Phase II Final Status Survey Report
Mallinckrodt Columbium-Tantalum Plant

St. Louis, Missouri

Chapter 28

Project No. 137131 **Revision 0**

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ABBREVIATIONS AND ACRONYMS

σ	sigma; standard deviation
AECOM	AECOM Technical Services
bgs	below grade surface
C-T	columbium-tantalum
CFR	Code of Federal Regulations
cm	centimeter
DCGL	derived concentration guideline level
DP	decommissioning plan
DQO	data quality objectives
EMC	elevated measurement comparison
Energy*Solutions*, LLC	Energy*Solutions*
F	exposure-weighted fraction of the $DCGL_W$
FSS	Final Status Survey
FSSR	Final Status Survey Report
ft	feet
GPS	global positioning system
GWS	gamma walk-over survey
m	meters
m^2	square meters
MARSSIM	Multi-Agency Radiation and Site Investigation Manual (NUREG-1575)
MDC	minimum detectable concentration
NIST	National Institute of Standards and Technology
NRC	U.S. Nuclear Regulatory Commission
pCi/g	picoCuries per gram
Ra	radium
SOF	sum of fractions
Th	thorium
U	uranium
Unc.	uncertainty
WRS	Wilcoxon Rank Sum

28.0 RESULTS SUMMARY FOR PLANT 5 SUBSURFACE SU22

This chapter of the Final Status Survey Report (FSSR) presents the results of the final status survey (FSS) and data assessment for the Plant 5 subsurface survey unit SU22 in accordance with Columbium-Tantalum (C-T) Phase II Decommissioning Plan (DP) Section 14.5. The FSS for this Class 1 survey unit was completed by Energy*Solutions*, LLC (Energy*Solutions*) in January of 2014. The SU22 data assessment was performed based on the assumptions, methods, and performance criteria established to satisfy the data quality objectives (DQOs) in accordance with the C-T Phase II DP Section 14.4.3.8. The summary statistics provide numerical values for measures of central tendency (i.e., mean, median), variation (i.e., standard deviation), and spread (i.e., minimum, maximum). Data evaluation and statistical analyses were performed and a separate decision was made for each survey unit of the C-T Plant as to its suitability for release for unrestricted use based upon the industrial use scenario release criterion as established in C-T Phase II DP Chapter 5.

28.1 OVERVIEW

SU22 was reclassified from Class 3 to a Class 1 survey unit based upon the elevated sampling and survey results as presented within this Chapter and Chapter 16. SU22 is located along the west side of C-T Plant 5 and consists of the Building 240 and 250 footprints, the alley between the buildings and some surrounding areas to the north and south. The survey unit is approximately 2,622 square meters (m^2) in size which is less than the size limit of 3,000 m^2 for Class 1 survey units for subsurface material (per C-T Phase II DP, Table 14-4). Class 1 was the appropriate classification because the survey unit contained residual radioactivity that exceeded the derived concentration guideline values ($DCGL_W$). Figure 28-1 shows the location of SU22 within the Plant 5 area. Figure 28-2 provides the approximate locations and directions of photographs taken to facilitate the text within this section.

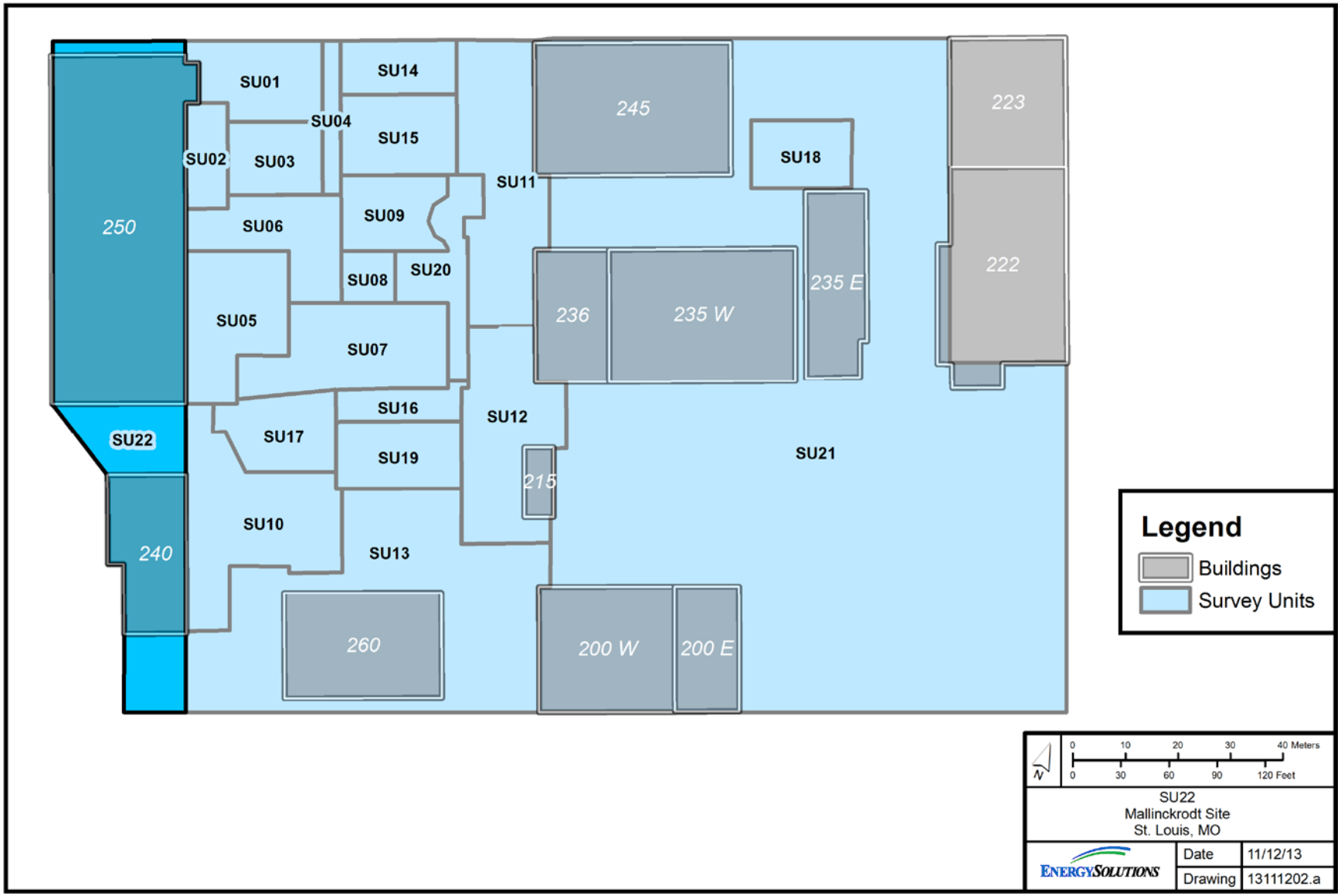

Figure 28-1 Location of SU22 in C-T Plant 5

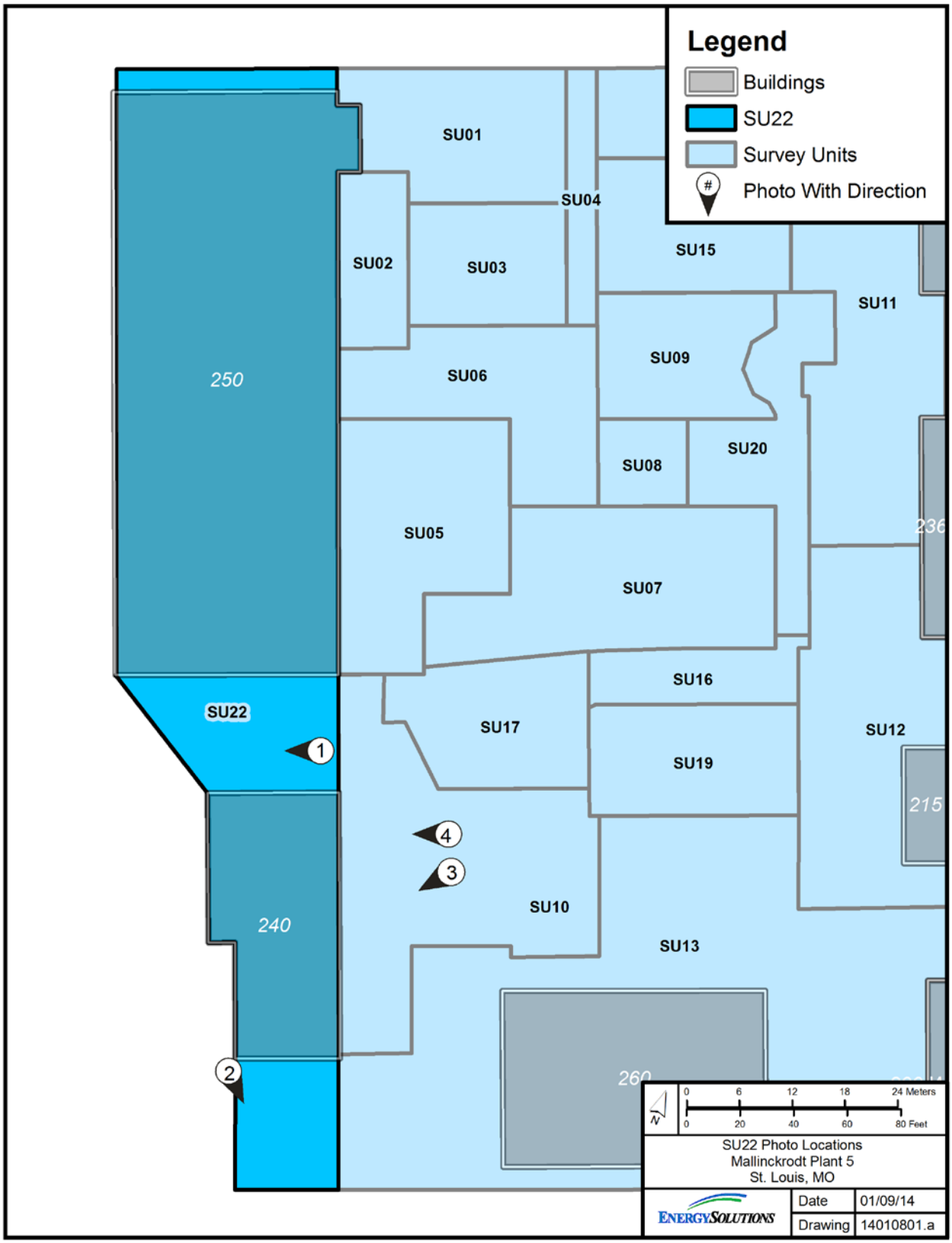

Figure 28-2 SU22 Photograph Locations

28.2 DATA COLLECTION

Data collection was performed based on the assumptions, methods, and performance criteria established to satisfy the DQOs in accordance with C-T Phase II DP, Sections 14.4.1 and 14.4.3. Details regarding FSS design and quality assurance and quality control applicable to all survey units were discussed in Chapters 4 and 5, respectively, of this FSSR. FSS data as collected for SU22 is summarized as follows:

28.2.1 Gamma Scans

A gamma walk-over survey (GWS) was only performed over the outdoor areas of the survey unit. Areas inside Buildings 240 and 250 did not receive a gamma scan survey; however, samples were collected under the buildings as discussed in the next sections. Due to the proximity to Buildings 240 and 250, the GPS signal was inadequate due to poor satellite reception. As a result, a 1-m grid survey was performed and a 1-minute scalar count collected over the center of each grid.

A photo of the alley between Buildings 240 and 250 looking west is provided as Figure 28-3 (photograph 1). Several obstructions were present including HVAC and process equipment.

Figure 28-3 Photograph (1) of SU22 – Building 240/250 Alley (West View)

Figure 28-4 provides the GWS results for the alley between Buildings 240 and 250 as shown above as well as the sidewalk along the north side of Building 250.

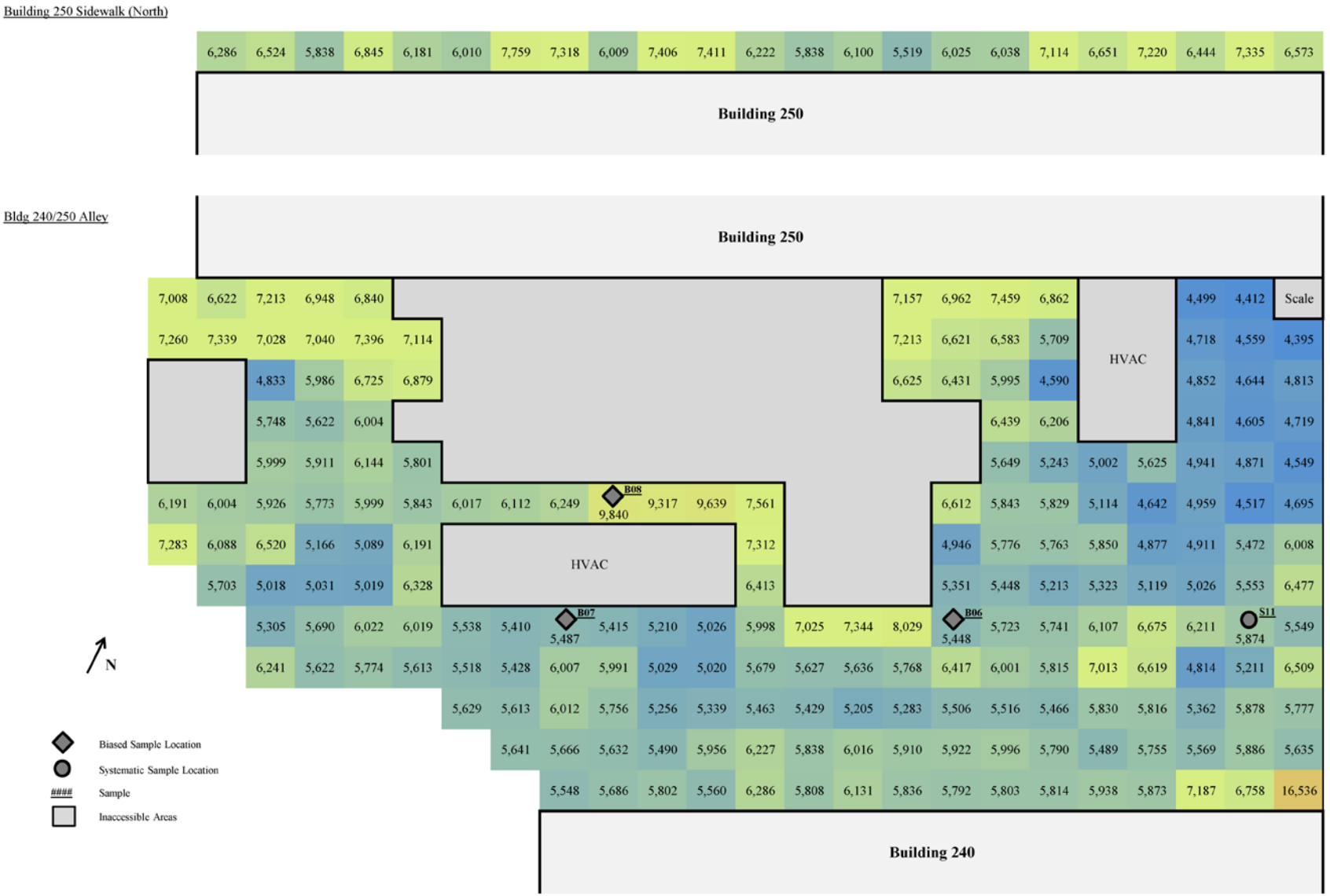

Figure 28-4 SU22 GWS Results – Bldg 250 North Sidewalk and Bldg 240/250 Alley

A photo of the Hydrogen yard as viewed from the SW corner of building 240 looking SSE is provided as Figure 28-5 (photograph 2). Two trailers as shown are stationed within the area containing Hydrogen supporting plant operations.

Figure 28-5 Photograph (2) of SU22 – Building 240 Hydrogen Yard (SSE View)

Figure 28-6 provides the GWS results for the Hydrogen yard located directly south of Building 240 as shown above.

The color gradients in both Figure 28-4 and Figure 28-6 are based on the count per minute results of the surveys. Elevated areas were noted at the northeast corner of Building 240 in the alley between Buildings 240/250 as well as along the western edge of SU22 within the hydrogen yard south of Building 240. These areas were identified for further investigation and biased sampling.

The area at the northeast corner of Building 240 was identified and sampled during the remediation of SU10 while the vertical face along Building 240 and the alley were exposed. The areas in the hydrogen yard along the west side of SU22 and extending beyond the Plant 5 boundary abuts the previously remediated FUSRAP area along the on-site rail-line.

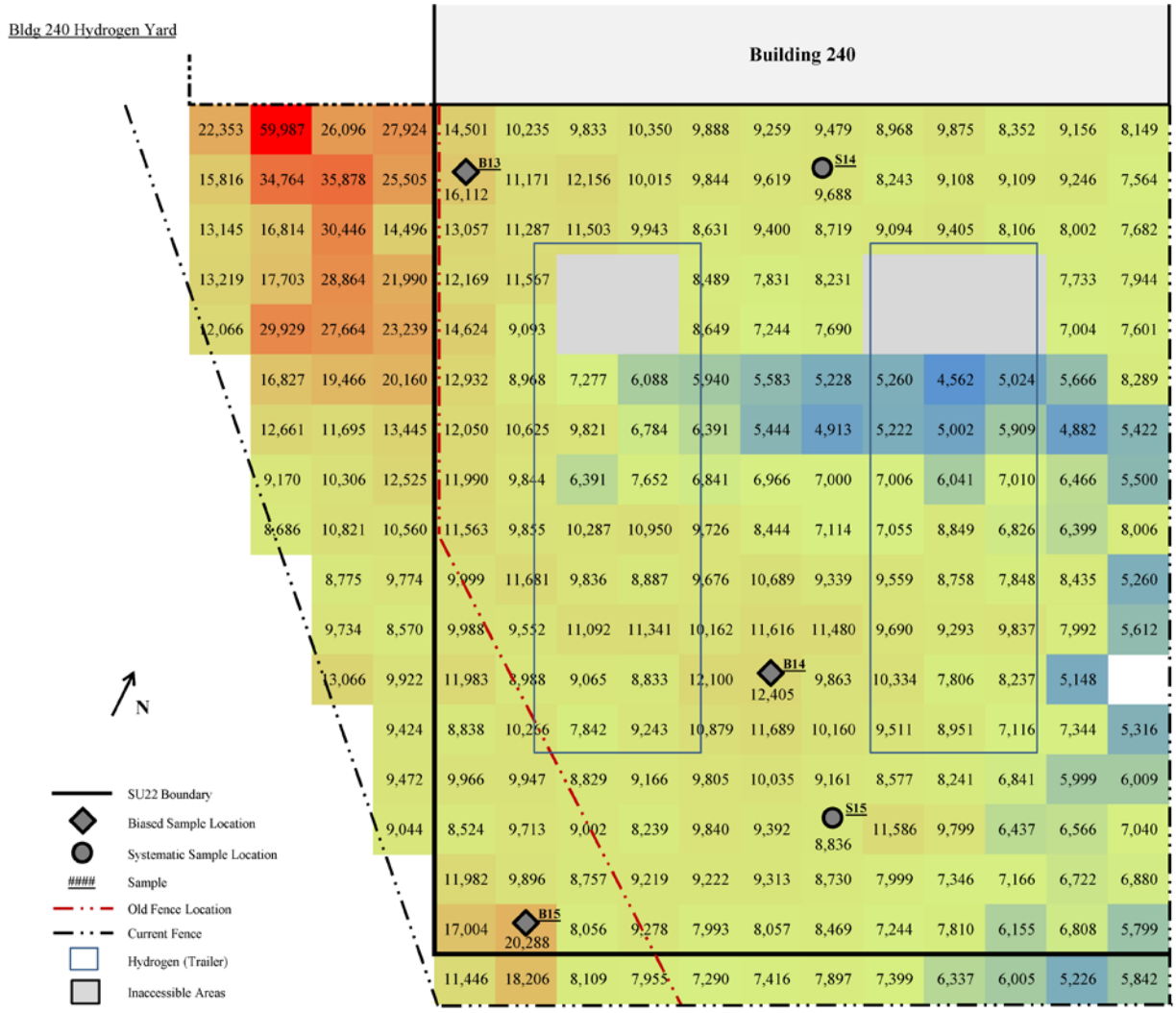

Figure 28-6 SU22 GWS Results – Building 240 Hydrogen Yard

During the remediation of SU10 adjacent to Building 240 to the east as discussed in Chapter 16 of this report, the west wall of the excavation (i.e. east wall of SU22) was surveyed along Building 240 and along the alley between Buildings 240 and 250 while the excavation was exposed. The vertical face of the excavation was gridded into 1-m grids and a 1-minute scalar count collected near the center of each grid. Figure 28-7 (photograph 3) and Figure 28-8 (photograph 4) show the exposed face of the excavation while Figure 28-9 provides the GWS results for the east wall of SU22 as exposed during the remediation of SU10. The color gradient is based on the count per minute results of the survey.

Figure 28-7 Photograph (3) of SU10 West Wall – South End (Building 240)

Figure 28-8 Photograph (4) of SU10 West Wall – North End (Building 240/250 Alley)

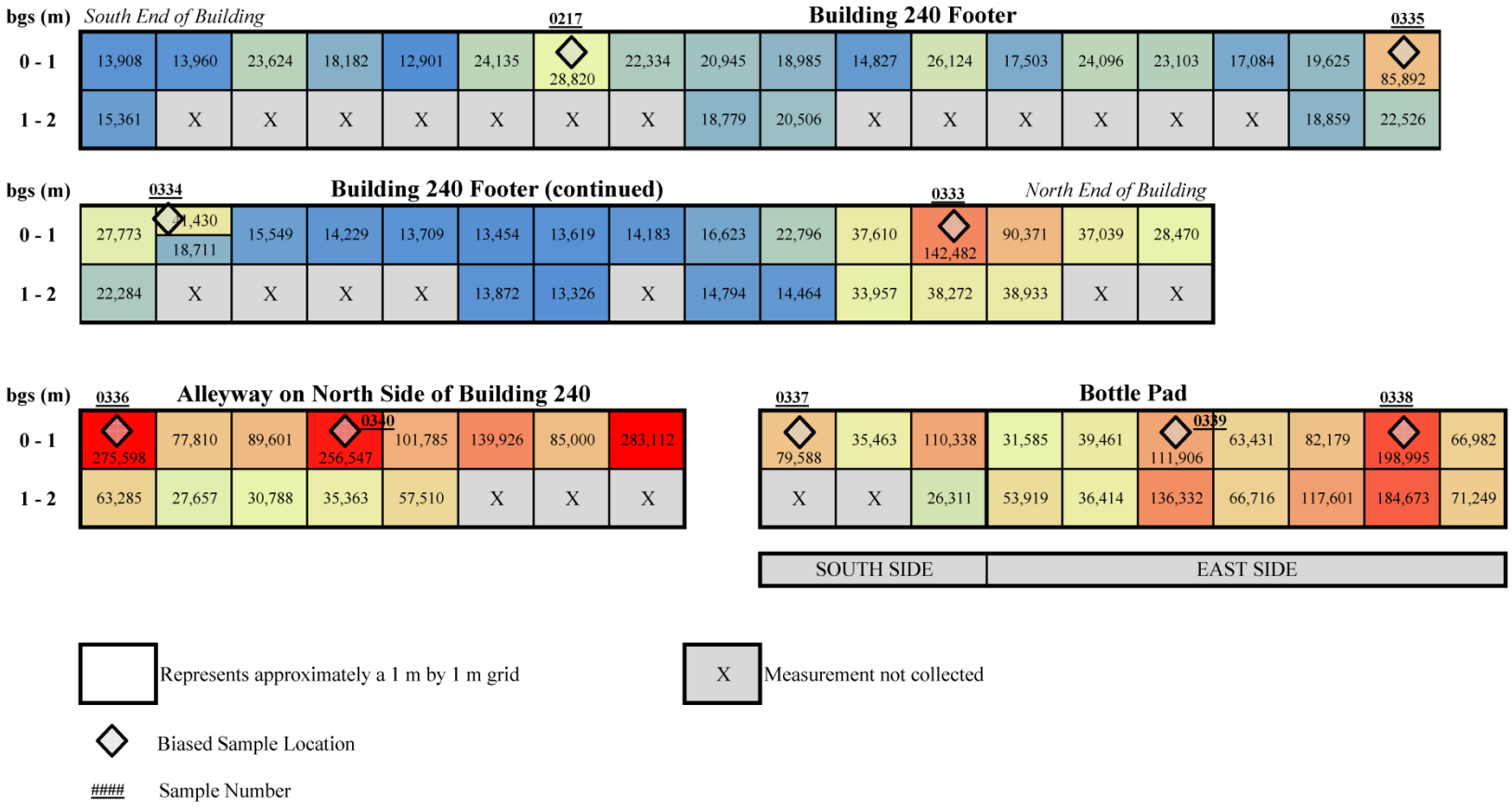

Figure 28-9 SU22 East Wall GWS Results – (i.e., West Wall of SU10 Excavation - Energy*Solutions*' Survey 295)

28.2.2 Soil Sampling

Soil samples to be used for the statistical testing were collected at a frequency and at representative locations throughout SU22 such that a statistically sound conclusion regarding the radiological condition of the survey unit could be developed. Biased soil samples were also collected at locations of elevated residual radioactivity identified by GWS and at areas of concern based upon the remediation and survey of adjacent areas to the east. Samples collected along the exposed face of the east boundary during the remediation of SU10 consisted of grab samples while all other samples consisted of 1-m composites from core bore locations taken throughout the area.

The C-T Phase II DP, Table 4-17, provided mean background activity levels of 1.3, 2.5, and 4.4 picoCuries per gram (pCi/g) for thorium-232 (^{232}Th), radium-226 (^{226}Ra), and uranium-238 (^{238}U), respectively. These values were used to calculate net sum of fractions (SOF) values for the individual sample results—note that when measured activity concentration levels were less than the background mean resulting in a negative value, the net activity concentration was set equal to zero for the net SOF calculation.

28.2.2.1 Surface (Top 1-m)

Energy*Solutions* collected borehole samples at each of the 15 systematic sampling locations (S01-S15) throughout SU22 as shown in Figure 28-10. Table 28-1 provides the results of the surface samples (i.e., top 1-meter) from the borehole samples collected at each FSS systematic location. Fifteen (15) biased borehole locations (B01-B15) as shown in Figure 28-10 were also sampled based upon the GWS results shown in Figure 28-4 and Figure 28-6 as well as along the west boundary of SU22 where activity was identified within areas adjacent to SU22. Table 28-2 provides the results of the surface samples (i.e., top 1-meter) from these biased borehole locations.

An additional thirteen (13) biased borehole locations (B16-B28) were also sampled to assess the remaining levels of activity as identified along the eastern edge of the survey unit during the remediation of SU10. These borehole locations and sample results are described in more detail in Section 28.2.2.2.

It should be noted that samples were not specifically collected at the locations as depicted in the figures. They were collected within the grids as space allowed within the buildings due to building layout and the presence of process equipment and structures.

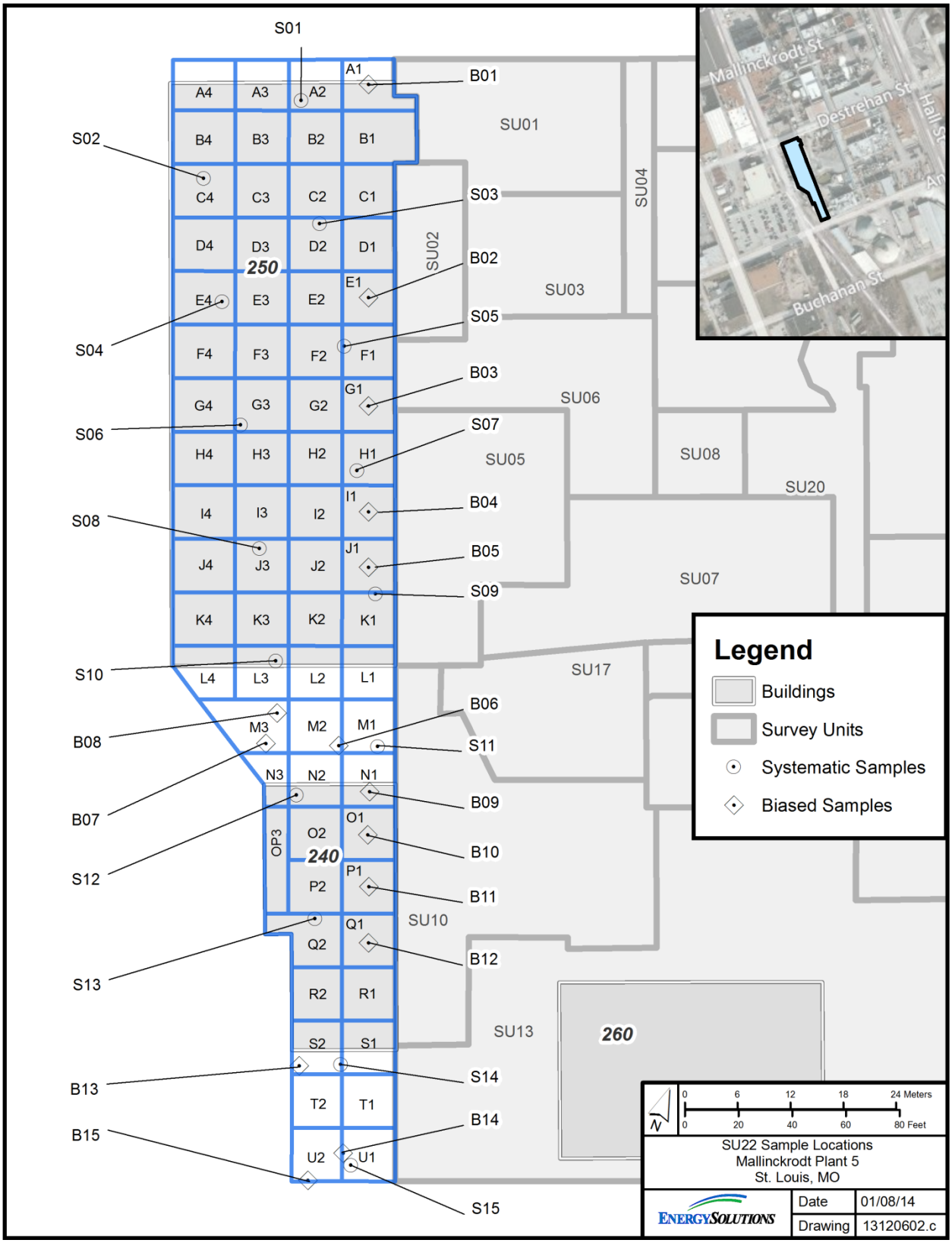

Figure 28-10 SU22 Soil Sampling Locations

Table 28-1 Gamma Spectroscopy Systematic Sample Analytical Results (Top 1-meter)

Sample	Grid	Sample ID	Depth (m)	Off-Site Results Activity Concentration (pCi/g) [a]									Sample SOF	
				^{232}Th			^{226}Ra			^{238}U				
				Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Gross	Net [b]
S01	A2	1529	0 – 1	0.65	0.30	0.39	2.07	0.36	0.19	2.81	1.05	2.60	0.10	0.00
S02	C4	1515	0 – 1	1.24	0.33	0.35	3.00	0.43	0.17	43.80	4.65	2.80	0.21	0.07
S03	D2	1517	0 – 1	1.58	0.40	0.20	3.94	0.58	0.30	37.60	5.52	3.78	0.25	0.11
S04	E4	1513	0 – 1	1.99	0.71	0.49	7.61	1.12	0.41	96.60	11.4	9.29	0.48	0.33
S05	F1	1466	0 – 1	1.16	0.30	0.22	2.24	0.38	0.27	39.20	5.55	3.75	0.18	0.05
S06	G3	1507	0 – 1	1.21	0.36	0.30	3.12	0.51	0.25	17.60	2.70	3.77	0.18	0.04
S07	H1	1463	0 – 1	0.74	0.26	0.33	3.00	0.45	0.25	26.50	2.98	2.59	0.17	0.05
S08	J3	1509	0 – 1	1.64	0.34	0.22	2.03	0.34	0.17	2.58	1.13	1.47	0.14	0.01
S09	K1	1458	0 – 1	1.09	0.34	0.25	5.74	0.73	0.25	30.10	3.51	3.43	0.28	0.15
S10	L3	1527	0 – 1	1.37	0.35	0.39	4.73	0.65	0.30	57.80	7.61	4.47	0.30	0.15
S11	M1	1475	0 – 1	1.40	0.48	0.33	2.75	0.48	0.34	24.10	3.78	3.01	0.19	0.04
S12	N2	1519	0 – 1	1.69	0.39	0.19	2.61	0.45	0.28	45.00	5.19	3.69	0.22	0.08
S13	Q2	1521	0 – 1	1.44	0.29	0.33	1.98	0.34	0.23	10.20	2.32	2.44	0.14	0.01
S14	S2	1523	0 – 1	1.45	0.32	0.35	4.16	0.58	0.27	15.90	3.27	3.11	0.22	0.08
S15	U1	1525	0 – 1	0.91	0.28	0.26	2.99	0.44	0.19	5.61	1.68	1.86	0.15	0.02
Summary Statistics														
Count:				15			15			15			15	15
Average:				1.30			3.46			30.36			0.21	0.08
Median:				1.37			3.00			26.50			0.19	0.05
Standard Dev.:				0.36			1.57			24.85			0.09	0.08
Minimum:				0.65			1.98			2.58			0.10	0.00
Maximum:				1.99			7.61			96.60			0.48	0.33
Range:				1.34			5.63			94.02			0.37	0.33

[a] Off-site laboratory results as reported by TestAmerica after sufficient in-growth time to reach ^{226}Ra progeny equilibrium.
[b] Calculated as discussed in Section 28.2.2.

Table 28-2 Gamma Spectroscopy Biased Sample Analytical Results (Top 1-meter)

Sample	Grid	Sample ID	Depth (m)	Off-Site Results Activity Concentration (pCi/g) [a]									Sample SOF [b]	
				^{232}Th			^{226}Ra			^{238}U				
				Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Gross	Net [c]
B01	A1	1500	0 – 1	1.25	0.35	0.32	4.27	0.57	0.25	4.23	1.63	2.03	0.20	0.06
B02	E1	1468	0 – 1	1.20	0.32	0.24	1.66	0.33	0.36	24.80	3.01	2.84	0.14	0.03
B03	G1	1465	0 – 1	1.08	0.34	0.56	1.59	0.36	0.30	5.69	1.31	2.30	0.11	0.00
B04	I1	1461	0 – 1	1.41	0.35	0.47	3.37	0.49	0.18	31.20	3.44	2.27	0.22	0.07
B05	J1	1460	0 – 1	1.62	0.42	0.19	3.80	0.59	0.35	129.00	14.00	5.54	0.38	0.23
B06	M2	1478	0 – 1	0.76	0.38	0.70	20.70	2.32	0.44	52.10	7.54	5.43	**0.81**	**0.69**
B07	M3	1480	0 – 1	1.19	0.30	0.34	2.24	0.38	0.22	5.25	1.71	2.13	0.13	0.00
B08	M3	1532	0 – 1	1.49	0.38	0.35	2.48	0.39	0.18	10.80	2.02	1.88	0.16	0.02
B09	N1	1472	0 – 1	0.90	0.31	0.38	3.42	0.52	0.30	4.61	1.13	2.26	0.16	0.03
B10	O1	1491	0 – 1	1.34	0.37	0.51	4.94	0.70	0.36	25.80	3.65	2.68	0.26	0.11
B11	P1	1490	0 – 1	1.20	0.26	0.19	2.20	0.36	0.30	9.50	2.02	1.99	0.14	0.01
B12	Q1	1488	0 – 1	0.84	0.30	0.49	3.48	0.52	0.27	40.10	5.02	2.65	0.21	0.08
B13	S2	1537	0 – 1	0.97	0.36	0.35	12.8	1.47	0.27	6.93	3.85	4.69	0.49	0.35
B14	U1	1534	0 – 1	0.81	0.27	0.30	3.72	0.50	0.17	12.80	1.93	2.54	0.18	0.05
B15	U2	1536	0 – 1	1.20	0.45	0.52	21.40	2.37	0.37	11.5	3.70	4.67	**0.79**	**0.65**

[a] Off-site laboratory results as reported by TestAmerica after sufficient in-growth time to reach ^{226}Ra progeny equilibrium.
[b] **Bolded orange** SOF values indicate a result >0.5 but ≤1.
[c] Calculated as discussed in Section 28.2.2.

28.2.2.2 SU22 East Boundary with SU10

Elevated activity was identified along the east boundary of SU22 during the remediation of SU10 in the soils under Building 240 and along the alley between Buildings 240 and 250; however, no excavation or remediation was performed within SU22 due to building proximity and active plant operations. Nine (9) grab samples, samples 0217 and 0333-0340, were collected from the exposed vertical face along the west side of the SU10 excavation (i.e., east edge of SU22). The approximate sample locations are shown in Figure 28-9 and Figure 28-12. Table 28-3 provides the results for these grab samples collected along the east edge of the survey unit. As noted, these samples were grab samples as opposed to 1-m vertical composites and were taken at the highest measurement location within the corresponding 1-m grids shown in Figure 28-9.

Based upon the field surveys of the exposed face of the excavation, the elevated area(s) is limited to no more than the top meter of soils directly under the building foundation at the north end of Building 240 and the pavement of the alley. Two additional small areas of localized activity were also identified below the Building 240 foundation that were limited to the top foot directly under the building foundation; one was approximately one meter wide and the other 2 to 3 meters wide. Core bore samples from biased locations B09 through B12 and systematic sample location S11 as shown in Figure 28-10 determined the lateral extent of residual contamination, which is estimated to extend no farther than 1-meter laterally. Figure 28-11 shows the locations of the elevated areas along the east boundary as identified.

The larger of the three elevated areas shown in Figure 28-11, EA#1, was investigated further and gridded into 1-meter grids along the edge of the survey unit from under Building 240 to the southern edge of the bottle storage pad. A core bore was advanced within each grid and samples collected for the 0-1m and 1-2m intervals, (i.e., samples B16 to B28), to quantify the extent of contamination including the average residual activity in the area. The area around the bottle storage pad was not gridded because the residual contamination along the eastern edge of the bottle storage pad is a small localized area from the sewer pipe that was removed along the pad based upon the survey and sample results from SU10.

Figure 28-12 shows the sampling grid for elevated area EA#1. Table 28-4 provides the results of the surface samples (i.e., top 1-meter) from the borehole samples collected at each grid location. Based upon the sample results, the area was split into two separate areas EA#1a and EA#1b for evaluation purposes, each approximately 3 to 4 meters long by 1 meter wide and 1 meter deep.

28.2.2.3 West Side – Hydrogen Yard

In addition to the two systematic samples collected from the Hydrogen yard south of Building 240, three biased samples were also collected based upon the gamma walkover survey as shown in Figure 28-6. As mentioned in Section 28.2.1, elevated gamma readings were noted along the western edge of SU22 within the Hydrogen yard and increased beyond the survey unit boundary to the west. The Hydrogen yard is directly adjacent to an area previously remediated along the rail-line and evaluated as part of FUSRAP. The biased samples as collected within SU22 along the west boundary as presented in Table 28-2 and Table 28-7 were all less than the DCGLs. As the area west of the SU22 boundary has already been evaluated as part of the FUSRAP remediation, no additional sampling was performed beyond the SU22 boundary.

Table 28-3 Gamma Spectroscopy Biased Sample Analytical Results - East Wall (Grab Samples)

Sample ID	Depth (ft bgs)	On-Site Results											Off-Site Results [a]										On-Site/ Off-Site Gross SOF Ratio
		Activity Concentration (pCi/g)									SOF [c]		Activity Concentration (pCi/g) [b]									SOF [c]	
		^{232}Th			^{226}Ra			^{238}U					^{232}Th			^{226}Ra			^{238}U				
		Result	Uncert. (2σ)	MDC	Result	Uncert. (2σ)	MDC	Result	Uncert. (2σ)	MDC	Gross	Net [d]	Result	Uncert. (2σ)	MDC	Result	Uncert. (2σ)	MDC	Result	Uncert. (2σ)	MDC	Gross	Net [d]	
0217 [e]	3	1.89	0.77	0.68	148.91	8.92	4.12	47.57	3.62	3.25	**5.21**	**5.06**	*1.48*	1.02	1.68	125.00	13.10	0.96	61.60	11.70	12.20	**4.40**	**4.25**	1.18
0333 [f]	2	3.68	2.61	1.59	648.10	29.81	7.71	30.61	7.87	6.25	**22.24**	**22.10**	These characterization samples were not sent for off-site analysis.										
0334 [g]	2	1.51	0.55	0.34	77.03	5.42	2.61	23.66	2.08	1.82	**2.72**	**2.57**											
0335 [g]	2	1.49	0.45	0.28	44.75	3.70	1.87	23.95	1.86	1.57	**1.62**	**1.47**											
0336 [f]	2	9.51	1.57	1.34	1,155.80	51.03	8.43	28.31	4.02	5.09	**39.75**	**39.60**											
0337 [f]	2	3.05	1.05	0.47	214.46	11.05	2.48	10.86	1.69	1.75	**7.44**	**7.29**											
0338 [f]	2	11.92	0.88	0.32	9.10	2.79	2.07	17.89	1.86	1.76	**0.83**	**0.69**											
0339 [f]	2	76.23	3.64	0.53	13.09	4.44	3.49	28.85	7.92	3.38	**3.67**	**3.53**											
0340 [f]	2	1.18	0.28	0.14	5.28	1.39	0.93	4.48	0.73	0.72	0.24	0.09											

[a] Off-site laboratory results as reported by TestAmerica after sufficient in-growth time to reach ^{226}Ra progeny equilibrium.
[b] Italicized results indicate <MDC.
[c] **Bolded orange** SOF values indicate a result >0.5 but ≤1 and **bolded red** SOF values indicate a result >1.
[d] Calculated as discussed in Section 28.2.2.
[e] Elevated Area #3 (See Figure 28-11)
[f] Elevated Area #1 (See Figure 28-11)
[g] Elevated Area #2 (See Figure 28-11)

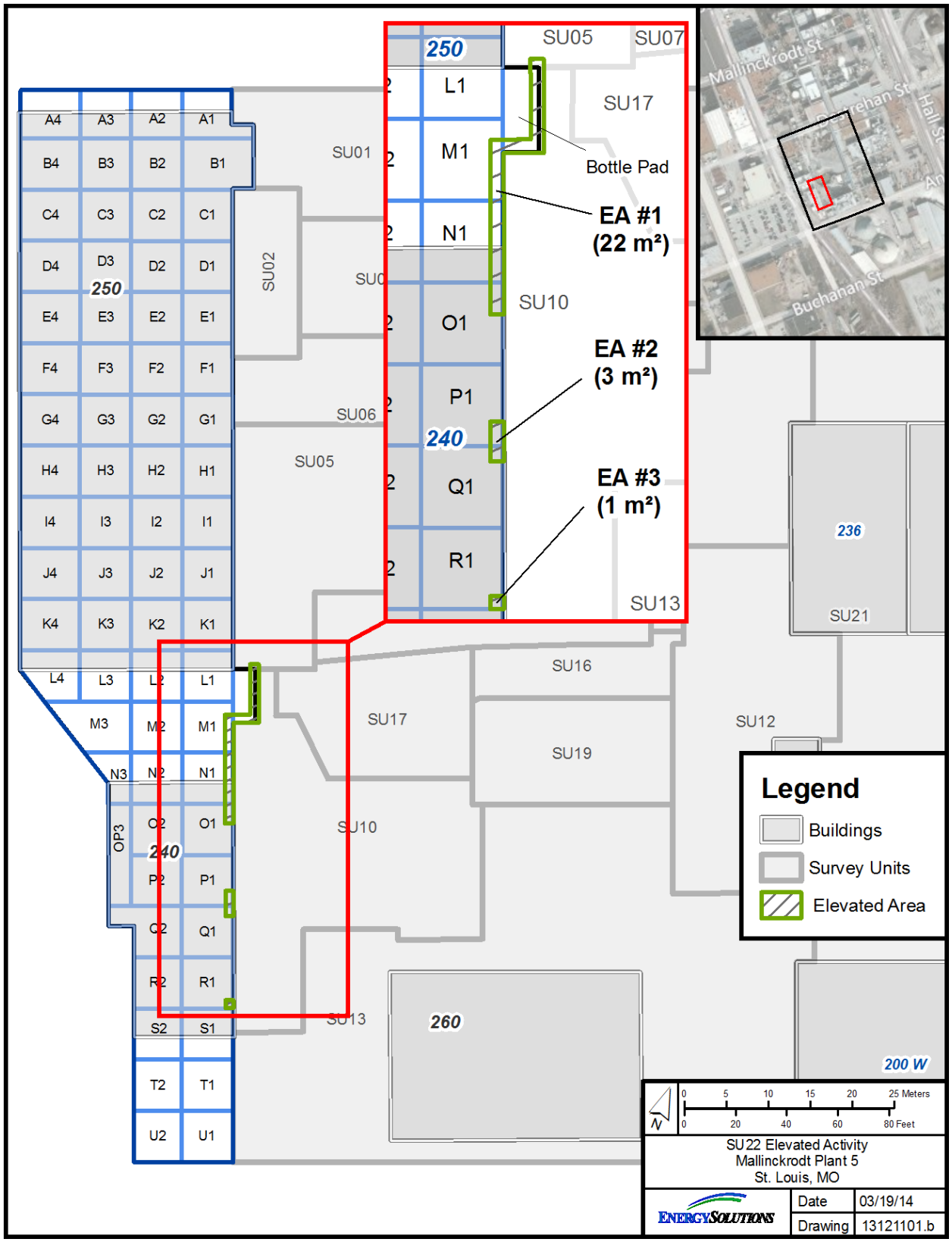

Figure 28-11 SU22 Elevated Areas – East Wall

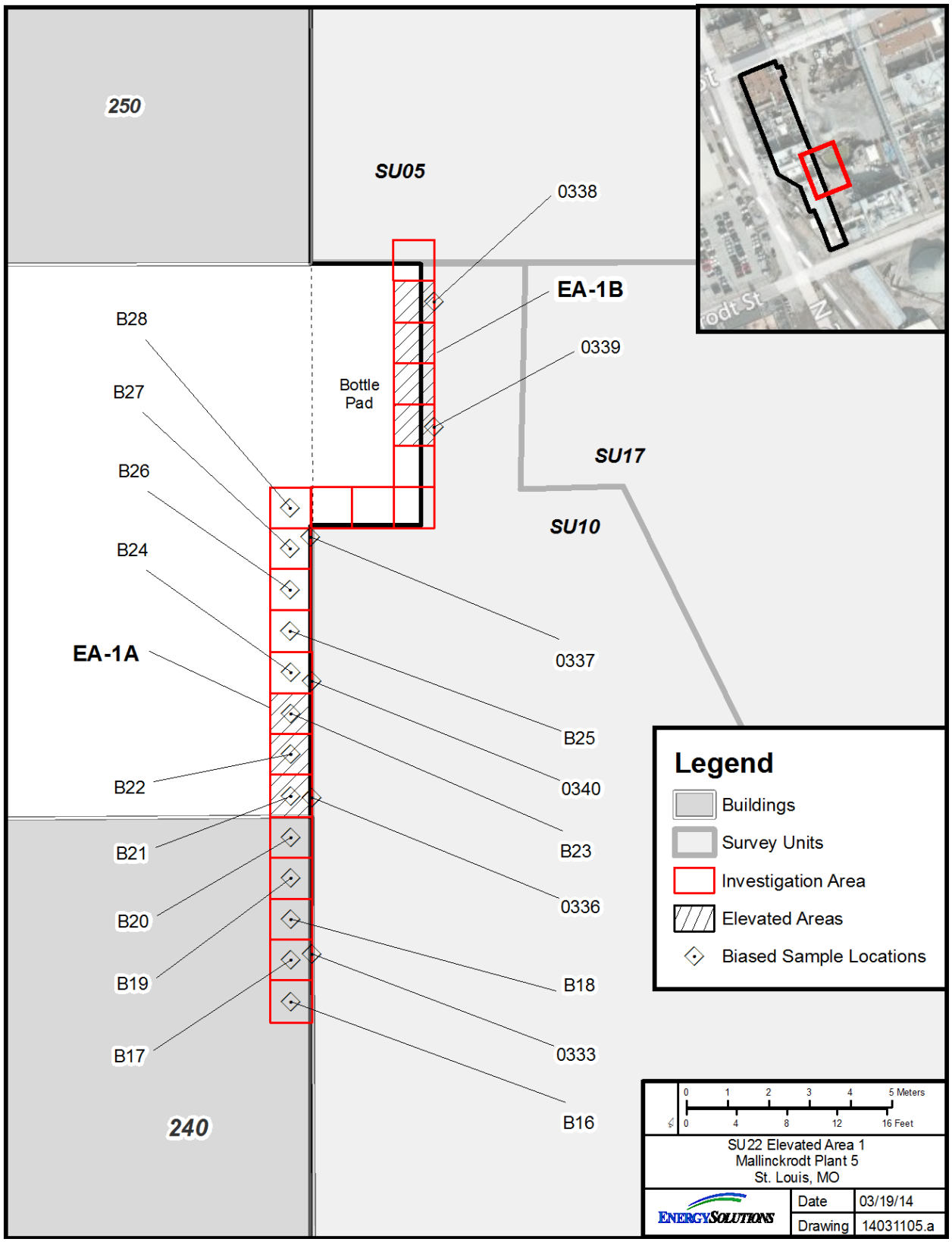

Figure 28-12 Elevated Area EA#1 Core Boring Sampling Grid

Table 28-4 Gamma Spectroscopy Biased Sample Analytical Results EA#1 (Top 1-meter)

Sample	Grid	Sample ID	Depth (m)	Off-Site Results Activity Concentration (pCi/g) [a, b]									Sample SOF [c]	
				^{232}Th			^{226}Ra			^{238}U				
				Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Gross	Net [d]
B16	1	1561	0 - 1	1.65	0.45	0.38	5.98	0.84	0.41	16.30	3.25	3.28	0.30	0.15
B17	2	1560	0 - 1	1.22	0.34	0.34	4.72	0.64	0.29	11.20	2.15	2.15	0.23	0.08
B18	3	1558	0 - 1	2.28	0.54	0.56	11.70	1.41	0.46	59.80	7.61	4.44	**0.58**	0.43
B19	4	1552	0 - 1	0.91	0.45	0.76	12.80	1.52	0.42	10.40	2.84	3.49	0.49	0.36
B20	5	1550	0 - 1	1.30	0.44	0.47	4.06	0.63	0.40	12.20	2.67	2.89	0.21	0.06
B21	6	1538	0 - 1	*1.19*	0.69	1.38	68.60	7.28	0.61	9.33	2.20	4.55	**2.40**	**2.26**
B22	7	1540	0 - 1	1.41	0.54	0.73	21.40	2.43	0.56	16.60	2.73	4.10	**0.81**	**0.66**
B23	8	1542	0 - 1	3.06	0.71	0.73	33.50	3.67	0.57	13.70	3.56	4.38	**1.29**	**1.14**
B24	9	1544	0 - 1	1.62	0.46	0.30	4.62	0.64	0.25	3.79	0.92	1.93	0.23	0.09
B25	10	1546	0 - 1	1.99	0.45	0.44	8.47	1.04	0.31	6.20	2.40	2.99	0.38	0.23
B26	11	1556	0 - 1	1.57	0.37	0.24	2.06	0.37	0.24	4.90	1.63	1.78	0.14	0.01
B27	12	1554	0 - 1	1.17	0.46	0.42	5.01	0.70	0.40	20.90	3.68	3.55	0.25	0.11
B28	13	1548	0 - 1	1.42	0.60	0.54	2.41	0.47	0.36	5.58	2.30	3.00	0.15	0.01

[a] Off-site laboratory results as reported by TestAmerica after sufficient in-growth time to reach ^{226}Ra progeny equilibrium.
[b] Italicized results indicate <MDC.
[c] **Bolded orange** SOF values indicate a result >0.5 but ≤1 and **bolded red** SOF values indicate a result >1.
[d] Calculated as discussed in Section 28.2.2.

28.2.3 Core Boring

C-T Phase II DP Tables 4-7, 4-15, and 4-16 provided characterization borehole results. Of the locations provided in the tables, six were collected within the extent of SU22. Table 28-5 provides the data for these locations.

Table 28-5 Characterization Borehole Results

Location ID	Sample Depth (ft)	Activity Concentration (pCi/g)			SOF	
		^{232}Th	^{226}Ra	^{238}U	Gross	Net [a]
BH-083	0.5 – 1.5	0.72	1.95	23.90	0.13	0.03
	3 – 4.5	1.46	2.65	97.00	0.29	0.14
	6 – 7.5	0.76	2.92	30.10	0.17	0.05
	10.5 – 12	0.91	1.46	1.35	0.09	0.00
	13.5 – 15	0.75	0.92	1.89	0.07	0.00
	16.5 – 18	1.24	1.02	0.83	0.09	0.00
BH-094	0.8 – 4	2.35	1.93	3.14	0.17	0.04
JA-01	0 – 5	1.87	1.87	216.06	0.44	0.32
JA-08	0 – 1	2.17	2.76	33.08	0.23	0.09
JA-09	0 – 1	1.90	2.71	69.76	0.27	0.12
JA-10	0 – 1	2.34	2.56	70.70	0.28	0.14

[a] Calculated as discussed in Section 28.2.2.

AECOM Technical Services (AECOM) did not collect any supplemental characterization core boring samples within the extent of SU22.

In accordance with Page 14-22 of the C-T Phase II DP, FSS core sampling was performed because of the potential for subsoil contamination below the building foundations and pavement as a result of the characterization sampling, areas that were remediated adjacent to SU22, and the GWS result. A total of 30 core bore locations throughout SU22 were sampled (15 systematic and 15 biased locations).

Energy*Solutions* collected borehole samples at each of the 15 systematic and 15 biased sampling locations throughout SU22 as shown in Figure 28-10 as well as the 13 additional biased sampling locations shown in Figure 28-12. Table 28-6 provides the results of the borehole samples collected at each FSS systematic location while Table 28-7 and Table 28-8 provide the results from the biased borehole locations.

In accordance with Table 14-5 of the C-T Phase II DP, the Class 1 subsurface investigation level is the $DCGL_W$ (1 SOF) plus the mean of background (0.15 SOF) plus two standard deviations of background (6 × 0.09 SOF = 0.54 SOF), using data from Tables 4-17 and B-1. This equates to a gross SOF of 1.69. All borehole samples were below this investigation level with the exception of one sample location, B21, collected during the investigation of elevated area EA#1. Since this area was already gridded to assess an elevated area, no further investigation was required. Figure 28-13 shows a summary of all sampling locations performed including all characterization and FSS samples.

Table 28-6 Gamma Spectroscopy Systematic Borehole Sample Analytical Results

Sample (Grid)	Sample ID	Depth (m)	Off-Site Results Activity Concentration (pCi/g) [a]									Sample SOF [b]		Column SOF [b, c]	
			^{232}Th			^{226}Ra			^{238}U						
			Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Gross	Net [d]	Gross	Net [d]
S01 (A2)	1529	0 - 1	0.65	0.30	0.39	2.07	0.36	0.19	2.81	1.05	2.60	0.10	0.00	0.10	0.00
	1530	1 - 2	0.97	0.24	0.11	1.40	0.28	0.19	*1.02*	0.78	2.52	0.09	0.00	0.10	0.00
	1531	2 - 3	1.05	0.26	0.13	1.47	0.31	0.20	*1.63*	0.81	2.33	0.10	0.00	0.10	0.00
	Refusal at approximately 3 m bgs														
S02 (C4)	1515	0 - 1	1.24	0.33	0.35	3.00	0.43	0.17	43.8	4.65	2.80	0.21	0.07	0.21	0.07
	1516	1 - 2	1.42	0.46	0.27	2.64	0.52	0.19	48.8	8.23	6.31	0.22	0.07	0.22	0.07
	Refusal at approximately 2 m bgs														
S03 (D2)	1517	0 - 1	1.58	0.40	0.20	3.94	0.58	0.30	37.6	5.52	3.78	0.25	0.11	0.25	0.11
	1518	1 – 1.5	1.46	0.36	0.22	1.59	0.29	0.17	7.59	1.34	2.26	0.13	0.01	0.19	0.04
	Refusal at approximately 1.5 m bgs														
S04 (E4)	1513	0 - 1	1.99	0.71	0.49	7.61	1.12	0.41	96.6	11.4	9.29	0.48	0.33	0.48	0.33
	1514	1 – 1.75	1.46	0.48	0.51	2.29	0.51	0.44	8.15	2.65	6.05	0.15	0.01	0.31	0.17
	Refusal at approximately 1.75 m bgs														
S05 (F1)	1466	0 - 1	1.16	0.30	0.22	2.24	0.38	0.27	39.20	5.55	3.75	0.18	0.05	0.18	0.05
	1467	1 - 2	1.05	0.32	0.22	1.65	0.34	0.26	1.91	0.76	1.77	0.10	0.00	0.14	0.02
	1471	2 - 3	1.18	0.30	0.27	1.96	0.33	0.22	3.02	1.69	2.15	0.12	0.00	0.13	0.01
	Refusal at approximately 3 m bgs														
S06 (G3)	1507	0 - 1	1.21	0.36	0.30	3.12	0.51	0.25	17.6	2.70	3.77	0.18	0.04	0.18	0.04
	1508	1 - 2	2.09	0.65	0.64	8.44	1.09	0.46	169.0	17.8	5.89	**0.61**	0.46	0.40	0.25
	Refusal at approximately 2 m bgs														
S07 (H1)	1463	0 - 1	0.74	0.26	0.33	3.00	0.45	0.25	26.50	2.98	2.59	0.17	0.05	0.17	0.05
	1502	0 - 1	0.56	0.23	0.46	1.56	0.29	0.22	23.20	3.18	2.36	0.11	0.03	0.11	0.03
	1464	1 - 2	1.37	0.30	0.17	2.10	0.36	0.22	31.90	4.55	2.99	0.17	0.04	0.17	0.04
	1503	1 - 2	1.73	0.50	0.37	1.59	0.32	0.19	18.10	2.82	2.17	0.15	0.04	0.13	0.02
	Refusal at approximately 2 m bgs														
S08 (J3)	1509	0 - 1	1.64	0.34	0.22	2.03	0.34	0.17	2.58	1.13	1.47	0.14	0.01	0.14	0.01
	1510	1 - 2	1.38	0.42	0.35	4.08	0.55	0.26	49.6	5.38	3.55	0.27	0.12	0.20	0.06
	1511	2 - 3	1.48	0.32	0.41	3.37	0.48	0.24	5.70	1.17	2.45	0.18	0.04	0.20	0.05
	1512	3 – 3.5	0.96	0.29	0.38	2.32	0.39	0.24	2.85	1.01	1.98	0.12	0.00	0.18	0.03
	Refusal at approximately 3.5 m bgs														

Table 28-6 Gamma Spectroscopy Systematic Borehole Sample Analytical Results (Continued)

Sample (Grid)	Sample ID	Depth (m)	Off-Site Results Activity Concentration (pCi/g) [a]									Sample SOF [b]		Column SOF [b, c]	
			^{232}Th			^{226}Ra			^{238}U						
			Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Gross	Net [d]	Gross	Net [d]
S09 (K1)	1458	0 - 1	1.09	0.34	0.25	5.74	0.73	0.25	30.10	3.51	3.43	0.28	0.15	0.28	0.15
	1506	0 - 1	1.36	0.32	0.41	3.51	0.53	0.30	58.10	7.22	3.80	0.26	0.11	0.26	0.11
	1459	1 - 2	1.21	0.27	0.18	3.33	0.49	0.24	16.00	2.90	2.65	0.19	0.04	0.27	0.13
	Refusal at approximately 2 m bgs														
S10 (L3)	1527	0 - 1	1.37	0.35	0.39	4.73	0.65	0.30	57.8	7.61	4.47	0.30	0.15	0.30	0.15
	1528	1 - 2	1.63	0.38	0.27	4.95	0.64	0.20	56.2	7.72	4.79	0.31	0.17	0.31	0.16
	Refusal at approximately 2 m bgs														
S11 (M1)	1475	0 - 1	1.40	0.48	0.33	2.75	0.48	0.34	24.10	3.78	3.01	0.19	0.04	0.19	0.04
	1476	1 - 2	1.76	0.46	0.27	2.21	0.41	0.24	19.70	2.89	2.15	0.18	0.04	0.18	0.04
	1477	2 - 3	1.12	0.40	0.65	1.82	0.40	0.38	21.20	2.83	3.07	0.14	0.02	0.17	0.03
	Refusal at approximately 3 m bgs														
S12 (N2)	1519	0 - 1	1.69	0.39	0.19	2.61	0.45	0.28	45.0	5.19	3.69	0.22	0.08	0.22	0.08
	1520	1 – 1.75	1.05	0.36	0.25	2.09	0.40	0.27	19.2	2.39	2.67	0.14	0.02	0.18	0.04
	Refusal at approximately 1.75 m bgs														
S13 (Q2)	1521	0 - 1	1.44	0.29	0.33	1.98	0.34	0.23	10.2	2.32	2.44	0.14	0.01	0.14	0.01
	1522	1 - 2	0.94	0.25	0.15	1.56	0.28	0.20	6.94	1.95	2.17	0.10	0.00	0.12	0.01
	Refusal at approximately 2 m bgs														
S14 (S2)	1523	0 - 1	1.45	0.32	0.35	4.16	0.58	0.27	15.9	3.27	3.11	0.22	0.08	0.22	0.08
	1524	1 - 2	1.79	0.48	0.44	2.37	0.48	0.40	37.6	5.12	3.38	0.21	0.07	0.22	0.07
	Refusal at approximately 2 m bgs														
S15 (U1)	1525	0 - 1	0.91	0.28	0.26	2.99	0.44	0.19	5.61	1.68	1.86	0.15	0.02	0.15	0.02
	1526	1 - 2	1.58	0.40	0.36	3.94	0.56	0.30	11.2	1.58	2.19	0.22	0.07	0.18	0.04
	Refusal at approximately 2 m bgs														

[a] Off-site laboratory results as reported by TestAmerica after sufficient in-growth time to reach ^{226}Ra progeny equilibrium.
[b] **Bolded orange** SOF values indicate a result >0.5 but ≤1.
[c] Calculated per Section 14.4.3.7 of C-T Phase II DP. Calculation of column SOF used on-site results unless off-site results were available.
[d] Calculated as discussed in Section 28.2.2.

Table 28-7 Gamma Spectroscopy Biased Borehole Sample Analytical Results

Sample (Grid)	Sample ID	Depth (m)	Off-Site Results Activity Concentration (pCi/g) [a, b]									Sample SOF [c]		Column SOF [c, d]	
			^{232}Th			^{226}Ra			^{238}U						
			Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Gross	Net [e]	Gross	Net [e]
B01 (A1)	1500	0 - 1	1.25	0.35	0.32	4.27	0.57	0.25	4.23	1.63	2.03	0.20	0.06	0.20	0.06
	1501	1 - 2	1.71	0.41	0.41	5.14	0.66	0.32	7.99	1.88	2.06	0.26	0.11	0.23	0.08
	Refusal at approximately 2 m bgs														
B02 (E1)	1468	0 - 1	1.20	0.32	0.24	1.66	0.33	0.36	24.80	3.01	2.84	0.14	0.03	0.14	0.03
	1469	1 - 2	0.96	0.28	0.40	3.28	0.49	0.21	5.37	1.10	1.92	0.16	0.03	0.15	0.01
	1470	2 - 3	1.06	0.44	0.61	4.32	0.64	0.33	7.32	1.55	3.18	0.20	0.07	0.17	0.03
	Refusal at approximately 3 m bgs														
B03 (G1)	1465	0 - 1	1.08	0.34	0.56	1.59	0.36	0.30	5.69	1.31	2.30	0.11	0.00	0.11	0.00
	1498	0 - 1	1.19	0.41	0.32	2.02	0.34	0.17	28.30	3.92	2.52	0.16	0.03	0.16	0.03
	1499	1 - 2	1.04	0.32	0.43	1.77	0.32	0.21	18.20	2.35	2.67	0.13	0.02	0.14	0.03
	Refusal at approximately 2 m bgs														
B04 (I1)	1461	0 - 1	1.41	0.35	0.47	3.37	0.49	0.18	31.20	3.44	2.27	0.22	0.07	0.22	0.07
	1504	0 - 1	1.27	0.46	0.45	3.41	0.58	0.36	47.10	5.07	3.06	0.23	0.09	0.23	0.09
	1462	1 - 2	2.03	0.42	0.35	3.34	0.51	0.20	8.18	1.40	2.36	0.21	0.06	0.21	0.07
	1505	1 - 2	1.11	0.32	0.44	2.42	0.40	0.29	15.40	2.10	2.39	0.15	0.02	0.19	0.05
	Refusal at approximately 2 m bgs														
B05 (J1)	1460	0 - 1	1.62	0.42	0.19	3.80	0.59	0.35	129.00	14.00	5.54	0.38	0.23	0.38	0.23
	1485	1 - 2	0.88	0.29	0.47	2.61	0.39	0.15	45.70	4.80	2.44	0.19	0.06	0.28	0.14
	1486	2 - 3	0.89	0.32	0.43	1.81	0.36	0.27	9.93	1.59	2.24	0.11	0.01	0.23	0.09
	--	3 - 4	No recovery												
	1487	4 - 5	1.40	0.37	0.24	2.27	0.38	0.25	6.70	1.83	2.02	0.15	0.01	0.21	0.06
B06 (M2)	1478	0 - 1	0.76	0.38	0.70	20.70	2.32	0.44	52.10	7.54	5.43	**0.81**	**0.69**	**0.81**	**0.69**
	1479	1 - 2	1.86	0.38	0.40	2.30	0.44	0.32	13.10	2.37	2.36	0.17	0.04	0.49	0.35
	Refusal at approximately 2 m bgs														
B07 (M3)	1480	0 - 1	1.19	0.30	0.34	2.24	0.38	0.22	5.25	1.71	2.13	0.13	0.00	0.13	0.00
	1481	1 - 2	2.03	0.47	0.49	2.40	0.49	0.40	8.07	2.37	2.85	0.18	0.04	0.16	0.02
	1482	2 - 3	1.81	0.36	0.20	1.74	0.35	0.27	4.68	1.76	2.14	0.14	0.02	0.15	0.02
	1483	3 - 4	1.03	0.40	0.49	1.14	0.34	0.37	*1.52*	0.99	2.20	0.08	0.00	0.13	0.01
	1484	4 - 5	1.52	0.32	0.35	1.36	0.28	0.22	*1.54*	0.79	2.13	0.11	0.01	0.13	0.01

Table 28-7 Gamma Spectroscopy Biased Borehole Sample Analytical Results (Continued)

Sample (Grid)	Sample ID	Depth (m)	Off-Site Results Activity Concentration (pCi/g) [a, b]									Sample SOF [c]		Column SOF [c, d]	
			^{232}Th			^{226}Ra			^{238}U						
			Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Gross	Net [e]	Gross	Net [e]
B08 (M3)	1532	0 - 1	1.49	0.38	0.35	2.48	0.39	0.18	10.80	2.02	1.88	0.16	0.02	0.16	0.02
	1533	1 - 2	1.61	0.42	0.31	2.17	0.45	0.39	6.92	2.27	2.88	0.15	0.02	0.16	0.02
	Refusal at approximately 2 m bgs														
B09 (N1)	1472	0 - 1	0.90	0.31	0.38	3.42	0.52	0.30	4.61	1.13	2.26	0.16	0.03	0.16	0.03
	1473	1 - 2	1.14	0.36	0.28	1.96	0.34	0.18	4.01	1.53	1.94	0.12	0.00	0.14	0.01
	1474	2 - 3	1.27	0.33	0.18	2.03	0.41	0.31	6.57	1.28	2.32	0.13	0.00	0.14	0.00
	Refusal at approximately 3 m bgs														
B10 (O1)	1491	0 - 1	1.34	0.37	0.51	4.94	0.70	0.36	25.80	3.65	2.68	0.26	0.11	0.26	0.11
	1492	1 - 2	1.27	0.32	0.42	2.07	0.40	0.31	5.54	1.90	2.47	0.13	0.00	0.20	0.05
	1493	2 - 3	1.15	0.30	0.30	2.77	0.51	0.35	10.90	2.37	2.34	0.16	0.02	0.18	0.04
	Refusal at approximately 3 m bgs														
B11 (P1)	1490	0 - 1	1.20	0.26	0.19	2.20	0.36	0.30	9.50	2.02	1.99	0.14	0.01	0.14	0.01
	1494	0 - 1	1.13	0.39	0.48	7.10	0.89	0.30	28.80	3.55	3.56	0.33	0.19	0.33	0.19
	1495	1 - 2	0.83	0.35	0.53	3.24	0.52	0.32	31.40	4.27	2.73	0.19	0.06	0.26	0.13
	1496	2 - 3	1.41	0.34	0.20	2.15	0.43	0.36	7.14	2.17	2.68	0.14	0.01	0.22	0.08
	1497	3 - 4	1.42	0.38	0.33	4.86	0.65	0.28	14.70	2.66	2.46	0.25	0.10	0.23	0.08
	Refusal at approximately 4 m bgs														
B12 (Q1)	1488	0 - 1	0.84	0.30	0.49	3.48	0.52	0.27	40.10	5.02	2.65	0.21	0.08	0.21	0.08
	1489	1 - 2	0.77	0.30	0.50	2.36	0.44	0.33	23.80	3.50	2.64	0.15	0.03	0.18	0.05
	Refusal at approximately 2 m bgs														
B13 (S2)	1537	0 - 1	0.97	0.36	0.35	12.8	1.47	0.27	6.93	3.85	4.69	0.49	0.35	0.49	0.35
	Refusal at approximately 1 m bgs														
B14 (U1)	1534	0 - 1	0.81	0.27	0.30	3.72	0.50	0.17	12.80	1.93	2.54	0.18	0.05	0.18	0.05
	1535	1 - 2	0.92	0.26	0.36	1.45	0.29	0.23	8.79	1.40	2.04	0.10	0.01	0.14	0.01
	Refusal at approximately 2 m bgs														
B15 (U2)	1536	0 - 1	1.20	0.45	0.52	21.40	2.37	0.37	11.5	3.70	4.67	**0.79**	**0.65**	**0.79**	**0.65**
	Refusal at approximately 1 m bgs														

[a] Off-site laboratory results as reported by TestAmerica after sufficient in-growth time to reach ^{226}Ra progeny equilibrium.
[b] Italicized results indicate <MDC.
[c] **Bolded orange** SOF values indicate a result >0.5 but ≤1.
[d] Calculated per Section 14.4.3.7 of C-T Phase II DP. Calculation of column SOF used on-site results unless off-site results were available.
[e] Calculated as discussed in Section 28.2.2.

Table 28-8 Gamma Spectroscopy Systematic Borehole Sample Analytical Results EA#1

Sample (Grid)	Sample ID	Depth (m)	Off-Site Results Activity Concentration (pCi/g) [a,b]									Sample SOF [c]		Column SOF [c, d]	
			^{232}Th			^{226}Ra			^{238}U						
			Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Gross	Net [e]	Gross	Net [e]
B16	1561	0 - 1	1.65	0.45	0.38	5.98	0.84	0.41	16.30	3.25	3.28	0.30	0.15	0.30	0.15
	1562	1 - 2	1.95	0.48	0.45	3.99	0.61	0.38	10.40	2.29	2.38	0.23	0.09	0.26	0.12
B17	1560	0 - 1	1.22	0.34	0.34	4.72	0.64	0.29	11.20	2.15	2.15	0.23	0.08	0.23	0.08
	Refusal at approximately 1 m bgs														
B18	1558	0 - 1	2.28	0.54	0.56	11.70	1.41	0.46	59.80	7.61	4.44	**0.58**	0.43	**0.58**	0.43
	1559	1 - 1.5	*2.42*	2.54	7.40	*2.21*	3.04	5.68	*13.80*	12.50	19.80	0.20	0.06	0.39	0.24
	Refusal at approximately 1.5 m bgs														
B19	1552	0 - 1	0.91	0.45	0.76	12.80	1.52	0.42	10.40	2.84	3.49	0.49	0.36	0.49	0.36
	1553	1 - 2	1.81	0.58	0.72	17.40	1.89	0.47	6.38	1.51	3.44	**0.68**	**0.53**	**0.58**	0.44
B20	1550	0 - 1	1.30	0.44	0.47	4.06	0.63	0.40	12.20	2.67	2.89	0.21	0.06	0.21	0.06
	1551	1 - 2	1.67	0.42	0.40	4.49	0.70	0.39	9.76	2.28	2.65	0.24	0.09	0.22	0.08
B21	1538	0 - 1	*1.19*	0.69	1.38	68.60	7.28	0.61	9.33	2.20	4.55	**2.40**	**2.26**	**2.40**	**2.26**
	1539	1 - 1.5	2.20	0.64	0.81	29.30	3.24	0.53	3.95	1.35	3.52	**1.09**	**0.95**	**1.75**	**1.60**
	Refusal at approximately 1.5 m bgs														
B22	1540	0 - 1	1.41	0.54	0.73	21.40	2.43	0.56	16.60	2.73	4.10	**0.81**	**0.66**	**0.81**	**0.66**
	1541	1 - 1.5	1.59	0.43	0.54	3.04	0.55	0.42	18.80	3.41	3.14	0.20	0.05	**0.50**	0.36
	Refusal at approximately 1.5 m bgs														
B23	1542	0 - 1	3.06	0.71	0.73	33.50	3.67	0.57	13.70	3.56	4.38	**1.29**	**1.14**	**1.29**	**1.14**
	1543	1 - 2	1.42	0.49	0.65	17.50	1.98	0.46	11.40	2.65	2.88	**0.67**	**0.52**	**0.98**	**0.83**
B24	1544	0 - 1	1.62	0.46	0.30	4.62	0.64	0.25	3.79	0.92	1.93	0.23	0.09	0.23	0.09
	1545	1 - 2	0.87	0.46	0.66	2.66	0.55	0.46	3.65	1.51	3.10	0.13	0.01	0.18	0.04
B25	1546	0 - 1	1.99	0.45	0.44	8.47	1.04	0.31	6.20	2.40	2.99	0.38	0.23	0.38	0.23
	1547	1 - 2	1.21	0.29	0.25	1.80	0.34	0.39	4.43	1.38	1.80	0.12	0.00	0.25	0.10
B26	1556	0 - 1	1.57	0.37	0.24	2.06	0.37	0.24	4.90	1.63	1.78	0.14	0.01	0.14	0.01
	1557	1 - 1.5	2.25	0.53	0.42	2.79	0.48	0.36	5.12	1.95	2.57	0.20	0.05	0.17	0.03
	Refusal at approximately 1.5 m bgs														

Table 28-8 Gamma Spectroscopy Systematic Borehole Sample Analytical Results EA#1 (Continued)

Sample (Grid)	Sample ID	Depth (m)	Off-Site Results Activity Concentration (pCi/g) [a, b]									Sample SOF [c]		Column SOF [c, d]	
			^{232}Th			^{226}Ra			^{238}U						
			Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Result	Unc. (2σ)	MDC	Gross	Net [e]	Gross	Net [e]
B27	1554	0 - 1	1.17	0.46	0.42	5.01	0.70	0.40	20.90	3.68	3.55	0.25	0.11	0.25	0.11
	1555	1 - 1.5	*0.99*	3.45	19.00	*5.24*	6.72	9.74	*9.36*	25.60	43.50	0.23	0.10	0.24	0.10
	Refusal at approximately 1.5 m bgs														
B28	1548	0 - 1	1.42	0.60	0.54	2.41	0.47	0.36	5.58	2.30	3.00	0.15	0.01	0.15	0.01
	1549	1 - 1.5	1.72	0.44	0.30	1.77	0.42	0.33	9.28	2.23	2.20	0.15	0.02	0.15	0.02
	Refusal at approximately 1.5 m bgs														

[a] Off-site laboratory results as reported by TestAmerica after sufficient in-growth time to reach ^{226}Ra progeny equilibrium.
[b] Italicized results indicate <MDC.
[c] **Bolded orange** SOF values indicate a result >0.5 but ≤1 and **bolded red** SOF values indicate a result >1.
[d] Calculated per Section 14.4.3.7 of C-T Phase II DP. Calculation of column SOF used on-site results unless off-site results were available.
[e] Calculated as discussed in Section 28.2.2.

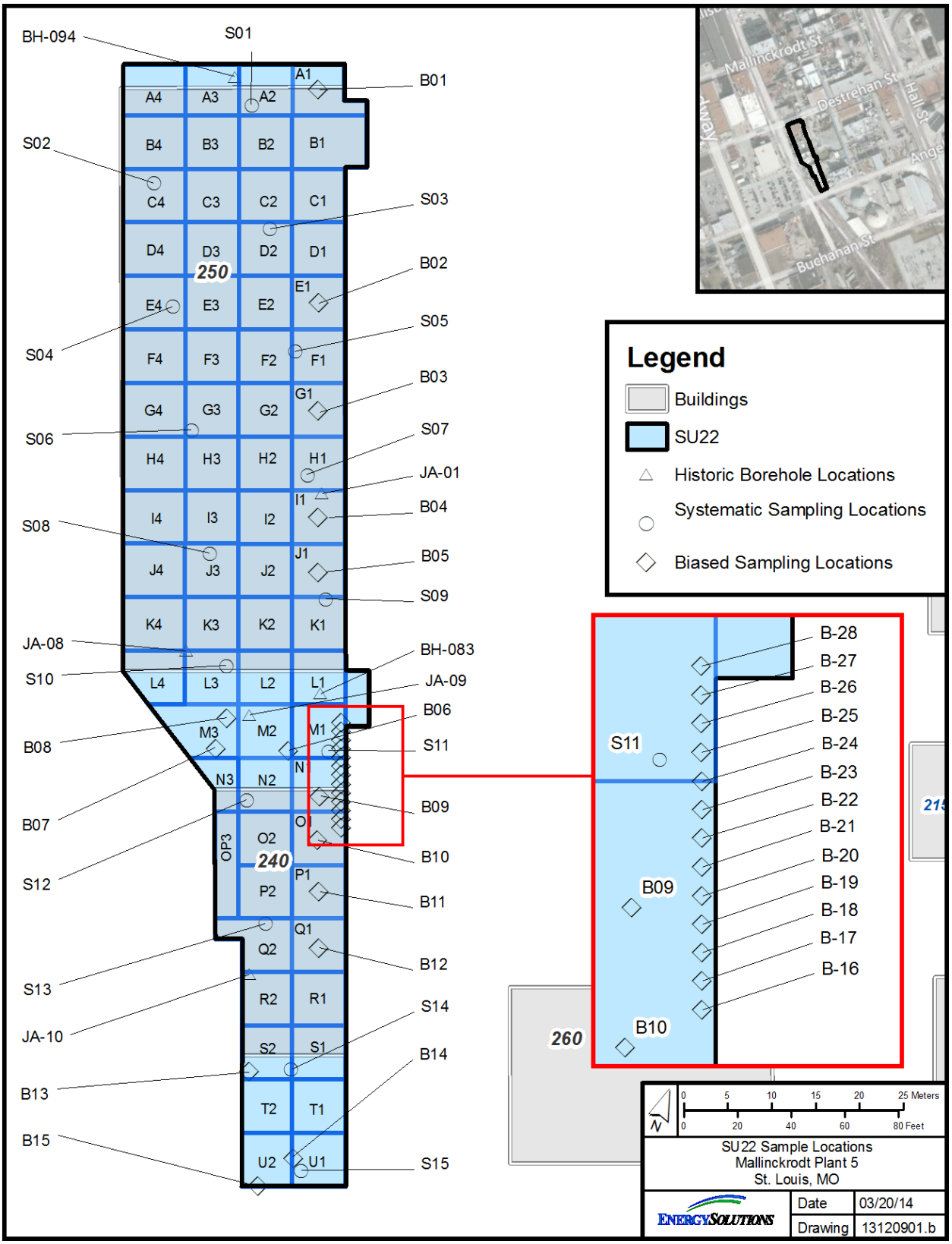

Figure 28-13 Characterization and FSS Sampling Locations

28.3 DATA ANALYSIS - SURFACE

Data analysis of the survey unit surface was performed based on the assumptions, methods, and performance criteria established to satisfy the DQOs in accordance with the C-T Phase II DP, Sections 14.4.1 and 14.4.3. Details regarding FSS design and quality assurance and quality control applicable to all survey units were discussed in Chapters 4 and 5, respectively, of this FSSR. Surface soil results for the 1-m composite samples from boreholes were used in the assessment for the SU22 surface.

28.3.1 Elevated Area Evaluation

Equation 9 from C-T Phase II DP, Section 5.8.7 provides for the calculation of an *Index* value that represents the fraction or multiple of the $DCGL_{EMC}$. If the *Index* value is greater than one, then the $DCGL_{EMC}$ is exceeded.

28.3.1.1 Northeast Corner of Building 240 and Building 240/250 Alley

Elevated Area #1a

Parameters necessary to calculate the *Index* value for the area along the east edge of SU22 under the northeast corner of Building 240 noted as Elevated Area #1a as shown in Figure 28-12 were:

- The elevated area activity levels, represented by the average of top 1-m samples from locations B21 through B23 were 1.89, 41.17, and 13.21 pCi/g for ^{232}Th, ^{226}Ra, and ^{238}U, respectively (from Table 28-4);
- Mean background activity levels were 1.3, 2.5, and 4.4 pCi/g for ^{232}Th, ^{226}Ra, and ^{238}U, respectively (from C-T Phase II DP Table 4-17);
- The size of the elevated area was determined to be approximately 1 m by 3 m, or 3.0 m^2; and,
- The area factors from C-T Phase II DP Figure 5-3 for the elevated area were 2.25, 2.4, and 3.3 for ^{232}Th, ^{226}Ra, and ^{238}U, respectively.

The calculation of the *Index* value is shown below. Because the *Index* value as calculated in accordance with the DP was less than one, this elevated area is compliant with the C-T Phase II DP for elevated measurements in soil..

$$Index = \frac{(1.89 - 1.3)\ pCi/g}{(2.25 \times 23.9\ pCi/g)_{Th\ series}} + \frac{(41.17 - 2.5)\ pCi/g}{(2.4 \times 29.4\ pCi/g)_{Ra226}} + \frac{(13.21 - 4.4)\ pCi/g}{(3.3 \times 721\ pCi/g)_{U}} = 0.56$$

Elevated Area #1b

Parameters necessary to calculate the *Index* value for the area along the east edge of SU22 along the bottle storage pad (Samples 0338 and 0339) noted as Elevated Area #1b as shown in Figure 28-12 were:

- The elevated area activity levels, represented by the average activity observed of the two grab samples taken along the exposed face of the excavation were 44.07, 11.10, and

23.37 pCi/g for ^{232}Th, ^{226}Ra, and ^{238}U, respectively (from Table 28-3);

- Mean background activity levels were 1.3, 2.5, and 4.4 pCi/g for ^{232}Th, ^{226}Ra, and ^{238}U, respectively (from C-T Phase II DP Table 4-17);
- The size of the elevated area was determined to be approximately 1 m by 4 m, or 4.0 m^2; and,
- The area factors from C-T Phase II DP Figure 5-3 for the elevated area were 2.25, 2.4, and 3.3 for ^{232}Th, ^{226}Ra, and ^{238}U, respectively.

The calculation of the *Index* value is shown below. Because the *Index* value as calculated in accordance with the DP was less than one, this elevated area is compliant with the C-T Phase II DP for elevated measurements in soil.

$$Index = \frac{(44.07 - 1.3)\ pCi/g}{(2.25 \times 23.9\ pCi/g)_{Th\ series}} + \frac{(11.10 - 2.5)\ pCi/g}{(2.4 \times 29.4\ pCi/g)_{Ra226}} + \frac{(23.37 - 4.4)\ pCi/g}{(3.3 \times 721\ pCi/g)_{U}} = 0.93$$

28.3.1.2 Building 240 Center

Elevated Area #2

Parameters necessary to calculate the *Index* value for the small area along the west edge of SU22 under the Building 240 foundation near the center of the building (Samples 334 and 335) noted as Elevated Area #2 as shown in Figure 28-11 were:

- The elevated area activity levels, represented by the average activity observed of the grab samples taken along the exposed face of the excavation were 1.50, 60.89, and 23.81 pCi/g for ^{232}Th, ^{226}Ra, and ^{238}U, respectively (from Table 28-3);
- Mean background activity levels were 1.3, 2.5, and 4.4 pCi/g for ^{232}Th, ^{226}Ra, and ^{238}U, respectively (from C-T Phase II DP Table 4-17);
- The size of the elevated area was determined to be approximately 1 m by 3 m, or 3.0 m^2; and,
- The area factors from C-T Phase II DP Figure 5-3 for the elevated area were 2.25, 2.4, and 3.3 for ^{232}Th, ^{226}Ra, and ^{238}U, respectively.

The calculation of the *Index* value is shown below. Because the *Index* value as calculated in accordance with the DP was less than one, this elevated area is compliant with the C-T Phase II DP for elevated measurements in soil.

$$Index = \frac{(1.50 - 1.3)\ pCi/g}{(2.25 \times 23.9\ pCi/g)_{Th\ series}} + \frac{(60.89 - 2.5)\ pCi/g}{(2.4 \times 29.4\ pCi/g)_{Ra226}} + \frac{(23.81 - 4.4)\ pCi/g}{(3.3 \times 721\ pCi/g)_{U}} = 0.84$$

28.3.1.3 Building 240 South

Elevated Area #3

Parameters necessary to calculate the *Index* value for the small area along the west edge of SU22 under the Building 240 foundation near the south of the building (Sample 217) noted as Elevated Area #3 as shown in Figure 28-11 were:

- The elevated area activity levels, represented by the average activity observed of the grab samples taken along the exposed face of the excavation were 1.89, 148.91, and 47.57 pCi/g for ^{232}Th, ^{226}Ra, and ^{238}U, respectively (from Table 28-3);
- Mean background activity levels were 1.3, 2.5, and 4.4 pCi/g for ^{232}Th, ^{226}Ra, and ^{238}U, respectively (from C-T Phase II DP Table 4-17);
- The size of the elevated area was determined to be approximately 1 m by 1 m, or 1.0 m^2; and,
- The area factors from C-T Phase II DP Figure 5-3 for the elevated area were 2.25, 2.4, and 3.3 for ^{232}Th, ^{226}Ra, and ^{238}U, respectively.

The calculation of the *Index* value is shown below. Because the *Index* value as calculated in accordance with the DP was greater than one, this elevated area is not compliant with the C-T Phase II DP for elevated measurements in soil. Section 28.5 discusses the dose assessment performed to evaluate the impact of this area that is not compliant with the DCGLs

$$Index = \frac{(1.89 - 1.3)\ pCi/g}{(2.25 \times 23.9\ pCi/g)_{Th\ series}} + \frac{(148.91 - 2.5)\ pCi/g}{(2.4 \times 29.4\ pCi/g)_{Ra226}} + \frac{(47.57 - 4.4)\ pCi/g}{(3.3 \times 721\ pCi/g)_{U}} = 2.10$$

28.3.2 Data Set Screening Analysis

Table 28-9 summarizes the results of the screening tests performed on the FSS data (top 1-m composites) in accordance with Pages 14-27 through 14-29 of the C-T Phase II DP. All applicable tests demonstrating compliance passed.

Table 28-9 Screening Tests Results – Excavated Surface

Screening Test	Test Value	Conclusion
Min/Max	0.46	PASS
Low Level	N/A	Not applicable; Class 1 survey unit
DCGL	N/A	Not applicable; Min/Max < 1
EMC Limit	0.26	PASS

28.3.2.1 Min/Max

In accordance with Page 14-27 of the C-T Phase II DP, the Min/Max screening test value was calculated by subtracting the minimum reference area result from the maximum survey unit systematic result. Sample 1513 with a gross SOF of 0.48 (from Table 28-1) was the maximum survey unit systematic result. Sample BH-Z-08 with a calculated gross SOF of 0.02 (from C-T

Phase II DP Table B-1) was the minimum reference area result. The Min/Max screening test value was calculated to be 0.46. Because the test value was less than one, no further computations are required, i.e., $DCGL_W$ screening and Wilcoxon Rank Sum (WRS) tests.

28.3.2.2 Low Level

In accordance with Page 14-27 of the C-T Phase II DP, the Low Level screening test is not applicable to Class 1 survey units.

28.3.2.3 $DCGL_W$

In accordance with Page 14-28 of the C-T Phase II DP and because the Min/Max test value was less than one, the $DCGL_W$ screening test was not applicable to the excavated surface of this survey unit.

28.3.2.4 EMC Limit

In accordance with Page 14-28 of the C-T Phase II DP, the elevated measurement comparison (EMC) limit screening test was applied due to the elevated areas along the eastern edge of SU22 adjacent to SU10. Parameters necessary to calculate the exposure-weighted fraction of the $DCGL_W$, *F*, were:

- The size of the elevated areas were determined to be approximately 3 m^2 for area #1a, 4 m^2 for area #1b, 3.0 m^2 for area #2 and 1.0 m^2 for area #3,
- The area factor from C-T Phase II DP Figure 5-3 for the elevated area was set to 2.25, 2.4 and 3.3 for areas #1a, #1b, #2 and #3 respectively (based on thorium series only),
- The elevated area activity levels were a gross SOF of 1.50, 2.25, 2.17 and 5.21 for areas #1a, #1b, #2 and #3, respectively; and,
- The survey unit average was a gross SOF = 0.21 (refer to Table 28-1).

The calculation of the EMC screening test result is shown below, using C-T Phase II DP Equation 14-7.

$$F = \left[\frac{3\ m^2}{2{,}622\ m^2} \times \frac{1.5}{2.25 \times 1}\right] + \left[\frac{4\ m^2}{2{,}622\ m^2} \times \frac{2.25}{2.25 \times 1}\right] + \left[\frac{3\ m^2}{2{,}622\ m^2} \times \frac{2.17}{2.25 \times 1}\right] + \left[\frac{1\ m^2}{2{,}622\ m^2} \times \frac{5.21}{2.25 \times 1}\right] + \left[\frac{(2{,}622 - 3 - 4 - 3 - 1)\ m^2}{2{,}622\ m^2} \times \frac{0.21}{1}\right] = 0.21$$

In accordance with the C-T Phase II DP and because the result was less than one, the total radioactivity concentration in the survey unit is within the release criterion.

28.3.3 WRS Test

In accordance with Page 14-29 of the C-T Phase II DP and because the Min/Max test value was less than one, the WRS Test was not required to demonstrate compliance.

28.3.4 Retrospective Analysis

A retrospective analysis was performed of the FSS results to determine whether the results met the survey design objectives, in accordance with Page 14-30 of the C-T Phase II DP. Table 28-10 provides the results of the retrospective analysis. Because the actual sample size exceeded the retrospective value sample size, the conclusion is that the survey design objectives were met.

Table 28-10 Retrospective Analysis – Surface (Top 1-meter)

Parameter	*A Priori* Value	Retrospective Value Based on FSS Results (Gross SOF)
Upper Bound of Gray Region	DCGL = 1	1
Lower Bound of Gray Region	0.5 x DCGL = 0.5	0.21
Spatial Variability (standard deviation)	1/6 x DCGL = 0.17	0.09
Type I Error (false positive)	0.05	0.05
Type II Error (false negative)	0.05	0.05
Relative Shift	3	8.6
Calculated N/2 Sample Size	15 [a]	9
Actual N/2 Sample Size	--	15

[a] The *a priori* value of 15 for the N/2 sample size was determined to be a conservative value that would allow application of either the Sign or WRS test. The *a priori* value for N/2 is 10 based on MARSSIM Table 5.3.

28.4 DATA ANALYSIS – SUBSURFACE MATERIAL

Data analysis of the subsurface material was performed based on the assumptions, methods, and performance criteria established to satisfy the DQOs in accordance with the C-T Phase II DP, Sections 14.4.1 and 14.4.3. Column average gross SOF results were used in the data assessment. Borehole sampling was stopped when native clay soil was reached or refusal encountered. Per Page 14-19 of the C-T Phase II DP, column averages were calculated over 1-meter increments (averaged 0 to 1 m, 0 to 2 m, etc.) for the set of systematic samples collected. Table 28-11 provides the calculated borehole column average gross SOF results while Table 28-12 provides the net SOF results.

Table 28-11 Systematic Borehole Column Average Gross SOF Results

Sample Location	Core Depth Interval (m)			
	0-1	0-2	0-3	0-4
	Combined Results for Column Average Gross SOF [a]			
S01	0.10	0.10	0.10	
S02	0.21	0.22		
S03	0.25	0.19		
S04	0.48	0.31		
S05	0.18	0.14	0.13	
S06	0.18	0.40		
S07	0.17	0.17		
S08	0.14	0.20	0.20	0.18

Table 28-11 Systematic Borehole Column Average Gross SOF Results (Continued)

Sample Location	Core Depth Interval (m)			
	0-1	0-2	0-3	0-4
	Combined Results for Column Average Gross SOF [a]			
S09	0.28	0.27		
S10	0.30	0.31		
S11	0.19	0.18	0.17	
S12	0.22	0.18		
S13	0.14	0.12		
S14	0.22	0.22		
S15	0.15	0.18		
Summary Statistics				
Count:	15	15	4	1
Average:	0.21	0.21	0.15	0.18
Median:	0.19	0.19	0.15	0.18
Standard Dev.:	0.09	0.08	0.04	
Minimum:	0.10	0.10	0.10	0.18
Maximum:	0.48	0.40	0.20	0.18
Range:	0.37	0.30	0.10	0.00

[a] Calculation of column average gross SOF used off-site results.

Table 28-12 Systematic Borehole Column Average Net SOF Results

Sample Location	Core Depth Interval (m)			
	0-1	0-2	0-3	0-4
	Combined Results for Column Average Net SOF [a]			
S01	0.00	0.00	0.00	
S02	0.07	0.07		
S03	0.11	0.04		
S04	0.33	0.17		
S05	0.05	0.02	0.01	
S06	0.04	0.25		
S07	0.05	0.04		
S08	0.01	0.06	0.05	0.03
S09	0.15	0.13		
S10	0.15	0.16		
S11	0.04	0.04	0.03	
S12	0.08	0.04		
S13	0.01	0.01		
S14	0.08	0.07		
S15	0.02	0.04		

[a] Calculation of column average net SOF used off-site results.

Table 28-12 Systematic Borehole Column Average Net SOF Results (Continued)

Sample Location	Core Depth Interval (m)			
	0-1	0-2	0-3	0-4
	Combined Results for Column Average Net SOF [a]			
Summary Statistics				
Count:	15	15	4	1
Average:	0.08	0.08	0.02	0.03
Median:	0.05	0.04	0.02	0.03
Standard Dev.:	0.08	0.07	0.02	
Minimum:	0.00	0.00	0.00	0.03
Maximum:	0.33	0.25	0.05	0.03
Range:	0.33	0.25	0.05	0.00

[a] Calculation of column average net SOF used off-site results.

28.4.1 Data Set Screening Analysis

Table 28-13 summarizes the results of the screening tests performed on the systematic borehole subsurface FSS data in accordance with Pages 14-27 through 14-29 of the C-T Phase II DP. All applicable tests demonstrating compliance passed.

Table 28-13 Screening Tests Results – Subsurface Material

Screening Test	Test Value	Conclusion
0 – 1 m		
Min/Max	0.46	PASS
Low Level	N/A	Not applicable; Class 1 survey unit
DCGL	N/A	Not applicable; Min / Max < 1
EMC Limit	N/A	Not applicable; subsurface material
0 – 2 m		
Min/Max	0.38	PASS
Low Level	N/A	Not applicable; Class 1 survey unit
DCGL	N/A	Not applicable; Min / Max < 1
EMC Limit	N/A	Not applicable; subsurface material
0 – 3 m		
Min/Max	0.18	PASS
Low Level	N/A	Not applicable; Class 1 survey unit
DCGL	N/A	Not applicable; Min / Max < 1
EMC Limit	N/A	Not applicable; subsurface material
0 – 4 m		
Min/Max	0.16	PASS
Low Level	N/A	Not applicable; Class 1 survey unit
DCGL	N/A	Not applicable; Min / Max < 1
EMC Limit	N/A	Not applicable; subsurface material

28.4.1.1 Min/Max

In accordance with Page 14-27 of the C-T Phase II DP, the Min/Max screening test value was calculated by subtracting the minimum reference area result from the maximum survey unit systematic result. Sample Location S04 had the maximum survey unit systematic column average gross SOF of 0.48 for 0-1 m (from Table 28-11). Location S06 had the maximum survey unit systematic column average gross SOF of 0.40 for 0-2 m (from Table 28-11). Location S08 had the maximum survey unit systematic column average gross SOF of 0.20 and 0.18 for 0-3 m and 0-4 m, respectively (from Table 28-11). Sample BH-Z-08 with a calculated gross SOF of 0.02 (from C-T Phase II DP Table B-1) was the minimum reference area result. The Min/Max screening test value was calculated to be 0.46, 0.38, 0.18, and 0.16 for 0-1 m, 0-2 m, 0-3 m and 0-4 m respectively. Because the test value was less than one for 0-1 m, 0-2 m, 0-3 m and 0-4 m, further computations are not required, i.e., $DCGL_W$ screening and Wilcoxon Rank Sum (WRS) tests.

28.4.1.2 Low Level

In accordance with Page 14-27 of the C-T Phase II DP, the Low Level screening test is not applicable to Class 1 survey units.

28.4.1.3 $DCGL_W$

In accordance with Page 14-28 of the C-T Phase II DP and because the Min/Max test value was less than one, the $DCGL_W$ screening test was not applicable to subsurface material for this survey unit.

28.4.1.4 EMC Limit

In accordance with Page 14-26 of the C-T Phase II DP, the $DCGL_{EMC}$ is not applicable to subsurface survey units, in this case the assessment of the subsurface material in the survey unit. Thus, the EMC limit is not applicable.

28.4.2 WRS Test

In accordance with Page 14-29 of the C-T Phase II DP and because the Min/Max test values were less than one, the WRS Test was not required to demonstrate compliance.

28.4.3 Retrospective Analysis

A retrospective analysis was performed of the FSS results to determine whether the results met the survey design objectives, in accordance with Page 14-30 of the C-T Phase II DP.

Table 28-14 and Table 28-15 provide the results of the retrospective analysis for 0-1 m and 0-2 m. Because the actual sample size exceeded the retrospective value sample size, the conclusion is that the survey design objectives were met.

Table 28-16 and Table 28-17 provide the results of the retrospective analysis for 0-3 m and 0-4 m. In both cases, the actual sample size was less than the retrospective value sample size.

This is the result of a limited sample size due to encountering refusal in the soil column, not because elevated contamination caused a large calculated relative shift. Based on this result and the core boring results provided in Section 28.2.3, it was reasonable to not re-perform the systematic FSS borehole sampling at new locations for two reasons: 1) FSS data results were consistent with characterization data results and 2) if the systematic FSS boring sampling was re-performed, it was anticipated that a large fraction of the new locations would have a reduced number of samples from 0-3 m and 0-4 m because of encountering refusal in the soil column, as with the original locations. Therefore, the FSS for 0-3 m and 0-4 m was considered adequate for demonstrating compliance in this situation.

Table 28-14 Retrospective Analysis – 0-1 m

Parameter	*A Priori* Value	Retrospective Value Based on FSS Results (Gross SOF)
Upper Bound of Gray Region	DCGL = 1	1
Lower Bound of Gray Region	0.5 x DCGL = 0.5	0.21
Spatial Variability (standard deviation)	1/6 x DCGL = 0.17	0.09
Type I Error (false positive)	0.05	0.05
Type II Error (false negative)	0.05	0.05
Relative Shift	3	8.8
Calculated N/2 Sample Size	15 [a]	9
Actual N/2 Sample Size	--	15

[a] The *a priori* value of 15 for the N/2 sample size was determined to be a conservative value that would allow application of either the Sign or WRS test. The *a priori* value for N/2 is 10 based on MARSSIM Table 5.3.

Table 28-15 Retrospective Analysis – 0-2 m

Parameter	*A Priori* Value	Retrospective Value Based on FSS Results (Gross SOF)
Upper Bound of Gray Region	DCGL = 1	1
Lower Bound of Gray Region	0.5 x DCGL = 0.5	0.21
Spatial Variability (standard deviation)	1/6 x DCGL = 0.17	0.08
Type I Error (false positive)	0.05	0.05
Type II Error (false negative)	0.05	0.05
Relative Shift	3	9.9
Calculated N/2 Sample Size	15 [a]	9
Actual N/2 Sample Size	--	15

[a] The *a priori* value of 15 for the N/2 sample size was determined to be a conservative value that would allow application of either the Sign or WRS test. The *a priori* value for N/2 is 10 based on MARSSIM Table 5.3.

Table 28-16 Retrospective Analysis – 0-3 m

Parameter	*A Priori* Value	Retrospective Value Based on FSS Results (Gross SOF)
Upper Bound of Gray Region	DCGL = 1	1
Lower Bound of Gray Region	0.5 x DCGL = 0.5	0.15
Spatial Variability (standard deviation)	1/6 x DCGL = 0.17	0.04
Type I Error (false positive)	0.05	0.05
Type II Error (false negative)	0.05	0.05
Relative Shift	3	21.3
Calculated N/2 Sample Size	15 [a]	9
Actual N/2 Sample Size	--	4

[a] The *a priori* value of 15 for the N/2 sample size was determined to be a conservative value that would allow application of either the Sign or WRS test. The *a priori* value for N/2 is 10 based on MARSSIM Table 5.3.

Table 28-17 Retrospective Analysis – 0-4 m

Parameter	*A Priori* Value	Retrospective Value Based on FSS Results (Gross SOF)
Upper Bound of Gray Region	DCGL = 1	1
Lower Bound of Gray Region	0.5 x DCGL = 0.5	0.18
Spatial Variability (standard deviation)	1/6 x DCGL = 0.17	NA
Type I Error (false positive)	0.05	0.05
Type II Error (false negative)	0.05	0.05
Relative Shift	3	NA
Calculated N/2 Sample Size	15 [a]	NA
Actual N/2 Sample Size	--	1

[a] The *a priori* value of 15 for the N/2 sample size was determined to be a conservative value that would allow application of either the Sign or WRS test. The *a priori* value for N/2 is 10 based on MARSSIM Table 5.3.

28.5 DOSE ASSESSMENT(S)

The elevated area evaluation (Section 28.3.1) for Elevated Areas #1a, #1b, #2 and #3 calculated an *Index* value of 0.56, 0.93, 0.84 and 2.10 respectively for the areas identified. Because the value for Elevated Area #3 was greater than one, this area failed to demonstrate compliance using the DCGLs developed in C-T Phase II DP Chapter 5. As an alternative, this section presents the results of dose assessments performed to evaluate this area.

28.5.1 Verification of RESRAD v6.5

C-T Phase II DP Chapter 5 presented three dose models (cases) in the development of the DCGLs. 408guti, 407guti, and 399guti were the RESRAD v6.4 cases for the thorium series, natural uranium, and "6 ^{230}Th + ^{226}Ra + ^{210}Pb," respectively. Energy*Solutions* was currently using RESRAD v6.5; therefore, to ensure comparable results, the three cases mentioned were run in the later version. Section 12.5.1 of this FSSR documents the results of the comparison. In

conclusion, RESRAD v6.5 provided identical or comparable results to RESRAD v6.4 and therefore RESRAD v6.5 was used to perform the dose assessments.

28.5.2 Elevated Area Characterization

28.5.2.1 Elevated Area Size

Elevated Area #3, along the SU10 and SU22 boundary toward the south end of Building 240 as shown in Figure 28-11, was relatively small and was estimated to be approximately 1 m by 1 m for an area of approximately 1 m^2. Remaining contamination is limited to approximately to top 1 ft of soil directly under the building foundation.

28.5.2.2 Radionuclide Concentrations

The gross activity levels for Elevated Area #3, represented by sample 0217 as presented in Table 28-3 and summarized in Table 28-18, are 1.89, 148.91, and 47.57 pCi/g for ^{232}Th, ^{226}Ra, and ^{238}U, respectively. The net activity levels are 0.59, 147.61, and 46.27 pCi/g for ^{232}Th, ^{226}Ra, and ^{238}U, respectively.

Table 28-18 Elevated Area #3 Radionuclide Concentrations

Sample ID	Gross				Net			
	Concentration (pCi/g)			SOF [a]	Concentration (pCi/g)			SOF [a]
	^{232}Th	^{226}Ra	^{238}U		^{232}Th	^{226}Ra	^{238}U	
0217	1.89	148.91	47.57	**5.21**	0.59	147.61	46.27	**5.11**
Avg.	1.89	148.91	47.57	**5.21**	0.59	147.61	46.27	**5.11**

[a] **Bolded red** SOF values indicate a result >1.

28.5.3 *In Situ* Models and Results

28.5.3.1 RESRAD Models

The C-T Phase II DP Chapter 5 RESRAD models 408guti, 407guti, and 399guti were identical except for the entered radionuclide concentrations. Three models were run in order to develop independent DCGLs. For these elevated areas, the actual radionuclide concentrations were established based on sampling and therefore independent models with respect to modeled radionuclides were not required. Table 28-19 provide the RESRAD *in situ* model parameters that were changed from the C-T Phase II DP Chapter 5 RESRAD models and the justification for each change for Elevated Area #3.

Table 28-19 RESRAD In Situ Model Parameters for Elevated Area #3

Parameter	Value	Justification
Soil Concentrations		
^{228}Ra, ^{228}Th, and ^{232}Th	0.59 pCi/g	Thorium series in secular equilibrium per C-T Phase II DP Section 5.8.2. Average net ^{232}Th concentration from Section 28.5.2.2.
^{226}Ra and ^{210}Pb	147.61 pCi/g	^{226}Ra and progeny in secular equilibrium per C-T Phase II DP Section 5.8.4. Average net ^{226}Ra concentration from Section 28.5.2.2.
^{230}Th	885.66 pCi/g	^{230}Th was not measured in FSS samples. The ^{230}Th / ^{226}Ra ratio of 6 was assumed per C-T Phase II DP Section 5.8.4.
^{238}U and ^{234}U	46.27 pCi/g	For natural uranium, the concentrations of ^{238}U and ^{234}U are equal per C-T Phase II DP Section 5.8.3. Average net ^{238}U concentration from Section 28.5.2.2.
^{235}U, ^{231}Pa, and ^{227}Ac	2.11 pCi/g	^{235}U and progeny in naturally-occurring proportion (^{235}U / ^{238}U = 0.0455) per C-T Phase II DP Section 5.8.3.
Contaminated Zone		
Area	1.0 m^2	Area beneath the Building 240 foundation toward the south end of the building along the east edge of SU22 as discussed in Section 28.5.2.1.
Thickness	0.305 m	Thickness of the elevated area below the building foundation discussed in Section 28.5.2.1.
Cover/Hydrol.		
Cover depth	0.00 m	Located directly under the pavement and building foundation.

28.5.3.2 Results

The maximum dose for Elevated Area #3 was 12.0 mrem/yr at year 0. APPENDIX A provides the RESRAD summary report.

28.5.4 Excavation Scenario Models and Results

In addition to evaluating the dose from the elevated areas *in situ*, an excavation scenario was developed to evaluate the dose if the contaminated material was exposed. It is unlikely, based on the future use scenario described in C-T Phase II DP Chapter 5, that large areas of contaminated material would be exposed during future site activities. No building foundations or basements are expected to be installed at the site, so excavation to expose the entire elevated area is unlikely except during building demolition. Utility systems are likely to be installed and most systems are installed in the 6 ft bgs (below grade surface) depth range; however, the specific depths of the elevated areas are not evaluated in this scenario.

28.5.4.1 RESRAD Models

Similar to the *in situ* models discussed in Section 28.5.3.1, one RESRAD model was developed for the excavation scenario. Table 28-20 provides the parameters for the RESRAD excavation scenario models that were changed from the C-T Phase II DP Chapter 5 RESRAD models and the justification for each change.

For Elevated Area #3, the scenario assumes that the elevated area is completely exposed due to its limited size. The total time in the trench is 0.5 hours, which equates to an outdoor time fraction of 0.000057 hours (0.5 hours / 8,766 hours). The indoor time fraction is zero.

Table 28-20 RESRAD Excavation Model Parameters for Elevated Area #3

Parameter	Value	Justification
Soil Concentrations		
^{228}Ra, ^{228}Th, and ^{232}Th	0.59 pCi/g	Thorium series in secular equilibrium per C-T Phase II DP Section 5.8.2. Average net ^{232}Th concentration from Section 28.5.2.2.
^{226}Ra and ^{210}Pb	147.61 pCi/g	^{226}Ra and progeny in secular equilibrium per C-T Phase II DP Section 5.8.4. Average net ^{226}Ra concentration from Section 28.5.2.2.
^{230}Th	885.66 pCi/g	^{230}Th was not measured in FSS samples. The ^{230}Th / ^{226}Ra ratio of 6 was assumed per C-T Phase II DP Section 5.8.4.
^{238}U and ^{234}U	46.27 pCi/g	For natural uranium, the concentrations of ^{238}U and ^{234}U are equal per C-T Phase II DP Section 5.8.3. Average net ^{238}U concentration from Section 28.5.2.2.
^{235}U, ^{231}Pa, and ^{227}Ac	2.11 pCi/g	^{235}U and progeny in naturally-occurring proportion (^{235}U / ^{238}U = 0.0455) per C-T Phase II DP Section 5.8.3.
Contaminated Zone		
Area	1 m^2	Total area of Elevated Area #4 is assumed to be completely exposed.
Thickness	0.30 m	C-T Phase II DP Appendix D, Page D-17, documents that for the radionuclide mixture used to develop the DCGLs that the maximum dose rate by direct radiation is reached asymptotically when the contaminated zone thickness reaches about 30 cm. Additional contaminated zone thickness does not result in additional dose.
Occupancy, Inhalation, and External Gamma Data		
Indoor time fraction	0	No internal exposure applicable for the critical receptor within a trench.
Outdoor time fraction	0.000057 hours	0.5 hours for this length of trench within any given modeled year.

28.5.4.2 Results

The maximum dose for Elevated Area #3 was 8.588E-03 mrem/yr at year 0. APPENDIX B provides the RESRAD summary report.

28.5.5 Dose Using Survey Unit Average

Table 28-1 provides the systematic sample results for the top 1-m of soil. The average net SOF result is 0.08. This corresponds to a dose of 2.00 mrem/yr.

28.5.6 Conclusion

Adding together the *in situ* doses as specified in Section 28.5.3.2, the cumulative dose associated with elevated area #3 of 12.0 mrem/yr and the dose from the survey unit average of 2.00 mrem/yr, the as-left total dose from the survey unit is 14.0 mrem/yr.

The independently-evaluated excavation scenario dose as specified in Section 28.5.4.2 was 0.0086 mrem/yr. When considering the dose contribution of the excavation walls, the total dose could be up to 0.026 mrem/yr.

28.6 DEVIATIONS

In accordance with the second bullet in Section 14.5 of the C-T Phase II DP, the FSSR is required to list changes made in the FSS from what was proposed in the DP. Two deviations were noted.

First, page 14-27 of the C-T Phase II DP indicated that the "data set for the survey unit will be processed within a database using screening software developed and verified for the project." This database was not developed; instead, a combination of Microsoft® Excel® spreadsheets and hand calculations was utilized. This deviation is not significant and does not affect the data collection or assessment.

Second, a 100% GWS was not performed over the full survey unit. All exterior areas did receive a 100% GWS; however, areas within Buildings 240 and 250 were not scanned. Both buildings house active manufacturing operations with limited access. Additionally, upon reclassification of the survey unit, sampling within the buildings through the concrete pads was performed including biased samples along the excavation boundary immediately to the east of the buildings as well as systematic samples throughout the buildings. During sampling, the concrete was determined to be approximately 6-inches thick. Considering both the thickness of the concrete within the buildings and the findings from both the systematic and biased sampling efforts within the buildings as presented in this Chapter, this deviation was determined to be not significant.

28.7 NRC INSPECTIONS

A summary of U.S. Nuclear Regulatory Commission (NRC) inspections applicable to the FSS are provided in Section 5.8 of this FSSR. The scope of the inspections included, but was not limited to: review of project plans, interviewing of project personnel, evaluation of the on-site laboratory, and independent confirmatory surveys conducted by the NRC after backfilling. No specific NRC inspection was performed during the survey and sampling of SU22.

28.8 CONCLUSION

FSS data were verified to be reliable, appropriately documented, and technically defensible. Specifically, the following conclusions are made:

- The instruments used to collect the data were capable of detecting the radiation type (i.e., gamma) at or below the release criteria (described in Sections 4.4 and 4.5 of this FSSR).
- The calibration of the instruments used to collect the data was current and radioactive sources used for calibration were National Institute of Standards and Technology (NIST) traceable (described in Section 5.4 of this FSSR). Specific records available upon request.
- Instrument response was checked before instrument use each day, at minimum (described in Section 5.4 of this FSSR). Specific records available upon request.

- The survey methods used to collect the data were appropriate for the media and type of radiation being measured (described in Section 4.4, 4.5, and 4.6 of this FSSR).
- The custody of samples collected for laboratory analysis was tracked from the point of collection until final results were obtained (described in Section 5.5.2 of this FSSR). Specific records available upon request.
- The survey data consist of qualified measurement results that are representative of the area of interest.
- Areas identified with elevated residual radioactivity (i.e. SOF > 1.0) were appropriately bounded, investigated and the $DCGL_{EMC}$ applied in accordance with the DP.

All the applicable screening tests passed, the retrospective analysis found that the survey design objectives were met, and additional subsurface contamination was not reasonably suspected. SU22 meets the industrial use scenario release criterion as established in the C-T Phase II DP Chapter 5; and therefore, satisfies the unrestricted release provisions of Title 10, Code of Federal Regulations (CFR), Part 20, Subpart E.

28.9 REFERENCES

Mallinckrodt, *Mallinckrodt Columbium-Tantalum Phase II Decommissioning Plan*, Revision 2, August 2008.

APPENDIX A

RESRAD v6.5 Summary Report for Elevated Area #3 *In Situ* Model

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Summary : SU22 Elevated Area #3 In-situ Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 IN SITU.RAD

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Part I: Mixture Sums and Single Radionuclide Guidelines

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Summary : SU22 Elevated Area #3 In-situ Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 IN SITU.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	Ac-228 (Source: FGR 12)	5.978E+00	5.978E+00	DCF1(2)
A-1	At-218 (Source: FGR 12)	5.847E-03	5.847E-03	DCF1(3)
A-1	Bi-210 (Source: FGR 12)	3.606E-03	3.606E-03	DCF1(4)
A-1	Bi-211 (Source: FGR 12)	2.559E-01	2.559E-01	DCF1(5)
A-1	Bi-212 (Source: FGR 12)	1.171E+00	1.171E+00	DCF1(6)
A-1	Bi-214 (Source: FGR 12)	9.808E+00	9.808E+00	DCF1(7)
A-1	Fr-223 (Source: FGR 12)	1.980E-01	1.980E-01	DCF1(8)
A-1	Pa-231 (Source: FGR 12)	1.906E-01	1.906E-01	DCF1(9)
A-1	Pa-234 (Source: FGR 12)	1.155E+01	1.155E+01	DCF1(10)
A-1	Pa-234m (Source: FGR 12)	8.967E-02	8.967E-02	DCF1(11)
A-1	Pb-210 (Source: FGR 12)	2.447E-03	2.447E-03	DCF1(12)
A-1	Pb-211 (Source: FGR 12)	3.064E-01	3.064E-01	DCF1(13)
A-1	Pb-212 (Source: FGR 12)	7.043E-01	7.043E-01	DCF1(14)
A-1	Pb-214 (Source: FGR 12)	1.341E+00	1.341E+00	DCF1(15)
A-1	Po-210 (Source: FGR 12)	5.231E-05	5.231E-05	DCF1(16)
A-1	Po-211 (Source: FGR 12)	4.764E-02	4.764E-02	DCF1(17)
A-1	Po-212 (Source: FGR 12)	0.000E+00	0.000E+00	DCF1(18)
A-1	Po-214 (Source: FGR 12)	5.138E-04	5.138E-04	DCF1(19)
A-1	Po-215 (Source: FGR 12)	1.016E-03	1.016E-03	DCF1(20)
A-1	Po-216 (Source: FGR 12)	1.042E-04	1.042E-04	DCF1(21)
A-1	Po-218 (Source: FGR 12)	5.642E-05	5.642E-05	DCF1(22)
A-1	Ra-223 (Source: FGR 12)	6.034E-01	6.034E-01	DCF1(23)
A-1	Ra-224 (Source: FGR 12)	5.119E-02	5.119E-02	DCF1(24)
A-1	Ra-226 (Source: FGR 12)	3.176E-02	3.176E-02	DCF1(25)
A-1	Ra-228 (Source: FGR 12)	0.000E+00	0.000E+00	DCF1(26)
A-1	Rn-219 (Source: FGR 12)	3.083E-01	3.083E-01	DCF1(27)
A-1	Rn-220 (Source: FGR 12)	2.298E-03	2.298E-03	DCF1(28)
A-1	Rn-222 (Source: FGR 12)	2.354E-03	2.354E-03	DCF1(29)
A-1	Th-227 (Source: FGR 12)	5.212E-01	5.212E-01	DCF1(30)
A-1	Th-228 (Source: FGR 12)	7.940E-03	7.940E-03	DCF1(31)
A-1	Th-230 (Source: FGR 12)	1.209E-03	1.209E-03	DCF1(32)
A-1	Th-231 (Source: FGR 12)	3.643E-02	3.643E-02	DCF1(33)
A-1	Th-232 (Source: FGR 12)	5.212E-04	5.212E-04	DCF1(34)
A-1	Th-234 (Source: FGR 12)	2.410E-02	2.410E-02	DCF1(35)
A-1	Tl-207 (Source: FGR 12)	1.980E-02	1.980E-02	DCF1(36)
A-1	Tl-208 (Source: FGR 12)	2.298E+01	2.298E+01	DCF1(37)
A-1	Tl-210 (Source: no data)	0.000E+00	-2.000E+00	DCF1(38)
A-1	U-234 (Source: FGR 12)	4.017E-04	4.017E-04	DCF1(39)
A-1	U-235 (Source: FGR 12)	7.211E-01	7.211E-01	DCF1(40)
A-1	U-238 (Source: FGR 12)	1.031E-04	1.031E-04	DCF1(41)
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	1.380E-02	1.360E-02	DCF2(3)
B-1	Po-210	9.400E-03	9.400E-03	DCF2(4)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(5)
B-1	Ra-228+D	5.078E-03	4.770E-03	DCF2(6)

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Summary : SU22 Elevated Area #3 In-situ Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 IN SITU.RAD

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

Menu	Parameter	Current Value#	Base Case*	Parameter Name
B-1	Th-228+D	3.454E-01	3.420E-01	DCF2(7)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(8)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(9)
B-1	U-234	1.320E-01	1.320E-01	DCF2(10)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(11)
B-1	U-238	1.180E-01	1.180E-01	DCF2(12)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(13)
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	5.376E-03	5.370E-03	DCF3(3)
D-1	Po-210	1.900E-03	1.900E-03	DCF3(4)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(5)
D-1	Ra-228+D	1.442E-03	1.440E-03	DCF3(6)
D-1	Th-228+D	8.086E-04	3.960E-04	DCF3(7)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(8)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(9)
D-1	U-234	2.830E-04	2.830E-04	DCF3(10)
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(11)
D-1	U-238	2.550E-04	2.550E-04	DCF3(12)
D-1	U-238+D	2.687E-04	2.550E-04	DCF3(13)
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	Po-210 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(4,1)
D-34	Po-210 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(4,2)
D-34	Po-210 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.400E-04	3.400E-04	RTF(4,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)
D-34				
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(6,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(6,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(6,3)
D-34				

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Summary : SU22 Elevated Area #3 In-situ Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 IN SITU.RAD

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

Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(9,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(9,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(9,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-34				
D-34	U-238 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(12,1)
D-34	U-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(12,2)
D-34	U-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(12,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(13,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(13,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(13,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				
D-5	Po-210 , fish	1.000E+02	1.000E+02	BIOFAC(4,1)
D-5	Po-210 , crustacea and mollusks	2.000E+04	2.000E+04	BIOFAC(4,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(6,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(6,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5				

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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-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5				
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(9,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(9,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)
D-5				
D-5	U-238 , fish	1.000E+01	1.000E+01	BIOFAC(12,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(12,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(13,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(13,2)

#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.

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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+00	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	3.048E-01	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)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	2.110E+00	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	2.110E+00	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	1.476E+02	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	1.476E+02	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Ra-228	5.900E-01	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-228	5.900E-01	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-230	8.857E+02	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): Th-232	5.900E-01	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-234	4.627E+01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-235	2.110E+00	0.000E+00	---	S1(11)
R012	Initial principal radionuclide (pCi/g): U-238	4.627E+01	0.000E+00	---	S1(12)
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(5)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(11)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(12)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	4.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	0.000E+00	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.329E-02	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)	5.000E+01	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	1.742E-02	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	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	8.731E-03	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.246E-02	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.246E-02	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.458E-05	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.458E-05	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.458E-05	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.742E-02	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.742E-02	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)

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Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(12)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(12,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(12)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.742E-02	ALEACH(12)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(12)
R016	Distribution coefficients for daughter Po-210				
R016	Contaminated zone (cm**3/g)	1.000E+01	1.000E+01	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.569E-02	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R017	Inhalation rate (m**3/yr)	1.227E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	3.500E-05	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	6.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	1.700E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	1.825E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	4.563E-02	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	1	---	---	KYMAX

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Summary of Pathway Selections

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

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Summary : SU22 Elevated Area #3 In-situ Model
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Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	1.00 square meters	Ac-227	2.110E+00
Thickness:	0.30 meters	Pa-231	2.110E+00
Cover Depth:	0.00 meters	Pb-210	1.476E+02
		Ra-226	1.476E+02
		Ra-228	5.900E-01
		Th-228	5.900E-01
		Th-230	8.857E+02
		Th-232	5.900E-01
		U-234	4.627E+01
		U-235	2.110E+00
		U-238	4.627E+01

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

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.197E+01	1.184E+01	1.160E+01	1.078E+01	8.834E+00	4.919E+00	1.026E-01	0.000E+00
M(t):	4.788E-01	4.738E-01	4.638E-01	4.311E-01	3.533E-01	1.968E-01	4.105E-03	0.000E+00

Maximum TDOSE(t): 1.197E+01 mrem/yr at t = 0.000E+00 years

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Summary : SU22 Elevated Area #3 In-situ Model
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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	3.137E-02	0.0026	3.063E-02	0.0026	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.505E-04	0.0000
Pa-231	3.524E-03	0.0003	6.491E-03	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.886E-04	0.0000
Pb-210	7.507E-03	0.0006	6.097E-03	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.698E-03	0.0006
Ra-226	1.104E+01	0.9224	2.914E-03	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.728E-03	0.0001
Ra-228	2.866E-02	0.0024	7.661E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.246E-06	0.0000
Th-228	3.269E-02	0.0027	3.830E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.332E-06	0.0000
Th-230	2.376E-02	0.0020	6.470E-01	0.0541	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.043E-03	0.0003
Th-232	1.650E-03	0.0001	2.172E-03	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.385E-05	0.0000
U-234	1.701E-04	0.0000	1.357E-02	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.081E-04	0.0000
U-235	1.272E-02	0.0011	5.766E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.658E-06	0.0000
U-238	5.086E-02	0.0042	1.213E-02	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.026E-04	0.0000
Total	1.123E+01	0.9385	7.221E-01	0.0603	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.415E-02	0.0012

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 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	6.224E-02	0.0052
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	1.020E-02	0.0009
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	2.130E-02	0.0018
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	1.104E+01	0.9228
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.874E-02	0.0024
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.307E-02	0.0028
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	6.748E-01	0.0564
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.835E-03	0.0003
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	1.385E-02	0.0012
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	1.330E-02	0.0011
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.309E-02	0.0053
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	1.197E+01	1.0000

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio-	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	2.908E-02	0.0025	2.841E-02	0.0024	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.323E-04	0.0000
Pa-231	4.414E-03	0.0004	7.310E-03	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.930E-04	0.0000
Pb-210	7.231E-03	0.0006	6.958E-03	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.222E-03	0.0007
Ra-226	1.089E+01	0.9194	3.083E-03	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.956E-03	0.0002
Ra-228	3.432E-02	0.0029	1.756E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.288E-06	0.0000
Th-228	2.273E-02	0.0019	2.666E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.319E-06	0.0000
Th-230	5.223E-02	0.0044	6.470E-01	0.0546	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.048E-03	0.0003
Th-232	5.487E-03	0.0005	2.187E-03	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.473E-05	0.0000
U-234	1.671E-04	0.0000	1.333E-02	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.062E-04	0.0000
U-235	1.249E-02	0.0011	5.668E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.582E-06	0.0000
U-238	4.995E-02	0.0042	1.192E-02	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.009E-04	0.0000
Total	1.111E+01	0.9378	7.212E-01	0.0609	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.489E-02	0.0013

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 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	5.773E-02	0.0049
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	1.192E-02	0.0010
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	2.241E-02	0.0019
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	1.089E+01	0.9199
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.451E-02	0.0029
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.300E-02	0.0019
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	7.033E-01	0.0594
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.689E-03	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	1.361E-02	0.0011
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	1.306E-02	0.0011
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.197E-02	0.0052
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	1.184E+01	1.0000

*Sum of all water independent and dependent pathways.

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Summary : SU22 Elevated Area #3 In-situ Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 IN SITU.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	2.500E-02	0.0022	2.445E-02	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.999E-04	0.0000
Pa-231	5.946E-03	0.0005	8.709E-03	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.999E-04	0.0000
Pb-210	6.677E-03	0.0006	6.605E-03	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.728E-03	0.0007
Ra-226	1.060E+01	0.9138	3.424E-03	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.398E-03	0.0002
Ra-228	3.637E-02	0.0031	2.534E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.619E-06	0.0000
Th-228	1.099E-02	0.0009	1.292E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.124E-06	0.0000
Th-230	1.080E-01	0.0093	6.470E-01	0.0558	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.059E-03	0.0004
Th-232	1.417E-02	0.0012	2.242E-03	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.642E-05	0.0000
U-234	1.614E-04	0.0000	1.288E-02	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.026E-04	0.0000
U-235	1.206E-02	0.0010	5.478E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.433E-06	0.0000
U-238	4.818E-02	0.0042	1.152E-02	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.740E-05	0.0000
Total	1.086E+01	0.9368	7.178E-01	0.0619	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.481E-02	0.0013

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

Water Dependent Pathways

Radio-	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	4.965E-02	0.0043
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	1.485E-02	0.0013
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	2.101E-02	0.0018
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	1.060E+01	0.9143
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.663E-02	0.0032
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.112E-02	0.0010
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	7.590E-01	0.0655
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.643E-02	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	1.314E-02	0.0011
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	1.261E-02	0.0011
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.979E-02	0.0052
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	1.160E+01	1.0000

*Sum of all water independent and dependent pathways.

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Summary : SU22 Elevated Area #3 In-situ Model
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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	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	1.473E-02	0.0014	1.445E-02	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.182E-04	0.0000
Pa-231	9.288E-03	0.0009	1.168E-02	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.093E-04	0.0000
Pb-210	5.044E-03	0.0005	5.002E-03	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.851E-03	0.0005
Ra-226	9.625E+00	0.8930	4.326E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.592E-03	0.0003
Ra-228	1.968E-02	0.0018	1.642E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.168E-06	0.0000
Th-228	8.643E-04	0.0001	1.023E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.895E-08	0.0000
Th-230	2.906E-01	0.0270	6.470E-01	0.0600	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.114E-03	0.0004
Th-232	3.812E-02	0.0035	2.430E-03	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.048E-05	0.0000
U-234	1.434E-04	0.0000	1.140E-02	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.082E-05	0.0000
U-235	1.065E-02	0.0010	4.863E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.953E-06	0.0000
U-238	4.247E-02	0.0039	1.019E-02	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.622E-05	0.0000
Total	1.006E+01	0.9331	7.071E-01	0.0656	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.409E-02	0.0013

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 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	2.930E-02	0.0027
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	2.117E-02	0.0020
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	1.590E-02	0.0015
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.633E+00	0.8938
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.985E-02	0.0018
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.746E-04	0.0001
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	9.417E-01	0.0874
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.057E-02	0.0038
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	1.164E-02	0.0011
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	1.114E-02	0.0010
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.275E-02	0.0049
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	1.078E+01	1.0000

*Sum of all water independent and dependent pathways.

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Summary : SU22 Elevated Area #3 In-situ Model
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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 = 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	3.245E-03	0.0004	3.216E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.630E-05	0.0000
Pa-231	1.037E-02	0.0012	1.209E-02	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.792E-04	0.0000
Pb-210	2.263E-03	0.0003	2.256E-03	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.639E-03	0.0003
Ra-226	7.306E+00	0.8271	5.200E-03	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.948E-03	0.0006
Ra-228	1.443E-03	0.0002	1.260E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.313E-07	0.0000
Th-228	6.034E-07	0.0000	7.286E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.338E-11	0.0000
Th-230	7.185E-01	0.0813	6.469E-01	0.0732	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.344E-03	0.0005
Th-232	5.434E-02	0.0062	2.576E-03	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.321E-05	0.0000
U-234	1.051E-04	0.0000	8.051E-03	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.413E-05	0.0000
U-235	7.461E-03	0.0008	3.477E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.860E-06	0.0000
U-238	2.960E-02	0.0034	7.195E-03	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.085E-05	0.0000
Total	8.133E+00	0.9207	6.879E-01	0.0779	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.229E-02	0.0014

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	6.488E-03	0.0007
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	2.264E-02	0.0026
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.157E-03	0.0008
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.316E+00	0.8282
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.455E-03	0.0002
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.107E-07	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.370E+00	0.1551
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.694E-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	8.221E-03	0.0009
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	7.811E-03	0.0009
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	3.685E-02	0.0042
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.834E+00	1.0000

*Sum of all water independent and dependent pathways.

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+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	1.612E-05	0.0000	1.673E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.368E-07	0.0000
Pa-231	3.414E-03	0.0007	4.079E-03	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.704E-05	0.0000
Pb-210	1.363E-04	0.0000	1.390E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.626E-04	0.0000
Ra-226	2.722E+00	0.5533	3.005E-03	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.054E-03	0.0006
Ra-228	1.191E-07	0.0000	1.141E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.093E-11	0.0000
Th-228	5.292E-18	0.0000	7.038E-20	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.122E-22	0.0000
Th-230	1.463E+00	0.2974	6.466E-01	0.1315	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.108E-03	0.0010
Th-232	5.082E-02	0.0103	2.585E-03	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.340E-05	0.0000
U-234	5.341E-05	0.0000	2.390E-03	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.903E-05	0.0000
U-235	2.137E-03	0.0004	1.085E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.278E-07	0.0000
U-238	8.240E-03	0.0017	2.125E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.798E-05	0.0000
Total	4.250E+00	0.8639	6.611E-01	0.1344	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.443E-03	0.0017

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.299E-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	7.550E-03	0.0015
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.379E-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	2.728E+00	0.5546
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.203E-07	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.363E-18	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.115E+00	0.4299
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.343E-02	0.0109
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	2.462E-03	0.0005
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.247E-03	0.0005
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.038E-02	0.0021
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.919E+00	1.0000

*Sum of all water independent and dependent pathways.

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Summary : SU22 Elevated Area #3 In-situ Model
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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 = 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	1.805E-13	0.0000	1.433E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.172E-15	0.0000
Pa-231	4.014E-06	0.0000	3.579E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.000E-08	0.0000
Pb-210	5.235E-09	0.0000	1.388E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.624E-09	0.0000
Ra-226	7.771E-03	0.0757	6.883E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.051E-06	0.0001
Ra-228	1.235E-20	0.0000	9.177E-23	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.684E-24	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	7.422E-02	0.7232	1.847E-02	0.1800	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.626E-04	0.0016
Th-232	1.883E-03	0.0184	7.388E-05	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.688E-07	0.0000
U-234	2.141E-06	0.0000	2.583E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.093E-08	0.0000
U-235	2.376E-06	0.0000	1.106E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.028E-09	0.0000
U-238	1.059E-05	0.0001	1.870E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.581E-08	0.0000
Total	8.389E-02	0.8175	1.856E-02	0.1808	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.704E-04	0.0017

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	3.250E-13	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	7.642E-06	0.0001
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.247E-09	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.785E-03	0.0759
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.244E-20	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.284E-02	0.9048
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.958E-03	0.0191
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	4.745E-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	2.488E-06	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.247E-05	0.0001
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	1.026E-01	1.0000

*Sum of all water independent and dependent pathways.

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+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	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

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

Water Dependent Pathways

Radio-	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
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

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Summary : SU22 Elevated Area #3 In-situ Model
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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	1.000E+02	3.000E+02	1.000E+03
Ac-227+D	Ac-227+D	1.000E+00	2.950E-02	2.736E-02	2.353E-02	1.388E-02	3.075E-03	1.563E-05	1.540E-13	0.000E+00
Pa-231	Pa-231	1.000E+00	4.363E-03	4.287E-03	4.139E-03	3.658E-03	2.572E-03	7.465E-04	7.624E-07	0.000E+00
Pa-231	Ac-227+D	1.000E+00	4.727E-04	1.361E-03	2.902E-03	6.376E-03	8.157E-03	2.831E-03	2.860E-06	0.000E+00
Pa-231	∑DSR(j)		4.836E-03	5.648E-03	7.040E-03	1.003E-02	1.073E-02	3.578E-03	3.622E-06	0.000E+00
Pb-210+D	Pb-210+D	1.000E+00	1.249E-04	1.200E-04	1.108E-04	8.377E-05	3.770E-05	2.302E-06	4.922E-11	0.000E+00
Pb-210+D	Po-210	1.000E+00	1.945E-05	3.185E-05	3.156E-05	2.392E-05	1.079E-05	6.642E-07	6.655E-12	0.000E+00
Pb-210+D	∑DSR(j)		1.443E-04	1.518E-04	1.423E-04	1.077E-04	4.849E-05	2.967E-06	5.587E-11	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	7.482E-02	7.380E-02	7.180E-02	6.522E-02	4.949E-02	1.843E-02	5.253E-05	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	1.945E-06	5.700E-06	1.263E-05	3.159E-05	5.540E-05	3.711E-05	1.851E-07	0.000E+00
Ra-226+D	Po-210	1.000E+00	2.294E-07	1.083E-06	3.037E-06	8.502E-06	1.545E-05	1.054E-05	2.467E-08	0.000E+00
Ra-226+D	∑DSR(j)		7.482E-02	7.381E-02	7.182E-02	6.526E-02	4.956E-02	1.848E-02	5.274E-05	0.000E+00
Ra-228+D	Ra-228+D	1.000E+00	3.842E-02	3.361E-02	2.572E-02	1.008E-02	6.935E-04	5.795E-08	6.270E-21	0.000E+00
Ra-228+D	Th-228+D	1.000E+00	1.029E-02	2.487E-02	3.636E-02	2.356E-02	1.773E-03	1.460E-07	1.482E-20	0.000E+00
Ra-228+D	∑DSR(j)		4.871E-02	5.849E-02	6.208E-02	3.364E-02	2.467E-03	2.039E-07	2.109E-20	0.000E+00
Th-228+D	Th-228+D	1.000E+00	5.606E-02	3.898E-02	1.885E-02	1.482E-03	1.035E-06	9.089E-18	0.000E+00	0.000E+00
Th-230	Th-230	1.000E+00	7.457E-04	7.457E-04	7.457E-04	7.455E-04	7.451E-04	7.438E-04	2.184E-05	0.000E+00
Th-230	Ra-226+D	1.000E+00	1.624E-05	4.840E-05	1.113E-04	3.176E-04	8.009E-04	1.641E-03	8.277E-05	0.000E+00
Th-230	Pb-210+D	1.000E+00	2.821E-10	1.945E-09	9.938E-09	7.886E-08	4.799E-07	1.992E-06	1.953E-07	0.000E+00
Th-230	Po-210	1.000E+00	2.694E-11	2.985E-10	2.090E-09	2.013E-08	1.310E-07	5.603E-07	2.586E-08	0.000E+00
Th-230	∑DSR(j)		7.620E-04	7.941E-04	8.570E-04	1.063E-03	1.547E-03	2.388E-03	1.048E-04	0.000E+00
Th-232	Th-232	1.000E+00	3.703E-03	3.703E-03	3.703E-03	3.702E-03	3.701E-03	3.697E-03	1.062E-04	0.000E+00
Th-232	Ra-228+D	1.000E+00	2.367E-03	6.699E-03	1.379E-02	2.776E-02	3.565E-02	3.348E-02	1.287E-03	0.000E+00
Th-232	Th-228+D	1.000E+00	4.306E-04	2.630E-03	1.035E-02	3.730E-02	5.716E-02	5.337E-02	1.925E-03	0.000E+00
Th-232	∑DSR(j)		6.500E-03	1.303E-02	2.785E-02	6.876E-02	9.651E-02	9.055E-02	3.318E-03	0.000E+00
U-234	U-234	1.000E+00	2.993E-04	2.941E-04	2.840E-04	2.514E-04	1.774E-04	5.237E-05	5.033E-08	0.000E+00
U-234	Th-230	1.000E+00	3.337E-09	9.934E-09	2.279E-08	6.440E-08	1.587E-07	3.178E-07	1.123E-08	0.000E+00
U-234	Ra-226+D	1.000E+00	4.856E-11	3.368E-10	1.743E-09	1.446E-08	9.835E-08	5.156E-07	4.088E-08	0.000E+00
U-234	Pb-210+D	1.000E+00	6.343E-16	9.373E-15	1.057E-13	2.485E-12	4.344E-11	5.367E-10	9.470E-11	0.000E+00
U-234	Po-210	1.000E+00	5.108E-17	1.227E-15	1.991E-14	6.059E-13	1.166E-11	1.503E-10	1.253E-11	0.000E+00
U-234	∑DSR(j)		2.993E-04	2.941E-04	2.840E-04	2.515E-04	1.777E-04	5.321E-05	1.026E-07	0.000E+00
U-235+D	U-235+D	1.000E+00	6.302E-03	6.191E-03	5.975E-03	5.276E-03	3.697E-03	1.058E-03	1.157E-06	0.000E+00
U-235+D	Pa-231	1.000E+00	4.602E-08	1.359E-07	3.064E-07	8.128E-07	1.660E-06	1.589E-06	4.863E-09	0.000E+00
U-235+D	Ac-227+D	1.000E+00	3.345E-09	2.269E-08	1.117E-07	7.797E-07	3.367E-06	5.005E-06	1.718E-08	0.000E+00
U-235+D	∑DSR(j)		6.302E-03	6.191E-03	5.975E-03	5.278E-03	3.702E-03	1.065E-03	1.179E-06	0.000E+00
U-238	U-238	5.400E-05	1.434E-08	1.409E-08	1.361E-08	1.204E-08	8.500E-09	2.510E-09	2.378E-12	0.000E+00

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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	1.000E+02	3.000E+02	1.000E+03
U-238+D	U-238+D	9.999E-01	1.364E-03	1.339E-03	1.292E-03	1.140E-03	7.965E-04	2.244E-04	2.695E-07	0.000E+00
U-238+D	U-234	9.999E-01	4.229E-10	1.249E-09	2.817E-09	7.482E-09	1.534E-08	1.492E-08	4.289E-11	0.000E+00
U-238+D	Th-230	9.999E-01	3.144E-15	2.179E-14	1.126E-13	9.299E-13	6.259E-12	3.270E-11	1.779E-12	0.000E+00
U-238+D	Ra-226+D	9.999E-01	3.435E-17	5.097E-16	5.803E-15	1.409E-13	2.677E-12	4.008E-11	6.019E-12	0.000E+00
U-238+D	Pb-210+D	9.999E-01	3.595E-22	1.098E-20	2.674E-19	1.852E-17	9.340E-16	3.602E-14	1.351E-14	0.000E+00
U-238+D	Po-210	9.999E-01	2.506E-23	1.262E-21	4.569E-20	4.323E-18	2.467E-16	1.004E-14	1.787E-15	0.000E+00
U-238+D	∑DSR(j)		1.364E-03	1.339E-03	1.292E-03	1.140E-03	7.965E-04	2.244E-04	2.695E-07	0.000E+00

The DSR includes contributions from associated (half-life ≤ 30 days) daughters.

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

Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227	8.475E+02	9.138E+02	1.062E+03	1.801E+03	8.131E+03	1.599E+06	*7.232E+13	*7.232E+13
Pa-231	5.170E+03	4.426E+03	3.551E+03	2.491E+03	2.330E+03	6.987E+03	6.902E+06	*4.723E+10
Pb-210	1.732E+05	1.647E+05	1.756E+05	2.321E+05	5.156E+05	8.427E+06	4.474E+11	*7.634E+13
Ra-226	3.341E+02	3.387E+02	3.481E+02	3.831E+02	5.044E+02	1.353E+03	4.740E+05	*9.885E+11
Ra-228	5.132E+02	4.274E+02	4.027E+02	7.432E+02	1.014E+04	1.226E+08	*2.726E+14	*2.726E+14
Th-228	4.460E+02	6.413E+02	1.326E+03	1.686E+04	2.415E+07	*8.195E+14	*8.195E+14	*8.195E+14
Th-230	3.281E+04	3.148E+04	2.917E+04	2.351E+04	1.616E+04	1.047E+04	2.385E+05	*2.018E+10
Th-232	3.846E+03	1.918E+03	8.978E+02	3.636E+02	2.590E+02	2.761E+02	7.534E+03	*1.097E+05
U-234	8.354E+04	8.500E+04	8.801E+04	9.941E+04	1.407E+05	4.698E+05	2.438E+08	*6.247E+09
U-235	3.967E+03	4.038E+03	4.184E+03	4.737E+03	6.753E+03	2.348E+04	*2.161E+06	*2.161E+06
U-238	1.833E+04	1.867E+04	1.935E+04	2.193E+04	3.139E+04	1.114E+05	*3.361E+05	*3.361E+05

*At specific activity limit

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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	2.110E+00	0.000E+00	2.950E-02	8.475E+02	2.950E-02	8.475E+02
Pa-231	2.110E+00	20.61 ± 0.04	1.123E-02	2.227E+03	4.836E-03	5.170E+03
Pb-210	1.476E+02	0.842 ± 0.002	1.520E-04	1.645E+05	1.443E-04	1.732E+05
Ra-226	1.476E+02	0.000E+00	7.482E-02	3.341E+02	7.482E-02	3.341E+02
Ra-228	5.900E-01	2.440 ± 0.005	6.252E-02	3.999E+02	4.871E-02	5.132E+02
Th-228	5.900E-01	0.000E+00	5.606E-02	4.460E+02	5.606E-02	4.460E+02
Th-230	8.857E+02	143.2 ± 0.3	2.498E-03	1.001E+04	7.620E-04	3.281E+04
Th-232	5.900E-01	38.19 ± 0.08	9.720E-02	2.572E+02	6.500E-03	3.846E+03
U-234	4.627E+01	0.000E+00	2.993E-04	8.354E+04	2.993E-04	8.354E+04
U-235	2.110E+00	0.000E+00	6.302E-03	3.967E+03	6.302E-03	3.967E+03
U-238	4.627E+01	0.000E+00	1.364E-03	1.833E+04	1.364E-03	1.833E+04

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Summary : SU22 Elevated Area #3 In-situ Model
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Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227	Ac-227	1.000E+00	6.224E-02	5.773E-02	4.965E-02	2.930E-02	6.488E-03	3.299E-05	3.250E-13	0.000E+00
Ac-227	Pa-231	1.000E+00	9.973E-04	2.872E-03	6.123E-03	1.345E-02	1.721E-02	5.974E-03	6.034E-06	0.000E+00
Ac-227	U-235	1.000E+00	7.057E-09	4.787E-08	2.358E-07	1.645E-06	7.105E-06	1.056E-05	3.626E-08	0.000E+00
Ac-227	∑DOSE(j)		6.324E-02	6.060E-02	5.577E-02	4.275E-02	2.371E-02	6.018E-03	6.070E-06	0.000E+00
Pa-231	Pa-231	1.000E+00	9.206E-03	9.045E-03	8.732E-03	7.719E-03	5.426E-03	1.575E-03	1.609E-06	0.000E+00
Pa-231	U-235	1.000E+00	9.711E-08	2.868E-07	6.464E-07	1.715E-06	3.503E-06	3.353E-06	1.026E-08	0.000E+00
Pa-231	∑DOSE(j)		9.206E-03	9.046E-03	8.733E-03	7.721E-03	5.430E-03	1.579E-03	1.619E-06	0.000E+00
Pb-210	Pb-210	1.000E+00	1.843E-02	1.771E-02	1.635E-02	1.237E-02	5.565E-03	3.398E-04	7.265E-09	0.000E+00
Pb-210	Ra-226	1.000E+00	2.871E-04	8.413E-04	1.864E-03	4.663E-03	8.178E-03	5.478E-03	2.732E-05	0.000E+00
Pb-210	Th-230	1.000E+00	2.498E-07	1.723E-06	8.802E-06	6.985E-05	4.250E-04	1.764E-03	1.730E-04	0.000E+00
Pb-210	U-234	1.000E+00	2.935E-14	4.337E-13	4.892E-12	1.150E-10	2.010E-09	2.483E-08	4.382E-09	0.000E+00
Pb-210	U-238	9.999E-01	1.663E-20	5.078E-19	1.237E-17	8.571E-16	4.322E-14	1.667E-12	6.251E-13	0.000E+00
Pb-210	∑DOSE(j)		1.872E-02	1.855E-02	1.822E-02	1.710E-02	1.417E-02	7.582E-03	2.003E-04	0.000E+00
Po-210	Pb-210	1.000E+00	2.870E-03	4.701E-03	4.659E-03	3.531E-03	1.592E-03	9.804E-05	9.823E-10	0.000E+00
Po-210	Ra-226	1.000E+00	3.385E-05	1.599E-04	4.484E-04	1.255E-03	2.281E-03	1.556E-03	3.641E-06	0.000E+00
Po-210	Th-230	1.000E+00	2.386E-08	2.644E-07	1.851E-06	1.783E-05	1.160E-04	4.962E-04	2.290E-05	0.000E+00
Po-210	U-234	1.000E+00	2.363E-15	5.677E-14	9.210E-13	2.804E-11	5.396E-10	6.956E-09	5.798E-10	0.000E+00
Po-210	U-238	9.999E-01	1.160E-21	5.841E-20	2.114E-18	2.000E-16	1.141E-14	4.648E-13	8.266E-14	0.000E+00
Po-210	∑DOSE(j)		2.904E-03	4.862E-03	5.109E-03	4.804E-03	3.989E-03	2.151E-03	2.654E-05	0.000E+00
Ra-226	Ra-226	1.000E+00	1.104E+01	1.089E+01	1.060E+01	9.627E+00	7.306E+00	2.721E+00	7.754E-03	0.000E+00
Ra-226	Th-230	1.000E+00	1.438E-02	4.287E-02	9.861E-02	2.813E-01	7.093E-01	1.454E+00	7.331E-02	0.000E+00
Ra-226	U-234	1.000E+00	2.247E-09	1.558E-08	8.064E-08	6.688E-07	4.551E-06	2.386E-05	1.892E-06	0.000E+00
Ra-226	U-238	9.999E-01	1.589E-15	2.358E-14	2.685E-13	6.518E-12	1.239E-10	1.855E-09	2.785E-10	0.000E+00
Ra-226	∑DOSE(j)		1.106E+01	1.094E+01	1.070E+01	9.909E+00	8.015E+00	4.175E+00	8.106E-02	0.000E+00
Ra-228	Ra-228	1.000E+00	2.267E-02	1.983E-02	1.518E-02	5.949E-03	4.092E-04	3.419E-08	3.699E-21	0.000E+00
Ra-228	Th-232	1.000E+00	1.397E-03	3.952E-03	8.138E-03	1.638E-02	2.104E-02	1.975E-02	7.593E-04	0.000E+00
Ra-228	∑DOSE(j)		2.407E-02	2.378E-02	2.331E-02	2.233E-02	2.144E-02	1.975E-02	7.593E-04	0.000E+00
Th-228	Ra-228	1.000E+00	6.071E-03	1.468E-02	2.145E-02	1.390E-02	1.046E-03	8.612E-08	8.744E-21	0.000E+00
Th-228	Th-228	1.000E+00	3.307E-02	2.300E-02	1.112E-02	8.746E-04	6.107E-07	5.363E-18	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	2.540E-04	1.552E-03	6.107E-03	2.201E-02	3.372E-02	3.149E-02	1.136E-03	0.000E+00
Th-228	∑DOSE(j)		3.940E-02	3.923E-02	3.868E-02	3.678E-02	3.477E-02	3.149E-02	1.136E-03	0.000E+00
Th-230	Th-230	1.000E+00	6.605E-01	6.604E-01	6.604E-01	6.603E-01	6.599E-01	6.587E-01	1.934E-02	0.000E+00
Th-230	U-234	1.000E+00	1.544E-07	4.597E-07	1.054E-06	2.980E-06	7.345E-06	1.470E-05	5.198E-07	0.000E+00
Th-230	U-238	9.999E-01	1.455E-13	1.008E-12	5.211E-12	4.303E-11	2.896E-10	1.513E-09	8.230E-11	0.000E+00
Th-230	∑DOSE(j)		6.605E-01	6.604E-01	6.604E-01	6.603E-01	6.600E-01	6.588E-01	1.934E-02	0.000E+00
Th-232	Th-232	1.000E+00	2.185E-03	2.185E-03	2.185E-03	2.184E-03	2.184E-03	2.181E-03	6.269E-05	0.000E+00
U-234	U-234	1.000E+00	1.385E-02	1.361E-02	1.314E-02	1.163E-02	8.209E-03	2.423E-03	2.329E-06	0.000E+00
U-234	U-238	9.999E-01	1.957E-08	5.781E-08	1.303E-07	3.462E-07	7.097E-07	6.905E-07	1.984E-09	0.000E+00
U-234	∑DOSE(j)		1.385E-02	1.361E-02	1.314E-02	1.163E-02	8.209E-03	2.424E-03	2.331E-06	0.000E+00
U-235	U-235	1.000E+00	1.330E-02	1.306E-02	1.261E-02	1.113E-02	7.801E-03	2.233E-03	2.442E-06	0.000E+00

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

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
U-238	U-238	5.400E-05	6.633E-07	6.519E-07	6.295E-07	5.572E-07	3.933E-07	1.161E-07	1.100E-10	0.000E+00
U-238	U-238	9.999E-01	6.309E-02	6.197E-02	5.979E-02	5.275E-02	3.685E-02	1.038E-02	1.247E-05	0.000E+00
U-238	∑DOSE(j)		6.309E-02	6.197E-02	5.979E-02	5.275E-02	3.685E-02	1.038E-02	1.247E-05	0.000E+00

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

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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	1.000E+02	3.000E+02	1.000E+03
Ac-227	Ac-227	1.000E+00	2.110E+00	1.957E+00	1.684E+00	9.955E-01	2.216E-01	1.153E-03	3.439E-10	4.992E-33
Ac-227	Pa-231	1.000E+00	0.000E+00	6.414E-02	1.756E-01	4.287E-01	5.678E-01	2.028E-01	6.212E-03	3.088E-08
Ac-227	U-235	1.000E+00	0.000E+00	6.851E-07	5.734E-06	4.970E-05	2.298E-04	3.564E-04	3.726E-05	6.487E-10
Ac-227	∑S(j):		2.110E+00	2.021E+00	1.860E+00	1.424E+00	7.896E-01	2.044E-01	6.249E-03	3.153E-08
Pa-231	Pa-231	1.000E+00	2.110E+00	2.074E+00	2.002E+00	1.772E+00	1.250E+00	3.687E-01	1.125E-02	5.594E-08
Pa-231	U-235	1.000E+00	0.000E+00	4.387E-05	1.271E-04	3.750E-04	7.938E-04	7.809E-04	7.166E-05	1.196E-09
Pa-231	∑S(j):		2.110E+00	2.074E+00	2.003E+00	1.773E+00	1.251E+00	3.694E-01	1.133E-02	5.714E-08
Pb-210	Pb-210	1.000E+00	1.476E+02	1.418E+02	1.310E+02	9.913E+01	4.471E+01	2.755E+00	9.592E-04	7.558E-16
Pb-210	Ra-226	1.000E+00	0.000E+00	4.469E+00	1.272E+01	3.536E+01	6.414E+01	4.376E+01	3.560E+00	4.283E-04
Pb-210	Th-230	1.000E+00	0.000E+00	5.859E-03	5.093E-02	5.019E-01	3.264E+00	1.396E+01	2.240E+01	2.274E+01
Pb-210	U-234	1.000E+00	0.000E+00	9.185E-10	2.395E-08	7.860E-07	1.519E-05	1.957E-04	5.673E-04	6.146E-04
Pb-210	U-238	9.999E-01	0.000E+00	6.510E-16	5.092E-14	5.568E-12	3.211E-10	1.308E-08	8.088E-08	1.001E-07
Pb-210	∑S(j):		1.476E+02	1.463E+02	1.438E+02	1.350E+02	1.121E+02	6.048E+01	2.597E+01	2.275E+01
Po-210	Pb-210	1.000E+00	0.000E+00	1.172E+02	1.273E+02	9.671E+01	4.362E+01	2.687E+00	9.357E-04	7.373E-16
Po-210	Ra-226	1.000E+00	0.000E+00	2.384E+00	1.015E+01	3.243E+01	6.097E+01	4.205E+01	3.424E+00	4.119E-04
Po-210	Th-230	1.000E+00	0.000E+00	2.362E-03	3.487E-02	4.354E-01	3.035E+00	1.328E+01	2.140E+01	2.173E+01
Po-210	U-234	1.000E+00	0.000E+00	3.001E-10	1.445E-08	6.498E-07	1.389E-05	1.854E-04	5.416E-04	5.871E-04
Po-210	U-238	9.999E-01	0.000E+00	1.793E-16	2.751E-14	4.397E-12	2.889E-10	1.233E-08	7.716E-08	9.564E-08
Po-210	∑S(j):		0.000E+00	1.196E+02	1.375E+02	1.296E+02	1.076E+02	5.801E+01	2.482E+01	2.173E+01
Ra-226	Ra-226	1.000E+00	1.476E+02	1.457E+02	1.420E+02	1.298E+02	1.003E+02	4.066E+01	3.084E+00	3.709E-04
Ra-226	Th-230	1.000E+00	0.000E+00	3.812E-01	1.129E+00	3.599E+00	9.542E+00	2.153E+01	2.898E+01	2.912E+01
Ra-226	U-234	1.000E+00	0.000E+00	8.931E-08	7.878E-07	8.160E-06	6.032E-05	3.522E-04	7.475E-04	7.868E-04
Ra-226	U-238	9.999E-01	0.000E+00	8.424E-14	2.221E-12	7.570E-11	1.616E-09	2.727E-08	1.100E-07	1.282E-07
Ra-226	∑S(j):		1.476E+02	1.461E+02	1.431E+02	1.334E+02	1.098E+02	6.219E+01	3.206E+01	2.912E+01
Ra-228	Ra-228	1.000E+00	5.900E-01	5.165E-01	3.959E-01	1.560E-01	1.091E-02	9.871E-07	2.763E-18	0.000E+00
Ra-228	Th-232	1.000E+00	0.000E+00	6.660E-02	1.759E-01	3.933E-01	5.247E-01	5.340E-01	5.324E-01	5.270E-01
Ra-228	∑S(j):		5.900E-01	5.831E-01	5.718E-01	5.493E-01	5.356E-01	5.340E-01	5.324E-01	5.270E-01
Th-228	Ra-228	1.000E+00	0.000E+00	1.672E-01	3.111E-01	2.216E-01	1.722E-02	1.560E-06	4.366E-18	0.000E+00
Th-228	Th-228	1.000E+00	5.900E-01	4.107E-01	1.990E-01	1.575E-02	1.122E-05	1.084E-16	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	0.000E+00	1.095E-02	7.243E-02	3.195E-01	5.189E-01	5.340E-01	5.324E-01	5.270E-01
Th-228	∑S(j):		5.900E-01	5.889E-01	5.825E-01	5.569E-01	5.362E-01	5.340E-01	5.324E-01	5.270E-01
Th-230	Th-230	1.000E+00	8.857E+02	8.856E+02	8.856E+02	8.855E+02	8.850E+02	8.836E+02	8.794E+02	8.650E+02
Th-230	U-234	1.000E+00	0.000E+00	4.129E-04	1.217E-03	3.822E-03	9.727E-03	1.969E-02	2.364E-02	2.337E-02
Th-230	U-238	9.999E-01	0.000E+00	5.836E-10	5.132E-09	5.260E-08	3.778E-07	2.019E-06	3.741E-06	3.808E-06
Th-230	∑S(j):		8.857E+02	8.856E+02	8.856E+02	8.855E+02	8.850E+02	8.836E+02	8.794E+02	8.650E+02
Th-232	Th-232	1.000E+00	5.900E-01	5.900E-01	5.900E-01	5.899E-01	5.897E-01	5.891E-01	5.874E-01	5.815E-01
U-234	U-234	1.000E+00	4.627E+01	4.547E+01	4.391E+01	3.887E+01	2.743E+01	8.099E+00	2.482E-01	1.249E-06
U-234	U-238	9.999E-01	0.000E+00	1.289E-04	3.735E-04	1.102E-03	2.333E-03	2.296E-03	2.111E-04	3.547E-09
U-234	∑S(j):		4.627E+01	4.547E+01	4.391E+01	3.887E+01	2.743E+01	8.101E+00	2.484E-01	1.253E-06
U-235	U-235	1.000E+00	2.110E+00	2.074E+00	2.003E+00	1.773E+00	1.251E+00	3.694E-01	1.133E-02	5.714E-08

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Summary : SU22 Elevated Area #3 In-situ Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 IN SITU.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	1.000E+02	3.000E+02	1.000E+03
U-238	U-238	5.400E-05	2.499E-03	2.455E-03	2.371E-03	2.099E-03	1.481E-03	4.375E-04	1.341E-05	6.766E-11
U-238	U-238	9.999E-01	4.627E+01	4.547E+01	4.391E+01	3.887E+01	2.743E+01	8.101E+00	2.484E-01	1.253E-06
U-238	∑S(j):		4.627E+01	4.547E+01	4.391E+01	3.887E+01	2.743E+01	8.101E+00	2.484E-01	1.253E-06

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

RESCALC.EXE execution time = 1.69 seconds

APPENDIX B

RESRAD v6.5 Summary Report for Elevated Area #3 Excavation Model

RESRAD, Version 6.5 T½ Limit = 30 days 01/06/2014 14:19 Page 1
Summary : SU22 Elevated Area #3 Excavation Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 EXCAVATION.RAD

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Part I: Mixture Sums and Single Radionuclide Guidelines

RESRAD, Version 6.5 T½ Limit = 30 days 01/06/2014 14:19 Page 2
Summary : SU22 Elevated Area #3 Excavation Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 EXCAVATION.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	Ac-228 (Source: FGR 12)	5.978E+00	5.978E+00	DCF1(2)
A-1	At-218 (Source: FGR 12)	5.847E-03	5.847E-03	DCF1(3)
A-1	Bi-210 (Source: FGR 12)	3.606E-03	3.606E-03	DCF1(4)
A-1	Bi-211 (Source: FGR 12)	2.559E-01	2.559E-01	DCF1(5)
A-1	Bi-212 (Source: FGR 12)	1.171E+00	1.171E+00	DCF1(6)
A-1	Bi-214 (Source: FGR 12)	9.808E+00	9.808E+00	DCF1(7)
A-1	Fr-223 (Source: FGR 12)	1.980E-01	1.980E-01	DCF1(8)
A-1	Pa-231 (Source: FGR 12)	1.906E-01	1.906E-01	DCF1(9)
A-1	Pa-234 (Source: FGR 12)	1.155E+01	1.155E+01	DCF1(10)
A-1	Pa-234m (Source: FGR 12)	8.967E-02	8.967E-02	DCF1(11)
A-1	Pb-210 (Source: FGR 12)	2.447E-03	2.447E-03	DCF1(12)
A-1	Pb-211 (Source: FGR 12)	3.064E-01	3.064E-01	DCF1(13)
A-1	Pb-212 (Source: FGR 12)	7.043E-01	7.043E-01	DCF1(14)
A-1	Pb-214 (Source: FGR 12)	1.341E+00	1.341E+00	DCF1(15)
A-1	Po-210 (Source: FGR 12)	5.231E-05	5.231E-05	DCF1(16)
A-1	Po-211 (Source: FGR 12)	4.764E-02	4.764E-02	DCF1(17)
A-1	Po-212 (Source: FGR 12)	0.000E+00	0.000E+00	DCF1(18)
A-1	Po-214 (Source: FGR 12)	5.138E-04	5.138E-04	DCF1(19)
A-1	Po-215 (Source: FGR 12)	1.016E-03	1.016E-03	DCF1(20)
A-1	Po-216 (Source: FGR 12)	1.042E-04	1.042E-04	DCF1(21)
A-1	Po-218 (Source: FGR 12)	5.642E-05	5.642E-05	DCF1(22)
A-1	Ra-223 (Source: FGR 12)	6.034E-01	6.034E-01	DCF1(23)
A-1	Ra-224 (Source: FGR 12)	5.119E-02	5.119E-02	DCF1(24)
A-1	Ra-226 (Source: FGR 12)	3.176E-02	3.176E-02	DCF1(25)
A-1	Ra-228 (Source: FGR 12)	0.000E+00	0.000E+00	DCF1(26)
A-1	Rn-219 (Source: FGR 12)	3.083E-01	3.083E-01	DCF1(27)
A-1	Rn-220 (Source: FGR 12)	2.298E-03	2.298E-03	DCF1(28)
A-1	Rn-222 (Source: FGR 12)	2.354E-03	2.354E-03	DCF1(29)
A-1	Th-227 (Source: FGR 12)	5.212E-01	5.212E-01	DCF1(30)
A-1	Th-228 (Source: FGR 12)	7.940E-03	7.940E-03	DCF1(31)
A-1	Th-230 (Source: FGR 12)	1.209E-03	1.209E-03	DCF1(32)
A-1	Th-231 (Source: FGR 12)	3.643E-02	3.643E-02	DCF1(33)
A-1	Th-232 (Source: FGR 12)	5.212E-04	5.212E-04	DCF1(34)
A-1	Th-234 (Source: FGR 12)	2.410E-02	2.410E-02	DCF1(35)
A-1	Tl-207 (Source: FGR 12)	1.980E-02	1.980E-02	DCF1(36)
A-1	Tl-208 (Source: FGR 12)	2.298E+01	2.298E+01	DCF1(37)
A-1	Tl-210 (Source: no data)	0.000E+00	-2.000E+00	DCF1(38)
A-1	U-234 (Source: FGR 12)	4.017E-04	4.017E-04	DCF1(39)
A-1	U-235 (Source: FGR 12)	7.211E-01	7.211E-01	DCF1(40)
A-1	U-238 (Source: FGR 12)	1.031E-04	1.031E-04	DCF1(41)
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	1.380E-02	1.360E-02	DCF2(3)
B-1	Po-210	9.400E-03	9.400E-03	DCF2(4)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(5)
B-1	Ra-228+D	5.078E-03	4.770E-03	DCF2(6)

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Summary : SU22 Elevated Area #3 Excavation Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 EXCAVATION.RAD

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

Menu	Parameter	Current Value#	Base Case*	Parameter Name
B-1	Th-228+D	3.454E-01	3.420E-01	DCF2(7)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(8)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(9)
B-1	U-234	1.320E-01	1.320E-01	DCF2(10)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(11)
B-1	U-238	1.180E-01	1.180E-01	DCF2(12)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(13)
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	5.376E-03	5.370E-03	DCF3(3)
D-1	Po-210	1.900E-03	1.900E-03	DCF3(4)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(5)
D-1	Ra-228+D	1.442E-03	1.440E-03	DCF3(6)
D-1	Th-228+D	8.086E-04	3.960E-04	DCF3(7)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(8)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(9)
D-1	U-234	2.830E-04	2.830E-04	DCF3(10)
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(11)
D-1	U-238	2.550E-04	2.550E-04	DCF3(12)
D-1	U-238+D	2.687E-04	2.550E-04	DCF3(13)
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	Po-210 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(4,1)
D-34	Po-210 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(4,2)
D-34	Po-210 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.400E-04	3.400E-04	RTF(4,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)
D-34				
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(6,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(6,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(6,3)
D-34				

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Summary : SU22 Elevated Area #3 Excavation Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 EXCAVATION.RAD

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

Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(9,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(9,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(9,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-34				
D-34	U-238 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(12,1)
D-34	U-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(12,2)
D-34	U-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(12,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(13,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(13,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(13,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				
D-5	Po-210 , fish	1.000E+02	1.000E+02	BIOFAC(4,1)
D-5	Po-210 , crustacea and mollusks	2.000E+04	2.000E+04	BIOFAC(4,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(6,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(6,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5				

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Summary : SU22 Elevated Area #3 Excavation Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 EXCAVATION.RAD

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

Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5				
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(9,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(9,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)
D-5				
D-5	U-238 , fish	1.000E+01	1.000E+01	BIOFAC(12,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(12,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(13,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(13,2)

#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.

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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+00	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	3.000E-01	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)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	2.110E+00	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	2.110E+00	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	1.476E+02	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	1.476E+02	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Ra-228	5.900E-01	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-228	5.900E-01	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-230	8.857E+02	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): Th-232	5.900E-01	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-234	4.627E+01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-235	2.110E+00	0.000E+00	---	S1(11)
R012	Initial principal radionuclide (pCi/g): U-238	4.627E+01	0.000E+00	---	S1(12)
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(5)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(11)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(12)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	4.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID

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Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	0.000E+00	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.398E-02	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)	5.000E+01	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	1.770E-02	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	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	8.870E-03	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.266E-02	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.266E-02	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.481E-05	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.481E-05	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.481E-05	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.770E-02	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.770E-02	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)

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Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(12)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(12,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(12)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.770E-02	ALEACH(12)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(12)
R016	Distribution coefficients for daughter Po-210				
R016	Contaminated zone (cm**3/g)	1.000E+01	1.000E+01	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.706E-02	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R017	Inhalation rate (m**3/yr)	1.227E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	3.500E-05	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	6.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	1.700E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	5.700E-05	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)

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Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	1	---	---	KYMAX

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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:	1.00 square meters	Ac-227	2.110E+00
Thickness:	0.30 meters	Pa-231	2.110E+00
Cover Depth:	0.00 meters	Pb-210	1.476E+02
		Ra-226	1.476E+02
		Ra-228	5.900E-01
		Th-228	5.900E-01
		Th-230	8.857E+02
		Th-232	5.900E-01
		U-234	4.627E+01
		U-235	2.110E+00
		U-238	4.627E+01

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

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	8.588E-03	8.493E-03	8.307E-03	7.695E-03	6.241E-03	3.332E-03	0.000E+00	0.000E+00
M(t):	3.435E-04	3.397E-04	3.323E-04	3.078E-04	2.496E-04	1.333E-04	0.000E+00	0.000E+00

Maximum TDOSE(t): 8.588E-03 mrem/yr at t = 0.000E+00 years

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

Water Independent Pathways (Inhalation excludes radon)

Radio-	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	2.326E-05	0.0027	1.125E-05	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.256E-08	0.0000
Pa-231	2.614E-06	0.0003	2.385E-06	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.712E-08	0.0000
Pb-210	5.575E-06	0.0006	2.240E-06	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.923E-06	0.0002
Ra-226	8.176E-03	0.9520	1.070E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.318E-07	0.0001
Ra-228	2.123E-05	0.0025	2.815E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.810E-09	0.0000
Th-228	2.420E-05	0.0028	1.407E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.326E-10	0.0000
Th-230	1.762E-05	0.0021	2.377E-04	0.0277	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.010E-06	0.0001
Th-232	1.222E-06	0.0001	7.980E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.460E-09	0.0000
U-234	1.264E-07	0.0000	4.985E-06	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.700E-08	0.0000
U-235	9.438E-06	0.0011	2.119E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.164E-09	0.0000
U-238	3.771E-05	0.0044	4.458E-06	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.564E-08	0.0000
Total	8.319E-03	0.9687	2.653E-04	0.0309	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.535E-06	0.0004

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

Water Dependent Pathways

Radio-	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	3.458E-05	0.0040
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	5.045E-06	0.0006
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	9.738E-06	0.0011
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	8.177E-03	0.9522
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.126E-05	0.0025
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.434E-05	0.0028
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	2.564E-04	0.0299
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.023E-06	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	5.138E-06	0.0006
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.651E-06	0.0011
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.219E-05	0.0049
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.588E-03	1.0000

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

Radio-	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	2.155E-05	0.0025	1.043E-05	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.799E-08	0.0000
Pa-231	3.273E-06	0.0004	2.685E-06	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.820E-08	0.0000
Pb-210	5.369E-06	0.0006	2.556E-06	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.054E-06	0.0002
Ra-226	8.063E-03	0.9493	1.133E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.886E-07	0.0001
Ra-228	2.541E-05	0.0030	6.453E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.820E-09	0.0000
Th-228	1.683E-05	0.0020	9.797E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.795E-10	0.0000
Th-230	3.870E-05	0.0046	2.377E-04	0.0280	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.011E-06	0.0001
Th-232	4.063E-06	0.0005	8.037E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.679E-09	0.0000
U-234	1.242E-07	0.0000	4.898E-06	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.653E-08	0.0000
U-235	9.269E-06	0.0011	2.082E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.144E-09	0.0000
U-238	3.702E-05	0.0044	4.379E-06	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.519E-08	0.0000
Total	8.224E-03	0.9684	2.650E-04	0.0312	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.719E-06	0.0004

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

Water Dependent Pathways

Radio-	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	3.204E-05	0.0038
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	6.006E-06	0.0007
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	9.978E-06	0.0012
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	8.064E-03	0.9495
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.548E-05	0.0030
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.692E-05	0.0020
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	2.775E-04	0.0327
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.871E-06	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	5.048E-06	0.0006
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.478E-06	0.0011
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.143E-05	0.0049
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.493E-03	1.0000

*Sum of all water independent and dependent pathways.

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 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	1.850E-05	0.0022	8.962E-06	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.983E-08	0.0000
Pa-231	4.405E-06	0.0005	3.196E-06	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.988E-08	0.0000
Pb-210	4.957E-06	0.0006	2.425E-06	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.930E-06	0.0002
Ra-226	7.842E-03	0.9440	1.257E-06	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.987E-07	0.0001
Ra-228	2.692E-05	0.0032	9.307E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.653E-09	0.0000
Th-228	8.136E-06	0.0010	4.746E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.808E-10	0.0000
Th-230	7.995E-05	0.0096	2.377E-04	0.0286	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.014E-06	0.0001
Th-232	1.049E-05	0.0013	8.236E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.101E-09	0.0000
U-234	1.199E-07	0.0000	4.727E-06	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.561E-08	0.0000
U-235	8.940E-06	0.0011	2.011E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.107E-09	0.0000
U-238	3.569E-05	0.0043	4.227E-06	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.431E-08	0.0000
Total	8.040E-03	0.9678	2.637E-04	0.0317	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.699E-06	0.0004

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 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	2.751E-05	0.0033
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	7.651E-06	0.0009
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	9.311E-06	0.0011
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.843E-03	0.9442
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.701E-05	0.0033
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.184E-06	0.0010
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.187E-04	0.0384
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.132E-05	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	4.873E-06	0.0006
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.142E-06	0.0011
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.994E-05	0.0048
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.307E-03	1.0000

*Sum of all water independent and dependent pathways.

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Summary : SU22 Elevated Area #3 Excavation Model
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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	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	1.085E-05	0.0014	5.271E-06	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.931E-08	0.0000
Pa-231	6.860E-06	0.0009	4.273E-06	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.212E-08	0.0000
Pb-210	3.741E-06	0.0005	1.835E-06	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.459E-06	0.0002
Ra-226	7.113E-03	0.9243	1.586E-06	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.956E-07	0.0001
Ra-228	1.455E-05	0.0019	6.023E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.901E-10	0.0000
Th-228	6.396E-07	0.0001	3.757E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.223E-11	0.0000
Th-230	2.150E-04	0.0279	2.377E-04	0.0309	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.028E-06	0.0001
Th-232	2.820E-05	0.0037	8.928E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.115E-09	0.0000
U-234	1.063E-07	0.0000	4.177E-06	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.263E-08	0.0000
U-235	7.879E-06	0.0010	1.782E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.848E-10	0.0000
U-238	3.140E-05	0.0041	3.734E-06	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.148E-08	0.0000
Total	7.432E-03	0.9658	2.597E-04	0.0338	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.515E-06	0.0005

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.615E-05	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	1.118E-05	0.0015
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.035E-06	0.0009
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.115E-03	0.9246
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.461E-05	0.0019
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.434E-07	0.0001
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	4.538E-04	0.0590
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.910E-05	0.0038
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	4.306E-06	0.0006
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.058E-06	0.0010
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.515E-05	0.0046
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.695E-03	1.0000

*Sum of all water independent and dependent pathways.

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Summary : SU22 Elevated Area #3 Excavation Model
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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 = 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	2.356E-06	0.0004	1.157E-06	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.434E-09	0.0000
Pa-231	7.598E-06	0.0012	4.390E-06	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.431E-08	0.0000
Pb-210	1.673E-06	0.0003	8.251E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.564E-07	0.0001
Ra-226	5.375E-03	0.8612	1.900E-06	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.229E-06	0.0002
Ra-228	1.061E-06	0.0002	4.605E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.746E-11	0.0000
Th-228	4.463E-10	0.0000	2.677E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.584E-14	0.0000
Th-230	5.303E-04	0.0850	2.377E-04	0.0381	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.085E-06	0.0002
Th-232	4.016E-05	0.0064	9.462E-07	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.797E-09	0.0000
U-234	7.743E-08	0.0000	2.933E-06	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.589E-08	0.0000
U-235	5.491E-06	0.0009	1.267E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.086E-10	0.0000
U-238	2.175E-05	0.0035	2.621E-06	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.508E-08	0.0000
Total	5.985E-03	0.9590	2.526E-04	0.0405	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.059E-06	0.0005

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	3.520E-06	0.0006
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	1.203E-05	0.0019
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	3.155E-06	0.0005
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	5.378E-03	0.8617
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.066E-06	0.0002
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.490E-10	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.691E-04	0.1232
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.111E-05	0.0066
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	3.027E-06	0.0005
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	5.618E-06	0.0009
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	2.439E-05	0.0039
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	6.241E-03	1.0000

*Sum of all water independent and dependent pathways.

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Summary : SU22 Elevated Area #3 Excavation Model
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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+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	1.113E-08	0.0000	5.734E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.189E-11	0.0000
Pa-231	2.443E-06	0.0007	1.450E-06	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.381E-08	0.0000
Pb-210	9.977E-08	0.0000	5.034E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.005E-08	0.0000
Ra-226	1.969E-03	0.5908	1.083E-06	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.491E-07	0.0002
Ra-228	8.618E-11	0.0000	4.112E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.128E-15	0.0000
Th-228	3.901E-21	0.0000	2.586E-23	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.530E-25	0.0000
Th-230	1.071E-03	0.3214	2.376E-04	0.0713	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.274E-06	0.0004
Th-232	3.743E-05	0.0112	9.494E-07	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.843E-09	0.0000
U-234	3.872E-08	0.0000	8.538E-07	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.623E-09	0.0000
U-235	1.541E-06	0.0005	3.877E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.253E-10	0.0000
U-238	5.926E-06	0.0018	7.593E-07	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.367E-09	0.0000
Total	3.087E-03	0.9265	2.428E-04	0.0729	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.092E-06	0.0006

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

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.690E-08	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	3.907E-06	0.0012
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.902E-07	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	1.970E-03	0.5914
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.660E-11	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.927E-21	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.310E-03	0.3931
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.838E-05	0.0115
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	8.972E-07	0.0003
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	1.580E-06	0.0005
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.689E-06	0.0020
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	3.332E-03	1.0000

*Sum of all water independent and dependent pathways.

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Summary : SU22 Elevated Area #3 Excavation Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 EXCAVATION.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	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 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	0.000E+00	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

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Summary : SU22 Elevated Area #3 Excavation Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 EXCAVATION.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	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

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

Water Dependent Pathways

Radio-	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
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

*Sum of all water independent and dependent pathways.

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Summary : SU22 Elevated Area #3 Excavation Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 EXCAVATION.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	1.000E+02	3.000E+02	1.000E+03
Ac-227+D	Ac-227+D	1.000E+00	1.639E-05	1.518E-05	1.304E-05	7.652E-06	1.668E-06	8.009E-09	0.000E+00	0.000E+00
Pa-231	Pa-231	1.000E+00	2.129E-06	2.091E-06	2.017E-06	1.778E-06	1.241E-06	3.499E-07	0.000E+00	0.000E+00
Pa-231	Ac-227+D	1.000E+00	2.625E-07	7.556E-07	1.609E-06	3.522E-06	4.462E-06	1.502E-06	0.000E+00	0.000E+00
Pa-231	∑DSR(j)		2.391E-06	2.846E-06	3.626E-06	5.301E-06	5.702E-06	1.852E-06	0.000E+00	0.000E+00
Pb-210+D	Pb-210+D	1.000E+00	5.973E-08	5.738E-08	5.296E-08	3.999E-08	1.793E-08	1.078E-09	0.000E+00	0.000E+00
Pb-210+D	Po-210	1.000E+00	6.243E-09	1.022E-08	1.012E-08	7.666E-09	3.446E-09	2.099E-10	0.000E+00	0.000E+00
Pb-210+D	∑DSR(j)		6.597E-08	6.760E-08	6.308E-08	4.766E-08	2.137E-08	1.288E-09	0.000E+00	0.000E+00
Ra-226+D	Ra-226+D	1.000E+00	5.540E-05	5.463E-05	5.313E-05	4.818E-05	3.640E-05	1.333E-05	0.000E+00	0.000E+00
Ra-226+D	Pb-210+D	1.000E+00	9.303E-10	2.726E-09	6.036E-09	1.507E-08	2.632E-08	1.731E-08	0.000E+00	0.000E+00
Ra-226+D	Po-210	1.000E+00	7.363E-11	3.476E-10	9.743E-10	2.724E-09	4.932E-09	3.319E-09	0.000E+00	0.000E+00
Ra-226+D	∑DSR(j)		5.540E-05	5.463E-05	5.314E-05	4.820E-05	3.643E-05	1.335E-05	0.000E+00	0.000E+00
Ra-228+D	Ra-228+D	1.000E+00	2.846E-05	2.489E-05	1.904E-05	7.451E-06	5.102E-07	4.192E-11	0.000E+00	0.000E+00
Ra-228+D	Th-228+D	1.000E+00	7.572E-06	1.830E-05	2.675E-05	1.731E-05	1.297E-06	1.049E-10	0.000E+00	0.000E+00
Ra-228+D	∑DSR(j)		3.603E-05	4.319E-05	4.578E-05	2.476E-05	1.807E-06	1.468E-10	0.000E+00	0.000E+00
Th-228+D	Th-228+D	1.000E+00	4.125E-05	2.869E-05	1.387E-05	1.091E-06	7.610E-10	6.656E-21	0.000E+00	0.000E+00
Th-230	Th-230	1.000E+00	2.774E-07	2.774E-07	2.774E-07	2.774E-07	2.772E-07	2.766E-07	0.000E+00	0.000E+00
Th-230	Ra-226+D	1.000E+00	1.202E-08	3.584E-08	8.241E-08	2.349E-07	5.910E-07	1.201E-06	0.000E+00	0.000E+00
Th-230	Pb-210+D	1.000E+00	1.349E-13	9.303E-13	4.751E-12	3.766E-11	2.284E-10	9.372E-10	0.000E+00	0.000E+00
Th-230	Po-210	1.000E+00	8.648E-15	9.582E-14	6.707E-13	6.453E-12	4.188E-11	1.779E-10	0.000E+00	0.000E+00
Th-230	∑DSR(j)		2.895E-07	3.133E-07	3.598E-07	5.123E-07	8.684E-07	1.479E-06	0.000E+00	0.000E+00
Th-232	Th-232	1.000E+00	1.360E-06	1.360E-06	1.360E-06	1.359E-06	1.359E-06	1.358E-06	0.000E+00	0.000E+00
Th-232	Ra-228+D	1.000E+00	1.753E-06	4.961E-06	1.021E-05	2.054E-05	2.635E-05	2.467E-05	0.000E+00	0.000E+00
Th-232	Th-228+D	1.000E+00	3.169E-07	1.935E-06	7.615E-06	2.742E-05	4.197E-05	3.903E-05	0.000E+00	0.000E+00
Th-232	∑DSR(j)		3.429E-06	8.256E-06	1.919E-05	4.932E-05	6.968E-05	6.505E-05	0.000E+00	0.000E+00
U-234	U-234	1.000E+00	1.111E-07	1.091E-07	1.053E-07	9.303E-08	6.528E-08	1.890E-08	0.000E+00	0.000E+00
U-234	Th-230	1.000E+00	1.241E-12	3.695E-12	8.474E-12	2.393E-11	5.883E-11	1.170E-10	0.000E+00	0.000E+00
U-234	Ra-226+D	1.000E+00	3.596E-14	2.493E-13	1.290E-12	1.068E-11	7.244E-11	3.752E-10	0.000E+00	0.000E+00
U-234	Pb-210+D	1.000E+00	3.034E-19	4.482E-18	5.055E-17	1.186E-15	2.065E-14	2.514E-13	0.000E+00	0.000E+00
U-234	Po-210	1.000E+00	1.640E-20	3.938E-19	6.386E-18	1.942E-16	3.725E-15	4.752E-14	0.000E+00	0.000E+00
U-234	∑DSR(j)		1.111E-07	1.091E-07	1.053E-07	9.306E-08	6.541E-08	1.939E-08	0.000E+00	0.000E+00
U-235+D	U-235+D	1.000E+00	4.574E-06	4.492E-06	4.333E-06	3.818E-06	2.660E-06	7.452E-07	0.000E+00	0.000E+00
U-235+D	Pa-231	1.000E+00	2.245E-11	6.629E-11	1.493E-10	3.950E-10	8.009E-10	7.449E-10	0.000E+00	0.000E+00
U-235+D	Ac-227+D	1.000E+00	1.858E-12	1.260E-11	6.198E-11	4.311E-10	1.844E-09	2.658E-09	0.000E+00	0.000E+00
U-235+D	∑DSR(j)		4.574E-06	4.492E-06	4.333E-06	3.819E-06	2.663E-06	7.486E-07	0.000E+00	0.000E+00
U-238	U-238	5.400E-05	5.278E-12	5.186E-12	5.005E-12	4.422E-12	3.103E-12	8.987E-13	0.000E+00	0.000E+00

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Summary : SU22 Elevated Area #3 Excavation Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 EXCAVATION.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	1.000E+02	3.000E+02	1.000E+03
U-238+D	U-238+D	9.999E-01	9.118E-07	8.953E-07	8.632E-07	7.597E-07	5.271E-07	1.446E-07	0.000E+00	0.000E+00
U-238+D	U-234	9.999E-01	1.569E-13	4.635E-13	1.044E-12	2.769E-12	5.644E-12	5.385E-12	0.000E+00	0.000E+00
U-238+D	Th-230	9.999E-01	1.170E-18	8.105E-18	4.187E-17	3.453E-16	2.316E-15	1.197E-14	0.000E+00	0.000E+00
U-238+D	Ra-226+D	9.999E-01	2.543E-20	3.773E-19	4.294E-18	1.041E-16	1.970E-15	2.906E-14	0.000E+00	0.000E+00
U-238+D	Pb-210+D	9.999E-01	1.719E-25	5.249E-24	1.278E-22	8.840E-21	4.436E-19	1.682E-17	0.000E+00	0.000E+00
U-238+D	Po-210	9.999E-01	8.046E-27	4.052E-25	1.466E-23	1.385E-21	7.873E-20	3.166E-18	0.000E+00	0.000E+00
U-238+D	∑DSR(j)		9.118E-07	8.953E-07	8.632E-07	7.597E-07	5.271E-07	1.446E-07	0.000E+00	0.000E+00

The DSR includes contributions from associated (half-life ≤ 30 days) daughters.

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

Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227	1.526E+06	1.646E+06	1.917E+06	3.267E+06	1.499E+07	3.121E+09	*7.232E+13	*7.232E+13
Pa-231	1.046E+07	8.783E+06	6.895E+06	4.716E+06	4.384E+06	1.350E+07	*4.723E+10	*4.723E+10
Pb-210	3.790E+08	3.698E+08	3.963E+08	5.246E+08	1.170E+09	1.941E+10	*7.634E+13	*7.634E+13
Ra-226	4.513E+05	4.576E+05	4.705E+05	5.186E+05	6.862E+05	1.873E+06	*9.885E+11	*9.885E+11
Ra-228	6.939E+05	5.789E+05	5.461E+05	1.010E+06	1.383E+07	1.703E+11	*2.726E+14	*2.726E+14
Th-228	6.061E+05	8.715E+05	1.802E+06	2.292E+07	3.285E+10	*8.195E+14	*8.195E+14	*8.195E+14
Th-230	8.636E+07	7.980E+07	6.947E+07	4.880E+07	2.879E+07	1.690E+07	*2.018E+10	*2.018E+10
Th-232	*1.097E+05	*1.097E+05	*1.097E+05	*1.097E+05	*1.097E+05	*1.097E+05	*1.097E+05	*1.097E+05
U-234	2.251E+08	2.291E+08	2.374E+08	2.686E+08	3.822E+08	1.289E+09	*6.247E+09	*6.247E+09
U-235	*2.161E+06	*2.161E+06	*2.161E+06	*2.161E+06	*2.161E+06	*2.161E+06	*2.161E+06	*2.161E+06
U-238	*3.361E+05	*3.361E+05	*3.361E+05	*3.361E+05	*3.361E+05	*3.361E+05	*3.361E+05	*3.361E+05

*At specific activity limit

RESRAD, Version 6.5 T½ Limit = 30 days 01/06/2014 14:19 Page 24
Summary : SU22 Elevated Area #3 Excavation Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 EXCAVATION.RAD

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

Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Ac-227	2.110E+00	0.000E+00	1.639E-05	1.526E+06	1.639E-05	1.526E+06
Pa-231	2.110E+00	20.70 ± 0.04	5.970E-06	4.187E+06	2.391E-06	1.046E+07
Pb-210	1.476E+02	0.666 ± 0.001	6.784E-08	3.685E+08	6.597E-08	3.790E+08
Ra-226	1.476E+02	0.000E+00	5.540E-05	4.513E+05	5.540E-05	4.513E+05
Ra-228	5.900E-01	2.429 ± 0.005	4.611E-05	5.421E+05	3.603E-05	6.939E+05
Th-228	5.900E-01	0.000E+00	4.125E-05	6.061E+05	4.125E-05	6.061E+05
Th-230	8.857E+02	140.6 ± 0.3	1.552E-06	1.611E+07	2.895E-07	8.636E+07
Th-232	5.900E-01	37.87 ± 0.08	7.016E-05	*1.097E+05	3.429E-06	*1.097E+05
U-234	4.627E+01	0.000E+00	1.111E-07	2.251E+08	1.111E-07	2.251E+08
U-235	2.110E+00	0.000E+00	4.574E-06	*2.161E+06	4.574E-06	*2.161E+06
U-238	4.627E+01	0.000E+00	9.118E-07	*3.361E+05	9.118E-07	*3.361E+05

*At specific activity limit

RESRAD, Version 6.5 T½ Limit = 30 days 01/06/2014 14:19 Page 25
Summary : SU22 Elevated Area #3 Excavation Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 EXCAVATION.RAD

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

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227	Ac-227	1.000E+00	3.458E-05	3.204E-05	2.751E-05	1.615E-05	3.520E-06	1.690E-08	0.000E+00	0.000E+00
Ac-227	Pa-231	1.000E+00	5.540E-07	1.594E-06	3.395E-06	7.432E-06	9.414E-06	3.168E-06	0.000E+00	0.000E+00
Ac-227	U-235	1.000E+00	3.920E-12	2.658E-11	1.308E-10	9.095E-10	3.892E-09	5.608E-09	0.000E+00	0.000E+00
Ac-227	∑DOSE(j)		3.513E-05	3.363E-05	3.091E-05	2.358E-05	1.294E-05	3.191E-06	0.000E+00	0.000E+00
Pa-231	Pa-231	1.000E+00	4.491E-06	4.411E-06	4.255E-06	3.752E-06	2.618E-06	7.384E-07	0.000E+00	0.000E+00
Pa-231	U-235	1.000E+00	4.737E-11	1.399E-10	3.150E-10	8.336E-10	1.690E-09	1.572E-09	0.000E+00	0.000E+00
Pa-231	∑DOSE(j)		4.491E-06	4.411E-06	4.256E-06	3.753E-06	2.620E-06	7.400E-07	0.000E+00	0.000E+00
Pb-210	Pb-210	1.000E+00	8.816E-06	8.470E-06	7.817E-06	5.903E-06	2.646E-06	1.592E-07	0.000E+00	0.000E+00
Pb-210	Ra-226	1.000E+00	1.373E-07	4.023E-07	8.910E-07	2.225E-06	3.885E-06	2.555E-06	0.000E+00	0.000E+00
Pb-210	Th-230	1.000E+00	1.195E-10	8.239E-10	4.208E-09	3.335E-08	2.023E-07	8.301E-07	0.000E+00	0.000E+00
Pb-210	U-234	1.000E+00	1.404E-17	2.074E-16	2.339E-15	5.489E-14	9.553E-13	1.163E-11	0.000E+00	0.000E+00
Pb-210	U-238	9.999E-01	7.956E-24	2.429E-22	5.915E-21	4.090E-19	2.053E-17	7.784E-16	0.000E+00	0.000E+00
Pb-210	∑DOSE(j)		8.954E-06	8.873E-06	8.712E-06	8.162E-06	6.733E-06	3.544E-06	0.000E+00	0.000E+00
Po-210	Pb-210	1.000E+00	9.215E-07	1.509E-06	1.494E-06	1.132E-06	5.087E-07	3.099E-08	0.000E+00	0.000E+00
Po-210	Ra-226	1.000E+00	1.087E-08	5.130E-08	1.438E-07	4.020E-07	7.280E-07	4.898E-07	0.000E+00	0.000E+00
Po-210	Th-230	1.000E+00	7.659E-12	8.487E-11	5.940E-10	5.715E-09	3.709E-08	1.576E-07	0.000E+00	0.000E+00
Po-210	U-234	1.000E+00	7.588E-19	1.822E-17	2.955E-16	8.983E-15	1.723E-13	2.199E-12	0.000E+00	0.000E+00
Po-210	U-238	9.999E-01	3.723E-25	1.875E-23	6.782E-22	6.407E-20	3.643E-18	1.465E-16	0.000E+00	0.000E+00
Po-210	∑DOSE(j)		9.323E-07	1.560E-06	1.639E-06	1.539E-06	1.274E-06	6.784E-07	0.000E+00	0.000E+00
Ra-226	Ra-226	1.000E+00	8.177E-03	8.064E-03	7.842E-03	7.113E-03	5.373E-03	1.967E-03	0.000E+00	0.000E+00
Ra-226	Th-230	1.000E+00	1.065E-05	3.174E-05	7.299E-05	2.081E-04	5.234E-04	1.064E-03	0.000E+00	0.000E+00
Ra-226	U-234	1.000E+00	1.664E-12	1.154E-11	5.968E-11	4.944E-10	3.352E-09	1.736E-08	0.000E+00	0.000E+00
Ra-226	U-238	9.999E-01	1.177E-18	1.746E-17	1.987E-16	4.816E-15	9.114E-14	1.345E-12	0.000E+00	0.000E+00
Ra-226	∑DOSE(j)		8.188E-03	8.096E-03	7.915E-03	7.321E-03	5.897E-03	3.031E-03	0.000E+00	0.000E+00
Ra-228	Ra-228	1.000E+00	1.679E-05	1.468E-05	1.123E-05	4.396E-06	3.010E-07	2.473E-11	0.000E+00	0.000E+00
Ra-228	Th-232	1.000E+00	1.034E-06	2.927E-06	6.025E-06	1.212E-05	1.555E-05	1.456E-05	0.000E+00	0.000E+00
Ra-228	∑DOSE(j)		1.782E-05	1.761E-05	1.726E-05	1.652E-05	1.585E-05	1.456E-05	0.000E+00	0.000E+00
Th-228	Ra-228	1.000E+00	4.467E-06	1.080E-05	1.578E-05	1.021E-05	7.651E-07	6.187E-11	0.000E+00	0.000E+00
Th-228	Th-228	1.000E+00	2.434E-05	1.692E-05	8.184E-06	6.434E-07	4.490E-10	3.927E-21	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	1.869E-07	1.142E-06	4.493E-06	1.618E-05	2.476E-05	2.303E-05	0.000E+00	0.000E+00
Th-228	∑DOSE(j)		2.899E-05	2.886E-05	2.846E-05	2.703E-05	2.553E-05	2.303E-05	0.000E+00	0.000E+00
Th-230	Th-230	1.000E+00	2.457E-04	2.457E-04	2.457E-04	2.457E-04	2.455E-04	2.450E-04	0.000E+00	0.000E+00
Th-230	U-234	1.000E+00	5.744E-11	1.710E-10	3.921E-10	1.107E-09	2.722E-09	5.414E-09	0.000E+00	0.000E+00
Th-230	U-238	9.999E-01	5.412E-17	3.750E-16	1.937E-15	1.598E-14	1.072E-13	5.541E-13	0.000E+00	0.000E+00
Th-230	∑DOSE(j)		2.457E-04	2.457E-04	2.457E-04	2.457E-04	2.455E-04	2.450E-04	0.000E+00	0.000E+00
Th-232	Th-232	1.000E+00	8.022E-07	8.022E-07	8.022E-07	8.021E-07	8.018E-07	8.010E-07	0.000E+00	0.000E+00
U-234	U-234	1.000E+00	5.138E-06	5.048E-06	4.872E-06	4.304E-06	3.021E-06	8.744E-07	0.000E+00	0.000E+00
U-234	U-238	9.999E-01	7.262E-12	2.144E-11	4.832E-11	1.281E-10	2.612E-10	2.491E-10	0.000E+00	0.000E+00
U-234	∑DOSE(j)		5.138E-06	5.048E-06	4.873E-06	4.305E-06	3.021E-06	8.746E-07	0.000E+00	0.000E+00
U-235	U-235	1.000E+00	9.651E-06	9.478E-06	9.142E-06	8.056E-06	5.612E-06	1.572E-06	0.000E+00	0.000E+00

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Summary : SU22 Elevated Area #3 Excavation Model
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Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
U-238	U-238	5.400E-05	2.442E-10	2.399E-10	2.316E-10	2.046E-10	1.436E-10	4.159E-11	0.000E+00	0.000E+00
U-238	U-238	9.999E-01	4.219E-05	4.143E-05	3.994E-05	3.515E-05	2.439E-05	6.689E-06	0.000E+00	0.000E+00
U-238	∑DOSE(j)		4.219E-05	4.143E-05	3.994E-05	3.515E-05	2.439E-05	6.689E-06	0.000E+00	0.000E+00

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

RESRAD, Version 6.5 T½ Limit = 30 days 01/06/2014 14:19 Page 27
Summary : SU22 Elevated Area #3 Excavation Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 EXCAVATION.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	1.000E+02	3.000E+02	1.000E+03
Ac-227	Ac-227	1.000E+00	2.110E+00	1.956E+00	1.681E+00	9.886E-01	2.170E-01	1.075E-03	2.794E-10	2.497E-33
Ac-227	Pa-231	1.000E+00	0.000E+00	6.411E-02	1.754E-01	4.267E-01	5.605E-01	1.959E-01	5.673E-03	2.320E-08
Ac-227	U-235	1.000E+00	0.000E+00	6.848E-07	5.727E-06	4.950E-05	2.272E-04	3.447E-04	3.404E-05	4.874E-10
Ac-227	∑S(j):		2.110E+00	2.020E+00	1.856E+00	1.415E+00	7.777E-01	1.973E-01	5.707E-03	2.369E-08
Pa-231	Pa-231	1.000E+00	2.110E+00	2.073E+00	2.001E+00	1.767E+00	1.240E+00	3.585E-01	1.035E-02	4.233E-08
Pa-231	U-235	1.000E+00	0.000E+00	4.386E-05	1.270E-04	3.740E-04	7.872E-04	7.594E-04	6.591E-05	9.052E-10
Pa-231	∑S(j):		2.110E+00	2.073E+00	2.001E+00	1.768E+00	1.241E+00	3.593E-01	1.042E-02	4.324E-08
Pb-210	Pb-210	1.000E+00	1.476E+02	1.418E+02	1.309E+02	9.899E+01	4.452E+01	2.716E+00	9.198E-04	6.572E-16
Pb-210	Ra-226	1.000E+00	0.000E+00	4.468E+00	1.272E+01	3.530E+01	6.381E+01	4.298E+01	3.361E+00	3.516E-04
Pb-210	Th-230	1.000E+00	0.000E+00	5.859E-03	5.091E-02	5.013E-01	3.253E+00	1.383E+01	2.202E+01	2.231E+01
Pb-210	U-234	1.000E+00	0.000E+00	9.184E-10	2.394E-08	7.848E-07	1.512E-05	1.930E-04	5.506E-04	5.935E-04
Pb-210	U-238	9.999E-01	0.000E+00	6.509E-16	5.089E-14	5.558E-12	3.194E-10	1.286E-08	7.770E-08	9.516E-08
Pb-210	∑S(j):		1.476E+02	1.463E+02	1.437E+02	1.348E+02	1.116E+02	5.952E+01	2.538E+01	2.232E+01
Po-210	Pb-210	1.000E+00	0.000E+00	1.171E+02	1.272E+02	9.651E+01	4.340E+01	2.648E+00	8.967E-04	6.407E-16
Po-210	Ra-226	1.000E+00	0.000E+00	2.382E+00	1.014E+01	3.235E+01	6.062E+01	4.126E+01	3.230E+00	3.380E-04
Po-210	Th-230	1.000E+00	0.000E+00	2.361E-03	3.484E-02	4.347E-01	3.023E+00	1.315E+01	2.102E+01	2.130E+01
Po-210	U-234	1.000E+00	0.000E+00	3.000E-10	1.444E-08	6.485E-07	1.382E-05	1.827E-04	5.252E-04	5.665E-04
Po-210	U-238	9.999E-01	0.000E+00	1.792E-16	2.748E-14	4.387E-12	2.872E-10	1.212E-08	7.408E-08	9.084E-08
Po-210	∑S(j):		0.000E+00	1.195E+02	1.374E+02	1.293E+02	1.070E+02	5.706E+01	2.425E+01	2.130E+01
Ra-226	Ra-226	1.000E+00	1.476E+02	1.457E+02	1.419E+02	1.295E+02	9.966E+01	3.985E+01	2.905E+00	3.038E-04
Ra-226	Th-230	1.000E+00	0.000E+00	3.812E-01	1.129E+00	3.596E+00	9.515E+00	2.136E+01	2.857E+01	2.867E+01
Ra-226	U-234	1.000E+00	0.000E+00	8.930E-08	7.874E-07	8.147E-06	6.004E-05	3.474E-04	7.272E-04	7.624E-04
Ra-226	U-238	9.999E-01	0.000E+00	8.423E-14	2.220E-12	7.555E-11	1.607E-09	2.681E-08	1.058E-07	1.222E-07
Ra-226	∑S(j):		1.476E+02	1.461E+02	1.431E+02	1.331E+02	1.092E+02	6.121E+01	3.148E+01	2.867E+01
Ra-228	Ra-228	1.000E+00	5.900E-01	5.164E-01	3.956E-01	1.557E-01	1.085E-02	9.676E-07	2.603E-18	0.000E+00
Ra-228	Th-232	1.000E+00	0.000E+00	6.659E-02	1.759E-01	3.930E-01	5.239E-01	5.332E-01	5.316E-01	5.261E-01
Ra-228	∑S(j):		5.900E-01	5.830E-01	5.715E-01	5.487E-01	5.348E-01	5.332E-01	5.316E-01	5.261E-01
Th-228	Ra-228	1.000E+00	0.000E+00	1.672E-01	3.110E-01	2.213E-01	1.713E-02	1.530E-06	4.116E-18	0.000E+00
Th-228	Th-228	1.000E+00	5.900E-01	4.107E-01	1.990E-01	1.575E-02	1.122E-05	1.084E-16	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	0.000E+00	1.095E-02	7.241E-02	3.193E-01	5.182E-01	5.332E-01	5.316E-01	5.261E-01
Th-228	∑S(j):		5.900E-01	5.888E-01	5.824E-01	5.564E-01	5.354E-01	5.332E-01	5.316E-01	5.261E-01
Th-230	Th-230	1.000E+00	8.857E+02	8.856E+02	8.856E+02	8.854E+02	8.850E+02	8.836E+02	8.794E+02	8.648E+02
Th-230	U-234	1.000E+00	0.000E+00	4.128E-04	1.217E-03	3.817E-03	9.690E-03	1.949E-02	2.327E-02	2.300E-02
Th-230	U-238	9.999E-01	0.000E+00	5.834E-10	5.129E-09	5.251E-08	3.758E-07	1.988E-06	3.633E-06	3.688E-06
Th-230	∑S(j):		8.857E+02	8.856E+02	8.856E+02	8.855E+02	8.850E+02	8.836E+02	8.794E+02	8.648E+02
Th-232	Th-232	1.000E+00	5.900E-01	5.900E-01	5.900E-01	5.899E-01	5.897E-01	5.891E-01	5.874E-01	5.813E-01
U-234	U-234	1.000E+00	4.627E+01	4.546E+01	4.388E+01	3.876E+01	2.720E+01	7.877E+00	2.282E-01	9.455E-07
U-234	U-238	9.999E-01	0.000E+00	1.289E-04	3.731E-04	1.099E-03	2.314E-03	2.233E-03	1.942E-04	2.684E-09
U-234	∑S(j):		4.627E+01	4.546E+01	4.388E+01	3.876E+01	2.720E+01	7.879E+00	2.284E-01	9.481E-07
U-235	U-235	1.000E+00	2.110E+00	2.073E+00	2.001E+00	1.768E+00	1.241E+00	3.593E-01	1.042E-02	4.324E-08

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Summary : SU22 Elevated Area #3 Excavation Model
File : C:\PROJECTS\2013\RESRAD MODELS\SU22 EA3 EXCAVATION.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	1.000E+02	3.000E+02	1.000E+03
U-238	U-238	5.400E-05	2.499E-03	2.455E-03	2.369E-03	2.093E-03	1.469E-03	4.255E-04	1.234E-05	5.120E-11
U-238	U-238	9.999E-01	4.627E+01	4.546E+01	4.387E+01	3.876E+01	2.720E+01	7.878E+00	2.284E-01	9.481E-07
U-238	∑S(j):		4.627E+01	4.546E+01	4.388E+01	3.876E+01	2.720E+01	7.879E+00	2.284E-01	9.481E-07

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

RESCALC.EXE execution time = 1.50 seconds