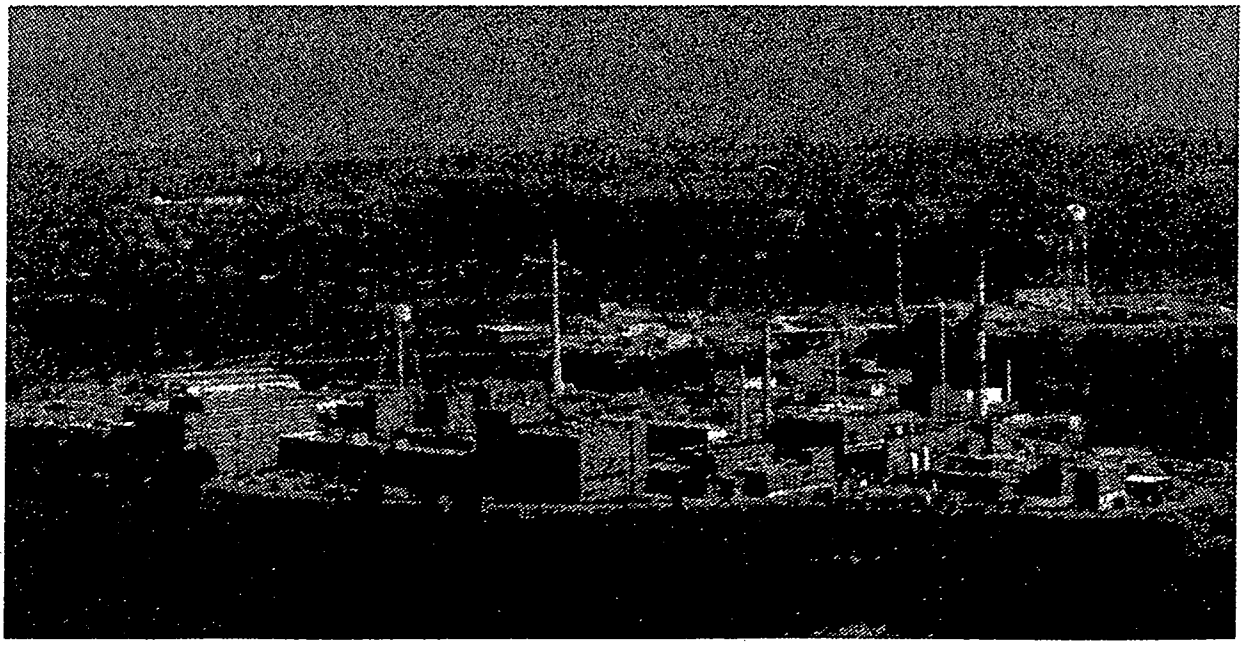
EG&G MOUND-30-03-04-02--9703180025

MOUND

Environmental
Restoration
Program

MOUND PLANT
Potential Release Site Package
PRS # 338



MOUND

Environmental Restoration Program

MOUND PLANT POTENTIAL RELEASE SITE PACKAGE

Notice of Public Review Period

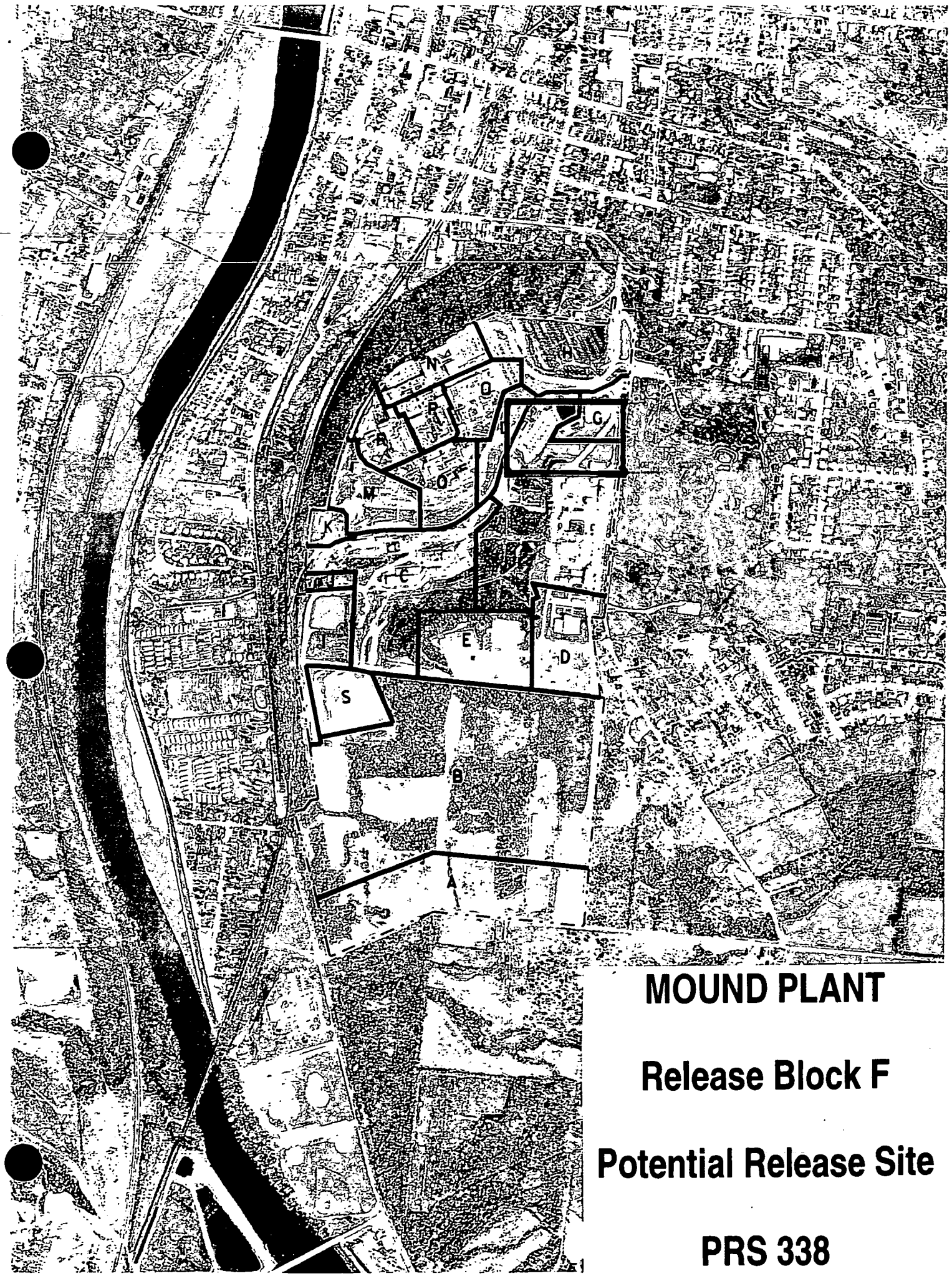
OhioEPA

The following potential release site (PRS) packages will be available for public review in the CERCLA Public Reading Room, 305 E. Central Ave., Miamisburg, Ohio beginning January 30, 1997. Public comment will be accepted on these packages from January 30, 1997, through March 6, 1997.

PRS 244:	Soil Contamination - B Building
PRS 273:	Soil Contamination - Area 12 (SM/PP Hillside)
PRS 309:	Soil Contamination - Radiological Survey Site Location S0307
PRS 315/316/319:	Waste Transportation Vehicles, Trash Dumpsters, Epoxy Resin Waste Storage Site - Building 49
PRS 332:	Waste Oil Tank - Building G (used engine oil)
PRS 338:	Septic Tank - Building 29
PRS 400:	Soil Contamination
PRS 401:	Soil Contamination

Questions can be referred to Mound's Community Relations at (937) 865-4140.

REV	DESCRIPTION	DATE
PUBLIC RELEASE 0	Available for comment.	Dec. 17, 1996
FINAL 1	Comment period expired. No comments. Recommendation page annotated.	Mar. 11, 1997

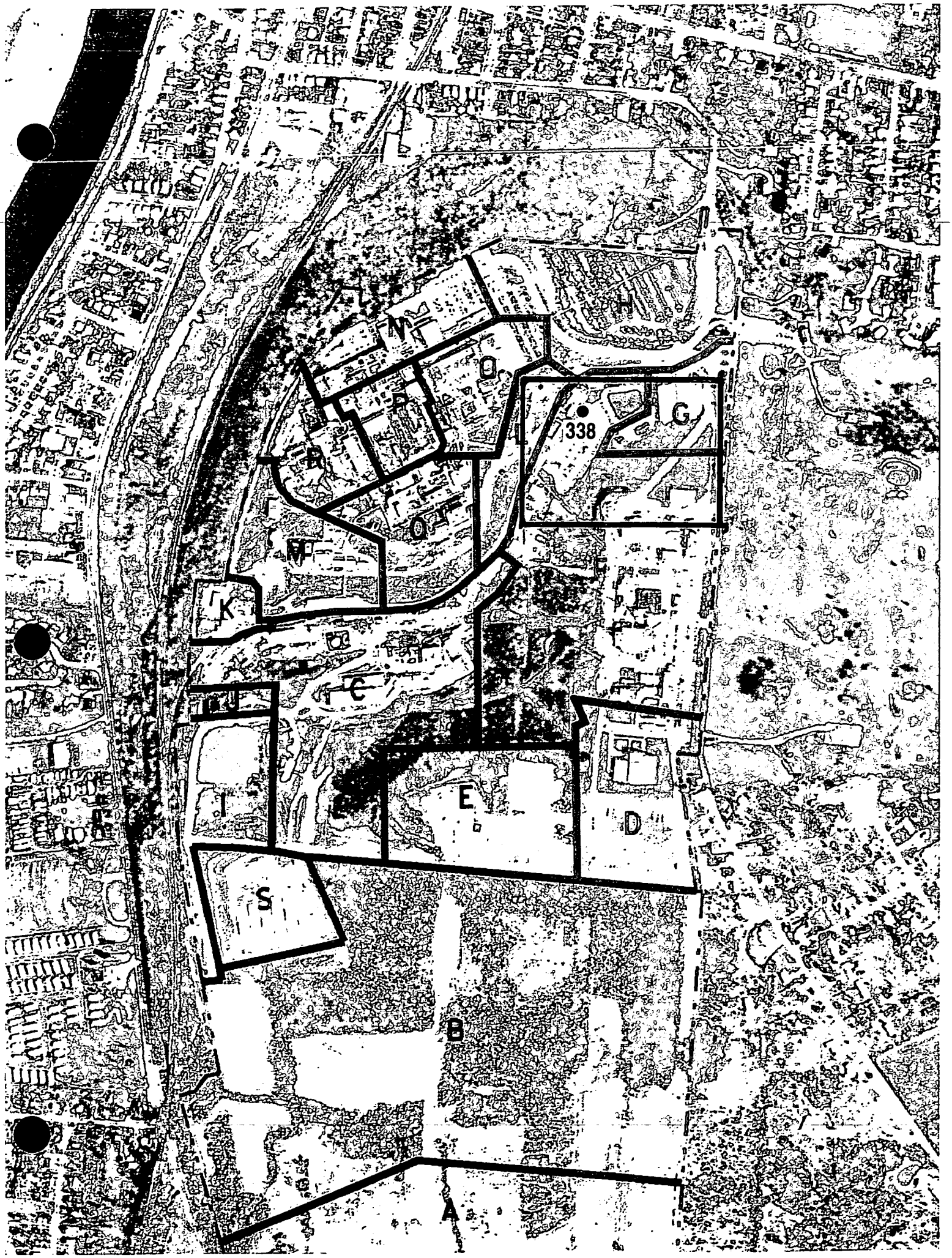


MOUND PLANT

Release Block F

Potential Release Site

PRS 338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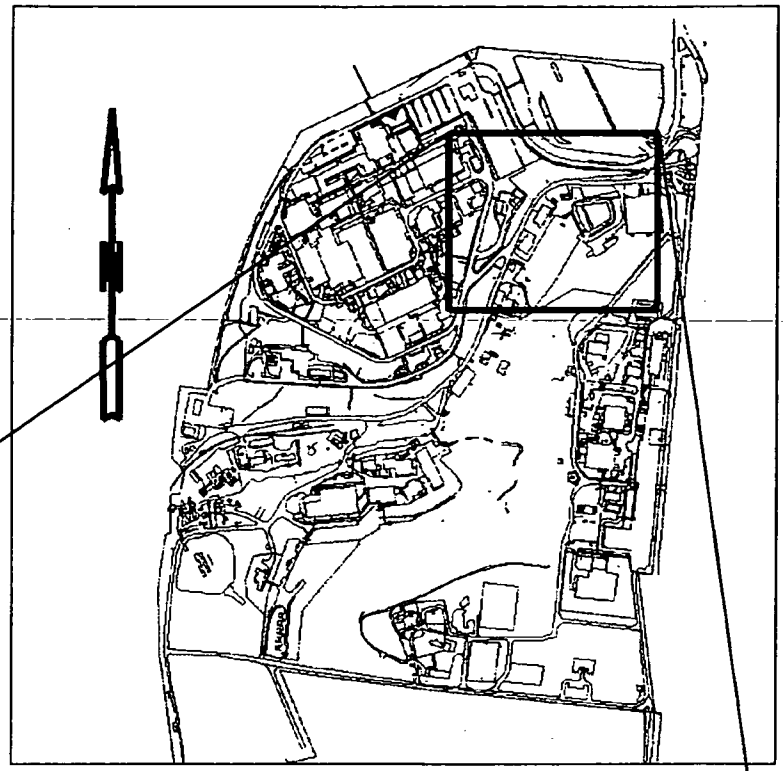
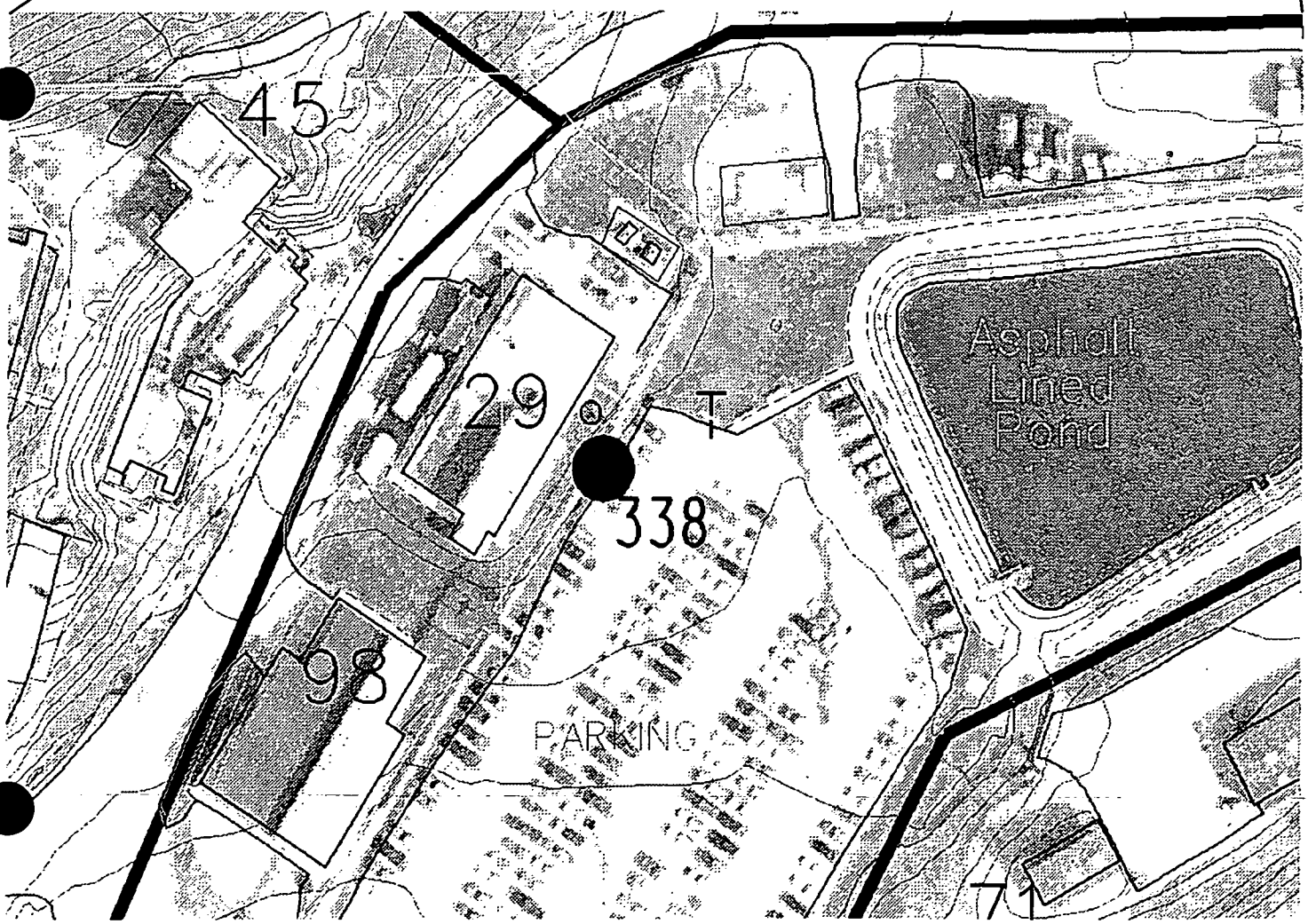
Mound Plant

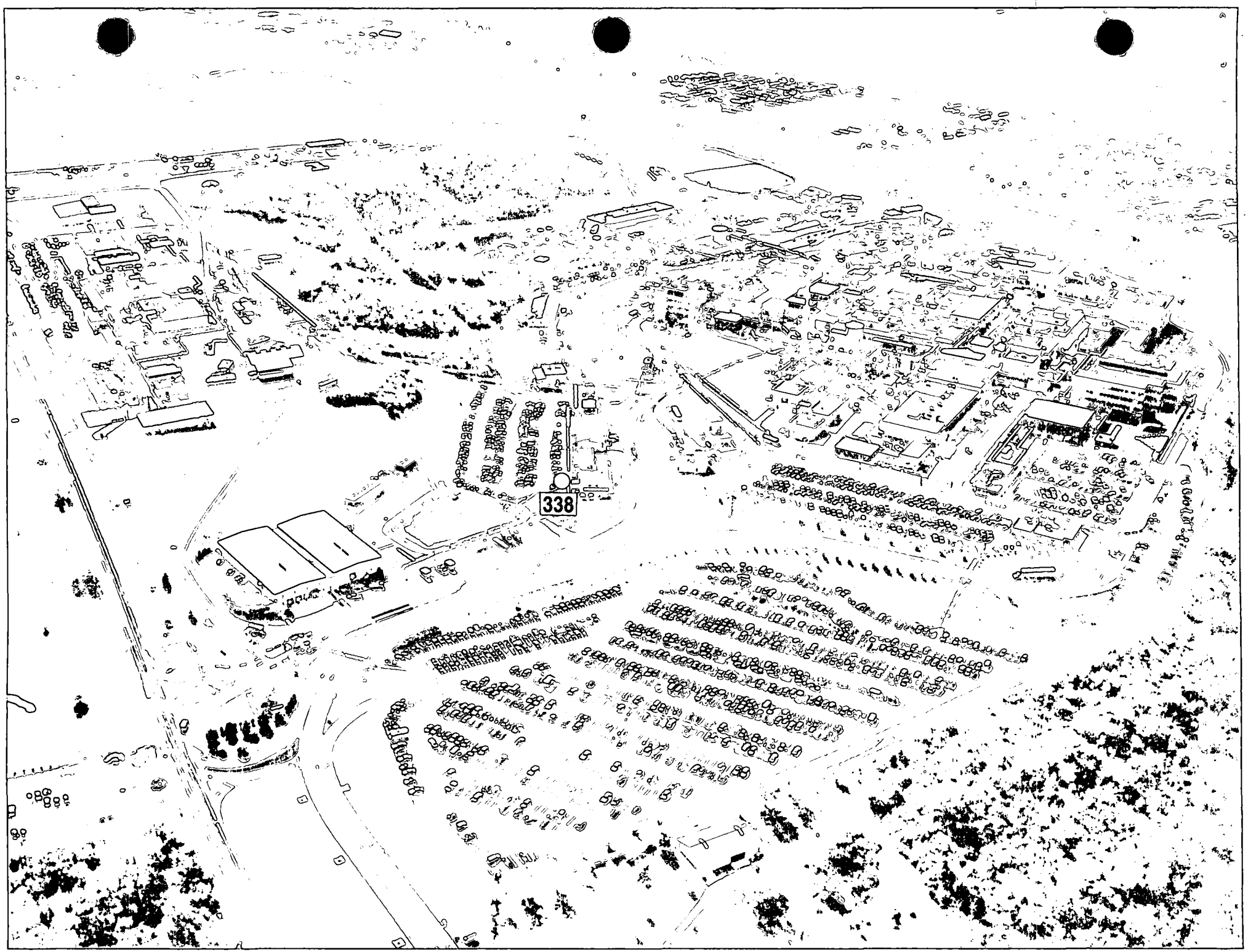
Release Block F

Potential Release Site

PRS 338






338

29
PARKING

PRS 338

PRS HISTORY:

Potential Release Site (PRS) 338 is the Building 29 septic tank, located approximately 20 feet beneath the parking lot in fill material east of Building 29.[1] The tank is inactive and may have been abandoned in place, in 1996, when Building 29 was connected to the sanitary sewer system.[6] Building 29 was used for the production and processing of plastic components. Asbestos, fiberglass, and acetone was also used in the plastic formulations. There are no suspected releases of contaminants to this tank. Organic material from the tank and the associated leach field may be responsible for relatively high methane levels that were encountered during soil boring activities in 1994.[4] Methane was the only gas encountered; there was no indication of volatile chemical vapors.

CONTAMINATION:

Investigations & Results:

Site Survey Project

A surface soil sample during the Site Survey Project, Radiological Site Survey, revealed that thorium-232 could not be detected at a detection level of 2 pCi/g.[2] This detection limit is below the guideline criteria of 5 pCi/g for surface contamination. Plutonium-238 was detected at a concentration of 0.29 pCi/g which is less than the Mound Plant ALARA (As Low As Reasonably Achievable) guideline criteria of 25 pCi/g.

1992 Soil Gas Sampling

Soil gas sampling, in 1992, from Area 7, indicated the presence of 1,1,1-TCE and toluene at a depth of 5 feet from sample location 2137.[3] Soil gas sampling from location 2136 detected no contaminants. The detected levels of 1,1,1-TCA and toluene are below the calculated soil gas guideline criteria that could pose a threat to groundwater.[5]

Contaminant	Maximum Concentration Detected	Guideline Criteria
1,1,1-TCA	6 ppb	173,400 ppb
Toluene	5 ppb	414,600 ppb

Area 7 Phase I Investigation[4]

Surface soil, subsurface soil, and groundwater samples were taken from borehole B03 which was drilled in the vicinity of the septic tank leach field. The borehole was abandoned at a depth of 40 feet when methane gas reached 10% of the lower explosive limit. The methane is consistent with decay of organic material from a septic tank leach field and is not related to chemical discharges or spills. The laboratory analysis detected many compounds which were below the comparison guideline criteria. Some detected compounds have no guideline criteria because no quantitative toxicity data exists. Arsenic was detected above the background value of 8.6 mg/kg, but was below the Risk Based Guideline Value of 64 mg/kg.

Soil Screening Facility

Contaminant	Maximum Concentration Detected	Guideline Criteria
Thorium-232	1.6 pCi/g	5/15 pCi/g
Plutonium-238	32 pCi/g	25 pCi/g

Laboratory Results for Surface Soils That Exceed Guideline Criteria

Contaminant	Maximum Concentration Detected	Guideline Criteria
METALS	**mg/kg**	**mg/kg**
Magnesium	60,300	40,000 (background)**
Sodium	260	240 (background)**

Laboratory Results for Subsurface Soils That Exceed Guideline Criteria

Contaminant	Maximum Concentration Detected	Guideline Criteria
METALS	**mg/kg**	**mg/kg**
Chloride	128.0	107 (background)**
Arsenic	21.50	8.6 (background) 64 (hazard index)
Potassium	3080.0 J*	1,900 (background)**
Sodium	346.0	240 (background)**

*J represents an estimated value.

** No Guideline Criteria exist other than natural background values because these are essential human nutrients.

READING ROOM REFERENCES:

1) OU9, Site Scoping Report: Volume 12 - Site Summary Report, December 1994. (pages 7-9)
2) OU9, Site Scoping Report: Volume 3 - Radiological Site Survey, June 1993. (pages 13-15)
3) Reconnaissance Sampling Report, Soil Gas Survey and Geophysical Investigations, Mound Plant, Main Hill and SM/PP Hill, February 1993. (pages 16-18)
4) OU5, Operational Area Phase I Investigation Area 7 Field Report, Volumes I and II, June 1995. (pages 19-44)
6) OU9, Site Scoping Report: Volume 7 - Waste Management, February 1993. (pages 10-12)

OTHER REFERENCES:

5) Comparison of Actual Soil Gas Values with Calculated Acceptable Soil Gas Values. (pages 45-47)

PREPARED BY:

Alexander G. Bray, Member of EG&G Technical Staff

MOUND PLANT
PRS 338
BUILDING 29 SEPTIC TANK

RECOMMENDATION:

Potential Release Site (PRS) 338 was identified as the Building 29 Septic Tank, which is now inactive. Plutonium-238 sampling results are below the 10^{-5} guideline criteria of 55 pCi/g. All thorium results are below the 5/15 pCi/g guideline criteria. In addition, all volatile organic compound (VOC) soil gas results are below the calculated acceptable guideline criteria. All metals concentrations are below risk-based guideline values. Therefore, NO FURTHER ASSESSMENT is recommended for PRS 338.

CONCURRENCE:

DOE/MB: Arthur W Kleinrath 11/27/96
Arthur W. Kleinrath, Remedial Project Manager (date)

USEPA: Timothy J. Fischer 12/3/96
Timothy J. Fischer, Remedial Project Manager (date)

OEPA: Brian K. Nickel 12/12/96
Brian K. Nickel, Project Manager (date)

SUMMARY OF COMMENTS AND RESPONSES:

Comment period from 1/30/97 to 3/6/97

☒ No comments were received during the comment period.

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

REFERENCE MATERIAL
PRS 338

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

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
336	Building 37 Waste Tank (AKA Low Risk Waste Tank) (Tank 267)	F-10	Inactive	Wastewater	25	None Suspected Never used for low-risk wastewaters			No Data		
337	Building H Condensate Sump (Tank 268)	E-6	In Service	Condensate wastewater	25	None Suspected			No Data		
338	Building 29 Septic Tank (Tank 270)	E-9	Inactive	Sanitary wastewater	25	None Suspected (Abandoned in place?)			No Data		
339	T-44 Wastewater Sump (Tank 250)	F-7	Historical	Wastewater	25	Unknown - filled with concrete			No Data		
340	T-16b Wastewater Sump (Tank 251)	F-7	Historical	Wastewater	25	Unknown - filled with concrete			No Data		
341	T-90 Condensate Sump (Tank 269)	F-7	In Service	Condensate wastewater	25	None Suspected			No Data		
342	T-1 Hot Side Fire Water Tank (Tank 271)	F-7	In Service	Wastewater/Radioactive wastewater	25	None Suspected			No Data		
343	T-20 Fire Water Sump (Tank 272)	F-7	In Service	Wastewater/Radioactive wastewater	25	None Suspected			No Data		
344	T-37 Fire Water Sump (Tank 273)	F-7	In Service	Wastewater/Radioactive wastewater	25	None Suspected			No Data		
345	Former Equipment Storage Area see related site 16	H-6	Historical	Potential contaminants listed under Hazardous Waste Storage Area	4, 5, 18	Historically related to site 16	S	7, 18	No Analytical Data		7

[a]Analyte List Codes
[b]SGS, Soil Gas Survey
[c]RSS, Radiological Site Survey

1 - Soil Gas Survey - Freon 11, Freon 113, Trans-1,2-Dichloroethylene, Cis-1,2-Dichloroethylene, 1,1,1-Trichloroethane, Perchloroethylene, Trichloroethylene, Toluene
2 - Gamma Spectroscopy - Thorium-228, -230, Cobalt-60, Cesium-137, Radium-224, -226, -228, Americium-241, Actinium-227, Bismuth-207, Bismuth-210m, Potassium-40
3 - Target Analyte List
4 - Target Compound List (VOC)
5 - Target Compound List (SVOC)
6 - Target Compound List (Pesticides/Polychlorinated Biphenyl)
7 - Dioxins/Furans
8 - Extractable Petroleum Hydrocarbons (EPH)/Total Petroleum Hydrocarbons (TPH)
9 - Lithium
10 - Nitrate/Nitrite
11 - Chloride
12 - Explosives
13 - Plutonium-238
14 - Plutonium-238, Thorium-232
15 - Cobalt-60, Cesium-137, Radium-226, Americium-241
16 - Tritium

Reference List

1. DOE 1986 "Phase I: Installation Assessment Mound [DRAFT]."
2. DOE 1992a "Remedial Investigation/Feasibility Study, Operable Unit 9, Site-Wide Work Plan (Final)."
3. DOE 1992c "Mound Plant Underground Storage Tank Program Plan & Regulatory Status Review (Final)."
4. DOE 1993a "Site Scoping Report: Vol. 7 - Waste Management (FINAL)."
5. EPA 1988a "Preliminary Review/Visual Site Inspection for RCRA Facility Assessment of Mound Plant"
6. DOE 1993d "Operable Unit 9, Site Scping Report: Vol. 3 - Radiological Site Survey (FINAL)."
7. DOE 1993c "Operable Unit 3, Misc. Sites Limited Field Investigation Report."
8. DOE 1992d "Reconnaissance Sampling Report Decontamination & Decommissioning Areas, OU6, (FINAL)."
9. Fentiman 1990 "Characterization of Mound's Hazardous, Radioactive and Mixed Wastes."
10. DOE 1992f "Operable Unit 9, Site Scpoing Report: Vol. 9 - Spills and Response Actions (FINAL)."
11. Styron and Meyer 1981"Potable Water Standards Project: Final Report."
12. DOE 1993b "Reconnaissance Sampling Report - Soil Gas Survey & Geophysical Investigations, Mound Plant Main Hill and SM/PP Hill (FINAL)."
13. DOE 1993d "Operable Unit 9, Site Scoping Report:. Vol. 3 - Radiological Site Survey (FINAL)."
14. DOE 1991b "Main Hill Seeps, Operable Unit 2, On-Scene Coordinator Report for CERCLA Section 104 Remedial Action, West Powerhouse PCB Site."
15. Halford 1990 "Results of South Pond Sampling."
16. DOE 1993e "Operable Unit 4, Special Canal Sampling Report, Miami Erie Canal."
17. DOE 1990 "Preliminary Results of Reconnaissance Magnetic Survey of Mound Plant Areas 2, 6, 7, and C."
18. DOE 1992a "Remedial Investigation/Feasibility Study, Operable Unit 9, Site-Wide Work Plan (FINAL)."
19. Rogers 1975 "Mound Laboratory Environmental Plutonium Study, 1974."
20. DOE 1992h "Ground Water and Seep Water Quality Data Report Through First Quarter, FY92."
21. Dames and Moore 1976a, b "Potable Water Standards Project Mound Laboratory" and "Evaluation of the Buried Valley Aquifer Adjacent to Mound Laboratory."
22. DOE 1992l "Closure Report, Building 34 - Aviation Fuel Storage Tank."
23. DOE 1992j "Closure Report, Building 51 - Waste Storage Tank."
24. DOE 1994 "Operable Unit 1, Remedial Investigation Report."
25. EG&G 1994 "Active Underground Storage Tank Plan."

Document Control No. _____

Environmental Restoration Program

OPERABLE UNIT 9, SITE SCOPING REPORT: VOLUME 7 - WASTE MANAGEMENT

MOUND PLANT
MIAMISBURG, OHIO

February 1993

FINAL
(Revision 0)

Department of Energy
Albuquerque Field Office

Environmental Restoration Program
EG&G Mound Applied Technologies

Table III.2. (page 2 of 2)

STORM SEWER SYSTEM CHRONOLOGY

1947	Original drainage system installed using closed drains around original buildings with discharge to natural open drainage ditch. Lower parking lot and adjacent areas drain off-plant via Mound Avenue.
1963	Drain line from vicinity of I Building tied through flow divider to outfall line dilute WD/SD effluent flow. Excess storm flow continues on to drainage ditch.
1957 - 1967	Local building drainage (following natural drainage) added as buildings were completed in Test Fire and SM areas.
1970	Weir and measuring station installed on drainage ditch near site exit.

SANITARY SEWER SYSTEM CHRONOLOGY

1947	All upper area (lettered buildings except OS) connected to original SD. Treated SD effluent to outfall to river. Various additions and reroutings have occurred including GS-1, 47, 28, M, 40, OS, B, RE, and 48.
1957	Building 2 - septic tank system
1959	Building 1 - settling basin only (no sanitary wastes)
1960	SM - septic tank system
1964	Building 3 - septic tank system
1966	Buildings 29, 36, 38 - septic tank system
1967	Building 37 - septic tank system
1968	Lower area plus SM area tied to lift station at Building 27, thence to SD
1968	Building 43
1969	Buildings 27, 44, 45, 46
1970	Buildings 42, 49, 50
1971	Sampling MH added to outfall line
1974	New sewage disposal plant to replace SD

Ref: Modified from Hurwitz 1974.

5.3.15. Building 29 Solvent Storage Shed (Inactive)

The Building 29 solvent storage shed is on the west end of Building 29, in the north-central portion of Mound (Figure 5.1). The solvent storage shed is a stand-alone building, approximately 11 ft wide by 10 ft high, and is constructed with sheet metal walls and roof. It is placed on a concrete pad. The floor is contained on three sides by a 4-inch-high curb, the remaining side of the floor is uncurbed.

Construction and operation of the solvent storage shed began in 1972. Acetone stored inside the shed in 55-gallon drums is pumped from the drums through transfer lines into Building 29 where it is used. Spent solvent is pumped from Building 29 back into the solvent shed and into drums for disposal. Acetone is the only solvent that has been stored in the shed for use in Building 29. A 55-gallon drum of propanol was delivered by mistake and is currently stored in the shed. However, Mound personnel indicated that acetone is the only solvent intentionally used and stored in the shed.

Prior to construction of the shed, acetone was stored in drums in Room 7 of Building 29. The acetone was used in the building. Waste acetone was drummed for disposal. The drummed waste was picked up by waste management personnel.

The solvent storage shed became inactive approximately two years ago when the process using acetone in Building 29 was shut down. The shed is in a standby mode and may go operational depending upon future plans. This shed was not described in the RFA (EPA 1988).

Document Control No. DGC
W.P. DAVIS

Environmental Restoration Program

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

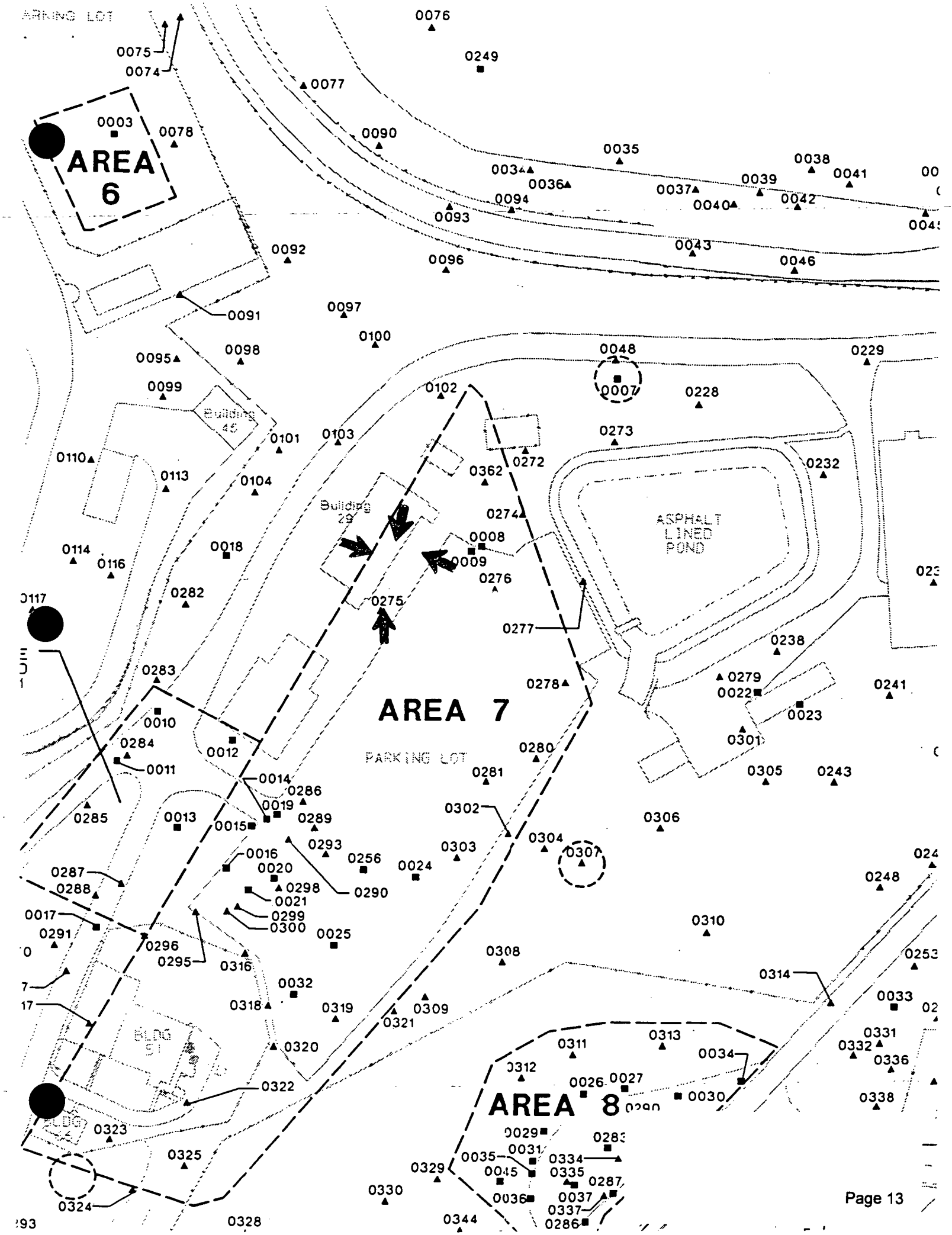
MOUND PLANT
MIAMISBURG, OHIO

June 1993

FINAL

Department of Energy
Albuquerque Field Office

Environmental Restoration Program
EG&G Mound Applied Technologies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AREA 7
AREA 8
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Building 29
Building 45
BLDG 31
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Table III.5. (page 4 of 5)

Plate 1 Location[a]	Coordinates South	Coordinates West	MRC ID No.	Mo-Yr	Depth (inch)	Plutonium-238 (pCi/g)	Thorium[b] (pCi/g)	Tritium (pCi/mL)	Cobalt-60 (pCi/g)	Cesium-137 (pCi/g)	Radium-226 (pCi/g)	Americium-241 (pCi/g)
C0024	2125	2200	1805	05-83	126	0.02	b					
			1806	05-83	144	0.01	b		LDL	LDL	0.8	LDL
			1807	05-83	156	0.02	b		LDL	LDL	0.9	LDL
C0025	2150	2290	1815	05-83	12	6.60	3.90					
			1816	05-83	36	0.30	4.02		LDL	LDL	1.0	LDL
			1817	05-83	72	0.09	b					
			1818	05-83	90	0.05	b					
			1819	05-83	144	0.05	2.43					
C0256	2100	2240	8385	11-84	18	0.03	2.79					
C0032	2175	2340	1808	05-83	18	0.64	3.14		LDL	LDL	1.0	LDL
			1809	05-83	36	2.19	b					
			1810	05-83	54	0.62	b					
			1811	05-83	90	0.08	b					
			1812	05-83	144	0.05	b					
			1813	05-83	162	0.08	b					
			1814	05-83	180	0.03	b					
S0274	1875	1985	5971	07-84	0	0.01	b					
S0275	1900	2135	5970	07-84	0	0.29	b					
S0276[d]	1925	2035	5973	07-84	0	1.27	b		LDL	LDL	1.5	LDL
S0278	2025	2010	5974	07-84	0	5.28	b		LDL	LDL	0.9	LDL
S0280	2075	2060	5975	07-84	0	0.56	b					
S0281	2075	2110	5976	07-84	0	0.83	4.03					
S0286	2025	2265	4091	10-83	0	7.40	b	5.23				
S0289	2050	2265	5983	07-84	0	0.64	b					
			5978	07-84	0	2.72	b					
S0290	2050	2290	6753	08-84	0	1.21	b					
S0293	2075	2265	5979	07-84	0	0.66	b					
S0295	2075	2390	4090	10-83	0	0.64	b					
S0298	2085	2315	6758	08-84	0	3.01	20.52					
S0299	2085	2355	6755	08-84	0	0.41	b		LDL	LDL	1.2	LDL

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)
C0289	2422.7	2081.0	None[d]	07-84	0	NR	0.6					
			None[d]	07-84	12	NR	1.1					
			None[d]	07-84	24	NR	0.5					
			None[d]	07-84	36	NR	0.8					
			None[d]	07-84	48	NR	1.0					
			None[d]	07-84	60	NR	0.8					
C0290	2401.5	2102.1	None[d]	07-84	0	NR	0.7					
			None[d]	07-84	12	NR	0.8					
			None[d]	07-84	24	NR	0.8					
			None[d]	07-84	36	NR	0.8					
			None[d]	07-84	48	NR	0.6					
			None[d]	07-84	60	NR	0.9					
			None[d]	07-84	72	NR	0.8					
C0291	2915.3	2490.3	None[d]	07-84	0	NR	0.6					
			None[d]	07-84	12	NR	0.4					
			None[d]	07-84	24	NR	0.5					
			None[d]	07-84	36	NR	0.4					
			None[d]	07-84	48	NR	0.4					
			None[d]	07-84	60	NR	0.3					
			None[d]	07-84	72	NR	0.5					
			None[d]	07-84	84	NR	0.4					
			None[d]	07-84	96	NR	0.7					
			None[d]	07-84	108	NR	0.6					
			None[d]	07-84	120	NR	0.3					
			None[d]	07-84	132	NR	0.3					
S1092	2185	3362	8413	12-84	f	0.31	323.5[g]					

[a]C denotes core location and S denotes surface sample location on Plate 1.

[b]Thorium results of ≤ 2 pCi/g are listed as "b".

[c]Verification sample analyzed for QA/QC.

[d]No MRC ID assigned because *in situ* gamma spectrometry was performed for thorium-232.

[e]Gamma results could not be confirmed using the gamma spectroscopy printout given in this appendix.

[f]The depth for this sample was given as "SS". For mapping purposes (Plates 1 and 5), this is assumed to be a surface sample.

[g]Sample results were given isotopically for this sample and included 0.99 pCi/g thorium-228; 321 pCi/g thorium-230; and 1.5 pCi/g thorium-232, for a total of 323.5 pCi/g.

ENVIRONMENTAL RESTORATION PROGRAM

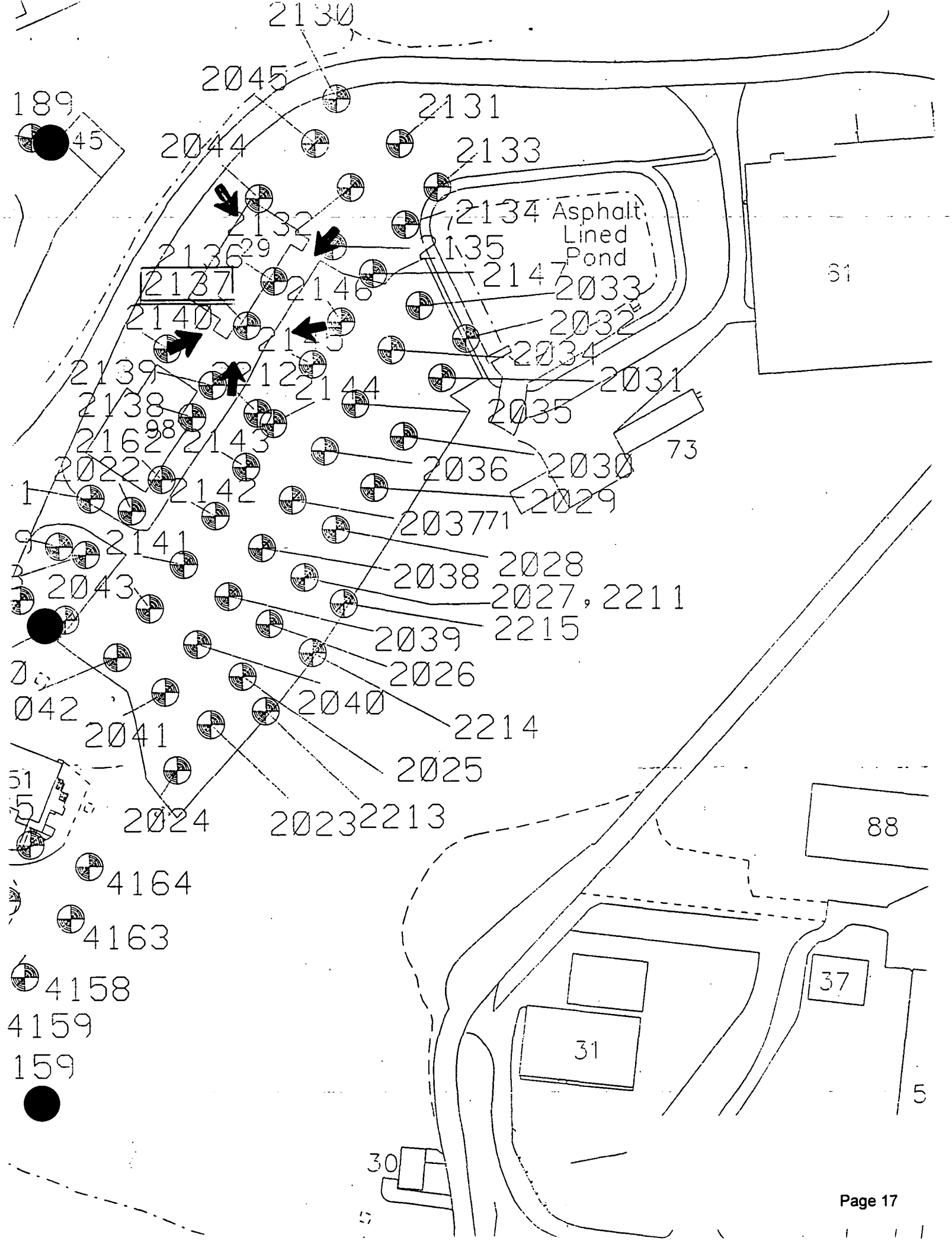
SOIL GAS SURVEY AND GEOPHYSICAL INVESTIGATIONS MAIN HILL AND SM/PP HILL AREAS RECONNAISSANCE SAMPLING

MOUND PLANT
MIAMISBURG, OHIO

February 1993

DEPARTMENT OF ENERGY
ALBUQUERQUE OFFICE

ENVIRONMENTAL RESTORATION PROGRAM
EG&G MOUND APPLIED TECHNOLOGIES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4163
4158
4159
159
37
31
5
30
61

TABLE II.10 SUMMARY OF POSITIVE DETECTIONS–AREA 7
(ppb)

SAMPLE ID	SAMPLE DATE	FREON 11	FREON 113	TRAN–12DCE	CIS–12DCE	111TCA	PCE	TCE	TOLUENE
MND–01–2021–0005	1 AUG 92	---	---	---	---	---	---	---	3
MND–01–2022–0005	1 AUG 92	---	---	---	---	---	---	---	3
MND–01–2023–0005	1 AUG 92	---	---	---	---	---	---	---	3
MND–01–2024–0005	1 AUG 92	---	---	---	---	---	---	---	3
MND–01–2025–0005	1 AUG 92	---	---	---	---	---	---	---	37
MND–01–2026–0005	1 AUG 92	---	---	---	---	---	---	---	133
MND–01–2027–0005	1 AUG 92	---	---	---	---	9	---	---	825
MND–01–2031–0005	1 AUG 92	---	---	---	---	---	---	---	13
MND–01–2032–0005	2 AUG 92	---	---	---	---	---	---	---	3
MND–01–2033–0005	2 AUG 92	---	---	---	---	---	---	---	3
MND–01–2034–0005	2 AUG 92	---	---	---	---	---	---	---	3
MND–01–2034–1005	2 AUG 92	---	---	---	---	---	---	---	3
MND–01–2036–0005w	3 AUG 92	---	---	---	---	---	---	---	242 *
MND–01–2036–1005w	3 AUG 92	---	---	---	---	---	---	---	218 *
MND–01–2039–0005	2 AUG 92	---	---	---	3	---	---	---	---
MND–01–2044–0005	3 AUG 92	---	---	---	---	---	---	---	13 *
MND–01–2137–1005	24 AUG 92	---	---	---	---	6	---	---	5
MND–01–2138–0005	24 AUG 92	11	---	---	---	2	---	---	80
MND–01–2139–0005	25 AUG 92	32	4	---	---	---	---	---	3 *
MND–01–2141–0005	25 AUG 92	---	---	---	10	---	---	---	5 *
MND–01–2142–0005	25 AUG 92	---	---	---	---	---	---	---	11*
MND–01–2142–1005	25 AUG 92	---	---	---	---	---	---	---	11*
MND–01–2145–0005	25 AUG 92	---	---	---	---	---	---	---	5 *
MND–01–2146–0005	25 AUG 92	---	33	---	---	---	6	---	---
MND–01–2147–0005	25 AUG 92	---	13	---	---	---	---	---	---
MND–01–2148–0005	26 AUG 92	---	---	---	---	22	---	---	---
MND–01–2149–0005	26 AUG 92	---	---	---	---	---	---	---	5 *
MND–01–2149–1005	26 AUG 92	---	---	---	---	---	---	---	5 *
MND–01–2150–0005	26 AUG 92	---	---	---	---	2	---	---	5 *
MND–01–2162–0005	30 AUG 92	7	---	---	---	---	---	---	---
MND–01–2212–0015	26 SEP 92	---	10	---	---	---	---	---	---
MND–01–2213–0005	26 SEP 92	---	---	---	---	---	---	---	11
MND–01–2214–0005	26 SEP 92	---	---	---	---	---	7	---	5
MND–01–2215–0005	26 SEP 92	---	---	---	---	---	---	---	11

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.

* NOTE LOCATION 213C HAD NO DETECTIONS AND IS NOT IN THIS TABLE

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

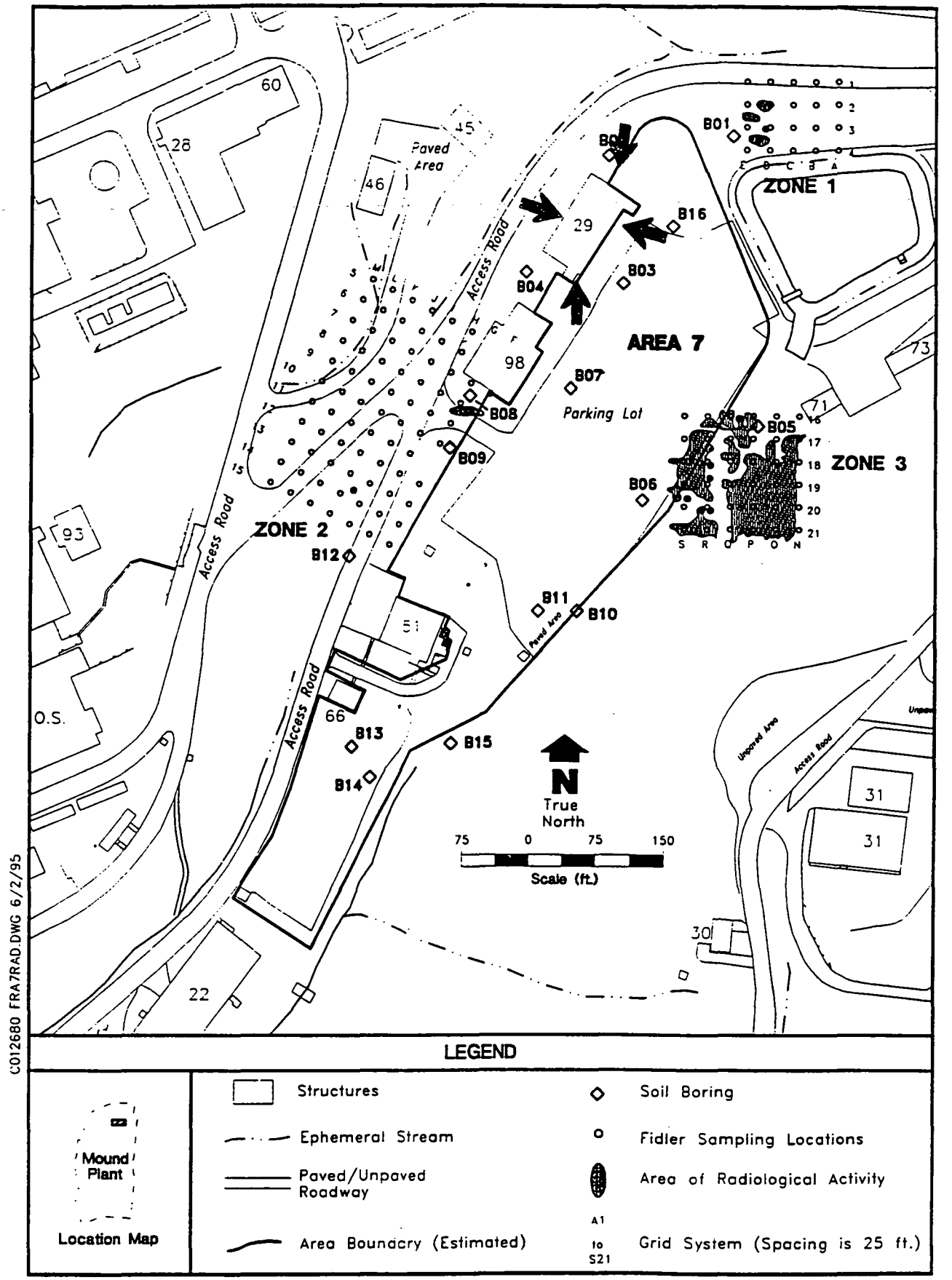

Figure 2.2. Areas of Elevated Surface Radiological Activity (FIDLER Survey)

Table II.6. Depth to Bedrock in Area 7 Soil Borings

Boring ID	Depth (ft. BGS)	Elevation (ft. MSL)	Comments
B01	35.5	808.81	bedrock
B02	7.5	814.82	bedrock
B03	40.0	809.91	abandoned due to LEL level
B04	9.0	811.69	bedrock
B05	7.0	810.41	bedrock
B06	16.0	804.74	bedrock
B07	17.0	805.20	abandoned due to LEL level
B08	24.0	805.83	bedrock
B09	33.0	802.77	bedrock
B10	13.5	803.45	bedrock
B11	20.5	802.14	bedrock
B12	23.5	795.53	bedrock
B13	70.0	782.20	bedrock
B14	114.0	781.93	bedrock
B15	14.3	782.43	bedrock
B16	48.0	809.52	bedrock

ID identification
ft BGS feet below ground surface
ft MSL feet above mean sea level
LEL lower explosive level

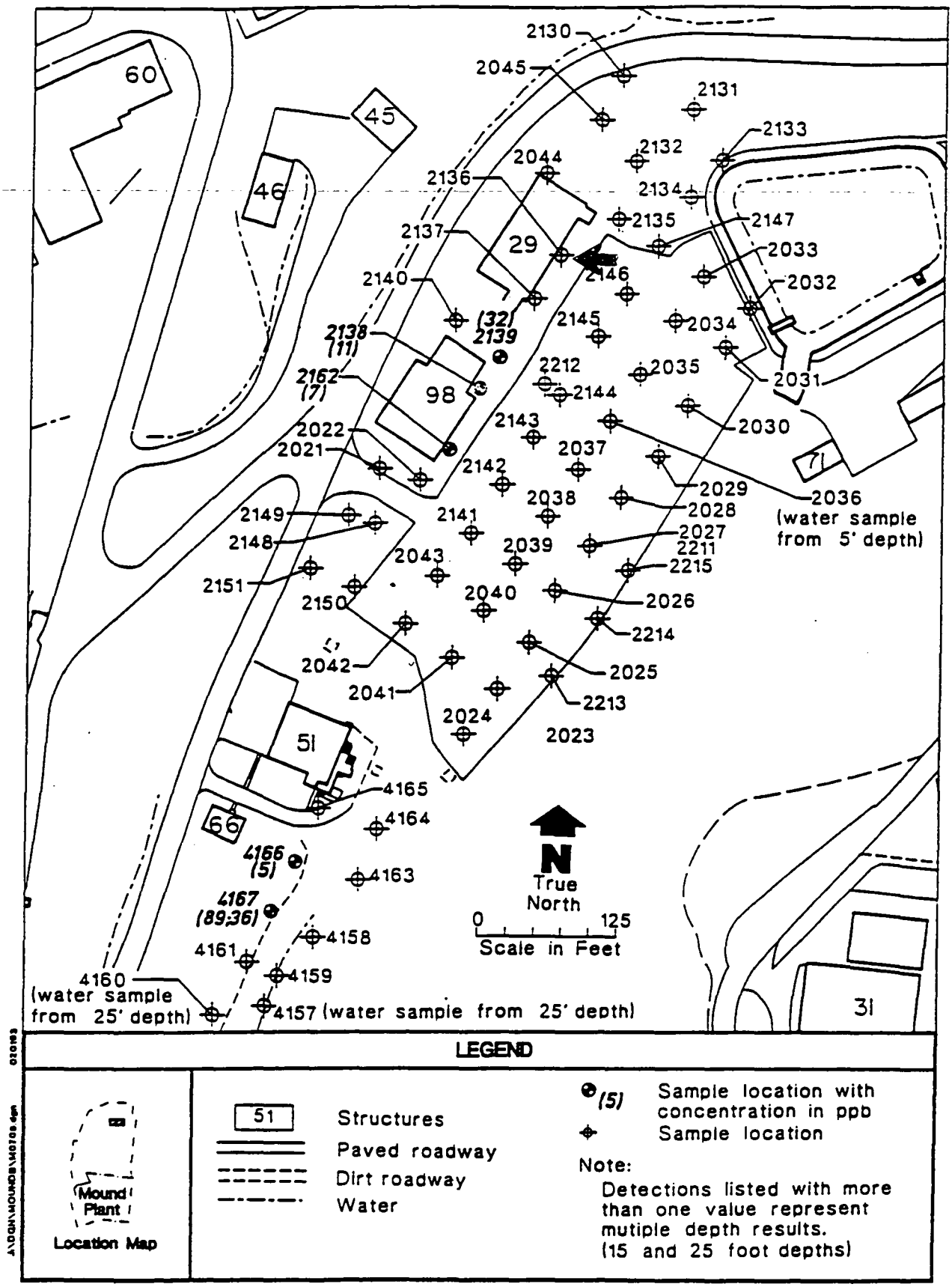

Figure 4.3. Freon-11 Detection Map for Area 7 from 1992 Soil Gas Survey

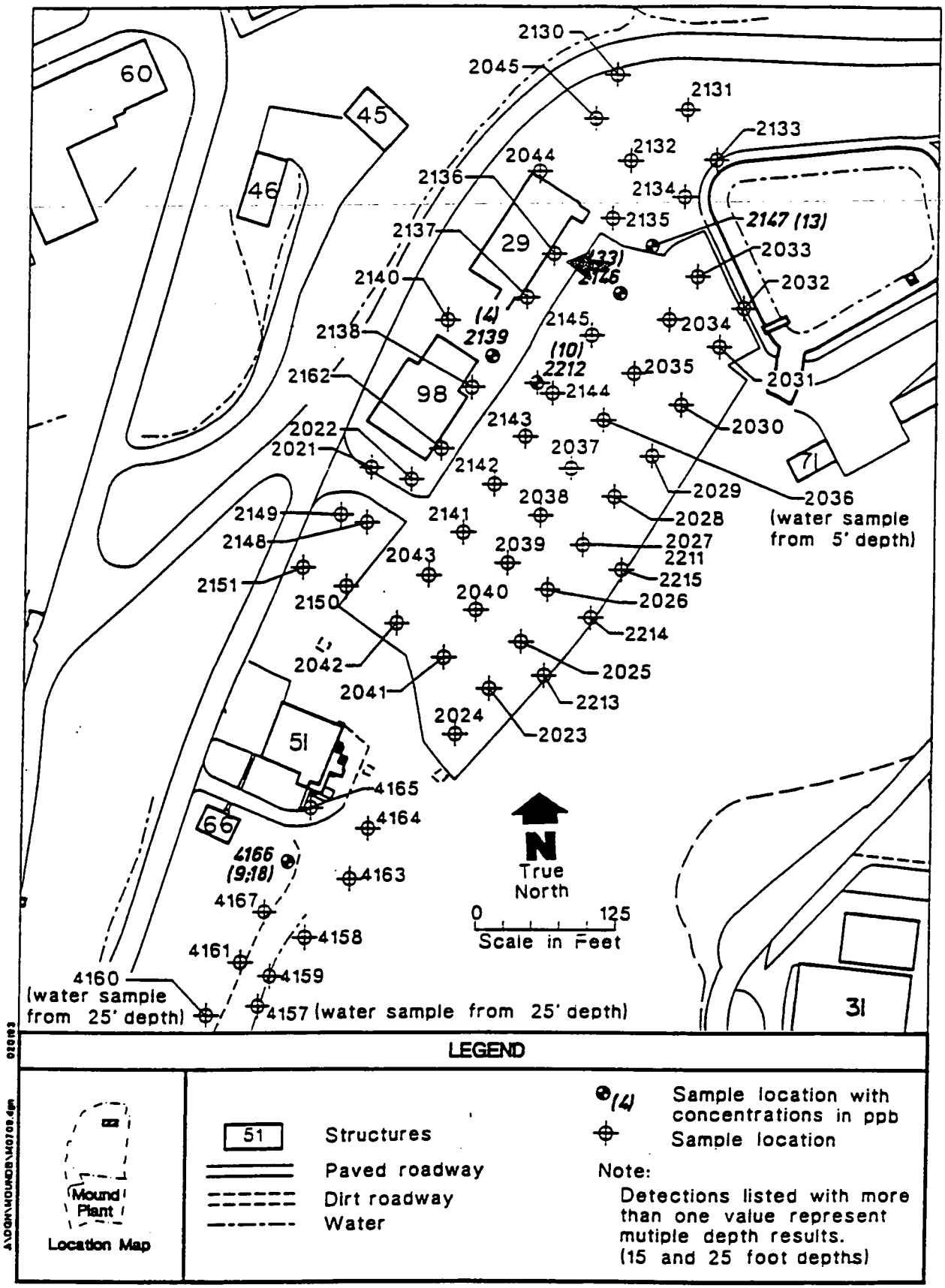

Figure 4.4. Freon-113 Detection Map for Area 7 from 1992 Soil Gas Survey

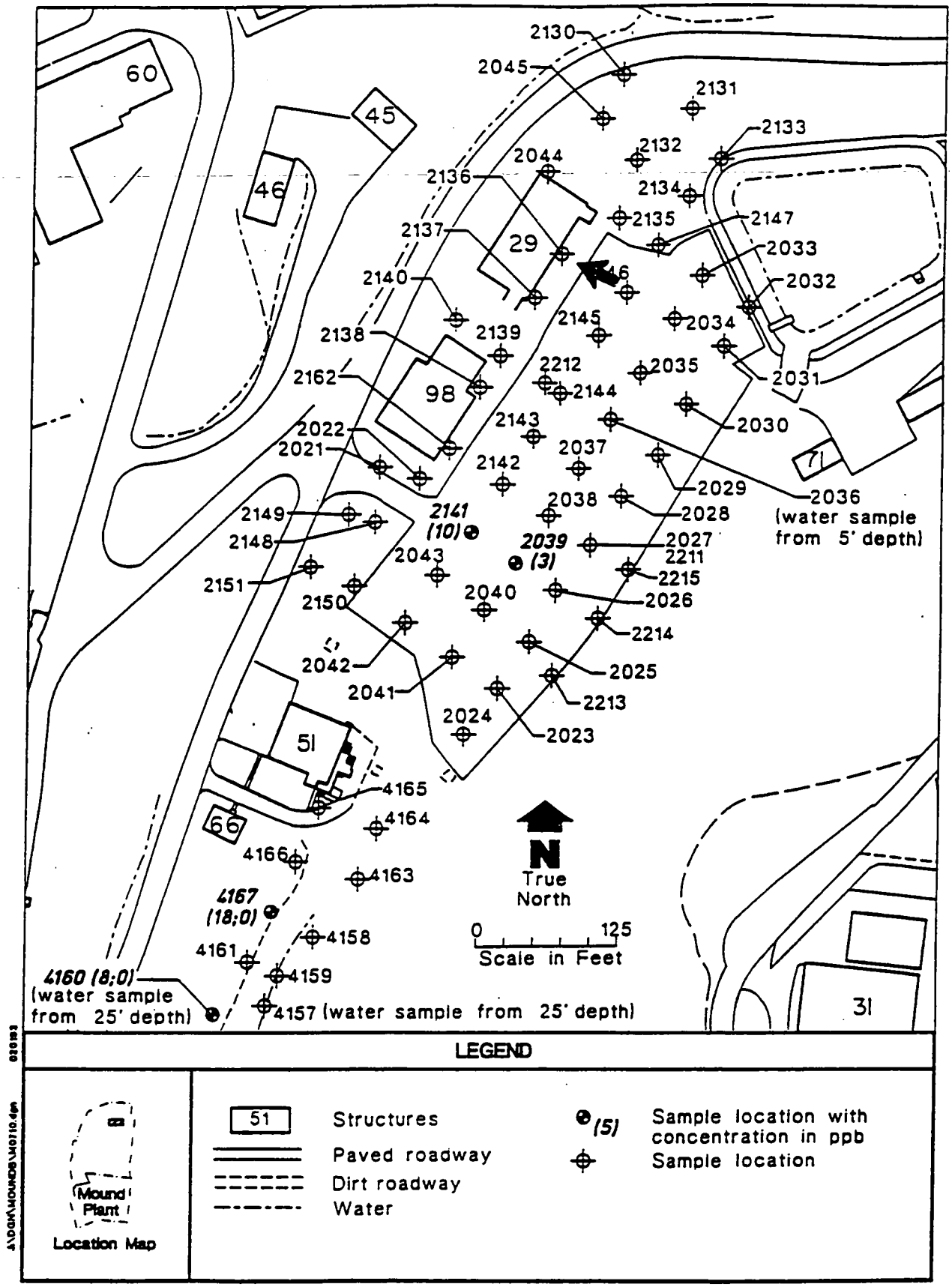

Figure 4.5. Cis-1,2-Dichloroethene Detection Map for Area 7 from 1992 Soil Gas Survey

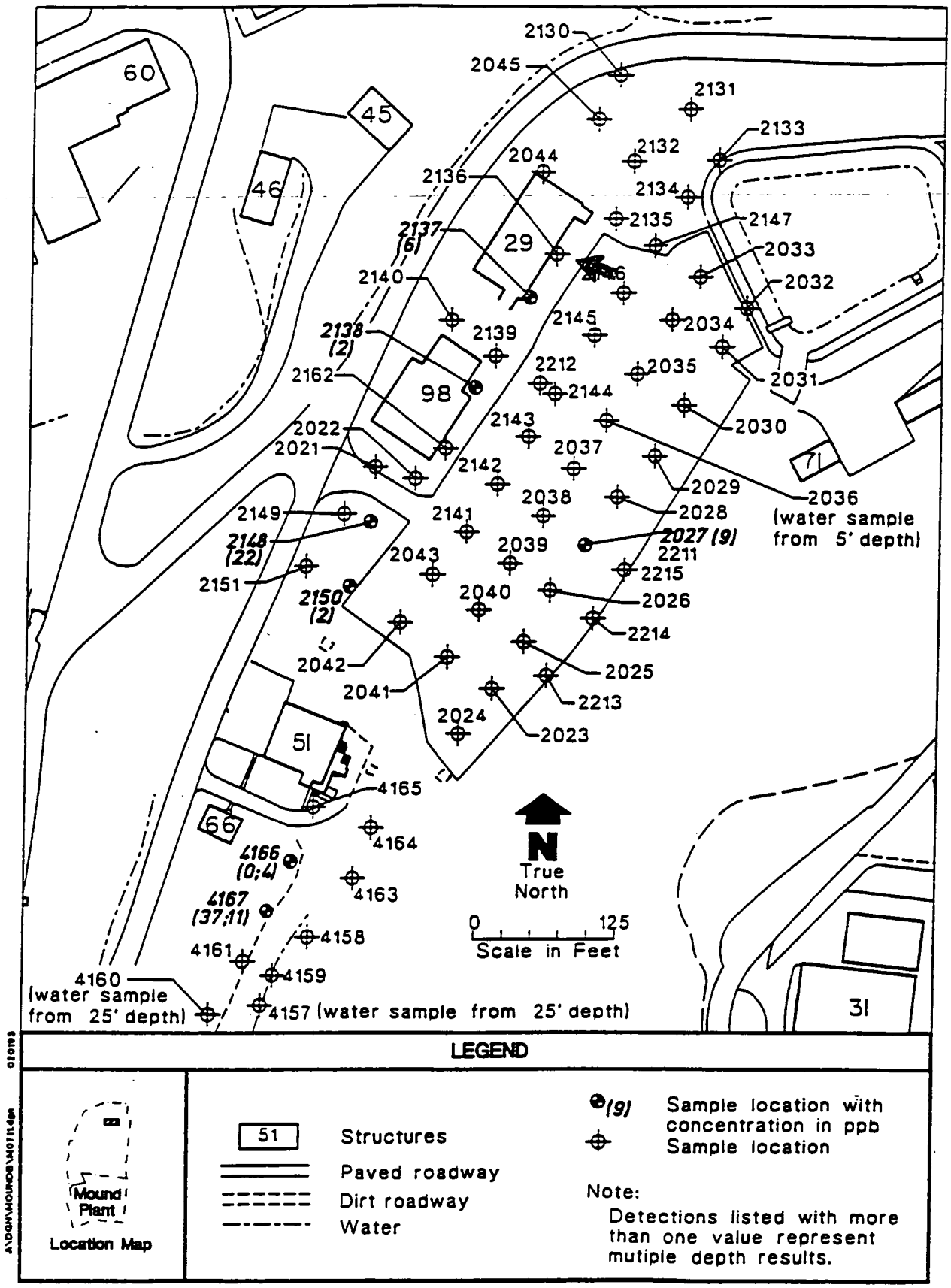

Figure 4.6. 1,1,1-Trichloroethane Detection Map for Area 7 from 1992 Soil Gas Survey

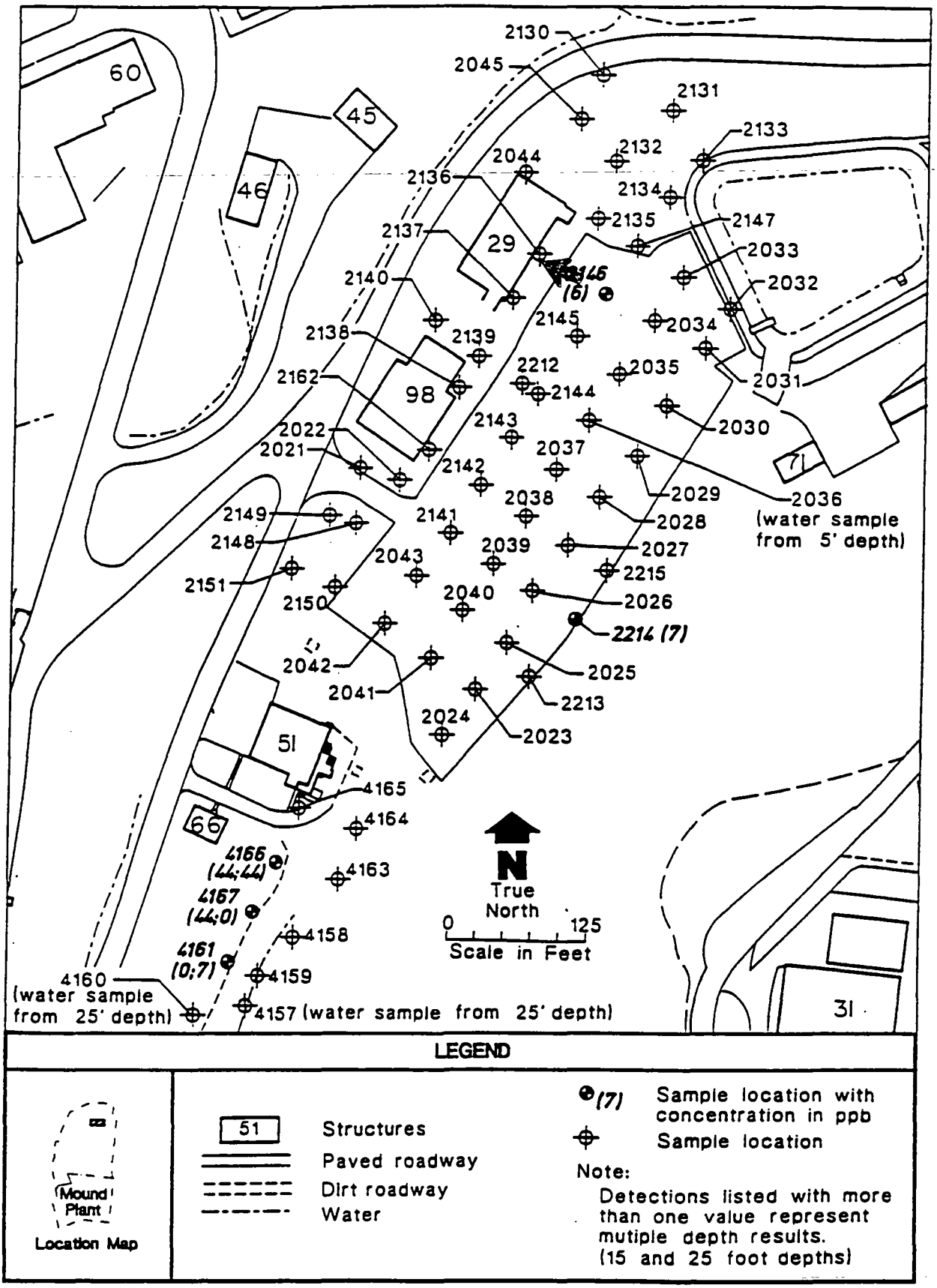

Figure 4.7. Tetrachloroethene Detection Map for Area 7 from 1992 Soil Gas Survey

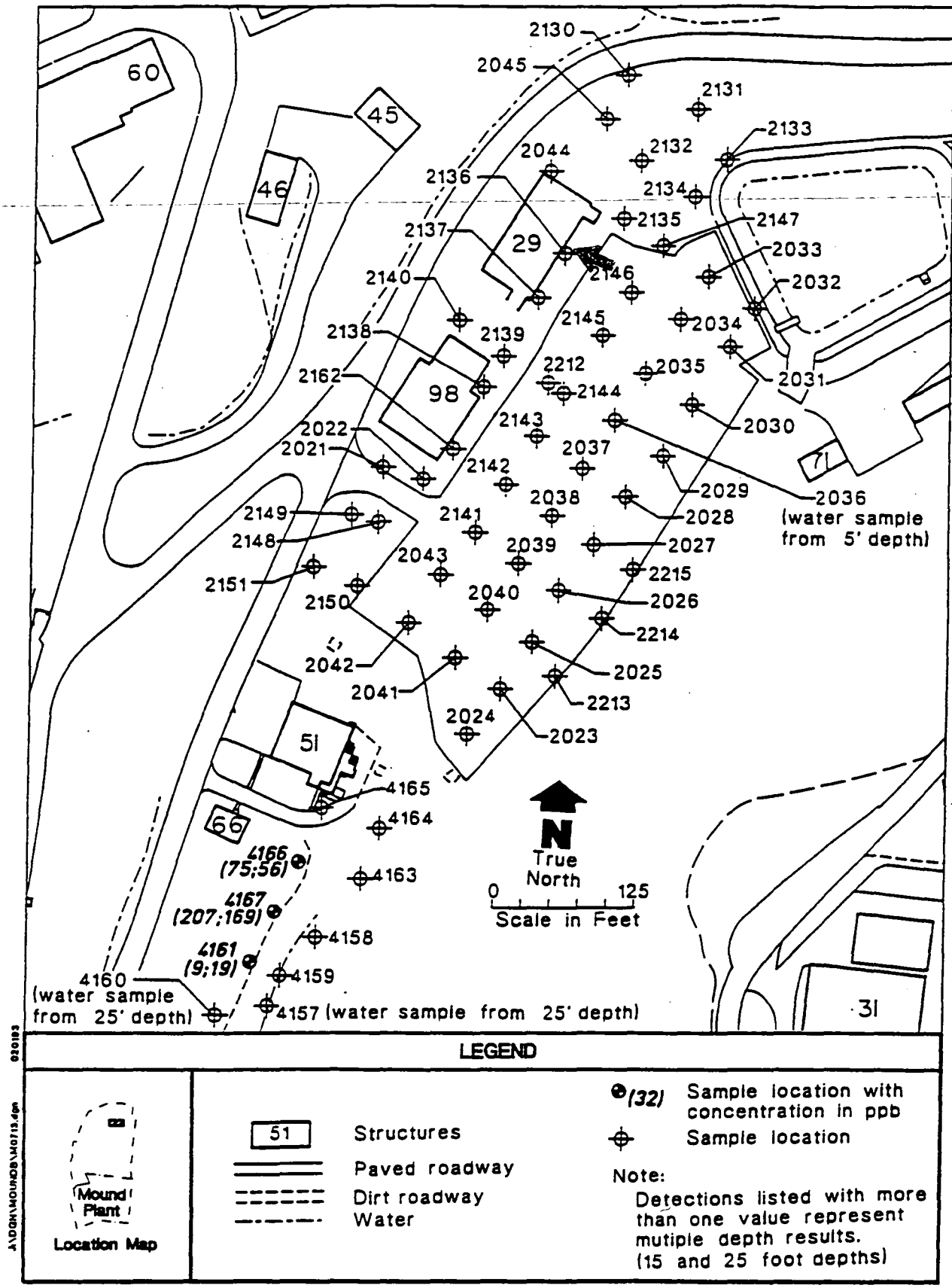

Figure 4.8. Trichloroethene Detection Map for Area 7 from 1992 Soil Gas Survey

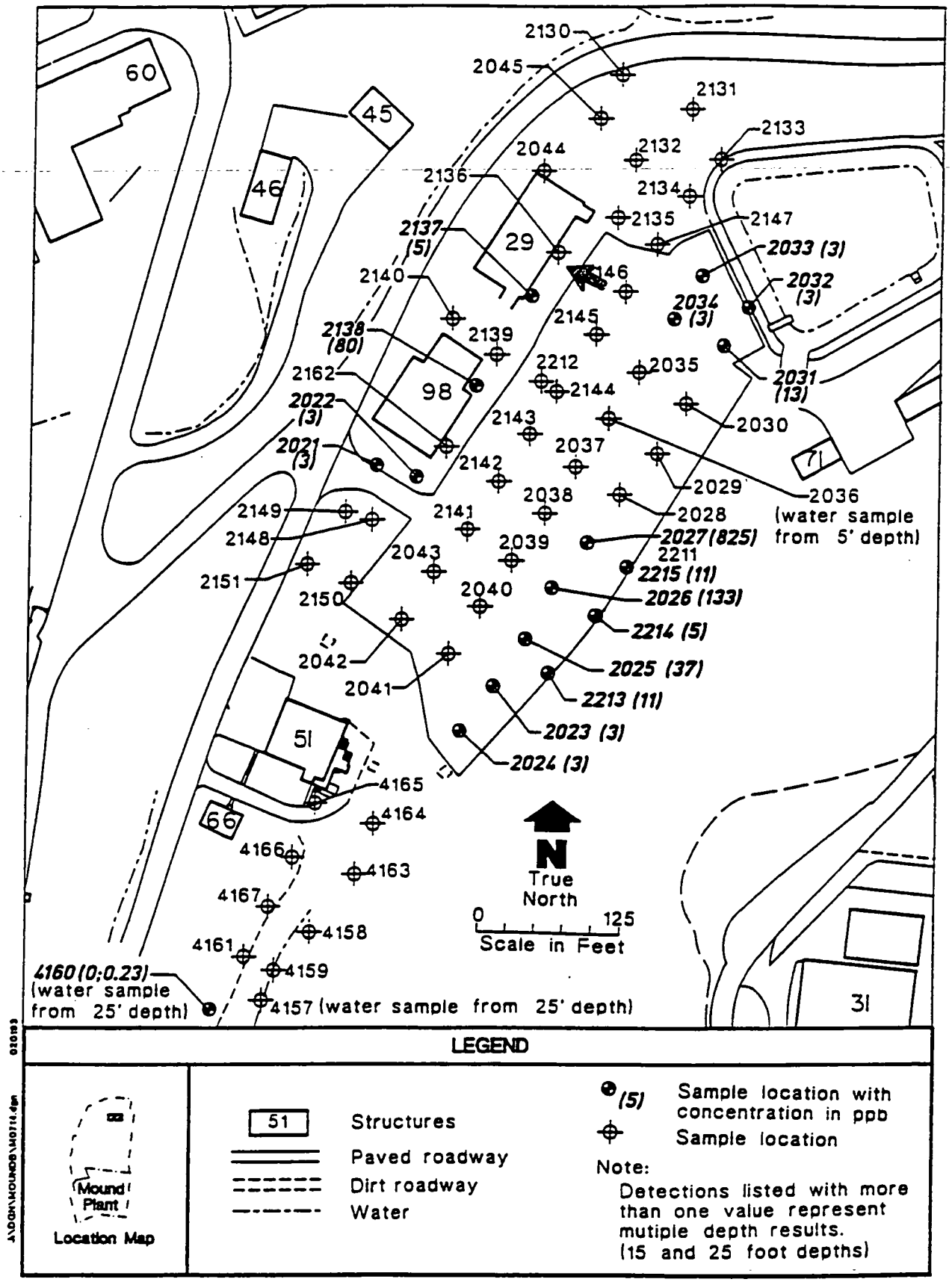

Figure 4.9. Toluene Detection Map for Area 7 from 1992 Soil Gas Survey

Document Control No.

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)

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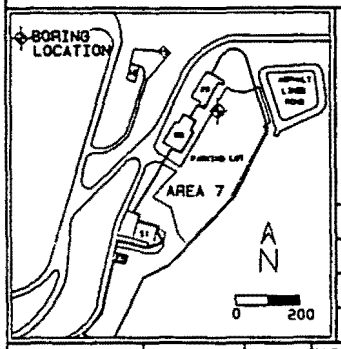
Ohio Field Office

EG&G Mound Applied Technologies



Area of Concern: Area 7
Drilling Company: Bowser-Morner
Drilling Method: 8 In. Hollow-Stem Auger
Drilling Dates: 6/23/94, 6/27/94, 6/28/94
Logged By: Greg Loder
Total Depth (ft BGS): 40.0

COORDINATES
State Plane; Northing: 598698.4910
Easting: 1497045.0900
Mound Plant; South: 1914.0967
West: 2101.4955
Ground Surface Elevation (ft MSL): 809.91

GROUNDWATER	DEPTH (ft BGS)	COMMENTS
▼	17.5	Encountered during drilling. Sample collected.
▽		
▽		

BLOW COUNTS	RECOVERY (ft)	F.I.D. (ppm)	DEPTH (ft BGS)	SAMPLES Geotech.	SAMPLES Water	SAMPLES Soil	LITHOLOGY	USCS	DESCRIPTION / COMMENTS
NA	2.0	0				B03001		GM	0-0.5 Asphalt 0.5-2.5 SILT, SAND and GRAVEL; nonplastic, very fine to very coarse sand, angular to subangular granules and pebbles; very loose; poorly sorted; dry; 10YR3/2 very dark greyish brown.
12 13 16 11	1.3	0						ML	2.5-5.0 SILT and CLAY, some coarse sand, trace gravel; plastic; soft; moist; 10YR4/3 brown.
18 16 10 11	2.6	0	4			B03002		CL	5.0-6.0 CLAY, trace fine sand; slightly plastic; firm; poorly sorted; moist; 10YR5/3 brown.
14 20 14 26	0.7	0						CL	6.0-8.0 CLAY; nonplastic; stiff; dry; laminated; 5GY6/1 greenish grey.
27 54 27 39	0.5	0	8					GC	8.0-17.0 CLAY, trace gravel; slightly plastic; firm; poorly sorted; moist; 5GY6/1 greenish grey.
27 12 12 12	1.9	0	12			B03003			
13 11 10 15	0.8	0							
24 15 14 27	0.6	0	16			B03004			
11 21 13 22	0.3	NR	▼		W03001			GC	17.0-19.0 GRAVEL, trace clay; subangular to subrounded pebbles; loose; well sorted; saturated.
10 25 11 12	0.4	0	20					GC	19.0-22.0 GRAVEL, SAND, and CLAY; subangular to rounded granules and pebbles, medium to coarse sand; plastic; soft; moderately sorted; saturated; 10 YR4/6 dark yellowish brown.
10 14 25 35	0.3	0						GW	22.0-24.0 GRAVEL; subrounded to rounded granules, pebbles and cobbles ; very loose; poorly sorted; saturated.
12 10 17 14	1.8	0	24			B03005		CL	24.0-33.0 CLAY, some coarse sand, trace gravel; plastic; firm; poorly sorted; moist; 10YR4/6 dark yellowish brown.
16 21 30 19	0.6	0	28						

BLOW COUNTS	RECOVERY (ft)	F.I.D. (ppm)	DEPTH (ft BGS)	SAMPLES: Geotech.	SAMPLES: Water	SAMPLES: Soil	LITHOLOGY	USCS	
21 17 28 25	1.4	NR						CL	
20 16 39 38	1.1	NR							
			32						
29 28 31 30	1.9	NR						CL	33.0-40.0 CLAY, trace coarse sand and gravel; slightly plastic; very stiff; poorly sorted; moist; N/4 dark grey.
17 31 42 44	1.9	8.0				B03008			VOA sample only collected
			36						
31 36 41 49	2.0	0							
37 41 30 41	0.8	10.0				B03007			
			40						LEL=10%; VOA sample only collected. Boring abandoned. Bottom of boring at 40.0 ft.
			44						
			48						
			52						
			56						
			60						

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:
B01	6 inches	20		0.9	
	2	19		0.7	
	3.5	11		0.8	
	5-7	23		0.7	
	10-12	12		1.0	
	15-17	30	a	0.7	
	20-22	24		0.9	
	25-27	17		0.8	
	30-32	20		1.1	
B02	6 inches	0		0.0	
	2	0		0.6	
	3.5	24		1.1	
	5-7	9		1.7	
B03	0-2	14		0.6	
	4-6	0		1.0	
	10-12	32	a	1.2	
	15-17	26	a	0.7	
	25-28	25	a	0.7	
	36-38	10		1.6	
	38-40	0		0.7	
B04	6 inches	12		0.5	
	2	23		0.8	
	3.5	18		1.8	
	5-7	14		0.9	
	5-9	16		1.1	
B05	6 inches	25	a	0.9	
	2	26	a	1.5	
	3.5	22		2.0	a
	3-5	11		1.2	
B06	6 inches	0		0.5	
	2	16		0.9	
	2-4	21		1.2	
	5-10	7		1.0	
	10-16	20		1.6	
B07	15-17	0		18.3	a
	15-17	9		8.7	a
B08	6 inches	0		1.3	
	2	11		1.1	
	5-10	25	a	1.0	
	10-22	0		0.9	

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

	B01	B02	B03	B04
	Value	Value	Value	Value
RADIONUCLIDES (pCi/g)				
Pu-238	ND	ND	ND	0.19
Ra-226	ND	ND	ND	0.49
Th-228	0.650 J	0.26	0.25	0.39
Th-230	1.310 J	0.1	ND	0.390 J
Th-232	0.450 J	ND	ND	0.290 J
U-235	0.060 J	0.12	0.050 J	0.04
U-238	0.910 J	0.39	0.380 J	0.62

	B05	B06	B07	B08
	Value	Value	Value	Value
RADIONUCLIDES (pCi/g)				
K-40	19.52	23.720 J	13.94	13.17
Pu-238	0.24	ND	1.36	ND
Pu-239/40	ND	ND	0.12	ND
Ra-226	ND	0.7	0.66	0.4
Th-228	1.21	ND	1.530 J	ND
Th-230	1.040 J	0.74	0.92	ND
Th-232	1.020 J	0.560 J	1.000 J	0.060 J
Tritium	ND	ND	4.7	3.4
U-234	1.19	0.79	0.44	0.63
U-235	0.23	ND	ND	0.12
U-238	1.23	0.690 J	0.790 J	0.710 J

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

	B01				B02			
	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	11.000	15.0-17.0	19.570	10.0-12.0	34.080	5.0-7.0	34.080	5.0-7.0
Pu-238	0.180 J	5.0-7.0	0.210	10.0-12.0	ND	NA	ND	NA
Ra-226	0.580	25.0-27.0	0.720	20.0-22.0	0.680	5.0-7.0	0.680	5.0-7.0
Th-228	0.290 J	25.0-27.0	0.540	20.0-22.0	0.580	5.0-7.0	0.580	5.0-7.0
Th-230	0.180	5.0-7.0	0.540	20.0-22.0	0.430	5.0-7.0	0.430	5.0-7.0
Th-232	0.050 J	25.0-27.0	0.300	20.0-22.0	0.430	5.0-7.0	0.430	5.0-7.0
U-235	0.030 J	15.0-17.0	0.250	5.0-7.0	0.110 J	5.0-7.0	0.110 J	5.0-7.0
U-238	0.650	10.0-12.0	1.000	30.0-32.0	1.140 J	5.0-7.0	1.140 J	5.0-7.0

	B03				B04			
	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	11.650	25.0-28.0	25.590	10.0-13.0	24.230	5.0-9.0	25.750	5.0-9.0
Th-228	0.540	5.0-7.0	1.060 J	15.0-19.0	0.550 J	5.0-9.0	0.690 J	5.0-9.0
Th-230	0.260 J	10.0-13.0	1.190 J	25.0-28.0	0.250 J	5.0-9.0	0.530 J	5.0-9.0
Th-232	0.290 J	10.0-13.0	0.730 J	15.0-19.0	0.240 J	5.0-9.0	0.420 J	5.0-9.0
U-235	0.060 J	25.0-28.0	0.140 J	5.0-7.0	0.040	5.0-9.0	0.040	5.0-9.0
U-238	0.740 J	5.0-7.0	0.790 J	10.0-13.0	0.740 J	5.0-9.0	0.850	5.0-9.0

	B05				B06			
	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	25.680	5.0-7.0	25.680	5.0-7.0	24.480 J	10.0-16.0	28.300 J	5.0-10.0
Th-228	0.630 J	5.0-7.0	0.630 J	5.0-7.0	ND	NA	ND	NA
Th-230	0.460 J	5.0-7.0	0.460 J	5.0-7.0	0.810	10.0-16.0	1.230	5.0-10.0
Th-232	0.420 J	5.0-7.0	0.420 J	5.0-7.0	0.750 J	5.0-10.0	0.920 J	10.0-16.0
U-234	ND	NA	ND	NA	0.740	5.0-10.0	0.740	5.0-10.0
U-238	0.710	5.0-7.0	0.710	5.0-7.0	0.870 J	10.0-16.0	1.140 J	5.0-10.0

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

	B01	B02	B03	B04
	Value	Value	Value	Value
EXPLOSIVES (µg/kg)				
4,4'-DDT	0.290 J	0.420 J	ND	ND
PESTICIDES/PCBs (µg/kg)				
Aldrin	ND	0.170 J	0.770 J	ND
alpha-Chlordane	ND	ND	ND	7.1
Endrin	0.330 J	ND	0.460 J	ND
Endrin Ketone	ND	ND	2.000 J	ND
gamma-Chlordane	ND	ND	0.780 J	8.5
Heptachlor	0.140 J	ND	ND	0.410 J
Heptachlor Epoxide	0.560 J	ND	ND	ND
p,p'-Methoxychlor	ND	1.800 J	ND	0.780 J

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

	B01	B02	B03	B04
	Value	Value	Value	Value
SEMI-VOLATILE ORGANICS (µg/kg)				
2-Methylnaphthalene	ND	ND	58.000 J	ND
Acenaphthene	62.000 J	ND	ND	61.000 J
Acenaphthylene	ND	ND	ND	ND
Anthracene	130.000 J	26.000 J	47.000 J	110.000 J
Benzo(a)anthracene	280.000 J	64.000 J	190.000 J	270.000 J
Benzo(a)pyrene	230.000 J	52.000 J	270.000 J	290.000 J
Benzo(b)fluoranthene	430	120.000 J	460	340.000 J
Benzo(g,h,i)perylene	54.000 J	ND	110.000 J	230.000 J
Benzo(k)fluoranthene	750	210.000 J	780	700
Benzoic Acid	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	80.000 J	67.000 J	ND	ND
Butylbenzylphthalate	ND	ND	ND	ND
Carbazole	60.000 J	ND	37.000 J	57.000 J
Chrysene	240.000 J	60.000 J	230.000 J	300.000 J
Di-n-butylphthalate	66.000 J	ND	ND	ND
Dibenzo(a,h)anthracene	ND	ND	ND	72.000 J
Fluoranthene	640	140.000 J	430	570
Fluorene	59.000 J	ND	ND	68.000 J
Indeno(1,2,3-c,d)pyrene	75.000 J	ND	120.000 J	200.000 J
Naphthalene	ND	ND	ND	ND
Phenanthrene	520	98.000 J	230.000 J	480
Pyrene	340.000 J	91.000 J	620	480
VOLATILE ORGANICS (µg/kg)				
Hexane	ND	ND	4.000 J	ND

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

	B03				B04			
	MINIMUM		MAXIMUM		MINIMUM		MAXIMUM	
	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)
PESTICIDES/PCB's (µg/kg)								
4,4'-DDE	0.840 J	15.0-19.0	3.500 J	5.0-7.0	ND	NA	ND	NA
Dieldrin	4.500 J	5.0-7.0	4.500 J	5.0-7.0	ND	NA	ND	NA
Endrin Aldehyde	0.600 J	10.0-13.0	0.600 J	10.0-13.0	ND	NA	ND	NA
Heptachlor Epoxide	0.230 J	15.0-19.0	0.230 J	15.0-19.0	ND	NA	ND	NA
SEMI-VOLATILE ORGANICS (µg/kg)								
Anthracene	48.000 J	5.0-7.0	91.000 J	15.0-19.0	58.000 J	5.0-9.0	58.000 J	5.0-9.0
Benzo(a)anthracene	180.000 J	5.0-7.0	220.000 J	15.0-19.0	160.000 J	5.0-9.0	160.000 J	5.0-9.0
Benzo(a)pyrene	160.000 J	5.0-7.0	200.000 J	15.0-19.0	170.000 J	5.0-9.0	170.000 J	5.0-9.0
Benzo(b)fluoranthene	260.000 J	5.0-7.0	320.000 J	15.0-19.0	200.000 J	5.0-9.0	200.000 J	5.0-9.0
Benzo(g,h,i)perylene	49.000 J	5.0-7.0	73.000 J	15.0-19.0	ND	NA	ND	NA
Benzo(k)fluoranthene	450.000 J	5.0-7.0	550.000	15.0-19.0	420.000 J	5.0-9.0	420.000 J	5.0-9.0
bis(2-Ethylhexyl)phthalate	43.000 J	15.0-19.0	43.000 J	15.0-19.0	ND	NA	ND	NA
Carbazole	47.000 J	15.0-19.0	47.000 J	15.0-19.0	ND	NA	ND	NA
Chrysene	160.000 J	5.0-7.0	210.000 J	15.0-19.0	180.000 J	5.0-9.0	180.000 J	5.0-9.0
Di-n-butylphthalate	44.000 J	15.0-19.0	130.000 J	5.0-7.0	ND	NA	ND	NA
Dibenzo(a,h)anthracene	46.000 J	15.0-19.0	55.000 J	5.0-7.0	ND	NA	ND	NA
Fluoranthene	360.000 J	5.0-7.0	480.000	15.0-19.0	360.000 J	5.0-9.0	360.000 J	5.0-9.0
Fluorene	44.000 J	15.0-19.0	44.000 J	15.0-19.0	ND	NA	ND	NA
Indeno(1,2,3-c,d)pyrene	110.000 J	5.0-7.0	120.000 J	15.0-19.0	ND	NA	ND	NA
Phenanthrene	260.000 J	5.0-7.0	410.000 J	15.0-19.0	260.000 J	5.0-9.0	260.000 J	5.0-9.0
Pyrene	310.000 J	5.0-7.0	420.000	15.0-19.0	360.000 J	5.0-9.0	360.000 J	5.0-9.0
VOLATILE ORGANICS (µg/kg)								
Acetone	22.000 J	15.0-19.0	59.000 J	5.0-7.0	14.000 J	5.0-9.0	40.000 J	5.0-9.0
Acetonitrile	61.000 J	25.0-28.0	61.000 J	25.0-28.0	ND	NA	ND	NA
Methylene Chloride	150.000	15.0-19.0	150.000	15.0-19.0	ND	NA	ND	NA

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

	B01	B02	B03	B04
	Value	Value	Value	Value
ANIONS (mg/kg)				
Chloride	55.400 J	153.000 J	69.5	61.6
Fluoride	2.330 J	8.320 J	2.64	4.090 J
Sulfate	208.000 J	250.000 J	67.6	222.000 J
Nitrate-Nitrite-N	1.080 J	ND	ND	ND
TOTAL ORGANIC CARBON (mg/kg)				
Organic Carbon	18300	27700	102000	21200
METALS (mg/kg)				
Aluminum	7800.000 J	2440.000 J	2760.000 J	6510.000 J
Antimony	2.100 J	2.600 J	3.000 J	2.100 J
Arsenic	8.000 J	4.200 J	4.200 J	11.500 J
Barium	50.900 J	11.700 J	22.000 J	46.400 J
Beryllium	0.38	0.12	0.14	0.35
Bismuth	141	ND	ND	ND
Cadmium	0.220 J	ND	ND	ND
Calcium	69600	171000	151000	171000
Chromium	10.100 J	4.200 J	11.500 J	8.700 J
Cobalt	5.500 J	1.900 J	2.600 J	5.700 J
Copper	13	4.4	6.8	13
Iron	12000	4870.000 J	6110.000 J	11600
Lead	9.800 J	5.000 J	8.800 J	11.900 J
Lithium	10.500 J	ND	6.400 J	11.200 J
Magnesium	35600	89900	60300	27600
Manganese	367.000 J	163.000 J	219.000 J	401.000 J
Mercury	ND	ND	ND	ND
Molybdenum	2.000 J	ND	ND	3.600 J
Nickel	11.4	4.3	9.3	11
Potassium	1090.000 J	701.000 J	694.000 J	1030.000 J
Sodium	170	369	260	205
Tin	ND	ND	ND	ND
Vanadium	16.600 J	6.100 J	14.300 J	12.200 J
Zinc	44.600 J	12.000 J	17.600 J	37.300 J

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

	B01	B02	B03	B04
	Value	Value	Value	Value
LANTHANIDES (mg/kg)				
Erbium	ND	7.500 J	ND	7.200 J
Europium	ND	ND	ND	1.4
Gadolinium	53.900 J	ND	ND	ND
Lanthanum	7.2	ND	6.1	9.7
Neodymium	ND	ND	16.9	13.2
Praseodymium	ND	13.6	13.8	ND

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

	B03				B04			
	MINIMUM		MAXIMUM		MINIMUM		MAXIMUM	
	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)	Value	Depth (ft BGS)
ANIONS (mg/kg)								
Chloride	80.000	5.0-7.0	128.000	15.0-19.0	62.200	5.0-9.0	69.700	5.0-9.0
Fluoride	2.490	25.0-28.0	4.920	15.0-19.0	2.740 J	5.0-9.0	5.580 J	5.0-9.0
Sulfate	116.000	25.0-28.0	513.000	10.0-13.0	159.000 J	5.0-9.0	621.000 J	5.0-9.0
Nitrate-Nitrite-N	1.180 J	15.0-19.0	1.180 J	15.0-19.0	26.500 J	5.0-9.0	26.500 J	5.0-9.0
TOTAL ORGANIC CARBON (mg/kg)								
Organic Carbon	847.000 J	15.0-19.0	19100.000	5.0-7.0	460.000 J	5.0-9.0	3900.000 J	5.0-9.0
METALS (mg/kg)								
Aluminum	7340.000 J	5.0-7.0	12200.000	10.0-13.0	12700.000	5.0-9.0	14800.000	5.0-9.0
Antimony	2.300 J	10.0-13.0	3.000 J	15.0-19.0	2.200 J	5.0-9.0	3.500 J	5.0-9.0
Arsenic	2.600 J	15.0-19.0	21.500	10.0-13.0	4.500 J	5.0-9.0	26.600	5.0-9.0
Barium	19.000 J	10.0-13.0	61.500 J	25.0-28.0	22.000 J	5.0-9.0	44.600 J	5.0-9.0
Beryllium	0.370	5.0-7.0	0.630	10.0-13.0	0.630	5.0-9.0	0.730	5.0-9.0
Bismuth	8.500	25.0-28.0	10.100	15.0-19.0	10.700	5.0-9.0	12.000	5.0-9.0
Calcium	39600.000	25.0-28.0	121000.000	15.0-19.0	57600.000	5.0-9.0	69800.000	5.0-9.0
Chromium	9.900 J	5.0-7.0	13.900 J	10.0-13.0	15.400 J	5.0-9.0	16.400 J	5.0-9.0
Cobalt	5.800 J	5.0-7.0	10.800 J	10.0-13.0	11.900	5.0-9.0	13.600 J	5.0-9.0
Copper	10.100	10.0-13.0	17.400	25.0-28.0	17.200	5.0-9.0	20.500	5.0-9.0
Iron	12400.000	5.0-7.0	20800.000	10.0-13.0	21500.000	5.0-9.0	24500.000	5.0-9.0
Lead	5.900 J	15.0-19.0	15.800 J	5.0-7.0	8.200 J	5.0-9.0	15.400 J	5.0-9.0
Magnesium	13900.000	15.0-19.0	36100.000	5.0-7.0	7540.000 J	5.0-9.0	13600.000	5.0-9.0
Manganese	317.000 J	5.0-7.0	420.000 J	15.0-19.0	572.000 J	5.0-9.0	588.000 J	5.0-9.0
Nickel	12.100	5.0-7.0	19.500	10.0-13.0	22.900	5.0-9.0	23.100	5.0-9.0
Potassium	1230.000 J	5.0-7.0	3080.000 J	10.0-13.0	1560.000 J	5.0-9.0	3100.000 J	5.0-9.0
Sodium	206.000	10.0-13.0	346.000	5.0-7.0	185.000	5.0-9.0	208.000	5.0-9.0
Vanadium	11.700 J	15.0-19.0	21.200 J	25.0-28.0	15.100 J	5.0-9.0	17.000 J	5.0-9.0
Zinc	37.200 J	5.0-7.0	46.100 J	25.0-28.0	48.500 J	5.0-9.0	50.800 J	5.0-9.0
LANTHANIDES (mg/kg)								
Dysprosium	4.000	25.0-28.0	4.100	15.0-19.0	3.800	5.0-9.0	3.900	5.0-9.0
Erbium	8.000 J	5.0-7.0	8.000 J	5.0-7.0	ND	NA	ND	NA
Europium	1.100	15.0-19.0	1.400	5.0-7.0	1.700	5.0-9.0	1.800	5.0-9.0
Lanthanum	6.000	5.0-7.0	9.000	15.0-19.0	12.100	5.0-9.0	15.100	5.0-9.0
Lutetium	0.630	5.0-7.0	0.990	10.0-13.0	0.960	5.0-9.0	0.960	5.0-9.0
Neodymium	14.700	10.0-13.0	17.700	15.0-19.0	23.200	5.0-9.0	27.100	5.0-9.0
Praseodymium	44.300	5.0-7.0	60.200	15.0-19.0	ND	NA	ND	NA

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	5600
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.