

RADIOLOGICAL ASSESSMENT

FOR

READING SLAG PILE SITE

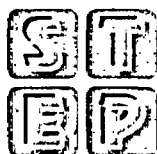
Prepared for:

**Cabot Corporation
Two Seaport Lane
Boston, MA 02210**

Prepared by:

**ST Environmental Professionals, Inc.
114 Lutz Road
Boyertown, PA 19512**

**Revision 2
May 2005**



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1.0 INTRODUCTION

The purpose of this Radiological Assessment is to calculate radiological doses (TEDE - total effective dose equivalent) for potential future exposure scenarios at the Reading, Pennsylvania Slag Pile Site. This Radiological Assessment is a complement to a Decommissioning Plan (STEP, 2005) being submitted to meet the requirements of 10 CFR Part 20, Subpart E. This report demonstrates that concentrations of radionuclides in materials on the Site are sufficiently low that the Site qualifies for release without restriction on use and are also as low as reasonably achievable (ALARA) without any additional decommissioning activities.

Cabot Corporation (Cabot) holds US Nuclear Regulatory Commission (NRC) License SMC-1562 for source materials at a site in Reading, Pennsylvania. All portions of the Reading Site except for a slag pile on a steep embankment, described below, have been decommissioned (NES, 1995, USNRC, 1995a) and released for unrestricted use. This Radiological Assessment applies only to the slag pile remaining at the Reading Site and a relatively small quantity of slag in soils in the River Road right-of-way (ROW) at the base of the slag pile.

Cabot has performed a comprehensive Site characterization and analysis including: surface gamma measurements, radiological analysis of surface and subsurface soil samples, radiological analysis of groundwater samples, characterization of the Site topography, climate, physiography, geology, hydrogeology and surface water hydrology, measurement of the leach rate of uranium from the slag, determination of the leach rates of thorium and radium, evaluation of the weathering rate of the slag, and analysis of the slag pile stability. The results of this work were reported to the NRC in several submittals (Cabot, 1996a, 1996b, 1996c, and 1996d, ERM, 1996, and NES, 1996a and 1996b). The NRC reviewed this information and approved the characterization work (USNRC, 1996). Supplemental decommissioning work has included the preparation of a Hydrologic and Geologic Assessment (STEP, 1997) for the Reading Site, a Report on the Topographic and Radiological Surveys (STEP, 1999), a response to a draft of NUREG-1703 (Cabot, 2002), this Radiological Assessment, and a Decommissioning Plan (STEP, 2005).

The Site characterization information was used as recommended in current NRC guidance documents to develop exposure scenarios and assumptions for the assessment of theoretical maximum radiation doses that might result from unrestricted use of the Site. The NRC guidance documents provide a framework for dose assessment that accommodates consideration of reasonably foreseeable land use and other site-specific characteristics and application of realistic models and assumptions in radiation dose assessment (USNRC, 2003a, USNRC, 2003b, USNRC, 2004, Beyeler, 1998a, and Beyeler, 1999b).

The property containing the Site has been used for industrial purposes for over 100 years and is designated for industrial/commercial and related uses in redevelopment plans for the Site. Future residential use is highly unlikely.

The Decommissioning Plan incorporates emplacement of 1.5-foot thick layer of rip-rap, on the slag pile slope face and along the top edge. A four-foot thick rip-rap apron will extend 20 feet from the bottom of the slope into the River Road ROW to anchor the slope. The rip-rap is intended primarily for added assurance that erosion will not occur over the period of interest. Given this limited purpose and the self-armoring properties of such measures, this feature constitutes a passive engineered barrier, as described in NRC guidance (USNRC, 2003b, Section 3.5). The rip-rap cover is designed to remain effective for erosion control for 1,000 years without maintenance. Consequently, no institutional controls will be required after license termination.

Three basic exposure scenarios were developed and evaluated as a base or primary analysis for the slag pile:

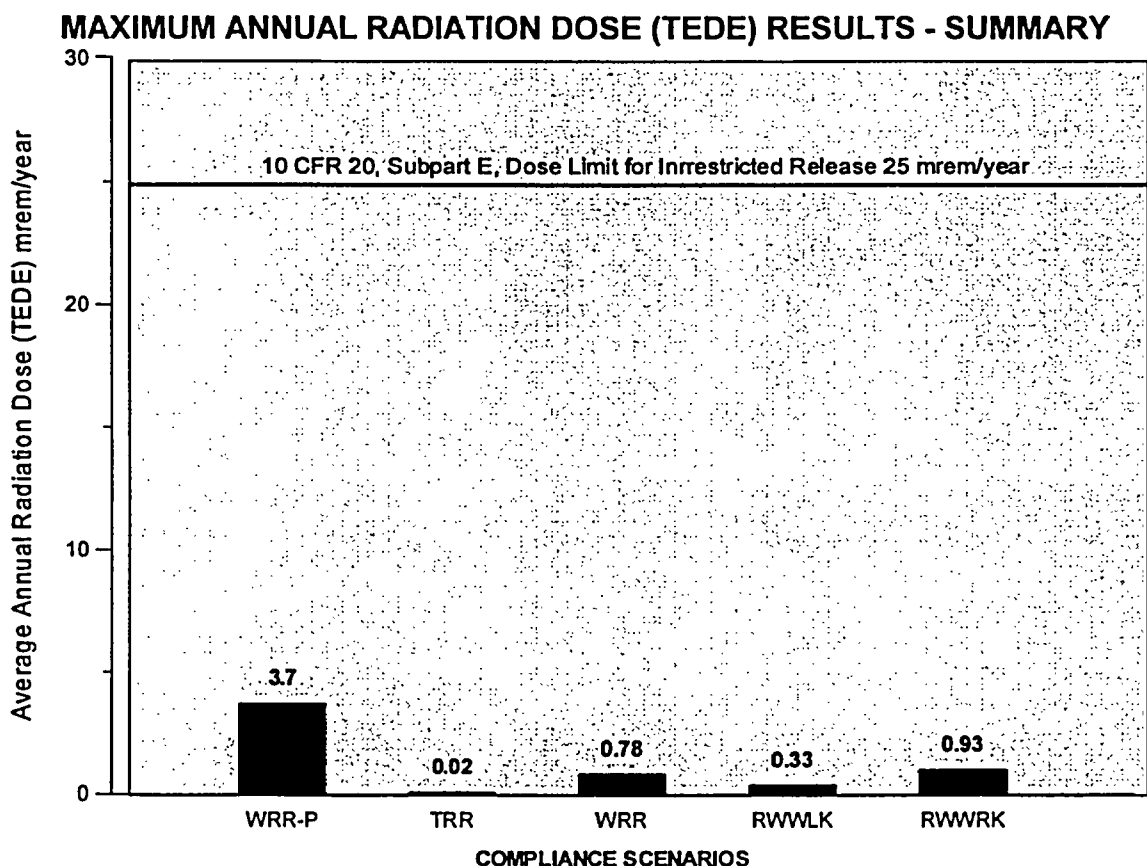
- A worker preparing the Site and constructing the rip-rap layer (WRR-P)
- A trespasser who walks on the slag pile slope face after license termination (TRR)
- A worker on the Site after license termination who spends part of his work day in a facility assumed to be located on the flat surface at the top of the slag pile and a portion of his work time in activities involving walking on the slag pile slope face. (WRR)

A separate analysis was performed for the River Road ROW Area under the current conditions. Development of scenarios for analysis recognizes the limited potential uses of the ROW segment. The most severe exposure scenarios would likely involve some kind of occasional recreational use or occupational use involving excavation. Even in those scenarios, exposure time would be small. Two basic exposure scenarios were developed for purposes of analysis:

- A recreational walker who routinely walks on the ROW segment for exercise or pleasure (RWWLK)
- A worker who participates in excavation in the ROW segment (RWWRK)

The maximum calculated dose for each scenario is presented below in both tabular and graphic form and is compared to the 25 mrem/y limit (10 CFR 20 Subpart E) for unrestricted release. As shown, the maximum calculated doses are all substantially less than the limit for unrestricted release. Most of the material in the ROW (75%) will be covered with a 4-foot thick layer of 18" rip rap. The rip-rap cover will eliminate most of the potential exposure and further reduce the modeled dose.

CASE	MAXIMUM ANNUAL TOTAL DOSE (mrem/y TEDE)
Slag Pile; Worker installing rip-rap (WRR-P)	3.7
Slag Pile with Rip-Rap; Trespasser (TRR)	0.020
Slag Pile with Rip-Rap; Worker (WRR)	0.78
ROW; Walker, Current Conditions (RWWLK)	0.33
ROW; Worker, Current Conditions (RWWRK)	0.93
The 10 CFR Part 20 dose criterion for license termination with no restrictions on use is 25 mrem/y.	



The calculated doses for these scenarios represent the maximum likely doses that might result from unrestricted use of the Site, and constitute the demonstration of compliance with the dose limit in 10CFR20, Subpart E.

Alternate scenarios, highly unlikely if not implausible, were also evaluated. These are not intended to be compliance scenarios, but are included to assist NRC in reaching a risk-informed decision, as envisioned in RIS 2004-08 (USNRC, 2004). All the calculated doses for those scenarios were also well below the 25 mrem/y limit, demonstrating the robustness of the conclusions of the assessment. These calculated doses provide additional assurance that the Site qualifies for unrestricted release.

An analysis to demonstrate that maximum doses from unrestricted release of the Site would be as low as reasonably achievable (ALARA) is also included in this radiological assessment. The conclusion from this analysis is that release without restrictions meets ALARA criteria.

In summary, the potential exposure levels for any reasonable future conditions involving unrestricted use of the site are all well below the 25 mrem/y criteria for unrestricted release, particularly given the added assurance provided by the rip-rap. Evaluation of alternate scenarios demonstrates this conclusion is robust. Further analysis demonstrates that additional remedial action is unwarranted and that doses from unrestricted release as proposed would be as low as reasonably achievable (ALARA).

Summary Site Description

Comprehensive information on the Site, operations at the Site, and the license termination in general is provided in the Decommissioning Plan. For that reason, only a summary description is provided here.

The Reading Slag Pile is located in Reading, Berks County, Pennsylvania. Figure 1-1 shows the location of the Reading Site. Slag materials from metal processing activities performed in the late 1960's were deposited on a portion of a much larger pre-existing slag disposal area. Kawecki Chemical (Kawecki), a predecessor to Cabot, leased a portion of the facility when the operations which lead to placement of the slag were conducted. Cabot has never owned or operated the Site.

The Kawecki process was designed to increase the percentage of tantalum in low-grade ores by heating a mixture of iron ore, tantalum ore (tin slags), and coke in an electric arc furnace. The ores used by Kawecki contained naturally occurring uranium and thorium in concentrations defined as "source material" by the Atomic Energy Commission (AEC). The AEC is now the NRC. The possession, handling, and disposal of these materials was performed under AEC/NRC license. The tantalum alloyed with the iron leaving a glass-like silica gangue (waste slag) in which the naturally occurring thorium and uranium remained. Period documents indicate that those operations were conducted only during 1967 and 1968.

The glass-like slag residues from Kawecki's processing operations were placed on an embankment at the southwest end of the property in accordance with a Pennsylvania Department of Health permit. The embankment was comprised of a much larger non-radiological slag disposal area. This same area had been used before 1967 for slag disposal from manufacturing operations conducted by one or more companies unaffiliated with Kawecki Chemical. Some radiological slag is also present at the base of the slope in the ROW. The slag pile location is shown on the Site Vicinity Map (Figure 1-2). The slag extends approximately 160 feet along the top of the embankment.

As shown on Figure 1-1 and Figure 1-2, the slag pile is located east of the Schuylkill River. The area is urban with land use being primarily industrial or related to the transportation corridor along the river. Between the Slag Pile Area and the Schuylkill River are a currently undeveloped extension of the River Road right-of-way (ROW), a Norfolk Southern (Norfolk) railroad ROW and remnants of the former Schuylkill Canal. Another Norfolk ROW is located approximately 150 feet northwest of the slag pile. Buttonwood Street is located approximately 600 feet to the southeast of the pile. The larger industrial property which contains the small slag area extends northeast to Tulpehocken Street.

The top of the slag pile is a level area that is approximately 160 feet long and extends back a maximum of 15 feet from the top edge of the slag pile. Its elevation is approximately that of the much larger contiguous level area, approximately 12 acres, upon which industrial facilities are located.

Because the property is not owned by the licensee, the area encompassing the slag pile and associated materials has been defined as the "Site" for purposes of discussion in this Radiological Assessment. The Site consists of the area containing radiological slag and slag mixed with soil and debris. The areal extent of the Site is shown on the Site Map (Figure 1-2). Currently there are no buildings, structures or use within the Site area. The Site is vegetated with trees and brush.

Topographic survey information and results of the Site-characterization efforts were used to refine the estimates of the dimensions of where the radiological slag may be present at the Site. The slag pile consists primarily of 600 tons of waste slag mixed with rock and assorted debris. The maximum cross sectional area of material potentially containing slag was estimated to be approximately 1,000 ft². The approximate length of the slag pile, as reported in the NES Characterization Report (NES, 1996a), is 160 ft. The estimated volume of the slag, rock, and debris mixture in the pile and in the River Road ROW is approximately 180,000 ft³. This volume represents an envelope of material within which slag is likely to be present. It does not represent a volume of pure slag. The 600 tons of pure slag (at 180 pounds per cubic foot) would occupy a volume of approximately 6,700 ft³, a small fraction of the total volume.

The total amount of thorium present at the Site was calculated to be 2.19 tons, based on inventory records and analytical results. The supporting data and calculations are included in an earlier submittal (Cabot, 2002). The inventory records of material placed on the pile and removed from Baltimore closely match the inventory records of material previously on-hand in Baltimore and are consistent with the characterization results. Therefore, the total amount of radionuclides present in the pile is believed to not be significantly different from the amount used for dose calculations. Any uncertainty is far below the amount that would affect the conclusions of the radiological assessment. As discussed in later sections, the assumptions made for the dose calculations are conservative and not particularly sensitive to variations in amount of slag present.

Based on the difference in elevations in 1904 and 1997, total volume of radiological slag, non-radiological slag, fill and debris on the property was calculated to be approximately 3,000,000 ft³. Therefore, the pure radiological slag represents approximately 0.22 % of the total volume of the slag, fill, and debris at the property.

Although the original Site characterization indicated the presence of some slag beyond the toe of the slag pile, the extent of those depositions appeared to be limited and the concentrations of radionuclides within the depositions were in the range of the concentrations of naturally occurring radionuclides. Consequently, at that time, explicit radiological assessment for these materials was considered unnecessary.

Supplementary characterization work was performed after submittal of the original Radiological Assessment and Decommissioning Plan (Revision 0, August 1998). This work included a topographic survey of the slag pile and additional radiological characterization of materials beyond the base of the slag pile (STEP, 1999 and STEP, 2000). This work indicated that the volume of the slag/soil mix in the River Road ROW was approximately 10,000 ft³ to 20,000 ft³. This assessment includes an explicit radiological assessment for materials in the River Road ROW under current conditions without the rip-rap cover in place...

The Site topography, climate, physiography and geology, soils, surface water hydrology, and groundwater hydrology are described in detail in the Decommissioning Plan (STEP, 2005), the Hydrologic and Geologic Assessment Report (STEP, 1997), and the Report on Topographic and Radiological Surveys (STEP, 1999).

The thickness and rock size for the proposed rip-rap cover design were calculated using NRC guidance document NUREG-1623. It should be noted that passive engineered barriers are typically constructed to inhibit water contacting the waste, limit releases, or mitigate doses for inadvertent intruders. The physical characteristics of the slag and Site already eliminate water pathways and release of radionuclides from the slag and limit exposure to an inadvertent intruder. The barrier is being proposed as a method to provide additional assurance that the characteristic Site features are robust.

Even without the addition of the rip-rap cover, it would be unlikely that erosion would expose a significant amount of slag. The Site characterization efforts and historical documents indicated that the material covering the slag contains large pieces of rock, reinforced concrete, and metal scrap. Some of the rock was intentionally placed by the licensee following operations. These large pieces of durable material provide for long-term protection from erosion through the natural process of self-armoring. If any erosion did occur, the fine materials would be preferentially removed leaving the large pieces as a cover preventing further erosion. A radiological survey performed by Cabot in 2003 indicated that the existing cover was nearly but not entirely covering the radiological slag. The potential exposure of a small area of slag would not result in modeled exposures above the regulatory limit for release without restrictions. However, the exact amount and disposition of large durable pieces of material within the cover was not known.

Therefore, the exact area of slag that could potentially be exposed, although likely to be small, was uncertain. The installation of the rip-rap cover ensures that the entire slag pile is covered by durable material that will provide additional assurance of long-term erosion protection.

The rip-rap cover on the slope and top edge will consist of a 1.5 foot thick layer of durable rock sized $D_{50}=9"$ (USA number R-5 rip-rap). This exceeds the size criteria calculated using NUREG-1623 methods of $D_{50} = 6.7"$ and $D_{50} = 7.3"$ for the top and slope, respectively. An apron of rip-rap will be placed extending 20 feet out from the toe of the slope to anchor the rip-rap cover. This will eliminate the need to excavate slag at the toe of the slope. The apron will consist of USA number R-7 rip-rap ($D_{50} = 18"$). This exceeds the design calculation of $D_{50} = 16"$. The apron will be 4-feet thick to facilitate proper placement of the large size rip-rap. Additional design details are provided in the Decommissioning Plan (STEP, 2005). Figure 1-3 depicts the location and extent of the proposed rip-rap cover.

Installation of the rip-rap cover will consist of three primary tasks.

- Clearing and grubbing will consist of cutting the trees and brush and removing stumps
- Surface preparation will consist of minimizing irregularities of the slope and installation of a six-inch thick filter blanket (NSA number FS-2) to separate the rip-rap from underlying materials
- Placement of the rip-rap will be performed by using excavators from the top and bottom of the slope with workers making final adjustments by hand

Total work time for all three tasks is expected to be approximately one month or 160 hours. It is likely that different workers will be performing the three tasks.

Radiological Assessment

The NRC radiological criteria for license termination are expressed in terms of radiation dose that might reasonably be expected from residual radioactive material after decommissioning. As used in this report, the term "dose" means total effective dose equivalent (TEDE), which is the quantity expressed in the NRC regulation. At the Reading Site this dose would depend upon concentrations of residual radioactive materials in soils and other remaining materials. The dose would also depend on Site-specific factors that might control potential resource use, potential migration of radioactive materials, and potential access to radioactive materials. Finally, this dose would also depend on potential activities of future users of the Site.

The radiation dose assessment process, as applied herein, includes the estimation of the maximum radiation dose (TEDE) that might be received by a typical member of a small

group of people that could be expected to receive the highest doses from use of the Site as far as 1,000 years into the future, as required in the radiological criteria for license termination. Thus, the assessment considers not only the expected conditions at the Site, soon after remediation, but potential (albeit unlikely) conditions projected for the distant future, as well. The assessment evaluates potential uses of the Site and potential migration of radioactive materials through the environment over time, taking account of both natural processes and human activities that could be expected to alter the patterns or rates of constituent movement.

In general, the dose assessment process consists of two steps: 1) development of representations of Site physical conditions and potentially exposed populations, and expression of these representations in mathematical terms; and 2) use of a mathematical model with input from the representations and/or technical literature to estimate future exposures and radiation doses (TEDE) as a function of time. The dual objective in the development of simplified representations is that the representations be realistic and not result in underestimation of exposures and doses. The following sections describe the representations of the radioactive material source, the Site environs, and potential exposure scenarios (step 1), and the dose assessment methodology and results (step 2).

Remaining sections of this report describe the radioactive material source (Section 2.0), potential radiation exposure scenarios (Section 3.0), the dose assessment methodology (Section 4.0), results (Section 5.0), ALARA analysis, (Section 6.0), and conclusions (Section 7.0).

TABLE 3-1 DERIVATION OF K_d VALUES FROM LEACH TEST DATA

Derive pseudo- K_d to apply to slag
for RESRAD runs. Assume U-238 and U-234 in mix at 5 pCi/g each.
Define K_d to produce leachate concentration equal to that
measured in leach test.

DATA (concentrations from Appendix A,
other data from Cabot, 1996a, 1996b, 1996c, and 1996d)

SLAG

676 CSU, U, ug/g as rcd
316 CSAC, Ac-228, pCi/g dry
2.17 CSBI, Bi-212, pCi/g dry
297 CSPB, Pb-212, pCi/g dry
105 CSTL, Tl-208, pCi/g dry

LEACHATE

6.9 U, ug/g OXSU4
1.68 U, ug/g OXSU6
8.93 U, ug/g OXSUT

1.81 RAU, readily available uranium, ug/g slag
0.201 SAU, slowly available uranium, ug/g slag
85.8 TAU, total available uranium, ug/g slag

80 VRAU, total liquid contact volume for RAU test, mL
1 SMRAU, slag mass for RAU test, g

CALCULATED RESULTS

2.26E-02 CLRAU, U conc in liq phase RAU test, ug/ml
 $CLRAU = RAU / VRAU$

1.53E+01 ALRAU, U conc in liq phase RAU test, pCi/L
 $ALRAU = CLRAU * 1000 \text{ mL/L} * 6.75E-1 \text{ pCi/ug}$

655 KDMX, distribution coefficient for uranium in mix, mL/g
 $KDMX = (5+5) / ALRAU * 1000$

A value of 655 mL/g for the contaminated zone K_d in RESRAD
with a source concentration of 5 pCi/g each of U-238 and U-234
will produce leachate at 15.8 pCi/L or 0.0226 ug/ml as measured
in the leach test

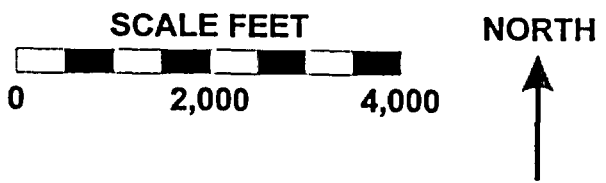
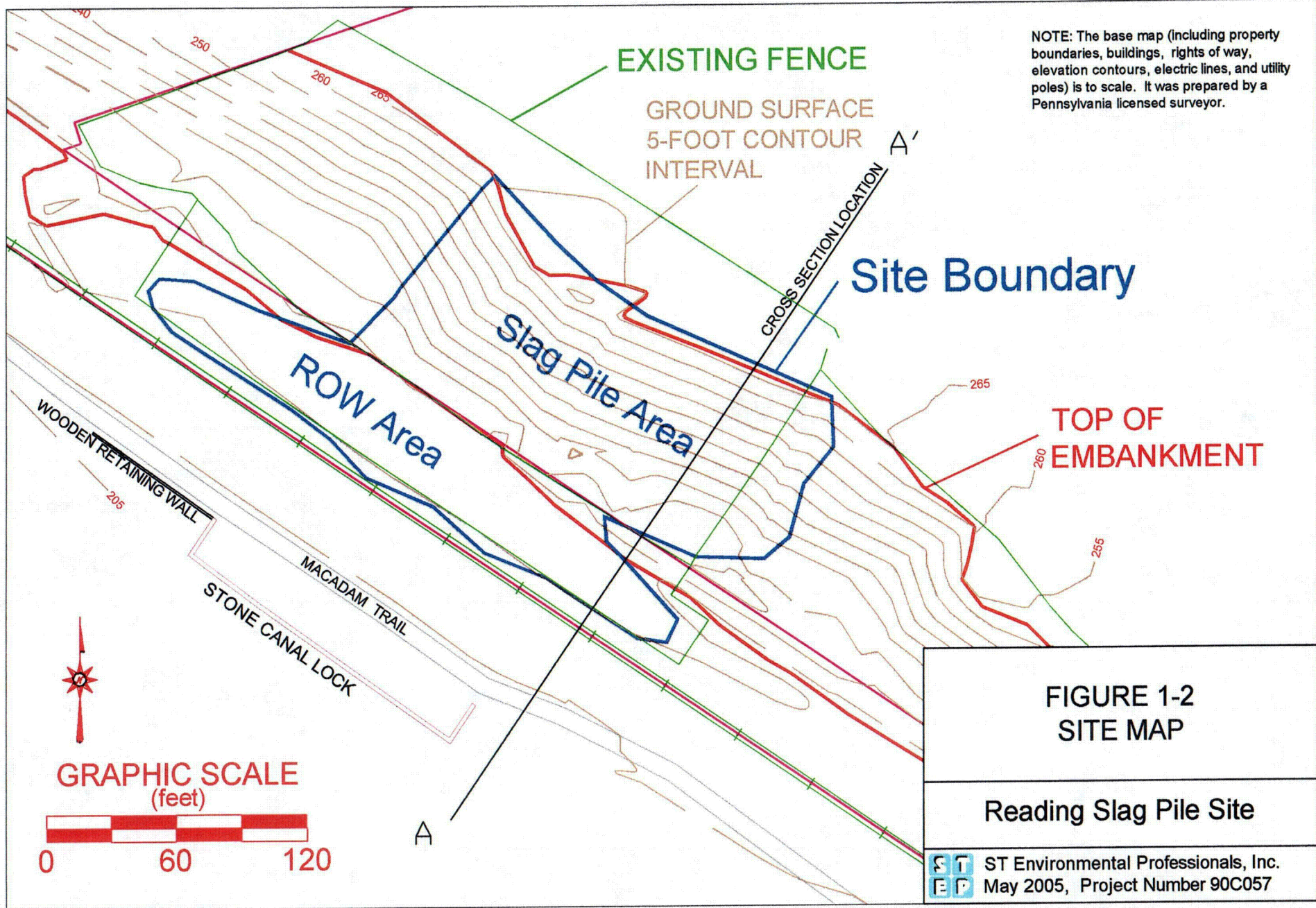


FIGURE 1-1
Site Location Map
 READING SLAG PILE SITE

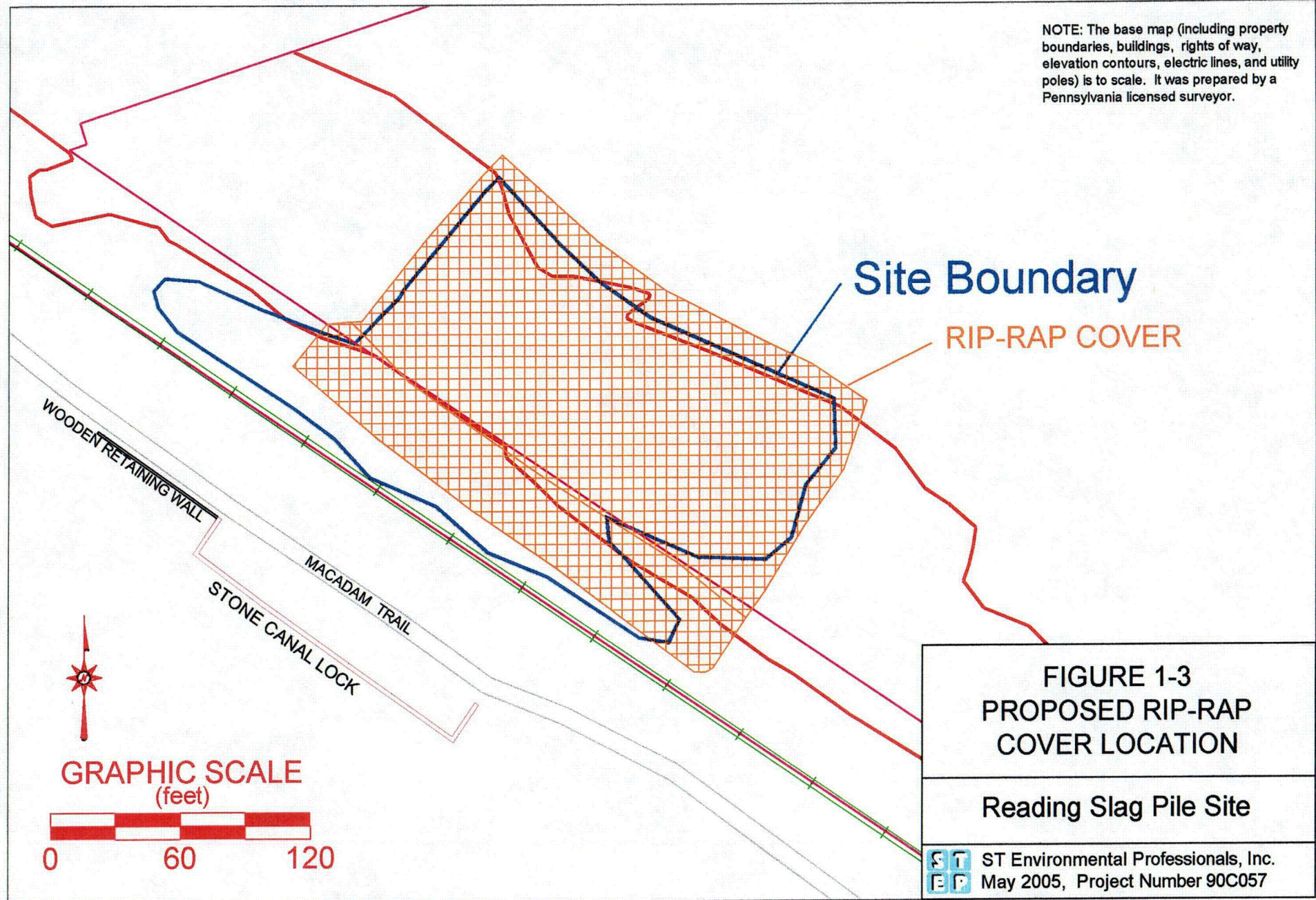
SOURCE: USGS, Reading, PA, 7.5 Minute Quadrangle



ST Environmental Professionals, Inc.
 STEP Project Number 90C057
 May, 2005



NOTE: The base map (including property boundaries, buildings, rights of way, elevation contours, electric lines, and utility poles) is to scale. It was prepared by a Pennsylvania licensed surveyor.



2.0 RADIOACTIVE MATERIAL SOURCE

Potential radiation doses from residual radionuclides remaining on the Site after decommissioning will depend upon the types and inventories of radionuclides present, the concentrations of nuclides in materials, and the physical distribution of the materials on the Site. This section describes the development of the Site source representation for dose assessment purposes. This development consists of the definition, in spatial terms, of source units within which nuclide distributions and/or physical characteristics can be considered reasonably uniform and at the same time reasonably representative of Site conditions. Such a representation of the Site is necessary to permit description of the Site conditions in a mathematical form.

The radionuclides of interest for evaluation are known from the history of operations of the Site and from Site characterization measurements. They are naturally occurring uranium (U-238, U-234, and U-235), naturally occurring thorium (Th-232 and Th-228) and their radioactive progeny.

Radioactive materials at concentrations distinguishable above background concentrations in soils are primarily confined to slag from processing of ores that contained small concentrations of naturally occurring uranium, thorium, and progeny nuclides in addition to the non-radioactive mineral values for which the ore was processed. The slag, which retained the radioactive constituents, was deposited on the slag pile at Reading, a pre-existing disposal area on an embankment at the southwestern end of the property.

At most sites bearing residual radioactive materials, the radioactive materials are present in the form of soils bearing the radionuclides in low concentrations. In contrast, licensed radioactive materials at Reading are contained in slag particles of varying sizes, some substantial in size relative to particles of importance for the inhalation pathway. For example, as indicated in Section 1.5.1 of the Decommissioning Plan, the physical and chemical stability of these slag pieces tend to render the contained radioactive materials substantially less mobile in the environment than they might be in more commonly encountered soil forms. The slag containing licensed material is diluted by other materials that contain no licensed radioactive material—slag from other processes, demolition rubble, rock, debris, etc.

Almost all of the slag of interest is contained on the described embankment. However, a small amount of slag has been identified in the River Road Right-of-Way (ROW) adjacent to the base of the embankment. Separate source term descriptions have been prepared for these two slag deposits.

Slag Pile

As noted above, the material bearing radionuclides of interest consists of a mix of various radionuclide-bearing slags, debris of various kinds, soil, and rock. Concentrations of

radionuclides in this mix vary, depending largely on the concentration of radionuclide-bearing slag in the mix.

Radionuclide concentrations are highest in waste slag, discrete pieces of which range widely in size in the material mix. Concentrations of thorium and uranium, the sources of the radionuclides of interest have been measured in a number of slag samples by different organizations including analyses by the radiological health physics consultant during the operations, the NES site characterization, and the Johns Hopkins report. Those results are summarized in previous Cabot-NRC correspondence (Cabot, 2002). Concentrations of thorium in this slag are quite uniform at about 0.31 weight percent (w/o). The maximum measured concentration was only about 50% higher than the average. Measurements of uranium concentrations in slag are not as numerous as the measurements of thorium and the results indicate more variability in uranium concentration. (However, as will be shown, the thorium radionuclides are more important contributors to dose, so the variability in uranium concentration does not significantly affect uncertainty in calculated doses.) The arithmetic average uranium concentration in waste slag is 0.05 weight percent (wt %). However, uranium measurements were more frequent among samples containing relatively low concentrations of thorium, which could bias uranium concentration results to the low side. For this reason, these thorium and uranium results from each measurement were used to calculate a uranium/thorium mass ratio. The average uranium/thorium mass ratio, 0.41, was then applied to the average thorium mass concentration to derive a uranium mass concentration of 0.13 wt %. The average measured thorium concentration of 0.31 wt % and the derived average uranium concentration of 0.13 wt % were used to calculate radionuclide concentrations in undiluted waste slag—670 pCi/g total thorium (Th-232 + Th-228) and 871 pCi/g total uranium (U-238 + U-234).

Average radionuclide concentrations in the material mix on the slag pile can be calculated from average nuclide concentrations measured in slag and soil material bearing licensed radionuclides. Direct radiation measurements of radiation exposure rate at 1-m above the surface can also be used to estimate nuclide concentrations in soils near the surface. Results of direct radiation measurements and measurements of nuclide concentrations in surface and subsurface soil samples from the slag pile are provided in the characterization report for the Reading slag pile (Cabot, 1996a and NES, 1996a and 1996b).

Average net activity concentrations may be calculated from data in the Characterization Report (NES, 1996a). The average net (background subtracted) activity concentration in the slag/soil/debris mix is approximately 75 pCi/g of combined thorium (Th-232 and Th-228) and uranium (U-238 and U-234). (This net activity concentration is the result of subtraction of 2.6 pCi/g total uranium and 2.5 pCi/g total thorium from gross measurements, as explained in the Characterization Report.) Of the 75 pCi/g total uranium and thorium, about 22.5 pCi/g is thorium-232 and 15 pCi/g is uranium-238. Progeny from these two nuclides can be assumed to be present at equilibrium concentrations. This estimate is based on the average measured concentrations from the surface to a depth of 16 feet in Boreholes 1, 3, 4, 5, 15, and 16 at the top of the pile. The

slag pile average thorium concentration estimated in this way is very close to the slag pile average thorium concentration estimated based on inventory assessment, as described in Section 1. The thorium concentration in undiluted slag is about a factor of 9 higher than the derived slag pile average thorium concentration.

Average net uranium and thorium concentrations in soils near the surface (to a depth of 2 feet or less) are somewhat lower. For example, the average net activity concentration in surface soil samples from the slope face is approximately 25 pCi/g total combined thorium and uranium, of which approximately 5 pCi/g is U-238 and 7.5 pCi/g is Th-232. These estimates are based on the results of surface soil measurements at 13 locations shown in Figure 2 of the Characterization Report and the results are reported in Table 3.4 of the Characterization Report. These results are consistent with gamma exposure rate measurements made on the slope surface as part of the site characterization and reported in the Characterization Report.

The measured gamma exposure rates at the top of the pile were lower than would be expected based on radiological analyses of samples collected from the upper two feet of soil. Because the measured gamma exposure rates represent the actual exposure at the top of the pile, the average net uranium and thorium concentrations used for dose calculations were adjusted to match the actual measured exposure rates. The details of this assumption are described below.

The average net uranium and thorium concentration measured in near-surface soils is only slightly lower than the average through the entire pile; the measured exposure rates that are indicative of near-surface concentrations show that the actual average concentration is substantially lower. The average net activity concentration in surface soil samples from the top 2 feet of Boreholes 1, 3, 4, 5, 15, and 16 at the top of the slope is approximately 56 pCi/g total combined thorium and uranium, of which approximately 11.5 pCi/g is U-238 and 16.5 pCi/g is Th-232. This is only slightly less than the average measured through the entire pile, but the direct radiation exposure rate measured at the top of the pile is substantially less than would be expected for the concentration indicated by the near-surface soil analyses. The direct radiation exposure rate measurements are reported in Table 3.9 of the Characterization Report. The values reported there are gross values. As indicated in Section 3.4.4 of the Characterization Report, net values can be obtained by subtracting a background of 6-7 $\mu\text{rem/h}$. Assuming a background of 6.5 $\mu\text{rem/h}$, the average net exposure rate at the top of the slope, based on measurements at Boreholes 1, 3, 4, 5, 15, and 16, is approximately 11.5 $\mu\text{rem/h}$ at the top of the slope. This value is actually slightly below the average net value of approximately 12.3 $\mu\text{rem/h}$ for slope face measurements at locations 1 through 25 (see Characterization Report Figure 2 and Table 3.9), for which the soil sample measurements indicate uranium and thorium concentrations at least a factor of 2 lower. Because direct exposure measurements are a better indicator of average near-surface soil concentrations for the nuclides of interest over broad areas with a limited number of measurements, it is reasonable to conclude that concentrations of uranium and thorium in near-surface soils at the top of the slope are

about the same as concentrations measured on the slope, where the number of soil measurements is greater and direct exposure measurement results are about the same.

Based on the analysis above, it is assumed for the purposes of this assessment that the net average total uranium and thorium concentration in the near-surface (0 to 2-ft depth) slag/soil/debris mix on the embankment is approximately 25 pCi/g of combined thorium (Th-232 and Th-228) and uranium (U-238 and U-234). Of the 25 pCi/g total uranium and thorium, about 7.5 pCi/g is assumed to be thorium-232 and 5 pCi/g is assumed to be uranium-238. For deeper materials (greater than 2-ft deep), it is assumed that the net average total uranium and thorium concentration in deeper material slag/soil/debris mix is approximately 75 pCi/g of combined thorium and uranium, of which about 22.5 pCi/g is assumed to be thorium-232 and 15 pCi/g is assumed to be uranium-238. Progeny nuclides are assumed to be present in equilibrium.

River Road ROW Materials

Characterization work included a topographic survey of the slag pile and radiological characterization of soils beyond the base of the slag pile. This work is described in the Report on Topographic and Radiological Surveys, Reading Slag Pile Site (STEP, 1999 and STEP, 2000). This work delimited the vertical and horizontal extent of slag present in the River Road ROW and provided a basis for estimating average radionuclide concentrations in the ROW soils containing slag. The maximum volume of slag/soil mix in the River Road ROW area is estimated to be approximately 10,000 to 20,000 ft³.

The segment of the River Road ROW containing slag was found to be less than 300 feet long and 50 feet wide and is located adjacent to the bottom of the slag pile, as shown in Figure 1-3. As can be seen in Figures 1-1 through 1-3, the setting of the ROW segment containing the slag of interest is itself a small, narrow, and, to a considerable extent, isolated strip of land. This strip is bounded on one side by the embankment that contains the slag pile and is bounded on its other side by, in succession, railroad tracks, the remains of the Schuylkill Canal, and the Schuylkill River. Concrete bridge abutments at either end tend to further isolate the strip.

Radiological survey measurements made as part of the topographic and radiological survey noted above were direct measurements of radiation emitted from radionuclides in soils. After the completion of that work, soil samples from various depths were collected from three locations in the River Road ROW and were analyzed for radionuclide content. The results of these analyses are reported in the Decommissioning Plan (STEP, 2000).

Results of direct radiation measurements and measurements of nuclide concentrations in surface and subsurface soil samples from the slag pile are provided in the characterization report for the Reading slag pile (Cabot, 1996a and NES, 1996a and 1996b). Although most radiological measurements in the early Site characterization work were focused on the slag pile itself, some of the measurements were made at locations along the bottom of the slag pile near or in the River Road ROW. These include analysis of soil samples and

measurement of direct radiation at a height of one meter above the ground at borehole locations B7 through B10. The locations of these points are not known with great accuracy, but are most likely close to the northern edge of the River Road ROW, as indicated in Figure 2 of the Characterization Report (NES, 1996a) and Figure 3-1 of the Hydrologic and Geologic Assessment (STEP, 1997). Results of direct radiation measurements at these points are reported in the updated page 30 of the Characterization Report (NES, 1996b). Results of analysis of soil samples from all borehole locations are tabulated in Table 3.4 of the Characterization Report (NES, 1996a).

Results of more recent direct radiation measurements focused on the River Road ROW are reported in Table 1 of the Report on Topographic and Radiological Surveys, Reading Slag Pile Site (STEP, 1999). Results of analysis of three supplementary soil samples from the River Road ROW are listed in Table 1-2 of the Decommissioning Plan (STEP, 2005).

Taken as a whole, the radiological data from the River Road ROW indicate that average radionuclide concentrations in near-surface soils in the ROW are about the same as concentrations in near-surface soils on the slag pile slope. The maximum depth of elevated radionuclide concentrations in the ROW materials is about 1 to 2 feet. Other industrial wastes similar in composition to those observed on the slag pile are also present to a substantial extent in the ROW material containing radionuclide bearing slag and in ROW material beyond and below that containing radionuclide bearing slag. However, the ROW material does not include large blocks of those wastes as observed on the slag pile.

The average net (background subtracted) activity concentration in the ROW near-surface soil is approximately 25 pCi/g of combined thorium (Th-232 and Th-228) and uranium (U-238 and U-234). (This net activity concentration is the result of subtraction of 2.6 pCi/g total uranium and 2.5 pCi/g total thorium from gross measurements, as explained in the Characterization Report.) Of the 25 pCi/g total uranium and thorium, about 7.5 pCi/g is thorium-232 and 5 pCi/g is uranium-238. Progeny from these two nuclides can be assumed to be present at equilibrium concentrations.

3.0 POTENTIAL EXPOSURE SCENARIOS

3.1 INTRODUCTION

The decision to terminate the NRC license for Reading without restrictions on use will depend on a finding that future exposure to residual radioactive materials at the Site would be within NRC limits for exposure of members of the public. Assessment of potential future exposure must include development of reasonably expected scenarios by which exposure to residual radioactive material might occur, given reasonably foreseeable uses of the land. This section describes the development of Site-specific exposure scenarios for the assessment of maximum radiation doses that might result from unrestricted use of the Site.

The Site characterization information was used as recommended in current NRC guidance documents to develop exposure scenarios and assumptions for the assessment of theoretical maximum radiation doses that might result from unrestricted use of the Site. The NRC guidance documents provide a framework for dose assessment that accommodates consideration of reasonably foreseeable land use and other site-specific characteristics and application of realistic models and assumptions in radiation dose assessment (USNRC, 2003a, USNRC, 2003b, USNRC, 2004, Beyeler, 1998a, and Beyeler, 1999b).

In general, people could conceivably receive radiation doses from radioactive materials on the Site through either internal or external exposure. In external exposure, the body absorbs radiation emitted by radioactive material outside the body. For example, radioactive materials deposited on the ground surface can cause external exposure of a person standing on the surface if the radiation emitted is sufficiently penetrating to reach internal body tissues. In internal exposure, the body absorbs radiation emitted by radioactive material that has been introduced into the body by inhalation of radioactive material constituents in air, or by ingestion of radioactive material constituents in food or water. In general, the level of the radiation dose received decreases as the quantity of radioactive material available for exposure decreases, but the exact relationships are sometimes complex. External radiation exposure can be mitigated by dilution of the source material, by increasing the distance between the receptor and the source, by limiting exposure time, and by shielding, i.e., the placement of radiation-absorbing material between the receptor and the source. Internal exposure can be best mitigated by isolation or dilution of the source material to minimize inhalation or ingestion of radioactive material.

This Section begins with a general discussion of Site-specific considerations that are important in radiological assessment, then proceeds to more detailed discussions of the limited potential for migration of radioactive material in water and the limited potential for movement of the slag material from its present location, and concludes with definition

of exposure pathways and exposure scenarios, based on the foregoing consideration of Site-specific features.

3.2 SITE-SPECIFIC CONSIDERATIONS

For the Reading Site, there are important Site-specific considerations that shape potential exposure scenarios. These have been considered, as described below, in the development of scenarios for potential radiation exposure to residual radioactive materials at the Reading Site.

Based on review of Sanborne maps, the property containing the Site has been used for industrial purposes for at least 100 years. The historical zoning designation for the property was HM (Heavy Manufacturing). The City of Reading and Berks County have designated the area containing the Site as an urban redevelopment area. As part of that process, the area containing the Site has been designated for industrial/commercial and related uses. The Reading Redevelopment Authority has razed the former buildings and is currently in the process of preparing the property for construction. Discussions with potential industrial tenants are in progress.

Development of the former Dana property north of the Site has been partially completed with the construction of roads and other infrastructure... Plans by a committed tenant of that property include the use of the River Road ROW as an access route in the near future.

Considering the likely schedule for completion of plans and development of the property (1 to 3 years) and the typical longevity of commercial or industrial facilities (50 to over 100 years), the use of the property is not expected to change in the foreseeable future. In accordance with NRC guidelines, the planned near-term use of a site is appropriate for dose modeling assumptions. The combined past and planned tenure of industrial/commercial use is approximately 200 years or 20% of the 1,000 year period of interest. This provides a good deal of confidence that the scenarios modeled are representative of both the long-term as well as short-term uses of the site.

Ground surface elevation data from the 1904 Sanborne map showed an approximately uniform slope from the Schuylkill Canal to Tulpehocken Street. Over the past 101 years, fill, consisting of slag and other materials, has been used to improve the topographic profile of the industrial property. The improvements have created a large level area extending from Tulpehocken Street to near the southwestern property boundary. As shown in cross section BB' (Figure 3-2), the current profile provides the maximum area of level ground suitable for industrial use within the property boundaries. The following features of the current configuration represent the optimal profile for industrial or commercial use.

- The maximum possible area of continuous level ground is available for buildings or parking areas

- The Site has good drainage
- The continuous level area is above the maximum reported flood level
- There is at-grade access to Tulpehocken Street, Buttonwood Street, and the railroad tracks on the northern property boundary
- The fill material is not suitable for any likely on-site or off-site use other than the current setting

In summary, incremental modifications to grade over 100 years have resulted in the current Site profile that is optimal for use of the property. This optimum grade is not likely to be modified in the future.

The volume of the fill was calculated to be 3,000,000 ft³, based on the different elevations shown in the 1904 maps and the current topography. The average density of the fill is estimated to be 117 pounds per ft³, although it may be higher due to inclusion of large quantities of non-radiological slag (approximately 180-190 pounds per ft³). The total weight of the fill was estimated to be approximately 175,500 tons.

The form, distribution, and location of the residual licensed radioactive materials at the Reading Site and other Site-specific features are important considerations in developing radiation exposure scenarios appropriate for evaluation to form a decision basis for terminating the NRC license with unrestricted use of the lands. As noted in Section 2.0, radioactive materials at concentrations distinguishable above background concentrations in soils were originally confined to discrete, highly stable pieces of slag, mixed with much larger volumes of non-radiological slag, rubble, and soil. Because the slag was broken up prior to disposal, some of the slag pieces are not easily separable from soil.

The distribution of the radiological slag also seriously limits the range of possible exposure scenarios. Much of the materials of potential radiological consequence are distributed in near-surface soils on a slope steep enough to preclude use for residential or agricultural purposes. Almost all of the remainder of the material of interest is distributed beneath a cover in near-surface soils on the top of the pile. Although, as explained in Section 1.0, this area is a long, narrow strip, with maximum dimensions of 15-ft wide by 162-ft along the edge of the embankment, the limited width, in particular, would be an important consideration in limiting potential exposure to the radioactive materials.

Leach testing of the slag, reported in the Decommissioning Plan, indicates extremely limited environmental availability. These results are consistent with results of monitoring of seepage from the slag pile and groundwater samples immediately downgradient of the pile (STEP, 1997, STEP, 2000), which indicates that nuclide concentrations in water do not exceed EPA Drinking Water Standards and are, in fact, indistinguishable from background surface water samples collected from the Schuylkill River. The limited

environmental availability of the licensed radionuclides in the slag is an important consideration in radiological dose assessment. Analytical results for groundwater samples collected from the wells in the ROW were also all within Drinking Water Standards.

Additional studies subsequent to the DPRV1 and RARV1 (NUREG-1703, NUREG-6632), confirm that the leach rate of radionuclides from the slag is exceedingly low. A detailed review of those reports is provided in the Decommissioning Plan (STEP, 2005)

The Decommissioning Plan provides a detailed discussion of the groundwater pathway. In summary, the Site conditions preclude the possibility of any completed groundwater pathway.

- Measured radionuclide concentrations in leachate from the slag are below Drinking Water Standards. This finding is consistent with findings from studies of similar slags by other organizations, as discussed in section 1.5.1 of the Decommissioning Plan (STEP, 2005). Migration and mixing can only lower the concentrations. Therefore, Drinking Water Standards can not be exceeded.
- The groundwater flow path between the slag and the river is limited to a shallow, thin, short zone unsuitable for installation of a well.
- There is insufficient yield downgradient of the slag to support even a domestic supply well.
- The total volume of the infiltration through the slag and subsequent leachate could represent only a miniscule fraction of the volume of an industrial or water supply well in the bedrock resulting in dilution of constituents from the slag to background levels.
- It is unlikely that the bedrock will be developed for use as a water supply source.

In conclusion, there are no current or future completed groundwater pathways and there is no groundwater contamination associated with the Site.

A detailed discussion of the limitations of potential future uses of the Site and industrial property is contained in Section 1.5.1 of the Decommissioning Plan (STEP, 2005). As shown in cross section BB' (Figure 3-1), the current topography of the industrial property is optimal for industrial or commercial redevelopment and would likely be maintained in its current configuration. Figure 3-1 also shows that the radiological slag occupies only a small portion of the industrial property in terms of area and volume fraction of fill.

Some of these considerations work together. For example, a use of the land that would result in use of groundwater does not appear viable. Residential or agricultural uses, uses that would most likely incorporate groundwater use, would not be consistent with past

and likely future uses of the land. The physical distribution of the radioactive materials on a slope and in a ribbon of flat area at the top tends to make them unavailable for residential or agricultural purposes. Even if such uses occurred, the limited environmental availability of nuclides in the slag would limit concentrations of radionuclides in groundwater to negligibly low levels. The City of Reading has indicated that future development on the industrial property will be required to connect to the City's public water supply system. In addition, analytical results for groundwater samples collected from immediately downgradient of the Site are all below the primary drinking water standards for radiological constituents (STEP, 2000). Thus, for a number of reasons, exposure through groundwater pathways need not be evaluated explicitly.

Additional Site-specific considerations are important for the ROW material in particular. The materials of potential radiological consequence are distributed in near-surface soils in a road right-of-way. The possibilities for development of the ROW segment of interest are limited. The ROW segment containing the slag is itself small, less than 300 feet long and 50 feet wide. It is contained within a small, narrow strip of land that is, to a considerable extent, isolated by geographical features. This strip is bounded on one side by an embankment, of which the slag pile forms a part. The strip is bounded on its other side by railroad tracks, the remains of the Schuylkill Canal, and the Schuylkill River. Concrete bridge abutments at either end further tend to isolate the strip of land containing the ROW segment of interest. For these reasons, future residential use or agricultural use of the land in the vicinity of the ROW segment is not practical. The current plans by the City of Reading and Redevelopment Authority call for the River Road ROW to become an active road providing access to the former Dana property north of the Site.

All of these considerations, taken together, tend to shape the radiation exposure scenarios that might reasonably be expected in the near or even distant future. In particular, direct application of commonly used generic exposure scenarios developed for screening purposes is not appropriate for this Site.

3.3 DETERMINATION OF NUCLIDE CONCENTRATIONS IN LEACHATE

In the context of this analysis, wherein no groundwater exposure pathways are included in the exposure scenarios, understanding of nuclide leaching behavior is important only in the qualitative sense. Leach test results are useful in assuring that nuclide concentrations in water seeping from the slag pile will be low, but monitoring data already demonstrate that. Leach test results are also useful in assessing the rate of depletion of the radiological source. However, over a very broad portion of the range of likely source depletion rates, uncertainty in depletion rate will affect uncertainty in the estimate of radiation dose negligibly. This is because, in the way the analysis was designed, the maximum calculated annual dose occurs at the outset of the 1,000-year period of analysis. The depletion rate will only affect the time at which the calculated annual dose begins to fall from its maximum but will not affect the magnitude of the maximum annual dose. Nonetheless, as described below, Site-specific leaching data were developed for consideration in this analysis.

For dose calculation purposes, uranium leaching was modeled as a desorption process in which the uranium concentration in the leachate was assumed to be directly proportional to the concentration in the solid source. The value selected for K_d , the ratio of uranium concentration in solid to uranium concentration in leachate - commonly called the distribution coefficient, was adjusted so that the dose model would produce a leachate uranium concentration equal to the readily available uranium (RAU) concentration measured in leaching tests on slag from the Reading Site. These leach tests consisted of exposure of ground-up samples of representative slag to highly acidic leaching conditions that are far more aggressive than would be encountered in the natural environment. The experimental leach solutions were at least 10 times more acidic than natural waters. The concentrations of dissolved nuclides measured in such a test are far higher than would be expected from leaching into natural waters percolating through the slag materials. The raw data from the leach test is provided in Appendix A. The use of these data in the derivation of the uranium K_d value for use in the dose model is shown in Table 3-1.

The derivation in Table 3-1 is fully consistent with the interpretation of leach test data by Environmental Resources Management, Inc. (ERM), which has been submitted to NRC previously (Cabot, 1996d). Specifically, the initial leachate uranium concentration calculated in the dose model, using the K_d value calculated in Table 3-1 and the uranium concentration of approximately 10 pCi/g (U-238 and U-234 combined) derived as the minimum average uranium concentration over the material of interest, matches the initial leachate concentration derived by ERM, 0.0226 ppm, or 15.8 pCi/L.

The leach test methodology and the ERM interpretation methodology used for the Reading slag leach test was approved by the NRC staff (USNRC, 1997).

Uranium progeny nuclides were assumed to be present in leachate in equilibrium with the uranium parent. This assumption implicitly assumes congruent leaching. As noted in Section 1.5.1 of the Decommissioning Plan (STEP, 2005), leaching would be incongruent, with concentrations of important uranium progeny in leachate lower than concentrations of uranium. Thus, assumption of equilibrium and congruent leaching results in conservatively high estimates of progeny nuclide concentrations in leachate. However, the derived K_d values for these nuclides remain high enough that depletion of these nuclides from the source would be slow enough to assure that calculated maximum annual doses from water-independent pathways would not be underestimated. More recent reports regarding the leach rate of uranium from radiological slag are consistent with the leach rate derived for this Radiological Assessment. In particular, the Johns Hopkins report (NUREG-1703) concludes that the radiological component is preferentially represented in the large hard glassy blocks of slag. The larger blocks have a lower surface area per unit volume and resultant lower bulk weathering rate.

The K_d value derived for uranium for dose calculations was also used for the thorium chain. As explained in the ERM analysis, a higher K_d value for thorium and its progeny nuclides, which would result in a lower concentration of those nuclides in leachate, would

be warranted based on data from experiments of sorption/desorption using various materials from other sites. Therefore, use of the same K_d value as that derived for uranium would result in conservatively high concentrations of thorium and progeny nuclides in leachate, as calculated in the dose model. Again, the derived K_d values for these nuclides remain high enough that depletion of these nuclides from the source would be slow enough to assure that calculated maximum annual doses from water-independent pathways would not be underestimated.

3.4 MOVEMENT OF SLAG

The low likelihood for movement of slag to other locations is a factor in the development of exposure scenarios and is discussed in this subsection.

Off-Site Movement of Slag

The potential for the slag to be removed from the Site and placed in a location that is suitable for residential development or farming uses was considered. Although it is physically possible to move the radiological slag to an off-site location, it is inconceivable that it could end up in a configuration that would lead to greater exposure than that at the Site. For the exposure to be greater, the radiological slag would have to be selectively excavated and separated from non-radiological slag, moved to a new location, and selectively spread across a surface area larger than the current Site. Because the radiological slag is indistinguishable from the non-radiological slag at the site, selective removal and placement of radiological slag would require the use of radiation detection devices. It is inconceivable that people with the knowledge of sophisticated instruments would either intentionally concentrate radiological material to increase the potential dose or have no knowledge of the potential dose.

Even if the slag were moved, the same physical characteristics that limit the potential exposure on-site would limit the off-site exposure. It would not be used for surface fill in any residential, agricultural, or commercial setting. If someone went through the expense and effort to move the material, it is doubtful that it would remain exposed even in an industrial setting.

As discussed below, the use of the radiological slag as a growing media for farming, turf, or for a residential garden is an unreasonable assumption. There are several factors that each and in itself would prevent that from occurring. Taken together, it is virtually impossible for off-site movement of the slag to result in doses of concern. The following factors are critical for evaluating the potential off-site exposure.

Physical Characteristics

The slag itself is a glassy granular material with many large pieces up to several feet in diameter. It has little moisture retention and no organic humus material. The radiological slag at the Reading Site is mixed with other materials including:

- Concrete slabs greater than 10-feet by 10-feet by 1-foot thick
- Metal trash and debris including structural steel, pipes, wires, hoses, spikes, nails, household items, batteries, pails, bricks, carbon electrodes, wooden timbers, and general commercial industrial and residential trash
- Non-radiological slag that is nearly identical in origin and appearance to the radiological slag

At the Reading Site, only drought tolerant weedy species of trees and brush are able to survive on the slope where approximately 2 feet of material covers the slag. Based on observations of numerous piles of non-radiological steel slag in Pennsylvania, pure slag does not support any but the hardiest weedy species of plants, if any. The slag is not suitable as a growing medium for crops or turf.

The debris mixed in with the slag severely limits its use. The large objects imbedded in the fill would impede grading to proper slope, tilling, plowing or harvesting any crop, and maintaining a lawn. The smaller nails and spikes would be a deterrent to using the material as surface cover for industrial residential or agricultural use because of the risk of puncturing tires on vehicles and equipment. The material is not aesthetically acceptable for any intentional residential, commercial, or industrial use.

Logistics

In the unlikely event that slag from the Reading Site were to be relocated in the future, the process would affect relative distribution of radiological slag relative to the non-radiological slag. The radiological slag and debris are indistinguishable from the non-radiological slag and debris without the use of sensitive instruments or laboratory analyses. Excavation of slag from the Reading Site would be indiscriminant resulting in thorough mixing of radiological and non-radiological slag.

The average activity slag pile mixed with the other fill at the property can be calculated. Based on the inventory records, a total of 2.19 tons of thorium was contained in the materials placed on the slag pile. The 3,000,000 ft³ of fill at the site would weigh approximately 175,500 tons. This equals a concentration of 0.00125 wt % thorium, corresponding to an activity of 2.7 pCi/g of thorium. Applying the measured ratio of uranium to thorium, there would be 0.00051 wt % uranium, corresponding to an activity of 3.4 pCi/g. Therefore, the result of excavation, shipping, and placement of the slag to a different location would most likely result in a greatly reduced average concentration of radiological constituents.

It is possible that there could still be some small volumes (limited to the size of one truckload) of slag that would be near or at the same concentration as currently exists in the radiological slag pile. At the destination site, these volumes of radiological slag

would be randomly distributed as zones scattered throughout the fill in three dimensions (raisin bread provides a useful analogy). The "raisins" would most likely be embedded in the fill and not exposed at the surface. In the few locations where it was exposed at the surface the size of the area and concentration would be less and than the area and concentration modeled for the on-site dose assessments. If the receiving site was residential or commercial, it is certain that slag would be covered with topsoil before use. If it was a heavy industrial site the uses would be similar to the Reading Site and the surface area and concentration of radiological slag would be substantially less than at the Reading Site. Therefore, the potential exposure would also be substantially less.

Burial in a Landfill

Cabot considered the unlikely scenario of assuming that all knowledge and capability to identify radiological slag is lost and there is large-scale excavation and removal of fill at the property, including the slag. Because of the negative aesthetic appeal and potential non-radiological contamination of the debris that compose the fill, it is not likely to be used for surface fill at a new location. If it was removed, the most likely disposition would be in a sanitary or industrial landfill. In such a setting the potential exposure would be zero because the radiological material would be buried having no direct exposure and concentrations of radionuclides in leachate would not exceed drinking water standards. In the reducing environment of a landfill, the uranium and thorium would be more stable and the radiological concentration of any leachate produced would be even lower than at the Site.

The potential dose was also considered if knowledge and maintenance of a landfill containing the radiological slag were somehow lost and excavation and erosion were possible. Because the radiological slag would be dispersed in the landfill any future exposures would be for small areas with low concentrations. Any potential dose would be less than modeled for the Site. In addition, the continued association with garbage and debris would still limit the intentional uses, disposition, and potential exposure.

Alternate exposure scenarios for the highly unlikely excavation and relocation of the slag and debris within which it is embedded were evaluated as part of the Radiological Assessment. Calculated doses were low.

On-Site Movement of Slag

Regrading of the property into a uniform slope was considered unlikely because the elevations at the property boundaries are fixed. Regrading would require the removal and offsite disposal of large volumes of trash and debris.

Excavation and relocation of slag within the industrial property would have the same affects as offsite relocation of slag. The result would be lower average concentrations, smaller areal extent, and likely cover with soil if the industrial property were developed for residential or commercial use. Because of the current location of the slag on an

embankment, the radiological slag would likely be buried beneath non-radiological slag. Any development of the areas containing radiological slag would result in a cover of soil or pavement. Either scenario greatly reduces the already low calculated potential dose.

If, as concluded in NUREG-1703, the radiological component is preferentially contained in the large hard glassy blocks of waste slag, then the probability of significant activity being available for exposure is extremely low. The large blocks of slag that do not leach uranium and thorium would not contribute to water-born or air-born pathways. Direct dose would be unlikely because the blocks would not be left exposed in any setting normally occupied for any but short time periods.

The RA calculated potential doses from the thin (1-foot to 2-foot thick) limited area of dilute radiological slag in the River Road ROW. Those results demonstrated that potential dose was below 1 mrem/yr for all scenarios considered. The limited extent and concentration of the ROW material ensures that any movement or change would likely reduce the dose. It is highly unlikely that the material could inadvertently be placed in a configuration that would lead to a dose above the 25 mrem/yr limit for release without restrictions. In addition, most of the material will be beneath a 4-foot thick rip-rap cover eliminating potential exposure and any reasonable probability of movement

Conclusions Regarding Movement of Slag

The above considerations lead to the following conclusions regarding the potential for relocation of slag materials:

- Offsite relocation of the slag is very unlikely and would result in reduced exposure, concentration, and potential dose.
- On-site redistribution of slag would result in reduced exposure, concentration, and potential dose.

Consequently, exposure scenarios appropriate for evaluation of this Site against regulatory criteria in 10 CFR Part 20, Subpart E, are confined to those that assume the material remains in place. However, hypothetical scenarios involving potential exposure associated with the process of relocation of this material to some unspecified and uncontrolled surface location and potential exposure of a worker who spends a portion of his work time on the relocated material have been included for evaluation as alternate scenarios.

3.5 EXPOSURE SCENARIO AND PATHWAY DEFINITION

License termination decisions can sometimes be based on analysis using simplified generic screening exposure scenarios. Screening exposure scenarios are based on conservative exposure assumptions that typically cause doses to be overestimated. While they may be useful for screening purposes, they are not suitable representations of

exposure scenarios that might reasonably be expected to arise at the Reading Site. In particular, the location, size, and physical arrangement of the slag material and its setting on an industrial property preclude resident and resident-farmer exposure scenarios. In such scenarios, it would be assumed that the resident spends a very large fraction of his time and raises a large portion of his food, including meat and milk, on the land bearing the licensed radioactive material. These activities would not be practical, given Site conditions and physical characteristics of the slag material. Site specific exposure scenarios were developed separately for the slag pile material and the ROW material.

3.5.1 Slag Pile Area

Development of scenarios for analysis recognizes that the Slag Pile Area is not likely to be used for any particular purpose. Some kind of occasional recreational or occupational use may be feasible, but even in those scenarios, exposure time would be small. The areas containing radioactive materials do not lend themselves very well to either recreational or occupational uses. The slope is too steep and the flat portion is too small and too close to the edge of the embankment. The only potential exposure pathways would be those that might involve some walking over the areas.

Three basic exposure scenarios were developed and evaluated as a base or primary analysis for the slag pile:

- A worker preparing the Site and constructing the rip-rap layer (WRR-P)
- A trespasser who walks on the slag pile slope face after license termination (TRR)
- A worker on the Site after license termination who spends part of his work day in a facility assumed to be located on the flat surface at the top of the slag pile and a portion of his work time in activities involving walking on the slag pile slope face. (WRR)

The worker in the third type of scenario is assumed to spend 200 hours per year (10% of his total annual work time) on the Site in the area where radioactive materials of interest are located. Of this 200 hours, it is assumed that he spends 20 hours per year on the slope and 180 hours per year in a small structure on top of the pile. The geometry of the pile dictates that the structure or portion of a structure on radioactive materials at the top of the pile be small. This would undoubtedly be a factor in limiting the fraction of his time in the areas where radioactive materials are located. For purposes of analysis, it is assumed that the structure is 15-ft by 15-ft with a 6-in concrete floor. Floor shielding and the limited extent of the areal source at the top of the pile would limit direct radiation exposure. Time spent in the building would also tend to limit exposure from inhalation of dust containing radioactive material and ingestion of soil containing radioactive material.

Substantial erosion of the flat surface at the top of the pile was assumed not to occur because maintenance of a structure usable by workers would dictate that such erosion be prevented or repaired.

Because radon-222 and radon-220 are progeny of the uranium-238 and thorium-232 decay chains, respectively, inhalation of radon daughter products is a possible radiation exposure pathway at this Site. However, because radiation doses from these nuclides are best controlled by measures commonly incorporated in new structures, radiation doses from these nuclides have been excluded from the new radiological criteria for decommissioning, and are not included in this assessment. This approach is consistent with current NRC radiological criteria for license termination in 10 CFR 20, Subpart E.

The set of exposure scenarios for consideration in dose assessment was developed based on the nuclides of interest, the anticipated distribution of the nuclides on the Site, reasonably likely potential uses of the Site, and potential environmental migration pathways. A list of all of the exposure pathways warranting analysis for one or more of the base case scenarios is provided below:

1. Ground - Direct radiation from material in soil
2. Dust - Resuspension of surface particulate material (air inhalation)
3. Soil - Ingestion of soil

Although exposure pathways may be the same for different exposure scenarios, values for key parameters, such as Site occupation time, may differ between scenarios.

There are certain analytical elements common to all the Slag Pile scenarios analyzed:

- Use of gamma measurements for source characterization at the top of the slag pile: Measured gamma exposure rates indicate that average concentrations of licensed radioactive material in the near-surface slag/rubble at the top of the pile are lower than those derived from measurements of concentrations in soil samples. For purposes of this analysis, concentration estimates were adjusted to be consistent with measured gamma exposure rates.
- Exclusion of radon pathways from evaluation for reasons described above
- Use of specially computed ground dose reduction factor for the worker's building at the top of the pile: MICROSHIELD was used to compute a ground dose reduction factor to account for the combined effects of limited source dimensions and shielding from the worker's structure. The structure is assumed to be 15-ft x 15-ft with a 6-in concrete slab floor located at the center of the ribbon of slag that forms the top of the pile.

The worker is presumed to work at the center of the structure. No reduction was considered from shielding in the walls. Details of the MICROSHIELD calculations are provided in Appendix C. The factor calculated from MICROSHIELD results (the ratio of shielded dose from a limited area source to unshielded dose from infinite area source) is 0.19, which was used to develop appropriate shielding factor input for RESRAD. Because the specially calculated reduction factor incorporates the effect of limited source area, the source area, as input to RESRAD, was assumed to be effectively an infinite area to prevent RESRAD from computing and applying an additional limited area correction factor.

- Use of Sandia reports for certain parameters: Two Sandia reports constitute the most current available NRC guidance for default parameter values for use in environmental radiation dose assessment. For this reason, they were used to aid in selecting appropriate values for certain parameters (Beyeler, 1998a and 1998b). They were used in particular as the basis for selecting a value of $1.4 \text{ m}^3/\text{h}$ ($12,400 \text{ m}^3/\text{y}$) as a breathing rate appropriate for light-to-moderate activity that would be expected for the scenarios evaluated in this assessment. In addition, they were used to support the use of RESRAD default values for the soil ingestion rate (0.1 g/d or 36.5 g/y), dust mass loading for inhalation (0.0002 g/m^3), and the shielding factor for inhalation, (0.4). In addition, shielding factor information in the Sandia reports was reviewed for compatibility with the derivation of the specially calculated ground dose reduction factor, described above. In general, the consideration of shielding in the specially calculated factor for this analysis is consistent with information and methodology described in the Sandia reports. However, it is important to note that the special factor calculated for this analysis also incorporates source geometry considerations, unlike the factors discussed in the Sandia reports, which address only shielding from an infinite area source.
- Use of input parameter values from RESRAD default values, except as noted: Default RESRAD parameter values were used for many parameters, generally those that do not influence the dose estimate significantly for the scenarios of interest. Site-specific values were determined for occupation times, which influence the dose estimate most significantly. Complete lists of parameter values are provided in the RESRAD documentation (Yu, 1993a Yu, 1993b).
- Assumption of negligible source depletion: The leachate studies described in section 3.3 demonstrated virtually no transport of radionuclides from slag to groundwater. In addition to eliminating groundwater-related exposure pathways, this also effectively eliminates depletion of the slag pile radionuclide source by water percolating through it. Minimum values for the slag pile distribution coefficients (ratio of nuclide concentration in

slag pile solid to the concentration in water percolating through it) were set at 1,000 mL/g to simulate this effect.

Compliance Scenarios

Three exposure scenarios were judged to be sufficiently realistic for determination of compliance with regulatory limits. Each is described in turn below:

WRR-P—Worker placing rip-rap on slope, including clearing and grubbing—Worker conservatively assumed to work full time on the slope for the duration of the job, one month

Source: 25 pCi/g U+Th (current near-surface)

Cover: none

Time: 160 h/y on slope (0.0183 y)

Inhalation rate: $1.74\text{E}4 \text{ m}^3/\text{y}$ (heavy)

Dust in air: $7.0\text{E}-4 \text{ g}/\text{m}^3$ (heavy)

Soil ingestion rate: 36.5 g/y

TRR—Trespasser on rip-rap after license termination—Trespasser walks on slope with rip-rap 3 hours per week, 6 months per year

Source: 25 pCi/g U+Th (current near-surface)

Cover: 1.5 ft rip-rap (0.8 ft solid equiv, $2.2 \text{ g}/\text{cm}^3$) (dose reduction from soil blanket is ignored)

Time: 72 h/y on slope (0.0082 y)

Inhalation rate: $1.24\text{E}4 \text{ m}^3/\text{y}$

Dust in air: $2.0\text{E}-4 \text{ g}/\text{m}^3$

Soil ingestion rate: 36.5 g/y

WRR—Worker on top of slope and on rip-rap on the slope after license termination—Worker works on radiologically affected area 10% of his work time, or 200 h/y, of which 20 h/y is walking on slope with rip-rap and 180 h/y is in building with 6" concrete floor on the flat surface at the top of the slag pile.

Source: 25 pCi/g U+Th (current near-surface)

Cover: 1.5 ft rip-rap (0.8 ft solid equiv) on slope (dose reduction from soil blanket is ignored); 6 in concrete on top (no rip-rap assumed)

Time: 180 h/y indoor at top (0.021 y) and 20 h/y outdoor on slope (0.0023 y)

Direct dose reduction factor: indoor—0.19; outdoor—1

Inhalation dose reduction factor: indoor—0.4; outdoor—1

Inhalation rate: $1.24\text{E}4 \text{ m}^3/\text{y}$

Dust in air: $2.0\text{E}-4 \text{ g}/\text{m}^3$

Soil ingestion rate: 36.5 g/y

Alternate Scenarios

To test the robustness of the results based on realistic scenarios intended for comparison to 10 CFR Part 20 Subpart E dose limits, alternate exposure scenarios, scenarios unlikely to occur, were developed and evaluated. These scenarios were developed following current NRC guidance (USNRC, 2004). Three groups of alternate scenarios were developed. The first set assessed dose for the trespasser and worker in the absence of rip-rap. This set is considered to provide upper bound estimates of dose in the event of reduced erosion control effectiveness of the rip-rap over time. This set of scenarios is unlikely because self-armoring over time would most likely occur and would reduce dose rather than increase it. The second set of alternate scenarios relate to hypothetical and highly unlikely limited excavation on the rip-rap-covered slag pile. This set of scenarios postulated excavation on the scale of trenching for laying pipe or cable across the site. Exposure scenarios were developed for a worker participating in the trenching operation and for a worker and trespasser on the site exposed to radionuclides assumed to have been brought to the surface in the trenching operation. The third set of alternate scenarios relate to major excavation, in which the entire deposit of industrial waste within which the slag bearing radionuclides of interest is embedded, a total volume of about 3,000,000 cubic feet, is assumed to be excavated and relocated to some unspecified and uncontrolled surface location. As stated earlier in this section, such an excavation is highly unlikely. Two exposure scenarios were developed for this set. The first is a worker participating in the excavation. The second is a worker who spends time on the excavated and relocated material in its new location. Because the material would not be suitable for locations likely to be used for residential or agricultural purposes and would, by its presence, preclude such land uses, a scenario involving a person exposed in his work is the only kind of scenario considered plausible. The alternate scenarios are described in detail below.

Alternate Scenarios—No Rip-Rap

TC (RIS-2004-08 alternate scenario)—Trespasser on slope in current conditions (considered bounding for future conditions)—Trespasser walks on slope 3 hours per week, 6 months per year

Source: 25 pCi/g U+Th (current near-surface)

Cover: none

Time: 72 h/y on slope (0.0082 y)

Inhalation rate: $1.24\text{E}4 \text{ m}^3/\text{y}$

Dust in air: $2.0\text{E}-4 \text{ g}/\text{m}^3$

Soil ingestion rate: 36.5 g/y

WC (RIS-2004-08 alternate scenario)—Worker on top and on slope in current conditions (considered bounding for future conditions)—Worker works on radiologically affected area 10% of his work time, or 200 h/y, of which 20 h/y is walking on slope in current

condition, 180 h/y is in building with 6" concrete floor on the flat surface at the top of the slag pile.

Source: 25 pCi/g U+Th (current near-surface)

Cover: No cover on slope; 6 in concrete on top (no rip-rap assumed)

Time: 180 h/y indoor at top (0.021 y) and 20 h/y outdoor on slope (0.0023 y)

Direct dose reduction factor: indoor—0.19; outdoor—1

Inhalation dose reduction factor: indoor—0.4; outdoor—1

Inhalation rate: $1.24\text{E}4 \text{ m}^3/\text{y}$

Dust in air: $2.0\text{E}-4 \text{ g}/\text{m}^3$

Soil ingestion rate: 36.5 g/y

Alternate Scenarios—Hypothetical Limited Excavation

WRR-LE (RIS-2004-08 alternate scenario)—Worker conducting limited excavation on slope covered by rip-rap (e.g., laying pipe or cable across slope), exposed to radionuclides in excavated slag and soil for 10 hours in one year

Source: 10 m^2 by 6 ft deep mix of 1.5 ft rip-rap (0.8 ft solid equivalent), 1.0 ft soil containing 15 pCi/g total Th and 10 pCi/g total U, and 4.2 ft of undiluted waste slag. (The dose reduction from the soil blanket is ignored.) Waste slag is assumed to contain 0.307 weight % Th (based on analysis of samples) and 0.128 weight % U (based on the average measured ratio of U/Th in samples analyzed for both). These concentrations correspond to 670 pCi/g total Th and 871 pCi/g total U for undiluted slag. The excavation mix average is 472 pCi/g total Th and 670 pCi/g total U.

Cover: none

Time: 10 h/y on slope (0.0011 y)

Inhalation rate: $1.74\text{E}4 \text{ m}^3/\text{y}$ (heavy)

Dust in air: $7.0\text{E}-4 \text{ g}/\text{m}^3$ (heavy)

Soil ingestion rate: 36.5 g/y

TRR-ALE (RIS-2004-08 alternate scenario)—Trespasser on slope covered by rip-rap after limited excavation redistributes some excavated slag radionuclides to the surface—Trespasser walks randomly on slope 3 hours per week, 6 months per year

Source: Excavated material in a strip 3 ft wide by 170 ft long contains 472 pCi/g total Th and 670 pCi/g total U, as described in Scenario WRR-LE. For walking randomly on the slope of approximately 19,600 ft², this is equivalent to slope area average concentrations of 12.3 pCi/g total Th and 17.4 pCi/g total U.

Cover: none

Time: 72 h/y on slope (0.0082 y)

Inhalation rate: $1.24\text{E}4 \text{ m}^3/\text{y}$

Dust in air: $2.0\text{E}-4 \text{ g}/\text{m}^3$

Soil ingestion rate: 36.5 g/y

WRR-ALE (RIS-2004-08 alternate scenario)—Worker on top and on rip-rap after limited excavation—Worker on top and on rip-rap covered slope after limited excavation—Worker works on radiologically affected area 10% of his work time, or 200 h/y, of which 20 h/y is walking on slope in current condition, 180 h/y is in building with 6" concrete floor on the flat surface at the top of the slag pile.

Source: On top of slope, 25 pCi/g U+Th (current near surface). On slope, excavated material in a strip 3 ft wide by 170 ft long contains 472 pCi/g total Th and 670 pCi/g total U, as described in Scenario WRR-LE. For walking randomly on the slope of approximately 19,600 ft², this is equivalent to slope area average concentrations of 12.3 pCi/g total Th and 17.4 pCi/g total U.

Cover: No cover on slope; 6 in concrete on top (no rip-rap assumed)

Time: 180 h/y indoor at top (0.021 y) and 20 h/y outdoor on slope (0.0023 y)

Direct dose reduction factor: indoor—0.19; outdoor—1

Inhalation dose reduction factor: indoor—0.4; outdoor—1

Inhalation rate: 1.24E4 m³/y

Dust in air: 2.0E-4 g/m³

Soil ingestion rate: 36.5 g/y

Alternate Scenarios—Hypothetical Major Excavation

W-ME (RIS-2004-08 alternate scenario)—Worker conducting major excavation—Worker employed full time for a month in relocation of 180,000 ft³ of debris containing 2.19 tons Th and the non-radiological debris deposit (about 3,000,000 ft³) in which that debris is embedded. Work locations are assumed randomly distributed over the entire debris deposit.

Source: 3,000,000 ft³ at 117 lb/ ft³ (175,500 tons) containing 2.19 tons Th is equivalent to average total Th Concentration of 2.7 pCi/g, and, based on U/Th mass concentration ratio of 0.41 (based on waste slag analyses), an average total U concentration of 3.5 pCi/g.

Cover: none

Time: 160 h/y on slope (0.0183 y)

Inhalation rate: 1.74E4 m³/y (heavy)

Dust in air: 7.0E-4 g/m³ (heavy)

Soil ingestion rate: 36.5 g/y

W-AME (RIS-2004-08 alternate scenario)—Worker spends substantial portion of work period on debris material removed to an unspecified surface location following major excavation of Scenario W-ME. Work locations are assumed randomly distributed over the entire debris deposit.

Source: Source: 3,000,000 ft³ at 110 lb/ ft³ (175,000 tons) containing 2.19 tons Th is equivalent to average total Th Concentration of 2.7 pCi/g, and, based on U/Th mass concentration ratio of 0.41 (based on waste slag analyses), an average total U concentration of 3.5 pCi/g.

Cover: none
Time: 500 h/y on slope (0.057 y)
Inhalation rate: $1.24\text{E}4 \text{ m}^3/\text{y}$
Dust in air: $2.0\text{E}-4 \text{ g}/\text{m}^3$
Soil ingestion rate: 36.5 g/y

3.5.2 River Road ROW Area

Generic screening exposure scenarios based on conservative exposure assumptions that typically cause doses to be overestimated may be useful for rapid screening purposes, but are not suitable representations of exposure scenarios that might reasonably be expected to arise at the River Road ROW. In particular, the location, size, and physical arrangement of the material of interest preclude resident and resident-farmer exposure scenarios. In screening scenarios, it would be assumed that the resident spends a very large fraction of his time and raises a large portion of his food, including meat and milk, on the land bearing the licensed radioactive material. These activities would not be practical, given Site conditions and physical characteristics of the slag material.

Development of scenarios for analysis recognizes the limited potential uses of the ROW segment. The most severe exposure scenarios would likely involve some kind of occasional recreational or some occupational use involving excavation. Even in those scenarios, exposure time would be small.

Two basic exposure scenario types were developed for purposes of analysis. The first of these was a recreational walker who routinely walks on the ROW segment for exercise or pleasure. The second is a worker who participates in excavation in the ROW segment. For purposes of easy identification, they are named walker (RWWLK) and worker (RWWRK). The walker is assumed to spend 5 minutes each day for 200 days (17 hours per year) each year walking over the segment. The worker is assumed to be exposed to the ROW segment material in the course of a 40-hour excavation project.

Because radon-222 and radon-220 are progeny of the uranium-238 and thorium-232 decay chains, respectively, inhalation of radon daughter products is a possible radiation exposure pathway at this Site. However, because radiation doses from these nuclides are best controlled by measures commonly incorporated in new structures, radiation doses from these nuclides have been excluded from the new radiological criteria for decommissioning, and are not included in this assessment. This approach is consistent with current NRC radiological criteria for license termination in 10 CFR 20, Subpart E.

The set of exposure scenarios for consideration in dose assessment was developed based on the nuclides of interest, the actual and anticipated distribution of the nuclides on the Site, reasonably likely potential uses of the Site, and potential environmental migration pathways. A list of all of the exposure pathways warranting analysis for one or more of the base case scenarios is provided below:

1. Ground - Direct radiation from material in soil
2. Dust - Resuspension of surface particulate material (air inhalation)
3. Soil - Ingestion of soil

Although exposure pathways may be the same for different exposure scenarios, values for key parameters, such as occupation time, may differ between scenarios.

Two Sandia reports constitute the most current available NRC guidance for default parameter values for use in environmental radiation dose assessment. For this reason, they were used to aid in selecting appropriate values for certain parameters (Beyeler, 1998a and 1998b). They were used in particular as the basis for selecting appropriate values for breathing rates for the walker and worker scenarios. A value of $1.4 \text{ m}^3/\text{h}$ ($12,400 \text{ m}^3/\text{y}$) was selected as a breathing rate appropriate for light-to-moderate activity that would be expected for the walker scenario. A value of $2.0 \text{ m}^3/\text{h}$ ($17,400 \text{ m}^3/\text{y}$) was selected as the breathing rate appropriate for heavy activity that might be expected for the excavation worker scenario. These reports were also used to support the use of RESRAD default values for the soil ingestion rate (0.1 g/d or 36.5 g/y) and the dust mass loading for inhalation for the walker (0.0002 g/m^3) and worker (0.0007 g/m^3 , near the upper limit for respirable particles) as reasonably conservative values for these parameters.

Default RESRAD parameter values were used for many parameters, generally those that do not influence the dose estimate significantly for the scenarios of interest. Site-specific values were determined for occupation times, which influence the dose estimate most significantly. Complete lists of parameter values are provided in the RESRAD documentation (Yu, 1993a Yu, 1993b).

The two exposure scenarios for the ROW material are considered sufficiently realistic to be compliance scenarios. Key assumptions for each of the exposure scenarios analyzed for the River Road ROW are summarized below:

RWWLK—ROW walker—Walker exposed during walks 5 min per day for 200 days per year to radiation from low concentrations of slag radionuclides in soils along the River Road ROW below the slope.

Source: 25 pCi/g U+Th (current)

Cover: none

Time: 17 h/y on slope (0.0019 y)

Inhalation rate: $1.24\text{E}4 \text{ m}^3/\text{y}$

Dust in air: $2.0\text{E}-4 \text{ g/m}^3$

Soil ingestion rate: 36.5 g/y

RWWRK—ROW worker—Worker exposed along the River Road ROW below the slope during excavation for 40 h/y of soils bearing low concentrations of slag radionuclides.

Source: 25 pCi/g U+Th (current)

Cover: none

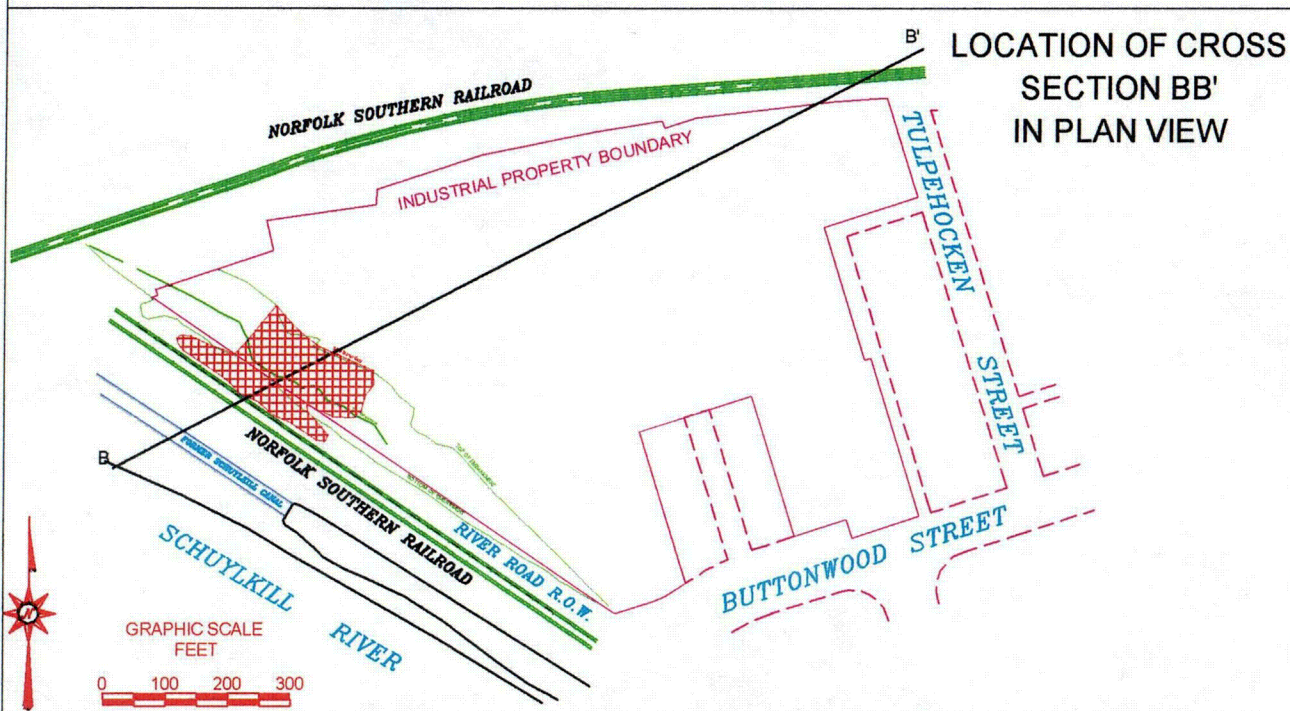
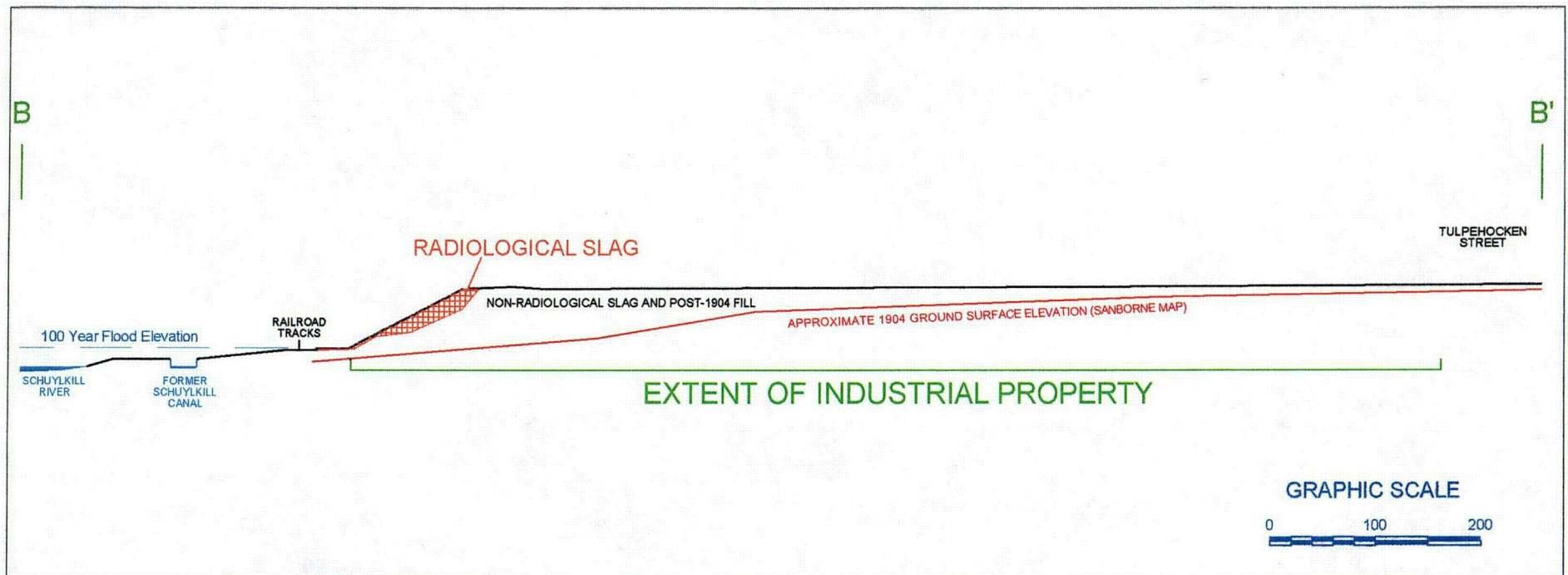
Time: 40 h/y on slope (0.0046 y)

Inhalation rate: $1.74\text{E}4 \text{ m}^3/\text{y}$ (heavy)

Dust in air: $7.0\text{E}-4 \text{ g/m}^3$ (heavy)

Soil ingestion rate: 36.5 g/y

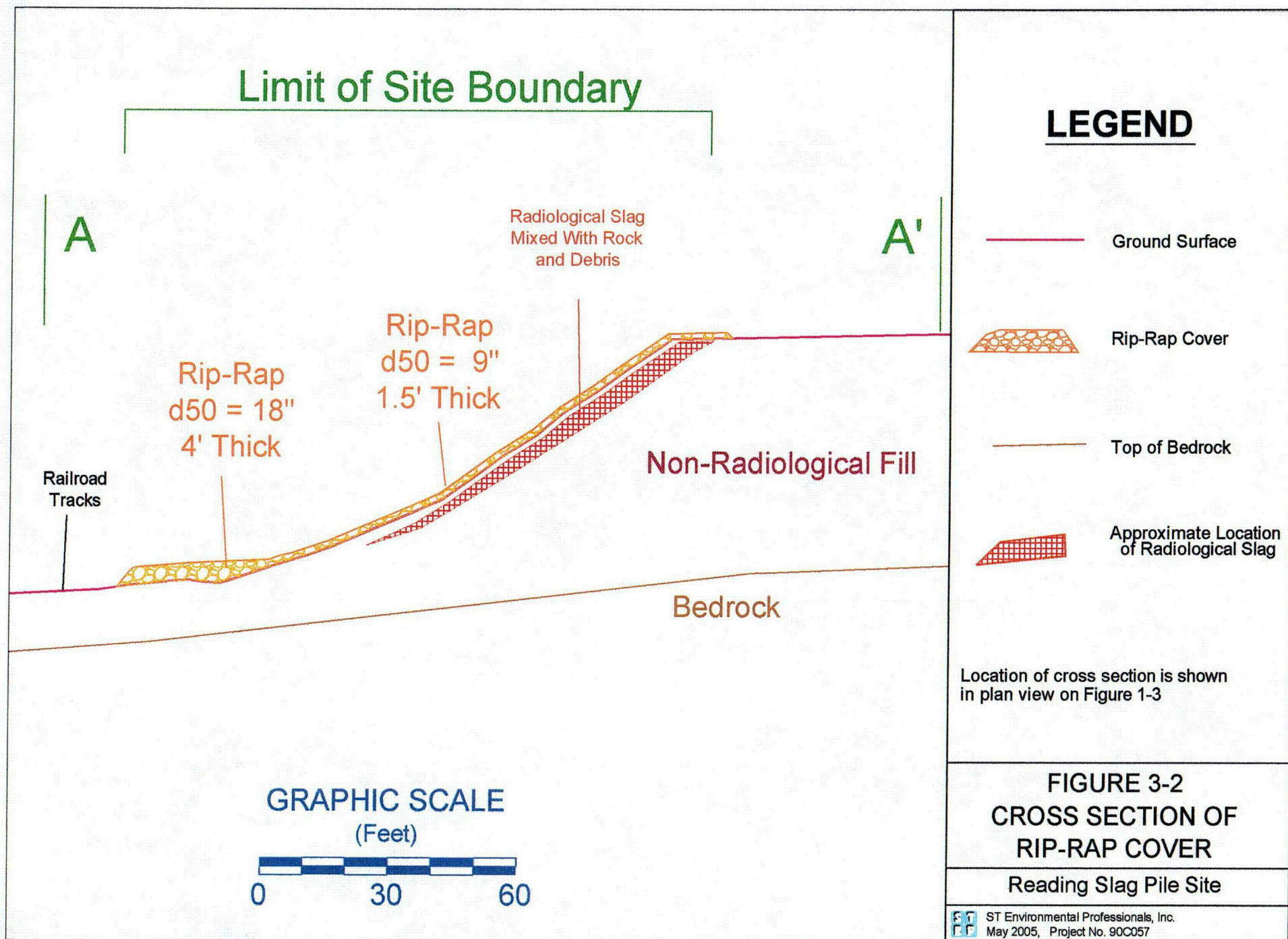
Because radionuclide concentrations in River Road ROW materials are well characterized and because scenario and parameter value uncertainties are small, analysis of alternate scenarios for exposure to radionuclides in River Road right-of-way materials is unnecessary. In addition, the assessment does not take into account the reduction of dose due to the four-foot thick rip-rap that will cover approximately 75% of the radiological slag in the ROW.



**FIGURE 3-1
CROSS SECTION BB'**

Reading Slag Pile Site

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EP May 2005, Project No. 90C057



4.0 DOSE ASSESSMENT METHODOLOGY

Potential future radiation doses are computed from estimates of potential intake rates and exposure rates. Radiation doses from internal exposure (inhalation or ingestion) are computed using dose factors developed using current methodology, specifically those in Federal Guidance Report 11 (USEPA, 1988). In conformance with this guidance, the term "dose," as it is used in this report, means "committed effective dose equivalent" (CEDE) in reference to doses from internal exposure, "deep dose" in reference to external exposure, and "total effective dose equivalent" (TEDE) in reference to combined internal and external exposure. Annual doses totaled over all applicable exposure pathways are computed for each of a number of times after license termination for each potentially important receptor. In this analysis, annual doses were evaluated at 0, 1, and 10 years after license termination. Evaluation for other times was unnecessary because equilibrium concentrations of progeny of long-lived parent radionuclides was assumed from the outset and because neither radioactive decay nor removal in infiltration would alter radionuclide concentrations in the source within the 1,000-year duration of interest. For this assessment, the peak calculated annual dose was the quantity selected to compare against NRC criteria for unrestricted release.

The computation of nuclide concentrations in media and radiation doses associated with exposure to those media is complex, and is usually performed using computer codes designed for the purpose. The RESRAD code (Gilbert, 1989 and Yu, 1993) was selected as suitable for evaluation of all pathways in the analysis. The version used was Version 6.22; the latest available at the time the analysis was performed.

RESRAD run titles begin with the letter code assigned to each scenario. The Slag Pile Area worker scenarios coded WRR, WRR-ALE, and WC all incorporate an assumption of exposure to two sources, material on the slope and material at the top of the slope. For each of these scenarios, separate RESRAD runs (e.g., WRR1 and WRR2) were made for each source. The total dose from all exposure was computed as the sum of the doses calculated in the two RESRAD runs. Only one RESRAD run was required for each of the other scenarios evaluated.

5.0 RESULTS

Complete listings of the summary output data file for each RESRAD run are provided in Appendix B. Each output data file also lists the input data used.

The results of the RESRAD analysis of the three Slag Pile Area and two ROW area exposure scenarios intended as compliance scenarios are provided in Table 5-1. The table identifies RESRAD runs serving as the source of the results listed. Some intermediate results are included to make the detailed results more visible. As indicated in Table 5-1, ground dose contributes a large portion of the total dose for each scenario. Inhalation dose accounts for practically all of the remainder. The calculated total doses for these scenarios are presented in graphical form in Figure 5-1.

The maximum dose (TEDE) calculated for the worker placing rip-rap (WRR-P) is 3.7 mrem/y. The maximum dose (TEDE) calculated for the trespasser on the Site after license termination (TRR) is 0.02 mrem/y. The shielding provided by rip-rap minimizes the dose. A worker spending 10% of his work time in the radiological area after license termination (WRR) would receive a calculated maximum dose (TEDE) of 0.78 mrem/y. Almost all of this dose results from exposure on the top of the slope, for which no rip-rap was assumed to be present. Maximum doses (TEDE) of 0.32 mrem/y and 0.93 mrem/y were calculated for the recreational walker and worker in the River Road ROW scenarios. In summary, the maximum dose (TEDE) calculated for any of the five compliance scenarios evaluated is 3.7 mrem/y.

The results of the RESRAD analysis of the seven Slag Pile Area alternate scenarios are provided in Table 5-2. As indicated in Table 5-2, ground dose contributes a large portion of the total dose for each scenario. Inhalation dose accounts for practically all of the remainder. The calculated total doses for these scenarios are presented in graphical form in Figure 5-2.

The first set of alternate scenarios assumes no rip-rap. A worker spending 10% of his work time in the radiological area after license termination (WC) would receive a calculated maximum dose (TEDE) of 1.2 mrem/y. The maximum dose (TEDE) calculated for the trespasser on the Site after license termination (TC) is 1.4 mrem/y.

The second set of alternate scenarios assumes limited excavation. The maximum dose (TEDE) calculated for the worker participating in the excavation (WRR-LE) is 4.8 mrem/y. A worker spending 10% of his work time in the radiological area after excavation has redistributed radionuclides to the surface (WRR-ALE) would receive a calculated maximum dose (TEDE) of 1.2 mrem/y. The maximum dose (TEDE) calculated for the trespasser on the Site after license termination (TC) is 1.6 mrem/y.

The third set of alternate scenarios assumes major excavation. The maximum dose (TEDE) calculated for the worker participating in the excavation (WRR-ME) is 0.92

mrem/y. A worker spending 10% of his work time on the relocated excavated material (W-AME) would receive a calculated maximum dose (TEDE) of 2.4 mrem/y.

In summary, the maximum dose (TEDE) calculated for any of the seven alternate compliance scenarios evaluated is 4.8 mrem/y.

**TABLE 5-1
RESULTS SUMMARY
COMPLIANCE SCENARIOS**

UNIT	MAXIMUM ANNUAL DOSE mrem/y				
	SLAG PILE AREA			ROW AREA	
	CASE WRR-P Worker placing rip-rap	CASE TRR Trespasser on rip-rap	CASE WRR Worker on rip-rap	CASE RDRWWLK Walker on ROW	CASE RDRWWRK Worker on ROW
Slope-ground	3.00	0.020	0.0055		
Slope-Inhalation	0.63	0	0		
Slope-soil Ingestion	0.061	0	0		
Top-ground			0.65		
Top-Inhalation			0.059		
Top-soil Ingestions			0.070		
ROW-Ground				0.31	0.75
ROW-Inhalation				0.013	0.16
ROW-Soil Ingestion				0.0064	0.015
Disposal location					
Disposal location					
Disposal location					
Total TEDE	3.7	0.02	0.78	0.33	0.93

Ground dose is deep dose equivalent, Inhalation and soil Ingestion doses are CEDE, total is TEDE.

The 10 CFR Part 20 dose criterion for license termination with no restrictions on use is 25 mrem/y TEDE.

RESRAD run titles are based on the scenario abbreviations. Results for scenarios with exposure at both the top of the pile and on the slope are the sum of results from two RESRAD runs, one for the top and one for the slope. For example, the results for Scenario WRR represent combine results for RESRAD runs WRR1 and WRR2.

**TABLE 5-2
RESULTS SUMMARY
ALTERNATE SCENARIOS**

UNIT	MAXIMUM ANNUAL DOSE mrem/y						
	NO RIP-RAP		LIMITED SLAG PILE EXCAVATION			MAJOR EXCAVATION	
	CASE WC Worker	CASE TC Trespasser	CASE WRR-LE Worker excavating	CASE WRR-ALE Worker after excavation	CASE TRR-ALE Trespasser after excavation	CASE W-ME Worker excavating	CASE W-AME Worker on relocated material
Slope-ground	0.37	1.33	3.88	0.42	1.49	0.73	
Slope-Inhalation	0.016	0.058	0.87	0.017	0.061	0.17	
Slope-soil Ingestion	0.008	0.027	0.0019	0.011	0.038	0.017	
Top-ground	0.65			0.65			
Top-Inhalation	0.059			0.059			
Top-soil Ingestions	0.070			0.070			
ROW-Ground							
ROW-Inhalation							
ROW-Soil Ingestion							
Disposal location							2.270
Disposal location							0.11
Disposal location							0.054
Total TEDE	1.2	1.4	4.8	1.2	1.6	0.92	2.4

Ground dose is deep dose equivalent, Inhalation and soil ingestion doses are CEDE, total is TEDE.

The 10 CFR Part 20 dose criterion for license termination with no restrictions on use is 25 mrem/y TEDE.

RESRAD run titles are based on the scenario abbreviations. Results for scenarios with exposure at both the top of the pile and on the slope are the sum of results from two RESRAD runs, one for the top and one for the slope. For example, the results for Scenario WRR represent combine results for RESRAD runs WRR1 and WRR2.

FIGURE 5-1 SUMMARY OF COMPLIANCE SCENARIO RESULTS

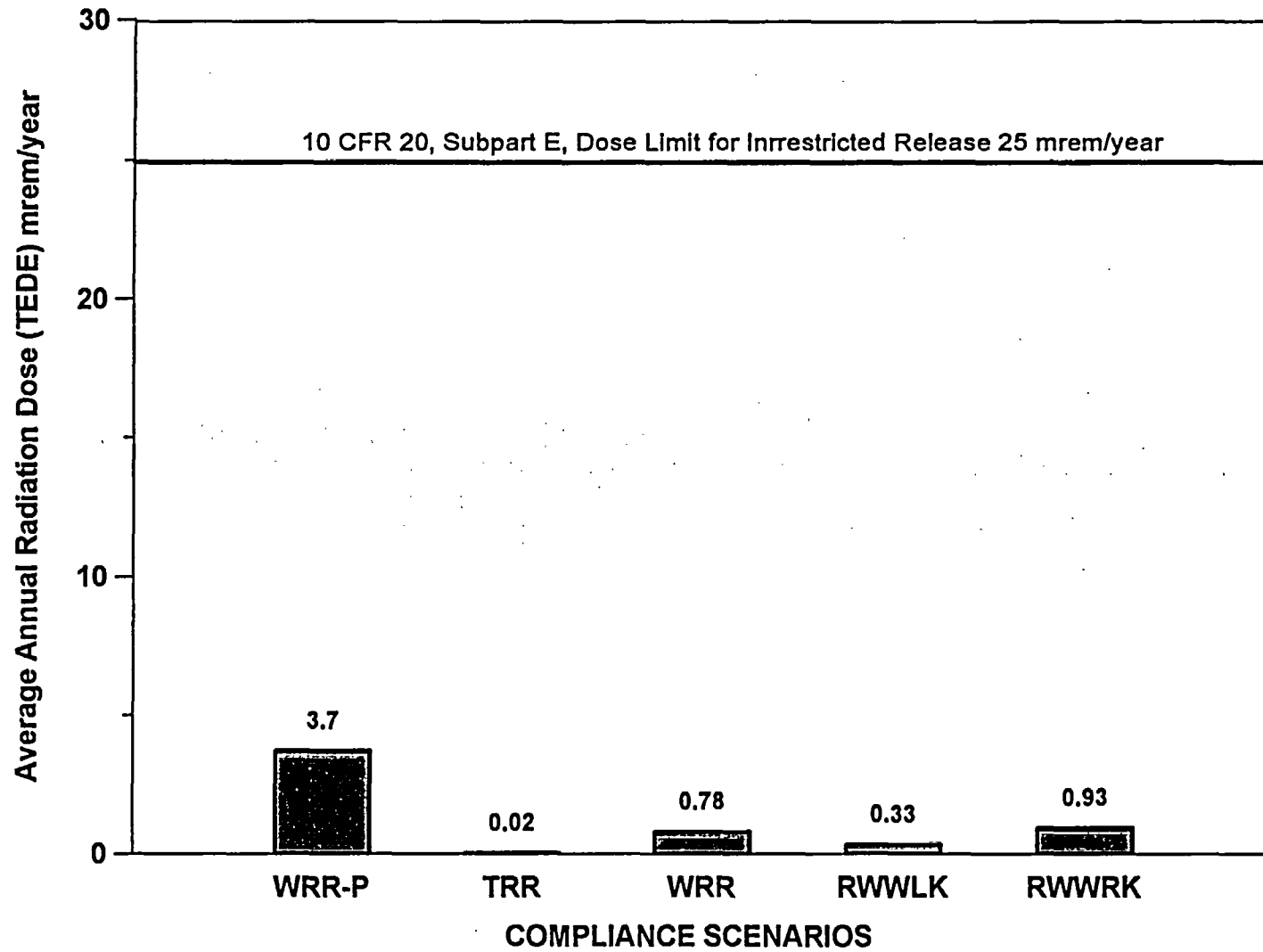
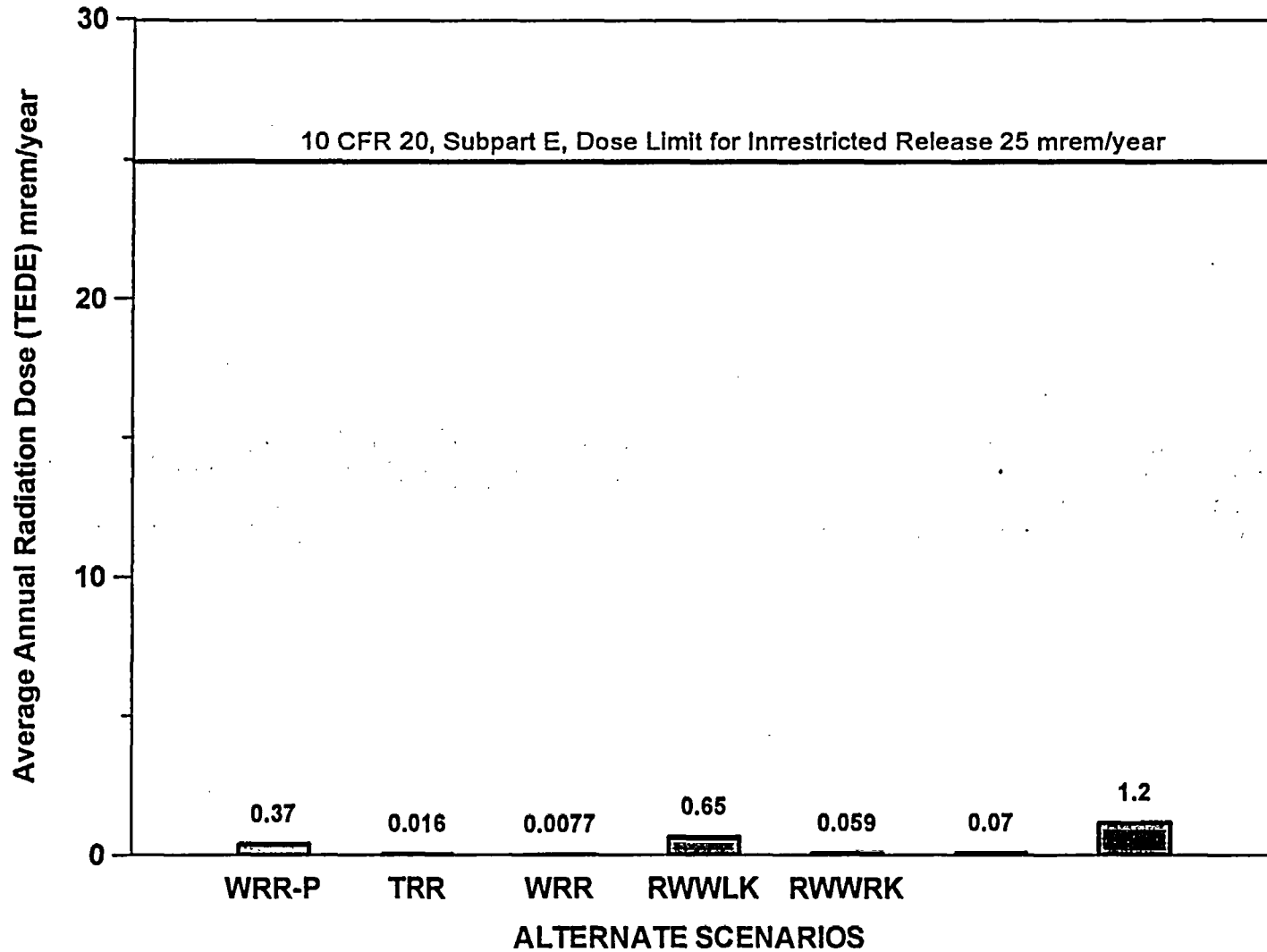


FIGURE 5-2 SUMMARY OF ALTERNATE SCENARIO RESULTS



6.0 ALARA ANALYSIS

The principle that radiation doses should be kept as low as reasonably achievable (ALARA) has been applied for many years in radiation protection. In conjunction with dose limits for workers and members of the public, application of the ALARA principle is an important element in the NRC standards for radiation protection (10 CFR Part 20). This section of the report describes an analysis designed to determine whether reduction of the concentration of uranium and thorium and progeny nuclides in soil on the Reading Site would be warranted by the ALARA principle. The methodology used in this analysis is generally consistent with current draft NRC guidance (USNRC, 2003b).

Elements of ALARA Analysis

In the context of soil remediation, ALARA analysis is fundamentally a balancing of the value of remedial action against its cost. If the expected value of the dose reduction exceeds the cost of remediation required to achieve the dose reduction, the action is warranted. The test is applied successively in a way that implements the most cost-effective actions first. When no further remedial actions are warranted by the ALARA test, remediation has reached the ALARA condition and the potential radiation dose has been reduced to a level as low as reasonably achievable.

Rigorous ALARA analysis can be complex, but ALARA analysis for situations such as the Reading soil remediation can be simplified greatly if the value of dose saved can be estimated on the conservatively high side and the cost of remediation can be estimated on the conservatively low side. If, in spite of such conservative assumptions, the cost of any proposed remediation exceeds the value of the dose expected to be saved, the ALARA condition has already been reached and no further dose reduction is warranted. If, on the other hand, the conservatively high estimated value of the dose expected to be saved exceeds the conservatively low estimate of the cost of any proposed remediation, the proposed action may be warranted. In that situation, a more rigorous analysis would be necessary to demonstrate that the ALARA point has been reached and no further dose reduction is warranted.

Value of Dose Saved

In determining the value of dose that might be saved by some candidate remedial action, the radiation dose quantity of interest is population dose, which can be thought of as an aggregate dose. It is the sum, over the future time period of interest and over the entire exposed population, of all of the individual annual doses received by each member of the exposed population. A population dose is expressed in units of person-rem. For example, ten people, each receiving 0.1 rem per year for a period of 20 years would result in a population dose of 20 person-rem.

The population dose depends upon the duration of the exposure period, the annual dose received by each person exposed, and the number of people exposed each year. Each of these factors is examined further below.

The maximum time period of interest is fixed by regulation at 1,000 years (10 CFR Part 20.1401). Shorter time periods can be considered more appropriate, and have been used in NRC environmental analyses, but for purposes of conservatism, shorter periods are not considered in this analysis. If a shorter period were to be used, the calculated aggregate dose would be less and the potential dose savings from any remedial action would be less than that calculated in this analysis. Certain scenarios, such as the worker placing rip-rap on the slag pile slope (WRR-P) and the worker in the right-of-way (RWWRK) involve total exposure periods of less than one year. Given the low calculated doses and the small number of workers likely to be involved in these scenarios, the total population dose associated with these scenarios is likely to be very small relative to population doses from scenarios involving recurring annual exposures. Therefore, these scenarios are not evaluated explicitly in this analysis.

The annual dose received by an exposed person can vary with time. However, the analysis can be simplified by conservatively assuming that the annual dose is constant with time at the maximum calculated in the 1,000-year period of interest. For purposes of this analysis, the remaining three compliance scenarios were evaluated explicitly: the trespasser on the slag pile with rip-rap (TRR), the worker on the slag pile with rip-rap (WRR), and the recreational walker in the right-of-way (RWWLK). The maximum doses calculated for these scenarios are 0.020, 0.78, and 0.33 millirem per year, respectively.

The total number of people exposed is highly site-dependent and scenario-dependent. For the Reading Site, it is unlikely that the Site slag pile will be used at all in a way that would result in doses even a small fraction of the limit for unrestricted release for reasons discussed in Section 3.0. For purposes of analysis, exposure of a small number of people can be assumed to assure that the benefits of further dose reduction are not understated. For this analysis, it is conservatively assumed that 5 trespassers and 5 workers are exposed each year. A larger number of users might be expected for the right-of-way walker, but total use would certainly be less than the equivalent of 100 persons using that area at the intensity assumed in the dose assessment.

The dose saved by a remedial action is the difference between two population doses--the population dose without the proposed remedial action less the population dose residual after implementation of the remedial action. The analysis can be simplified greatly if the population dose after remedial action is conservatively assumed to be zero (i.e., the remedial action is assumed to be entirely effective in eliminating the potential for radiation exposure). This assumption results in the maximum possible dose savings. Any more realistic estimate of potential dose savings from any remedial action can only be less, and, consequently, its value can only be less. With this simplification, it is possible to derive a conservatively high estimate of the expected dose to be saved from

further remedial action by calculating only one population dose--the population dose based on the assumption that no further remedial action occurs.

The discussion of the benefit of remedial action has thus far focused on the dose saved. However, for ALARA analysis, the value of dose saved and the cost of remedial action must be expressed in the same units (monetary units). NRC has provided guidance for estimating the monetary value of population dose saved (USNRC, 1995b and USNRC, 1995c). These documents establish the value of a person-rem for purposes of ALARA analysis at \$2,000, and provide guidance for accommodating the differences in the time distributions of benefits realized from dose savings and costs incurred in remedial action.

In the context of this analysis, in which the value of dose saving is realized at a relatively low rate over a large portion of the time period of interest and the costs of remedial action are incurred entirely at the beginning of the time period, NRC guidance recommends consideration of the use of the present value of dose savings in the ALARA balance against remedial action costs. For periods of interest less than about 100 years, NRC recommends use of a 7% per year discount rate in valuing future dose savings. For longer periods, NRC recommends two approaches: (1) calculation of the value of dose savings on a present worth basis using a discount rate of 3% per year, and (2) displaying benefits and costs at the time they occur, with no present value conversion. For a time period of 1,000 years and a constant annual dose, the first approach is equivalent to using an undiscounted value of a person-rem of approximately \$70. For the conservative assumption, noted above, of a constant annual dose with time, the realization of the value of dose savings can be considered to occur at a rate constant with time.

The above discussion leads to a simple algorithm for deriving a conservatively high estimate of the value of dose savings from reducing the concentration of radionuclides in soil. The value estimate in present value dollars is the product of the number of people exposed each year, the annual dose to each (expressed in rem), the time period of interest (1,000 years), and the monetary value of a person-rem (\$70, as described above).

Cost of Remedial Action

The second part of the ALARA analysis usually involves identification of candidate remedial actions and estimation of costs for each. In this more simple case, detailed cost estimates for candidate remedial actions are not necessary, because, as shown below, the dose to be saved is so low at the outset that its value is not sufficient to warrant any remedial action.

ALARA Analysis and Conclusions

ALARA analyses performed as described above can be summarized in the equations below:

$$B = N \times D \times T \times V / (1000)$$

Equation 1

Where

B is the benefit of dose saved in terms of dollars per square meter remediated,

N is the number of people exposed each year, 5 slag pile trespassers, 5 slag pile workers, and 5 right-of-way walkers, as noted above,

D is the constant annual dose, 0.020 mrem/y (TEDE) per trespasser and 0.78 mrem/y (TEDE) per worker, and 0.33 mrem/y per walker

T is the aggregation time, 1,000 years,

V is the value of 1 person-rem dose savings, \$70, as described above,

1000 is the number of mrem per rem.

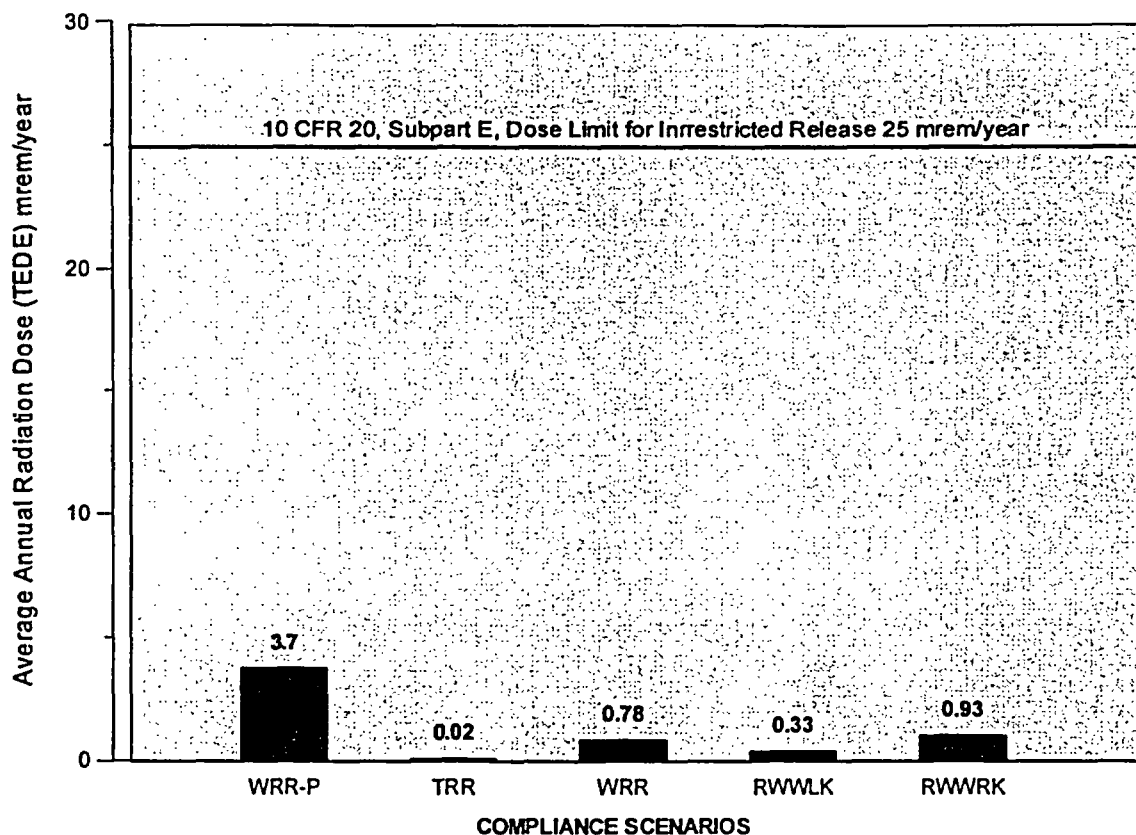
The use of Equation 1 to calculate the maximum potential benefit of any candidate remedial action results in a benefit value of \$7 and \$270, respectively for scenarios TRR and WRR, and \$2,300 for scenario RWWLK. Detailed cost analysis is not required to conclude that no remedial action could result in a significant dose reduction for a cost as little as \$2,300. Therefore, remedial action for further reduction is not warranted by the ALARA principle.

7.0 RADIOLOGICAL ASSESSMENT CONCLUSIONS

Detailed results of the radiological assessment are provided and discussed in Section 5.0. In summary, results from the analysis of the compliance scenarios show that the maximum radiation dose that might be expected from unrestricted use of the Site is far below the 10 CFR Part 20 limit, 25 mrem/year (TEDE) for release with unrestricted use. Specifically, the maximum dose (TEDE) calculated for the Slag Pile Area worker installing rip-rap is 3.7 mrem/y. After rip-rap installation, a trespasser would receive a maximum dose (TEDE) of 0.020 mrem/y. A worker spending 10% of his work time in the Slag Pile Area with rip-rap installed would receive a maximum dose (TEDE) of 0.78 mrem/y. A recreational walker in the ROW Area would receive a maximum dose (TEDE) of 0.33 mrem/y. A worker in the ROW Area would receive a maximum dose (TEDE) of 0.93 mrem/y. Those results are summarized below:

COMPLIANCE SCENARIOS	
CASE	MAXIMUM ANNUAL TOTAL DOSE (mrem/y TEDE)
SLAG PILE	
Slag Pile; Worker installing rip-rap (WRR-P)	3.7
Slag Pile with Rip-Rap; Trespasser (TRR)	0.020
Slag Pile with Rip-Rap; Worker (WRR)	0.78
RIGHT-OF-WAY	
ROW; Walker, Current Conditions (RWWLK)	0.33
ROW; Worker, Current Conditions (RWWRK)	0.93
The 10 CFR Part 20 dose criterion for license termination with no restrictions on use is 25 mrem/y.	

MAXIMUM ANNUAL RADIATION DOSE (TEDE) RESULTS - SUMMARY



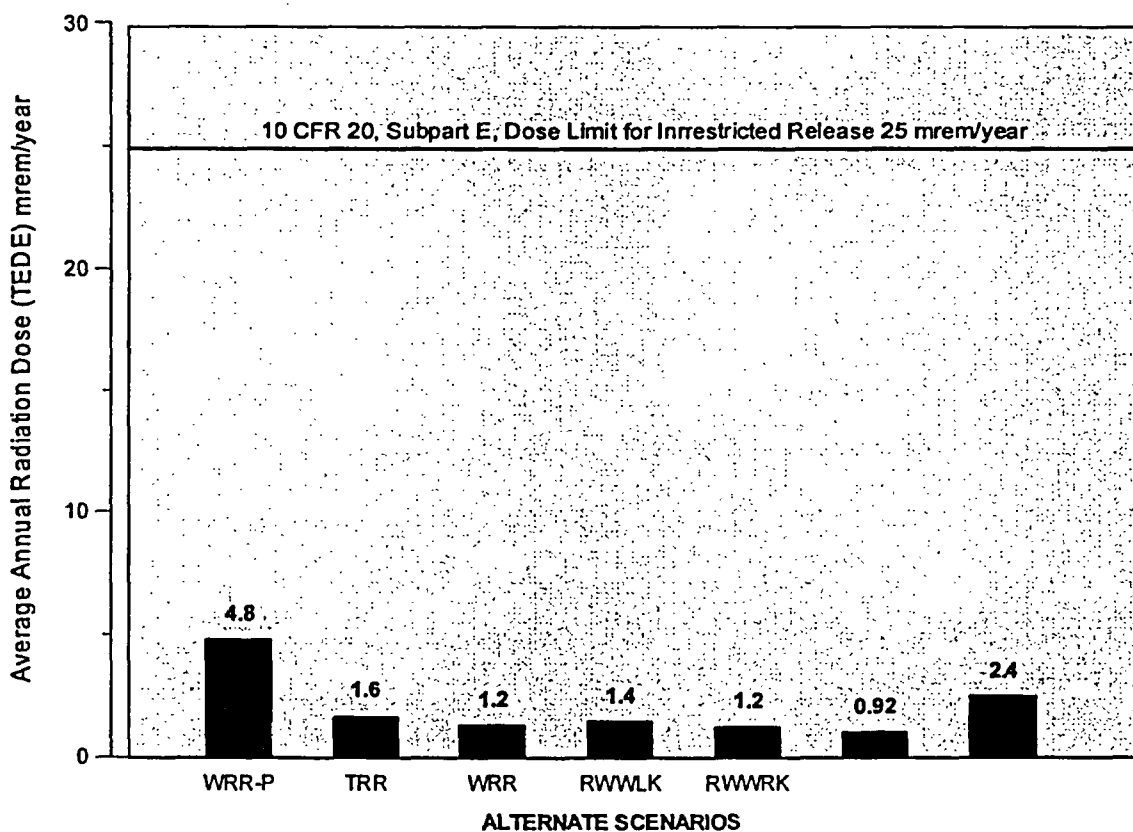
These calculated doses represent the maximum likely doses that might result from unrestricted use of the Site.

The maximum dose (TEDE) calculated for all scenarios is 3.7 mrem/y, substantially less than the 10 CFR Part 20 limit of 25 mrem/y.

Though not subject to the 10 CFR Part 20 Subpart E limit, results from the analysis of the alternate scenarios also fall below the limit for release with unrestricted use, 25 mrem/year (TEDE). Specifically, the maximum doses (TEDE) calculated for the Slag Pile Area trespasser and worker under current conditions with no rip-rap are 1.4 mrem/y and 1.2 mrem/y, respectively. For the limited excavation scenarios, the maximum dose (TEDE) calculated for the excavation worker is 4.8 mrem/y. The maximum doses (TEDE) calculated for the trespasser and worker after excavation are 1.6 mrem/y and 1.2 mrem/y, respectively. For the major excavation scenarios, the maximum dose (TEDE) calculated for the excavation worker is 0.92 mrem/y and the maximum dose (TEDE) calculated for the worker exposed to material relocated following major excavation is 2.4 mrem/y. These results are summarized below:

ALTERNATE SCENARIOS

CASE	MAXIMUM ANNUAL TOTAL DOSE (mrem/y TEDE)
CURRENT CONDITIONS (NO RIP-RAP)	
Slag Pile; Trespasser (TC)	1.4
Slag Pile; Worker (WC)	1.2
SLAG PILE—LIMITED EXCAVATION	
Slag Pile: Worker in limited excavation (WRR-LE)	4.8
Slag Pile: Trespasser after limited excavation (TRR-LE)	1.6
Slag Pile: Worker after limited excavation (WRR-LE)	1.2
SLAG PILE—MAJOR EXCAVATION	
Slag Pile: Worker in major excavation (W-ME)	0.92
Slag Pile: Worker after major excavation (W-AME)	2.4
The 10 CFR Part 20 dose criterion for license termination with no restrictions on use is 25 mrem/y.	



An ALARA analysis was also performed, as described in section 6. The ALARA analysis shows that no remedial action is warranted by the ALARA principle to reduce doses further.

The maximum calculated annual doses (TEDE) are below the limit for release with unrestricted use. Calculated doses for alternate scenarios, though not subject to the same limit, are also comparably low. The ALARA analysis shows that no further remedial action is warranted. Consequently, the Site qualifies for license termination with no restrictions on use.

8.0 REFERENCES

Beyeler, 1998a. Review of Parameter Data for the NUREG/CR-5512 Building Occupancy Scenario and Probability Distributions for the DanD Parameter Analysis, Beyeler, W.E., Hareland, S.C., Duran, F.A., Kalinina, E., Gallegos, D.P., and Davis, P.A., Letter Report for NRC Project JCN W6227, Sandia National Laboratories, January 30, 1998.

Beyeler, 1998b. Review of Parameter Data for the NUREG/CR-5512 Residential Farmer Scenario and Probability Distributions for the DanD Parameter Analysis, Beyeler, W.E., Brown, T.J., Hareland, S.C., Olague, N., Brosseau, D., Kalinina, E., Gallegos, D.P., and Davis, P.A., Letter Report for NRC Project JCN W6227, Sandia National Laboratories, January 30, 1998.

Cabot, 1996a. Letter from Cabot Performance Materials to the U.S. Nuclear Regulatory Commission, April 4, 1996.

Cabot, 1996b. Letter from Cabot Performance Materials to the U.S. Nuclear Regulatory Commission, July 11, 1996.

Cabot, 1996c. Letter from Cabot Performance Materials to the U.S. Nuclear Regulatory Commission, September 12, 1996.

Cabot, 1996d. Letter from Cabot Performance Materials to the U.S. Nuclear Regulatory Commission, November 6, 1996.

Cabot, 2002. Letter and attachments from Mr. Wayne M. Reiber, Cabot Corporation, to Mr. Larry Camper, U.S. Nuclear Regulatory Commission, November 21, 2002.

ERM, 1996, *Leaching analysis for Uranium and Thorium for the Reading Slag Pile*, An attachment to a letter from Anthony Campitelli (Cabot) to Judith M. Greenwald (NRC), Re: Characterization of Reading Slag Pile – Leach Rate Methodology, September 12, 1996.

FR, 1997. "Radiological Criteria for License Termination; Final Rule," *Federal Register*, 62, pp. 38897-39100, July 21, 1997.

Gilbert, 1989. Gilbert, T.L., Yu, C., Yuan, Y.C., Zielen, A.J., Jusko, M.J., and Wallo, A., "A Manual for Implementing Residual Radioactive Material Guidelines," ANL/ES-160, Argonne National Laboratory, Argonne, Illinois, June 1989.

NES, 1995. "Final Decommissioning Report for the Main Process Building and Surrounding Area, Reading, Pennsylvania," Prepared for Cabot Corporation, May 1995.

NES, 1996a. "Characterization Report for the Reading Slag Pile," Revision 1, NES, Ind./IES, Danbury, Connecticut, April 1996.

NES, 1996b. Letter from K. Craig, NES, to J. Greenwald, U.S. NRC regarding changes to the Characterization Report for the Reading slag pile, NES, Ind./IES, Danbury, Connecticut, April 22, 1996.

STEP, 1997. "Hydrologic and Geologic Assessment for the Reading, Pennsylvania Slag Pile Site" for Cabot Corporation, ST Environmental Professionals, Inc., November 12, 1997.

STEP, 1999. "Report on Topographic and Radiological Surveys—Reading Slag Pile Site," ST Environmental Professionals, Inc., January 25, 1999.

STEP, 2005. "Decommissioning Plan for the Reading, Pennsylvania Site, Revision 2" for Cabot Corporation, ST Environmental Professionals, Inc., May 2005.

USEPA, 1988. "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion," Federal Guidance Report No. 11, EPA-520/1-88-020, U.S. Environmental Protection Agency, Washington, D.C., September, 1988.

USNRC, 1995a, Letter from Robert C. Hogg (USNRC) to Anthony Campitelli (Cabot), August 18, 1995.

USNRC, 1995b. "Reassessment of NRC's Dollar Per Person-Rem Conversion Factor Policy," NUREG-1530, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, December 1995.

USNRC, 1995c. "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission," NUREG/BR-0058 Revision 2, U.S. Nuclear Regulatory Commission, November 1995.

USNRC, 1996. Letter from U.S. Nuclear Regulatory Commission to Cabot Performance Materials, October 25, 1996.

USNRC, 1997. Letter from U.S. Nuclear Regulatory Commission to Cabot Performance Materials, March 12, 1997.

USNRC, 2003a. Consolidated NMSS Decommissioning Guidance—Decommissioning Process for Materials Licensees, Smith, T.B., Banovac, K.L., McCann, J.D., Parrott, J.C., Shepherd, J.C., and Sobel, P.A., U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards, Division of Waste Management, NUREG-1757, Vol. 1, Revision 1, September, 2003.

USNRC, 2003b. Consolidated NMSS Decommissioning Guidance—Characterization, Survey, and Determination of Radiological Criteria, Schmidt, D.W. Kottan, J.J., McKenney, C.A. and Schneider, S., U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards, Division of Waste Management, NUREG-1757, Vol 2, September, 2003.

USNRC, 2004. Results of the License Termination Rule Analysis, U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards, Office of Nuclear Reactor Regulation, NRC Regulatory Issue Summary 2004-08, May 28, 2004.

Yu, 1993a. Yu, C., Zielen, A.J., Cheng, J. -J., Yuan, Y.C., Jones, L.G., LePoire, D.J., Wang, Y.Y., Loureiro, C.O., Gnanapragasam, E., Faillace, E., Wallo, A., Williams, W.A., Peterson, H., "Manual for Implementing Residual Radioactive Material Guidelines Using RESRAD, Version 5.0," ANL/EA/RP-81333, Argonne National Laboratory, Argonne, Illinois, September, 1993.

Yu, 1993b. Yu, C., Cheng, J. -J., Jones, L.G., Wang, Y.Y., E., Faillace, E., Loureiro, C., Chia, Y.P., "Data Collection Handbook to Support Modeling the Impacts of Radioactive Material in Soil," ANL/EAS-8, Argonne National Laboratory, Argonne, Illinois, April 1993.

APPENDIX A
LEACH TEST RESULTS

PROJECT NUMBER 1295073V L202
FIELD GROUP RMESB2

PROJECT NAME NES
LAB COORDINATOR JEFF SHAMLS

PARAMETER:	URANIUM		THORIUM DECAY PRODUCTS			
	U		AC-228	BI-212	PS-212	TL-208
	UNITS:	AS RECEIVED	PCI/G DRIED	PCI/G DRIED	PCI/G DRIED	PCI/G DRIED

FLD.GRP. #* SAMPLE ID* DATE

RDSLAG1

RMESB2	ID	DATE	U	AC-228	BI-212	PS-212	TL-208
RMESB2	1	RDSLAG1 11/07/95	676	316 +/- 2.43	2.17 +/- 0.153	297 +/- 1.58	105 +/- 0.976
RMESB2	11	RDS-OXSU4 11/07/95	6.90	NRQ	NRQ	NRQ	NRQ
RMESB2	21	RDS-OXSU6 11/07/95	1.68	NRQ	NRQ	NRQ	NRQ
RMESB2	31	RDS-OXSU7 11/07/95	8.93	NRQ	NRQ	NRQ	NRQ
RMESB2	41	RDS-RAU 11/07/95	1.81	NRQ	NRQ	NRQ	NRQ
RMESB2	51	RDS-SAU 11/07/95	0.201	NRQ	NRQ	NRQ	NRQ
RMESB2	61	RDS-TAU 11/07/95	85.8	NRQ	NRQ	NRQ	NRQ

RVSLAG1

RMESB2	ID	DATE	U	AC-228	BI-212	PS-212	TL-208
RMESB2	2	RVSLAG1 11/07/95	220	10.8 +/- 0.666	6.62 +/- 1.31	9.61 +/- 0.390	3.82 +/- 0.237
RMESB2	12	RVS-OXSU4 11/07/95	0.031	NRQ	NRQ	NRQ	NRQ
RMESB2	22	RVS-OXSU6 11/07/95	0.052	NRQ	NRQ	NRQ	NRQ
RMESB2	32	RVS-OXSU7 11/07/95	0.081	NRQ	NRQ	NRQ	NRQ
RMESB2	42	RVS-RAU 11/07/95	0.128	NRQ	NRQ	NRQ	NRQ
RMESB2	52	RVS-SAU 11/07/95	0.034	NRQ	NRQ	NRQ	NRQ
RMESB2	62	RVS-TAU 11/07/95	0.824	NRQ	NRQ	NRQ	NRQ

RSP#41

RMESB2	ID	DATE	U	AC-228	BI-212	PS-212	TL-208
RMESB2	3	RSP#41 11/07/95	49.6	37.5 +/- 0.964	<0.276 +/- 0.061	39.3 +/- 0.699	12.8 +/- 0.413
RMESB2	43	RSP-RAU 11/07/95	0.186	NRQ	NRQ	NRQ	NRQ
RMESB2	53	RSP-SAU 11/07/95	0.826	NRQ	NRQ	NRQ	NRQ
RMESB2	63	RSP-TAU 11/07/95	8.13	NRQ	NRQ	NRQ	NRQ

*EST Samples 1-3 received from NES.

Others numbers setup in-house to document results of RAU/SAU/TAU and oxidation-state determinations.

**IDs of OXSU1 = Oxidation State of Uranium where 1 = 4, 6, or Total.

APPENDIX B
RESRAD RESULTS

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Summary : RWWLK-WALKER IN RIGHT-OF-WAY File: RWWLK.RAD

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

0 Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(3)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(4)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(5)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(11)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(3)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(4)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(10)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(11)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)

D-34					
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)	
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)	
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)	
D-34					
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)	
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)	
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)	

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 Summary : RWWLK-WALKER IN RIGHT-OF-WAY File: RWWLK.RAD

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

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5				
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)

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 Summary : RWWLK-WALKER IN RIGHT-OF-WAY File: RWWLK.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)

File: FGR 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)

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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)	2.000E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICKO
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+01	3.000E+00	---	T(3)
R011	Times for calculations (yr)	not used	1.000E+01	---	T(4)
R011	Times for calculations (yr)	not used	3.000E+01	---	T(5)
R011	Times for calculations (yr)	not used	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	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	2.330E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	2.330E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	5.000E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.000E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	7.500E+00	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-228	7.500E+00	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-230	5.000E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-232	7.500E+00	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): U-234	5.000E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-235	2.330E-01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	5.000E+00	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVERO
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP

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Site-Specific Parameter Summary (continued)					
0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	1.000E+03	2.000E+01	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+03	1.000E+02	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)

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Site-Specific Parameter Summary (continued)					
0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(4)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(5)

R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

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Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	1.240E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	1.900E-03	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)

R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (if different from user input)	Parameter Name
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFIS
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFIS
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWIS
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWIS
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAH

C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSX
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSX
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E-01	---	CO2F

STOR Storage times of contaminated foodstuffs (days):
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	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	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

Summary : RWWLK-WALKER IN RIGHT-OF-WAY

File: RWWLK.RAD

Contaminated Zone Dimensions

Initial Soil Concentrations, pCi/g

Area: 2000.00 square meters
 Thickness: 2.00 meters
 Cover Depth: 0.00 meters

Ac-227 2.330E-01
 Pa-231 2.330E-01
 Pb-210 5.000E+00
 Ra-226 5.000E+00
 Ra-228 7.500E+00
 Th-228 7.500E+00
 Th-230 5.000E+00
 Th-232 7.500E+00
 U-234 5.000E+00
 U-235 2.330E-01
 U-238 5.000E+00

0

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years): 0.000E+00 1.000E+00 1.000E+01

TDOSE(t): 3.284E-01 3.284E-01 3.281E-01

M(t): 1.314E-02 1.314E-02 1.313E-02

OMaximum TDOSE(t): 3.284E-01 mrem/yr at t = 0.000E+00 years

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Summary : RWWLK-WALKER IN RIGHT-OF-WAY

File: RWWLK.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	8.002E-04	0.0024	1.041E-03	0.0032	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.354E-04	0.0007
Pa-231	9.061E-05	0.0003	2.181E-04	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.750E-04	0.0005
Pb-210	5.370E-05	0.0002	7.715E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.482E-03	0.0076
Ra-226	9.655E-02	0.2940	3.024E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.998E-04	0.0015
Ra-228	9.322E-02	0.2839	2.946E-04	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.705E-04	0.0023
Th-228	1.109E-01	0.3378	1.466E-03	0.0045	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.525E-04	0.0011
Th-230	3.161E-05	0.0001	1.101E-03	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.901E-04	0.0006
Th-232	5.336E-03	0.0162	8.322E-03	0.0253	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.466E-03	0.0045
U-234	3.583E-06	0.0000	4.458E-04	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.812E-05	0.0003
U-235	3.095E-04	0.0009	1.936E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.316E-06	0.0000
U-238	1.312E-03	0.0040	3.985E-04	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.327E-05	0.0003
Total	3.086E-01	0.9398	1.341E-02	0.0408	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.367E-03	0.0194

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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	2.077E-03	0.0063
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	4.838E-04	0.0015
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	2.613E-03	0.0080
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	9.708E-02	0.2956
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	9.429E-02	0.2871
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	1.128E-01	0.3433
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	1.323E-03	0.0040
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	1.512E-02	0.0460
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	5.475E-04	0.0017
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	3.331E-04	0.0010
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	1.804E-03	0.0055
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	3.284E-01	1.0000

*Sum of all water independent and dependent pathways.

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	7.750E-04	0.0024	1.008E-03	0.0031	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.280E-04	0.0007
Pa-231	1.157E-04	0.0004	2.507E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.824E-04	0.0006
Pb-210	5.205E-05	0.0002	7.478E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.406E-03	0.0073
Ra-226	9.650E-02	0.2938	3.259E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.755E-04	0.0018
Ra-228	1.143E-01	0.3480	6.794E-04	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.835E-04	0.0024
Th-228	7.722E-02	0.2351	1.021E-03	0.0031	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.454E-04	0.0007
Th-230	7.342E-05	0.0002	1.101E-03	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.904E-04	0.0006
Th-232	1.799E-02	0.0548	8.382E-03	0.0255	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.560E-03	0.0048
U-234	3.583E-06	0.0000	4.458E-04	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.811E-05	0.0003
U-235	3.094E-04	0.0009	1.936E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.319E-06	0.0000
U-238	1.312E-03	0.0040	3.985E-04	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.326E-05	0.0003
Total	3.086E-01	0.9398	1.341E-02	0.0408	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.367E-03	0.0194

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	2.011E-03	0.0061
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	5.487E-04	0.0017
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	2.532E-03	0.0077
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	9.710E-02	0.2957
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	1.157E-01	0.3524
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	7.848E-02	0.2390
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	1.365E-03	0.0042
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	2.793E-02	0.0851
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	5.475E-04	0.0017
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	3.331E-04	0.0010
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	1.804E-03	0.0055
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	3.284E-01	1.0000

*Sum of all water independent and dependent pathways.

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Summary : RWMLK-WALKER IN RIGHT-OF-WAY

File: RWMLK.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	5.812E-04	0.0018	7.561E-04	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.710E-04	0.0005
Pa-231	3.083E-04	0.0009	5.012E-04	0.0015	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.388E-04	0.0007
Pb-210	3.930E-05	0.0001	5.646E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.816E-03	0.0055
Ra-226	9.602E-02	0.2926	5.061E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.158E-03	0.0035
Ra-228	7.321E-02	0.2231	6.871E-04	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.745E-04	0.0011
Th-228	2.962E-03	0.0090	3.915E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.412E-06	0.0000
Th-230	4.487E-04	0.0014	1.101E-03	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.938E-04	0.0006
Th-232	1.332E-01	0.4059	9.355E-03	0.0285	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.204E-03	0.0067
U-234	3.600E-06	0.0000	4.453E-04	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.801E-05	0.0003
U-235	3.091E-04	0.0009	1.941E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.354E-06	0.0000
U-238	1.311E-03	0.0040	3.980E-04	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.315E-05	0.0003
Total	3.084E-01	0.9397	1.341E-02	0.0409	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.361E-03	0.0194

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

Radio- Nuclide	Water		Fish		Radon		Water Dependent Pathways 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	1.508E-03	0.0046
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	1.048E-03	0.0032
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	1.912E-03	0.0058
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	9.723E-02	0.2963
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	7.427E-02	0.2263
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	3.010E-03	0.0092
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	1.744E-03	0.0053
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	1.447E-01	0.4411
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	5.469E-04	0.0017
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	3.328E-04	0.0010
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	1.802E-03	0.0055

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 3.281E-01 1.0000

0*Sum of all water independent and dependent pathways.

1RESRAD, Version 6.22 T_{1/2} Limit = 0.5 year 02/24/2005 14:23 Page 15
Summary : RWWLK-WALKER IN RIGHT-OF-WAY File: RWWLK.RAD

Dose/Source Ratios Summed Over All Pathways

Parent and Progeny Principal Radionuclide Contributions Indicated

Parent Product Branch DSR(j,t) (mrem/yr)/(pCi/g)
(i) (j) Fraction* t= 0.000E+00 1.000E+00 1.000E+01

Ac-227	Ac-227	1.000E+00	8.912E-03	8.632E-03	6.474E-03
OPa-231	Pa-231	1.000E+00	1.934E-03	1.933E-03	1.931E-03
Pa-231	Ac-227	1.000E+00	1.426E-04	4.218E-04	2.569E-03
Pa-231	DSR(j)		2.076E-03	2.355E-03	4.499E-03
OPb-210	Pb-210	1.000E+00	5.226E-04	5.065E-04	3.824E-04
ORa-226	Ra-226	1.000E+00	1.941E-02	1.940E-02	1.930E-02
Ra-226	Pb-210	1.000E+00	8.162E-06	2.414E-05	1.472E-04
Ra-226	DSR(j)		1.942E-02	1.942E-02	1.945E-02
ORa-228	Ra-228	1.000E+00	9.800E-03	8.686E-03	2.932E-03
Ra-228	Th-228	1.000E+00	2.772E-03	6.745E-03	6.971E-03
Ra-228	DSR(j)		1.257E-02	1.543E-02	9.903E-03
OTH-228	Th-228	1.000E+00	1.503E-02	1.046E-02	4.014E-04
OTH-230	Th-230	1.000E+00	2.604E-04	2.604E-04	2.603E-04
Th-230	Ra-226	1.000E+00	4.204E-06	1.261E-05	8.804E-05
Th-230	Pb-210	1.000E+00	1.182E-09	8.198E-09	3.537E-07
Th-230	DSR(j)		2.646E-04	2.730E-04	3.487E-04
OTH-232	Th-232	1.000E+00	1.298E-03	1.298E-03	1.298E-03
Th-232	Ra-228	1.000E+00	6.026E-04	1.715E-03	7.463E-03
Th-232	Th-228	1.000E+00	1.159E-04	7.109E-04	1.054E-02
Th-232	DSR(j)		2.017E-03	3.724E-03	1.930E-02
OU-234	U-234	1.000E+00	1.095E-04	1.095E-04	1.094E-04
U-234	Th-230	1.000E+00	1.172E-09	3.515E-09	2.459E-08
U-234	Ra-226	1.000E+00	1.262E-11	8.829E-11	4.166E-09
U-234	Pb-210	1.000E+00	2.664E-15	3.968E-14	1.146E-11
U-234	DSR(j)		1.095E-04	1.095E-04	1.094E-04
OU-235	U-235	1.000E+00	1.430E-03	1.430E-03	1.428E-03
U-235	Pa-231	1.000E+00	2.046E-08	6.136E-08	4.290E-07
U-235	Ac-227	1.000E+00	1.008E-09	6.995E-09	3.014E-07
U-235	DSR(j)		1.430E-03	1.430E-03	1.429E-03
OU-238	U-238	1.000E+00	3.608E-04	3.608E-04	3.604E-04
U-238	U-234	1.000E+00	1.552E-10	4.656E-10	3.255E-09
U-238	Th-230	1.000E+00	1.107E-15	7.751E-15	3.662E-13
U-238	Ra-226	1.000E+00	8.941E-18	1.341E-16	4.141E-14
U-238	Pb-210	1.000E+00	1.512E-21	4.661E-20	8.685E-17
U-238	DSR(j)		3.608E-04	3.608E-04	3.604E-04

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).

The DSR includes contributions from associated (half-life < 0.5 yr) daughters.

1RESRAD, Version 6.22 T_{1/2} Limit = 0.5 year 02/24/2005 14:23 Page 16
Summary : RWWLK-WALKER IN RIGHT-OF-WAY File: RWWLK.RAD

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

ONuclide (i)	t= 0.000E+00	1.000E+00	1.000E+01
Ac-227	2.805E+03	2.896E+03	3.862E+03
Pa-231	1.204E+04	1.062E+04	5.556E+03
Pb-210	4.784E+04	4.936E+04	6.537E+04
Ra-226	1.288E+03	1.287E+03	1.286E+03
Ra-228	1.989E+03	1.620E+03	2.525E+03
Th-228	1.663E+03	2.389E+03	6.229E+04
Th-230	9.450E+04	9.158E+04	7.169E+04
Th-232	1.240E+04	6.712E+03	1.295E+03
U-234	2.283E+05	2.283E+05	2.286E+05
U-235	1.749E+04	1.749E+04	1.750E+04
U-238	6.928E+04	6.929E+04	6.937E+04

0

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

ONuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin) (pCi/g)	G(i,tmin) (pCi/g)	DSR(i,tmax) (pCi/g)	G(i,tmax) (pCi/g)
Ac-227	2.330E-01	0.000E+00	8.912E-03	2.805E+03	8.912E-03	2.805E+03
Pa-231	2.330E-01	1.000E+01	4.499E-03	5.556E+03	2.076E-03	1.204E+04
Pb-210	5.000E+00	0.000E+00	5.226E-04	4.784E+04	5.226E-04	4.784E+04
Ra-226	5.000E+00	1.000E+01	1.945E-02	1.286E+03	1.942E-02	1.288E+03
Ra-228	7.500E+00	2.714 n 0.005	1.687E-02	1.482E+03	1.257E-02	1.989E+03
Th-228	7.500E+00	0.000E+00	1.503E-02	1.663E+03	1.503E-02	1.663E+03
Th-230	5.000E+00	1.000E+01	3.487E-04	7.169E+04	2.646E-04	9.450E+04
Th-232	7.500E+00	1.000E+01	1.930E-02	1.295E+03	2.017E-03	1.240E+04
U-234	5.000E+00	0.000E+00	1.095E-04	2.283E+05	1.095E-04	2.283E+05
U-235	2.330E-01	0.000E+00	1.430E-03	1.749E+04	1.430E-03	1.749E+04
U-238	5.000E+00	0.000E+00	3.608E-04	6.928E+04	3.608E-04	6.928E+04

1RESRAD, Version 6.22 T_e Limit = 0.5 year 02/24/2005 14:23 Page 17
Summary : RWWLK-WALKER IN RIGHT-OF-WAY File: RWWLK.RAD

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

ONuclide Parent (j)	Parent (i)	BRF(i)	DOSE(j,t), mrem/yr t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	2.077E-03 2.011E-03 1.508E-03
Ac-227	Pa-231	1.000E+00	3.323E-05 9.828E-05 5.985E-04
Ac-227	U-235	1.000E+00	2.350E-10 1.630E-09 7.023E-08
Ac-227	DOSE(j)		2.110E-03 2.109E-03 2.107E-03
OPa-231	Pa-231	1.000E+00	4.505E-04 4.505E-04 4.498E-04
Pa-231	U-235	1.000E+00	4.766E-09 1.430E-08 9.995E-08
Pa-231	DOSE(j)		4.505E-04 4.505E-04 4.499E-04
OPb-210	Pb-210	1.000E+00	2.613E-03 2.532E-03 1.912E-03
Pb-210	Ra-226	1.000E+00	4.081E-05 1.207E-04 7.361E-04
Pb-210	Th-230	1.000E+00	5.909E-09 4.099E-08 1.769E-06
Pb-210	U-234	1.000E+00	1.332E-14 1.984E-13 5.731E-11
Pb-210	U-238	1.000E+00	7.560E-21 2.331E-19 4.343E-16
Pb-210	DOSE(j)		2.654E-03 2.653E-03 2.650E-03
ORa-226	Ra-226	1.000E+00	9.704E-02 9.698E-02 9.649E-02
Ra-226	Th-230	1.000E+00	2.102E-05 6.305E-05 4.402E-04
Ra-226	U-234	1.000E+00	6.308E-11 4.415E-10 2.083E-08
Ra-226	U-238	1.000E+00	4.471E-17 6.705E-16 2.071E-13
Ra-226	DOSE(j)		9.706E-02 9.705E-02 9.693E-02
ORa-228	Ra-228	1.000E+00	7.350E-02 6.515E-02 2.199E-02
Ra-228	Th-232	1.000E+00	4.519E-03 1.287E-02 5.598E-02
Ra-228	DOSE(j)		7.802E-02 7.801E-02 7.796E-02
OTh-228	Ra-228	1.000E+00	2.079E-02 5.059E-02 5.228E-02
Th-228	Th-228	1.000E+00	1.128E-01 7.848E-02 3.010E-03
Th-228	Th-232	1.000E+00	8.690E-04 5.332E-03 7.903E-02
Th-228	DOSE(j)		1.344E-01 1.344E-01 1.343E-01
OTh-230	Th-230	1.000E+00	1.302E-03 1.302E-03 1.302E-03

Th-230	U-234	1.000E+00	5.859E-09	1.758E-08	1.230E-07
Th-230	U-238	1.000E+00	5.537E-15	3.875E-14	1.831E-12
Th-230	DOSE(j)		1.302E-03	1.302E-03	1.302E-03
OTH-232	Th-232	1.000E+00	9.736E-03	9.736E-03	9.735E-03
OU-234	U-234	1.000E+00	5.475E-04	5.474E-04	5.468E-04
U-234	U-238	1.000E+00	7.761E-10	2.328E-09	1.628E-08
U-234	DOSE(j)		5.475E-04	5.474E-04	5.468E-04
OU-235	U-235	1.000E+00	3.331E-04	3.331E-04	3.327E-04
OU-238	U-238	1.000E+00	1.804E-03	1.804E-03	1.802E-03

BRF(i) is the branch fraction of the parent nuclide.

1RESRAD, Version 6.22 T₀ Limit = 0.5 year 02/24/2005 14:23 Page 18
Summary : RWWLK-WALKER IN RIGHT-OF-WAY File: RWWLK.RAD

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

ONuclide	Parent	BRF(i)	S(j,t), pCi/g
(j)	(i)		t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	2.330E-01 2.257E-01 1.692E-01
Ac-227	Pa-231	1.000E+00	0.000E+00 7.300E-03 6.344E-02
Ac-227	U-235	1.000E+00	0.000E+00 7.763E-08 7.067E-06
Ac-227	S(j):		2.330E-01 2.330E-01 2.327E-01
OPa-231	Pa-231	1.000E+00	2.330E-01 2.330E-01 2.326E-01
Pa-231	U-235	1.000E+00	0.000E+00 4.929E-06 4.923E-05
Pa-231	S(j):		2.330E-01 2.330E-01 2.327E-01
OPb-210	Pb-210	1.000E+00	5.000E+00 4.846E+00 3.659E+00
Pb-210	Ra-226	1.000E+00	0.000E+00 1.530E-01 1.331E+00
Pb-210	Th-230	1.000E+00	0.000E+00 3.331E-05 3.036E-03
Pb-210	U-234	1.000E+00	0.000E+00 1.002E-10 9.343E-08
Pb-210	U-238	1.000E+00	0.000E+00 7.114E-17 6.723E-13
Pb-210	S(j):		5.000E+00 4.999E+00 4.993E+00
ORa-226	Ra-226	1.000E+00	5.000E+00 4.997E+00 4.972E+00
Ra-226	Th-230	1.000E+00	0.000E+00 2.165E-03 2.160E-02
Ra-226	U-234	1.000E+00	0.000E+00 9.747E-09 9.726E-07
Ra-226	U-238	1.000E+00	0.000E+00 9.211E-15 9.194E-12
Ra-226	S(j):		5.000E+00 4.999E+00 4.993E+00
ORa-228	Ra-228	1.000E+00	7.500E+00 6.647E+00 2.244E+00
Ra-228	Th-232	1.000E+00	0.000E+00 8.517E-01 5.250E+00
Ra-228	S(j):		7.500E+00 7.499E+00 7.494E+00
OTH-228	Ra-228	1.000E+00	0.000E+00 2.140E+00 3.064E+00
Th-228	Th-228	1.000E+00	7.500E+00 5.220E+00 2.002E-01
Th-228	Th-232	1.000E+00	0.000E+00 1.398E-01 4.231E+00
Th-228	S(j):		7.500E+00 7.500E+00 7.495E+00
OTH-230	Th-230	1.000E+00	5.000E+00 5.000E+00 4.999E+00
Th-230	U-234	1.000E+00	0.000E+00 4.501E-05 4.498E-04
Th-230	U-238	1.000E+00	0.000E+00 6.379E-11 6.374E-09
Th-230	S(j):		5.000E+00 5.000E+00 5.000E+00
OTH-232	Th-232	1.000E+00	7.500E+00 7.500E+00 7.500E+00
OU-234	U-234	1.000E+00	5.000E+00 4.999E+00 4.993E+00
U-234	U-238	1.000E+00	0.000E+00 1.417E-05 1.416E-04
U-234	S(j):		5.000E+00 4.999E+00 4.993E+00
OU-235	U-235	1.000E+00	2.330E-01 2.330E-01 2.327E-01
OU-238	U-238	1.000E+00	5.000E+00 4.999E+00 4.993E+00

BRF(i) is the branch fraction of the parent nuclide.

ORESCALC.EXE execution time = 2.70 seconds

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IRESRAD, Version 6.22 T_e Limit = 0.5 year 02/24/2005 14:15 Page 2
 Summary : RWRK-WORKER IN RIGHT-OF-WAY File: RWRK.RAD

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

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(3)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(4)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(5)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(11)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(3)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(4)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(10)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(11)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)

D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)

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 Summary : RWRK-WORKER IN RIGHT-OF-WAY File: RWRK.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)

File: FGR 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)

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

Menu	Parameter	Current Value	Default	Parameter Name
D-5	U-238+D , fish	1.000E-01	1.000E+01	BIOFAC(11,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)

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Summary : RWRK-WORKER IN RIGHT-OF-WAY File: RWRK.RAD

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	2.000E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+01	3.000E+00	---	T(3)
R011	Times for calculations (yr)	not used	1.000E+01	---	T(4)
R011	Times for calculations (yr)	not used	3.000E+01	---	T(5)
R011	Times for calculations (yr)	not used	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	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	2.330E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	2.330E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	5.000E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.000E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	7.500E+00	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-228	7.500E+00	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-230	5.000E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-232	7.500E+00	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): U-234	5.000E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-235	2.330E-01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	5.000E+00	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP

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Summary : RWRK-WORKER IN RIGHT-OF-WAY File: RWRK.RAD

Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VMT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	1.000E+03	2.000E+01	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+03	1.000E+02	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(4)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(5)

R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

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 Summary : RNRWK-WORKER IN RIGHT-OF-WAY File: RNRWK.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	1.740E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	7.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	4.600E-03	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)

R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
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Summary : RWRK-WORKER IN RIGHT-OF-WAY File: RWRK.RAD					

Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LF15
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LF16
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LW15
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LW16
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m ² ·3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m ²)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m ²)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m ²)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRI(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRI(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRI(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM

C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (l/sec)	not used	7.000E-07	---	EVSIN
C14	C-12 evasion flux rate from soil (l/sec)	not used	1.000E-10	---	REVSIN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E+01	---	CO2F

STOR Storage times of contaminated foodstuffs (days):
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	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	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

Contaminated Zone Dimensions

Area: 2000.00 square meters
 Thickness: 2.00 meters
 Cover Depth: 0.00 meters

Initial Soil Concentrations, pCi/g

Ac-227 2.330E-01
 Pa-231 2.330E-01
 Pb-210 5.000E+00
 Ra-226 5.000E+00
 Ra-228 7.500E+00
 Th-228 7.500E+00
 Th-230 5.000E+00
 Th-232 7.500E+00
 U-234 5.000E+00
 U-235 2.330E-01
 U-238 5.000E+00

0

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years): 0.000E+00 1.000E+00 1.000E+01

TDOSE(t): 9.222E-01 9.221E-01 9.214E-01

M(t): 3.689E-02 3.688E-02 3.686E-02

Maximum TDOSE(t): 9.222E-01 mrem/yr at t = 0.000E+00 years

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Summary : RWRK-WORKER IN RIGHT-OF-WAY

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.937E-03	0.0021	1.238E-02	0.0134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.698E-04	0.0006
Pa-231	2.194E-04	0.0002	2.593E-03	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.238E-04	0.0005
Pb-210	1.300E-04	0.0001	9.173E-04	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.009E-03	0.0065
Ra-226	2.337E-01	0.2535	3.596E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.210E-03	0.0013
Ra-228	2.257E-01	0.2448	3.502E-03	0.0038	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.866E-03	0.0020
Th-228	2.686E-01	0.2913	1.743E-02	0.0189	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.535E-04	0.0009
Th-230	7.653E-05	0.0001	1.309E-02	0.0142	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.603E-04	0.0005
Th-232	1.292E-02	0.0140	9.895E-02	0.1073	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.549E-03	0.0038
U-234	8.674E-06	0.0000	5.301E-03	0.0057	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.376E-04	0.0003
U-235	7.492E-04	0.0008	2.302E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.045E-05	0.0000
U-238	3.177E-03	0.0034	4.739E-03	0.0051	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.258E-04	0.0002
Total	7.472E-01	0.8103	1.595E-01	0.1730	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.542E-02	0.0167

0

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	1.488E-02	0.0161
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	3.237E-03	0.0035
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	7.056E-03	0.0077
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	2.353E-01	0.2552
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	2.311E-01	0.2506
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	2.869E-01	0.3111
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	1.363E-02	0.0148
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	1.154E-01	0.1252
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	5.547E-03	0.0060
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.898E-04	0.0011
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	8.142E-03	0.0088
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	9.222E-01	1.0000

*Sum of all water independent and dependent pathways.

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Summary : RWRK-WORKER IN RIGHT-OF-WAY

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)														
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years														
Water Independent Pathways (Inhalation excludes radon)														
Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.876E-03	0.0020	1.199E-02	0.0130	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.519E-04	0.0006
Pa-231	2.800E-04	0.0003	2.981E-03	0.0032	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.416E-04	0.0005
Pb-210	1.260E-04	0.0001	8.891E-04	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.824E-03	0.0063
Ra-226	2.336E-01	0.2534	3.875E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.393E-03	0.0015
Ra-228	2.767E-01	0.3000	8.078E-03	0.0088	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.897E-03	0.0021
Th-228	1.869E-01	0.2027	1.214E-02	0.0132	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.941E-04	0.0006
Th-230	1.778E-04	0.0002	1.309E-02	0.0142	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.609E-04	0.0005
Th-232	4.356E-02	0.0472	9.967E-02	0.1081	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.777E-03	0.0041
U-234	8.674E-06	0.0000	5.300E-03	0.0057	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.375E-04	0.0003
U-235	7.491E-04	0.0008	2.302E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.046E-05	0.0000
U-238	3.177E-03	0.0034	4.738E-03	0.0051	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.258E-04	0.0002
Total	7.472E-01	0.8103	1.595E-01	0.1730	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.541E-02	0.0167

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	1.442E-02	0.0156
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	3.702E-03	0.0040
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	6.839E-03	0.0074
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	2.354E-01	0.2553
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	2.866E-01	0.3109
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	1.997E-01	0.2165
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	1.373E-02	0.0149
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	1.470E-01	0.1594
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	5.547E-03	0.0060
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.898E-04	0.0011
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	8.141E-03	0.0088
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	9.221E-01	1.0000

0*Sum of all water independent and dependent pathways.

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Ta Limit = 0.5 year

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Summary : RWRK-WORKER IN RIGHT-OF-WAY

File: RWRK.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)														
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years														
Water Independent Pathways (Inhalation excludes radon)														
Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.407E-03	0.0015	8.991E-03	0.0098	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.139E-04	0.0004
Pa-231	7.465E-04	0.0008	5.959E-03	0.0065	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.783E-04	0.0006
Pb-210	9.515E-05	0.0001	6.714E-04	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.398E-03	0.0048
Ra-226	2.325E-01	0.2523	6.018E-04	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.803E-03	0.0030
Ra-228	1.772E-01	0.1924	8.170E-03	0.0089	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.068E-04	0.0010
Th-228	7.170E-03	0.0078	4.655E-04	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.279E-05	0.0000
Th-230	1.086E-03	0.0012	1.309E-02	0.0142	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.691E-04	0.0005
Th-232	3.224E-01	0.3499	1.112E-01	0.1207	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.337E-03	0.0058
U-234	8.715E-06	0.0000	5.295E-03	0.0057	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.373E-04	0.0003
U-235	7.483E-04	0.0008	2.308E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.054E-05	0.0000
U-238	3.173E-03	0.0034	4.732E-03	0.0051	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.255E-04	0.0002
Total	7.466E-01	0.8102	1.594E-01	0.1730	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.540E-02	0.0167

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

Radio- Nuclide	Water		Fish		Radon		Water Dependent Pathways 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	1.081E-02	0.0117
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	7.284E-03	0.0079
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	5.164E-03	0.0056
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	2.359E-01	0.2560
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	1.863E-01	0.2022
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	7.659E-03	0.0083
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	1.465E-02	0.0159
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	4.390E-01	0.4764
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	5.541E-03	0.0060
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.897E-04	0.0011
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	8.131E-03	0.0088

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 9.214E-01 1.0000

0*Sum of all water independent and dependent pathways.

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Summary : RWRK-WORKER IN RIGHT-OF-WAY File: RWRK.RAD

Dose/Source Ratios Summed Over All Pathways

Parent and Progeny Principal Radionuclide Contributions Indicated

0Parent Product Branch DSR(j,t) (mrem/yr)/(pCi/g)
(i) (j) Fraction* t= 0.000E+00 1.000E+00 1.000E+01

Ac-227	Ac-227	1.000E+00	6.388E-02	6.187E-02	4.640E-02
OPa-231	Pa-231	1.000E+00	1.287E-02	1.287E-02	1.285E-02
Pa-231	Ac-227	1.000E+00	1.022E-03	3.023E-03	1.841E-02
Pa-231	DSR(j)		1.389E-02	1.589E-02	3.126E-02
OPb-210	Pb-210	1.000E+00	1.411E-03	1.368E-03	1.033E-03
ORa-226	Ra-226	1.000E+00	4.704E-02	4.702E-02	4.678E-02
Ra-226	Pb-210	1.000E+00	2.204E-05	6.521E-05	3.976E-04
Ra-226	DSR(j)		4.706E-02	4.708E-02	4.717E-02
ORa-228	Ra-228	1.000E+00	2.376E-02	2.106E-02	7.107E-03
Ra-228	Th-228	1.000E+00	7.051E-03	1.716E-02	1.773E-02
Ra-228	DSR(j)		3.081E-02	3.822E-02	2.484E-02
OTh-228	Th-228	1.000E+00	3.825E-02	2.662E-02	1.021E-03
OTh-230	Th-230	1.000E+00	2.716E-03	2.716E-03	2.715E-03
Th-230	Ra-226	1.000E+00	1.019E-05	3.056E-05	2.134E-04
Th-230	Pb-210	1.000E+00	3.192E-09	2.214E-08	9.553E-07
Th-230	DSR(j)		2.726E-03	2.746E-03	2.930E-03
OTh-232	Th-232	1.000E+00	1.363E-02	1.363E-02	1.363E-02
Th-232	Ra-228	1.000E+00	1.461E-03	4.159E-03	1.809E-02
Th-232	Th-228	1.000E+00	2.948E-04	1.809E-03	2.681E-02
Th-232	DSR(j)		1.539E-02	1.960E-02	5.853E-02
OU-234	U-234	1.000E+00	1.109E-03	1.109E-03	1.108E-03
U-234	Th-230	1.000E+00	1.222E-08	3.667E-08	2.565E-07
U-234	Ra-226	1.000E+00	3.058E-11	2.140E-10	1.010E-08
U-234	Pb-210	1.000E+00	7.194E-15	1.072E-13	3.095E-11
U-234	DSR(j)		1.109E-03	1.109E-03	1.108E-03
OU-235	U-235	1.000E+00	4.248E-03	4.248E-03	4.242E-03
U-235	Pa-231	1.000E+00	1.361E-07	4.084E-07	2.855E-06
U-235	Ac-227	1.000E+00	7.229E-09	5.014E-08	2.161E-06
U-235	DSR(j)		4.248E-03	4.248E-03	4.247E-03
OU-238	U-238	1.000E+00	1.628E-03	1.628E-03	1.626E-03
U-238	U-234	1.000E+00	1.573E-09	4.717E-09	3.298E-08
U-238	Th-230	1.000E+00	1.155E-14	8.084E-14	3.820E-12
U-238	Ra-226	1.000E+00	2.167E-17	3.250E-16	1.004E-13
U-238	Pb-210	1.000E+00	4.084E-21	1.259E-19	2.346E-16
U-238	DSR(j)		1.628E-03	1.628E-03	1.626E-03

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).

The DSR includes contributions from associated (half-life < 0.5 yr) daughters.

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Summary : RWRK-WORKER IN RIGHT-OF-WAY File: RWRK.RAD

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

ONuclide (i)	t= 0.000E+00	1.000E+00	1.000E+01
Ac-227	3.913E+02	4.041E+02	5.388E+02
Pa-231	1.800E+03	1.573E+03	7.997E+02
Pb-210	1.771E+04	1.828E+04	2.421E+04
Ra-226	5.312E+02	5.310E+02	5.300E+02
Ra-228	8.114E+02	6.541E+02	1.006E+03
Th-228	6.536E+02	9.390E+02	2.448E+04
Th-230	9.171E+03	9.103E+03	8.533E+03
Th-232	1.625E+03	1.275E+03	4.271E+02
U-234	2.253E+04	2.254E+04	2.256E+04
U-235	5.885E+03	5.885E+03	5.886E+03
U-238	1.535E+04	1.535E+04	1.537E+04

0

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

ONuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin) (pCi/g)	G(i,tmin) (pCi/g)	DSR(i,tmax) (pCi/g)	G(i,tmax) (pCi/g)
Ac-227	2.330E-01	0.000E+00	6.388E-02	3.913E+02	6.388E-02	3.913E+02
Pa-231	2.330E-01	1.000E+01	3.126E-02	7.997E+02	1.389E-02	1.800E+03
Pb-210	5.000E+00	0.000E+00	1.411E-03	1.771E+04	1.411E-03	1.771E+04
Ra-226	5.000E+00	1.000E+01	4.717E-02	5.300E+02	4.706E-02	5.312E+02
Ra-228	7.500E+00	2.770 A 0.006	4.209E-02	5.940E+02	3.081E-02	8.114E+02
Th-228	7.500E+00	0.000E+00	3.825E-02	6.536E+02	3.825E-02	6.536E+02
Th-230	5.000E+00	1.000E+01	2.930E-03	8.533E+03	2.726E-03	9.171E+03
Th-232	7.500E+00	1.000E+01	5.853E-02	4.271E+02	1.539E-02	1.625E+03
U-234	5.000E+00	0.000E+00	1.109E-03	2.253E+04	1.109E-03	2.253E+04
U-235	2.330E-01	0.000E+00	4.248E-03	5.885E+03	4.248E-03	5.885E+03
U-238	5.000E+00	0.000E+00	1.628E-03	1.535E+04	1.628E-03	1.535E+04

1RESRAD, Version 6.22 T* Limit = 0.5 year 02/24/2005 14:15 Page 17
Summary : RWRK-WORKER IN RIGHT-OF-WAY File: RWRK.RAD

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

ONuclide (j)	Parent (i)	BRF(i)	DOSE(j,t), mrem/yr t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	1.488E-02 1.442E-02 1.081E-02
Ac-227	Pa-231	1.000E+00	2.382E-04 7.045E-04 4.290E-03
Ac-227	U-235	1.000E+00	1.684E-09 1.168E-08 5.034E-07
Ac-227	DOSE(j)		1.512E-02 1.512E-02 1.510E-02
OPa-231	Pa-231	1.000E+00	2.998E-03 2.998E-03 2.994E-03
Pa-231	U-235	1.000E+00	3.172E-08 9.515E-08 6.652E-07
Pa-231	DOSE(j)		2.998E-03 2.998E-03 2.994E-03
OPb-210	Pb-210	1.000E+00	7.056E-03 6.839E-03 5.164E-03
Pb-210	Ra-226	1.000E+00	1.102E-04 3.260E-04 1.988E-03
Pb-210	Th-230	1.000E+00	1.596E-08 1.107E-07 4.776E-06
Pb-210	U-234	1.000E+00	3.597E-14 5.359E-13 1.548E-10
Pb-210	U-238	1.000E+00	2.042E-20 6.294E-19 1.173E-15
Pb-210	DOSE(j)		7.166E-03 7.166E-03 7.157E-03
ORa-226	Ra-226	1.000E+00	2.352E-01 2.351E-01 2.339E-01
Ra-226	Th-230	1.000E+00	5.095E-05 1.528E-04 1.067E-03
Ra-226	U-234	1.000E+00	1.529E-10 1.070E-09 5.049E-08
Ra-226	U-238	1.000E+00	1.084E-16 1.625E-15 5.019E-13
Ra-226	DOSE(j)		2.353E-01 2.352E-01 2.349E-01
ORa-228	Ra-228	1.000E+00	1.782E-01 1.579E-01 5.330E-02
Ra-228	Th-232	1.000E+00	1.096E-02 3.119E-02 1.357E-01
Ra-228	DOSE(j)		1.891E-01 1.891E-01 1.890E-01
OTh-228	Ra-228	1.000E+00	5.289E-02 1.287E-01 1.330E-01
Th-228	Th-228	1.000E+00	2.869E-01 1.997E-01 7.659E-03
Th-228	Th-232	1.000E+00	2.211E-03 1.356E-02 2.011E-01
Th-228	DOSE(j)		3.420E-01 3.420E-01 3.417E-01
OTh-230	Th-230	1.000E+00	1.358E-02 1.358E-02 1.358E-02

Th-230	U-234	1.000E+00	6.111E-08	1.833E-07	1.282E-06
Th-230	U-238	1.000E+00	5.775E-14	4.042E-13	1.910E-11
Th-230	DOSE(j)		1.358E-02	1.358E-02	1.358E-02
0Th-232	Th-232	1.000E+00	1.022E-01	1.022E-01	1.022E-01
0U-234	U-234	1.000E+00	5.547E-03	5.546E-03	5.540E-03
U-234	U-238	1.000E+00	7.863E-09	2.359E-08	1.649E-07
U-234	DOSE(j)		5.547E-03	5.546E-03	5.540E-03
0U-235	U-235	1.000E+00	9.898E-04	9.897E-04	9.885E-04
0U-238	U-238	1.000E+00	8.142E-03	8.141E-03	8.131E-03

BRF(i) is the branch fraction of the parent nuclide.

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Summary : RWRK-WORKER IN RIGHT-OF-WAY File: RWRK.RAD

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

ONuclide	Parent	BRF(i)	S(j,t), pCi/g
(j)	(i)		t = 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	2.330E-01 2.257E-01 1.692E-01
Ac-227	Pa-231	1.000E+00	0.000E+00 7.300E-03 6.344E-02
Ac-227	U-235	1.000E+00	0.000E+00 7.763E-08 7.067E-06
Ac-227	S(j):		2.330E-01 2.330E-01 2.327E-01
0Pa-231	Pa-231	1.000E+00	2.330E-01 2.330E-01 2.326E-01
Pa-231	U-235	1.000E+00	0.000E+00 4.929E-06 4.923E-05
Pa-231	S(j):		2.330E-01 2.330E-01 2.327E-01
0Pb-210	Pb-210	1.000E+00	5.000E+00 4.846E+00 3.659E+00
Pb-210	Ra-226	1.000E+00	0.000E+00 1.530E-01 1.331E+00
Pb-210	Th-230	1.000E+00	0.000E+00 3.331E-05 3.036E-03
Pb-210	U-234	1.000E+00	0.000E+00 1.002E-10 9.343E-08
Pb-210	U-238	1.000E+00	0.000E+00 7.114E-17 6.723E-13
Pb-210	S(j):		5.000E+00 4.999E+00 4.993E+00
0Ra-226	Ra-226	1.000E+00	5.000E+00 4.997E+00 4.972E+00
Ra-226	Th-230	1.000E+00	0.000E+00 2.165E-03 2.160E-02
Ra-226	U-234	1.000E+00	0.000E+00 9.747E-09 9.726E-07
Ra-226	U-238	1.000E+00	0.000E+00 9.211E-15 9.194E-12
Ra-226	S(j):		5.000E+00 4.999E+00 4.993E+00
0Ra-228	Ra-228	1.000E+00	7.500E+00 6.647E+00 2.244E+00
Ra-228	Th-232	1.000E+00	0.000E+00 8.517E-01 5.250E+00
Ra-228	S(j):		7.500E+00 7.499E+00 7.494E+00
0Th-228	Ra-228	1.000E+00	0.000E+00 2.140E+00 3.064E+00
Th-228	Th-228	1.000E+00	7.500E+00 5.220E+00 2.002E-01
Th-228	Th-232	1.000E+00	0.000E+00 1.398E-01 4.231E+00
Th-228	S(j):		7.500E+00 7.500E+00 7.495E+00
0Th-230	Th-230	1.000E+00	5.000E+00 5.000E+00 4.999E+00
Th-230	U-234	1.000E+00	0.000E+00 4.501E-05 4.498E-04
Th-230	U-238	1.000E+00	0.000E+00 6.379E-11 6.374E-09
Th-230	S(j):		5.000E+00 5.000E+00 5.000E+00
0Th-232	Th-232	1.000E+00	7.500E+00 7.500E+00 7.500E+00
0U-234	U-234	1.000E+00	5.000E+00 4.999E+00 4.993E+00
U-234	U-238	1.000E+00	0.000E+00 1.417E-05 1.416E-04
U-234	S(j):		5.000E+00 4.999E+00 4.993E+00
0U-235	U-235	1.000E+00	2.330E-01 2.330E-01 2.327E-01
0U-238	U-238	1.000E+00	5.000E+00 4.999E+00 4.993E+00

BRF(i) is the branch fraction of the parent nuclide.

0RESALC.EXE execution time = 2.70 seconds

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

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(3)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(4)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(5)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(11)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(3)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(4)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(10)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(11)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)

D-34
D-34 Ra-228+D , plant/soil concentration ratio, dimensionless 4.000E-02 4.000E-02 RTF(5,1)
D-34 Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) 1.000E-03 1.000E-03 RTF(5,2)
D-34 Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) 1.000E-03 1.000E-03 RTF(5,3)
D-34
D-34 Th-228+D , plant/soil concentration ratio, dimensionless 1.000E-03 1.000E-03 RTF(6,1)
D-34 Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) 1.000E-04 1.000E-04 RTF(6,2)
D-34 Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) 5.000E-06 5.000E-06 RTF(6,3)
D-34

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Dose Conversion Factor (and Related) Parameter Summary (continued)

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Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)

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Dose Conversion Factor (and Related) Parameter Summary (continued)

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Menu	Parameter	Current Value	Default	Parameter Name
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)

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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)	2.000E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+01	3.000E+00	---	T(3)
R011	Times for calculations (yr)	not used	1.000E+01	---	T(4)
R011	Times for calculations (yr)	not used	3.000E+01	---	T(5)
R011	Times for calculations (yr)	not used	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	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	2.330E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	2.330E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	5.000E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.000E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	7.500E+00	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-228	7.500E+00	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-230	5.000E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-232	7.500E+00	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): U-234	5.000E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-235	2.330E-01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	5.000E+00	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP

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Site-Specific Parameter Summary (continued)					
0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	1.000E+03	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+03	1.000E+02	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
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Site-Specific Parameter Summary (continued)					
0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(5)

R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	1.240E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	8.200E-03	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)

R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
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Summary : TC-TRESPASS ON SLOPE-CURRENT CONDITIONS File: TC.RAD					

Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LF15
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LF16
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LM15
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LM16
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LS1
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM

C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E+01	---	CO2F

STOR Storage times of contaminated foodstuffs (days):
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	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	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	RMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

Summary : TC-TRESPASS ON SLOPE-CURRENT CONDITIONS

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Contaminated Zone Dimensions

Initial Soil Concentrations, pCi/g

Area: 2000.00 square meters
 Thickness: 2.00 meters
 Cover Depth: 0.00 meters

Ac-227 2.330E-01
 Pa-231 2.330E-01
 Pb-210 5.000E+00
 Ra-226 5.000E+00
 Ra-228 7.500E+00
 Th-228 7.500E+00
 Th-230 5.000E+00
 Th-232 7.500E+00
 U-234 5.000E+00
 U-235 2.330E-01
 U-238 5.000E+00

0

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years): 0.000E+00 1.000E+00 1.000E+01

TDOSE(t): 1.417E+00 1.417E+00 1.416E+00

M(t): 5.670E-02 5.669E-02 5.665E-02

OMaximum TDOSE(t): 1.417E+00 mrem/yr at t = 0.000E+00 years

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Summary : TC-TRESPASS ON SLOPE-CURRENT CONDITIONS

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	3.453E-03	0.0024	4.493E-03	0.0032	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.016E-03	0.0007
Pa-231	3.911E-04	0.0003	9.413E-04	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.554E-04	0.0005
Pb-210	2.318E-04	0.0002	3.330E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.071E-02	0.0076
Ra-226	4.167E-01	0.2940	1.305E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.157E-03	0.0015
Ra-228	4.023E-01	0.2839	1.271E-03	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.326E-03	0.0023
Th-228	4.788E-01	0.3378	6.328E-03	0.0045	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.522E-03	0.0011
Th-230	1.364E-04	0.0001	4.752E-03	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.205E-04	0.0006
Th-232	2.303E-02	0.0162	3.591E-02	0.0253	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.327E-03	0.0045
U-234	1.546E-05	0.0000	1.924E-03	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.235E-04	0.0003
U-235	1.336E-03	0.0009	8.356E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.863E-05	0.0000
U-238	5.664E-03	0.0040	1.720E-03	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.025E-04	0.0003
Total	1.332E+00	0.9398	5.789E-02	0.0408	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.748E-02	0.0194

0

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	8.962E-03	0.0063
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	2.088E-03	0.0015
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	1.128E-02	0.0080
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	4.190E-01	0.2956
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	4.069E-01	0.2871
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	4.866E-01	0.3433
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	5.709E-03	0.0040
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	6.527E-02	0.0460
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	2.363E-03	0.0017
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	1.438E-03	0.0010
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	7.787E-03	0.0055
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	1.417E+00	1.0000

O*Sum of all water independent and dependent pathways.

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

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	3.345E-03	0.0024	4.351E-03	0.0031	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.838E-04	0.0007
Pa-231	4.992E-04	0.0004	1.082E-03	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.871E-04	0.0006
Pb-210	2.246E-04	0.0002	3.227E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.038E-02	0.0073
Ra-226	4.165E-01	0.2938	1.406E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.484E-03	0.0018
Ra-228	4.932E-01	0.3480	2.932E-03	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.382E-03	0.0024
Th-228	3.333E-01	0.2351	4.405E-03	0.0031	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.059E-03	0.0007
Th-230	3.169E-04	0.0002	4.752E-03	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.215E-04	0.0006
Th-232	7.764E-02	0.0548	3.618E-02	0.0255	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.733E-03	0.0048
U-234	1.546E-05	0.0000	1.924E-03	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.234E-04	0.0003
U-235	1.335E-03	0.0009	8.357E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.864E-05	0.0000
U-238	5.663E-03	0.0040	1.720E-03	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.025E-04	0.0003
Total	1.332E+00	0.9398	5.789E-02	0.0408	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.748E-02	0.0194

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	8.680E-03	0.0061
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	2.368E-03	0.0017
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	1.093E-02	0.0077
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	4.191E-01	0.2957
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	4.995E-01	0.3524
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	3.387E-01	0.2390
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	5.890E-03	0.0042
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	1.206E-01	0.0851
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	2.363E-03	0.0017
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	1.438E-03	0.0010
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	7.786E-03	0.0055
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	1.417E+00	1.0000

*Sum of all water independent and dependent pathways.

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Summary : TC-TRESPASS ON SLOPE-CURRENT CONDITIONS

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

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	2.509E-03	0.0018	3.263E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.378E-04	0.0005
Pa-231	1.331E-03	0.0009	2.163E-03	0.0015	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.031E-03	0.0007
Pb-210	1.696E-04	0.0001	2.437E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.839E-03	0.0055
Ra-226	4.144E-01	0.2926	2.184E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.996E-03	0.0035
Ra-228	3.159E-01	0.2231	2.965E-03	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.616E-03	0.0011
Th-228	1.278E-02	0.0090	1.689E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.062E-05	0.0000
Th-230	1.936E-03	0.0014	4.752E-03	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.363E-04	0.0006
Th-232	5.748E-01	0.4059	4.037E-02	0.0285	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.513E-03	0.0067
U-234	1.553E-05	0.0000	1.922E-03	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.230E-04	0.0003
U-235	1.334E-03	0.0009	8.378E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.879E-05	0.0000
U-238	5.657E-03	0.0040	1.718E-03	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.020E-04	0.0003
Total	1.331E+00	0.9397	5.787E-02	0.0409	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.745E-02	0.0194

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

Radio- Nuclide	Water		Fish		Radon		Water Dependent Pathways 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	6.510E-03	0.0046
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	4.524E-03	0.0032
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	8.253E-03	0.0058
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	4.196E-01	0.2963
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	3.205E-01	0.2263
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	1.299E-02	0.0092
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	7.525E-03	0.0053
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	6.247E-01	0.4411
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	2.360E-03	0.0017
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	1.437E-03	0.0010
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	7.776E-03	0.0055

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 1.416E+00 1.0000

0*Sum of all water independent and dependent pathways.

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Summary : TC-TRESPASS ON SLOPE-CURRENT CONDITIONS File: TC.RAD

Dose/Source Ratios Summed Over All Pathways

Parent and Progeny Principal Radionuclide Contributions Indicated

0Parent Product Branch DSR(j,t) (mrem/yr)/(pCi/g)
(i) (j) Fraction* t= 0.000E+00 1.000E+00 1.000E+01

Ac-227	Ac-227	1.000E+00	3.846E-02	3.725E-02	2.794E-02
0Pa-231	Pa-231	1.000E+00	8.345E-03	8.344E-03	8.332E-03
Pa-231	Ac-227	1.000E+00	6.155E-04	1.820E-03	1.109E-02
Pa-231	DSR(j)		8.960E-03	1.016E-02	1.942E-02
0Pb-210	Pb-210	1.000E+00	2.255E-03	2.186E-03	1.651E-03
0Ra-226	Ra-226	1.000E+00	8.376E-02	8.371E-02	8.329E-02
Ra-226	Pb-210	1.000E+00	3.523E-05	1.042E-04	6.354E-04
Ra-226	DSR(j)		8.379E-02	8.382E-02	8.392E-02
0Ra-228	Ra-228	1.000E+00	4.230E-02	3.749E-02	1.265E-02
Ra-228	Th-228	1.000E+00	1.196E-02	2.911E-02	3.008E-02
Ra-228	DSR(j)		5.426E-02	6.660E-02	4.274E-02
0Th-228	Th-228	1.000E+00	6.488E-02	4.516E-02	1.732E-03
0Th-230	Th-230	1.000E+00	1.124E-03	1.124E-03	1.124E-03
Th-230	Ra-226	1.000E+00	1.814E-05	5.442E-05	3.800E-04
Th-230	Pb-210	1.000E+00	5.100E-09	3.538E-08	1.527E-06
Th-230	DSR(j)		1.142E-03	1.178E-03	1.505E-03
0Th-232	Th-232	1.000E+00	5.602E-03	5.602E-03	5.602E-03
Th-232	Ra-228	1.000E+00	2.601E-03	7.404E-03	3.221E-02
Th-232	Th-228	1.000E+00	5.001E-04	3.068E-03	4.548E-02
Th-232	DSR(j)		8.703E-03	1.607E-02	8.329E-02
0U-234	U-234	1.000E+00	4.726E-04	4.725E-04	4.719E-04
U-234	Th-230	1.000E+00	5.057E-09	1.517E-08	1.061E-07
U-234	Ra-226	1.000E+00	5.445E-11	3.810E-10	1.798E-08
U-234	Pb-210	1.000E+00	1.150E-14	1.713E-13	4.946E-11
U-234	DSR(j)		4.726E-04	4.725E-04	4.721E-04
0U-235	U-235	1.000E+00	6.170E-03	6.169E-03	6.162E-03
U-235	Pa-231	1.000E+00	8.828E-08	2.648E-07	1.851E-06
U-235	Ac-227	1.000E+00	4.352E-09	3.019E-08	1.301E-06
U-235	DSR(j)		6.170E-03	6.170E-03	6.165E-03
0U-238	U-238	1.000E+00	1.557E-03	1.557E-03	1.555E-03
U-238	U-234	1.000E+00	6.699E-10	2.009E-09	1.405E-08
U-238	Th-230	1.000E+00	4.779E-15	3.345E-14	1.580E-12
U-238	Ra-226	1.000E+00	3.859E-17	5.787E-16	1.787E-13
U-238	Pb-210	1.000E+00	6.526E-21	2.012E-19	3.748E-16
U-238	DSR(j)		1.557E-03	1.557E-03	1.555E-03

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).

The DSR includes contributions from associated (half-life > 0.5 yr) daughters.

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Summary : TC-TRESPASS ON SLOPE-CURRENT CONDITIONS File: TC.RAD

Single Radionuclide Soil Guidelines G(i,t) in pCi/g

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

ONuclide (i)	t= 0.000E+00	1.000E+00	1.000E+01
Ac-227	6.500E+02	6.711E+02	8.948E+02
Pa-231	2.790E+03	2.460E+03	1.287E+03
Pb-210	1.109E+04	1.144E+04	1.515E+04
Ra-226	2.984E+02	2.983E+02	2.979E+02
Ra-228	4.608E+02	3.754E+02	5.850E+02
Th-228	3.853E+02	5.536E+02	1.443E+04
Th-230	2.190E+04	2.122E+04	1.661E+04
Th-232	2.873E+03	1.555E+03	3.002E+02
U-234	5.290E+04	5.291E+04	5.296E+04
U-235	4.052E+03	4.052E+03	4.055E+03
U-238	1.605E+04	1.606E+04	1.607E+04

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

ONuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin) (pCi/g)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Ac-227	2.330E-01	0.000E+00	3.846E-02	6.500E+02	3.846E-02	6.500E+02
Pa-231	2.330E-01	1.000E+01	1.942E-02	1.287E+03	8.960E-03	2.790E+03
Pb-210	5.000E+00	0.000E+00	2.255E-03	1.109E+04	2.255E-03	1.109E+04
Ra-226	5.000E+00	1.000E+01	8.392E-02	2.979E+02	8.379E-02	2.984E+02
Ra-228	7.500E+00	2.714 E 0.005	7.283E-02	3.433E+02	5.426E-02	4.608E+02
Th-228	7.500E+00	0.000E+00	6.488E-02	3.853E+02	6.488E-02	3.853E+02
Th-230	5.000E+00	1.000E+01	1.505E-03	1.661E+04	1.142E-03	2.190E+04
Th-232	7.500E+00	1.000E+01	8.329E-02	3.002E+02	8.703E-03	2.873E+03
U-234	5.000E+00	0.000E+00	4.726E-04	5.290E+04	4.726E-04	5.290E+04
U-235	2.330E-01	0.000E+00	6.170E-03	4.052E+03	6.170E-03	4.052E+03
U-238	5.000E+00	0.000E+00	1.557E-03	1.605E+04	1.557E-03	1.605E+04

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Summary : TC-TRESPASS ON SLOPE-CURRENT CONDITIONS File: TC.RAD

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

ONuclide (j)	Parent (i)	BRF(i)	DOSE(j,t), mrem/yr t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	8.962E-03 8.680E-03 6.510E-03
Ac-227	Pa-231	1.000E+00	1.434E-04 4.241E-04 2.583E-03
Ac-227	U-235	1.000E+00	1.014E-09 7.034E-09 3.031E-07
Ac-227	DOSE(j)		9.105E-03 9.104E-03 9.093E-03
OPa-231	Pa-231	1.000E+00	1.944E-03 1.944E-03 1.941E-03
Pa-231	U-235	1.000E+00	2.057E-08 6.170E-08 4.313E-07
Pa-231	DOSE(j)		1.944E-03 1.944E-03 1.942E-03
OPb-210	Pb-210	1.000E+00	1.128E-02 1.093E-02 8.253E-03
Pb-210	Ra-226	1.000E+00	1.761E-04 5.210E-04 3.177E-03
Pb-210	Th-230	1.000E+00	2.550E-08 1.769E-07 7.633E-06
Pb-210	U-234	1.000E+00	5.748E-14 8.564E-13 2.473E-10
Pb-210	U-238	1.000E+00	3.263E-20 1.006E-18 1.874E-15
Pb-210	DOSE(j)		1.145E-02 1.145E-02 1.144E-02
ORa-226	Ra-226	1.000E+00	4.188E-01 4.186E-01 4.164E-01
Ra-226	Th-230	1.000E+00	9.072E-05 2.721E-04 1.900E-03
Ra-226	U-234	1.000E+00	2.722E-10 1.905E-09 8.990E-08
Ra-226	U-238	1.000E+00	1.929E-16 2.894E-15 8.936E-13
Ra-226	DOSE(j)		4.189E-01 4.188E-01 4.183E-01
ORa-228	Ra-228	1.000E+00	3.172E-01 2.812E-01 9.490E-02
Ra-228	Th-232	1.000E+00	1.950E-02 5.553E-02 2.416E-01
Ra-228	DOSE(j)		3.367E-01 3.367E-01 3.365E-01
OTh-228	Ra-228	1.000E+00	8.971E-02 2.183E-01 2.256E-01
Th-228	Th-228	1.000E+00	4.866E-01 3.387E-01 1.299E-02
Th-228	Th-232	1.000E+00	3.750E-03 2.301E-02 3.411E-01
Th-228	DOSE(j)		5.801E-01 5.801E-01 5.797E-01
OTh-230	Th-230	1.000E+00	5.618E-03 5.618E-03 5.618E-03

Th-230	U-234	1.000E+00	2.529E-08	7.585E-08	5.306E-07
Th-230	U-238	1.000E+00	2.389E-14	1.672E-13	7.902E-12
Th-230	DOSE(j)		5.618E-03	5.618E-03	5.618E-03
OTH-232	Th-232	1.000E+00	4.202E-02	4.202E-02	4.202E-02
OU-234	U-234	1.000E+00	2.363E-03	2.363E-03	2.360E-03
U-234	U-238	1.000E+00	3.349E-09	1.005E-08	7.024E-08
U-234	DOSE(j)		2.363E-03	2.363E-03	2.360E-03
OU-235	U-235	1.000E+00	1.438E-03	1.437E-03	1.436E-03
OU-238	U-238	1.000E+00	7.787E-03	7.786E-03	7.776E-03

BRF(i) is the branch fraction of the parent nuclide.
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 Summary : TC-TRESPASS ON SLOPE-CURRENT CONDITIONS File: TC.RAD

Individual Nuclide Soil Concentration
 Parent Nuclide and Branch Fraction Indicated

ONuclide	Parent	BRF(i)	S(j,t), pCi/g
(j)	(i)		t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	2.330E-01 2.257E-01 1.692E-01
Ac-227	Pa-231	1.000E+00	0.000E+00 7.300E-03 6.344E-02
Ac-227	U-235	1.000E+00	0.000E+00 7.763E-08 7.067E-06
Ac-227	S(j):		2.330E-01 2.330E-01 2.327E-01
OPa-231	Pa-231	1.000E+00	2.330E-01 2.330E-01 2.326E-01
Pa-231	U-235	1.000E+00	0.000E+00 4.929E-06 4.923E-05
Pa-231	S(j):		2.330E-01 2.330E-01 2.327E-01
OPb-210	Pb-210	1.000E+00	5.000E+00 4.846E+00 3.659E+00
Pb-210	Ra-226	1.000E+00	0.000E+00 1.530E-01 1.331E+00
Pb-210	Th-230	1.000E+00	0.000E+00 3.331E-05 3.036E-03
Pb-210	U-234	1.000E+00	0.000E+00 1.002E-10 9.343E-08
Pb-210	U-238	1.000E+00	0.000E+00 7.114E-17 6.723E-13
Pb-210	S(j):		5.000E+00 4.999E+00 4.993E+00
ORa-226	Ra-226	1.000E+00	5.000E+00 4.997E+00 4.972E+00
Ra-226	Th-230	1.000E+00	0.000E+00 2.165E-03 2.160E-02
Ra-226	U-234	1.000E+00	0.000E+00 9.747E-09 9.726E-07
Ra-226	U-238	1.000E+00	0.000E+00 9.211E-15 9.194E-12
Ra-226	S(j):		5.000E+00 4.999E+00 4.993E+00
ORa-228	Ra-228	1.000E+00	7.500E+00 6.647E+00 2.244E+00
Ra-228	Th-232	1.000E+00	0.000E+00 8.517E-01 5.250E+00
Ra-228	S(j):		7.500E+00 7.499E+00 7.494E+00
OTH-228	Ra-228	1.000E+00	0.000E+00 2.140E+00 3.064E+00
Th-228	Th-228	1.000E+00	7.500E+00 5.220E+00 2.002E-01
Th-228	Th-232	1.000E+00	0.000E+00 1.398E-01 4.231E+00
Th-228	S(j):		7.500E+00 7.500E+00 7.495E+00
OTH-230	Th-230	1.000E+00	5.000E+00 5.000E+00 4.999E+00
Th-230	U-234	1.000E+00	0.000E+00 4.501E-05 4.498E-04
Th-230	U-238	1.000E+00	0.000E+00 6.379E-11 6.374E-09
Th-230	S(j):		5.000E+00 5.000E+00 5.000E+00
OTH-232	Th-232	1.000E+00	7.500E+00 7.500E+00 7.500E+00
OU-234	U-234	1.000E+00	5.000E+00 4.999E+00 4.993E+00
U-234	U-238	1.000E+00	0.000E+00 1.417E-05 1.416E-04
U-234	S(j):		5.000E+00 4.999E+00 4.993E+00
OU-235	U-235	1.000E+00	2.330E-01 2.330E-01 2.327E-01
OU-238	U-238	1.000E+00	5.000E+00 4.999E+00 4.993E+00

BRF(i) is the branch fraction of the parent nuclide.
 ORESALC.EXE execution time = 2.75 seconds

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

0 Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(3)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(4)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(5)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(11)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(3)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(4)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(10)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(11)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)

D-34					
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)	
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)	
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)	
D-34					
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)	
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)	
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)	
D-34					

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Dose Conversion Factor (and Related) Parameter Summary (continued)

File: FGR 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-5				
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5				
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)
D-5				

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Dose Conversion Factor (and Related) Parameter Summary (continued)

File: FGR 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-5	U-238-D , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238-D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)

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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)	2.000E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+01	3.000E+00	---	T(3)
R011	Times for calculations (yr)	not used	1.000E+01	---	T(4)
R011	Times for calculations (yr)	not used	3.000E+01	---	T(5)
R011	Times for calculations (yr)	not used	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	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	2.330E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	2.330E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	5.000E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.000E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	7.500E+00	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-228	7.500E+00	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-230	5.000E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-232	7.500E+00	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): U-234	5.000E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-235	2.330E-01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	5.000E+00	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)	2.400E-01	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	2.200E+00	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP

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Site-Specific Parameter Summary (continued)						
0	Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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)		not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations		not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)		not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity		not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity		not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity		not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)		not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient		not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter		not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)		not used	1.000E-03	---	VMT
R014	Well pump intake depth (m below water table)		not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)		not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)		not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata		not used	1	---	NS
R015	Unsat. zone 1, thickness (m)		not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)		not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity		not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity		not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity		not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter		not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)		not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227					
R016	Contaminated zone (cm**3/g)		1.000E+03	2.000E+01	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)		not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)		not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)		0.000E+00	0.000E+00	1.333E-04	ALEACH(1)
R016	Solubility constant		0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231					
R016	Contaminated zone (cm**3/g)		1.000E+03	5.000E+01	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)		not used	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)		not used	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)		0.000E+00	0.000E+00	1.333E-04	ALEACH(2)
R016	Solubility constant		0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210					
R016	Contaminated zone (cm**3/g)		1.000E+03	1.000E+02	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)		not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)		not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)		0.000E+00	0.000E+00	1.333E-04	ALEACH(3)
R016	Solubility constant		0.000E+00	0.000E+00	not used	SOLUBK(3)
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Site-Specific Parameter Summary (continued)						
0	Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
	R016	Distribution coefficients for Ra-226				
	R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(4)
	R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
	R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
	R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(4)
	R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
	R016	Distribution coefficients for Ra-228				
	R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(5)
	R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
	R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
	R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(5)

R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	1.240E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	8.200E-03	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)

R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LF15
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LF16
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LW15
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LW16
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM

C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (l/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (l/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E+01	---	CO2F

STOR Storage times of contaminated foodstuffs (days):

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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (if different from user input)	Parameter Name
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	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	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TI1L	Number of graphical time points	32	---	---	NPTS
TI1L	Maximum number of integration points for dose	17	---	---	LYMAX
TI1L	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

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Summary : TRR-TRESPASS ON RIP-RAP

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Contaminated Zone Dimensions

Initial Soil Concentrations, pCi/g

Area: 2000.00 square meters
 Thickness: 2.00 meters
 Cover Depth: 0.24 meters

Ac-227 2.330E-01
 Pa-231 2.330E-01
 Pb-210 5.000E+00
 Ra-226 5.000E+00
 Ra-228 7.500E+00
 Th-228 7.500E+00
 Th-230 5.000E+00
 Th-232 7.500E+00
 U-234 5.000E+00
 U-235 2.330E-01
 U-238 5.000E+00

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years): 0.000E+00 1.000E+00 1.000E+01

TDOSE(t): 1.974E-02 1.974E-02 1.972E-02

M(t): 7.895E-04 7.895E-04 7.888E-04

Maximum TDOSE(t): 1.974E-02 mrem/yr at t = 0.000E+00 years

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Summary : TRR-TRESPASS ON RIP-RAP

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	7.240E-06	0.0004	0.000E+00	0.0000	0.000E+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	8.583E-07	0.0000	0.000E+00	0.0000	0.000E+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	1.799E-08	0.0000	0.000E+00	0.0000	0.000E+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	5.317E-03	0.2694	0.000E+00	0.0000	0.000E+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	4.798E-03	0.2431	0.000E+00	0.0000	0.000E+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	9.309E-03	0.4716	0.000E+00	0.0000	0.000E+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	1.154E-06	0.0001	0.000E+00	0.0000	0.000E+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	2.612E-04	0.0132	0.000E+00	0.0000	0.000E+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	4.276E-10	0.0000	0.000E+00	0.0000	0.000E+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	9.201E-07	0.0000	0.000E+00	0.0000	0.000E+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	4.181E-05	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.974E-02	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-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	7.240E-06	0.0004
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	8.583E-07	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	1.799E-08	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	5.317E-03	0.2694
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	4.798E-03	0.2431
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	9.309E-03	0.4716
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	1.154E-06	0.0001
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	2.612E-04	0.0132
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.276E-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	9.201E-07	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	4.181E-05	0.0021
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	1.974E-02	1.0000

*Sum of all water independent and dependent pathways.

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Summary : TRR-TRESPASS ON RIP-RAP

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)														
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years														
Water Independent Pathways (Inhalation excludes radon)														
Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	7.012E-06	0.0004	0.000E+00	0.0000	0.000E+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	1.085E-06	0.0001	0.000E+00	0.0000	0.000E+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	1.743E-08	0.0000	0.000E+00	0.0000	0.000E+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	5.314E-03	0.2693	0.000E+00	0.0000	0.000E+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	6.908E-03	0.3500	0.000E+00	0.0000	0.000E+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	6.480E-03	0.3283	0.000E+00	0.0000	0.000E+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	3.457E-06	0.0002	0.000E+00	0.0000	0.000E+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	9.796E-04	0.0496	0.000E+00	0.0000	0.000E+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	4.483E-10	0.0000	0.000E+00	0.0000	0.000E+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	9.200E-07	0.0000	0.000E+00	0.0000	0.000E+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	4.180E-05	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.974E-02	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 = 1.000E+00 years														
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	7.012E-06	0.0004
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	1.085E-06	0.0001
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	1.743E-08	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	5.314E-03	0.2693
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	6.908E-03	0.3500
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	6.480E-03	0.3283
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	3.457E-06	0.0002
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	9.796E-04	0.0496
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.483E-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	9.200E-07	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	4.180E-05	0.0021
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	1.974E-02	1.0000

0*Sum of all water independent and dependent pathways.

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Summary : TRR-TRESPASS ON RIP-RAP

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)														
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years														
Water Independent Pathways (Inhalation excludes radon)														
Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	5.259E-06	0.0003	0.000E+00	0.0000	0.000E+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	2.828E-06	0.0001	0.000E+00	0.0000	0.000E+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	1.316E-08	0.0000	0.000E+00	0.0000	0.000E+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	5.287E-03	0.2681	0.000E+00	0.0000	0.000E+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	5.238E-03	0.2656	0.000E+00	0.0000	0.000E+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	2.485E-04	0.0126	0.000E+00	0.0000	0.000E+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	2.412E-05	0.0012	0.000E+00	0.0000	0.000E+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	8.872E-03	0.4499	0.000E+00	0.0000	0.000E+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	1.565E-09	0.0000	0.000E+00	0.0000	0.000E+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	9.192E-07	0.0000	0.000E+00	0.0000	0.000E+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	4.175E-05	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.972E-02	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 = 1.000E+01 years

Radio- Nuclide	Water		Fish		Radon		Water Dependent Pathways 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	5.259E-06	0.0003
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	2.828E-06	0.0001
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	1.316E-08	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	5.287E-03	0.2691
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	5.238E-03	0.2656
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	2.485E-04	0.0126
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	2.412E-05	0.0012
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	8.872E-03	0.4499
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	1.565E-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	9.192E-07	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	4.175E-05	0.0021

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 1.972E-02 1.0000

*Sum of all water independent and dependent pathways.

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Summary : TRR-TRESPASS ON RIP-RAP File: TRR.RAD

Dose/Source Ratios Summed Over All Pathways

Parent and Progeny Principal Radionuclide Contributions Indicated

Parent Product Branch DSR(j,t) (mrem/yr)/(pCi/g)
(i) (j) Fraction* t= 0.000E+00 1.000E+00 1.000E+01

Ac-227	Ac-227	1.000E+00	3.107E-05	3.010E-05	2.257E-05
OPa-231	Pa-231	1.000E+00	3.187E-06	3.186E-06	3.182E-06
Pa-231	Ac-227	1.000E+00	4.972E-07	1.471E-06	8.957E-06
Pa-231	DSR(j)		3.684E-06	4.657E-06	1.214E-05
OPb-210	Pb-210	1.000E+00	3.597E-09	3.487E-09	2.633E-09
ORa-226	Ra-226	1.000E+00	1.063E-03	1.063E-03	1.057E-03
Ra-226	Pb-210	1.000E+00	5.619E-11	1.662E-10	1.013E-09
Ra-226	DSR(j)		1.063E-03	1.063E-03	1.057E-03
ORa-228	Ra-228	1.000E+00	4.109E-04	3.642E-04	1.229E-04
Ra-228	Th-228	1.000E+00	2.288E-04	5.569E-04	5.755E-04
Ra-228	DSR(j)		6.397E-04	9.211E-04	6.984E-04
OTTh-228	Th-228	1.000E+00	1.241E-03	8.640E-04	3.314E-05
OTTh-230	Th-230	1.000E+00	4.411E-10	4.411E-10	4.411E-10
Th-230	Ra-226	1.000E+00	2.304E-07	6.910E-07	4.824E-06
Th-230	Pb-210	1.000E+00	8.135E-15	5.644E-14	2.435E-12
Th-230	DSR(j)		2.308E-07	6.914E-07	4.825E-06
OTTh-232	Th-232	1.000E+00	5.919E-11	5.919E-11	5.918E-11
Th-232	Ra-228	1.000E+00	2.527E-05	7.193E-05	3.129E-04
Th-232	Th-228	1.000E+00	9.566E-06	5.869E-05	8.700E-04
Th-232	DSR(j)		3.483E-05	1.306E-04	1.183E-03
OU-234	U-234	1.000E+00	8.484E-11	8.483E-11	8.472E-11
U-234	Th-230	1.000E+00	1.985E-15	5.956E-15	4.166E-14
U-234	Ra-226	1.000E+00	6.913E-13	4.838E-12	2.283E-10
U-234	Pb-210	1.000E+00	1.834E-20	2.732E-19	7.890E-17
U-234	DSR(j)		8.553E-11	8.967E-11	3.131E-10
OU-235	U-235	1.000E+00	3.949E-06	3.948E-06	3.943E-06
U-235	Pa-231	1.000E+00	3.371E-11	1.011E-10	7.069E-10
U-235	Ac-227	1.000E+00	3.516E-12	2.439E-11	1.051E-09
U-235	DSR(j)		3.949E-06	3.948E-06	3.945E-06
OU-238	U-238	1.000E+00	8.362E-06	8.360E-06	8.350E-06
U-238	U-234	1.000E+00	1.203E-16	3.607E-16	2.522E-15
U-238	Th-230	1.000E+00	1.876E-21	1.313E-20	6.204E-19
U-238	Ra-226	1.000E+00	4.900E-19	7.348E-18	2.269E-15
U-238	Pb-210	1.000E+00	1.041E-26	3.209E-25	5.979E-22
U-238	DSR(j)		8.362E-06	8.360E-06	8.350E-06

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).

The DSR includes contributions from associated (half-life < 0.5 yr) daughters.

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Summary : TRR-TRESPASS ON RIP-RAP File: TRR.RAD

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

ONuclide
(i) t= 0.000E+00 1.000E+00 1.000E+01

Ac-227	8.045E+05	8.307E+05	1.108E+06
Pa-231	6.786E+06	5.369E+06	2.060E+06
Pb-210	6.950E+09	7.170E+09	9.496E+09
Ra-226	2.351E+04	2.352E+04	2.364E+04
Ra-228	3.908E+04	2.714E+04	3.579E+04
Th-228	2.014E+04	2.894E+04	7.544E+05
Th-230	1.083E+08	3.616E+07	5.182E+06
Th-232	*1.096E+05	*1.096E+05	2.113E+04
U-234	*6.245E+09	*6.245E+09	*6.245E+09
U-235	*2.160E+06	*2.160E+06	*2.160E+06
U-238	*3.360E+05	*3.360E+05	*3.360E+05

*At specific activity limit

0

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

CNuclide	Initial (i) (pCi/g)	tmin (years)	DSR(i,tmin) (pCi/g)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Ac-227	2.330E-01	0.000E+00	3.107E-05	8.045E+05	3.107E-05	8.045E+05
Pa-231	2.330E-01	1.000E+01	1.214E-05	2.060E+06	3.684E-06	6.786E+06
Pb-210	5.000E+00	0.000E+00	3.597E-09	6.950E+09	3.597E-09	6.950E+09
Ra-226	5.000E+00	0.000E+00	1.063E-03	2.351E+04	1.063E-03	2.351E+04
Ra-228	7.500E+00	3.328 A 0.007	1.116E-03	2.239E+04	6.397E-04	3.908E+04
Th-228	7.500E+00	0.000E+00	1.241E-03	2.014E+04	1.241E-03	2.014E+04
Th-230	5.000E+00	1.000E+01	4.825E-06	5.182E+06	2.308E-07	1.083E+08
Th-232	7.500E+00	1.000E+01	1.183E-03	2.113E+04	3.483E-05	*1.096E+05
U-234	5.000E+00	1.000E+01	3.131E-10	*6.245E+09	8.553E-11	*6.245E+09
U-235	2.330E-01	0.000E+00	3.949E-06	*2.160E+06	3.949E-06	*2.160E+06
U-238	5.000E+00	0.000E+00	8.362E-06	*3.360E+05	8.362E-06	*3.360E+05

*At specific activity limit

IRSRAD, Version 6.22 T* Limit = 0.5 year 02/24/2005 13:36 Page 17
Summary : TRR-TRESPASS ON RIP-RAP File: TRR.RAD

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

ONuclide	Parent (j)	BRF(i)	DOSE(j,t), mrem/yr
(i)	(i)		t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	7.240E-06 7.012E-06 5.259E-06
Ac-227	Pa-231	1.000E+00	1.159E-07 3.427E-07 2.087E-06
Ac-227	U-235	1.000E+00	8.192E-13 5.682E-12 2.449E-10
Ac-227	DOSE(j)		7.356E-06 7.355E-06 7.346E-06
OPa-231	Pa-231	1.000E+00	7.425E-07 7.424E-07 7.413E-07
Pa-231	U-235	1.000E+00	7.855E-12 2.356E-11 1.647E-10
Pa-231	DOSE(j)		7.425E-07 7.424E-07 7.415E-07
OPb-210	Pb-210	1.000E+00	1.799E-08 1.743E-08 1.316E-08
Pb-210	Ra-226	1.000E+00	2.809E-10 8.311E-10 5.067E-09
Pb-210	Th-230	1.000E+00	4.068E-14 2.822E-13 1.218E-11
Pb-210	U-234	1.000E+00	9.168E-20 1.366E-18 3.945E-16
Pb-210	U-238	1.000E+00	5.205E-26 1.604E-24 2.990E-21
Pb-210	DOSE(j)		1.827E-08 1.827E-08 1.824E-08
ORa-226	Ra-226	1.000E+00	5.317E-03 5.314E-03 5.287E-03
Ra-226	Th-230	1.000E+00	1.152E-06 3.455E-06 2.412E-05
Ra-226	U-234	1.000E+00	3.457E-12 2.419E-11 1.141E-09
Ra-226	U-238	1.000E+00	2.450E-18 3.674E-17 1.135E-14
Ra-226	DOSE(j)		5.319E-03 5.318E-03 5.312E-03
ORa-228	Ra-228	1.000E+00	3.082E-03 2.731E-03 9.219E-04
Ra-228	Th-232	1.000E+00	1.895E-04 5.395E-04 2.347E-03
Ra-228	DOSE(j)		3.271E-03 3.271E-03 3.269E-03
OTh-228	Ra-228	1.000E+00	1.716E-03 4.177E-03 4.316E-03
Th-228	Th-228	1.000E+00	9.309E-03 6.480E-03 2.485E-04
Th-228	Th-232	1.000E+00	7.175E-05 4.402E-04 6.525E-03

Th-228	DOSE(j)	1.110E-02	1.110E-02	1.109E-02
0Th-230	Th-230	1.000E+00	2.206E-09	2.206E-09
Th-230	U-234	1.000E+00	9.927E-15	2.978E-14
Th-230	U-238	1.000E+00	9.381E-21	6.566E-20
Th-230	DOSE(j)		2.206E-09	2.206E-09
0Th-232	Th-232	1.000E+00	4.439E-10	4.439E-10
0U-234	U-234	1.000E+00	4.242E-10	4.241E-10
U-234	U-238	1.000E+00	6.013E-16	1.804E-15
U-234	DOSE(j)		4.242E-10	4.241E-10
0U-235	U-235	1.000E+00	9.200E-07	9.199E-07
0U-238	U-238	1.000E+00	4.181E-05	4.180E-05

BRF(i) is the branch fraction of the parent nuclide.
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Individual Nuclide Soil Concentration
 Parent Nuclide and Branch Fraction Indicated

ONuclide	Parent	BRF(i)	S(j,t), pCi/g
(j)	(i)		t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	2.330E-01 2.257E-01 1.692E-01
Ac-227	Pa-231	1.000E+00	0.000E+00 7.300E-03 6.344E-02
Ac-227	U-235	1.000E+00	0.000E+00 7.763E-08 7.067E-06
Ac-227	S(j):		2.330E-01 2.330E-01 2.327E-01
0Pa-231	Pa-231	1.000E+00	2.330E-01 2.330E-01 2.326E-01
Pa-231	U-235	1.000E+00	0.000E+00 4.929E-06 4.923E-05
Pa-231	S(j):		2.330E-01 2.330E-01 2.327E-01
0Pb-210	Pb-210	1.000E+00	5.000E+00 4.846E+00 3.659E+00
Pb-210	Ra-226	1.000E+00	0.000E+00 1.530E-01 1.331E+00
Pb-210	Th-230	1.000E+00	0.000E+00 3.331E-05 3.036E-03
Pb-210	U-234	1.000E+00	0.000E+00 1.002E-10 9.343E-08
Pb-210	U-238	1.000E+00	0.000E+00 7.114E-17 6.723E-13
Pb-210	S(j):		5.000E+00 4.999E+00 4.993E+00
0Ra-226	Ra-226	1.000E+00	5.000E+00 4.997E+00 4.972E+00
Ra-226	Th-230	1.000E+00	0.000E+00 2.165E-03 2.160E-02
Ra-226	U-234	1.000E+00	0.000E+00 9.747E-09 9.726E-07
Ra-226	U-238	1.000E+00	0.000E+00 9.211E-15 9.194E-12
Ra-226	S(j):		5.000E+00 4.999E+00 4.993E+00
0Ra-228	Ra-228	1.000E+00	7.500E+00 6.647E+00 2.244E+00
Ra-228	Th-232	1.000E+00	0.000E+00 8.517E-01 5.250E+00
Ra-228	S(j):		7.500E+00 7.499E+00 7.494E+00
0Th-228	Ra-228	1.000E+00	0.000E+00 2.140E+00 3.064E+00
Th-228	Th-228	1.000E+00	7.500E+00 5.220E+00 2.002E-01
Th-228	Th-232	1.000E+00	0.000E+00 1.398E-01 4.231E+00
Th-228	S(j):		7.500E+00 7.500E+00 7.495E+00
0Th-230	Th-230	1.000E+00	5.000E+00 5.000E+00 4.999E+00
Th-230	U-234	1.000E+00	0.000E+00 4.501E-05 4.498E-04
Th-230	U-238	1.000E+00	0.000E+00 6.379E-11 6.374E-09
Th-230	S(j):		5.000E+00 5.000E+00 5.000E+00
0Th-232	Th-232	1.000E+00	7.500E+00 7.500E+00 7.500E+00
0U-234	U-234	1.000E+00	5.000E+00 4.999E+00 4.993E+00
U-234	U-238	1.000E+00	0.000E+00 1.417E-05 1.416E-04
U-234	S(j):		5.000E+00 4.999E+00 4.993E+00
0U-235	U-235	1.000E+00	2.330E-01 2.330E-01 2.327E-01
0U-238	U-238	1.000E+00	5.000E+00 4.999E+00 4.993E+00

BRF(i) is the branch fraction of the parent nuclide.
 ORESALC.EXE execution time = 2.78 seconds

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

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(3)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(4)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(5)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(11)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(3)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(4)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(10)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(11)
D-34	Food transfer factors:			
D-34	Ac-227+D, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231, plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D, plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D, plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)

D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)

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Dose Conversion Factor (and Related) Parameter Summary (continued)
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0	Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-230	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34	Th-232	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34	U-234	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34	U-235+D	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34	U-238+D	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-5	Bioaccumulation factors, fresh water, L/kg:				
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)	
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)	
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)	
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)	
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)	
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)	
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)	
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)	
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)	
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)	
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)	
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)	
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)	
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)	
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)	
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)	
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)	
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)	
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)	
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)	

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Dose Conversion Factor (and Related) Parameter Summary (continued)
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Menu	Parameter	Current Value	Default	Parameter Name
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)

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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)	2.000E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICKO
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+01	3.000E+00	---	T(3)
R011	Times for calculations (yr)	not used	1.000E+01	---	T(4)
R011	Times for calculations (yr)	not used	3.000E+01	---	T(5)
R011	Times for calculations (yr)	not used	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	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	3.980E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	3.980E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	8.700E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	8.700E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	6.200E+00	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-228	6.200E+00	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-230	8.700E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-232	6.200E+00	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): U-234	8.700E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-235	3.980E-01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	8.700E+00	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVERO
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP

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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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	---	RUNCOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	1.000E+03	2.000E+01	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+03	1.000E+02	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(4)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(5)

R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	1.240E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	8.200E-03	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)

R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
IRESRAD, Version 6.22 T* Limit = 0.5 year 02/24/2005 21:22 Page 9 Summary : TRE-ALE-TRESPASS ON SLOPE AFTER LIMITED EXCV File: TRR-ALE.RAD					

Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LF15
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LF16
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LW15
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LW16
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LST
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM

C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E+01	---	CO2F

STOR Storage times of contaminated foodstuffs (days):
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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	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	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	IMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

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Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	2000.00 square meters	Ac-227	3.980E-01
Thickness:	2.00 meters	Pa-231	3.980E-01
Cover Depth:	0.00 meters	Pb-210	9.700E+00
		Ra-226	8.700E+00
		Ra-228	6.200E+00
		Th-228	6.200E+00
		Th-230	8.700E+00
		Th-232	6.200E+00
		U-234	8.700E+00
		U-235	3.980E-01
		U-238	8.700E+00

0
 Total Dose TDOSE(t), mrem/yr
 Basic Radiation Dose Limit = 2.500E+01 mrem/yr
 Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years): 0.000E+00 1.000E+00 1.000E+01
 TDOSE(t): 1.590E+00 1.590E+00 1.589E+00
 M(t): 6.361E-02 6.360E-02 6.354E-02
 OMaximum TDOSE(t): 1.590E+00 mrem/yr at t = 0.000E+00 years
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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
 Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	5.899E-03	0.0037	7.674E-03	0.0048	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.735E-03	0.0011
Pa-231	6.680E-04	0.0004	1.608E-03	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.290E-03	0.0008
Pb-210	4.033E-04	0.0003	5.793E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.864E-02	0.0117
Ra-226	7.250E-01	0.4559	2.271E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.753E-03	0.0024
Ra-228	3.326E-01	0.2092	1.051E-03	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.749E-03	0.0017
Th-228	3.958E-01	0.2489	5.231E-03	0.0033	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.258E-03	0.0008
Th-230	2.374E-04	0.0001	8.269E-03	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.428E-03	0.0009
Th-232	1.904E-02	0.0120	2.969E-02	0.0187	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.230E-03	0.0033
U-234	2.691E-05	0.0000	3.348E-03	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.369E-04	0.0005
U-235	2.281E-03	0.0014	1.427E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.182E-05	0.0000
U-238	9.855E-03	0.0062	2.993E-03	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.004E-04	0.0004
Total	1.492E+00	0.9381	6.081E-02	0.0382	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.755E-02	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.
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	1.531E-02	0.0096
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	3.566E-03	0.0022
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	1.962E-02	0.0123
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	7.290E-01	0.4584
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	3.364E-01	0.2115
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	4.023E-01	0.2530
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	9.934E-03	0.0062
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	5.396E-02	0.0339
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.112E-03	0.0026
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	2.456E-03	0.0015
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	1.355E-02	0.0085
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	1.590E+00	1.0000

0*Sum of all water independent and dependent pathways.
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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	5.713E-03	0.0036	7.433E-03	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.681E-03	0.0011
Pa-231	8.527E-04	0.0005	1.848E-03	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.345E-03	0.0008
Pb-210	3.909E-04	0.0002	5.615E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.807E-02	0.0114
Ra-226	7.246E-01	0.4557	2.447E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.321E-03	0.0027
Ra-228	4.077E-01	0.2564	2.424E-03	0.0015	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.795E-03	0.0018
Th-228	2.755E-01	0.1733	3.641E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.755E-04	0.0006
Th-230	5.514E-04	0.0003	8.269E-03	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.429E-03	0.0009
Th-232	6.419E-02	0.0404	2.991E-02	0.0188	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.566E-03	0.0035
U-234	2.690E-05	0.0000	3.347E-03	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.368E-04	0.0005
U-235	2.281E-03	0.0014	1.427E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.184E-05	0.0000
U-238	9.854E-03	0.0062	2.992E-03	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.003E-04	0.0004
Total	1.492E+00	0.9381	6.081E-02	0.0382	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.755E-02	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 = 1.000E+00 years

Water Dependent Pathways

0		Water Dependent Pathways										All 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	1.483E-02	0.0093
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	4.045E-03	0.0025
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	1.902E-02	0.0120
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	7.292E-01	0.4586
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	4.129E-01	0.2597
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	2.800E-01	0.1761
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	1.025E-02	0.0064
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	9.966E-02	0.0627
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.111E-03	0.0026
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	2.456E-03	0.0015
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	1.355E-02	0.0085
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	1.590E+00	1.0000

*Sum of all water independent and dependent pathways.

IRESRAD, Version 6.22 T_a Limit = 0.5 year

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Summary : TRE-ALE-TRESPASS ON SLOPE AFTER LIMITED EXCV

File: TRR-ALE.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-Nuclide	mrem/yr fract.	mrem/yr fract.	mrem/yr fract.	mrem/yr fract.	mrem/yr fract.	mrem/yr fract.	mrem/yr fract.	mrem/yr fract.	mrem/yr fract.	mrem/yr fract.	mrem/yr fract.	mrem/yr fract.	mrem/yr fract.
Ac-227	4.285E-03 0.0027	5.574E-03 0.0035	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	1.260E-03 0.0008		
Pa-231	2.273E-03 0.0014	3.695E-03 0.0023	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	1.761E-03 0.0011		
Pb-210	2.951E-04 0.0002	4.240E-04 0.0003	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+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-02 0.0086		
Ra-226	7.210E-01 0.4539	3.801E-04 0.0002	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	8.694E-03 0.0055		
Ra-228	2.612E-01 0.1644	2.451E-03 0.0015	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	1.336E-03 0.0008		
Th-228	1.057E-02 0.0067	1.397E-04 0.0001	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	3.358E-05 0.0000		
Th-230	3.369E-03 0.0021	8.269E-03 0.0052	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	1.455E-03 0.0009		
Th-232	4.752E-01 0.2991	3.338E-02 0.0210	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	7.864E-03 0.0050		
U-234	2.703E-05 0.0000	3.344E-03 0.0021	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	7.360E-04 0.0005		
U-235	2.279E-03 0.0014	1.431E-04 0.0001	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	3.210E-05 0.0000		
U-238	9.842E-03 0.0062	2.989E-03 0.0019	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	6.995E-04 0.0004		
Total	1.490E+00 0.9381	6.078E-02 0.0383	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	3.751E-02 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 = 1.000E+01 years

Radio- Nuclide	Water		Fish		Radon		Water Dependent Pathways 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	1.112E-02	0.0070
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	7.729E-03	0.0049
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	1.436E-02	0.0090
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	7.301E-01	0.4596
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	2.650E-01	0.1668
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	1.074E-02	0.0068
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	1.309E-02	0.0082
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	5.164E-01	0.3251
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.107E-03	0.0026
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	2.454E-03	0.0015
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	1.353E-02	0.0085

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 1.589E+00 1.0000

0*Sum of all water independent and dependent pathways.

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Summary : TRE-ALE-TRESPASS ON SLOPE AFTER LIMITED EXCV File: TRR-ALE.RAD

Dose/Source Ratios Summed Over All Pathways

Parent and Progeny Principal Radionuclide Contributions Indicated

0Parent Product Branch DSR(j,t) (mrem/yr)/(pCi/g)
(i) (j) Fraction* t= 0.000E+00 1.000E+00 1.000E+01

Ac-227	Ac-227	1.000E+00	3.846E-02	3.725E-02	2.794E-02
OPa-231	Pa-231	1.000E+00	8.345E-03	8.344E-03	8.332E-03
Pa-231	Ac-227	1.000E+00	6.155E-04	1.820E-03	1.109E-02
Pa-231	DSR(j)		8.960E-03	1.016E-02	1.942E-02
OPb-210	Pb-210	1.000E+00	2.255E-03	2.186E-03	1.651E-03
ORa-226	Ra-226	1.000E+00	8.376E-02	8.371E-02	8.329E-02
Ra-226	Pb-210	1.000E+00	3.523E-05	1.042E-04	6.354E-04
Ra-226	DSR(j)		8.379E-02	8.382E-02	8.392E-02
ORa-228	Ra-228	1.000E+00	4.230E-02	3.749E-02	1.265E-02
Ra-228	Th-228	1.000E+00	1.196E-02	2.911E-02	3.008E-02
Ra-228	DSR(j)		5.426E-02	6.660E-02	4.274E-02
OTH-228	Th-228	1.000E+00	6.488E-02	4.516E-02	1.732E-03
OTH-230	Th-230	1.000E+00	1.124E-03	1.124E-03	1.124E-03
Th-230	Ra-226	1.000E+00	1.814E-05	5.442E-05	3.800E-04
Th-230	Pb-210	1.000E+00	5.100E-09	3.538E-08	1.527E-06
Th-230	DSR(j)		1.142E-03	1.178E-03	1.505E-03
OTH-232	Th-232	1.000E+00	5.602E-03	5.602E-03	5.602E-03
Th-232	Ra-228	1.000E+00	2.601E-03	7.404E-03	3.221E-02
Th-232	Th-228	1.000E+00	5.001E-04	3.068E-03	4.548E-02
Th-232	DSR(j)		8.703E-03	1.607E-02	8.329E-02
OU-234	U-234	1.000E+00	4.726E-04	4.725E-04	4.719E-04
U-234	Th-230	1.000E+00	5.057E-09	1.517E-08	1.061E-07
U-234	Ra-226	1.000E+00	5.445E-11	3.810E-10	1.798E-08
U-234	Pb-210	1.000E+00	1.150E-14	1.713E-13	4.946E-11
U-234	DSR(j)		4.726E-04	4.725E-04	4.721E-04
OU-235	U-235	1.000E+00	6.170E-03	6.169E-03	6.162E-03
U-235	Pa-231	1.000E+00	8.828E-08	2.648E-07	1.851E-06
U-235	Ac-227	1.000E+00	4.352E-09	3.019E-08	1.301E-06
U-235	DSR(j)		6.170E-03	6.170E-03	6.165E-03
OU-238	U-238	1.000E+00	1.557E-03	1.557E-03	1.555E-03
U-238	U-234	1.000E+00	6.699E-10	2.009E-09	1.405E-08
U-238	Th-230	1.000E+00	4.779E-15	3.345E-14	1.580E-12
U-238	Ra-226	1.000E+00	3.859E-17	5.787E-16	1.787E-13
U-238	Pb-210	1.000E+00	6.526E-21	2.012E-19	3.748E-16
U-238	DSR(j)		1.557E-03	1.557E-03	1.555E-03

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).

The DSR includes contributions from associated (half-life > 0.5 yr) daughters.

IRESPRAD, Version 6.22 T* Limit = 0.5 year 02/24/2005 21:22 Page 16

Summary : TRE-ALE-TRESPASS ON SLOPE AFTER LIMITED EXCV File: TRR-ALE.RAD

Single Radionuclide Soil Guidelines G(i,t) in pCi/g

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

ONuclide (i)	t= 0.000E+00	1.000E+00	1.000E+01
Ac-227	6.500E+02	6.711E+02	8.948E+02
Pa-231	2.790E+03	2.460E+03	1.287E+03
Pb-210	1.109E+04	1.144E+04	1.515E+04
Ra-226	2.984E+02	2.983E+02	2.979E+02
Ra-228	4.608E+02	3.754E+02	5.850E+02
Th-228	3.853E+02	5.536E+02	1.443E+04
Th-230	2.190E+04	2.122E+04	1.661E+04
Th-232	2.873E+03	1.555E+03	3.002E+02
U-234	5.290E+04	5.291E+04	5.296E+04
U-235	4.052E+03	4.052E+03	4.055E+03
U-238	1.605E+04	1.606E+04	1.607E+04

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

ONuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin) (pCi/g)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Ac-227	3.980E-01	0.000E+00	3.846E-02	6.500E+02	3.846E-02	6.500E+02
Pa-231	3.980E-01	1.000E+01	1.942E-02	1.287E+03	8.960E-03	2.790E+03
Pb-210	8.700E+00	0.000E+00	2.255E-03	1.109E+04	2.255E-03	1.109E+04
Ra-226	8.700E+00	1.000E+01	8.392E-02	2.979E+02	8.379E-02	2.984E+02
Ra-228	6.200E+00	2.714 n 0.005	7.283E-02	3.433E+02	5.426E-02	4.608E+02
Th-228	6.200E+00	0.000E+00	6.488E-02	3.853E+02	6.488E-02	3.853E+02
Th-230	8.700E+00	1.000E+01	1.505E-03	1.661E+04	1.142E-03	2.190E+04
Th-232	6.200E+00	1.000E+01	8.329E-02	3.002E+02	8.703E-03	2.873E+03
U-234	8.700E+00	0.000E+00	4.726E-04	5.290E+04	4.726E-04	5.290E+04
U-235	3.980E-01	0.000E+00	6.170E-03	4.052E+03	6.170E-03	4.052E+03
U-238	8.700E+00	0.000E+00	1.557E-03	1.605E+04	1.557E-03	1.605E+04

IRSRAD, Version 6.22 T_x Limit = 0.5 year 02/24/2005 21:22 Page 17
Summary : TRE-ALE-TRESPASS ON SLOPE AFTER LIMITED EXCV File: TRR-ALE.RAD

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

ONuclide (j)	Parent (i)	BRF(i)	DOSE(j,t), mrem/yr t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	1.531E-02 1.483E-02 1.112E-02
Ac-227	Pa-231	1.000E+00	2.450E-04 7.245E-04 4.412E-03
Ac-227	U-235	1.000E+00	1.732E-09 1.201E-08 5.178E-07
Ac-227	DOSE(j)		1.555E-02 1.555E-02 1.553E-02
OPa-231	Pa-231	1.000E+00	3.321E-03 3.321E-03 3.316E-03
Pa-231	U-235	1.000E+00	3.514E-08 1.054E-07 7.368E-07
Pa-231	DOSE(j)		3.321E-03 3.321E-03 3.317E-03
OPb-210	Pb-210	1.000E+00	1.962E-02 1.902E-02 1.436E-02
Pb-210	Ra-226	1.000E+00	3.065E-04 9.066E-04 5.528E-03
Pb-210	Th-230	1.000E+00	4.437E-08 3.078E-07 1.328E-05
Pb-210	U-234	1.000E+00	1.000E-13 1.490E-12 4.303E-10
Pb-210	U-238	1.000E+00	5.677E-20 1.750E-18 3.261E-15
Pb-210	DOSE(j)		1.993E-02 1.992E-02 1.990E-02
ORa-226	Ra-226	1.000E+00	7.287E-01 7.283E-01 7.246E-01
Ra-226	Th-230	1.000E+00	1.579E-04 4.735E-04 3.306E-03
Ra-226	U-234	1.000E+00	4.737E-10 3.315E-09 1.564E-07
Ra-226	U-238	1.000E+00	3.357E-16 5.035E-15 1.555E-12
Ra-226	DOSE(j)		7.289E-01 7.288E-01 7.279E-01
ORa-228	Ra-228	1.000E+00	2.622E-01 2.324E-01 7.845E-02
Ra-228	Th-232	1.000E+00	1.612E-02 4.590E-02 1.997E-01
Ra-228	DOSE(j)		2.784E-01 2.783E-01 2.782E-01
OTh-228	Ra-228	1.000E+00	7.416E-02 1.805E-01 1.865E-01
Th-228	Th-228	1.000E+00	4.023E-01 2.800E-01 1.074E-02
Th-228	Th-232	1.000E+00	3.100E-03 1.902E-02 2.820E-01
Th-228	DOSE(j)		4.795E-01 4.795E-01 4.792E-01
OTh-230	Th-230	1.000E+00	9.776E-03 9.776E-03 9.775E-03

Th-230	U-234	1.000E+00	4.400E-08	1.320E-07	9.233E-07
Th-230	U-238	1.000E+00	4.158E-14	2.910E-13	1.375E-11
Th-230	DOSE(j)		9.776E-03	9.776E-03	9.776E-03
0Th-232	Th-232	1.000E+00	3.473E-02	3.473E-02	3.473E-02
OU-234	U-234	1.000E+00	4.112E-03	4.111E-03	4.106E-03
U-234	U-238	1.000E+00	5.828E-09	1.748E-08	1.222E-07
U-234	DOSE(j)		4.112E-03	4.111E-03	4.106E-03
OU-235	U-235	1.000E+00	2.456E-03	2.455E-03	2.453E-03
OU-238	U-238	1.000E+00	1.355E-02	1.355E-02	1.353E-02

BRF(i) is the branch fraction of the parent nuclide.
 IRESRAD, Version 6.22 T= Limit = 0.5 year 02/24/2005 21:22 Page 18
 Summary : TRE-ALE-TRESPASS ON SLOPE AFTER LIMITED EXCV File: TRR-ALE.RAD

Individual Nuclide Soil Concentration
 Parent Nuclide and Branch Fraction Indicated

ONuclide	Parent	BRF(i)	S(j,t), pCi/g
(j)	(i)		t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	3.980E-01 3.855E-01 2.891E-01
Ac-227	Pa-231	1.000E+00	0.000E+00 1.247E-02 1.084E-01
Ac-227	U-235	1.000E+00	0.000E+00 1.326E-07 1.207E-05
Ac-227	S(j):		3.980E-01 3.979E-01 3.975E-01
OPa-231	Pa-231	1.000E+00	3.980E-01 3.979E-01 3.974E-01
Pa-231	U-235	1.000E+00	0.000E+00 8.420E-06 8.409E-05
Pa-231	S(j):		3.980E-01 3.979E-01 3.975E-01
OPb-210	Pb-210	1.000E+00	8.700E+00 8.433E+00 6.367E+00
Pb-210	Ra-226	1.000E+00	0.000E+00 2.662E-01 2.316E+00
Pb-210	Th-230	1.000E+00	0.000E+00 5.796E-05 5.282E-03
Pb-210	U-234	1.000E+00	0.000E+00 1.744E-10 1.626E-07
Pb-210	U-238	1.000E+00	0.000E+00 1.238E-16 1.170E-12
Pb-210	S(j):		8.700E+00 8.699E+00 8.688E+00
ORa-226	Ra-226	1.000E+00	8.700E+00 8.695E+00 8.651E+00
Ra-226	Th-230	1.000E+00	0.000E+00 3.768E-03 3.758E-02
Ra-226	U-234	1.000E+00	0.000E+00 1.696E-08 1.692E-06
Ra-226	U-238	1.000E+00	0.000E+00 1.603E-14 1.600E-11
Ra-226	S(j):		8.700E+00 8.699E+00 8.688E+00
ORa-228	Ra-228	1.000E+00	6.200E+00 5.495E+00 1.855E+00
Ra-228	Th-232	1.000E+00	0.000E+00 7.041E-01 4.340E+00
Ra-228	S(j):		6.200E+00 6.199E+00 6.195E+00
0Th-228	Ra-228	1.000E+00	0.000E+00 1.769E+00 2.533E+00
Th-228	Th-228	1.000E+00	6.200E+00 4.316E+00 1.655E-01
Th-228	Th-232	1.000E+00	0.000E+00 1.156E-01 3.498E+00
Th-228	S(j):		6.200E+00 6.200E+00 6.196E+00
0Th-230	Th-230	1.000E+00	8.700E+00 8.700E+00 8.699E+00
Th-230	U-234	1.000E+00	0.000E+00 7.831E-05 7.826E-04
Th-230	U-238	1.000E+00	0.000E+00 1.110E-10 1.109E-08
Th-230	S(j):		8.700E+00 8.700E+00 8.700E+00
0Th-232	Th-232	1.000E+00	6.200E+00 6.200E+00 6.200E+00
OU-234	U-234	1.000E+00	8.700E+00 8.699E+00 8.688E+00
U-234	U-238	1.000E+00	0.000E+00 2.466E-05 2.463E-04
U-234	S(j):		8.700E+00 8.699E+00 8.688E+00
OU-235	U-235	1.000E+00	3.980E-01 3.979E-01 3.975E-01
OU-238	U-238	1.000E+00	8.700E+00 8.699E+00 8.688E+00

BRF(i) is the branch fraction of the parent nuclide.
 ORESALC.EXE execution time = 2.76 seconds

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Summary : W-AME-WORKER-ON MAJOR EXCV DEBRIS File: W-AME.RAD

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

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.290E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(3)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(4)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(5)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(11)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(3)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(4)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(10)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(11)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)

D-34					
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)	
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)	
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)	
D-34					
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)	
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)	
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)	
D-34					

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 Summary : W-AME-WORKER-ON MAJOR EXCV DEBRIS File: W-AME.RAD

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

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-5				
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5				
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)
D-5				

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 Summary : W-AME-WORKER-ON MAJOR EXCV DEBRIS File: W-AME.RAD

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

Menu	Parameter	Current Value	Default	Parameter Name
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)

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Summary : W-AME-WORKER-ON MAJOR EXCV DEBRIS File: W-AME.RAD

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+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(2)
R011	Times for calculations (yr)	1.000E+01	3.000E+00	---	T(3)
R011	Times for calculations (yr)	not used	1.000E+01	---	T(4)
R011	Times for calculations (yr)	not used	3.000E+01	---	T(5)
R011	Times for calculations (yr)	not used	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	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	8.000E-02	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	8.000E-02	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	1.750E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	1.750E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	1.370E+00	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-228	1.370E+00	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-230	1.750E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-232	1.370E+00	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): U-234	1.750E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-235	8.000E-02	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	1.750E+00	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E-01	1.000E-01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP

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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	1.000E+03	2.000E+01	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+03	1.000E+02	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(4)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(5)

R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	1.240E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	5.700E-02	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)

R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LF15
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LF16
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LW15
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LW16
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LS1
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM

C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (l/sec)	not used	7.000E-07	---	EVSIN
C14	C-12 evasion flux rate from soil (l/sec)	not used	1.300E-10	---	REYSIN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E+01	---	CO2F

STOR Storage times of contaminated foodstuffs (days):
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	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	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

Contaminated Zone Dimensions

Area: 10000.00 square meters
 Thickness: 2.00 meters
 Cover Depth: 0.00 meters

Initial Soil Concentrations, pCi/g

Ac-227 8.000E-02
 Pa-231 8.000E-02
 Pb-210 1.750E+00
 Ra-226 1.750E+00
 Ra-228 1.370E+00
 Th-228 1.370E+00
 Th-230 1.750E+00
 Th-232 1.370E+00
 U-234 1.750E+00
 U-235 8.000E-02
 U-238 1.750E+00

0

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years): 0.000E+00 1.000E+00 1.000E+01

TDOSE(t): 2.430E+00 2.430E+00 2.428E+00

M(t): 9.722E-02 9.721E-02 9.712E-02

Maximum TDOSE(t): 2.430E+00 mrem/yr at t = 0.000E+00 years

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Summary : W-AME-WORKER-ON MAJOR EXCV DEBRIS

File: W-AME.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	8.542E-03	0.0035	1.266E-02	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.424E-03	0.0010
Pa-231	9.642E-04	0.0004	2.653E-03	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.803E-03	0.0007
Pb-210	5.888E-04	0.0002	9.566E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.606E-02	0.0107
Ra-226	1.052E+00	0.4328	3.750E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.248E-03	0.0022
Ra-228	5.303E-01	0.2182	1.906E-03	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.223E-03	0.0017
Th-228	6.299E-01	0.2592	9.489E-03	0.0039	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.932E-03	0.0008
Th-230	3.438E-04	0.0001	1.365E-02	0.0056	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.996E-03	0.0008
Th-232	3.036E-02	0.0125	5.385E-02	0.0222	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.034E-03	0.0033
U-234	3.887E-05	0.0000	5.528E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.030E-03	0.0004
U-235	3.286E-03	0.0014	2.355E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.446E-05	0.0000
U-238	1.430E-02	0.0059	4.942E-03	0.0020	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.793E-04	0.0004
Total	2.270E+00	0.9342	1.063E-01	0.0437	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.377E-02	0.0221

0

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	2.363E-02	0.0097
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	5.420E-03	0.0022
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	2.761E-02	0.0114
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	1.057E+00	0.4351
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	5.365E-01	0.2207
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	6.413E-01	0.2639
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	1.599E-02	0.0066
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	9.225E-02	0.0380
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	6.597E-03	0.0027
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	3.566E-03	0.0015
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	2.022E-02	0.0083
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	2.430E+00	1.0000

*Sum of all water independent and dependent pathways.

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Summary : W-AME-WORKER-ON MAJOR EXCV DEBRIS

File: W-AME.RAD

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

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	8.274E-03	0.0034	1.226E-02	0.0050	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.348E-03	0.0010
Pa-231	1.232E-03	0.0005	3.049E-03	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.879E-03	0.0008
Pb-210	5.707E-04	0.0002	9.272E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.526E-02	0.0104
Ra-226	1.051E+00	0.4326	4.041E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.042E-03	0.0025
Ra-228	6.497E-01	0.2674	4.396E-03	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.294E-03	0.0018
Th-228	4.384E-01	0.1804	6.605E-03	0.0027	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.345E-03	0.0006
Th-230	7.993E-04	0.0003	1.365E-02	0.0056	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.999E-03	0.0008
Th-232	1.023E-01	0.0421	5.425E-02	0.0223	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.549E-03	0.0035
U-234	3.887E-05	0.0000	5.527E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.030E-03	0.0004
U-235	3.286E-03	0.0014	2.355E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.449E-05	0.0000
U-238	1.430E-02	0.0059	4.941E-03	0.0020	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.792E-04	0.0004
Total	2.270E+00	0.9342	1.062E-01	0.0437	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.377E-02	0.0221

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

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	2.289E-02	0.0094
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	6.160E-03	0.0025
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	2.676E-02	0.0110
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	1.058E+00	0.4352
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	6.584E-01	0.2709
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	4.464E-01	0.1837
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	1.645E-02	0.0068
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	1.651E-01	0.0679
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	6.596E-03	0.0027
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	3.566E-03	0.0015
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	2.022E-02	0.0083
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	2.430E+00	1.0000

*Sum of all water independent and dependent pathways.

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TW Limit = 0.5 year

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Summary : W-AME-WORKER-ON MAJOR EXCV DEBRIS

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

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	6.205E-03	0.0026	9.198E-03	0.0038	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.761E-03	0.0007
Pa-231	3.288E-03	0.0014	6.096E-03	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.460E-03	0.0010
Pb-210	4.309E-04	0.0002	7.001E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.907E-02	0.0079
Ra-226	1.046E+00	0.4308	6.276E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.216E-02	0.0050
Ra-228	4.160E-01	0.1713	4.447E-03	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.052E-03	0.0008
Th-228	1.682E-02	0.0069	2.533E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.158E-05	0.0000
Th-230	4.888E-03	0.0020	1.365E-02	0.0056	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.035E-03	0.0008
Th-232	7.570E-01	0.3118	6.054E-02	0.0249	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.208E-02	0.0050
U-234	3.905E-05	0.0000	5.522E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.029E-03	0.0004
U-235	3.282E-03	0.0014	2.361E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.485E-05	0.0000
U-238	1.428E-02	0.0059	4.935E-03	0.0020	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.781E-04	0.0004
Total	2.268E+00	0.9341	1.062E-01	0.0437	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.372E-02	0.0221

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

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	1.716E-02	0.0071
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	1.185E-02	0.0049
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	2.020E-02	0.0083
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	1.059E+00	0.4361
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	4.225E-01	0.1740
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	1.712E-02	0.0071
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	2.058E-02	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	8.296E-01	0.3417
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	6.590E-03	0.0027
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	3.563E-03	0.0015
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	2.019E-02	0.0083

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 2.428E+00 1.0000

*Sum of all water independent and dependent pathways.

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Summary : W-AME-WORKER-ON MAJOR EXCV DEBRIS File: W-AME.RAD

Dose/Source Ratios Summed Over All Pathways

Parent and Progeny Principal Radionuclide Contributions Indicated

Parent Product Branch DSR(j,t) (mrem/yr)/(pCi/g)
(i) (j) Fraction* t= 0.000E+00 1.000E+00 1.000E+01

Ac-227	Ac-227	1.000E+00	2.954E-01	2.861E-01	2.145E-01
OPa-231	Pa-231	1.000E+00	6.303E-02	6.302E-02	6.293E-02
Pa-231	Ac-227	1.000E+00	4.726E-03	1.398E-02	8.513E-02
Pa-231	DSR(j)		6.775E-02	7.700E-02	1.481E-01
OPb-210	Pb-210	1.000E+00	1.577E-02	1.529E-02	1.154E-02
ORa-226	Ra-226	1.000E+00	6.040E-01	6.037E-01	6.006E-01
Ra-226	Pb-210	1.000E+00	2.464E-04	7.289E-04	4.444E-03
Ra-226	DSR(j)		6.042E-01	6.044E-01	6.050E-01
ORa-228	Ra-228	1.000E+00	3.053E-01	2.706E-01	9.132E-02
Ra-228	Th-228	1.000E+00	8.630E-02	2.100E-01	2.170E-01
Ra-228	DSR(j)		3.916E-01	4.806E-01	3.084E-01
OTh-228	Th-228	1.000E+00	4.681E-01	3.258E-01	1.250E-02
OTh-230	Th-230	1.000E+00	9.008E-03	9.008E-03	9.007E-03
Th-230	Ra-226	1.000E+00	1.308E-04	3.924E-04	2.740E-03
Th-230	Pb-210	1.000E+00	3.567E-08	2.475E-07	1.068E-05
Th-230	DSR(j)		9.139E-03	9.401E-03	1.176E-02
OTh-232	Th-232	1.000E+00	4.496E-02	4.496E-02	4.496E-02
Th-232	Ra-228	1.000E+00	1.877E-02	5.344E-02	2.325E-01
Th-232	Th-228	1.000E+00	3.608E-03	2.213E-02	3.281E-01
Th-232	DSR(j)		6.733E-02	1.205E-01	6.055E-01
OU-234	U-234	1.000E+00	3.770E-03	3.769E-03	3.765E-03
U-234	Th-230	1.000E+00	4.054E-08	1.216E-07	8.508E-07
U-234	Ra-226	1.000E+00	3.926E-10	2.748E-09	1.297E-07
U-234	Pb-210	1.000E+00	8.041E-14	1.198E-12	3.460E-10
U-234	DSR(j)		3.770E-03	3.769E-03	3.766E-03
OU-235	U-235	1.000E+00	4.458E-02	4.457E-02	4.452E-02
U-235	Pa-231	1.000E+00	6.668E-07	2.000E-06	1.398E-05
U-235	Ac-227	1.000E+00	3.342E-08	2.318E-07	9.990E-06
U-235	DSR(j)		4.458E-02	4.457E-02	4.454E-02
OU-238	U-238	1.000E+00	1.155E-02	1.155E-02	1.154E-02
U-238	U-234	1.000E+00	5.343E-09	1.603E-08	1.121E-07
U-238	Th-230	1.000E+00	3.831E-14	2.682E-13	1.267E-11
U-238	Ra-226	1.000E+00	2.783E-16	4.173E-15	1.289E-12
U-238	Pb-210	1.000E+00	4.565E-20	1.407E-18	2.622E-15
U-238	DSR(j)		1.155E-02	1.155E-02	1.154E-02

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).

The DSR includes contributions from associated (half-life < 0.5 yr) daughters.

1RESRAD, Version 6.22 T* Limit = 0.5 year 02/25/2005 10:22 Page 16
Summary : W-AME-WORKER-ON MAJOR EXCV DEBRIS File: W-AME.RAD

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

ONuclide	t=	0.000E+00	1.000E+00	1.000E+01
(i)				
Ac-227	8.464E+01	8.739E+01	1.165E+02	
Pa-231	3.690E+02	3.247E+02	1.688E+02	
Pb-210	1.585E+03	1.635E+03	2.165E+03	
Ra-226	4.137E+01	4.136E+01	4.132E+01	
Ra-228	6.385E+01	5.202E+01	8.107E+01	
Th-228	5.341E+01	7.673E+01	2.000E+03	
Th-230	2.736E+03	2.659E+03	2.126E+03	
Th-232	3.713E+02	2.074E+02	4.129E+01	
U-234	6.632E+03	6.632E+03	6.639E+03	
U-235	5.606E+02	5.609E+02	5.613E+02	
U-238	2.164E+03	2.164E+03	2.167E+03	

0

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

ONuclide	Initial	tmin	DSR(i,tmin)	G(i,tmin)	DSR(i,tmax)	G(i,tmax)
(i)	(pCi/g)	(years)		(pCi/g)		(pCi/g)
Ac-227	8.000E-02	0.000E+00	2.954E-01	8.464E+01	2.954E-01	8.464E+01
Pa-231	8.000E-02	1.000E+01	1.481E-01	1.688E+02	6.775E-02	3.690E+02
Pb-210	1.750E+00	0.000E+00	1.577E-02	1.585E+03	1.577E-02	1.585E+03
Ra-226	1.750E+00	1.000E+01	6.050E-01	4.132E+01	6.042E-01	4.137E+01
Ra-228	1.370E+00	2.716 A 0.005	5.255E-01	4.757E+01	3.916E-01	6.385E+01
Th-228	1.370E+00	0.000E+00	4.681E-01	5.341E+01	4.681E-01	5.341E+01
Th-230	1.750E+00	1.000E+01	1.176E-02	2.126E+03	9.139E-03	2.736E+03
Th-232	1.370E+00	1.000E+01	6.055E-01	4.129E+01	6.733E-02	3.713E+02
U-234	1.750E+00	0.000E+00	3.770E-03	6.632E+03	3.770E-03	6.632E+03
U-235	8.000E-02	0.000E+00	4.458E-02	5.608E+02	4.458E-02	5.608E+02
U-238	1.750E+00	0.000E+00	1.155E-02	2.164E+03	1.155E-02	2.164E+03

RESRAD, Version 6.22 T* Limit = 0.5 year 02/25/2005 10:22 Page 17
Summary : W-AME-WORKER-ON MAJOR EXCV DEBRIS File: W-AME.RAD

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

ONuclide	Parent	BRF(i)	DOSE(j,t), mrem/yr
(j)	(i)		t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	2.363E-02 2.289E-02 1.716E-02
Ac-227	Pa-231	1.000E+00	3.781E-04 1.118E-03 6.811E-03
Ac-227	U-235	1.000E+00	2.674E-09 1.855E-08 7.992E-07
Ac-227	DOSE(j)		2.401E-02 2.400E-02 2.398E-02
OPa-231	Pa-231	1.000E+00	5.042E-03 5.041E-03 5.034E-03
Pa-231	U-235	1.000E+00	5.334E-08 1.600E-07 1.119E-06
Pa-231	DOSE(j)		5.042E-03 5.041E-03 5.035E-03
OPb-210	Pb-210	1.000E+00	2.761E-02 2.676E-02 2.020E-02
Pb-210	Ra-226	1.000E+00	4.312E-04 1.276E-03 7.777E-03
Pb-210	Th-230	1.000E+00	6.243E-08 4.331E-07 1.869E-05
Pb-210	U-234	1.000E+00	1.407E-13 2.096E-12 6.055E-10
Pb-210	U-238	1.000E+00	7.988E-20 2.463E-18 4.588E-15
Pb-210	DOSE(j)		2.804E-02 2.803E-02 2.800E-02
ORa-226	Ra-226	1.000E+00	1.057E+00 1.056E+00 1.051E+00
Ra-226	Th-230	1.000E+00	2.290E-04 6.867E-04 4.795E-03
Ra-226	U-234	1.000E+00	6.871E-10 4.809E-09 2.269E-07
Ra-226	U-238	1.000E+00	4.870E-16 7.303E-15 2.255E-12
Ra-226	DOSE(j)		1.057E+00 1.057E+00 1.056E+00
ORa-228	Ra-228	1.000E+00	4.182E-01 3.707E-01 1.251E-01
Ra-228	Th-232	1.000E+00	2.572E-02 7.321E-02 3.185E-01
Ra-228	DOSE(j)		4.439E-01 4.439E-01 4.436E-01
OTH-228	Ra-228	1.000E+00	1.182E-01 2.877E-01 2.973E-01
Th-228	Th-228	1.000E+00	6.413E-01 4.464E-01 1.712E-02
Th-228	Th-232	1.000E+00	4.942E-03 3.032E-02 4.495E-01
Th-228	DOSE(j)		7.645E-01 7.644E-01 7.640E-01
OTH-230	Th-230	1.000E+00	1.576E-02 1.576E-02 1.576E-02

Th-230	U-234	1.000E+00	7.095E-08	2.128E-07	1.489E-06
Th-230	U-238	1.000E+00	6.705E-14	4.693E-13	2.217E-11
Th-230	DOSE(j)		1.576E-02	1.576E-02	1.576E-02
0Th-232	Th-232	1.000E+00	6.159E-02	6.159E-02	6.159E-02
OU-234	U-234	1.000E+00	6.597E-03	6.596E-03	6.588E-03
U-234	U-238	1.000E+00	9.351E-09	2.805E-08	1.961E-07
U-234	DOSE(j)		6.597E-03	6.596E-03	6.588E-03
OU-235	U-235	1.000E+00	3.566E-03	3.566E-03	3.561E-03
OU-238	U-238	1.000E+00	2.022E-02	2.022E-02	2.019E-02

BRF(i) is the branch fraction of the parent nuclide.

1RESRAD, Version 6.22 T₀ Limit = 0.5 year 02/25/2005 10:22 Page 18
Summary : W-AME-WORKER-ON MAJOR EXCV DEBRIS File: W-AME.RAD

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

ONuclide	Parent	BRF(i)	S(j,t), pCi/g
(j)	(i)		t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	8.000E-02 7.748E-02 5.811E-02
Ac-227	Pa-231	1.000E+00	0.000E+00 2.506E-03 2.178E-02
Ac-227	U-235	1.000E+00	0.000E+00 2.666E-08 2.426E-06
Ac-227	S(j):		8.000E-02 7.999E-02 7.989E-02
0Pa-231	Pa-231	1.000E+00	8.000E-02 7.999E-02 7.988E-02
Pa-231	U-235	1.000E+00	0.000E+00 1.692E-06 1.690E-05
Pa-231	S(j):		8.000E-02 7.999E-02 7.989E-02
0Pb-210	Pb-210	1.000E+00	1.750E+00 1.696E+00 1.281E+00
Pb-210	Ra-226	1.000E+00	0.000E+00 5.354E-02 4.658E-01
Pb-210	Th-230	1.000E+00	0.000E+00 1.166E-05 1.063E-03
Pb-210	U-234	1.000E+00	0.000E+00 3.507E-11 3.270E-08
Pb-210	U-238	1.000E+00	0.000E+00 2.490E-17 2.353E-13
Pb-210	S(j):		1.750E+00 1.750E+00 1.748E+00
0Ra-226	Ra-226	1.000E+00	1.750E+00 1.749E+00 1.740E+00
Ra-226	Th-230	1.000E+00	0.000E+00 7.579E-04 7.559E-03
Ra-226	U-234	1.000E+00	0.000E+00 3.411E-09 3.404E-07
Ra-226	U-238	1.000E+00	0.000E+00 3.224E-15 3.218E-12
Ra-226	S(j):		1.750E+00 1.750E+00 1.748E+00
0Ra-228	Ra-228	1.000E+00	1.370E+00 1.214E+00 4.098E-01
Ra-228	Th-232	1.000E+00	0.000E+00 1.556E-01 9.591E-01
Ra-228	S(j):		1.370E+00 1.370E+00 1.369E+00
0Th-228	Ra-228	1.000E+00	0.000E+00 3.908E-01 5.597E-01
Th-228	Th-228	1.000E+00	1.370E+00 9.536E-01 3.658E-02
Th-228	Th-232	1.000E+00	0.000E+00 2.554E-02 7.729E-01
Th-228	S(j):		1.370E+00 1.370E+00 1.369E+00
0Th-230	Th-230	1.000E+00	1.750E+00 1.750E+00 1.750E+00
Th-230	U-234	1.000E+00	0.000E+00 1.575E-05 1.574E-04
Th-230	U-238	1.000E+00	0.000E+00 2.233E-11 2.231E-09
Th-230	S(j):		1.750E+00 1.750E+00 1.750E+00
0Th-232	Th-232	1.000E+00	1.370E+00 1.370E+00 1.370E+00
OU-234	U-234	1.000E+00	1.750E+00 1.750E+00 1.748E+00
U-234	U-238	1.000E+00	0.000E+00 4.961E-06 4.954E-05
U-234	S(j):		1.750E+00 1.750E+00 1.748E+00
OU-235	U-235	1.000E+00	8.000E-02 7.999E-02 7.989E-02
OU-238	U-238	1.000E+00	1.750E+00 1.750E+00 1.748E+00

BRF(i) is the branch fraction of the parent nuclide.

0RESALC.EXE execution time = 2.70 seconds

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 Summary : WC1-WORKER-CURRENT CONDITION-TOP File: WC1.RAD

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

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(3)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(4)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(5)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(11)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(3)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(4)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(10)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(11)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)

D-34
 D-34 Ra-228+D , plant/soil concentration ratio, dimensionless 4.000E-02 4.000E-02 RTF(5,1)
 D-34 Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) 1.000E-03 1.000E-03 RTF(5,2)
 D-34 Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) 1.000E-03 1.000E-03 RTF(5,3)
 D-34
 D-34 Th-228+D , plant/soil concentration ratio, dimensionless 1.000E-03 1.000E-03 RTF(6,1)
 D-34 Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) 1.000E-04 1.000E-04 RTF(6,2)
 D-34 Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d) 5.000E-06 5.000E-06 RTF(6,3)
 D-34
 IRESRAD, Version 6.22 T* Limit = 0.5 year 02/24/2005 14:41 Page 3
 Summary : WCI-WORKER-CURRENT CONDITION-TOP File: WCI.RAD

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

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)

Dose Conversion Factor (and Related) Parameter Summary (continued)

File: FGR 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-5	U-238+D, fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238+D, crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)

IRESRAD, Version 6.22 T* Limit = 0.5 year
Summary : WC1-WORKER-CURRENT CONDITION-TOP

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File: WC1.RAD

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	2.000E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICKO
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	T1
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+01	3.000E+00	---	T(3)
R011	Times for calculations (yr)	not used	1.000E+01	---	T(4)
R011	Times for calculations (yr)	not used	3.000E+01	---	T(5)
R011	Times for calculations (yr)	not used	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	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	2.330E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	2.330E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	5.000E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.000E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	7.500E+00	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-228	7.500E+00	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-230	5.000E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-232	7.500E+00	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): U-234	5.000E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-235	2.330E-01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	5.000E+00	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVERO
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP

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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EFSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	1.000E+03	2.000E+01	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+03	1.000E+02	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(4)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(5)

R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	1.240E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	1.900E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	2.100E-02	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	0.000E+00	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)

R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LF15
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LF16
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LW15
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LW16
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LS1
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM

C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (l/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (l/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E+01	---	CO2F

STOR Storage times of contaminated foodstuffs (days):
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	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	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

Summary : WC1-WORKER-CURRENT CONDITION-TOP

File: WC1.RAD

Contaminated Zone Dimensions

Initial Soil Concentrations, pCi/g

Area: 2000.00 square meters
 Thickness: 2.00 meters
 Cover Depth: 0.00 meters

Ac-227 2.330E-01
 Pa-231 2.330E-01
 Pb-210 5.000E+00
 Ra-226 5.000E+00
 Ra-228 7.500E+00
 Th-228 7.500E+00
 Th-230 5.000E+00
 Th-232 7.500E+00
 U-234 5.000E+00
 U-235 2.330E-01
 U-238 5.000E+00

0

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years): 0.000E+00 1.000E+00 1.000E+01

TDOSE(t): 7.778E-01 7.778E-01 7.772E-01

M(t): 3.111E-02 3.111E-02 3.109E-02

0Maximum TDOSE(t): 7.778E-01 mrem/yr at t = 0.000E+00 years

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Summary : WC1-WORKER-CURRENT CONDITION-TOP File: WC1.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

0

0

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.680E-03	0.0022	4.602E-03	0.0059	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.601E-03	0.0033
Pa-231	1.903E-04	0.0002	9.643E-04	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.935E-03	0.0025
Pb-210	1.128E-04	0.0001	3.411E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.743E-02	0.0353
Ra-226	2.028E-01	0.2607	1.337E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.524E-03	0.0071
Ra-228	1.958E-01	0.2517	1.302E-03	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.517E-03	0.0109
Th-228	2.330E-01	0.2995	6.482E-03	0.0083	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.897E-03	0.0050
Th-230	6.638E-05	0.0001	4.868E-03	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.101E-03	0.0027
Th-232	1.121E-02	0.0144	3.679E-02	0.0473	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.620E-02	0.0208
U-234	7.524E-06	0.0000	1.971E-03	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.085E-03	0.0014
U-235	6.498E-04	0.0008	8.559E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.770E-05	0.0001
U-238	2.756E-03	0.0035	1.762E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.031E-03	0.0013
Total	6.482E-01	0.8333	5.930E-02	0.0762	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.037E-02	0.0905

0

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

0

0

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	8.884E-03	0.0114
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	3.089E-03	0.0040
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	2.769E-02	0.0359
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	2.084E-01	0.2679
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	2.056E-01	0.2643
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	2.433E-01	0.3129
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	7.036E-03	0.0090
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	6.420E-02	0.0825
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	3.063E-03	0.0039
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	7.831E-04	0.0010
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	5.549E-03	0.0071
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	7.778E-01	1.0000

0*Sum of all water independent and dependent pathways.

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

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.628E-03	0.0021	4.457E-03	0.0057	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.520E-03	0.0032
Pa-231	2.429E-04	0.0003	1.108E-03	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.016E-03	0.0026
Pb-210	1.093E-04	0.0001	3.306E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.659E-02	0.0342
Ra-226	2.026E-01	0.2605	1.441E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.360E-03	0.0082
Ra-228	2.400E-01	0.3085	3.003E-03	0.0039	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.660E-03	0.0111
Th-228	1.622E-01	0.2085	4.512E-03	0.0058	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.712E-03	0.0035
Th-230	1.542E-04	0.0002	4.868E-03	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.104E-03	0.0027
Th-232	3.778E-02	0.0486	3.706E-02	0.0476	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.724E-02	0.0222
U-234	7.524E-06	0.0000	1.971E-03	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.084E-03	0.0014
U-235	6.498E-04	0.0008	8.560E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.774E-05	0.0001
U-238	2.756E-03	0.0035	1.762E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.031E-03	0.0013
Total	6.481E-01	0.8333	5.930E-02	0.0762	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.037E-02	0.0905

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	8.604E-03	0.0111
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	3.367E-03	0.0043
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	2.703E-02	0.0348
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	2.091E-01	0.2689
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	2.516E-01	0.3235
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	1.694E-01	0.2178
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	7.126E-03	0.0092
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	9.208E-02	0.1184
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	3.063E-03	0.0039
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	7.831E-04	0.0010
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	5.548E-03	0.0071
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	7.778E-01	1.0000

0*Sum of all water independent and dependent pathways.

1RESRAD, Version 6.22 T_w Limit = 0.5 year

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Summary : WC1-WORKER-CURRENT CONDITION-TOP

File: WC1.RAD

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

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.221E-03	0.0016	3.343E-03	0.0043	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.890E-03	0.0024
Pa-231	6.475E-04	0.0008	2.216E-03	0.0029	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.640E-03	0.0034
Pb-210	8.254E-05	0.0001	2.496E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.008E-02	0.0258
Ra-226	2.016E-01	0.2594	2.237E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.280E-02	0.0165
Ra-228	1.537E-01	0.1978	3.038E-03	0.0039	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.140E-03	0.0053
Th-228	6.220E-03	0.0080	1.731E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.040E-04	0.0001
Th-230	9.423E-04	0.0012	4.868E-03	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.142E-03	0.0028
Th-232	2.797E-01	0.3599	4.136E-02	0.0532	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.436E-02	0.0313
U-234	7.559E-06	0.0000	1.969E-03	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.083E-03	0.0014
U-235	6.491E-04	0.0008	8.582E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.813E-05	0.0001
U-238	2.752E-03	0.0035	1.760E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.030E-03	0.0013
Total	6.476E-01	0.8332	5.928E-02	0.0763	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.031E-02	0.0905

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

Radio- Nuclide	Water		Fish		Radon		Water Dependent Pathways 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	6.453E-03	0.0083
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	5.503E-03	0.0071
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	2.041E-02	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	2.147E-01	0.2762
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	1.609E-01	0.2070
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	6.497E-03	0.0084
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	7.952E-03	0.0102
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	3.454E-01	0.4444
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	3.060E-03	0.0039
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	7.830E-04	0.0010
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	5.542E-03	0.0071

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 7.772E-01 1.0000

0*Sum of all water independent and dependent pathways.

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Summary : WCL-WORKER-CURRENT CONDITION-TOP File: WCL.RAD

Dose/Source Ratios Summed Over All Pathways

Parent and Progeny Principal Radionuclide Contributions Indicated

0Parent Product Branch DSR(j,t) (mrem/yr)/(pCi/g)
(i) (j) Fraction* t= 0.000E+00 1.000E+00 1.000E+01

Ac-227	Ac-227	1.000E+00	3.813E-02	3.693E-02	2.770E-02
0Pa-231	Pa-231	1.000E+00	1.265E-02	1.265E-02	1.263E-02
Pa-231	Ac-227	1.000E+00	6.101E-04	1.805E-03	1.099E-02
Pa-231	DSR(j)		1.326E-02	1.445E-02	2.362E-02
0Pb-210	Pb-210	1.000E+00	5.577E-03	5.406E-03	4.082E-03
0Ra-226	Ra-226	1.000E+00	4.159E-02	4.157E-02	4.136E-02
Ra-226	Pb-210	1.000E+00	8.711E-05	2.577E-04	1.571E-03
Ra-226	DSR(j)		4.168E-02	4.183E-02	4.293E-02
0Ra-228	Ra-228	1.000E+00	2.143E-02	1.899E-02	6.411E-03
Ra-228	Th-228	1.000E+00	5.982E-03	1.456E-02	1.504E-02
Ra-228	DSR(j)		2.741E-02	3.355E-02	2.146E-02
0Th-228	Th-228	1.000E+00	3.245E-02	2.258E-02	8.662E-04
0Th-230	Th-230	1.000E+00	1.398E-03	1.398E-03	1.398E-03
Th-230	Ra-226	1.000E+00	9.011E-06	2.702E-05	1.887E-04
Th-230	Pb-210	1.000E+00	1.261E-08	8.749E-08	3.775E-06
Th-230	DSR(j)		1.407E-03	1.425E-03	1.590E-03
0Th-232	Th-232	1.000E+00	6.992E-03	6.992E-03	6.992E-03
Th-232	Ra-228	1.000E+00	1.318E-03	3.751E-03	1.632E-02
Th-232	Th-228	1.000E+00	2.501E-04	1.534E-03	2.274E-02
Th-232	DSR(j)		8.560E-03	1.228E-02	4.605E-02
0U-234	U-234	1.000E+00	6.126E-04	6.125E-04	6.118E-04
U-234	Th-230	1.000E+00	6.293E-09	1.888E-08	1.320E-07
U-234	Ra-226	1.000E+00	2.704E-11	1.892E-10	8.929E-09
U-234	Pb-210	1.000E+00	2.843E-14	4.235E-13	1.223E-10
U-234	DSR(j)		6.126E-04	6.125E-04	6.119E-04
0U-235	U-235	1.000E+00	3.361E-03	3.361E-03	3.357E-03
U-235	Pa-231	1.000E+00	1.338E-07	4.014E-07	2.806E-06
U-235	Ac-227	1.000E+00	4.314E-09	2.993E-08	1.290E-06
U-235	DSR(j)		3.361E-03	3.361E-03	3.361E-03
0U-238	U-238	1.000E+00	1.110E-03	1.110E-03	1.108E-03
U-238	U-234	1.000E+00	8.683E-10	2.605E-09	1.821E-08
U-238	Th-230	1.000E+00	5.946E-15	4.162E-14	1.966E-12
U-238	Ra-226	1.000E+00	1.916E-17	2.874E-16	8.875E-14
U-238	Pb-210	1.000E+00	1.614E-20	4.975E-19	9.270E-16
U-238	DSR(j)		1.110E-03	1.110E-03	1.108E-03

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).

The DSR includes contributions from associated (half-life < 0.5 yr) daughters.

1RESRAD, Version 6.22 T* Limit = 0.5 year 02/24/2005 14:41 Page 16
Summary : WCL-WORKER-CURRENT CONDITION-TOP File: WCL.RAD

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

ONuclide (i)	t = 0.000E+00	1.000E+00	1.000E+01
Ac-227	6.557E+02	6.770E+02	9.027E+02
Pa-231	1.886E+03	1.730E+03	1.058E+03
Pb-210	4.483E+03	4.625E+03	6.125E+03
Ra-226	5.998E+02	5.977E+02	5.823E+02
Ra-228	9.120E+02	7.451E+02	1.165E+03
Th-228	7.705E+02	1.107E+03	2.886E+04
Th-230	1.777E+04	1.754E+04	1.572E+04
Th-232	2.921E+03	2.036E+03	5.428E+02
U-234	4.081E+04	4.081E+04	4.086E+04
U-235	7.438E+03	7.438E+03	7.439E+03
U-238	2.253E+04	2.253E+04	2.256E+04

0

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

ONuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin) (pCi/g)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Ac-227	2.330E-01	0.000E+00	3.813E-02	6.557E+02	3.813E-02	6.557E+02
Pa-231	2.330E-01	1.000E+01	2.362E-02	1.058E+03	1.326E-02	1.886E+03
Pb-210	5.000E+00	0.000E+00	5.577E-03	4.483E+03	5.577E-03	4.483E+03
Ra-226	5.000E+00	1.000E+01	4.293E-02	5.823E+02	4.168E-02	5.998E+02
Ra-228	7.500E+00	2.699 n 0.005	3.662E-02	6.827E+02	2.741E-02	9.120E+02
Th-228	7.500E+00	0.000E+00	3.245E-02	7.705E+02	3.245E-02	7.705E+02
Th-230	5.000E+00	1.000E+01	1.590E-03	1.572E+04	1.407E-03	1.777E+04
Th-232	7.500E+00	1.000E+01	4.605E-02	5.428E+02	8.560E-03	2.921E+03
U-234	5.000E+00	0.000E+00	6.126E-04	4.081E+04	6.126E-04	4.081E+04
U-235	2.330E-01	0.000E+00	3.361E-03	7.438E+03	3.361E-03	7.438E+03
U-238	5.000E+00	0.000E+00	1.110E-03	2.253E+04	1.110E-03	2.253E+04

1RESRAD, Version 6.22 Te Limit = 0.5 year 02/24/2005 14:41 Page 17
Summary : WCI-WORKER-CURRENT CONDITION-TOP File: WCI.RAD

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

ONuclide Parent (j)	Parent (i)	BRF(i)	DOSE(j,t), mrem/yr t = 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	8.884E-03 8.604E-03 6.453E-03
Ac-227	Pa-231	1.000E+00	1.422E-04 4.205E-04 2.561E-03
Ac-227	U-235	1.000E+00	1.005E-09 6.973E-09 3.005E-07
Ac-227	DOSE(j)		9.026E-03 9.025E-03 9.014E-03
OPa-231	Pa-231	1.000E+00	2.947E-03 2.947E-03 2.942E-03
Pa-231	U-235	1.000E+00	3.118E-08 9.352E-08 6.538E-07
Pa-231	DOSE(j)		2.947E-03 2.947E-03 2.943E-03
OPb-210	Pb-210	1.000E+00	2.789E-02 2.703E-02 2.041E-02
Pb-210	Ra-226	1.000E+00	4.356E-04 1.288E-03 7.856E-03
Pb-210	Th-230	1.000E+00	6.306E-08 4.375E-07 1.888E-05
Pb-210	U-234	1.000E+00	1.421E-13 2.118E-12 6.116E-10
Pb-210	U-238	1.000E+00	8.069E-20 2.488E-18 4.635E-15
Pb-210	DOSE(j)		2.832E-02 2.832E-02 2.828E-02
ORa-226	Ra-226	1.000E+00	2.080E-01 2.079E-01 2.068E-01
Ra-226	Th-230	1.000E+00	4.505E-05 1.351E-04 9.434E-04
Ra-226	U-234	1.000E+00	1.352E-10 9.461E-10 4.464E-08
Ra-226	U-238	1.000E+00	9.582E-17 1.437E-15 4.438E-13
Ra-226	DOSE(j)		2.080E-01 2.080E-01 2.077E-01
ORa-228	Ra-228	1.000E+00	1.607E-01 1.425E-01 4.808E-02
Ra-228	Th-232	1.000E+00	9.883E-03 2.813E-02 1.224E-01
Ra-228	DOSE(j)		1.706E-01 1.706E-01 1.705E-01
0Th-228	Ra-228	1.000E+00	4.486E-02 1.092E-01 1.128E-01
Th-228	Th-228	1.000E+00	2.433E-01 1.694E-01 6.497E-03
Th-228	Th-232	1.000E+00	1.875E-03 1.151E-02 1.706E-01
Th-228	DOSE(j)		2.901E-01 2.901E-01 2.899E-01
0Th-230	Th-230	1.000E+00	6.991E-03 6.990E-03 6.990E-03

Th-230	U-234	1.000E+00	3.146E-08	9.438E-08	6.602E-07
Th-230	U-238	1.000E+00	2.973E-14	2.081E-13	9.832E-12
Th-230	DOSE(j)		6.991E-03	6.991E-03	6.990E-03
0Th-232	Th-232	1.000E+00	5.244E-02	5.244E-02	5.244E-02
0U-234	U-234	1.000E+00	3.063E-03	3.063E-03	3.059E-03
U-234	U-238	1.000E+00	4.342E-09	1.302E-08	9.105E-08
U-234	DOSE(j)		3.063E-03	3.063E-03	3.059E-03
0U-235	U-235	1.000E+00	7.831E-04	7.830E-04	7.821E-04
0U-238	U-238	1.000E+00	5.549E-03	5.548E-03	5.541E-03

BRF(i) is the branch fraction of the parent nuclide.
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 Summary : WC1-WORKER-CURRENT CONDITION-TOP File: WC1.RAD

Individual Nuclide Soil Concentration
 Parent Nuclide and Branch Fraction Indicated

0Nuclide	Parent	BRF(i)	S(j,t), pCi/g
(j)	(i)		t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	2.330E-01 2.257E-01 1.692E-01
Ac-227	Pa-231	1.000E+00	0.000E+00 7.300E-03 6.344E-02
Ac-227	U-235	1.000E+00	0.000E+00 7.763E-08 7.667E-06
Ac-227	S(j):		2.330E-01 2.330E-01 2.327E-01
0Pa-231	Pa-231	1.000E+00	2.330E-01 2.330E-01 2.326E-01
Pa-231	U-235	1.000E+00	0.000E+00 4.929E-06 4.923E-05
Pa-231	S(j):		2.330E-01 2.330E-01 2.327E-01
0Pb-210	Pb-210	1.000E+00	5.000E+00 4.846E+00 3.659E+00
Pb-210	Ra-226	1.000E+00	0.000E+00 1.530E-01 1.331E+00
Pb-210	Th-230	1.000E+00	0.000E+00 3.331E-05 3.036E-03
Pb-210	U-234	1.000E+00	0.000E+00 1.002E-10 9.343E-08
Pb-210	U-238	1.000E+00	0.000E+00 7.114E-17 6.723E-13
Pb-210	S(j):		5.000E+00 4.999E+00 4.993E+00
0Ra-226	Ra-226	1.000E+00	5.000E+00 4.997E+00 4.972E+00
Ra-226	Th-230	1.000E+00	0.000E+00 2.165E-03 2.160E-02
Ra-226	U-234	1.000E+00	0.000E+00 9.747E-09 9.726E-07
Ra-226	U-238	1.000E+00	0.000E+00 9.211E-15 9.194E-12
Ra-226	S(j):		5.000E+00 4.999E+00 4.993E+00
0Ra-228	Ra-228	1.000E+00	7.500E+00 6.647E+00 2.244E+00
Ra-228	Th-232	1.000E+00	0.000E+00 8.517E-01 5.250E+00
Ra-228	S(j):		7.500E+00 7.499E+00 7.494E+00
0Th-228	Ra-228	1.000E+00	0.000E+00 2.140E+00 3.064E+00
Th-228	Th-228	1.000E+00	7.500E+00 5.220E+00 2.002E-01
Th-228	Th-232	1.000E+00	0.000E+00 1.398E-01 4.231E+00
Th-228	S(j):		7.500E+00 7.500E+00 7.495E+00
0Th-230	Th-230	1.000E+00	5.000E+00 5.000E+00 4.999E+00
Th-230	U-234	1.000E+00	0.000E+00 4.501E-05 4.498E-04
Th-230	U-238	1.000E+00	0.000E+00 6.379E-11 6.374E-09
Th-230	S(j):		5.000E+00 5.000E+00 5.000E+00
0Th-232	Th-232	1.000E+00	7.500E+00 7.500E+00 7.500E+00
0U-234	U-234	1.000E+00	5.000E+00 4.999E+00 4.993E+00
U-234	U-238	1.000E+00	0.000E+00 1.417E-05 1.416E-04
U-234	S(j):		5.000E+00 4.999E+00 4.993E+00
0U-235	U-235	1.000E+00	2.330E-01 2.330E-01 2.327E-01
0U-238	U-238	1.000E+00	5.000E+00 4.999E+00 4.993E+00

BRF(i) is the branch fraction of the parent nuclide.
 ORESALC.EXE execution time = 2.60 seconds

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 Summary : WC2-WORKER-CURRENT CONDITION-SLOPE File: WC2.RAD

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

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(3)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(4)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(5)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(11)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(3)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(4)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(10)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(11)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)

D-34					
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)	
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)	
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)	
D-34					
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)	
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)	
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)	
D-34					

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 Summary : WC2-WORKER-CURRENT CONDITION-SLOPE File: WC2.RAD

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

0	Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-230	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34					
D-34	Th-232	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34					
D-34	U-234	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34					
D-34	U-235+D	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34					
D-34	U-238+D	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-5					
D-5	Bioaccumulation factors, fresh water, L/kg:				
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)	
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)	
D-5					
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)	
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)	
D-5					
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)	
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)	
D-5					
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)	
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)	
D-5					
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)	
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)	
D-5					
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)	
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)	
D-5					
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)	
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)	
D-5					
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)	
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)	
D-5					
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)	
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)	
D-5					
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)	
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)	
D-5					

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

Menu	Parameter	Current Value	Default	Parameter Name
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)

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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)	2.000E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	T1
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+01	3.000E+00	---	T(3)
R011	Times for calculations (yr)	not used	1.000E+01	---	T(4)
R011	Times for calculations (yr)	not used	3.000E+01	---	T(5)
R011	Times for calculations (yr)	not used	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	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	2.330E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	2.330E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	5.000E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.000E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	7.500E+00	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-228	7.500E+00	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-230	5.000E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-232	7.500E+00	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): U-234	5.000E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-235	2.330E-01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	5.000E+00	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VMT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	1.000E+03	2.000E+01	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+03	1.000E+02	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(4)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(5)

R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	1.240E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.300E-03	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)

R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LF15
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LF16
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LW15
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LW16
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LS1
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM

C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12C2
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (l/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (l/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E+01	---	CO2F

STOR Storage times of contaminated foodstuffs (days):
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	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	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HFM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	CMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

Contaminated Zone Dimensions

Initial Soil Concentrations, pCi/g

Area:	2000.00 square meters	Ac-227	2.330E-01
Thickness:	2.00 meters	Pa-231	2.330E-01
Cover Depth:	0.00 meters	Pb-210	5.000E+00
		Ra-226	5.000E+00
		Ra-228	7.500E+00
		Th-228	7.500E+00
		Th-230	5.000E+00
		Th-232	7.500E+00
		U-234	5.000E+00
		U-235	2.330E-01
		U-238	5.000E+00

0

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years): 0.000E+00 1.000E+00 1.000E+01

TDOSE(t): 3.976E-01 3.975E-01 3.972E-01

M(t): 1.590E-02 1.590E-02 1.589E-02

Maximum TDOSE(t): 3.976E-01 mrem/yr at t = 0.000E+00 years

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	9.686E-04	0.0024	1.260E-03	0.0032	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.849E-04	0.0007
Pa-231	1.097E-04	0.0003	2.640E-04	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.119E-04	0.0005
Pb-210	6.501E-05	0.0002	9.339E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.004E-03	0.0076
Ra-226	1.169E-01	0.2940	3.661E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.050E-04	0.0015
Ra-228	1.129E-01	0.2839	3.566E-04	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.328E-04	0.0023
Th-228	1.343E-01	0.3378	1.775E-03	0.0045	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.268E-04	0.0011
Th-230	3.826E-05	0.0001	1.333E-03	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.301E-04	0.0006
Th-232	6.460E-03	0.0162	1.007E-02	0.0253	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.775E-03	0.0045
U-234	4.337E-06	0.0000	5.397E-04	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.188E-04	0.0003
U-235	3.746E-04	0.0009	2.344E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.224E-06	0.0000
U-238	1.589E-03	0.0040	4.824E-04	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.129E-04	0.0003
Total	3.736E-01	0.9398	1.624E-02	0.0408	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.708E-03	0.0194

0

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	2.514E-03	0.0063
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	5.856E-04	0.0015
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	3.163E-03	0.0080
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	1.175E-01	0.2956
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	1.141E-01	0.2871
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	1.365E-01	0.3433
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	1.601E-03	0.0040
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	1.831E-02	0.0460
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	6.628E-04	0.0017
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	4.033E-04	0.0010
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	2.184E-03	0.0055
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	3.976E-01	1.0000

*Sum of all water independent and dependent pathways.

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Summary : WC2-WORKER-CURRENT CONDITION-SLOPE

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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

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	9.382E-04	0.0024	1.220E-03	0.0031	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.760E-04	0.0007
Pa-231	1.400E-04	0.0004	3.035E-04	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.208E-04	0.0006
Pb-210	6.301E-05	0.0002	9.052E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.912E-03	0.0073
Ra-226	1.168E-01	0.2938	3.945E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.966E-04	0.0018
Ra-228	1.383E-01	0.3480	8.224E-04	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.485E-04	0.0024
Th-228	9.347E-02	0.2351	1.235E-03	0.0031	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.971E-04	0.0007
Th-230	8.888E-05	0.0002	1.333E-03	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.304E-04	0.0006
Th-232	2.178E-02	0.0548	1.015E-02	0.0255	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.889E-03	0.0048
U-234	4.337E-06	0.0000	5.396E-04	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.188E-04	0.0003
U-235	3.746E-04	0.0009	2.344E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.228E-06	0.0000
U-238	1.588E-03	0.0040	4.824E-04	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.129E-04	0.0003
Total	3.736E-01	0.9398	1.624E-02	0.0408	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.707E-03	0.0194

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

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	2.435E-03	0.0061
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	6.643E-04	0.0017
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	3.066E-03	0.0077
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	1.175E-01	0.2957
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	1.401E-01	0.3524
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	9.501E-02	0.2390
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	1.652E-03	0.0042
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	3.381E-02	0.0851
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	6.627E-04	0.0017
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	4.032E-04	0.0010
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	2.184E-03	0.0055
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	3.975E-01	1.0000

0*Sum of all water independent and dependent pathways.

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Tw Limit = 0.5 year

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Summary : WC2-WORKER-CURRENT CONDITION-SLOPE

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

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	7.036E-04	0.0018	9.153E-04	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.070E-04	0.0005
Pa-231	3.732E-04	0.0009	6.067E-04	0.0015	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.891E-04	0.0007
Pb-210	4.758E-05	0.0001	6.835E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.199E-03	0.0055
Ra-226	1.162E-01	0.2926	6.126E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.401E-03	0.0035
Ra-228	8.862E-02	0.2231	8.318E-04	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.534E-04	0.0011
Th-228	3.585E-03	0.0090	4.739E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.139E-05	0.0000
Th-230	5.432E-04	0.0014	1.333E-03	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.346E-04	0.0006
Th-232	1.612E-01	0.4059	1.132E-02	0.0285	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.668E-03	0.0067
U-234	4.357E-06	0.0000	5.391E-04	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.186E-04	0.0003
U-235	3.742E-04	0.0009	2.350E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.271E-06	0.0000
U-238	1.587E-03	0.0040	4.818E-04	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.128E-04	0.0003
Total	3.733E-01	0.9397	1.623E-02	0.0409	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.701E-03	0.0194

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

Radio- Nuclide	Water		Fish		Radon		Water Dependent Pathways 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	1.826E-03	0.0046
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	1.269E-03	0.0032
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	2.315E-03	0.0058
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	1.177E-01	0.2963
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	8.990E-02	0.2263
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	3.644E-03	0.0092
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	2.111E-03	0.0053
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	1.752E-01	0.4411
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	6.621E-04	0.0017
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	4.029E-04	0.0010
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	2.181E-03	0.0055

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 3.972E-01 1.0000

*Sum of all water independent and dependent pathways.

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Summary : WC2-WORKER-CURRENT CONDITION-SLOPE File: WC2.RAD

Dose/Source Ratios Summed Over All Pathways

Parent and Progeny Principal Radionuclide Contributions Indicated

Parent Product Branch DSR(j,t) (mrem/yr)/(pCi/g)
(i) (j) Fraction* t= 0.000E+00 1.000E+00 1.000E+01

Ac-227	Ac-227	1.000E+00	1.079E-02	1.045E-02	7.836E-03
OPa-231	Pa-231	1.000E+00	2.341E-03	2.340E-03	2.337E-03
Pa-231	Ac-227	1.000E+00	1.726E-04	5.106E-04	3.110E-03
Pa-231	DSR(j)		2.513E-03	2.851E-03	5.447E-03
OPb-210	Pb-210	1.000E+00	6.326E-04	6.131E-04	4.630E-04
ORa-226	Ra-226	1.000E+00	2.349E-02	2.348E-02	2.336E-02
Ra-226	Pb-210	1.000E+00	9.880E-06	2.923E-05	1.782E-04
Ra-226	DSR(j)		2.350E-02	2.351E-02	2.354E-02
ORa-228	Ra-228	1.000E+00	1.186E-02	1.051E-02	3.549E-03
Ra-228	Th-228	1.000E+00	3.355E-03	8.165E-03	8.438E-03
Ra-228	DSR(j)		1.522E-02	1.868E-02	1.199E-02
OTh-228	Th-228	1.000E+00	1.820E-02	1.267E-02	4.859E-04
OTh-230	Th-230	1.000E+00	3.152E-04	3.152E-04	3.151E-04
Th-230	Ra-226	1.000E+00	5.089E-06	1.526E-05	1.066E-04
Th-230	Pb-210	1.000E+00	1.431E-09	9.924E-09	4.282E-07
Th-230	DSR(j)		3.203E-04	3.304E-04	4.221E-04
OTh-232	Th-232	1.000E+00	1.571E-03	1.571E-03	1.571E-03
Th-232	Ra-228	1.000E+00	7.294E-04	2.077E-03	9.035E-03
Th-232	Th-228	1.000E+00	1.403E-04	8.605E-04	1.276E-02
Th-232	DSR(j)		2.441E-03	4.509E-03	2.336E-02
OU-234	U-234	1.000E+00	1.326E-04	1.325E-04	1.324E-04
U-234	Th-230	1.000E+00	1.419E-09	4.255E-09	2.977E-08
U-234	Ra-226	1.000E+00	1.527E-11	1.069E-10	5.043E-09
U-234	Pb-210	1.000E+00	3.224E-15	4.804E-14	1.387E-11
U-234	DSR(j)		1.326E-04	1.325E-04	1.324E-04
OU-235	U-235	1.000E+00	1.731E-03	1.730E-03	1.728E-03
U-235	Pa-231	1.000E+00	2.476E-08	7.428E-08	5.193E-07
U-235	Ac-227	1.000E+00	1.221E-09	8.467E-09	3.649E-07
U-235	DSR(j)		1.731E-03	1.731E-03	1.729E-03
OU-238	U-238	1.000E+00	4.368E-04	4.367E-04	4.362E-04
U-238	U-234	1.000E+00	1.879E-10	5.636E-10	3.940E-09
U-238	Th-230	1.000E+00	1.340E-15	9.382E-15	4.433E-13
U-238	Ra-226	1.000E+00	1.082E-17	1.623E-16	5.013E-14
U-238	Pb-210	1.000E+00	1.830E-21	5.643E-20	1.051E-16
U-238	DSR(j)		4.368E-04	4.367E-04	4.362E-04

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).

The DSR includes contributions from associated (half-life < 0.5 yr) daughters.

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Summary : WC2-WORKER-CURRENT CONDITION-SLOPE File: WC2.RAD

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

ONuclide (i)	t= 0.000E+00	1.000E+00	1.000E+01
Ac-227	2.317E+03	2.393E+03	3.190E+03
Pa-231	9.947E+03	8.769E+03	4.590E+03
Pb-210	3.952E+04	4.077E+04	5.400E+04
Ra-226	1.064E+03	1.063E+03	1.062E+03
Ra-228	1.643E+03	1.338E+03	2.086E+03
Th-228	1.374E+03	1.974E+03	5.145E+04
Th-230	7.806E+04	7.566E+04	5.922E+04
Th-232	1.024E+04	5.545E+03	1.070E+03
U-234	1.886E+05	1.886E+05	1.888E+05
U-235	1.444E+04	1.445E+04	1.446E+04
U-238	5.723E+04	5.724E+04	5.731E+04

0

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

ONuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin) (pCi/g)	G(i,tmin) (pCi/g)	DSR(i,tmax) (pCi/g)	G(i,tmax) (pCi/g)
Ac-227	2.330E-01	0.000E+00	1.079E-02	2.317E+03	1.079E-02	2.317E+03
Pa-231	2.330E-01	1.000E+01	5.447E-03	4.590E+03	2.513E-03	9.947E+03
Pb-210	5.000E+00	0.000E+00	6.326E-04	3.952E+04	6.326E-04	3.952E+04
Ra-226	5.000E+00	1.000E+01	2.354E-02	1.062E+03	2.350E-02	1.064E+03
Ra-228	7.500E+00	2.714 A 0.005	2.043E-02	1.224E+03	1.522E-02	1.643E+03
Th-228	7.500E+00	0.000E+00	1.820E-02	1.374E+03	1.820E-02	1.374E+03
Th-230	5.000E+00	1.000E+01	4.221E-04	5.922E+04	3.203E-04	7.806E+04
Th-232	7.500E+00	1.000E+01	2.336E-02	1.070E+03	2.441E-03	1.024E+04
U-234	5.000E+00	0.000E+00	1.326E-04	1.886E+05	1.326E-04	1.886E+05
U-235	2.330E-01	0.000E+00	1.731E-03	1.444E+04	1.731E-03	1.444E+04
U-238	5.000E+00	0.000E+00	4.368E-04	5.723E+04	4.368E-04	5.723E+04

1RESRAD, Version 6.22 T_e Limit = 0.5 year 02/24/2005 13:26 Page 17
Summary : WC2-WORKER-CURRENT CONDITION-SLOPE File: WC2.RAD

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

ONuclide Parent (j)	Parent (i)	BRF(i)	DOSE(j,t), mrem/yr t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	2.514E-03 2.435E-03 1.826E-03
Ac-227	Pa-231	1.000E+00	4.022E-05 1.190E-04 7.245E-04
Ac-227	U-235	1.000E+00	2.844E-10 1.973E-09 8.502E-08
Ac-227	DOSE(j)		2.554E-03 2.554E-03 2.550E-03
OPa-231	Pa-231	1.000E+00	5.454E-04 5.453E-04 5.445E-04
Pa-231	U-235	1.000E+00	5.769E-09 1.731E-08 1.210E-07
Pa-231	DOSE(j)		5.454E-04 5.453E-04 5.447E-04
OPb-210	Pb-210	1.000E+00	3.163E-03 3.066E-03 2.315E-03
Pb-210	Ra-226	1.000E+00	4.940E-05 1.461E-04 8.911E-04
Pb-210	Th-230	1.000E+00	7.153E-09 4.962E-08 2.141E-06
Pb-210	U-234	1.000E+00	1.612E-14 2.402E-13 6.937E-11
Pb-210	U-238	1.000E+00	9.152E-21 2.821E-19 5.257E-16
Pb-210	DOSE(j)		3.212E-03 3.212E-03 3.208E-03
ORa-226	Ra-226	1.000E+00	1.175E-01 1.174E-01 1.168E-01
Ra-226	Th-230	1.000E+00	2.545E-05 7.632E-05 5.329E-04
Ra-226	U-234	1.000E+00	7.636E-11 5.344E-10 2.522E-08
Ra-226	U-238	1.000E+00	5.412E-17 8.116E-16 2.506E-13
Ra-226	DOSE(j)		1.175E-01 1.175E-01 1.173E-01
ORa-228	Ra-228	1.000E+00	8.898E-02 7.886E-02 2.662E-02
Ra-228	Th-232	1.000E+00	5.471E-03 1.557E-02 6.776E-02
Ra-228	DOSE(j)		9.445E-02 9.444E-02 9.438E-02
OTh-228	Ra-228	1.000E+00	2.516E-02 6.124E-02 6.329E-02
Th-228	Th-228	1.000E+00	1.365E-01 9.501E-02 3.644E-03
Th-228	Th-232	1.000E+00	1.052E-03 6.454E-03 9.567E-02
Th-228	DOSE(j)		1.627E-01 1.627E-01 1.626E-01
OTh-230	Th-230	1.000E+00	1.576E-03 1.576E-03 1.576E-03

Th-230	U-234	1.000E+00	7.093E-09	2.128E-08	1.488E-07
Th-230	U-238	1.000E+00	6.702E-15	4.691E-14	2.216E-12
Th-230	DOSE(j)		1.576E-03	1.576E-03	1.576E-03
0Th-232	Th-232	1.000E+00	1.179E-02	1.179E-02	1.178E-02
0U-234	U-234	1.000E+00	6.628E-04	6.627E-04	6.619E-04
U-234	U-238	1.000E+00	9.395E-10	2.818E-09	1.970E-08
U-234	DOSE(j)		6.628E-04	6.627E-04	6.619E-04
0U-235	U-235	1.000E+00	4.033E-04	4.032E-04	4.027E-04
0U-238	U-238	1.000E+00	2.184E-03	2.184E-03	2.181E-03

BRF(i) is the branch fraction of the parent nuclide.

1RESRAD, Version 6.22 T₀ Limit = 0.5 year 02/24/2005 13:26 Page 18
Summary : WC2-WORKER-CURRENT CONDITION-SLOPE File: WC2.RAD

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

ONuclide	Parent	BRF(i)	S(j,t), pCi/g
(j)	(i)		t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	2.330E-01 2.257E-01 1.692E-01
Ac-227	Pa-231	1.000E+00	0.000E+00 7.300E-03 6.344E-02
Ac-227	U-235	1.000E+00	0.000E+00 7.763E-08 7.067E-06
Ac-227	S(j):		2.330E-01 2.330E-01 2.327E-01
0Pa-231	Pa-231	1.000E+00	2.330E-01 2.330E-01 2.326E-01
Pa-231	U-235	1.000E+00	0.000E+00 4.929E-06 4.923E-05
Pa-231	S(j):		2.330E-01 2.330E-01 2.327E-01
0Pb-210	Pb-210	1.000E+00	5.000E+00 4.846E+00 3.659E+00
Pb-210	Ra-226	1.000E+00	0.000E+00 1.530E-01 1.331E+00
Pb-210	Th-230	1.000E+00	0.000E+00 3.331E-05 3.036E-03
Pb-210	U-234	1.000E+00	0.000E+00 1.002E-10 9.343E-08
Pb-210	U-238	1.000E+00	0.000E+00 7.114E-17 6.723E-13
Pb-210	S(j):		5.000E+00 4.999E+00 4.993E+00
0Ra-226	Ra-226	1.000E+00	5.000E+00 4.997E+00 4.972E+00
Ra-226	Th-230	1.000E+00	0.000E+00 2.165E-03 2.160E-02
Ra-226	U-234	1.000E+00	0.000E+00 9.747E-09 9.726E-07
Ra-226	U-238	1.000E+00	0.000E+00 9.211E-15 9.194E-12
Ra-226	S(j):		5.000E+00 4.999E+00 4.993E+00
0Ra-228	Ra-228	1.000E+00	7.500E+00 6.647E+00 2.244E+00
Ra-228	Th-232	1.000E+00	0.000E+00 8.517E-01 5.250E+00
Ra-228	S(j):		7.500E+00 7.499E+00 7.494E+00
0Th-228	Ra-228	1.000E+00	0.000E+00 2.140E+00 3.064E+00
Th-228	Th-228	1.000E+00	7.500E+00 5.220E+00 2.002E-01
Th-228	Th-232	1.000E+00	0.000E+00 1.398E-01 4.231E+00
Th-228	S(j):		7.500E+00 7.500E+00 7.495E+00
0Th-230	Th-230	1.000E+00	5.000E+00 5.000E+00 4.999E+00
Th-230	U-234	1.000E+00	0.000E+00 4.501E-05 4.498E-04
Th-230	U-238	1.000E+00	0.000E+00 6.379E-11 6.374E-09
Th-230	S(j):		5.000E+00 5.000E+00 5.000E+00
0Th-232	Th-232	1.000E+00	7.500E+00 7.500E+00 7.500E+00
0U-234	U-234	1.000E+00	5.000E+00 4.999E+00 4.993E+00
U-234	U-238	1.000E+00	0.000E+00 1.417E-05 1.416E-04
U-234	S(j):		5.000E+00 4.999E+00 4.993E+00
0U-235	U-235	1.000E+00	2.330E-01 2.330E-01 2.327E-01
0U-238	U-238	1.000E+00	5.000E+00 4.999E+00 4.993E+00

BRF(i) is the branch fraction of the parent nuclide.

0RESCALC.EXE execution time = 2.69 seconds

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 Summary : W-ME-WORKER-MAJOR EXCV File: W-ME.RAD

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

0 Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(3)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(4)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(5)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(11)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(3)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(4)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(10)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(11)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)

D-34					
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)	
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)	
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)	
D-34					
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)	
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)	
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)	
D-34					

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 Summary : W-ME-WORKER-MAJOR EXCV File: W-ME.RAD

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

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-5				
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5				
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)
D-5				

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

Menu	Parameter	Current Value	Default	Parameter Name
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)

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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+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+01	3.000E+00	---	T(3)
R011	Times for calculations (yr)	not used	1.000E+01	---	T(4)
R011	Times for calculations (yr)	not used	3.000E+01	---	T(5)
R011	Times for calculations (yr)	not used	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	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	8.000E-02	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	8.000E-02	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	1.750E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	1.750E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	1.370E+00	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-228	1.370E+00	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-230	1.750E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-232	1.370E+00	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): U-234	1.750E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-235	8.000E-02	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	1.750E+00	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSC2
R013	Contaminated zone erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP

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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	1.000E+03	2.000E+01	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+03	1.000E+02	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(4)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(5)

R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	1.740E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	7.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	1.830E-02	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)

R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	not used	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LF15
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LF16
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LW15
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LW16
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGHHW
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM

C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (q/q)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (l/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (l/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E+01	---	CO2F

STOR Storage times of contaminated foodstuffs (days):
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (if different from user input)	Parameter Name
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	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	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

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Contaminated Zone Dimensions

Initial Soil Concentrations, pCi/g

Area: 10000.00 square meters
 Thickness: 2.00 meters
 Cover Depth: 0.00 meters

Ac-227 8.000E-02
 Pa-231 8.000E-02
 Pb-210 1.750E+00
 Ra-226 1.750E+00
 Ra-228 1.370E+00
 Th-228 1.370E+00
 Th-230 1.750E+00
 Th-232 1.370E+00
 U-234 1.750E+00
 U-235 8.000E-02
 U-238 1.750E+00

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years): 0.000E+00 1.000E+00 1.000E+01

TDOSE(t): 9.137E-01 9.136E-01 9.129E-01

M(t): 3.655E-02 3.655E-02 3.652E-02

OMaximum TDOSE(t): 9.137E-01 mrem/yr at t = 0.000E+00 years

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	2.743E-03	0.0030	1.997E-02	0.0219	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.783E-04	0.0009
Pa-231	3.096E-04	0.0003	4.183E-03	0.0046	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.788E-04	0.0006
Pb-210	1.890E-04	0.0002	1.508E-03	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.367E-03	0.0092
Ra-226	3.377E-01	0.3696	5.913E-04	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.685E-03	0.0018
Ra-228	1.703E-01	0.1863	3.006E-03	0.0033	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.356E-03	0.0015
Th-228	2.022E-01	0.2213	1.496E-02	0.0164	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.203E-04	0.0007
Th-230	1.104E-04	0.0001	2.153E-02	0.0236	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.409E-04	0.0007
Th-232	9.748E-03	0.0107	8.492E-02	0.0929	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.579E-03	0.0028
U-234	1.248E-05	0.0000	8.716E-03	0.0095	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.308E-04	0.0004
U-235	1.055E-03	0.0012	3.713E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.427E-05	0.0000
U-238	4.590E-03	0.0050	7.792E-03	0.0085	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.144E-04	0.0003
Total	7.289E-01	0.7977	1.675E-01	0.1834	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.726E-02	0.0189

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	2.349E-02	0.0257
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	5.072E-03	0.0056
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	1.006E-02	0.0110
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	3.400E-01	0.3721
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	0.1911
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	2.178E-01	0.2384
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	2.228E-02	0.0244
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	9.724E-02	0.1064
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	9.060E-03	0.0099
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	1.441E-03	0.0016
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	1.270E-02	0.0139
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	9.137E-01	1.0000

*Sum of all water independent and dependent pathways.

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p) As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years Water Independent Pathways (Inhalation excludes radon)												
Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk	Soil
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	2.656E-03	0.0029	1.934E-02	0.0212	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	3.954E-04	0.0004	4.808E-03	0.0053	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	1.832E-04	0.0002	1.462E-03	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	3.375E-01	0.3694	6.371E-04	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	2.086E-01	0.2283	6.932E-03	0.0076	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	1.408E-01	0.1541	1.041E-02	0.0114	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	2.566E-04	0.0003	2.153E-02	0.0236	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	3.285E-02	0.0360	8.554E-02	0.0936	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	1.248E-05	0.0000	8.715E-03	0.0095	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	1.055E-03	0.0012	3.714E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	4.590E-03	0.0050	7.791E-03	0.0085	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	7.288E-01	0.7977	1.675E-01	0.1834	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0189

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.
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	0.0249
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	0.0064
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	0.0107
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	0.3722
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	0.2374
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	0.1659
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	0.0245
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	0.1326
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	0.0099
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	0.0016
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	0.0139
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	9.136E-01

0*Sum of all water independent and dependent pathways.

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Summary : W-ME-WORKER-MAJOR EXCV File: W-ME.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p) As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years Water Independent Pathways (Inhalation excludes radon)												
Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk	Soil
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.992E-03	0.0022	1.450E-02	0.0159	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0006
Pa-231	1.056E-03	0.0012	9.613E-03	0.0105	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0009
Pb-210	1.383E-04	0.0002	1.104E-03	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0067
Ra-226	3.358E-01	0.3679	9.895E-04	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0043
Ra-228	1.335E-01	0.1463	7.011E-03	0.0077	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0007
Th-228	5.399E-03	0.0059	3.994E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	1.569E-03	0.0017	2.153E-02	0.0236	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0007
Th-232	2.430E-01	0.2662	9.546E-02	0.1046	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0042
U-234	1.254E-05	0.0000	8.707E-03	0.0095	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0004
U-235	1.054E-03	0.0012	3.723E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	4.584E-03	0.0050	7.782E-03	0.0085	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0003
Total	7.282E-01	0.7977	1.675E-01	0.1834	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0189

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

Radio- Nuclide	Water		Fish		Radon		Water Dependent Pathways 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	1.706E-02	0.0187
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	1.146E-02	0.0126
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	7.366E-03	0.0081
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	3.407E-01	0.3732
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	1.412E-01	0.1547
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	5.815E-03	0.0064
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	2.375E-02	0.0260
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	3.424E-01	0.3750
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	9.049E-03	0.0099
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	1.441E-03	0.0016
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	1.268E-02	0.0139

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 9.129E-01 1.0000

0*Sum of all water independent and dependent pathways.

RESRAD, Version 6.22 T_e Limit = 0.5 year 02/25/2005 10:15 Page 15
Summary : W-ME-WORKER-MAJOR EXCV File: W-ME.RAD

Dose/Source Ratios Summed Over All Pathways

Parent and Progeny Principal Radionuclide Contributions Indicated

Parent Product Branch DSR(j,t) (mrem/yr)/(pCi/g)
(i) (j) Fraction* t= 0.000E+00 1.000E+00 1.000E+01

Ac-227	Ac-227	1.000E+00	2.936E-01	2.843E-01	2.133E-01
OPa-231	Pa-231	1.000E+00	5.870E-02	5.869E-02	5.861E-02
Pa-231	Ac-227	1.000E+00	4.698E-03	1.389E-02	8.462E-02
Pa-231	DSR(j)		6.340E-02	7.258E-02	1.432E-01
OPb-210	Pb-210	1.000E+00	5.751E-03	5.574E-03	4.209E-03
ORa-226	Ra-226	1.000E+00	1.942E-01	1.941E-01	1.931E-01
Ra-226	Pb-210	1.000E+00	8.983E-05	2.657E-04	1.620E-03
Ra-226	DSR(j)		1.943E-01	1.943E-01	1.947E-01
ORa-228	Ra-228	1.000E+00	9.815E-02	8.700E-02	2.936E-02
Ra-228	Th-228	1.000E+00	2.931E-02	7.133E-02	7.371E-02
Ra-228	DSR(j)		1.275E-01	1.583E-01	1.031E-01
OTTh-228	Th-228	1.000E+00	1.590E-01	1.107E-01	4.244E-03
OTTh-230	Th-230	1.000E+00	1.269E-02	1.269E-02	1.269E-02
Th-230	Ra-226	1.000E+00	4.206E-05	1.262E-04	8.808E-04
Th-230	Pb-210	1.000E+00	1.301E-08	9.022E-08	3.893E-06
Th-230	DSR(j)		1.273E-02	1.282E-02	1.357E-02
OTTh-232	Th-232	1.000E+00	6.372E-02	6.372E-02	6.372E-02
Th-232	Ra-228	1.000E+00	6.035E-03	1.718E-02	7.475E-02
Th-232	Th-228	1.000E+00	1.225E-03	7.517E-03	1.114E-01
Th-232	DSR(j)		7.098E-02	8.842E-02	2.499E-01
OU-234	U-234	1.000E+00	5.177E-03	5.176E-03	5.170E-03
U-234	Th-230	1.000E+00	5.711E-08	1.713E-07	1.198E-06
U-234	Ra-226	1.000E+00	1.262E-10	8.833E-10	4.168E-08
U-234	Pb-210	1.000E+00	2.931E-14	4.367E-13	1.261E-10
U-234	DSR(j)		5.177E-03	5.176E-03	5.171E-03
OU-235	U-235	1.000E+00	1.801E-02	1.801E-02	1.798E-02
U-235	Pa-231	1.000E+00	6.210E-07	1.863E-06	1.302E-05
U-235	Ac-227	1.000E+00	3.322E-08	2.304E-07	9.930E-06
U-235	DSR(j)		1.801E-02	1.801E-02	1.801E-02
OU-238	U-238	1.000E+00	7.255E-03	7.254E-03	7.246E-03
U-238	U-234	1.000E+00	7.338E-09	2.201E-08	1.539E-07
U-238	Th-230	1.000E+00	5.397E-14	3.777E-13	1.785E-11
U-238	Ra-226	1.000E+00	8.946E-17	1.342E-15	4.143E-13
U-238	Pb-210	1.000E+00	1.664E-20	5.130E-19	9.559E-16
U-238	DSR(j)		7.255E-03	7.254E-03	7.246E-03

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).

The DSR includes contributions from associated (half-life > 0.5 yr) daughters.

RESRAD, Version 6.22 T_e Limit = 0.5 year 02/25/2005 10:15 Page 16
Summary : W-ME-WORKER-MAJOR EXCV File: W-ME.RAD

Single Radionuclide Soil Guidelines G(i,t) in pCi/g

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

ONuclide (i)	t= 0.000E+00	1.000E+00	1.000E+01
Ac-227	8.515E+01	8.792E+01	1.172E+02
Pa-231	3.943E+02	3.444E+02	1.745E+02
Pb-210	4.347E+03	4.485E+03	5.940E+03
Ra-226	1.287E+02	1.286E+02	1.284E+02
Ra-228	1.961E+02	1.579E+02	2.425E+02
Th-228	1.573E+02	2.259E+02	5.890E+03
Th-230	1.964E+03	1.951E+03	1.842E+03
Th-232	3.522E+02	2.827E+02	1.000E+02
U-234	4.829E+03	4.830E+03	4.835E+03
U-235	1.388E+03	1.388E+03	1.388E+03
U-238	3.446E+03	3.446E+03	3.450E+03

0

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

ONuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin) (pCi/g)	G(i,tmin) (pCi/g)	DSR(i,tmax) (pCi/g)	G(i,tmax) (pCi/g)
Ac-227	8.000E-02	0.000E+00	2.936E-01	8.515E+01	2.936E-01	8.515E+01
Pa-231	8.000E-02	1.000E+01	1.432E-01	1.745E+02	6.340E-02	3.943E+02
Pb-210	1.750E+00	0.000E+00	5.751E-03	4.347E+03	5.751E-03	4.347E+03
Ra-226	1.750E+00	1.000E+01	1.947E-01	1.284E+02	1.943E-01	1.287E+02
Ra-228	1.370E+00	2.777 A 0.006	1.745E-01	1.433E+02	1.275E-01	1.961E+02
Th-228	1.370E+00	0.000E+00	1.590E-01	1.573E+02	1.590E-01	1.573E+02
Th-230	1.750E+00	1.000E+01	1.357E-02	1.842E+03	1.273E-02	1.964E+03
Th-232	1.370E+00	1.000E+01	2.499E-01	1.000E+02	7.098E-02	3.522E+02
U-234	1.750E+00	0.000E+00	5.177E-03	4.829E+03	5.177E-03	4.829E+03
U-235	8.000E-02	0.000E+00	1.801E-02	1.388E+03	1.801E-02	1.388E+03
U-238	1.750E+00	0.000E+00	7.255E-03	3.446E+03	7.255E-03	3.446E+03

1RESRAD, Version 6.22 T_x Limit = 0.5 year 02/25/2005 10:15 Page 17
Summary : W-ME-WORKER-MAJOR EXCV File: W-ME.RAD

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

ONuclide (j)	Parent (i)	BRF(i)	DOSE(j,t), mrem/yr t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	2.349E-02 2.275E-02 1.706E-02
Ac-227	Pa-231	1.000E+00	3.758E-04 1.112E-03 6.770E-03
Ac-227	U-235	1.000E+00	2.658E-09 1.843E-08 7.944E-07
Ac-227	DOSE(j)		2.386E-02 2.386E-02 2.383E-02
OPa-231	Pa-231	1.000E+00	4.696E-03 4.695E-03 4.689E-03
Pa-231	U-235	1.000E+00	4.968E-08 1.490E-07 1.042E-06
Pa-231	DOSE(j)		4.696E-03 4.695E-03 4.690E-03
OPb-210	Pb-210	1.000E+00	1.006E-02 9.755E-03 7.366E-03
Pb-210	Ra-226	1.000E+00	1.572E-04 4.650E-04 2.835E-03
Pb-210	Th-230	1.000E+00	2.276E-08 1.579E-07 6.812E-06
Pb-210	U-234	1.000E+00	5.130E-14 7.643E-13 2.207E-10
Pb-210	U-238	1.000E+00	2.912E-20 8.978E-19 1.673E-15
Pb-210	DOSE(j)		1.022E-02 1.022E-02 1.021E-02
ORa-226	Ra-226	1.000E+00	3.398E-01 3.396E-01 3.379E-01
Ra-226	Th-230	1.000E+00	7.361E-05 2.208E-04 1.541E-03
Ra-226	U-234	1.000E+00	2.209E-10 1.546E-09 7.294E-08
Ra-226	U-238	1.000E+00	1.565E-16 2.348E-15 7.250E-13
Ra-226	DOSE(j)		3.399E-01 3.398E-01 3.394E-01
ORa-228	Ra-228	1.000E+00	1.345E-01 1.192E-01 4.023E-02
Ra-228	Th-232	1.000E+00	8.268E-03 2.354E-02 1.024E-01
Ra-228	DOSE(j)		1.427E-01 1.427E-01 1.426E-01
OTh-228	Ra-228	1.000E+00	4.015E-02 9.772E-02 1.010E-01
Th-228	Th-228	1.000E+00	2.178E-01 1.516E-01 5.815E-03
Th-228	Th-232	1.000E+00	1.679E-03 1.030E-02 1.527E-01
Th-228	DOSE(j)		2.596E-01 2.596E-01 2.595E-01
OTh-230	Th-230	1.000E+00	2.221E-02 2.221E-02 2.220E-02

Th-230	U-234	1.000E+00	9.994E-08	2.998E-07	2.097E-06
Th-230	U-238	1.000E+00	9.444E-14	6.610E-13	3.123E-11
Th-230	DOSE(j)		2.221E-02	2.221E-02	2.221E-02
0Th-232	Th-232	1.000E+00	8.730E-02	8.730E-02	8.729E-02
OU-234	U-234	1.000E+00	9.060E-03	9.058E-03	9.047E-03
U-234	U-238	1.000E+00	1.284E-08	3.852E-08	2.693E-07
U-234	DOSE(j)		9.060E-03	9.058E-03	9.048E-03
OU-235	U-235	1.000E+00	1.441E-03	1.440E-03	1.439E-03
OU-238	U-238	1.000E+00	1.270E-02	1.270E-02	1.268E-02

BRF(i) is the branch fraction of the parent nuclide.

1RESRAD, Version 6.22 T* Limit = 0.5 year 02/25/2005 10:15 Page 18
Summary : W-ME-WORKER-MAJOR EXCV File: W-ME.RAD

Individual Nuclide Soil Concentration					
Parent Nuclide and Branch Fraction Indicated					
ONuclide	Parent	BRF(i)	S(j,t), pCi/g		
(j)	(i)		t = 0.000E+00 1.000E+00 1.000E+01		
Ac-227	Ac-227	1.000E+00	8.000E-02	7.748E-02	5.811E-02
Ac-227	Pa-231	1.000E+00	0.000E+00	2.506E-03	2.178E-02
Ac-227	U-235	1.000E+00	0.000E+00	2.666E-08	2.426E-06
Ac-227	S(j):		8.000E-02	7.999E-02	7.989E-02
OPa-231	Pa-231	1.000E+00	8.000E-02	7.999E-02	7.988E-02
Pa-231	U-235	1.000E+00	0.000E+00	1.692E-06	1.690E-05
Pa-231	S(j):		8.000E-02	7.999E-02	7.989E-02
OPb-210	Pb-210	1.000E+00	1.750E+00	1.696E+00	1.281E+00
Pb-210	Ra-226	1.000E+00	0.000E+00	5.354E-02	4.658E-01
Pb-210	Th-230	1.000E+00	0.000E+00	1.166E-05	1.063E-03
Pb-210	U-234	1.000E+00	0.000E+00	3.507E-11	3.270E-08
Pb-210	U-238	1.000E+00	0.000E+00	2.490E-17	2.353E-13
Pb-210	S(j):		1.750E+00	1.750E+00	1.748E+00
ORa-226	Ra-226	1.000E+00	1.750E+00	1.749E+00	1.740E+00
Ra-226	Th-230	1.000E+00	0.000E+00	7.579E-04	7.559E-03
Ra-226	U-234	1.000E+00	0.000E+00	3.411E-09	3.404E-07
Ra-226	U-238	1.000E+00	0.000E+00	3.224E-15	3.218E-12
Ra-226	S(j):		1.750E+00	1.750E+00	1.748E+00
ORa-228	Ra-228	1.000E+00	1.370E+00	1.214E+00	4.098E-01
Ra-228	Th-232	1.000E+00	0.000E+00	1.556E-01	9.591E-01
Ra-228	S(j):		1.370E+00	1.370E+00	1.369E+00
0Th-228	Ra-228	1.000E+00	0.000E+00	3.908E-01	5.597E-01
Th-228	Th-228	1.000E+00	1.370E+00	9.536E-01	3.658E-02
Th-228	Th-232	1.000E+00	0.000E+00	2.554E-02	7.729E-01
Th-228	S(j):		1.370E+00	1.370E+00	1.369E+00
0Th-230	Th-230	1.000E+00	1.750E+00	1.750E+00	1.750E+00
Th-230	U-234	1.000E+00	0.000E+00	1.575E-05	1.574E-04
Th-230	U-238	1.000E+00	0.000E+00	2.233E-11	2.231E-09
Th-230	S(j):		1.750E+00	1.750E+00	1.750E+00
0Th-232	Th-232	1.000E+00	1.370E+00	1.370E+00	1.370E+00
OU-234	U-234	1.000E+00	1.750E+00	1.750E+00	1.748E+00
U-234	U-238	1.000E+00	0.000E+00	4.961E-06	4.954E-05
U-234	S(j):		1.750E+00	1.750E+00	1.748E+00
OU-235	U-235	1.000E+00	8.000E-02	7.999E-02	7.989E-02
OU-238	U-238	1.000E+00	1.750E+00	1.750E+00	1.748E+00

BRF(i) is the branch fraction of the parent nuclide.

ORSCALC.EXE execution time = 2.90 seconds

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

0 Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(3)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(4)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(5)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(11)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(3)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(4)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(10)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(11)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)

D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)

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

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)

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

Menu	Parameter	Current Value	Default	Parameter Name
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)

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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)	2.000E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	TI (2)
R011	Times for calculations (yr)	1.000E+01	3.000E+00	---	TI (3)
R011	Times for calculations (yr)	not used	1.000E+01	---	TI (4)
R011	Times for calculations (yr)	not used	3.000E+01	---	TI (5)
R011	Times for calculations (yr)	not used	1.000E+02	---	TI (6)
R011	Times for calculations (yr)	not used	3.000E+02	---	TI (7)
R011	Times for calculations (yr)	not used	1.000E+03	---	TI (8)
R011	Times for calculations (yr)	not used	0.000E+00	---	TI (9)
R011	Times for calculations (yr)	not used	0.000E+00	---	TI(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	2.330E-01	0.000E+00	---	SI(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	2.330E-01	0.000E+00	---	SI(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	5.000E+00	0.000E+00	---	SI(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.000E+00	0.000E+00	---	SI(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	7.500E+00	0.000E+00	---	SI(5)
R012	Initial principal radionuclide (pCi/g): Th-228	7.500E+00	0.000E+00	---	SI(6)
R012	Initial principal radionuclide (pCi/g): Th-230	5.000E+00	0.000E+00	---	SI(7)
R012	Initial principal radionuclide (pCi/g): Th-232	7.500E+00	0.000E+00	---	SI(8)
R012	Initial principal radionuclide (pCi/g): U-234	5.000E+00	0.000E+00	---	SI(9)
R012	Initial principal radionuclide (pCi/g): U-235	2.330E-01	0.000E+00	---	SI(10)
R012	Initial principal radionuclide (pCi/g): U-238	5.000E+00	0.000E+00	---	SI(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VMT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DMIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	1.000E+03	2.000E+01	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+03	1.000E+02	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(4)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(5)

R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

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Site-Specific Parameter Summary (continued)

0	Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
	R016	Distribution coefficients for U-238				
	R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(11)
	R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
	R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
	R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(11)
	R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
	R017	Inhalation rate (m**3/yr)	1.240E+04	8.400E+03	---	INHALR
	R017	Mass loading for inhalation (g/m**3)	2.000E-04	1.000E-04	---	MLINH
	R017	Exposure duration	3.000E+01	3.000E+01	---	ED
	R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
	R017	Shielding factor, external gamma	1.900E-01	7.000E-01	---	SHF1
	R017	Fraction of time spent indoors	2.100E-02	5.000E-01	---	FIND
	R017	Fraction of time spent outdoors (on site)	0.000E+00	2.500E-01	---	FOTD
	R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
	R017	Radii of shape factor array (used if FS = -1):				
	R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
	R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
	R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
	R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
	R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
	R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
	R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
	R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
	R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
	R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
	R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)

R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within APEA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFIS
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFIS
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM

C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (l/sec)	not used	7.000E-07	---	EVSIN
C14	C-12 evasion flux rate from soil (l/sec)	not used	1.000E-10	---	REVSIN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E+01	---	CO2F

STOR Storage times of contaminated foodstuffs (days):

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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	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	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

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Contaminated Zone Dimensions

Initial Soil Concentrations, pCi/g

Area: 2000.00 square meters
Thickness: 2.00 meters
Cover Depth: 0.00 meters

Ac-227 2.330E-01
Pa-231 2.330E-01
Pb-210 5.000E+00
Ra-226 5.000E+00
Ra-228 7.500E+00
Th-228 7.500E+00
Th-230 5.000E+00
Th-232 7.500E+00
U-234 5.000E+00
U-235 2.330E-01
U-238 5.000E+00

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years): 0.000E+00 1.000E+00 1.000E+01

TDOSE(t): 7.778E-01 7.778E-01 7.772E-01

M(t): 3.111E-02 3.111E-02 3.109E-02

Maximum TDOSE(t): 7.778E-01 mrem/yr at t = 0.000E+00 years

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground mrem/yr fract.	Inhalation mrem/yr fract.	Radon mrem/yr fract.	Plant mrem/yr fract.	Meat mrem/yr fract.	Milk mrem/yr fract.	Soil mrem/yr fract.
Ac-227	1.680E-03 0.0022	4.602E-03 0.0059	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	2.601E-03 0.0033
Pa-231	1.903E-04 0.0002	9.643E-04 0.0012	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	1.935E-03 0.0025
Pb-210	1.128E-04 0.0001	3.411E-04 0.0004	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	2.743E-02 0.0353
Ra-226	2.028E-01 0.2607	1.337E-04 0.0002	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	5.524E-03 0.0071
Ra-228	1.958E-01 0.2517	1.302E-03 0.0017	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	8.517E-03 0.0109
Th-228	2.330E-01 0.2995	6.482E-03 0.0083	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	3.897E-03 0.0050
Th-230	6.638E-05 0.0001	4.868E-03 0.0063	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	2.101E-03 0.0027
Th-232	1.121E-02 0.0144	3.679E-02 0.0473	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	1.620E-02 0.0208
U-234	7.524E-06 0.0000	1.971E-03 0.0025	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	1.085E-03 0.0014
U-235	6.498E-04 0.0008	8.559E-05 0.0001	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	4.770E-05 0.0001
U-238	2.756E-03 0.0035	1.762E-03 0.0023	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	1.031E-03 0.0013
Total	6.482E-01 0.8333	5.930E-02 0.0762	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	7.037E-02 0.0905

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 mrem/yr fract.	Fish mrem/yr fract.	Radon mrem/yr fract.	Plant mrem/yr fract.	Meat mrem/yr fract.	Milk mrem/yr fract.	All Pathways* 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	8.884E-03 0.0114
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	3.089E-03 0.0040
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	2.789E-02 0.0359
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	2.084E-01 0.2679
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	2.056E-01 0.2643
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	2.433E-01 0.3128
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	7.036E-03 0.0090
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	6.420E-02 0.0825
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	3.063E-03 0.0039
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	7.831E-04 0.0010
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	5.549E-03 0.0071
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	7.778E-01 1.0000

*Sum of all water independent and dependent pathways.

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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

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.628E-03	0.0021	4.457E-03	0.0057	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.520E-03	0.0032
Pa-231	2.429E-04	0.0003	1.108E-03	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.016E-03	0.0026
Pb-210	1.093E-04	0.0001	3.306E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.659E-02	0.0342
Ra-226	2.026E-01	0.2605	1.441E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.360E-03	0.0082
Ra-228	2.400E-01	0.3085	3.003E-03	0.0039	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.660E-03	0.0111
Th-228	1.622E-01	0.2085	4.512E-03	0.0058	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.712E-03	0.0035
Th-230	1.542E-04	0.0002	4.868E-03	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.104E-03	0.0027
Th-232	3.778E-02	0.0486	3.706E-02	0.0476	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.724E-02	0.0222
U-234	7.524E-06	0.0000	1.971E-03	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.084E-03	0.0014
U-235	6.498E-04	0.0008	8.560E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.774E-05	0.0001
U-238	2.756E-03	0.0035	1.762E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.031E-03	0.0013
Total	6.481E-01	0.8333	5.930E-02	0.0762	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.037E-02	0.0905

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

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	8.604E-03	0.0111
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	3.367E-03	0.0043
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	2.703E-02	0.0348
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	2.091E-01	0.2689
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	2.516E-01	0.3235
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	1.694E-01	0.2178
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	7.126E-03	0.0092
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	9.208E-02	0.1184
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	3.063E-03	0.0039
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	7.831E-04	0.0010
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	5.548E-03	0.0071
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	7.778E-01	1.0000

0*Sum of all water independent and dependent pathways.

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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

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.221E-03	0.0016	3.343E-03	0.0043	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.890E-03	0.0024
Pa-231	6.475E-04	0.0008	2.216E-03	0.0029	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.640E-03	0.0034
Pb-210	8.254E-05	0.0001	2.496E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.008E-02	0.0258
Ra-226	2.016E-01	0.2594	2.237E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.280E-02	0.0165
Ra-228	1.537E-01	0.1978	3.038E-03	0.0039	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.140E-03	0.0053
Th-228	6.220E-03	0.0080	1.731E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.040E-04	0.0001
Th-230	9.423E-04	0.0012	4.868E-03	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.142E-03	0.0028
Th-232	2.797E-01	0.3599	4.136E-02	0.0532	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.436E-02	0.0313
U-234	7.559E-06	0.0000	1.969E-03	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.083E-03	0.0014
U-235	6.491E-04	0.0008	8.582E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.813E-05	0.0001
U-238	2.752E-03	0.0035	1.760E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.030E-03	0.0013
Total	6.476E-01	0.8332	5.928E-02	0.0763	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.031E-02	0.0905

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

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	6.453E-03	0.0083
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	5.503E-03	0.0071
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	2.041E-02	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	2.147E-01	0.2762
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	1.609E-01	0.2070
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	6.497E-03	0.0084
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	7.952E-03	0.0102
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	3.454E-01	0.4444
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	3.060E-03	0.0039
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	7.830E-04	0.0010
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	5.542E-03	0.0071

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 7.772E-01 1.0000

*Sum of all water independent and dependent pathways.

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Summary : WRR1-WORKER-RIP-RAP-TOP File: WRR1.RAD

Dose/Source Ratios Summed Over All Pathways

Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Branch Fraction*	DSR(j,t) t=0.000E+00	(mrem/yr)/(pCi/g)
Ac-227	Ac-227	1.000E+00	3.813E-02	3.693E-02
OPa-231	Pa-231	1.000E+00	1.265E-02	1.263E-02
Pa-231	Ac-227	1.000E+00	6.101E-04	1.805E-03
Pa-231	DSR(j)		1.326E-02	1.445E-02
OPb-210	Pb-210	1.000E+00	5.577E-03	5.406E-03
ORa-226	Ra-226	1.000E+00	4.159E-02	4.157E-02
Ra-226	Pb-210	1.000E+00	8.711E-05	2.577E-04
Ra-226	DSR(j)		4.168E-02	4.183E-02
ORa-228	Ra-228	1.000E+00	2.143E-02	1.899E-02
Ra-228	Th-228	1.000E+00	5.982E-03	1.456E-02
Ra-228	DSR(j)		2.741E-02	3.355E-02
OTH-228	Th-228	1.000E+00	3.245E-02	2.258E-02
OTH-230	Th-230	1.000E+00	1.398E-03	1.398E-03
Th-230	Ra-226	1.000E+00	9.011E-06	2.702E-05
Th-230	Pb-210	1.000E+00	1.261E-08	8.749E-08
Th-230	DSR(j)		1.407E-03	1.425E-03
OTH-232	Th-232	1.000E+00	6.992E-03	6.992E-03
Th-232	Ra-228	1.000E+00	1.318E-03	3.751E-03
Th-232	Th-228	1.000E+00	2.501E-04	1.534E-03
Th-232	DSR(j)		8.560E-03	1.228E-02
OU-234	U-234	1.000E+00	6.126E-04	6.125E-04
U-234	Th-230	1.000E+00	6.293E-09	1.888E-08
U-234	Ra-226	1.000E+00	2.704E-11	1.892E-10
U-234	Pb-210	1.000E+00	2.843E-14	4.235E-13
U-234	DSR(j)		6.126E-04	6.125E-04
OU-235	U-235	1.000E+00	3.361E-03	3.361E-03
U-235	Pa-231	1.000E+00	1.338E-07	4.014E-07
U-235	Ac-227	1.000E+00	4.314E-09	2.993E-08
U-235	DSR(j)		3.361E-03	3.361E-03
OU-238	U-238	1.000E+00	1.110E-03	1.110E-03
U-238	U-234	1.000E+00	8.683E-10	2.605E-09
U-238	Th-230	1.000E+00	5.946E-15	4.162E-14
U-238	Ra-226	1.000E+00	1.916E-17	2.874E-16
U-238	Pb-210	1.000E+00	1.614E-20	4.975E-19
U-238	DSR(j)		1.110E-03	1.110E-03

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).

The DSR includes contributions from associated (half-life < 0.5 yr) daughters.

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Summary : WRR1-WORKER-RIP-RAP-TOP File: WRR1.RAD

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

ONuclide (i)	t= 0.000E+00	1.000E+00	1.000E+01
Ac-227	6.557E+02	6.770E+02	9.027E+02
Pa-231	1.886E+03	1.730E+03	1.058E+03
Pb-210	4.483E+03	4.625E+03	6.125E+03
Ra-226	5.998E+02	5.977E+02	5.823E+02
Ra-228	9.120E+02	7.451E+02	1.165E+03
Th-228	7.705E+02	1.107E+03	2.886E+04
Th-230	1.777E+04	1.754E+04	1.572E+04
Th-232	2.921E+03	2.036E+03	5.428E+02
U-234	4.081E+04	4.081E+04	4.086E+04
U-235	7.438E+03	7.438E+03	7.439E+03
U-238	2.253E+04	2.253E+04	2.256E+04

0

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

ONuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin) (pCi/g)	G(i,tmin) (pCi/g)	DSR(i,tmax) (pCi/g)	G(i,tmax) (pCi/g)
Ac-227	2.330E-01	0.000E+00	3.813E-02	6.557E+02	3.813E-02	6.557E+02
Pa-231	2.330E-01	1.000E+01	2.362E-02	1.058E+03	1.326E-02	1.886E+03
Pb-210	5.000E+00	0.000E+00	5.577E-03	4.483E+03	5.577E-03	4.483E+03
Ra-226	5.000E+00	1.000E+01	4.293E-02	5.823E+02	4.168E-02	5.998E+02
Ra-228	7.500E+00	2.699 A 0.005	3.662E-02	6.827E+02	2.741E-02	9.120E+02
Th-228	7.500E+00	0.000E+00	3.245E-02	7.705E+02	3.245E-02	7.705E+02
Th-230	5.000E+00	1.000E+01	1.590E-03	1.572E+04	1.407E-03	1.777E+04
Th-232	7.500E+00	1.000E+01	4.605E-02	5.428E+02	8.560E-03	2.921E+03
U-234	5.000E+00	0.000E+00	6.126E-04	4.081E+04	6.126E-04	4.081E+04
U-235	2.330E-01	0.000E+00	3.361E-03	7.438E+03	3.361E-03	7.438E+03
U-238	5.000E+00	0.000E+00	1.110E-03	2.253E+04	1.110E-03	2.253E+04

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Summary : WRR1-WORKER-RIP-RAP-TOP File: WRR1.RAD

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

ONuclide Parent (j)	Parent (i)	BRF(i)	DOSE(j,t), mrem/yr t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	8.884E-03 8.604E-03 6.453E-03
Ac-227	Pa-231	1.000E+00	1.422E-04 4.205E-04 2.561E-03
Ac-227	U-235	1.000E+00	1.005E-09 6.973E-09 3.005E-07
Ac-227	DOSE(j)		9.026E-03 9.025E-03 9.014E-03
OPa-231	Pa-231	1.000E+00	2.947E-03 2.947E-03 2.942E-03
Pa-231	U-235	1.000E+00	3.118E-08 9.352E-08 6.538E-07
Pa-231	DOSE(j)		2.947E-03 2.947E-03 2.943E-03
OPb-210	Pb-210	1.000E+00	2.789E-02 2.703E-02 2.041E-02
Pb-210	Ra-226	1.000E+00	4.356E-04 1.288E-03 7.856E-03
Pb-210	Th-230	1.000E+00	6.306E-08 4.375E-07 1.888E-05
Pb-210	U-234	1.000E+00	1.421E-13 2.118E-12 6.116E-10
Pb-210	U-238	1.000E+00	8.069E-20 2.488E-18 4.635E-15
Pb-210	DOSE(j)		2.832E-02 2.832E-02 2.828E-02
ORa-226	Ra-226	1.000E+00	2.080E-01 2.079E-01 2.068E-01
Ra-226	Th-230	1.000E+00	4.505E-05 1.351E-04 9.434E-04
Ra-226	U-234	1.000E+00	1.352E-10 9.461E-10 4.464E-08
Ra-226	U-238	1.000E+00	9.582E-17 1.437E-15 4.438E-13
Ra-226	DOSE(j)		2.080E-01 2.080E-01 2.077E-01
ORa-228	Ra-228	1.000E+00	1.607E-01 1.425E-01 4.808E-02
Ra-228	Th-232	1.000E+00	9.883E-03 2.813E-02 1.224E-01
Ra-228	DOSE(j)		1.706E-01 1.706E-01 1.705E-01
OTH-228	Ra-228	1.000E+00	4.486E-02 1.092E-01 1.128E-01
Th-228	Th-228	1.000E+00	2.433E-01 1.694E-01 6.497E-03
Th-228	Th-232	1.000E+00	1.875E-03 1.151E-02 1.706E-01
Th-228	DOSE(j)		2.901E-01 2.901E-01 2.899E-01
OTH-230	Th-230	1.000E+00	6.991E-03 6.990E-03 6.990E-03

Th-230	U-234	1.000E+00	3.146E-08	9.438E-08	6.602E-07
Th-230	U-238	1.000E+00	2.973E-14	2.081E-13	9.832E-12
Th-230	DOSE(j)		6.991E-03	6.991E-03	6.990E-03
OTh-232	Th-232	1.000E+00	5.244E-02	5.244E-02	5.244E-02
OU-234	U-234	1.000E+00	3.063E-03	3.063E-03	3.059E-03
U-234	U-238	1.000E+00	4.342E-09	1.302E-08	9.105E-08
U-234	DOSE(j)		3.063E-03	3.063E-03	3.059E-03
OU-235	U-235	1.000E+00	7.831E-04	7.830E-04	7.821E-04
OU-238	U-238	1.000E+00	5.549E-03	5.548E-03	5.541E-03

BRF(i) is the branch fraction of the parent nuclide.
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 Summary : WRR1-WORKER-RIP-RAP-TOP File: WRR1.RAD

Individual Nuclide Soil Concentration					
Parent Nuclide and Branch Fraction Indicated					
ONuclide	Parent	BRF(i)	S(j,t), pCi/g		
(j)	(i)		t= 0.000E+00 1.000E+00 1.000E+01		
Ac-227	Ac-227	1.000E+00	2.330E-01	2.257E-01	1.692E-01
Ac-227	Pa-231	1.000E+00	0.000E+00	7.300E-03	6.344E-02
Ac-227	U-235	1.000E+00	0.000E+00	7.763E-08	7.067E-06
Ac-227	S(j):		2.330E-01	2.330E-01	2.327E-01
OPa-231	Pa-231	1.000E+00	2.330E-01	2.330E-01	2.326E-01
Pa-231	U-235	1.000E+00	0.000E+00	4.929E-06	4.923E-05
Pa-231	S(j):		2.330E-01	2.330E-01	2.327E-01
OPb-210	Pb-210	1.000E+00	5.000E+00	4.846E+00	3.659E+00
Pb-210	Ra-226	1.000E+00	0.000E+00	1.530E-01	1.331E+00
Pb-210	Th-230	1.000E+00	0.000E+00	3.331E-05	3.036E-03
Pb-210	U-234	1.000E+00	0.000E+00	1.002E-10	9.343E-08
Pb-210	U-238	1.000E+00	0.000E+00	7.114E-17	6.723E-13
Pb-210	S(j):		5.000E+00	4.999E+00	4.993E+00
ORa-226	Ra-226	1.000E+00	5.000E+00	4.997E+00	4.972E+00
Ra-226	Th-230	1.000E+00	0.000E+00	2.165E-03	2.160E-02
Ra-226	U-234	1.000E+00	0.000E+00	9.747E-09	9.726E-07
Ra-226	U-238	1.000E+00	0.000E+00	9.211E-15	9.194E-12
Ra-226	S(j):		5.000E+00	4.999E+00	4.993E+00
ORa-228	Ra-228	1.000E+00	7.500E+00	6.647E+00	2.244E+00
Ra-228	Th-232	1.000E+00	0.000E+00	8.517E-01	5.250E+00
Ra-228	S(j):		7.500E+00	7.499E+00	7.494E+00
OTh-228	Ra-228	1.000E+00	0.000E+00	2.140E+00	3.064E+00
Th-228	Th-228	1.000E+00	7.500E+00	5.220E+00	2.002E-01
Th-228	Th-232	1.000E+00	0.000E+00	1.398E-01	4.231E+00
Th-228	S(j):		7.500E+00	7.500E+00	7.495E+00
OTh-230	Th-230	1.000E+00	5.000E+00	5.000E+00	4.999E+00
Th-230	U-234	1.000E+00	0.000E+00	4.501E-05	4.498E-04
Th-230	U-238	1.000E+00	0.000E+00	6.379E-11	6.374E-09
Th-230	S(j):		5.000E+00	5.000E+00	5.000E+00
OTh-232	Th-232	1.000E+00	7.500E+00	7.500E+00	7.500E+00
OU-234	U-234	1.000E+00	5.000E+00	4.999E+00	4.993E+00
U-234	U-238	1.000E+00	0.000E+00	1.417E-05	1.416E-04
U-234	S(j):		5.000E+00	4.999E+00	4.993E+00
OU-235	U-235	1.000E+00	2.330E-01	2.330E-01	2.327E-01
OU-238	U-238	1.000E+00	5.000E+00	4.999E+00	4.993E+00

BRF(i) is the branch fraction of the parent nuclide.
 ORESALC.EXE execution time = 2.74 seconds

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

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(3)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(4)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(5)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(11)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(3)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(4)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(10)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(11)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)

D-34					
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)	
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)	
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)	
D-34					
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)	
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)	
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)	
D-34					

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

0 Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5				
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)
D-5				

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

0	Menu	Parameter	Current Value	Default	Parameter Name
	D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
	D-5	U-239+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)

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0		Site-Specific Parameter Summary		Used by RESRAD		Parameter Name
Menu	Parameter	User Input	Default	(If different from user input)		
R011	Area of contaminated zone (m**2)	2.000E+03	1.000E+04	---		AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---		THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---		LC2PAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---		BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---		TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---		T(2)
R011	Times for calculations (yr)	1.000E+01	3.000E+00	---		T(3)
R011	Times for calculations (yr)	not used	1.000E+01	---		T(4)
R011	Times for calculations (yr)	not used	3.000E+01	---		T(5)
R011	Times for calculations (yr)	not used	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	0.000E+00	---		T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---		T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	2.330E-01	0.000E+00	---		SI(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	2.330E-01	0.000E+00	---		SI(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	5.000E+00	0.000E+00	---		SI(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.000E+00	0.000E+00	---		SI(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	7.500E+00	0.000E+00	---		SI(5)
R012	Initial principal radionuclide (pCi/g): Th-228	7.500E+00	0.000E+00	---		SI(6)
R012	Initial principal radionuclide (pCi/g): Th-230	5.000E+00	0.000E+00	---		SI(7)
R012	Initial principal radionuclide (pCi/g): Th-232	7.500E+00	0.000E+00	---		SI(8)
R012	Initial principal radionuclide (pCi/g): U-234	5.000E+00	0.000E+00	---		SI(9)
R012	Initial principal radionuclide (pCi/g): U-235	2.330E-01	0.000E+00	---		SI(10)
R012	Initial principal radionuclide (pCi/g): U-238	5.000E+00	0.000E+00	---		SI(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---		W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---		W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---		W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---		W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---		W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---		W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---		W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---		W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---		W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---		W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---		W1(11)
R013	Cover depth (m)	2.400E-01	0.000E+00	---		COVER0
R013	Density of cover material (g/cm**3)	2.200E+00	1.500E+00	---		DENSCV
R013	Cover depth erosion rate (m/yr)	0.000E+00	1.000E-03	---		VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---		DENSCZ
R013	Contaminated zone erosion rate (m/yr)	0.000E+00	1.000E-03	---		VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---		TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---		FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---		HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---		BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---		WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---		HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---		EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---		PRECIP

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Site-Specific Parameter Summary (continued)						
0	Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
	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)	not used	1.000E+06	---	WAREA
	R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
	R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
	R014	Saturated zone total porosity	not used	4.000E-01	---	TPS2
	R014	Saturated zone effective porosity	not used	2.000E-01	---	EPS2
	R014	Saturated zone field capacity	not used	2.000E-01	---	FCS2
	R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCS2
	R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
	R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
	R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
	R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
	R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
	R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
	R015	Number of unsaturated zone strata	not used	1	---	NS
	R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
	R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
	R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
	R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
	R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
	R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
	R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
	R016	Distribution coefficients for Ac-227				
	R016	Contaminated zone (cm**3/g)	1.000E+03	2.000E+01	---	DCNUCC(1)
	R016	Unsat. zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
	R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
	R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(1)
	R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
	R016	Distribution coefficients for Pa-231				
	R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(2)
	R016	Unsat. zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(2,1)
	R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(2)
	R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(2)
	R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
	R016	Distribution coefficients for Pb-210				
	R016	Contaminated zone (cm**3/g)	1.000E+03	1.000E+02	---	DCNUCC(3)
	R016	Unsat. zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
	R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
	R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(3)
	R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)

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Site-Specific Parameter Summary (continued)						
0	Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
	R016	Distribution coefficients for Ra-226				
	R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(4)
	R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
	R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
	R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(4)
	R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
	R016	Distribution coefficients for Ra-228				
	R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(5)
	R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
	R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
	R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(5)

R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	1.240E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.300E-03	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)

R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
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Summary : WRR2-WORKER ON RIP-RAP-SLOPE PART File: WRR2.RAD					

Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LF15
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LF16
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LW15
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LW16
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LS1
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM

C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E+01	---	CO2F

STOR Storage times of contaminated foodstuffs (days):

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	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	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TIIL	Number of graphical time points	32	---	---	NPTS
TIIL	Maximum number of integration points for dose	17	---	---	LYMAX
TIIL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

Summary : WRR2-WORKER ON RIP-RAP-SLOPE PART

File: WRR2.RAD

Contaminated Zone Dimensions

Initial Soil Concentrations, pCi/g

Area: 2000.00 square meters
 Thickness: 2.00 meters
 Cover Depth: 0.24 meters

Ac-227 2.330E-01
 Pa-231 2.330E-01
 Pb-210 5.000E+00
 Ra-226 5.000E+00
 Ra-228 7.500E+00
 Th-228 7.500E+00
 Th-230 5.000E+00
 Th-232 7.500E+00
 U-234 5.000E+00
 U-235 2.330E-01
 U-238 5.000E+00

0

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years): 0.000E+00 1.000E+00 1.000E+01

TDOSE(t): 5.536E-03 5.536E-03 5.532E-03

M(t): 2.215E-04 2.214E-04 2.213E-04

OMaximum TDOSE(t): 5.536E-03 mrem/yr at t = 0.000E+00 years

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Summary : WRR2-WORKER ON RIP-RAP-SLOPE PART

File: WRR2.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	2.031E-06	0.0004	0.000E+00	0.0000	0.000E+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	2.408E-07	0.0000	0.000E+00	0.0000	0.000E+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	5.045E-09	0.0000	0.000E+00	0.0000	0.000E+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	1.491E-03	0.2694	0.000E+00	0.0000	0.000E+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	1.346E-03	0.2431	0.000E+00	0.0000	0.000E+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	2.611E-03	0.4716	0.000E+00	0.0000	0.000E+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	3.237E-07	0.0001	0.000E+00	0.0000	0.000E+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	7.327E-05	0.0132	0.000E+00	0.0000	0.000E+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	1.200E-10	0.0000	0.000E+00	0.0000	0.000E+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	2.581E-07	0.0000	0.000E+00	0.0000	0.000E+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	1.173E-05	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	5.536E-03	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

0

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	2.031E-06	0.0004
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	2.408E-07	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	5.045E-09	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	1.491E-03	0.2694
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	1.346E-03	0.2431
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	2.611E-03	0.4716
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	3.237E-07	0.0001
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	7.327E-05	0.0132
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	1.200E-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	2.581E-07	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	1.173E-05	0.0021
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	5.536E-03	1.0000

0*Sum of all water independent and dependent pathways.

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p) As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years Water Independent Pathways (Inhalation excludes radon)											
Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Soil
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr
Ac-227	1.967E-06	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
Pa-231	3.043E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
Pb-210	4.890E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
Ra-226	1.491E-03	0.2693	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
Ra-228	1.938E-03	0.3500	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
Th-228	1.818E-03	0.3283	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
Th-230	9.697E-07	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
Th-232	2.748E-04	0.0496	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
U-234	1.258E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
U-235	2.580E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
U-238	1.172E-05	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
Total	5.536E-03	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

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		All Pathways*
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr
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	1.967E-06
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	3.043E-07
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	4.890E-09
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	1.491E-03
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	1.938E-03
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	1.818E-03
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	9.697E-07
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	2.748E-04
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	1.258E-10
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	2.580E-07
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	1.172E-05
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	5.536E-03

0*Sum of all water independent and dependent pathways.

1RESRAD, Version 6.22 T₀ Limit = 0.5 year 02/24/2005 13:41 Page 14
Summary : WRR2-WORKER ON RIP-RAP-SLOPE PART File: WRR2.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p) As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years Water Independent Pathways (Inhalation excludes radon)											
Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Soil
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr
Ac-227	1.475E-06	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
Pa-231	7.933E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
Pb-210	3.692E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
Ra-226	1.483E-03	0.2681	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
Ra-228	1.469E-03	0.2656	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
Th-228	6.971E-05	0.0126	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
Th-230	6.766E-06	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
Th-232	2.488E-03	0.4499	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
U-234	4.390E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
U-235	2.578E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
U-238	1.171E-05	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00
Total	5.532E-03	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

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

Radio- Nuclide	Water		Fish		Radon		Water Dependent Pathways 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	1.475E-06	0.0003
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	7.933E-07	0.0001
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	3.692E-09	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	1.483E-03	0.2681
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	1.469E-03	0.2656
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	6.971E-05	0.0126
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	6.766E-06	0.0012
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	2.488E-03	0.4499
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.390E-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	2.578E-07	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	1.171E-05	0.0021

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 5.532E-03 1.0000

0*Sum of all water independent and dependent pathways.

1RESRAD, Version 6.22 T_e Limit = 0.5 year 02/24/2005 13:41 Page 15
Summary : WRR2-WORKER ON RIP-RAP-SLOPE PART File: WRR2.RAD

Dose/Source Ratios Summed Over All Pathways

Parent and Progeny Principal Radionuclide Contributions Indicated

0Parent Product Branch DSR(j,t) (mrem/yr)/(pCi/g)
(i) (j) Fraction* t= 0.000E+00 1.000E+00 1.000E+01

Ac-227	Ac-227	1.000E+00	8.716E-06	8.442E-06	6.331E-06
OPa-231	Pa-231	1.000E+00	8.938E-07	8.937E-07	8.924E-07
Pa-231	Ac-227	1.000E+00	1.395E-07	4.125E-07	2.512E-06
Pa-231	DSR(j)		1.033E-06	1.306E-06	3.405E-06
OPb-210	Pb-210	1.000E+00	1.009E-09	9.780E-10	7.385E-10
ORa-226	Ra-226	1.000E+00	2.983E-04	2.981E-04	2.966E-04
Ra-226	Pb-210	1.000E+00	1.576E-11	4.662E-11	2.843E-10
Ra-226	DSR(j)		2.983E-04	2.981E-04	2.966E-04
ORa-228	Ra-228	1.000E+00	1.153E-04	1.022E-04	3.448E-05
Ra-228	Th-228	1.000E+00	6.418E-05	1.562E-04	1.614E-04
Ra-228	DSR(j)		1.794E-04	2.584E-04	1.959E-04
OTH-228	Th-228	1.000E+00	3.481E-04	2.423E-04	9.295E-06
OTH-230	Th-230	1.000E+00	1.237E-10	1.237E-10	1.237E-10
Th-230	Ra-226	1.000E+00	6.462E-08	1.938E-07	1.353E-06
Th-230	Pb-210	1.000E+00	2.282E-15	1.583E-14	6.830E-13
Th-230	DSR(j)		6.474E-08	1.939E-07	1.353E-06
OTH-232	Th-232	1.000E+00	1.660E-11	1.660E-11	1.660E-11
Th-232	Ra-228	1.000E+00	7.087E-06	2.017E-05	8.777E-05
Th-232	Th-228	1.000E+00	2.683E-06	1.646E-05	2.440E-04
Th-232	DSR(j)		9.770E-06	3.664E-05	3.318E-04
OU-234	U-234	1.000E+00	2.380E-11	2.379E-11	2.376E-11
U-234	Th-230	1.000E+00	5.569E-16	1.671E-15	1.169E-14
U-234	Ra-226	1.000E+00	1.939E-13	1.357E-12	6.403E-11
U-234	Pb-210	1.000E+00	5.143E-21	7.663E-20	2.213E-17
U-234	DSR(j)		2.399E-11	2.515E-11	8.781E-11
OU-235	U-235	1.000E+00	1.108E-06	1.107E-06	1.106E-06
U-235	Pa-231	1.000E+00	9.456E-12	2.836E-11	1.983E-10
U-235	Ac-227	1.000E+00	9.862E-13	6.841E-12	2.948E-10
U-235	DSR(j)		1.108E-06	1.107E-06	1.107E-06
OU-238	U-238	1.000E+00	2.345E-06	2.345E-06	2.342E-06
U-238	U-234	1.000E+00	3.373E-17	1.012E-16	7.074E-16
U-238	Th-230	1.000E+00	5.262E-22	3.683E-21	1.740E-19
U-238	Ra-226	1.000E+00	1.374E-19	2.061E-18	6.365E-16
U-238	Pb-210	1.000E+00	2.920E-27	9.001E-26	1.677E-22
U-238	DSR(j)		2.345E-06	2.345E-06	2.342E-06

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).

The DSR includes contributions from associated (half-life > 0.5 yr) daughters.

1RESRAD, Version 6.22 T_e Limit = 0.5 year 02/24/2005 13:41 Page 16
Summary : WRR2-WORKER ON RIP-RAP-SLOPE PART File: WRR2.RAD

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

ONuclide (i)	t = 0.000E+00	1.000E+00	1.000E+01
Ac-227	2.868E+06	2.962E+06	3.949E+06
Pa-231	2.419E+07	1.914E+07	7.343E+06
Pb-210	2.478E+10	2.556E+10	3.385E+10
Ra-226	8.381E+04	8.386E+04	8.428E+04
Ra-228	1.393E+05	9.676E+04	1.276E+05
Th-228	7.181E+04	1.032E+05	2.690E+06
Th-230	3.861E+08	1.289E+08	1.847E+07
Th-232	*1.096E+05	*1.096E+05	7.535E+04
U-234	*6.245E+09	*6.245E+09	*6.245E+09
U-235	*2.160E+06	*2.160E+06	*2.160E+06
U-238	*3.360E+05	*3.360E+05	*3.360E+05

*At specific activity limit

0

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

ONuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin) (pCi/g)	G(i,tmin) (pCi/g)	DSR(i,tmax) (pCi/g)	G(i,tmax) (pCi/g)
Ac-227	2.330E-01	0.000E+00	8.716E-06	2.868E+06	8.716E-06	2.868E+06
Pa-231	2.330E-01	1.000E+01	3.405E-06	7.343E+06	1.033E-06	2.419E+07
Pb-210	5.000E+00	0.000E+00	1.009E-09	2.478E+10	1.009E-09	2.478E+10
Ra-226	5.000E+00	0.000E+00	2.983E-04	8.381E+04	2.983E-04	8.381E+04
Ra-228	7.500E+00	3.328 A 0.007	3.131E-04	7.984E+04	1.794E-04	1.393E+05
Th-228	7.500E+00	0.000E+00	3.481E-04	7.181E+04	3.481E-04	7.181E+04
Th-230	5.000E+00	1.000E+01	1.353E-06	1.847E+07	6.474E-08	3.861E+08
Th-232	7.500E+00	1.000E+01	3.318E-04	7.535E+04	9.770E-06	*1.096E+05
U-234	5.000E+00	1.000E+01	8.781E-11	*6.245E+09	2.399E-11	*6.245E+09
U-235	2.330E-01	0.000E+00	1.108E-06	*2.160E+06	1.108E-06	*2.160E+06
U-238	5.000E+00	0.000E+00	2.345E-06	*3.360E+05	2.345E-06	*3.360E+05

*At specific activity limit

1RESRAD, Version 6.22 Tc Limit = 0.5 year 02/24/2005 13:41 Page 17
Summary : WRR2-WORKER ON RIP-RAP-SLOPE PART File: WRR2.RAD

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

ONuclide Parent (j)	Parent (i)	BRF(i)	DOSE(j,t), mrem/yr	t = 0.000E+00	1.000E+00	1.000E+01
Ac-227	Ac-227	1.000E+00	2.031E-06	1.967E-06	1.475E-06	
Ac-227	Pa-231	1.000E+00	3.250E-08	9.611E-08	5.853E-07	
Ac-227	U-235	1.000E+00	2.298E-13	1.594E-12	6.869E-11	
Ac-227	DOSE(j)		2.063E-06	2.063E-06	2.061E-06	
OPa-231	Pa-231	1.000E+00	2.083E-07	2.082E-07	2.079E-07	
Pa-231	U-235	1.000E+00	2.203E-12	6.609E-12	4.620E-11	
Pa-231	DOSE(j)		2.083E-07	2.082E-07	2.080E-07	
OPb-210	Pb-210	1.000E+00	5.045E-09	4.890E-09	3.692E-09	
Pb-210	Ra-226	1.000E+00	7.880E-11	2.331E-10	1.421E-09	
Pb-210	Th-230	1.000E+00	1.141E-14	7.915E-14	3.415E-12	
Pb-210	U-234	1.000E+00	2.572E-20	3.831E-19	1.107E-16	
Pb-210	U-238	1.000E+00	1.460E-26	4.500E-25	8.385E-22	
Pb-210	DOSE(j)		5.124E-09	5.123E-09	5.117E-09	
ORa-226	Ra-226	1.000E+00	1.491E-03	1.491E-03	1.483E-03	
Ra-226	Th-230	1.000E+00	3.231E-07	9.690E-07	6.766E-06	
Ra-226	U-234	1.000E+00	9.695E-13	6.785E-12	3.202E-10	
Ra-226	U-238	1.000E+00	6.871E-19	1.031E-17	3.182E-15	
Ra-226	DOSE(j)		1.492E-03	1.492E-03	1.490E-03	
ORa-228	Ra-228	1.000E+00	8.644E-04	7.661E-04	2.586E-04	
Ra-228	Th-232	1.000E+00	5.315E-05	1.513E-04	6.583E-04	
Ra-228	DOSE(j)		9.176E-04	9.175E-04	9.169E-04	
OTh-228	Ra-228	1.000E+00	4.814E-04	1.172E-03	1.211E-03	
Th-228	Th-228	1.000E+00	2.611E-03	1.818E-03	6.971E-05	
Th-228	Th-232	1.000E+00	2.012E-05	1.235E-04	1.830E-03	

Th-228	DOSE(j)		3.113E-03	3.113E-03	3.111E-03
OTH-230	Th-230	1.000E+00	6.186E-10	6.186E-10	6.186E-10
Th-230	U-234	1.000E+00	2.784E-15	8.353E-15	5.843E-14
Th-230	U-238	1.000E+00	2.631E-21	1.842E-20	8.701E-19
Th-230	DOSE(j)		6.186E-10	6.186E-10	6.186E-10
OTH-232	Th-232	1.000E+00	1.245E-10	1.245E-10	1.245E-10
OU-234	U-234	1.000E+00	1.190E-10	1.190E-10	1.188E-10
U-234	U-238	1.000E+00	1.686E-16	5.059E-16	3.537E-15
U-234	DOSE(j)		1.190E-10	1.190E-10	1.188E-10
OU-235	U-235	1.000E+00	2.581E-07	2.580E-07	2.577E-07
OU-238	U-238	1.000E+00	1.173E-05	1.172E-05	1.171E-05

BRF(i) is the branch fraction of the parent nuclide.
 IRESRAD, Version 6.22 T_{1/2} Limit = 0.5 year 02/24/2005 13:41 Page 18
 Summary : WRR2-WORKER ON RIP-RAP-SLOPE PART File: WRR2.RAD

Individual Nuclide Soil Concentration
 Parent Nuclide and Branch Fraction Indicated

ONuclide	Parent	BRF(i)	S(j,t), pCi/g
(j)	(i)		t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	2.330E-01 2.257E-01 1.692E-01
Ac-227	Pa-231	1.000E+00	0.000E+00 7.300E-03 6.344E-02
Ac-227	U-235	1.000E+00	0.000E+00 7.763E-08 7.067E-06
Ac-227	S(j):		2.330E-01 2.330E-01 2.327E-01
OPa-231	Pa-231	1.000E+00	2.330E-01 2.330E-01 2.326E-01
Pa-231	U-235	1.000E+00	0.000E+00 4.929E-06 4.923E-05
Pa-231	S(j):		2.330E-01 2.330E-01 2.327E-01
OPb-210	Pb-210	1.000E+00	5.000E+00 4.846E+00 3.659E+00
Pb-210	Ra-226	1.000E+00	0.000E+00 1.530E-01 1.331E+00
Pb-210	Th-230	1.000E+00	0.000E+00 3.331E-05 3.036E-03
Pb-210	U-234	1.000E+00	0.000E+00 1.002E-10 9.343E-08
Pb-210	U-238	1.000E+00	0.000E+00 7.114E-17 6.723E-13
Pb-210	S(j):		5.000E+00 4.999E+00 4.993E+00
ORa-226	Ra-226	1.000E+00	5.000E+00 4.997E+00 4.972E+00
Ra-226	Th-230	1.000E+00	0.000E+00 2.165E-03 2.160E-02
Ra-226	U-234	1.000E+00	0.000E+00 9.747E-09 9.726E-07
Ra-226	U-238	1.000E+00	0.000E+00 9.211E-15 9.194E-12
Ra-226	S(j):		5.000E+00 4.999E+00 4.993E+00
ORa-228	Ra-228	1.000E+00	7.500E+00 6.647E+00 2.244E+00
Ra-228	Th-232	1.000E+00	0.000E+00 8.517E-01 5.250E+00
Ra-228	S(j):		7.500E+00 7.499E+00 7.494E+00
OTH-228	Ra-228	1.000E+00	0.000E+00 2.140E+00 3.064E+00
Th-228	Th-228	1.000E+00	7.500E+00 5.220E+00 2.002E-01
Th-228	Th-232	1.000E+00	0.000E+00 1.398E-01 4.231E+00
Th-228	S(j):		7.500E+00 7.500E+00 7.495E+00
OTH-230	Th-230	1.000E+00	5.000E+00 5.000E+00 4.999E+00
Th-230	U-234	1.000E+00	0.000E+00 4.501E-05 4.498E-04
Th-230	U-238	1.000E+00	0.000E+00 6.379E-11 6.374E-09
Th-230	S(j):		5.000E+00 5.000E+00 5.000E+00
OTH-232	Th-232	1.000E+00	7.500E+00 7.500E+00 7.500E+00
OU-234	U-234	1.000E+00	5.000E+00 4.999E+00 4.993E+00
U-234	U-238	1.000E+00	0.000E+00 1.417E-05 1.416E-04
U-234	S(j):		5.000E+00 4.999E+00 4.993E+00
OU-235	U-235	1.000E+00	2.330E-01 2.330E-01 2.327E-01
OU-238	U-238	1.000E+00	5.000E+00 4.999E+00 4.993E+00

BRF(i) is the branch fraction of the parent nuclide.
 ORESICALC.EXE execution time = 2.75 seconds

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

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(3)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(4)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(5)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(11)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(3)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(4)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(10)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(11)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)

D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)

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Dose Conversion Factor (and Related) Parameter Summary (continued)
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Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)

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Dose Conversion Factor (and Related) Parameter Summary (continued)
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Menu	Parameter	Current Value	Default	Parameter Name
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)

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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)	2.000E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+01	3.000E+00	---	T(3)
R011	Times for calculations (yr)	not used	1.000E+01	---	T(4)
R011	Times for calculations (yr)	not used	3.000E+01	---	T(5)
R011	Times for calculations (yr)	not used	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	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	2.330E-01	0.000E+00	---	SI(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	2.330E-01	0.000E+00	---	SI(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	5.000E+00	0.000E+00	---	SI(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.000E+00	0.000E+00	---	SI(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	7.500E+00	0.000E+00	---	SI(5)
R012	Initial principal radionuclide (pCi/g): Th-228	7.500E+00	0.000E+00	---	SI(6)
R012	Initial principal radionuclide (pCi/g): Th-230	5.000E+00	0.000E+00	---	SI(7)
R012	Initial principal radionuclide (pCi/g): Th-232	7.500E+00	0.000E+00	---	SI(8)
R012	Initial principal radionuclide (pCi/g): U-234	5.000E+00	0.000E+00	---	SI(9)
R012	Initial principal radionuclide (pCi/g): U-235	2.330E-01	0.000E+00	---	SI(10)
R012	Initial principal radionuclide (pCi/g): U-238	5.000E+00	0.000E+00	---	SI(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UM
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	1.000E+03	2.000E+01	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+03	1.000E+02	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(4)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(5)

R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

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Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	1.240E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	1.900E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	2.100E-02	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	0.000E+00	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)

R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI

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 Summary : WRR-ALE1-WORKER-RIP-RAP-LIGHT EXCV-TOP File: WRR-ALE1.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFIS
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFIS
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWIS
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWIS
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM

C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSX
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSX
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E+01	---	CO2F

STOR Storage times of contaminated foodstuffs (days):
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	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	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

Summary : WRR-ALE1-WORKER-RIP-RAP-LIGHT EXCV-TOP

File: WRR-ALE1.RAD

Contaminated Zone Dimensions

Initial Soil Concentrations, pCi/g

Area: 2000.00 square meters
 Thickness: 2.00 meters
 Cover Depth: 0.00 meters

Ac-227 2.330E-01
 Pa-231 2.330E-01
 Pb-210 5.000E+00
 Ra-226 5.000E+00
 Ra-228 7.500E+00
 Th-228 7.500E+00
 Th-230 5.000E+00
 Th-232 7.500E+00
 U-234 5.000E+00
 U-235 2.330E-01
 U-238 5.000E+00

0

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years): 0.000E+00 1.000E+00 1.000E+01

TDOSE(t): 7.778E-01 7.778E-01 7.772E-01

M(t): 3.111E-02 3.111E-02 3.109E-02

OMaximum TDOSE(t): 7.778E-01 mrem/yr at t = 0.000E+00 years

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Summary : WRR-ALE1-WORKER-RIP-RAP-LIGHT EXCV-TOP

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.680E-03	0.0022	4.602E-03	0.0059	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.601E-03	0.0033
Pa-231	1.903E-04	0.0002	9.643E-04	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.935E-03	0.0025
Pb-210	1.128E-04	0.0001	3.411E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.743E-02	0.0353
Ra-226	2.028E-01	0.2607	1.337E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.524E-03	0.0071
Ra-228	1.958E-01	0.2517	1.302E-03	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.517E-03	0.0109
Th-228	2.330E-01	0.2995	6.482E-03	0.0083	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.897E-03	0.0050
Th-230	6.638E-05	0.0001	4.868E-03	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.101E-03	0.0027
Th-232	1.121E-02	0.0144	3.679E-02	0.0473	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.620E-02	0.0208
U-234	7.524E-06	0.0000	1.971E-03	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.085E-03	0.0014
U-235	6.498E-04	0.0008	8.559E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.770E-05	0.0001
U-238	2.756E-03	0.0035	1.762E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.031E-03	0.0013
Total	6.482E-01	0.8333	5.930E-02	0.0762	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.037E-02	0.0905

0

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	8.884E-03	0.0114
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	3.089E-03	0.0040
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	2.789E-02	0.0359
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	2.084E-01	0.2679
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	2.056E-01	0.2643
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	2.433E-01	0.3128
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	7.036E-03	0.0090
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	6.420E-02	0.0825
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	3.063E-03	0.0039
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	7.831E-04	0.0010
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	5.549E-03	0.0071
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	7.778E-01	1.0000

0*Sum of all water independent and dependent pathways.

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Summary : WRR-ALE1-WORKER-RIP-RAP-LIGHT EXCV-TOP

File: WRR-ALE1.RAD

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

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.628E-03	0.0021	4.457E-03	0.0057	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.520E-03	0.0032
Pa-231	2.429E-04	0.0003	1.108E-03	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.016E-03	0.0026
Pb-210	1.093E-04	0.0001	3.306E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.659E-02	0.0342
Ra-226	2.026E-01	0.2605	1.441E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.360E-03	0.0082
Ra-228	2.400E-01	0.3085	3.003E-03	0.0039	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.660E-03	0.0111
Th-228	1.622E-01	0.2085	4.512E-03	0.0058	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.712E-03	0.0035
Th-230	1.542E-04	0.0002	4.868E-03	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.104E-03	0.0027
Th-232	3.778E-02	0.0486	3.706E-02	0.0476	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.724E-02	0.0222
U-234	7.524E-06	0.0000	1.971E-03	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.084E-03	0.0014
U-235	6.498E-04	0.0008	8.560E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.774E-05	0.0001
U-238	2.756E-03	0.0035	1.762E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.031E-03	0.0013
Total	6.481E-01	0.8333	5.930E-02	0.0762	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.037E-02	0.0905

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

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	8.604E-03	0.0111
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	3.367E-03	0.0043
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	2.703E-02	0.0348
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	2.091E-01	0.2689
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	2.516E-01	0.3235
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	1.694E-01	0.2178
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	7.126E-03	0.0092
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	9.208E-02	0.1184
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	3.063E-03	0.0039
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	7.831E-04	0.0010
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	5.548E-03	0.0071
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	7.778E-01	1.0000

*Sum of all water independent and dependent pathways.

1RESRAD, Version 6.22 T₀ Limit = 0.5 year

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File: WRR-ALE1.RAD

Summary : WRR-ALE1-WORKER-RIP-RAP-LIGHT EXCV-TOP

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

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.221E-03	0.0016	3.343E-03	0.0043	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.890E-03	0.0024
Pa-231	6.475E-04	0.0008	2.216E-03	0.0029	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.640E-03	0.0034
Pb-210	8.254E-05	0.0001	2.496E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.008E-02	0.0258
Ra-226	2.016E-01	0.2594	2.237E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.280E-02	0.0165
Ra-228	1.537E-01	0.1978	3.038E-03	0.0039	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.140E-03	0.0053
Th-228	6.220E-03	0.0080	1.731E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.040E-04	0.0001
Th-230	9.423E-04	0.0012	4.868E-03	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.142E-03	0.0028
Th-232	2.797E-01	0.3599	4.136E-02	0.0532	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.436E-02	0.0313
U-234	7.559E-06	0.0000	1.969E-03	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.083E-03	0.0014
U-235	6.491E-04	0.0008	8.582E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.813E-05	0.0001
U-238	2.752E-03	0.0035	1.760E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.030E-03	0.0013
Total	6.476E-01	0.8332	5.928E-02	0.0763	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.031E-02	0.0905

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

Radio- Nuclide	Water		Fish		Water Dependent Pathways 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	6.453E-03	0.0083
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	5.503E-03	0.0071
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	2.041E-02	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	2.147E-01	0.2762
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	1.609E-01	0.2070
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	6.497E-03	0.0084
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	7.952E-03	0.0102
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	3.454E-01	0.4444
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	3.060E-03	0.0039
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	7.830E-04	0.0010
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	5.542E-03	0.0071

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 7.772E-01 1.0000

0*Sum of all water independent and dependent pathways.

IRSRAD, Version 6.22 T_{1/2} Limit = 0.5 year 02/24/2005 15:03 Page 15

Summary : WRR-ALE1-WORKER-RIP-RAP-LIGHT EXCV-TOP File: WRR-ALE1.RAD

Dose/Source Ratios Summed Over All Pathways

Parent and Progeny Principal Radionuclide Contributions Indicated

0Parent Product Branch DSR(j,t) (mrem/yr)/(pCi/g)
(i) (j) Fraction* t= 0.000E+00 1.000E+00 1.000E+01

Ac-227	Ac-227	1.000E+00	3.813E-02	3.693E-02	2.770E-02
OPa-231	Pa-231	1.000E+00	1.265E-02	1.265E-02	1.263E-02
Pa-231	Ac-227	1.000E+00	6.101E-04	1.805E-03	1.099E-02
Pa-231	DSR(j)		1.326E-02	1.445E-02	2.362E-02
OPb-210	Pb-210	1.000E+00	5.577E-03	5.406E-03	4.082E-03
ORa-226	Ra-226	1.000E+00	4.159E-02	4.157E-02	4.136E-02
Ra-226	Pb-210	1.000E+00	8.711E-05	2.577E-04	1.571E-03
Ra-226	DSR(j)		4.168E-02	4.183E-02	4.293E-02
ORa-228	Ra-228	1.000E+00	2.143E-02	1.899E-02	6.411E-03
Ra-228	Th-228	1.000E+00	5.982E-03	1.456E-02	1.504E-02
Ra-228	DSR(j)		2.741E-02	3.355E-02	2.146E-02
OTh-228	Th-228	1.000E+00	3.245E-02	2.258E-02	8.662E-04
OTh-230	Th-230	1.000E+00	1.398E-03	1.398E-03	1.398E-03
Th-230	Ra-226	1.000E+00	9.011E-06	2.702E-05	1.887E-04
Th-230	Pb-210	1.000E+00	1.261E-08	8.749E-08	3.775E-06
Th-230	DSR(j)		1.407E-03	1.425E-03	1.590E-03
OTh-232	Th-232	1.000E+00	6.992E-03	6.992E-03	6.992E-03
Th-232	Ra-228	1.000E+00	1.318E-03	3.751E-03	1.632E-02
Th-232	Th-228	1.000E+00	2.501E-04	1.534E-03	2.274E-02
Th-232	DSR(j)		8.560E-03	1.228E-02	4.605E-02
OU-234	U-234	1.000E+00	6.126E-04	6.125E-04	6.118E-04
U-234	Th-230	1.000E+00	6.293E-09	1.888E-08	1.320E-07
U-234	Ra-226	1.000E+00	2.704E-11	1.892E-10	8.929E-09
U-234	Pb-210	1.000E+00	2.843E-14	4.235E-13	1.223E-10
U-234	DSR(j)		6.126E-04	6.125E-04	6.119E-04
OU-235	U-235	1.000E+00	3.361E-03	3.361E-03	3.357E-03
U-235	Pa-231	1.000E+00	1.338E-07	4.014E-07	2.806E-06
U-235	Ac-227	1.000E+00	4.314E-09	2.993E-08	1.290E-06
U-235	DSR(j)		3.361E-03	3.361E-03	3.361E-03
OU-238	U-238	1.000E+00	1.110E-03	1.110E-03	1.108E-03
U-238	U-234	1.000E+00	8.683E-10	2.605E-09	1.821E-08
U-238	Th-230	1.000E+00	5.946E-15	4.162E-14	1.966E-12
U-238	Ra-226	1.000E+00	1.916E-17	2.874E-16	8.875E-14
U-238	Pb-210	1.000E+00	1.614E-20	4.975E-19	9.270E-16
U-238	DSR(j)		1.110E-03	1.110E-03	1.108E-03

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).

The DSR includes contributions from associated (half-life < 0.5 yr) daughters.

IRSRAD, Version 6.22 T_{1/2} Limit = 0.5 year 02/24/2005 15:03 Page 16

Summary : WRR-ALE1-WORKER-RIP-RAP-LIGHT EXCV-TOP File: WRR-ALE1.RAD

Single Radionuclide Soil Guidelines G(i,t) in pCi/g

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

ONuclide
(i) t= 0.000E+00 1.000E+00 1.000E+01

Ac-227	6.557E+02	6.770E+02	9.027E+02
Pa-231	1.886E+03	1.730E+03	1.058E+03
Pb-210	4.483E+03	4.625E+03	6.125E+03
Ra-226	5.998E+02	5.977E+02	5.823E+02
Ra-228	9.120E+02	7.451E+02	1.165E+03
Th-228	7.705E+02	1.107E+03	2.886E+04
Th-230	1.777E+04	1.754E+04	1.572E+04
Th-232	2.921E+03	2.036E+03	5.428E+02
U-234	4.081E+04	4.081E+04	4.086E+04
U-235	7.438E+03	7.438E+03	7.439E+03
U-238	2.253E+04	2.253E+04	2.256E+04

0

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

ONuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin) (pCi/g)	G(i,tmin) (pCi/g)	DSR(i,tmax) (pCi/g)	G(i,tmax) (pCi/g)
Ac-227	2.330E-01	0.000E+00	3.813E-02	6.557E+02	3.813E-02	6.557E+02
Pa-231	2.330E-01	1.000E+01	2.362E-02	1.058E+03	1.326E-02	1.886E+03
Pb-210	5.000E+00	0.000E+00	5.577E-03	4.483E+03	5.577E-03	4.483E+03
Ra-226	5.000E+00	1.000E+01	4.293E-02	5.823E+02	4.168E-02	5.998E+02
Ra-228	7.500E+00	2.699 A 0.005	3.662E-02	6.827E+02	2.741E-02	9.120E+02
Th-228	7.500E+00	0.000E+00	3.245E-02	7.705E+02	3.245E-02	7.705E+02
Th-230	5.000E+00	1.000E+01	1.590E-03	1.572E+04	1.407E-03	1.777E+04
Th-232	7.500E+00	1.000E+01	4.605E-02	5.428E+02	8.560E-03	2.921E+03
U-234	5.000E+00	0.000E+00	6.126E-04	4.081E+04	6.126E-04	4.081E+04
U-235	2.330E-01	0.000E+00	3.361E-03	7.438E+03	3.361E-03	7.438E+03
U-238	5.000E+00	0.000E+00	1.110E-03	2.253E+04	1.110E-03	2.253E+04

1RESRAD, Version 6.22 T_a Limit = 0.5 year 02/24/2005 15:03 Page 17
Summary : WRR-ALE1-WORKER-RIP-RAP-LIGHT EXCV-TOP File: WRR-ALE1.RAD

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

ONuclide Parent (j)	Parent (i)	BRF(i)	DOSE(j,t), mrem/yr t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	8.884E-03 8.604E-03 6.453E-03
Ac-227	Pa-231	1.000E+00	1.422E-04 4.205E-04 2.561E-03
Ac-227	U-235	1.000E+00	1.005E-09 6.973E-09 3.005E-07
Ac-227	DOSE(j)		9.026E-03 9.025E-03 9.014E-03
OPa-231	Pa-231	1.000E+00	2.947E-03 2.947E-03 2.942E-03
Pa-231	U-235	1.000E+00	3.118E-08 9.352E-08 6.538E-07
Pa-231	DOSE(j)		2.947E-03 2.947E-03 2.943E-03
OPb-210	Pb-210	1.000E+00	2.789E-02 2.703E-02 2.041E-02
Pb-210	Ra-226	1.000E+00	4.356E-04 1.288E-03 7.856E-03
Pb-210	Th-230	1.000E+00	6.306E-08 4.375E-07 1.888E-05
Pb-210	U-234	1.000E+00	1.421E-13 2.118E-12 6.116E-10
Pb-210	U-238	1.000E+00	8.069E-20 2.488E-18 4.635E-15
Pb-210	DOSE(j)		2.832E-02 2.832E-02 2.828E-02
ORa-226	Ra-226	1.000E+00	2.080E-01 2.079E-01 2.068E-01
Ra-226	Th-230	1.000E+00	4.505E-05 1.351E-04 9.434E-04
Ra-226	U-234	1.000E+00	1.352E-10 9.461E-10 4.464E-08
Ra-226	U-238	1.000E+00	9.582E-17 1.437E-15 4.438E-13
Ra-226	DOSE(j)		2.080E-01 2.080E-01 2.077E-01
ORa-228	Ra-228	1.000E+00	1.607E-01 1.425E-01 4.808E-02
Ra-228	Th-232	1.000E+00	9.883E-03 2.813E-02 1.224E-01
Ra-228	DOSE(j)		1.706E-01 1.706E-01 1.705E-01
OTH-228	Ra-228	1.000E+00	4.486E-02 1.092E-01 1.128E-01
Th-228	Th-228	1.000E+00	2.433E-01 1.694E-01 6.497E-03
Th-228	Th-232	1.000E+00	1.875E-03 1.151E-02 1.706E-01
Th-228	DOSE(j)		2.901E-01 2.901E-01 2.899E-01
OTH-230	Th-230	1.000E+00	6.991E-03 6.990E-03 6.990E-03

Th-230	U-234	1.000E+00	3.146E-08	9.438E-08	6.602E-07
Th-230	U-238	1.000E+00	2.973E-14	2.081E-13	9.832E-12
Th-230	DOSE(j)		6.991E-03	6.991E-03	6.990E-03
0Th-232	Th-232	1.000E+00	5.244E-02	5.244E-02	5.244E-02
OU-234	U-234	1.000E+00	3.063E-03	3.063E-03	3.059E-03
U-234	U-238	1.000E+00	4.342E-09	1.302E-08	9.105E-08
U-234	DOSE(j)		3.063E-03	3.063E-03	3.059E-03
OU-235	U-235	1.000E+00	7.831E-04	7.830E-04	7.821E-04
OU-238	U-238	1.000E+00	5.549E-03	5.548E-03	5.541E-03

BRF(i) is the branch fraction of the parent nuclide.

1RESRAD, Version 6.22 T_x Limit = 0.5 year 02/24/2005 15:03 Page 18
Summary : WRR-ALE1-WORKER-RIP-RAP-LIGHT EXCV-TOP File: WRR-ALE1.RAD

Individual Nuclide Soil Concentration					
Parent Nuclide and Branch Fraction Indicated					
ONuclide	Parent	BRF(i)	S(j,t), pCi/g		
(j)	(i)		t= 0.000E+00 1.000E+00 1.000E+01		
Ac-227	Ac-227	1.000E+00	2.330E-01	2.257E-01	1.692E-01
Ac-227	Pa-231	1.000E+00	0.000E+00	7.300E-03	6.344E-02
Ac-227	U-235	1.000E+00	0.000E+00	7.763E-08	7.067E-06
Ac-227	S(j):		2.330E-01	2.330E-01	2.327E-01
OPa-231	Pa-231	1.000E+00	2.330E-01	2.330E-01	2.326E-01
Pa-231	U-235	1.000E+00	0.000E+00	4.929E-06	4.923E-05
Pa-231	S(j):		2.330E-01	2.330E-01	2.327E-01
OPb-210	Pb-210	1.000E+00	5.000E+00	4.846E+00	3.659E+00
Pb-210	Ra-226	1.000E+00	0.000E+00	1.530E-01	1.331E+00
Pb-210	Th-230	1.000E+00	0.000E+00	3.331E-05	3.036E-03
Pb-210	U-234	1.000E+00	0.000E+00	1.002E-10	9.343E-08
Pb-210	U-238	1.000E+00	0.000E+00	7.114E-17	6.723E-13
Pb-210	S(j):		5.000E+00	4.999E+00	4.993E+00
ORa-226	Ra-226	1.000E+00	5.000E+00	4.997E+00	4.972E+00
Ra-226	Th-230	1.000E+00	0.000E+00	2.165E-03	2.160E-02
Ra-226	U-234	1.000E+00	0.000E+00	9.747E-09	9.726E-07
Ra-226	U-238	1.000E+00	0.000E+00	9.211E-15	9.194E-12
Ra-226	S(j):		5.000E+00	4.999E+00	4.993E+00
ORa-228	Ra-228	1.000E+00	7.500E+00	6.647E+00	2.244E+00
Ra-228	Th-232	1.000E+00	0.000E+00	8.517E-01	5.250E+00
Ra-228	S(j):		7.500E+00	7.499E+00	7.494E+00
0Th-228	Ra-228	1.000E+00	0.000E+00	2.140E+00	3.064E+00
Th-228	Th-228	1.000E+00	7.500E+00	5.220E+00	2.002E-01
Th-228	Th-232	1.000E+00	0.000E+00	1.398E-01	4.231E+00
Th-228	S(j):		7.500E+00	7.500E+00	7.495E+00
0Th-230	Th-230	1.000E+00	5.000E+00	5.000E+00	4.999E+00
Th-230	U-234	1.000E+00	0.000E+00	4.501E-05	4.498E-04
Th-230	U-238	1.000E+00	0.000E+00	6.379E-11	6.374E-09
Th-230	S(j):		5.000E+00	5.000E+00	5.000E+00
0Th-232	Th-232	1.000E+00	7.500E+00	7.500E+00	7.500E+00
OU-234	U-234	1.000E+00	5.000E+00	4.999E+00	4.993E+00
U-234	U-238	1.000E+00	0.000E+00	1.417E-05	1.416E-04
U-234	S(j):		5.000E+00	4.999E+00	4.993E+00
OU-235	U-235	1.000E+00	2.330E-01	2.330E-01	2.327E-01
OU-238	U-238	1.000E+00	5.000E+00	4.999E+00	4.993E+00

BRF(i) is the branch fraction of the parent nuclide.

ORESCALC.EXE execution time = 2.72 seconds

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

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(3)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(4)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(5)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(11)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(3)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(4)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(10)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(11)
D-34	Food transfer factors:			
D-34	Ac-227+D, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231, plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D, plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D, plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)

D-34					
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)	
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)	
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)	
D-34					
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)	
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)	
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)	
D-34					

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Dose Conversion Factor (and Related) Parameter Summary (continued)

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0	Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-230	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34					
D-34	Th-232	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34					
D-34	U-234	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34					
D-34	U-235+D	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34					
D-34	U-238+D	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-5					
D-5	Bioaccumulation factors, fresh water, L/kg:				
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)	
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)	
D-5					
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)	
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)	
D-5					
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)	
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)	
D-5					
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)	
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)	
D-5					
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)	
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)	
D-5					
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)	
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)	
D-5					
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)	
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)	
D-5					
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)	
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)	
D-5					
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)	
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)	
D-5					
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)	
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)	
D-5					

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Dose Conversion Factor (and Related) Parameter Summary (continued)

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Menu	Parameter	Current Value	Default	Parameter Name
D-5	U-238+D, fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238+D, crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)

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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)	2.000E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+01	3.000E+00	---	T(3)
R011	Times for calculations (yr)	not used	1.000E+01	---	T(4)
R011	Times for calculations (yr)	not used	3.000E+01	---	T(5)
R011	Times for calculations (yr)	not used	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	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	3.980E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	3.980E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	8.700E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	8.700E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	6.200E+00	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-228	6.200E+00	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-230	8.700E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-232	6.200E+00	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): U-234	8.700E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-235	3.980E-01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	8.700E+00	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP

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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TFSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VMT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	1.000E+03	2.000E+01	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+03	1.000E+02	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(4)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(5)

R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	1.240E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.300E-03	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)

R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
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Site-Specific Parameter Summary (continued)

0	Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW	
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW	
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW	
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW	
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9	
R018	Contamination fraction of plant food	not used	-1	---	FPLANT	
R018	Contamination fraction of meat	not used	-1	---	FMEAT	
R018	Contamination fraction of milk	not used	-1	---	FMILK	
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LF15	
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LF16	
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LW15	
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LW16	
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI	
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD	
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM	
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT	
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW	
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH	
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW	
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR	
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)	
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)	
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)	
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)	
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)	
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)	
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)	
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)	
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)	
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)	
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)	
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)	
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)	
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)	
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)	
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM	

C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSIN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSIN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E+01	---	CO2F

STOR Storage times of contaminated foodstuffs (days):
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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	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	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

Summary : WRR-ALE2-WORKER-RIP-RAP-LIGHT EXCV-SLOPE

File: WRR-ALE2.RAD

Contaminated Zone Dimensions

Initial Soil Concentrations, pCi/g

Area: 2000.00 square meters
 Thickness: 2.00 meters
 Cover Depth: 0.00 meters

Ac-227 3.980E-01
 Pa-231 3.980E-01
 Pb-210 8.700E+00
 Ra-226 8.700E+00
 Ra-228 6.200E+00
 Th-228 6.200E+00
 Th-230 8.700E+00
 Th-232 6.200E+00
 U-234 8.700E+00
 U-235 3.980E-01
 U-238 8.700E+00

0

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years): 0.000E+00 1.000E+00 1.000E+01

TDOSE(t): 4.460E-01 4.460E-01 4.456E-01

M(t): 1.784E-02 1.784E-02 1.782E-02

OMaximum TDOSE(t): 4.460E-01 mrem/yr at t = 0.000E+00 years

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Summary : WRR-ALE2-WORKER-RIP-RAP-LIGHT EXCV-SLOPE

File: WRR-ALE2.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.655E-03	0.0037	2.152E-03	0.0048	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.867E-04	0.0011
Pa-231	1.874E-04	0.0004	4.510E-04	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.619E-04	0.0008
Pb-210	1.131E-04	0.0003	1.625E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.228E-03	0.0117
Ra-226	2.034E-01	0.4559	6.370E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.053E-03	0.0024
Ra-228	9.329E-02	0.2092	2.948E-04	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.711E-04	0.0017
Th-228	1.110E-01	0.2489	1.467E-03	0.0033	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.528E-04	0.0008
Th-230	6.658E-05	0.0001	2.319E-03	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.005E-04	0.0009
Th-232	5.340E-03	0.0120	8.327E-03	0.0187	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.467E-03	0.0033
U-234	7.547E-06	0.0000	9.390E-04	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.067E-04	0.0005
U-235	6.399E-04	0.0014	4.003E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.924E-06	0.0000
U-238	2.764E-03	0.0062	8.394E-04	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.965E-04	0.0004
Total	4.184E-01	0.9381	1.706E-02	0.0382	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.053E-02	0.0236

0

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	4.294E-03	0.0096
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	1.000E-03	0.0022
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	5.503E-03	0.0123
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	2.045E-01	0.4584
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	9.436E-02	0.2115
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	1.128E-01	0.2530
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	2.786E-03	0.0062
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	1.513E-02	0.0339
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	1.153E-03	0.0026
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	6.888E-04	0.0015
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	3.800E-03	0.0085
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	4.460E-01	1.0000

0*Sum of all water independent and dependent pathways.

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)											
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years											
Water Independent Pathways (Inhalation excludes radon)											
Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Soil
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr
Ac-227	1.603E-03	0.0036	2.085E-03	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.714E-04
Pa-231	2.392E-04	0.0005	5.184E-04	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.771E-04
Pb-210	1.096E-04	0.0002	1.575E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.067E-03
Ra-226	2.032E-01	0.4557	6.864E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.212E-03
Ra-228	1.144E-01	0.2564	6.798E-04	0.0015	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.841E-04
Th-228	7.727E-02	0.1733	1.021E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.456E-04
Th-230	1.547E-04	0.0003	2.319E-03	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.009E-04
Th-232	1.800E-02	0.0404	8.388E-03	0.0188	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.561E-03
U-234	7.547E-06	0.0000	9.389E-04	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.067E-04
U-235	6.398E-04	0.0014	4.004E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.931E-06
U-238	2.764E-03	0.0062	8.393E-04	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.964E-04
Total	4.184E-01	0.9381	1.706E-02	0.0382	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.053E-02

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		All Pathways*
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr
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	4.159E-03
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	1.135E-03
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	5.334E-03
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	2.045E-01
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	1.158E-01
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	7.854E-02
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	2.875E-03
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	2.795E-02
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	1.153E-03
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	6.888E-04
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	3.800E-03
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	4.460E-01

0*Sum of all water independent and dependent pathways.

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Summary : WRR-ALE2-WORKER-RIP-RAP-LIGHT EXCV-SLOPE File: WRR-ALE2.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)											
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years											
Water Independent Pathways (Inhalation excludes radon)											
Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Soil
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr
Ac-227	1.202E-03	0.0027	1.563E-03	0.0035	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.535E-04
Pa-231	6.376E-04	0.0014	1.036E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.939E-04
Pb-210	8.278E-05	0.0002	1.189E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.826E-03
Ra-226	2.022E-01	0.4539	1.066E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.438E-03
Ra-228	7.326E-02	0.1644	6.876E-04	0.0015	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.748E-04
Th-228	2.964E-03	0.0067	3.917E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.419E-06
Th-230	9.451E-04	0.0021	2.319E-03	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.081E-04
Th-232	1.333E-01	0.2991	9.361E-03	0.0210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.206E-03
U-234	7.582E-06	0.0000	9.380E-04	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.064E-04
U-235	6.391E-04	0.0014	4.014E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.004E-06
U-238	2.761E-03	0.0062	8.383E-04	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.962E-04
Total	4.180E-01	0.9381	1.705E-02	0.0383	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.052E-02

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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

Radio- Nuclide	Water		Fish		Radon		Water Dependent Pathways 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	3.119E-03	0.0070
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	2.168E-03	0.0049
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	4.028E-03	0.0090
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	2.048E-01	0.4596
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	7.432E-02	0.1668
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	3.012E-03	0.0068
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	3.673E-03	0.0082
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	1.448E-01	0.3251
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	1.152E-03	0.0026
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	6.883E-04	0.0015
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	3.795E-03	0.0085

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 4.456E-01 1.0000

0*Sum of all water independent and dependent pathways.

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Summary : WRR-ALE2-WORKER-RIP-RAP-LIGHT EXCV-SLOPE File: WRR-ALE2.RAD

Dose/Source Ratios Summed Over All Pathways

Parent and Progeny Principal Radionuclide Contributions Indicated

Parent Product Branch DSR(j,t) (mrem/yr)/(pCi/g)
(i) (j) Fraction* t= 0.000E+00 1.000E+00 1.000E+01

Ac-227	Ac-227	1.000E+00	1.079E-02	1.045E-02	7.836E-03
OPa-231	Pa-231	1.000E+00	2.341E-03	2.340E-03	2.337E-03
Pa-231	Ac-227	1.000E+00	1.726E-04	5.106E-04	3.110E-03
Pa-231	DSR(j)		2.513E-03	2.851E-03	5.447E-03
OPb-210	Pb-210	1.000E+00	6.326E-04	6.131E-04	4.630E-04
ORa-226	Ra-226	1.000E+00	2.349E-02	2.348E-02	2.336E-02
Ra-226	Pb-210	1.000E+00	9.880E-06	2.923E-05	1.782E-04
Ra-226	DSR(j)		2.350E-02	2.351E-02	2.354E-02
ORa-228	Ra-228	1.000E+00	1.186E-02	1.051E-02	3.549E-03
Ra-228	Th-228	1.000E+00	3.355E-03	8.165E-03	8.438E-03
Ra-228	DSR(j)		1.522E-02	1.868E-02	1.199E-02
OTh-228	Th-228	1.000E+00	1.820E-02	1.267E-02	4.859E-04
OTh-230	Th-230	1.000E+00	3.152E-04	3.152E-04	3.151E-04
Th-230	Ra-226	1.000E+00	5.089E-06	1.526E-05	1.066E-04
Th-230	Pb-210	1.000E+00	1.431E-09	9.924E-09	4.282E-07
Th-230	DSR(j)		3.203E-04	3.304E-04	4.221E-04
OTh-232	Th-232	1.000E+00	1.571E-03	1.571E-03	1.571E-03
Th-232	Ra-228	1.000E+00	7.294E-04	2.077E-03	9.035E-03
Th-232	Th-228	1.000E+00	1.403E-04	8.605E-04	1.276E-02
Th-232	DSR(j)		2.441E-03	4.509E-03	2.336E-02
OU-234	U-234	1.000E+00	1.326E-04	1.325E-04	1.324E-04
U-234	Th-230	1.000E+00	1.419E-09	4.255E-09	2.977E-08
U-234	Ra-226	1.000E+00	1.527E-11	1.069E-10	5.043E-09
U-234	Pb-210	1.000E+00	3.224E-15	4.804E-14	1.387E-11
U-234	DSR(j)		1.326E-04	1.325E-04	1.324E-04
OU-235	U-235	1.000E+00	1.731E-03	1.730E-03	1.728E-03
U-235	Pa-231	1.000E+00	2.476E-08	7.428E-08	5.193E-07
U-235	Ac-227	1.000E+00	1.221E-09	8.467E-09	3.649E-07
U-235	DSR(j)		1.731E-03	1.731E-03	1.729E-03
OU-238	U-238	1.000E+00	4.368E-04	4.367E-04	4.362E-04
U-238	U-234	1.000E+00	1.879E-10	5.636E-10	3.940E-09
U-238	Th-230	1.000E+00	1.340E-15	9.382E-15	4.433E-13
U-238	Ra-226	1.000E+00	1.082E-17	1.623E-16	5.013E-14
U-238	Pb-210	1.000E+00	1.830E-21	5.643E-20	1.051E-16
U-238	DSR(j)		4.368E-04	4.367E-04	4.362E-04

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).

The DSR includes contributions from associated (half-life < 0.5 yr) daughters.

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Summary : WRR-ALE2-WORKER-RIP-RAP-LIGHT EXCV-SLOPE File: WRR-ALE2.RAD

Single Radionuclide Soil Guidelines G(i,t) in pCi/g

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

ONuclide (i)	t= 0.000E+00	1.000E+00	1.000E+01
Ac-227	2.317E+03	2.393E+03	3.190E+03
Pa-231	9.947E+03	8.769E+03	4.590E+03
Pb-210	3.952E+04	4.077E+04	5.400E+04
Ra-226	1.064E+03	1.063E+03	1.062E+03
Ra-228	1.643E+03	1.338E+03	2.086E+03
Th-228	1.374E+03	1.974E+03	5.145E+04
Th-230	7.806E+04	7.566E+04	5.922E+04
Th-232	1.024E+04	5.545E+03	1.070E+03
U-234	1.886E+05	1.886E+05	1.888E+05
U-235	1.444E+04	1.445E+04	1.446E+04
U-238	5.723E+04	5.724E+04	5.731E+04

0

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

ONuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin) (pCi/g)	G(i,tmin) (pCi/g)	DSR(i,tmax) (pCi/g)	G(i,tmax) (pCi/g)
Ac-227	3.980E-01	0.000E+00	1.079E-02	2.317E+03	1.079E-02	2.317E+03
Pa-231	3.980E-01	1.000E+01	5.447E-03	4.590E+03	2.513E-03	9.947E+03
Pb-210	8.700E+00	0.000E+00	6.326E-04	3.952E+04	6.326E-04	3.952E+04
Ra-226	8.700E+00	1.000E+01	2.354E-02	1.062E+03	2.350E-02	1.064E+03
Ra-228	6.200E+00	2.714 n 0.005	2.043E-02	1.224E+03	1.522E-02	1.643E+03
Th-228	6.200E+00	0.000E+00	1.820E-02	1.374E+03	1.820E-02	1.374E+03
Th-230	8.700E+00	1.000E+01	4.221E-04	5.922E+04	3.203E-04	7.806E+04
Th-232	6.200E+00	1.000E+01	2.336E-02	1.070E+03	2.441E-03	1.024E+04
U-234	8.700E+00	0.000E+00	1.326E-04	1.886E+05	1.326E-04	1.886E+05
U-235	3.980E-01	0.000E+00	1.731E-03	1.444E+04	1.731E-03	1.444E+04
U-238	8.700E+00	0.000E+00	4.368E-04	5.723E+04	4.368E-04	5.723E+04

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 Summary : WRR-ALE2-WORKER-RIP-RAP-LIGHT EXCV-SLOPE File: WRR-ALE2.RAD

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

ONuclide Parent (j)	BRF(i)	DOSE(j,t), mrem/yr	t= 0.000E+00	1.000E+00	1.000E+01
Ac-227	Ac-227	1.000E+00	4.294E-03	4.159E-03	3.119E-03
Ac-227	Pa-231	1.000E+00	6.871E-05	2.032E-04	1.238E-03
Ac-227	U-235	1.000E+00	4.859E-10	3.370E-09	1.452E-07
Ac-227	DOSE(j)		4.362E-03	4.362E-03	4.357E-03
OPa-231	Pa-231	1.000E+00	9.316E-04	9.314E-04	9.301E-04
Pa-231	U-235	1.000E+00	9.855E-09	2.956E-08	2.067E-07
Pa-231	DOSE(j)		9.316E-04	9.315E-04	9.303E-04
OPb-210	Pb-210	1.000E+00	5.503E-03	5.334E-03	4.028E-03
Pb-210	Ra-226	1.000E+00	8.596E-05	2.543E-04	1.550E-03
Pb-210	Th-230	1.000E+00	1.245E-08	8.634E-08	3.725E-06
Pb-210	U-234	1.000E+00	2.805E-14	4.179E-13	1.207E-10
Pb-210	U-238	1.000E+00	1.592E-20	4.909E-19	9.147E-16
Pb-210	DOSE(j)		5.589E-03	5.589E-03	5.582E-03
ORa-226	Ra-226	1.000E+00	2.044E-01	2.043E-01	2.032E-01
Ra-226	Th-230	1.000E+00	4.428E-05	1.328E-04	9.272E-04
Ra-226	U-234	1.000E+00	1.329E-10	9.298E-10	4.388E-08
Ra-226	U-238	1.000E+00	9.416E-17	1.412E-15	4.361E-13
Ra-226	DOSE(j)		2.044E-01	2.044E-01	2.042E-01
ORa-228	Ra-228	1.000E+00	7.355E-02	6.519E-02	2.200E-02
Ra-228	Th-232	1.000E+00	4.523E-03	1.288E-02	5.602E-02
Ra-228	DOSE(j)		7.808E-02	7.807E-02	7.802E-02
OTh-228	Ra-228	1.000E+00	2.080E-02	5.062E-02	5.232E-02
Th-228	Th-228	1.000E+00	1.128E-01	7.854E-02	3.012E-03
Th-228	Th-232	1.000E+00	8.696E-04	5.335E-03	7.909E-02
Th-228	DOSE(j)		1.345E-01	1.345E-01	1.344E-01
OTh-230	Th-230	1.000E+00	2.742E-03	2.742E-03	2.742E-03

Th-230	U-234	1.000E+00	1.234E-08	3.702E-08	2.590E-07
Th-230	U-238	1.000E+00	1.166E-14	8.163E-14	3.857E-12
Th-230	DOSE(j)		2.742E-03	2.742E-03	2.742E-03
0Th-232	Th-232	1.000E+00	9.742E-03	9.742E-03	9.742E-03
0U-234	U-234	1.000E+00	1.153E-03	1.153E-03	1.152E-03
U-234	U-238	1.000E+00	1.635E-09	4.903E-09	3.428E-08
U-234	DOSE(j)		1.153E-03	1.153E-03	1.152E-03
0U-235	U-235	1.000E+00	6.888E-04	6.887E-04	6.879E-04
0U-238	U-238	1.000E+00	3.800E-03	3.800E-03	3.795E-03

BRF(i) is the branch fraction of the parent nuclide.
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 Summary : WRR-ALE2-WORKER-RIP-RAP-LIGHT EXCV-SLOPE File: WRR-ALE2.RAD

Individual Nuclide Soil Concentration					
Parent Nuclide and Branch Fraction Indicated					
ONuclide	Parent	BRF(i)	S(j,t), pCi/g		
(j)	(i)		t = 0.000E+00	1.000E+00	1.000E+01
Ac-227	Ac-227	1.000E+00	3.980E-01	3.855E-01	2.891E-01
Ac-227	Pa-231	1.000E+00	0.000E+00	1.247E-02	1.084E-01
Ac-227	U-235	1.000E+00	0.000E+00	1.326E-07	1.207E-05
Ac-227	S(j):		3.980E-01	3.979E-01	3.975E-01
0Pa-231	Pa-231	1.000E+00	3.980E-01	3.979E-01	3.974E-01
Pa-231	U-235	1.000E+00	0.000E+00	8.420E-06	8.409E-05
Pa-231	S(j):		3.980E-01	3.979E-01	3.975E-01
0Pb-210	Pb-210	1.000E+00	8.700E+00	8.433E+00	6.367E+00
Pb-210	Ra-226	1.000E+00	0.000E+00	2.662E-01	2.316E+00
Pb-210	Th-230	1.000E+00	0.000E+00	5.796E-05	5.282E-03
Pb-210	U-234	1.000E+00	0.000E+00	1.744E-10	1.626E-07
Pb-210	U-238	1.000E+00	0.000E+00	1.238E-16	1.170E-12
Pb-210	S(j):		8.700E+00	8.699E+00	8.688E+00
0Ra-226	Ra-226	1.000E+00	8.700E+00	8.695E+00	8.651E+00
Ra-226	Th-230	1.000E+00	0.000E+00	3.768E-03	3.758E-02
Ra-226	U-234	1.000E+00	0.000E+00	1.696E-08	1.692E-06
Ra-226	U-238	1.000E+00	0.000E+00	1.603E-14	1.600E-11
Ra-226	S(j):		8.700E+00	8.699E+00	8.688E+00
0Ra-228	Ra-228	1.000E+00	6.200E+00	5.495E+00	1.855E+00
Ra-228	Th-232	1.000E+00	0.000E+00	7.041E-01	4.340E+00
Ra-228	S(j):		6.200E+00	6.199E+00	6.195E+00
0Th-228	Ra-228	1.000E+00	0.000E+00	1.769E+00	2.533E+00
Th-228	Th-228	1.000E+00	6.200E+00	4.316E+00	1.655E-01
Th-228	Th-232	1.000E+00	0.000E+00	1.156E-01	3.498E+00
Th-228	S(j):		6.200E+00	6.200E+00	6.196E+00
0Th-230	Th-230	1.000E+00	8.700E+00	8.700E+00	8.699E+00
Th-230	U-234	1.000E+00	0.000E+00	7.831E-05	7.826E-04
Th-230	U-238	1.000E+00	0.000E+00	1.110E-10	1.109E-08
Th-230	S(j):		8.700E+00	8.700E+00	8.700E+00
0Th-232	Th-232	1.000E+00	6.200E+00	6.200E+00	6.200E+00
0U-234	U-234	1.000E+00	8.700E+00	8.699E+00	8.688E+00
U-234	U-238	1.000E+00	0.000E+00	2.466E-05	2.463E-04
U-234	S(j):		8.700E+00	8.699E+00	8.688E+00
0U-235	U-235	1.000E+00	3.980E-01	3.979E-01	3.975E-01
0U-238	U-238	1.000E+00	8.700E+00	8.699E+00	8.688E+00

BRF(i) is the branch fraction of the parent nuclide.
 ORESALC.EXE execution time = 2.64 seconds

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

0	Menu	Parameter	Current Value	Default	Parameter Name
	B-1	Dose conversion factors for inhalation, mrem/pCi:			
	B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
	B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
	B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(3)
	B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(4)
	B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(5)
	B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(6)
	B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
	B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
	B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
	B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
	B-1	U-238+D	1.180E-01	1.180E-01	DCF2(11)
	D-1	Dose conversion factors for ingestion, mrem/pCi:			
	D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
	D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
	D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(3)
	D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(4)
	D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(5)
	D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(6)
	D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
	D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
	D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
	D-1	U-235+D	2.670E-04	2.670E-04	DCF3(10)
	D-1	U-238+D	2.690E-04	2.690E-04	DCF3(11)
	D-34	Food transfer factors:			
	D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
	D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
	D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
	D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
	D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
	D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
	D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
	D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
	D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
	D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
	D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
	D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)

D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)

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Dose Conversion Factor (and Related) Parameter Summary (continued)

File: FGR 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)

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 Summary : WRR-LE-WORKER-LIMITED EXCV ON RIP-RAP File: WRR-LE.RAD

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

Menu	Parameter	Current Value	Default	Parameter Name
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)

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Summary : WRR-LE-WORKER-LIMITED EXCV ON RIP-RAP File: WRR-LE.RAD

Site-Specific Parameter Summary		User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+01	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICKO
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+01	3.000E+00	---	T(3)
R011	Times for calculations (yr)	not used	1.000E+01	---	T(4)
R011	Times for calculations (yr)	not used	3.000E+01	---	T(5)
R011	Times for calculations (yr)	not used	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	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	1.530E+01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	1.530E+01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	3.350E+02	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	3.350E+02	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	2.360E+02	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-228	2.360E+02	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-230	3.350E+02	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-232	2.360E+02	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): U-234	3.350E+02	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-235	1.530E+01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	3.350E+02	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVERO
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP

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Summary : WRR-LE-WORKER-LIMITED EXCV ON RIP-RAP File: WRR-LE.RAD

Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	1.000E+03	2.000E+01	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+03	1.000E+02	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)

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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(4)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(5)

R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	1.740E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	7.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	1.100E-03	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)

R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LF15
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LF16
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LW15
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LW16
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM

C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSU
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSU
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E+01	---	CO2F

STOR Storage times of contaminated foodstuffs (days):
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	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	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

Summary : WRR-LE-WORKER-LIMITED EXCV ON RIP-RAP

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Contaminated Zone Dimensions

Initial Soil Concentrations, pCi/g

Area: 10.00 square meters
 Thickness: 2.00 meters
 Cover Depth: 0.00 meters

Ac-227 1.530E+01
 Pa-231 1.530E+01
 Pb-210 3.350E+02
 Ra-226 3.350E+02
 Ra-228 2.360E+02
 Th-228 2.360E+02
 Th-230 3.350E+02
 Th-232 2.360E+02
 U-234 3.350E+02
 U-235 1.530E+01
 U-238 3.350E+02

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years): 0.000E+00 1.000E+00 1.000E+01

TDOSE(t): 4.750E+00 4.749E+00 4.746E+00

M(t): 1.900E-01 1.900E-01 1.898E-01

Maximum TDOSE(t): 4.750E+00 mrem/yr at t = 0.000E+00 years

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.610E-02	0.0034	1.106E-01	0.0233	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.948E-05	0.0000
Pa-231	1.828E-03	0.0004	2.317E-02	0.0049	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.654E-05	0.0000
Pb-210	1.158E-03	0.0002	8.361E-03	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.627E-04	0.0002
Ra-226	1.906E+00	0.4013	3.278E-03	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.939E-04	0.0000
Ra-228	8.615E-01	0.1814	1.499E-02	0.0032	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.404E-04	0.0000
Th-228	1.007E+00	0.2120	7.463E-02	0.0157	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.423E-05	0.0000
Th-230	6.406E-04	0.0001	1.193E-01	0.0251	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.375E-05	0.0000
Th-232	4.938E-02	0.0104	4.236E-01	0.0892	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.671E-04	0.0001
U-234	7.835E-05	0.0000	4.831E-02	0.0102	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.806E-05	0.0000
U-235	6.296E-03	0.0013	2.056E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.641E-06	0.0000
U-238	2.636E-02	0.0055	4.319E-02	0.0091	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.618E-05	0.0000
Total	3.876E+00	0.8161	8.714E-01	0.1835	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.934E-03	0.0004

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	1.268E-01	0.0267
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	2.506E-02	0.0053
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	1.048E-02	0.0022
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	1.909E+00	0.4020
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	8.766E-01	0.1846
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	1.082E+00	0.2278
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	1.200E-01	0.0253
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	4.732E-01	0.0996
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.843E-02	0.0102
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.354E-03	0.0018
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	6.958E-02	0.0146
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	4.750E+00	1.0000

*Sum of all water independent and dependent pathways.

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Summary : WRR-LE-WORKER-LIMITED EXCV ON RIP-RAP

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

As a result of the release of radon gas from the reactor, the estimated annual dose to the public is 0.0000 mrem/yr.													
0	Ground				Water Independent Pathways (Inhalation excludes radon)				Milk		Soil		
Radio- Nuclide	Inhalation		Radon		Plant		Meat						
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	
Ac-227	1.559E-02	0.0033	1.071E-01	0.0225	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.666E-05	0.0000	
Pa-231	2.332E-03	0.0005	2.663E-02	0.0056	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.934E-05	0.0000	
Pb-210	1.122E-03	0.0002	8.104E-03	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.331E-04	0.0002	
Ra-226	1.905E+00	0.4011	3.532E-03	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.232E-04	0.0000	
Ra-228	1.051E+00	0.2213	3.458E-02	0.0073	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.427E-04	0.0000	
Th-228	7.010E-01	0.1476	5.195E-02	0.0109	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.470E-05	0.0000	
Th-230	1.466E-03	0.0003	1.193E-01	0.0251	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.384E-05	0.0000	
Th-232	1.660E-01	0.0349	4.266E-01	0.0898	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.842E-04	0.0001	
U-234	7.835E-05	0.0000	4.831E-02	0.0102	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.806E-05	0.0000	
U-235	6.295E-03	0.0013	2.057E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.642E-06	0.0000	
U-238	2.635E-02	0.0055	4.318E-02	0.0091	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.617E-05	0.0000	
Total	3.876E+00	0.8161	8.714E-01	0.1835	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.934E-03	0.0004	

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	1.228E-01	0.0258
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	2.903E-02	0.0061
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	1.016E-02	0.0021
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	1.909E+00	0.4019
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	1.086E+00	0.2286
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	7.530E-01	0.1586
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	1.209E-01	0.0254
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	5.929E-01	0.1248
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.843E-02	0.0102
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.353E-03	0.0018
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	6.958E-02	0.0146
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	4.749E+00	1.0000

0*Sum of all water independent and dependent pathways.

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Summary : WRR-LE-WORKER-LIMITED EXCV ON RIP-RAP

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

Radio- Nuclide	Water Independent Pathways (Inhalation excludes radon)													
	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.169E-02	0.0025	8.031E-02	0.0169	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.499E-05	0.0000
Pa-231	6.207E-03	0.0013	5.323E-02	0.0112	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.080E-05	0.0000
Pb-210	8.472E-04	0.0002	6.119E-03	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.046E-04	0.0001
Ra-226	1.896E+00	0.3994	5.485E-03	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.491E-04	0.0001
Ra-228	6.691E-01	0.1410	3.497E-02	0.0074	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.823E-05	0.0000
Th-228	2.689E-02	0.0057	1.992E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.715E-06	0.0000
Th-230	8.875E-03	0.0019	1.193E-01	0.0251	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.516E-05	0.0000
Th-232	1.221E+00	0.2572	4.761E-01	0.1003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.016E-04	0.0001
U-234	7.868E-05	0.0000	4.826E-02	0.0102	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.802E-05	0.0000
U-235	6.288E-03	0.0013	2.062E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.655E-06	0.0000
U-238	2.632E-02	0.0055	4.313E-02	0.0091	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.613E-05	0.0000
Total	3.873E+00	0.8160	8.710E-01	0.1836	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.932E-03	0.0004

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

Radio- Nuclide	Water		Fish		Radon		Water Dependent Pathways 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	9.207E-02	0.0194
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	5.953E-02	0.0125
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	7.671E-03	0.0016
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	1.901E+00	0.4007
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	7.042E-01	0.1484
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	2.888E-02	0.0061
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	1.283E-01	0.0270
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	1.697E+00	0.3576
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.838E-02	0.0102
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.352E-03	0.0018
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	6.949E-02	0.0146

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 4.746E+00 1.0000

0*Sum of all water independent and dependent pathways.

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Summary : WRR-LE-WORKER-LIMITED EXCV ON RIP-RAP File: WRR-LE.RAD

Dose/Source Ratios Summed Over All Pathways

Parent and Progeny Principal Radionuclide Contributions Indicated

0Parent Product Branch DSR(j,t) (mrem/yr)/(pCi/g)
(i) (j) Fraction* t= 0.000E+00 1.000E+00 1.000E+01

Ac-227	Ac-227	1.000E+00	8.284E-03	8.024E-03	6.018E-03
OPa-231	Pa-231	1.000E+00	1.505E-03	1.505E-03	1.503E-03
Pa-231	Ac-227	1.000E+00	1.326E-04	3.921E-04	2.388E-03
Pa-231	DSR(j)		1.638E-03	1.897E-03	3.891E-03
OPb-210	Pb-210	1.000E+00	3.129E-05	3.033E-05	2.290E-05
ORa-226	Ra-226	1.000E+00	5.699E-03	5.696E-03	5.667E-03
Ra-226	Pb-210	1.000E+00	4.887E-07	1.446E-06	8.815E-06
Ra-226	DSR(j)		5.700E-03	5.698E-03	5.676E-03
ORa-228	Ra-228	1.000E+00	2.869E-03	2.543E-03	8.583E-04
Ra-228	Th-228	1.000E+00	8.451E-04	2.057E-03	2.126E-03
Ra-228	DSR(j)		3.714E-03	4.600E-03	2.984E-03
OTh-228	Th-228	1.000E+00	4.584E-03	3.191E-03	1.224E-04
OTh-230	Th-230	1.000E+00	3.571E-04	3.571E-04	3.571E-04
Th-230	Ra-226	1.000E+00	1.235E-06	3.703E-06	2.585E-05
Th-230	Pb-210	1.000E+00	7.076E-11	4.908E-10	2.118E-08
Th-230	DSR(j)		3.583E-04	3.608E-04	3.829E-04
OTh-232	Th-232	1.000E+00	1.793E-03	1.793E-03	1.793E-03
Th-232	Ra-228	1.000E+00	1.764E-04	5.022E-04	2.185E-03
Th-232	Th-228	1.000E+00	3.533E-05	2.168E-04	3.213E-03
Th-232	DSR(j)		2.005E-03	2.512E-03	7.191E-03
OU-234	U-234	1.000E+00	1.446E-04	1.445E-04	1.444E-04
U-234	Th-230	1.000E+00	1.607E-09	4.821E-09	3.373E-08
U-234	Ra-226	1.000E+00	3.705E-12	2.593E-11	1.223E-09
U-234	Pb-210	1.000E+00	1.595E-16	2.376E-15	6.862E-13
U-234	DSR(j)		1.446E-04	1.446E-04	1.444E-04
OU-235	U-235	1.000E+00	5.460E-04	5.459E-04	5.452E-04
U-235	Pa-231	1.000E+00	1.593E-08	4.777E-08	3.340E-07
U-235	Ac-227	1.000E+00	9.374E-10	6.502E-09	2.802E-07
U-235	DSR(j)		5.460E-04	5.460E-04	5.459E-04
OU-238	U-238	1.000E+00	2.077E-04	2.077E-04	2.074E-04
U-238	U-234	1.000E+00	2.049E-10	6.147E-10	4.298E-09
U-238	Th-230	1.000E+00	1.519E-15	1.063E-14	5.023E-13
U-238	Ra-226	1.000E+00	2.626E-18	3.938E-17	1.216E-14
U-238	Pb-210	1.000E+00	9.053E-23	2.791E-21	5.200E-18
U-238	DSR(j)		2.077E-04	2.077E-04	2.074E-04

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).

The DSR includes contributions from associated (half-life < 0.5 yr) daughters.

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Summary : WRR-LE-WORKER-LIMITED EXCV ON RIP-RAP File: WRR-LE.RAD

Single Radionuclide Soil Guidelines G(i,t) in pCi/g

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

ONuclide (i)	t= 0.000E+00	1.000E+00	1.000E+01
Ac-227	3.018E+03	3.116E+03	4.154E+03
Pa-231	1.526E+04	1.318E+04	6.425E+03
Pb-210	7.990E+05	8.244E+05	1.092E+06
Ra-226	4.386E+03	4.388E+03	4.404E+03
Ra-228	6.731E+03	5.435E+03	8.378E+03
Th-228	5.454E+03	7.835E+03	2.043E+05
Th-230	6.977E+04	6.929E+04	6.528E+04
Th-232	1.247E+04	9.951E+03	3.476E+03
U-234	1.729E+05	1.729E+05	1.731E+05
U-235	4.579E+04	4.579E+04	4.580E+04
U-238	1.204E+05	1.204E+05	1.205E+05

U

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

ONuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin) (pCi/g)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Ac-227	1.530E+01	0.000E+00	8.284E-03	3.018E+03	8.284E-03	3.018E+03
Pa-231	1.530E+01	1.000E+01	3.891E-03	6.425E+03	1.638E-03	1.526E+04
Pb-210	3.350E+02	0.000E+00	3.129E-05	7.990E+05	3.129E-05	7.990E+05
Ra-226	3.350E+02	0.000E+00	5.700E-03	4.386E+03	5.700E-03	4.386E+03
Ra-228	2.360E+02	2.761 n 0.006	5.060E-03	4.941E+03	3.714E-03	6.731E+03
Th-228	2.360E+02	0.000E+00	4.584E-03	5.454E+03	4.584E-03	5.454E+03
Th-230	3.350E+02	1.000E+01	3.829E-04	6.528E+04	3.583E-04	6.977E+04
Th-232	2.360E+02	1.000E+01	7.191E-03	3.476E+03	2.005E-03	1.247E+04
U-234	3.350E+02	0.000E+00	1.446E-04	1.729E+05	1.446E-04	1.729E+05
U-235	1.530E+01	0.000E+00	5.460E-04	4.579E+04	5.460E-04	4.579E+04
U-238	3.350E+02	0.000E+00	2.077E-04	1.204E+05	2.077E-04	1.204E+05

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Summary : WRR-LE-WORKER-LIMITED EXCV ON RIP-RAP File: WRR-LE.RAD

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

ONuclide Parent (j)	BRF(i)	DOSE(j,t), mrem/yr
(i)		t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227 1.000E+00	1.268E-01 1.228E-01 9.207E-02
Ac-227	Pa-231 1.000E+00	2.028E-03 5.999E-03 3.653E-02
Ac-227	U-235 1.000E+00	1.434E-08 9.948E-08 4.287E-06
Ac-227	DOSE(j)	1.288E-01 1.288E-01 1.286E-01
OPa-231	Pa-231 1.000E+00	2.303E-02 2.303E-02 2.300E-02
Pa-231	U-235 1.000E+00	2.437E-07 7.309E-07 5.110E-06
Pa-231	DOSE(j)	2.303E-02 2.303E-02 2.300E-02
OPb-210	Pb-210 1.000E+00	1.048E-02 1.016E-02 7.671E-03
Pb-210	Ra-226 1.000E+00	1.637E-04 4.843E-04 2.953E-03
Pb-210	Th-230 1.000E+00	2.370E-08 1.644E-07 7.095E-06
Pb-210	U-234 1.000E+00	5.343E-14 7.960E-13 2.299E-10
Pb-210	U-238 1.000E+00	3.033E-20 9.350E-19 1.742E-15
Pb-210	DOSE(j)	1.065E-02 1.064E-02 1.063E-02
ORa-226	Ra-226 1.000E+00	1.909E+00 1.908E+00 1.899E+00
Ra-226	Th-230 1.000E+00	4.136E-04 1.241E-03 8.661E-03
Ra-226	U-234 1.000E+00	1.241E-09 8.686E-09 4.099E-07
Ra-226	U-238 1.000E+00	8.796E-16 1.319E-14 4.074E-12
Ra-226	DOSE(j)	1.910E+00 1.909E+00 1.907E+00
ORa-228	Ra-228 1.000E+00	6.771E-01 6.002E-01 2.026E-01
Ra-228	Th-232 1.000E+00	4.163E-02 1.185E-01 5.157E-01
Ra-228	DOSE(j)	7.188E-01 7.187E-01 7.183E-01
OTh-228	Ra-228 1.000E+00	1.994E-01 4.854E-01 5.016E-01
Th-228	Th-228 1.000E+00	1.082E+00 7.530E-01 2.888E-02
Th-228	Th-232 1.000E+00	8.338E-03 5.116E-02 7.583E-01
Th-228	DOSE(j)	1.290E+00 1.290E+00 1.289E+00
OTh-230	Th-230 1.000E+00	1.196E-01 1.196E-01 1.196E-01

Th-230	U-234	1.000E+00	5.384E-07	1.615E-06	1.130E-05
Th-230	U-238	1.000E+00	5.088E-13	3.561E-12	1.683E-10
Th-230	DOSE(j)		1.196E-01	1.196E-01	1.196E-01
0Th-232	Th-232	1.000E+00	4.232E-01	4.232E-01	4.232E-01
OU-234	U-234	1.000E+00	4.843E-02	4.842E-02	4.836E-02
U-234	U-238	1.000E+00	6.865E-08	2.059E-07	1.440E-06
U-234	DOSE(j)		4.843E-02	4.842E-02	4.837E-02
OU-235	U-235	1.000E+00	8.353E-03	8.352E-03	8.342E-03
OU-238	U-238	1.000E+00	6.958E-02	6.957E-02	6.949E-02

BRF(i) is the branch fraction of the parent nuclide.

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 Summary : WRR-LE-WORKER-LIMITED EXCV ON RIP-RAP File: WRR-LE.RAD

Individual Nuclide Soil Concentration					
Parent Nuclide and Branch Fraction Indicated					
ONuclide	Parent	BRF(i)	S(j,t), pCi/g		
(j)	(i)		t= 0.000E+00 1.000E+00 1.000E+01		
Ac-227	Ac-227	1.000E+00	1.530E+01	1.482E+01	1.111E+01
Ac-227	Pa-231	1.000E+00	0.000E+00	4.793E-01	4.166E+00
Ac-227	U-235	1.000E+00	0.000E+00	5.098E-06	4.640E-04
Ac-227	S(j):		1.530E+01	1.530E+01	1.528E+01
OPa-231	Pa-231	1.000E+00	1.530E+01	1.530E+01	1.528E+01
Pa-231	U-235	1.000E+00	0.000E+00	3.237E-04	3.233E-03
Pa-231	S(j):		1.530E+01	1.530E+01	1.528E+01
OPb-210	Pb-210	1.000E+00	3.350E+02	3.247E+02	2.452E+02
Pb-210	Ra-226	1.000E+00	0.000E+00	1.025E+01	8.918E+01
Pb-210	Th-230	1.000E+00	0.000E+00	2.232E-03	2.034E-01
Pb-210	U-234	1.000E+00	0.000E+00	6.714E-09	6.260E-06
Pb-210	U-238	1.000E+00	0.000E+00	4.766E-15	4.504E-11
Pb-210	S(j):		3.350E+02	3.350E+02	3.346E+02
ORa-226	Ra-226	1.000E+00	3.350E+02	3.348E+02	3.331E+02
Ra-226	Th-230	1.000E+00	0.000E+00	1.451E-01	1.447E+00
Ra-226	U-234	1.000E+00	0.000E+00	6.531E-07	6.517E-05
Ra-226	U-238	1.000E+00	0.000E+00	6.171E-13	6.160E-10
Ra-226	S(j):		3.350E+02	3.350E+02	3.346E+02
ORa-228	Ra-228	1.000E+00	2.360E+02	2.092E+02	7.060E+01
Ra-228	Th-232	1.000E+00	0.000E+00	2.680E+01	1.652E+02
Ra-228	S(j):		2.360E+02	2.360E+02	2.358E+02
0Th-228	Ra-228	1.000E+00	0.000E+00	6.732E+01	9.641E+01
Th-228	Th-228	1.000E+00	2.360E+02	1.643E+02	6.301E+00
Th-228	Th-232	1.000E+00	0.000E+00	4.400E+00	1.331E+02
Th-228	S(j):		2.360E+02	2.360E+02	2.358E+02
0Th-230	Th-230	1.000E+00	3.350E+02	3.350E+02	3.350E+02
Th-230	U-234	1.000E+00	0.000E+00	3.015E-03	3.013E-02
Th-230	U-238	1.000E+00	0.000E+00	4.274E-09	4.271E-07
Th-230	S(j):		3.350E+02	3.350E+02	3.350E+02
0Th-232	Th-232	1.000E+00	2.360E+02	2.360E+02	2.360E+02
OU-234	U-234	1.000E+00	3.350E+02	3.350E+02	3.345E+02
U-234	U-238	1.000E+00	0.000E+00	9.496E-04	9.484E-03
U-234	S(j):		3.350E+02	3.350E+02	3.346E+02
OU-235	U-235	1.000E+00	1.530E+01	1.530E+01	1.528E+01
OU-238	U-238	1.000E+00	3.350E+02	3.350E+02	3.346E+02

BRF(i) is the branch fraction of the parent nuclide.

ORESALC.EXE execution time = 2.68 seconds

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 Summary : WRR-P-WORKER PLACING RIP-RAP ON SLOPE File: WRR-P.RAD

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

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(3)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(4)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(5)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(11)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(3)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(4)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(10)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(11)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)

D-34					
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)	
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)	
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)	
D-34					
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)	
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)	
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)	
D-34					

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

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5				
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)
D-5				

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 Summary : WRR-P-WORKER PLACING RIP-RAP ON SLOPE File: WRR-P.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)

File: FGR 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)

IRESRAD, Version 6.22 T_a Limit = 0.5 year
Summary : WRR-P-WORKER PLACING RIP-RAP ON SLOPE

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File: WRR-P.RAD

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	2.000E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+01	3.000E+00	---	T(3)
R011	Times for calculations (yr)	not used	1.000E+01	---	T(4)
R011	Times for calculations (yr)	not used	3.000E+01	---	T(5)
R011	Times for calculations (yr)	not used	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	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	2.330E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	2.330E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	5.000E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.000E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	7.500E+00	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-228	7.500E+00	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-230	5.000E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-232	7.500E+00	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): U-234	5.000E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-235	2.330E-01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	5.000E+00	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP

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Site-Specific Parameter Summary (continued)						
0			User		Used by RESRAD	Parameter
Menu	Parameter		Input	Default	(If different from user input)	Name
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	---	RUNCOFF
R013	Watershed area for nearby stream or pond (m**2)		not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations		not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)		not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity		not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity		not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity		not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)		not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient		not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter		not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)		not used	1.000E-03	---	VMT
R014	Well pump intake depth (m below water table)		not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)		not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)		not used	2.500E+02	---	UM
R015	Number of unsaturated zone strata		not used	1	---	NS
R015	Unsat. zone 1, thickness (m)		not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)		not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity		not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity		not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity		not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter		not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)		not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227					
R016	Contaminated zone (cm**3/g)		1.000E+03	2.000E+01	---	DCNUCC(1)
R016	Unsat. zone 1 (cm**3/g)		not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)		not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)		0.000E+00	0.000E+00	1.333E-04	ALEACH(1)
R016	Solubility constant		0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231					
R016	Contaminated zone (cm**3/g)		1.000E+03	5.000E+01	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)		not used	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)		not used	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)		0.000E+00	0.000E+00	1.333E-04	ALEACH(2)
R016	Solubility constant		0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210					
R016	Contaminated zone (cm**3/g)		1.000E+03	1.000E+02	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)		not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)		not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)		0.000E+00	0.000E+00	1.333E-04	ALEACH(3)
R016	Solubility constant		0.000E+00	0.000E+00	not used	SOLUBK(3)
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Site-Specific Parameter Summary (continued)						
0			User		Used by RESRAD	Parameter
Menu		Parameter	Input	Default	(If different from user input)	Name
R016		Distribution coefficients for Ra-226				
R016		Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(4)
R016		Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016		Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016		Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(4)
R016		Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016		Distribution coefficients for Ra-228				
R016		Contaminated zone (cm**3/g)	1.000E+03	7.000E+01	---	DCNUCC(5)
R016		Unsat. zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016		Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016		Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(5)

R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.222E-06	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	1.000E+03	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.333E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	1.740E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	7.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	1.830E-02	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radial of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)

R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LF15
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LF16
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LW15
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LW16
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LS1
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM

C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E+01	---	CO2F

STOR Storage times of contaminated foodstuffs (days):
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Site-Specific Parameter Summary (continued)					
Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	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	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

Summary : WRR-P-WORKER PLACING RIP-RAP ON SLOPE

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Contaminated Zone Dimensions

Initial Soil Concentrations, pCi/g

Area: 2000.00 square meters
 Thickness: 2.00 meters
 Cover Depth: 0.00 meters

Ac-227 2.330E-01
 Pa-231 2.330E-01
 Pb-210 5.000E+00
 Ra-226 5.000E+00
 Ra-228 7.500E+00
 Th-228 7.500E+00
 Th-230 5.000E+00
 Th-232 7.500E+00
 U-234 5.000E+00
 U-235 2.330E-01
 U-238 5.000E+00

0

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years): 0.000E+00 1.000E+00 1.000E+01

TDOSE(t): 3.669E+00 3.668E+00 3.666E+00

M(t): 1.467E-01 1.467E-01 1.466E-01

Maximum TDOSE(t): 3.669E+00 mrem/yr at t = 0.000E+00 years

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	7.707E-03	0.0021	4.924E-02	0.0134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.267E-03	0.0006
Pa-231	8.727E-04	0.0002	1.032E-02	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.686E-03	0.0005
Pb-210	5.172E-04	0.0001	3.649E-03	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.390E-02	0.0065
Ra-226	9.299E-01	0.2535	1.431E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.814E-03	0.0013
Ra-228	8.979E-01	0.2448	1.393E-02	0.0038	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.422E-03	0.0020
Th-228	1.068E+00	0.2913	6.936E-02	0.0189	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.396E-03	0.0009
Th-230	3.045E-04	0.0001	5.209E-02	0.0142	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.831E-03	0.0005
Th-232	5.140E-02	0.0140	3.936E-01	0.1073	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.412E-02	0.0038
U-234	3.451E-05	0.0000	2.109E-02	0.0057	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.451E-04	0.0003
U-235	2.980E-03	0.0008	9.158E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.157E-05	0.0000
U-238	1.264E-02	0.0034	1.885E-02	0.0051	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.983E-04	0.0002
Total	2.973E+00	0.8103	6.345E-01	0.1730	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.133E-02	0.0167

0

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	5.922E-02	0.0161
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	1.288E-02	0.0035
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	2.807E-02	0.0077
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	9.362E-01	0.2552
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	9.193E-01	0.2506
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	1.141E+00	0.3111
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	5.422E-02	0.0148
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	4.592E-01	0.1252
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	2.207E-02	0.0060
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	3.938E-03	0.0011
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	3.239E-02	0.0088
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	3.669E+00	1.0000

*Sum of all water independent and dependent pathways.

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

Radio- Nuclide	Ground	Inhalation	Radon	Plant	Meat	Milk	Soil
mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	7.465E-03 0.0020	4.769E-02 0.0130	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	2.196E-03 0.0006
Pa-231	1.114E-03 0.0003	1.186E-02 0.0032	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	1.757E-03 0.0005
Pb-210	5.013E-04 0.0001	3.537E-03 0.0010	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	2.317E-02 0.0063
Ra-226	9.294E-01 0.2534	1.541E-03 0.0004	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	5.543E-03 0.0015
Ra-228	1.101E+00 0.3000	3.214E-02 0.0088	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	7.547E-03 0.0021
Th-228	7.437E-01 0.2027	4.828E-02 0.0132	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	2.364E-03 0.0006
Th-230	7.072E-04 0.0002	5.209E-02 0.0142	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	1.833E-03 0.0005
Th-232	1.733E-01 0.0472	3.965E-01 0.1081	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	1.503E-02 0.0041
U-234	3.451E-05 0.0000	2.109E-02 0.0057	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	9.450E-04 0.0003
U-235	2.980E-03 0.0008	9.159E-04 0.0002	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	4.160E-05 0.0000
U-238	1.264E-02 0.0034	1.885E-02 0.0051	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	8.982E-04 0.0002
Total	2.972E+00 0.8103	6.345E-01 0.1730	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	6.132E-02 0.0167

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.
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	5.735E-02 0.0156
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	1.473E-02 0.0040
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	2.721E-02 0.0074
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	9.365E-01 0.2553
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	1.140E+00 0.3109
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	7.944E-01 0.2165
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	5.463E-02 0.0149
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	5.848E-01 0.1594
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	2.207E-02 0.0060
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	3.938E-03 0.0011
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	3.239E-02 0.0088
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	3.668E+00 1.0000

*Sum of all water independent and dependent pathways.

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Summary : WRR-P-WORKER PLACING RIP-RAP ON SLOPE File: WRR-P.RAD

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

Radio- Nuclide	Ground	Inhalation	Radon	Plant	Meat	Milk	Soil
mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	5.598E-03 0.0015	3.577E-02 0.0098	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	1.647E-03 0.0004
Pa-231	2.970E-03 0.0008	2.371E-02 0.0065	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	2.300E-03 0.0006
Pb-210	3.785E-04 0.0001	2.671E-03 0.0007	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	1.750E-02 0.0048
Ra-226	9.248E-01 0.2523	2.394E-03 0.0007	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	1.115E-02 0.0030
Ra-228	7.051E-01 0.1924	3.250E-02 0.0089	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	3.607E-03 0.0010
Th-228	2.853E-02 0.0078	1.852E-03 0.0005	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	9.065E-05 0.0000
Th-230	4.322E-03 0.0012	5.209E-02 0.0142	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	1.866E-03 0.0005
Th-232	1.283E+00 0.3499	4.425E-01 0.1207	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	2.123E-02 0.0058
U-234	3.467E-05 0.0000	2.106E-02 0.0057	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	9.440E-04 0.0003
U-235	2.977E-03 0.0008	9.183E-04 0.0003	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	4.194E-05 0.0000
U-238	1.262E-02 0.0034	1.883E-02 0.0051	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	8.972E-04 0.0002
Total	2.970E+00 0.8102	6.343E-01 0.1730	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	0.000E+00 0.0000	6.127E-02 0.0167

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

Radio- Nuclide	Water		Fish		Radon		Water Dependent Pathways 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	4.301E-02	0.0117
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	2.898E-02	0.0079
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	2.054E-02	0.0056
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	9.383E-01	0.2560
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	7.412E-01	0.2022
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	3.047E-02	0.0083
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	5.828E-02	0.0159
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	1.747E+00	0.4764
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	2.204E-02	0.0060
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	3.937E-03	0.0011
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	3.235E-02	0.0088

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 3.666E+00 1.0000

0*Sum of all water independent and dependent pathways.

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Summary : WRR-P-WORKER PLACING RIP-RAP ON SLOPE File: WRR-P.RAD

Dose/Source Ratios Summed Over All Pathways

Parent and Progeny Principal Radionuclide Contributions Indicated

0Parent Product Branch DSR(j,t) (mrem/yr)/(pCi/g)
(i) (j) Fraction* t= 0.000E+00 1.000E+00 1.000E+01

Ac-227	Ac-227	1.000E+00	2.541E-01	2.461E-01	1.846E-01
OPa-231	Pa-231	1.000E+00	5.119E-02	5.119E-02	5.112E-02
Pa-231	Ac-227	1.000E+00	4.067E-03	1.203E-02	7.325E-02
Pa-231	DSR(j)		5.526E-02	6.321E-02	1.244E-01
OPb-210	Pb-210	1.000E+00	5.614E-03	5.442E-03	4.109E-03
ORa-226	Ra-226	1.000E+00	1.871E-01	1.870E-01	1.861E-01
Ra-226	Pb-210	1.000E+00	8.769E-05	2.594E-04	1.582E-03
Ra-226	DSR(j)		1.872E-01	1.873E-01	1.877E-01
ORa-228	Ra-228	1.000E+00	9.451E-02	8.377E-02	2.827E-02
Ra-228	Th-228	1.000E+00	2.805E-02	6.827E-02	7.055E-02
Ra-228	DSR(j)		1.226E-01	1.520E-01	9.883E-02
OTH-228	Th-228	1.000E+00	1.522E-01	1.059E-01	4.062E-03
OTH-230	Th-230	1.000E+00	1.080E-02	1.080E-02	1.080E-02
Th-230	Ra-226	1.000E+00	4.054E-05	1.216E-04	8.489E-04
Th-230	Pb-210	1.000E+00	1.270E-08	8.808E-08	3.800E-06
Th-230	DSR(j)		1.084E-02	1.093E-02	1.166E-02
OTH-232	Th-232	1.000E+00	5.424E-02	5.424E-02	5.424E-02
Th-232	Ra-228	1.000E+00	5.811E-03	1.654E-02	7.198E-02
Th-232	Th-228	1.000E+00	1.173E-03	7.195E-03	1.067E-01
Th-232	DSR(j)		6.122E-02	7.798E-02	2.329E-01
OU-234	U-234	1.000E+00	4.414E-03	4.413E-03	4.408E-03
U-234	Th-230	1.000E+00	4.862E-08	1.459E-07	1.020E-06
U-234	Ra-226	1.000E+00	1.216E-10	8.514E-10	4.017E-08
U-234	Pb-210	1.000E+00	2.862E-14	4.264E-13	1.231E-10
U-234	DSR(j)		4.414E-03	4.413E-03	4.409E-03
OU-235	U-235	1.000E+00	1.690E-02	1.690E-02	1.688E-02
U-235	Pa-231	1.000E+00	5.416E-07	1.625E-06	1.136E-05
U-235	Ac-227	1.000E+00	2.876E-08	1.995E-07	8.596E-06
U-235	DSR(j)		1.690E-02	1.690E-02	1.690E-02
OU-238	U-238	1.000E+00	6.478E-03	6.477E-03	6.469E-03
U-238	U-234	1.000E+00	6.256E-09	1.877E-08	1.312E-07
U-238	Th-230	1.000E+00	4.595E-14	3.216E-13	1.520E-11
U-238	Ra-226	1.000E+00	8.622E-17	1.293E-15	3.993E-13
U-238	Pb-210	1.000E+00	1.625E-20	5.008E-19	9.332E-16
U-238	DSR(j)		6.478E-03	6.477E-03	6.470E-03

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).

The DSR includes contributions from associated (half-life < 0.5 yr) daughters.

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Summary : WRR-P-WORKER PLACING RIP-RAP ON SLOPE File: WRR-P.RAD

Single Radionuclide Soil Guidelines G(i,t) in pCi/g

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

ONuclide	(i)	t= 0.000E+00	1.000E+00	1.000E+01
Ac-227		9.837E+01	1.016E+02	1.354E+02
Pa-231		4.524E+02	3.955E+02	2.010E+02
Pb-210		4.453E+03	4.594E+03	6.084E+03
Ra-226		1.335E+02	1.335E+02	1.332E+02
Ra-228		2.040E+02	1.644E+02	2.530E+02
Th-228		1.643E+02	2.360E+02	6.154E+03
Th-230		2.305E+03	2.288E+03	2.145E+03
Th-232		4.084E+02	3.206E+02	1.074E+02
U-234		5.664E+03	5.665E+03	5.671E+03
U-235		1.479E+03	1.479E+03	1.479E+03
U-238		3.859E+03	3.860E+03	3.864E+03

0

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

ONuclide	Initial	tmin	DSR(i,tmin)	G(i,tmin)	DSR(i,tmax)	G(i,tmax)
(i)	(pCi/g)	(years)		(pCi/g)		(pCi/g)
Ac-227	2.330E-01	0.000E+00	2.541E-01	9.837E+01	2.541E-01	9.837E+01
Pa-231	2.330E-01	1.000E+01	1.244E-01	2.010E+02	5.526E-02	4.524E+02
Pb-210	5.000E+00	0.000E+00	5.614E-03	4.453E+03	5.614E-03	4.453E+03
Ra-226	5.000E+00	1.000E+01	1.877E-01	1.332E+02	1.872E-01	1.335E+02
Ra-228	7.500E+00	2.770 n 0.006	1.674E-01	1.493E+02	1.226E-01	2.040E+02
Th-228	7.500E+00	0.000E+00	1.522E-01	1.643E+02	1.522E-01	1.643E+02
Th-230	5.000E+00	1.000E+01	1.166E-02	2.145E+03	1.084E-02	2.305E+03
Th-232	7.500E+00	1.000E+01	2.329E-01	1.074E+02	6.122E-02	4.084E+02
U-234	5.000E+00	0.000E+00	4.414E-03	5.664E+03	4.414E-03	5.664E+03
U-235	2.330E-01	0.000E+00	1.690E-02	1.479E+03	1.690E-02	1.479E+03
U-238	5.000E+00	0.000E+00	6.478E-03	3.859E+03	6.478E-03	3.859E+03

1RESRAD, Version 6.22 T* Limit = 0.5 year 02/24/2005 14:05 Page 17
Summary : WRR-P-WORKER PLACING RIP-RAP ON SLOPE File: WRR-P.RAD

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

ONuclide	Parent	BRF(i)	DOSE(j,t), mrem/yr
(j)	(i)		t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	5.922E-02 5.735E-02 4.301E-02
Ac-227	Pa-231	1.000E+00	9.475E-04 2.803E-03 1.707E-02
Ac-227	U-235	1.000E+00	6.700E-09 4.648E-08 2.003E-06
Ac-227	DOSE(j)		6.016E-02 6.015E-02 6.008E-02
OPa-231	Pa-231	1.000E+00	1.193E-02 1.193E-02 1.191E-02
Pa-231	U-235	1.000E+00	1.262E-07 3.785E-07 2.646E-06
Pa-231	DOSE(j)		1.193E-02 1.193E-02 1.191E-02
OPb-210	Pb-210	1.000E+00	2.807E-02 2.721E-02 2.054E-02
Pb-210	Ra-226	1.000E+00	4.385E-04 1.297E-03 7.909E-03
Pb-210	Th-230	1.000E+00	6.348E-08 4.404E-07 1.900E-05
Pb-210	U-234	1.000E+00	1.431E-13 2.132E-12 6.157E-10
Pb-210	U-238	1.000E+00	8.123E-20 2.504E-18 4.666E-15
Pb-210	DOSE(j)		2.851E-02 2.851E-02 2.847E-02
ORa-226	Ra-226	1.000E+00	9.357E-01 9.352E-01 9.304E-01
Ra-226	Th-230	1.000E+00	2.027E-04 6.080E-04 4.245E-03
Ra-226	U-234	1.000E+00	6.082E-10 4.257E-09 2.009E-07
Ra-226	U-238	1.000E+00	4.311E-16 6.465E-15 1.997E-12
Ra-226	DOSE(j)		9.359E-01 9.358E-01 9.347E-01
ORa-228	Ra-228	1.000E+00	7.089E-01 6.283E-01 2.121E-01
Ra-228	Th-232	1.000E+00	4.358E-02 1.241E-01 5.398E-01
Ra-228	DOSE(j)		7.524E-01 7.524E-01 7.519E-01
OTh-228	Ra-228	1.000E+00	2.104E-01 5.120E-01 5.292E-01
Th-228	Th-228	1.000E+00	1.141E+00 7.944E-01 3.047E-02
Th-228	Th-232	1.000E+00	8.796E-03 5.396E-02 7.999E-01
Th-228	DOSE(j)		1.360E+00 1.360E+00 1.360E+00
OTh-230	Th-230	1.000E+00	5.402E-02 5.402E-02 5.401E-02

Th-230	U-234	1.000E+00	2.431E-07	7.293E-07	5.102E-06
Th-230	U-238	1.000E+00	2.297E-13	1.608E-12	7.598E-11
Th-230	DOSE(j)		5.402E-02	5.402E-02	5.402E-02
0Th-232	Th-232	1.000E+00	4.068E-01	4.068E-01	4.068E-01
OU-234	U-234	1.000E+00	2.207E-02	2.206E-02	2.204E-02
U-234	U-238	1.000E+00	3.128E-08	9.383E-08	6.560E-07
U-234	DOSE(j)		2.207E-02	2.206E-02	2.204E-02
OU-235	U-235	1.000E+00	3.938E-03	3.937E-03	3.933E-03
OU-238	U-238	1.000E+00	3.239E-02	3.239E-02	3.235E-02

BRF(i) is the branch fraction of the parent nuclide.
 IRESRAD, Version 6.22 Tk Limit = 0.5 year 02/24/2005 14:05 Page 18
 Summary : WRR-P-WORKER PLACING RIP-RAP ON SLOPE File: WRR-P.RAD

Individual Nuclide Soil Concentration
 Parent Nuclide and Branch Fraction Indicated

ONuclide	Parent	BRF(i)	S(j,t), pCi/g
(j)	(i)		t= 0.000E+00 1.000E+00 1.000E+01
Ac-227	Ac-227	1.000E+00	2.330E-01 2.257E-01 1.692E-01
Ac-227	Pa-231	1.000E+00	0.000E+00 7.300E-03 6.344E-02
Ac-227	U-235	1.000E+00	0.000E+00 7.763E-08 7.067E-06
Ac-227	S(j):		2.330E-01 2.330E-01 2.327E-01
OPa-231	Pa-231	1.000E+00	2.330E-01 2.330E-01 2.326E-01
Pa-231	U-235	1.000E+00	0.000E+00 4.929E-06 4.923E-05
Pa-231	S(j):		2.330E-01 2.330E-01 2.327E-01
OPb-210	Pb-210	1.000E+00	5.000E+00 4.846E+00 3.659E+00
Pb-210	Ra-226	1.000E+00	0.000E+00 1.530E-01 1.331E+00
Pb-210	Th-230	1.000E+00	0.000E+00 3.331E-05 3.036E-03
Pb-210	U-234	1.000E+00	0.000E+00 1.002E-10 9.343E-08
Pb-210	U-238	1.000E+00	0.000E+00 7.114E-17 6.723E-13
Pb-210	S(j):		5.000E+00 4.999E+00 4.993E+00
ORa-226	Ra-226	1.000E+00	5.000E+00 4.997E+00 4.972E+00
Ra-226	Th-230	1.000E+00	0.000E+00 2.165E-03 2.160E-02
Ra-226	U-234	1.000E+00	0.000E+00 9.747E-09 9.726E-07
Ra-226	U-238	1.000E+00	0.000E+00 9.211E-15 9.194E-12
Ra-226	S(j):		5.000E+00 4.999E+00 4.993E+00
ORa-228	Ra-228	1.000E+00	7.500E+00 6.647E+00 2.244E+00
Ra-228	Th-232	1.000E+00	0.000E+00 8.517E-01 5.250E+00
Ra-228	S(j):		7.500E+00 7.499E+00 7.494E+00
0Th-228	Ra-228	1.000E+00	0.000E+00 2.140E+00 3.064E+00
Th-228	Th-228	1.000E+00	7.500E+00 5.220E+00 2.002E-01
Th-228	Th-232	1.000E+00	0.000E+00 1.398E-01 4.231E+00
Th-228	S(j):		7.500E+00 7.500E+00 7.495E+00
0Th-230	Th-230	1.000E+00	5.000E+00 5.000E+00 4.999E+00
Th-230	U-234	1.000E+00	0.000E+00 4.501E-05 4.498E-04
Th-230	U-238	1.000E+00	0.000E+00 6.379E-11 6.374E-09
Th-230	S(j):		5.000E+00 5.000E+00 5.000E+00
0Th-232	Th-232	1.000E+00	7.500E+00 7.500E+00 7.500E+00
OU-234	U-234	1.000E+00	5.000E+00 4.999E+00 4.993E+00
U-234	U-238	1.000E+00	0.000E+00 1.417E-05 1.416E-04
U-234	S(j):		5.000E+00 4.999E+00 4.993E+00
OU-235	U-235	1.000E+00	2.330E-01 2.330E-01 2.327E-01
OU-238	U-238	1.000E+00	5.000E+00 4.999E+00 4.993E+00

BRF(i) is the branch fraction of the parent nuclide.
 ORESALC.EXE execution time = 2.67 seconds

APPENDIX C

MICROSHIELD Input and Output

Microshield 3.11
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Page : 1
File : CRD1.MSH
Run date: August 18, 1998
Run time: 3:13 p.m.

File Ref: STEP CL1
Date: 8/18/98
By: Heater
Checked: _____

CASE: CRD1 5m x 50m no shield

GEOMETRY 11: Rectangular solid source - slab shields

Distance to detector.....	X	400.	cm.
Source width.....	W	5000.	"
Source length.....	L	500.	"
Rectangular solid, thickness toward dose pt..	T1	300.	"
Thickness of second shield.....	T2	100.	"

Source Volume: 750000000 cubic centimeters

MATERIAL DENSITIES (g/cc):

Material	Source	Shield 2
-----	-----	-----
Air		.001220
Aluminum		
Carbon		
Concrete	1.60	
Hydrogen		
Iron		
Lead		
Lithium		
Nickel		
Tin		
Titanium		
Tungsten		
Urania		
Uranium		
Water		
Zirconium		

CASE: CRD1 5m x 50m no shield

BUILDUP FACTOR: based on TAYLOR method.
Using the characteristics of the materials in shield 1.

INTEGRATION PARAMETERS:

Number of lateral angle segments (Ntheta).....	51
Number of azimuthal angle segments (Npsi).....	21
Number of radial segments (Nradius).....	41

SOURCE NUCLIDES:

Nuclide	Curies	Nuclide	Curies	Nuclide	Curies
-----	-----	-----	-----	-----	-----
Ac-228	9.0000e-03	Bi-210	6.0000e-03	Bi-212	9.0000e-03
Bi-214	6.0000e-03	Pa-234	7.8000e-06	Pa-234m	6.0000e-03
Pb-210	6.0000e-03	Pb-212	9.0000e-03	Pb-214	6.0000e-03
Po-210	6.0000e-03	Po-212	5.7600e-03	Po-214	6.0000e-03
Po-216	9.0000e-03	Po-218	6.0000e-03	Ra-224	9.0000e-03
Ra-226	6.0000e-03	Ra-228	9.0000e-03	Rn-220	9.0000e-03
Rn-222	6.0000e-03	Th-228	9.0000e-03	Th-230	6.0000e-03
Th-232	9.0000e-03	Th-234	6.0000e-03	Tl-208	3.2400e-03
Tl-210	1.2600e-05	U-234	6.0000e-03	U-238	6.0000e-03

CASE: CRD1 5m x 50m no shield

RESULTS:

Group f	Energy (MeV)	Activity (photons/sec)	Dose point flux MeV/(sq cm)/sec	Dose rate (mr/hr)
1	2.5667	1.380e+08	5.011e+00	7.550e-03
2	1.6228	1.253e+08	2.559e+00	4.421e-03
3	1.1519	7.618e+07	1.008e+00	1.884e-03
4	.8769	3.199e+08	3.069e+00	6.075e-03
5	.5949	2.173e+08	1.441e+00	2.978e-03
6	.4752	5.865e+07	3.041e-01	6.204e-04
7	.3231	2.135e+08	6.316e-01	1.284e-03
8	.2393	1.996e+08	3.806e-01	7.364e-04
9	.1691	1.200e+07	1.391e-02	2.465e-05
10	.1210	1.793e+07	1.229e-02	1.962e-05
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
TOTALS:		1.378e+09	1.443e+01	2.559e-02

Microshield 3.11

(HENRY MORTON - f098)

Page : 1
File : CRD2.MSH
Run date: August 18, 1998
Run time: 2:48 p.m.

File Ref: STP 065
Date: 8/18/98
By: Jebble
Checked: _____

CASE: CRD2 5m x 5m no shield

GEOMETRY 11: Rectangular solid source - slab shields

Distance to detector.....	X	400.	cm.
Source width.....	W	500.	"
Source length.....	L	500.	"
Rectangular solid, thickness toward dose pt..	T1	300.	"
Thickness of second shield.....	T2	100.	"

Source Volume: 75000000 cubic centimeters

MATERIAL DENSITIES (g/cc):

Material	Source	Shield 2
-----	-----	-----
Air		.001220
Aluminum		
Carbon		
Concrete	1.60	
Hydrogen		
Iron		
Lead		
Lithium		
Nickel		
Tin		
Titanium		
Tungsten		
Urania		
Uranium		
Water		
Zirconium		

CASE: CRD2 5m x 5m no shield

BUILDUP FACTOR: based on TAYLOR method.
Using the characteristics of the materials in shield 1.

INTEGRATION PARAMETERS:

Number of lateral angle segments (Ntheta).....	41
Number of azimuthal angle segments (Npsi).....	41
Number of radial segments (Nradius).....	41

SOURCE NUCLIDES:

Nuclide	Curies	Nuclide	Curies	Nuclide	Curies
Ac-228	9.0000e-04	Bi-210	6.0000e-04	Bi-212	9.0000e-04
Bi-214	6.0000e-04	Pa-234	7.8000e-07	Pa-234m	6.0000e-04
Pb-210	6.0000e-04	Pb-212	9.0000e-04	Pb-214	6.0000e-04
Po-210	6.0000e-04	Po-212	5.7600e-04	Po-214	6.0000e-04
Po-216	9.0000e-04	Po-218	6.0000e-04	Ra-224	9.0000e-04
Ra-226	6.0000e-04	Ra-228	9.0000e-04	Rn-220	9.0000e-04
Rn-222	6.0000e-04	Th-228	9.0000e-04	Th-230	6.0000e-04
Th-232	9.0000e-04	Th-234	6.0000e-04	Tl-208	3.2400e-04
Tl-210	1.2600e-06	U-234	6.0000e-04	U-238	6.0000e-04

CASE: CRD2 5m x 5m no shield

RESULTS:

Group f	Energy (MeV)	Activity (photons/sec)	Dose point flux MeV/(sq cm)/sec	Dose rate (mr/hr)
1	2.5667	1.380e+07	4.312e+00	6.497e-03
2	1.6228	1.253e+07	2.212e+00	3.821e-03
3	1.1519	7.618e+06	8.736e-01	1.633e-03
4	.8769	3.199e+07	2.667e+00	5.278e-03
5	.5949	2.173e+07	1.260e+00	2.606e-03
6	.4752	5.865e+06	2.668e-01	5.443e-04
7	.3231	2.135e+07	5.510e-01	1.120e-03
8	.2393	1.996e+07	3.292e-01	6.371e-04
9	.1691	1.200e+06	1.187e-02	2.104e-05
10	.1210	1.793e+06	1.023e-02	1.632e-05
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
TOTALS:		1.378e+08	1.249e+01	2.217e-02

Microshield 3.11
=====

Page : 1
File : CRD3.MSH
Run date: August 18, 1998
Run time: 3:18 p.m.

File Ref: SVEP Oct
Date: 8/18/98
By: JRP
Checked: _____

CASE: CRD3 100m x 100m no shield

GEOMETRY 11: Rectangular solid source - slab shields

Distance to detector.....	X	400.	cm.
Source width.....	W	10000.	"
Source length.....	L	10000.	"
Rectangular solid, thickness toward dose pt..	T1	300.	"
Thickness of second shield.....	T2	100.	"

Source Volume: 30000000000 cubic centimeters

MATERIAL DENSITIES (g/cc):

Material	Source	Shield 2
-----	-----	-----
Air		.001220
Aluminum		
Carbon		
Concrete	1.60	
Hydrogen		
Iron		
Lead		
Lithium		
Nickel		
Tin		
Titanium		
Tungsten		
Urania		
Uranium		
Water		
Zirconium		

CASE: CRD3 100m x 100m no shield

BUILDUP FACTOR: based on TAYLOR method.
Using the characteristics of the materials in shield 1.

INTEGRATION PARAMETERS:

Number of lateral angle segments (Ntheta).....	**
Number of azimuthal angle segments (Npsi).....	**
Number of radial segments (Nradius).....	41

SOURCE NUCLIDES:

Nuclide	Curies	Nuclide	Curies	Nuclide	Curies
-----	-----	-----	-----	-----	-----
Ac-228	3.6000e-01	Bi-210	2.4000e-01	Bi-212	3.6000e-01
Bi-214	2.4000e-01	Pa-234	3.1200e-04	Pa-234m	2.4000e-01
Pb-210	2.4000e-01	Pb-212	3.6000e-01	Pb-214	2.4000e-01
Po-210	2.4000e-01	Po-212	2.3000e-01	Po-214	2.4000e-01
Po-216	3.6000e-01	Po-218	2.4000e-01	Ra-224	3.6000e-01
Ra-226	2.4000e-01	Ra-228	3.6000e-01	Rn-220	3.6000e-01
Rn-222	2.4000e-01	Th-228	3.6000e-01	Th-230	2.4000e-01
Th-232	3.6000e-01	Th-234	2.4000e-01	Tl-208	1.3000e-01
Tl-210	5.0400e-04	U-234	2.4000e-01	U-238	2.4000e-01

CASE: CRD3 100m x 100m no shield

RESULTS:

Group f	Energy (MeV)	Activity (photons/sec)	Dose point flux MeV/(sq cm)/sec	Dose rate (mr/hr)
1	2.5668	5.536e+09	7.061e+00	1.064e-02
2	1.6228	5.011e+09	3.639e+00	6.285e-03
3	1.1519	3.047e+09	1.452e+00	2.714e-03
4	.8769	1.280e+10	4.465e+00	8.837e-03
5	.5948	8.703e+09	2.108e+00	4.358e-03
6	.4753	2.349e+09	4.501e-01	9.182e-04
7	.3231	8.541e+09	9.781e-01	1.989e-03
8	.2393	7.983e+09	6.157e-01	1.192e-03
9	.1691	4.799e+08	2.376e-02	4.211e-05
10	.1210	7.172e+08	2.272e-02	3.624e-05
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
TOTALS:		5.516e+10	2.081e+01	3.701e-02

Microshield 3.11

(HENRY MORTON - f098)

Page : 1
File : CRD4.MSH
Run date: August 18, 1998
Run time: 2:56 p.m.

File Ref: SRP61
Date: 8/18/98
By: [Signature]
Checked: _____

CASE: CRD4 5m x 5m 6in concrete

GEOMETRY 11: Rectangular solid source - slab shields

Distance to detector.....	X	415.	cm.
Source width.....	W	500.	"
Source length.....	L	500.	"
Rectangular solid, thickness toward dose pt..	T1	300.	"
Thickness of second shield.....	T2	15.	"
Thickness of third shield.....	T3	100.	"

Source Volume: 75000000 cubic centimeters

MATERIAL DENSITIES (g/cc):

Material	Source	Shield 2	Shield 3
-----	-----	-----	-----
Air			.001220
Aluminum			
Carbon			
Concrete	1.60	2.350	
Hydrogen			
Iron			
Lead			
Lithium			
Nickel			
Tin			
Titanium			
Tungsten			
Uranium			
Water			
Zirconium			

CASE: CRD4 5m x 5m 6in concrete

BUILDUP FACTOR: based on TAYLOR method.
Using the characteristics of the materials in shield 1.

INTEGRATION PARAMETERS:

Number of lateral angle segments (Ntheta).....	41
Number of azimuthal angle segments (Npsi).....	41
Number of radial segments (Nradius).....	41

SOURCE NUCLIDES:

Nuclide	Curies	Nuclide	Curies	Nuclide	Curies
-----	-----	-----	-----	-----	-----
Ac-228	9.0000e-04	Bi-210	6.0000e-04	Bi-212	9.0000e-04
Bi-214	6.0000e-04	Pa-234	7.8000e-07	Pa-234m	6.0000e-04
Pb-210	6.0000e-04	Pb-212	9.0000e-04	Pb-214	6.0000e-04
Po-210	6.0000e-04	Po-212	5.7600e-04	Po-214	6.0000e-04
Po-216	9.0000e-04	Po-218	6.0000e-04	Ra-224	9.0000e-04
Ra-226	6.0000e-04	Ra-228	9.0000e-04	Rn-220	9.0000e-04
Rn-222	6.0000e-04	Th-228	9.0000e-04	Th-230	6.0000e-04
Th-232	9.0000e-04	Th-234	6.0000e-04	Tl-208	3.2400e-04
Tl-210	1.2600e-06	U-234	6.0000e-04	U-238	6.0000e-04

CASE: CRD4 5m x 5m 6in concrete

RESULTS:

Group #	Energy (MeV)	Activity (photons/sec)	Dose point flux MeV/(sq cm)/sec	Dose rate (mr/hr)
-----	-----	-----	-----	-----
1	2.5667	1.380e+07	1.007e+00	1.518e-03
2	1.6228	1.253e+07	3.868e-01	6.680e-04
3	1.1519	7.618e+06	1.160e-01	2.169e-04
4	.8769	3.199e+07	2.903e-01	5.747e-04
5	.5949	2.173e+07	1.034e-01	2.137e-04
6	.4752	5.865e+06	1.747e-02	3.564e-05
7	.3231	2.135e+07	2.212e-02	4.496e-05
8	.2393	1.996e+07	8.523e-03	1.649e-05
9	.1691	1.200e+06	1.798e-04	3.187e-07
10	.1210	1.793e+06	6.937e-05	1.107e-07
11				
12				
13				
14				
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19				
20				
	TOTALS:	1.378e+08	1.952e+00	3.289e-03

Microshield 3.11
=====

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Run date: August 18, 1998
Run time: 3:01 p.m.

File Ref: STEPAT
Date: 8/18/98
By: Jeptha
Checked: _____

CASE: CRD5 inf slab no shield

GEOMETRY 14: Infinite slab source - slab shields

Distance to detector.....	X	400.	cm.
Source slab thickness.....	T1	300.	"
Thickness of second shield.....	T2	100.	"

MATERIAL DENSITIES (g/cc):

Material	Source	Shield 2
-----	-----	-----
Air		.001220
Aluminum		
Carbon		
Concrete	1.60	
Hydrogen		
Iron		
Lead		
Lithium		
Nickel		
Tin		
Titanium		
Tungsten		
Uranium		
Water		
Zirconium		

CASE: CRD5 inf slab no shield

BUILDUP FACTOR: based on TAYLOR method.
Using the characteristics of the materials in shield 1.

INTEGRATION PARAMETERS:

None - analytically integrated.

SOURCE NUCLIDES:

Nuclide	Curies	Nuclide	Curies	Nuclide	Curies
-----	-----	-----	-----	-----	-----
Ac-228	1.2000e-11	Bi-210	8.0000e-12	Bi-212	1.2000e-11
Bi-214	8.0000e-12	Pa-234	1.0400e-14	Pa-234m	8.0000e-12
Pb-210	8.0000e-12	Pb-212	1.2000e-11	Pb-214	8.0000e-12
Po-210	8.0000e-12	Po-212	7.6800e-12	Po-214	8.0000e-12
Po-216	1.2000e-11	Po-218	8.0000e-12	Ra-224	1.2000e-11
Ra-226	8.0000e-12	Ra-228	1.2000e-11	Rn-220	1.2000e-11
Rn-222	8.0000e-12	Th-228	1.2000e-11	Th-230	8.0000e-12
Th-232	1.2000e-11	Th-234	8.0000e-12	Tl-208	4.3200e-12
Tl-210	1.6800e-14	U-234	8.0000e-12	U-238	8.0000e-12

CASE: CRD5 inf slab no shield

RESULTS:

Group £	Energy (MeV)	Activity (photons/sec)	Dose point flux MeV/(sq cm)/sec	Dose rate (mr/hr)
-----	-----	-----	-----	-----
1	2.5667	1.841e-01	6.706e+00	1.010e-02
2	1.6228	1.670e-01	3.424e+00	5.914e-03
3	1.1519	1.016e-01	1.352e+00	2.527e-03
4	.8769	4.265e-01	4.137e+00	8.187e-03
5	.5949	2.897e-01	1.982e+00	4.099e-03
6	.4752	7.819e-02	4.245e-01	8.661e-04
7	.3231	2.847e-01	8.921e-01	1.814e-03
8	.2393	2.661e-01	5.430e-01	1.051e-03
9	.1691	1.600e-02	2.006e-02	3.555e-05
10	.1210	2.391e-02	1.792e-02	2.860e-05
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
	TOTALS:	1.838e+00	1.950e+01	3.463e-02