TA00

ENVIRONMENTAL RESTORATION PROJECT

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Date: August 7, 2002
Refer to: ER2002-0519

Mr. John Young, Corrective Action Project Leader
Permits Management Program
NMED – Hazardous Waste Bureau
2905 Rodeo Park Drive East
Building 1
Santa Fe, NM 87505-6303

SUBJECT: SUBMITTAL OF RESPONSE TO REQUEST FOR SUPPLEMENTAL INFORMATION (RSI) FOR THE RESOURCE CONSERVATION RECOVERY ACT (RCRA) FACILITY INVESTIGATION (RFI) REPORT FOR POTENTIAL RELEASE SITE (PRS) 00-030(g), LOS ALAMOS NATIONAL LABORATORY, NM0890010515 HWB-LANL-01-003

Dear Mr. Young:

Enclosed are two copies of the Los Alamos National Laboratory (LANL) Environmental Restoration (ER) response to the RSI for the RFI Report for PRS 00-030(g), dated February 2001 and referenced by LA-UR-00-5378 (ER2000-0647). The ER Project Office received the RSI on July 8, 2002.

Requests that could not be satisfied in the time allotted will be provided under a separate cover. This approach was discussed, and agreed to, with Neelam Dhwan of the Hazardous Waste Bureau (HWB) on July 8, 2002 and again on July 22, 2002.

If you have any questions, please contact Terry Rust at (505) 665-8843 or David Gregory at (505) 667-5808.

Sincerely,

Dave McInroy, Acting Program Manager
Environmental Restoration Project
Los Alamos National Laboratory

Sincerely,

Everett Trollinger, Project Manager
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Office of Los Alamos Site Operations

7638

DM/ET/NR/vn

Enclosure: IM Report (ER2002-0431)

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Response to
"Request for Supplemental Information for the RFI Report for SWMU 00-030(g)-99
Los Alamos National Laboratory, NM0890010515; HWB-LANL-01-003"

INTRODUCTION

To facilitate review of this response, the comments of the New Mexico Environment Department (NMED) Hazardous Waste Bureau (HWB) are included verbatim. The comments are divided into general and specific categories as presented in the letter. Los Alamos National Laboratory (LANL) responses follow each NMED comment.

GENERAL COMMENTS

HWB Comment

1. *Although the County of Los Alamos has designated the canyon portion of the solid waste management unit (SWMU) 00-030(g), as a "Scenic Open Lands District', at present, New Mexico Environment Department (NMED) has no means to ensure that the current designation will be maintained in the future and should therefore not be relied upon to ensure land use.*

LANL Response

1. LANL recognizes that any land-use designation such as recreational is, by nature, subject to political shifts. This is true throughout northern New Mexico and is not unique to Los Alamos. However, in this case the land in question is legally zoned as a Scenic Open Lands District. This formal zoning, coupled with the ongoing and steady shift away from development in community standards in Los Alamos County makes it highly unlikely that this designation could successfully be removed without the objection of the numerous, very vocal, and litigious special interest groups that have thus far resisted any change in any county open space designation. However, as unlikely as a change in designation may be, LANL agrees that such a zoning designation cannot be solely relied upon to ensure future land use in perpetuity, but rather this information is presented as an indicator of reasonably expected land use in the foreseeable future. This future land-use designation is further reinforced by the physical properties of the site in question: (1) it is a narrow canyon bottom with steep walls; (2) it is the major drainage for most of the developed area of the townsite to the south; and (3) it is heavily used by hikers, walkers, joggers, and bicyclists for recreational purposes. In its risk assessment guidance, the U.S. Environmental Protection Agency (EPA) states that an assumption of future residential land use may not be justifiable if the probability that the area will become residential in the future is minute and is presently unanticipated. Therefore, the continuation of the area as a recreational resource is reasonable, and the belief that this use will continue is justified.

HWB Comment

2. *Los Alamos National Laboratory (LANL) should revise the human health risk assessment for the child recreational scenario. To be consistent, LANL should conduct an 'Extended Backyard' scenario risk assessment for this SWMU, using the child exposure parameters (such as time spent outdoors, dust ingestion, etc.) that were utilized for the Extended Backyard scenario in the risk assessment conducted for the south fork of the Acid Canyon. Parameters related to site and contamination characteristics can remain equal to the values currently given in the Report.*

LANL Response

2. At the time this report was prepared and submitted, the "extended backyard" scenario had not been fully developed or approved by NMED for use in conducting risk assessments. However, the exposure parameters for the child recreational scenario for SWMU 00-030(g) were compared to the exposure parameters used for the "extended backyard" scenario for the South Fork of Acid Canyon. There were two parameters by which the input values differed: fraction of time spent on site and soil ingestion rate. The fraction of time spent on site for the child recreational scenario was 0.0114; for the "extended backyard" scenario, the fraction was 0.0228. The soil ingestion rate for the child recreational scenario was 1752 g/yr; for the "extended backyard" scenario, the soil ingestion rate was 626 g/yr. The "extended backyard" exposure parameters of Acid Canyon, used in conjunction with site contamination characteristics [i.e., the maximum concentration of each contaminant of potential concern (COPC)], yielded a maximum dose of 5.2 mrem/yr. The original child recreational scenario yielded a maximum dose of 6.9 mrem/yr. The residual radioactive material (RESRAD) calculations are included as Attachment 1.

HWB Comment

3. *The ecological risk assessment for this SWMU should be revised using upper confidence limits (UCLs) calculated with the correct statistical approach. For contaminants, which continue to generate hazard quotients (HQs) substantially above one, area use factors may be incorporated in the exposure calculations for those receptors with home ranges larger than the contaminated area.*

LANL Response

3. The 95% UCL of the mean will be recalculated using nonparametric methods (i.e., "bootstrapping"). The calculation will also be performed using one-half of the detection limit rather than the full detection limit as outlined by the EPA. The recalculated values will then be assessed using the same screening levels used in the Resouce Conservationand Recovery Act (RCRA) RCRA Facility Investigation (RFI) Report to determine if the risk, hazard, and/or dose have changed. The ecological screening assessment will also be evaluated using calculated 95% UCLs and other factors (e.g., area use) where appropriate as requested in the Request for Supplemental Information (RSI). This information will be provided to the NMED under separate cover.

SPECIFIC COMMENTS

HWB Comment

4. *Table 2.3-6, SWMU 0-030(g), Frequency of Detected Inorganic Chemicals in Samples Collected by the Laboratory from the Mesa Top and Drainage Channel, page 36:*

   Correct the Table: The type of environmental media reported for mesa top samples is incorrect, out of 23 samples analyzed for mesa top, 21 were tuff and 2 were soil/fill samples (see Table 3, page 9, of SWMU 00-030(g) Revised Status Report, December 1998, EM/ER:98-484). Detection limits for antimony were above background values for 16 samples not 7 samples. Additionally, according to Table 3, page 10, of SWMU 00-030(g) Revised Status Report (December 1998), mercury was analyzed for 31 tuff and 2 soil/tuff samples but the Table 2.3-6 reports only 23 mesa top samples for mercury.

LANL Response

4. There was some uncertainty regarding the media code (soil or tuff) for two samples (AAA4375 and RE00-98-0031) at location ID 00-3670. Therefore, the location was inspected and the field sampling team was interviewed. From this newly gathered information, it was determined that the media of both samples in question were crushed tuff. Table 3, page 9 of SWMU 00-030(g) Revised Status Report, December 1998, EM/ER:98-484 was in error, and the table in the RFI Report for SWMU 00-030(g) correctly reports the media as tuff (Qbt).

   The mercury data are under re-evaluation and, if necessary, a revised table will be submitted under separate cover upon completion of this data review.

HWB Comment

5. *Table 2.3-20, SWMU 0-030(g), Frequency of Detected Organic Chemicals in Samples Collected by the Laboratory from the Mesa Top and Drainage Channel, page 65:*

   Provide the rationale for using a range of values for estimated quantitation limits and their significance to data evaluation of organic chemicals.

LANL Response

5. The range of estimated quantitation limits (EQLs) comes from different laboratories using different equipment at different times because of multiple sampling events that occurred over several years. There is no significant data evaluation effect because all detections are reported regardless of whether or not the value was less than, equal to, or greater than the reported EQL. Revised Table 2.3-20 has been included as Attachment 2 showing only the highest reported EQL and not the range of reported EQLs.

HWB Comment

6. *Table 2.3-22, SWMU 0-030(g), Frequency of Detected Organic Chemicals in Sediment Samples Collected by the Laboratory and NMED/DOE OB from the Stream Channel in Acid Canyon, page 66:*

See comment 4.

LANL Response

6. See response to comment 4.

HWB Comment

7. *Section 2.3.5.1, Nature and Extent of Contamination, page 75:*

   LANL Statement: "The source of 4,4'-DDT and its metabolites may be the result of aerial spraying by the U.S. Forest Service in 1963 for the purpose of controlling spruce budworms."

   Note that 4,4'-DDT, 4,4'-DDD, 4,4'-DDE were detected in the samples taken from the septic tank (e.g. AAA 1904, AAA 1907), hence, the septic tank cannot be discounted as the source of contamination in the drainage channel.

LANL Response

7. LANL agrees that the septic tank cannot be ruled out entirely as a potential contamination source; however, the intent of the referenced statement was to illustrate that sources other than the septic tank inputs may also be significant contributors. 4,4'-DDT and its metabolites were detected in the streambed upgradient from SWMU 00-030(g). Therefore, the presence of 4,4'-DDT and its metabolites as a result of aerial spraying by the U.S. Forest Service in 1963 cannot be discounted as a source. One might also argue that since the original septic tank was opened, was backfilled with soil, and was without an impermeable cover, it is possible that DDT and its metabolites entered the septic tank during the time of widespread aerial spraying. Regardless of the original source(s) of the contamination, the residual levels are such that no unacceptable risk remains.

HWB Comment

8. *Section 2.3.5.1, Nature and Extent of Contamination, page 76:*

   LANL Statement: "All of the Acid Canyon data will be presented and discussed in the evaluation of sediment and surface water in Acid Canyon in a report to be prepared by the Canyons Focus Area."

   Data from the RFI investigation indicates that there is contamination up gradient and down gradient of SWMU 00-030(g) in the Acid Canyon. It is likely that over the years, some of the contamination from SWMU 00-030(g) has migrated and contributed to the contamination found in Acid Canyon. NMED will need to review the report that will be prepared by Canyons Focus Area for Acid Canyon before concurring with any no further action recommendation for SWMU 00-030(g).

LANL Response

8. As discussed with and agreed to by NMED at the Environmental Restoration (ER) Monthly meeting on July 17, 2002, data from Acid Canyon Reach 1 and Acid Canyon Reach 2 will be used in a revised nature and extent discussion to further define the extent of any contamination unique to SWMU 00-030(g). This information will be provided to the NMED under separate cover.

HWB Comment

9. *Section 2.4.2.1(b), Screening Evaluation, page 80:*

   LANL Statement: "The maximum concentration of each COPC was compared with the SAL for radionuclides; the SALs for Class A, B1, and B2 carcinogens; 10 times the SAL for Class C carcinogens; or one-tenth of SAL for noncarcinogens when there are more than two noncarcinogenic COPCs."

   All carcinogens should be compared to the NMED soil screening action levels (SALs), Class C carcinogens should not be singled out for an arbitrary comparison to ten times the SAL. Revise the statement.

LANL Response

9. The RFI Report for SWMU 00-030(g) was written when NMED's 1998 position paper and risk-based decision tree instructed that Class C carcinogens be compared to 10 times SAL and noncarcinogens be compared to 0.1 SAL. When the March 2000 NMED position paper came out advising to compare all carcinogens to 10-6 risk levels, the RFI Report had been written and was in review. Because no

Class C carcinogens were part of the screening assessment, it was decided that the text and tables did not need revision. When the NMED soil screening levels (SSLs) were available in December 2000, the RFI Report had already been reviewed, all comments incorporated, and the report was in final editing. A re-evaluation using NMED SSLs at that stage would have delayed submission of the report and would not have affected the conclusions of the report. Therefore, no changes to the text or tables are necessary.

HWB Comment

10. Table 2.4-3, SWMU 0-030(g), Comparison of Noncarcinogenic Mesa Top COPCs to SALs, page 82:

Lead should not have been included in the table. The screening action level (SAL) for lead is not calculated in the same manner as other non-carcinogens. It is not appropriate to use 40 ppm as the 0.1 SAL since the SAL of 400 ppm for lead is based on blood lead levels. Lead should be evaluated separately as done on page 85. Revise the table.

LANL Response

10. Table 2.4-3 fulfills the intent of the first sentence in (b) Screening Evaluation: "The COPCs identified by the data review were compared with SALs to determine if the chemicals were detected at concentrations of potential concern to human health." LANL agrees that the SAL for lead is not calculated in the same manner as other noncarcinogens; however, neither are the noncarcinogens with "max" values (e.g., Chromium III) and "sat" values (e.g., 1,2-dichlorobenzene). The 0.1 SAL comparison is intended to identify chemicals that require further evaluation and is not dependent on how the SAL is calculated. Table 2.4-3 compares COPC sample values to SALs and 0.1 SAL, regardless of how they are calculated, for a first cut indication of whether or not further evaluation is warranted. Using this approach LANL identified lead for further evaluation; a separate evaluation based on blood lead levels is presented on page 85 of the RFI Report.

HWB Comment

11. Table 2.4-4, SWMU 0-030(g), Comparison of Noncarcinogenic Drainage Channel COPCs to SALs, page 82:

See comment number 7.

LANL Response

11. This comment refers back to Specific Comment 7 regarding 4,4'-DDT and its metabolites. 4,4'-DDT and its metabolites are carcinogens and are compared to their respective SALs in Tables 2.4-1 and 2.4-2. It is not appropriate to include a carcinogen in Table 2.4-4, "Comparison of Noncarcinogenic Drainage Channel COPCs to SALs."

HWB Comment

12. Table 2.4-5, SWMU 0-030(g), Comparison of Mesa Top radionuclide COPCs to SALs, page 83:

Correct the table, the depth reported for sample AAA1909 is incorrect, it should be 3-8 ft not 36-96 ft.

LANL Response

12. LANL agrees that "36-96" in the depth column of Table 2.4-5, which is the depth in inches, should be replaced with "3 to 8 ft," which is the depth in feet.

HWB Comment

13. Section 2.4.2.2(b), Ecological Screening-Screening Evaluation, page 93:

LANL Statement: " The chemicals that appear in bold in Table 2.4-8 were identified as COPECs at SWMU 00-030(g) because their HQs were greater than 0.3."

Modify the Table, none of the chemicals with hazard quotients (HQs) greater than 0.3 appear in bold in Table 2.4-8.

LANL Response

13. LANL agrees that none of the chemicals with hazard quotients (HQs) greater than 0.3 appear in bold text in Table 2.4-8. Text preceding Table 2.4-8 should be changed to indicate the chemicals with HQs greater than 0.3 instead of using bold text in the table. The revised text should read, "The chemicals identified in Table 2.4-8 as chemicals of potential ecological concern (COPECs) at SWMU 00-030(g) because their HQs were greater than 0.3 are antimony, arsenic, barium, hexavalent chromium, cobalt, copper, lead, mercury, selenium, silver, thallium, zinc, aroclor-1254, aroclor-1260, 4,4'-DDE, 4,4'-DDT, dieldrin, endrin aldehyde, endrin ketone, and plutonium-239."

HWB Comment

14. Section 2.4.2.2(c), Ecological Screening-Uncertainty Analysis, page 95:

The HQs generated during initial screening are greater than one for most of the chemicals of potential ecological concern (COPECs), but are dismissed based on the assumption that the HQs were developed conservatively. The screening level ecological risk assessment does use conservative assumptions that result in conservative HQs, but COPECs cannot be discounted based on this assumption. If the initial screening evaluation results in HQs of greater than one, then HQs should be developed using site- specific parameters such as area use factors and bioavailability. Bioavailablity should only be considered when information is available on the speciation and bioavailablity of the contaminants found at the site. NMED disagrees with LANL that arsenic with HQ of 13.2 for vagrant shrew and 6.8 for deer mouse is not a COPEC. Although HQs for cobalt, silver, thallium, and zinc were greater than one, they were also dismissed as potential COPECs. Additionally, Aroclor-1260, 4,4-DDE, 4,4-DDT, endrin ketone with respective HQs of 3.8, 10, 24.3 and 6.7 were not retained as COPECs. LANL should perform a site-specific ecological risk assessment.

LANL Response

14. The COPECs in question are not dismissed based solely on the assumption of conservatively developed HQs. Although this rationale is appropriate since the screening assessment process is specifically designed to overestimate potential risk to receptors, additional reasons were also presented as to why the COPECs in the drainage channel do not pose an unacceptable risk to ecological receptors. The individual COPECs in question are discussed relative to their frequency of detection, background (where applicable) and extent of contamination within the drainage channel.

Based on this holistic evaluation, the following rationales were presented regarding why there remain no potential adverse impacts to ecological receptors: (1) the abundant and ecologically healthy habitat found along the drainage channel, (2) the infrequent and low level of detection of the COPECs, (3) the broad distribution of receptor populations in relation to the area of contamination, (4) the similarity of exposure concentrations to background concentrations of inorganics, and (5) the relatively low hazard quotient/hazard index is given the very conservative assumptions of bioavailability, area use, dietary composition, and ingestion rates, etc. LANL will reassess the ecological risk once the 95% UCLs of the mean for each COPEC are recalculated as requested in General Comment 3 and Specific Comment 15. As a part of the recalculation, one half the detection limit for nondetected values will be used rather than the full detection limit. The use of one half the detection limit is in keeping with EPA guidance and is also more representative of actual exposure levels. In addition, the COPECs will be reassessed using individual area use, population area use, and other factors as appropriate to more clearly explain why there is not a potential for adverse ecological risk at SWMU 00-030(g). This information will be provided to the NMED under separate cover.

LANL will not perform a site-specific ecological risk assessment for SWMU 00-030(g). The scale of the SWMU is less than one acre and, therefore, is too small an area to conduct an effect and exposure characterization. The COPECs will be re-evaluated as stated above and provided under separate cover.

HWB Comment

15. Appendix E, page E-21

LANL Statement: "In most cases, the assumption of both normality and lognormality was rejected at a 95% level of statistical confidence, which is likely the result of a significant number of non detected values in each data set. Rather than using a nonparametric approach that employs the median value to determine 95% UCLs, normal (SW-846 Chapter Nine 1986) and lognormal (Land H method, Gilbert 1987, 55619) 95% UCLs were calculated for each constituent of concern."

Mean values using the 95% UCL of the mean were calculated based on both lognormal and normal distributions even though the data sets did not pass the test for either distribution. LANL utilized the higher of the two estimates of the mean, unless they both exceeded the max value; then the max value was used. If the data do not fit either a normal or lognormal distribution then those distributions are not appropriate for calculating a statistical estimate of the mean for these contaminants. LANL should use either a nonparametric method such as a bootstrap method or the maximum value.

LANL Response

15. The 95% UCLs of the mean will be recalculated using nonparametric methods (i.e., "bootstrapping"). The calculation will also be performed using one-half of the detection limit rather than the full detection limit as outlined by EPA. The recalculated values will then be assessed using the same screening levels used in the RFI Report to determine if risk, hazard, and/or dose have changed. This information will be provided to the NMED under separate cover.

HWB Comment

16. Appendix F, RESRAD Parameters, page F-12

For both radionuclides (using RESRAD) and chemicals (using ingestion, inhalation etc. risk model equations), the total grams of soil ingested over the six-year scenario is 120 grams. In the Acid Canyon Extended Backyard scenario the total soil ingested over the six year scenario is 85.68 grams. The radionuclide analysis is presented as annual risk under both the adult and child scenario; risk from exposure over the time frame of the scenario (6 years for child; 30 years for adult) is not presented. Therefore the risk associated with maximum level of each radionuclides should be calculated for the adult and required extended backyard scenarios.

LANL Response

16. The risk associated with maximum levels of each radionuclide was not presented because the U.S. Department of Energy (DOE) regulates radionuclides according to dose, not according to risk. As presented in Table F-3.0-1, (page F-12), the time frame for the child trail user is 6 yrs. As presented in Table F-3.0-2, the time frame for the adult trail user is 30 yrs (page F-14). The dose for each of those scenarios was calculated using the time frame appropriate to the respective scenario.

    The supplemental submittal to this RSI will include all data necessary for the conversion from dose to risk evaluation.

Attachment 1

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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	Am-241	4.440E-01	4.440E-01	DCF2(2)
B-1	Np-237+D	5.400E-01	5.400E-01	DCF2(3)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(4)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(5)
B-1	Pu-238	3.920E-01	3.920E-01	DCF2(6)
B-1	Pu-239	4.290E-01	4.290E-01	DCF2(7)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(8)
B-1	Th-229+D	2.160E+00	2.160E+00	DCF2(9)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(10)
B-1	U-233	1.350E-01	1.350E-01	DCF2(11)
B-1	U-234	1.320E-01	1.320E-01	DCF2(12)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(13)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(14)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Am-241	3.640E-03	3.640E-03	DCF3(2)
D-1	Np-237+D	4.440E-03	4.440E-03	DCF3(3)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(4)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(5)
D-1	Pu-238	3.200E-03	3.200E-03	DCF3(6)
D-1	Pu-239	3.540E-03	3.540E-03	DCF3(7)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(8)
D-1	Th-229+D	4.030E-03	4.030E-03	DCF3(9)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(10)
D-1	U-233	2.890E-04	2.890E-04	DCF3(11)
D-1	U-234	2.830E-04	2.830E-04	DCF3(12)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(13)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(14)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34				
D-34	Am-241 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(2,1)
D-34	Am-241 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-05	5.000E-05	RTF(2,2)
D-34	Am-241 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(2,3)
D-34				
D-34	Np-237+D , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(3,1)
D-34	Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(3,2)
D-34	Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(3,3)
D-34				
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(4,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(4,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(4,3)
D-34				

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

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(5,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(5,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(5,3)
D-34				
D-34	Pu-238 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Pu-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)
D-34	Pu-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(6,3)
D-34				
D-34	Pu-239 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Pu-239 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Pu-239 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(7,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(8,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(8,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(8,3)
D-34				
D-34	Th-229+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(9,1)
D-34	Th-229+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(9,2)
D-34	Th-229+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(9,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(10,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(10,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(10,3)
D-34				
D-34	U-233 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-233 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-233 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(12,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(12,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(12,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(13,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(13,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(13,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(14,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(14,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(14,3)
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	Am-241 , fish	3.000E+01	3.000E+01	BIOFAC(2,1)
D-5	Am-241 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(2,2)
D-5				
D-5	Np-237+D , fish	3.000E+01	3.000E+01	BIOFAC(3,1)
D-5	Np-237+D , crustacea and mollusks	4.000E+02	4.000E+02	BIOFAC(3,2)
D-5				

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

Menu	Parameter	Current Value	Default	Parameter Name
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(4,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(4,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(5,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(5,2)
D-5				
D-5	Pu-238 , fish	3.000E+01	3.000E+01	BIOFAC(6,1)
D-5	Pu-238 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(6,2)
D-5				
D-5	Pu-239 , fish	3.000E+01	3.000E+01	BIOFAC(7,1)
D-5	Pu-239 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(7,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(8,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(8,2)
D-5				
D-5	Th-229+D , fish	1.000E+02	1.000E+02	BIOFAC(9,1)
D-5	Th-229+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(9,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(10,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(10,2)
D-5				
D-5	U-233 , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-233 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(12,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(12,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(13,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(13,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(14,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(14,2)

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.000E+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)	1.500E+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)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Am-241	7.600E+00	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pu-238	9.000E-01	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Pu-239	8.250E+01	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): U-234	2.830E+01	0.000E+00	---	S1(12)
R012	Initial principal radionuclide (pCi/g): U-235	2.100E+00	0.000E+00	---	S1(13)
R012	Initial principal radionuclide (pCi/g): U-238	1.570E+01	0.000E+00	---	S1(14)
R012	Concentration in groundwater (pCi/L): Am-241	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pu-238	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Pu-239	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(12)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(13)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(14)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	3.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	9.990E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	3.500E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	0.000E+00	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	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

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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 Am-241				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	9.266E-05	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pu-238				
R016	Contaminated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+03	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+03	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	9.333E-07	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Pu-239				
R016	Contaminated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+03	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+03	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	9.333E-07	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(12)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(12,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(12)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.722E-05	ALEACH(12)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(12)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(13)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(13,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(13)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.722E-05	ALEACH(13)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(13)

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)	5.000E+01	5.000E+01	---	DCNUCC(14)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(14,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(14)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.722E-05	ALEACH(14)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(14)
R016	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	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	9.266E-05	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for daughter Np-237				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	not used	-1.000E+00	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	-1.000E+00	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.247E-06	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.722E-05	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for daughter Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.864E-05	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for daughter Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.661E-05	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for daughter Th-229				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.111E-08	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.111E-08	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)
R016	Distribution coefficients for daughter U-233				
R016	Contaminated zone (cm**3/g)	5.000E+01	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	3.722E-05	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	1.050E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	6.000E+00	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)	2.280E-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)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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)	6.260E+02	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
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	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
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

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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):				
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:	10000.00 square meters
Thickness:	1.00 meters
Cover Depth:	0.00 meters

Initial Soil Concentrations, pCi/g	
Am-241	7.600E+00
Pu-238	9.000E-01
Pu-239	8.250E+01
U-234	2.830E+01
U-235	2.100E+00
U-238	1.570E+01

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

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	5.192E+00	5.191E+00	5.189E+00	5.180E+00	5.158E+00	5.090E+00	4.949E+00	0.000E+00
M(t):	3.461E-01	3.461E-01	3.459E-01	3.454E-01	3.439E-01	3.393E-01	3.299E-01	0.000E+00

Maximum TDOSE(t): 5.192E+00 mrem/yr at t = 0.000E+00 years

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

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	7.342E-03	0.0014	2.377E-02	0.0046	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.945E-01	0.0760
Pu-238	3.056E-06	0.0000	2.477E-03	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.094E-02	0.0079
Pu-239	5.328E-04	0.0001	2.495E-01	0.0481	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.168E+00	0.8028
U-234	2.514E-04	0.0000	2.634E-02	0.0051	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.143E-01	0.0220
U-235	3.451E-02	0.0066	1.821E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.006E-03	0.0015
U-238	4.625E-02	0.0089	1.306E-02	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.028E-02	0.0116
Total	8.888E-02	0.0171	3.170E-01	0.0610	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.786E+00	0.9218

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.256E-01	0.0820
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.342E-02	0.0084
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.418E+00	0.8510
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	1.409E-01	0.0271
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	4.433E-02	0.0085
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	1.196E-01	0.0230
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	5.192E+00	1.0000

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	7.330E-03	0.0014	2.373E-02	0.0046	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.938E-01	0.0759
Pu-238	3.032E-06	0.0000	2.458E-03	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.062E-02	0.0078
Pu-239	5.328E-04	0.0001	2.495E-01	0.0481	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.168E+00	0.8030
U-234	2.514E-04	0.0000	2.634E-02	0.0051	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.143E-01	0.0220
U-235	3.451E-02	0.0066	1.822E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.013E-03	0.0015
U-238	4.625E-02	0.0089	1.306E-02	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.028E-02	0.0116
Total	8.887E-02	0.0171	3.169E-01	0.0611	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.785E+00	0.9218

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.249E-01	0.0819
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.308E-02	0.0083
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.418E+00	0.8511
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	1.409E-01	0.0271
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	4.434E-02	0.0085
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	1.196E-01	0.0230
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	5.191E+00	1.0000

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	7.305E-03	0.0014	2.365E-02	0.0046	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.925E-01	0.0756
Pu-238	2.985E-06	0.0000	2.419E-03	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.998E-02	0.0077
Pu-239	5.328E-04	0.0001	2.495E-01	0.0481	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.168E+00	0.8033
U-234	2.516E-04	0.0000	2.633E-02	0.0051	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.143E-01	0.0220
U-235	3.450E-02	0.0066	1.823E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.027E-03	0.0015
U-238	4.624E-02	0.0089	1.306E-02	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.027E-02	0.0116
Total	8.884E-02	0.0171	3.168E-01	0.0611	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.783E+00	0.9218

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.235E-01	0.0816
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.241E-02	0.0082
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.418E+00	0.8515
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	1.409E-01	0.0272
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	4.435E-02	0.0085
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	1.196E-01	0.0230
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	5.189E+00	1.0000

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	7.219E-03	0.0014	2.337E-02	0.0045	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.879E-01	0.0749
Pu-238	2.824E-06	0.0000	2.289E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.783E-02	0.0073
Pu-239	5.327E-04	0.0001	2.494E-01	0.0482	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.167E+00	0.8044
U-234	2.528E-04	0.0000	2.633E-02	0.0051	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.143E-01	0.0221
U-235	3.450E-02	0.0067	1.828E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.085E-03	0.0016
U-238	4.623E-02	0.0089	1.306E-02	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.026E-02	0.0116
Total	8.874E-02	0.0171	3.163E-01	0.0611	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.775E+00	0.9218

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.185E-01	0.0808
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.013E-02	0.0077
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.417E+00	0.8526
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	1.409E-01	0.0272
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	4.441E-02	0.0086
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	1.195E-01	0.0231
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	5.180E+00	1.0000

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	6.980E-03	0.0014	2.259E-02	0.0044	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.749E-01	0.0727
Pu-238	2.412E-06	0.0000	1.955E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.230E-02	0.0063
Pu-239	5.324E-04	0.0001	2.493E-01	0.0483	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.165E+00	0.8074
U-234	2.636E-04	0.0001	2.632E-02	0.0051	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.142E-01	0.0221
U-235	3.449E-02	0.0067	1.854E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.301E-03	0.0016
U-238	4.620E-02	0.0090	1.305E-02	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.022E-02	0.0117
Total	8.847E-02	0.0172	3.151E-01	0.0611	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.755E+00	0.9218

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.045E-01	0.0784
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.426E-02	0.0066
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.414E+00	0.8558
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	1.408E-01	0.0273
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	4.465E-02	0.0087
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	1.195E-01	0.0232
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	5.158E+00	1.0000

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	6.202E-03	0.0012	2.006E-02	0.0039	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.330E-01	0.0654
Pu-238	1.389E-06	0.0000	1.124E-03	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.858E-02	0.0037
Pu-239	5.314E-04	0.0001	2.488E-01	0.0489	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.156E+00	0.8165
U-234	3.829E-04	0.0001	2.629E-02	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.141E-01	0.0224
U-235	3.453E-02	0.0068	2.002E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.302E-03	0.0018
U-238	4.608E-02	0.0091	1.302E-02	0.0026	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.007E-02	0.0118
Total	8.773E-02	0.0172	3.113E-01	0.0612	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.691E+00	0.9216

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.592E-01	0.0706
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.971E-02	0.0039
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.405E+00	0.8655
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	1.408E-01	0.0277
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	4.584E-02	0.0090
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	1.192E-01	0.0234
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	5.090E+00	1.0000

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	4.427E-03	0.0009	1.429E-02	0.0029	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.372E-01	0.0479
Pu-238	2.945E-07	0.0000	2.318E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.828E-03	0.0008
Pu-239	5.285E-04	0.0001	2.473E-01	0.0500	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.131E+00	0.8348
U-234	1.390E-03	0.0003	2.620E-02	0.0053	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.140E-01	0.0230
U-235	3.469E-02	0.0070	2.477E-03	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.239E-02	0.0025
U-238	4.573E-02	0.0092	1.293E-02	0.0026	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.966E-02	0.0121
Total	8.677E-02	0.0175	3.034E-01	0.0613	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.558E+00	0.9212

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.559E-01	0.0517
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.060E-03	0.0008
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.379E+00	0.8849
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	1.416E-01	0.0286
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	4.956E-02	0.0100
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	1.183E-01	0.0239
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	4.949E+00	1.0000

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

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

Parent (i)	Product (j)	Branch Fraction*	DSR(j,t) (mrem/yr)/(pCi/g) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Am-241	Am-241	1.000E+00	5.600E-02	5.591E-02	5.572E-02	5.506E-02	5.322E-02	4.726E-02	3.367E-02	0.000E+00
Am-241	Np-237	1.000E+00	1.472E-08	4.412E-08	1.028E-07	3.065E-07	8.754E-07	2.721E-06	6.926E-06	0.000E+00
Am-241	U-233	1.000E+00	1.205E-15	8.432E-15	4.452E-14	3.966E-13	3.306E-12	3.448E-11	2.761E-10	0.000E+00
Am-241	Th-229	1.000E+00	5.977E-19	8.961E-18	1.045E-16	2.761E-15	6.693E-14	2.319E-12	5.677E-11	0.000E+00
Am-241	∑DSR(j)		5.600E-02	5.591E-02	5.572E-02	5.506E-02	5.322E-02	4.727E-02	3.367E-02	0.000E+00
Pu-238	Pu-238	1.000E+00	4.825E-02	4.787E-02	4.712E-02	4.458E-02	3.807E-02	2.190E-02	4.509E-03	0.000E+00
Pu-238	U-234	1.000E+00	7.039E-09	2.104E-08	4.872E-08	1.422E-07	3.823E-07	9.767E-07	1.607E-06	0.000E+00
Pu-238	Th-230	1.000E+00	4.307E-14	3.008E-13	1.582E-12	1.389E-11	1.113E-10	1.019E-09	6.052E-09	0.000E+00
Pu-238	Ra-226	1.000E+00	1.193E-16	1.787E-15	2.076E-14	5.428E-13	1.274E-11	3.972E-10	7.539E-09	0.000E+00
Pu-238	Pb-210	1.000E+00	2.961E-19	9.116E-18	2.263E-16	1.676E-14	1.025E-12	7.626E-11	2.323E-09	0.000E+00
Pu-238	∑DSR(j)		4.825E-02	4.787E-02	4.712E-02	4.458E-02	3.807E-02	2.190E-02	4.511E-03	0.000E+00
Pu-239	Pu-239	1.000E+00	5.356E-02	5.355E-02	5.355E-02	5.354E-02	5.351E-02	5.340E-02	5.308E-02	0.000E+00
Pu-239	U-235	1.000E+00	1.039E-11	3.118E-11	7.276E-11	2.182E-10	6.335E-10	2.082E-09	6.185E-09	0.000E+00
Pu-239	Pa-231	1.000E+00	5.711E-16	3.998E-15	2.113E-14	1.890E-13	1.592E-12	1.723E-11	1.528E-10	0.000E+00
Pu-239	Ac-227	1.000E+00	8.295E-18	1.236E-16	1.420E-15	3.568E-14	7.547E-13	1.778E-11	2.278E-10	0.000E+00
Pu-239	∑DSR(j)		5.356E-02	5.355E-02	5.355E-02	5.354E-02	5.351E-02	5.340E-02	5.308E-02	0.000E+00
U-234	U-234	1.000E+00	4.979E-03	4.978E-03	4.978E-03	4.977E-03	4.973E-03	4.959E-03	4.919E-03	0.000E+00
U-234	Th-230	1.000E+00	4.567E-08	1.370E-07	3.196E-07	9.588E-07	2.784E-06	9.157E-06	2.724E-05	0.000E+00
U-234	Ra-226	1.000E+00	1.687E-10	1.180E-09	6.237E-09	5.573E-08	4.684E-07	5.025E-06	4.344E-05	0.000E+00
U-234	Pb-210	1.000E+00	5.223E-13	7.782E-12	8.944E-11	2.249E-09	4.763E-08	1.122E-06	1.414E-05	0.000E+00
U-234	∑DSR(j)		4.979E-03	4.979E-03	4.978E-03	4.978E-03	4.976E-03	4.974E-03	5.004E-03	0.000E+00
U-235	U-235	1.000E+00	2.111E-02	2.111E-02	2.111E-02	2.110E-02	2.109E-02	2.103E-02	2.088E-02	0.000E+00
U-235	Pa-231	1.000E+00	1.740E-06	5.219E-06	1.218E-05	3.652E-05	1.060E-04	3.480E-04	1.031E-03	0.000E+00
U-235	Ac-227	1.000E+00	3.364E-08	2.333E-07	1.208E-06	1.006E-05	7.006E-05	4.471E-04	1.693E-03	0.000E+00
U-235	∑DSR(j)		2.111E-02	2.111E-02	2.112E-02	2.115E-02	2.126E-02	2.183E-02	2.360E-02	0.000E+00
U-238	U-238	1.000E+00	7.617E-03	7.617E-03	7.616E-03	7.614E-03	7.608E-03	7.589E-03	7.532E-03	0.000E+00
U-238	U-234	1.000E+00	7.057E-09	2.117E-08	4.939E-08	1.481E-07	4.300E-07	1.413E-06	4.192E-06	0.000E+00
U-238	Th-230	1.000E+00	4.315E-14	3.021E-13	1.597E-12	1.428E-11	1.203E-10	1.304E-09	1.159E-08	0.000E+00
U-238	Ra-226	1.000E+00	1.195E-16	1.793E-15	2.091E-14	5.540E-13	1.351E-11	4.788E-10	1.246E-08	0.000E+00
U-238	Pb-210	1.000E+00	2.965E-19	9.141E-18	2.275E-16	1.704E-14	1.076E-12	8.968E-11	3.708E-09	0.000E+00
U-238	∑DSR(j)		7.617E-03	7.617E-03	7.616E-03	7.614E-03	7.609E-03	7.590E-03	7.536E-03	0.000E+00

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
The DSR includes contributions from associated (half-life ≤ 0.5 yr) daughters.

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

Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Am-241	2.678E+02	2.683E+02	2.692E+02	2.724E+02	2.818E+02	3.173E+02	4.455E+02	*3.430E+12
Pu-238	3.109E+02	3.134E+02	3.183E+02	3.364E+02	3.940E+02	6.850E+02	3.325E+03	*1.711E+13
Pu-239	2.801E+02	2.801E+02	2.801E+02	2.802E+02	2.803E+02	2.809E+02	2.826E+02	*6.212E+10
U-234	3.013E+03	3.013E+03	3.013E+03	3.013E+03	3.015E+03	3.016E+03	2.998E+03	*6.245E+09
U-235	7.105E+02	7.104E+02	7.102E+02	7.093E+02	7.055E+02	6.872E+02	6.356E+02	*2.160E+06
U-238	1.969E+03	1.969E+03	1.969E+03	1.970E+03	1.971E+03	1.976E+03	1.990E+03	*3.360E+05

*At specific activity limit

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

Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Am-241	7.600E+00	0.000E+00	5.600E-02	2.678E+02	5.600E-02	2.678E+02
Pu-238	9.000E-01	0.000E+00	4.825E-02	3.109E+02	4.825E-02	3.109E+02
Pu-239	8.250E+01	0.000E+00	5.356E-02	2.801E+02	5.356E-02	2.801E+02
U-234	2.830E+01	849 ± 2	5.291E-03	2.835E+03	4.979E-03	3.013E+03
U-235	2.100E+00	827 ± 2	2.804E-02	5.349E+02	2.111E-02	7.105E+02
U-238	1.570E+01	0.000E+00	7.617E-03	1.969E+03	7.617E-03	1.969E+03

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

Nuclide (j)	Parent (i)	BRF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Am-241	Am-241	1.000E+00	4.256E-01	4.249E-01	4.235E-01	4.185E-01	4.045E-01	3.592E-01	2.559E-01	0.000E+00
Np-237	Am-241	1.000E+00	1.119E-07	3.353E-07	7.812E-07	2.330E-06	6.653E-06	2.068E-05	5.264E-05	0.000E+00
U-233	Am-241	1.000E+00	9.159E-15	6.408E-14	3.383E-13	3.014E-12	2.513E-11	2.621E-10	2.098E-09	0.000E+00
Th-229	Am-241	1.000E+00	4.542E-18	6.811E-17	7.939E-16	2.099E-14	5.087E-13	1.763E-11	4.314E-10	0.000E+00
Pu-238	Pu-238	1.000E+00	4.342E-02	4.308E-02	4.241E-02	4.013E-02	3.426E-02	1.971E-02	4.058E-03	0.000E+00
U-234	Pu-238	1.000E+00	6.335E-09	1.894E-08	4.384E-08	1.280E-07	3.441E-07	8.790E-07	1.446E-06	0.000E+00
U-234	U-234	1.000E+00	1.409E-01	1.409E-01	1.409E-01	1.408E-01	1.407E-01	1.403E-01	1.392E-01	0.000E+00
U-234	U-238	1.000E+00	1.108E-07	3.324E-07	7.755E-07	2.326E-06	6.751E-06	2.218E-05	6.582E-05	0.000E+00
U-234	∑DOSE(j)		1.409E-01	1.409E-01	1.409E-01	1.408E-01	1.407E-01	1.404E-01	1.393E-01	0.000E+00
Th-230	Pu-238	1.000E+00	3.876E-14	2.707E-13	1.424E-12	1.251E-11	1.001E-10	9.170E-10	5.446E-09	0.000E+00
Th-230	U-234	1.000E+00	1.292E-06	3.877E-06	9.046E-06	2.713E-05	7.878E-05	2.591E-04	7.710E-04	0.000E+00
Th-230	U-238	1.000E+00	6.775E-13	4.743E-12	2.507E-11	2.242E-10	1.889E-09	2.047E-08	1.820E-07	0.000E+00
Th-230	∑DOSE(j)		1.292E-06	3.877E-06	9.046E-06	2.713E-05	7.878E-05	2.592E-04	7.712E-04	0.000E+00
Ra-226	Pu-238	1.000E+00	1.074E-16	1.608E-15	1.869E-14	4.885E-13	1.147E-11	3.575E-10	6.785E-09	0.000E+00
Ra-226	U-234	1.000E+00	4.773E-09	3.341E-08	1.765E-07	1.577E-06	1.325E-05	1.422E-04	1.229E-03	0.000E+00
Ra-226	U-238	1.000E+00	1.877E-15	2.815E-14	3.283E-13	8.698E-12	2.122E-10	7.517E-09	1.956E-07	0.000E+00
Ra-226	∑DOSE(j)		4.773E-09	3.341E-08	1.765E-07	1.577E-06	1.325E-05	1.422E-04	1.230E-03	0.000E+00
Pb-210	Pu-238	1.000E+00	2.665E-19	8.205E-18	2.036E-16	1.509E-14	9.221E-13	6.863E-11	2.090E-09	0.000E+00
Pb-210	U-234	1.000E+00	1.478E-11	2.202E-10	2.531E-09	6.365E-08	1.348E-06	3.176E-05	4.003E-04	0.000E+00
Pb-210	U-238	1.000E+00	4.655E-18	1.435E-16	3.573E-15	2.676E-13	1.689E-11	1.408E-09	5.821E-08	0.000E+00
Pb-210	∑DOSE(j)		1.478E-11	2.202E-10	2.531E-09	6.365E-08	1.348E-06	3.177E-05	4.003E-04	0.000E+00
Pu-239	Pu-239	1.000E+00	4.418E+00	4.418E+00	4.418E+00	4.417E+00	4.414E+00	4.405E+00	4.379E+00	0.000E+00
U-235	Pu-239	1.000E+00	8.576E-10	2.573E-09	6.003E-09	1.800E-08	5.226E-08	1.718E-07	5.103E-07	0.000E+00
U-235	U-235	1.000E+00	4.433E-02	4.433E-02	4.433E-02	4.431E-02	4.428E-02	4.417E-02	4.384E-02	0.000E+00
U-235	∑DOSE(j)		4.433E-02	4.433E-02	4.433E-02	4.431E-02	4.428E-02	4.417E-02	4.384E-02	0.000E+00
Pa-231	Pu-239	1.000E+00	4.712E-14	3.298E-13	1.743E-12	1.559E-11	1.313E-10	1.422E-09	1.261E-08	0.000E+00
Pa-231	U-235	1.000E+00	3.653E-06	1.096E-05	2.557E-05	7.669E-05	2.225E-04	7.308E-04	2.164E-03	0.000E+00
Pa-231	∑DOSE(j)		3.653E-06	1.096E-05	2.557E-05	7.669E-05	2.225E-04	7.308E-04	2.164E-03	0.000E+00
Ac-227	Pu-239	1.000E+00	6.843E-16	1.020E-14	1.172E-13	2.944E-12	6.226E-11	1.467E-09	1.879E-08	0.000E+00
Ac-227	U-235	1.000E+00	7.063E-08	4.900E-07	2.537E-06	2.113E-05	1.471E-04	9.389E-04	3.555E-03	0.000E+00
Ac-227	∑DOSE(j)		7.063E-08	4.900E-07	2.537E-06	2.113E-05	1.471E-04	9.389E-04	3.555E-03	0.000E+00
U-238	U-238	1.000E+00	1.196E-01	1.196E-01	1.196E-01	1.195E-01	1.195E-01	1.191E-01	1.183E-01	0.000E+00

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

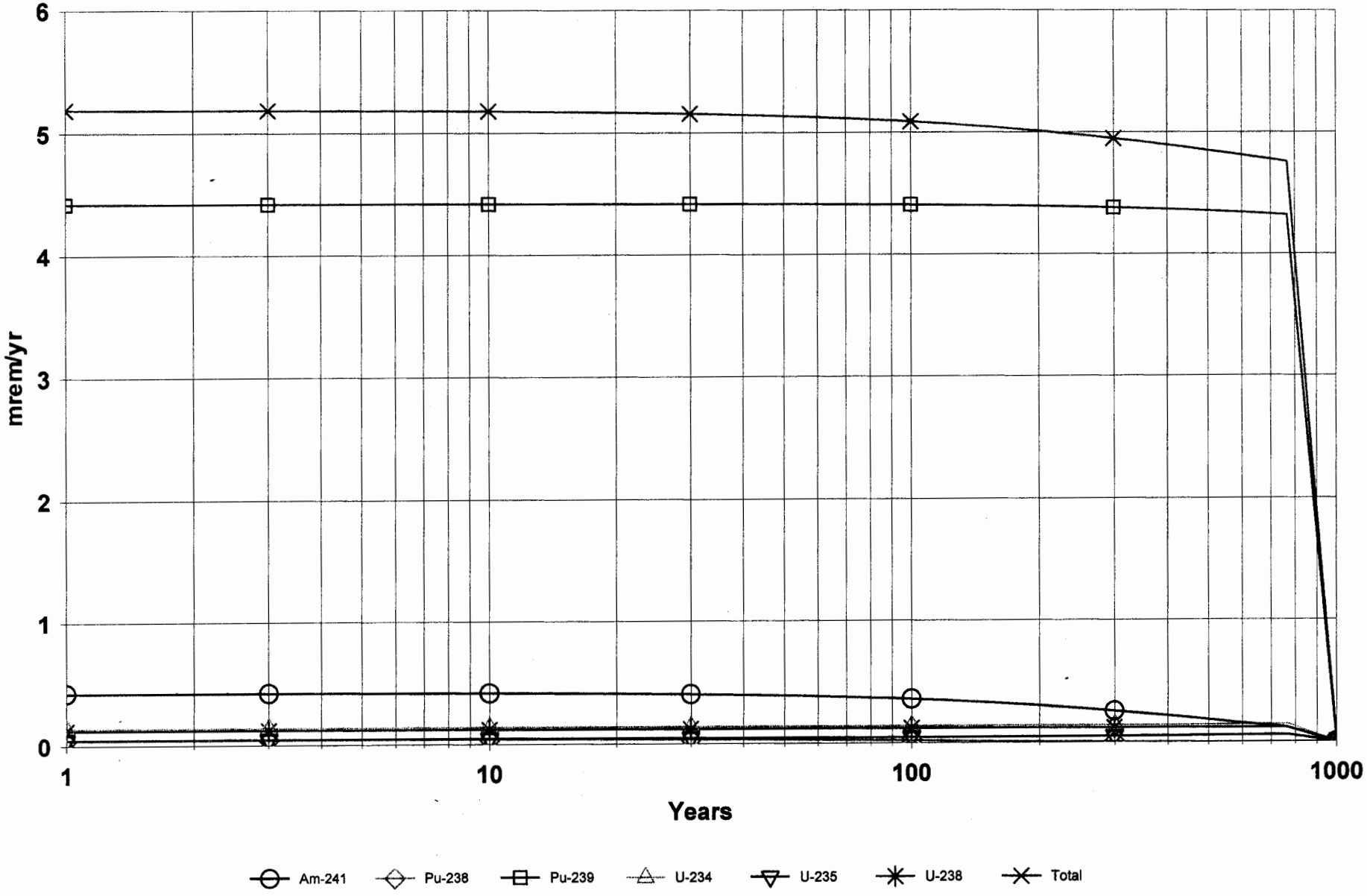
Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	BRF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Am-241	Am-241	1.000E+00	7.600E+00	7.587E+00	7.561E+00	7.472E+00	7.223E+00	6.414E+00	4.569E+00	1.393E+00
Np-237	Am-241	1.000E+00	0.000E+00	2.460E-06	7.366E-06	2.441E-05	7.199E-05	2.263E-04	5.781E-04	1.179E-03
U-233	Am-241	1.000E+00	0.000E+00	5.379E-12	4.836E-11	5.351E-10	4.761E-09	5.082E-08	4.096E-07	3.231E-06
Th-229	Am-241	1.000E+00	0.000E+00	1.694E-16	4.568E-15	1.687E-13	4.512E-12	1.619E-10	4.003E-09	1.120E-07
Pu-238	Pu-238	1.000E+00	9.000E-01	8.929E-01	8.789E-01	8.316E-01	7.101E-01	4.084E-01	8.411E-02	3.334E-04
U-234	Pu-238	1.000E+00	0.000E+00	2.541E-06	7.564E-06	2.453E-05	6.811E-05	1.760E-04	2.904E-04	3.117E-04
U-234	U-234	1.000E+00	2.830E+01	2.830E+01	2.830E+01	2.829E+01	2.827E+01	2.819E+01	2.796E+01	2.719E+01
U-234	U-238	1.000E+00	0.000E+00	4.451E-05	1.335E-04	4.449E-04	1.334E-03	4.434E-03	1.320E-02	4.282E-02
U-234	∑S(j):		2.830E+01	2.830E+01	2.830E+01	2.829E+01	2.827E+01	2.819E+01	2.798E+01	2.723E+01
Th-230	Pu-238	1.000E+00	0.000E+00	1.145E-11	1.025E-10	1.119E-09	9.560E-09	8.958E-08	5.355E-07	2.484E-06
Th-230	U-234	1.000E+00	0.000E+00	2.547E-04	7.642E-04	2.547E-03	7.637E-03	2.541E-02	7.587E-02	2.486E-01
Th-230	U-238	1.000E+00	0.000E+00	2.003E-10	1.803E-09	2.003E-08	1.801E-07	1.998E-06	1.787E-05	1.947E-04
Th-230	∑S(j):		0.000E+00	2.547E-04	7.642E-04	2.547E-03	7.637E-03	2.542E-02	7.588E-02	2.488E-01
Ra-226	Pu-238	1.000E+00	0.000E+00	1.655E-15	4.449E-14	1.624E-12	4.208E-11	1.358E-09	2.604E-08	4.226E-07
Ra-226	U-234	1.000E+00	0.000E+00	5.517E-08	4.964E-07	5.509E-06	4.941E-05	5.426E-04	4.722E-03	4.681E-02
Ra-226	U-238	1.000E+00	0.000E+00	2.893E-14	7.808E-13	2.889E-11	7.779E-10	2.854E-08	7.500E-07	2.532E-05
Ra-226	∑S(j):		0.000E+00	5.517E-08	4.964E-07	5.509E-06	4.941E-05	5.426E-04	4.723E-03	4.684E-02
Pb-210	Pu-238	1.000E+00	0.000E+00	1.279E-17	1.019E-15	1.192E-13	8.320E-12	6.484E-10	1.999E-08	3.948E-07
Pb-210	U-234	1.000E+00	0.000E+00	5.672E-10	1.508E-08	5.292E-07	1.237E-05	3.015E-04	3.832E-03	4.409E-02
Pb-210	U-238	1.000E+00	0.000E+00	2.234E-16	1.787E-14	2.113E-12	1.522E-10	1.329E-08	5.564E-07	2.311E-05
Pb-210	∑S(j):		0.000E+00	5.672E-10	1.508E-08	5.292E-07	1.237E-05	3.015E-04	3.833E-03	4.411E-02
Pu-239	Pu-239	1.000E+00	8.250E+01	8.250E+01	8.249E+01	8.248E+01	8.243E+01	8.226E+01	8.177E+01	8.008E+01
U-235	Pu-239	1.000E+00	0.000E+00	8.125E-08	2.437E-07	8.122E-07	2.435E-06	8.098E-06	2.413E-05	7.858E-05
U-235	U-235	1.000E+00	2.100E+00	2.100E+00	2.100E+00	2.099E+00	2.098E+00	2.092E+00	2.077E+00	2.023E+00
U-235	∑S(j):		2.100E+00	2.100E+00	2.100E+00	2.099E+00	2.098E+00	2.092E+00	2.077E+00	2.023E+00
Pa-231	Pu-239	1.000E+00	0.000E+00	8.595E-13	7.735E-12	8.592E-11	7.726E-10	8.560E-09	7.640E-08	8.244E-07
Pa-231	U-235	1.000E+00	0.000E+00	4.443E-05	1.333E-04	4.441E-04	1.331E-03	4.422E-03	1.314E-02	4.236E-02
Pa-231	∑S(j):		0.000E+00	4.443E-05	1.333E-04	4.441E-04	1.331E-03	4.422E-03	1.314E-02	4.236E-02
Ac-227	Pu-239	1.000E+00	0.000E+00	9.049E-15	2.405E-13	8.435E-12	1.968E-10	4.798E-09	6.200E-08	7.731E-07
Ac-227	U-235	1.000E+00	0.000E+00	6.998E-07	6.166E-06	6.374E-05	4.735E-04	3.088E-03	1.175E-02	4.097E-02
Ac-227	∑S(j):		0.000E+00	6.998E-07	6.166E-06	6.374E-05	4.735E-04	3.088E-03	1.175E-02	4.097E-02
U-238	U-238	1.000E+00	1.570E+01	1.570E+01	1.570E+01	1.569E+01	1.568E+01	1.564E+01	1.553E+01	1.513E+01

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

RESCALC.EXE execution time = 4.65 seconds

DOSE: All Nuclides Summed, All Pathways Summed



Site4.RAD 07/17/2002 17:24 Includes All Pathways

Attachment 2

Table 2.3-20

Analyte	Location	Media	Number of Samples Analyzed	Number of Detects	Concentration Range (mg/kg)[a]	EQL[b] (mg/kg)	Frequency of Detects
Acetone	Mesa Top	Qbt 3	16	0	[0.02–0.023]	0.023	0/16
	Drainage	Sediment	2	1	[0.02]–0.022	0.02	1/2
Aroclor-1254	Mesa Top	Qbt 3	19	0	[0.003–1.0]	1.0	0/19
	Drainage	Sediment	23	14	[0.036]–1.1	0.19	14/23
Aroclor-1260	Mesa Top	Qbt 3	19	0	[0.003–1.0]	1.0	0/19
	Drainage	Sediment	23	2	[0.014]–0.71	0.19	2/23
Chlordane [alpha-]	Mesa Top	Qbt 3	16	0	[0.0017–0.0019]	0.0019	0/16
	Drainage	Sediment	12	8	[0.002]–0.044	0.024	8/12
Chlordane [gamma-]	Mesa Top	Qbt 3	16	0	[0.0017–0.0019]	0.0019	0/16
	Drainage	Sediment	12	7	[0.002]–0.036	0.024	7/12
4,4'-DDD	Mesa Top	Qbt 3	19	0	[0.00032–0.004]	0.004	0/19
	Drainage	Sediment	12	4	[0.0036]–0.11	0.038	4/12
4,4'-DDE	Mesa Top	Qbt 3	19	0	[0.00032–0.004]	0.004	0/19
	Drainage	Sediment	12	5	[0.0037]–0.048	0.038	5/12
4,4'-DDT	Mesa Top	Qbt 3	19	2	[0.00032]–0.044	0.004	2/19
	Drainage	Sediment	12	12	[0.0057]–0.27	0.0036	12/12
Dieldrin	Mesa Top	Qbt 3	19	0	[0.00032–0.0038]	0.0038	0/19
	Drainage	Sediment	12	2	[0.0036]–0.044	0.048	2/12
Endosulfan I	Mesa Top	Qbt 3	16	0	[0.0017–0.0019]	0.0019	0/16
	Drainage	Sediment	12	1	[0.0018–0.024]	0.024	1/12
Endosulfan II	Mesa Top	Qbt 3	19	0	[0.0003–0.0038]	0.0038	0/19
	Drainage	Sediment	12	2	[0.0036–0.048]	0.048	2/12
Endrin Aldehyde	Mesa Top	Qbt 3	19	0	[0.0003–0.0038]	0.0038	0/19
	Drainage	Sediment	12	1	[0.0036–0.048]	0.048	1/12
Endrin Ketone	Mesa Top	Qbt 3	16	0	[0.0034–0.0038]	0.0038	0/16
	Drainage	Sediment	12	2	[0.0037–0.048]	0.048	2/12
Toxaphene	Mesa Top	Qbt 3	18	0	[0.091–0.19]	0.19	0/18
	Drainage	Sediment	12	1	[0.18–2.4]	2.4	1/12

[a] Values in square brackets represent detection limits reported by the laboratory. The results were reported as not detected.

[b] EQL= Estimated quantitation limit

[c] Value is the ratio of the number of detects to the number of analyses.