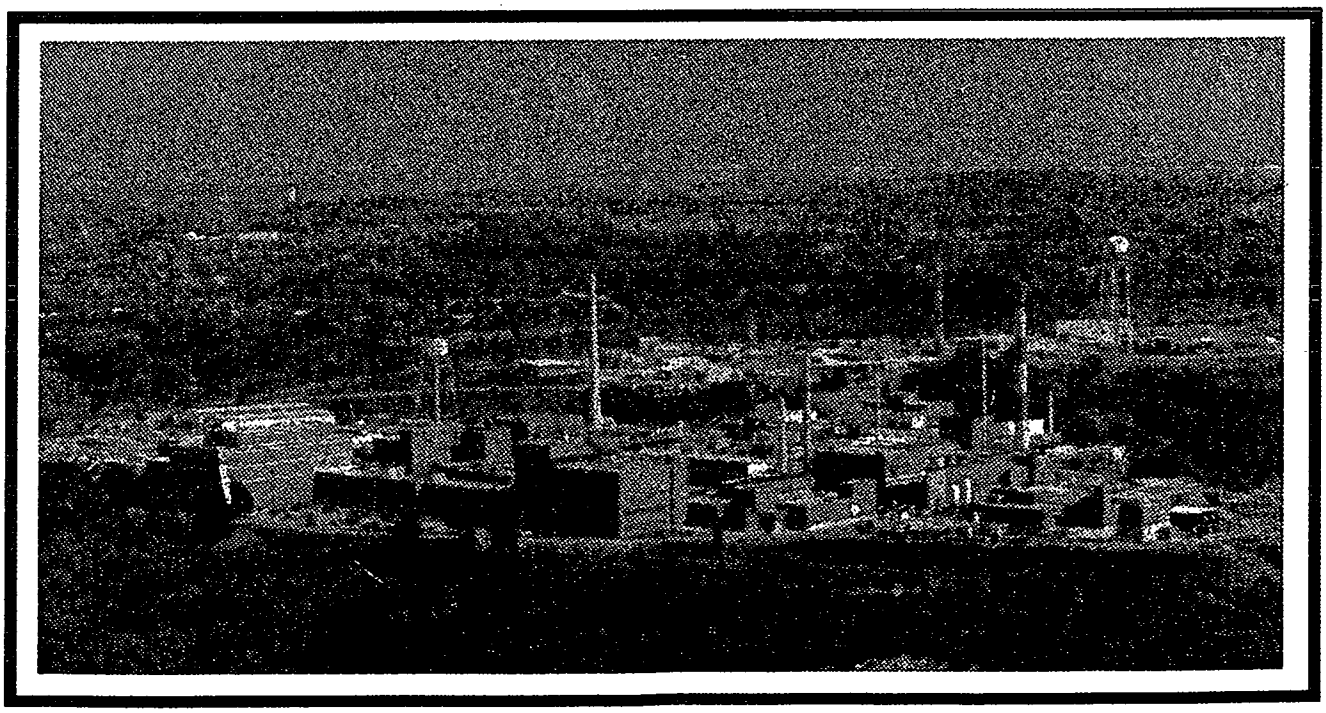
EG&G MOUND-30-03-03-02--9705080029

MOUND

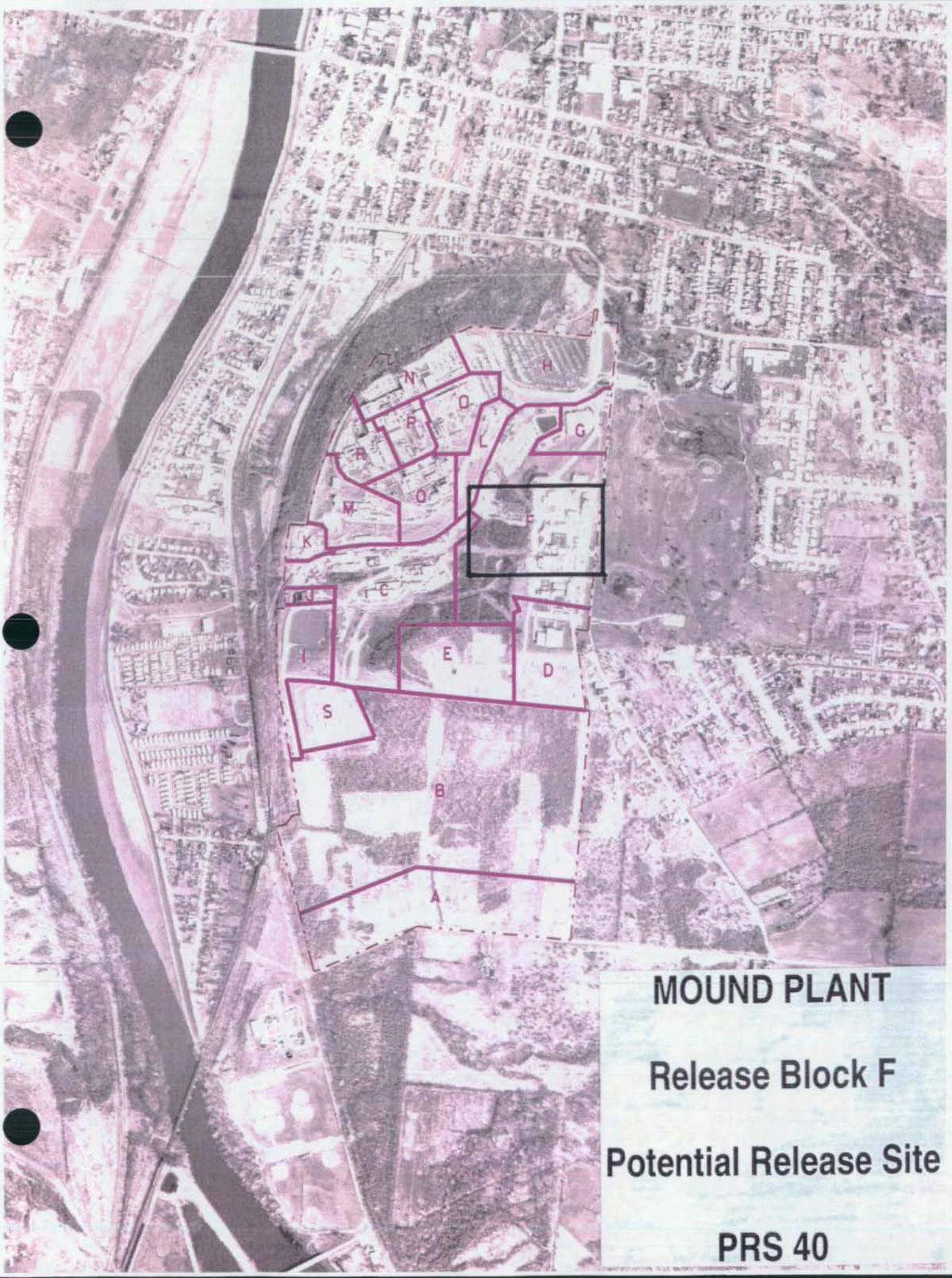
Environmental
Restoration
Program

MOUND PLANT
Potential Release Site Package
PRS # 40



PRS 40

REV	DESCRIPTION	DATE
PUBLIC RELEASE 0	Available for comments.	Mar. 19, 1997
FINAL 1		

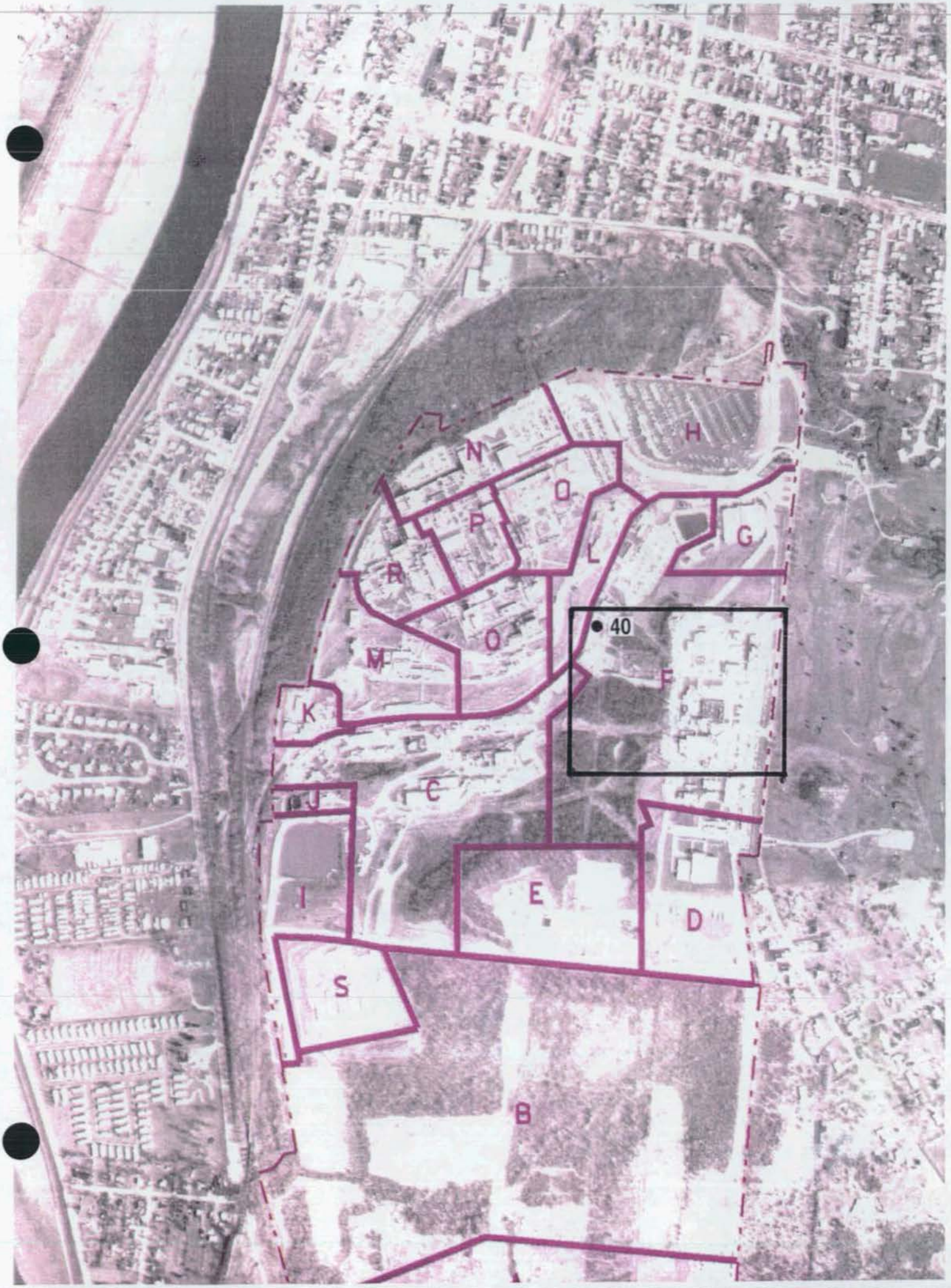


MOUND PLANT

Release Block F

Potential Release Site

PRS 40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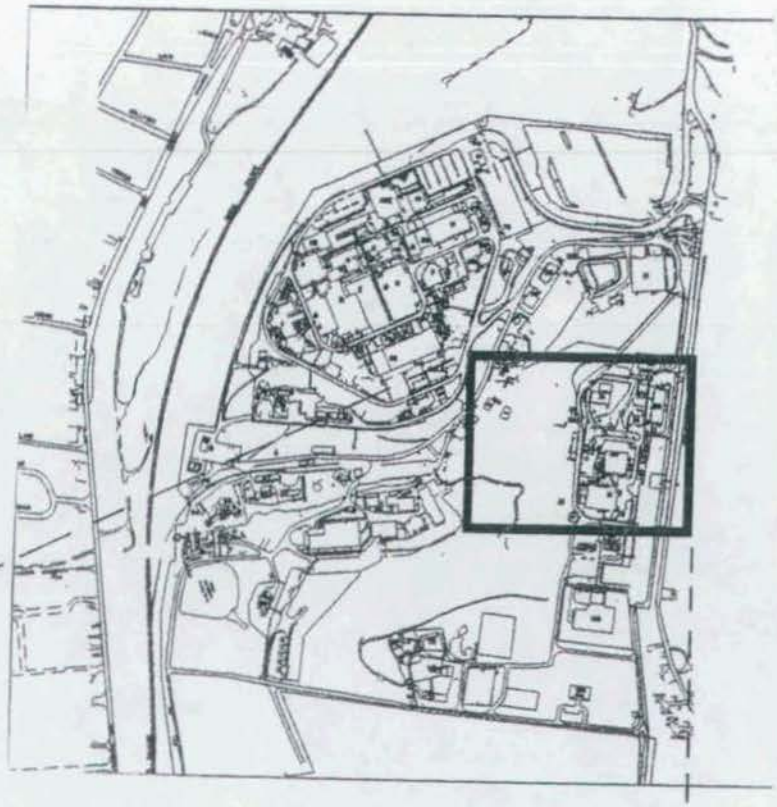
MOUND PLANT

Release Block F

Potential Release Site

PRS 40



40
NO PARKING

PRS 40

PRS HISTORY:

Potential Release Site (PRS) 40 was identified as a local area of plutonium-238 contamination as a result of an aborted construction project.[2] The area is located in the upper valley adjacent to Building 66, a small refueling facility. The contamination was discovered in 1986, apparently during routine monitoring during construction excavation. Upon discovery, the construction was reportedly abandoned and the excavation backfilled without any remedial actions. No production or storage process activities are known in this area.

CONTAMINATION:

A) In 1983-1984, the Radiological Site Survey[2] investigated radionuclides via Mound Soil Screening, radiochemistry, and gamma spectroscopy. One surface sample was collected approximately 25 feet east of PRS 40. Results showed:

Contaminant	Maximum Concentration Detected	Guideline Criteria
Plutonium-238	0.45 pCi/g (in surface soil)	25 pCi/g (Mound ALARA in surface soil)
Thorium-232	Less than 3.64 pCi/g (in surface soil)	5 pCi/g [ref 6] (in surface soil)

pCi = picocurries, g = grams, ALARA = As low as reasonably achievable

B) In 1986, during a Building 66 construction project, elevated plutonium-238 concentrations were detected. Ninety soil samples (surface and subsurface) were taken and analyzed by Mound Soil Screening for plutonium and thorium contamination. Results showed:

- The maximum plutonium-238 concentration found was seven nanocuries/gram at a depth of 4 to 6 feet and a location just northeast of Building 66.
- At least twenty of the ninety samples exceeded the Mound ALARA guideline criteria for plutonium-238 of 25 pCi/g.
- The depth at which plutonium-238 contamination was detected varied from the surface down to 12 feet (12 feet was the extent of the depth of sampling).
- The locations at which elevated plutonium concentrations (exceeding Mound ALARA) were detected was not limited to Building 66 Soils. Elevated plutonium-238 readings extended south towards Building 22.

C) In 1992, the Site Soil Gas Survey[3] investigated VOCs via soil gas and gas chromatography. Two samples (#4166 at 15 feet and #4166 at 25 feet) were taken approximately 50 feet east of PRS 40. Results showed:

Contaminant	Maximum Concentration Detected	Guideline Criteria (Calculated)
Tetrachloroethane (PCE)	44 ppb (soil gas)	3,100 ppb [5] (soil gas)
Trichloroethane (TCE)	75 ppb (soil gas)	2,400 ppb [5] (soil gas)
111 Trichloroethane (111TCE)	4 ppb (soil gas)	173,400 ppb [5] (soil gas)

ppb = parts per billion.

- Freon 11 was detected at 5 ppb and freon 113 at 18 ppb. No guideline criteria was available for these compounds.

D) In 1994, the Area 7 Investigation [4] took 11 soil samples from two boreholes (locations 13 and 14) located approximately 50 and 100 feet southeast of PRS 40. Samples were analyzed by laboratories outside of Mound for radionuclides, volatiles, semivolatiles. PCBs, pesticides, explosives and metals. Results showed:

- All radionuclides were below either the 10^{-6} Risk Based Soil Guideline Value or Mound ALARA (as low as reasonably achievable) concentrations.
- All, volatiles, semivolatiles, PCBs, pesticides, explosives and metals were below the 10^{-6} Risk Based Soil Guideline Values with the exception of the following:

Contaminant	Maximum Concentration Detected	Guideline Criteria
Beryllium	0.76 mg/kg (in soil)	0.7 mg/kg [7] (in soil)
Benzo(a)pyrene	0.89 mg/kg (in soil)	0.41 mg/kg [7] (in soil)

READING ROOM REFERENCES:

1) OU9, Site Scoping Report: Volume 12 - Site Summary, December 1994. (pages 6-8)
2) OU9, Site Scoping Report: Volume 3 - Radiological Site Survey, June 1993. (pages 9-12.10)
3) Soil Gas Survey, Reconnaissance Report, February 1993. (pages 13-15)
4) OU5 AOC Area 7 Field Report and Appendices, June 1995. (pages 16-33)
7) Risk Based Soil Guideline Values, Final, Revision 3, December 1995.

OTHER REFERENCES:

5) Soil Contaminant Concentration Calculations (A. Bray), February 1996. (pages 34-36)
6) Code of Federal Regulation, 40 CFR 192.12 and 40 CFR 192.41.

PREPARED BY:

Eric Horstman, Member of EG&G Technical Staff

MOUND PLANT
PRS 40
SOIL CONTAMINATION - BUILDING 66 PARKING LOT

RECOMMENDATION:

Potential Release Site (PRS) 40 was identified as a local area of plutonium-238 contamination found during a construction project.

Plutonium-238 has been found at concentrations of up to 7 nanocuries per gram (7,000 picocuries per gram) at a depth of 4 to 6 feet. The concentrations of plutonium-238 in the soil are above both the Mound ALARA Guideline Criteria of 25 picocuries per gram and the 10^{-4} Risk Based Guideline Value of 550 picocuries per gram. All other contaminants were detected or calculated to be at acceptable soil concentrations or below guideline criteria.

Plutonium-238 exists in the PRS 40 soils at levels presenting unacceptable risk to future construction workers. Therefore, a RESPONSE ACTION is recommended.

CONCURRENCE:

DOE/MB: Arthur W. Kleinrath 3/18/97
Arthur W. Kleinrath, Remedial Project Manager (date)

USEPA: Timothy J. Fischer 3/18/97
Timothy J. Fischer, Remedial Project Manager (date)

OEPA: Brian K. Nickel 3/18/97
Brian K. Nickel, Project Manager (date)

SUMMARY OF COMMENTS AND RESPONSES:

Comment period from _____ to _____

☐ No comments were received during the comment period.

☐ Comment responses can be found on page _____ of this package.

REFERENCE MATERIAL
PRS 40

Document Control No. _____

Environmental Restoration Program

OPERABLE UNIT 9 SITE SCOPING REPORT: VOLUME 12 – SITE SUMMARY REPORT

MOUND PLANT
MIAMISBURG, OHIO

December 1994

Final

U.S. Department of Energy
Ohio Field Office

EG&G Mound Applied Technologies

Table V.3. Potential Release Sites Currently in D&D Program and Sites Recommended for Inclusion in D&D Program

No.	Site Name	Status[a]	Historic Activities		Further Action Recommended	FFA OU
			Evidence of Release	Response Authority		
40	Building 66 Lot	Grounds	Yes	AEA	D&D	
75	Railroad Siding	Inactive	Yes	AEA	D&D	
78	Warehouse 13	Historical	Yes	AEA	D&D	
86	Building 29 Septic Tank (Tank 224)	Historical	Yes	AEA	Yes	6
90	Site Survey Project Potential Hot Spot Location S0425	Grounds	Yes	AEA	Yes	6
122	Underground Radioactive Waste Lines (Main Hill)	Inactive	Yes	AEA	Yes	6
123	Area 5, Radioactive Waste Line Break	Grounds	Yes	AEA	Yes	6
124	Building 48 Hillside	Inactive	Yes	AEA	D&D	
132	Area 15, Entombed SW Cave (Room SW 1-B)	Historical	Yes	AEA	D&D	
133	SW Building Room 1-A	Historical	Yes	AEA	D&D	
138	Room SW-137 Alpha Wastewater Sump (Tank 23)	Surplus	No	AEA	Yes	6
139	Room SW-10 Beta Wastewater Sump (Tank 226)	Inactive	No	AEA	D&D	
146	R Building Rooms 121, 144, 146 and 148 Drains	Historical	Yes	AEA	D&D	
150	Room HH-15 Beta Wastewater Sump (Tank 236)	Inactive	No	AEA	D&D	
151	Room HH-6 Alpha Wastewater Sump (Tank 237)	Historical	No	AEA	D&D	
153	Area 20, Radioactive Waste Line Break	Grounds	Yes	AEA	Yes	6
154	Area 23, Thorium Contaminated Soil	Grounds	Yes	AEA	Yes	6
155	Old Sanitary Disposal (SD) Plant (AKA Old Sanitary Wastewater Treatment Plant)	Surplus	Yes	AEA	Yes	6
156	Old SD plant Tank (Tank 205)	Surplus	Yes	AEA	Yes	6
157	Old SD plant Tank (Tank 206)	Surplus	Yes	AEA	Yes	6

Description of History and Nature of Waste Handling						Hazardous Conditions and Incidents			Environmental Data		
No.	Site Name	Location	Status	Potential Hazardous Substances	Ref	Releases	Media	Ref	Analytes[a]	Results	Ref
30	Building 27 Diesel Fuel Storage Tank (Tank 123) (AKA Building 27 Propane Tank)	G-6	Inactive	Tank is actually above ground	3				Not Applicable		
31	Underground Sanitary Sewer Line G5	H-5	In service	Organic solvents	5, 18			7, 18	3, 4, 5, 6, 10, 11, 12, 14, 16	Tables B.6, B.7, and B.8	7
32	Underground Sanitary Sewer Line G12	F-8 G-8		Plating solutions, Laboratory chemicals							
33	Underground Sanitary Sewer Line G14 EAST	H-5 H-6				Suspected, not confirmed	S	2, 7	3, 4, 5, 6, 10, 11, 12, 14, 16	Tables B.6, B.7, B.8, and B.9	7
34	Underground Sanitary Sewer Line G14 WEST	H-5 H-6		Nitric acid, Hydrochloric acid							
35	Underground Sanitary Sewer Lines G19 & G14	G-5		Methylene chloride							
36	Underground Sanitary Sewer Line G15	E-9		Strong acids and bases							
37	Building 51 Waste Solvent Storage Tank (Tank 220)	F-8	Historical	Organic solvents, Paints, Waste oils	3, 4, 5, 18	Tank Removed 1991, VOC residuals	S	4, 23	3, 4, 5, 6, 8	Tables B.6, B.7 and B.8	7, 23
38	Building 51 Waste Incinerator	F-8	Historical	Contaminants listed under Bldg. 51 Waste Solvent Storage Tank (Tank 220)	4, 5		A	4	No Data		
39	Building 51 Waste Incinerator Scrubber	F-8	Historical	Combustion products from Bldg. 51 Waste Incinerator	4, 5	Water released to plant drainage ditch	SW	4	No Data		
40	Building 66 Lot	F-8	Grounds	Plutonium-238 from unknown source	6	Plutonium-238	S	6	13	Table B.1 RSS[c] Location S0323 (Appendix E in Ref. 6)	6

ENVIRONMENTAL RESTORATION PROGRAM

OPERABLE UNIT 9, SITE SCOPING REPORT: VOLUME 3 - RADIOLOGICAL SITE SURVEY

MOUND PLANT
MIAMISBURG, OHIO

June 1993

DEPARTMENT OF ENERGY
ALBUQUERQUE FIELD OFFICE

ENVIRONMENTAL RESTORATION PROGRAM
EG&G MOUND APPLIED TECHNOLOGIES

FINAL

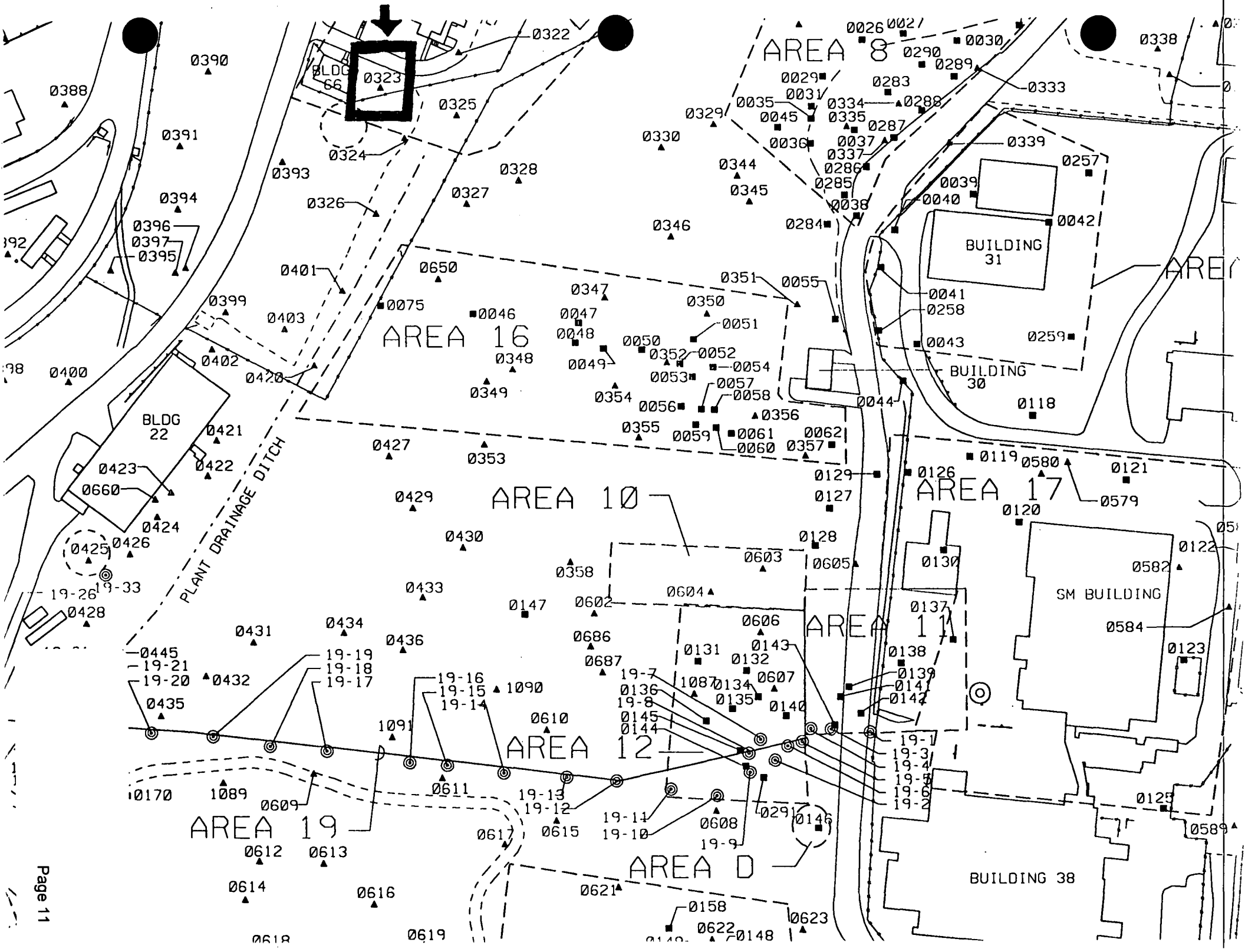
4.1.10. Building 66 Lot Site

A note in the Site Survey Project Report (Table 2.1 in Stought et al. 1988) indicated that elevated levels of plutonium-238 were discovered in an area designated as Block 33. The area of concern is actually located adjacent to Building 66 just south of Building 51 along the upper reach of the plant drainage ditch (Plate 1). This area is referred to as the Building 66 lot site in this report. The Building 66 lot site is enclosed within the boundaries of Area 7 (Plate 1). Internal Mound Plant memoranda reviewed for this report substantiate the note in the project report (Stought et al. 1988) that plutonium-238 concentrations are as high as 7 nCi/g (MRC 1986). Plutonium-238 concentrations, however, ranged widely from less than 25 pCi/g to 7 nCi/g, suggesting very spotty contamination. The data report is included in Appendix E. The levels of plutonium-238 encountered required that the construction project be abandoned at the Building 66 lot site, so the initial holes were simply backfilled and the contamination left in place.

4.1.11. Locations With Elevated Plutonium-238

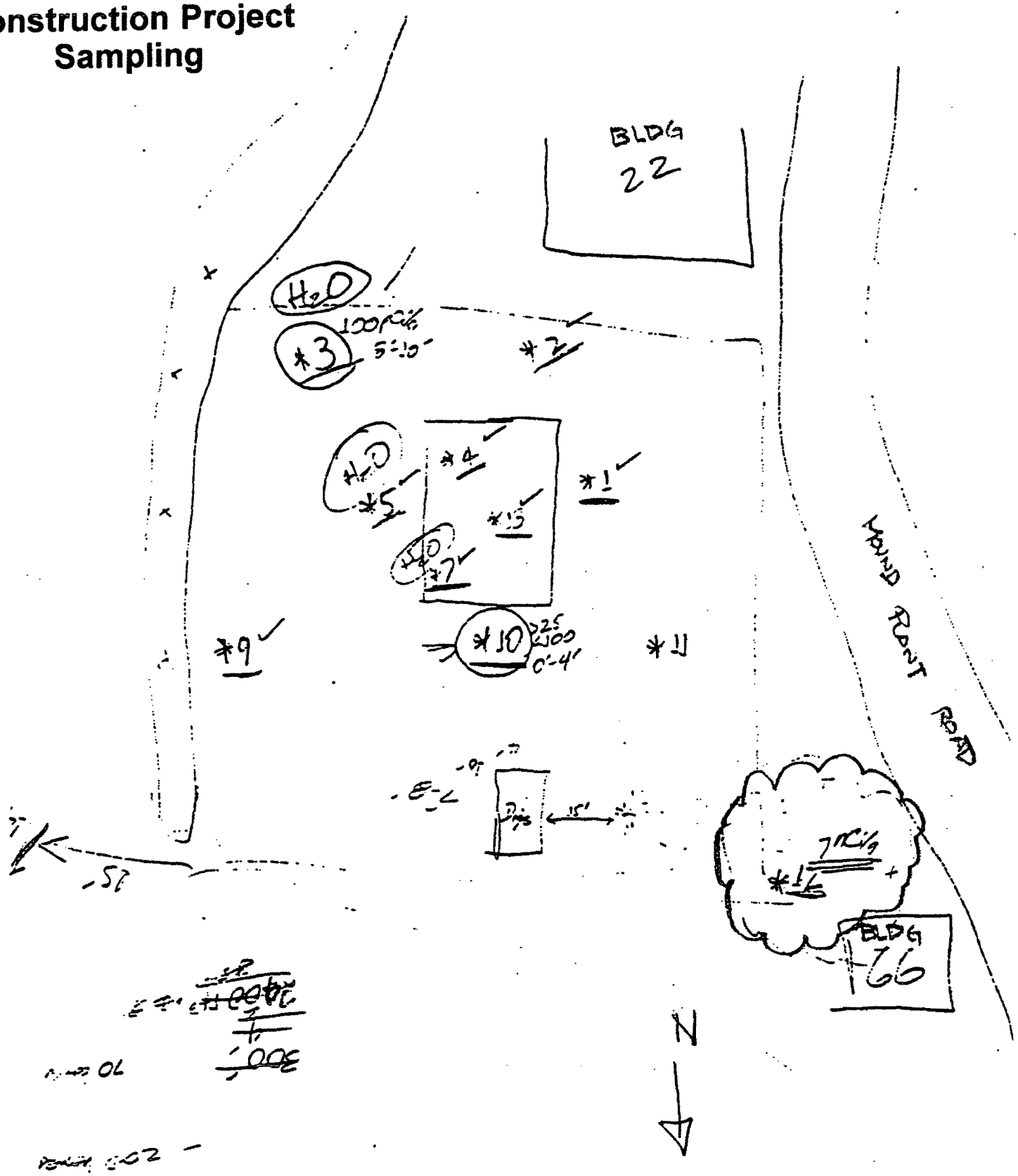
The evaluation of the Site Survey Project data for the compilation of this report indicated that three potential hot spots contained levels of plutonium-238 in excess of 25 pCi/g. These are all surface locations, numbered S0166, S0208, and S0706 on Table IV.9. These areas indicated plutonium-238 values of 34.5, 61.0, and 28.9 pCi/g, respectively. Surface location 0166 is located near the SW and R Buildings on the Main Hill; surface location 0208 is located northwest of the WD Building; and surface location 0706 is located north of the Area 1 runoff channel that goes west toward Area 2 (Plate 1). The Area 1 runoff channel is located in a ditch, and location 0706 is either on the embankment or in the woods above Area 1. The review of process history indicates that the elevated plutonium-238 activity in the three potential hot spot locations cannot be easily associated with process information. Areas 3, 4 and 4a, 7, 8, 12, and J also indicated elevated levels of plutonium-238. The elevated concentrations are not directly ascribed to process history, but may be due to spills, runoff, or other unknown processes. Descriptions of these areas are provided in companion sections of this report. Areas 3, 7, 8, and 12 are included in section 5; additional descriptions of Area 7 are provided in section 7; areas 4 and 4a are included in section 3; and Area J is described in section 10.

As with several hot spots and other local areas of contamination described in this report, elevated levels of plutonium-238 were discovered in Area 3 during routine surveys conducted during construction activities. The surveys of construction activities have been conducted routinely since 1985, required partly by the specifications for soil destined for the spoils disposal area. In August 1988, during survey of the dismantling of a portion of the sludge drying beds adjacent to the wastewater treatment facility, elevated levels of thorium and plutoniu


AREA 8
AREA 16
AREA 10
AREA 17
AREA 11
AREA 12
AREA 19
AREA D
BUILDING 31
BUILDING 30
BUILDING 38
SM BUILDING
BLDG 22
BLDG 66
PLANT DRAINAGE DITCH

Map Location[a]	Coordinates South	Coordinates West	MRC ID No.	Mo-Yr	Depth (inch)	Pu-238 (pCi/g)	Thorium[b] (pCi/g)	Tritium (pCi/mL)	Co-60 (pCi/g)	Cs-137 (pCi/g)	Ra-226 (pCi/g)	Am-241 (pCi/g)
S0323	2225	2540	5988	08-84	0	0.45[c]	3.64[c]					
S0324	2275	2540	6848	08-84	0	1.86	b					
S0325	2275	2490	6849	08-84	0	1.73	b					
S0326	2325	2590	4096	10-83	0	3.91	b					
S0327	2350	2515	6847	08-84	0	1.50	b					
S0328	2350	2465	4097	10-83	0	0.73	b		~~LDL~~	~~1.2~~	~~1.1~~	~~LDL~~
S0329	2375	2290	4098	10-83	0	15.88	b	~~1.39~~				
S0330	2375	2340	6846	08-84	0	2.02	b					
C0033	2400	1860	8349	11-84	36	0.11[c]	42.38[c]					
			8414	11-84	48	0.97[c]	20.17[c]					
C0034	2405	2010	1260	12-82	18	4.83[c]	32.20[c]					
			1261	12-82	72	0.48	9.12					
			1262	12-82	90	0.07	b					
			1263	12-82	108	0.03	b					
C0035	2405.8	2212.9	None[d]	07-84	0	NR	5.5					
			None[d]	07-84	12	NR	11					
			None[d]	07-84	24	NR	24					
			None[d]	07-84	36	NR	29					
			None[d]	07-84	48	NR	42					
			None[d]	07-84	60	NR	18					
			None[d]	07-84	72	NR	33					
			None[d]	07-84	84	NR	28					
			None[d]	07-84	96	NR	15					
			None[d]	07-84	108	NR	11					
			None[d]	07-84	120	NR	39					
			None[d]	07-84	132	NR	31					
			None[d]	07-84	144	NR	15					

Building 66 Construction Project Sampling



SOIL SCREENING FACILITY BUILDING 30
MRC MOUND
WELL A

SAMPLE TYPE CONT
SAMPLE CONDITION WET
DATE SCREENED 10/07/86
DATE COLLECTED 10/07/86
SAMPLER NAME & HP D. BROWN [redacted]

REC. NO.	SAMPLE NUMBER	GRAMS	WEIGHT FACTOR	GROSS CTS TH-232	GROSS CTS PU-238	TH 232 pCi/g	PU 238 pCi/g	GRID & SAMPLE LOCATION
7	13524	300	0.167	1370	2097	1.4	231	BEHIND BLDG 66 #2
8	13526	300	0.167	1552	4968	1.6	575	BEHIND BLDG 66 #5

ALL BUILDING 66
CONSTRUCTION PROJECT DATA
FROM OU9 VOL 3, APPENDIX E

PREPARED BY : TROY J. PLANSON III

ALL SOIL SAMPLE ARE RAN FOR 400 SEC UNLESS SPECIFIED

SOIL SCREENING FACILITY BUILDING 30
ARC MOUND
WELL A

SAMPLE TYPE CORE
SAMPLE CONDITION WET
DATE SCREENED 10/09/88
DATE COLLECTED 10/09/88
SAMPLER NAME & HF D. BROWN [redacted]

REC. NO.	SAMPLE NUMBER	GRAMS	WEIGHT FACTOR	GROSS CTS TH-232	GROSS CTS PB-238	TH 232 pCi/g	PB 238 pCi/g	GRID & SAMPLE LOCATION
31	13568	300	0.167	390	455	0.9	0	CORE BLDG 66 12 SURFACE
32	13569	300	0.167	370	414	0.4	-5	CORE BLDG 66 12 2
33	13570	300	0.167	662	476	0.4	-4	CORE BLDG 66 12 4'
34	13575	300	0.167	721	569	0.5	10	CORE BLDG 66 HOLE 7 0'-2'
35	13576	300	0.167	806	577	0.6	9	CORE BLDG 66 HOLE 7 2'-4'
36	13577	300	0.167	926	606	0.8	10	CORE BLDG 66 HOLE 7 4 -6
37	13578	300	0.167	421	457	0.1	0	CORE BLDG 66 HOLE 7 6'-8
38	13579	300	0.167	977	502	0.8	2	CORE BLDG 66 HOLE 7 8 -10
39	13580	300	0.167	876	593	0.7	9	CORE BLDG 66 HOLE 10 -12
40	13787	300	0.167	943	543	0.8	0	BURN AREA DUMPSTER

PREPARED BY : IRO J. PEARSON III

ALL SOIL SAMPLE ARE RAN FOR 400 SEC UNLESS SPECIFIE
OTHERWISE NOTED

SOIL SCREENING FACILITY BUILDING 30
MRC MOUND
WELL A

SAMPLE TYPE CORE
SAMPLE CONDITION WET
DATE SCREENED 10/13/86
DATE COLLECTED 10/10/86
SAMPLER NAME & HP D. BROWN [redacted]

REC. NO.	SAMPLE NUMBER	GRAMS	WEIGHT FACTOR	GROSS CTS TH-232	GROSS CTS PU-238	TH 232 pCi/g	PU 238 pCi/g	GRID & SAMPLE LOCATION
22	13657	300	0.167	1070	600	1.0	5	CORE BLDG 66 #4 0-2
23	13658	300	0.167	1219	608	1.2	3	CORE BLDG 66 #4 2 -4
24	13659	300	0.167	665	524	0.4	4	CORE BLDG 66 #4 4 -6
25	13660	300	0.167	998	593	0.9	6	CORE BLDG 66 #4 6 -8
26	13661	300	0.167	918	584	0.8	7	CORE BLDG 66 #4 8 -10
27	13662	300	0.167	551	562	0.3	13	CORE BLDG 66 #4 10 -12
28	13663	300	0.167	1053	636	1.0	11	CORE BLDG 66 #5 0-2
29	13664	300	0.167	1219	657	1.2	10	CORE BLDG 66 #5 2 -4
30	13665	300	0.167	805	506	0.6	-2	CORE BLDG 66 #5 4 -6
31	13666	300	0.167	721	508	0.5	0	CORE BLDG 66 #5 6 -8
32	13667	300	0.167	893	512	0.6	-1	CORE BLDG 66 #5 8 -10
33	13668	300	0.167	1026	970	0.9	64	CORE BLDG 66 #5 10 -12

PREPARED BY : TROY J. PEARSON III

ALL SOIL SAMPLE ARE RAN FOR 400 SEC UNLESS SPECIFIED
THIS REPORT .

SOIL SCREENING FACILITY BUILDING 30
MRC MOUND
WELL A

SAMPLE TYPE CORE
SAMPLE CONDITION WET
DATE SCREENED 10/10/86
DATE COLLECTED 10/09/86
SAMPLER NAME & HP D. BROWN [redacted]

REC. NO.	SAMPLE NUMBER	GRAMS	WEIGHT FACTOR	GROSS CTS TH-232	GROSS CTS PU-238	TH 232 pCi/g	PU 238 pCi/g	GRID & SAMPLE LOCATION
41	13587	300	0.167	837	1055	0.7	83	CORE BLDG 66 10 0-2'
42	13588	300	0.167	766	769	0.6	40	CORE BLDG 66 10 2-4
43	13589	300	0.167	1454	694	1.5	10	CORE BLDG 66 10 4-6
44	13590	300	0.167	981	769	0.9	34	CORE BLDG 66 10 6-8
45	13591	300	0.167	597	491	0.3	1	CORE BLDG 66 10 8'-10
46	13592	300	0.167	774	541	0.6	4	CORE BLDG 66 10 10-12
48	13599	300	0.167	1058	608	1.0	7	CORE BLDG 66 1 0-2'
49	13600	300	0.167	1058	636	1.0	11	CORE BLDG 66 1 2'-4
50	13601	300	0.167	874	600	0.7	10	CORE BLDG 66 1 4'-6'
51	13602	300	0.167	1353	758	1.4	23	CORE BLDG 66 1 6-8
52	13603	300	0.167	571	526	0.3	7	CORE BLDG 66 1 8'-10
53	13604	300	0.167	843	589	0.7	9	CORE BLDG 66 1 10-12

PREPARED BY : TROY J. PEARSON III

ALL SOIL SAMPLE ARE RAN FOR 400 SEC UNLESS SPECIFIED

SOIL SCREENING FACILITY BUILDING 30
MRC MOUND
WELL B

SAMPLE TYPE CONT
SAMPLE CONDITION WET
DATE SCREENED 10/07/86
DATE COLLECTED 10/07/86
SAMPLER NAME & HP D. BROWN [redacted]

REC. NO.	SAMPLE NUMBER	GRAMS	WEIGHT FACTOR	GROSS CTS TH-232	GROSS CTS PU-238	TH 232 pCi/g	PU 238 pCi/g	GRID & SAMPLE LOCATION
9	13523	300	0.167	1458	1254	1.3	70	BEHIND BLDG 66 #1
10	13526	300	0.167	1832	5377	1.7	642	BEHIND BLDG 66 #4
11	13527	300	0.167	1405	4415	1.2	514	BEHIND BLDG 66 #3

PREPARED BY : LARRY J. PEARSON III

ALL SOIL SAMPLE ARE RAN FOR 400 SEC UNLESS SPECIFI
THIS REPORT .

SOIL SCREENING FACILITY BUILDING 30
HRC MOUND
WELL B

SAMPLE TYPE CORE
SAMPLE CONDITION WET
DATE SCREENED 10/04/96
DATE COLLECTED 10/09/96
SAMPLER NAME & HP D. BROWN [redacted]

REC. NO.	SAMPLE NUMBER	GRAMS	WEIGHT FACTOR	GROSS CTS TH-232	GROSS CTS PU-239	TH 232 pCi/g	PU 239 pCi/g	GRID & SAMPLE LOCATION
33	13571	300	0.167	926	49117	0.6	6812	CORE BLDG 66 12 6 4' TO 6'
34	13572	300	0.167	1315	797	1.1	0	CORE BLDG 66 12 8 6' TO 8'
35	13573	300	0.167	1057	1033	0.8	40	CORE BLDG 66 12 10 8' TO 10'
36	13574	300	0.167	832	702	0.5	-2	CORE BLDG 66 12 12 10' TO 12
37	13581	300	0.167	711	640	0.3	-8	CORE BLDG 66 HOLE 7 0 -2'
38	13582	300	0.167	1647	894	1.5	6	CORE BLDG 66 HOLE 7 2 -4
39	13583	300	0.167	1165	770	0.9	-1	CORE BLDG 66 HOLE 7 4 -6'
40	13584	300	0.167	798	663	0.5	-7	CORE BLDG 66 HOLE 7 6 -8'
41	13585	300	0.167	1187	728	0.9	-7	CORE BLDG 66 HOLE 7 8 -10
42	13586	300	0.167	1175	781	0.9	1	CORE BLDG 66 HOLE 7 10 -12

PREPARED BY : TROY J. PEARSON III

ALL SOIL SAMPLE ARE RAN FOR 400 SEC UNLESS SPECIFIED
THIS REPORT .

SOIL SCREENING FACILITY BUILDING 30
MRC MOUND
WELL B

SAMPLE TYPE CORE
SAMPLE CONDITION WET
DATE SCREENED 10/10/88
DATE COLLECTED 10/09/88
SAMPLER NAME & HP D. BROWN [redacted]

REC. NO.	SAMPLE NUMBER	GRAMS	WEIGHT FACTOR	GROSS CTS TH-232	GROSS CTS PB-238	TH 232 pCi/g	PB 238 pCi/g	GRID & SAMPLE LOCATION
43	13593	300	0.167	1209	837	1.0	8	CORE BLDG 66 9 0-2
44	13594	300	0.167	1014	805	0.7	8	CORE BLDG 66 9 2 -4
45	13595	300	0.167	1106	818	0.8	2	CORE BLDG 66 9 4 -6
46	13596	300	0.167	1095	787	0.8	3	CORE BLDG 66 9 6 -8
47	13597	300	0.167	822	701	0.5	-2	CORE BLDG 66 9 8 -10
48	13598	300	0.167	1313	851	1.1	7	CORE BLDG 66 9 10 -12
49	13605	300	0.167	904	711	0.6	-3	CORE BLDG 66 13 0-2
50	13606	300	0.167	937	682	0.6	-8	CORE BLDG 66 13 2 -4
51	13607	300	0.167	937	638	0.6	-14	CORE BLDG 66 13 4 -6
52	13608	300	0.167	777	654	0.4	-8	CORE BLDG 66 13 6 -8
53	13609	300	0.167	816	679	0.5	-5	CORE BLDG 66 13 8 -10
54	13610	300	0.167	1176	830	0.9	8	CORE BLDG 66 13 10 -12

PREPARED BY : TROY J. PEARSON III

ALL SOIL SAMPLE ARE RAN FOR 400 SEC UNLESS SPECIF

SOIL SCREENING FACILITY BUILDING 30
HRC MOUND
WELL B

SAMPLE TYPE CONT
SAMPLE CONDITION WET
DATE SCREENED 10/13/86
DATE COLLECTED 10/10/86
SAMPLER NAME & HF D. BROWN [redacted]

REC. NO.	SAMPLE NUMBER	GRAMS	WEIGHT FACTOR	GROSS CTS TH-232	GROSS CTS PU-238	TH 232 pCi/g	PU 238 pCi/g	GRID & SAMPLE LOCATION
81	13669	300	0.167	1360	748	1.1	-8	CORE BLDG 66 #2 0-2
82	13670	300	0.167	948	653	0.6	-12	CORE BLDG 66 #2 2 -4
84	13671	300	0.167	1161	770	0.9	-1	CORE BLDG 66 #2 4 -6
85	13672	300	0.167	782	643	0.4	-10	CORE BLDG 66 #2 6 -8
86	13673	300	0.167	873	651	0.5	-11	CORE BLDG 66 #2 8 -10
87	13674	300	0.167	1157	819	0.9	7	CORE BLDG 66 #2 10 -12
88	13675	300	0.167	1320	801	1.1	0	CORE BLDG 66 #3 0-2
89	13676	300	0.167	907	779	0.6	7	CORE BLDG 66 #3 2 -4
90	13677	300	0.167	1246	739	1.0	-7	CORE BLDG 66 #3 4 -6
91	13678	300	0.167	1111	1190	0.8	61	CORE BLDG 66 #3 6 -8
92	13679	300	0.167	1189	1489	0.9	102	CORE BLDG 66 #3 8 -10
93	13680	300	0.167	1093	1066	0.8	45	CORE BLDG 66 #3 10 -12

PREPARED BY : TROY J. PEARSON III

ALL SOIL SAMPLE ARE RAN FOR 400 SEC UNLESS SPECIFIED IN THIS REPORT .

SOIL SCREENING FACILITY BUILDING 30
MRC MOUND
WELL A & B

SAMPLE TYPE CONT
SAMPLE CONDITION WET
DATE SCREENED 07/21/87
DATE COLLECTED 07/20/87
SAMPLER NAME & #: [redacted]

A	16541	300	0.167	1512	16181	2.1	1647	W2550	S2225	#11	
A	16542	300	0.167	567	522	0.7	[illegible]	W2550	S2225	#10	
A	16544	300	0.167	1056	981	1.3	[illegible]	W2550	S2225	[illegible]	
A	16545	300	0.167	1129	882	1.5	[illegible]	W2550	S2225	[illegible]	
A	16546	300	0.167	957	750	1.2	[illegible]	W2550	S2225	[illegible]	
A	16547	300	0.167	1129	776	1.4	[illegible]	W2550	S2225	[illegible]	
A	16548	300	0.167	1054	4075	1.3	1424	W2550	S2225	[illegible]	
A	16560	300	0.167	1072	474	1.0	[illegible]	W2550	S2225	[illegible]	S2225
A	16561	300	0.167	1072	882	1.4	[illegible]	W2550	S2225	[illegible]	S2225
A	16562	300	0.167	575	592	1.0	[illegible]	[illegible]	[illegible]	[illegible]	
A	16563	300	0.167	756	337	0.4	[illegible]	[illegible]	[illegible]	[illegible]	
A	16564	300	0.167	474	594	0.7	[illegible]	[illegible]	[illegible]	[illegible]	
A	16565	300	0.167	474	592	1.0	[illegible]	[illegible]	[illegible]	[illegible]	
A	16566	300	0.167	594	594	1.0	[illegible]	[illegible]	[illegible]	[illegible]	
A	16567	300	0.167	837	547	0.7	[illegible]	[illegible]	[illegible]	[illegible]	
A	16572	300	0.167	1417	838	1.0	[illegible]	W2550	S2225	[illegible]	S2225
A	16573	300	0.167	972	502	1.1	[illegible]	W2550	S2225	[illegible]	S2225

ALTHOUGH NOT LEGIBLE THIS COLUMN CLEARLY SHOWS THAT A NUMBER OF SAMPLES EXCEED MOUND ALARA FOR PLUTONIUM

PREPARED BY: [illegible]

ALL SOIL SAMPLE ARE RAN FOR 400 SEC UNLESS SPECIFIED IN THIS REPORT .

ENVIRONMENTAL RESTORATION PROGRAM

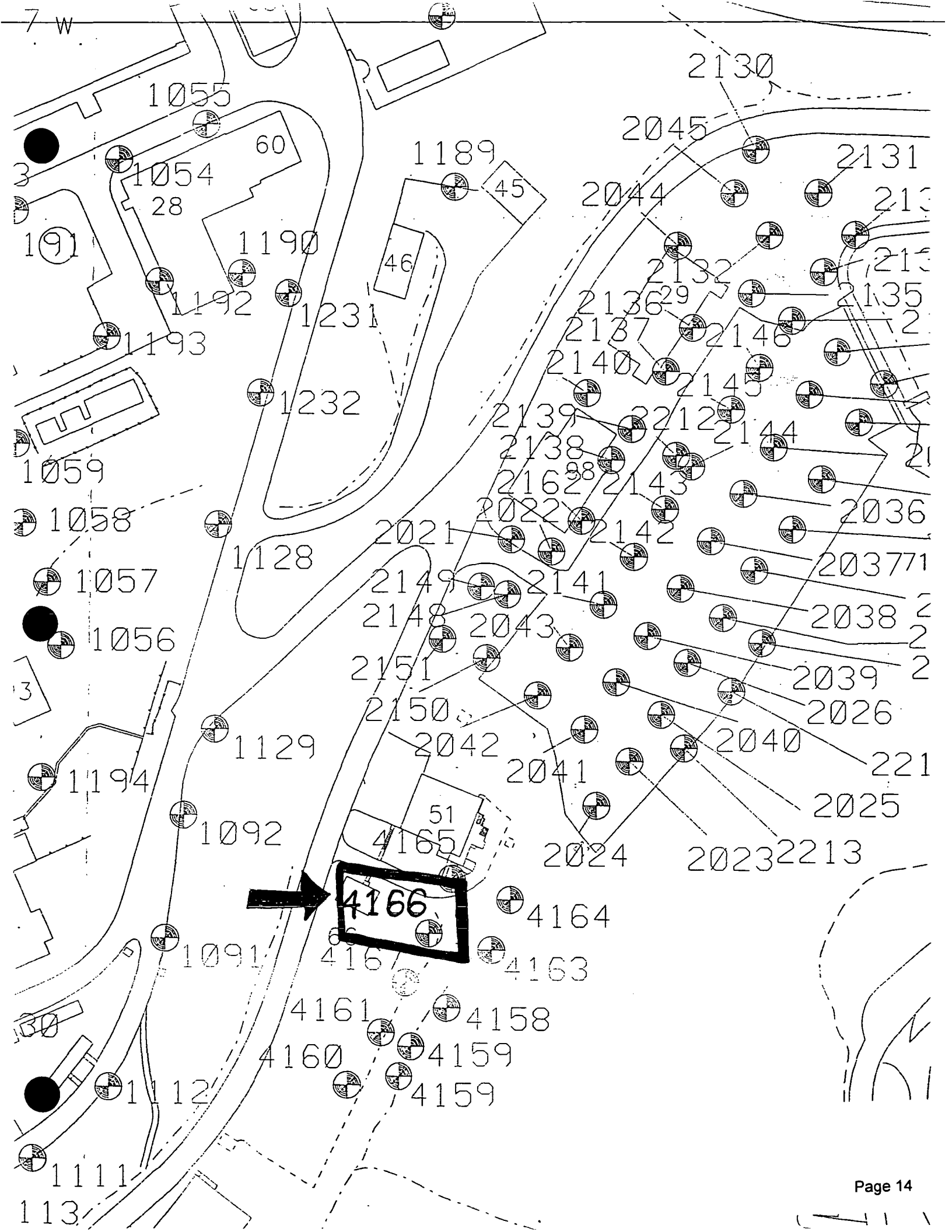
SOIL GAS SURVEY AND GEOPHYSICAL INVESTIGATIONS MAIN HILL AND SM/PP HILL AREAS RECONNAISSANCE SAMPLING

MOUND PLANT
MIAMISBURG, OHIO

February 1993

DEPARTMENT OF ENERGY
ALBUQUERQUE OFFICE

ENVIRONMENTAL RESTORATION PROGRAM
EG&G MOUND APPLIED TECHNOLOGIES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221
2025
2024
2023
2213

15 foot depth

TABLE II.8. SUMMARY OF POSITIVE DETECTIONS – BUILDING 51
(ppb)

SAMPLE ID	SAMPLE DATE	FREON 11	FREON 113	TRAN–12DCE	CIS–12DCE	111TCA	PCE	TCE	TOLUENE
MND–01–4157–0025w	28 AUG 92	---	---	---	---	---	---	---	0.2 *
MND–01–4160–0015	29 AUG 92	---	---	---	8	---	---	---	37 *
MND–01–4160–0025w	30 AUG 92	---	---	---	---	---	---	---	0.23
MND–01–4161–0015	29 AUG 92	---	---	---	---	---	---	9	8 *
MND–01–4161–1025	29 AUG 92	---	---	---	---	---	7	19	---
MND–01–4166–0015	31 AUG 92	5	9	---	---	---	44	75	---
MND–01–4166–0025	31 AUG 92	---	18	---	---	4	44	56	---
MND–01–4167–0015	31 AUG 92	89	---	---	18	37	44	207	6 *
MND–01–4167–0025	31 AUG 92	36	---	---	---	11	---	169	8 *

Notes:

Only sample locations having positive detections are shown.
*: Associated trip, ambient, equipment or field blank contained specified compound.
B: Indicates blank sample.
w: Indicates water sample.

25 foot depth

Environmental Restoration Program

OPERABLE UNIT 5
OPERATIONAL AREA PHASE I INVESTIGATION
AREA 7 FIELD REPORT

MOUND PLANT
MIAMISBURG, OHIO

VOLUME I - TEXT

June 1995

Final (Revision 0)

U.S. Department of Energy
Ohio Field Office

EG&G Mound Applied Technologies

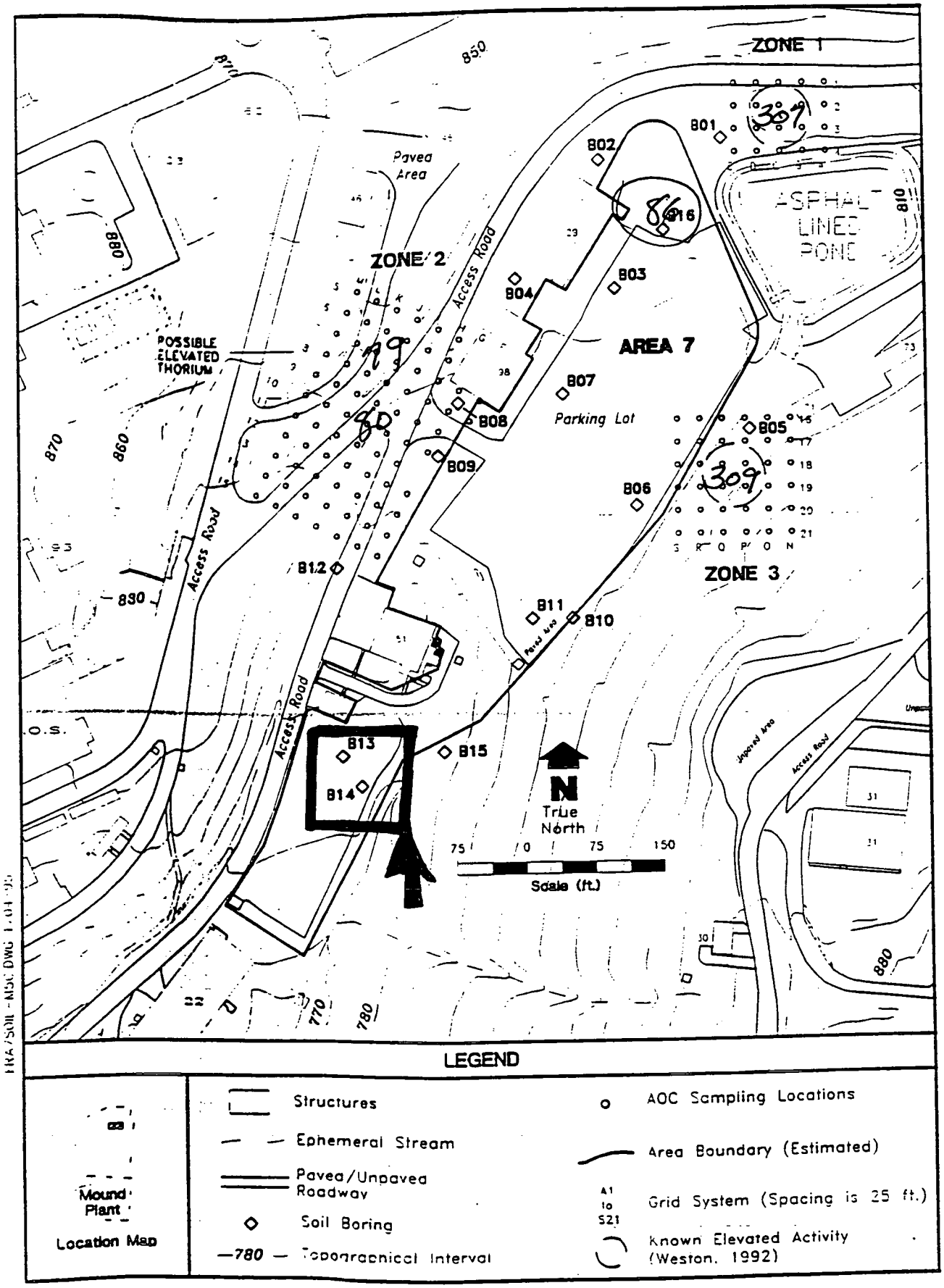

Figure 2.1. Data Collection Points for Area 7 Phase 1 and Phase 2 Investigations

Environmental Restoration Program

OPERABLE UNIT 5
OPERATIONAL AREA PHASE I INVESTIGATION
AREA 7 FIELD REPORT

MOUND PLANT
MIAMISBURG, OHIO

VOLUME II - APPENDICES A-G

June 1995

Final (Revision 0)

U.S. Department of Energy
Ohio Field Office

EG&G Mound Applied Technologies

APPENDIX C

RADIOLOGICAL DATA (MOUND SOIL SCREENING FACILITY DATA)

FOR AREA 7 SOIL BORINGS

		SOIL BORINGS (B01 - B16)			
		MOUND SOIL SCREENING FACILITY DATA			
SOIL	Sample Depth[b]	Plutonium - 238		Thorium - 232	
BORING		Units: pCi/g		Units: pCi/g	
		RESULTS	Note:	RESULTS	Note:
B09	6 inches	6		0.2	
	2	19		1.6	
	2-4	19		1.8	
	5-12	18		1.2	
	12-20	0		0.8	
	20-26	0		0.5	
	26-34	0		0.8	
B10	6 inches	22		1.4	
	2	26	a	1.7	
	2-10	27	a	1.0	
	10-13.5	13		1.2	
B11	6 inches	11		0.4	
	2	13		0.7	
	2-10	17		1.1	
	10-15	13		2.0	a
	15-20	21		1.9	
B12	6 inches	4		0.2	
	2	4		0.5	
	6-10	14		1.0	
	12-21	22		1.0	
B13	6 inches	0		0.2	
	2	24		0.5	
	4-6	0		0.5	
	6-8	18		0.9	
	8-10	0		0.6	
	10-12	24		0.7	
	12-14	20		1.0	
	14-16	23		0.5	
	20-25	21		1.5	
	25-30	0		0.8	
	32-34	20		0.7	
B14	6 inches	0		0.2	
	2	0		0.3	
	12-18	31	a	1.0	
	20-22	21		1.2	
	24-30	36	a	1.7	
B15	6 inches	23		0.8	
	2	24		1.1	
	2-6	4		1.3	
	6-10	16		1.3	

a - Mound Soil Screening Facility detection level exceeded.

b - Sample depths are recorded in feet unless otherwise denoted.

CPM - Counts per Minute

KCPM - Counts per Minute X 1000

pCi/g - Picocuries per gram

APPENDIX F.1 Tables of Validated Detected Analytes in Soil and Groundwater

Table F.1.1 Radionuclides in Surface Soil Samples from Area 7 Soil Borings

	B09	B10	B11	B12
	Value	Value	Value	Value
RADIONUCLIDES (pCi/g)				
K-40	13.82	19.85	12.04	ND
Pu-238	0.16	0.180 J	0.280 J	ND
Pu-239/40	ND	ND	ND	ND
Ra-226	0.36	0.49	0.54	0.4
Th-232	0.130 J	0.360 J	0.130 J	ND
Tritium	9.5	ND	2.6	ND
U-234	0.440 J	0.76	0.56	0.43
U-235	ND	ND	ND	ND
U-238	0.440 J	0.860 J	0.540 J	0.440 J

	B13	B14	B15	B16
	Value	Value	Value	Value
RADIONUCLIDES (pCi/g)				
K-40	ND	ND	15.910 J	17.9
Pu-238	0.120 J	ND	0.650 J	0.43
Ra-226	ND	0.36	0.52	0.83
Th-228	0.37	0.64	ND	0.880 J
Th-230	0.25	0.68	0.36	0.680 J
Th-232	0.05	0.09	0.350 J	0.580 J
U-234	0.35	0.350 J	0.68	0.65
U-235	ND	ND	0.07	0.05
U-238	0.39	0.320 J	0.670 J	0.78

All samples collected 0-2 feet below ground surface
pCi/g - picocuries per gram
J - estimated
ND - not detected

APPENDIX F.1 Tables of Validated Detected Analytes in Soil and Groundwater

TABLE F.1.2 Radionuclides in Subsurface Soil Samples from Area 7 Soil Borings

	B13				B14			
	MINIMUM		MAXIMUM		MINIMUM		MAXIMUM	
	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)
RADIONUCLIDES (pCi/g)								
K-40	10.660	25.0-28.0	18.860	5.0-10.0	12.080	25.0-30.0	18.880	12.0-18.0
Pu-238	0.150	5.0-10.0	0.250	20.0-25.0	0.610	12.0-18.0	2.980	25.0-30.0
Pu-239/40	ND	NA	ND	NA	0.270	25.0-30.0	0.270	25.0-30.0
Ra-226	0.400	20.0-25.0	0.570	25.0-28.0	0.510	12.0-18.0	0.640	25.0-30.0
Th-228	0.500 J	25.0-28.0	1.010	10.0-16.0	0.510	12.0-18.0	1.480 J	25.0-30.0
Th-230	0.120 J	25.0-28.0	0.440	10.0-16.0	0.100	12.0-18.0	1.140 J	25.0-30.0
Th-232	0.050 J	20.0-25.0	0.350	10.0-16.0	0.240	25.0-30.0	0.740 J	25.0-30.0
U-234	0.540	10.0-16.0	0.680 J	5.0-10.0	0.510 J	12.0-18.0	0.840 J	25.0-30.0
U-235	ND	NA	ND	NA	0.040 J	12.0-18.0	0.040 J	12.0-18.0
U-238	0.500	10.0-16.0	0.830	25.0-28.0	0.520 J	12.0-18.0	0.880 J	25.0-30.0

	B15				B16			
	MINIMUM		MAXIMUM		MINIMUM		MAXIMUM	
	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)
RADIONUCLIDES (pCi/g)								
Ac-227	ND	NA	ND	NA	8.880	10.0-12.0	44.680	15.0-18.0
Cs-137	ND	NA	ND	NA	0.110	5.0-7.0	0.110	5.0-7.0
K-40	12.580 J	6.0-10.0	27.980 J	10.0-16.0	9.490	10.0-12.0	16.670	5.0-7.0
Pu-238	0.460	2.0-6.0	0.460	2.0-6.0	0.100	5.0-7.0	0.100	5.0-7.0
Pu-239/40	0.040	2.0-6.0	0.040	2.0-6.0	ND	NA	ND	NA
Ra-226	0.700	10.0-16.0	0.700	10.0-16.0	0.370	20.0-24.0	1.290	15.0-18.0
Th-228	ND		ND		0.590	15.0-18.0	2.440 J	5.0-7.0
Th-230	0.300	2.0-6.0	0.740 J	6.0-10.0	0.030 J	26.0-30.0	0.280 J	5.0-7.0
Th-232	0.060 J	2.0-6.0	0.630 J	10.0-16.0	0.080 J	26.0-30.0	1.590 J	5.0-7.0
U-234	0.470	6.0-10.0	0.710	10.0-16.0	0.500	20.0-24.0	1.950 J	5.0-7.0
U-235	ND		ND		0.060	20.0-24.0	0.060	20.0-24.0
U-238	0.530 J	2.0-6.0	0.990 J	10.0-16.0	0.460 J	20.0-24.0	2.070 J	5.0-7.0

pCi/g - picocuries per gram
J - estimated
ND - not detected
NA - not applicable
NS - not sampled
ft BGS - feet below ground surface

APPENDIX F.1 Tables of Validated Detected Analytes in Soil and Groundwater

Table F.1.3 Organic Compounds in Surface Soil Samples From Area 7 Soil Borings

	B13	B14	B15	B16
	Value	Value	Value	Value
PESTICIDES/PCBs (µg/kg)				
alpha-Chlordane	3.100 J	0.690 J	ND	ND
Aroclor-1248	210	ND	ND	ND
Aroclor-1254	ND	ND	38.000 J	ND
delta-BHC	0.160 J	ND	ND	ND
Dieldrin	ND	ND	0.960 J	ND
Endosulfan Sulfate	0.810 J	1.400 J	ND	ND
Endrin	ND	1.600 J	ND	ND
Endrin Aldehyde	ND	ND	ND	ND
Endrin Ketone	0.420 J	ND	ND	ND
gamma-BHC (Lindane)	0.220 J	ND	ND	ND
gamma-Chlordane	0.490 J	0.160 J	ND	ND
Heptachlor Epoxide	0.360 J	ND	0.180 J	ND
p,p'-Methoxychlor	ND	7.000 J	ND	ND

APPENDIX F.1 Tables of Validated Detected Analytes in Soil and Groundwater

Table F.1.3 Organic Compounds in Surface Soil Samples From Area 7 Soil Borings

	B13	B14	B15	B16
	Value	Value	Value	Value
SEMI-VOLATILE ORGANICS (µg/kg)				
2-Methylnaphthalene	120.000 J	93.000 J	ND	ND
Acenaphthene	110.000 J	140.000 J	360.000 J	ND
Acenaphthylene	ND	ND	ND	ND
Anthracene	210.000 J	140.000 J	270.000 J	ND
Benzo(a)anthracene	600	530	1000.000 J	ND
Benzo(a)pyrene	580	500	840.000 J	ND
Benzo(b)fluoranthene	980.000 J	1000	1900.000 J	ND
Benzo(g,h,i)perylene	150.000 J	110.000 J	160.000 J	ND
Benzo(k)fluoranthene	1500.000 J	1600	3000.000 J	ND
Benzoic Acid	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ND	2800	ND	ND
Butylbenzylphthalate	ND	53.000 J	ND	ND
Carbazole	120.000 J	110.000 J	220.000 J	ND
Chrysene	630	480	970.000 J	ND
Di-n-butylphthalate	ND	ND	55.000 J	ND
Dibenzo(a,h)anthracene	ND	ND	160.000 J	ND
Dibenzofuran	63.000 J	57.000 J	130.000 J	ND
Fluoranthene	1400	1200	2200.000 J	ND
Fluorene	96.000 J	98.000 J	260.000 J	ND
Indeno(1,2,3-c,d)pyrene	210.000 J	180.000 J	530.000 J	ND
Naphthalene	ND	40.000 J	91.000 J	ND
Phenanthrene	1100	800	2200.000 J	ND
Pyrene	1100	780	1600.000 J	ND
VOLATILE ORGANICS (µg/kg)				
Acetone	10.000 J	ND	ND	ND
Hexane	ND	2.000 J	ND	ND

All samples collected 0-2 feet below ground surface
µg/kg - microgram per kilogram
J - estimated
ND - not detected

APPENDIX F.1 Tables of Validated Detected Analytes in Soil and Groundwater

Table F.1.4 Organic Compounds in Subsurface Soil Samples from Area 7 Soil Borings

	B13				B14			
	MINIMUM		MAXIMUM		MINIMUM		MAXIMUM	
	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)
EXPLOSIVES (µg/kg)								
HMX	0.720 J	10.0-16.0	0.720 J	10.0-16.0	ND	NA	ND	NA
RDX	0.770 J	10.0-16.0	0.770 J	10.0-16.0	ND	NA	ND	NA
PESTICIDES/PCB's (µg/kg)								
4,4'-DDT	0.190 J	5.0-10.0	0.190 J	5.0-10.0	ND	NA	ND	NA
alpha-Chlordane	1.400 J	5.0-10.0	1.400 J	5.0-10.0	ND	NA	ND	NA
Aroclor-1253	ND	NA	ND	NA	200.000	25.0-30.0	270.000	25.0-30.0
Aroclor-1254	110.000	5.0-10.0	110.000	5.0-10.0	79.000	12.0-18.0	540.000	25.0-30.0
delta-BHC	0.200 J	5.0-10.0	0.200 J	5.0-10.0	ND	NA	ND	NA
Endosulfan Sulfate	0.250 J	5.0-10.0	0.250 J	5.0-10.0	ND	NA	ND	NA
Endrin Ketone	0.210 J	5.0-10.0	0.210 J	5.0-10.0	ND	NA	ND	NA
gamma-BHC (Lindane)	ND	NA	ND	NA	0.860	25.0-30.0	0.860	25.0-30.0
Heptachlor Epoxide	0.120 J	5.0-10.0	0.120 J	5.0-10.0	ND	NA	ND	NA
SEMI-VOLATILE ORGANICS (µg/kg)								
2-Methylnaphthalene	39.000 J	5.0-10.0	39.000 J	5.0-10.0	ND	NA	ND	NA
Acenaphthene	180.000 J	5.0-10.0	180.000 J	5.0-10.0	ND	NA	ND	NA
Anthracene	380.000 J	5.0-10.0	380.000 J	5.0-10.0	ND	NA	ND	NA
Benzo(a)anthracene	1100.000	5.0-10.0	1100.000	5.0-10.0	73.000 J	25.0-30.0	73.000 J	25.0-30.0
Benzo(a)pyrene	890.000	5.0-10.0	890.000	5.0-10.0	ND	NA	ND	NA
Benzo(b)fluoranthene	1500.000	5.0-10.0	1500.000	5.0-10.0	130.000 J	25.0-30.0	130.000 J	25.0-30.0
Benzo(g,h,i)perylene	370.000 J	5.0-10.0	370.000 J	5.0-10.0	ND	NA	ND	NA
Benzo(k)fluoranthene	2800.000	5.0-10.0	2800.000	5.0-10.0	52.000 J	12.0-18.0	210.000 J	25.0-30.0
Benzoic Acid	46.000 J	25.0-28.0	92.000 J	20.0-25.0	63.000 J	25.0-30.0	63.000 J	25.0-30.0
bis(2-Ethylhexyl)phthalate	86.000 J	5.0-10.0	86.000 J	5.0-10.0	700.000	25.0-30.0	780.000	25.0-30.0
Carbazole	260.000 J	5.0-10.0	260.000 J	5.0-10.0	ND	NA	ND	NA
Chrysene	1100.000	5.0-10.0	1100.000	5.0-10.0	79.000 J	25.0-30.0	79.000 J	25.0-30.0
Dibenzo(a,h)anthracene	160.000 J	5.0-10.0	160.000 J	5.0-10.0	ND	NA	ND	NA
Dibenzofuran	120.000 J	5.0-10.0	120.000 J	5.0-10.0	ND	NA	ND	NA
Fluoranthene	2100.000	5.0-10.0	2100.000	5.0-10.0	37.000 J	12.0-18.0	150.000 J	25.0-30.0
Fluorene	210.000 J	5.0-10.0	210.000 J	5.0-10.0	ND	NA	ND	NA
Indeno(1,2,3-c,d)pyrene	520.000	5.0-10.0	520.000	5.0-10.0	ND	NA	ND	NA
Phenanthrene	2100.000	5.0-10.0	2100.000	5.0-10.0	170.000 J	25.0-30.0	170.000 J	25.0-30.0
Pyrene	2600.000	5.0-10.0	2600.000	5.0-10.0	110.000 J	25.0-30.0	110.000 J	25.0-30.0

APPENDIX F.1 Tables of Validated Detected Analytes in Soil and Groundwater

Table F.1.4 Organic Compounds in Subsurface Soil Samples from Area 7 Soil Borings

	B13 (CONT)				B14 (CONT)			
	MINIMUM		MAXIMUM		MINIMUM		MAXIMUM	
	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)
VOLATILE ORGANICS (µg/kg)								
1,2-Diethylbenzene	ND	NA	ND	NA	13.000	22.0-24.0	13.000	22.0-24.0
Acetone	11.000	5.0-10.0	78.000	25.0-28.0	ND	NA	ND	NA
Hexane	ND	NA	ND	NA	1.000 J	12.0-18.0	42.000	25.0-30.0
Toluene	ND	NA	ND	NA	2.000 J	22.0-24.0	3.000 J	25.0-30.0

APPENDIX F.1 Tables of Validated Detected Analytes in Soil and Groundwater

Table F.1.5 Inorganic Compounds in Surface Soil Samples from Area 7 Soil Borings

	B13	B14	B15	B16
	Value	Value	Value	Value
ANIONS (mg/kg)				
Chloride	54.700 J	101	52.800 J	ND
Fluoride	1.320 J	1.58	8.570 J	ND
Sulfate	464.000 J	266.000 J	253	ND
Nitrate-Nitrite-N	ND	0.978	2.13	ND
TOTAL ORGANIC CARBON (mg/kg)				
Organic Carbon	24200	6820	8580	ND
METALS (mg/kg)				
Aluminum	4320.000 J	67000	9190.000 J	ND
Antimony	3.100 J	2.800 J	ND	ND
Arsenic	3.900 J	2.800 J	5.800 J	ND
Barium	27.500 J	17.500 J	52.400 J	ND
Beryllium	0.21	0.2	0.420 J	ND
Bismuth	ND	ND	31.9	ND
Calcium	141000	185000	74900	ND
Chromium	8.400 J	5.500 J	ND	ND
Cobalt	3	2.5	ND	ND
Copper	27.000 J	7.400 J	ND	ND
Iron	7950.000 J	6740.000 J	16700	ND
Lead	14.300 J	7.7	23.600 J	ND
Lithium	8.100 J	7.100 J	18.2	ND
Magnesium	77200	66900	31800	ND
Manganese	244.000 J	249.000 J	434.000 J	ND
Mercury	ND	ND	0.3	ND
Molybdenum	ND	ND	10.800 J	ND
Nickel	7.3	5.9	ND	ND
Potassium	928.000 J	888.000 J	2310	ND
Silver	0.790 J	0.220 J	0.2	ND
Sodium	262	302	ND	ND
Vanadium	11.300 J	8.200 J	ND	ND
Zinc	43.500 J	23.000 J	56.000 J	ND

APPENDIX F.1 Tables of Validated Detected Analytes in Soil and Groundwater

Table F.1.5 Inorganic Compounds in Surface Soil Samples from Area 7 Soil Borings

	B13	B14	B15	B16
	Value	Value	Value	Value
LANTHANIDES (mg/kg)				
Cerium	ND	ND	30.2	ND
Dysprosium	2.4	2.5	ND	ND
Erbium	ND	6.700 J	ND	ND
Europium	0.87	0.89	ND	ND
Gadolinium	ND	ND	106	ND
Holmium	ND	ND	ND	ND
Lanthanum	ND	ND	ND	ND
Neodymium	20.3	16.9	24.1	ND
Praseodymium	ND	22.4	ND	ND
Samarium	17.8	18.3	ND	ND
Terbium	13	13.4	ND	ND
Ytterbium	3.3	3.3	ND	ND

All samples collected 0-2 feet below ground surface
mg/kg - milligrams per kilogram
J - estimated
ND - not detected

APPENDIX F.1 Tables of Validated Detected Analytes in Soil and Groundwater

Table F.1.6 Inorganic Compounds in Subsurface Soil Samples from Area 7 Soil Borings

	B13				B14			
	MINIMUM		MAXIMUM		MINIMUM		MAXIMUM	
	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)
ANIONS (mg/kg)								
Chloride	25.200 J	10.0-16.0	214.000 J	20.0-25.0	111.000 J	25.0-30.0	165.000 J	25.0-30.0
Fluoride	1.670 J	10.0-16.0	4.240 J	20.0-25.0	2.620	25.0-30.0	2.970	25.0-30.0
Sulfate	64.200 J	20.0-25.0	413.000 J	5.0-10.0	172.000 J	25.0-30.0	620.000 J	12.0-18.0
Nitrate-Nitrite-N	0.829 J	25.0-28.0	3.050 J	5.0-10.0	1.140	25.0-30.0	2.130	12.0-18.0
TOTAL ORGANIC CARBON (mg/kg)								
Organic Carbon	1630.000 J	10.0-16.0	15600 J	10.0-16.0	4490.000	12.0-18.0	12500.000	25.0-30.0
METALS (mg/kg)								
Aluminum	197000.000	10.0-16.0	283000.000	20.0-25.0	164000.000	25.0-30.0	303000.000	25.0-30.0
Antimony	2.300 J	5.0-10.0	3.200 J	25.0-28.0	2.200 J	12.0-18.0	4.100 J	25.0-30.0
Arsenic	2.400 J	10.0-16.0	7.800 J	25.0-28.0	3.600 J	12.0-18.0	6.100 J	25.0-30.0
Barium	17.000 J	5.0-10.0	64.400 J	20.0-25.0	57.300 J	25.0-30.0	229.000 J	25.0-30.0
Beryllium	0.450	10.0-16.0	0.640	20.0-25.0	0.400	25.0-30.0	0.760	25.0-30.0
Bismuth	18.200	20.0-25.0	21.500	5.0-10.0	16.800	25.0-30.0	28.100	25.0-30.0
Cadmium	ND	NA	ND	NA	1.400 J	25.0-30.0	1.400 J	25.0-30.0
Calcium	29000.000	20.0-25.0	142000.000	10.0-16.0	59700.000	25.0-30.0	130000.000	12.0-18.0
Chromium	9.800 J	10.0-16.0	15.000 J	20.0-25.0	11.800 J	12.0-18.0	29.700 J	25.0-30.0
Cobalt	6.900	10.0-16.0	11.500	5.0-10.0	7.500	25.0-30.0	9.400	25.0-30.0
Copper	7.900 J	10.0-16.0	17.900 J	5.0-10.0	12.400 J	12.0-18.0	430.000 J	25.0-30.0
Iron	17200.000	10.0-16.0	24500.000	5.0-10.0	15400.000	25.0-30.0	24100.000	25.0-30.0
Lead	4.100	10.0-16.0	15.600 J	20.0-25.0	13.300 J	12.0-18.0	87.000 J	25.0-30.0
Magnesium	7250.000	20.0-25.0	23600.000	25.0-28.0	10300.000	25.0-30.0	23400.000	25.0-30.0
Manganese	363.000 J	10.0-16.0	1460.000 J	25.0-28.0	248.000 J	25.0-30.0	404.000 J	25.0-30.0
Mercury	ND	NA	ND	NA	0.410 J	25.0-30.0	2.000 J	25.0-30.0
Nickel	12.700	10.0-16.0	20.600	25.0-28.0	13.700	25.0-30.0	22.000	25.0-30.0
Potassium	2100.000 J	25.0-28.0	2680.000 J	10.0-16.0	1220.000 J	25.0-30.0	2900.000 J	12.0-18.0
Silver	0.250 J	20.0-25.0	0.470 J	25.0-28.0	0.220 J	12.0-18.0	7.900 J	25.0-30.0
Sodium	169.000	20.0-25.0	255.000	25.0-28.0	246.000	25.0-30.0	658.000	25.0-30.0
Tin	ND	NA	ND	NA	5.300	25.0-30.0	5.300	25.0-30.0
Vanadium	10.500 J	10.0-16.0	24.900 J	20.0-25.0	13.500 J	12.0-18.0	25.200 J	25.0-30.0
Zinc	32.300 J	10.0-16.0	53.600 J	20.0-25.0	34.500 J	12.0-18.0	371.000 J	25.0-30.0

APPENDIX F.1 Tables of Validated Detected Analytes in Soil and Groundwater

Table F.1.6 Inorganic Compounds in Subsurface Soil Samples from Area 7 Soil Borings

	B13 (CONT)				B14 (CONT)			
	MINIMUM		MAXIMUM		MINIMUM		MAXIMUM	
	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)
LANTHANIDES (mg/kg)								
Dysprosium	3.400	10.0-16.0	5.900	25.0-28.0	2.400	12.0-18.0	3.700	25.0-30.0
Erbium	6.800 J	25.0-28.0	7.500 J	20.0-25.0	6.600 J	12.0-18.0	7.900 J	25.0-30.0
Europium	0.940	5.0-10.0	1.300	25.0-28.0	0.880	12.0-18.0	1.100	25.0-30.0
Gadolinium	7.100 J	25.0-28.0	72.500 J	10.0-16.0	45.500 J	25.0-30.0	45.500 J	25.0-30.0
Holmium	2.100	5.0-10.0	2.200	20.0-25.0	2.400	25.0-30.0	2.400	25.0-30.0
Lutetium	0.500	20.0-25.0	0.960	5.0-10.0	0.530	25.0-30.0	0.530	25.0-30.0
Neodymium	11.800	10.0-16.0	26.800	5.0-10.0	16.800	25.0-30.0	24.200	12.0-18.0
Praseodymium	7.300	25.0-28.0	64.100	10.0-16.0	55.200	25.0-30.0	80.700	25.0-30.0
Samarium	18.700	25.0-28.0	20.400	20.0-25.0	18.100	12.0-18.0	19.200	25.0-30.0
Terbium	13.700	25.0-28.0	14.900	20.0-25.0	14.000	25.0-30.0	14.000	25.0-30.0
Ytterbium	3.400	25.0-28.0	3.700	20.0-25.0	3.300	12.0-18.0	3.900	25.0-30.0

APPENDIX F.1 Tables of Validated Detected Analytes in Soil and Groundwater
Table F.1.7 Radionuclides in Groundwater Samples from Area 7 Soil Borings

	B03		B11		B13		B14	
	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)
RADIONUCLIDES (pCi/L)								
Am-241	ND	NA	ND	NA	0.730 J	34	ND	NA
K-40	ND	NA	ND	NA	199.9	34	ND	NA
Pu-238	ND	NA	ND	NA	ND	NA	2.290 J	21.5
Ra-226	0.810 J	17.4	0.640 J	12.5	0.780 J	34	0.650 J	21.5
Th-228	1.24	17.4	ND	NA	1.190 J	34	0.950 J	21.5
Th-230	0.48	17.4	ND	NA	0.580 J	34	ND	NA
Th-232	0.320 J	17.4	ND	NA	0.150 J	34	ND	NA
Tritium	1241.900 J	17.4	2373.7	12.5	8	34	2	21.5
U-234	2.660 J	17.4	0.44	12.5	0.500 J	34	0.620 J	21.5
U-235	ND	NA	0.29	12.5	ND	NA	0.210 J	21.5
U-238	2.290 J	17.4	0.18	12.5	0.680 J	34	0.400 J	21.5
	B16							
	Value	Depth (ft BGS)						
RADIONUCLIDES (pCi/L)								
Ra-226	0.550 J	17						
Th-228	0.870 J	17						
Th-230	0.55	17						
Th-232	0.1	17						
Tritium	736.8	17						
U-234	2.940 J	17						
U-235	0.39	17						
U-238	3.49	17						

pCi/L - picocuries per liter
J - estimated
ND - not detected
NA - not applicable
ft BGS - feet below ground surface

APPENDIX F.1 Tables of Validated Detected Analytes in Soil and Groundwater

Table F.1.8 Organic Compounds in Groundwater Samples from Area 7 Soil Borings

	B03		B11		B13		B14	
	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)
EXPLOSIVES (µg/L)								
1,3,5-Trinitrobenzene	ND	NA	1.100 J	12.5	0.230 J	34	ND	NA
1,3-Dinitrobenzene	ND	NA	ND	NA	ND	NA	0.190 J	21.5
2-Amino-4,6-dinitrotoluene	ND	NA	ND	NA	2.200 J	34	ND	NA
RDX	ND	NA	0.900 J	12.5	ND	NA	ND	NA
PESTICIDES/PCBs (µg/L)								
Aroclor-1254	ND	NA	ND	NA	ND	NA	0.380 J	21.5
SEMI-VOLATILE ORGANICS (µg/L)								
Benzoic Acid	ND	NA	ND	NA	6.000 J	34	2.000 J	21.5
bis(2-Ethylhexyl)phthalate	ND	NA	2.000 J	12.5	ND	NA	8.000 J	21.5
Phenol	ND	NA	ND	NA	ND	NA	3.000 J	21.5
VOLATILE ORGANICS (µg/L)								
Chloroform	1.000 J	17.4	ND	NA	ND	NA	ND	NA
Trichloroethene	ND	NA	5	12.5	ND	NA	ND	NA
c-1,2-Dichloroethene	ND	NA	ND	NA	ND	NA	0.270 J	21.5
trans-1,2-Dichloroethene	ND	NA	ND	NA	ND	NA	0.030 J	21.5

µg/L - microgram per liter
J - estimated
ND - not detected
NA - not applicable
ft BGS - feet below ground surface

APPENDIX F.1 Tables of Validated Detected Analytes in Soil and Groundwater

Table F.1.9 Inorganic Compounds in Groundwater Samples from Area 7 Soil Borings

	B03		B11		B13		B14	
	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)
INORGANICS (mg/L)								
Alkalinity as Calcium Carbonate	367	17.4	310	12.5	487	34	445	21.5
Kjeldahl Nitrogen	0.528	17.4	0.225 J	12.5	0.653	34	1.37	21.5
Total Phosphorus	0.896	17.4	0.644	12.5	0.218	34	0.542	21.5
Dissolved Solids	1740	17.4	1040	12.5	2140	34	1190	21.5
Suspended Solids	9	17.4	370	12.5	308	34	660	21.5
ANIONS (mg/L)								
Chloride	866	17.4	153	12.5	632	34	443	21.5
Fluoride	0.58	17.4	0.492	12.5	0.157	34	0.298	21.5
Sulfate	25.5	17.4	60.5	12.5	75.200 J	34	45.200 J	21.5
Nitrate-Nitrite-N	1.220 J	17.4	0.07	12.5	0.086	34	0.09	21.5
TOTAL ORGANIC CARBON (mg/L)								
Organic Carbon	2.53	17.4	1.580 J	12.5	3.74	34	ND	NA
METALS (µg/L)								
Aluminum	ND	NA	3180.000 J	12.5	8410.000 J	34	13000	21.5
Antimony	ND	NA	ND	NA	ND	NA	2.6	21.5
Arsenic	ND	NA	ND	NA	10.6	34	9	21.5
Barium	ND	NA	70.9	12.5	155	34	165	21.5
Bismuth	268	17.4	ND	NA	160	34	92.3	21.5
Calcium	ND	NA	127000	12.5	249000	34	76200	21.5
Cobalt	ND	NA	3.3	12.5	7.7	34	6.7	21.5
Copper	ND	NA	3.500 J	12.5	17.2	34	106	21.5
Chromium	ND	NA	ND	NA	30.1	34	47.2	21.5
Iron	ND	NA	4280.000 J	12.5	22100	34	19200	21.5
Lead	ND	NA	ND	NA	6.9	34	27.4	21.5
Magnesium	ND	NA	47400	12.5	69800	34	22200	21.5
Manganese	ND	NA	323	12.5	1690	34	663	21.5
Potassium	ND	NA	10700	12.5	9520.000 J	34	10400	21.5
Silver	ND	NA	ND	NA	ND	NA	9.3	21.5
Sodium	ND	NA	63200	12.5	206000	34	285000	21.5
Thallium	ND	NA	3.6	12.5	ND	NA	ND	NA
Vanadium	ND	NA	5.5	12.5	15.1	34	21.2	21.5
Zinc	ND	NA	13.2	12.5	55.8	34	195	21.5

APPENDIX F.1 Tables of Validated Detected Analytes in Soil and Groundwater

Table F.1.9 Inorganic Compounds in Groundwater Samples from Area 7 Soil Borings

	B03		B11		B13		B14	
	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)
LANTHANIDES (µg/L)								
Europium	4	17.4	ND	NA	ND	NA	ND	NA
Gadolinium	168	17.4	ND	NA	181.000 J	34	ND	NA
Holmium	10	17.4	ND	NA	ND	NA	ND	NA
Samarium	82	17.4	ND	NA	ND	NA	ND	NA

mg/L - milligrams per liter
µg/L - microgram per liter
J - estimated
ND - not detected
NA - not applicable
ft BGS - feet below ground surface

COMPARISON OF ACTUAL SOIL GAS VALUES WITH CALCULATED ACCEPTABLE SOIL GAS VALUES

SCREENING POTENTIAL RELEASE SITES BASED ON SOIL GAS READINGS

Soil gas readings can be utilized in the PRS screening process to identify potential release sites that may present a potential soil contamination problem for volatile organics. The soil gas survey that was conducted at Mound as part of the "Reconnaissance Sampling Report--Soil Gas Survey and Geophysical Investigations, Mound Plant Main Hill and SM/PP Hill" investigated 8 volatile compounds. The concentrations of these compounds in the in the vapor phase within the pore spaces of the soil can be correlated to the actual soil contaminant concentrations by utilizing a method developed by ICF Kaiser Engineers. This technique has been used with US EPA Region IX approval at a large Superfund site contaminated with many of the same chemicals found at relatively low levels in soils at the Mound Plant.

The soil concentration can be estimated from the soil gas values by the following equation:

$$Ct = (Cg/Pb)*[[Pb * Kd / H] + [pw / H] + [pt - pw]]$$

where

Cg	concentration of volatile chemical concentrations as soil vapor in ng/ml
Pb	Bulk density of the soil in g/ml
Kd	soil/water partition coefficient in ml/g
H	Dimensionless Henry's Law Constant
pw	water filled porosity
pt	total porosity
Ct	target soil concentration in ng/g or ug/kg (ppb)

The technique that Mound Plant will use for screening a PRS, is to compare the soil gas values obtained at a PRS with soil gas concentrations that are known to be below any regulatory or health based level of concern. The risk based guideline values for the Mound Plant (DOE, December 1995) soils are based upon 10^{-6} risk levels or a hazard index of 1. These values correspond to direct soil exposure to persons who's activities place them at the highest risk, in particular inhalation and ingestion by a Mound Plant construction worker.

Another potential exposure path must be considered, however. The potential for some of the organic contaminants to leach into ground water must be considered in developing protective soil screening levels. A "Mound Plant Soil Screening Level" paper explains the calculation of soil screening levels. For all of the chemicals that the soil gas survey identified, the calculated soil screening level soil concentrations are below the standard guideline values, therefore they are more conservative and are appropriate to be used as the basis for the soil gas calculations.

By re-arranging the equation, and using either the soil guideline values or the soil screening levels as the target soil concentration, a soil gas concentration can be calculated; this calculated soil gas concentration can be compared to the actual observed soil gas values:

$$Cg = (Pb*Ct)/[[Pb*Kd/H] + [pw/H] + [pt-pw]]$$

The values of the soil specific and chemical parameters for this equation are summarized as follows:

Pb	1.6	Bulk density of the soil in g/ml
pw	0.15	water filled porosity
pt	0.43	total porosity
foc	0.02	fraction organic material in soil (used in developing the SSL values)

Typical chemicals that are detected with soil gas sampling are:					
NAME	H	Kd	Calculated Acceptable Soil Screening Level Value	Calculated Acceptable Soil Gas Reading	Calculated Acceptable Soil Gas Reading
		ml/g	mg/kg (ppm)	ng/ml	ppb
Toluene	2.52E-01	3.42	22.06	1.56E+03	414600
Trichloroethene (TCE)	4.35E-01	2.24	0.07	1.26E+01	2400
111 Trichloroethane (TCA)	7.63E-01	2.2	3.01	9.46E+02	173400
Trans-1,2 Dichloroethene (DCE)	2.29E-01	1	0.70	1.41E+02	35700
cis-1,2 Dichloroethene (DCE)	1.85E-01	2.78	0.31	1.97E+01	5000
Freon 11	NA	NA			
Freon 113	NA	NA			
Tetrachloroethene (PCE)	7.09E-01	2.78	0.09	2.13E+01	3100

na not available

IF THE SOIL GAS READING IS BELOW THE VALUES IN THE CALCULATED SOIL GAS READING COLUMN (SHADED), THEN THERE IS NO THREAT TO GROUNDWATER FROM THIS PRS.

The soil screening level values are calculated using the Soil Screening Methodology. The Potential Release Site is assumed to be more than 100 meters from a potential drinking water source with an aquifer thickness of 15 meters and a source size of 10 meters. The hydraulic gradient is assumed to be 0.01 which is conservative for most of the Mound Plant PRSs. In special instances where the PRS lies less than 100 meters from a potential drinking water source, or the hydraulic gradient is much less than 0.01, new SSL values and new acceptable soil gas values will be calculated for that particular PRS.