

**Final Status Survey Plan
for the
Plum Brook Reactor Facility**

Attachment B

**Approach and Basis for Development of Site-Specific Derived
Concentration Guideline Levels (DCGL)**

1.0 Purpose

Document the approach, methodology and bases for the establishment of site-specific Derived Concentration Guideline Levels (DCGL) and to document the actual DCGL(s) and area factors to be used during the performance of Final Status Survey of the Plum Brook Reactor Facility (PBRF).

2.0 References

- 2.1 Title 10, Code of Federal Regulations, Part 20 "Standards for Protection Against Radiation"
- 2.2 Draft Regulatory Guide DG-4006, "Demonstrating Compliance with the Radiological Criteria for License Termination" (NRC 1998a)
- 2.3 NUREG-1549, "Decision Methods for Dose Assessment to Comply with Radiological Criteria for License Termination" (NRC 1998b)
- 2.4 PBRF Decommissioning Plan
- 2.5 NUREG-1757 Vol. 2, "Consolidated NMSS Decommissioning Guidance, Characterization, Survey, and Determination of Radiological Criteria" (NRC 2003)
- 2.6 NUREG-5512, Vol. 3, "Parameter Analysis" (NRC 1999)
- 2.7 NUREG/CR-6697, "Development of Probabilistic RESRAD 6.0 and RESRAD-BUILD 3.0 Computer Codes" (NRC 2000)
- 2.8 Federal Guidance Report No. 11 (FGR 11), "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion and Ingestion"
- 2.9 Federal Guidance Report No. 12 (FGR 12), "External Exposure to Radionuclides in Air, Water and Soil"
- 2.10 NUREG/CR-6377 (PNL-11408), Krupka, K.M., and R.J. Serne. 1998. "Effects on Radionuclide Concentrations by Cement/Groundwater Interactions in Support of Performance Assessment of Low-Level Radioactive Waste Disposal Facilities"
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- 2.18 National Climactic Data Center, NCDC, <http://www.ncdc.noaa.gov/oa/ncdc.html>.
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- 2.20 US Army Corps of Engineers, 2004. "Hydrogeologic Report Plum Brook Reactor Facility, Sandusky, OH."
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3.0 DCGL Approach

Consistent with 10 CFR Part 20, decommissioning means reducing residual radioactivity to a level that permits termination of the license and release of the site for unrestricted use. The PBRF license would be terminated after NASA demonstrates that the site meets the criteria for decommissioning specified in 10 CFR Part 20, Subpart E, "Radiological Criteria for License Termination." The two radiological criteria for unrestricted use specified in 10 CFR 20.1402 are: (1) the TEDE from residual radioactivity that is distinguishable from background radiation must not be greater than 25 mrem/yr to the Average Member of the Critical Group (AMCG) and (2) residual radioactivity levels must be ALARA.

According to NUREG-1549, "Decision Methods for Dose Assessment to Comply with Radiological Criteria for License Termination" (NRC 1998b), a licensee can demonstrate compliance with the dose criterion either by using a generic screening model or by using site-specific analyses. As recommended by Draft Regulatory Guide DG-4006, "Demonstrating Compliance with the Radiological Criteria for License Termination" (NRC 1998a), this attachment presents the methodology and approach used for the development of site-specific DCGLs. This document also presents the estimated DCGLs for surface soils, building surfaces, and subsurface structures at the PBRF. The DCGLs will be used during the final radiation survey to demonstrate compliance with the two unrestricted use criteria previously specified.

The Decommissioning Plan for the PBRF presents the proposed methodology for demonstrating that residual contamination levels are ALARA. The methodology follows the guidance in DG-4006 and involves comparing the costs and benefits of postulated decommissioning actions. The Decommissioning Plan also presents options for using DCGLs for specific portions of the PBRF and the timing of the final status survey, including the identification of the criteria that will be used for selecting DCGLs for specific portions of the PBRF. Preliminary ALARA analyses indicate that complying with the criterion of a TEDE to the AMCG of 25 mrem/yr will be more conservative than the criterion that residual radioactivity must be ALARA.

4.0 DCGL Methodology

This section presents the methodology used in the calculation of DCGLs (the level of residual contamination that would produce a TEDE of 25 mrem/yr to the AMCG). DCGLs were estimated using existing characterization data. DCGL estimates are based on the analysis of scenarios that could reasonably be expected to occur if a site is released for unrestricted use. A scenario is defined as a set of release modes, receptor metabolic and behavioral characteristics, environmental transport pathways, and exposure modes that result in dose to an individual or population. The dose analysis performed assumes the PBRF site is released for unrestricted use and evaluates the case of members of the public using the site. In actuality, NASA has no plans to sell this property after license termination, so realistic receptors would be members of the public located offsite and NASA employees working onsite after license termination. Thus, unrestricted use of the PBRF site is conservative and bounds the realistically expected scenario.

NRC has published guidance on methods for dose analysis supporting license termination under 10 CFR Part 20 (NUREG/CR-5512 [Kennedy and Strenge 1992], DG-4006, NUREG-1549, and NUREG-1757 Vol. 2, "Consolidated NMSS Decommissioning Guidance, Characterization, Survey, and Determination of Radiological Criteria" [NRC 2003]). The guidance allows using either generic screening or site-specific dose assessment in the decision framework. Under the generic screening approach, NRC has identified pathways, scenarios, models, and model parameter values and has provided analysis results in the form of levels of contamination consistent with the 10 CFR Part 20, Subpart E, dose criteria. The pathways and scenarios constitute the residential farmer and building reuse scenarios. The NRC generic screening analysis of the residential farmer scenario is based on the assumption that all contamination has been distributed into the upper 15 cm (6 in.) of soil. Among the options presented for site-specific analysis is the use of site-specific parameter values and existing models other than the generic NRC model. The guidance recommends that the licensee provide information supporting use of site-specific data or models other than the generic NRC model. Because the generic screening model addresses subsurface contamination through assumed redistribution to surface soil, it is very conservative for the case of residual contamination of subsurface structures. To provide a consistent level of analysis for the contamination of surface soil, building surface, and subsurface structures, a site-specific analysis approach was used for the PBRF.

The dose model selected for analyzing residual soil contamination, RESRAD Version 6.0 (Yu et al. 2000), has been formally accepted by the NRC for analysis of residential farmer scenarios. The dose model selected for analyzing residual building surface contamination, RESRAD-BUILD Version 3.22 (Yu et al. 2000), addresses pathways discussed in NRC guidance and is widely used by the U.S. Department of Energy (DOE) and the U.S. Department of Defense when analyzing building reuse scenarios. These two site-specific models include all pathways and exposure modes included in the NRC generic screening models. No conditions outside those incorporated in the site-specific models are expected to occur at the PBRF. The residential farmer scenario presumes that both the residence and garden are located on contaminated soil. Thus, the site-specific modeling is appropriate for assessing doses because of contamination of soil and building surfaces.

The RESRAD Version 6.21 (Yu et al. 2002) model was used to analyze residual subsurface structure contamination to allow a sensitivity analysis to be conducted for the concrete K_d values. In this case, concrete K_d is the most sensitive parameter. No conditions outside those incorporated in the site-specific model are expected to occur at the PBRF, and no pathways have been eliminated. Thus, the site-specific model is appropriate for assessing dose because of residual contamination associated with subsurface structures.

Using existing characterization information, site-specific pathway scenarios were used to calculate DCGLs and to develop estimates of dose over time for the AMCG at the PBRF. The site-specific DCGLs were developed by considering PBRF soils and hydrology.

5.0 DCGL BASES

5.1 Residual Contamination in Surface Soils

NRC regulatory guidance (DG-4006) recommends analysis of a residential farmer scenario as the basis for the DCGLs for residual contamination in site-wide surface soil. In the residential farmer scenario, an individual could contact residual contamination by establishing a home and garden on contaminated soil or by using groundwater that comes in contact with the residual contamination. The primary release modes are partitioning of contaminants from soil into infiltrating water and resuspension by wind. The environmental transport pathways include ground water transport; translocation into plants, animals, and fish; and atmospheric dispersion. Exposure modes include ingestion of water, crops, animal products, and fish; direct external exposure from the ground; inhalation of airborne material; and inadvertent ingestion of soil. Because radium contamination is not expected based on historical knowledge or survey measurements, the radon exposure pathway is not included in the calculation of DCGLs for residual contamination of surface soils.

NUREG-1549 identifies DCGLs (i.e., soil concentrations that would result in a TEDE of 25 mrem/yr to the AMCG) for a generic, screening-level exposure scenario. More realistic site-specific DCGLs for the PBRF were developed using RESRAD Version 6.21, a computer code developed by DOE and commonly used to estimate residual contamination in soils. The site-specific DCGLs were calculated based on many variables that characterize the receptors, environmental pathways, and modes of exposure. The estimates of physical, behavioral, and metabolic parameter values were developed from either site measurements or literature review.

In support of the PBRF project and resident farmer DCGL development, available hydrogeologic information was consolidated in a report by the US Army Corps of Engineers entitled "Hydrogeological Report Plum Brook Reactor Facility Sandusky, Ohio". This report summarized available information about the geologic and hydrogeologic conditions that exist both regionally and within the PBRF. The following excerpts from the hydrogeologic report were used to develop site-specific RESRAD inputs as shown in Tables 5-1 through 5-4.

Note that surface soil dose is insensitive to the hydrogeological parameters but site specific values are provided for completeness.

Bedrock that subcrops at the PBRF consists of Devonian Delaware Limestone and the overlying Devonian Plum Brook Shale Member of the Olentangy Shale. The majority of the site is underlain by Olentangy Shale, with the subcrop of Delaware Limestone limited to the northern and southeastern portion of the PBRF. Underlying the Delaware Limestone is a thick section of predominantly carbonate bedrock consisting of the Columbus Limestone and the Detroit River Formation.

The bedrock surface at the PBS generally slopes toward the north, although the PBS is located in an area where an apparent bowl-shaped feature is present. In-filling of the bedrock depression has resulted in a similar thickening of unconsolidated deposits at the PBRF.

Unconsolidated deposits consist mostly of glacial till that occurs as a thin veneer over the bedrock surface. The thickness of these materials at the PBRF is typically about 25 ft. Native surficial deposits at the PBRF have been extensively disturbed. Boring logs for the PBRF test borings and monitoring wells show that the unconsolidated deposits consist predominantly of cohesive soil, with some relatively thin, discontinuous granular units interbedded. The pro-glacial lacustrine depositional environment in which these deposits formed tends to homogenize the deposits through wave reworking. While localized lenses of granular materials do exist, it does not appear that these lenses are continuous across the site, and these units should not be considered to be indicative of the typical site stratigraphy.

The United States Department of Agriculture, Natural Resources Conservation Service (2002) has recently revised the Soil Survey of Erie County, Ohio. The soil within the 27-acre PBRF is mapped as Udorthents, disturbed soil that has been affected by construction activities. Review of the soils surrounding the PBRF provides insight regarding what was likely present prior to disturbance. The soils in the immediate vicinity of the PBRF consist of Colwood Loam, 0-1 percent slopes (CmA); Elnora loamy fine sand, 0-4 percent slopes (EnA); Gilford fine sandy loam, 0-1 percent slopes (GdA); Oakville loamy fine sand, 0-6 percent slopes (Oab), and Udorthents, loamy, 0-6 percent slopes (UdB). These undisturbed soils are composed of loam, loamy fine sand, fine sandy loam, and loamy fine sand, respectively.

The surficial soil at the PBRF has been extensively disturbed. In addition, the entire site was reportedly regraded to promote surface water to flow to the southeast corner of the PBRF. These excavation and grading activities have resulted in the entire PBRF being mapped by NRCS as Udorthents. Photographs during construction show stockpiled soil that was presumably used to backfill around the structures and to support the regrading activity. Therefore, it is likely that the surficial materials at the PBRF are a mixture of variable thickness composed of the entire section of unconsolidated deposits, which at depth predominantly consists of cohesive soils.

Hydraulic conductivity for the mixed unconsolidated deposits ranges from 49 to 270 meters/year (m/yr), gradient ranges from 0.005 to 0.006 ft/ft, and the porosity is expected to range from about 0.35 to 0.70 (Freeze and Cherry, 1979). The hydraulic conductivity of the Delaware Limestone ranges from 3 to 188 m/yr, and the gradient ranges from 0.002 to 0.003 ft/ft. The site-specific effective porosity of the Delaware Limestone has not been established. Therefore, a published value for limestone must be used to calculate groundwater flow velocity: 0.01 to 0.3 (Fetter, 1988).

All the other parameters used in the dose analysis were generic screening values or a most conservative value was chosen. These parameters were estimated based on NRC and DOE guidance for generic screening (i.e., the NUREG-1549 analysis and the RESRAD computer code) and are considered to be prudently conservative. Using a water table drop rate of 0 m/yr is also prudently conservative because it minimizes travel time through the unsaturated zone for the observed thickness of the zone. Using observed values for other site-specific parameters is reasonable because it is consistent with existing conditions and does not introduce a judgment bias that may be conservative or non-conservative depending on the intricacies of pathway analysis for individual radionuclides. Wherever possible, NRC-recommended parameter values were used unless site-specific data were available. In the absence of either site-specific and NRC-recommended values, RESRAD default values were used. The parameter values used in the analysis of the PBRF residential farmer scenario are presented in Tables 5-1 through 5-8. The generic values used for the most dose-sensitive parameter (i.e., the distribution coefficient), are relatively high. This results in retaining radionuclides in soil rather than removing them by groundwater, which produces conservative dose estimates through the external exposure pathway for the radionuclides controlling dose at the PBRF. The radiation dose limit and time for calculations are 25 mrem/yr and 1000 years, respectively, as specified in 10 CFR 20.1401 and 20.1402.

Table 5-1. Residential Farmer Scenario: Contaminated Zone Parameters

Parameter	Parameter Value	Source
Area of contaminated zone	109100 m ² for controlled area including: <ul style="list-style-type: none"> • 102400 m² for PBRF • 6700 m² for Pentolite Ditch 	Teledyne Isotopes, 1987.
Thickness of contaminated zone	1 m	Conservative thickness to maximize dose
Length parallel to aquifer flow	365 m	Teledyne Isotopes, 1987.
Radiation dose limit	25 mrem/yr	10 CFR 20.1402
Time since placement of material	0 years	Distribution coefficients available
Time for calculations	Through 1000 years	10 CFR 20.1402

Table 5-2. Resident Farmer Scenario: Cover and Contaminated Zone Hydrologic Data

Parameter	Parameter Value	Source
Density of contaminated zone	1.522 g/cm ³	Hydrogeologic Report PBRF, 2004. <i>Average value used unconsolidated deposits.</i>
Contaminated zone erosion rate	0.001 m/yr	RESRAD
Contaminated zone total porosity	0.45	Groundwater Hydrology and Hydraulics, 1977.
Contaminated zone field capacity	0.20	RESRAD
Contaminated zone hydraulic conductivity	270 m/yr	Hydrogeologic Report PBRF, 2004. <i>Most conservative value unconsolidated deposits.</i>
Contaminated zone b parameter	7.12	"Empirical Equations for Some Soil Hydraulic Properties", 1978. <i>Sandy clay loam</i>
Evapotranspiration coefficient	0.5	RESRAD
Precipitation	0.86 m/yr	National Climactic Data Center - Ohio
Irrigation	1.04 m/yr	NUREG 1549
Irrigation mode	Overhead	RESRAD
Runoff coefficient	0.3	Handbook on the Principles of Hydrology, 1970.
Watershed area for stream or pond	1 × 10 ⁶ m ²	RESRAD

Table 5-3. Residential Farmer Scenario: Saturated Zone Hydrologic Data

Parameter	Parameter Value	Source
Density of saturated zone	1.522 g/cm ³	Hydrogeologic Report PBRF, 2004. <i>Average value used unconsolidated deposits.</i>
Saturated zone total porosity	0.45	Groundwater Hydrology and Hydraulics, 1977.
Saturated zone effective porosity	0.20	Groundwater Hydrology and Hydraulics, 1977.
Saturated zone hydraulic conductivity	270 m/yr	Hydrogeologic Report PBRF, 2004. <i>Most conservative value unconsolidated deposits.</i>
Saturated zone hydraulic gradient	0.005 m/m	Hydrogeologic Report PBRF, 2004.
Saturated zone b parameter	NA	
Water table drop rate	0.0 m/yr.	Most conservative – minimizes transport time
Well pump intake depth	8 (m below water table)	Hydrogeologic Report PBRF, 2004
Mixing model	Nondispersion	RESRAD
Individual use of groundwater	118 m ³ /yr	NUREG 1549

Table 5-4. Residential Farmer Scenario: Uncontaminated and Unsaturated Zone Hydrologic Data

Parameter	Parameter Value	Source
Number of unsaturated zone strata	1	Hydrogeologic Report PBRF, 2004.
Unsaturated zone thickness	3.0 m	Hydrogeologic Report PBRF, 2004.
Unsaturated zone soil density	1.522 g/cm ³	Hydrogeologic Report PBRF, 2004. <i>Average value used unconsolidated deposits.</i>
Unsaturated zone total porosity	0.45	Groundwater Hydrology and Hydraulics, 1977.
Unsaturated zone effective porosity	0.20	Groundwater Hydrology and Hydraulics, 1977.
Unsaturated zone b parameter	7.12	“Empirical Equations for Some Soil Hydraulic Properties”, 1978. <i>Sandy clay loam</i>
Unsaturated zone hydraulic conductivity	270 m/yr	Hydrogeologic Report PBRF, 2004. <i>Most conservative value unconsolidated deposits.</i>

Table 5-5. Residential Farmer Scenario: Distribution Coefficients

Element	Parameter Value* (mL/g)
C	21
Fe	891
Co	1,000
Ni	37
Sr	32
Tc	7
Cs	447
Eu	955

* Source: NUREG-1549.

Table 5-6. Residential Farmer Scenario: Dust Inhalation and External Gamma Parameters

Parameter	Parameter Value	Source
Inhalation rate	8400 m ³ /yr	NUREG-1549 ^a
Mass loading for inhalation	6 × 10 ⁻⁶ g/m ³	NUREG-1549 ^b
Dilution length for airborne dust	3 m	RESRAD ^c
Exposure duration	365.25 days	NUREG-1549
Shielding factor, inhalation	0.40	RESRAD
Shielding factor, external gamma	0.47	NUREG-1549 ^d
Fraction of time indoors, onsite	0.66	NUREG-1549
Fraction of time outdoors, onsite	0.11	NUREG-1549
Shape factor, external gamma	1	RESRAD
Fraction of annular areas	0	RESRAD

a. NUREG-1549.

b. Activity and time average of NUREG-1549 values.

c. RESRAD.

d. Sum of the product of the means for the fraction of time and shielding factor for outdoor and indoor exposure.

Table 5-7. Residential Farmer Scenario: Ingestion Pathway, Data Dietary Parameters

Parameter	Parameter Value	Source
Fruit, vegetable, and grain consumption rate	78 kg/yr	NUREG-1549 ^{a,b}
Leafy vegetable consumption rate	15 kg/yr	NUREG-1549
Milk consumption	118 L/yr	NUREG-1549
Meat and poultry consumption	52 kg/yr	NUREG-1549 ^c
Fish consumption	16 kg/yr	NUREG-1549
Soil ingestion rate	18.3 g/yr	NUREG-1549
Drinking water intake	478 L/yr	NUREG-1549
Fraction of drinking water from site	1	RESRAD ^d
Fraction of aquatic load from site	0.5	RESRAD

- a. Sum of individual means for other vegetables, fruit, and grain.
- b. NUREG-1549.
- c. Sum of individual means for meat and poultry.
- d. RESRAD.

Table 5-8. Residential Farmer Scenario: Ingestion Pathway Data, Nondietary Parameters

Parameter	Parameter Value	Source
Livestock fodder intake for meat	8.5 kg/day	NUREG-1549 ^a
Livestock fodder intake for milk	17 kg/day	NUREG-1549 ^b
Livestock water intake for meat	50 L/day	RESRAD ^c
Livestock water intake for milk	160 L/day	RESRAD
Livestock soil intake	0.5 kg/day	RESRAD
Mass loading for foliar deposition	4×10^{-4} g/m ³	NUREG-1549 ^d
Depth of soil mixing layer	0.15 m	NUREG-1549
Depth of roots	0.9 m	RESRAD
Drinking water fraction from groundwater	1	RESRAD
Livestock water fraction from groundwater	1	NUREG-1549
Irrigation fraction from groundwater	1	RESRAD

- a. NUREG-1549.
- b. Sum of individual medians for forage, hay, and grain.
- c. RESRAD.
- d. Value for gardening.

The parameters identified in Tables 5-1 through 5-8 were used in the RESRAD code to determine the corresponding radionuclides concentrations in soil (i.e., DCGLs). Table 5-9 presents the DCGLs for the significant radionuclides present at PBRF (i.e., radionuclides that in total represent more than 90% of the dose at PBRF) that would result in an annual TEDE of 25 mrem to a residential farmer.

Table 5-9. DCGLs for Surface Soils

Radionuclide	Site-Specific DCGL ^a (pCi/g)
Co-60	3.8
Sr-90	5.4
Cs-137	14.7

a. Calculated by RESRAD using the parameters specified in Tables 5-1 through 5-8.

5.2 Residual Contamination in Buildings

The PBRF buildings that were largely uncontaminated by past operations will be demolished during decommissioning and be used as clean, hard fill to backfill the subsurface structures. The PBRF buildings having residual contamination will be decontaminated, surveyed, and demolished. The FSS survey will determine that the buildings meet the criteria for unrestricted release. After a survey of the subsurface structures demonstrates that these areas are suitable for free release, the demolition debris will be placed in the below grade cavities of the buildings. The building reuse scenario was used to develop DCGLs supporting release of PBRF buildings, such as the Reactor Office and Laboratory Building (Building 1141), which is known to have low levels of residual contamination.

In the building reuse scenario, residual contamination is assumed to be located on building surfaces (i.e., walls, floors, and ceilings). Exposure modes include direct external exposure, inhalation, and ingestion. Because radium contamination is not expected based on historical data or survey measurements, the radon pathway is not included in the calculation of DCGLs for the building reuse scenario.

To analyze residual contamination in PBRF buildings, a site-specific analysis was conducted using RESRAD-BUILD 3.22. The RESRAD-BUILD parameters were selected in accordance with the methods recommended in NUREG-1757 Vol. 2. The parameters were categorized as behavioral, metabolic, or physical. The behavioral and metabolic parameters selected were the default values from NUREG-5512, Vol. 3 or the NRC screening code DandD 2.1.0. Because of differences between the RESRAD-BUILD and NUREG-5512 dose assessment models, some parameters required by the RESRAD-BUILD code are not provided in NUREG-5512 Vol. 3. The RESRAD-BUILD specific parameters were derived from NUREG/CR-6697. The average or most likely value was selected to represent the average member of the critical group.

Physical parameters that were not site specific, such as the assumed room dimensions, or selected to be consistent with NUREG/CR-5512 model assumptions (such as evaluating one room for the building occupancy scenario) were selected to be conservative. Physical parameters that did not have a clearly conservative value were evaluated using the probabilistic module of RESRAD-BUILD to determine whether the dose was sensitive to the parameter. The only parameter requiring a sensitivity analysis was the "Lifetime or Time of Source Removal" (Source Lifetime). This represents the time over which surface contamination is removed.

The default parameter distribution function (PDF) from NUREG/CR-6697, Attachment C, Section 8.8, was used for the sensitivity analysis of the Source Lifetime parameter. The PDF was a triangular distribution defined by a 1000 day minimum, 100,000 day maximum, and 10,000 day most likely value. The RESRAD-BUILD output for the Partial Rank Correlation Coefficient (PRCC) was used to evaluate the sensitivity of dose to the parameter. The PRCC is one of the recommended methods in NUREG-1757 Section I.7.5. In addition, precedence has been set for the use of PRCC in other previously submitted and approved decommissioning plans. If the PRCC exceeded the absolute value of 0.10, then the dose was considered sensitive to the parameter and either the 25th or 75th quantile of the PDF was selected as the deterministic parameter. The 25th quantile was used if the dose was negatively correlated, i.e., dose increased as the parameter decreased. The 75th quantile was used if the dose was positively correlated, i.e., dose increased as the parameter increased. A negative correlation was indicated by a negative PRCC result and a positive correlation by a positive PRCC. The 25th quantile for source lifetime was 18,200 days and the 75th quantile was 52,700 days. All of the nuclides were sensitive to the Source Lifetime parameter. Table 5-10 lists the nuclides according to whether the dose was positively or negatively correlated. In general, a nuclide was positively correlated if the primary dose pathway was direct radiation and negatively correlated if the direct radiation dose was not significant.

Table 5-10. Results of Sensitivity Analysis for Source Lifetime Parameter

Positive PRCC 75 th Quantile	Negative PRCC 25 th Quantile
C-14	Fe-55
Co-60	Ni-59
Cs-137	Ni-63
Eu-152	Sr-90
Eu-154	Tc-99
I-129	H-3
Nb-94	Pu-241
	Pu-238
	Cm-243
	Am-241
	Eu-155
	Pu-239
	U-234
	U-235
	U-236
	U-238

Table 5-11 lists all of the parameters used in the site-specific RESRAD-BUILD analysis and provides the reference and justification as appropriate. The room dimensions of 15 m [49 ft] long, 5 m [16 ft] wide, and 3 m [10 ft] high represent the largest room expected to have residual contamination and is considered prudently conservative since it maximizes direct radiation from the floor and the largest wall because of the relative narrowness of the room. The bases provided in Table 5-11 for the parameter selections are self-explanatory with one exception, i.e., Direct Ingestion.

The Direct Ingestion parameter of $4.07\text{E-}07 \text{ hr}^{-1}$ was selected to ensure consistency with the NRC recommended Effective Transfer Rate for Ingestion provided in NUREG/CR-5512 Vol. 3, Section 5.2.3. The recommended Effective Transfer Rate is $1.1\text{E-}04 \text{ m}^2/\text{h}$ and applies to loose source surface contamination. RESRAD-BUILD does not have a direct analogy to the Effective Transfer Rate from the source. However, the Direct Ingestion parameter can be modified to result in the same ingestion intake as would occur using the NUREG/CR-5512 model and the Effective Transfer rate. This is accomplished by dividing the $1.1\text{E-}04 \text{ m}^2/\text{h}$ value by the total source area for the room, i.e., 270 m^2 . RESRAD-BUILD calculates the ingestion intake for each of the six sources (4 walls, floor, and ceiling) by calculating the total inventory (activity/area multiplied by the area) of each source and then multiplying by the Direct Ingestion parameter. The $4.07\text{E-}07 \text{ hr}^{-1}$ parameter will result in an ingestion rate equal to $1.1\text{E-}04 \text{ m}^2/\text{hr}$ when the results of all six sources are summed.

The RESRAD-BUILD dose assessment results are provided as Addendum 2. The results are in three reports; the first contains the nuclides requiring a Source Lifetime parameter of 52,700 days, the second those requiring a Source Lifetime of 18,200 days, and a third containing the results for H-3. The DCGLs were calculated by dividing the 25 mrem/yr criteria by the nuclide specific unitized dose factors. The term unitized dose factor was used because the source term was $1 \text{ dpm}/100 \text{ cm}^2$ for each radionuclide. Table 5-12 provides the DCGLs for the Building Reuse scenario.

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Table 5-11. Building Reuse Scenario: Parameter Values

No	Parameter (unit)	Type*	Value/Distribution	Source	Comments/Justification
1	Exposure duration (days)	B	365.25	NUREG/CR-5512, V3 S5.2.1	Accounts for leap year
2	Indoor fraction	B	0.267	NUREG/CR-5512, V3 S5.2.2	Equal to 97.5 day/year, or 45 hour/week; average value
3	Evaluation time (year)	P	0		
4	Number of rooms	P	1	NUREG/CR-5512, V1	Building occupancy scenario assumes only one contaminated room
5	Deposition velocity (m/sec)	P	2.7E-06	NUREG/CR-6697, C, 7.5	Minimum value selected to maximize airborne concentration
6	Resuspension Rate (sec ⁻¹)	P	1.4E-05	NUREG/CR-6697, C, 7.2	Maximum value selected to maximize airborne concentration
7	Air exchange rate for building and room (hr ⁻¹)	B	0.8	NUREG/CR-6697, C, 7.4	Most likely value
8	Room area (m ²)	P	75	Site-specific model	Largest unit expected at PBRF
9	Room height (m)	P	3	Site-specific model	Largest unit expected at PBRF
10	Time fraction	B	1.0	NUREG/CR-5512, V1	Building occupancy scenario assumes all time is spent at one receptor location
11	Breathing rate (m ³ /day)	B	33.6	NUREG/CR-5512, V3 S5.3	Equal to 1.4 m ³ /hr which is median value and DandD V2.1 default
12	Indirect ingestion rate (m ² /hr)	B	0.00E+00	NUREG/CR-5512, V3 S5.2.3	Indirect ingestion not modeled in building occupancy scenario
13	Receptor location: x,y,z (m)	B	7.5, 2.5, 1	Site-specific model	Occupant located at center of room area with exposure at 1m height
14	Shielding thickness (cm)	P	0	Site-specific model	No shielding is assumed
15	Shielding density (g/cc)	P	0	Site-specific model	No shielding is assumed
16	Shielding material	P	None	Site-specific model	No shielding is assumed
17	Number of sources	P	6	Site-specific model	All room surfaces assumed to be equally and uniformly contaminated
18	External dose conversion factor (mrem/yr)/(pCi/m ²)	M	RESRAD-BUILD defaults	FGR 12	
19	Air submersion dose conversion factor ((mrem/yr)/(pCi/m ³))	M	RESRAD-BUILD defaults	FGR 12	
20	Inhalation dose conversion factors (mrem/pCi)	M	RESRAD-BUILD defaults	FGR 11	
21	Ingestion dose conversion factors (mrem/pCi)	M	RESRAD-BUILD defaults	FGR 11	
22	Wall Area	P	Area	Site-specific model	
23	Direction	P	X	Site-specific model	
24	Location of center of source: x,y,z (m)	P	0, 2.5, 1.5	Site-specific model	
25	Area (m ²)	P	15	Site-specific model	Wall area is 5 m by 3 m
26	Air fraction for H-3	B	1.00	NUREG/CR-6697, C, 8.6	Recommended value for gaseous form of H-3
	Air fraction (for all radionuclides except H-3)	B	0.07	NUREG/CR-6697, C, 8.6	Upper bound for contaminated noncombustible solids
27	Direct ingestion (hr ⁻¹)	B	4.07E-07	NUREG/CR-5512, V3 S5.2.3	Equal to 1.1E-4 m ² /hr divided by total source area of 270 m ²
28	Removable fraction	P	0.1	NUREG-1757, V2 SI.6.3.1	Default parameter value for loose fraction from DandD 2.1
29	Lifetime or time for source removal (days)	P	Nuclide Specific	NUREG/CR-6697, C, 8.8	
30	Radionuclide Concentration (pCi/m ²)	P	45	Site-specific model	Initial concentration is unit source of 1 dpm/100 cm ² to allow for

No	Parameter (unit)	Type ^a	Value/Distribution	Source	Comments/Justification
proportional DCGL calculation					
2. Wall					
31		P	Area	Site-specific model	
32	Direction	P	X	Site-specific model	
33	Location of center of source: x,y,z (m)	P	15, 2.5, 1.5	Site-specific model	
34	Area (m ²)	P	15	Site-specific model	Wall is 5 m by 3 m
35	Air fraction for H-3	B	1.00	NUREG/CR-6697, C, 8.6	Recommended value for gaseous form of H-3
	Air fraction (for all radionuclides except H-3)	B	0.07	NUREG/CR-6697, C, 8.6	Upper bound for contaminated noncombustible solids
36	Direct ingestion (hr ⁻¹)	B	4.07E-07	NUREG/CR-5512, V3 S5.2.3	Equal to 1.1E-4 m ² /hr divided by total source area of 270 m ²
37	Removable fraction	P	0.1	NUREG-1757, V2 SI.6.3.1	Default parameter value for loose fraction from DandD 2.1
38	Lifetime or time for source removal (days)	P	Nuclide Specific	NUREG/CR-6697, C, 8.8	
39	Radionuclide Concentration (pCi/m ³)	P	45	Site-specific model	Initial concentration is unit source to allow for proportional DCGL calculation
3. Wall					
40	Type	P	Area	Site-specific model	
41	Direction	P	Y	Site-specific model	
42	Location of center of source: x,y,z (m)	P	7.5, 0, 1.5	Site-specific model	
43	Area (m ²)	P	45	Site-specific model	Wall area is 15 m by 3 m
44	Air fraction for H-3	B	1.00	NUREG/CR-6697, C, 8.6	Recommended value for gaseous form of H-3
	Air fraction (for all radionuclides except H-3)	B	0.07	NUREG/CR-6697, C, 8.6	Upper bound for contaminated noncombustible solids
45	Direct ingestion (hr ⁻¹)	B	4.07E-07	NUREG/CR-5512, V3 S5.2.3	Equal to 1.1E-4 m ² /hr divided by total source area of 270 m ²
46	Removable fraction	P	0.1	NUREG-1757, V2 SI.6.3.1	Default parameter value for loose fraction from DandD 2.1
47	Lifetime or time for source removal (days)	P	Nuclide Specific	NUREG/CR-6697, C, 8.8	
48	Radionuclide Concentration (pCi/m ³)	P	45	Site-specific model	Initial concentration is unit source to allow for proportional DCGL calculation
4. Wall					
49	Type	P	Area	Site-specific model	
50	Direction	P	Y	Site-specific model	
51	Location of center of source: x,y,z (m)	P	7.5, 5, 1.5	Site-specific model	
52	Area (m ²)	P	45	Site-specific model	Wall area is 15 m by 3 m
53	Air fraction for H-3	B	1.00	NUREG/CR-6697, C, 8.6	Recommended value for gaseous form of H-3
	Air fraction (for all radionuclides except H-3)	B	0.07	NUREG/CR-6697, C, 8.6	Upper bound for contaminated noncombustible solids
54	Direct ingestion (hr ⁻¹)	B	4.07E-07	NUREG/CR-5512, V3 S5.2.3	Equal to 1.1E-4 m ² /hr divided by total source area of 270 m ²
55	Removable fraction	P	0.1	NUREG-1757, V2 SI.6.3.1	Default parameter value for loose fraction from DandD 2.1
56	Lifetime or time for source removal (days)	P	Nuclide Specific	NUREG/CR-6697, C, 8.8	
57	Radionuclide Concentration (pCi/m ³)	P	45	Site-specific model	Initial concentration is unit source to allow for proportional DCGL calculation
5. Floor					
58	Type	P	Area	Site-specific model	

No	Parameter (unit)	Type ^a	Value/Distribution	Source	Comments/Justification
59	Direction	P	Z	Site-specific model	
60	Location of center of source: x,y,z (m)	P	7.5, 2.5, 0	Site-specific model	
61	Area (m ²)	P	75	Site-specific model	Floor area is 5 m by 15 m
62	Air fraction for H-3	B	1.00	NUREG/CR-6697, C, 8.6	Recommended value for gaseous form of H-3
	Air fraction (for all radionuclides except H-3)	B	0.07	NUREG/CR-6697, C, 8.6	Upper bound for contaminated noncombustible solids
63	Direct Ingestion (hr ⁻¹)	B	4.07E-07	NUREG/CR-5512, V3 S5.2.3	Equal to 1.1E-4 m ² /hr divided by total source area of 270 m ²
64	Removable fraction	P	0.1	NUREG-1757, V2 SI.6.3.1	Default parameter value for loose fraction from DandD 2.1
65	Lifetime or time for source removal (days)	P	Nuclide Specific	NUREG/CR-6697, C, 8.8	
66	Radionuclide Concentration (pCi/m ²)	P	45	Site-specific model	Initial concentration is unit source to allow for proportional DCGL calculation
6: Ceiling					
67	Type	P	Area	Site-specific model	
68	Direction	P	Z	Site-specific model	
69	Location of center of source: x,y,z (m)	P	7.5, 2.5, 3	Site-specific model	
70	Area (m ²)	P	75	Site-specific model	Ceiling area is 15 m by 5 m
71	Air fraction for H-3	B	1.00	NUREG/CR-6697, C, 8.6	Recommended value for gaseous form of H-3
	Air fraction (for all radionuclides except H-3)	B	0.07	NUREG/CR-6697, C, 8.6	Upper bound for contaminated noncombustible solids
72	Direct Ingestion (hr ⁻¹)	B	4.07E-07	NUREG/CR-5512, V3 S5.2.3	Equal to 1.1E-4 m ² /hr divided by total source area of 270 m ²
73	Removable fraction	P	0.1	NUREG-1757, V2 SI.6.3.1	Default parameter value for loose fraction from DandD 2.1
74	Lifetime or time for source removal (days)	P	Nuclide Specific	NUREG/CR-6697, C, 8.8	
75	Radionuclide Concentration (pCi/m ²)	P	45	Site-specific model	Initial concentration is unit source to allow for proportional DCGL calculation

Notes:

^a P = physical, B = behavioral, M = metabolic; [NUREG/CR-6676, App. B, Table B.3]

Table 5-12. DCGLs for Building Reuse Scenario

Radionuclide	DCGL (dpm/100 cm ²)
C-14	1.0E+07
Fe-55	4.0E+07
Co-60	11,000
Ni-59	9.9E+07
Ni-63	3.6E+07
Sr-90	136,200
Tc-99	1.4E+07
Cs-137	40,500
Eu-152	24,300
Eu-154	4500
H-3	3.2E+08
Pu-241	228,000
Pu-238	4900
Cm-243/244	6100
Am-241	4300
Eu-155	395,000
I-129	67,800
Nb-94	15,800
Pu-239	4400
U-234	31,500
U-235	27,100
U-236	33,200
U-238	32,900

5.3 Residual Contamination in Subsurface Structures

Decontamination and decommissioning of below grade PBRF structures (e.g., the Reactor Building [Building 1111]) will include decontamination of surfaces to building reuse DCGLs and offsite disposal of decontamination waste, removing decontaminated above grade and below grade structures down to 1 m (3 ft) below grade, backfilling belowground cavities with rubble generated from demolishing decontaminated above grade and below grade structures, and installing a cover over the backfilled area.

Residual activity in the belowground portions of the various structures could be from several sources: in crushed concrete from aboveground structures, in remaining portions of the biological shield, on the surfaces of the canals and quadrants.

The resident farmer scenario was used for the Subsurface Structure dose assessment. RESRAD 6.21 was used for the assessment with certain parameter modifications, as listed below, to model the source in the saturated zone. The area used in the dose assessment was a 70-m (230-ft) cylinder (the approximate diameter of the subsurface structures), which extended vertically downward a distance of 3 m (10 ft) placing the contaminated zone directly on top of the saturated zone. The thickness of the contaminated zone is taken as 3 m (10 ft) to maximize dose through the external exposure and crop pathways. The well could be conceptualized as either in the center of the contaminated zone or located on the down gradient edge of the 70-m (230 ft.) diameter cylinder because the mass balance (MB) water transport model was used. The MB model eliminates the inappropriate dilution found in the Non-Dispersion Model that does not apply to the saturated zone equilibrium assumption of the Subsurface Structure fill model. Note that the hydrological parameters used were those provided in the Decommissioning Plan, which in some cases differ slightly from the final parameters listed in Tables 5-1 through 5-3. However, these parameters have no effect on the resulting water concentrations from the Subsurface Structure model because the model was designed to simulate concrete in an equilibrium saturated condition and not flow through an unsaturated contaminated zone.

The dose assessment and DCGL development for the Subsurface Structure scenario was performed using RESRAD 6.21 and the deterministic parameters from the surface soil scenario with seven changes as listed below. The unsaturated zone depth, time since material placement, and contaminated zone hydraulic conductivity parameters were selected to allow RESRAD to model a saturated condition.

1. MB water transport model used,
2. unsaturated zone depth 0 m,
3. contaminated zone 3 m,
4. contaminated zone area 3850 m²,
5. time since material placement 1 yr,
6. contaminated zone hydraulic conductivity 0.86 m/y, and
7. concrete K_{ds} used in place of soil K_{ds} .

A dose assessment was also performed assuming a 1m cover is in place, which is the actual planned end state for the site. The "no cover" condition was assumed to be conservative for all radionuclides. The 1m cover analysis was performed to ensure that this assumption was correct. As shown in Table 5-14, the 1m cover assumption results in a lower DCGL for one radionuclide, i.e., H-3.

Concrete K_d s were used to model the concrete debris to be placed in the subsurface structures. Table 5-13 provides the range of concrete K_d s for the each of the radionuclides that were reported as above detection limits in smear samples of PBRF concrete and represent greater than 0.05% of the smear radionuclide mixture. The final list of radionuclides considered for FSS will include only those radionuclides considered significant per NUREG-1757, Vol. 3.

The K_d ranges were derived from the following three references:

1. Krupka, K.M., and R.J. Serne. 1998. *Effects on Radionuclide Concentrations by Cement/Groundwater Interactions in Support of Performance Assessment of Low-Level Radioactive Waste Disposal Facilities*. NUREG/CR-6377 (PNL-11408).
2. Mattigod, S.V., et. al., 2002. *Radionuclide Desorption and Leaching Tests for Concrete Cores from Haddam Neck Nuclear Plant Facilities*. Final Letter Report, Battelle, Pacific Northwest Laboratory.
3. Fuhrmann, M., Sullivan, T, 1999. *Leaching and Sorption of Radionuclides: Structural Concrete from Maine Yankee Nuclear Power Station*. Final Letter Report, Brookhaven National Laboratory.

K_d parameter distribution functions (PDFs) were developed for each radionuclide based on the range of potential values. Table 5-13 provides the PDFs and defining numerical parameters. NUREG/CR-6697, Appendix A states that the uniform or loguniform distribution is useful if little is known about the distribution except the minimum and maximum, which is the condition arising from compiling the data from the above references. The loguniform is more appropriate when there is a wide range between the minimum and maximum. Accordingly, the loguniform PDF was selected if the range exceeded a factor of 10. Otherwise, the uniform distribution was used. The three exceptions were Sr-90, Cs-137, and Tc-99. Because the K_d ranges were numerically low, i.e., 10, 18, and 21 for Sr-90, Cs-137, and Tc-99, respectively, the uniform distribution was used.

Consistent with the recommendations in NUREG-1757, Vol. 2, an uncertainty analysis was performed to determine if the calculated dose was sensitive to the concrete K_d . The uncertainty analysis was performed using the probabilistic module of RESRAD 6.21 with radionuclide specific PDFs. The RESRAD output report of the Partial Rank Correlation Coefficient (PRCC) for the peak of the mean dose was reviewed. A decision criterion of the absolute value of 0.25 was selected for the PRCC test. The 0.1 and 0.25 values were found acceptable by the NRC through the approval of the Connecticut Yankee License Termination Plan (LTP). The results showed that the PRCC was less than -0.25 for all radionuclides indicating that the parameter was sensitive and the dose negatively correlated to the K_d (i.e., the dose went up as the K_d went down). Because the dose was negatively correlated, the 25th quantile value of each PDF was used as the deterministic K_d parameter in the subsurface structure dose model. See Table 5-13 for the 25th quantile K_d values.

The dose assessment was performed with and without a 1 meter cover. As expected, the dose was higher with no cover with the exception of H-3 where the dose was higher with the cover in place. This is due to the unique characteristics of H-3 and the corresponding unique RESRAD environmental transport model. The highest H-3 dose was used for the PBRF DCGL calculation as shown in Table 5-14, Column 4.

Addendum 3 contains the RESRAD output report for the Subsurface Structure dose assessment. Page 21 of the RESRAD output report contains the maximum dose results (at $t = 0y$). The RESRAD output report also contains the RESRAD dose results for the evaluation with 1 m cover at the time of maximum dose ($t = 0y$).

Table 5-13. Concrete K_d s (ml/g) for Subsurface Structure Model Dose Assessment

Radionuclide	Literature ¹	CY ²	Maine ³	Plum Brook K_d PDF	25 th Quantile K_d
C	10 - 500			10 - 500 Loguniform ⁴	26
Fe	10 - 100	7 - 18		7 - 100 Loguniform	13
Co	10 - 100	180 - 32500		10 - 100 Loguniform	17
Ni	10 - 100	10 - 61		10 - 100 Uniform ⁵	32
Sr	1 - 3	10 - 11 ¹	0.7 - 1.3	1 - 11 Uniform	3.5
Tc	0 - 100	6 - 21		0 - 21 Uniform	5.2
Cs	2 - 20	34 - 26800	2.9 - 3.3	2 - 20 Uniform	6.5
Eu	200 - 1000			200 - 1000 Uniform	400
Pu	500 - 5000			500 - 5000 Uniform	1625
Cm	200 - 1000			200 - 1000 Uniform	400
Am	200 - 5000	>230 - >1750		200 - 5000 Loguniform	445
I	1 - 10			1 - 10 Uniform	3.2
Nb	100 - 1000			100 - 1000 Uniform	325
U	100 - 2000			100 - 2000 Loguniform	212

Footnotes:

1. Krupka 1998 and Bradbury 1998
2. Mattigod 2002
3. Fuhrman 1999
4. Minimum and maximum values of distribution
5. Minimum and maximum of distribution

¹ CY K_d value for Sr-90 was confirmed by an independent review by Brookhaven National Laboratory

The DCGL calculation was performed by dividing 25 mrem/y by the unitized dose factors from the RESRAD output report (and the corresponding output page for the 1 m cover evaluation). The term unitized dose factor is used because the source term was 1 pCi/g for each radionuclide. The DCGLs are listed in Table 5-14. The radionuclides listed in Table 5-14 represent all radionuclides that were reported as above detection limits in smear samples of PBRF concrete.

The final list of radionuclides considered for FSS will include only those that are considered significant per NUREG-1757, Vol. 3.

Table 5-14. DCGLs for Subsurface Structures

Radionuclide	DCGL No Cover (pCi/g)	DCGL 1 m Cover (pCi/g)	PBRF DCGL (pCi/g)
C-14	17	85	17
Fe-55	685	691	685
Co-60	3.3	17	3.3
Ni-59	2134	2,495	2134
Ni-63	779	911	779
Sr-90	0.6	0.7	0.6
Tc-99	25	87	25
Cs-137	2.2	2.6	2.2
Eu-152	9.4	2,074	9.4
Eu-154	8.6	1,426	8.6
H-3	357	166	166
Pu-241	472	552	472
Pu-238	13	17	13
Cm-243/244	4.8	5.3	4.8
Am-241	3.8	4.0	3.8
Eu-155	354	9,184	354
I-129	0.27	0.27	0.27
Nb-94	6.6	1,504	6.6
Pu-239	12	15	12
U-234	22	24	22
U-235	18	25	18
U-236	23	25	23
U-238	22	25	22

The last step in the subsurface structure DCGL calculation is the conversion of the pCi/g volumetric DCGL_V to an Effective Surface DCGL (DCGL_{ES}). This allows the FSS to be performed using surface activity measurements and the inclusion of the source term that is present on the subsurface structure surfaces.

The DCGL_{ES} is calculated using the following basic relationship:

$$\text{DCGL}_V (\text{pCi/g}) = \text{Radionuclide Inventory} / \text{Concrete Debris Mass}$$

Where:

$$\text{Inventory} = (\text{SA m}^2)(10,000 \text{ cm}^2/\text{m}^2)(\text{DCGL}_{\text{ES}} \text{ dpm}/100 \text{ cm}^2)(1 \text{ pCi}/2.22 \text{ dpm})$$

$$\text{Concrete Debris Mass} = (\text{V m}^3)(1\text{E}+06 \text{ cm}^3/\text{m}^3)(1-\eta)(2.4 \text{ g}/\text{cm}^3)$$

SA = Structure surface area requiring FSS (internal surfaces above and below grade) (m²)

η = porosity (0.41)

V = Volume of fill required (m³)

Combining conversion factors and rearranging terms results on the following equation for calculating the DCGL_{ES}:

$$\text{DCGL}_{\text{ES}} \text{ dpm}/100 \text{ cm}^2 = 31,435 (\text{DCGL}_V \text{ pCi/g}) (\text{V m}^3/\text{SA m}^2)$$

The vast majority of the structure contamination is in the Reactor Building (1111), Reactor Hot Lab (1112), Reactor Primary Pump House (1134), and Reactor Office and Lab Building (1141). These buildings are essentially connected and during demolition the debris from these structures will be expected to mix together. Because of the aforementioned, the V/SA ratio will be based on an average of these four buildings. The DCGL_{ES} values calculated using this V/SA ratio will conservatively apply to all subsurface structures. The result is conservative because it is very unlikely the actual inventory of residual radioactivity remaining on any structure surfaces will approach the calculated inventory assuming uniform contamination at the DCGL_{ES} level. This ensures with high confidence that the Subsurface Structure volumetric DCGL will not be exceeded. The V/SA ratios are listed in Table 5-15.

Table 5-15. Structure V/SA ratios

Structure	V/SA Ratio (m^3/m^2)
Reactor Building (1111)	2.91
Hot Laboratory Building (1112)	1.19
Primary Pump House (1134)	1.27
Reactor Office and Laboratory Building (1141)	1.65
Average	1.76

Table 5-16 lists the DCGL_{ES} and the Building Reuse DCGL values for each radionuclide that was reported as above detection limits in smear samples of PBRF concrete. The final list of radionuclides considered for FSS will include only those that have a significant dose per NUREG-1757, Vol. 3.

The DCGL_{ES} values were compared to the Building Reuse DCGL s and the more conservative of the two values designated as DCGL_{FSS} as shown in Column 4 of Table 5-16. The DCGL_{FSS} is the surface activity level that will be used during FSS to determine compliance with the 25 mrem/yr unrestricted use criteria.

The use of the DCGL_{FSS} value is a conservative approach when the DCGL_{ES} is limiting because the radionuclide inventory expected to actually be present on building surfaces at the time of demolition is much lower than that used in either the DCGL or the DCGL_{ES} calculations, which assume uniform contamination at either level.

If deemed necessary, the Building Reuse DCGL s could be applied for radionuclides where the DCGL_{ES} is limiting. This would require a separate calculation to be performed, based on actual FSS measurement results, to confirm that the radionuclide specific inventory divided by the fill volume is less than the Subsurface Structure volumetric DCGL . For the four structures listed in Table 5-15, this confirmation would be based on the average residual surface radioactivity level in the four structures (and the combined subsurface structure volumes). For all other structures the confirmation would be structure specific.

Table 5-16. Building Reuse DCGLs, Subsurface Structure Effective Surface DCGLs, and DCGL_{FSS} Values

Radionuclide	Building Reuse DCGL (dpm/100 cm ²) (from Table 5-12)	Subsurface Structure Effective Surface DCGL _{ES} (dpm/100 cm ²)	DCGL _{FSS} (dpm/100 cm ²)
C-14	1.0E+07	940,500	940,500
Fe-55	4.0E+07	3.7E+07	3.7E+07
Co-60	11,000	182,500	11,000
Ni-59	9.9E+07	8.0E+07	8.0E+07
Ni-63	3.6E+07	4.3E+07	3.6E+07
Sr-90	136,200	33,100	33,100
Tc-99	1.4E+07	1.3E+06	1.3E+06
Cs-137	40,500	121,700	40,500
Eu-152	24,300	520,000	24,300
Eu-154	4,500	475,800	4,500
H-3	3.2E+08	9.1E+06	9.1E+06
Pu-241	228,000	2.6E+07	228,000
Pu-238	4,900	719,200	4,900
Cm-243/244	6,100	265,500	6,100
Am-241	4,300	210,200	4,300
Eu-155	395,000	1.9E+07	395,000
I-129	67,800	14,900	14,900
Nb-94	15,800	365,100	15,800
Pu-239	4,400	663,900	4,400
U-234	31,500	1.2E+06	31,500
U-235	27,100	995,800	27,100
U-236	33,200	1.2E+06	33,200
U-238	32,900	1.2E+06	32,900

6.0 Area Factors

Area factors (AFs) were developed for the Surface Soil and Building Reuse scenarios. The Building Reuse AFs also apply to the Subsurface Structure DCGL_{ES} values. The AFs were calculated using Co-60 to ensure the values are conservative for all radionuclides. The AF for the direct exposure pathway is lower than that for the ingestion and inhalation pathways and Co-60 generates the highest direct exposure per pCi/g.

The AFs for Surface Soil were calculated by first running the RESRAD code with the Surface Soil parameters and a source area of 2000 m². The 2,000 m² source area was selected since this is the maximum survey unit size for a Class 1 area. RESRAD was then run using source areas ranging from 1 m² to 250 m² to represent the elevated area sizes. RESRAD dose reports used for the calculations are included as part of this document. The AFs were calculated by dividing the dose result for the 2,000 m² source area by the dose results for the smaller elevated areas. The Surface Soil AFs are shown in Table 6-1.

The AFs for Building Reuse were calculated in an analogous manner except that an initial source area of 75 m² was selected to represent the floor area for the room size used in the RESRAD-BUILD modeling for the Building Reuse scenario. The elevated areas evaluated ranged from 0.25 m² to 50 m². The RESRAD-BUILD dose reports used for the calculations are included as Addendum 4. The Building Reuse AFs are listed in Table 6-2.

Table 6-1. Surface Soil Area Factors

Elevated Area (m²)	1	2	3	5	10	15	25	100	250	2000
Area Factor	10.4	6.2	4.7	3.4	2.3	1.9	1.6	1.2	1.1	1

Table 6-2 Building Reuse Area Factors

Elevated Area (m²)	0.25	0.50	1	2	4	6	8	10	15	25	50	75
Area Factor	40.2	20.8	11.1	6.2	3.6	2.8	2.4	2.1	1.7	1.4	1.1	1

7.0 Addendums

Addendum 1 - RESRAD Reports for Surface Soil Scenario Dose Assessment

Addendum 2 - RESRAD-BUILD Reports for Building Reuse Scenario Dose Assessment

Addendum 3 - RESRAD Reports for Subsurface Structure Scenario Dose Assessment

Addendum 4 - RESRAD and RESRAD-BUILD Reports for Area Factor Calculations

**Final Status Survey Plan
for the
Plum Brook Reactor Facility**

Attachment B

**Approach and Basis for Development of Site-Specific Derived
Concentration Guideline Levels (DCGL)**

Addendum 1

**RESRAD Reports for
Surface Soil Scenario Dose Assessment
(55 Pages)**

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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	Co-60	2.190E-04	2.190E-04	DCF2(1)
B-1	Cs-137+D	3.190E-05	3.190E-05	DCF2(2)
B-1	Eu-152	2.210E-04	2.210E-04	DCF2(3)
B-1	Eu-154	2.860E-04	2.860E-04	DCF2(5)
B-1	Fe-55	2.690E-06	2.690E-06	DCF2(6)
B-1	Gd-152	2.430E-01	2.430E-01	DCF2(7)
B-1	Ni-59	2.700E-06	2.700E-06	DCF2(8)
B-1	Ni-63	6.290E-06	6.290E-06	DCF2(9)
B-1	Sr-90+D	1.310E-03	1.310E-03	DCF2(10)
B-1	Tc-99	8.330E-06	8.330E-06	DCF2(11)
D-1	Dose Conversion factors for ingestion, mrem/pCi:			
D-1	Co-60	2.690E-05	2.690E-05	DCF3(1)
D-1	Cs-137+D	5.000E-05	5.000E-05	DCF3(2)
D-1	Eu-152	6.480E-06	6.480E-06	DCF3(3)
D-1	Eu-154	9.550E-06	9.550E-06	DCF3(5)
D-1	Fe-55	6.070E-07	6.070E-07	DCF3(6)
D-1	Gd-152	1.610E-04	1.610E-04	DCF3(7)
D-1	Ni-59	2.100E-07	2.100E-07	DCF3(8)
D-1	Ni-63	5.770E-07	5.770E-07	DCF3(9)
D-1	Sr-90+D	1.530E-04	1.530E-04	DCF3(10)
D-1	Tc-99	1.460E-06	1.460E-06	DCF3(11)
D-34	Food transfer factors:			
D-34	Co-60 , plant/soil concentration ratio, dimensionless	8.000E-02	8.000E-02	RTF(1,1)
D-34	Co-60 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-02	2.000E-02	RTF(1,2)
D-34	Co-60 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(1,3)
D-34	Cs-137+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Cs-137+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-02	3.000E-02	RTF(2,2)
D-34	Cs-137+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	8.000E-03	8.000E-03	RTF(2,3)
D-34	Eu-152 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(3,1)
D-34	Eu-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(3,2)
D-34	Eu-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(3,3)
D-34	Eu-154 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(5,1)
D-34	Eu-154 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(5,2)
D-34	Eu-154 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(5,3)
D-34	Fe-55 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Fe-55 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-02	2.000E-02	RTF(6,2)
D-34	Fe-55 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(6,3)
D-34	Gd-152 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(7,1)
D-34	Gd-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(7,2)
D-34	Gd-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(7,3)

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

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Ni-59 , plant/soil concentration ratio, dimensionless	5.000E-02	5.000E-02	RTF(8,1)
D-34	Ni-59 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(8,2)
D-34	Ni-59 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-02	2.000E-02	RTF(8,3)
D-34				
D-34	Ni-63 , plant/soil concentration ratio, dimensionless	5.000E-02	5.000E-02	RTF(9,1)
D-34	Ni-63 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(9,2)
D-34	Ni-63 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-02	2.000E-02	RTF(9,3)
D-34				
D-34	Sr-90+D , plant/soil concentration ratio, dimensionless	3.000E-01	3.000E-01	RTF(10,1)
D-34	Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	6.000E-03	6.000E-03	RTF(10,2)
D-34	Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(10,3)
D-34				
D-34	Tc-99 , plant/soil concentration ratio, dimensionless	5.000E+00	5.000E+00	RTF(11,1)
D-34	Tc-99 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(11,2)
D-34	Tc-99 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(11,3)
D-5				
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Cc-60 , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Cc-60 , crustacea and mollusks	2.000E+02	2.000E+02	BIOFAC(1,2)
D-5				
D-5	Cs-137+D , fish	2.000E+03	2.000E+03	BIOFAC(2,1)
D-5	Cs-137+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(2,2)
D-5				
D-5	Eu-152 , fish	5.000E+01	5.000E+01	BIOFAC(3,1)
D-5	Eu-152 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(3,2)
D-5				
D-5	Eu-154 , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Eu-154 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(5,2)
D-5				
D-5	Fe-55 , fish	2.000E+02	2.000E+02	BIOFAC(6,1)
D-5	Fe-55 , crustacea and mollusks	3.200E-03	3.200E-03	BIOFAC(6,2)
D-5				
D-5	Gd-152 , fish	2.500E+01	2.500E+01	BIOFAC(7,1)
D-5	Gd-152 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(7,2)
D-5				
D-5	Ni-59 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Ni-59 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(8,2)
D-5				
D-5	Ni-63 , fish	1.000E+02	1.000E+02	BIOFAC(9,1)
D-5	Ni-63 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(9,2)
D-5				
D-5	Sr-90+D , fish	6.000E+01	6.000E+01	BIOFAC(10,1)
D-5	Sr-90+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(10,2)
D-5				
D-5	Tc-99 , fish	2.000E+01	2.000E+01	BIOFAC(11,1)
D-5	Tc-99 , crustacea and mollusks	5.000E+00	5.000E+00	BIOFAC(11,2)

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)	1.091E+05	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.000E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	3.650E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	ERDL
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): Co-60	1.000E+00	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Cs-137	1.000E+00	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Eu-152	1.000E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Eu-154	1.000E+00	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Fe-55	1.000E+00	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Ni-59	1.000E+00	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): Ni-63	1.000E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): Sr-90	1.000E+00	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): Tc-99	1.000E+00	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Co-60	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Cs-137	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Eu-152	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Eu-154	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Fe-55	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Ni-59	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): Ni-63	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): Sr-90	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): Tc-99	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)	1.520E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.500E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	2.700E+02	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	7.120E+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)	8.600E-01	1.000E+00	---	FRECIP
R013	Irrigation (m/yr)	1.640E+00	2.000E-01	---	PI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	3.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA

Site-Specific Parameter Summary (continued):

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.520E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.500E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	2.000E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	2.700E+02	1.000E+02	---	HCEZ
R014	Saturated zone hydraulic gradient	5.000E-03	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	0.000E+00	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	5.000E+00	1.000E+01	---	DWIEWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	1.160E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	3.000E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.520E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.500E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	7.120E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	2.700E+02	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Co-60				
R016	Contaminated zone (cm**3/g)	1.000E+03	1.000E+03	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)	1.000E+03	1.000E+03	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	1.000E+03	1.000E+03	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.400E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUEK(1)
R016	Distribution coefficients for Cs-137				
R016	Contaminated zone (cm**3/g)	4.470E+02	1.000E+03	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)	4.470E+02	1.000E+03	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	4.470E+02	1.000E+03	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.206E-03	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUEK(2)
R016	Distribution coefficients for Eu-152				
R016	Contaminated zone (cm**3/g)	9.550E+02	-1.000E+00	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)	9.550E+02	-1.000E+00	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	9.550E+02	-1.000E+00	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.655E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUEK(3)
R016	Distribution coefficients for Eu-154				
R016	Contaminated zone (cm**3/g)	9.550E+02	-1.000E+00	---	DCNUCC(5)
R016	Unsat. zone 1 (cm**3/g)	9.550E+02	-1.000E+00	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	9.550E+02	-1.000E+00	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.655E-04	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUEK(5)

Site-Specific Parameter Summary (continued)

Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016 Distribution coefficients for Fe-55				
R016 Contaminated zone (cm**3/g)	8.910E+02	1.000E+03	---	DCNUCC(6)
R016 Unsaturated zone 1 (cm**3/g)	8.910E+02	1.000E+03	---	DCNUCU(6,1)
R016 Saturated zone (cm**3/g)	8.910E+02	1.000E+03	---	DCNUCS(6)
R016 Leach rate (/yr)	0.000E+00	0.000E+00	6.061E-04	ALEACH(6)
R016 Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016 Distribution coefficients for Ni-59				
R016 Contaminated zone (cm**3/g)	3.700E+01	1.000E+03	---	DCNUCC(8)
R016 Unsaturated zone 1 (cm**3/g)	3.700E+01	1.000E+03	---	DCNUCU(8,1)
R016 Saturated zone (cm**3/g)	3.700E+01	1.000E+03	---	DCNUCS(8)
R016 Leach rate (/yr)	0.000E+00	0.000E+00	1.452E-02	ALEACH(8)
R016 Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016 Distribution coefficients for Ni-63				
R016 Contaminated zone (cm**3/g)	3.700E+01	1.000E+03	---	DCNUCC(9)
R016 Unsaturated zone 1 (cm**3/g)	3.700E+01	1.000E+03	---	DCNUCU(9,1)
R016 Saturated zone (cm**3/g)	3.700E+01	1.000E+03	---	DCNUCS(9)
R016 Leach rate (/yr)	0.000E+00	0.000E+00	1.452E-02	ALEACH(9)
R016 Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016 Distribution coefficients for Sr-90				
R016 Contaminated zone (cm**3/g)	3.200E+01	3.000E+01	---	DCNUCC(10)
R016 Unsaturated zone 1 (cm**3/g)	3.200E+01	3.000E+01	---	DCNUCU(10,1)
R016 Saturated zone (cm**3/g)	3.200E+01	3.000E+01	---	DCNUCS(10)
R016 Leach rate (/yr)	0.000E+00	0.000E+00	1.677E-02	ALEACH(10)
R016 Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)
R016 Distribution coefficients for Tc-99				
R016 Contaminated zone (cm**3/g)	7.000E+00	0.000E+00	---	DCNUCC(11)
R016 Unsaturated zone 1 (cm**3/g)	7.000E+00	0.000E+00	---	DCNUCU(11,1)
R016 Saturated zone (cm**3/g)	7.000E+00	0.000E+00	---	DCNUCS(11)
R016 Leach rate (/yr)	0.000E+00	0.000E+00	7.490E-02	ALEACH(11)
R016 Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R016 Distribution coefficients for Daughter Gd-152				
R016 Contaminated zone (cm**3/g)	9.550E+02	-1.000E+00	---	DCNUCC(7)
R016 Unsaturated zone 1 (cm**3/g)	9.550E+02	-1.000E+00	---	DCNUCU(7,1)
R016 Saturated zone (cm**3/g)	9.550E+02	-1.000E+00	---	DCNUCS(7)
R016 Leach rate (/yr)	0.000E+00	0.000E+00	5.655E-04	ALEACH(7)
R016 Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
O17 Inhalation rate (m**3/yr)	8.400E+03	8.400E+03	---	INHALR
O17 Mass loading for inhalation (g/m**3)	6.000E-06	1.000E-04	---	MLINH
O17 Exposure duration	3.653E+02	3.000E+01	---	ED
O17 Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHP3
O17 Shielding factor, external gamma	4.700E-01	7.000E-01	---	SHP1
O17 Fraction of time spent indoors	6.000E-01	5.000E-01	---	FIND
O17 Fraction of time spent outdoors (on site)	1.100E-01	2.500E-01	---	FOTD
O17 Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS

Site-Specific Parameter Summary (continued):

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.752E-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)	7.500E+01	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	1.500E+01	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	1.160E+02	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	5.200E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	1.600E+01	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	0.000E+00	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	1.830E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	4.780E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	5.000E-01	5.000E-01	---	FR9
R018	Contamination fraction of plant food	1.000E+00	-1	---	FPLANT
R018	Contamination fraction of meat	1.000E+00	-1	---	FMEAT
R018	Contamination fraction of milk	1.000E+00	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	8.500E+00	6.800E+01	---	LF15
R019	Livestock fodder intake for milk (kg/day)	1.700E+01	5.500E+01	---	LF16
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LW15
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LW16
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	4.000E-04	1.000E-04	---	MLFD

Site-Specific Parameter Summary (continued)

Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R019 Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019 Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019 Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDM
R019 Household water fraction from ground water	not used	1.000E+00	---	FGWEH
R019 Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
R019 Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
R19B Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
R19B Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
R19B Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
R19B Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)
R19B Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14 C-12 concentration in water (g/cm**3)	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	9.600E-01	---	CAIR
C14 C-14 evasion layer thickness in soil (m)	not used	2.000E-01	---	DHC
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	6.694E+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)
.021 Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
.021 Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
.021 Total porosity of the cover material	not used	4.000E-01	---	TPCV
.021 Total porosity of the building foundation	not used	1.000E-01	---	TPFL
.021 Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
RC21	Volumetric water content of the foundation	not used	3.000E-02	---	FR2OFL
RC21	Diffusion coefficient for radon gas (m/sec):				
RC21	in cover material	not used	2.000E-06	---	DIFCV
RC21	in foundation material	not used	3.000E-07	---	DIFFL
RC21	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
RC21	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
RC21	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
RC21	Height of the building (room) (m)	not used	2.500E+00	---	HRM
RC21	Building interior area factor	not used	0.000E+00	---	FAI
RC21	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
RC21	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
RC21	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	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	active
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	active

Contaminated Zone Dimensions	Initial Soil Concentrations, pCi/g
Area: 109100.00 square meters	Ce-137 1.000E+00
Thickness: 1.00 meters	Cs-137 1.000E+00
Cover Depth: 0.00 meters	Eu-152 1.000E+00
	Eu-154 1.000E+00
	Fe-55 1.000E+00
	Ni-59 1.000E+00
	Ni-63 1.000E+00
	Sr-90 1.000E+00
	Tc-99 1.000E+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	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.929E+01	1.764E+01	1.534E+01	9.476E+00	3.272E+00	2.839E-01	4.966E-03	4.521E-06
M(t):	7.716E-01	7.136E-01	6.134E-01	3.790E-01	1.309E-01	1.136E-02	1.987E-04	1.608E-09

Maximum TDOSE(t): 1.929E+01 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- 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.
Co-60	6.246E+00	0.3238	8.333E-07	0.0000	0.000E+00	0.0000	1.875E-01	0.0057	3.093E-02	0.0016	1.106E-02	0.0006	3.551E-04	0.0000
Cs-137	1.366E+00	0.0719	1.280E-07	0.0000	0.000E+00	0.0000	1.838E-01	0.0095	6.475E-02	0.0034	5.505E-02	0.0029	6.961E-04	0.0000
Eu-152	2.814E+00	0.1459	8.744E-07	0.0000	0.000E+00	0.0000	1.472E-03	0.0001	3.424E-04	0.0000	2.086E-06	0.0000	8.895E-05	0.0000
Eu-154	3.040E+00	0.1576	1.117E-06	0.0000	0.000E+00	0.0000	2.141E-03	0.0001	4.979E-04	0.0000	1.176E-05	0.0000	1.294E-04	0.0000
Fe-55	0.000E+00	0.0000	9.633E-09	0.0000	0.000E+00	0.0000	5.015E-05	0.0000	2.832E-04	0.0000	9.803E-06	0.0000	7.541E-06	0.0000
Ni-59	0.000E+00	0.0000	1.089E-06	0.0000	0.000E+00	0.0000	5.700E-04	0.0001	5.023E-05	0.0000	6.651E-04	0.0000	2.938E-06	0.0000
Ni-63	0.000E+00	0.0000	2.527E-06	0.0000	0.000E+00	0.0000	2.656E-03	0.0001	1.375E-04	0.0000	1.821E-03	0.0001	8.043E-06	0.0000
Sr-90	9.935E-03	0.0005	5.214E-06	0.0000	0.000E+00	0.0000	4.185E+00	0.2170	1.907E-01	0.0099	1.985E-01	0.0103	2.113E-03	0.0001
Tc-99	5.071E-05	0.0000	3.260E-06	0.0000	0.000E+00	0.0000	6.556E-01	0.0340	3.184E-04	0.0000	1.431E-02	0.0007	1.962E-05	0.0000
Total	1.350E+01	0.6997	8.245E-06	0.0000	0.000E+00	0.0000	5.220E+00	0.2706	2.880E-01	0.0149	2.815E-01	0.0146	3.421E-03	0.0002

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 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.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.475E+00	0.3357
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.691E+00	0.0877
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.816E+00	0.1460
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.043E+00	0.1578
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.507E-04	0.0000
Ni-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.688E-03	0.0001
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.622E-03	0.0002
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.587E+00	0.2378
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.703E-01	0.0347
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	1.929E+01	1.0000

Sum of all water independent and dependent pathways.



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

Water Independent Pathways (Inhalation excludes radon)

Radio- 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.
Co-60	5.473E+00	0.3968	7.302E-07	0.0000	0.000E+00	0.0000	1.643E-01	0.0092	2.711E-02	0.0015	9.696E-03	0.0005	3.112E-04	0.0000
Cs-137	1.353E+00	0.0758	1.249E-07	0.0000	0.000E+00	0.0000	1.794E-01	0.0101	6.320E-02	0.0035	5.373E-02	0.0030	6.793E-04	0.0000
Eu-152	2.670E+00	0.1497	8.297E-07	0.0000	0.000E+00	0.0000	1.397E-03	0.0001	3.248E-04	0.0000	7.674E-06	0.0000	8.440E-05	0.0000
Eu-154	2.809E+00	0.1574	1.032E-06	0.0000	0.000E+00	0.0000	1.978E-03	0.0001	4.599E-04	0.0000	1.067E-05	0.0000	1.195E-04	0.0000
Fe-55	0.050E+00	0.0000	7.446E-09	0.0000	0.000E+00	0.0000	3.677E-05	0.0000	2.169E-04	0.0000	7.579E-06	0.0000	5.830E-06	0.0000
Ni-59	0.090E+00	0.0000	1.073E-08	0.0000	0.000E+00	0.0000	9.561E-04	0.0001	4.951E-05	0.0000	6.556E-04	0.0000	2.695E-06	0.0000
Ni-63	0.000E+00	0.0000	2.473E-08	0.0000	0.000E+00	0.0000	2.599E-03	0.0001	1.346E-04	0.0000	1.762E-03	0.0001	7.970E-06	0.0000
Sr-90	9.540E-03	0.0005	5.007E-06	0.0000	0.000E+00	0.0000	4.019E+00	0.2253	1.832E-01	0.0103	1.907E-01	0.0107	2.029E-03	0.0001
Tc-99	4.705E-05	0.0000	3.024E-08	0.0000	0.000E+00	0.0000	6.084E-01	0.0341	2.957E-04	0.0000	1.329E-02	0.0007	1.839E-05	0.0000
Total	1.231E+01	0.6902	7.796E-06	0.0000	0.000E+00	0.0000	4.976E+00	0.2790	2.750E-01	0.0154	2.698E-01	0.0151	3.258E-03	0.0002

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 1.000E+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.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.675E+00	0.3181
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.650E+00	0.0925
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.672E+00	0.1496
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.811E+00	0.1576
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.711E-04	0.0000
Ni-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.664E-03	0.0001
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.523E-03	0.0003
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.405E+00	0.2469
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.220E-01	0.0349
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	1.784E+01	1.0000

Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio- 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.
Co-60	4.203E+00	0.2741	5.607E-07	0.0000	0.000E+00	0.0000	1.262E-01	0.0082	2.082E-02	0.0014	7.446E-03	0.0005	2.389E-04	0.0000
Cs-137	1.289E+00	0.0840	1.190E-07	0.0000	0.000E+00	0.0000	1.709E-01	0.0111	6.020E-02	0.0039	5.118E-02	0.0033	6.471E-04	0.0000
Eu-152	2.403E+00	0.1567	7.469E-07	0.0000	0.000E+00	0.0000	1.257E-03	0.0001	2.924E-04	0.0000	6.908E-06	0.0000	7.597E-05	0.0000
Eu-154	2.396E+00	0.1563	6.802E-07	0.0000	0.000E+00	0.0000	1.686E-03	0.0001	3.925E-04	0.0000	9.272E-06	0.0000	1.020E-04	0.0000
Fe-55	0.000E+00	0.0000	4.451E-09	0.0000	0.000E+00	0.0000	2.317E-05	0.0000	1.308E-04	0.0000	4.530E-06	0.0000	3.485E-06	0.0000
Ni-59	0.000E+00	0.0000	1.042E-08	0.0000	0.000E+00	0.0000	9.287E-04	0.0001	4.809E-05	0.0000	6.368E-04	0.0000	2.612E-06	0.0000
Ni-63	0.000E+00	0.0000	2.368E-08	0.0000	0.000E+00	0.0000	2.488E-03	0.0002	1.288E-04	0.0000	1.706E-03	0.0001	7.535E-06	0.0000
Sr-90	6.796E-03	0.0006	4.617E-06	0.0000	0.000E+00	0.0000	3.706E+00	0.2417	1.689E-01	0.0110	1.758E-01	0.0115	1.871E-03	0.0001
Tc-99	4.051E-05	0.0000	2.604E-08	0.0000	0.000E+00	0.0000	5.237E-01	0.0342	2.546E-04	0.0000	1.144E-02	0.0007	1.583E-05	0.0000
Total	1.030E+01	0.6717	6.966E-06	0.0000	0.000E+00	0.0000	4.533E+00	0.2956	2.512E-01	0.0164	2.462E-01	0.0162	2.964E-03	0.0002

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

Water Dependent Pathways

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.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.358E+00	0.2841
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.572E+00	0.1025
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.405E+00	0.1567
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.399E+00	0.1564
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.620E-04	0.0000
Ni-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.616E-03	0.0001
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.331E-03	0.0002
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.061E+00	0.2648
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.355E-01	0.0349
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	1.534E+01	1.0000

Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio- 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.
Co-60	1.666E+00	0.1760	2.225E-07	0.0000	0.000E+00	0.0000	5.007E-02	0.0053	8.260E-03	0.0009	2.955E-03	0.0003	9.462E-05	0.0000
Cs-137	1.087E+00	0.1147	1.004E-07	0.0000	0.000E+00	0.0000	1.441E-01	0.0152	5.078E-02	0.0054	4.317E-02	0.0046	5.458E-04	0.0001
Eu-152	1.664E+00	0.1756	5.169E-07	0.0000	0.000E+00	0.0000	8.703E-04	0.0001	2.024E-04	0.0000	4.782E-06	0.0000	5.259E-05	0.0000
Eu-154	1.375E+00	0.1451	5.051E-07	0.0000	0.000E+00	0.0000	9.685E-04	0.0001	2.252E-04	0.0000	5.321E-06	0.0000	5.852E-05	0.0000
Fe-55	0.000E+00	0.0000	7.349E-10	0.0000	0.000E+00	0.0000	3.626E-06	0.0000	2.160E-05	0.0000	7.478E-07	0.0000	5.753E-07	0.0000
Ni-59	0.000E+00	0.0000	9.415E-09	0.0000	0.000E+00	0.0000	8.389E-04	0.0001	4.344E-05	0.0000	5.753E-04	0.0001	2.541E-06	0.0000
Ni-63	0.000E+00	0.0000	2.033E-09	0.0000	0.000E+00	0.0000	2.137E-03	0.0002	1.107E-04	0.0000	1.465E-03	0.0002	6.472E-06	0.0000
Sr-90	6.622E-03	0.0007	3.475E-06	0.0000	0.000E+00	0.0000	2.790E+00	0.2944	1.271E-01	0.0134	1.323E-01	0.0140	1.408E-03	0.0001
Tc-99	2.398E-05	0.0000	1.541E-06	0.0000	0.000E+00	0.0000	3.160E-01	0.0327	1.507E-04	0.0000	6.774E-03	0.0007	9.372E-06	0.0000
Total	5.800E+00	0.6121	4.866E-06	0.0000	0.000E+00	0.0000	3.299E+00	0.3461	1.669E-01	0.0197	1.873E-01	0.0198	2.179E-03	0.0002

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 1.000E+01 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.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.729E+00	0.1825
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.326E+00	0.1399
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.665E+00	0.1757
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.376E+00	0.1453
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.675E-05	0.0000
Ni-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.460E-03	0.0002
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.719E-03	0.0004
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.057E+00	0.3226
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.170E-01	0.0335
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	9.476E+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- 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.
Co-60	1.189E-01	0.0363	1.586E-08	0.0000	0.000E+00	0.0000	3.570E-03	0.0011	5.869E-04	0.0002	2.107E-04	0.0001	6.761E-06	0.0000
Cs-137	6.666E-01	0.2043	6.172E-08	0.0000	0.000E+00	0.0000	8.663E-02	0.0271	3.123E-02	0.0095	2.654E-02	0.0081	3.356E-04	0.0001
Eu-152	5.814E-01	0.1777	1.607E-07	0.0000	0.000E+00	0.0000	3.042E-04	0.0001	7.073E-05	0.0000	1.671E-06	0.0000	1.838E-05	0.0000
Eu-154	2.814E-01	0.0860	1.034E-07	0.0000	0.000E+00	0.0000	1.562E-04	0.0001	4.608E-05	0.0000	1.089E-06	0.0000	1.197E-05	0.0000
Fe-55	0.000E+00	0.0000	4.277E-12	0.0000	0.000E+00	0.0000	2.226E-08	0.0000	1.257E-07	0.0000	4.352E-09	0.0000	3.348E-09	0.0000
Ni-59	0.000E+00	0.0000	7.042E-09	0.0000	0.000E+00	0.0000	6.274E-04	0.0002	3.249E-05	0.0000	4.302E-04	0.0001	1.900E-06	0.0000
Ni-63	0.000E+00	0.0000	1.317E-08	0.0000	0.000E+00	0.0000	1.384E-03	0.0004	7.165E-05	0.0000	9.488E-04	0.0003	4.190E-06	0.0000
Sr-90	2.941E-03	0.0009	1.544E-06	0.0000	0.000E+00	0.0000	1.239E+00	0.3767	5.648E-02	0.0173	5.679E-02	0.0180	6.255E-04	0.0002
Tc-99	5.361E-06	0.0000	3.446E-09	0.0000	0.000E+00	0.0000	6.931E-02	0.0212	3.369E-05	0.0000	1.514E-03	0.0005	2.055E-06	0.0000
Total	1.653E+00	0.5052	1.929E-06	0.0000	0.000E+00	0.0000	1.403E+00	0.4289	8.655E-02	0.0271	6.844E-02	0.0270	1.006E-03	0.0003

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 3.000E+01 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.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.233E-01	0.0377
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.153E-01	0.2492
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.816E-01	0.1776
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.616E-01	0.0861
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.557E-07	0.0000
Ni-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.092E-03	0.0003
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.408E-03	0.0007
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.356E+00	0.4150
Tc-99	1.641E-02	0.0050	5.990E-04	0.0002	0.000E+00	0.0000	1.927E-02	0.0059	2.518E-05	0.0000	1.389E-03	0.0004	1.086E-01	0.0332
Total	1.641E-02	0.0050	5.990E-04	0.0002	0.000E+00	0.0000	1.927E-02	0.0059	2.518E-05	0.0000	1.389E-03	0.0004	3.272E+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- 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.
Co-60	1.151E-05	0.0000	1.536E-12	0.0000	0.000E+00	0.0000	3.454E-07	0.0000	5.699E-08	0.0000	2.038E-08	0.0000	6.544E-10	0.0000
Cs-137	1.219E-01	0.4294	1.125E-06	0.0000	0.000E+00	0.0000	1.615E-02	0.0569	5.693E-03	0.0201	4.639E-03	0.0170	6.120E-05	0.0002
Eu-152	1.467E-02	0.0517	4.559E-09	0.0000	0.000E+00	0.0000	7.672E-06	0.0000	1.765E-06	0.0000	4.217E-06	0.0000	4.639E-07	0.0000
Eu-154	1.090E-03	0.0038	4.005E-10	0.0000	0.000E+00	0.0000	7.675E-07	0.0000	1.766E-07	0.0000	4.219E-09	0.0000	4.640E-06	0.0000
Fe-55	0.000E+00	0.0000	6.430E-20	0.0000	0.000E+00	0.0000	3.346E-16	0.0000	1.890E-15	0.0000	6.543E-17	0.0000	5.034E-17	0.0000
Ni-59	0.000E+00	0.0000	2.548E-09	0.0000	0.000E+00	0.0000	2.269E-04	0.0008	1.175E-05	0.0000	1.556E-04	0.0005	6.874E-07	0.0000
Ni-63	0.000E+00	0.0000	2.675E-09	0.0000	0.000E+00	0.0000	3.020E-04	0.0011	1.564E-05	0.0001	2.071E-04	0.0007	9.151E-07	0.0000
Sr-90	1.719E-04	0.0006	9.020E-06	0.0000	0.000E+00	0.0000	7.237E-02	0.2549	3.299E-03	0.0116	3.433E-03	0.0121	3.655E-05	0.0001
Tc-99	2.832E-08	0.0000	1.821E-11	0.0000	0.000E+00	0.0000	3.661E-04	0.0013	1.760E-07	0.0000	7.998E-06	0.0000	1.107E-08	0.0000
Total	1.379E-01	0.4856	1.119E-07	0.0000	0.000E+00	0.0000	8.942E-02	0.3150	9.021E-03	0.0316	6.643E-03	0.0304	9.987E-05	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+02 years

Water Dependent Pathways

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.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.193E-05	0.0000
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.487E-01	0.5236
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.468E-02	0.0517
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.091E-03	0.0038
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.340E-15	0.0000
Ni-59	6.675E-05	0.0003	1.618E-05	0.0001	0.000E+00	0.0000	5.040E-05	0.0002	6.201E-06	0.0000	1.395E-04	0.0005	6.959E-04	0.0025
Ni-63	1.161E-04	0.0004	2.153E-05	0.0001	0.000E+00	0.0000	6.709E-05	0.0002	6.253E-06	0.0000	1.857E-04	0.0007	9.264E-04	0.0033
Sr-90	1.710E-02	0.0602	1.872E-03	0.0068	0.000E+00	0.0000	1.025E-02	0.0361	1.938E-03	0.0068	2.709E-03	0.0095	1.132E-01	0.3987
Tc-99	1.859E-03	0.0065	6.797E-05	0.0002	0.000E+00	0.0000	2.190E-03	0.0077	2.900E-06	0.0000	1.566E-04	0.0006	4.652E-03	0.0164
Total	1.916E-02	0.0675	1.978E-03	0.0070	0.000E+00	0.0000	1.256E-02	0.0442	1.955E-03	0.0069	3.193E-03	0.0112	2.639E-01	1.0000

Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio- 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.
Co-60	3.908E-17	0.0000	5.215E-24	0.0000	0.000E+00	0.0000	9.121E-19	0.0000	1.688E-19	0.0000	5.798E-20	0.0000	2.222E-21	0.0000
Cs-137	9.424E-04	0.1298	8.781E-11	0.0000	0.000E+00	0.0000	9.711E-05	0.0196	4.005E-05	0.0001	3.262E-05	0.0066	4.731E-07	0.0001
Eu-152	3.988E-07	0.0001	1.240E-15	0.0000	0.000E+00	0.0000	1.623E-10	0.0000	4.808E-11	0.0000	1.126E-12	0.0000	1.261E-11	0.0000
Eu-154	1.402E-10	0.0000	5.151E-17	0.0000	0.000E+00	0.0000	7.683E-14	0.0000	2.276E-14	0.0000	5.331E-16	0.0000	5.967E-15	0.0000
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-59	0.000E+00	0.0000	1.395E-10	0.0000	0.000E+00	0.0000	9.661E-06	0.0019	5.777E-07	0.0001	7.328E-06	0.0015	3.764E-06	0.0000
Ni-63	0.000E+00	0.0000	3.722E-11	0.0000	0.000E+00	0.0000	3.040E-06	0.0006	1.818E-07	0.0000	2.306E-06	0.0005	1.184E-06	0.0000
Sr-90	5.143E-08	0.0000	2.699E-11	0.0000	0.000E+00	0.0000	1.684E-05	0.0034	6.036E-07	0.0002	6.194E-07	0.0002	1.094E-06	0.0000
Tc-99	8.837E-15	0.0000	5.680E-18	0.0000	0.000E+00	0.0000	8.861E-11	0.0000	4.332E-14	0.0000	1.944E-12	0.0000	3.454E-15	0.0000
Total	9.429E-04	0.1899	2.908E-10	0.0000	0.000E+00	0.0000	1.267E-04	0.0255	4.161E-05	0.0084	4.307E-05	0.0087	5.336E-07	0.0001

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

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.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.022E-17	0.0000
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.113E-05	0.2240
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.990E-07	0.0001
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.403E-10	0.0000
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-59	6.765E-04	0.1562	1.235E-04	0.0249	0.000E+00	0.0000	3.851E-04	0.0775	4.794E-05	0.0097	1.071E-03	0.2156	2.321E-03	0.4674
Ni-63	3.129E-04	0.0429	3.887E-05	0.0078	0.000E+00	0.0000	1.212E-04	0.0244	1.509E-05	0.0030	3.369E-04	0.0678	7.305E-04	0.1471
Sr-90	3.948E-04	0.0793	4.327E-05	0.0087	0.000E+00	0.0000	2.370E-04	0.3477	4.508E-05	0.0091	6.279E-05	0.0126	6.015E-04	0.1614
Tc-99	4.583E-10	0.0000	1.676E-11	0.0000	0.000E+00	0.0000	5.398E-10	0.0000	7.149E-13	0.0000	3.911E-11	0.0000	1.146E-09	0.0000
Total	1.264E-03	0.2586	2.057E-04	0.0414	0.000E+00	0.0000	7.432E-04	0.1497	1.081E-04	0.0218	1.470E-03	0.2961	4.966E-03	1.0000

Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 1.000E+03 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.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.209E-18	0.0000	2.026E-17	0.0000	7.899E-16	0.0000	0.000E+00	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.163E-22	0.0000	1.264E-21	0.0000	3.286E-24	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
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
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.067E-16	0.0000	2.927E-16	0.0000	1.848E-15	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.194E-19	0.0000	5.936E-19	0.0000	3.747E-18	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.405E-24	0.0000	7.260E-24	0.0000	3.905E-24	0.0000	0.000E+00	0.0000
K-40	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+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	2.093E-16	0.0000	3.135E-16	0.0000	1.859E-15	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

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.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.036E-17	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.605E-21	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
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
U-235	1.324E-06	0.2929	2.419E-09	0.0555	0.000E+00	0.0000	7.539E-09	0.1666	9.405E-10	0.0206	2.099E-06	0.4641	4.512E-08	0.9990
U-238	2.676E-11	0.0006	4.289E-12	0.0001	0.000E+00	0.0000	1.524E-11	0.0003	1.901E-12	0.0000	4.241E-11	0.0009	9.121E-11	0.0020
Th-232	4.646E-17	0.0000	5.092E-18	0.0000	0.000E+00	0.0000	2.769E-17	0.0000	5.306E-18	0.0000	7.390E-18	0.0000	9.214E-17	0.0000
K-40	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.327E-06	0.2934	2.423E-09	0.0556	0.000E+00	0.0000	7.554E-09	0.1671	9.424E-10	0.0208	2.102E-06	0.4650	4.521E-08	1.0000

Sum of all water independent and dependent pathways.

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

Product (i)	Branch (j)	Fraction	DSF(j,t) (mrem/yr)/(pCi/g)							
			t = 0.000E+00	1.000E-06	3.000E-06	1.000E+01	3.000E-01	1.000E+02	3.000E+02	1.000E+03
Co-60	Co-60	1.000E+00	6.475E+00	5.675E+00	4.356E+00	1.729E+00	1.233E-01	1.193E-05	4.022E-17	0.000E+00
Cs-137	Cs-137	1.000E+00	1.691E+00	1.650E+00	1.572E+00	1.326E+00	8.153E-01	1.487E-01	1.115E-03	3.036E-17
Eu-152	Eu-152	7.209E-01	2.030E+00	1.926E+00	1.734E+00	1.200E+00	4.194E-01	1.056E-02	2.676E-07	3.531E-32
Eu-152	Fu-152	2.792E-01	7.662E-01	7.459E-01	6.715E-01	4.648E-01	1.624E-01	4.099E-03	1.114E-07	1.368E-32
Eu-152	Gd-152	2.792E-01	4.379E-17	1.263E-16	2.845E-16	7.168E-16	1.340E-15	1.610E-15	1.201E-15	1.605E-21
Eu-152	[DSR(j)]		7.662E-01	7.459E-01	6.715E-01	4.648E-01	1.624E-01	4.099E-03	1.114E-07	1.605E-21
Eu-154	Eu-154	1.000E+00	3.043E+00	2.611E+00	2.399E+00	1.376E+00	2.816E-01	1.091E-03	1.403E-10	1.710E-43
Fe-55	Fe-55	1.000E+00	3.507E-04	2.711E-04	1.620E-04	2.675E-05	1.557E-07	2.340E-15	1.006E-37	0.000E+00
Ni-59	Ni-59	1.000E+00	1.686E-03	1.664E-03	1.616E-03	1.460E-03	1.092E-03	6.959E-04	2.321E-03	4.512E-08
Ni-63	Ni-63	1.000E+00	4.622E-03	4.523E-03	4.331E-03	3.719E-03	2.408E-03	9.264E-04	7.305E-04	9.121E-11
Sr-90	Sr-90	1.000E+00	4.587E+00	4.405E+00	4.061E+00	3.057E+00	1.358E+00	1.132E-01	8.015E-04	9.214E-17
Tc-99	Tc-99	1.000E+00	6.703E-01	6.220E-01	5.355E-01	3.170E-01	1.086E-01	4.652E-03	1.146E-09	1.267E-33

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

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

Radionuclide (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
Co-60	3.861E+00	4.406E+00	5.757E+00	1.446E+01	2.026E+02	2.095E+06	*1.131E+15	*1.131E+15
Cs-137	1.475E+01	1.515E+01	1.550E+01	1.886E+01	3.066E+01	1.682E+02	2.247E+04	*8.701E+13
Eu-152	8.878E+00	8.357E+00	1.029E+01	1.502E+01	4.297E+01	1.703E+03	6.266E+07	*1.765E+14
Eu-154	6.215E+00	6.894E+00	1.042E+01	1.816E+01	8.876E+01	2.291E+04	1.782E+11	*2.639E+14
Fe-55	7.129E-04	9.222E+04	1.543E+05	9.346E+05	1.606E+06	*2.409E+15	*2.409E+15	*2.409E+15
Ni-59	1.483E+04	1.503E+04	1.547E+04	1.712E+04	2.289E+04	3.592E+04	1.077E+04	5.541E+08
Ni-63	5.409E+03	5.527E+03	5.773E+03	6.721E+03	1.038E+04	2.699E+04	3.422E+04	2.741E+11
Sr-90	5.450E+00	5.676E+00	6.156E+00	8.177E+00	1.841E+01	2.209E+02	3.119E+04	*1.365E+14
Tc-99	3.730E+01	4.019E+01	4.669E+01	7.887E+01	2.303E+02	5.374E+03	*1.696E+10	*1.696E+10

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 t_{min} = time of minimum single radionuclide soil guideline
 and at t_{max} = time of maximum total dose = 0.000E+00 years

Nuclide (i)	Initial (pCi/g)	t _{min} (years)	DSR(i,t _{min})	G(i,t _{min}) (pCi/g)	DSR(i,t _{max})	G(i,t _{max}) (pCi/g)
Co-60	1.000E+00	0.000E+00	6.475E+00	3.861E+00	6.475E+00	3.861E+00
Cs-137	1.000E+00	0.000E+00	1.691E+00	1.479E+01	1.691E+00	1.479E+01
Eu-152	1.000E+00	0.000E+00	2.816E+00	8.878E+00	2.816E+00	8.878E+00
Eu-154	1.000E+00	0.000E+00	3.043E+00	8.215E+00	3.043E+00	8.215E+00
Fe-55	1.000E+00	0.000E+00	3.507E-04	7.129E+04	3.507E-04	7.129E+04
Ni-59	1.000E+00	336.3 ± 0.7	2.352E-03	1.063E+04	1.688E-03	1.461E+04
Ni-63	1.000E+00	0.000E+00	4.622E-03	5.409E+03	4.622E-03	5.409E+03
Sr-90	1.000E+00	0.000E+00	4.557E+00	5.450E+00	4.557E+00	5.450E+00
Tc-99	1.000E+00	0.000E+00	6.703E-01	3.730E+01	6.703E-01	3.730E+01

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

Nuclide	Parent	BRF(i)	DOSE(j,t), mrem/yr							
			(j)	(i)	1	2	3	4	5	6
Co-60	Co-60	1.000E+00	6.475E+00	5.675E+00	4.258E+00	1.729E+00	1.233E-01	1.193E-05	4.022E-17	0.000E+00
Cs-137	Cs-137	1.000E+00	1.691E+00	1.650E+00	1.572E+00	1.326E+00	8.153E-01	1.487E-01	1.113E-03	3.036E-17
Eu-152	Eu-152	7.208E-01	2.030E+00	1.926E+00	1.734E+00	1.200E+00	4.194E-01	1.058E-02	2.876E-07	0.000E+00
Eu-152	Eu-152	2.792E-01	7.862E-01	7.459E-01	6.715E-01	4.648E-01	1.624E-01	4.099E-03	1.114E-07	0.000E+00
Eu-152	DOSE(j)		2.816E+00	2.672E+00	2.405E+00	1.665E+00	5.816E-01	1.468E-02	3.990E-07	0.000E+00
Gd-152	Eu-152	2.792E-01	4.379E-17	1.283E-16	2.645E-16	7.168E-16	1.340E-15	1.610E-15	1.201E-15	1.605E-21
Eu-154	Eu-154	1.000E+00	3.043E+00	2.811E+00	2.399E+00	1.376E+00	2.816E-01	1.091E-03	1.403E-10	0.000E+00
Fe-55	Fe-55	1.000E+00	3.507E-04	2.711E-04	1.620E-04	2.675E-05	1.557E-07	2.340E-15	0.000E+00	0.000E+00
Ni-59	Ni-59	1.000E+00	1.688E-03	1.664E-03	1.616E-03	1.460E-03	1.092E-03	6.959E-04	2.321E-03	4.512E-08
Ni-63	Ni-63	1.000E+00	4.622E-03	4.523E-03	4.331E-03	3.719E-03	2.408E-03	9.264E-04	7.305E-04	9.121E-11
Sr-90	Sr-90	1.000E+00	4.587E+00	4.405E+00	4.061E+00	3.057E+00	1.358E+00	1.132E-01	8.015E-04	9.214E-17
Tc-99	Tc-99	1.000E+00	6.703E-01	6.220E-01	5.355E-01	3.170E-01	1.086E-01	4.652E-03	1.146E-09	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
Cs-60	Cs-60	1.000E+00	1.000E+00	9.763E-01	6.729E-01	2.670E-01	1.904E-02	1.843E-06	6.258E-18	0.000E+00
Cs-137	Cs-137	1.000E+00	1.000E+00	9.760E-01	9.297E-01	7.642E-01	4.822E-01	8.793E-02	6.797E-04	2.761E-11
Eu-152	Eu-152	7.208E-01	7.208E-01	6.839E-01	6.156E-01	4.261E-01	1.489E-01	3.758E-03	1.022E-07	1.070E-23
Eu-152	Eu-152	2.792E-01	2.792E-01	2.649E-01	2.385E-01	1.651E-01	5.768E-02	1.456E-03	3.957E-08	4.144E-24
Eu-152	ΣS(j):		1.000E+00	9.488E-01	8.541E-01	5.912E-01	2.066E-01	5.214E-03	1.417E-07	1.464E-23
Gd-152	Eu-152	2.792E-01	0.000E+00	1.745E-15	4.969E-15	1.389E-14	2.676E-14	3.239E-14	2.908E-14	1.958E-14
Eu-154	Eu-154	1.000E+00	1.000E+00	9.237E-01	7.862E-01	4.523E-01	9.255E-02	3.586E-04	4.613E-11	3.519E-35
Fe-55	Fe-55	1.000E+00	1.000E+00	7.731E-01	4.621E-01	7.629E-02	4.439E-04	6.675E-12	2.973E-34	0.000E+00
Ni-59	Ni-59	1.000E+00	1.000E+00	9.856E-01	9.574E-01	8.648E-01	6.468E-01	2.340E-01	1.261E-02	4.922E-07
Ni-63	Ni-63	1.000E+00	1.000E+00	9.765E-01	9.369E-01	8.046E-01	5.210E-01	1.136E-01	1.473E-03	3.634E-10
Sr-90	Sr-90	1.000E+00	1.000E+00	9.602E-01	8.854E-01	6.665E-01	2.961E-01	1.730E-02	5.176E-06	2.399E-18
Tc-99	Tc-99	1.000E+00	1.000E+00	9.278E-01	7.988E-01	4.726E-01	1.057E-01	5.586E-04	1.743E-10	2.956E-33

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

RESRAD.EXE execution time = 19.94 seconds

Summary : RESRAD Default Parameters

File : Plumerook Surface Soil Mixture USACE.RAD

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Summary : RESRAD Default Parameters

File : Plumbrink Surface Soil Mixture USACE.RAI

Dose Conversion Factor (and Related) Parameter Summary

File: FGF 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
E-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
F-1	Am-241	4.440E-01	4.440E-01	DCF2(2)
F-1	Am-243+D	4.400E-01	4.400E-01	DCF2(3)
E-1	C-14	2.090E-06	2.090E-06	DCF2(4)
E-1	Cm-248	4.550E-01	4.550E-01	DCF2(5)
E-1	Co-60	2.190E-04	2.190E-04	DCF2(7)
F-1	Cs-137+D	3.190E-05	3.190E-05	DCF2(8)
F-1	Eu-155	4.140E-05	4.140E-05	DCF2(9)
E-1	H-3	6.400E-08	6.400E-08	DCF2(10)
F-1	I-129	1.740E-04	1.740E-04	DCF2(11)
E-1	Nb-94	4.140E-04	4.140E-04	DCF2(12)
E-1	Ni-63	6.290E-06	6.290E-06	DCF2(13)
F-1	Np-237+D	5.400E-01	5.400E-01	DCF2(14)
F-1	Pb-211	1.280E+00	1.280E+00	DCF2(15)
E-1	Pu-210+D	2.320E-02	2.320E-02	DCF2(16)
F-1	Pu-238	3.920E-01	3.920E-01	DCF2(17)
F-1	Pu-239	4.290E-01	4.290E-01	DCF2(18)
E-1	Pu-241+D	8.250E-03	8.250E-03	DCF2(19)
E-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(21)
E-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(22)
E-1	Rn-222	1.310E-03	1.310E-03	DCF2(23)
E-1	Tb-148+D	3.450E-01	3.450E-01	DCF2(24)
E-1	Tb-149+D	2.160E+00	2.160E+00	DCF2(25)
E-1	Th-230	3.260E-01	3.260E-01	DCF2(26)
E-1	Th-232	1.640E+00	1.640E+00	DCF2(27)
E-1	U-235	1.350E-01	1.350E-01	DCF2(28)
E-1	U-238	1.520E-01	1.520E-01	DCF2(29)
E-1	U-235+D	1.230E-01	1.230E-01	DCF2(30)
E-1	U-238	1.250E-01	1.250E-01	DCF2(31)
B-1	Dose conversion factors for ingestion, mrem/pCi:			
E-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
E-1	Am-241	3.640E-03	3.640E-03	DCF3(2)
E-1	Am-243+D	3.630E-03	3.630E-03	DCF3(3)
E-1	C-14	2.090E-06	2.090E-06	DCF3(4)
E-1	Cm-248	3.740E-03	3.740E-03	DCF3(5)
E-1	Co-60	2.690E-05	2.690E-05	DCF3(7)
E-1	Cs-137+D	5.000E-05	5.000E-05	DCF3(8)
E-1	Eu-155	1.530E-06	1.530E-06	DCF3(9)
E-1	H-3	6.400E-08	6.400E-08	DCF3(10)
E-1	I-129	2.760E-04	2.760E-04	DCF3(11)
E-1	Nb-94	7.140E-06	7.140E-06	DCF3(12)
E-1	Ni-63	5.770E-07	5.770E-07	DCF3(13)
E-1	Np-237+D	4.440E-03	4.440E-03	DCF3(14)
E-1	Pb-211	1.060E-02	1.060E-02	DCF3(15)
E-1	Pu-210+D	7.270E-03	7.270E-03	DCF3(16)
E-1	Pu-238	3.200E-03	3.200E-03	DCF3(17)
E-1	Pu-239	3.540E-03	3.540E-03	DCF3(18)
E-1	Pu-241+D	6.850E-05	6.850E-05	DCF3(19)

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

Menu	Parameter	Current Value	Default	Parameter Name
D-1	Ra-226-D	1.330E-03	1.250E-03	DCF3(21)
D-1	Ra-226-D	1.440E-03	1.440E-03	DCF3(22)
D-1	Sr-90-D	1.530E-04	1.530E-04	DCF3(23)
D-1	Th-226-D	8.080E-04	8.080E-04	DCF3(24)
D-1	Th-229-D	4.030E-03	4.030E-03	DCF3(25)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(26)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(27)
D-1	U-233	2.690E-04	2.690E-04	DCF3(28)
D-1	U-234	2.830E-04	2.830E-04	DCF3(29)
D-1	U-235-D	2.670E-04	2.670E-04	DCF3(30)
D-1	U-236	2.690E-04	2.690E-04	DCF3(31)
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	Am-241-D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(3,1)
D-34	Am-241-D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-05	5.000E-05	RTF(3,2)
D-34	Am-241-D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(3,3)
D-34				
D-34	C-14 , plant/soil concentration ratio, dimensionless	5.500E+00	5.500E+00	RTF(4,1)
D-34	C-14 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.100E-02	3.100E-02	RTF(4,2)
D-34	C-14 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.200E-02	1.200E-02	RTF(4,3)
D-34				
D-34	Cr-51 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
D-34	Cr-51 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(5,2)
D-34	Cr-51 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(5,3)
D-34				
D-34	Co-60 , plant/soil concentration ratio, dimensionless	6.000E-02	6.000E-02	RTF(7,1)
D-34	Co-60 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-02	2.000E-02	RTF(7,2)
D-34	Co-60 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(7,3)
D-34				
D-34	Cs-137-D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(6,1)
D-34	Cs-137-D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-02	3.000E-02	RTF(6,2)
D-34	Cs-137-D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-03	6.000E-03	RTF(6,3)
D-34				
D-34	Eu-155 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	Eu-155 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(9,2)
D-34	Eu-155 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(9,3)
D-34				
D-34	K-40 , plant/soil concentration ratio, dimensionless	4.800E+00	4.800E+00	RTF(10,1)
D-34	K-40 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.200E-02	1.200E-02	RTF(10,2)
D-34	K-40 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-02	1.000E-02	RTF(10,3)
D-34				

Summary : RESRAD Default Parameters

File : Plumrock Surface Soil Mixture WSACE.RAI

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

File: FGR 12 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-34	I-129 , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(11,1)
D-34	I-129 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	7.000E-03	7.000E-03	RTF(11,2)
D-34	I-129 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-02	1.000E-02	RTF(11,3)
D-34				
D-34	Nb-94 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(12,1)
D-34	Nb-94 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-07	3.000E-07	RTF(12,2)
D-34	Nb-94 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(12,3)
D-34				
D-34	Ni-63 , plant/soil concentration ratio, dimensionless	5.000E-02	5.000E-02	RTF(13,1)
D-34	Ni-63 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(13,2)
D-34	Ni-63 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-02	2.000E-02	RTF(13,3)
D-34				
D-34	Np-237+D , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(14,1)
D-34	Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(14,2)
D-34	Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(14,3)
D-34				
D-34	Fa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(15,1)
D-34	Fa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(15,2)
D-34	Fa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(15,3)
D-34				
D-34	Fb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(16,1)
D-34	Fb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(16,2)
D-34	Fb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(16,3)
D-34				
D-34	Fu-236 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(17,1)
D-34	Fu-236 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(17,2)
D-34	Fu-236 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(17,3)
D-34				
D-34	Fu-239 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(18,1)
D-34	Fu-239 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(18,2)
D-34	Fu-239 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(18,3)
D-34				
D-34	Fu-241+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(19,1)
D-34	Fu-241+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(19,2)
D-34	Fu-241+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(19,3)
D-34				
D-34	Fa-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(21,1)
D-34	Fa-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(21,2)
D-34	Fa-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(21,3)
D-34				
D-34	Fa-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(22,1)
D-34	Fa-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(22,2)
D-34	Fa-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(22,3)
D-34				
D-34	Fa-226+D , plant/soil concentration ratio, dimensionless	3.000E-01	3.000E-01	RTF(23,1)
D-34	Fa-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-03	8.000E-03	RTF(23,2)
D-34	Fa-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(23,3)

Summary : RESRAD Default Parameters

File : Plumtree Surface Soil Mixture WASTE.RAD

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

File: FGR 15 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-226+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(24,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(24,2)
L-34	Th-228+L , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(24,3)
D-34				
D-34	Th-229+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(25,1)
D-34	Th-229+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(25,2)
D-34	Th-229+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(25,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(26,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(26,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(26,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(27,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(27,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(27,3)
D-34				
D-34	U-233 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(28,1)
D-34	U-233 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(28,2)
D-34	U-233 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(28,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(29,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(29,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(29,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(30,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(30,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(30,3)
D-34				
D-34	U-236 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(31,1)
D-34	U-236 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(31,2)
D-34	U-236 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(31,3)
-5	Bioaccumulation factors, fresh water, L/kg:			
-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
-5				
-5	Am-241 , fish	3.000E+01	3.000E+01	BIOFAC(2,1)
-5	Am-241 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(2,2)
-5				
-5	Am-243+D , fish	3.000E+01	3.000E+01	BIOFAC(3,1)
-5	Am-243+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(3,2)
-5				
-5	C-14 , fish	5.000E+04	5.000E+04	BIOFAC(4,1)
-5	C-14 , crustacea and mollusks	9.100E+03	9.100E+03	BIOFAC(4,2)
-5				
-5	Cm-245 , fish	3.000E+01	3.000E+01	BIOFAC(5,1)
-5	Cm-245 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(5,2)
-5				
-5	Co-60 , fish	3.000E+02	3.000E+02	BIOFAC(7,1)
-5	Co-60 , crustacea and mollusks	2.000E+02	2.000E+02	BIOFAC(7,2)

Summary : RESRAD Default Parameters

File : Plum Brook Surface Soil Mixture USACE.RAD

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

File: FGR 13 Mortality

Menu	Parameter	Current Value	Default	Parameter Name
D-5	Cs-137-D, fish	2.000E+03	2.000E+03	BIOFAC(8,1)
D-5	Cs-137-D, crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(8,2)
D-5				
D-5	Eu-155, fish	5.000E+01	5.000E+01	BIOFAC(9,1)
D-5	Eu-155, crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(9,2)
D-5				
D-5	H-3, fish	1.000E+00	1.000E+00	BIOFAC(10,1)
D-5	H-3, crustacea and mollusks	1.000E+00	1.000E+00	BIOFAC(10,2)
D-5				
D-5	I-129, fish	4.000E+01	4.000E+01	BIOFAC(11,1)
D-5	I-129, crustacea and mollusks	5.000E+00	5.000E+00	BIOFAC(11,2)
D-5				
D-5	Nb-94, fish	3.000E+02	3.000E+02	BIOFAC(12,1)
D-5	Nb-94, crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(12,2)
D-5				
D-5	Ni-63, fish	1.000E+02	1.000E+02	BIOFAC(13,1)
D-5	Ni-63, crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(13,2)
D-5				
D-5	Np-237-D, fish	3.000E+01	3.000E+01	BIOFAC(14,1)
D-5	Np-237-D, crustacea and mollusks	4.000E+02	4.000E+02	BIOFAC(14,2)
D-5				
D-5	Pa-231, fish	1.000E+01	1.000E+01	BIOFAC(15,1)
D-5	Pa-231, crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(15,2)
D-5				
D-5	Pb-210-D, fish	3.000E+02	3.000E+02	BIOFAC(16,1)
D-5	Pb-210-D, crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(16,2)
D-5				
D-5	Pu-239, fish	3.000E+01	3.000E+01	BIOFAC(17,1)
D-5	Pu-239, crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(17,2)
D-5				
D-5	Pu-238, fish	3.000E+01	3.000E+01	BIOFAC(18,1)
D-5	Pu-238, crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(18,2)
D-5				
D-5	Pu-241-D, fish	3.000E+01	3.000E+01	BIOFAC(19,1)
D-5	Pu-241-D, crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(19,2)
D-5				
D-5	Ra-226-D, fish	5.000E+01	5.000E+01	BIOFAC(21,1)
D-5	Ra-226-D, crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(21,2)
D-5				
D-5	Ra-228-D, fish	5.000E+01	5.000E+01	BIOFAC(22,1)
D-5	Ra-228-D, crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(22,2)
D-5				
D-5	Sr-90-D, fish	6.000E+01	6.000E+01	BIOFAC(23,1)
D-5	Sr-90-D, crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(23,2)
D-5				
D-5	Tb-152-D, fish	1.000E+02	1.000E+02	BIOFAC(24,1)
D-5	Tb-152-D, crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(24,2)
D-5				
D-5	Th-232-D, fish	1.000E+02	1.000E+02	BIOFAC(25,1)
D-5	Th-232-D, crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(25,2)

Summary : RESRAD Default Parameters

File : Flumbrook Surface Soil Mixture USACE.RAD

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

File: FGR 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-5	Th-230 ; fish	1.000E+02	1.000E+02	BIOFAC(26,1)
D-5	Th-230 , crustacea and mollusks	5.000E-02	5.000E-02	BIOFAC(26,2)
D-5				
D-5	Th-232 ; fish	1.000E-02	1.000E-02	BIOFAC(27,1)
D-5	Th-232 , crustacea and mollusks	5.000E-02	5.000E-02	BIOFAC(27,2)
D-5				
D-5	U-235 ; fish	1.000E+01	1.000E+01	BIOFAC(28,1)
D-5	U-235 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(28,2)
D-5				
D-5	U-238 ; fish	1.000E+01	1.000E+01	BIOFAC(29,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(29,2)
D-5				
D-5	U-235-D ; fish	1.000E+01	1.000E+01	BIOFAC(30,1)
D-5	U-235-D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(30,2)
D-5				
D-5	U-236 ; fish	1.000E+01	1.000E+01	BIOFAC(31,1)
D-5	U-236 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(31,2)

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)	1.091E+05	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.000E+00	2.000E+00	---	THICKO
R011	Length parallel to aquifer flow (m)	3.650E+02	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)	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)	3.000E+01	1.000E+02	---	T(6)
R011	Times for calculations (yr)	1.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	3.000E+02	1.000E+03	---	T(8)
R011	Times for calculations (yr)	1.000E+03	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
F012	Initial principal radionuclide (pCi/g): Am-241	1.500E-01	0.000E+00	---	S1(2)
F012	Initial principal radionuclide (pCi/g): Am-243	1.600E-01	0.000E+00	---	S1(3)
F012	Initial principal radionuclide (pCi/g): C-14	2.100E-00	0.000E+00	---	S1(4)
F012	Initial principal radionuclide (pCi/g): Cm-245	1.200E-01	0.000E+00	---	S1(5)
F012	Initial principal radionuclide (pCi/g): Co-60	1.600E+00	0.000E+00	---	S1(7)
F012	Initial principal radionuclide (pCi/g): Cs-137	5.850E+01	0.000E+00	---	S1(8)
F012	Initial principal radionuclide (pCi/g): Eu-155	7.600E-01	0.000E+00	---	S1(9)
F012	Initial principal radionuclide (pCi/g): H-3	2.268E+01	0.000E+00	---	S1(10)
F012	Initial principal radionuclide (pCi/g): I-129	5.300E-01	0.000E+00	---	S1(11)
F012	Initial principal radionuclide (pCi/g): Nb-94	3.000E-01	0.000E+00	---	S1(12)
F012	Initial principal radionuclide (pCi/g): Ni-63	6.960E+00	0.000E+00	---	S1(13)
F012	Initial principal radionuclide (pCi/g): Pu-238	1.700E-01	0.000E+00	---	S1(17)
F012	Initial principal radionuclide (pCi/g): Pu-239	1.600E-01	0.000E+00	---	S1(18)
F012	Initial principal radionuclide (pCi/g): Sr-90	5.490E+00	0.000E+00	---	S1(23)
F012	Initial principal radionuclide (pCi/g): U-236	1.200E-01	0.000E+00	---	S1(31)
W012	Concentration in groundwater (pCi/L): Am-241	not used	0.000E+00	---	W1(2)
W012	Concentration in groundwater (pCi/L): Am-243	not used	0.000E+00	---	W1(3)
W012	Concentration in groundwater (pCi/L): C-14	not used	0.000E+00	---	W1(4)
W012	Concentration in groundwater (pCi/L): Cm-245	not used	0.000E+00	---	W1(5)
W012	Concentration in groundwater (pCi/L): Co-60	not used	0.000E+00	---	W1(7)
W012	Concentration in groundwater (pCi/L): Cs-137	not used	0.000E+00	---	W1(8)
W012	Concentration in groundwater (pCi/L): Eu-155	not used	0.000E+00	---	W1(9)
W012	Concentration in groundwater (pCi/L): H-3	not used	0.000E+00	---	W1(10)
W012	Concentration in groundwater (pCi/L): I-129	not used	0.000E+00	---	W1(11)
W012	Concentration in groundwater (pCi/L): Nb-94	not used	0.000E+00	---	W1(12)
W012	Concentration in groundwater (pCi/L): Ni-63	not used	0.000E+00	---	W1(13)
W012	Concentration in groundwater (pCi/L): Pu-238	not used	0.000E+00	---	W1(17)
W012	Concentration in groundwater (pCi/L): Pu-239	not used	0.000E+00	---	W1(18)
W012	Concentration in groundwater (pCi/L): Sr-90	not used	0.000E+00	---	W1(23)
W012	Concentration in groundwater (pCi/L): U-236	not used	0.000E+00	---	W1(31)
O013	Cover depth (m)	0.000E+00	0.000E+00	---	COVERO
D013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
V013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
D013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.500E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	2.700E-02	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	7.120E+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)	8.000E+00	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	8.600E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	1.040E+00	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	5.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EFS
R014	Density of saturated zone (g/cm**3)	1.520E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.500E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	2.000E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	2.700E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	5.000E-03	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	0.000E+00	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	8.000E-00	1.000E+01	---	DWIEWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	1.180E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	5.000E-00	4.000E-00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.520E+00	1.500E+00	---	DENSU2(1)
R015	Unsat. zone 1, total porosity	4.500E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	7.120E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	2.700E-02	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Am-241				
R016	Contaminated zone (cm**3/g)	1.445E+03	2.000E+01	---	DCNUCC(2)
R016	Unsat. zone 1 (cm**3/g)	1.445E+03	2.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	1.445E+03	2.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.737E-04	ALEACH(2)
R016	Solubility constant	1.445E+03	0.000E+00	Sol. Kd =-2.115E-01 not used	SOLUEK(2)
R016	Distribution coefficients for Am-243				
R016	Contaminated zone (cm**3/g)	1.445E+03	2.000E+01	---	DCNUCC(3)
R016	Unsat. zone 1 (cm**3/g)	1.445E+03	2.000E+01	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	1.445E+03	2.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.737E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUEK(3)

Summary : RESRAD Default Parameters

File : Fluoropol, Surface Soil Mixture USACE.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 C-14				
R016	Contaminated zone (cm**3/g)	2.100E+01	0.000E+00	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	2.100E+01	0.000E+00	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	2.100E+01	0.000E+00	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.546E-02	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Cm-245				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	1.378E+03	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	-1.000E+00	-1.000E+00	1.378E+03	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	-1.000E+00	-1.000E+00	1.378E+03	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.919E-04	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Co-60				
R016	Contaminated zone (cm**3/g)	1.000E+03	1.000E+03	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+03	1.000E+03	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	1.000E+03	1.000E+03	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.400E-04	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Cs-137				
R016	Contaminated zone (cm**3/g)	4.470E+02	1.000E+03	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	4.470E+02	1.000E+03	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	4.470E+02	1.000E+03	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.208E-03	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for Eu-152				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	8.249E+02	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	-1.000E+00	-1.000E+00	8.249E+02	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	-1.000E+00	-1.000E+00	8.249E+02	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	6.546E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for H-3				
R016	Contaminated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.555E+00	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)
R016	Distribution coefficients for I-129				
R016	Contaminated zone (cm**3/g)	4.570E+00	1.000E-01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	4.570E+00	1.000E-01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	4.570E+00	1.000E-01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.130E-01	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
	Distribution coefficients for No-94				
R016	Contaminated zone (cm**3/g)	6.310E+02	0.000E+00	---	DCNUCC(12)
R016	Unsaturated zone 1 (cm**3/g)	6.310E+02	0.000E+00	---	DCNUCU(12,1)
R016	Saturated zone (cm**3/g)	6.310E+02	0.000E+00	---	DCNUCS(12)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	6.557E-04	ALEACH(12)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(12)
	Distribution coefficients for Ni-63				
R016	Contaminated zone (cm**3/g)	3.700E+01	1.000E+03	---	DCNUCC(13)
R016	Unsaturated zone 1 (cm**3/g)	3.700E+01	1.000E+03	---	DCNUCU(13,1)
R016	Saturated zone (cm**3/g)	3.700E+01	1.000E+03	---	DCNUCS(13)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.452E-02	ALEACH(13)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(13)
	Distribution coefficients for Pu-238				
R016	Contaminated zone (cm**3/g)	9.540E+02	2.000E+03	---	DCNUCC(17)
R016	Unsaturated zone 1 (cm**3/g)	9.540E+02	2.000E+03	---	DCNUCU(17,1)
R016	Saturated zone (cm**3/g)	9.540E+02	2.000E+03	---	DCNUCS(17)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.661E-04	ALEACH(17)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(17)
	Distribution coefficients for Pu-239				
R016	Contaminated zone (cm**3/g)	9.540E+02	2.000E+03	---	DCNUCC(18)
R016	Unsaturated zone 1 (cm**3/g)	9.540E+02	2.000E+03	---	DCNUCU(18,1)
R016	Saturated zone (cm**3/g)	9.540E+02	2.000E+03	---	DCNUCS(18)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.661E-04	ALEACH(18)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(18)
	Distribution coefficients for Sr-90				
R016	Contaminated zone (cm**3/g)	3.200E+01	3.000E+01	---	DCNUCC(23)
R016	Unsaturated zone 1 (cm**3/g)	3.200E+01	3.000E+01	---	DCNUCU(23,1)
R016	Saturated zone (cm**3/g)	3.200E+01	3.000E+01	---	DCNUCS(23)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.677E-02	ALEACH(23)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(23)
	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.250E+02	5.000E+01	---	DCNUCC(31)
R016	Unsaturated zone 1 (cm**3/g)	1.250E+02	5.000E+01	---	DCNUCU(31,1)
R016	Saturated zone (cm**3/g)	1.250E+02	5.000E+01	---	DCNUCS(31)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.314E-03	ALEACH(31)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(31)
	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.672E-02	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)

Summary : RESRAD Default Parameters

File : Plumcreek Surface Soil Mixture USRCELRAD

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 Np-237				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCC(14)
R016	Unsaturated zone 1 (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCU(14,1)
R016	Saturated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCS(14)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.096E-03	ALEACH(14)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(14)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(15)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(15,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(15)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.076E-02	ALEACH(15)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(15)
R016	Distribution coefficients for daughter Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(16)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(16,1)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(16)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.390E-03	ALEACH(16)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(16)
R016	Distribution coefficients for daughter Pu-241				
R016	Contaminated zone (cm**3/g)	9.540E+02	2.000E+03	---	DCNUCC(19)
R016	Unsaturated zone 1 (cm**3/g)	9.540E+02	2.000E+03	---	DCNUCU(19,1)
R016	Saturated zone (cm**3/g)	9.540E+02	2.000E+03	---	DCNUCS(19)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.661E-04	ALEACH(19)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(19)
R016	Distribution coefficients for daughter Pu-241				
R016	Contaminated zone (cm**3/g)	9.540E+02	2.000E+03	---	DCNUCC(20)
R016	Unsaturated zone 1 (cm**3/g)	9.540E+02	2.000E+03	---	DCNUCU(20,1)
R016	Saturated zone (cm**3/g)	9.540E+02	2.000E+03	---	DCNUCS(20)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.661E-04	ALEACH(20)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(20)
R016	Distribution coefficients for daughter Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(21)
R016	Unsaturated zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(21,1)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(21)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.693E-03	ALEACH(21)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(21)
R016	Distribution coefficients for daughter Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(22)
R016	Unsaturated zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(22,1)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(22)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.693E-03	ALEACH(22)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(22)

Summary : RESRAD Default Parameters

File : Flumbrook Surface Soil Mixture USACE.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 daughter Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(24)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(24,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(24)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	9.002E-06	ALEACH(24)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(24)
R016	Distribution coefficients for daughter Th-229				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(25)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(25,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(25)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	9.002E-06	ALEACH(25)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(25)
R016	Distribution coefficients for daughter Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(26)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(26,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(26)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	9.002E-06	ALEACH(26)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(26)
R016	Distribution coefficients for daughter Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(27)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(27,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(27)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	9.002E-06	ALEACH(27)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(27)
R016	Distribution coefficients for daughter U-233				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(28)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(28,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(28)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.076E-02	ALEACH(28)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(28)
R016	Distribution coefficients for daughter U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(29)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(29,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(29)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.076E-02	ALEACH(29)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(29)
R016	Distribution coefficients for daughter U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(30)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(30,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(30)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.076E-02	ALEACH(30)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(30)
R017	Inhalation rate (m**3/yr)	6.400E+03	6.400E+03	---	INHALR

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (if different from user input)	Parameter Name
R017	Mass loading for inhalation (g/m ³)	6.000E-06	1.000E-04	---	MLINH
R017	Exposure duration	3.653E+02	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	4.700E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	6.600E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	1.100E-01	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)
	Fractions of annular areas within AREA:				
	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)
018	Fruits, vegetables and grain consumption (kg/yr)	7.800E+01	1.600E+02	---	DIET(1)
018	Leafy vegetable consumption (kg/yr)	1.500E+01	1.400E+01	---	DIET(2)
018	Milk consumption (L/yr)	1.180E+02	9.200E+01	---	DIET(3)
018	Meat and poultry consumption (kg/yr)	5.200E+01	6.300E+01	---	DIET(4)
018	Fish consumption (kg/yr)	1.600E+01	5.400E+00	---	DIET(5)
018	Other seafood consumption (kg/yr)	0.000E+00	9.000E-01	---	DIET(6)
018	Soil ingestion rate (g/yr)	1.830E+01	3.650E+01	---	SOIL
018	Drinking water intake (L/yr)	4.780E+02	5.100E+02	---	DWI
018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
018	Contamination fraction of household water	not used	1.000E+00	---	FHW
018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
018	Contamination fraction of aquatic food	5.000E-01	5.000E-01	---	FRF
018	Contamination fraction of plant food	1.000E+00	-1	---	FFLANT
018	Contamination fraction of meat	1.000E+00	-1	---	FMEAT

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
RO18	Contamination fraction of milk	1.000E+00	-1	---	FMILK
RO19	Livestock fodder intake for meat (kg/day)	8.500E+00	6.800E+01	---	LF15
RO19	Livestock fodder intake for milk (kg/day)	1.700E+01	5.500E+01	---	LF16
RO19	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LW15
RO19	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LW16
RO19	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
RO19	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
RO19	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
RO19	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
RO19	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGNDW
RO19	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
RO19	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
RO19	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
119B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
119E	Wet weight crop yield for leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
119B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
119B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
119E	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
119E	Growing Season for Fodder (years)	6.000E-02	6.000E-02	---	TE(3)
	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
19E	Dry foliar interception fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
19E	Dry foliar interception fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
19E	Dry foliar interception fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
19E	Wet foliar interception fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
19E	Wet foliar interception fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
19E	Wet foliar interception fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
19E	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
14	C-12 concentration in water (g/cm**3)	2.000E-05	2.000E-05	---	C12WTR
14	C-12 concentration in contaminated soil (g/g)	3.000E-02	3.000E-02	---	C12CZ
14	Fraction of vegetation carbon from soil	2.000E-02	2.000E-02	---	CSOIL
14	Fraction of vegetation carbon from air	9.800E-01	9.800E-01	---	CAIR
14	C-14 evasion layer thickness in soil (m)	3.000E-01	3.000E-01	---	DMC
14	C-14 evasion flux rate from soil (l/sec)	7.000E-07	7.000E-07	---	EVSN
14	C-14 evasion flux rate from soil (l/sec)	1.000E-10	1.000E-10	---	REVSN
14	Fraction of grain in beef cattle feed	6.000E-01	6.000E-01	---	AVFGJ
14	Fraction of grain in milk cow feed	1.000E-01	2.000E-01	---	AVFGS
14	DCF correction factor for gaseous forms of C14	6.894E+01	6.894E+01	---	CO2F
OR	Storage times of contaminated foodstuffs (days):				
OR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
OR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
OR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
OR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
OR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
OR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)

Summary : RESRAD default Parameters

File : Plumrock Surface Soil Mixture USACE.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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-30	---	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)
FILE	Number of graphical time points	32	---	---	NPTS
FILE	Maximum number of integration points for dose	17	---	---	LYMAX
FILE	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

Summary : RESRAD Default Parameters

File : Blanketed Surface Soil Mixture WSAGE.RAD

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	109100.00 square meters	Am-241	1.500E-01
Thickness:	1.00 meters	Am-243	1.600E-01
Cover Depth:	0.00 meters	C-14	2.110E+00
		Cm-245	2.200E-01
		Cc-60	1.680E+00
		Cs-137	5.850E+01
		Eu-155	7.600E-01
		H-3	2.268E+01
		I-129	5.300E-01
		Nb-94	3.000E-01
		Ni-63	6.960E-00
		Pu-238	1.700E-01
		Pu-239	1.600E-01
		Sr-90	5.490E+00
		U-236	1.200E-01

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	3.000E+00	1.000E+01	3.000E+01	3.300E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.442E+02	1.329E+02	1.236E+02	9.905E+01	6.589E+01	6.196E+01	1.084E+01	1.279E+00	4.327E-02
M(t):	5.769E+00	5.316E+00	4.943E+00	3.962E+00	2.636E+00	2.478E+00	4.335E-01	5.115E-02	1.731E-03

TDOSE(t): 1.442E+02 mrem/yr at t = 0.000E+00 years

Summary : RESRAD Default Parameters

File : Plutonium Surface Soil Minnow USACE.RSL

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.
Am-241	2.749E-03	0.0000	2.702E-04	0.0000	0.000E+00	0.0000	5.082E-02	0.0004	7.212E-04	0.0000	6.657E-05	0.0000	7.686E-03	0.0001
Am-243	5.941E-02	0.0004	2.859E-04	0.0000	0.000E+00	0.0000	5.411E-02	0.0004	7.678E-04	0.0000	7.086E-05	0.0000	8.182E-03	0.0001
C-14	1.781E-06	0.0000	6.336E-04	0.0000	0.000E+00	0.0000	3.434E+00	0.0238	2.192E+00	0.0152	1.167E+00	0.0041	9.315E-06	0.0000
Cm-245	5.124E-02	0.0002	4.067E-04	0.0000	0.000E+00	0.0000	7.668E-02	0.0005	4.360E-04	0.0000	1.004E-04	0.0000	1.160E-02	0.0001
Ce-60	1.049E-01	0.0728	1.400E-06	0.0000	0.000E+00	0.0000	3.150E-01	0.0022	5.196E-02	0.0004	1.859E-02	0.0001	5.965E-04	0.0000
Cs-137	6.111E-01	0.5624	7.488E-06	0.0000	0.000E+00	0.0000	1.075E+01	0.0745	3.757E-00	0.0263	3.219E+00	0.0223	4.072E-02	0.0003
Eu-155	5.412E-02	0.0004	1.192E-07	0.0000	0.000E+00	0.0000	2.524E-04	0.0000	5.882E-05	0.0000	1.389E-06	0.0000	1.529E-05	0.0000
H-3	0.000E+00	0.0000	1.576E-02	0.0001	0.000E+00	0.0000	1.067E-01	0.0007	8.402E-03	0.0001	1.531E-02	0.0001	3.935E-06	0.0000
I-129	2.717E-03	0.0000	3.542E-07	0.0000	0.000E+00	0.0000	2.583E-01	0.0018	3.404E-02	0.0002	1.380E-01	0.0010	1.949E-03	0.0000
Nb-94	1.195E+00	0.0083	5.042E-07	0.0000	0.000E+00	0.0000	1.992E-03	0.0000	1.954E-06	0.0000	3.366E-07	0.0000	3.017E-05	0.0000
Ni-63	0.000E+00	0.0000	1.759E-07	0.0000	0.000E+00	0.0000	1.848E-02	0.0001	9.568E-04	0.0000	1.267E-02	0.0001	5.598E-05	0.0000
Pu-238	1.074E-05	0.0000	2.695E-04	0.0000	0.000E+00	0.0000	5.047E-02	0.0003	1.433E-03	0.0000	3.306E-05	0.0000	7.633E-03	0.0001
Pu-239	1.967E-05	0.0000	2.787E-04	0.0000	0.000E+00	0.0000	5.276E-02	0.0004	1.457E-03	0.0000	3.455E-05	0.0000	7.979E-03	0.0001
Sr-90	5.454E-02	0.0004	2.863E-05	0.0000	0.000E+00	0.0000	2.298E+01	0.1593	1.047E+00	0.0073	1.090E+00	0.0076	1.160E-02	0.0001
U-236	1.060E-05	0.0000	6.079E-05	0.0000	0.000E+00	0.0000	7.496E-03	0.0001	2.969E-04	0.0000	1.237E-03	0.0000	4.539E-04	0.0000
Total	9.300E+01	0.6449	1.603E-02	0.0001	0.000E+00	0.0000	3.815E+01	0.2646	7.127E+00	0.0494	5.662E+00	0.0393	9.651E-02	0.0007

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

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.232E-02	0.0004
Am-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.232E-01	0.0009
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.754E+00	0.0471
Cm-245	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.205E-01	0.0008
Ce-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.089E+01	0.0754
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.891E+01	0.6858
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.445E-02	0.0004
H-3	0.000E+00	0.0000	1.620E-04	0.0001	0.000E+00	0.0000	4.179E-02	0.0003	5.010E-03	0.0000	2.019E-02	0.0001	3.051E-01	0.0021
I-129	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.350E-01	0.0030
Nb-94	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.197E+00	0.0083
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.216E-02	0.0002
U-236	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.985E-02	0.0004
U-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.257E-02	0.0004
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.518E+01	0.1746
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	9.555E-03	0.0001
Total	9.300E+01	0.6449	1.603E-02	0.0000	0.000E+00	0.0000	4.179E-02	0.0003	5.010E-03	0.0000	2.019E-02	0.0001	1.442E+02	1.0000

Sum of all water independent and dependent pathways.

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

Water Independent Pathways (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.
Am-241	2.744E-03	0.0000	2.697E-04	0.0000	0.000E+00	0.0000	5.072E-02	0.0004	7.199E-04	0.0000	6.644E-05	0.0000	7.671E-03	0.0001
Am-243	5.978E-02	0.0004	2.858E-04	0.0000	0.000E+00	0.0000	5.406E-02	0.0004	7.675E-04	0.0000	7.083E-05	0.0000	6.179E-03	0.0001
C-14	2.259E-09	0.0000	6.035E-07	0.0000	0.000E+00	0.0000	5.063E-03	0.0000	4.932E-03	0.0000	2.299E-03	0.0000	1.181E-08	0.0000
Cm-245	3.122E-02	0.0002	4.068E-04	0.0000	0.000E+00	0.0000	7.672E-02	0.0006	4.377E-04	0.0000	1.004E-04	0.0000	1.160E-02	0.0001
Co-60	9.195E-00	0.0692	1.227E-06	0.0000	0.000E+00	0.0000	2.760E-01	0.0021	4.553E-02	0.0003	1.629E-02	0.0001	5.228E-04	0.0000
Cs-137	7.916E+01	0.5957	7.308E-06	0.0000	0.000E+00	0.0000	1.049E+01	0.0790	3.696E+00	0.0278	3.142E+00	0.0236	3.974E-02	0.0003
Eu-155	4.703E-02	0.0004	1.036E-07	0.0000	0.000E+00	0.0000	2.194E-04	0.0000	5.111E-05	0.0000	1.207E-06	0.0000	1.326E-05	0.0000
H-3	0.000E+00	0.0000	7.616E-05	0.0000	0.000E+00	0.0000	6.616E-04	0.0000	7.007E-05	0.0000	1.165E-04	0.0000	2.235E-08	0.0000
I-129	2.426E-03	0.0000	3.164E-07	0.0000	0.000E+00	0.0000	2.309E-01	0.0017	3.045E-02	0.0002	1.233E-01	0.0009	1.741E-03	0.0000
Nb-94	1.194E+00	0.0090	5.038E-07	0.0000	0.000E+00	0.0000	1.990E-03	0.0000	1.952E-06	0.0000	3.363E-07	0.0000	3.014E-05	0.0000
Ni-63	0.000E+00	0.0000	1.721E-07	0.0000	0.000E+00	0.0000	1.808E-02	0.0001	9.364E-04	0.0000	1.240E-02	0.0001	5.477E-05	0.0000
Pu-238	1.065E-05	0.0000	2.673E-04	0.0000	0.000E+00	0.0000	5.005E-02	0.0004	1.420E-03	0.0000	3.278E-05	0.0000	7.569E-03	0.0001
Pu-239	1.966E-05	0.0000	2.785E-04	0.0000	0.000E+00	0.0000	5.273E-02	0.0004	1.497E-03	0.0000	3.453E-05	0.0000	7.974E-03	0.0001
Sr-90	5.237E-02	0.0004	2.749E-05	0.0000	0.000E+00	0.0000	2.207E+01	0.1660	1.006E+00	0.0076	1.047E+00	0.0079	1.114E-02	0.0001
U-236	1.076E-05	0.0000	6.053E-05	0.0000	0.000E+00	0.0000	7.463E-03	0.0001	2.957E-04	0.0000	1.232E-03	0.0000	4.519E-04	0.0000
Total	8.975E+01	0.6753	1.685E-03	0.0000	0.000E+00	0.0000	3.338E+01	0.2512	4.789E+00	0.0360	4.345E+00	0.0327	9.669E-02	0.0007

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.
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	6.220E-02	0.0005
Am-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.232E-01	0.0009
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.230E-02	0.0001
Cm-245	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.205E-01	0.0009
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.533E+00	0.0717
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.653E+01	0.7264
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.732E-02	0.0004
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.342E-01	0.0040
I-129	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.888E-01	0.0029
Nb-94	0.000E+00	0.0000	0.000E+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+00	0.0090
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.148E-02	0.0002
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	5.935E-02	0.0004
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	6.253E-02	0.0005
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.416E+01	0.1820
U-236	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.514E-03	0.0001
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.466E-01	0.0011	2.056E-02	0.0002	6.747E-02	0.0005	1.329E+02	1.0000

Sum of all water independent and dependent pathways.

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

Water Independent Pathways (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.
Am-241	2.733E-03	0.0000	2.686E-04	0.0000	0.000E+00	0.0000	5.053E-02	0.0004	7.170E-04	0.0000	6.617E-05	0.0000	7.641E-03	0.0001
Am-243	5.972E-02	0.0005	2.855E-04	0.0000	0.000E+00	0.0000	5.403E-02	0.0004	7.669E-04	0.0000	7.077E-05	0.0000	8.171E-03	0.0001
C-14	3.490E-15	0.0000	1.241E-12	0.0000	0.000E+00	0.0000	7.832E-09	0.0000	7.658E-09	0.0000	3.565E-09	0.0000	1.825E-14	0.0000
Cm-245	3.120E-02	0.0003	4.072E-04	0.0000	0.000E+00	0.0000	7.679E-02	0.0006	4.410E-04	0.0000	1.004E-04	0.0000	1.161E-02	0.0001
Co-60	7.061E+00	0.0571	9.420E-07	0.0000	0.000E+00	0.0000	2.120E-01	0.0017	3.496E-02	0.0003	1.251E-02	0.0001	4.014E-04	0.0000
Cs-137	7.540E+01	0.6102	6.961E-06	0.0000	0.000E+00	0.0000	9.595E+00	0.0689	5.521E+00	0.0285	2.993E+00	0.0242	3.785E-02	0.0003
Eu-155	3.552E-02	0.0003	7.824E-06	0.0000	0.000E+00	0.0000	1.657E-04	0.0000	3.860E-05	0.0000	9.117E-07	0.0000	1.003E-05	0.0000
H-3	0.000E+00	0.0000	2.482E-09	0.0000	0.000E+00	0.0000	2.102E-06	0.0000	2.229E-05	0.0000	3.704E-05	0.0000	7.097E-13	0.0000
I-129	1.936E-03	0.0000	2.524E-07	0.0000	0.000E+00	0.0000	1.842E-01	0.0015	2.429E-02	0.0002	9.840E-02	0.0008	1.369E-03	0.0000
Nb-94	1.191E+00	0.0096	5.029E-07	0.0000	0.000E+00	0.0000	1.986E-03	0.0000	1.949E-06	0.0000	3.377E-07	0.0000	3.009E-05	0.0000
Ni-63	0.000E+00	0.0000	1.648E-07	0.0000	0.000E+00	0.0000	1.732E-02	0.0001	8.966E-04	0.0000	1.187E-02	0.0001	5.244E-05	0.0000
Pu-238	1.047E-05	0.0000	2.628E-04	0.0000	0.000E+00	0.0000	4.921E-02	0.0004	1.397E-03	0.0000	3.224E-05	0.0000	7.442E-03	0.0001
Pu-239	1.964E-05	0.0000	2.782E-04	0.0000	0.000E+00	0.0000	5.267E-02	0.0004	1.495E-03	0.0000	3.449E-05	0.0000	7.965E-03	0.0001
Sr-90	4.929E-02	0.0004	2.555E-05	0.0000	0.000E+00	0.0000	2.035E+01	0.1646	9.272E-01	0.0075	9.651E-01	0.0078	1.027E-02	0.0001
U-236	1.066E-05	0.0000	6.031E-05	0.0000	0.000E+00	0.0000	7.399E-03	0.0001	2.931E-04	0.0000	1.222E-03	0.0000	4.480E-04	0.0000
Total	8.384E+01	0.6784	1.597E-03	0.0000	0.000E+00	0.0000	3.105E+01	0.2512	4.514E+00	0.0365	4.082E+00	0.0330	9.329E-02	0.0008

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

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
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	6.195E-02	0.0005
Am-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.231E-01	0.0010
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.906E-08	0.0000
Cm-245	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.205E-01	0.0010
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.321E+00	0.0592
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.195E+01	0.7441
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.573E-02	0.0003
H-3	3.631E-03	0.0000	7.236E-06	0.0000	0.000E+00	0.0000	2.112E-03	0.0000	3.862E-04	0.0000	9.233E-04	0.0000	7.060E-03	0.0001
I-129	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.102E-01	0.0023
Nb-94	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.193E+00	0.0097
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.014E-02	0.0002
U-236	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.835E-02	0.0005
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	6.246E-02	0.0005
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.230E+01	0.1804
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	9.433E-03	0.0001
Total	3.631E-03	0.0000	7.236E-06	0.0000	0.000E+00	0.0000	2.112E-03	0.0000	3.862E-04	0.0000	9.233E-04	0.0000	1.236E+02	1.0000

Sum of all water independent and dependent pathways.

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

Water Independent Pathways (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.
Am-241	2.695E-03	0.0000	2.649E-04	0.0000	0.000E+00	0.0000	4.993E-02	0.0005	7.072E-04	0.0000	6.526E-05	0.0000	7.536E-03	0.0001
Am-243	5.953E-02	0.0006	2.846E-04	0.0000	0.000E+00	0.0000	5.387E-02	0.0005	7.647E-04	0.0000	7.054E-05	0.0000	8.146E-03	0.0001
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.359E-29	0.0000	2.337E-29	0.0000	1.083E-29	0.0000	0.000E+00	0.0000
Cm-245	3.111E-02	0.0003	4.089E-04	0.0000	0.000E+00	0.0000	7.711E-02	0.0006	4.525E-04	0.0000	1.006E-04	0.0000	1.166E-02	0.0001
Co-60	2.402E+00	0.0283	3.738E-07	0.0000	0.000E+00	0.0000	6.411E-02	0.0006	1.387E-02	0.0001	4.963E-03	0.0001	1.593E-04	0.0000
Cs-137	6.560E+01	0.6422	5.872E-06	0.0000	0.000E+00	0.0000	6.430E+00	0.0951	2.970E+00	0.0300	2.525E+00	0.0255	3.193E-02	0.0003
Eu-155	1.329E-02	0.0001	2.928E-06	0.0000	0.000E+00	0.0000	6.200E-05	0.0000	1.445E-05	0.0000	3.412E-07	0.0000	3.755E-06	0.0000
H-3	0.000E+00	0.0000	3.905E-25	0.0000	0.000E+00	0.0000	3.227E-24	0.0000	3.440E-25	0.0000	5.704E-25	0.0000	1.088E-28	0.0000
I-129	8.779E-04	0.0000	1.145E-07	0.0000	0.000E+00	0.0000	6.353E-02	0.0006	1.102E-02	0.0001	4.463E-02	0.0005	6.299E-04	0.0000
Nb-94	1.184E+00	0.0120	4.998E-07	0.0000	0.000E+00	0.0000	1.974E-03	0.0000	1.957E-06	0.0000	3.356E-07	0.0000	2.990E-05	0.0000
Ni-63	0.000E+00	0.0000	1.415E-07	0.0000	0.000E+00	0.0000	1.487E-02	0.0002	7.701E-04	0.0000	1.020E-02	0.0001	4.504E-05	0.0000
Pu-239	9.467E-06	0.0000	2.476E-04	0.0000	0.000E+00	0.0000	4.638E-02	0.0005	1.316E-03	0.0000	3.042E-05	0.0000	7.014E-03	0.0001
Pu-239	1.955E-05	0.0000	2.771E-04	0.0000	0.000E+00	0.0000	5.245E-02	0.0005	1.489E-03	0.0000	3.435E-05	0.0000	7.931E-03	0.0001
Sr-90	3.655E-02	0.0004	1.908E-05	0.0000	0.000E+00	0.0000	1.532E+01	0.1546	6.980E-01	0.0070	7.265E-01	0.0073	7.731E-03	0.0001
U-238	1.035E-05	0.0000	5.623E-05	0.0000	0.000E+00	0.0000	7.179E-03	0.0001	2.844E-04	0.0000	1.185E-03	0.0000	4.347E-04	0.0000
Total	6.773E+01	0.6639	1.567E-05	0.0000	0.000E+00	0.0000	2.422E+01	0.2445	3.699E+00	0.0373	3.312E+00	0.0334	8.325E-02	0.0008

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- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.110E-02	0.0006
Am-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.227E-01	0.0012
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.776E-29	0.0000
Cm-245	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.208E-01	0.0012
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.905E-00	0.0293
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.756E-01	0.7831
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.337E-02	0.0001
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.519E-19	0.0000	6.442E-18	0.0000	1.538E-19	0.0000	1.176E-18	0.0000
I-129	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.407E-01	0.0014
Nb-94	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.166E+00	0.0120
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.588E-02	0.0003
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	5.500E-02	0.0006
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	6.220E-02	0.0006
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.678E+01	0.1695
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	9.152E-03	0.0001
Total	0.047E-19	0.0000	1.235E-21	0.0000	0.000E+00	0.0000	3.519E-19	0.0000	6.442E-18	0.0000	1.538E-19	0.0000	9.905E+01	1.0000

Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio- 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.
Am-241	2.591E-03	0.0000	2.547E-04	0.0000	0.000E+00	0.0000	4.791E-02	0.0007	6.799E-04	0.0000	6.274E-05	0.0000	7.243E-03	0.0001
Am-243	5.697E-02	0.0009	2.621E-04	0.0000	0.000E+00	0.0000	5.340E-02	0.0009	7.564E-04	0.0000	6.991E-05	0.0000	6.075E-03	0.0001
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-245	3.089E-02	0.0005	4.153E-04	0.0000	0.000E+00	0.0000	7.631E-02	0.0012	4.630E-04	0.0000	1.019E-04	0.0000	1.164E-02	0.0002
Co-60	1.996E-01	0.0030	2.665E-08	0.0000	0.000E+00	0.0000	5.997E-03	0.0001	9.693E-04	0.0000	3.539E-04	0.0000	1.136E-05	0.0000
Cs-137	3.911E+01	0.5935	3.611E-06	0.0000	0.000E+00	0.0000	5.164E+00	0.0787	1.626E+00	0.0277	1.552E+00	0.0236	1.964E-02	0.0003
Eu-155	6.018E-04	0.0000	1.766E-09	0.0000	0.000E+00	0.0000	3.740E-06	0.0000	8.714E-07	0.0000	2.058E-08	0.0000	2.265E-07	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
I-129	9.168E-05	0.0000	1.195E-08	0.0000	0.000E+00	0.0000	8.723E-03	0.0001	1.150E-03	0.0000	4.660E-03	0.0001	6.578E-05	0.0000
Nb-94	1.163E+00	0.0177	4.909E-07	0.0000	0.000E+00	0.0000	1.939E-03	0.0000	1.403E-06	0.0000	3.297E-07	0.0000	2.937E-05	0.0000
Ni-63	0.000E+00	0.0000	9.164E-06	0.0000	0.000E+00	0.0000	9.629E-03	0.0001	4.966E-04	0.0000	6.602E-03	0.0001	2.916E-05	0.0000
Pu-238	6.331E-06	0.0000	2.091E-04	0.0000	0.000E+00	0.0000	3.915E-02	0.0006	1.211E-03	0.0000	2.576E-05	0.0000	5.921E-03	0.0001
Pu-239	1.932E-05	0.0000	2.738E-04	0.0000	0.000E+00	0.0000	5.183E-02	0.0008	1.471E-03	0.0000	3.394E-05	0.0000	7.838E-03	0.0001
Sr-90	1.615E-02	0.0002	6.476E-06	0.0000	0.000E+00	0.0000	6.603E+00	0.1032	3.101E-01	0.0047	3.227E-01	0.0049	3.434E-03	0.0001
U-236	9.492E-06	0.0000	5.341E-05	0.0000	0.000E+00	0.0000	6.566E-03	0.0001	2.609E-04	0.0000	1.067E-03	0.0000	3.968E-04	0.0000
Total	4.058E+01	0.6159	1.501E-03	0.0000	0.000E+00	0.0000	1.229E+01	0.1865	2.144E+00	0.0325	1.688E+00	0.0287	6.452E-02	0.0010

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- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.674E-02	0.0009
Am-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.216E-01	0.0018
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-245	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.220E-01	0.0019
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.071E-01	0.0031
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.769E+01	0.7236
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.067E-04	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
I-129	3.830E+00	0.0536	2.577E-01	0.0039	0.000E+00	0.0000	1.995E+00	0.0303	3.493E-01	0.0053	2.789E+00	0.0423	6.936E+00	0.1356
Nb-94	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.165E+00	0.0177
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.676E-02	0.0003
U-236	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.643E-02	0.0007
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	6.146E-02	0.0009
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.456E+00	0.1131
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	6.396E-03	0.0001
Total	2.530E+00	0.0536	2.577E-01	0.0039	0.000E+00	0.0000	1.995E+00	0.0303	3.493E-01	0.0053	2.789E+00	0.0423	6.589E+01	1.0000

Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 3.300E+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.
Am-241	2.576E-03	0.0000	2.532E-04	0.0000	0.000E+00	0.0000	4.763E-02	0.0008	6.759E-04	0.0000	6.236E-05	0.0000	7.201E-03	0.0001
Am-243	5.669E-02	0.0010	2.618E-04	0.0000	0.000E+00	0.0000	5.333E-02	0.0009	7.575E-04	0.0000	6.991E-05	0.0000	8.064E-03	0.0001
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-245	3.066E-02	0.0005	4.163E-04	0.0000	0.000E+00	0.0000	7.851E-02	0.0013	4.873E-04	0.0000	1.021E-04	0.0000	1.167E-02	0.0002
Co-60	1.344E-01	0.0022	1.794E-06	0.0000	0.000E+00	0.0000	4.036E-03	0.0001	6.657E-04	0.0000	2.381E-04	0.0000	7.643E-06	0.0000
Cs-137	3.636E+01	0.5769	3.357E-06	0.0000	0.000E+00	0.0000	4.419E+00	0.0776	1.698E+00	0.0274	1.443E+00	0.0233	1.625E-02	0.0003
Eu-155	5.262E-04	0.0000	1.159E-06	0.0000	0.000E+00	0.0000	2.454E-06	0.0000	5.719E-07	0.0000	1.351E-08	0.0000	1.466E-07	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
I-129	6.533E-05	0.0000	6.517E-09	0.0000	0.000E+00	0.0000	6.215E-03	0.0001	6.199E-04	0.0000	3.321E-03	0.0001	4.667E-05	0.0000
Nb-94	1.160E+00	0.0167	4.896E-07	0.0000	0.000E+00	0.0000	1.934E-03	0.0000	1.698E-05	0.0000	3.266E-07	0.0000	2.930E-05	0.0000
Ni-63	0.000E+00	0.0000	6.585E-08	0.0000	0.000E+00	0.0000	9.021E-02	0.0001	4.671E-04	0.0000	6.185E-03	0.0001	2.732E-05	0.0000
Pu-238	6.122E-06	0.0000	2.038E-04	0.0000	0.000E+00	0.0000	3.817E-02	0.0006	1.083E-03	0.0000	2.512E-05	0.0000	7.824E-03	0.0001
Pu-239	1.929E-05	0.0000	2.733E-04	0.0000	0.000E+00	0.0000	5.173E-02	0.0008	1.468E-03	0.0000	3.388E-05	0.0000	7.824E-03	0.0001
Sr-90	1.430E-02	0.0002	7.504E-06	0.0000	0.000E+00	0.0000	6.024E+00	0.0972	2.745E-01	0.0044	2.857E-01	0.0046	3.041E-03	0.0000
U-238	9.370E-06	0.0000	5.273E-05	0.0000	0.000E+00	0.0000	6.501E-03	0.0001	2.575E-04	0.0000	1.073E-03	0.0000	3.937E-04	0.0000
Total	3.776E+01	0.6095	1.493E-03	0.0000	0.000E+00	0.0000	1.114E+01	0.1798	1.979E+00	0.0319	1.740E+00	0.0281	6.253E-02	0.0010

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 3.300E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.839E-02	0.0009
Am-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.214E-01	0.0020
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-245	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.223E-01	0.0020
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.394E-01	0.0022
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.434E+01	0.7156
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.294E-04	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
I-129	3.666E+00	0.0592	2.678E-01	0.0043	0.000E+00	0.0000	2.074E+00	0.0335	3.632E-01	0.0059	2.899E+00	0.0466	9.262E+00	0.1498
Nb-94	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.162E+00	0.0188
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.570E-02	0.0003
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	4.527E-02	0.0007
U-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.135E-02	0.0010
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.601E-03	0.1065
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	6.268E-03	0.0001
Total	3.666E+00	0.0592	2.678E-01	0.0043	0.000E+00	0.0000	2.074E+00	0.0335	3.632E-01	0.0059	2.899E+00	0.0466	6.196E+01	1.0000

Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : Plumbrook Surface Soil Mixture USAGE.RAT

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- 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.
Am-241	2.258E-03	0.0002	2.216E-04	0.0000	0.000E+00	0.0000	4.172E-02	0.0038	5.924E-04	0.0001	5.463E-05	0.0000	6.307E-03	0.0006
Am-243	5.707E-02	0.0053	2.736E-04	0.0000	0.000E+00	0.0000	5.175E-02	0.0046	7.366E-04	0.0001	6.772E-05	0.0000	7.830E-03	0.0007
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-245	3.026E-02	0.0026	4.401E-04	0.0000	0.000E+00	0.0000	6.294E-02	0.0077	5.739E-04	0.0001	1.076E-04	0.0000	1.255E-02	0.0012
Ce-60	1.934E-05	0.0000	2.560E-12	0.0000	0.000E+00	0.0000	5.802E-07	0.0000	9.573E-06	0.0000	3.424E-08	0.0000	1.099E-05	0.0000
Cs-137	7.152E+00	0.6561	6.564E-07	0.0000	0.000E+00	0.0000	5.446E-01	0.0572	3.330E-01	0.0307	2.630E-01	0.0261	3.580E-03	0.0003
Eu-155	4.323E-08	0.0000	9.524E-14	0.0000	0.000E+00	0.0000	2.015E-10	0.0000	4.696E-11	0.0000	1.110E-12	0.0000	1.221E-11	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
I-129	3.374E-06	0.0000	4.399E-13	0.0000	0.000E+00	0.0000	3.209E-06	0.0000	4.234E-07	0.0000	1.715E-06	0.0000	2.421E-08	0.0000
Nb-94	1.053E+00	0.1009	4.613E-07	0.0000	0.000E+00	0.0000	1.821E-03	0.0002	1.766E-06	0.0000	3.097E-07	0.0000	2.760E-05	0.0000
Ni-63	0.000E+00	0.0000	2.001E-06	0.0000	0.000E+00	0.0000	2.102E-03	0.0002	1.069E-04	0.0000	1.441E-03	0.0001	6.369E-06	0.0000
Pu-238	4.609E-06	0.0000	1.156E-04	0.0000	0.000E+00	0.0000	2.164E-02	0.0020	6.144E-04	0.0001	1.438E-05	0.0000	3.274E-03	0.0003
Pu-239	1.854E-05	0.0000	2.626E-04	0.0000	0.000E+00	0.0000	4.969E-02	0.0046	1.411E-03	0.0001	3.255E-05	0.0000	7.518E-03	0.0007
Sr-90	9.435E-04	0.0001	4.952E-07	0.0000	0.000E+00	0.0000	3.973E-01	0.0367	1.811E-02	0.0017	1.885E-02	0.0017	2.006E-04	0.0000
Tl-236	7.020E-06	0.0000	3.949E-05	0.0000	0.000E+00	0.0000	4.867E-03	0.0004	1.929E-04	0.0000	8.039E-04	0.0001	2.948E-04	0.0000
Total	8.315E+00	0.7673	1.355E-03	0.0001	0.000E+00	0.0000	1.599E+00	0.1475	3.553E-01	0.0326	3.044E-01	0.0281	4.159E-02	0.0036

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

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
n-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	5.115E-02	0.0047
n-243	9.937E-15	0.0000	2.716E-16	0.0000	0.000E+00	0.0000	5.564E-15	0.0000	2.770E-16	0.0000	1.559E-17	0.0000	1.177E-01	0.0109
-14	1.539E-04	0.0000	1.404E-02	0.0013	0.000E+00	0.0000	1.207E-03	0.0001	2.620E-04	0.0000	3.038E-04	0.0000	1.596E-02	0.0015
n-245	0.000E+00	0.0000	0.000E+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-01	0.0117
c-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.005E-05	0.0000
s-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.696E+00	0.6025
J-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.349E-06	0.0000
-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
-129	6.112E-03	0.0006	4.472E-04	0.0000	0.000E+00	0.0000	3.465E-03	0.0003	6.152E-04	0.0001	4.671E-03	0.0004	1.551E-02	0.0014
p-94	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.055E+00	0.1010
I-63	8.222E-04	0.0001	1.499E-04	0.0000	0.000E+00	0.0000	4.669E-04	0.0000	5.744E-05	0.0000	1.292E-03	0.0001	6.447E-03	0.0006
J-236	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.566E-02	0.0024
J-239	3.280E-11	0.0000	9.968E-13	0.0000	0.000E+00	0.0000	1.844E-11	0.0000	9.160E-15	0.0000	5.152E-14	0.0000	5.893E-02	0.0054
-90	9.387E-02	0.0087	1.028E-02	0.0009	0.000E+00	0.0000	5.628E-02	0.0052	1.064E-02	0.0010	1.487E-02	0.0014	6.213E-01	0.0573
63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.205E-03	0.0006
Total	1.010E-01	0.0099	2.491E-02	0.0023	0.000E+00	0.0000	6.243E-02	0.0057	1.159E-02	0.0011	2.134E-02	0.0020	1.084E-01	1.0000

Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 3.000E+02 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.
Am-241	1.523E-03	0.0012	1.493E-04	0.0001	0.000E+00	0.0000	2.189E-02	0.0171	3.962E-04	0.0003	3.653E-05	0.0000	4.247E-03	0.0033
Am-243	5.198E-02	0.0406	2.505E-04	0.0002	0.000E+00	0.0000	3.627E-02	0.0288	6.758E-04	0.0005	6.139E-05	0.0000	7.170E-03	0.0056
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-245	2.838E-02	0.0222	4.847E-04	0.0004	0.000E+00	0.0000	7.106E-02	0.0556	7.450E-04	0.0006	1.160E-04	0.0001	1.381E-02	0.0108
Co-60	6.565E-17	0.0000	6.761E-24	0.0000	0.000E+00	0.0000	1.532E-18	0.0000	2.835E-19	0.0000	9.736E-20	0.0000	3.733E-21	0.0000
Cs-137	5.513E-02	0.0431	5.090E-09	0.0000	0.000E+00	0.0000	5.680E-03	0.0044	2.343E-03	0.0018	1.908E-03	0.0015	2.768E-05	0.0000
Eu-155	2.758E-20	0.0000	6.076E-26	0.0000	0.000E+00	0.0000	1.000E-22	0.0000	2.970E-23	0.0000	6.956E-25	0.0000	7.790E-24	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
I-129	5.204E-16	0.0000	6.785E-22	0.0000	0.000E+00	0.0000	3.850E-16	0.0000	6.189E-17	0.0000	2.406E-16	0.0000	3.734E-18	0.0000
Nb-94	9.147E-01	0.7152	3.861E-07	0.0000	0.000E+00	0.0000	1.185E-03	0.0009	1.448E-04	0.0000	2.446E-07	0.0000	2.310E-05	0.0000
Ni-63	0.000E+00	0.0000	2.590E-10	0.0000	0.000E+00	0.0000	2.116E-05	0.0000	1.265E-06	0.0000	1.605E-05	0.0000	8.244E-08	0.0000
Pu-238	6.543E-07	0.0000	2.126E-05	0.0000	0.000E+00	0.0000	3.097E-03	0.0024	1.126E-04	0.0001	2.676E-06	0.0000	6.021E-04	0.0005
Pu-239	1.646E-05	0.0000	2.532E-04	0.0002	0.000E+00	0.0000	3.432E-02	0.0266	1.248E-03	0.0010	2.869E-05	0.0000	6.675E-03	0.0052
Sr-90	2.622E-07	0.0000	1.482E-10	0.0000	0.000E+00	0.0000	9.245E-05	0.0001	4.412E-06	0.0000	4.498E-06	0.0000	6.004E-08	0.0000
U-236	2.967E-06	0.0000	1.667E-05	0.0000	0.000E+00	0.0000	1.597E-03	0.0012	8.067E-05	0.0001	3.333E-04	0.0003	1.244E-04	0.0001
Total	1.052E+00	0.8224	1.156E-03	0.0009	0.000E+00	0.0000	1.758E-01	0.1375	5.609E-03	0.0044	2.509E-03	0.0020	3.268E-02	0.0256

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

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	1.131E-09	0.0000	2.066E-11	0.0000	0.000E+00	0.0000	6.370E-10	0.0000	5.436E-12	0.0000	5.561E-11	0.0000	2.824E-02	0.0221
Am-243	3.688E-11	0.0000	7.952E-13	0.0000	0.000E+00	0.0000	2.088E-11	0.0000	3.468E-13	0.0000	9.789E-13	0.0000	9.701E-02	0.0759
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-245	1.027E-10	0.0000	3.750E-12	0.0000	0.000E+00	0.0000	5.784E-11	0.0000	4.542E-13	0.0000	4.332E-12	0.0000	1.146E-01	0.0896
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.757E-17	0.0000
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.509E-02	0.0509
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.772E-20	0.0000
I-129	7.412E-13	0.0000	5.424E-14	0.0000	0.000E+00	0.0000	4.202E-13	0.0000	7.461E-14	0.0000	5.507E-13	0.0000	1.882E-12	0.0000
Nb-94	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.159E-01	0.7162
Ni-63	1.482E-03	0.0012	2.705E-04	0.0002	0.000E+00	0.0000	8.434E-04	0.0007	1.050E-04	0.0001	2.345E-03	0.0016	5.064E-03	0.0040
U-238	2.066E-05	0.0000	3.820E-07	0.0000	0.000E+00	0.0000	1.164E-05	0.0000	9.948E-06	0.0000	9.798E-07	0.0000	3.870E-03	0.0030
U-239	1.924E-06	0.0000	4.146E-10	0.0000	0.000E+00	0.0000	1.085E-06	0.0000	1.937E-10	0.0000	5.023E-10	0.0000	4.253E-02	0.0333
Sr-90	2.162E-03	0.0017	2.375E-04	0.0002	0.000E+00	0.0000	1.301E-03	0.0010	2.475E-04	0.0002	3.447E-04	0.0003	4.400E-03	0.0034
U-236	7.822E-13	0.0000	7.136E-14	0.0000	0.000E+00	0.0000	4.426E-13	0.0000	1.082E-14	0.0000	6.079E-14	0.0000	2.156E-03	0.0017
Total	3.670E-03	0.0029	5.045E-04	0.0004	0.000E+00	0.0000	2.156E-03	0.0017	3.526E-04	0.0003	2.691E-03	0.0021	1.279E+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- 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.
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.063E-09	0.0000	7.324E-10	0.0000	3.625E-12	0.0000	0.000E+00	0.0000
Am-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.502E-08	0.0000	3.664E-09	0.0000	1.743E-11	0.0000	0.000E+00	0.0000
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-245	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.749E-08	0.0000	6.073E-09	0.0000	4.391E-11	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.251E-16	0.0000	1.183E-15	0.0000	4.608E-16	0.0000	0.000E+00	0.0000
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
I-129	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Nb-94	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.516E-10	0.0000	6.860E-14	0.0000	3.218E-13	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.918E-18	0.0000	4.126E-18	0.0000	2.602E-17	0.0000	0.000E+00	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.621E-12	0.0000	2.197E-12	0.0000	6.274E-15	0.0000	0.000E+00	0.0000
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.257E-06	0.0000	5.976E-09	0.0000	7.389E-12	0.0000	0.000E+00	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.418E-23	0.0000	3.984E-23	0.0000	2.143E-23	0.0000	0.000E+00	0.0000
U-236	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.327E-11	0.0000	2.979E-11	0.0000	1.301E-11	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.854E-08	0.0000	1.648E-08	0.0000	8.570E-11	0.0000	0.000E+00	0.0000

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

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	9.407E-06	0.0002	5.148E-07	0.0000	0.000E+00	0.0000	5.320E-06	0.0001	1.331E-07	0.0000	4.327E-09	0.0000	1.538E-05	0.0004
Am-243	5.352E-10	0.0000	1.144E-11	0.0000	0.000E+00	0.0000	3.005E-10	0.0000	6.612E-12	0.0000	1.328E-11	0.0000	1.957E-08	0.0000
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-245	3.283E-06	0.0001	1.795E-07	0.0000	0.000E+00	0.0000	1.656E-06	0.0000	4.637E-08	0.0000	1.768E-09	0.0000	5.410E-06	0.0001
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.773E-15	0.0000
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
I-129	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Nb-94	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.520E-10	0.0000
Ni-63	1.663E-10	0.0000	3.402E-11	0.0000	0.000E+00	0.0000	1.061E-10	0.0000	1.323E-11	0.0000	2.952E-10	0.0000	6.348E-10	0.0000
U-236	9.131E-07	0.0000	1.449E-07	0.0000	0.000E+00	0.0000	5.151E-07	0.0000	6.525E-09	0.0000	3.983E-08	0.0000	1.619E-06	0.0000
U-238	3.165E-08	0.0000	6.847E-10	0.0000	0.000E+00	0.0000	1.795E-08	0.0000	4.022E-10	0.0000	7.608E-10	0.0000	7.023E-08	0.0000
Sr-90	2.551E-16	0.0000	2.795E-17	0.0000	0.000E+00	0.0000	1.531E-16	0.0000	2.913E-17	0.0000	4.057E-17	0.0000	5.058E-16	0.0000
U-235	1.647E-01	0.6117	4.833E-04	0.0011	0.000E+00	0.0000	1.491E-02	0.3446	1.275E-04	0.0029	1.256E-03	0.0290	4.327E-02	0.9995
Total	1.648E-02	0.6120	4.842E-04	0.0112	0.000E+00	0.0000	1.492E-02	0.3448	1.276E-04	0.0029	1.256E-03	0.0290	4.327E-02	1.0000

Sum of all water independent and dependent pathways.

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



Parent (i)	Product (j)	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	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Am-241	Am-241	1.000E+00	4.155E-01	4.146E-01	4.130E-01	4.073E-01	3.915E-01	3.892E-01	3.408E-01	1.879E-01	2.511E-06
Am-241	Np-237	1.000E+00	1.371E-06	4.242E-06	9.974E-06	2.967E-05	8.290E-05	9.050E-05	2.369E-04	3.741E-04	1.024E-04
Am-241	U-235	1.000E+00	3.063E-14	1.754E-13	8.206E-13	6.639E-12	4.963E-11	5.895E-11	3.848E-10	1.353E-09	1.406E-07
Am-241	Th-229	1.000E+00	6.889E-18	9.664E-17	1.032E-15	2.791E-14	8.322E-13	8.284E-12	1.765E-11	2.333E-10	8.044E-11
Am-241	ΣDSR(j)		4.155E-01	4.146E-01	4.130E-01	4.073E-01	3.916E-01	3.893E-01	3.410E-01	1.883E-01	1.024E-04
Am-243	Am-243	1.000E+00	7.701E-01	7.697E-01	7.690E-01	7.665E-01	7.594E-01	7.583E-01	7.348E-01	6.059E-01	1.123E-07
Am-243	Pu-239	1.000E+00	5.625E-06	1.688E-05	3.935E-05	1.176E-04	3.381E-04	3.708E-04	1.073E-03	2.345E-03	3.562E-09
Am-243	U-235	1.000E+00	1.839E-15	1.290E-14	6.785E-14	5.915E-13	4.623E-12	5.514E-12	3.907E-11	3.923E-10	2.787E-09
Am-243	Fa-231	1.000E+00	2.600E-19	4.122E-18	4.901E-17	1.271E-15	2.798E-14	3.647E-14	8.912E-13	4.186E-11	7.635E-10
Am-243	Ac-227	1.000E+00	1.018E-21	2.682E-20	5.937E-19	3.887E-17	2.009E-15	2.799E-15	1.974E-13	1.329E-10	1.856E-09
Am-243	ΣDSR(j)		7.761E-01	7.698E-01	7.691E-01	7.666E-01	7.597E-01	7.587E-01	7.356E-01	6.063E-01	1.223E-07
C-14	C-14	1.000E+00	3.220E+00	5.827E-03	9.031E-09	2.739E-29	0.000E+00	0.000E+00	7.575E-03	0.000E+00	0.000E+00
Cm-245	Cm-245	1.000E+00	5.474E-01	5.471E-01	5.466E-01	5.448E-01	5.396E-01	5.389E-01	5.219E-01	4.077E-01	1.027E-07
Cm-245	Pu-241	1.000E+00	1.790E-04	5.261E-04	1.171E-03	2.988E-03	5.739E-03	5.961E-03	7.149E-03	5.328E-03	2.527E-09
Cm-245	Am-241	1.000E+00	5.294E-06	3.648E-05	1.866E-04	1.491E-03	9.373E-03	1.086E-02	4.761E-02	1.078E-01	9.267E-08
Cm-245	Np-237	1.000E+00	8.188E-12	1.293E-10	1.516E-09	3.743E-06	7.280E-07	9.336E-07	1.368E-05	9.395E-05	2.432E-05
Cm-245	U-235	1.000E+00	1.400E-19	3.401E-18	7.075E-17	4.507E-15	2.417E-13	3.394E-13	1.395E-11	9.032E-10	7.417E-08
Cm-245	Th-229	1.000E+00	1.899E-23	1.066E-21	5.344E-20	1.116E-17	1.871E-15	2.906E-15	4.006E-13	1.169E-10	2.712E-10
Cm-245	ΣDSR(j)		5.475E-01	5.477E-01	5.479E-01	5.492E-01	5.547E-01	5.557E-01	5.766E-01	5.209E-01	2.459E-05
Cm-245	Cm-245	2.450E-05	1.341E-05	1.340E-05	1.339E-05	1.335E-05	1.322E-05	1.320E-05	1.279E-05	9.988E-06	2.517E-12
Cm-245	Pu-241	2.450E-05	4.388E-09	1.289E-08	2.870E-08	7.321E-08	1.406E-07	1.461E-07	1.751E-07	1.305E-07	6.191E-14
Cm-245	Np-237	2.450E-05	5.145E-13	3.770E-12	1.950E-11	1.576E-10	9.938E-10	1.151E-09	5.036E-09	1.094E-08	2.932E-09
Cm-245	U-235	2.450E-05	9.891E-21	1.174E-19	1.181E-18	2.503E-17	4.469E-16	5.681E-16	7.007E-15	2.767E-13	5.095E-12
Cm-245	Th-229	2.450E-05	1.673E-24	4.715E-23	1.122E-21	7.936E-20	4.466E-18	8.281E-18	2.701E-16	5.480E-15	2.466E-15
Cm-245	ΣDSR(j)		1.341E-05	1.342E-05	1.342E-05	1.342E-05	1.326E-05	1.325E-05	1.297E-05	1.013E-05	2.940E-09
Co-60	Co-60	1.000E+00	6.475E-02	5.874E-02	4.357E-02	1.729E-01	1.233E-01	8.290E-02	1.193E-05	4.022E-17	0.000E+00
Cs-137	Cs-137	1.000E+00	1.681E+00	1.650E+00	1.572E+00	1.326E+00	8.153E-01	7.579E-01	1.486E-01	1.113E-03	3.031E-17
Eu-155	Eu-155	1.000E+00	7.164E-02	6.126E-02	4.702E-02	1.760E-02	1.061E-03	6.966E-04	5.722E-06	3.647E-20	0.000E+00
F-19	F-19	1.000E+00	1.345E-01	2.355E-02	5.113E-04	5.165E-20	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I-129	I-129	1.000E+00	7.107E-01	7.356E-01	5.853E-01	2.654E-01	1.666E-01	1.751E-01	2.927E-01	3.550E-11	0.000E+00
K-94	K-94	1.000E+00	3.969E+00	3.985E+00	3.976E+00	3.954E+00	3.884E+00	3.873E+00	3.649E+00	3.053E+00	1.173E-09
Ni-63	Ni-63	1.000E+00	4.621E-03	4.522E-03	4.330E-03	3.719E-03	2.408E-03	2.256E-03	9.263E-04	7.305E-04	9.121E-11



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	3.300E+01	1.000E+02	3.000E+02	1.000E+03
Pu-238	Pu-238	1.000E+00	3.521E-01	3.491E-01	3.433E-01	3.235E-01	2.731E-01	2.663E-01	1.509E-01	2.256E-02	4.000E-11
Pu-238	U-234	1.000E+00	1.148E-07	3.479E-07	6.021E-07	2.258E-06	5.416E-06	5.782E-06	9.127E-06	2.018E-04	5.918E-06
Pu-238	Th-230	1.000E+00	2.954E-13	1.935E-12	9.608E-12	8.258E-11	6.106E-10	7.227E-10	4.329E-09	1.133E-06	1.607E-09
Pu-238	Ra-226	1.000E+00	4.205E-15	6.496E-14	7.615E-13	1.945E-11	4.170E-10	5.415E-10	9.395E-09	9.739E-08	6.588E-07
Pu-238	Pb-210	1.000E+00	2.662E-17	7.621E-16	1.706E-14	1.147E-12	6.223E-11	8.726E-11	3.291E-09	1.431E-07	2.947E-06
Pu-238	ΣDSR(j)		3.521E-01	3.491E-01	3.433E-01	3.235E-01	2.731E-01	2.663E-01	1.509E-01	2.277E-02	9.526E-06
Pu-239	Pu-239	1.000E+00	3.911E-01	3.908E-01	3.904E-01	3.887E-01	3.841E-01	3.835E-01	3.683E-01	2.658E-01	1.160E-07
Pu-239	U-235	1.000E+00	1.922E-10	5.757E-10	1.330E-09	3.840E-09	9.995E-09	1.080E-08	2.302E-08	1.350E-07	1.638E-07
Pu-239	Pa-231	1.000E+00	3.712E-14	1.710E-13	1.442E-12	1.240E-11	9.074E-11	1.071E-10	6.047E-10	2.199E-08	4.683E-08
Pu-239	Ac-227	1.000E+00	1.677E-16	2.154E-15	2.225E-14	4.894E-13	8.162E-12	1.026E-11	4.265E-10	6.894E-08	1.123E-07
Pu-239	ΣDSR(j)		3.911E-01	3.908E-01	3.904E-01	3.887E-01	3.841E-01	3.835E-01	3.683E-01	2.658E-01	4.389E-07
Sr-90	Sr-90	1.000E+00	4.566E-00	4.405E-00	4.061E+00	3.057E+00	1.358E+00	1.202E+00	1.132E-01	8.015E-04	9.214E-17
U-238	U-238	1.000E+00	7.963E-02	7.929E-02	7.861E-02	7.627E-02	6.996E-02	6.906E-02	5.171E-02	1.796E-02	3.604E-01
U-238	Th-232	1.000E+00	8.157E-12	2.337E-11	5.341E-11	1.565E-10	4.345E-10	4.741E-10	1.238E-09	2.064E-09	2.158E-10
U-238	Ra-226	1.000E+00	7.246E-12	5.079E-11	2.517E-10	1.738E-09	8.111E-09	9.105E-09	2.857E-08	5.281E-08	9.767E-08
U-238	Th-228	1.000E+00	3.792E-13	4.954E-12	4.559E-11	6.058E-10	3.857E-09	4.390E-09	1.492E-08	3.292E-08	2.805E-10
U-238	ΣDSR(j)		7.963E-02	7.929E-02	7.861E-02	7.627E-02	6.996E-02	6.906E-02	5.171E-02	1.796E-02	3.604E-01

Each fraction is the cumulative factor for the j'th principal radionuclide daughter: CUMBRF(j) = ERF(1)*BRF(2)* ... ERF(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 = 2.500E+01 mrem/yr

Nuclide (i)	t = 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	3.300E+01	1.000E+02	3.000E+02	1.000E+03
Am-241	6.018E-01	6.029E+01	6.053E+01	6.137E+01	6.364E+01	6.422E+01	7.331E-01	1.328E+02	2.436E+05
Am-243	3.246E+01	3.248E+01	3.251E+01	3.261E+01	3.291E+01	3.295E+01	3.398E+01	4.122E+01	2.044E+08
C-14	7.765E+00	4.290E+03	2.766E+09	*4.454E+12	*4.454E+12	*4.454E+12	3.300E+03	*4.454E+12	*4.454E+12
Cm-245	4.566E+01	4.565E+01	4.562E+01	4.552E+01	4.506E+01	4.499E+01	4.335E+01	4.799E+01	1.017E+06
Co-60	3.861E+00	4.406E+00	5.737E+00	1.446E+01	2.028E+02	3.013E+02	2.095E+06	*1.131E+15	*1.131E+15
Cs-137	1.479E+01	1.515E+01	1.591E+01	1.686E+01	3.066E+01	3.296E+01	1.682E+02	2.247E+04	*8.701E+13
Eu-155	3.490E+02	4.016E+02	5.317E+02	1.421E+03	2.355E+04	3.589E+04	4.369E+08	*4.651E+14	*4.651E+14
I-131	1.458E+03	1.061E+03	8.031E-04	*9.594E+15	*9.594E+15	*9.594E+15	*9.594E+15	*9.594E+15	*9.594E+15
I-129	3.046E+01	3.408E+01	4.271E+01	9.419E+01	1.483E+00	1.427E+00	8.540E+02	*1.766E+08	*1.766E+08
Pb-94	6.267E+00	6.273E+00	6.284E+00	6.323E+00	6.437E+00	6.454E+00	6.851E+00	8.189E+00	2.131E+10
Pt-63	5.410E+03	5.528E+03	5.774E+03	6.722E+03	1.038E+04	1.108E+04	2.699E+04	3.422E+04	2.741E+11
Pu-238	7.101E+01	7.161E+01	7.283E+01	7.728E+01	9.154E+01	9.389E+01	1.656E+02	1.098E+03	2.624E+06
Pu-239	6.393E+01	6.397E+01	6.404E+01	6.431E+01	6.508E+01	6.520E+01	6.788E+01	9.406E+01	5.696E+07
R-90	5.451E+00	5.678E+00	6.156E+00	8.177E+00	1.841E+01	2.079E+01	2.205E+02	3.119E+04	*1.365E+14
U-238	3.140E+02	3.153E+02	3.180E+02	3.278E+02	3.573E+02	3.620E+02	4.835E+02	1.392E+03	6.936E-01

Activity specific activity limit

Summary : RESRAD Default Parameters

File : Plum Brook Surface Soil Mixture USACE.RAI

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	1.500E-01	0.000E+00	4.155E-01	6.018E+01	4.155E-01	6.018E+01
Am-243	1.600E-01	0.000E+00	7.701E-01	3.246E+01	7.701E-01	3.246E+01
C-14	2.110E+00	0.000E+00	3.220E+00	7.765E+00	3.220E+00	7.765E+00
Cm-245	2.200E-01	99.8 ± 0.2	5.767E-01	4.335E+01	5.475E-01	4.566E+01
Co-60	1.680E+00	0.000E+00	6.475E+00	3.861E+00	6.475E+00	3.861E+00
Cs-137	5.850E+01	0.000E+00	1.691E+00	1.479E+01	1.691E+00	1.479E+01
Eu-155	7.600E-01	0.000E+00	7.164E-02	3.490E+02	7.164E-02	3.490E+02
H-3	2.268E+01	1.067 ± 0.002	2.359E-02	1.060E+03	1.345E-02	1.858E+03
I-129	5.300E-01	42.86 ± 0.09	1.859E-01	1.345E+00	8.208E-01	3.046E+01
Nb-94	3.000E-01	0.000E+00	3.989E+00	6.267E+00	3.989E+00	6.267E+00
Ni-63	6.960E+00	0.000E+00	4.621E-03	5.410E+03	4.621E-03	5.410E+03
Pu-239	1.700E-01	0.000E+00	3.521E-01	7.101E+01	3.521E-01	7.101E+01
Pu-239	1.600E-01	0.000E+00	3.911E-01	6.393E+01	3.911E-01	6.393E+01
Sr-90	5.490E+00	0.000E+00	4.586E+00	5.451E+00	4.586E+00	5.451E+00
U-236	1.200E-01	1.000E+03	3.604E-01	6.936E+01	7.963E-02	3.140E+02

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



Nuclide	Parent	BRF(i)	DOSE(j,t), mrem/yr								
			t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	3.300E+01	1.000E+02	3.000E+02	1.000E+03
Am-241	Am-241	1.000E+00	6.232E-02	6.219E-02	6.195E-02	6.110E-02	5.873E-02	5.638E-02	5.111E-02	2.819E-02	3.767E-09
Am-241	Cm-245	1.000E+00	1.165E-06	8.025E-06	4.104E-05	5.279E-04	2.062E-03	2.389E-03	1.047E-02	2.372E-02	2.039E-06
Am-241	ΣDOSE(j)		6.232E-02	6.220E-02	6.199E-02	6.143E-02	6.079E-02	6.077E-02	6.159E-02	5.191E-02	2.415E-08
Np-237	Am-241	1.000E+00	2.057E-07	6.363E-07	1.496E-06	4.450E-06	1.243E-05	1.358E-05	3.554E-05	5.612E-05	1.536E-05
Np-237	Cm-245	1.000E+00	1.801E-12	2.844E-11	3.336E-10	8.234E-09	1.602E-07	2.054E-07	3.009E-06	2.067E-05	5.350E-06
Np-237	Cm-245	2.450E-05	1.132E-13	8.207E-13	4.291E-12	3.467E-11	2.186E-10	2.533E-10	1.108E-09	2.407E-09	6.450E-10
Np-237	ΣDOSE(j)		2.057E-07	6.363E-07	1.496E-06	4.459E-06	1.259E-05	1.378E-05	3.855E-05	7.679E-05	2.071E-05
J-233	Am-241	1.000E+00	4.625E-15	2.631E-14	1.231E-13	9.958E-13	7.445E-12	8.843E-12	5.772E-11	2.030E-09	2.109E-08
J-233	Cm-245	1.000E+00	3.060E-20	7.481E-19	1.557E-17	9.915E-16	5.318E-14	7.467E-14	3.070E-12	1.967E-10	1.632E-08
J-233	Cm-245	2.450E-05	2.176E-21	2.582E-20	2.532E-19	5.507E-18	9.833E-17	1.250E-16	1.542E-15	6.088E-14	1.121E-12
J-233	ΣDOSE(j)		4.625E-15	2.631E-14	1.231E-13	9.968E-13	7.498E-12	8.916E-12	6.079E-11	2.229E-09	3.741E-08
Th-229	Am-241	1.000E+00	1.033E-18	1.450E-17	1.639E-16	4.186E-15	9.483E-14	1.243E-13	2.647E-12	3.499E-11	1.207E-11
Th-229	Cm-245	1.000E+00	4.176E-24	2.345E-22	1.176E-20	2.455E-18	4.116E-16	6.394E-16	8.814E-14	2.572E-11	5.967E-11
Th-229	Cm-245	2.450E-05	3.681E-25	1.037E-23	2.468E-22	1.746E-20	9.826E-19	1.384E-18	5.943E-17	1.206E-15	5.426E-16
Th-229	ΣDOSE(j)		1.033E-18	1.450E-17	1.639E-16	4.189E-15	9.524E-14	1.249E-13	2.735E-12	6.071E-11	7.174E-11
Am-243	Am-243	1.000E+00	1.232E-01	1.232E-01	1.230E-01	1.226E-01	1.215E-01	1.213E-01	1.176E-01	9.663E-02	1.813E-08
Am-243	Am-243	1.000E+00	9.000E-07	2.701E-06	6.297E-06	1.882E-05	5.410E-05	5.933E-05	1.717E-04	3.752E-04	5.699E-04
U-235	Fu-239	1.000E+00	6.257E-02	6.253E-02	6.246E-02	6.220E-02	6.146E-02	6.135E-02	5.893E-02	4.253E-02	1.855E-08
U-235	ΣDOSE(j)		6.257E-02	6.253E-02	6.246E-02	6.222E-02	6.152E-02	6.141E-02	5.910E-02	4.290E-02	1.912E-08
-235	Am-243	1.000E+00	2.943E-16	2.064E-15	1.086E-14	9.464E-14	7.396E-13	8.823E-13	6.251E-12	6.277E-11	4.460E-10
-235	Fu-239	1.000E+00	3.075E-11	9.212E-11	2.128E-10	6.144E-10	1.599E-09	1.728E-09	3.683E-09	2.160E-08	2.621E-08
-235	ΣDOSE(j)		3.075E-11	9.212E-11	2.129E-10	6.145E-10	1.600E-09	1.729E-09	3.689E-09	2.166E-08	2.665E-08
a-231	Am-243	1.000E+00	4.159E-20	6.595E-19	7.842E-18	2.033E-16	4.476E-15	5.836E-15	1.106E-13	6.698E-12	1.222E-10
a-231	Fu-239	1.000E+00	5.940E-10	4.875E-14	2.307E-13	1.983E-12	1.452E-11	1.714E-11	9.676E-11	3.518E-09	7.493E-09
a-231	ΣDOSE(j)		5.940E-10	4.875E-14	2.307E-13	1.983E-12	1.452E-11	1.715E-11	9.687E-11	3.525E-09	7.615E-09
c-227	Am-243	1.000E+00	1.629E-22	4.292E-21	9.499E-20	6.235E-18	3.214E-16	4.479E-16	3.159E-14	2.127E-11	2.969E-10
c-227	Fu-239	1.000E+00	2.683E-17	3.446E-16	3.560E-15	7.831E-14	1.306E-12	1.641E-12	6.624E-11	1.103E-08	1.797E-08
c-227	ΣDOSE(j)		2.683E-17	3.446E-16	3.560E-15	7.831E-14	1.306E-12	1.642E-12	6.627E-11	1.105E-08	1.827E-08
-14	C-14	1.000E+00	6.794E+00	1.230E+02	1.906E+08	5.776E+25	0.000E+00	0.000E+00	1.596E-02	0.000E+00	0.000E+00
n-245	Cm-245	1.000E+00	1.204E-01	1.204E-01	1.202E-01	1.199E-01	1.187E-01	1.186E-01	1.146E-01	8.969E-02	2.260E-08
n-245	Cm-245	2.450E-05	2.950E-06	2.949E-06	2.946E-06	2.936E-06	2.909E-06	2.905E-06	2.813E-06	2.197E-06	5.537E-13
n-245	ΣDOSE(j)		1.204E-01	1.204E-01	1.202E-01	1.199E-01	1.187E-01	1.186E-01	1.146E-01	8.969E-02	2.260E-08
r-241	Cm-245	1.000E+00	3.936E-05	1.157E-04	2.577E-04	6.574E-04	1.263E-03	1.312E-03	1.573E-03	1.172E-03	5.559E-10
r-241	Cm-245	2.450E-05	9.649E-10	2.836E-09	6.313E-09	1.611E-08	3.094E-08	3.213E-08	3.855E-08	2.872E-08	1.362E-14
r-241	ΣDOSE(j)		3.936E-05	1.157E-04	2.577E-04	6.574E-04	1.263E-03	1.312E-03	1.573E-03	1.172E-03	5.559E-10
g-208	Ac-208	1.000E+00	1.068E-01	9.533E-00	7.321E-00	2.905E+00	2.071E-01	1.394E-01	2.005E-05	6.757E-17	0.000E+00



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

Nuclide	Parent	BRF(1)	DOSE(j,t), mrem/yr									
			t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	3.300E+01	1.000E+02	3.000E+02	1.000E+03	
Cs-137	Cs-137	1.000E+00	9.891E+01	9.653E+01	9.195E+01	7.736E+01	4.769E+01	4.434E+01	8.696E+00	6.509E+02	1.773E-15	
Eu-155	Eu-155	1.000E+00	5.445E-02	4.732E-02	3.573E-02	1.337E-02	8.067E-04	5.294E-04	4.349E-08	2.772E-20	0.000E+00	
H-3	H-3	1.000E+00	3.051E-01	5.342E-01	7.060E-03	1.176E-16	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	
I-129	I-129	1.000E+00	4.350E-01	3.868E-01	3.102E-01	1.407E-01	8.936E+00	9.262E+00	1.551E-02	1.882E-12	0.000E+00	
Nb-94	Nb-94	1.000E+00	1.197E+00	1.196E+00	1.193E+00	1.186E+00	1.165E+00	1.162E+00	1.095E+00	9.159E-01	3.520E-10	
Ni-63	Ni-63	1.000E+00	3.216E-02	3.148E-02	3.014E-02	2.568E-02	1.676E-02	1.570E-02	6.447E-03	5.084E-03	6.348E-10	
Pu-238	Pu-238	1.000E+00	5.965E-02	5.935E-02	5.835E-02	5.500E-02	4.643E-02	4.526E-02	2.566E-02	3.836E-03	6.801E-12	
U-234	Pu-238	1.000E+00	1.951E-06	5.915E-06	1.364E-07	3.638E-07	9.211E-07	5.830E-07	1.552E-06	3.430E-05	1.006E-06	
Th-230	Pu-238	1.000E+00	5.021E-14	3.290E-13	1.667E-12	1.404E-11	1.038E-10	1.229E-10	7.359E-10	1.925E-09	3.073E-10	
Ra-226	Pu-238	1.000E+00	7.148E-16	1.104E-14	1.295E-13	3.307E-12	7.068E-11	9.206E-11	1.597E-09	1.656E-08	1.120E-07	
Fr-223	Pu-238	1.000E+00	4.566E-16	1.196E-16	2.900E-15	1.950E-13	1.058E-11	1.463E-11	5.595E-10	2.433E-08	5.010E-07	
Fr-90	Fr-90	1.000E+00	2.518E+01	2.418E+01	2.230E+01	1.676E+01	7.456E+00	6.601E+00	6.213E-01	4.400E-03	5.058E-16	
J-236	U-236	1.000E+00	9.555E-03	9.514E-03	9.433E-03	9.152E-03	8.396E-03	8.288E-03	6.205E-03	2.156E-03	4.325E-02	
Th-232	U-236	1.000E+00	9.789E-13	1.808E-12	6.409E-12	1.676E-11	5.214E-11	5.689E-11	1.485E-10	3.500E-10	2.580E-11	
Pa-228	U-236	1.000E+00	8.694E-13	8.095E-11	3.020E-11	2.085E-10	9.733E-10	1.093E-09	3.429E-09	6.337E-09	1.172E-08	
Th-228	U-236	1.000E+00	4.551E-14	5.940E-13	5.471E-12	7.270E-11	4.629E-10	5.262E-10	1.791E-09	3.950E-09	3.366E-11	

BRF(1) is the branch fraction of the parent nuclide.

Summary : RESRAD Default Parameters

File : Plumcreek Surface Soil Mixture USACE.RAD

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	3.300E+01	1.000E+02	3.000E+02	1.000E+03	
Am-241	Am-241	1.000E+00	1.500E-01	1.497E-01	1.491E-01	1.471E-01	1.414E-01	1.405E-01	1.231E-01	8.288E-02	2.076E-02	
Am-241	Cm-245	1.000E+00	0.000E+00	8.548E-06	7.265E-05	7.204E-04	4.630E-03	5.612E-03	2.506E-02	6.960E-02	1.124E-01	
Am-241	ΣS(j):		1.500E-01	1.497E-01	1.492E-01	1.476E-01	1.462E-01	1.461E-01	1.461E-01	1.525E-01	1.331E-01	
Np-237	Am-241	1.000E+00	0.000E+00	4.449E-06	1.449E-07	4.761E-07	1.371E-06	1.499E-06	3.963E-06	7.911E-06	6.339E-06	
Np-237	Cm-245	1.000E+00	0.000E+00	9.047E-13	2.379E-11	8.058E-10	1.719E-08	2.214E-08	3.334E-07	2.908E-06	1.315E-05	
Np-237	Cm-245	2.450E-05	0.000E+00	4.131E-14	3.595E-13	3.563E-12	2.387E-11	2.773E-11	1.234E-10	3.391E-10	5.321E-10	
Np-237	ΣS(j):		0.000E+00	4.449E-06	1.449E-07	4.769E-07	1.368E-06	1.521E-06	4.297E-06	1.062E-05	1.949E-05	
U-233	Am-241	1.000E+00	0.000E+00	1.057E-13	9.421E-13	1.011E-11	8.258E-11	9.849E-11	6.612E-10	2.561E-09	2.813E-09	
U-233	Cm-245	1.000E+00	0.000E+00	9.496E-19	7.815E-17	8.843E-15	5.661E-13	6.013E-13	3.478E-11	6.930E-10	4.943E-09	
U-233	Cm-245	2.450E-05	0.000E+00	6.031E-20	1.579E-18	5.265E-17	1.072E-15	1.371E-15	1.760E-14	1.013E-13	2.153E-13	
U-233	ΣS(j):		0.000E+00	1.057E-13	9.421E-13	1.012E-11	8.315E-11	9.930E-11	6.960E-10	3.254E-09	7.756E-09	
Th-229	Am-241	1.000E+00	0.000E+00	3.332E-18	8.929E-17	3.222E-15	8.084E-14	1.064E-13	2.340E-12	3.363E-11	2.365E-10	
Th-229	Cm-245	1.000E+00	0.000E+00	1.873E-23	4.456E-21	1.705E-18	3.399E-16	5.322E-16	7.727E-14	5.564E-12	1.928E-10	
Th-229	Cm-245	2.450E-05	0.000E+00	1.428E-24	1.129E-22	1.281E-20	8.264E-19	1.171E-18	5.239E-17	1.159E-15	1.265E-14	
Th-229	ΣS(j):		0.000E+00	3.332E-18	8.929E-17	3.224E-15	8.118E-14	1.070E-13	2.417E-12	3.920E-11	4.293E-10	
Am-243	Am-243	1.000E+00	1.600E-01	1.599E-01	1.598E-01	1.593E-01	1.578E-01	1.575E-01	1.527E-01	1.391E-01	1.002E-01	
Pu-239	Am-243	1.000E+00	0.000E+00	4.606E-06	1.380E-05	4.584E-05	1.361E-04	1.494E-04	4.370E-04	1.179E-03	2.711E-03	
Pu-239	Fu-239	1.000E+00	1.600E-01	1.599E-01	1.597E-01	1.591E-01	1.572E-01	1.569E-01	1.508E-01	1.338E-01	8.826E-02	
Pu-239	ΣS(j):		1.600E-01	1.599E-01	1.597E-01	1.591E-01	1.573E-01	1.570E-01	1.512E-01	1.350E-01	9.097E-02	
J-235	Am-243	1.000E+00	0.000E+00	2.260E-15	2.018E-14	2.182E-13	1.819E-12	2.177E-12	1.573E-11	7.825E-11	2.355E-10	
J-235	Fu-239	1.000E+00	0.000E+00	1.567E-10	4.648E-10	1.489E-09	4.003E-09	4.332E-09	9.322E-09	1.236E-08	8.554E-09	
J-235	ΣS(j):		0.000E+00	1.567E-10	4.648E-10	1.490E-09	4.004E-09	4.334E-09	9.336E-09	1.243E-08	8.789E-09	
Pa-231	Am-243	1.000E+00	0.000E+00	1.392E-20	4.249E-19	1.513E-17	3.656E-16	4.787E-16	9.338E-15	9.971E-14	4.337E-13	
Pa-231	Fu-239	1.000E+00	0.000E+00	1.655E-15	1.468E-14	1.549E-13	1.206E-12	1.428E-12	6.215E-12	2.179E-11	1.777E-11	
Pa-231	ΣS(j):		0.000E+00	1.655E-15	1.468E-14	1.549E-13	1.206E-12	1.428E-12	8.224E-12	2.189E-11	1.820E-11	
Ce-227	Am-243	1.000E+00	0.000E+00	1.153E-12	9.631E-11	1.087E-10	6.549E-17	9.182E-17	3.393E-15	4.892E-14	2.329E-13	
Ce-227	Fu-239	1.000E+00	0.000E+00	1.734E-17	4.498E-16	1.453E-14	2.720E-13	3.437E-13	3.477E-12	1.154E-11	9.756E-12	
Ce-227	ΣS(j):		0.000E+00	1.734E-17	4.498E-16	1.453E-14	2.721E-13	3.438E-13	3.480E-12	1.159E-11	9.989E-12	
C-14	C-14	1.000E+00	1.110E-01	2.641E-01	4.159E-01	1.266E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	
m-245	Cm-245	1.000E+00	2.200E-01	2.199E-01	2.197E-01	2.190E-01	2.169E-01	2.166E-01	2.096E-01	1.909E-01	1.370E-01	
m-245	Cm-245	2.450E-05	1.390E-06	5.387E-06	5.382E-06	5.365E-06	5.214E-06	5.306E-06	5.141E-06	4.676E-06	3.357E-06	
m-245	ΣS(j):		2.200E-01	2.199E-01	2.197E-01	2.190E-01	2.169E-01	2.166E-01	2.096E-01	1.909E-01	1.370E-01	
U-241	Cm-245	1.000E+00	0.000E+00	1.033E-02	2.954E-02	8.362E-02	1.655E-01	1.722E-01	2.077E-01	1.905E-01	1.368E-01	
U-241	Cm-245	2.450E-05	0.000E+00	1.532E-07	7.236E-07	1.049E-06	4.056E-06	4.218E-06	5.090E-06	4.667E-06	2.351E-06	
Bi-213	Cm-245	1.000E+00	1.600E-01	1.472E+00	1.131E+00	4.486E-01	3.199E-02	2.152E-02	3.096E-06	1.051E-17	0.000E+00	

Summary : RESRAD Default Parameters

File : Plum Brook Surface Soil Mixture WSACE.RAD

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	3.300E+01	1.000E+02	3.000E+02	1.000E+03	
Cs-137	Cs-137	1.000E+00	5.850E+01	5.709E+01	5.439E+01	4.567E+01	2.821E+01	2.622E+01	5.144E+00	3.976E+02	1.615E+09	
Eu-155	Eu-155	1.000E+00	7.600E-01	6.604E-01	4.986E-01	1.867E-01	1.126E-02	7.389E-03	6.071E-07	3.873E-19	0.000E+00	
H-3	H-3	1.000E+00	2.266E+01	1.289E+01	4.102E-06	6.232E-22	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	
I-129	I-129	1.000E+00	5.300E-01	4.734E-01	3.777E-01	1.713E-01	1.789E-02	1.274E-02	6.583E-06	1.015E-15	0.000E+00	
Nb-94	Nb-94	1.000E+00	3.000E-01	2.997E-01	2.992E-01	2.973E-01	2.921E-01	2.913E-01	2.745E-01	2.297E-01	1.232E-01	
Ni-63	Ni-63	1.000E+00	6.960E+00	6.810E+00	6.521E+00	5.600E+00	3.626E+00	3.397E+00	7.919E-01	1.025E-02	2.529E-09	
Pu-238	Pu-238	1.000E+00	1.700E-01	1.686E-01	1.657E-01	1.562E-01	1.319E-01	1.266E-01	7.291E-02	1.341E-02	3.578E-05	
J-234	Pu-238	1.000E+00	0.000E+00	4.773E-07	1.405E-06	4.378E-06	1.084E-05	1.156E-05	1.847E-05	8.245E-06	3.976E-06	
Th-230	Pu-238	1.000E+00	0.000E+00	2.155E-12	1.915E-11	2.035E-10	1.614E-09	1.917E-09	1.174E-08	3.667E-08	4.691E-08	
Pa-226	Pu-238	1.000E+00	0.000E+00	3.111E-16	8.286E-15	2.926E-13	6.898E-12	6.998E-12	1.608E-10	1.263E-09	2.492E-09	
U-230	Pu-238	1.000E+00	0.000E+00	2.403E-16	1.898E-16	2.145E-14	1.359E-12	1.920E-12	7.594E-11	9.578E-10	2.121E-09	
Sr-90	Sr-90	1.000E+00	1.450E+00	5.272E+00	4.661E+00	3.659E+00	1.625E+00	1.439E+00	9.497E-02	2.842E-05	1.317E-17	
U-236	U-236	1.000E+00	1.200E-01	1.195E-01	1.185E-01	1.149E-01	1.054E-01	1.041E-01	7.795E-02	3.290E-02	1.606E-03	
Th-232	U-236	1.000E+00	0.000E+00	5.907E-12	1.765E-11	5.794E-11	1.666E-10	1.621E-10	4.806E-10	9.945E-10	1.345E-09	
Pa-226	U-236	1.000E+00	0.000E+00	3.416E-13	2.524E-12	2.391E-11	1.181E-10	1.329E-10	4.227E-10	9.226E-10	1.263E-09	
Th-226	U-236	1.000E+00	0.000E+00	3.836E-14	1.179E-13	1.510E-11	1.045E-10	1.193E-10	4.122E-10	9.182E-10	1.263E-09	

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

ESCALC.ENE execution time = 625.11 seconds



**Final Status Survey Plan
for the
Plum Brook Reactor Facility**

Attachment B

**Approach and Basis for Development of Site-Specific Derived
Concentration Guideline Levels (DCGL)**

Addendum 2

**RESRAD-BUILD Reports for
Building Reuse Scenario Dose Assessment
(57 Pages)**

=====
=====
===
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```

=====
=====
===
=== RESRAD-BUILD Input Parameters ===
===
=====
=====
  
```

Number of Sources : 6
 Number of Receptors: 1
 Total Time : 3.652500E+02 days
 Fraction Inside : 2.670000E-01

----- Receptor Information -----

Receptor	Room	x [m]	y [m]	z [m]	FracTime	Inhalation [m3/day]	Ingestion(Dust) [m2/hr]
1	1	7.500	2.500	1.000	1.000	3.36E+01	0.00E+00

=== Receptor-Source Shielding Relationship ===

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	2.40E+00	0.00E+00	Concrete
1	2	2.40E+00	0.00E+00	Concrete
1	3	2.40E+00	0.00E+00	Concrete
1	4	2.40E+00	0.00E+00	Concrete
1	5	2.40E+00	0.00E+00	Concrete
1	6	2.40E+00	0.00E+00	Concrete

=====
Building Information
=====

Building Air Exchange Rate: 8.00E-01 1/hr

Height[m]	Area [m2]	Air Exchanges [m3/hr]

		* * *
		* * *
		* * *
H1: 3.000		* Room 1 <=Q01: 1.80E+02
		* LAMBDA: 8.00E-01 Q10 : 1.80E+02
Area 75.000		* * *
		* * *

Deposition velocity: 2.70E-06 [m/s] Resuspension Rate: 1.40E-05 [1/s]

***** Source Information *****

Source: 1

Location:: Room : 1 x: 0.00 y: 2.50 z: 1.50[m]
 Geometry:: Type: Area Area:1.50E+01 [m2] Direction: x
 Pathway ::
 Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 1.000E+00
 Removable fraction: 1.000E-01
 Time to Remove: 1.820E+04 [day]

Contamination::

Nuclide Concentration	Dose Conversion Factor (Library: FGR 13 Morbidity)		
	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
H-3 4.500E+01 [pCi/m2]	6.400E-08	6.400E-08	0.000E+00

Source: 2

Location:: Room : 1 x: 15.00 y: 2.50 z: 1.50[m]
 Geometry:: Type: Area Area:1.50E+01 [m2] Direction: x
 Pathway ::
 Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 1.000E+00
 Removable fraction: 1.000E-01
 Time to Remove: 1.820E+04 [day]

Contamination::

Nuclide Concentration	Dose Conversion Factor (Library: FGR 13 Morbidity)		
	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
H-3 4.500E+01 [pCi/m2]	6.400E-08	6.400E-08	0.000E+00

Source: 3

Location:: Room : 1 x: 7.50 y: 0.00 z: 1.50[m]
 Geometry:: Type: Area Area:4.50E+01 [m2] Direction: y
 Pathway ::
 Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 1.000E+00
 Removable fraction: 1.000E-01
 Time to Remove: 1.820E+04 [day]

Contamination::

Nuclide Concentration	Dose Conversion Factor (Library: FGR 13 Morbidity)		
	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
H-3 4.500E+01 [pCi/m2]	6.400E-08	6.400E-08	0.000E+00

Source: 4

Location:: Room : 1 x: 7.50 y: 5.00 z: 1.50[m]
 Geometry:: Type: Area Area:4.50E+01 [m2] Direction: y
 Pathway ::
 Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 1.000E+00
 Removable fraction: 1.000E-01
 Time to Remove: 1.820E+04 [day]

Contamination::

Nuclide Concentration	Dose Conversion Factor (Library: FGR 13 Morbidity)		
	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
H-3 4.500E+01 [pCi/m2]	6.400E-08	6.400E-08	0.000E+00

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised H-3.bld

Source: 5

Location:: Room : 1 x: 7.50 y: 2.50 z: 0.00[m]
 Geometry:: Type: Area Area:7.50E+01 [m2] Direction: z
 Pathway ::
 Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 1.000E+00
 Removable fraction: 1.000E-01
 Time to Remove: 1.820E+04 [day]

Contamination::

	Nuclide Concentration	Dose Conversion Factor (Library: FGR 13 Morbidity)		
		Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
H-3	4.500E+01	6.400E-08	6.400E-08	0.000E+00

Source: 6

Location:: Room : 1 x: 7.50 y: 2.50 z: 3.00[m]
 Geometry:: Type: Area Area:7.50E+01 [m2] Direction: z
 Pathway ::
 Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 1.000E+00
 Removable fraction: 1.000E-01
 Time to Remove: 1.820E+04 [day]

Contamination::

	Nuclide Concentration	Dose Conversion Factor (Library: FGR 13 Morbidity)		
		Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
H-3	4.500E+01	6.400E-08	6.400E-08	0.000E+00

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised H-3.bld

Evaluation Time: 0.00000000E+00 years

```
=====
=====
===      Assessment for Time: 1      ===
===      Time =0.00E+00 yr          ===
=====
=====
```

===== Source Information =====

Source: 1

Location:: Room : 1 x: 0.00 y: 2.50 z: 1.50 [m]
Geometry:: Type: Area Area:1.50E+01 [m2] Direction: x
Pathway ::
Direct Ingestion Rate: 4.070E-07 [1/hr]
Fraction released to air: 1.000E+00
Removable fraction: 1.000E-01
Time to Remove: 1.820E+04 [day]

Contamination:: Nuclide Concentration
[pCi/m2]
H-3 4.500E+01

Source: 2

Location:: Room : 1 x: 15.00 y: 2.50 z: 1.50 [m]
Geometry:: Type: Area Area:1.50E+01 [m2] Direction: x
Pathway ::
Direct Ingestion Rate: 4.070E-07 [1/hr]
Fraction released to air: 1.000E+00
Removable fraction: 1.000E-01
Time to Remove: 1.820E+04 [day]

Contamination:: Nuclide Concentration
[pCi/m2]
H-3 4.500E+01

Source: 3

Location:: Room : 1 x: 7.50 y: 0.00 z: 1.50 [m]
Geometry:: Type: Area Area:4.50E+01 [m2] Direction: y
Pathway ::
Direct Ingestion Rate: 4.070E-07 [1/hr]
Fraction released to air: 1.000E+00
Removable fraction: 1.000E-01
Time to Remove: 1.820E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	H-3	4.500E+01

Source: 4

Location:: Room : 1 x: 7.50 y: 5.00 z: 1.50 [m]
Geometry:: Type: Area Area:4.50E+01 [m2] Direction: y
Pathway ::
Direct Ingestion Rate: 4.070E-07 [1/hr]
Fraction released to air: 1.000E+00
Removable fraction: 1.000E-01
Time to Remove: 1.820E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	H-3	4.500E+01

Source: 5

Location:: Room : 1 x: 7.50 y: 2.50 z: 0.00 [m]
Geometry:: Type: Area Area:7.50E+01 [m2] Direction: z
Pathway ::
Direct Ingestion Rate: 4.070E-07 [1/hr]
Fraction released to air: 1.000E+00
Removable fraction: 1.000E-01
Time to Remove: 1.820E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	H-3	4.500E+01

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised H-3.bld

Evaluation Time: 0.00000000E+00 years

Source: 6

Location:: Room : 1 .x: 7.50 y: 2.50 z: 3.00 [m]

Geometry:: Type: Area Area:7.50E+01 [m2] Direction: z

Pathway ::

Direct Ingestion Rate: 4.070E-07 [1/hr]

Fraction released to air: 1.000E+00

Removable fraction: 1.000E-01

Time to Remove: 1.820E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	H-3	4.500E+01

** RESRAD-BUILD Dose Program Output, Version 3.22 03/24/04 13:09:41 Page: 10 **
Title : Plumbrook Duplicate
Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised H-3.bld
Evaluation Time: 0.0000000E+00 years

```
=====
=====
===
=== RESRAD-BUILD Dose Tables ===
===
=====
=====
```

Source Contributions to Receptor Doses

=====

[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	4.22E-09	4.22E-09	1.27E-08	1.27E-08	2.11E-08	2.11E-08	7.60E-08
Total	4.22E-09	4.22E-09	1.27E-08	1.27E-06	2.11E-08	2.11E-08	7.60E-08

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised H-3.bld

Evaluation Time: 0.0000000E+00. years

Pathway Detail of Doses

=====

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	0.00E+00	0.00E+00	0.00E+00	2.63E-10	0.00E+00	3.96E-09
Total	0.00E+00	0.00E+00	0.00E+00	2.63E-10	0.00E+00	3.96E-09

Source: 2

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	0.00E+00	0.00E+00	0.00E+00	2.63E-10	0.00E+00	3.96E-09
Total	0.00E+00	0.00E+00	0.00E+00	2.63E-10	0.00E+00	3.96E-09

Source: 3

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	0.00E+00	0.00E+00	0.00E+00	7.88E-10	0.00E+00	1.19E-08
Total	0.00E+00	0.00E+00	0.00E+00	7.88E-10	0.00E+00	1.19E-08

Source: 4

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	0.00E+00	0.00E+00	0.00E+00	7.88E-10	0.00E+00	1.19E-08
Total	0.00E+00	0.00E+00	0.00E+00	7.88E-10	0.00E+00	1.19E-08

Source: 5

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	0.00E+00	0.00E+00	0.00E+00	1.31E-09	0.00E+00	1.98E-08
Total	0.00E+00	0.00E+00	0.00E+00	1.31E-09	0.00E+00	1.98E-08

Source: 6

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	0.00E+00	0.00E+00	0.00E+00	1.31E-09	0.00E+00	1.98E-08
Total	0.00E+00	0.00E+00	0.00E+00	1.31E-09	0.00E+00	1.98E-08

** RESRAD-BUILD Dose Program Output, Version 3.22 03/24/04 13:09:41 Page: 12 **
Title : Plumbrook Duplicate
Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised H-3.bld
Evaluation Time: 0.0000000E+00. years

Nuclide Detail of Doses

=====

[mrem]

Source: 1

	Nuclide	Receptor	Total
		1	
-3	H-3	4.22E-09	4.22E-09

Source: 2

	Nuclide	Receptor	Total
		1	
-3	H-3	4.22E-09	4.22E-09

Source: 3

	Nuclide	Receptor	Total
		1	
-3	H-3	1.27E-08	1.27E-08

Source: 4

	Nuclide	Receptor	Total
		1	
-3	H-3	1.27E-08	1.27E-08

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised H-3.bld

Evaluation Time: 0.0000000E+00 years

Source: 5

	Nuclide	Receptor	Total
		1	
I-3			
H-3	2.11E-08		2.11E-08

Source: 6

	Nuclide	Receptor	Total
		1	
-3			
H-3	2.11E-08		2.11E-08

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised H-3.bld

Full Summary

=====
=====

===		===
===	RESRAD-BUILD Dose (Time) Tables	===
===		===

=====
=====

Receptor Dose Received for the Exposure Duration
=====

(mrem)

	Evaluation Time [yr]
	<u>0.00E+00</u>
1	7.60E-08

Receptor Dose/Yr Averaged Over Exposure Duration
=====

(mrem/yr)

	Evaluation Time [yr]
	<u>0.00E+00</u>
1	7.60E-08

=====
=====
===
=== RESRAD-BUILD Table of Contents ===
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```

=====
=====
===
=== RESRAD-BUILD Input Parameters ===
===
=====
=====
  
```

```

Number of Sources : 6
Number of Receptors: 1
Total Time : 3.652500E+02 days
Fraction Inside : 2.670000E-01
  
```

```

===== Receptor Information =====
  
```

Receptor	Room	x [m]	y [m]	z [m]	FracTime	Inhalation [m3/day]	Ingestion (Dust) [m2/hr]
1	1	7.500	2.500	1.000	1.000	3.36E+01	0.00E+00

```

=== Receptor-Source Shielding Relationship ===
  
```

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	2.40E+00	0.00E+00	Concrete
1	2	2.40E+00	0.00E+00	Concrete
1	3	2.40E+00	0.00E+00	Concrete
1	4	2.40E+00	0.00E+00	Concrete
1	5	2.40E+00	0.00E+00	Concrete
1	6	2.40E+00	0.00E+00	Concrete

***** Building Information *****

Building Air Exchange Rate: 8.00E-01 1/hr

Height [m]	Area [m2]	Air Exchanges [m3/hr]

		* * *
		* * *
		* * *
H1: 3.000		* * * <=Q01: 1.80E+02
		* * * Room 1 * Q10 : 1.80E+02
		* * * LAMBDA: 8.00E-01 * * *
Area 75.000		* * *
		* * *

Deposition velocity: 2.70E-06 [m/s] Resuspension Rate: 1.40E-05 [1/s]

=====
 Source Information
 =====

Source: 1

Location:: Room : 1 x: 0.00 y: 2.50 z: 1.50[m]
 Geometry:: Type: Area Area:1.50E+01 [m2] Direction: x
 Pathway ::
 Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 7.000E-02
 Removable fraction: 1.000E-01
 Time to Remove: 5.270E+04 [day]

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
GD-152	0.000E+00	1.610E-04	2.430E-01	0.000E+00
EU-154	4.500E+01	9.550E-06	2.860E-04	7.180E-03
EU-152	4.500E+01	6.480E-06	2.210E-04	6.610E-03
S-137	4.500E+01	5.000E-05	3.190E-05	3.190E-03
-129	4.500E+01	2.760E-04	1.740E-04	4.450E-05
NB-94	4.500E+01	7.140E-06	4.140E-04	9.010E-03
CO-60	4.500E+01	2.690E-05	2.190E-04	1.470E-02
C-14	4.500E+01	2.090E-06	2.090E-06	2.620E-08

Source: 2

Location:: Room : 1 x: 15.00 y: 2.50 z: 1.50[m]
 Geometry:: Type: Area Area:1.50E+01 [m2] Direction: x
 Pathway ::
 Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 7.000E-02
 Removable fraction: 1.000E-01
 Time to Remove: 5.270E+04 [day]

Contamination::

Nuclide	Concentration [pCi/m2]	Dose Conversion Factor (Library: FGR 13 Morbidity)		
		Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
GD-152	0.000E+00	1.610E-04	2.430E-01	0.000E+00
EU-154	4.500E+01	9.550E-06	2.860E-04	7.180E-03
EU-152	4.500E+01	6.480E-06	2.210E-04	6.610E-03
CS-137	4.500E+01	5.000E-05	3.190E-05	3.190E-03
I-129	4.500E+01	2.760E-04	1.740E-04	4.450E-05
NB-94	4.500E+01	7.140E-06	4.140E-04	9.010E-03
PO-60	4.500E+01	2.690E-05	2.190E-04	1.470E-02
-14	4.500E+01	2.090E-06	2.090E-06	2.620E-08

Source: 3

Location:: Room : 1 x: 7.50 y: 0.00 z: 1.50[m]
 Geometry:: Type: Area Area:4.50E+01 [m2] Direction: y
 Pathway ::
 Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 7.000E-02
 Removable fraction: 1.000E-01
 Time to Remove: 5.270E+04 [day]

Contamination::

Nuclide	Concentration [pCi/m2]	Dose Conversion Factor (Library: FGR 13 Morbidity)		
		Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
GD-152	0.000E+00	1.610E-04	2.430E-01	0.000E+00

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 75th DCGL.bld

EU-154	4.500E+01	9.550E-06	2.860E-04	7.180E-03
EU-152	4.500E+01	6.480E-06	2.210E-04	6.610E-03
CS-137	4.500E+01	5.000E-05	3.190E-05	3.190E-03
I-129	4.500E+01	2.760E-04	1.740E-04	4.450E-05
NB-94	4.500E+01	7.140E-06	4.140E-04	9.010E-03
CO-60	4.500E+01	2.690E-05	2.190E-04	1.470E-02
C-14	4.500E+01	2.090E-06	2.090E-06	2.620E-08

Source: 4

Location:: Room : 1 x: 7.50 y: 5.00 z: 1.50[m]
 Geometry:: Type: Area Area:4.50E+01 [m2] Direction: y
 Pathway ::
 Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 7.000E-02
 Removable fraction: 1.000E-01
 Time to Remove: 5.270E+04 [day]

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
GD-152	0.000E+00	1.610E-04	2.430E-01	0.000E+00
EU-154	4.500E+01	9.550E-06	2.860E-04	7.180E-03
EU-152	4.500E+01	6.480E-06	2.210E-04	6.610E-03
CS-137	4.500E+01	5.000E-05	3.190E-05	3.190E-03
I-129	4.500E+01	2.760E-04	1.740E-04	4.450E-05
NB-94	4.500E+01	7.140E-06	4.140E-04	9.010E-03
CO-60	4.500E+01	2.690E-05	2.190E-04	1.470E-02
C-14	4.500E+01	2.090E-06	2.090E-06	2.620E-08

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 75th DCGL.bld

Source: 5

Location:: Room : 1 x: 7.50 y: 2.50 z: 0.00[m]
 Geometry:: Type: Area Area:7.50E+01 [m2] Direction: z
 Pathway ::
 Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 7.000E-02
 Removable fraction: 1.000E-01
 Time to Remove: 5.270E+04 [day]

Contamination::

	Nuclide Concentration	Dose Conversion Factor (Library: FGR 13 Morbidity)		
		Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
GD-152	0.000E+00	1.610E-04	2.430E-01	0.000E+00
EU-154	4.500E+01	9.550E-06	2.860E-04	7.180E-03
EU-152	4.500E+01	6.480E-06	2.210E-04	6.610E-03
CS-137	4.500E+01	5.000E-05	3.190E-05	3.190E-03
I-129	4.500E+01	2.760E-04	1.740E-04	4.450E-05
NB-94	4.500E+01	7.140E-06	4.140E-04	9.010E-03
O-60	4.500E+01	2.690E-05	2.190E-04	1.470E-02
C-14	4.500E+01	2.090E-06	2.090E-06	2.620E-08

Source: 6

Location:: Room : 1 x: 7.50 y: 2.50 z: 3.00[m]
 Geometry:: Type: Area Area:7.50E+01 [m2] Direction: z
 Pathway ::
 Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 7.000E-02
 Removable fraction: 1.000E-01
 Time to Remove: 5.270E+04 [day]

Contamination::

	Nuclide Concentration	Dose Conversion Factor (Library: FGR 13 Morbidity)		
		Ingestion	Inhalation	Submersion
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m3)]
GD-152	0.000E+00	1.610E-04	2.430E-01	0.000E+00

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 75th DCGL.bld

EU-154	4.500E+01	9.550E-06	2.860E-04	7.180E-03
EU-152	4.500E+01	6.480E-06	2.210E-04	6.610E-03
CS-137	4.500E+01	5.000E-05	3.190E-05	3.190E-03
I-129	4.500E+01	2.760E-04	1.740E-04	4.450E-05
NB-94	4.500E+01	7.140E-06	4.140E-04	9.010E-03
CO-60	4.500E+01	2.690E-05	2.190E-04	1.470E-02
C-14	4.500E+01	2.090E-06	2.090E-06	2.620E-08

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 75th DCGL.bld

Evaluation Time: 0.0000000E+00 years

```
=====
=====
===      Assessment for Time: 1      ===
===      Time =0.00E+00 yr          ===
=====
=====
```

=====
===== Source Information =====

Source: 1

Location:: Room : 1 x: 0.00 y: 2.50 z: 1.50 [m]
Geometry:: Type: Area Area:1.50E+01 [m2] Direction: x
Pathway ::
Direct Ingestion Rate: 4.070E-07 [1/hr]
Fraction released to air: 7.000E-02
Removable fraction: 1.000E-01
Time to Remove: 5.270E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	GD-152	0.000E+00
	EU-154	4.500E+01
	EU-152	4.500E+01
	CS-137	4.500E+01
	I-129	4.500E+01
	NB-94	4.500E+01
	CO-60	4.500E+01
	C-14	4.500E+01

Source: 2

Location:: Room : 1 x: 15.00 y: 2.50 z: 1.50 [m]
Geometry:: Type: Area Area:1.50E+01 [m2] Direction: x
Pathway ::
Direct Ingestion Rate: 4.070E-07 [1/hr]
Fraction released to air: 7.000E-02
Removable fraction: 1.000E-01
Time to Remove: 5.270E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	GD-152	0.000E+00
	EU-154	4.500E+01
	EU-152	4.500E+01

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 75th DCGL.bld

Evaluation Time: 0.0000000E+00 years

CS-137	4.500E+01
I-129	4.500E+01
NB-94	4.500E+01
CO-60	4.500E+01
C-14	4.500E+01

Source: 3

Location:: Room : 1 x: 7.50 y: 0.00 z: 1.50 [m]
Geometry:: Type: Area Area:4.50E+01 [m2] Direction: y
Pathway ::
Direct Ingestion Rate: 4.070E-07 [1/hr]
Fraction released to air: 7.000E-02
Removable fraction: 1.000E-01
Time to Remove: 5.270E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	GD-152	0.000E+00
	EU-154	4.500E+01
	EU-152	4.500E+01
	CS-137	4.500E+01
	I-129	4.500E+01
	NB-94	4.500E+01
	CO-60	4.500E+01
	C-14	4.500E+01

Source: 4

Location:: Room : 1 x: 7.50 y: 5.00 z: 1.50 [m]
Geometry:: Type: Area Area:4.50E+01 [m2] Direction: y
Pathway ::
Direct Ingestion Rate: 4.070E-07 [1/hr]
Fraction released to air: 7.000E-02
Removable fraction: 1.000E-01
Time to Remove: 5.270E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	GD-152	0.000E+00
	EU-154	4.500E+01
	EU-152	4.500E+01
	CS-137	4.500E+01
	I-129	4.500E+01
	NE-94	4.500E+01
	CO-60	4.500E+01
	C-14	4.500E+01

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 75th DCGL.bld

Evaluation Time: 0.00000000E+00 years

Source: 5

Location:: Room : 1 x: 7.50 y: 2.50 z: 0.00 [m]

Geometry:: Type: Area Area:7.50E+01 [m2] Direction: z

Pathway ::

Direct Ingestion Rate: 4.070E-07 [1/hr]

Fraction released to air: 7.000E-02

Removable fraction: 1.000E-01

Time to Remove: 5.270E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	GD-152	0.000E+00
	EU-154	4.500E+01
	EU-152	4.500E+01
	CS-137	4.500E+01
	I-129	4.500E+01
	NE-94	4.500E+01
	CO-60	4.500E+01
	C-14	4.500E+01

Source: 6

Location:: Room : 1 x: 7.50 y: 2.50 z: 3.00 [m]

Geometry:: Type: Area Area:7.50E+01 [m2] Direction: z

Pathway ::

Direct Ingestion Rate: 4.070E-07 [1/hr]

Fraction released to air: 7.000E-02

Removable fraction: 1.000E-01

Time to Remove: 5.270E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	GD-152	0.000E+00
	EU-154	4.500E+01
	EU-152	4.500E+01
	CS-137	4.500E+01
	I-129	4.500E+01
	NE-94	4.500E+01
	CO-60	4.500E+01
	C-14	4.500E+01

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 75th DCGL.bld

Evaluation Time: 0.00000000E+00. years

```
=====
=====
===
===          RESRAD-BUILDDose Tables          ===
===
=====
=====
```

Source Contributions to Receptor Doses

=====

[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
Receptor 1	1.39E-04	1.39E-04	1.77E-03	1.77E-03	4.73E-03	2.90E-03	1.15E-02
Total	1.39E-04	1.39E-04	1.77E-03	1.77E-03	4.73E-03	2.90E-03	1.15E-02

** RESRAD-BUILD Dose Program Output, Version 3.22 03/24/04 12:45:32 Page: 13 **
 Title : Plumbrook Duplicate
 Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 75th DCGL.bld
 Evaluation Time: 0.0000000E+00 years

Pathway Detail of Doses

 [mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	1.15E-04	4.10E-13	2.18E-10	8.96E-08	0.00E+00	2.41E-05
Total	1.15E-04	4.10E-13	2.18E-10	8.96E-08	0.00E+00	2.41E-05

Source: 2

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	1.15E-04	4.10E-13	2.18E-10	8.96E-08	0.00E+00	2.41E-05
Total	1.15E-04	4.10E-13	2.18E-10	8.96E-08	0.00E+00	2.41E-05

Source: 3

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	1.70E-03	1.23E-12	6.55E-10	2.69E-07	0.00E+00	7.22E-05
Total	1.70E-03	1.23E-12	6.55E-10	2.69E-07	0.00E+00	7.22E-05

Source: 4

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	1.70E-03	1.23E-12	6.55E-10	2.69E-07	0.00E+00	7.22E-05
Total	1.70E-03	1.23E-12	6.55E-10	2.69E-07	0.00E+00	7.22E-05

Source: 5

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	4.61E-03	2.05E-12	1.09E-09	4.48E-07	0.00E+00	1.20E-04
Total	4.61E-03	2.05E-12	1.09E-09	4.48E-07	0.00E+00	1.20E-04

Source: 6

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	2.78E-03	2.05E-12	1.09E-09	4.48E-07	0.00E+00	1.20E-04
Total	2.78E-03	2.05E-12	1.09E-09	4.48E-07	0.00E+00	1.20E-04

Nuclide Detail of Doses

 [mrem]

Source: 1

Nuclide	Receptor	Total
	1	
U-154		
EU-154	5.81E-05	5.81E-05
D-152		
GD-152	8.46E-20	8.46E-20
EU-152	1.21E-05	1.21E-05
S-137		
CS-137	9.02E-06	9.02E-06
-129		
I-129	1.82E-05	1.82E-05
B-94		
NB-94	1.69E-05	1.69E-05
D-60		
CO-60	2.48E-05	2.48E-05
-14		
C-14	1.34E-07	1.34E-07

Source: 2

Nuclide	Receptor	Total
	1	
-154		
EU-154	5.81E-05	5.81E-05
-152		
GD-152	8.46E-20	8.46E-20
EU-152	1.21E-05	1.21E-05
-137		
CS-137	9.02E-06	9.02E-06
129		
I-129	1.82E-05	1.82E-05
-94		
NB-94	1.69E-05	1.69E-05
-60		
CO-60	2.48E-05	2.48E-05
14		
C-14	1.34E-07	1.34E-07

** RESRAD-BUILD Dose Program Output, Version 3.22 03/24/04 12:45:32 Page: 15 **
Title : Plumbrook Duplicate
Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 75th DCGL.bld
Evaluation Time: 0.00000000E+00 years

source: 3

Nuclide	Receptor	Total
	1	
U-154		
EU-154	8.48E-04	8.48E-04
D-152		
GD-152	2.54E-19	2.54E-19
EU-152	1.73E-04	1.73E-04
S-137		
CS-137	9.57E-05	9.57E-05
-129		
I-129	6.09E-05	6.09E-05
B-94		
NB-94	2.43E-04	2.43E-04
O-60		
CO-60	3.48E-04	3.48E-04
-14		
C-14	4.06E-07	4.06E-07

source: 4

Nuclide	Receptor	Total
	1	
J-154		
EU-154	8.48E-04	8.48E-04
D-152		
GD-152	2.54E-19	2.54E-19
EU-152	1.73E-04	1.73E-04
S-137		
CS-137	9.57E-05	9.57E-05
-129		
I-129	6.09E-05	6.09E-05
B-94		
NB-94	2.43E-04	2.43E-04
O-60		
CO-60	3.48E-04	3.48E-04
-14		
C-14	4.06E-07	4.06E-07

Source: 5

Nuclide	Receptor	Total
	1	
U-154		
EU-154	2.30E-03	2.30E-03
D-152		
GD-152	4.23E-19	4.23E-19
EU-152	4.68E-04	4.68E-04
S-137		
CS-137	2.50E-04	2.50E-04
-129		
I-129	1.09E-04	1.09E-04
B-94		
NB-94	6.60E-04	6.60E-04
O-60		
CO-60	9.41E-04	9.41E-04
-14		
C-14	6.80E-07	6.80E-07

Source: 6

Nuclide	Receptor	Total
	1	
U-154		
EU-154	1.39E-03	1.39E-03
D-152		
GD-152	4.23E-19	4.23E-19
EU-152	2.84E-04	2.84E-04
S-137		
CS-137	1.57E-04	1.57E-04
-129		
I-129	1.01E-04	1.01E-04
B-94		
NB-94	3.99E-04	3.99E-04
O-60		
CO-60	5.71E-04	5.71E-04
-14		
C-14	6.76E-07	6.76E-07

=====
=====
===
=== RESRAD-BUILD Dose (Time) Tables ===
===
=====
=====

Receptor Dose Received for the Exposure Duration
=====

(mrem)

Evaluation Time [yr]

0.00E+00

1 1.15E-02

Receptor Dose/Yr Averaged Over Exposure Duration
=====

(mrem/yr)

Evaluation Time [yr]

0.00E+00

1 1.15E-02

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

=====
=====
===
=== RESRAD-BUILD Table of Contents ===
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```

=====
=====
===
=== RESRAD-BUILD Input Parameters ===
===
=====
=====
  
```

Number of Sources : 6
 Number of Receptors: 1
 Total Time : 3.652500E+02 days
 Fraction Inside : 2.670000E-01

----- Receptor Information -----

Receptor	Room	x [m]	y [m]	z [m]	FracTime	Inhalation [m3/day]	Ingestion(Dust) [m2/hr]
1	1	7.500	2.500	1.000	1.000	3.36E+01	0.00E+00

=== Receptor-Source Shielding Relationship ===

Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	2.40E+00	0.00E+00	Concrete
1	2	2.40E+00	0.00E+00	Concrete
1	3	2.40E+00	0.00E+00	Concrete
1	4	2.40E+00	0.00E+00	Concrete
1	5	2.40E+00	0.00E+00	Concrete
1	6	2.40E+00	0.00E+00	Concrete

***** Building Information *****

Building Air Exchange Rate: 8.00E-01 1/hr

Height[m]	Area [m2]	Air Exchanges [m3/hr]

		* * *
		* * *
		* * *
H1: 3.000		* Room 1 * <=Q01: 1.80E+02
		* LAMBDA: 8.00E-01 * Q10 : 1.80E+02
Area 75.000		* * *
		* * *

Deposition velocity: 2.70E-06 [m/s] Resuspension Rate: 1.40E-05 [1/s]

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

=====
 ===== Source Information =====
 =====

Source: 1

Location:: Room : 1 x: 0.00 y: 2.50 z: 1.50[m]
 Geometry:: Type: Area Area:1.50E+01 [m2] Direction: x
 Pathway ::
 Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 7.000E-02
 Removable fraction: 1.000E-01
 Time to Remove: 1.820E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-243	4.500E+01	2.510E-03	3.070E-01	6.880E-04
U-241	4.500E+01	6.850E-05	8.250E-03	2.560E-08
A-241	4.500E+01	3.640E-03	4.440E-01	9.570E-05
PU-239	4.500E+01	3.540E-03	4.290E-01	4.960E-07
PU-238	4.500E+01	3.200E-03	3.920E-01	5.710E-07
NP-237	0.000E+00	4.440E-03	5.400E-01	1.210E-03
U-238	4.500E+01	2.690E-04	1.180E-01	1.600E-04
U-236	4.500E+01	2.690E-04	1.250E-01	5.860E-07
U-235	4.500E+01	2.670E-04	1.230E-01	9.030E-04
U-234	4.500E+01	2.830E-04	1.320E-01	6.930E-07
U-233	0.000E+00	2.890E-04	1.350E-01	1.910E-06
PA-231	0.000E+00	1.060E-02	1.280E+00	2.010E-04
TH-232	0.000E+00	2.730E-03	1.640E+00	1.020E-06
TH-230	0.000E+00	5.480E-04	3.260E-01	2.040E-06
TH-229	0.000E+00	4.030E-03	2.160E+00	1.720E-03
TH-228	0.000E+00	8.080E-04	3.450E-01	9.410E-03
AC-227	0.000E+00	1.480E-02	6.720E+00	2.160E-03
RA-228	0.000E+00	1.440E-03	5.080E-03	5.590E-03
RA-226	0.000E+00	1.330E-03	8.600E-03	1.040E-02
PE-210	0.000E+00	5.370E-03	1.380E-02	1.050E-05
EU-155	4.500E+01	1.530E-06	4.140E-05	2.910E-04
TC-99	4.500E+01	1.460E-06	8.330E-06	1.900E-07
SR-90	4.500E+01	1.530E-04	1.310E-03	2.310E-05
NI-63	4.500E+01	5.770E-07	6.290E-06	0.000E+00
NI-59	4.500E+01	2.100E-07	2.700E-06	0.000E+00
FE-55	4.500E+01	6.070E-07	2.690E-06	0.000E+00

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Source: 2

Location:: Room : 1 x: 15.00 y: 2.50 z: 1.50[m]
 Geometry:: Type: Area Area:1.50E+01 [m2] Direction: x
 Pathway ::

Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 7.000E-02
 Removable fraction: 1.000E-01
 Time to Remove: 1.620E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-243	4.500E+01	2.510E-03	3.070E-01	6.880E-04
PU-241	4.500E+01	6.850E-05	8.250E-03	2.560E-08
AM-241	4.500E+01	3.640E-03	4.440E-01	9.570E-05
PU-239	4.500E+01	3.540E-03	4.290E-01	4.960E-07
U-238	4.500E+01	3.200E-03	3.920E-01	5.710E-07
NP-237	0.000E+00	4.440E-03	5.400E-01	1.210E-03
U-238	4.500E+01	2.690E-04	1.180E-01	1.600E-04
U-236	4.500E+01	2.690E-04	1.250E-01	5.860E-07
U-235	4.500E+01	2.670E-04	1.230E-01	9.030E-04
U-234	4.500E+01	2.630E-04	1.320E-01	8.930E-07
U-233	0.000E+00	2.890E-04	1.350E-01	1.910E-06
PA-231	0.000E+00	1.060E-02	1.280E+00	2.010E-04
TH-232	0.000E+00	2.730E-03	1.640E+00	1.020E-06
TH-230	0.000E+00	5.480E-04	3.260E-01	2.040E-06
TH-229	0.000E+00	4.030E-03	2.160E+00	1.720E-03
TH-228	0.000E+00	8.080E-04	3.450E-01	9.410E-03
AC-227	0.000E+00	1.480E-02	6.720E+00	2.160E-03
RA-228	0.000E+00	1.440E-03	5.060E-03	5.590E-03
RA-226	0.000E+00	1.330E-03	8.600E-03	1.040E-02
PE-210	0.000E+00	5.370E-03	1.380E-02	1.050E-05
EU-155	4.500E+01	1.530E-06	4.140E-05	2.910E-04
TC-99	4.500E+01	1.460E-06	8.330E-06	1.900E-07
SR-90	4.500E+01	1.530E-04	1.310E-03	2.310E-05
NI-63	4.500E+01	5.770E-07	6.290E-06	0.000E+00
NI-59	4.500E+01	2.100E-07	2.700E-06	0.000E+00
FE-55	4.500E+01	6.070E-07	2.690E-06	0.000E+00

Title : Flumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Source: 3

Location:: Room : 1 x: 7.50 y: 0.00 z: 1.50[m]
 Geometry:: Type: Area Area:4.50E+01 [m2] Direction: y
 Pathway ::

Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 7.000E-02
 Removable fraction: 1.000E-01
 Time to Remove: 1.820E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-243	4.500E+01	2.510E-03	3.070E-01	5.880E-04
PU-241	4.500E+01	6.850E-05	8.250E-03	2.560E-08
AM-241	4.500E+01	3.640E-03	4.440E-01	9.570E-05
PU-239	4.500E+01	3.540E-03	4.290E-01	4.960E-07
U-238	4.500E+01	3.200E-03	3.920E-01	5.710E-07
NP-237	0.000E+00	4.440E-03	5.400E-01	1.210E-03
U-238	4.500E+01	2.690E-04	1.180E-01	1.600E-04
U-236	4.500E+01	2.690E-04	1.250E-01	5.860E-07
U-235	4.500E+01	2.670E-04	1.230E-01	9.030E-04
U-234	4.500E+01	2.830E-04	1.320E-01	8.930E-07
U-233	0.000E+00	2.890E-04	1.350E-01	1.910E-06
PA-231	0.000E+00	1.060E-02	1.280E+00	2.010E-04
TH-232	0.000E+00	2.730E-03	1.640E+00	1.020E-06
TH-230	0.000E+00	5.480E-04	3.260E-01	2.040E-06
TH-229	0.000E+00	4.030E-03	2.160E+00	1.720E-03
TH-228	0.000E+00	8.080E-04	3.450E-01	9.410E-03
AC-227	0.000E+00	1.480E-02	6.720E+00	2.160E-03
RA-226	0.000E+00	1.440E-03	5.080E-03	5.590E-03
RA-226	0.000E+00	1.330E-03	8.600E-03	1.040E-02
PB-210	0.000E+00	5.370E-03	1.380E-02	1.050E-05
EU-155	4.500E+01	1.530E-06	4.140E-05	2.910E-04
TC-99	4.500E+01	1.460E-06	8.330E-06	1.900E-07
SR-90	4.500E+01	1.530E-04	1.310E-03	2.310E-05
NI-63	4.500E+01	5.770E-07	6.290E-06	0.000E+00
NI-59	4.500E+01	2.100E-07	2.700E-06	0.000E+00
FE-55	4.500E+01	6.070E-07	2.690E-06	0.000E+00

Title : Plumbrock Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Source: 4

Location:: Room : 1 x: 7.50 y: 5.00 z: 1.50[m]
 Geometry:: Type: Area Area:4.50E+01 [m2] Direction: y
 Pathway ::

Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 7.000E-02
 Removable fraction: 1.000E-01
 Time to Remove: 1.820E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	Nuclide Concentration [pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-243	4.500E+01	2.510E-03	3.070E-01	6.880E-04
PU-241	4.500E+01	6.850E-05	8.250E-03	2.560E-08
AM-241	4.500E+01	3.640E-03	4.440E-01	9.570E-05
PU-239	4.500E+01	3.540E-03	4.290E-01	4.960E-07
PU-238	4.500E+01	3.200E-03	3.920E-01	5.710E-07
U-238	4.500E+01	2.690E-04	1.180E-01	1.600E-04
U-236	4.500E+01	2.690E-04	1.250E-01	5.860E-07
U-235	4.500E+01	2.670E-04	1.230E-01	9.030E-04
U-234	4.500E+01	2.830E-04	1.320E-01	8.930E-07
U-233	0.000E+00	2.890E-04	1.350E-01	1.910E-06
PA-231	0.000E+00	1.060E-02	1.280E+00	2.010E-04
TH-232	0.000E+00	2.730E-03	1.640E+00	1.020E-06
TH-230	0.000E+00	5.480E-04	3.260E-01	2.040E-06
TH-229	0.000E+00	4.030E-03	2.160E+00	1.720E-03
TH-228	0.000E+00	8.080E-04	3.450E-01	9.410E-03
AC-227	0.000E+00	1.480E-02	6.720E+00	2.160E-03
RA-228	0.000E+00	1.440E-03	5.080E-03	5.590E-03
RA-226	0.000E+00	1.330E-03	8.600E-03	1.040E-02
PB-210	0.000E+00	5.370E-03	1.380E-02	1.050E-05
EU-155	4.500E+01	1.530E-06	4.140E-05	2.910E-04
TC-99	4.500E+01	1.460E-06	8.330E-06	1.900E-07
SR-90	4.500E+01	1.530E-04	1.310E-03	2.310E-05
NI-63	4.500E+01	5.770E-07	6.290E-06	0.000E+00
NI-59	4.500E+01	2.100E-07	2.700E-06	0.000E+00
FE-55	4.500E+01	6.070E-07	2.690E-06	0.000E+00

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Source: 5

Location:: Room : 1 x: 7.50 y: 2.50 z: 0.00[m]
 Geometry:: Type: Area Area:7.50E+01 [m2] Direction: z
 Pathway ::

Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 7.000E-02
 Removable fraction: 1.000E-01
 Time to Remove: 1.820E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination:

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-243	4.500E+01	2.510E-03	3.070E-01	6.880E-04
PU-241	4.500E+01	6.850E-05	8.250E-03	2.560E-08
AM-241	4.500E+01	3.640E-03	4.440E-01	9.570E-05
PU-239	4.500E+01	3.540E-03	4.290E-01	4.960E-07
PU-238	4.500E+01	3.200E-03	3.920E-01	5.710E-07
P-237	0.000E+00	4.440E-03	5.400E-01	1.210E-03
U-238	4.500E+01	2.690E-04	1.180E-01	1.600E-04
U-236	4.500E+01	2.690E-04	1.250E-01	5.860E-07
U-235	4.500E+01	2.670E-04	1.230E-01	9.030E-04
U-234	4.500E+01	2.830E-04	1.320E-01	8.930E-07
U-233	0.000E+00	2.890E-04	1.350E-01	1.910E-06
PA-231	0.000E+00	1.060E-02	1.280E+00	2.010E-04
TH-232	0.000E+00	2.730E-03	1.640E+00	1.020E-06
TH-230	0.000E+00	5.480E-04	3.260E-01	2.040E-06
TH-229	0.000E+00	4.030E-03	2.160E+00	1.720E-03
TH-228	0.000E+00	8.080E-04	3.450E-01	9.410E-03
AC-227	0.000E+00	1.480E-02	6.720E+00	2.160E-03
RA-228	0.000E+00	1.440E-03	5.080E-03	5.590E-03
RA-226	0.000E+00	1.330E-03	8.600E-03	1.040E-02
FB-210	0.000E+00	5.370E-03	1.380E-02	1.050E-05
EU-155	4.500E+01	1.530E-06	4.140E-05	2.910E-04
TC-99	4.500E+01	1.460E-06	8.330E-06	1.900E-07
SR-90	4.500E+01	1.530E-04	1.310E-03	2.310E-05
NI-63	4.500E+01	5.770E-07	6.290E-06	0.000E+00
NI-59	4.500E+01	2.100E-07	2.700E-06	0.000E+00
FE-55	4.500E+01	6.070E-07	2.690E-06	0.000E+00

Source: 6

Location:: Room : 1 x: 7.50 y: 2.50 z: 3.00[m]
 Geometry:: Type: Area Area:7.50E+01 [m2] Direction: z
 Pathway ::

Direct Ingestion Rate: 4.070E-07 [1/hr]
 Fraction released to air: 7.000E-02
 Removable fraction: 1.000E-01
 Time to Remove: 1.820E+04 [day]

Radon Release Fraction: 0.000E+00

Contamination::

Nuclide Concentration Dose Conversion Factor (Library: FGR 13 Morbidity)

	[pCi/m2]	Ingestion [mrem/pCi]	Inhalation [mrem/pCi]	Submersion [mrem/yr/ (pCi/m3)]
CM-243	4.500E+01	2.510E-03	3.070E-01	6.880E-04
PU-241	4.500E+01	6.850E-05	8.250E-03	2.560E-08
AM-241	4.500E+01	3.640E-03	4.440E-01	9.570E-05
PU-239	4.500E+01	3.540E-03	4.290E-01	4.960E-07
PU-238	4.500E+01	3.200E-03	3.920E-01	5.710E-07
P-237	0.000E+00	4.440E-03	5.400E-01	1.210E-03
U-238	4.500E+01	2.690E-04	1.180E-01	1.600E-04
U-236	4.500E+01	2.690E-04	1.250E-01	5.860E-07
U-235	4.500E+01	2.670E-04	1.230E-01	9.030E-04
U-234	4.500E+01	2.830E-04	1.320E-01	8.930E-07
U-233	0.000E+00	2.890E-04	1.350E-01	1.910E-06
PA-231	0.000E+00	1.060E-02	1.280E+00	2.010E-04
TH-232	0.000E+00	2.730E-03	1.640E+00	1.020E-06
TH-230	0.000E+00	5.480E-04	3.260E-01	2.040E-06
TH-229	0.000E+00	4.030E-03	2.160E+00	1.720E-03
TH-228	0.000E+00	8.080E-04	3.450E-01	9.410E-03
AC-227	0.000E+00	1.480E-02	6.720E+00	2.160E-03
RA-228	0.000E+00	1.440E-03	5.080E-03	5.590E-03
RA-226	0.000E+00	1.330E-03	8.600E-03	1.040E-02
PB-210	0.000E+00	5.370E-03	1.380E-02	1.050E-05
EU-155	4.500E+01	1.530E-06	4.140E-05	2.910E-04
TC-99	4.500E+01	1.460E-06	8.330E-06	1.900E-07
SR-90	4.500E+01	1.530E-04	1.310E-03	2.310E-05
NI-63	4.500E+01	5.770E-07	6.290E-06	0.000E+00
NI-59	4.500E+01	2.100E-07	2.700E-06	0.000E+00
FE-55	4.500E+01	6.070E-07	2.690E-06	0.000E+00

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Evaluation Time: 0.0000000E+00 years

```
=====
=====
===      Assessment for Time: 1      ===
===      Time =0.00E+00 yr          ===
=====
=====
```

===== Source Information =====

Source: 1

Location:: Room : 1 x: 0.00 y: 2.50 z: 1.50 [m]
Geometry:: Type: Area Area:1.50E+01 [m2] Direction: x
Pathway ::
Direct Ingestion Rate: 4.070E-07 [1/hr]
Fraction released to air: 7.000E-02
Removable fraction: 1.000E-01
Time to Remove: 1.820E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	CM-243	4.500E+01
	PU-241	4.500E+01
	AM-241	4.500E+01
	PU-239	4.500E+01
	PU-238	4.500E+01
	NP-237	0.000E+00
	U-238	4.500E+01
	U-236	4.500E+01
	U-235	4.500E+01
	U-234	4.500E+01
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-226	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	EU-155	4.500E+01
	TC-99	4.500E+01
	SR-90	4.500E+01
	NI-63	4.500E+01
	NI-59	4.500E+01
	FE-55	4.500E+01

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Evaluation Time: 0.00000000E+00 years

Source: 2

Location:: Room : 1 x: 15.00 y: 2.50 z: 1.50 [m]
Geometry:: Type: Area Area:1.50E+01 [m2] Direction: x
Pathway ::

Direct Ingestion Rate: 4.070E-07 [1/hr]

Fraction released to air: 7.000E-02

Removable fraction: 1.000E-01

Time to Remove: 1.820E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	CM-243	4.500E+01
	PU-241	4.500E+01
	AM-241	4.500E+01
	PU-239	4.500E+01
	PU-238	4.500E+01
	NP-237	0.000E+00
	U-238	4.500E+01
	U-236	4.500E+01
	U-235	4.500E+01
	U-234	4.500E+01
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	EU-155	4.500E+01
	TC-99	4.500E+01
	SR-90	4.500E+01
	NI-63	4.500E+01
	NI-59	4.500E+01
	FE-55	4.500E+01

** RESRAD-BUILD Dose Program Output, Version 3.22 03/24/04 12:53:13 Page: 12 **
Title : Plumbrook Duplicate
Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld
Evaluation Time: 0.00000000E+00 years

Source: 3

Location:: Room : 1 x: 7.50 y: 0.00 z: 1.50 [m]
Geometry:: Type: Area Area:4.50E+01 [m2] Direction: y
Pathway ::
Direct Ingestion Rate: 4.070E-07 [1/hr]
Fraction released to air: 7.000E-02
Removable fraction: 1.000E-01
Time to Remove: 1.820E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	CM-243	4.500E+01
	PU-241	4.500E+01
	AM-241	4.500E+01
	PU-239	4.500E+01
	PU-238	4.500E+01
	NP-237	0.000E+00
	U-238	4.500E+01
	U-236	4.500E+01
	U-235	4.500E+01
	U-234	4.500E+01
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	EU-155	4.500E+01
	TC-99	4.500E+01
	SR-90	4.500E+01
	NI-63	4.500E+01
	NI-59	4.500E+01
	FE-55	4.500E+01

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Evaluation Time: 0.00000000E+00. years

Source: 4

Location:: Room : 1 x: 7.50 y: 5.00 z: 1.50 [m]
Geometry:: Type: Area Area:4.50E+01 [m2] Direction: y
Pathway ::

Direct Ingestion Rate: 4.070E-07 [1/hr]
Fraction released to air: 7.000E-02
Removable fraction: 1.000E-01
Time to Remove: 1.820E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	CM-243	4.500E+01
	PU-241	4.500E+01
	AM-241	4.500E+01
	PU-239	4.500E+01
	PU-238	4.500E+01
	NP-237	0.000E+00
	U-238	4.500E+01
	U-236	4.500E+01
	U-235	4.500E+01
	U-234	4.500E+01
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-226	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	EU-155	4.500E+01
	TC-99	4.500E+01
	SR-90	4.500E+01
	NI-63	4.500E+01
	NI-59	4.500E+01
	FE-55	4.500E+01

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Evaluation Time: 0.00000000E+00 years

Source: 5

Location:: Room : 1 x: 7.50 y: 2.50 z: 0.00 [m]

Geometry:: Type: Area Area:7.50E+01 [m2] Direction: z

Pathway ::

Direct Ingestion Rate: 4.070E-07 [1/hr]

Fraction released to air: 7.000E-02

Removable fraction: 1.000E-01

Time to Remove: 1.620E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	CM-243	4.500E+01
	PU-241	4.500E+01
	AM-241	4.500E+01
	PU-239	4.500E+01
	PU-238	4.500E+01
	NP-237	0.000E+00
	U-238	4.500E+01
	U-236	4.500E+01
	U-235	4.500E+01
	U-234	4.500E+01
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PE-210	0.000E+00
	EU-155	4.500E+01
	TC-99	4.500E+01
	SR-90	4.500E+01
	NI-63	4.500E+01
	NI-59	4.500E+01
	FE-55	4.500E+01

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Evaluation Time: 0.0000000E+00 years

Source: 6

Location:: Room : 1 x: 7.50 y: 2.50 z: 3.00 [m]
Geometry:: Type: Area Area:7.50E+01 [m2] Direction: z
Pathway ::

Direct Ingestion Rate: 4.070E-07 [1/hr]
Fraction released to air: 7.000E-02
Removable fraction: 1.000E-01
Time to Remove: 1.820E+04 [day]

Contamination::	Nuclide	Concentration [pCi/m2]
	CM-243	4.500E+01
	PU-241	4.500E+01
	AM-241	4.500E+01
	PU-239	4.500E+01
	PU-238	4.500E+01
	NP-237	0.000E+00
	U-238	4.500E+01
	U-236	4.500E+01
	U-235	4.500E+01
	U-234	4.500E+01
	U-233	0.000E+00
	PA-231	0.000E+00
	TH-232	0.000E+00
	TH-230	0.000E+00
	TH-229	0.000E+00
	TH-228	0.000E+00
	AC-227	0.000E+00
	RA-228	0.000E+00
	RA-226	0.000E+00
	PB-210	0.000E+00
	EU-155	4.500E+01
	TC-99	4.500E+01
	SR-90	4.500E+01
	NI-63	4.500E+01
	NI-59	4.500E+01
	FE-55	4.500E+01

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Evaluation Time: 0.00000000E+00 years

```
=====
=====
===
===          RESRAD-BUILDDose Tables          ===
===
=====
=====
```

Source Contributions to Receptor Doses

=====

[mrem]

	Source 1	Source 2	Source 3	Source 4	Source 5	Source 6	Total
receptor 1	1.31E-03	1.31E-03	4.00E-03	4.00E-03	6.74E-03	6.66E-03	2.40E-02
total	1.31E-03	1.31E-03	4.00E-03	4.00E-03	6.74E-03	6.66E-03	2.40E-02

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Evaluation Time: 0.0000000E+00. years

Pathway Detail of Doses

[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	4.80E-06	4.93E-14	3.43E-11	4.08E-04	1.03E-20	9.01E-04
Total	4.80E-06	4.93E-14	3.43E-11	4.08E-04	1.03E-20	9.01E-04

Source: 2

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	4.80E-06	4.93E-14	3.43E-11	4.08E-04	1.03E-20	9.01E-04
Total	4.80E-06	4.93E-14	3.43E-11	4.08E-04	1.03E-20	9.01E-04

Source: 3

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	7.02E-05	1.48E-13	1.03E-10	1.23E-03	3.08E-20	2.70E-03
Total	7.02E-05	1.48E-13	1.03E-10	1.23E-03	3.08E-20	2.70E-03

Source: 4

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	7.02E-05	1.48E-13	1.03E-10	1.23E-03	3.08E-20	2.70E-03
Total	7.02E-05	1.48E-13	1.03E-10	1.23E-03	3.08E-20	2.70E-03

Source: 5

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	1.91E-04	2.47E-13	1.72E-10	2.04E-03	5.14E-20	4.51E-03
Total	1.91E-04	2.47E-13	1.72E-10	2.04E-03	5.14E-20	4.51E-03

Source: 6

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	1.15E-04	2.47E-13	1.72E-10	2.04E-03	5.14E-20	4.51E-03
Total	1.15E-04	2.47E-13	1.72E-10	2.04E-03	5.14E-20	4.51E-03

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Evaluation Time: 0.00000000E+00 years

Nuclide Detail of Doses

=====

[mrem]

Source: 1

Nuclide	Receptor	Total
	1	
M-243		
CM-243	2.19E-04	2.19E-04
PU-239	4.42E-09	4.42E-09
U-235	2.02E-19	2.02E-19
PA-231	2.30E-23	2.30E-23
AC-227	3.57E-25	3.57E-25
J-241		
PU-241	5.84E-06	5.84E-06
AM-241	2.52E-07	2.52E-07
NP-237	3.34E-14	3.34E-14
U-233	4.21E-21	4.21E-21
TH-229	1.21E-24	1.21E-24
I-241		
AM-241	3.19E-04	3.19E-04
U-237	6.32E-11	6.32E-11
U-233	1.06E-17	1.06E-17
TH-229	3.81E-21	3.81E-21
U-239		
PU-239	3.10E-04	3.10E-04
U-235	2.12E-14	2.12E-14
PA-231	3.21E-18	3.21E-18
AC-227	6.22E-20	6.22E-20
U-238		
PU-238	2.80E-04	2.80E-04
U-234	6.22E-11	6.22E-11
TH-230	4.20E-16	4.20E-16
RA-226	4.76E-20	4.76E-20
PB-210	9.75E-22	9.75E-22
U-238		
J-238	4.07E-05	4.07E-05
J-234	6.24E-11	6.24E-11
TH-230	4.21E-16	4.21E-16
RA-226	4.77E-20	4.77E-20
PB-210	9.76E-22	9.76E-22
U-236		
J-236	4.17E-05	4.17E-05
TH-232	1.22E-14	1.22E-14
TH-228	1.09E-17	1.09E-17
RA-226	9.83E-17	9.83E-17
U-235		
U-235	4.31E-05	4.31E-05
PA-231	9.79E-09	9.79E-09
AC-227	2.52E-10	2.52E-10

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Evaluation Time: 0.0000000E+00 years

J-234

U-234	4.40E-05	4.40E-05
TH-230	4.46E-10	4.46E-10
RA-226	6.73E-14	6.73E-14
PB-210	1.72E-15	1.72E-15
U-155		
EU-155	8.15E-07	8.15E-07
C-99		
TC-99	9.55E-08	9.55E-08
R-90		
SR-90	9.94E-06	9.94E-06
I-63		
NI-63	3.78E-08	3.78E-08
I-59		
NI-59	1.39E-08	1.39E-08
E-55		
FE-55	3.46E-08	3.46E-08

Source: 2

Nuclide	Receptor	Total
	1	
CM-243	2.19E-04	2.19E-04
PU-239	4.42E-09	4.42E-09
U-235	2.02E-19	2.02E-19
PA-231	2.30E-23	2.30E-23
AC-227	3.57E-25	3.57E-25
-241		
PU-241	5.84E-06	5.84E-06
AM-241	2.52E-07	2.52E-07
NP-237	3.34E-14	3.34E-14
U-233	4.21E-21	4.21E-21
TH-229	1.21E-24	1.21E-24
-241		
AM-241	3.19E-04	3.19E-04
NP-237	6.32E-11	6.32E-11
J-233	1.06E-17	1.06E-17
TH-229	3.81E-21	3.81E-21
-239		
PU-239	3.10E-04	3.10E-04
J-235	2.12E-14	2.12E-14
PA-231	3.21E-18	3.21E-18
AC-227	6.22E-20	6.22E-20
-238		
PU-238	2.80E-04	2.80E-04
	6.22E-11	6.22E-11
	4.20E-16	4.20E-16
RA-226	4.76E-20	4.76E-20
PB-210	9.75E-22	9.75E-22

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Evaluation Time: 0.0000000E+00 years

U-238

U-238	4.07E-05	4.07E-05
U-234	6.24E-11	6.24E-11
TH-230	4.21E-16	4.21E-16
RA-226	4.77E-20	4.77E-20
PB-210	9.76E-22	9.76E-22

J-236

U-236	4.17E-05	4.17E-05
TH-232	1.22E-14	1.22E-14
TH-228	1.09E-17	1.09E-17
RA-228	9.83E-17	9.83E-17

-235

U-235	4.31E-05	4.31E-05
PA-231	9.79E-09	9.79E-09
AC-227	2.52E-10	2.52E-10

-234

U-234	4.40E-05	4.40E-05
TH-230	4.46E-10	4.46E-10
RA-226	6.73E-14	6.73E-14
PB-210	1.72E-15	1.72E-15

J-155

EU-155	8.15E-07	8.15E-07
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-99

TC-99	9.55E-08	9.55E-08
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SR-90

SR-90	9.94E-06	9.94E-06
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-63

NI-63	3.78E-08	3.78E-08
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-59

NI-59	1.39E-08	1.39E-08
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-55

FE-55	3.46E-08	3.46E-08
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srce: 3

Nuclide	Receptor	Total
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1

-243

CM-243	6.73E-04	6.73E-04
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U-239	1.33E-08	1.33E-08
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J-235	7.09E-19	7.09E-19
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RA-231	6.92E-23	6.92E-23
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AC-227	1.08E-24	1.08E-24
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-241

U-241	1.75E-05	1.75E-05
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M-241	7.60E-07	7.60E-07
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P-237	1.03E-13	1.03E-13
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U-238	1.26E-20	1.26E-20
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U-235	3.71E-24	3.71E-24
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241

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Evaluation Time: 0.0000000E+00 years

AM-241	9.63E-04	9.63E-04
NP-237	1.94E-10	1.94E-10
U-233	3.18E-17	3.18E-17
TH-229	1.17E-20	1.17E-20
J-239		
PU-239	9.30E-04	9.30E-04
U-235	7.44E-14	7.44E-14
PA-231	9.66E-18	9.66E-18
AC-227	1.88E-19	1.88E-19
J-238		
PU-238	8.40E-04	8.40E-04
U-234	1.87E-10	1.87E-10
TH-230	1.26E-15	1.26E-15
RA-226	2.38E-19	2.38E-19
PB-210	2.93E-21	2.93E-21
.238		
U-238	1.26E-04	1.26E-04
U-234	1.87E-10	1.87E-10
TH-230	1.26E-15	1.26E-15
RA-226	2.39E-19	2.39E-19
PB-210	2.93E-21	2.93E-21
236		
U-236	1.25E-04	1.25E-04
TH-232	3.67E-14	3.67E-14
RA-228	4.68E-17	4.68E-17
RA-228	4.08E-16	4.08E-16
235		
U-235	1.51E-04	1.51E-04
PA-231	2.94E-08	2.94E-08
AC-227	7.62E-10	7.62E-10
234		
U-234	1.32E-04	1.32E-04
TH-230	1.34E-09	1.34E-09
RA-226	3.37E-13	3.37E-13
PB-210	5.16E-15	5.16E-15
-155		
EU-155	9.83E-06	9.83E-06
-99		
PC-99	2.96E-07	2.96E-07
-90		
BR-90	3.05E-05	3.05E-05
-63		
HI-63	1.13E-07	1.13E-07
-59		
HI-59	4.17E-08	4.17E-08
-55		
EE-55	1.04E-07	1.04E-07

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Evaluation Time: 0.0000000E+00 years

Source: 4

Nuclide	Receptor	Total
	1	
Y-243		
CM-243	6.73E-04	6.73E-04
PU-239	1.33E-08	1.33E-08
U-235	7.09E-19	7.09E-19
PA-231	6.92E-23	6.92E-23
AC-227	1.08E-24	1.08E-24
J-241		
PU-241	1.75E-05	1.75E-05
AM-241	7.60E-07	7.60E-07
NP-237	1.03E-13	1.03E-13
U-233	1.26E-20	1.26E-20
TH-229	3.71E-24	3.71E-24
I-241		
AM-241	9.63E-04	9.63E-04
NP-237	1.94E-10	1.94E-10
U-233	3.18E-17	3.18E-17
TH-229	1.17E-20	1.17E-20
I-239		
PU-239	9.30E-04	9.30E-04
U-235	7.44E-14	7.44E-14
PA-231	9.66E-18	9.66E-18
AC-227	1.88E-19	1.88E-19
-238		
PU-238	8.40E-04	8.40E-04
U-234	1.87E-10	1.87E-10
TH-230	1.26E-15	1.26E-15
RA-226	2.38E-19	2.38E-19
PB-210	2.93E-21	2.93E-21
238		
U-238	1.26E-04	1.26E-04
U-234	1.87E-10	1.87E-10
TH-230	1.26E-15	1.26E-15
RA-226	2.39E-19	2.39E-19
PB-210	2.93E-21	2.93E-21
236		
J-236	1.25E-04	1.25E-04
TH-232	5.67E-14	5.67E-14
TH-228	4.68E-17	4.68E-17
RA-228	4.08E-16	4.08E-16
235		
J-235	1.51E-04	1.51E-04
PA-231	2.94E-08	2.94E-08
AC-227	7.62E-10	7.62E-10
234		
U-234	1.32E-04	1.32E-04
U-234	1.34E-09	1.34E-09
RA-226	3.37E-13	3.37E-13
PB-210	5.16E-15	5.16E-15

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Evaluation Time: 0.00000000E+00 years

U-155		
EU-155	9.83E-06	9.83E-06
C-99		
TC-99	2.96E-07	2.96E-07
R-90		
SR-90	3.05E-05	3.05E-05
I-63		
NI-63	1.13E-07	1.13E-07
I-59		
NI-59	4.17E-08	4.17E-08
E-55		
FE-55	1.04E-07	1.04E-07

Source: 5

Nuclide	Receptor	Total
	1	
I-243		
CM-243	1.14E-03	1.14E-03
PU-239	2.21E-08	2.21E-08
U-235	1.32E-18	1.32E-18
PA-231	1.16E-22	1.16E-22
U-237	1.81E-24	1.81E-24
U-241		
PU-241	2.92E-05	2.92E-05
AM-241	1.27E-06	1.27E-06
NP-237	1.75E-13	1.75E-13
U-233	2.11E-20	2.11E-20
TH-229	6.29E-24	6.29E-24
AM-241	1.61E-03	1.61E-03
NP-237	3.31E-10	3.31E-10
U-233	5.31E-17	5.31E-17
TH-229	1.98E-20	1.98E-20
U-239		
PU-239	1.55E-03	1.55E-03
J-235	1.38E-13	1.38E-13
PA-231	1.61E-17	1.61E-17
AC-227	3.15E-19	3.15E-19
U-238		
PU-238	1.40E-03	1.40E-03
J-234	3.12E-10	3.12E-10
TH-230	2.10E-15	2.10E-15
PA-226	5.23E-19	5.23E-19
PB-210	4.88E-21	4.88E-21
I-238		
I-238	2.16E-04	2.16E-04
U-238	3.13E-10	3.13E-10
H-235	2.11E-15	2.11E-15
PA-226	5.24E-19	5.24E-19

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Evaluation Time: 0.0000000E+00 years

PB-210	4.89E-21	4.89E-21
-236		
U-236	2.09E-04	2.09E-04
TH-232	6.12E-14	6.12E-14
TH-228	9.67E-17	9.67E-17
RA-228	8.28E-16	8.28E-16
-235		
U-235	2.81E-04	2.81E-04
PA-231	4.91E-08	4.91E-08
AC-227	1.28E-09	1.28E-09
-234		
U-234	2.21E-04	2.21E-04
TH-230	2.23E-09	2.23E-09
RA-226	7.39E-13	7.39E-13
PB-210	8.61E-15	8.61E-15
I-155		
EU-155	2.59E-05	2.59E-05
-99		
TC-99	5.06E-07	5.06E-07
-90		
SR-90	5.18E-05	5.18E-05
-63		
NI-63	1.89E-07	1.89E-07
-93		
PO-210	6.95E-08	6.95E-08
-55		
FE-55	1.73E-07	1.73E-07

Source: 6

Nuclide	Receptor	Total
	1	
-243		
CM-243	1.12E-03	1.12E-03
PU-239	2.21E-08	2.21E-08
J-235	1.18E-18	1.18E-18
PA-231	1.15E-22	1.15E-22
AC-227	1.80E-24	1.80E-24
-241		
PU-241	2.92E-05	2.92E-05
AM-241	1.27E-06	1.27E-06
NP-237	1.71E-13	1.71E-13
J-233	2.11E-20	2.11E-20
TH-229	6.19E-24	6.19E-24
-241		
AM-241	1.60E-03	1.60E-03
NP-237	3.24E-10	3.24E-10
NI-63	5.31E-17	5.31E-17
TH-229	1.94E-20	1.94E-20
-239		

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Evaluation Time: 0.00000000E+00 years

PU-239	1.55E-03	1.55E-03
U-235	1.24E-13	1.24E-13
PA-231	1.61E-17	1.61E-17
AC-227	3.13E-19	3.13E-19
J-238		
PU-238	1.40E-03	1.40E-03
U-234	3.12E-10	3.12E-10
TH-230	2.10E-15	2.10E-15
RA-226	3.94E-19	3.94E-19
PB-210	4.88E-21	4.88E-21
-238		
U-238	2.10E-04	2.10E-04
U-234	3.12E-10	3.12E-10
TH-230	2.11E-15	2.11E-15
RA-226	3.95E-19	3.95E-19
PB-210	4.88E-21	4.88E-21
-236		
U-236	2.09E-04	2.09E-04
TH-232	6.12E-14	6.12E-14
TH-228	7.76E-17	7.76E-17
RA-228	6.76E-16	6.76E-16
235		
U-235	2.51E-04	2.51E-04
PA-231	4.90E-08	4.90E-08
AC-227	1.27E-09	1.27E-09
234		
U-234	2.20E-04	2.20E-04
TH-230	2.23E-09	2.23E-09
RA-226	5.57E-13	5.57E-13
PB-210	8.60E-15	8.60E-15
-155		
EU-155	1.61E-05	1.61E-05
-99		
TC-99	4.93E-07	4.93E-07
-90		
SR-90	5.08E-05	5.08E-05
-63		
NI-63	1.89E-07	1.89E-07
-59		
NI-59	6.95E-08	6.95E-08
-55		
FE-55	1.73E-07	1.73E-07

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised 25th.bld

Full Summary

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=== RESRAD-BUILD Dose (Time) Tables ===
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Receptor Dose Received for the Exposure Duration
=====

(mrem)

Evaluation Time [yr]

0.00E+00

1 2.40E-02

Receptor Dose/Yr Averaged Over Exposure Duration
=====

(mrem/yr)

Evaluation Time [yr]

0.00E+00

1 2.40E-02

**Final Status Survey Plan
for the
Plum Brook Reactor Facility**

Attachment B

**Approach and Basis for Development of Site-Specific Derived
Concentration Guideline Levels (DCGL)**

Addendum 3

**RESRAD Reports for
Subsurface Structure Scenario Dose Assessment
(63 Pages)**

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otal Dose Components	
Time = 0.000E+00	20
Time = 1.000E+00	22
Time = 3.000E+00	24
Time = 1.000E+01	26
Time = 3.000E+01	28
Time = 1.000E+02	30
Time = 3.000E+02	32
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Innse Conversion Factor (and Related) Parameter Summary
 File: FGR 13 Morbidity



enu	Parameter	Current Value	Default	Parameter Name
-1	Dose conversion factors for inhalation, mrem/pCi:			
-1	Ac-227-D	6.720E+00	6.720E+00	DCF2(1)
-1	Am-241	4.440E-01	4.440E-01	DCF2(2)
-2	Am-243-D	4.400E-01	4.400E-01	DCF2(3)
-1	C-14	2.090E-06	2.090E-06	DCF2(4)
-1	Cm-243	3.070E-01	3.070E-01	DCF2(5)
-1	Co-60	2.190E-04	2.190E-04	DCF2(7)
-1	Cs-137-D	3.190E-05	3.190E-05	DCF2(8)
-1	Eu-152	2.210E-04	2.210E-04	DCF2(9)
1	Eu-154	2.860E-04	2.860E-04	DCF2(11)
1	Eu-155	4.140E-05	4.140E-05	DCF2(12)
1	Fe-55	2.690E-06	2.690E-06	DCF2(13)
1	Gd-152	2.430E-01	2.430E-01	DCF2(14)
1	H-3	6.400E-08	6.400E-08	DCF2(15)
1	I-129	1.740E-04	1.740E-04	DCF2(16)
1	Nd-94	4.140E-04	4.140E-04	DCF2(17)
1	Ni-59	2.700E-06	2.700E-06	DCF2(18)
1	Ni-63	6.290E-06	6.290E-06	DCF2(19)
1	Np-237-D	5.400E-01	5.400E-01	DCF2(20)
1	Po-211	1.260E-00	1.260E-00	DCF2(21)
1	Pb-210-D	2.320E-02	2.320E-02	DCF2(22)
1	Pb-210	3.920E-01	3.920E-01	DCF2(23)
1	Pu-239	4.290E-01	4.290E-01	DCF2(24)
1	Pu-241-D	8.250E-03	8.250E-03	DCF2(25)
1	Ra-226-D	6.600E-03	6.600E-03	DCF2(27)
1	Ra-226-E	5.080E-03	5.080E-03	DCF2(28)
1	Sr-90-D	1.310E-05	1.310E-05	DCF2(29)
1	Tc-99	8.330E-06	8.330E-06	DCF2(30)
1	Tm-226-D	3.450E-01	3.450E-01	DCF2(31)
1	Th-226-D	2.160E+00	2.160E+00	DCF2(32)
1	Th-230	3.260E-01	3.260E-01	DCF2(33)
1	Th-232	1.640E+00	1.640E+00	DCF2(34)
1	U-233	1.350E-01	1.350E-01	DCF2(35)
1	U-234	1.320E-01	1.320E-01	DCF2(36)
1	U-235-D	1.230E-01	1.230E-01	DCF2(37)
1	U-236	1.250E-01	1.250E-01	DCF2(38)
1	U-238-D	1.180E-01	1.180E-01	DCF2(39)
	Dose conversion factors for ingestion, mrem/pCi:			
1	Ac-227-D	1.460E-02	1.460E-02	DCF3(1)
1	Am-241	3.640E-03	3.640E-03	DCF3(2)
1	Am-243-D	3.630E-03	3.630E-03	DCF3(3)
1	C-14	2.090E-06	2.090E-06	DCF3(4)
1	Cm-243	2.510E-03	2.510E-03	DCF3(5)
1	Co-60	2.690E-05	2.690E-05	DCF3(7)
1	Cs-137-D	5.000E-05	5.000E-05	DCF3(8)
1	Eu-152	6.480E-06	6.480E-06	DCF3(9)
1	Eu-154	9.550E-06	9.550E-06	DCF3(11)
1	Eu-155	1.530E-06	1.530E-06	DCF3(12)
1	Fe-55	6.070E-07	6.070E-07	DCF3(13)
1	Gd-152	1.610E-04	1.610E-04	DCF3(14)

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

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nu	Parameter	Current Value	Default	Parameter Name
1	H-3	6.400E-06	6.400E-06	DCF3 (15)
1	I-129	2.760E-04	2.760E-04	DCF3 (16)
1	Np-94	7.340E-06	7.340E-06	DCF3 (17)
1	Ni-59	2.300E-07	2.300E-07	DCF3 (18)
1	Ni-63	5.770E-07	5.770E-07	DCF3 (19)
1	Np-237+D	4.440E-03	4.440E-03	DCF3 (20)
2	Pa-231	1.060E-02	1.060E-02	DCF3 (21)
1	Pd-230+D	7.270E-03	7.270E-03	DCF3 (22)
2	Pu-238	3.200E-03	3.200E-03	DCF3 (23)
1	Pu-239	3.540E-03	3.540E-03	DCF3 (24)
1	Pu-241+D	6.950E-05	6.950E-05	DCF3 (25)
1	Ra-226+D	1.330E-03	1.330E-03	DCF3 (27)
1	Ra-228+D	1.440E-03	1.440E-03	DCF3 (26)
1	Sr-90+D	1.530E-04	1.530E-04	DCF3 (29)
1	Tc-99	1.460E-06	1.460E-06	DCF3 (30)
1	Th-229+D	9.080E-04	9.080E-04	DCF3 (31)
1	Th-229+D	4.030E-03	4.030E-03	DCF3 (32)
1	Th-230	5.480E-04	5.480E-04	DCF3 (33)
1	Th-232	2.730E-03	2.730E-03	DCF3 (34)
1	U-233	2.890E-04	2.890E-04	DCF3 (35)
1	U-234	2.830E-04	2.830E-04	DCF3 (36)
1	U-235+D	2.670E-04	2.670E-04	DCF3 (37)
1	U-236	2.690E-04	2.690E-04	DCF3 (38)
1	U-238+D	2.690E-04	2.690E-04	DCF3 (39)
14	Food transfer factors:			
14	Ac-227+D, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
14	Ac-227+D, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
14	Ac-227+D, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
14				
14	Am-241, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(2,1)
14	Am-241, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-05	5.000E-05	RTF(2,2)
14	Am-241, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	1.000E-06	RTF(2,3)
14				
14	Am-243+D, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(3,1)
14	Am-243+D, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-05	5.000E-05	RTF(3,2)
14	Am-243+D, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(3,3)
14				
14	C-14, plant/soil concentration ratio, dimensionless	5.500E-05	5.500E-05	RTF(4,1)
14	C-14, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.100E-02	3.100E-02	RTF(4,2)
14	C-14, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.200E-02	1.200E-02	RTF(4,3)
14				
14	Cm-243, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
14	Cm-243, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(5,2)
14	Cm-243, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(5,3)
14				
14	Cs-137, plant/soil concentration ratio, dimensionless	9.000E-02	9.000E-02	RTF(7,1)
14	Cs-137, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-02	2.000E-02	RTF(7,2)
14	Cs-137, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(7,3)
14				

Dose Conversion Factor (and Related) Parameter Summary (continued)
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enu	Parameter	Current Value	Default	Parameter Name
-34	Cs-137-D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(8,1)
-34	Cs-137-D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-02	3.000E-02	RTF(8,2)
-34	Cs-137-D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-03	6.000E-03	RTF(8,3)
-34				
-34	Eu-152 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
-34	Eu-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(9,2)
-34	Eu-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(9,3)
-34				
34	Eu-154 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
34	Eu-154 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(11,2)
34	Eu-154 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(11,3)
34				
34	Eu-155 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(12,1)
34	Eu-155 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(12,2)
34	Eu-155 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(12,3)
34				
34	Fe-55 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(13,1)
34	Fe-55 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-02	2.000E-02	RTF(13,2)
34	Fe-55 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(13,3)
34				
34	Gd-152 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(14,1)
34	Gd-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(14,2)
34	Gd-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(14,3)
34				
4	H-3 , plant/soil concentration ratio, dimensionless	4.600E-00	4.600E-00	RTF(15,1)
4	H-3 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.200E-02	1.200E-02	RTF(15,2)
4	H-3 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-02	1.000E-02	RTF(15,3)
4				
4	I-129 , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(16,1)
4	I-129 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	7.000E-03	7.000E-03	RTF(16,2)
4	I-129 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-02	1.000E-02	RTF(16,3)
4				
4	Nb-94 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(17,1)
4	Nb-94 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-07	3.000E-07	RTF(17,2)
4	Nb-94 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(17,3)
4				
4	Ni-59 , plant/soil concentration ratio, dimensionless	5.000E-02	5.000E-02	RTF(18,1)
4	Ni-59 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-02	5.000E-03	RTF(18,2)
4	Ni-59 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-02	2.000E-02	RTF(18,3)
4				
4	Ni-63 , plant/soil concentration ratio, dimensionless	5.000E-02	5.000E-02	RTF(19,1)
4	Ni-63 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-02	5.000E-03	RTF(19,2)
4	Ni-63 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-02	2.000E-02	RTF(19,3)
4				
4	Np-237-D , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(20,1)
4	Np-237-D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(20,2)
4	Np-237-D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(20,3)
4				
4	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(21,1)
4	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(21,2)
4	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(21,3)

Dose Conversion Factor (and Related) Parameter Summary (continued)
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nu	Parameter	Current Value	Default	Parameter Name
34	Pb-210-D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(22,1)
34	Pb-210-D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(22,2)
34	Pb-210-D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(22,3)
34				
34	Pu-238 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(23,1)
34	Pu-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(23,2)
34	Pu-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(23,3)
34				
34	Pu-239 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(24,1)
34	Pu-239 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(24,2)
34	Pu-239 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(24,3)
34				
34	Pu-241-D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(25,1)
34	Pu-241-D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(25,2)
34	Pu-241-D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(25,3)
34				
34	Re-226-D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(27,1)
34	Re-226-D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(27,2)
34	Re-226-D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(27,3)
34				
34	Pa-226-D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(28,1)
34	Pa-226-D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(28,2)
34	Pa-226-D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(28,3)
34				
34	Sr-90-D , plant/soil concentration ratio, dimensionless	3.000E-01	3.000E-01	RTF(29,1)
34	Sr-90-D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-03	8.000E-03	RTF(29,2)
34	Sr-90-D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(29,3)
34				
34	Tc-99 , plant/soil concentration ratio, dimensionless	5.000E+00	5.000E+00	RTF(30,1)
34	Tc-99 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(30,2)
34	Tc-99 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(30,3)
34				
34	Th-228-D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(31,1)
34	Th-228-D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(31,2)
34	Th-228-D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(31,3)
34				
34	Th-229-D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(32,1)
34	Th-229-D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(32,2)
34	Th-229-D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(32,3)
34				
34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(33,1)
34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(33,2)
34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(33,3)
34				
34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(34,1)
34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(34,2)
34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(34,3)
34				
34	U-233 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(35,1)
34	U-233 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(35,2)
34	U-233 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(35,3)

Dose Conversion Factor (and Related) Parameter Summary (continued)
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enu	Parameter	Current Value	Default	Parameter Name
-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(36,1)
-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(36,2)
-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(36,3)
-34				
-34	U-235-D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(37,1)
-34	U-235-D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(37,2)
-34	U-235-D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(37,3)
34				
34	U-236 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(38,1)
34	U-236 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(38,2)
34	U-236 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(38,3)
34				
34	U-238-D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(39,1)
34	U-238-D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(39,2)
34	U-238-D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(39,3)
5				
5	Bioaccumulation factors, fresh water, L/kg:			
5	Ac-227-D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
5	Ac-227-D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
5				
5	Am-241 , fish	3.000E+01	3.000E+01	BIOFAC(2,1)
5	Am-241 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(2,2)
5				
5	Am-243-D , fish	3.000E+01	3.000E+01	BIOFAC(3,1)
5	Am-243-D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(3,2)
5				
5	C-14 , fish	5.000E+04	5.000E+04	BIOFAC(4,1)
5	C-14 , crustacea and mollusks	9.100E+03	9.100E+03	BIOFAC(4,2)
5				
5	Cm-243 , fish	3.000E+01	3.000E+01	BIOFAC(5,1)
5	Cm-243 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(5,2)
5				
5	Ce-60 , fish	3.000E+02	3.000E+02	BIOFAC(7,1)
5	Ce-60 , crustacea and mollusks	2.000E+02	2.000E+02	BIOFAC(7,2)
5				
5	Ce-137-D , fish	2.000E+03	2.000E+03	BIOFAC(8,1)
5	Ce-137-D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(8,2)
5				
5	Eu-152 , fish	5.000E+01	5.000E+01	BIOFAC(9,1)
5	Eu-152 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(9,2)
5				
5	Eu-154 , fish	5.000E+01	5.000E+01	BIOFAC(11,1)
5	Eu-154 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(11,2)
5				
5	Eu-155 , fish	5.000E+01	5.000E+01	BIOFAC(12,1)
5	Eu-155 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(12,2)
5				
5	Fe-55 , fish	2.000E+02	2.000E+02	BIOFAC(13,1)
5	Fe-55 , crustacea and mollusks	3.200E+03	3.200E+03	BIOFAC(13,2)

Dose Conversion Factor (and Related) Parameter Summary (continued)
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enu	Parameter	Current Value	Default	Parameter Name
-5	Gd-152 , fish	2.500E+01	2.500E+01	BIOFAC(14,1)
-5	Gd-152 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(14,2)
-5				
-5	H-3 , fish	1.000E+00	1.000E+00	BIOFAC(15,1)
-5	H-3 , crustacea and mollusks	1.000E+00	1.000E+00	BIOFAC(15,2)
-5				
-5	I-129 , fish	4.000E+01	4.000E+01	BIOFAC(16,1)
-5	I-129 , crustacea and mollusks	5.000E+00	5.000E+00	BIOFAC(16,2)
-5				
5	Nr-94 , fish	3.000E+02	3.000E+02	BIOFAC(17,1)
5	Nr-94 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(17,2)
5				
5	Ni-59 , fish	1.000E+02	1.000E+02	BIOFAC(18,1)
5	Ni-59 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(18,2)
5				
5	Ni-63 , fish	1.000E+02	1.000E+02	BIOFAC(19,1)
5	Ni-63 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(19,2)
5				
5	Np-237-D , fish	3.000E+01	3.000E+01	BIOFAC(20,1)
5	Np-237-D , crustacea and mollusks	4.000E+02	4.000E+02	BIOFAC(20,2)
5				
5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(21,1)
5	Pa-231 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(21,2)
5				
5	Pb-210-D , fish	3.000E+02	3.000E+02	BIOFAC(22,1)
5	Pb-210-D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(22,2)
5				
5	Pu-239 , fish	3.000E+01	3.000E+01	BIOFAC(23,1)
5	Pu-239 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(23,2)
5				
5	Pu-239 , fish	3.000E+01	3.000E+01	BIOFAC(24,1)
5	Pu-239 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(24,2)
5				
5	Pu-241-D , fish	3.000E+01	3.000E+01	BIOFAC(25,1)
5	Pu-241-D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(25,2)
5				
5	Ra-226-D , fish	5.000E+01	5.000E+01	BIOFAC(27,1)
5	Ra-226-D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(27,2)
5				
5	Ra-226-D , fish	5.000E+01	5.000E+01	BIOFAC(28,1)
5	Ra-226-D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(28,2)
5				
5	Sr-90-D , fish	6.000E+01	6.000E+01	BIOFAC(29,1)
5	Sr-90-D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(29,2)
5				
5	Tc-99 , fish	2.000E+01	2.000E+01	BIOFAC(30,1)
5	Tc-99 , crustacea and mollusks	5.000E+00	5.000E+00	BIOFAC(30,2)
5				
5	Th-232-D , fish	1.000E+02	1.000E+02	BIOFAC(31,1)
5	Th-232-D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(31,2)
5				

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

nu	Parameter	Current Value	Default	Parameter Name
5	Th-229-D , fish	1.000E+02	1.000E+02	EIOFAC(32,1)
5	Th-229-D , crustacea and mollusks	5.000E+02	5.000E+02	EIOFAC(32,2)
5				
5	Th-230 , fish	1.000E+02	1.000E+02	EIOFAC(33,1)
5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	EIOFAC(33,2)
5				
5	Th-232 , fish	1.000E+02	1.000E+02	EIOFAC(34,1)
5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	EIOFAC(34,2)
5				
5	U-233 , fish	1.000E+01	1.000E+01	EIOFAC(35,1)
5	U-233 , crustacea and mollusks	6.000E+01	6.000E+01	EIOFAC(35,2)
5				
5	U-234 , fish	1.000E+01	1.000E+01	EIOFAC(36,1)
5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	EIOFAC(36,2)
5				
5	U-235-D , fish	1.000E+01	1.000E+01	EIOFAC(37,1)
5	U-235-D , crustacea and mollusks	6.000E+01	6.000E+01	EIOFAC(37,2)
5				
5	U-236 , fish	1.000E+01	1.000E+01	EIOFAC(38,1)
5	U-236 , crustacea and mollusks	6.000E+01	6.000E+01	EIOFAC(38,2)
5				
5	U-238-D , fish	1.000E+01	1.000E+01	EIOFAC(39,1)
5	U-238-D , crustacea and mollusks	6.000E+01	6.000E+01	EIOFAC(39,2)

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (if different from user input)	Parameter Name
011	Area of contaminated zone (m**2)	3.950E+03	1.000E+04	---	AREA
011	Thickness of contaminated zone (m)	3.000E+00	2.000E+00	---	THICK0
011	Length parallel to aquifer flow (m)	7.000E+01	1.000E+02	---	LCZPAR0
011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	BRDL
011	Time since placement of material (yr)	1.000E+00	0.000E+00	---	TI
011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
112	Initial principal radionuclide (pCi/g): Am-241	1.000E+00	0.000E+00	---	S1(2)
112	Initial principal radionuclide (pCi/g): C-14	1.000E+00	0.000E+00	---	S1(4)
112	Initial principal radionuclide (pCi/g): Cm-243	1.000E+00	0.000E+00	---	S1(5)
112	Initial principal radionuclide (pCi/g): Co-60	1.000E+00	0.000E+00	---	S1(7)
112	Initial principal radionuclide (pCi/g): Cs-137	1.000E+00	0.000E+00	---	S1(8)
112	Initial principal radionuclide (pCi/g): Eu-152	1.000E+00	0.000E+00	---	S1(9)
112	Initial principal radionuclide (pCi/g): Eu-154	1.000E+00	0.000E+00	---	S1(11)
112	Initial principal radionuclide (pCi/g): Eu-155	1.000E+00	0.000E+00	---	S1(12)
112	Initial principal radionuclide (pCi/g): Fe-55	1.000E+00	0.000E+00	---	S1(13)
112	Initial principal radionuclide (pCi/g): H-3	1.000E+00	0.000E+00	---	S1(15)
112	Initial principal radionuclide (pCi/g): I-129	1.000E+00	0.000E+00	---	S1(16)
112	Initial principal radionuclide (pCi/g): Nb-94	1.000E+00	0.000E+00	---	S1(17)
112	Initial principal radionuclide (pCi/g): Ni-59	1.000E+00	0.000E+00	---	S1(18)
112	Initial principal radionuclide (pCi/g): Ni-63	1.000E+00	0.000E+00	---	S1(19)
112	Initial principal radionuclide (pCi/g): Pu-238	1.000E+00	0.000E+00	---	S1(23)
112	Initial principal radionuclide (pCi/g): Pu-239	1.000E+00	0.000E+00	---	S1(24)
112	Initial principal radionuclide (pCi/g): Pu-241	1.000E+00	0.000E+00	---	S1(25)
112	Initial principal radionuclide (pCi/g): Sr-90	1.000E+00	0.000E+00	---	S1(29)
112	Initial principal radionuclide (pCi/g): Tc-99	1.000E+00	0.000E+00	---	S1(30)
112	Initial principal radionuclide (pCi/g): U-234	1.000E+00	0.000E+00	---	S1(36)
112	Initial principal radionuclide (pCi/g): U-235	1.000E+00	0.000E+00	---	S1(37)
112	Initial principal radionuclide (pCi/g): U-236	1.000E+00	0.000E+00	---	S1(38)
112	Initial principal radionuclide (pCi/g): U-238	1.000E+00	0.000E+00	---	S1(39)
2	Concentration in groundwater (pCi/L): Am-241	not used	0.000E+00	---	W1(2)
2	Concentration in groundwater (pCi/L): C-14	not used	0.000E+00	---	W1(4)
2	Concentration in groundwater (pCi/L): Cm-243	not used	0.000E+00	---	W1(5)
2	Concentration in groundwater (pCi/L): Co-60	not used	0.000E+00	---	W1(7)
2	Concentration in groundwater (pCi/L): Cs-137	not used	0.000E+00	---	W1(8)
2	Concentration in groundwater (pCi/L): Eu-152	not used	0.000E+00	---	W1(9)
2	Concentration in groundwater (pCi/L): Eu-154	not used	0.000E+00	---	W1(11)
2	Concentration in groundwater (pCi/L): Eu-155	not used	0.000E+00	---	W1(12)
2	Concentration in groundwater (pCi/L): Fe-55	not used	0.000E+00	---	W1(13)
2	Concentration in groundwater (pCi/L): H-3	not used	0.000E+00	---	W1(15)
2	Concentration in groundwater (pCi/L): I-129	not used	0.000E+00	---	W1(16)
2	Concentration in groundwater (pCi/L): Nb-94	not used	0.000E+00	---	W1(17)
2	Concentration in groundwater (pCi/L): Ni-59	not used	0.000E+00	---	W1(18)

Site-Specific Parameter Summary (continued)

No	Parameter	User		Used by RESRAD (if different from user input)	Parameter Name
		Input	Default		
12	Concentration in groundwater (pCi/L): Ni-63	not used	0.000E+00	---	W1(19)
12	Concentration in groundwater (pCi/L): Pu-238	not used	0.000E+00	---	W1(23)
12	Concentration in groundwater (pCi/L): Pu-239	not used	0.000E+00	---	W1(24)
12	Concentration in groundwater (pCi/L): Pu-241	not used	0.000E+00	---	W1(25)
12	Concentration in groundwater (pCi/L): Sr-90	not used	0.000E+00	---	W1(29)
12	Concentration in groundwater (pCi/L): Tc-99	not used	0.000E+00	---	W1(30)
12	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(36)
12	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(37)
12	Concentration in groundwater (pCi/L): U-236	not used	0.000E+00	---	W1(38)
12	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(39)
13	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
13	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
13	Cover depth erosion rate (m/yr)	not used	1.000E+03	---	VCV
13	Density of contaminated zone (g/cm**3)	1.560E+00	1.500E+00	---	DENSC2
13	Contaminated zone erosion rate (m/yr)	1.000E+03	1.000E+03	---	VCZ
13	Contaminated zone total porosity	4.100E-01	4.000E-01	---	TPCZ
13	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
13	Contaminated zone hydraulic conductivity (m/yr)	8.600E-01	1.000E+01	---	HCCZ
13	Contaminated zone b parameter	1.400E+00	5.300E+00	---	BCZ
3	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
3	Humidity in air (g/m**3)	8.000E+00	8.000E+00	---	HUMID
3	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
3	Precipitation (m/yr)	8.600E-01	1.000E+00	---	PRECIP
3	Irrigation (m/yr)	1.040E+00	2.000E-01	---	RI
3	Irrigation mode	overhead	overhead	---	IDITCH
3	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
3	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
3	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
4	Density of saturated zone (g/cm**3)	1.460E+00	1.500E+00	---	DENSA0
4	Saturated zone total porosity	4.500E-01	4.000E-01	---	TPS2
4	Saturated zone effective porosity	2.000E-01	2.000E-01	---	EPS2
4	Saturated zone field capacity	2.000E-01	2.000E-01	---	FCS2
4	Saturated zone hydraulic conductivity (m/yr)	1.070E+03	1.000E+02	---	HCS2
4	Saturated zone hydraulic gradient	4.500E-03	2.000E-02	---	HGHT
4	Saturated zone b parameter	not used	5.300E+00	---	BS2
4	Water table drop rate (m/yr)	0.000E+00	1.000E-03	---	VWT
4	Well pump intake depth (m below water table)	2.010E-00	1.000E-01	---	DWBWT
4	Model: Nondispersion (ND) or Mass-Balance (MB)	MB	ND	---	MODEL
4	Well pumping rate (m**3/yr)	1.180E+02	2.500E+02	---	W
5	Number of unsaturated zone strata	1	1	---	NS
5	Unsat. zone 1, thickness (m)	0.000E+00	4.000E+00	---	H(1)
5	Unsat. zone 1, soil density (g/cm**3)	1.560E+00	1.500E+00	---	DENSU2(1)
5	Unsat. zone 1, total porosity	4.100E-01	4.000E-01	---	TPU2(1)
5	Unsat. zone 1, effective porosity	3.000E-01	2.000E-01	---	EFU2(1)
5	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FU2(1)
5	Unsat. zone 1, soil-specific b parameter	1.400E+00	5.300E+00	---	BU2(1)
5	Unsat. zone 1, hydraulic conductivity (m/yr)	1.262E+03	1.000E+01	---	HU2(1)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Am-241				
R016	Contaminated zone (cm ³ /g)	4.450E+02	2.000E+01	---	DCNUCC (2)
R016	Unsaturated zone 1 (cm ³ /g)	2.300E+01	2.000E+01	---	DCNUCU (2,1)
R016	Saturated zone (cm ³ /g)	2.000E+01	2.000E+01	---	DCNUCS (2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.146E-04	ALEACH (2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (2)
R016	Distribution coefficients for C-14				
R016	Contaminated zone (cm ³ /g)	2.600E+01	0.000E+00	---	DCNUCC (4)
R016	Unsaturated zone 1 (cm ³ /g)	2.100E+01	0.000E+00	---	DCNUCU (4,1)
R016	Saturated zone (cm ³ /g)	2.100E+01	0.000E+00	---	DCNUCS (4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.030E-03	ALEACH (4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (4)
R016	Distribution coefficients for Cm-243				
R016	Contaminated zone (cm ³ /g)	4.000E+02	-1.000E+00	---	DCNUCC (5)
R016	Unsaturated zone 1 (cm ³ /g)	4.000E+02	-1.000E+00	---	DCNUCU (5,1)
R016	Saturated zone (cm ³ /g)	4.000E+02	-1.000E+00	---	DCNUCS (5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.612E-04	ALEACH (5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (5)
R016	Distribution coefficients for Co-60				
R016	Contaminated zone (cm ³ /g)	1.700E+01	1.000E+03	---	DCNUCC (7)
R016	Unsaturated zone 1 (cm ³ /g)	1.000E+03	1.000E+03	---	DCNUCU (7,1)
R016	Saturated zone (cm ³ /g)	1.000E+03	1.000E+03	---	DCNUCS (7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.069E-02	ALEACH (7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (7)
R016	Distribution coefficients for Cs-137				
R016	Contaminated zone (cm ³ /g)	6.500E+00	1.000E+03	---	DCNUCC (8)
R016	Unsaturated zone 1 (cm ³ /g)	4.470E+02	1.000E+03	---	DCNUCU (8,1)
R016	Saturated zone (cm ³ /g)	4.470E+02	1.000E+03	---	DCNUCS (8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.730E-02	ALEACH (8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (8)
R016	Distribution coefficients for Eu-152				
R016	Contaminated zone (cm ³ /g)	4.000E+02	-1.000E+00	---	DCNUCC (9)
R016	Unsaturated zone 1 (cm ³ /g)	9.550E+02	-1.000E+00	---	DCNUCU (9,1)
R016	Saturated zone (cm ³ /g)	9.550E+02	-1.000E+00	---	DCNUCS (9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.612E-04	ALEACH (9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (9)
R016	Distribution coefficients for Eu-154				
R016	Contaminated zone (cm ³ /g)	4.000E+02	-1.000E+00	---	DCNUCC (11)
R016	Unsaturated zone 1 (cm ³ /g)	9.550E+02	-1.000E+00	---	DCNUCU (11,1)
R016	Saturated zone (cm ³ /g)	9.550E+02	-1.000E+00	---	DCNUCS (11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.612E-04	ALEACH (11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK (11)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (if different from user input)	Parameter Name
	Distribution coefficients for Eu-155				
1016	Contaminated zone (cm ³ /g)	4.000E+02	-1.000E+00	---	DCNUCC(12)
1016	Unsaturated zone 1 (cm ³ /g)	9.550E+02	-1.000E+00	---	DCNUCU(12,1)
1016	Saturated zone (cm ³ /g)	9.550E+02	-1.000E+00	---	DCNUCS(12)
1016	Leach rate (/yr)	0.000E+00	0.000E+00	4.612E-04	ALEACH(12)
1016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(12)
	Distribution coefficients for Fe-55				
016	Contaminated zone (cm ³ /g)	1.300E+03	1.000E+03	---	DCNUCC(13)
016	Unsaturated zone 1 (cm ³ /g)	6.910E+02	1.000E+03	---	DCNUCU(13,1)
016	Saturated zone (cm ³ /g)	8.910E+02	1.000E+03	---	DCNUCS(13)
016	Leach rate (/yr)	0.000E+00	0.000E+00	1.392E-02	ALEACH(13)
016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(13)
	Distribution coefficients for H-3				
116	Contaminated zone (cm ³ /g)	0.000E+00	0.000E+00	---	DCNUCC(15)
116	Unsaturated zone 1 (cm ³ /g)	0.000E+00	0.000E+00	---	DCNUCU(15,1)
116	Saturated zone (cm ³ /g)	0.000E+00	0.000E+00	---	DCNUCS(15)
116	Leach rate (/yr)	0.000E+00	0.000E+00	7.024E-03	ALEACH(15)
116	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(15)
	Distribution coefficients for I-129				
16	Contaminated zone (cm ³ /g)	3.200E+00	1.000E-01	---	DCNUCC(16)
16	Unsaturated zone 1 (cm ³ /g)	1.000E-01	1.000E-01	---	DCNUCU(16,1)
16	Saturated zone (cm ³ /g)	1.000E-01	1.000E-01	---	DCNUCS(16)
16	Leach rate (/yr)	0.000E+00	0.000E+00	5.331E-02	ALEACH(16)
16	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(16)
	Distribution coefficients for Nb-94				
16	Contaminated zone (cm ³ /g)	3.250E+02	0.000E+00	---	DCNUCC(17)
16	Unsaturated zone 1 (cm ³ /g)	0.000E+00	0.000E+00	---	DCNUCU(17,1)
16	Saturated zone (cm ³ /g)	0.000E+00	0.000E+00	---	DCNUCS(17)
16	Leach rate (/yr)	0.000E+00	0.000E+00	5.676E-04	ALEACH(17)
16	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(17)
	Distribution coefficients for Ni-59				
6	Contaminated zone (cm ³ /g)	3.200E+01	1.000E+03	---	DCNUCC(18)
6	Unsaturated zone 1 (cm ³ /g)	3.700E+01	1.000E+03	---	DCNUCU(18,1)
6	Saturated zone (cm ³ /g)	3.700E+01	1.000E+03	---	DCNUCS(18)
6	Leach rate (/yr)	0.000E+00	0.000E+00	5.722E-03	ALEACH(18)
6	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(18)
	Distribution coefficients for Ni-63				
6	Contaminated zone (cm ³ /g)	3.200E+01	1.000E+03	---	DCNUCC(19)
6	Unsaturated zone 1 (cm ³ /g)	3.700E+01	1.000E+03	---	DCNUCU(19,1)
6	Saturated zone (cm ³ /g)	3.700E+01	1.000E+03	---	DCNUCS(19)
6	Leach rate (/yr)	0.000E+00	0.000E+00	5.722E-03	ALEACH(19)
6	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(19)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (if different from user input)	Parameter Name
R016	Distribution coefficients for Pu-238				
R016	Contaminated zone (cm ³ /g)	1.625E+03	2.000E+03	---	DCNUCC(23)
R016	Unsaturated zone 1 (cm ³ /g)	2.000E+03	2.000E+03	---	DCNUCU(23,1)
R016	Saturated zone (cm ³ /g)	2.000E+03	2.000E+03	---	DCNUCS(23)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.136E-04	ALEACH(23)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(23)
R016	Distribution coefficients for Pu-239				
R016	Contaminated zone (cm ³ /g)	1.625E+03	2.000E+03	---	DCNUCC(24)
R016	Unsaturated zone 1 (cm ³ /g)	2.000E+03	2.000E+03	---	DCNUCU(24,1)
R016	Saturated zone (cm ³ /g)	2.000E+03	2.000E+03	---	DCNUCS(24)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.136E-04	ALEACH(24)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(24)
R016	Distribution coefficients for Pu-241				
R016	Contaminated zone (cm ³ /g)	1.625E+03	2.000E+03	---	DCNUCC(25)
R016	Unsaturated zone 1 (cm ³ /g)	2.000E+03	2.000E+03	---	DCNUCU(25,1)
R016	Saturated zone (cm ³ /g)	2.000E+03	2.000E+03	---	DCNUCS(25)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.136E-04	ALEACH(25)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(25)
R016	Distribution coefficients for Sr-90				
R016	Contaminated zone (cm ³ /g)	3.500E+00	3.000E+01	---	DCNUCC(29)
R016	Unsaturated zone 1 (cm ³ /g)	3.200E+01	3.000E+01	---	DCNUCU(29,1)
R016	Saturated zone (cm ³ /g)	3.200E+01	3.000E+01	---	DCNUCS(29)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.906E-02	ALEACH(29)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(29)
R016	Distribution coefficients for Tc-99				
R016	Contaminated zone (cm ³ /g)	5.200E+00	0.000E+00	---	DCNUCC(30)
R016	Unsaturated zone 1 (cm ³ /g)	7.000E+00	0.000E+00	---	DCNUCU(30,1)
R016	Saturated zone (cm ³ /g)	7.000E+00	0.000E+00	---	DCNUCS(30)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.379E-02	ALEACH(30)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(30)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm ³ /g)	2.120E+02	5.000E+01	---	DCNUCC(36)
R016	Unsaturated zone 1 (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCU(36,1)
R016	Saturated zone (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCS(36)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	6.697E-04	ALEACH(36)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(36)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm ³ /g)	2.120E+02	5.000E+01	---	DCNUCC(37)
R016	Unsaturated zone 1 (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCU(37,1)
R016	Saturated zone (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCS(37)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	6.697E-04	ALEACH(37)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(37)

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-236				
R016	Contaminated zone (cm ³ /g)	2.120E+02	5.000E+01	---	DCNUCC(38)
R016	Unsaturated zone 1 (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCU(38,1)
R016	Saturated zone (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCS(38)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.697E-04	ALEACH(38)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(38)
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm ³ /g)	2.120E+02	5.000E+01	---	DCNUCC(39)
R016	Unsaturated zone 1 (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCU(39,1)
R016	Saturated zone (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCS(39)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.697E-04	ALEACH(39)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(39)
R016	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm ³ /g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm ³ /g)	2.000E+01	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm ³ /g)	2.000E+01	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	9.111E-03	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for daughter Am-243				
R016	Contaminated zone (cm ³ /g)	2.000E+01	2.000E+01	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm ³ /g)	2.000E+01	2.000E+01	---	DCNUCU(3,1)
R016	Saturated zone (cm ³ /g)	2.000E+01	2.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	9.111E-03	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for daughter Gd-152				
R016	Contaminated zone (cm ³ /g)	-1.000E+00	-1.000E+00	8.249E-02	DCNUCC(14)
R016	Unsaturated zone 1 (cm ³ /g)	-1.000E+00	-1.000E+00	8.249E-02	DCNUCU(14,1)
R016	Saturated zone (cm ³ /g)	-1.000E+00	-1.000E+00	8.249E-02	DCNUCS(14)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.237E-04	ALEACH(14)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(14)
R016	Distribution coefficients for daughter Np-237				
R016	Contaminated zone (cm ³ /g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCC(20)
R016	Unsaturated zone 1 (cm ³ /g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCU(20,1)
R016	Saturated zone (cm ³ /g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCS(20)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.164E-04	ALEACH(20)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(20)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCC(21)
R016	Unsaturated zone 1 (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCU(21,1)
R016	Saturated zone (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCS(21)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.672E-03	ALEACH(21)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(21)

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 Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(22)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(22,1)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(22)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.441E-03	ALEACH(22)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(22)
R016	Distribution coefficients for daughter Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(27)
R016	Unsaturated zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(27,1)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(27)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.627E-03	ALEACH(27)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(27)
R016	Distribution coefficients for daughter Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(28)
R016	Unsaturated zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(28,1)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(28)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.627E-03	ALEACH(28)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(28)
R016	Distribution coefficients for daughter Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(31)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(31,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(31)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.077E-06	ALEACH(31)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(31)
R016	Distribution coefficients for daughter Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(32)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(32,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(32)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.077E-06	ALEACH(32)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(32)
R016	Distribution coefficients for daughter Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(33)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(33,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(33)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.077E-06	ALEACH(33)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(33)
R016	Distribution coefficients for daughter Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(34)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(34,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(34)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.077E-06	ALEACH(34)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(34)

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 U-233				
R016	Contaminated zone (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCC(35)
R016	Unsaturated zone 1 (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCU(35,1)
R016	Saturated zone (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCS(35)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.673E-03	ALEACH(35)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(35)
R017	Inhalation rate (m ³ /yr)	8.400E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m ³)	6.000E-06	1.000E-04	---	MLINH
R017	Exposure duration	3.653E+02	3.000E+02	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	4.700E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	6.600E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	1.100E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radius 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	2.752E-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)	7.000E+01	1.600E+02	---	DJET(1)
R018	Leafy vegetable consumption (kg/yr)	1.500E+01	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	1.100E+02	9.200E+01	---	DJET(3)
R018	Meat and poultry consumption (kg/yr)	5.200E+01	6.300E+01	---	DIET(4)
R018	Egg consumption (kg/yr)	1.600E+01	5.400E+00	---	DJET(5)
R018	Other seafood consumption (kg/yr)	0.000E+00	9.000E-01	---	DJET(6)
R018	Soil ingestion rate (g/yr)	1.850E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	4.760E+02	5.100E+02	---	DW1

Site-Specific Parameter Summary (continued)

Media	Parameter	User Input	Default	Used by RESRAD (if different from user input)	Parameter Name
	RO1F Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
	RO1E Contamination fraction of household water	not used	1.000E+00	---	FHHW
	RO1B Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
	RO1I Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIW
	RO1F Contamination fraction of aquatic food	5.000E-01	5.000E-01	---	FAF
	RO1F Contamination fraction of plant food	1.000E+00	-1	---	FPLANT
	RO1E Contamination fraction of meat	1.000E+00	-1	---	FMEAT
	RO1E Contamination fraction of milk	1.000E+00	-1	---	FMILK
	LO19 Livestock fodder intake for meat (kg/day)	6.500E-00	6.800E+00	---	LF15
	LO19 Livestock fodder intake for milk (kg/day)	1.700E-01	1.500E+01	---	LF16
	LO19 Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LW15
	LO19 Livestock water intake for milk (L/day)	1.600E-02	1.600E+02	---	LW16
	LO19 Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
	LO19 Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
	LO19 Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
	LO19 Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
	LO19 Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
	LO19 Household water fraction from ground water	not used	1.000E+00	---	FGWHH
	LO19 Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGLW
	LO19 Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWR
	Y1 Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
	Y2 Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
	Y3 Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
	YS Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
	YS Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
	YS Growing Season for Fodder (years)	6.000E-02	6.000E-02	---	TE(3)
	YS Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
	YS Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
	YS Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
	YS Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
	YS Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
	YS Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
	YS Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
	YS Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
	YS Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
	YS Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAN
	C-12 concentration in water (g/cm**3)	2.000E-05	2.000E-05	---	C12WTF
	C-12 concentration in contaminated soil (g/g)	3.000E-02	3.000E-02	---	C12C2
	Fraction of vegetation carbon from soil	2.000E-02	2.000E-02	---	CSC1L
	Fraction of vegetation carbon from air	9.600E-01	9.600E-01	---	CA1F
	C-14 evasion layer thickness in soil (m)	3.000E-01	3.000E-01	---	DMC
	C-14 evasion flux rate from soil (l/sec)	7.000E-07	7.000E-07	---	EVSN
	C-12 evasion flux rate from soil (l/sec)	1.000E-10	1.000E-10	---	REVSN
	Fraction of grain in beef cattle feed	6.000E-01	6.000E-01	---	AVFG4
	Fraction of grain in milk cow feed	2.000E-01	2.000E-01	---	AVFG5
	correction factor for gaseous forms of C14	6.694E+01	6.694E+01	---	CC2F
	Storage times of contaminated foodstuffs (days):				

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)
STOP	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)
4021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
4021	Bulk density of building foundation (g/cm ³)	not used	2.400E+03	---	DENSFL
4021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
4021	Total porosity of the building foundation	not used	1.000E-01	---	TFFL
021	Volumetric water content of the cover material	not used	5.000E-02	---	PH20CV
021	Volumetric water content of the foundation	not used	5.000E-02	---	PH20FL
021	Diffusion coefficient for radon gas (m/sec):				
021	in cover material	not used	2.000E-06	---	DIFCV
021	in foundation material	not used	3.000E-07	---	DIFFL
021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
321	Radon vertical dimension of mining (m)	not used	2.000E+00	---	RMIX
221	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REMG
	height of the building (room) (m)	not used	2.500E+00	---	HRM
421	Building interior area factor	not used	0.000E+00	---	FAI
421	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TL	Number of preproced time points	12	---	---	NPTS
TL	Maximum number of integration points for dose	17	---	---	LYMAX
TL	Maximum number of integration points for risk	1	---	---	RYMAX

Summary of Pathway Selections

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

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	3850.00 square meters	Am-241	1.000E+00
Thickness:	3.00 meters	C-14	1.000E+00
Cover Depth:	0.00 meters	Cm-243	1.000E+00
		Co-60	1.000E+00
		Cs-137	1.000E+00
		Eu-152	1.000E+00
		Eu-154	1.000E+00
		Eu-155	1.000E+00
		Fe-55	1.000E+00
		H-3	1.000E+00
		I-129	1.000E+00
		Nb-94	1.000E+00
		Ni-59	1.000E+00
		Ni-63	1.000E+00
		Pu-238	1.000E+00
		Pu-239	1.000E+00
		Pu-241	1.000E+00
		Sr-90	1.000E+00
		Tc-99	1.000E+00
		U-234	1.000E+00
		U-235	1.000E+00
		U-236	1.000E+00
		U-238	1.000E+00

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

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.629E+02	1.719E+02	1.540E+02	1.078E+02	4.711E+01	1.760E+01	1.344E+01	6.593E+00
Mit):	7.515E-01	6.672E-01	6.161E-01	4.313E-01	1.664E-01	7.039E-01	5.374E-01	2.637E-01

Maximum TDOSE(t): 1.629E+02 mrem/yr at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,j,t) for Individual Radionuclides (i) and Pathways (j)
 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.
n-241	1.739E-02	0.0001	1.243E-03	0.0000	0.000E+00	0.0000	5.366E-01	0.0019	4.809E-05	0.0000	4.437E-04	0.0000	5.124E-02	0.0003
-14	2.164E-06	0.0000	1.551E-04	0.0000	0.000E+00	0.0000	4.199E-01	0.0045	3.957E-01	0.0022	2.357E-01	0.0017	1.183E-05	0.0000
n-243	2.261E-01	0.0012	6.771E-04	0.0000	0.000E+00	0.0000	2.309E-01	0.0013	1.311E-05	0.0000	3.025E-04	0.0000	3.493E-02	0.0002
p-60	5.837E+00	0.0319	5.905E-07	0.0000	0.000E+00	0.0000	1.666E-01	0.0010	3.091E-02	0.0002	2.102E-02	0.0001	3.533E-04	0.0000
s-137	1.276E+00	0.0070	6.996E-08	0.0000	0.000E+00	0.0000	1.615E-01	0.0010	6.405E-02	0.0004	5.441E-02	0.0003	6.671E-04	0.0000
-152	2.637E+00	0.0144	6.224E-07	0.0000	0.000E+00	0.0000	1.469E-03	0.0000	3.423E-04	0.0000	8.094E-06	0.0000	6.896E-05	0.0000
-154	2.656E+00	0.0136	7.953E-07	0.0000	0.000E+00	0.0000	2.156E-03	0.0000	4.975E-04	0.0000	1.176E-05	0.0000	1.294E-04	0.0000
-155	6.736E-02	0.0004	1.117E-07	0.0000	0.000E+00	0.0000	3.321E-04	0.0000	7.740E-05	0.0000	1.828E-06	0.0000	2.012E-05	0.0000
-55	0.000E+00	0.0000	6.817E-09	0.0000	0.000E+00	0.0000	4.954E-05	0.0000	2.814E-04	0.0000	9.735E-06	0.0000	7.494E-06	0.0000
3	0.000E+00	0.0000	2.637E-04	0.0000	0.000E+00	0.0000	9.846E-03	0.0001	5.876E-04	0.0000	1.200E-05	0.0000	4.736E-07	0.0000
129	5.141E-03	0.0000	4.901E-07	0.0000	0.000E+00	0.0000	5.010E-01	0.0027	6.564E-02	0.0004	2.673E-01	0.0015	3.787E-03	0.0000
-94	3.714E+00	0.0203	1.197E-06	0.0000	0.000E+00	0.0000	6.639E-03	0.0000	6.515E-05	0.0000	1.129E-06	0.0000	1.006E-04	0.0000
-59	0.000E+00	0.0000	7.787E-09	0.0000	0.000E+00	0.0000	9.739E-04	0.0000	5.039E-05	0.0000	6.674E-04	0.0000	2.951E-06	0.0000
-63	0.000E+00	0.0000	1.808E-06	0.0000	0.000E+00	0.0000	2.666E-03	0.0000	1.389E-04	0.0000	1.827E-05	0.0000	6.078E-06	0.0000
-238	6.210E-05	0.0000	1.129E-03	0.0000	0.000E+00	0.0000	2.966E-01	0.0016	6.425E-03	0.0000	1.945E-04	0.0000	4.491E-02	0.0002
-239	1.171E-04	0.0000	1.241E-03	0.0000	0.000E+00	0.0000	3.296E-01	0.0016	9.361E-03	0.0001	2.160E-04	0.0000	4.968E-02	0.0003
-241	2.101E-05	0.0000	2.451E-05	0.0000	0.000E+00	0.0000	6.495E-03	0.0000	1.810E-04	0.0000	4.430E-06	0.0000	9.828E-04	0.0000
-90	9.164E-03	0.0001	3.654E-06	0.0000	0.000E+00	0.0000	4.123E+00	0.0225	1.685E-01	0.0010	1.960E-01	0.0011	2.079E-03	0.0000
-134	1.891E-05	0.0000	2.369E-09	0.0000	0.000E+00	0.0000	6.662E-01	0.0037	3.226E-04	0.0000	1.454E-02	0.0001	2.023E-05	0.0000
135	1.605E-04	0.0000	3.816E-04	0.0000	0.000E+00	0.0000	6.591E-02	0.0004	2.607E-03	0.0000	1.087E-02	0.0001	3.986E-03	0.0000
135	2.971E-01	0.0016	3.557E-04	0.0000	0.000E+00	0.0000	6.219E-02	0.0003	2.475E-03	0.0000	1.025E-02	0.0001	3.762E-03	0.0000
136	6.652E-05	0.0000	3.614E-04	0.0000	0.000E+00	0.0000	6.255E-02	0.0003	2.476E-03	0.0000	1.033E-02	0.0001	3.789E-03	0.0000
136	5.693E-02	0.0003	2.412E-04	0.0000	0.000E+00	0.0000	6.255E-02	0.0003	2.476E-03	0.0000	1.033E-02	0.0001	3.789E-03	0.0000
21	1.700E+01	0.0920	6.421E-03	0.0000	0.000E+00	0.0000	7.959E+00	0.0435	7.833E-01	0.0043	6.296E-01	0.0045	2.046E-01	0.0011

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 0.008E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Rabon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	3.902E-00	0.0213	7.543E-03	0.0000	0.000E+00	0.0000	2.194E+00	0.0120	2.763E-03	0.0000	6.172E-04	0.0000	6.524E+00	0.0357
C-14	1.880E-03	0.0000	6.216E-03	0.0000	0.000E+00	0.0000	3.673E-03	0.0000	1.607E-03	0.0000	2.420E-03	0.0000	1.471E+00	0.0080
Co-243	2.959E+00	0.0162	5.721E-03	0.0000	0.000E+00	0.0000	1.667E+00	0.0091	6.363E-04	0.0000	4.661E-04	0.0000	5.126E+00	0.0280
Co-60	6.944E-01	0.0036	1.342E-02	0.0001	0.000E+00	0.0000	3.979E-01	0.0022	1.972E-01	0.0011	1.100E-01	0.0006	7.479E+00	0.0409
Cs-137	3.450E+00	0.0189	4.447E-01	0.0024	0.000E+00	0.0000	1.960E+00	0.0107	1.471E+00	0.0040	2.197E+00	0.0120	1.109E+01	0.0606
Co-152	7.536E-03	0.0000	2.424E-05	0.0000	0.000E+00	0.0000	4.245E-03	0.0000	2.135E-04	0.0000	1.192E-05	0.0000	2.651E+00	0.0145
Co-154	1.076E-02	0.0001	3.531E-05	0.0000	0.000E+00	0.0000	6.175E-03	0.0000	3.104E-04	0.0000	1.734E-05	0.0000	2.677E+00	0.0157
Co-155	1.704E-03	0.0000	5.490E-06	0.0000	0.000E+00	0.0000	9.600E-04	0.0000	4.827E-05	0.0000	2.695E-06	0.0000	7.051E-02	0.0004
Co-55	1.917E-02	0.0001	2.472E-04	0.0000	0.000E+00	0.0000	1.090E-02	0.0001	5.438E-03	0.0000	4.552E-04	0.0000	3.646E-02	0.0002
Cr	3.257E-02	0.0002	2.136E-06	0.0000	0.000E+00	0.0000	1.577E-02	0.0001	2.400E-03	0.0000	7.403E-03	0.0000	7.005E-02	0.0004
Cr-129	3.719E+01	0.2034	9.542E-02	0.0005	0.000E+00	0.0000	2.105E+01	0.1151	2.710E+00	0.0203	2.950E+01	0.1613	9.239E+01	0.5052
Cr-94	1.046E-02	0.0001	2.027E-04	0.0000	0.000E+00	0.0000	5.917E-03	0.0000	4.456E-06	0.0000	1.659E-06	0.0000	3.738E+00	0.0204
Cr-59	3.102E-03	0.0000	1.999E-01	0.0000	0.000E+00	0.0000	1.766E-02	0.0000	2.200E-04	0.0000	4.911E-03	0.0000	1.171E-02	0.0001
Cr-62	8.492E-03	0.0000	5.472E-05	0.0000	0.000E+00	0.0000	4.835E-03	0.0000	6.022E-04	0.0000	1.345E-02	0.0001	3.207E-02	0.0002
Cr-238	9.369E-01	0.0051	1.611E-03	0.0000	0.000E+00	0.0000	5.277E-01	0.0029	1.327E-03	0.0000	7.422E-05	0.0000	1.619E+00	0.0099
Cr-239	1.041E+00	0.0057	2.013E-03	0.0000	0.000E+00	0.0000	5.960E-01	0.0032	1.474E-03	0.0000	8.229E-05	0.0000	2.021E+00	0.0110
Cr-241	2.691E-02	0.0002	5.577E-05	0.0000	0.000E+00	0.0000	1.624E-02	0.0001	3.410E-05	0.0000	2.979E-06	0.0000	5.295E-02	0.0003
Cr-90	1.678E-01	0.0027	7.267E-02	0.0004	0.000E+00	0.0000	1.128E+01	0.0617	2.151E+00	0.0114	2.992E+00	0.0164	3.960E+01	0.2176
Cr-234	1.258E-01	0.0007	1.622E-04	0.0000	0.000E+00	0.0000	1.483E-01	0.0008	1.950E-04	0.0000	1.670E-02	0.0001	9.692E-01	0.0053
Cr-235	6.367E-01	0.0035	4.103E-04	0.0000	0.000E+00	0.0000	3.567E-01	0.0020	3.066E-03	0.0000	3.022E-02	0.0002	1.113E+00	0.0061
Cr-236	6.041E-01	0.0033	3.893E-04	0.0000	0.000E+00	0.0000	3.403E-01	0.0019	3.099E-03	0.0000	2.851E-02	0.0002	1.353E+00	0.0074
Cr-237	6.052E-01	0.0033	3.900E-04	0.0000	0.000E+00	0.0000	3.410E-01	0.0019	2.915E-03	0.0000	2.872E-02	0.0002	1.054E+00	0.0058
Cr-238	6.052E-01	0.0033	3.900E-04	0.0000	0.000E+00	0.0000	3.410E-01	0.0019	2.915E-03	0.0000	2.872E-02	0.0002	1.117E+00	0.0061
total	7.166E+01	0.3916	6.524E-01	0.0036	0.000E+00	0.0000	4.126E+01	0.2257	7.559E-03	0.0413	2.495E-01	0.1911	1.629E+02	1.0000

* sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 1.000E+06 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.
Am-241	1.735E-02	0.0001	1.290E-03	0.0000	0.000E+00	0.0000	3.560E-01	0.0020	4.798E-03	0.0000	4.428E-04	0.0000	5.114E-02	0.0003
C-14	2.349E-07	0.0000	1.684E-05	0.0000	0.000E+00	0.0000	5.128E-02	0.0005	4.781E-02	0.0003	2.816E-02	0.0002	1.284E-06	0.0000
Mn-243	2.206E-01	0.0013	8.557E-04	0.0000	0.000E+00	0.0000	2.252E-01	0.0013	1.279E-03	0.0000	2.951E-04	0.0000	3.409E-02	0.0002
Pb-60	5.064E+00	0.0295	5.122E-07	0.0000	0.000E+00	0.0000	1.619E-01	0.0009	2.673E-02	0.0002	9.558E-03	0.0001	3.065E-04	0.0000
S-137	1.214E+00	0.0071	8.556E-08	0.0000	0.000E+00	0.0000	1.726E-01	0.0010	6.093E-02	0.0004	5.175E-02	0.0003	6.533E-04	0.0000
U-152	2.503E+00	0.0146	5.909E-07	0.0000	0.000E+00	0.0000	1.394E-03	0.0000	3.248E-04	0.0000	7.671E-06	0.0000	8.441E-05	0.0000
U-154	2.639E+00	0.0154	7.347E-07	0.0000	0.000E+00	0.0000	1.573E-03	0.0000	4.599E-04	0.0000	1.066E-05	0.0000	1.195E-04	0.0000
U-155	5.854E+02	0.0003	9.711E-08	0.0000	0.000E+00	0.0000	2.887E-04	0.0000	6.727E-05	0.0000	1.589E-06	0.0000	1.748E-05	0.0000
Fr-55	0.000E+00	0.0000	5.200E-09	0.0000	0.000E+00	0.0000	3.780E-05	0.0000	2.147E-04	0.0000	7.427E-06	0.0000	5.717E-06	0.0000
Th-3	0.000E+00	0.0000	6.108E-05	0.0000	0.000E+00	0.0000	2.307E-03	0.0000	1.440E-04	0.0000	2.896E-04	0.0000	1.097E-07	0.0000
Th-129	4.674E-03	0.0000	4.647E-07	0.0000	0.000E+00	0.0000	4.751E-01	0.0028	6.247E-02	0.0004	2.535E-01	0.0015	3.591E-03	0.0000
Th-94	3.712E+00	0.0216	1.196E-06	0.0000	0.000E+00	0.0000	6.635E-03	0.0000	6.511E-06	0.0000	1.128E-06	0.0000	1.005E-04	0.0000
Th-59	0.000E+00	0.0000	7.743E-09	0.0000	0.000E+00	0.0000	9.683E-04	0.0000	5.011E-05	0.0000	6.637E-04	0.0000	2.534E-06	0.0000
Th-63	0.000E+00	0.0000	1.784E-08	0.0000	0.000E+00	0.0000	2.632E-03	0.0000	1.362E-04	0.0000	1.804E-03	0.0000	7.974E-06	0.0000
Th-238	6.160E-05	0.0000	1.120E-03	0.0000	0.000E+00	0.0000	2.944E-01	0.0017	8.361E-03	0.0000	1.930E-04	0.0000	4.455E-02	0.0003
Th-239	1.171E-04	0.0000	1.241E-03	0.0000	0.000E+00	0.0000	3.296E-01	0.0019	9.359E-03	0.0001	2.159E-04	0.0000	4.987E-02	0.0003
Th-241	4.721E-05	0.0000	2.517E-05	0.0000	0.000E+00	0.0000	6.719E-03	0.0000	1.800E-04	0.0000	4.915E-06	0.0000	1.017E-03	0.0000
Th-90	8.520E-03	0.0000	3.398E-06	0.0000	0.000E+00	0.0000	3.634E+00	0.0223	2.754E-01	0.0010	1.823E-01	0.0011	1.933E-03	0.0000
Th-728	0.000E-05	0.0000	2.290E-08	0.0000	0.000E+00	0.0000	6.461E-01	0.0038	3.122E-04	0.0000	1.406E-02	0.0001	1.556E-05	0.0000
Th-234	1.604E-04	0.0000	3.813E-04	0.0000	0.000E+00	0.0000	6.575E-02	0.0004	2.605E-03	0.0000	1.086E-02	0.0001	3.983E-03	0.0000
Th-235	2.969E-01	0.0017	3.554E-04	0.0000	0.000E+00	0.0000	6.234E-02	0.0004	2.507E-03	0.0000	1.024E-02	0.0001	3.762E-03	0.0000
Th-236	8.644E-05	0.0000	3.611E-04	0.0000	0.000E+00	0.0000	6.250E-02	0.0004	2.476E-03	0.0000	1.032E-02	0.0001	3.766E-03	0.0000
Th-238	5.888E-02	0.0003	3.409E-04	0.0000	0.000E+00	0.0000	6.250E-02	0.0004	2.476E-03	0.0000	1.032E-02	0.0001	3.766E-03	0.0000
Th-241	1.580E+01	0.0919	6.046E-03	0.0000	0.000E+00	0.0000	6.844E+00	0.0396	4.091E-01	0.0024	5.851E-01	0.0034	2.028E-01	0.0012

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		Wheat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	3.493E-00	0.0227	7.525E-03	0.0000	0.000E+00	0.0000	2.192E+00	0.0124	2.757E-03	0.0000	6.157E-04	0.0000	6.509E+00	0.0379
C-14	2.043E-04	0.0000	6.632E-04	0.0000	0.000E+00	0.0000	3.422E-04	0.0000	1.867E-04	0.0000	2.670E-04	0.0000	1.689E-01	0.0010
Cm-243	2.886E+00	0.0166	5.579E-03	0.0000	0.000E+00	0.0000	1.625E+00	0.0095	8.176E-04	0.0000	4.565E-04	0.0000	5.001E+00	0.0291
Co-60	6.021E-01	0.0035	1.164E-02	0.0001	0.000E+00	0.0000	3.451E-01	0.0020	1.710E-01	0.0010	9.542E-02	0.0006	6.487E+00	0.0376
Cs-137	3.279E-00	0.0191	4.228E-01	0.0025	0.000E+00	0.0000	1.664E+00	0.0105	1.259E-00	0.0061	2.079E-00	0.0121	1.054E+01	0.0614
Eu-152	7.146E-03	0.0000	2.303E-05	0.0000	0.000E+00	0.0000	4.027E-03	0.0000	2.025E-04	0.0000	1.131E-05	0.0000	2.516E+00	0.0146
Eu-154	1.012E-02	0.0001	3.261E-05	0.0000	0.000E+00	0.0000	5.702E-03	0.0000	2.867E-04	0.0000	1.601E-05	0.0000	2.658E+00	0.0155
Fr-155	1.481E-03	0.0000	4.770E-06	0.0000	0.000E+00	0.0000	8.342E-04	0.0000	4.194E-05	0.0000	2.342E-06	0.0000	6.128E-02	0.0004
Ge-68	1.462E-02	0.0001	1.865E-04	0.0000	0.000E+00	0.0000	6.237E-03	0.0000	4.149E-03	0.0000	3.472E-04	0.0000	2.781E-02	0.0002
Ir-192	7.548E-03	0.0000	4.979E-07	0.0000	0.000E+00	0.0000	3.695E-03	0.0000	5.706E-04	0.0000	1.726E-03	0.0000	1.634E-02	0.0001
K-40	3.524E+01	0.2051	9.092E-02	0.0005	0.000E+00	0.0000	1.995E+01	0.1161	3.520E-00	0.0205	2.798E+01	0.1628	6.759E+01	0.5098
La-139	1.048E-02	0.0001	2.025E-04	0.0000	0.000E+00	0.0000	5.911E-03	0.0000	4.451E-03	0.0000	1.657E-06	0.0000	3.736E+00	0.0217
Li-6	3.083E-03	0.0000	1.987E-05	0.0000	0.000E+00	0.0000	1.755E-03	0.0000	2.187E-04	0.0000	4.862E-03	0.0000	1.164E-02	0.0001
Li-7	6.360E-03	0.0000	5.400E-05	0.0000	0.000E+00	0.0000	4.771E-03	0.0000	5.944E-04	0.0000	1.327E-02	0.0001	3.165E-02	0.0002
Mn-54	9.291E-01	0.0054	1.756E-03	0.0000	0.000E+00	0.0000	5.233E-01	0.0030	1.516E-03	0.0000	7.369E-05	0.0000	1.804E+00	0.0105
Mn-56	1.040E+00	0.0061	2.010E-03	0.0000	0.000E+00	0.0000	5.857E-01	0.0034	1.473E-03	0.0000	6.225E-05	0.0000	2.020E+00	0.0118
Ni-63	3.393E-02	0.0002	6.545E-05	0.0000	0.000E+00	0.0000	1.906E-02	0.0001	3.695E-03	0.0000	3.842E-06	0.0000	6.106E-02	0.0004
Ni-64	1.746E-01	0.0106	6.755E-02	0.0004	0.000E+00	0.0000	1.048E-01	0.0010	2.001E-00	0.0116	2.782E+00	0.0162	3.700E+01	0.2153
Ni-66	1.216E-01	0.0007	1.567E-04	0.0000	0.000E+00	0.0000	1.433E-01	0.0008	1.886E-04	0.0000	1.034E-02	0.0001	9.361E-01	0.0054
Ni-69	3.360E-01	0.0037	4.098E-04	0.0000	0.000E+00	0.0000	3.563E-01	0.0021	3.063E-03	0.0000	3.016E-02	0.0002	1.112E+00	0.0065
P-32	6.059E-01	0.0035	3.906E-04	0.0000	0.000E+00	0.0000	3.414E-01	0.0020	3.243E-03	0.0000	2.548E-02	0.0002	1.355E+00	0.0078
P-33	6.045E-01	0.0035	3.895E-04	0.0000	0.000E+00	0.0000	3.406E-01	0.0020	2.911E-03	0.0000	2.869E-02	0.0002	1.057E+00	0.0061
P-33	6.045E-01	0.0035	3.895E-04	0.0000	0.000E+00	0.0000	3.406E-01	0.0020	2.911E-03	0.0000	2.869E-02	0.0002	1.115E+00	0.0065
Tal	6.800E+01	0.3558	6.128E-01	0.0036	0.000E+00	0.0000	3.815E+01	0.2279	7.116E-00	0.0414	3.306E+01	0.1916	1.718E+02	1.0006

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- Nuclide	Ground		Inhalation		Radon		Plant		Heat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	1.728E-02	0.0001	1.275E-03	0.0000	0.000E+00	0.0000	3.366E-01	0.0022	4.779E-03	0.0000	4.411E-04	0.0000	5.093E-02	0.0003
C-14	2.758E-09	0.0000	1.977E-07	0.0000	0.000E+00	0.0000	1.072E+03	0.0000	5.616E-04	0.0000	3.307E-04	0.0000	1.508E-06	0.0000
Co-243	2.099E-01	0.0014	8.344E-04	0.0000	0.000E+00	0.0000	2.144E-01	0.0014	1.216E-03	0.0000	2.809E-04	0.0000	3.244E-02	0.0002
Cr-60	3.610E-00	0.0247	3.454E-07	0.0000	0.000E+00	0.0000	1.216E-01	0.0008	2.011E-02	0.0001	7.192E-03	0.0000	2.306E-04	0.0000
Cs-137	1.097E+00	0.0071	7.736E-04	0.0000	0.000E+00	0.0000	1.561E-01	0.0010	5.509E-02	0.0004	4.679E-02	0.0003	5.907E-04	0.0000
Eu-152	2.253E+00	0.0146	5.321E-07	0.0000	0.000E+00	0.0000	1.255E-03	0.0000	2.924E-04	0.0000	6.906E-06	0.0000	7.600E-05	0.0000
Eu-154	2.252E+00	0.0146	6.271E-07	0.0000	0.000E+00	0.0000	1.684E-03	0.0000	3.925E-04	0.0000	9.270E-06	0.0000	1.020E-04	0.0000
Eu-155	4.423E-02	0.0003	7.337E-04	0.0000	0.000E+00	0.0000	2.181E-04	0.0000	5.082E-05	0.0000	1.200E-06	0.0000	1.321E-05	0.0000
Fe-55	0.000E+00	0.0000	3.027E-09	0.0000	0.000E+00	0.0000	2.200E-05	0.0000	1.250E-04	0.0000	4.322E-06	0.0000	3.327E-06	0.0000
Fe-59	0.000E+00	0.0000	3.272E-06	0.0000	0.000E+00	0.0000	1.236E-04	0.0000	7.718E-06	0.0000	1.552E-05	0.0000	5.890E-09	0.0000
Fe-129	4.381E-03	0.0000	4.177E-07	0.0000	0.000E+00	0.0000	4.271E-01	0.0028	5.615E-02	0.0004	2.279E-01	0.0015	3.227E-03	0.0000
Fe-94	3.708E+00	0.0241	1.195E-04	0.0000	0.000E+00	0.0000	6.627E-03	0.0000	6.503E-04	0.0000	1.127E-06	0.0000	1.004E-04	0.0000
I-59	0.000E+00	0.0000	7.655E-09	0.0000	0.000E+00	0.0000	9.573E-04	0.0000	4.954E-05	0.0000	6.561E-04	0.0000	2.900E-06	0.0000
I-63	0.000E+00	0.0000	1.739E-04	0.0000	0.000E+00	0.0000	2.565E-03	0.0000	1.327E-04	0.0000	1.758E-03	0.0000	7.770E-06	0.0000
I-236	6.062E-05	0.0000	1.102E-03	0.0000	0.000E+00	0.0000	2.894E-01	0.0019	8.226E-03	0.0001	1.900E-04	0.0000	4.384E-02	0.0003
I-239	1.171E-04	0.0000	1.240E-03	0.0000	0.000E+00	0.0000	3.295E-01	0.0021	9.357E-03	0.0001	2.159E-04	0.0000	4.966E-02	0.0003
I-241	9.581E-05	0.0000	2.676E-03	0.0000	0.000E+00	0.0000	7.132E-03	0.0000	1.741E-04	0.0000	5.914E-06	0.0000	1.079E-03	0.0000
Ir-90	7.364E-03	0.0000	2.977E-04	0.0000	0.000E+00	0.0000	3.314E+00	0.0215	1.516E-01	0.0010	1.576E-01	0.0010	1.671E-03	0.0000
Ir-192	4.419E-05	0.0000	2.141E-04	0.0000	0.000E+00	0.0000	6.039E-01	0.0039	2.939E-04	0.0000	1.314E-02	0.0001	1.626E-05	0.0000
Ir-225	1.602E-04	0.0000	3.807E-04	0.0000	0.000E+00	0.0000	6.564E-01	0.0004	2.600E-03	0.0000	1.064E-02	0.0001	3.976E-03	0.0000
Ir-226	2.964E-01	0.0019	5.550E-04	0.0000	0.000E+00	0.0000	8.266E-02	0.0004	2.570E-03	0.0000	1.023E-02	0.0001	3.763E-03	0.0000
Pb-210	6.629E-05	0.0000	7.605E-04	0.0000	0.000E+00	0.0000	6.239E-02	0.0004	2.472E-03	0.0000	1.030E-02	0.0001	3.775E-03	0.0000
Pb-214	5.679E-02	0.0004	3.489E-04	0.0000	0.000E+00	0.0000	6.135E-02	0.0004	2.472E-03	0.0000	1.030E-02	0.0001	3.775E-03	0.0000
Ta-182	1.376E+01	0.0692	5.905E-03	0.0000	0.000E+00	0.0000	6.068E+00	0.0394	3.184E-01	0.0021	4.962E-01	0.0032	1.955E-01	0.0013

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

Water Dependent Pathways

Radio- nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
90-241	3.874E+00	0.0212	7.490E-03	0.0000	0.000E+00	0.0000	2.162E-00	0.0142	2.744E-03	0.0000	6.128E-04	0.0000	6.479E+00	0.0421
137-137	2.395E-06	0.0000	8.086E-06	0.0000	0.000E+00	0.0000	4.012E-06	0.0000	2.189E-06	0.0000	3.130E-06	0.0000	1.984E-03	0.0000
243-243	2.745E+00	0.0176	5.306E-03	0.0000	0.000E+00	0.0000	1.546E+00	0.0100	7.777E-04	0.0000	4.341E-04	0.0000	4.756E+00	0.0309
238-238	4.528E-01	0.0029	8.754E-03	0.0001	0.000E+00	0.0000	2.595E-01	0.0017	1.266E-01	0.0008	7.175E-02	0.0005	4.881E+00	0.0317
137-137	2.963E+00	0.0192	3.820E-01	0.0025	0.000E+00	0.0000	1.684E-00	0.0109	1.264E-00	0.0082	1.879E-00	0.0122	9.527E+00	0.0619
137-137	6.432E-02	0.0000	2.072E-05	0.0000	0.000E+00	0.0000	3.624E-05	0.0000	1.822E-04	0.0000	1.017E-05	0.0000	2.265E+00	0.0147
137-137	6.633E-03	0.0001	2.761E-01	0.0000	0.000E+00	0.0000	4.865E-03	0.0000	2.445E-04	0.0000	1.365E-05	0.0000	2.269E+00	0.0147
137-137	1.118E-03	0.0000	3.605E-06	0.0000	0.000E+00	0.0000	6.296E-04	0.0000	3.166E-05	0.0000	1.766E-06	0.0000	4.630E-02	0.0003
137-137	8.504E-03	0.0001	1.096E-04	0.0000	0.000E+00	0.0000	4.791E-03	0.0000	2.413E-03	0.0000	2.019E-04	0.0000	1.617E-02	0.0001
137-137	4.040E-04	0.0000	1.665E-06	0.0000	0.000E+00	0.0000	1.978E-04	0.0000	3.054E-05	0.0000	5.236E-05	0.0000	6.749E-04	0.0000
137-137	3.166E+01	0.2055	8.167E-02	0.0005	0.000E+00	0.0000	1.792E-01	0.0116	3.162E-00	0.0205	2.513E-01	0.0163	7.868E+01	0.5108
137-137	1.046E-02	0.0001	2.821E-04	0.0000	0.000E+00	0.0000	5.900E-03	0.0000	4.443E-06	0.0000	1.654E-06	0.0000	3.731E+00	0.0242
137-137	3.046E-03	0.0000	1.963E-05	0.0000	0.000E+00	0.0000	1.734E-03	0.0000	2.160E-04	0.0000	4.823E-03	0.0000	1.150E-02	0.0001
137-137	8.161E-03	0.0001	1.259E-05	0.0000	0.000E+00	0.0000	4.646E-03	0.0000	5.788E-04	0.0000	1.292E-02	0.0001	3.082E-02	0.0002
137-137	9.138E-01	0.0059	1.766E-03	0.0000	0.000E+00	0.0000	5.146E-01	0.0033	1.294E-03	0.0000	7.264E-05	0.0000	1.775E+00	0.0115
137-137	1.039E+00	0.0067	2.009E-03	0.0000	0.000E+00	0.0000	5.852E-01	0.0036	1.472E-03	0.0000	8.217E-05	0.0000	2.018E+00	0.0131
137-137	4.322E-02	0.0003	8.342E-05	0.0000	0.000E+00	0.0000	2.429E-02	0.0002	4.234E-05	0.0000	5.452E-06	0.0000	7.616E-02	0.0005
137-137	1.508E-01	0.0079	5.835E-02	0.0004	0.000E+00	0.0000	9.057E+00	0.0586	1.729E-00	0.0112	2.403E-00	0.0156	3.196E+01	0.2075
137-137	1.135E-01	0.0007	1.464E-04	0.0000	0.000E+00	0.0000	1.339E-01	0.0009	1.761E-04	0.0000	9.661E-03	0.0001	6.747E-01	0.0057
137-137	6.344E-01	0.0041	4.088E-04	0.0000	0.000E+00	0.0000	3.574E-01	0.0023	3.055E-03	0.0000	3.011E-02	0.0002	1.109E+00	0.0072
137-137	6.102E-01	0.0040	3.939E-04	0.0000	0.000E+00	0.0000	3.438E-01	0.0022	3.535E-03	0.0000	2.841E-02	0.0002	1.361E+00	0.0086
137-137	6.051E-01	0.0039	3.886E-04	0.0000	0.000E+00	0.0000	3.398E-01	0.0022	2.904E-03	0.0000	2.862E-02	0.0002	1.054E+00	0.0068
137-137	6.031E-01	0.0038	3.846E-04	0.0000	0.000E+00	0.0000	3.398E-01	0.0022	2.904E-03	0.0000	2.862E-02	0.0002	1.113E+00	0.0072
137-137	6.136E-01	0.0040	3.886E-04	0.0000	0.000E+00	0.0000	3.532E-01	0.0023	6.306E+00	0.0409	2.963E-01	0.0194	1.540E+02	1.0000

* of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Heat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	1.704E-02	0.0002	1.257E-03	0.0000	0.000E+00	0.0000	3.319E-03	0.0031	4.722E-03	0.0000	4.349E-04	0.0000	5.022E-02	0.0005
C-14	4.608E-16	0.0000	3.303E-14	0.0000	0.000E+00	0.0000	1.791E-10	0.0000	9.401E-11	0.0000	5.533E-11	0.0000	2.519E-15	0.0000
Cm-243	1.765E-01	0.0016	6.649E-04	0.0000	0.000E+00	0.0000	1.803E-01	0.0017	1.026E-03	0.0000	2.362E-04	0.0000	2.728E-02	0.0002
Co-60	1.408E+00	0.0131	1.424E-07	0.0000	0.000E+00	0.0000	4.502E-02	0.0004	7.434E-03	0.0001	2.658E-03	0.0000	8.524E-05	0.0000
Cs-137	7.711E-01	0.0072	5.436E-08	0.0000	0.000E+00	0.0000	1.097E-01	0.0010	3.971E-02	0.0004	3.288E-02	0.0003	4.151E-04	0.0000
Cs-137	1.561E+00	0.0145	3.689E-07	0.0000	0.000E+00	0.0000	8.691E-04	0.0000	2.025E-04	0.0000	4.784E-06	0.0000	5.264E-05	0.0000
Cs-137	1.293E+00	0.0120	3.601E-07	0.0000	0.000E+00	0.0000	9.672E-04	0.0000	2.254E-04	0.0000	5.324E-06	0.0000	5.858E-05	0.0000
U-235	1.657E-02	0.0002	2.750E-04	0.0000	0.000E+00	0.0000	8.172E-05	0.0000	1.905E-05	0.0000	4.498E-07	0.0000	4.950E-06	0.0000
U-235	0.000E+00	0.0000	4.552E-10	0.0000	0.000E+00	0.0000	3.309E-06	0.0000	1.880E-05	0.0000	6.501E-07	0.0000	5.004E-07	0.0000
U-235	0.000E+00	0.0000	1.148E-10	0.0000	0.000E+00	0.0000	4.335E-09	0.0000	2.708E-10	0.0000	5.445E-10	0.0000	2.062E-13	0.0000
U-235	3.017E-03	0.0000	2.876E-07	0.0000	0.000E+00	0.0000	2.940E-01	0.0027	3.866E-02	0.0004	1.569E-01	0.0015	2.222E-03	0.0000
U-235	3.692E-00	0.0342	1.190E-06	0.0000	0.000E+00	0.0000	6.599E-03	0.0001	6.476E-04	0.0000	1.122E-06	0.0000	9.999E-05	0.0000
U-235	0.000E+00	0.0000	7.354E-09	0.0000	0.000E+00	0.0000	9.197E-04	0.0000	4.788E-05	0.0000	6.303E-04	0.0000	2.786E-06	0.0000
U-235	0.000E+00	0.0000	1.588E-04	0.0000	0.000E+00	0.0000	2.343E-03	0.0000	1.212E-04	0.0000	1.606E-03	0.0000	7.097E-06	0.0000
U-235	5.732E-05	0.0000	1.042E-03	0.0000	0.000E+00	0.0000	2.740E-01	0.0025	7.778E-03	0.0001	1.788E-04	0.0000	4.145E-02	0.0004
U-235	1.170E-04	0.0000	1.239E-03	0.0000	0.000E+00	0.0000	3.292E-01	0.0031	9.347E-03	0.0001	2.157E-04	0.0000	4.981E-02	0.0005
U-235	2.318E-04	0.0000	3.115E-03	0.0000	0.000E+00	0.0000	6.271E-03	0.0001	1.723E-04	0.0000	5.318E-06	0.0000	1.251E-03	0.0000
U-235	4.422E-03	0.0000	1.763E-06	0.0000	0.000E+00	0.0000	1.990E+00	0.0185	5.105E-02	0.0004	8.464E-02	0.0009	1.003E-03	0.0000
U-235	3.488E-05	0.0000	1.890E-06	0.0000	0.000E+00	0.0000	4.766E-01	0.0044	2.303E-04	0.0000	1.037E-02	0.0001	1.443E-05	0.0000
U-235	1.601E-04	0.0000	3.784E-04	0.0000	0.000E+00	0.0000	6.524E-02	0.0006	2.585E-03	0.0000	1.077E-02	0.0001	3.952E-03	0.0000
U-235	2.846E-01	0.0027	3.540E-04	0.0000	0.000E+00	0.0000	6.279E-02	0.0006	2.787E-03	0.0000	1.017E-02	0.0001	3.767E-03	0.0000
U-235	8.577E-03	0.0000	3.583E-04	0.0000	0.000E+00	0.0000	6.201E-02	0.0006	2.457E-03	0.0000	1.024E-02	0.0001	3.756E-03	0.0000
U-235	5.842E-02	0.0005	3.362E-04	0.0000	0.000E+00	0.0000	6.201E-02	0.0006	2.457E-03	0.0000	1.024E-02	0.0001	3.756E-03	0.0000
U-235	9.287E-00	0.0862	5.688E-03	0.0001	0.000E+00	0.0000	4.304E+00	0.0389	2.100E-01	0.0019	3.422E-01	0.0032	1.892E-01	0.0018

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

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Fadon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	3.811E+00	0.0553	7.367E-03	0.0001	0.000E+00	0.0000	2.146E+00	0.0199	2.699E-03	0.0000	6.028E-04	0.0000	6.274E+00	0.0591
C-14	3.979E-13	0.0000	1.330E-12	0.0000	0.000E-00	0.0000	6.665E-13	0.0000	3.656E-13	0.0000	5.201E-13	0.0000	3.318E-10	0.0000
Cm-243	2.303E-00	0.0214	4.453E-03	0.0000	0.000E+00	0.0000	1.297E+00	0.0120	6.526E-04	0.0000	3.642E-04	0.0000	3.991E+00	0.0370
Co-60	1.670E-01	0.0015	3.228E-03	0.0000	0.000E+00	0.0000	9.567E-02	0.0009	4.742E-02	0.0004	2.646E-02	0.0002	1.803E+00	0.0167
Cs-137	2.077E+00	0.0193	2.878E-01	0.0025	0.000E+00	0.0000	1.180E+00	0.0109	8.862E-03	0.0002	1.317E+00	0.0122	6.681E+00	0.0620
Cu-152	4.445E-03	0.0000	1.432E-05	0.0000	0.000E+00	0.0000	2.504E-03	0.0000	1.259E-04	0.0000	7.037E-06	0.0000	1.569E+00	0.0146
Cu-154	4.946E-03	0.0000	1.594E-05	0.0000	0.000E+00	0.0000	2.787E-03	0.0000	1.401E-04	0.0000	7.824E-06	0.0000	1.303E+00	0.0121
Cu-155	4.179E-04	0.0000	1.347E-06	0.0000	0.000E+00	0.0000	2.355E-04	0.0000	1.164E-05	0.0000	6.611E-07	0.0000	1.735E-02	0.0002
Fe-55	1.276E-03	0.0000	1.645E-05	0.0000	0.000E+00	0.0000	7.184E-04	0.0000	3.620E-04	0.0000	3.030E-05	0.0000	2.427E-03	0.0000
-3	1.412E-06	0.0000	9.314E-13	0.0000	0.000E-00	0.0000	6.912E-09	0.0000	1.066E-09	0.0000	3.228E-09	0.0000	3.060E-08	0.0000
-129	2.175E-01	0.2017	5.610E-02	0.3005	0.000E+00	0.0000	1.231E-01	0.1142	2.172E+00	0.0201	1.726E+01	0.1601	5.405E+01	0.5012
B-94	1.039E-02	0.0001	2.009E-04	0.0000	0.000E+00	0.0000	5.862E-03	0.0001	4.414E-05	0.0000	3.643E-06	0.0000	3.715E+00	0.0345
I-59	2.919E-03	0.0000	1.881E-03	0.0000	0.000E+00	0.0000	1.662E-03	0.0000	2.071E-04	0.0000	4.622E-03	0.0000	1.103E-02	0.0001
I-63	7.436E-03	0.0001	4.792E-03	0.0000	0.000E+00	0.0000	4.234E-03	0.0000	5.274E-04	0.0000	1.177E-02	0.0001	2.810E-02	0.0003
J-238	8.619E-01	0.0000	1.666E-03	0.0000	0.000E+00	0.0000	4.854E-01	0.0045	1.221E-03	0.0000	6.910E-05	0.0000	1.675E+00	0.0155
J-239	1.036E+00	0.0006	2.002E-03	0.0000	0.000E+00	0.0000	5.832E-01	0.0054	1.467E-03	0.0000	8.190E-05	0.0000	2.012E+00	0.0187
J-241	6.904E-02	0.0006	1.334E-04	0.0000	0.000E+00	0.0000	3.885E-02	0.0004	5.724E-05	0.0000	9.536E-06	0.0000	1.151E-01	0.0011
90	9.034E+00	0.0858	3.496E-02	0.0003	0.000E+00	0.0000	5.426E-00	0.0503	1.036E-00	0.0006	1.440E+00	0.0134	1.915E+01	0.1776
99	3.941E-02	0.0006	1.153E-04	0.0000	0.000E+00	0.0000	1.054E-01	0.0010	1.387E-04	0.0000	7.608E-03	0.0001	6.900E-01	0.0064
234	6.291E-01	0.0058	4.054E-04	0.0000	0.000E+00	0.0000	3.544E-01	0.0032	3.030E-03	0.0000	2.965E-02	0.0003	1.100E+00	0.0102
235	6.303E-01	0.0058	4.103E-04	0.0000	0.000E+00	0.0000	3.551E-01	0.0033	4.532E-03	0.0000	2.820E-02	0.0003	1.394E+00	0.0129
236	5.980E-01	0.0055	3.853E-04	0.0000	0.000E+00	0.0000	3.369E-01	0.0031	2.880E-03	0.0000	2.838E-02	0.0003	1.045E+00	0.0097
238	5.980E-01	0.0055	3.853E-04	0.0000	0.000E+00	0.0000	3.369E-01	0.0031	2.880E-03	0.0000	2.838E-02	0.0003	1.104E+00	0.0102
total	4.366E+01	0.4051	3.797E-01	0.0075	0.000E+00	0.0000	2.507E+01	0.1320	4.162E+00	0.0386	2.019E+01	0.1872	1.078E+02	1.0000

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes reason)

Radio- nuclide	Ground		Inhalation		Reason		Plant		Heat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
m-241	1.637E-02	0.0003	1.204E-05	0.0000	0.000E+00	0.0000	3.144E-01	0.0068	4.527E-02	0.0001	4.177E-04	0.0000	4.422E-02	0.0016
-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.147E-30	0.0000	2.724E-30	0.0000	1.606E-30	0.0000	0.000E+00	0.0000
x-243	1.075E-01	0.0023	4.174E-04	0.0000	0.000E+00	0.0000	1.100E-01	0.0023	6.252E-04	0.0000	1.440E-04	0.0000	1.664E-02	0.0004
y-60	1.195E-02	0.0017	8.290E-09	0.0000	0.000E+00	0.0000	2.620E-03	0.0001	4.326E-04	0.0000	1.547E-04	0.0000	4.961E-06	0.0000
z-137	2.814E-01	0.0060	1.944E-06	0.0000	0.000E+00	0.0000	4.002E-02	0.0008	1.413E-02	0.0003	1.200E-02	0.0003	1.515E-04	0.0000
-152	5.466E-01	0.0116	1.291E-07	0.0000	0.000E+00	0.0000	3.044E-04	0.0000	7.093E-05	0.0000	1.675E-06	0.0000	1.844E-05	0.0000
-154	2.652E-01	0.0056	7.384E-06	0.0000	0.000E+00	0.0000	1.943E-04	0.0000	4.622E-05	0.0000	1.092E-06	0.0000	1.201E-05	0.0000
-155	1.004E-03	0.0000	1.665E-09	0.0000	0.000E+00	0.0000	4.949E-06	0.0000	1.153E-06	0.0000	2.724E-06	0.0000	2.998E-07	0.0000
-55	0.000E+00	0.0000	2.030E-12	0.0000	0.000E+00	0.0000	1.475E-08	0.0000	5.381E-08	0.0000	2.859E-09	0.0000	2.231E-09	0.0000
3	0.000E+00	0.0000	1.485E-23	0.0000	0.000E+00	0.0000	7.121E-22	0.0000	4.455E-23	0.0000	4.952E-23	0.0000	3.366E-26	0.0000
129	1.039E-03	0.0000	9.901E-08	0.0000	0.000E+00	0.0000	1.012E-01	0.0021	1.331E-02	0.0003	5.402E-02	0.0011	7.651E-04	0.0000
-94	3.648E+00	0.0774	1.176E-06	0.0000	0.000E+00	0.0000	6.520E-03	0.0001	6.598E-08	0.0000	1.109E-06	0.0000	8.878E-05	0.0000
-59	0.000E+00	0.0000	6.557E-09	0.0000	0.000E+00	0.0000	8.201E-04	0.0000	4.243E-05	0.0000	5.620E-04	0.0000	2.465E-06	0.0000
-63	0.000E+00	0.0000	1.226E-08	0.0000	0.000E+00	0.0000	1.409E-03	0.0000	9.357E-05	0.0000	1.239E-03	0.0000	5.479E-06	0.0000
-238	4.884E-05	0.0000	8.460E-04	0.0000	0.000E+00	0.0000	2.334E-01	0.0050	6.627E-03	0.0001	1.537E-04	0.0000	3.531E-02	0.0007
-239	1.166E-04	0.0000	1.235E-03	0.0000	0.000E+00	0.0000	3.262E-01	0.0070	5.321E-03	0.0002	2.151E-04	0.0000	4.967E-02	0.0011
-241	4.305E-04	0.0000	3.714E-05	0.0000	0.000E+00	0.0000	9.823E-03	0.0002	1.604E-04	0.0000	1.191E-05	0.0000	1.446E-03	0.0000
90	1.030E-03	0.0000	4.106E-07	0.0000	0.000E+00	0.0000	4.633E-01	0.0098	2.120E-02	0.0005	2.204E-02	0.0005	2.336E-04	0.0000
	7.74E-05	0.0000	6.595E-09	0.0000	0.000E+00	0.0000	2.424E-01	0.0051	1.172E-04	0.0000	5.277E-03	0.0001	7.339E-06	0.0000
134	1.641E-04	0.0000	3.720E-04	0.0000	0.000E+00	0.0000	6.413E-02	0.0014	2.540E-03	0.0001	1.059E-02	0.0002	3.665E-03	0.0001
135	2.897E-01	0.0061	3.527E-04	0.0000	0.000E+00	0.0000	6.713E-02	0.0014	3.369E-03	0.0001	9.995E-03	0.0002	3.796E-03	0.0001
136	8.430E-05	0.0000	3.521E-04	0.0000	0.000E+00	0.0000	6.094E-02	0.0013	2.414E-03	0.0001	1.006E-02	0.0002	3.691E-03	0.0001
138	5.741E-02	0.0012	1.324E-04	0.0000	0.000E+00	0.0000	6.095E-02	0.0013	2.415E-03	0.0001	1.006E-02	0.0002	3.692E-03	0.0001
ei	5.298E+00	0.1125	1.187E-03	0.0001	0.000E+00	0.0000	2.113E+00	0.0448	8.145E-02	0.0017	1.369E-01	0.0029	1.677E-01	0.0036

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- Nuclide	Water		Fish		Recon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	3.636E+00	0.0777	7.029E-03	0.0001	0.000E+00	0.0000	2.048E-00	0.0435	2.576E-03	0.0001	5.751E-04	0.0000	6.084E-05	0.1251
C-14	0.000E+00	0.0000	0.000E-00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.527E-30	0.0000
Cm-243	1.394E+00	0.0296	2.695E-03	0.0001	0.000E+00	0.0000	7.651E-01	0.0167	3.956E-04	0.0000	2.204E-04	0.0000	2.418E+00	0.0513
Co-60	8.651E-03	0.0002	1.866E-04	0.0000	0.000E+00	0.0000	5.531E-03	0.0001	2.741E-02	0.0001	1.529E-03	0.0000	1.046E-01	0.0022
Cs-137	7.529E-01	0.0160	9.707E-02	0.0021	0.000E-00	0.0000	4.279E-01	0.0092	3.212E-01	0.0068	4.774E-01	0.0101	2.424E-00	0.0515
Cu-64	1.546E-03	0.0000	4.941E-06	0.0000	0.000E+00	0.0000	8.711E-04	0.0000	4.380E-05	0.0000	2.446E-06	0.0000	5.495E-01	0.0117
Cu-65	1.007E-03	0.0000	3.246E-06	0.0000	0.000E+00	0.0000	5.675E-04	0.0000	2.853E-05	0.0000	1.593E-06	0.0000	2.671E-01	0.0057
Cu-66	2.514E-05	0.0000	8.100E-08	0.0000	0.000E+00	0.0000	1.416E-05	0.0000	7.121E-07	0.0000	3.977E-08	0.0000	1.050E-03	0.0000
Fe-55	5.651E-06	0.0000	7.265E-08	0.0000	0.000E+00	0.0000	3.184E-06	0.0000	1.604E-06	0.0000	1.342E-07	0.0000	1.075E-05	0.0000
Fe-59	2.296E-21	0.0000	1.515E-25	0.0000	0.000E+00	0.0000	1.124E-21	0.0000	1.737E-22	0.0000	5.249E-22	0.0000	4.984E-21	0.0000
Fe-60	7.437E-00	0.1579	1.819E-02	0.0004	0.000E+00	0.0000	4.211E+00	0.0894	7.427E-01	0.0156	5.904E+00	0.1253	1.846E+01	0.3923
Fe-64	1.019E-02	0.0002	1.971E-04	0.0000	0.000E+00	0.0000	5.753E-03	0.0001	4.332E-06	0.0000	1.613E-06	0.0000	3.671E+00	0.0779
Fe-65	2.586E-03	0.0001	1.666E-05	0.0000	0.000E+00	0.0000	1.472E-03	0.0000	1.834E-04	0.0000	4.094E-03	0.0001	9.779E-03	0.0002
Fe-66	5.702E-03	0.0001	3.674E-05	0.0000	0.000E+00	0.0000	3.246E-03	0.0001	4.044E-04	0.0000	9.029E-03	0.0002	2.156E-02	0.0005
Fe-235	7.294E-01	0.0155	1.410E-03	0.0000	0.000E+00	0.0000	4.104E-01	0.0087	1.033E-03	0.0000	6.002E-05	0.0000	1.419E+00	0.0301
Fe-239	1.026E+00	0.0218	1.983E-03	0.0000	0.000E+00	0.0000	5.777E-01	0.0123	1.453E-03	0.0000	6.112E-05	0.0000	1.996E+00	0.0424
Fe-241	1.058E-01	0.0022	2.045E-04	0.0000	0.000E+00	0.0000	5.959E-02	0.0013	7.812E-05	0.0000	1.637E-05	0.0000	1.777E-01	0.0038
Fe-90	2.090E+00	0.0444	8.059E-03	0.0002	0.000E+00	0.0000	1.255E+00	0.0266	2.396E-01	0.0051	3.330E-01	0.0071	4.433E+00	0.0941
Fe-234	6.517E-02	0.0010	5.825E-05	0.0000	0.000E+00	0.0000	5.326E-02	0.0011	7.008E-05	0.0000	3.844E-03	0.0001	3.503E-01	0.0074
Fe-235	6.141E-01	0.0130	3.961E-04	0.0000	0.000E+00	0.0000	3.460E-01	0.0073	2.959E-03	0.0001	2.914E-02	0.0006	1.074E+00	0.0228
Fe-236	7.156E-01	0.0152	4.656E-04	0.0000	0.000E+00	0.0000	4.032E-01	0.0056	7.190E-03	0.0002	2.764E-02	0.0006	1.528E+00	0.0324
Fe-238	5.838E-01	0.0124	3.762E-04	0.0000	0.000E+00	0.0000	3.269E-01	0.0070	2.611E-03	0.0001	2.770E-02	0.0006	1.021E+00	0.0217
Fe-239	5.638E-01	0.0124	3.762E-04	0.0000	0.000E+00	0.0000	3.269E-01	0.0070	2.611E-03	0.0001	2.770E-02	0.0006	1.078E+00	0.0229
total	1.974E+01	0.4191	1.394E+01	0.0000	0.000E+00	0.0000	1.125E+01	0.2369	1.524E+00	0.0262	6.546E+00	0.1453	4.711E+01	1.0000

Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 1.00E+02 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.
m-241	1.422E-02	0.0005	1.049E-03	0.0001	0.000E+00	0.0000	2.770E-01	0.0157	3.934E-03	0.0002	3.627E-04	0.0000	4.188E-02	0.0024
i-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
m-243	1.897E-02	0.0011	7.469E-05	0.0000	0.000E+00	0.0000	1.972E-02	0.0011	1.199E-04	0.0000	2.561E-05	0.0000	2.943E-03	0.0002
c-60	3.897E-06	0.0000	3.942E-13	0.0000	0.000E+00	0.0000	1.246E-07	0.0000	2.057E-08	0.0000	7.355E-09	0.0000	2.359E-10	0.0000
s-137	6.261E-03	0.0005	5.123E-10	0.0000	0.000E+00	0.0000	1.175E-03	0.0001	4.147E-04	0.0000	3.522E-04	0.0000	4.446E-06	0.0000
u-132	1.349E-02	0.0008	3.241E-09	0.0000	0.000E+00	0.0000	7.737E-06	0.0000	1.803E-06	0.0000	4.259E-06	0.0000	4.687E-07	0.0000
u-154	1.035E-03	0.0001	2.842E-10	0.0000	0.000E+00	0.0000	7.740E-07	0.0000	1.804E-07	0.0000	4.260E-09	0.0000	4.688E-06	0.0000
u-155	5.485E-09	0.0000	9.099E-14	0.0000	0.000E+00	0.0000	2.704E-10	0.0000	6.303E-11	0.0000	1.489E-12	0.0000	1.636E-11	0.0000
p-55	0.000E+00	0.0000	1.202E-20	0.0000	0.000E+00	0.0000	6.734E-17	0.0000	4.962E-16	0.0000	1.716E-17	0.0000	1.321E-17	0.0000
-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
-129	2.467E-05	0.0000	2.371E-09	0.0000	0.000E+00	0.0000	2.424E-03	0.0001	3.187E-04	0.0000	1.294E-03	0.0001	1.632E-05	0.0000
u-94	3.498E+00	0.1988	1.127E-06	0.0000	0.000E+00	0.0000	6.251E-03	0.0004	6.134E-08	0.0000	1.063E-06	0.0000	9.471E-05	0.0000
-55	0.000E+00	0.0000	4.390E-09	0.0000	0.000E+00	0.0000	5.490E-04	0.0000	2.841E-05	0.0000	3.763E-04	0.0000	1.663E-06	0.0000
-63	0.000E+00	0.0000	4.955E-09	0.0000	0.000E+00	0.0000	7.308E-04	0.0000	3.762E-05	0.0000	5.009E-04	0.0000	2.214E-06	0.0000
i-238	2.790E-05	0.0000	5.068E-04	0.0000	0.000E+00	0.0000	1.332E-01	0.0076	3.762E-03	0.0002	8.929E-05	0.0000	2.015E-02	0.0011
-239	1.155E-04	0.0000	1.213E-03	0.0001	0.000E+00	0.0000	3.250E-01	0.0165	9.228E-03	0.0005	2.129E-04	0.0000	4.917E-02	0.0029
-241	4.885E-04	0.0000	3.621E-05	0.0000	0.000E+00	0.0000	9.564E-03	0.0005	1.265E-04	0.0000	1.249E-05	0.0000	1.446E-03	0.0001
-90	6.274E-06	0.0000	2.502E-09	0.0000	0.000E+00	0.0000	2.823E-03	0.0002	1.292E-04	0.0000	1.243E-04	0.0000	1.424E-06	0.0000
-137	1.666E-06	0.0000	8.068E-10	0.0000	0.000E+00	0.0000	2.276E-02	0.0013	1.100E-05	0.0000	4.953E-04	0.0000	6.889E-07	0.0000
234	2.225E-04	0.0000	3.506E-04	0.0000	0.000E+00	0.0000	6.050E-02	0.0034	2.393E-03	0.0001	9.564E-03	0.0006	3.661E-03	0.0002
235	2.733E-01	0.1155	3.526E-04	0.0000	0.000E+00	0.0000	7.725E-02	0.0044	5.004E-03	0.0003	9.425E-03	0.0005	3.918E-03	0.0002
236	7.934E-05	0.0000	3.313E-04	0.0000	0.000E+00	0.0000	5.734E-02	0.0033	2.272E-03	0.0001	9.469E-03	0.0005	3.473E-03	0.0002
238	5.402E-02	0.0031	3.128E-04	0.0000	0.000E+00	0.0000	5.736E-02	0.0033	2.272E-03	0.0001	9.471E-03	0.0005	3.474E-03	0.0002
total	3.862E+00	0.2206	4.236E-03	0.0002	0.000E+00	0.0000	1.054E+00	0.0359	3.004E-02	0.0017	4.219E-02	0.0024	1.303E-01	0.0074

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

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
m-241	3.093E+00	0.1752	5.959E-03	0.0003	0.000E+00	0.0000	1.756E+00	0.0967	1.146E-03	0.0001	4.876E-04	0.0000	5.166E-00	0.2936
p-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
m-243	2.415E-01	0.0137	4.667E-04	0.0000	0.000E+00	0.0000	1.360E-01	0.0077	6.979E-05	0.0000	3.810E-05	0.0000	4.199E-01	0.0239
o-60	4.481E-07	0.0000	8.663E-03	0.0000	0.000E+00	0.0000	2.568E-07	0.0000	1.273E-07	0.0000	7.100E-06	0.0000	4.961E-06	0.0000
s-137	2.156E-02	0.0012	2.782E-03	0.0002	0.000E+00	0.0000	1.226E-02	0.0007	5.208E-03	0.0005	1.369E-02	0.0006	6.973E-02	0.0040
u-152	3.838E-05	0.0000	1.236E-07	0.0000	0.000E+00	0.0000	2.162E-05	0.0000	1.087E-06	0.0000	6.070E-06	0.0000	1.397E-02	0.0006
u-154	5.839E-06	0.0000	1.237E-06	0.0000	0.000E+00	0.0000	2.163E-06	0.0000	1.087E-07	0.0000	6.073E-09	0.0000	1.042E-03	0.0000
u-155	1.341E-09	0.0000	4.322E-12	0.0000	0.000E+00	0.0000	7.557E-10	0.0000	3.800E-11	0.0000	2.122E-12	0.0000	5.734E-06	0.0000
h-55	3.267E-14	0.0000	4.211E-16	0.0000	0.000E+00	0.0000	1.840E-14	0.0000	9.270E-15	0.0000	7.758E-16	0.0000	6.215E-14	0.0000
3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
129	1.739E-01	0.0099	4.486E-04	0.0000	0.000E+00	0.0000	9.945E-02	0.0056	1.736E-02	0.0010	1.380E-01	0.0078	4.323E-01	0.0246
94	9.543E-03	0.0005	1.845E-04	0.0000	0.000E+00	0.0000	5.385E-03	0.0003	4.055E-06	0.0000	1.510E-06	0.0000	3.519E-00	0.2000
59	1.690E-03	0.0001	1.089E-05	0.0000	0.000E+00	0.0000	9.622E-04	0.0001	1.199E-04	0.0000	2.676E-03	0.0002	6.415E-03	0.0004
63	2.250E-03	0.0001	1.450E-05	0.0000	0.000E+00	0.0000	1.281E-03	0.0001	1.596E-04	0.0000	3.563E-03	0.0002	8.540E-03	0.0005
238	4.065E-01	0.0231	7.857E-04	0.0000	0.000E+00	0.0000	2.289E-01	0.0130	5.761E-04	0.0000	3.766E-05	0.0000	7.946E-01	0.0452
239	9.916E-01	0.0564	1.917E-03	0.0001	0.000E+00	0.0000	5.585E-01	0.0317	1.404E-03	0.0001	7.842E-05	0.0000	1.938E-00	0.1102
241	1.111E-01	0.0063	2.148E-04	0.0000	0.000E+00	0.0000	6.256E-02	0.0036	7.998E-05	0.0000	1.756E-05	0.0000	1.857E-01	0.0106
90	1.243E-02	0.0007	4.810E-05	0.0000	0.000E+00	0.0000	7.486E-03	0.0004	1.425E-03	0.0001	1.981E-03	0.0001	2.645E-02	0.0015
140	1.140E-03	0.0002	5.339E-06	0.0000	0.000E+00	0.0000	4.891E-03	0.0003	6.423E-06	0.0000	3.523E-04	0.0000	3.265E-02	0.0019
134	5.645E-01	0.0321	3.705E-04	0.0000	0.000E+00	0.0000	3.181E-01	0.0181	2.722E-03	0.0002	2.679E-02	0.0015	9.856E-01	0.0562
135	1.055E+00	0.0599	7.940E-04	0.0000	0.000E+00	0.0000	5.942E-01	0.0336	1.448E-02	0.0008	2.589E-02	0.0015	2.059E+00	0.1170
136	5.363E-01	0.0305	3.456E-04	0.0000	0.000E+00	0.0000	3.022E-01	0.0172	2.583E-03	0.0001	2.545E-02	0.0014	9.399E-01	0.0534
138	5.365E-01	0.0305	3.457E-04	0.0000	0.000E+00	0.0000	3.022E-01	0.0172	2.584E-03	0.0001	2.546E-02	0.0014	9.940E-01	0.0541
61	7.751E-00	0.4405	1.469E-02	0.0004	0.000E+00	0.0000	4.569E+00	0.2453	5.497E-02	0.0031	2.645E-01	0.0150	1.768E-01	1.0000

m of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radionuclide	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.
Am-241	9.517E-03	0.0007	7.003E-04	0.0001	0.000E+00	0.0000	1.954E-01	0.0136	2.634E-03	0.0002	2.423E-04	0.0000	2.797E-02	0.0021
-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
m-243	1.340E-04	0.0000	1.905E-06	0.0000	0.000E+00	0.0000	5.047E-04	0.0000	1.123E-05	0.0000	4.202E-07	0.0000	7.637E-05	0.0000
o-60	1.736E-16	0.0000	1.757E-25	0.0000	0.000E+00	0.0000	5.552E-20	0.0000	9.167E-21	0.0000	3.276E-01	0.0000	1.051E-22	0.0000
s-137	3.460E-07	0.0000	2.439E-14	0.0000	0.000E+00	0.0000	4.921E-08	0.0000	1.737E-08	0.0000	1.475E-08	0.0000	1.862E-10	0.0000
u-152	3.857E-07	0.0000	9.109E-14	0.0000	0.000E+00	0.0000	2.148E-10	0.0000	5.009E-11	0.0000	1.162E-12	0.0000	1.301E-11	0.0000
u-154	1.359E-10	0.0000	3.785E-17	0.0000	0.000E+00	0.0000	1.016E-13	0.0000	2.369E-14	0.0000	5.595E-16	0.0000	6.157E-15	0.0000
u-155	3.638E-20	0.0000	6.034E-26	0.0000	0.000E+00	0.0000	1.794E-22	0.0000	4.160E-23	0.0000	9.872E-25	0.0000	1.086E-23	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
-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
-129	5.820E-10	0.0000	5.548E-14	0.0000	0.000E+00	0.0000	5.673E-08	0.0000	7.459E-09	0.0000	3.027E-08	0.0000	4.287E-10	0.0000
-134	3.101E+00	0.2308	9.894E-07	0.0000	0.000E+00	0.0000	5.543E-03	0.0004	5.439E-06	0.0000	9.424E-07	0.0000	8.397E-05	0.0000
-137	0.000E+00	0.0000	1.385E-09	0.0000	0.000E+00	0.0000	1.745E-04	0.0000	9.029E-06	0.0000	1.196E-04	0.0000	5.287E-07	0.0000
-138	0.000E+00	0.0000	3.723E-10	0.0000	0.000E+00	0.0000	5.491E-05	0.0000	2.841E-06	0.0000	3.763E-05	0.0000	1.664E-07	0.0000
-238	5.750E-06	0.0000	1.021E-04	0.0000	0.000E+00	0.0000	2.683E-02	0.0020	7.622E-04	0.0001	2.051E-05	0.0000	4.059E-03	0.0003
-239	1.123E-04	0.0000	1.189E-03	0.0001	0.000E+00	0.0000	3.159E-01	0.0235	8.969E-03	0.0007	2.069E-04	0.0000	4.779E-02	0.0036
-241	3.301E-04	0.0000	2.429E-05	0.0000	0.000E+00	0.0000	6.429E-03	0.0005	9.135E-05	0.0000	8.406E-06	0.0000	9.703E-04	0.0001
-242	2.941E-12	0.0000	1.173E-15	0.0000	0.000E+00	0.0000	1.323E-09	0.0000	6.055E-11	0.0000	6.294E-11	0.0000	6.673E-13	0.0000
-243	9.931E-09	0.0000	9.356E-13	0.0000	0.000E+00	0.0000	2.639E-05	0.0000	1.275E-08	0.0000	5.744E-07	0.0000	7.989E-10	0.0000
234	6.487E-04	0.0000	2.960E-04	0.0000	0.000E+00	0.0000	5.202E-02	0.0039	2.054E-03	0.0002	8.403E-03	0.0006	3.098E-03	0.0002
235	2.311E-01	0.0172	3.342E-04	0.0000	0.000E+00	0.0000	8.891E-02	0.0066	7.248E-03	0.0005	7.954E-03	0.0006	3.905E-03	0.0003
236	6.672E-05	0.0000	2.784E-04	0.0000	0.000E+00	0.0000	4.818E-02	0.0036	1.909E-03	0.0001	7.957E-03	0.0006	2.919E-03	0.0002
238	4.540E-02	0.0034	2.631E-04	0.0000	0.000E+00	0.0000	4.623E-02	0.0036	1.921E-03	0.0001	7.964E-03	0.0006	2.921E-03	0.0002
241	3.396E-00	0.2522	3.190E-03	0.0002	0.000E+00	0.0000	7.781E-01	0.0579	2.558E-02	0.0019	3.292E-02	0.0015	9.380E-02	0.0070

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

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Heat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	1.917E+00	0.1427	3.706E-03	0.0003	0.000E+00	0.0000	1.060E+00	0.0804	1.364E-02	0.0003	3.034E-04	0.0000	3.229E+00	0.2404
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-243	2.715E-03	0.0002	5.248E-06	0.0000	0.000E+00	0.0000	1.529E-03	0.0001	2.014E-06	0.0000	3.447E-07	0.0000	4.951E-03	0.0004
Co-60	1.659E-19	0.0000	3.594E-21	0.0000	0.000E+00	0.0000	1.065E-19	0.0000	5.291E-20	0.0000	2.946E-20	0.0000	2.183E-18	0.0000
Cs-137	8.415E-07	0.0000	1.075E-07	0.0000	0.000E+00	0.0000	4.782E-07	0.0000	3.590E-07	0.0000	5.356E-07	0.0000	2.748E-06	0.0000
Eu-152	9.916E-10	0.0000	3.195E-12	0.0000	0.000E+00	0.0000	5.987E-10	0.0000	2.809E-11	0.0000	1.569E-12	0.0000	3.875E-07	0.0000
Eu-154	4.694E-13	0.0000	1.512E-15	0.0000	0.000E+00	0.0000	2.645E-13	0.0000	1.330E-14	0.0000	7.425E-16	0.0000	1.368E-10	0.0000
Eu-155	8.253E-22	0.0000	2.669E-24	0.0000	0.000E+00	0.0000	4.666E-22	0.0000	2.346E-23	0.0000	1.310E-24	0.0000	3.793E-20	0.0000
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Fr-23	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Fr-129	3.789E-06	0.0000	9.774E-09	0.0000	0.000E+00	0.0000	2.145E-06	0.0000	3.754E-07	0.0000	3.007E-06	0.0000	9.425E-06	0.0000
Ir-94	7.878E-03	0.0006	1.523E-04	0.0000	0.000E+00	0.0000	4.446E-03	0.0003	3.348E-03	0.0000	1.246E-06	0.0000	3.119E+00	0.2321
Ir-59	5.002E-04	0.0000	3.227E-06	0.0000	0.000E+00	0.0000	2.548E-04	0.0000	3.548E-05	0.0000	7.920E-04	0.0001	1.919E-03	0.0001
I-63	1.574E-04	0.0000	1.014E-06	0.0000	0.000E+00	0.0000	8.561E-05	0.0000	1.116E-05	0.0000	2.492E-04	0.0000	6.040E-04	0.0000
J-238	7.634E-02	0.0057	1.474E-04	0.0000	0.000E+00	0.0000	4.300E-02	0.0032	1.087E-04	0.0000	1.345E-05	0.0000	1.514E-01	0.0113
J-239	8.973E-01	0.0668	1.735E-03	0.0001	0.000E+00	0.0000	5.054E-01	0.0376	1.272E-03	0.0001	7.097E-05	0.0000	1.780E+00	0.1225
J-241	6.965E-02	0.0052	1.346E-04	0.0000	0.000E+00	0.0000	3.923E-02	0.0029	4.954E-05	0.0000	1.102E-05	0.0000	1.169E-01	0.0087
K-40	5.425E-09	0.0000	2.099E-11	0.0000	0.000E+00	0.0000	3.258E-09	0.0000	6.220E-10	0.0000	8.646E-10	0.0000	1.164E-08	0.0000
K-42	4.470E-06	0.0000	5.764E-09	0.0000	0.000E+00	0.0000	5.271E-06	0.0000	6.935E-09	0.0000	3.804E-07	0.0000	3.712E-05	0.0000
K-234	4.451E-01	0.0331	3.458E-04	0.0000	0.000E+00	0.0000	2.508E-01	0.0197	2.173E-03	0.0002	2.108E-02	0.0016	7.860E-01	0.0595
K-235	1.494E+00	0.1112	1.213E-03	0.0001	0.000E+00	0.0000	8.439E-01	0.0627	2.351E-02	0.0017	2.111E-02	0.0016	2.721E+00	0.2025
K-236	4.196E-01	0.0312	2.704E-04	0.0000	0.000E+00	0.0000	2.364E-01	0.0176	2.021E-03	0.0002	1.991E-02	0.0015	7.395E-01	0.0550
K-238	4.200E-01	0.0313	2.707E-04	0.0000	0.000E+00	0.0000	2.366E-01	0.0176	2.023E-03	0.0002	1.993E-02	0.0015	7.455E-01	0.0551
total	5.751E+00	0.4260	7.984E-03	0.0006	0.000E+00	0.0000	3.239E+00	0.2411	3.257E-02	0.0024	4.349E-02	0.0062	1.344E+01	1.0000

sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 At nrem/yr and Fraction of Total Dose At t = 1.00E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Feces		Plant		Heat		Milk		Soil	
	nrem/yr	fract.	nrem/yr	fract.	nrem/yr	fract.	nrem/yr	fract.	nrem/yr	fract.	nrem/yr	fract.	nrem/yr	fract.
Am-241	2.346E-03	0.0004	1.706E-04	0.0000	0.000E+00	0.0000	4.573E-02	0.0069	6.525E-04	0.0001	5.916E-05	0.0000	6.614E-03	0.0010
B-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-243	1.192E-07	0.0000	1.255E-06	0.0000	0.000E+00	0.0000	3.334E-04	0.0001	9.467E-06	0.0000	2.165E-07	0.0000	5.045E-05	0.0000
Po-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Fr-223	1.645E-22	0.0000	1.159E-25	0.0000	0.000E+00	0.0000	2.339E-23	0.0000	8.256E-24	0.0000	7.012E-24	0.0000	8.852E-26	0.0000
U-232	4.345E-23	0.0000	1.928E-17	0.0000	0.000E+00	0.0000	1.027E-15	0.0000	2.394E-16	0.0000	5.654E-18	0.0000	6.221E-17	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	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
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	3.608E-26	0.0000	3.439E-30	0.0000	0.000E+00	0.0000	3.517E-24	0.0000	4.624E-25	0.0000	1.876E-24	0.0000	2.658E-26	0.0000
Pb-210	2.035E+00	0.3087	6.559E-07	0.0000	0.000E+00	0.0000	3.637E-03	0.0036	3.566E-06	0.0000	6.184E-07	0.0000	5.510E-05	0.0000
Pb-214	0.000E+00	0.0000	2.525E-11	0.0000	0.000E+00	0.0000	3.158E-06	0.0000	1.634E-07	0.0000	2.164E-06	0.0000	9.567E-09	0.0000
Pb-214	0.000E+00	0.0000	4.328E-14	0.0000	0.000E+00	0.0000	6.353E-09	0.0000	3.302E-10	0.0000	4.375E-09	0.0000	1.934E-11	0.0000
Pb-214	8.636E-07	0.0000	4.356E-07	0.0000	0.000E+00	0.0000	1.114E-04	0.0000	3.266E-06	0.0000	1.932E-06	0.0000	1.556E-05	0.0000
Pb-214	1.016E-04	0.0000	1.076E-03	0.0002	0.000E+00	0.0000	2.859E-01	0.0434	6.116E-03	0.0012	1.873E-04	0.0000	4.326E-02	0.0066
Pb-214	6.140E-05	0.0000	5.918E-06	0.0000	0.000E+00	0.0000	1.585E-03	0.0002	2.261E-05	0.0000	2.052E-06	0.0000	2.364E-04	0.0000
Pb-214	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-214	1.026E-19	0.0000	4.969E-23	0.0000	0.000E+00	0.0000	1.402E-15	0.0000	6.773E-16	0.0000	3.051E-17	0.0000	4.243E-20	0.0000
Pb-214	2.808E-05	0.0004	1.652E-04	0.0000	0.000E+00	0.0000	3.484E-02	0.0053	1.237E-03	0.0002	4.756E-03	0.0007	1.783E-03	0.0003
Pb-214	1.266E-01	0.0192	2.053E-04	0.0000	0.000E+00	0.0000	6.319E-02	0.0096	5.421E-03	0.0009	4.353E-03	0.0007	2.504E-03	0.0004
Pb-214	3.646E-05	0.0000	1.514E-04	0.0000	0.000E+00	0.0000	2.621E-02	0.0040	1.036E-03	0.0002	4.328E-03	0.0007	1.568E-03	0.0002
Pb-214	2.470E-02	0.0037	1.434E-04	0.0000	0.000E+00	0.0000	2.630E-02	0.0040	1.042E-03	0.0002	4.342E-03	0.0007	1.593E-03	0.0002
Tl-208	2.182E+00	0.3324	1.920E-03	0.0000	0.000E+00	0.0000	4.676E-01	0.0740	1.794E-02	0.0027	1.863E-02	0.0027	5.790E-02	0.0056

Total Dose Contributions DCOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 1.000E+05 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.
U-238	3.459E-01	0.0525	6.667E-04	0.0001	0.000E+00	0.0000	1.949E-01	0.0296	2.515E-04	0.0000	5.484E-05	0.0000	5.975E-01	0.0906
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	7.189E-04	0.0001	1.390E-06	0.0000	0.000E+00	0.0000	4.049E-04	0.0001	1.019E-06	0.0000	5.687E-09	0.0000	1.521E-03	0.0002
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	2.962E-22	0.0000	3.619E-23	0.0000	0.000E+00	0.0000	1.683E-22	0.0000	1.264E-22	0.0000	1.676E-22	0.0000	1.020E-21	0.0000
U-234	1.795E-15	0.0000	2.641E-16	0.0000	0.000E+00	0.0000	1.011E-15	0.0000	5.064E-17	0.0000	2.639E-16	0.0000	4.216E-15	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	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
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	1.739E-22	0.0000	4.466E-23	0.0000	0.000E+00	0.0000	9.645E-23	0.0000	1.737E-23	0.0000	1.380E-22	0.0000	4.341E-22	0.0000
Th-232	3.828E-03	0.0006	7.399E-05	0.0000	0.000E+00	0.0000	2.160E-03	0.0003	1.627E-04	0.0000	6.055E-07	0.0000	2.045E+00	0.3101
U-238	6.702E-06	0.0000	4.319E-06	0.0000	0.000E+00	0.0000	3.615E-06	0.0000	4.753E-07	0.0000	1.061E-05	0.0000	2.714E-05	0.0000
Th-232	1.355E-06	0.0000	6.730E-11	0.0000	0.000E+00	0.0000	7.713E-09	0.0000	9.609E-10	0.0000	2.145E-08	0.0000	5.467E-05	0.0000
U-238	2.827E-04	0.0000	5.275E-07	0.0000	0.000E+00	0.0000	1.592E-04	0.0000	6.966E-07	0.0000	3.567E-06	0.0000	5.902E-04	0.0001
Th-232	6.013E-01	0.0912	1.162E-03	0.0002	0.000E+00	0.0000	3.367E-01	0.0514	6.516E-04	0.0001	4.757E-05	0.0000	1.261E+00	0.1943
U-235	1.257E-02	0.0019	2.429E-05	0.0000	0.000E+00	0.0000	7.076E-03	0.0011	9.129E-06	0.0000	1.992E-06	0.0000	2.162E-02	0.0033
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.756E-16	0.0000	2.267E-19	0.0000	0.000E+00	0.0000	2.072E-16	0.0000	2.727E-19	0.0000	1.496E-17	0.0000	1.831E-16	0.0000
U-235	1.945E-01	0.0290	3.645E-04	0.0001	0.000E+00	0.0000	1.096E-01	0.0166	1.060E-03	0.0002	9.032E-04	0.0014	3.601E-01	0.0546
Th-232	9.063E-01	0.1376	7.199E-04	0.0001	0.000E+00	0.0000	5.116E-01	0.0776	1.504E-02	0.0023	8.696E-03	0.0013	1.647E+00	0.2499
U-238	1.690E-01	0.0256	1.089E-04	0.0000	0.000E+00	0.0000	9.522E-02	0.0144	6.129E-04	0.0001	8.020E-03	0.0012	3.065E-01	0.0465
Th-232	1.695E-01	0.0257	1.095E-04	0.0000	0.000E+00	0.0000	9.551E-02	0.0145	6.165E-04	0.0001	8.045E-03	0.0012	3.321E-01	0.0504
U-238	2.406E+00	0.3649	2.194E-03	0.0005	0.000E+00	0.0000	1.355E+00	0.2056	1.884E-02	0.0029	3.411E-02	0.0052	6.593E+00	1.0000

Sum of all water independent and dependent pathways.

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

Parent (i)	Product (j)	Branch Fraction	BSR(i,j) (mrem/yr)/(pCi/g)							
			0.000E+00	1.000E-00	3.000E-00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
m-241	Am-241	1.000E+00	6.524E-00	6.509E-00	6.479E-00	6.374E-00	6.093E-00	5.165E+00	3.227E+00	5.960E-01
m-241	Np-237	1.000E+00	7.567E-06	1.465E-05	2.674E-05	7.737E-05	2.105E-04	6.140E-04	1.343E-03	1.557E-03
m-241	U-233	1.000E+00	6.736E-12	2.107E-11	6.466E-11	4.106E-10	2.941E-09	2.579E-08	1.405E-07	3.040E-07
m-241	Th-229	1.000E+00	2.372E-11	2.373E-11	2.376E-11	2.367E-11	2.479E-11	4.795E-11	4.566E-10	5.911E-09
m-241	ZSR(j)		6.524E-00	6.509E-00	6.479E+00	6.374E+00	6.094E+00	5.166E+00	3.229E+00	5.975E-01
-14	C-14	1.000E+00	1.471E-00	1.669E-01	1.964E-03	3.319E-10	9.621E-30	0.000E+00	0.000E+00	0.000E+00
n-243	Cm-243	9.976E-03	5.115E-00	4.989E-00	4.744E-00	3.980E-00	2.410E-00	4.162E-01	2.747E-03	6.170E-11
n-243	Fu-239	9.976E-01	6.456E-05	1.412E-04	2.497E-04	5.896E-04	1.220E-03	2.116E-03	2.115E-03	1.521E-03
n-243	U-235	9.976E-01	3.224E-14	9.602E-14	3.327E-13	2.209E-12	1.456E-11	9.419E-11	3.316E-10	7.154E-10
n-243	Pu-231	9.976E-01	2.629E-14	2.597E-14	2.627E-14	4.641E-14	4.554E-13	9.470E-12	9.220E-11	3.895E-10
n-243	Ac-227	9.976E-01	3.519E-14	3.454E-14	3.342E-14	3.600E-14	3.062E-13	1.345E-11	1.909E-10	8.951E-10
n-243	ZSR(j)		5.115E-00	4.989E+00	4.745E+00	3.961E+00	2.411E+00	4.163E-01	4.863E-03	1.521E-03
n-243	Cm-242	2.400E-03	1.231E-02	1.200E-02	1.141E-02	9.576E-03	5.799E-03	1.001E-03	6.609E-06	1.484E-13
n-243	Am-243	2.400E-03	4.366E-05	7.276E-05	1.280E-04	2.926E-04	5.739E-04	6.033E-04	1.113E-04	1.325E-07
-243	Fu-239	2.400E-03	6.444E-11	1.579E-10	3.339E-10	1.243E-09	5.576E-09	2.495E-08	4.754E-08	3.791E-08
-243	U-235	2.400E-03	9.295E-19	1.182E-18	1.724E-18	4.911E-18	3.932E-17	6.739E-16	5.235E-15	1.630E-14
-243	Pu-231	2.400E-03	1.425E-16	1.794E-16	2.496E-16	4.596E-16	9.119E-16	9.069E-16	1.343E-15	6.446E-15
-243	Ac-227	2.400E-03	1.909E-16	2.403E-16	3.341E-16	6.149E-16	1.085E-15	1.209E-15	2.553E-15	1.935E-14
-243	ZSR(j)		1.235E-02	1.207E-02	1.154E-02	9.668E-03	6.372E-03	1.605E-03	1.179E-04	1.704E-07
-60	Co-60	1.000E+00	7.479E-00	6.447E+00	4.891E+00	1.603E+00	1.049E+01	4.961E+06	2.163E+14	0.000E+00
-137	Cs-137	1.000E+00	1.109E+01	1.054E+01	9.527E+00	6.681E+00	2.424E+00	6.973E+02	2.746E+06	1.020E+21
-152	Eu-152	7.292E-01	2.401E+00	1.613E+00	1.633E+00	1.131E+00	3.961E+01	1.007E+02	2.793E+07	3.143E+23
-152	Eu-152	2.792E-01	7.402E-01	7.024E-01	6.304E-01	4.391E-01	1.534E-01	3.699E-03	1.092E-07	1.218E-23
-152	Gd-152	2.792E-01	4.648E-16	1.007E-16	1.421E-15	3.176E-15	5.604E-15	6.701E-15	6.105E-15	4.216E-15
-152	ZSR(j)		7.402E-01	7.024E-01	6.324E-01	4.391E-01	1.534E-01	3.699E-03	1.092E-07	4.216E-15
-154	Eu-154	1.000E+00	2.677E+00	2.656E+00	2.269E+00	1.305E+00	2.671E+01	1.042E+03	1.366E+10	1.121E+34
-155	Eu-155	1.000E+00	7.051E-02	6.129E-02	4.630E-02	1.735E-02	1.050E-03	5.734E-06	3.783E-20	0.000E+00
55	Fe-55	1.000E+00	3.646E-02	2.791E-02	1.617E-02	2.427E-03	1.075E-05	6.215E-14	1.900E-37	0.000E+00
	H-3	1.000E+00	7.005E-02	1.634E-02	9.749E-04	3.060E-08	4.984E-21	0.000E+00	0.000E+00	0.000E+00
29	I-129	1.000E+00	9.139E+01	6.759E+01	7.568E+01	5.405E+01	1.648E+01	4.323E+01	9.423E+06	4.341E+22
94	Np-94	1.000E+00	3.739E+00	3.736E+00	3.731E+00	3.715E+00	3.671E+00	3.539E+00	3.119E+00	2.045E+00
59	Ni-59	1.000E+00	1.171E-02	1.164E-02	1.150E-02	1.103E-02	9.779E-03	6.435E-03	1.914E-03	2.714E-05

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

Parent (i)	Product (j)	Branch Fraction*	DSR(j,i) (mrem/yr)/(pCi/g)							
			0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
41-63	Ni-63	1.000E+00	3.207E-02	3.165E-02	3.082E-02	2.810E-02	2.156E-02	8.540E-03	6.040E-04	5.417E-05
U-238	Pu-238	1.000E+00	1.819E+00	1.804E+00	1.775E+00	1.675E+00	1.419E+00	7.944E-01	1.511E-01	4.400E-04
U-238	U-234	1.000E+00	4.345E-06	7.465E-06	1.363E-05	3.429E-05	8.616E-05	2.055E-04	2.746E-04	1.284E-04
U-238	Th-230	1.000E+00	6.055E-12	1.109E-11	2.609E-11	1.304E-10	8.754E-10	6.864E-09	3.616E-08	1.281E-07
U-238	Ra-226	1.000E+00	3.973E-12	4.497E-12	7.556E-12	6.557E-11	1.247E-09	3.439E-08	5.140E-07	2.766E-06
U-238	Pb-210	1.000E+00	2.067E-11	2.182E-11	2.396E-11	4.397E-11	7.198E-10	4.226E-08	9.724E-07	7.859E-06
U-238	ΣDSR(j)		1.819E+00	1.804E+00	1.775E+00	1.675E+00	1.419E+00	7.944E-01	1.511E-01	5.802E-04
I-239	Pu-239	1.000E+00	2.021E+00	2.020E+00	2.016E+00	2.012E+00	1.996E+00	1.936E+00	1.760E+00	1.281E+00
I-239	U-235	1.000E+00	1.566E-09	2.890E-09	5.533E-09	1.472E-08	4.044E-08	1.345E-07	3.291E-07	6.216E-07
I-239	Ra-223	1.000E+00	9.303E-12	1.616E-11	4.066E-11	2.393E-10	1.715E-09	1.568E-08	9.689E-08	3.404E-07
I-239	Ac-227	1.000E+00	7.561E-12	8.244E-12	1.253E-11	8.788E-11	1.354E-09	2.457E-08	2.046E-07	7.842E-07
I-239	ΣDSR(j)		2.021E+00	2.020E+00	2.016E+00	2.012E+00	1.996E+00	1.936E+00	1.760E+00	1.281E+00
-241	Pu-241	1.000E+00	3.816E-02	3.637E-02	3.501E-02	2.350E-02	8.806E-03	2.952E-04	1.816E-04	3.101E-23
-241	Am-241	1.000E+00	1.477E-02	2.471E-02	4.315E-02	9.455E-02	1.688E-01	1.954E-01	1.169E-01	2.156E-02
-241	Np-237	1.000E+00	8.501E-09	2.615E-08	9.254E-08	6.002E-07	3.507E-06	1.707E-05	4.360E-05	5.319E-05
-241	U-233	1.000E+00	3.088E-14	5.313E-14	1.798E-13	2.346E-12	3.736E-11	6.219E-10	4.422E-09	1.052E-08
-241	Th-229	1.000E+00	2.665E-13	2.927E-13	3.416E-13	4.805E-13	7.020E-13	1.308E-12	1.299E-11	1.867E-10
-241	ΣDSR(j)		5.295E-02	6.108E-02	7.616E-02	1.161E-01	1.777E-01	1.857E-01	1.169E-01	2.162E-02
-241	Pu-241	2.450E-05	9.354E-07	8.911E-07	8.067E-07	5.758E-07	2.182E-07	7.507E-09	4.448E-13	7.597E-28
-241	Np-237	2.450E-05	1.846E-10	3.501E-10	6.583E-10	1.525E-09	2.826E-09	3.407E-09	2.854E-09	1.468E-09
-241	U-233	2.450E-05	1.734E-16	4.754E-16	1.506E-15	8.854E-15	4.901E-14	2.218E-13	4.789E-13	3.628E-13
-241	Th-229	2.450E-05	7.513E-18	8.821E-18	1.130E-17	1.816E-17	4.356E-17	2.767E-16	2.072E-15	1.075E-14
-241	ΣDSR(j)		9.356E-07	8.914E-07	8.068E-07	5.773E-07	2.210E-07	1.071E-06	2.855E-09	1.466E-09
90	Sr-90	1.000E+00	3.950E+01	3.700E+01	3.196E+01	1.915E+01	4.433E+00	2.645E+00	1.164E+00	6.343E-31
99	Tc-99	1.000E+00	9.682E-01	8.361E-01	8.747E-01	6.800E-01	3.503E-01	3.265E-02	3.712E-05	1.831E-15
34	U-234	1.000E+00	1.113E+00	1.112E+00	1.109E+00	1.100E+00	1.074E+00	9.585E-01	7.774E-01	3.216E-01
34	Th-230	1.000E+00	1.427E-06	2.074E-06	3.305E-06	7.593E-06	1.969E-05	6.025E-05	1.622E-04	3.963E-04
34	Ra-226	1.000E+00	1.430E-07	1.925E-07	8.765E-07	5.866E-06	4.426E-05	4.213E-04	2.799E-03	1.236E-02
34	Pb-210	1.000E+00	4.006E-07	4.147E-07	5.033E-07	2.113E-06	3.040E-05	5.991E-04	5.567E-03	2.578E-02
34	ΣDSR(j)		1.113E+00	1.112E+00	1.109E+00	1.100E+00	1.074E+00	9.585E-01	7.660E-01	3.601E-01
5	U-235	1.000E+00	1.347E+00	1.346E+00	1.343E+00	1.332E+00	1.303E+00	1.205E+00	9.629E-01	4.267E-01
5	Ra-223	1.000E+00	5.166E-09	8.863E-09	1.621E-08	4.135E-08	1.081E-07	2.904E-07	5.282E-07	3.549E-07
5	Ac-227	1.000E+00	4.020E-04	1.095E-03	3.460E-03	2.053E-02	1.173E-01	5.618E-01	1.229E+00	8.595E-01
5	ΣDSR(j)		1.351E+00	1.350E+00	1.346E+00	1.334E+00	1.303E+00	1.205E+00	9.629E-01	4.267E-01
6	U-236	1.000E+00	1.058E+00	1.057E+00	1.054E+00	1.045E+00	1.021E+00	8.398E-01	7.395E-01	3.065E-01
6	Th-232	1.000E+00	1.489E-11	3.248E-11	6.592E-11	1.625E-10	5.113E-10	1.615E-09	4.393E-09	1.081E-08
6	Ra-226	1.000E+00	1.043E-10	3.119E-10	1.046E-09	5.869E-09	2.651E-08	1.017E-07	2.808E-07	5.995E-07
6	Th-230	1.000E+00	1.468E-12	7.782E-12	5.382E-11	6.354E-10	4.110E-09	1.782E-08	1.268E-08	1.348E-07
6	ΣDSR(j)		1.058E+00	1.057E+00	1.054E+00	1.045E+00	1.021E+00	8.398E-01	7.395E-01	3.065E-01

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



Parent	Product	Branch Fraction	DSR(j,t) (mrem/yr)/(pCi/g)							
(1)	(2)	(3)	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
238	U-238	1.000E+00	1.117E+00	1.115E+00	1.113E+00	1.104E+00	1.078E+00	9.937E-01	7.649E-01	2.312E-01
238	U-234	1.000E+00	4.440E-06	7.639E-06	1.391E-05	3.562E-05	9.569E-05	2.443E-04	6.666E-04	9.142E-04
238	Th-230	1.000E+00	2.229E-06	2.227E-06	2.225E-06	2.215E-06	2.240E-06	2.436E-06	4.195E-06	4.495E-07
238	Ra-226	1.000E+00	5.871E-08	5.861E-08	5.849E-08	5.804E-08	5.794E-08	9.245E-08	8.553E-07	1.231E-05
238	Pb-210	1.000E+00	3.090E-07	3.087E-07	3.079E-07	3.054E-07	2.987E-07	3.214E-07	1.709E-06	2.474E-05
238	DSR(j)		1.117E+00	1.115E+00	1.113E+00	1.104E+00	1.078E+00	9.940E-01	7.655E-01	3.321E-01

branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
 * 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 = 2.500E-01 mrem/yr

clide	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
241	3.632E+00	3.641E+00	3.659E+00	3.922E+00	4.109E+00	4.840E+00	7.743E+00	4.184E+01
4	1.700E+01	1.440E+02	1.260E+04	7.535E+10	*4.454E+12	*4.454E+12	*4.454E+12	*4.454E+12
243	4.676E+00	4.999E+00	5.256E+00	6.264E+00	1.034E+01	5.954E+01	5.020E+03	1.644E+04
60	3.343E+00	3.654E+00	5.122E+00	1.366E+01	2.395E+02	5.039E+06	*1.131E+15	*1.131E+15
232	2.254E+00	2.371E+00	2.624E+00	3.742E+00	1.031E+01	3.585E+02	9.096E+06	*6.701E+13
152	9.429E+00	9.937E+00	1.104E+01	1.593E+01	4.550E+01	1.780E+03	6.451E+07	*1.765E+14
154	6.691E+00	6.407E+00	1.102E+01	1.919E+01	6.341E+01	2.399E+04	1.627E+11	*2.639E+14
155	3.546E+01	4.079E+01	5.400E+02	1.441E+03	2.340E+04	4.360E+08	*4.651E+14	*4.651E+14
85	6.957E+00	6.390E+02	1.546E+03	1.030E+04	2.326E+06	4.022E+14	*3.409E+15	*2.459E+15
	3.569E+01	1.530E+03	3.858E+04	6.171E+06	*9.594E+15	*9.594E+15	*9.594E+15	*9.594E+15
89	2.706E+01	2.854E+01	3.178E+01	4.626E+01	1.313E+00	5.783E+01	2.615E+06	*1.766E+06
74	6.641E+00	6.692E+00	6.701E+00	6.729E+00	6.811E+00	7.104E+00	6.015E+00	1.223E+01
89	2.134E+03	2.147E+03	2.173E+03	2.267E+03	2.556E+03	3.447E+03	1.303E+04	9.211E+05
83	7.796E+02	7.899E+02	8.111E+02	8.496E+02	1.159E+03	1.924E+03	4.079E+04	4.556E+08
38	1.374E+01	1.766E+01	1.409E+01	1.493E+01	1.762E+01	3.146E+01	1.653E+01	4.309E+04
38	1.237E+01	1.236E+01	1.239E+01	1.242E+01	1.253E+01	1.290E+01	1.405E+01	1.952E+01
41	4.712E+00	4.093E+00	3.293E+00	2.115E+00	1.407E+00	1.346E+00	2.134E+00	1.157E+03
0	6.292E+01	6.787E+01	7.623E+01	1.305E+00	5.639E+00	9.453E+02	2.147E+09	*1.365E+14
9	2.582E+01	2.671E+01	2.858E+01	3.623E+01	7.137E+01	7.636E+02	6.736E+05	*1.696E+10
4	2.246E+01	2.249E+01	2.254E+01	2.273E+01	2.327E+01	2.526E+01	3.161E+01	6.942E+01
5	1.648E+01	1.644E+01	1.635E+01	1.799E+01	1.636E+01	1.214E+01	9.167E+00	1.517E+01
6	2.363E+01	2.366E+01	2.372E+01	2.391E+01	2.448E+01	2.660E+01	3.560E+01	6.156E+01
6	2.259E+01	2.261E+01	2.247E+01	2.261E+01	2.318E+01	2.515E+01	3.143E+01	7.527E+01

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

Radionuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
241	1.000E+00	0.000E+00	6.524E+00	3.832E+00	6.524E+00	3.832E+00
243	1.000E+00	0.000E+00	1.471E+00	1.700E+00	1.471E+00	1.700E+00
243	1.000E+00	0.000E+00	5.121E+00	4.876E+00	5.121E+00	4.876E+00
60	1.000E+00	0.000E+00	7.479E+00	3.343E+00	7.479E+00	3.343E+00
137	1.000E+00	0.000E+00	1.109E+01	2.254E+00	1.109E+01	2.254E+00
137	1.000E+00	0.000E+00	2.651E+00	9.429E+00	2.651E+00	9.429E+00
154	1.000E+00	0.000E+00	2.877E+00	8.691E+00	2.877E+00	8.691E+00
155	1.000E+00	0.000E+00	7.051E+02	3.546E+02	7.051E+02	3.546E+02
55	1.000E+00	0.000E+00	3.646E+02	6.857E+02	3.646E+02	6.857E+02
5	1.000E+00	0.000E+00	7.005E+02	3.569E+02	7.005E+02	3.569E+02
129	1.000E+00	0.000E+00	9.239E+01	2.706E+01	9.239E+01	2.706E+01
94	1.000E+00	0.000E+00	3.738E+00	6.686E+00	3.738E+00	6.686E+00
59	1.000E+00	0.000E+00	1.171E+02	2.134E+03	1.171E+02	2.134E+03
63	1.000E+00	0.000E+00	3.207E+02	7.796E+02	3.207E+02	7.796E+02
238	1.000E+00	0.000E+00	1.819E+00	1.374E+01	1.819E+00	1.374E+01
239	1.000E+00	0.000E+00	2.021E+00	1.237E+01	2.021E+00	1.237E+01
241	1.000E+00	60.1 ± 0.1	1.955E+01	1.279E+02	5.295E+02	4.722E+02
90	1.000E+00	0.000E+00	3.960E+01	6.282E+01	3.960E+01	6.282E+01
99	1.000E+00	0.000E+00	9.682E+01	2.582E+01	9.682E+01	2.582E+01
106	1.000E+00	0.000E+00	1.113E+00	2.246E+00	1.113E+00	2.246E+00
135	1.000E+00	351.4 ± 0.7	2.741E+00	9.120E+00	1.353E+00	1.848E+01
136	1.000E+00	0.000E+00	1.058E+00	2.363E+01	1.058E+00	2.363E+01
136	1.000E+00	0.000E+00	1.117E+00	2.278E+01	1.117E+00	2.278E+01

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

Nuclide Parent	BRF(i)	DOSE(j,t), mrem/yr								
		1=	0.000E+00	1.000E-00	3.000E-00	1.000E+00	3.000E+00	1.000E+02	3.000E+02	1.000E+03
Am-241	Am-241	1.000E+00	6.524E+00	6.509E-00	6.479E-00	6.374E+00	6.093E+00	5.165E+00	3.227E+00	5.960E-01
Am-241	Pu-241	1.000E+00	1.477E-02	2.471E-02	4.315E-02	9.455E-02	1.688E-01	1.814E-01	1.169E-01	2.156E-02
Am-241	ΣDOSE(j)		6.539E+00	6.534E+00	6.522E+00	6.468E+00	6.252E+00	5.350E+00	3.344E+00	6.175E-01
Pu-237	Am-241	1.000E+00	7.587E-06	1.465E-05	2.874E-05	7.757E-05	2.105E-04	6.140E-04	1.343E-03	1.557E-03
Pu-237	Pu-241	1.000E+00	5.501E-09	2.615E-08	9.254E-08	6.002E-07	3.507E-06	1.707E-05	4.380E-05	5.319E-05
Pu-237	Pu-241	2.450E-05	1.846E-10	2.503E-10	6.583E-10	1.525E-09	2.826E-09	3.407E-09	2.854E-09	1.468E-09
Pu-237	ΣDOSE(j)		7.596E-06	1.468E-05	2.883E-05	7.797E-05	2.140E-04	6.311E-04	1.387E-03	1.610E-03
-233	Am-241	1.000E+00	8.738E-12	2.107E-11	6.466E-11	4.106E-10	2.941E-09	2.579E-08	1.405E-07	3.040E-07
-233	Pu-241	1.000E+00	3.088E-14	5.313E-14	1.796E-13	2.346E-12	3.736E-11	6.219E-10	4.422E-09	1.052E-08
-233	Pu-241	2.450E-05	1.734E-16	4.754E-16	1.500E-15	6.654E-15	4.902E-14	2.216E-13	4.789E-13	3.628E-13
-233	ΣDOSE(j)		8.769E-12	2.112E-11	6.464E-11	4.130E-10	2.979E-09	2.641E-08	1.449E-07	3.146E-07
-229	Am-241	1.000E+00	2.372E-11	2.273E-11	2.276E-11	2.387E-11	2.476E-11	4.785E-11	4.566E-10	5.811E-09
-229	Pu-241	1.000E+00	2.665E-13	2.927E-13	3.416E-13	4.805E-13	7.020E-13	1.308E-12	1.299E-11	1.567E-10
-229	Pu-241	2.450E-05	7.513E-16	8.821E-16	1.131E-15	1.816E-15	4.356E-15	2.767E-16	2.072E-15	1.075E-14
-229	ΣDOSE(j)		2.399E-11	2.403E-11	2.410E-11	2.435E-11	2.548E-11	4.916E-11	4.696E-10	5.998E-09
14	C-14	1.000E+00	1.471E+00	1.689E+00	1.964E+00	3.315E+00	9.527E+00	0.000E+00	0.000E+00	0.000E+00
-243	Cm-243	9.976E-01	5.115E-00	4.968E+00	4.744E+00	3.960E+00	2.410E+00	4.162E+00	2.747E+00	6.170E-11
-243	Cm-243	2.400E-03	1.231E-02	1.200E-02	1.141E-02	9.576E-03	5.796E-03	1.001E-03	6.609E-06	1.484E-13
-243	ΣDOSE(j)		5.127E+00	5.000E+00	4.756E+00	3.990E+00	2.416E+00	4.172E+00	2.754E+00	6.185E-11
-239	Cm-243	9.976E-01	8.456E-05	1.412E-04	2.497E-04	5.889E-04	1.280E-03	2.116E-03	2.315E-03	1.521E-03
-239	Cm-243	2.400E-03	8.444E-11	1.879E-10	3.339E-10	1.343E-09	5.576E-09	2.495E-08	4.754E-08	3.793E-08
-239	Pu-239	1.000E+00	2.021E+00	2.020E+00	2.016E+00	2.012E+00	1.996E+00	1.998E+00	1.780E+00	1.281E+00
-239	ΣDOSE(j)		2.021E+00	2.020E+00	2.016E+00	2.012E+00	1.997E+00	1.941E+00	1.782E+00	1.282E+00
135	Cm-243	9.976E-01	3.204E-14	9.602E-14	3.387E-13	2.309E-12	1.456E-11	9.419E-11	3.316E-10	7.154E-10
135	Cm-243	2.400E-03	9.295E-19	1.182E-18	1.728E-18	4.811E-18	3.922E-17	6.739E-16	5.235E-15	1.630E-14
135	Pu-239	1.000E+00	1.564E-04	2.890E-04	5.133E-04	1.472E-03	4.044E-03	1.245E-02	3.191E-02	6.216E-02
135	U-235	1.000E+00	1.347E+00	1.346E+00	1.343E+00	1.332E+00	1.303E+00	1.205E+00	9.629E-01	4.287E-01
135	ΣDOSE(j)		1.347E+00	1.346E+00	1.343E+00	1.332E+00	1.303E+00	1.205E+00	9.629E-01	4.287E-01
231	Cm-243	9.976E-01	2.628E-14	2.597E-14	2.627E-14	4.641E-14	4.564E-13	9.470E-12	9.220E-11	3.885E-10
231	Cm-243	2.400E-03	1.425E-16	1.794E-16	2.496E-16	4.596E-16	9.119E-16	9.069E-16	1.343E-15	8.446E-15
231	Pu-239	1.000E+00	9.373E-12	1.619E-11	4.066E-11	2.793E-10	1.715E-09	1.568E-08	9.689E-08	3.404E-07
231	U-235	1.000E+00	5.166E-05	5.163E-05	1.621E-05	4.135E-05	1.092E-04	2.924E-04	5.282E-04	3.589E-04
231	ΣDOSE(j)		5.166E-05	5.163E-05	1.621E-05	4.135E-05	1.092E-04	2.924E-04	5.282E-04	3.589E-04
227	Cm-243	9.976E-01	3.519E-14	3.454E-14	3.342E-14	3.600E-14	3.062E-13	1.345E-11	1.909E-10	9.951E-10
227	Cm-243	2.400E-03	1.909E-16	2.403E-16	3.341E-16	6.149E-16	1.065E-15	1.209E-15	2.551E-15	1.935E-14
227	Pu-239	1.000E+00	7.561E-12	8.244E-12	1.253E-11	8.788E-11	1.354E-09	2.457E-08	2.046E-07	7.842E-07
227	U-235	1.000E+00	4.020E-04	1.095E-03	3.462E-03	1.803E-02	1.173E-01	5.618E-01	1.229E+00	8.598E-01
227	ΣDOSE(j)		4.020E-04	1.095E-03	3.462E-03	1.803E-02	1.173E-01	5.618E-01	1.229E+00	8.598E-01
243	Cm-243	2.400E-03	4.368E-05	7.276E-05	1.190E-04	2.926E-04	5.738E-04	8.013E-04	1.113E-04	1.525E-07

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

Nuclide (j)	Parent (i)	ERF(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
60	Co-60	1.000E+00	7.479E+00	6.467E+00	4.661E+00	1.803E+00	1.044E-01	4.961E-06	2.183E-18	0.000E+00
137	Cs-137	1.000E+00	1.109E+01	1.054E+01	9.527E+00	6.691E+00	2.424E+00	6.973E-02	2.746E-06	1.020E-21
-152	Eu-152	7.266E-01	1.911E+00	1.615E+00	1.633E+00	1.131E+00	3.961E-01	1.007E-02	2.793E-07	3.143E-23
-152	Eu-152	2.752E-01	7.402E-01	7.024E-01	6.324E-01	4.381E-01	1.534E-01	3.699E-03	1.082E-07	1.216E-23
-152	ΣDOSE(j)		2.651E+00	2.516E+00	2.265E+00	1.569E+00	5.495E-01	1.397E-02	3.875E-07	4.361E-23
-152	Eu-152	2.752E-01	4.646E-16	8.007E-16	1.421E-15	3.136E-15	5.608E-15	6.701E-15	6.105E-15	4.216E-15
-154	Eu-154	1.000E+00	2.677E+00	2.656E+00	2.268E+00	1.303E+00	2.671E-01	1.042E-03	1.366E-10	0.000E+00
-155	Eu-155	1.000E+00	7.051E-02	6.128E-02	4.630E-02	1.735E-02	1.050E-03	5.734E-08	3.793E-20	0.000E+00
-55	Fe-55	1.000E+00	3.646E-02	2.781E-02	1.617E-02	2.427E-03	1.075E-05	6.215E-14	0.000E+00	0.000E+00
-3	H-3	1.000E+00	7.005E-02	1.634E-02	9.749E-04	3.060E-08	4.964E-21	0.000E+00	0.000E+00	0.000E+00
129	I-129	1.000E+00	9.239E+01	8.759E+01	7.666E+01	5.405E+01	1.646E+01	4.323E-01	9.425E-06	4.341E-22
94	Sr-94	1.000E+00	3.736E+00	3.736E+00	3.731E+00	3.715E+00	3.671E+00	3.519E+00	3.119E+00	2.045E+00
55	Sr-55	1.000E+00	1.171E-02	1.164E-02	1.150E-02	1.103E-02	9.779E-03	6.415E-03	1.919E-03	2.714E-05
63	Ni-63	1.000E+00	3.207E-02	3.169E-02	3.062E-02	2.610E-02	2.156E-02	8.540E-03	6.040E-04	5.497E-08
238	Pu-238	1.000E+00	1.819E+00	1.804E+00	1.775E+00	1.675E+00	1.419E+00	7.944E-01	1.511E-01	4.400E-04
238	Pu-238	1.000E+00	4.345E-06	7.465E-06	1.363E-05	3.429E-05	5.616E-05	2.035E-04	2.746E-04	1.264E-04
238	U-238	1.000E+00	1.113E+00	1.112E+00	1.109E+00	1.100E+00	1.074E+00	9.685E-01	7.774E-01	5.216E-01
238	U-238	1.000E+00	4.490E-06	7.639E-06	1.391E-05	3.562E-05	9.569E-05	2.843E-04	6.646E-04	9.142E-04
238	ΣDOSE(j)		1.113E+00	1.112E+00	1.109E+00	1.100E+00	1.074E+00	9.690E-01	7.764E-01	3.226E-01
238	Pu-238	1.000E+00	6.055E-12	1.109E-11	2.609E-11	1.304E-10	8.354E-10	6.864E-09	3.686E-08	1.281E-07
238	U-238	1.000E+00	1.427E-06	2.674E-06	3.305E-06	7.593E-06	1.969E-05	6.025E-05	1.622E-04	3.963E-04
238	U-238	1.000E+00	2.229E-08	2.227E-08	2.223E-08	2.215E-08	2.240E-08	2.836E-08	8.195E-08	4.895E-07
238	ΣDOSE(j)		1.450E-06	2.096E-06	3.327E-06	7.615E-06	1.971E-05	6.829E-05	1.623E-04	3.969E-04
238	Pu-238	1.000E+00	3.973E-12	4.497E-12	7.536E-12	6.557E-11	1.247E-09	3.439E-08	5.140E-07	2.766E-06
238	U-238	1.000E+00	1.430E-07	2.925E-07	8.765E-07	5.866E-06	4.428E-05	4.213E-04	2.799E-03	1.236E-02
238	U-238	1.000E+00	5.871E-08	5.861E-08	5.849E-08	5.804E-08	5.794E-08	5.345E-08	6.563E-07	1.218E-05
238	ΣDOSE(j)		2.017E-07	3.511E-07	9.350E-07	5.924E-06	4.434E-05	4.214E-04	2.806E-03	1.234E-02
238	Pu-238	1.000E+00	2.087E-11	2.182E-11	2.398E-11	4.397E-11	7.198E-10	4.226E-08	9.724E-07	7.839E-06
238	U-238	1.000E+00	4.006E-07	4.147E-07	5.033E-07	7.113E-06	3.040E-05	5.991E-04	5.587E-03	2.578E-02
238	U-238	1.000E+00	3.090E-07	3.087E-07	3.079E-07	3.054E-07	2.987E-07	3.214E-07	1.709E-06	2.474E-05
238	ΣDOSE(j)		7.096E-07	7.234E-07	8.113E-07	2.419E-06	3.070E-05	5.995E-04	5.590E-03	2.582E-02

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

Nucl	Parent	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	
U-241	Pu-241	1.000E+00	3.818E-02	3.637E-02	3.301E-02	2.350E-02	8.906E-03	2.982E-04	1.816E-08	3.101E-23	
U-241	Pu-241	2.450E-05	9.354E-07	8.911E-07	8.087E-07	5.758E-07	2.182E-07	7.307E-09	4.446E-13	7.575E-28	
U-241	ΣDOSE(j)		3.818E-02	3.637E-02	3.301E-02	2.350E-02	8.906E-03	2.982E-04	1.816E-08	3.101E-23	
Sr-90	Sr-90	1.000E+00	3.980E+01	3.700E+01	3.196E+01	1.915E+01	4.433E+00	2.645E-02	1.164E-08	0.000E+00	
Tc-99	Tc-99	1.000E+00	9.682E-01	9.361E-01	8.747E-01	6.900E-01	3.503E-01	3.265E-02	3.712E-05	1.831E-15	
U-236	U-236	1.000E+00	1.058E+00	1.057E+00	1.054E+00	1.045E+00	1.021E+00	9.396E-01	7.395E-01	3.065E-01	
U-236	U-236	1.000E+00	1.489E-11	3.248E-11	6.592E-11	1.825E-10	5.113E-10	1.615E-09	4.393E-09	1.081E-08	
U-236	U-236	1.000E+00	1.043E-10	3.119E-10	1.046E-09	5.669E-09	2.651E-08	1.017E-07	2.808E-07	5.999E-07	
U-236	U-236	1.000E+00	1.463E-12	7.752E-12	5.282E-11	6.354E-10	4.110E-09	1.782E-08	5.266E-08	1.348E-07	
U-238	U-238	1.000E+00	1.117E+00	1.115E+00	1.113E+00	1.104E+00	1.078E+00	9.937E-01	7.849E-01	3.312E-01	

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

Individual Nuclide Soil Concentration
 Parent Nuclide and Branch Fraction Indicated

Nuclide	Parent	BRF(i)	S(i,t), pCi/g							
			t = 0.000E+00	1.000E+00	2.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Am-241	Am-241	1.000E+00	1.000E+00	9.980E-01	9.940E-01	9.200E-01	9.412E-01	8.172E-01	5.456E-01	1.329E-01
Am-241	Pu-241	1.000E+00	0.000E+00	1.564E-03	4.465E-03	1.258E-02	2.449E-02	2.607E-02	1.893E-02	4.609E-03
Am-241	ΣS(j):		1.000E+00	9.995E-01	9.984E-01	9.926E-01	9.657E-01	8.453E-01	5.647E-01	1.375E-01
Pu-239	Am-241	1.000E+00	0.000E+00	3.235E-07	9.677E-07	3.193E-06	9.327E-06	2.817E-05	6.486E-05	8.145E-05
Pu-239	Pu-241	1.000E+00	0.000E+00	2.554E-10	2.223E-09	2.204E-08	1.478E-07	7.625E-07	2.860E-06	2.953E-06
Pu-239	Pu-241	2.450E-05	0.000E+00	7.744E-12	2.214E-11	6.271E-11	1.241E-10	1.541E-10	1.346E-10	8.153E-11
Pu-239	ΣS(j):		0.000E+00	3.237E-07	9.700E-07	3.217E-06	9.475E-06	2.903E-05	6.694E-05	9.141E-05
Pu-239	Am-241	1.000E+00	0.000E+00	7.067E-13	6.333E-12	6.933E-11	5.979E-10	5.730E-09	3.412E-08	9.963E-08
Pu-239	Pu-241	1.000E+00	0.000E+00	3.735E-16	9.815E-15	3.315E-13	7.014E-12	1.313E-10	1.026E-09	3.295E-09
Pu-239	Pu-241	2.450E-05	0.000E+00	1.705E-17	1.482E-16	1.464E-15	9.655E-15	4.762E-14	1.116E-13	1.136E-13
Pu-239	ΣS(j):		0.000E+00	7.071E-13	6.343E-12	6.966E-11	6.049E-10	5.861E-09	3.515E-08	1.029E-07
Pu-239	Am-241	1.000E+00	0.000E+00	2.226E-17	5.990E-16	2.193E-14	5.733E-13	1.699E-11	3.756E-10	5.214E-09
Pu-239	Pu-241	1.000E+00	0.000E+00	8.841E-21	7.008E-19	6.034E-17	5.340E-15	3.746E-13	1.050E-11	1.672E-10
Pu-239	Pu-241	2.450E-05	0.000E+00	5.391E-22	1.418E-20	4.607E-19	1.028E-17	2.003E-16	1.758E-15	9.660E-15
Pu-239	ΣS(j):		0.000E+00	2.227E-17	5.997E-16	2.202E-14	5.787E-13	1.926E-11	3.861E-10	5.351E-09
C-14	C-14	1.000E+00	1.000E+00	1.086E-01	1.276E-03	2.139E-10	6.251E-30	0.000E+00	0.000E+00	0.000E+00
C-14	Am-243	9.976E-01	9.976E-01	9.732E-01	9.261E-01	7.786E-01	4.743E-01	8.349E-02	5.890E-04	1.723E-11
C-14	Am-243	2.400E-03	2.400E-03	2.341E-03	2.228E-03	1.873E-03	1.141E-03	2.013E-04	1.417E-06	4.144E-14
C-14	ΣS(j):		1.000E+00	9.755E-01	9.253E-01	7.805E-01	4.755E-01	8.349E-02	5.904E-04	1.727E-11
Cm-243	Am-243	9.976E-01	0.000E+00	2.936E-05	8.306E-05	2.543E-04	6.067E-04	1.052E-03	1.117E-03	1.011E-03
Cm-243	Am-243	2.400E-03	0.000E+00	3.210E-12	2.824E-11	2.901E-10	2.101E-09	1.176E-08	2.496E-08	2.521E-08
Cm-243	Pu-239	1.000E+00	1.000E+00	9.999E-01	9.996E-01	9.986E-01	9.957E-01	9.889E-01	9.582E-01	6.673E-01
Cm-243	ΣS(j):		1.000E+00	9.999E-01	9.997E-01	9.988E-01	9.963E-01	9.889E-01	9.592E-01	6.683E-01
Cm-243	Am-243	9.976E-01	0.000E+00	1.403E-14	1.241E-13	1.300E-12	9.980E-12	6.921E-11	2.596E-10	6.876E-10
Cm-243	Am-243	2.400E-03	0.000E+00	1.056E-21	2.803E-20	9.774E-19	2.232E-17	4.861E-16	4.089E-15	1.566E-14
Cm-243	Pu-239	1.000E+00	0.000E+00	9.844E-10	1.950E-09	9.799E-09	2.910E-08	9.365E-08	2.543E-07	6.069E-07
Cm-243	U-235	1.000E+00	1.000E+00	9.991E-01	9.974E-01	9.913E-01	9.742E-01	9.167E-01	7.703E-01	4.191E-01
Cm-243	ΣS(j):		1.000E+00	9.991E-01	9.974E-01	9.913E-01	9.742E-01	9.167E-01	7.703E-01	4.191E-01
Cm-243	Am-243	9.976E-01	0.000E+00	9.906E-20	2.636E-18	9.280E-17	2.179E-15	3.237E-14	5.581E-13	3.121E-12
Cm-243	Am-243	2.400E-03	0.000E+00	5.594E-27	4.482E-25	5.221E-23	3.642E-21	2.765E-19	7.164E-18	6.762E-17
Cm-243	Pu-239	1.000E+00	0.000E+00	1.049E-14	9.333E-14	1.026E-12	8.949E-12	8.932E-11	6.009E-10	2.797E-09
Cm-243	U-235	1.000E+00	0.000E+00	2.111E-05	6.304E-05	2.068E-04	5.929E-04	1.690E-03	3.298E-03	2.953E-03
Cm-243	ΣS(j):		0.000E+00	2.111E-05	6.304E-05	2.068E-04	5.929E-04	1.690E-03	3.298E-03	2.953E-03
Cm-243	Am-243	9.976E-01	0.000E+00	7.831E-22	6.168E-20	6.914E-18	4.297E-16	1.360E-14	3.719E-13	2.368E-12
Cm-243	Am-243	2.400E-03	0.000E+00	3.542E-29	8.363E-27	3.148E-24	5.936E-22	1.097E-19	4.556E-18	5.117E-17
Cm-243	Pu-239	1.000E+00	0.000E+00	1.093E-16	3.885E-15	9.892E-14	2.173E-12	4.464E-11	4.091E-10	2.126E-09
Cm-243	U-235	1.000E+00	0.000E+00	3.317E-07	2.897E-06	2.906E-05	1.992E-04	1.038E-03	2.471E-03	2.334E-03
Cm-243	ΣS(j):		0.000E+00	3.317E-07	2.897E-06	2.906E-05	1.992E-04	1.038E-03	2.471E-03	2.334E-03
Cm-243	Am-243	2.400E-03	0.000E+00	2.216E-07	6.427E-07	1.809E-06	4.099E-06	4.500E-06	9.060E-07	1.455E-06

Individual Nuclide Soil Concentration
 Parent Nuclide and Branch Fraction Indicated

Nuclide Parent (j) (i)	BRF(i)	Site 11, pCi/g							
		t= 0.000E+00	1.000E+00	3.600E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
0-60 Co-60	1.000E+00	1.000E+00	8.675E-01	6.527E-01	2.412E-01	1.404E-02	6.676E-07	2.975E-19	0.000E+00
s-137 Cs-137	1.000E+00	1.000E+00	9.508E-01	9.597E-01	6.041E-01	2.204E-01	6.471E-03	2.710E-07	1.268E-22
u-152 Eu-152	7.208E-01	7.208E-01	6.640E-01	6.159E-01	4.266E-01	1.494E-01	3.797E-03	1.054E-07	1.187E-23
j-152 Eu-152	2.792E-01	2.792E-01	2.649E-01	2.385E-01	1.652E-01	5.787E-02	1.471E-03	4.083E-08	4.599E-24
j-152 ΣS(j):		1.000E+00	9.489E-01	8.544E-01	5.918E-01	2.075E-01	5.268E-03	1.462E-07	1.647E-23
f-152 Eu-152	2.792E-01	0.000E+00	1.746E-15	4.972E-15	1.393E-14	2.696E-14	3.336E-14	3.208E-14	2.743E-14
-154 Eu-154	1.000E+00	1.000E+00	9.238E-01	7.885E-01	4.528E-01	9.284E-02	3.624E-04	4.759E-11	3.906E-35
-155 Eu-155	1.000E+00	1.000E+00	8.692E-01	6.566E-01	2.461E-01	1.490E-02	8.144E-07	5.401E-19	0.000E+00
-55 Fe-55	1.000E+00	1.000E+00	7.629E-01	4.440E-01	6.678E-02	2.978E-04	1.763E-12	5.478E-36	0.000E+00
3 H-3	1.000E+00	1.000E+00	2.317E-01	1.242E-02	4.360E-07	7.186E-20	0.000E+00	0.000E+00	0.000E+00
129 I-129	1.000E+00	1.000E+00	9.481E-01	8.522E-01	5.866E-01	2.020E-01	4.837E-03	1.132E-07	7.018E-24
94 Tl-94	1.000E+00	1.000E+00	9.994E-01	9.982E-01	9.940E-01	9.821E-01	9.416E-01	8.348E-01	5.479E-01
59 Ni-59	1.000E+00	1.000E+00	9.943E-01	9.830E-01	9.443E-01	8.420E-01	5.637E-01	1.792E-01	3.242E-03
63 Ni-63	1.000E+00	1.000E+00	9.871E-01	9.619E-01	8.786E-01	6.782E-01	2.741E-01	2.059E-02	2.394E-06
238 Pu-238	1.000E+00	1.000E+00	9.920E-01	9.762E-01	9.250E-01	7.863E-01	4.487E-01	9.035E-02	3.309E-04
34 Pu-238	1.000E+00	0.000E+00	2.822E-06	8.392E-06	2.712E-05	7.458E-05	1.857E-04	2.697E-04	1.658E-04
34 U-234	1.000E+00	1.000E+00	9.991E-01	9.974E-01	9.913E-01	9.742E-01	9.164E-01	7.697E-01	4.179E-01
34 U-238	1.000E+00	0.000E+00	2.832E-06	8.463E-06	2.810E-05	8.285E-05	2.598E-04	6.549E-04	1.166E-03
34 ΣS(j):		1.000E+00	9.991E-01	9.974E-01	9.914E-01	9.743E-01	9.169E-01	7.706E-01	4.192E-01
230 Pu-238	1.000E+00	0.000E+00	1.272E-11	1.134E-10	1.239E-09	1.052E-08	9.633E-08	5.368E-07	1.927E-06
230 U-234	1.000E+00	0.000E+00	8.998E-06	2.697E-05	8.962E-05	2.665E-04	8.615E-04	2.372E-03	5.964E-03
230 U-238	1.000E+00	0.000E+00	1.275E-11	1.146E-10	1.269E-09	1.128E-08	1.204E-07	9.654E-07	7.263E-06
230 ΣS(j):		0.000E+00	8.998E-06	2.697E-05	8.962E-05	2.665E-04	8.617E-04	2.373E-03	5.973E-03
26 Pu-238	1.000E+00	0.000E+00	1.837E-15	4.931E-14	1.789E-12	4.552E-11	1.379E-09	2.196E-08	1.924E-07
26 U-234	1.000E+00	0.000E+00	1.947E-09	1.748E-08	1.924E-07	1.687E-06	1.713E-05	1.204E-04	6.306E-04
26 U-238	1.000E+00	0.000E+00	1.840E-15	4.957E-14	1.821E-12	4.799E-11	1.638E-09	3.506E-08	6.201E-07
26 ΣS(j):		0.000E+00	1.947E-09	1.748E-08	1.924E-07	1.687E-06	1.713E-05	1.205E-04	6.314E-04
10 Pu-238	1.000E+00	0.000E+00	1.419E-17	1.128E-15	1.311E-13	8.956E-12	6.501E-10	1.652E-08	1.745E-07
10 U-234	1.000E+00	0.000E+00	2.002E-11	5.307E-10	1.846E-08	4.204E-07	9.411E-06	9.582E-05	5.767E-04
10 238	1.000E+00	0.000E+00	1.431E-17	1.134E-15	1.330E-13	8.755E-12	7.538E-10	2.552E-08	5.508E-07
10 ΣS(j):		0.000E+00	2.002E-11	5.307E-10	1.846E-08	4.204E-07	9.412E-06	9.582E-05	5.770E-04

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
Pu-241	Pu-241	1.000E+00	1.000E+00	9.529E-01	6.652E-01	6.172E-01	2.352E-01	6.027E-02	5.173E-07	1.111E-21
Pu-241	Pu-241	2.450E-05	2.450E-05	2.335E-05	2.120E-05	1.512E-05	5.762E-06	1.967E-07	1.267E-11	2.723E-26
Pu-241	ΣS(j):		1.000E+00	9.529E-01	6.652E-01	6.172E-01	2.352E-01	6.027E-02	5.173E-07	1.111E-21
Sr-90	Sr-90	1.000E+00	1.000E+00	9.297E-01	8.036E-01	4.826E-01	1.124E-01	6.646E-04	3.209E-10	2.263E-32
Tc-99	Tc-99	1.000E+00	1.000E+00	9.666E-01	9.036E-01	7.132E-01	3.628E-01	3.405E-02	3.949E-05	2.097E-15
U-236	U-236	1.000E+00	1.000E+00	9.991E-01	9.974E-01	9.913E-01	9.742E-01	9.167E-01	7.703E-01	4.190E-01
U-236	U-236	1.000E+00	0.000E+00	4.931E-11	1.475E-10	4.912E-10	1.461E-09	4.724E-09	1.302E-08	3.269E-08
U-236	U-236	1.000E+00	0.000E+00	2.854E-12	2.373E-11	2.046E-10	1.055E-09	4.262E-09	1.244E-08	3.203E-08
U-236	U-236	1.000E+00	0.000E+00	3.187E-13	6.861E-12	1.287E-10	9.289E-10	4.139E-09	1.234E-08	3.197E-08
U-238	U-238	1.000E+00	1.000E+00	9.991E-01	9.974E-01	9.913E-01	9.742E-01	9.167E-01	7.703E-01	4.191E-01

i) is the branch fraction of the parent nuclide.

RE execution time = 39.95 seconds

Summary : RESRAD Default Parameters

File : Plumbrook Subsurface Modified In cwr.RAD

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Summary : RESRAD Default Parameters

File : Plumbrook Subsurface Modified Im cvr.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	Am-241	4.440E-01	4.440E-01	DCF2(2)
B-1	Am-243+D	4.400E-01	4.400E-01	DCF2(3)
B-1	C-14	2.090E-06	2.090E-06	DCF2(4)
B-1	Cm-243	3.070E-01	3.070E-01	DCF2(5)
B-1	Co-60	2.190E-04	2.190E-04	DCF2(7)
B-1	Cs-137+D	3.190E-05	3.190E-05	DCF2(8)
B-1	Eu-152	2.210E-04	2.210E-04	DCF2(9)
B-1	Eu-154	2.860E-04	2.860E-04	DCF2(11)
B-1	Eu-155	4.140E-05	4.140E-05	DCF2(12)
B-1	Fe-55	2.690E-06	2.690E-06	DCF2(13)
B-1	Gd-152	2.430E-01	2.430E-01	DCF2(14)
B-1	H-3	6.400E-08	6.400E-08	DCF2(15)
1	I-129	1.740E-04	1.740E-04	DCF2(16)
1	Nb-94	4.140E-04	4.140E-04	DCF2(17)
1	Ni-59	2.700E-06	2.700E-06	DCF2(18)
1	Ni-63	6.290E-06	6.290E-06	DCF2(19)
1	Np-237+D	5.400E-01	5.400E-01	DCF2(20)
1	Pa-231	1.280E+00	1.280E+00	DCF2(21)
1	Pb-210+D	2.320E-02	2.320E-02	DCF2(22)
1	Pb-214	3.920E-01	3.920E-01	DCF2(23)
1	Pb-239	4.290E-01	4.290E-01	DCF2(24)
1	Pb-241+D	8.250E-03	8.250E-03	DCF2(25)
1	Ra-226+D	8.600E-03	8.600E-03	DCF2(27)
1	Ra-228+D	5.040E-03	5.040E-03	DCF2(28)
1	Sr-90+D	1.310E-03	1.310E-03	DCF2(29)
1	Tc-99	8.330E-06	8.330E-06	DCF2(30)
1	Th-228+D	3.450E-01	3.450E-01	DCF2(31)
1	Th-229+D	2.160E+00	2.160E+00	DCF2(32)
1	Th-230	3.260E-01	3.260E-01	DCF2(33)
1	Th-232	1.640E+00	1.640E+00	DCF2(34)
1	U-233	1.350E-01	1.350E-01	DCF2(35)
1	U-234	1.320E-01	1.320E-01	DCF2(36)
1	U-235+D	1.230E-01	1.230E-01	DCF2(37)
1	U-236	1.250E-01	1.250E-01	DCF2(38)
1	U-238+D	1.180E-01	1.180E-01	DCF2(39)
	Dose conversion factors for ingestion, mrem/pCi:			
	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
	Am-241	3.640E-03	3.640E-03	DCF3(2)
	Am-243+D	3.630E-03	3.630E-03	DCF3(3)
	C-14	2.090E-06	2.090E-06	DCF3(4)
	Cm-243	2.510E-03	2.510E-03	DCF3(5)
	Co-60	2.690E-05	2.690E-05	DCF3(7)
	Cs-137+D	5.000E-05	5.000E-05	DCF3(8)
	Eu-152	6.480E-06	6.480E-06	DCF3(9)
	Eu-154	9.550E-06	9.550E-06	DCF3(10)
	Eu-155	1.530E-06	1.530E-06	DCF3(12)
	Fe-55	6.070E-07	6.070E-07	DCF3(13)

Summary : RESRAD Default Parameters

File : Plumbrock Subsurface Modified In cvr.RAD

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

File: FCR 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-1	Gd-152	1.610E-04	1.610E-04	DCF3(14)
D-1	H-3	6.400E-06	6.400E-06	DCF3(15)
D-1	I-129	2.760E-04	2.760E-04	DCF3(16)
D-1	Nb-94	7.140E-06	7.140E-06	DCF3(17)
D-1	Ni-59	2.100E-07	2.100E-07	DCF3(18)
D-1	Ni-63	5.770E-07	5.770E-07	DCF3(19)
D-1	Np-237+D	4.440E-03	4.440E-03	DCF3(20)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(21)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(22)
D-1	Pu-238	3.200E-03	3.200E-03	DCF3(23)
D-1	Pu-239	3.540E-03	3.540E-03	DCF3(24)
D-1	Pu-241+D	6.850E-05	6.850E-05	DCF3(25)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(27)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(28)
D-1	Sr-90+D	1.530E-04	1.530E-04	DCF3(29)
D-1	Tc-99	1.460E-06	1.460E-06	DCF3(30)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(31)
D-1	Th-229+D	4.030E-03	4.030E-03	DCF3(32)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(33)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(34)
D-1	U-233	2.890E-04	2.890E-04	DCF3(35)
D-1	U-234	2.830E-04	2.830E-04	DCF3(36)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(37)
D-1	U-236	2.690E-04	2.690E-04	DCF3(38)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(39)
-34	Food transfer factors:			
-34	Ac-227+D, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
-34	Ac-227+D, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(1,2)
-34	Ac-227+D, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
-34				
-34	Am-241, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(2,1)
-34	Am-241, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
-34	Am-241, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(2,3)
-34				
-34	Am-243+D, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(3,1)
-34	Am-243+D, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(3,2)
-34	Am-243+D, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(3,3)
-34				
-34	C-14, plant/soil concentration ratio, dimensionless	5.500E-02	5.500E-02	RTF(4,1)
-34	C-14, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.100E-02	3.100E-02	RTF(4,2)
-34	C-14, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.200E-02	1.200E-02	RTF(4,3)
-34				
-34	Cs-243, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
-34	Cs-243, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(5,2)
-34	Cs-243, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(5,3)
-34				
-34	Co-60, plant/soil concentration ratio, dimensionless	8.000E-02	8.000E-02	RTF(7,1)
-34	Co-60, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-02	2.000E-02	RTF(7,2)
-34	Co-60, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(7,3)

Summary : RESRAD Default Parameters

File : Plumbrook Subsurface Modified In cvr.RAD

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

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Cs-137+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(8,1)
D-34	Cs-137+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-02	3.000E-02	RTF(8,2)
D-34	Cs-137+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	8.000E-03	8.000E-03	RTF(8,3)
D-34				
D-34	Eu-152 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	Eu-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(9,2)
D-34	Eu-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(9,3)
D-34				
D-34	Eu-154 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	Eu-154 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(11,2)
D-34	Eu-154 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(11,3)
D-34				
D-34	Eu-155 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(12,1)
D-34	Eu-155 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(12,2)
D-34	Eu-155 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(12,3)
D-34				
D-34	Fe-55 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(13,1)
D-34	Fe-55 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-02	2.000E-02	RTF(13,2)
D-34	Fe-55 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(13,3)
D-34				
D-34	Gd-152 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(14,1)
D-34	Gd-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(14,2)
D-34	Gd-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(14,3)
D-34				
D-34	H-3 , plant/soil concentration ratio, dimensionless	4.600E+00	4.600E+00	RTF(15,1)
D-34	H-3 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.200E-02	1.200E-02	RTF(15,2)
D-34	H-3 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-02	1.000E-02	RTF(15,3)
D-34				
D-34	I-129 , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(16,1)
D-34	I-129 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	7.000E-03	7.000E-03	RTF(16,2)
D-34	I-129 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-02	1.000E-02	RTF(16,3)
D-34				
D-34	Nb-94 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(17,1)
D-34	Nb-94 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-07	3.000E-07	RTF(17,2)
D-34	Nb-94 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(17,3)
D-34				
D-34	Ni-59 , plant/soil concentration ratio, dimensionless	5.000E-02	5.000E-02	RTF(18,1)
D-34	Ni-59 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(18,2)
D-34	Ni-59 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-02	2.000E-02	RTF(18,3)
D-34				
D-34	Ni-63 , plant/soil concentration ratio, dimensionless	5.000E-02	5.000E-02	RTF(19,1)
D-34	Ni-63 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(19,2)
D-34	Ni-63 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-02	2.000E-02	RTF(19,3)
D-34				
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(20,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-03	3.000E-03	RTF(20,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(20,3)
D-34				

Summary : RESRAD Default Parameters

File : Flumbrook Subsurface Modified Im.cvr.RAD

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

File: FGR 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Fa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(21,1)
D-34	Fa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(21,2)
D-34	Fa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(21,3)
D-34				
D-34	Fb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(22,1)
D-34	Fb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(22,2)
D-34	Fb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(22,3)
D-34				
D-34	Fc-238 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(23,1)
D-34	Fc-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(23,2)
D-34	Fc-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(23,3)
D-34				
D-34	Fd-239 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(24,1)
D-34	Fd-239 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(24,2)
D-34	Fd-239 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(24,3)
D-34				
D-34	Fu-241+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(25,1)
D-34	Fu-241+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(25,2)
D-34	Fu-241+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(25,3)
D-34				
D-34	Fv-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(27,1)
D-34	Fv-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(27,2)
D-34	Fv-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(27,3)
D-34				
D-34	Fw-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(28,1)
D-34	Fw-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(28,2)
D-34	Fw-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(28,3)
D-34				
D-34	Sr-90+D , plant/soil concentration ratio, dimensionless	3.000E-01	3.000E-01	RTF(29,1)
D-34	Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-03	8.000E-03	RTF(29,2)
D-34	Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(29,3)
D-34				
D-34	Tc-99 , plant/soil concentration ratio, dimensionless	5.000E+00	5.000E+00	RTF(30,1)
D-34	Tc-99 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(30,2)
D-34	Tc-99 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(30,3)
D-34				
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(31,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(31,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(31,3)
D-34				
D-34	Th-229+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(32,1)
D-34	Th-229+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(32,2)
D-34	Th-229+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(32,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(33,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(33,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(33,3)

Summary : RESRAD Default Parameters

File : Flumbrook Subsurface Modified Im cvr.RAD

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

File: FGR 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(34,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(34,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(34,3)
D-34				
D-34	U-235 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(35,1)
D-34	U-235 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(35,2)
D-34	U-235 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(35,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(36,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(36,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(36,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(37,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(37,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(37,3)
D-34				
D-34	U-236 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(38,1)
D-34	U-236 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(38,2)
D-34	U-236 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(38,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(39,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(39,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(39,3)
D-34				
5	Bioaccumulation factors, fresh water, L/kg:			
5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
5				
5	Am-241 , fish	3.000E+01	3.000E+01	BIOFAC(2,1)
5	Am-241 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(2,2)
5				
5	Am-243+D , fish	3.000E+01	3.000E+01	BIOFAC(3,1)
5	Am-243+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(3,2)
5				
5	C-14 , fish	5.000E+04	5.000E+04	BIOFAC(4,1)
5	C-14 , crustacea and mollusks	9.100E+03	9.100E+03	BIOFAC(4,2)
5				
5	Cm-243 , fish	3.000E+01	3.000E+01	BIOFAC(5,1)
5	Cm-243 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(5,2)
5				
5	Co-60 , fish	3.000E+02	3.000E+02	BIOFAC(7,1)
5	Co-60 , crustacea and mollusks	2.000E+02	2.000E+02	BIOFAC(7,2)
5				
5	Cs-137+D , fish	2.000E+03	2.000E+03	BIOFAC(8,1)
5	Cs-137+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(8,2)
5				
5	Eu-152 , fish	5.000E+01	5.000E+01	BIOFAC(9,1)
5	Eu-152 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(9,2)
5				

Summary : RESRAD Default Parameters

File : Plum Brook Subsurface Modified 1m cvr.RAD

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

File: FGR 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-5	Eu-154 , fish	5.000E+01	5.000E+01	BIOFAC(11,1)
D-5	Eu-154 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(11,2)
D-5				
D-5	Eu-155 , fish	5.000E+01	5.000E+01	BIOFAC(12,1)
D-5	Eu-155 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(12,2)
D-5				
D-5	Fe-55 , fish	2.000E+02	2.000E+02	BIOFAC(13,1)
D-5	Fe-55 , crustacea and mollusks	3.200E+03	3.200E+03	BIOFAC(13,2)
D-5				
D-5	Gd-152 , fish	2.500E+01	2.500E+01	BIOFAC(14,1)
D-5	Gd-152 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(14,2)
D-5				
D-5	H-3 , fish	1.000E+00	1.000E+00	BIOFAC(15,1)
D-5	H-3 , crustacea and mollusks	1.000E+00	1.000E+00	BIOFAC(15,2)
D-5				
D-5	I-129 , fish	4.000E+01	4.000E+01	BIOFAC(16,1)
D-5	I-129 , crustacea and mollusks	5.000E+00	5.000E+00	BIOFAC(16,2)
D-5				
D-5	Nb-94 , fish	3.000E+02	3.000E+02	BIOFAC(17,1)
D-5	Nb-94 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(17,2)
D-5				
D-5	Ni-59 , fish	1.000E+02	1.000E+02	BIOFAC(18,1)
D-5	Ni-59 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(18,2)
D-5				
D-5	Ni-63 , fish	1.000E+02	1.000E+02	BIOFAC(19,1)
D-5	Ni-63 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(19,2)
D-5				
D-5	Np-237+D , fish	3.000E+01	3.000E+01	BIOFAC(20,1)
D-5	Np-237+D , crustacea and mollusks	4.000E+02	4.000E+02	BIOFAC(20,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(21,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(21,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(22,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(22,2)
D-5				
D-5	Pu-238 , fish	3.000E+01	3.000E+01	BIOFAC(23,1)
D-5	Pu-238 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(23,2)
D-5				
D-5	Pu-239 , fish	3.000E+01	3.000E+01	BIOFAC(24,1)
D-5	Pu-239 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(24,2)
D-5				
D-5	Pu-241+D , fish	3.000E+01	3.000E+01	BIOFAC(25,1)
D-5	Pu-241+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(25,2)
D-5				
D-5	Pu-226+D , fish	5.000E+01	5.000E+01	BIOFAC(27,1)
D-5	Pu-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(27,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(28,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(28,2)

Summary : RESRAD Default Parameters

File : Plumbrook Subsurface Modified Im cvr.RAD

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

File: FGR 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-5	Sr-90+D , fish	6.000E+01	6.000E+01	BIOFAC(29,1)
D-5	Sr-90+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(29,2)
D-5				
D-5	Tc-99 , fish	2.000E+01	2.000E+01	BIOFAC(30,1)
D-5	Tc-99 , crustacea and mollusks	5.000E+00	5.000E+00	BIOFAC(30,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(31,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(31,2)
D-5				
D-5	Th-229+D , fish	1.000E+02	1.000E+02	BIOFAC(32,1)
D-5	Th-229+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(32,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(33,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(33,2)
D-5				
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(34,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(34,2)
D-5				
D-5	U-233 , fish	1.000E+01	1.000E+01	BIOFAC(35,1)
D-5	U-233 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(35,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(36,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(36,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(37,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(37,2)
D-5				
D-5	U-236 , fish	1.000E+01	1.000E+01	BIOFAC(38,1)
D-5	U-236 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(38,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(39,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(39,2)

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Summary : RESRAD Default Parameters

File : Flumbrook Subsurface Modified in cur.RAD

Site-Specific Parameter Summary

ID	Parameter	User		Used by RESRAD (If different from user input)	Parameter Name
		Input	Default		
1	Area of contaminated zone (m ²)	3.850E+03	1.000E+04	---	AREA
1	Thickness of contaminated zone (m)	3.000E+00	2.000E+00	---	THICKO
1	Length parallel to aquifer flow (m)	7.000E+01	1.000E+02	---	LCZPAQ
1	Basic radiation dose limit (mrem/yr)	2.500E-01	2.500E-01	---	BRDL
2	Time since placement of material (yr)	1.000E+00	0.000E+00	---	TI
1	Times for calculations (yr)	1.000E+00	1.000E+00	---	T (2)
1	Times for calculations (yr)	3.000E+00	3.000E+00	---	T (3)
1	Times for calculations (yr)	1.000E+01	1.000E+01	---	T (4)
1	Times for calculations (yr)	3.000E+01	3.000E+01	---	T (5)
1	Times for calculations (yr)	1.000E+02	1.000E+02	---	T (6)
1	Times for calculations (yr)	3.000E+02	3.000E+02	---	T (7)
1	Times for calculations (yr)	1.000E+03	1.000E+03	---	T (8)
1	Times for calculations (yr)	not used	0.000E+00	---	T (9)
1	Times for calculations (yr)	not used	0.000E+00	---	T(10)
	Initial principal radionuclide (pCi/g): Am-241	1.000E+00	0.000E+00	---	S1 (2)
	Initial principal radionuclide (pCi/g): C-14	1.000E+00	0.000E+00	---	S1 (4)
	Initial principal radionuclide (pCi/g): Cm-243	1.000E+00	0.000E+00	---	S1 (5)
	Initial principal radionuclide (pCi/g): Co-60	1.000E+00	0.000E+00	---	S1 (7)
	Initial principal radionuclide (pCi/g): Cs-137	1.000E+00	0.000E+00	---	S1 (8)
	Initial principal radionuclide (pCi/g): Eu-152	1.000E+00	0.000E+00	---	S1 (9)
	Initial principal radionuclide (pCi/g): Eu-154	1.000E+00	0.000E+00	---	S1(11)
	Initial principal radionuclide (pCi/g): Eu-155	1.000E+00	0.000E+00	---	S1(12)
	Initial principal radionuclide (pCi/g): Fe-55	1.000E+00	0.000E+00	---	S1(13)
	Initial principal radionuclide (pCi/g): K-3	1.000E+00	0.000E+00	---	S1(15)
	Initial principal radionuclide (pCi/g): I-129	1.000E+00	0.000E+00	---	S1(16)
	Initial principal radionuclide (pCi/g): Nb-94	1.000E+00	0.000E+00	---	S1(17)
	Initial principal radionuclide (pCi/g): Ni-59	1.000E+00	0.000E+00	---	S1(18)
	Initial principal radionuclide (pCi/g): Ni-63	1.000E+00	0.000E+00	---	S1(19)
	Initial principal radionuclide (pCi/g): Pu-239	1.000E+00	0.000E+00	---	S1(23)
	Initial principal radionuclide (pCi/g): Pu-239	1.000E+00	0.000E+00	---	S1(24)
	Initial principal radionuclide (pCi/g): Pu-241	1.000E+00	0.000E+00	---	S1(25)
	Initial principal radionuclide (pCi/g): Sr-90	1.000E+00	0.000E+00	---	S1(29)
	Initial principal radionuclide (pCi/g): Tc-99	1.000E+00	0.000E+00	---	S1(30)
	Initial principal radionuclide (pCi/g): U-234	1.000E+00	0.000E+00	---	S1(36)
	Initial principal radionuclide (pCi/g): U-235	1.000E+00	0.000E+00	---	S1(37)
	Initial principal radionuclide (pCi/g): U-236	1.000E+00	0.000E+00	---	S1(38)
	Initial principal radionuclide (pCi/g): U-238	1.000E+00	0.000E+00	---	S1(39)
	Concentration in groundwater (pCi/L): Am-241	not used	0.000E+00	---	W1 (2)
	Concentration in groundwater (pCi/L): C-14	not used	0.000E+00	---	W1 (4)
	Concentration in groundwater (pCi/L): Cm-243	not used	0.000E+00	---	W1 (5)
	Concentration in groundwater (pCi/L): Co-60	not used	0.000E+00	---	W1 (7)
	Concentration in groundwater (pCi/L): Cs-137	not used	0.000E+00	---	W1 (8)
	Concentration in groundwater (pCi/L): Eu-152	not used	0.000E+00	---	W1 (9)
	Concentration in groundwater (pCi/L): Eu-154	not used	0.000E+00	---	W1(11)
	Concentration in groundwater (pCi/L): Eu-155	not used	0.000E+00	---	W1(12)
	Concentration in groundwater (pCi/L): Fe-55	not used	0.000E+00	---	W1(13)
	Concentration in groundwater (pCi/L): K-3	not used	0.000E+00	---	W1(15)
	Concentration in groundwater (pCi/L): I-129	not used	0.000E+00	---	W1(16)
	Concentration in groundwater (pCi/L): Nb-94	not used	0.000E+00	---	W1(17)

Summary : RESRAD Default: Parameters

1e : Flumbrook Subsurface Modified in cvr.RAD

Site-Specific Parameter Summary (continued)

no	Parameter	User Input	Default	Used by RESRAD (if different from user input)	Parameter Name
12	Concentration in groundwater (pCi/L): Ni-59	not used	0.000E+00	---	W1(16)
2	Concentration in groundwater (pCi/L): Ni-63	not used	0.000E+00	---	W1(19)
2	Concentration in groundwater (pCi/L): Pu-238	not used	0.000E+00	---	W1(23)
2	Concentration in groundwater (pCi/L): Pu-239	not used	0.000E+00	---	W1(24)
2	Concentration in groundwater (pCi/L): Pu-241	not used	0.000E+00	---	W1(25)
2	Concentration in groundwater (pCi/L): Sr-90	not used	0.000E+00	---	W1(29)
2	Concentration in groundwater (pCi/L): Tc-99	not used	0.000E+00	---	W1(30)
2	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(36)
2	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(37)
2	Concentration in groundwater (pCi/L): U-236	not used	0.000E+00	---	W1(38)
2	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(39)
3	Cover depth (m)	1.000E+00	0.000E+00	---	COVER0
1	Density of cover material (g/cm**3)	1.500E+00	1.500E+00	---	DENSCV
1	Cover depth erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCV
1	Density of contaminated zone (g/cm**3)	1.560E+00	1.500E+00	---	DENSCZ
1	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
	Contaminated zone total porosity	4.100E-01	4.000E-01	---	TPCZ
	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
	Contaminated zone hydraulic conductivity (m/yr)	6.600E-01	1.000E+01	---	HCCZ
	Contaminated zone b parameter	1.400E+00	5.300E+00	---	BCZ
	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
	Humidity in air (g/m**3)	8.000E+00	8.000E+00	---	HUMID
	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
	Precipitation (m/yr)	6.600E-01	1.000E+00	---	PRECIP
	Irrigation (m/yr)	1.040E+00	2.000E-01	---	RI
	Irrigation mode	overhead	overhead	---	IDITCH
	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
	Density of saturated zone (g/cm**3)	1.460E+00	1.500E+00	---	DENSAQ
	Saturated zone total porosity	4.500E-01	4.000E-01	---	TPSZ
	Saturated zone effective porosity	2.000E-01	2.000E-01	---	EPSZ
	Saturated zone field capacity	2.000E-01	2.000E-01	---	FCSZ
	Saturated zone hydraulic conductivity (m/yr)	1.070E+03	1.000E-02	---	HCSZ
	Saturated zone hydraulic gradient	4.500E-03	2.000E-02	---	NGWT
	Saturated zone b parameter	not used	5.300E+00	---	BSZ
	Water table drop rate (m/yr)	0.000E+00	1.000E-03	---	VWT
	Well pump intake depth (m below water table)	2.010E+00	1.000E+01	---	DWIENT
	Model: Nondispersion (ND) or Mass-Balance (MB)	MB	ND	---	MODEL
	Well pumping rate (m**3/yr)	1.160E+02	2.500E+02	---	UW
	Number of unsaturated zone strata	1	1	---	NS

Summary : RESRAD Default Parameters

File : Flumbrook Subsurface Modified in Cvr.RAD

Site-Specific Parameter Summary (continued)

no	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
15	Unsat. zone 1, thickness (m)	0.000E+00	4.000E+00	---	H(1)
15	Unsat. zone 1, soil density (g/cm ³)	1.560E+00	1.500E+00	---	DENSUZ(1)
15	Unsat. zone 1, total porosity	4.100E-01	4.000E-01	---	TPUZ(1)
15	Unsat. zone 1, effective porosity	3.000E-01	2.000E-01	---	EPUZ(1)
5	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
5	Unsat. zone 1, soil-specific b parameter	1.400E+00	5.300E+00	---	BUZ(1)
5	Unsat. zone 1, hydraulic conductivity (m/yr)	1.262E+03	1.000E+01	---	HCUZ(1)
6	Distribution coefficients for Am-241				
6	Contaminated zone (cm ³ /g)	4.450E+02	2.000E+01	---	DCNUCC(2)
6	Unsat. zone 1 (cm ³ /g)	2.000E+01	2.000E+01	---	DCNUCU(2,1)
6	Saturated zone (cm ³ /g)	2.000E+01	2.000E+01	---	DCNUCS(2)
5	Leach rate (/yr)	0.000E-00	0.000E+00	4.146E-04	ALEACH(2)
5	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
5	Distribution coefficients for C-14				
5	Contaminated zone (cm ³ /g)	2.600E+01	0.000E+00	---	DCNUCC(4)
5	Unsat. zone 1 (cm ³ /g)	2.100E+01	0.000E+00	---	DCNUCU(4,1)
5	Saturated zone (cm ³ /g)	2.100E+01	0.000E+00	---	DCNUCS(4)
5	Leach rate (/yr)	0.000E+00	0.000E+00	7.030E-03	ALEACH(4)
5	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
5	Distribution coefficients for Cm-243				
5	Contaminated zone (cm ³ /g)	4.000E+02	-1.000E+00	---	DCNUCC(5)
5	Unsat. zone 1 (cm ³ /g)	4.000E+02	-1.000E+00	---	DCNUCU(5,1)
5	Saturated zone (cm ³ /g)	4.000E+02	-1.000E+00	---	DCNUCS(5)
5	Leach rate (/yr)	0.000E+00	0.000E+00	4.612E-04	ALEACH(5)
5	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
5	Distribution coefficients for Co-60				
5	Contaminated zone (cm ³ /g)	1.700E+01	1.000E+03	---	DCNUCC(7)
5	Unsat. zone 1 (cm ³ /g)	1.000E+03	1.000E+03	---	DCNUCU(7,1)
5	Saturated zone (cm ³ /g)	1.000E+03	1.000E+03	---	DCNUCS(7)
5	Leach rate (/yr)	0.000E+00	0.000E+00	1.069E-02	ALEACH(7)
5	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
5	Distribution coefficients for Cs-137				
5	Contaminated zone (cm ³ /g)	6.500E+00	1.000E+03	---	DCNUCC(8)
5	Unsat. zone 1 (cm ³ /g)	4.470E+02	1.000E+03	---	DCNUCU(8,1)
5	Saturated zone (cm ³ /g)	4.470E+02	1.000E+03	---	DCNUCS(8)
5	Leach rate (/yr)	0.000E+00	0.000E+00	2.730E-02	ALEACH(8)
5	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
5	Distribution coefficients for Eu-152				
5	Contaminated zone (cm ³ /g)	4.300E+02	-1.000E+00	---	DCNUCC(9)
5	Unsat. zone 1 (cm ³ /g)	9.550E+02	-1.000E+00	---	DCNUCU(9,1)
5	Saturated zone (cm ³ /g)	9.550E+02	-1.000E+00	---	DCNUCS(9)
5	Leach rate (/yr)	0.000E+00	0.000E+00	4.612E-04	ALEACH(9)
5	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)

Summary : RESRAD Default Parameters

File : Plumbrook Subsurface Modified 1m cvr.RAD

Site-Specific Parameter Summary (continued)

no	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
Distribution coefficients for Eu-154					
16	Contaminated zone (cm**3/g)	4.000E+02	-1.000E+00	---	DCNUCC(13)
16	Unsaturated zone 1 (cm**3/g)	9.550E+02	-1.000E+00	---	DCNUCU(11,1)
16	Saturated zone (cm**3/g)	9.550E+02	-1.000E+00	---	DCNUCS(11)
6	Leach rate (/yr)	0.000E+00	0.000E+00	4.612E-04	ALEACH(11)
6	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
Distribution coefficients for Eu-155					
6	Contaminated zone (cm**3/g)	4.000E+02	-1.000E+00	---	DCNUCC(12)
6	Unsaturated zone 1 (cm**3/g)	4.000E+02	-1.000E+00	---	DCNUCU(12,1)
6	Saturated zone (cm**3/g)	4.000E+02	-1.000E+00	---	DCNUCS(12)
6	Leach rate (/yr)	0.000E+00	0.000E+00	4.612E-04	ALEACH(12)
6	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(12)
Distribution coefficients for Fe-55					
5	Contaminated zone (cm**3/g)	1.300E+01	1.000E+03	---	DCNUCC(13)
5	Unsaturated zone 1 (cm**3/g)	8.910E+02	1.000E+03	---	DCNUCU(13,1)
5	Saturated zone (cm**3/g)	8.910E+02	1.000E+03	---	DCNUCS(13)
5	Leach rate (/yr)	0.000E+00	0.000E+00	1.392E-02	ALEACH(13)
5	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(13)
Distribution coefficients for H-3					
	Contaminated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCC(15)
	Unsaturated zone 1 (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCU(15,1)
	Saturated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCS(15)
	Leach rate (/yr)	0.000E+00	0.000E+00	7.024E-01	ALEACH(15)
	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(15)
Distribution coefficients for I-129					
	Contaminated zone (cm**3/g)	3.250E+00	1.000E-01	---	DCNUCC(16)
	Unsaturated zone 1 (cm**3/g)	1.000E-01	1.000E-01	---	DCNUCU(16,1)
	Saturated zone (cm**3/g)	1.000E-01	1.000E-01	---	DCNUCS(16)
	Leach rate (/yr)	0.000E+00	0.000E+00	5.255E-02	ALEACH(16)
	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(16)
Distribution coefficients for Nb-94					
	Contaminated zone (cm**3/g)	3.250E+02	0.000E+00	---	DCNUCC(17)
	Unsaturated zone 1 (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCU(17,1)
	Saturated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCS(17)
	Leach rate (/yr)	0.000E+00	0.000E+00	5.676E-04	ALEACH(17)
	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(17)
Distribution coefficients for Ni-59					
	Contaminated zone (cm**3/g)	3.200E+01	1.000E+03	---	DCNUCC(18)
	Unsaturated zone 1 (cm**3/g)	3.700E+01	1.000E+03	---	DCNUCU(18,1)
	Saturated zone (cm**3/g)	3.700E+01	1.000E+03	---	DCNUCS(18)
	Leach rate (/yr)	0.000E+00	0.000E+00	5.722E-03	ALEACH(18)
	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(18)

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
016	Distribution coefficients for Ni-63				
016	Contaminated zone (cm**3/g)	3.200E+01	1.000E+03	---	DCNUCC(19)
016	Unsaturated zone 1 (cm**3/g)	3.700E+01	1.000E+03	---	DCNUCU(19,1)
016	Saturated zone (cm**3/g)	3.700E+01	1.000E+03	---	DCNUCS(19)
016	Leach rate (/yr)	0.000E+00	0.000E+00	5.722E-03	ALEACH(19)
016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(19)
016	Distribution coefficients for Pu-238				
016	Contaminated zone (cm**3/g)	1.625E+03	2.000E+03	---	DCNUCC(23)
016	Unsaturated zone 1 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(23,1)
016	Saturated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCS(23)
016	Leach rate (/yr)	0.000E+00	0.000E+00	1.136E-04	ALEACH(23)
016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(23)
016	Distribution coefficients for Pu-239				
016	Contaminated zone (cm**3/g)	1.625E+03	2.000E+03	---	DCNUCC(24)
016	Unsaturated zone 1 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(24,1)
016	Saturated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCS(24)
016	Leach rate (/yr)	0.000E+00	0.000E+00	1.136E-04	ALEACH(24)
016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(24)
016	Distribution coefficients for Pu-241				
016	Contaminated zone (cm**3/g)	1.625E+03	2.000E+03	---	DCNUCC(25)
016	Unsaturated zone 1 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(25,1)
016	Saturated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCS(25)
016	Leach rate (/yr)	0.000E+00	0.000E+00	1.136E-04	ALEACH(25)
016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(25)
016	Distribution coefficients for Sr-90				
016	Contaminated zone (cm**3/g)	3.500E+00	3.000E+01	---	DCNUCC(29)
016	Unsaturated zone 1 (cm**3/g)	3.200E+01	3.000E+01	---	DCNUCU(29,1)
016	Saturated zone (cm**3/g)	0.000E+00	3.000E+01	---	DCNUCS(29)
016	Leach rate (/yr)	0.000E+00	0.000E+00	4.906E-02	ALEACH(29)
016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(29)
016	Distribution coefficients for Tc-99				
016	Contaminated zone (cm**3/g)	5.200E+00	0.000E+00	---	DCNUCC(30)
016	Unsaturated zone 1 (cm**3/g)	7.000E+00	0.000E+00	---	DCNUCU(30,1)
016	Saturated zone (cm**3/g)	7.000E+00	0.000E+00	---	DCNUCS(30)
016	Leach rate (/yr)	0.000E+00	0.000E+00	3.379E-02	ALEACH(30)
016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(30)
016	Distribution coefficients for U-234				
016	Contaminated zone (cm**3/g)	2.120E+02	5.000E+01	---	DCNUCC(36)
016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(36,1)
016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(36)
016	Leach rate (/yr)	0.000E+00	0.000E+00	6.697E-04	ALEACH(36)
016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(36)

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
016	Distribution coefficients for U-235				
016	Contaminated zone (cm**3/g)	2.120E+02	5.000E+01	---	DCNUCC(37)
016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(37,1)
016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(37)
016	Leach rate (/yr)	0.000E+00	0.000E+00	8.697E-04	ALEACH(37)
016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(37)
016	Distribution coefficients for U-236				
016	Contaminated zone (cm**3/g)	2.120E+02	5.000E+01	---	DCNUCC(38)
016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(38,1)
016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(38)
016	Leach rate (/yr)	0.000E+00	0.000E+00	8.697E-04	ALEACH(38)
016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(38)
016	Distribution coefficients for U-238				
016	Contaminated zone (cm**3/g)	2.120E+02	5.000E+01	---	DCNUCC(39)
016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(39,1)
016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(39)
016	Leach rate (/yr)	0.000E+00	0.000E+00	8.697E-04	ALEACH(39)
016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(39)
016	Distribution coefficients for daughter Ac-227				
016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
016	Unsaturated zone 1 (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCU(1,1)
016	Saturated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCS(1)
016	Leach rate (/yr)	0.000E+00	0.000E+00	9.111E-03	ALEACH(1)
016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
016	Distribution coefficients for daughter Am-243				
016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(3)
016	Unsaturated zone 1 (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCU(3,1)
016	Saturated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCS(3)
016	Leach rate (/yr)	0.000E+00	0.000E+00	9.111E-03	ALEACH(3)
016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
016	Distribution coefficients for daughter Gd-152				
016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	8.249E+02	DCNUCC(14)
016	Unsaturated zone 1 (cm**3/g)	-1.000E+00	-1.000E+00	8.249E+02	DCNUCU(14,1)
016	Saturated zone (cm**3/g)	-1.000E+00	-1.000E+00	8.249E+02	DCNUCS(14)
016	Leach rate (/yr)	0.000E+00	0.000E+00	2.237E-04	ALEACH(14)
016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(14)
016	Distribution coefficients for daughter Np-237				
016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCC(20)
016	Unsaturated zone 1 (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCU(20,1)
016	Saturated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCS(20)
016	Leach rate (/yr)	0.000E+00	0.000E+00	7.164E-04	ALEACH(20)
016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(20)

Summary: RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

nu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
16	Distribution coefficients for daughter Pa-231				
16	Contaminated zone (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCC(21)
16	Unsaturated zone 1 (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCU(21,1)
16	Saturated zone (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCS(21)
16	Leach rate (/yr)	0.000E+00	0.000E+00	3.673E-03	ALEACH(21)
16	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(21)
16	Distribution coefficients for daughter Pb-210				
16	Contaminated zone (cm ³ /g)	1.000E+02	1.000E+02	---	DCNUCC(22)
16	Unsaturated zone 1 (cm ³ /g)	1.000E+02	1.000E+02	---	DCNUCU(22,1)
16	Saturated zone (cm ³ /g)	1.000E+02	1.000E+02	---	DCNUCS(22)
16	Leach rate (/yr)	0.000E+00	0.000E+00	1.641E-03	ALEACH(22)
16	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(22)
6	Distribution coefficients for daughter Ra-226				
6	Contaminated zone (cm ³ /g)	7.000E+01	7.000E+01	---	DCNUCC(27)
6	Unsaturated zone 1 (cm ³ /g)	7.000E+01	7.000E+01	---	DCNUCU(27,1)
6	Saturated zone (cm ³ /g)	7.000E+01	7.000E+01	---	DCNUCS(27)
6	Leach rate (/yr)	0.000E+00	0.000E+00	2.627E-03	ALEACH(27)
6	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(27)
3	Distribution coefficients for daughter Ra-228				
3	Contaminated zone (cm ³ /g)	7.000E+01	7.000E+01	---	DCNUCC(28)
3	Unsaturated zone 1 (cm ³ /g)	7.000E+01	7.000E+01	---	DCNUCU(28,1)
3	Saturated zone (cm ³ /g)	7.000E+01	7.000E+01	---	DCNUCS(28)
3	Leach rate (/yr)	0.000E+00	0.000E+00	2.627E-03	ALEACH(28)
3	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(28)
6	Distribution coefficients for daughter Th-228				
6	Contaminated zone (cm ³ /g)	6.000E+04	6.000E+04	---	DCNUCC(31)
6	Unsaturated zone 1 (cm ³ /g)	6.000E+04	6.000E+04	---	DCNUCU(31,1)
6	Saturated zone (cm ³ /g)	6.000E+04	6.000E+04	---	DCNUCS(31)
6	Leach rate (/yr)	0.000E+00	0.000E+00	3.077E-06	ALEACH(31)
6	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(31)
6	Distribution coefficients for daughter Th-229				
6	Contaminated zone (cm ³ /g)	6.000E+04	6.000E+04	---	DCNUCC(32)
6	Unsaturated zone 1 (cm ³ /g)	6.000E+04	6.000E+04	---	DCNUCU(32,1)
6	Saturated zone (cm ³ /g)	6.000E+04	6.000E+04	---	DCNUCS(32)
6	Leach rate (/yr)	0.000E+00	0.000E+00	3.077E-06	ALEACH(32)
6	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(32)
6	Distribution coefficients for daughter Th-230				
6	Contaminated zone (cm ³ /g)	6.000E+04	6.000E+04	---	DCNUCC(33)
6	Unsaturated zone 1 (cm ³ /g)	6.000E+04	6.000E+04	---	DCNUCU(33,1)
6	Saturated zone (cm ³ /g)	6.000E+04	6.000E+04	---	DCNUCS(33)
6	Leach rate (/yr)	0.000E+00	0.000E+00	3.077E-06	ALEACH(33)
6	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(33)

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

ID	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
6	Distribution coefficients for daughter Th-232				
6	Contaminated zone (cm ³ /g)	6.000E+04	6.000E+04	---	DCNUCC(34)
6	Unsaturated zone 1 (cm ³ /g)	6.000E+04	6.000E+04	---	DCNUCU(34,1)
6	Saturated zone (cm ³ /g)	6.000E+04	6.000E+04	---	DCNUCS(34)
6	Leach rate (/yr)	0.000E+00	0.000E+00	3.077E-06	ALEACH(34)
6	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(34)
6	Distribution coefficients for daughter U-233				
6	Contaminated zone (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCC(35)
6	Unsaturated zone 1 (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCU(35,1)
6	Saturated zone (cm ³ /g)	5.000E+01	5.000E+01	---	DCNUCS(35)
6	Leach rate (/yr)	0.000E+00	0.000E+00	3.673E-03	ALEACH(35)
6	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(35)
	Inhalation rate (m ³ /yr)	8.400E+03	8.400E+03	---	INHALR
	Mass loading for inhalation (g/m ³)	6.000E-06	1.000E-04	---	MLINH
	Exposure duration	3.653E+02	3.000E+01	---	ED
	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
	Shielding factor, external gamma	4.700E-01	7.000E-01	---	SHF1
	Fraction of time spent indoors	6.600E-01	5.000E-01	---	FIND
	Fraction of time spent outdoors (on site)	1.100E-01	2.500E-01	---	FOTD
	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
	Radius of shape factor array (used if FS = -1):				
	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
	Outer annular radius (m), ring 3:	not used	3.000E+00	---	RAD_SHAPE(3)
	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
	Outer annular radius (m), ring 7:	not used	3.000E-00	---	RAD_SHAPE(7)
	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
	Fractions of annular areas within AREA:				
	Ring 1	not used	1.000E+00	---	FRACA(1)
	Ring 2	not used	2.732E-01	---	FRACA(2)
	Ring 3	not used	0.000E+00	---	FRACA(3)
	Ring 4	not used	0.000E+00	---	FRACA(4)
	Ring 5	not used	0.000E+00	---	FRACA(5)
	Ring 6	not used	0.000E+00	---	FRACA(6)
	Ring 7	not used	0.000E+00	---	FRACA(7)
	Ring 8	not used	0.000E+00	---	FRACA(8)
	Ring 9	not used	0.000E+00	---	FRACA(9)
	Ring 10	not used	0.000E+00	---	FRACA(10)
	Ring 11	not used	0.000E+00	---	FRACA(11)
	Ring 12	not used	0.000E+00	---	FRACA(12)

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

no	Parameter	User Input	Default	Used by RESRAD (if different from user input)	Parameter Name
8	Fruits, vegetables and grain consumption (kg/yr)	7.800E+01	1.600E+02	---	DIET(1)
8	Leafy vegetable consumption (kg/yr)	1.500E+01	1.400E+01	---	DIET(2)
8	Milk consumption (L/yr)	1.180E+02	9.200E+01	---	DIET(3)
8	Meat and poultry consumption (kg/yr)	5.200E+01	6.500E+01	---	DIET(4)
8	Fish consumption (kg/yr)	1.600E+01	5.400E+00	---	DIET(5)
8	Other seafood consumption (kg/yr)	0.000E+00	9.000E-01	---	DIET(6)
8	Soil ingestion rate (g/yr)	1.830E+01	3.650E-01	---	SOIL
8	Drinking water intake (L/yr)	4.780E+02	5.100E+02	---	DWI
8	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
8	Contamination fraction of household water	not used	1.000E+00	---	FHW
8	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
8	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
8	Contamination fraction of aquatic food	5.000E-01	5.000E-01	---	FR9
8	Contamination fraction of plant food	1.000E+00	-1	---	FPLANT
8	Contamination fraction of meat	1.000E+00	-1	---	FMEAT
8	Contamination fraction of milk	1.000E+00	-1	---	FMILK
1	Livestock fodder intake for meat (kg/day)	8.500E+00	6.800E+01	---	LF15
1	Livestock fodder intake for milk (kg/day)	1.700E+01	5.500E+01	---	LF16
1	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LW15
1	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LW16
1	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
1	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
1	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
1	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
1	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
1	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
1	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
1	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
1	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
1	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
1	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
1	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
1	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
1	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)
1	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
1	Translocation factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
1	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
1	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
1	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
1	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
1	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
1	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
1	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
1	Decaying Removal Constant for Vegetation	2.000E-01	2.000E-01	---	WLAM
1	C-12 concentration in water (g/cm**3)	2.000E-05	2.000E-05	---	C12WTR
1	C-12 concentration in contaminated soil (g/g)	3.000E-02	3.000E-02	---	C12C2
1	Fraction of vegetation carbon from soil	2.000E-02	2.000E-02	---	CSOIL

Summary : RESRAD Default Parameters

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Site-Specific Parameter Summary (continued)

enu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
14	Fraction of vegetation carbon from air	9.800E-01	9.800E-01	---	CAIR
14	C-14 evasion layer thickness in soil (m)	3.000E-01	3.000E-01	---	DNC
14	C-14 evasion flux rate from soil (1/sec)	7.000E-07	7.000E-07	---	EVSN
4	C-12 evasion flux rate from soil (1/sec)	1.000E-10	1.000E-10	---	REVSN
4	Fraction of grain in beef cattle feed	8.000E-01	8.000E-01	---	AVFG4
4	Fraction of grain in milk cow feed	2.000E-01	2.000E-01	---	AVFG5
4	DCF correction factor for gaseous forms of C14	8.894E+01	8.894E+01	---	CO2F
OR	Storage times of contaminated foodstuffs (days):				
OR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
OR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
OR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
OR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
OR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
OR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
OR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
OR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
R	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
1	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
	bk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
	al porosity of the cover material	not used	4.000E-01	---	TPCV
1	total porosity of the building foundation	not used	1.000E-01	---	TPFL
1	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
1	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
	Diffusion coefficient for radon gas (m/sec):				
	in cover material	not used	2.000E-06	---	DIFCV
	in foundation material	not used	3.000E-07	---	DIFFL
	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
	Height of the building (room) (m)	not used	2.500E+00	---	HRM
	Building interior area factor	not used	0.000E+00	---	FAI
	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
	Emanating power of Rn-221 gas	not used	2.500E-01	---	EMANA(1)
	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
	Number of graphical time points	32	---	---	NPTS
	Maximum number of integration points for dose	17	---	---	LYMAX
	Maximum number of integration points for risk	1	---	---	KYMAX

Summary : RESRAD Default Parameters

.le : Plum Brook Subsurface Modified in cvr.RAD

Summary of Pathway Selections

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

Summary : RESRAD Default Parameters

File : Plumbrook Subsurface Modified Im cvr.RAD

Contaminated Zone Dimensions

Area: 3850.00 square meters
 Thickness: 3.00 meters
 Layer Depth: 1.00 meters

Initial Soil Concentrations, pCi/g

Am-241 1.000E+00
 C-14 1.000E+00
 Cm-243 1.000E+00
 Co-60 1.000E+00
 Cs-137 1.000E+00
 Eu-152 1.000E+00
 Eu-154 1.000E+00
 Eu-155 1.000E+00
 Fe-55 1.000E+00
 H-3 1.000E+00
 I-129 1.000E+00
 Nb-94 1.000E+00
 Ni-59 1.000E+00
 Ni-63 1.000E+00
 Pu-238 1.000E+00
 Pu-239 1.000E+00
 Pu-241 1.000E+00
 Sr-90 1.000E+00
 Tc-99 1.000E+00
 U-234 1.000E+00
 U-235 1.000E+00
 U-236 1.000E+00
 U-238 1.000E+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)

(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
DOSE(t):	1.552E+02	1.473E+02	1.328E+02	9.377E+01	4.013E+01	1.306E+01	1.042E+01	8.503E+00
M(t):	6.210E+00	5.891E+00	5.311E+00	3.751E+00	1.605E+00	5.225E-01	4.169E-01	3.401E-01

Sum TDOSE(t): 1.552E+02 mrem/yr at t = 0.000E+00 years

mary : RESRAD Default Parameters

e : Flum Brook Subsurface Modified In cwr.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 = 5.000E+00 years

Water Dependent Pathways

Code	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.
41	3.904E+00	0.0251	7.546E-03	0.0000	0.000E+00	0.0000	2.199E+00	0.0142	2.764E-03	0.0000	6.175E-04	0.0000	6.113E+00	0.0394
	3.792E-02	0.0002	1.222E-01	0.0008	0.000E+00	0.0000	5.859E-02	0.0004	2.746E-02	0.0002	4.711E-02	0.0003	2.932E-01	0.0019
43	2.561E+00	0.0191	5.723E-03	0.0000	0.000E+00	0.0000	1.668E+00	0.0107	8.387E-04	0.0000	4.683E-04	0.0000	4.635E+00	0.0299
0	6.947E-01	0.0045	1.343E-02	0.0001	0.000E+00	0.0000	3.961E-01	0.0026	1.973E-01	0.0013	1.101E-01	0.0007	1.414E+00	0.0091
37	3.451E+00	0.0222	4.449E-01	0.0029	0.000E+00	0.0000	1.961E+00	0.0126	1.472E+00	0.0095	2.188E+00	0.0141	9.517E+00	0.0613
52	7.539E-03	0.0000	2.429E-05	0.0000	0.000E+00	0.0000	4.247E-03	0.0000	2.135E-04	0.0000	1.192E-05	0.0000	1.205E-02	0.0001
54	1.096E-02	0.0001	3.533E-05	0.0000	0.000E+00	0.0000	6.177E-03	0.0000	3.106E-04	0.0000	1.734E-05	0.0000	1.752E-02	0.0001
55	1.705E-03	0.0000	5.493E-06	0.0000	0.000E+00	0.0000	9.605E-04	0.0000	4.829E-05	0.0000	2.697E-06	0.0000	2.722E-03	0.0000
5	1.918E-02	0.0001	2.472E-04	0.0000	0.000E+00	0.0000	1.080E-02	0.0001	5.441E-03	0.0000	4.554E-04	0.0000	3.613E-02	0.0002
	8.465E-02	0.0005	5.505E-06	0.0000	0.000E+00	0.0000	4.037E-02	0.0003	6.004E-03	0.0000	1.908E-02	0.0001	1.501E-01	0.0010
1	3.669E+01	0.2363	9.463E-02	0.0006	0.000E+00	0.0000	2.077E+01	0.1336	3.659E+00	0.0236	2.911E+01	0.1875	9.031E+01	0.5817
	1.049E-02	0.0001	2.025E-04	0.0000	0.000E+00	0.0000	5.920E-03	0.0000	4.458E-06	0.0000	1.659E-06	0.0000	1.662E-02	0.0001
	3.103E-03	0.0000	2.000E-05	0.0000	0.000E+00	0.0000	1.767E-03	0.0000	2.201E-04	0.0000	4.913E-03	0.0000	1.002E-02	0.0001
	8.496E-03	0.0001	5.475E-05	0.0000	0.000E+00	0.0000	4.837E-03	0.0000	6.025E-04	0.0000	1.345E-02	0.0001	2.744E-02	0.0002
8	9.374E-01	0.0060	1.812E-03	0.0000	0.000E+00	0.0000	5.279E-01	0.0034	1.327E-03	0.0000	7.425E-05	0.0000	1.469E+00	0.0095
9	7.041E+00	0.0067	2.012E-03	0.0000	0.000E+00	0.0000	5.863E-01	0.0038	1.474E-03	0.0000	8.233E-05	0.0000	1.631E+00	0.0105
	3.72E-02	0.0002	5.579E-05	0.0000	0.000E+00	0.0000	1.624E-02	0.0001	3.411E-05	0.0000	2.980E-06	0.0000	4.526E-02	0.0003
	1.79E+01	0.1211	7.271E-02	0.0005	0.000E+00	0.0000	1.128E+01	0.0727	2.152E+00	0.0139	2.994E+00	0.0193	3.530E+01	0.2273
	1.258E-01	0.0006	1.622E-04	0.0000	0.000E+00	0.0000	1.483E-01	0.0010	1.951E-04	0.0000	1.070E-02	0.0001	2.652E-01	0.0016
	6.370E-01	0.0041	4.105E-04	0.0000	0.000E+00	0.0000	5.589E-01	0.0023	3.068E-03	0.0000	3.023E-02	0.0002	1.030E+00	0.0066
	6.044E-01	0.0039	3.895E-04	0.0000	0.000E+00	0.0000	3.405E-01	0.0022	3.100E-03	0.0000	2.852E-02	0.0002	9.769E-01	0.0063
	6.055E-01	0.0039	3.902E-04	0.0000	0.000E+00	0.0000	3.411E-01	0.0022	2.916E-03	0.0000	2.873E-02	0.0002	9.787E-01	0.0063
	6.055E-01	0.0039	3.902E-04	0.0000	0.000E+00	0.0000	3.412E-01	0.0022	2.916E-03	0.0000	2.873E-02	0.0002	9.787E-01	0.0063
	7.126E+01	0.4590	7.674E-01	0.0049	0.000E+00	0.0000	4.103E+01	0.2646	7.540E+00	0.0486	3.461E+01	0.2229	1.552E+02	1.0000

*if all water independent and dependent pathways.

1.4

Summary : RESRAD Default Parameters

file : Plumbrook Subsurface Modified in. cvr.FAP

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)

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.
-241	2.074E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
14	2.690E-25	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
-243	3.613E-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
-60	4.104E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
-137	8.157E-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
-152	8.515E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
-154	1.188E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
-155	2.002E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
29	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
94	4.542E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
238	3.438E-18	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
230	1.641E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
	1.587E-16	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
	1.315E-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
19	7.464E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
14	7.920E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
5	3.117E-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
6	9.411E-17	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
8	5.767E-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
1	6.685E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

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Summary : RESRAD Default Parameters

file : Plumbrook Subsurface Modified Im.cvr.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

Water Dependent Pathways

Radionuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
-241	3.896E+00	0.0265	7.531E-03	0.0001	0.000E+00	0.0000	2.194E+00	0.0149	2.755E-03	0.0000	6.162E-04	0.0000	6.101E+00	0.0414
14	3.765E-02	0.0003	1.213E-01	0.0006	0.000E+00	0.0000	5.817E-02	0.0004	2.727E-02	0.0002	4.677E-02	0.0003	2.912E-01	0.0020
-243	2.888E+00	0.0196	5.583E-03	0.0000	0.000E+00	0.0000	1.627E+00	0.0110	8.182E-04	0.0000	4.568E-04	0.0000	4.522E+00	0.0307
-60	6.026E-01	0.0041	1.165E-02	0.0001	0.000E+00	0.0000	3.453E-01	0.0023	1.712E-01	0.0012	9.545E-02	0.0006	1.226E+00	0.0083
-137	3.282E+00	0.0223	4.231E-01	0.0029	0.000E+00	0.0000	1.865E+00	0.0127	1.400E+00	0.0095	2.061E+00	0.0141	9.051E+00	0.0615
-152	7.154E-03	0.0000	2.305E-05	0.0000	0.000E+00	0.0000	4.030E-03	0.0000	2.026E-04	0.0000	1.132E-05	0.0000	1.143E-02	0.0001
-154	1.013E-02	0.0001	3.264E-05	0.0000	0.000E+00	0.0000	5.707E-03	0.0000	2.869E-04	0.0000	1.602E-05	0.0000	1.618E-02	0.0001
-155	1.482E-03	0.0000	4.774E-06	0.0000	0.000E+00	0.0000	8.348E-04	0.0000	4.197E-05	0.0000	2.344E-06	0.0000	2.366E-03	0.0000
-55	1.463E-02	0.0001	1.886E-04	0.0000	0.000E+00	0.0000	8.243E-03	0.0001	4.152E-03	0.0000	3.475E-04	0.0000	2.756E-02	0.0002
3	3.966E-02	0.0003	2.585E-06	0.0000	0.000E+00	0.0000	1.899E-02	0.0001	2.841E-03	0.0000	8.957E-03	0.0001	7.045E-02	0.0005
129	3.481E+01	0.2363	8.980E-02	0.0006	0.000E+00	0.0000	1.871E+01	0.1338	3.476E+00	0.0236	2.763E+01	0.1876	8.571E+01	0.5819
-94	1.048E-02	0.0001	2.027E-04	0.0000	0.000E+00	0.0000	5.916E-03	0.0000	4.455E-08	0.0000	1.658E-06	0.0000	1.661E-02	0.0001
-59	3.086E-03	0.0000	1.988E-05	0.0000	0.000E+00	0.0000	1.757E-03	0.0000	2.188E-04	0.0000	4.866E-03	0.0000	9.967E-03	0.0001
-63	8.387E-03	0.0001	5.405E-05	0.0000	0.000E+00	0.0000	4.775E-03	0.0000	5.948E-04	0.0000	1.328E-02	0.0001	2.709E-02	0.0002
-238	9.299E-01	0.0063	1.798E-03	0.0000	0.000E+00	0.0000	5.237E-01	0.0036	1.517E-03	0.0000	7.574E-05	0.0000	1.457E+00	0.0099
-239	1.041E+00	0.0071	2.012E-03	0.0000	0.000E+00	0.0000	5.862E-01	0.0040	1.474E-03	0.0000	8.232E-05	0.0000	1.631E+00	0.0111
	1.395E-02	0.0002	6.550E-05	0.0000	0.000E+00	0.0000	1.907E-02	0.0001	3.691E-05	0.0000	3.845E-06	0.0000	5.313E-02	0.0004
	1.747E+01	0.1166	6.761E-02	0.0005	0.000E+00	0.0000	1.049E+01	0.0712	2.003E+00	0.0136	2.785E+00	0.0189	3.282E+01	0.2228
-99	1.217E-01	0.0008	1.569E-04	0.0000	0.000E+00	0.0000	1.434E-01	0.0010	1.887E-04	0.0000	1.035E-02	0.0001	2.758E-01	0.0019
34	6.365E-01	0.0043	4.101E-04	0.0000	0.000E+00	0.0000	3.586E-01	0.0024	3.065E-03	0.0000	3.028E-02	0.0002	1.029E+00	0.0070
35	6.064E-01	0.0041	3.910E-04	0.0000	0.000E+00	0.0000	3.416E-01	0.0023	3.246E-03	0.0000	2.850E-02	0.0002	9.802E-01	0.0067
36	6.050E-01	0.0041	3.898E-04	0.0000	0.000E+00	0.0000	3.409E-01	0.0023	2.913E-03	0.0000	2.871E-02	0.0002	9.779E-01	0.0066
38	6.050E-01	0.0041	3.898E-04	0.0000	0.000E+00	0.0000	3.409E-01	0.0023	2.913E-03	0.0000	2.871E-02	0.0002	9.779E-01	0.0066
all	6.766E-01	0.4594	7.327E-01	0.0050	0.000E+00	0.0000	3.900E+01	0.2648	7.104E+00	0.0482	3.278E-01	0.2226	1.473E+02	1.0000

m of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

file : Plumbrook Subsurface Modified In. cvr.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 = 3.000E+00 years

Water Dependent Pathways

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.
-241	3.880E+00	0.0252	7.501E-03	0.0001	0.000E+00	0.0000	2.183E+00	0.0165	2.746E-03	0.0000	6.137E-04	0.0000	6.076E+00	0.0458
14	3.711E-02	0.0003	1.196E-01	0.0009	0.000E+00	0.0000	5.734E-02	0.0004	2.688E-02	0.0002	4.611E-02	0.0003	2.670E-01	0.0022
-243	2.749E+00	0.0207	5.314E-03	0.0000	0.000E+00	0.0000	1.548E+00	0.0117	7.788E-04	0.0000	4.348E-04	0.0000	4.303E+00	0.0324
-60	4.535E-01	0.0034	8.767E-03	0.0001	0.000E+00	0.0000	2.599E-01	0.0020	1.288E-01	0.0010	7.185E-02	0.0005	9.228E-01	0.0070
-137	2.967E+00	0.0223	3.825E-01	0.0029	0.000E+00	0.0000	1.686E+00	0.0127	1.266E+00	0.0095	1.882E-00	0.0142	8.163E+00	0.0616
-152	6.441E-03	0.0000	2.075E-05	0.0000	0.000E+00	0.0000	3.629E-03	0.0000	1.825E-04	0.0000	1.019E-05	0.0000	1.029E-02	0.0001
-154	8.645E-03	0.0001	2.785E-05	0.0000	0.000E+00	0.0000	4.871E-03	0.0000	2.449E-04	0.0000	1.367E-05	0.0000	1.381E-02	0.0001
-155	1.119E-03	0.0000	3.607E-06	0.0000	0.000E+00	0.0000	6.307E-04	0.0000	3.171E-05	0.0000	1.771E-06	0.0000	1.787E-03	0.0000
-55	8.516E-03	0.0001	1.098E-04	0.0000	0.000E+00	0.0000	4.798E-03	0.0000	2.416E-03	0.0000	2.022E-04	0.0000	1.604E-02	0.0001
1	8.699E-03	0.0001	5.671E-07	0.0000	0.000E+00	0.0000	4.166E-03	0.0000	6.232E-04	0.0000	1.965E-03	0.0000	1.545E-02	0.0001
29	3.134E+01	0.2360	8.084E-02	0.0006	0.000E+00	0.0000	1.774E+01	0.1336	3.129E+00	0.0236	2.487E+01	0.1873	7.716E+01	0.5812
94	1.047E-02	0.0001	2.024E-04	0.0000	0.000E+00	0.0000	5.909E-03	0.0000	4.450E-04	0.0000	1.656E-06	0.0000	1.659E-02	0.0001
59	3.050E-03	0.0000	1.966E-05	0.0000	0.000E+00	0.0000	1.737E-03	0.0000	2.163E-04	0.0000	4.830E-03	0.0000	9.853E-03	0.0001
63	8.173E-03	0.0001	5.267E-05	0.0000	0.000E+00	0.0000	4.653E-03	0.0000	5.796E-04	0.0000	1.294E-02	0.0001	2.640E-02	0.0002
238	9.151E-01	0.0069	1.769E-03	0.0000	0.000E+00	0.0000	5.154E-01	0.0039	1.296E-03	0.0000	7.274E-05	0.0000	1.434E+00	0.0108
229	1.041E+00	0.0078	2.012E-03	0.0000	0.000E+00	0.0000	5.661E-01	0.0044	1.474E-03	0.0000	8.229E-05	0.0000	1.630E+00	0.0123
241	4.328E-02	0.0003	8.354E-05	0.0000	0.000E+00	0.0000	2.433E-02	0.0002	4.240E-05	0.0000	5.460E-06	0.0000	6.774E-02	0.0005
59	5.10E+01	0.1138	5.844E-02	0.0004	0.000E+00	0.0000	9.070E+00	0.0685	1.731E+00	0.0130	2.407E+00	0.0181	2.637E+01	0.2137
99	1.137E-01	0.0009	1.466E-04	0.0000	0.000E+00	0.0000	1.341E-01	0.0010	1.764E-04	0.0000	9.675E-03	0.0001	2.578E-01	0.0019
34	6.354E-01	0.0048	4.094E-04	0.0000	0.000E+00	0.0000	3.580E-01	0.0027	3.060E-03	0.0000	3.015E-02	0.0002	1.027E+00	0.0077
35	6.111E-01	0.0046	3.944E-04	0.0000	0.000E+00	0.0000	3.443E-01	0.0026	3.540E-03	0.0000	2.845E-02	0.0002	9.877E-01	0.0074
36	6.040E-01	0.0045	3.892E-04	0.0000	0.000E+00	0.0000	3.403E-01	0.0026	2.508E-03	0.0000	2.866E-02	0.0002	9.762E-01	0.0074
38	6.040E-01	0.0045	3.892E-04	0.0000	0.000E+00	0.0000	3.403E-01	0.0026	2.908E-03	0.0000	2.866E-02	0.0002	9.762E-01	0.0074
11	6.115E+01	0.4606	6.690E-01	0.0050	0.000E+00	0.0000	3.522E+01	0.2653	6.305E+00	0.0475	2.945E+01	0.2216	1.328E+02	1.0000

* 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 Dependent Pathways

Radionuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
241	3.826E+00	0.0408	7.396E-03	0.0011	0.000E+00	0.0000	2.155E+00	0.0250	2.709E-03	0.0000	6.051E-04	0.0000	5.591E+00	0.0639
14	3.530E-02	0.0004	1.137E-01	0.0012	0.000E+00	0.0000	5.455E-02	0.0006	2.557E-02	0.0003	4.356E-02	0.0005	2.730E-01	0.0029
243	2.311E+00	0.0246	4.468E-03	0.0000	0.000E+00	0.0000	1.302E+00	0.0139	6.551E-04	0.0000	3.656E-04	0.0000	3.619E+00	0.0366
60	1.676E-01	0.0018	3.240E-03	0.0000	0.000E+00	0.0000	9.604E-02	0.0010	4.760E-02	0.0005	2.656E-02	0.0003	3.410E-01	0.0036
137	2.065E+00	0.0222	2.688E-01	0.0029	0.000E+00	0.0000	1.185E+00	0.0126	8.896E-01	0.0095	1.322E+00	0.0141	5.750E+00	0.0613
152	4.462E-03	0.0000	1.437E-01	0.0000	0.000E+00	0.0000	2.514E-03	0.0000	1.264E-04	0.0000	7.057E-06	0.0000	7.129E-03	0.0001
154	4.965E-03	0.0001	1.600E-05	0.0000	0.000E+00	0.0000	2.797E-03	0.0000	1.406E-04	0.0000	7.853E-06	0.0000	7.933E-03	0.0001
155	4.195E-04	0.0000	1.352E-06	0.0000	0.000E+00	0.0000	2.364E-04	0.0000	1.188E-05	0.0000	6.636E-07	0.0000	6.698E-04	0.0000
55	1.281E-03	0.0000	1.651E-05	0.0000	0.000E+00	0.0000	7.215E-04	0.0000	3.634E-04	0.0000	3.041E-05	0.0000	2.413E-03	0.0000
139	4.299E-05	0.0000	2.803E-09	0.0000	0.000E+00	0.0000	2.059E-05	0.0000	3.050E-06	0.0000	9.710E-06	0.0000	7.637E-05	0.0000
29	2.169E+01	0.2313	5.596E-02	0.0006	0.000E+00	0.0000	1.228E+01	0.1310	2.166E+00	0.0231	1.722E+01	0.1836	5.341E+01	0.5696
94	1.043E-02	0.0001	2.016E-04	0.0000	0.000E+00	0.0000	5.864E-03	0.0001	4.431E-08	0.0000	1.649E-06	0.0000	1.652E-02	0.0002
59	2.931E-03	0.0000	1.888E-05	0.0000	0.000E+00	0.0000	1.668E-03	0.0000	2.078E-04	0.0000	4.640E-03	0.0000	9.466E-03	0.0001
63	7.465E-03	0.0001	4.810E-05	0.0000	0.000E+00	0.0000	4.250E-03	0.0000	5.294E-04	0.0000	1.152E-02	0.0001	2.411E-02	0.0003
236	8.652E-01	0.0092	1.672E-03	0.0000	0.000E+00	0.0000	4.873E-01	0.0052	1.225E-03	0.0000	6.936E-05	0.0000	1.355E+00	0.0145
239	1.040E+00	0.0111	2.030E-03	0.0000	0.000E+00	0.0000	5.855E-01	0.0062	1.472E-03	0.0000	8.221E-05	0.0000	1.629E+00	0.0174
241	6.930E-02	0.0007	1.339E-04	0.0000	0.000E+00	0.0000	3.900E-02	0.0004	5.746E-05	0.0000	9.973E-06	0.0000	1.085E-01	0.0012
99	0.069E-02	0.0007	3.509E-02	0.0004	0.000E+00	0.0000	5.446E+00	0.0581	1.040E+00	0.0111	1.445E-00	0.0154	1.704E+01	0.1817
99	8.975E-02	0.0010	1.157E-04	0.0000	0.000E+00	0.0000	1.058E-01	0.0011	1.392E-04	0.0000	7.637E-03	0.0001	2.035E-01	0.0022
34	6.315E-01	0.0067	4.070E-04	0.0000	0.000E+00	0.0000	3.558E-01	0.0038	3.041E-03	0.0000	2.897E-02	0.0003	1.021E+00	0.0109
35	6.327E-01	0.0067	4.138E-04	0.0000	0.000E+00	0.0000	3.565E-01	0.0038	4.548E-03	0.0000	2.630E-02	0.0003	1.022E+00	0.0109
36	6.003E-01	0.0064	3.868E-04	0.0000	0.000E+00	0.0000	3.362E-01	0.0036	2.892E-03	0.0000	2.849E-02	0.0003	9.703E-01	0.0103
36	6.003E-01	0.0064	3.868E-04	0.0000	0.000E+00	0.0000	3.362E-01	0.0036	2.892E-03	0.0000	2.849E-02	0.0003	9.703E-01	0.0103
11	4.375E+01	0.4665	4.945E-01	0.0053	0.000E+00	0.0000	2.514E+01	0.2681	4.188E+00	0.0447	2.020E+01	0.2154	9.377E+01	1.0000

* of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : Plum Brook Subsurface Modified in cvr.FAD

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

Radionuclide	Water		Fish		Radon		Plant		Heat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
241	3.674E+00	0.0916	7.103E-03	0.0002	0.000E+00	0.0000	2.069E+00	0.0516	2.603E-03	0.0001	5.812E-04	0.0000	5.754E+00	0.1434
14	3.060E-02	0.0008	9.859E-02	0.0025	0.000E+00	0.0000	4.728E-02	0.0012	2.216E-02	0.0006	3.801E-02	0.0009	2.366E-01	0.0059
243	1.409E+00	0.0351	2.723E-03	0.0001	0.000E+00	0.0000	7.934E-01	0.0198	3.999E-04	0.0000	2.228E-04	0.0000	2.206E+00	0.0550
60	9.753E-03	0.0002	1.886E-04	0.0000	0.000E+00	0.0000	5.589E-03	0.0001	2.770E-03	0.0001	1.545E-03	0.0000	1.985E-02	0.0005
137	7.609E-01	0.0190	9.810E-02	0.0024	0.000E+00	0.0000	4.324E-01	0.0108	3.246E-01	0.0081	4.525E-01	0.0120	2.098E+00	0.0523
152	1.563E-03	0.0000	5.054E-06	0.0000	0.000E+00	0.0000	8.803E-04	0.0000	4.426E-05	0.0000	2.472E-06	0.0000	2.497E-03	0.0001
154	1.018E-03	0.0000	3.280E-06	0.0000	0.000E+00	0.0000	5.735E-04	0.0000	2.884E-05	0.0000	1.610E-06	0.0000	1.627E-03	0.0000
155	2.541E-05	0.0000	8.185E-08	0.0000	0.000E+00	0.0000	1.431E-05	0.0000	7.196E-07	0.0000	4.019E-08	0.0000	4.056E-05	0.0000
55	5.711E-06	0.0000	7.362E-08	0.0000	0.000E+00	0.0000	3.217E-06	0.0000	1.620E-06	0.0000	1.356E-07	0.0000	1.076E-05	0.0000
3	1.108E-11	0.0000	7.223E-16	0.0000	0.000E+00	0.0000	5.307E-12	0.0000	7.939E-13	0.0000	2.503E-12	0.0000	1.968E-11	0.0000
129	7.582E+00	0.1890	1.956E-02	0.0005	0.000E+00	0.0000	4.293E+00	0.1070	7.571E-01	0.0189	6.018E+00	0.1500	1.887E+01	0.4653
94	1.030E-02	0.0003	1.992E-04	0.0000	0.000E+00	0.0000	5.814E-03	0.0001	4.378E-08	0.0000	1.630E-06	0.0000	1.632E-02	0.0004
59	2.613E-03	0.0001	1.664E-05	0.0000	0.000E+00	0.0000	1.488E-03	0.0000	1.853E-04	0.0000	4.138E-03	0.0001	8.440E-03	0.0002
63	5.762E-03	0.0001	3.713E-05	0.0000	0.000E+00	0.0000	3.281E-03	0.0001	4.087E-04	0.0000	9.124E-03	0.0002	1.861E-02	0.0005
238	7.371E-01	0.0184	1.425E-03	0.0000	0.000E+00	0.0000	4.151E-01	0.0103	1.044E-03	0.0000	6.066E-05	0.0000	1.155E+00	0.0288
239	1.037E+00	0.0258	2.004E-03	0.0000	0.000E+00	0.0000	5.838E-01	0.0145	1.468E-03	0.0000	8.198E-05	0.0000	1.624E+00	0.0405
7	1.068E-01	0.0027	2.067E-04	0.0000	0.000E+00	0.0000	6.022E-02	0.0015	7.894E-05	0.0000	1.654E-05	0.0000	1.675E-01	0.0042
135	2.112E+00	0.0526	8.171E-03	0.0002	0.000E+00	0.0000	1.268E+00	0.0316	2.421E-01	0.0060	3.365E-01	0.0084	3.967E+00	0.0988
99	4.565E-02	0.0011	5.887E-05	0.0000	0.000E+00	0.0000	5.382E-02	0.0013	7.082E-05	0.0000	3.885E-03	0.0001	1.035E-01	0.0026
234	6.206E-01	0.0155	4.062E-04	0.0000	0.000E+00	0.0000	3.497E-01	0.0087	2.989E-03	0.0001	2.945E-02	0.0007	1.003E+00	0.0250
235	7.232E-01	0.0180	4.901E-04	0.0000	0.000E+00	0.0000	4.074E-01	0.0102	7.265E-03	0.0002	2.793E-02	0.0007	1.166E+00	0.0291
236	5.899E-01	0.0147	3.801E-04	0.0000	0.000E+00	0.0000	3.324E-01	0.0083	2.841E-03	0.0001	2.799E-02	0.0007	9.535E-01	0.0238
238	5.900E-01	0.0147	3.802E-04	0.0000	0.000E+00	0.0000	3.324E-01	0.0083	2.841E-03	0.0001	2.800E-02	0.0007	9.536E-01	0.0238
all	2.005E+01	0.4997	2.400E-01	0.0060	0.000E+00	0.0000	1.146E+01	0.2655	1.371E-00	0.0342	7.008E+00	0.1747	4.013E+01	1.0000

Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : Plumbrock Subsurface Modified In cvr.FAD

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)

Radionuclide	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.
241	7.537E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.444E-04	0.0000	2.499E-08	0.0000	5.103E-09	0.0000	0.000E+00	0.0000
4	1.043E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.862E-04	0.0000	1.340E-04	0.0000	1.031E-04	0.0000	0.000E+00	0.0000
243	2.307E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.024E-05	0.0000	7.462E-10	0.0000	3.580E-10	0.0000	0.000E+00	0.0000
60	1.010E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.346E-11	0.0000	4.257E-12	0.0000	2.232E-12	0.0000	0.000E+00	0.0000
137	2.276E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.053E-07	0.0000	6.223E-08	0.0000	8.596E-08	0.0000	0.000E+00	0.0000
152	1.646E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.002E-09	0.0000	2.719E-11	0.0000	1.430E-12	0.0000	0.000E+00	0.0000
154	1.575E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.985E-10	0.0000	2.703E-12	0.0000	1.403E-13	0.0000	0.000E+00	0.0000
155	3.199E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.377E-13	0.0000	9.315E-16	0.0000	4.841E-17	0.0000	0.000E+00	0.0000
55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.341E-20	0.0000	2.921E-21	0.0000	2.283E-22	0.0000	0.000E+00	0.0000
	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
29	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.353E-06	0.0000	3.241E-08	0.0000	2.396E-07	0.0000	0.000E+00	0.0000
94	1.653E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.265E-06	0.0000	3.335E-12	0.0000	1.152E-10	0.0000	0.000E+00	0.0000
59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.865E-07	0.0000	4.881E-09	0.0000	1.031E-07	0.0000	0.000E+00	0.0000
63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.809E-07	0.0000	6.486E-09	0.0000	1.344E-07	0.0000	0.000E+00	0.0000
238	8.354E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.936E-05	0.0000	2.362E-08	0.0000	1.292E-09	0.0000	0.000E+00	0.0000
239	1.201E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.695E-04	0.0000	5.773E-08	0.0000	2.991E-09	0.0000	0.000E+00	0.0000
	2.039E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.988E-06	0.0000	8.643E-10	0.0000	1.757E-10	0.0000	0.000E+00	0.0000
	755E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.456E-06	0.0000	3.980E-08	0.0000	5.150E-08	0.0000	0.000E+00	0.0000
39	6.034E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.182E-05	0.0000	4.037E-09	0.0000	2.090E-07	0.0000	0.000E+00	0.0000
34	1.033E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.156E-05	0.0000	3.671E-08	0.0000	3.342E-07	0.0000	0.000E+00	0.0000
35	2.253E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.034E-05	0.0000	1.837E-07	0.0000	3.160E-07	0.0000	0.000E+00	0.0000
36	7.365E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.993E-05	0.0000	3.466E-08	0.0000	3.169E-07	0.0000	0.000E+00	0.0000
38	2.071E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.994E-05	0.0000	3.467E-08	0.0000	3.170E-07	0.0000	0.000E+00	0.0000
41	1.694E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.026E-03	0.0000	1.346E-04	0.0000	1.032E-04	0.0000	0.000E+00	0.0000

Summary : RESRAD Default Parameters

File : Plumbrook Subsurface Modified In rvr.RAL

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

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	3.190E-00	0.2442	6.167E-03	0.0005	0.000E-00	0.0000	1.797E+00	0.1375	2.262E-03	0.0002	5.047E-04	0.0000	4.996E+00	0.3825
C-14	1.855E-02	0.0014	5.976E-02	0.0046	0.000E+00	0.0000	2.666E-02	0.0022	1.343E-02	0.0010	2.304E-02	0.0018	1.442E-01	0.0110
Cm-243	2.499E-01	0.0191	4.831E-04	0.0000	0.000E-00	0.0000	1.407E-01	0.0109	7.223E-05	0.0000	3.944E-05	0.0000	3.912E-01	0.0300
Co-60	4.637E-07	0.0000	6.966E-09	0.0000	0.000E+00	0.0000	2.658E-07	0.0000	1.317E-07	0.0000	7.346E-08	0.0000	9.438E-07	0.0000
Cs-137	2.234E-02	0.0017	2.890E-03	0.0002	0.000E+00	0.0000	1.269E-02	0.0010	9.530E-03	0.0007	1.416E-02	0.0011	6.160E-02	0.0047
Eu-152	3.972E-05	0.0000	1.290E-07	0.0000	0.000E+00	0.0000	2.238E-05	0.0000	1.125E-06	0.0000	6.262E-06	0.0000	6.358E-05	0.0000
Eu-154	3.973E-06	0.0000	1.280E-08	0.0000	0.000E+00	0.0000	2.239E-06	0.0000	1.125E-07	0.0000	6.265E-09	0.0000	6.360E-06	0.0000
Eu-155	1.366E-09	0.0000	4.473E-12	0.0000	0.000E+00	0.0000	7.822E-10	0.0000	3.933E-11	0.0000	2.196E-12	0.0000	2.217E-09	0.0000
Fe-55	3.381E-14	0.0000	4.358E-16	0.0000	0.000E+00	0.0000	1.905E-14	0.0000	9.594E-15	0.0000	6.029E-16	0.0000	6.369E-14	0.0000
I-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E-00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
I-129	1.915E-01	0.0147	4.939E-04	0.0000	0.000E+00	0.0000	1.084E-01	0.0083	1.912E-02	0.0015	1.520E-01	0.0116	4.715E-01	0.0361
Ib-94	9.877E-03	0.0008	1.909E-04	0.0000	0.000E+00	0.0000	5.574E-03	0.0004	4.197E-03	0.0000	1.562E-06	0.0000	1.566E-02	0.0012
I-59	1.748E-03	0.0003	1.127E-05	0.0000	0.000E+00	0.0000	9.960E-04	0.0001	1.241E-04	0.0000	2.770E-03	0.0002	5.653E-03	0.0004
I-63	2.329E-03	0.0002	1.501E-05	0.0000	0.000E+00	0.0000	1.326E-03	0.0001	1.652E-04	0.0000	3.687E-03	0.0003	7.523E-03	0.0006
U-238	4.207E-01	0.0322	6.132E-04	0.0001	0.000E+00	0.0000	2.370E-01	0.0181	5.942E-04	0.0000	3.897E-05	0.0000	6.592E-01	0.0505
U-239	1.026E+00	0.0786	1.984E-03	0.0002	0.000E+00	0.0000	5.760E-01	0.0442	1.453E-03	0.0001	6.117E-05	0.0000	1.608E+00	0.1231
U-241	1.150E-01	0.0058	2.223E-04	0.0000	0.000E+00	0.0000	6.477E-02	0.0050	6.163E-03	0.0000	1.818E-05	0.0000	1.601E-01	0.0135
U-235	1.267E-02	0.0010	4.978E-05	0.0000	0.000E+00	0.0000	7.727E-03	0.0006	1.475E-03	0.0001	2.050E-03	0.0002	2.417E-02	0.0019
U-234	4.265E-03	0.0003	5.526E-06	0.0000	0.000E+00	0.0000	5.052E-03	0.0004	6.647E-06	0.0000	3.646E-04	0.0000	9.726E-03	0.0007
U-236	5.643E-01	0.0447	3.833E-04	0.0000	0.000E+00	0.0000	3.292E-01	0.0252	2.817E-03	0.0002	2.772E-02	0.0021	9.445E-01	0.0723
U-233	1.092E+00	0.0836	6.218E-04	0.0001	0.000E+00	0.0000	6.150E-01	0.0471	1.489E-02	0.0011	2.679E-02	0.0021	1.749E+00	0.1339
U-236	5.553E-01	0.0425	3.577E-04	0.0000	0.000E+00	0.0000	3.127E-01	0.0239	2.673E-03	0.0002	2.634E-02	0.0020	6.972E-01	0.0667
U-238	5.553E-01	0.0425	3.577E-04	0.0000	0.000E+00	0.0000	3.126E-01	0.0239	2.674E-03	0.0002	2.635E-02	0.0020	6.975E-01	0.0667
Total	6.052E+00	0.6164	7.500E-02	0.0057	0.000E+00	0.0000	4.556E+00	0.3488	7.147E-02	0.0055	3.059E-01	0.0234	1.306E+01	1.0000

Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : Plum Brook Subsurface Modified In cvr.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 = 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- nuclide	Grounds		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.
241	6.904E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.123E-02	0.0040	1.033E-05	0.0000	1.786E-06	0.0000	0.000E+00	0.0000
14	1.690E-20	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.009E-02	0.0048	1.910E-02	0.0018	1.262E-02	0.0012	0.000E+00	0.0000
243	9.332E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.123E-04	0.0000	4.179E-06	0.0000	3.076E-09	0.0000	0.000E+00	0.0000
60	4.716E-22	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.237E-20	0.0000	1.176E-21	0.0000	5.337E-22	0.0000	0.000E+00	0.0000
137	1.648E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.096E-06	0.0000	1.568E-09	0.0000	1.895E-09	0.0000	0.000E+00	0.0000
152	5.677E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.761E-11	0.0000	4.541E-13	0.0000	2.062E-14	0.0000	0.000E+00	0.0000
154	2.421E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.263E-14	0.0000	2.149E-16	0.0000	9.758E-18	0.0000	0.000E+00	0.0000
155	6.534E-25	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.993E-23	0.0000	3.793E-25	0.0000	1.722E-26	0.0000	0.000E+00	0.0000
55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
29	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.586E-08	0.0000	5.313E-10	0.0000	3.436E-09	0.0000	0.000E+00	0.0000
94	2.247E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.234E-03	0.0001	1.759E-09	0.0000	5.223E-08	0.0000	0.000E+00	0.0000
59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.887E-05	0.0000	9.237E-07	0.0000	1.677E-05	0.0000	0.000E+00	0.0000
63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.223E-05	0.0000	2.907E-07	0.0000	5.277E-06	0.0000	0.000E+00	0.0000
238	1.590E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.969E-03	0.0006	2.840E-06	0.0000	1.804E-07	0.0000	0.000E+00	0.0000
239	6.704E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.026E-02	0.0067	3.337E-05	0.0000	1.515E-06	0.0000	0.000E+00	0.0000
241	2.193E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.430E-13	0.0001	3.567E-07	0.0000	6.191E-08	0.0000	0.000E+00	0.0000
57	8.72E-18	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.947E-10	0.0000	1.126E-11	0.0000	1.277E-11	0.0000	0.000E+00	0.0000
59	9.27E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.879E-06	0.0000	2.806E-09	0.0000	1.271E-07	0.0000	0.000E+00	0.0000
34	8.700E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.158E-02	0.0011	1.942E-05	0.0000	1.497E-04	0.0000	0.000E+00	0.0000
35	1.274E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.980E-02	0.0019	1.898E-04	0.0000	1.394E-04	0.0000	0.000E+00	0.0000
36	2.166E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.073E-02	0.0010	1.732E-05	0.0000	1.388E-04	0.0000	0.000E+00	0.0000
38	2.742E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.074E-02	0.0010	1.734E-05	0.0000	1.389E-04	0.0000	0.000E+00	0.0000
11	2.277E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.232E-01	0.0214	1.940E-02	0.0019	1.322E-02	0.0013	0.000E+00	0.0000

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

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Am-241	2.131E+00	0.2045	4.120E-03	0.0004	0.000E+00	0.0000	1.200E-00	0.1152	1.516E-03	0.0001	3.372E-04	0.0000	3.379E+00	0.3242
C-14	4.439E-03	0.0004	1.430E-02	0.0014	0.000E+00	0.0000	6.858E-03	0.0007	3.215E-03	0.0003	5.515E-03	0.0005	1.161E-01	0.0111
Cm-243	3.019E-03	0.0003	5.835E-06	0.0000	0.000E+00	0.0000	1.700E-03	0.0002	2.238E-05	0.0000	3.832E-07	0.0000	4.639E-03	0.0005
Co-60	2.067E-19	0.0000	3.996E-21	0.0000	0.000E+00	0.0000	1.184E-19	0.0000	5.870E-20	0.0000	3.275E-20	0.0000	4.251E-19	0.0000
Cs-137	5.355E-07	0.0000	1.206E-07	0.0000	0.000E+00	0.0000	5.317E-07	0.0000	3.991E-07	0.0000	5.932E-07	0.0000	2.595E-06	0.0000
Eu-152	1.103E-09	0.0000	3.552E-12	0.0000	0.000E+00	0.0000	6.211E-10	0.0000	3.123E-11	0.0000	1.744E-12	0.0000	1.865E-09	0.0000
Eu-154	5.219E-13	0.0000	1.681E-15	0.0000	0.000E+00	0.0000	2.940E-13	0.0000	1.478E-14	0.0000	8.254E-16	0.0000	8.802E-13	0.0000
Eu-155	9.208E-22	0.0000	2.967E-24	0.0000	0.000E+00	0.0000	5.186E-22	0.0000	2.608E-23	0.0000	1.456E-24	0.0000	1.510E-21	0.0000
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Fr-23	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Fr-129	5.215E-06	0.0000	1.345E-08	0.0000	0.000E+00	0.0000	2.953E-06	0.0000	5.267E-07	0.0000	4.139E-06	0.0000	1.286E-05	0.0000
Ir-94	8.758E-03	0.0008	1.693E-04	0.0000	0.000E+00	0.0000	4.942E-03	0.0005	3.722E-08	0.0000	1.385E-06	0.0000	1.533E-02	0.0015
I-59	5.561E-04	0.0001	3.583E-06	0.0000	0.000E+00	0.0000	3.166E-04	0.0000	3.944E-05	0.0000	8.204E-04	0.0001	1.853E-03	0.0002
I-63	1.750E-04	0.0000	1.128E-06	0.0000	0.000E+00	0.0000	9.962E-05	0.0000	1.241E-05	0.0000	2.771E-04	0.0000	5.830E-04	0.0001
Ir-239	8.457E-02	0.0061	1.638E-04	0.0000	0.000E+00	0.0000	4.780E-02	0.0046	1.208E-04	0.0000	1.495E-05	0.0000	1.389E-01	0.0133
Ir-239	9.976E-01	0.0957	1.928E-03	0.0002	0.000E+00	0.0000	5.618E-01	0.0539	1.413E-03	0.0001	7.890E-05	0.0000	1.623E-00	0.1567
Ir-241	7.743E-02	0.0074	1.497E-04	0.0000	0.000E+00	0.0000	4.361E-02	0.0042	5.507E-05	0.0000	1.225E-05	0.0000	1.227E-01	0.0118
Ir-241	6.031E-09	0.0000	2.334E-11	0.0000	0.000E+00	0.0000	3.622E-09	0.0000	6.914E-10	0.0000	9.612E-10	0.0000	1.165E-08	0.0000
Ir-241	4.970E-06	0.0000	6.408E-09	0.0000	0.000E+00	0.0000	5.859E-06	0.0000	7.709E-09	0.0000	4.229E-07	0.0000	1.727E-05	0.0000
234	4.948E-01	0.0475	3.845E-04	0.0000	0.000E+00	0.0000	2.788E-01	0.0267	2.415E-03	0.0002	2.344E-02	0.0022	8.116E-01	0.0779
235	1.661E+00	0.1594	1.349E-03	0.0001	0.000E+00	0.0000	9.359E-01	0.0998	2.614E-02	0.0025	2.347E-02	0.0023	2.668E+00	0.2560
236	4.465E-01	0.0448	3.006E-04	0.0000	0.000E+00	0.0000	2.628E-01	0.0252	2.246E-03	0.0002	2.214E-02	0.0021	7.649E-01	0.0734
238	4.669E-01	0.0448	3.009E-04	0.0000	0.000E+00	0.0000	2.631E-01	0.0252	2.248E-03	0.0002	2.216E-02	0.0021	7.656E-01	0.0735
tot	6.597E+00	0.6138	2.318E-02	0.0022	0.000E+00	0.0000	3.608E+00	0.3462	3.942E-01	0.0039	5.832E-02	0.0054	1.042E+01	1.0000

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways (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.
Am-241	2.348E-03	0.0003	1.706E-04	0.0000	0.000E+00	0.0000	4.573E-02	0.0054	6.523E-04	0.0001	5.516E-05	0.0000	6.814E-03	0.0008
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sm-243	1.192E-07	0.0000	1.255E-06	0.0000	0.000E+00	0.0000	3.334E-04	0.0000	9.467E-06	0.0000	2.184E-07	0.0000	5.045E-05	0.0000
U-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-137	1.645E-22	0.0000	1.159E-29	0.0000	0.000E+00	0.0000	2.339E-23	0.0000	6.256E-24	0.0000	7.012E-24	0.0000	6.852E-26	0.0000
U-152	4.345E-23	0.0000	1.928E-17	0.0000	0.000E+00	0.0000	1.027E-15	0.0000	2.394E-16	0.0000	5.654E-18	0.0000	6.221E-17	0.0000
U-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Am-129	7.708E-26	0.0000	7.349E-30	0.0000	0.000E+00	0.0000	7.513E-24	0.0000	9.878E-25	0.0000	4.009E-24	0.0000	5.678E-26	0.0000
Am-94	2.035E+00	0.2393	6.559E-07	0.0000	0.000E+00	0.0000	3.637E-03	0.0004	3.569E-06	0.0000	6.194E-07	0.0000	5.510E-05	0.0000
Am-59	0.000E+00	0.0000	2.525E-11	0.0000	0.000E+00	0.0000	3.156E-06	0.0000	1.634E-07	0.0000	2.164E-06	0.0000	9.567E-09	0.0000
Am-63	0.000E+00	0.0000	4.326E-14	0.0000	0.000E+00	0.0000	6.383E-09	0.0000	3.203E-10	0.0000	4.375E-09	0.0000	1.934E-11	0.0000
Am-238	6.836E-07	0.0000	4.366E-07	0.0000	0.000E+00	0.0000	1.114E-04	0.0000	3.266E-06	0.0000	1.932E-06	0.0000	1.556E-05	0.0000
Am-239	1.016E-04	0.0000	1.076E-03	0.0000	0.000E+00	0.0000	2.859E-01	0.0336	6.139E-03	0.0010	1.873E-04	0.0000	4.326E-02	0.0051
Am-241	6.140E-05	0.0000	5.916E-06	0.0000	0.000E+00	0.0000	1.565E-03	0.0002	2.262E-05	0.0000	2.052E-06	0.0000	2.364E-04	0.0000
Am-95	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Am-95	1.026E-19	0.0000	4.969E-23	0.0000	0.000E+00	0.0000	1.402E-15	0.0000	6.772E-16	0.0000	3.050E-17	0.0000	4.243E-20	0.0000
Am-234	1.266E-03	0.0003	1.652E-04	0.0000	0.000E+00	0.0000	3.484E-02	0.0041	1.237E-03	0.0001	4.755E-03	0.0006	1.783E-03	0.0002
Am-235	1.266E-01	0.0149	2.053E-04	0.0000	0.000E+00	0.0000	6.319E-02	0.0074	5.821E-03	0.0007	4.353E-03	0.0005	2.504E-03	0.0003
Am-236	3.646E-05	0.0000	1.514E-04	0.0000	0.000E+00	0.0000	2.621E-02	0.0031	1.059E-03	0.0001	4.326E-03	0.0005	1.599E-03	0.0002
Am-236	2.470E-02	0.0029	1.434E-04	0.0000	0.000E+00	0.0000	2.620E-02	0.0031	1.042E-03	0.0001	4.342E-03	0.0005	1.592E-03	0.0002
Total	2.192E+00	0.2577	1.620E-03	0.0002	0.000E+00	0.0000	4.878E-01	0.0574	1.794E-02	0.0021	1.803E-02	0.0021	5.790E-02	0.0066

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

Water Dependent Pathways

Radio- nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
m-241	5.190E-01	0.0610	1.003E-03	0.0001	0.000E+00	0.0000	2.923E-01	0.0344	3.774E-04	0.0000	8.228E-05	0.0000	8.666E-01	0.1022
-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
m-243	1.079E-03	0.0001	2.085E-06	0.0000	0.000E+00	0.0000	6.074E-04	0.0001	1.527E-06	0.0000	6.533E-09	0.0000	2.085E-03	0.0002
c-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
s-137	4.444E-22	0.0000	5.729E-23	0.0000	0.000E+00	0.0000	2.525E-22	0.0000	1.896E-22	0.0000	2.818E-22	0.0000	1.429E-21	0.0000
j-152	2.693E-15	0.0000	4.338E-18	0.0000	0.000E+00	0.0000	1.517E-15	0.0000	7.628E-17	0.0000	4.260E-18	0.0000	5.649E-15	0.0000
j-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
i-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
i-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
129	5.495E-22	0.0000	1.417E-24	0.0000	0.000E+00	0.0000	3.111E-22	0.0000	5.487E-23	0.0000	4.262E-22	0.0000	1.366E-21	0.0000
-94	5.743E-03	0.0007	1.110E-04	0.0000	0.000E+00	0.0000	3.241E-03	0.0004	2.440E-09	0.0000	9.085E-07	0.0000	2.048E+00	0.2408
-59	1.005E-05	0.0000	6.479E-08	0.0000	0.000E+00	0.0000	5.724E-06	0.0000	7.131E-07	0.0000	1.592E-05	0.0000	3.797E-05	0.0000
-63	2.033E-08	0.0000	1.310E-10	0.0000	0.000E+00	0.0000	1.157E-08	0.0000	1.442E-09	0.0000	3.218E-09	0.0000	7.676E-08	0.0000
-238	4.241E-04	0.0000	7.915E-07	0.0000	0.000E+00	0.0000	2.389E-04	0.0000	1.045E-06	0.0000	5.352E-06	0.0000	8.037E-04	0.0001
-239	9.022E-01	0.1061	1.744E-03	0.0002	0.000E+00	0.0000	5.081E-01	0.0598	1.278E-03	0.0002	7.137E-05	0.0000	1.752E+00	0.2060
-241	1.686E-02	0.0022	3.645E-05	0.0000	0.000E+00	0.0000	1.062E-02	0.0012	1.370E-05	0.0000	2.989E-06	0.0000	3.146E-02	0.0037
-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
-99	2.637E-16	0.0000	3.401E-18	0.0000	0.000E+00	0.0000	3.109E-16	0.0000	4.091E-19	0.0000	2.244E-17	0.0000	2.031E-15	0.0000
134	2.918E-01	0.0343	5.769E-04	0.0001	0.000E+00	0.0000	1.644E-01	0.0193	1.590E-03	0.0002	1.355E-02	0.0016	5.175E-01	0.0609
135	1.363E+00	0.1603	1.140E-03	0.0001	0.000E+00	0.0000	7.679E-01	0.0903	2.256E-02	0.0027	1.335E-02	0.0016	2.370E+00	0.2788
136	2.534E-01	0.0296	1.634E-04	0.0000	0.000E+00	0.0000	1.429E-01	0.0168	1.221E-03	0.0001	1.203E-02	0.0014	4.432E-01	0.0521
138	2.543E-01	0.0299	1.643E-04	0.0000	0.000E+00	0.0000	1.433E-01	0.0169	1.225E-03	0.0001	1.207E-02	0.0014	4.692E-01	0.0552
all	5.610E+00	0.4245	4.942E-03	0.0006	0.000E+00	0.0000	2.034E+00	0.2392	2.527E-02	0.0033	5.118E-02	0.0060	6.503E+00	1.0000

m 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,i) (mrem/yr)/(pCi/g)								
			0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03	
m-241	Am-241	1.000E+00	6.113E+00	6.101E+00	6.076E+00	5.991E+00	5.754E+00	4.996E+00	3.378E+00	8.667E-01	
m-241	Np-237	1.000E+00	6.223E-06	1.043E-05	1.880E-05	4.777E-05	1.275E-04	3.739E-04	9.697E-04	1.942E-03	
m-241	U-233	1.000E+00	8.711E-12	2.091E-11	6.393E-11	4.054E-10	2.918E-09	2.617E-08	1.534E-07	4.519E-07	
m-241	Th-229	1.000E+00	2.373E-11	2.375E-11	2.379E-11	2.394E-11	2.439E-11	2.814E-11	8.925E-11	5.918E-09	
m-241	ΣDSR(j)		6.113E+00	6.101E+00	6.076E+00	5.991E+00	5.754E+00	4.996E+00	3.379E+00	8.666E-01	
-14	C-14	1.000E+00	2.932E-01	2.912E-01	2.870E-01	2.750E-01	2.366E-01	1.442E-01	1.161E-01	0.000E+00	
m-243	Cm-243	9.976E-01	4.624E+00	4.511E+00	4.293E+00	3.609E+00	2.199E+00	3.879E-01	2.761E-03	8.831E-11	
m-243	Pu-239	9.976E-01	7.904E-05	1.248E-04	2.124E-04	4.870E-04	1.052E-03	1.765E-03	1.949E-03	2.084E-03	
m-243	U-235	9.976E-01	3.051E-14	8.389E-14	2.695E-13	1.678E-12	1.080E-11	7.035E-11	2.636E-10	9.429E-10	
m-243	Pa-231	9.976E-01	2.629E-14	2.599E-14	2.626E-14	4.534E-14	4.363E-13	9.161E-12	9.647E-11	5.646E-10	
m-243	Ac-227	9.976E-01	3.521E-14	3.457E-14	3.347E-14	3.610E-14	3.073E-13	1.381E-11	2.107E-10	1.338E-09	
m-243	ΣDSR(j)		4.624E+00	4.511E+00	4.293E+00	3.610E+00	2.200E+00	3.897E-01	4.709E-03	2.084E-03	
m-243	Cm-243	2.400E-03	1.112E-02	1.085E-02	1.033E-02	8.663E-03	5.289E-03	9.333E-04	6.641E-06	2.124E-13	
-243	Am-243	2.400E-03	4.362E-05	7.257E-05	1.276E-04	2.923E-04	5.767E-04	6.209E-04	1.230E-04	1.983E-07	
-243	Pu-239	2.400E-03	8.406E-11	1.551E-10	3.193E-10	1.123E-09	4.783E-09	2.104E-08	4.384E-08	5.196E-08	
-243	U-235	2.400E-03	9.299E-19	1.162E-18	1.713E-18	4.504E-18	3.085E-17	5.061E-16	4.162E-15	2.150E-14	
-243	Pa-231	2.400E-03	1.426E-16	1.796E-16	2.499E-16	4.613E-16	8.204E-16	9.352E-16	1.415E-15	1.227E-14	
-243	Ac-227	2.400E-03	1.910E-16	2.405E-16	3.346E-16	6.173E-16	1.097E-15	1.250E-15	2.817E-15	2.892E-14	
-243	ΣDSR(j)		1.112E-02	1.085E-02	1.046E-02	8.975E-03	5.866E-03	1.554E-03	1.297E-04	2.503E-07	
-60	Ce-60	1.000E+00	1.414E+00	1.226E+00	9.228E-01	3.410E-01	1.985E-02	9.438E-07	4.351E-19	0.000E+00	
-137	Ce-137	1.000E+00	9.517E-00	9.051E-00	8.183E+00	5.750E+00	2.096E+00	6.160E-02	2.595E-06	1.429E-21	
-152	Eu-152	7.200E-01	6.682E-03	8.239E-03	7.418E-03	5.139E-03	1.800E-03	4.583E-05	1.344E-09	3.148E-23	
-152	Eu-152	2.792E-01	3.363E-03	3.191E-03	2.873E-03	1.990E-03	6.972E-04	1.775E-05	5.208E-10	1.219E-23	
-152	Gd-152	2.792E-01	4.214E-16	6.739E-16	1.140E-15	2.432E-15	4.313E-15	5.231E-15	5.297E-15	5.649E-15	
-152	ΣDSR(j)		3.363E-03	3.191E-03	2.873E-03	1.990E-03	6.972E-04	1.775E-05	5.208E-10	5.649E-15	
-154	Eu-154	1.000E+00	1.752E-02	1.618E-02	1.381E-02	7.933E-03	1.627E-03	6.360E-06	8.802E-13	1.124E-34	
-155	Eu-155	1.000E+00	2.722E-03	2.366E-03	1.787E-03	6.698E-04	4.056E-05	2.217E-09	1.510E-21	0.000E+00	
-55	Fe-55	1.000E+00	3.613E-02	2.756E-02	1.604E-02	2.413E-03	1.076E-05	6.369E-14	1.980E-37	0.000E+00	
-3	H-3	1.000E+00	1.501E-01	7.045E-02	1.545E-02	7.637E-03	1.968E-11	1.711E-34	0.000E+00	0.000E+00	
-129	I-129	1.000E+00	9.031E+01	8.571E+01	7.716E+01	5.341E+01	1.867E+01	4.715E-01	1.286E-05	1.366E-21	
-94	Nb-94	1.000E+00	1.662E-02	1.661E-02	1.659E-02	1.652E-02	1.632E-02	1.566E-02	1.533E-02	2.048E-00	
-99		1.000E+00	1.002E-02	9.567E-03	8.853E-03	8.460E-03	8.440E-03	5.651E-03	1.853E-03	3.797E-05	

Summary : RESRAD Default Parameters

File : Plumbront Subsurface Modified In: cvr.RAD

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

Parent (i)	Product (j)	Branch Fraction*	t =	DSR(j,t) (incm/yr)/(pCi/g)	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
91-63	Ni-63	1.000E+00			2.744E-02	2.709E-02	2.640E-02	2.411E-02	1.861E-02	7.523E-03	5.830E-04	7.676E-05
90-238	Pu-238	1.000E+00			1.469E-00	1.457E-00	1.434E+00	1.355E+00	1.155E+00	6.590E-01	1.387E-01	6.020E-04
90-238	U-234	1.000E+00			4.232E-06	7.121E-06	1.283E-05	3.203E-05	6.066E-05	1.945E-04	2.841E-04	1.857E-04
90-238	Th-230	1.000E+00			5.763E-12	9.163E-12	1.626E-11	4.553E-11	1.642E-10	6.676E-10	1.014E-08	1.326E-07
90-238	Ra-226	1.000E+00			3.971E-12	4.437E-12	6.796E-12	4.606E-11	6.006E-10	2.179E-08	3.623E-07	4.763E-06
90-238	Pb-210	1.000E+00			2.088E-11	2.183E-11	2.399E-11	4.294E-11	6.569E-10	3.878E-08	9.728E-07	1.116E-05
90-238	ΣDSR(j)				1.469E+00	1.457E+00	1.434E+00	1.355E+00	1.155E+00	6.592E-01	1.389E-01	6.037E-04
90-239	Pu-239	1.000E+00			1.631E+00	1.631E+00	1.630E+00	1.629E+00	1.624E+00	1.608E+00	1.633E+00	1.752E+00
90-239	U-235	1.000E+00			1.354E-09	2.338E-09	4.246E-09	1.089E-08	2.963E-08	9.227E-08	2.518E-07	6.183E-07
90-239	Pa-231	1.000E+00			9.270E-12	1.592E-11	2.945E-11	2.270E-10	1.624E-09	1.514E-08	1.032E-07	4.944E-07
90-239	Ac-227	1.000E+00			7.564E-12	6.248E-12	1.252E-11	8.768E-11	1.358E-09	2.522E-08	2.258E-07	1.172E-06
90-239	ΣDSR(j)				1.631E+00	1.631E+00	1.630E+00	1.629E+00	1.624E+00	1.608E+00	1.633E+00	1.752E+00
90-241	Pu-241	1.000E+00			3.081E-02	2.556E-02	2.666E-02	1.902E-02	7.246E-03	2.474E-04	1.666E-05	4.242E-23
90-241	Am-241	1.000E+00			1.445E-02	2.377E-02	4.108E-02	6.949E-02	1.602E-01	1.798E-01	1.227E-01	3.140E-01
90-241	Np-237	1.000E+00			7.805E-09	2.111E-08	6.620E-08	3.879E-07	2.180E-06	1.060E-05	3.208E-05	6.664E-05
90-241	U-233	1.000E+00			3.088E-14	5.301E-14	1.785E-13	2.321E-12	3.711E-11	6.318E-10	4.833E-09	1.564E-08
90-241	Th-229	1.000E+00			2.666E-13	2.830E-13	3.421E-13	4.822E-13	7.033E-13	9.311E-13	2.745E-12	1.903E-10
90-241	ΣDSR(j)				4.526E-02	5.313E-02	6.774E-02	1.085E-01	1.675E-01	1.801E-01	1.227E-01	3.146E-02
90-241	Pu-241	2.450E-05			7.549E-07	7.193E-07	6.532E-07	4.660E-07	1.775E-07	6.061E-09	4.021E-13	1.039E-27
90-241	Np-237	2.450E-05			1.516E-10	2.501E-10	4.335E-10	9.501E-10	1.731E-09	2.106E-09	2.088E-09	1.829E-09
90-241	U-233	2.450E-05			1.727E-16	4.716E-16	1.459E-15	8.745E-15	4.866E-14	2.253E-13	5.234E-13	5.394E-13
90-241	Th-229	2.450E-05			7.516E-14	8.626E-14	1.130E-13	1.863E-13	3.256E-13	6.120E-13	3.149E-16	1.094E-14
90-241	ΣDSR(j)				7.551E-07	7.196E-07	6.536E-07	4.669E-07	1.799E-07	6.167E-09	2.089E-09	1.839E-09
90	Sr-90	1.000E+00			3.530E+01	3.242E+01	2.637E+01	1.704E+01	3.967E+00	2.417E+02	1.165E+05	9.005E-31
99	Tc-99	1.000E+00			2.852E-01	2.758E-01	2.578E-01	2.035E-01	1.035E-01	9.726E-03	1.727E-05	2.031E-15
34	U-234	1.000E+00			1.030E+00	1.029E+00	1.027E+00	1.021E+00	1.003E+00	9.436E-01	8.040E-01	4.650E-01
34	Th-230	1.000E+00			1.129E-06	1.217E-06	1.338E-06	1.761E-06	2.856E-06	6.998E-06	4.415E-05	4.101E-04
34	Ra-226	1.000E+00			1.372E-07	2.504E-07	6.513E-07	3.862E-06	2.795E-05	2.653E-04	1.966E-03	1.554E-02
34	Pb-210	1.000E+00			4.007E-07	4.144E-07	4.973E-07	1.962E-06	2.747E-05	5.486E-04	5.584E-03	3.660E-02
34	ΣDSR(j)				1.030E+00	1.029E+00	1.027E+00	1.021E+00	1.003E+00	9.445E-01	8.116E-01	5.175E-01
35	U-235	1.000E+00			9.714E-01	9.706E-01	9.689E-01	9.630E-01	9.464E-01	8.905E-01	7.592E-01	5.644E-01
35	Pa-231	1.000E+00			5.051E-03	6.507E-03	1.536E-02	3.896E-02	1.023E-01	2.621E-01	5.528E-01	5.212E-01
35	Ac-227	1.000E+00			4.016E-04	1.092E-03	3.447E-03	2.046E-02	1.176E-01	5.766E-01	1.356E+00	1.288E+00
35	ΣDSR(j)				9.789E-01	9.802E-01	9.877E-01	1.022E+00	1.166E+00	1.749E+00	2.668E+00	2.370E+00

Summary : RESRAD Default Parameters

File : Numrock Subsurface Modified In env.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	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
236	U-236	1.000E+00	9.767E-01	9.779E-01	9.762E-01	9.703E-01	9.535E-01	8.972E-01	7.649E-01	4.432E-01
236	Th-228	1.000E+00	6.761E-12	9.201E-12	1.256E-11	2.426E-11	5.730E-11	1.691E-10	1.199E-09	1.119E-08
236	Ra-226	1.000E+00	9.727E-11	2.620E-10	7.979E-10	4.132E-09	1.616E-08	7.006E-08	2.175E-07	7.729E-07
236	Th-228	1.000E+00	1.103E-12	3.049E-12	9.397E-12	4.959E-11	2.207E-10	8.560E-10	2.795E-09	1.370E-07
236	DSR(j)		9.767E-01	9.779E-01	9.762E-01	9.703E-01	9.535E-01	8.972E-01	7.649E-01	4.432E-01
138	U-238	1.000E+00	9.767E-01	9.779E-01	9.762E-01	9.703E-01	9.535E-01	8.972E-01	7.649E-01	4.678E-01
138	U-234	1.000E+00	4.373E-06	7.289E-06	1.310E-05	3.327E-05	8.957E-05	2.716E-04	6.675E-04	1.322E-03
138	Th-230	1.000E+00	2.230E-06	2.229E-06	2.226E-06	2.215E-06	2.190E-06	2.157E-06	3.557E-06	5.097E-07
38	Ra-226	1.000E+00	5.674E-08	5.866E-08	5.858E-08	5.825E-08	5.807E-08	7.930E-08	6.205E-07	1.532E-05
38	Pb-210	1.000E+00	2.092E-07	3.089E-07	3.084E-07	3.065E-07	3.019E-07	3.269E-07	1.734E-06	3.513E-05
38	DSR(j)		9.767E-01	9.779E-01	9.762E-01	9.703E-01	9.535E-01	8.972E-01	7.656E-01	4.692E-01

anch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
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 = 2.500E+01 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
141	4.089E+00	4.089E+00	4.114E+00	4.173E+00	4.345E+00	5.004E+00	7.399E+00	2.679E+01
	6.525E+01	6.566E+01	6.710E+01	6.157E+01	1.056E+02	1.734E+02	2.152E+02	*4.454E+12
43	5.393E+00	5.529E+00	5.809E+00	6.909E+00	1.134E+01	6.390E+01	5.166E+03	1.199E+04
0	1.769E+01	2.039E+01	2.709E+01	7.330E+01	1.260E+03	2.649E+07	*1.131E+15	*1.131E+15
37	2.627E+00	2.762E+00	3.055E+00	4.348E+00	1.191E+01	4.058E+02	9.636E+06	*6.701E+13
52	2.075E+03	2.187E+03	2.429E+03	3.507E+03	1.001E+04	3.932E+05	1.340E+10	*1.765E+14
54	1.427E+03	1.545E+03	1.810E+03	3.151E+03	1.537E+04	3.931E+06	2.640E+13	*2.639E+14
55	9.165E+03	1.057E+04	1.399E+04	3.732E+04	6.163E+05	1.128E+10	*4.651E+14	*4.651E+14
5	6.910E+02	9.070E+02	1.154E+03	1.036E+04	2.324E+06	3.925E+14	*2.409E+15	*2.409E+15
	1.666E+02	3.549E+02	1.618E+03	3.273E+05	1.270E+12	*9.594E+15	*9.594E+15	*9.594E+15
9	2.765E+01	2.917E+01	3.240E+01	4.681E+01	1.339E+02	5.303E+02	1.944E+06	*1.766E+08
4	1.504E+03	1.505E+03	1.507E+03	1.513E+03	1.532E+03	1.596E+03	1.631E+03	1.221E+01
9	2.494E+05	2.508E+05	2.537E+05	2.641E+05	2.962E+05	4.424E+05	1.349E+04	6.584E+05
3	9.110E+02	9.228E+02	9.470E+02	1.037E+03	1.343E+03	3.323E+03	4.289E+04	3.257E+08
36	1.702E+01	1.716E+01	1.744E+01	1.844E+01	2.165E+01	3.792E+01	1.799E+02	3.111E+04
39	1.533E+01	1.533E+01	1.534E+01	1.535E+01	1.539E+01	1.555E+01	1.581E+01	1.427E+01
11	5.529E+02	4.705E+02	3.690E+02	2.364E+02	1.493E+02	1.388E+02	1.038E+02	7.946E+02
2	7.063E+01	7.617E+01	8.612E+01	1.468E+02	6.302E+02	1.034E+03	2.146E+04	*1.363E+14
3	8.765E+01	9.065E+01	9.899E+01	1.229E+02	2.416E+02	2.570E+03	1.447E+06	*1.696E+10
1	2.428E+01	2.420E+01	2.434E+01	2.449E+01	2.492E+01	2.647E+01	3.080E+01	4.831E+01
1	2.559E+01	2.551E+01	2.531E+01	2.445E+01	2.143E+01	1.429E+01	9.370E+00	1.055E+01
1	2.554E+01	2.557E+01	2.561E+01	2.577E+01	2.622E+01	2.786E+01	3.169E+01	5.641E+01
1	2.554E+01	2.557E+01	2.561E+01	2.577E+01	2.622E+01	2.786E+01	3.266E+01	5.324E+01

specific activity limit

Summary : RESRAD Default Parameters

File : Plumcreek Subsurface Modified lm.cvr.RAD

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
 and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
 at tmin = time of minimum single radionuclide soil guideline
 and at tmax = time of maximum total dose = 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)
243	1.000E+00	0.000E+00	6.113E+00	4.069E+00	6.113E+00	4.069E+00
14	1.000E+00	0.000E+00	2.932E-01	8.525E+01	2.932E-01	8.525E+01
243	1.000E+00	0.000E+00	4.635E+00	5.393E+00	4.635E+00	5.393E+00
60	1.000E+00	0.000E+00	1.414E+00	1.769E+01	1.414E+00	1.769E+01
137	1.000E+00	0.000E+00	9.517E+00	2.627E+00	9.517E+00	2.627E+00
152	1.000E+00	0.000E+00	1.205E-02	2.075E+03	1.205E-02	2.075E+03
154	1.000E+00	0.000E+00	1.752E-02	1.427E+03	1.752E-02	1.427E+03
155	1.000E+00	0.000E+00	2.722E-03	9.185E+03	2.722E-03	9.185E+03
55	1.000E+00	0.000E+00	3.613E-02	6.920E+02	3.613E-02	6.920E+02
3	1.000E+00	0.000E+00	1.501E-01	1.666E+02	1.501E-01	1.666E+02
129	1.000E+00	0.000E+00	9.031E+01	2.766E-01	9.031E+01	2.766E-01
94	1.000E+00	1.000E+03	2.049E+00	1.221E+01	1.662E-02	1.504E+03
59	1.000E+00	0.000E+00	1.002E-02	2.494E+03	1.002E-02	2.494E+03
63	1.000E+00	0.000E+00	2.744E-02	9.110E+02	2.744E-02	9.110E+02
236	1.000E+00	0.000E+00	1.469E-00	1.702E+01	1.469E+00	1.702E+01
239	1.000E+00	1.000E+03	1.752E+00	1.427E+01	1.631E-00	1.533E+01
241	1.000E+00	63.8 ± 0.1	1.671E-01	1.336E+02	4.526E-02	5.523E+02
90	1.000E+00	0.000E+00	3.530E+01	7.063E-01	3.530E+01	7.063E-01
90	1.000E+00	0.000E+00	2.852E-01	6.765E+01	2.852E-01	6.765E+01
90	1.000E+00	0.000E+00	1.030E+00	2.428E+01	1.030E+00	2.428E+01
35	1.000E+00	470.2 ± 0.9	2.832E+00	6.628E+00	9.769E-01	2.559E+01
36	1.000E+00	0.000E+00	9.767E-01	2.554E+01	9.767E-01	2.554E+01
38	1.000E+00	0.000E+00	9.767E-01	2.554E+01	9.767E-01	2.554E+01

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

Nuclide	Parent	ERF(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	6.113E+00	6.101E+00	6.076E+00	5.991E+00	5.754E+00	4.996E+00	3.37E+00	8.667E-01
Am-241	Pu-241	1.600E+00	1.445E-02	2.377E-02	4.108E-02	8.949E-02	1.602E-01	1.798E-01	1.227E-01	3.140E-02
Am-241	ΣDOSE(j)		6.128E+00	6.125E+00	6.117E+00	6.081E+00	5.914E+00	5.176E+00	3.501E+00	8.981E-01
Am-237	Am-241	1.000E+00	6.223E-06	1.043E-05	1.880E-05	4.777E-05	1.275E-04	3.739E-04	9.697E-04	1.942E-03
Am-237	Pu-241	1.000E+00	7.808E-09	2.111E-08	6.620E-08	3.879E-07	2.180E-06	1.060E-05	3.20E-05	6.664E-05
P-237	Pu-241	2.450E-05	1.516E-10	2.501E-10	4.335E-10	9.501E-10	1.731E-09	2.106E-09	2.088E-09	1.839E-09
P-237	ΣDOSE(j)		6.231E-06	1.045E-05	1.887E-05	4.816E-05	1.297E-04	3.845E-04	1.002E-03	2.009E-03
-233	Am-241	1.000E+00	8.711E-12	2.091E-11	6.393E-11	4.054E-10	2.91E-09	2.617E-08	1.534E-07	4.519E-07
-233	Pu-241	1.000E+00	3.086E-14	5.301E-14	1.785E-13	2.321E-12	3.711E-11	6.318E-10	4.833E-09	1.564E-08
-233	Pu-241	2.450E-05	1.727E-16	4.716E-16	1.489E-15	8.745E-15	4.866E-14	2.253E-13	5.234E-13	5.294E-13
-233	ΣDOSE(j)		8.743E-12	2.096E-11	6.411E-11	4.077E-10	2.955E-09	2.680E-08	1.583E-07	4.675E-07
-229	Am-241	1.000E+00	2.373E-11	2.375E-11	2.379E-11	2.394E-11	2.439E-11	2.814E-11	8.925E-11	5.918E-09
-229	Pu-241	1.000E+00	2.666E-13	2.930E-13	3.421E-13	4.822E-13	7.033E-13	9.311E-13	2.745E-12	1.903E-10
-229	Pu-241	2.450E-05	7.516E-16	8.826E-16	1.130E-15	1.863E-15	3.236E-15	6.120E-15	3.149E-16	1.094E-14
-229	ΣDOSE(j)		2.400E-11	2.404E-11	2.413E-11	2.442E-11	2.509E-11	2.907E-11	9.199E-11	6.108E-09
14	C-14	1.000E+00	2.932E-01	2.912E-01	2.870E-01	2.730E-01	2.366E-01	1.442E-01	1.161E-01	0.000E+00
14	Cm-243	9.976E-01	4.624E+00	4.511E+00	4.293E+00	3.609E+00	2.199E+00	3.879E-01	2.761E-03	8.831E-11
-243	Cm-243	2.400E-03	1.112E-02	1.085E-02	1.033E-02	8.682E-03	5.289E-03	9.332E-04	6.641E-06	2.124E-13
-243	ΣDOSE(j)		4.635E+00	4.522E+00	4.303E+00	3.618E+00	2.204E+00	3.889E-01	2.767E-03	8.852E-11
-239	Cm-243	9.976E-01	7.904E-05	1.246E-04	2.124E-04	4.870E-04	1.052E-03	1.765E-03	1.949E-03	2.064E-03
-239	Cm-243	2.400E-03	8.406E-11	1.581E-10	3.193E-10	1.123E-09	4.783E-09	2.104E-08	4.384E-08	5.196E-08
-239	Pu-239	1.000E+00	1.631E+00	1.631E+00	1.630E+00	1.629E+00	1.624E+00	1.608E+00	1.632E+00	1.752E+00
-239	ΣDOSE(j)		1.631E+00	1.631E+00	1.630E+00	1.629E+00	1.625E+00	1.610E+00	1.635E+00	1.754E+00
35	Cm-243	9.976E-01	3.051E-14	8.389E-14	2.695E-13	1.678E-12	1.080E-11	7.025E-11	2.636E-10	9.435E-10
35	Cm-243	2.400E-03	9.299E-19	1.182E-18	1.713E-18	4.504E-18	3.085E-17	5.061E-16	4.162E-15	2.150E-14
35	Pu-239	1.000E+00	1.384E-09	2.338E-09	4.246E-09	1.089E-08	2.963E-08	9.227E-08	2.518E-07	8.183E-07
35	U-235	1.000E+00	9.714E-01	9.706E-01	9.699E-01	9.630E-01	9.464E-01	8.905E-01	7.592E-01	5.644E-01
35	ΣDOSE(j)		9.714E-01	9.706E-01	9.699E-01	9.630E-01	9.464E-01	8.905E-01	7.592E-01	5.644E-01
231	Cm-243	9.976E-01	3.629E-14	2.599E-14	2.626E-14	4.534E-14	4.363E-13	9.161E-12	9.647E-11	5.646E-10
231	Cm-243	2.400E-03	1.426E-16	1.796E-16	2.499E-16	4.613E-16	8.204E-16	9.352E-16	1.415E-15	1.227E-14
231	Pu-239	1.000E+00	9.270E-12	1.592E-11	3.945E-11	2.270E-10	1.624E-09	1.514E-08	1.012E-07	4.944E-07
231	U-235	1.000E+00	5.051E-03	8.507E-03	1.538E-02	8.896E-02	1.023E-01	2.821E-01	5.528E-01	5.212E-01
231	ΣDOSE(j)		5.051E-03	8.507E-03	1.538E-02	8.896E-02	1.023E-01	2.821E-01	5.528E-01	5.212E-01
227	Cm-243	9.976E-01	3.521E-14	3.457E-14	3.347E-14	3.610E-14	3.073E-13	1.381E-11	2.107E-10	1.336E-09
227	Cm-243	2.400E-03	1.910E-16	2.405E-16	3.346E-16	6.173E-16	1.097E-15	1.250E-15	2.817E-15	2.892E-14
227	Pu-239	1.000E+00	7.564E-12	8.248E-12	1.252E-11	8.768E-11	1.358E-09	2.522E-08	2.258E-07	1.172E-06
227	U-235	1.000E+00	4.016E-04	1.092E-03	3.447E-03	2.046E-02	1.176E-01	5.766E-01	1.356E-01	1.255E+00
227	ΣDOSE(j)		4.016E-04	1.092E-03	3.447E-03	2.046E-02	1.176E-01	5.766E-01	1.356E+00	1.255E+00
43	Cm-243	2.400E-03	4.362E-05	7.257E-05	1.276E-04	2.923E-04	5.767E-04	6.209E-04	1.230E-04	1.463E-07

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-02	3.000E-02	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03	
60	Co-60	1.000E+00	1.414E+00	1.226E+00	9.228E-01	5.410E-01	1.985E-02	9.438E-07	4.351E-19	0.000E+00	
137	Cs-137	1.000E+00	9.517E-00	9.051E+00	8.163E+00	5.750E+00	2.095E+00	6.160E-02	2.595E-06	1.429E-21	
152	Eu-152	7.208E-01	8.682E-03	8.239E-03	7.418E-03	5.139E-03	1.800E-03	4.583E-05	1.344E-09	3.148E-23	
152	Eu-152	2.792E-01	3.363E-03	3.191E-03	2.873E-03	1.990E-03	6.972E-04	1.775E-05	5.208E-10	1.219E-23	
152	ΣDOSE(j)		1.205E-02	1.143E-02	1.029E-02	7.129E-03	2.497E-03	6.358E-05	1.863E-09	4.368E-23	
152	Eu-152	2.792E-01	4.214E-16	6.739E-16	1.140E-15	2.432E-15	4.313E-15	5.231E-15	5.297E-15	5.649E-15	
154	Eu-154	1.000E+00	1.752E-02	1.618E-02	1.381E-02	7.933E-03	1.627E-03	6.360E-06	8.802E-13	0.000E+00	
155	Eu-155	1.000E+00	2.722E-03	2.366E-03	1.787E-03	6.698E-04	4.056E-05	2.217E-09	1.510E-21	0.000E+00	
55	Fe-55	1.000E+00	3.613E-02	2.756E-02	1.604E-02	2.413E-03	1.076E-05	6.369E-14	0.000E+00	0.000E+00	
3	H-3	1.000E+00	1.501E-01	7.045E-02	1.545E-02	7.637E-05	1.968E-11	0.000E+00	0.000E+00	0.000E+00	
129	I-129	1.000E+00	9.031E+01	8.571E+01	7.716E+01	5.341E+01	1.867E+01	4.715E+01	1.286E-05	1.366E-21	
94	Mo-94	1.000E+00	1.662E-02	1.661E-02	1.659E-02	1.652E-02	1.632E-02	1.566E-02	1.533E-02	2.048E+00	
59	Ni-59	1.000E+00	1.002E-02	9.967E-03	9.853E-03	9.466E-03	8.440E-03	5.651E-03	1.853E-03	3.797E-05	
63	Ni-63	1.000E+00	2.744E-02	2.709E-02	2.640E-02	2.411E-02	1.861E-02	7.523E-03	5.630E-04	7.676E-09	
238	Pu-238	1.000E+00	1.469E+00	1.457E+00	1.434E+00	1.355E+00	1.155E+00	6.590E-01	1.387E-01	6.020E-04	
238	Pu-238	1.000E+00	4.232E-06	7.121E-06	1.283E-05	3.203E-05	8.066E-05	1.945E-04	2.841E-04	1.857E-04	
234	U-234	1.000E+00	1.030E+00	1.029E+00	1.027E+00	1.021E+00	1.003E+00	9.436E-01	9.040E-01	4.650E-01	
238	U-238	1.000E+00	4.373E-06	7.289E-06	1.310E-05	3.327E-05	8.957E-05	2.716E-04	6.875E-04	1.322E-03	
238	ΣDOSE(j)		1.030E+00	1.029E+00	1.027E+00	1.021E+00	1.003E+00	9.441E-01	9.050E-01	4.665E-01	
238	Pu-238	1.000E+00	5.763E-12	9.163E-12	1.626E-11	4.553E-11	1.642E-10	8.876E-10	1.014E-08	1.326E-07	
238	U-234	1.000E+00	1.129E-06	1.217E-06	1.338E-06	1.761E-06	2.956E-06	6.998E-06	4.415E-05	4.101E-04	
238	U-238	1.000E+00	2.230E-08	2.229E-08	2.226E-08	2.215E-08	2.190E-08	2.157E-08	3.557E-08	5.097E-07	
238	ΣDOSE(j)		1.151E-06	1.239E-06	1.360E-06	1.783E-06	2.978E-06	7.020E-06	4.420E-05	4.107E-04	
238	Pu-238	1.000E+00	3.971E-12	4.437E-12	6.796E-12	4.606E-11	8.006E-10	2.179E-08	3.623E-07	4.763E-06	
238	U-234	1.000E+00	1.372E-07	2.504E-07	6.513E-07	3.862E-06	2.795E-05	2.653E-04	1.966E-03	1.554E-02	
238	U-238	1.000E+00	5.874E-08	5.866E-08	5.858E-08	5.825E-08	5.807E-08	7.930E-08	8.205E-07	1.532E-05	
238	ΣDOSE(j)		1.960E-07	3.090E-07	7.099E-07	3.921E-06	2.801E-05	2.654E-04	1.967E-03	1.556E-02	
238	Pu-238	1.000E+00	2.068E-11	2.183E-11	2.399E-11	4.294E-11	6.569E-10	3.878E-08	9.728E-07	1.116E-05	
238	U-234	1.000E+00	4.007E-07	4.144E-07	4.973E-07	1.962E-06	2.747E-05	5.416E-04	5.584E-03	3.660E-02	
238	U-238	1.000E+00	3.092E-07	3.089E-07	3.084E-07	3.065E-07	3.018E-07	3.164E-07	1.734E-06	3.513E-05	
238	ΣDOSE(j)		7.095E-07	7.234E-07	8.058E-07	2.769E-06	2.778E-05	5.490E-04	5.587E-03	3.664E-02	

Summary : RESRAD Default Parameters

File : Flumbrook Subsurface Modified In RESRAD

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



Nuclide	Parent	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
Pu-241	Pu-241	1.000E+00	3.081E-02	2.936E-02	2.666E-02	1.902E-02	7.246E-03	2.474E-04	1.666E-08	4.242E-23
Pu-241	Pu-241	2.450E-05	7.549E-07	7.193E-07	6.532E-07	4.660E-07	1.775E-07	6.061E-09	4.081E-13	1.037E-27
Pu-241	ΣDOSE(j)		3.081E-02	2.936E-02	2.666E-02	1.902E-02	7.246E-03	2.474E-04	1.666E-08	4.242E-23
Sr-90	Sr-90	1.000E+00	3.530E-01	3.262E+01	2.837E-01	1.704E+01	3.967E+00	2.417E-02	1.165E-08	0.000E+00
Tc-99	Tc-99	1.000E+00	2.852E-01	2.756E-01	2.574E-01	2.035E-01	1.035E-01	9.726E-03	1.727E-05	2.031E-15
U-236	U-236	1.000E+00	9.787E-01	9.779E-01	9.762E-01	9.703E-01	9.535E-01	8.972E-01	7.649E-01	4.432E-01
U-232	U-236	1.000E+00	6.781E-12	9.201E-12	1.256E-11	2.426E-11	5.750E-11	1.691E-10	1.189E-09	1.119E-06
U-228	U-236	1.000E+00	9.727E-11	2.620E-10	7.975E-10	4.132E-09	1.816E-08	7.006E-08	2.175E-07	7.729E-07
U-228	U-236	1.000E+00	1.103E-12	3.049E-12	9.397E-12	4.959E-11	2.207E-10	8.560E-10	2.755E-09	1.370E-07
U-238	U-238	1.000E+00	9.787E-01	9.779E-01	9.762E-01	9.703E-01	9.535E-01	8.972E-01	7.649E-01	4.432E-01

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



Summary : RESRAD Default Parameters

File : Plum Brook Subsurface Modified In cvr.FAL

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide	Parent	BRF(1)	S(s,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
m-241	Am-241	1.000E+00	1.000E+00	9.980E-01	9.940E-01	9.800E-01	9.412E-01	8.173E-01	5.459E-01	1.329E-01
m-241	Pu-241	1.000E+00	0.000E+00	1.564E-03	4.465E-03	1.258E-02	2.449E-02	2.607E-02	1.893E-02	4.609E-03
m-241	ΣS(j):		1.000E+00	9.995E-01	9.984E-01	9.926E-01	9.657E-01	8.453E-01	5.647E-01	1.375E-01
p-237	Am-241	1.000E+00	0.000E+00	3.235E-07	9.677E-07	3.195E-06	9.327E-06	2.827E-05	6.486E-05	8.845E-05
p-237	Pu-241	1.000E+00	0.000E+00	2.554E-10	2.223E-09	2.204E-09	1.478E-07	7.625E-07	2.060E-06	2.953E-06
p-237	Pu-241	2.450E-05	0.000E+00	7.744E-12	2.214E-11	6.271E-11	1.241E-10	1.541E-10	1.346E-10	8.153E-11
p-237	ΣS(j):		0.000E+00	3.237E-07	9.700E-07	3.217E-06	9.475E-06	2.903E-05	6.694E-05	9.141E-05
233	Am-241	1.000E+00	0.000E+00	7.067E-13	6.333E-12	6.933E-11	5.979E-10	5.730E-09	3.412E-08	9.963E-08
233	Pu-241	1.000E+00	0.000E+00	3.735E-16	9.815E-15	3.315E-13	7.014E-12	1.313E-10	1.026E-09	3.295E-09
233	Pu-241	2.450E-05	0.000E+00	1.705E-17	1.492E-16	1.464E-15	9.695E-15	4.762E-14	1.116E-13	1.138E-13
233	ΣS(j):		0.000E+00	7.071E-13	6.343E-12	6.966E-11	6.049E-10	5.861E-09	3.515E-08	1.029E-07
-229	Am-241	1.000E+00	0.000E+00	2.226E-17	5.950E-16	2.193E-14	5.753E-13	1.699E-11	3.756E-10	5.214E-09
-229	Pu-241	1.000E+00	0.000E+00	8.641E-21	7.005E-19	6.034E-17	5.340E-15	3.746E-13	1.050E-11	1.672E-10
-229	Pu-241	2.450E-05	0.000E+00	5.391E-22	1.416E-20	4.807E-19	1.029E-17	2.005E-16	1.789E-15	9.660E-15
-229	ΣS(j):		0.000E+00	2.227E-17	5.997E-16	2.202E-14	5.787E-13	1.936E-11	3.861E-10	5.381E-09
4	C-14	1.000E+00	1.000E+00	9.929E-01	9.788E-01	9.310E-01	8.069E-01	4.992E-01	1.171E-01	0.000E+00
m-243	Am-243	9.976E-01	9.976E-01	9.732E-01	9.261E-01	7.786E-01	4.743E-01	8.369E-02	5.890E-04	1.723E-11
243	Cm-243	2.400E-03	2.400E-03	2.341E-03	2.229E-03	1.973E-03	1.141E-03	2.013E-04	1.417E-06	4.144E-14
243	ΣS(j):		1.000E+00	9.755E-01	9.263E-01	7.805E-01	4.755E-01	8.389E-02	5.904E-04	1.727E-11
239	Cm-243	9.976E-01	0.000E+00	2.839E-05	8.306E-05	2.543E-04	6.067E-04	1.052E-03	1.117E-03	1.011E-03
239	Cm-243	2.400E-03	0.000E+00	3.210E-12	2.824E-11	2.901E-10	2.101E-09	1.176E-08	2.496E-08	2.521E-08
239	Pu-239	1.000E+00	1.000E+00	9.999E-01	9.996E-01	9.966E-01	9.957E-01	9.859E-01	9.562E-01	8.673E-01
239	ΣS(j):		1.000E+00	9.999E-01	9.997E-01	9.968E-01	9.963E-01	9.869E-01	9.593E-01	8.683E-01
15	Cm-243	9.976E-01	0.000E+00	1.402E-14	1.241E-13	1.300E-12	9.980E-12	6.921E-11	2.596E-10	6.876E-10
15	Cm-243	2.400E-03	0.000E+00	1.056E-21	2.903E-20	9.774E-19	2.232E-17	4.861E-16	4.089E-15	1.566E-14
15	Pu-239	1.000E+00	0.000E+00	9.844E-10	2.950E-09	9.799E-09	2.910E-08	9.365E-08	2.543E-07	6.069E-07
5	U-235	1.000E+00	1.000E+00	9.991E-01	9.974E-01	9.913E-01	9.742E-01	9.167E-01	7.703E-01	4.191E-01
5	ΣS(j):		1.000E+00	9.991E-01	9.974E-01	9.913E-01	9.742E-01	9.167E-01	7.703E-01	4.191E-01
31	Cm-243	9.976E-01	0.000E+00	9.906E-20	7.636E-18	9.280E-17	2.179E-15	5.227E-14	5.581E-13	3.121E-12
31	Cm-243	2.400E-03	0.000E+00	5.594E-27	4.462E-25	5.211E-23	3.642E-21	2.768E-19	7.184E-18	6.762E-17
31	Pu-239	1.000E+00	0.000E+00	1.040E-14	9.383E-14	1.026E-12	8.948E-12	8.932E-11	6.009E-10	2.797E-09
31	U-235	1.000E+00	0.000E+00	2.111E-05	6.304E-05	2.068E-04	5.929E-04	1.690E-03	3.298E-03	2.953E-03
31	ΣS(j):		0.000E+00	2.111E-05	6.304E-05	2.068E-04	5.929E-04	1.690E-03	3.298E-03	2.953E-03
17	Cm-243	9.976E-01	0.000E+00	7.831E-22	6.168E-20	6.914E-18	4.297E-16	2.360E-14	3.719E-13	2.368E-12
17	Cm-243	2.400E-03	0.000E+00	3.542E-29	8.383E-27	3.148E-24	5.938E-22	1.097E-19	4.556E-18	5.117E-17
17	Pu-239	1.000E+00	0.000E+00	1.093E-16	1.885E-15	9.892E-14	2.173E-12	4.464E-11	4.091E-10	2.126E-09
17	ΣS(j):		0.000E+00	3.317E-17	2.897E-16	2.906E-15	1.952E-14	1.039E-13	2.471E-12	2.334E-11
3	Cm-243	2.400E-03	0.000E+00	2.216E-07	6.427E-07	1.994E-06	4.099E-06	4.550E-06	9.060E-07	1.455E-09

Individual Nuclide Soil Concentration
 Parent Nuclide and Branch Fraction Indicated

Nuclide	Parent	BRF(i)	S(i,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	
0-60	Ce-60	1.000E+00	1.000E+00	6.675E-01	6.527E-01	2.412E-01	1.404E-02	6.676E-07	2.975E-19	0.000E+00	
0-137	Cs-137	1.000E+00	1.000E+00	9.508E-01	8.597E-01	6.041E-01	2.204E-01	6.471E-02	2.710E-07	1.286E-22	
0-152	Eu-152	7.208E-01	7.208E-01	6.640E-01	6.158E-01	4.266E-01	1.494E-01	3.797E-03	1.054E-07	1.167E-23	
0-152	Eu-152	2.792E-01	2.792E-01	2.649E-01	2.365E-01	1.652E-01	5.787E-02	1.471E-03	4.083E-08	4.599E-24	
0-152	ΣS(i):		1.000E+00	9.489E-01	8.544E-01	5.918E-01	2.073E-01	5.268E-03	1.462E-07	1.647E-23	
0-152	Eu-152	2.792E-01	0.000E+00	1.746E-15	4.972E-15	1.393E-14	2.696E-14	3.336E-14	3.208E-14	2.743E-14	
0-154	Eu-154	1.000E+00	1.000E+00	9.238E-01	7.885E-01	4.528E-01	9.284E-02	3.624E-04	4.759E-11	3.906E-35	
0-155	Eu-155	1.000E+00	1.000E+00	8.692E-01	6.566E-01	2.461E-01	1.490E-02	6.144E-07	5.401E-19	0.000E+00	
0-55	Fe-55	1.000E+00	1.000E+00	7.629E-01	4.440E-01	6.678E-02	2.978E-04	1.763E-12	5.476E-36	0.000E+00	
0	H-3	1.000E+00	1.000E+00	4.683E-01	1.027E-01	5.077E-04	1.309E-10	1.136E-33	0.000E+00	0.000E+00	
0-129	I-129	1.000E+00	1.000E+00	9.489E-01	8.541E-01	5.912E-01	2.067E-01	5.219E-03	1.421E-07	1.499E-23	
0-94	Mo-94	1.000E+00	1.000E+00	9.994E-01	9.962E-01	9.940E-01	9.821E-01	9.416E-01	6.348E-01	5.479E-01	
0-59	Ni-59	1.000E+00	1.000E+00	9.943E-01	9.830E-01	9.443E-01	8.420E-01	5.637E-01	1.792E-01	3.242E-03	
0-63	Ni-63	1.000E+00	1.000E+00	9.871E-01	9.619E-01	8.786E-01	6.782E-01	2.741E-01	2.059E-02	2.394E-06	
0-238	Pu-238	1.000E+00	1.000E+00	9.820E-01	9.762E-01	9.230E-01	7.863E-01	4.467E-01	9.035E-02	3.309E-04	
0-238	Pu-238	1.000E+00	0.000E+00	2.822E-06	8.392E-06	2.712E-05	7.458E-05	1.857E-04	2.697E-04	1.658E-04	
0-234	U-234	1.000E+00	1.000E+00	9.991E-01	9.974E-01	9.913E-01	9.742E-01	9.164E-01	7.697E-01	4.179E-01	
0-236	U-236	1.000E+00	0.000E+00	2.832E-06	8.463E-06	2.810E-05	8.285E-05	2.592E-04	6.549E-04	1.386E-03	
0-238	ΣS(i):		1.000E+00	9.991E-01	9.974E-01	9.914E-01	9.743E-01	9.169E-01	7.706E-01	4.192E-01	
0-238	Pu-238	1.000E+00	0.000E+00	1.272E-11	1.138E-10	1.239E-09	1.052E-08	9.633E-08	5.368E-07	1.927E-06	
0-234	U-234	1.000E+00	0.000E+00	8.998E-06	2.697E-05	8.962E-05	2.665E-04	8.615E-04	2.372E-03	5.964E-03	
0-238	U-238	1.000E+00	0.000E+00	1.275E-11	1.146E-10	1.269E-09	1.128E-08	1.204E-07	9.654E-07	7.263E-06	
0-238	ΣS(i):		0.000E+00	8.998E-06	2.697E-05	8.962E-05	2.665E-04	8.617E-04	2.273E-03	5.973E-03	
0-238	Pu-238	1.000E+00	0.000E+00	1.637E-15	4.931E-14	1.789E-12	4.552E-11	1.379E-09	2.198E-08	1.924E-07	
0-234	U-234	1.000E+00	0.000E+00	1.947E-09	1.748E-08	1.924E-07	1.667E-06	1.713E-05	1.204E-04	6.306E-04	
0-236	U-236	1.000E+00	0.000E+00	1.840E-15	4.957E-14	1.821E-12	4.799E-11	1.636E-09	3.506E-08	6.201E-07	
0-238	ΣS(i):		0.000E+00	1.947E-09	1.748E-08	1.924E-07	1.667E-06	1.713E-05	1.205E-04	6.314E-04	
0-238	Pu-238	1.000E+00	0.000E+00	1.419E-17	1.129E-15	1.311E-13	8.956E-12	6.501E-10	1.652E-08	1.745E-07	
0-234	U-234	1.000E+00	0.000E+00	2.602E-11	5.307E-10	1.846E-08	4.204E-07	9.411E-06	9.582E-05	5.763E-04	
0-238	U-238	1.000E+00	0.000E+00	1.471E-17	1.134E-15	1.330E-13	9.355E-12	7.538E-10	2.452E-08	5.503E-07	
0-238	ΣS(i):		0.000E+00	2.602E-11	5.307E-10	1.846E-08	4.204E-07	9.412E-06	9.586E-05	5.770E-04	

Summary : RESRAD Default Parameters

File : Plumbrook Subsurface Modified In: C:\RAE

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide Parent (j)	ERF(i)	S(j,t), pCi/g							
		t= 0.000E+00	1.000E+00	2.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
J-241 Pu-241	1.000E+00	1.000E+00	9.529E-01	8.652E-01	6.172E-01	2.352E-01	8.027E-03	5.173E-07	1.111E-21
J-241 Pu-241	2.450E-05	2.450E-05	2.335E-05	2.120E-05	1.512E-05	5.762E-06	1.967E-07	1.267E-11	2.723E-26
J-241 ΣS(i):		1.000E+00	9.529E-01	8.652E-01	6.172E-01	2.352E-01	8.028E-03	5.173E-07	1.111E-21
-90 Sr-90	1.000E+00	1.000E+00	9.297E-01	8.036E-01	4.826E-01	1.124E-01	6.846E-04	3.209E-10	2.263E-32
-99 Tc-99	1.000E+00	1.000E+00	9.669E-01	9.036E-01	7.132E-01	3.628E-01	3.405E-02	3.949E-05	2.057E-15
236 U-236	1.000E+00	1.000E+00	9.991E-01	9.974E-01	9.913E-01	9.742E-01	9.167E-01	7.703E-01	4.190E-01
-232 U-232	1.000E+00	0.000E+00	4.931E-11	1.478E-10	4.912E-10	1.461E-09	4.724E-09	1.302E-08	3.289E-08
-228 U-236	1.000E+00	0.000E+00	2.854E-12	2.373E-11	2.046E-10	1.055E-09	4.262E-09	1.244E-08	3.203E-08
-228 U-236	1.000E+00	0.000E+00	3.167E-13	6.861E-12	1.267E-10	9.289E-10	4.136E-09	1.234E-08	3.197E-08
238 U-238	1.000E+00	1.000E+00	9.991E-01	9.974E-01	9.913E-01	9.742E-01	9.167E-01	7.703E-01	4.191E-01

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

XE execution time = 42.9 seconds

**Final Status Survey Plan
for the
Plum Brook Reactor Facility**

Attachment B

**Approach and Basis for Development of Site-Specific Derived
Concentration Guideline Levels (DCGL)**

Addendum 4

**RESRAD and RESRAD-BUILD Reports for
Area Factor Calculations
(26 Pages)**

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

Water Independent Pathways (Inhalation excludes radon)

Radioisotope	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.
-14	3.313E-06	0.0000	1.420E-07	0.0000	0.000E+00	0.0000	6.077E-04	0.0003	6.506E-04	0.0004	3.724E-04	0.0002	1.343E-09	0.0000
-60	4.495E-01	0.2231	2.442E-07	0.0000	0.000E+00	0.0000	3.111E-02	0.0154	1.601E-02	0.0079	4.303E-03	0.0021	3.534E-07	0.0000
-137	1.102E-01	0.0547	3.744E-08	0.0000	0.000E+00	0.0000	3.043E-02	0.0151	4.264E-02	0.0212	2.842E-02	0.0141	6.915E-07	0.0000
-152	2.125E-01	0.1060	2.562E-07	0.0000	0.000E+00	0.0000	2.438E-04	0.0001	3.291E-04	0.0002	7.518E-06	0.0000	8.851E-06	0.0000
-154	2.256E-01	0.1120	3.272E-07	0.0000	0.000E+00	0.0000	3.546E-04	0.0002	4.787E-04	0.0002	1.093E-05	0.0000	1.287E-07	0.0000
-55	0.000E+00	0.0000	2.827E-09	0.0000	0.000E+00	0.0000	8.285E-06	0.0000	2.779E-04	0.0001	9.451E-06	0.0000	7.505E-09	0.0000
-59	0.000E+00	0.0000	3.064E-09	0.0000	0.000E+00	0.0000	1.549E-04	0.0001	2.976E-05	0.0000	3.025E-04	0.0002	2.807E-09	0.0000
-63	0.000E+00	0.0000	7.112E-09	0.0000	0.000E+00	0.0000	4.240E-04	0.0002	8.148E-05	0.0000	8.283E-04	0.0004	7.697E-09	0.0000
-90	7.788E-04	0.0004	1.458E-06	0.0000	0.000E+00	0.0000	6.644E-01	0.3298	5.543E-02	0.0275	4.575E-02	0.0227	2.007E-06	0.0000
-99	4.391E-06	0.0000	7.752E-09	0.0000	0.000E+00	0.0000	8.929E-02	0.0443	4.822E-05	0.0000	2.072E-03	0.0010	1.601E-08	0.0000
Total	9.995E-01	0.4961	2.486E-06	0.0000	0.000E+00	0.0000	8.170E-01	0.4055	1.162E-01	0.0577	8.207E-02	0.0407	3.204E-06	0.0000

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

Water Dependent Pathways

Radioisotope	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.
4	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.812E-03	0.0000
60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.805E-01	0.2886
137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.117E-01	0.1051
152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.341E-01	0.1063
154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.264E-01	0.1124
55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.957E-04	0.0001
59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.672E-04	0.0001
63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.334E-03	0.0007
90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.663E-01	0.3804
99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.142E-02	0.0454
1	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.015E+00	1.0000

* of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,r) 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.
-14	5.225E-06	0.0000	2.000E-07	0.0000	0.000E+00	0.0000	7.086E-04	0.0000	9.314E-04	0.0000	4.090E-04	0.0001	2.686E-09	0.0000
o-60	7.906E-03	0.2855	2.634E-07	0.0000	0.000E+00	0.0000	3.111E-02	0.0112	1.601E-02	0.0059	4.303E-03	0.0016	7.068E-07	0.0000
s-137	1.922E-01	0.0694	4.039E-08	0.0000	0.000E+00	0.0000	3.043E-02	0.0110	4.264E-02	0.0154	2.842E-02	0.0103	1.383E-06	0.0000
c-152	3.735E-01	0.1349	2.764E-07	0.0000	0.000E+00	0.0000	2.438E-04	0.0001	3.291E-04	0.0001	7.518E-06	0.0000	1.770E-07	0.0000
J-154	3.959E-01	0.1430	3.530E-07	0.0000	0.000E+00	0.0000	3.546E-04	0.0001	4.787E-04	0.0002	1.093E-05	0.0000	2.575E-07	0.0000
P-55	0.000E+00	0.0000	3.045E-09	0.0000	0.000E+00	0.0000	8.287E-06	0.0000	2.775E-04	0.0001	9.481E-06	0.0000	1.501E-08	0.0000
i-59	0.000E+00	0.0000	3.305E-09	0.0000	0.000E+00	0.0000	1.549E-04	0.0001	2.976E-05	0.0000	3.025E-04	0.0001	5.615E-09	0.0000
i-63	0.000E+00	0.0000	7.673E-09	0.0000	0.000E+00	0.0000	4.240E-04	0.0002	8.145E-05	0.0000	8.283E-04	0.0003	1.537E-08	0.0000
r-90	1.364E-03	0.0005	1.573E-06	0.0000	0.000E+00	0.0000	6.644E-01	0.2399	5.543E-02	0.0200	4.575E-02	0.0165	4.013E-06	0.0000
r-99	7.594E-06	0.0000	8.363E-09	0.0000	0.000E+00	0.0000	8.929E-02	0.0322	4.622E-05	0.0000	2.072E-03	0.0007	3.202E-08	0.0000
total	1.754E+00	0.6333	2.730E-06	0.0000	0.000E+00	0.0000	8.171E-01	0.2951	1.163E-01	0.0420	8.211E-02	0.0297	6.608E-06	0.0000

Total Dose Contributions TDOSE(i,p,r) 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.
4	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.049E-05	0.0000
60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.420E-01	0.3041
137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.537E-01	0.1061
152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.740E-01	0.1351
154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.967E-01	0.1433
55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.957E-04	0.0001
59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.472E-04	0.0002
63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.374E-05	0.0000
90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.665E-01	0.3770
99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.142E-02	0.0330
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	7.769E+00	1.0000

* of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio- 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.
D-14	6.710E-06	0.0000	2.459E-07	0.0000	0.000E+00	0.0000	7.860E-04	0.0002	1.009E-03	0.0003	4.371E-04	0.0001	4.029E-05	0.0000
Co-60	1.052E+00	0.3144	2.754E-07	0.0000	0.000E+00	0.0000	3.111E-02	0.0093	1.601E-02	0.0049	4.303E-03	0.0013	1.060E-06	0.0000
Cs-137	2.551E-01	0.0762	4.221E-06	0.0000	0.000E+00	0.0000	3.043E-02	0.0091	4.264E-02	0.0127	2.842E-02	0.0085	2.074E-06	0.0000
Co-152	4.562E-01	0.1482	2.889E-07	0.0000	0.000E+00	0.0000	2.438E-04	0.0002	3.291E-04	0.0001	7.518E-06	0.0000	2.655E-07	0.0000
Co-154	5.266E-01	0.1573	3.690E-07	0.0000	0.000E+00	0.0000	3.547E-04	0.0001	4.787E-04	0.0001	1.093E-05	0.0000	3.862E-07	0.0000
Fe-55	0.000E+00	0.0000	3.183E-09	0.0000	0.000E+00	0.0000	8.259E-06	0.0000	2.779E-04	0.0001	9.481E-06	0.0000	2.251E-08	0.0000
I-59	0.000E+00	0.0000	3.455E-09	0.0000	0.000E+00	0.0000	1.549E-04	0.0000	2.976E-05	0.0000	3.025E-04	0.0001	8.422E-09	0.0000
I-63	0.000E+00	0.0000	8.020E-09	0.0000	0.000E+00	0.0000	4.240E-04	0.0001	8.146E-05	0.0000	8.284E-04	0.0002	2.306E-06	0.0000
R-90	1.812E-03	0.0005	1.644E-06	0.0000	0.000E+00	0.0000	6.644E-01	0.1583	5.543E-02	0.0166	4.575E-02	0.0137	6.020E-06	0.0000
C-99	9.698E-06	0.0000	6.741E-09	0.0000	0.000E+00	0.0000	6.929E-02	0.0267	4.822E-05	0.0000	2.072E-03	0.0006	4.802E-08	0.0000
Total	2.332E+00	0.6966	2.689E-06	0.0000	0.000E+00	0.0000	8.172E-01	0.2441	1.163E-01	0.0347	6.213E-02	0.0245	9.911E-06	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.
D-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.232E-03	0.0007
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.104E+00	0.3297
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.566E-01	0.1065
Co-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.266E-01	0.1284
Co-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.274E-01	0.1575
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.957E-04	0.0001
I-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.872E-04	0.0001
I-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.334E-03	0.0004
R-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.674E-01	0.2297
C-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.142E-02	0.0273
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	3.346E+00	1.0000

* of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation, excludes radon)

Radio- 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.
C-14	9.049E-08	0.0000	3.175E-07	0.0000	0.000E+00	0.0000	9.095E-04	0.0002	1.132E-03	0.0003	4.116E-04	0.0001	6.715E-09	0.0000
Co-60	1.467E+00	0.3440	2.911E-07	0.0000	0.000E+00	0.0000	3.111E-02	0.0073	1.601E-02	0.0038	4.303E-03	0.0010	1.767E-06	0.0000
S-137	3.549E-01	0.0832	4.463E-08	0.0000	0.000E+00	0.0000	3.043E-02	0.0071	4.264E-02	0.0100	2.842E-02	0.0067	3.457E-06	0.0000
U-152	6.909E-01	0.1620	3.055E-07	0.0000	0.000E+00	0.0000	2.439E-04	0.0001	3.291E-04	0.0001	7.516E-06	0.0000	4.426E-07	0.0000
U-154	7.336E-01	0.1720	3.901E-07	0.0000	0.000E+00	0.0000	3.547E-04	0.0001	4.767E-04	0.0001	1.093E-05	0.0000	6.437E-07	0.0000
Fe-55	0.000E+00	0.0000	3.665E-09	0.0000	0.000E+00	0.0000	8.290E-06	0.0000	2.779E-04	0.0001	9.461E-06	0.0000	3.752E-06	0.0000
I-59	0.000E+00	0.0000	3.652E-09	0.0000	0.000E+00	0.0000	1.549E-04	0.0000	2.976E-05	0.0000	3.026E-04	0.0001	1.404E-08	0.0000
I-63	0.000E+00	0.0000	6.479E-09	0.0000	0.000E+00	0.0000	4.240E-04	0.0001	8.146E-05	0.0000	8.284E-04	0.0002	3.843E-06	0.0000
Ti-90	2.524E-02	0.0006	1.736E-06	0.0000	0.000E+00	0.0000	6.644E-01	0.1558	1.543E-02	0.0130	4.575E-02	0.0107	1.003E-05	0.0000
Y-99	1.335E-05	0.0000	9.242E-09	0.0000	0.000E+00	0.0000	8.929E-02	0.0209	4.822E-03	0.0000	2.072E-03	0.0005	8.004E-06	0.0000
Total	3.250E+00	0.7618	3.112E-06	0.0000	0.000E+00	0.0000	9.173E-01	0.1916	1.165E-01	0.0273	8.218E-02	0.0193	1.652E-05	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.
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.522E-03	0.0006
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.519E+00	0.3561
S-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.564E-01	0.1070
U-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.915E-01	0.1621
U-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.546E-01	0.1722
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.957E-04	0.0001
I-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.872E-04	0.0001
I-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.334E-03	0.0003
Ti-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.661E-01	0.1851
Y-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.143E-02	0.0214
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	4.265E+00	1.0000

* of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

id i nuclide	Ground		Inhalation		Radon		Plant		Heat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
14	1.335E-07	0.0000	4.489E-07	0.0000	0.000E+00	0.0000	1.134E-02	0.0002	1.357E-03	0.0002	5.635E-04	0.0001	1.343E-08	0.0000
-60	2.230E-00	0.3747	3.139E-07	0.0000	0.000E+00	0.0000	3.111E-02	0.0052	1.601E-02	0.0027	4.303E-03	0.0007	3.534E-06	0.0000
-137	5.362E-01	0.0904	4.612E-06	0.0000	0.000E+00	0.0000	3.043E-02	0.0051	4.264E-02	0.0072	2.642E-02	0.0048	6.913E-06	0.0000
-152	1.049E+00	0.1762	3.293E-07	0.0000	0.000E+00	0.0000	2.439E-04	0.0000	3.291E-04	0.0001	7.516E-06	0.0000	6.851E-07	0.0000
-154	1.115E+00	0.1873	4.206E-07	0.0000	0.000E+00	0.0000	3.547E-04	0.0001	4.787E-04	0.0001	1.093E-05	0.0000	1.287E-06	0.0000
-51	0.000E+00	0.0000	3.625E-09	0.0000	0.000E+00	0.0000	8.293E-06	0.0000	2.779E-04	0.0000	5.481E-06	0.0000	7.505E-08	0.0000
-59	0.000E+00	0.0000	3.538E-09	0.0000	0.000E+00	0.0000	1.549E-04	0.0000	2.976E-05	0.0000	3.026E-04	0.0001	2.607E-08	0.0000
-63	0.000E+00	0.0000	9.141E-09	0.0000	0.000E+00	0.0000	4.240E-04	0.0001	8.148E-05	0.0000	8.284E-04	0.0001	7.687E-08	0.0000
-90	3.832E-03	0.0006	1.874E-06	0.0000	0.000E+00	0.0000	6.644E-01	0.1116	5.543E-02	0.0093	4.575E-02	0.0077	2.007E-05	0.0000
-99	2.007E-05	0.0000	9.964E-09	0.0000	0.000E+00	0.0000	8.929E-02	0.0150	4.622E-05	0.0000	2.072E-03	0.0003	1.601E-07	0.0000
.a1	4.935E+00	0.8242	3.462E-06	0.0000	0.000E+00	0.0000	6.175E-01	0.1374	1.767E-01	0.0196	8.226E-02	0.0138	3.304E-05	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

id i nuclide	Water		Fish		Radon		Plant		Heat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
1	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.056E-03	0.0005
10	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.252E+00	0.3823
.37	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.397E-01	0.1075
52	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.049E+00	0.1763
54	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.115E+00	0.1874
5	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.917E-04	0.0000
9	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.672E-04	0.0001
3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.334E-03	0.0002
0	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.654E-01	0.1293
9	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.143E-02	0.0154
1	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.952E+00	1.0000

* of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio- 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.
Co-60	1.506E-07	0.0000	5.498E-07	0.0000	0.000E+00	0.0000	1.308E-03	0.0002	1.530E-03	0.0002	6.263E-04	0.0001	2.014E-06	0.0000
Co-60	2.627E+00	0.3850	3.280E-07	0.0000	0.000E+00	0.0000	3.111E-02	0.0046	1.601E-02	0.0023	4.303E-03	0.0006	5.301E-06	0.0000
Cs-137	6.316E-01	0.0926	5.028E-06	0.0000	0.000E+00	0.0000	3.043E-02	0.0045	4.264E-02	0.0062	2.642E-02	0.0042	1.037E-05	0.0000
Cs-137	1.232E+00	0.1806	3.441E-07	0.0000	0.000E+00	0.0000	2.439E-04	0.0000	3.291E-04	0.0000	7.516E-06	0.0000	1.326E-06	0.0000
Cs-137	1.311E+00	0.1922	4.395E-07	0.0000	0.000E+00	0.0000	3.548E-04	0.0001	4.767E-04	0.0001	1.093E-05	0.0000	1.931E-06	0.0000
Cs-137	0.000E+00	0.0000	3.791E-09	0.0000	0.000E+00	0.0000	8.291E-06	0.0000	2.779E-04	0.0000	9.481E-06	0.0000	1.126E-07	0.0000
I-131	0.000E+00	0.0000	4.115E-09	0.0000	0.000E+00	0.0000	1.549E-04	0.0000	2.976E-05	0.0000	3.026E-04	0.0000	4.211E-08	0.0000
I-131	0.000E+00	0.0000	9.552E-09	0.0000	0.000E+00	0.0000	4.240E-04	0.0001	6.148E-05	0.0000	8.284E-04	0.0001	1.152E-07	0.0000
Rn-222	4.504E-03	0.0007	1.956E-06	0.0000	0.000E+00	0.0000	6.644E-01	0.0974	5.543E-02	0.0061	4.575E-02	0.0067	3.010E-05	0.0000
Rn-222	2.306E-05	0.0000	1.041E-06	0.0000	0.000E+00	0.0000	8.929E-02	0.0131	4.622E-05	0.0000	2.072E-03	0.0003	2.401E-07	0.0000
Total	5.807E+00	0.8510	3.698E-06	0.0000	0.000E+00	0.0000	8.177E-01	0.1199	1.169E-01	0.0171	8.232E-02	0.0121	4.956E-05	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.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.465E-03	0.0005
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.678E+00	0.3825
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.331E-01	0.1074
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.223E+00	0.1607
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.512E+00	0.4923
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.858E-04	0.0000
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.672E-04	0.0001
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.334E-03	0.0002
Rn-222	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.701E-01	0.1129
Rn-222	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.144E-02	0.0134
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	6.824E+00	1.0000

m of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 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.
-14	1.650E-07	0.0000	6.348E-07	0.0000	0.000E+00	0.0000	1.453E-03	0.0002	1.676E-05	0.0002	6.753E-04	0.0001	2.666E-06	0.0000
c-60	2.961E-00	0.3918	3.383E-07	0.0000	0.000E+00	0.0000	3.111E-02	0.0041	1.601E-02	0.0021	4.503E-03	0.0006	7.068E-06	0.0000
s-137	7.104E-01	0.0940	5.166E-08	0.0000	0.000E+00	0.0000	3.043E-02	0.0040	4.264E-02	0.0056	1.642E-02	0.0038	1.383E-05	0.0000
j-152	1.388E+00	0.1836	3.550E-07	0.0000	0.000E+00	0.0000	2.439E-04	0.0000	3.291E-04	0.0000	7.516E-06	0.0000	1.770E-06	0.0000
j-154	1.477E+00	0.1954	4.533E-07	0.0000	0.000E+00	0.0000	3.548E-04	0.0000	4.767E-04	0.0001	1.053E-05	0.0000	2.575E-06	0.0000
i-55	0.000E+00	0.0000	3.911E-09	0.0000	0.000E+00	0.0000	8.296E-06	0.0000	2.779E-04	0.0000	9.481E-06	0.0000	1.501E-07	0.0000
-59	0.000E+00	0.0000	4.245E-09	0.0000	0.000E+00	0.0000	1.548E-04	0.0000	2.976E-05	0.0000	3.026E-04	0.0000	5.615E-08	0.0000
-63	0.000E+00	0.0000	9.853E-09	0.0000	0.000E+00	0.0000	4.240E-04	0.0001	8.148E-05	0.0000	8.264E-04	0.0001	1.557E-07	0.0000
-90	5.071E-03	0.0007	2.020E-06	0.0000	0.000E+00	0.0000	6.644E-01	0.0879	5.543E-02	0.0073	4.575E-02	0.0061	4.013E-05	0.0000
-99	2.561E-05	0.0000	1.074E-08	0.0000	0.000E+00	0.0000	9.819E-02	0.0118	4.822E-05	0.0000	2.072E-03	0.0003	3.202E-07	0.0000
total	6.542E+00	0.8654	3.682E-06	0.0000	0.000E+00	0.0000	8.179E-01	0.1052	1.170E-01	0.0155	8.238E-02	0.0109	6.608E-05	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.
4	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.810E-03	0.0005
60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.012E+00	0.3986
137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.120E-01	0.1074
152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.588E+00	0.2036
154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.478E+00	0.1955
55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.958E-04	0.0000
59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.973E-04	0.0001
63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.534E-03	0.0002
90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.767E-01	0.1020
99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.144E-02	0.0121
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	7.559E+00	1.0000

* of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio- 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.
C-14	1.716E-07	0.0000	7.097E-07	0.0000	0.000E+00	0.0000	1.582E-03	0.0002	1.605E-03	0.0002	7.259E-04	0.0001	3.317E-06	0.0000
C-60	3.133E+00	0.3949	3.465E-07	0.0000	0.000E+00	0.0000	3.111E-02	0.0039	1.601E-02	0.0020	4.303E-03	0.0005	6.635E-06	0.0000
S-337	7.496E-01	0.0945	5.313E-06	0.0000	0.000E+00	0.0000	3.043E-02	0.0038	4.264E-02	0.0054	2.642E-02	0.0036	1.728E-05	0.0000
U-152	1.466E+00	0.1846	3.636E-07	0.0000	0.000E+00	0.0000	2.439E-04	0.0000	3.291E-04	0.0000	7.518E-06	0.0000	2.213E-06	0.0000
U-154	1.562E+00	0.1969	4.644E-07	0.0000	0.000E+00	0.0000	3.548E-04	0.0000	4.787E-04	0.0001	1.093E-05	0.0000	3.218E-06	0.0000
P-55	0.000E+00	0.0000	4.606E-09	0.0000	0.000E+00	0.0000	8.297E-06	0.0000	2.779E-04	0.0000	9.481E-06	0.0000	1.876E-07	0.0000
I-59	0.000E+00	0.0000	4.348E-09	0.0000	0.000E+00	0.0000	1.549E-04	0.0000	2.976E-05	0.0000	3.026E-04	0.0000	7.019E-06	0.0000
I-63	0.000E+00	0.0000	1.009E-08	0.0000	0.000E+00	0.0000	4.340E-04	0.0001	8.148E-05	0.0000	6.284E-04	0.0001	1.922E-07	0.0000
C-90	5.355E-03	0.0007	2.069E-06	0.0000	0.000E+00	0.0000	6.644E-01	0.0837	5.543E-02	0.0070	4.575E-02	0.0058	5.016E-05	0.0000
C-99	2.676E-05	0.0000	1.300E-08	0.0000	0.000E+00	0.0000	8.929E-01	0.0113	4.822E-05	0.0000	2.072E-03	0.0003	4.002E-07	0.0000
Total	6.916E+00	0.8717	4.056E-06	0.0000	0.000E+00	0.0000	6.180E-01	0.1031	1.171E-01	0.0148	8.242E-02	0.0104	8.260E-05	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.
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.113E-03	0.0005
C-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.184E+00	0.4034
S-337	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.511E-01	0.1073
U-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.467E+00	0.1849
U-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.563E+00	0.1970
P-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.955E-04	0.0000
I-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.873E-04	0.0001
I-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.334E-03	0.0002
C-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.710E-01	0.0972
C-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.144E-02	0.0115
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	7.934E+00	1.0000

* of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon.)

Radio- 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.
-14	2.133E-07	0.0000	1.419E-06	0.0000	0.000E+00	0.0000	2.600E-03	0.0003	3.022E-03	0.0003	1.166E-03	0.0001	1.343E-07	0.0000
0-60	4.279E+00	0.4101	4.021E-07	0.0000	0.000E+00	0.0000	3.111E-02	0.0030	1.601E-02	0.0015	4.303E-03	0.0004	3.534E-05	0.0000
s-137	1.010E+00	0.0968	6.165E-07	0.0000	0.000E+00	0.0000	3.043E-02	0.0029	4.264E-02	0.0041	2.542E-02	0.0027	6.913E-05	0.0000
u-152	1.990E+00	0.1908	4.219E-07	0.0000	0.000E+00	0.0000	2.440E-04	0.0000	3.291E-04	0.0000	7.512E-06	0.0000	6.851E-06	0.0000
z-154	2.127E+00	0.2035	5.369E-07	0.0000	0.000E+00	0.0000	3.549E-04	0.0000	4.767E-04	0.0000	1.053E-05	0.0000	1.267E-05	0.0000
z-55	0.000E+00	0.0000	4.649E-09	0.0000	0.000E+00	0.0000	6.303E-06	0.0000	2.779E-04	0.0000	9.491E-06	0.0000	7.505E-07	0.0000
i-59	0.000E+00	0.0000	5.045E-09	0.0000	0.000E+00	0.0000	1.549E-04	0.0000	2.976E-05	0.0000	3.026E-04	0.0000	2.907E-07	0.0000
-63	0.000E+00	0.0000	1.171E-08	0.0000	0.000E+00	0.0000	4.241E-04	0.0000	8.148E-05	0.0000	8.284E-04	0.0001	7.687E-07	0.0000
-90	7.272E-03	0.0007	2.401E-06	0.0000	0.000E+00	0.0000	6.644E-01	0.0637	5.543E-02	0.0053	4.575E-02	0.0044	2.007E-04	0.0000
-99	3.425E-05	0.0000	1.277E-08	0.0000	0.000E+00	0.0000	8.929E-02	0.0086	4.822E-05	0.0000	2.672E-03	0.0002	1.601E-06	0.0000
tot	9.413E+00	0.9022	5.279E-06	0.0000	0.000E+00	0.0000	8.152E-01	0.0785	1.163E-01	0.0113	8.287E-02	0.0079	3.304E-04	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.
4	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.952E-03	0.0007
60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.330E+00	0.4150
137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.111E+00	0.1065
152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.491E+00	0.1408
154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.124E+00	0.1069
55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.564E-04	0.0000
59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.875E-04	0.0000
63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.335E-03	0.0001
90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.730E-01	0.0741
99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.145E-02	0.0048
1	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.042E+01	1.0000

* of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio- 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.
-14	2.258E-07	0.0000	2.244E-06	0.0000	0.000E+00	0.0000	4.215E-03	0.0004	4.437E-03	0.0004	1.681E-03	0.0001	3.357E-07	0.0000
o-60	4.686E+00	0.4142	4.435E-07	0.0000	0.000E+00	0.0000	3.111E-02	0.0027	1.601E-02	0.0014	4.303E-03	0.0004	8.935E-05	0.0000
s-137	1.100E+00	0.0972	6.787E-08	0.0000	0.000E+00	0.0000	2.043E-02	0.0017	4.264E-02	0.0038	2.842E-02	0.0025	1.728E-04	0.0000
u-152	2.167E+00	0.1916	4.652E-07	0.0000	0.000E+00	0.0000	2.441E-04	0.0000	3.291E-04	0.0000	7.515E-06	0.0000	2.213E-05	0.0000
u-154	2.327E+00	0.2057	5.941E-07	0.0000	0.000E+00	0.0000	5.550E-04	0.0000	4.787E-04	0.0000	1.093E-05	0.0000	3.218E-05	0.0000
z-55	0.000E+00	0.0000	5.125E-09	0.0000	0.000E+00	0.0000	6.366E-06	0.0000	2.779E-04	0.0000	9.481E-06	0.0000	1.676E-06	0.0000
z-59	0.000E+00	0.0000	5.562E-09	0.0000	0.000E+00	0.0000	1.549E-06	0.0000	2.976E-05	0.0000	3.026E-04	0.0000	7.019E-07	0.0000
z-63	0.000E+00	0.0000	1.291E-08	0.0000	0.000E+00	0.0000	4.241E-04	0.0000	8.148E-05	0.0000	6.264E-04	0.0001	1.922E-06	0.0000
z-90	7.916E-03	0.0007	2.647E-06	0.0000	0.000E+00	0.0000	6.644E-01	0.0587	5.542E-02	0.0049	4.575E-02	0.0040	5.016E-04	0.0000
z-99	3.672E-05	0.0000	1.407E-08	0.0000	0.000E+00	0.0000	8.929E-02	0.0079	4.822E-05	0.0000	2.072E-03	0.0002	4.002E-06	0.0000
total	1.029E+01	0.9094	6.500E-06	0.0000	0.000E+00	0.0000	6.266E-01	0.0725	1.198E-01	0.0106	6.338E-02	0.0074	6.260E-04	0.0001

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

Water Independent Pathways

Radio- nuclide	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.
4	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.634E-02	0.0005
60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.737E+00	0.4188
137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.201E+00	0.1062
152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.168E+00	0.1916
154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.328E+00	0.2058
55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.976E-04	0.0000
59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.979E-04	0.0000
63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.922E-06	0.0000
90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.740E-01	0.0684
99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.145E-02	0.0081
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	1.131E+01	1.0000

* of all water independent and dependent pathways.

Total Dose Contributions TDGSE(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)

Radionuclide	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.
-14	2.328E-07	0.0000	3.173E-06	0.0000	0.000E+00	0.0000	5.511E-03	0.0005	6.052E-03	0.0005	2.260E-03	0.0002	6.715E-07	0.0000
-60	4.920E+00	0.4158	4.771E-07	0.0000	0.000E+00	0.0000	3.111E-02	0.0026	1.601E-02	0.0014	4.303E-03	0.0004	1.767E-04	0.0000
-137	1.157E+00	0.0978	7.314E-06	0.0000	0.000E+00	0.0000	3.044E-02	0.0026	4.264E-02	0.0036	2.842E-02	0.0024	3.457E-04	0.0000
-132	2.274E+00	0.1922	5.006E-07	0.0000	0.000E+00	0.0000	2.441E-04	0.0000	3.291E-04	0.0000	7.516E-06	0.0000	4.426E-05	0.0000
-154	2.443E+00	0.2064	6.393E-07	0.0000	0.000E+00	0.0000	3.550E-04	0.0000	4.787E-04	0.0000	1.093E-05	0.0000	6.437E-05	0.0000
-55	0.000E+00	0.0000	5.535E-09	0.0000	0.000E+00	0.0000	8.312E-06	0.0000	2.779E-04	0.0000	9.482E-06	0.0000	3.752E-06	0.0000
-59	0.000E+00	0.0000	5.956E-09	0.0000	0.000E+00	0.0000	1.549E-04	0.0000	2.976E-05	0.0000	3.026E-04	0.0000	1.404E-06	0.0000
-63	0.000E+00	0.0000	1.390E-06	0.0000	0.000E+00	0.0000	4.241E-04	0.0000	8.146E-05	0.0000	6.284E-04	0.0001	3.643E-06	0.0000
-90	8.310E-03	0.0007	2.649E-06	0.0000	0.000E+00	0.0000	6.444E-03	0.0562	5.543E-02	0.0047	4.575E-02	0.0039	1.003E-03	0.0001
-99	3.816E-05	0.0000	1.515E-08	0.0000	0.000E+00	0.0000	8.929E-02	0.0075	4.822E-05	0.0000	2.072E-03	0.0002	8.004E-06	0.0000
total	1.040E+01	0.9130	7.753E-06	0.0000	0.000E+00	0.0000	8.221E-03	0.0695	1.214E-01	0.0103	6.396E-02	0.0071	1.652E-03	0.0001

Total Dose Contributions TDGSE(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

Radionuclide	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.
4	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.411E-02	0.0012
50	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.971E-05	0.4202
137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.259E+00	0.1064
132	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.275E+00	0.1923
154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.443E+00	0.2064
55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.994E-04	0.0000
59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.886E-04	0.0000
63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.538E-03	0.0001
90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.748E-01	0.0655
99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.146E-02	0.0077
1	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.163E-01	1.0000

* of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : Plumbroot Surface Soil AF 10000.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.
P-24	2.374E-07	0.0000	4.488E-06	0.0000	0.000E+00	0.0000	8.067E-05	0.0007	8.287E-03	0.0007	3.075E-03	0.0003	1.343E-06	0.0000
Co-60	5.072E+00	0.4170	5.132E-07	0.0000	0.000E+00	0.0000	3.111E-02	0.0026	1.601E-02	0.0013	4.303E-03	0.0004	3.534E-04	0.0000
S-137	1.190E+00	0.0979	7.867E-05	0.0000	0.000E+00	0.0000	3.044E-02	0.0025	4.264E-02	0.0035	2.842E-02	0.0023	6.913E-04	0.0001
C-152	2.339E+00	0.1923	5.354E-07	0.0000	0.000E+00	0.0000	2.442E-04	0.0000	3.293E-04	0.0000	7.518E-06	0.0000	8.651E-05	0.0000
U-154	2.517E+00	0.2070	6.977E-07	0.0000	0.000E+00	0.0000	3.551E-04	0.0000	4.787E-04	0.0000	1.093E-05	0.0000	1.287E-04	0.0000
Se-55	0.000E+00	0.0000	5.932E-09	0.0000	0.000E+00	0.0000	8.316E-06	0.0000	2.779E-04	0.0000	9.482E-06	0.0000	7.505E-06	0.0000
I-59	0.000E+00	0.0000	6.438E-05	0.0000	0.000E+00	0.0000	1.549E-04	0.0000	2.976E-05	0.0000	3.026E-04	0.0000	2.807E-06	0.0000
I-63	0.000E+00	0.0000	1.495E-06	0.0000	0.000E+00	0.0000	4.241E-04	0.0000	5.148E-05	0.0000	8.284E-04	0.0001	7.687E-06	0.0000
Y-90	8.547E-03	0.0007	3.064E-06	0.0000	0.000E+00	0.0000	6.644E-01	0.0546	5.543E-02	0.0046	4.575E-02	0.0038	2.007E-03	0.0002
Y-99	3.899E-05	0.0000	1.629E-08	0.0000	0.000E+00	0.0000	8.929E-02	0.0073	4.822E-05	0.0000	2.072E-03	0.0002	1.601E-05	0.0000
Total	1.113E+01	0.9148	9.414E-06	0.0000	0.000E+00	0.0000	8.245E-01	0.0678	1.236E-01	0.0102	6.478E-02	0.0070	2.304E-03	0.0003

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 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.
P-24	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.544E-02	0.0016
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.124E+00	0.4212
S-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.293E+00	0.1063
C-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.340E+00	0.1924
U-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.518E+00	0.2070
Se-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.032E-04	0.0000
I-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.900E-04	0.0000
I-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.342E-03	0.0001
Y-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.761E-01	0.0636
Y-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.147E-02	0.0075
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	1.216E+01	1.0000

* of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio- 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.
-14	2.353E-07	0.0000	5.496E-06	0.0000	0.000E+00	0.0000	9.795E-03	0.0000	1.002E-02	0.0000	3.707E-03	0.0003	1.543E-06	0.0000
0-60	5.106E-00	0.4171	5.354E-07	0.0000	0.000E+00	0.0000	3.111E-02	0.0025	1.601E-02	0.0013	4.303E-03	0.0004	2.534E-04	0.0000
s-137	1.196E+00	0.0979	8.205E-08	0.0000	0.000E+00	0.0000	3.044E-02	0.0025	4.264E-02	0.0035	2.842E-02	0.0023	6.913E-04	0.0001
u-152	2.355E+00	0.1924	5.618E-07	0.0000	0.000E+00	0.0000	2.442E-04	0.0000	3.291E-04	0.0000	7.518E-06	0.0000	8.851E-05	0.0000
u-154	2.534E+00	0.2070	7.175E-07	0.0000	0.000E+00	0.0000	3.552E-04	0.0000	4.787E-04	0.0000	1.094E-05	0.0000	1.267E-04	0.0000
u-235	0.000E+00	0.0000	6.189E-09	0.0000	0.000E+00	0.0000	8.318E-06	0.0000	2.779E-04	0.0000	9.482E-06	0.0000	7.505E-06	0.0000
u-238	0.000E+00	0.0000	6.716E-09	0.0000	0.000E+00	0.0000	1.549E-04	0.0000	2.976E-05	0.0000	2.026E-04	0.0000	2.807E-06	0.0000
-63	0.000E+00	0.0000	1.559E-08	0.0000	0.000E+00	0.0000	4.241E-04	0.0000	8.148E-05	0.0000	8.284E-04	0.0001	7.687E-06	0.0000
-90	8.603E-03	0.0007	3.197E-06	0.0000	0.000E+00	0.0000	6.644E-03	0.0543	5.543E-02	0.0045	4.575E-02	0.0037	2.007E-03	0.0002
-99	3.912E-05	0.0000	1.790E-08	0.0000	0.000E+00	0.0000	8.925E-02	0.0073	4.822E-05	0.0000	2.072E-03	0.0002	1.601E-05	0.0000
total	1.120E-01	0.9150	1.064E-05	0.0000	0.000E+00	0.0000	8.261E-01	0.0675	1.253E-01	0.0102	8.541E-02	0.0070	3.304E-03	0.0003

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 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.
4	0.000E+00	0.0000	0.000E+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-02	0.0019
60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.156E+00	0.4214
137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E-00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.300E+00	0.1062
152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.355E+00	0.1924
154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.535E+00	0.2071
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	3.032E-04	0.0000
238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.900E-04	0.0000
63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.342E-03	0.0001
90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.762E-01	0.0634
99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.147E-02	0.0075
1	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.224E+01	1.0000

* of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : Flushing Surface Soil AF.2000m: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.
D-14	2.409E-07	0.0000	6.347E-06	0.0000	0.000E+00	0.0000	1.126E-02	0.0009	1.148E-02	0.0009	4.236E-03	0.0003	1.343E-06	0.0000
Co-60	5.134E+00	0.4172	5.517E-07	0.0000	0.000E+00	0.0000	3.111E-02	0.0025	1.601E-02	0.0013	4.303E-03	0.0003	3.534E-04	0.0000
Cs-137	1.204E+00	0.0978	8.458E-08	0.0000	0.000E+00	0.0000	3.044E-02	0.0025	4.264E-02	0.0035	2.642E-02	0.0023	6.913E-04	0.0001
Cs-137	1.204E+00	0.0978	5.789E-07	0.0000	0.000E+00	0.0000	2.442E-04	0.0000	3.291E-04	0.0000	7.119E-06	0.0000	8.851E-05	0.0000
Cs-137	1.204E+00	0.0978	7.393E-07	0.0000	0.000E+00	0.0000	3.512E-04	0.0000	4.787E-04	0.0000	1.094E-05	0.0000	1.297E-04	0.0000
Fe-55	0.000E+00	0.0000	6.378E-09	0.0000	0.000E+00	0.0000	8.320E-06	0.0000	2.779E-04	0.0000	9.482E-06	0.0000	7.505E-06	0.0000
I-131	0.000E+00	0.0000	6.922E-09	0.0000	0.000E+00	0.0000	1.549E-04	0.0000	2.976E-05	0.0000	3.026E-04	0.0000	2.807E-06	0.0000
I-131	0.000E+00	0.0000	1.607E-08	0.0000	0.000E+00	0.0000	4.241E-04	0.0000	8.146E-05	0.0000	8.284E-04	0.0001	7.687E-06	0.0000
R-90	8.650E-03	0.0007	3.295E-06	0.0000	0.000E+00	0.0000	6.444E-01	0.0540	5.543E-02	0.0045	4.575E-02	0.0037	2.907E-03	0.0002
Cs-137	3.922E-05	0.0000	1.752E-08	0.0000	0.000E+00	0.0000	8.929E-02	0.0073	4.822E-05	0.0000	2.072E-03	0.0002	1.601E-05	0.0000
Total	1.126E-01	0.9152	1.164E-05	0.0000	0.000E+00	0.0000	8.277E-01	0.0673	1.268E-01	0.0103	8.594E-02	0.0070	3.304E-03	0.0003

Total Dose Contributions TDCSE(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.
D-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.695E-02	0.0022
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.186E+00	0.4214
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.306E+00	0.1061
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.368E+00	0.1925
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.548E+00	0.2071
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.032E-04	0.0000
I-131	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.900E-04	0.0000
R-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.342E-03	0.0001
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.762E-01	0.0631
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.147E-02	0.0074
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	1.235E+01	1.0000

* of all water independent and dependent pathways.

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised AF 0.25m.bld

Evaluation Time: 0.0000000E+00 years

Source: 5

	Nuclide	Receptor	Total
		1	
CO-60			
CO-60	1.88E-05		1.88E-05

Source: 6

	Nuclide	Receptor	Total
		1	
CS-137			
CS-137	1.57E-04		1.57E-04

** RESRAD-BUILD Program Output, Version 3.21 03/08/04 15:35:48 Page: 13 **

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised AF 0.5m.bld

Evaluation Time: 0.00000000E+00 years

Source: 5

	Nuclide	Receptor	Total
		1	
CO-60			
CO-60	3.62E-05		3.62E-05

Source: 6

	Nuclide	Receptor	Total
		1	
CS-137			
CS-137	1.57E-04		1.57E-04

* RESRAD-BUILD Program Output, Version 3.21 03/08/04 15:34:23 Page: 13 **

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised AF 1m.blc

Evaluation Time: 0.00000000E+00 years

Source: 5

	Nuclide	Receptor	Total
		1	
	CO-60		
	CO-60	6.77E-05	6.77E-05

Source: 6

	Nuclide	Receptor	Total
		1	
	S-137		
	CS-137	1.57E-04	1.57E-04

** RESRAD-BUILD Program Output, Version 3.21 03/08/04 15:32:32 Page: 13 **
Title : Plumbrook Duplicate
Input File : C:\Program Files\RESRAD Family\BUILD\Plum Brook Revised AF 2m.blc
Evaluation Time: 0.00000000E+00 years

Source: 5

Nuclide	Receptor	Total
	1	
CO-60		
CO-60	1.21E-04	1.21E-04

Source: 6

Nuclide	Receptor	Total
	1	
CS-137		
CS-137	1.57E-04	1.57E-04

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD Family\BUILD\Plum Brook Revised AF 4m.blc

Evaluation Time: 0.0000000E+00 years

Source: 5

Nuclide	Receptor	Total
	1	
CO-60		
CO-60	2.01E-04	2.01E-04

Source: 6

Nuclide	Receptor	Total
	1	
S-137		
CS-137	1.57E-04	1.57E-04

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD Family\BUILD\Plum Brook Revised AF 6m.blc

Evaluation Time: 0.00000000E+00 years

Source: 5

Nuclide	Receptor	Total
	1	
CO-60		
CO-60	2.61E-04	2.61E-04

Source: 6

Nuclide	Receptor	Total
	1	
CS-137		
CS-137	1.57E-04	1.57E-04

** RESRAD-BUILD Program Output, Version 3.21 03/09/04 11:32:27 Page: 13 **
Title : Plumbrook Duplicate
Input File : C:\Program Files\RESRAD Family\BUILD\Plum Brook Revised AF 8m.blc
Evaluation Time: 0.00000000E+00 years

Source: 5

	Nuclide Receptor	Total
	1	
CO-60		
CO-60	3.08E-04	3.08E-04

Source: 6

	Nuclide Receptor	Total
	1	
CS-137		
CS-137	1.57E-04	1.57E-04

* RESRAD-BUILD Program Output, Version 3.21 03/08/04 15:27:53 Page: 13 **
Title : Plumbrook Duplicate
Input File : C:\Program Files\RESRAD Family\BUILD\Plum Brook Revised AF 10m.bld
Evaluation Time: 0.0000000E+00 years

Source: 5

	Nuclide	Receptor	Total
		1	
CO-60			
CO-60	3.48E-04		3.48E-04

Source: 6

	Nuclide	Receptor	Total
		1	
CS-137			
CS-137	1.57E-04		1.57E-04

** RESRAD-BUILD Program Output, Version 3.21 03/08/04 15:26:41 Page: 13 **

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised AF 15m.bld

Evaluation Time: 0.00000000E+00 years

Source: 5

	Nuclide Receptor	Total
	1	
CO-60		
CO-60	4.25E-04	4.25E-04

Source: 6

	Nuclide Receptor	Total
	1	
CS-137		
CS-137	1.57E-04	1.57E-04

** RESRAD-BUILD Program Output, Version 3.21 03/09/04 11:33:27 Page: 13 **

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD Family\BUILD\Plum.Brook Revised AF 25m.bld

Evaluation Time: 0.00000000E+00 years

Source: 5

Nuclide	Receptor	Total
	1	
CO-60		
CO-60	5.28E-04	5.28E-04

Source: 6

Nuclide	Receptor	Total
	1	
CS-137		
CS-137	1.57E-04	1.57E-04

** RESRAD-BUILD Program Output, Version 3.21 03/08/04 15:24:44 Page: 13 **

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised AF 50m.bld

Evaluation Time: 0.00000000E+00 years

Source: 5

Nuclide	Receptor	Total
	1	
CO-60		
CO-60	6.72E-04	6.72E-04

Source: 6

Nuclide	Receptor	Total
	1	
CS-137		
CS-137	1.57E-04	1.57E-04

Title : Plumbrook Duplicate

Input File : C:\Program Files\RESRAD_Family\BUILD\Plum Brook Revised AF 75m.bld

Evaluation Time: 0.00000000E+00 years

Source: 5

	Nuclide	Receptor	Total
		1	
CO-60			
CO-60	7.56E-04		7.56E-04

Source: 6

	Nuclide	Receptor	Total
		1	
S-137			
CS-137	1.57E-04		1.57E-04

**Final Status Survey Plan
for the
Plum Brook Reactor Facility**

**Attachment C
Dose Assessment and DCGL Calculation for Embedded Pipe**

1.0 Purpose

The PBRF contains a number of pipe runs that are embedded in concrete. PBRF has performed an assessment of safety, estimated dose and the cost associated with the removal of the embedded pipe. PBRF has concluded that the increased risk from industrial safety, the time and associated dose from the physical logistics of removing the piping would justify leaving the piping in place. In addition, the cost of removing the pipes is high and far more costly than justified by NRCs \$2000/person-rem ALARA criterion. Therefore, designated sections of embedded pipe (EP) will be remediated in place, undergo FSS, and then filled with grout.

This document describes the geometry and location of the EP to remain, the cost estimate for removing the pipes, and the dose assessment and DCGL calculations for the EP and attached floor drains.

2.0 References

2.1 NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual" (MARSSIM), Revision 1 (June 2001).

2.2 "Decommissioning Plan for the Plum Brook Reactor"

3.0 Discussion

A description of the EP, an assessment of the feasibility of removing the EP and methods anticipated to be used for remediation is contained in Attachment #1.

3.1 Dose Assessment and DCGL Calculation

The dose pathway for EP and floor drains is direct exposure. The ingestion and inhalation pathways are eliminated by a combination of hydrolazing to remove all but the most strongly fixed contamination and filling pipes with grout after remediation and FSS. The assessment includes not only the EPs but also the floor drains connected to the EPs. Also evaluated are the exposed ends of the primary water pipes after cutting during the demolition of the Primary Pump House to the -3' elevation.

The Building Reuse scenario was used for the EP dose assessment. However, a very conservative check calculation of the Subsurface Structure scenario was also performed.

3.1.1 Embedded Pipe

Attachment #2 provides a description of the EPs including the internal diameter (ID), length, and elevations. The applicable facility drawings are referenced. Each of the EPs listed in Attachment #2 were addressed by either a direct dose calculation using Microshield v5.04 or a stated assumption that a given pipe geometry results in lower dose than the EPs specifically evaluated. The assessment method, either direct calculation or assumption, is also stated in Attachment #2.

There are several locations where two or more EPs are contained in a relatively small area. Because the dose pathway is direct radiation, these

EP "clusters" provide a higher dose than any individual pipe. The dose from each of the pipes in a given cluster must be calculated and summed to determine the worst-case dose. The two primary EP clusters are located in the Reactor Building Upper Sub-Basement near the Pump Room wall. The "Worst-Case" cluster was located in the area between the Pump Room and Canal F (see Drawing PF-00376). This location is Worst-Case because it has the highest pipe density (i.e., 11 pipes in an 11'6" wide floor area) and the pipes are closest to the floor surface (i.e., 11").

The Worst-Case EP dose was calculated assuming that a worker stands directly over the center of the pipe cluster for the Building Reuse occupancy time of 2340 hrs/yr. Eleven separate Microshield runs were performed using a "Cylinder Surface" geometry with a concrete slab shield 11" thick. The 11" shield represents the depth of concrete between the pipes and the floor of the Upper Sub-Basement. The models included the appropriate offset as the pipes located further from the center of the cluster were evaluated. The evaluation conservatively assumed that the receptor was at the center of each pipe length. While this is not physically possible because the lengths vary, it provides a simple conceptual approach that does not require extensive reconciliation with drawings and is not excessively conservative.

The source term for the assessment was 1 dpm/100 cm² gross beta. Attachment #3 shows the calculation converting 1 dpm/100 cm² gross beta into nuclide specific source term inputs for the Microshield in units of uCi/cm². While acknowledging that both the Hot Laboratory and ROLB each has embedded piping, the majority of contaminated piping systems either originate or reside in the Reactor and Containment Buildings. Therefore, it was determined that the BOP smear population would be most applicable to the embedded piping. While assessing the data results from within the BOP smear population, it was apparent that the percentage of Co-60 on smears collected in Containment areas that had routinely flooded during reactor operations was significantly higher than areas outside of Containment. Therefore, as a conservative measure, the smears from the Reactor Building were removed from the sample population leaving only the smears taken from the quads and canals. The resulting nuclide distribution that was used for embedded piping is provided in Attachment #3.

The nuclide mixture used in this assessment is considered conservative because over 96% of the gamma radiation is from Co-60, which delivers the highest direct dose per disintegration. However, since the mixture was derived from smears collected on equipment and structure surfaces, additional confirmatory measurements will be performed as a part of the embedded pipe characterization that is planned to support the remediation and final survey of the embedded pipe. This characterization will include scrapings from the internal surfaces of the pipes. The radionuclide

mixture derived from these samples will be checked to ensure that this dose assessment is conservative with the assumed mixture provided in Attachment #3.

Special consideration will be given to the confirmatory nuclide assessment of the primary water pipes (PWP) to ensure that PWPs close to the reactor are evaluated for potential neutron activation. Note that the probability of significant neutron activation is believed to be low. In addition, the confirmatory scrapings of the PWPs will be evaluated to check for the presence of europium isotopes because these isotopes were reported as being present in the one PWP residue sample collected as a part of the 1985 characterization report. Note that a check calculation was performed to confirm that the mixture used in this TBD resulted in a higher dose than the PWP mixture reported in the 1985 characterization report.

Attachment #3 also provides the dose assessment results and the name of the Microshield file used for each assessment (Attachment #4 contains the corresponding Microshield reports). The dose from the worst-case 11 pipe cluster was $1.98\text{E-}05$ mRem/yr at a source term of 1 dpm/ 100 cm² gross beta. The inverse of this value, i.e., $50,500$ dpm/ 100 cm², represents the gross beta residual contamination level that delivers 1.0 mRem/yr.

Two additional EP clusters were evaluated to verify that the selected Worst-Case was limiting; the cluster located north of the Pump Room wall in the Upper Sub-Basement (Drawing PF-00376) and the two primary water pipes (PWPs). These calculations are designated as Check Case 4 and Check Case 6, respectively, in Attachment #3. The check cases were performed by assuming a gross beta source term of $50,500$ dpm/ 100 cm² and confirming that the resulting dose was less than the 1 mRem/yr calculated for the Worst-Case.

Check Case 4 was evaluated because five of the ten pipes in the cluster had a larger diameter than the largest diameter pipe in the worst-case (i.e., $10''$ ID vs. $8''$ ID). However, the elevations of the EPs in Check Case 4 were lower than the worst-case ($-26'-7''$ vs. $-25'-11''$) which provides greater shielding and was expected to more than compensate for the larger pipe IDs. The assessment was conservatively performed by calculating the dose from the longest $10''$ ID pipe and multiplying by 10 to account for all ten pipes, including 5 pipes with smaller IDs. The resulting dose was $6.40\text{E-}03$ mRem/yr.

Check Case 6 evaluates the two $24''$ PWPs. This check was performed because the PWPs have large IDs compared to the Worst-Case. The PWPs are the closest to a floor surface in the Reactor Building "Unexcavated Area" and the Pump House after rising from the $-34'$ elevation to the $-6'-8''$ elevation. The concrete from the floor at $0'$ elevation was assumed to be removed down to the $-3'$ elevation in accordance with the decommissioning plan. This left $2'8''$ of concrete shielding between the top of the pipe and the $-3'$ excavated surface. The

dose from the PWP's assuming a 50,500 dpm/100 cm² gross beta source term was 1.19E-03 mRem/yr.

The remaining EPs listed in Attachment #2 are either isolated individual pipe runs or a part of a small cluster of a few pipes. The IDs are less than or equal to those evaluated in the Worst-Case, Check Case 4, or Check Case 6 and the depth in the concrete is greater than the Worst-Case. Therefore, it was concluded that the dose cannot be greater than the Worst-Case and a specific Microshield assessment was not performed. This conclusion is noted for the applicable EPs in Attachment #2.

3.1.2 Floor Drains

The floor drains required evaluation because they have a different geometry than the EPs. The EPs are generally at a constant depth below the concrete surfaces (a few are sloped). The drains start at the floor surface and extend down a given distance depending on the drain type. There are several different types of floor drains, primarily in the various canals and quadrants, but also in other miscellaneous areas. The JOSAM Series 5586 drain is the most prevalent with a 17.75" ID and a 14.625" depth.

The drains were modeled as "Cylinder Volumes – End Shield" with the receptor at the center of the drain 1 meter above the drain (and floor) surface. As with the EPs, the occupancy time was 2340 hrs/yr. The floor drains were evaluated as check cases using the 50,500 dpm/100 cm² gross beta source term corresponding to 1 mRem/yr for the Worst-Case EP cluster. The total inventory was assumed to be uniformly distributed over the pipe volume.

The results of the four drain check cases are provided in Attachment #3 and designated as Check Cases 1, 2, 3 and 5. Check Case 1 is a single JOSAM 5586 drain. Check Case 2 evaluates two JOSAM 5586 drains that are approximately 6 feet apart in Quadrant C. Check Case 3 evaluates three JOSAM 5586 drains in Canal E that are equidistant at seven feet from a center point. Check Case 5 evaluates a JOSAM 5586 drain and JOSAM 384-J drain that are very close together in the Hot Dry Storage area.

The dose results for Check Cases 1, 2, 3, and 5 were 1.12, 1.10, 0.35, and 1.39 mRem/yr, respectively. Check Case 1 shows that a single JOSAM 5586 floor drain results in 1.12 mRem/yr at 50,500 dpm/100 cm² gross beta. This means that individual drains will have a lower DCGL than the EPs by a factor of 1/1.12. Check Case 2 indicates that the two drains in Quadrant C will have a lower DCGL by a factor of 1/1.10. Check Case 5 indicates that the two drains that are very close together in Canal E will have a lower DCGL by a factor of 1/1.39.

The lower DCGLs estimates for drains assume that the same dose goal is used for the EPs and drains, for example, 1 mRem/yr. However, at the

discretion of PBRF, different dose goals could be applied in different areas as long as the residual contamination on the structure surface in the survey unit containing the given drain or EPs is sufficiently low to allow for the selected dose goal. For example, if the FSS results indicate that the residual contamination level in the Dry Hot Storage area is 0.5 DCGL, the dose from the two drains in this survey unit could be as high as 12.5 mRem/yr. The same logic applies to the EPs, either generically or individually.

3.1.3 Primary Water Pipe Open Ends

The open ends of the assumed cut PWP's at the -3' elevation of the Primary Pump House were evaluated because they have a geometry that differs from the standard EPs. The geometry of the PWP open ends is the same as the drains and was modeled using the Microshield "Cylinder Volumes -End Shield" geometry. The receptor was assumed to be 1 m above the mid-point between the two PWP's. This results in an offset of 16.5" from the center of each pipe. The PWP's were modeled as 2'8" high, 24" ID Cylinder Volumes with a gross beta contamination level of 50,500 dpm/100 cm². The total inventory was assumed to be uniformly distributed over the pipe volume.

The dose from the PWP open ends was 2.64 mRem/yr as shown in Check Case 7 of Attachment #3. This dose result applies only to the 2'8" lengths of PWP's that rise from the -6'8" elevation to the assumed -3' excavated surface in the Primary Pump House. The DCGL for these 2'8" lengths of PWP would be 1/2.64 of the generic EP DCGL if one DCGL is selected for all EPs. However, as discussed above, the DCGL selected for this specific 2'8" length of PWP can vary from a generic value depending on the dose goal selected and the residual contamination level on the structures comprising the survey unit containing this pipe.

3.1.4 Subsurface Structure Check

The final check calculation was an assessment of the bounding dose from the EP using the Subsurface Structure scenario. This check was performed by assuming that the total radionuclide inventory in the EPs is instantaneously released to the subsurface volumes of the Reactor Building, Hot Laboratory, and Primary Pump House. This is extremely conservative because the material remaining on the EPs after remediation will be strongly fixed to the pipe surfaces and the grouting will further secure the contamination from future release.

The Subsurface Structure calculation is provided in Check Case 8 in Attachment #3. Under the assumption of 100% instantaneous release, the dose was 0.49 mRem/yr assuming a contamination level of 50,500 dpm/100 cm² gross beta. The actual release rate is controlled by the dissolution of the fixed contamination and the diffusion through long lengths of pipe after dissolution. These factors would be combined with

radionuclide decay to determine the concentrations that actually enter the Subsurface Structures. It is very likely that the combination of the dissolution, diffusion, and decay will limit the release to levels much less than 100% of the entire inventory remaining after remediation.

3.2 Embedded Pipe DCGLs

Based on the analyses provided in Attachment #3, the following DCGLs were selected to represent 1 mRem/yr. As discussed above, the dose goal for EPs and drains may be adjusted at the discretion of PBRF, either generically or individually. The DCGLs provided in Table 3-1 below would be adjusted accordingly if the dose goal were set at a value other than 1 mRem/yr. For example, if 50,500 dpm/100cm² equates to 1 mRem/yr, then 101,000 dpm/100cm² equates to 2 mRem/yr, 151,500 dpm/100cm² equates to 3 mRem/yr and so on.

Table 3-1 – Embedded Pipe and Drain DCGLs

Embedded Pipe or Drain	DCGL at 1 mRem/yr Dose Goal (dpm/100 cm ² Gross Beta)
Embedded Pipe (Worst-Case)	50,500
Individual Floor Drain (Check 1)	45,000
Two 5586 Drains in Quadrant C (Check 2)	45,900
Two Drains in Hot Dry Storage (Check 5)	36,300
Cut Open Ends of PWP's in Primary Pump House (Check 7)	19,100

3.3 Embedded Pipe Area Factors

The area factors were developed using methods that are directly analogous to those recommended for structures in MARSSIM. An area factor is the multiple of the DCGL that is permitted in the area of elevated residual radioactivity without remediation. The area factor is related to the size of the area over which the elevated activity is distributed. That area is generally bordered by levels of residual radioactivity below the DCGL and is determined by the investigation process. First, the dose from a 63' length of 10" pipe was calculated (the average length of the EPs was 63' and 10" ID was selected as an average diameter). Additional dose assessments were then performed at lengths ranging from 0.25' to 20'. The ratio of the dose at 63' to the dose at each smaller length is the area factor. Table 3-2 lists the EP area factors. As an additional control, the number of elevated areas will be limited to ensure that the total inventory remaining in each EP will be maintained at the level that would be present if the entire pipe were contaminated at the DCGL level.

Table 3-2 – Embedded Pipe Area Factors

Pipe Length (ft)	mRem/hr	Area Factor
63	2.59E-11	1.00E+00
20	2.59E-11	1.00E+00
10	2.49E-11	1.04E+00
5	1.91E-11	1.36E+00
2	9.18E-12	2.82E+00
1	4.74E-12	5.46E+00
0.5	2.39E-12	1.08E+01
0.25	1.20E-12	2.16E+01

4.0 Addendums

- Addendum 1 Description of PBRF Embedded Piping Designated to Remain in Place
- Addendum 2 Description of Embedded Piping at PBRF
- Addendum 3 Dose Assessment for Embedded Piping and Associated Drains
- Addendum 4 Microshield Reports for Embedded Piping and Drain Dose Assessment
- Addendum 5 Embedded Piping Drain Specifications

**Final Status Survey Plan
for the
Plum Brook Reactor Facility**

**Attachment C
Dose Assessment and DCGL Calculation
for Embedded Pipe**

**Addendum 1
Description of PBRF Embedded Piping Designated to
Remain in Place
(9 Pages)**

Description of PBRF Embedded Piping Designated to Remain in Place

The pending Step 3 Schedule and its related Estimate of Cost anticipates that all embedded piping will remain in place in lieu of being removed. The term "embedded piping" as used herein is defined as any pipe conduit situated three feet or more below grade elevation which is totally encased within structural concrete. Further, the term embedded piping is intended to be construed as the primary cooling loop conduits along with any of the Quadrant and Canal piping meeting the definitional criteria set forth above.

The embedded piping which remains in place will be radiologically surveyed and subsequently decontaminated to the extent required by License Termination derived concentration guideline ("DCGL") limits presuming that the same are as low as reasonably achievable ("ALARA"). The decontaminated conduit will be grouted with a non-shrink, non-metallic grout following the conclusion of the decontamination effort.

The review of crud sample data generated during the Facility's operational life cycle coupled with information gained by means of interviewing former NASA personnel that worked at the Plum Brook Reactor Facility ("PBRF") during its operational history clearly indicate that the embedded piping systems are not grossly contaminated.

In fact, it is almost a given that the need to decontaminate the embedded piping will be driven more by ALARA considerations than the need to "knock down" residual contamination in order to meet License Termination DCGLs. In other words, some level of effort must be put forth to decontaminate the activity levels present within the embedded piping. Even if the existing dose rates either meet or are lower than License Termination DCGLs, NRC License Termination regulations dictate that an effort must be put forth to assure the Project's stakeholders that the residual dose rates are ALARA. Simply surveying a pipe and verifying that the residual dose rate comports itself with License Termination DCGLs does not enable a Licensee the liberty of not attempting to further reduce the residual dose rate.

The three (3) primary drivers leading to the decision to leave the embedded piping in place were safety, waste and cost related issues when compared to the benefit derived by removing the embedded piping from its present location. A discussion of the three (3) decision making drivers follows:

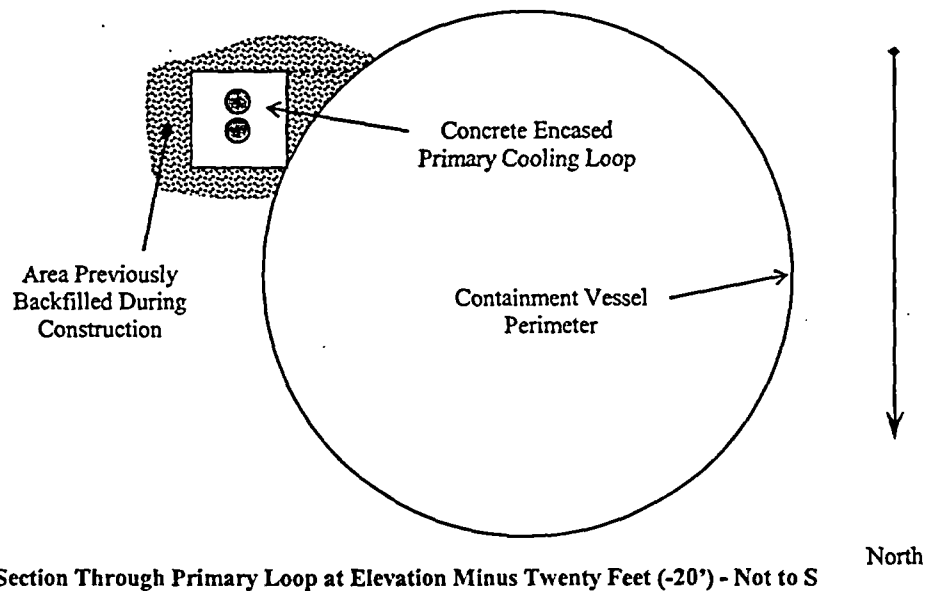
Safety related concerns above and beyond those traditionally associated with any reactor decommissioning project were primarily linked to the removal of the primary cooling loop portion of the embedded piping situated at the PBRF Site. The additional safety related matters associated with the removal of the primary cooling loop were generated by the routing of the primary cooling loop from the Primary Pump House to the Reactor Tank.

The routing of the primary cooling loop is best described as starting at one end within Room Four (4) of the Primary Pump House. This initial run of pipe is oriented vertically as opposed to along the horizontal and terminates at a set of elbow sweeps. The two (2) stainless steel conduits exit the sweep elbows traveling westerly in direction into the Reactor Building terminating at yet another set of sweep elbows. At a point near the Containment Vessel, the loop descends vertically to approximate elevation minus thirty-five feet (-35') traveling downward in direction alongside the Containment Vessel. The vertical run adjacent to the Containment Vessel ends with a set of sweep elbows which reorient the pipe along the horizontal and redirect the conduits

to the west. After a short horizontal run, the two (2) conduits enter the confines of the Containment Vessel. The loop continues along its westerly heading beneath the floor of the Canals of the Containment Vessel to the midpoint of Quadrant B. At the midpoint of Quadrant B, the loop turns north and terminates at the Reactor Tank.

The routing of the primary cooling loop in this vicinity in which the safety related issues related to the removal of the primary cooling significantly exceed those safety concerns traditionally associated with removing embedded conduits.

The removal of the two (2) coolant conduits in the subject area is extremely problematic. As previously discussed, the supply and return coolant lines within this area are oriented in a vertical attitude for the initial portion of the pipe run and in a horizontal position for the balance of the run. However, the spatial orientation of the pipes is not the dilemma. The physical location of the two (2) pipes is the problem. The conduits, encased within concrete, lie outside of the Containment Vessel's steel liner plate and below the minus fifteen foot (-15') elevation within Structure 1111 in what was, at the time that the PBRF was constructed, an excavated area. The graphic depicted below will assist in clarifying the discussion to follow.



Section Through Primary Loop at Elevation Minus Twenty Feet (-20') - Not to S

The north-south dimension of the concrete encasing the primary cooling conduits in the vertical orientation is fifteen feet (15'), while the east-west dimension of the concrete encasement is eleven feet (11'). It should be noted that the structural concrete encasement is not symmetrical about the two (2) cooling conduits. The primary supply and return line are centrally located within the encasement detail with respect to an east-west orientation. The outer edges of both pipes, when compared to the centerline of the encasement in an east-west view, are located four feet, six inches (4'-06") from the outside edges of the encasement. However, the pipes are offset when contrasted to the centerline of the north-south perspective. The southerly edge of the return line, the more southerly of the two (2) conduits, is located four feet, six inches (4'-06") distant from the south edge of the encasement detail. The northerly edge of the supply line, however, is located six feet (6') in from the northerly face of the structural concrete encasement.

Further, review of the diagram depicting a cross-section view through the primary cooling loop at elevation minus twenty feet (-20'), indicates that although the northwest corner of the concrete encasing the primary cooling loop is tangent to the Containment Vessel's steel liner plate, the southwest corner of the encasement is some eleven feet ($\approx 11'$) distant from the steel liner plate.

The only practical means of accessing the two (2) pipes is via removal of the Canal "E" wall and the associated Containment Vessel steel liner plate adjacent to the location of the concrete encasing the supply and return lines. Although the area beneath elevation minus fifteen feet (-15') in the vicinity of the cooling pipes within Structure 1111 is characterized in various dated NASA documents and the PBRF Decommissioning Plan as "unexcavated", such is not the case. To the contrary, review of the photographs taken during the construction of the PBRF indicates that the bedrock and its overburden in the subject area were grossly "over-excavated" to accommodate the construction process. That void was backfilled with some material which, although compacted during placement, obviously, was more porous than the bedrock material that it replaced. Accordingly, a high degree of likelihood exists that groundwater will be present, to some degree, at elevation minus thirty-five feet (-35') which is the bottom elevation of the coolant pipes as the same exit the Containment Vessel.

Therefore, removal of the Canal "E" wall along with the Containment Vessel's steel liner plate adjacent thereto will, almost certainly, invite and promote the inflow of groundwater into Structure 1111. Notwithstanding when this event is sequenced within the PBRF Decommissioning Schedule, the same is certain to require a dedicated level of effort to manage and control groundwater to preclude the groundwater from infiltrating into Structure 1111 during coolant pipe removal operations.

The removal of a portion of the exterior wall of Canal "E" is somewhat challenging, in, and of, itself. The challenge presents itself in the form of the fact that the exterior wall of Canal "E" in the area of concrete removal operations required to gain access to the exterior primary cooling loop concrete encasement detail [elevation minus twenty-five feet (-25') to elevation minus fifteen feet, six inches (-15'-06")] is two foot (2') thick. However, the residual portion of the Canal "E" exterior concrete wall above the removal limits [elevation minus fifteen feet (-15') to the underside of the concrete walk appearing at, or near, elevation zero feet (0') within the Containment Vessel] is one foot (1') thick. Twenty-four linear feet (24 l.f.) of the lower Canal "E" wall, as measured along the wall adjacent to the exterior primary loop encasement detail, must be removed to ultimately access the subject concrete encasement system.

Accordingly, some provision must be made available and supplied to stabilize and support the thinner, upper residual portion of the Canal "E" wall during, and following, the removal of the thicker, lower portion of the wall while accessing the Containment Vessel's steel liner plate.

The need to stabilize and support the upper residual wall of Canal "E" could be accomplished in any one (1) of several manners. However, one (1) of the two (2) following applications appears most logical for incorporation into the work plan pertaining to the PBRF decommissioning effort:

Either provide structural shoring and falsework to support the residual wall above the area in which the lower portion is removed to access the Containment Vessel's steel liner plate or remove the upper portion of the Canal "E" to elevation zero feet (0') thereby negating the need to stabilize and support the "residual wall".

Another problem, perhaps of far greater significance and bearing upon embedded piping removal operations than the potential inflow of groundwater into Structure 1111, is the need to remove a significant amount of backfill material located between the steel liner plate of the Containment Vessel and the concrete which encases the primary cooling loop conduits. This vertical "wedge" of saturated backfill material must be removed to gain access to the north face of the concrete encasing the two (2) conduits.

The backfill material situated between the steel liner plate and the north face of the concrete encasing the primary cooling loop must be removed from elevation minus thirty-five feet (-35') to elevation minus fifteen feet six inches (-15'-06"). Therefore, approximately, one thousand, one hundred eighty cubic feet ($\approx 1,180 \text{ ft.}^3$) of backfill material must be removed from the subject location.

The installation of either a cutoff wall system, traditionally some form of driven sheet pile, or a mechanical dewatering system, for example, either wellpoints or vacuum wells, will not be practical in the light of access related issues coupled with the need to remove a significant amount of backfill material to gain access to the concrete encasing the primary cooling loop.

The lack of sufficient "working" height on the floor situated at elevation minus fifteen feet (-15') will effectively preclude the installation of a steel sheet pile cutoff wall. Neither a wellpoint nor a vacuum dewatering system will, in all likelihood, stabilize the saturated backfill material in need of being removed to gain access to the concrete encasing the primary cooling loop to a point sufficient so as to accommodate the safe and systematic removal of the backfill material. Despite the presence of any dewatering system, groundwater will continue to flow into the area which will continually destabilize the backfill material in the vicinity of the concrete encasement system.

It would appear, at this juncture, and for the want of sufficient hydrogeological data in the vicinity of the encased "exterior" cooling loop pipes, that the most effective means of controlling the potential groundwater problem would be to introduce a grout material into the area thereby "gelling" the ground and inhibiting the flow of groundwater to the perimeter of the Containment Vessel.

The grout would be introduced into the backfill area adjacent to the encased cooling loop conduits by virtue of injecting material, be the same either naturally occurring or manmade (chemical). The material, as function of which grouting system is selected, would be introduced either directly into a hole or into a pipe inserted into a hole which is drilled into the backfilled area from the minus fifteen foot (-15') elevation.¹ The choice of grouting media is a function of the soil grain sizes into which the grout is injected. Therefore, additional hydrogeological studies will be required to assist in selecting the most effective grouting procedure, from both a soil stabilization and cost perspective, to be utilized to gel the backfill material in the vicinity of the concrete encased primary cooling conduits.

Presuming that the problems attendant to removing the backfill material situated between the Containment Vessel's steel liner plate and the north face of the cooling loop's concrete encasement, along with those issues associated with maintaining a reasonably dry work environ,

¹ Although it has been stated that it will not be practical to install either well points or sheet piling; it will be realistic to bore a hole into the backfill media adjacent to the encased primary loop piping through the utilization of either five or six foot (5' or 6') long hollow stem auger sections.

can be reined in and controlled; yet another challenge is encountered with regard to removing the concrete encasement enveloping the two (2) pipes.

Once the west face of the concrete encasing the two (2) cooling conduits has been exposed, the task at hand now consists of demolishing that encasement for a vertical height of approximately twenty feet ($\approx 20'$), elevation minus thirty-five feet ($-35'$) to elevation minus fifteen feet six inches ($-15'-06''$), while standing off from the face, at the midpoint of the west face in the north-south direction, for a distance of approximately ten to eleven feet ($\approx 10'-11'$), approximately five plus feet ($\approx 5+'$) from the Containment Vessel to the encasement's face plus an additional four feet, six inches ($4'-06''$) of concrete cover to the two (2) conduit's most westerly edge.

The utilization of an excavator mounted hydraulic hammer (hoe-ram) has been eliminated from consideration as the demolition tool of choice. The sole reason for eliminating the hoe-ram as the means of demolishing the cooling loop's concrete encasement detail was that of the need to preserve the fragile structural integrity of the stabilized soil in the vicinity of the encasement detail. The vibratory energy generated by hoe-ram operations would have migrated into and through the stabilized soil thereby potentially weakening the bonding between soil grains which was created via the gelling operation.

Any significant failure of the congealed soil could have catastrophic results. Either a cave-in or a sudden inrush of groundwater could seriously jeopardize the health and the well being of any site personnel in the vicinity during said occurrence. Absent the presence of site personnel, either a cave-in or a sudden inrush of groundwater could seriously impede the future progress of the removal operations and may increase the level of difficulty related to future radiological survey efforts.

A resolution to the access related issues (height imposed) attendant to the removal of the concrete encasement within the area would be to employ a "platform based" demolition system. The installation of a mast mounted work platform would provide laborers direct access to the front face of the encasement detail within the removal area. The work platform ascends and descends along a track which is affixed to the mast. Note: the installation of the mast mounted work platform will also be of further benefit during the removal of the primary pipe's sheathing system which is to be discussed later.

Laborers could either demolish the concrete by utilizing hand held, pneumatically powered, chipping hammers or drill holes into the concrete and fracture the structural concrete with hydraulic splitting tools. The operational procedures related to utilizing pneumatic powered chipping hammers are rather self-explanatory, however, the employment of hydraulic splitting tools may require further explanation.

The hydraulic splitting of concrete is a two (2) step procedure:

A series of holes are drilled into the concrete's outermost surface. The number of, the depth of, and the spacing of, the holes is determined by the particular hydraulic splitting system that is incorporated into the work effort (manufacturer and model driven).

Following the completion of the drilling operation, an expandable mechanical insert is placed into each hole. The insert is attached to a hydraulic pump via hydraulic hose. As the pressure is increased within the hydraulic system, the inserts begin to expand in diameter. The expansion of the inserts creates a pressure buildup within the structural concrete. At some juncture during the

insert's expansion effort, the concrete will crack to relieve the internal pressure imposed within the concrete by the insert's expansive action. Presuming that the holes were drilled to the right depth and at the correct spacing, the cracking effect will stream from one (1) hole to adjacent holes. That concrete which is not dislodged as a result of the initial fracturing operation can be easily removed with the assistance of a chipping hammer. The drilling and splitting operation is repeated in successive intervals (depths) until the desired depth of removal has been achieved.

The removal of the concrete encasing the primary loop conduits will not, however, expose the two (2) stainless steel pipes. A carbon steel "sheathing" system is situated between the structural concrete encasement and the two (2) pipes.

Upon exiting the confines of the Containment Vessel and prior to entering the Primary Pump House, the two (2) cooling conduits were enclosed within a specially constructed sheathing system prior to the placement of the more substantial concrete encasement structure. The primary pipe sheathing system was a box-like structure, the interior of which measured five feet, six inches by three feet (5'-06" x 3').

The exterior walls of the sheathing box were constructed of one-half inch ($\frac{1}{2}$ ") thick steel plate. The steel plate's exterior surface was stiffened at various locations along its route by the addition of either several six inch (6") wide flanges sections or several six inch (6") angle iron shapes. A three inch diameter (3"Ø) steel pipe was welded vertically at the midpoint of the sheathing box at the same location wherein the exterior stiffening devices were installed.

Further, review of NASA Drawing PF-00382, indicates that the steel sheathing box was filled with concrete, grouted, from the conduit's point of exit from the Containment Vessel to a point in the vertical riser section of the sheathing box outside of the Containment Vessel equivalent to elevation minus thirty feet, six inches (-30-06"). It is unclear, from further review of available Drawings, as to why the concrete grouting operation was terminated at that point.

Although it is uncertain that the entire run of the primary cooling loop situated within the steel sheathing is grouted in place; it is certain that the two (2) conduits are not just "dangling in air" within the confines of the sheathing. Review of NASA Drawing PF-00424 clearly indicates that either some type or form of either supports or anchors were provided for the supply and return line of the primary cooling loop system within the interior of the steel sheathing. The two (2) conduits, while in a horizontal orientation, each "sit" within a saddle that envelopes the lower half of each conduit to its spring line. While in a vertical orientation, each of the two (2) pipes is captured between two (2) smaller saddles. Each one (1) of the two (2) smaller saddles circumscribes the pipe through an arc segment of sixty degrees (60°). Accordingly, one-third of the circumference of each pipe is in contact with, and captured between, these two (2) smaller saddles. Review of the subject drawings does not indicate any weldment material between the saddles and the cooling loop conduits. The presence of the subject saddles will, in all likelihood, preclude the possibility of exposing a run of conduit, cutting the same, and subsequently being successful in "pulling" the next section into place to continue with successive cutting operations. Therefore, it is presumed, at a minimum, that one (1) face of the entire sheathing system and the concrete encasing the same will have to be removed in order to remove the embedded primary piping system.

Following the removal of the concrete cover over the sheathing box, one (1) side of the sheathing box must be removed to gain access to the two (2) conduits housed within the steel box.

Obviously, the structural shapes that stiffened the sheathing box will also have to be removed along with the steel plate face of the sheathing box. The steel components comprising the steel sheathing box will have to be flame cut with a torch to remove the same.

Given the interior spatial constraints imposed upon the sheathing by the two (2) pipes housed within, there is not sufficient space available in which to manipulate a hydraulic shear for the purposes of removing the steel sheathing. The void area between the box's perimeter and the outside diameter of the cooling pipes is rather nominal, in some instances as narrow as six inches (6"). Therefore, the shear would not be capable of opening and closing without contacting one (1) of the two (2) pipes thereby interfering with the shear's operation and effectiveness. Moreover, the utilization of a shear would require that the shear have access to at least three (3) sides of the steel sheathing box thereby increasing the amount of concrete which must be removed as part of embedded pipe removal operations within the area.

The need to flame cut the sheathing box drove the commentary above with regard to the dual benefit derived by the erection and utilization of the mast mounted work platform for the purposes of "manually" opening and demolishing the cooling loop's concrete encasement.

It must be noted that the foregoing discussion pertaining to the difficulties associated with, and the challenges presented by, attempting to remove the primary cooling loop in the subject area only address those difficulties and challenges allied with removing the pipe from elevation minus twenty-five feet (-25') to elevation minus fifteen feet (-15'). The piping run continues vertically outside of the Containment Vessel for an additional depth of ten feet (10') and horizontally for an additional seven feet at elevation minus thirty-five feet (-35').

Discussion of the removal operations in that vicinity would only serve to belabor the discussion had above pertaining to removal operations from elevation minus twenty-five feet (-25') to elevation minus fifteen feet (-15'). Suffice it to say that removing the cooling loop conduits from elevation minus twenty-five feet (-25') to elevation minus thirty-five feet (-35') present just as great, if not greater, challenges and complexities as those described in detail above.

That which follows is a recapitulation of the activities which elevate the safety risks attendant to removing the primary cooling loop conduits above those traditionally associated with reactor decommissioning projects:

Working underground, outside of the exterior perimeter of the Containment Vessel's steel liner plate, and beneath elevation minus fifteen feet (-15'), the Site labor forces must rely on the soil stabilization system to prevent either a cave-in in, or an onrush of groundwater into, the work area.

The removal of the primary cooling loop and the Quadrant and Canal embedded piping in other areas of the Reactor Building beyond that area discussed at length above entails the use of large hydraulic hammers (hoe-rams) for extended periods of time. The utilization of hoe-rams may require that the Project to reevaluate its industrial safety program and amend its work practices accordingly in the light of the following concerns:

Increased fugitive dust emissions potentially creating a need to monitor silica emissions.

Significantly increased noise levels throughout the entire building.

The usage of a hoe-ram introduces the need to manage and control access to the work area, and adjacent environs, by persons not directly involved in the hoe-ram operation in the light of the flying debris generated by the hoe-ram's operation.

The effort to remove the pipe itself and the pipe sheathing entails a significant amount of torch flame cutting and rigging and lifting. Those particular tasks are inherently risk fraught activities and every effort should be made to minimize the durations of those particular types of activities.

The removal of the embedded piping at the PBRF Site generates a significant amount of radiologically contaminated waste and "potentially releasable" waste. The term "potentially releasable" waste also connotes that the subject may be potentially contaminated. The potentially releasable waste stream must be transferred to a licensed waste processor. The waste processor will, in turn, radiologically survey the subject waste and dispose of the same in an appropriate manner. The waste processor's fee is, obviously, significantly greater than the disposal costs associated with the disposing of clean debris.

It is presumed that the uppermost level of the concrete encasement surrounding the conduit, generally presumed to be floor elevation, will be treated as radiologically contaminated demolition debris. The concrete below floor elevation to the bottom of the embedded conduit would more likely than not be categorized as potentially releasable material. The elevation at which the contaminated zone interfaces with the potentially releasable strata can only be determined following field characterization efforts. The majority of the embedded piping, if not the entirety of the embedded must be disposed of as radiologically contaminated waste.

The table appearing below details the types of waste and the quantities of waste generated by the removal of the embedded piping systems situated at the PBRF Site:

Type of Waste	Weight, in Pounds
Concrete Rubble. Note: the weight includes both radiologically contaminated and potentially releasable rubble.	3,397,000
Ferrous Debris. Embedded piping and primary cooling loop sheathing.	60,400
Soil. Backfill material adjacent to the Containment Vessel's steel liner plate.	107,700
TOTAL	3,565,100

The generation of unnecessary radiologically contaminated waste and clean waste runs contrary to the waste minimization standards established by NASA, the NRC, and those mandated by Congress in the Hazardous and Solid Waste Amendment of 1984 to the 1976 Resource Conservation and Recovery Act.

The Waste Minimization Act flows from the 1976 Resource Conservation and Recovery Act ("RCRA"). The Hazardous and Solid Waste Amendments of 1984 amended the RCRA. Congress established a new policy concerning hazardous waste management. Specifically, Congress declared that either the reduction or the elimination of hazardous waste generation at the source should take priority over the management of hazardous wastes after the same are generated.

The in-situ decontamination of the embedded piping generates appreciably less waste than does the removal process. As of this moment, it appears that hydrolasing technology will be the decontamination technology of choice. The Project will have the ability to treat aqueous waste stream generated by the hydrolasing, operation and be in a position to potentially release some portion of that aqueous waste stream in the form of clean water.

The estimated cost of removing the primary cooling loop is approximately eight to ten million dollars (\approx \$8,000,000-\$10,000,000). That costs is the combined cost of field removal operations, waste disposal costs and the costs associated with extending the critical path of the Project's Schedule by approximately eight (\approx 8) months.

**Final Status Survey Plan
for the
Plum Brook Reactor Facility**

**Attachment C
Dose Assessment and DCGL Calculation
for Embedded Pipe**

**Addendum 2
Description of Embedded Piping at PBRF
(2 Pages)**

PBRF EMBEDDED PIPE

		Pipe Diameter	Length	Ref. Dwg(s)	Lowest Elevation	End Elevation	Dose Assessment
Dry Annulus inside CV @ -25 ft. level							
	Hot Drain	4"	131.5 ft.	PF-00376	-29'-0"	-27'-7"	No dose assessment Dose less than Worst Case because pipe density less, pipe IDs same or less, and depth of concrete shielding greater
	Sub-pile room drain	6"	46 ft.	PF-00375 PF-00382	-44'-10" -44'-0"	-37'-6"	
SW Area of Reactor Building @ -25 ft. level							
Quadrant - D -25'-0" Floor	Purge Line	3"	149.5 ft.	PF-00375 PF-00376	-27'-6"	-25'-11"	Check 4
	Drain Line	10"	149 ft.		-27'-6"	-25'-11"	Check 4
Quadrant - C -25'-0" Floor	Purge Line	3"	78 ft.	PF-00376	-27'-6"	-25'-11"	Check 4
	Drain Line	10"	91 ft.		-27'-6"	-25'-11"	Check 4
Quadrant - B -27'-0" Floor	Purge Line	3"	78 ft.	PF-00376	-27'-6"	-26'-6"	Check 4
	Drain Line	10"	40.5 ft.		-27'-6"	-26'-1"	Check 4
Quadrant - B Thermal Column -27'-0" Floor	Drain Line	6"	46 ft.	PF-00376	(Slope) From -27'-7" to -27'- 6"		No dose assessment Dose less than Worst Case because pipe density less, pipe IDs same or less, and depth of concrete shielding greater
	Waste Cooling Air	6"	42.5 ft.				
	Drain Line RT	6"	46.5 ft.		(Slope) From -28'-6" to -28'- 7"		
	Lily Pad Vent	2"	47.5 ft.				
Drain Line	2.5"	48 ft.					
Quadrant - A -25'-0" Floor	Purge Line	3"	36 ft.	PF-00376	-27'-6"	-26'-9"	Check 4
	Drain Line	10"	41.5 ft.	PF-00385	-27'-6"	-25'-11"	Check 4
Canal - E -25'-0" Floor	Purge Line	3"	23.5 ft.	PF-00376	-27'-6"	-25'-11"	Check 4
	Drain Line	10"	56 ft.		-27'-6"	-25'-11"	Check 4
Canal - F -25'-0" Floor	Purge Line	3"	19.5 ft.	PF-00376 PF-00385 PF-00403	-25'-11"	-25'-11"	Worst Case
	Drain Line	6"	20 ft.		-25'-11"	-25'-11"	Worst Case
Canal - G -25'-0" Floor	Purge Line	3"	39 ft.	PF-00376	-25'-11"	-25'-0"	Worst Case
	Drain Line	6"	42 ft.	PF-00403	-25'-11"	-25'-0"	Worst Case

	Overflow	8"	52 ft.				Worst Case
Canal - H -25'-0" Floor	Purge Line	3"	90.5 ft.	PF-00376 PF-00403 PF-00405	-25'-11"	-2'-6"	Worst Case
	Drain Line	6"	81 ft.		-25'-11"	-25'-0"	Worst Case
	Drain Line	4"	37.5 ft.		-25'-11"	-1'-10"	Worst Case
	Vent Line	2"	99 ft.		-29'-9"	-24'-0"	No dose assessment – air line
	Drain Line	2"	82.5 ft.		-31'-11" -25'-8"	-24'-0"	Worst Case

Hot Laboratory Building

Canal - J -25'-0" Floor	Purge Line	6"	6 ft.	PF-00387 PF-04541 PF-04645	-26'-0"	-25'-0"	No dose assessment Dose less than Worst Case because pipe density less, pipe IDs same or less, and depth of concrete shielding greater
	Drain Line (Overflow)	4"	87 ft.		-29'-3"	-25'-0"	

Canal - K -25'-0" Floor	Purge Line	3" WI	47 ft.	PF-04541 PF-04645	-26'-0"	-25'-0"	Worst Case
	Drain Line	6" WI	52 ft.			-25'-0"	Worst Case

Valve Pit -28'-0" Floor	Purge Line	3"	34 ft.	PF-00378 PF-04645	-27'-0"	-26'-5"	No dose assessment Dose less than Worst Case because pipe density less, pipe IDs same or less, and depth of concrete shielding greater
	Drain Line	6"	37 ft.		-27'-0"	-26'-5"	

Hot Dry Storage -25'-0" Floor	Drain Line	4"	131 ft.	PF-00376 PF-00387 PF-04645	-28'-2"	-25'-0"	No dose assessment. Dose less than Worst Case because pipe density less, pipe IDs same or less, and depth of concrete shielding greater
	Drain Line	6"	30 ft.			-25'-0"	
	Purge Line	3"	24 ft.			-25'-0"	

Primary Pump House

Primary Coolant	Supply	24"	120.5 ft.	PF-00155 PF-00159 PF-00170 PF-00227 PF-00382	-34'-0" -6'-8"	0'-0"	Check 6
	Return	24"	128.5 ft.		-34'-0" -6'-8"	0'-0"	Check 6

**Final Status Survey Plan
for the
Plum Brook Reactor Facility**

**Attachment C
Dose Assessment and DCGL Calculation
for Embedded Pipe**

**Addendum 3
Dose Assessment for Embedded Piping and Associated
Drains
(9 Pages)**

Worst Case: Upper Sub-Basement East of Pump Room Wall (PF-00376)

The worst-case location is the center of the 11-pipe cluster in Upper Sub-Basement between the Pump Room and Canal G (Drawing PF-00376). This is the worst-case location because the area contains the highest pipe density and the pipes are the closest to the floor surface (11"). The receptor is at a 1 m height with an occupancy time of 2340 hrs/yr.

All calculations are performed with the BOP radionuclide mixture because it results in the highest dose per dpm/100 cm² Gross Beta.

ID (in)	Length (ft)	Depth (in)	Offset ft.	mSv/hr per dpm/100 cm ²	mRem/yr per dpm/100 cm ²	Microshield File Name
3	19.5	11	5.75	7.05E-13	1.65E-07	PBRF1_1C
6	20	11	4.5	3.18E-12	7.44E-07	PBRF1_2C
3	39	11	2.75	4.93E-12	1.15E-06	PBRF1_3C
6	42	11	1.25	1.55E-11	3.63E-06	PBRF1_4C
2	82.5	83	0.5	2.84E-22	6.65E-17	PBRF1_9C
3	90.5	11	0	1.06E-11	2.48E-06	PBRF1_5C
6	81	11	0.25	2.46E-11	5.76E-06	PBRF1_6C
8	52	11	1.75	1.64E-11	3.84E-06	PBR1_10C
3	47	11	3.25	4.53E-12	1.06E-06	PBRF1_7C
6	52	11	4.75	2.70E-12	6.32E-07	PBRF1_8C
4	37.5	11	5.25	1.32E-12	3.09E-07	PBR1_11C
			Sum	8.45E-11	1.98E-05	
					mRem/yr per dpm/100 cm ²	
BOP Mixture	Nuclide Fraction	Beta Fraction	uCi/cm ²			
Cs-137	0.19	0.03	1.22E-10			
Sr-90	0.12	0.02	7.69E-11			
Co-60	6.72	0.96	4.31E-09			
Sum	7.03	1.00				

Embedded piping surface activity resulting in 1 mRem/yr for worst-case pipe geometry

50500 dpm/100 cm² gross beta

Check Case 1: Floor Drains

In addition to embedded piping, the drains serving the piping require evaluation because the geometries differ from the pipe. The embedded piping is at a constant depth below a floor surface. The drains start at the floor surface and extend down a given distance depending on the drain type. There are several different types of floor drains, primarily in the various canals and quadrants, but also in other miscellaneous areas. The JOSAM Series 5586 drain is the most common with 17.75" ID and a 14.625" depth.

This drain results in the highest individual drain dose with one exception (see Check Case 5).

The JOSAM 5586 floor drains are modeled as Cylinder Volumes with the top at floor surface.

The receptor is assumed to be located 1 m above the center of the drain for 2340 hrs with residual contamination of 50500 dpm/100 cm² gross beta.

Microshield File: Check1C

BOP Mixture	Nuclide Fraction		uCi/cm ² per dpm/100 cm ²	uCi/cm ² per	17.75" ID, 14.625" depth
	Beta Only	Beta Fraction		50500 dpm/100 cm ²	Inventory (Ci)
Beta Only	Beta Only	Beta Fraction		Gross Beta	
Cs-137	0.19	0.03	1.22E-10	6.15E-06	3.23E-08
Sr-90	0.12	0.02	7.69E-11	3.88E-06	2.04E-08
Co-60	6.72	0.96	4.31E-09	2.17E-04	1.14E-06
Sum	7.03	1.00			

Results:
4.79E-06 mSv/hr
1.12E+00 mRem/yr

Check Case 2: Equidistant from two JOSAM 5586 drains in Quadrant C (Drawing PF-00376)

There are two drains approximately 6 ft apart in Quadrant C.

Receptor at 1 m height, three feet from each of the two drains with occupancy time of 2340 hrs/yr.

Modeled using methods described for Check Case 1 with receptor 3' offset from center of cylinder.

Results multiplied by two to calculate mrem/yr.

Microshield File: Check2C

Results:	2.36E-06	mSv/hr
	1.10E+00	mRem/yr

Check Case 3: Equidistant from three JOSAM 5586 drains in Canal E (Drawing PF-00376)

Receptor at 1 m height seven feet from each of three drains located in Canal E.

Modeled using methods described in Check Case 1 with receptor 7' offset from cylinder center.

Source inventory for each drain is the same as in Check 1.

Results multiplied by three to calculate mRem/yr.

Microshield File: Check3C

Results:	4.95E-07	mSv/hr
	3.47E-01	mRem/yr

Check Case 4: Center of Pipe Cluster at -27'-6" EL (Drawing PF-00376)

There are five 10" ID pipes that serve as pump out drains from Quadrants A, B, C, D, and E.

The five 10" ID pipes from the Quadrants form a cluster with five 3" purge lines northeast of the Pump Room wall in the Upper Sub-Basement similar to the worst case location. However, the pipes are at a lower elevation under the floor (-27'-6" vs. -25'-11") which provides greater concrete shielding.

Because the diameter of some of the pipes are larger than the worst case cluster (10" maximum vs. 8" maximum), a check was performed by conservatively assessing the longest 10" ID pipe (149 ft), at -27'-6" depth, and multiplying by 10.

The Microshield source term was 1 dpm/100 cm² gross beta converted to uCi/cm² as calculated for the Worst Case.

The mrem/yr calculation assumed 50,500 dpm/100 cm² gross beta and 2340 hrs/yr occupancy time.

It is also obvious from this check that the individual 10" ID "Hot Drain RB" pipe shown on Drawing PF-00376 is acceptable at 50,500 dpm/100 cm².

Microshield File: Check4C

Results:	5.42E-14	mSv/hr
	6.40E-03	mRem/yr

Check Case 5: Two Drains In Dry Hot Storage Cell (PF-04645)

There are two floor drains in the Dry Hot Storage Cell that are a few inches apart.

One drain is a JOSAM 384-J which has a 4" ID and a depth of 38" at this location.

The second drain is a JOSAM 5586 with a 14.625" depth and 17.75" ID.

The receptor is at a 1 m height from the center of the drains. The dose is calculated by adding the results of Check 1 with the results of the calculation for the 4" ID, 38" deep drain as shown below.

Microshield File: Check5C

BOP Mixture	Nuclide Fraction		uCi/cm ² per dpm/100 cm ²	uCi/cm ² per 50500 dpm/100 cm ²	
	Beta Only	Beta Fraction		Gross Beta	4" ID, 38" depth Inventory (Ci)
Cs-137	0.19	0.03	1.22E-10	6.15E-06	1.89E-08
Sr-90	0.12	0.02	7.69E-11	3.88E-06	1.20E-08
Co-60	6.72	0.96	4.31E-09	2.17E-04	6.70E-07
Sum	7.03	1.00			

Results:	JOSAM 384-J	JOSAM 5586	Sum
mSv/hr	1.17E-06	4.79E-06	5.96E-06
mrem/yr	2.74E-01	1.12E+00	1.39E+00

Check Case 6: Primary Water Pipes Check

The PWP's are closest to a floor surface in the Primary Pump House and the Reactor Building Unexcavated Area after rising from the -34' elevation.

Assuming that the concrete above the PWP's is removed from 0' elevation to -3' elevation per the decommissioning plan, the PWP's would be shielded by the remaining 2'-8" of concrete at the -3' excavation surface (Drawing PF-00159).

The length of the PWP's in this area is 29' (Drawing PF-00382). The area will be backfilled with 3' of clean material but this additional shielding was not be included for the Building Reuse evaluation.

The dose from one PWP was calculated and the results multiplied by two to account for both pipes.

Source term 50,500 dpm/100 cm² gross beta for mRem/yr calculation.

Microshield File: Check 6C

BOP Mixture	Nuclide Fraction		uCi/cm ² per
Beta Only	Beta Only	Beta Fraction	dpm/100 cm ²
Cs-137	0.19	0.03	1.22E-10
Sr-90	0.12	0.02	7.69E-11
Co-60	6.72	0.96	4.31E-09
Sum	7.03	1.00	
Results:		5.05E-14	mSv/hr
		1.19E-03	mRem/yr

Check Case 7: Primary Water Pipe Ends After Cut

This check evaluates the scenario of a worker standing over the center of the exposed, grouted, open ends of the PWP's after cutting for remediation at -3' elevation in the Pump House floor.

The area will be backfilled with 3' of clean material but this additional shielding was not be included in the Building Reuse scenario.

The worker is assumed to stand above the grouted PWP openings for 2340 hrs/yr.

The pipes are modeled as a 2'8" high, 24" ID right cylinders with the receptor at a 1 m height and at an offset of 16.5" from the center of each pipe, i.e., equidistant from each pipe (Drawing PF-00126). The results are multiplied by two to account for both pipes.

Microshield File: Check 7C

BOP Mixture	Nuclide Fraction	Beta Fraction	uCi/cm ² per dpm/100 cm ²	uCi/cm ² per	
				50,500 dpm/100 cm ²	32" depth 24"ID
Beta Only	Beta Only			Gross Beta	Inventory (Ci)
Cs-137	0.19	0.03	1.22E-10	6.15E-06	9.57E-08
Sr-90	0.12	0.02	7.69E-11	3.88E-06	6.04E-08
Co-60	6.72	0.96	4.31E-09	2.17E-04	3.38E-06
Sum	7.03	1.00			

Results: 5.65E-06 mSv/hr
2.64E+00 mRem/yr

Check Case 8 - Subsurface Structure Embedded Piping Effective pCi/g

A check was performed to determine the bounding dose from the Subsurface Structure Scenario assuming the entire inventory in the embedded piping was instantaneously released to the Subsurface Structures.

This is a very unlikely scenario because the pipes will be hydroblasted to remove all loose contamination and after remediation the pipes will be filled with grout.

The fraction of the total inventory actually released is expected to be very small.

RESRAD File Name: PlumBrook Subsurface Modified Embedded Pipe

BOP ID (in)	length (ft)	ID (cm)	length (cm)	Circum. (cm)	Internal Area (cm ²)	Gross Beta (pCi) at 1 dpm/100 cm ²
2.00	229.00	5.08	6979.92	15.95	1.11E+05	5.02E+02
2.50	48.00	6.35	1463.04	19.94	2.92E+04	1.31E+02
3.00	514.00	7.62	15666.72	23.93	3.75E+05	1.69E+03
4.00	169.00	10.16	5151.12	31.90	1.64E+05	7.40E+02
6.00	330.00	15.24	10058.40	47.85	4.81E+05	2.17E+03
8.00	52.00	20.32	1584.96	63.80	1.01E+05	4.56E+02
10.00	378.00	25.40	11521.44	79.76	9.19E+05	4.14E+03
24.00	249.00	60.96	7589.52	191.41	1.45E+06	6.54E+03
				Sum	3.63E+06	1.64E+04

Hot Lab ID (in)	length (ft)	ID (cm)	length (cm)	Circum. (cm)	Internal Area (cm ²)	Gross Beta pCi @ 1 dpm/100 cm ²
3.00	105.00	7.62	3200.40	23.93	7.66E+04	3.45E+02
4.00	218.00	10.16	6644.64	31.90	2.12E+05	9.55E+02
6.00	119.00	15.24	3627.12	47.85	1.74E+05	7.82E+02
				Sum	4.62E+05	2.08E+03

Check Case 8 (cont.)

Radionuclide	Hot Lab	BOP	Inventory (pCi) at 50,500 dpm/100 cm ² Gross Beta		
	Nuclide Fraction	Nuclide Fraction	HL	BOP	Total
Cs-137	0.5470	0.0019	6.41E+07	2.24E+07	8.65E+07
Sr-90	0.3180	0.0012	3.73E+07	1.41E+07	5.14E+07
Co-60	0.0300	0.0672	3.52E+06	7.92E+08	7.95E+08
H-3	0.1040	0.9297	1.22E+07	1.10E+10	1.10E+10
Eu-154	0.0010	NA	1.17E+05		1.17E+05
Beta Fraction	0.8960	0.0703			

The total mass of fill material in the subsurface structures is calculated using the equation shown in Table 5-15 of PBRF-TBD-04-006, Rev 0. The subsurface structure volume used in the calculation was 500,112 ft³ which includes the Reactor Building, Hot Laboratory Building, and the Primary Pump House. As discussed in the TBD-04-006, these buildings are essentially connected and after demolition any source term released can be reasonably modeled as uniformly mixing throughout the three subsurface structures. The subsurface volume of the three buildings is 500,112 ft³.

Fill Mass (g) 1.98E+10

Radionuclide	pCi/g	Dose (mRem/yr)	
Cs-137	4.36E-03	4.84E-02	
Sr-90	2.59E-03	1.03E-01	
Co-60	4.01E-02	3.00E-01	
H-3	5.53E-01	3.87E-02	
Eu-154	5.91E-06	1.70E-05	
	Sum	4.90E-01	mRem/yr

Embedded Pipe Area Factor

Pipe Length (ft)	mSv/hr	Area Factor	Microshield File
63	2.59E-11	1.00E+00	AF63C
20	2.59E-11	1.00E+00	AF20C
10	2.49E-11	1.04E+00	AF10C
5	1.91E-11	1.36E+00	AF5C
2	9.18E-12	2.82E+00	AF2C
1	4.74E-12	5.46E+00	AF1C
0.5	2.39E-12	1.08E+01	AFHALFC
0.25	1.20E-12	2.16E+01	AFQTRC

**Final Status Survey Plan
for the
Plum Brook Reactor Facility**

**Attachment C
Dose Assessment and DCGL Calculation
for Embedded Pipe**

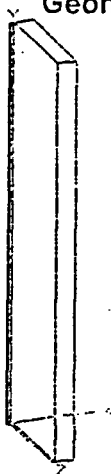
**Addendum 4
Microshield Reports for Embedded Piping and Drain Dose
Assessment
(97 Pages)**

Page : 1
 File : PBRF1_1C.MS5
 Run Date: November 10, 2004
 Run Time: 11:31:03 AM
 Duration : 00:00:01

File Ref: _____
 Date: 11/12/04
 By: DATE
 Checked: _____

Case Title: Case 1
 Description: Case 1

Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions		
Height	594.36 cm	19 ft 6.0 in
Radius	3.81 cm	1.5 in

Dose Points			
	<u>X</u>	<u>Y</u>	<u>Z</u>
# 1	131.7754 cm 4 ft 3.9 in	297.18 cm 9 ft 9.0 in	175.26 cm 5 ft 9.0 in

Shields			
<u>Shield Name</u>	<u>Dimension</u>	<u>Material</u>	<u>Density</u>
Cyl. Core	3.81 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

<u>Nuclide</u>	<u>curies</u>	<u>becquerels</u>	<u>µCi/cm²</u>	<u>Bq/cm²</u>
Ba-137m	1.6421e-012	6.0759e-002	1.1541e-010	4.2702e-006
Co-60	6.1324e-011	2.2690e+000	4.3100e-009	1.5947e-004
Cs-137	1.7359e-012	6.4227e-002	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec		<u>Exposure Rate</u> mR/hr	
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.0318	1.258e-03	2.130e-60	8.730e-37	1.774e-62	7.272e-39
0.122	2.321e-03	1.045e-58	1.674e-36	8.409e-61	1.347e-38
0.364	8.445e-04	6.297e-47	9.328e-37	3.578e-49	5.300e-39

Page : 2

DOS File : PBRF1_1C.MS5

Run Date: November 10, 2004

Run Time: 11:31:03 AM

Position : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	5.467e-02	2.301e-12	6.059e-11	4.461e-15	1.175e-13
0.6938	3.701e-04	1.989e-14	4.892e-13	3.840e-17	9.445e-16
1.1732	2.269e+00	1.588e-09	1.866e-08	2.839e-12	3.335e-11
1.3325	2.269e+00	2.834e-09	2.829e-08	4.917e-12	4.909e-11
TOTALS:	4.597e+00	4.425e-09	4.701e-08	7.760e-12	8.255e-11

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\PBRF1_1C.MS5

Case Title: Case 1

This case was run on Wednesday, November 10, 2004 at 11:31:03 AM

Dose Point # 1 - (131.7754,297.18,175.26) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	3.484e-009	3.723e-008
Photon Energy Fluence Rate	MeV/cm ² /sec	4.425e-009	4.701e-008
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	7.760e-012	8.255e-011
Absorbed Dose Rate in Air	mGy/hr	6.775e-014	7.207e-013
"	mrads/hr	6.775e-012	7.207e-011
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	7.691e-014	8.183e-013
o Opposed	"	6.625e-014	7.045e-013
o Rotational	"	6.625e-014	7.045e-013
o Isotropic	"	5.919e-014	6.293e-013
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	8.186e-014	8.711e-013
o Opposed	"	7.883e-014	8.387e-013
o Rotational	"	7.883e-014	8.387e-013
o Isotropic	"	6.270e-014	6.668e-013
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	6.925e-014	7.368e-013
o Posterior/Anterior	"	6.381e-014	6.786e-013
o Lateral	"	5.076e-014	5.396e-013
o Rotational	"	5.746e-014	6.110e-013
o Isotropic	"	5.086e-014	5.407e-013

Page : 1

File : PBRF1_2C.MS5
 Date: November 10, 2004
 Run Time: 1:34:44 PM
 Duration : 00:00:01

File Ref: _____
 Date: 11/12/04
 By: DNF
 Checked: _____

Case Title: Case 1
 Description: Case 1
 Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions

Height	609.6 cm	20 ft 0.0 in
Radius	7.62 cm	3.0 in

Dose Points

	<u>X</u>	<u>Y</u>	<u>Z</u>
# 1	135.5854 cm 4 ft 5.4 in	304.8 cm 10 ft 0.0 in	137.16 cm 4 ft 6.0 in

Shields

<u>Shield Name</u>	<u>Dimension</u>	<u>Material</u>	<u>Density</u>
Cyl. Core	7.62 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

<u>Nuclide</u>	<u>curies</u>	<u>becquerels</u>	<u>µCi/cm²</u>	<u>Bq/cm²</u>
Ba-137m	3.3685e-012	1.2463e-001	1.1541e-010	4.2702e-006
Co-60	1.2579e-010	4.6543e+000	4.3100e-009	1.5947e-004
Cs-137	3.5607e-012	1.3175e-001	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u>		<u>Exposure Rate</u>	
		<u>MeV/cm²/sec</u>	<u>MeV/cm²/sec</u>	<u>mR/hr</u>	<u>mR/hr</u>
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.0318	2.580e-03	7.592e-53	2.138e-36	6.324e-55	1.781e-38
0.0322	4.761e-03	2.283e-51	4.099e-36	1.837e-53	3.299e-38
0.0364	1.732e-03	2.103e-41	2.285e-36	1.195e-43	1.298e-38

Page : 2

DOS File : PBRF1_2C.MS5

Run Date : November 10, 2004

Run Time : 1:34:44 PM

Exposure : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	1.121e-01	1.696e-11	3.563e-10	3.288e-14	6.908e-13
0.6938	7.592e-04	1.427e-13	2.814e-12	2.756e-16	5.432e-15
1.1732	4.654e+00	8.701e-09	8.632e-08	1.555e-11	1.543e-10
1.3325	4.654e+00	1.465e-08	1.249e-07	2.542e-11	2.168e-10
TOTALS:	9.431e+00	2.337e-08	2.116e-07	4.100e-11	3.717e-10

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\IPBRF1_2C.MS5

Case Title: Case 1

This case was run on Wednesday, November 10, 2004 at 1:34:44 PM

Dose Point # 1 - (135.5854,304.8,137.16) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	1.844e-008	1.679e-007
Photon Energy Fluence Rate	MeV/cm ² /sec	2.337e-008	2.116e-007
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	4.100e-011	3.717e-010
Absorbed Dose Rate in Air	mGy/hr	3.579e-013	3.245e-012
"	mrads/hr	3.579e-011	3.245e-010
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	4.063e-013	3.685e-012
o Opposed	"	3.500e-013	3.172e-012
o Rotational	"	3.500e-013	3.172e-012
o Isotropic	"	3.126e-013	2.833e-012
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	4.325e-013	3.923e-012
o Opposed	"	4.165e-013	3.777e-012
o Rotational	"	4.165e-013	3.777e-012
o Isotropic	"	3.312e-013	3.002e-012
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	3.659e-013	3.318e-012
o Posterior/Anterior	"	3.371e-013	3.056e-012
o Lateral	"	2.681e-013	2.429e-012
o Rotational	"	3.035e-013	2.751e-012
o Isotropic	"	2.687e-013	2.434e-012

Case Title: Case 1
Description: Case 1

Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions		
Height	1.2e+3 cm	39 ft 0.0 in
Radius	3.81 cm	1.5 in

Dose Points			
	<u>X</u>	<u>Y</u>	<u>Z</u>
# 1	131.7754 cm 4 ft 3.9 in	594.36 cm 19 ft 6.0 in	83.82 cm 2 ft 9.0 in

Shields			
Shield Name	Dimension	Material	Density
Cyl. Core	3.81 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Nuclide	Grouping Method : Actual Photon Energies			
	curies	becquerels	μCi/cm ²	Bq/cm ²
Ba-137m	3.2842e-012	1.2152e-001	1.1541e-010	4.2702e-006
Co-60	1.2265e-010	4.5380e+000	4.3100e-009	1.5947e-004
Cs-137	3.4717e-012	1.2845e-001	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

Energy MeV	Activity photons/sec	Fluence Rate		Exposure Rate	
		<u>No Buildup</u> MeV/cm ² /sec	<u>With Buildup</u> MeV/cm ² /sec	<u>No Buildup</u> mR/hr	<u>With Buildup</u> mR/hr
0.0318	2.516e-03	9.837e-47	1.722e-36	8.194e-49	1.435e-38
0.1170	4.642e-03	1.944e-45	3.302e-36	1.565e-47	2.657e-38
0.6620	1.689e-03	4.954e-37	3.140e-36	2.814e-39	1.784e-38

Page : 2

DOS File : PBRF1_3C.MS5

Run Date: November 10, 2004

Run Time: 1:46:23 PM

Duration : 00:00:01

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm²/sec</u> <u>No Buildup</u>	<u>Fluence Rate</u> <u>MeV/cm²/sec</u> <u>With Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>No Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>With Buildup</u>
0.6616	1.093e-01	4.469e-11	7.287e-10	8.665e-14	1.413e-12
0.6938	7.402e-04	3.665e-13	5.628e-12	7.075e-16	1.087e-14
1.1732	4.538e+00	1.700e-08	1.380e-07	3.037e-11	2.466e-10
1.3325	4.538e+00	2.692e-08	1.896e-07	4.670e-11	3.290e-10
TOTALS:	9.195e+00	4.396e-08	3.284e-07	7.715e-11	5.771e-10

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\IPBRF1_3C.MS5

Case Title: Case 1

This case was run on Wednesday, November 10, 2004 at 1:46:23 PM

Dose Point # 1 - (131.7754,594.36,83.82) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	3.475e-008	2.611e-007
Photon Energy Fluence Rate	MeV/cm ² /sec	4.396e-008	3.284e-007
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	7.715e-011	5.771e-010
Absorbed Dose Rate in Air	mGy/hr	6.736e-013	5.038e-012
"	mrad/hr	6.736e-011	5.038e-010
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	7.647e-013	5.721e-012
o Opposed	"	6.585e-013	4.924e-012
o Rotational	"	6.585e-013	4.924e-012
o Isotropic	"	5.882e-013	4.398e-012
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	8.141e-013	6.091e-012
o Opposed	"	7.838e-013	5.864e-012
o Rotational	"	7.838e-013	5.864e-012
o Isotropic	"	6.233e-013	4.660e-012
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	6.886e-013	5.151e-012
o Posterior/Anterior	"	6.343e-013	4.744e-012
o Lateral	"	5.044e-013	3.770e-012
o Rotational	"	5.712e-013	4.271e-012
o Isotropic	"	5.055e-013	3.778e-012

Page : 1
 File : PBRF1_4C.MS5
 Date : November 10, 2004
 Run Time : 1:58:12 PM
 Duration : 00:00:01

File Ref: _____
 Date: 11/12/04
 By: DNF
 Checked: _____

Case Title: Case 1
 Description: Case 1
 Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions

Height	1.3e+3 cm	42 ft 0.0 in
Radius	7.62 cm	3.0 in

Dose Points

	X	Y	Z
# 1	135.5854 cm 4 ft 5.4 in	640.08 cm 21 ft 0.0 in	38.1 cm 1 ft 3.0 in

Shields

Shield Name	Dimension	Material	Density
Cyl. Core	7.62 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ²	Bq/cm ²
Ba-137m	7.0738e-012	2.6173e-001	1.1541e-010	4.2702e-006
Co-60	2.6417e-010	9.7741e+000	4.3100e-009	1.5947e-004
Cs-137	7.4775e-012	2.7667e-001	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm ² /sec		Exposure Rate mR/hr	
		No Buildup	With Buildup	No Buildup	With Buildup
0.0318	5.419e-03	3.401e-42	3.940e-36	2.833e-44	3.282e-38
0.322	9.997e-03	5.057e-41	7.553e-36	4.070e-43	6.079e-38
0.364	3.638e-03	1.130e-33	3.565e-33	6.422e-36	2.025e-35

Page : 2

DOS File : PBRF1_4C.MS5

Run Date: November 10, 2004

Run Time: 1:58:12 PM

tion : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	2.355e-01	1.907e-10	2.637e-09	3.697e-13	5.111e-12
0.6938	1.594e-03	1.539e-12	2.013e-11	2.972e-15	3.886e-14
1.1732	9.774e+00	6.095e-08	4.383e-07	1.089e-10	7.833e-10
1.3325	9.774e+00	9.334e-08	5.875e-07	1.619e-10	1.019e-09
TOTALS:	1.980e+01	1.545e-07	1.029e-06	2.712e-10	1.808e-09

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\PBRF1_4C.MS5

Case Title: Case 1

This case was run on Wednesday, November 10, 2004 at 1:58:12 PM

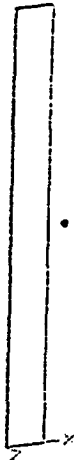
Dose Point # 1 - (135.5854,640.08,38.1) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	1.223e-007	8.185e-007
Photon Energy Fluence Rate	MeV/cm ² /sec	1.545e-007	1.029e-006
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	2.712e-010	1.808e-009
Absorbed Dose Rate in Air	mGy/hr	2.368e-012	1.578e-011
"	mrads/hr	2.368e-010	1.578e-009
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	2.689e-012	1.792e-011
o Opposed	"	2.315e-012	1.542e-011
o Rotational	"	2.315e-012	1.542e-011
o Isotropic	"	2.068e-012	1.378e-011
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	2.862e-012	1.908e-011
o Opposed	"	2.756e-012	1.837e-011
o Rotational	"	2.756e-012	1.837e-011
o Isotropic	"	2.191e-012	1.460e-011
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	2.421e-012	1.614e-011
o Posterior/Anterior	"	2.230e-012	1.486e-011
o Lateral	"	1.773e-012	1.181e-011
o Rotational	"	2.008e-012	1.338e-011
o Isotropic	"	1.777e-012	1.184e-011

Case Title: Case 1

Description: Case 1

Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions		
Height	2.5e+3 cm	82 ft 6.0 in
Radius	2.54 cm	1.0 in

Dose Points			
#	X	Y	Z
# 1	313.3854 cm 10 ft 3.4 in	1257.3 cm 41 ft 3.0 in	15.24 cm 6.0 in

Shields			
Shield Name	Dimension	Material	Density
Cyl. Core	2.54 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	210.82 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^2$	Bq/cm^2
Ba-137m	4.6316e-012	1.7137e-001	1.1541e-010	4.2702e-006
Co-60	1.7297e-010	6.3997e+000	4.3100e-009	1.5947e-004
Cs-137	4.8960e-012	1.8115e-001	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm ² /sec		Exposure Rate mR/hr	
		No Buildup	With Buildup	No Buildup	With Buildup
0.0318	3.548e-03	1.388e-229	5.768e-37	1.156e-231	4.805e-39
0.322	6.546e-03	6.442e-223	1.106e-36	5.184e-225	8.900e-39
0.64	2.382e-03	1.417e-168	6.163e-37	8.049e-171	3.502e-39

Page : 2

DOS File : PBRF1_9C.MS5

Run Date: November 10, 2004

Run Time: 2:03:39 PM

Position : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	1.542e-01	3.135e-26	1.034e-23	6.078e-29	2.005e-26
0.6938	1.044e-03	5.176e-28	1.521e-25	9.993e-31	2.936e-28
1.1732	6.400e+00	3.236e-20	2.766e-18	5.782e-23	4.943e-21
1.3325	6.400e+00	2.485e-19	1.624e-17	4.312e-22	2.817e-20
TOTALS:	1.297e+01	2.809e-19	1.900e-17	4.890e-22	3.311e-20

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\IPBRF1_9C.MS5

Case Title: Case 1

This case was run on Wednesday, November 10, 2004 at 2:03:39 PM

Dose Point # 1 - (313.3854,1257.3,15.24) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	2.141e-019	1.454e-017
Photon Energy Fluence Rate	MeV/cm ² /sec	2.809e-019	1.900e-017
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	4.890e-022	3.311e-020
Absorbed Dose Rate in Air	mGy/hr	4.269e-024	2.891e-022
"	mrads/hr	4.269e-022	2.891e-020
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	4.841e-024	3.278e-022
o Opposed	"	4.182e-024	2.831e-022
o Rotational	"	4.182e-024	2.831e-022
o Isotropic	"	3.740e-024	2.532e-022
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	5.148e-024	3.487e-022
o Opposed	"	4.963e-024	3.361e-022
o Rotational	"	4.963e-024	3.361e-022
o Isotropic	"	3.957e-024	2.679e-022
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	4.361e-024	2.953e-022
o Posterior/Anterior	"	4.025e-024	2.725e-022
o Lateral	"	3.214e-024	2.175e-022
o Rotational	"	3.627e-024	2.455e-022
o Isotropic	"	3.216e-024	2.177e-022

Case Title: Case 1
 Description: Case 1
 Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions		
Height	2.8e+3 cm	90 ft 6.0 in
Radius	3.81 cm	1.5 in

Dose Points			
	X	Y	Z
# 1	131.7754 cm 4 ft 3.9 in	1379.22 cm 45 ft 3.0 in	0 cm 0.0 in

Shields			
Shield Name	Dimension	Material	Density
Cyl. Core	3.81 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Nuclide	Grouping Method : Actual Photon Energies			
	curies	becquerels	μCi/cm ²	Bq/cm ²
Ba-137m	7.6211e-012	2.8198e-001	1.1541e-010	4.2702e-006
Co-60	2.8461e-010	1.0530e+001	4.3100e-009	1.5947e-004
Cs-137	8.0562e-012	2.9808e-001	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

Energy MeV	Activity photons/sec	Fluence Rate		Exposure Rate	
		No Buildup	With Buildup	No Buildup	With Buildup
0.0318	5.838e-03	2.594e-41	2.292e-36	2.160e-43	1.909e-38
0.322	1.077e-02	3.631e-40	4.395e-36	2.922e-42	3.537e-38
0.64	3.920e-03	4.658e-33	1.471e-32	2.646e-35	8.356e-35

Page : 2

DOS File : PBRF1_5C.MS5

Run Date: November 10, 2004

Run Time: 2:07:02 PM

Duration : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	2.537e-01	1.436e-10	1.898e-09	2.783e-13	3.679e-12
0.6938	1.718e-03	1.154e-12	1.443e-11	2.229e-15	2.786e-14
1.1732	1.053e+01	4.373e-08	3.015e-07	7.815e-11	5.388e-10
1.3325	1.053e+01	6.623e-08	3.999e-07	1.149e-10	6.938e-10
TOTALS:	2.134e+01	1.101e-07	7.033e-07	1.933e-10	1.236e-09

Page : 1

File : PBRF1_6C.MS5

Date: November 10, 2004

Run Time: 2:09:49 PM

Duration : 00:00:01

File Ref: _____

Date: 11/12/04

By: DNF

Checked: _____

Case Title: Case 1

Description: Case 1

Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions		
Height	2.5e+3 cm	81 ft 0.0 in
Radius	7.62 cm	3.0 in

Dose Points			
#	X	Y	Z
# 1	135.5854 cm 4 ft 5.4 in	1234.44 cm 40 ft 6.0 in	7.62 cm 3.0 in

Shields			
Shield Name	Dimension	Material	Density
Cyl. Core	7.62 cm ²	Air	0.00122
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ²	Bq/cm ²
Ba-137m	1.3642e-011	5.0476e-001	1.1541e-010	4.2702e-006
Co-60	5.0946e-010	1.8850e+001	4.3100e-009	1.5947e-004
Cs-137	1.4421e-011	5.3358e-001	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm ² /sec		Exposure Rate mR/hr	
		No Buildup	With Buildup	No Buildup	With Buildup
0.0318	1.045e-02	9.095e-41	4.409e-36	7.575e-43	3.672e-38
0.122	1.928e-02	1.270e-39	8.453e-36	1.022e-41	6.803e-38
0.6364	7.016e-03	1.597e-32	5.042e-32	9.074e-35	2.865e-34

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\IPBRF1_5C.MS5

Case Title: Case 1

This case was run on Wednesday, November 10, 2004 at 2:07:02 PM

Dose Point # 1 - (131.7754,1379.22,0) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	8.720e-008	5.600e-007
Photon Energy Fluence Rate	MeV/cm ² /sec	1.101e-007	7.033e-007
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	1.933e-010	1.236e-009
Absorbed Dose Rate in Air	mGy/hr	1.688e-012	1.079e-011
"	mrads/hr	1.688e-010	1.079e-009
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	1.916e-012	1.226e-011
o Opposed	"	1.650e-012	1.055e-011
o Rotational	"	1.650e-012	1.055e-011
o Isotropic	"	1.474e-012	9.420e-012
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	2.040e-012	1.305e-011
o Opposed	"	1.964e-012	1.256e-011
o Rotational	"	1.964e-012	1.256e-011
o Isotropic	"	1.562e-012	9.983e-012
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	1.726e-012	1.104e-011
o Posterior/Anterior	"	1.589e-012	1.016e-011
o Lateral	"	1.264e-012	8.074e-012
o Rotational	"	1.431e-012	9.149e-012
o Isotropic	"	1.266e-012	8.093e-012

Page : 2
DOS File : PBRF1_6C.MS5
Run Date : November 10, 2004
Run Time : 2:09:49 PM
Duration : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	4.542e-01	3.698e-10	4.650e-09	7.170e-13	9.014e-12
0.6938	3.075e-03	2.961e-12	3.522e-11	5.717e-15	6.800e-14
1.1732	1.885e+01	1.070e-07	7.056e-07	1.912e-10	1.261e-09
1.3325	1.885e+01	1.602e-07	9.270e-07	2.780e-10	1.608e-09
TOTALS:	3.819e+01	2.676e-07	1.637e-06	4.699e-10	2.878e-09

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\PBRF1_6C.MS5

Case Title: Case 1

This case was run on Wednesday, November 10, 2004 at 2:09:49 PM

Dose Point # 1 - (135.5854,1234.44,7.62) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	2.120e-007	1.304e-006
Photon Energy Fluence Rate	MeV/cm ² /sec	2.676e-007	1.637e-006
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	4.699e-010	2.878e-009
Absorbed Dose Rate in Air	mGy/hr	4.102e-012	2.513e-011
"	mrads/hr	4.102e-010	2.513e-009
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	4.658e-012	2.854e-011
o Opposed	"	4.011e-012	2.456e-011
o Rotational	"	4.011e-012	2.456e-011
o Isotropic	"	3.582e-012	2.193e-011
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	4.959e-012	3.038e-011
o Opposed	"	4.774e-012	2.925e-011
o Rotational	"	4.774e-012	2.925e-011
o Isotropic	"	3.796e-012	2.324e-011
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	4.194e-012	2.569e-011
o Posterior/Anterior	"	3.863e-012	2.366e-011
o Lateral	"	3.071e-012	1.880e-011
o Rotational	"	3.478e-012	2.130e-011
o Isotropic	"	3.078e-012	1.884e-011

Case Title: Case 1
 Description: Case 1
 Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions		
Height	1.6e+3 cm	52 ft 0.0 in
Radius	10.16 cm	4.0 in

Dose Points			
#	X	Y	Z
# 1	138.1254 cm 4 ft 6.4 in	792.48 cm 26 ft 0.0 in	53.34 cm 1 ft 9.0 in

Shields			
Shield Name	Dimension	Material	Density
Cyl. Core	10.16 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Nuclide	Grouping Method : Actual Photon Energies			
	curies	becquerels	μCi/cm ²	Bq/cm ²
Ba-137m	1.1677e-011	4.3206e-001	1.1541e-010	4.2702e-006
Co-60	4.3608e-010	1.6135e+001	4.3100e-009	1.5947e-004
Cs-137	1.2344e-011	4.5672e-001	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

Energy MeV	Activity photons/sec	Fluence Rate		Exposure Rate	
		No Buildup	With Buildup	No Buildup	With Buildup
0.0318	8.945e-03	6.493e-43	5.116e-36	5.408e-45	4.262e-38
0.322	1.650e-02	1.017e-41	9.810e-36	8.187e-44	7.895e-38
0.364	6.006e-03	3.525e-34	1.113e-33	2.003e-36	6.321e-36

Page : 2
DOS File : PBR1_10C.MS5
Run Date : November 10, 2004
Run Time : 2:13:32 PM
Position : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	3.888e-01	1.875e-10	2.688e-09	3.635e-13	5.211e-12
0.6938	2.632e-03	1.518e-12	2.058e-11	2.932e-15	3.973e-14
1.1732	1.614e+01	6.231e-08	4.624e-07	1.113e-10	8.264e-10
1.3325	1.614e+01	9.622e-08	6.244e-07	1.669e-10	1.083e-09
TOTALS:	3.269e+01	1.587e-07	1.090e-06	2.787e-10	1.915e-09

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\PBR1_10C.MS5

Case Title: Case 1

This case was run on Wednesday, November 10, 2004 at 2:13:32 PM

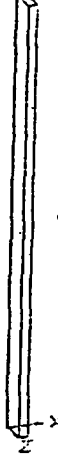
Dose Point # 1 - (138.1254,792.48,53.34) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	1.256e-007	8.669e-007
Photon Energy Fluence Rate	MeV/cm ² /sec	1.587e-007	1.090e-006
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	2.787e-010	1.915e-009
Absorbed Dose Rate in Air	mGy/hr	2.433e-012	1.672e-011
"	mrads/hr	2.433e-010	1.672e-009
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	2.762e-012	1.899e-011
o Opposed	"	2.378e-012	1.634e-011
o Rotational	"	2.378e-012	1.634e-011
o Isotropic	"	2.124e-012	1.459e-011
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	2.940e-012	2.021e-011
o Opposed	"	2.831e-012	1.946e-011
o Rotational	"	2.831e-012	1.946e-011
o Isotropic	"	2.251e-012	1.546e-011
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	2.487e-012	1.709e-011
o Posterior/Anterior	"	2.291e-012	1.574e-011
o Lateral	"	1.822e-012	1.251e-011
o Rotational	"	2.063e-012	1.417e-011
o Isotropic	"	1.825e-012	1.254e-011

Case Title: Case 1

Description: Case 1

Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions

Height	1.4e+3 cm	47 ft
Radius	3.81 cm	1.5 in

Dose Points

#	X	Y	Z
# 1	131.7754 cm 4 ft 3.9 in	716.28 cm 23 ft 6.0 in	99.06 cm 3 ft 3.0 in

Shields

Shield Name	Dimension	Material	Density
Cyl. Core	3.81 ft ²	Air	0.00122
Transition		Air	0.00122
Shield 2	.917 ft	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.001 ft	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ²	Bq/cm ²
Ba-137m	3.9579e-012	1.4644e-001	1.1541e-010	4.2702e-006
Co-60	1.4781e-010	5.4689e+000	4.3100e-009	1.5947e-004
Cs-137	4.1839e-012	1.5480e-001	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

Energy MeV	Activity photons/sec	Fluence Rate		Exposure Rate	
		MeV/cm ² /sec No Buildup	MeV/cm ² /sec With Buildup	mR/hr No Buildup	mR/hr With Buildup
0.0318	3.032e-03	2.572e-48	1.670e-36	2.142e-50	1.391e-38
0.322	5.594e-03	5.743e-47	3.201e-36	4.622e-49	2.576e-38
0.364	2.036e-03	4.168e-38	1.791e-36	2.368e-40	1.017e-38

Page : 2

DOS File : PBRF1_7C.MS5

Run Date: November 10, 2004

Run Time: 2:18:52 PM

Position : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	1.318e-01	3.895e-11	6.543e-10	7.551e-14	1.268e-12
0.6938	8.921e-04	3.204e-13	5.063e-12	6.185e-16	9.776e-15
1.1732	5.469e+00	1.528e-08	1.265e-07	2.731e-11	2.260e-10
1.3325	5.469e+00	2.434e-08	1.744e-07	4.222e-11	3.026e-10
TOTALS:	1.108e+01	3.966e-08	3.016e-07	6.961e-11	5.299e-10

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\PBRF1_7C.MS5

Case Title: Case 1

This case was run on Wednesday, November 10, 2004 at 2:18:52 PM

Dose Point # 1 - (4.32e+00,23.5,3.25) ft

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	3.135e-008	2.397e-007
Photon Energy Fluence Rate	MeV/cm ² /sec	3.966e-008	3.016e-007
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	6.961e-011	5.299e-010
Absorbed Dose Rate in Air	mGy/hr	6.077e-013	4.626e-012
"	mrads/hr	6.077e-011	4.626e-010
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	6.900e-013	5.254e-012
o Opposed	"	5.942e-013	4.522e-012
o Rotational	"	5.942e-013	4.522e-012
o Isotropic	"	5.307e-013	4.039e-012
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	7.345e-013	5.593e-012
o Opposed	"	7.072e-013	5.384e-012
o Rotational	"	7.072e-013	5.384e-012
o Isotropic	"	5.623e-013	4.280e-012
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	6.213e-013	4.730e-012
o Posterior/Anterior	"	5.723e-013	4.356e-012
o Lateral	"	4.551e-013	3.462e-012
o Rotational	"	5.153e-013	3.922e-012
o Isotropic	"	4.561e-013	3.470e-012

Page : 1

File : PBRF1_8C.MS5

Date : November 10, 2004

Run Time: 2:49:22 PM

Duration : 00:00:01

File Ref: _____

Date: 11/12/04

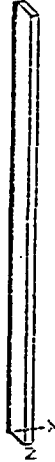
By: DNF

Checked: _____

Case Title: Case 1

Description: Case 1

Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions

Height	1.6e+3 cm	52 ft 0.0 in
Radius	7.62 cm	3.0 in

Dose Points

	<u>X</u>	<u>Y</u>	<u>Z</u>
# 1	135.5854 cm 4 ft 5.4 in	640.08 cm 21 ft 0.0 in	144.78 cm 4 ft 9.0 in

Shields

<u>Shield Name</u>	<u>Dimension</u>	<u>Material</u>	<u>Density</u>
Cyl. Core	7.62 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

<u>Nuclide</u>	<u>curies</u>	<u>becquerels</u>	<u>μCi/cm²</u>	<u>Bq/cm²</u>
Ba-137m	8.7580e-012	3.2405e-001	1.1541e-010	4.2702e-006
Co-60	3.2706e-010	1.2101e+001	4.3100e-009	1.5947e-004
Cs-137	9.2579e-012	3.4254e-001	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

<u>Energy</u>	<u>Activity</u>	<u>Fluence Rate</u>	<u>Fluence Rate</u>	<u>Exposure Rate</u>	<u>Exposure Rate</u>
<u>MeV</u>	<u>photons/sec</u>	<u>MeV/cm²/sec</u>	<u>MeV/cm²/sec</u>	<u>mR/hr</u>	<u>mR/hr</u>
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.0318	6.709e-03	5.919e-54	2.719e-36	4.930e-56	2.265e-38
0.022	1.238e-02	1.910e-52	5.214e-36	1.537e-54	4.196e-38
0.0364	4.504e-03	3.226e-42	2.906e-36	1.833e-44	1.651e-38

Page : 2

DOS File : PBRF1_8C.MS5

Run Date : November 10, 2004

Run Time : 2:49:22 PM

Position : 00:00:01

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm²/sec</u> <u>No Buildup</u>	<u>Fluence Rate</u> <u>MeV/cm²/sec</u> <u>With Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>No Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>With Buildup</u>
0.6616	2.916e-01	1.324e-11	2.893e-10	2.566e-14	5.609e-13
0.6938	1.974e-03	1.119e-13	2.293e-12	2.160e-16	4.428e-15
1.1732	1.210e+01	7.140e-09	7.307e-08	1.276e-11	1.306e-10
1.3325	1.210e+01	1.215e-08	1.067e-07	2.107e-11	1.851e-10
TOTALS:	2.452e+01	1.930e-08	1.801e-07	3.386e-11	3.162e-10

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\PBFR1_8C.MS5

Case Title: Case 1

This case was run on Wednesday, November 10, 2004 at 2:49:22 PM

Dose Point # 1 - (135.5854,640.08,144.78) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	1.522e-008	1.428e-007
Photon Energy Fluence Rate	MeV/cm ² /sec	1.930e-008	1.801e-007
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	3.386e-011	3.162e-010
Absorbed Dose Rate in Air	mGy/hr	2.956e-013	2.761e-012
"	mrads/hr	2.956e-011	2.761e-010
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	3.356e-013	3.135e-012
o Opposed	"	2.890e-013	2.699e-012
o Rotational	"	2.890e-013	2.699e-012
o Isotropic	"	2.582e-013	2.411e-012
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	3.572e-013	3.337e-012
o Opposed	"	3.439e-013	3.213e-012
o Rotational	"	3.439e-013	3.213e-012
o Isotropic	"	2.735e-013	2.554e-012
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	3.022e-013	2.823e-012
o Posterior/Anterior	"	2.784e-013	2.600e-012
o Lateral	"	2.214e-013	2.067e-012
o Rotational	"	2.507e-013	2.341e-012
o Isotropic	"	2.219e-013	2.071e-012

Case Title: Case 1
 Description: Case 1

Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions

Height	1.1e+3 cm	37 ft 6.0 in
Radius	5.08 cm	2.0 in

Dose Points

	<u>X</u>	<u>Y</u>	<u>Z</u>
# 1	1.33e+02 cm 4 ft 4.4 in	571.5 cm 18 ft 9.0 in	160.02 cm 5 ft 3.0 in

Shields

<u>Shield Name</u>	<u>Dimension</u>	<u>Material</u>	<u>Density</u>
Cyl. Core	5.08 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

<u>Nuclide</u>	<u>curies</u>	<u>becquerels</u>	<u>μCi/cm²</u>	<u>Bq/cm²</u>
Ba-137m	4.2106e-012	1.5579e-001	1.1541e-010	4.2702e-006
Co-60	1.5724e-010	5.8179e+000	4.3100e-009	1.5947e-004
Cs-137	4.4509e-012	1.6468e-001	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm²/sec</u> <u>No Buildup</u>	<u>Fluence Rate</u> <u>MeV/cm²/sec</u> <u>With Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>No Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>With Buildup</u>
0.0318	3.225e-03	2.743e-57	1.602e-36	2.285e-59	1.335e-38
0.322	5.951e-03	1.101e-55	3.072e-36	8.863e-58	2.472e-38
0.364	2.165e-03	1.197e-44	1.712e-36	6.803e-47	9.727e-39

Page : 2

DOS File : PBR1_11C.MS5

Run Date: November 10, 2004

Run Time: 2:59:29 PM

Duration : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	1.402e-01	5.209e-12	1.259e-10	1.010e-14	2.442e-13
0.6938	9.490e-04	4.455e-14	1.008e-12	8.602e-17	1.946e-15
1.1732	5.818e+00	3.200e-09	3.525e-08	5.718e-12	6.300e-11
1.3325	5.818e+00	5.581e-09	5.250e-08	9.683e-12	9.108e-11
TOTALS:	1.179e+01	8.786e-09	8.788e-08	1.541e-11	1.543e-10

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\PBR1_11C.MS5

Case Title: Case 1

This case was run on Wednesday, November 10, 2004 at 2:59:29 PM

Dose Point # 1 - (1.33e+02,571.5,160.02) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	6.924e-009	6.964e-008
Photon Energy Fluence Rate	MeV/cm ² /sec	8.786e-009	8.788e-008
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	1.541e-011	1.543e-010
Absorbed Dose Rate in Air	mGy/hr	1.345e-013	1.347e-012
"	mrads/hr	1.345e-011	1.347e-010
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	1.527e-013	1.530e-012
o Opposed	"	1.316e-013	1.317e-012
o Rotational	"	1.316e-013	1.317e-012
o Isotropic	"	1.175e-013	1.176e-012
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	1.626e-013	1.629e-012
o Opposed	"	1.565e-013	1.568e-012
o Rotational	"	1.565e-013	1.568e-012
o Isotropic	"	1.245e-013	1.247e-012
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	1.375e-013	1.377e-012
o Posterior/Anterior	"	1.267e-013	1.269e-012
o Lateral	"	1.008e-013	1.009e-012
o Rotational	"	1.141e-013	1.142e-012
o Isotropic	"	1.010e-013	1.011e-012

Page : 1

File : CHECK1C.MS5

Date: November 10, 2004

Run Time: 3:29:09 PM

Duration : 00:00:00

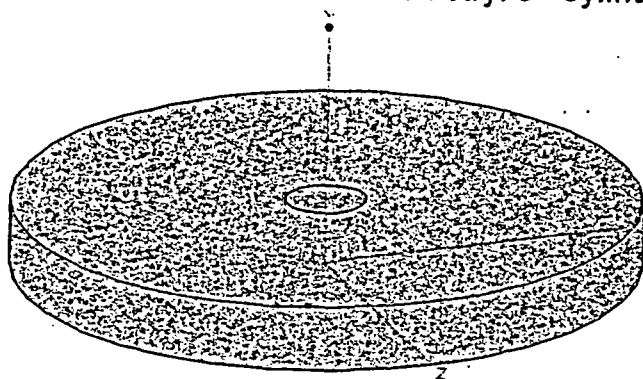
File Ref: _____

Date: 11/12/04

By: DNE

Checked: _____

Case Title: Case 1
 Description: Case 1
 Geometry: 8 - Cylinder Volume - End Shields



Source Dimensions
 Height 37.148 cm 1 ft 2.6 in
 Radius 22.543 cm 8.9 in

Dose Points

#	X	Y	Z
1	0 cm 0.0 in	137.1475 cm 4 ft 6.0 in	0 cm 0.0 in

Shields

Shield Name	Dimension	Material	Density
Source	5.93e+04 cm ³	Concrete	1.8
Air Gap		Air	0.00122
Wall Clad	152.4 cm	Concrete	2.4

Source Input

Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^3$	Bq/cm^3
Ba-137m	3.0556e-008	1.1306e+003	5.1524e-007	1.9064e-002
Co-60	1.1400e-006	4.2180e+004	1.9223e-005	7.1125e-001
Cs-137	3.2300e-008	1.1951e+003	5.4465e-007	2.0152e-002

Buildup

The material reference is : Source

Integration Parameters

Radial	20
Circumferential	10
Y Direction (axial)	10

Results

Energy MeV	Activity photons/sec	Fluence Rate		Exposure Rate	
		No Buildup MeV/cm ² /sec	With Buildup MeV/cm ² /sec	No Buildup mR/hr	With Buildup mR/hr
0.0318	2.341e+01	8.341e-08	1.013e-07	6.948e-10	8.436e-10
0.0322	4.318e+01	1.605e-07	1.960e-07	1.291e-09	1.578e-09
0.0364	1.571e+01	8.918e-08	1.169e-07	5.067e-10	6.645e-10
0.0316	1.017e+03	8.738e-04	1.853e-03	1.694e-06	3.593e-06

Page : 2

DOS File : CHECK1C.MS5

Run Date : November 10, 2004

Run Time : 3:29:09 PM

Position : 00:00:00

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6938	6.880e+00	6.315e-06	1.321e-05	1.219e-08	2.551e-08
1.1732	4.218e+04	8.121e-02	1.469e-01	1.451e-04	2.626e-04
1.3325	4.218e+04	9.727e-02	1.700e-01	1.688e-04	2.950e-04
TOTALS:	8.547e+04	1.794e-01	3.189e-01	3.156e-04	5.612e-04

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\CHECK1C.MS5

Case Title: Case 1

This case was run on Wednesday, November 10, 2004 at 3:29:09 PM

Dose Point # 1 - (0,137.1475,0) cm

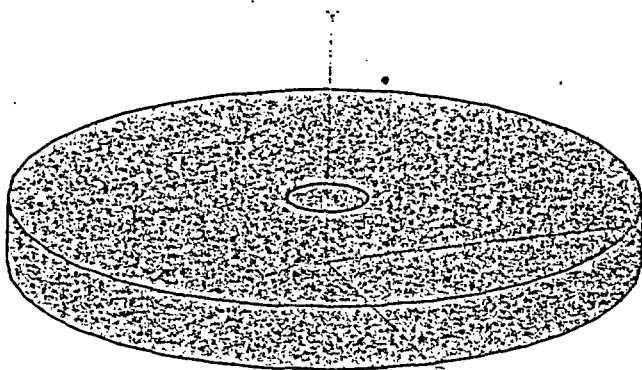
<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	1.436e-001	2.557e-001
Photon Energy Fluence Rate	MeV/cm ² /sec	1.794e-001	3.189e-001
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	3.156e-004	5.612e-004
Absorbed Dose Rate in Air	mGy/hr	2.755e-006	4.900e-006
"	mrads/hr	2.755e-004	4.900e-004
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	3.130e-006	5.566e-006
o Opposed	"	2.692e-006	4.787e-006
o Rotational	"	2.692e-006	4.787e-006
o Isotropic	"	2.404e-006	4.274e-006
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	3.332e-006	5.927e-006
o Opposed	"	3.207e-006	5.704e-006
o Rotational	"	3.207e-006	5.704e-006
o Isotropic	"	2.548e-006	4.531e-006
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	2.817e-006	5.011e-006
o Posterior/Anterior	"	2.594e-006	4.612e-006
o Lateral	"	2.060e-006	3.662e-006
o Rotational	"	2.335e-006	4.152e-006
o Isotropic	"	2.065e-006	3.672e-006

Page : 1

File : CHECK2G.MS5
 Date: November 10, 2004
 Run Time: 3:33:56 PM
 Duration : 00:00:02

File Ref: _____
 Date: 11/12/04
 By: DNF
 Checked: _____

Case Title: Case 1
 Description: Case 1
 Geometry: 8 - Cylinder Volume - End Shields



		Source Dimensions	
Height		37.148 cm	1 ft 2.6 in
Radius		22.543 cm	8.9 in
		Dose Points	
# 1	<u>X</u>	<u>Y</u>	<u>Z</u>
	0 cm	137.1475 cm	91.44 cm
	0.0 in	4 ft 6.0 in	3 ft

Shields			
<u>Shield Name</u>	<u>Dimension</u>	<u>Material</u>	<u>Density</u>
Source	5.93e+04 cm ³	Concrete	1.8
Air Gap		Air	0.00122
Wall Clad	152.4 cm	Concrete	2.4
Immersion		Air	0.00122

Source Input

	Grouping Method : Actual Photon Energies			
<u>Nuclide</u>	<u>curies</u>	<u>becquerels</u>	<u>μCi/cm³</u>	<u>Bq/cm³</u>
Ba-137m	3.0556e-008	1.1306e+003	5.1524e-007	1.9064e-002
Co-60	1.1400e-006	4.2180e+004	1.9223e-005	7.1125e-001
Cs-137	3.2300e-008	1.1951e+003	5.4465e-007	2.0152e-002

Buildup

The material reference is : Source

Integration Parameters

Radial	20
Circumferential	10
Y Direction (axial)	10

Results

<u>Energy</u>	<u>Activity</u>	<u>Fluence Rate</u>	<u>Fluence Rate</u>	<u>Exposure Rate</u>	<u>Exposure Rate</u>
<u>MeV</u>	<u>photons/sec</u>	<u>MeV/cm²/sec</u>	<u>MeV/cm²/sec</u>	<u>mR/hr</u>	<u>mR/hr</u>
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.0318	2.341e+01	3.263e-08	4.186e-08	2.718e-10	3.487e-10
0.1172	4.318e+01	6.325e-08	8.156e-08	5.090e-10	6.564e-10
0.609364	1.571e+01	3.675e-08	5.034e-08	2.088e-10	2.860e-10

Page : 2

DOS File : CHECK2C.MS5

Run Date: November 10, 2004

Run Time: 3:33:56 PM

Position : 00:00:02

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	1.017e+03	3.932e-04	8.839e-04	7.623e-07	1.713e-06
0.6938	6.880e+00	2.847e-06	6.314e-06	5.496e-09	1.219e-08
1.1732	4.218e+04	3.740e-02	7.195e-02	6.684e-05	1.286e-04
1.3325	4.218e+04	4.508e-02	8.385e-02	7.822e-05	1.455e-04
TOTALS:	8.547e+04	8.288e-02	1.567e-01	1.458e-04	2.758e-04

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\CHECK2C.MS5

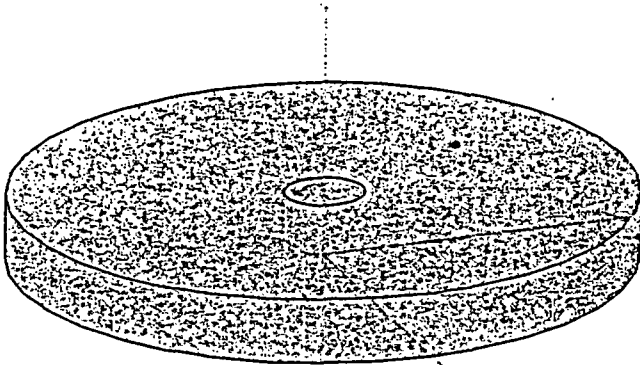
Case Title: Case 1

This case was run on Wednesday, November 10, 2004 at 3:33:56 PM

Dose Point # 1 - (0,137.1475,91.44) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	6.632e-002	1.256e-001
Photon Energy Fluence Rate	MeV/cm ² /sec	8.288e-002	1.567e-001
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	1.458e-004	2.758e-004
Absorbed Dose Rate in Air	mGy/hr	1.273e-006	2.408e-006
"	mrad/hr	1.273e-004	2.408e-004
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	1.446e-006	2.735e-006
o Opposed	"	1.244e-006	2.352e-006
o Rotational	"	1.244e-006	2.352e-006
o Isotropic	"	1.111e-006	2.100e-006
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	1.540e-006	2.912e-006
o Opposed	"	1.482e-006	2.803e-006
o Rotational	"	1.482e-006	2.803e-006
o Isotropic	"	1.177e-006	2.226e-006
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	1.302e-006	2.462e-006
o Posterior/Anterior	"	1.198e-006	2.266e-006
o Lateral	"	9.518e-007	1.800e-006
o Rotational	"	1.079e-006	2.040e-006
o Isotropic	"	9.542e-007	1.804e-006

Case Title: Case 1
 Description: Case 1
 Geometry: 8 - Cylinder Volume - End Shields



Source Dimensions

Height	37.148 cm	1 ft 2.6 in
Radius	22.543 cm	8.9 in

Dose Points

#	X	Y	Z
# 1	0 cm 0.0 in	137.1475 cm 4 ft 6.0 in	213.36 cm 7 ft 0.0 in

Shields

Shield Name	Dimension	Material	Density
Source	5.93e+04 cm ³	Concrete	1.8
Air Gap		Air	0.00122
Wall Clad	152.4 cm	Concrete	2.4
Immersion		Air	0.00122

Source Input

Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	3.0556e-008	1.1306e+003	5.1524e-007	1.9064e-002
Co-60	1.1400e-006	4.2180e+004	1.9223e-005	7.1125e-001
Cs-137	3.2300e-008	1.1951e+003	5.4465e-007	2.0152e-002

Buildup

The material reference is : Source

Integration Parameters

Radial	20
Circumferential	10
Y Direction (axial)	10

Results

Energy MeV	Activity photons/sec	Fluence Rate		Exposure Rate	
		MeV/cm ² /sec	MeV/cm ² /sec	mR/hr	mR/hr
		No Buildup	With Buildup	No Buildup	With Buildup
0.0318	2.341e+01	4.394e-09	5.997e-09	3.660e-11	4.995e-11
0.322	4.318e+01	8.715e-09	1.196e-08	7.013e-11	9.624e-11
0.564	1.571e+01	6.043e-09	8.834e-09	3.434e-11	5.019e-11

Page : 2

DOS File : CHECK3C.MS5

Run Date: November 11, 2004

Run Time: 12:08:23 PM

Position : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	1.017e+03	7.704e-05	1.797e-04	1.494e-07	3.483e-07
0.6938	6.880e+00	5.583e-07	1.286e-06	1.078e-09	2.483e-09
1.1732	4.218e+04	7.451e-03	1.506e-02	1.332e-05	2.691e-05
1.3325	4.218e+04	9.028e-03	1.770e-02	1.566e-05	3.070e-05
TOTALS:	8.547e+04	1.656e-02	3.293e-02	2.913e-05	5.796e-05

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\CHECK3C.MS5

Case Title: Case 1

This case was run on Thursday, November 11, 2004 at 12:08:23 PM

Dose Point # 1 - (0,137.1475,213.36) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	1.324e-002	2.639e-002
Photon Energy Fluence Rate	MeV/cm ² /sec	1.656e-002	3.293e-002
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	2.913e-005	5.796e-005
Absorbed Dose Rate in Air	mGy/hr	2.543e-007	5.060e-007
"	mrad/hr	2.543e-005	5.060e-005
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	2.889e-007	5.748e-007
o Opposed	"	2.485e-007	4.944e-007
o Rotational	"	2.485e-007	4.944e-007
o Isotropic	"	2.219e-007	4.414e-007
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	3.076e-007	6.120e-007
o Opposed	"	2.960e-007	5.890e-007
o Rotational	"	2.960e-007	5.890e-007
o Isotropic	"	2.352e-007	4.679e-007
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	2.601e-007	5.174e-007
o Posterior/Anterior	"	2.394e-007	4.763e-007
o Lateral	"	1.901e-007	3.782e-007
o Rotational	"	2.155e-007	4.288e-007
o Isotropic	"	1.906e-007	3.792e-007

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File : CHECK4C.MS5

Date : November 11, 2004

Run Time: 12:21:33 PM

Duration : 00:00:01

File Ref: _____

Date: 11/12/04

By: DNF

Checked: _____

Case Title: Case 1

Description: Case 1

Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions		
Height	4.5e+3 cm	149 ft 0.0 in
Radius	12.7 cm	5.0 in

Dose Points			
#	X	Y	Z
# 1	188.9254 cm 6 ft 2.4 in	2270.76 cm 74 ft 6.0 in	0 cm 0.0 in

Shields			
Shield Name	Dimension	Material	Density
Cyl. Core	12.7 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	76.2 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ²	Bq/cm ²
Ba-137m	4.1825e-011	1.5475e+000	1.1541e-010	4.2702e-006
Co-60	1.5619e-009	5.7791e+001	4.3100e-009	1.5947e-004
Cs-137	4.4212e-011	1.6359e+000	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

Energy MeV	Activity photons/sec	Fluence Rate		Exposure Rate	
		MeV/cm ² /sec No Buildup	MeV/cm ² /sec With Buildup	mR/hr No Buildup	mR/hr With Buildup
0.0318	3.204e-02	4.519e-91	5.376e-36	3.765e-93	4.478e-38
0.1322	5.911e-02	1.906e-88	1.031e-35	1.534e-90	8.295e-38
0.6364	2.151e-02	1.103e-68	5.744e-36	6.268e-71	3.264e-38

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DOS File : CHECK4C.MS5

Run Date : November 11, 2004

Run Time : 12:21:33 PM

Duration : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	1.392e+00	2.343e-14	1.301e-12	4.541e-17	2.521e-15
0.6938	9.427e-03	2.268e-16	1.160e-14	4.378e-19	2.239e-17
1.1732	5.779e+01	5.850e-11	1.246e-09	1.045e-13	2.226e-12
1.3325	5.779e+01	1.354e-10	2.371e-09	2.348e-13	4.113e-12
TOTALS:	1.171e+02	1.939e-10	3.618e-09	3.394e-13	6.341e-12

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\CHECK4C.MS5

Case Title: Case 1

This case was run on Thursday, November 11, 2004 at 12:21:33 PM

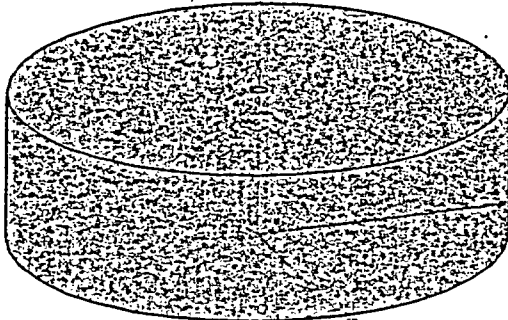
Dose Point # 1 - (188.9254,2270.76,0) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	1.515e-010	2.843e-009
Photon Energy Fluence Rate	MeV/cm ² /sec	1.939e-010	3.618e-009
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	3.394e-013	6.341e-012
Absorbed Dose Rate in Air	mGy/hr	2.963e-015	5.536e-014
"	mrads/hr	2.963e-013	5.536e-012
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	3.363e-015	6.284e-014
o Opposed	"	2.899e-015	5.414e-014
o Rotational	"	2.899e-015	5.414e-014
o Isotropic	"	2.590e-015	4.837e-014
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	3.579e-015	6.688e-014
o Opposed	"	3.447e-015	6.441e-014
o Rotational	"	3.447e-015	6.441e-014
o Isotropic	"	2.743e-015	5.124e-014
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	3.029e-015	5.659e-014
o Posterior/Anterior	"	2.792e-015	5.214e-014
o Lateral	"	2.223e-015	4.149e-014
o Rotational	"	2.514e-015	4.696e-014
o Isotropic	"	2.226e-015	4.157e-014

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 File : CHECK5C.MS5
 Date : November 11, 2004
 Run Time : 12:36:43 PM
 Duration : 00:00:00

File Ref: _____
 Date: 11/12/04
 By: DNF
 Checked: _____

Case Title: Case 1
 Description: Case 1
 Geometry: 8 - Cylinder Volume - End Shields



Source Dimensions

Height 96.52 cm 3 ft 2.0 in
 Radius 5.08 cm 2.0 in

Dose Points

#	X	Y	Z
# 1	0 cm 0.0 in	196.52 cm 6 ft 5.4 in	0 cm 0.0 in

Shields

Shield Name	Dimension	Material	Density
Source	7825.185 cm ³	Concrete	1.8
Air Gap		Air	0.00122
Wall Clad	152.4 cm	Concrete	2.4

Source Input

Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	1.7879e-008	6.6154e+002	2.2849e-006	8.4540e-002
Co-60	6.7000e-007	2.4790e+004	8.5621e-005	3.1680e+000
Cs-137	1.8900e-008	6.9930e+002	2.4153e-006	8.9365e-002

Buildup

The material reference is : Source

Integration Parameters

Radial	20
Circumferential	10
Y Direction (axial)	10

Results

Energy MeV	Activity photons/sec	Fluence Rate		Exposure Rate	
		MeV/cm ² /sec No Buildup	MeV/cm ² /sec With Buildup	mR/hr No Buildup	mR/hr With Buildup
0.0318	1.370e+01	1.945e-08	2.380e-08	1.620e-10	1.983e-10
0.0322	2.527e+01	3.742e-08	4.606e-08	3.011e-10	3.707e-10
0.0364	9.195e+00	2.079e-08	2.735e-08	1.181e-10	1.554e-10
0.0616	5.953e+02	2.033e-04	4.372e-04	3.942e-07	8.477e-07

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DOS File : CHECK5C.MS5
Run Date: November 11, 2004
Run Time: 12:36:43 PM
Duration : 00:00:00

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6938	4.044e+00	1.476e-06	3.135e-06	2.850e-09	6.053e-09
1.1732	2.479e+04	1.910e-02	3.558e-02	3.413e-05	6.358e-05
1.3325	2.479e+04	2.294e-02	4.145e-02	3.980e-05	7.192e-05
TOTALS:	5.023e+04	4.224e-02	7.747e-02	7.433e-05	1.363e-04

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\CHECK5C.MS5

Case Title: Case 1

This case was run on Thursday, November 11, 2004 at 12:36:43 PM

Dose Point # 1 - (0,196.52,0) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	3.381e-002	6.210e-002
Photon Energy Fluence Rate	MeV/cm ² /sec	4.224e-002	7.747e-002
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	7.433e-005	1.363e-004
Absorbed Dose Rate in Air	mGy/hr	6.489e-007	1.190e-006
"	mrads/hr	6.489e-005	1.190e-004
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	7.371e-007	1.352e-006
o Opposed	"	6.340e-007	1.163e-006
o Rotational	"	6.340e-007	1.163e-006
o Isotropic	"	5.662e-007	1.038e-006
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	7.848e-007	1.440e-006
o Opposed	"	7.554e-007	1.386e-006
o Rotational	"	7.554e-007	1.386e-006
o Isotropic	"	6.001e-007	1.101e-006
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	6.636e-007	1.217e-006
o Posterior/Anterior	"	6.108e-007	1.120e-006
o Lateral	"	4.851e-007	8.898e-007
o Rotational	"	5.499e-007	1.009e-006
o Isotropic	"	4.864e-007	8.920e-007

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File : CHECK6C.MS5

Date: November 11, 2004

Run Time: 12:48:53 PM

Duration : 00:00:01

File Ref: _____

Date: 11/12/04

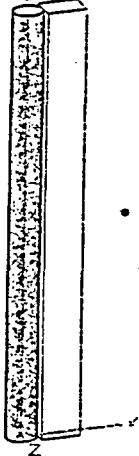
By: DWF

Checked: _____

Case Title: Case 1

Description: Case 1

Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions		
Height	883.92 cm	29 ft
Radius	30.48 cm	1 ft

Dose Points			
#	<u>X</u>	<u>Y</u>	<u>Z</u>
# 1	211.7854 cm 6 ft 11.4 in	441.96 cm 14 ft 6.0 in	0 cm 0.0 in

Shields			
<u>Shield Name</u>	<u>Dimension</u>	<u>Material</u>	<u>Density</u>
Cyl. Core	30.48 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	81.28 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

<u>Nuclide</u>	<u>curies</u>	<u>becquerels</u>	<u>μCi/cm²</u>	<u>Bq/cm²</u>
Ba-137m	1.9537e-011	7.2287e-001	1.1541e-010	4.2702e-006
Co-60	7.2960e-010	2.6995e+001	4.3100e-009	1.5947e-004
Cs-137	2.0652e-011	7.6413e-001	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u>		<u>Exposure Rate</u>	
		<u>MeV/cm²/sec</u> <u>No Buildup</u>	<u>MeV/cm²/sec</u> <u>With Buildup</u>	<u>mR/hr</u> <u>No Buildup</u>	<u>mR/hr</u> <u>With Buildup</u>
0.0318	1.497e-02	1.162e-95	8.757e-36	9.683e-98	7.294e-38
0.322	2.761e-02	6.591e-93	1.679e-35	5.304e-95	1.351e-37
0.0364	1.005e-02	4.992e-72	9.357e-36	2.836e-74	5.316e-38

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DOS File : CHECK6C.MS5

Run Date : November 11, 2004

Run Time : 12:48:53 PM

Position : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	6.504e-01	1.489e-14	9.362e-13	2.886e-17	1.815e-15
0.6938	4.403e-03	1.475e-16	8.524e-15	2.848e-19	1.646e-17
1.1732	2.700e+01	4.822e-11	1.127e-09	8.617e-14	2.015e-12
1.3325	2.700e+01	1.174e-10	2.241e-09	2.036e-13	3.888e-12
TOTALS:	5.470e+01	1.656e-10	3.369e-09	2.898e-13	5.905e-12

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\CHECK6C.MS5

Case Title: Case 1

This case was run on Thursday, November 11, 2004 at 12:48:53 PM

Dose Point #.1 - (211.7854,441.96,0) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	1.292e-010	2.644e-009
Photon Energy Fluence Rate	MeV/cm ² /sec	1.656e-010	3.369e-009
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	2.898e-013	5.905e-012
Absorbed Dose Rate in Air	mGy/hr	2.530e-015	5.155e-014
"	mrads/hr	2.530e-013	5.155e-012
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	2.871e-015	5.851e-014
o Opposed	"	2.475e-015	5.042e-014
o Rotational	"	2.475e-015	5.042e-014
o Isotropic	"	2.212e-015	4.505e-014
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	3.055e-015	6.227e-014
o Opposed	"	2.943e-015	5.997e-014
o Rotational	"	2.943e-015	5.997e-014
o Isotropic	"	2.342e-015	4.771e-014
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	2.586e-015	5.269e-014
o Posterior/Anterior	"	2.384e-015	4.855e-014
o Lateral	"	1.898e-015	3.864e-014
o Rotational	"	2.147e-015	4.373e-014
o Isotropic	"	1.901e-015	3.871e-014

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File : CHECK7C.MS5

Date: November 11, 2004

Run Time: 1:02:39 PM

Duration : 00:00:01

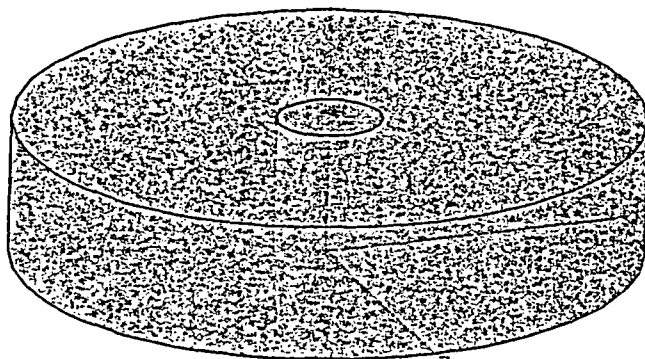
File Ref: _____

Date: 11/12/04

By: DNF

Checked: _____

Case Title: Case 1
 Description: Case 1
 Geometry: 8 - Cylinder Volume - End Shields



Source Dimensions

Height	81.28 cm	2 ft 8.0 in
Radius	30.48 cm	1 ft

Dose Points

#	X	Y	Z
# 1	0 cm 0.0 in	181.28 cm 5 ft 11.4 in	41.91 cm 1 ft 4.5 in

Shields

Shield Name	Dimension	Material	Density
Source	2.37e+05 cm ³	Concrete	1.8
Air Gap		Air	0.00122
Wall Clad	152.4 cm	Concrete	2.4
Immersion		Air	0.00122

Source Input

Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ³	Bq/cm ³
Ba-137m	9.0532e-008	3.3497e+003	3.8163e-007	1.4120e-002
Co-60	3.3800e-006	1.2506e+005	1.4248e-005	5.2718e-001
Cs-137	9.5700e-008	3.5409e+003	4.0341e-007	1.4926e-002

Buildup

The material reference is : Source

Integration Parameters

Radial	20
Circumferential	10
Y Direction (axial)	10

Results

Energy MeV	Activity photons/sec	Fluence Rate		Exposure Rate	
		No Buildup	With Buildup	No Buildup	With Buildup
0.0318	6.935e+01	5.906e-08	8.057e-08	4.920e-10	6.711e-10
0.322	1.279e+02	1.172e-07	1.607e-07	9.431e-10	1.293e-09
0.664	4.656e+01	8.150e-08	1.190e-07	4.631e-10	6.760e-10

Page : 2
DOS File : CHECK7C.MS5
Run Date : November 11, 2004
Run Time : 1:02:39 PM
Duration : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	3.014e+03	9.605e-04	2.109e-03	1.862e-06	4.089e-06
0.6938	2.040e+01	6.953e-06	1.508e-05	1.342e-08	2.911e-08
1.1732	1.251e+05	9.068e-02	1.724e-01	1.620e-04	3.080e-04
1.3325	1.251e+05	1.091e-01	2.012e-01	1.894e-04	3.491e-04
TOTALS:	2.534e+05	2.008e-01	3.757e-01	3.533e-04	6.613e-04

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\CHECK7C.MS5

Case Title: Case 1

This case was run on Thursday, November 11, 2004 at 1:02:39 PM

Dose Point # 1 - (0,181.28,41.91) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	1.607e-001	3.012e-001
Photon Energy Fluence Rate	MeV/cm ² /sec	2.008e-001	3.757e-001
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	3.533e-004	6.613e-004
Absorbed Dose Rate in Air	mGy/hr	3.084e-006	5.773e-006
"	mrad/hr	3.084e-004	5.773e-004
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	3.503e-006	6.558e-006
o Opposed	"	3.014e-006	5.641e-006
o Rotational	"	3.014e-006	5.641e-006
o Isotropic	"	2.691e-006	5.037e-006
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	3.730e-006	6.983e-006
o Opposed	"	3.590e-006	6.721e-006
o Rotational	"	3.590e-006	6.721e-006
o Isotropic	"	2.852e-006	5.339e-006
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	3.154e-006	5.904e-006
o Posterior/Anterior	"	2.903e-006	5.434e-006
o Lateral	"	2.306e-006	4.315e-006
o Rotational	"	2.614e-006	4.892e-006
o Isotropic	"	2.312e-006	4.326e-006

Summary : RESRAD Default Parameters

File : Plankton Subsurface Modified Embedded Pipe.FBI

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Time = 3.000E+00	12
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Summary : RESRAD Default Parameters

File : Bunkerrock Cutsurface Modified Embedded Pipe.RAI

Dose Conversion Factor and Related Parameter Summary
File: FGR 15 Morbidity.

Menu	Parameter	Current Value	Default	Parameter Name
E-1	Dose conversion factors for inhalation, mrem/pCi:			
E-1	Co-60	2.190E-04	2.190E-04	DCF2 (1)
E-1	Cs-137-D	3.190E-05	3.190E-05	DCF2 (2)
E-1	Eu-154	2.860E-04	2.860E-04	DCF2 (3)
E-1	H-3	6.400E-06	6.400E-06	DCF2 (4)
E-1	Sr-90-D	1.310E-03	1.310E-03	DCF2 (5)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Co-60	2.690E-05	2.690E-05	DCF3 (1)
D-1	Cs-137-D	5.000E-05	5.000E-05	DCF3 (2)
D-1	Eu-154	9.550E-06	9.550E-06	DCF3 (3)
D-1	H-3	6.400E-08	6.400E-08	DCF3 (4)
D-1	Sr-90-D	1.530E-04	1.530E-04	DCF3 (5)
D-34	Food transfer factors:			
D-34	Co-60 , plant/soil concentration ratio, dimensionless	8.000E-02	8.000E-02	RTF (1,1)
D-34	Co-60 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-02	2.000E-02	RTF (1,2)
D-34	Co-60 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF (1,3)
D-34				
D-34	Cs-137-D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF (2,1)
D-34	Cs-137-D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-02	3.000E-02	RTF (2,2)
D-34	Cs-137-D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-03	6.000E-03	RTF (2,3)
D-34				
D-34	Eu-154 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF (3,1)
D-34	Eu-154 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF (3,2)
D-34	Eu-154 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF (3,3)
D-34				
D-34	H-3 , plant/soil concentration ratio, dimensionless	4.800E-03	4.800E-03	RTF (4,1)
D-34	H-3 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.200E-02	1.200E-02	RTF (4,2)
D-34	H-3 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-02	1.000E-02	RTF (4,3)
D-34				
D-34	Sr-90-D , plant/soil concentration ratio, dimensionless	3.000E-01	3.000E-01	RTF (5,1)
D-34	Sr-90-D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-03	8.000E-03	RTF (5,2)
D-34	Sr-90-D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF (5,3)
D-34				
-5	Bioaccumulation factors, fresh water, L/kg:			
-5	Co-60 , fish	3.000E-02	3.000E-02	BIOFAC (1,1)
-5	Co-60 , crustacea and mollusks	3.000E-02	3.000E-02	BIOFAC (1,2)
-5				
-5	Cs-137-D , fish	1.000E-03	1.000E-03	BIOFAC (2,1)
-5	Cs-137-D , crustacea and mollusks	1.000E-02	1.000E-02	BIOFAC (2,2)
-5				
-5	Eu-154 , fish	5.000E-01	5.000E-01	BIOFAC (3,1)
-5	Eu-154 , crustacea and mollusks	1.000E-03	1.000E-03	BIOFAC (3,2)
-5				
-5	H-3 , fish	1.000E-00	1.000E-00	BIOFAC (4,1)
-5	H-3 , crustacea and mollusks	1.000E-00	1.000E-00	BIOFAC (4,2)

Summary : RESRAD Default Parameters

File : Blumbrook Subsurface Modified Embedded Pipe.RAD

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

File: FGR 15 Toxicity

Menu	Parameter	Current Value	Default	Parameter Name
D-5	Sr-90+D , fish	6.000E-01	6.000E-01	EIOFAC(5,1)
D-5	Sr-90+D , crustacea and mollusks	1.000E-02	1.000E-02	EIOFAC(5,2)

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)	3.450E+03	1.000E+04	---	AREA
RC11	Thickness of contaminated zone (m)	3.000E+00	2.000E+00	---	THICKO
RC11	Length parallel to aquifer flow (m)	7.500E+01	1.000E+02	---	LCZFAQ
RC11	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+01	---	BRDL
RC11	Time since placement of material (yr)	1.000E+00	0.000E+00	---	TI
RC11	Times for calculations (yr)	1.000E+00	1.000E+00	---	T (2)
RC11	Times for calculations (yr)	3.000E+00	3.000E+00	---	T (3)
RC11	Times for calculations (yr)	1.000E+01	1.000E+01	---	T (4)
RC11	Times for calculations (yr)	3.000E+01	3.000E+01	---	T (5)
RC11	Times for calculations (yr)	1.000E+02	1.000E+02	---	T (6)
RC11	Times for calculations (yr)	3.000E+02	3.000E+02	---	T (7)
RC11	Times for calculations (yr)	1.000E+03	1.000E+03	---	T (8)
RC11	Times for calculations (yr)	not used	0.000E+00	---	T (9)
RC11	Times for calculations (yr)	not used	0.000E+00	---	T (10)
R012	Initial principal radionuclide (pCi/g): Co-60	4.010E+02	0.000E+00	---	S1 (1)
R012	Initial principal radionuclide (pCi/g): Cs-137	4.360E+03	0.000E+00	---	S1 (2)
R012	Initial principal radionuclide (pCi/g): Eu-154	5.900E+06	0.000E+00	---	S1 (3)
R012	Initial principal radionuclide (pCi/g): H-3	5.530E+01	0.000E+00	---	S1 (4)
R012	Initial principal radionuclide (pCi/g): Sr-90	2.590E+03	0.000E+00	---	S1 (5)
R012	Concentration in groundwater (pCi/L): Co-60	not used	0.000E+00	---	W1 (1)
R012	Concentration in groundwater (pCi/L): Cs-137	not used	0.000E+00	---	W1 (2)
R012	Concentration in groundwater (pCi/L): Eu-154	not used	0.000E+00	---	W1 (3)
R012	Concentration in groundwater (pCi/L): H-3	not used	0.000E+00	---	W1 (4)
R012	Concentration in groundwater (pCi/L): Sr-90	not used	0.000E+00	---	W1 (5)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVERD
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)	1.560E+00	1.560E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E+03	1.000E+03	---	VCZ
R013	Contaminated zone total porosity	4.100E+01	4.000E+01	---	TPCZ
R013	Contaminated zone field capacity	2.000E+01	2.000E+01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	6.600E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	1.400E+00	3.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	6.000E+00	6.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E+01	5.000E+01	---	EVAPTR
R013	Precipitation (m/yr)	6.600E+01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	1.040E+00	2.000E+01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E+01	2.000E+01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E+03	1.000E+03	---	EFS
R04	Density of saturated zone (g/cm**3)	1.460E+00	1.500E+00	---	DENSAQ
R04	Saturated zone total porosity	4.500E+01	4.000E+01	---	TFSE
R04	Saturated zone effective porosity	1.000E+01	2.000E+01	---	EPSE
R04	Saturated zone field capacity	2.000E+01	2.000E+01	---	FCSZ
R04	Saturated zone hydraulic conductivity (m/yr)	1.070E+03	1.000E+02	---	HCSZ

Summary: RESRAD Default Parameters

File: Plumbicon Insurance Identified Enclaves Pipe.PAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (if different from user input)	Parameter Name
R014	Saturated zone hydraulic gradient	4.500E-03	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	ESZ
R014	Water table drop rate (in/yr)	0.000E+00	1.000E-03	---	VWT
R014	Well pump intake depth (in below water table)	2.010E+00	1.000E+01	---	DWISWT
R014	Model: NonDispersion (ND) or Mass-Balance (MB)	MB	ND	---	MODEL
R014	Well pumping rate (m ³ /yr)	1.186E+02	2.500E+02	---	WQ
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	0.000E+00	4.000E+00	---	R(1)
R015	Unsat. zone 1, soil density (g/cm ³)	1.560E+00	1.500E+00	---	DENSU2(1)
R015	Unsat. zone 1, total porosity	4.100E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	3.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	1.400E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	1.262E+03	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Co-60				
R016	Contaminated zone (cm ³ /g)	1.700E+01	1.000E+03	---	DCNUCC(1)
R016	Unsat. zone 1 (cm ³ /g)	1.000E+03	1.000E+03	---	DCNUCU(1,1)
R016	Saturated zone (cm ³ /g)	1.000E+03	1.000E+03	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.069E-02	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUEK(1)
R016	Distribution coefficients for Cs-137				
R016	Contaminated zone (cm ³ /g)	6.500E+00	1.000E+03	---	DCNUCC(2)
R016	Unsat. zone 1 (cm ³ /g)	4.470E+02	1.000E+03	---	DCNUCU(2,1)
R016	Saturated zone (cm ³ /g)	4.470E+02	1.000E+03	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.730E-02	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUEK(2)
R016	Distribution coefficients for Eu-154				
R016	Contaminated zone (cm ³ /g)	4.000E-02	-1.000E+00	---	DCNUCC(3)
R016	Unsat. zone 1 (cm ³ /g)	9.550E+02	-1.000E+00	---	DCNUCU(3,1)
R016	Saturated zone (cm ³ /g)	9.550E+02	-1.000E+00	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.612E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUEK(3)
R016	Distribution coefficients for H-3				
R016	Contaminated zone (cm ³ /g)	0.000E+00	0.000E+00	---	DCNUCC(4)
R016	Unsat. zone 1 (cm ³ /g)	0.000E+00	0.000E+00	---	DCNUCU(4,1)
R016	Saturated zone (cm ³ /g)	0.000E+00	0.000E+00	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.024E-01	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUEK(4)
R016	Distribution coefficients for Sr-90				
R016	Contaminated zone (cm ³ /g)	3.500E+00	3.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm ³ /g)	3.100E+01	3.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm ³ /g)	0.000E+00	3.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.906E-02	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUEK(5)

Summary: RESRAD Input Parameters

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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 meat	1.000E+00	-1	---	FMEAT
R018	Contamination fraction of milk	1.000E+00	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	5.500E+00	6.500E-01	---	LF15
R019	Livestock fodder intake for milk (kg/day)	1.700E+01	5.500E-01	---	LF16
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LW15
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LW16
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
U9B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
U9B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
U9B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
U9B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
U9B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
U9B	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)
U9B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
U9B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
U9B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
U9B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	EDRY(1)
U9B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	EDRY(2)
U9B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	EDRY(3)
U9B	Wet Foliar Interception Fraction for Non-Leafy	1.500E-01	1.500E-01	---	EWET(1)
U9B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	EWET(2)
U9B	Wet Foliar Interception Fraction for Fodder	1.500E-01	1.500E-01	---	EWET(3)
U9B	Weathering Removal Constant for Vegetation	1.000E-01	1.000E-01	---	WLAM
4	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
4	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CE
4	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSO11
4	Fraction of vegetation carbon from air	not used	8.000E-01	---	CASR
4	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
4	C-14 evasion flux rate from soil (l/sec)	not used	7.000E-07	---	EVSN
4	C-14 evasion flux rate from soil (l/sec)	not used	1.000E-10	---	REVEN
4	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
4	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
4	DCF correction factor for gaseous forms of C14	not used	8.894E-01	---	CO2F
DF	Storage times of contaminated foodstuffs (days):				
DF	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
DF	Leafy vegetables	1.500E+00	1.000E+00	---	STOR_T(2)
DF	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
DF	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
DF	Fish	7.000E+03	7.000E+00	---	STOR_T(5)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (if different from user input)	Parameter Name
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STCR_7(6)
STOR	Well water	1.000E+00	1.000E+00	---	STCR_7(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STCR_7(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STCR_7(9)
RO21	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR3
RO21	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
RO21	Total porosity of the cover material	not used	4.000E-01	---	TPCV
RO21	Total porosity of the building foundation	not used	1.000E-01	---	TFFL
RO21	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
RO21	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
RO21	Diffusion coefficient for radon gas (m/sec):				
RO21	in cover material	not used	2.000E-06	---	DIFCV
RO21	in foundation material	not used	3.000E-07	---	DIFFL
RO21	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
RO21	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	RMIX
RO21	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
RO21	Height of the building (room) (m)	not used	2.500E+00	---	HRM
RO21	Building interior area factor	not used	0.000E+00	---	FAI
RO21	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
RO21	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
RO21	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TTL	Number of graphical time points	32	---	---	NPTS
TTL	Maximum number of integration points for dose	17	---	---	LYMAX
TTL	Maximum number of integration points for risk	1	---	---	RVMAX

Summary of Pathway Selections

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

Summary: RESRAD Default Parameters

File: Blumbrook Subsurface Modified Extended Page.RAD

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	3650.00 square meters	Co-60	4.010E-02
Thickness:	3.00 meters	Cs-137	4.360E-03
Cover Depth:	0.00 meters	Zn-154	5.900E-06
		H-3	5.530E-01
		Sr-90	2.590E-03

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	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	4.901E-01	4.110E-01	3.265E-01	1.510E-01	2.626E-02	3.727E-04	1.201E-06	4.447E-24
M(t):	1.960E-02	1.644E-02	1.262E-02	6.042E-03	1.050E-03	1.491E-05	4.805E-10	1.779E-25

Maximum TDOSE(t): 4.901E-01 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- 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.
Ce-137	2.341E-01	0.4776	2.366E-08	0.0000	0.000E+00	0.0000	7.463E-03	0.0153	1.235E-03	0.0025	4.416E-04	0.0009	1.417E-05	0.0000
Cs-137	5.565E-03	0.0114	3.923E-10	0.0000	0.000E+00	0.0000	7.915E-04	0.0016	2.753E-04	0.0006	2.372E-04	0.0005	2.996E-06	0.0000
Eu-154	1.665E-05	0.0000	4.692E-12	0.0000	0.000E+00	0.0000	1.260E-08	0.0000	2.937E-09	0.0000	6.936E-11	0.0000	7.633E-10	0.0000
H-3	0.000E+00	0.0000	1.455E-04	0.0003	0.000E+00	0.0000	3.445E-03	0.0111	3.250E-04	0.0007	6.636E-04	0.0014	2.620E-07	0.0000
Sr-90	2.373E-05	0.0000	9.465E-09	0.0000	0.000E+00	0.0000	1.066E-02	0.0219	4.841E-04	0.0010	5.075E-04	0.0010	5.385E-06	0.0000
Total	2.397E-01	0.4851	1.456E-04	0.0003	0.000E+00	0.0000	2.440E-02	0.0491	2.326E-03	0.0047	1.650E-03	0.0036	2.261E-05	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.
Ce-137	2.784E-02	0.0568	5.363E-04	0.0011	0.000E+00	0.0000	1.556E-02	0.0326	7.907E-03	0.0161	4.412E-03	0.0090	2.999E-01	0.6119
Cs-137	1.504E-02	0.0307	1.939E-03	0.0040	0.000E+00	0.0000	6.547E-03	0.0174	6.414E-03	0.0131	9.536E-03	0.0195	4.635E-02	0.0967
Eu-154	6.466E-08	0.0000	2.063E-10	0.0000	0.000E+00	0.0000	3.643E-08	0.0000	1.832E-09	0.0000	1.023E-10	0.0000	1.697E-05	0.0000
H-3	1.601E-02	0.0336	1.161E-06	0.0000	0.000E+00	0.0000	2.713E-03	0.0179	1.327E-03	0.0027	4.094E-03	0.0084	3.874E-02	0.0790
Sr-90	4.865E-02	0.0993	1.882E-04	0.0004	0.000E+00	0.0000	2.921E-02	0.0596	5.572E-03	0.0114	7.750E-03	0.0156	1.031E-01	0.2103
Total	1.095E-01	0.2235	1.667E-03	0.0034	0.000E+00	0.0000	6.244E-02	0.1274	2.121E-02	0.0433	2.879E-02	0.0526	4.901E-01	1.0000

*Sum of all water independent and dependent pathways.

Summary: RESRAD Default Parameters

File: Plummerak Superfund Modified Inroads (1).RAD

Total Dose Contributions (DOSE(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- 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.
Ce-60	1.526E-01	0.4767	1.546E-09	0.0000	0.000E-00	0.0000	4.865E-03	0.0152	8.066E-04	0.0025	2.854E-04	0.0009	9.245E-06	0.0000
Cs-137	4.754E-03	0.0149	3.375E-10	0.0000	0.000E-00	0.0000	6.805E-04	0.0021	2.402E-04	0.0007	2.040E-04	0.0006	2.575E-06	0.0000
Eu-154	1.329E-05	0.0000	3.700E-12	0.0000	0.000E-00	0.0000	9.936E-09	0.0000	2.316E-09	0.0000	3.469E-11	0.0000	6.018E-10	0.0000
H-3	0.000E+00	0.0000	1.410E-06	0.0000	0.000E-00	0.0000	6.835E-05	0.0002	4.266E-06	0.0000	8.563E-06	0.0000	3.252E-09	0.0000
Sr-90	1.907E-05	0.0001	7.606E-09	0.0000	0.000E-00	0.0000	5.563E-03	0.0266	3.927E-04	0.0012	4.062E-04	0.0013	4.325E-06	0.0000
Total	1.576E-01	0.4917	1.833E-06	0.0000	0.000E+00	0.0000	1.422E-02	0.0444	1.444E-03	0.0045	9.052E-04	0.0028	1.616E-05	0.0001

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

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ce-60	1.816E-02	0.0566	3.510E-04	0.0011	0.000E+00	0.0000	1.040E-02	0.0325	5.157E-03	0.0161	2.877E-03	0.0090	1.957E-01	0.6106
Cs-137	1.292E-02	0.0403	1.669E-03	0.0052	0.000E-00	0.0000	7.341E-03	0.0229	5.512E-03	0.0172	5.191E-03	0.0256	4.154E-02	0.1296
Eu-154	5.093E-08	0.0000	1.641E-10	0.0000	0.000E+00	0.0000	2.869E-06	0.0000	1.442E-09	0.0000	8.056E-11	0.0000	1.336E-05	0.0000
H-3	2.234E-04	0.0007	1.474E-05	0.0000	0.000E+00	0.0000	1.094E-04	0.0003	1.699E-05	0.0001	5.108E-05	0.0002	4.635E-04	0.0015
Sr-90	3.906E-03	0.0121	1.511E-04	0.0005	1.007E-00	0.0000	2.346E-02	0.0732	4.476E-03	0.0140	6.225E-03	0.0194	6.275E-02	0.2562
Total	7.036E-02	0.2195	5.166E-03	0.0166	0.000E+00	0.0000	4.135E-02	0.1269	1.506E-03	0.0047	1.734E-02	0.0543	3.205E-01	1.0000

Sum of all water independent and dependent pathways.

Summary: RESRAD Default Parameters

File: Fluoride/Fluoride Modified Embedded Pipe.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 = 1.00E+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.
Co-60	5.647E-02	0.3738	5.712E-09	0.0000	0.000E+00	0.0000	1.805E-03	0.0120	2.961E-04	0.0020	1.066E-04	0.0007	3.416E-06	0.0000
Cs-137	3.362E-03	0.0223	2.370E-10	0.0000	0.000E+00	0.0000	4.782E-04	0.0032	1.688E-04	0.0011	1.434E-04	0.0009	1.810E-06	0.0000
Eu-154	7.631E-06	0.0001	2.125E-12	0.0000	0.000E+00	0.0000	5.706E-09	0.0000	1.230E-09	0.0000	3.141E-11	0.0000	3.456E-10	0.0000
H-3	0.000E+00	0.0000	6.347E-11	0.0000	0.000E+00	0.0000	2.397E-09	0.0000	1.498E-10	0.0000	3.013E-10	0.0000	1.140E-13	0.0000
Sr-90	1.145E-05	0.0001	4.567E-09	0.0000	0.000E+00	0.0000	5.154E-03	0.0341	2.358E-04	0.0016	2.451E-04	0.0016	2.599E-06	0.0000
Total	5.965E-02	0.3962	1.058E-08	0.0000	0.000E+00	0.0000	7.437E-03	0.0492	7.027E-04	0.0047	4.951E-04	0.0033	7.627E-06	0.0001

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.00E+01 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.
Co-60	6.695E-03	0.0443	1.294E-04	0.0009	0.000E+00	0.0000	3.837E-03	0.0254	1.902E-03	0.0126	1.061E-03	0.0070	7.230E-02	0.4787
Cs-137	9.056E-03	0.0600	1.166E-03	0.0077	0.000E+00	0.0000	5.147E-03	0.0341	3.864E-03	0.0256	3.743E-03	0.0310	2.915E-02	0.1929
Eu-154	2.918E-08	0.0000	9.402E-11	0.0000	0.000E+00	0.0000	1.644E-08	0.0000	8.266E-10	0.0000	4.616E-11	0.0000	7.685E-06	0.0000
H-3	7.809E-09	0.0000	5.151E-13	0.0000	0.000E+00	0.0000	3.822E-09	0.0000	3.904E-10	0.0000	1.785E-09	0.0000	1.692E-08	0.0000
Sr-90	2.340E-02	0.1549	9.054E-05	0.0006	0.000E+00	0.0000	1.405E-02	0.0930	2.682E-03	0.0178	3.729E-03	0.0247	4.960E-02	0.3264
Total	2.815E-02	0.1861	1.366E-03	0.0092	0.000E+00	0.0000	2.304E-02	0.1515	8.448E-03	0.0559	1.063E-02	0.0697	1.510E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 3.00E+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.
Co-60	3.166E-03	0.1252	3.314E-10	0.0000	0.000E+00	0.0000	1.811E-04	0.0040	1.735E-05	0.0007	6.203E-06	0.0002	1.989E-07	0.0000
Cs-137	1.227E-03	0.0467	8.649E-11	0.0000	0.000E+00	0.0000	1.746E-04	0.0066	6.159E-05	0.0023	5.231E-05	0.0020	6.604E-07	0.0000
Eu-154	1.565E-06	0.0001	4.357E-13	0.0000	0.000E+00	0.0000	1.172E-09	0.0000	2.727E-10	0.0000	6.440E-12	0.0000	7.087E-11	0.0000
H-3	0.000E+00	0.0000	1.042E-13	0.0000	0.000E+00	0.0000	3.938E-22	0.0000	2.464E-23	0.0000	4.951E-23	0.0000	1.873E-26	0.0000
Sr-90	2.667E-06	0.0001	1.064E-09	0.0000	0.000E+00	0.0000	1.200E-03	0.0457	5.491E-05	0.0021	5.708E-05	0.0022	6.051E-07	0.0000
Total	4.517E-03	0.1721	1.483E-09	0.0000	0.000E+00	0.0000	1.480E-03	0.0564	1.339E-04	0.0051	1.156E-04	0.0044	1.465E-06	0.0001

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
 As mrem/yr and Fraction of Total Dose At t = 3.00E+01 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.
Co-60	5.870E-04	0.0147	7.482E-06	0.0003	0.000E+00	0.0000	2.218E-04	0.0064	1.099E-04	0.0042	6.133E-05	0.0023	4.203E-03	0.1601
Cs-137	3.265E-03	0.1250	4.232E-04	0.0161	0.000E+00	0.0000	1.866E-03	0.0711	1.401E-03	0.0533	2.082E-03	0.0793	1.057E-02	0.4026
Eu-154	5.943E-05	0.0000	1.915E-11	0.0000	0.000E+00	0.0000	3.348E-09	0.0000	1.684E-10	0.0000	9.401E-12	0.0000	1.576E-06	0.0001
H-3	1.270E-21	0.0000	8.376E-26	0.0000	0.000E+00	0.0000	6.217E-21	0.0000	9.604E-23	0.0000	2.903E-22	0.0000	2.756E-21	0.0000
Sr-90	5.410E-03	0.2061	3.094E-05	0.0001	0.000E+00	0.0000	3.210E-03	0.1238	6.205E-04	0.0236	6.625E-04	0.0329	1.148E-02	0.4373
Total	9.041E-03	0.3419	4.816E-04	0.0170	0.000E+00	0.0000	5.336E-03	0.2033	1.133E-03	0.0612	3.005E-03	0.1145	2.626E-02	1.0000

*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : Plumcreek Surface Modified Entreded Pipe.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+02 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.
Co-60	1.563E-07	0.0004	1.561E-14	0.0000	0.000E+00	0.0000	4.956E-09	0.0000	8.249E-10	0.0000	2.949E-10	0.0000	9.458E-12	0.0000
Cs-137	3.602E-05	0.0966	2.559E-12	0.0000	0.000E+00	0.0000	5.123E-06	0.0137	1.609E-06	0.0049	1.536E-06	0.0041	1.939E-08	0.0001
Eu-154	6.107E-09	0.0000	1.700E-15	0.0000	0.000E+00	0.0000	4.567E-12	0.0000	1.064E-12	0.0000	2.314E-14	0.0000	2.766E-13	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	1.625E-08	0.0000	6.490E-12	0.0000	0.000E+00	0.0000	7.312E-06	0.0196	3.346E-07	0.0009	3.478E-07	0.0009	3.687E-05	0.0000
Total	3.620E-05	0.0971	9.036E-12	0.0000	0.000E+00	0.0000	1.244E-05	0.0334	2.144E-06	0.0056	1.984E-06	0.0051	2.308E-06	0.0001

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

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	1.797E-08	0.0000	3.474E-10	0.0000	0.000E+00	0.0000	1.030E-08	0.0000	5.104E-09	0.0000	2.847E-09	0.0000	1.999E-07	0.0005
Cs-137	9.409E-05	0.2524	1.213E-05	0.0325	0.000E+00	0.0000	5.347E-05	0.1435	4.015E-05	0.1077	5.967E-05	0.1601	3.040E-04	0.8157
Eu-154	2.265E-11	0.0000	7.298E-14	0.0000	0.000E+00	0.0000	1.276E-11	0.0000	6.416E-13	0.0000	3.583E-14	0.0000	6.149E-09	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	3.320E-05	0.0864	1.246E-07	0.0003	0.000E+00	0.0000	1.934E-05	0.0519	3.693E-06	0.0099	5.101E-06	0.0138	6.648E-01	0.1639
Total	1.369E-04	0.3569	1.226E-05	0.0319	0.000E+00	0.0000	7.262E-05	0.1954	4.364E-05	0.1176	6.480E-05	0.1739	3.727E-04	1.0000

*Sum of all water independent and dependent pathways.

Summary: RESRAD Default Parameters

File: 1 Plummeron Surface Modifier Scenario Type:SA

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.00E+02 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.
Cs-60	6.968E-20	0.0000	7.044E-27	0.0000	0.000E-00	0.0000	1.226E-21	0.0000	3.676E-21	0.0000	1.314E-22	0.0000	4.215E-24	0.0000
Cs-137	1.506E-09	0.1256	1.063E-16	0.0000	0.000E-00	0.0000	2.145E-10	0.0179	7.572E-11	0.0063	6.432E-11	0.0014	8.119E-13	0.0001
Eu-154	8.020E-16	0.0000	2.233E-22	0.0000	0.000E-00	0.0000	5.997E-19	0.0000	1.396E-19	0.0000	3.201E-21	0.0000	3.633E-20	0.0000
H-3	0.000E+00	0.0000	0.000E-00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	7.617E-15	0.0000	3.037E-16	0.0000	0.000E-00	0.0000	3.427E-12	0.0003	1.568E-13	0.0000	1.650E-15	0.0000	1.722E-15	0.0000
Total	1.506E-09	0.1256	1.094E-16	0.0000	0.000E+00	0.0000	2.160E-10	0.0181	7.586E-11	0.0063	6.446E-11	0.0014	8.136E-13	0.0001

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.00E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-60	7.455E-21	0.0000	1.441E-22	0.0000	0.000E-00	0.0000	4.272E-21	0.0000	2.318E-21	0.0000	1.161E-21	0.0000	8.753E-20	0.0000
Cs-137	3.669E-09	0.3054	4.730E-10	0.0394	0.000E-00	0.0000	2.085E-09	0.1736	1.565E-09	0.1303	2.327E-09	0.1937	1.196E-08	0.9975
Eu-154	2.770E-16	0.0000	8.923E-21	0.0000	0.000E-00	0.0000	1.560E-16	0.0000	7.645E-20	0.0000	4.381E-21	0.0000	6.072E-16	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	1.405E-11	0.0012	5.457E-14	0.0000	0.000E+00	0.0000	8.439E-12	0.0007	1.611E-13	0.0001	2.239E-12	0.0002	3.015E-11	0.0025
Total	3.669E-09	0.3054	4.730E-10	0.0394	0.000E+00	0.0000	2.094E-09	0.1743	1.567E-09	0.1304	2.329E-09	0.1939	1.201E-08	1.0000

*Sum of all water independent and dependent pathways.

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

Parent (i)	Product (j)	Branch Fraction*	DSR(i,j) inrem.yr/(pCi/g)							
			0.000E+00	1.00E-01	3.000E-01	1.000E-01	3.000E-01	1.000E-01	3.000E-02	1.000E+03
Co-60	Co-60	1.000E+00	7.479E+00	6.487E+00	4.261E+00	1.603E+00	1.046E-01	4.961E-06	2.163E-16	0.000E+00
Cs-137	Cs-137	1.000E+00	1.109E-01	1.054E+01	9.527E-00	6.621E-03	2.424E-00	6.973E-02	2.748E-06	1.020E-21
Eu-154	Eu-154	1.000E+00	3.877E+00	2.658E-00	2.268E+00	1.303E-00	2.671E-01	1.042E-03	1.368E-10	1.121E-34
H-3	H-3	1.000E-00	7.005E-02	1.634E-02	6.749E-04	3.060E-08	4.974E-11	0.000E+00	0.000E+00	0.000E+00
Sr-90	Sr-90	1.000E+00	3.980E+01	3.700E+01	3.196E+01	1.915E-01	4.433E-00	2.645E-02	1.164E-06	6.343E-31

*Branch Fraction is the cumulative factor for the j'th 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(1,t) in pCi/g
 Basic Radiation Dose Limit = 2.500E-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
Co-60	3.343E+00	3.654E+00	5.122E+00	1.386E-01	2.385E+02	5.039E+06	*1.131E+15	*1.131E+15
Cs-137	2.254E+00	2.371E+00	2.624E+00	3.742E-00	1.031E-01	3.585E-02	9.096E+06	*6.701E+13
Eu-154	6.691E+00	9.407E+00	1.102E+01	1.919E+01	9.361E+01	2.399E+04	1.827E+11	*2.639E+14
H-3	3.569E+02	1.530E+02	2.858E+04	8.171E-08	*9.594E+10	*9.594E+10	*9.594E+10	*9.594E+10
Sr-90	6.262E-03	6.787E-01	7.622E-01	1.305E-00	1.079E-00	9.459E-02	1.147E-09	*1.365E-14

*At specific activity limit

Summed Dose/Source Ratio DSR(1,t) in inrem.yr/(pCi/g)
 and Single Radionuclide Soil Guidelines G(1,t) in pCi/g
 at t_{min} = time of minimum single radionuclide soil guideline
 and at t_{max} = time of maximum total dose = 1.000E+00 years

Nuclide (i)	Initial (pCi/g)	t _{min} (years)	DSR(1,t _{min}) (inrem.yr/(pCi/g))	G(1,t _{min}) (pCi/g)	DSR(1,t _{max}) (inrem.yr/(pCi/g))	G(1,t _{max}) (pCi/g)
Co-60	4.010E-02	0.000E+00	7.479E+00	3.343E-01	7.479E+00	3.343E-01
Cs-137	4.360E-03	0.000E+00	1.109E-01	1.054E+00	1.109E-01	1.054E+00
Eu-154	1.000E-06	0.000E+00	3.877E+00	4.691E-01	3.877E+00	4.691E-01
H-3	1.830E-01	0.000E+00	7.005E-02	3.569E-02	7.005E-02	3.569E-02
Sr-90	2.590E-03	0.000E+00	3.980E+01	6.262E-03	3.980E+01	6.262E-03

Summary : RESRAD Default Parameters

File : Fluoroch Subsurface Modfile.mdb [pipe.RAD]

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-01	3.000E+00	1.000E-01	3.000E-01	1.000E+02	3.000E+02	1.000E+03
Co-60	Co-60	1.000E+00	2.999E-01	2.601E-01	1.957E-01	7.230E-02	4.203E-03	1.999E-07	2.753E-20	0.000E+00
Cs-137	Cs-137	1.000E+00	4.455E-02	4.597E-02	4.154E-02	2.913E-02	1.057E-02	3.040E-04	1.192E-06	4.447E-24
Eu-154	Eu-154	1.000E+00	1.697E-05	1.566E-05	1.338E-05	7.665E-06	1.576E-06	6.149E-09	2.072E-16	0.000E+00
H-3	H-3	1.000E+00	3.574E-02	9.037E-03	4.826E-04	1.692E-06	2.756E-21	0.000E-00	0.000E+00	0.000E+00
Sr-90	Sr-90	1.000E+00	1.051E-01	9.592E-02	8.276E-02	4.960E-02	1.146E-02	6.849E-05	3.015E-11	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-01	3.000E+00	1.000E-01	3.000E-01	1.000E+02	3.000E+02	1.000E+03
Co-60	Co-60	1.000E+00	4.010E-02	3.476E-02	2.617E-02	9.674E-03	5.630E-04	2.677E-09	1.193E-20	0.000E+00
Cs-137	Cs-137	1.000E+00	4.360E-03	4.146E-03	3.746E-03	2.634E-03	9.611E-04	2.622E-05	1.132E-09	5.617E-25
Eu-154	Eu-154	1.000E+00	5.900E-06	5.452E-06	4.652E-06	2.672E-06	5.476E-07	2.136E-09	2.808E-16	2.305E-40
H-3	H-3	1.000E+00	5.430E-01	1.263E-01	6.966E-02	2.411E-07	3.974E-20	0.000E+00	0.000E+00	0.000E+00
Sr-90	Sr-90	1.000E+00	2.190E-01	1.404E-01	2.061E-01	1.250E-01	2.910E-04	1.770E-06	2.712E-12	5.660E-35

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

RESRAD.EME execution time = 0.94 seconds

Case Title: Case 1
 Description: Case 1

Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions		
Height	1.9e+3 cm	63 ft
Radius	12.7 cm	5.0 in

Dose Points			
	X	Y	Z
# 1	140.6654 cm 4 ft 7.4 in	960.12 cm 31 ft 6.0 in	0 cm 0.0 in

Shields			
Shield Name	Dimension	Material	Density
Cyl. Core	12.7 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ²	Bq/cm ²
Ba-137m	1.7684e-011	6.5432e-001	1.1541e-010	4.2702e-006
Co-60	6.6041e-010	2.4435e+001	4.3100e-009	1.5947e-004
Cs-137	1.8694e-011	6.9167e-001	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm ² /sec		Exposure Rate mR/hr	
		No Buildup	With Buildup	No Buildup	With Buildup
0.0318	1.355e-02	7.476e-41	6.929e-36	6.227e-43	5.772e-38
0.322	2.499e-02	1.037e-39	1.329e-35	8.343e-42	1.069e-37
0.364	9.095e-03	1.234e-32	3.897e-32	7.012e-35	2.214e-34

Page : 2

DOS File : AF63C.MS5

Run Date: November 11, 2004

Run Time: 2:25:21 PM

Duration : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	5.888e-01	3.524e-10	4.614e-09	6.832e-13	8.945e-12
0.6938	3.986e-03	2.831e-12	3.509e-11	5.465e-15	6.775e-14
1.1732	2.444e+01	1.067e-07	7.377e-07	1.906e-10	1.318e-09
1.3325	2.444e+01	1.617e-07	9.822e-07	2.805e-10	1.704e-09
TOTALS:	4.951e+01	2.687e-07	1.724e-06	4.718e-10	3.031e-09

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\AF63C.MS5

Case Title: Case 1

This case was run on Thursday, November 11, 2004 at 2:25:21 PM

Dose Point # 1 - (140.6654,960.12,0) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	2.128e-007	1.373e-006
Photon Energy Fluence Rate	MeV/cm ² /sec	2.687e-007	1.724e-006
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	4.718e-010	3.031e-009
Absorbed Dose Rate in Air	mGy/hr	4.119e-012	2.646e-011
"	mrad/hr	4.119e-010	2.646e-009
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	4.677e-012	3.005e-011
o Opposed	"	4.027e-012	2.586e-011
o Rotational	"	4.027e-012	2.586e-011
o Isotropic	"	3.597e-012	2.310e-011
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	4.979e-012	3.200e-011
o Opposed	"	4.793e-012	3.080e-011
o Rotational	"	4.793e-012	3.080e-011
o Isotropic	"	3.811e-012	2.448e-011
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	4.211e-012	2.706e-011
o Posterior/Anterior	"	3.879e-012	2.491e-011
o Lateral	"	3.084e-012	1.980e-011
o Rotational	"	3.492e-012	2.243e-011
o Isotropic	"	3.091e-012	1.984e-011

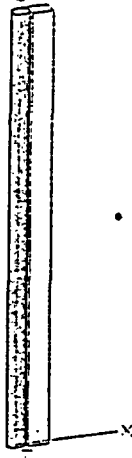
Page : 1

File : AF20C.MS5
 Date: November 11, 2004
 Run Time: 2:29:49 PM
 Duration : 00:00:01

File Ref: _____
 Date: 11/12/04
 By: DNF
 Checked: _____

Case Title: Case 1
 Description: Case 1

Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions

Height	609.6 cm	20 ft 0.0 in
Radius	12.7 cm	5.0 in

Dose Points

	<u>X</u>	<u>Y</u>	<u>Z</u>
# 1	140.6654 cm 4 ft 7.4 in	304.8 cm 10 ft 0.0 in	0 cm 0.0 in

Shields

Shield Name	Dimension	Material	Density
Cyl. Core	12.7 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	$\mu\text{Ci}/\text{cm}^2$	Bq/cm^2
Ba-137m	5.6141e-012	2.0772e-001	1.1541e-010	4.2702e-006
Co-60	2.0966e-010	7.7572e+000	4.3100e-009	1.5947e-004
Cs-137	5.9346e-012	2.1958e-001	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

Energy MeV	Activity photons/sec	Fluence Rate		Exposure Rate	
		MeV/cm ² /sec No Buildup	MeV/cm ² /sec With Buildup	mR/hr No Buildup	mR/hr With Buildup
0.0318	4.300e-03	6.344e-41	5.538e-36	5.284e-43	4.613e-38
0.322	7.934e-03	8.844e-40	1.062e-35	7.117e-42	8.545e-38
0.364	2.887e-03	1.119e-32	3.532e-32	6.356e-35	2.007e-34

Page : 2

DOS File : AF20C.MS5

Run Date: November 11, 2004

Run Time: 2:29:49 PM

Position : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	1.869e-01	3.522e-10	4.610e-09	6.828e-13	8.937e-12
0.6938	1.265e-03	2.829e-12	3.506e-11	5.462e-15	6.769e-14
1.1732	7.757e+00	1.066e-07	7.369e-07	1.905e-10	1.317e-09
1.3325	7.757e+00	1.615e-07	9.810e-07	2.802e-10	1.702e-09
TOTALS:	1.572e+01	2.685e-07	1.722e-06	4.714e-10	3.028e-09

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\AF20C.MS5

Case Title: Case 1

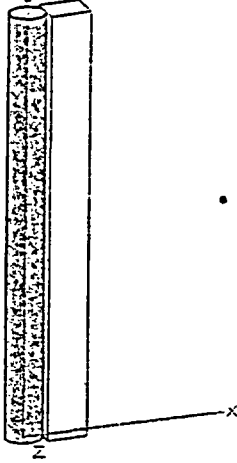
This case was run on Thursday, November 11, 2004 at 2:29:49 PM

Dose Point # 1 - (140.6654,304.8,0) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	2.126e-007	1.371e-006
Photon Energy Fluence Rate	MeV/cm ² /sec	2.685e-007	1.722e-006
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	4.714e-010	3.028e-009
Absorbed Dose Rate in Air	mGy/hr	4.115e-012	2.643e-011
"	mrads/hr	4.115e-010	2.643e-009
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	4.672e-012	3.002e-011
o Opposed	"	4.023e-012	2.583e-011
o Rotational	"	4.023e-012	2.583e-011
o Isotropic	"	3.593e-012	2.307e-011
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	4.974e-012	3.196e-011
o Opposed	"	4.789e-012	3.076e-011
o Rotational	"	4.789e-012	3.076e-011
o Isotropic	"	3.808e-012	2.445e-011
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	4.207e-012	2.703e-011
o Posterior/Anterior	"	3.875e-012	2.489e-011
o Lateral	"	3.081e-012	1.978e-011
o Rotational	"	3.489e-012	2.241e-011
o Isotropic	"	3.088e-012	1.982e-011

Case Title: Case 1
 Description: Case 1

Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions		
Height	304.8 cm	10 ft 0.0 in
Radius	12.7 cm	5.0 in

Dose Points			
	X	Y	Z
# 1	140.6654 cm 4 ft 7.4 in	152.4 cm 5 ft 0.0 in	0 cm 0.0 in

Shields			
Shield Name	Dimension	Material	Density
Cyl. Core	12.7 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ²	Bq/cm ²
Ba-137m	2.8070e-012	1.0386e-001	1.1541e-010	4.2702e-006
Co-60	1.0483e-010	3.8786e+000	4.3100e-009	1.5947e-004
Cs-137	2.9673e-012	1.0979e-001	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

Energy MeV	Activity photons/sec	Fluence Rate		Exposure Rate	
		No Buildup	With Buildup	No Buildup	With Buildup
0.0318	2.150e-03	6.320e-41	4.021e-36	5.264e-43	3.350e-38
0.322	3.967e-03	8.810e-40	7.710e-36	7.090e-42	6.205e-38
0.364	1.444e-03	1.117e-32	3.525e-32	6.344e-35	2.003e-34

Page : 2
 DOS File : AF10C.MS5
 Run Date: November 11, 2004
 Run Time: 2:33:13 PM
 Duration : 00:00:01 .

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec		<u>Exposure Rate</u> mR/hr	
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.6616	9.345e-02	3.485e-10	4.517e-09	6.756e-13	8.758e-12
0.6938	6.327e-04	2.797e-12	3.432e-11	5.400e-15	6.625e-14
1.1732	3.879e+00	1.042e-07	7.098e-07	1.862e-10	1.268e-09
1.3325	3.879e+00	1.573e-07	9.402e-07	2.729e-10	1.631e-09
TOTALS:	7.859e+00	2.619e-07	1.655e-06	4.598e-10	2.908e-09

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\AF10C.MS5

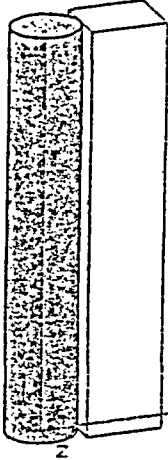
Case Title: Case 1

This case was run on Thursday, November 11, 2004 at 2:33:13 PM

Dose Point # 1 - (140.6654,152.4,0) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	2.074e-007	1.317e-006
Photon Energy Fluence Rate	MeV/cm ² /sec	2.619e-007	1.655e-006
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	4.598e-010	2.908e-009
Absorbed Dose Rate in Air	mGy/hr	4.014e-012	2.539e-011
"	mrad/hr	4.014e-010	2.539e-009
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	4.558e-012	2.884e-011
o Opposed	"	3.924e-012	2.482e-011
o Rotational	"	3.924e-012	2.482e-011
o Isotropic	"	3.505e-012	2.216e-011
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	4.852e-012	3.070e-011
o Opposed	"	4.672e-012	2.955e-011
o Rotational	"	4.672e-012	2.955e-011
o Isotropic	"	3.714e-012	2.349e-011
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	4.104e-012	2.596e-011
o Posterior/Anterior	"	3.780e-012	2.391e-011
o Lateral	"	3.005e-012	1.900e-011
o Rotational	"	3.404e-012	2.152e-011
o Isotropic	"	3.012e-012	1.904e-011

Case Title: Case 1
 Description: Case 1
 Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions		
Height	152.4 cm	5 ft 0.0 in
Radius	12.7 cm	5.0 in

Dose Points			
#	X	Y	Z
# 1	140.6654 cm 4 ft 7.4 in	76.2 cm 2 ft 6.0 in	0 cm 0.0 in

Shields			
Shield Name	Dimension	Material	Density
Cyl. Core	12.7 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ²	Bq/cm ²
Ba-137m	1.4035e-012	5.1930e-002	1.1541e-010	4.2702e-006
Co-60	5.2414e-011	1.9393e+000	4.3100e-009	1.5947e-004
Cs-137	1.4836e-012	5.4895e-002	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

Energy MeV	Activity photons/sec	Fluence Rate		Exposure Rate	
		No Buildup	With Buildup	No Buildup	With Buildup
0.0318	1.075e-03	6.320e-41	2.424e-36	5.264e-43	2.019e-38
0.322	1.984e-03	8.810e-40	4.647e-36	7.090e-42	3.740e-38
0.64	7.218e-04	1.116e-32	3.524e-32	6.343e-35	2.002e-34

Page : 2

DOS File : AF5C.MS5

Run Date : November 11, 2004

Run Time : 2:37:11 PM

Position : 00:00:01

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm²/sec</u> <u>No Buildup</u>	<u>Fluence Rate</u> <u>MeV/cm²/sec</u> <u>With Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>No Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>With Buildup</u>
0.6616	4.673e-02	2.950e-10	3.653e-09	5.719e-13	7.081e-12
0.6938	3.163e-04	2.359e-12	2.764e-11	4.554e-15	5.337e-14
1.1732	1.939e+00	8.403e-08	5.470e-07	1.502e-10	9.775e-10
1.3325	1.939e+00	1.254e-07	7.168e-07	2.176e-10	1.244e-09
TOTALS:	3.929e+00	2.098e-07	1.267e-06	3.684e-10	2.228e-09

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\AF5C.MS5

Case Title: Case 1

This case was run on Thursday, November 11, 2004 at 2:37:11 PM

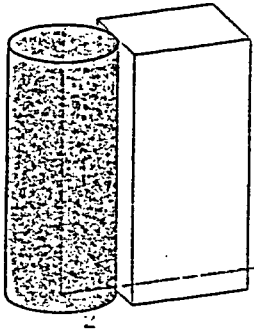
Dose Point # 1 - (140.6654,76.2,0) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	1.662e-007	1.010e-006
Photon Energy Fluence Rate	MeV/cm ² /sec	2.098e-007	1.267e-006
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	3.684e-010	2.228e-009
Absorbed Dose Rate in Air	mGy/hr	3.216e-012	1.945e-011
"	mrad/hr	3.216e-010	1.945e-009
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	3.652e-012	2.209e-011
o Opposed	"	3.144e-012	1.901e-011
o Rotational	"	3.144e-012	1.901e-011
o Isotropic	"	2.808e-012	1.698e-011
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	3.888e-012	2.352e-011
o Opposed	"	3.743e-012	2.264e-011
o Rotational	"	3.743e-012	2.264e-011
o Isotropic	"	2.976e-012	1.799e-011
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	3.288e-012	1.989e-011
o Posterior/Anterior	"	3.028e-012	1.831e-011
o Lateral	"	2.408e-012	1.455e-011
o Rotational	"	2.727e-012	1.649e-011
o Isotropic	"	2.413e-012	1.459e-011

Page : 1
 File : AF2C.MS5
 Date : November 11, 2004
 Run Time : 2:40:46 PM
 Duration : 00:00:01

File Ref: _____
 Date: 11/12/04
 By: DNF
 Checked: _____

Case Title: Case 1
 Description: Case 1
 Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions		
Height	60.96 cm	2 ft
Radius	12.7 cm	5.0 in

Dose Points			
	X	Y	Z
# 1	140.6654 cm 4 ft 7.4 in	30.48 cm 1 ft	0 cm 0.0 in

Shields			
Shield Name	Dimension	Material	Density
Cyl. Core	12.7 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Nuclide	Grouping Method : Actual Photon Energies			
	curies	becquerels	μCi/cm ²	Bq/cm ²
Ba-137m	5.6141e-013	2.0772e-002	1.1541e-010	4.2702e-006
Co-60	2.0966e-011	7.7572e-001	4.3100e-009	1.5947e-004
Cs-137	5.9346e-013	2.1958e-002	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

Energy MeV	Activity photons/sec	Fluence Rate		Exposure Rate	
		MeV/cm ² /sec No Buildup	MeV/cm ² /sec With Buildup	mR/hr No Buildup	mR/hr With Buildup
0.0316	4.300e-04	5.987e-41	1.043e-36	4.987e-43	8.689e-39
0.322	7.934e-04	8.314e-40	2.000e-36	6.691e-42	1.610e-38
0.364	2.887e-04	1.005e-32	3.172e-32	5.708e-35	1.802e-34

Page : 2

DOS File : AF2C.MS5

Run Date: November 11, 2004

Run Time: 2:40:46 PM

Position : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	1.869e-02	1.539e-10	1.830e-09	2.984e-13	3.548e-12
0.6938	1.265e-04	1.227e-12	1.381e-11	2.368e-15	2.666e-14
1.1732	7.757e-01	4.212e-08	2.650e-07	7.527e-11	4.736e-10
1.3325	7.757e-01	6.236e-08	3.450e-07	1.082e-10	5.985e-10
TOTALS:	1.572e+00	1.046e-07	6.118e-07	1.838e-10	1.076e-09

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\AF2C.MS5

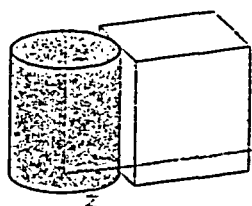
Case Title: Case 1

This case was run on Thursday, November 11, 2004 at 2:40:46 PM

Dose Point # 1 - (140.6654,30.48,0) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	8.294e-008	4.876e-007
Photon Energy Fluence Rate	MeV/cm ² /sec	1.046e-007	6.118e-007
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	1.838e-010	1.076e-009
Absorbed Dose Rate in Air	mGy/hr	1.604e-012	9.391e-012
"	mrads/hr	1.604e-010	9.391e-010
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	1.822e-012	1.067e-011
o Opposed	"	1.568e-012	9.178e-012
o Rotational	"	1.568e-012	9.178e-012
o Isotropic	"	1.401e-012	8.196e-012
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	1.939e-012	1.136e-011
o Opposed	"	1.867e-012	1.093e-011
o Rotational	"	1.867e-012	1.093e-011
o Isotropic	"	1.484e-012	8.686e-012
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	1.640e-012	9.602e-012
o Posterior/Anterior	"	1.511e-012	8.841e-012
o Lateral	"	1.201e-012	7.025e-012
o Rotational	"	1.360e-012	7.960e-012
o Isotropic	"	1.204e-012	7.041e-012

Case Title: Case 1
 Description: Case 1
 Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions

Height	30.48 cm	1 ft
Radius	12.7 cm	5.0 in

Dose Points

#	X	Y	Z
# 1	140.6654 cm 4 ft 7.4 in	15.24 cm 6.0 in	0 cm 0.0 in

Shields

Shield Name	Dimension	Material	Density
Cyl. Core	12.7 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ²	Bq/cm ²
Ba-137m	2.8070e-013	1.0386e-002	1.1541e-010	4.2702e-006
Co-60	1.0483e-011	3.8786e-001	4.3100e-009	1.5947e-004
Cs-137	2.9673e-013	1.0979e-002	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm ² /sec		Exposure Rate mR/hr	
		No Buildup	With Buildup	No Buildup	With Buildup
0.0318	2.150e-04	4.233e-41	5.277e-37	3.526e-43	4.396e-39
0.3322	3.967e-04	5.838e-40	1.012e-36	4.698e-42	8.143e-39
0.364	1.444e-04	6.601e-33	2.084e-32	3.751e-35	1.184e-34

Page : 2
 DOS File : AF1C.MS5
 Run Date : November 11, 2004
 Run Time : 2:58:08 PM
 Position : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	9.345e-03	8.059e-11	9.506e-10	1.562e-13	1.843e-12
0.6938	6.327e-05	6.417e-13	7.168e-12	1.239e-15	1.384e-14
1.1732	3.879e-01	2.188e-08	1.368e-07	3.910e-11	2.444e-10
1.3325	3.879e-01	3.234e-08	1.778e-07	5.612e-11	3.085e-10
TOTALS:	7.859e-01	5.431e-08	3.156e-07	9.538e-11	5.548e-10

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\AF1C.MS5

Case Title: Case 1

This case was run on Thursday, November 11, 2004 at 2:58:08 PM

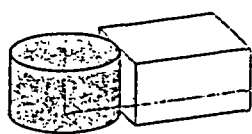
Dose Point # 1 - (140.6654,15.24,0) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	4.305e-008	2.515e-007
Photon Energy Fluence Rate	MeV/cm ² /sec	5.431e-008	3.156e-007
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	9.538e-011	5.548e-010
Absorbed Dose Rate in Air	mGy/hr	8.326e-013	4.844e-012
"	mrads/hr	8.326e-011	4.844e-010
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	9.454e-013	5.501e-012
o Opposed	"	8.140e-013	4.734e-012
o Rotational	"	8.140e-013	4.734e-012
o Isotropic	"	7.270e-013	4.227e-012
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	1.007e-012	5.857e-012
o Opposed	"	9.690e-013	5.638e-012
o Rotational	"	9.690e-013	5.638e-012
o Isotropic	"	7.704e-013	4.480e-012
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	8.513e-013	4.953e-012
o Posterior/Anterior	"	7.840e-013	4.560e-012
o Lateral	"	6.233e-013	3.623e-012
o Rotational	"	7.060e-013	4.106e-012
o Isotropic	"	6.247e-013	3.632e-012

Page : 1
 DOS File : AFHALFC.MS5
 Date: November 11, 2004
 Run Time: 3:00:56 PM
 Duration : 00:00:01

File Ref: _____
 Date: 11/12/04
 By: DNF
 Checked: _____

Case Title: Case 1
 Description: Case 1
 Geometry: 10 - Cylinder Surface - External Dose Point



Source Dimensions

Height	15.24 cm	6.0 in
Radius	12.7 cm	5.0 in

Dose Points

	<u>X</u>	<u>Y</u>	<u>Z</u>
# 1	140.6654 cm 4 ft 7.4 in	7.62 cm 3.0 in	0 cm 0.0 in

Shields

<u>Shield Name</u>	<u>Dimension</u>	<u>Material</u>	<u>Density</u>
Cyl. Core	12.7 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

<u>Nuclide</u>	<u>curies</u>	<u>becquerels</u>	<u>μCi/cm²</u>	<u>Bq/cm²</u>
Ba-137m	1.4035e-013	5.1930e-003	1.1541e-010	4.2702e-006
Co-60	5.2414e-012	1.9393e-001	4.3100e-009	1.5947e-004
Cs-137	1.4836e-013	5.4895e-003	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

<u>Energy</u> <u>MeV</u>	<u>Activity</u> <u>photons/sec</u>	<u>Fluence Rate</u> <u>MeV/cm²/sec</u> <u>No Buildup</u>	<u>Fluence Rate</u> <u>MeV/cm²/sec</u> <u>With Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>No Buildup</u>	<u>Exposure Rate</u> <u>mR/hr</u> <u>With Buildup</u>
0.0318	1.075e-04	2.364e-41	2.646e-37	1.969e-43	2.204e-39
0.0322	1.984e-04	3.251e-40	5.074e-37	2.616e-42	4.084e-39
0.0364	7.218e-05	3.582e-33	1.131e-32	2.035e-35	6.427e-35

Page : 2
 DOS File : AFHALFC.MS5
 Run Date: November 11, 2004
 Run Time: 3:00:56 PM
 Position : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec <u>No Buildup</u>	<u>Fluence Rate</u> MeV/cm ² /sec <u>With Buildup</u>	<u>Exposure Rate</u> mR/hr <u>No Buildup</u>	<u>Exposure Rate</u> mR/hr <u>With Buildup</u>
0.6616	4.673e-03	4.078e-11	4.799e-10	7.906e-14	9.304e-13
0.6938	3.163e-05	3.247e-13	3.619e-12	6.268e-16	6.986e-15
1.1732	1.939e-01	1.105e-08	6.895e-08	1.974e-11	1.232e-10
1.3325	1.939e-01	1.633e-08	8.962e-08	2.832e-11	1.555e-10
TOTALS:	3.929e-01	2.742e-08	1.590e-07	4.815e-11	2.796e-10

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\AFHALFC.MS5

Case Title: Case 1

This case was run on Thursday, November 11, 2004 at 3:00:56 PM

Dose Point # 1 - (140.6654,7.62,0) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	2.173e-008	1.268e-007
Photon Energy Fluence Rate	MeV/cm ² /sec	2.742e-008	1.590e-007
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	4.815e-011	2.796e-010
Absorbed Dose Rate in Air	mGy/hr	4.203e-013	2.441e-012
"	mrads/hr	4.203e-011	2.441e-010
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	4.773e-013	2.772e-012
o Opposed	"	4.109e-013	2.386e-012
o Rotational	"	4.109e-013	2.386e-012
o Isotropic	"	3.670e-013	2.131e-012
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	5.081e-013	2.952e-012
o Opposed	"	4.892e-013	2.841e-012
o Rotational	"	4.892e-013	2.841e-012
o Isotropic	"	3.889e-013	2.258e-012
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	4.297e-013	2.496e-012
o Posterior/Anterior	"	3.958e-013	2.298e-012
o Lateral	"	3.147e-013	1.826e-012
o Rotational	"	3.564e-013	2.069e-012
o Isotropic	"	3.153e-013	1.830e-012

Page : 1

DOS File : AFQTRC.MS5

Date : November 11, 2004

Run Time : 3:08:54 PM

Duration : 00:00:01

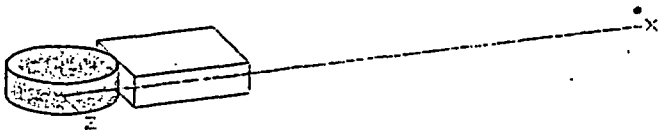
File Ref: _____

Date: 11/12/04

By: DNF

Checked: _____

Case Title: Case 1
 Description: Case 1
 Geometry: 10 -Cylinder Surface - External Dose Point



Source Dimensions

Height	7.62 cm	3.0 in
Radius	12.7 cm	5.0 in

Dose Points

	X	Y	Z
# 1	140.6654 cm 4 ft 7.4 in	3.81 cm 1.5 in	0 cm 0.0 in

Shields

Shield Name	Dimension	Material	Density
Cyl. Core	12.7 cm ²	Concrete	1.8
Transition		Air	0.00122
Shield 2	27.94 cm	Concrete	2.4
Air Gap		Air	0.00122
Wall Clad	.025 cm	Iron	7.86

Source Input

Grouping Method : Actual Photon Energies

Nuclide	curies	becquerels	μCi/cm ²	Bq/cm ²
Ba-137m	7.0176e-014	2.5965e-003	1.1541e-010	4.2702e-006
Co-60	2.6207e-012	9.6966e-002	4.3100e-009	1.5947e-004
Cs-137	7.4182e-014	2.7447e-003	1.2200e-010	4.5140e-006

Buildup

The material reference is : Shield 2

Integration Parameters

Y Direction (axial)	20
Circumferential	20

Results

Energy MeV	Activity photons/sec	Fluence Rate		Exposure Rate	
		No Buildup	With Buildup	No Buildup	With Buildup
0.0318	5.376e-05	1.217e-41	1.324e-37	1.014e-43	1.103e-39
0.0322	9.918e-05	1.673e-40	2.539e-37	1.346e-42	2.043e-39
0.064	3.609e-05	1.830e-33	5.778e-33	1.040e-35	3.283e-35

Page : 2
DOS File : AFQTRC.MS5
Run Date : November 11, 2004
Run Time : 3:08:54 PM
Position : 00:00:01

<u>Energy</u> MeV	<u>Activity</u> photons/sec	<u>Fluence Rate</u> MeV/cm ² /sec		<u>Exposure Rate</u> mR/hr	
		<u>No Buildup</u>	<u>With Buildup</u>	<u>No Buildup</u>	<u>With Buildup</u>
0.6616	2.336e-03	2.045e-11	2.406e-10	3.965e-14	4.664e-13
0.6938	1.582e-05	1.628e-13	1.814e-12	3.143e-16	3.502e-15
1.1732	9.697e-02	5.538e-09	3.454e-08	9.897e-12	6.173e-11
1.3325	9.697e-02	8.182e-09	4.490e-08	1.420e-11	7.789e-11
TOTALS:	1.965e-01	1.374e-08	7.968e-08	2.413e-11	1.401e-10

MicroShield v5.04 (5.04-00362)

Conversion of calculated exposure in air to dose

FILE: C:\MS5\DATA\AFQTRC.MS5

Case Title: Case 1

This case was run on Thursday, November 11, 2004 at 3:08:54 PM

Dose Point # 1 - (140.6654,3.81,0) cm

<u>Results (Summed over energies)</u>	<u>Units</u>	<u>Without Buildup</u>	<u>With Buildup</u>
Photon Fluence Rate (flux)	Photons/cm ² /sec	1.089e-008	6.350e-008
Photon Energy Fluence Rate	MeV/cm ² /sec	1.374e-008	7.968e-008
Exposure and Dose Rates:			
Exposure Rate in Air	mR/hr	2.413e-011	1.401e-010
Absorbed Dose Rate in Air	mGy/hr	2.107e-013	1.223e-012
"	mrad/hr	2.107e-011	1.223e-010
Deep Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	2.392e-013	1.389e-012
o Opposed	"	2.059e-013	1.195e-012
o Rotational	"	2.059e-013	1.195e-012
o Isotropic	"	1.839e-013	1.067e-012
Shallow Dose Equivalent Rate (ICRP 51 - 1987)			
o Parallel Geometry	mSv/hr	2.547e-013	1.479e-012
o Opposed	"	2.452e-013	1.424e-012
o Rotational	"	2.452e-013	1.424e-012
o Isotropic	"	1.949e-013	1.131e-012
Effective Dose Equivalent Rate (ICRP 51 - 1987)			
o Anterior/Posterior Geometry	mSv/hr	2.154e-013	1.251e-012
o Posterior/Anterior	"	1.984e-013	1.151e-012
o Lateral	"	1.577e-013	9.149e-013
o Rotational	"	1.786e-013	1.037e-012
o Isotropic	"	1.581e-013	9.170e-013

**Final Status Survey Plan
for the
Plum Brook Reactor Facility**

**Attachment C
Dose Assessment and DCGL Calculation
for Embedded Pipe**

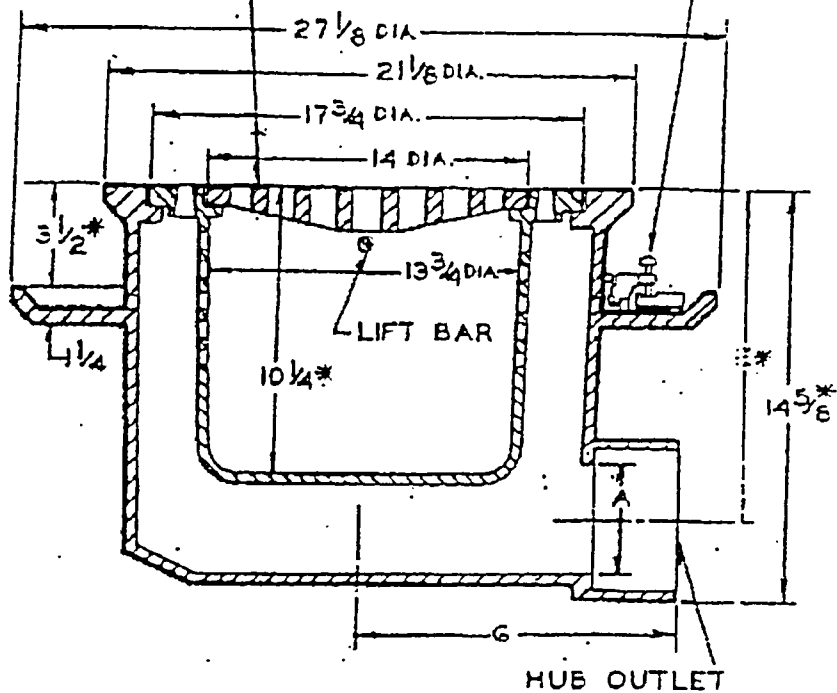
**Addendum 5
Embedded Piping Drain Specifications
(7 Pages)**

SPECIFICATION CAST IRON EXTRA DEEP NON-CLOG TRIPLE DRAINAGE FLOOR DRAIN WITH DOUBLE DRAINAGE FLANGE, WEEPHOLE, SIDE OUTLET, ROUND TOP HEAVY DUTY GRATE AND ROUND PERFORATED EXTRA DEEP SEDIMENT BUCKET WITH INTEGRAL AUXILIARY DRAINAGE RIM SO DESIGNED THAT GRATE CANNOT BE SET IN PLACE UNLESS BUCKET IS IN POSITION

**NON-CLOG
FLOOR DRAINS
SERIES 5580-YY**

GRATE FREE AREA
50.6 SQ. IN.

FLASHING CLAMP DEVICE
OPTIONAL (AT EXTRA COST)



* ADD 1/4 WHEN FURNISHED WITH BRASS TOP.

TYPE	A IN.	E* IN.	G IN.	WGT. LBS.
5583-YY	3	12 1/4	12	267
5584-YY	4	11 3/4	12 1/4	267
5585-YY	5	11 1/4	12 1/2	267
5586-YY	6	10 3/4	12 1/4	267

DRAWING NO.
A-2618-K

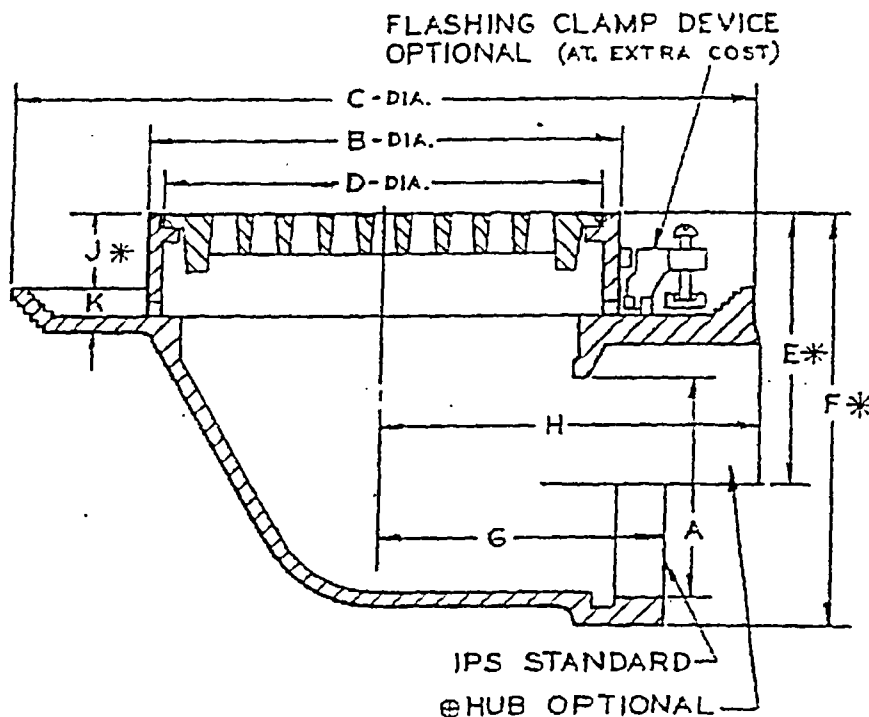
JOSAM MANUFACTURING COMPANY
MAIN SALES & ENGR. OFFICE FACTORY & FOUNDRY
MICHIGAN CITY, IND.

SERIES
5580-YY

DOUBLE DRAINAGE PATTERN
SIDE OUTLET, ANTI-TILTING GRATE

**FLOOR DRAINS
WITH GRATE
SERIES -550**

SPECIFICATION: CAST IRON FLOOR DRAIN WITH DOUBLE DRAINAGE FLANGE, WEEPHOLES, SIDE OUTLET, ROUND TOP AND LOOSE SET ANTI-TILTING GRATE.



SIZE: 5" & 6" FURNISHED WITH HUB OUTLET ONLY.

*ADD 1/4 WHEN FURNISHED WITH BRASS TOP, TYPES 552, 553 & 554.

ADD 1/2 WHEN FURNISHED WITH BRASS TOP, TYPES 555 & 556.

TYPE	A IN.	TOP GRATE		DIMENSIONS IN INCHES								WGT. LBS.
		B IN.	D IN.	FREE AREA SQ. IN.	C	E*	F*	G	H	J*	K	
552	2	8 ⁵ / ₈	8	17.7	13 ¹ / ₂	6	7 ¹ / ₂	3 ⁵ / ₈	5 ¹ / ₈	1 ³ / ₈	3 ¹ / ₄	28
553	3	8 ⁵ / ₈	8	17.7	13 ¹ / ₂	5 ¹ / ₂	7 ⁵ / ₈	4 ¹ / ₂	6	1 ³ / ₈	3 ¹ / ₄	29
554	4	8 ⁵ / ₈	8	17.7	13 ¹ / ₂	5	7 ⁵ / ₈	5 ¹ / ₄	6 ¹ / ₈	1 ³ / ₈	3 ¹ / ₄	30
555	5	12 ³ / ₈	11	29.4	16 ⁷ / ₈	6 ¹ / ₄	9 ³ / ₄	—	8 ¹ / ₈	1 ¹ / ₄	1	58
556	6	12 ³ / ₈	11	29.4	16 ⁷ / ₈	5 ⁷ / ₈	9 ³ / ₄	—	8 ¹ / ₈	1 ¹ / ₄	1	60

DRAWING NO.
A-1914-K

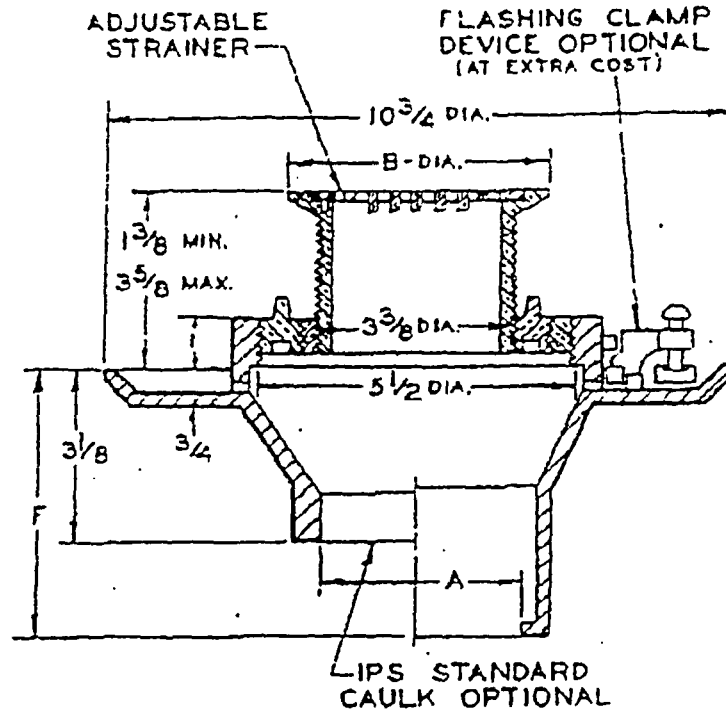
JOSAM MANUFACTURING COMPANY
MAIN SALES & ENGR. OFFICE FACTORY & FOUNDRY
MICHIGAN CITY, IND.

SERIES
550

NS
RAINER

SPECIFICATION: CAST IRON FLOOR DRAIN WITH DOUBLE DRAINAGE FLANGE, WEEPHOLE, BOTTOM OUTLET, ADJUSTABLE POLISHED BRASS STRAINER AND DOUBLE ECCENTRIC BRASS BUSHING PERMITTING VERTICAL AND HORIZONTAL STRAINER ADJUSTMENT.

**FLOOR DRAINS
WITH
ADJUSTABLE STRAINER
SERIES 380**



TYPE	A IN.	STRAINER		FREE AREA SQ. IN.	F IN.	WGT LBS.
		NO.	E IN.			
382	2	23AY	4 1/2	3.0	4 5/8	15
383	3	23AY	4 1/2	3.0	4 1/8	15
384	4	23AY	4 1/2	3.0	3 5/8	15

DRAWING NO.
A-1143-K

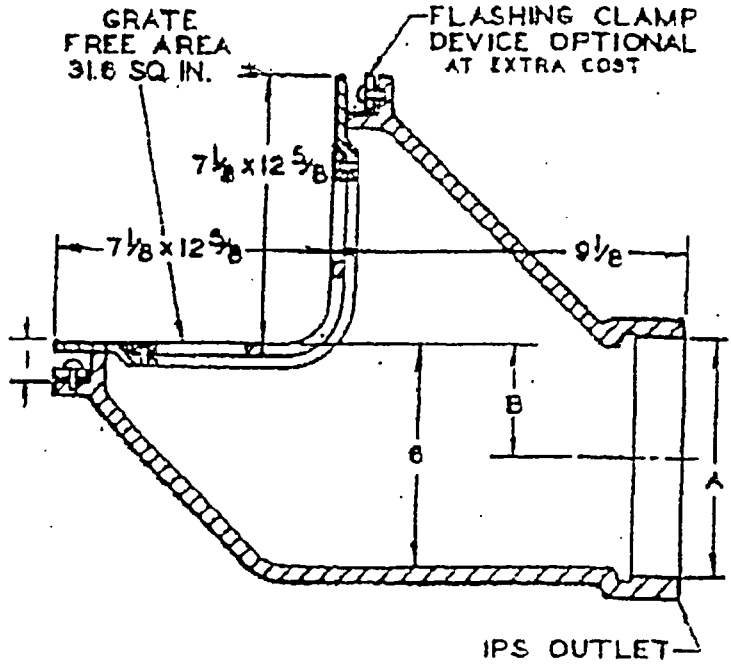
JOSAM MANUFACTURING COMPANY
MAIN SALES & ENGR. OFFICE FACTORY & FOUNDRY
MICHIGAN CITY, IND.

SERIES
380

ES
10

SPECIFICATION: CAST IRON RECTANGULAR PATTERN
 END DRAIN WITH REVERSIBLE OUTLET, REMOVABLE
 ANGLE FRAME AND GRATE, AND MEMBRANE ANCHOR
 FLANGE.

**PIT AND POOL
 DRAINS
 SERIES 0400**



TYPE	A IN.	B IN.	WGT. LBS.
0404	4	4 1/2	60
0405	5	3 5/8	60
0406	6	3	60

*Asked for
 0604, but
 got 0406*

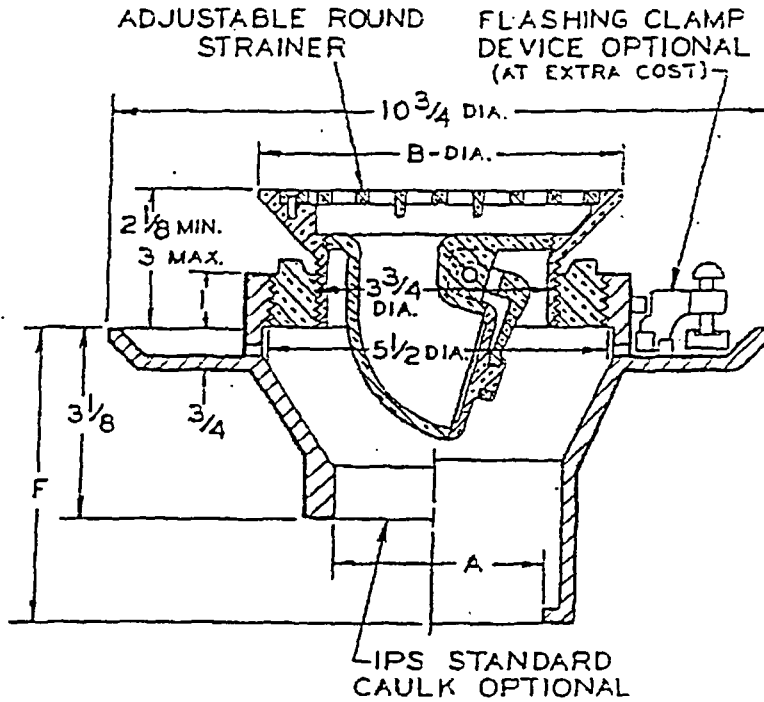
DRAWING NO.
A-2632-K

JOSAM MANUFACTURING COMPANY
 MAIN SALES & ENGR. OFFICE FACTORY & FOUNDRY
 MICHIGAN CITY, IND.

SERIES
0400

SPECIFICATION: CAST IRON FLOOR DRAIN WITH DOUBLE DRAINAGE FLANGE, WEEPHOLES, BOTTOM OUTLET, AND ADJUSTABLE POLISHED BRASS ROUND FLAT STRAINER WITH INTERNAL BACKWATER VALVE.

**FLOOR DRAINS
WITH
ADJUSTABLE STRAINER
SERIES 380-J**



TYPE	A IN.	STRAINER			F IN.	WGT. LBS
		NO.	B IN.	FREE AREA SQ. IN.		
382	2	36JV	6	7.4	4 5/8	19
382-37J	2	37JV	7	8.2	4 5/8	20
383	3	36JV	6	7.4	4 7/8	19
383-37J	3	37JV	7	8.2	4 7/8	20
384	4	36JV	6	7.4	3 5/8	19
384-37J	4	37JV	7	8.2	3 5/8	20

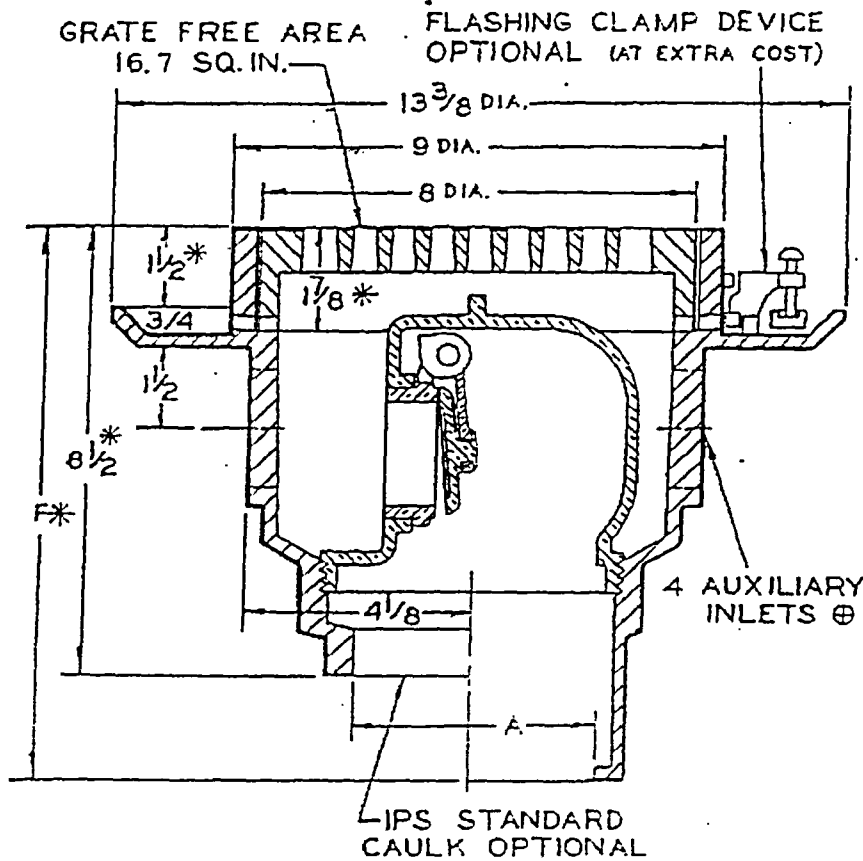
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JOSAM MANUFACTURING COMPANY
MAIN SALES & ENGR. OFFICE FACTORY & FOUNDRY
MICHIGAN CITY, IND.

SERIES
380-J

SPECIFICATION: CAST IRON DEEP FLOOR DRAIN WITH DOUBLE DRAINAGE FLANGE, WEEPHOLES, BOTTOM OUTLET, ROUND TOP, DEEP SET TRACTOR GRATE AND BRASS VERTICAL SWING BACKWATER VALVE IN DRAIN HEAD.

**FLOOR DRAINS
WITH GRATE
SERIES 680 V**



*ADD 1/4 WHEN FURNISHED WITH BRASS TOP.

OPTIONAL - LESS BACKWATER VALVE - SERIES 680

TYPE	A IN.	F* IN.	WGT LBS.
683-V	3	10 1/4	48
684-V	4	10 1/2	48

⊕ OPTIONAL AT EXTRA COST, AUXILIARY INLETS, 1-1/2 OR 2 IPS, SER. 680-VA. 2" HUB, SERIES 680-VAY. 2" SPIGOT, SERIES 680-VAZ.

DRAWING NO.
A-1923-K

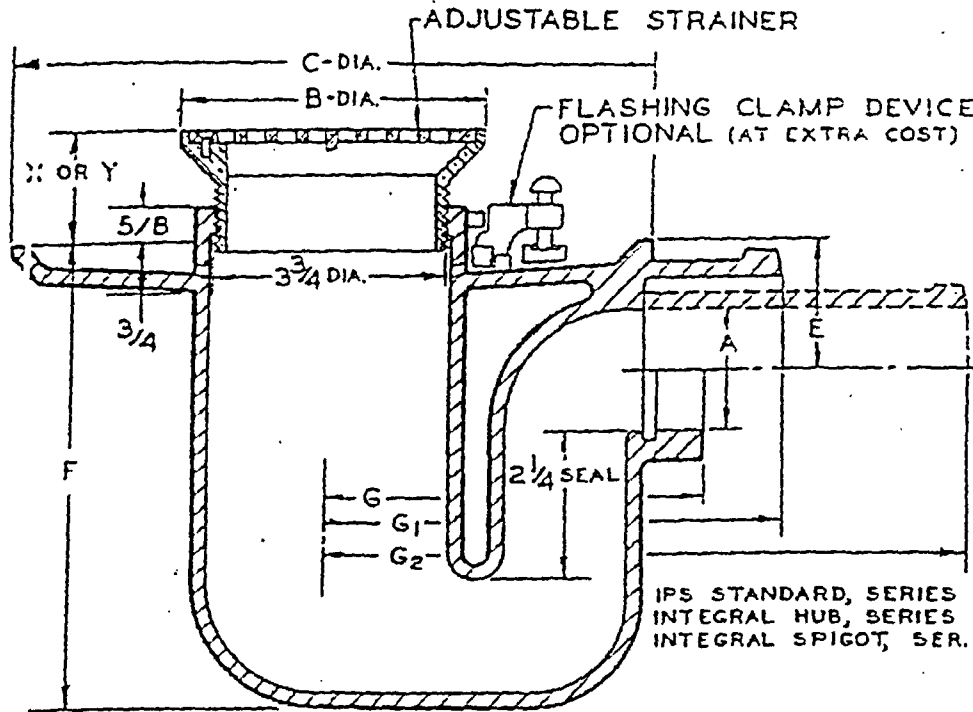
JOSAM MANUFACTURING COMPANY
MAIN SALES & ENGR. OFFICE FACTORY & FOUNDRY
MICHIGAN CITY, IND.

SERIES
680V

T,
-VA.
I.
VAZ.

SPECIFICATION: CAST IRON COMBINED FLOOR DRAIN AND INTEGRAL DEEP DRUM TYPE "P" TRAP WITH DOUBLE DRAINAGE FLANGE, WEEPHOLES, SIDE OUTLET, AND ADJUSTABLE POLISHED BRASS ROUND STRAINER.

**FLOOR DRAINS
INTEGRAL TRAP AND
ADJUSTABLE STRAINER
SERIES 200**



IPS STANDARD, SERIES 200
INTEGRAL HUB, SERIES 200-YY
INTEGRAL SPIGOT, SER. 200-ZZ

TYPE	A IN.	STRAINER			DIMENSIONS						INCHES		WGT. LBS.
		NO.	B IN.	FREE AREA SQ. IN.	C	E	F	G	G ₁	G ₂	ADJUSTMENT		
											X	Y	
201 1/2	1 1/2	34A	4	3.0	10 1/2	2	7 7/8	6 1/8	—	—	7/8	2 1/8	17
201 1/2 - 35A	1 1/2	35A	5	5.7	10 1/2	2	7 3/8	6 1/8	—	—	1 5/8	2 3/8	18
201 1/2 - 36A	1 1/2	36A	6	7.4	10 1/2	2	7 7/8	6 1/8	—	—	1 7/8	2 7/8	19
202 - 34A	2	34A	4	3.0	10 1/2	2	7 7/8	6 1/8	7 1/2	10 3/8	1/8	2 1/8	18
202	2	35A	5	5.7	10 1/2	2	7 7/8	6 1/8	7 1/2	10 3/8	1 5/8	2 3/8	19
202 - 36A	2	36A	6	7.4	10 1/2	2	7 7/8	6 1/8	7 1/2	10 3/8	1 7/8	2 5/8	20
203 - 35A	3	35A	5	5.7	10 3/4	2 1/2	8 5/8	7 3/8	8 3/4	11 3/8	1 5/8	2 3/8	25
203 - 36A	3	36A	6	7.4	10 3/4	2 1/2	8 5/8	7 3/8	8 3/4	11 3/8	1 7/8	2 5/8	26
203	3	37A	7	8.2	10 3/4	2 1/2	8 5/8	7 3/8	8 3/4	11 3/8	1 7/8	3 1/8	27
203 - 38A	3	38A	8	10.5	10 3/4	2 1/2	8 5/8	7 3/8	8 3/4	11 3/8	2 1/4	2 7/8	28
204 - 36A	4	36A	6	7.4	10 1/2	2 5/8	10 1/4	10 5/8	11 3/8	12 1/4	1 7/8	2 5/8	34
204 - 37A	4	37A	7	8.2	10 1/2	2 5/8	10 1/4	10 5/8	11 3/8	12 1/4	1 7/8	3 1/8	35
204	4	38A	8	10.5	10 1/2	2 5/8	10 1/4	10 5/8	11 3/8	12 1/4	2 1/4	2 7/8	36
204 - 30A	4	30A	10	26.0	10 1/2	2 5/8	10 1/4	10 5/8	11 3/8	12 1/4	1 3/4	2 5/8	38

DRAWING NO.
A-8853-K

JOSAM MANUFACTURING COMPANY
MAIN SALES & ENGR. OFFICE FACTORY & FOUNDRY
MICHIGAN CITY, IND.

SERIES
200

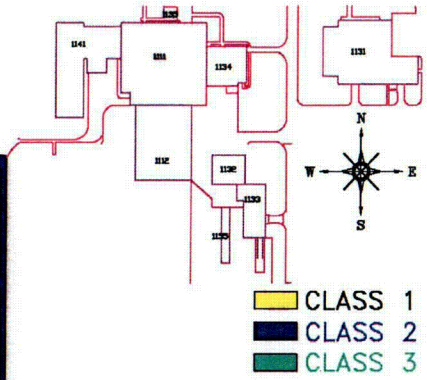
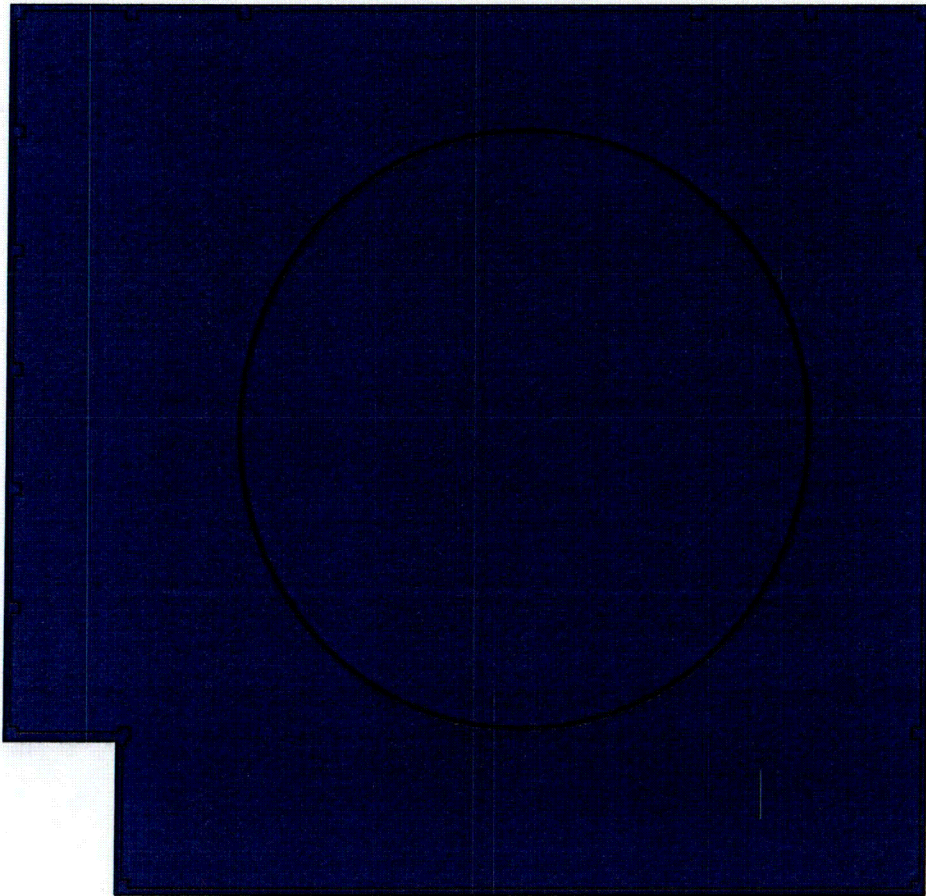
**Final Status Survey Plan
for the
Plum Brook Reactor Facility**

Attachment D

Illustrations of Survey Area Classification

(33 Pages)

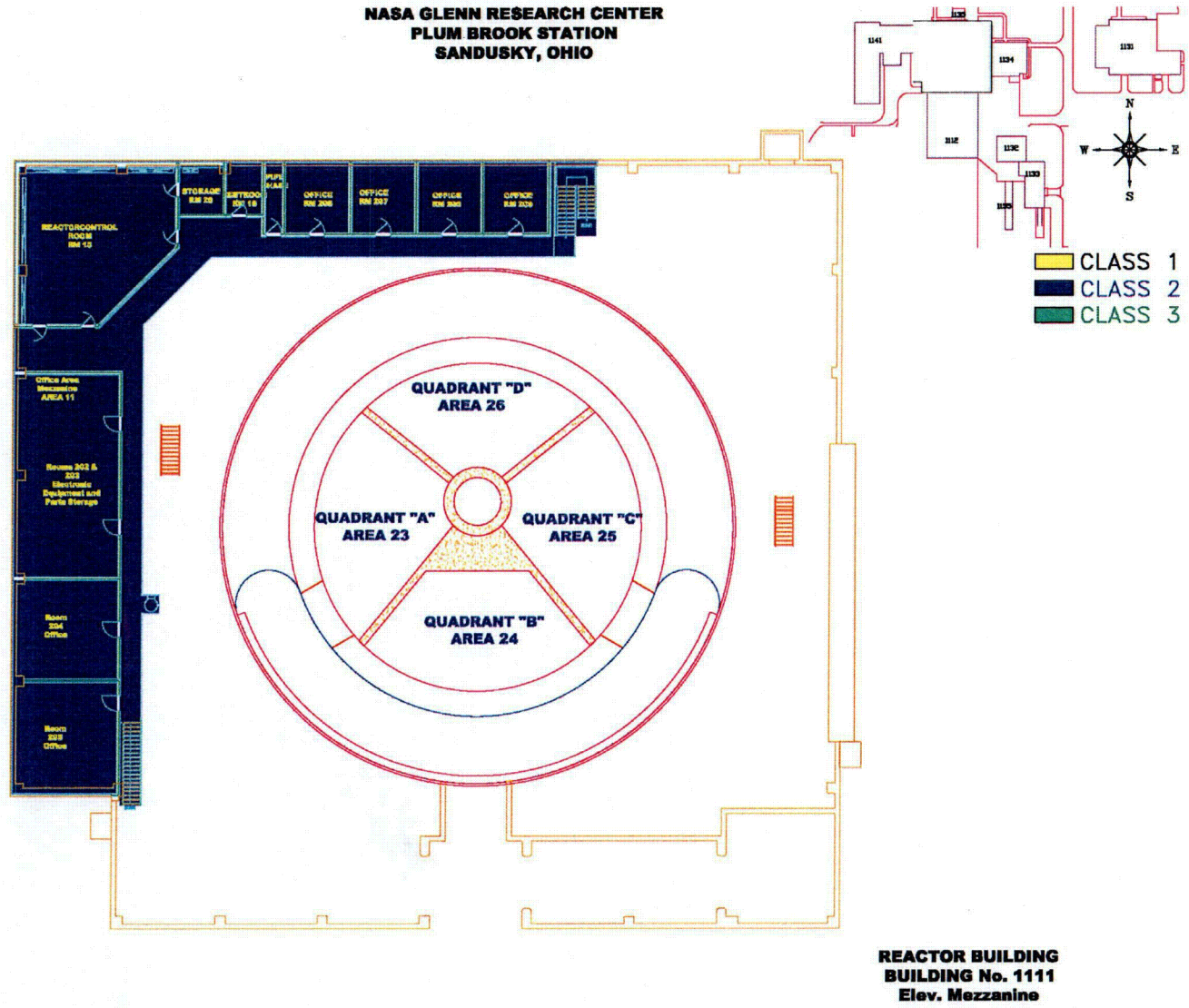
NASA GLENN RESEARCH CENTER
PLUM BROOK STATION
SANDUSKY, OHIO



REACTOR BUILDING
BUILDING No. 1111
Elev. Roof

Figure D-1 – Reactor Building Roof Elevation

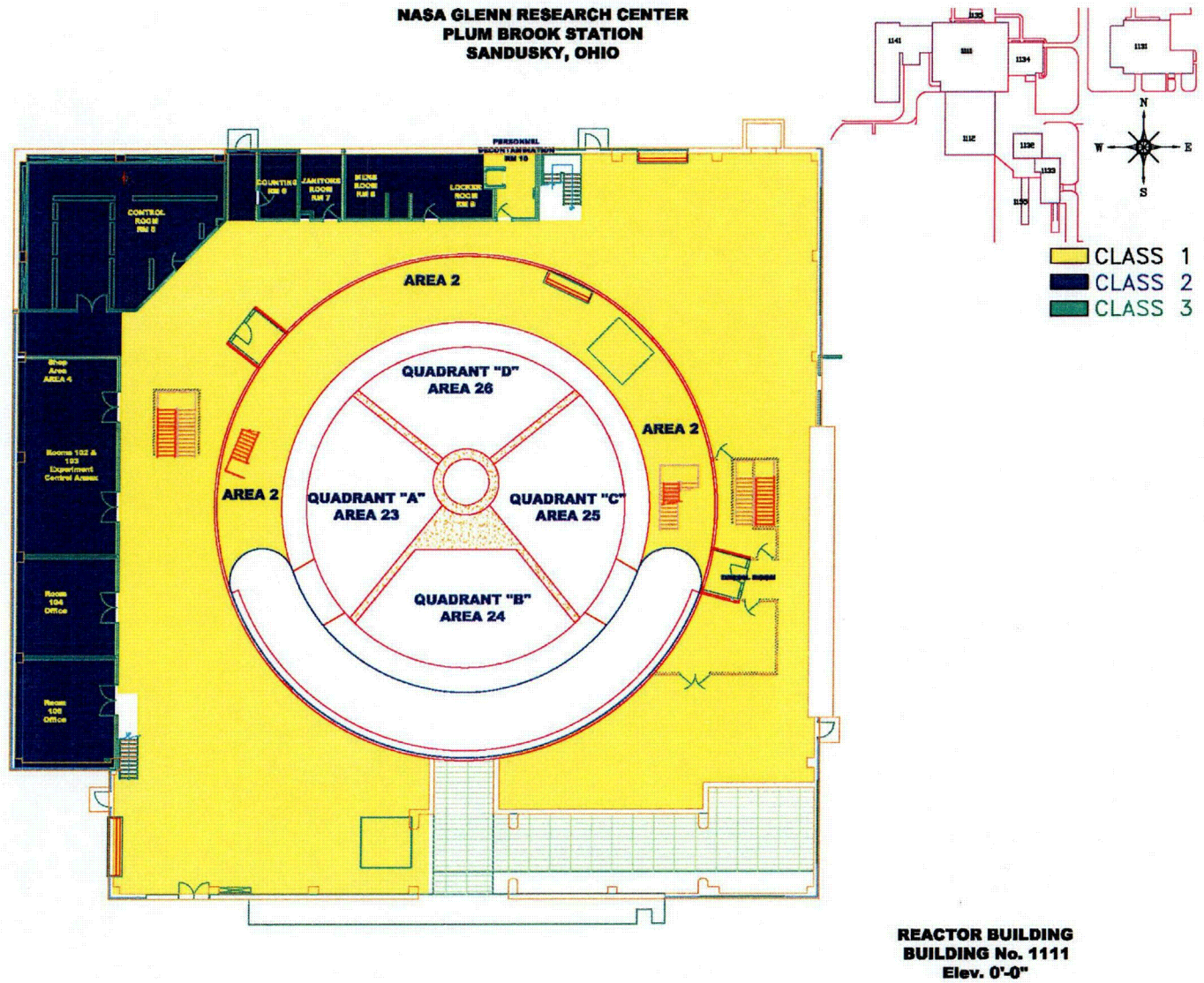
NASA GLENN RESEARCH CENTER
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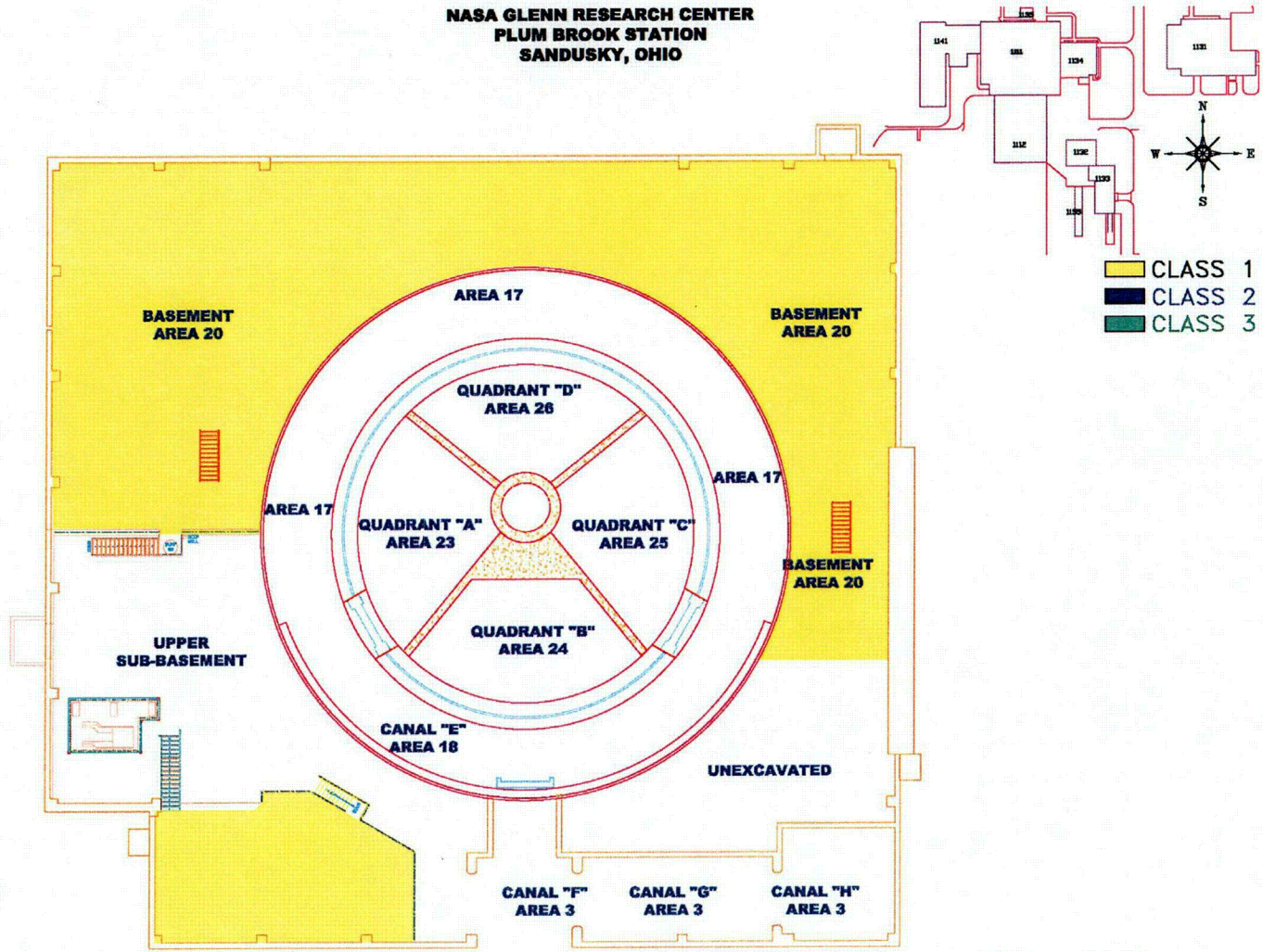
REACTOR BUILDING
 BUILDING No. 1111
 Elev. Mezzanine

Figure D-2 – Reactor Building Mezzanine Elevation

Figure D-3 – Reactor Building 0'-0" Elevation



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REACTOR BUILDING
BUILDING No. 1111
Elev. -15'-0"

Figure D-4—Reactor Building -15'-0" Elevation

Plum Brook Reactor Decommissioning Project

D-4

Revision 0 December 3, 2004

Final Status Survey Plan

C06

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 SANDUSKY, OHIO

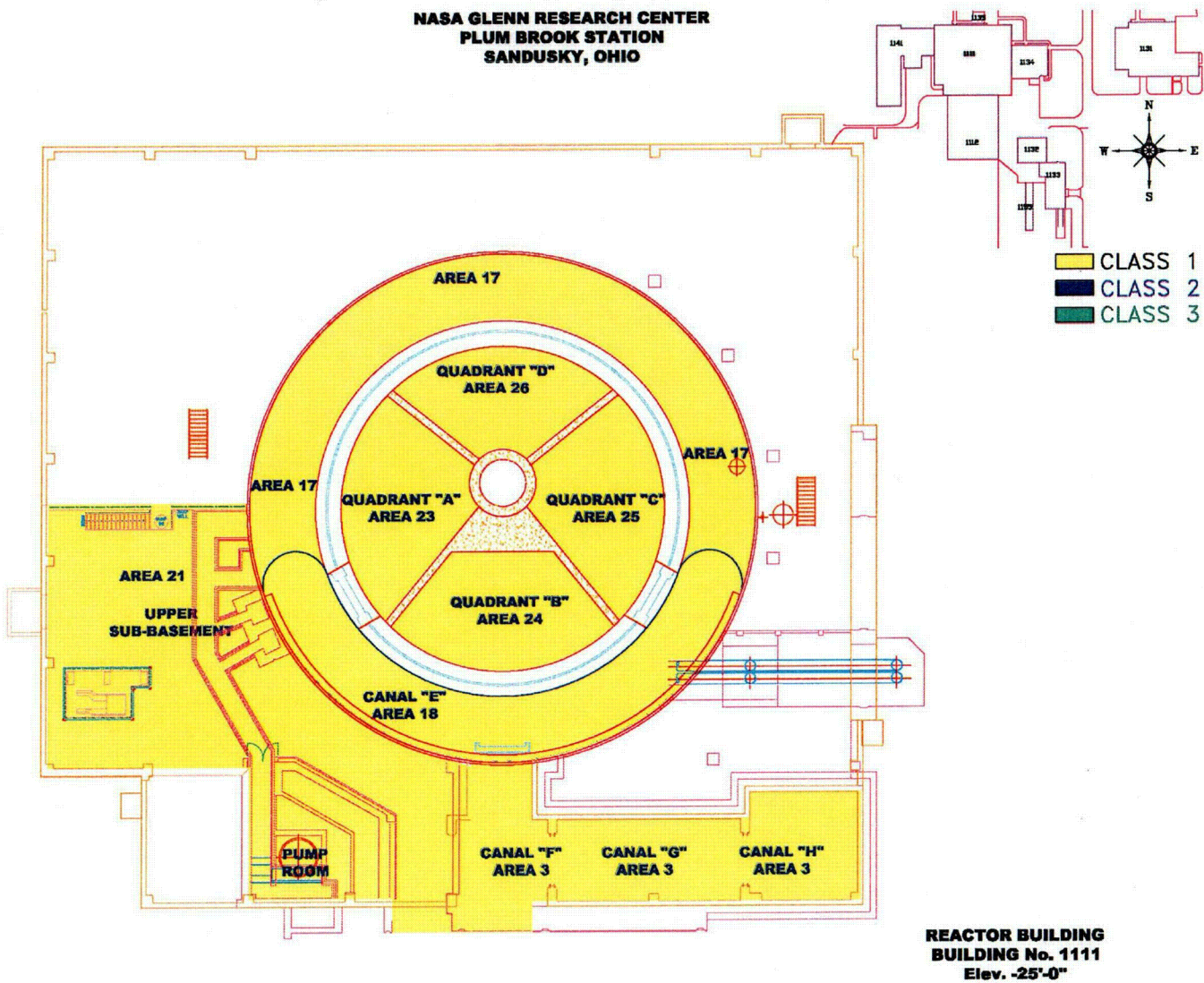
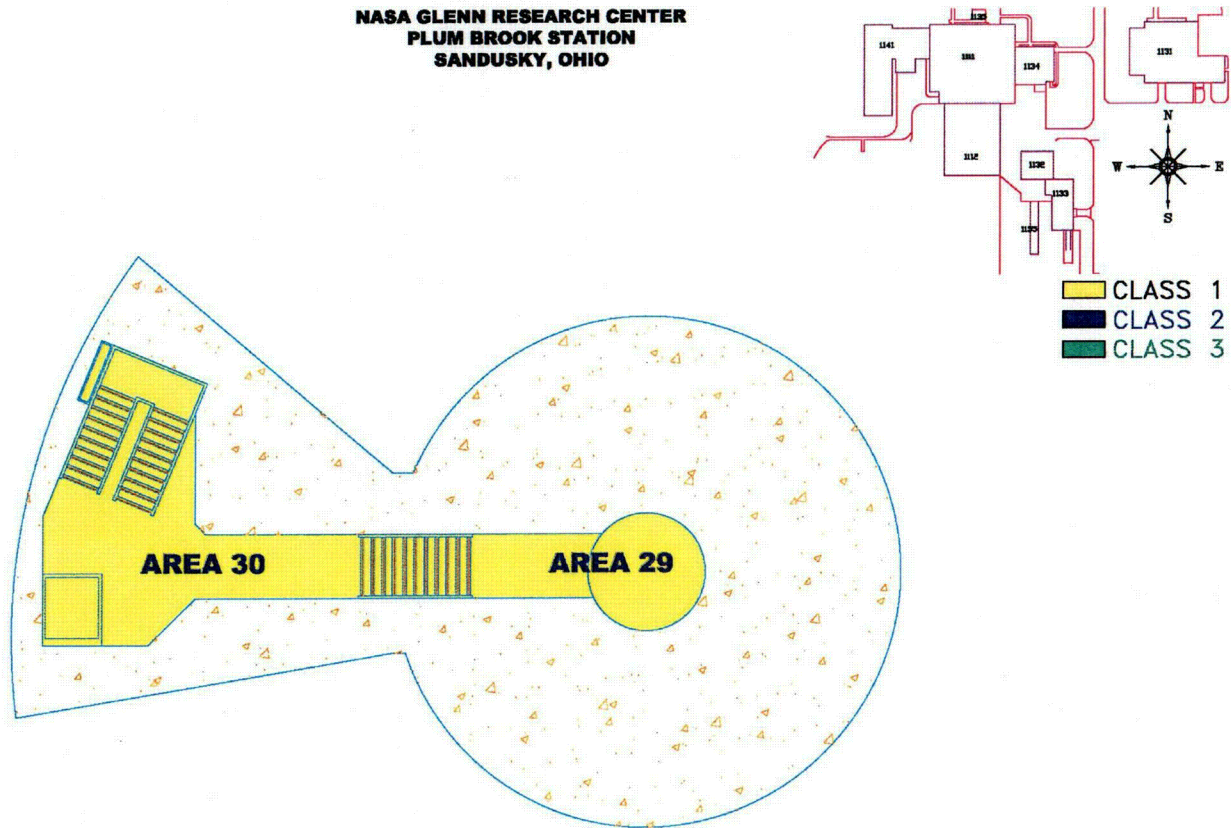


Figure D-5 – Reactor Building -25'-0" Elevation

Figure D-6 – Reactor Building Sub-Pile Elevation



C09

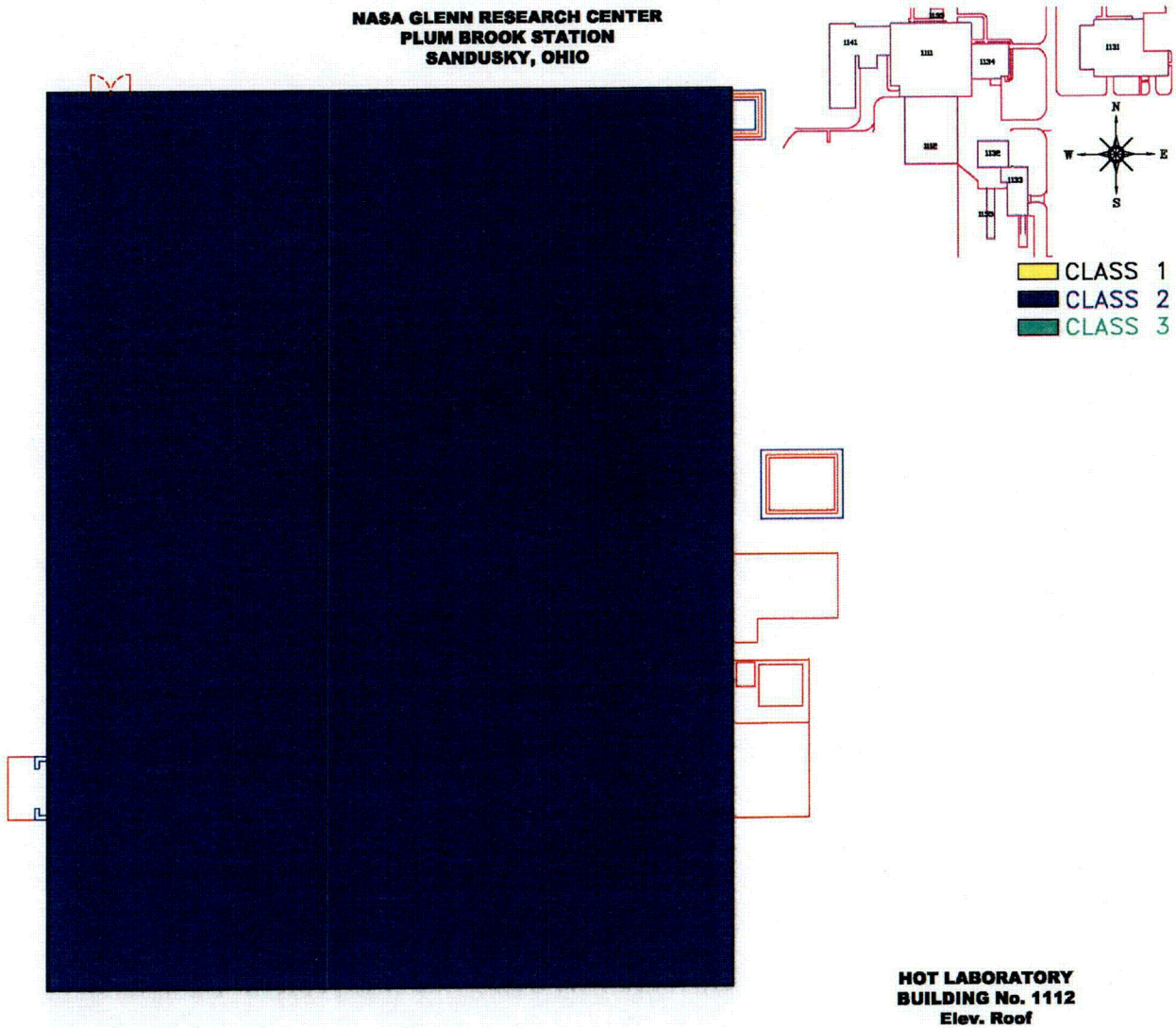


Figure D-7 – Hot Laboratory Building Roof Elevation

Figure D-8 – Hot Laboratory Building +11'-6" Elevation

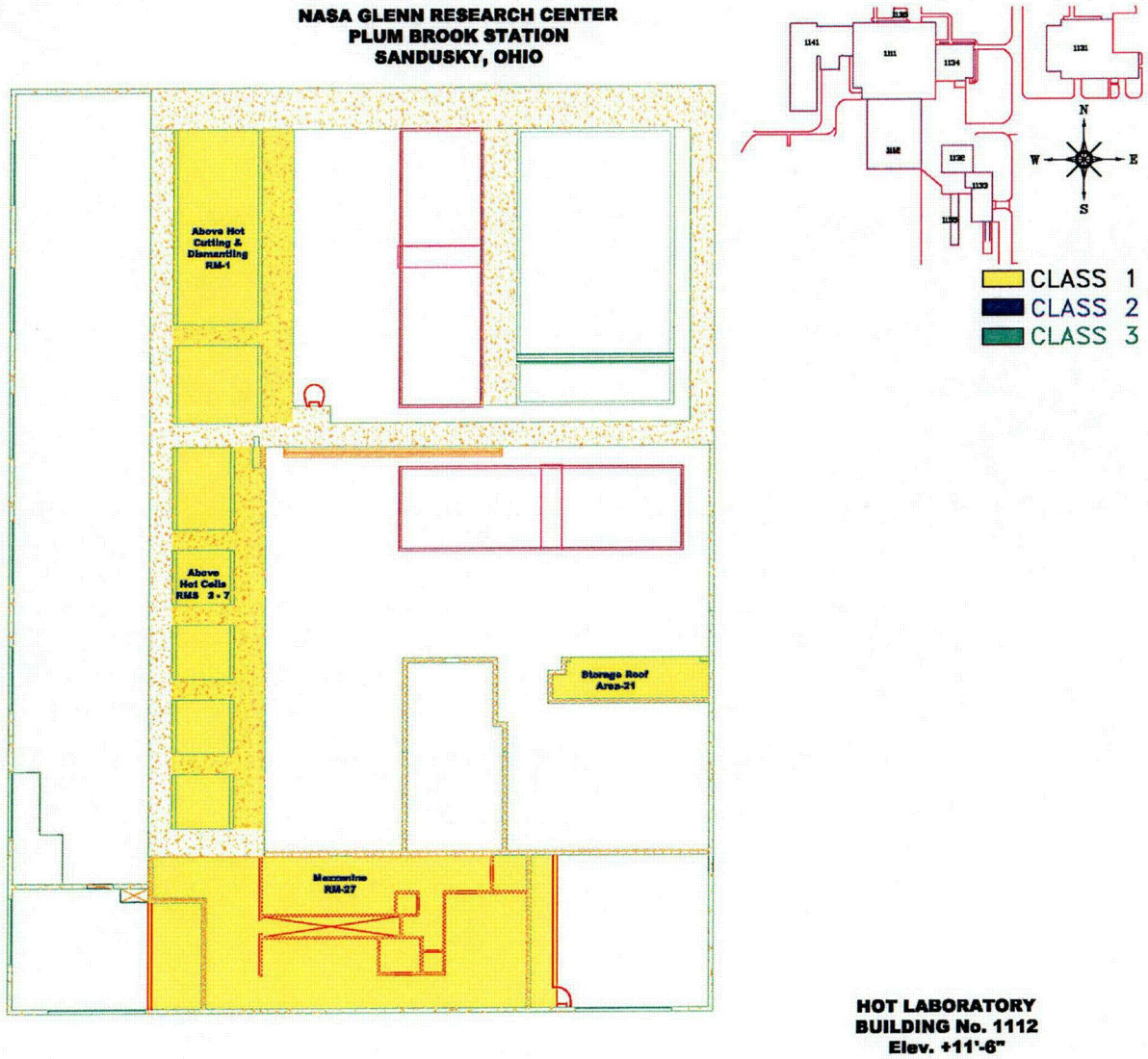


Figure D-9 – Hot Laboratory Building 0'-0" Elevation

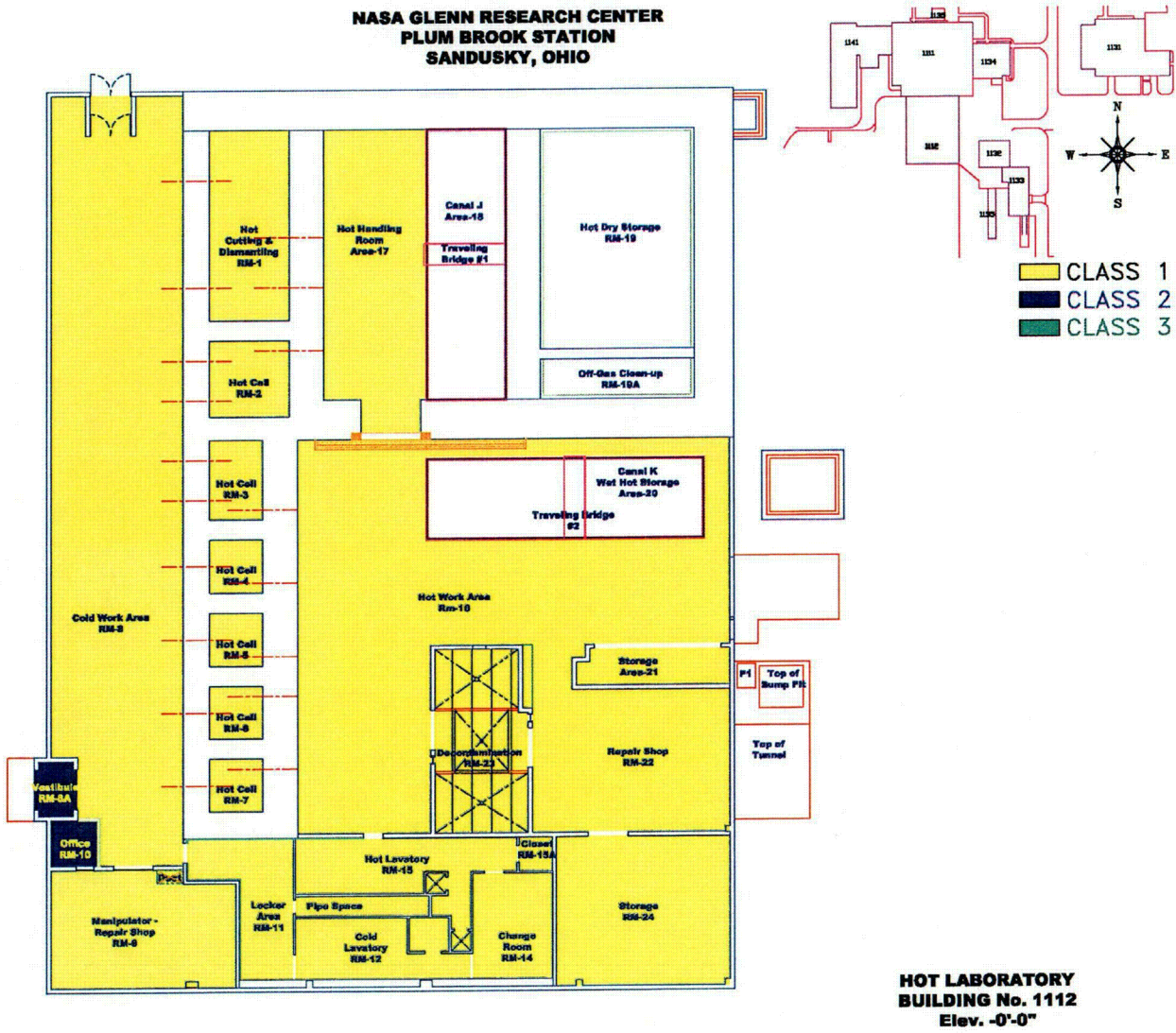
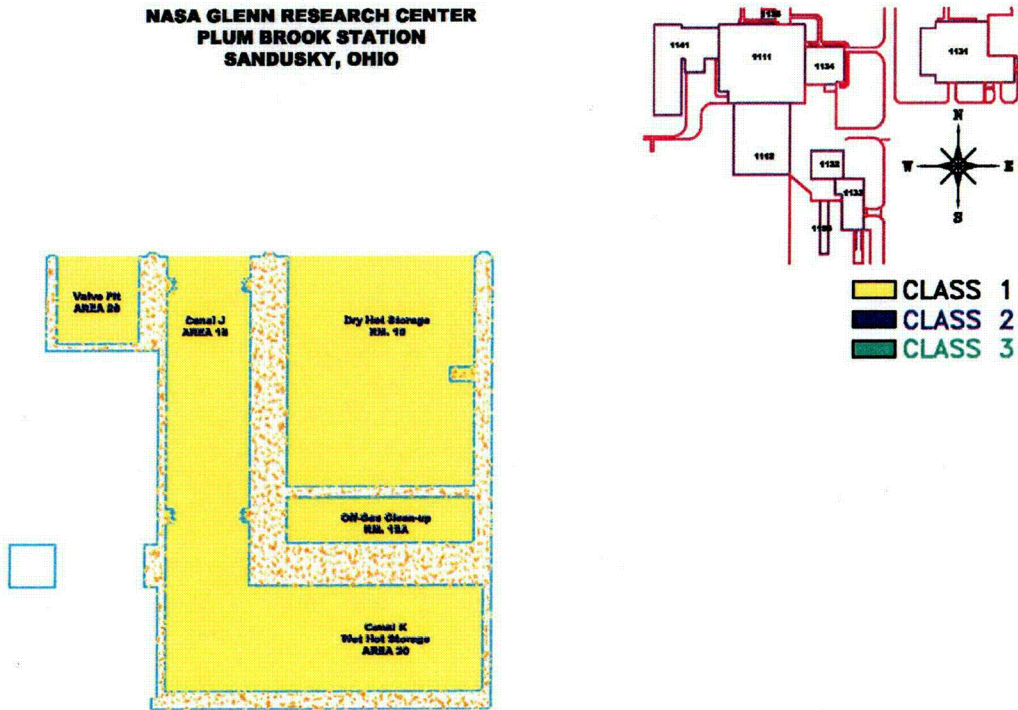
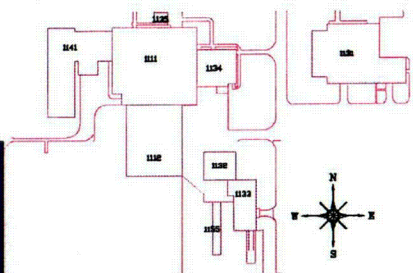


Figure D-11 – Hot Laboratory Building -25'-0" Elevation

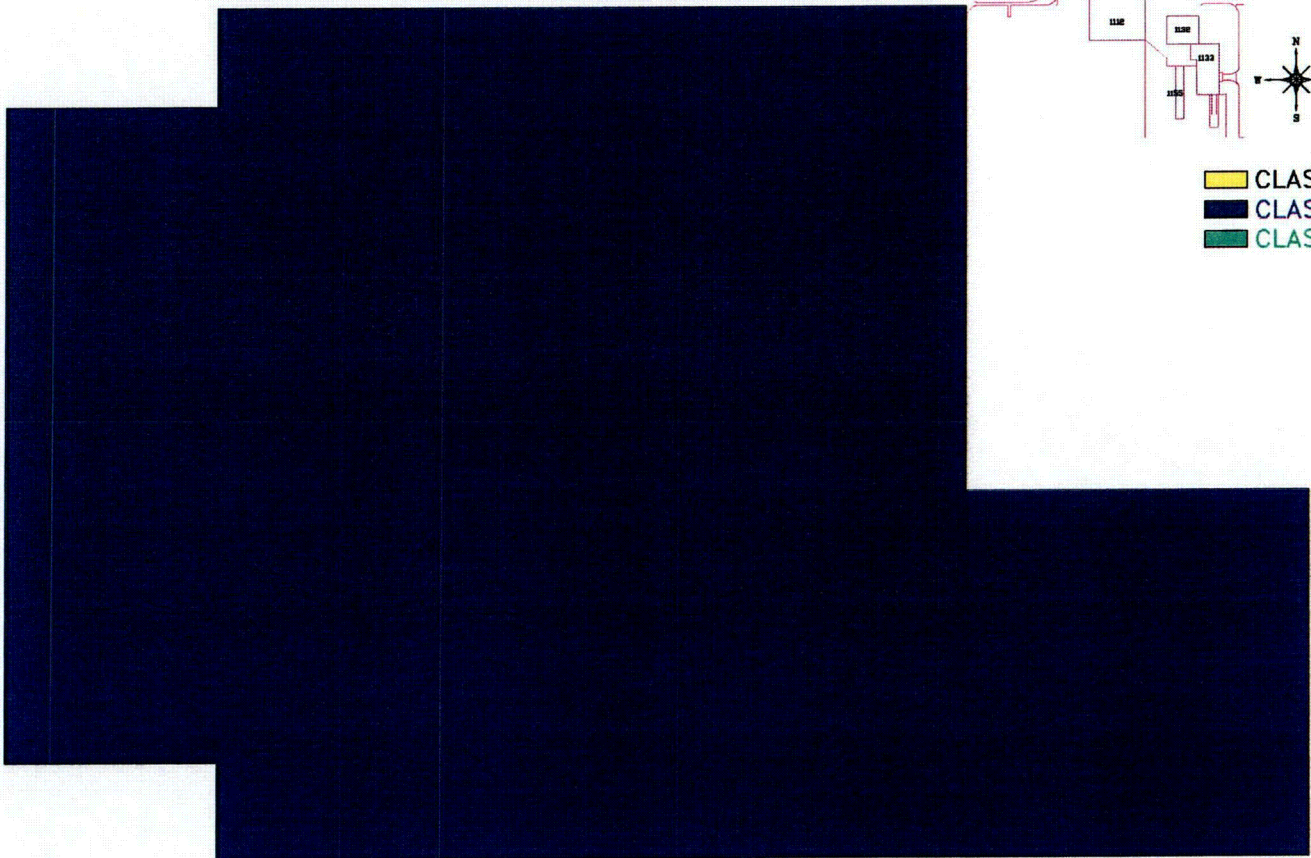


**HOT LABORATORY
BUILDING No. 1112
Elev. @ -25'-0"**

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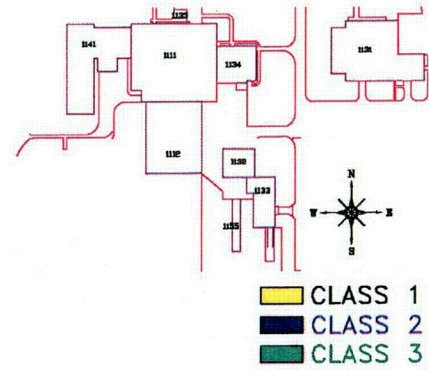
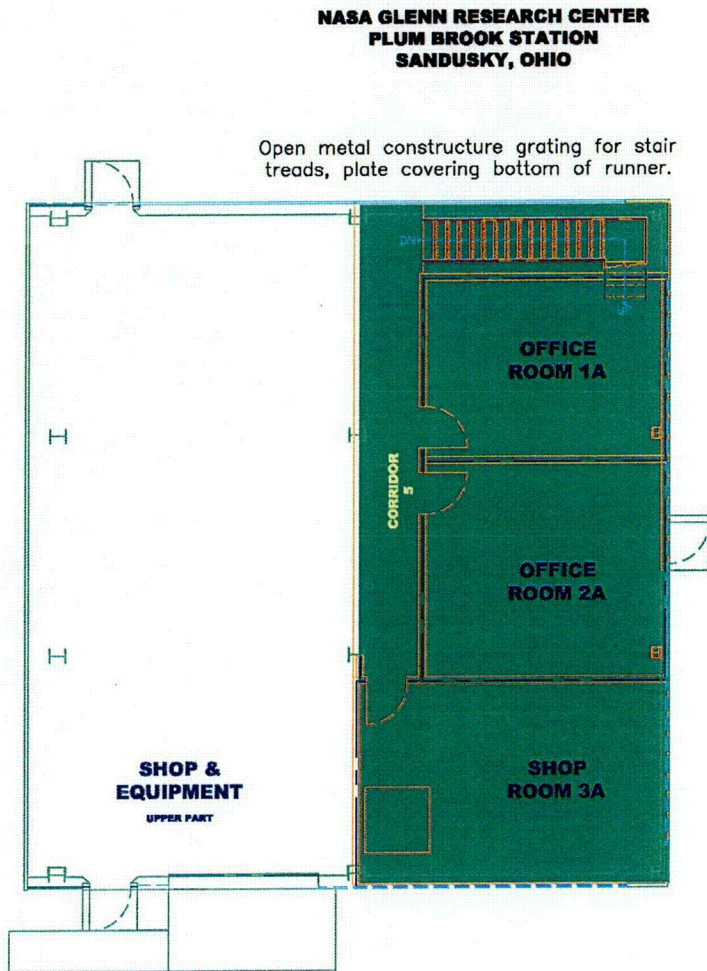
- CLASS 1
- CLASS 2
- CLASS 3



REACTOR SERVICE EQUIPMENT BUILDING
BUILDING No. 1131
Elev. Roof

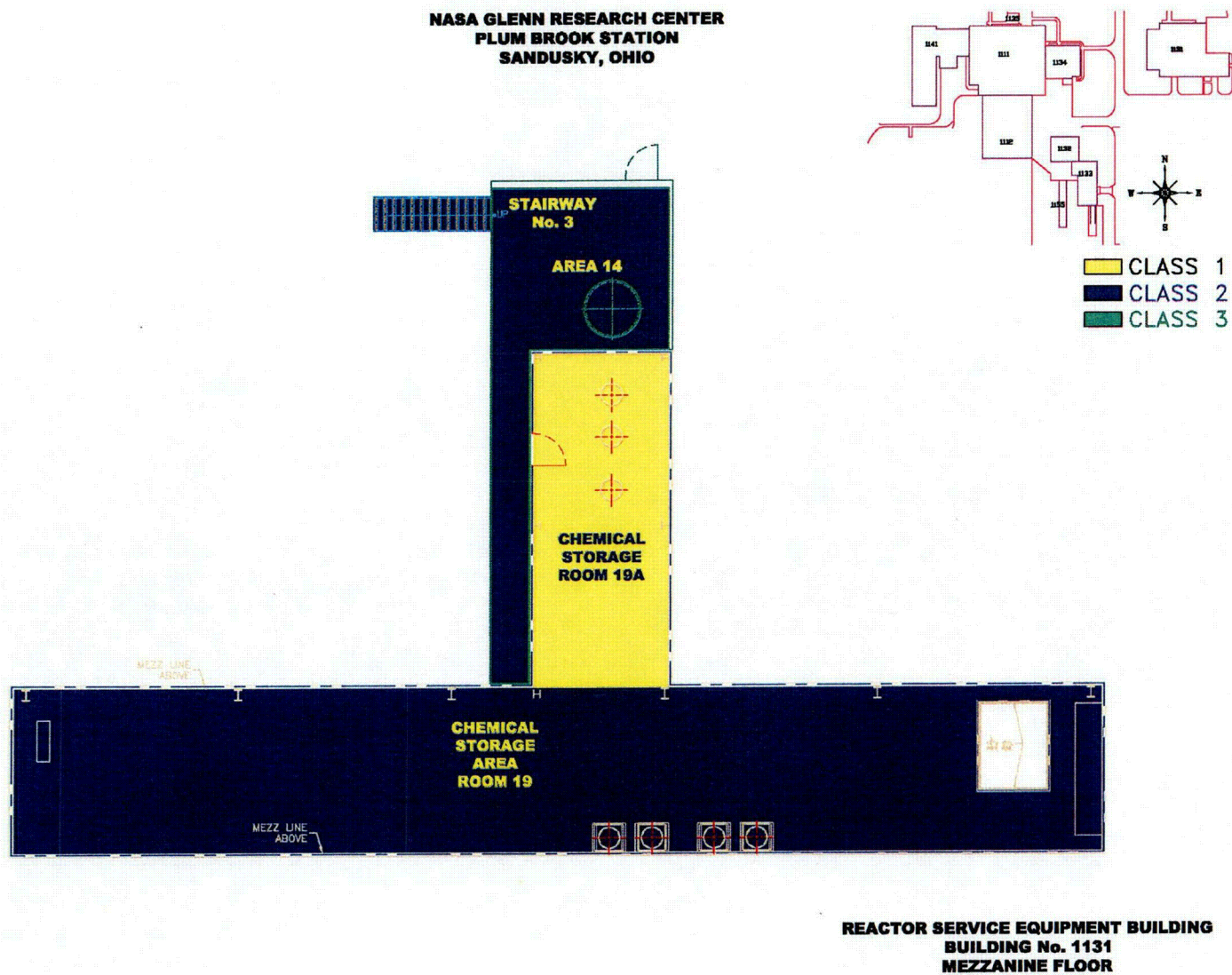
Figure D-12 – Service Equipment Building Roof Elevation

Figure D-13 – Service Equipment Building Mezzanine over Addition



**REACTOR SERVICE EQUIPMENT BUILDING
BUILDING No. 1131
MEZZANINE FLOOR ADDITION**

Figure D-14 – Service Equipment Building Mezzanine Elevation



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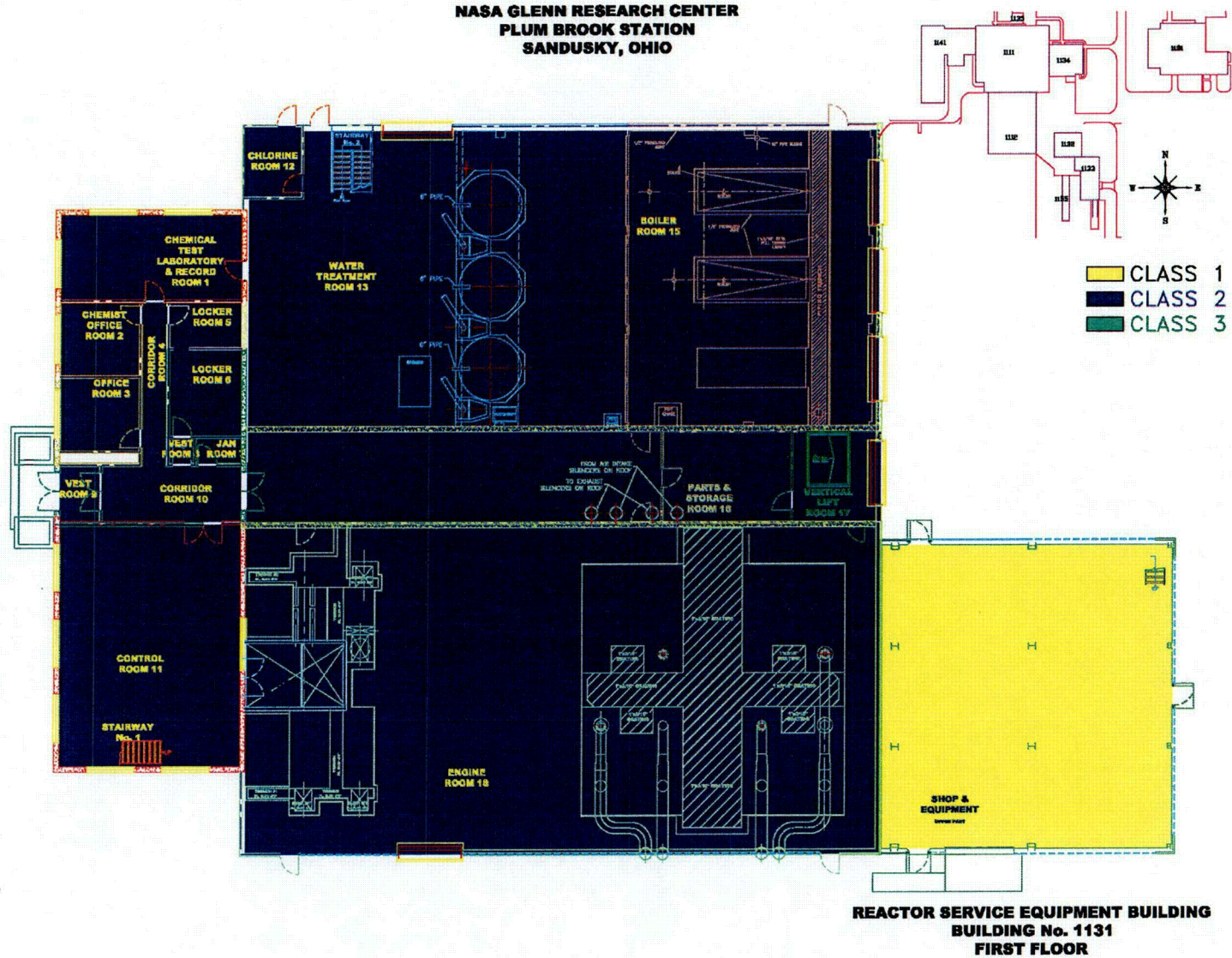
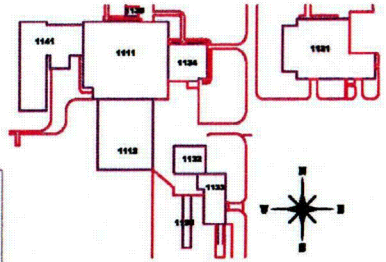
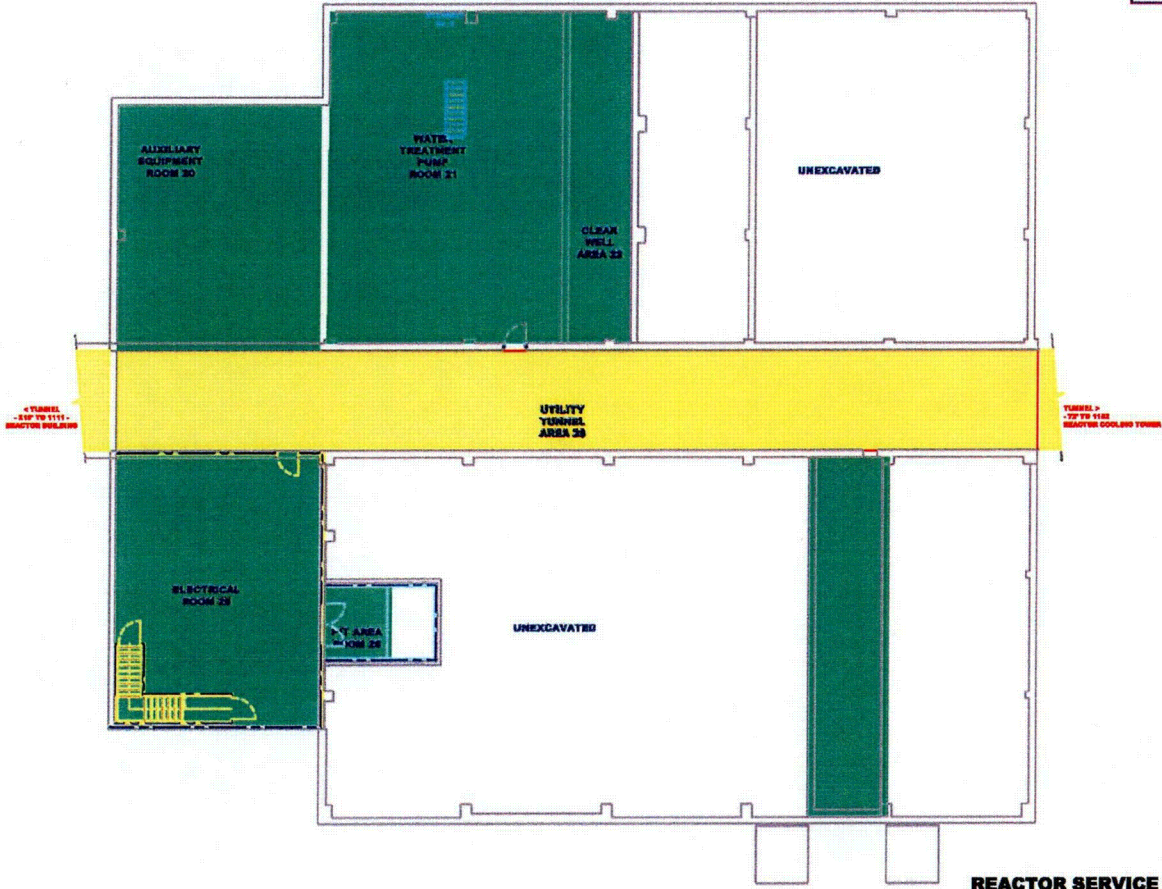


Figure D-15 – Service Equipment Building First Floor Elevation

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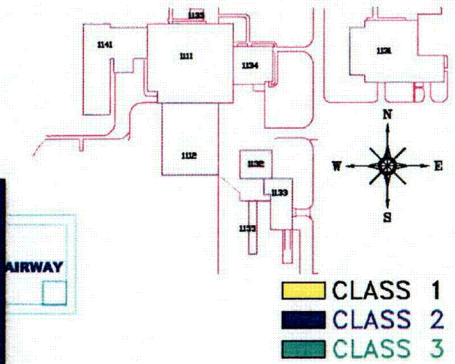
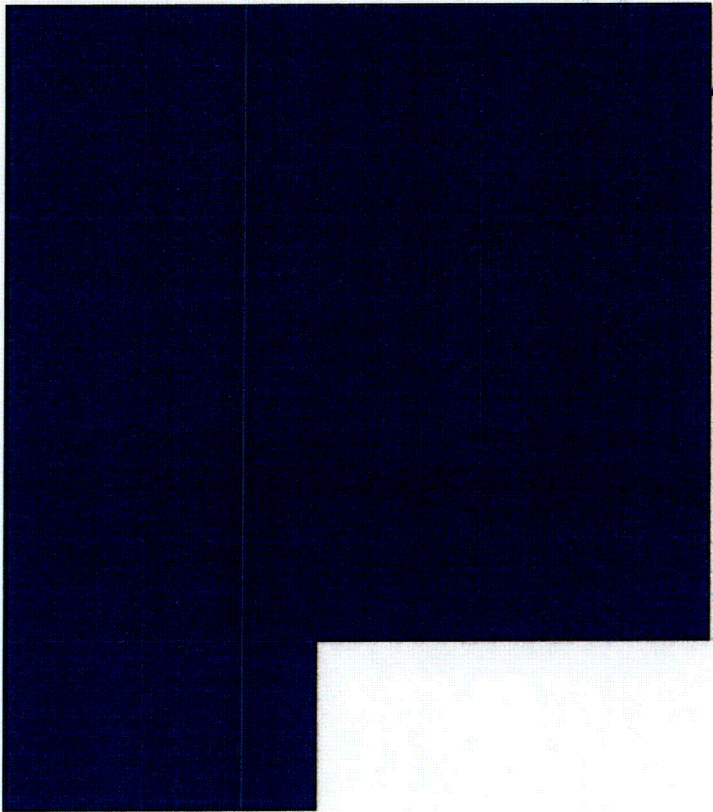
- CLASS 1
- CLASS 2
- CLASS 3



REACTOR SERVICE EQUIPMENT BUILDING
 BUILDING No. 1131
 BASEMENT & FOUNDATION FLOOR

Figure D-16 – Service Equipment Building Basement Elevation

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PLUM BROOK STATION
SANDUSKY, OHIO**

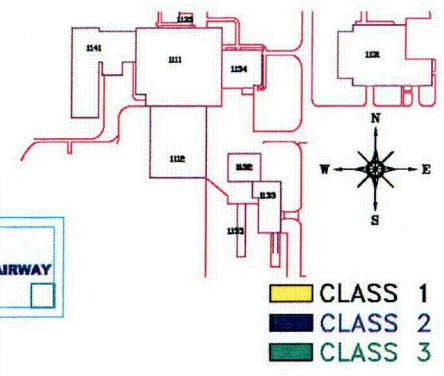
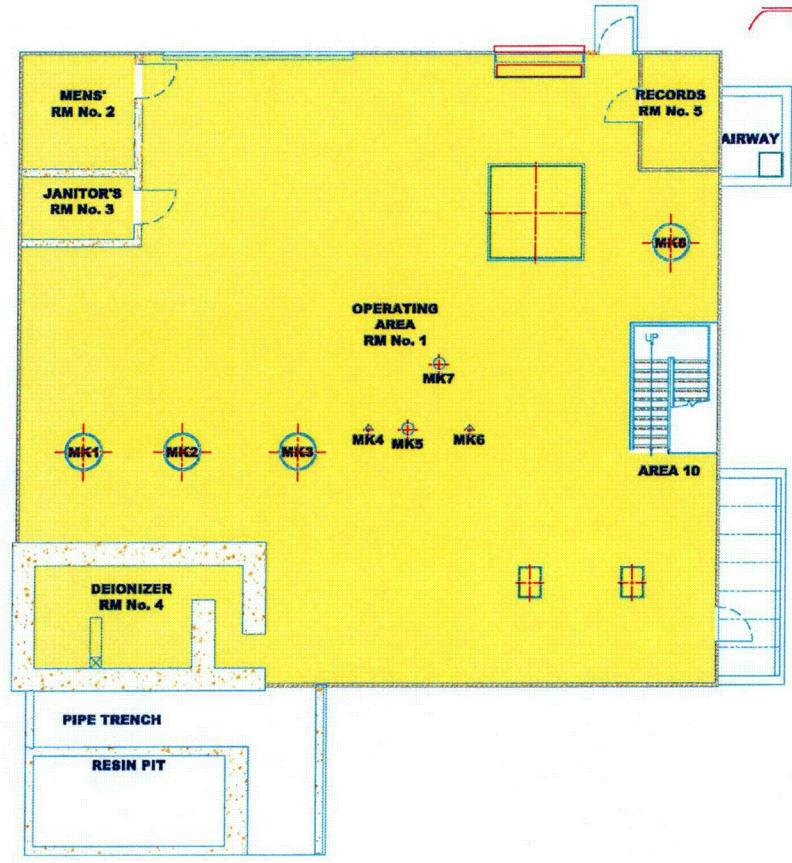


**FAN HOUSE
BUILDING No. 1132
Elev. Roof**

Figure D-17 – Fan House 0'-0" Elevation

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Figure D-18 – Fan House 0'-0" Elevation



FAN HOUSE
BUILDING No. 1132
Elev. 0'-0"

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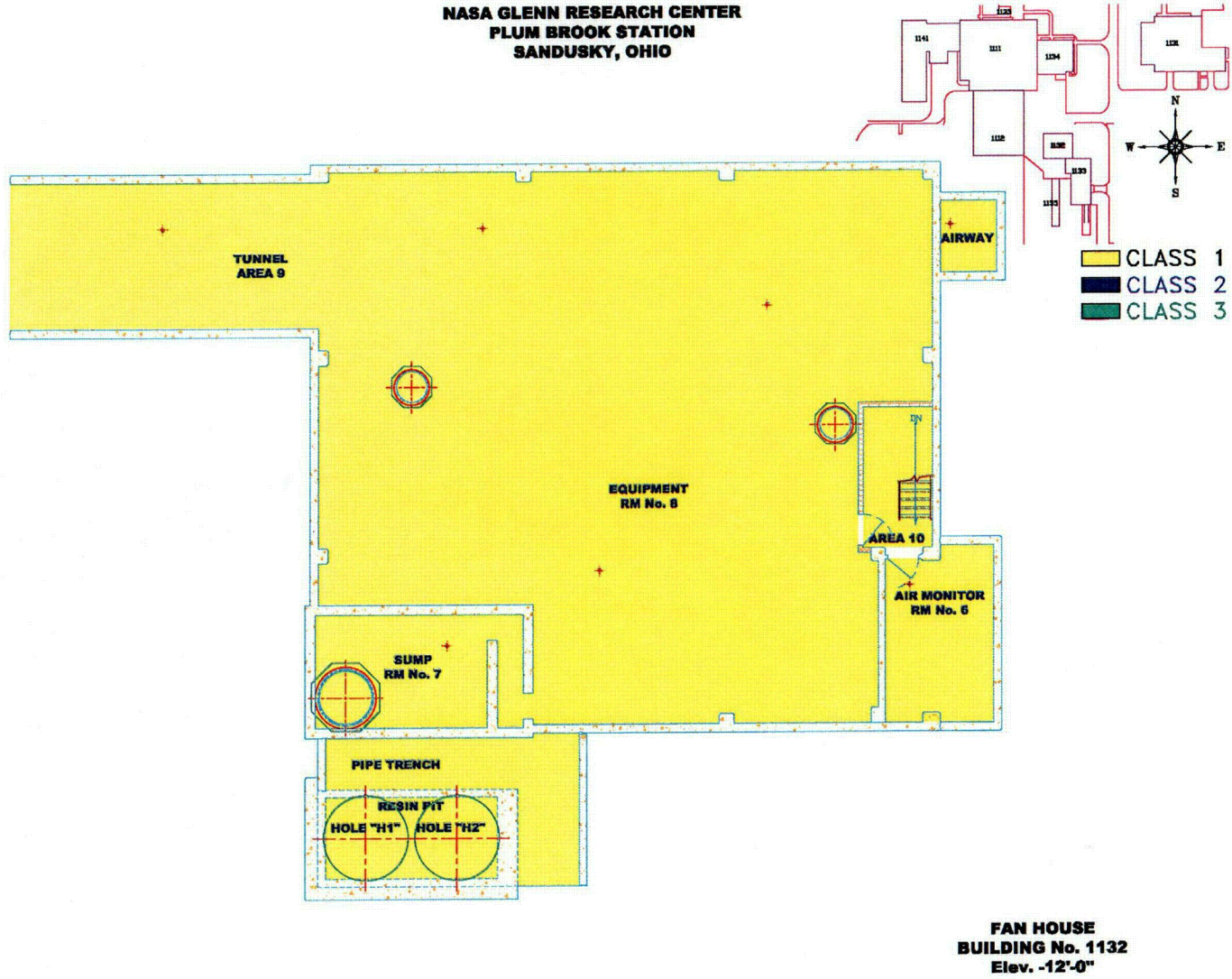


Figure D-19 – Fan House -12'-6" Elevation

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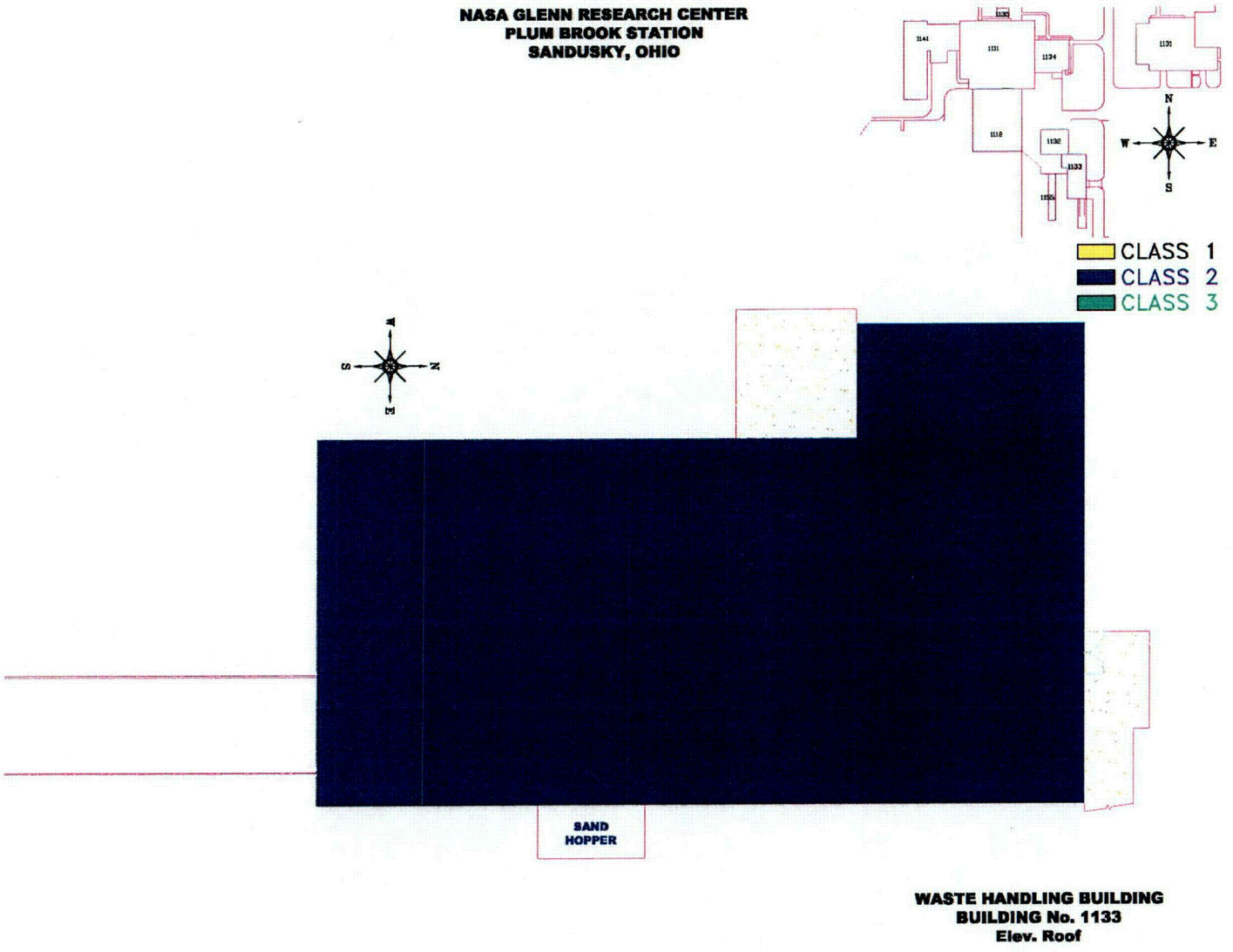
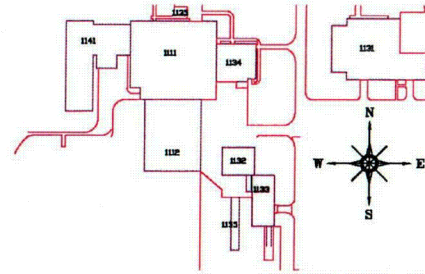
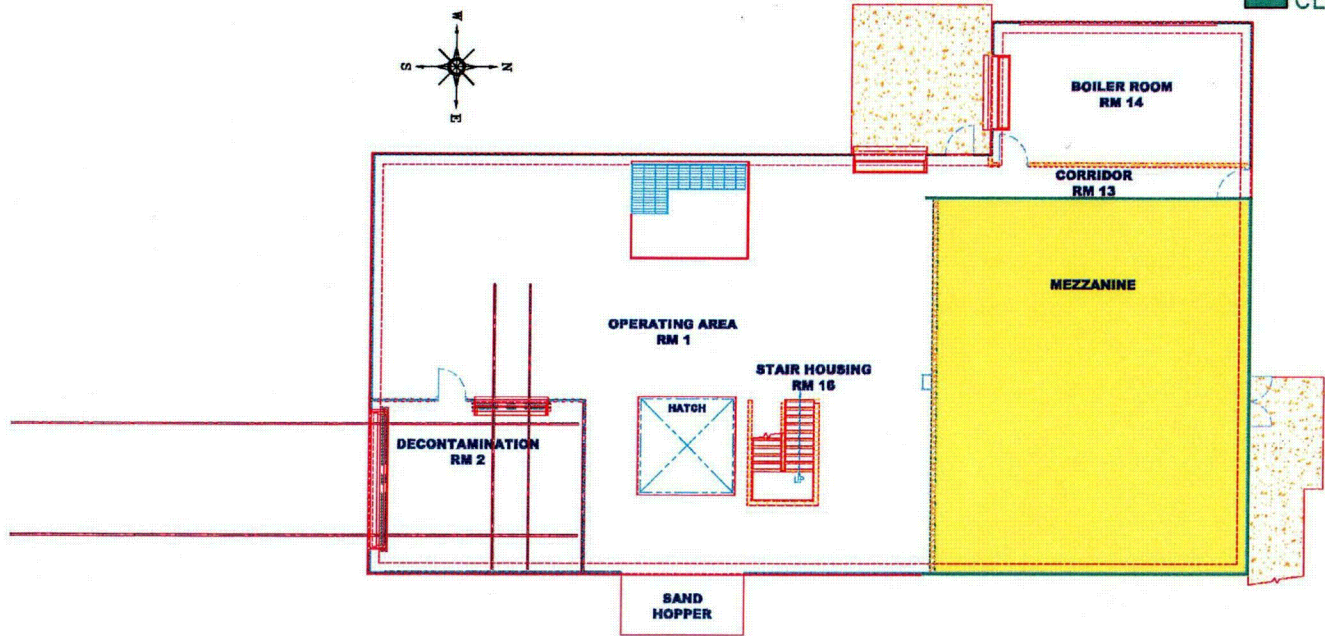


Figure D-20 – Waste Handling Building Roof Elevation

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SANDUSKY, OHIO



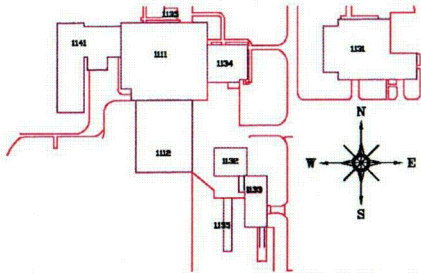
- CLASS 1
- CLASS 2
- CLASS 3



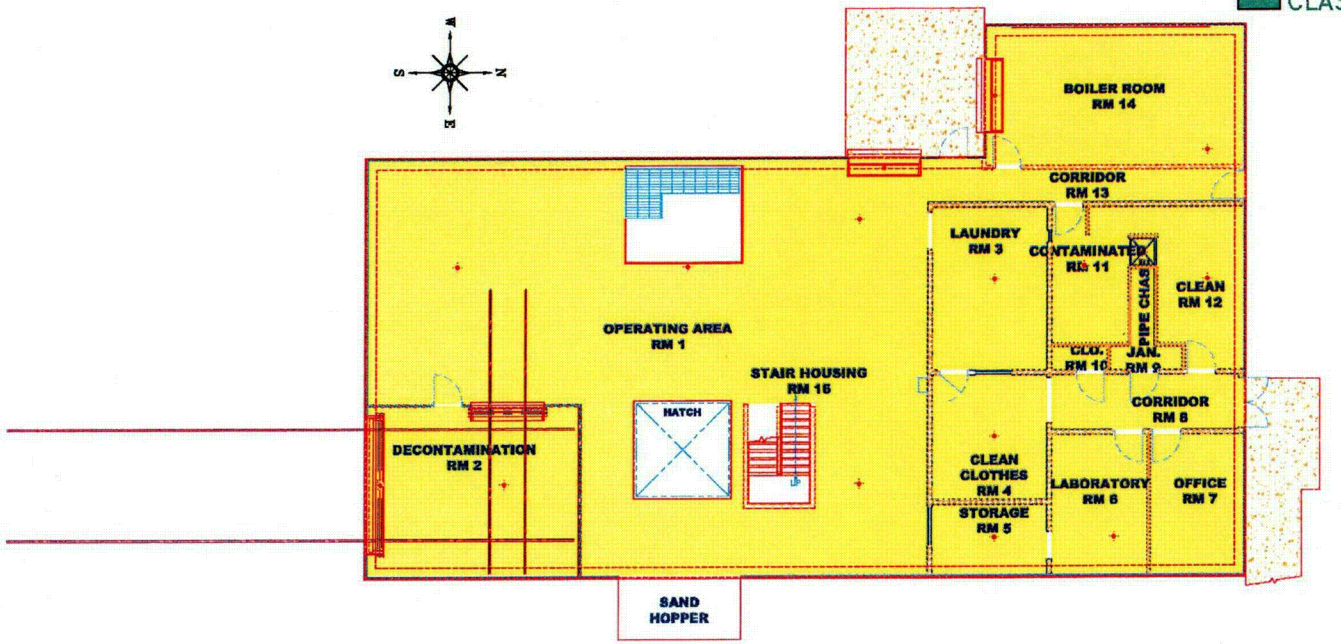
WASTE HANDLING BUILDING
BUILDING No. 1133
Elev. @ 9'-0"

Figure D-21 – Waste Handling Building +9'-0" Elevation

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 PLUM BROOK STATION
 SANDUSKY, OHIO



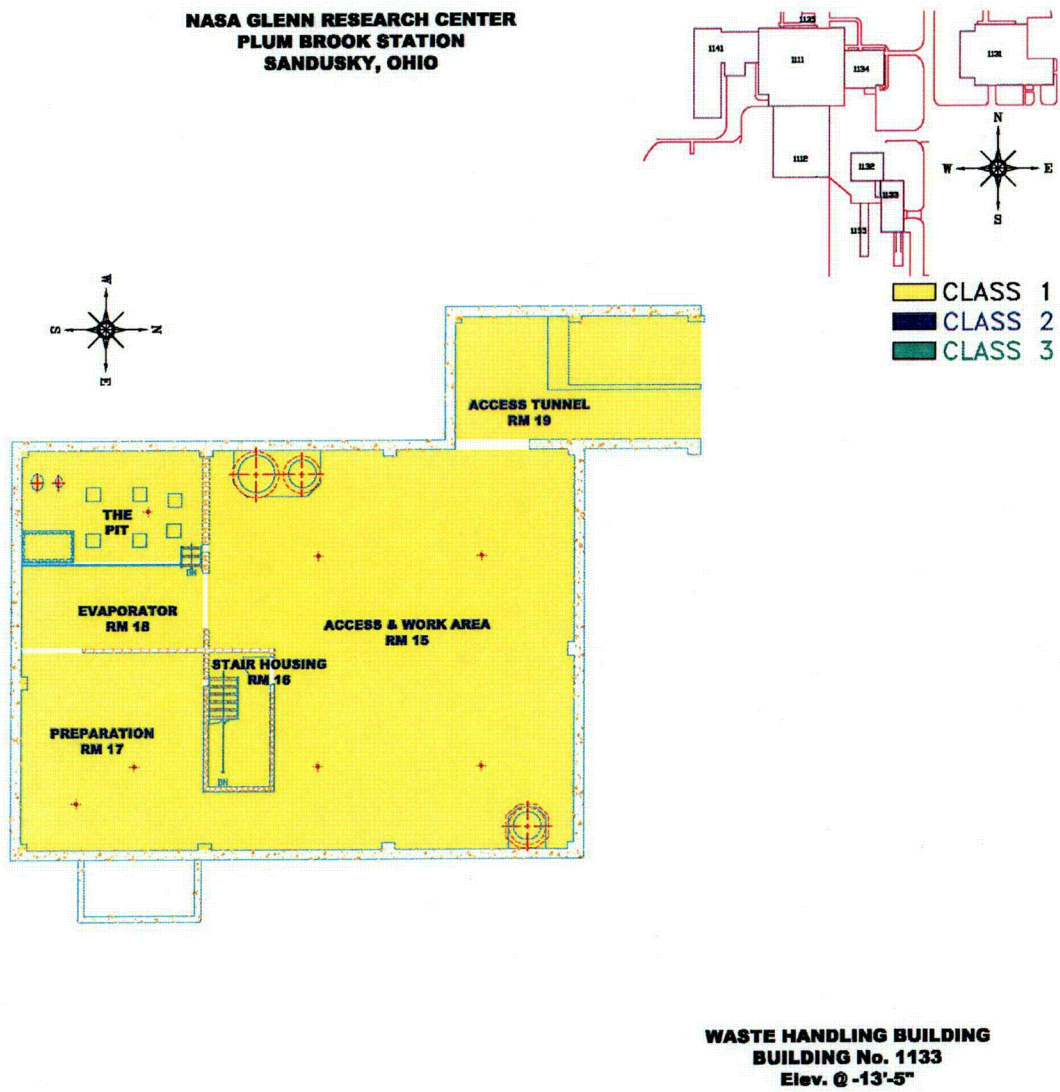
- CLASS 1
- CLASS 2
- CLASS 3



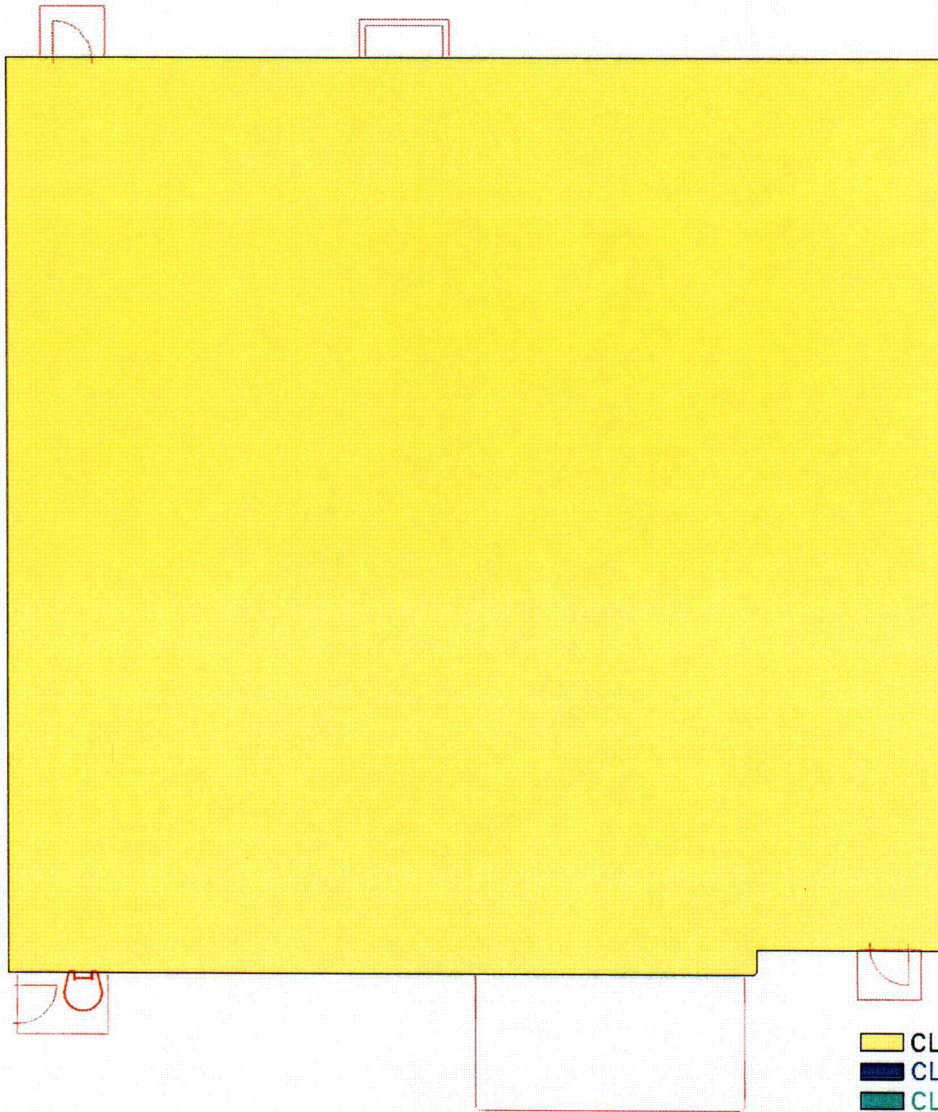
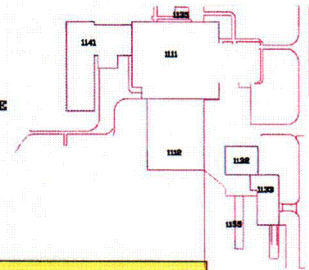
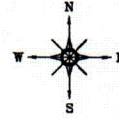
WASTE HANDLING BUILDING
BUILDING No. 1133
 Elev. @ 0'-0"

Figure D-22 – Waste Handling Building 0'-0" Elevation

Figure D-23 – Waste Handling Building -13'-5" Elevation



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- CLASS 1
- CLASS 2
- CLASS 3

**PRIMARY PUMP HOUSE
BUILDING No. 1134
Elev. Roof**

Figure D-24 – Primary Pump House Roof Elevation

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 PLUM BROOK STATION
 SANDUSKY, OHIO

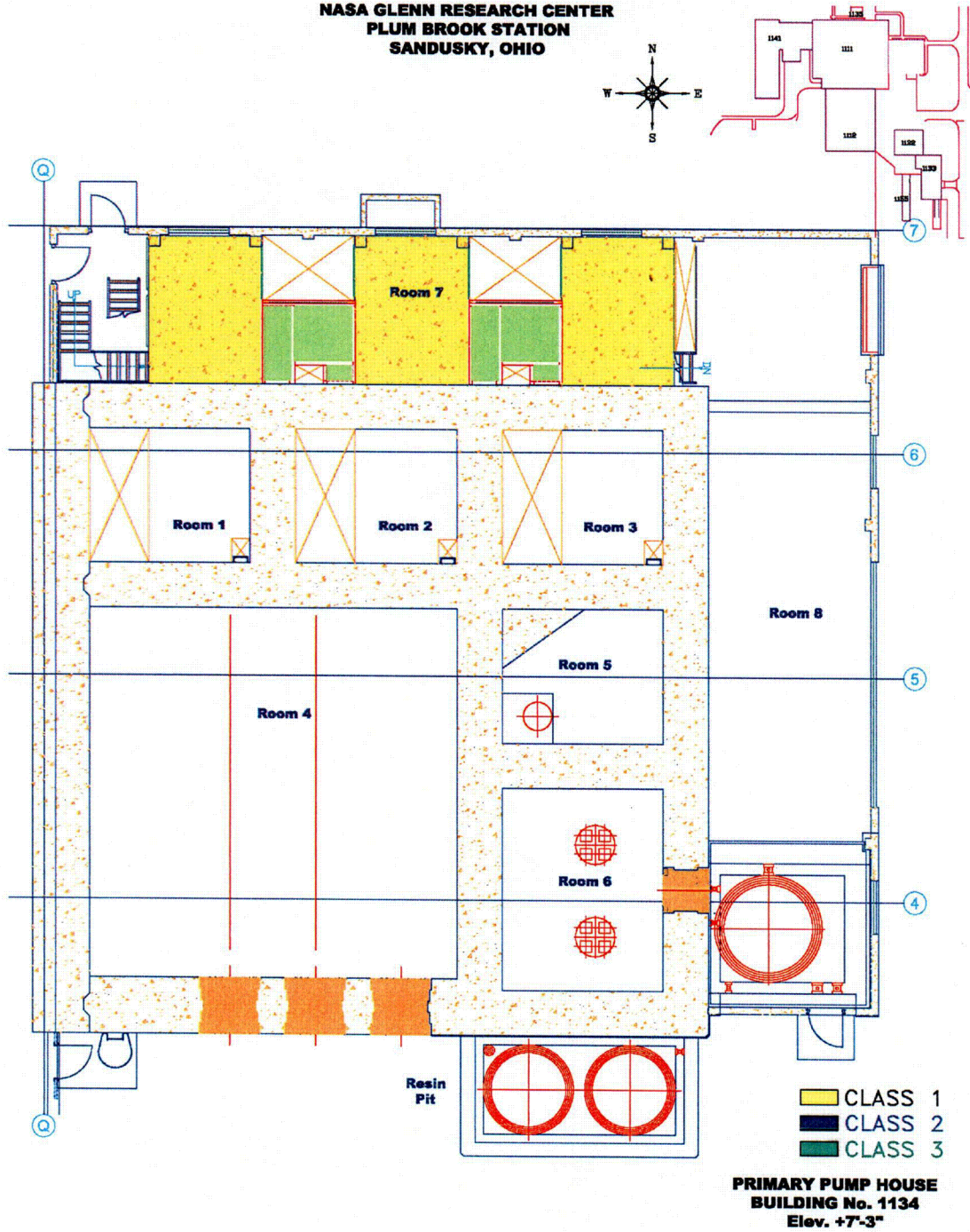


Figure D-25 – Primary Pump House +7'-3" Elevation

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 PLUM BROOK STATION
 SANDUSKY, OHIO

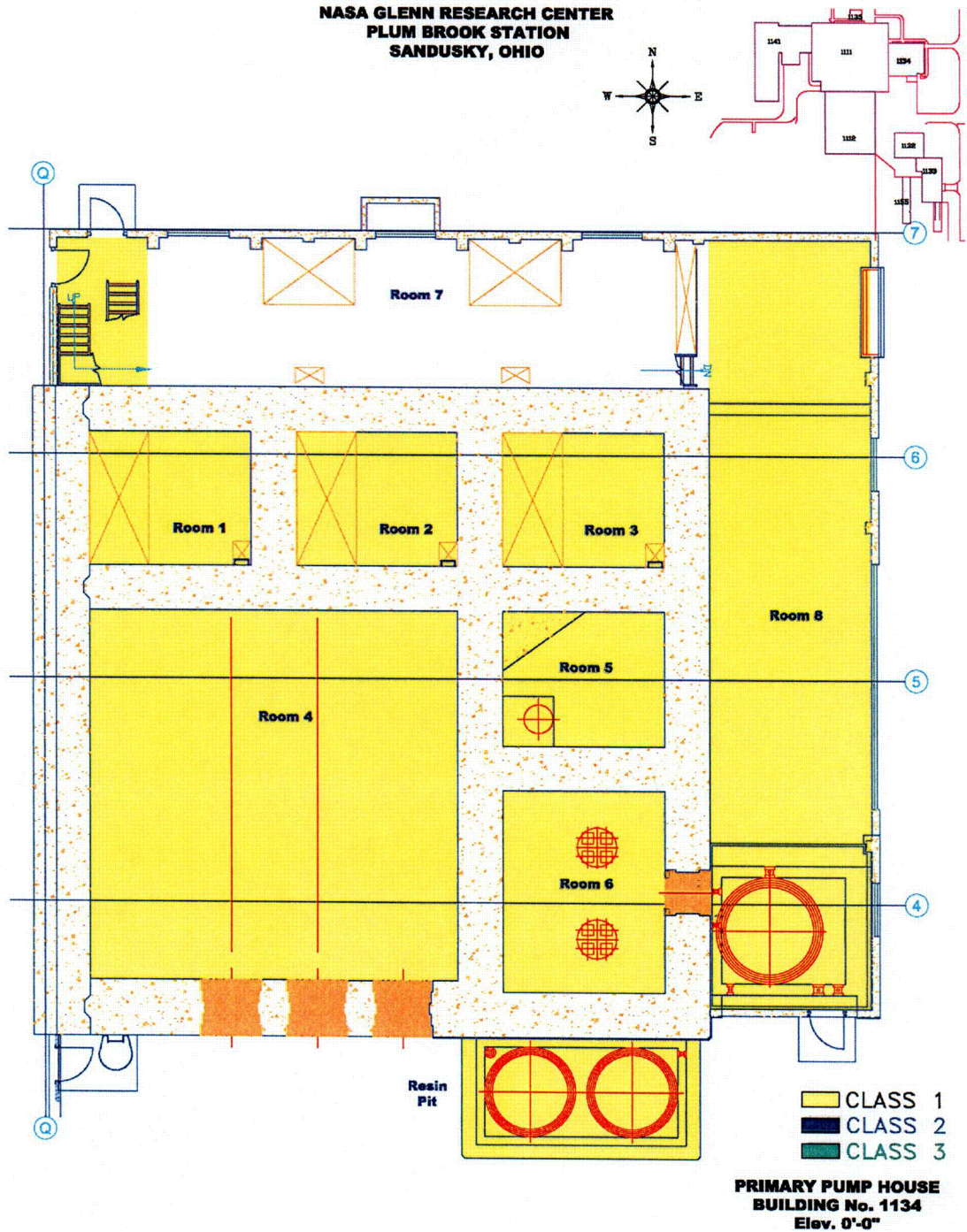


Figure D-26 – Primary Pump House 0'-0" Elevation

C28

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 PLUM BROOK STATION
 SANDUSKY, OHIO

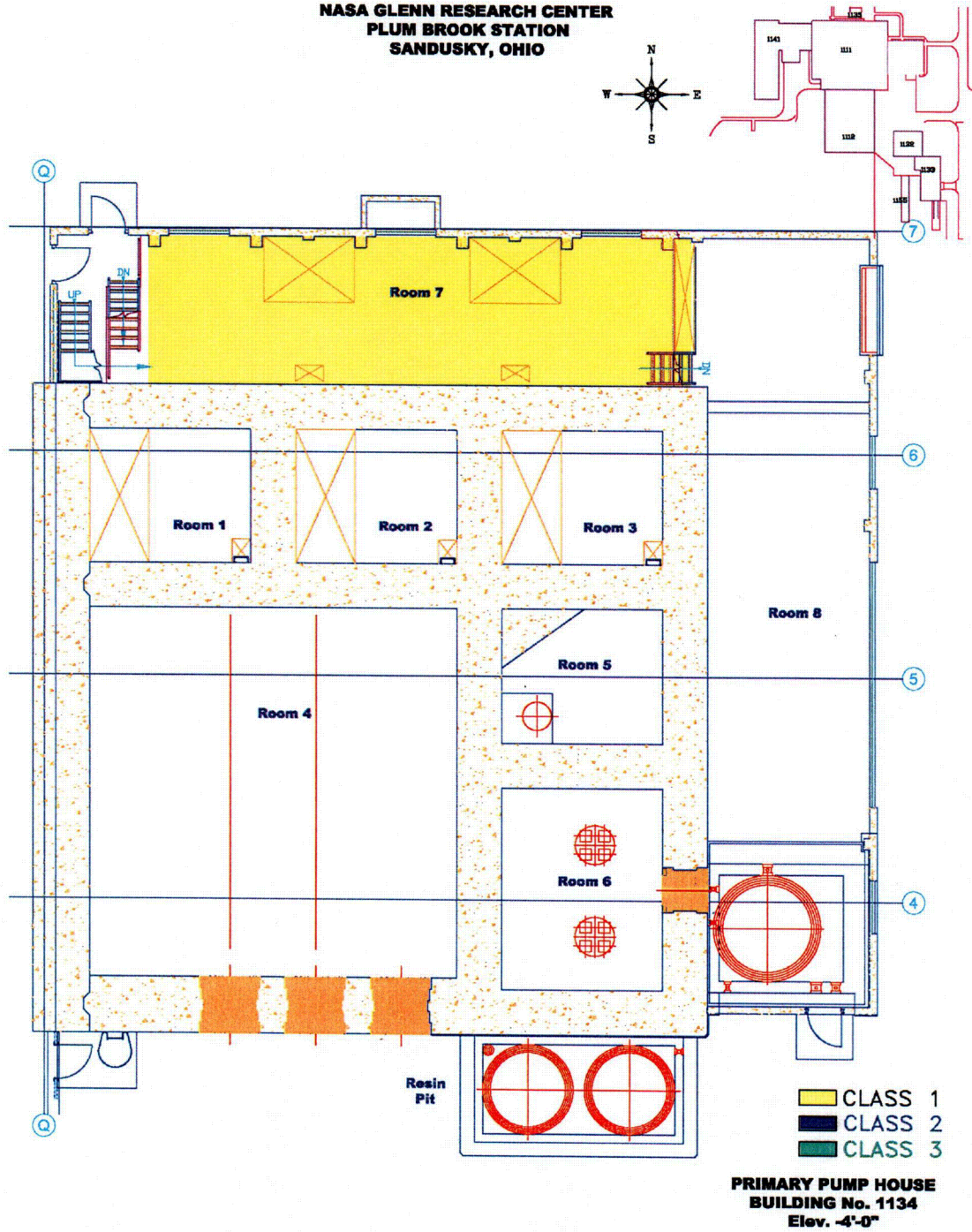


Figure D-27 – Primary Pump House -4'-0" Elevation

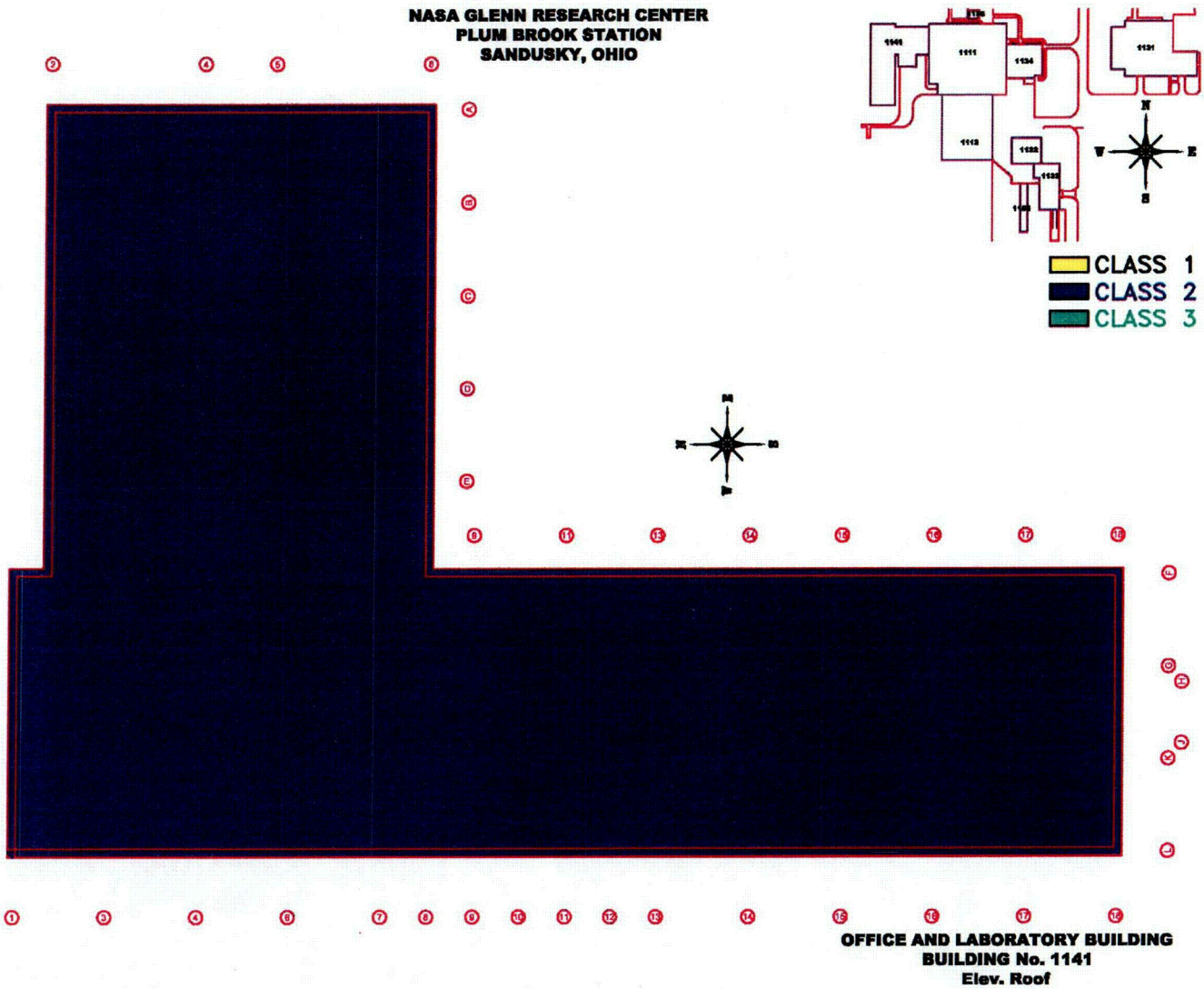


Figure D-28 – Reactor Office and Laboratory Building Roof Elevation

Figure D-29 – Reactor Office and Laboratory Building 2nd Floor Elevation

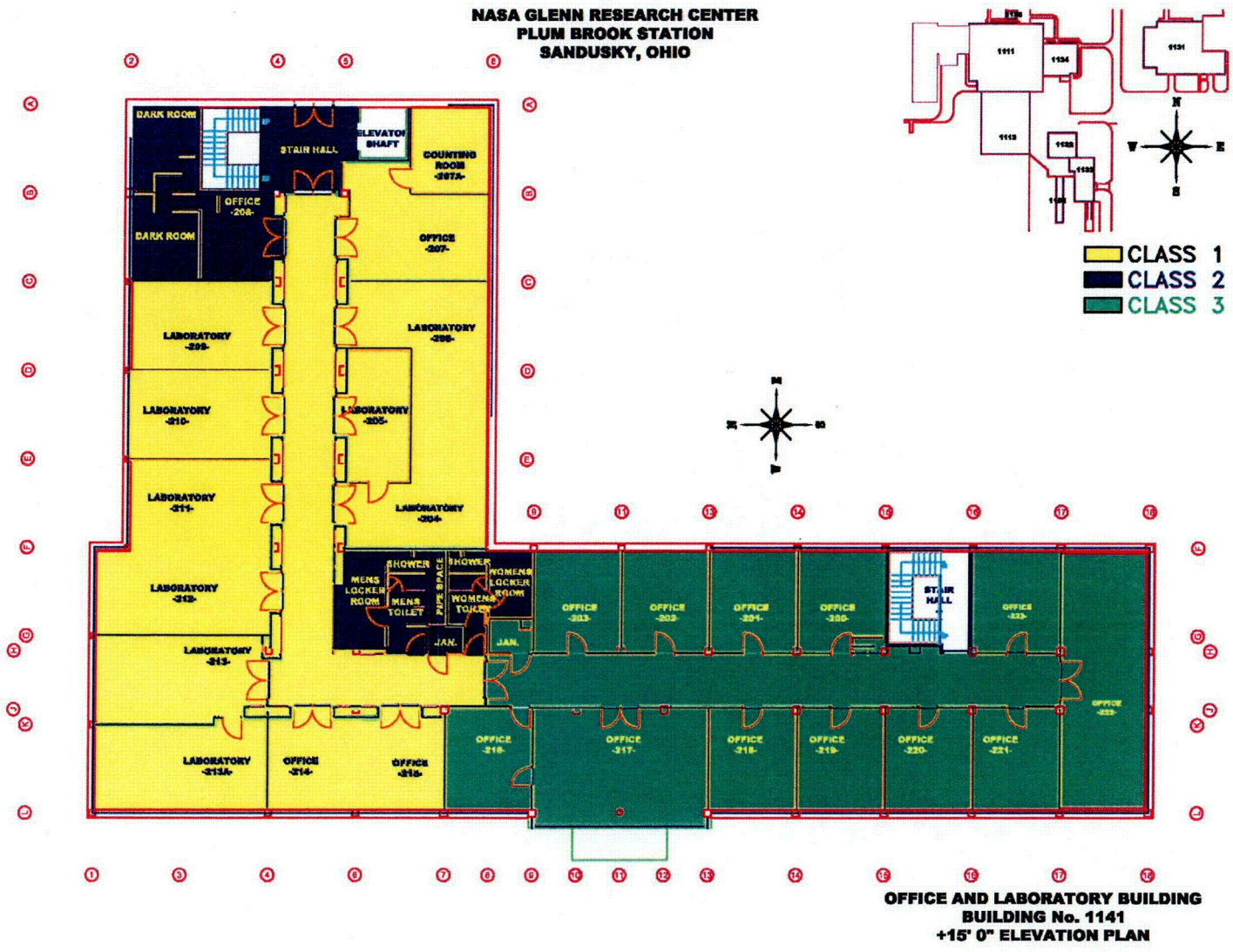


Figure D-30 – Reactor Office and Laboratory Building 1st Floor Elevation

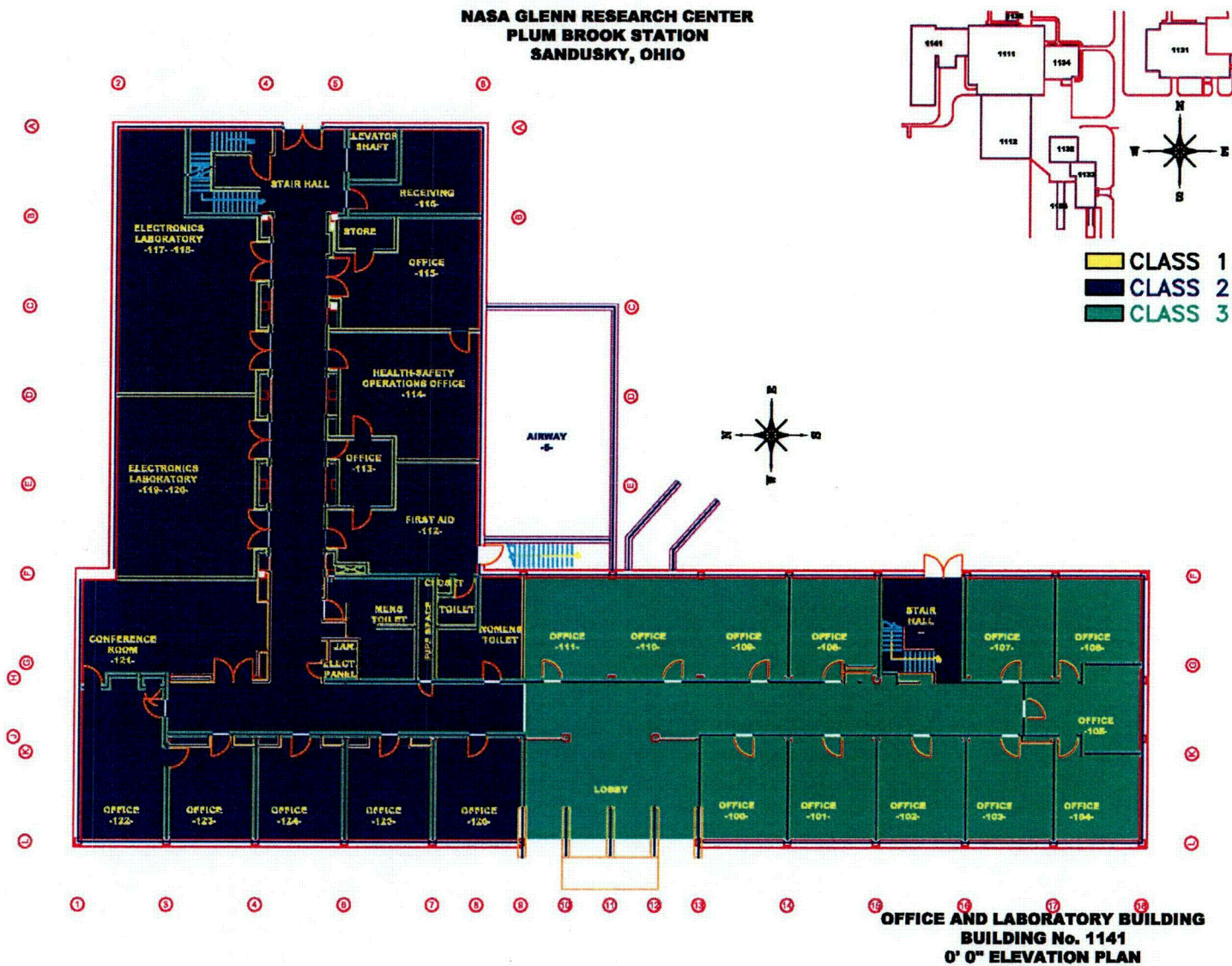


Figure D-31 – Reactor Office and Laboratory Building Basement Elevation

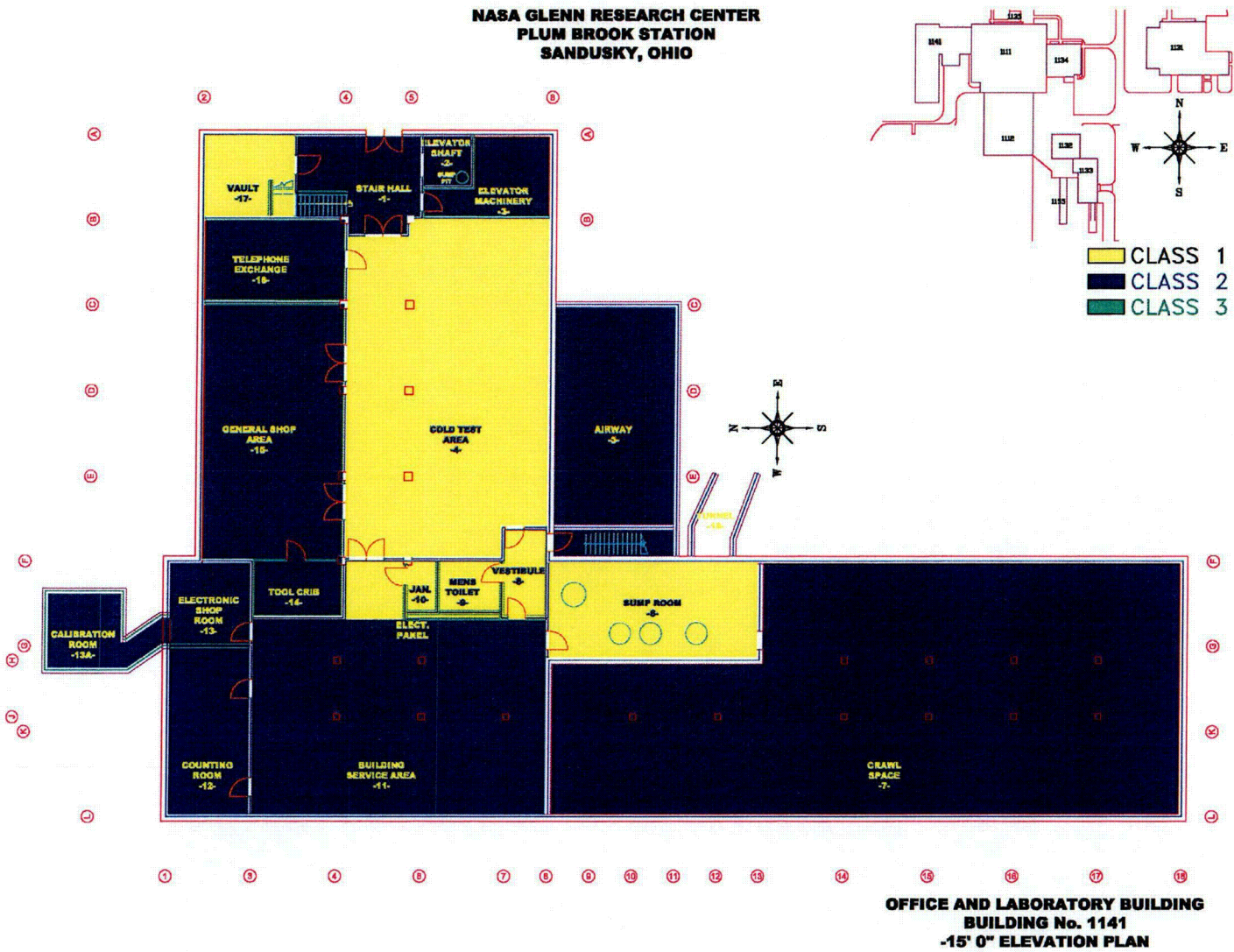
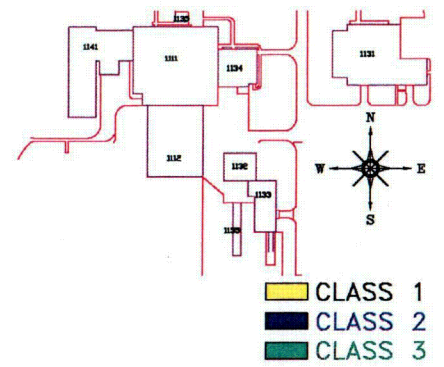
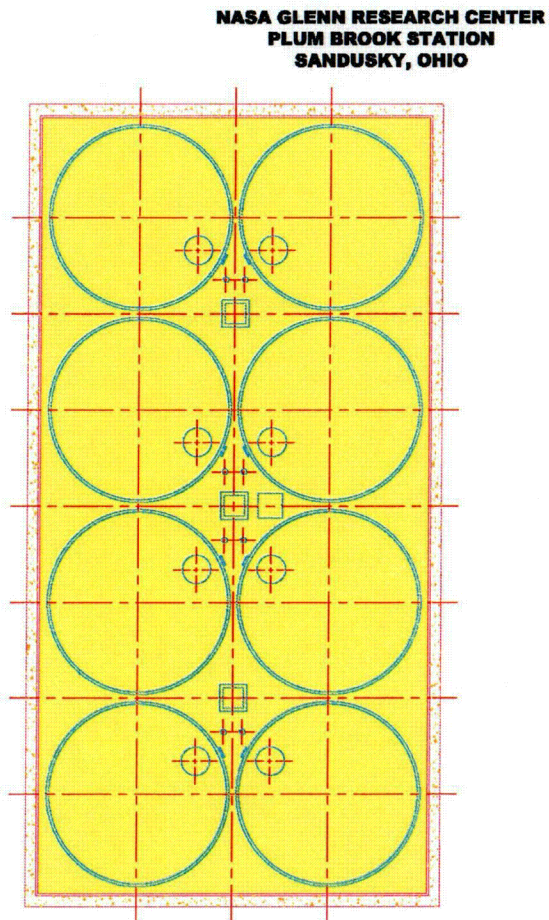


Figure D-32 – Hot Retention Area



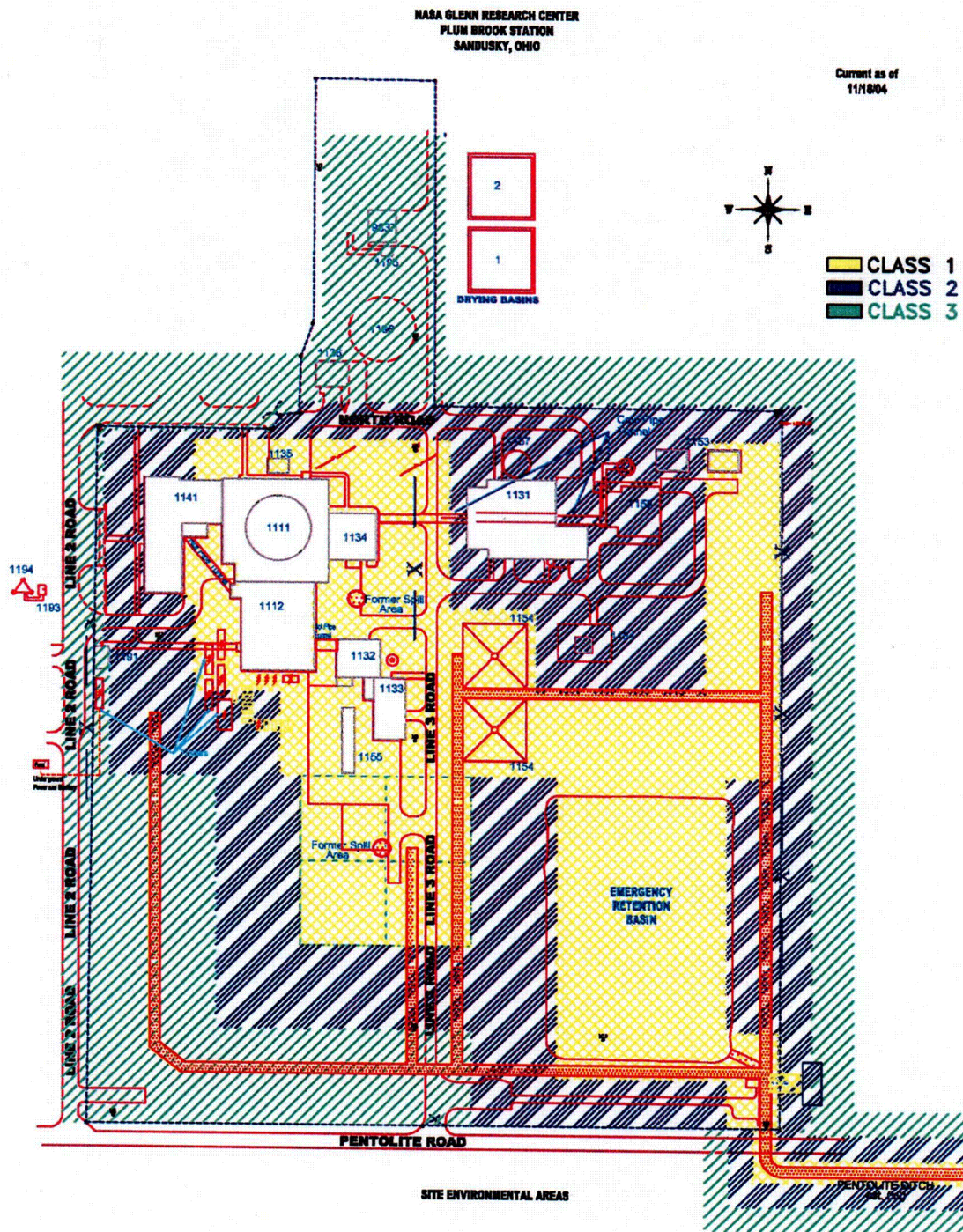


Figure D-33 – PBRF Environmental Areas