NFSS Balance of Plant Operable Unit

Development of Radiological Soil Remediation Goals (Derived Concentration Guideline Limits DCGLs)

Introduction

The Baseline Risk Assessment (BRA) for the NFSS Balance of Plant (BOP) was published in December 2007 (USACE 2007). Generally, at the conclusion of a BRA, preliminary remediation goals (PRGs) may be generated. However, at that time, a comprehensive set of risk-based PRGs were published only for chemicals (Tables A697 through A705, USACE 2007a). For radionuclides, PRGs were only developed for screening purposes at the onset of the Remedial Investigation and only for the subsistence farmer exposure scenario (Table B.1, USACE 2007a). Those radiological PRGs were based on the lower end of the NCP's acceptable cancer risk range of 1 in a million excess cancers (EPA 1990).

Since the time that the BRA was drafted (which began in 2003), work has progressed on the RI/FS of the NFSS, including the following efforts which would affect development of radiological DCGLs

- Additional groundwater modeling efforts (provides additional site-specific characterization of soil and subsurface properties which affect RESRAD modeling)
- Additional sampling of site groundwater, surface water, sediment, and soils (may affect radiological soil source term), and
- Identification of proposed Applicable or Relevant and Appropriate Requirements (ARARs) (which affects the limits used for DCGL development)

Furthermore, the RESRAD computer code has undergone several revisions since the BRA was drafted. The version of the RESRAD code that was used to generate baseline radiological doses and cancer risks was version 6.2.2. The current version of the RESRAD code is version 6.5. (See attachment 1 for version history list of changes between versions 6.2.2 and 6.5).

The results of the BRA were used in conjunction with the information or changes listed above in order to develop soil remediation goals (DCGLs) for radionuclides of concern for the BOP FS.

Evaluation of BRA Source Term

The NFSS BRA database consisted of analytical results for samples collected from June 30, 1998 through October 7, 2003. The database consists of analytical results for 954 soil samples, 238 groundwater samples, 115 sediment samples, and 98 surface water samples (USACE 2007a). Site samples were collected across all of the 191-acre NFSS. Various laboratory analyses for radionuclides and chemicals were performed on samples from different phases of the remedial investigation.

Annual surveillance of groundwater, sediment, and surface water has been conducted since that time. However, those environmental monitoring efforts do not include soil sampling.

In April 2011, the Corps published an Addendum to the Remedial Investigation Report (RIRA, USACE 2011). However, this addendum was focused towards further characterization of

various groundwater impacts, and no new soil samples were obtained as part of the development of the RIRA.

In November and December 2012, an additional 109 soil samples were obtained in an effort to characterize the source term for specified areas of uranium contamination in the groundwater (USACE 2013a). Those soil samples did not reveal any significantly elevated radionuclides in the soil.

Therefore, the radiological soil source term does not need to be revised based on what was used in the BRA.

Identification of ARARs

Applicable or Relevant and Appropriate Guidelines are used to guide remedial action objectives and identification of remedial action alternatives at the site. USACE is identifying the *Criteria Relating to the Operations of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material from Ores Processed Primarily for their Source Material Content*, 10 CFR 40 Appendix A, as a potential ARAR for the Interim Waste Contaminant Structure (IWCS) IWCS Operable Unit (OU) (USACE 2013b).

10 CFR Part 40, Appendix A, Criterion 6(6) provides a means to derive cleanup goals for radionuclides other than radium. As per 40 CFR Part 192, radium is limited to 5 pCi/g in the top 15 cm of soil. 10 CFR Part 40, Appendix A, Criterion 6(6) requires that if other radionuclides are present, their cleanup goals are the concentration of the radionuclide that would produce the same dose as 5 pCi/g of radium in the top 15 cm. This dose for radium is called the 'benchmark' dose. The cleanup goals for radionuclides other than radium must also be As Low As Reasonably Achievable (ALARA). 10 CFR Part 40, Appendix A, Criterion 6(6) also states if more than one residual radionuclide is present in the same 100-square-meter area, the sum of the ratios (SOR) shall not exceed "1" (unity).

Reasonable Future Land Use

Based on current ownership of the site and the adjacent land use, the reasonable future land use for the NFSS BOP would be either restricted access, or industrial/commercial use, with or without redevelopment, depending on final disposition of the wastes under the IWCS. To be conservative, redevelopment under an industrial land use is considered because this would entail some type of construction at the site. The protection of a construction worker from unacceptable radiological exposures would drive soil cleanup goals lower (for radionuclides other than radium-226 and thorium-230) than the cleanup goals that may be developed for a restricted access land use for these other radionuclides.

Identification of Radionuclides of Concern

In the BRA, Table 3.25 lists the ROPCs that are ROCs by medium and receptor, where an ROC is any ROPC with a cancer risk of at least 1 in 100,000 when the total risk from exposure to all ROPCs combined is equal to or greater than 1 in 10,000. The identification of ROCs depends on the receptor (critical group) utilized for cleanup goal development. Table 3.25 indicates that for the construction worker, the following radionuclides would be considered radionuclides of concern:

- Actinium-227 (Ac-227)
- Protactinium-231 (Pa-231)
- Lead-210 (Pb-210)
- Radium-226 (Ra-226)
- Thorium-230 (Th-230)
- Uranium-234 (U-234)
- Uranium-235 (U-235)
- Uranium-238 (U-238)

Although Pb-210 is listed as an ROC, and it could be considered to be present in equilibrium with it parent Ra-226, a separate DCGL will not be developed for Pb-210. This is because it has never been measured at the site, and laboratory analysis for this radionuclide is not commonly performed. One way to account for its presence would be to add its dose to the dose of its parent Ra-226. However, this was not done for the NFSS BOP because the dose contribution from Pb-210 is orders of magnitude smaller than the Ra-226 dose. Furthermore, adding the Pb-210 dose contribution to the Ra-226 dose would increase the benchmark dose used to calculate cleanup goals under 10 CFR 40 Appendix A Criterion 6(6), which would result in larger DCGLs for other radionuclides (i.e., it would not be conservative).

Derived Concentration Guideline Limits (DCGLs)

Derived concentration guideline limits (DCGLs) were developed for the ROCs listed above, using the construction worker as the critical group and the benchmark dose (as per 10 CFR 40 Appendix A Criterion 6(6)) as the dose limit. The RESRAD input parameters used in the BRA for the construction worker were reviewed and updated as noted in Table 1, mainly by using the additional soil and subsurface characterization that occurred as part of the groundwater modeling (USACE 2007b). The resulting RESRAD run was examined for the times of peak dose (for total dose and doses from individual radionuclides) and dose-to-source ratios at those times were extracted from the RESRAD output into an excel file. The minimum DCGL (at time of peak dose per individual nuclide) was chosen as the DCGL for the FS.

To simplify the presentation of DCGLs as well as the resulting sampling and analysis that would be needed to plan for and verify remediation, a combined total uranium DCGL was calculated, and then the U-238 concentration was determined which could be used as a surrogate for the total uranium DCGL. This was done by combining the DCGLs for the uranium isotopes (U-234, U-235, and U-238) according to the ratio in which they occur naturally (1:0.046:1). Results for U-238 can then be used to substitute for total uranium by multiplying the total U DCGL by 0.489. In addition, the dose contributions from Ac-227 and Pa-231 were added to their parent radionuclide U-235 in order to allow these daughter nuclides to be accounted in the overall benchmark dose and DCGL, without necessitating that these nuclides be measured and evaluated in the SOR calculation to show benchmark dose compliance during remediation.

Therefore, only the DCGLs for Ra-226, Th-230, and U-238 will be used in the SOR calculation.

The DCGLs are

- 5 pCi/g Ra-226
- 18 pCi/g Th-230
- 115 pCi/g U-238

References

EPA 1990 (1994), *National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule (40 CFR Part 300)*, Federal Register, 55 (46):8666-8865 (March 8); http://ecfr.gpoaccess.gov/cgi/t/text/textidx?c=ecfr&tpl=/ecfrbrowse/Title40/40cfr300_main_02.tpl

USACE 2007a, *Baseline Risk Assessment for the Niagara Falls Storage Site,* prepared by Sciences Applications International Corporation for the Buffalo District

USACE 2007b, *Groundwater Flow and Contaminant Transport Modeling, Niagara Falls Storage Site*, prepared by HydroGeoLogic for the Buffalo District

USACE 2011, *Remedial Investigation Report Addendum Niagara Falls Storage Site, prepared by Sciences Applications International Corporation for the Buffalo District*

USACE 2013a, *Balance of Plant Operable Unit Field Investigation Niagara Falls Storage Site*, Lewiston NY, prepared by URS Group Inc. for the Buffalo District

USACE 2013b, *Applicable or Relevant and Appropriate Requirements for the Interim Waste Contaminant Structure Feasibility Study Technical Memorandum, Niagara Falls Storage Site* prepared by Sciences Applications International Corporation for the Buffalo District

Attachment 1: RESRAD Version History

RESRAD 6.5 (10/30/09):

- C-14 gaseous and particulate contributions to dose and risk available
- Partially or fully submerged contaminated zone now treated
- Choice between ICRP60 or FGR12 for External dose factors added
- 64-bit and Vista computers now supported

RESRAD 6.4 (12/20/07):

- Added ICRP 72 age-dependent DCFs
- Improved data storage and retrieval, user specified directories.
- User specified ground DCF's now possible.
- C-14 inhalation dose and risk improved.

RESRAD 6.3 (8/25/05):

- Added ICRP-38 radionuclides
- Allow variable half-life cutoff
- DCF Editor is now common between RESRAD and RESRAD-BUILD

RESRAD 6.22 (2/6/04):

- Added Tl-206 and Bi-210m

Attachment 2: RESRAD Summary Report for Construction Worker (surface soil)

Summary : NFSS FS BOP Construction Worker for DCGLs
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\NFSS_BOP_CONSTRUCTION.RAD

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Part I: Mixture Sums and Single Radionuclide Guidelines

Summary : NFSS FS BOP Construction Worker for DCGLs
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\NFSS_BOP_CONSTRUCTION.RAD

Dose Conversion Factor (and Related) Parameter Summary
Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	Ac-227 (Source: FGR 12)	4.951E-04	4.951E-04	DCF1(1)
A-1	At-218 (Source: FGR 12)	5.847E-03	5.847E-03	DCF1(2)
A-1	Bi-210 (Source: FGR 12)	3.606E-03	3.606E-03	DCF1(3)
A-1	Bi-211 (Source: FGR 12)	2.559E-01	2.559E-01	DCF1(4)
A-1	Bi-214 (Source: FGR 12)	9.808E+00	9.808E+00	DCF1(5)
A-1	Fr-223 (Source: FGR 12)	1.980E-01	1.980E-01	DCF1(6)
A-1	Pa-231 (Source: FGR 12)	1.906E-01	1.906E-01	DCF1(7)
A-1	Pa-234 (Source: FGR 12)	1.155E+01	1.155E+01	DCF1(8)
A-1	Pa-234m (Source: FGR 12)	8.967E-02	8.967E-02	DCF1(9)
A-1	Pb-210 (Source: FGR 12)	2.447E-03	2.447E-03	DCF1(10)
A-1	Pb-211 (Source: FGR 12)	3.064E-01	3.064E-01	DCF1(11)
A-1	Pb-214 (Source: FGR 12)	1.341E+00	1.341E+00	DCF1(12)
A-1	Po-210 (Source: FGR 12)	5.231E-05	5.231E-05	DCF1(13)
A-1	Po-211 (Source: FGR 12)	4.764E-02	4.764E-02	DCF1(14)
A-1	Po-214 (Source: FGR 12)	5.138E-04	5.138E-04	DCF1(15)
A-1	Po-215 (Source: FGR 12)	1.016E-03	1.016E-03	DCF1(16)
A-1	Po-218 (Source: FGR 12)	5.642E-05	5.642E-05	DCF1(17)
A-1	Ra-223 (Source: FGR 12)	6.034E-01	6.034E-01	DCF1(18)
A-1	Ra-226 (Source: FGR 12)	3.176E-02	3.176E-02	DCF1(19)
A-1	Rn-219 (Source: FGR 12)	3.083E-01	3.083E-01	DCF1(20)
A-1	Rn-222 (Source: FGR 12)	2.354E-03	2.354E-03	DCF1(21)
A-1	Th-227 (Source: FGR 12)	5.212E-01	5.212E-01	DCF1(22)
A-1	Th-230 (Source: FGR 12)	1.209E-03	1.209E-03	DCF1(23)
A-1	Th-231 (Source: FGR 12)	3.643E-02	3.643E-02	DCF1(24)
A-1	Th-234 (Source: FGR 12)	2.410E-02	2.410E-02	DCF1(25)
A-1	Tl-207 (Source: FGR 12)	1.980E-02	1.980E-02	DCF1(26)
A-1	Tl-210 (Source: no data)	0.000E+00	-2.000E+00	DCF1(27)
A-1	U-234 (Source: FGR 12)	4.017E-04	4.017E-04	DCF1(28)
A-1	U-235 (Source: FGR 12)	7.211E-01	7.211E-01	DCF1(29)
A-1	U-238 (Source: FGR 12)	1.031E-04	1.031E-04	DCF1(30)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(3)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(4)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(5)
B-1	U-234	1.320E-01	1.320E-01	DCF2(6)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(7)
B-1	U-238	1.180E-01	1.180E-01	DCF2(8)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(9)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(3)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(4)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(5)
D-1	U-234	2.830E-04	2.830E-04	DCF3(6)

Summary : NFSS FS BOP Construction Worker for DCGLs
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Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(7)
D-1	U-238	2.550E-04	2.550E-04	DCF3(8)
D-1	U-238+D	2.687E-04	2.550E-04	DCF3(9)
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	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34				
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(5,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(5,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(6,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(6,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(6,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(7,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(7,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(7,3)
D-34				
D-34	U-238 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(8,1)
D-34	U-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(8,2)
D-34	U-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(8,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)

Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(5,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(5,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(6,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(6,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(7,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(7,2)
D-5				
D-5	U-238 , fish	1.000E+01	1.000E+01	BIOFAC(8,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(8,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.
*Base Case means Default.Lib w/o Associate Nuclide contributions.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\NFSS_BOP_CONSTRUCTION.RAD

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+02	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.000E+00	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRACT
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	3.000E+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)	2.000E+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)	1.842E+03	0.000E+00	---	T(9)
R011	Times for calculations (yr)	1.000E+05	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	1.000E+00	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	1.000E+00	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	1.000E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	1.000E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Th-230	1.000E+00	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): U-234	1.000E+00	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): U-235	1.000E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): U-238	1.000E+00	0.000E+00	---	S1(8)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(8)
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)	1.200E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	6.000E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.500E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	3.050E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.010E+00	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	1.040E+01	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	4.500E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	7.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	8.130E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	3.130E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	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	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	1.500E+03	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.264E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231				
R016	Contaminated zone (cm**3/g)	1.500E+03	5.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.264E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	3.632E+04	1.000E+02	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.221E-06	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	2.710E+02	7.000E+01	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	6.988E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)

Summary : NFSS FS BOP Construction Worker for DCGLs
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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	1.000E+03	6.000E+04	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.896E-04	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.220E+02	5.000E+01	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.550E-03	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.220E+02	5.000E+01	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.550E-03	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	1.220E+02	5.000E+01	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.550E-03	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R017	Inhalation rate (m**3/yr)	7.300E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	6.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	1.000E+00	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	4.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.280E-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)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	1.752E+02	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	5.000E-02	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)

Summary : NFSS FS BOP Construction Worker for DCGLs
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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

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Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	100.00 square meters	Ac-227	1.000E+00
Thickness:	1.00 meters	Pa-231	1.000E+00
Cover Depth:	0.00 meters	Pb-210	1.000E+00
		Ra-226	1.000E+00
		Th-230	1.000E+00
		U-234	1.000E+00
		U-235	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)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	2.000E+02	3.000E+02	1.000E+03	1.842E+03	1.000E+05
TDOSE(t):	3.119E+00	3.117E+00	3.113E+00	3.101E+00	3.065E+00	2.787E+00	2.644E+00	1.944E+00	1.489E+00	0.000E+00
M(t):	1.247E-01	1.247E-01	1.245E-01	1.240E-01	1.226E-01	1.115E-01	1.058E-01	7.774E-02	5.957E-02	0.000E+00

Maximum TDOSE(t): 3.119E+00 mrem/yr at t = 0.000E+00 years

Summary : NFSS FS BOP Construction Worker for DCGLs
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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	3.653E-01	0.1171	2.948E-01	0.0945	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.817E-02	0.0187
Pa-231	4.087E-02	0.0131	6.174E-02	0.0198	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.327E-02	0.0139
Pb-210	1.119E-03	0.0004	1.018E-03	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.862E-02	0.0092
Ra-226	2.010E+00	0.6446	3.986E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.720E-03	0.0018
Th-230	6.644E-04	0.0002	1.452E-02	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.190E-03	0.0007
U-234	7.728E-05	0.0000	5.877E-03	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.130E-03	0.0004
U-235	1.424E-01	0.0457	5.477E-03	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.068E-03	0.0003
U-238	2.749E-02	0.0088	5.255E-03	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.073E-03	0.0003
Total	2.588E+00	0.8299	3.891E-01	0.1248	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.412E-01	0.0453

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.183E-01	0.2303
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.459E-01	0.0468
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.076E-02	0.0099
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.017E+00	0.6466
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.738E-02	0.0056
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.084E-03	0.0023
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.490E-01	0.0478
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.382E-02	0.0108
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	3.119E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\NFSS_BOP_CONSTRUCTION.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 Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	3.538E-01	0.1135	2.856E-01	0.0916	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.634E-02	0.0181
Pa-231	5.231E-02	0.0168	7.097E-02	0.0228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.509E-02	0.0145
Pb-210	1.085E-03	0.0003	9.864E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.774E-02	0.0089
Ra-226	2.008E+00	0.6443	4.293E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.589E-03	0.0021
Th-230	1.535E-03	0.0005	1.452E-02	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.192E-03	0.0007
U-234	7.717E-05	0.0000	5.868E-03	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.128E-03	0.0004
U-235	1.422E-01	0.0456	5.470E-03	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.067E-03	0.0003
U-238	2.745E-02	0.0088	5.247E-03	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.071E-03	0.0003
Total	2.587E+00	0.8299	3.891E-01	0.1248	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.412E-01	0.0453

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.957E-01	0.2232
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.684E-01	0.0540
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.981E-02	0.0096
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.015E+00	0.6465
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.825E-02	0.0059
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.073E-03	0.0023
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.487E-01	0.0477
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.377E-02	0.0108
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	3.117E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\NFSS_BOP_CONSTRUCTION.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 Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	3.319E-01	0.1066	2.679E-01	0.0860	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.285E-02	0.0170
Pa-231	7.412E-02	0.0238	8.856E-02	0.0284	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.855E-02	0.0156
Pb-210	1.019E-03	0.0003	9.270E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.607E-02	0.0084
Ra-226	2.004E+00	0.6436	4.877E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.245E-03	0.0026
Th-230	3.272E-03	0.0011	1.452E-02	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.198E-03	0.0007
U-234	7.697E-05	0.0000	5.850E-03	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.124E-03	0.0004
U-235	1.418E-01	0.0455	5.456E-03	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.066E-03	0.0003
U-238	2.737E-02	0.0088	5.231E-03	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.068E-03	0.0003
Total	2.583E+00	0.8297	3.889E-01	0.1249	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.412E-01	0.0453

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.527E-01	0.2096
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.112E-01	0.0678
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.802E-02	0.0090
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.012E+00	0.6464
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.998E-02	0.0064
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.051E-03	0.0023
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.483E-01	0.0476
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.366E-02	0.0108
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	3.113E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\NFSS_BOP_CONSTRUCTION.RAD

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

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	2.654E-01	0.0856	2.142E-01	0.0691	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.226E-02	0.0136
Pa-231	1.403E-01	0.0452	1.419E-01	0.0458	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.905E-02	0.0190
Pb-210	8.199E-04	0.0003	7.457E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.097E-02	0.0068
Ra-226	1.988E+00	0.6412	6.644E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.326E-02	0.0043
Th-230	9.315E-03	0.0030	1.450E-02	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.228E-03	0.0007
U-234	7.653E-05	0.0000	5.788E-03	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.112E-03	0.0004
U-235	1.403E-01	0.0452	5.414E-03	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.062E-03	0.0003
U-238	2.707E-02	0.0087	5.174E-03	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.056E-03	0.0003
Total	2.571E+00	0.8293	3.884E-01	0.1253	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.410E-01	0.0455

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.218E-01	0.1683
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.413E-01	0.1101
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.254E-02	0.0073
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.002E+00	0.6457
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.604E-02	0.0084
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.976E-03	0.0022
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.467E-01	0.0473
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.330E-02	0.0107
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	3.101E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\NFSS_BOP_CONSTRUCTION.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+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.400E-01	0.0457	1.130E-01	0.0369	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.230E-02	0.0073
Pa-231	2.645E-01	0.0863	2.421E-01	0.0790	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.872E-02	0.0257
Pb-210	4.403E-04	0.0001	4.004E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.126E-02	0.0037
Ra-226	1.944E+00	0.6343	9.904E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.255E-02	0.0074
Th-230	2.628E-02	0.0086	1.445E-02	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.378E-03	0.0008
U-234	7.736E-05	0.0000	5.613E-03	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.079E-03	0.0004
U-235	1.361E-01	0.0444	5.331E-03	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.059E-03	0.0003
U-238	2.625E-02	0.0086	5.017E-03	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.024E-03	0.0003
Total	2.538E+00	0.8280	3.869E-01	0.1262	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.404E-01	0.0458

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.754E-01	0.0898
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.853E-01	0.1910
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.210E-02	0.0039
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.967E+00	0.6419
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	4.310E-02	0.0141
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.769E-03	0.0022
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.425E-01	0.0465
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.229E-02	0.0105
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	3.065E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\NFSS_BOP_CONSTRUCTION.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 = 2.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	6.117E-04	0.0002	4.937E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.741E-05	0.0000
Pa-231	3.940E-01	0.1414	3.459E-01	0.1241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.843E-02	0.0353
Pb-210	2.231E-06	0.0000	2.029E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.707E-05	0.0000
Ra-226	1.604E+00	0.5755	1.158E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.818E-02	0.0101
Th-230	1.534E-01	0.0550	1.405E-02	0.0050	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.395E-03	0.0016
U-234	1.873E-04	0.0001	4.330E-03	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.331E-04	0.0003
U-235	1.057E-01	0.0379	5.145E-03	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.117E-03	0.0004
U-238	2.017E-02	0.0072	3.857E-03	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.871E-04	0.0003
Total	2.278E+00	0.8174	3.750E-01	0.1345	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.339E-01	0.0480

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 2.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.203E-03	0.0004
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.384E-01	0.3008
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.133E-05	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.633E+00	0.5861
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.719E-01	0.0617
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.350E-03	0.0019
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.120E-01	0.0402
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.481E-02	0.0089
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.787E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\NFSS_BOP_CONSTRUCTION.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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	2.503E-05	0.0000	2.020E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.986E-06	0.0000
Pa-231	3.888E-01	0.1471	3.413E-01	0.1291	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.708E-02	0.0367
Pb-210	9.962E-08	0.0000	9.061E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.548E-06	0.0000
Ra-226	1.432E+00	0.5417	1.036E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.521E-02	0.0095
Th-230	2.154E-01	0.0815	1.383E-02	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.453E-03	0.0021
U-234	3.154E-04	0.0001	3.719E-03	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.174E-04	0.0003
U-235	9.132E-02	0.0345	5.080E-03	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.148E-03	0.0004
U-238	1.727E-02	0.0065	3.304E-03	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.743E-04	0.0003
Total	2.145E+00	0.8114	3.683E-01	0.1393	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.303E-01	0.0493

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.922E-05	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.272E-01	0.3129
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.738E-06	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.459E+00	0.5516
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.347E-01	0.0888
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.752E-03	0.0018
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	9.755E-02	0.0369
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.125E-02	0.0080
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.644E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\NFSS_BOP_CONSTRUCTION.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+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	4.808E-15	0.0000	3.880E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.656E-16	0.0000
Pa-231	3.507E-01	0.1804	3.078E-01	0.1584	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.756E-02	0.0451
Pb-210	3.527E-17	0.0000	3.208E-17	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.022E-16	0.0000
Ra-226	6.484E-01	0.3336	4.689E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.142E-02	0.0059
Th-230	4.650E-01	0.2392	1.223E-02	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.632E-03	0.0050
U-234	1.582E-03	0.0008	1.304E-03	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.738E-04	0.0001
U-235	3.417E-02	0.0176	4.621E-03	0.0024	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.214E-03	0.0006
U-238	5.837E-03	0.0030	1.119E-03	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.284E-04	0.0001
Total	1.506E+00	0.7747	3.276E-01	0.1685	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.103E-01	0.0568

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.454E-15	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	7.461E-01	0.3839
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.695E-16	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.603E-01	0.3397
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	4.868E-01	0.2505
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.160E-03	0.0016
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.000E-02	0.0206
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.185E-03	0.0037
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	1.944E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\NFSS_BOP_CONSTRUCTION.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 = 1.842E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	9.871E-27	0.0000	7.967E-27	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.572E-27	0.0000
Pa-231	3.097E-01	0.2080	2.719E-01	0.1826	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.733E-02	0.0519
Pb-210	1.511E-28	0.0000	1.374E-28	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.865E-27	0.0000
Ra-226	2.499E-01	0.1678	1.808E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.401E-03	0.0030
Th-230	5.319E-01	0.3572	1.045E-02	0.0070	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.059E-02	0.0071
U-234	2.617E-03	0.0018	3.998E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.182E-04	0.0001
U-235	1.250E-02	0.0084	4.096E-03	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.138E-03	0.0008
U-238	1.586E-03	0.0011	3.043E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.215E-05	0.0000
Total	1.108E+00	0.7442	2.873E-01	0.1929	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.364E-02	0.0629

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.842E+03 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.941E-26	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	6.589E-01	0.4425
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.153E-27	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.545E-01	0.1709
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.529E-01	0.3713
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.135E-03	0.0021
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.774E-02	0.0119
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.952E-03	0.0013
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	1.489E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\NFSS_BOP_CONSTRUCTION.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+05 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
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-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+05 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
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-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
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Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	2.000E+02	3.000E+02	1.000E+03	1.842E+03	1.000E+05
Ac-227+D	Ac-227+D	1.000E+00	7.183E-01	6.957E-01	6.527E-01	5.218E-01	2.754E-01	1.203E-03	4.922E-05	9.454E-15	1.941E-26	0.000E+00
Pa-231	Pa-231	1.000E+00	1.344E-01	1.344E-01	1.343E-01	1.342E-01	1.338E-01	1.305E-01	1.286E-01	1.160E-01	1.024E-01	0.000E+00
Pa-231	Ac-227+D	1.000E+00	1.149E-02	3.400E-02	7.689E-02	2.071E-01	4.515E-01	7.079E-01	6.986E-01	6.301E-01	5.565E-01	0.000E+00
Pa-231	∑DSR(j)		1.459E-01	1.684E-01	2.112E-01	3.413E-01	5.853E-01	8.384E-01	8.272E-01	7.461E-01	6.589E-01	0.000E+00
Pb-210+D	Pb-210+D	1.000E+00	3.076E-02	2.981E-02	2.802E-02	2.254E-02	1.210E-02	6.133E-05	2.738E-06	9.695E-16	4.153E-27	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	2.016E+00	2.014E+00	2.009E+00	1.993E+00	1.949E+00	1.608E+00	1.435E+00	6.499E-01	2.505E-01	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	4.803E-04	1.420E-03	3.212E-03	8.643E-03	1.875E-02	2.577E-02	2.306E-02	1.044E-02	4.026E-03	0.000E+00
Ra-226+D	∑DSR(j)		2.017E+00	2.015E+00	2.012E+00	2.002E+00	1.967E+00	1.633E+00	1.459E+00	6.603E-01	2.545E-01	0.000E+00
Th-230	Th-230	1.000E+00	1.694E-02	1.694E-02	1.693E-02	1.691E-02	1.684E-02	1.628E-02	1.596E-02	1.389E-02	1.175E-02	0.000E+00
Th-230	Ra-226+D	1.000E+00	4.367E-04	1.309E-03	3.051E-03	9.112E-03	2.612E-02	1.536E-01	2.157E-01	4.658E-01	5.329E-01	0.000E+00
Th-230	Pb-210+D	1.000E+00	6.954E-08	4.823E-07	2.497E-06	2.077E-05	1.440E-04	2.031E-03	3.038E-03	7.112E-03	8.249E-03	0.000E+00
Th-230	∑DSR(j)		1.738E-02	1.825E-02	1.998E-02	2.604E-02	4.310E-02	1.719E-01	2.347E-01	4.868E-01	5.529E-01	0.000E+00
U-234	U-234	1.000E+00	7.084E-03	7.073E-03	7.051E-03	6.974E-03	6.761E-03	5.193E-03	4.446E-03	1.499E-03	4.056E-04	0.000E+00
U-234	Th-230	1.000E+00	7.621E-08	2.285E-07	5.322E-07	1.587E-06	4.530E-06	2.573E-05	3.547E-05	6.851E-05	7.168E-05	0.000E+00
U-234	Ra-226+D	1.000E+00	1.310E-09	9.163E-09	4.835E-08	4.296E-07	3.554E-06	1.306E-04	2.670E-04	1.568E-03	2.618E-03	0.000E+00
U-234	Pb-210+D	1.000E+00	1.567E-13	2.334E-12	2.679E-11	6.708E-10	1.403E-08	1.509E-06	3.426E-06	2.339E-05	4.015E-05	0.000E+00
U-234	∑DSR(j)		7.084E-03	7.073E-03	7.051E-03	6.976E-03	6.769E-03	5.350E-03	4.752E-03	3.160E-03	3.135E-03	0.000E+00
U-235+D	U-235+D	1.000E+00	1.490E-01	1.487E-01	1.483E-01	1.467E-01	1.422E-01	1.093E-01	9.358E-02	3.162E-02	8.575E-03	0.000E+00
U-235+D	Pa-231	1.000E+00	1.421E-06	4.260E-06	9.923E-06	2.959E-05	8.452E-05	4.825E-04	6.671E-04	1.319E-03	1.428E-03	0.000E+00
U-235+D	Ac-227+D	1.000E+00	8.125E-08	5.634E-07	2.914E-06	2.417E-05	1.663E-04	2.251E-03	3.306E-03	7.062E-03	7.733E-03	0.000E+00
U-235+D	∑DSR(j)		1.490E-01	1.487E-01	1.483E-01	1.467E-01	1.425E-01	1.120E-01	9.755E-02	4.000E-02	1.774E-02	0.000E+00
U-238	U-238	5.400E-05	3.398E-07	3.393E-07	3.382E-07	3.346E-07	3.243E-07	2.492E-07	2.134E-07	7.213E-08	1.956E-08	0.000E+00
U-238+D	U-238+D	9.999E-01	3.382E-02	3.377E-02	3.366E-02	3.330E-02	3.228E-02	2.481E-02	2.124E-02	7.179E-03	1.947E-03	0.000E+00
U-238+D	U-234	9.999E-01	1.004E-08	3.007E-08	6.995E-08	2.076E-07	5.846E-07	2.952E-06	3.789E-06	4.259E-06	2.124E-06	0.000E+00
U-238+D	Th-230	9.999E-01	7.200E-14	5.035E-13	2.656E-12	2.358E-11	1.945E-10	6.984E-09	1.409E-08	7.593E-08	1.165E-07	0.000E+00
U-238+D	Ra-226+D	9.999E-01	9.283E-16	1.391E-14	1.620E-13	4.262E-12	1.020E-10	2.402E-08	7.249E-08	1.268E-06	3.377E-06	0.000E+00
U-238+D	Pb-210+D	9.999E-01	8.893E-20	2.740E-18	6.811E-17	5.074E-15	3.151E-13	2.465E-10	8.524E-10	1.842E-08	5.119E-08	0.000E+00
U-238+D	∑DSR(j)		3.382E-02	3.377E-02	3.366E-02	3.330E-02	3.229E-02	2.481E-02	2.125E-02	7.185E-03	1.952E-03	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Summary : NFSS FS BOP Construction Worker for DCGLs
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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	2.000E+02	3.000E+02	1.000E+03	1.842E+03	1.000E+05
Ac-227	3.480E+01	3.593E+01	3.830E+01	4.791E+01	9.079E+01	2.079E+04	5.080E+05	*7.232E+13	*7.232E+13	*7.232E+13
Pa-231	1.714E+02	1.485E+02	1.184E+02	7.326E+01	4.271E+01	2.982E+01	3.022E+01	3.351E+01	3.794E+01	*4.723E+10
Pb-210	8.129E+02	8.385E+02	8.923E+02	1.109E+03	2.066E+03	4.077E+05	9.129E+06	*7.634E+13	*7.634E+13	*7.634E+13
Ra-226	1.240E+01	1.241E+01	1.242E+01	1.249E+01	1.271E+01	1.531E+01	1.714E+01	3.786E+01	9.822E+01	*9.885E+11
Th-230	1.439E+03	1.370E+03	1.251E+03	9.601E+02	5.800E+02	1.455E+02	1.065E+02	5.135E+01	4.521E+01	*2.018E+10
U-234	3.529E+03	3.535E+03	3.545E+03	3.583E+03	3.693E+03	4.673E+03	5.261E+03	7.913E+03	7.974E+03	*6.247E+09
U-235	1.678E+02	1.681E+02	1.686E+02	1.704E+02	1.755E+02	2.232E+02	2.563E+02	6.249E+02	1.409E+03	*2.161E+06
U-238	7.392E+02	7.403E+02	7.426E+02	7.507E+02	7.743E+02	1.008E+03	1.177E+03	3.480E+03	1.280E+04	*3.361E+05

*At specific activity limit

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

Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Ac-227	1.000E+00	0.000E+00	7.183E-01	3.480E+01	7.183E-01	3.480E+01
Pa-231	1.000E+00	163.3 ± 0.3	8.402E-01	2.975E+01	1.459E-01	1.714E+02
Pb-210	1.000E+00	0.000E+00	3.076E-02	8.129E+02	3.076E-02	8.129E+02
Ra-226	1.000E+00	0.000E+00	2.017E+00	1.240E+01	2.017E+00	1.240E+01
Th-230	1.000E+00	1846 ± 4	5.529E-01	4.521E+01	1.738E-02	1.439E+03
U-234	1.000E+00	0.000E+00	7.084E-03	3.529E+03	7.084E-03	3.529E+03
U-235	1.000E+00	0.000E+00	1.490E-01	1.678E+02	1.490E-01	1.678E+02
U-238	1.000E+00	0.000E+00	3.382E-02	7.392E+02	3.382E-02	7.392E+02

Summary : NFSS FS BOP Construction Worker for DCGLs
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Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide	Parent	THF(i)	DOSE(j,t), mrem/yr									
(j)	(i)		t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	2.000E+02	3.000E+02	1.000E+03	1.842E+03	1.000E+05
Ac-227	Ac-227	1.000E+00	7.183E-01	6.957E-01	6.527E-01	5.218E-01	2.754E-01	1.203E-03	4.922E-05	9.454E-15	1.941E-26	0.000E+00
Ac-227	Pa-231	1.000E+00	1.149E-02	3.400E-02	7.689E-02	2.071E-01	4.515E-01	7.079E-01	6.986E-01	6.301E-01	5.565E-01	0.000E+00
Ac-227	U-235	1.000E+00	8.125E-08	5.634E-07	2.914E-06	2.417E-05	1.663E-04	2.251E-03	3.306E-03	7.062E-03	7.733E-03	0.000E+00
Ac-227	∑DOSE(j)		7.298E-01	7.297E-01	7.296E-01	7.289E-01	7.271E-01	7.113E-01	7.020E-01	6.372E-01	5.642E-01	0.000E+00
Pa-231	Pa-231	1.000E+00	1.344E-01	1.344E-01	1.343E-01	1.342E-01	1.338E-01	1.305E-01	1.286E-01	1.160E-01	1.024E-01	0.000E+00
Pa-231	U-235	1.000E+00	1.421E-06	4.260E-06	9.923E-06	2.959E-05	8.452E-05	4.825E-04	6.671E-04	1.319E-03	1.428E-03	0.000E+00
Pa-231	∑DOSE(j)		1.344E-01	1.344E-01	1.343E-01	1.342E-01	1.339E-01	1.310E-01	1.292E-01	1.173E-01	1.038E-01	0.000E+00
Pb-210	Pb-210	1.000E+00	3.076E-02	2.981E-02	2.802E-02	2.254E-02	1.210E-02	6.133E-05	2.738E-06	9.695E-16	4.153E-27	0.000E+00
Pb-210	Ra-226	1.000E+00	4.803E-04	1.420E-03	3.212E-03	8.643E-03	1.875E-02	2.577E-02	2.306E-02	1.044E-02	4.026E-03	0.000E+00
Pb-210	Th-230	1.000E+00	6.954E-08	4.823E-07	2.497E-06	2.077E-05	1.440E-04	2.031E-03	3.038E-03	7.112E-03	8.249E-03	0.000E+00
Pb-210	U-234	1.000E+00	1.567E-13	2.334E-12	2.679E-11	6.708E-10	1.403E-08	1.509E-06	3.426E-06	2.339E-05	4.015E-05	0.000E+00
Pb-210	U-238	9.999E-01	8.893E-20	2.740E-18	6.811E-17	5.074E-15	3.151E-13	2.465E-10	8.524E-10	1.842E-08	5.119E-08	0.000E+00
Pb-210	∑DOSE(j)		3.124E-02	3.123E-02	3.123E-02	3.120E-02	3.100E-02	2.786E-02	2.611E-02	1.758E-02	1.231E-02	0.000E+00
Ra-226	Ra-226	1.000E+00	2.016E+00	2.014E+00	2.009E+00	1.993E+00	1.949E+00	1.608E+00	1.435E+00	6.499E-01	2.505E-01	0.000E+00
Ra-226	Th-230	1.000E+00	4.367E-04	1.309E-03	3.051E-03	9.112E-03	2.612E-02	1.536E-01	2.157E-01	4.658E-01	5.329E-01	0.000E+00
Ra-226	U-234	1.000E+00	1.310E-09	9.163E-09	4.835E-08	4.296E-07	3.554E-06	1.306E-04	2.670E-04	1.568E-03	2.618E-03	0.000E+00
Ra-226	U-238	9.999E-01	9.283E-16	1.391E-14	1.620E-13	4.262E-12	1.020E-10	2.402E-08	7.249E-08	1.268E-06	3.377E-06	0.000E+00
Ra-226	∑DOSE(j)		2.016E+00	2.015E+00	2.012E+00	2.002E+00	1.975E+00	1.761E+00	1.651E+00	1.117E+00	7.861E-01	0.000E+00
Th-230	Th-230	1.000E+00	1.694E-02	1.694E-02	1.693E-02	1.691E-02	1.684E-02	1.628E-02	1.596E-02	1.389E-02	1.175E-02	0.000E+00
Th-230	U-234	1.000E+00	7.621E-08	2.285E-07	5.322E-07	1.587E-06	4.530E-06	2.573E-05	3.547E-05	6.851E-05	7.168E-05	0.000E+00
Th-230	U-238	9.999E-01	7.200E-14	5.035E-13	2.656E-12	2.358E-11	1.945E-10	6.984E-09	1.409E-08	7.593E-08	1.165E-07	0.000E+00
Th-230	∑DOSE(j)		1.694E-02	1.694E-02	1.693E-02	1.691E-02	1.685E-02	1.631E-02	1.600E-02	1.396E-02	1.182E-02	0.000E+00
U-234	U-234	1.000E+00	7.084E-03	7.073E-03	7.051E-03	6.974E-03	6.761E-03	5.193E-03	4.446E-03	1.499E-03	4.056E-04	0.000E+00
U-234	U-238	9.999E-01	1.004E-08	3.007E-08	6.995E-08	2.076E-07	5.846E-07	2.952E-06	3.789E-06	4.259E-06	2.124E-06	0.000E+00
U-234	∑DOSE(j)		7.084E-03	7.073E-03	7.051E-03	6.975E-03	6.762E-03	5.196E-03	4.450E-03	1.504E-03	4.077E-04	0.000E+00
U-235	U-235	1.000E+00	1.490E-01	1.487E-01	1.483E-01	1.467E-01	1.422E-01	1.093E-01	9.358E-02	3.162E-02	8.575E-03	0.000E+00
U-238	U-238	5.400E-05	3.398E-07	3.393E-07	3.382E-07	3.346E-07	3.243E-07	2.492E-07	2.134E-07	7.213E-08	1.956E-08	0.000E+00
U-238	U-238	9.999E-01	3.382E-02	3.377E-02	3.366E-02	3.330E-02	3.228E-02	2.481E-02	2.124E-02	7.179E-03	1.947E-03	0.000E+00
U-238	∑DOSE(j)		3.382E-02	3.377E-02	3.366E-02	3.330E-02	3.229E-02	2.481E-02	2.125E-02	7.179E-03	1.947E-03	0.000E+00

THF(i) is the thread fraction of the parent nuclide.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : C:\RESRAD_FAMILY\RESRAD\6.5\USERFILES\NFSS_BOP_CONSTRUCTION.RAD

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	2.000E+02	3.000E+02	1.000E+03	1.842E+03	1.000E+05
Ac-227	Ac-227	1.000E+00	1.000E+00	9.685E-01	9.086E-01	7.264E-01	3.833E-01	1.674E-03	6.851E-05	1.316E-14	2.702E-26	0.000E+00
Ac-227	Pa-231	1.000E+00	0.000E+00	3.133E-02	9.105E-02	2.723E-01	6.127E-01	9.699E-01	9.573E-01	8.634E-01	7.625E-01	3.911E-07
Ac-227	U-235	1.000E+00	0.000E+00	3.330E-07	2.931E-06	3.018E-05	2.216E-04	3.076E-03	4.523E-03	9.674E-03	1.060E-02	5.900E-09
Ac-227	∑S(j):		1.000E+00	9.999E-01	9.996E-01	9.987E-01	9.962E-01	9.746E-01	9.619E-01	8.731E-01	7.731E-01	3.970E-07
Pa-231	Pa-231	1.000E+00	1.000E+00	9.999E-01	9.996E-01	9.985E-01	9.956E-01	9.709E-01	9.567E-01	8.628E-01	7.620E-01	3.908E-07
Pa-231	U-235	1.000E+00	0.000E+00	2.114E-05	6.331E-05	2.098E-04	6.188E-04	3.583E-03	4.957E-03	9.815E-03	1.063E-02	5.896E-09
Pa-231	∑S(j):		1.000E+00	9.999E-01	9.996E-01	9.987E-01	9.962E-01	9.745E-01	9.617E-01	8.726E-01	7.726E-01	3.967E-07
Pb-210	Pb-210	1.000E+00	1.000E+00	9.694E-01	9.110E-01	7.328E-01	3.935E-01	1.994E-03	8.904E-05	3.152E-14	1.350E-25	0.000E+00
Pb-210	Ra-226	1.000E+00	0.000E+00	3.059E-02	8.888E-02	2.656E-01	5.947E-01	8.253E-01	7.387E-01	3.345E-01	1.290E-01	0.000E+00
Pb-210	Th-230	1.000E+00	0.000E+00	6.661E-06	5.868E-05	6.059E-04	4.480E-03	6.486E-02	9.711E-02	2.277E-01	2.641E-01	1.111E-09
Pb-210	U-234	1.000E+00	0.000E+00	2.003E-11	5.318E-10	1.859E-08	4.290E-07	4.807E-05	1.093E-04	7.484E-04	1.285E-03	7.384E-12
Pb-210	U-238	9.999E-01	0.000E+00	1.422E-17	1.135E-15	1.335E-13	9.468E-12	7.829E-09	2.715E-08	5.891E-07	1.638E-06	1.549E-14
Pb-210	∑S(j):		1.000E+00	1.000E+00	9.999E-01	9.990E-01	9.926E-01	8.922E-01	8.360E-01	5.629E-01	3.943E-01	1.118E-09
Ra-226	Ra-226	1.000E+00	1.000E+00	9.989E-01	9.966E-01	9.887E-01	9.666E-01	7.974E-01	7.120E-01	3.224E-01	1.243E-01	0.000E+00
Ra-226	Th-230	1.000E+00	0.000E+00	4.329E-04	1.297E-03	4.303E-03	1.274E-02	7.596E-02	1.068E-01	2.309E-01	2.642E-01	1.104E-09
Ra-226	U-234	1.000E+00	0.000E+00	1.948E-09	1.750E-08	1.931E-07	1.705E-06	6.446E-05	1.320E-04	7.771E-04	1.298E-03	7.338E-12
Ra-226	U-238	9.999E-01	0.000E+00	1.840E-15	4.958E-14	1.822E-12	4.812E-11	1.182E-08	3.578E-08	6.281E-07	1.674E-06	1.539E-14
Ra-226	∑S(j):		1.000E+00	9.993E-01	9.979E-01	9.930E-01	9.794E-01	8.734E-01	8.190E-01	5.540E-01	3.898E-01	1.111E-09
Th-230	Th-230	1.000E+00	1.000E+00	9.998E-01	9.994E-01	9.980E-01	9.941E-01	9.611E-01	9.422E-01	8.199E-01	6.937E-01	2.379E-09
Th-230	U-234	1.000E+00	0.000E+00	8.994E-06	2.693E-05	8.923E-05	2.631E-04	1.516E-03	2.091E-03	4.043E-03	4.231E-03	1.581E-11
Th-230	U-238	9.999E-01	0.000E+00	1.275E-11	1.145E-10	1.262E-09	1.111E-08	4.104E-07	8.293E-07	4.479E-06	6.878E-06	3.317E-14
Th-230	∑S(j):		1.000E+00	9.998E-01	9.994E-01	9.981E-01	9.943E-01	9.626E-01	9.443E-01	8.240E-01	6.979E-01	2.394E-09
U-234	U-234	1.000E+00	1.000E+00	9.984E-01	9.954E-01	9.846E-01	9.545E-01	7.330E-01	6.276E-01	2.117E-01	5.726E-02	0.000E+00
U-234	U-238	9.999E-01	0.000E+00	2.830E-06	8.465E-06	2.791E-05	8.118E-05	4.157E-04	5.340E-04	6.009E-04	2.998E-04	0.000E+00
U-234	∑S(j):		1.000E+00	9.985E-01	9.954E-01	9.846E-01	9.546E-01	7.335E-01	6.282E-01	2.123E-01	5.756E-02	0.000E+00
U-235	U-235	1.000E+00	1.000E+00	9.985E-01	9.954E-01	9.846E-01	9.546E-01	7.335E-01	6.282E-01	2.123E-01	5.756E-02	0.000E+00
U-238	U-238	5.400E-05	5.400E-05	5.392E-05	5.375E-05	5.317E-05	5.155E-05	3.961E-05	3.392E-05	1.146E-05	3.108E-06	0.000E+00
U-238	U-238	9.999E-01	9.999E-01	9.984E-01	9.953E-01	9.846E-01	9.545E-01	7.334E-01	6.281E-01	2.123E-01	5.756E-02	0.000E+00
U-238	∑S(j):		1.000E+00	9.985E-01	9.954E-01	9.846E-01	9.546E-01	7.335E-01	6.282E-01	2.123E-01	5.756E-02	0.000E+00

THF(i) is the thread fraction of the parent nuclide.

RESCALC.EXE execution time = 1.28 seconds

Table 1. RESRAD Input Parameter Values for Derivation of Guideline Concentration Levels (Cleanup Goals)

RESRAD Parameter	Units	Value	Receptor	Comment/Reference
Area of contaminated zone	m^2	100	All	Use 100 m2 for 10CFR40 Appendix A compliance
Thickness of contaminated zone	m	1	Al1	Most contamination is within the top 3 feet
Length parallel to aquifer flow	m	10	All	10 m would be more appropriate if the area is reduced to 100 m2
Does the initial contamination penetrate the water table?	yes/no	No	All	Majority of contamination (at least for primary radionuclide Ra-226) is surficial
Contaminated fraction below the water table	unitless	NU	All	Only needed if initial contamination penetrates the water table
Time since placement of material	yr	0	All	RESRAD default
Cover depth	m	0	All	Assumes no cover
Density of cover material	g/cm^3	NU	All	Not used
Cover depth erosion rate	m/yr	NU	All	Not used
Density of contaminated zone	g/cm^3	1.2	All	Consistent with HGL (USACE 2007) Table 4.6 for tower soil and clay soil type
Contaminated zone erosion rate	m/yr	0.00006	All others	2% slope with no farming/gardening (DCH)
Contaminated zone total porosity	unitless	0.45	All	Site-wide value consistent with sandy silty clay (DCH)
Contaminated zone field capacity	unitless	0.305	All	HELP V3 Manual, Table 2 (1994)
Contaminated zone hydraulic conductivity	m/yr	1.01	All	Value for upper clay till, 3.2E-06 cm/sec (USACE HGL 2007 Table 2.5)
Contaminated zone b parameter	unitless	10.4	All	Assumed for silty/sandy clay per DCH, Table 13.1 (brown clay layer has silty sand lenses)
Average annual wind speed	m/sec	4.5	All	NOAA average for Lewiston, NY (10 mph)
Humidity in air	g/m^3	NU	All	Not used
Evapotranspiration coefficient	unitless	0.700	All	Per DCH equation 12.1 assuming 0.533 m/yr evapotranspiration from measured value (HGL Table 2.8)
Precipitation	m/yr	0.813	All	Measured value (32 in/yr from USACE HGL 2007 table 2.8)
Irrigation	m/yr	0.2	All	RESRAD default
Irrigation mode	unitless	Overhead	All	RESRAD default
Runoff coefficient	unitless	0.313	All	Site-specific value: (precip. rate - evapotranspiration rate - infiltration rate) ÷ precip. rate or (0.813 - 0.533 - 0.0254) ÷ 0.813; inputs derived from HGL Table 2.8
Watershed area for nearby stream or pond	m^2	2.7E+09	Resident only	Oak Orchard-Twelve Mile watershed (1040 sq. miles)
Accuracy for water/soil computations	unitless	0.001	Resident only	RESRAD default
Saturated zone density	g/cm^3	1.52	Resident only	Sandy, silty clay (NLO/HGL); sand value selected (DCH)
Saturated zone total porosity	unitless	0.395	Resident only	Sandy, silty clay (NLO/HGL); sand value selected (DCH)
Saturated zone effective porosity	unitless	0.30	Resident only	Sandy, silty clay (NLO/HGL); sand value selected (SEF 2006)

Table 1. RESRAD Input Parameter Values for Derivation of Guideline Concentration Levels (Cleanup Goals)

RESRAD Parameter	Units	Value	Receptor	Comment/Reference
Saturated zone field capacity	unitless	0.062	Resident only	HELP V3 Manual, sand (1994)
Saturated zone hydraulic conductivity	m/yr	315	Resident only	Assumed value for sand at 1.0E-03 cm/sec; within range of K-values for BCT/SL in HGL Table 2.4; also consistent with literature values for sand (e.g., HELP)
Saturated zone hydraulic gradient	unitless	0.005	Resident only	Assigned based on HGL Figs. 2.27 and 2.28 and EU-13 (USACE 2007)
Saturated zone b parameter	unitless	4.05	Resident only	Sandy, silty clay (NLO/HGL), sand value selected (DCH)
Water table drop rate	m/yr	0.001	Resident only	RESRAD default
Well pump intake depth (m below water table)	m	4	Resident only	Upper water bearing zone depth (USACE HGL 2007)
Model: Nondispersion (ND) or Mass-Balance (MB)	unitless	ND	Resident only	RESRAD default
Well pumping rate	m^3/yr	250	Resident only	RESRAD default
Number of unsaturated zone strata	unitless	1	Resident only	RESRAD default
Unsaturated zone thickness	m	0.9	Resident only	Specific to EU-13 (USACE HGL 2007)
Unsaturated zone soil density	g/cm^3	1.7	Resident only	Specific to EU-13 (USACE HGL 2007)
Unsaturated zone total porosity	unitless	0.37	Resident only	Specific to EU-13 (USACE HGL 2007)
Unsaturated zone effective porosity	unitless	0.08	Resident only	Value from table 4.7 for BCT (USACE HGL 2007)
Unsaturated zone field capacity	unitless	0.305	Resident only	Value from HGL Table 4.7 for BCT
Unsaturated zone b parameter	unitless	10.4	Resident only	Value from DCH Table 13.1 assuming silty clay (NLO/HGL)
Unsaturated zone hydraulic conductivity	m/yr	1.01	Resident only	Value for upper clay till, 3.2E-06 cm/sec (HGL, Table 2.5)
Distribution coefficient – actinium	cm^3/g	1,500	All	Site-wide measured value (USACE HGL 2007, App. D Table 2)
Distribution coefficient – protactinium	cm^3/g	1,500	All	Site-wide measured value (USACE HGL 2007, App. D Table 2)
Distribution coefficient – lead	cm^3/g	36,321	All	Site-wide measured value (USACE HGL 2007, App. D Table 2)
Distribution coefficient – radium	cm^3/g	271	All	Site-wide measured value (USACE HGL 2007, App. D Table 2)
Distribution coefficient – thorium	cm^3/g	1,000	All	Site-wide measured value (USACE HGL 2007, App. D Table 2)
Distribution coefficient – uranium	cm^3/g	122	All	Calculated from site soil/groundwater data; reasonable lower limit (USACE HGL 2011)
Inhalation rate	m^3/yr	7,300	Workers	Assuming RAGS default rate of 20 m^3/day for workers (industrial and construction)
Mass Loading for Inhalation	kg/m^3	6E-04 1E-04	Construction Worker Industrial Worker	Assumed for construction activities (DCH) RESRAD default
Shielding factor, inhalation	unitless	0.4	All	RESRAD default.
Shielding factor, external gamma	unitless	0.4	All	60% shielding per SSG-2000 for all indoor receptors.
Fraction of time spent outdoors (on site soil)	unitless	0.228 0.0285	Construction Worker Industrial Worker	Assumes a supervisor type worker (8 hr/day, 250 days/year) Assumes 1 hour/day, 250 days/year

Table 1. RESRAD Input Parameter Values for Derivation of Guideline Concentration Levels (Cleanup Goals)

RESRAD Parameter	Units	Value	Receptor	Comment/Reference
Fraction of time spent indoors	unitless	0	Construction Worker	All work performed outside
		0.200	Industrial Worker	Assumes 7 hours/day, 250 days/year
Shape factor flag, external gamma	unitless	1	All	RESRAD default
Fruits, vegetables and grain consumption	kg/yr	NU	Worker	Not used
Leafy vegetable consumption	kg/yr	NU	Worker	Not used
Milk consumption	L/yr	NU	Worker	Not used
Meat and poultry consumption	kg/yr	NU	Worker	Not used
Fish consumption	kg/yr	NU	All	Not used
Other seafood consumption	kg/yr	NU	All	Not used
Soil ingestion rate	g/yr	175.2	ConstructionWorker	480 mg/day for RME assuming outdoor summer activities (EFH 1997, Table 4-16, no activity-specific updates for adults were made in the 2011 version of the EFH).
		18.25	Industrial Worker	50 mg/day EFH 2011 recommended value for adults
Drinking water intake	L/yr	NU	Worker	Not used
Contamination fraction of drinking water	unitless	NU	Worker	RESRAD default, where applicable
Contamination fraction of household water	unitless	NU	Worker	RESRAD default, where applicable
Contamination fraction of livestock water	unitless	NU	Worker	RESRAD default, where applicable
Contamination fraction of irrigation water	unitless	NU	Worker	RESRAD default
				RESRAD default
Contamination fraction of aquatic food	unitless	NU	All	Not used
Contamination fraction of plant food	unitless	NU	Worker	Not used
Contamination fraction of meat	unitless	NU	Worker	Not used
Contamination fraction of milk	unitless	NU	Worker	Not used
Livestock fodder intake for meat	kg/day	NU	Worker	Not used
Livestock fodder intake for milk	kg/day	NU	Worker	Not used
Livestock water intake for meat	L/day	NU	Worker	Not used
Livestock water intake for milk	L/day	NU	Worker	Not used
Livestock soil intake	kg/day	NU	Worker	Not used
Mass loading for foliar deposition	g/m^3	NU	Worker	Not used
Depth of soil mixing layer	m	0.05	All others	Assumed for non-gardening/non-tilling scenarios
Depth of roots	m	0.9	All *	RESRAD default
Drinking water fraction from ground water	unitless	NU	Worker	Not used
Household water fraction from ground water	unitless	NU	Worker	Not used

Table 1. RESRAD Input Parameter Values for Derivation of Guideline Concentration Levels (Cleanup Goals)

RESRAD Parameter	Units	Value	Receptor	Comment/Reference
Livestock water fraction from ground water	unitless	NU	Worker	Not used
Irrigation fraction from ground water	unitless	NU	Worker	Not used
Wet weight crop yield for non-leafy	kg/m^2	NU	Worker	Not used
Wet weight crop yield for leafy	kg/m^2	NU	Worker	Not used
Wet weight crop yield for fodder	kg/m^2	NU	Worker	Not used
Growing season for non-leafy	years	NU	Worker	Not used
Growing season for leafy	years	NU	Worker	Not used
Growing season for fodder	years	NU	Worker	Not used
Translocation factor for non-leafy	unitless	NU	Worker	Not used
Translocation factor for leafy	unitless	NU	Worker	Not used
Translocation factor for fodder	unitless	NU	Worker	Not used
Dry foliar interception fraction for non-leafy	unitless	NU	Worker	Not used
Dry foliar interception fraction for leafy	unitless	NU	Worker	Not used
Dry foliar interception fraction for fodder	unitless	NU	Worker	Not used
Wet foliar interception fraction for non-leafy	unitless	NU	Worker	Not used
Wet foliar interception fraction for leafy	unitless	NU	Worker	Not used
Wet foliar interception fraction for fodder	unitless	NU	Worker	Not used
Weathering removal constant for vegetation	unitless	NU	Worker	Not used
Storage time: fruits, non-leafy vegetables, and grain	days	NU	Worker	Not used
Storage time: leafy vegetables	days	NU	Worker	Not used
Storage time: milk	days	NU	Worker	Not used
Storage time: meat and poultry	days	NU	Worker	Not used
Storage time: fish	days	NU	Worker	Not used
Storage time: crustacea and mollusks	days	NU	Worker	Not used
Storage time: well water	days	NU	Worker	Not used
Storage time: surface water	days	NU	Worker	Not used
Storage time: livestock fodder	days	NU	Worker	Not used
Thickness of building foundation	m	NU	All	Not used
Bulk density of building foundation	g/cm^3	NU	All	Not used
Total porosity of the cover material	unitless	NU	All	Not used
Total porosity of the building foundation	unitless	NU	All	Not used
Volumetric water constant of the cover material	unitless	NU	All	Not used

Table 1. RESRAD Input Parameter Values for Derivation of Guideline Concentration Levels (Cleanup Goals)

RESRAD Parameter	Units	Value	Receptor	Comment/Reference
Volumetric water constant of the foundation	unitless	NU	All	Not used
Diffusion coef. for radon gas in cover material	m/sec	NU	All	Not used
Diffusion coef. for radon gas in foundation material	m/sec	NU	All	Not used
Diffusion coef. for radon gas in contaminated zone soil	m/sec	NU	All	Not used
Radon vertical dimension of mixing	m	NU	All	Not used
Average building air exchange rate	1/hour	NU	All	Not used
Height of the building (room)	m	NU	All	Not used
Building interior area factor	unitless	NU	All	Not used
Building depth below ground surface	m	NU	All	Not used
Emanating power of Rn-222 gas	unitless	NU	All	Not used
Emanating power of Rn-220 gas	unitless	NU	All	Not used
Pathway – external gamma	unitless	Active	All	Assumed complete for all receptors
Pathway – inhalation (w/o radon)	unitless	Active	All	Assumed complete for all receptors
Pathway – plant ingestion	unitless	Inactive	Worker	Assumed incomplete for all other receptors
Pathway – meat ingestion	unitless	Inactive	Worker	Assumed incomplete for all other receptors
Pathway – milk ingestion	unitless	Inactive	Worker	Assumed incomplete for all other receptors
Pathway – aquatic foods	unitless	Inactive	All	Assumed incomplete for all receptors
Pathway – drinking water	unitless	Inactive	Worker	Assumed incomplete for all other receptors
Pathway – soil ingestion	unitless	Active	All	Assumed complete for all receptors
Pathway – radon	unitless	Inactive	All	Inactive for all receptors

Other Assumptions, Notes, References, and Abbreviations

* Not used for some receptors when pathway is incomplete. Value can still be entered in RESRAD for all receptor whether eventually used or not.
DCH = Data Collection Handbook (ANL 1993)
EFH = Exposure Factors Handbook (EPA 1997)
RAGS = Risk Assessment Guidance for Superfund, specifically Volume 1 Part B (EPA 1991)
RME = reasonable maximum exposure
SSG-1996 = Soil Screening Guidance: User's Guide (EPA 1996)
SSG-2000 = Soil Screening Guidance for Radionuclides: Technical Background Document (EPA 2000)
NU = not used

Table 2. Derived Concentration Guideline Levels for NFSS BOP FS

Radionuclide / units	**DSR year 0** (mrem/year)/ (pCi/g)	**DCGL year 0** pCi/g	**DSR year 1000** (mrem/year)/ (pCi/g)	**DCGL year 1000** pCi/g	**DSR year 1844** (mrem/year)/ (pCi/g)	**DCGL year 1844** pCi/g	**DCGL for FS** pCi/g
Ac-227	7.18E-01	1.4E+01	9.45E-15	1.1E+15	1.94E-26	5.2E+26	14
Pa-231	1.46E-01	6.9E+01	7.46E-01	1.4E+01	6.59E-01	1.5E+01	14
Pb-210	3.08E-02	3.3E+02	9.70E-16	1.0E+16	4.15E-27	2.4E+27	328
Ra-226	2.02E+00	5.0E+00	6.60E-01	1.5E+01	2.55E-01	4.0E+01	**5**
Th-230	1.74E-02	5.8E+02	4.87E-01	2.1E+01	5.53E-01	1.8E+01	**18**
U-234	7.08E-03	1.4E+03	3.16E-03	3.2E+03	3.14E-03	3.2E+03	1424
U-235	1.49E-01	6.8E+01	4.00E-02	2.5E+02	1.77E-02	5.7E+02	68
U-238	3.38E-02	3.0E+02	7.19E-03	1.4E+03	1.95E-03	5.2E+03	298
Total U*		4.32E+02		1.69E+03		3.50E+03	432
U-238 as total U surrogate		2.11E+02		8.28E+02		1.71E+03	211
U-235 with Ac, Pa contributions	1.01E+00	1.0E+01	7.86E-01	1.3E+01	6.77E-01	1.5E+01	10
Total U with Ac,Pa		2.36E+02		4.44E+02		5.70E+02	236
U-238 as total U surrogate		1.15E+02		2.17E+02		2.79E+02	**115**

Benchmark dose is 10 mrem/year
DSR Dose to source ratio (amount of radiological dose per unit activity of radionuclide)
DCGL Derived concentration guideline level (preliminary remediation goal)

*Total U assumes that the uranium isotopes exist in their natural abundance, i.e., U-234:U-235:U-238 assumed to be 1:0.046:1
Bolded radionuclides will be included in the SOR calculation.

The DCGLs will be applied incrementally to average background concentrations of radionuclides, and will be applied at all soil depths.

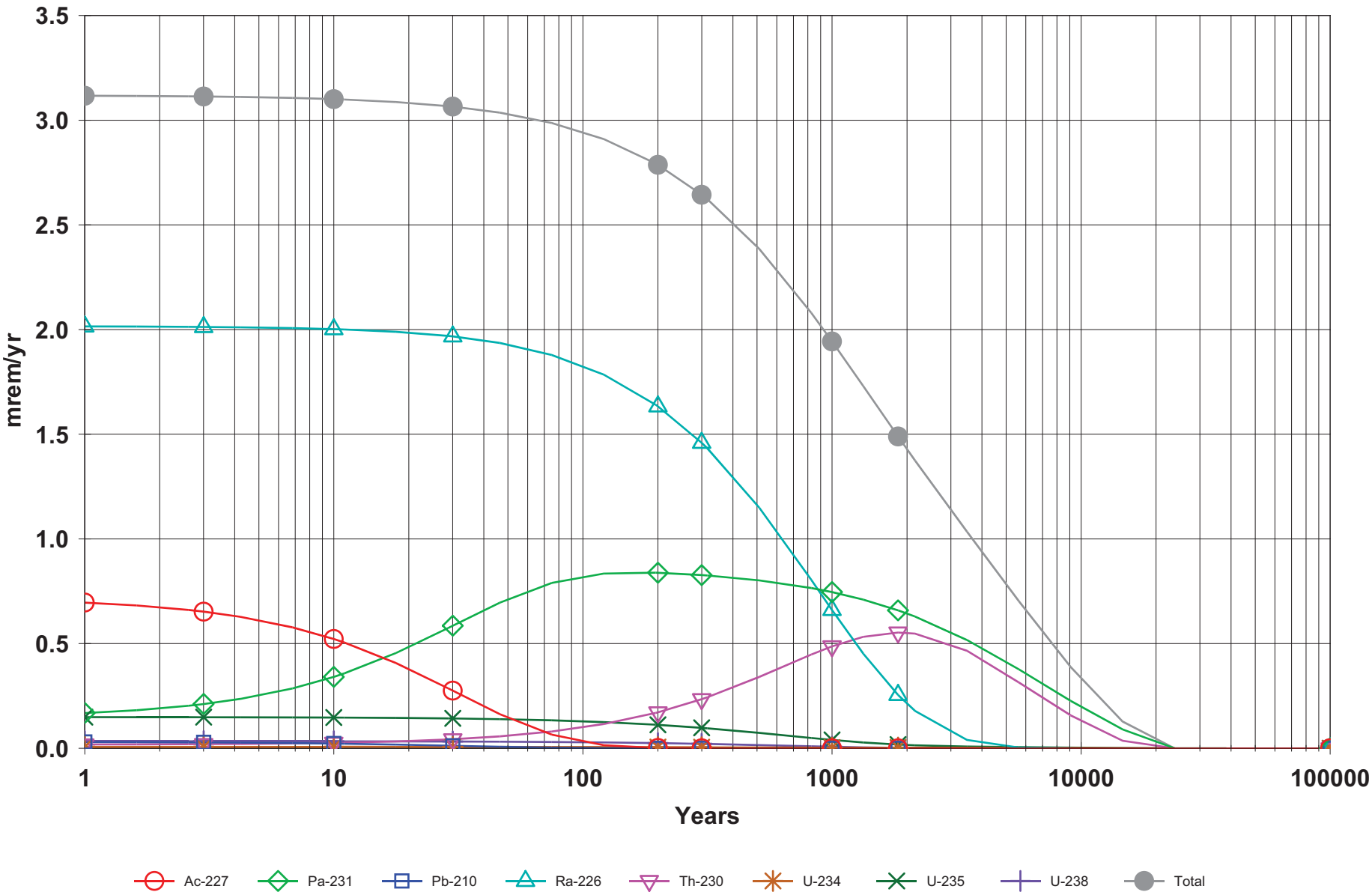

FIGURE 1 Construction Worker Dose-to-Source Ratios for Soil DCGLs

Attachment 3: RESRAD Summary Report for Construction Worker (subsurface soil)

Summary : NFSS FS BOP Construction Worker for DCGLs
File : K:\NFSSP\BOP FIELD INVESTIGATION\BOP DCGLS\NFSS_BOP_CONST_100M2_COVER.RAD

Table of Contents

Part I: Mixture Sums and Single Radionuclide Guidelines

Summary : NFSS FS BOP Construction Worker for DCGLs
File : K:\NFSSP\BOP FIELD INVESTIGATION\BOP DCGLS\NFSS_BOP_CONST_100M2_COVER.RAD

Dose Conversion Factor (and Related) Parameter Summary
Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	Ac-227 (Source: FGR 12)	4.951E-04	4.951E-04	DCF1(1)
A-1	At-218 (Source: FGR 12)	5.847E-03	5.847E-03	DCF1(2)
A-1	Bi-210 (Source: FGR 12)	3.606E-03	3.606E-03	DCF1(3)
A-1	Bi-211 (Source: FGR 12)	2.559E-01	2.559E-01	DCF1(4)
A-1	Bi-214 (Source: FGR 12)	9.808E+00	9.808E+00	DCF1(5)
A-1	Fr-223 (Source: FGR 12)	1.980E-01	1.980E-01	DCF1(6)
A-1	Pa-231 (Source: FGR 12)	1.906E-01	1.906E-01	DCF1(7)
A-1	Pa-234 (Source: FGR 12)	1.155E+01	1.155E+01	DCF1(8)
A-1	Pa-234m (Source: FGR 12)	8.967E-02	8.967E-02	DCF1(9)
A-1	Pb-210 (Source: FGR 12)	2.447E-03	2.447E-03	DCF1(10)
A-1	Pb-211 (Source: FGR 12)	3.064E-01	3.064E-01	DCF1(11)
A-1	Pb-214 (Source: FGR 12)	1.341E+00	1.341E+00	DCF1(12)
A-1	Po-210 (Source: FGR 12)	5.231E-05	5.231E-05	DCF1(13)
A-1	Po-211 (Source: FGR 12)	4.764E-02	4.764E-02	DCF1(14)
A-1	Po-214 (Source: FGR 12)	5.138E-04	5.138E-04	DCF1(15)
A-1	Po-215 (Source: FGR 12)	1.016E-03	1.016E-03	DCF1(16)
A-1	Po-218 (Source: FGR 12)	5.642E-05	5.642E-05	DCF1(17)
A-1	Ra-223 (Source: FGR 12)	6.034E-01	6.034E-01	DCF1(18)
A-1	Ra-226 (Source: FGR 12)	3.176E-02	3.176E-02	DCF1(19)
A-1	Rn-219 (Source: FGR 12)	3.083E-01	3.083E-01	DCF1(20)
A-1	Rn-222 (Source: FGR 12)	2.354E-03	2.354E-03	DCF1(21)
A-1	Th-227 (Source: FGR 12)	5.212E-01	5.212E-01	DCF1(22)
A-1	Th-230 (Source: FGR 12)	1.209E-03	1.209E-03	DCF1(23)
A-1	Th-231 (Source: FGR 12)	3.643E-02	3.643E-02	DCF1(24)
A-1	Th-234 (Source: FGR 12)	2.410E-02	2.410E-02	DCF1(25)
A-1	Tl-207 (Source: FGR 12)	1.980E-02	1.980E-02	DCF1(26)
A-1	Tl-210 (Source: no data)	0.000E+00	-2.000E+00	DCF1(27)
A-1	U-234 (Source: FGR 12)	4.017E-04	4.017E-04	DCF1(28)
A-1	U-235 (Source: FGR 12)	7.211E-01	7.211E-01	DCF1(29)
A-1	U-238 (Source: FGR 12)	1.031E-04	1.031E-04	DCF1(30)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(3)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(4)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(5)
B-1	U-234	1.320E-01	1.320E-01	DCF2(6)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(7)
B-1	U-238	1.180E-01	1.180E-01	DCF2(8)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(9)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(3)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(4)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(5)
D-1	U-234	2.830E-04	2.830E-04	DCF3(6)

Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(7)
D-1	U-238	2.550E-04	2.550E-04	DCF3(8)
D-1	U-238+D	2.687E-04	2.550E-04	DCF3(9)
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	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34				
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(5,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(5,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(6,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(6,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(6,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(7,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(7,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(7,3)
D-34				
D-34	U-238 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(8,1)
D-34	U-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(8,2)
D-34	U-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(8,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)

Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(5,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(5,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(6,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(6,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(7,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(7,2)
D-5				
D-5	U-238 , fish	1.000E+01	1.000E+01	BIOFAC(8,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(8,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.
*Base Case means Default.Lib w/o Associate Nuclide contributions.

Summary : NFSS FS BOP Construction Worker for DCGLs
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Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+02	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.000E+00	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRACT
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	3.000E+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)	2.000E+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)	1.846E+03	0.000E+00	---	T(9)
R011	Times for calculations (yr)	1.000E+05	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	1.000E+00	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	1.000E+00	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	1.000E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	1.000E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Th-230	1.000E+00	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): U-234	1.000E+00	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): U-235	1.000E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): U-238	1.000E+00	0.000E+00	---	S1(8)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(8)
R013	Cover depth (m)	1.500E-01	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	1.500E+00	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.200E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	6.000E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.500E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	3.050E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.010E+00	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	1.040E+01	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	4.500E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	7.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	8.130E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	3.130E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	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	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	1.500E+03	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.264E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231				
R016	Contaminated zone (cm**3/g)	1.500E+03	5.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.264E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	3.632E+04	1.000E+02	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.221E-06	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	2.710E+02	7.000E+01	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	6.988E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	1.000E+03	6.000E+04	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.896E-04	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	1.220E+02	5.000E+01	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.550E-03	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	1.220E+02	5.000E+01	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.550E-03	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	1.220E+02	5.000E+01	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.550E-03	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R017	Inhalation rate (m**3/yr)	7.300E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	6.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	1.000E+00	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	4.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.280E-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)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	1.752E+02	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	5.000E-02	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS

Summary : NFSS FS BOP Construction Worker for DCGLs
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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

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

Summary : NFSS FS BOP Construction Worker for DCGLs
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Contaminated Zone Dimensions

Area:	100.00 square meters
Thickness:	1.00 meters
Cover Depth:	0.15 meters

Initial Soil Concentrations, pCi/g

Ac-227	1.000E+00
Pa-231	1.000E+00
Pb-210	1.000E+00
Ra-226	1.000E+00
Th-230	1.000E+00
U-234	1.000E+00
U-235	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)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	2.000E+02	3.000E+02	1.000E+03	1.846E+03	1.000E+05
TDOSE(t):	4.486E-01	4.537E-01	4.641E-01	5.024E-01	6.314E-01	2.787E+00	2.644E+00	1.944E+00	1.488E+00	0.000E+00
M(t):	1.794E-02	1.815E-02	1.856E-02	2.010E-02	2.526E-02	1.115E-01	1.058E-01	7.774E-02	5.950E-02	0.000E+00

Maximum TDOSE(t): 2.874E+00 mrem/yr at t = 148.7 ± 0.3 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.487E+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.
Ac-227	3.154E-03	0.0011	2.503E-03	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.939E-04	0.0002
Pa-231	3.946E-01	0.1373	3.409E-01	0.1186	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.719E-02	0.0338
Pb-210	1.066E-05	0.0000	9.838E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.767E-04	0.0001
Ra-226	1.716E+00	0.5970	1.199E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.916E-02	0.0101
Th-230	1.192E-01	0.0415	1.394E-02	0.0049	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.733E-03	0.0013
U-234	1.286E-04	0.0000	4.607E-03	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.858E-04	0.0003
U-235	1.132E-01	0.0394	5.096E-03	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.080E-03	0.0004
U-238	2.191E-02	0.0076	4.108E-03	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.385E-04	0.0003
Total	2.368E+00	0.8239	3.724E-01	0.1296	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.337E-01	0.0465

Summary : NFSS FS BOP Construction Worker for DCGLs
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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.487E+02 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.151E-03	0.0021
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.327E-01	0.2897
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.972E-04	0.0001
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.746E+00	0.6076
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.369E-01	0.0476
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.622E-03	0.0020
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.194E-01	0.0415
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.686E-02	0.0093
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.874E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : K:\NFSSP\BOP FIELD INVESTIGATION\BOP DCGLS\NFSS_BOP_CONST_100M2_COVER.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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	3.110E-02	0.0693	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	3.497E-03	0.0078	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	3.705E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	4.032E-01	0.8989	0.000E+00	0.0000	0.000E+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	9.111E-05	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	8.539E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	7.033E-03	0.0157	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	3.575E-03	0.0080	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	4.486E-01	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.110E-02	0.0693
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.497E-03	0.0078
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.705E-05	0.0001
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.032E-01	0.8989
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.111E-05	0.0002
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.539E-07	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	7.033E-03	0.0157
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.575E-03	0.0080
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	4.486E-01	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	3.064E-02	0.0675	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	4.548E-03	0.0100	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	3.663E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	4.074E-01	0.8980	0.000E+00	0.0000	0.000E+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	2.688E-04	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	8.794E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	7.170E-03	0.0158	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	3.618E-03	0.0080	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	4.537E-01	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.064E-02	0.0675
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.548E-03	0.0100
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.663E-05	0.0001
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.074E-01	0.8980
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.688E-04	0.0006
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.794E-07	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	7.170E-03	0.0158
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.618E-03	0.0080
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	4.537E-01	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : K:\NFSSP\BOP FIELD INVESTIGATION\BOP DCGLS\NFSS_BOP_CONST_100M2_COVER.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 Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	2.974E-02	0.0641	0.000E+00	0.0000	0.000E+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	6.662E-03	0.0144	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	3.580E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	4.158E-01	0.8961	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	6.356E-04	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	9.373E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	7.452E-03	0.0161	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	3.706E-03	0.0080	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	4.641E-01	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.974E-02	0.0641
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.662E-03	0.0144
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.580E-05	0.0001
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.158E-01	0.8961
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.356E-04	0.0014
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.373E-07	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	7.452E-03	0.0161
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.706E-03	0.0080
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	4.641E-01	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : K:\NFSSP\BOP FIELD INVESTIGATION\BOP DCGLS\NFSS_BOP_CONST_100M2_COVER.RAD

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

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	2.679E-02	0.0533	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	1.419E-02	0.0283	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	3.306E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	4.468E-01	0.8893	0.000E+00	0.0000	0.000E+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	2.047E-03	0.0041	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	1.221E-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
U-235	8.530E-03	0.0170	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	4.032E-03	0.0080	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	5.024E-01	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.679E-02	0.0533
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.419E-02	0.0283
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.306E-05	0.0001
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.468E-01	0.8893
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.047E-03	0.0041
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.221E-06	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	8.530E-03	0.0170
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	4.032E-03	0.0080
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.024E-01	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : K:\NFSSP\BOP FIELD INVESTIGATION\BOP DCGLS\NFSS_BOP_CONST_100M2_COVER.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+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	1.990E-02	0.0315	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	3.766E-02	0.0596	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	2.634E-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
Ra-226	5.488E-01	0.8691	0.000E+00	0.0000	0.000E+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	7.363E-03	0.0117	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	2.954E-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
U-235	1.256E-02	0.0199	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	5.136E-03	0.0081	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	6.314E-01	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.990E-02	0.0315
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.766E-02	0.0596
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.634E-05	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.488E-01	0.8691
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.363E-03	0.0117
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.954E-06	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	1.256E-02	0.0199
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.136E-03	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	6.314E-01	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : K:\NFSSP\BOP FIELD INVESTIGATION\BOP DCGLS\NFSS_BOP_CONST_100M2_COVER.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 = 2.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	6.117E-04	0.0002	4.937E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.741E-05	0.0000
Pa-231	3.940E-01	0.1414	3.459E-01	0.1241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.843E-02	0.0353
Pb-210	2.231E-06	0.0000	2.029E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.707E-05	0.0000
Ra-226	1.604E+00	0.5755	1.158E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.818E-02	0.0101
Th-230	1.534E-01	0.0550	1.405E-02	0.0050	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.395E-03	0.0016
U-234	1.873E-04	0.0001	4.330E-03	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.331E-04	0.0003
U-235	1.057E-01	0.0379	5.145E-03	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.117E-03	0.0004
U-238	2.017E-02	0.0072	3.857E-03	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.871E-04	0.0003
Total	2.278E+00	0.8174	3.750E-01	0.1345	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.339E-01	0.0480

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 2.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.203E-03	0.0004
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.384E-01	0.3008
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.133E-05	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.633E+00	0.5861
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.719E-01	0.0617
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.350E-03	0.0019
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.120E-01	0.0402
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.481E-02	0.0089
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.787E+00	1.0000

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	2.503E-05	0.0000	2.020E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.986E-06	0.0000
Pa-231	3.888E-01	0.1471	3.413E-01	0.1291	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.708E-02	0.0367
Pb-210	9.962E-08	0.0000	9.061E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.548E-06	0.0000
Ra-226	1.432E+00	0.5417	1.036E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.521E-02	0.0095
Th-230	2.154E-01	0.0815	1.383E-02	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.453E-03	0.0021
U-234	3.154E-04	0.0001	3.719E-03	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.174E-04	0.0003
U-235	9.132E-02	0.0345	5.080E-03	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.148E-03	0.0004
U-238	1.727E-02	0.0065	3.304E-03	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.743E-04	0.0003
Total	2.145E+00	0.8114	3.683E-01	0.1393	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.303E-01	0.0493

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.922E-05	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.272E-01	0.3129
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.738E-06	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.459E+00	0.5516
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.347E-01	0.0888
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.752E-03	0.0018
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	9.755E-02	0.0369
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.125E-02	0.0080
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.644E+00	1.0000

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	4.808E-15	0.0000	3.880E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.656E-16	0.0000
Pa-231	3.507E-01	0.1804	3.078E-01	0.1584	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.756E-02	0.0451
Pb-210	3.527E-17	0.0000	3.208E-17	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.022E-16	0.0000
Ra-226	6.484E-01	0.3336	4.689E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.142E-02	0.0059
Th-230	4.650E-01	0.2392	1.223E-02	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.632E-03	0.0050
U-234	1.582E-03	0.0008	1.304E-03	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.738E-04	0.0001
U-235	3.417E-02	0.0176	4.621E-03	0.0024	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.214E-03	0.0006
U-238	5.837E-03	0.0030	1.119E-03	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.284E-04	0.0001
Total	1.506E+00	0.7747	3.276E-01	0.1685	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.103E-01	0.0568

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.454E-15	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	7.461E-01	0.3839
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.695E-16	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.603E-01	0.3397
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	4.868E-01	0.2505
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.160E-03	0.0016
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.000E-02	0.0206
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.185E-03	0.0037
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	1.944E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : K:\NFSSP\BOP FIELD INVESTIGATION\BOP DCGLS\NFSS_BOP_CONST_100M2_COVER.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 = 1.846E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	8.687E-27	0.0000	7.011E-27	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.383E-27	0.0000
Pa-231	3.095E-01	0.2081	2.717E-01	0.1827	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.729E-02	0.0520
Pb-210	1.334E-28	0.0000	1.214E-28	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.413E-27	0.0000
Ra-226	2.488E-01	0.1673	1.799E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.381E-03	0.0029
Th-230	5.319E-01	0.3576	1.044E-02	0.0070	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.059E-02	0.0071
U-234	2.620E-03	0.0018	3.977E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.178E-04	0.0001
U-235	1.245E-02	0.0084	4.093E-03	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.137E-03	0.0008
U-238	1.576E-03	0.0011	3.025E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.176E-05	0.0000
Total	1.107E+00	0.7441	2.871E-01	0.1930	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.357E-02	0.0629

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.846E+03 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.708E-26	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	6.585E-01	0.4427
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.668E-27	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.534E-01	0.1703
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.529E-01	0.3717
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.136E-03	0.0021
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.768E-02	0.0119
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.940E-03	0.0013
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	1.488E+00	1.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : K:\NFSSP\BOP FIELD INVESTIGATION\BOP DCGLS\NFSS_BOP_CONST_100M2_COVER.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+05 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
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-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+05 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
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-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : K:\NFSSP\BOP FIELD INVESTIGATION\BOP DCGLS\NFSS_BOP_CONST_100M2_COVER.RAD

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

Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	2.000E+02	3.000E+02	1.000E+03	1.846E+03	1.000E+05
Ac-227+D	Ac-227+D	1.000E+00	3.110E-02	3.064E-02	2.974E-02	2.679E-02	1.990E-02	1.203E-03	4.922E-05	9.454E-15	1.708E-26	0.000E+00
Pa-231	Pa-231	1.000E+00	2.998E-03	3.050E-03	3.157E-03	3.561E-03	5.025E-03	1.305E-01	1.286E-01	1.160E-01	1.023E-01	0.000E+00
Pa-231	Ac-227+D	1.000E+00	4.991E-04	1.499E-03	3.505E-03	1.063E-02	3.263E-02	7.079E-01	6.986E-01	6.301E-01	5.562E-01	0.000E+00
Pa-231	∑DSR(j)		3.497E-03	4.548E-03	6.662E-03	1.419E-02	3.766E-02	8.384E-01	8.272E-01	7.461E-01	6.585E-01	0.000E+00
Pb-210+D	Pb-210+D	1.000E+00	3.705E-05	3.663E-05	3.580E-05	3.306E-05	2.634E-05	6.133E-05	2.738E-06	9.695E-16	3.668E-27	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	4.032E-01	4.074E-01	4.158E-01	4.468E-01	5.487E-01	1.608E+00	1.435E+00	6.499E-01	2.494E-01	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	5.805E-07	1.747E-06	4.107E-06	1.268E-05	4.081E-05	2.577E-02	2.306E-02	1.044E-02	4.007E-03	0.000E+00
Ra-226+D	∑DSR(j)		4.032E-01	4.074E-01	4.158E-01	4.468E-01	5.488E-01	1.633E+00	1.459E+00	6.603E-01	2.534E-01	0.000E+00
Th-230	Th-230	1.000E+00	3.590E-06	3.692E-06	3.903E-06	4.743E-06	8.279E-06	1.628E-02	1.596E-02	1.389E-02	1.174E-02	0.000E+00
Th-230	Ra-226+D	1.000E+00	8.752E-05	2.651E-04	6.317E-04	2.042E-03	7.355E-03	1.536E-01	2.157E-01	4.658E-01	5.330E-01	0.000E+00
Th-230	Pb-210+D	1.000E+00	8.419E-11	5.939E-10	3.194E-09	3.048E-08	3.134E-07	2.031E-03	3.038E-03	7.112E-03	8.250E-03	0.000E+00
Th-230	∑DSR(j)		9.111E-05	2.688E-04	6.356E-04	2.047E-03	7.363E-03	1.719E-01	2.347E-01	4.868E-01	5.529E-01	0.000E+00
U-234	U-234	1.000E+00	8.536E-07	8.775E-07	9.272E-07	1.124E-06	1.951E-06	5.193E-03	4.446E-03	1.499E-03	4.031E-04	0.000E+00
U-234	Th-230	1.000E+00	1.623E-11	4.987E-11	1.228E-10	4.453E-10	2.227E-09	2.573E-05	3.547E-05	6.851E-05	7.165E-05	0.000E+00
U-234	Ra-226+D	1.000E+00	2.628E-10	1.856E-09	1.001E-08	9.630E-08	1.001E-06	1.306E-04	2.670E-04	1.568E-03	2.621E-03	0.000E+00
U-234	Pb-210+D	1.000E+00	1.899E-16	2.876E-15	3.429E-14	9.845E-13	3.054E-11	1.509E-06	3.426E-06	2.339E-05	4.020E-05	0.000E+00
U-234	∑DSR(j)		8.539E-07	8.794E-07	9.373E-07	1.221E-06	2.954E-06	5.350E-03	4.752E-03	3.160E-03	3.136E-03	0.000E+00
U-235+D	U-235+D	1.000E+00	7.033E-03	7.170E-03	7.452E-03	8.528E-03	1.254E-02	1.093E-01	9.358E-02	3.162E-02	8.522E-03	0.000E+00
U-235+D	Pa-231	1.000E+00	3.179E-08	9.678E-08	2.333E-07	7.854E-07	3.175E-06	4.825E-04	6.671E-04	1.319E-03	1.428E-03	0.000E+00
U-235+D	Ac-227+D	1.000E+00	3.533E-09	2.486E-08	1.329E-07	1.241E-06	1.202E-05	2.251E-03	3.306E-03	7.062E-03	7.733E-03	0.000E+00
U-235+D	∑DSR(j)		7.033E-03	7.170E-03	7.452E-03	8.530E-03	1.256E-02	1.120E-01	9.755E-02	4.000E-02	1.768E-02	0.000E+00
U-238	U-238	5.400E-05	3.268E-14	3.481E-14	3.948E-14	6.134E-14	2.160E-13	2.492E-07	2.134E-07	7.213E-08	1.944E-08	0.000E+00
U-238+D	U-238+D	9.999E-01	3.575E-03	3.618E-03	3.706E-03	4.032E-03	5.136E-03	2.481E-02	2.124E-02	7.179E-03	1.935E-03	0.000E+00
U-238+D	U-234	9.999E-01	1.216E-12	3.737E-12	9.205E-12	3.348E-11	1.687E-10	2.952E-06	3.789E-06	4.259E-06	2.116E-06	0.000E+00
U-238+D	Th-230	9.999E-01	1.537E-17	1.101E-16	6.131E-16	6.617E-15	9.562E-14	6.984E-09	1.409E-08	7.593E-08	1.166E-07	0.000E+00
U-238+D	Ra-226+D	9.999E-01	1.863E-16	2.819E-15	3.355E-14	9.556E-13	2.872E-11	2.402E-08	7.249E-08	1.268E-06	3.386E-06	0.000E+00
U-238+D	Pb-210+D	9.999E-01	1.078E-22	3.379E-21	8.720E-20	7.447E-18	6.859E-16	2.465E-10	8.524E-10	1.842E-08	5.133E-08	0.000E+00
U-238+D	∑DSR(j)		3.575E-03	3.618E-03	3.706E-03	4.032E-03	5.136E-03	2.481E-02	2.125E-02	7.185E-03	1.940E-03	0.000E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : K:\NFSSP\BOP FIELD INVESTIGATION\BOP DCGLS\NFSS_BOP_CONST_100M2_COVER.RAD

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	2.000E+02	3.000E+02	1.000E+03	1.846E+03	1.000E+05
Ac-227	8.038E+02	8.159E+02	8.406E+02	9.332E+02	1.256E+03	2.079E+04	5.080E+05	*7.232E+13	*7.232E+13	*7.232E+13
Pa-231	7.150E+03	5.496E+03	3.753E+03	1.761E+03	6.639E+02	2.982E+01	3.022E+01	3.351E+01	3.796E+01	*4.723E+10
Pb-210	6.747E+05	6.825E+05	6.982E+05	7.562E+05	9.492E+05	4.077E+05	9.129E+06	*7.634E+13	*7.634E+13	*7.634E+13
Ra-226	6.200E+01	6.136E+01	6.012E+01	5.596E+01	4.556E+01	1.531E+01	1.714E+01	3.786E+01	9.867E+01	*9.885E+11
Th-230	2.744E+05	9.302E+04	3.933E+04	1.221E+04	3.395E+03	1.455E+02	1.065E+02	5.135E+01	4.521E+01	*2.018E+10
U-234	2.928E+07	2.843E+07	2.667E+07	2.047E+07	8.464E+06	4.673E+03	5.261E+03	7.912E+03	7.972E+03	*6.247E+09
U-235	3.555E+03	3.487E+03	3.355E+03	2.931E+03	1.991E+03	2.232E+02	2.563E+02	6.249E+02	1.414E+03	*2.161E+06
U-238	6.993E+03	6.910E+03	6.746E+03	6.201E+03	4.868E+03	1.008E+03	1.177E+03	3.480E+03	1.288E+04	*3.361E+05

*At specific activity limit

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 148.7 ± 0.3 years

Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Ac-227	1.000E+00	0.000E+00	3.110E-02	8.038E+02	6.151E-03	4.065E+03
Pa-231	1.000E+00	163.2 ± 0.3	8.402E-01	2.975E+01	8.327E-01	3.002E+01
Pb-210	1.000E+00	131.6 ± 0.3	3.280E-04	7.622E+04	2.972E-04	8.413E+04
Ra-226	1.000E+00	148.4 ± 0.3	1.748E+00	1.430E+01	1.746E+00	1.432E+01
Th-230	1.000E+00	1846 ± 4	5.529E-01	4.521E+01	1.369E-01	1.827E+02
U-234	1.000E+00	150.0 ± 0.3	5.710E-03	4.378E+03	5.622E-03	4.447E+03
U-235	1.000E+00	149.8 ± 0.3	1.201E-01	2.081E+02	1.194E-01	2.095E+02
U-238	1.000E+00	148.9 ± 0.3	2.686E-02	9.308E+02	2.686E-02	9.309E+02

Summary : NFSS FS BOP Construction Worker for DCGLs
File : K:\NFSSP\BOP FIELD INVESTIGATION\BOP DCGLS\NFSS_BOP_CONST_100M2_COVER.RAD

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

Nuclide	Parent	THF(i)	DOSE(j,t), mrem/yr									
(j)	(i)		t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	2.000E+02	3.000E+02	1.000E+03	1.846E+03	1.000E+05
Ac-227	Ac-227	1.000E+00	3.110E-02	3.064E-02	2.974E-02	2.679E-02	1.990E-02	1.203E-03	4.922E-05	9.454E-15	1.708E-26	0.000E+00
Ac-227	Pa-231	1.000E+00	4.991E-04	1.499E-03	3.505E-03	1.063E-02	3.263E-02	7.079E-01	6.986E-01	6.301E-01	5.562E-01	0.000E+00
Ac-227	U-235	1.000E+00	3.533E-09	2.486E-08	1.329E-07	1.241E-06	1.202E-05	2.251E-03	3.306E-03	7.062E-03	7.733E-03	0.000E+00
Ac-227	∑DOSE(j)		3.160E-02	3.214E-02	3.324E-02	3.742E-02	5.254E-02	7.113E-01	7.020E-01	6.372E-01	5.639E-01	0.000E+00
Pa-231	Pa-231	1.000E+00	2.998E-03	3.050E-03	3.157E-03	3.561E-03	5.025E-03	1.305E-01	1.286E-01	1.160E-01	1.023E-01	0.000E+00
Pa-231	U-235	1.000E+00	3.179E-08	9.678E-08	2.333E-07	7.854E-07	3.175E-06	4.825E-04	6.671E-04	1.319E-03	1.428E-03	0.000E+00
Pa-231	∑DOSE(j)		2.998E-03	3.050E-03	3.157E-03	3.562E-03	5.029E-03	1.310E-01	1.292E-01	1.173E-01	1.038E-01	0.000E+00
Pb-210	Pb-210	1.000E+00	3.705E-05	3.663E-05	3.580E-05	3.306E-05	2.634E-05	6.133E-05	2.738E-06	9.695E-16	3.668E-27	0.000E+00
Pb-210	Ra-226	1.000E+00	5.805E-07	1.747E-06	4.107E-06	1.268E-05	4.081E-05	2.577E-02	2.306E-02	1.044E-02	4.007E-03	0.000E+00
Pb-210	Th-230	1.000E+00	8.419E-11	5.939E-10	3.194E-09	3.048E-08	3.134E-07	2.031E-03	3.038E-03	7.112E-03	8.250E-03	0.000E+00
Pb-210	U-234	1.000E+00	1.899E-16	2.876E-15	3.429E-14	9.845E-13	3.054E-11	1.509E-06	3.426E-06	2.339E-05	4.020E-05	0.000E+00
Pb-210	U-238	9.999E-01	1.078E-22	3.379E-21	8.720E-20	7.447E-18	6.859E-16	2.465E-10	8.524E-10	1.842E-08	5.133E-08	0.000E+00
Pb-210	∑DOSE(j)		3.763E-05	3.838E-05	3.992E-05	4.577E-05	6.746E-05	2.786E-02	2.611E-02	1.758E-02	1.230E-02	0.000E+00
Ra-226	Ra-226	1.000E+00	4.032E-01	4.074E-01	4.158E-01	4.468E-01	5.487E-01	1.608E+00	1.435E+00	6.499E-01	2.494E-01	0.000E+00
Ra-226	Th-230	1.000E+00	8.752E-05	2.651E-04	6.317E-04	2.042E-03	7.355E-03	1.536E-01	2.157E-01	4.658E-01	5.330E-01	0.000E+00
Ra-226	U-234	1.000E+00	2.628E-10	1.856E-09	1.001E-08	9.630E-08	1.001E-06	1.306E-04	2.670E-04	1.568E-03	2.621E-03	0.000E+00
Ra-226	U-238	9.999E-01	1.863E-16	2.819E-15	3.355E-14	9.556E-13	2.872E-11	2.402E-08	7.249E-08	1.268E-06	3.386E-06	0.000E+00
Ra-226	∑DOSE(j)		4.033E-01	4.077E-01	4.165E-01	4.488E-01	5.561E-01	1.761E+00	1.651E+00	1.117E+00	7.850E-01	0.000E+00
Th-230	Th-230	1.000E+00	3.590E-06	3.692E-06	3.903E-06	4.743E-06	8.279E-06	1.628E-02	1.596E-02	1.389E-02	1.174E-02	0.000E+00
Th-230	U-234	1.000E+00	1.623E-11	4.987E-11	1.228E-10	4.453E-10	2.227E-09	2.573E-05	3.547E-05	6.851E-05	7.165E-05	0.000E+00
Th-230	U-238	9.999E-01	1.537E-17	1.101E-16	6.131E-16	6.617E-15	9.562E-14	6.984E-09	1.409E-08	7.593E-08	1.166E-07	0.000E+00
Th-230	∑DOSE(j)		3.590E-06	3.692E-06	3.903E-06	4.744E-06	8.281E-06	1.631E-02	1.600E-02	1.396E-02	1.181E-02	0.000E+00
U-234	U-234	1.000E+00	8.536E-07	8.775E-07	9.272E-07	1.124E-06	1.951E-06	5.193E-03	4.446E-03	1.499E-03	4.031E-04	0.000E+00
U-234	U-238	9.999E-01	1.216E-12	3.737E-12	9.205E-12	3.348E-11	1.687E-10	2.952E-06	3.789E-06	4.259E-06	2.116E-06	0.000E+00
U-234	∑DOSE(j)		8.536E-07	8.775E-07	9.272E-07	1.124E-06	1.951E-06	5.196E-03	4.450E-03	1.504E-03	4.052E-04	0.000E+00
U-235	U-235	1.000E+00	7.033E-03	7.170E-03	7.452E-03	8.528E-03	1.254E-02	1.093E-01	9.358E-02	3.162E-02	8.522E-03	0.000E+00
U-238	U-238	5.400E-05	3.268E-14	3.481E-14	3.948E-14	6.134E-14	2.160E-13	2.492E-07	2.134E-07	7.213E-08	1.944E-08	0.000E+00
U-238	U-238	9.999E-01	3.575E-03	3.618E-03	3.706E-03	4.032E-03	5.136E-03	2.481E-02	2.124E-02	7.179E-03	1.935E-03	0.000E+00
U-238	∑DOSE(j)		3.575E-03	3.618E-03	3.706E-03	4.032E-03	5.136E-03	2.481E-02	2.125E-02	7.179E-03	1.935E-03	0.000E+00

THF(i) is the thread fraction of the parent nuclide.

Summary : NFSS FS BOP Construction Worker for DCGLs
File : K:\NFSSP\BOP FIELD INVESTIGATION\BOP DCGLS\NFSS_BOP_CONST_100M2_COVER.RAD

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	2.000E+02	3.000E+02	1.000E+03	1.846E+03	1.000E+05
Ac-227	Ac-227	1.000E+00	1.000E+00	9.685E-01	9.086E-01	7.264E-01	3.833E-01	1.674E-03	6.851E-05	1.316E-14	2.378E-26	0.000E+00
Ac-227	Pa-231	1.000E+00	0.000E+00	3.133E-02	9.105E-02	2.723E-01	6.127E-01	9.699E-01	9.573E-01	8.634E-01	7.621E-01	3.911E-07
Ac-227	U-235	1.000E+00	0.000E+00	3.330E-07	2.931E-06	3.018E-05	2.216E-04	3.076E-03	4.523E-03	9.674E-03	1.059E-02	5.900E-09
Ac-227	∑S(j):		1.000E+00	9.999E-01	9.996E-01	9.987E-01	9.962E-01	9.746E-01	9.619E-01	8.731E-01	7.727E-01	3.970E-07
Pa-231	Pa-231	1.000E+00	1.000E+00	9.999E-01	9.996E-01	9.985E-01	9.956E-01	9.709E-01	9.567E-01	8.628E-01	7.616E-01	3.908E-07
Pa-231	U-235	1.000E+00	0.000E+00	2.114E-05	6.331E-05	2.098E-04	6.188E-04	3.583E-03	4.957E-03	9.815E-03	1.063E-02	5.896E-09
Pa-231	∑S(j):		1.000E+00	9.999E-01	9.996E-01	9.987E-01	9.962E-01	9.745E-01	9.617E-01	8.726E-01	7.722E-01	3.967E-07
Pb-210	Pb-210	1.000E+00	1.000E+00	9.694E-01	9.110E-01	7.328E-01	3.935E-01	1.994E-03	8.904E-05	3.152E-14	1.193E-25	0.000E+00
Pb-210	Ra-226	1.000E+00	0.000E+00	3.059E-02	8.888E-02	2.656E-01	5.947E-01	8.253E-01	7.387E-01	3.345E-01	1.284E-01	0.000E+00
Pb-210	Th-230	1.000E+00	0.000E+00	6.661E-06	5.868E-05	6.059E-04	4.480E-03	6.486E-02	9.711E-02	2.277E-01	2.641E-01	1.111E-09
Pb-210	U-234	1.000E+00	0.000E+00	2.003E-11	5.318E-10	1.859E-08	4.290E-07	4.807E-05	1.093E-04	7.484E-04	1.287E-03	7.384E-12
Pb-210	U-238	9.999E-01	0.000E+00	1.422E-17	1.135E-15	1.335E-13	9.468E-12	7.829E-09	2.715E-08	5.891E-07	1.643E-06	1.549E-14
Pb-210	∑S(j):		1.000E+00	1.000E+00	9.999E-01	9.990E-01	9.926E-01	8.922E-01	8.360E-01	5.629E-01	3.938E-01	1.118E-09
Ra-226	Ra-226	1.000E+00	1.000E+00	9.989E-01	9.966E-01	9.887E-01	9.666E-01	7.974E-01	7.120E-01	3.224E-01	1.237E-01	0.000E+00
Ra-226	Th-230	1.000E+00	0.000E+00	4.329E-04	1.297E-03	4.303E-03	1.274E-02	7.596E-02	1.068E-01	2.309E-01	2.642E-01	1.104E-09
Ra-226	U-234	1.000E+00	0.000E+00	1.948E-09	1.750E-08	1.931E-07	1.705E-06	6.446E-05	1.320E-04	7.771E-04	1.299E-03	7.338E-12
Ra-226	U-238	9.999E-01	0.000E+00	1.840E-15	4.958E-14	1.822E-12	4.812E-11	1.182E-08	3.578E-08	6.281E-07	1.678E-06	1.539E-14
Ra-226	∑S(j):		1.000E+00	9.993E-01	9.979E-01	9.930E-01	9.794E-01	8.734E-01	8.190E-01	5.540E-01	3.893E-01	1.111E-09
Th-230	Th-230	1.000E+00	1.000E+00	9.998E-01	9.994E-01	9.980E-01	9.941E-01	9.611E-01	9.422E-01	8.199E-01	6.931E-01	2.379E-09
Th-230	U-234	1.000E+00	0.000E+00	8.994E-06	2.693E-05	8.923E-05	2.631E-04	1.516E-03	2.091E-03	4.043E-03	4.229E-03	1.581E-11
Th-230	U-238	9.999E-01	0.000E+00	1.275E-11	1.145E-10	1.262E-09	1.111E-08	4.104E-07	8.293E-07	4.479E-06	6.883E-06	3.317E-14
Th-230	∑S(j):		1.000E+00	9.998E-01	9.994E-01	9.981E-01	9.943E-01	9.626E-01	9.443E-01	8.240E-01	6.974E-01	2.394E-09
U-234	U-234	1.000E+00	1.000E+00	9.984E-01	9.954E-01	9.846E-01	9.545E-01	7.330E-01	6.276E-01	2.117E-01	5.691E-02	0.000E+00
U-234	U-238	9.999E-01	0.000E+00	2.830E-06	8.465E-06	2.791E-05	8.118E-05	4.157E-04	5.340E-04	6.009E-04	2.986E-04	0.000E+00
U-234	∑S(j):		1.000E+00	9.985E-01	9.954E-01	9.846E-01	9.546E-01	7.335E-01	6.282E-01	2.123E-01	5.721E-02	0.000E+00
U-235	U-235	1.000E+00	1.000E+00	9.985E-01	9.954E-01	9.846E-01	9.546E-01	7.335E-01	6.282E-01	2.123E-01	5.721E-02	0.000E+00
U-238	U-238	5.400E-05	5.400E-05	5.392E-05	5.375E-05	5.317E-05	5.155E-05	3.961E-05	3.392E-05	1.146E-05	3.089E-06	0.000E+00
U-238	U-238	9.999E-01	9.999E-01	9.984E-01	9.953E-01	9.846E-01	9.545E-01	7.334E-01	6.281E-01	2.123E-01	5.720E-02	0.000E+00
U-238	∑S(j):		1.000E+00	9.985E-01	9.954E-01	9.846E-01	9.546E-01	7.335E-01	6.282E-01	2.123E-01	5.721E-02	0.000E+00

THF(i) is the thread fraction of the parent nuclide.

RESCALC.EXE execution time = 1.24 seconds