(19,1) |
| D-5 | Ni-63 , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(19,2) |
| D-5 | | | | |
| D-5 | Np-237+D , fish | 3.000E+01 | 3.000E+01 | BIOFAC(20,1) |
| D-5 | Np-237+D , crustacea and mollusks | 4.000E+02 | 4.000E+02 | BIOFAC(20,2) |
| D-5 | | | | |
| D-5 | Pa-231 , fish | 1.000E+01 | 1.000E+01 | BIOFAC(21,1) |
| D-5 | Pa-231 , crustacea and mollusks | 1.100E+02 | 1.100E+02 | BIOFAC(21,2) |
| D-5 | | | | |
| D-5 | Pb-210+D , fish | 3.000E+02 | 3.000E+02 | BIOFAC(22,1) |
| D-5 | Pb-210+D , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(22,2) |
| D-5 | | | | |
| D-5 | Po-210 , fish | 1.000E+02 | 1.000E+02 | BIOFAC(23,1) |
| D-5 | Po-210 , crustacea and mollusks | 2.000E+04 | 2.000E+04 | BIOFAC(23,2) |
| D-5 | | | | |
| D-5 | Pu-238 , fish | 3.000E+01 | 3.000E+01 | BIOFAC(24,1) |
| D-5 | Pu-238 , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(24,2) |
| D-5 | | | | |
| D-5 | Pu-239 , fish | 3.000E+01 | 3.000E+01 | BIOFAC(25,1) |
| D-5 | Pu-239 , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(25,2) |
| D-5 | | | | |
| D-5 | Pu-241+D , fish | 3.000E+01 | 3.000E+01 | BIOFAC(26,1) |
| D-5 | Pu-241+D , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(26,2) |
| D-5 | | | | |
| D-5 | Ra-226+D , fish | 5.000E+01 | 5.000E+01 | BIOFAC(28,1) |
| D-5 | Ra-226+D , crustacea and mollusks | 2.500E+02 | 2.500E+02 | BIOFAC(28,2) |
| D-5 | | | | |
| D-5 | Sb-125 , fish | 1.000E+02 | 1.000E+02 | BIOFAC(29,1) |
| D-5 | Sb-125 , crustacea and mollusks | 1.000E+01 | 1.000E+01 | BIOFAC(29,2) |
| D-5 | | | | |
| D-5 | Sr-90+D , fish | 6.000E+01 | 6.000E+01 | BIOFAC(31,1) |
| D-5 | Sr-90+D , crustacea and mollusks | 1.000E+02 | 1.000E+02 | BIOFAC(31,2) |
| D-5 | | | | |
| D-5 | Tc-99 , fish | 2.000E+01 | 2.000E+01 | BIOFAC(32,1) |
| D-5 | Tc-99 , crustacea and mollusks | 5.000E+00 | 5.000E+00 | BIOFAC(32,2) |
| D-5 | | | | |
| D-5 | Te-125m , fish | 4.000E+02 | 4.000E+02 | BIOFAC(33,1) |
| D-5 | Te-125m , crustacea and mollusks | 7.500E+01 | 7.500E+01 | BIOFAC(33,2) |
| D-5 | | | | |
| D-5 | Th-229+D , fish | 1.000E+02 | 1.000E+02 | BIOFAC(34,1) |
| D-5 | Th-229+D , crustacea and mollusks | 5.000E+02 | 5.000E+02 | BIOFAC(34,2) |
| D-5 | | | | |
| D-5 | Th-230 , fish | 1.000E+02 | 1.000E+02 | BIOFAC(35,1) |
| D-5 | Th-230 , crustacea and mollusks | 5.000E+02 | 5.000E+02 | BIOFAC(35,2) |
| D-5 | | | | |
| D-5 | U-233 , fish | 1.000E+01 | 1.000E+01 | BIOFAC(36,1) |
| D-5 | U-233 , crustacea and mollusks | 6.000E+01 | 6.000E+01 | BIOFAC(36,2) |
| D-5 | | | | |

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 Morbidity

| Menu | Parameter | Current Value | Default | Parameter Name |
|---|---|---|---|---|
| D-5 | U-234 , fish | 1.000E+01 | 1.000E+01 | BIOFAC(37,1) |
| D-5 | U-234 , crustacea and mollusks | 6.000E+01 | 6.000E+01 | BIOFAC(37,2) |
| D-5 | | | | |
| D-5 | U-235+D , fish | 1.000E+01 | 1.000E+01 | BIOFAC(38,1) |
| D-5 | U-235+D , crustacea and mollusks | 6.000E+01 | 6.000E+01 | BIOFAC(38,2) |

Site-Specific Parameter Summary

| 0 Menu | Parameter | | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|---|
| R011 | Area of contaminated zone (m**2) | | 5.800E+01 | 1.000E+04 | --- | AREA |
| R011 | Thickness of contaminated zone (m) | | 2.000E+00 | 2.000E+00 | --- | THICK0 |
| R011 | Length parallel to aquifer flow (m) | | 9.000E+00 | 1.000E+02 | --- | LCZPAQ |
| R011 | Basic radiation dose limit (mrem/yr) | | 1.000E+00 | 2.500E+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): | Ag-108m | 1.000E+00 | 0.000E+00 | --- | S1( 2) |
| R012 | Initial principal radionuclide (pCi/g): | Am-241 | 1.000E+00 | 0.000E+00 | --- | S1( 3) |
| R012 | Initial principal radionuclide (pCi/g): | C-14 | 1.000E+00 | 0.000E+00 | --- | S1( 5) |
| R012 | Initial principal radionuclide (pCi/g): | Cm-243 | 1.000E+00 | 0.000E+00 | --- | S1( 6) |
| R012 | Initial principal radionuclide (pCi/g): | Co-60 | 1.000E+00 | 0.000E+00 | --- | S1( 8) |
| R012 | Initial principal radionuclide (pCi/g): | Cs-134 | 1.000E+00 | 0.000E+00 | --- | S1( 9) |
| R012 | Initial principal radionuclide (pCi/g): | Cs-137 | 1.000E+00 | 0.000E+00 | --- | S1(10) |
| R012 | Initial principal radionuclide (pCi/g): | Eu-152 | 1.000E+00 | 0.000E+00 | --- | S1(11) |
| R012 | Initial principal radionuclide (pCi/g): | Eu-154 | 1.000E+00 | 0.000E+00 | --- | S1(13) |
| R012 | Initial principal radionuclide (pCi/g): | Eu-155 | 1.000E+00 | 0.000E+00 | --- | S1(14) |
| R012 | Initial principal radionuclide (pCi/g): | Fe-55 | 1.000E+00 | 0.000E+00 | --- | S1(15) |
| R012 | Initial principal radionuclide (pCi/g): | H-3 | 1.000E+00 | 0.000E+00 | --- | S1(17) |
| R012 | Initial principal radionuclide (pCi/g): | Nb-94 | 1.000E+00 | 0.000E+00 | --- | S1(18) |
| R012 | Initial principal radionuclide (pCi/g): | Ni-63 | 1.000E+00 | 0.000E+00 | --- | S1(19) |
| R012 | Initial principal radionuclide (pCi/g): | Pu-238 | 1.000E+00 | 0.000E+00 | --- | S1(24) |
| R012 | Initial principal radionuclide (pCi/g): | Pu-239 | 1.000E+00 | 0.000E+00 | --- | S1(25) |
| R012 | Initial principal radionuclide (pCi/g): | Pu-241 | 1.000E+00 | 0.000E+00 | --- | S1(26) |
| R012 | Initial principal radionuclide (pCi/g): | Sb-125 | 1.000E+00 | 0.000E+00 | --- | S1(29) |
| R012 | Initial principal radionuclide (pCi/g): | Sr-90 | 1.000E+00 | 0.000E+00 | --- | S1(31) |
| R012 | Initial principal radionuclide (pCi/g): | Tc-99 | 1.000E+00 | 0.000E+00 | --- | S1(32) |
| R012 | Concentration in groundwater (pCi/L): | Ag-108m | not used | 0.000E+00 | --- | W1( 2) |
| R012 | Concentration in groundwater (pCi/L): | Am-241 | not used | 0.000E+00 | --- | W1( 3) |
| R012 | Concentration in groundwater (pCi/L): | C-14 | not used | 0.000E+00 | --- | W1( 5) |
| R012 | Concentration in groundwater (pCi/L): | Cm-243 | not used | 0.000E+00 | --- | W1( 6) |
| R012 | Concentration in groundwater (pCi/L): | Co-60 | not used | 0.000E+00 | --- | W1( 8) |
| R012 | Concentration in groundwater (pCi/L): | Cs-134 | not used | 0.000E+00 | --- | W1( 9) |
| R012 | Concentration in groundwater (pCi/L): | Cs-137 | not used | 0.000E+00 | --- | W1(10) |
| R012 | Concentration in groundwater (pCi/L): | Eu-152 | not used | 0.000E+00 | --- | W1(11) |
| R012 | Concentration in groundwater (pCi/L): | Eu-154 | not used | 0.000E+00 | --- | W1(13) |
| R012 | Concentration in groundwater (pCi/L): | Eu-155 | not used | 0.000E+00 | --- | W1(14) |
| R012 | Concentration in groundwater (pCi/L): | Fe-55 | not used | 0.000E+00 | --- | W1(15) |
| R012 | Concentration in groundwater (pCi/L): | H-3 | not used | 0.000E+00 | --- | W1(17) |
| R012 | Concentration in groundwater (pCi/L): | Nb-94 | not used | 0.000E+00 | --- | W1(18) |
| R012 | Concentration in groundwater (pCi/L): | Ni-63 | not used | 0.000E+00 | --- | W1(19) |
| R012 | Concentration in groundwater (pCi/L): | Pu-238 | not used | 0.000E+00 | --- | W1(24) |
| R012 | Concentration in groundwater (pCi/L): | Pu-239 | not used | 0.000E+00 | --- | W1(25) |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R012 | Concentration in groundwater (pCi/L): Pu-241 | not used | 0.000E+00 | --- | W1(26) |
| R012 | Concentration in groundwater (pCi/L): Sb-125 | not used | 0.000E+00 | --- | W1(29) |
| R012 | Concentration in groundwater (pCi/L): Sr-90 | not used | 0.000E+00 | --- | W1(31) |
| R012 | Concentration in groundwater (pCi/L): Tc-99 | not used | 0.000E+00 | --- | W1(32) |
| R013 | Cover depth (m) | 4.600E+00 | 0.000E+00 | --- | COVER0 |
| R013 | Density of cover material (g/cm**3) | 2.100E+00 | 1.500E+00 | --- | DENSCV |
| R013 | Cover depth erosion rate (m/yr) | 1.830E-06 | 1.000E-03 | --- | VCV |
| R013 | Density of contaminated zone (g/cm**3) | 1.510E+00 | 1.500E+00 | --- | DENSCZ |
| R013 | Contaminated zone erosion rate (m/yr) | 1.000E-03 | 1.000E-03 | --- | VCZ |
| R013 | Contaminated zone total porosity | 4.300E-01 | 4.000E-01 | --- | TPCZ |
| R013 | Contaminated zone field capacity | 5.000E-02 | 2.000E-01 | --- | FCCZ |
| R013 | Contaminated zone hydraulic conductivity (m/yr) | 2.506E+03 | 1.000E+01 | --- | HCCZ |
| R013 | Contaminated zone b parameter | 9.750E-01 | 5.300E+00 | --- | BCZ |
| R013 | Average annual wind speed (m/sec) | 2.000E+00 | 2.000E+00 | --- | WIND |
| R013 | Humidity in air (g/m**3) | 8.000E+00 | 8.000E+00 | --- | HUMID |
| R013 | Evapotranspiration coefficient | 9.500E-01 | 5.000E-01 | --- | EVAPTR |
| R013 | Precipitation (m/yr) | 3.550E-01 | 1.000E+00 | --- | PRECIP |
| R013 | Irrigation (m/yr) | 2.000E-01 | 2.000E-01 | --- | RI |
| R013 | Irrigation mode | overhead | overhead | --- | IDITCH |
| R013 | Runoff coefficient | 4.000E-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) | 1.520E+00 | 1.500E+00 | --- | DENSAQ |
| R014 | Saturated zone total porosity | 4.000E-01 | 4.000E-01 | --- | TPSZ |
| R014 | Saturated zone effective porosity | 3.200E-01 | 2.000E-01 | --- | EPSZ |
| R014 | Saturated zone field capacity | 8.000E-02 | 2.000E-01 | --- | FCSZ |
| R014 | Saturated zone hydraulic conductivity (m/yr) | 5.500E+03 | 1.000E+02 | --- | HCSZ |
| R014 | Saturated zone hydraulic gradient | 2.000E-02 | 2.000E-02 | --- | HGWT |
| R014 | Saturated zone b parameter | 4.050E+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) | 3.000E+02 | 4.000E+00 | --- | H(1) |
| R015 | Unsat. zone 1, soil density (g/cm**3) | 2.100E+00 | 1.500E+00 | --- | DENSUZ(1) |
| R015 | Unsat. zone 1, total porosity | 4.200E-01 | 4.000E-01 | --- | TPUZ(1) |
| R015 | Unsat. zone 1, effective porosity | 6.000E-02 | 2.000E-01 | --- | EPUZ(1) |
| R015 | Unsat. zone 1, field capacity | 3.600E-01 | 2.000E-01 | --- | FCUZ(1) |
| R015 | Unsat. zone 1, soil-specific b parameter | 1.140E+01 | 5.300E+00 | --- | BUZ(1) |
| R015 | Unsat. zone 1, hydraulic conductivity (m/yr) | 1.000E-03 | 1.000E+01 | --- | HCUZ(1) |
| R016 | Distribution coefficients for Ag-108m | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.160E+02 | 0.000E+00 | --- | DCNUCC( 2) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.800E+02 | 0.000E+00 | --- | DCNUCU( 2,1) |
| R016 | Saturated zone (cm**3/g) | 9.000E+01 | 0.000E+00 | --- | DCNUCS( 2) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 3.165E-05 | ALEACH( 2) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 2) |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for Am-241 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.445E+03 | 2.000E+01 | --- | DCNUCC( 3) |
| R016 | Unsaturated zone 1 (cm**3/g) | 8.400E+03 | 2.000E+01 | --- | DCNUCU( 3,1) |
| R016 | Saturated zone (cm**3/g) | 1.900E+03 | 2.000E+01 | --- | DCNUCS( 3) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 4.732E-06 | ALEACH( 3) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 3) |
| R016 | Distribution coefficients for C-14 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.100E+01 | 0.000E+00 | --- | DCNUCC( 5) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+00 | 0.000E+00 | --- | DCNUCU( 5,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+00 | 0.000E+00 | --- | DCNUCS( 5) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.197E-04 | ALEACH( 5) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 5) |
| R016 | Distribution coefficients for Cm-243 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.761E+03 | -1.000E+00 | --- | DCNUCC( 6) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+03 | -1.000E+00 | --- | DCNUCU( 6,1) |
| R016 | Saturated zone (cm**3/g) | 4.000E+03 | -1.000E+00 | --- | DCNUCS( 6) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.011E-06 | ALEACH( 6) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 6) |
| R016 | Distribution coefficients for Co-60 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.350E+02 | 1.000E+03 | --- | DCNUCC( 8) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.500E+02 | 1.000E+03 | --- | DCNUCU( 8,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+01 | 1.000E+03 | --- | DCNUCS( 8) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.909E-05 | ALEACH( 8) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 8) |
| R016 | Distribution coefficients for Cs-134 | | | | |
| R016 | Contaminated zone (cm**3/g) | 4.460E+02 | 1.000E+03 | --- | DCNUCC( 9) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.900E+03 | 1.000E+03 | --- | DCNUCU( 9,1) |
| R016 | Saturated zone (cm**3/g) | 2.800E+02 | 1.000E+03 | --- | DCNUCS( 9) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.533E-05 | ALEACH( 9) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 9) |
| R016 | Distribution coefficients for Cs-137 | | | | |
| R016 | Contaminated zone (cm**3/g) | 4.460E+02 | 1.000E+03 | --- | DCNUCC(10) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.900E+03 | 1.000E+03 | --- | DCNUCU(10,1) |
| R016 | Saturated zone (cm**3/g) | 2.800E+02 | 1.000E+03 | --- | DCNUCS(10) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.533E-05 | ALEACH(10) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(10) |
| R016 | Distribution coefficients for Eu-152 | | | | |
| R016 | Contaminated zone (cm**3/g) | 8.250E+02 | -1.000E+00 | 8.249E+02 | DCNUCC(11) |
| R016 | Unsaturated zone 1 (cm**3/g) | -1.000E+00 | -1.000E+00 | 8.249E+02 | DCNUCU(11,1) |
| R016 | Saturated zone (cm**3/g) | -1.000E+00 | -1.000E+00 | 8.249E+02 | DCNUCS(11) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 8.289E-06 | ALEACH(11) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(11) |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for Eu-154 | | | | |
| R016 | Contaminated zone (cm**3/g) | 8.250E+02 | -1.000E+00 | 8.249E+02 | DCNUCC(13) |
| R016 | Unsaturated zone 1 (cm**3/g) | -1.000E+00 | -1.000E+00 | 8.249E+02 | DCNUCU(13,1) |
| R016 | Saturated zone (cm**3/g) | -1.000E+00 | -1.000E+00 | 8.249E+02 | DCNUCS(13) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 8.289E-06 | ALEACH(13) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(13) |
| R016 | Distribution coefficients for Eu-155 | | | | |
| R016 | Contaminated zone (cm**3/g) | 8.250E+02 | -1.000E+00 | 8.249E+02 | DCNUCC(14) |
| R016 | Unsaturated zone 1 (cm**3/g) | -1.000E+00 | -1.000E+00 | 8.249E+02 | DCNUCU(14,1) |
| R016 | Saturated zone (cm**3/g) | -1.000E+00 | -1.000E+00 | 8.249E+02 | DCNUCS(14) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 8.289E-06 | ALEACH(14) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(14) |
| R016 | Distribution coefficients for Fe-55 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.090E+02 | 1.000E+03 | --- | DCNUCC(15) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.650E+02 | 1.000E+03 | --- | DCNUCU(15,1) |
| R016 | Saturated zone (cm**3/g) | 2.200E+02 | 1.000E+03 | --- | DCNUCS(15) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 3.271E-05 | ALEACH(15) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(15) |
| R016 | Distribution coefficients for H-3 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E-02 | 0.000E+00 | --- | DCNUCC(17) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCNUCU(17,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCNUCS(17) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 7.344E-02 | ALEACH(17) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(17) |
| R016 | Distribution coefficients for Nb-94 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.800E+02 | 0.000E+00 | --- | DCNUCC(18) |
| R016 | Unsaturated zone 1 (cm**3/g) | 9.000E+02 | 0.000E+00 | --- | DCNUCU(18,1) |
| R016 | Saturated zone (cm**3/g) | 1.600E+02 | 0.000E+00 | --- | DCNUCS(18) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.799E-05 | ALEACH(18) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(18) |
| R016 | Distribution coefficients for Ni-63 | | | | |
| R016 | Contaminated zone (cm**3/g) | 4.240E+02 | 1.000E+03 | --- | DCNUCC(19) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.500E+02 | 1.000E+03 | --- | DCNUCU(19,1) |
| R016 | Saturated zone (cm**3/g) | 4.000E+02 | 1.000E+03 | --- | DCNUCS(19) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.613E-05 | ALEACH(19) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(19) |
| R016 | Distribution coefficients for Pu-238 | | | | |
| R016 | Contaminated zone (cm**3/g) | 9.530E+02 | 2.000E+03 | --- | DCNUCC(24) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.100E+03 | 2.000E+03 | --- | DCNUCU(24,1) |
| R016 | Saturated zone (cm**3/g) | 5.500E+02 | 2.000E+03 | --- | DCNUCS(24) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 7.175E-06 | ALEACH(24) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(24) |

Site-Specific Parameter Summary (continued)

| 0 Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for Pu-239 | | | | |
| R016 | Contaminated zone (cm**3/g) | 9.530E+02 | 2.000E+03 | --- | DCNUCC(25) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.100E+03 | 2.000E+03 | --- | DCNUCU(25,1) |
| R016 | Saturated zone (cm**3/g) | 5.500E+02 | 2.000E+03 | --- | DCNUCS(25) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 7.175E-06 | ALEACH(25) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(25) |
| R016 | Distribution coefficients for Pu-241 | | | | |
| R016 | Contaminated zone (cm**3/g) | 9.530E+02 | 2.000E+03 | --- | DCNUCC(26) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.100E+03 | 2.000E+03 | --- | DCNUCU(26,1) |
| R016 | Saturated zone (cm**3/g) | 5.500E+02 | 2.000E+03 | --- | DCNUCS(26) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 7.175E-06 | ALEACH(26) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(26) |
| R016 | Distribution coefficients for Sb-125 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.800E+02 | 0.000E+00 | --- | DCNUCC(29) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.500E+02 | 0.000E+00 | --- | DCNUCU(29,1) |
| R016 | Saturated zone (cm**3/g) | 4.500E+01 | 0.000E+00 | --- | DCNUCS(29) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.799E-05 | ALEACH(29) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(29) |
| R016 | Distribution coefficients for Sr-90 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.200E+01 | 3.000E+01 | --- | DCNUCC(31) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.100E+02 | 3.000E+01 | --- | DCNUCU(31,1) |
| R016 | Saturated zone (cm**3/g) | 1.500E+01 | 3.000E+01 | --- | DCNUCS(31) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.135E-04 | ALEACH(31) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(31) |
| R016 | Distribution coefficients for Tc-99 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.100E-01 | 0.000E+00 | --- | DCNUCC(32) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+00 | 0.000E+00 | --- | DCNUCU(32,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E-01 | 0.000E+00 | --- | DCNUCS(32) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.259E-02 | ALEACH(32) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(32) |
| R016 | Distribution coefficients for daughter Ac-227 | | | | |
| R016 | Contaminated zone (cm**3/g) | 8.250E+02 | 2.000E+01 | --- | DCNUCC( 1) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.400E+03 | 2.000E+01 | --- | DCNUCU( 1,1) |
| R016 | Saturated zone (cm**3/g) | 4.500E+02 | 2.000E+01 | --- | DCNUCS( 1) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 8.288E-06 | ALEACH( 1) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 1) |
| R016 | Distribution coefficients for daughter Am-243 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.445E+03 | 2.000E+01 | --- | DCNUCC( 4) |
| R016 | Unsaturated zone 1 (cm**3/g) | 8.400E+03 | 2.000E+01 | --- | DCNUCU( 4,1) |
| R016 | Saturated zone (cm**3/g) | 1.900E+03 | 2.000E+01 | --- | DCNUCS( 4) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 4.732E-06 | ALEACH( 4) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK( 4) |

Site-Specific Parameter Summary (continued)

| 0 Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for daughter Gd-152 | | | | |
| R016 | Contaminated zone (cm**3/g) | 8.250E+02 | -1.000E+00 | 8.249E+02 | DCNUCC(16) |
| R016 | Unsaturated zone 1 (cm**3/g) | -1.000E+00 | -1.000E+00 | 8.249E+02 | DCNUCU(16,1) |
| R016 | Saturated zone (cm**3/g) | -1.000E+00 | -1.000E+00 | 8.249E+02 | DCNUCS(16) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 8.289E-06 | ALEACH(16) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(16) |
| R016 | Distribution coefficients for daughter Np-237 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.700E+01 | -1.000E+00 | --- | DCNUCC(20) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.500E+01 | -1.000E+00 | --- | DCNUCU(20,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+00 | -1.000E+00 | --- | DCNUCS(20) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 4.014E-04 | ALEACH(20) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(20) |
| R016 | Distribution coefficients for daughter Pa-231 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.800E+02 | 5.000E+01 | --- | DCNUCC(21) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.700E+03 | 5.000E+01 | --- | DCNUCU(21,1) |
| R016 | Saturated zone (cm**3/g) | 5.500E+02 | 5.000E+01 | --- | DCNUCS(21) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.799E-05 | ALEACH(21) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(21) |
| R016 | Distribution coefficients for daughter Pb-210 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.392E+03 | 1.000E+02 | --- | DCNUCC(22) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.500E+02 | 1.000E+02 | --- | DCNUCU(22,1) |
| R016 | Saturated zone (cm**3/g) | 2.700E+02 | 1.000E+02 | --- | DCNUCS(22) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.859E-06 | ALEACH(22) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(22) |
| R016 | Distribution coefficients for daughter Po-210 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.810E+02 | 1.000E+01 | --- | DCNUCC(23) |
| R016 | Unsaturated zone 1 (cm**3/g) | 3.000E+03 | 1.000E+01 | --- | DCNUCU(23,1) |
| R016 | Saturated zone (cm**3/g) | 1.500E+02 | 1.000E+01 | --- | DCNUCS(23) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 3.777E-05 | ALEACH(23) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(23) |
| R016 | Distribution coefficients for daughter Ra-226 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.533E+03 | 7.000E+01 | --- | DCNUCC(28) |
| R016 | Unsaturated zone 1 (cm**3/g) | 9.100E+03 | 7.000E+01 | --- | DCNUCU(28,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+02 | 7.000E+01 | --- | DCNUCS(28) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.935E-06 | ALEACH(28) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(28) |
| R016 | Distribution coefficients for daughter Te-125m | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.800E+01 | 0.000E+00 | --- | DCNUCC(33) |
| R016 | Unsaturated zone 1 (cm**3/g) | 7.200E+02 | 0.000E+00 | --- | DCNUCU(33,1) |
| R016 | Saturated zone (cm**3/g) | 1.250E+02 | 0.000E+00 | --- | DCNUCS(33) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.798E-04 | ALEACH(33) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(33) |

Site-Specific Parameter Summary (continued)

| 0 Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for daughter Th-229 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.884E+03 | 6.000E+04 | --- | DCNUCC(34) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.800E+03 | 6.000E+04 | --- | DCNUCU(34,1) |
| R016 | Saturated zone (cm**3/g) | 3.200E+03 | 6.000E+04 | --- | DCNUCS(34) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.162E-06 | ALEACH(34) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(34) |
| R016 | Distribution coefficients for daughter Th-230 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.884E+03 | 6.000E+04 | --- | DCNUCC(35) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.800E+03 | 6.000E+04 | --- | DCNUCU(35,1) |
| R016 | Saturated zone (cm**3/g) | 3.200E+03 | 6.000E+04 | --- | DCNUCS(35) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.162E-06 | ALEACH(35) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(35) |
| R016 | Distribution coefficients for daughter U-233 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.260E+02 | 5.000E+01 | --- | DCNUCC(36) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.600E+03 | 5.000E+01 | --- | DCNUCU(36,1) |
| R016 | Saturated zone (cm**3/g) | 3.500E+01 | 5.000E+01 | --- | DCNUCS(36) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 5.425E-05 | ALEACH(36) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(36) |
| R016 | Distribution coefficients for daughter U-234 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.260E+02 | 5.000E+01 | --- | DCNUCC(37) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.600E+03 | 5.000E+01 | --- | DCNUCU(37,1) |
| R016 | Saturated zone (cm**3/g) | 3.500E+01 | 5.000E+01 | --- | DCNUCS(37) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 5.425E-05 | ALEACH(37) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(37) |
| R016 | Distribution coefficients for daughter U-235 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.260E+02 | 5.000E+01 | --- | DCNUCC(38) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.600E+03 | 5.000E+01 | --- | DCNUCU(38,1) |
| R016 | Saturated zone (cm**3/g) | 3.500E+01 | 5.000E+01 | --- | DCNUCS(38) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 5.425E-05 | ALEACH(38) |
| R016 | Solubility constant | 0.000E+00 | 0.000E+00 | not used | SOLUBK(38) |
| 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 | >0 shows circular AREA. | FS |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R017 | Radii of shape factor array (used if FS = -1): | | | | |
| R017 | Outer annular radius (m), ring 1: | not used | 5.000E+01 | --- | RAD_SHAPE( 1) |
| R017 | Outer annular radius (m), ring 2: | not used | 7.071E+01 | --- | RAD_SHAPE( 2) |
| R017 | Outer annular radius (m), ring 3: | not used | 0.000E+00 | --- | RAD_SHAPE( 3) |
| R017 | Outer annular radius (m), ring 4: | not used | 0.000E+00 | --- | RAD_SHAPE( 4) |
| R017 | Outer annular radius (m), ring 5: | not used | 0.000E+00 | --- | RAD_SHAPE( 5) |
| R017 | Outer annular radius (m), ring 6: | not used | 0.000E+00 | --- | RAD_SHAPE( 6) |
| R017 | Outer annular radius (m), ring 7: | not used | 0.000E+00 | --- | RAD_SHAPE( 7) |
| R017 | Outer annular radius (m), ring 8: | not used | 0.000E+00 | --- | RAD_SHAPE( 8) |
| R017 | Outer annular radius (m), ring 9: | not used | 0.000E+00 | --- | RAD_SHAPE( 9) |
| R017 | Outer annular radius (m), ring 10: | not used | 0.000E+00 | --- | RAD_SHAPE(10) |
| R017 | Outer annular radius (m), ring 11: | not used | 0.000E+00 | --- | RAD_SHAPE(11) |
| R017 | Outer annular radius (m), ring 12: | not used | 0.000E+00 | --- | RAD_SHAPE(12) |
| R017 | Fractions of annular areas within AREA: | | | | |
| R017 | Ring 1 | not used | 1.000E+00 | --- | FRACA( 1) |
| R017 | Ring 2 | not used | 2.732E-01 | --- | FRACA( 2) |
| R017 | Ring 3 | not used | 0.000E+00 | --- | FRACA( 3) |
| R017 | Ring 4 | not used | 0.000E+00 | --- | FRACA( 4) |
| R017 | Ring 5 | not used | 0.000E+00 | --- | FRACA( 5) |
| R017 | Ring 6 | not used | 0.000E+00 | --- | FRACA( 6) |
| R017 | Ring 7 | not used | 0.000E+00 | --- | FRACA( 7) |
| R017 | Ring 8 | not used | 0.000E+00 | --- | FRACA( 8) |
| R017 | Ring 9 | not used | 0.000E+00 | --- | FRACA( 9) |
| R017 | Ring 10 | not used | 0.000E+00 | --- | FRACA(10) |
| R017 | Ring 11 | not used | 0.000E+00 | --- | FRACA(11) |
| R017 | Ring 12 | not used | 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) | not used | 5.400E+00 | --- | DIET(5) |
| R018 | Other seafood consumption (kg/yr) | not used | 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 | 1.000E+00 | 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 | not used | 5.000E-01 | --- | FR9 |
| R018 | Contamination fraction of plant food | -1 | -1 | 0.290E-01 | FPLANT |
| R018 | Contamination fraction of meat | -1 | -1 | 0.290E-02 | FMEAT |
| R018 | Contamination fraction of milk | -1 | -1 | 0.290E-02 | 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 |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| 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 | 1.000E+00 | 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) |
| 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) | 2.000E-05 | 2.000E-05 | --- | C12WTR |
| C14 | C-12 concentration in contaminated soil (g/g) | 3.000E-02 | 3.000E-02 | --- | C12CZ |
| C14 | Fraction of vegetation carbon from soil | 2.000E-02 | 2.000E-02 | --- | CSOIL |
| C14 | Fraction of vegetation carbon from air | 9.800E-01 | 9.800E-01 | --- | CAIR |
| C14 | C-14 evasion layer thickness in soil (m) | 3.000E-01 | 3.000E-01 | --- | DMC |
| C14 | C-14 evasion flux rate from soil (1/sec) | 7.000E-07 | 7.000E-07 | --- | EVSN |
| C14 | C-12 evasion flux rate from soil (1/sec) | 1.000E-10 | 1.000E-10 | --- | REVSN |
| C14 | Fraction of grain in beef cattle feed | 8.000E-01 | 8.000E-01 | --- | AVFG4 |
| C14 | Fraction of grain in milk cow feed | 2.000E-01 | 2.000E-01 | --- | AVFG5 |
| C14 | DCF correction factor for gaseous forms of C14 | 8.894E+01 | 8.894E+01 | --- | CO2F |
| 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) |
| R021 | Thickness of building foundation (m) | 1.500E-01 | 1.500E-01 | --- | FLOOR1 |
| R021 | Bulk density of building foundation (g/cm**3) | 2.400E+00 | 2.400E+00 | --- | DENSFL |
| R021 | Total porosity of the cover material | 4.000E-01 | 4.000E-01 | --- | TPCV |
| R021 | Total porosity of the building foundation | 1.000E-01 | 1.000E-01 | --- | TPFL |
| R021 | Volumetric water content of the cover material | 5.000E-02 | 5.000E-02 | --- | PH2OCV |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R021 | Volumetric water content of the foundation | 3.000E-02 | 3.000E-02 | --- | PH2OFL |
| R021 | Diffusion coefficient for radon gas (m/sec): | | | | |
| R021 | in cover material | 2.000E-06 | 2.000E-06 | --- | DIFCV |
| R021 | in foundation material | 3.000E-07 | 3.000E-07 | --- | DIFFL |
| R021 | in contaminated zone soil | 2.000E-06 | 2.000E-06 | --- | DIFCZ |
| R021 | Radon vertical dimension of mixing (m) | 2.000E+00 | 2.000E+00 | --- | HMIX |
| R021 | Average building air exchange rate (1/hr) | 5.000E-01 | 5.000E-01 | --- | REXG |
| R021 | Height of the building (room) (m) | 2.500E+00 | 2.500E+00 | --- | HRM |
| R021 | Building interior area factor | 0.000E+00 | 0.000E+00 | code computed (time dependent) | FAI |
| R021 | Building depth below ground surface (m) | -1.000E+00 | -1.000E+00 | code computed (time dependent) | DMFL |
| R021 | Emanating power of Rn-222 gas | 2.500E-01 | 2.500E-01 | --- | EMANA(1) |
| R021 | Emanating power of Rn-220 gas | not used | 1.500E-01 | --- | EMANA(2) |
| | | | | | |
| TITL | Number of graphical time points | 32 | --- | --- | NPTS |
| TITL | Maximum number of integration points for dose | 17 | --- | --- | LYMAX |
| TITL | Maximum number of integration points for risk | 1 | --- | --- | 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 | suppressed |
| 7 -- drinking water | active |
| 8 -- soil ingestion | active |
| 9 -- radon | active |
| Find peak pathway doses | active |

Contaminated Zone Dimensions

| | |
|---|---|
| Area: | 58.00 square meters |
| Thickness: | 2.00 meters |
| Cover Depth: | 4.60 meters |

Initial Soil Concentrations, pCi/g

| | |
|---|---|
| Ag-108m | 1.000E+00 |
| Am-241 | 1.000E+00 |
| C-14 | 1.000E+00 |
| Cm-243 | 1.000E+00 |
| Co-60 | 1.000E+00 |
| Cs-134 | 1.000E+00 |
| Cs-137 | 1.000E+00 |
| Eu-152 | 1.000E+00 |
| Eu-154 | 1.000E+00 |
| Eu-155 | 1.000E+00 |
| Fe-55 | 1.000E+00 |
| H-3 | 1.000E+00 |
| Nb-94 | 1.000E+00 |
| Ni-63 | 1.000E+00 |
| Pu-238 | 1.000E+00 |
| Pu-239 | 1.000E+00 |
| Pu-241 | 1.000E+00 |
| Sb-125 | 1.000E+00 |
| Sr-90 | 1.000E+00 |
| Tc-99 | 1.000E+00 |

0

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 1.000E+00 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): | 3.507E-16 | 5.251E-15 | 6.101E-14 | 1.595E-12 | 3.744E-11 | 1.167E-09 | 2.217E-08 | 3.593E-07 |
| M(t): | 3.507E-16 | 5.251E-15 | 6.101E-14 | 1.595E-12 | 3.744E-11 | 1.167E-09 | 2.217E-08 | 3.593E-07 |

0Maximum TDOSE(t): 3.593E-07 mrem/yr at t = 1.000E+03 years

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

| 0Parent (i) | Product (j) | Branch Fraction* | t= | DSR(j,t) (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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ag-108m | Ag-108m | 1.000E+00 | | 1.083E-40 | 1.077E-40 | 1.066E-40 | 1.026E-40 | 9.199E-41 | 6.280E-41 | 2.111E-41 | 4.652E-43 |
| 0Am-241 | Am-241 | 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 |
| Am-241 | Np-237 | 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 |
| Am-241 | U-233 | 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 |
| Am-241 | Th-229 | 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 |
| Am-241 | ãDSR(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 |
| 0C-14 | C-14 | 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 |
| 0Cm-243 | Cm-243 | 9.976E-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 |
| Cm-243 | Pu-239 | 9.976E-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 |
| Cm-243 | U-235 | 9.976E-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 |
| Cm-243 | Pa-231 | 9.976E-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 |
| Cm-243 | Ac-227 | 9.976E-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 |
| Cm-243 | ãDSR(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 |
| 0Cm-243 | Cm-243 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | Am-243 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | Pu-239 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | U-235 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | Pa-231 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | Ac-227 | 2.400E-03 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243 | ãDSR(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 |
| 0Co-60 | Co-60 | 1.000E+00 | | 1.592E-32 | 1.396E-32 | 1.073E-32 | 4.273E-33 | 3.080E-34 | 3.096E-38 | 0.000E+00 | 0.000E+00 |
| 0Cs-134 | Cs-134 | 1.000E+00 | | 4.310E-39 | 3.080E-39 | 1.572E-39 | 1.495E-40 | 1.794E-43 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 0Cs-137 | Cs-137 | 1.000E+00 | | 2.620E-40 | 2.560E-40 | 2.444E-40 | 2.080E-40 | 1.311E-40 | 2.605E-41 | 2.578E-43 | 0.000E+00 |
| 0Eu-152 | Eu-152 | 7.208E-01 | | 1.546E-35 | 1.467E-35 | 1.322E-35 | 9.191E-36 | 3.250E-36 | 8.548E-38 | 2.615E-42 | 0.000E+00 |
| 0Eu-152 | Eu-152 | 2.792E-01 | | 5.987E-36 | 5.684E-36 | 5.122E-36 | 3.560E-36 | 1.259E-36 | 3.311E-38 | 1.013E-42 | 0.000E+00 |
| Eu-152 | Gd-152 | 2.792E-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 |
| Eu-152 | ãDSR(j) | | | 5.987E-36 | 5.684E-36 | 5.122E-36 | 3.560E-36 | 1.259E-36 | 3.311E-38 | 1.013E-42 | 0.000E+00 |
| 0Eu-154 | Eu-154 | 1.000E+00 | | 1.572E-34 | 1.453E-34 | 1.241E-34 | 7.154E-35 | 1.481E-35 | 5.981E-38 | 8.408E-45 | 0.000E+00 |
| 0Eu-155 | Eu-155 | 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 |
| 0Fe-55 | Fe-55 | 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 |
| 0H-3 | H-3 | 1.000E+00 | | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.786E-33 |
| 0Nb-94 | Nb-94 | 1.000E+00 | | 3.585E-38 | 3.585E-38 | 3.585E-38 | 3.584E-38 | 3.583E-38 | 3.579E-38 | 3.567E-38 | 3.524E-38 |

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

| 0Parent (i) | Product (j) | Branch Fraction* | t= | DSR(j,t) (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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ni-63 | Ni-63 | 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 |
| 0Pu-238 | Pu-238 | 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 |
| Pu-238 | 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 |
| Pu-238 | 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 |
| Pu-238 | Ra-226 | 1.000E+00 | | 3.507E-16 | 5.251E-15 | 6.101E-14 | 1.595E-12 | 3.744E-11 | 1.167E-09 | 2.217E-08 | 3.593E-07 |
| Pu-238 | Pb-210 | 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 |
| Pu-238 | Po-210 | 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 |
| Pu-238 | äDSR(j) | | | 3.507E-16 | 5.251E-15 | 6.101E-14 | 1.595E-12 | 3.744E-11 | 1.167E-09 | 2.217E-08 | 3.593E-07 |
| 0Pu-239 | Pu-239 | 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 |
| Pu-239 | U-235 | 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 |
| Pu-239 | 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 |
| Pu-239 | Ac-227 | 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 |
| Pu-239 | äDSR(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 |
| 0Pu-241 | Pu-241 | 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 |
| Pu-241 | Am-241 | 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 |
| Pu-241 | Np-237 | 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 |
| Pu-241 | U-233 | 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 |
| Pu-241 | Th-229 | 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 |
| Pu-241 | äDSR(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 |
| 0Pu-241 | Pu-241 | 2.450E-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 |
| Pu-241 | Np-237 | 2.450E-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 |
| Pu-241 | U-233 | 2.450E-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 |
| Pu-241 | Th-229 | 2.450E-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 |
| Pu-241 | äDSR(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 |
| 0Sb-125 | Sb-125 | 7.720E-01 | | 1.037E-42 | 8.085E-43 | 4.905E-43 | 8.548E-44 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 0Sb-125 | Sb-125 | 2.280E-01 | | 3.069E-43 | 2.396E-43 | 1.457E-43 | 2.522E-44 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Sb-125 | Te-125m | 2.280E-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 |
| Sb-125 | äDSR(j) | | | 3.069E-43 | 2.396E-43 | 1.457E-43 | 2.522E-44 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| 0Sr-90 | Sr-90 | 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 |
| 0Tc-99 | Tc-99 | 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 |

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
The DSR includes contributions from associated (half-life 6 30 days) daughters.