

OVERSIZE PAGES

LOCATED AT

END OF

DOCUMENT

# MOUND



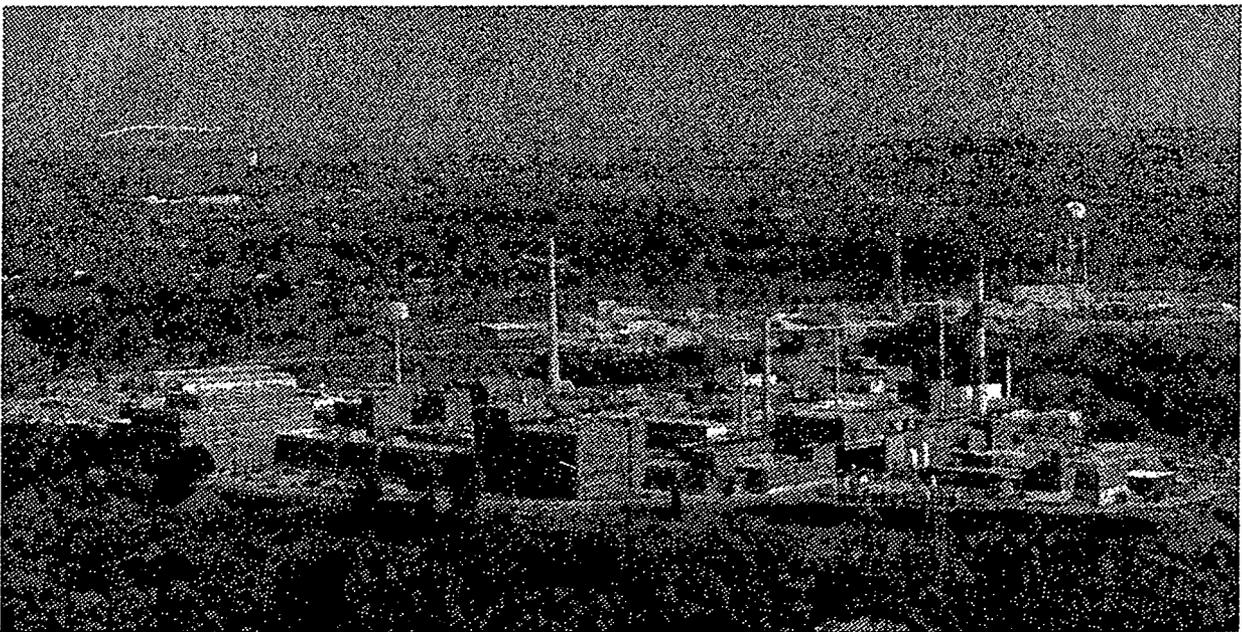
**Environmental  
Restoration  
Program**



# **MOUND PLANT**

## **Potential Release Site Package**

### **PRS # 390/393/394**



**MOUND**



Environmental  
Restoration  
Program

# MOUND PLANT POTENTIAL RELEASE SITE PACKAGE

## *Notice of Public Review Period*



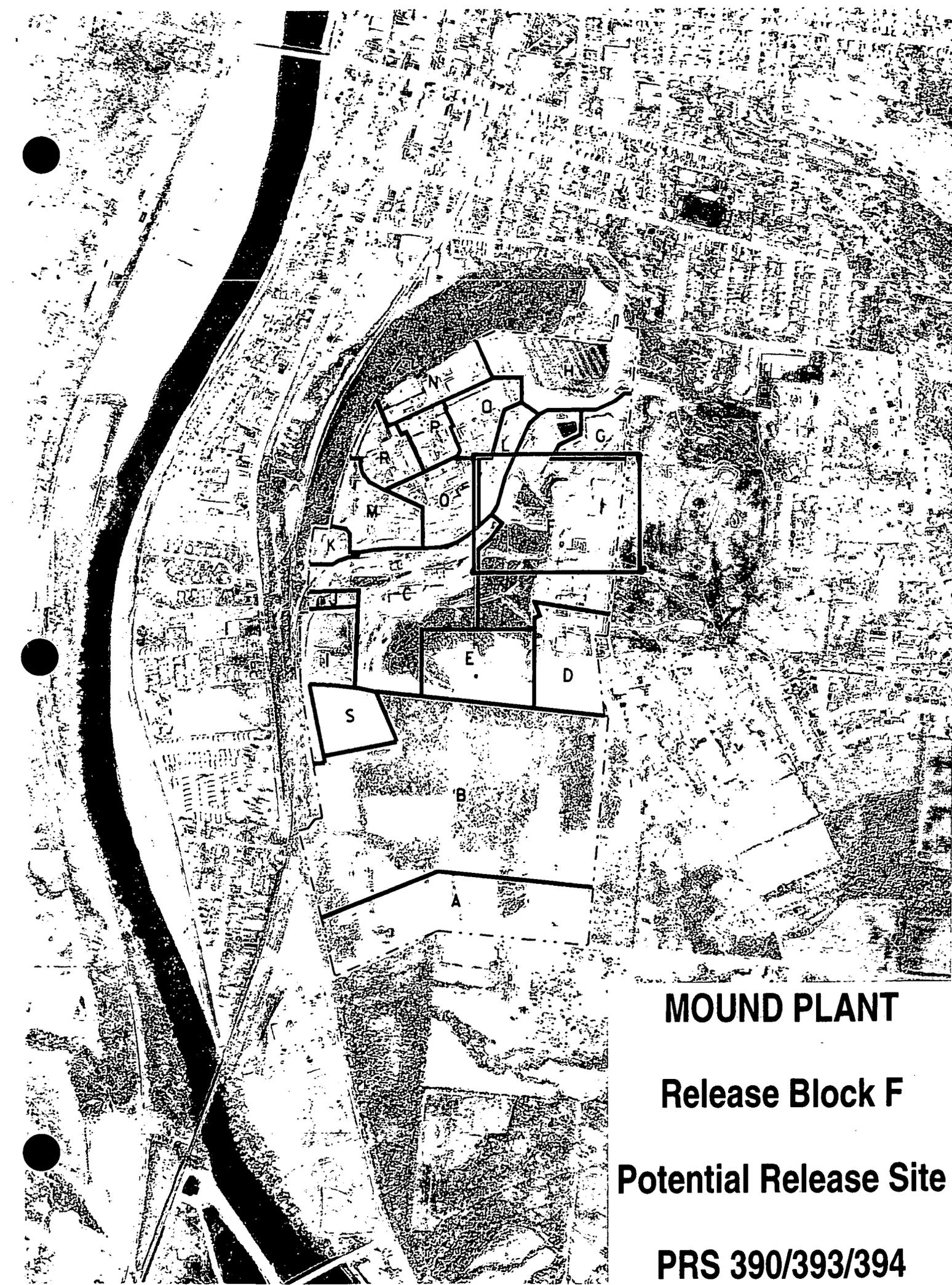
The following potential release site (PRS) packages will be available for public review in the CERCLA Public Reading Room, 305 E. Central Ave., Miamisburg, Ohio beginning February 27, 1997. Public comment will be accepted on these packages from February 27, 1997, through April 3, 1997.

- PRS 13: Former Treatment Site - Trash Incinerator
- PRS 23: Solvent Waste Tank - Building 43 Settling Basin
- PRS 24: Solvent Storage Tank - Building 43
- PRS 358: Soil Contamination
- PRS 365: Soil Contamination
- PRS 366: Soil Contamination
- PRS 367: Soil Contamination
- PRS 390/393/394: Soil Contamination

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

PRS 390/393/394

REV	DESCRIPTION	DATE
0 <b>PUBLIC RELEASE</b>	Available for comments.	<b>Oct. 3, 1996</b>
1 <b>FINAL</b>	Comment period expired. No comments. Recommendation page annotated.	<b>Apr. 7, 1997</b>

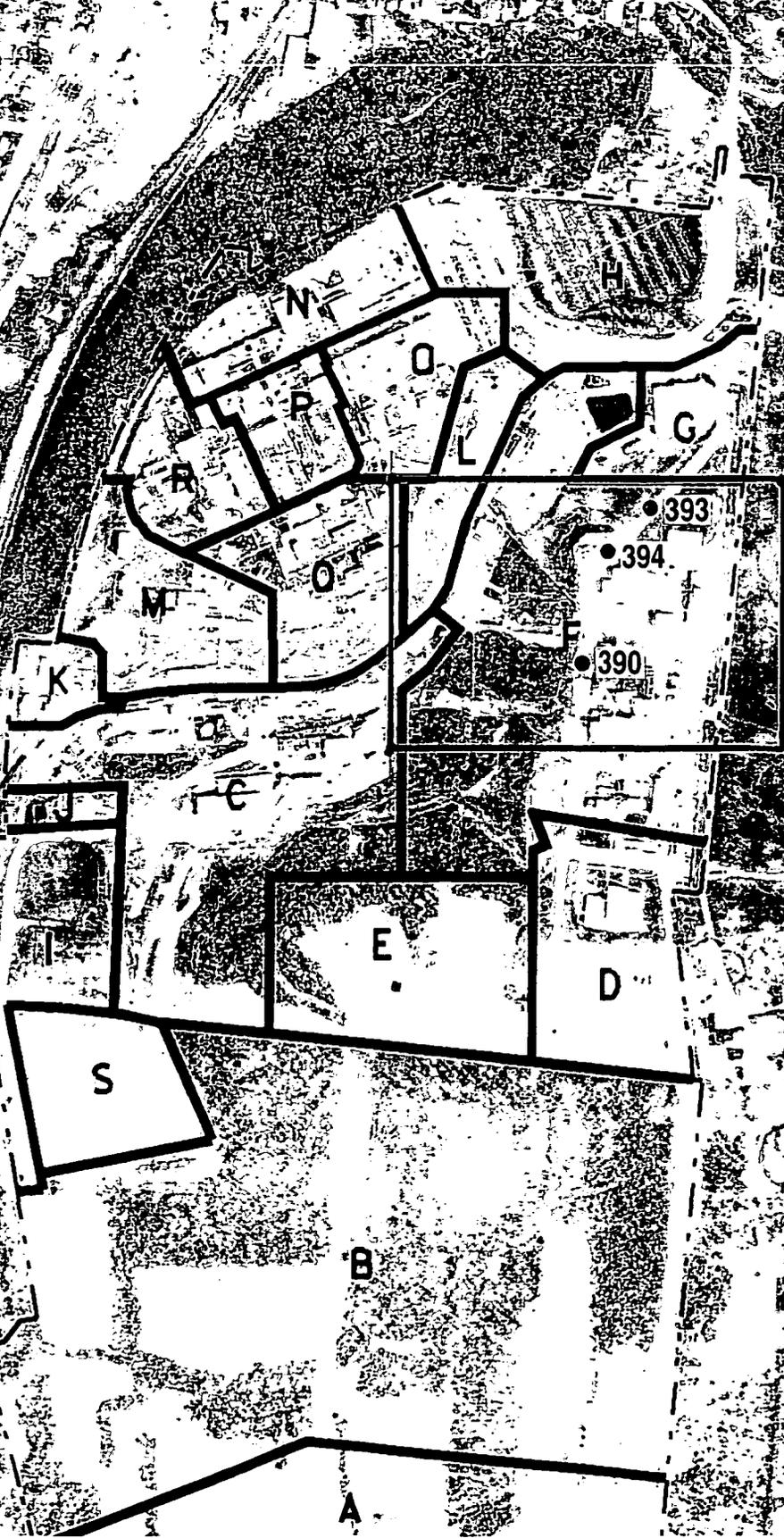


**MOUND PLANT**

**Release Block F**

**Potential Release Site**

**PRS 390/393/394**



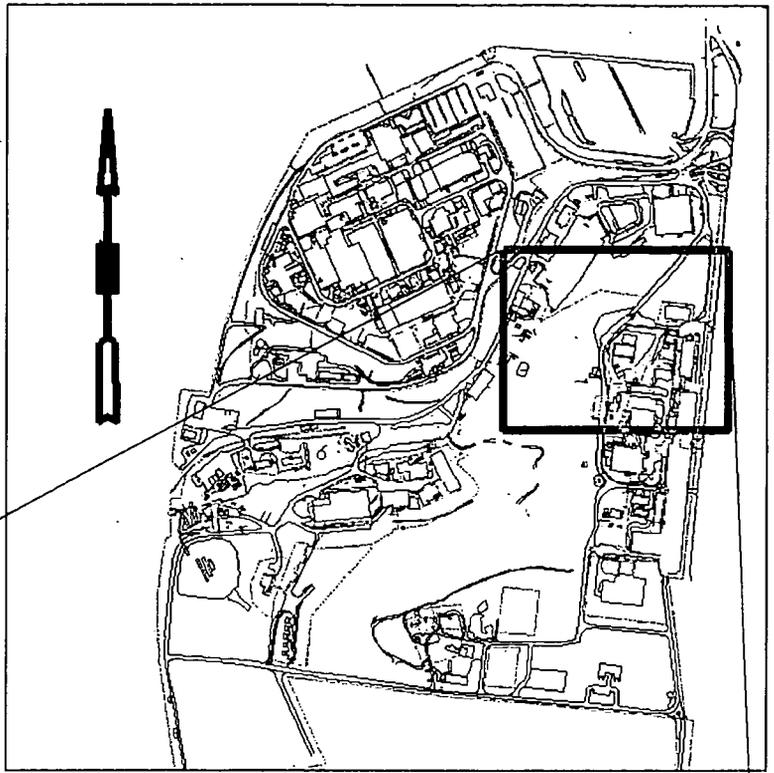
• 393  
• 394  
• 390

# Mound Plant

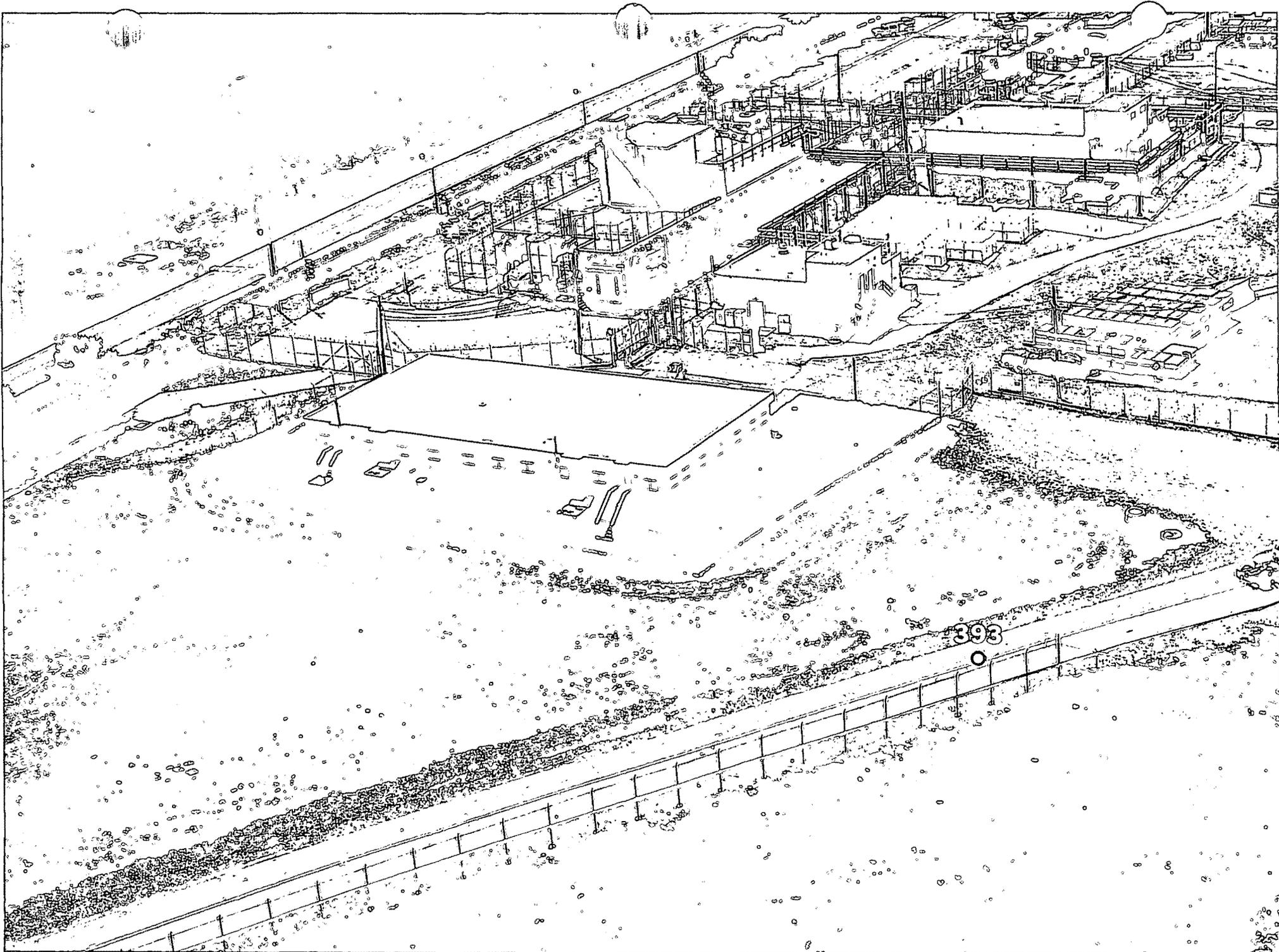
## Release Block F

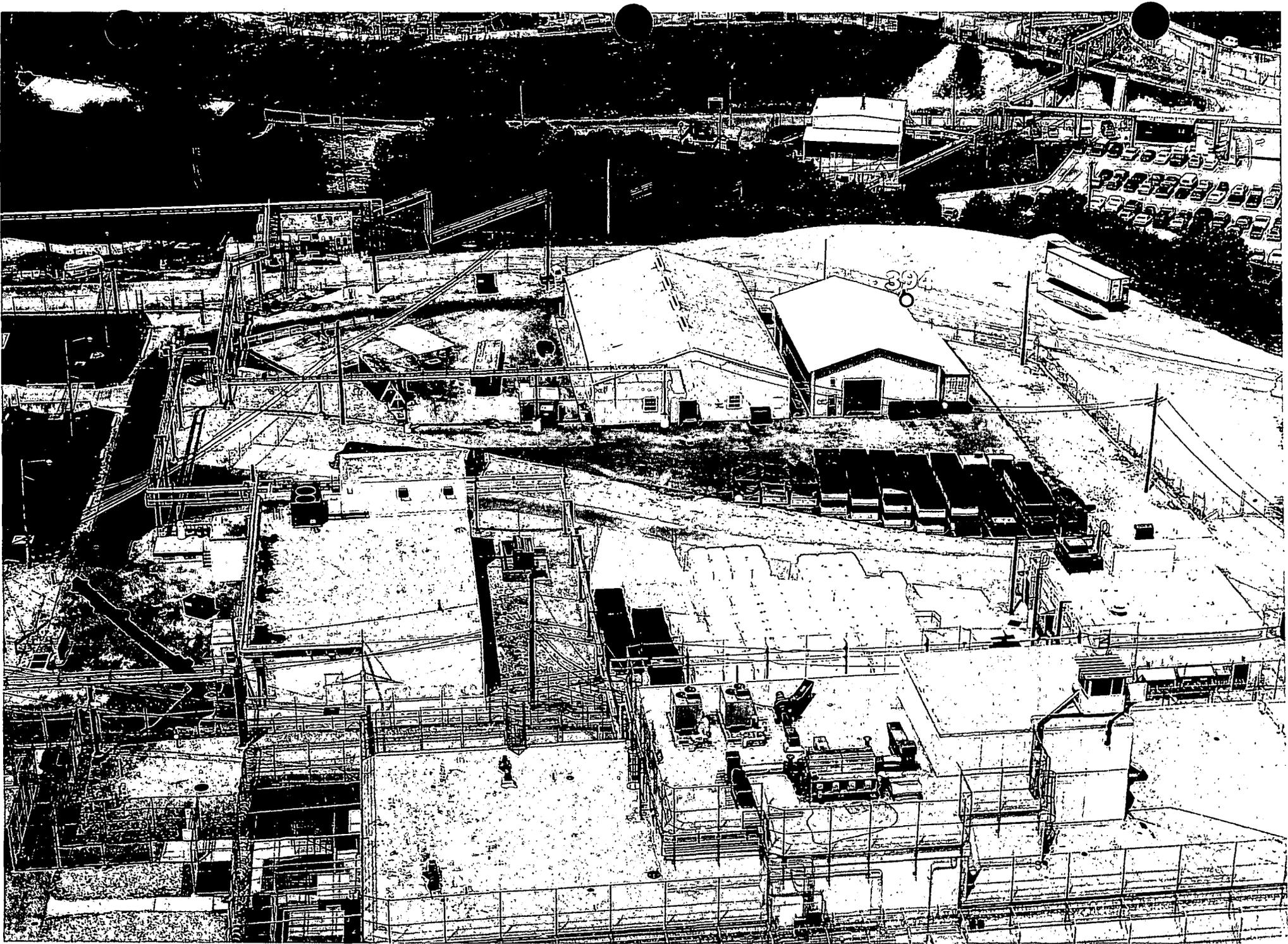
### Potential Release Site

PRS 390/393/394









## PRS 390/393/394

### PRS HISTORY:

PRS 390, 393 and 394 are soils potential release sites (PRSs) located near the eastern boundary of the Mound plant on the SM hill (see maps on pages 10 and 31). These soils locations were identified as PRSs due to relatively elevated hydrocarbon detections found during the qualitative PETREX soil gas portion of the *OU5, Non Area of Concern*<sup>4</sup> investigation.

PRS 390 is located in an area used for truck parking and as a result has the potential for diesel fuel and oil contamination.

*NOTE: PRSs 393 and 394 are located in the vicinity of areas which are already covered by PRSs as a result of suspected radiological contamination. Therefore, PRSs 393 and 394, as presented in this package, address only the potential for organic contamination (PRS 393 and PRS 394 radiological data is presented in this package for reference purposes only). Potential radiological contamination relevant to PRS 393 is addressed by PRS 412 and potential radiological contamination relevant to PRS 394 is addressed by PRS 266.*

In 1965, thorium contaminated soil from area 9 (PRS 267) was moved through PRS 394 in route to Area 8 (PRS 266). PRS 390 is located in soils Area 11. Plutonium is the suspected contaminant in Area 11 as a result of operations in the Special Metallurgy (SM) Building. The map on page 10 shows PRSs 390 and 394 in relation to soils areas 8, 9 and 11.

### CONTAMINATION:

1. In 1983, the *Radiological Site Survey*<sup>2</sup> investigated radionuclides in the soils at the Mound site via Mound Soil Screening, radiochemistry, and gamma spectroscopy. The *Radiological Site Survey* map on page 10 shows the locations of PRS 390, 393 and 394 to pertinent *Radiological Site Survey* samples. Results showed:

PRS	No. of Samples	Sample Type and Location	Results (Maximum)	Guideline Criteria
390	1	Surface soil sample S0605 taken within 30 ft of PRS 390	Radium-226 at 0.7 pCi/g	5 pCi/g <sup>ref 6</sup>
393	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 393	Plutonium-238 at 0.97 pCi/g Thorium at 42.4 pCi/g at 3 ft (C0033) Tritium 2.07 pCi/ml	25 pCi/g (Mound ALARA) 15 pCi/g <sup>ref 6</sup> 20 pCi/ml
394	8	One surface sample (S0339)* and seven core samples (C0288) taken within 50 ft. of PRS 394	Plutonium-238 at 0.74 pCi/g Thorium at 12 pCi/g (S0339)*	25 pCi/g (Mound ALARA) 5 pCi/g <sup>ref 6</sup>

\* This sample was taken from within the PRS 267 boundary (approximately 30 feet from PRS 394). Results from this sample location appear both with PRS 267 and PRS 394.

2. In 1994, the *OU5, Operational Area Phase I Investigation*<sup>4</sup> 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 Quantitative Results	Mound Soil Screened Sample
390	Relatively elevated aromatic, Semivolatile and petroleum hydrocarbons	No results available
393	Relatively elevated halogenated hydrocarbons	9 pCi/g plutonium-238 (ALARA guideline = 25 pCi/g) 0.5 pCi/g thorium-232 (guideline = 5 pCi/g <sup>ref 4</sup> )
394	Relatively elevated aromatic, halogenated and petroleum hydrocarbons	Less than 20 disintegration's per minute

3. In 1996, the quantitative *Soil Gas Confirmation Sampling*<sup>7</sup> 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).

PRSs 390, 393 and 394 (PETREX sample locations 897, 868 and 888 respectively), 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 PRSs 390, 393 and 394. The map on page 31 shows the locations of PRSs 390, 393 and 394 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 PRSs 390, 393 and 394.

PETREX Soil Gas Contaminant Family	Maximum Ion Count <sup>4</sup>	Confirm Sample #	Confirmation Sample Results that Exceed Guideline Criteria (GC)	Ion Counts at PRSs 390, 393 and 394	
Total Aromatic Hydrocarbons	7,780,673	2	None	2,892,152 22,326 5,315,457	PRS 390 PRS 393 PRS 394
Total Semivolatile Hydrocarbons	7,015,960	2	1300 ug/kg Benzo(a)pyrene (GC = 410 ug/kg <sup>ref 5</sup> )	93,427 Non-detect 36,969	PRS 390 PRS 393 PRS 394
Total C5-C11 Petroleum Hydrocarbons	24,166,931	2	None	5,475,698 43,566 9,565,092	PRS 390 PRS 393 PRS 394
Total Halogenated Hydrocarbons	1,370,283	4	None	Non-detect 51,737 67,782	PRS 390 PRS 393 PRS 394

The above table and discussion make no conclusions about individual contaminant concentrations at PRSs 390, 393 and 394 only that the overall health risk from PRSs 390, 393 and 394 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 12 - Site Summary Report, December 1994. (pages 7-8.1)
- 2) OU9, Site Scoping Report: Volume 3 - Radiological Site Survey, June 1993. (pages 9-15)
- 3) OU9, Site Scoping Report: Volume 7 - Waste Management, February 1993. (pages 16-17)
- 4) OU5, Operational Area Phase I Investigation, Non-AOC Field Report, Volumes I and II, Final (Revision 0), June 1995. (pages 18-26)
- 5) Risk Based Guideline Values, Final, (Revision 0), December 1995.

**OTHER REFERENCES:**

- 6) Code of Federal Regulations, 40 CFR 192.41 and 40 CFR 192.12.
- 7) Soil Gas Confirmation Sampling, (Revision 0), May 1996. (pages 27-35)

**PREPARED BY:**

George Liebson, Member of EG&G Technical Staff

**MOUND PLANT  
PRS 390/393/394  
SOIL CONTAMINATION -- ORGANIC COMPOUNDS**

**RECOMMENDATION:**

PRSs 390, 393, and 394 are located in the northern sector of the original Mound plant. These soil locations were identified as PRSs solely due to qualitative hydrocarbon detections found during the PETREX soil gas portion of the *OU5, Non Area of Concern* investigation.

In 1996, the Soil Gas Confirmation sampling effort sampled the locations with the highest ion counts (confirmation sample locations 2 and 4) in the northern sector and discovered no contamination above the  $10^{-5}$  risk range. PRSs 390, 393, and 394 were not sampled as part of the *Soil Gas Confirmation Sampling* but these PRSs had lower ion counts than confirmation sample locations 2 and 4. This implies that PRSs 390, 393 and 394 will have similar or lower health risk than confirmation sample locations 2 and 4 ( $<10^{-5}$  risk).

All sample results from PRS 390 indicate all radionuclides are below guideline criteria. Potential radiological contamination near PRS 393 will be addressed by creating a new PRS (PRS 412) and potential radiological contamination relevant to PRS 394 will be addressed by the PRS 266 removal action. Therefore NO FURTHER ASSESSMENT is recommended for PRSs 390,393 and 394.

**CONCURRENCE:**

DOE/MB:

Arthur W. Kleinrath 12/17/96  
Arthur W. Kleinrath, Remedial Project Manager (date)

USEPA:

Timothy J. Fischer 12/17/96  
Timothy J. Fischer, Remedial Project Manager (date)

OEPA:

Brian K. Nickel 12/17/96  
Brian K. Nickel, Project Manager (date)

**SUMMARY OF COMMENTS AND RESPONSES:**

Comment period from 2/27/97 to 4/3/97

- No comments were received during the comment period.
- Comment responses can be found on page \_\_\_\_\_ of this package.

**REFERENCE MATERIAL**  
**PRS 390/393/394**

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 <sup>a</sup>	Results
280	Waste Oil Drum Field Area	I-8	Historical	Waste oil  Plating Operations waste Explosive/solvent waste Herbicides Waste chemicals Photo-processing waste Batteries Kitchen grease Epoxy resins Ethylene glycol Scintillation vials	4, 6, 18	Confirmed VOCs	S	4	3, 4, 5, 6, 8, 12	Tables B.6, B.7, and B.8  RSS <sup>c</sup> Locations S0263, S0164, S0265, and S0266 (Appendix E in Ref. 6) Table B.9
281	Area E, Waste Oil Spill	J-8	Historical	Waste oil	1	Minor oil	S	1	No Data	
282	Spoils Disposal Area/Construction Spoils Area	J-5 K-5	In service	Plutonium-238, Thorium  Gasoline contaminated soils from G Building	4, 5, 18	Plutonium-238 < 25 pCi/gm Thorium < 5 pCi/gm	S	6	14, 15, 16	Table B.1 (Table X.3 in Ref. 6)
283	Area 1, Bulk Transfer of Thorium Drums (AKA, PI W)	I to L 6 to 8	Grounds	Thorium sludge constituents, Plutonium-238	1, 4, 5, 18	Thorium dust, Plutonium-238	S	6	3, 4  14, 15, 16	Tables B.6, B.7, and B.8  Table B.1 (Table IV.2 in Ref. 6)
284	Building			sludge constituents	4	Thorium dust	S	4, 6	See Area 1	
285	Area 11, Contamination from SM Building Operations	G-9	Surplus	Plutonium-238	1, 4, 5, 18	Plutonium-238	S	6	3, 4, 5, 6  14, 16	Tables B.6, B.7, and B.8  Table B.1 (Table IV.3 in Ref. 6)
286	Area 16, SM Building Sanitary Sewage Septic Tank Leach Field	F-9 G-9	Surplus	Plutonium-238, Thorium  Sanitary wastes from SM Building	1, 4, 5, 18	Plutonium-238	S	6	3, 4, 6  14, 15, 16	Tables B.6, B.7, and B.8  Table B.1 (Table IV.5 in Ref. 6)

PRS 390 is located within Area 11.

- 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: Volume 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 Scoping Report: Volume 3 - Radiological Site Survey (Final)."
7. DOE 1993c "Operable Unit 3, Miscellaneous 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 Scoping Report: Volume 11 - 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: Volume 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 1976 a, b "Potable Water Standards Project Mound Laboratory" and "Evaluation of the Buried Valley Aquifer Adjacent to Mound Laboratory."
22. DOE 1992i "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."

Environmental Restoration Program

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

**MOUND PLANT  
MIAMISBURG, OHIO**

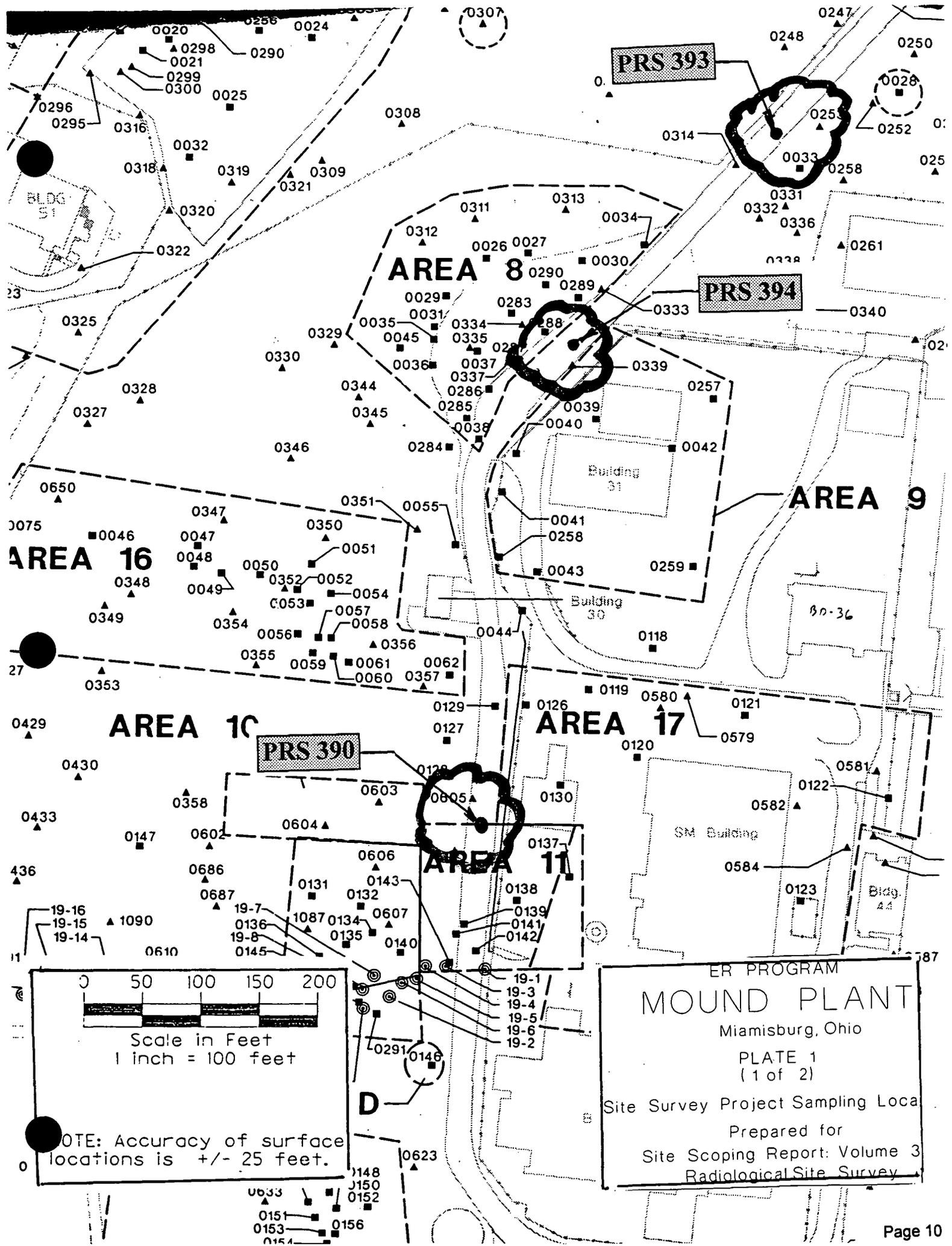
**JUNE 1993**

**FINAL**

Department of Energy  
Albuquerque Field Office

Environmental Restoration Program  
EG&G Mound Applied Technologies





PRS 393

PRS 394

PRS 399

AREA 16

AREA 8

AREA 9

AREA 10

AREA 17

AREA 11



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 Locations

Prepared for  
Site Scoping Report: Volume 3  
Radiological Site Survey

Map Location <sup>a</sup>	Coordinates		MRC ID No.	Mo-Yr	Depth (Inch)	Pu-238 (pCi/g)	Thorium <sup>b</sup> (pCi/g)	Tritium (pCi/mL)	Co-60 (pCi/g)	Cs-137 (pCi/g)	Ra-226 (pCi/g)	Am-241 (pCi/g)
	South	West										
C0127	2725	2340	1212	12-82	18	1.57	b					
			1213	12-82	36	1.40	b					
			1214	12-82	54	0.15	b					
			1215	12-82	72	0.54	b					
			1216	12-82	90	0.06 <sup>c</sup>	b					
			1217	12-82	120	0.11	b					
S0602	2725	2565	4112	10-83	0	5.13	b					
C0128	2750	2365	1207	12-82	18	7.97	b					
			1208	12-82	36	6.15	b					
			1209	12-82	54	10.20	b					
			1210	12-82	72	0.94	b					
			1211	12-82	84	0.23	b					
S0603	2750	2415	6784	08-84	0	0.69	b					
C0129	2715	2290	1218	12-82	18	3.70	b					
			1219	12-82	36	0.41	b					
			1220	12-82	54	0.92	b					
			1221	12-82	72	0.85	b					
			1222	12-82	90	0.05	b					
			1223	12-82	108	0.04	b					
S0604	2750	2465	1319	08-84	0	11.80	b					
S0605	2780	2340	9549	06-85	0	NR	NR		LDL	LDL	0.7	LDL

Page 11

<sup>a</sup>C denotes core location and S denotes surface sample location on Plate 1.

<sup>b</sup>Thorium results of  $\leq 2$  pCi/g are listed as "b".

<sup>c</sup>Verification sample analyzed for QA/QC.

<sup>d</sup>No MRC ID assigned because *in situ* gamma spectrometry was performed for thorium-232.

<sup>e</sup>Gamma results could not be confirmed using the gamma spectroscopy printout given in this appendix.

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

<sup>g</sup>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 <sup>a</sup>	Coordinates		MRC ID No.	Mo-Yr	Depth (inch)	Pu-238 (pCi/g)	Thorium <sup>b</sup> (pCi/g)	Tritium (pCi/mL)	Co-60 (pCi/g)	Cs-137 (pCi/g)	Ra-226 (pCi/g)	Am-241 (pCi/g)
	South	West										
S0323	2225	2540	5988	08-84	0	0.45 <sup>c</sup>	3.64 <sup>c</sup>					
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					
FRS 393 C0033	2400	1860	8349	11-84	36	0.11 <sup>c</sup>	42.38 <sup>c</sup>					
			8414	11-84	48	0.97 <sup>c</sup>	20.17 <sup>c</sup>					
C0034	2405	2010	1260	12-82	18	4.83 <sup>c</sup>	32.20 <sup>c</sup>					
			1261	12-82	72	0.48	9.12					
			1262	12-82	90	0.07	b					
			1263	12-82	108	0.03	b					

Page 12

<sup>a</sup>C denotes core location and S denotes surface sample location on Plate 1.

<sup>b</sup>Thorium results of  $\leq 2$  pCi/g are listed as "b".

<sup>c</sup>Verification sample analyzed for QA/QC.

<sup>d</sup>No MRC ID assigned because *in situ* gamma spectrometry was performed for thorium-232.

<sup>e</sup>Gamma results could not be confirmed using the gamma spectroscopy printout given in this appendix.

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

<sup>g</sup>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 <sup>a</sup>	Coordinates		MRC ID No.	Mo-Yr	Depth (inch)	Pu-238 (pCi/g)	Thorium <sup>b</sup> (pCi/g)	Tritium (pCi/mL)	Co-60 (pCi/g)	Cs-137 (pCi/g)	Ra-228 (pCi/g)	Am-241 (pCi/g)
S0252	2375	1780	6500	08-84	0	0.49	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 <sup>c</sup>	b					
S0268	2575	1655	6359	08-84	0	3.60 <sup>c</sup>	b					
S0269	2575	1830	6350	08-84	0	0.34	b					
S0270	2625	1730	6351	08-84	0	0.13	b					

RS  
393

Map Location <sup>a</sup>	Coordinates South West	MRC ID No.	Mo-Yr	Depth (inch)	Pu-238 (pCi/g)	Thorium <sup>b</sup> (pCi/g)	Tritium (pCi/mL)	Co-60 (pCi/g)	Cs-137 (pCi/g)	Ra-226 (pCi/g)	Am-241 (pCi/g)
---------------------------	---------------------------	---------------	-------	-----------------	-------------------	---------------------------------	---------------------	------------------	-------------------	-------------------	-------------------

None <sup>d</sup>	07-84	72	NR	18							
None <sup>d</sup>	07-84	84	NR	12							
None <sup>d</sup>	07-84	96	NR	12							
None <sup>d</sup>	07-84	108	NR	10							
None <sup>d</sup>	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 <sup>c</sup>	29.45 <sup>c</sup>				
			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 <sup>d</sup>	07-84	0	NR	12				
			None <sup>d</sup>	07-84	12	NR	17				
			None <sup>d</sup>	07-84	24	NR	17				
			None <sup>d</sup>	07-84	36	NR	38				
			None <sup>d</sup>	07-84	48	NR	53				
			None <sup>d</sup>	07-84	60	NR	42				
			None <sup>d</sup>	07-84	72	NR	36				
			None <sup>d</sup>	07-84	84	NR	38				
			None <sup>d</sup>	07-84	96	NR	55				
			None <sup>d</sup>	07-84	108	NR	48				
			None <sup>d</sup>	07-84	120	NR	36				
			None <sup>d</sup>	07-84	132	NR	21				
			None <sup>d</sup>	07-84	144	NR	17				

FRS  
303

FRS  
131

Map Location <sup>a</sup>	Coordinates		MRC ID No.	Mo-Yr	Depth (inch)	Pu-238 (pCi/g)	Thorium <sup>b</sup> (pCi/g)	Tritium (pCi/mL)	Co-60 (pCi/g)	Cs-137 (pCi/g)	Ra-226 (pCi/g)	Am-241 (pCi/g)
	South	West										
S0331	2425	1885	6365	08-84	0	0.01	b					
S0332	2425	1910	6367	08-84	0	8.17	b					
S0333	2425	2060	7113	08-84	0	24.40	70.52					
S0334	2425	2135	7112	08-84	0	8.44	15.65					
S0335	2425	2185	7111	08-84	0	5.88	7.14					
C0036	2425	2220	1242	12-82	18	1.45	9.41					
			1243	12-82	48	NR	46.30					
			1244	12-82	114	0.84 <sup>c</sup>	36.16 <sup>c</sup>	LDL	LDL	1.0	LDL	
C0037	2428.6	2178	None <sup>d</sup>	07-84	0	NR	5.9					
			None <sup>d</sup>	07-84	12	NR	11					
			None <sup>d</sup>	07-84	24	NR	14					
			None <sup>d</sup>	07-84	36	NR	5.8					
			None <sup>d</sup>	07-84	48	NR	5.1					
			None <sup>d</sup>	07-84	60	NR	6.3					
			None <sup>d</sup>	07-84	72	NR	6.3					
			None <sup>d</sup>	07-84	84	NR	5.1					
None <sup>d</sup>	07-84	96	NR	2.5								
S0336	2450	1885	6366	08-84	0	0.06	b					
S0337	2450	2160	7110	08-84	0	2.10	38.04					
S0338	2475	1910	6368	08-84	0	0.05	b					
FRS 33A S0339	2475	2110	7114	08-84	0	0.74	12.00					
S0340	2500	1910	6369	08-84	0	0.19	b					
C0038	2500	2210	7109	08-84	0	1.41	5.08					
			1236	12-82	18	2.39	b					
			1237	12-82	36	0.65	b					

Map Location <sup>a</sup>	Coordinates South West	MRC ID No.	Mo-Yr	Depth (inch)	Pu-238 (pCi/g)	Thorium <sup>b</sup> (pCi/g)	Tritium (pCi/mL)	Co-60 (pCi/g)	Cs-137 (pCi/g)	Ra-226 (pCi/g)	Am-241 (pCi/g)
C0285	2478.9	2212.0	None <sup>d</sup>	07-84	0	NR	0.3				
			None <sup>d</sup>	07-84	12	NR	0.8				
			None <sup>d</sup>	07-84	24	NR	0.7				
			None <sup>d</sup>	07-84	36	NR	0.8				
			None <sup>d</sup>	07-84	48	NR	0.8				
			None <sup>d</sup>	07-84	60	NR	0.6				
			None <sup>d</sup>	07-84	72	NR	0.7				
C0288	2484.1	2184.0	None <sup>d</sup>	07-84	0	NR	0.3				
			None <sup>d</sup>	07-84	0	---					

<sup>a</sup>C denotes core location and S denotes surface sample location on Plate 1.

<sup>b</sup>Thorium results of  $\leq 2$  pCi/g are listed as "b".

<sup>c</sup>Verification sample analyzed for QA/QC.

<sup>d</sup>No MRC ID assigned because *in situ* gamma spectrometry was performed for thorium-232.

<sup>e</sup>Gamma results could not be confirmed using the gamma spectroscopy printout given in this appendix.

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

<sup>g</sup>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.)

C0288	2438.6	2119.3	None <sup>d</sup>	07-84	0	NR	0.3
			None <sup>d</sup>	07-84	12	NR	0.8
			None <sup>d</sup>	07-84	24	NR	1.1
			None <sup>d</sup>	07-84	36	NR	0.8
			None <sup>d</sup>	07-84	48	NR	0.8
			None <sup>d</sup>	07-84	60	NR	0.5
			None <sup>d</sup>	07-84	72	NR	0.7

PRS  
394

Environmental Restoration Program

EG&G MOUND-29-01 -01 -07 -07 -9502080001

**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**



In 1965, the thorium-contaminated soil was reportedly excavated and the area backfilled with clean soil (MRC 1985a; Stought et al. 1988). This claim could not be verified through research for this report. The Mound Site Survey Project (1982-1985) (DOE 1991c) analyzed soil samples from Area 3 and found elevated concentrations of plutonium and thorium - maximum plutonium-238 concentration of 50.60 pCi/g and maximum thorium concentration of 5.30 pCi/g. The plutonium contamination may have resulted from runoff from the rupture of the WTS line between the WD Building and the SM/PP area complex in 1969 (DOE 1991c). Building 72 is currently used to store drums of hazardous waste prior to shipment for off-plant disposal. Wastes stored in this area may include organic solvents (e.g., acetone, isopropanol, methanol, trichloroethene), waste oils; paints and thinners; spent plating solutions containing chrome, cadmium, nickel, and copper; photoprocessing wastes; and polymer wastes (EP 1988).

#### **5.1.5. Area 9, Thorium Storage and Redrumming Area (Historical)**

Area 9, the former Thorium Storage and Redrumming Area, is located under and around Building 31 (Figure 5.1). Building 31 was constructed in 1966 (MRC 1985a) and is on the eastern border of the site on the SM/PP Hill. It is currently used to stage both alpha and beta solidified and packaged wastes prior to shipment to off-plant disposal locations. In 1954 and 1955, 6,000 55-gallon drums of thorium sludge were delivered to Mound (MRC 1973a; Meyer 1979a). Some of these drums were stored at Area 9, and prolonged outside storage and internal exposure to corrosive solutions necessitated their frequent repackaging to ensure containment of the ore residue. Redrumming was initiated in April 1966 (Meyer 1956d). It became routine to repackage 20 to 45% of the drums annually. Drums were eventually moved to Area 1 where the thorium sludge was removed and placed in Building 21 (Thorium Sludge Storage Facility) beginning in July 1964. In 1965, an area of approximately 40,000 ft<sup>2</sup> was excavated from Area 9 and backfilled with clean soil to remove thorium-contaminated soils, which were subsequently deposited in Area 8 (MRC 1985a; DOE 1991c). The area is currently covered with asphalt. Low levels of plutonium and thorium contamination were detected in soils in this area (maximum plutonium-238 concentration of 8.15 pCi/g and maximum thorium concentration of 12 pCi/g) during the 1982 to 1985 Radiological Site Survey (DOE 1991c).

#### **5.1.6. Building 21, Thorium Sludge Storage Facility (Historical)**

Building 21 is southeast of the Building 90 blockhouse in the southern portion of Mound (Figure 5.1). Building 21 became operational in July 1964 (MRC 1973a), but is currently empty and is to be decommissioned. The building is 112 ft by 66 ft by 14 ft high and is completely enclosed with the walls and roof constructed of iron and steel (MRC 1973a). It was constructed on concrete with a 10-inch-thick floor and 14- to 16-inch-thick walls, which were intended to act as cantilevered retaining

Environmental Restoration Program

**OPERABLE UNIT 3  
OPERATIONAL AREA PHASE I INVESTIGATION  
NON-AOC FIELD REPORT**

**MOUND PLANT  
MIAMISBURG, OHIO**

**VOLUME II - APPENDICES A-C**

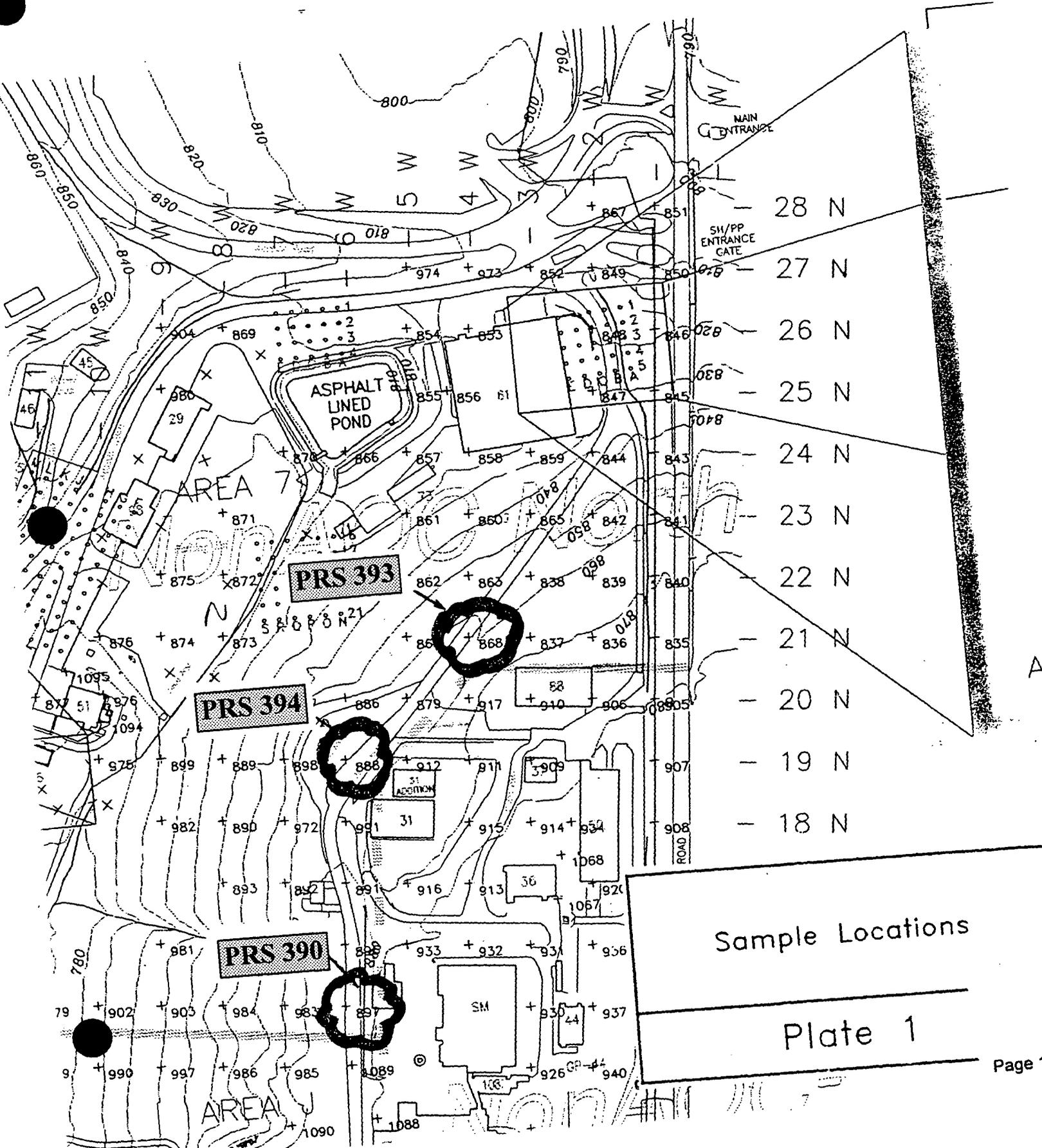
June 1995

Final (Revision 0)

U.S. Department of Energy  
Ohio State Office

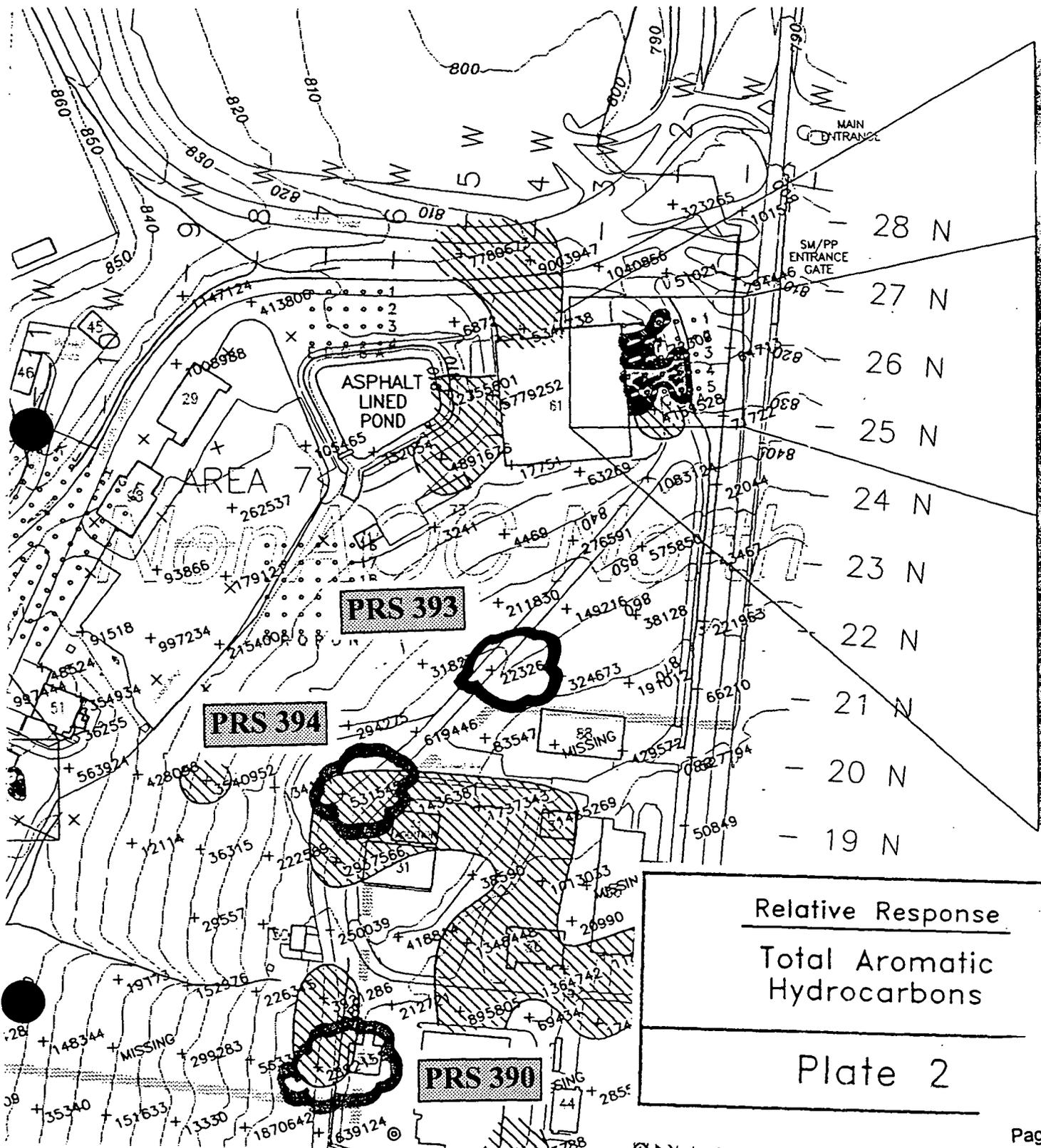


EG&G Mound Applied Technologies

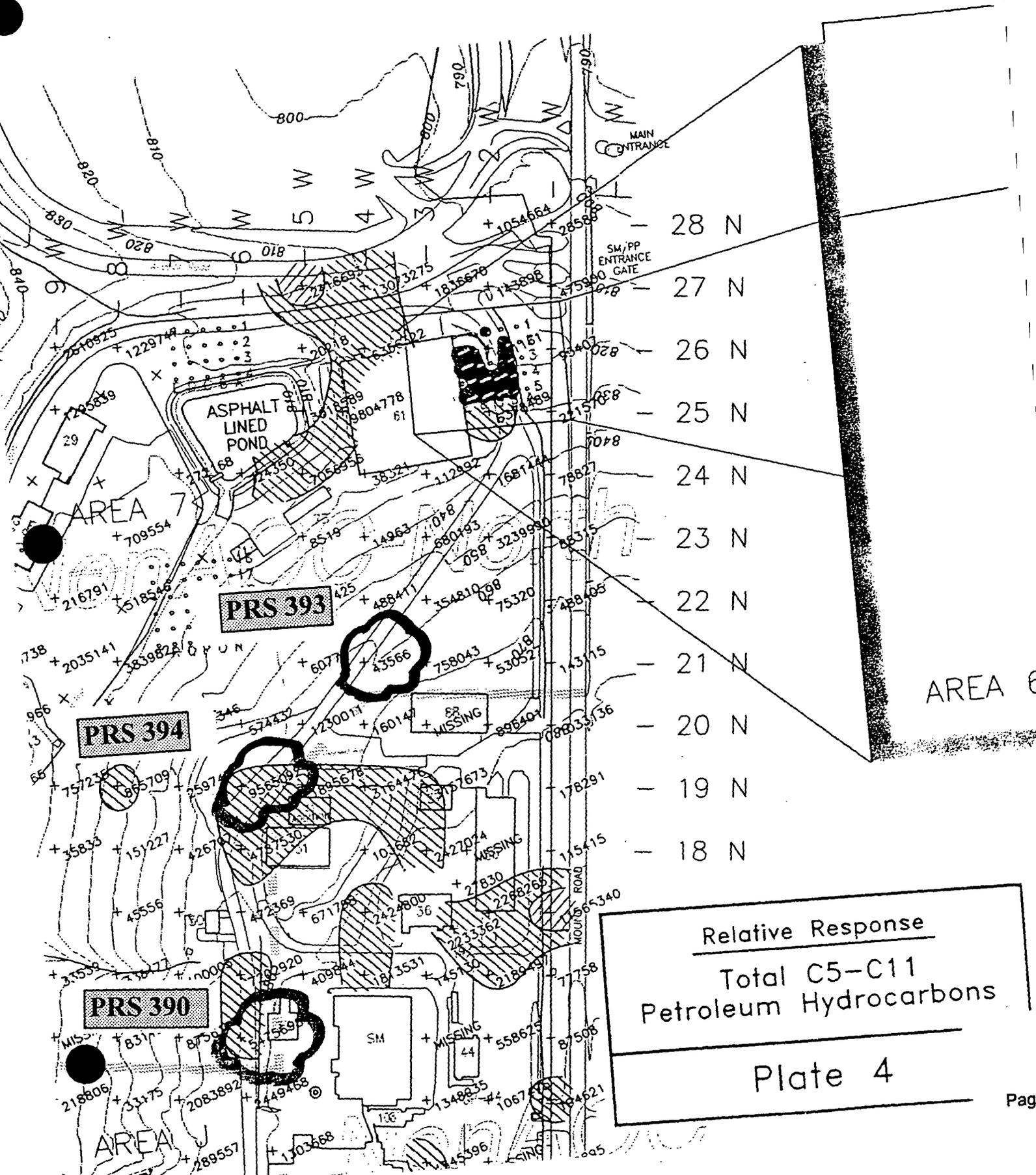


Sample Locations

Plate 1





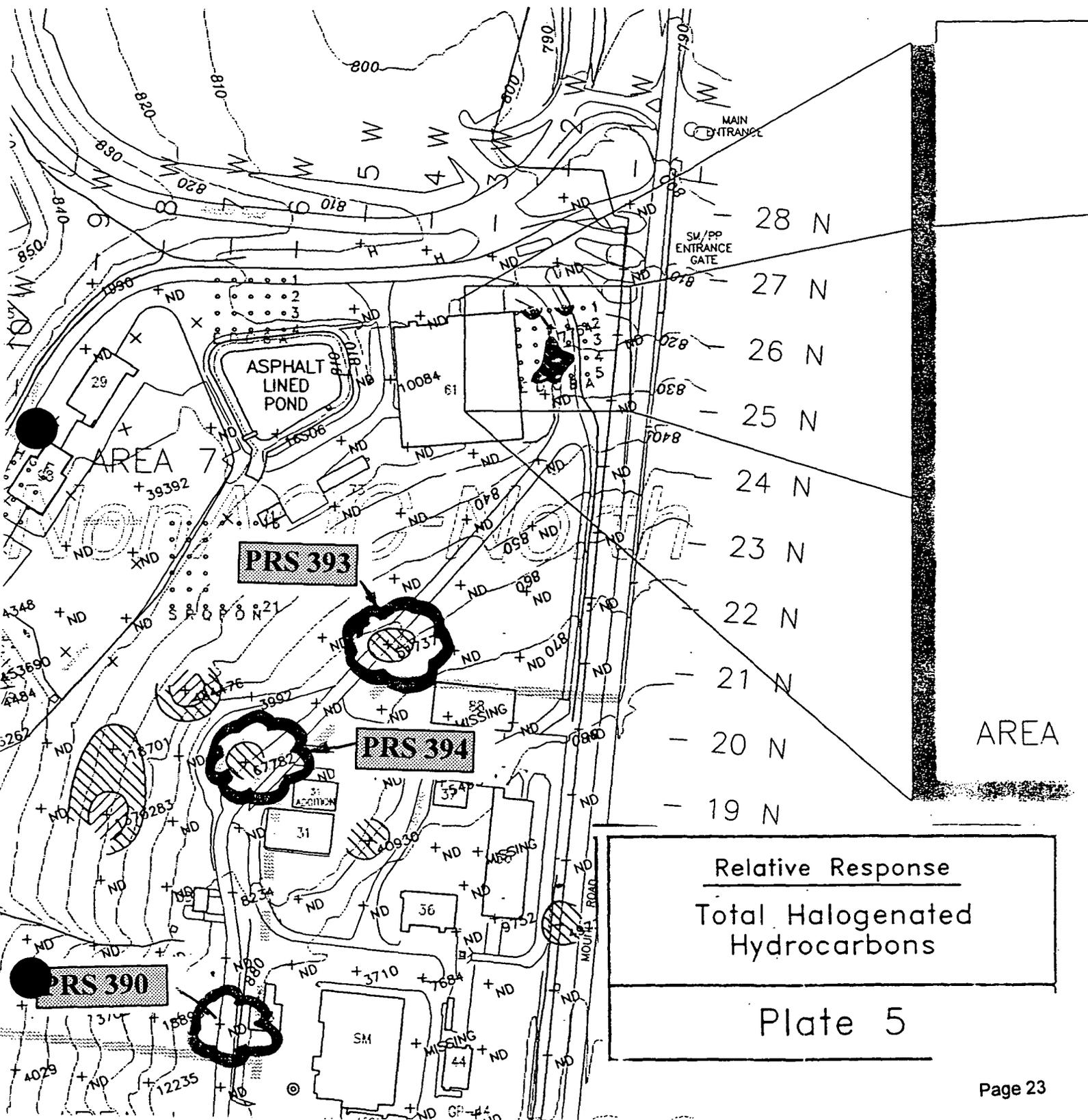


- 28 N
- 27 N
- 26 N
- 25 N
- 24 N
- 23 N
- 22 N
- 21 N
- 20 N
- 19 N
- 18 N

Relative Response  
 Total C5-C11  
 Petroleum Hydrocarbons

---

Plate 4



AREA

Relative Response  
 Total Halogenated  
 Hydrocarbons  
 Plate 5

APPENDIX D

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

SMPID	FIDLER SURVEY DATA					MOUND SOIL SCREENING FACILITY DATA			
	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:
15N01	253.5	190	12.48	10.0	NC	21	a	1.1	a
15N02	122.2	110	5.59	4.5	NC	WIPE	c	WIPE	c
<del>15N03</del>	<del>130</del>	<del>80</del>	<del>6.5</del>	<del>6.0</del>	<del>NC</del>	<del>0</del>	<del>a</del>	<del>0</del>	<del>a</del>
15N06	130	75	6.5	5.0	NC	NR		NR	
<del>15N07</del>	<del>170.3</del>	<del>115</del>	<del>9.72</del>	<del>8.5</del>	<del>NC</del>	<del>50</del>	<del>b</del>	<del>1</del>	<del>a</del>
15N08	170.3	155	9.72	9.0	NC	NR		NR	
15N09	170.3	125	9.72	10.5	NC	17	a	1.2	a
15N10	170.3	10						1.1	a
15N11	170.3	12						0.9	a
15N12	157.3	10						1	a
15N13	157.3	85						0.6	a
15N14	157.3	10						WIPE	c
16N01	253.5	17						NR	
16N02	122.2	70						1.1	a
16N03	130	10						WIPE	c
16N04	130	1						0.5	a
16N05	NC	N						1.2	a
16N06	130	4						1.2	a
16N07	170.3	80						WIPE	c
16N08	170.3	45	9.72	4.5	NC	9	a	1	a
16N09	170.3	130	9.72	7.5	NC	NR		0.6	a
16N10	170.3	125	9.72	6.5	NC	NR		NR	
16N11	157.3	110	8.45	5.5	NC	NC		NR	
16N13	157.3	55	8.45	5.5	NC	NR		NC	
17N01	253.5	100	12.48	5.5	NC	0	a	0.5	a
17N02	130	80	6.5	4.5	NC	WIPE	c	0.5	a
17N04	130	80	6.5	4.0	NC	WIPE	c	WIPE	c

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 - Picocuries per gram

FRS  
390

APPENDIX D

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

SMPID	FIDLER SURVEY DATA					MOUND SOIL SCREENING FACILITY DATA			
	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
<del>21N03</del>	<del>176.8</del>	<del>160</del>	<del>8.97</del>	<del>8.0</del>	<del>NC</del>	<del>20</del>	<del>a</del>	<del>1.2</del>	<del>a</del>
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						WIPE	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 - Picocuries per gram

FRS  
393

APPENDIX D

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

SMPID	FIDLER SURVEY DATA					MOUND SOIL SCREENING FACILITY DATA			
	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:
17N06	130	100	6.5	5.0	NC	0	a	0.9	a
17N07	170.3	130	9.72	6.5	NC	21	a	1.2	a
17N08	170.3	130	9.72	8.0	NC	19	a	1.2	a
17N09	170.3	80	9.72	5.5	NC	NC		NC	
17N10	170.3	100	9.72	6.0	NC	NC		NC	
17N11	170.3	90	9.72	7.0	NC	NC		NC	
17N12	152.1	40						0.6	a
18N01	253.5	11						1.1	a
18N02	130	8						WIPE	c
18N03	130	7						WIPE	c
18N04	130	6						0.8	a
18N06	130	9						WIPE	c
18N07	170.3							0.7	a
18N08	170.3							1.1	a
18N09	170.3							NR	
18N12	152.1							0.3	a
19N01	253.5							0.6	a
19N02	130							NC	
19N03	130							0.8	a
19N04	130	60	6.5	4.0	NC	WIPE	c	WIPE	c
19N05	130	60	6.5	5.0	NC	WIPE	c	WIPE	c
19N07	176.8	325	8.97	20.0	45	56	b	15.9	b
19N08	176.8	125	8.97	7	NC	25	b	2.4	b
						39	b	0.9	a
19N09	176.8	170	8.97	9.5	NC	10	a	1.1	a
19N10	176.8	70	8.97	3.5	NC	3	a	0.2	a
20N01	253.5	95	12.48	5.0	NC	16	a	0.6	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 - Picocuries per gram

FRS  
394

**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	Dimethylphthalate	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.

Table A.1

Detected Volatile Organic Compounds (µg/kg)

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

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)

Table A.2.

Detected Semivolatile Organic Compounds (µg/kg)

ANALYTE	Background Value	Industrial Scenario Guideline Criteria	SGC-NAC-000001 <del>NORTH</del>	SGC-NAC-000002 NORTH	SGC-NAC-000003 <del>NORTH</del>	SGC-NAC-000004 NORTH	SGC-NAC-000005 EAST	SGC-NAC-000006 EAST	SGC-NAC-000008 <del>WEST</del>
PETREX Sample Area									
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		16 J	30 J	57 J
Benzo(a)pyrene	NA	410		1300	80 J		100 J	450	65 J
Benzo(b)fluoranthene	NA	4,100		1000	18 J		190 J	460	67 J
Benzo(g,h,i)perylene	NA	NA		550	10 J		100 J	260	28 J
Benzo(k)fluoranthene	NA	41,000		1000	160 J		190 J	40	58 J
Bis(2-ethylhexyl)phthalate	NA	215,000							
Butylbenzylphthalate	NA	43,000,000							
Carbazole	NA	NA		600				34 J	
Chrysene	NA	410,000		1500	22 J		240 J	490	600
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	J	
Dibenzofuran	NA	NA		1100	23				
Diethyl phthalate	NA	NA							
Fluoranthene	NA	8,500,000		3400 D			400 J	800	110 J
Fluorene	NA	NA		1500	42 J				
Indeno(1,2,3-cd)pyrene	NA	4,100		690	120 J		10 J	120 J	16 J
2-Methylnaphthalene	NA	NA		970					
Naphthalene	NA	NA		4000 D	24				
Phenanthrene	NA	NA		4700 D	30		150 J	280 J	53 J
Phenol	NA	130,000,000							
Pyrene	NA	6,400,000	24 J	2700 D	40		340 J	70	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
			NORTH	NORTH	NORTH	NORTH	EAST	EAST	WEST	WEST	EAST
<b>TAL INORGANICS (mg/kg)</b>											
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		2.1 B	2.9	1.4 B			1.9		11.1
Barium	180	15,000		20.7 B		47.1 B	3.6	85	20 B	23.2	168
Beryllium	1.3	1		0.56		0.65	0.38	0.28	0.28		0.9 B
Bismuth	NA	NA									0.85 B
Cadmium	2.1	210		0.25 B	0.19 B		0.38 B	0.5 B	0.33 B	0.22 B	6
Calcium	310000	NA	162000	159000	95500	152000	15500	86200	85000	113000	5940
Chromium	20	110,000	13.2	6.7	3.8	15.2	11	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	7 B	13
Copper	26	NA	11.2	11.9	9.9	17.1	14.5	15.2	16.2	5.9	18.2
Cyanide	ND	4,300									
Iron	35000	NA	300	10600	500	21800	17200	700	23000	160	29400
Lead	48	NA	17	5.2	1.5	8.6	30.9	21	7.2	5	22.2
Lithium	26	NA	2 B	12.5 B	1.2	23 B	7 B	10.3	3 B	8.2 B	14.7 B
Magnesium	40000	NA	6160	57800	2900	5670	5240	35600	2800	47800	450
Manganese	1400	27,000	69	384	270	612	383	589	493	256	228
Mercury	ND	64			0.13						
Molybdenum	27	NA	0.43 B	1.2 B	0.77 B		1 B	1.5 B	0.9 B	1.4 B	1.8 B
Nickel	32	4,300	18.4	9.9	6.4 B	20.6	11.1	16.2	22.8	8.1 B	24.5
Potassium	1900	NA	780	742 B	346	2080	574 B	344 B	1590	463	1420
Selenium	NA	NA									
Silver	1.7	1,100			0.1 B						
Sodium	240	NA	228	888 B	50	137 B	411 B	198 B	248 B	11 B	1010 B
Thallium	0.46	NA									
Tin	20	NA	1.1			1.4 B	1 B			4.5 B	1.5 B
Vanadium	25	1,500	14	8.3	4.7	16.3	23.1	18.9	14.2	7.4	
Zinc	140	64,000	55	29.5		67	59	69.2	53.8	36.6	1.8
<b>OTHER INORGANICS</b>											
% Solids (%)	NA	NA	83	93.8	75	83.3	78.4	75	80	85	78.9
Nitrate/Nitrite (mg-N/kg)	NA	NA	2	1.8	1.2	2.1	7.2	4.8	1.8	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	0.87	0.087	0.543
Plutonium-239/240	0.18	5.5			0.032		
Potassium-40	37	NA	21.7	2.95	5.53	27.4	15.1
Radium-226+D	2	0.14	1.5	0.478	0.508	1.16	1.2
Thorium-228+D	1.5	0.85	1.52	0.277	0.37	1.24	1.05
Thorium-230	1.9	44	0.814	0.374	0.621	0.98	1.19
Thorium-232	1.4	50	1.3	0.184	0.31	1.17	0.95
Uranium-234	1.1	38	2.19	0.401	0.719	0.934	0.874
Uranium-235+D	0.11	3.4	0.0994		0.04	0.0349	0.028
Uranium-238+D	1.2	11.0	2.5	0.392	0.512	0.918	0.918

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)

