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RESIDUAL RISK EVALUATION - RELEASE BLOCK D REVISION SUMMARY - FINAL

MOUND PLANT
MIAMISBURG, OHIO

December 1998

Miamisburg Environmental Management Project
Department Of Energy

Babcock & Wilcox of Ohio, Inc.
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RESIDUAL RISK EVALUATION - RELEASE BLOCK D - REVISION SUMMARY
INTRODUCTION

The Mound Plant has been used as a research, development and production facility in support of the Department of Energy's (DOE) weapons and energy programs since 1948. Past operations created approximately 400 areas at the Mound where potential releases of hazardous substances may have occurred. These areas where releases may have occurred are undergoing investigation and, as deemed necessary, restoration. With the concurrence of the United States Environmental Protection Agency (U.S. EPA) and the Ohio Environmental Protection Agency (OEPA), the DOE will release the restored Mound property to the Miamisburg Mound Community Improvement Corporation for economic development and industrial enterprises.

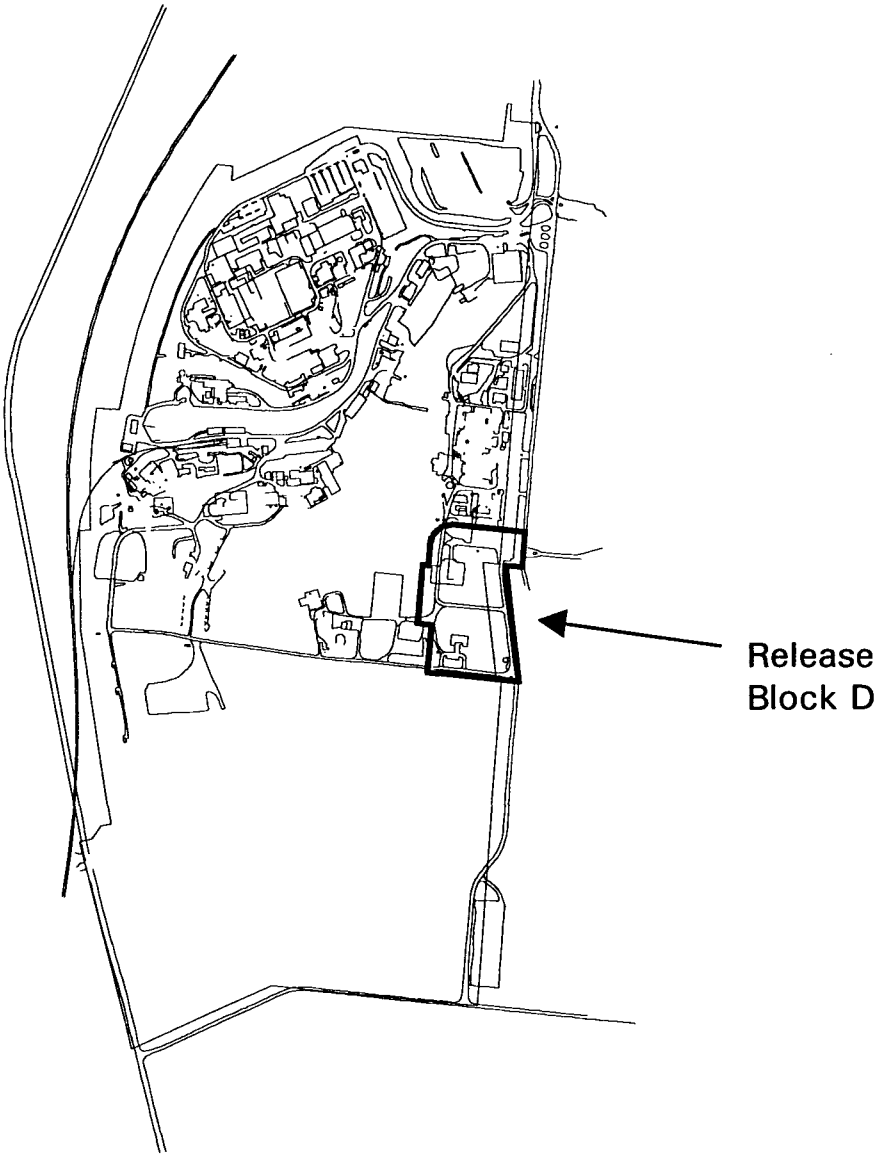
To streamline the transfer process, the Mound property has been divided into a number of "release blocks", which are contiguous tracts of property designated for release. Before transfer of a release block can be completed, an evaluation will be completed of human health risks that are associated with residual levels of contamination remaining in the release block either after removal actions (clean-ups) have occurred or have been deemed unnecessary. A Residual Risk Evaluation (RRE) will be prepared for each release block at the Mound to evaluate these residual risks. A RRE was completed for Release Block D in December 1996 (Residual Risk Evaluation - Release Block D Final Revision 0, December 1996) which addressed the residual contaminants in soil and groundwater for this release block.

In 1998 the boundary of Release Block D was reconfigured. (Figure 1 shows the location and new boundaries of Release Block D.) Due to this reconfiguration the data set used to complete the December 1996 Final RRE was revised. The original soil data set was modified to include or remove data points based on the boundary reconfiguration. In addition, there were some new soil samples collected and analyzed in October 1998 that are included in this revision.

This revision of the Release Block D RRE did not revise any data associated with the groundwater (current or future) scenarios. The Release Block D boundary change and the additional soil samples collected would have no affect on the groundwater risk calculations. This is due to the methodology used in calculating groundwater risk which is dependent on groundwater contaminants found in the Buried Valley Aquifer and the bedrock aquifer. The overall hazard index and risk included in the revised Release Block D RRE were recalculated using the revised soil data set and the December 1996 current and future groundwater hazards and risks values.

The Release Block D revision followed the Mound 2000 Residual Risk Evaluation Methodology or RREM (DOE, 1997). The RREM was developed through the collaborative efforts of Mound personnel, DOE, U.S. EPA, and OEPA.

Figure 1. Location and Boundaries of Release Block D, December 1998.



IDENTIFICATION OF CONTAMINANTS TO BE EVALUATED

Identification of contaminants to be evaluated required the compilation of new data. New data were compiled for soil sampling locations not previously included in Release Block D. This was accomplished by querying the Mound Environmental Information Management System (MEIMS) for all data associated with Release Block D based on the original boundary and the new boundary. These two databases were then compared to identify the soil sampling locations that needed to be added. A manual comparison of the soil sampling locations was done by using maps with both boundaries and locating the sampling locations that needed to be added, i.e., locations in the new boundary but outside the original boundary. Based on this exercise, it was determined that data for 15 soil sampling locations needed to be added, and data for six locations needed to be removed. Additionally, during October 1998, 13 new soil samples were collected within the Release Block D boundary and sent off-site to a commercial laboratory for radionuclide analysis. In November 1998 an additional 11 soil samples were collected and analyzed by the Mound soil screening laboratory. All the data for the 15 locations, as well as the October and November 1998 sampling locations, were then added to the existing Release Block D risk assessment database.

The second step of identifying contaminants to be evaluated consisted of determining what contaminants were detected one or more times. All contaminants that were detected one or more times were listed in a contaminant summary table for soil. Such information as the maximum concentration detected for any depth (construction worker scenario) and for depths less than 2 feet (site employee scenario) were noted. Contaminants that had previously met this criterion (Table II.2, December 1996 RRE) were updated to determine revised maximum concentration and frequency of detections. Review of the 15 new sampling locations identified 13 contaminants that had either one or more detections. These contaminants had been previously analyzed at other locations in Release Block D but were not detected in any samples. Data were then compiled for these 13 contaminants for all the sampling locations within the revised Release Block D boundary and the maximum concentrations and frequency of detection calculated. Table II.2 has been revised to present the maximum concentration of each contaminant, and also present appropriate background concentrations, Guideline Values and additional screening criteria for comparative purposes.

As per the RREM, the list of contaminants in Table II.2 was compared to background concentrations, Guideline Values and other screening criteria that define contaminants to be carried through the RRE process. Only contaminants exceeding both background and Guideline Values and meeting certain frequency of detection criteria are carried through the RRE process. Common constituents of most soil such as sodium and potassium were not carried through the RRE.

The screening process is documented on the revised Table II.2 by listing the reason each contaminant was carried through the RRE. The revised list of contaminants in soil contained 50 organic, 34 inorganic and 20 radionuclide compounds. Nearly all the organic contaminants found are generally not naturally occurring substances; therefore, background concentrations were not generally available.

This screening process identified 17 of 50 total organic contaminants, 5 of 34 inorganic contaminants, and 5 of 20 radiological contaminants. The revised list of contaminants carried through the RRE process for soil is summarized in Table II.5. The new contaminants required to be carried through the RRE based on the RREM are 7 organics (acenaphthene, acenaphthylene, dibenz(a,h)anthracene, dibenzofuran, 2,4-dinitrophenol, 2-methylnaphthalene, 1,1,1-trichloroethane) and two radionuclides (lead-210 and thorium-228).

EXPOSURE ASSESSMENT

This revision to the Release Block D RRE did not require any changes to the RREM concerning exposure assessments except for the soil concentrations used. The additional data changed maximum concentrations in some cases, and in many cases, the 95th % upper confidence limit (UCL) of the arithmetic mean or geometric mean. The same two exposure scenarios, construction worker and site employee, were used in the revision. All exposure pathways required by the RREM were evaluated in this revision. Table III.1 lists the soil contaminants carried through the RRE process at the new Release Block D for all onsite construction workers and site employees and includes soil exposure concentrations (C_{soil}). For each constituent the total soil exposure concentration was based on either the measured maximum concentration among all samples from the revised Release Block D or the 95th % UCL of the arithmetic mean or geometric mean of soil data. The total soil exposure concentration is comprised of possible background concentrations plus any incremental additional contamination above background.

The revised intakes of Release Block D soil are listed in Tables III.4 and III.7 for the construction worker and site employee, respectively. Intakes of Release Block D soil contaminants are based on the incremental concentrations attributable to the site. Revised intakes of Release Block D soil contaminants based on the background concentrations at the site are shown in Tables F.1 and F.4 for the construction worker and site employee, respectively. Intakes as revised for soil contaminants based on the total concentration are shown in Tables F.13 and F.16 for the construction worker and site employee, respectively.

TOXICITY ASSESSMENT

Toxicological values appropriate for use in the Release Block D RRE were assembled from various sources. The U.S. EPA's integrated Risk Information System (IRIS 1998) and the Health Assessment Summary Tables (HEAST 1997) were the data sources for organics and inorganics. Radionuclide data were obtained from the DOE (HAZWRAP, 1995) and HEAST. These sources were reviewed to obtain values for the new contaminants carried through the Release Block D RRE.

The new contaminants carried through the RRE consisted of 6 organics that are non-carcinogens, one organic that is a carcinogen, and two radionuclides. The toxicity values for the contaminants carried through the RRE are listed in Table IV.1.

RISK CHARACTERIZATION

The residual soil risks associated with use of Release Block D were calculated for non-carcinogens, carcinogens and radionuclides separately. The calculation of the noncarcinogenic hazard quotient and carcinogenic risk associated with carcinogens and radionuclides were revised using updated toxicity values if applicable and revised exposure assessment data. All calculations were performed as required by the RREM.

Soil Noncarcinogenic Hazards - Construction Worker

The noncarcinogenic hazard calculations were revised for all relevant construction worker pathways. Hazards were calculated for the incremental concentration above background (Table V.1) and for background and total concentrations (Appendix F Tables F.7 and F.19). For Pathway 6 (incidental ingestion of soil), the revised overall pathway hazard was 0.12 and for Pathway 8 (dermal contact with soil), the overall pathway hazard was 0.003. When combined, the overall construction worker incremental hazard was 0.13, which is lower then the allowable limit of 1.0.

Soil Carcinogenic Risk - Construction Worker

Carcinogenic risk calculations were revised for all relevant construction worker pathways. Pathway 6 (incidental ingestion of soil) and Pathway 8 (dermal contact with soil) applied to non-radionuclide carcinogens. Risks were calculated for the incremental concentration above background (Table V.1) and for background and total concentrations (Appendix F Tables F.7 and F.19). For the carcinogenic soil contaminants, the potential risk due to exposure of non-radionuclide carcinogens to a construction worker for Pathway 6 (incidental ingestion of soil) overall was 8.0E-06, and for Pathway 8 (dermal contact with soil) overall was 1.7E-06. The combined incremental risks (above background) across all pathways and all chemicals was 9.6E-06. These revised risks again indicate that the overall incremental risk was approximately evenly divided between several contaminants, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene and indeno(1,2,3-cd)pyrene.

Soil Radionuclide Risk - Construction Worker

For radionuclides the revised potential risk to the construction worker for Pathway 2 (inhalation of dust) was 2.4E-09, for Pathway 6 (incidental ingestion of soil) was 3.4E-06 and for Pathway 7 (external radiation) was 1.9E-05, while the combined incremental risk (above background) across all pathways was 2.3E-05. Risks calculations were revised similarly for the same pathways using intakes based on background and total radionuclide concentrations (Tables F. 7 and F.19).

Soil Noncarcinogenic Hazards - Site Employee

The noncarcinogenic hazards calculations were revised for all relevant site employee pathways. Hazards were calculated for the incremental concentration above background (Table V.4) and for background and total concentrations (Appendix F Tables F.10 and F.22). For Pathway 6 (incidental ingestion of soil), the revised overall pathway hazard was 0.017 and since only one pathway is required the overall incremental hazard is also 0.017. This hazard value is well below the allowable limit of 1.0.

Soil Carcinogenic Risk - Site Employee

The carcinogenic risk calculations were revised for all relevant site employee pathways. Hazards were calculated for the incremental concentration above background (Table V.4) and for background and total concentrations (Appendix F Tables F.10 and F.22). For Pathway 6 (incidental ingestion of soil), the revised overall pathway risk was 2.0E-06 and since only one pathway is required the overall incremental hazard is also 2.0E-06. This risk again is attributed to a series of polynuclear aromatic hydrocarbons.

Soil Radionuclide Risk - Site Employee

For radionuclides, the revised potential risk to the site employee for Pathway 2 (inhalation of dust) was 1.2E-08, for Pathway 6 (incidental ingestion of soil) was 1.8E-06, and for Pathway 7 (external radiation) was 2.1E-05. The combined incremental risk (above background) across all pathways and all radionuclides was 2.3E-05 based primarily on thorium-228 (Table V.4). Revised risks were calculated similarly for the same pathways using intakes based on background and total radionuclides concentrations and are presented in Tables F. 10 and F.22.

SUMMARY OF INCREMENTAL HAZARDS AND RISKS

Revised overall hazards from non-carcinogenic contaminants and risks from carcinogenic and radionuclide contaminants across all pathways for soil + current groundwater, and for soil + future groundwater, were summed to provide a comprehensive Hazard Index and risks based on the incremental exposures above background to construction workers or site employees working at Release Block D (Table V.7).

SUMMARY OF CUMULATIVE HAZARDS AND RISKS

The risks associated with the naturally occurring, "background" concentrations of contaminants were calculated separately from the risks associated directly with Mound activities that constitute the "incremental" risks above background. The soil and groundwater risks are added together, and the background and incremental risks were added together to produce total risks. These total risks were divided into risks associated with non-carcinogenic contaminants, termed the Overall Hazard Index, and the risks associated with carcinogenic contaminants (including radionuclides), termed Overall Risk. Summary tables of the final risks obtained during this revision of the Release Block D RRE are provided below and compared to the December 1996 final risks.

Construction Worker

	Current Scenario		Future Scenario		
	Overall Hazard Index	Overall Risk	Overall Hazard Index	Overall Risk	Comments
Incremental/1996	0.21	1.5E-5	1.2	1.6E-5	Table V.7
Incremental/1998	0.16	3.5E-5	1.1	3.5E-5	Table V.7
Background/1996	9.3E-5	3.1E-7	0.023	3.1E-7	Table V.8
Background/1998	9.3E-5	1.4E-5	0.023	1.4E-5	Table V.8
Total / 1996	0.21	1.5E-5	1.2	1.6E-5	Table V.9
Total / 1998	0.16	4.9E-5	1.2	5.0E-5	Table V.9

Site Employee

	Current Scenario		Future Scenario		
	Overall Hazard Index	Overall Risk	Overall Hazard Index	Overall Risk	Comments
Incremental/1996	0.059	1.1E-5	1.0	1.4E-5	Table V.7
Incremental/1998	0.054	3.6E-5	1.0	3.9E-5	Table V.7
Background/1996	7.3E-5	1.4E-6	0.023	1.4E-6	Table V.8
Background/1998	7.3E-5	1.7E-5	0.023	1.7E-5	Table V.8
Total / 1996	0.059	1.3E-5	1.0	1.6E-5	Table V.9
Total / 1998	0.056	5.2E-5	1.0	5.5E-5	Table V.9

Table II.2. Summary Table of All Soil Contaminants Detected in Release Block D

Soil contaminants above detection limit	Maximum concentration Any Depth	Maximum concentration Shallow - only	Soil background	G.V. for construction worker	G.V. for site employee	Detects / Analyses	Carried through RRE?	Reason
ORGANICS (mg/kg)								
Acenaphthene	6.4	3.80				10/ 55	Yes	F.O.D. ˜ 18% [8]
Acenaphthylene	0.22	0.029				4 / 53	Yes	F.O.D. = 8%
Acetone	0.23	0.210		21000[2]	200000[2]	21 / 47	No	Conc. < G.V.
Alpha Chlordane	0.086	---				2 / 74	No	F.O.D. `5%
Anthracene	11.65	4.8		64000[2]	610000[2]	16 / 60	No	Conc. < G.V.
Aroclor-1248	0.059	0.059		0.385[4]	0.74[4]	1 / 60	No	Conc. < G.V.
Aroclor-1254	0.3025	0.3025		4.30[2]	41[2]	1 / 60	No	Conc. < G.V.
Benzene	0.001	---		32	8.9	1 / 63	No	Conc. < G.V.
Benzo(a)anthracene	41.5	6.8		4.10[4]	7.8[4]	24 / 61	Yes	Conc > G.V.
Benzo(a)pyrene	33.5	7.5		0.41[4]	0.78[4]	25 / 60	Yes	Conc. > G.V.
Benzo(b)fluoranthene	53	12		4.10[4]	7.8[4]	24 / 60	Yes	Conc > G.V.
Benzo(g,h,i) perylene	3.9	3.9				15 / 60	Yes	F.O.D. = 25%
Benzo(k)fluoranthene	1.3	1.3		41.0[4]	78.0[4]	13 / 61	No	Conc < G.V.
Benzoic Acid	0.750	0.750		850000[2]	8200000[2]	6 / 52	No	Conc. < G.V.
Beta-BHC	0.360	0.360		1.65	3.2	5 / 78	NO	Conc. < G.V.
Bis(2-ethylhexyl)phthalate	4.2	3.650		215[4]	410[4]	43 / 60	No	Conc < G.V.
Bromoform	0.002	0.001				3 / 63	No	F.O.D ˜ 5%
2-Butanone	0.028	0.010		9300[1]	9300[1]	4 / 24	No	Conc. < G.V.
Carbazole	0.165	0.165				2 / 13	Yes	F.O.D. = 15%
Carbon Disulfide	0.004	0.004		280[1]	280[1]	1 / 48	No	Conc. < G.V.
2-Chlorophenol	0.1	0.1				1 / 60	No	F.O.D. = 2.8%
Chrysene	51.5	5.4		410[4]	780[4]	24 / 60	No	Conc. < G.V.
2,4-Dinitrophenol	0.970	0.970				4 / 72	Yes	F.O.D. = 5.6%
Di-n-butyl phthalate	0.140	---		21000[2]	200000[2]	1 / 48	No	Conc. < G.V.
Di-n-octyl phthalate	0.089	0.089		4300[2]	41000[2]	1 / 48	No	Conc. < G.V.
Dibenz(a,h)anthracene	1.3	1.3		0.41[4]	0.78[4]	10 / 60	Yes	Conc. > G.V.
Dibenzofuran	3.8	3.0				12 / 60	Yes	F.O.D. = 20%

Table II.2. Summary Table of All Soil Contaminants Detected in Release Block D

Soil contaminants above detection limit	Maximum concentration Any Depth	Maximum concentration Shallow - only	Soil background	G.V. for construction worker	G.V. for site employee	Detects / Analyses	Carried through RRE?	Reason
Dibromochloromethane	0.001	0.001		35.5	68	2 / 63	No	Cons. < G.V.
Ethylbenzene	0.003	0.001		0.48[1]	0.48[1]	8 / 48	No	Conc. < G.V.
Fluoranthene	65	5.3		8500[2]	82000[2]	34 / 60	No	Conc. < G.V.
Fluorene	6.3	3.3				16 / 60	Yes	F.O.D. = 27%
Indeno(1,2,3-cd)pyrene	20.5	4.7		4.10[4]	7.8[4]	17 / 60	Yes	Conc. > G.V.
2-Hexanone	0.011	0.008				2 / 63	No	F.O.D. ~5%
Methoxychlor	0.0055	0.0055	30			1 / 61	No	Conc. < Bkgd.
2-Methylnaphthalene	1.4	1.4				12 / 59	Yes	F.O.D.= 20%
4-Methyl-2-pentanone	0.002	---		700[1]	700[1]	1 / 24	No	Conc. < G.V.
Methylene Chloride	0.066	0.056		1000[1]	1000[1]	53 / 62	No	Conc. < G.V.
Naphthalene	1.9	1.9				14 / 60	Yes	F.O.D. = 23%
N-Nitrosodiphenylamine	0.083	---		600[4]	1200[4]	1 / 60	No	Conc. < G.V.
Pentachlorophenol	0.97	0.97		25[4]	48[4]	2 / 60	No	Conc. < G.V.
Phenanthrene	49.5	13				24 / 60	Yes	F.O.D. = 40%
Phenol	0.120	0.120		130000[2]	1200000[2]	1 / 60	No	Conc. < G.V.
Pyrene	62	3.4		6400[2]	61000[2]	35 / 61	No	Conc. < G.V.
Styrene	0.001	---				1 / 63	No	F.O.D. ~ 5%
Toluene	0.016	0.004		250[1]	250[1]	31 / 51	No	Conc. < G.V.
1,1,1-Trichloroethane	0.0025	0.002				6 / 48	Yes	F.O.D. = 12.5%
1,1,2-Trichloro-1,2,2-trifluoroethane	0.003	0.003				2 / 4	Yes	F.O.D. = 50%
Tetrachloroethene	0.0295	0.027		2100	20000	30 / 63	No	Conc. < G.V.
Trichloroethene	0.00175	0.001		125	41	3 / 63	No	Conc. < G.V.
Xylenes, total	0.019	0.005		430000[2]	4100000[2]	17 / 48	No	Conc. < G.V.
INORGANICS (mg/kg)								
Aluminum	24300	24300	19000			61 / 61	No	Common soil constituent
Antimony	39.2	39.2		85[2]	820[2]	41 / 60	Yes	Conc. > G.V.
Arsenic (total)	15.8	12.35	8.6	64[2]	610[2]	56 / 60	Yes	Conc. > G.V. & Bkgd.
Barium (total)	185	185	180	15000[1]	140000[1]	61 / 61	No	Conc. < G.V. >Bkgd

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Soil contaminants above detection limit	Maximum concentration Any Depth	Maximum concentration Shallow - only	Soil background	G.V. for construction worker	G.V. for site employee	Detects / Analyses	Carried through RRE?	Reason
Beryllium	1.8	1.8	1.3	0.7[3]	1.3[3]	47 / 49	Yes	Conc. > Bkgd. > G.V.
Bismuth	5.7	5.7				2 / 13	Yes	F.O.D. = 15%
Cadmium (total)	10.2	10.2	2.1	210[2]	2000[2]	21 / 61	No	Conc. < G.V. > Bkgd
Calcium (total)	276000	232000	310000			61 / 61	No	Conc. < Bkgd.
Chloride	59	---	107			3 / 6	No	Conc. < Bkgd.
Chromium (total)	29.6	28	20	1100[2]	10000[2]	61 / 61	No	Conc. < G.V. > Bkgd.
Cobalt (total)	15	15	19			59 / 61	No	Conc. < Bkgd.
Copper (total)	33.1	30.5	26			61 / 61	Yes	Conc. > Bkgd.
Cyanide	1.0	1.0		4300[2]	41000[2]	33 / 54	No	Conc. < G.V.
Fluoride	6.38	2.2	6.7			6 / 6	No	Conc. < Bkgd.
Iron (total)	43600	38900	35000			61 / 61	No	Common soil constituent
Lead (total)	35.8	35.8	48			61 / 61	No	Conc. < Bkgd.
Lithium	25.3	25.3	26			9 / 10	No	Conc. < Bkgd.
Magnesium (total)	64500	64500	40000			61 / 61	No	Common soil constituent
Manganese (total)	757	746	1400	27000[1]	150000[1]	61 / 61	No	Conc. < G.V. & Bkgd.
Mercury (total)	1.6	0.71		64[1]	610[1]	25 / 60	No	Conc. < G.V.
Molybdenum	14.5	2.3	27			9 / 11	No	Conc. < Bkgd.
Nickel (total)	52.05	36.0	32	4300[2]	41000[2]	49 / 61	No	Conc. < G.V. > Bkgd.
Nitrate	2.07	---	26			1 / 1	No	Conc. < Bkgd.
Nitrate/Nitrite	3.7	3.7				10 / 13	No	Common soil constituent
Organic Carbon	10189.1	---				1 / 1	No	Common soil constituent
Potassium (total)	2580	2580	1900			59 / 61	No	Common soil constituent
Silicon (total)	1100	---				1 / 1	No	Common soil constituent
Silver (total)	18.6	17.6	1.7	1100[2]	10000[2]	40 / 61	No	Conc. < G.V. > Bkgd.
Sodium (total)	2490	2490	240			57 / 60	No	Common soil constituent
Sulfate	129	---	150			2 / 6	No	Conc. < Bkgd.
Thallium	0.23	---	0.46			2 / 60	No	Conc. < Bkgd.
Tin	1.7	1.7	20			7 / 9	No	Conc. < Bkgd.

Table II.2. Summary Table of All Soil Contaminants Detected in Release Block D

Soil contaminants above detection limit	Maximum concentration Any Depth	Maximum concentration Shallow - only	Soil background	G.V. for construction worker	G.V. for site employee	Detects / Analyses	Carried through RRE?	Reason
Vanadium	41	41	25	1500[2]	14000[2]	60 / 61	No	Conc. < G. V. > Bkgd.
Zinc (total)	754	238	140	64000[2]	610000[2]	61 / 61	No	Conc. < G. V. > Bkgd.
RADIONUCLIDES (pCi/g)								
Actinium-227	0.38	0.38		1.0	1.1	17 / 17	No	Conc. < G.V.
Americium-241	0.05	0.05		4.95	9.2	17 / 24	No	Conc. < G.V.
Cesium-137	1.7	1.7	0.42	0.46[5]	0.42[5]	43 / 79	Yes	Conc. > G.V. & Bkgd.
Cobalt-60	0.055	0.055	1.01	0.1	0.09	17 / 24	No	Conc. < Bkgd. & G.V.
Lead-210	2.91	2.91				17 / 17	Yes	F.O.D. = 100%
Plutonium-238	60	60	0.13	5.50[5]	11[5]	332/394	Yes	Conc. > G.V. & Bkgd.
Plutonium-239/240	0.0196	0.0196	0.18	5.50[5]	10[5]	10 / 21	No	Conc. < G.V. & Bkgd.
Potassium-40	34.9	26.9	37			46 / 46	No	Conc. < Bkgd.
Radium-224	12.2	12.2		0.85[6]	0.83[6]	25 / 25	No	Th-232 decay products
Radium-226	3.055	2.3	2	0.14[5]	0.13[5]	78 / 79	No	Th-232 decay products
Radium-228	1.52	1.25		0.85[6]	0.83[6]	25 / 25	No	Th-232 decay products
Strontium-90	0.854	---	0.72	3.0[5]	57[5]	1 / 5	No	Conc. < G.V. > Bkgd.
Thorium-228	3.57	3.57	1.5	0.85[5]	0.83[5]	18 / 18	Yes	Conc. > G.V. > Bkgd.
Thorium-230	5.75	5.75	1.9	44.0[5]	81[5]	34 / 39	No	Conc. < G.V. & Bkgd.
Thorium-232	7	7	1.4	0.85[5,6]	0.83[5,6]	221/393	Yes	Conc. > G.V. & Bkgd.
Thorium-234	1.48	1.17	1.2	11.0[7]	13.0[7]	25 / 25	No	Conc. < G.V.
Tritium	0.58	0.58	1.6	23500[5]	45000[5]	5 / 14	No	Conc. < G.V. & Bkgd.
Uranium-234	1.14	1.14	1.1	37.5[5]	70[5]	19 / 19	No	Conc. < G.V. & Bkgd.
Uranium-235	0.1195	0.1195	0.11	3.35[5]	3.1[5]	16 / 19	No	Conc. < G.V. > Bkgd.
Uranium-238	1.14	1.14	1.2	11.0[5]	13.0[5]	19 / 24	No	Conc. < G.V. & Bkgd.

Table II.2. Summary Table of All Soil Contaminants Detected in Release Block D

Soil contaminants above detection limit	Maximum concentration Any Depth	Maximum concentration Shallow - only	Soil background	G.V. for construction worker	G.V. for site employee	Detects / Analyses	Carried through RRE?	Reason

NOTE: Contaminants with no background or Guideline Value available were left blank.
--- No shallow data available.
[1] - Hazard Quotient for both Ingestion and Inhalation. (decision made on 0.1 x G.V.)
[2] - Hazard Quotient for Ingestion only. (decision made on 0.1 x G.V.)
[3] - Total Risk 10^{-6} for both Ingestion and Inhalation.
[4] - Total Risk 10^{-6} for Ingestion only.
[5] - Total Risk 10^{-6} for Ingestion, Inhalation and External.
[6] - Guideline Values from Thorium-228+D.
[7] - Guideline values from U-238+D.
[8] - F.O.D. = Frequency of detection. Contaminants with a F.O.D. greater than 5% were carried through the RRE.

Table II.5. Soil Contaminants Carried Through RRE

Soil Constituents	Maximum concentration Any Depth	Maximum concentration Shallow (<2' deep)	Screening Concentration (either background or G.V.)	Reason for carrying through RRE
ORGANICS (mg/kg)				
Acenaphthene	6.4	3.8		F.OD. =18%
Acenaphthylene	0.22	0.029		F.O.D. = 8%
Benzo(a)anthracene	41.5	6.8	4.10[1]	Max Conc > G.V.
Benzo(a)pyrene	33.5	7.5	0.41[1]	Conc. > G.V.
Benzo(b)fluoranthene	53	12	4.10[1]	Max Conc > G.V.
Benzo(g,h,i) perylene	3.9	3.9		F.O.D. = 25%
Carbazole	0.165	0.165		F.O.D. = 15%
Dibenz(a,h)anthracene	1.3	1.3	0.41	Conc. > G.V.
Dibenzofuran	3.8	3.0		F.O.D. = 20%
2,4-Dinitrophenol	0.970	0.970		F.O.D. = 5.6%
Fluorene	6.3	3.3		F.O.D. = 27%
Indeno(1,2,3-cd)pyrene	20.5	4.7	4.10[1]	Max. Conc. > G.V.
2-Methylnaphthalene	1.4	1.4		F.O.D. = 20%
Naphthalene	1.9	1.9		F.O.D. = 23%
Phenanthrene	49.5	13		F.O.D. = 40%
1,1,1-Trichloroethane	0.0025	0.002		F.O.D. = 12.5%
1,1,2-Trichloro-1,2,2-trifluoroethane	0.003	0.003		F.O.D. = 50%
INORGANICS (mg/kg)				
Antimony	39.2	39.2	85[5]	Conc. > G.V.
Arsenic	15.8	12.35	64[5]	Conc. > G.V. & Bkgd.
Beryllium	1.8	1.8	0.7	Conc. > Bkgd. > G.V.
Bismuth	5.7	5.7		F.O.D. = 15%
Copper (total)	33.1	30.5	26[4]	Conc. > Bkgd.
RADIONUCLIDES (pCi/g)				
Cesium-137	1.7	1.7	0.42[2]	Conc. > G.V.
Lead-210	2.91	2.91		F.O.D. = 100%
Plutonium-238	60	60	5.50[2]	Conc. > G.V.
Thorium-228	3.57	3.57	0.83[6]	Conc. > G.V. > Bkgd.
Thorium-232	7	7	0.83[2,3]	Conc. > G.V.

Table II.5. Soil Contaminants Carried Through RRE

Soil Constituents	Maximum concentration Any Depth	Maximum concentration Shallow (<2' deep)	Screening Concentration (either background or G.V.)	Reason for carrying through RRE

[1] - Total Risk 10^{-6} for Ingestion only.
[2] - Total Risk 10^{-6} for Ingestion, Inhalation and External.
[3] - Guideline Values from thorium-228+D.
[4] - Background value
[5] - Hazard Quotient for Ingestion only. (decision made on 0.1 x G.V.)
[6] - Revisions to guideline values for thorium-228 and thorium-232 are pending. However, the Th-228 G.V. was not a factor in (a) carrying Th-228 through the RRE, or (b) screening Th-232 from the RRE. As seen in Table IV.1, the updated external slope factor for Th-228 was used in the risk calculations.

F.O.D. - Frequency of detection. Contaminants with a F.O.D. greater than 5% were carried through the RRE.

Table III.1. Soil Constituents Carried through Release Block D RRE

Constituent	C_{soil}					ABS
	Total[1] Construction Worker	Total[1] Site Employee	BG[2]	Increment Construction Worker	Increment Site Employee	
ORGANICS (mg/kg)						
Acenaphthene	0.827	0.671	NAv	0.827	0.671	0.1
Acenaphthylene	0.22	0.029	NAv	0.409	0.309	0.1
Benzo(a)anthracene	2.774	1.1	NAv	2.774	1.1	0.1
Benzo(a)pyrene	2.444	1.17	NAv	2.444	1.17	0.1
Benzo(b)fluoranthene	3.767	1.77	NAv	3.767	1.77	0.1
Benzo(g,h,i)perylene	0.630	0.7	NAv	0.630	0.7	0.1
Carbazole	0.165	0.165	NAv	0.165	0.165	0.1
Dibenz(a,h)anthracene	0.437	0.377	NAv	0.437	0.377	0.1
Dibenzofuran	0.606	0.534	NAv	0.606	0.534	0.1
2,4-Dinitrophenol	0.970	0.970	NAv	0.970	0.970	0.1
Fluorene	0.733	0.563	NAv	0.733	0.563	0.1
Indeno(1,2,3-cd)pyrene	1.543	0.797	NAv	1.543	0.797	0.1
2-Methylnaphthalene	0.435	0.410	NAv	0.435	0.410	0.1
Naphthalene	0.473	0.419	NAv	0.473	0.419	0.1
Phenanthrene	3.673	1.87	NAv	3.673	1.87	0.1
1,1,1-Trichloroethane	0.0025	0.002	NAv	0.003	0.002	0.1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.003	0.003	NAv	0.003	0.003	0.1
INORGANICS (mg/kg)						
Antimony	10.31	13.361	NAv	10.31	13.361	0.01
Arsenic[3]	4.27	4.289	8.6	0	0	0.01
Beryllium	0.72	0.766	1.3	0	0	0.01

Table III.1. Soil Constituents Carried through Release Block D RRE

Constituent	C_{soil}					ABS
	Total[1] Construction Worker	Total[1] Site Employee	BG[2]	Increment Construction Worker	Increment Site Employee	
Bismuth	5.7	5.7	NAv	5.7	5.7	0.01
Copper[3]	16.07	17.0	26	0	0	0.01
RADIONUCLIDES (pCi/g)						
Cesium-137[3]	0.25	0.298	0.42	0	0	NAp
Lead-210	2.91	2.91	NAv	2.91	2.91	NAp
Plutonium-238[4]	7.79	7.796	0.13	7.66	7.66	NAp
Thorium-228	3.57	3.57	1.5	2.07	2.07	NAp
Thorium-232[3]	0.97	0.995	1.4	0	0	NAp

ABS - Absorption factor (unitless)
NAv - Not Available
NAp - Not Applicable

1 Soil exposure concentration for Release Block D, based on the 95th% UCL for all parameters with greater than 20 analyses completed. These exclude the Site Employee value for fluorene and naphthalene, all carbazole, bismuth and 1,1,2-trichloro-1,2,2-trifluoroethane data. These parameters use the maximum concentration value since N<20 samples.

2 Soil background concentration for Mound facility (see RREM, DOE, 1996).

3 Arsenic, cesium-137, copper and thorium-232 total values were less than the background value therefore not carried thru the RRE.

4 Pu-238 values were log-normally distributed and hence, concentrations (95th% UCL) shown were based on the log-transformed data.

Table IV.1. Toxicity Values* for Soil Constituents Included in the Release Block D RRE

Soil Constituent	Oral RfD (mg/kg-da)	Inhalation RfD (mg/kg-da)	Oral Slope Factor $(mg/kg\text{-}da)^{-1}$	Inhalation Slope Factor $(mg/kg\text{-}da)^{-1}$	Carcinogenic Weight of Evidence**
ORGANICS					
Acenaphthene	0.60				D
Acenaphthylene					
Benzo(a)anthracene			0.73		B2
Benzo(a)pyrene			7.3		B2
Benzo(b)fluoranthene			0.73		B2
Benzo(g,h,i)perylene					
Carbazole			0.02		B2
Dibenz(a,h)anthracene					
Dibenzofuran	4.0E-03				D
2,4-Dinitrophenol	0.002				D
Fluorene	0.04				D
Indeno(1,2,3-cd)pyrene			0.73		B2
2-Methylnaphthalene					
Naphthalene	0.02				C
Phenanthrene					
1,1,1-Trichloroethane					
1,1,2-Trichloro-1,2,2-trifluoroethane	30				D
INORGANICS					
Antimony	4.0E-04				
Bismuth					
RADIONUCLIDES			**Oral Slope Factor (risk/pCi)**	**Inhalation Slope Factor (risk/pCi)**	**External Slope Factor (risk/yr per pCi/g)**
Lead-210 + D			1.10E-9	3.86E-9	1.45E-10
Plutonium-238			3.0E-10	2.7E-8	1.9E-11
Thorium-228 +D			2.3E-10	9.7E-8	6.2E-6

* -Values from IRIS (1996), HEAST(1997) and HAZWRAP (1995). No data available if left blank.

** A - Human Carcinogen.
B1 - Probable human carcinogen; limited human data available.
B2 - Probable human carcinogen; sufficient evidence in animals, insufficient or no human data available.
C - Possible human carcinogen.
D - Not classified.

Table III.4. Construction Worker Calculated Constituent Intakes for Soil (Incremental*) for Release Block D

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Pathway 6 Soil Ingestion	Pathway 7 External** Radiation	Pathway 8 Soil Dermal
Organics								
Acenaphthene	NA	3.781E-11	NA	NA	NA	3.884E-06	NA	8.092E-07
Acenaphthylene	NA	1.870E-11	NA	NA	NA	1.921E-06	NA	4.002E-07
Benzo(a)anthracene	NA	9.060E-12	NA	NA	NA	9.306E-07	NA	1.939E-07
Benzo(a)pyrene	NA	7.982E-12	NA	NA	NA	8.199E-07	NA	1.708E-07
Benzo(b)fluoranthene	NA	1.230E-11	NA	NA	NA	1.264E-06	NA	2.633E-07
Benzo(g,h,i)perylene	NA	2.058E-12	NA	NA	NA	2.114E-07	NA	4.403E-08
Carbazole	NA	5.389E-13	NA	NA	NA	5.535E-08	NA	1.153E-08
Dibenz(a,h)anthracene	NA	1.427E-12	NA	NA	NA	1.466E-07	NA	3.054E-08
Dibenzofuran	NA	2.771E-11	NA	NA	NA	2.846E-06	NA	5.930E-07
2,4-Dinitrophenol	NA	4.435E-11	NA	NA	NA	4.556E-06	NA	9.491E-07
Fluorene	NA	3.352E-11	NA	NA	NA	3.443E-06	NA	7.172E-07
Indeno(1,2,3-cd)pyrene	NA	5.039E-12	NA	NA	NA	5.176E-07	NA	1.078E-07
2-Methylnaphthalene	NA	1.989E-11	NA	NA	NA	2.043E-06	NA	4.256E-07
Naphthalene	NA	2.163E-11	NA	NA	NA	2.222E-06	NA	4.628E-07
Phenanthrene	NA	1.679E-10	NA	NA	NA	1.725E-05	NA	3.594E-06
1,1,1-Trichloroethane	NA	1.372E-13	NA	NA	NA	1.409E-08	NA	2.935E-09
1,1,2-Trichloro-1,2,2-trichloroethane	NA	1.372E-13	NA	NA	NA	1.409E-08	NA	2.935E-09
Inorganics								
Antimony	NA	4.714E-10	NA	NA	NA	4.842E-05	NA	1.009E-06
Bismuth	NA	2.606E-10	NA	NA	NA	2.677E-05	NA	5.577E-07
Radionuclides								
Lead-210 (pCi)	NA	1.70E-02	NA	NA	NA	1.75E+03	4.361E+00	NA
Plutonium-238 (pCi)	NA	4.474E-02	NA	NA	NA	4.596E+03	1.148E+01	NA
Thorium-228 (pCi)	NA	1.209E-02	NA	NA	NA	1.242E+03	3.102E+00	NA

* - Incremental soil concentrations and resulting intakes obtained by subtracting background from total concentrations.

** - External Radiation Exposure has units of pCi-yr/gm (Pathway 7).

Intakes due to exposure to total and background concentrations presented in Appendix F.

Note: Intakes for carcinogens are calculated as average daily dose-lifetime,
Intakes for non-carcinogens are calculated as average daily doses.

NA - Not applicable.

Table III.7. Site Employee Calculated Constituent Intakes from Soil (Incremental*) for Release Block D

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External** Radiation
Organics					
Acenaphthene	NA	3.068E-11	NA	3.283E-07	NA
Acenaphthylene	NA	1.413E-11	NA	1.512E-07	NA
Benzo(a)anthracene	NA	1.796E-11	NA	1.922E-07	NA
Benzo(a)pyrene	NA	1.911E-11	NA	2.044E-07	NA
Benzo(b)fluoranthene	NA	2.890E-11	NA	3.093E-07	NA
Benzo(g,h,i)perylene	NA	1.143E-11	NA	1.223E-07	NA
Carbazole	NA	2.694E-12	NA	2.883E-08	NA
Dibenz(a,h)anthracene	NA	6.156E-12	NA	6.587E-08	NA
Dibenzofuran	NA	2.442E-11	NA	2.613E-07	NA
2,4-Dinitrophenol	NA	4.435E-11	NA	4.746E-07	NA
Fluorene	NA	2.574E-11	NA	2.754E-07	NA
Indeno(1,2,3-cd)pyrene	NA	1.301E-11	NA	1.393E-07	NA
2-Methylnaphthalene	NA	1.875E-11	NA	2.006E-07	NA
Naphthalene	NA	1.916E-11	NA	2.050E-07	NA
Phenanthrene	NA	8.550E-11	NA	9.149E-07	NA
1,1,1-Trichloroethene	NA	9.145E-14	NA	9.785E-10	NA
1,1,2-Trichloro-1,2,2-trichloroethane	NA	1.372E-13	NA	1.468E-09	NA
Inorganics					
Antimony	NA	6.109E-10	NA	6.537E-06	NA
Bismuth	NA	2.606E-10	NA	2.789E-06	NA
Radionuclides					
Lead-210 (pCi)	NA	8.499E-02	NA	9.09E+02	4.85E+00
Plutonium-238 (pCi)	NA	2.237E-01	NA	2.394E+03	1.276E+01
Thorium-228 (pCi)	NA	6.046E-02	NA	6.469E+02	3.449E+00

* - Incremental soil concentrations and resulting intakes obtained by subtracting background from total concentrations.

** - External Radiation Exposure has units of pCi-yr/gm (Pathway 7).

Intakes due to exposure to total and background concentrations presented in Appendix F.

NA - Not applicable.

Table V.1. Characterization of Residual Risks at Release Block D - Construction Worker (Soil Pathways - Incremental)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker
Non-carcinogens (HQ)									
Acenaphthene	NA	***	NA	NA	NA	6.5E-06	NA	1.3E-06	
Acenaphthylene	NA	***	NA	NA	NA	***	NA	***	
Antimony	NA	***	NA	NA	NA	1.2E-01	NA	2.5E-03	
Bismuth	NA	***	NA	NA	NA	***	NA	***	
Dibenzofuran	NA	***	NA	NA	NA	7.1E-04	NA	1.5E-04	
2,4-Dinitrophenol	NA	***	NA	NA	NA	2.3E-03		4.7E-04	
Fluorene	NA	***	NA	NA	NA	8.6E-05	NA	1.8E-06	
2-Methylnaphthalene	NA	***	NA	NA	NA	***		***	
Naphthalene	NA	***	NA	NA	NA	1.1E-04	NA	2.3E-05	
Phenanthrene	NA	***	NA	NA	NA	***	NA	***	
1,1,1-Trichloroethane	NA	***	NA	NA	NA	***	NA	***	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	NA	NA	NA	4.7E-10	NA	9.8E-11	Total Soil HI =
Total:						1.2E-01		3.2E-03	1.3E-01
Carcinogens (Risk)									
Benzo(a)anthracene	NA	***	NA	NA	NA	6.8E-07	NA	1.4E-07	
Benzo(a)pyrene	NA	***	NA	NA	NA	6.0E-06	NA	1.2E-06	
Benzo(b)fluoranthene	NA	***	NA	NA	NA	9.2E-07	NA	1.9E-07	
Benzo(g,h,i)perylene	NA	***	NA	NA	NA	***	NA	***	
Carbazole	NA	***	NA	NA	NA	1.1E-09	NA	2.3E-10	Total Carcinogenic
Dibenz(a,h)anthracene	NA	***	NA	NA	NA	***	NA	***	
Indeno(1,2,3-cd)pyrene	NA	***	NA	NA	NA	3.8E-07	NA	7.9E-08	
Total:						8.0E-06		1.7E-06	9.6E-06
Radionuclides (Risk)									Total Radionuclide
Lead-210 (pCi)	NA	6.6E-11	NA	NA	NA	1.8E-06	6.3E-10	NA	
Plutonium-238 (pCi)	NA	1.2E-09	NA	NA	NA	1.4E-06	2.2E-10	NA	
Thorium-228 (pCi)	NA	1.2E-09	NA	NA	NA	2.9E-07	1.9E-05	NA	Risks =
Total:		2.4E-09				3.4E-06	1.9E-05		2.3E-05

*** - Toxicity values not available.

NA - Not applicable.

Table V.4. Characterization of Residual Risks at Release Block D - Site Employee (Soil Pathways - Incremental)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee
Non-carcinogens (HQ)						
Acenaphthene	NA	***	NA	5.5E-07	NA	
Acenaphthylene	NA	***	NA	***	NA	
Antimony	NA	***	NA	1.6E-02	NA	
Bismuth	NA	***	NA	***	NA	
Dibenzofuran	NA	***	NA	6.5E-05	NA	
2,4-Dinitrophenol	NA	***	NA	2.4E-04	NA	
Fluorene	NA	***	NA	6.9E-06	NA	
2-Methylnaphthalene	NA	***	NA	***	NA	
Naphthalene	NA	***	NA	1.0E-05	NA	
Phenanthrene	NA	***	NA	***	NA	
1,1,1-Trichloroethene	NA	***	NA	***	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	NA	4.9E-11	NA	Total Soil HI =
Total:				1.7E-02		1.7E-02
Carcinogens (Risk)						
Benzo(a)anthracene	NA	***	NA	1.4E-07	NA	
Benzo(a)pyrene	NA	***	NA	1.5E-06	NA	
Benzo(b)fluoranthene	NA	***	NA	2.3E-07	NA	
Benzo(g,h,i)perylene	NA	***	NA	***	NA	
Carbazole	NA	***	NA	5.8E-10	NA	Total Carcinogenic
Dibenz(a,h)anthracene	NA	***	NA	***	NA	
Indeno(1,2,3-cd)pyrene	NA	***	NA	1.0E-07	NA	
Total:				2.0E-06		2.0E-06
Radionuclides (Risk)						Total Radionuclide
Lead-210 (pCi)	NA	3.3E-10	NA	9.2E-07	7.0E-10	
Plutonium-238 (pCi)	NA	6.0E-09	NA	7.2E-07	2.4E-10	
Thorium-228 (pCi)	NA	5.9E-09	NA	1.5E-07	2.1E-05	Risks =
Total:		1.2E-08		1.8E-06	2.1E-05	2.3E-05

*** - Toxicity values not available.

NA - Not applicable.

Table Appendix F.1. Construction Worker Calculated Constituent Intakes from Soil (Background) for Release Block D

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Pathway 6 Soil Ingestion	Pathway 7 External** Radiation	Pathway 8 Soil Dermal
Organics								
Acenaphthene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Acenaphthylene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Benzo(a)anthracene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Benzo(a)pyrene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Benzo(b)fluoranthene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Benzo(g,h,i)perylene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Carbazole	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Dibenz(a,h)anthracene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Dibenzofuran	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
2,4-Dinitrophenol	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Fluorene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Indeno(1,2,3-cd)pyrene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
2-Methylnaphthalene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Naphthalene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Phenanthrene	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
1,1,1-Trichloroethane	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
1,1,2-Trichloro-1,2,2-trichloroethane	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Inorganics								
Antimony	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Bismuth	NA	0.000E+00	NA	NA	NA	0.000E+00	NA	0.000E+00
Radionuclides								
Lead-210 (pCi)	NA	0.00E+00	NA	NA	NA	0.00E+00	0.00E+00	NA
Plutonium-238 (pCi)	NA	7.593E-04	NA	NA	NA	7.800E+01	1.948E-01	NA
Thorium-228 (pCi)	NA	8.762E-03	NA	NA	NA	9.000E+02	2.248E+00	NA

NA - Not applicable.

** - External Radiation Exposure has units of pCi-yr/gm (Pathway 7).

Note: Intakes for carcinogens are calculated as average daily dose-lifetime,
Intakes for non-carcinogens are calculated as average daily doses.

Table Appendix F.4. Site Employee Calculated Constituent Intakes from Soil (Background) for Release Block D

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External** Radiation
Organics					
Acenaphthene	NA	0.000E+00	NA	0.000E+00	NA
Acenaphthylene	NA	0.000E+00	NA	0.000E+00	NA
Benzo(a)anthracene	NA	0.000E+00	NA	0.000E+00	NA
Benzo(a)pyrene	NA	0.000E+00	NA	0.000E+00	NA
Benzo(b)fluoranthene	NA	0.000E+00	NA	0.000E+00	NA
Benzo(g,h,i)perylene	NA	0.000E+00	NA	0.000E+00	NA
Carbazole	NA	0.000E+00	NA	0.000E+00	NA
Dibenz(a,h)anthracene	NA	0.000E+00	NA	0.000E+00	NA
Dibenzofuran	NA	0.000E+00	NA	0.000E+00	NA
2,4-Dinitrophenol	NA	0.000E+00	NA	0.000E+00	NA
Fluorene	NA	0.000E+00	NA	0.000E+00	NA
Indeno(1,2,3-cd)pyrene	NA	0.000E+00	NA	0.000E+00	NA
2-Methylnaphthalene	NA	0.000E+00	NA	0.000E+00	NA
Naphthalene	NA	0.000E+00	NA	0.000E+00	NA
Phenanthrene	NA	0.000E+00	NA	0.000E+00	NA
1,1,1-Trichloroethane	NA	0.000E+00	NA	0.000E+00	NA
1,1,2-Trichloro-1,2,2-trichloroethane	NA	0.000E+00	NA	0.000E+00	NA
Inorganics					
Antimony	NA	0.000E+00	NA	0.000E+00	NA
Bismuth	NA	0.000E+00	NA	0.000E+00	NA
Radionuclides					
Lead-210 (pCi)	NA	0.000E+00	NA	0.000E+00	0.000E+00
Plutonium-238 (pCi)	NA	3.797E-03	NA	4.063E+01	2.166E-01
Thorium-228 (pCi)	NA	4.381E-02	NA	4.688E+02	2.499E+00

NA - Not applicable.

** - External Radiation Exposure has units of pCi-yr/gm (Pathway 7).

Table Appendix F.7. Characterization of Residual Risks at Release Block D - Construction Worker (Soil Pathways - Background)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker
Non-carcinogens (HQ)									
Acenaphthene	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00	
Acenaphthylene	NA	***	NA	NA	NA	***	NA	***	
Antimony	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00	
Bismuth	NA	***	NA	NA	NA	***	NA	***	
Dibenzofuran	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00	
2.4-Dinitrophenol	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00	
Fluorene	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00	
2-Methylnaphthalene	NA	***	NA	NA	NA	***	NA	***	
Naphthalene	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00	
Phenanthrene	NA	***	NA	NA	NA	***	NA	***	
1,1,1-Trichloroethane	NA	***	NA	NA	NA	***	NA	***	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00	Total Soil HI =
Total:						0.0E+00		0.0E+00	0.0E+00
Carcinogens (Risk)									
Benzo(a)anthracene	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00	
Benzo(a)pyrene	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00	
Benzo(b)fluoranthene	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00	
Benzo(g,h,i)perylene	NA	***	NA	NA	NA	***	NA	***	
Carbazole	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00	Total Carcinogenic
Dibenz(a,h)anthracene	NA	***	NA	NA	NA	***	NA	***	
Indeno(1,2,3-cd)pyrene	NA	***	NA	NA	NA	0.0E+00	NA	0.0E+00	
Total:						0.0E+00		0.0E+00	0.0E+00
Radionuclides (Risk)									Total Radionuclide
Lead-210 (pCi)	NA	0.0E+00	NA	NA	NA	0.0E+00	0.0E+00	NA	
Plutonium-238 (pCi)	NA	2.1E-11	NA	NA	NA	2.3E-08	3.7E-12	NA	
Thorium-228 (pCi)	NA	8.5E-10	NA	NA	NA	2.1E-07	1.4E-05	NA	Risks =
Total:		8.7E-10				2.3E-07	1.4E-05		1.4E-05

*** - Toxicity values not available.
NAv - Background value not available.
NA - Not applicable.

Table Appendix F.10. Characterization of Residual Risks at Release Block D - Site Employee (Soil Pathways - Background)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee
Non-carcinogens (HQ)						
Acenaphthene	NA	***	NA	0.0E+00	NA	
Acenaphthylene	NA	***	NA	***	NA	
Antimony	NA	***	NA	0.0E+00	NA	
Bismuth	NA	***	NA	***	NA	
Dibenzofuran	NA	***	NA	0.0E+00	NA	
2,4-Dinitrophenol	NA	***	NA	0.0E+00	NA	
Fluorene	NA	***	NA	0.0E+00	NA	
2-Methylnaphthalene	NA	***	NA	***	NA	
Naphthalene	NA	***	NA	0.0E+00	NA	
Phenanthrene	NA	***	NA	***	NA	
1,1,1-Trichloroethane	NA	***	NA	***	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	NA	0.0E+00	NA	Total Soil HI =
Total:				0.0E+00		0.0E+00
Carcinogens (Risk)						
Benzo(a)anthracene	NA	***	NA	0.0E+00	NA	
Benzo(a)pyrene	NA	***	NA	0.0E+00	NA	
Benzo(b)fluoranthene	NA	***	NA	0.0E+00	NA	
Benzo(g,h,i)perylene	NA	***	NA	***	NA	
Carbazole	NA	***	NA	0.0E+00	NA	Total Carcinogenic
Dibenz(a,h)anthracene	NA	***	NA	***	NA	
Indeno(1,2,3-cd)pyrene	NA	***	NA	0.0E+00	NA	
Total:				0.0E+00		0.0E+00
Radionuclides (Risk)						Total Radionuclide
Lead-210 (pCi)	NA	0.0E+00	NA	0.0E+00	0.0E+00	
Plutonium-238 (pCi)	NA	1.0E-10	NA	1.2E-08	4.1E-12	
Thorium-228 (pCi)	NA	4.2E-09	NA	1.1E-07	1.5E-05	Risks =
Total:		4.4E-09		1.2E-07	1.5E-05	1.6E-05

*** - Toxicity values not available.
NAv - Background value not available.
NA - Not applicable.

Table Appendix F.13. Construction Worker Calculated Constituent Intakes from Soil (Total) for Release Block D

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Pathway 6 Soil Ingestion	Pathway 7 External** Radiation	Pathway 8 Soil Dermal
Organics								
Acenaphthene	NA	3.781E-11	NA	NA	NA	3.884E-06	NA	8.092E-07
Acenaphthylene	NA	1.870E-11	NA	NA	NA	1.921E-06	NA	4.002E-07
Benzo(a)anthracene	NA	9.060E-12	NA	NA	NA	9.306E-07	NA	1.939E-07
Benzo(a)pyrene	NA	7.982E-12	NA	NA	NA	8.199E-07	NA	1.708E-07
Benzo(b)fluoranthene	NA	1.230E-11	NA	NA	NA	1.264E-06	NA	2.633E-07
Benzo(g,h,i)perylene	NA	2.058E-12	NA	NA	NA	2.114E-07	NA	4.403E-08
Carbazole	NA	5.389E-13	NA	NA	NA	5.535E-08	NA	1.153E-08
Dibenz(a,h)anthracene	NA	1.427E-12	NA	NA	NA	1.466E-07	NA	3.054E-08
Dibenzofuran	NA	2.771E-11	NA	NA	NA	2.846E-06	NA	5.930E-07
2,4-Dinitrophenol	NA	4.435E-11	NA	NA	NA	4.556E-06	NA	9.491E-07
Fluorene	NA	3.352E-11	NA	NA	NA	3.443E-06	NA	7.172E-07
Indeno(1,2,3-cd)pyrene	NA	5.039E-12	NA	NA	NA	5.176E-07	NA	1.078E-07
2-Methylnaphthalene	NA	1.989E-11	NA	NA	NA	2.043E-06	NA	4.256E-07
Naphthalene	NA	2.163E-11	NA	NA	NA	2.222E-06	NA	4.628E-07
Phenanthrene	NA	1.679E-10	NA	NA	NA	1.725E-05	NA	3.594E-06
1,1,1-Trichloroethane	NA	1.372E-13	NA	NA	NA	1.409E-08	NA	2.935E-09
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	1.372E-13	NA	NA	NA	1.409E-08	NA	2.935E-09
Inorganics								
Antimony	NA	4.714E-10	NA	NA	NA	4.842E-05	NA	1.009E-06
Bismuth	NA	2.606E-10	NA	NA	NA	2.677E-05	NA	5.577E-07
Radionuclides								
Lead-210 (pCi)	NA	1.700E-02	NA	NA	NA	1.746E+03	4.361E+00	NA
Plutonium-238 (pCi)	NA	4.550E-02	NA	NA	NA	4.674E+03	1.167E+01	NA
Thorium-228 (pCi)	NA	2.085E-02	NA	NA	NA	2.142E+03	5.350E+00	NA

NA - Not applicable.

** - External Radiation Exposure has units of pCi-yr/gm (Pathway 7).

Note: Intakes for carcinogens are calculated as average daily dose-lifetime,
Intakes for non-carcinogens are calculated as average daily doses.

Table Appendix F.16. Site Employee Calculated Constituent Intakes from Soil (Total) for Release Block D

Constituent (mg/kg-da) unless otherwise noted	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External** Radiation
Organics					
Acenaphthene	NA	3.068E-11	NA	3.283E-07	NA
Acenaphthylene	NA	1.413E-11	NA	1.512E-07	NA
Benzo(a)anthracene	NA	1.796E-11	NA	1.922E-07	NA
Benzo(a)pyrene	NA	1.911E-11	NA	2.044E-07	NA
Benzo(b)fluoranthene	NA	2.890E-11	NA	3.093E-07	NA
Benzo(g,h,i)perylene	NA	1.143E-11	NA	1.223E-07	NA
Carbazole	NA	2.694E-12	NA	2.883E-08	NA
Dibenz(a,h)anthracene	NA	6.156E-12	NA	6.587E-08	NA
Dibenzofuran	NA	2.442E-11	NA	2.613E-07	NA
2,4-Dinitrophenol	NA	4.435E-11	NA	4.556E-06	NA
Fluorene	NA	2.574E-11	NA	2.754E-07	NA
Indeno(1,2,3-cd)pyrene	NA	1.301E-11	NA	1.393E-07	NA
2-Methylnaphthalene	NA	1.875E-11	NA	2.006E-07	NA
Naphthalene	NA	1.916E-11	NA	2.050E-07	NA
Phenanthrene	NA	8.550E-11	NA	9.149E-07	NA
1,1,1-Trichloroethane	NA	9.145E-14	NA	9.785E-10	NA
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	1.372E-13	NA	1.468E-09	NA
Inorganics					
Antimony	NA	6.109E-10	NA	6.537E-06	NA
Bismuth	NA	2.606E-10	NA	2.789E-06	NA
Radionuclides					
Lead-210 (pCi)	NA	8.499E-02	NA	9.094E+02	4.848E+00
Plutonium-238 (pCi)	NA	2.277E-01	NA	2.436E+03	1.299E+01
Thorium-228 (pCi)	NA	1.043E-01	NA	1.116E+03	5.948E+00

NA - Not applicable.

** - External Radiation Exposure has units of pCi-yr/gm (Pathway 7).

Table Appendix F.19. Characterization of Residual Risks at Release Block D - Construction Worker (Soil Pathways - Total)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 4 Shower Inhalation	Pathway 5 Groundwtr. Dermal	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Pathway 8 Soil Dermal	Construction Worker
Non-carcinogens (HQ)									
Acenaphthene	NA	***	NA	NA	NA	6.5E-06	NA	1.3E-06	
Acenaphthylene	NA	***	NA	NA	NA	***	NA	***	
Antimony	NA	***	NA	NA	NA	1.2E-01	NA	2.5E-03	
Bismuth	NA	***	NA	NA	NA	***	NA	***	
Dibenzofuran	NA	***	NA	NA	NA	***	NA	***	
2,4-Dinitrophenol	NA	***	NA	NA	NA	2.3E-03	NA	4.7E-04	
Fluorene	NA	***	NA	NA	NA	8.6E-05	NA	1.8E-06	
2-Methylnaphthalene	NA	***	NA	NA	NA	***	NA	***	
Naphthalene	NA	***	NA	NA	NA	1.1E-04	NA	2.3E-05	
Phenanthrene	NA	***	NA	NA	NA	***	NA	***	
1,1,1-Trichloroethane	NA	***	NA	NA	NA	***	NA	***	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	NA	NA	NA	4.7E-10	NA	9.8E-11	Total Soil HI =
Total:						1.2E-01		3.0E-03	1.3E-01
Carcinogens (Risk)									
Benzo(a)anthracene	NA	***	NA	NA	NA	6.8E-07	NA	1.4E-07	
Benzo(a)pyrene	NA	***	NA	NA	NA	6.0E-06	NA	1.2E-06	
Benzo(b)fluoranthene	NA	***	NA	NA	NA	9.2E-07	NA	1.9E-07	
Benzo(g,h,i)perylene	NA	***	NA	NA	NA	***	NA	***	
Carbazole	NA	***	NA	NA	NA	1.1E-09	NA	2.3E-10	Total Carcinogenic
Dibenzo(a,h)anthracene	NA	***	NA	NA	NA	***	NA	***	
Indeno(1,2,3-cd)pyrene	NA	***	NA	NA	NA	3.8E-07	NA	7.9E-08	Risks =
Total:						8.0E-06		1.7E-06	9.6E-06
Radionuclides (Risk)									Total Radionuclide
Lead-210 (pCi)	NA	6.6E-11	NA	NA	NA	1.8E-06	6.3E-10	NA	
Plutonium-238 (pCi)	NA	1.2E-09	NA	NA	NA	1.4E-06	2.2E-10	NA	Risks =
Thorium-228 (pCi)	NA	2.0E-09	NA	NA	NA	4.9E-07	3.3E-05	NA	
Total:		3.3E-09				3.7E-06	3.3E-05		3.7E-05

*** - Toxicity values not available.

NA - Not applicable.

Table Appendix F.22. Characterization of Residual Risks at Release Block D - Site Employee (Soil Pathways - Total)

Constituent	Pathway 1 Soil VOC Inhalation	Pathway 2 Soil/Dust Inhalation	Pathway 3 Groundwtr. Ingestion	Pathway 6 Soil Ingestion	Pathway 7 External Radiation	Site Employee
Non-carcinogens (HQ)						
Acenaphthene	NA	***	NA	5.5E-07	NA	
Acenaphthylene	NA	***	NA	***	NA	
Antimony	NA	***	NA	1.6E-02	NA	
Bismuth	NA	***	NA	***	NA	
Dibenzofuran	NA	***	NA	6.5E-05	NA	
2,4-Dinitrophenol	NA	***	NA	2.3E-03	NA	
Fluorene	NA	***	NA	6.9E-06	NA	
2-Methylnaphthalene	NA	***	NA	***	NA	
Naphthalene	NA	***	NA	1.0E-05	NA	
Phenanthrene	NA	***	NA	***	NA	
1,1,1-Trichloroethene	NA	***	NA	***	NA	
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	***	NA	4.9E-11	NA	Total Soil HI =
Total:				1.9E-02		1.9E-02
Carcinogens (Risk)						
Benzo(a)anthracene	NA	***	NA	1.4E-07	NA	
Benzo(a)pyrene	NA	***	NA	1.5E-06	NA	
Benzo(b)fluoranthene	NA	***	NA	2.3E-07	NA	
Benzo(g,h,i)perylene	NA	***	NA	***	NA	
Carbazole	NA	***	NA	5.8E-10	NA	Total Carcinogenic
Dibenz(a,h)anthracene	NA	***	NA	***	NA	
Indeno(1,2,3-cd)pyrene	NA	***	NA	1.0E-07	NA	
Total:				2.0E-06		2.0E-06
Radionuclides (Risk)						Total Radionuclide
Lead-210 (pCi)	NA	3.3E-10	NA	9.2E-07	7.0E-10	
Plutonium-238 (pCi)	NA	6.1E-09	NA	7.3E-07	2.5E-10	
Thorium-228 (pCi)	NA	1.0E-08	NA	2.6E-07	3.7E-05	Risks =
Total:		1.6E-08		9.9E-07	3.7E-05	3.8E-05

*** - Toxicity values not available.

NA - Not applicable.

TABLE V.7. Summary of Current and Future Incremental Risks at Release Block D - Mound Facility

	Construction Worker					
	Soil	Groundwater Current	Groundwater Future	Sum of Soil and Groundwater Current	Sum of Soil and Groundwater Future	
Non-carcinogenic Hazard Index				HI =	HI =	
for Organics &	1.8E-01	3.7E-02	1.0E+00	2.1E-01	1.2E+00	December 1996 Final (Revision 0)
Inorganics	1.3E-01	3.7E-02	1.0E+00	1.6E-01	1.1E+00	December 1998 Final (Revision 1)
Carcinogenic Risks				Risk =	Risk =	
for Organics &	1.2E-05	9.9E-08	4.0E-07	1.2E-05	1.3E-05	December 1996 Final (Revision 0)
Inorganics	9.6E-06	9.9E-08	4.0E-07	9.7E-06	1.0E-05	December 1998 Final (Revision 1)
Carcinogenic Risks				Risk =	Risk =	
for Radionuclides	4.6E-07	2.1E-06	2.4E-06	2.6E-06	2.9E-06	December 1996 Final (Revision 0)
	2.3E-05	2.1E-06	2.4E-06	2.5E-05	2.5E-05	December 1998 Final (Revision 1)
		Construction Worker				
			Overall HI =	2.1E-01	1.2E+00	December 1996 Final (Revision 0)
				1.6E-01	1.1E+00	December 1998 Final (Revision 1)
			Overall Risk =	1.5E-05	1.6E-05	December 1996 Final (Revision 0)
				3.5E-05	3.5E-05	December 1998 Final (Revision 1)

	Site Employee					
	Soil	Groundwater Current	Groundwater Future	Sum of Soil and Groundwater Current	Sum of Soil and Groundwater Future	
Non-carcinogenic Hazard Index				HI =	HI =	
for Organics &	2.2E-02	3.7E-02	1.0E+00	5.9E-02	1.0E+00	December 1996 Final (Revision 0)
Inorganics	1.7E-02	3.7E-02	1.0E+00	5.4E-02	1.0E+00	December 1998 Final (Revision 1)
Carcinogenic Risks				Risk =	Risk =	
for Organics &	6.1E-07	NA	1.5E-06	6.1E-07	2.1E-06	December 1996 Final (Revision 0)
Inorganics	2.0E-06	NA	1.5E-06	2.0E-06	3.5E-06	December 1998 Final (Revision 1)
Carcinogenic Risks				Risk =	Risk =	
for Radionuclides	2.5E-07	1.1E-05	1.2E-05	1.1E-05	1.2E-05	December 1996 Final (Revision 0)
	2.3E-05	1.1E-05	1.2E-05	3.4E-05	3.5E-05	December 1998 Final (Revision 1)
		Site Employee				
			Overall HI =	5.9E-02	1.0E+00	December 1996 Final (Revision 0)
				5.4E-02	1.0E+00	December 1998 Final (Revision 1)
			Overall Risk =	1.1E-05	1.4E-05	December 1996 Final (Revision 0)
				3.6E-05	3.9E-05	December 1998 Final (Revision 1)

TABLE V.8. Summary of Current and Future Background Risks at Release Block D - Mound Facility

	Construction Worker					
	Soil	Groundwater Current	Groundwater Future	Sum of Soil and Groundwater Current	Sum of Soil and Groundwater Future	
Non-carcinogenic Hazard Index for Organics & Inorganics				HI =	HI =	
	0.0E+00	9.3E-05	2.3E-02	9.3E-05	2.3E-02	December 1996 Final (Revision 0)
	0.0E+00	9.3E-05	2.3E-02	9.3E-05	2.3E-02	December 1998 Final (Revision 1)
Carcinogenic Risks for Organics & Inorganics				Risk =	Risk =	
	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	December 1996 Final (Revision 0)
	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	December 1998 Final (Revision 1)
Carcinogenic Risks for Radionuclides				Risk =	Risk =	
	2.3E-08	2.9E-07	2.8E-07	3.1E-07	3.1E-07	December 1996 Final (Revision 0)
	1.4E-05	2.9E-07	2.8E-07	1.4E-05	1.4E-05	December 1998 Final (Revision 1)
		Construction Worker				
			Overall HI =	9.3E-05	2.3E-02	December 1996 Final (Revision 0)
				9.3E-05	2.3E-02	December 1998 Final (Revision 1)
			Overall Risk =	3.1E-07	3.1E-07	December 1996 Final (Revision 0)
				1.4E-05	1.4E-05	December 1998 Final (Revision 1)

	Site Employee					
	Soil	Groundwater Current	Groundwater Future	Sum of Soil and Groundwater Current	Sum of Soil and Groundwater Future	
Non-carcinogenic Hazard Index for Organics & Inorganics				HI =	HI =	
	0.0E+00	7.3E-05	2.3E-02	7.3E-05	2.3E-02	December 1996 Final (Revision 0)
	0.0E+00	7.3E-05	2.3E-02	7.3E-05	2.3E-02	December 1998 Final (Revision 1)
Carcinogenic Risks for Organics & Inorganics				Risk =	Risk =	
	0.0E+00	NA	0.0E+00	0.0E+00	0.0E+00	December 1996 Final (Revision 0)
	0.0E+00	NA	0.0E+00	0.0E+00	0.0E+00	December 1998 Final (Revision 1)
Carcinogenic Risks for Radionuclides				Risk =	Risk =	
	1.2E-08	1.4E-06	1.4E-06	1.4E-06	1.4E-06	December 1996 Final (Revision 0)
	1.6E-05	1.4E-06	1.4E-06	1.7E-05	1.7E-05	December 1998 Final (Revision 1)
		Site Employee				
			Overall HI =	7.3E-05	2.3E-02	December 1996 Final (Revision 0)
				7.3E-05	2.3E-02	December 1998 Final (Revision 1)
			Overall Risk =	1.4E-06	1.4E-06	December 1996 Final (Revision 0)
				1.7E-05	1.7E-05	December 1998 Final (Revision 1)

TABLE V.9. Summary of Current and Future Total Risks at Release Block D - Mound Facility

	Construction Worker					
	Soil	Groundwater Current	Groundwater Future	Sum of Soil and Groundwater Current	Sum of Soil and Groundwater Future	
Non-carcinogenic Hazard Index for Organics & Inorganics				HI =	HI =	
	1.8E-01	3.7E-02	1.0E+00	2.1E-01	1.2E+00	December 1996 Final (Revision 0)
	1.3E-01	3.7E-02	1.0E+00	1.6E-01	1.2E+00	December 1998 Final (Revision 1)
Carcinogenic Risks for Organics & Inorganics				Risk =	Risk =	
	1.2E-05	9.9E-08	4.0E-07	1.2E-05	1.3E-05	December 1996 Final (Revision 0)
	9.6E-06	9.9E-08	4.0E-07	9.7E-06	1.0E-05	December 1998 Final (Revision 1)
Carcinogenic Risks for Radionuclides				Risk =	Risk =	
	4.8E-07	2.4E-06	2.7E-06	2.9E-06	3.2E-06	December 1996 Final (Revision 0)
	3.7E-05	2.4E-06	2.7E-06	3.9E-05	4.0E-05	December 1998 Final (Revision 1)
		Construction Worker				
			Overall HI =	2.1E-01	1.2E+00	December 1996 Final (Revision 0)
				1.6E-01	1.2E+00	December 1998 Final (Revision 1)
			Overall Risk =	1.5E-05	1.6E-05	December 1996 Final (Revision 0)
				4.9E-05	5.0E-05	December 1998 Final (Revision 1)

	Site Employee					
	Soil	Groundwater Current	Groundwater Future	Sum of Soil and Groundwater Current	Sum of Soil and Groundwater Future	
Non-carcinogenic Hazard Index for Organics & Inorganics				HI =	HI =	
	2.2E-02	3.7E-02	1.0E+00	5.9E-02	1.0E+00	December 1996 Final (Revision 0)
	1.9E-02	3.7E-02	1.0E+00	5.6E-02	1.0E+00	December 1998 Final (Revision 1)
Carcinogenic Risks for Organics & Inorganics				Risk =	Risk =	
	6.1E-07	NA	1.5E-06	6.1E-07	2.1E-06	December 1996 Final (Revision 0)
	2.0E-06	NA	1.5E-06	2.0E-06	3.5E-06	December 1998 Final (Revision 1)
Carcinogenic Risks for Radionuclides				Risk =	Risk =	
	2.6E-07	1.2E-05	1.3E-05	1.2E-05	1.4E-05	December 1996 Final (Revision 0)
	3.8E-05	1.2E-05	1.3E-05	5.0E-05	5.1E-05	December 1998 Final (Revision 1)
		Site Employee				
			Overall HI =	5.9E-02	1.0E+00	December 1996 Final (Revision 0)
				5.6E-02	1.0E+00	December 1998 Final (Revision 1)
			Overall Risk =	1.3E-05	1.6E-05	December 1996 Final (Revision 0)
				5.2E-05	5.5E-05	December 1998 Final (Revision 1)