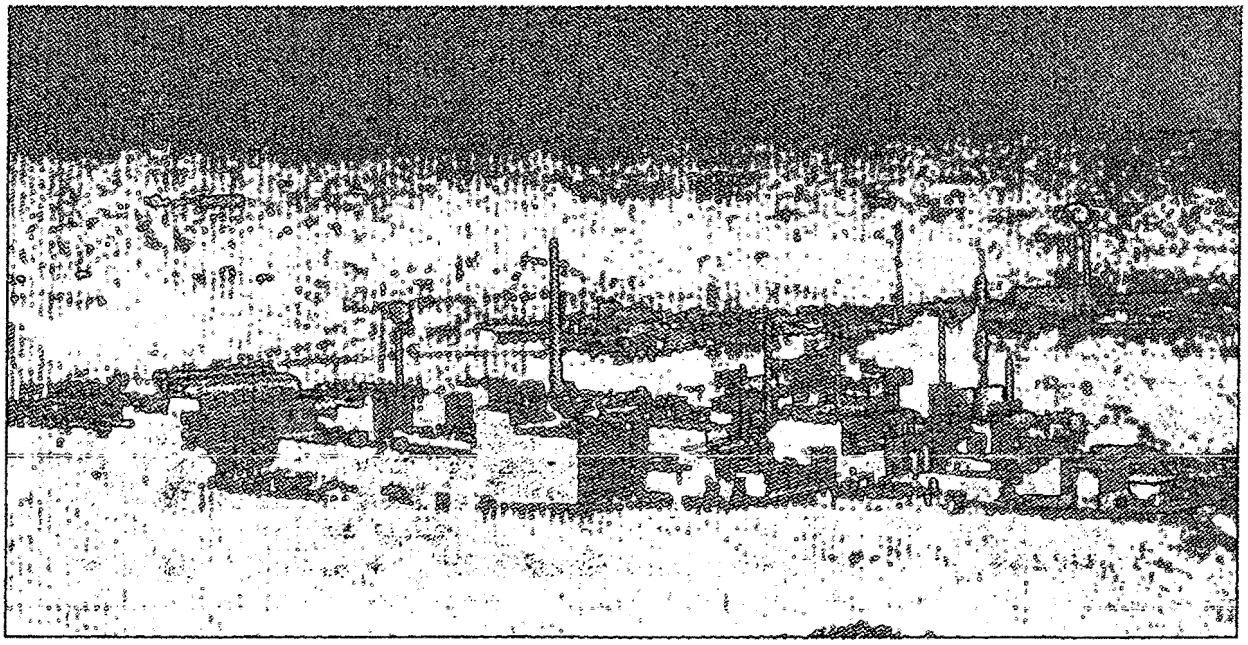
30030302-9804220001

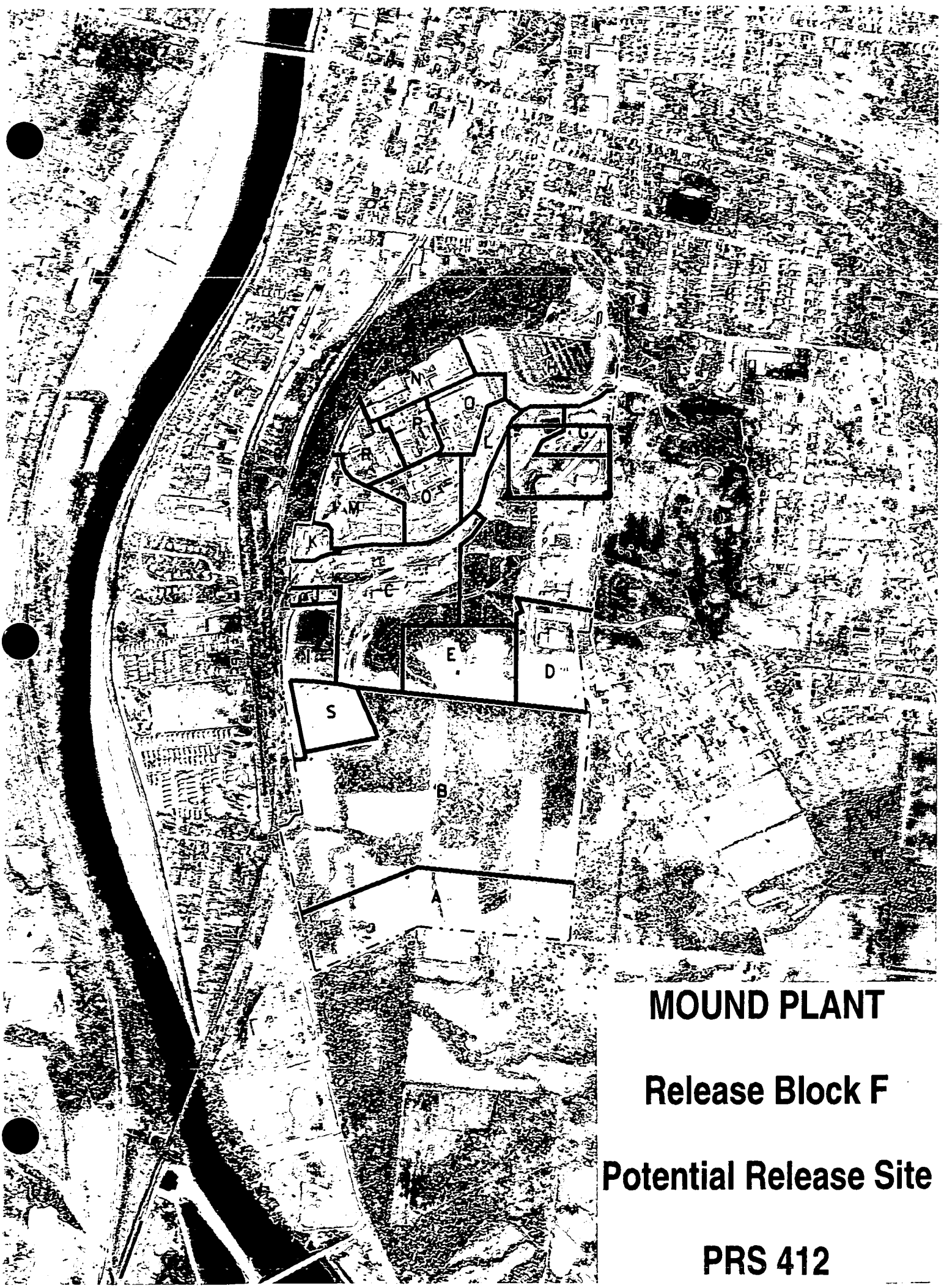
MOUND

Environmental
Restoration
Program

MOUND PLANT
Potential Release Site Package
PRS # 412



REV	DESCRIPTION	DATE
PUBLIC RELEASE **0**	Available for comments.	**Mar. 25, 1998**
FINAL RELEASE **1**		



MOUND PLANT

Release Block F

Potential Release Site

PRS 412

N
H
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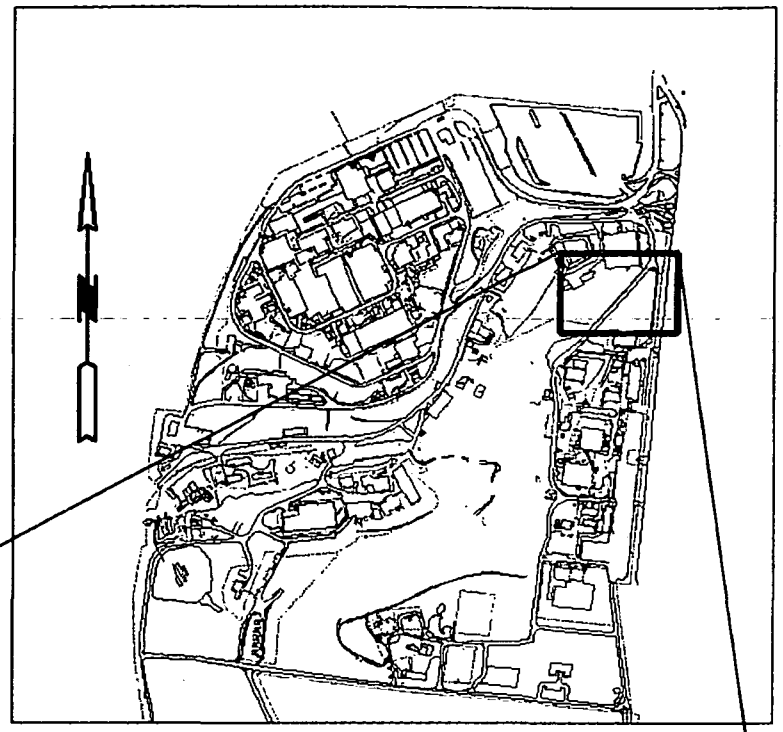
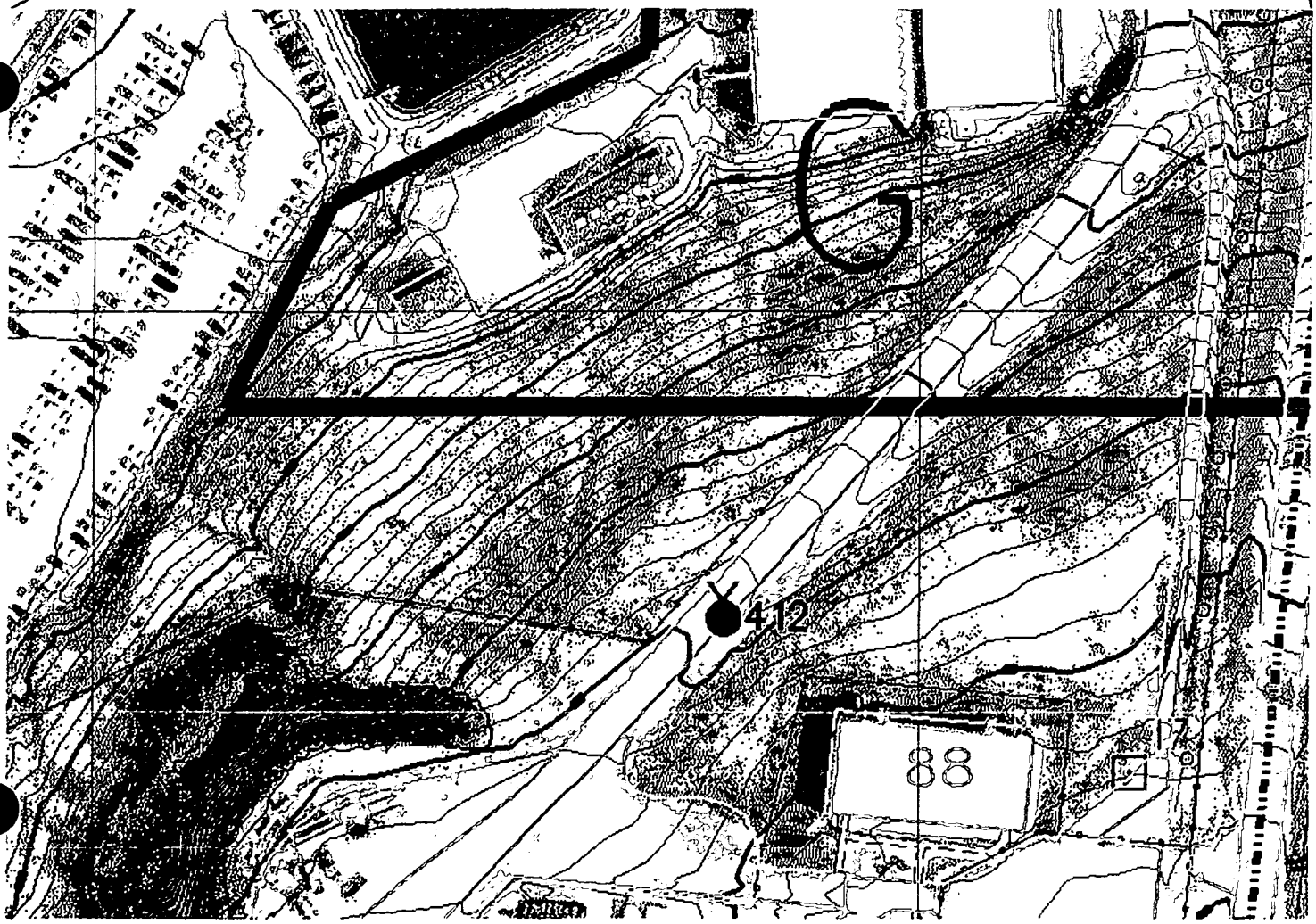
Mound Plant

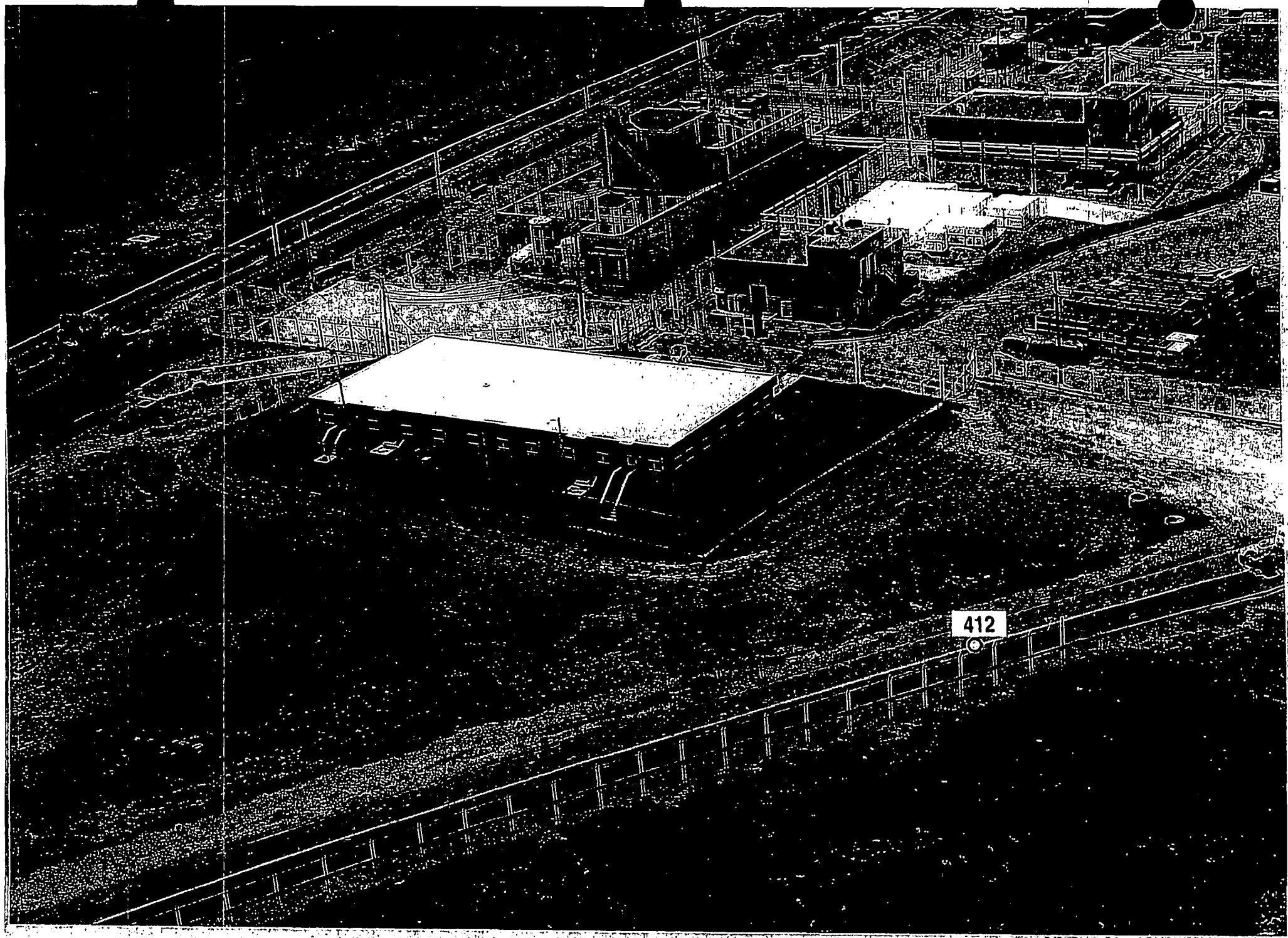
Release Block F

Potential Release Site

PRS 412






412

PRS 412

PRS HISTORY:

PRS 412 (previously known as PRS 393) is identified as a radiological hot spot located near the eastern boundary of the Mound plant on the SM hill. PRS 412 (hot spot C0033) was identified as a result of the Radiological Site Survey Project.[1]

CONTAMINATION:

1. In 1983, the ***Radiological Site Survey***[1] investigated radionuclides in the soils at the Mound site via Mound Soil Screening, radiochemistry, and gamma spectroscopy. The *Radiological Site Survey* map on page 7 shows the locations of PRS 412 to pertinent *Radiological Site Survey* samples. Results showed:

PRS	No. of Samples	Sample Type and Location	Results (Maximum)	Guideline Criteria
412	4	2 surface soil samples (one at S0253 and one at S0314) and 2 core samples (both at C0033) taken within 50 ft. of PRS 412	Plutonium-238 at 0.97 pCi/g	25 pCi/g (Mound ALARA)
			Thorium at 42.4 pCi/g at 3 ft (C0033)	15 pCi/g
			Tritium 2.07 pCi/ml	20 pCi/ml

2. In 1994, the ***OU5, Operational Area Phase I Investigation***[2] analyzed the Mound site for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) via a qualitative PETREX soil gas survey. The OU5 investigation also analyzed surface soil for radiological contamination via Mound FIDLER (field instrument for detecting low energy radiation) and Mound soil screening. Results showed:

PRS	PETREX Qualitative Results	Mound Soil Screened Sample
412	Relatively elevated halogenated hydrocarbons	9 pCi/g plutonium-238 (ALARA guideline = 25 pCi/g) 0.5 pCi/g thorium-232 (guideline = 5 pCi/g)

3. In 1996, the quantitative ***Soil Gas Confirmation Sampling***[5] investigation sampled the *PETREX* soil gas locations with the highest *PETREX* ion counts in the northern sector of the Mound plant. These locations were identified as *Soil Gas Confirmation Sampling* locations 2 and 4 (the corresponding *PETREX* sample locations are 974 and 890) respectively).

   PRS 412 (*PETREX* sample location 868), also located in Mound's northern sector had lower ion counts than *Soil Gas Confirmation Sampling* locations 974 and 890. Hence, the quantitative *Soil Gas Confirmation* results taken at the locations with the highest ion counts provide evidence about the risk of contamination at other locations with similar or lower ion counts such as PRS 412. The map on page 22 shows the locations of PRS 412 relative to the *Soil Gas Confirmation Sampling* locations 2 and 4).

The following table lists the qualitative (*PETREX*) and quantitative (*Soil Gas Confirmation Sampling*) results for the locations with the highest ion counts. The table also compares these results to the relative ion counts for PRS 412.

PETREX Soil Gas Contaminant Family	Maximum Ion Count[4]	Confirm Sample #	Confirmation Sample Results that Exceed Guideline Criteria (GC)	Ion Counts at PRS 412
Total Aromatic Hydrocarbons	7,780,673	2	None	22,326
Total Semivolatile Hydrocarbons	7,015,960	2	1300 ug/kg Benzo(a)pyrene (GC = 410 ug/kg [ref 3])	Non-detect
Total C5-C11 Petroleum Hydrocarbons	24,166,931	2	None	43,566
Total Halogenated Hydrocarbons	1,370,283	4	None	51,737

The above table and discussion make no conclusions about individual contaminant concentrations at PRS 412 only that the overall health risk from PRS 412 is expected to be similar to or less than that of the PETREX locations with the highest measured ion counts (*Confirmation Sample* locations 2 and 4).

READING ROOM REFERENCES:

1) OU9, Site Scoping Report: Volume 3 - Radiological Site Survey, June 1993. (pages 6-10)
2) OU5, Operational Area Phase I Investigation, Non-AOC Field Report, Volumes I and II, Final (Revision 0), June 1995. (pages 11-17)
3) Risk Based Guideline Values, Final, (Revision 0), December 1995.

OTHER REFERENCES:

4) Code of Federal Regulations, 40 CFR 192.41 and 40 CFR 192.12.
5) Soil Gas Confirmation Sampling, (Revision 0), May 1996. (pages 18-26)

PREPARED BY:

Dennis J. Gault, Member of EG&G Technical Staff

MOUND PLANT
PRS 412
Contaminated Soil

RECOMMENDATION:

PRS 412 (hot spot C0033) was identified as a result of the Radiological Site Survey Project. Thorium was found at 42 pCi/g at this location.

The Core Team originally recommended Further Assessment for PRS 412. Subsequently, the cost of further investigation versus the cost of removing the potentially contaminated soils was evaluated. Cost estimates indicate that the cost of removal is not significantly greater than the cost of further assessment at PRS 412. Additionally Further Assessment findings may indicate the need for a Response (removal) Action, resulting in costs associated with both Further Assessment and Response Action. Therefore, the Core Team recommends a RESPONSE ACTION as a more cost-effective course of action for PRS 412.

CONCURRENCE:

DOE/MEMP: Arthur W. Kleinrath, Remedial Project Manager — 3/19/98 (date)

USEPA: Timothy J. Fischer, Remedial Project Manager — 3/19/98 (date)

OEPA: Brian K. Nickel, Project Manager — 3/19/98 (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 412

Document Control No. DGC

Environmental Restoration Program

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

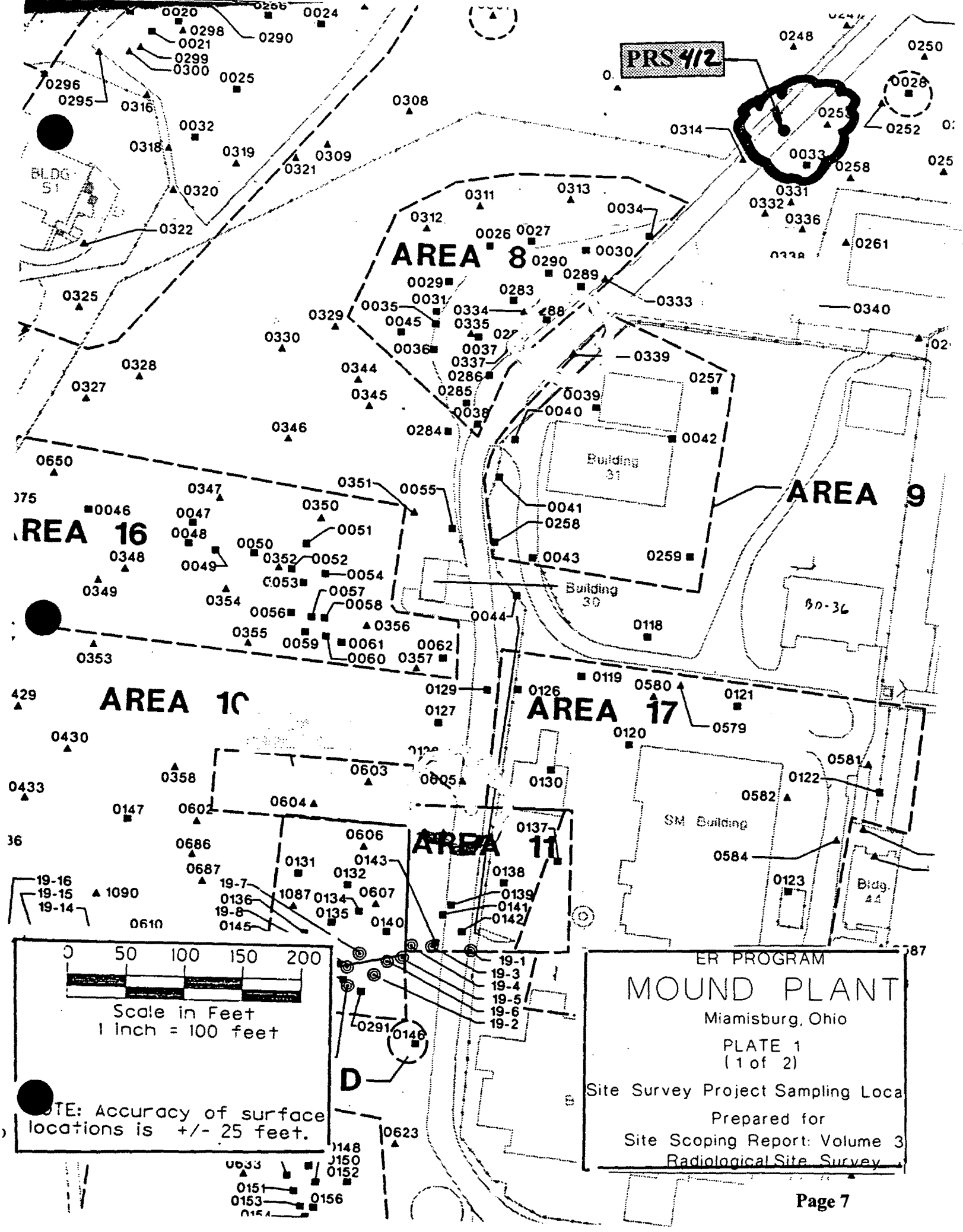
MOUND PLANT
MIAMISBURG, OHIO

June 1993

FINAL

Department of Energy
Albuquerque Field Office

Environmental Restoration Program
EG&G Mound Applied Technologies


PRS 412
AREA 8
AREA 9
AREA 16
AREA 10
AREA 17
AREA 11
Building 31
Building 30
SM Building
Bldg. 44
BLDG 51
Scale in Feet
1 inch = 100 feet
NOTE: Accuracy of surface locations is +/- 25 feet.
ER PROGRAM
MOUND PLANT
Miamisburg, Ohio
PLATE 1
(1 of 2)
Site Survey Project Sampling Loca
Prepared for
Site Scoping Report: Volume 3
Radiological Site Survey

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	[illegible]	[illegible]	[illegible][d]	[illegible]	[illegible]	[illegible]	[illegible]					

[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.

LDL - The sample result was below the Lower Detection Limit, which was estimated to be 0.5 pCi/g for cesium-137, cobalt-60, and americium-241. The LDL for radium-226 or actinium-227 was estimated to be 1 pCi/g.
NR - No result provided. (Note: no samples were taken for plutonium-238 when *in situ* gamma spectrometry was performed.)

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)
S0252	2375	1780	6500	08-84	0	0.48	b					
S0253	2375	1830	2810	10-83	0	0.86	b	2.07				
S0254	2425	1500	2824	10-83	0	1.56	b					
S0255	2425	1605	6355	08-84	0	1.42	b					
S0256	2425	1705	2823	10-83	0	0.35	b					
S0257	2425	1730	6362	08-84	0	0.01	b					
S0258	2425	1830	2822	10-83	0	0.72	b					
S0259	2450	1755	6361	08-84	0	0.01	b					
S0260	2475	1630	6356	08-84	0	0.02	b					
S0261	2475	1855	6360	08-84	0	0.01	b					
S0262	2500	1650	6357	08-84	0	0.79	b					
S0263	2500	1655	6353	08-84	0	0.03	b					
S0264	2500	1730	6354	08-84	0	0.04	b					
S0265	2525	1655	6358	08-84	0	0.02	b					
S0266	2525	1680	6352	08-84	0	0.01	b					
S0267	2525	1730	2862	10-83	0	0.05[c]	b					
S0268	2575	1655	6359	08-84	0	3.60[c]	b					
S0269	2575	1830	6350	08-84	0	0.34	b					
S0270	2625	1730	6351	08-84	0	0.13	b					

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)
			None[d]	07-84	72	NR	18					
			None[d]	07-84	84	NR	12					
			None[d]	07-84	96	NR	12					
			None[d]	07-84	108	NR	10					
			None[d]	07-84	120	NR	5.3					
C0028	2375	1755	1245	12-82	18	11.40	5.61					
			1246	12-82	48	NR	109.00					
			1247	12-82	66	NR	109.00					
			1248	12-82	102	NR	58.00					
			1250	12-82	156	NR	97.00					
			1251	12-82	216	0.29[c]	29.45[c]					
			1252	12-82	234	0.06	b					
			1253	12-82	252	0.03	b					
S0314	2375	1910	2820	10-83	0	0.78	b					
C0029	2374.1	2184.3	None[d]	07-84	0	NR	12					
			None[d]	07-84	12	NR	17					
			None[d]	07-84	24	NR	17					
			None[d]	07-84	36	NR	38					
			None[d]	07-84	48	NR	53					
			None[d]	07-84	60	NR	42					
			None[d]	07-84	72	NR	36					
			None[d]	07-84	84	NR	38					
			None[d]	07-84	96	NR	55					
			None[d]	07-84	108	NR	48					
			None[d]	07-84	120	NR	36					
			None[d]	07-84	132	NR	21					
			None[d]	07-84	144	NR	17					

Document Control No.

Environmental Restoration Program

OPERABLE UNIT 5
OPERATIONAL AREA PHASE I INVESTIGATIO
NON-AOC FIELD REPORT

MOUND PLANT
MIAMISBURG, OHIO

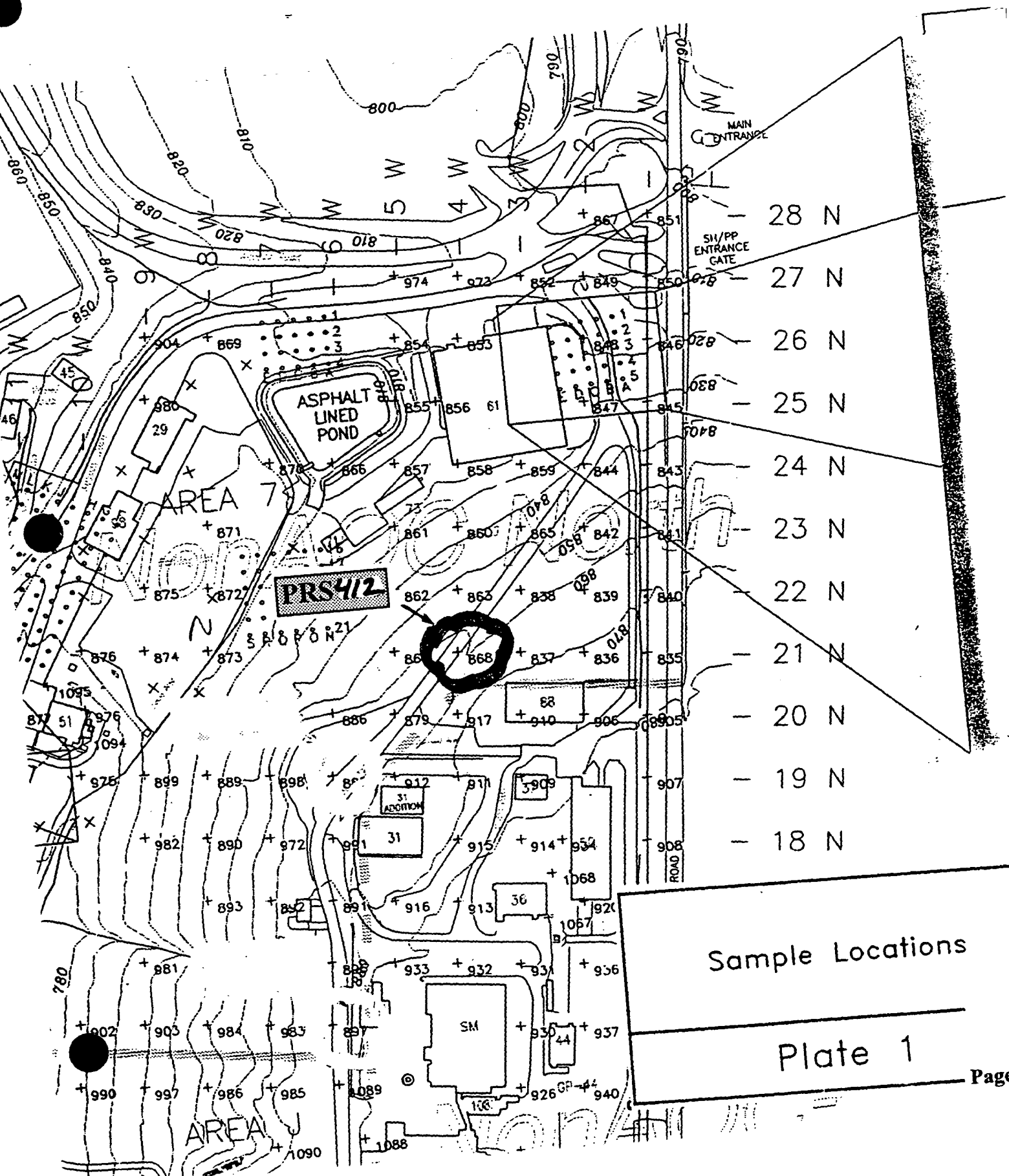
VOLUME II - APPENDICES A-G

June 1995

Final (Revision 0)

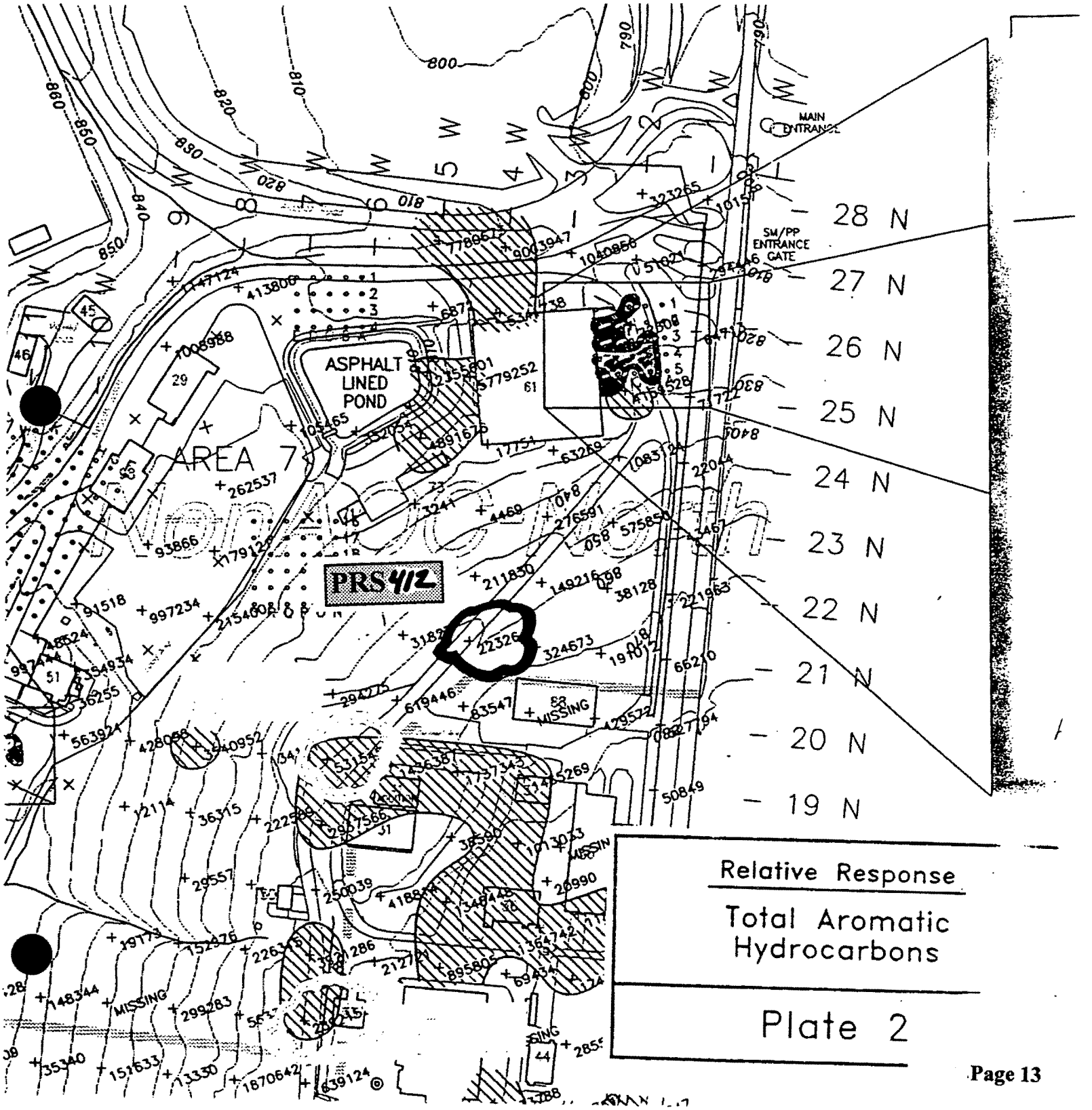
U.S. Department of Energy
Ohio Field Office

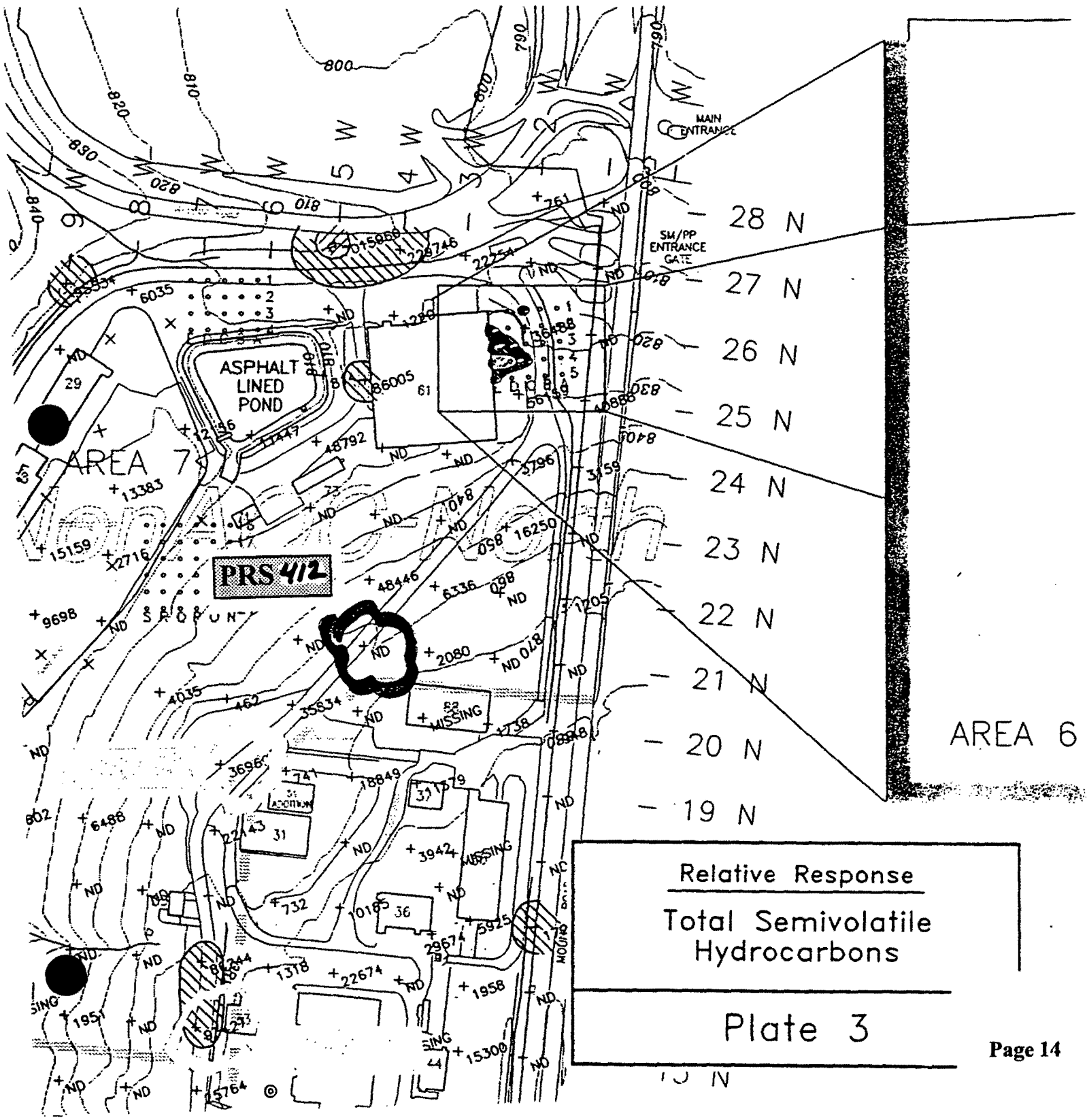
EG&G Mound Applied Technologies



Sample Locations

Plate 1

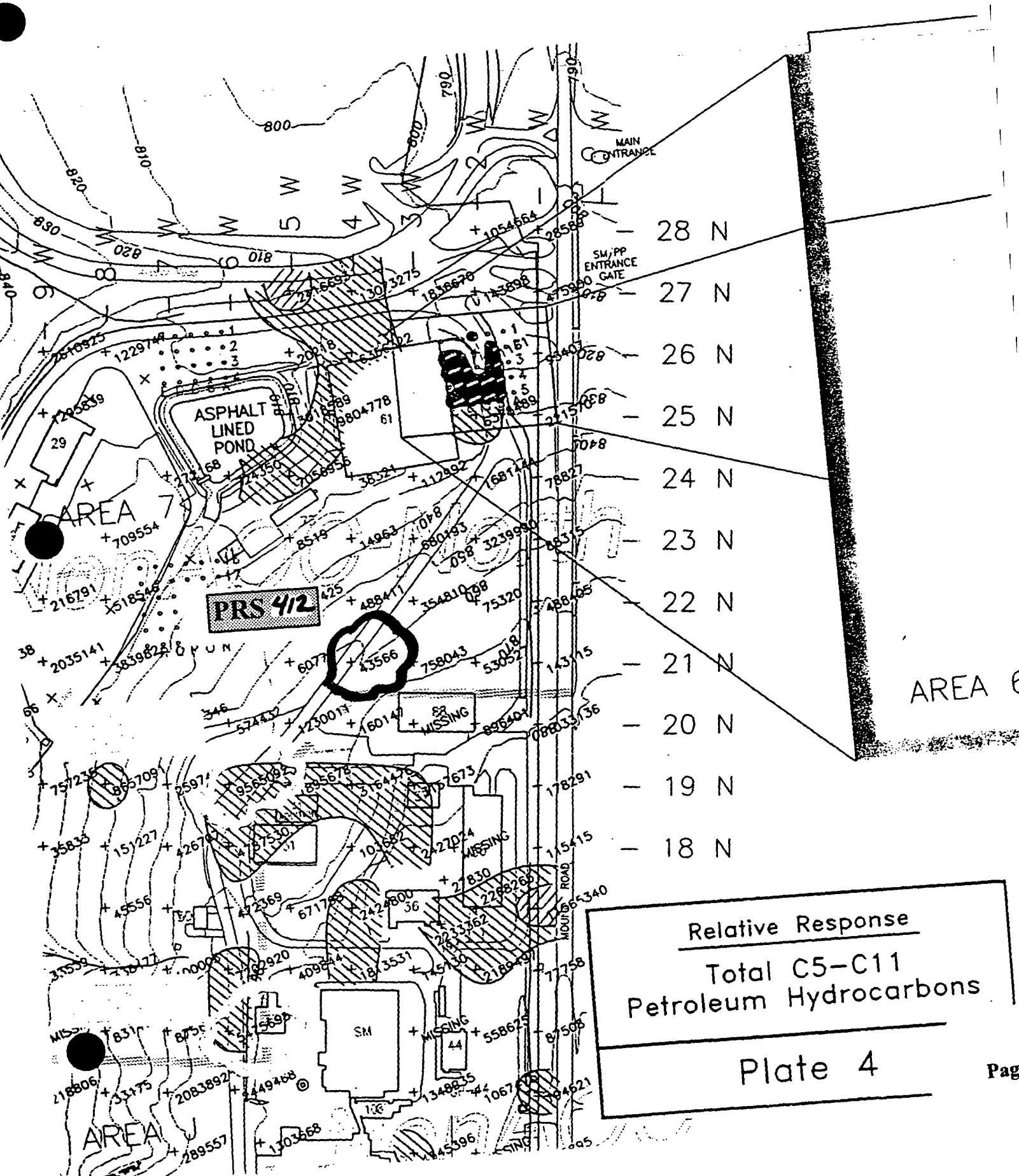

ASPHALT LINED POND
AREA 7
PRS 412
MAIN ENTRANCE
SM/PP ENTRANCE GATE
28 N
27 N
26 N
25 N
24 N
23 N
22 N
21 N
20 N
19 N
Relative Response
Total Aromatic Hydrocarbons
Plate 2



Relative Response

Total Semivolatile Hydrocarbons

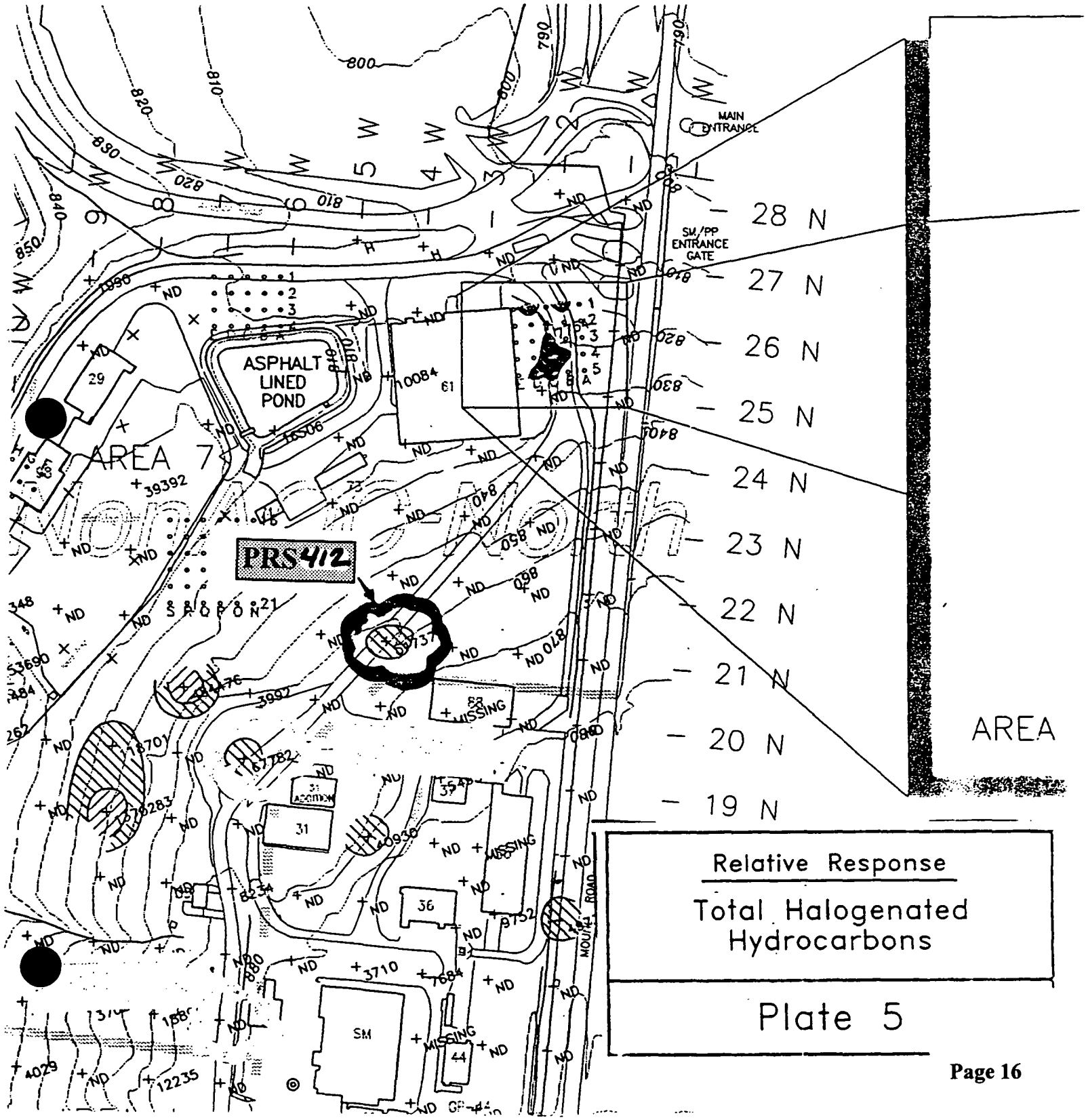
Plate 3



Relative Response

Total C5–C11 Petroleum Hydrocarbons

Plate 4



Relative Response

Total Halogenated Hydrocarbons

Plate 5

APPENDIX D

RADIOLOGICAL DATA (FIDLER SURVEY MOUND SOIL SCREENING FACILITY DATA) FOR NON-AOC POINTS

	FIDLER SURVEY DATA					MOUND SOIL SCREENING FACILITY DATA			
SMPID	Contamination Criteria CH1	FIDLER Readings CH1	Contamination Criteria CH2	FIDLER Readings CH2	FIDLER Readings Out Channel	Plutonium - 238		Thorium - 232	
	Units: CPM	Units: CPM	Units: KCPM	Units: KCPM	Units: KCPM	Units: pCi/g		Units: pCi/g	
	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	Note:	RESULTS	Note:
20N03	130	100	6.5	6.5	NC	0	a	0.3	a
20N04	176.8	110	8.97	7.5	NC	0	a	1.1	a
20N05	176.8	85	8.97	4.5	NC	WIPE	c	WIPE	c
20N06	176.8	375	8.97	22.0	30	27	b	2.6	b
20N07	176.8	325	8.97	22.5	45	37	b	14.7	b
20N10	157.3	95	8.45	4.5	NC	0	a	0.6	a
20N11	157.3	80	8.45	4.0	NC	WIPE	c	WIPE	c
21N01	253.5	140	12.48	9.5	NC	15	a	1	a
						3	a	0.8	a
21N02	176.8	140	8.97	6.5	NC	7	a	1	a
						19	a	0.7	a
21N03	176.8	160	8.97	8.0	NC	20	a	1.2	a
21N04	176.8	100	8.97	5.0	NC	9	a	0.5	a
21N05	152.1	110	8.45	10.0	NC	11	a	1.8	a
21N08	176.8	85	8.97	4.5	NC	WIPE	c	WIPE	c
21N09	176.8	75						IPE	c
21N10	157.3	90							a
22N01	253.5	145							a
22N02	176.8	135							a
22N03	176.8	115							a
22N04	152.1	100							b
22N05	152.1	105							a
22N08	176.8	115						PE	c
22N09	176.8	95						PE	c
23N01	253.5	170							a
23N02	176.8	160							a
									a
									a

NC - No sample collected because location not an original grid point
NA - Reading not taken; contamination criteria not exceeded.
NS - Sample collected but not analyzed.
a - Mound Soil Screening Facility detection level not exceeded.
c - Results of the wipe sample were less than 20 disintegrations per minute.
CPM - Counts per minute
KCPM - Counts per minute x 1000
pCi/g - Picocuires per gram

MOUND

Environmental
Restoration
Program

Further Assessment

Soil Gas Confirmation Sampling

Mound Plant
Miamisburg, Ohio

May 1996

Revision 0

Department of Energy

EG&G Mound Applied Technologies

Table I.1 Soil Analyte List

Volatile Organic Compounds

Acetone	Dibromochloromethane	4-Methyl-2-Pentanone
Benzene	1,1-Dichloroethane	Styrene
Bromodichloromethane	1,2-Dichloroethane	1,1,2,2-Tetrachloroethane
Bromoform	1,1-Dichloroethene	Tetrachloroethene
Bromomethane	1,2-Dichloroethene (total)	1,1,1-Trichloroethane
2-Butanone	1,2-Dichloropropane	1,1,2-Trichloroethane-
Carbon Disulfide	cis-1,3-Dichloropropene	Trichloroethene
Carbon Tetrachloride	trans-1,3-Dichloropropene	Toluene
Chlorobenzene	Ethylbenzene	Vinyl Acetate
Chloroethane	2-Hexanone	Vinyl Chloride
Chloroform	Methylene Chloride	Xylenes (total)
Chloromethane		

Semivolatile Organic Compounds

Acenaphthene	Chrysene	Hexachlorobenzene
Acenaphthylene	Dibenz(a,h)anthracene	Hexachlorobutadiene
Anthracene	Dibenzofuran	Hexachlorocyclopentadiene
Benzo(a)anthracene	1,2-Dichlorobenzene	Hexachloroethane
Benzo(a)pyrene	1,3-Dichlorobenzene	Indeno(1,2,3-cd)pyrene
Benzo(b)fluoranthene	1,4-Dichlorobenzene	Isophorone
Benzo(g,h,i)perylene	3,3-Dichlorobenzidine	2-Methylnaphthalene
Benzo(k)fluoranthene	2,4-Dichlorophenol	2-Methylphenol
bis(2-Chloroethoxy)methane	Diethylphthalate	4-Methylphenol
bis(2-Chloroethyl)ether	2,4-Dimethylphenol	Naphthalene
bis(2-Ethylhexyl)phthalate	Dimethyphthalate	2-Nitroaniline
4-Bromophenyl-phenylether	Di-n-butylphthalate	3-Nitroaniline
Butylbenzylphthalate	Di-n-octylphthalate	4-Nitroaniline
Carbazole	4,6-Dinitro-2-methylphenol	Nitrobenzene
4-Chloroaniline	2,4-Dinitrophenol	2-Nitrophenol
4-Chloro-3-methylphenol	2,4-Dinitrotoluene	4-Nitrophenol
2-Chloronaphthalene	2,6-Dinitrotoluene	N-Nitroso-di-n-propylamine
2-Chlorophenol	Fluoranthene	N-Nitroso-diphenylamine
4-Chlorophenyl-phenylether	Fluorene	2,2-oxybis(1-Chloropropane)
Pentachlorophenol	Pyrene	2,4,5-Trichlorobenzene
Phenanthrene	1,2,4-Trichlorobenzene	2,4,6-Trichlorobenzene
Phenol		

Table I.1 Soil Analyte List (Continued)		
Pesticides/PCB's		
Aroclor-1016	Delta-BHC	Endosulfan II
Aroclor-1221	Gamma-BHC	Endosulfan sulfate
Aroclor-1232	alpha-Chlordane	Endrin
Aroclor-1242	gamma-Chlordane	Endrin aldehyde
Aroclor-1248	4,4'-DDD	Endrin ketone
Aroclor-1254	4,4'-DDE	Heptachlor
Aroclor-1260	4,4'-DDT	Heptachlor epoxide
Aldrin	Dieldrin	Methoxychlor
Alpha-BHC	Endosulfan I	Toxaphene
Beta-BHC		
Inorganics		
Aluminum	Copper	Potassium
Antimony	Cyanide	Selenium
Arsenic	Iron	Silver
Barium	Lead	Sodium
Beryllium	Lithium	Thallium
Bismuth	Magnesium	Tin
Cadmium	Manganese	Vanadium
Calcium	Mercury	Zinc
Chromium	Molybdenum	Nitrate/Nitrite
Cobalt	Nickel	Explosives (USATHAMA,PETN)
Radionuclides		
Americium-241	Plutonium-238	Thorium-230
Bismuth-207	Plutonium-239/240	Thorium-232
Bismuth-210	Potassium-40	Uranium-234
Cesium-137	Radium-226	Uranium-235
Cobalt-60	Thorium-228	Uranium-238

Table I.2. Variance From 3-Foot Sampling Depth Specification

Location	Description of Variance
SGC-NAC-000001	Core sampler hit refusal at 2 feet.
SGC-NAC-000002	Relocated due to utilities.
SGC-NAC-000003	Core sampler hit refusal at 2 feet.
SGC-NAC-000004	Core sampler hit refusal at 18 inches.
SGC-NAC-000005	Drilled to 1 foot, hand-augered rest due to utilities.
SGC-NAC-000006	Drilled to 1 foot, hand-augered rest due to utilities.
SGC-NAC-000007	Core sampler hit refusal at 18 inches.
SGC-NAC-000008	Drilled to 2 feet due to utilities.
SGC-NAC-000010	Drilled to 1 foot; hand-augered rest due to utilities; flag against building, so sample taken 6 feet from flag.
SGC-NAC-000012	Drilled to 2 feet due to utilities.
SGC-SAN-000018	Core sampler hit refusal at 2 feet; relocated from inside clarifier.
SGC-NAC-000029	Core sampler hit refusal at 18 inches.
SGC-A61-000043	Sampled 1 foot from flag.
SGC-A61-000047	Drilled to 2 feet due to utilities.
SGC-A61-000048	Drilled to 2 feet due to utilities.
SGC-A61-000049	Relocated due to utilities.
SGC-A61-000051	Core sampler hit refusal at 18 inches.
SGC-A61-000052	Relocated due to utilities; core sampler hit refusal at 18 inches.
SGC-A61-000053	Core sampler hit refusal at 2 feet.
SGC-A13-000056	Core sampler hit refusal at 18 inches
SGC-A13-000058	Drilled to 1 foot, hand-augered rest due to utilities.
SGC-A13-000060	Core sampler hit refusal at 1 foot.
SGC-AOJ-000064	Core sampler hit refusal at 2 - 3 inches.
SGC-AOJ-000066	Core sampler hit refusal at 4 inches.
SGC-AOJ-000067	Core sampler hit refusal at 6 inches.
SGC-AOJ-000069	Core sampler hit refusal at 2 feet.
SGC-A03-000080	Core sampler hit refusal at 20 inches
SGC-A03-000081	Drilled to 2 feet due to utilities.
SGC-A03-000082	Drilled to 1 foot, hand-augered rest due to utilities.
SGC-A03-000083	Sampled 25 feet from original location due to storm sewer; core sampler hit refusal at 18 inches.
SGC-A03-000087	Core sampler hit refusal at 2 feet.
SGC-A21-000088	Core sampler hit refusal at 18 inches.
SGC-A21-000090	Core sampler hit refusal at 20 inches.
SGC-SDB-000097	Relocated due to utilities.
SGC-SDB-000098	Relocated from inside a building.
SGC-SDB-000101	Relocation of SGC-SDB-000099; first location surveyed incorrectly.
SGC-SDB-000102	Relocation of SGC-SDB-000100; first location surveyed incorrectly.

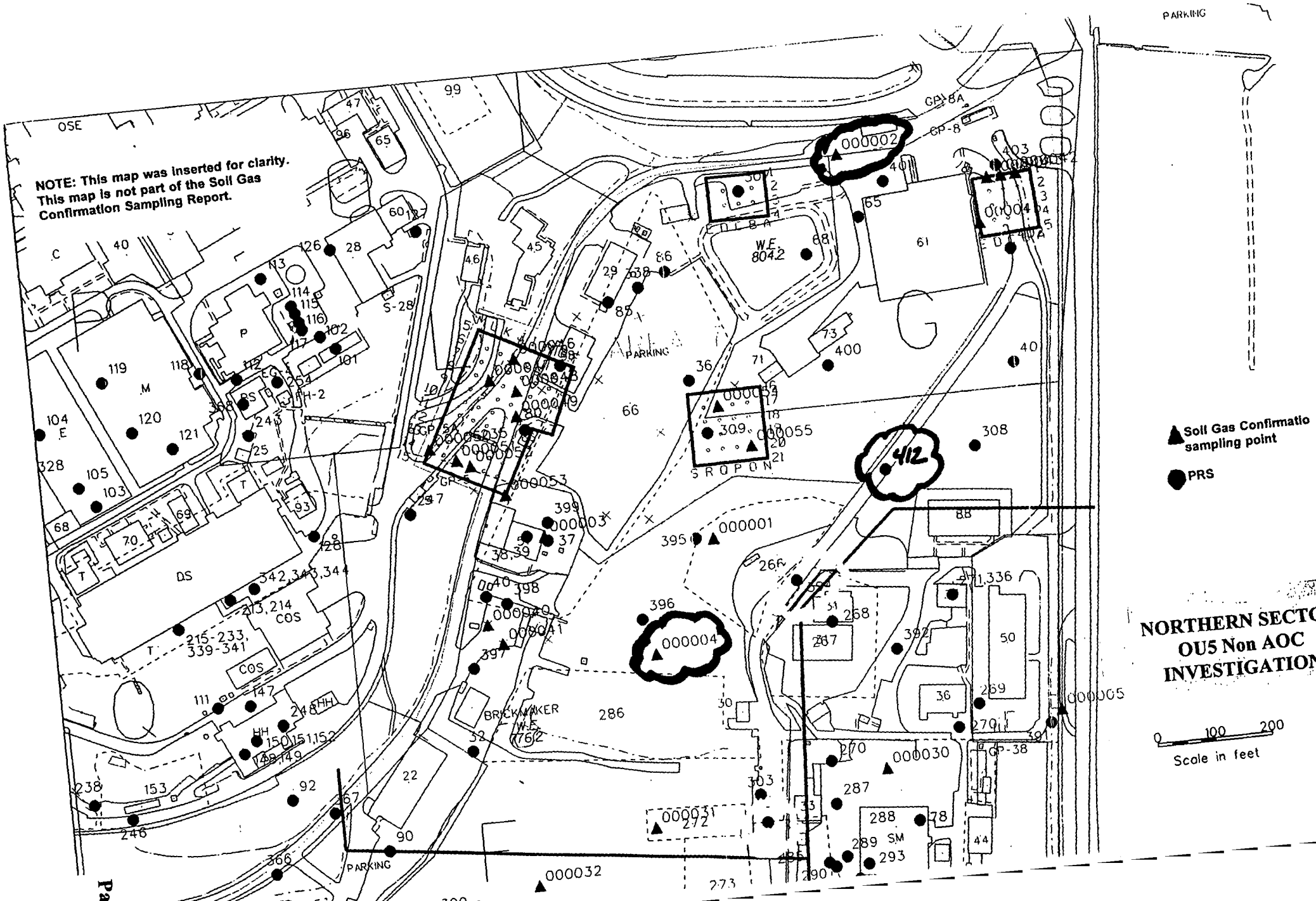

NOTE: This map was inserted for clarity.
This map is not part of the Soil Gas
Confirmation Sampling Report.
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Table A.1

Detected Volatile Organic Compounds (µg/kg)

ANALYTE	Background Value	Industrial Scenario Guideline Criteria	SGC-NAC-000002	SGC-NAC-000003	SGC-NAC-000004	SGC-NAC-000005	SGC-NAC-000006
PETREX SAMPLE AREA			NORTH	NORTH	NORTH	EAST	EAST
Acetone	NA	21000000	36				
1,2-Dichloroethene (total)	NA	43000000					
2-Butanone	NA	93000000	12				
Benzene	NA	8.90E+03	1 J				
Carbon Disulfide	NA	280000					
Chloroform	NA	3100			67		
Chloromethane	NA	NA					
Ethylbenzene	NA	480					
Methylene Chloride	NA	3.95E+05	6			7	8
Tetrachloroethene	NA	21000000					
Toluene	NA	250000	1 J	1 J			
Trichloroethene	NA	41000					
Xylene (total)	NA	430000000					

No entry - not detected
J - Numerical value is an estimated quantity
C - Identification confirmed by GC/MS
mg/kg - micrograms per kilogram

Red = above Guideline Criteria (GC)
Green = above GC and below Background
Magenta = above Background and Below GC
Blue = above Background (no GC)

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Table A.2.

Detected Semivolatile Organic Compounds (µg/kg)

ANALYTE	Background Value	Industrial Scenario Guideline Criteria	SGC-NAC-000001	SGC-NAC-000002	SGC-NAC-000003	SGC-NAC-000004	SGC-NAC-000005	SGC-NAC-000006	SGC-NAC-000007
PETREX Sample Area			NORTH	NORTH	NORTH	NORTH	EAST	EAST	WEST
Acenaphthene	NA	NA		190 J	63 J				
Acenaphthylene	NA	NA		730				42 J	
Anthracene	NA	64,000,000		1300	66 J		25	55 J	
Benzo(a)anthracene	NA	4,100		1500	180 J		160 J	300 J	57 J
Benzo(a)pyrene	NA	410		1300	80 J		100 J	450	65 J
Benzo(b)fluoranthene	NA	4,100		1000	180 J		190 J	460	67 J
Benzo(g,h,i)perylene	NA	NA		550	70 J		100 J	260	28 J
Benzo(k)fluoranthene	NA	41,000		1000	160 J		190 J	440	58 J
Bis(2-ethylhexyl)phthalate	NA	215,000							
Butylbenzylphthalate	NA	43,000,000							
Carbazole	NA	NA		600	22			34 J	
Chrysene	NA	410,000		1500	220 J		240 J	490	60 J
Di-n-butyl phthalate	NA	21,000,000	120			280 J			
Di-n-octyl phthalate	NA	4,300,000							
Dibenz(a,h)anthracene	NA	410		180 J	40 J		37	50 J	
Dibenzofuran	NA	NA		1100	23				
Diethyl phthalate	NA	NA							
Fluoranthene	NA	8,500,000		3400 D	[illegible]		400 J	800	110 J
Fluorene	NA	NA		1500	42 J				
Indeno(1,2,3-cd)pyrene	NA	4,100		690	120 J		70 J	120 J	36 J
2-Methylnaphthalene	NA	NA		970					
Naphthalene	NA	NA		4000 D	24				
Phenanthrene	NA	NA		4700 D	350		150 J	280 J	53 J
Phenol	NA	130,000,000							
Pyrene	NA	6,400,000	24 J	2700 D	440		340 J	700	120 J

No entry - not detected
J - Value is an est. quantity
D - Sample was diluted
NA - Value not available
H - Analyzed outside holding time
µg/kg - micrograms per kilogram
Red = above Guideline Criteria (GC)
Green = above GC and below Background
Magenta = above Background and Below GC
Blue = above Background (no GC)

Table A.4.
Detected Inorganics

ANALYTE	Background Value	Industrial Scenario Guideline Criteria	SGC-NAC-000001	SGC-NAC-000002	SGC-NAC-000003	SGC-NAC-000004	SGC-NAC-000005	SGC-NAC-000006	SGC-NAC-000007	SGC-NAC-000008	SGC-NAC-000009
PETREX Sample Area			NORTH	NORTH	NORTH	NORTH	EAST	EAST	WEST	WEST	EAST
TAL INORGANICS (mg/kg)											
Aluminum	19000	NA	11000	4190	1910	11400	7970	7780	10200	2820	18700
Antimony	NA	85		0.23 B		0.24 B	0.41			0.27 B	0.91 B
Arsenic	8.6	64	B	2.1 B	2.9	1.4 B		2	1.9		11.1
Barium	180	15,000	.6	20.7 B	B	47.1 B	3.6	86	B	23.2	
Beryllium	1.3	1	0.56		0. B	0.65	0.38	0.28	.28		.9 B
Bismuth	NA	NA									0.85 B
Cadmium	2.1	210		0.25 B	.19 B		0.36 B	0.5 B	0.33 B	0.22 B	6
Calcium	310000	NA	162000	159000	6500	152000	13 00	86200	00	113000	5940
Chromium	20	110,000	13.2	6.7	3.8	15.2		11	14	5.7	20.3
Cobalt	19	NA	9 B	4.5 B	2.3 B	10.1 B	7.6 B	.6 B	11 B	B	13
Copper	26	NA	1 2	11.9	8.9	17.1	14.5	15.2	16.2	.9	19.2
Cyanide	ND	4,300									
Iron	35000	NA	300	10600	5	21800	17200	700	23000	60	29400
Lead	48	NA	7	5.2	1	8.6	30.9	2	7.2	5	22.2
Lithium	26	NA	2 B	12.5 B	.2	23 B	7 B	10.3	3 B	8.2 B	14.7 B
Magnesium	40000	NA	6160	57800	2 900	5670	52 0	35600	2 00	47900	45
Manganese	1400	27,000	69	384	270	612	383	589	493	256	28
Mercury	ND	64			0.13						
Molybdenum	27	NA	.43 B	1.2 B	0.77 B		1 B	1.5 B	B	1.4 B	1.8 B
Nickel	32	4,300	18.4	9.9	6.4	20.6	11.1	16	22.6	8.1 B	24.5
Potassium	1900	NA	780	742 B	346	2080	574 B	44 B	1590	46	1420
Selenium	NA	NA									
Silver	1.7	1,100			0 B						
Sodium	240	NA	228	888 B	50	137 B	411 B	8 B	246 B	1 B	1010 B
Thallium	0.46	NA									
Tin	20	NA	1.1			1.4 B	1 B			4.5 B	1 B
Vanadium	25	1,500	14	8.3	4.7	16.3	23.1	18.9	1.2	7.4	
Zinc	140	64,000	5	29.5		67	59	69.2	53.8	38.6	1.8
OTHER INORGANICS											
% Solids (%)	NA	NA	83	93.8	5	83.3	78.4	75	8	95	8.9
Nitrate/Nitrite (mg-N/kg)	NA	NA	2	1.8	2	2.1	7.2	4.8	1.6	26.5	2.2

No entry - not detected
mg/kg - milligrams/kilogram
NA - Value not available
NC - Background not comp
ND - No detections in background samples
mg-N/kg - milligrams per kilogram, reported as nitrogen
J - Numerical value is an estimated quantity
B - Analyte detected in blanks associated with this sample
Red = above Guideline Criteria (GC)
Green = above GC and below Background
Magenta = above Background and Below GC
Blue = above Background (no GC)

Table A.5.

Detected Radionuclides (pCi/g)

ANALYTE	Background	Industrial Scenario Guideline Criteria	SGC-NAC-000001	SGC-NAC-000002	SGC-NAC-000003	SGC-NAC-000004	SGC-NAC-000005
PETREX Sample Area			NORTH	NORTH	NORTH	NORTH	EAST
Americium-241	ND	4.95					
Bismuth-207	ND	0.18					
Bismuth-210	ND	NA					
Cesium-137	0.42	0.46					
Cobalt-60	NC	0.10					
Plutonium-238	0.13	5.5	1.42	0.069	0.8[illegible]	0.087	0.543
Plutonium-239/240	0.18	5.5			0.0[illegible]62		
Potassium-40	37	NA	21.7	2.95	[illegible].53	27.4	15.1
Radium-226+D	2	0.14	[illegible]	0.478	0.508	1.16	[illegible]
Thorium-228+D	1.5	0.85	1.[illegible]	0.277	[illegible].37	1.24	1.0[illegible]
Thorium-230	1.9	44	0.814	0.374	0.6[illegible]	0.98	1.19
Thorium-232	1.4	50	1.3	0.184	0.3[illegible]	1.17	0.95
Uranium-234	1.1	38	2.1[illegible]	0.401	0.[illegible]19	0.934	0.874
Uranium-235+D	0.11	3.4	0.09[illegible]4		0.04	0.0349	0.[illegible]8
Uranium-238+D	1.2	11.0	[illegible]5	0.392	0.512	0.918	0.91[illegible]

No entry - not detected
ND -No detections in background samples
NA - Data not available
NC - Background value not computed
pCi/g - picocuries per gram
Red = above Guideline Criteria (GC)
Green = above GC and below Background
Magenta = above Background and Below GC
Blue = above Background (no GC)