ATTACHMENT 4

UNCERTAINTY ANALYSIS RESULTS

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Part VI: Uncertainty Analysis

Probabilistic Input

Number of Sample Runs: 300

Number	Name	Distribution	Parameters			
1	HCCZ	BOUNDED LOGNORMAL-N	2.3	2.11	.004	9250
2	EPUZ(1)	TRUNCATED NORMAL	.355	.0906	.001	.999
3	HCUZ(1)	BOUNDED LOGNORMAL-N	2.3	2.11	.004	9250
4	DWIBWT	TRIANGULAR	6	10	30	
5	SHF3	UNIFORM	.15	.95		
6	YV(1)	TRUNCATED LOGNORMAL-N	.56	.48	.001	.999
7	RWET(2)	TRIANGULAR	.06	.67	.95	
8	WLAM	TRIANGULAR	5.1	18	84	

Probabilistic Total Dose Summary

Nuclide (j)	Peak Time	Peak Dose	DOSE(j,t), mrem/yr t= 0.00E+00	1.00E+00
Ac-227				
Min	0.00E+00	3.21E-02	3.21E-02	3.08E-02
Max	0.00E+00	3.21E-02	3.21E-02	3.09E-02
Avg	0.00E+00	3.21E-02	3.21E-02	3.08E-02
Std	0.00E+00	1.48E-05	1.48E-05	1.43E-05
Pa-231				
Min	1.00E+00	3.78E-02	3.69E-02	3.78E-02
Max	1.00E+00	3.78E-02	3.69E-02	3.78E-02
Avg	1.00E+00	3.78E-02	3.69E-02	3.78E-02
Std	0.00E+00	3.57E-06	3.12E-06	3.57E-06
Pb-210				
Min	0.00E+00	2.45E-01	2.45E-01	2.37E-01
Max	0.00E+00	2.45E-01	2.45E-01	2.37E-01
Avg	0.00E+00	2.45E-01	2.45E-01	2.37E-01
Std	0.00E+00	5.32E-07	5.33E-07	5.34E-07
Ra-226				
Min	1.00E+00	2.40E+00	2.40E+00	2.40E+00
Max	1.00E+00	2.40E+00	2.40E+00	2.40E+00
Avg	1.00E+00	2.40E+00	2.40E+00	2.40E+00
Std	0.00E+00	3.27E-06	1.11E-06	3.22E-06
Ra-228				
Min	1.00E+00	1.27E+01	1.13E+01	1.27E+01
Max	1.00E+00	1.27E+01	1.13E+01	1.27E+01
Avg	1.00E+00	1.27E+01	1.13E+01	1.27E+01
Std	0.00E+00	6.44E-05	2.77E-05	6.43E-05
Th-228				
Min	0.00E+00	9.75E+00	9.75E+00	6.79E+00
Max	0.00E+00	9.75E+00	9.75E+00	6.79E+00
Avg	0.00E+00	9.75E+00	9.75E+00	6.79E+00
Std	0.00E+00	1.36E-04	1.36E-04	9.48E-05
Th-230				
Min	1.00E+00	1.67E-02	1.44E-02	1.67E-02
Max	1.00E+00	1.68E-02	1.45E-02	1.68E-02
Avg	1.00E+00	1.68E-02	1.45E-02	1.68E-02
Std	0.00E+00	1.68E-05	1.68E-05	1.68E-05
Th-232				
Min	1.00E+00	2.70E+00	1.24E+00	2.70E+00
Max	1.00E+00	2.70E+00	1.25E+00	2.70E+00
Avg	1.00E+00	2.70E+00	1.24E+00	2.70E+00
Std	0.00E+00	7.79E-04	7.73E-04	7.79E-04
U-234				
Min	0.00E+00	4.66E-03	4.66E-03	4.64E-03
Max	0.00E+00	4.67E-03	4.67E-03	4.65E-03
Avg	0.00E+00	4.67E-03	4.67E-03	4.65E-03
Std	0.00E+00	3.41E-06	3.41E-06	3.40E-06
U-235				
Min	0.00E+00	2.46E-03	2.46E-03	2.45E-03
Max	0.00E+00	2.46E-03	2.46E-03	2.45E-03
Avg	0.00E+00	2.46E-03	2.46E-03	2.45E-03
Std	0.00E+00	1.40E-07	1.40E-07	1.39E-07

Probabilistic Total Dose Summary(cont.)

Nuclide (j)	Peak Time	Peak Dose	DOSE(j,t), mrem/yr t= 0.00E+00	1.00E+00
U-238				
Min	0.00E+00	1.31E-02	1.31E-02	1.30E-02
Max	0.00E+00	1.31E-02	1.31E-02	1.30E-02
Avg	0.00E+00	1.31E-02	1.31E-02	1.30E-02
Std	0.00E+00	3.05E-06	3.05E-06	3.04E-06
TALL				
Min	0.00E+00	2.50E+01	2.50E+01	2.50E+01
Max	0.00E+00	2.50E+01	2.50E+01	2.50E+01
Avg	0.00E+00	2.50E+01	2.50E+01	2.50E+01
Std	0.00E+00	9.79E-04	9.79E-04	9.78E-04

TALL is total dose summed for all nuclides.

Probabilistic Risk Summary

Nuclide (j)	RISK(j,t) t= 0.00E+00	1.00E+00
Ac-227		
Min	2.83E-07	2.71E-07
Max	2.83E-07	2.71E-07
Avg	2.83E-07	2.71E-07
Std	1.44E-11	1.41E-11
Pa-231		
Min	4.67E-08	5.54E-08
Max	4.67E-08	5.54E-08
Avg	4.67E-08	5.54E-08
Std	5.15E-12	5.58E-12
Pb-210		
Min	3.54E-06	3.43E-06
Max	3.54E-06	3.43E-06
Avg	3.54E-06	3.43E-06
Std	2.14E-11	2.08E-11
Ra-226		
Min	3.56E-05	3.56E-05
Max	3.56E-05	3.56E-05
Avg	3.56E-05	3.56E-05
Std	1.95E-11	3.81E-11
Ra-228		
Min	2.51E-04	2.97E-04
Max	2.51E-04	2.97E-04
Avg	2.51E-04	2.97E-04
Std	6.17E-10	2.00E-09
Th-228		
Min	2.60E-04	1.81E-04
Max	2.60E-04	1.81E-04
Avg	2.60E-04	1.81E-04
Std	5.06E-09	3.52E-09
Th-230		
Min	8.88E-08	1.23E-07
Max	8.90E-08	1.23E-07
Avg	8.89E-08	1.23E-07
Std	5.26E-11	5.26E-11
Th-232		
Min	8.84E-07	3.39E-05
Max	8.87E-07	3.39E-05
Avg	8.85E-07	3.39E-05
Std	6.11E-10	7.75E-10
U-234		
Min	4.75E-08	4.73E-08
Max	4.75E-08	4.74E-08
Avg	4.75E-08	4.73E-08
Std	2.16E-11	2.15E-11
U-235		
Min	5.09E-08	5.07E-08
Max	5.09E-08	5.07E-08
Avg	5.09E-08	5.07E-08
Std	8.55E-13	8.55E-13

Probabilistic Risk Summary(cont.)

Nuclide (j)	RISK(j,t) t= 0.00E+00	1.00E+00
U-238		
Min	2.23E-07	2.23E-07
Max	2.23E-07	2.23E-07
Avg	2.23E-07	2.23E-07
Std	1.83E-11	1.83E-11
∑ALL		
Min	5.52E-04	5.51E-04
Max	5.52E-04	5.51E-04
Avg	5.52E-04	5.51E-04
Std	6.43E-09	6.44E-09

∑ALL is total risk summed for all nuclides.

Probabilistic Dose vs Pathway(i): Ground External

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
Ac-227		
Min	1.14E-02	1.09E-02
Max	1.14E-02	1.09E-02
Avg	1.14E-02	1.09E-02
Std	6.15E-08	1.78E-07
Pa-231		
Min	1.28E-03	1.63E-03
Max	1.28E-03	1.63E-03
Avg	1.28E-03	1.63E-03
Std	1.73E-09	8.08E-09
Pb-210		
Min	3.69E-04	3.57E-04
Max	3.69E-04	3.57E-04
Avg	3.69E-04	3.57E-04
Std	7.33E-11	2.32E-10
Ra-226		
Min	6.11E-01	6.09E-01
Max	6.11E-01	6.09E-01
Avg	6.11E-01	6.09E-01
Std	2.73E-07	8.23E-07
Ra-228		
Min	8.04E+00	9.73E+00
Max	8.04E+00	9.73E+00
Avg	8.04E+00	9.73E+00
Std	3.25E-06	1.05E-05
Th-228		
Min	9.19E+00	6.40E+00
Max	9.19E+00	6.40E+00
Avg	9.19E+00	6.40E+00
Std	0.00E+00	0.00E+00
Th-230		
Min	4.62E-04	1.05E-03
Max	4.62E-04	1.05E-03
Avg	4.62E-04	1.05E-03
Std	9.14E-11	6.20E-10
Th-232		
Min	4.62E-01	1.54E+00
Max	4.62E-01	1.54E+00
Avg	4.62E-01	1.54E+00
Std	1.25E-07	9.70E-07
U-234		
Min	2.76E-05	2.75E-05
Max	2.76E-05	2.75E-05
Avg	2.76E-05	2.75E-05
Std	2.41E-11	7.25E-11
U-235		
Min	2.26E-03	2.25E-03
Max	2.26E-03	2.25E-03
Avg	2.26E-03	2.25E-03
Std	1.97E-09	5.93E-09

Probabilistic Dose vs Pathway(i): Ground External(cont.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
U-238		
Min	8.66E-03	8.63E-03
Max	8.66E-03	8.63E-03
Avg	8.66E-03	8.63E-03
Std	7.61E-09	2.27E-08
∑ALL		
Min	1.83E+01	1.83E+01
Max	1.83E+01	1.83E+01
Avg	1.83E+01	1.83E+01
Std	3.50E-06	1.25E-05

∑ALL is total pathway dose summed for all nuclides.

Probabilistic Dose vs Pathway(i): Inhalation (w/o Radon)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
Ac-227		
Min	1.76E-05	1.69E-05
Max	6.87E-05	6.60E-05
Avg	4.33E-05	4.15E-05
Std	1.48E-05	1.43E-05
Pa-231		
Min	3.69E-06	4.22E-06
Max	1.44E-05	1.65E-05
Avg	9.09E-06	1.04E-05
Std	3.12E-06	3.57E-06
Pb-210		
Min	6.25E-07	6.05E-07
Max	2.45E-06	2.37E-06
Avg	1.54E-06	1.49E-06
Std	5.29E-07	5.11E-07
Ra-226		
Min	2.45E-07	2.63E-07
Max	9.59E-07	1.03E-06
Avg	6.03E-07	6.49E-07
Std	2.07E-07	2.23E-07
Ra-228		
Min	3.23E-05	7.45E-05
Max	1.27E-04	2.92E-04
Avg	7.97E-05	1.84E-04
Std	2.73E-05	6.30E-05
Th-228		
Min	1.61E-04	1.12E-04
Max	6.31E-04	4.39E-04
Avg	3.97E-04	2.76E-04
Std	1.36E-04	9.48E-05
Th-230		
Min	1.99E-05	1.99E-05
Max	7.78E-05	7.78E-05
Avg	4.90E-05	4.90E-05
Std	1.68E-05	1.68E-05
Th-232		
Min	9.15E-04	9.21E-04
Max	3.58E-03	3.61E-03
Avg	2.25E-03	2.27E-03
Std	7.73E-04	7.79E-04
U-234		
Min	4.04E-06	4.02E-06
Max	1.58E-05	1.57E-05
Avg	9.94E-06	9.90E-06
Std	3.41E-06	3.40E-06
U-235		
Min	1.65E-07	1.65E-07
Max	6.48E-07	6.46E-07
Avg	4.08E-07	4.06E-07
Std	1.40E-07	1.39E-07

Probabilistic Dose vs Pathway(i): Inhalation (w/o Radon)(cont.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
U-238		
Min	3.61E-06	3.59E-06
Max	1.41E-05	1.41E-05
Avg	8.89E-06	8.85E-06
Std	3.05E-06	3.04E-06
∑ALL		
Min	1.16E-03	1.16E-03
Max	4.53E-03	4.53E-03
Avg	2.85E-03	2.85E-03
Std	9.79E-04	9.79E-04

∑ALL is total pathway dose summed for all nuclides.

Probabilistic Dose vs Pathway(i): Radon (Water Ind.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
Ac-227		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pa-231		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pb-210		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-226		
Min	1.63E+00	1.63E+00
Max	1.63E+00	1.63E+00
Avg	1.63E+00	1.63E+00
Std	7.56E-07	2.18E-06
Ra-228		
Min	7.62E-02	1.85E-01
Max	7.62E-02	1.85E-01
Avg	7.62E-02	1.85E-01
Std	2.27E-08	1.32E-07
Th-228		
Min	4.14E-01	2.88E-01
Max	4.14E-01	2.88E-01
Avg	4.14E-01	2.88E-01
Std	0.00E+00	0.00E+00
Th-230		
Min	7.87E-04	2.36E-03
Max	7.87E-04	2.36E-03
Avg	7.87E-04	2.36E-03
Std	2.43E-10	1.71E-09
Th-232		
Min	3.19E-03	1.95E-02
Max	3.19E-03	1.95E-02
Avg	3.19E-03	1.95E-02
Std	7.18E-10	9.62E-09
U-234		
Min	1.19E-09	8.28E-09
Max	1.19E-09	8.28E-09
Avg	1.19E-09	8.28E-09
Std	8.06E-16	1.17E-14
U-235		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

Probabilistic Dose vs Pathway(i): Radon (Water Ind.)(cont.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
U-238		
Min	8.40E-16	1.26E-14
Max	8.40E-16	1.26E-14
Avg	8.40E-16	1.26E-14
Std	7.31E-22	2.30E-20
∑ALL		
Min	2.13E+00	2.12E+00
Max	2.13E+00	2.12E+00
Avg	2.13E+00	2.12E+00
Std	7.48E-07	2.33E-06

∑ALL is total pathway dose summed for all nuclides.

Probabilistic Dose vs Pathway(i): Plant (Water Ind.)(cont.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
U-238		
Min	1.96E-03	1.95E-03
Max	1.96E-03	1.95E-03
Avg	1.96E-03	1.95E-03
Std	2.57E-09	5.43E-09
∑ALL		
Min	3.62E+00	3.61E+00
Max	3.62E+00	3.61E+00
Avg	3.62E+00	3.61E+00
Std	1.59E-06	4.29E-06

∑ALL is total pathway dose summed for all nuclides.

Probabilistic Dose vs Pathway(i): Meat (Water Ind.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
Ac-227		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pa-231		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pb-210		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-226		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-228		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-228		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-230		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-232		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
U-234		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
U-235		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

Probabilistic Dose vs Pathway(i): Meat (Water Ind.)(cont.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
U-238		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
ΣALL		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

ΣALL is total pathway dose summed for all nuclides.

Probabilistic Dose vs Pathway(i): Milk (Water Ind.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
Ac-227		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pa-231		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pb-210		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-226		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-228		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-228		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-230		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-232		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
U-234		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
U-235		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

Probabilistic Dose vs Pathway(i): Milk (Water Ind.)(cont.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
U-238		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
ΣALL		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

ΣALL is total pathway dose summed for all nuclides.

Probabilistic Dose vs Pathway(i): Soil Ingestion

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
Ac-227		
Min	1.15E-02	1.10E-02
Max	1.15E-02	1.10E-02
Avg	1.15E-02	1.10E-02
Std	6.19E-08	1.79E-07
Pa-231		
Min	8.56E-03	8.89E-03
Max	8.56E-03	8.89E-03
Avg	8.56E-03	8.89E-03
Std	8.24E-09	2.73E-08
Pb-210		
Min	5.81E-02	5.63E-02
Max	5.81E-02	5.63E-02
Avg	5.81E-02	5.63E-02
Std	1.32E-08	3.71E-08
Ra-226		
Min	1.17E-02	1.34E-02
Max	1.17E-02	1.34E-02
Avg	1.17E-02	1.34E-02
Std	5.28E-09	1.72E-08
Ra-228		
Min	2.45E-01	2.48E-01
Max	2.45E-01	2.48E-01
Avg	2.45E-01	2.48E-01
Std	1.10E-07	3.00E-07
Th-228		
Min	1.12E-01	7.80E-02
Max	1.12E-01	7.80E-02
Avg	1.12E-01	7.80E-02
Std	0.00E+00	0.00E+00
Th-230		
Min	9.92E-03	9.93E-03
Max	9.92E-03	9.93E-03
Avg	9.92E-03	9.93E-03
Std	0.00E+00	0.00E+00
Th-232		
Min	4.66E-01	4.96E-01
Max	4.66E-01	4.96E-01
Avg	4.66E-01	4.96E-01
Std	0.00E+00	2.58E-08
U-234		
Min	2.57E-03	2.56E-03
Max	2.57E-03	2.56E-03
Avg	2.57E-03	2.56E-03
Std	2.25E-09	6.74E-09
U-235		
Min	1.07E-04	1.06E-04
Max	1.07E-04	1.06E-04
Avg	1.07E-04	1.06E-04
Std	9.38E-11	2.81E-10

Probabilistic Dose vs Pathway(i): Soil Ingestion(cont.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
U-238		
Min	2.44E-03	2.43E-03
Max	2.44E-03	2.43E-03
Avg	2.44E-03	2.43E-03
Std	2.13E-09	6.41E-09
ΣALL		
Min	9.27E-01	9.26E-01
Max	9.27E-01	9.26E-01
Avg	9.27E-01	9.26E-01
Std	1.99E-07	5.93E-07

ΣALL is total pathway dose summed for all nuclides.

Probabilistic Dose vs Pathway(i): Water Ingestion

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
Ac-227		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pa-231		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pb-210		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-226		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-228		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-228		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-230		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-232		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
U-234		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
U-235		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

Probabilistic Dose vs Pathway(i): Water Ingestion(cont.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
U-238		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
∑ALL		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

∑ALL is total pathway dose summed for all nuclides.

Probabilistic Dose vs Pathway(i): Fish Ingestion

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
Ac-227		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pa-231		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pb-210		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-226		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-228		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-228		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-230		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-232		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
U-234		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
U-235		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

Probabilistic Dose vs Pathway(i): Fish Ingestion(cont.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
U-238		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
∑ALL		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

∑ALL is total pathway dose summed for all nuclides.

Probabilistic Dose vs Pathway(i): Radon (Water Dep.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
Ac-227		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pa-231		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pb-210		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-226		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-228		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-228		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-230		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-232		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
U-234		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
U-235		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

Probabilistic Dose vs Pathway(i): Radon (Water Dep.)(cont.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
U-238		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
∑ALL		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

∑ALL is total pathway dose summed for all nuclides.

Probabilistic results summary : Resident: No Secular Equilibrium; Uncertainty Analysis
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Probabilistic Dose vs Pathway(i): Plant (Water Dep.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
Ac-227		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pa-231		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pb-210		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-226		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-228		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-228		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-230		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-232		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
U-234		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
U-235		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

Probabilistic Dose vs Pathway(i): Plant (Water Dep.)(cont.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
U-238		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
∑ALL		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

∑ALL is total pathway dose summed for all nuclides.

Probabilistic Dose vs Pathway(i): Meat (Water Dep.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
Ac-227		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pa-231		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pb-210		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-226		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-228		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-228		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-230		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-232		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
U-234		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
U-235		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

Probabilistic Dose vs Pathway(i): Meat (Water Dep.)(cont.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
U-238		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
∑ALL		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

∑ALL is total pathway dose summed for all nuclides.

Probabilistic Dose vs Pathway(i): Milk (Water Dep.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
Ac-227		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pa-231		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Pb-210		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-226		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Ra-228		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-228		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-230		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
Th-232		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
U-234		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
U-235		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

Probabilistic Dose vs Pathway(i): Milk (Water Dep.)(cont.)

Nuclide (j)	DOSE(i,j,t), mrem/yr t= 0.00E+00	1.00E+00
U-238		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00
ΣALL		
Min	0.00E+00	0.00E+00
Max	0.00E+00	0.00E+00
Avg	0.00E+00	0.00E+00
Std	0.00E+00	0.00E+00

ΣALL is total pathway dose summed for all nuclides.

Cumulative Probability Summary for: Total Dose Over Pathways

Dose(t), mrem/yr

Cumulative Probability	t= 0.00E+00	1.00E+00
0.025	2.50E+01	2.50E+01
0.050	2.50E+01	2.50E+01
0.075	2.50E+01	2.50E+01
0.100	2.50E+01	2.50E+01
0.125	2.50E+01	2.50E+01
0.150	2.50E+01	2.50E+01
0.175	2.50E+01	2.50E+01
0.200	2.50E+01	2.50E+01
0.225	2.50E+01	2.50E+01
0.250	2.50E+01	2.50E+01
0.275	2.50E+01	2.50E+01
0.300	2.50E+01	2.50E+01
0.325	2.50E+01	2.50E+01
0.350	2.50E+01	2.50E+01
0.375	2.50E+01	2.50E+01
0.400	2.50E+01	2.50E+01
0.425	2.50E+01	2.50E+01
0.450	2.50E+01	2.50E+01
0.475	2.50E+01	2.50E+01
0.500	2.50E+01	2.50E+01
0.525	2.50E+01	2.50E+01
0.550	2.50E+01	2.50E+01
0.575	2.50E+01	2.50E+01
0.600	2.50E+01	2.50E+01
0.625	2.50E+01	2.50E+01
0.650	2.50E+01	2.50E+01
0.675	2.50E+01	2.50E+01
0.700	2.50E+01	2.50E+01
0.725	2.50E+01	2.50E+01
0.750	2.50E+01	2.50E+01
0.775	2.50E+01	2.50E+01
0.800	2.50E+01	2.50E+01
0.825	2.50E+01	2.50E+01
0.850	2.50E+01	2.50E+01
0.875	2.50E+01	2.50E+01
0.900	2.50E+01	2.50E+01
0.925	2.50E+01	2.50E+01
0.950	2.50E+01	2.50E+01
0.975	2.50E+01	2.50E+01
1.000	2.50E+01	2.50E+01

Summary of dose at graphical times, reptition 1

Dose statistics at graphical times, mrem/yr

Time Years	Minimum	Maximum	Mean	Median	90%	95%	97.5%	99%
0.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01

Probabilistic results summary : Resident: No Secular Equilibrium; Uncertainty Analysis
File: r61unc.rad

Summary of dose at graphical times, reptition 2

Dose statistics at graphical times, mrem/yr

Time Years	Minimum	Maximum	Mean	Median	90%	95%	97.5%	99%
0.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01

Probabilistic results summary : Resident: No Secular Equilibrium; Uncertainty Analysis
File: r61unc.rad

Summary of dose at graphical times, reptition 3

Dose statistics at graphical times, mrem/yr

Time Years	Minimum	Maximum	Mean	Median	90%	95%	97.5%	99%
0.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01
1.00E+00	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01	2.50E+01

Probabilistic results summary : Resident: No Secular Equilibrium; Uncertainty Analysis File: r61unc.rad

Peak of the mean dose (averaged over observations) at graphical times

Repetition	Time of peak mean dose	Peak mean dose
	Years	mrem/yr
1	0.000E+00	2.500E+01
2	0.000E+00	2.500E+01
3	0.000E+00	2.500E+01

Title : Resident: No Secular Equilibrium; Uncertainty Analysis
Input File : r6lunc.rad

Coefficients for peak of mean dose time Dose

	PCC		SRC		PRCC		SRRC	
Coefficient =	1		1		1		1	
Repetition =								
Description of Probabilistic Variable	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff
Contaminated zone hydraulic conductivity	5	-0.10	5	0.00	2	-0.25	2	-0.01
Effective Porosity of Unsaturated zone 1	6	0.08	6	0.00	3	0.15	3	0.00
Hydraulic Conductivity of Unsaturated zone 1	2	0.17	2	0.01	6	0.06	6	0.00
Well pump intake depth	8	0.02	8	0.00	8	0.00	8	0.00
Indoor dust filtration factor	1	1.00	1	1.00	1	1.00	1	1.00
Wet weight crop yield of fruit, grain and non-leafy vegetables	4	-0.12	4	0.00	7	-0.05	7	0.00
Wet foliar interception fraction of leafy vegetables	7	0.06	7	0.00	5	-0.09	5	0.00
Weathering removal constant of all vegetation	3	-0.17	3	0.00	4	-0.13	4	0.00
R-SQUARE		1.00		1.00		1.00		1.00

-Rank is set to zero if the dose is zero or the correlation matrix is singular.
-R-SQUARE varies between 0 and 1 and is called the coefficient of determination; it provides a measure of the variation in the dependent variable (Dose) explained by regression on the independent variables.

ATTACHMENT 5

LAND AREA PARAMETER CALCULATIONS

ATTACHMENT 5 PARAMETER CALCULATIONS

This Attachment shows how the dust concentration was calculated.

5.1 Dust Concentration

One of the parameters required by the RESRAD model is the dust concentration. This concentration is the amount of respirable dust that is site-related; as opposed to the total amount of dust in the air. The dust concentration was calculated based on the particulate emission factor (PEF). The PEF relates the concentration of contaminant in soil with the concentration of dust particles in air. The equations used are as follows:

$$\text{Dust Concentration } (mg/m^3) = \frac{1}{\text{PEF } (m^3/kg)} \times 10^6 \text{ mg/kg}$$

$$PEF = Q/C \times \frac{3{,}600 \text{ s/hr}}{0.036 \times (1 - V) \times (U_m/U_t)^3 \times F(x)}$$

where:

- Q/C = inverse of the mean concentration at the center of a square source (g/m^2-s per kg/m^3)
- V = fraction of vegetative cover (unitless)
- U_m = mean annual windspeed (m/s)
- U_t = equivalent threshold value of windspeed at 7 meters (m/s)
- F(x) = function dependent on U_m/U_t (unitless)

The parameter values are summarized in Table A5-1.

Table A5-1. Paramters for Dust Concentration Calculations

Parameter	Value	Source
Inverse of the mean concentration at the center of a square source (g/m^2-s per kg/m^3); Q/C	65.4	Value for a 2-acre site in Albuquerque (EPA, 1996)
Fraction of vegetative cover (unitless); V	0.0	Conservative value applicable for desert Conditions
Mean annual windspeed (m/s); U_m	4.52	Mean annual windspeed measured at the Albuquerque Airport from 1931 to 1999 (personal communication from the National Weather Service, April 20,2000)
Equivalent threshold of windspeed at 7 meters (m/s); U_t	11.32	EPA default value (EPA, 1996)
Function dependent on U_m/U_t (unitless); F(x)	0.149	Value based on U_m and U_t (EPA, 1985)

REFERENCES

EPA, 1985. *Rapid Assessment of Exposure to Particulate Emissions from Surface Contamination Sites.* EPA/600/8-85/002. U.S. Environmental Protection Agency. February 1985.

EPA, 1996. *Soil Screening Guidance: Technical Background Document.* EPA/540/R95/128. U.S. Environmental Protection Agency. May 1996.

ATTACHMENT 6

RESRAD-BUILD MODEL RESULTS

Title : Bunker Surface Contamination-U-238
Input File : C:\WINBLD\U-238.INP

RESRAD-BUILD Table of Contents

Title : Bunker Surface Contamination-U-238
Input File : C:\WINBLD\U-238.INP

RESRAD-BUILD Input Parameters

Number of Sources : 1
Number of Receptors: 1
Total Time : 2.500000E+02 days
Fraction Inside : 3.330000E-01

Receptor Information

Receptor	Room	x [m]	y [m]	z [m]	FracTime	Inhalation [m3/day]	Ingestion(Dust) [m2/hr]
1	1	6.100	3.050	1.000	1.000	1.50E+01	1.00E-04

Receptor-Source Shielding Relationship

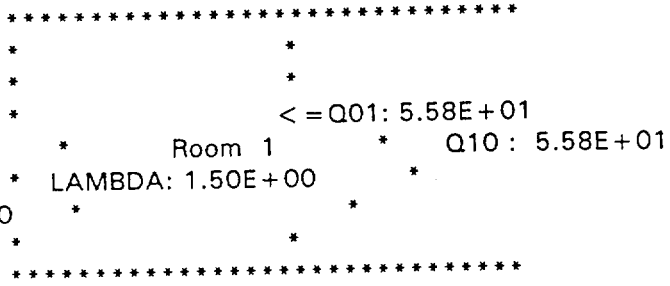
Receptor	Source	Density [g/cm3]	Thickness [cm]	Material
1	1	2.40E+00	0.00E+00	Concrete

Title : Bunker Surface Contamination-U-238
Input File : C:\WINBLD\U-238.INP

ÍÍÍÍÍÍÍÍ Building Information ÍÍÍÍÍÍÍÍ

Building Air Exchange Rate: 1.50E+00 1/hr

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



Deposition velocity: 1.00E-02 [m/s] Resuspension Rate: 5.00E-07 [1/s]

Title : Bunker Surface Contamination-U-238
Input File : C:\WINBLD\U-238.INP

íííííííí Source Information íííííííí

Source: 1
Location:: Room : 1 x: 3.05 y: 1.52 z: 0.00[m]
Geometry:: Type: Area Area:1.86E+01 [m2] Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E+00
Removable fraction: 2.000E-01
Time to Remove: 3.650E+02 [day]

Radon Release Fraction: 3.000E-01

Contamination::

Nuclide	Concentration	Dose Conversion Factors				
		Ingestion	Inhalation	External (Surface)	External Submersion (Volume)	
	[pCi/m2]	[mrem/pCi]	[mrem/pCi]	[mrem/yr/ (pCi/m2)]	[mrem/yr/ (pCi/m3)]	[mrem/yr/ (pCi/m3)]
U-238	3.680E+03	2.690E-04	1.180E-01	3.530E-06	9.510E-08	1.600E-04
U-234	3.680E+03	2.830E-04	1.320E-01	8.750E-08	2.520E-10	8.930E-07
TH-230	3.680E+03	5.480E-04	3.260E-01	8.780E-08	7.570E-10	2.040E-06
RA-226	3.680E+03	1.330E-03	8.600E-03	1.940E-04	7.000E-06	1.040E-02
PB-210	2.580E+03	7.270E-03	2.320E-02	4.140E-07	3.820E-09	1.430E-05

Title : Bunker Surface Contamination-U-238
Input File : C:\WINBLD\U-238.INP Evaluation Time: 0.000000 years

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ÍÍÍ Assessment for Time: 1 ÍÍÍ
ÍÍÍ Time =0.00E+00 yr ÍÍÍ
ÍÍ
ÍÍ

ÍÍÍÍÍÍÍÍ Source Information ÍÍÍÍÍÍÍÍ

Source: 1
Location:: Room : 1 x: 3.05 y: 1.52 z: 0.00 [m]
Geometry:: Type: Area Area:1.86E+01 [m2] Direction: z
Pathway ::
Direct Ingestion Rate: 0.000E+00 [1/hr]
Fraction released to air: 1.000E+00
Removable fraction: 0.000E+00
Time to Remove: 3.650E+02 [day]

Contamination:: Nuclide Concentration
[pCi/m2]
U-238 3.428E+03
U-234 3.428E+03
TH-230 3.428E+03
RA-226 3.428E+03
PB-210 2.414E+03

Title : Bunker Surface Contamination-U-238
Input File : C:\WINBLD\U-238.INP Evaluation Time: 0.000000 years

RESRAD-BUILD Dose Tables

Source Contributions to Receptor Doses

[mrem]

	Source	Total
	1	
Receptor 1	2.2E+01	2.2E+01
Total	2.2E+01	2.2E+01

Title : Bunker Surface Contamination-U-238
Input File : C:\WINBLD\U-238.INP Evaluation Time: 0.000000 years

Pathway Detail of Doses
[mrem]

Source: 1

Receptor	External	Deposition	Immersion	Inhalation	Radon	Ingestion
1	8.34E-03	4.39E-03	6.76E-05	2.10E+01	8.32E-03	8.31E-01
Total	8.34E-03	4.39E-03	6.76E-05	2.10E+01	8.32E-03	8.31E-01

Title : Bunker Surface Contamination-U-238
Input File : C:\WINBLD\U-238.INP Evaluation Time: 0.000000 years

Nuclide Detail of Doses
[mrem]

Source: 1

Nuclide	Receptor 1	Total
U-238		
U-238	4.16E+00	4.16E+00
U-234	4.51E-06	4.51E-06
TH-230	2.28E-11	2.28E-11
RA-226	5.31E-17	5.31E-17
PB-210	0.00E+00	0.00E+00
U-234		
U-234	4.65E+00	4.65E+00
TH-230	3.53E-05	3.53E-05
RA-226	1.43E-10	1.43E-10
PB-210	2.55E-12	2.55E-12
TH-230		
TH-230	1.15E+01	1.15E+01
RA-226	6.97E-05	6.97E-05
PB-210	1.65E-06	1.65E-06
RA-226		
RA-226	4.70E-01	4.70E-01
PB-210	1.67E-02	1.67E-02
PB-210		
PB-210	1.10E+00	1.10E+00

APPENDIX B

SITE-SPECIFIC HEALTH AND SAFETY PLAN

INSTALLATION RESTORATION PROGRAM
KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

SITE-SPECIFIC HEALTH AND SAFETY PLAN
FOR DECOMMISSIONING ACTIVITIES AT
INSTALLATION RESTORATION PROGRAM SITE OT-10,
RADIATION TRAINING SITES,
KIRTLAND AIR FORCE BASE, NEW MEXICO

REVISED AUGUST 2002

Prepared for

HQ AFCEE/ERD
ENVIRONMENTAL RESTORATION DIVISION
BROOKS AFB, TEXAS 78253-5363
USAF CONTRACT NO. F41624-97-D-8013 DELIVERY ORDER NO. 0037

Prepared by

MWH AMERICAS, INC.
ALBUQUERQUE, NEW MEXICO

SITE-SPECIFIC HEALTH AND SAFETY PLAN

DECOMMISSIONING ACTIVITIES AT INSTALLATION RESTORATION PROGRAM SITE OT-10, RADIATION TRAINING SITES, KIRTLAND AIR FORCE BASE, NEW MEXICO

Prepared by:

Beth Darnell, CIH, MWH Americas
AFCEE Program Health and Safety Manager

Date

Reviewed by:

Jeff Johnston, MWH Americas
Delivery Order Manager

Date

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ATTACHMENT 4	MWH Americas Hazard Communication Program
ATTACHMENT 5	Respiratory Protection Program

FIGURES

ACRONYMS

AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
AHA	activity hazard analysis
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
CFR	*U.S. Code of Federal Regulations*
CPR	cardiopulmonary resuscitation
DNWS	Defense Nuclear Weapons School
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ERG	Environmental Restoration Group
GFCI	ground fault circuit interrupter
HAZWOPER	Hazardous Waste Operations and Emergency Response
hr	hour or hours
HSO	Health and Safety Officer
HSP	Health and Safety Plan
mrem/hr	millirem per hr
MSDS	material safety data sheet
MWCI	MWH Americas Constructors, Inc.
NRC	Nuclear Regulatory Commission
NRR	noise reduction rating
OSHA	Occupational Safety and Health Administration
PA/RD	preliminary assessment/remedial design
PPE	personal protective equipment
RSO	radiation safety officer
SPF	sun protection factor
SSHP	Site Safety and Health Plan (developed by Foster Wheeler)

ACRONYMS (Concluded)

TLD	thermoluminescent detectors
TS5	OT-10 Training Site 5
TS6	OT-10 Training Site 6
TS7	OT-10 Training Site 7
TS8	OT-10 Training Site 8
uCi/ml	microcuries per milliliter
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force

B1.0 INTRODUCTION

This Site-Specific Health and Safety Plan (HSP) has been prepared for MWH Americas employees overseeing the decommissioning of the four inactive OT-10 training sites at Kirtland Air Force Base (AFB) in Albuquerque, New Mexico. This document, along with the others listed below, form the health and safety program documents governing this project.

- Section 4.0 of the Decommissioning Plan containing the Radiation Protection Program (USAF, 2000).
- Kirtland AFB Volume IV Site Safety and Health Plan (SSHP) developed by Foster Wheeler Environmental Corporation, March 3, 1995. Foster Wheeler Environmental Corporation developed the SSHP under a U.S. Army Corps of Engineers (USACE) Total Environmental Restoration Contract; it has been serving many contractors at Kirtland AFB since it was written. In a memorandum dated May 27, 1999, MWH Americas identified elements of the Foster Wheeler SSHP that did not apply or required clarification for MWH Americas employees.
- Contractor-specific activity hazard analyses (AHAs)

This HSP provides the safety and health procedures specific to the decommissioning activities at OT-10. The Radiation Protection Program provides specific information about the controls that will be employed to protect site workers from over-exposure to radiation.

B1.1 SITE LOCATION AND CLIENT INFORMATION

B1.1.1 Site Location

Kirtland AFB is located in Albuquerque, New Mexico. Installation Restoration Program (IRP) Site OT-10 is located in the north-central part of the base. It contains four former Defense Nuclear Weapons School (DNWS) Radiation Training Sites. These sites (TS5, TS6, TS7 and TS8) are being decommissioned in accordance with this plan (Figure B.1-1). The Decommissioning Plan provides a detailed discussion of the background and the nature and extent of contamination at OT-10.

B1.1.2 Client Information

MWH Americas' work at OT-10 will be conducted under Air Force Center for Environmental Excellence (AFCEE) Contract No. F41624-97-D-8013, Delivery Order 37.

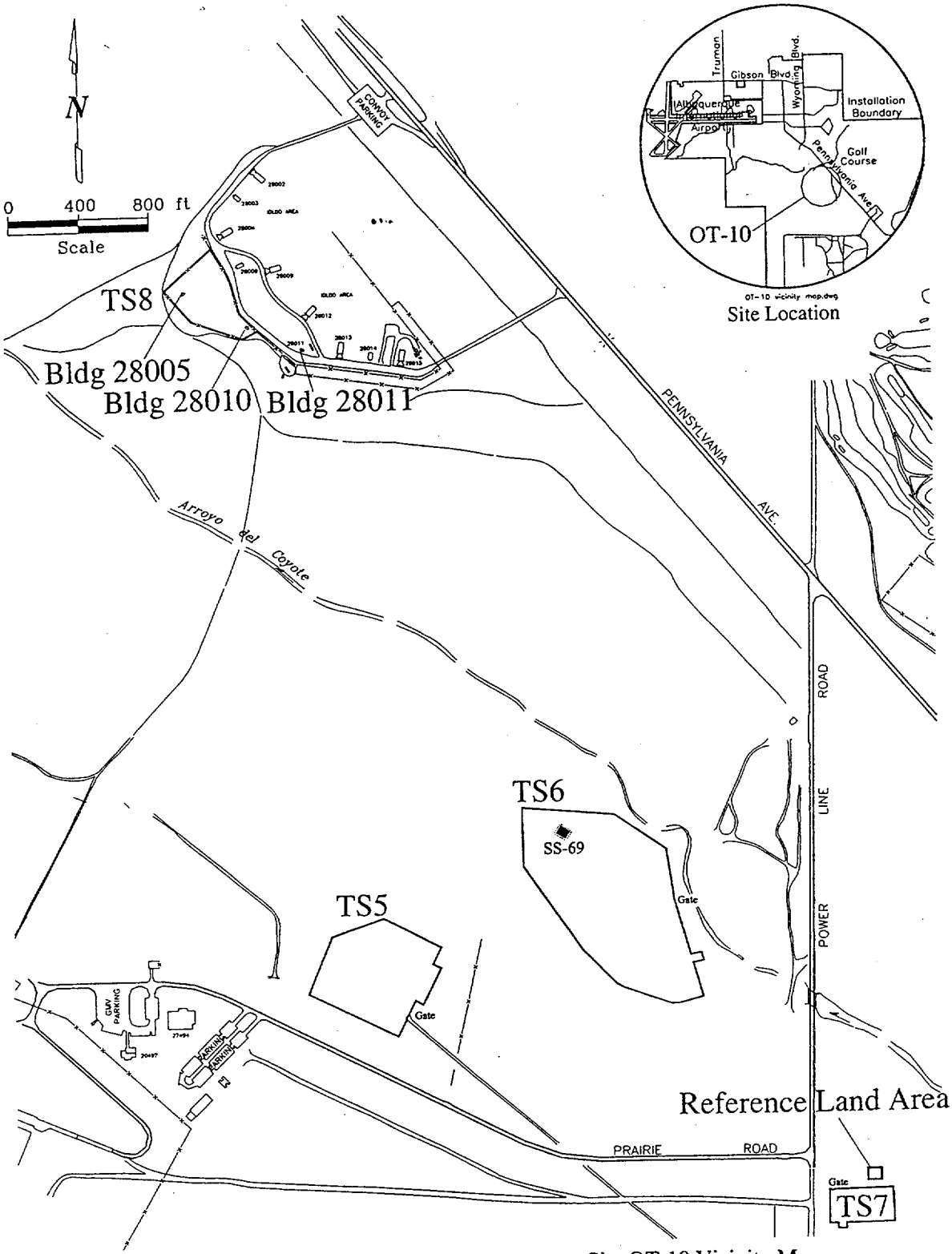

Figure B.1-1. Installation Restoration Program Site OT-10 Vicinity Map

B.1.2 SCOPE OF WORK AND SCHEDULE

From 1961 to 1990, OT-10 was used to train military radiological response personnel to detect contaminants generated during simulated nuclear weapons accidents. Known quantities of thorium oxide sludge were applied and tilled into site soils to simulate dispersed plutonium. Four other training sites (training sites 1 through 4) remain active. The training sites are owned by the U.S. Government and regulated by the U.S. Nuclear Regulatory Commission (NRC) under United States Air Force (USAF) Master Materials License No. 42-23529-01AF. Radiological contamination at OT-10 is limited to thorium-232, uranium-238, uranium-235, and their decay progeny. No chemical contaminants of concern have been identified at these sites.

B.1.2.1 Scope of Work

A detailed scope of work appears in the Decommissioning Plan. Field activities will include:

- Gamma-ray scanning surveys prior to and during decommissioning activities;
- Clearing and grubbing of vegetation and debris from excavation sites;
- Excavation of radiologically-contaminated soils;
-
- Sampling of vegetation, debris and soil for waste characterization;
- Packaging of vegetation, debris, and soil into Intermodal containers;
- Placement by crane of Intermodal containers onto rail cars for transport to waste disposal facility (Envirocare in Clive, Utah);
- Final status radiation surveying (includes sampling); and
- Grading and re-vegetation.

The protection of workers is a paramount decommissioning task. Health physics activities, including contamination, radiation, and air monitoring, will be overseen by onsite health physics personnel during radiological surveying, excavating, and packaging operations. Monitoring will include air-borne particulate monitoring and personal dosimetry. General air monitoring will be performed daily or whenever site work activities have the potential for releasing airborne radioactivity. Air sample filters will be measured weekly for radioactive counts to determine potential worker exposure to airborne radioactive particles. Thermoluminescent detectors (TLDs) will be used to monitor worker exposure to external radiation.

B.1.2.2 Schedule

Field activities are anticipated to take place from November 2001 through April 2003. A five day, 50-hour (hr) workweek is anticipated for this project.

B.1.3 PURPOSE OF THE HEALTH AND SAFETY PLAN

The purpose of this HSP is to address known and reasonably anticipated health and safety hazards to the MWH Americas employees and team conducting decommissioning activities at OT-10. In particular, this HSP is intended to provide enough information to site personnel to prevent and minimize personal injuries, illnesses, and physical damage to equipment, supplies, and property. Specifically, Section B.7.0 has been designed to serve as a code of safe practices for oversight activities on this project. Contractors performing heavy equipment operations will be required to submit an AHA covering work means and methods and the anticipated hazards and controls.

B.1.4 AMENDING THE HEALTH AND SAFETY PLAN

The evaluation of hazards, levels of protection, and procedures specified in this plan are based on the best information available at the time of this writing (July 2000). It is recognized that site conditions may change; therefore, it is imperative that safety measures be thoroughly assessed by a safety and health professional prior to any hazardous field activities.

This HSP will be modified/amended when work activities not covered by this plan are scheduled, or if the provisions specified herein are not feasible or adequate to protect the health and safety of site personnel. Modifications shall be accomplished by consultation with a MWH Americas safety and health professional. The Delivery Order Manager will act as liaison between the project staff and the MWH Americas safety and health professional. All modifications or amendments to the HSP will be written and communicated to all affected personnel.

B.1.5 APPLICABLE REGULATIONS AND REFERENCES

The Occupational Safety and Health Administration (OSHA) requires each employer involved in construction activities to comply with Title 29 of the U.S. Code of Federal Regulations (29 CFR § 1926), Safety and Health Regulations for the Construction Industry and applicable sections of 29 CFR § 1910 Safety and Health Regulations for General Industry. The Hazardous Waste Operations and Emergency Response standard (regulation) (29 CFR § 1910.120 and 29 CFR § 1926.65) applies to the decommissioning of the radioactive training sites.

OT-10 decommissioning activities will receive added precautions because of the radioactive nature of the contamination at OT-10. The USAF and the NRC will review the Decommissioning Plan and oversee decommissioning activities. Title 10 CFR Parts 20, 30, and 49, the *U.S. Nuclear Regulatory Commission Draft Regulatory Guide DG-4006*, and the *Multi-Agency Radiation Survey and Site Investigation Manual* guided the writing of this Decommissioning Plan.

All employees and contractors will implement and enforce the requirements of the safety plan(s) of the company he/she is working for; and comply with the requirements of 29 CFR § 1926 and relevant sections of 29 CFR § 1910, as well as the relevant Title 10, 20, 30, 40, and 49 CFR requirements.

B2.0 SITE-SPECIFIC CONDITIONS

B2.1 Radiation Hazard

The radiation aspects of OT-10 make it an interesting and unique project. A Radiation Protection Plan, required for such a project, has been developed by a contracted health physicist. The Radiation Protection Plan provides detailed information about the contamination hazards and exposure monitoring program at the site. The Radiation Protection Plan is included in Section 4.0 of the Decommissioning Plan. The Radiation Protection Plan can be summarized as follows:

- The primary hazards are thorium-232 and its decay progeny. This element decays to ten different isotopes before it stabilizes. Its decay process liberates radon-220 gas that is an alpha emitter. Its decay process also liberates alpha, beta, and gamma radiation. Several of its decay progeny emit gamma radiation.

- Uranium 238 and its decay progeny are also present at OT-10; it liberates radon-222 gas. Its decay process also liberates alpha, beta, and gamma radiation.
- Radon gas is a significant health concern due to the alpha particle's ability to damage the lung tissue, including the potential to cause lung cancer. However, radon-220 is a less important source of exposure to humans than radon-222 due to its short half life and limited ability to migrate. Radon-222 control actions will also reduce exposure to radon-220.
- Daily air monitoring will be performed to quantify the amount of alpha radiation being generated by invasive (clearing, grubbing, excavation and loading) decommissioning activities. The monitoring will be accomplished by collecting particulate samples on a filter cassette attached to a personal air sampling pump, as well as area samples on intermediate volume air sampling pumps. The samples will be analyzed daily and again a week later by a scintillation counter providing gross alpha radiation data. This monitoring will be considered as a surrogate to direct monitoring for thorium-232.
- A portable Ludlum 44-10 sodium iodide scintillometer equipped with a Ludlum 2221 ratemeter/scaler will be used to measure direct radiation (gamma) dose rates at the surface of soil piles, Intermodal containers, and any other surface in question.
- Onsite workers will be issued individual TLDs to monitor their external exposure. The TLDs will be worn under protective clothing to prevent possible contamination of the TLD from dirt or airborne dust. All TLDs, as well as controls, will be placed in the support zone when not in use. TLDs will be provided and read quarterly by a third-party vendor certified by the National Voluntary Laboratory Accreditation Program.
- 2 millirem per hr (mrem/hr) will be the maximum acceptable dose rate for workers. At this level the onsite health physicist will work with the crew to ensure that unnecessary exposure does not occur.
- The principles of time, distance, and shielding for the protection of workers from radiation will be employed. The amount of time each worker is exposed to radiation above background by having them record times in and out on a sign-in/sign-out sheet. The time a worker spends onsite will be limited by the acceptable exposure dose rate.
- Invasive work tasks will start in Level C personal protective equipment (PPE). If at least one week of air monitoring indicates that airborne thorium-232 levels are acceptable and planned activities are not anticipated to generate any more dust than those conducted during the one week evaluation period, downgrading out of respirators may be permitted.
- Level C PPE for this project requires:
  - ✓ Standard Tyvek® suite with feet and hood
  - ✓ Steel-toed safety boots
  - ✓ Galosh overboots with tread to prevent slipping hazards
  - ✓ Latex or nitrile inner gloves
  - ✓ Cotton or other cloth overgloves
  - ✓ Full-face air purifying respirator with P100 (high efficiency particulate air) filters. With permission from the Site Radiation Safety Officer (RSO), half-face respirators may be used.
  - ✓ Hard hat
  - ✓ Safety glasses with side shields
- A pre-project medical radiation whole body count may be provided to all project personnel. This will be coordinated by the Site RSO.
- The amount and type of radiation at Site OT-10 is not strong enough to result in an acute onsite radiation injury or illness to site workers. Any injury or illness occurring at the site would be the result of other factors. It is possible for an injured or ill worker to have contaminated soil adhere to his/her PPE or exposed body. For this reason medical

emergencies will require decontamination and planning. Section 8.0 of this HSP provides information about the medical assistance network established for this project. The emergency medical service (local 24-hr hospital) has been informed of this project and the potential for radioactive soil contamination on an injured/ill worker's clothing or body.

- Decontamination will include the removal of outer clothing and washing affected body parts with soap and water. Note: do not use a hard-bristled brush when washing skin or equipment as it could lead to tiny abrasions which would allow the injection of contaminated material. Decontamination solutions and spent PPE will be containerized and disposed of in accordance with the Decommissioning Plan.

B2.2 Medical Surveillance

In addition to the annual medical evaluation required by the Hazardous Waste Operations and Emergency Response standard (described in the SSHP), project personnel may be required to obtain pre and post whole body radiation counts to assess radiation exposure. The Sandia National Laboratory has the facilities to conduct this test and the testing will be coordinated by Dr. Kenneth Baker, the Site RSO. MWH Americas employees will need to bring a copy of the Authorization to Release Previous Medical Records form to Sandia so that the results can be forwarded directly to Dr. Greaney for inclusion in the employee's permanent medical surveillance file. Since the form does not have Dr. Greaney's address, it is being included here for reference: WorkCare, 333 S. Anita Dr., Suite 630, Orange, CA 92868. Phone 800-455-6155 ext. 113 with any questions. Mr. Jeffrey Johnston, the Delivery Order Manager will have copies of this form to provide to all MWH Americas personnel participating in the radiation testing program.

B2.3 HEAT STRESS AND EXPOSURE TO THE SUN

B2.3.1 Heat Stress

The stress of working in a hot environment can cause a variety of illnesses including heat exhaustion or heat stroke; the latter can be fatal. Personal protective equipment (i.e., EPA Level C protection) can significantly increase heat stress. While the field work associated with the decommissioning of OT-10 is scheduled to start during the fall and winter months, heat stress is still a potential concern in the desert portions of the country, particularly in New Mexico. To reduce or prevent heat stress, frequent rest periods and controlled beverage consumption to replace body fluids and salts may be required. It should be noted that heat stress can occur in people wearing regular, permeable, work clothing.

Additionally, quantitative physiological monitoring for heat stress may be conducted. Physiological monitoring for heat stress includes heart rate as a primary indicator and oral temperature as a secondary indicator. The frequency of monitoring depends on the ambient temperature and the level of protection used on-site. To determine the initial monitoring frequency, after a work period of moderate exertion, use the following information:

Adjusted Temperature*	Level D	Level C
90 F or above	after 45 minutes	after 15 minutes
87.5 to 90 F	after 60 minutes	after 30 minutes
82.5 to 87.5 F	after 90 minutes	after 60 minutes
77.5 to 82.5 F	after 120 minutes	after 90 minutes
72.5 to 77.5 F	after 150 minutes	after 120 minutes

* Adjusted air temperature (F) = observed temp + (13 x percent sunshine)

Air temperature measured with bulb shielded from radiant heat, percent sunshine is the time sun is not covered by clouds thick enough to produce a shadow (100 percent = no cloud cover and a sharp, distinct shadow; 0 percent = no shadows). The Industrial Environment, its Evaluation and Control; U.S. Department of Health and Human Services, 1973.

The following procedures and action levels are to be used for the physiological monitoring of heat stress:

Heart rate: Count the radial pulse during a 30-second period as early as possible in the rest period. If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle one-third and keep the rest period the same. If the heart rate exceeds the 110 beats per minute at the next rest period, shorten the following work cycle by another one-third and also monitor oral temperature.

Oral temperature: Use a clinical thermometer (3 minutes under the tongue) to measure the oral temperature at the end of the work period (before drinking). If oral temperature exceeds 99.6 F, shorten the next work cycle by one-third without changing the rest period. If oral temperature exceeds 99.6 F at the beginning of the next rest period, shorten the following work cycle by one-third. ***DO NOT*** allow a field team member to wear EPA Level C protection when oral temperature exceeds 100.6 F.

Personnel will be trained to recognize the symptoms of heat stress and the appropriate action to take upon recognition. Even though physiological monitoring is not always necessary, it is essential that personnel understand the significance of heat stress and its recognition.

Some of the symptoms, which indicate heat exhaustion, are:

- Clammy skin
- Lightheadedness
- Slurred speech
- Rapid pulse
- Weakness, fatigue
- Confusion
- Fainting
- Nausea (vomiting)

If these conditions are noted, the following steps should be performed:

- Remove the victim to a cool and uncontaminated area.
- Remove protective clothing.
- Give water to drink, if conscious.

Symptoms that indicate heat stroke include:

- Staggering gait
- Hot skin, temperature rise (yet may feel chilled)
- Incoherent, delirious
- Mental confusion
- Convulsions
- Unconsciousness

If heat stroke conditions are noted, immediately perform the following steps:

- Remove victim to a cool, uncontaminated area.
- Cool the victim, whole body, with water, compresses and/or rapid Fanning.
- Give water to drink, if conscious.
- Transport the victim to the designated medical facility for further cooling and monitoring of body functions. ***HEAT STROKE IS A MEDICAL EMERGENCY!***

B2.3.2 Exposure to the Sun

When working outdoors, even on seemingly cloudy days, exposure to the sun can result in sun burn. Workers wearing the minimum level of personal protective equipment at OT-10 will be fairly well protected against sun burn, except for their face. It is possible that workers will be wearing respirators that will cover their faces for a good portion of the work, but exposure may still be an issue. For this reason, it is recommended that workers use a sun screen to protect the exposed skin against sun burn. The higher the sun protection factor (SPF), the better. Exposed skin will likely include the back of the neck, top of the ears, nose, cheeks and forehead as well as forearms and hands. Should a worker experience a sun burn, first aid treatment should be administered in accordance with the booklet in the first aid kit on the site.

B2.4 BIOHAZARDS

Potential biological hazards at Site OT-10 include snakes, scorpions, spiders, ticks and fleas, poisonous plants such as poison oak and poison ivy, and the newly identified hantavirus.

Spiders, scorpions, snakes, and fleas exist in cool, dark, moist areas. The potential for encounters exist when reaching into dark, covered places. Such places include storage of site supplies. Suggestions for control include using a long stick to break apart webs or loosen soil from certain areas. A flashlight should also be used when reaching into a dark area. Field personnel shall be aware of their surroundings and avoid contact with all insects.

Rattlesnakes and scorpions are indigenous to many parts of the United States, particularly New Mexico. The daily tailgate safety meetings should include a reminder to be on the lookout for rattlesnakes and scorpions. It should be noted that the American Red Cross does not advocate the use of snake bite kits for snake bite injuries. Rather, experience has shown that the victim has a better chance of recovery without permanent damage when the site of the wound is immobilized and the victim rushed to the closest emergency medical facility (preferably within 30 minutes). Most snakes and scorpions are not generally aggressive, however, if the temperature is very warm, they may already be irritated and encountering you may put them over the edge. Do not attempt to handle a snake. Rather, see if the snake will leave on its own, if not contact the local animal control at: 505-768-1975.

Poisonous plants such as poison ivy and poison oak grow wild in dark, moist areas, and at the base or surrounding seedling or adult trees. Some individuals are prone to break out in dermal (skin) rashes upon contact with the plant oil. A visual site inspection and identification of the plants should be completed prior to each work shift so that all individuals are aware of the potential exposure.

A recently identified disease, hantavirus, has resulted in several deaths in the southwestern part of the United States. While there may not have been any outbreaks or notices of the virus at a particular project site, field team members should be aware of the cause and potential control methods. The hantavirus has

been shown to be transmitted through the aerosolization of dried rodent excreta. The newly recognized hantavirus-associated disease begins with one or more symptoms including fever, muscle aches, headache, and cough and progresses rapidly to severe lung disease, often requiring intensive care treatment. To control potential contact with dust that may be carrying the rodent excreta, the field team will conduct a visual survey of the area around each site to note whether rodents are thriving in the area. If it is determined that non-domesticated rodents may be living near the work area, or the area is affected by wind blowing dust into the work area, dust suppression techniques and/or respiratory protection (dust mask or dual cartridge air purifying respirator with dust filters) will be required. The Center for Disease Control, in Atlanta Georgia, has established a hotline for inquiries regarding the hantavirus: (800) 532-9929.

New Mexico has reported 9 cases of Plague in 1998. Plague is contracted from a bite of an infected rodent flea, primarily in the months between May and September. Again, try to identify areas where there are rodents and keep clear of them. Do not attempt to kill them as that would encourage the flea to jump from the now dead rodent to the live person standing near by.

B3.0 MULTI EMPLOYER WORK SITES

B3.1 OSHA Multi-Employer Work Site Rules

Under the Occupational Safety and Health Act, each employer is required to provide a safe and healthy working environment for employees. When several contractors are working simultaneously on the project, the activities of one contractor could expose employees of another company to a hazard. OSHA categorizes four types of employers (note, one employer may fit more than one category): the creating employer (activities that create a hazard), the exposing employer (employees exposed to a hazardous condition), the controlling employer (the contractor with authority to correct unsafe conditions) and the general contractor (responsible for the safety of the project regardless of which contractor is creating a hazardous condition).

Based on OSHA's categorization of employers, it is clear that the general contractor and the exposing employers must take action to ensure the safety of site workers. This in no way relieves other contractors/employers of their obligations to work in a safe manner, thus all contractors must engage in a cooperative effort to create a safe job-site.

MWH Americas is the general contractor for this project and is thus responsible for ensuring that MWH Americas employees and other subcontractors are appraised of hazards, provided the necessary safety tools and are made to follow site safety requirements.

B3.2 Unsafe Acts or Conditions

Any direct subcontractor to MWH Americas shall immediately correct any and all unsafe acts or conditions that are brought to its attention. Any failure to correct unsafe acts and/or unsafe conditions will result in stoppage of the subcontractor's work until the unsafe acts and/or conditions are corrected to the satisfaction of MWH Americas.

In the role of general contractor, MWH Americas employees will follow the guidance below in addressing potentially unsafe acts or conditions:

B3.2.1 Threat of Injury or Death

- Have the contractor remove people from the immediate danger or hazard zone.
- Notify the contractor's superintendent or foreman.
- Issue a written notice to the contractor indicating that immediate corrective action is needed.
- Record in the daily report the time and to whom any verbal or written notices were given.
- If you think it is necessary, take photographs.
- If the contractor does not take action stop work.
- The Construction Manager on site or the Delivery Order Manager will write a full report in the daily construction report form on the condition found to be unsafe and the actions and correspondence taken, including names and times.

B3.2.2 Differing Opinions

When a dispute or difference of opinion occurs between MWH Americas and a subcontractor concerning any interpretation of the safety practices or procedures required for the subcontractor's scope of work, MWH Americas or its designee's interpretation shall control. The subcontractor shall not start or continue with work until the safety practices and procedures in dispute are resolved to the satisfaction of MWH Americas.

B3.2.3 Reporting Unsafe Conditions

If any site worker or visitor observes conditions that exposes themselves or other workers to hazards that are likely to cause harm, they must immediately report the hazard to their supervisor so that prompt corrective action can be taken to correct the hazard. In cases of imminent danger, any person on site may stop an activity if s/he is aware that by not doing so it would cause serious harm to a person, property, or equipment.

B3.3 Disciplinary Action

Subcontractor employees refusing or repeatedly failing to comply with job safety requirements, or supervisors failing to enforce compliance with these and referenced safety and health standards shall be promptly disciplined, which at MWH Americas' discretion, may include removal from the job site.

B3.4 Safety Suggestions

The project has an "open door policy" for site personnel to make suggestions to improve safety. Suggestions are welcome and may be made by any person conducting or observing work, or affected by work on site. Suggestions may be communicated verbally to a MWH Americas manager or in written form.

B4.0 ROLES AND RESPONSIBILITIES

B4.1 Management Commitment

It is the policy of MWH Americas and the management organization assigned to field projects to provide a safe and healthful work environment for all assigned employees. MWH Americas recognizes that injury, illness, or property/equipment loss impacts each of our lives through suffering and potential disability, as well as through lost wages and productivity.

A fundamental principle of occupational safety and loss prevention is that most all accidents causing injuries or illnesses and property damage are ***preventable***. Examinations of the causes of accidents and industrial illnesses demonstrate that most injuries or illnesses are the result of an unsafe act or condition. MWH Americas recognizes that it is both a moral obligation and a sound business practice to prevent workplace injuries and illnesses. This can be accomplished by recognizing, evaluating, and controlling unsafe acts and conditions.

The health a safety program embodied in each MWH Americas health and safety plan (HSP) has been developed in accordance with relevant occupational safety and health regulations and requirements, and applies to all field sites and workplaces associated with the referenced Contract.

Safety and loss prevention are a direct responsibility of all levels of management on all projects. Each level of onsite management has the responsibility to provide a safe and healthful work environment. This shall be achieved through strict adherence to the requirements of this site health and safety program and associated addenda.

Management personnel at all levels shall, through personal example, create a work climate in which all assigned employees develop a concern not only for their own safety and health, but also for the safety and health of their fellow workers and the environment. While it is important to instill a sense of empowerment for innovation and efficiency, the knowledge of boundary conditions concerning the health and safety program by all personnel is vital. Common sense and good judgment always need to be applied to site work; however, it is not intended that the health and safety guidelines contained in this HSP or subsequent addenda be open to innovative interpretation.

B4.2 The Project Team

The efforts of multiple organizations will be needed to complete this project. Each individual assigned to the project is responsible for conducting his/her job in a safe and healthful manner. However, in order to facilitate the implementation of this HSP and the site safety and health program, it is necessary to assign key responsibilities to specified individuals. The Decommissioning Plan for the OT-10 project details the team and their responsibilities. In summary the following firms have the following roles at OT-10 on this project:

MWH Americas
- Prime contractor
- Reporting
- Confirmation soil sampling

MWH Americas Constructors, Inc.
- Construction oversight

Environmental Restoration Group (ERG) (contracted Senior Health Physicist and Health Physicist Technician)
- Preparation of the Radiation Protection Program
- Serve as the Site RSO

- Conduct radiation surveys prior to, during, and after decommissioning activities
- Conduct personal radiation safety monitoring (air, wipe, badge, etc.)

MKM Engineers. Inc.

- Mobilization and site preparation
- Development of temporary facilities
- Clear and grub vegetation
- Excavation of radiation-contaminated soils
- Packaging of soil and debris into Intermodal containers
- Transportation of Intermodal containers
- Re-vegetation
- Demobilization

Greenfield Logistics

- Rail transportation of radioactive waste

Envirocare of Utah

- Disposal of radioactive waste

B4.3 Assignment of Safety and Health Responsibilities

B4.3.1 MWH Americas Health and Safety Manager:

Beth Darnell, CIH, is the MWH Americas safety manager for this project. She is responsible for preparing this HSP and ensuring that the Delivery Order Manager and Construction Manager have the tools necessary to implement the safety plan on site. She will see that the site is audited for compliance with the HSP periodically throughout the life of the project.

B4.3.2 Delivery Order Manager

Mr. Jeffrey Johnston is the Delivery Order Manager for this project. He is responsible for the budgeting and coordination of the project health and safety program. He will act as the liaison between the field health and safety staff and the MWH Americas safety manager, as needed.

B4.3.3 Health and Safety Officer/Supervisory Personnel:

Mr. Richard Valdez is the Construction Manager and, thus, the MWH Americas Health and Safety Officer (HSO) onsite, responsible for implementing this HSP for MWH Americas and MWH Americas Constructors, Inc.

The Health and Safety Officer has the authority to stop work and to remove personnel (or subcontractors) from the site when their actions are considered dangerous or when attitude jeopardizes the safe performance of the project. His duties include, but are not limited to:

- Serve as the lead in all issues related to health and safety.
- Coordinate site safety issues with the Site RSO.
- Conduct / participate in daily Tailgate Safety Meetings. Participate in project meetings.
- Conduct periodic site safety inspections and document them.

- Maintain necessary health and safety documentation and records.
- Ensure that personnel wear the prescribed level of personal protective clothing and perform correct decontamination procedures in accordance with the Radiation Protection Program.
- Ensure that the bulletin board contains the necessary health and safety postings and that the information is current.
- Use authority, if needed, to suspend work that could adversely affect workers or the environment.
- Prepare incident reports for near miss accidents and actual work-related injuries, illnesses or losses involving the environment or property.
- Maintain current cardiopulmonary resuscitation (CPR) and first aid training, and be able to provide such care in the event that it is needed.
- Maintain first aid supplies and rescue equipment.
- Assure maintenance of fire extinguishers.

B4.3.4 Radiation Safety Officer

Dr. Kenneth Baker of ERG, is the Site RSO for this project. He may designate someone to assist or perform onsite duties in his absence, but maintains overall responsibility for the site radiation safety program. Specifically, he will

- Conduct initial radiation surveys and communicate results to site personnel.
- Conduct on-going radiation monitoring to document personnel exposure to radiation.
- Make recommendations to adjust PPE ensembles to balance the risk of radiation exposure with the risks of wearing protective gear such as heat stress, decreased visibility and communication.
- Monitor decontamination activities to make sure that employees are not spreading contamination outside of the approved work zones.
- Provide external monitoring for the waste containers prior to shipment.
- Conduct monitoring and make recommendations for the protection of the community outside of the regulated work zones.

B4.3.5 Subcontractor Safety Personnel

Each MWH Americas subcontractor shall designate a competent person (capable of recognizing hazards, with the authority to immediately correct) in a supervisory position, to administer its safety program. This person, or a formal designee, shall be onsite at all times the subcontractor is performing work. However, should the subcontractor's safety effort be considered inadequate, MWH Americas has the option to request the replacement of the designated safety person. These designated safety personnel shall attend all applicable safety meetings and communicate relevant site safety information to all of its company employees at the site. The following personnel will serve as Safety Personnel for the subcontractors listed below:

- MWH Americas Constructors, Inc. – Richard Valdez
- ERG – Ken Baker
- MKM Engineers – Rick Holthauser

B4.4 Site Visitors

Visitors will be permitted to enter the project site with prior approval by the site Delivery Order Manager and Site RSO. Visitors who have obtained approval to enter the training sites must read the documents that make up the site safety and health program for this project, attend the daily tailgate safety meeting conducted in the morning before each day of work, or be given a briefing by the site HSO as well as by the Site RSO. Site visitors must have the necessary training and medical clearance to access areas that are restricted due to specific training, medical surveillance, and personal protective equipment requirements.

B5.0 TRAINING, COMMUNICATIONS AND MEETINGS

B5.1 Safety Training Requirements

Health and safety training is an integral part of the total project health and safety program. The objectives of such training are to educate workers about the potential health and safety hazards associated with working at the project site. MWH Americas' Deliver Order and Construction Managers and subcontractor site supervisors are expected to instruct their employees about the hazards of the project and site before allowing them to work. An orientation should include an overview of this HSP, the Foster Wheeler SSHP, the Radiation Protection Plan, emergency information, and other relevant information that would assist the safety and health of the person(s) entering the project site.

The following specific training requirements apply:

- 40-hr initial Hazardous Waste Operations and Emergency Response (HAZWOPER) training
- 8-hr HAZWOPER refresher training, annually
- 8-hr HAZWOPER supervisor training required of the Construction Manager
- 10-hr Construction Safety Awareness (all field crew)
- Four to 8-hr Radiation Safety Program Orientation
- CPR and First Aid (required for at least two people at the site with one being the Construction Manager, though it is recommended for all site personnel)
- Fire Extinguisher Use (required for the Construction Manager, recommended for all)
- Function-specific training for heavy equipment operators such as backhoe/loader, dump truck and crane.

Each subcontractor is required to verify that their employees have received any necessary training and that certificates for training are available on the project site for inspection by MWH Americas.

B5.2 Methods of Communication to Employees

Project safety information will be communicated to site employees in the following manner:

- Off-site training described above will provide general health and safety information, prior to coming to the site.
- Project briefing on the first day of site work.
- Each site worker is required to read this HSP, the Radiation Protection Plan, and any contractor-specific AHAs.

- Each day prior to starting work there will be a tailgate safety meeting conducted to inform people of the day's activities, the expected hazards, and to remind them of the control program.
- The project trailer/office will contain postings of a safety and health nature that employees may read.
- Other communications in the form of verbal, written or audio-visual information will be provided as needed or desired.

B5.3 Meeting Schedule

MWH Americas and subcontractor supervisors will conduct "tailgate" safety meetings with their crews at least once daily to emphasize safety.

Meeting topics discussed will be documented, accompanied with an attendance signature sheet. The meetings are to be conducted as follows:

Meeting Type	Purpose	Length	Frequency
Site Orientation	To acquaint personnel with the project and the contractors at the site.	Likely up to four hrs	At time of first assignment to the project.
Supervisory Meeting	To ensure that all site supervisory personnel maintain coordination and focus on the site safety program. It allows for coordination between organizations conducting work at the same time at the site.	Likely two hrs – depending on topics and nature of the work.	Monthly
Tailgate	To orient personnel to the tasks for the day or time period; go over any unusual occurrence from the previous day; discuss any particular safety considerations for the new or routine tasks ahead.	Approximately 20 minutes.	Daily

B5.4 Safety Inspections / Evaluations

B5.4.1 Site Safety Inspections

It is the responsibility of the site HSO to ensure safety inspections are carried out periodically. This includes conducting on-going visual inspections of the work looking for problems in the safety and health program. When problems are identified, actions shall be taken to correct or address the problem as soon as possible. A written record of such issues shall be kept and reported on the daily progress documents.

B5.4.2 Health and Safety Audits

MWH Americas audits projects on a random and periodic basis. Based on the duration of this project and the unique radiation hazard it poses, this project will be subject to a formal health and safety audit. The audit will be conducted by a MWH Americas safety and health professional early enough in the project to be effective. Coordination of the audit will be conducted with the Delivery Order Manager.

B5.5 Accident Investigation and Reporting

Accidents and incidents (including near misses) will be investigated. The Delivery Order Manager along with the Construction Manager should take the lead in conducting the investigation. If assistance is needed, contact the Health and Safety Manager. The investigation shall be documented either using a MWH Americas incident report form (see Attachment 1 to this HSP) or a subcontractor form, as deemed appropriate. A copy of the report shall be provided to the MWH Americas Safety and Health Manager. A copy is to be kept in a project file on site as well.

Each and every month in which a subcontractor performs any work on the project, a monthly summary of hrs worked as well as accidents and injuries will be provided to MWH Americas. This information is required no later than the 7th calendar day of the month. This summary will be completed in a manner prescribed by MWH Americas and/or by the submission of a properly completed monthly summary of accident form or forms supplied by MWH Americas (see Attachment 2 to this HSP).

B6.0 DOCUMENTATION AND POSTINGS

The following documents are required to be accessible, either at the project site, or from an employee's home office:

- Employee safety training for work tasks performed (e.g., HAZWOPER, Excavation/Trench, Competent Person, Crane Operation, Hazard Communication, etc.).
- Equipment certifications, licenses and permits (e.g., Crane Inspection, Excavations, Trenches, Underground Utility Clearance, etc.).
- Medical surveillance documentation.

The following documents are to be kept on site:

- Project documentation in a log book or other approved record keeping format. This will include daily safety observations, any deviations from the safety program, and any corrective actions initiated.
- Personal acknowledgement form indicating that each project employee has read and will abide by the project safety program (see Attachment 3 to this HSP)
- Daily, weekly and monthly safety meetings documentation.
- Accident/Incident investigations
- Hazard Communication Program and Material Safety Data Sheets (MSDS) for hazardous materials used at the site.

The following health and safety postings are to be displayed in a location where workers are likely to see them (i.e., a lunchroom, entry/exit trailer, administration office):

- The Federal OSHA Job Safety and Health Protection Poster.
- NRC Radiation Protection Program Poster
- A copy of the "Route to Hospital" map and emergency medical contact information in this plan. Refer to section 8.0 of this HSP.

B7.0 ACTIVITY HAZARD ANALYSIS / CODE OF SAFE PRACTICES

As part of MWH Americas' AFCEE contract documents, contractors are required to submit to MWH Americas AHAs for each task they will be performing. MWH Americas will review the AHAs and no

work is permitted to begin until an AHA satisfactory to MWH Americas has been developed. The AHAs shall be routed through the Contract Manager/Buyer or Delivery Order Manager.

B7.1 Office Environment

B7.1.1 Fire Protection Plan

Mr. Richard Valdez, the HSO/Construction Manager will, at a minimum, maintain training for the use of portable fire extinguishers. Other employees are encouraged to be trained. Two ten-pound ABC fire extinguisher shall be available in the office trailer. It is the HSO's responsibility to ensure that the extinguishers are inspected monthly (note that it is charged, pin is in place and it is in its proper location) and serviced annually.

In the event of a fire, those who have been trained to use the extinguisher may attempt to put the fire out if it is safe to do so. If access to a telephone permits, dial 911 to call the fire department. If it is not deemed to be safe to try and fight the fire or call for help, MWH Americas employees must evacuate the office trailer by means of the nearest marked exit, or other portion of the construction site immediately. All employees shall meet to be counted at the job site trailer. The HSO will collect the head count.

Employees will be alerted to an emergency evacuation. When out in the field, notification will either be by direct visual or verbal contact, or by means of a horn. The horn may be on a piece of equipment or a portable air horn, as deemed necessary by the HSO.

Note that contractors may have flammable materials, fuels and welding supplies that present a fire hazard. Each contractor using such material must have MSDSs and a fire prevention plan for the materials. In the event of a fire involving contractor materials, MWH Americas personnel should immediately evacuate the area and report the incident according to this HSP.

B7.1.2 Electrical Hazards

The electric circuit breaker for the trailer must be located. A 6 foot clearance shall be maintained in front of the electrical panel and a clear path to the panel must be maintained.

Avoid using extension cords for fixed electrical devices. When using a surge protector, only use one per outlet – that is do not string them together like extension cords. Keep electrical cords away from heat and water. Do not run cords under rugs. Do not remove the third prong (ground) on grounded plugs. Do not use damaged electrical equipment or cords. Be sure that all appliances are turned off when they are no longer needed and at the end of the shift.

B7.1.3 Ergonomic Hazards

Ergonomic hazards in the office typically result from repeated use of computer keyboards, resulting in aches, pain, or disease to the wrists and forearms, and from prolonged static postures, resulting in back and leg pain. To avoid these hazards and their end results, try implementing the following tips:

- Work in a neutral body position – that is with your neck straight, your arms hanging from your shoulders, your back positioned with the natural curve in the lower back supported and all other joints at right angles.

- Try to work with your muscles relaxed.
- Avoid slumped sitting positions, rounded shoulders, sway back or an overly straight, stiff posture.
- Adjust your work-station or chair so that your hands work within two inches above or below your elbow.
- Keep commonly used items (e.g., phone, planner) within arm's reach.
- Sit close to your work so that you do not bend over it.
- Place the top of your video monitor at eye level
- Try to type with your wrists in a neutral position – let your fingers dangle over the keys.
- If your desk has sharp edges, purchase a wrist rest to create a comfortable position for your forearms.
- Reduce glare on the monitor by positioning it perpendicular to a window, or facing it away from a window. Try to place it under an indirect light source.
- Take a work break at a rate of about ten minutes every hr.
- Take mini-breaks to stretch your neck and body by circling, shrugging and arching – this will increase circulation and relieve tension.

Back injuries are common in office environments due to improper lifting. Follow the guidelines below for proper lifting:

- Size up the load, can you get someone to help you lift it? If so, do.
- Use any sort of mechanical lifting mechanisms that are available.
- If you can, try to place heavy items on a surface that is waist high so that you do not have to bend down or lift up to reach it.
- Push rather than pull
- Keep the load close to your body
- Bend at the knees and hips to avoid pressure on the lower back
- Do not twist when lifting
- Lift with the muscles in your legs instead of your back.

B7.2 Common Field Safety Issues

This section provides safety information common to all field projects regardless of size, hazardous environment, or client.

B7.2.1 Housekeeping and Storage of Materials

Housekeeping and clean-up acceptable to MWH Americas shall be maintained by subcontractors in all areas within and related to the subcontractor's scope of operation. Supervisors are to inspect their work areas frequently and at the end of each day to ensure housekeeping is maintained. At a minimum, the following must be ensured:

- Trip and impalement hazards are eliminated.
- Incoming materials are secured to prevent tipping or rolling.
- Trash is secured in covered containers.
- Scrap lumber with protruding nails, pipe, sawdust, snow, and all other debris are cleared from work areas, passageways, stairs, and in and around buildings or other structures.

- Drinking water is provided in tightly closed containers with disposable cups. Mark water containers to identify their contents.
- Test job site water supply if the water is derived from a private well.
- Mark outlets carrying non-potable water.
- Provide workers with restroom facilities.
- Provide adequate washing facilities for employees using paints, coatings, chemicals, or for other operations where contaminants may be harmful to the employees.
- Provide employees with a clean and safe area to take breaks.
- Use fencing/barricades as necessary after each shift to secure the area.

B7.2.2 Storage of Flammable Materials

If the subcontractors need to store fuel onsite, this section provides some basic guidelines that should be observed in the field. Flammable liquids should be kept in safety cans, except for bulk shipments. All safety cans should be equipped with a dispensing funnel or hose. Each container should be clearly labeled and closed when not in use. Drums containing flammable liquids should be grounded when in use, have a self-closing faucet, and a bung vent.

Flammable and combustible materials should be stored away from sources of ignition and areas where hot work is performed. Flammable material storage areas should be clearly marked with signs denoting "FLAMMABLE - No Smoking or Open Flames within 50 feet". Flammable and combustible materials shall be stored a minimum of 20 feet from a building or structure. The storage area shall be graded in a manner to direct possible spills away from buildings or other exposures or shall be surrounded by a curb at least 6 inches high. One portable dry chemical fire extinguisher (10A-60 B:C) shall be located within 10 feet of the storage area.

Oxygen cylinders in storage should be separated from flammable liquids or gases or combustible materials (e.g. oil, grease) by a minimum distance of 20 feet or a non-combustible barrier at least 5 feet high having a fire-resistance rating of at least one half hr. Cylinders should always be secured in an upright position with valves capped.

B7.2.3 Hazard Communication and Material Safety Data Sheets

MWH Americas will have available on the project site a written Hazard Communications program that complies with the requirements of 29 CFR 1926.59 and 29 CFR 1910.1200 (see Attachment 4). MSDSs for products that are used on the site (e.g. surveyor paint, fuel gases, welding rods, petroleum products etc.) will also be available on the job site for review by workers. The HSO will collect MSDSs from subcontractors. All containers of hazardous materials are required to have a written warning that includes its contents, a health hazard warning, and a physical hazard warning. If this is not the case, field personnel should inform the HSO.

B7.2.4 Fire Prevention Plan

In the field it is important to plan ahead for potential fires. This includes identification of a safe place of refuge, ability to contact fire department personnel and ability to try to extinguish fires on site, before they get out of control. Each day during the tailgate safety meetings a safe place of refuge shall be identified. Use of cellular phones will be permitted in the work zone and will allow for direct contact with fire department personnel (make sure this is true). In accordance with the paragraph below, fire extinguishers shall be available for use by trained personnel.

Clear access to all available fire fighting equipment should be maintained at all times. Fire prevention equipment should be inspected monthly. Fire lanes providing access to all areas should be established and maintained free from obstruction. Fire extinguishers should be a multipurpose dry chemical fire extinguisher not rated less than 2A-40 B:C. Specific areas where fire extinguishers are required are identified below

- Where flammable materials are stored, handled, and used
- On cranes and heavy equipment
- Where welding or open flame cutting is being done.
- In shops and offices near exit doors
- Near gasoline powered generators and pumps
- Job site vehicles.

B7.2.5 First Aid and CPR

At least two people trained and willing to provide first aid and CPR will be required in the work or exclusion zone at all times. Such training shall be equivalent to or exceed the elements covered in the Standard First Aid course provided by the American Red Cross. If the training course does not cover the use of "universal precautions" as defined in the Bloodborne Pathogens standard under OSHA (29 CFR 1910.1030), supplemental training will be needed. The HSO will be provided with information needed to give this supplemental training by the MWH Americas Health and Safety Manager, if necessary.

Each employer working on the project is responsible to provide a clean and hazard-free area with adequate supplies to administer first-aid to their employees. The location of first-aid kit will be communicated to site employees. First-aid supplies shall be individually sealed and stored in a weatherproof container. The contents of first-aid kits are to be checked by the employer before being sent out to the project and at least weekly to ensure that expended items are replaced. Contents of the MWH Americas first aid are provided in Section 8.1. At a minimum, supervisors are to:

- Maintain a record of inspection of first-aid kits.
- Provide bloodborne pathogen kits.
- Establish a shaded heat-stress rehabilitation area.
- Ensure employees are aware of posted telephone emergency response numbers, such as physician, hospital, ambulance, and have means to get help (such as a cell phone or two-way radio).
- Provide a means for persons exposed to injurious corrosive materials to flush their eyes or body.

B7.2.6 Site Security

Site personnel are required to sign a tailgate safety meeting form each day. This will assist controlling who is on site and accounting for personnel in case there is an emergency.

A security fence will be shut and locked at the end of each day after personnel have left the site. This is the responsibility of the HSO.

B7.2.7 Field Sanitation

Employers must provide an adequate supply of potable drinking water for their workers on site, at least two liters per person, per day. Portable containers used to dispense drinking water shall be capable of being tightly closed and equipped with a drain faucet. Water must not be dipped from containers. Containers are to be clearly marked as to the nature of their contents and not used for any other purpose. A common drinking cup is prohibited. Where disposable cups are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups will be provided.

Toilet facilities shall be provided for site workers. If the field office or existing toilet facilities at Kirtland AFB are not close enough to provide reasonable access to site personnel, a portable toilet facility will be brought to the worksite. If a portable toilet is provided, there must be at least one for every 20 workers with a door capable of being locked from the inside (this will avoid the need to supply separate facilities for men and women).

B7.3 Site-Specific Field Work

MWH Americas field workers may be subject to the hazards posed by the various construction activities being conducted by MKM Engineers. This section of the HSP is meant to provide a brief description of the controls that should be taken to prevent injury to personnel observing such tasks. This section therefore serves as a Code of Safe Practices of the physical hazards associated with oversight, surveying and confirmation sampling activities on this project. The following tasks are anticipated to be performed by MKM Engineers. Company specific information about the safety procedures for these tasks is included in the AHA to be submitted by this contractor:

- Mobilization and demobilization of equipment and supplies (may require use of welding or cutting materials, electrical connections and industrial trucks)
- Clearing and grubbing using heavy equipment and hand tools
- Excavation of soils including the use of excavators and dump trucks
- Mobile crane lifting Intermodal containers

B7.3.1 Welding and Cutting

If the object to be welded or cut cannot be moved and if all fire hazards cannot be removed, then guards / shields shall be used to confine the heat, sparks, and slag, and to protect the immovable fire hazards. Prior to welding or cutting, contractor personnel shall inspect the area for the presence of flammable and combustible materials including vapors and gases. A Hot Work Permit may be required by Kirtland AFB and issued for all cutting, and welding activities in locations where flammables and combustibles are present. The contractor should identify any Hot Work Permit requirements and follow them.

A fire watch shall be required whenever welding or cutting is performed in locations where combustible materials are

- closer than 35 feet away from the point of operations,
- more than 35 feet away but are easily ignited by sparks,
- adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are likely to be ignited by conduction or radiation

To protect workers and others in the vicinity from sparks or welding arcs, noncombustible or flameproof screens shall be used to shield welding and cutting operations. All cylinders must be labeled with the contents and whether it is full/in-use/empty and secured by chain or dolly. Workers shall be provided with protective clothing and equipment including eye/face protection, gloves, aprons, and welding jackets/leathers. Observers should stand far enough away to negate the need personal protective gear.

B7.3.2 Electrical Work and Control of Hazardous Energy

It is each contractor's responsibility to see that only qualified personnel conduct electrical operations. MWH Americas personnel are not authorized to conduct electrical work on this project. All electrical work should be done according to local codes and regulations as well as contract documents.

All electrical tools used on the project must be properly grounded (containing a ground plug and tested for shorts) or double insulated. Power cords shall be of the three-wire type and rated for heavy-duty use (for example type S ST, and SO). Additionally, the use of ground fault circuit interrupters (GFCI) are required for all portable electrical tools and fixed electrical equipment to be used at the site. All portable generators shall be equipped with only GFCI receptacles.

Work on energized mechanical, electrical, or other equipment in which workers could be injured as a result of accidental start-up or release of stored energy (e.g. electricity, fluids under pressure, etc.) shall be locked out. A competent person will coordinate lockout procedures among the contractors and shall conduct periodic inspections to ensure that lockout procedures are followed.

Lockout Guidelines

1. Notify affected employees.
2. Shut down equipment by normal stopping procedure.
3. Isolate from energy sources.
4. Apply locks. Each authorized person working on equipment applies his/her own.
5. Bleed off or otherwise release any stored energy.
6. Verify isolation.
7. Remove guards or covers as necessary and perform work.
8. When work is complete, reinstall guards and inspect equipment to ensure it is operational. Notify affected employees.
9. Remove locks. Each authorized employee removes his/her own.
10. Return the equipment to service and notify affected employees.

B7.3.3 Excavations

All excavations and trenches required for this project shall comply with the requirements of 29 CFR subpart P. The contractor digging the excavation or trench is required to have a competent person available to classify soils and ensure that proper protective systems are installed. The excavations at OT-10 are anticipated to be between one and five feet in depth. If the excavation reaches four feet, a protective system must be employed if workers will be required to enter the excavation for the collection of confirmation soil samples. If the confirmation samples can be collected from the backhoe bucket and protective systems are not employed – PERSONNEL ARE PROHIBITED FROM ENTERING ANY EXCAVATION. The following are guidelines to follow while observing activities around excavations and trenches:

- Before excavation begins, the responsible supervisor should have identified overhead hazards and called the local utility companies to locate and mark all underground installations (i.e., sewer, telephone, water, natural gas, electric). All underground installations should have been identified, located, protected, supported, and removed as necessary. For instance, electrical lines should be de-energized; water and gas lines should be blocked and locked out.
- A stairway, ladder, ramp or safe means of egress should be located inside excavations more than 4 feet deep, if personnel are required to enter. The means of egress shall not be more than 25 feet from any worker in the excavation. If a ladder is used, it shall be properly secured and extend at least 3 feet beyond the surface or top of the excavation.
- Observations of work inside an excavation should be made from at least two feet away from the excavation edge. Significant communication between ground personnel and the operator of heavy equipment is necessary to ensure that observations can be made in a safe location.
- It is also important for the ground personnel to know the traffic patterns of the excavation equipment, staging areas and dump trucks. Do not stand or walk within the swing radius of the excavation equipment.
- The contractor should be placing stop logs when equipment is operated near the edge of an excavation.
- A competent worker should be completing daily inspections of the excavation before work begins each day or shift to verify the absence of water accumulation, water seepage soil cracks, sloughing, cave-ins, hazardous atmospheres, or failure of protective systems (i.e., shoring and bracing). If any of these items are noted, work shall be stopped immediately and the excavation evacuated until the appropriate control measures are taken and installed.
- Excavations should be shored and braced when the stability of adjoining structures is endangered.
- Construction material, excavated soil, rock, and equipment should be kept at least 2 feet from the edge of any excavation.

B7.3.4 Industrial/Construction Trucks and Equipment

There will be many types of heavy equipment being operated as part of the decommissioning activities at this site. MWH Americas will coordinate work with operators so that observers can stay out of the way of operating vehicles. Do not approach a vehicle unless you have made eye contact with the operator and it is known that you plan to approach. Wear a highly visible traffic safety vest while on site. Truck tires should be choked when stationary or loading and unloading. When standing within about ten feet of operating equipment, the noise level usually approaches 85 decibels, which is the action level for requiring hearing protection. If planning to be on site near (within ten feet) heavy equipment for more than four hrs a day – MWH Americas personnel shall wear hearing protection. The contractor should have a program for conducting safe operating inspections on heavy trucks and equipment, these inspections should occur daily. Equipment that is unsafe should not be operated. Any repairs should be made with the equipment protected from movement (see control of hazardous energy). Employees riding on equipment must be in a seat meant for transporting people. Heavy equipment and trucks should have audible back-up alarms. Dust should be controlled such that it does not limit visibility and release requirements of the Radiation Protection Program.

B7.3.5 Mobile Cranes and Overhead Hoists

MWH Americas and other ground personnel should be vigilant about standing clear of crane operations. At no time is it permitted to stand or walk underneath a suspended load. Personnel must stand outside of the swing radius of the crane arm and pay attention to the signals of the other ground personnel assisting

the crane operator. This section provides information about the safety issues associated with the use of a mobile crane.

The contractor employing cranes shall be responsible for ensuring that:

- safe, suitable equipment is provided to meet the requirements of the job,
- a pre-job site inspection is conducted to ensure that the area is adequately prepared for the operation of the crane.
- overhead utility clearance of 20 feet is maintained

The contractor is responsible for supplying an operator that is trained in the safe operation of the crane(s). The contractor should be able to provide written proof that the operator has been trained. The contractor should also be able to provide documentation of current inspections, tests, repairs, modifications to, and maintenance of the crane. The crane should be inspected daily by a competent person.

No machine shall be selected to do any lifting on a specific job until its size and characteristics of the crane are considered against:

- the weights, dimension, and lifting radii of the heaviest and largest loads,
- the maximum lift height, the maximum lift radius, and the weight of the loads that must be handled,
- the number and frequency of lifts to be made,
- how long the crane will be required on site,
- the type of lifting to be done (for example, is precision placement of loads important?)
- the type of carrier required (this depends on ground conditions and machine capacity in its various operating quadrants),
- whether the load will have to be walked or carried,
- whether loads will have to be suspended for lengthy periods,
- site condition, including the ground where the machine will be set up, access roads and ramps it must travel, space for erection and any obstacles that might impeded access or operations.

The contractor is responsible for verifying the weight of the object to be lifted.

B7.3.6 Hand Tools

The contractor should be inspecting tools to be sure they are clean and in good repair. Any defective tool must be taken out of service such that no one can accidentally use it. Personnel operating hand tools should have been trained in their safe operation. Electrical cords are not to be used for hauling or hoisting tools. Power tools should be double insulated or grounded and kept out of wet locations. Guards should be in place to protect chains drives, sprockets, gears, belt-pulleys, reciprocating parts, screw conveyors, exposed shafts, blades, and other nip points.

B7.4 Personal Protective Equipment

All site personnel will be required to wear the following equipment on site, regardless of task:

Item	Specifications
Exterior garments	Long pants, shirt with sleeves (no tank tops or shorts)
Foot protection	Safety toed footwear/boots (ANSI Z41).
Gloves	Cloth or heavy leather gloves for clearing/grubbing. Latex or nitrile gloves if handling soil.
Eye and face protection	Safety glasses with side shields. (ANSI Z87.1).
Head protection	Hard hats (ANSI Z89.1). Hard hats shall be worn with the brim pointed forward.
Hearing protection	Earplugs or muffs with a noise reduction rating (NRR) of 25 db. When working on or near operating equipment or machinery.
Safety Vest	Workers will wear a high-visibility traffic safety vest, when working near heavy equipment and traffic.

When performing invasive work in the radiation contaminated work zone, personnel will incorporate the following into a Level C PPE ensemble:

Item	Specifications
Level D PPE	As listed above.
Body protection	Tyvek□ suit with feet and hood.
Outer foot protection.	Galoshes with tread to cover safety shoes.
Respiratory protection	Full-face air purifying respirator with P100 filters. Filters shall be changed as directed by the RSO. If the RSO determines that more frequent changes are required, this shall be communicated to site personnel.

B8.0 EMERGENCY ASSISTANCE INFORMATION ALWAYS PROVIDE YOUR EXACT LOCATION TO THE 911 OPERATOR

Kirtland Air Force Base
Site OT-10 (see Figure B1-1)
Albuquerque, New Mexico

The Deliver Order Manager will be responsible for taking necessary action and contacting the appropriate emergency contacts and MWH Americas personnel in case of an emergency.

B8.1 First Aid and CPR

An adequate number of employees (at least two) from each employer must have a valid certificate in first aid and CPR training from the American Red Cross or equivalent training that can be verified by documentary evidence. Along with the training requirement, a first aid kit must be available at the site suitable for the number of employees expected to be under MWH Americas' control. The contents of the kit should include the following:

- Container that will ensure that all supplies are kept clean and sanitary.
- Aspirin or non-aspirin substitute
- Eye drops
- Burn spray or ointment
- Antiseptic spray, cream or ointment
- Hydrogen peroxide 3% solution
- Bandaids: knuckle bandaid, elastic strips (3"x7/8"), adhesive bandage (3"x3/4"),
- finger tip bandage (2"x13/4")
- Triangle bandage and safety pins
- Gauze bandages: 2 and 4 inch square pads and 1, 2, and 4 inch rolls or compresses
- Instant ice packs
- Scissors and tweezers
- Latex gloves
- CPR barricade, to prevent mouth to mouth contact
- Ammonia inhalant
- First aid guidebook
- Blankets (mylar)
- Ace bandage
- Antiseptic hand cleaner
- Sterile water
- Pressure dressings
- First aid tape
- Eye dressing packet

A kit with these contents (with the exception of the CPR barricade and latex gloves, purchase these separately and add to the kit for the control of bloodborne pathogens) can be purchased through safety supply catalogs such as Masune (800/831-0894).

B8.2 24-HR Emergency Hospital

Lovelace, Gibson (switchboard)	(505) 262-7000
Lovelace, Gibson Emergency Room	**(505) 262-7222**
(contact: Marti Miller)	(505) 262-7341
5400 Gibson Blvd. S. E.	
Albuquerque, New Mexico 87108	

Note: This facility is equipped to handle emergency situations with radiation contamination.

Figure B.8-1 indicates the location of this clinic along with driving instructions.

B8.3 Emergency Contact Numbers

Ambulance	911
Fire Department	911
Police Department	911
NM Poison Control Center (UNM, north campus)	(505) 843-2551
National Response Center	(800) 424-8802
Utilities Underground Service Alert	(505) 260-1990
Bioengineering, Radiation Protection (Kirtland AFB RSO)	(505) 846-4259
Safety (Kirtland AFB) (contact: Dennis Hine, Peter Moss)	(505) 846-4226
Industrial Hygiene (Sandia National Labs - CSE, Patrick Harring)	(505) 845-7412
Kirtland AFB Command Post	(505) 846-6432

MWH Americas Workers' Compensation Insurance Information:

AON (Janice Johnson)	(213) 630-3200
The Hartford (Steve Tribucher)	(800) 826-7365
Teleclaim account number 78397	(800) 327-3636
LARS or Location Code = Cost Center Number	

B8.4 Key MWH Americas and Other Project Personnel

Contact Person	Work Number	Home Number	Mobile
Jeff Johnston Delivery Order Manager	(505) 878-1430	N/A	N/A
Richard Valdez Onsite Health and Safety Officer/Construction Manager	(505) 878-1430	N/A	(505) 247-2711
Beth Darnell Health and Safety Manager	(949) 222-1844	(949) 454-0636	(818) 547-8479
Mike Grasso MWCI Construction Safety Manager	(607) 648-6935	N/A	(630) 258-3283
Ken Baker ERG Health Physicist	(505) 298-4224	N/A	N/A
Rick Holthauser MKM Engineers	(702) 395-9238	N/A	N/A

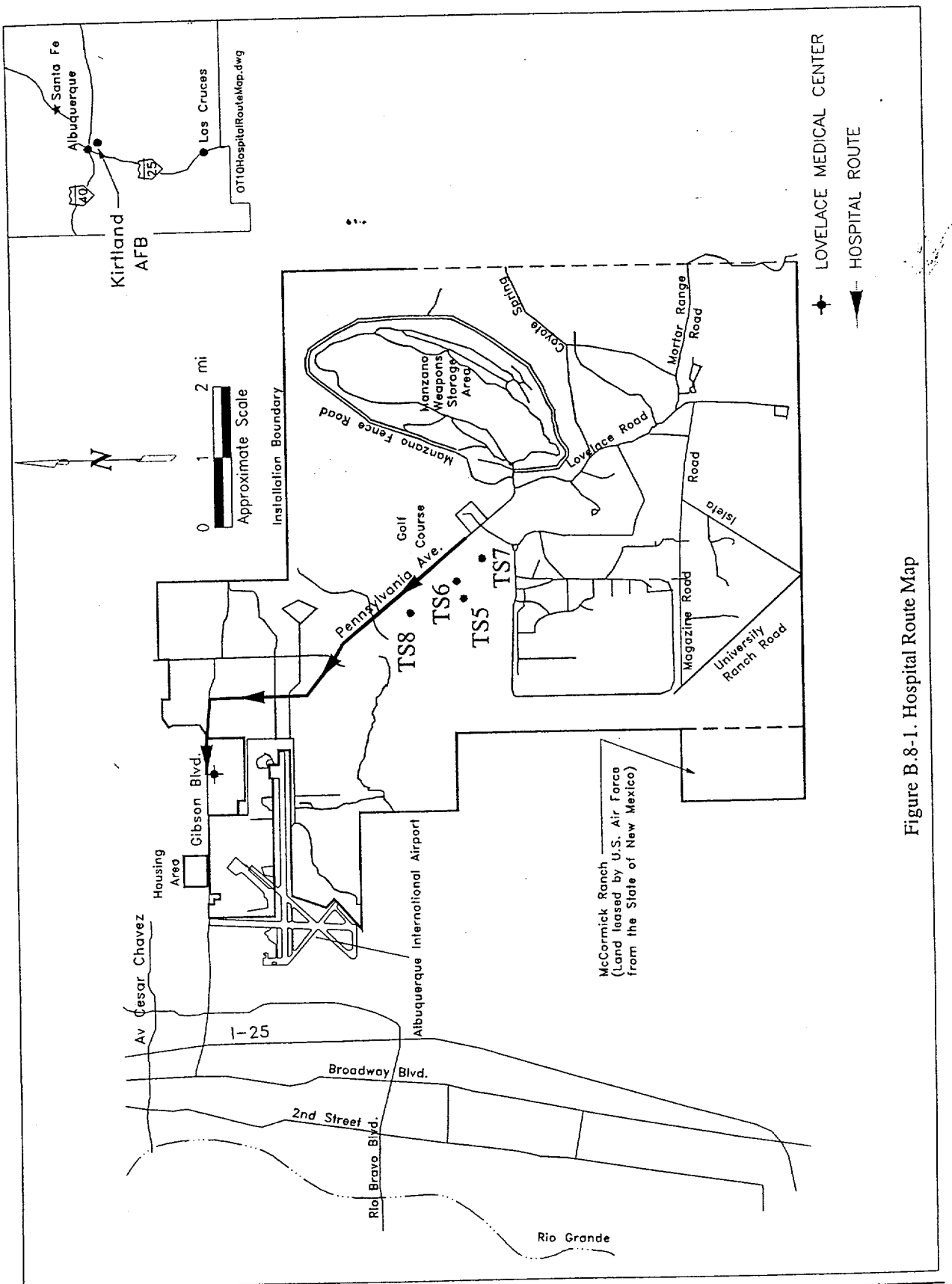

Figure B.8-1. Hospital Route Map

ATTACHMENT 1

INCIDENT REPORT FORM

OCCUPATIONAL INJURY/ILLNESS/INCIDENT REPORT FORM

This report is for (check all that apply):

__ MWH Americas
__ Equipment Damage
__ Theft
__ Injury
__ Non-MWH Americas
__ Spill/Leak
__ Property Damage
__ Illness
__ Near Miss
__ Fire
__ Vehicle Damage
__ Other (Describe):_____

In the event of a fatality or the hospitalization of an individual, contact the company Health & Safety Manager immediately.

Section 1 - Employee Information

Name:_____ Title:_____ Sex:_____

Business Unit:_____ Employee Number:_____ Date Hired:_____

Birth Date:_____ Social Security Number:_____ Phone Number:_____

Address:_____

Section 2 - Incident Information

Date of Incident:_____ Day of Week: S M T W TH F S Time:_____

Weather Conditions: SUN CLEAR OVERCAST RAIN SNOW

Temperature: TO 32°F 32-50°F 50-70°F 70-85°F 85°F & UP

Wind: STILL MODERATE HIGH

Location of Incident:_____

Project Name:_____

Contractor or Subcontractor involved?_____

Did employee leave work site?_____ If so, time employee left:_____

Section 3 - Injury/Illness Information (if applicable)

Date/Time injury reported:_____ Reported to whom?_____

Type of injury sustained (check all that apply):

__ Bruise, Contusion
__ Chemical Exposure
__ Concussion
__ Dismemberment
__ Electrical Burn
__ Loss of Senses (hearing, sight, smell, etc.)
__ Electrical Shock
__ Fatality
__ Foreign Object in Eye
__ Fracture
__ Hernia
__ Unconsciousness
__ Joint Sprain
__ Laceration, Puncture
__ Muscle Strain
__ Suffocation
__ Thermal Burn
__ Other (Specify):_____
_____

Specific parts of body affected (e.g., head, left leg, right ear, index finger, etc.):_____
_____

Type of illness resulted (check all that apply):

__ Cardiovascular (heart/circulatory system)
__ Eye
__ Respiratory
__ Effect of Hazardous Substance/Material (Specify):_____
__ Central Nervous System (brain/spine)
__ Skin
__ Heat/Cold Stress
__ Cumulative Trauma Disorder (i.e., carpal tunnel syndrome)
__ Systemic (Liver, Kidney, Heart, etc.)
__ Hearing Loss
__ Other (Specify):_____
_____

What caused the injury of illness? (check all that apply)

__ Caught In, Under, Between
__ Contact w/ Electrical Current
__ Contact w/ Material
__ Contact w/ Plant, Animal, Insect
__ Contact w/ Temperature Extremes
__ Fall from Higher Elevation
__ Fall on Same Level
__ Inhalation of Material
__ Ingestion of Material
__ Involuntary Body Reaction
__ Over Exertion
__ Rubbed or Abraded
__ Slip
__ Struck Against
__ Struck By
__ Trip
__ Other (Specify):
_____

Method of Treatment

__ Onsite First Aid
__ Doctor's Care
__ Clinic/Doctor First Aid
__ Hospitalization

Name of service, physician, location:_____

Phone number:_____

Address:_____

Will injury-illness result in restricted activity?
__ No __ Yes __ Do Not Know

Will injury-illness result in lost workday(s)?
__ No __ Yes, How Many?____ __ Do Not Know

Section 4 - Incident Description

Description of incident:_____

_____

What was person doing at time of incident?_____

_____

Why did incident occur?_____

Was use or lack of safety equipment a factor in this incident?_____

If so, explain:_____

Were any safety regulations violated?_____ Explain:_____

_____

Were any regulatory agencies notified?_____ Explain:_____

_____

Action taken by regulatory agency:_____

Property damage?_____ Extent of damage:_____

Property owner:_____ Phone Number:_____

Address:_____

Space for Sketch or Additional Narrative

Section 5 - Incident Witnesses/Documentation

Incident Witness:_____ Phone Number:_____

Address:_____

Employer:_____

Statements Attached? __ No __ Yes

Were any photographs taken of the site after the incident? __ No __ Yes

Photographs taken by whom?_____

Photographs stored at:_____

Section 6 - Corrective Action/Recommendations

Recommended Corrective Action(s):_____

_____

Assigned to:_____ Targeted Completion Date:_____

Was this corrective action shared with all affected employees? __ No __ Yes, Date?_____

Section 7 - Acknowledgment/Distribution

Printed Name	Signature	Date
Employee Reporting Incident:		
Direct Supervisor:		
Business Unit Manager/Program Director:		
Program Health and Safety Coordinator:		
Health and Safety Manager:		

Section 8 - Follow-Up

Follow-up necessary? __ No __ Yes

Recommendation:_____

Completed by:_____ Date:_____

Note: For each MWH Americas incident or work-related injury/illness, this form must be completed, and faxed/mailed to the distribution list above within 24 hrs. In addition, for injuries and illnesses, an Employer's First Report of Injury Form, and an Employee's Claim for Workers' Compensation Benefits form must be completed within 24 hrs and sent to Human Resources.

If a fatality occurs or 3 or more employees require in-patient hospitalization, the local OSHA office must be notified of the incident within 8 hrs. If the Company Health and Safety Manager can not be contacted with a reasonable time, the most senior MWH Americas person at the scene shall make the notification.

ATTACHMENT 2

MONTHLY PROJECT SAFETY REPORT

MONTHLY PROJECT SAFETY REPORT

PURPOSE

The purpose of the Monthly Project Safety Report is to collect data on the effectiveness of MWCI Safety Program. The intent of the report is to capture successes and failures. The data collected in the report is tabulated and a Corporate Safety report are prepared for the quarterly management meeting, for OSHA and insurance purposes, and to meet the client's request for information on the number of man-hrs worked.

DISCUSSION

The Monthly Project Safety Report will be used to analyze injury, illness, and near miss incident trends over time so those patterns with common causes can be identified and preventive measures implemented. As required for statistical comparison with other companies the total man–hr worked is important to measure the total hrs it took to complete a project. Historically, this data can be used to estimate the cost of future projects.

PROCEDURE

On the 15th of every month following the reporting month, The Construction Manager or their designated representative must submit the Monthly Project Safety Report to the MWCI Health and Safety Manager.

Each month in which a subcontractor performs any work on the project, a monthly summary of hrs worked, accidents, and injuries will be provided to MWH Americas no later than the 7th calendar day of the month. This summary will be completed in a manner prescribed by MWH Americas and/or by the submission of a properly completed monthly summary of accident form or forms supplied by MWH Americas.

Upon completion of the contract the Subcontractor must submit the Monthly Subcontractors Safety Report to the Construction Manager. The report will cover the portion of the reporting month in which the subcontractor worked.

RECORDING

Information on the man-hrs worked by MWH Americas and each subcontractor and information on the number of incidents that resulted in a first aid case, or OSHA recordable case shall be recorded on the attached forms.

MONTHLY SUBCONTRACTORS SAFETY REPORT

INSTRUCTION: This report must include sub's subcontractors. The report must be submitted to the MWCI representative by the 7th of every month following the reporting month.

SUBCONTRACTOR:

MWCI PROJECT NAME:

NAME OF SUPERINTENDENT:

FIRST AID CASES	
OSHA RECORDABLE INJURIES	
LOST WORKDAY CASES	
TOTAL HRS WORKED	

BRIEF DESCRIPTION OF RECORDABLE INJURIES

THIS REPORT WAS PREPARED AND SUBMITTED BY:
DATE:

MONTHLY CONSTRUCTION SAFETY REPORT

INSTRUCTION: The Monthly Project Safety Report must be filled out and submitted to the MWCI Health and Safety Manager by the 15th of every month following the reporting month. Indicate the total hrs all site personnel worked. Record the number of OSHA and lost workday cases (LWDC).

PROJECT NAME: _____ DATE: _____

PROJECT No: _____ REPORTING MONTH: _____

PROJECT MANAGER: _____ PREPARED BY: _____

MWH AMERICAS	TOTAL HRS	FIRST AID	OSHA	LWDC
Construction Management				
MWCI Labor				
SUBCONTRACTORS				
A.				
B.				
C.				
D.				
E.				
F.				
TOTAL				
LAST MONTHS PROJECT TOTAL				
TOTAL TO DATE				

BRIEF DESCRIPTION OF WORK OR UNIQUE SAFETY SITUATIONS

DESCRIPTION OF MONTHLY SAFETY ACTIVITIES

UPCOMING CRITICAL ACTIVITIES (include start dates)

ATTACHMENT 3

PERSONAL ACKNOWLEDGEMENT FORM

PERSONAL ACKNOWLEDGEMENT FORM

HEALTH AND SAFETY PROGRAM

Kirtland Air Force Base, Site OT-10

As a component of the MWH Americas Health and Safety Program (which includes Site Specific Health and Safety Plans) designed to provide personnel safety during construction operations, you are required to read and understand the Site-Specific Health and Safety Program for this project. This project's safety and health program includes the following documents:

1. Foster Wheeler Site Safety and Health Plan (SSHP) for Kirtland Air Force Base
2. This Health and Safety Plan (HSP) which is attached to the Decommissioning Plan for Site OT-10
3. The Radiation Protection Program that is included in the Decommissioning Plan

Upon completion of reading and understanding these documents, please sign and date this personal acknowledgment form and return it to the Health and Safety Officer or Delivery Order Manager, Jeff Johnston.

_____ _____

Signature Name (Printed)

_____

Date