DD-93-03
Revision 0

# VOLUMETRIC RELEASE CRITERIA TECHNICAL BASIS DOCUMENT

for

Battelle Columbus Laboratories
Decommissioning Project (BCLDP)

April, 1993

BATTELLE
505 King Avenue
Columbus, Ohio 43201

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REVISION RECORD INDICATING
LATEST DOCUMENT REVISION

Title Volumetric Release Criteria Technical Basis Document No. DD-93-03, Rev 0



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# APPROVAL PAGE

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# EXECUTIVE SUMMARY

Volumetric release criteria and associated procedures have been developed for the unrestricted release of materials and liquids by the Battelle Columbus Laboratories Decommissioning Project (BCLDP). Latest instrumentation technology and nuclear industry standards have been utilized to develop and apply these criteria and procedures. The BCLDP will release soils, bulk materials, and solid volumes at or below the concentration limits defined in Table 1 of this document, BCLDP Guidelines for Residual Radioactivity Concentrations for Soil and Solid Volumes. Water released as effluents to the environment will be released at or below the concentrations found in 10CFR20, Appendix B, Table 2, Column 2. Water released to sanitary sewage systems will satisfy 10CFR20, Appendix B, Table 3 and 10CFR20.303 requirements. Materials, equipment, and buildings are also released with consideration of surface contamination levels. Surface release criteria for the BCLDP are defined in a separate project document entitled, "Surface Release Criteria Technical Basis Document for the BCLDP (DD-93-02)." Bulk liquids such as oils, solvents, and hazardous wastes will be processed and disposed according to applicable regulations.

# VOLUMETRIC RELEASE CRITERIA TECHNICAL BASIS DOCUMENT FOR BCLDP

## Introduction

The Battelle Columbus Laboratories Decommissioning Project (BCLDP) is an extensive project to remediate 13 buildings and associated facilities such that they can be released for unrestricted use to the general public. As part of this effort, release criteria are being established to serve as requirements for remedial action. This document establishes the technical basis by which applicable volumetric release criteria for residual radioactivity have been selected to serve as the basis for performing the remedial action.

Volumetric residual radioactivity is the amount of radioactivity per unit mass or volume and is usually defined for solid and liquid media. General volumetric residual radioactivity release criteria and guidance are contained in many source documents governing BCLDP activities; (1) DOE Order 5400.5, (2) Nuclear Regulatory Commission (NRC) Guidance as presented in Attachment 1, and (3) 10 CFR 20 requirements. For the BCLDP, DOE Order 5400.5 requirements are applicable because the radioactive material being removed is the property of DOE and the DOE provides funding for the project. NRC requirements are also applicable for the BCLDP because Battelle is an NRC Licensee and the BCLDP is being conducted under an NRC decommissioning plan.

Volumetric Release Criteria (i.e., soil and liquid radioactivity concentrations) are ultimately determined by the maximum dose limit to a member of the public, commonly referred to as the Public Dose Limit (PDL). Given the same environmental pathways, transport parameters, isotopes, and source activities, as the acceptable dose limit is increased, so does the acceptable source term concentration (i.e., release criteria). Differences between DOE and NRC guidance concerning the PDL are described below. The PDL is expressed as mrem/year Effective Dose Equivalent (EDE) to the maximally exposed member of the general public. A PDL has been used for the derivation of concentrations of acceptable radioactive isotopes in air and water found in the regulations and is also used as the basis for site-specific release criteria for residual radioactivity in soil. Despite the importance of the PDL, a single value does not exist for all applications. For example:

- DOE specifies 100 mrem/year for use in developing site-specific guidelines for soil as well as for evaluating the external gamma radiation limit. In addition, DOE uses this same value to develop its derived concentration guide for air and water (DOE Order 5400.5, Chapter III).

- NRC specifies 100 mrem/year in 10 CFR 20; however, NRC further specifies 10 mrem/year for use in developing site-specific guidelines for release of licensed facilities for unrestricted use as seen in Attachment 1.

- NRC specifies 50 mrem/year for limiting radioactivity concentrations in effluent concentrations in Table 2, Appendix B, 10CFR20.

# Release Criteria

## Residual Radioactivity Concentrations for Soil

The BCLDP has completed a review of the guidance given in the source documents and has completed environmental pathway and dose analyses for residual soil radioactivity. Residual Radioactivity Concentration criteria for soil and solid volumes to be used by the BCLDP are shown in Table 1, "BCLDP Guidelines for Residual Radioactivity Concentrations for Soil and Solid Volumes". Criteria for residual radioactivity concentrations in soil are defined in a number of references. DOE Order 5400.5, Section IV.a.2 provides generic guidelines for residual concentrations of Ra-226, Ra-228, Th-230, and Th-232. NRC Guidance has been received by the BCLDP as shown in Attachment 1 which contains soil radioactivity concentration guidelines for Co-60, Sr-90, Cs-137, Ra-226, and Ra-228. Attachment 1 contains NRC guidance for soil radioactivity concentration guidelines for natural, enriched and depleted uranium. Table 1 is a compilation of the soil residual radioactivity concentration guidelines to be utilized by the BCLDP generated primarily from the various reference documents mentioned in the above sentences and from soil guidelines generated from computer pathway analyses.

Table 1. BCLDP Guidelines for Residual Radioactivity Concentrations for Soil and Solid Volumes

| Radionuclide | Predominant Pathway | King Avenue Concentration (pCi/g) | West Jefferson Concentration (pCi/g) |
|---|---|---|---|
| Natural Uranium | Dust | 10[1] | na[b] |
| Enriched Uranium | Dust | 30[1] | 30[1] |
| Depleted Uranium | Dust | 35[1] | 35[1] |
| Ac-227 | Dust | 19[c] | 19 |
| Am-241 | Dust | na | 270 |
| Am-243 | Dust | na | 140 |
| Ce-144 | Water | na | 2,100 |
| Cm-243 | Water | na | 0.79 |
| Cm-244 | Water | na | 1.0 |
| Co-60 | Direct | 8[2] | 8[2] |
| Cs-134 | Direct | na | 33 |
| Cs-137 | Direct | 15[2] | 15[2] |
| C-14 | Water | 940 | 940 |
| Eu-152 | Water | na | 390 |
| Eu-154 | Water | na | 260 |

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# APPROVAL FORM PROCEDURE CHANGE

Requester DENNIS P. CLUM -
(Print name & title)

Procedure No. DD-93-03 Rev. No. 0

*This is an approved procedure change by one of the following methods:*

☒ Field Change Effective till Next Revision

☐ Waiver Effective till _____

**Approvals:**

J. F. Poliani — 1.30.97
*Section Manager* — *Date*

Cray Jensen for STL — 1-30-97
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*Quality Manager* — *Date*

# Release Criteria

## Residual Radioactivity Concentrations for Soil

The BCLDP has completed a review of the guidance given in the source documents and has completed environmental pathway and dose analyses for residual soil radioactivity. Residual Radioactivity Concentration criteria for soil and solid volumes to be used by the BCLDP are shown in Table 1, "BCLDP Guidelines for Residual Radioactivity Concentrations for Soil and Solid Volumes". Criteria for residual radioactivity concentrations in soil are defined in a number of references. DOE Order 5400.5, Section IV.a.2 provides generic guidelines for residual concentrations of Ra-226, Ra-228, Th-230, and Th-232. NRC Guidance has been received by the BCLDP as shown in Attachment 1 which contains soil radioactivity concentration guidelines for Co-60, Sr-90, Cs-137, Ra-226, and Ra-228. Attachment 1 contains NRC guidance for soil radioactivity concentration guidelines for natural, enriched and depleted uranium. Table 1 is a compilation of the soil residual radioactivity concentration guidelines to be utilized by the BCLDP generated primarily from the various reference documents mentioned in the above sentences and from soil guidelines generated from computer pathway analyses.

Table 1. BCLDP Guidelines for Residual Radioactivity Concentrations for Soil and Solid Volumes

| Radionuclide | Predominant Pathway | King Avenue Concentration (pCi/g) | West Jefferson Concentration (pCi/g) |
|---|---|---|---|
| Natural Uranium | Dust | 10[1] | na[b] |
| Enriched Uranium | Dust | 30[1] | 30[1] |
| Depleted Uranium | Dust | 35[1] | 35[1] |
| Ac-227 | Dust | 19[c] | 19 |
| Am-241 | Dust | na | ~~270~~ 30[4] |
| Am-243 | Dust | na | ~~140~~ 30[4] |
| Ce-144 | Water | na | 2,100 |
| Cm-243 | Water | na | 0.79 |
| Cm-244 | Water | na | 1.0 |
| Co-60 | Direct | 8[2] | 8[2] |
| Cs-134 | Direct | na | 33 |
| Cs-137 | Direct | 15[2] | 15[2] |
| C-14 | Water | 940 | 940 |
| Eu-152 | Water | na | 390 |
| Eu-154 | Water | na | 260 |

Field Change

# FIELD CHANGE



| Radionuclide | Predominant Pathway | King Avenue Concentration (pCi/g) | West Jefferson Concentration (pCi/g) |
|---|---|---|---|
| Eu-155 | Water | na | 1,900 |
| Fe-55 | Dust | na | 2.7E+07 |
| H-3 | Water | 41,000 | 38,000 |
| I-129 | Water | na | 13 |
| Mn-54 | Direct | na | 61 |
| Ni-59 | Plant | na | 1.3E+07 |
| Ni-63 | Plant | na | 4.9E+06 |
| Np-237 | Water | na | 0.58 |
| Pa-231 | Water | 18 | 18 |
| Pb-210 | Dust | 140 | na |
| Pu-238 | Dust | na | ~~320~~ 25 (4) |
| Pu-239 | Dust | na | ~~290~~ 25 (4) |
| Pu-240 | Dust | na | ~~290~~ 25 (4) |
| Pu-241 | Dust | na | ~~13,000~~ 25 (4) |
| Pu-242 | Dust | na | ~~310~~ 25 (4) |
| Ra-226 | Direct | 5(2,3) | na |
| Ra-228 | Direct | 5(2,3) | na |
| Ru-106 | Water | na | 180 |
| Sb-125 | Water | na | 1,100 |
| Sm-151 | Dust | na | 6,700 |
| Sr-90 | Plant | 5(2) | 5(2) |
| Th-228 | Direct | 29 | na |
| Th-230 | Dust | 5(3) | na |
| Th-232 | Dust | 5(3) | na |

Field Change

Table 1 Notes and References

Notes:

a. Activity concentrations above natural background concentrations. Where more than one radionuclide is present, the sum of the ratios of the individual radionuclide concentrations to their respective concentration limits shall not exceed 1.

b. Indicates that this radionuclide is not expected to be found at the indicated site.

| Radionuclide | Predominant Pathway | King Avenue Concentration (pCi/g) | West Jefferson Concentration (pCi/g) |
|---|---|---|---|
| Eu-155 | Water | na | 1,900 |
| Fe-55 | Dust | na | 2.7E+07 |
| H-3 | Water | 41,000 | 38,000 |
| I-129 | Water | na | 13 |
| Mn-54 | Direct | na | 61 |
| Ni-59 | Plant | na | 1.3E+07 |
| Ni-63 | Plant | na | 4.9E+06 |
| Np-237 | Water | na | 0.58 |
| Pa-231 | Water | 18 | 18 |
| Pb-210 | Dust | 140 | na |
| Pu-238 | Dust | na | 320 |
| Pu-239 | Dust | na | 290 |
| Pu-240 | Dust | na | 290 |
| Pu-241 | Dust | na | 13,000 |
| Pu-242 | Dust | na | 310 |
| Ra-226 | Direct | 5[2,3] | na |
| Ra-228 | Direct | 5[2,3] | na |
| Ru-106 | Water | na | 180 |
| Sb-125 | Water | na | 1,100 |
| Sm-151 | Dust | na | 6,700 |
| Sr-90 | Plant | 5[2] | 5[2] |
| Th-228 | Direct | 29 | na |
| Th-230 | Dust | 5[3] | na |
| Th-232 | Dust | 5[3] | na |

**Table 1 Notes and References**

Notes:

a. Activity concentrations above natural background concentrations. Where more than one radionuclide is present, the sum of the ratios of the individual radionuclide concentrations to their respective concentration limits shall not exceed 1.

b. Indicates that this radionuclide is not expected to be found at the indicated site.

c. Concentrations for which no specific reference is cited have been derived from RESRAD calculations.

References:

1. Options 1 and 2 of the Branch Technical Position, "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations" (46 FR 52061, October 23, 1981).

2. NRC Memorandum, "Acceptable Cleanup Criteria and Practices for Decontamination and Decommissioning (License No. SNM-7)" dated April 17, 1992, to Harley L. Toy, License Coordinator and Manager, Nuclear Sciences, Battelle Memorial Institute from J.W.N. Hickey, Chief, Fuel Cycle Safety Branch, Division of Industrial and Medical Nuclear Safety, Office of Nuclear Material Safety and Safeguards.

3. DOE Order 5400.5, "Radiation Protection of the Public and the Environment".

The criteria in Table 1 are the maximum allowable concentrations of radioactive material above background levels that may be left in soil and solid volumes that are released to the general public for unrestricted use. The term "Unconditional Free Release" is a generally accepted term in industry that is used synonymously with this unrestricted use. It is the policy of the BCLDP to aggressively apply the principles of As Low As Reasonably Achievable (ALARA) to releases as discussed in the section entitled "Radiological Release Logic for the BCLDP" on Page 11 of this document. The release criteria stated in Table 1 shall be applied as an upper limit of radioactive volume contamination for free release of soil and solid volumes by BCLDP. Table 1 includes all isotopes and their predominant exposure pathways which are expected to be encountered by the BCLDP at each remediation site. If additional isotopes are encountered, an isotopic release criteria which meets DOE and NRC regulations will be determined and documented prior to performing remedial actions.

DOE Order 5400.5 requires an environmental pathway analysis code to be utilized for determining applicable activity concentrations for isotopes when numerical concentration values are not defined by the order (i.e., required for nuclides other than Th-232, Th-230, Ra-228, and Ra-226). RESRAD is an acronym for the DOE's Residual Radioactivity Materials computer program and this program has environmental pathway modeling and dose assessment capabilities. Input parameters, such as an acceptable public dose limit and local hydrogeologic parameters, must be supplied to the code. The code then derives associated soil radioactivity concentrations for a number of environmental pathways (e.g., direct exposure, ground water transport, farming). The activity concentrations generated by RESRAD are based on a 100 mrem/yr effective dose equivalent (EDE) limit to a member of the public and are also computed using local hydrology and soil parameters. The concentrations are also derived based on the most conservative pathway analysis used in the RESRAD code. Attachment 2 contains the complete output report generated by the RESRAD code for the assessment of the BCLDP isotopes. The report includes all input data and parameters used to run the code.

The radionuclides anticipated from historical evidence and observed in various sample analyses vary significantly between the King Avenue and West Jefferson sites. To accommodate the variety of mixtures that will be encountered in remediation activities, RESRAD calculations have been performed to obtain soil guidelines. The guidelines are maximum concentrations for the individual

c. Concentrations for which no specific reference is cited have been derived from RESRAD calculations.

References:

1. Options 1 and 2 of the Branch Technical Position, "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations" (46 FR 52061, October 23, 1981).

2. NRC Memorandum, "Acceptable Cleanup Criteria and Practices for Decontamination and Decommissioning (License No. SNM-7)" dated April 17, 1992, to Harley L. Toy, License Coordinator and Manager, Nuclear Sciences, Battelle Memorial Institute from J.W.N. Hickey, Chief, Fuel Cycle Safety Branch, Division of Industrial and Medical Nuclear Safety, Office of Nuclear Material Safety and Safeguards.

3. DOE Order 5400.5, "Radiation Protection of the Public and the Environment".

4. NRC Policy and Guidance Directive FC 83-23: Termination of Byproduct, Source, and Special Nuclear Material Licenses.

Field Change

FIELD CHANGE

The criteria in Table 1 are the maximum allowable concentrations of radioactive material above background levels that may be left in soil and solid volumes that are released to the general public for unrestricted use. The term "Unconditional Free Release" is a generally accepted term in industry that is used synonymously with this unrestricted use. It is the policy of the BCLDP to aggressively apply the principles of As Low As Reasonably Achievable (ALARA) to releases as discussed in the section entitled "Radiological Release Logic for the BCLDP" on Page 11 of this document. The release criteria stated in Table 1 shall be applied as an upper limit of radioactive volume contamination for free release of soil and solid volumes by BCLDP. Table 1 includes all isotopes and their predominant exposure pathways which are expected to be encountered by the BCLDP at each remediation site. If additional isotopes are encountered, an isotopic release criteria which meets DOE and NRC regulations will be determined and documented prior to performing remedial actions.

DOE Order 5400.5 requires an environmental pathway analysis code to be utilized for determining applicable activity concentrations for isotopes when numerical concentration values are not defined by the order (i.e., required for nuclides other than Th-232, Th-230, Ra-228, and Ra-226). RESRAD is an acronym for the DOE's Residual Radioactivity Materials computer program and this program has environmental pathway modeling and dose assessment capabilities. Input parameters, such as an acceptable public dose limit and local hydrogeologic parameters, must be supplied to the code. The code then derives associated soil radioactivity concentrations for a number of environmental pathways (e.g., direct exposure, ground water transport, farming). The activity concentrations generated by RESRAD are based on a 100 mrem/yr effective dose equivalent (EDE) limit to a member of the public and are also computed using local hydrology and soil parameters. The concentrations are also derived based on the most conservative pathway analysis used in the RESRAD code. Attachment 2 contains the complete output report generated by the RESRAD code for the assessment of the BCLDP isotopes. The report includes all input data and parameters used to run the code.

The radionuclides anticipated from historical evidence and observed in various sample analyses vary significantly between the King Avenue and West Jefferson sites. To accommodate the variety of mixtures that will be encountered in remediation activities, RESRAD calculations have been performed to obtain soil guidelines. The guidelines are maximum concentrations for the individual

radionuclides that may be present. These individual guidelines can be utilized to obtain guidelines for any mixture if the amount of any isotope present is ratioed to its limit as a fraction and the summation of the individual isotope fractions are less than unity (i.e., 1). The mixture sum is stated as the condition:

$$\Sigma\ C_i/SG_i \leq 1$$

where

$C_i$ = concentration of the $i^{th}$ radionuclide (pCi/g), and
$SG_i$ = soil guideline of the $i^{th}$ radionuclide (pCi/g).

The RESRAD radionuclide library contains principal radionuclides and associated radionuclides. Associated radionuclides are decay products with half-lives less than six months and are assumed to be in equilibrium with their principal radionuclide. The associated radionuclides are accounted for in dose and soil guideline calculations by their inclusion in the dose conversion factors of their respective principal radionuclides, i.e., they are not contained explicitly in the library. The principal and associated radionuclides of the uranium and thorium series are given in Table 2.

King Avenue Radionuclides. The radionuclides found at the King Avenue site and their individual RESRAD-derived soil guidelines are listed in Table 3. The individual soil guidelines in Table 3 are the more restrictive values calculated for residual material deposited at the surface at a depth of 5 meters. The soil guidelines in Table 3 are based on a water table depth of 45 feet, which was obtained from the driller's log for a well in the vicinity of Building 15. Direct exposure and dust inhalation pathways dominate exposure pathways, so RESRAD default soil parameters were used. The entries in Table 3 are sufficient to determine soil guidelines for thorium and the types of uranium handled at King Avenue: natural, depleted, and enriched (un-irradiated). Other radionuclides can also be included in mixture sums. Soil guidelines derived in this way for various uranium forms and natural thorium are given in Table 4. Two properties of enriched and depleted uranium should be noted with respect to these soil guidelines:

1. Uranium is stripped of its decay products in both the conversion to uranium hexa-fluoride – the feed material for the enrichment process and the production of metal and oxides – and in the enrichment process itself. The one exception is U-234, which is assumed to be in equilibrium with U-238 and to be enriched and depleted in the same proportion as U-235.

2. The longest possible time for decay product in-growth is about 50 years, since enriched and depleted uranium did not exist in significant quantities prior to that time. This effectively limits RESRAD principal decay products to U-234 for U-238 and Pa-231 (about 0.1% of the parent activity) for U-235.

Table 2. Principal and Associated Radionuclides of the Uranium and Thorium Series in the RESRAD Library.

| Principal Radionuclide | Associated Radionuclides |
|---|---|
| Uranium-238 | Thorium-234 |
| | Protactinium-234 |
| Uranium-234 | |
| Thorium-230 | |
| Radium-226 | Lead-214 |
| | Bismuth-214 |
| | Polonium-214 |
| | Lead-210 |
| | Bismuth-210 |
| | Polonium-210 |
| Thorium-232 | |
| Radium-228 | Actinium-228 |
| Thorium-228 | Radium-224 |
| | Radon-220 |
| | Polonium-216 |
| | Lead-212 |
| | Bismuth-212 |
| | Polonium-212 |
| | Thallium-208 |
| Uranium-235 | Thorium-231 |
| Protactinium-231 | |
| Actinium-227 | Thorium-227 |
| | Radium-223 |
| | Radon-219 |
| | Polonium-215 |
| | Lead-211 |
| | Bismuth-211 |
| | Thallium-207 |

Table 3. RESRAD Derived Maximum Individual Nuclide Soil Guidelines (SG) for King Avenue

| Nuclide | Year[a] | Cover Depth[b], m | SG, pCi/g |
|---|---|---|---|
| Ac-227 | 0 | 0 | 19 |
| C-14 | 4 | 0 | 940 |
| Co-60 | 0 | 0 | 16 |
| Cs-137 | 0 | 0 | 68 |
| H-3 | 4 | 5 | 41,000 |
| Pa-231 | 739 | 0 | 18 |
| Pb-210 | 0 | 0 | 140 |
| Ra-226 | 0 | 0 | 24 |
| Ra-228 | 3 | 0 | 31 |
| Sr-90 | 0 | 0 | 2,400 |
| Th-228 | 0 | 0 | 29 |
| Th-230 | 11 | 0 | 470 |
| Th-232 | 25 | 0 | 19 |
| U-234 | 0 | 0 | 1,200 |
| U-235 | 0 | 0 | 270 |
| U-238 | 0 | 0 | 860 |

a. Year of maximum dose calculated by RESRAD.
b. Depth of a 100 $m^2$ by 15 cm contaminated zone.

The soil guidelines given in Table 4 for natural uranium and thorium assume all decay products are in equilibrium.

Table 4. RESRAD Determined Soil Guidelines (SG) for Uranium and Thorium Derived From Individual Nuclide Mixture Sums for King Avenue

| Nuclide Mixture | SG, pCi/g |
|---|---|
| Natural Uranium | 17[a] |
| Enriched Uranium, 3% | 180[b] |
| Enriched Uranium, 93% | 46[c] |
| Depleted Uranium | 600[d] |
| Natural Thorium | 8.4[e] |

a. Activity concentration of U-238. Assumes short- and long-lived daughters of U-238 and U-235 are in equilibrium.

b. Activity concentration of U-238. Assumes short-lived daughters of U-238 and U-235 are in equilibrium and U-234 is enriched by the same factor as U-235.

c. Activity concentration of U-235. Assumes short-lived daughters of U-238 and U-235 are in equilibrium and U-234 is enriched by the same factor as U-235.

d. Activity concentration of U-238. Assumes short-lived daughters of U-238 and U-235 are in equilibrium, and U-234 and U-235 are depleted to 50% of their proportions in natural uranium.

e. Activity concentration of Th-232. Assumes short- and long-lived daughters of Th-232 are in equilibrium.

West Jefferson Radionuclides. The radionuclides that might be found at the West Jefferson site are given in Table 5. Unlike the King Avenue site where several distinct forms of uranium have been used, irradiated enriched uranium is the principal form used at West Jefferson. Since a wide variety of mixtures of spent fuel, fission products, and neutron activation products are possible, the specification of generic soil guidelines is not feasible. Rather, it will be necessary to calculate mixture sums based on the results of analyses and individual soil guidelines to determine guidelines for specific situations.

Deposition coefficients based on laboratory measurements were used for americium and plutonium nuclides; RESRAD default values were used for other nuclides. A water table depth of 25 feet was used for the RESRAD calculations; this depth was obtained from driller's logs for four test boreholes drilled prior to the construction of the JN-1 storage pool. The soil guidelines given in Table 5 are the more restrictive of values calculated for residual material for surface deposition at a depth of 5 meters.

## External Gamma Radiation from Ground Surfaces

DOE Order 5400.5, Section IV-4.c and EPA Regulation 40 CFR 192 state that surface gamma radiation levels from ground surfaces shall not exceed 20 $\mu$R/h. However, NRC Guidance received by the BCLDP in Attachment 1 states gamma exposure rates at 1 meter above the ground surface shall not exceed 5 $\mu$R/h above background. This more restrictive level was derived by the NRC to keep remediated areas with full time occupancy (2000 hrs/yr) to exposures of less than or equal to 10 mrem per year.

This more restrictive criteria of 5 $\mu$R/hr at 1 meter above the ground will be utilized by the BCLDP as an additional criteria for free release of material volumes for the release of ground, building, and materials.

Table 5. RESRAD Derived Maximum Individual Nuclide Soil Guidelines (SG) for West Jefferson

| Nuclide | Year[a] | Cover Depth[b], m | SG, pCi/g |
|---|---|---|---|
| Ac-227 | 0 | 0 | 19 |
| Am-241 | 0 | 0 | 270 |
| Am-243 | 0 | 0 | 140 |
| Ce-144 | 0 | 0 | 2,100 |
| Cm-243 | 1 | 5 | 0.79 |
| Cm-244 | 1 | 5 | 1.0 |
| Co-60 | 0 | 0 | 16 |
| Cs-134 | 0 | 0 | 33 |
| Cs-137 | 0 | 0 | 68 |
| C-14 | 2 | 0 | 940 |
| Eu-152 | 1 | 5 | 390 |
| Eu-154 | 1 | 5 | 260 |
| Eu-155 | 1 | 5 | 1,900 |
| Fe-55 | 0 | 0 | 2.7e+07 |
| H-3 | 1 | 5 | 38,000 |
| I-129 | 4 | 0 | 13 |
| Mn-54 | 0 | 0 | 61 |
| Ni-59 | 0 | 0 | 1.3e+07 |
| Ni-63 | 0 | 0 | 4.9e+06 |
| Np-237 | 2 | 0 | 0.58 |
| Pa-231 | 411 | 0 | 18 |
| Pu-238 | 0 | 0 | 320 |
| Pu-239 | 0 | 0 | 290 |
| Pu-240 | 0 | 0 | 290 |
| Pu-241 | 11 | 0 | 13,000 |
| Pu-242 | 0 | 0 | 310 |
| Ru-106 | 1 | 5 | 180 |
| Sb-125 | 1 | 5 | 1,100 |
| Sm-151 | 2 | 0 | 6,700 |
| Sr-90 | 0 | 0 | 2,400 |
| U-233 | 0 | 0 | 1,200 |
| U-234 | 0 | 0 | 1,200 |
| U-235 | 0 | 0 | 270 |
| U-236 | 0 | 0 | 1,300 |
| U-238 | 0 | 0 | 860 |

a. Year of maximum dose calculated by RESRAD.
b. Depth of a 100 $m^2$ by 15 cm contaminated zone.

## Solid Material Volumes

Soil criteria will be considered applicable for any solid material volumes that are being considered for unconditional release by the BCLDP. This is considered to be a conservative approach since most solid materials containing residual radioactivity such as concrete rubble or building debris will not have the potential uses similar to those of soil (e.g., farming, top soil) and therefore are unlikely to enter human ingestion pathways.

## Radioactivity Concentrations for Water and Bulk Liquid Releases

DOE Order 5400.5, Chapter 3 provides derived concentration guides for water releases based on a public effective dose equivalent limit of 100 mrem/year. NRC guidance in the revised 10 CFR 20 also establishes a public dose limit of 100 mrem/yr. However, effluent concentrations for water listed in 10CFR20, Appendix B, Table 2 are designed to a public effective dose limit of 50 mrem/yr. As a result, water concentration values in 10CFR20, Appendix B, Table 2 are approximately 50% of the concentration values listed in DOE Order 5400.5, Chapter 3, "Derived Concentration Guides for Water." Water releases will generally be to storm or sanitary sewer systems. Direct releases to drinking water supplies such as injection to ground water or directly to other drinking water sources are not planned by the BCLDP.

Examples of the difference in water concentration values for U-238 and Th-232 are demonstrated below:

| Nuclide | 10 CFR 20 Appendix B, Table 2 ($\mu$Ci/ml) | DOE Order 5400.5 Chapter 3 ($\mu$Ci/ml) |
|---|---|---|
| U-238 | 3E-7 | 6E-7 |
| Th-232 | 3E-8 | 5E-8 |

Due to its NRC license, the BCLDP will comply with the more stringent water concentration guides of 10CFR20, Appendix B, Table 2 for water released as effluents to the environment. An exception will be for water released to sanitary sewers where the guidance of 10CFR20, Appendix B, Table 3 will apply and the guidance of 10CFR20.303 must be satisfied. In situations where more than one radionuclide is present, the sum of the ratios of the individual radionuclide concentrations to their respective concentration limits shall not exceed one. Bulk liquids other than water with detectable radioactivity above background levels of the material will be managed appropriately by the BCLDP's Waste Management Group. Attachment 4 of this document is a table which shows the release criteria for water, soil, and solids for each isotope expected to be encountered by the BCLDP.

## Radiological Release Logic for the BCLDP

Consistent with the requirements of DOE Order 5400.5, Section II.5, "Release of Property Having Residual Radioactive Material," and the DOE Radiological Control Manual, Section 422, "Release to Uncontrolled Areas," materials having activity concentrations in excess of applicable limits (Table 1 of this document and 10 CFR 20, Appendix B, Table 2) shall require decontamination and/or removal and disposal as radioactive waste. Materials that do not have detectable contamination (i.e., above the LLD) shall be released without any further assessment or evaluation. As required by DOE Order 5400.5, Section II.2.b, "ALARA Evaluations," formal ALARA evaluations and cost benefit analyses shall be performed as part of Decontamination and Decommissioning Plans for facilities, buildings, and large volumes of associated equipment and materials with residual radioactivity above the LLD but below the limits presented.

As dictated in DOE Order 5400.5, Section II.5.c.1-4, "Release of Materials and Equipment," individual items not addressed by specific Decontamination & Decommissioning plans with residual radioactivity above the LLD but below applicable limits will also be subjected to an ALARA process and assessed for potential decontamination activities prior to release by the BCLDP. This ALARA process consists of a field assessment by a trained evaluator (usually a Health Physics Supervisor) prior to releasing any materials with detectable contamination below the limit. In addition, all volumetric releases, solid or liquid, will be conducted using a permit approved by the Environment, Safety and Health Manager. BCLDP Procedures HP-OP-011, "Release of Materials from Radiologically Controlled Areas" and HP-OP-106, "Volumetric Releases and Permitting Requirements" further define and establish requirements for the uncontrolled release of materials and equipment from radiological areas. Figure 1 contains a flow chart which graphically depicts the release logic utilized by the BCLDP.

In summary, it is the practice of the BCLDP that all releases of materials and bulk liquids will meet or be below the limits and criteria found in Table 1 of this document and 10 CFR 20, Appendix B, Table 2. In addition, for materials with residual radioactivity below those in Table 1 but above the LLD of radiation detection equipment, it is the practice of the BCLDP to use sound ALARA principles and analyses to determine what, if any, decontamination actions are warranted prior to release. It should be made clear this does not mean that all materials will be released at or near the LLD since there may not be a reasonable ALARA basis to do so.

## Natural and Electronic Background

The application of release criteria standards cannot be successfully applied without the understanding of background. Two types of background exist: natural and electronic. Natural and electronic background significantly impact the release criteria by the following:

- Natural background, by providing a quantity of radioactive material which is available to be detected.

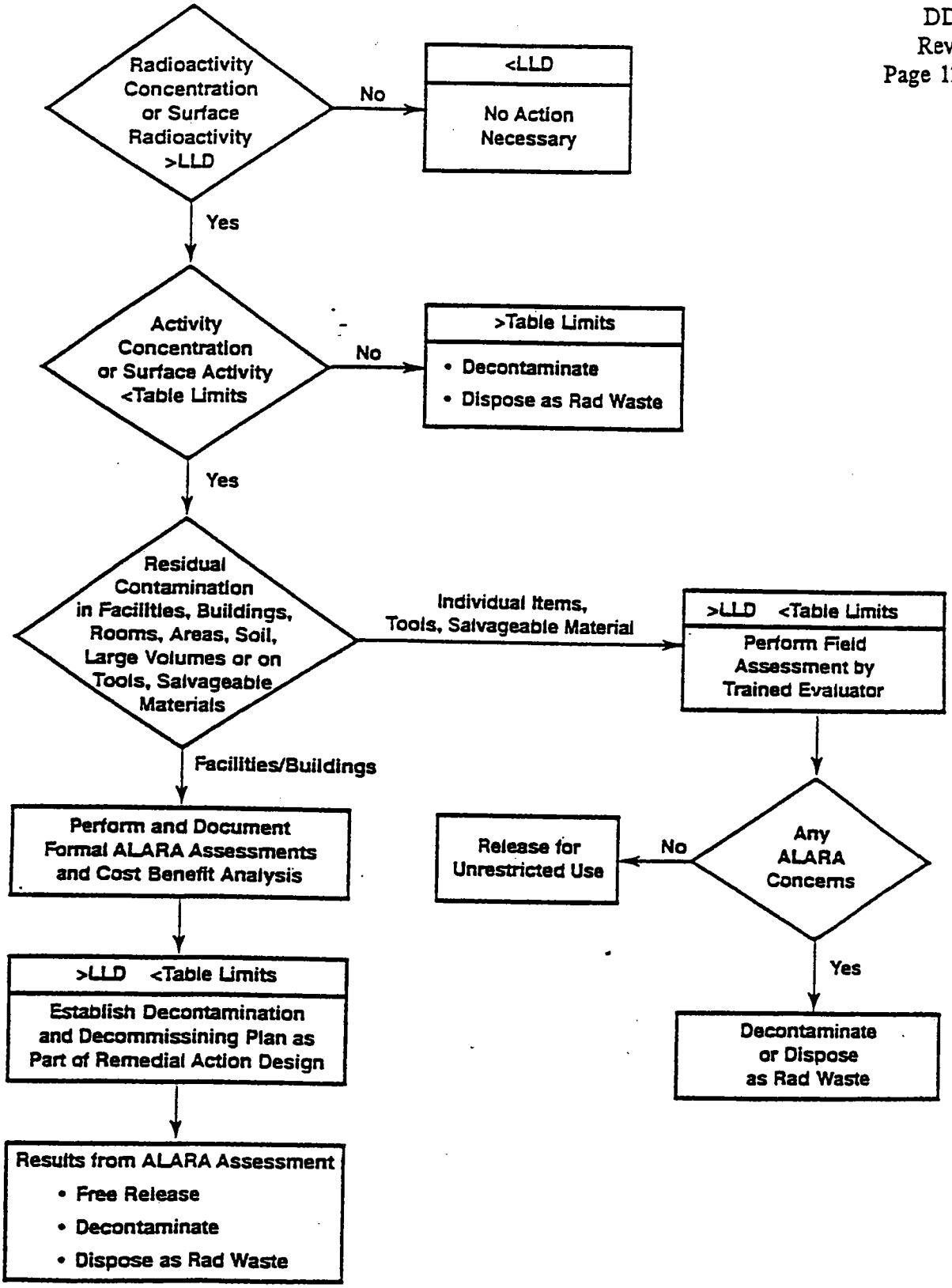


Figure 1. Radiological Release Logic for the BCLDP

- Electronic background, by influencing the least amount of radioactivity that can be measured by a particular instrument.

It is necessary to distinguish the difference of the two types of background. Obviously, the term background could apply to either. The following are the terms as accepted by industry practice.

Generic term - natural background, the amount of radioactive material that exists in a substance, surface, or material as a result of nature. The quantity of natural background is generally expressed in terms of picocuries/gram (pCi/g), femtocuries/liter ($10^{-15}$ Ci/l), milligrams/milliliter (mg/ml), disintegrations per minute (dpm), or other suitable combinations of activity or quantity per unit mass or area. Cosmic radiation is also considered a part of natural background. Natural background is detectable and must be accounted for when making activity determinations. For example, field beta/gamma type instruments might have background that ranges from 100 to 500 counts/minute. For a laboratory type alpha scintillation counter, the background might be 1 count per 2 minutes of counting time.

Generic term - electronic background, the amount of electronic signal produced by electronic noise which results in a meter or scaler deflection. Instrument background is generally expressed in counts per minute (cpm), picocuries/gram (pCi/g), milligrams/liter (mg/l), or other suitable units. Electronic background (background) is determined by measuring the signal output for a particular instrument when subjected to an area or matrix that contains no radioactive material.

## Determining Background

Accurately determining both types of background must be accomplished before applying release criteria. Two industry accepted practices exist for determining natural background in materials. The first method is to accurately measure the naturally-occurring radioactivity in materials with the appropriate analytical instrument. This is accomplished by collecting a clean sample of similar material from an uncontaminated source. An example of this type of natural background determination is to measure the radioactivity in a piece of lumber from the hardware store or a quart of motor oil from Wal-Mart®. The expected results for such an analysis would be 1 to 2 pCi/g in wood for natural uranium and less than 0.1 pCi/l for mixed fission products in oil. This same process can also be applied to chemical contaminates in various matrices.

The other type of material background analysis is a statistical procedure called Chavenet's Determination. This process requires making a large number of radiation measurements in a defined area and then casting out the larger or smaller measured results which do not fit the criteria. The average of the remaining results is considered to be background for the defined population.

Both of these techniques are applied for determination of natural background for the BCLDP.

## Instrumentation and Application

Release surveys will be performed using suitable instrumentation and industry standards. It should be noted that the upper end of the release criteria defined in the applicable regulatory standards and being applied to the BCLDP were developed in part based on the detection limitations of the field instruments available at the time the standards were published. The BCLDP will utilize field instruments, laboratory techniques, and survey techniques capable of achieving detection limits at or below the upper bounds of the release criteria stated in Table 1. Current BCLDP laboratory analyses techniques and instrumentation have detection limits lower than the concentration guidelines for the most restrictive nuclides shown in Table 1. However, the BCLDP will not continue to upgrade with state-of-the-art detection systems simply to drive the lower limit of detection (LLD) continually lower. Materials with detectable radioactive contamination levels greater than the LLD but less than the concentrations stated release criteria will be evaluated based upon ALARA analyses for decontamination, disposal, or free release. Materials greater than the release criteria will be decontaminated or disposed of as of radioactive waste.

## Lower Limits of Detection

The lower limit of detection (LLD) as used in this technical basis document is the smallest amount of sample activity that will yield a net count for which there is a 95% confidence level that the activity is, in fact, present. The LLD is an *a priori* (before the fact) estimate of the capabilities of a given detection system. The LLD does not depend on the sample activity but rather on the detection capability of the detection process itself (i.e., detection efficiency and background count rate).

The formula for LLD is given below:

$$LLD = \frac{3 + 4.65(S_b)}{Eff\ (T)}$$ [See Equation 6, Attachment 3]

where

$S_b$ = standard deviation of background or blank counts ($C_b$) for a counting time, defined as $\sqrt{C_b}$

T = counting time for samples, background or blanks; in units of minutes (m). All counting times are set equal.

Eff = counting efficiency in units of c/d; the number of counts (detections) per the number of disintegrations from a calibration source.

An excerpt from Brodsky's and Gallaghar's Paper, "Statistical Considerations in Practical Contamination Monitoring" published in Radiation Protection Management, Volume 8, No. 4 is found in Attachment 3. The paper discusses the derivation of the LLD formula and discusses Type I $\alpha$ (false detection) and Type II $\beta$ (false non-detection) errors. For radioactivity measurements performed by BCLDP, the LLD, as defined above, establishes a 5% chance of incorrectly detecting activity when it is absent and a 95% confidence that activity will be detected when it is present.

## Instrument Calibration

Field instruments and laboratory instruments shall be calibrated in accordance with ANSI N323, "Radiation Protection Instrumentation Test and Calibration". Instrument calibrations will be in accordance with formal procedures including reference checks and documented maintenance programs.

## Quality

Instrument calibrations shall be performed with National Institute of Standards and Testing (NIST) traceable standards. Reference checks shall be performed in accordance with formal BCLDP procedures. Final release of buildings and grounds shall be verified by an Independent Verification Contractor (IVC).

Release surveys will be performed or directed by technicians whose qualifications meet ANSI/ANS 3.1, "Selection, Qualification, and Training of Personnel for Nuclear Power Plants" and DOE Order 5480.11, "Radiation Protection for Occupational Workers". Routine oversight of the release program will be performed by a department of the BCLDP other than that of those performing the release surveys.

# Attachments

to

# VOLUMETRIC RELEASE CRITERIA TECHNICAL BASIS DOCUMENT

for

**Battelle Columbus Laboratories**
**Decommissioning Project (BCLDP)**

**April, 1993**

**BATTELLE**
**505 King Avenue**
**Columbus, Ohio 43201**

# Attachment 1

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

April 17, 1992

RECEIVED

APR 23 1992

HARLEY TOY

Docket No. 70-8

Mr. Harley L. Toy
License Coordinator and
Manager, Nuclear Services
Battelle Memorial Institute
505 King Avenue
Columbus, Ohio 43201-2693

Dear Mr. Toy:

RE: CURRENT NRC GUIDANCE, ACCEPTABLE CLEANUP CRITERIA AND PRACTICES FOR DECONTAMINATION AND DECOMMISSIONING (LICENSE NO. SNM-7)

On January 24, 1992, we met with you at Nuclear Regulatory Commission Headquarters to discuss Battelle Memorial Institute's (BMI) draft revision of Certification of Financial Assurance for decontamination and decommissioning (D&D). During this meeting we also described to you the current NRC guidance, acceptable cleanup criteria and practices for D&D of the BMI facilities and the need for BMI to agree in writing to the current NRC cleanup criteria listed below.

Pending codification of radiological criteria for decommissioning, the NRC will continue to use existing guidance, criteria and practices listed below to determine whether sites have been sufficiently decontaminated so that they may be released for unrestricted use, pursuant to the decommissioning rules in 10 CFR 30.36, 40.42, 50.82, 70.38, and 72.54. These cleanup criteria will be applied on a site-specific basis with emphasis, when necessary, to ensure that residual contamination levels are As Low As Is Reasonably Achievable (ALARA).

1. Options 1 and 2 of the Branch Technical Position "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations" (46 FR 52061, October 23, 1981).

2. "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," Policy and Guidance Directive FC 83-23, Division of Industrial and Medical Nuclear Safety, August 1987.

3. "Termination of Operating Licenses for Nuclear Reactors," Regulatory Guide 1.86, June 1974, Table 1, for surface contamination of reactor facility structures. Also Cobalt-60, Cesium-137, and Europium-152 that may exist in concrete, components, structures, and soil should be removed such that the exposure rate is less than 5 microroentgen per hour above natural background at 1 meter, with an overall dose objective of 10 millirem per year (cf. Letter to Stanford University from James R. Miller, Chief, Standardization and Special Projects Branch, Division of Licensing, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, April 21, 1982, Docket No. 50-141, (Enclosure 1).

4. The Environmental Protection Agency's (EPA's) "National Primary Drinking Water Standards," 40 CFR Part 141. In accordance with FC 83-23, the maximum contaminant levels for radionuclides in public drinking water as established by the EPA should be used as reference standards for protection of groundwater and surface water resources.

5. The EPA's "Radiation Dose Guidelines for Protection Against Transuranium Elements Present in the Environment as a Result of Unplanned Contamination" (42 FR 60956; November 30, 1977). This document provides guidelines for acceptable levels of transuranium elements in soil.

In addition to these criteria, guidelines, and standards, the NRC will continue to use the additional guidelines listed in Table 1 on acceptable levels of contamination in soil to be released for unrestricted use.

Table 1. Additional Guidelines on Acceptable Levels of Contamination in Soil To be Released for Unrestricted Use

| Radionuclide* | Maximum Soil Concentration (in pCi/g) |
|---|---|
| Cobalt-60@ | 8 |
| Strontium-90# | 5 |
| Cesium-137@ | 15 |
| Radium-226& | 5 |
| Radium-228& | 5 |

*If only one radionuclide is present, then the maximum concentration is the value listed in the table. However, if more than one radionuclide is present, determine for each radionuclide the ratio between the measured concentration in soil and the concentration listed in the table. The sum of all such ratios may not exceed one (i.e., unity).

@Memorandum to W. E. Cline, Chief, Nuclear Materials Safety and Safeguards Branch, NRC, Region II, from J. W. N. Hickey, Chief, Operations Branch, Division of Fuel Cycle, Medical Academic, and Commercial Use Safety: Evaluation of Acceptability of Proposed Decommissioning Activities, May 6, 1987 (Enclosure 2).

#United Nuclear Corporation Resources Company, Approved Soil Decontamination Criteria for the Decommissioning of the UNC Facility, Docket No. 70-820, May 12, 1981.

&U.S. Environmental Protection Agency, Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings, 40 CFR Part 192, Subparts B and E, July 1, 1991.

Please respond back in writing your acceptance of these criteria or any questions you may have regarding them within three weeks from receipt of this letter. We want BMI to accept these criteria in writing because the Commission will approve and support BMI's unrestricted release of its facilities which meet these criteria.

If you have any questions or if we can be of additional assistance, please contact Dr. Tin Mo of my staff at (301) 504-2570.

Sincerely,

for

John W. N. Hickey, Chief
Fuel Cycle Safety Branch
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards

Enclosures: As stated

cc: Dr. Kenneth Brog, BMI
Mr. Jefferson Neff, DOE, Columbus Field Office

WASHINGTON, D. C. 20555

APR 21 1982

Docket No. 50-141

Dr. Roland A. Finston, Director
Health Physics and Biosafety
Stanford University
67 Encina Hall
Stanford, California 94305

Dear Dr. Finston:

By letter dated March 17, 1981, we provided radiation criteria for release of the dismantled Stanford Research Reactor to unrestricted access. That criteria specified Reg. Guide 1.86 for surface contamination and 5 micro Rem per hour at one meter for reactor generated, gamma emitting isotopes.

Since March 17, 1981, we have refined further our position with respect to release criteria and have determined that radiation from gamma emitting isotopes is also acceptable if the potential exposure to individuals is less than 10 mRem per year with reasonable occupancy assumptions. If you wish to justify gamma exposure rates from reactor generated isotopes that are greater than 5 micro Rem per hour, you should show that reasonable occupancy of that area would be sufficiently less than 2000 hours per year, which would result in exposures of less than 10 mRem per year.

Sincerely,

James R. Miller, Chief
Standardization and Special
Projects Branch
Division of Licensing

ENCLOSURE C

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAY 06 1987

MEMORANDUM FOR: William E. Cline, Chief
Nuclear Materials Safety and Safeguards Branch
Region II

FROM: John W. N. Hickey, Chief
Operations Branch
Division of Fuel Cycle, Medical, Academic and Commercial Use Safety

SUBJECT: EVALUATION OF ACCEPTABILITY OF PROPOSED DECOMMISSIONING ACTIVITIES

In your memorandum of April 16, 1987, you requested guidance on the acceptable concentration of Co-60 and Cs-137 in soil to allow the release of the Department of the Army, Fort McClellan, Alabama, facility. The primary pathway for exposure of individuals for these nuclides is by direct radiation. Therefore, the determination of acceptability for surface contamination of ground areas should be based on the following criteria:

External Radiation

The gamma exposure at 1 meter above the ground surface shall not exceed 10 uR/h above background for an area of greater than 30 ft x 30 ft and shall not exceed 20 uR/h above background for any discrete area (i.e., less than 30 ft x 30 ft).

Concentration criteria have also been developed for Co-60 and Cs-137 for situations in which subsurface contamination may be present, such as when burials of material have been made. These criteria are as follows:

| Radionuclide | Concentration Limit Above Background (pCi/g) |
|---|---|
| Co-60 | 8 |
| Cs-137 | 15 |

Where more than one radionuclide is present, the sum of the ratios of the individual radionuclide concentrations to their respective concentration limits shall not exceed 1.

I hope that this information is satisfactory as you evaluate the adequacy of the Department of the Army's decommissioning. If you have further questions, please feel free to contact me.

John W. N. Hickey, Chief
Operations Branch
Division of Fuel Cycle, Medical, Academic, and Commercial Use Safety

8706260094 870616
REG2 LIC30 PDR
01-02861-04

Enclosures:
1. Ltr to Mr. Rourk fm JLDascanio dtd 4/6/87.
2. Draft ltr to Dept of Army and Memo to JPotter fm JBKahle dtd 3/12/87.

Official Co

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## 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) | 1.000E+02 | 1.000E+04 | --- | AREA |
| R011 | Thickness of contaminated zone (m) | 1.500E-01 | 1.000E+00 | --- | THICK0 |
| R011 | Length parallel to aquifer flow (m) | 1.000E+02 | 1.000E+02 | --- | LCZPAQ |
| R011 | Basic radiation dose limit (mrem/yr) | 1.000E+02 | 1.000E+02 | --- | BRLD |
| 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 | 3.000E+03 | --- | T( 9) |
| R011 | Times for calculations (yr) | not used | 1.000E+04 | --- | T(10) |
| R012 | Initial principal radionuclide (pCi/g): Ac-227 | 1.000E+01 | 0.000E+00 | --- | S( 1) |
| R012 | Initial principal radionuclide (pCi/g): C-14 | 1.000E+01 | 0.000E+00 | --- | S( 2) |
| R012 | Initial principal radionuclide (pCi/g): Co-60 | 1.000E+01 | 0.000E+00 | --- | S( 3) |
| R012 | Initial principal radionuclide (pCi/g): Cs-137 | 1.000E+01 | 0.000E+00 | --- | S( 4) |
| R012 | Initial principal radionuclide (pCi/g): H-3 | 1.000E+01 | 0.000E+00 | --- | S( 5) |
| R012 | Initial principal radionuclide (pCi/g): Pa-231 | 1.000E+01 | 0.000E+00 | --- | S( 6) |
| R012 | Initial principal radionuclide (pCi/g): Pb-210 | 1.000E+01 | 0.000E+00 | --- | S( 7) |
| R012 | Initial principal radionuclide (pCi/g): Ra-226 | 1.000E+01 | 0.000E+00 | --- | S( 8) |
| R012 | Initial principal radionuclide (pCi/g): Ra-228 | 1.000E+01 | 0.000E+00 | --- | S( 9) |
| R012 | Initial principal radionuclide (pCi/g): Sr-90 | 1.000E+01 | 0.000E+00 | --- | S(10) |
| R012 | Initial principal radionuclide (pCi/g): Th-228 | 1.000E+01 | 0.000E+00 | --- | S(11) |
| R012 | Initial principal radionuclide (pCi/g): Th-230 | 1.000E+01 | 0.000E+00 | --- | S(12) |
| R012 | Initial principal radionuclide (pCi/g): Th-232 | 1.000E+01 | 0.000E+00 | --- | S(13) |
| R012 | Initial principal radionuclide (pCi/g): U-234 | 1.000E+01 | 0.000E+00 | --- | S(14) |
| R012 | Initial principal radionuclide (pCi/g): U-235 | 1.000E+01 | 0.000E+00 | --- | S(15) |
| R012 | Initial principal radionuclide (pCi/g): U-238 | 1.000E+01 | 0.000E+00 | --- | S(16) |
| R012 | Concentration in groundwater (pCi/L): Ac-227 | not used | 0.000E+00 | --- | W( 1) |
| R012 | Concentration in groundwater (pCi/L): C-14 | not used | 0.000E+00 | --- | W( 2) |
| R012 | Concentration in groundwater (pCi/L): Co-60 | not used | 0.000E+00 | --- | W( 3) |
| R012 | Concentration in groundwater (pCi/L): Cs-137 | not used | 0.000E+00 | --- | W( 4) |
| R012 | Concentration in groundwater (pCi/L): H-3 | not used | 0.000E+00 | --- | W( 5) |
| R012 | Concentration in groundwater (pCi/L): Pa-231 | not used | 0.000E+00 | --- | W( 6) |
| R012 | Concentration in groundwater (pCi/L): Pb-210 | not used | 0.000E+00 | --- | W( 7) |
| R012 | Concentration in groundwater (pCi/L): Ra-226 | not used | 0.000E+00 | --- | W( 8) |
| R012 | Concentration in groundwater (pCi/L): Ra-228 | not used | 0.000E+00 | --- | W( 9) |
| R012 | Concentration in groundwater (pCi/L): Sr-90 | not used | 0.000E+00 | --- | W(10) |
| R012 | Concentration in groundwater (pCi/L): Th-228 | not used | 0.000E+00 | --- | W(11) |
| R012 | Concentration in groundwater (pCi/L): Th-230 | not used | 0.000E+00 | --- | W(12) |
| R012 | Concentration in groundwater (pCi/L): Th-232 | not used | 0.000E+00 | --- | W(13) |
| R012 | Concentration in groundwater (pCi/L): U-234 | not used | 0.000E+00 | --- | W(14) |
| R012 | Concentration in groundwater (pCi/L): U-235 | not used | 0.000E+00 | --- | W(15) |
| R012 | Concentration in groundwater (pCi/L): U-238 | not used | 0.000E+00 | --- | W(16) |
| R013 | Cover depth (m) | 0.000E+00 | 0.000E+00 | --- | COVER0 |
| R013 | Density of cover material (g/cm**3) | not used | 1.600E+00 | --- | DENSCV |
| R013 | Cover depth erosion rate (m/yr) | not used | 1.000E-03 | --- | VCV |

Site-Specific Parameter Summary (continued)

| | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| 013 | Density of contaminated zone (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSCZ |
| R013 | Contaminated zone erosion rate (m/yr) | 1.000E-03 | 1.000E-03 | --- | VCZ |
| R013 | Contaminated zone total porosity | 4.000E-01 | 4.000E-01 | --- | TPCZ |
| 013 | Contaminated zone effective porosity | 2.000E-01 | 2.000E-01 | --- | EPCZ |
| 013 | Contaminated zone hydraulic conductivity (m/yr) | 5.550E+03 | 1.000E+01 | --- | HCCZ |
| R013 | Contaminated zone b parameter | 4.050E+00 | 5.300E+00 | --- | BCZ |
| R013 | Evapotranspiration coefficient | 6.000E-01 | 6.000E-01 | --- | EVAPTR |
| 013 | Precipitation (m/yr) | 1.000E+00 | 1.000E+00 | --- | PRECIP |
| 013 | Irrigation (m/yr) | 0.000E+00 | 2.000E-01 | --- | RI |
| R013 | Irrigation mode | overhead | overhead | --- | IDITCH |
| R013 | Runoff coefficient | 2.000E-01 | 2.000E-01 | --- | RUNOFF |
| | Watershed area for nearby stream or pond (m**2) | 1.000E+06 | 1.000E+06 | --- | WAREA |
| 014 | Density of saturated zone (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSAQ |
| 014 | Saturated zone total porosity | 4.000E-01 | 4.000E-01 | --- | TPSZ |
| R014 | Saturated zone effective porosity | 2.000E-01 | 2.000E-01 | --- | EPSZ |
| R014 | Saturated zone hydraulic conductivity (m/yr) | 5.550E+03 | 1.000E+02 | --- | HCSZ |
| 014 | Saturated zone hydraulic gradient | 2.000E-02 | 2.000E-02 | --- | HGWT |
| 014 | 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 |
| 014 | Model: Nondispersion (ND) or Mass-Balance (MB) | ND | ND | --- | MODEL |
| 014 | Individual's use of groundwater (m**3/yr) | not used | 1.500E+02 | --- | UW |
| R015 | Number of unsaturated zone strata | 1 | 1 | --- | NS |
| R015 | Unsat. zone 1, thickness (m) | 1.367E+01 | 4.000E+00 | --- | H(1) |
| 015 | Unsat. zone 1, soil density (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSUZ(1) |
| 015 | Unsat. zone 1, total porosity | 4.000E-01 | 4.000E-01 | --- | TPUZ(1) |
| R015 | Unsat. zone 1, effective porosity | 2.000E-01 | 2.000E-01 | --- | EPUZ(1) |
| R01 | Unsat. zone 1, soil-specific b parameter | 4.050E+00 | 5.300E+00 | --- | BUZ(1) |
| | Unsat. zone 1, hydraulic conductivity (m/yr) | 5.550E+03 | 1.000E+02 | --- | HCUZ(1) |
| | Distribution coefficients for Ac-227 | | | | |
| 2016 | Contaminated zone (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTC( 1) |
| 016 | Unsaturated zone 1 (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTU( 1,1) |
| 16 | Saturated zone (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTS( 1) |
| 16 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.632E-02 | RLEACH( 1) |
| 016 | Distribution coefficients for C-14 | | | | |
| 16 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 2) |
| 16 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 2,1) |
| 16 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 2) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 2) |
| 16 | Distribution coefficients for Co-60 | | | | |
| 16 | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC( 3) |
| 016 | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU( 3,1) |
| 016 | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS( 3) |
| 16 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH( 3) |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for Cs-137 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC( 4) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU( 4,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS( 4) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH( 4) |
| R016 | Distribution coefficients for H-3 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 5) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 5,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 5) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 5) |
| R016 | Distribution coefficients for Pa-231 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC( 6) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU( 6,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS( 6) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH( 6) |
| R016 | Distribution coefficients for Pb-210 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTC( 7) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTU( 7,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTS( 7) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.332E-02 | RLEACH( 7) |
| R016 | Distribution coefficients for Ra-226 | | | | |
| R016 | Contaminated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTC( 8) |
| R016 | Unsaturated zone 1 (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTU( 8,1) |
| R016 | Saturated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTS( 8) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.902E-02 | RLEACH( 8) |
| R016 | Distribution coefficients for Ra-228 | | | | |
| R016 | Contaminated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTC( 9) |
| R016 | Unsaturated zone 1 (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTU( 9,1) |
| R016 | Saturated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTS( 9) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.902E-02 | RLEACH( 9) |
| R016 | Distribution coefficients for Sr-90 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.000E+01 | 3.000E+01 | --- | DCACTC(10) |
| R016 | Unsaturated zone 1 (cm**3/g) | 3.000E+01 | 3.000E+01 | --- | DCACTU(10,1) |
| R016 | Saturated zone (cm**3/g) | 3.000E+01 | 3.000E+01 | --- | DCACTS(10) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 4.429E-02 | RLEACH(10) |
| R016 | Distribution coefficients for Th-228 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(11) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(11,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(11) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(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 Th-230 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(12) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(12,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(12) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(12) |
| R016 | Distribution coefficients for Th-232 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(13) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(13,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(13) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(13) |
| R016 | Distribution coefficients for U-234 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(14) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(14,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(14) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(14) |
| R016 | Distribution coefficients for U-235 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(15) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(15,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(15) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(15) |
| R016 | Distribution coefficients for U-238 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(16) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(16,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(16) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(16) |
| | Inhalation rate (m**3/yr) | 8.400E+03 | 8.400E+03 | --- | INHALR |
| | Mass loading for inhalation (g/m**3) | 2.000E-04 | 2.000E-04 | --- | MLINH |
| R017 | Dilution length for airborne dust, inhalation (m) | 3.000E+00 | 3.000E+00 | --- | LM |
| R017 | Occupancy factor, inhalation | 5.000E-01 | 4.500E-01 | --- | FO3 |
| R017 | Occupancy and shielding factor, external gamma | 6.000E-01 | 6.000E-01 | --- | FO1 |
| R017 | Shape factor, external gamma | 1.000E+00 | 1.000E+00 | --- | FS1 |
| R017 | Fractions of annular areas within AREA: | | | | |
| R017 | Outer annular radius (m) = √(1/π) | not used | 1.000E+00 | --- | FRACA( 1) |
| R017 | Outer annular radius (m) = √(10/π) | not used | 1.000E+00 | --- | FRACA( 2) |
| R017 | Outer annular radius (m) = √(20/π) | not used | 1.000E+00 | --- | FRACA( 3) |
| R017 | Outer annular radius (m) = √(50/π) | not used | 1.000E+00 | --- | FRACA( 4) |
| R017 | Outer annular radius (m) = √(100/π) | not used | 1.000E+00 | --- | FRACA( 5) |
| R017 | Outer annular radius (m) = √(200/π) | not used | 1.000E+00 | --- | FRACA( 6) |
| R017 | Outer annular radius (m) = √(500/π) | not used | 1.000E+00 | --- | FRACA( 7) |
| R017 | Outer annular radius (m) = √(1000/π) | not used | 1.000E+00 | --- | FRACA( 8) |
| R017 | Outer annular radius (m) = √(5000/π) | not used | 1.000E+00 | --- | FRACA( 9) |
| R017 | Outer annular radius (m) = √(1.E+04/π) | not used | 1.000E+00 | --- | FRACA(10) |
| R017 | Outer annular radius (m) = √(1.E+05/π) | not used | 0.000E+00 | --- | FRACA(11) |
| R017 | Outer annular radius (m) = √(1.E+06/π) | not used | 0.000E+00 | --- | FRACA(12) |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R018 | Fruits, vegetables and grain consumption (kg/yr) | 1.600E+02 | 1.600E+02 | --- | DIET(1) |
| R018 | Leafy vegetable consumption (kg/yr) | 1.400E+01 | 1.400E+01 | --- | DIET(2) |
| R018 | Milk consumption (L/yr) | 9.200E+01 | 9.200E+01 | --- | DIET(3) |
| R018 | Meat and poultry consumption (kg/yr) | 6.300E+01 | 6.300E+01 | --- | DIET(4) |
| R018 | Fish consumption (kg/yr) | 5.400E+00 | 5.400E+00 | --- | DIET(5) |
| R018 | Other seafood consumption (kg/yr) | 9.000E-01 | 9.000E-01 | --- | DIET(6) |
| R018 | Soil ingestion rate (g/yr) | 3.650E+01 | 0.000E+00 | --- | SOIL |
| R018 | Drinking water intake (L/yr) | 4.100E+02 | 4.100E+02 | --- | DWI |
| R018 | Fraction of drinking water from site | 1.000E+00 | 1.000E+00 | --- | FDW |
| 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 | Mass loading for foliar deposition (g/m**3) | 1.000E-04 | 1.000E-04 | --- | MLFD |
| R019 | Depth of soil mixing layer (m) | 1.500E-01 | 1.500E-01 | --- | DM |
| R019 | Depth of roots (m) | 9.000E-01 | 9.000E-01 | --- | DROOT |
| R019 | Drinking water fraction from ground water | 1.000E+00 | 1.000E+00 | --- | FGWDW |
| R019 | 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 |
| R021 | Total porosity of the cover material | not used | 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 | not used | 5.000E-02 | --- | PH2OCV |
| R021 | Volumetric water content of the foundation | 1.000E-02 | 1.000E-02 | --- | PH2OFL |
| R021 | Diffusion coefficient for radon gas (m/sec): | | | | |
| R021 | in cover material | not used | 2.000E-06 | --- | DIFCV |
| R021 | in foundation material | 2.000E-08 | 2.000E-08 | --- | 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 annual wind speed (m/sec) | 2.000E+00 | 2.000E+00 | --- | WIND |
| R021 | Average building air exchange rate (1/hr) | 1.000E+00 | 1.000E+00 | --- | REXG |
| R021 | Height of the building (room) (m) | 2.500E+00 | 2.500E+00 | --- | HRM |
| R021 | Building interior area factor | 1.000E+00 | 1.000E+00 | --- | FAI |
| R021 | Bulk density of building foundation (g/cm**3) | 2.400E+00 | 2.400E+00 | --- | DENSFL |
| R021 | Thickness of building foundation (m) | 1.500E-01 | 1.500E-01 | --- | FLOOR |
| R021 | Building depth below ground surface (m) | 1.000E+00 | 1.000E+00 | --- | DMFL |
| R021 | Fraction of time spent indoors | 5.000E-01 | 5.000E-01 | --- | FIND |
| R021 | Fraction of time spent outdoors (on site) | 2.500E-01 | 2.500E-01 | --- | FOTD |
| R021 | Emanating power of Rn-222 gas | 2.000E-01 | 2.000E-01 | --- | EMANA(1) |
| R021 | Emanating power of Rn-220 gas | 1.000E-01 | 1.000E-01 | --- | EMANA(2) |

Summary of Pathway Selections

| Pathway | User Selection |
|---|---|
| 1 -- external gamma | active |
| 2 -- inhalation | active |
| 3 -- plant ingestion | active |
| 4 -- meat ingestion | active |
| 5 -- milk ingestion | active |
| 6 -- aquatic foods | active |
| 7 -- drinking water | active |
| 8 -- radon | active |
| 9 -- soil ingestion | active |

Summary : King Avenue -- all nuclides -- no cover
File : C:\RESRAD4\KA\ALLNUCS.KA

**Contaminated Zone Dimensions**

| | |
|---|---|
| Area: | 100.00 square meters |
| Thickness: | 0.15 meters |
| Cover Depth: | 0.00 meters |

**Initial Soil Concentrations, pCi/g**

| | |
|---|---|
| Ac-227 | 1.000E+01 |
| C-14 | 1.000E+01 |
| Co-60 | 1.000E+01 |
| Cs-137 | 1.000E+01 |
| H-3 | 1.000E+01 |
| Pa-231 | 1.000E+01 |
| Pb-210 | 1.000E+01 |
| Ra-226 | 1.000E+01 |
| Ra-228 | 1.000E+01 |
| Sr-90 | 1.000E+01 |
| Th-228 | 1.000E+01 |
| Th-230 | 1.000E+01 |
| Th-232 | 1.000E+01 |
| U-234 | 1.000E+01 |
| U-235 | 1.000E+01 |
| U-238 | 1.000E+01 |

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 100 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): | 2.643E+02 | 2.500E+02 | 2.252E+02 | 1.673E+02 | 1.027E+02 | 3.432E+01 | 0.000E+00 | 4.054E-06 |
| M(t): | 2.643E+00 | 2.500E+00 | 2.252E+00 | 1.673E+00 | 1.027E+00 | 3.432E-01 | 0.000E+00 | 4.054E-08 |

Maximum TDOSE(t): 2.643E+02 mrem/yr at t = 0.000E+00 years

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| -227 | 8.198E+00 | 0.0310 | 4.329E+01 | 0.1638 | 0.000E+00 | 0.0000 | 5.509E-01 | 0.0021 | 7.048E-03 | 0.0000 | 4.162E-06 | 0.0000 | 4.106E-01 | 0.0016 |
| -14 | 0.000E+00 | 0.0000 | 1.357E-05 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.749E-05 | 0.0000 |
| Co-60 | 6.244E+01 | 0.2363 | 9.692E-04 | 0.0000 | 0.000E+00 | 0.0000 | 3.556E-03 | 0.0000 | 8.848E-06 | 0.0000 | 5.225E-06 | 0.0000 | 7.117E-04 | 0.0000 |
| Cs-137 | 1.464E+01 | 0.0554 | 2.068E-04 | 0.0000 | 0.000E+00 | 0.0000 | 1.474E-03 | 0.0000 | 1.142E-04 | 0.0000 | 2.248E-05 | 0.0000 | 1.369E-03 | 0.0000 |
| -3 | 0.000E+00 | 0.0000 | 4.071E-07 | 0.0000 | 0.000E+00 | 0.0000 | 3.002E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.725E-06 | 0.0000 |
| -231 | 6.592E-01 | 0.0025 | 8.400E+00 | 0.0318 | 0.000E+00 | 0.0000 | 4.040E-01 | 0.0015 | 5.168E-03 | 0.0000 | 3.052E-06 | 0.0000 | 3.011E-01 | 0.0011 |
| -210 | 1.393E-02 | 0.0001 | 1.357E-01 | 0.0005 | 0.000E+00 | 0.0000 | 6.609E+00 | 0.0250 | 1.613E-02 | 0.0001 | 1.925E-04 | 0.0000 | 1.834E-01 | 0.0007 |
| Ra-226 | 4.168E+01 | 0.1577 | 5.105E-02 | 0.0002 | 1.663E-01 | 0.0006 | 2.285E-02 | 0.0001 | 5.957E-05 | 0.0000 | 1.421E-05 | 0.0000 | 3.011E-02 | 0.0001 |
| -228 | 2.232E+01 | 0.0844 | 2.908E-02 | 0.0001 | 0.000E+00 | 0.0000 | 2.493E-02 | 0.0001 | 6.499E-05 | 0.0000 | 1.551E-05 | 0.0000 | 3.285E-02 | 0.0001 |
| -90 | 0.000E+00 | 0.0000 | 8.400E-03 | 0.0000 | 0.000E+00 | 0.0000 | 4.061E-01 | 0.0015 | 3.001E-04 | 0.0000 | 1.772E-03 | 0.0000 | 3.832E-03 | 0.0000 |
| -228 | 3.222E+01 | 0.1219 | 2.003E+00 | 0.0076 | 4.802E-01 | 0.0018 | 4.603E-02 | 0.0002 | 5.800E-04 | 0.0000 | 3.425E-07 | 0.0000 | 2.053E-02 | 0.0001 |
| Th-230 | 6.392E-03 | 0.0000 | 2.068E+00 | 0.0078 | 0.000E+00 | 0.0000 | 3.253E-02 | 0.0001 | 4.099E-04 | 0.0000 | 2.420E-07 | 0.0000 | 1.451E-02 | 0.0001 |
| Th-232 | 3.851E-03 | 0.0000 | 1.034E+01 | 0.0391 | 0.000E+00 | 0.0000 | 1.719E-01 | 0.0007 | 2.165E-03 | 0.0000 | 1.279E-06 | 0.0000 | 7.665E-02 | 0.0003 |
| 234 | 4.403E-03 | 0.0000 | 8.400E-01 | 0.0032 | 0.000E+00 | 0.0000 | 9.549E-03 | 0.0000 | 1.222E-04 | 0.0000 | 1.732E-05 | 0.0000 | 7.118E-03 | 0.0000 |
| 235 | 2.909E+00 | 0.0110 | 7.754E-01 | 0.0029 | 0.000E+00 | 0.0000 | 9.182E-03 | 0.0000 | 1.175E-04 | 0.0000 | 1.665E-05 | 0.0000 | 6.844E-03 | 0.0000 |
| -238 | 3.656E-01 | 0.0014 | 7.754E-01 | 0.0029 | 0.000E+00 | 0.0000 | 9.182E-03 | 0.0000 | 1.175E-04 | 0.0000 | 1.665E-05 | 0.0000 | 6.844E-03 | 0.0000 |
| tal | 1.855E+02 | 0.7018 | 6.872E+01 | 0.2600 | 6.464E-01 | 0.0024 | 8.301E+00 | 0.0314 | 3.241E-02 | 0.0001 | 2.082E-03 | 0.0000 | 1.097E+00 | 0.0041 |

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

Water Dependent Pathways

| Radio-Nuclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.246E+01 | 0.1985 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.106E-05 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.245E+01 | 0.2363 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.465E+01 | 0.0554 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.162E-06 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.769E+00 | 0.0370 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.959E+00 | 0.0263 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.195E+01 | 0.1588 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.240E+01 | 0.0848 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.204E-01 | 0.0016 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.477E+01 | 0.1316 |
| Th-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.122E+00 | 0.0080 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.059E+01 | 0.0401 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.612E-01 | 0.0033 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.701E+00 | 0.0140 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.157E+00 | 0.0044 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.643E+02 | 1.0000 |

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| c-227 | 7.417E+00 | 0.0297 | 3.898E+01 | 0.1559 | 0.000E+00 | 0.0000 | 4.960E-01 | 0.0020 | 6.346E-03 | 0.0000 | 3.748E-06 | 0.0000 | 3.697E-01 | 0.0015 |
| -14 | 0.000E+00 | 0.0000 | 3.539E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.499E-10 | 0.0000 |
| Co-60 | 5.453E+01 | 0.2181 | 8.430E-04 | 0.0000 | 0.000E+00 | 0.0000 | 3.093E-03 | 0.0000 | 7.696E-06 | 0.0000 | 4.545E-06 | 0.0000 | 6.191E-04 | 0.0000 |
| Cs-137 | 1.426E+01 | 0.0570 | 2.005E-04 | 0.0000 | 0.000E+00 | 0.0000 | 1.429E-03 | 0.0000 | 1.107E-04 | 0.0000 | 2.179E-05 | 0.0000 | 1.327E-03 | 0.0000 |
| -3 | 0.000E+00 | 0.0000 | 1.004E-12 | 0.0000 | 0.000E+00 | 0.0000 | 7.403E-14 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.253E-12 | 0.0000 |
| a-231 | 8.859E-01 | 0.0035 | 9.414E+00 | 0.0377 | 0.000E+00 | 0.0000 | 4.072E-01 | 0.0016 | 5.209E-03 | 0.0000 | 3.076E-06 | 0.0000 | 3.035E-01 | 0.0012 |
| rb-210 | 1.331E-02 | 0.0001 | 1.289E-01 | 0.0005 | 0.000E+00 | 0.0000 | 6.280E+00 | 0.0251 | 1.533E-02 | 0.0001 | 1.829E-04 | 0.0000 | 1.743E-01 | 0.0007 |
| Ra-226 | 4.077E+01 | 0.1631 | 5.379E-02 | 0.0002 | 1.620E-01 | 0.0006 | 2.199E-01 | 0.0009 | 5.405E-04 | 0.0000 | 1.960E-05 | 0.0000 | 3.482E-02 | 0.0001 |
| a-228 | 2.843E+01 | 0.1137 | 5.873E-01 | 0.0023 | 1.357E-01 | 0.0005 | 3.446E-02 | 0.0001 | 2.189E-04 | 0.0000 | 1.350E-05 | 0.0000 | 3.415E-02 | 0.0001 |
| r-90 | 0.000E+00 | 0.0000 | 7.793E-03 | 0.0000 | 0.000E+00 | 0.0000 | 3.767E-01 | 0.0015 | 2.784E-04 | 0.0000 | 1.644E-03 | 0.0000 | 3.555E-03 | 0.0000 |
| h-228 | 2.235E+01 | 0.0894 | 1.385E+00 | 0.0055 | 3.342E-01 | 0.0013 | 3.183E-02 | 0.0001 | 4.010E-04 | 0.0000 | 2.368E-07 | 0.0000 | 1.420E-02 | 0.0001 |
| Th-230 | 2.422E-02 | 0.0001 | 2.054E+00 | 0.0082 | 7.086E-05 | 0.0000 | 3.236E-02 | 0.0001 | 4.072E-04 | 0.0000 | 2.477E-07 | 0.0000 | 1.443E-02 | 0.0001 |
| h-232 | 3.098E+00 | 0.0124 | 1.031E+01 | 0.0412 | 8.881E-03 | 0.0000 | 1.743E-01 | 0.0007 | 2.169E-03 | 0.0000 | 3.007E-06 | 0.0000 | 8.018E-02 | 0.0003 |
| -234 | 4.285E-03 | 0.0000 | 8.125E-01 | 0.0032 | 3.171E-10 | 0.0000 | 9.236E-03 | 0.0000 | 1.182E-04 | 0.0000 | 1.675E-05 | 0.0000 | 6.884E-03 | 0.0000 |
| -235 | 2.831E+00 | 0.0113 | 7.502E-01 | 0.0030 | 0.000E+00 | 0.0000 | 8.889E-03 | 0.0000 | 1.137E-04 | 0.0000 | 1.610E-05 | 0.0000 | 6.626E-03 | 0.0000 |
| -238 | 3.552E-01 | 0.0014 | 7.500E-01 | 0.0030 | 2.982E-16 | 0.0000 | 8.881E-03 | 0.0000 | 1.136E-04 | 0.0000 | 1.610E-05 | 0.0000 | 6.620E-03 | 0.0000 |
| otal | 1.750E+02 | 0.6998 | 6.523E+01 | 0.2609 | 6.408E-01 | 0.0026 | 8.085E+00 | 0.0323 | 3.136E-02 | 0.0001 | 1.946E-03 | 0.0000 | 1.051E+00 | 0.0042 |

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

Water Dependent Pathways

| Radio-Nuclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.727E+01 | 0.1891 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.853E-10 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.454E+01 | 0.2181 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.426E+01 | 0.0571 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.331E-12 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.102E+01 | 0.0441 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.612E+00 | 0.0264 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.124E+01 | 0.1649 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.922E+01 | 0.1169 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.900E-01 | 0.0016 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.411E+01 | 0.0964 |
| Th-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.125E+00 | 0.0085 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.367E+01 | 0.0547 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.330E-01 | 0.0033 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.596E+00 | 0.0144 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.121E+00 | 0.0045 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.500E+02 | 1.0000 |

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 6.070E+00 | 0.0270 | 3.160E+01 | 0.1403 | 0.000E+00 | 0.0000 | 4.021E-01 | 0.0018 | 5.144E-03 | 0.0000 | 3.038E-06 | 0.0000 | 2.997E-01 | 0.0013 |
| C-14 | 0.000E+00 | 0.0000 | 2.407E-22 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.020E-21 | 0.0000 |
| Co-60 | 4.159E+01 | 0.1847 | 6.377E-04 | 0.0000 | 0.000E+00 | 0.0000 | 2.340E-03 | 0.0000 | 5.821E-06 | 0.0000 | 3.438E-06 | 0.0000 | 4.683E-04 | 0.0000 |
| Cs-137 | 1.353E+01 | 0.0601 | 1.884E-04 | 0.0000 | 0.000E+00 | 0.0000 | 1.343E-03 | 0.0000 | 1.040E-04 | 0.0000 | 2.048E-05 | 0.0000 | 1.247E-03 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 6.104E-24 | 0.0000 | 0.000E+00 | 0.0000 | 4.501E-25 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.586E-23 | 0.0000 |
| Pa-231 | 1.253E+00 | 0.0056 | 1.097E+01 | 0.0487 | 0.000E+00 | 0.0000 | 4.084E-01 | 0.0018 | 5.225E-03 | 0.0000 | 3.086E-06 | 0.0000 | 3.044E-01 | 0.0014 |
| Pb-210 | 1.215E-02 | 0.0001 | 1.164E-01 | 0.0005 | 0.000E+00 | 0.0000 | 5.669E+00 | 0.0252 | 1.384E-02 | 0.0001 | 1.651E-04 | 0.0000 | 1.573E-01 | 0.0007 |
| Ra-226 | 3.899E+01 | 0.1731 | 5.846E-02 | 0.0003 | 1.537E-01 | 0.0007 | 5.701E-01 | 0.0025 | 1.395E-03 | 0.0000 | 2.913E-05 | 0.0000 | 4.307E-02 | 0.0002 |
| Ra-228 | 3.121E+01 | 0.1386 | 1.043E+00 | 0.0046 | 2.505E-01 | 0.0011 | 3.962E-02 | 0.0002 | 3.385E-04 | 0.0000 | 1.018E-05 | 0.0000 | 3.169E-02 | 0.0001 |
| Sr-90 | 0.000E+00 | 0.0000 | 6.706E-03 | 0.0000 | 0.000E+00 | 0.0000 | 3.242E-01 | 0.0014 | 2.396E-04 | 0.0000 | 1.415E-03 | 0.0000 | 3.059E-03 | 0.0000 |
| Th-228 | 1.075E+01 | 0.0477 | 6.620E-01 | 0.0029 | 1.619E-01 | 0.0007 | 1.521E-02 | 0.0001 | 1.917E-04 | 0.0000 | 1.132E-07 | 0.0000 | 6.785E-03 | 0.0000 |
| Th-230 | 5.856E-02 | 0.0003 | 2.026E+00 | 0.0090 | 2.057E-04 | 0.0000 | 3.227E-02 | 0.0001 | 4.026E-04 | 0.0000 | 2.655E-07 | 0.0000 | 1.426E-02 | 0.0001 |
| Th-232 | 1.042E+01 | 0.0463 | 1.038E+01 | 0.0461 | 5.847E-02 | 0.0003 | 1.811E-01 | 0.0008 | 2.210E-03 | 0.0000 | 5.778E-06 | 0.0000 | 8.706E-02 | 0.0004 |
| U-234 | 4.058E-03 | 0.0000 | 7.601E-01 | 0.0034 | 2.732E-09 | 0.0000 | 8.641E-03 | 0.0000 | 1.105E-04 | 0.0000 | 1.567E-05 | 0.0000 | 6.440E-03 | 0.0000 |
| U-235 | 2.680E+00 | 0.0119 | 7.022E-01 | 0.0031 | 0.000E+00 | 0.0000 | 8.332E-03 | 0.0000 | 1.066E-04 | 0.0000 | 1.506E-05 | 0.0000 | 6.211E-03 | 0.0000 |
| U-238 | 3.353E-01 | 0.0015 | 7.016E-01 | 0.0031 | 7.663E-15 | 0.0000 | 8.308E-03 | 0.0000 | 1.063E-04 | 0.0000 | 1.506E-05 | 0.0000 | 6.192E-03 | 0.0000 |
| Total | 1.569E+02 | 0.6967 | 5.903E+01 | 0.2621 | 6.249E-01 | 0.0028 | 7.671E+00 | 0.0341 | 2.942E-02 | 0.0001 | 1.701E-03 | 0.0000 | 9.680E-01 | 0.0043 |

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

Water Dependent Pathways

| Radio-Nuclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.838E+01 | 0.1704 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.261E-21 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.160E+01 | 0.1847 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.353E+01 | 0.0601 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.241E-23 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.294E+01 | 0.0575 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.969E+00 | 0.0265 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.982E+01 | 0.1768 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.258E+01 | 0.1446 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.356E-01 | 0.0015 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.160E+01 | 0.0515 |
| Th-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.132E+00 | 0.0095 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.113E+01 | 0.0938 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.793E-01 | 0.0035 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.396E+00 | 0.0151 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.051E+00 | 0.0047 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.252E+02 | 1.0000 |

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| c-227 | 3.007E+00 | 0.0180 | 1.513E+01 | 0.0905 | 0.000E+00 | 0.0000 | 1.926E-01 | 0.0012 | 2.463E-03 | 0.0000 | 1.455E-06 | 0.0000 | 1.435E-01 | 0.0009 |
| -14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 1.609E+01 | 0.0962 | 2.396E-04 | 0.0000 | 0.000E+00 | 0.0000 | 8.793E-04 | 0.0000 | 2.188E-06 | 0.0000 | 1.292E-06 | 0.0000 | 1.760E-04 | 0.0000 |
| Cs-137 | 1.122E+01 | 0.0671 | 1.513E-04 | 0.0000 | 0.000E+00 | 0.0000 | 1.079E-03 | 0.0000 | 8.357E-05 | 0.0000 | 1.645E-05 | 0.0000 | 1.002E-03 | 0.0000 |
| -3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| a-231 | 1.896E+00 | 0.0113 | 1.306E+01 | 0.0781 | 0.000E+00 | 0.0000 | 3.786E-01 | 0.0023 | 4.844E-03 | 0.0000 | 2.861E-06 | 0.0000 | 2.822E-01 | 0.0017 |
| rb-210 | 8.825E-03 | 0.0001 | 8.124E-02 | 0.0005 | 0.000E+00 | 0.0000 | 3.957E+00 | 0.0237 | 9.659E-03 | 0.0001 | 1.152E-04 | 0.0000 | 1.098E-01 | 0.0007 |
| Ra-226 | 3.333E+01 | 0.1992 | 6.790E-02 | 0.0004 | 1.279E-01 | 0.0008 | 1.415E+00 | 0.0085 | 3.456E-03 | 0.0000 | 5.161E-05 | 0.0000 | 6.190E-02 | 0.0004 |
| a-228 | 1.658E+01 | 0.0991 | 6.796E-01 | 0.0041 | 1.728E-01 | 0.0010 | 2.124E-02 | 0.0001 | 2.099E-04 | 0.0000 | 3.707E-06 | 0.0000 | 1.451E-02 | 0.0001 |
| r-90 | 0.000E+00 | 0.0000 | 3.958E-03 | 0.0000 | 0.000E+00 | 0.0000 | 1.913E-01 | 0.0011 | 1.414E-04 | 0.0000 | 8.350E-04 | 0.0000 | 1.806E-03 | 0.0000 |
| h-228 | 8.300E-01 | 0.0050 | 4.990E-02 | 0.0003 | 1.282E-02 | 0.0001 | 1.147E-03 | 0.0000 | 1.445E-05 | 0.0000 | 8.533E-09 | 0.0000 | 5.115E-04 | 0.0000 |
| Th-230 | 1.657E-01 | 0.0010 | 1.930E+00 | 0.0115 | 6.114E-04 | 0.0000 | 3.381E-02 | 0.0002 | 3.909E-04 | 0.0000 | 3.762E-07 | 0.0000 | 1.374E-02 | 0.0001 |
| Th-232 | 3.056E+01 | 0.1826 | 1.065E+01 | 0.0637 | 2.543E-01 | 0.0015 | 1.982E-01 | 0.0012 | 2.347E-03 | 0.0000 | 1.076E-05 | 0.0000 | 1.016E-01 | 0.0006 |
| -234 | 3.357E-03 | 0.0000 | 6.010E-01 | 0.0036 | 2.601E-08 | 0.0000 | 6.832E-03 | 0.0000 | 8.741E-05 | 0.0000 | 1.238E-05 | 0.0000 | 5.092E-03 | 0.0000 |
| -235 | 2.210E+00 | 0.0132 | 5.567E-01 | 0.0033 | 0.000E+00 | 0.0000 | 6.639E-03 | 0.0000 | 8.494E-05 | 0.0000 | 1.191E-05 | 0.0000 | 4.948E-03 | 0.0000 |
| u-238 | 2.736E-01 | 0.0016 | 5.546E-01 | 0.0033 | 2.384E-13 | 0.0000 | 6.567E-03 | 0.0000 | 8.402E-05 | 0.0000 | 1.191E-05 | 0.0000 | 4.895E-03 | 0.0000 |
| Total | 1.162E+02 | 0.6944 | 4.337E+01 | 0.2592 | 5.684E-01 | 0.0034 | 6.410E+00 | 0.0383 | 2.387E-02 | 0.0001 | 1.075E-03 | 0.0000 | 7.457E-01 | 0.0045 |

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

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.848E+01 | 0.1104 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.610E+01 | 0.0962 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.123E+01 | 0.0671 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.562E+01 | 0.0934 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.167E+00 | 0.0249 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.501E+01 | 0.2092 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.746E+01 | 0.1044 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.981E-01 | 0.0012 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.944E-01 | 0.0053 |
| Th-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.144E+00 | 0.0128 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.177E+01 | 0.2497 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.163E-01 | 0.0037 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.779E+00 | 0.0166 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.398E-01 | 0.0050 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.673E+02 | 1.0000 |

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| c-227 | 3.996E-01 | 0.0039 | 1.819E+00 | 0.0177 | 0.000E+00 | 0.0000 | 2.315E-02 | 0.0002 | 2.961E-04 | 0.0000 | 1.749E-07 | 0.0000 | 1.725E-02 | 0.0002 |
| -14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 1.055E+00 | 0.0103 | 1.442E-05 | 0.0000 | 0.000E+00 | 0.0000 | 5.289E-05 | 0.0000 | 1.316E-07 | 0.0000 | 7.772E-08 | 0.0000 | 1.059E-05 | 0.0000 |
| Cs-137 | 6.514E+00 | 0.0634 | 7.978E-05 | 0.0000 | 0.000E+00 | 0.0000 | 5.686E-04 | 0.0000 | 4.405E-05 | 0.0000 | 8.672E-06 | 0.0000 | 5.281E-04 | 0.0000 |
| -3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| a-231 | 1.622E+00 | 0.0158 | 9.153E+00 | 0.0891 | 0.000E+00 | 0.0000 | 2.234E-01 | 0.0022 | 2.858E-03 | 0.0000 | 1.688E-06 | 0.0000 | 1.665E-01 | 0.0016 |
| Pb-210 | 3.512E-03 | 0.0000 | 2.865E-02 | 0.0003 | 0.000E+00 | 0.0000 | 1.396E+00 | 0.0136 | 3.407E-03 | 0.0000 | 4.064E-05 | 0.0000 | 3.873E-02 | 0.0004 |
| Ra-226 | 2.102E+01 | 0.2047 | 6.254E-02 | 0.0006 | 7.441E-02 | 0.0007 | 1.947E+00 | 0.0190 | 4.753E-03 | 0.0000 | 6.274E-05 | 0.0000 | 6.718E-02 | 0.0007 |
| a-228 | 1.018E+00 | 0.0099 | 4.011E-02 | 0.0004 | 1.191E-02 | 0.0001 | 1.219E-03 | 0.0000 | 1.231E-05 | 0.0000 | 1.964E-07 | 0.0000 | 8.092E-04 | 0.0000 |
| -90 | 0.000E+00 | 0.0000 | 8.644E-04 | 0.0000 | 0.000E+00 | 0.0000 | 4.179E-02 | 0.0004 | 3.088E-05 | 0.0000 | 1.824E-04 | 0.0000 | 3.944E-04 | 0.0000 |
| -228 | 5.430E-04 | 0.0000 | 3.047E-05 | 0.0000 | 9.131E-06 | 0.0000 | 7.003E-07 | 0.0000 | 8.824E-09 | 0.0000 | 5.211E-12 | 0.0000 | 3.124E-07 | 0.0000 |
| Th-230 | 3.770E-01 | 0.0037 | 1.653E+00 | 0.0161 | 1.313E-03 | 0.0000 | 4.372E-02 | 0.0004 | 3.709E-04 | 0.0000 | 8.163E-07 | 0.0000 | 1.232E-02 | 0.0001 |
| Th-232 | 4.123E+01 | 0.4015 | 9.634E+00 | 0.0938 | 4.041E-01 | 0.0039 | 1.853E-01 | 0.0018 | 2.166E-03 | 0.0000 | 1.180E-05 | 0.0000 | 9.744E-02 | 0.0009 |
| -234 | 1.969E-03 | 0.0000 | 3.027E-01 | 0.0029 | 1.498E-07 | 0.0000 | 3.444E-03 | 0.0000 | 4.405E-05 | 0.0000 | 6.234E-06 | 0.0000 | 2.565E-03 | 0.0000 |
| -235 | 1.267E+00 | 0.0123 | 2.837E-01 | 0.0028 | 0.000E+00 | 0.0000 | 3.431E-03 | 0.0000 | 4.390E-05 | 0.0000 | 5.996E-06 | 0.0000 | 2.557E-03 | 0.0000 |
| U-238 | 1.514E-01 | 0.0015 | 2.792E-01 | 0.0027 | 3.881E-12 | 0.0000 | 3.306E-03 | 0.0000 | 4.230E-05 | 0.0000 | 5.995E-06 | 0.0000 | 2.464E-03 | 0.0000 |
| otal | 7.467E+01 | 0.7270 | 2.326E+01 | 0.2264 | 4.918E-01 | 0.0048 | 3.872E+00 | 0.0377 | 1.407E-02 | 0.0001 | 3.274E-04 | 0.0000 | 4.087E-01 | 0.0040 |

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

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.259E+00 | 0.0220 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.055E+00 | 0.0103 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.515E+00 | 0.0634 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.117E+01 | 0.1087 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.470E+00 | 0.0143 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.318E+01 | 0.2257 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.072E+00 | 0.0104 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.326E-02 | 0.0004 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.836E-04 | 0.0000 |
| Th-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.088E+00 | 0.0203 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.156E+01 | 0.5020 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.108E-01 | 0.0030 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.557E+00 | 0.0152 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.364E-01 | 0.0042 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.027E+02 | 1.0000 |

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 2.562E-04 | 0.0000 | 7.831E-04 | 0.0000 | 0.000E+00 | 0.0000 | 9.965E-06 | 0.0000 | 1.275E-07 | 0.0000 | 7.529E-11 | 0.0000 | 7.427E-06 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 5.611E-05 | 0.0000 | 5.500E-10 | 0.0000 | 0.000E+00 | 0.0000 | 2.018E-09 | 0.0000 | 5.021E-12 | 0.0000 | 2.965E-12 | 0.0000 | 4.039E-10 | 0.0000 |
| Cs-137 | 7.226E-01 | 0.0211 | 6.063E-06 | 0.0000 | 0.000E+00 | 0.0000 | 4.322E-05 | 0.0000 | 3.348E-06 | 0.0000 | 6.591E-07 | 0.0000 | 4.014E-05 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 1.733E-01 | 0.0050 | 6.431E-01 | 0.0187 | 0.000E+00 | 0.0000 | 1.509E-02 | 0.0004 | 1.930E-04 | 0.0000 | 1.140E-07 | 0.0000 | 1.125E-02 | 0.0003 |
| Pb-210 | 1.084E-04 | 0.0000 | 5.334E-04 | 0.0000 | 0.000E+00 | 0.0000 | 2.598E-02 | 0.0008 | 6.342E-05 | 0.0000 | 7.567E-07 | 0.0000 | 7.210E-04 | 0.0000 |
| Ra-226 | 3.077E+00 | 0.0897 | 9.823E-03 | 0.0003 | 7.977E-03 | 0.0002 | 3.611E-01 | 0.0105 | 8.816E-04 | 0.0000 | 1.116E-05 | 0.0000 | 1.142E-02 | 0.0003 |
| Ra-228 | 3.255E-05 | 0.0000 | 9.706E-07 | 0.0000 | 6.904E-07 | 0.0000 | 2.948E-08 | 0.0000 | 2.978E-10 | 0.0000 | 4.748E-12 | 0.0000 | 1.957E-08 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 3.009E-06 | 0.0000 | 0.000E+00 | 0.0000 | 1.454E-04 | 0.0000 | 1.075E-07 | 0.0000 | 6.347E-07 | 0.0000 | 1.373E-06 | 0.0000 |
| Th-228 | 2.828E-15 | 0.0000 | 1.226E-16 | 0.0000 | 8.798E-17 | 0.0000 | 2.817E-18 | 0.0000 | 3.549E-20 | 0.0000 | 2.096E-23 | 0.0000 | 1.256E-18 | 0.0000 |
| Th-230 | 4.147E-01 | 0.0121 | 6.879E-01 | 0.0200 | 1.063E-03 | 0.0000 | 3.684E-02 | 0.0011 | 1.998E-04 | 0.0000 | 9.245E-07 | 0.0000 | 5.731E-03 | 0.0002 |
| Th-232 | 2.334E+01 | 0.6801 | 4.022E+00 | 0.1172 | 4.130E-01 | 0.0120 | 7.754E-02 | 0.0023 | 9.054E-04 | 0.0000 | 4.978E-06 | 0.0000 | 4.083E-02 | 0.0012 |
| U-234 | 3.313E-04 | 0.0000 | 1.977E-02 | 0.0006 | 2.764E-07 | 0.0000 | 2.317E-04 | 0.0000 | 2.902E-06 | 0.0000 | 4.034E-07 | 0.0000 | 1.674E-04 | 0.0000 |
| U-235 | 1.434E-01 | 0.0042 | 1.929E-02 | 0.0006 | 0.000E+00 | 0.0000 | 2.441E-04 | 0.0000 | 3.123E-06 | 0.0000 | 3.880E-07 | 0.0000 | 1.819E-04 | 0.0000 |
| U-238 | 1.418E-02 | 0.0004 | 1.806E-02 | 0.0005 | 1.900E-11 | 0.0000 | 2.139E-04 | 0.0000 | 2.737E-06 | 0.0000 | 3.879E-07 | 0.0000 | 1.594E-04 | 0.0000 |
| Total | 2.789E+01 | 0.8125 | 5.422E+00 | 0.1580 | 4.220E-01 | 0.0123 | 5.174E-01 | 0.0151 | 2.256E-03 | 0.0001 | 2.041E-05 | 0.0000 | 7.051E-02 | 0.0021 |

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

Water Dependent Pathways

| Radio-Nuclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.057E-03 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.611E-05 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.227E-01 | 0.0211 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.430E-01 | 0.0246 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.741E-02 | 0.0008 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.468E+00 | 0.1010 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.426E-05 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.506E-04 | 0.0000 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.043E-15 | 0.0000 |
| Th-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.146E+00 | 0.0334 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.790E+01 | 0.8128 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.051E-02 | 0.0006 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.631E-01 | 0.0048 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.262E-02 | 0.0010 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.432E+01 | 1.0000 |

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio-Nuclide | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0010 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.1480 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0010 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0010 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0010 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0033 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.1275 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 1.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0534 | 0.000E+00 | 0.0000 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 1.0000 | 0.000E+00 | 0.2582 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0406 | 0.000E+00 | 0.0000 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.9300 | 0.000E+00 | 0.0079 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.9600 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 25.2973 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 1.0000 | 0.000E+00 | ******* | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 1.0000 | 0.000E+00 | ******* | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0038 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 17.1147 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.2830 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 37.5080 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0119 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.3030 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| Radio-Nuclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0019 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0001 | 0.000E+00 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0510 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0408 | 0.000E+00 | 0.0013 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.2480 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0016 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.3550 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0005 | 0.000E+00 | 0.0000 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0114 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.2480 | 0.000E+00 | 0.0311 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0002 | 0.000E+00 | 0.0000 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0751 | 0.000E+00 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0999 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| Radio-Nuclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 5.684E-20 | 0.0000 | 2.488E-22 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.092E-23 | 0.0000 | 2.551E-26 | 0.0000 | 5.710E-20 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 3.954E-06 | 0.9753 | 1.731E-08 | 0.0043 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.594E-10 | 0.0002 | 1.774E-12 | 0.0000 | 3.972E-06 | 0.9797 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 8.177E-08 | 0.0202 | 3.580E-10 | 0.0001 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.571E-11 | 0.0000 | 3.670E-14 | 0.0000 | 8.214E-08 | 0.0203 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 4.036E-06 | 0.9955 | 1.767E-08 | 0.0044 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.751E-10 | 0.0002 | 1.811E-12 | 0.0000 | 4.054E-06 | 1.0000 |

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways, (mrem/yr)/(pCi/g)

| ide (i) | t= 0.000E+00 | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|---|---|
| Ac-227 | 5.246E+00 | 4.727E+00 | 3.838E+00 | 1.848E+00 | 2.259E-01 | 1.057E-04 | 0.000E+00 | 5.710E-21 |
| C-14 | 7.106E-06 | 1.853E-11 | 1.261E-22 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Co-60 | 6.245E+00 | 5.454E+00 | 4.160E+00 | 1.610E+00 | 1.055E-01 | 5.611E-06 | 0.000E+00 | 0.000E+00 |
| Cs-137 | 1.465E+00 | 1.426E+00 | 1.353E+00 | 1.123E+00 | 6.515E-01 | 7.227E-02 | 0.000E+00 | 0.000E+00 |
| H-3 | 2.162E-07 | 5.331E-13 | 3.241E-24 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Pa-231 | 9.769E-01 | 1.102E+00 | 1.294E+00 | 1.562E+00 | 1.117E+00 | 8.430E-02 | 0.000E+00 | 3.972E-07 |
| Pb-210 | 6.959E-01 | 6.612E-01 | 5.969E-01 | 4.167E-01 | 1.470E-01 | 2.741E-03 | 0.000E+00 | 0.000E+00 |
| Ra-226 | 4.195E+00 | 4.124E+00 | 3.982E+00 | 3.501E+00 | 2.318E+00 | 3.468E-01 | 0.000E+00 | 0.000E+00 |
| Ra-228 | 2.240E+00 | 2.922E+00 | 3.258E+00 | 1.746E+00 | 1.072E-01 | 3.426E-06 | 0.000E+00 | 0.000E+00 |
| Sr-90 | 4.204E-02 | 3.900E-02 | 3.356E-02 | 1.981E-02 | 4.326E-03 | 1.506E-05 | 0.000E+00 | 0.000E+00 |
| Th-228 | 3.477E+00 | 2.411E+00 | 1.160E+00 | 8.944E-02 | 5.836E-05 | 3.043E-16 | 0.000E+00 | 0.000E+00 |
| Th-230 | 2.122E-01 | 2.125E-01 | 2.132E-01 | 2.144E-01 | 2.088E-01 | 1.146E-01 | 0.000E+00 | 0.000E+00 |
| Th-232 | 1.059E+00 | 1.367E+00 | 2.113E+00 | 4.177E+00 | 5.156E+00 | 2.790E+00 | 0.000E+00 | 0.000E+00 |
| U-234 | 8.612E-02 | 8.330E-02 | 7.793E-02 | 6.163E-02 | 3.108E-02 | 2.051E-03 | 0.000E+00 | 0.000E+00 |
| U-235 | 3.701E-01 | 3.596E-01 | 3.396E-01 | 2.779E-01 | 1.557E-01 | 1.631E-02 | 0.000E+00 | 8.214E-09 |
| U-238 | 1.157E-01 | 1.121E-01 | 1.051E-01 | 8.398E-02 | 4.364E-02 | 3.262E-03 | 0.000E+00 | 0.000E+00 |

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 100 mrem/yr

| uclide (i) | t= 0.000E+00 | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|---|---|
| Ac-227 | 1.906E+01 | 2.116E+01 | 2.606E+01 | 5.412E+01 | 4.426E+02 | 9.463E+05 | *7.244E+13 | *7.244E+13 |
| -14 | 1.407E+07 | *4.454E+12 | *4.454E+12 | *4.454E+12 | *4.454E+12 | *4.454E+12 | *4.454E+12 | *4.454E+12 |
| o-60 | 1.601E+01 | 1.834E+01 | 2.404E+01 | 6.213E+01 | 9.477E+02 | 1.782E+07 | *1.131E+15 | *1.131E+15 |
| Cs-137 | 6.827E+01 | 7.010E+01 | 7.392E+01 | 8.907E+01 | 1.535E+02 | 1.384E+03 | *8.652E+13 | *8.652E+13 |
| H- | 4.626E+08 | 1.876E+14 | *9.610E+15 | *9.610E+15 | *9.610E+15 | *9.610E+15 | *9.610E+15 | *9.610E+15 |
| | 1.024E+02 | 9.078E+01 | 7.726E+01 | 6.402E+01 | 8.954E+01 | 1.186E+03 | *4.716E+10 | 2.518E+08 |
| | 1.437E+02 | 1.512E+02 | 1.675E+02 | 2.400E+02 | 6.803E+02 | 3.648E+04 | *7.631E+13 | *7.631E+13 |
| Ra-226 | 2.384E+01 | 2.425E+01 | 2.511E+01 | 2.857E+01 | 4.314E+01 | 2.883E+02 | *9.882E+11 | *9.882E+11 |
| Ra-228 | 4.464E+01 | 3.422E+01 | 3.070E+01 | 5.726E+01 | 9.330E+02 | 2.919E+07 | *2.721E+14 | *2.721E+14 |
| Sr-90 | 2.379E+03 | 2.564E+03 | 2.980E+03 | 5.049E+03 | 2.312E+04 | 6.642E+06 | *1.380E+14 | *1.380E+14 |
| Th-228 | 2.876E+01 | 4.147E+01 | 8.621E+01 | 1.118E+03 | 1.714E+06 | *8.192E+14 | *8.192E+14 | *8.192E+14 |
| Th-230 | 4.714E+02 | 4.705E+02 | 4.691E+02 | 4.665E+02 | 4.789E+02 | 8.722E+02 | *2.018E+10 | *2.018E+10 |
| Th-232 | 9.440E+01 | 7.314E+01 | 4.734E+01 | 2.394E+01 | 1.940E+01 | 3.585E+01 | *1.092E+05 | *1.092E+05 |
| U-234 | 1.161E+03 | 1.200E+03 | 1.283E+03 | 1.622E+03 | 3.218E+03 | 4.876E+04 | *6.233E+09 | *6.233E+09 |
| -235 | 2.702E+02 | 2.781E+02 | 2.944E+02 | 3.599E+02 | 6.425E+02 | 6.132E+03 | *2.160E+06 | *2.160E+06 |
| -238 | 8.642E+02 | 8.922E+02 | 9.511E+02 | 1.191E+03 | 2.291E+03 | 3.066E+04 | *3.360E+05 | *3.360E+05 |

*At specific activity limit

Summary : King Avenue -- all nuclides -- no cover
File : C:\RESRAD4\KA\ALLNUCS.KA

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

| Nuclide (i) | Initial pCi/g | tmin (years) | DSR(i,tmin) | G(i,tmin) (pCi/g) | DSR(i,tmax) | G(i,tmax) (pCi/g) |
|---|---|---|---|---|---|---|
| Ac-227 | 1.000E+01 | 0.000E+00 | 5.246E+00 | 1.906E+01 | 5.246E+00 | 1.906E+01 |
| C-14 | 1.000E+01 | 3.727 ± 0.001 | 1.060E-01 | 9.430E+02 | 7.106E-06 | 1.407E+07 |
| Co-60 | 1.000E+01 | 0.000E+00 | 6.245E+00 | 1.601E+01 | 6.245E+00 | 1.601E+01 |
| Cs-137 | 1.000E+01 | 0.000E+00 | 1.465E+00 | 6.827E+01 | 1.465E+00 | 6.827E+01 |
| H-3 | 1.000E+01 | 3.727 ± 0.001 | 2.264E-03 | 4.417E+04 | 2.162E-07 | 4.626E+08 |
| Pa-231 | 1.000E+01 | 738.7 ± 0.2 | 5.570E+00 | 1.795E+01 | 9.769E-01 | 1.024E+02 |
| Pb-210 | 1.000E+01 | 0.000E+00 | 6.959E-01 | 1.437E+02 | 6.959E-01 | 1.437E+02 |
| Ra-226 | 1.000E+01 | 0.000E+00 | 4.195E+00 | 2.384E+01 | 4.195E+00 | 2.384E+01 |
| Ra-228 | 1.000E+01 | 2.7215 ± 0.0008 | 3.264E+00 | 3.064E+01 | 2.240E+00 | 4.464E+01 |
| Sr-90 | 1.000E+01 | 0.000E+00 | 4.204E-02 | 2.379E+03 | 4.204E-02 | 2.379E+03 |
| Th-228 | 1.000E+01 | 0.000E+00 | 3.477E+00 | 2.876E+01 | 3.477E+00 | 2.876E+01 |
| Th-230 | 1.000E+01 | 11.356 ± 0.003 | 2.144E-01 | 4.664E+02 | 2.122E-01 | 4.714E+02 |
| Th-232 | 1.000E+01 | 25.190 ± 0.008 | 5.193E+00 | 1.926E+01 | 1.059E+00 | 9.440E+01 |
| U-234 | 1.000E+01 | 0.000E+00 | 8.612E-02 | 1.161E+03 | 8.612E-02 | 1.161E+03 |
| U-235 | 1.000E+01 | 0.000E+00 | 3.701E-01 | 2.702E+02 | 3.701E-01 | 2.702E+02 |
| U-238 | 1.000E+01 | 0.000E+00 | 1.157E-01 | 8.642E+02 | 1.157E-01 | 8.642E+02 |

# RESRAD
# (RESIDUAL RADIOACTIVITY MATERIALS PROGRAM)

# SOIL GUIDELINE CALCULATIONS
# KING AVENUE RADIONUCLIDES
# 5 METER SOIL COVER

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## Site-Specific Parameter Summary

| | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R011 | Area of contaminated zone (m**2) | 1.000E+02 | 1.000E+04 | --- | AREA |
| R011 | Thickness of contaminated zone (m) | 1.500E-01 | 1.000E+00 | --- | THICKO |
| R011 | Length parallel to aquifer flow (m) | 1.000E+02 | 1.000E+02 | --- | LCZPAQ |
| R011 | Basic radiation dose limit (mrem/yr) | 1.000E+02 | 1.000E+02 | --- | BRLD |
| 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 | 3.000E+03 | --- | T( 9) |
| R011 | Times for calculations (yr) | not used | 1.000E+04 | --- | T(10) |
| R012 | Initial principal radionuclide (pCi/g): Ac-227 | 1.000E+01 | 0.000E+00 | --- | S( 1) |
| R012 | Initial principal radionuclide (pCi/g): C-14 | 1.000E+01 | 0.000E+00 | --- | S( 2) |
| R012 | Initial principal radionuclide (pCi/g): Co-60 | 1.000E+01 | 0.000E+00 | --- | S( 3) |
| R012 | Initial principal radionuclide (pCi/g): Cs-137 | 1.000E+01 | 0.000E+00 | --- | S( 4) |
| R012 | Initial principal radionuclide (pCi/g): H-3 | 1.000E+01 | 0.000E+00 | --- | S( 5) |
| R012 | Initial principal radionuclide (pCi/g): Pa-231 | 1.000E+01 | 0.000E+00 | --- | S( 6) |
| R012 | Initial principal radionuclide (pCi/g): Pb-210 | 1.000E+01 | 0.000E+00 | --- | S( 7) |
| R012 | Initial principal radionuclide (pCi/g): Ra-226 | 1.000E+01 | 0.000E+00 | --- | S( 8) |
| R012 | Initial principal radionuclide (pCi/g): Ra-228 | 1.000E+01 | 0.000E+00 | --- | S( 9) |
| R012 | Initial principal radionuclide (pCi/g): Sr-90 | 1.000E+01 | 0.000E+00 | --- | S(10) |
| R012 | Initial principal radionuclide (pCi/g): Th-228 | 1.000E+01 | 0.000E+00 | --- | S(11) |
| R012 | Initial principal radionuclide (pCi/g): Th-230 | 1.000E+01 | 0.000E+00 | --- | S(12) |
| R012 | Initial principal radionuclide (pCi/g): Th-232 | 1.000E+01 | 0.000E+00 | --- | S(13) |
| R012 | Initial principal radionuclide (pCi/g): U-234 | 1.000E+01 | 0.000E+00 | --- | S(14) |
| R012 | Initial principal radionuclide (pCi/g): U-235 | 1.000E+01 | 0.000E+00 | --- | S(15) |
| R012 | Initial principal radionuclide (pCi/g): U-238 | 1.000E+01 | 0.000E+00 | --- | S(16) |
| | Concentration in groundwater (pCi/L): Ac-227 | not used | 0.000E+00 | --- | W( 1) |
| | Concentration in groundwater (pCi/L): C-14 | not used | 0.000E+00 | --- | W( 2) |
| R012 | Concentration in groundwater (pCi/L): Co-60 | not used | 0.000E+00 | --- | W( 3) |
| R012 | Concentration in groundwater (pCi/L): Cs-137 | not used | 0.000E+00 | --- | W( 4) |
| R012 | Concentration in groundwater (pCi/L): H-3 | not used | 0.000E+00 | --- | W( 5) |
| R012 | Concentration in groundwater (pCi/L): Pa-231 | not used | 0.000E+00 | --- | W( 6) |
| R012 | Concentration in groundwater (pCi/L): Pb-210 | not used | 0.000E+00 | --- | W( 7) |
| R012 | Concentration in groundwater (pCi/L): Ra-226 | not used | 0.000E+00 | --- | W( 8) |
| R012 | Concentration in groundwater (pCi/L): Ra-228 | not used | 0.000E+00 | --- | W( 9) |
| R012 | Concentration in groundwater (pCi/L): Sr-90 | not used | 0.000E+00 | --- | W(10) |
| R012 | Concentration in groundwater (pCi/L): Th-228 | not used | 0.000E+00 | --- | W(11) |
| R012 | Concentration in groundwater (pCi/L): Th-230 | not used | 0.000E+00 | --- | W(12) |
| R012 | Concentration in groundwater (pCi/L): Th-232 | not used | 0.000E+00 | --- | W(13) |
| R012 | Concentration in groundwater (pCi/L): U-234 | not used | 0.000E+00 | --- | W(14) |
| R012 | Concentration in groundwater (pCi/L): U-235 | not used | 0.000E+00 | --- | W(15) |
| R012 | Concentration in groundwater (pCi/L): U-238 | not used | 0.000E+00 | --- | W(16) |
| R013 | Cover depth (m) | 5.000E+00 | 0.000E+00 | --- | COVERO |
| R013 | Density of cover material (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSCV |
| R013 | Cover depth erosion rate (m/yr) | 1.000E-03 | 1.000E-03 | --- | VCV |
| R013 | Density of contaminated zone (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSCZ |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R013 | Contaminated zone erosion rate (m/yr) | 1.000E-03 | 1.000E-03 | --- | VCZ |
| R013 | Contaminated zone total porosity | 4.000E-01 | 4.000E-01 | --- | TPCZ |
| R013 | Contaminated zone effective porosity | 2.000E-01 | 2.000E-01 | --- | EPCZ |
| R013 | Contaminated zone hydraulic conductivity (m/yr) | 5.550E+03 | 1.000E+01 | --- | HCCZ |
| R013 | Contaminated zone b parameter | 4.050E+00 | 5.300E+00 | --- | BCZ |
| R013 | Evapotranspiration coefficient | 6.000E-01 | 6.000E-01 | --- | EVAPTR |
| R013 | Precipitation (m/yr) | 1.000E+00 | 1.000E+00 | --- | PRECIP |
| R013 | Irrigation (m/yr) | 0.000E+00 | 2.000E-01 | --- | RI |
| R013 | Irrigation mode | overhead | overhead | --- | IDITCH |
| R013 | Runoff coefficient | 2.000E-01 | 2.000E-01 | --- | RUNOFF |
| R013 | Watershed area for nearby stream or pond (m**2) | 1.000E+06 | 1.000E+06 | --- | WAREA |
| R014 | Density of saturated zone (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSAQ |
| R014 | Saturated zone total porosity | 4.000E-01 | 4.000E-01 | --- | TPSZ |
| R014 | Saturated zone effective porosity | 2.000E-01 | 2.000E-01 | --- | EPSZ |
| R014 | Saturated zone hydraulic conductivity (m/yr) | 5.550E+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 | Individual's use of groundwater (m**3/yr) | not used | 1.500E+02 | --- | UW |
| R015 | Number of unsaturated zone strata | 1 | 1 | --- | NS |
| R015 | Unsat. zone 1, thickness (m) | 8.670E+00 | 4.000E+00 | --- | H(1) |
| R015 | Unsat. zone 1, soil density (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSUZ(1) |
| R015 | Unsat. zone 1, total porosity | 4.000E-01 | 4.000E-01 | --- | TPUZ(1) |
| R015 | Unsat. zone 1, effective porosity | 2.000E-01 | 2.000E-01 | --- | EPUZ(1) |
| R015 | Unsat. zone 1, soil-specific b parameter | 4.050E+00 | 5.300E+00 | --- | BUZ(1) |
| R015 | Unsat. zone 1, hydraulic conductivity (m/yr) | 5.550E+03 | 1.000E+02 | --- | HCUZ(1) |
| R016 | Distribution coefficients for Ac-227 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTC( 1) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTU( 1,1) |
| R016 | Saturated zone (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTS( 1) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.632E-02 | RLEACH( 1) |
| R016 | Distribution coefficients for C-14 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 2) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 2,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 2) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 2) |
| R016 | Distribution coefficients for Co-60 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC( 3) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU( 3,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS( 3) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH( 3) |

Site-Specific Parameter Summary (continued)

| Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|
| Distribution coefficients for Cs-137 | | | | |
| Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC( 4) |
| Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU( 4,1) |
| Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS( 4) |
| Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH( 4) |
| Distribution coefficients for H-3 | | | | |
| Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 5) |
| Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 5,1) |
| Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 5) |
| Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 5) |
| Distribution coefficients for Pa-231 | | | | |
| Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC( 6) |
| Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU( 6,1) |
| Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS( 6) |
| Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH( 6) |
| Distribution coefficients for Pb-210 | | | | |
| Contaminated zone (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTC( 7) |
| Unsaturated zone 1 (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTU( 7,1) |
| Saturated zone (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTS( 7) |
| Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.332E-02 | RLEACH( 7) |
| Distribution coefficients for Ra-226 | | | | |
| Contaminated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTC( 8) |
| Unsaturated zone 1 (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTU( 8,1) |
| Saturated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTS( 8) |
| Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.902E-02 | RLEACH( 8) |
| Distribution coefficients for Ra-228 | | | | |
| Contaminated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTC( 9) |
| Unsaturated zone 1 (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTU( 9,1) |
| Saturated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTS( 9) |
| Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.902E-02 | RLEACH( 9) |
| Distribution coefficients for Sr-90 | | | | |
| Contaminated zone (cm**3/g) | 3.000E+01 | 3.000E+01 | --- | DCACTC(10) |
| Unsaturated zone 1 (cm**3/g) | 3.000E+01 | 3.000E+01 | --- | DCACTU(10,1) |
| Saturated zone (cm**3/g) | 3.000E+01 | 3.000E+01 | --- | DCACTS(10) |
| Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 4.429E-02 | RLEACH(10) |
| Distribution coefficients for Th-228 | | | | |
| Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(11) |
| Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(11,1) |
| Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(11) |
| Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(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 Th-230 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(12) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(12,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(12) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(12) |
| R016 | Distribution coefficients for Th-232 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(13) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(13,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(13) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(13) |
| R016 | Distribution coefficients for U-234 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(14) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(14,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(14) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(14) |
| R016 | Distribution coefficients for U-235 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(15) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(15,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(15) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(15) |
| R016 | Distribution coefficients for U-238 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(16) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(16,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(16) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(16) |
| R017 | Inhalation rate (m**3/yr) | 8.400E+03 | 8.400E+03 | --- | INHALR |
| R017 | Mass loading for inhalation (g/m**3) | 2.000E-04 | 2.000E-04 | --- | MLINH |
| R017 | Dilution length for airborne dust, inhalation (m) | 3.000E+00 | 3.000E+00 | --- | LM |
| R017 | Occupancy factor, inhalation | 5.000E-01 | 4.500E-01 | --- | FO3 |
| R017 | Occupancy and shielding factor, external gamma | 6.000E-01 | 6.000E-01 | --- | FO1 |
| R017 | Shape factor, external gamma | 1.000E+00 | 1.000E+00 | --- | FS1 |
| R017 | Fractions of annular areas within AREA: | | | | |
| R017 | Outer annular radius (m) = √(1/π) | not used | 1.000E+00 | --- | FRACA( 1) |
| R017 | Outer annular radius (m) = √(10/π) | not used | 1.000E+00 | --- | FRACA( 2) |
| R017 | Outer annular radius (m) = √(20/π) | not used | 1.000E+00 | --- | FRACA( 3) |
| R017 | Outer annular radius (m) = √(50/π) | not used | 1.000E+00 | --- | FRACA( 4) |
| R017 | Outer annular radius (m) = √(100/π) | not used | 1.000E+00 | --- | FRACA( 5) |
| R017 | Outer annular radius (m) = √(200/π) | not used | 1.000E+00 | --- | FRACA( 6) |
| R017 | Outer annular radius (m) = √(500/π) | not used | 1.000E+00 | --- | FRACA( 7) |
| R017 | Outer annular radius (m) = √(1000/π) | not used | 1.000E+00 | --- | FRACA( 8) |
| R017 | Outer annular radius (m) = √(5000/π) | not used | 1.000E+00 | --- | FRACA( 9) |
| R017 | Outer annular radius (m) = √(1.E+04/π) | not used | 1.000E+00 | --- | FRACA(10) |
| R017 | Outer annular radius (m) = √(1.E+05/π) | not used | 0.000E+00 | --- | FRACA(11) |
| R017 | Outer annular radius (m) = √(1.E+06/π) | not used | 0.000E+00 | --- | FRACA(12) |
| R018 | Fruits, vegetables and grain consumption (kg/yr) | 1.600E+02 | 1.600E+02 | --- | DIET(1) |

Site-Specific Parameter Summary (continued)

| | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R018 | Leafy vegetable consumption (kg/yr) | 1.400E+01 | 1.400E+01 | --- | DIET(2) |
| R018 | Milk consumption (L/yr) | 9.200E+01 | 9.200E+01 | --- | DIET(3) |
| R018 | Meat and poultry consumption (kg/yr) | 6.300E+01 | 6.300E+01 | --- | DIET(4) |
| R018 | Fish consumption (kg/yr) | 5.400E+00 | 5.400E+00 | --- | DIET(5) |
| R018 | Other seafood consumption (kg/yr) | 9.000E-01 | 9.000E-01 | --- | DIET(6) |
| R018 | Soil ingestion rate (g/yr) | 3.650E+01 | 0.000E+00 | --- | SOIL |
| R018 | Drinking water intake (L/yr) | 4.100E+02 | 4.100E+02 | --- | DWI |
| R018 | Fraction of drinking water from site | 1.000E+00 | 1.000E+00 | --- | FDW |
| 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 | Mass loading for foliar deposition (g/m**3) | 1.000E-04 | 1.000E-04 | --- | MLFD |
| R019 | Depth of soil mixing layer (m) | 1.500E-01 | 1.500E-01 | --- | DM |
| R019 | Depth of roots (m) | 9.000E-01 | 9.000E-01 | --- | DROOT |
| R019 | Drinking water fraction from ground water | 1.000E+00 | 1.000E+00 | --- | FGWDW |
| R019 | 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 |
| 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 |
| R021 | Volumetric water content of the foundation | 1.000E-02 | 1.000E-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 | 2.000E-08 | 2.000E-08 | --- | 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 annual wind speed (m/sec) | 2.000E+00 | 2.000E+00 | --- | WIND |
| R021 | Average building air exchange rate (1/hr) | 1.000E+00 | 1.000E+00 | --- | REXG |
| R021 | Height of the building (room) (m) | 2.500E+00 | 2.500E+00 | --- | HRM |
| R021 | Building interior area factor | 1.000E+00 | 1.000E+00 | --- | FAI |
| R021 | Bulk density of building foundation (g/cm**3) | 2.400E+00 | 2.400E+00 | --- | DENSFL |
| R021 | Thickness of building foundation (m) | 1.500E-01 | 1.500E-01 | --- | FLOOR |
| R021 | Building depth below ground surface (m) | 1.000E+00 | 1.000E+00 | --- | DMFL |
| R021 | Fraction of time spent indoors | 5.000E-01 | 5.000E-01 | --- | FIND |
| R021 | Fraction of time spent outdoors (on site) | 2.500E-01 | 2.500E-01 | --- | FOTD |
| R021 | Emanating power of Rn-222 gas | 2.000E-01 | 2.000E-01 | --- | EMANA(1) |
| R021 | Emanating power of Rn-220 gas | 1.000E-01 | 1.000E-01 | --- | EMANA(2) |

Summary of Pathway Selections

| Pathway | User Selection |
|---|---|
| 1 -- external gamma | active |
| 2 -- inhalation | active |
| 3 -- plant ingestion | active |
| 4 -- meat ingestion | active |
| 5 -- milk ingestion | active |
| 6 -- aquatic foods | active |
| 7 -- drinking water | active |
| 8 -- radon | active |
| 9 -- soil ingestion | active |

**Contaminated Zone Dimensions**

| | |
|---|---|
| Area: | 100.00 square meters |
| kness: | 0.15 meters |
| Depth: | 5.00 meters |

**Initial Soil Concentrations, pCi/g**

| | |
|---|---|
| Ac-227 | 1.000E+01 |
| C-14 | 1.000E+01 |
| Co-60 | 1.000E+01 |
| Cs-137 | 1.000E+01 |
| H-3 | 1.000E+01 |
| Pa-231 | 1.000E+01 |
| Pb-210 | 1.000E+01 |
| Ra-226 | 1.000E+01 |
| Ra-228 | 1.000E+01 |
| Sr-90 | 1.000E+01 |
| Th-228 | 1.000E+01 |
| Th-230 | 1.000E+01 |
| Th-232 | 1.000E+01 |
| U-234 | 1.000E+01 |
| U-235 | 1.000E+01 |
| U-238 | 1.000E+01 |

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 100 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): | 1.723E-03 | 1.692E-03 | 2.347E-03 | 1.440E-03 | 1.009E-03 | 3.092E-04 | 5.852E-05 | 1.037E-04 |
| M(t): | 1.723E-05 | 1.692E-05 | 2.347E-05 | 1.440E-05 | 1.009E-05 | 3.092E-06 | 5.852E-07 | 1.037E-06 |

uximum TDOSE(t): 5.672E+01 mrem/yr at t = 474.2 ± 0.1 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 474.2 years

Water Independent Pathways

| Radio-Nuclide | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 7.050E-24 | 0.0000 | 0.000E+00 | 0.0000 | 2.764E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-230 | 1.570E-21 | 0.0000 | 0.000E+00 | 0.0000 | 6.156E-05 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-232 | 9.801E-16 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 5.316E-25 | 0.0000 | 0.000E+00 | 0.0000 | 2.084E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 5.659E-29 | 0.0000 | 0.000E+00 | 0.0000 | 2.216E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 9.801E-16 | 0.0000 | 0.000E+00 | 0.0000 | 6.186E-05 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 474.2 years

Water Dependent Pathways

| adio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| :-227 | 1.528E-05 | 0.0000 | 6.689E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.935E-09 | 0.0000 | 6.857E-12 | 0.0000 | 1.535E-05 | 0.0000 |
| -14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| ..-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -231 | 5.594E+01 | 0.9862 | 2.449E-01 | 0.0043 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.074E-02 | 0.0002 | 2.510E-05 | 0.0000 | 5.619E+01 | 0.9907 |
| -210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.764E-07 | 0.0000 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| ..-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.156E-05 | 0.0000 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.801E-16 | 0.0000 |
| -234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.084E-08 | 0.0000 |
| 235 | 5.259E-01 | 0.0093 | 2.303E-03 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.010E-04 | 0.0000 | 2.360E-07 | 0.0000 | 5.283E-01 | 0.0093 |
| 238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.216E-12 | 0.0000 |
| Total | 5.647E+01 | 0.9954 | 2.472E-01 | 0.0044 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.085E-02 | 0.0002 | 2.534E-05 | 0.0000 | 5.672E+01 | 1.0000 |

um of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 2.333E-23 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 2.769E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 4.769E-22 | 0.0000 | 0.000E+00 | 0.0000 | 1.723E-03 | 1.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-228 | 3.135E-23 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-228 | 2.169E-17 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 4.060E-29 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 2.169E-17 | 0.0000 | 0.000E+00 | 0.0000 | 1.723E-03 | 1.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| adio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| c-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| o-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.333E-23 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.769E-28 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| a-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| o-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.723E-03 | 1.0000 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.135E-23 | 0.0000 |
| r-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| h-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.169E-17 | 0.0000 |
| h-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.060E-29 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.723E-03 | 1.0000 |

um of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 2.066E-23 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 2.739E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 4.726E-22 | 0.0000 | 0.000E+00 | 0.0000 | 1.692E-03 | 0.9996 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-228 | 6.179E-18 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-228 | 1.522E-17 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-230 | 2.068E-25 | 0.0000 | 0.000E+00 | 0.0000 | 7.400E-07 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-232 | 4.045E-19 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.312E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 4.005E-29 | 0.0000 | 0.000E+00 | 0.0000 | 3.115E-18 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 2.181E-17 | 0.0000 | 0.000E+00 | 0.0000 | 1.692E-03 | 1.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| tadio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| ıc-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| :-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| .o-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.066E-23 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.739E-28 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| a-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| b-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.692E-03 | 0.9996 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.179E-18 | 0.0000 |
| r-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| h-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.522E-17 | 0.0000 |
| .h-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.400E-07 | 0.0004 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.045E-19 | 0.0000 |
| "-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.312E-12 | 0.0000 |
| -235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.115E-18 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.692E-03 | 1.0000 |

Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio-Nuclide | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 1.620E-23 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 2.679E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 4.643E-22 | 0.0000 | 0.000E+00 | 0.0000 | 1.631E-03 | 0.6946 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-228 | 1.160E-17 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-228 | 7.500E-18 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-230 | 6.214E-25 | 0.0000 | 0.000E+00 | 0.0000 | 2.182E-06 | 0.0009 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-232 | 2.708E-18 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.897E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 3.896E-29 | 0.0000 | 0.000E+00 | 0.0000 | 8.127E-17 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 2.181E-17 | 0.0000 | 0.000E+00 | 0.0000 | 1.633E-03 | 0.6955 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| Radio-Nuclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 6.135E-04 | 0.2613 | 8.572E-05 | 0.0365 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.992E-04 | 0.2979 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.620E-23 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.679E-28 | 0.0000 |
| H-3 | 1.555E-05 | 0.0066 | 3.731E-10 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.555E-05 | 0.0066 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.631E-03 | 0.6946 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.160E-17 | 0.0000 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.500E-18 | 0.0000 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.182E-06 | 0.0009 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.708E-18 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.897E-11 | 0.0000 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 6.290E-04 | 0.2680 | 8.572E-05 | 0.0365 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.127E-17 | 0.0000 |
| | | | | | | | | | | | | | 2.347E-03 | 1.0000 |

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 6.916E-24 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 2.479E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 4.363E-22 | 0.0000 | 0.000E+00 | 0.0000 | 1.433E-03 | 0.9952 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-228 | 8.487E-18 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-228 | 6.294E-19 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-230 | 2.086E-24 | 0.0000 | 0.000E+00 | 0.0000 | 6.853E-06 | 0.0048 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-232 | 1.249E-17 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 8.877E-29 | 0.0000 | 0.000E+00 | 0.0000 | 2.916E-10 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 3.539E-29 | 0.0000 | 0.000E+00 | 0.0000 | 2.672E-15 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 2.160E-17 | 0.0000 | 0.000E+00 | 0.0000 | 1.440E-03 | 1.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.916E-24 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.479E-28 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.433E-03 | 0.9952 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.487E-18 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.294E-19 | 0.0000 |
| Th-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.853E-06 | 0.0048 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.249E-17 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.916E-10 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.672E-15 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.440E-03 | 1.0000 |

Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 6.078E-25 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 1.986E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 3.653E-22 | 0.0000 | 0.000E+00 | 0.0000 | 9.913E-04 | 0.9827 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-228 | 6.916E-19 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-228 | 5.302E-22 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-230 | 6.443E-24 | 0.0000 | 0.000E+00 | 0.0000 | 1.749E-05 | 0.0173 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-232 | 2.346E-17 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 7.352E-28 | 0.0000 | 0.000E+00 | 0.0000 | 1.995E-09 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 2.691E-29 | 0.0000 | 0.000E+00 | 0.0000 | 5.170E-14 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 2.416E-17 | 0.0000 | 0.000E+00 | 0.0000 | 1.009E-03 | 1.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| :adio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| c-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| o-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.078E-25 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.986E-28 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| a-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| b-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| ka-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.913E-04 | 0.9827 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.916E-19 | 0.0000 |
| r-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| h-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.302E-22 | 0.0000 |
| h-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.749E-05 | 0.0173 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.346E-17 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.995E-09 | 0.0000 |
| -235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.170E-14 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.009E-03 | 1.0000 |

Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio-Nuclide | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 1.223E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 9.145E-29 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 1.961E-22 | 0.0000 | 0.000E+00 | 0.0000 | 2.729E-04 | 0.8824 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-228 | 7.215E-23 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-230 | 2.613E-23 | 0.0000 | 0.000E+00 | 0.0000 | 3.636E-05 | 0.1176 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-232 | 4.316E-17 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 6.793E-27 | 0.0000 | 0.000E+00 | 0.0000 | 9.454E-09 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 1.075E-29 | 0.0000 | 0.000E+00 | 0.0000 | 6.497E-13 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 4.316E-17 | 0.0000 | 0.000E+00 | 0.0000 | 3.092E-04 | 1.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.223E-28 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.145E-29 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.729E-04 | 0.8824 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.215E-23 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.636E-05 | 0.1176 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.316E-17 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.454E-09 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.497E-13 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.092E-04 | 1.0000 |

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 3.315E-23 | 0.0000 | 0.000E+00 | 0.0000 | 6.848E-06 | 0.1170 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-230 | 2.500E-22 | 0.0000 | 0.000E+00 | 0.0000 | 5.166E-05 | 0.8827 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-232 | 2.291E-16 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 8.406E-26 | 0.0000 | 0.000E+00 | 0.0000 | 1.737E-08 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.814E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 2.291E-16 | 0.0000 | 0.000E+00 | 0.0000 | 5.852E-05 | 1.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| Radio-nuclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| o-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| a-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| b-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| a-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.848E-06 | 0.1170 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| h-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| h-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.166E-05 | 0.8827 |
| J-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.291E-16 | 0.0000 |
| -235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.737E-08 | 0.0003 |
| -238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| | | | | | | | | | | | | | 1.814E-12 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.852E-05 | 1.0000 |

Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 6.585E-26 | 0.0000 | 0.000E+00 | 0.0000 | 1.709E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-230 | 3.995E-19 | 0.0000 | 0.000E+00 | 0.0000 | 1.037E-04 | 0.9997 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-232 | 7.894E-14 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 1.353E-22 | 0.0000 | 0.000E+00 | 0.0000 | 3.511E-08 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 1.440E-26 | 0.0000 | 0.000E+00 | 0.0000 | 3.738E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 7.894E-14 | 0.0000 | 0.000E+00 | 0.0000 | 1.037E-04 | 1.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 3.284E-27 | 0.0000 | 1.438E-29 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.298E-27 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 2.284E-13 | 0.0000 | 1.000E-15 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.388E-17 | 0.0000 | 1.025E-19 | 0.0000 | 2.295E-13 | 0.0000 |
| Pb-210 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ra-226 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.709E-11 | 0.0000 |
| Ra-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 1.894E-16 | 0.0000 | 2.019E-19 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.183E-21 | 0.0000 | 5.101E-20 | 0.0000 | 1.897E-16 | 0.0000 |
| Th-228 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Th-230 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.037E-04 | 0.9997 |
| Th-232 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.894E-14 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.511E-08 | 0.0003 |
| U-235 | 4.724E-15 | 0.0000 | 2.068E-17 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.074E-19 | 0.0000 | 2.120E-21 | 0.0000 | 4.746E-15 | 0.0000 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.738E-12 | 0.0000 |
| Total | 2.334E-13 | 0.0000 | 1.021E-15 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.479E-17 | 0.0000 | 1.556E-19 | 0.0000 | 1.037E-04 | 1.0000 |

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways, (mrem/yr)/(pCi/g)

| Nuclide (i) | t= 0.000E+00 | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|---|---|
| Ac-227 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 3.298E-28 |
| C-14 | 0.000E+00 | 0.000E+00 | 6.992E-05 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Co-60 | 2.333E-24 | 2.066E-24 | 1.620E-24 | 6.916E-25 | 6.078E-26 | 1.223E-29 | 0.000E+00 | 0.000E+00 |
| Cs-137 | 2.769E-29 | 2.739E-29 | 2.679E-29 | 2.479E-29 | 1.986E-29 | 9.145E-30 | 0.000E+00 | 0.000E+00 |
| H-3 | 0.000E+00 | 0.000E+00 | 1.555E-06 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Pa-231 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.295E-14 |
| Pb-210 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Ra-226 | 1.723E-04 | 1.692E-04 | 1.631E-04 | 1.433E-04 | 9.913E-05 | 2.729E-05 | 6.848E-07 | 1.709E-12 |
| Ra-228 | 3.135E-24 | 6.179E-19 | 1.160E-18 | 8.487E-19 | 6.916E-20 | 7.215E-24 | 0.000E+00 | 0.000E+00 |
| Sr-90 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.897E-17 |
| Th-228 | 2.169E-18 | 1.522E-18 | 7.500E-19 | 6.294E-20 | 5.302E-23 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Th-230 | 0.000E+00 | 7.400E-08 | 2.182E-07 | 6.853E-07 | 1.749E-06 | 3.636E-06 | 5.166E-06 | 1.037E-05 |
| Th-232 | 0.000E+00 | 4.045E-20 | 2.708E-19 | 1.249E-18 | 2.346E-18 | 4.316E-18 | 2.291E-17 | 7.894E-15 |
| U-234 | 0.000E+00 | 3.312E-13 | 2.897E-12 | 2.916E-11 | 1.995E-10 | 9.454E-10 | 1.737E-09 | 3.511E-09 |
| U-235 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 4.746E-16 |
| U-238 | 4.060E-30 | 3.115E-19 | 8.127E-18 | 2.672E-16 | 5.170E-15 | 6.497E-14 | 1.814E-13 | 3.738E-13 |

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 100 mrem/yr

| Nuclide (i) | t= 0.000E+00 | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|---|---|
| Ac-227 | *7.244E+13 | *7.244E+13 | *7.244E+13 | *7.244E+13 | *7.244E+13 | *7.244E+13 | *7.244E+13 | *7.244E+13 |
| C-14 | *4.454E+12 | *4.454E+12 | 1.430E+06 | *4.454E+12 | *4.454E+12 | *4.454E+12 | *4.454E+12 | *4.454E+12 |
| Co-60 | *1.131E+15 | *1.131E+15 | *1.131E+15 | *1.131E+15 | *1.131E+15 | *1.131E+15 | *1.131E+15 | *1.131E+15 |
| Cs-137 | *8.652E+13 | *8.652E+13 | *8.652E+13 | *8.652E+13 | *8.652E+13 | *8.652E+13 | *8.652E+13 | *8.652E+13 |
| H-3 | *9.610E+15 | *9.610E+15 | 6.429E+07 | *9.610E+15 | *9.610E+15 | *9.610E+15 | *9.610E+15 | *9.610E+15 |
| Pa-231 | *4.716E+10 | *4.716E+10 | *4.716E+10 | *4.716E+10 | *4.716E+10 | *4.716E+10 | *4.716E+10 | *4.716E+10 |
| Pb-210 | *7.631E+13 | *7.631E+13 | *7.631E+13 | *7.631E+13 | *7.631E+13 | *7.631E+13 | *7.631E+13 | *7.631E+13 |
| Ra-226 | 5.803E+05 | 5.911E+05 | 6.133E+05 | 6.977E+05 | 1.009E+06 | 3.665E+06 | 1.460E+08 | *9.882E+11 |
| Ra-228 | *2.721E+14 | *2.721E+14 | *2.721E+14 | *2.721E+14 | *2.721E+14 | *2.721E+14 | *2.721E+14 | *2.721E+14 |
| Sr-90 | *1.380E+14 | *1.380E+14 | *1.380E+14 | *1.380E+14 | *1.380E+14 | *1.380E+14 | *1.380E+14 | *1.380E+14 |
| Th-228 | *8.192E+14 | *8.192E+14 | *8.192E+14 | *8.192E+14 | *8.192E+14 | *8.192E+14 | *8.192E+14 | *8.192E+14 |
| Th-230 | *2.018E+10 | 1.351E+09 | 4.583E+08 | 1.459E+08 | 5.719E+07 | 2.750E+07 | 1.936E+07 | 9.644E+06 |
| Th-232 | *1.092E+05 | *1.092E+05 | *1.092E+05 | *1.092E+05 | *1.092E+05 | *1.092E+05 | *1.092E+05 | *1.092E+05 |
| U-234 | *6.233E+09 | *6.233E+09 | *6.233E+09 | *6.233E+09 | *6.233E+09 | *6.233E+09 | *6.233E+09 | *6.233E+09 |
| U-235 | *2.160E+06 | *2.160E+06 | *2.160E+06 | *2.160E+06 | *2.160E+06 | *2.160E+06 | *2.160E+06 | *2.160E+06 |
| U-238 | *3.360E+05 | *3.360E+05 | *3.360E+05 | *3.360E+05 | *3.360E+05 | *3.360E+05 | *3.360E+05 | *3.360E+05 |

*At specific activity limit

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
nd at tmax = time of maximum total dose = 474.2 ± 0.1 years

| luclide (i) | Initial pCi/g | tmin (years) | DSR(i,tmin) | G(i,tmin) (pCi/g) | DSR(i,tmax) | G(i,tmax) (pCi/g) |
|---|---|---|---|---|---|---|
| Ac-227 | 1.000E+01 | 474.1 ± 0.1 | 1.534E-06 | 6.518E+07 | 1.535E-06 | 6.515E+07 |
| -14 | 1.000E+01 | 2.4294 ± 0.0007 | 1.060E-01 | 9.431E+02 | 0.000E+00 | *4.454E+12 |
| o-60 | 1.000E+01 | 0.000E+00 | 2.333E-24 | *1.131E+15 | 0.000E+00 | *1.131E+15 |
| s-137 | 1.000E+01 | 0.000E+00 | 2.769E-29 | *8.652E+13 | 0.000E+00 | *8.652E+13 |
| H-3 | 1.000E+01 | 2.4293 ± 0.0007 | 2.435E-03 | 4.107E+04 | 0.000E+00 | *9.610E+15 |
| Pa-231 | 1.000E+01 | 474.1 ± 0.1 | 5.599E+00 | 1.786E+01 | 5.619E+00 | 1.780E+01 |
| b-210 | 1.000E+01 | 0.000E+00 | 0.000E+00 | *7.631E+13 | 0.000E+00 | *7.631E+13 |
| a-226 | 1.000E+01 | 0.000E+00 | 1.723E-04 | 5.803E+05 | 2.764E-08 | 3.618E+09 |
| Ra-228 | 1.000E+01 | 4.458 ± 0.001 | 1.238E-18 | *2.721E+14 | 0.000E+00 | *2.721E+14 |
| Sr-90 | 1.000E+01 | 729.1 ± 0.2 | 8.434E-10 | 1.186E+11 | 0.000E+00 | *1.380E+14 |
| Th-228 | 1.000E+01 | 0.000E+00 | 2.169E-18 | *8.192E+14 | 0.000E+00 | *8.192E+14 |
| h-230 | 1.000E+01 | 973.3 ± 0.3 | 1.010E-05 | 9.902E+06 | 6.156E-06 | 1.624E+07 |
| h-232 | 1.000E+01 | 973.3 ± 0.3 | 6.316E-15 | *1.092E+05 | 9.801E-17 | *1.092E+05 |
| U-234 | 1.000E+01 | 973.3 ± 0.3 | 3.420E-09 | *6.233E+09 | 2.084E-09 | *6.233E+09 |
| U-235 | 1.000E+01 | 474.2 ± 0.1 | 5.279E-02 | 1.894E+03 | 5.283E-02 | 1.893E+03 |
| -238 | 1.000E+01 | 973.3 ± 0.3 | 3.640E-13 | *3.360E+05 | 2.216E-13 | *3.360E+05 |

*At specific activity limit

# RESRAD
# (RESIDUAL RADIOACTIVITY MATERIALS PROGRAM)

# SOIL GUIDELINE CALCULATIONS
# WEST JEFFERSON RADIONUCLIDES
# NO SOIL COVER

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## 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) | 1.000E+02 | 1.000E+04 | --- | AREA |
| R011 | Thickness of contaminated zone (m) | 1.500E-01 | 1.000E+00 | --- | THICKO |
| R011 | Length parallel to aquifer flow (m) | 1.000E+02 | 1.000E+02 | --- | LCZPAQ |
| R011 | Basic radiation dose limit (mrem/yr) | 1.000E+02 | 1.000E+02 | --- | BRLD |
| R011 | Time since placement of material (yr) | 0.000E+00 | 0.000E+00 | --- | TI |
| R011 | Times for calculations (yr) | 2.118E+00 | 1.000E+00 | --- | T( 2) |
| R011 | Times for calculations (yr) | 4.058E+00 | 3.000E+00 | --- | T( 3) |
| R011 | Times for calculations (yr) | 1.148E+01 | 1.000E+01 | --- | T( 4) |
| R011 | Times for calculations (yr) | 4.107E+02 | 3.000E+01 | --- | T( 5) |
| R011 | Times for calculations (yr) | 1.000E+03 | 1.000E+02 | --- | T( 6) |
| R011 | Times for calculations (yr) | not used | 3.000E+02 | --- | T( 7) |
| R011 | Times for calculations (yr) | not used | 1.000E+03 | --- | T( 8) |
| R011 | Times for calculations (yr) | not used | 3.000E+03 | --- | T( 9) |
| R011 | Times for calculations (yr) | not used | 1.000E+04 | --- | T(10) |
| R012 | Initial principal radionuclide (pCi/g): Ac-227 | 1.000E+01 | 0.000E+00 | --- | S( 1) |
| R012 | Initial principal radionuclide (pCi/g): C-14 | 1.000E+01 | 0.000E+00 | --- | S( 2) |
| R012 | Initial principal radionuclide (pCi/g): Ce-144 | 1.000E+01 | 0.000E+00 | --- | S( 3) |
| R012 | Initial principal radionuclide (pCi/g): Co-60 | 1.000E+01 | 0.000E+00 | --- | S( 4) |
| R012 | Initial principal radionuclide (pCi/g): Cs-134 | 1.000E+01 | 0.000E+00 | --- | S( 5) |
| R012 | Initial principal radionuclide (pCi/g): Cs-137 | 1.000E+01 | 0.000E+00 | --- | S( 6) |
| R012 | Initial principal radionuclide (pCi/g): Eu-152 | 1.000E+01 | 0.000E+00 | --- | S( 7) |
| R012 | Initial principal radionuclide (pCi/g): Eu-154 | 1.000E+01 | 0.000E+00 | --- | S( 8) |
| R012 | Initial principal radionuclide (pCi/g): Eu-155 | 1.000E+01 | 0.000E+00 | --- | S( 9) |
| R012 | Initial principal radionuclide (pCi/g): Fe-55 | 1.000E+01 | 0.000E+00 | --- | S(10) |
| R012 | Initial principal radionuclide (pCi/g): H-3 | 1.000E+01 | 0.000E+00 | --- | S(11) |
| R012 | Initial principal radionuclide (pCi/g): I-129 | 1.000E+01 | 0.000E+00 | --- | S(12) |
| R012 | Initial principal radionuclide (pCi/g): Mn-54 | 1.000E+01 | 0.000E+00 | --- | S(13) |
| R012 | Initial principal radionuclide (pCi/g): Ni-59 | 1.000E+01 | 0.000E+00 | --- | S(14) |
| R012 | Initial principal radionuclide (pCi/g): Ni-63 | 1.000E+01 | 0.000E+00 | --- | S(15) |
| R012 | Initial principal radionuclide (pCi/g): Pa-231 | 1.000E+01 | 0.000E+00 | --- | S(16) |
| R012 | Initial principal radionuclide (pCi/g): Ru-106 | 1.000E+01 | 0.000E+00 | --- | S(19) |
| R012 | Initial principal radionuclide (pCi/g): Sb-125 | 1.000E+01 | 0.000E+00 | --- | S(20) |
| R012 | Initial principal radionuclide (pCi/g): Sm-151 | 1.000E+01 | 0.000E+00 | --- | S(21) |
| R012 | Initial principal radionuclide (pCi/g): Sr-90 | 1.000E+01 | 0.000E+00 | --- | S(22) |
| R012 | Initial principal radionuclide (pCi/g): U-233 | 1.000E+01 | 0.000E+00 | --- | S(25) |
| R012 | Initial principal radionuclide (pCi/g): U-234 | 1.000E+01 | 0.000E+00 | --- | S(26) |
| R012 | Initial principal radionuclide (pCi/g): U-235 | 1.000E+01 | 0.000E+00 | --- | S(27) |
| R012 | Concentration in groundwater (pCi/L): Ac-227 | not used | 0.000E+00 | --- | W( 1) |
| R012 | Concentration in groundwater (pCi/L): C-14 | not used | 0.000E+00 | --- | W( 2) |
| R012 | Concentration in groundwater (pCi/L): Ce-144 | not used | 0.000E+00 | --- | W( 3) |
| R012 | Concentration in groundwater (pCi/L): Co-60 | not used | 0.000E+00 | --- | W( 4) |
| R012 | Concentration in groundwater (pCi/L): Cs-134 | not used | 0.000E+00 | --- | W( 5) |
| R012 | Concentration in groundwater (pCi/L): Cs-137 | not used | 0.000E+00 | --- | W( 6) |
| R012 | Concentration in groundwater (pCi/L): Eu-152 | not used | 0.000E+00 | --- | W( 7) |
| R012 | Concentration in groundwater (pCi/L): Eu-154 | not used | 0.000E+00 | --- | W( 8) |
| R012 | Concentration in groundwater (pCi/L): Eu-155 | not used | 0.000E+00 | --- | W( 9) |
| R012 | Concentration in groundwater (pCi/L): Fe-55 | not used | 0.000E+00 | --- | W(10) |
| R012 | Concentration in groundwater (pCi/L): H-3 | not used | 0.000E+00 | --- | W(11) |
| R012 | Concentration in groundwater (pCi/L): I-129 | not used | 0.000E+00 | --- | W(12) |
| R012 | Concentration in groundwater (pCi/L): Mn-54 | not used | 0.000E+00 | --- | W(13) |

Site-Specific Parameter Summary (continued)

| | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R012 | Concentration in groundwater (pCi/L): Ni-59 | not used | 0.000E+00 | --- | W(14) |
| R012 | Concentration in groundwater (pCi/L): Ni-63 | not used | 0.000E+00 | --- | W(15) |
| R012 | Concentration in groundwater (pCi/L): Pa-231 | not used | 0.000E+00 | --- | W(16) |
| R012 | Concentration in groundwater (pCi/L): Ru-106 | not used | 0.000E+00 | --- | W(19) |
| R012 | Concentration in groundwater (pCi/L): Sb-125 | not used | 0.000E+00 | --- | W(20) |
| R012 | Concentration in groundwater (pCi/L): Sm-151 | not used | 0.000E+00 | --- | W(21) |
| R012 | Concentration in groundwater (pCi/L): Sr-90 | not used | 0.000E+00 | --- | W(22) |
| R012 | Concentration in groundwater (pCi/L): U-233 | not used | 0.000E+00 | --- | W(25) |
| R012 | Concentration in groundwater (pCi/L): U-234 | not used | 0.000E+00 | --- | W(26) |
| R012 | Concentration in groundwater (pCi/L): U-235 | not used | 0.000E+00 | --- | W(27) |
| R013 | Cover depth (m) | 0.000E+00 | 0.000E+00 | --- | COVER0 |
| R013 | Density of cover material (g/cm**3) | not used | 1.600E+00 | --- | DENSCV |
| R013 | Cover depth erosion rate (m/yr) | not used | 1.000E-03 | --- | VCV |
| R013 | Density of contaminated zone (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSCZ |
| R013 | Contaminated zone erosion rate (m/yr) | 1.000E-03 | 1.000E-03 | --- | VCZ |
| R013 | Contaminated zone total porosity | 4.000E-01 | 4.000E-01 | --- | TPCZ |
| R013 | Contaminated zone effective porosity | 2.000E-01 | 2.000E-01 | --- | EPCZ |
| R013 | Contaminated zone hydraulic conductivity (m/yr) | 5.550E+03 | 1.000E+01 | --- | HCCZ |
| R013 | Contaminated zone b parameter | 4.050E+00 | 5.300E+00 | --- | BCZ |
| R013 | Evapotranspiration coefficient | 6.000E-01 | 6.000E-01 | --- | EVAPTR |
| R013 | Precipitation (m/yr) | 1.000E+00 | 1.000E+00 | --- | PRECIP |
| R013 | Irrigation (m/yr) | 0.000E+00 | 2.000E-01 | --- | RI |
| R013 | Irrigation mode | overhead | overhead | --- | IDITCH |
| R013 | Runoff coefficient | 2.000E-01 | 2.000E-01 | --- | RUNOFF |
| R013 | Watershed area for nearby stream or pond (m**2) | 1.000E+06 | 1.000E+06 | --- | WAREA |
| R014 | Density of saturated zone (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSAQ |
| R014 | Saturated zone total porosity | 4.000E-01 | 4.000E-01 | --- | TPSZ |
| R014 | Saturated zone effective porosity | 2.000E-01 | 2.000E-01 | --- | EPSZ |
| R014 | Saturated zone hydraulic conductivity (m/yr) | 5.550E+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 | Individual's use of groundwater (m**3/yr) | not used | 1.500E+02 | --- | UW |
| R015 | Number of unsaturated zone strata | 1 | 1 | --- | NS |
| R015 | Unsat. zone 1, thickness (m) | 7.470E+00 | 4.000E+00 | --- | H(1) |
| R015 | Unsat. zone 1, soil density (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSUZ(1) |
| R015 | Unsat. zone 1, total porosity | 4.000E-01 | 4.000E-01 | --- | TPUZ(1) |
| R015 | Unsat. zone 1, effective porosity | 2.000E-01 | 2.000E-01 | --- | EPUZ(1) |
| R015 | Unsat. zone 1, soil-specific b parameter | 4.050E+00 | 5.300E+00 | --- | BUZ(1) |
| R015 | Unsat. zone 1, hydraulic conductivity (m/yr) | 5.550E+03 | 1.000E+02 | --- | HCUZ(1) |
| R016 | Distribution coefficients for Ac-227 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTC( 1) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTU( 1,1) |
| R016 | Saturated zone (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTS( 1) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.632E-02 | RLEACH( 1) |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for C-14 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 2) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 2,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 2) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 2) |
| R016 | Distribution coefficients for Ce-144 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC( 3) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU( 3,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS( 3) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH( 3) |
| R016 | Distribution coefficients for Co-60 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC( 4) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU( 4,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS( 4) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH( 4) |
| R016 | Distribution coefficients for Cs-134 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC( 5) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU( 5,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS( 5) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH( 5) |
| R016 | Distribution coefficients for Cs-137 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC( 6) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU( 6,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS( 6) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH( 6) |
| R016 | Distribution coefficients for Eu-152 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 7) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 7,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 7) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 7) |
| R016 | Distribution coefficients for Eu-154 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 8) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 8,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 8) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 8) |
| R016 | Distribution coefficients for Eu-155 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 9) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 9,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 9) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 9) |

Site-Specific Parameter Summary (continued)

| | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| 016 | Distribution coefficients for Fe-55 | | | | |
| 016 | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC(10) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU(10,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS(10) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH(10) |
| 016 | Distribution coefficients for H-3 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC(11) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU(11,1) |
| 016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS(11) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH(11) |
| R016 | Distribution coefficients for I-129 | | | | |
| 016 | Contaminated zone (cm**3/g) | 1.000E-01 | 1.000E-01 | --- | DCACTC(12) |
| 016 | Unsaturated zone 1 (cm**3/g) | 1.000E-01 | 1.000E-01 | --- | DCACTU(12,1) |
| 016 | Saturated zone (cm**3/g) | 1.000E-01 | 1.000E-01 | --- | DCACTS(12) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.544E+00 | RLEACH(12) |
| 016 | Distribution coefficients for Mn-54 | | | | |
| 016 | Contaminated zone (cm**3/g) | 2.000E+02 | 2.000E+02 | --- | DCACTC(13) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.000E+02 | 2.000E+02 | --- | DCACTU(13,1) |
| R016 | Saturated zone (cm**3/g) | 2.000E+02 | 2.000E+02 | --- | DCACTS(13) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.663E-03 | RLEACH(13) |
| 016 | Distribution coefficients for Ni-59 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC(14) |
| 016 | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU(14,1) |
| 016 | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS(14) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH(14) |
| R016 | Distribution coefficients for Ni-63 | | | | |
| | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC(15) |
| | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU(15,1) |
| | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS(15) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH(15) |
| 016 | Distribution coefficients for Pa-231 | | | | |
| 016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(16) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(16,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(16) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(16) |
| 016 | Distribution coefficients for Ru-106 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC(19) |
| 016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU(19,1) |
| 016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS(19) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH(19) |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for Sb-125 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC(20) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU(20,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS(20) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH(20) |
| R016 | Distribution coefficients for Sm-151 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC(21) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU(21,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS(21) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH(21) |
| R016 | Distribution coefficients for Sr-90 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.000E+01 | 3.000E+01 | --- | DCACTC(22) |
| R016 | Unsaturated zone 1 (cm**3/g) | 3.000E+01 | 3.000E+01 | --- | DCACTU(22,1) |
| R016 | Saturated zone (cm**3/g) | 3.000E+01 | 3.000E+01 | --- | DCACTS(22) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 4.429E-02 | RLEACH(22) |
| R016 | Distribution coefficients for U-233 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(25) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(25,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(25) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(25) |
| R016 | Distribution coefficients for U-234 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(26) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(26,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(26) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(26) |
| R016 | Distribution coefficients for U-235 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(27) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(27,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(27) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(27) |
| R016 | Distribution coefficients for daughter Pb-210 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTC(17) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTU(17,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTS(17) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.332E-02 | RLEACH(17) |
| R016 | Distribution coefficients for daughter Ra-226 | | | | |
| R016 | Contaminated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTC(18) |
| R016 | Unsaturated zone 1 (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTU(18,1) |
| R016 | Saturated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTS(18) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.902E-02 | RLEACH(18) |

Site-Specific Parameter Summary (continued)

| | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| :016 | Distribution coefficients for daughter Th-229 | | | | |
| :016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(23) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(23,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(23) |
| :016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(23) |
| .016 | Distribution coefficients for daughter Th-230 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(24) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(24,1) |
| 016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(24) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(24) |
| R017 | Inhalation rate (m**3/yr) | 8.400E+03 | 8.400E+03 | --- | INHALR |
| 017 | Mass loading for inhalation (g/m**3) | 2.000E-04 | 2.000E-04 | --- | MLINH |
| 017 | Dilution length for airborne dust, inhalation (m) | 3.000E+00 | 3.000E+00 | --- | LM |
| .017 | Occupancy factor, inhalation | 5.000E-01 | 4.500E-01 | --- | FO3 |
| R017 | Occupancy and shielding factor, external gamma | 6.000E-01 | 6.000E-01 | --- | FO1 |
| 017 | Shape factor, external gamma | 1.000E+00 | 1.000E+00 | --- | FS1 |
| 017 | Fractions of annular areas within AREA: | | | | |
| .017 | Outer annular radius (m) = √(1/π) | not used | 1.000E+00 | --- | FRACA( 1) |
| 017 | Outer annular radius (m) = √(10/π) | not used | 1.000E+00 | --- | FRACA( 2) |
| 017 | Outer annular radius (m) = √(20/π) | not used | 1.000E+00 | --- | FRACA( 3) |
| 017 | Outer annular radius (m) = √(50/π) | not used | 1.000E+00 | --- | FRACA( 4) |
| 017 | Outer annular radius (m) = √(100/π) | not used | 1.000E+00 | --- | FRACA( 5) |
| 017 | Outer annular radius (m) = √(200/π) | not used | 1.000E+00 | --- | FRACA( 6) |
| 017 | Outer annular radius (m) = √(500/π) | not used | 1.000E+00 | --- | FRACA( 7) |
| 017 | Outer annular radius (m) = √(1000/π) | not used | 1.000E+00 | --- | FRACA( 8) |
| 017 | Outer annular radius (m) = √(5000/π) | not used | 1.000E+00 | --- | FRACA( 9) |
| 017 | Outer annular radius (m) = √(1.E+04/π) | not used | 1.000E+00 | --- | FRACA(10) |
| 017 | Outer annular radius (m) = √(1.E+05/π) | not used | 0.000E+00 | --- | FRACA(11) |
| 017 | Outer annular radius (m) = √(1.E+06/π) | not used | 0.000E+00 | --- | FRACA(12) |
| | Fruits, vegetables and grain consumption (kg/yr) | 1.600E+02 | 1.600E+02 | --- | DIET(1) |
| 018 | Leafy vegetable consumption (kg/yr) | 1.400E+01 | 1.400E+01 | --- | DIET(2) |
| 018 | Milk consumption (L/yr) | 9.200E+01 | 9.200E+01 | --- | DIET(3) |
| 018 | Meat and poultry consumption (kg/yr) | 6.300E+01 | 6.300E+01 | --- | DIET(4) |
| 018 | Fish consumption (kg/yr) | 5.400E+00 | 5.400E+00 | --- | DIET(5) |
| 018 | Other seafood consumption (kg/yr) | 9.000E-01 | 9.000E-01 | --- | DIET(6) |
| 18 | Soil ingestion rate (g/yr) | 3.650E+01 | 0.000E+00 | --- | SOIL |
| 18 | Drinking water intake (L/yr) | 4.100E+02 | 4.100E+02 | --- | DWI |
| 18 | Fraction of drinking water from site | 1.000E+00 | 1.000E+00 | --- | FDW |
| 19 | Livestock fodder intake for meat (kg/day) | 6.800E+01 | 6.800E+01 | --- | LFI5 |
| 19 | Livestock fodder intake for milk (kg/day) | 5.500E+01 | 5.500E+01 | --- | LFI6 |
| 19 | Livestock water intake for meat (L/day) | 5.000E+01 | 5.000E+04 | --- | LWI5 |
| 19 | Livestock water intake for milk (L/day) | 1.600E+02 | 1.600E+02 | --- | LWI6 |
| 19 | Mass loading for foliar deposition (g/m**3) | 1.000E-04 | 1.000E-04 | --- | MLFD |
| 19 | Depth of soil mixing layer (m) | 1.500E-01 | 1.500E-01 | --- | DM |
| 19 | Depth of roots (m) | 9.000E-01 | 9.000E-01 | --- | DROOT |
| 19 | Drinking water fraction from ground water | 1.000E+00 | 1.000E+00 | --- | FGWDW |
| 19 | Livestock water fraction from ground water | 1.000E+00 | 1.000E+00 | --- | FGWLW |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R019 | Irrigation fraction from ground water | 1.000E+00 | 1.000E+00 | --- | FGWIR |
| R021 | Total porosity of the cover material | not used | 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 | not used | 5.000E-02 | --- | PH2OCV |
| R021 | Volumetric water content of the foundation | 1.000E-02 | 1.000E-02 | --- | PH2OFL |
| R021 | Diffusion coefficient for radon gas (m/sec): | | | | |
| R021 | in cover material | not used | 2.000E-06 | --- | DIFCV |
| R021 | in foundation material | 2.000E-08 | 2.000E-08 | --- | 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 annual wind speed (m/sec) | 2.000E+00 | 2.000E+00 | --- | WIND |
| R021 | Average building air exchange rate (1/hr) | 1.000E+00 | 1.000E+00 | --- | REXG |
| R021 | Height of the building (room) (m) | 2.500E+00 | 2.500E+00 | --- | HRM |
| R021 | Building interior area factor | 1.000E+00 | 1.000E+00 | --- | FAI |
| R021 | Bulk density of building foundation (g/cm**3) | 2.400E+00 | 2.400E+00 | --- | DENSFL |
| R021 | Thickness of building foundation (m) | 1.500E-01 | 1.500E-01 | --- | FLOOR |
| R021 | Building depth below ground surface (m) | 1.000E+00 | 1.000E+00 | --- | DMFL |
| R021 | Fraction of time spent indoors | 5.000E-01 | 5.000E-01 | --- | FIND |
| R021 | Fraction of time spent outdoors (on site) | 2.500E-01 | 2.500E-01 | --- | FOTD |
| R021 | Emanating power of Rn-222 gas | 2.000E-01 | 2.000E-01 | --- | EMANA(1) |
| R021 | Emanating power of Rn-220 gas | not used | 1.000E-01 | --- | EMANA(2) |

Summary of Pathway Selections

| Pathway | User Selection |
|---|---|
| 1 -- external gamma | active |
| 2 -- inhalation | active |
| 3 -- plant ingestion | active |
| 4 -- meat ingestion | active |
| 5 -- milk ingestion | active |
| 6 -- aquatic foods | active |
| 7 -- drinking water | active |
| 8 -- radon | active |
| 9 -- soil ingestion | active |

**Contaminated Zone Dimensions**

| | |
|---|---|
| Area: | 100.00 square meters |
| Thickness: | 0.15 meters |
| Cover Depth: | 0.00 meters |

**Initial Soil Concentrations, pCi/g**

| | |
|---|---|
| Ac-227 | 1.000E+01 |
| C-14 | 1.000E+01 |
| Ce-144 | 1.000E+01 |
| Co-60 | 1.000E+01 |
| Cs-134 | 1.000E+01 |
| Cs-137 | 1.000E+01 |
| Eu-152 | 1.000E+01 |
| Eu-154 | 1.000E+01 |
| Eu-155 | 1.000E+01 |
| Fe-55 | 1.000E+01 |
| H-3 | 1.000E+01 |
| I-129 | 1.000E+01 |
| Mn-54 | 1.000E+01 |
| Ni-59 | 1.000E+01 |
| Ni-63 | 1.000E+01 |
| Pa-231 | 1.000E+01 |
| Ru-106 | 1.000E+01 |
| Sb-125 | 1.000E+01 |
| Sm-151 | 1.000E+01 |
| Sr-90 | 1.000E+01 |
| U-233 | 1.000E+01 |
| U-234 | 1.000E+01 |
| U-235 | 1.000E+01 |

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 100 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

| | | | | | | |
|---|---|---|---|---|---|---|
| t (years): | 0.000E+00 | 2.118E+00 | 4.058E+00 | 1.148E+01 | 4.107E+02 | 1.000E+03 |
| TDOSE(t): | 2.625E+02 | 1.485E+02 | 1.901E+02 | 6.008E+01 | 5.666E+01 | 4.294E-15 |
| M(t): | 2.625E+00 | 1.485E+00 | 1.901E+00 | 6.008E-01 | 5.666E-01 | 4.294E-17 |

Maximum TDOSE(t): 1.902E+02 mrem/yr at t = 4.059 ± 0.001 years (within user specified time frame)

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 4.059 years

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 5.459E+00 | 0.0287 | 2.827E+01 | 0.1487 | 0.000E+00 | 0.0000 | 3.598E-01 | 0.0019 | 4.603E-03 | 0.0000 | 2.718E-06 | 0.0000 | 2.682E-01 | 0.0014 |
| C-14 | 0.000E+00 | 0.0000 | 2.958E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.253E-27 | 0.0000 |
| Ce-144 | 1.270E-02 | 0.0001 | 5.896E-05 | 0.0000 | 0.000E+00 | 0.0000 | 4.029E-06 | 0.0000 | 1.177E-08 | 0.0000 | 1.390E-10 | 0.0000 | 1.427E-05 | 0.0000 |
| Co-60 | 3.603E+01 | 0.1895 | 5.500E-04 | 0.0000 | 0.000E+00 | 0.0000 | 2.018E-03 | 0.0000 | 5.021E-06 | 0.0000 | 2.965E-06 | 0.0000 | 4.039E-04 | 0.0000 |
| Cs-134 | 7.577E+00 | 0.0398 | 7.510E-05 | 0.0000 | 0.000E+00 | 0.0000 | 5.394E-04 | 0.0000 | 4.179E-05 | 0.0000 | 8.227E-06 | 0.0000 | 5.010E-04 | 0.0000 |
| Cs-137 | 1.315E+01 | 0.0692 | 1.823E-04 | 0.0000 | 0.000E+00 | 0.0000 | 1.299E-03 | 0.0000 | 1.007E-04 | 0.0000 | 1.982E-05 | 0.0000 | 1.207E-03 | 0.0000 |
| Eu-152 | 4.831E-22 | 0.0000 | 2.497E-26 | 0.0000 | 0.000E+00 | 0.0000 | 3.870E-27 | 0.0000 | 4.952E-29 | 0.0000 | 0.000E+00 | 0.0000 | 2.885E-27 | 0.0000 |
| Eu-154 | 4.836E-22 | 0.0000 | 2.631E-26 | 0.0000 | 0.000E+00 | 0.0000 | 5.235E-27 | 0.0000 | 6.697E-29 | 0.0000 | 0.000E+00 | 0.0000 | 3.902E-27 | 0.0000 |
| Eu-155 | 7.006E-24 | 0.0000 | 3.117E-27 | 0.0000 | 0.000E+00 | 0.0000 | 5.905E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.401E-28 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 5.702E-06 | 0.0000 | 0.000E+00 | 0.0000 | 1.236E-06 | 0.0000 | 7.481E-08 | 0.0000 | 2.651E-09 | 0.0000 | 5.389E-06 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.994E-29 | 0.0000 |
| I-129 | 3.135E-13 | 0.0000 | 3.311E-15 | 0.0000 | 0.000E+00 | 0.0000 | 2.349E-13 | 0.0000 | 1.213E-14 | 0.0000 | 7.166E-15 | 0.0000 | 2.182E-14 | 0.0000 |
| Mn-54 | 5.951E-01 | 0.0031 | 1.465E-06 | 0.0000 | 0.000E+00 | 0.0000 | 4.165E-05 | 0.0000 | 5.144E-07 | 0.0000 | 1.215E-08 | 0.0000 | 2.618E-06 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 1.688E-05 | 0.0000 | 0.000E+00 | 0.0000 | 5.341E-05 | 0.0000 | 1.322E-07 | 0.0000 | 5.308E-07 | 0.0000 | 5.298E-06 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 3.830E-05 | 0.0000 | 0.000E+00 | 0.0000 | 1.402E-04 | 0.0000 | 3.470E-07 | 0.0000 | 1.394E-06 | 0.0000 | 1.391E-05 | 0.0000 |
| Pa-231 | 1.407E+00 | 0.0074 | 1.158E+01 | 0.0609 | 0.000E+00 | 0.0000 | 4.068E-01 | 0.0021 | 5.205E-03 | 0.0000 | 3.074E-06 | 0.0000 | 3.032E-01 | 0.0016 |
| Ru-106 | 5.283E-24 | 0.0000 | 4.076E-27 | 0.0000 | 0.000E+00 | 0.0000 | 4.505E-27 | 0.0000 | 1.120E-29 | 0.0000 | 0.000E+00 | 0.0000 | 8.478E-28 | 0.0000 |
| Sb-125 | 6.794E-23 | 0.0000 | 5.002E-28 | 0.0000 | 0.000E+00 | 0.0000 | 3.285E-27 | 0.0000 | 2.448E-29 | 0.0000 | 0.000E+00 | 0.0000 | 5.622E-28 | 0.0000 |
| Sm-151 | 4.002E-29 | 0.0000 | 3.961E-27 | 0.0000 | 0.000E+00 | 0.0000 | 2.639E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.967E-28 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 6.193E-03 | 0.0000 | 0.000E+00 | 0.0000 | 2.994E-01 | 0.0016 | 2.212E-04 | 0.0000 | 1.306E-03 | 0.0000 | 2.825E-03 | 0.0000 |
| U-233 | 6.085E-03 | 0.0000 | 7.369E-01 | 0.0039 | 0.000E+00 | 0.0000 | 8.739E-03 | 0.0000 | 1.118E-04 | 0.0000 | 1.568E-05 | 0.0000 | 6.485E-03 | 0.0000 |
| U-234 | 3.943E-03 | 0.0000 | 7.337E-01 | 0.0039 | 4.884E-09 | 0.0000 | 8.340E-03 | 0.0000 | 1.067E-04 | 0.0000 | 1.512E-05 | 0.0000 | 6.216E-03 | 0.0000 |
| U-235 | 2.603E+00 | 0.0137 | 6.780E-01 | 0.0036 | 0.000E+00 | 0.0000 | 8.051E-03 | 0.0000 | 1.030E-04 | 0.0000 | 1.454E-05 | 0.0000 | 6.001E-03 | 0.0000 |
| Total | 6.685E+01 | 0.3515 | 4.201E+01 | 0.2209 | 4.884E-09 | 0.0000 | 1.095E+00 | 0.0058 | 1.050E-02 | 0.0001 | 1.391E-03 | 0.0000 | 5.951E-01 | 0.0031 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 4.059 years

Water Dependent Pathways

| adio- uclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.437E+01 | 0.1807 |
| -14 | 1.395E-11 | 0.0000 | 1.950E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.590E-11 | 0.0000 |
| e-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.277E-02 | 0.0001 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.604E+01 | 0.1895 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.578E+00 | 0.0398 |
| s-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.315E+01 | 0.0692 |
| u-152 | 3.213E-11 | 0.0000 | 1.407E-13 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.170E-15 | 0.0000 | 1.442E-17 | 0.0000 | 3.227E-11 | 0.0000 |
| u-154 | 4.345E-11 | 0.0000 | 1.902E-13 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.345E-15 | 0.0000 | 1.950E-17 | 0.0000 | 4.365E-11 | 0.0000 |
| Eu-155 | 4.901E-12 | 0.0000 | 2.146E-14 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.414E-16 | 0.0000 | 2.200E-18 | 0.0000 | 4.924E-12 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.240E-05 | 0.0000 |
| -3 | 3.334E-13 | 0.0000 | 7.996E-18 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.334E-13 | 0.0000 |
| 129 | 7.939E+01 | 0.4174 | 2.871E-02 | 0.0002 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.099E-02 | 0.0003 | 1.425E-01 | 0.0007 | 7.962E+01 | 0.4187 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.951E-01 | 0.0031 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.625E-05 | 0.0000 |
| -63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.942E-04 | 0.0000 |
| -231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.370E+01 | 0.0721 |
| -106 | 9.440E-12 | 0.0000 | 1.294E-14 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.626E-16 | 0.0000 | 8.473E-19 | 0.0000 | 9.454E-12 | 0.0000 |
| b-125 | 6.260E-12 | 0.0000 | 3.813E-16 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.214E-16 | 0.0000 | 8.428E-16 | 0.0000 | 6.262E-12 | 0.0000 |
| m-151 | 2.191E-12 | 0.0000 | 9.591E-15 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.208E-16 | 0.0000 | 9.831E-19 | 0.0000 | 2.201E-12 | 0.0000 |
| -90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.099E-01 | 0.0016 |
| 233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.583E-01 | 0.0040 |
| -234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.523E-01 | 0.0040 |
| -235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.295E+00 | 0.0173 |
| tal | 7.939E+01 | 0.4174 | 2.871E-02 | 0.0002 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.099E-02 | 0.0003 | 1.425E-01 | 0.0007 | 1.902E+02 | 1.0000 |

Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 8.198E+00 | 0.0312 | 4.329E+01 | 0.1649 | 0.000E+00 | 0.0000 | 5.509E-01 | 0.0021 | 7.048E-03 | 0.0000 | 4.162E-06 | 0.0000 | 4.106E-01 | 0.0016 |
| C-14 | 0.000E+00 | 0.0000 | 1.357E-05 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.749E-05 | 0.0000 |
| Ce-144 | 4.768E-01 | 0.0018 | 2.262E-03 | 0.0000 | 0.000E+00 | 0.0000 | 1.545E-04 | 0.0000 | 4.514E-07 | 0.0000 | 5.332E-09 | 0.0000 | 5.475E-04 | 0.0000 |
| Co-60 | 6.244E+01 | 0.2379 | 9.692E-04 | 0.0000 | 0.000E+00 | 0.0000 | 3.556E-03 | 0.0000 | 8.848E-06 | 0.0000 | 5.225E-06 | 0.0000 | 7.117E-04 | 0.0000 |
| Cs-134 | 3.007E+01 | 0.1146 | 3.037E-04 | 0.0000 | 0.000E+00 | 0.0000 | 2.181E-03 | 0.0000 | 1.690E-04 | 0.0000 | 3.327E-05 | 0.0000 | 2.026E-03 | 0.0000 |
| Cs-137 | 1.464E+01 | 0.0558 | 2.068E-04 | 0.0000 | 0.000E+00 | 0.0000 | 1.474E-03 | 0.0000 | 1.142E-04 | 0.0000 | 2.248E-05 | 0.0000 | 1.369E-03 | 0.0000 |
| Eu-152 | 2.706E+01 | 0.1031 | 1.422E-03 | 0.0000 | 0.000E+00 | 0.0000 | 2.204E-04 | 0.0000 | 2.819E-06 | 0.0000 | 1.665E-09 | 0.0000 | 1.642E-04 | 0.0000 |
| Eu-154 | 3.036E+01 | 0.1157 | 1.680E-03 | 0.0000 | 0.000E+00 | 0.0000 | 3.342E-04 | 0.0000 | 4.276E-06 | 0.0000 | 2.525E-09 | 0.0000 | 2.491E-04 | 0.0000 |
| Eu-155 | 5.523E-01 | 0.0021 | 2.520E-04 | 0.0000 | 0.000E+00 | 0.0000 | 4.774E-05 | 0.0000 | 6.108E-07 | 0.0000 | 3.607E-10 | 0.0000 | 3.559E-05 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 1.680E-05 | 0.0000 | 0.000E+00 | 0.0000 | 3.640E-06 | 0.0000 | 2.204E-07 | 0.0000 | 7.811E-09 | 0.0000 | 1.588E-05 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 4.071E-07 | 0.0000 | 0.000E+00 | 0.0000 | 3.002E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.725E-06 | 0.0000 |
| I-129 | 1.072E-01 | 0.0004 | 1.163E-03 | 0.0000 | 0.000E+00 | 0.0000 | 8.253E-02 | 0.0003 | 4.263E-03 | 0.0000 | 2.518E-03 | 0.0000 | 7.665E-03 | 0.0000 |
| Mn-54 | 1.651E+01 | 0.0629 | 4.135E-05 | 0.0000 | 0.000E+00 | 0.0000 | 1.176E-03 | 0.0000 | 1.452E-05 | 0.0000 | 3.431E-07 | 0.0000 | 7.391E-05 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 1.745E-05 | 0.0000 | 0.000E+00 | 0.0000 | 5.520E-05 | 0.0000 | 1.366E-07 | 0.0000 | 5.486E-07 | 0.0000 | 5.475E-06 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 4.071E-05 | 0.0000 | 0.000E+00 | 0.0000 | 1.490E-04 | 0.0000 | 3.688E-07 | 0.0000 | 1.481E-06 | 0.0000 | 1.478E-05 | 0.0000 |
| Pa-231 | 6.592E-01 | 0.0025 | 8.400E+00 | 0.0320 | 0.000E+00 | 0.0000 | 4.040E-01 | 0.0015 | 5.168E-03 | 0.0000 | 3.052E-06 | 0.0000 | 3.011E-01 | 0.0011 |
| Ru-106 | 3.613E+00 | 0.0138 | 2.843E-03 | 0.0000 | 0.000E+00 | 0.0000 | 3.142E-03 | 0.0000 | 7.813E-06 | 0.0000 | 4.614E-09 | 0.0000 | 5.913E-04 | 0.0000 |
| Sb-125 | 8.435E+00 | 0.0321 | 6.332E-05 | 0.0000 | 0.000E+00 | 0.0000 | 4.159E-04 | 0.0000 | 3.100E-06 | 0.0000 | 9.154E-07 | 0.0000 | 7.118E-05 | 0.0000 |
| Sm-151 | 1.843E-06 | 0.0000 | 1.874E-04 | 0.0000 | 0.000E+00 | 0.0000 | 1.249E-05 | 0.0000 | 1.598E-07 | 0.0000 | 9.435E-11 | 0.0000 | 9.308E-06 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 8.400E-03 | 0.0000 | 0.000E+00 | 0.0000 | 4.061E-01 | 0.0015 | 3.001E-04 | 0.0000 | 1.772E-03 | 0.0000 | 3.832E-03 | 0.0000 |
| U-233 | 4.407E-03 | 0.0000 | 8.400E-01 | 0.0032 | 0.000E+00 | 0.0000 | 9.916E-03 | 0.0000 | 1.269E-04 | 0.0000 | 1.798E-05 | 0.0000 | 7.391E-03 | 0.0000 |
| U-234 | 4.403E-03 | 0.0000 | 8.400E-01 | 0.0032 | 0.000E+00 | 0.0000 | 9.549E-03 | 0.0000 | 1.222E-04 | 0.0000 | 1.732E-05 | 0.0000 | 7.118E-03 | 0.0000 |
| U-235 | 2.909E+00 | 0.0111 | 7.754E-01 | 0.0030 | 0.000E+00 | 0.0000 | 9.182E-03 | 0.0000 | 1.175E-04 | 0.0000 | 1.665E-05 | 0.0000 | 6.844E-03 | 0.0000 |
| Total | 2.061E+02 | 0.7850 | 5.417E+01 | 0.2064 | 0.000E+00 | 0.0000 | 1.485E+00 | 0.0057 | 1.747E-02 | 0.0001 | 4.413E-03 | 0.0000 | 7.505E-01 | 0.0029 |

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

Water Dependent Pathways

| adio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| uclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| -227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.246E+01 | 0.1999 |
| -14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.106E-05 | 0.0000 |
| -144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.798E-01 | 0.0018 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.245E+01 | 0.2379 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.008E+01 | 0.1146 |
| -137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.465E+01 | 0.0558 |
| -152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.706E+01 | 0.1031 |
| u-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.036E+01 | 0.1157 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.526E-01 | 0.0021 |
| -55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.655E-05 | 0.0000 |
| -3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.162E-06 | 0.0000 |
| -129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.054E-01 | 0.0008 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.652E+01 | 0.0629 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.880E-05 | 0.0000 |
| -63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.064E-04 | 0.0000 |
| -231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.769E+00 | 0.0372 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.619E+00 | 0.0138 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.436E+00 | 0.0321 |
| -151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.112E-04 | 0.0000 |
| -90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.204E-01 | 0.0016 |
| 233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.619E-01 | 0.0033 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.612E-01 | 0.0033 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.701E+00 | 0.0141 |
| tal | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.625E+02 | 1.0000 |

*Su f all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 2.118E+00 years

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 6.631E+00 | 0.0446 | 3.467E+01 | 0.2334 | 0.000E+00 | 0.0000 | 4.411E-01 | 0.0030 | 5.643E-03 | 0.0000 | 3.333E-06 | 0.0000 | 3.288E-01 | 0.0022 |
| C-14 | 0.000E+00 | 0.0000 | 2.025E-17 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.578E-17 | 0.0000 |
| Ce-144 | 7.188E-02 | 0.0005 | 3.372E-04 | 0.0000 | 0.000E+00 | 0.0000 | 2.304E-05 | 0.0000 | 6.731E-08 | 0.0000 | 7.951E-10 | 0.0000 | 8.164E-05 | 0.0000 |
| Co-60 | 4.687E+01 | 0.3156 | 7.212E-04 | 0.0000 | 0.000E+00 | 0.0000 | 2.646E-03 | 0.0000 | 6.584E-06 | 0.0000 | 3.888E-06 | 0.0000 | 5.296E-04 | 0.0000 |
| Cs-134 | 1.465E+01 | 0.0986 | 1.465E-04 | 0.0000 | 0.000E+00 | 0.0000 | 1.052E-03 | 0.0000 | 8.152E-05 | 0.0000 | 1.605E-05 | 0.0000 | 9.772E-04 | 0.0000 |
| Cs-137 | 1.385E+01 | 0.0932 | 1.936E-04 | 0.0000 | 0.000E+00 | 0.0000 | 1.380E-03 | 0.0000 | 1.069E-04 | 0.0000 | 2.105E-05 | 0.0000 | 1.282E-03 | 0.0000 |
| Eu-152 | 3.638E-11 | 0.0000 | 1.895E-15 | 0.0000 | 0.000E+00 | 0.0000 | 2.938E-16 | 0.0000 | 3.758E-18 | 0.0000 | 2.220E-21 | 0.0000 | 2.190E-16 | 0.0000 |
| Eu-154 | 3.846E-11 | 0.0000 | 2.110E-15 | 0.0000 | 0.000E+00 | 0.0000 | 4.197E-16 | 0.0000 | 5.369E-18 | 0.0000 | 3.171E-21 | 0.0000 | 3.128E-16 | 0.0000 |
| Eu-155 | 6.213E-13 | 0.0000 | 2.798E-16 | 0.0000 | 0.000E+00 | 0.0000 | 5.300E-17 | 0.0000 | 6.781E-19 | 0.0000 | 4.005E-22 | 0.0000 | 3.951E-17 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 9.560E-06 | 0.0000 | 0.000E+00 | 0.0000 | 2.071E-06 | 0.0000 | 1.254E-07 | 0.0000 | 4.444E-09 | 0.0000 | 9.035E-06 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 5.394E-19 | 0.0000 | 0.000E+00 | 0.0000 | 3.978E-20 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.285E-18 | 0.0000 |
| I-129 | 1.026E-07 | 0.0000 | 1.097E-09 | 0.0000 | 0.000E+00 | 0.0000 | 7.788E-08 | 0.0000 | 4.022E-09 | 0.0000 | 2.375E-09 | 0.0000 | 7.233E-09 | 0.0000 |
| Mn-54 | 2.915E+00 | 0.0196 | 7.235E-06 | 0.0000 | 0.000E+00 | 0.0000 | 2.057E-04 | 0.0000 | 2.541E-06 | 0.0000 | 6.002E-08 | 0.0000 | 1.293E-05 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 1.715E-05 | 0.0000 | 0.000E+00 | 0.0000 | 5.426E-05 | 0.0000 | 1.343E-07 | 0.0000 | 5.393E-07 | 0.0000 | 5.382E-06 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 3.944E-05 | 0.0000 | 0.000E+00 | 0.0000 | 1.444E-04 | 0.0000 | 3.573E-07 | 0.0000 | 1.435E-06 | 0.0000 | 1.432E-05 | 0.0000 |
| Pa-231 | 1.104E+00 | 0.0074 | 1.036E+01 | 0.0697 | 0.000E+00 | 0.0000 | 4.086E-01 | 0.0028 | 5.228E-03 | 0.0000 | 3.087E-06 | 0.0000 | 3.046E-01 | 0.0021 |
| Ru-106 | 1.316E-12 | 0.0000 | 1.025E-15 | 0.0000 | 0.000E+00 | 0.0000 | 1.133E-15 | 0.0000 | 2.817E-18 | 0.0000 | 1.664E-21 | 0.0000 | 2.132E-16 | 0.0000 |
| Sb-125 | 7.486E-12 | 0.0000 | 5.563E-17 | 0.0000 | 0.000E+00 | 0.0000 | 3.654E-16 | 0.0000 | 2.723E-18 | 0.0000 | 8.042E-19 | 0.0000 | 6.253E-17 | 0.0000 |
| Sm-151 | 2.745E-18 | 0.0000 | 2.752E-16 | 0.0000 | 0.000E+00 | 0.0000 | 1.834E-17 | 0.0000 | 2.346E-19 | 0.0000 | 1.385E-22 | 0.0000 | 1.367E-17 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 7.165E-03 | 0.0000 | 0.000E+00 | 0.0000 | 3.464E-01 | 0.0023 | 2.560E-04 | 0.0000 | 1.512E-03 | 0.0000 | 3.269E-03 | 0.0000 |
| U-233 | 5.312E-03 | 0.0000 | 7.845E-01 | 0.0053 | 0.000E+00 | 0.0000 | 9.283E-03 | 0.0001 | 1.187E-04 | 0.0000 | 1.674E-05 | 0.0000 | 6.904E-03 | 0.0000 |
| U-234 | 4.156E-03 | 0.0000 | 7.828E-01 | 0.0053 | 1.388E-09 | 0.0000 | 8.899E-03 | 0.0001 | 1.138E-04 | 0.0000 | 1.613E-05 | 0.0000 | 6.633E-03 | 0.0000 |
| U-235 | 2.745E+00 | 0.0185 | 7.230E-01 | 0.0049 | 0.000E+00 | 0.0000 | 8.573E-03 | 0.0001 | 1.097E-04 | 0.0000 | 1.551E-05 | 0.0000 | 6.390E-03 | 0.0000 |
| Total | 8.884E+01 | 0.5982 | 4.732E+01 | 0.3186 | 1.388E-09 | 0.0000 | 1.228E+00 | 0.0083 | 1.167E-02 | 0.0001 | 1.609E-03 | 0.0000 | 6.595E-01 | 0.0044 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 2.118E+00 years

Water Dependent Pathways

| :adio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| 'c-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.207E+01 | 0.2833 |
| -14 | 9.303E-01 | 0.0063 | 1.300E-01 | 0.0009 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.060E+00 | 0.0071 |
| e-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.233E-02 | 0.0005 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.688E+01 | 0.3156 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.465E+01 | 0.0986 |
| s-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.385E+01 | 0.0932 |
| u-152 | 2.375E+00 | 0.0160 | 1.040E-02 | 0.0001 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.561E-04 | 0.0000 | 1.066E-06 | 0.0000 | 2.386E+00 | 0.0161 |
| Eu-154 | 3.393E+00 | 0.0228 | 1.485E-02 | 0.0001 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.517E-04 | 0.0000 | 1.523E-06 | 0.0000 | 3.408E+00 | 0.0229 |
| Eu-155 | 4.285E-01 | 0.0029 | 1.876E-03 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.230E-05 | 0.0000 | 1.923E-07 | 0.0000 | 4.304E-01 | 0.0029 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.080E-05 | 0.0000 |
| -3 | 2.478E-02 | 0.0002 | 5.944E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.478E-02 | 0.0002 |
| -129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.952E-07 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.916E+00 | 0.0196 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.747E-05 | 0.0000 |
| i-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.999E-04 | 0.0000 |
| a-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.218E+01 | 0.0820 |
| Ru-106 | 2.312E+00 | 0.0156 | 3.169E-03 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.883E-05 | 0.0000 | 2.076E-07 | 0.0000 | 2.316E+00 | 0.0156 |
| Sb-125 | 6.782E-01 | 0.0046 | 4.131E-05 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.815E-05 | 0.0000 | 9.130E-05 | 0.0000 | 6.784E-01 | 0.0046 |
| m-151 | 1.482E-01 | 0.0010 | 6.490E-04 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.847E-05 | 0.0000 | 6.652E-08 | 0.0000 | 1.489E-01 | 0.0010 |
| -90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.586E-01 | 0.0024 |
| -233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.062E-01 | 0.0054 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.026E-01 | 0.0054 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.483E+00 | 0.0235 |
| :tal | 1.029E+01 | 0.0693 | 1.610E-01 | 0.0011 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.386E-03 | 0.0000 | 9.436E-05 | 0.0000 | 1.485E+02 | 1.0000 |

*Su[illegible] all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 4.058E+00 years

Water Independent Pathways

| Radio-Nuclide | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 5.459E+00 | 0.0287 | 2.828E+01 | 0.1487 | 0.000E+00 | 0.0000 | 3.598E-01 | 0.0019 | 4.603E-03 | 0.0000 | 2.718E-06 | 0.0000 | 2.682E-01 | 0.0014 |
| C-14 | 0.000E+00 | 0.0000 | 2.978E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.262E-27 | 0.0000 |
| Ce-144 | 1.270E-02 | 0.0001 | 5.899E-05 | 0.0000 | 0.000E+00 | 0.0000 | 4.031E-06 | 0.0000 | 1.178E-08 | 0.0000 | 1.391E-10 | 0.0000 | 1.428E-05 | 0.0000 |
| Co-60 | 3.604E+01 | 0.1895 | 5.501E-04 | 0.0000 | 0.000E+00 | 0.0000 | 2.018E-03 | 0.0000 | 5.021E-06 | 0.0000 | 2.965E-06 | 0.0000 | 4.039E-04 | 0.0000 |
| Cs-134 | 7.578E+00 | 0.0399 | 7.512E-05 | 0.0000 | 0.000E+00 | 0.0000 | 5.395E-04 | 0.0000 | 4.180E-05 | 0.0000 | 8.229E-06 | 0.0000 | 5.011E-04 | 0.0000 |
| Cs-137 | 1.315E+01 | 0.0692 | 1.823E-04 | 0.0000 | 0.000E+00 | 0.0000 | 1.299E-03 | 0.0000 | 1.007E-04 | 0.0000 | 1.982E-05 | 0.0000 | 1.207E-03 | 0.0000 |
| Eu-152 | 4.866E-22 | 0.0000 | 2.514E-26 | 0.0000 | 0.000E+00 | 0.0000 | 3.898E-27 | 0.0000 | 4.987E-29 | 0.0000 | 0.000E+00 | 0.0000 | 2.905E-27 | 0.0000 |
| Eu-154 | 4.871E-22 | 0.0000 | 2.650E-26 | 0.0000 | 0.000E+00 | 0.0000 | 5.272E-27 | 0.0000 | 6.745E-29 | 0.0000 | 0.000E+00 | 0.0000 | 3.929E-27 | 0.0000 |
| Eu-155 | 7.056E-24 | 0.0000 | 3.139E-27 | 0.0000 | 0.000E+00 | 0.0000 | 5.947E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.433E-28 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 5.703E-06 | 0.0000 | 0.000E+00 | 0.0000 | 1.236E-06 | 0.0000 | 7.482E-08 | 0.0000 | 2.651E-09 | 0.0000 | 5.390E-06 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.015E-29 | 0.0000 |
| I-129 | 3.146E-13 | 0.0000 | 3.322E-15 | 0.0000 | 0.000E+00 | 0.0000 | 2.358E-13 | 0.0000 | 1.218E-14 | 0.0000 | 7.192E-15 | 0.0000 | 2.190E-14 | 0.0000 |
| Mn-54 | 5.953E-01 | 0.0031 | 1.465E-06 | 0.0000 | 0.000E+00 | 0.0000 | 4.166E-05 | 0.0000 | 5.146E-07 | 0.0000 | 1.216E-08 | 0.0000 | 2.619E-06 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 1.688E-05 | 0.0000 | 0.000E+00 | 0.0000 | 5.341E-05 | 0.0000 | 1.322E-07 | 0.0000 | 5.308E-07 | 0.0000 | 5.298E-06 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 3.830E-05 | 0.0000 | 0.000E+00 | 0.0000 | 1.402E-04 | 0.0000 | 3.470E-07 | 0.0000 | 1.394E-06 | 0.0000 | 1.391E-05 | 0.0000 |
| Pa-231 | 1.407E+00 | 0.0074 | 1.158E+01 | 0.0609 | 0.000E+00 | 0.0000 | 4.068E-01 | 0.0021 | 5.205E-03 | 0.0000 | 3.074E-06 | 0.0000 | 3.032E-01 | 0.0016 |
| Ru-106 | 5.322E-24 | 0.0000 | 4.106E-27 | 0.0000 | 0.000E+00 | 0.0000 | 4.539E-27 | 0.0000 | 1.128E-29 | 0.0000 | 0.000E+00 | 0.0000 | 8.540E-28 | 0.0000 |
| Sb-125 | 6.843E-23 | 0.0000 | 5.037E-28 | 0.0000 | 0.000E+00 | 0.0000 | 3.309E-27 | 0.0000 | 2.466E-29 | 0.0000 | 0.000E+00 | 0.0000 | 5.662E-28 | 0.0000 |
| Sm-151 | 4.030E-29 | 0.0000 | 3.989E-27 | 0.0000 | 0.000E+00 | 0.0000 | 2.658E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.981E-28 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 6.193E-03 | 0.0000 | 0.000E+00 | 0.0000 | 2.994E-01 | 0.0016 | 2.212E-04 | 0.0000 | 1.307E-03 | 0.0000 | 2.826E-03 | 0.0000 |
| U-233 | 6.085E-03 | 0.0000 | 7.369E-01 | 0.0039 | 0.000E+00 | 0.0000 | 8.739E-03 | 0.0000 | 1.118E-04 | 0.0000 | 1.568E-05 | 0.0000 | 6.486E-03 | 0.0000 |
| U-234 | 3.943E-03 | 0.0000 | 7.337E-01 | 0.0039 | 4.883E-09 | 0.0000 | 8.341E-03 | 0.0000 | 1.067E-04 | 0.0000 | 1.512E-05 | 0.0000 | 6.217E-03 | 0.0000 |
| U-235 | 2.603E+00 | 0.0137 | 6.780E-01 | 0.0036 | 0.000E+00 | 0.0000 | 8.051E-03 | 0.0000 | 1.030E-04 | 0.0000 | 1.454E-05 | 0.0000 | 6.001E-03 | 0.0000 |
| Total | 6.685E+01 | 0.3516 | 4.201E+01 | 0.2210 | 4.883E-09 | 0.0000 | 1.095E+00 | 0.0058 | 1.050E-02 | 0.0001 | 1.391E-03 | 0.0000 | 5.951E-01 | 0.0031 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 4.058E+00 years

Water Dependent Pathways

| :adio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| /uclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| ıc-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.437E+01 | 0.1808 |
| :-14 | 1.405E-11 | 0.0000 | 1.963E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.601E-11 | 0.0000 |
| :e-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.278E-02 | 0.0001 |
| :o-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.604E+01 | 0.1896 |
| :s-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.579E+00 | 0.0399 |
| :s-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.315E+01 | 0.0692 |
| u-152 | 3.235E-11 | 0.0000 | 1.416E-13 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.214E-15 | 0.0000 | 1.452E-17 | 0.0000 | 3.250E-11 | 0.0000 |
| .u-154 | 4.376E-11 | 0.0000 | 1.916E-13 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.405E-15 | 0.0000 | 1.964E-17 | 0.0000 | 4.396E-11 | 0.0000 |
| :u-155 | 4.936E-12 | 0.0000 | 2.161E-14 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.481E-16 | 0.0000 | 2.215E-18 | 0.0000 | 4.959E-12 | 0.0000 |
| :e-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.241E-05 | 0.0000 |
| ı-3 | 3.357E-13 | 0.0000 | 8.052E-18 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.357E-13 | 0.0000 |
| -129 | 7.932E+01 | 0.4172 | 2.869E-02 | 0.0002 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.094E-02 | 0.0003 | 1.424E-01 | 0.0007 | 7.955E+01 | 0.4184 |
| ın-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.954E-01 | 0.0031 |
| i-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.625E-05 | 0.0000 |
| i-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.942E-04 | 0.0000 |
| a-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.370E+01 | 0.0721 |
| u-106 | 9.510E-12 | 0.0000 | 1.303E-14 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.653E-16 | 0.0000 | 8.536E-19 | 0.0000 | 9.524E-12 | 0.0000 |
| b-125 | 6.305E-12 | 0.0000 | 3.841E-16 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.266E-16 | 0.0000 | 8.489E-16 | 0.0000 | 6.307E-12 | 0.0000 |
| m-151 | 2.206E-12 | 0.0000 | 9.659E-15 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.237E-16 | 0.0000 | 9.901E-19 | 0.0000 | 2.216E-12 | 0.0000 |
| .r-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.099E-01 | 0.0016 |
| ı-233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.583E-01 | 0.0040 |
| ı-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.523E-01 | 0.0040 |
| ı-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.295E+00 | 0.0173 |
| otal | 7.932E+01 | 0.4172 | 2.869E-02 | 0.0002 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.094E-02 | 0.0003 | 1.424E-01 | 0.0007 | 1.901E+02 | 1.0000 |

Si[illegible]f all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.148E+01 years

Water Independent Pathways

| Radio-Nuclide | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 2.591E+00 | 0.0431 | 1.295E+01 | 0.2155 | 0.000E+00 | 0.0000 | 1.647E-01 | 0.0027 | 2.108E-03 | 0.0000 | 1.245E-06 | 0.0000 | 1.228E-01 | 0.0020 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144 | 1.674E-05 | 0.0000 | 7.474E-08 | 0.0000 | 0.000E+00 | 0.0000 | 5.107E-09 | 0.0000 | 1.492E-11 | 0.0000 | 1.762E-13 | 0.0000 | 1.809E-08 | 0.0000 |
| Co-60 | 1.316E+01 | 0.2191 | 1.948E-04 | 0.0000 | 0.000E+00 | 0.0000 | 7.147E-04 | 0.0000 | 1.778E-06 | 0.0000 | 1.050E-06 | 0.0000 | 1.430E-04 | 0.0000 |
| Cs-134 | 6.081E-01 | 0.0101 | 5.824E-06 | 0.0000 | 0.000E+00 | 0.0000 | 4.183E-05 | 0.0000 | 3.241E-06 | 0.0000 | 6.380E-07 | 0.0000 | 3.885E-05 | 0.0000 |
| Cs-137 | 1.079E+01 | 0.1796 | 1.444E-04 | 0.0000 | 0.000E+00 | 0.0000 | 1.030E-03 | 0.0000 | 7.977E-05 | 0.0000 | 1.570E-05 | 0.0000 | 9.562E-04 | 0.0000 |
| Eu-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 7.889E-07 | 0.0000 | 0.000E+00 | 0.0000 | 1.709E-07 | 0.0000 | 1.035E-08 | 0.0000 | 3.668E-10 | 0.0000 | 7.455E-07 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| I-129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 1.363E-03 | 0.0000 | 3.251E-09 | 0.0000 | 0.000E+00 | 0.0000 | 9.243E-08 | 0.0000 | 1.142E-09 | 0.0000 | 2.697E-11 | 0.0000 | 5.810E-09 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 1.586E-05 | 0.0000 | 0.000E+00 | 0.0000 | 5.019E-05 | 0.0000 | 1.242E-07 | 0.0000 | 4.989E-07 | 0.0000 | 4.979E-06 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 3.419E-05 | 0.0000 | 0.000E+00 | 0.0000 | 1.252E-04 | 0.0000 | 3.098E-07 | 0.0000 | 1.244E-06 | 0.0000 | 1.242E-05 | 0.0000 |
| Pa-231 | 1.946E+00 | 0.0324 | 1.307E+01 | 0.2175 | 0.000E+00 | 0.0000 | 3.684E-01 | 0.0061 | 4.712E-03 | 0.0001 | 2.783E-06 | 0.0000 | 2.746E-01 | 0.0046 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sm-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 3.539E-03 | 0.0001 | 0.000E+00 | 0.0000 | 1.711E-01 | 0.0028 | 1.264E-04 | 0.0000 | 7.466E-04 | 0.0000 | 1.615E-03 | 0.0000 |
| U-233 | 8.592E-03 | 0.0001 | 5.798E-01 | 0.0097 | 0.000E+00 | 0.0000 | 6.941E-03 | 0.0001 | 8.876E-05 | 0.0000 | 1.217E-05 | 0.0000 | 5.105E-03 | 0.0001 |
| U-234 | 3.226E-03 | 0.0001 | 5.717E-01 | 0.0095 | 3.318E-08 | 0.0000 | 6.499E-03 | 0.0001 | 8.315E-05 | 0.0000 | 1.178E-05 | 0.0000 | 4.844E-03 | 0.0001 |
| U-235 | 2.122E+00 | 0.0353 | 5.299E-01 | 0.0088 | 0.000E+00 | 0.0000 | 6.326E-03 | 0.0001 | 8.094E-05 | 0.0000 | 1.133E-05 | 0.0000 | 4.716E-03 | 0.0001 |
| Total | 3.123E+01 | 0.5199 | 2.770E+01 | 0.4610 | 3.318E-08 | 0.0000 | 7.259E-01 | 0.0121 | 7.285E-03 | 0.0001 | 8.051E-04 | 0.0000 | 4.148E-01 | 0.0069 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.148E+01 years

Water Dependent Pathways

| adio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ..uclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.583E+01 | 0.2634 |
| -14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| e-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.684E-05 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.317E+01 | 0.2191 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.082E-01 | 0.0101 |
| s-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.079E+01 | 0.1796 |
| J-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| J-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.716E-06 | 0.0000 |
| -3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -129 | 6.659E-20 | 0.0000 | 2.408E-23 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.116E-23 | 0.0000 | 1.195E-22 | 0.0000 | 6.678E-20 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.364E-03 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.166E-05 | 0.0000 |
| -63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.733E-04 | 0.0000 |
| -231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.566E+01 | 0.2606 |
| J-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sm-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.771E-01 | 0.0029 |
| 233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.006E-01 | 0.0100 |
| J-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.863E-01 | 0.0098 |
| J-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.663E+00 | 0.0443 |
| tal | 6.659E-20 | 0.0000 | 2.408E-23 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.116E-23 | 0.0000 | 1.195E-22 | 0.0000 | 6.008E+01 | 1.0000 |

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 4.107E+02 years

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| I-129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sm-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 4.107E+02 years

Water Dependent Pathways

| adio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| c-227 | 1.155E-04 | 0.0000 | 5.057E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.218E-08 | 0.0000 | 5.183E-11 | 0.0000 | 1.160E-04 | 0.0000 |
| -14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| e-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| s-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| cu-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| e-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| i-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| a-231 | 5.595E+01 | 0.9875 | 2.450E-01 | 0.0043 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.075E-02 | 0.0002 | 2.511E-05 | 0.0000 | 5.621E+01 | 0.9920 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| m-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| r-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 4.503E-01 | 0.0079 | 1.972E-03 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.650E-05 | 0.0000 | 2.021E-07 | 0.0000 | 4.524E-01 | 0.0080 |
| otal | 5.640E+01 | 0.9955 | 2.469E-01 | 0.0044 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.083E-02 | 0.0002 | 2.531E-05 | 0.0000 | 5.666E+01 | 1.0000 |

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| I-129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sm-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| Radio-nuclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 6.015E-29 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.015E-29 | 0.0000 |
| -14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| e-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| s-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| e-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| i-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| a-231 | 4.184E-15 | 0.9745 | 1.832E-17 | 0.0043 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.036E-19 | 0.0002 | 1.878E-21 | 0.0000 | 4.203E-15 | 0.9789 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| m-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -90 | 3.469E-18 | 0.0008 | 3.698E-21 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.998E-23 | 0.0000 | 9.342E-22 | 0.0000 | 3.474E-18 | 0.0008 |
| -233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 8.653E-17 | 0.0202 | 3.788E-19 | 0.0001 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.662E-20 | 0.0000 | 3.883E-23 | 0.0000 | 8.692E-17 | 0.0202 |
| tal | 4.274E-15 | 0.9955 | 1.870E-17 | 0.0044 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.203E-19 | 0.0002 | 2.851E-21 | 0.0000 | 4.294E-15 | 1.0000 |

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways, (mrem/yr)/(pCi/g)

| Nuclide (i) | t= 0.000E+00 | 2.118E+00 | 4.058E+00 | 1.148E+01 | 4.107E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|
| Ac-227 | 5.246E+00 | 4.207E+00 | 3.437E+00 | 1.583E+00 | 1.160E-05 | 6.015E-30 |
| C-14 | 7.106E-06 | 1.060E-01 | 1.601E-12 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Ce-144 | 4.798E-02 | 7.233E-03 | 1.278E-03 | 1.684E-06 | 0.000E+00 | 0.000E+00 |
| Co-60 | 6.245E+00 | 4.688E+00 | 3.604E+00 | 1.317E+00 | 0.000E+00 | 0.000E+00 |
| Cs-134 | 3.008E+00 | 1.465E+00 | 7.579E-01 | 6.082E-02 | 0.000E+00 | 0.000E+00 |
| Cs-137 | 1.465E+00 | 1.385E+00 | 1.315E+00 | 1.079E+00 | 0.000E+00 | 0.000E+00 |
| Eu-152 | 2.706E+00 | 2.386E-01 | 3.250E-12 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Eu-154 | 3.036E+00 | 3.408E-01 | 4.396E-12 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Eu-155 | 5.526E-02 | 4.304E-02 | 4.959E-13 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Fe-55 | 3.655E-06 | 2.080E-06 | 1.241E-06 | 1.716E-07 | 0.000E+00 | 0.000E+00 |
| H-3 | 2.162E-07 | 2.478E-03 | 3.357E-14 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| I-129 | 2.054E-02 | 1.952E-08 | 7.955E+00 | 6.678E-21 | 0.000E+00 | 0.000E+00 |
| Mn-54 | 1.652E+00 | 2.916E-01 | 5.954E-02 | 1.364E-04 | 0.000E+00 | 0.000E+00 |
| Ni-59 | 7.880E-06 | 7.747E-06 | 7.625E-06 | 7.166E-06 | 0.000E+00 | 0.000E+00 |
| Ni-63 | 2.064E-05 | 1.999E-05 | 1.942E-05 | 1.733E-05 | 0.000E+00 | 0.000E+00 |
| Pa-231 | 9.769E-01 | 1.218E+00 | 1.370E+00 | 1.566E+00 | 5.621E+00 | 4.203E-16 |
| Ru-106 | 3.619E-01 | 2.316E-01 | 9.524E-13 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Sb-125 | 8.436E-01 | 6.784E-02 | 6.307E-13 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Sm-151 | 2.112E-05 | 1.489E-02 | 2.216E-13 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Sr-90 | 4.204E-02 | 3.586E-02 | 3.099E-02 | 1.771E-02 | 0.000E+00 | 3.474E-19 |
| U-233 | 8.619E-02 | 8.062E-02 | 7.583E-02 | 6.006E-02 | 0.000E+00 | 0.000E+00 |
| U-234 | 8.612E-02 | 8.026E-02 | 7.523E-02 | 5.863E-02 | 0.000E+00 | 0.000E+00 |
| U-235 | 3.701E-01 | 3.483E-01 | 3.295E-01 | 2.663E-01 | 4.524E-02 | 8.692E-18 |

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 100 mrem/yr

| Nuclide (i) | t= 0.000E+00 | 2.118E+00 | 4.058E+00 | 1.148E+01 | 4.107E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|
| Ac-227 | 1.906E+01 | 2.377E+01 | 2.910E+01 | 6.318E+01 | 8.619E+06 | *7.244E+13 |
| C-14 | 1.407E+07 | 9.431E+02 | *4.454E+12 | *4.454E+12 | *4.454E+12 | *4.454E+12 |
| Ce-144 | 2.084E+03 | 1.383E+04 | 7.824E+04 | 5.939E+07 | *3.190E+15 | *3.190E+15 |
| Co-60 | 1.601E+01 | 2.133E+01 | 2.775E+01 | 7.596E+01 | *1.131E+15 | *1.131E+15 |
| Cs-134 | 3.325E+01 | 6.826E+01 | 1.319E+02 | 1.644E+03 | *1.294E+15 | *1.294E+15 |
| Cs-137 | 6.827E+01 | 7.221E+01 | 7.602E+01 | 9.267E+01 | *8.652E+13 | *8.652E+13 |
| Eu-152 | 3.696E+01 | 4.192E+02 | 3.077E+13 | *1.810E+14 | *1.810E+14 | *1.810E+14 |
| Eu-154 | 3.293E+01 | 2.934E+02 | 2.275E+13 | *2.732E+14 | *2.732E+14 | *2.732E+14 |
| Eu-155 | 1.810E+03 | 2.323E+03 | 2.017E+14 | *4.651E+14 | *4.651E+14 | *4.651E+14 |
| Fe-55 | 2.736E+07 | 4.809E+07 | 8.061E+07 | 5.827E+08 | *2.423E+15 | *2.423E+15 |
| H-3 | 4.626E+08 | 4.035E+04 | 2.979E+15 | *9.610E+15 | *9.610E+15 | *9.610E+15 |
| I-129 | 4.869E+03 | *1.733E+08 | 1.257E+01 | *1.733E+08 | *1.733E+08 | *1.733E+08 |
| Mn-54 | 6.055E+01 | 3.430E+02 | 1.680E+03 | 7.334E+05 | *7.739E+15 | *7.739E+15 |
| Ni-59 | 1.269E+07 | 1.291E+07 | 1.311E+07 | 1.396E+07 | *8.085E+10 | *8.085E+10 |
| Ni-63 | 4.846E+06 | 5.002E+06 | 5.150E+06 | 5.770E+06 | *5.679E+13 | *5.679E+13 |
| Pa-231 | 1.024E+02 | 8.211E+01 | 7.297E+01 | 6.386E+01 | 1.779E+01 | *4.716E+10 |
| Ru-106 | 2.763E+02 | 4.318E+02 | 1.050E+14 | *3.265E+15 | *3.265E+15 | *3.265E+15 |
| Sb-125 | 1.185E+02 | 1.474E+03 | 1.586E+14 | *1.033E+15 | *1.033E+15 | *1.033E+15 |
| Sm-151 | 4.735E+06 | 6.716E+03 | *2.631E+13 | *2.631E+13 | *2.631E+13 | *2.631E+13 |
| Sr-90 | 2.379E+03 | 2.789E+03 | 3.227E+03 | 5.646E+03 | *1.380E+14 | *1.380E+14 |
| U-233 | 1.160E+03 | 1.240E+03 | 1.319E+03 | 1.665E+03 | *9.633E+11 | *9.633E+11 |
| U-234 | 1.161E+03 | 1.246E+03 | 1.329E+03 | 1.706E+03 | *6.233E+09 | *6.233E+09 |
| U-235 | 2.702E+02 | 2.871E+02 | 3.035E+02 | 3.755E+02 | 2.210E+03 | *2.160E+06 |

*At specific activity limit

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 4.059 ± 0.001 years

| Nuclide (i) | Initial pCi/g | tmin (years) | DSR(i,tmin) | G(i,tmin) (pCi/g) | DSR(i,tmax) | G(i,tmax) (pCi/g) |
|---|---|---|---|---|---|---|
| Ac-227 | 1.000E+01 | 0.000E+00 | 5.246E+00 | 1.906E+01 | 3.437E+00 | 2.910E+01 |
| C-14 | 1.000E+01 | 2.118E+00 | 1.060E-01 | 9.431E+02 | 1.590E-12 | *4.454E+12 |
| Ce-144 | 1.000E+01 | 0.000E+00 | 4.798E-02 | 2.084E+03 | 1.277E-03 | 7.828E+04 |
| Co-60 | 1.000E+01 | 0.000E+00 | 6.245E+00 | 1.601E+01 | 3.604E+00 | 2.775E+01 |
| Cs-134 | 1.000E+01 | 0.000E+00 | 3.008E+00 | 3.325E+01 | 7.578E-01 | 1.320E+02 |
| Cs-137 | 1.000E+01 | 0.000E+00 | 1.465E+00 | 6.827E+01 | 1.315E+00 | 7.602E+01 |
| Eu-152 | 1.000E+01 | 0.000E+00 | 2.706E+00 | 3.696E+01 | 3.227E-12 | 3.099E+13 |
| Eu-154 | 1.000E+01 | 0.000E+00 | 3.036E+00 | 3.293E+01 | 4.365E-12 | 2.291E+13 |
| Eu-155 | 1.000E+01 | 0.000E+00 | 5.526E-02 | 1.810E+03 | 4.924E-13 | 2.031E+14 |
| Fe-55 | 1.000E+01 | 0.000E+00 | 3.655E-06 | 2.736E+07 | 1.240E-06 | 8.062E+07 |
| H-3 | 1.000E+01 | 2.118E+00 | 2.478E-03 | 4.035E+04 | 3.334E-14 | 3.000E+15 |
| I-129 | 1.000E+01 | 4.058 ± 0.001 | 7.961E+00 | 1.256E+01 | 7.962E+00 | 1.256E+01 |
| Mn-54 | 1.000E+01 | 0.000E+00 | 1.652E+00 | 6.055E+01 | 5.951E-02 | 1.680E+03 |
| Ni-59 | 1.000E+01 | 0.000E+00 | 7.880E-06 | 1.269E+07 | 7.625E-06 | 1.311E+07 |
| Ni-63 | 1.000E+01 | 0.000E+00 | 2.064E-05 | 4.846E+06 | 1.942E-05 | 5.150E+06 |
| Pa-231 | 1.000E+01 | 410.6 ± 0.1 | 5.616E+00 | 1.781E+01 | 1.370E+00 | 7.297E+01 |
| Ru-106 | 1.000E+01 | 0.000E+00 | 3.619E-01 | 2.763E+02 | 9.454E-13 | 1.058E+14 |
| Sb-125 | 1.000E+01 | 0.000E+00 | 8.436E-01 | 1.185E+02 | 6.262E-13 | 1.597E+14 |
| Sm-151 | 1.000E+01 | 2.118E+00 | 1.489E-02 | 6.716E+03 | 2.201E-13 | *2.631E+13 |
| Sr-90 | 1.000E+01 | 0.000E+00 | 4.204E-02 | 2.379E+03 | 3.099E-02 | 3.227E+03 |
| U-233 | 1.000E+01 | 0.000E+00 | 8.619E-02 | 1.160E+03 | 7.583E-02 | 1.319E+03 |
| U-234 | 1.000E+01 | 0.000E+00 | 8.612E-02 | 1.161E+03 | 7.523E-02 | 1.329E+03 |
| U-235 | 1.000E+01 | 0.000E+00 | 3.701E-01 | 2.702E+02 | 3.295E-01 | 3.035E+02 |

*At specific activity limit

# Attachment 2

# RESRAD
# (RESIDUAL RADIOACTIVITY MATERIALS PROGRAM)

# SOIL GUIDELINE CALCULATIONS
# KING AVENUE RADIONUCLIDES
# NO SOIL COVER

# RESRAD
# (RESIDUAL RADIOACTIVITY MATERIALS PROGRAM)

# SOIL GUIDELINE CALCULATIONS
# WEST JEFFERSON RADIONUCLIDES
# NO SOIL COVER
(Continued)

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## Site-Specific Parameter Summary

| | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| 011 | Area of contaminated zone (m**2) | 1.000E+02 | 1.000E+04 | --- | AREA |
| 011 | Thickness of contaminated zone (m) | 1.500E-01 | 1.000E+00 | --- | THICK0 |
| 011 | Length parallel to aquifer flow (m) | 1.000E+02 | 1.000E+02 | --- | LCZPAQ |
| 011 | Basic radiation dose limit (mrem/yr) | 1.000E+02 | 1.000E+02 | --- | BRLD |
| 011 | Time since placement of material (yr) | 0.000E+00 | 0.000E+00 | --- | TI |
| 011 | Times for calculations (yr) | 2.118E+00 | 1.000E+00 | --- | T( 2) |
| 011 | Times for calculations (yr) | 4.058E+00 | 3.000E+00 | --- | T( 3) |
| 011 | Times for calculations (yr) | 1.148E+01 | 1.000E+01 | --- | T( 4) |
| 011 | Times for calculations (yr) | 4.107E+02 | 3.000E+01 | --- | T( 5) |
| 011 | Times for calculations (yr) | 1.000E+03 | 1.000E+02 | --- | T( 6) |
| 011 | Times for calculations (yr) | not used | 3.000E+02 | --- | T( 7) |
| 011 | Times for calculations (yr) | not used | 1.000E+03 | --- | T( 8) |
| 011 | Times for calculations (yr) | not used | 3.000E+03 | --- | T( 9) |
| 011 | Times for calculations (yr) | not used | 1.000E+04 | --- | T(10) |
| 012 | Initial principal radionuclide (pCi/g): Am-241 | 1.000E+01 | 0.000E+00 | --- | S( 2) |
| 012 | Initial principal radionuclide (pCi/g): Am-243 | 1.000E+01 | 0.000E+00 | --- | S( 3) |
| 012 | Initial principal radionuclide (pCi/g): Cm-243 | 1.000E+01 | 0.000E+00 | --- | S( 4) |
| 012 | Initial principal radionuclide (pCi/g): Cm-244 | 1.000E+01 | 0.000E+00 | --- | S( 5) |
| 012 | Initial principal radionuclide (pCi/g): Np-237 | 1.000E+01 | 0.000E+00 | --- | S( 6) |
| 012 | Initial principal radionuclide (pCi/g): Pu-238 | 1.000E+01 | 0.000E+00 | --- | S( 9) |
| 012 | Initial principal radionuclide (pCi/g): Pu-239 | 1.000E+01 | 0.000E+00 | --- | S(10) |
| 012 | Initial principal radionuclide (pCi/g): Pu-240 | 1.000E+01 | 0.000E+00 | --- | S(11) |
| 012 | Initial principal radionuclide (pCi/g): Pu-241 | 1.000E+01 | 0.000E+00 | --- | S(12) |
| 012 | Initial principal radionuclide (pCi/g): Pu-242 | 1.000E+01 | 0.000E+00 | --- | S(13) |
| 012 | Initial principal radionuclide (pCi/g): U-236 | 1.000E+01 | 0.000E+00 | --- | S(23) |
| 012 | Initial principal radionuclide (pCi/g): U-238 | 1.000E+01 | 0.000E+00 | --- | S(24) |
| 012 | Concentration in groundwater (pCi/L): Am-241 | not used | 0.000E+00 | --- | W( 2) |
| 012 | Concentration in groundwater (pCi/L): Am-243 | not used | 0.000E+00 | --- | W( 3) |
| 012 | Concentration in groundwater (pCi/L): Cm-243 | not used | 0.000E+00 | --- | W( 4) |
| 012 | Concentration in groundwater (pCi/L): Cm-244 | not used | 0.000E+00 | --- | W( 5) |
| | Concentration in groundwater (pCi/L): Np-237 | not used | 0.000E+00 | --- | W( 6) |
| | Concentration in groundwater (pCi/L): Pu-238 | not used | 0.000E+00 | --- | W( 9) |
| | Concentration in groundwater (pCi/L): Pu-239 | not used | 0.000E+00 | --- | W(10) |
| 012 | Concentration in groundwater (pCi/L): Pu-240 | not used | 0.000E+00 | --- | W(11) |
| 012 | Concentration in groundwater (pCi/L): Pu-241 | not used | 0.000E+00 | --- | W(12) |
| 012 | Concentration in groundwater (pCi/L): Pu-242 | not used | 0.000E+00 | --- | W(13) |
| 012 | Concentration in groundwater (pCi/L): U-236 | not used | 0.000E+00 | --- | W(23) |
| 012 | Concentration in groundwater (pCi/L): U-238 | not used | 0.000E+00 | --- | W(24) |
| 013 | Cover depth (m) | 0.000E+00 | 0.000E+00 | --- | COVER0 |
| 013 | Density of cover material (g/cm**3) | not used | 1.600E+00 | --- | DENSCV |
| 013 | Cover depth erosion rate (m/yr) | not used | 1.000E-03 | --- | VCV |
| 013 | Density of contaminated zone (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSCZ |
| 013 | Contaminated zone erosion rate (m/yr) | 1.000E-03 | 1.000E-03 | --- | VCZ |
| 013 | Contaminated zone total porosity | 4.000E-01 | 4.000E-01 | --- | TPCZ |
| 013 | Contaminated zone effective porosity | 2.000E-01 | 2.000E-01 | --- | EPCZ |
| 013 | Contaminated zone hydraulic conductivity (m/yr) | 5.550E+03 | 1.000E+01 | --- | HCCZ |
| 013 | Contaminated zone b parameter | 4.050E+00 | 5.300E+00 | --- | BCZ |
| 013 | Evapotranspiration coefficient | 6.000E-01 | 6.000E-01 | --- | EVAPTR |
| 013 | Precipitation (m/yr) | 1.000E+00 | 1.000E+00 | --- | PRECIP |
| 013 | Irrigation (m/yr) | 0.000E+00 | 2.000E-01 | --- | RI |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R013 | Irrigation mode | overhead | overhead | --- | IDITCH |
| R013 | Runoff coefficient | 2.000E-01 | 2.000E-01 | --- | RUNOFF |
| R013 | Watershed area for nearby stream or pond (m**2) | 1.000E+06 | 1.000E+06 | --- | WAREA |
| R014 | Density of saturated zone (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSAQ |
| R014 | Saturated zone total porosity | 4.000E-01 | 4.000E-01 | --- | TPSZ |
| R014 | Saturated zone effective porosity | 2.000E-01 | 2.000E-01 | --- | EPSZ |
| R014 | Saturated zone hydraulic conductivity (m/yr) | 5.550E+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 | Individual's use of groundwater (m**3/yr) | not used | 1.500E+02 | --- | UW |
| R015 | Number of unsaturated zone strata | 1 | 1 | --- | NS |
| R015 | Unsat. zone 1, thickness (m) | 7.470E+00 | 4.000E+00 | --- | H(1) |
| R015 | Unsat. zone 1, soil density (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSUZ(1) |
| R015 | Unsat. zone 1, total porosity | 4.000E-01 | 4.000E-01 | --- | TPUZ(1) |
| R015 | Unsat. zone 1, effective porosity | 2.000E-01 | 2.000E-01 | --- | EPUZ(1) |
| R015 | Unsat. zone 1, soil-specific b parameter | 4.050E+00 | 5.300E+00 | --- | BUZ(1) |
| R015 | Unsat. zone 1, hydraulic conductivity (m/yr) | 5.550E+03 | 1.000E+02 | --- | HCUZ(1) |
| R016 | Distribution coefficients for Am-241 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.200E+02 | 2.000E+01 | --- | DCACTC( 2) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.200E+02 | 2.000E+01 | --- | DCACTU( 2,1) |
| R016 | Saturated zone (cm**3/g) | 1.200E+02 | 2.000E+01 | --- | DCACTS( 2) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.110E-02 | RLEACH( 2) |
| R016 | Distribution coefficients for Am-243 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.200E+02 | 2.000E+01 | --- | DCACTC( 3) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.200E+02 | 2.000E+01 | --- | DCACTU( 3,1) |
| R016 | Saturated zone (cm**3/g) | 1.200E+02 | 2.000E+01 | --- | DCACTS( 3) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.110E-02 | RLEACH( 3) |
| R016 | Distribution coefficients for Cm-243 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 4) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 4,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 4) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 4) |
| R016 | Distribution coefficients for Cm-244 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 5) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 5,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 5) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 5) |

Site-Specific Parameter Summary (continued)

| | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for Np-237 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 6) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 6,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 6) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 6) |
| R016 | Distribution coefficients for Pu-238 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTC( 9) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTU( 9,1) |
| R016 | Saturated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTS( 9) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.663E-03 | RLEACH( 9) |
| R016 | Distribution coefficients for Pu-239 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTC(10) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTU(10,1) |
| R016 | Saturated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTS(10) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.663E-03 | RLEACH(10) |
| R016 | Distribution coefficients for Pu-240 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTC(11) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTU(11,1) |
| R016 | Saturated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTS(11) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.663E-03 | RLEACH(11) |
| R016 | Distribution coefficients for Pu-241 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTC(12) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTU(12,1) |
| R016 | Saturated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTS(12) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.663E-03 | RLEACH(12) |
| R016 | Distribution coefficients for Pu-242 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTC(13) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTU(13,1) |
| R016 | Saturated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTS(13) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.663E-03 | RLEACH(13) |
| R016 | Distribution coefficients for U-236 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(23) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(23,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(23) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(23) |
| R016 | Distribution coefficients for U-238 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(24) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(24,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(24) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(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 daughter Ac-227 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTC( 1) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTU( 1,1) |
| R016 | Saturated zone (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTS( 1) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.632E-02 | RLEACH( 1) |
| R016 | Distribution coefficients for daughter Pa-231 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC( 7) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU( 7,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS( 7) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH( 7) |
| R016 | Distribution coefficients for daughter Pb-210 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTC( 8) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTU( 8,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTS( 8) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.332E-02 | RLEACH( 8) |
| R016 | Distribution coefficients for daughter Ra-226 | | | | |
| R016 | Contaminated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTC(14) |
| R016 | Unsaturated zone 1 (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTU(14,1) |
| R016 | Saturated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTS(14) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.902E-02 | RLEACH(14) |
| R016 | Distribution coefficients for daughter Ra-228 | | | | |
| R016 | Contaminated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTC(15) |
| R016 | Unsaturated zone 1 (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTU(15,1) |
| R016 | Saturated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTS(15) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.902E-02 | RLEACH(15) |
| R016 | Distribution coefficients for daughter Th-228 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(16) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(16,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(16) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(16) |
| R016 | Distribution coefficients for daughter Th-229 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(17) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(17,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(17) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(17) |
| R016 | Distribution coefficients for daughter Th-230 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(18) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(18,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(18) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(18) |

Site-Specific Parameter Summary (continued)

| | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for daughter Th-232 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(19) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(19,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(19) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(19) |
| R016 | Distribution coefficients for daughter U-233 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(20) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(20,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(20) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(20) |
| R016 | Distribution coefficients for daughter U-234 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(21) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(21,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(21) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(21) |
| R016 | Distribution coefficients for daughter U-235 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(22) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(22,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(22) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(22) |
| R017 | Inhalation rate (m**3/yr) | 8.400E+03 | 8.400E+03 | --- | INHALR |
| R017 | Mass loading for inhalation (g/m**3) | 2.000E-04 | 2.000E-04 | --- | MLINH |
| R017 | Dilution length for airborne dust, inhalation (m) | 3.000E+00 | 3.000E+00 | --- | LM |
| R017 | Occupancy factor, inhalation | 5.000E-01 | 4.500E-01 | --- | FO3 |
| R017 | Occupancy and shielding factor, external gamma | 6.000E-01 | 6.000E-01 | --- | FO1 |
| R017 | Shape factor, external gamma | 1.000E+00 | 1.000E+00 | --- | FS1 |
| R017 | Fractions of annular areas within AREA: | | | | |
| | Outer annular radius (m) = √(1/π) | not used | 1.000E+00 | --- | FRACA( 1) |
| | Outer annular radius (m) = √(10/π) | not used | 1.000E+00 | --- | FRACA( 2) |
| R017 | Outer annular radius (m) = √(20/π) | not used | 1.000E+00 | --- | FRACA( 3) |
| R017 | Outer annular radius (m) = √(50/π) | not used | 1.000E+00 | --- | FRACA( 4) |
| R017 | Outer annular radius (m) = √(100/π) | not used | 1.000E+00 | --- | FRACA( 5) |
| R017 | Outer annular radius (m) = √(200/π) | not used | 1.000E+00 | --- | FRACA( 6) |
| R017 | Outer annular radius (m) = √(500/π) | not used | 1.000E+00 | --- | FRACA( 7) |
| R017 | Outer annular radius (m) = √(1000/π) | not used | 1.000E+00 | --- | FRACA( 8) |
| R017 | Outer annular radius (m) = √(5000/π) | not used | 1.000E+00 | --- | FRACA( 9) |
| R017 | Outer annular radius (m) = √(1.E+04/π) | not used | 1.000E+00 | --- | FRACA(10) |
| R017 | Outer annular radius (m) = √(1.E+05/π) | not used | 0.000E+00 | --- | FRACA(11) |
| R017 | Outer annular radius (m) = √(1.E+06/π) | 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) | 5.400E+00 | 5.400E+00 | --- | DIET(5) |
| R018 | Other seafood consumption (kg/yr) | 9.000E-01 | 9.000E-01 | --- | DIET(6) |
| R018 | Soil ingestion rate (g/yr) | 3.650E+01 | 0.000E+00 | --- | SOIL |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R018 | Drinking water intake (L/yr) | 4.100E+02 | 4.100E+02 | --- | DWI |
| R018 | Fraction of drinking water from site | 1.000E+00 | 1.000E+00 | --- | FDW |
| 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 | Mass loading for foliar deposition (g/m**3) | 1.000E-04 | 1.000E-04 | --- | MLFD |
| R019 | Depth of soil mixing layer (m) | 1.500E-01 | 1.500E-01 | --- | DM |
| R019 | Depth of roots (m) | 9.000E-01 | 9.000E-01 | --- | DROOT |
| R019 | Drinking water fraction from ground water | 1.000E+00 | 1.000E+00 | --- | FGWDW |
| R019 | 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 |
| R021 | Total porosity of the cover material | not used | 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 | not used | 5.000E-02 | --- | PH2OCV |
| R021 | Volumetric water content of the foundation | 1.000E-02 | 1.000E-02 | --- | PH2OFL |
| R021 | Diffusion coefficient for radon gas (m/sec): | | | | |
| R021 | in cover material | not used | 2.000E-06 | --- | DIFCV |
| R021 | in foundation material | 2.000E-08 | 2.000E-08 | --- | 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 annual wind speed (m/sec) | 2.000E+00 | 2.000E+00 | --- | WIND |
| R021 | Average building air exchange rate (1/hr) | 1.000E+00 | 1.000E+00 | --- | REXG |
| R021 | Height of the building (room) (m) | 2.500E+00 | 2.500E+00 | --- | HRM |
| R021 | Building interior area factor | 1.000E+00 | 1.000E+00 | --- | FAI |
| R021 | Bulk density of building foundation (g/cm**3) | 2.400E+00 | 2.400E+00 | --- | DENSFL |
| R021 | Thickness of building foundation (m) | 1.500E-01 | 1.500E-01 | --- | FLOOR |
| R021 | Building depth below ground surface (m) | 1.000E+00 | 1.000E+00 | --- | DMFL |
| R021 | Fraction of time spent indoors | 5.000E-01 | 5.000E-01 | --- | FIND |
| R021 | Fraction of time spent outdoors (on site) | 2.500E-01 | 2.500E-01 | --- | FOTD |
| R021 | Emanating power of Rn-222 gas | 2.000E-01 | 2.000E-01 | --- | EMANA(1) |
| R021 | Emanating power of Rn-220 gas | 1.000E-01 | 1.000E-01 | --- | EMANA(2) |

Summary of Pathway Selections

| Pathway | User Selection |
|---|---|
| 1 -- external gamma | active |
| 2 -- inhalation | active |
| 3 -- plant ingestion | active |
| 4 -- meat ingestion | active |
| 5 -- milk ingestion | active |
| 6 -- aquatic foods | active |
| 7 -- drinking water | active |
| 8 -- radon | active |
| 9 -- soil ingestion | active |

**Contaminated Zone Dimensions**

| | |
|---|---|
| Area: | 100.00 square meters |
| ...ness: | 0.15 meters |
| ...er Depth: | 0.00 meters |

**Initial Soil Concentrations, pCi/g**

| | |
|---|---|
| Am-241 | 1.000E+01 |
| Am-243 | 1.000E+01 |
| Cm-243 | 1.000E+01 |
| Cm-244 | 1.000E+01 |
| Np-237 | 1.000E+01 |
| Pu-238 | 1.000E+01 |
| Pu-239 | 1.000E+01 |
| Pu-240 | 1.000E+01 |
| Pu-241 | 1.000E+01 |
| Pu-242 | 1.000E+01 |
| U-236 | 1.000E+01 |
| U-238 | 1.000E+01 |

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 100 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

| | | | | | | |
|---|---|---|---|---|---|---|
| t (years): | 0.000E+00 | 2.118E+00 | 4.058E+00 | 1.148E+01 | 4.107E+02 | 1.000E+03 |
| TDOSE(t): | 4.084E+01 | 3.927E+03 | 2.414E+01 | 2.126E+01 | 8.528E-08 | 4.168E-23 |
| M(t): | 4.084E-01 | 3.927E+01 | 2.414E-01 | 2.126E-01 | 8.528E-10 | 4.168E-25 |

aximum TDOSE(t): 3.927E+03 mrem/yr at t = 2.118E+00 years

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

Water Independent Pathways

| Radio-Nuclide | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 1.566E-01 | 0.0038 | 3.360E+00 | 0.0823 | 0.000E+00 | 0.0000 | 1.846E-02 | 0.0005 | 3.071E-04 | 0.0000 | 1.813E-07 | 0.0000 | 1.232E-01 | 0.0030 |
| Am-243 | 3.473E+00 | 0.0851 | 3.360E+00 | 0.0823 | 0.000E+00 | 0.0000 | 1.846E-02 | 0.0005 | 3.071E-04 | 0.0000 | 1.813E-07 | 0.0000 | 1.232E-01 | 0.0030 |
| Cm-243 | 2.302E+00 | 0.0564 | 2.262E+00 | 0.0554 | 0.000E+00 | 0.0000 | 1.065E-01 | 0.0026 | 1.363E-03 | 0.0000 | 8.047E-07 | 0.0000 | 7.939E-02 | 0.0019 |
| Cm-244 | 4.277E-03 | 0.0001 | 1.745E+00 | 0.0427 | 0.000E+00 | 0.0000 | 8.447E-02 | 0.0021 | 1.081E-03 | 0.0000 | 6.382E-07 | 0.0000 | 6.296E-02 | 0.0015 |
| Np-237 | 4.918E+00 | 0.1204 | 3.166E+00 | 0.0775 | 0.000E+00 | 0.0000 | 1.432E-01 | 0.0035 | 1.832E-03 | 0.0000 | 1.082E-06 | 0.0000 | 1.068E-01 | 0.0026 |
| Pu-238 | 4.269E-03 | 0.0001 | 2.972E+00 | 0.0728 | 0.000E+00 | 0.0000 | 1.559E-02 | 0.0004 | 2.593E-04 | 0.0000 | 1.531E-09 | 0.0000 | 1.040E-01 | 0.0025 |
| Pu-239 | 2.360E-03 | 0.0001 | 3.295E+00 | 0.0807 | 0.000E+00 | 0.0000 | 1.764E-02 | 0.0004 | 2.934E-04 | 0.0000 | 1.733E-09 | 0.0000 | 1.177E-01 | 0.0029 |
| Pu-240 | 4.060E-03 | 0.0001 | 3.295E+00 | 0.0807 | 0.000E+00 | 0.0000 | 1.764E-02 | 0.0004 | 2.934E-04 | 0.0000 | 1.733E-09 | 0.0000 | 1.177E-01 | 0.0029 |
| Pu-241 | 0.000E+00 | 0.0000 | 6.462E-02 | 0.0016 | 0.000E+00 | 0.0000 | 3.527E-04 | 0.0000 | 5.868E-06 | 0.0000 | 3.466E-11 | 0.0000 | 2.354E-03 | 0.0001 |
| Pu-242 | 3.421E-03 | 0.0001 | 3.102E+00 | 0.0759 | 0.000E+00 | 0.0000 | 1.682E-02 | 0.0004 | 2.798E-04 | 0.0000 | 1.652E-09 | 0.0000 | 1.122E-01 | 0.0027 |
| U-236 | 3.726E-03 | 0.0001 | 7.754E-01 | 0.0190 | 0.000E+00 | 0.0000 | 9.182E-03 | 0.0002 | 1.175E-04 | 0.0000 | 1.665E-05 | 0.0000 | 6.844E-03 | 0.0002 |
| U-238 | 3.656E-01 | 0.0090 | 7.754E-01 | 0.0190 | 0.000E+00 | 0.0000 | 9.182E-03 | 0.0002 | 1.175E-04 | 0.0000 | 1.665E-05 | 0.0000 | 6.844E-03 | 0.0002 |
| Total | 1.124E+01 | 0.2752 | 2.817E+01 | 0.6899 | 0.000E+00 | 0.0000 | 4.575E-01 | 0.0112 | 6.257E-03 | 0.0002 | 3.619E-05 | 0.0000 | 9.632E-01 | 0.0236 |

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

Water Dependent Pathways

| Radio-Nuclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.659E+00 | 0.0896 |
| Am-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.975E+00 | 0.1[illegible] |
| Cm-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.751E+00 | 0.[illegible] |
| Cm-244 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.897E+00 | 0.0[illegible] |
| Np-237 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.336E+00 | 0.2041 |
| Pu-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.096E+00 | 0.0758 |
| Pu-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.433E+00 | 0.0841 |
| Pu-240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.435E+00 | 0.0841 |
| Pu-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.733E-02 | 0.0016 |
| Pu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.234E+00 | 0.0792 |
| U-236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.953E-01 | 0.0195 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.157E+00 | 0.0283 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.084E+01 | 1.0000 |

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 2.118E+00 years

Water Independent Pathways

| Radio-nuclide | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 1.523E-01 | 0.0000 | 3.225E+00 | 0.0008 | 0.000E+00 | 0.0000 | 1.771E-02 | 0.0000 | 2.947E-04 | 0.0000 | 1.740E-07 | 0.0000 | 1.182E-01 | 0.0000 |
| Am-243 | 3.384E+00 | 0.0009 | 3.235E+00 | 0.0008 | 0.000E+00 | 0.0000 | 1.777E-02 | 0.0000 | 2.956E-04 | 0.0000 | 1.746E-07 | 0.0000 | 1.186E-01 | 0.0000 |
| Cm-243 | 5.198E-09 | 0.0000 | 7.160E-06 | 0.0000 | 0.000E+00 | 0.0000 | 3.832E-08 | 0.0000 | 6.375E-10 | 0.0000 | 3.766E-15 | 0.0000 | 2.557E-07 | 0.0000 |
| Cm-244 | 3.274E-08 | 0.0000 | 2.623E-05 | 0.0000 | 1.467E-24 | 0.0000 | 1.404E-07 | 0.0000 | 2.335E-09 | 0.0000 | 1.387E-14 | 0.0000 | 9.369E-07 | 0.0000 |
| Np-237 | 1.789E-07 | 0.0000 | 2.663E-05 | 0.0000 | 0.000E+00 | 0.0000 | 3.151E-07 | 0.0000 | 4.031E-09 | 0.0000 | 5.684E-10 | 0.0000 | 2.344E-07 | 0.0000 |
| U-238 | 4.135E-03 | 0.0000 | 2.841E+00 | 0.0007 | 2.774E-15 | 0.0000 | 1.490E-02 | 0.0000 | 2.479E-04 | 0.0000 | 1.562E-09 | 0.0000 | 9.944E-02 | 0.0000 |
| U-239 | 2.324E-03 | 0.0000 | 3.203E+00 | 0.0008 | 0.000E+00 | 0.0000 | 1.714E-02 | 0.0000 | 2.852E-04 | 0.0000 | 1.684E-09 | 0.0000 | 1.144E-01 | 0.0000 |
| U-240 | 3.997E-03 | 0.0000 | 3.203E+00 | 0.0008 | 2.050E-19 | 0.0000 | 1.714E-02 | 0.0000 | 2.852E-04 | 0.0000 | 1.694E-09 | 0.0000 | 1.144E-01 | 0.0000 |
| Pu-241 | 4.941E-04 | 0.0000 | 6.718E-02 | 0.0000 | 0.000E+00 | 0.0000 | 3.671E-04 | 0.0000 | 6.107E-06 | 0.0000 | 5.949E-10 | 0.0000 | 2.450E-03 | 0.0000 |
| Pu-242 | 3.371E-03 | 0.0000 | 3.015E+00 | 0.0008 | 2.275E-25 | 0.0000 | 1.635E-02 | 0.0000 | 2.720E-04 | 0.0000 | 1.606E-09 | 0.0000 | 1.091E-01 | 0.0000 |
| -236 | 3.518E-03 | 0.0000 | 7.225E-01 | 0.0002 | 1.243E-12 | 0.0000 | 8.556E-03 | 0.0000 | 1.095E-04 | 0.0000 | 1.551E-05 | 0.0000 | 6.377E-03 | 0.0000 |
| -238 | 3.439E-01 | 0.0001 | 7.225E-01 | 0.0002 | 2.756E-15 | 0.0000 | 8.556E-03 | 0.0000 | 1.095E-04 | 0.0000 | 1.551E-05 | 0.0000 | 6.377E-03 | 0.0000 |
| Total | 3.899E+00 | 0.0010 | 2.023E+01 | 0.0052 | 1.249E-12 | 0.0000 | 1.185E-01 | 0.0000 | 1.906E-03 | 0.0000 | 3.139E-05 | 0.0000 | 6.894E-01 | 0.0002 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 2.118E+00 years

Water Dependent Pathways

| Radio-clide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 1.184E-03 | 0.0000 | 2.073E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.273E-07 | 0.0000 | 5.312E-10 | 0.0000 | 3.514E+00 | 0.0009 |
| Am-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.756E+00 | 0.0017 |
| [illegible] | 1.221E+03 | 0.3108 | 5.344E+00 | 0.0014 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.344E-01 | 0.0001 | 5.478E-04 | 0.0000 | 1.226E+03 | 0.3122 |
| [illegible] | 9.398E+02 | 0.2393 | 4.115E+00 | 0.0010 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.805E-01 | 0.0000 | 4.218E-04 | 0.0000 | 9.441E+02 | 0.2404 |
| [illegible] | 1.728E+03 | 0.4401 | 3.027E+00 | 0.0008 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.319E-01 | 0.0001 | 7.756E-04 | 0.0000 | 1.732E+03 | 0.4410 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.960E+00 | 0.0008 |
| U-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.337E+00 | 0.0008 |
| -240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.338E+00 | 0.0009 |
| -241 | 1.941E-06 | 0.0000 | 3.399E-09 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.728E-10 | 0.0000 | 8.711E-13 | 0.0000 | 7.050E-02 | 0.0000 |
| U-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.144E+00 | 0.0008 |
| -236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.411E-01 | 0.0002 |
| 238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.082E+00 | 0.0003 |
| Total | 3.889E+03 | 0.9903 | 1.249E+01 | 0.0032 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.469E-01 | 0.0002 | 1.745E-03 | 0.0000 | 3.927E+03 | 1.0000 |

Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 4.058E+00 years

Water Independent Pathways

| Radio-Nuclide | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 1.485E-01 | 0.0062 | 3.105E+00 | 0.1286 | 0.000E+00 | 0.0000 | 1.706E-02 | 0.0007 | 2.837E-04 | 0.0000 | 1.676E-07 | 0.0000 | 1.138E-01 | 0.0047 |
| Am-243 | 3.305E+00 | 0.1369 | 3.124E+00 | 0.1294 | 0.000E+00 | 0.0000 | 1.716E-02 | 0.0007 | 2.855E-04 | 0.0000 | 1.686E-07 | 0.0000 | 1.145E-01 | 0.0047 |
| Cm-243 | 5.122E-09 | 0.0000 | 6.974E-06 | 0.0000 | 0.000E+00 | 0.0000 | 3.733E-08 | 0.0000 | 6.210E-10 | 0.0000 | 3.668E-15 | 0.0000 | 2.491E-07 | 0.0000 |
| Cm-244 | 3.228E-08 | 0.0000 | 2.555E-05 | 0.0000 | 1.747E-23 | 0.0000 | 1.367E-07 | 0.0000 | 2.275E-09 | 0.0000 | 1.358E-14 | 0.0000 | 9.126E-07 | 0.0000 |
| Np-237 | 2.051E-07 | 0.0000 | 2.502E-05 | 0.0000 | 0.000E+00 | 0.0000 | 2.967E-07 | 0.0000 | 3.795E-09 | 0.0000 | 5.323E-10 | 0.0000 | 2.202E-07 | 0.0000 |
| Pu-238 | 4.016E-03 | 0.0002 | 2.726E+00 | 0.1129 | 1.870E-14 | 0.0000 | 1.429E-02 | 0.0006 | 2.378E-04 | 0.0000 | 1.582E-09 | 0.0000 | 9.540E-02 | 0.0040 |
| Pu-239 | 2.292E-03 | 0.0001 | 3.120E+00 | 0.1293 | 0.000E+00 | 0.0000 | 1.670E-02 | 0.0007 | 2.778E-04 | 0.0000 | 1.641E-09 | 0.0000 | 1.115E-01 | 0.0046 |
| Pu-240 | 3.941E-03 | 0.0002 | 3.119E+00 | 0.1292 | 2.284E-18 | 0.0000 | 1.669E-02 | 0.0007 | 2.777E-04 | 0.0000 | 1.658E-09 | 0.0000 | 1.114E-01 | 0.0046 |
| Pu-241 | 8.867E-04 | 0.0000 | 6.887E-02 | 0.0029 | 0.000E+00 | 0.0000 | 3.766E-04 | 0.0000 | 6.266E-06 | 0.0000 | 1.028E-09 | 0.0000 | 2.514E-03 | 0.0001 |
| Pu-242 | 3.326E-03 | 0.0001 | 2.937E+00 | 0.1217 | 2.935E-24 | 0.0000 | 1.592E-02 | 0.0007 | 2.649E-04 | 0.0000 | 1.565E-09 | 0.0000 | 1.063E-01 | 0.0044 |
| U-236 | 3.338E-03 | 0.0001 | 6.772E-01 | 0.0281 | 6.925E-12 | 0.0000 | 8.019E-03 | 0.0003 | 1.026E-04 | 0.0000 | 1.454E-05 | 0.0000 | 5.977E-03 | 0.0002 |
| U-238 | 3.252E-01 | 0.0135 | 6.772E-01 | 0.0281 | 1.847E-14 | 0.0000 | 8.019E-03 | 0.0003 | 1.026E-04 | 0.0000 | 1.454E-05 | 0.0000 | 5.977E-03 | 0.0002 |
| Total | 3.796E+00 | 0.1573 | 1.956E+01 | 0.8102 | 6.962E-12 | 0.0000 | 1.142E-01 | 0.0047 | 1.839E-03 | 0.0001 | 2.943E-05 | 0.0000 | 6.674E-01 | 0.0277 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 4.058E+00 years

Water Dependent Pathways

| Radio-Nuclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 3.421E-14 | 0.0000 | 5.990E-17 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.570E-18 | 0.0000 | 1.535E-20 | 0.0000 | 3.385E+00 | 0.1402 |
| Am-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.561E+00 | 0.271[illegible] |
| Cm-243 | 1.759E-08 | 0.0000 | 7.701E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.378E-12 | 0.0000 | 7.894E-15 | 0.0000 | 7.284E-06 | 0.0[illegible] |
| Cm-244 | 1.318E-08 | 0.0000 | 5.772E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.532E-12 | 0.0000 | 5.916E-15 | 0.0000 | 2.665E-05 | 0.0[illegible] |
| Np-237 | 2.611E-08 | 0.0000 | 4.572E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.015E-12 | 0.0000 | 1.172E-14 | 0.0000 | 2.577E-05 | 0.0000 |
| Pu-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.840E+00 | 0.1177 |
| Pu-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.251E+00 | 0.1347 |
| Pu-240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.252E+00 | 0.1347 |
| Pu-241 | 1.043E-16 | 0.0000 | 1.827E-19 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.004E-20 | 0.0000 | 4.682E-23 | 0.0000 | 7.266E-02 | 0.0030 |
| Pu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.063E+00 | 0.1269 |
| U-236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.946E-01 | 0.0288 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.016E+00 | 0.0421 |
| Total | 5.688E-08 | 0.0000 | 1.805E-10 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.093E-11 | 0.0000 | 2.553E-14 | 0.0000 | 2.413E+01 | 1.0000 |

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.148E+01 years

Water Independent Pathways

| adio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| uclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| n-241 | 1.346E-01 | 0.0063 | 2.682E+00 | 0.1261 | 0.000E+00 | 0.0000 | 1.473E-02 | 0.0007 | 2.451E-04 | 0.0000 | 1.447E-07 | 0.0000 | 9.832E-02 | 0.0046 |
| r-243 | 3.014E+00 | 0.1418 | 2.730E+00 | 0.1284 | 0.000E+00 | 0.0000 | 1.499E-02 | 0.0007 | 2.494E-04 | 0.0000 | 1.473E-07 | 0.0000 | 1.001E-01 | 0.0047 |
| r-243 | 4.850E-09 | 0.0000 | 6.299E-06 | 0.0000 | 0.000E+00 | 0.0000 | 3.371E-08 | 0.0000 | 5.609E-10 | 0.0000 | 3.313E-15 | 0.0000 | 2.250E-07 | 0.0000 |
| m-244 | 3.055E-08 | 0.0000 | 2.306E-05 | 0.0000 | 6.169E-22 | 0.0000 | 1.234E-07 | 0.0000 | 2.053E-09 | 0.0000 | 1.248E-14 | 0.0000 | 8.237E-07 | 0.0000 |
| p-237 | 2.903E-07 | 0.0000 | 1.968E-05 | 0.0000 | 0.000E+00 | 0.0000 | 2.356E-07 | 0.0000 | 3.013E-09 | 0.0000 | 4.134E-10 | 0.0000 | 1.733E-07 | 0.0000 |
| r-238 | 3.589E-03 | 0.0002 | 2.322E+00 | 0.1092 | 3.597E-13 | 0.0000 | 1.218E-02 | 0.0006 | 2.026E-04 | 0.0000 | 1.607E-09 | 0.0000 | 8.127E-02 | 0.0038 |
| r-239 | 2.170E-03 | 0.0001 | 2.818E+00 | 0.1325 | 0.000E+00 | 0.0000 | 1.508E-02 | 0.0007 | 2.509E-04 | 0.0000 | 1.482E-09 | 0.0000 | 1.007E-01 | 0.0047 |
| u-240 | 3.730E-03 | 0.0002 | 2.816E+00 | 0.1324 | 7.695E-17 | 0.0000 | 1.507E-02 | 0.0007 | 2.507E-04 | 0.0000 | 1.524E-09 | 0.0000 | 1.006E-01 | 0.0047 |
| u-241 | 1.961E-03 | 0.0001 | 7.089E-02 | 0.0033 | 0.000E+00 | 0.0000 | 3.883E-04 | 0.0000 | 6.461E-06 | 0.0000 | 2.126E-09 | 0.0000 | 2.592E-03 | 0.0001 |
| r-242 | 3.156E-03 | 0.0001 | 2.653E+00 | 0.1248 | 1.589E-22 | 0.0000 | 1.439E-02 | 0.0007 | 2.393E-04 | 0.0000 | 1.413E-09 | 0.0000 | 9.601E-02 | 0.0045 |
| 236 | 2.729E-03 | 0.0001 | 5.275E-01 | 0.0248 | 7.187E-11 | 0.0000 | 6.247E-03 | 0.0003 | 7.992E-05 | 0.0000 | 1.133E-05 | 0.0000 | 4.656E-03 | 0.0002 |
| 238 | 2.621E-01 | 0.0123 | 5.276E-01 | 0.0248 | 3.476E-13 | 0.0000 | 6.247E-03 | 0.0003 | 7.992E-05 | 0.0000 | 1.133E-05 | 0.0000 | 4.656E-03 | 0.0002 |
| otal | 3.428E+00 | 0.1612 | 1.715E+01 | 0.8063 | 7.258E-11 | 0.0000 | 9.932E-02 | 0.0047 | 1.604E-03 | 0.0001 | 2.296E-05 | 0.0000 | 5.888E-01 | 0.0277 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.148E+01 years

Water Dependent Pathways

| dio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| clide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| r-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.930E+00 | 0.1378 |
| r-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.859E+00 | 0.2755 |
| | .000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.563E-06 | 0.0000 |
| | .000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.404E-05 | 0.0000 |
| | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.039E-05 | 0.0000 |
| r-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.420E+00 | 0.1138 |
| -239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.936E+00 | 0.1381 |
| -240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.935E+00 | 0.1380 |
| -241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.584E-02 | 0.0036 |
| -242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.767E+00 | 0.1301 |
| 236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.413E-01 | 0.0255 |
| 238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.006E-01 | 0.0377 |
| tal | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.126E+01 | 1.0000 |

m of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 4.107E+02 years

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Am-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-244 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Np-237 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 4.107E+02 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Am-243 | 3.088E-10 | 0.0036 | 1.352E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.932E-14 | 0.0000 | 1.386E-16 | 0.0000 | 3.102E-10 | 0.[illegible] |
| Cm-243 | 8.079E-11 | 0.0009 | 3.537E-13 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.552E-14 | 0.0000 | 3.626E-17 | 0.0000 | 8.116E-11 | 0[illegible] |
| Cm-244 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.[illegible] |
| Np-237 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-239 | 8.450E-08 | 0.9909 | 3.700E-10 | 0.0043 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.623E-11 | 0.0002 | 3.792E-14 | 0.0000 | 8.489E-08 | 0.9954 |
| Pu-240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 8.489E-08 | 0.9955 | 3.717E-10 | 0.0044 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.631E-11 | 0.0002 | 3.810E-14 | 0.0000 | 8.528E-08 | 1.0000 |

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| adio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ..uclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| m-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| m-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-244 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Np-237 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| 236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| 238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| otal | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| adio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| clide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| ..-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| m-243 | 3.751E-25 | 0.0090 | 1.642E-27 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.205E-29 | 0.0000 | 0.000E+00 | 0.0000 | 3.768E-25 | 0.0090 |
| [illegible] | .466E-26 | 0.0011 | 1.955E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.485E-26 | 0.0011 |
| [illegible] | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| [illegible] | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-239 | 4.107E-23 | 0.9854 | 1.798E-25 | 0.0043 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.889E-27 | 0.0002 | 1.843E-29 | 0.0000 | 4.126E-23 | 0.9899 |
| 240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| 241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| .242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| 236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| 238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| al | 4.149E-23 | 0.9955 | 1.817E-25 | 0.0044 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.961E-27 | 0.0002 | 1.843E-29 | 0.0000 | 4.168E-23 | 1.0000 |

um of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways, (mrem/yr)/(pCi/g)

| Nuclide (i) | t= 0.000E+00 | 2.118E+00 | 4.058E+00 | 1.148E+01 | 4.107E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|
| Am-241 | 3.659E-01 | 3.514E-01 | 3.385E-01 | 2.930E-01 | 0.000E+00 | 0.000E+00 |
| Am-243 | 6.975E-01 | 6.756E-01 | 6.561E-01 | 5.859E-01 | 3.102E-11 | 3.768E-26 |
| Cm-243 | 4.751E-01 | 1.226E+02 | 7.284E-07 | 6.563E-07 | 8.116E-12 | 4.485E-27 |
| Cm-244 | 1.897E-01 | 9.441E+01 | 2.665E-06 | 2.404E-06 | 0.000E+00 | 0.000E+00 |
| Np-237 | 8.336E-01 | 1.732E+02 | 2.577E-06 | 2.039E-06 | 0.000E+00 | 0.000E+00 |
| Pu-238 | 3.096E-01 | 2.960E-01 | 2.840E-01 | 2.420E-01 | 0.000E+00 | 0.000E+00 |
| Pu-239 | 3.433E-01 | 3.337E-01 | 3.251E-01 | 2.936E-01 | 8.489E-09 | 4.126E-24 |
| Pu-240 | 3.435E-01 | 3.338E-01 | 3.252E-01 | 2.935E-01 | 0.000E+00 | 0.000E+00 |
| Pu-241 | 6.733E-03 | 7.050E-03 | 7.266E-03 | 7.584E-03 | 0.000E+00 | 0.000E+00 |
| Pu-242 | 3.234E-01 | 3.144E-01 | 3.063E-01 | 2.767E-01 | 0.000E+00 | 0.000E+00 |
| U-236 | 7.953E-02 | 7.411E-02 | 6.946E-02 | 5.413E-02 | 0.000E+00 | 0.000E+00 |
| U-238 | 1.157E-01 | 1.082E-01 | 1.016E-01 | 8.006E-02 | 0.000E+00 | 0.000E+00 |

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 100 mrem/yr

| Nuclide (i) | t= 0.000E+00 | 2.118E+00 | 4.058E+00 | 1.148E+01 | 4.107E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|
| Am-241 | 2.733E+02 | 2.845E+02 | 2.955E+02 | 3.413E+02 | *3.424E+12 | *3.424E+12 |
| Am-243 | 1.434E+02 | 1.480E+02 | 1.524E+02 | 1.707E+02 | *1.995E+11 | *1.995E+11 |
| Cm-243 | 2.105E+02 | 8.156E-01 | 1.373E+08 | 1.524E+08 | 1.232E+13 | *5.159E+13 |
| Cm-244 | 5.270E+02 | 1.059E+00 | 3.753E+07 | 4.160E+07 | *8.086E+13 | *8.086E+13 |
| Np-237 | 1.200E+02 | 5.775E-01 | 3.880E+07 | 4.905E+07 | *7.045E+08 | *7.045E+08 |
| Pu-238 | 3.230E+02 | 3.378E+02 | 3.521E+02 | 4.133E+02 | *1.711E+13 | *1.711E+13 |
| Pu-239 | 2.913E+02 | 2.996E+02 | 3.076E+02 | 3.406E+02 | 1.178E+10 | *6.203E+10 |
| Pu-240 | 2.911E+02 | 2.995E+02 | 3.075E+02 | 3.407E+02 | *2.266E+11 | *2.266E+11 |
| Pu-241 | 1.485E+04 | 1.418E+04 | 1.376E+04 | 1.319E+04 | *1.030E+14 | *1.030E+14 |
| Pu-242 | 3.092E+02 | 3.181E+02 | 3.265E+02 | 3.614E+02 | *3.927E+09 | *3.927E+09 |
| J-236 | 1.257E+03 | 1.349E+03 | 1.440E+03 | 1.848E+03 | *6.465E+08 | *6.465E+08 |
| J-238 | 8.642E+02 | 9.246E+02 | 9.838E+02 | 1.249E+03 | *3.360E+05 | *3.360E+05 |

*At specific activity limit

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 2.118E+00 years

| Nuclide (i) | Initial pCi/g | tmin (years) | DSR(i,tmin) | G(i,tmin) (pCi/g) | DSR(i,tmax) | G(i,tmax) (pCi/g) |
|---|---|---|---|---|---|---|
| Am-241 | 1.000E+01 | 0.000E+00 | 3.659E-01 | 2.733E+02 | 3.514E-01 | 2.845E+02 |
| Am-243 | 1.000E+01 | 0.000E+00 | 6.975E-01 | 1.434E+02 | 6.756E-01 | 1.480E+02 |
| Cm-243 | 1.000E+01 | 2.118E+00 | 1.226E+02 | 8.156E-01 | 1.226E+02 | 8.156E-01 |
| Cm-244 | 1.000E+01 | 2.118E+00 | 9.441E+01 | 1.059E+00 | 9.441E+01 | 1.059E+00 |
| Np-237 | 1.000E+01 | 2.118E+00 | 1.732E+02 | 5.775E-01 | 1.732E+02 | 5.775E-01 |
| Pu-238 | 1.000E+01 | 0.000E+00 | 3.096E-01 | 3.230E+02 | 2.960E-01 | 3.378E+02 |
| Pu-239 | 1.000E+01 | 0.000E+00 | 3.433E-01 | 2.913E+02 | 3.337E-01 | 2.996E+02 |
| Pu-240 | 1.000E+01 | 0.000E+00 | 3.435E-01 | 2.911E+02 | 3.338E-01 | 2.995E+02 |
| Pu-241 | 1.000E+01 | 11.481 ± 0.003 | 7.584E-03 | 1.319E+04 | 7.050E-03 | 1.418E+04 |
| Pu-242 | 1.000E+01 | 0.000E+00 | 3.234E-01 | 3.092E+02 | 3.144E-01 | 3.181E+02 |
| U-236 | 1.000E+01 | 0.000E+00 | 7.953E-02 | 1.257E+03 | 7.411E-02 | 1.349E+03 |
| U-238 | 1.000E+01 | 0.000E+00 | 1.157E-01 | 8.642E+02 | 1.082E-01 | 9.246E+02 |

# RESRAD
# (RESIDUAL RADIOACTIVITY MATERIALS PROGRAM)

# SOIL GUIDELINE CALCULATIONS
# WEST JEFFERSON RADIONUCLIDES
# 5 METER SOIL COVER

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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) | 1.000E+02 | 1.000E+04 | --- | AREA |
| R011 | Thickness of contaminated zone (m) | 1.500E-01 | 1.000E+00 | --- | THICK0 |
| R011 | Length parallel to aquifer flow (m) | 1.000E+02 | 1.000E+02 | --- | LCZPAQ |
| R011 | Basic radiation dose limit (mrem/yr) | 1.000E+02 | 1.000E+02 | --- | BRLD |
| R011 | Time since placement of material (yr) | 0.000E+00 | 0.000E+00 | --- | TI |
| R011 | Times for calculations (yr) | 1.000E-02 | 1.000E+00 | --- | T( 2) |
| R011 | Times for calculations (yr) | 8.210E-01 | 3.000E+00 | --- | T( 3) |
| R011 | Times for calculations (yr) | 1.511E+00 | 1.000E+01 | --- | T( 4) |
| R011 | Times for calculations (yr) | 1.461E+02 | 3.000E+01 | --- | T( 5) |
| R011 | Times for calculations (yr) | 2.246E+02 | 1.000E+02 | --- | T( 6) |
| R011 | Times for calculations (yr) | 3.951E+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 | 3.000E+03 | --- | T( 9) |
| R011 | Times for calculations (yr) | not used | 1.000E+04 | --- | T(10) |
| R012 | Initial principal radionuclide (pCi/g): Ac-227 | 1.000E+01 | 0.000E+00 | --- | S( 1) |
| R012 | Initial principal radionuclide (pCi/g): C-14 | 1.000E+01 | 0.000E+00 | --- | S( 2) |
| R012 | Initial principal radionuclide (pCi/g): Ce-144 | 1.000E+01 | 0.000E+00 | --- | S( 3) |
| R012 | Initial principal radionuclide (pCi/g): Co-60 | 1.000E+01 | 0.000E+00 | --- | S( 4) |
| R012 | Initial principal radionuclide (pCi/g): Cs-134 | 1.000E+01 | 0.000E+00 | --- | S( 5) |
| R012 | Initial principal radionuclide (pCi/g): Cs-137 | 1.000E+01 | 0.000E+00 | --- | S( 6) |
| R012 | Initial principal radionuclide (pCi/g): Eu-152 | 1.000E+01 | 0.000E+00 | --- | S( 7) |
| R012 | Initial principal radionuclide (pCi/g): Eu-154 | 1.000E+01 | 0.000E+00 | --- | S( 8) |
| R012 | Initial principal radionuclide (pCi/g): Eu-155 | 1.000E+01 | 0.000E+00 | --- | S( 9) |
| R012 | Initial principal radionuclide (pCi/g): Fe-55 | 1.000E+01 | 0.000E+00 | --- | S(10) |
| R012 | Initial principal radionuclide (pCi/g): H-3 | 1.000E+01 | 0.000E+00 | --- | S(11) |
| R012 | Initial principal radionuclide (pCi/g): I-129 | 1.000E+01 | 0.000E+00 | --- | S(12) |
| R012 | Initial principal radionuclide (pCi/g): Mn-54 | 1.000E+01 | 0.000E+00 | --- | S(13) |
| R012 | Initial principal radionuclide (pCi/g): Ni-59 | 1.000E+01 | 0.000E+00 | --- | S(14) |
| R012 | Initial principal radionuclide (pCi/g): Ni-63 | 1.000E+01 | 0.000E+00 | --- | S(15) |
| R012 | Initial principal radionuclide (pCi/g): Pa-231 | 1.000E+01 | 0.000E+00 | --- | S(16) |
| R012 | Initial principal radionuclide (pCi/g): Ru-106 | 1.000E+01 | 0.000E+00 | --- | S(19) |
| R012 | Initial principal radionuclide (pCi/g): Sb-125 | 1.000E+01 | 0.000E+00 | --- | S(20) |
| R012 | Initial principal radionuclide (pCi/g): Sm-151 | 1.000E+01 | 0.000E+00 | --- | S(21) |
| R012 | Initial principal radionuclide (pCi/g): Sr-90 | 1.000E+01 | 0.000E+00 | --- | S(22) |
| R012 | Initial principal radionuclide (pCi/g): U-233 | 1.000E+01 | 0.000E+00 | --- | S(25) |
| R012 | Initial principal radionuclide (pCi/g): U-234 | 1.000E+01 | 0.000E+00 | --- | S(26) |
| R012 | Initial principal radionuclide (pCi/g): U-235 | 1.000E+01 | 0.000E+00 | --- | S(27) |
| R012 | Concentration in groundwater (pCi/L): Ac-227 | not used | 0.000E+00 | --- | W( 1) |
| R012 | Concentration in groundwater (pCi/L): C-14 | not used | 0.000E+00 | --- | W( 2) |
| R012 | Concentration in groundwater (pCi/L): Ce-144 | not used | 0.000E+00 | --- | W( 3) |
| R012 | Concentration in groundwater (pCi/L): Co-60 | not used | 0.000E+00 | --- | W( 4) |
| R012 | Concentration in groundwater (pCi/L): Cs-134 | not used | 0.000E+00 | --- | W( 5) |
| R012 | Concentration in groundwater (pCi/L): Cs-137 | not used | 0.000E+00 | --- | W( 6) |
| R012 | Concentration in groundwater (pCi/L): Eu-152 | not used | 0.000E+00 | --- | W( 7) |
| R012 | Concentration in groundwater (pCi/L): Eu-154 | not used | 0.000E+00 | --- | W( 8) |
| R012 | Concentration in groundwater (pCi/L): Eu-155 | not used | 0.000E+00 | --- | W( 9) |
| R012 | Concentration in groundwater (pCi/L): Fe-55 | not used | 0.000E+00 | --- | W(10) |
| R012 | Concentration in groundwater (pCi/L): H-3 | not used | 0.000E+00 | --- | W(11) |
| R012 | Concentration in groundwater (pCi/L): I-129 | not used | 0.000E+00 | --- | W(12) |
| R012 | Concentration in groundwater (pCi/L): Mn-54 | not used | 0.000E+00 | --- | W(13) |

Site-Specific Parameter Summary (continued)

| | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| :012 | Concentration in groundwater (pCi/L): Ni-59 | not used | 0.000E+00 | --- | W(14) |
| :012 | Concentration in groundwater (pCi/L): Ni-63 | not used | 0.000E+00 | --- | W(15) |
| R012 | Concentration in groundwater (pCi/L): Pa-231 | not used | 0.000E+00 | --- | W(16) |
| R012 | Concentration in groundwater (pCi/L): Ru-106 | not used | 0.000E+00 | --- | W(19) |
| -012 | Concentration in groundwater (pCi/L): Sb-125 | not used | 0.000E+00 | --- | W(20) |
| 012 | Concentration in groundwater (pCi/L): Sm-151 | not used | 0.000E+00 | --- | W(21) |
| 012 | Concentration in groundwater (pCi/L): Sr-90 | not used | 0.000E+00 | --- | W(22) |
| R012 | Concentration in groundwater (pCi/L): U-233 | not used | 0.000E+00 | --- | W(25) |
| R012 | Concentration in groundwater (pCi/L): U-234 | not used | 0.000E+00 | --- | W(26) |
| 012 | Concentration in groundwater (pCi/L): U-235 | not used | 0.000E+00 | --- | W(27) |
| K013 | Cover depth (m) | 5.000E+00 | 0.000E+00 | --- | COVER0 |
| R013 | Density of cover material (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSCV |
| -013 | Cover depth erosion rate (m/yr) | 1.000E-03 | 1.000E-03 | --- | VCV |
| 013 | Density of contaminated zone (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSCZ |
| 013 | Contaminated zone erosion rate (m/yr) | 1.000E-03 | 1.000E-03 | --- | VCZ |
| R013 | Contaminated zone total porosity | 4.000E-01 | 4.000E-01 | --- | TPCZ |
| R013 | Contaminated zone effective porosity | 2.000E-01 | 2.000E-01 | --- | EPCZ |
| 013 | Contaminated zone hydraulic conductivity (m/yr) | 5.550E+03 | 1.000E+01 | --- | HCCZ |
| 013 | Contaminated zone b parameter | 4.050E+00 | 5.300E+00 | --- | BCZ |
| R013 | Evapotranspiration coefficient | 6.000E-01 | 6.000E-01 | --- | EVAPTR |
| R013 | Precipitation (m/yr) | 1.000E+00 | 1.000E+00 | --- | PRECIP |
| 013 | Irrigation (m/yr) | 0.000E+00 | 2.000E-01 | --- | RI |
| 013 | Irrigation mode | overhead | overhead | --- | IDITCH |
| ..013 | Runoff coefficient | 2.000E-01 | 2.000E-01 | --- | RUNOFF |
| R013 | Watershed area for nearby stream or pond (m**2) | 1.000E+06 | 1.000E+06 | --- | WAREA |
| 014 | Density of saturated zone (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSAQ |
| 014 | Saturated zone total porosity | 4.000E-01 | 4.000E-01 | --- | TPSZ |
| R014 | Saturated zone effective porosity | 2.000E-01 | 2.000E-01 | --- | EPSZ |
| R01 | Saturated zone hydraulic conductivity (m/yr) | 5.550E+03 | 1.000E+02 | --- | HCSZ |
| | Saturated zone hydraulic gradient | 2.000E-02 | 2.000E-02 | --- | HGWT |
| | Saturated zone b parameter | 4.050E+00 | 5.300E+00 | --- | BSZ |
| ..014 | 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 |
| 014 | Individual's use of groundwater (m**3/yr) | not used | 1.500E+02 | --- | UW |
| R015 | Number of unsaturated zone strata | 1 | 1 | --- | NS |
| R015 | Unsat. zone 1, thickness (m) | 2.470E+00 | 4.000E+00 | --- | H(1) |
| 15 | Unsat. zone 1, soil density (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSUZ(1) |
| 15 | Unsat. zone 1, total porosity | 4.000E-01 | 4.000E-01 | --- | TPUZ(1) |
| ..15 | Unsat. zone 1, effective porosity | 2.000E-01 | 2.000E-01 | --- | EPUZ(1) |
| R015 | Unsat. zone 1, soil-specific b parameter | 4.050E+00 | 5.300E+00 | --- | BUZ(1) |
| R015 | Unsat. zone 1, hydraulic conductivity (m/yr) | 5.550E+03 | 1.000E+02 | --- | HCUZ(1) |
| 16 | Distribution coefficients for Ac-227 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTC( 1) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTU( 1,1) |
| 16 | Saturated zone (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTS( 1) |
| 16 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.632E-02 | RLEACH( 1) |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for C-14 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 2) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 2,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 2) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 2) |
| R016 | Distribution coefficients for Ce-144 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC( 3) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU( 3,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS( 3) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH( 3) |
| R016 | Distribution coefficients for Co-60 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC( 4) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU( 4,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS( 4) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH( 4) |
| R016 | Distribution coefficients for Cs-134 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC( 5) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU( 5,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS( 5) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH( 5) |
| R016 | Distribution coefficients for Cs-137 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC( 6) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU( 6,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS( 6) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH( 6) |
| R016 | Distribution coefficients for Eu-152 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 7) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 7,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 7) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 7) |
| R016 | Distribution coefficients for Eu-154 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 8) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 8,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 8) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 8) |
| R016 | Distribution coefficients for Eu-155 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 9) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 9,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 9) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 9) |

Site-Specific Parameter Summary (continued)

| | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| D16 | Distribution coefficients for Fe-55 | | | | |
| D16 | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC(10) |
| RD16 | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU(10,1) |
| RD16 | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS(10) |
| D16 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH(10) |
| D16 | Distribution coefficients for H-3 | | | | |
| RD16 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC(11) |
| RD16 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU(11,1) |
| D16 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS(11) |
| D16 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH(11) |
| RD16 | Distribution coefficients for I-129 | | | | |
| D16 | Contaminated zone (cm**3/g) | 1.000E-01 | 1.000E-01 | --- | DCACTC(12) |
| D16 | Unsaturated zone 1 (cm**3/g) | 1.000E-01 | 1.000E-01 | --- | DCACTU(12,1) |
| D16 | Saturated zone (cm**3/g) | 1.000E-01 | 1.000E-01 | --- | DCACTS(12) |
| RD16 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.544E+00 | RLEACH(12) |
| D16 | Distribution coefficients for Mn-54 | | | | |
| D16 | Contaminated zone (cm**3/g) | 2.000E+02 | 2.000E+02 | --- | DCACTC(13) |
| RD16 | Unsaturated zone 1 (cm**3/g) | 2.000E+02 | 2.000E+02 | --- | DCACTU(13,1) |
| RD16 | Saturated zone (cm**3/g) | 2.000E+02 | 2.000E+02 | --- | DCACTS(13) |
| D16 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.663E-03 | RLEACH(13) |
| D16 | Distribution coefficients for Ni-59 | | | | |
| RD16 | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC(14) |
| RD16 | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU(14,1) |
| D16 | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS(14) |
| D16 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH(14) |
| RD16 | Distribution coefficients for Ni-63 | | | | |
| | Contaminated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTC(15) |
| | Unsaturated zone 1 (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTU(15,1) |
| | Saturated zone (cm**3/g) | 1.000E+03 | 1.000E+03 | --- | DCACTS(15) |
| RD16 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.333E-03 | RLEACH(15) |
| D16 | Distribution coefficients for Pa-231 | | | | |
| D16 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(16) |
| RD16 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(16,1) |
| RD16 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(16) |
| D16 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(16) |
| D16 | Distribution coefficients for Ru-106 | | | | |
| RD16 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC(19) |
| D16 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU(19,1) |
| D16 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS(19) |
| D16 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH(19) |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R016 | Distribution coefficients for Sb-125 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC(20) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU(20,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS(20) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH(20) |
| R016 | Distribution coefficients for Sm-151 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC(21) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU(21,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS(21) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH(21) |
| R016 | Distribution coefficients for Sr-90 | | | | |
| R016 | Contaminated zone (cm**3/g) | 3.000E+01 | 3.000E+01 | --- | DCACTC(22) |
| R016 | Unsaturated zone 1 (cm**3/g) | 3.000E+01 | 3.000E+01 | --- | DCACTU(22,1) |
| R016 | Saturated zone (cm**3/g) | 3.000E+01 | 3.000E+01 | --- | DCACTS(22) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 4.429E-02 | RLEACH(22) |
| R016 | Distribution coefficients for U-233 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(25) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(25,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(25) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(25) |
| R016 | Distribution coefficients for U-234 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(26) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(26,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(26) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(26) |
| R016 | Distribution coefficients for U-235 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(27) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(27,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(27) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(27) |
| R016 | Distribution coefficients for daughter Pb-210 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTC(17) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTU(17,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTS(17) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.332E-02 | RLEACH(17) |
| R016 | Distribution coefficients for daughter Ra-226 | | | | |
| R016 | Contaminated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTC(18) |
| R016 | Unsaturated zone 1 (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTU(18,1) |
| R016 | Saturated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTS(18) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.902E-02 | RLEACH(18) |

Site-Specific Parameter Summary (continued)

| | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| 016 | Distribution coefficients for daughter Th-229 | | | | |
| 016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(23) |
| K016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(23,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(23) |
| -016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(23) |
| 016 | Distribution coefficients for daughter Th-230 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(24) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(24,1) |
| 016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(24) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(24) |
| R017 | Inhalation rate (m**3/yr) | 8.400E+03 | 8.400E+03 | --- | INHALR |
| -017 | Mass loading for inhalation (g/m**3) | 2.000E-04 | 2.000E-04 | --- | MLINH |
| 017 | Dilution length for airborne dust, inhalation (m) | 3.000E+00 | 3.000E+00 | --- | LM |
| 017 | Occupancy factor, inhalation | 5.000E-01 | 4.500E-01 | --- | FO3 |
| R017 | Occupancy and shielding factor, external gamma | 6.000E-01 | 6.000E-01 | --- | FO1 |
| R017 | Shape factor, external gamma | 1.000E+00 | 1.000E+00 | --- | FS1 |
| 017 | Fractions of annular areas within AREA: | | | | |
| 017 | Outer annular radius (m) = √(1/π) | not used | 1.000E+00 | --- | FRACA( 1) |
| R017 | Outer annular radius (m) = √(10/π) | not used | 1.000E+00 | --- | FRACA( 2) |
| R017 | Outer annular radius (m) = √(20/π) | not used | 1.000E+00 | --- | FRACA( 3) |
| 017 | Outer annular radius (m) = √(50/π) | not used | 1.000E+00 | --- | FRACA( 4) |
| 017 | Outer annular radius (m) = √(100/π) | not used | 1.000E+00 | --- | FRACA( 5) |
| 017 | Outer annular radius (m) = √(200/π) | not used | 1.000E+00 | --- | FRACA( 6) |
| R017 | Outer annular radius (m) = √(500/π) | not used | 1.000E+00 | --- | FRACA( 7) |
| R017 | Outer annular radius (m) = √(1000/π) | not used | 1.000E+00 | --- | FRACA( 8) |
| 017 | Outer annular radius (m) = √(5000/π) | not used | 1.000E+00 | --- | FRACA( 9) |
| 017 | Outer annular radius (m) = √(1.E+04/π) | not used | 1.000E+00 | --- | FRACA(10) |
| R017 | Outer annular radius (m) = √(1.E+05/π) | not used | 0.000E+00 | --- | FRACA(11) |
| R017 | Outer annular radius (m) = √(1.E+06/π) | not used | 0.000E+00 | --- | FRACA(12) |
| | Fruits, vegetables and grain consumption (kg/yr) | 1.600E+02 | 1.600E+02 | --- | DIET(1) |
| | Leafy vegetable consumption (kg/yr) | 1.400E+01 | 1.400E+01 | --- | DIET(2) |
| 018 | Milk consumption (L/yr) | 9.200E+01 | 9.200E+01 | --- | DIET(3) |
| 018 | Meat and poultry consumption (kg/yr) | 6.300E+01 | 6.300E+01 | --- | DIET(4) |
| 018 | Fish consumption (kg/yr) | 5.400E+00 | 5.400E+00 | --- | DIET(5) |
| 018 | Other seafood consumption (kg/yr) | 9.000E-01 | 9.000E-01 | --- | DIET(6) |
| 018 | Soil ingestion rate (g/yr) | 3.650E+01 | 0.000E+00 | --- | SOIL |
| 018 | Drinking water intake (L/yr) | 4.100E+02 | 4.100E+02 | --- | DWI |
| 018 | Fraction of drinking water from site | 1.000E+00 | 1.000E+00 | --- | FDW |
| 019 | Livestock fodder intake for meat (kg/day) | 6.800E+01 | 6.800E+01 | --- | LFI5 |
| 019 | Livestock fodder intake for milk (kg/day) | 5.500E+01 | 5.500E+01 | --- | LFI6 |
| 019 | Livestock water intake for meat (L/day) | 5.000E+01 | 5.000E+01 | --- | LWI5 |
| 019 | Livestock water intake for milk (L/day) | 1.600E+02 | 1.600E+02 | --- | LWI6 |
| 019 | Mass loading for foliar deposition (g/m**3) | 1.000E-04 | 1.000E-04 | --- | MLFD |
| 019 | Depth of soil mixing layer (m) | 1.500E-01 | 1.500E-01 | --- | DM |
| 019 | Depth of roots (m) | 9.000E-01 | 9.000E-01 | --- | DROOT |
| 019 | Drinking water fraction from ground water | 1.000E+00 | 1.000E+00 | --- | FGWDW |
| 019 | Livestock water fraction from ground water | 1.000E+00 | 1.000E+00 | --- | FGWLW |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R019 | Irrigation fraction from ground water | 1.000E+00 | 1.000E+00 | --- | FGWIR |
| 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 |
| R021 | Volumetric water content of the foundation | 1.000E-02 | 1.000E-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 | 2.000E-08 | 2.000E-08 | --- | 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 annual wind speed (m/sec) | 2.000E+00 | 2.000E+00 | --- | WIND |
| R021 | Average building air exchange rate (1/hr) | 1.000E+00 | 1.000E+00 | --- | REXG |
| R021 | Height of the building (room) (m) | 2.500E+00 | 2.500E+00 | --- | HRM |
| R021 | Building interior area factor | 1.000E+00 | 1.000E+00 | --- | FAI |
| R021 | Bulk density of building foundation (g/cm**3) | 2.400E+00 | 2.400E+00 | --- | DENSFL |
| R021 | Thickness of building foundation (m) | 1.500E-01 | 1.500E-01 | --- | FLOOR |
| R021 | Building depth below ground surface (m) | 1.000E+00 | 1.000E+00 | --- | DMFL |
| R021 | Fraction of time spent indoors | 5.000E-01 | 5.000E-01 | --- | FIND |
| R021 | Fraction of time spent outdoors (on site) | 2.500E-01 | 2.500E-01 | --- | FOTD |
| R021 | Emanating power of Rn-222 gas | 2.000E-01 | 2.000E-01 | --- | EMANA(1) |
| R021 | Emanating power of Rn-220 gas | not used | 1.000E-01 | --- | EMANA(2) |

Summary of Pathway Selections

| Pathway | User Selection |
|---|---|
| 1 -- external gamma | active |
| 2 -- inhalation | active |
| 3 -- plant ingestion | active |
| 4 -- meat ingestion | active |
| 5 -- milk ingestion | active |
| 6 -- aquatic foods | active |
| 7 -- drinking water | active |
| 8 -- radon | active |
| 9 -- soil ingestion | active |

**Contaminated Zone Dimensions**

| | |
|---|---|
| Area: | 100.00 square meters |
| ckness: | 0.15 meters |
| Cover Depth: | 5.00 meters |

**Initial Soil Concentrations, pCi/g**

| | |
|---|---|
| Ac-227 | 1.000E+01 |
| C-14 | 1.000E+01 |
| Ce-144 | 1.000E+01 |
| Co-60 | 1.000E+01 |
| Cs-134 | 1.000E+01 |
| Cs-137 | 1.000E+01 |
| Eu-152 | 1.000E+01 |
| Eu-154 | 1.000E+01 |
| Eu-155 | 1.000E+01 |
| Fe-55 | 1.000E+01 |
| H-3 | 1.000E+01 |
| I-129 | 1.000E+01 |
| Mn-54 | 1.000E+01 |
| Ni-59 | 1.000E+01 |
| Ni-63 | 1.000E+01 |
| Pa-231 | 1.000E+01 |
| Ru-106 | 1.000E+01 |
| Sb-125 | 1.000E+01 |
| Sm-151 | 1.000E+01 |
| Sr-90 | 1.000E+01 |
| U-233 | 1.000E+01 |
| U-234 | 1.000E+01 |
| U-235 | 1.000E+01 |

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 100 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| t (years): | 0.000E+00 | 1.000E-02 | 8.210E-01 | 1.511E+00 | 1.461E+02 | 2.246E+02 | 3.951E+02 | 1.000E+03 |
| TDOSE(t): | 6.935E-23 | 3.360E-16 | 1.457E+01 | 7.972E+01 | 5.668E+01 | 4.060E-01 | 1.778E+01 | 3.693E-03 |
| M(t): | 6.935E-25 | 3.360E-18 | 1.457E-01 | 7.972E-01 | 5.668E-01 | 4.060E-03 | 1.778E-01 | 3.693E-05 |

Maximum TDOSE(t): 7.973E+01 mrem/yr at t = 1.5113 ± 0.0005 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.5113 years

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 1.941E-23 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 5.311E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 2.723E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| I-129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 2.370E-25 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sm-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-233 | 4.260E-27 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 1.965E-23 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.5113 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 1.313E-04 | 0.0000 | 1.835E-05 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.497E-04 | 0.0000 |
| Ce-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.941E-23 | 0.0000 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.311E-28 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.723E-28 | 0.0000 |
| Eu-152 | 3.463E-04 | 0.0000 | 1.516E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.651E-08 | 0.0000 | 1.554E-10 | 0.0000 | 3.479E-04 | 0.0000 |
| Eu-154 | 5.032E-04 | 0.0000 | 2.203E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.666E-08 | 0.0000 | 2.258E-10 | 0.0000 | 5.056E-04 | 0.0000 |
| Eu-155 | 6.584E-05 | 0.0000 | 2.883E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.265E-08 | 0.0000 | 2.955E-11 | 0.0000 | 6.614E-05 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 3.620E-06 | 0.0000 | 8.683E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.620E-06 | 0.0000 |
| I-129 | 7.950E+01 | 0.9971 | 2.875E-02 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.108E-02 | 0.0008 | 1.427E-01 | 0.0018 | 7.973E+01 | 1.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.370E-25 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ru-106 | 4.904E-04 | 0.0000 | 6.721E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.884E-08 | 0.0000 | 4.401E-11 | 0.0000 | 4.911E-04 | 0.0000 |
| Sb-125 | 1.114E-04 | 0.0000 | 6.788E-09 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.284E-08 | 0.0000 | 1.500E-08 | 0.0000 | 1.115E-04 | 0.0000 |
| Sm-151 | 2.102E-05 | 0.0000 | 9.204E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.038E-09 | 0.0000 | 9.435E-12 | 0.0000 | 2.112E-05 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.260E-27 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.869E-10 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.869E-10 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 7.950E+01 | 0.9971 | 2.878E-02 | 0.0004 | 7.869E-10 | 0.0000 | 0.000E+00 | 0.0000 | 6.108E-02 | 0.0008 | 1.427E-01 | 0.0018 | 7.973E+01 | 1.0000 |

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 2.333E-23 | 0.3364 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 8.670E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 2.769E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-152 | 3.802E-23 | 0.5482 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-154 | 7.207E-24 | 0.1039 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| I-129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 7.996E-25 | 0.0115 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sm-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 6.935E-23 | 1.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| e-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.333E-23 | 0.3364 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.670E-28 | 0.0000 |
| s-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.769E-28 | 0.0000 |
| u-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.802E-23 | 0.5482 |
| cu-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.207E-24 | 0.1039 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| e-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.996E-25 | 0.0115 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| i-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| a-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sm-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| r-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| tal | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.935E-23 | 1.0000 |

*S all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 2.330E-23 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 8.642E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 2.769E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-152 | 3.342E-23 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-154 | 6.333E-24 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| I-129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 7.931E-25 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sm-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-233 | 2.831E-29 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.360E-16 | 1.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 6.385E-23 | 0.0000 | 0.000E+00 | 0.0000 | 3.360E-16 | 1.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| .adio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ɴuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| *c-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| e-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.330E-23 | 0.0000 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.642E-28 | 0.0000 |
| s-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.769E-28 | 0.0000 |
| u-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.342E-23 | 0.0000 |
| ɛu-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.333E-24 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| *e-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.931E-25 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| i-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| a-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| ku-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| m-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| r-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| .-233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.831E-29 | 0.0000 |
| J-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.360E-16 | 1.0000 |
| J-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| ɔtal | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.360E-16 | 1.0000 |

*Su all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 8.210E-01 years

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 2.111E-23 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 6.643E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 2.744E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-152 | 9.619E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-154 | 1.782E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| I-129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 4.130E-25 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sm-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-233 | 2.319E-27 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.238E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 2.153E-23 | 0.0000 | 0.000E+00 | 0.0000 | 2.238E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 8.210E-01 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 9.309E-01 | 0.0639 | 1.301E-01 | 0.0089 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.061E+00 | 0.0728 |
| Ce-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.111E-23 | 0.0000 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.643E-28 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.744E-28 | 0.0000 |
| Eu-152 | 2.546E+00 | 0.1747 | 1.115E-02 | 0.0008 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.890E-04 | 0.0000 | 1.143E-06 | 0.0000 | 2.558E+00 | 0.1755 |
| Eu-154 | 3.773E+00 | 0.2590 | 1.652E-02 | 0.0011 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.247E-04 | 0.0000 | 1.693E-06 | 0.0000 | 3.790E+00 | 0.2601 |
| Eu-155 | 5.139E-01 | 0.0353 | 2.250E-03 | 0.0002 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.870E-05 | 0.0000 | 2.306E-07 | 0.0000 | 5.162E-01 | 0.0354 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 2.667E-02 | 0.0018 | 6.397E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.667E-02 | 0.0018 |
| I-129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.130E-25 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ru-106 | 5.522E+00 | 0.3789 | 7.568E-03 | 0.0005 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.121E-04 | 0.0000 | 4.956E-07 | 0.0000 | 5.529E+00 | 0.3795 |
| Sb-125 | 9.386E-01 | 0.0644 | 5.718E-05 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.082E-04 | 0.0000 | 1.264E-04 | 0.0000 | 9.389E-01 | 0.0644 |
| Sm-151 | 1.498E-01 | 0.0103 | 6.558E-04 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.877E-05 | 0.0000 | 6.722E-08 | 0.0000 | 1.505E-01 | 0.0103 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.319E-27 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.238E-12 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 1.440E+01 | 0.9883 | 1.683E-01 | 0.0115 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.662E-03 | 0.0001 | 1.300E-04 | 0.0000 | 1.457E+01 | 1.0000 |

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.511E+00 years

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 1.941E-23 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 5.311E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 2.724E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| I-129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 2.370E-25 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sm-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-233 | 4.259E-27 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.507E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 1.965E-23 | 0.0000 | 0.000E+00 | 0.0000 | 7.507E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.511E+00 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 1.318E-04 | 0.0000 | 1.842E-05 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.502E-04 | 0.0000 |
| Ce-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.941E-23 | 0.0000 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.311E-28 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.724E-28 | 0.0000 |
| Eu-152 | 3.475E-04 | 0.0000 | 1.521E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.675E-08 | 0.0000 | 1.560E-10 | 0.0000 | 3.491E-04 | 0.0000 |
| Eu-154 | 5.051E-04 | 0.0000 | 2.211E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.701E-08 | 0.0000 | 2.267E-10 | 0.0000 | 5.074E-04 | 0.0000 |
| Eu-155 | 6.608E-05 | 0.0000 | 2.893E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.269E-08 | 0.0000 | 2.965E-11 | 0.0000 | 6.638E-05 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 3.633E-06 | 0.0000 | 8.714E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.633E-06 | 0.0000 |
| I-129 | 7.948E+01 | 0.9971 | 2.875E-02 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.107E-02 | 0.0008 | 1.427E-01 | 0.0018 | 7.972E+01 | 1.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.370E-25 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ru-106 | 4.922E-04 | 0.0000 | 6.746E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.891E-08 | 0.0000 | 4.418E-11 | 0.0000 | 4.929E-04 | 0.0000 |
| Sb-125 | 1.118E-04 | 0.0000 | 6.812E-09 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.289E-08 | 0.0000 | 1.506E-08 | 0.0000 | 1.119E-04 | 0.0000 |
| Sm-151 | 2.110E-05 | 0.0000 | 9.237E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.052E-09 | 0.0000 | 9.468E-12 | 0.0000 | 2.119E-05 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.259E-27 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.507E-12 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 7.949E+01 | 0.9971 | 2.877E-02 | 0.0004 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.107E-02 | 0.0008 | 1.427E-01 | 0.0018 | 7.972E+01 | 1.0000 |

*S of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.461E+02 years

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 5.487E-29 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| I-129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sm-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-233 | 4.858E-25 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 1.407E-26 | 0.0000 | 0.000E+00 | 0.0000 | 1.263E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 4.999E-25 | 0.0000 | 0.000E+00 | 0.0000 | 1.263E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.461E+02 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 5.343E-01 | 0.0094 | 2.339E-03 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.026E-04 | 0.0000 | 2.398E-07 | 0.0000 | 5.367E-01 | 0.0095 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.487E-29 | 0.0000 |
| Eu-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| I-129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 5.575E+01 | 0.9836 | 2.441E-01 | 0.0043 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.071E-02 | 0.0002 | 2.502E-05 | 0.0000 | 5.600E+01 | 0.9881 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sm-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.858E-25 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.263E-08 | 0.0000 |
| U-235 | 1.370E-01 | 0.0024 | 5.998E-04 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.631E-05 | 0.0000 | 6.148E-08 | 0.0000 | 1.376E-01 | 0.0024 |
| Total | 5.642E+01 | 0.9955 | 2.470E-01 | 0.0044 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.084E-02 | 0.0002 | 2.532E-05 | 0.0000 | 5.668E+01 | 1.0000 |

*[illegible] of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 2.246E+02 years

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 2.300E-29 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| I-129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sm-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-233 | 1.137E-24 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 3.681E-26 | 0.0000 | 0.000E+00 | 0.0000 | 1.562E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 1.174E-24 | 0.0000 | 0.000E+00 | 0.0000 | 1.562E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 2.246E+02 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 3.121E-04 | 0.0008 | 1.366E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.994E-08 | 0.0000 | 1.400E-10 | 0.0000 | 3.135E-04 | 0.0008 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.300E-29 | 0.0000 |
| Eu-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| I-129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 4.006E-01 | 0.9868 | 1.754E-03 | 0.0043 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.694E-05 | 0.0002 | 1.798E-07 | 0.0000 | 4.024E-01 | 0.9913 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sm-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 1.583E-03 | 0.0039 | 1.688E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.825E-08 | 0.0000 | 4.264E-07 | 0.0000 | 1.586E-03 | 0.0039 |
| U-233 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.137E-24 | 0.0000 |
| U-234 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.562E-08 | 0.0000 |
| U-235 | 1.640E-03 | 0.0040 | 7.182E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.151E-07 | 0.0000 | 7.362E-10 | 0.0000 | 1.648E-03 | 0.0041 |
| Total | 4.041E-01 | 0.9955 | 1.764E-03 | 0.0043 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.734E-05 | 0.0002 | 6.070E-07 | 0.0000 | 4.060E-01 | 1.0000 |

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.951E+02 years

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| I-129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sm-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-233 | 6.961E-24 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 2.308E-25 | 0.0000 | 0.000E+00 | 0.0000 | 1.925E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 7.192E-24 | 0.0000 | 0.000E+00 | 0.0000 | 1.925E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.951E+02 years

Water Dependent Pathways

| adio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| uclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| c-227 | 2.932E-11 | 0.0000 | 1.284E-13 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.632E-15 | 0.0000 | 1.316E-17 | 0.0000 | 2.945E-11 | 0.0000 |
| -14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| e-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| s-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| J-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| e-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -231 | 1.651E+01 | 0.9286 | 1.107E-02 | 0.0006 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.172E-03 | 0.0002 | 7.412E-06 | 0.0000 | 1.653E+01 | 0.9294 |
| u-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| n-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -90 | 2.424E-08 | 0.0000 | 2.584E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.793E-13 | 0.0000 | 6.527E-12 | 0.0000 | 2.427E-08 | 0.0000 |
| 233 | 3.442E-01 | 0.0194 | 9.434E-05 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.610E-05 | 0.0000 | 3.707E-05 | 0.0000 | 3.444E-01 | 0.0194 |
| J-234 | 3.932E-01 | 0.0221 | 1.078E-04 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.552E-05 | 0.0000 | 4.235E-05 | 0.0000 | 3.934E-01 | 0.0221 |
| J-235 | 5.169E-01 | 0.0291 | 1.965E-04 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.929E-05 | 0.0000 | 4.083E-05 | 0.0000 | 5.173E-01 | 0.0291 |
| tal | 1.777E+01 | 0.9992 | 1.146E-02 | 0.0006 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.413E-03 | 0.0002 | 1.277E-04 | 0.0000 | 1.778E+01 | 1.0000 |

'Sum all water independent and dependent pathways.

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

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Ac-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| C-14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Fe-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| H-3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| I-129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pa-231 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sm-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sr-90 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-233 | 4.272E-21 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-234 | 1.353E-22 | 0.0000 | 0.000E+00 | 0.0000 | 3.511E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-235 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 4.407E-21 | 0.0000 | 0.000E+00 | 0.0000 | 3.511E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| c-227 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -14 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| e-144 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cs-134 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| s-137 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-152 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-154 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Eu-155 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| e-55 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -3 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -129 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Mn-54 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| i-63 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| a-231 | 1.250E-05 | 0.0034 | 8.379E-09 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.402E-09 | 0.0000 | 5.612E-12 | 0.0000 | 1.251E-05 | 0.0034 |
| Ru-106 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Sb-125 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| m-151 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| r-90 | 2.005E-25 | 0.0000 | 2.137E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.398E-29 | 0.0000 | 2.007E-25 | 0.0000 |
| -233 | 2.028E-07 | 0.0001 | 5.560E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.896E-11 | 0.0000 | 2.185E-11 | 0.0000 | 2.029E-07 | 0.0001 |
| U-234 | 3.670E-03 | 0.9937 | 9.777E-06 | 0.0026 | 3.932E-10 | 0.0000 | 0.000E+00 | 0.0000 | 1.396E-07 | 0.0000 | 6.724E-09 | 0.0000 | 3.680E-03 | 0.9964 |
| U-235 | 5.573E-07 | 0.0002 | 2.585E-10 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.070E-10 | 0.0000 | 3.138E-11 | 0.0000 | 5.577E-07 | 0.0002 |
| otal | 3.683E-03 | 0.9973 | 9.786E-06 | 0.0026 | 3.932E-10 | 0.0000 | 0.000E+00 | 0.0000 | 1.422E-07 | 0.0000 | 6.782E-09 | 0.0000 | 3.693E-03 | 1.0000 |

*S all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways, (mrem/yr)/(pCi/g)

| Nuclide (i) | t= 0.000E+00 | 1.000E-02 | 8.210E-01 | 1.511E+00 | 1.461E+02 | 2.246E+02 | 3.951E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|---|---|
| Ac-227 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 5.367E-02 | 3.135E-05 | 2.945E-12 | 0.000E+00 |
| C-14 | 0.000E+00 | 0.000E+00 | 1.061E-01 | 1.502E-05 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Ce-144 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Co-60 | 2.333E-24 | 2.330E-24 | 2.111E-24 | 1.941E-24 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cs-134 | 8.670E-29 | 8.642E-29 | 6.643E-29 | 5.311E-29 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cs-137 | 2.769E-29 | 2.769E-29 | 2.744E-29 | 2.724E-29 | 5.487E-30 | 2.300E-30 | 0.000E+00 | 0.000E+00 |
| Eu-152 | 3.802E-24 | 3.342E-24 | 2.558E-01 | 3.491E-05 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Eu-154 | 7.207E-25 | 6.333E-25 | 3.790E-01 | 5.074E-05 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Eu-155 | 0.000E+00 | 0.000E+00 | 5.162E-02 | 6.638E-06 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Fe-55 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| H-3 | 0.000E+00 | 0.000E+00 | 2.667E-03 | 3.633E-07 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| I-129 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 7.972E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Mn-54 | 7.996E-26 | 7.931E-26 | 4.130E-26 | 2.370E-26 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Ni-59 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Ni-63 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Pa-231 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 5.600E+00 | 4.024E-02 | 1.653E+00 | 1.251E-06 |
| Ru-106 | 0.000E+00 | 0.000E+00 | 5.529E-01 | 4.929E-05 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Sb-125 | 0.000E+00 | 0.000E+00 | 9.389E-02 | 1.119E-05 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Sm-151 | 0.000E+00 | 0.000E+00 | 1.505E-02 | 2.119E-06 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Sr-90 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.586E-04 | 2.427E-09 | 2.007E-26 |
| U-233 | 0.000E+00 | 2.831E-30 | 2.319E-28 | 4.259E-28 | 4.858E-26 | 1.137E-25 | 3.444E-02 | 2.029E-08 |
| U-234 | 0.000E+00 | 3.360E-17 | 2.238E-13 | 7.507E-13 | 1.263E-09 | 1.562E-09 | 3.934E-02 | 3.680E-04 |
| U-235 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.376E-02 | 1.648E-04 | 5.173E-02 | 5.577E-08 |

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 100 mrem/yr

| (i) | t= 0.000E+00 | 1.000E-02 | 8.210E-01 | 1.511E+00 | 1.461E+02 | 2.246E+02 | 3.951E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|---|---|
| c-227 | *7.244E+13 | *7.244E+13 | *7.244E+13 | *7.244E+13 | 1.863E+03 | 3.190E+06 | 3.395E+13 | *7.244E+13 |
| C-14 | *4.454E+12 | *4.454E+12 | 9.425E+02 | 6.657E+06 | *4.454E+12 | *4.454E+12 | *4.454E+12 | *4.454E+12 |
| Ce-144 | *3.190E+15 | *3.190E+15 | *3.190E+15 | *3.190E+15 | *3.190E+15 | *3.190E+15 | *3.190E+15 | *3.190E+15 |
| o-60 | *1.131E+15 | *1.131E+15 | *1.131E+15 | *1.131E+15 | *1.131E+15 | *1.131E+15 | *1.131E+15 | *1.131E+15 |
| s-134 | *1.294E+15 | *1.294E+15 | *1.294E+15 | *1.294E+15 | *1.294E+15 | *1.294E+15 | *1.294E+15 | *1.294E+15 |
| s-137 | *8.652E+13 | *8.652E+13 | *8.652E+13 | *8.652E+13 | *8.652E+13 | *8.652E+13 | *8.652E+13 | *8.652E+13 |
| Eu-152 | *1.810E+14 | *1.810E+14 | 3.910E+02 | 2.865E+06 | *1.810E+14 | *1.810E+14 | *1.810E+14 | *1.810E+14 |
| Eu-154 | *2.732E+14 | *2.732E+14 | 2.638E+02 | 1.971E+06 | *2.732E+14 | *2.732E+14 | *2.732E+14 | *2.732E+14 |
| u-155 | *4.651E+14 | *4.651E+14 | 1.937E+03 | 1.507E+07 | *4.651E+14 | *4.651E+14 | *4.651E+14 | *4.651E+14 |
| e-55 | *2.423E+15 | *2.423E+15 | *2.423E+15 | *2.423E+15 | *2.423E+15 | *2.423E+15 | *2.423E+15 | *2.423E+15 |
| H-3 | *9.610E+15 | *9.610E+15 | 3.749E+04 | 2.753E+08 | *9.610E+15 | *9.610E+15 | *9.610E+15 | *9.610E+15 |
| I-129 | *1.733E+08 | *1.733E+08 | *1.733E+08 | 1.254E+01 | *1.733E+08 | *1.733E+08 | *1.733E+08 | *1.733E+08 |
| n-54 | *7.739E+15 | *7.739E+15 | *7.739E+15 | *7.739E+15 | *7.739E+15 | *7.739E+15 | *7.739E+15 | *7.739E+15 |
| -59 | *8.085E+10 | *8.085E+10 | *8.085E+10 | *8.085E+10 | *8.085E+10 | *8.085E+10 | *8.085E+10 | *8.085E+10 |
| -63 | *5.679E+13 | *5.679E+13 | *5.679E+13 | *5.679E+13 | *5.679E+13 | *5.679E+13 | *5.679E+13 | *5.679E+13 |
| Pa-231 | *4.716E+10 | *4.716E+10 | *4.716E+10 | *4.716E+10 | 1.786E+01 | 2.485E+03 | 6.050E+01 | 7.990E+07 |
| Ru-106 | *3.265E+15 | *3.265E+15 | 1.809E+02 | 2.029E+06 | *3.265E+15 | *3.265E+15 | *3.265E+15 | *3.265E+15 |
| b-125 | *1.033E+15 | *1.033E+15 | 1.065E+03 | 8.939E+06 | *1.033E+15 | *1.033E+15 | *1.033E+15 | *1.033E+15 |
| b-151 | *2.631E+13 | *2.631E+13 | 6.646E+03 | 4.718E+07 | *2.631E+13 | *2.631E+13 | *2.631E+13 | *2.631E+13 |
| Sr-90 | *1.380E+14 | *1.380E+14 | *1.380E+14 | *1.380E+14 | *1.380E+14 | 6.307E+05 | 4.120E+10 | *1.380E+14 |
| U-233 | *9.633E+11 | *9.633E+11 | *9.633E+11 | *9.633E+11 | *9.633E+11 | *9.633E+11 | 2.904E+03 | 4.928E+09 |
| 234 | *6.233E+09 | *6.233E+09 | *6.233E+09 | *6.233E+09 | *6.233E+09 | *6.233E+09 | 2.542E+03 | 2.718E+05 |
| 235 | *2.160E+06 | *2.160E+06 | *2.160E+06 | *2.160E+06 | 7.267E+03 | 6.068E+05 | 1.933E+03 | *2.160E+06 |

*At specific activity limit

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 1.5113 ± 0.0005 years

| Nuclide (i) | Initial pCi/g | tmin (years) | DSR(i,tmin) | G(i,tmin) (pCi/g) | DSR(i,tmax) | G(i,tmax) (pCi/g) |
|---|---|---|---|---|---|---|
| Ac-227 | 1.000E+01 | 146.04 ± 0.04 | 5.377E-02 | 1.860E+03 | 0.000E+00 | *7.244E+13 |
| C-14 | 1.000E+01 | 0.8210 ± 0.0002 | 1.061E-01 | 9.425E+02 | 1.497E-05 | 6.680E+06 |
| Ce-144 | 1.000E+01 | 0.000E+00 | 0.000E+00 | *3.190E+15 | 0.000E+00 | *3.190E+15 |
| Co-60 | 1.000E+01 | 0.000E+00 | 2.333E-24 | *1.131E+15 | 1.941E-24 | *1.131E+15 |
| Cs-134 | 1.000E+01 | 0.000E+00 | 8.670E-29 | *1.294E+15 | 5.311E-29 | *1.294E+15 |
| Cs-137 | 1.000E+01 | 0.000E+00 | 2.769E-29 | *8.652E+13 | 2.723E-29 | *8.652E+13 |
| Eu-152 | 1.000E+01 | 0.8210 ± 0.0002 | 2.558E-01 | 3.910E+02 | 3.479E-05 | 2.875E+06 |
| Eu-154 | 1.000E+01 | 0.8210 ± 0.0002 | 3.790E-01 | 2.638E+02 | 5.056E-05 | 1.978E+06 |
| Eu-155 | 1.000E+01 | 0.8210 ± 0.0002 | 5.162E-02 | 1.937E+03 | 6.614E-06 | 1.512E+07 |
| Fe-55 | 1.000E+01 | 0.000E+00 | 0.000E+00 | *2.423E+15 | 0.000E+00 | *2.423E+15 |
| H-3 | 1.000E+01 | 0.8210 ± 0.0002 | 2.667E-03 | 3.749E+04 | 3.620E-07 | 2.762E+08 |
| I-129 | 1.000E+01 | 1.5110 ± 0.0005 | 7.972E+00 | 1.254E+01 | 7.973E+00 | 1.254E+01 |
| Mn-54 | 1.000E+01 | 0.000E+00 | 7.996E-26 | *7.739E+15 | 2.370E-26 | *7.739E+15 |
| Ni-59 | 1.000E+01 | 0.000E+00 | 0.000E+00 | *8.085E+10 | 0.000E+00 | *8.085E+10 |
| Ni-63 | 1.000E+01 | 0.000E+00 | 0.000E+00 | *5.679E+13 | 0.000E+00 | *5.679E+13 |
| Pa-231 | 1.000E+01 | 146.06 ± 0.04 | 5.605E+00 | 1.784E+01 | 0.000E+00 | *4.716E+10 |
| Ru-106 | 1.000E+01 | 0.8210 ± 0.0002 | 5.529E-01 | 1.809E+02 | 4.911E-05 | 2.036E+06 |
| Sb-125 | 1.000E+01 | 0.8210 ± 0.0002 | 9.389E-02 | 1.065E+03 | 1.115E-05 | 8.972E+06 |
| Sm-151 | 1.000E+01 | 0.8210 ± 0.0002 | 1.505E-02 | 6.646E+03 | 2.112E-06 | 4.735E+07 |
| Sr-90 | 1.000E+01 | 224.55 ± 0.07 | 1.586E-04 | 6.307E+05 | 0.000E+00 | *1.380E+14 |
| U-233 | 1.000E+01 | 395.0 ± 0.1 | 3.441E-02 | 2.906E+03 | 4.260E-28 | *9.633E+11 |
| U-234 | 1.000E+01 | 395.1 ± 0.1 | 3.932E-02 | 2.543E+03 | 7.869E-11 | *6.233E+09 |
| U-235 | 1.000E+01 | 395.1 ± 0.1 | 5.173E-02 | 1.933E+03 | 0.000E+00 | *2.160E+06 |

*At specific activity limit

## Site-Specific Parameter Summary

| | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| 011 | Area of contaminated zone (m**2) | 1.000E+02 | 1.000E+04 | --- | AREA |
| 011 | Thickness of contaminated zone (m) | 1.500E-01 | 1.000E+00 | --- | THICK0 |
| K011 | Length parallel to aquifer flow (m) | 1.000E+02 | 1.000E+02 | --- | LCZPAQ |
| R011 | Basic radiation dose limit (mrem/yr) | 1.000E+02 | 1.000E+02 | --- | BRLD |
| 011 | Time since placement of material (yr) | 0.000E+00 | 0.000E+00 | --- | TI |
| 011 | Times for calculations (yr) | 1.000E-02 | 1.000E+00 | --- | T( 2) |
| 011 | Times for calculations (yr) | 8.210E-01 | 3.000E+00 | --- | T( 3) |
| R011 | Times for calculations (yr) | 1.511E+00 | 1.000E+01 | --- | T( 4) |
| R011 | Times for calculations (yr) | 1.461E+02 | 3.000E+01 | --- | T( 5) |
| 011 | Times for calculations (yr) | 2.246E+02 | 1.000E+02 | --- | T( 6) |
| 011 | Times for calculations (yr) | 3.951E+02 | 3.000E+02 | --- | T( 7) |
| K011 | Times for calculations (yr) | 1.000E+03 | 1.000E+03 | --- | T( 8) |
| R011 | Times for calculations (yr) | not used | 3.000E+03 | --- | T( 9) |
| 011 | Times for calculations (yr) | not used | 1.000E+04 | --- | T(10) |
| 012 | Initial principal radionuclide (pCi/g): Am-241 | 1.000E+01 | 0.000E+00 | --- | S( 2) |
| R012 | Initial principal radionuclide (pCi/g): Am-243 | 1.000E+01 | 0.000E+00 | --- | S( 3) |
| R012 | Initial principal radionuclide (pCi/g): Cm-243 | 1.000E+01 | 0.000E+00 | --- | S( 4) |
| 012 | Initial principal radionuclide (pCi/g): Cm-244 | 1.000E+01 | 0.000E+00 | --- | S( 5) |
| 012 | Initial principal radionuclide (pCi/g): Np-237 | 1.000E+01 | 0.000E+00 | --- | S( 6) |
| W012 | Initial principal radionuclide (pCi/g): Pu-238 | 1.000E+01 | 0.000E+00 | --- | S( 9) |
| 012 | Initial principal radionuclide (pCi/g): Pu-239 | 1.000E+01 | 0.000E+00 | --- | S(10) |
| 012 | Initial principal radionuclide (pCi/g): Pu-240 | 1.000E+01 | 0.000E+00 | --- | S(11) |
| 012 | Initial principal radionuclide (pCi/g): Pu-241 | 1.000E+01 | 0.000E+00 | --- | S(12) |
| 012 | Initial principal radionuclide (pCi/g): Pu-242 | 1.000E+01 | 0.000E+00 | --- | S(13) |
| 012 | Initial principal radionuclide (pCi/g): U-236 | 1.000E+01 | 0.000E+00 | --- | S(23) |
| 012 | Initial principal radionuclide (pCi/g): U-238 | 1.000E+01 | 0.000E+00 | --- | S(24) |
| 12 | Concentration in groundwater (pCi/L): Am-241 | not used | 0.000E+00 | --- | W( 2) |
| 12 | Concentration in groundwater (pCi/L): Am-243 | not used | 0.000E+00 | --- | W( 3) |
| 012 | Concentration in groundwater (pCi/L): Cm-243 | not used | 0.000E+00 | --- | W( 4) |
| 012 | Concentration in groundwater (pCi/L): Cm-244 | not used | 0.000E+00 | --- | W( 5) |
| | Concentration in groundwater (pCi/L): Np-237 | not used | 0.000E+00 | --- | W( 6) |
| | Concentration in groundwater (pCi/L): Pu-238 | not used | 0.000E+00 | --- | W( 9) |
| | Concentration in groundwater (pCi/L): Pu-239 | not used | 0.000E+00 | --- | W(10) |
| 012 | Concentration in groundwater (pCi/L): Pu-240 | not used | 0.000E+00 | --- | W(11) |
| 012 | Concentration in groundwater (pCi/L): Pu-241 | not used | 0.000E+00 | --- | W(12) |
| 12 | Concentration in groundwater (pCi/L): Pu-242 | not used | 0.000E+00 | --- | W(13) |
| 12 | Concentration in groundwater (pCi/L): U-236 | not used | 0.000E+00 | --- | W(23) |
| 012 | Concentration in groundwater (pCi/L): U-238 | not used | 0.000E+00 | --- | W(24) |
| 13 | Cover depth (m) | 5.000E+00 | 0.000E+00 | --- | COVER0 |
| 13 | Density of cover material (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSCV |
| 13 | Cover depth erosion rate (m/yr) | 1.000E-03 | 1.000E-03 | --- | VCV |
| 013 | Density of contaminated zone (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSCZ |
| 13 | Contaminated zone erosion rate (m/yr) | 1.000E-03 | 1.000E-03 | --- | VCZ |
| 13 | Contaminated zone total porosity | 4.000E-01 | 4.000E-01 | --- | TPCZ |
| 13 | Contaminated zone effective porosity | 2.000E-01 | 2.000E-01 | --- | EPCZ |
| 13 | Contaminated zone hydraulic conductivity (m/yr) | 5.550E+03 | 1.000E+01 | --- | HCCZ |
| 13 | Contaminated zone b parameter | 4.050E+00 | 5.300E+00 | --- | BCZ |
| 13 | Evapotranspiration coefficient | 6.000E-01 | 6.000E-01 | --- | EVAPTR |
| 13 | Precipitation (m/yr) | 1.000E+00 | 1.000E+00 | --- | PRECIP |
| 13 | Irrigation (m/yr) | 0.000E+00 | 2.000E-01 | --- | RI |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R013 | Irrigation mode | overhead | overhead | --- | IDITCH |
| R013 | Runoff coefficient | 2.000E-01 | 2.000E-01 | --- | RUNOFF |
| R013 | Watershed area for nearby stream or pond (m**2) | 1.000E+06 | 1.000E+06 | --- | WAREA |
| R014 | Density of saturated zone (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSAQ |
| R014 | Saturated zone total porosity | 4.000E-01 | 4.000E-01 | --- | TPSZ |
| R014 | Saturated zone effective porosity | 2.000E-01 | 2.000E-01 | --- | EPSZ |
| R014 | Saturated zone hydraulic conductivity (m/yr) | 5.550E+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 | Individual's use of groundwater (m**3/yr) | not used | 1.500E+02 | --- | UW |
| R015 | Number of unsaturated zone strata | 1 | 1 | --- | NS |
| R015 | Unsat. zone 1, thickness (m) | 2.470E+00 | 4.000E+00 | --- | H(1) |
| R015 | Unsat. zone 1, soil density (g/cm**3) | 1.600E+00 | 1.600E+00 | --- | DENSUZ(1) |
| R015 | Unsat. zone 1, total porosity | 4.000E-01 | 4.000E-01 | --- | TPUZ(1) |
| R015 | Unsat. zone 1, effective porosity | 2.000E-01 | 2.000E-01 | --- | EPUZ(1) |
| R015 | Unsat. zone 1, soil-specific b parameter | 4.050E+00 | 5.300E+00 | --- | BUZ(1) |
| R015 | Unsat. zone 1, hydraulic conductivity (m/yr) | 5.550E+03 | 1.000E+02 | --- | HCUZ(1) |
| R016 | Distribution coefficients for Am-241 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.200E+02 | 2.000E+01 | --- | DCACTC( 2) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.200E+02 | 2.000E+01 | --- | DCACTU( 2,1) |
| R016 | Saturated zone (cm**3/g) | 1.200E+02 | 2.000E+01 | --- | DCACTS( 2) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.110E-02 | RLEACH( 2) |
| R016 | Distribution coefficients for Am-243 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.200E+02 | 2.000E+01 | --- | DCACTC( 3) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.200E+02 | 2.000E+01 | --- | DCACTU( 3,1) |
| R016 | Saturated zone (cm**3/g) | 1.200E+02 | 2.000E+01 | --- | DCACTS( 3) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.110E-02 | RLEACH( 3) |
| R016 | Distribution coefficients for Cm-243 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 4) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 4,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 4) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 4) |
| R016 | Distribution coefficients for Cm-244 | | | | |
| R016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 5) |
| R016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 5,1) |
| R016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 5) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 5) |

Site-Specific Parameter Summary (continued)

| | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| 016 | Distribution coefficients for Np-237 | | | | |
| 016 | Contaminated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTC( 6) |
| 016 | Unsaturated zone 1 (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTU( 6,1) |
| 016 | Saturated zone (cm**3/g) | 0.000E+00 | 0.000E+00 | --- | DCACTS( 6) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.285E+01 | RLEACH( 6) |
| 016 | Distribution coefficients for Pu-238 | | | | |
| 016 | Contaminated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTC( 9) |
| 016 | Unsaturated zone 1 (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTU( 9,1) |
| 016 | Saturated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTS( 9) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.663E-03 | RLEACH( 9) |
| 016 | Distribution coefficients for Pu-239 | | | | |
| 016 | Contaminated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTC(10) |
| 016 | Unsaturated zone 1 (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTU(10,1) |
| 016 | Saturated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTS(10) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.663E-03 | RLEACH(10) |
| 016 | Distribution coefficients for Pu-240 | | | | |
| 016 | Contaminated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTC(11) |
| 016 | Unsaturated zone 1 (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTU(11,1) |
| 016 | Saturated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTS(11) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.663E-03 | RLEACH(11) |
| 016 | Distribution coefficients for Pu-241 | | | | |
| 016 | Contaminated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTC(12) |
| 016 | Unsaturated zone 1 (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTU(12,1) |
| 16 | Saturated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTS(12) |
| 16 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.663E-03 | RLEACH(12) |
| 016 | Distribution coefficients for Pu-242 | | | | |
| | Contaminated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTC(13) |
| | Unsaturated zone 1 (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTU(13,1) |
| | Saturated zone (cm**3/g) | 2.000E+02 | 2.000E+03 | --- | DCACTS(13) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.663E-03 | RLEACH(13) |
| 16 | Distribution coefficients for U-236 | | | | |
| 16 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(23) |
| 016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(23,1) |
| 016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(23) |
| 16 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(23) |
| 16 | Distribution coefficients for U-238 | | | | |
| 016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(24) |
| 016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(24,1) |
| 16 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(24) |
| 16 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(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 daughter Ac-227 | | | | |
| R016 | Contaminated zone (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTC( 1) |
| R016 | Unsaturated zone 1 (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTU( 1,1) |
| R016 | Saturated zone (cm**3/g) | 2.000E+01 | 2.000E+01 | --- | DCACTS( 1) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 6.632E-02 | RLEACH( 1) |
| R016 | Distribution coefficients for daughter Pa-231 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC( 7) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU( 7,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS( 7) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH( 7) |
| R016 | Distribution coefficients for daughter Pb-210 | | | | |
| R016 | Contaminated zone (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTC( 8) |
| R016 | Unsaturated zone 1 (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTU( 8,1) |
| R016 | Saturated zone (cm**3/g) | 1.000E+02 | 1.000E+02 | --- | DCACTS( 8) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.332E-02 | RLEACH( 8) |
| R016 | Distribution coefficients for daughter Ra-226 | | | | |
| R016 | Contaminated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTC(14) |
| R016 | Unsaturated zone 1 (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTU(14,1) |
| R016 | Saturated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTS(14) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.902E-02 | RLEACH(14) |
| R016 | Distribution coefficients for daughter Ra-228 | | | | |
| R016 | Contaminated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTC(15) |
| R016 | Unsaturated zone 1 (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTU(15,1) |
| R016 | Saturated zone (cm**3/g) | 7.000E+01 | 7.000E+01 | --- | DCACTS(15) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 1.902E-02 | RLEACH(15) |
| R016 | Distribution coefficients for daughter Th-228 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(16) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(16,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(16) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(16) |
| R016 | Distribution coefficients for daughter Th-229 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(17) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(17,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(17) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(17) |
| R016 | Distribution coefficients for daughter Th-230 | | | | |
| R016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(18) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(18,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(18) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(18) |

Site-Specific Parameter Summary (continued)

| | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| 1016 | Distribution coefficients for daughter Th-232 | | | | |
| 1016 | Contaminated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTC(19) |
| R016 | Unsaturated zone 1 (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTU(19,1) |
| R016 | Saturated zone (cm**3/g) | 6.000E+04 | 6.000E+04 | --- | DCACTS(19) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.222E-05 | RLEACH(19) |
| 016 | Distribution coefficients for daughter U-233 | | | | |
| R016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(20) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(20,1) |
| 016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(20) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(20) |
| R016 | Distribution coefficients for daughter U-234 | | | | |
| 016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(21) |
| 016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(21,1) |
| 016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(21) |
| R016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(21) |
| 016 | Distribution coefficients for daughter U-235 | | | | |
| 016 | Contaminated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTC(22) |
| R016 | Unsaturated zone 1 (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTU(22,1) |
| R016 | Saturated zone (cm**3/g) | 5.000E+01 | 5.000E+01 | --- | DCACTS(22) |
| 016 | Leach rate (/yr) | 0.000E+00 | 0.000E+00 | 2.661E-02 | RLEACH(22) |
| 017 | Inhalation rate (m**3/yr) | 8.400E+03 | 8.400E+03 | --- | INHALR |
| R017 | Mass loading for inhalation (g/m**3) | 2.000E-04 | 2.000E-04 | --- | MLINH |
| R017 | Dilution length for airborne dust, inhalation (m) | 3.000E+00 | 3.000E+00 | --- | LM |
| 017 | Occupancy factor, inhalation | 5.000E-01 | 4.500E-01 | --- | FO3 |
| 017 | Occupancy and shielding factor, external gamma | 6.000E-01 | 6.000E-01 | --- | FO1 |
| R017 | Shape factor, external gamma | 1.000E+00 | 1.000E+00 | --- | FS1 |
| R01 | Fractions of annular areas within AREA: | | | | |
| | Outer annular radius (m) = √(1/π) | not used | 1.000E+00 | --- | FRACA( 1) |
| | Outer annular radius (m) = √(10/π) | not used | 1.000E+00 | --- | FRACA( 2) |
| | Outer annular radius (m) = √(20/π) | not used | 1.000E+00 | --- | FRACA( 3) |
| R017 | Outer annular radius (m) = √(50/π) | not used | 1.000E+00 | --- | FRACA( 4) |
| R017 | Outer annular radius (m) = √(100/π) | not used | 1.000E+00 | --- | FRACA( 5) |
| 017 | Outer annular radius (m) = √(200/π) | not used | 1.000E+00 | --- | FRACA( 6) |
| 017 | Outer annular radius (m) = √(500/π) | not used | 1.000E+00 | --- | FRACA( 7) |
| R017 | Outer annular radius (m) = √(1000/π) | not used | 1.000E+00 | --- | FRACA( 8) |
| R017 | Outer annular radius (m) = √(5000/π) | not used | 1.000E+00 | --- | FRACA( 9) |
| 017 | Outer annular radius (m) = √(1.E+04/π) | not used | 1.000E+00 | --- | FRACA(10) |
| 017 | Outer annular radius (m) = √(1.E+05/π) | not used | 0.000E+00 | --- | FRACA(11) |
| 017 | Outer annular radius (m) = √(1.E+06/π) | not used | 0.000E+00 | --- | FRACA(12) |
| 018 | Fruits, vegetables and grain consumption (kg/yr) | 1.600E+02 | 1.600E+02 | --- | DIET(1) |
| 018 | Leafy vegetable consumption (kg/yr) | 1.400E+01 | 1.400E+01 | --- | DIET(2) |
| 018 | Milk consumption (L/yr) | 9.200E+01 | 9.200E+01 | --- | DIET(3) |
| 018 | Meat and poultry consumption (kg/yr) | 6.300E+01 | 6.300E+01 | --- | DIET(4) |
| 018 | Fish consumption (kg/yr) | 5.400E+00 | 5.400E+00 | --- | DIET(5) |
| 018 | Other seafood consumption (kg/yr) | 9.000E-01 | 9.000E-01 | --- | DIET(6) |
| 018 | Soil ingestion rate (g/yr) | 3.650E+01 | 0.000E+00 | --- | SOIL |

Site-Specific Parameter Summary (continued)

| Menu | Parameter | User Input | Default | Used by RESRAD (If different from user input) | Parameter Name |
|---|---|---|---|---|---|
| R018 | Drinking water intake (L/yr) | 4.100E+02 | 4.100E+02 | --- | DWI |
| R018 | Fraction of drinking water from site | 1.000E+00 | 1.000E+00 | --- | FDW |
| 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 | Mass loading for foliar deposition (g/m**3) | 1.000E-04 | 1.000E-04 | --- | MLFD |
| R019 | Depth of soil mixing layer (m) | 1.500E-01 | 1.500E-01 | --- | DM |
| R019 | Depth of roots (m) | 9.000E-01 | 9.000E-01 | --- | DROOT |
| R019 | Drinking water fraction from ground water | 1.000E+00 | 1.000E+00 | --- | FGWDW |
| R019 | 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 |
| 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 |
| R021 | Volumetric water content of the foundation | 1.000E-02 | 1.000E-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 | 2.000E-08 | 2.000E-08 | --- | 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 annual wind speed (m/sec) | 2.000E+00 | 2.000E+00 | --- | WIND |
| R021 | Average building air exchange rate (1/hr) | 1.000E+00 | 1.000E+00 | --- | REXG |
| R021 | Height of the building (room) (m) | 2.500E+00 | 2.500E+00 | --- | HRM |
| R021 | Building interior area factor | 1.000E+00 | 1.000E+00 | --- | FAI |
| R021 | Bulk density of building foundation (g/cm**3) | 2.400E+00 | 2.400E+00 | --- | DENSFL |
| R021 | Thickness of building foundation (m) | 1.500E-01 | 1.500E-01 | --- | FLOOR |
| R021 | Building depth below ground surface (m) | 1.000E+00 | 1.000E+00 | --- | DMFL |
| R021 | Fraction of time spent indoors | 5.000E-01 | 5.000E-01 | --- | FIND |
| R021 | Fraction of time spent outdoors (on site) | 2.500E-01 | 2.500E-01 | --- | FOTD |
| R021 | Emanating power of Rn-222 gas | 2.000E-01 | 2.000E-01 | --- | EMANA(1) |
| R021 | Emanating power of Rn-220 gas | 1.000E-01 | 1.000E-01 | --- | EMANA(2) |

Summary of Pathway Selections

| Pathway | User Selection |
|---|---|
| 1 -- external gamma | active |
| 2 -- inhalation | active |
| 3 -- plant ingestion | active |
| 4 -- meat ingestion | active |
| 5 -- milk ingestion | active |
| 6 -- aquatic foods | active |
| 7 -- drinking water | active |
| 8 -- radon | active |
| 9 -- soil ingestion | active |

**Contaminated Zone Dimensions**

| | |
|---|---|
| Area: | 100.00 square meters |
| ...kness: | 0.15 meters |
| ...er Depth: | 5.00 meters |

**Initial Soil Concentrations, pCi/g**

| | |
|---|---|
| Am-241 | 1.000E+01 |
| Am-243 | 1.000E+01 |
| Cm-243 | 1.000E+01 |
| Cm-244 | 1.000E+01 |
| Np-237 | 1.000E+01 |
| Pu-238 | 1.000E+01 |
| Pu-239 | 1.000E+01 |
| Pu-240 | 1.000E+01 |
| Pu-241 | 1.000E+01 |
| Pu-242 | 1.000E+01 |
| U-236 | 1.000E+01 |
| U-238 | 1.000E+01 |

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 100 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

| t (years): | 0.000E+00 | 1.000E-02 | 8.210E-01 | 1.511E+00 | 1.461E+02 | 2.246E+02 | 3.951E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|---|---|
| TDOSE(t): | 4.060E-29 | 8.563E-24 | 3.991E+03 | 5.585E-01 | 8.335E-09 | 1.652E-10 | 8.226E-01 | 5.208E-06 |
| M(t): | 4.060E-31 | 8.563E-26 | 3.991E+01 | 5.585E-03 | 8.335E-11 | 1.652E-12 | 8.226E-03 | 5.208E-08 |

aximum TDOSE(t): 3.991E+03 mrem/yr at t = 0.8210 ± 0.0002 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.8210 years

Water Independent Pathways

| idio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| uclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| m-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| m-244 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| p-237 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| 236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -238 | 4.015E-29 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| tal | 4.015E-29 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and fraction of Total Dose At t = 0.8210 years

Water Dependent Pathways

| Radio-Nuclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 4.595E-04 | 0.0000 | 8.047E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.826E-08 | 0.0000 | 2.062E-10 | 0.0000 | 4.604E-04 | 0.0000 |
| Am-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-243 | 1.260E+03 | 0.3158 | 5.518E+00 | 0.0014 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.421E-01 | 0.0001 | 5.656E-04 | 0.0000 | 1.266E+03 | 0.3172 |
| Cm-244 | 9.882E+02 | 0.2476 | 4.326E+00 | 0.0011 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.898E-01 | 0.0000 | 4.435E-04 | 0.0000 | 9.927E+02 | 0.2487 |
| Np-237 | 1.729E+03 | 0.4332 | 3.028E+00 | 0.0008 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.321E-01 | 0.0001 | 7.760E-04 | 0.0000 | 1.732E+03 | 0.4341 |
| Pu-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.532E-13 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.532E-13 | 0.0000 |
| Pu-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-241 | 2.981E-07 | 0.0000 | 5.220E-10 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.725E-11 | 0.0000 | 1.338E-13 | 0.0000 | 2.986E-07 | 0.0000 |
| Pu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.949E-21 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.949E-21 | 0.0000 |
| U-236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.375E-14 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.375E-14 | 0.0000 |
| Total | 3.977E+03 | 0.9966 | 1.287E+01 | 0.0032 | 2.369E-13 | 0.0000 | 0.000E+00 | 0.0000 | 7.640E-01 | 0.0002 | 1.785E-03 | 0.0000 | 3.991E+03 | 1.0000 |

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| adio- -uclide | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| ^m-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| m-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| m-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-244 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Np-237 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| 236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| 238 | 4.060E-29 | 1.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 4.060E-29 | 1.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| Radio- -clide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| -241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Am-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| [illegible] | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| [illegible] | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| [illegible] | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| 238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.060E-29 | 1.0000 |
| :al | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.060E-29 | 1.0000 |

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio-Nuclide | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Am-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-244 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Np-237 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.172E-24 | 0.3704 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 4.060E-29 | 0.0000 | 0.000E+00 | 0.0000 | 5.391E-24 | 0.6296 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 4.060E-29 | 0.0000 | 0.000E+00 | 0.0000 | 8.563E-24 | 1.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| Radio-Nuclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Am-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-244 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Np-237 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.172E-24 | 0.3704 |
| Pu-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.391E-24 | 0.6296 |
| Total | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.563E-24 | 1.0000 |

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 8.210E-01 years

Water Independent Pathways

| Radio- | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Am-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-244 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Np-237 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.733E-18 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.519E-29 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 4.015E-29 | 0.0000 | 0.000E+00 | 0.0000 | 1.729E-18 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 4.015E-29 | 0.0000 | 0.000E+00 | 0.0000 | 3.462E-18 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 8.210E-01 years

Water Dependent Pathways

| Radio- | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclide | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 4.595E-04 | 0.0000 | 8.047E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.826E-08 | 0.0000 | 2.062E-10 | 0.0000 | 4.604E-04 | 0.0000 |
| Am-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| [illegible] | 1.260E+03 | 0.3158 | 5.518E+00 | 0.0014 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.421E-01 | 0.0001 | 5.656E-04 | 0.0000 | 1.266E+03 | 0.3172 |
| [illegible] | 9.882E+02 | 0.2476 | 4.326E+00 | 0.0011 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.898E-01 | 0.0000 | 4.435E-04 | 0.0000 | 9.927E+02 | 0.2487 |
| Np-237 | 1.729E+03 | 0.4332 | 3.028E+00 | 0.0008 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.321E-01 | 0.0001 | 7.760E-04 | 0.0000 | 1.732E+03 | 0.4341 |
| Pu-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.733E-18 | 0.0000 |
| Pu-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-241 | 2.981E-07 | 0.0000 | 5.220E-10 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.725E-11 | 0.0000 | 1.338E-13 | 0.0000 | 2.987E-07 | 0.0000 |
| Pu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.519E-29 | 0.0000 |
| U-236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.729E-18 | 0.0000 |
| Total | 3.978E+03 | 0.9966 | 1.287E+01 | 0.0032 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.640E-01 | 0.0002 | 1.785E-03 | 0.0000 | 3.991E+03 | 1.0000 |

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.511E+00 years

Water Independent Pathways

| Radio-Nuclide | Ground mrem/yr | Ground fract. | Dust mrem/yr | Dust fract. | Radon mrem/yr | Radon fract. | Plant mrem/yr | Plant fract. | Meat mrem/yr | Meat fract. | Milk mrem/yr | Milk fract. | Soil mrem/yr | Soil fract. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Am-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-244 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Np-237 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.070E-17 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.264E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-236 | 2.227E-29 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 3.977E-29 | 0.0000 | 0.000E+00 | 0.0000 | 1.065E-17 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 6.204E-29 | 0.0000 | 0.000E+00 | 0.0000 | 2.135E-17 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.511E+00 years

Water Dependent Pathways

| Radio-Nuclide | Water mrem/yr | Water fract. | Fish mrem/yr | Fish fract. | Radon mrem/yr | Radon fract. | Plant mrem/yr | Plant fract. | Meat mrem/yr | Meat fract. | Milk mrem/yr | Milk fract. | All Pathways* mrem/yr | All Pathways* fract. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Am-241 | 1.197E-07 | 0.0000 | 2.096E-10 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.299E-11 | 0.0000 | 5.371E-14 | 0.0000 | 1.199E-07 | 0.0000 |
| Am-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-243 | 1.755E-01 | 0.3142 | 7.683E-04 | 0.0014 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.371E-05 | 0.0001 | 7.875E-08 | 0.0000 | 1.763E-01 | 0.3[illegible] |
| Cm-244 | 1.363E-01 | 0.2440 | 5.966E-04 | 0.0011 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.617E-05 | 0.0000 | 6.116E-08 | 0.0000 | 1.369E-01 | 0.2[illegible] |
| Np-237 | 2.448E-01 | 0.4384 | 4.288E-04 | 0.0008 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.703E-05 | 0.0001 | 1.099E-07 | 0.0000 | 2.453E-01 | 0.43[illegible] |
| Pu-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.070E-17 | 0.0000 |
| Pu-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-241 | 1.414E-10 | 0.0000 | 2.475E-13 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.715E-14 | 0.0000 | 6.344E-17 | 0.0000 | 1.416E-10 | 0.0000 |
| Pu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.264E-28 | 0.0000 |
| U-236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.227E-29 | 0.0000 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.065E-17 | 0.0000 |
| Total | 5.566E-01 | 0.9966 | 1.794E-03 | 0.0032 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.069E-04 | 0.0002 | 2.498E-07 | 0.0000 | 5.585E-01 | 1.0000 |

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.461E+02 years

Water Independent Pathways

| adio- nuclide | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| *m-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| m-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| m-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-244 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Np-237 | 1.646E-29 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| J-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.556E-12 | 0.0002 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| J-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.923E-21 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -236 | 1.140E-25 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.078E-12 | 0.0001 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 1.140E-25 | 0.0000 | 0.000E+00 | 0.0000 | 2.634E-12 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.461E+02 years

Water Dependent Pathways

| Radio- nuclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| m-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| m-243 | 1.003E-11 | 0.0012 | 4.389E-14 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.926E-15 | 0.0000 | 4.499E-18 | 0.0000 | 1.007E-11 | 0.0012 |
| [illegible] | 5.369E-12 | 0.0006 | 2.351E-14 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.031E-15 | 0.0000 | 2.410E-18 | 0.0000 | 5.394E-12 | 0.0006 |
| [illegible] | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| [illegible] | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.646E-29 | 0.0000 |
| u-239 | 8.279E-09 | 0.9933 | 3.625E-11 | 0.0043 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.556E-12 | 0.0002 |
| -240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.590E-12 | 0.0002 | 3.716E-15 | 0.0000 | 8.317E-09 | 0.9978 |
| -241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.923E-21 | 0.0000 |
| 238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.140E-25 | 0.0000 |
| | | | | | | | | | | | | | 1.078E-12 | 0.0001 |
| tal | 8.295E-09 | 0.9951 | 3.632E-11 | 0.0044 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.593E-12 | 0.0002 | 3.722E-15 | 0.0000 | 8.335E-09 | 1.0000 |

Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 2.246E+02 years

Water Independent Pathways

| Radio-Nuclide | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Am-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-244 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Np-237 | 3.852E-29 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.527E-12 | 0.0153 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.846E-20 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-236 | 2.249E-25 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.556E-12 | 0.0094 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 2.249E-25 | 0.0000 | 0.000E+00 | 0.0000 | 4.083E-12 | 0.0247 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 2.246E+02 years

Water Dependent Pathways

| Radio-Nuclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Am-243 | 3.078E-13 | 0.0019 | 1.348E-15 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.913E-17 | 0.0000 | 1.382E-19 | 0.0000 | 3.092E-13 | 0.00[illegible] |
| Cm-243 | 1.272E-13 | 0.0008 | 5.569E-16 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.443E-17 | 0.0000 | 5.708E-20 | 0.0000 | 1.278E-13 | 0.[illegible] |
| Cm-244 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.[illegible] |
| Np-237 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.852E-29 | 0.0000 |
| Pu-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.527E-12 | 0.0153 |
| Pu-239 | 1.600E-10 | 0.9682 | 7.004E-13 | 0.0042 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.072E-14 | 0.0002 | 7.179E-17 | 0.0000 | 1.607E-10 | 0.9726 |
| Pu-240 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.846E-20 | 0.0000 |
| U-236 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.249E-25 | 0.0000 |
| U-238 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.556E-12 | 0.0094 |
| Total | 1.604E-10 | 0.9708 | 7.023E-13 | 0.0043 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.081E-14 | 0.0002 | 7.198E-17 | 0.0000 | 1.652E-10 | 1.0000 |

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.951E+02 years

Water Independent Pathways

| adio-nuclide | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| *m-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| m-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| m-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-244 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Np-237 | 2.359E-28 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-238 | 4.398E-29 | 0.0000 | 0.000E+00 | 0.0000 | 3.667E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| u-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| ru-240 | 3.699E-29 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| ᵀu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.871E-20 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -236 | 9.366E-25 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| -238 | 2.466E-29 | 0.0000 | 0.000E+00 | 0.0000 | 2.041E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 9.370E-25 | 0.0000 | 0.000E+00 | 0.0000 | 5.708E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.951E+02 years

Water Dependent Pathways

| Radio-uclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 3.471E-06 | 0.0000 | 9.515E-10 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.667E-10 | 0.0000 | 3.739E-10 | 0.0000 | 3.473E-06 | 0.0000 |
| Am | 9.244E-10 | 0.0000 | 2.934E-13 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.776E-13 | 0.0000 | 8.873E-14 | 0.0000 | 9.250E-10 | 0.0000 |
| | 1.811E-10 | 0.0000 | 5.989E-14 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.479E-14 | 0.0000 | 1.673E-14 | 0.0000 | 1.812E-10 | 0.0000 |
| | 1.117E-07 | 0.0000 | 3.062E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.146E-11 | 0.0000 | 1.203E-11 | 0.0000 | 1.118E-07 | 0.0000 |
| ..ɹ ɛ57 | 6.460E-02 | 0.0785 | 1.771E-05 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.241E-05 | 0.0000 | 6.958E-06 | 0.0000 | 6.463E-02 | 0.0786 |
| Pu-238 | 1.346E-04 | 0.0002 | 3.691E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.586E-08 | 0.0000 | 1.450E-08 | 0.0000 | 1.347E-04 | 0.0002 |
| Pu-239 | 1.733E-07 | 0.0000 | 5.815E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.329E-11 | 0.0000 | 1.578E-11 | 0.0000 | 1.734E-07 | 0.0000 |
| ɹ-240 | 4.335E-05 | 0.0001 | 1.188E-08 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.326E-09 | 0.0000 | 4.669E-09 | 0.0000 | 4.337E-05 | 0.0001 |
| ɹ-241 | 1.052E-07 | 0.0000 | 2.883E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.020E-11 | 0.0000 | 1.133E-11 | 0.0000 | 1.052E-07 | 0.0000 |
| Pu-242 | 2.320E-08 | 0.0000 | 6.361E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.457E-12 | 0.0000 | 2.499E-12 | 0.0000 | 2.322E-08 | 0.0000 |
| U-236 | 3.784E-01 | 0.4600 | 1.037E-04 | 0.0001 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.269E-05 | 0.0001 | 4.076E-05 | 0.0000 | 3.787E-01 | 0.4603 |
| 238 | 3.789E-01 | 0.4606 | 1.039E-04 | 0.0001 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.278E-05 | 0.0001 | 4.081E-05 | 0.0000 | 3.791E-01 | 0.4609 |
| .ɔtal | 8.221E-01 | 0.9994 | 2.254E-04 | 0.0003 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.579E-04 | 0.0002 | 8.855E-05 | 0.0001 | 8.226E-01 | 1.0000 |

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways

| Radio-nuclide | Ground | | Dust | | Radon | | Plant | | Meat | | Milk | | Soil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Am-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-243 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-244 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Np-237 | 1.447E-25 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-238 | 2.634E-26 | 0.0000 | 0.000E+00 | 0.0000 | 6.836E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-239 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-240 | 6.392E-27 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-241 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Pu-242 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.710E-20 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-236 | 1.459E-22 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| U-238 | 1.440E-26 | 0.0000 | 0.000E+00 | 0.0000 | 3.738E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total | 1.461E-22 | 0.0000 | 0.000E+00 | 0.0000 | 1.057E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |

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

Water Dependent Pathways

| Radio-nuclide | Water | | Fish | | Radon | | Plant | | Meat | | Milk | | All Pathways* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. | mrem/yr | fract. |
| Am-241 | 1.184E-11 | 0.0000 | 3.245E-15 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.273E-15 | 0.0000 | 1.275E-15 | 0.0000 | 1.184E-11 | 0.0000 |
| Am-243 | 5.176E-15 | 0.0000 | 1.906E-18 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.942E-19 | 0.0000 | 4.256E-19 | 0.0000 | 5.179E-15 | 0.00[illegible] |
| Cm-243 | 4.622E-16 | 0.0000 | 1.831E-19 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.877E-20 | 0.0000 | 3.450E-20 | 0.0000 | 4.625E-16 | 0.0[illegible] |
| Cm-244 | 2.192E-13 | 0.0000 | 6.014E-17 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.209E-17 | 0.0000 | 2.360E-17 | 0.0000 | 2.193E-13 | 0.00[illegible] |
| Np-237 | 1.106E-07 | 0.0212 | 3.033E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.125E-11 | 0.0000 | 1.192E-11 | 0.0000 | 1.107E-07 | 0.0213 |
| Pu-238 | 1.029E-06 | 0.1977 | 2.742E-09 | 0.0005 | 7.654E-14 | 0.0000 | 0.000E+00 | 0.0000 | 3.916E-11 | 0.0000 | 1.889E-12 | 0.0000 | 1.032E-06 | 0.1982 |
| Pu-239 | 4.125E-13 | 0.0000 | 1.648E-16 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.923E-17 | 0.0000 | 3.041E-17 | 0.0000 | 4.128E-13 | 0.0000 |
| Pu-240 | 8.153E-11 | 0.0000 | 2.237E-14 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.566E-14 | 0.0000 | 8.780E-15 | 0.0000 | 8.158E-11 | 0.0000 |
| Pu-241 | 3.820E-13 | 0.0000 | 1.047E-16 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.337E-17 | 0.0000 | 4.114E-17 | 0.0000 | 3.822E-13 | 0.0000 |
| Pu-242 | 1.785E-13 | 0.0000 | 3.680E-16 | 0.0000 | 9.752E-22 | 0.0000 | 0.000E+00 | 0.0000 | 1.373E-17 | 0.0000 | 5.096E-18 | 0.0000 | 1.789E-13 | 0.0000 |
| U-236 | 2.903E-07 | 0.0557 | 7.974E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.574E-11 | 0.0000 | 3.126E-11 | 0.0000 | 2.904E-07 | 0.0558 |
| U-238 | 3.765E-06 | 0.7229 | 9.335E-09 | 0.0018 | 4.185E-14 | 0.0000 | 0.000E+00 | 0.0000 | 1.880E-10 | 0.0000 | 3.769E-11 | 0.0000 | 3.774E-06 | 0.7248 |
| Total | 5.195E-06 | 0.9976 | 1.219E-08 | 0.0023 | 1.184E-13 | 0.0000 | 0.000E+00 | 0.0000 | 3.042E-10 | 0.0001 | 8.276E-11 | 0.0000 | 5.208E-06 | 1.0000 |

Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways, (mrem/yr)/(pCi/g)

| | t= 0.000E+00 | 1.000E-02 | 8.210E-01 | 1.511E+00 | 1.461E+02 | 2.246E+02 | 3.951E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|---|---|
| Am-241 | 0.000E+00 | 0.000E+00 | 4.604E-05 | 1.199E-08 | 0.000E+00 | 0.000E+00 | 3.473E-07 | 1.184E-12 |
| Am-243 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 1.007E-12 | 3.092E-14 | 9.250E-11 | 5.179E-16 |
| Cm-243 | 0.000E+00 | 0.000E+00 | 1.266E+02 | 1.763E-02 | 5.394E-13 | 1.278E-14 | 1.812E-11 | 4.625E-17 |
| Cm-244 | 0.000E+00 | 0.000E+00 | 9.927E+01 | 1.369E-02 | 0.000E+00 | 0.000E+00 | 1.118E-08 | 2.193E-14 |
| Np-237 | 0.000E+00 | 0.000E+00 | 1.732E+02 | 2.453E-02 | 1.646E-30 | 3.852E-30 | 6.463E-03 | 1.107E-08 |
| Pu-238 | 0.000E+00 | 3.172E-25 | 1.733E-19 | 1.070E-18 | 1.556E-13 | 2.527E-13 | 1.347E-05 | 1.032E-07 |
| Pu-239 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 8.317E-10 | 1.607E-11 | 1.734E-08 | 4.128E-14 |
| Pu-240 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 4.337E-06 | 8.158E-12 |
| Pu-241 | 0.000E+00 | 0.000E+00 | 2.987E-08 | 1.416E-11 | 0.000E+00 | 0.000E+00 | 1.052E-08 | 3.822E-14 |
| Pu-242 | 0.000E+00 | 0.000E+00 | 5.519E-30 | 6.264E-29 | 7.923E-22 | 1.846E-21 | 2.322E-09 | 1.789E-14 |
| U-236 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 2.227E-30 | 1.140E-26 | 2.249E-26 | 3.787E-02 | 2.904E-08 |
| U-238 | 4.060E-30 | 5.391E-25 | 1.729E-19 | 1.065E-18 | 1.078E-13 | 1.556E-13 | 3.791E-02 | 3.774E-07 |

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 100 mrem/yr

| uclide (i) | t= 0.000E+00 | 1.000E-02 | 8.210E-01 | 1.511E+00 | 1.461E+02 | 2.246E+02 | 3.951E+02 | 1.000E+03 |
|---|---|---|---|---|---|---|---|---|
| Am-241 | *3.424E+12 | *3.424E+12 | 2.172E+06 | 8.339E+09 | *3.424E+12 | *3.424E+12 | 2.879E+08 | *3.424E+12 |
| Am-243 | *1.995E+11 | *1.995E+11 | *1.995E+11 | *1.995E+11 | *1.995E+11 | *1.995E+11 | *1.995E+11 | *1.995E+11 |
| m-243 | *5.159E+13 | *5.159E+13 | 7.899E-01 | 5.673E+03 | *5.159E+13 | *5.159E+13 | 5.518E+12 | *5.159E+13 |
| m-244 | *8.086E+13 | *8.086E+13 | 1.007E+00 | 7.305E+03 | *8.086E+13 | *8.086E+13 | 8.946E+09 | *8.086E+13 |
| Np-237 | *7.045E+08 | *7.045E+08 | 5.772E-01 | 4.076E+03 | *7.045E+08 | *7.045E+08 | 1.547E+04 | *7.045E+08 |
| Pu-238 | *1.711E+13 | *1.711E+13 | *1.711E+13 | *1.711E+13 | *1.711E+13 | *1.711E+13 | 7.423E+06 | 9.689E+08 |
| u-239 | *6.203E+10 | *6.203E+10 | *6.203E+10 | *6.203E+10 | *6.203E+10 | *6.203E+10 | 5.766E+09 | *6.203E+10 |
| u-240 | *2.266E+11 | *2.266E+11 | *2.266E+11 | *2.266E+11 | *2.266E+11 | *2.266E+11 | 2.306E+07 | *2.266E+11 |
| u-241 | *1.030E+14 | *1.030E+14 | 3.348E+09 | 7.061E+12 | *1.030E+14 | *1.030E+14 | 9.502E+09 | *1.030E+14 |
| Pu- | *3.927E+09 | *3.927E+09 | *3.927E+09 | *3.927E+09 | *3.927E+09 | *3.927E+09 | *3.927E+09 | *3.927E+09 |
| | *6.465E+08 | *6.465E+08 | *6.465E+08 | *6.465E+08 | *6.465E+08 | *6.465E+08 | 2.641E+03 | *6.465E+08 |
| | *3.360E+05 | *3.360E+05 | *3.360E+05 | *3.360E+05 | *3.360E+05 | *3.360E+05 | 2.638E+03 | *3.360E+05 |

*At specific activity limit

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.8210 ± 0.0002 years

| Nuclide (i) | Initial pCi/g | tmin (years) | DSR(i,tmin) | G(i,tmin) (pCi/g) | DSR(i,tmax) | G(i,tmax) (pCi/g) |
|---|---|---|---|---|---|---|
| Am-241 | 1.000E+01 | 0.8211 ± 0.0002 | 4.605E-05 | 2.172E+06 | 4.604E-05 | 2.172E+06 |
| Am-243 | 1.000E+01 | 395.1 ± 0.1 | 9.242E-11 | *1.995E+11 | 0.000E+00 | *1.995E+11 |
| Cm-243 | 1.000E+01 | 0.8210 ± 0.0002 | 1.266E+02 | 7.899E-01 | 1.266E+02 | 7.899E-01 |
| Cm-244 | 1.000E+01 | 0.8210 ± 0.0002 | 9.927E+01 | 1.007E+00 | 9.927E+01 | 1.007E+00 |
| Np-237 | 1.000E+01 | 0.8210 ± 0.0002 | 1.732E+02 | 5.772E-01 | 1.732E+02 | 5.772E-01 |
| Pu-238 | 1.000E+01 | 395.1 ± 0.1 | 1.346E-05 | 7.428E+06 | 1.532E-14 | *1.711E+13 |
| Pu-239 | 1.000E+01 | 395.1 ± 0.1 | 1.733E-08 | 5.770E+09 | 0.000E+00 | *6.203E+10 |
| Pu-240 | 1.000E+01 | 395.1 ± 0.1 | 4.334E-06 | 2.308E+07 | 0.000E+00 | *2.266E+11 |
| Pu-241 | 1.000E+01 | 0.8211 ± 0.0002 | 2.987E-08 | 3.347E+09 | 2.986E-08 | 3.348E+09 |
| Pu-242 | 1.000E+01 | 395.1 ± 0.1 | 2.320E-09 | *3.927E+09 | 1.949E-22 | *3.927E+09 |
| U-236 | 1.000E+01 | 395.1 ± 0.1 | 3.785E-02 | 2.642E+03 | 0.000E+00 | *6.465E+08 |
| U-238 | 1.000E+01 | 395.1 ± 0.1 | 3.790E-02 | 2.639E+03 | 8.375E-15 | *3.360E+05 |

*At specific activity limit

# Attachment 3

## 2. FORMULAS FOR DECISION LEVEL, MINIMUM DETECTABLE AMOUNT, AND CONVERSION FROM COUNTS TO ACTIVITY

### 2.1 Decision Level ($L_c$), Decision Amount (DA) and Minimum Detectable Amount (or Activity)(MDA)

For describing consistently the detection capabilities of measurements or analytical procedures, a number of methods of specifying minimum detectable amount (MDA) were considered by the Health Physics Society Standards Committee, Working Group 2.5, in developing the MDA formulations for bioassay performance criteria[7,8]. The method selected was based on an approach originally developed by Currie[9], whose formulations have received increasing acceptance and use in radioactivity measurements[10-12].

The simplest formula for MDA from Reference 8 is also the one most useful and instructive for application to smear surveys. The formulation assumes that the major source of error (uncertainty), with proper quality assurance, in the count of a smear is the random Poisson fluctuation in a count, from one count to another. Uncertainties in bias ("fixed" or "deterministic" errors), and other sources of random fluctuation, can be taken into account separately once the main concepts of MDA are understood. (These other sources of error are discussed in detail in References 8 and 12.)

Currie, as a noted research radiochemist as well as capable statistician, has considered in detail the actual steps taken when calculating the result of a radioactivity measurement [9,12]. In particular, he has introduced the consideration that the result for even a zero-activity sample must account for the random fluctuations in both the count of the zero-activity sample itself and the count of the blank that is subtracted from the sample count.

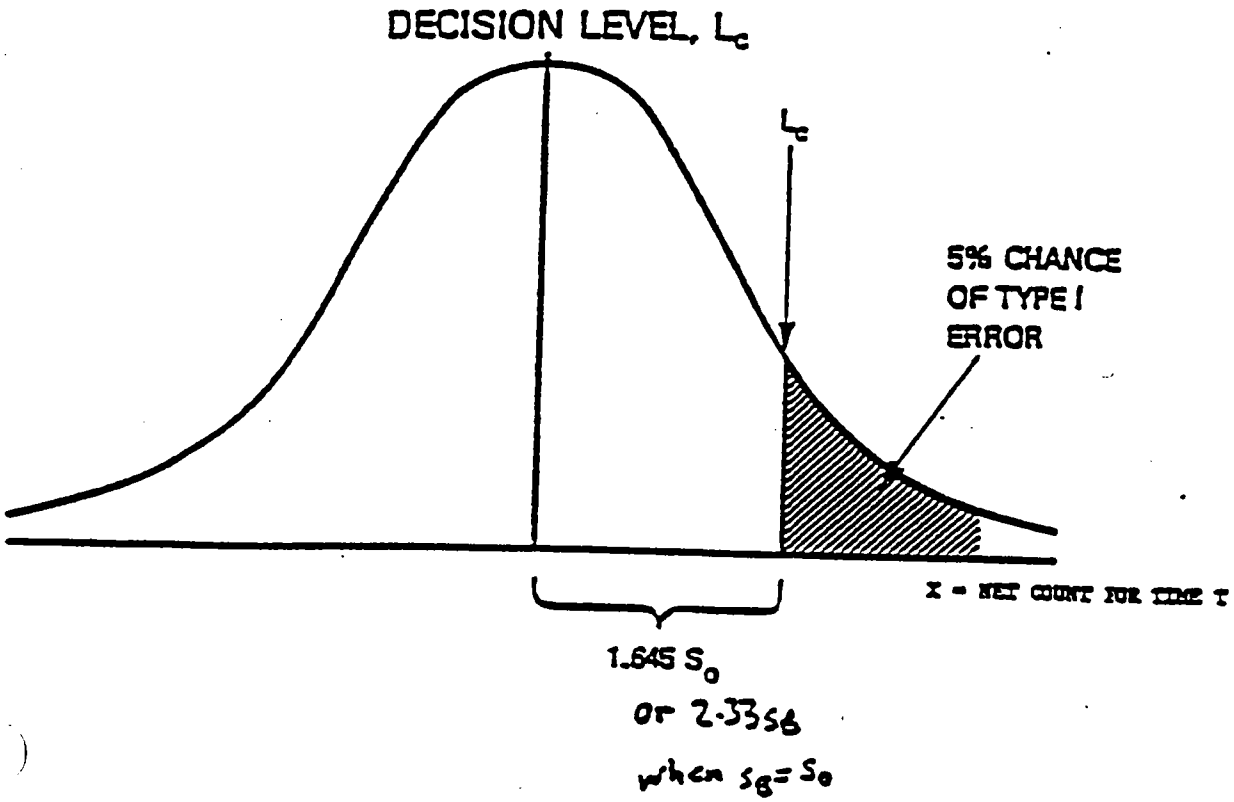
Figures 1 and 2 and their sub-titles summarize graphically the main steps of Currie in his formulation of MDA[9]. In Figure 1, a decision level for total counts ("decision limit", as used by Currie[9]). $L_c$ is defined as the net count level (for a total sample counting time T) of a zero-activity sample, with the count of an appropriate blank in time T subtracted, for which there is no more than a 5% chance that any repeated net count would exceed this level. That is, the net count should not exceed $L_c$ more than 5 % of the time if the smear has not picked up any radioactivity. Thus, the convention is established that a net count will be considered positive for smearable activity if it is greater than $L_c$.

It is important to note that, in Figure 1, the x-axis represents the scale of total net counts. In the statistics of Poisson count variates, it is in the total count domain that precisions of measurement are determined. Count-rates, such as counts per minute, are generally derived quantities, unless the count is for one minute. Therefore, all derivations and discussions are carried out for the general case, with T appearing in the formulas.

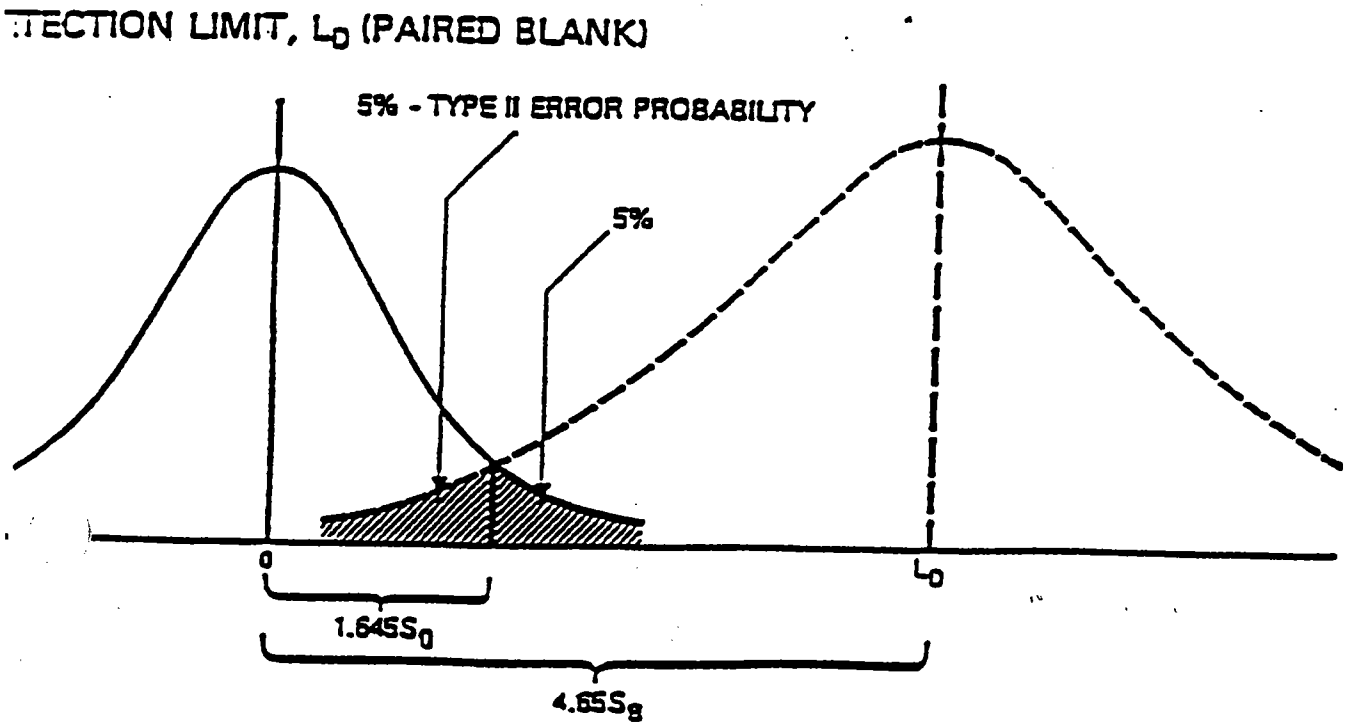
It also should be noted that the definition of $L_c$ is equivalent, in statistical terminology, to the use of a one-tailed "alpha" ($\alpha$) level of 0.05 (or 5%) as the limit of a "Type I" error. A Type I error can be conveniently remembered as "jumping to a conclusion" that a positive indication of contamination has been found, when indeed there is none, but instead just a random high count (of 5% chance) has been obtained from an actual zero-activity sample. It is the desired (conservative) way of making a decision that the radioactivity searched for has been detected. The selection of a 0.05 probability of a Type I error means that we have considered it acceptable to be wrong 5 % of the time in order to detect most of the contaminated samples.

If the standard deviation of the net count of a zero activity sample is symbolized by $s_o$, then by the statistical rules for compounding

Figure 1. The decision level, $L_c$, is chosen so that there will be a 5% chance that a net signal from a zero-activity sample compared to a blank will be greater than $L_c$. Approximately, assuming Normal distribution statistics, $L_c = 1.465\ s_o = 1.645\ (s^2_{\text{[illegible]}} + s^2_{\text{[illegible]}})^{1/2}$. (Adapted from NUREG-1156[8], with permission.)




re 2. The detection limit, $L_D$, is placed far enough above zero so that there is a 5% chance that an $L_D$ ity will give a signal less than $L_c$. $L_D = 4.65\ s_B$ when the counting times of the sample and kground are the same, and all $s^2$ values are approximately the same. Otherwise, $L_D = 1.645\ s_o + 1.645$ $_{\text{[illegible]}} + s^2_{\text{[illegible]}})^{1/2}$. (From NUREG-1156[8], with permission.)



errors from independent variables,

$$s_o = (s_{tot}^2 + s_B^2)^{1/2}, \qquad (1)$$

where:

$s_{tot}$ = the standard deviation in the total count over counting time T of the zero-activity sample (e.g., a smear of a "clean" surface), and

$s_B$ = the standard deviation of the total count of an "appropriate blank" over the same time T.

This net count (sample - blank) will then have a frequency distribution that is Poisson, but which fits approximately under the Normal (Gaussian) distribution envelope for net counts greater than about 30. The matched Normal distribution would have a mean net count of zero (for the zero-activity sample) and a standard deviation of $s_o$. Using Normal distribution tables for the probability density function (PDF), the decision level ("detection limit" for making the decision that something is detected) would be a number of net counts in time T equal to:

$$L_c = 1.645\, s_o \qquad (2)$$

as shown in Figure 1. This figure shows that 5 % of the area under the PDF lies to the right of 1.645 $s_o$. This value of $L_c$ is like an arbitrarily selected alarm level, above which we have decided to call a sample measurement positive. That is, we have decided to assume that the sample (smear) is contaminated – even though we could be wrong 5 % of the time; we might just be observing only an extreme fluctuation in the net count of a zero-activity sample that much of the time.

## Definition of "Appropriate Blank"

It is important here to understand the need for selecting the "appropriate blank" and for determining the count accurately for this appropriate blank for the routine sample counting time T. This determination must be made under the same geometry and counting conditions as used for the sample. Considerations in selecting the appropriate blank are discussed in detail in References 8 and 12. An ideal blank is not always available, but usually a close approximation can be obtained. When the blank is not ideal, estimates of any maximum biases introduced can be made and used to conservatively correct the calculated decision level and MDA.

For purposes of this article, the following definition of an appropriate blank, paraphrased from the ANSI N13.30 standard[7], should suffice to demonstrate the factors to be considered:

> "An appropriate blank is a sample...identical in physiochemically and radiologically significant ways...to the sample to be analyzed, except that it contains no quantity of the analyte to be measured..." (except the ambient level that might already be in the blank due to natural activity in the filter paper, etc.)

Here, the term "analyte" would mean the radionuclide(s) of interest in the smear survey. Of course, the "ambient level" mentioned in the definition would be, for example, the number of counts produced by natural radioactivity in the filter paper in the same channels used for detecting the contaminant of interest in the smear samples. Or, if variable ambient contamination from natural radon decay products might interfere with the measurement by superimposing on counts from the contamination of interest, then the "appropriate blank" for determining the man-made contamination of interest might need to include the maximum count from natural contamination that might be expected on a blank, in order to provide a conservative estimate of detection limit and MDA. Reasons for making MDA estimates conservative, when extraneous uncertainties are present, are also discussed in Reference 8.

**Definitions of Decision Amount (DA) and Minimum Detectable Amount (MDA)**

The definitions here will assume (as does the standard[7,8]) that an appropriate blank has been selected and counted for the same counting time T as the sample. Moreover, we assume that the blank has been counted on the same day, or with the same batch of measurements, as the sample, so that counting conditions have not changed, as verified by check QA measurements made with the batch and/or standard calibration sources measured with the same batch. An appropriate blank counted under these conditions will be referred to as a "paired blank".

For a carefully selected and measured paired blank, the assumption may be made in Equation 1 that $s_o = s_B$, so that Equation 2 becomes:

$$L_c = 1.645\, s_o = 1.645(2s_B^2)^{1/2}$$

$$= 1.645\,(2)^{1/2}\, s_B = 1.645(1.414)\, s_B$$

$$= 2.33\, s_B, \qquad (3)$$

which is the decision level in terms of total counts. To convert this number to units of activity, a calibration factor K must be used together with the time T, giving the equation for the "Decision Amount (DA)", the amount of activity that would be indicated on a smear sample result when the decision would be made that it is positive:

$$DA = 2.33\, s_B/KT, \qquad (4)$$

where:

$s_B$ = the standard deviation of the blank count, for time T (which for pure Poisson fluctuations would be the square root of the number of counts in time T),

K = a calibration constant, in units of counts/minute per microcurie, or counts per minute per dpm, obtained by counting an appropriate standard of known activity and similar geometry and composition as the smear sample, and

T = the counting time for the paired blank, which should be made the same in these equations as the counting time for each smear sample to be counted (even though a much longer blank count may be taken for improving the precision of interpreted activities (see "well-known blank" below)).

In order to conservatively derive detection capabilities, Currie[9] defined the "Detection Limit, $L_D$" as a total count high enough so that, if a decision was made the count was positive at or above $L_c$, then the Normal distribution envelope of count variations (Figure 2) about $L_D$ would fall less than 5% of the time to the left of $L_c$. Thus, if a decision is made that the smear is positive at the count level of $L_c$, then an amount of activity that would give a count $L_D$ on the average, would give a particular count less than the decision level only 5 % of the time. That is, there would be only a 5 % chance of assuming no activity is present when actually an activity giving an expected count $L_D$ was present. In statistical terminology, there would be only a 0.05 probability of making a Type II error – of "missing something when it was there". (In statistical testing criteria, the probability of a Type II error is called "beta"(β), and is not always taken as 0.05.)

Actually, Currie used separate symbols, k, instead of 1.645, in his derivation of $L_D$, and assumed that the distribution in counts at $L_D$ could be wider than for the zero-activity sample since the counts would be larger and Poisson distributed, so that variance would be proportional to the mean number of counts (as indicated by the wider dotted curve in Figure 2). Using additional assumptions and solving for $L_D$, and after setting k = 1.645 for both alpha and beta, Currie obtained the following equation for

$L_D$, which is fairly widely known:

$$L_D = 4.65\, s_B + 2.71 \qquad (5)$$

When examining Currie's derivation, the Health Physics Society working group[7] realized that the constant 2.71 was an artifact of the mixed assumptions of Normal and Poisson distribution, and that in the limit of very low background (and very low blank) counting, $s_B$ would be zero and the constant 2.71 should be 3 (Reference 8). As seen in Figure 3, when the expected number of counts is m = 3 in the Poisson formula, $P(x) = \exp(-m)\, m^x/x!$, then x = 0 counts are obtained only 5 % of the time, consistent with the "beta" probability chosen. (Note that $\exp(-3)\,1/1 = 0.05$, as indicated in Figure 3.) Thus, in the limit of low blank counts, the value of 3 should be substituted for 2.71 above.

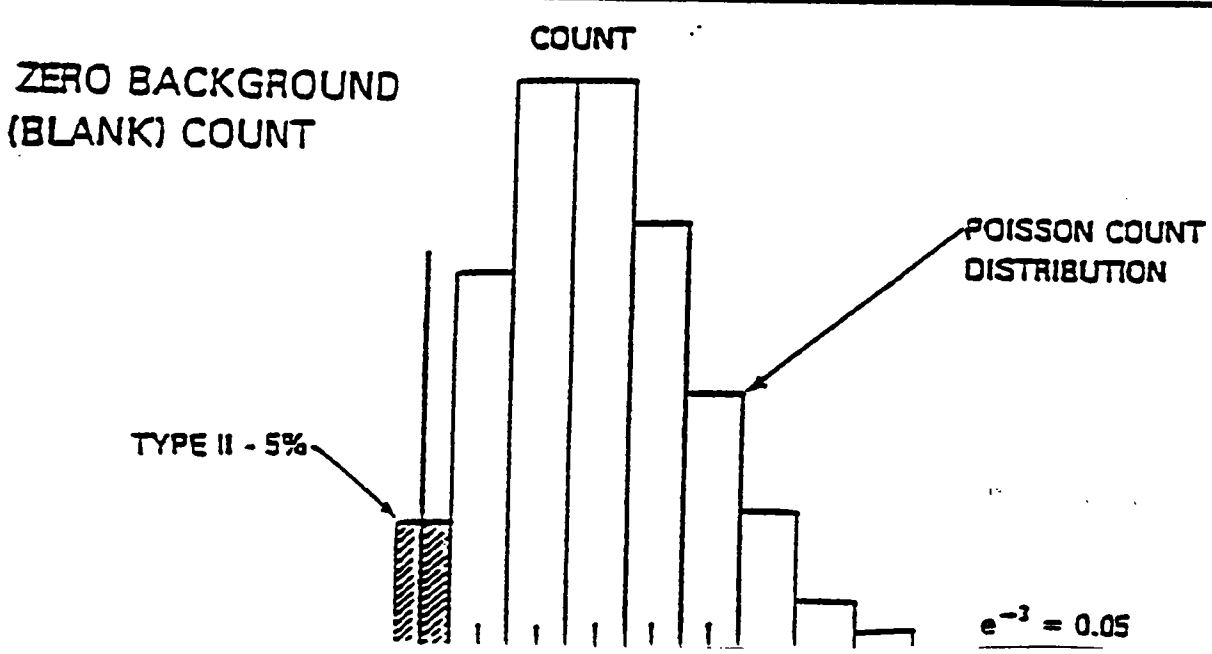
Currie also obtained the constant 4.65 in Equation 5 using the assumption that the total counts were large enough (e.g., greater than 70) so that it could be assumed that the standard deviation of the count $L_D$ was approximately the same as that of the blank (i.e., that the dotted curve of Figure 2 was not significantly wider than the solid curve). With this assumption, and ignoring the 2.71 or 3 term for large counts, the origin of the value 4.65 can be seen by examining the last equation in the subtitle to Figure 2, and reducing both standard deviations to $(2)^{1/2}\, s_B$, as done to obtain Equation 3.

With recognition of the above assumptions and adopted conventions, the equation for the detection limit, in terms of total counts, becomes:

$$L_D = 4.65\, s_B + 3 \qquad (6)$$

This equation was examined for consistency with a beta = 0.05 level in the intermediate range between that for large counts where the Poisson can be considered within the Normal envelope, and for zero blank counts, and the approximation to beta = 0.05 was found to be sufficient to utilize this simple equation as a standard method for consistently defining detection capabilities[13].

**Figure 3.** When the number of counts are not large (B greater than about 70), the Normal distribution assumption begins to lose validity. When counts are zero or close to zero, $L_c$ becomes 0, and the detection limit becomes about 3, since $\exp(-3) = 0.05$. (From NUREG-1156[8], with permission.)



Just as information does not suddenly become zero below MDA, a measurement can not be assumed accurate because it falls above MDA. As a rule of thumb, a determination of activity should be about three times MDA (i.e., 3MDA) before the precision can be represented by a standard error of 10 percent or less[8,9].

Special care must be taken in liquid scintillation counting to assure not only that the blank is appropriate, but also that counting efficiency does not change due to changes in light collection efficiency or quenching from sample to sample. Since smear samples are collecting various kinds of dust, dirt and other unknown contamination along with whatever other radioactive material is being monitored, various chemical reactions might be possible in the scintillation liquid that produce light exceeding that from any radioactive decay in the sample[15]. Other phenomena that might contribute to background counts are excitation of the glass vial, vial cap, and scintillation liquid by sunlight or fluorescent light, leading to delayed light emission. Scintillation counting is very susceptible to various sources of chemiluminescence and changes in purity of the scintillation fluid. Thus, special quality control provisions must be included in smear analysis procedures when liquid scintillation counting is used.

In recording data, it is usually best to determine the standard error of each determination to two significant digits, and then carry out the result to the decimal digit of the second digit of the standard error (SE). No recommendation was made here in this regard, since uncertainties in transfer of removable contamination on a single smear will usually be quite large anyway. However, for consistency in recording data, and for simplicity of instructions to the counting technicians, it might be best to adhere to the convention of two digits for the standard error. Otherwise, inconsistencies in results of as much as 50% can be introduced by the rounding of an SE of 1.49 to 1. In any case, the convention for recording data should be specified in the smear counting procedure, and should be used consistently by each person recording data.

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Attachment 4

BCLDP Isotopic Release Criteria for Water, Soil, and Solids

| Radionuclide | Water[a] | Soil and Solids | |
|---|---|---|---|
| | Concentration ($\mu$Ci/ml) | King Avenue Concentration (pCi/g) | West Jefferson Concentration (pCi/g) |
| Natural Uranium | (b) | 10 | na (c) |
| Enriched Uranium | (b) | 30 | 30 |
| Depleted Uranium | (b) | 35 | 35 |
| Ac-227 | 5E-9 | 19 | 19 |
| Ac-228 | 3E-8 | (d) | na |
| Am-241 | 2E-8 | na | 270 |
| Am-243 | 2E-8 | na | 140 |
| Bi-210 | 1E-5 | (d) | na |
| Bi-212 | 7E-5 | (d) | na |
| Bi-214 | 3E-4 | (d) | na |
| Ce-144 | 3E-6 | na | 2,100 |
| Cm-243 | 3E-8 | na | 0.79 |
| Cm-244 | 3E-8 | na | 1.0 |
| Co-60 | 3E-6 | 8 | 8 |
| Cs-134 | 9E-7 | na | 33 |
| Cs-137 | 1E-6 | 15 | 15 |
| C-14 | 3E-5 | 940 | 940 |
| Eu-152 | 1E-5 | na | 390 |
| Eu-154 | 7E-6 | na | 260 |
| Eu-155 | 5E-5 | na | 1,900 |
| Fe-55 | 1E-4 | na | 2.7E+07 |
| H-3 | 1E-3 | 41,000 | 38,000 |
| I-129 | 2E-7 | na | 13 |
| Mn-54 | 3E-5 | na | 61 |
| Ni-59 | 3E-4 | na | 1.3E+07 |
| Ni-63 | 1E-4 | na | 4.9E+06 |
| Np-237 | 2E-8 | na | 0.58 |
| Pa-231 | 6E-9 | 18 | 18 |
| Pa-234 | 3E-5 | (d) | na |
| Pb-210 | 1E-8 | 140 | na |
| Pb-211 | 2E-4 | (d) | (d) |
| Pb-212 | 2E-6 | (d) | na |
| Pb-214 | 1E-4 | (d) | na |
| Po-210 | 4E-8 | (d) | na |
| Pu-238 | 2E-8 | na | 320 |
| Pu-239 | 2E-8 | na | 290 |
| Pu-240 | 2E-8 | na | 290 |
| Pu-241 | 1E-6 | na | 13,000 |
| Pu-242 | 2E-8 | na | 310 |

| Radionuclide | Water[a] | Soil and Solids | |
|---|---|---|---|
| | Concentration (μCi/ml) | King Avenue Concentration (pCi/g) | West Jefferson Concentration (pCi/g) |
| Ra-223 | 1E-7 | (d) | (d) |
| Ra-224 | 2E-7 | (d) | na |
| Ra-226 | 6E-8 | 5 | na |
| Ra-228 | 6E-8 | 5 | na |
| Rn-220 | 2E-8 | (d) | na |
| Ru-106 | 3E-6 | na | 180 |
| Sb-125 | 3E-5 | na | 1,100 |
| Sm-151 | 2E-4 | na | 6,700 |
| Sr-90 | 5E-7 | 5 | 5 |
| Th-227 | 2E-6 | (d) | (d) |
| Th-228 | 2E-7 | 29 | na |
| Th-230 | 1E-7 | 5 | na |
| Th-231 | 5E-5 | (d) | (d) |
| Th-232 | 3E-8 | 5 | na |
| Th-234 | 5E-6 | (d) | na |
| U-234 | 3E-7 | (e) | (e) |
| U-235 | 3E-7 | (e) | (e) |
| U-236 | 3E-7 | (e) | (e) |
| U-238 | 3E-7 | (e) | (e) |

Notes:

a. Values from 10CFR Part 20, Table 2, Column 2.

b. Concentration limits of component radionuclides are listed separately.

c. Indicates that this radionuclide is not expected to be found at the indicated site.

d. Associated radionuclide; dose contribution included in that of the principal radionuclide.

e. Guideline is included with natural, depleted, or enriched uranium.