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# MOUND



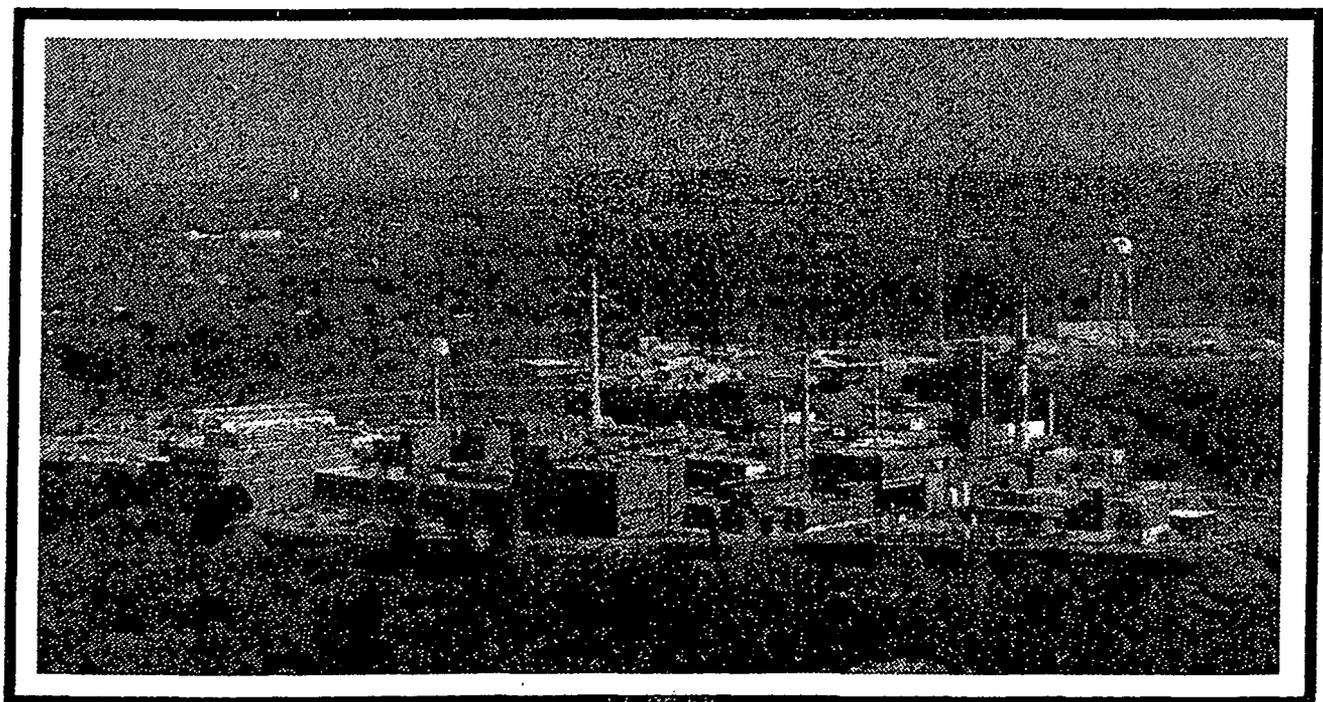
Environmental  
Restoration  
Program



# MOUND PLANT

## Potential Release Site Package

### PRS # 266/395



**MOUND**



Environmental  
Restoration  
Program

# MOUND PLANT POTENTIAL RELEASE SITE PACKAGE

## *Notice of Public Review Period*



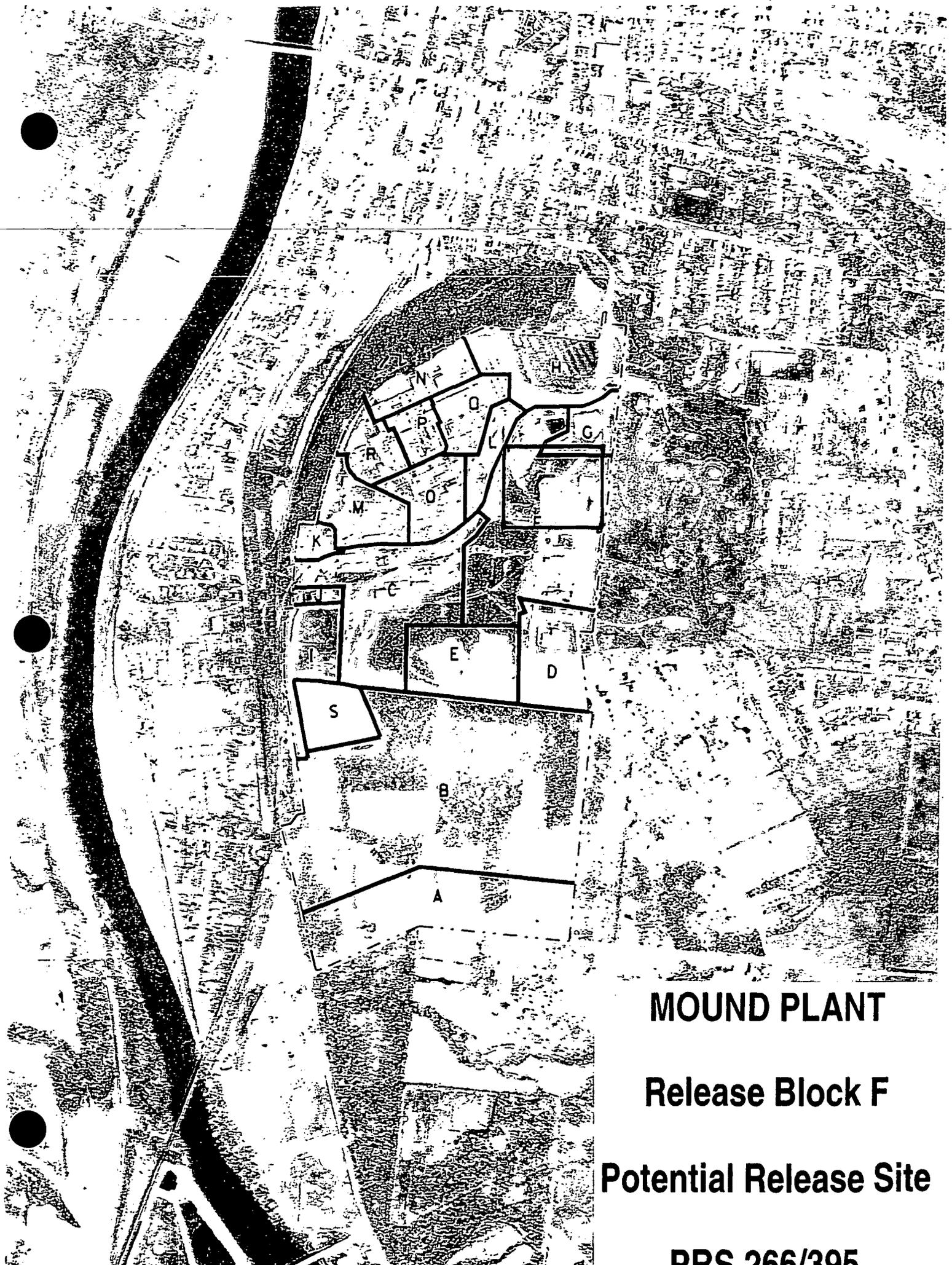
The following potential release site (PRS) packages will be available for public review in the CERCLA Public Reading Room, 305 E. Central Ave., Miamisburg, Ohio beginning April 3, 1997. Public comment will be accepted on these packages from April 3, 1997, through May 8, 1997.

- PRS 15: Former Waste Treatment Site - Area C (lithium burn area)**
- PRS 74: Former Waste Storage Site - Quonsot Hut**
- PRS 330: Former Tank Site - Building 2 Fuel Oil Tank**
- PRS 349: Soil Contamination**
- PRS 371: Soil Contamination**
- PRS 391: Soil Contamination**
- PRS 395: Soil Contamination**
- PRS 396: Soil Contamination**

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

PRS 266/395

REV	DESCRIPTION	DATE
0 <b>PUBLIC RELEASE</b>	Available for comments.	<b>Oct. 18, 1995</b>
1 <b>FINAL</b>	Comment period expired. No comments. Recommendation page annotated.	<b>Oct. 10, 1996</b>
2 <b>FINAL</b>	Signature page changed to show correct review period.	<b>Nov. 19, 1996</b>
3 <b>BINNING REVISIONS (CHANGED POST BINNING)</b>	On the Supplemental Data page, 2nd para: changed from“(see map on page 64)” to “(see map on page 60)”  PRS 395 binned No Further Assessment, Dec. 18, 1996.	<b>Dec. 18, 1996</b>
4 <b>BINNING REVISIONS (CHANGED POST BINNING)</b>	Comment period expired. No comments. Recommendation page annotated.	<b>May 13, 1997</b>



**MOUND PLANT**

**Release Block F**

**Potential Release Site**

**PRS 266/395**



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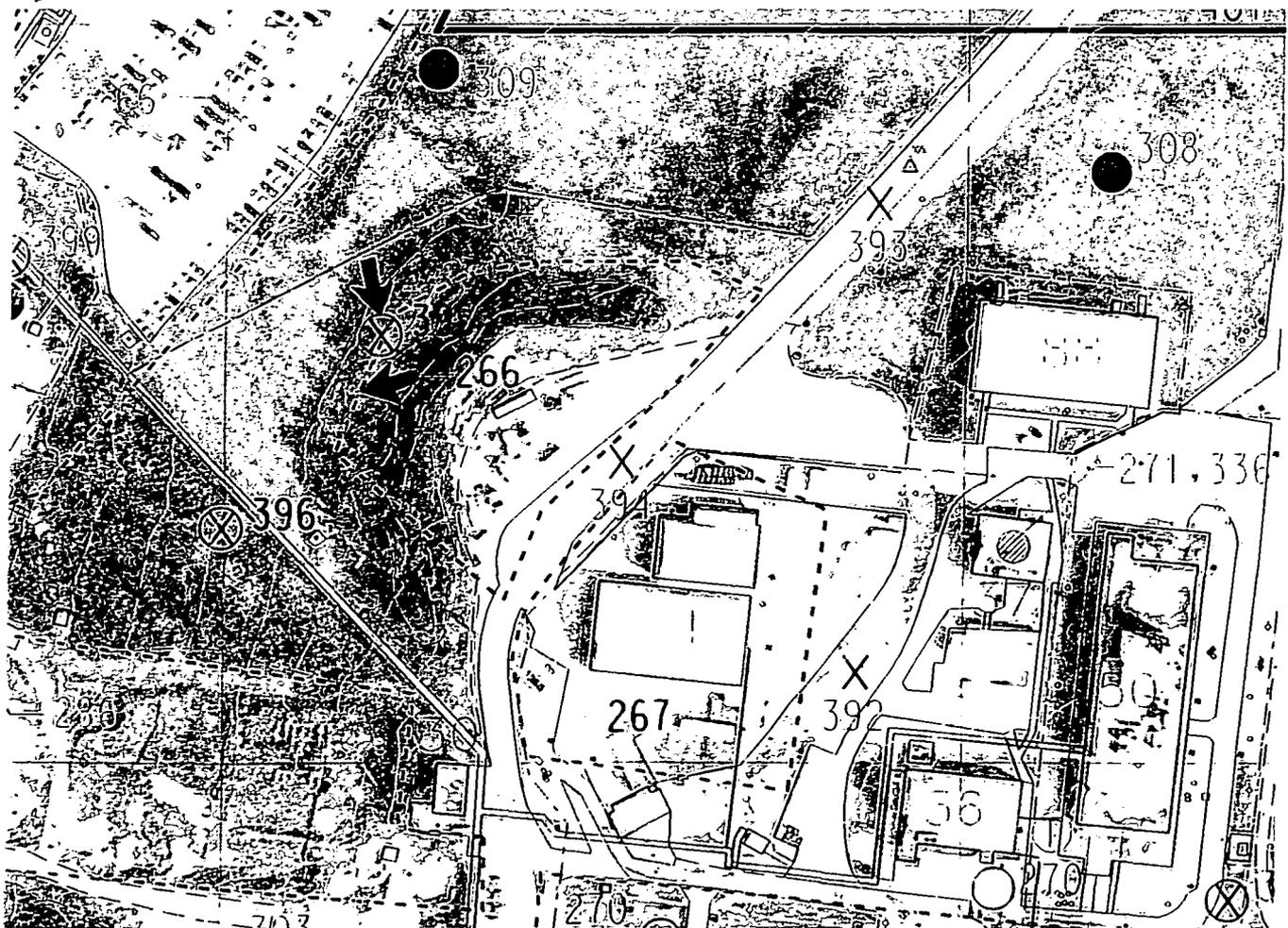
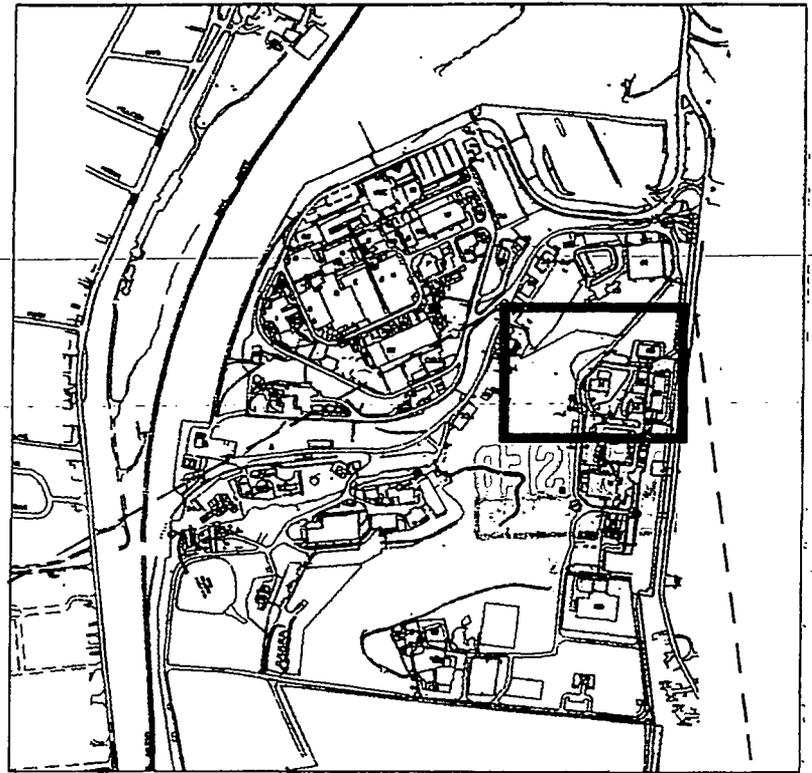
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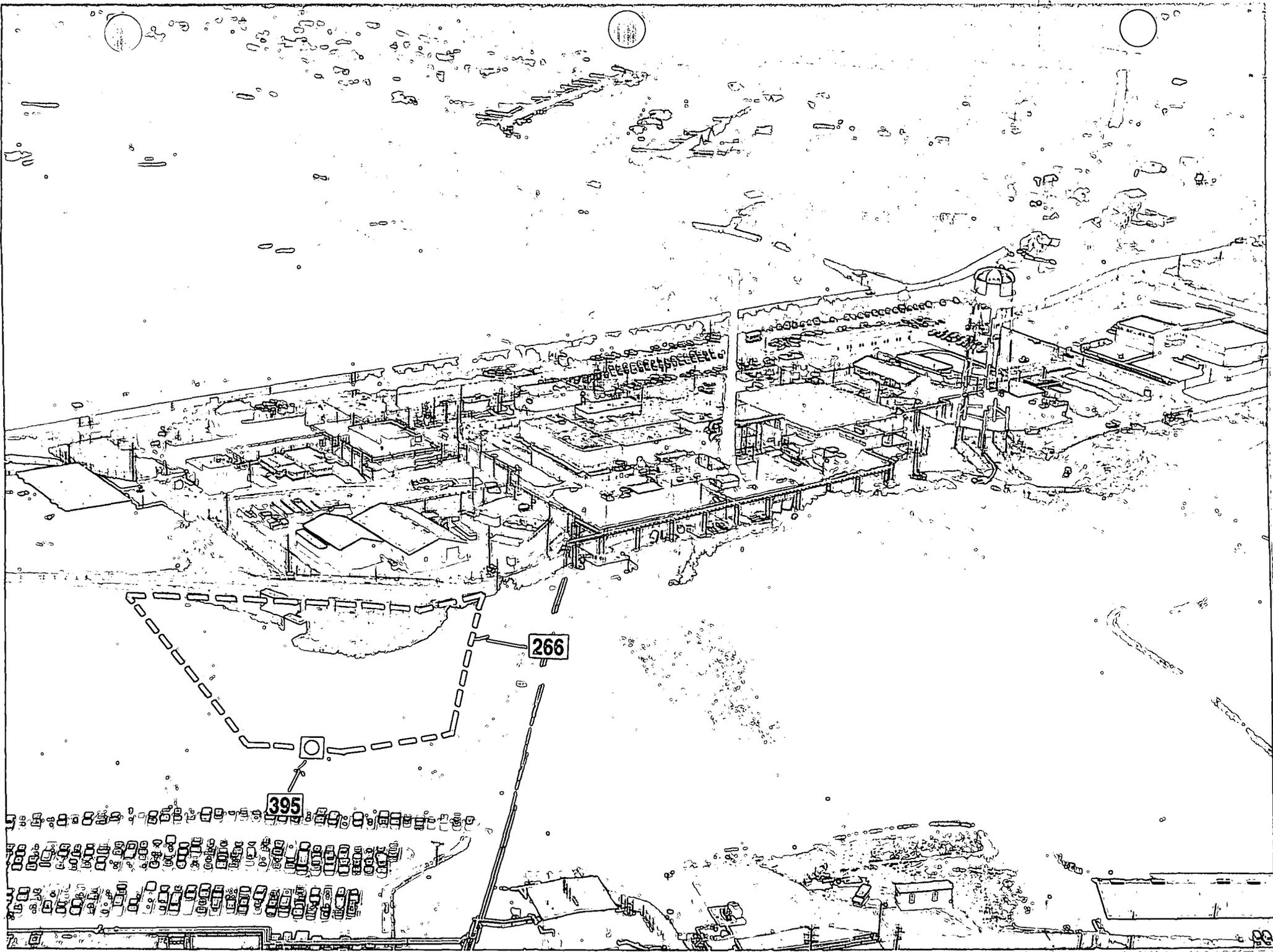
**MOUND PLANT**

**Release Block F**

**Potential Release Site**

**PRS 266/395**





## **PRS 266/395**

### **PRS HISTORY:**

PRS 266 (also recognized as Area 8) was identified as a potential release site as a result of historical information and the radiological site survey performed in October 1983.

PRS 395 was identified as a potential release site in June 1994 as part of the Operable Unit 5, Operational Area Phase I Investigation Non-AOC Field Report.

### **PROCESS DESCRIPTION:**

The historical data suggests the radiological contamination associated with PRS 266 (approximately 25,000 square feet) is from surface soil which was removed from Areas 9 and 1 (Areas 9 and 1 were used for repackaging drums of Thorium 232 sludge). For PRS 266 and 395, no record of hazardous chemical processes are known to have occurred and there are no buildings located in the immediate area.

### **CONTAMINATION:**

Radiological data from the Site Survey in 1983 identified Thorium 232 contamination at a maximum value of 254.3 pCi/g in a subsurface sample at a depth of 80 inches. The Pu-238 levels were slightly elevated in the same area. PRS 395, which is at the western edge of PRS 266, indicated elevated levels of "Total Halogenated Hydrocarbons". On a relative basis, the contamination level was nearly 500,000 ion counts. Three sets of data are attached which all verify high levels of Thorium-232 in PRS 266, which is the primary contaminant of concern.

### **READING ROOM REFERENCES:**

- 1) OU9 Site Scoping Report: Volume 12 - Site Summary Report. (pages 5-6.1)
- 2) OU9 Site Scoping Report: Volume 7 - Waste Management. (pages 7-13)
- 3) OU9 Site Scoping Report: Volume 3 - Radiological Site Survey Report. (pages 14-24)
- 4) OU5 Operational Area Phase I Investigation Non-AOC Field Report Sampling and Analysis Plan for the Other Soils Areas, June 1994. (pages 25-35)
- 5) Sampling and Analysis Plan for Other Soils Area, June 1994. (pages 36-55)

### **PREPARED BY:**

Gerald Maul, Member of EG&G Technical Staff

**PRS 395  
(SUPPLEMENTAL DATA)**

**CONTAMINATION:**

In February 1996, PRS 395 was sampled as part of the *Soil Gas Confirmation Investigation*.<sup>6</sup> This investigation was a quantitative survey performed as the second phase to the original 1994 OUS, Operational Area Phase I qualitative PETREX Soil Gas Investigation.

*Soil Gas Confirmation* samples #000001 was taken within approximately 50 feet of PRS 395 (see map on page 60). The soil was sampled over a depth of 1 to 2 feet and analyzed by laboratories outside of Mound for volatiles, semivolatiles, PCBs, pesticides, metals, radionuclides, and explosives. Results showed:

All concentrations of volatile, semivolatile, PCBs, pesticides, metals, radionuclides, and explosives, in the soils, were below the applicable ALARA, regulatory, or  $10^{-6}$  Risk Based Soil Guideline Criteria.<sup>6, 7, 8</sup>

**SUPPLEMENTAL REFERENCES:**

- 6) Soil Gas Confirmation Sampling, May 1996, Revision 0. (pages 56-66)
- 7) Risk Based Soil Guidelines, Final, Revision 0, December 1995.
- 8) Code of Federal Regulations, 40 CFR 192.41 and 40 CFR 192.12.

**MOUND PLANT**  
**PRS 266/395**  
**SOIL CONTAMINATION**  
**Supersedes October 18, 1995 Recommendation**

**RECOMMENDATION:**

PRS 266 was identified as a potential release site as a result of historical information and the Radiological Site Survey performed in October 1983. The 25,000 square foot area has three sets of data indicating high levels of thorium-232 (greater than 200 pCi/g). Therefore, a RESPONSE ACTION is recommended for PRS 266, as previously recommended on October 18, 1995.

PRS 395 was identified as a potential release site in June 1994 due to qualitative PETREX soil gas results during the Operable Unit 5, Operational Area Phase I Investigation. On October 18, 1995 further assessment for halogenated hydrocarbons was recommended for PRS 395. A subsequent quantitative *Soil Gas Confirmation Investigation* sample taken within 50 feet of PRS 395 showed that all concentrations of volatile (including halogenated hydrocarbons), semivolatile, PCBs, pesticides, metals, radionuclides, and explosives in the soils were below their respective ALARA, regulatory or  $10^{-6}$  Risk Based Guideline Criteria. Therefore, NO FURTHER ASSESSMENT is recommended for PRS 395.

**CONCURRENCE:**

DOE/MEMP:

Arthur W. Kleinrath 12/18/96  
Arthur W. Kleinrath, Remedial Project Manager (date)

USEPA:

Timothy J. Fischer 12/18/96  
Timothy J. Fischer, Remedial Project Manager (date)

OEPA:

Brian K. Nickel 12/18/96  
Brian K. Nickel, Project Manager (date)

**SUMMARY OF COMMENTS AND RESPONSES:**

Comment period from 4/3/97 to 5/8/97

No comments were received during the comment period.

Comment responses can be found on page \_\_\_\_\_ of this package.

**REFERENCE MATERIAL**  
**PRS 266/395**

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	Ref
264	Explosive Waste Storage Bunker (Magazine 53)	I-7	In service	Classified, non-explosive wastes  Explosion residuals (primarily aluminum residuals)  Contaminants listed under Explosive Waste Storage Bunker (Magazine 53)  Detonators, Detonating cord, Thermite, Pyrotechnic powders, Primary explosives  High explosive powder, PETN, PBX, RDX, HMX, HNS, CP  HNS (hexanitrostilbene)	4, 5, 18	None Suspected			No Data		
265	Biodegradation Unit	I-7	Inactive	Soapy wastewater containing explosives constituents	4, 5, 18	Suspected	S	7, 18	See Pyrotechnic Waste Shed		4
266	Area 8, Thorium-Contaminated Soils from Areas 1 and 9	F-9	Grounds	Thorium-232, Plutonium-238	1, 4, 5, 18	Thorium	S	4, 6	14, 15, 16	Table B.1 (Table V.3 in Ref. 6)	6
267	Area 9, Thorium Storage and Redrumming Area	F-9 G-9	Grounds	Plutonium-238, Thorium  Thorium sludge constituents (c)	1, 4, 5, 18	Thorium	S	4, 6	14	Table B.1 (Table V.4 in Ref. 6)	6
268	Building 31, Contaminated Material Storage Building	F-9	In service	Plutonium-238  Thorium  Tritium	4  3	None Suspected			See Area 9	Table B.9	6
269	Building 36 Historic Gasoline Tanks (Tanks 239 and 240)	G-10	Historical	Gasoline	3	No information on when tanks were removed			No Data		
270	Underground Sanitary Sewer Lines G6 & G7	G-10	In Service	Organic solvents, plating solutions, laboratory chemicals, nitric acid, hydrochloric acid, methylene chloride, strong acids and bases	4	Suspected VOCs	S	4	3, 4, 5, 6, 9, 10, 11, 12, 13, 16	Tables B.6, B.7, B.8, and B.9	7
271	Building 37 Sanitary Waste Tank (Tank 100)	F-10	In service	Sanitary wastes	3, 4	None Suspected			No Data		

Page 6

- 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."

**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**



with aluminum and copper cladding was also part of the metal scrap inventory (Nuclear Metals, Inc. 1955). One shipment in January 1955 consisted of 45 kg of oxide and 25 kg of turnings (Waldfofle 1955). The drums shipped by railcar were unloaded in the old Warehouse 9. The drums were stored in many areas of the plant, including Warehouse 15, the Quonset hut, W Building, G Building (Scott 1955a), and many open areas (Figure 2.10).

Although the thorium refinery project was terminated, the drums of thorium residues continued to be stored at Mound. Because of the corrosive nature of these sludges, the drums leaked and frequent repacking was necessary. Typically, 20 to 40% of the drums were repacked annually. Initially, repacking of leaking drums took place in Warehouse 15, but the elevated radiation levels (radon?) forced the work outside to Area 3 and later to Area 9 (Figure 2.10). In 1961, a new bulk storage facility was proposed for containment of the sludge. This facility, known as Building 21, was completed in 1964, and most of the contents of the drums were transferred into the building at that time. By 1973, at least 117 55-gallon drums of thorium residue were still stored outside the building but were to be moved inside (Storey 1973a). Building 21 originally did not have any doors or windows and was referred to as a silo. The sectioned roof allowed the materials to be loaded. The oxalate sludge was stored in a separate room from the hydroxide sludges. By this time, the sludges had lost a significant amount of moisture; and, during the dumping of the material into the bin through a roof opening, significant emission of fugitive dust occurred, contaminating the surrounding area. The thorium sludges remained in storage in Building 21 until a decision was made to dispose of the material. General Atomic Company purchased the sludge and began packaging the material in 55-gallon drums and shipping it to its facilities in October 1974, completing the task in July 1975. Once the silo building was clean, it was used to store the drums of Cotter Concentrate.

### 2.5.1. Process Description

The preliminary design for the thorium refining process, the starting point for the developmental studies at Mound, was based upon pilot plant studies conducted at the National Lead Company of Fernald, Ohio, and the ORNL, where a thorium extraction process known as the Thorex process was developed. The background work conducted at these two facilities formed the basis for laboratory and pilot development studies for the Monex process conducted at Mound. The Monex process development work at Mound took place in the R Building in 1954 and 1955. The Monex pulse column pilot plant was installed in room 1-B of the SW Building. The pilot plant was constructed of laboratory glassware and 2-inch glass columns. A berm constructed around the pilot plant served the purpose of containing any spills.

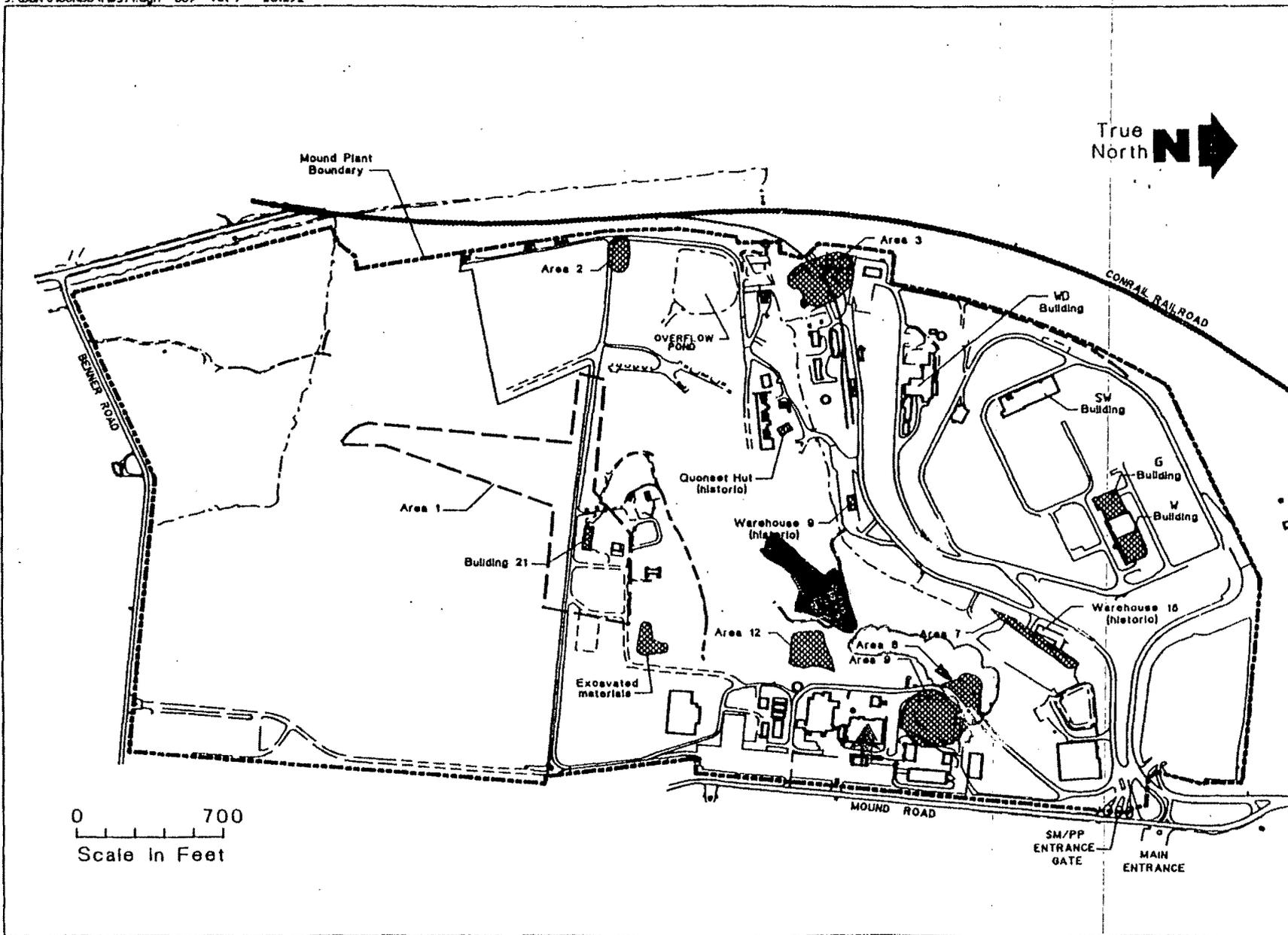


Figure 2.10. Thorium ore storage, disposal, and redrumming areas.

barium chloride followed by a pH adjustment to 6. This step resulted in the precipitation of the radium isotopes. No analytical data were found to indicate the concentrations of radium-228 and -224 present in the raffinate or wastewater. This aqueous waste went to the 30,000-gallon influent tanks in the WD Building. It is not known whether it was treated or simply diluted and released to the Great Miami River. The tributyl phosphate and nitric acid wastes were probably drummed for shipment and burial offsite, but this has not been confirmed. The equipment used in the pilot plant, including the columns, glassware, pumps, and other equipment, was cleaned and subsequently used for the protactinium-231 separations (Meyer 1956c).

The production-scale thorium refinery facility that was planned for construction at Mound required extensive construction in the SW Building. Construction of the foundations for the refinery equipment was nearly complete in the west side of the SW Building when excavations for the refinery exposed a section of contaminated soil and gravel that had resulted from leakage of radium-actinium process wastes from the sump located on the west side of room SW-1-A. The sump served the "hot" side of the old cave in which the radium and actinium was processed. About 200 ft<sup>3</sup> of contaminated soil and gravel were excavated and dumped into an old septic tank. The septic tank was a remnant from the plant construction in the late-1940s and is currently included in Area 7 (DOE 1992g).

The majority of the waste generated by the thorium refinery project at Mound was associated with the storage of the 1,650 tons of thorium-containing sludges. Some of the drums in which the thorium was shipped were in poor condition when they arrived; many of the drums were apparently frozen when they were shipped and had thawed in transit, resulting in contamination of the interiors of the boxcars. These boxcars underwent decontamination procedures before being allowed to leave the facility. In some cases, the interior flooring and other contaminated material was removed, and some of the flooring was replaced.

Equipment necessary to conduct the redrumming was initially installed in Warehouse 15 (Figure 2.9), but the high levels of radon caused the operation to be moved outdoors (Thomas 1991). One report indicates that some redrumming took place by an AEC contractor other than MCC. The drums were washed, and the resulting "thorium decantate," amounting to 630 drums of wastewater, was diluted and released to the river in early January 1956 (Meyer 1956a). This release probably took place either to the storm sewer or the NPDES Outfall 001 pipeline to the Great Miami River.

The highly corrosive nature of the sludges resulted in drum leakage and subsequent soil contamination. The repacking of leaking drums became an ongoing activity. Somewhere between 15,000 and 20,000 steel drums had to be disposed of before the sludge was put into storage in Building 21 (Meyer 1979a). Corroded drums were collapsed and buried at Mound in the areas now known as Areas 2 and

7 (Figure 2.9). Used drums were not cleaned and contained residual amounts of the thorium sludges. Soils contaminated with thorium at the areas of redrumming and around the silo (Building 21) were removed to other areas and were generally dumped over the western slopes of the SM/PP Hill. The areas of redrumming are now known as Areas 3 and 8. Area 1 surrounds the old silo, and Areas 8, 12, and perhaps 7 received the contaminated soils (DOE 1992g). Equipment used during redrumming operations, including a flatbed truck and a conveyor belt, is known to have been buried in Area 7 (Figure 2.9). Nothing is known of the fate of the thorium metal. Mound reviewed the options for disposal of the thorium in April 1973 (MRC 1973a). This report indicated that some material had been sold prior to 1973. There is no specific mention of the thorium metal. An inventory of the thorium that was stored at Mound as of April 1973 does not include thorium metal. When Mound decided to sell the thorium residues, the invitation to bid, dated November 1, 1973, did not mention thorium metal available for sale (MRC 1973d).

## 2.6. THORIUM-230 (IONIUM) PROGRAMS

Ionium is an alpha-active thorium isotope with a half-life of  $8.05 \times 10^4$  years. Ionium and thorium-230 are names that have been used interchangeably to identify this isotope. The interest in ionium goes back to 1946 (Peppard 1949), when a survey was conducted to identify sources of ionium. This survey looked at various fractions obtained from processing uranium and its ores to identify sources of ionium and protactinium-231 (Bruehlman 1947). In 1949, the ionium program reached a second milestone when a pilot plant was constructed at ANL to process 3,600 gallons of Mallinckrodt sparged turbid liquor from a material referred to as the airport cake, a raffinate produced by the diethyl ether solvent extraction of uranium (Peppard 1949). The material containing ionium was being produced at the Mallinckrodt Chemical Works uranium refinery in St. Louis, Missouri (Fariss 1955; Eichelberger and Scott 1956a).

In July 1955, Mound submitted a proposal to the AEC to design and install a facility that would be used for process chemistry development. The work would isolate ionium from raffinates produced at Mallinckrodt (McCarthy 1955). In November 1955, Mound received a directive to proceed with the design and construction of this facility, with a target completion date of February 1956 (Johnson 1955). The process chemistry research and development took place in the R Building. The larger columns required for production separation also were assembled in the R Building. Ionium was to be used as a tracer element in the Redwing test program, and kilogram quantities of ionium were needed for weapons diagnostic tests. Between April 6 and May 18, 1955, five shipments of a total of 400 g of ionium were made to the AEC (Haubach 1956a, 1956b, 1956c, 1956d).

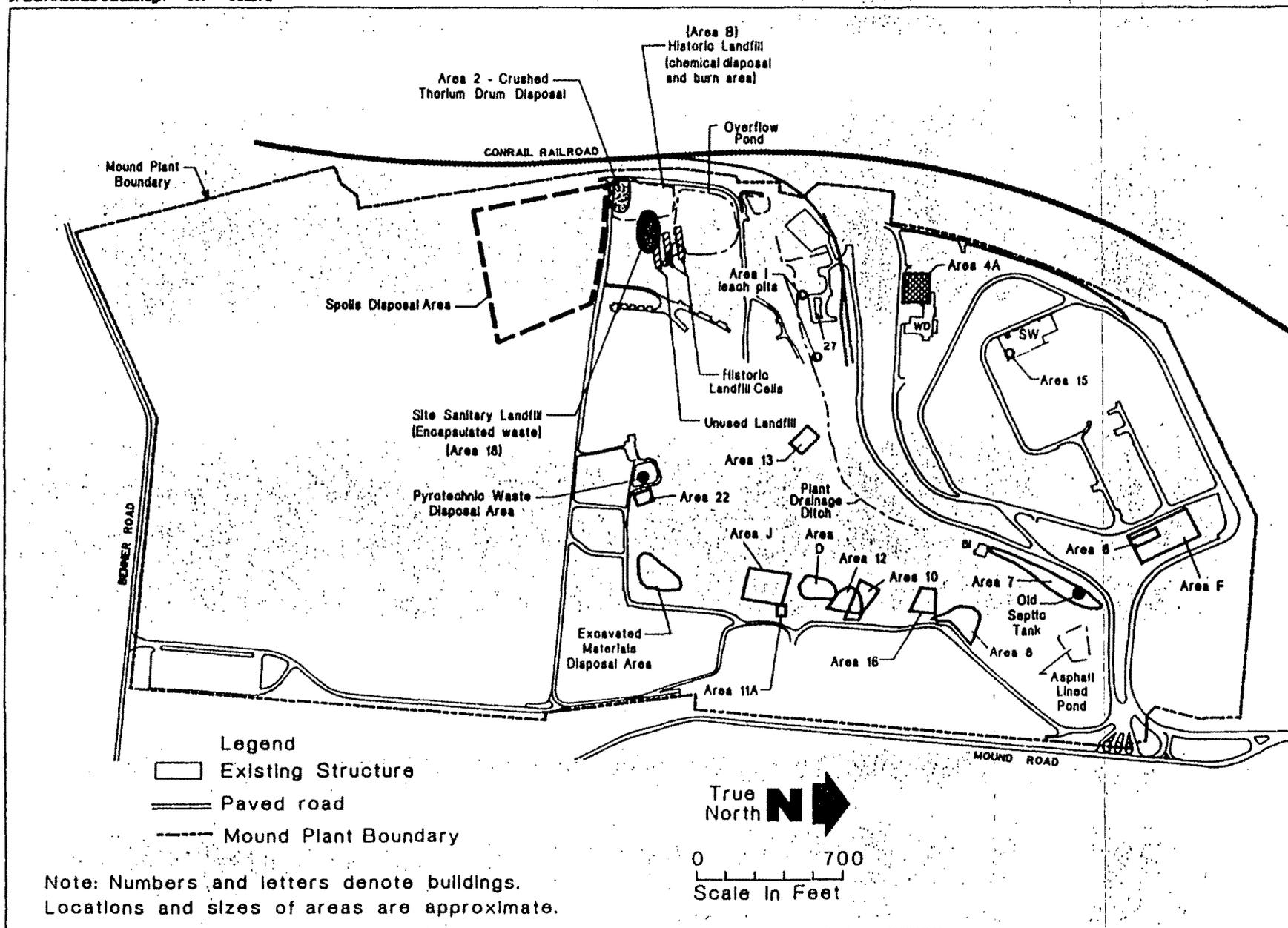


Figure 6.1 On-plant waste disposal areas.

Later versions of the map appeared in the waste management site plans of the mid-1970s (e.g., MRC 1974c) with the correct thorium-232 isotope identified.

The contamination levels within Area 7, reported as a result of the Site Survey Project investigation, are plutonium-238 and thorium concentrations of 7.40 and 20.52 pCi/g, respectively, in surface samples (DOE 1991c). Other radionuclides detected included radium-226 (2 pCi/g), cesium-137 (1.2 pCi/g), and tritium (5.23 nCi/L).

#### 6.1.1.4. Area 8, Thorium-Contaminated Soils from Areas 1 and 9 (Historical)

Area 8 is northwest of Building 31, on the SM/PP Hill in the eastern portion of Mound (Figure 6.1), and encompasses approximately 25,000 ft<sup>2</sup> (MRC 1985a). Area 9 and Area 1 were contaminated by the repackaging of the thorium-232 sludges in 1965 and 1966. When these areas were scraped to remove the surficial contamination (in 1965), the soils were disposed of in Area 8 and Area 12. During the 1982 to 1985 Radiological Site Survey (DOE 1991c), plutonium-238 was detected at a maximum concentration of 24.4 pCi/g in a surface sample; all other surface samples were less than 10 pCi/g. The maximum thorium concentration was 254.3 pCi/g in a subsurface sample at a depth of 80 inches.

#### 6.1.1.5. Area 10, Debris from Dayton Units (Historical)

Area 10 is west of Building 30, on the slope of the SM/PP Hill, in the east-central portion of Mound (Figure 6.1) (DOE 1991c). It was used for the disposal of concrete contaminated with polonium-210 from the Dayton operations. The concrete was deposited in 1950 and, because of the short half-life of polonium-210 (138.4 days), is no longer radioactive (DOE 1992g). One hundred and sixty truckloads of debris were brought to Mound from Dayton Unit IV (Halbach 1950), and 100 truckloads were brought from Unit III. It is unknown how much of this was stored in Warehouse 10, the tropical huts, or dumped in Area 10. Many of the temporary buildings at Unit III were also razed and brought to Mound when that facility was decommissioned. Some more recent concrete disposal may also have occurred, but nothing is known for certain. The area is estimated to be approximately 150 ft by 100 ft. The single surface soil sample collected from Area 10 during the 1982 to 1985 Radiological Site Survey had a plutonium-238 concentration of 11.8 pCi/g and a thorium concentration of less than 2 pCi/g (DOE 1991c).

#### 6.1.1.6. Area 12, Thorium-Contaminated Soil from Area 1

Area 12 is west of Building 38, on the SM/PP Hill, in the eastern portion of Mound (Figure 6.1) (DOE 1991c). In 1965, soil contaminated with thorium-232 was transferred to Area 12 from Area 1, when

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



The drilling and sampling were performed using an auger drill rig and a 2-ft, split-barrel sampler. As the split-barrel sampler was removed from the borehole, it was monitored for radioactivity contamination by Mound Plant health physics personnel using a FIDLER to detect radioactivity contamination that would pose a hazard to the workers present. After the soil was removed from the sampler and placed in sample containers, field team members wearing gloves brushed the remaining soil out of the sampler. The gloves were then monitored with an alpha scintillometer before the split-barrel sampler was used again. However, no standard decontamination was performed.

The core locations are shown in Plate 1. The core locations were surveyed by a licensed surveyor after drilling was completed. The available reports submitted to Mound Plant by the drilling subcontractors are presented in Appendix B.

#### 2.1.4. Sample Analyses

##### 2.1.4.1. FIDLER Screening

In order to identify samples with concentrations of plutonium-238 exceeding 25 pCi/g and total thorium exceeding 2 pCi/g, all of the soil samples collected were pulverized and then screened using a Bicon® FIDLER at the Mound Plant Soil Screening Facility, known as trailer 15 at the time of the Site Survey Project. The Soil Screening Facility is now located in the H Building at Mound Plant (Plate 1). The minimum detectable activity at which plutonium-238 can be reliably detected at the Mound Plant screening facility is estimated to be 25 pCi/g (Draper 1986b). The detection of plutonium-238 at lesser concentrations (12-25 pCi/g) was unreliable and had an estimated error of  $\pm 75$  percent. The estimated error decreased with increasing sample activity; for samples with 25 to 100 pCi/g of plutonium-238, the estimated error was  $\pm 35$  percent, and for samples with  $> 100$  pCi/g, the estimated error was  $\pm 30$  percent (Casella and Bishop 1984). The minimum detectable activity for thorium from FIDLER screening was estimated to be about 2 pCi/g (Stought et al. 1988). The Mound Plant procedure for screening soil samples is provided in Appendix A.

##### 2.1.4.2. Radiochemical Analysis for Plutonium-238

Because of the high error ( $\pm 75$  percent) involved in the FIDLER screening of samples containing less than 25 pCi/g of plutonium-238, all soil samples were radiochemically analyzed by Mound Plant for plutonium-238. The lower detection limit (LDL) for plutonium-238 by this method was estimated to be 0.01 pCi/g, with a relative precision (two standard deviations) of 25 percent. The overall precision of the plutonium-238 measurements was reported to be about 18 percent (DOE 1991b). The Mound

Plant procedure for the radiochemical analysis of soil samples for plutonium-238 is provided in Appendix A.

#### 2.1.4.3. Radiochemical Analysis for Thorium

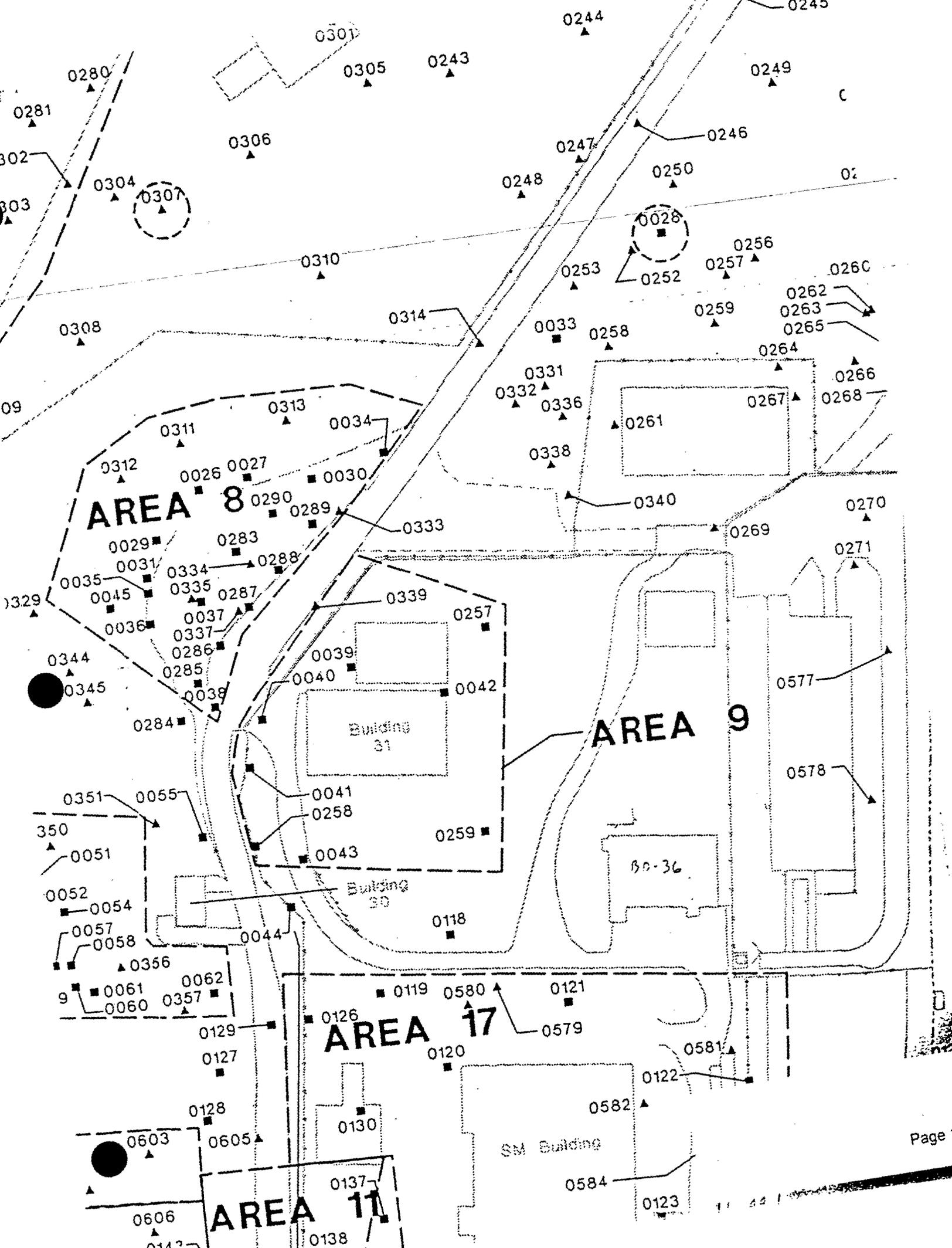
~~Samples with thorium concentrations in excess of 2 pCi/g by FIDLER screening were also~~ radiochemically analyzed for thorium, resulting in the radiochemical analysis of about 12 percent of the samples. The LDLs for the thorium isotopes using radiochemical procedures were estimated to be

- 0.3 pCi/g for thorium-228, with a relative precision of 60 percent;
- 0.3 pCi/g for thorium-230, with a relative precision of 30 percent; and
- 0.1 pCi/g for thorium-232, with a relative precision of 70 percent.

The overall precision for the thorium measurement was reported to be about 25 percent. The thorium results were reported in pCi of total thorium per gram of soil, isotopes were not identified. The Mound Plant procedure for the radiochemical analysis of soil samples for thorium is provided in Appendix A.

#### 2.1.4.4. Gamma Spectroscopy

Gamma spectroscopy was performed by Mound Plant on approximately 350 (18 percent) of the soil samples in order to verify the identity of the radionuclides present when screening indicated the presence of gamma-emitting radionuclides, but little excess plutonium or thorium was identified by radiochemical analysis. Gamma spectroscopy is capable of detecting a variety of gamma-emitting radionuclides; the radionuclides detected in samples collected during the Site Survey Project included cobalt-60, cesium-137, radium-226, actinium-227, and americium-241. No other gamma-emitting radionuclides with gamma energies below 1.5 millielectron volts (MeV) were detected, although the project report stated that subsequent sampling and analysis in some areas indicated bismuth-207 and bismuth 210m. No polonium-210 peaks were detected in the Site Survey Project samples, confirming that polonium-210, which was used at Mound Plant in the 1950s, is no longer present due to radioactive decay (half-life of 138.4 days). The LDLs for cesium-137, cobalt-60, and americium-241 were given with the original data, and were estimated to be 0.5 pCi/g for each. The LDLs for radium-226 and actinium-227 were estimated to be 1.0 pCi/g for both (Stought 1990). The Mound Plant procedure for gamma spectroscopy is provided in Appendix A.



**AREA 8**

**AREA 9**

**AREA 17**

**AREA 11**

Building 31

Building 30

SM Building

B0-36

included radium-226, cesium-137, and tritium. Maximum concentrations detected were 2 pCi/g, 1.2 pCi/g, and 5.23 nCi/l, respectively.

The core locations in Area 7 were drilled and sampled to the maximum depths of 96 to 234 inches (8 to 19.5 ft). Mound Plant drawing #FSE16472 (DOE 1992f) indicates the depth to bedrock in this area is 9 to 15 ft at the north end of the area, and to 65 ft at the southern end near Building 51. Because a boring log is available for only one of the Area 7 locations, it is not known if bedrock was encountered during the drilling; however, it appears that the majority of the core sampling did not penetrate fill and reach the original disposal area. The area of thorium drum and other disposals of magnetic materials are depicted in the Preliminary Results of Reconnaissance Magnetic Survey (DOE 1990).

During the early 1970s, it is believed that some of the trash from the historic landfill was excavated and removed to the ravine (DOE 1991a). This fact was not substantiated during research for the scoping reports, but if true, it would suggest the possibility that some hazardous chemicals could have been relocated from the historic landfill to Area 7. Area 7 was one of the original areas identified in the early 1970s as a historic burial site for materials containing residual radionuclides. Some errors were apparent on the original map of Hot Waste Burial Sites compiled in the early 1970s and reproduced in the Site Scoping Report: Volume 7-Waste Management (DOE 1992g). For example, the thorium contamination was listed as thorium-228 when in fact thorium-232 was the dominant isotope in the Thorium Monex Process. Later versions of the map appeared in the Waste Management Site Plans of the mid 1970s with the correct thorium-232 isotope identified.

## 5.6. AREA 8

Area 8 is located on the SM/PP Hill in a low-lying area north of Building 31 (Plate 1). This area contains thorium-contaminated soils excavated from Areas 1 and 9 in 1966 and 1965, respectively. About 6 inches of topsoil was used as a cap. In 1984, a concrete pad was installed and some of the thorium contaminated soils were excavated. Soils with a contamination level greater than 15 pCi/g were boxed for offsite disposal and the remaining materials moved to the eastern, upper part of Area 12 (Draper 1985). The extent of Area 8 shown on Plate 1 is based on a review of Site Survey Project data conducted during the preparation this report, and is similar to the area described in the original report (Stought et al. 1988). The original report boundaries do not consider the isopleth contour shapes depicted on Plate 5.

*In situ* gamma spectroscopy for thorium-232 was performed at 14 core locations in Area 8. These analyses are identifiable in Table V.3 by a "None" given as the MRC ID. *In situ* analysis for thorium-232 was performed at core locations 0026, 0027, 0029, 0030, 0031, 0035, 0037, 0033,

Table V.3. Mound Site Survey Project - Area 8

Plate 1 Location <sup>a</sup>	Coordinates		MRC ID No.	Mo-Yr	Depth (inch)	Plutonium-238 (pCi/g)	Thorium <sup>b</sup> (pCi/g)	Tritium (pCi/mL)	Cobalt-60 (pCi/g)	Cesium-137 (pCi/g)	Radium-226 (pCi/g)	Americium-241 (pCi/g)	
	South	West											
C0026	2362.7	2142.4	None	07-84	0	NR	13						
			None	07-84	12	NR	17						
			None	07-84	24	NR	33						
			None	07-84	36	NR	37						
			None	07-84	48	NR	30						
			None	07-84	60	NR	34						
			None	07-84	72	NR	37						
			None	07-84	84	NR	36						
			None	07-84	96	NR	39						
			None	07-84	108	NR	39						
			None	07-84	120	NR	34						
			None	07-84	132	NR	29						
			C0027	2371.9	2104.9	None	07-84	0	NR	8.3			
None	07-84	12				NR	29						
None	07-84	24				NR	35						
None	07-84	36				NR	53						
None	07-84	48				NR	43						
None	07-84	60				NR	34						
None	07-84	72				NR	18						
None	07-84	84				NR	12						
None	07-84	96				NR	12						
None	07-84	108				NR	10						
			None	07-84	120	NR	5.3						

<sup>a</sup>Map locations are given using a "C" to designate core locations and an "S" to designate surface locations.

<sup>b</sup>A "b" indicates that the total thorium concentration was less than the background level of 2.0 pCi/g, using FIDLER screening. Therefore, radiochemical analysis was not performed.

FIDLER - field instrument for the detection of low-energy radiation

LDL - The measured concentration was below the lower detection limit, estimated to be 0.5 pCi/g for cobalt-60, cesium-137, and americium-241; and 1 pCi/g for radium-226.

MRC ID - Monsanto Research Corporation identification

None - No MRC ID was assigned because *in situ* gamma spectroscopy for thorium-232 was performed. The report on this procedure is provided in Appendix C.

NR - No result given

pCi/g - picocuries per gram

pCi/mL - picocuries per milliliter

# RADIOCHEMICAL ANALYSIS

Table V.3. (page 2 of 5)

Plate 1 Location <sup>a</sup>	Coordinates		MRC ID No.	Mo-Yr	Depth (inch)	Plutonium-238 (pCi/g)	Thorium <sup>b</sup> (pCi/g)	Tritium (pCi/mL)	Cobalt-60 (pCi/g)	Cesium-137 (pCi/g)	Radium-226 (pCi/g)	Americium-241 (pCi/g)	
	South	West											
C0029	2374.1	2184.3	None	07-84	0	NR	12						
			None	07-87	12	NR	17						
			None	07-87	24	NR	17						
			None	07-87	36	NR	38						
			None	07-87	48	NR	53						
			None	07-87	60	NR	42						
			None	07-87	72	NR	36						
			None	07-87	84	NR	38						
			None	07-87	96	NR	55						
			None	07-87	108	NR	48						
			None	07-87	120	NR	36						
			None	07-87	132	NR	21						
			None	07-87	144	NR	17						
			C0030	2395	2063.6	None	07-84	0	NR	4.6			
None	07-87	12				NR	26						
None	07-87	24				NR	9.6						
None	07-87	36				NR	5.9						
None	07-87	48				NR	2						
None	07-87	60				NR	1.4						
None	07-87	72				NR	1.1						
None	07-87	84				NR	0.8						
None	07-87	96				NR	1.2						
None	07-87	108				NR	1.0						
None	07-87	120				NR	1.1						
None	07-87	132				NR	0.9						
None	07-87	144				NR	1.1						
None	07-87	156				NR	1.7						
C0031	2396.6	2204.7	None	07-84	0	NR	8.4						
			None	07-87	12	NR	27						
			None	07-87	24	NR	36						
			None	07-87	36	NR	42						
			None	07-87	48	NR	43						
			None	07-87	60	NR	64						
			None	07-87	72	NR	64						
			None	07-87	84	NR	47						
			None	07-87	96	NR	32						
			None	07-87	108	NR	42						
			None	07-87	120	NR	54						
C0034	2405	2010	1260	12-82	18	4.83	32.20						
			1261	12-82	72	0.48	9.12						
			1262	12-82	90	0.07	b						
			1263	12-82	108	0.03	b						

Table V.3. (page 3 of 5)

Plate 1 Location <sup>a</sup>	Coordinates		MRC ID No.	Mo-Yr	Depth (Inch)	Plutonium-238 (pCi/g)	Thorium <sup>b</sup> (pCi/g)	Tritium (pCi/mL)	Cobalt-60 (pCi/g)	Cesium-137 (pCi/g)	Radium-226 (pCi/g)	Americium-241 (pCi/g)	
	South	West											
C0035	2405.8	2212.9	None	07-84	0	NR	5.5						
			None	07-84	12	NR	11						
			None	07-84	24	NR	24						
			None	07-84	36	NR	29						
			None	07-84	48	NR	42						
			None	07-84	60	NR	18						
			None	07-84	72	NR	33						
			None	07-84	84	NR	28						
			None	07-84	96	NR	15						
			None	07-84	108	NR	11						
			None	07-84	120	NR	39						
			None	07-84	132	NR	31						
			None	07-84	144	NR	15						
C0283	2411.5	2139.2	None	07-84	0	NR	1.0						
			None	07-84	12	NR	1.8						
			None	07-84	24	NR	1.7						
			None	07-84	36	NR	1.4						
			None	07-84	48	NR	1.2						
			None	07-84	60	NR	0.8						
			None	07-84	72	NR	0.7						
			None	07-84	84	NR	0.9						
			None	07-84	96	NR	0.6						
			None	07-84	108	NR	0.7						
			None	07-84	120	NR	0.7						
			None	07-84	132	NR	0.5						
			None	07-84	144	NR	0.5						
C0285	2478.9	2212.0	None	07-84	0	NR	0.3						
			None	07-84	12	NR	0.8						
			None	07-84	24	NR	0.7						
			None	07-84	36	NR	0.8						
			None	07-84	48	NR	0.8						
			None	07-84	60	NR	0.6						
			None	07-84	72	NR	0.7						

# RADIOCHEMICAL ANALYSIS

Table V.3. (page 4 of 5)

Plate 1 Location <sup>a</sup>	Coordinates		MRC ID No.	Mo-Yr	Depth (inch)	Plutonium-238 (pCi/g)	Thorium <sup>b</sup> (pCi/g)	Tritium (pCi/mL)	Cobalt-60 (pCi/g)	Cesium-137 (pCi/g)	Radium-226 (pCi/g)	Americium-241 (pCi/g)
C0286	2464.1	2184.0	None	07-84	0	NR	0.3					
			None	07-84	12	NR	0.5					
			None	07-84	24	NR	0.5					
			None	07-84	36	NR	0.8					
			None	07-84	48	NR	0.9					
			None	07-84	60	NR	0.6					
			None	07-84	84	NR	0.8					
			None	07-84	96	NR	0.8					
C0287	2450.7	2151.6	None	07-84	0	NR	0.5					
			None	07-84	12	NR	1.3					
			None	07-84	24	NR	0.9					
			None	07-84	36	NR	0.8					
			None	07-84	48	NR	0.6					
			None	07-84	60	NR	0.7					
			None	07-84	72	NR	0.6					
C0288	2438.6	2119.3	None	07-84	0	NR	0.3					
			None	07-84	12	NR	0.8					
			None	07-84	24	NR	1.1					
			None	07-84	36	NR	0.8					
			None	07-84	48	NR	0.8					
			None	07-84	60	NR	0.5					
			None	07-84	72	NR	0.7					
C0289	2422.7	2081.0	None	07-84	0	NR	0.6					
			None	07-84	12	NR	1.1					
			None	07-84	24	NR	0.5					
			None	07-84	36	NR	0.8					
			None	07-84	48	NR	1.0					
			None	07-84	60	NR	0.8					

## RADIOCHEMICAL ANALYSIS

# RADIOCHEMICAL ANALYSIS

Table V.3. (page 5 of 5)

Plate 1 Location <sup>a</sup>	Coordinates		MRC ID		Depth (inch)	Plutonium-238 (pCi/g)	Thorium <sup>b</sup> (pCi/g)	Tritium (pCi/mL)	Cobalt-60 (pCi/g)	Cesium-137 (pCi/g)	Radium-226 (pCi/g)	Americium-241 (pCi/g)
	South	West	No.	Mo-Yr								
C0290	2401.5	2102.1	None	07-84	0	NR	0.7					
			None	07-84	12	NR	0.8					
			None	07-84	24	NR	0.8					
			None	07-84	36	NR	0.8					
			None	07-84	48	NR	0.6					
			None	07-84	60	NR	0.9					
			None	07-84	72	NR	0.8					
C0036	2425	2220	1242	12-82	18	1.45	9.41					
			1243	12-82	48	NR	46.3					
			1244	12-82	114	0.84	36.16	LDL	LDL	1.0	LDL	
C0037	2428.6	2178	None	07-84	0	NR	5.9					
			None	07-84	12	NR	11					
			None	07-84	24	NR	14					
			None	07-84	36	NR	5.8					
			None	07-84	48	NR	5.1					
			None	07-84	60	NR	6.3					
			None	07-84	72	NR	6.3					
			None	07-84	84	NR	5.1					
			None	07-84	96	NR	2.5					
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					
			1238	12-82	54	2.24	b					
			1239	12-82	72	0.31	b					
			1240	12-82	90	0.64	b					
			1241	12-82	108	0.35	b					
C0045	2400	2240	8350	11-84	54	4.66	142.58					
			8350	11-84	80	0.51	254.30	LDL	LDL	3.3	LDL	
S0311	2325	2135	6507	08-84	0	0.62	6.78					
S0312	2325	2185	6507	08-84	0	0.75	b					
S0313	2350	2060	2817	10-83	0	6.28	28.73	1.12				
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	5.86	7.14					
S0337	2450	2160	7110	08-84	0	2.10	38.04					

0285, 0286, 0287, 0288, 0289, and 0290 (Plate 1). Appendix C contains the report provided by RMC on the *in situ* thorium analysis. Mound Plant personnel report that the *in situ* analysis was performed by driving pipes through the soils to bedrock and lowering the detector down the pipes. The logs for the drilling to install these pipes are located in Appendix B.

The maximum thorium concentration reported for Area 8, 254.3 pCi/g, was detected in the sample collected from core location 0045 at a depth of 80 inches (C0045 on Table V.3 and core location 0045 on Plate 1). Plutonium-238 was detected in several samples. The maximum concentration, 24.4 pCi/g, was detected in the sample collected from surface location 0333 (S0333 on Table V.3). As shown in Plate 5, the area of elevated thorium concentrations appears to extend north, down the slope of the hill, and in general, extends beyond the original boundaries of the low-lying area. Therefore, it is probable that some transport of contaminated sediments by surface water has occurred from Area 8. All other values detected were less than 10 pCi/g. The original Site Survey Project Report (Stought et al. 1988) noted that post site survey D&D FIDLER screening data indicated thorium levels much higher than 10,000 counts per minute. This information suggests that levels of thorium greater than those given in Table V.3 may be present in Area 8.

Based on the *in situ* analysis performed in Area 8, which involved driving pipes to bedrock, the depth to bedrock ranges from 72 to 144 inches (8 to 12 ft). The remaining core locations in the area (0034, 0036, and 0038), which were sampled to depths of 108, 114, and 108 inches, may also have been sampled to bedrock, but boring logs are not available for these locations.

## 5.7. AREA 9

Area 9 is located on the north end of the SM/PP Hill, surrounding Building 31 (Plate 1). This area was used for storage and redrumming operations of thorium sludges from the mid-1950s to the early 1960s. The Site Scoping Report: Volume 6 - Photo History (DOE 1992b) documents the use of the area for open drum storage through 1959. In 1966, thorium-contaminated soils were pushed over the edge of the hillside to the adjacent Area 8. Area 9 was backfilled with clean soil and is currently covered with asphalt. Area 9, as shown in Plate 1, is based on a review of the site survey data conducted during the preparation of this report, and is similar to that depicted in the original report.

The samples collected in Area 9 during the Site Survey Project were analyzed for plutonium-238 and thorium (Table V.4). Only relatively low levels of plutonium-238, with a maximum level of 8.15 pCi/g were detected at location C0040. Three of the samples collected contained thorium concentrations in excess of 2 pCi/g. These were the samples collected from core location 0039 at a depth of 18 inches (5.62 pCi/g), from core location 0043 at a depth of 18 inches (6.22 pCi/g), and from surface location 0339 (12 pCi/g). This evaluation of the Area 9 samples is based on a review of the site

Environmental Restoration Program

**OPERABLE UNIT 5  
OPERATIONAL AREA PHASE I INVESTIGATION  
NON-AOC 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

A FIDLER was used to monitor placement of all samplers and timers. Soil samples were collected from each of the locations for analysis of radiological contamination at the Mound Plant Soil Screening Facility. Results of the soil screening analyses are summarized in Section 2.1.4.2 and presented in their entirety in Appendix D.

#### **2.2.1.1. Non-AOC South**

##### **Soil Gas Sampler Installation**

Three sets of timers and 131 data samplers were installed on 10 days between June 14 and July 7, 1994. Locations of the timers and data samplers are shown in Appendix E, Plate 1.

##### **Soil Gas Sampler Retrieval**

On June 21, 1994, one timer from each of the three timer sets was retrieved, wiped (checked for radiological contamination), and sent to Northeast Research Institute LLC (NERI) for analysis. The analysis of the timers indicated the following: high response levels of petroleum hydrocarbons at 1N2; low to medium response levels of TCE at 1N18; and trace response levels of hydrocarbons at 7N23. Based on these responses, NERI recommended an exposure time of approximately seven to 14 days per data sampler.

Samplers were extracted on seven days between June 28 and July 21, 1994. The samplers were wiped and prepared for shipment. On July 27, 1994, all of the Non-AOC south samplers were sent as a batch to NERI for analysis. In general, samplers were shipped as a batch for each Non-AOC section for quality control purposes.

#### **2.2.1.2. Non-AOC North**

##### **Soil Gas Sampler Installation**

Two sets of timers and 92 data samplers were installed on eight days between August 17 and September 14, 1994. Locations of the timers and data samplers are shown in Appendix E, Plate 1.

### Soil Gas Sampler Retrieval

On August 23, 1994, one timer from each of the two timer sets was retrieved, wiped, and sent to NERI for analysis. The analysis of the timer at grid coordinate 23N2 indicated low to moderate response levels of light weight hydrocarbons and the analysis of the timer at grid coordinate 26N5 indicated moderate to high response levels of light weight hydrocarbons and trace response levels of tetrachloroethene (PCE). Based on these responses, NERI recommended an exposure time of approximately 12 days per data sampler.

Samplers were extracted on five days between August 29 and September 27, 1994. One sampler, located at grid coordinate 15N9, was not retrieved due to a broken tube. The remaining samplers were wiped and prepared for shipment. On September 27, 1994, the samplers were sent as a batch to NERI for analysis.

#### 2.2.1.3. Non-AOC West

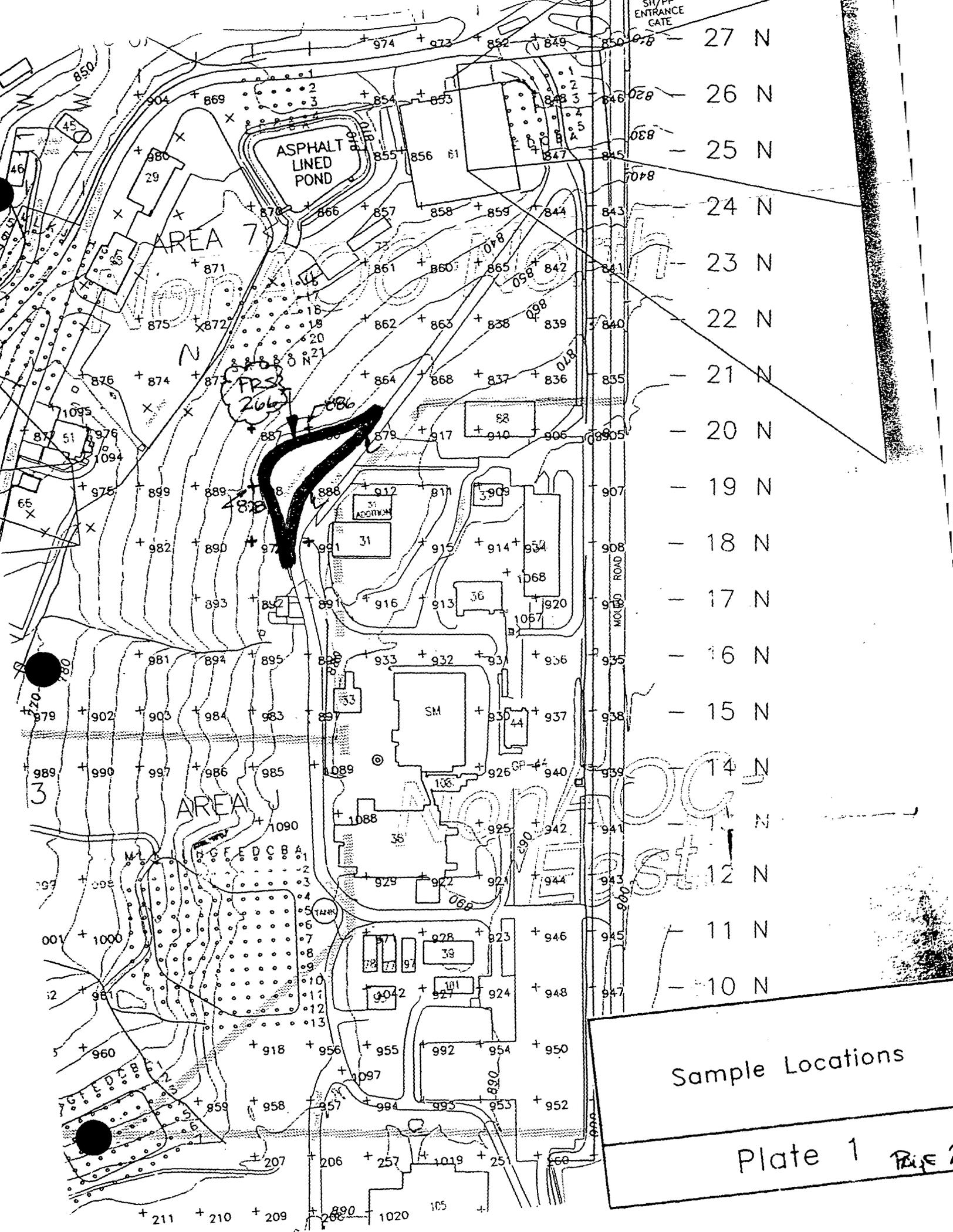
### Soil Gas Sampler Installation

Two sets of timers and 85 data samplers were installed on 10 days between August 29 and September 6, 1994. Locations of the timers and data samplers are shown in Appendix E, Plate 1.

### Soil Gas Sampler Retrieval

On September 6, 1994, one timer from each of the two timer sets was retrieved, wiped, and sent to NERI for analysis. The analysis of the timers at grid coordinates 9N10 and 8N27 indicated that little to no hydrocarbons were detected. NERI requested that the second timer from each timer set be retrieved after three weeks. The second timers were retrieved and sent to NERI on September 22, 1994, for analysis. The analysis of these timers indicated low levels of hydrocarbons, including some benzene at grid coordinate 9N10 and moderate levels of hydrocarbons, including benzene, toluene, ethylbenzene, and xylene (BTEX), TCE, and PCE at grid coordinate 8N27. Based on these responses, NERI recommended an exposure time of approximately 28 days per sampler.

Samplers were extracted on three days between September 27 and October 1, 1994. Two samplers, 14N25 and 9N15, broke during retrieval. Sample wires were transferred immediately to clean tubes. All



SHIP ENTRANCE GATE

- 27 N
- 26 N
- 25 N
- 24 N
- 23 N
- 22 N
- 21 N
- 20 N
- 19 N
- 18 N
- 17 N
- 16 N
- 15 N
- 14 N
- 13 N
- 12 N
- 11 N
- 10 N

Sample Locations

Plate 1 Page 2

ASPHALT LINED POND

AREA 7

AREA 3

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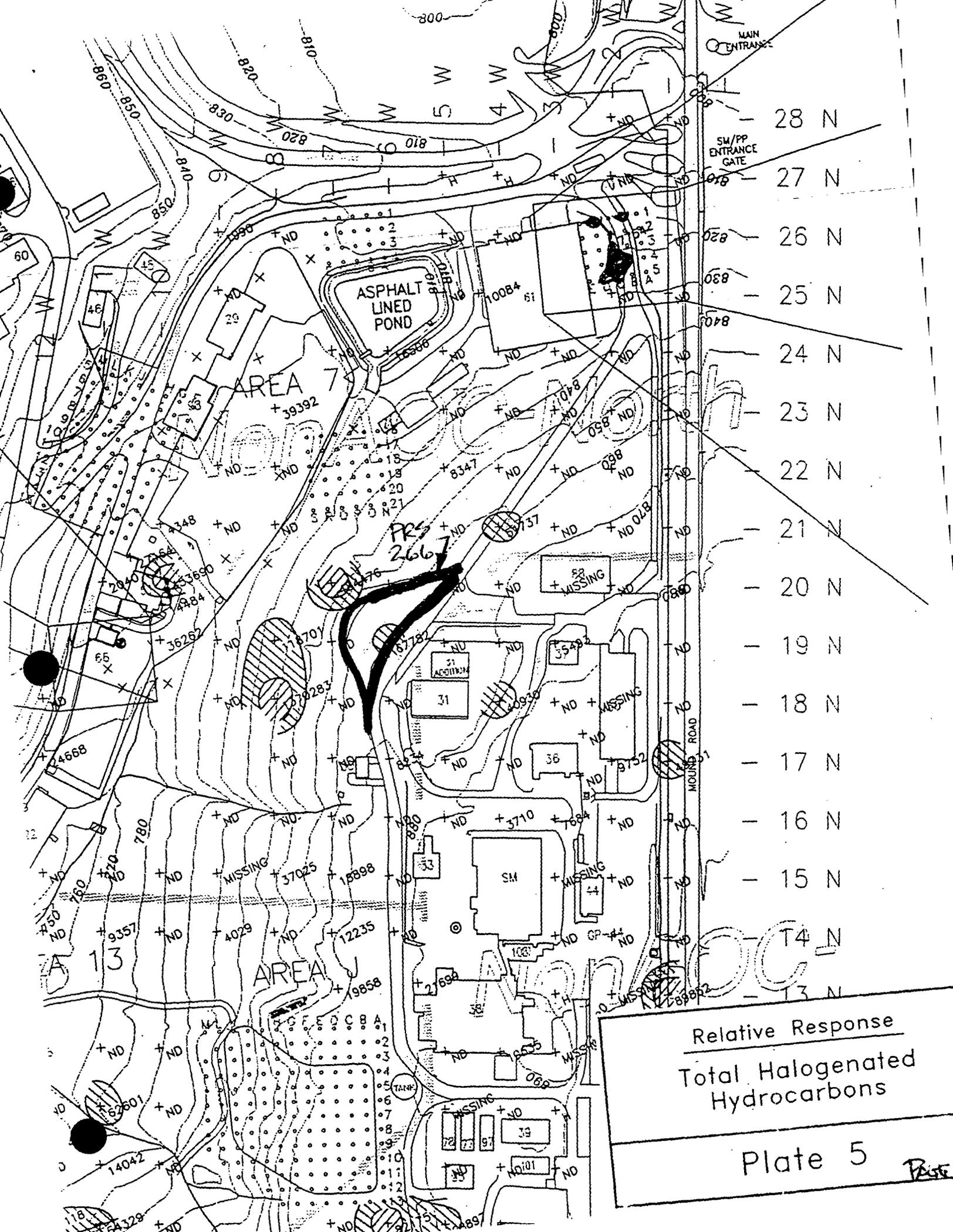
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Relative Response  
 Total Halogenated  
 Hydrocarbons

Plate 5

PAGE

# PETREX DATA (RELATIVE)

Table 4 (cont'd)

Sample #	Total Aromatic Hydrocarbons (a)	Total Semivolatile Hydrocarbons (b)	Total C5 to C11 Petroleum Hydrocarbons (c)	Total Halogenated Hydrocarbons (d)
858	17,751	ND	38,321	ND
859	63,269	ND	112,992	ND
860	4,469	ND	14,963	ND
861	3,241	ND	8,519	ND
862	81,929	ND	268,425	8,347
3862 (e)	119,259	ND	435,287	13,451
863	211,830	48,446	488,411	ND
864	31,827	ND	60,770	ND
865	276,591	ND	680,193	ND
866	332,054	11,447	724,350	16,506
3866 (e)	272,440	6,951	555,885	11,448
867	323,265	761	1,054,664	ND
868	22,326	ND	43,566	51,737
869	413,806	6,035	1,229,747	ND
870	105,465	12,156	272,168	ND
871	262,537	13,383	709,554	39,392
3871 (e)	117,156	4,180	350,827	18,146
872	179,121	2,716	518,546	ND
873	215,400	ND	383,982	ND
874	997,234	9,698	2,035,141	ND
875	93,866	15,159	216,791	ND
876	91,518	ND	160,738	4,348
877	997,444	49,913	2,306,808	2,040
879	619,446	35,834	1,230,011	ND
886	294,275	462	574,432	3,992
887 (f)	600,046	4,035	1,054,346	484,476
888	5,315,457	36,969	9,565,092	67,782
889	3,540,952	4,865	8,657,091	118,701
890 (f)	36,315	6,488	151,227	1,370,283
3890 (e)(f)	18,704	4,258	115,026	1,199,030
891	250,039	ND	472,369	8,234
892	T	ND	T	ND



# PETREX DATA (RELATIVE)

Table 4 (cont'd)

Sample #	Total Aromatic Hydrocarbons (a)	Total Semivolatile Hydrocarbons (b)	Total C5 to C11 Petroleum Hydrocarbons (c)	Total Halogenated Hydrocarbons (d)
1074	1,077,488	310,921	3,334,270	H
1075	5,024,920	190,818	8,157,950	ND
1076	98,846	ND	150,244	11,278
1077	179,495	637	313,677	253,075
1078	292,004	ND	384,717	27,102
1079	878,182	ND	1,047,284	ND
1080	476,919	ND	688,052	ND
1081	1,359,839	ND	1,737,634	ND
1082	2,366,016	ND	2,549,371	ND
1083	6,566,476	ND	7,262,620	ND
3083 (e)	5,727,584	ND	6,343,712	ND
1094	36,255	ND	65,413	14,484
1095	48,524	ND	79,645	27,164
8001 *	ND	ND	ND	ND
8002 *	ND	ND	ND	ND
8003 *	ND	ND	ND	ND

- Key:
- (a) Intensity of response to ions of atomic masses 78, 92, 106, 120, 134, 148, 162, 176, 190, and 204.
  - (b) Intensity of response to ions of atomic masses 128, 142, 153, 156, 178, 184, 198, 202, and 212.
  - (c) Intensity of response to ions of atomic masses 70, 72, 78, 84, 86, 92, 98, 100, 106, 110, 112, 114, 120, 124, 126, 128, 134, 138, 140, 142, 148, 152, 154, and 156.
  - (d) Intensity of response to ions of atomic masses 83, 101, 130, 146, 151, and 164.
  - (e) Duplicate of preceding sample.

- (f) A pronounced level of chloroform was detected in this sample.
- H High levels of petroleum hydrocarbons have interfered with the identification of halogenated hydrocarbons in this sample; see
- T High levels of terpenes have interfered with the identification of petroleum hydrocarbons in this sample; see text.
- ND The targeted compounds were not detected in this sample.
- \* Travel Blank

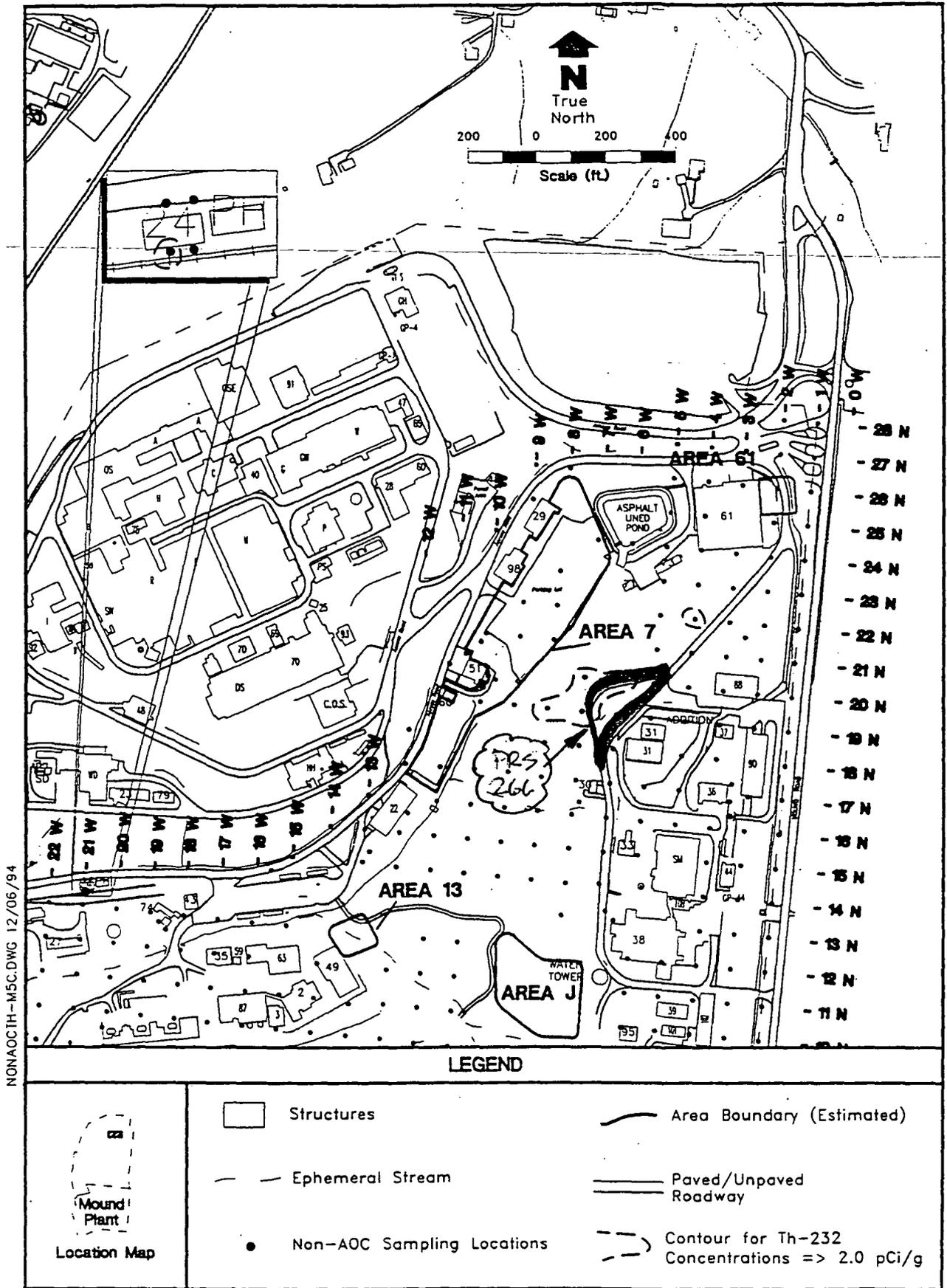


Figure 2.2. Locations of Elevated Surface Soil Th-232 Activity

# MOUND SOIL SCREEN DATA

Table II.3. Summary of Elevated Surface Soil Radiological Activity  
Page 2 of 2

Grid Location <sup>a</sup>	Mound Soil Screening Facility Data	
	Plutonium-238 (pCi/g)	Thorium-232 (pCi/g)
6N9	33	ND
6N14	30	ND
6N16	29	ND
6N17	25	ND
6N19	39	ND
7N14	27	ND
7N18	26	ND
7N23	25	1
9N10	25	ND
11N11	25	ND
12N15	85	ND
15N7	30	ND
16N4	78	ND
16N5	243	ND
19N7	56	15.9
19N8	25 39	2.4 ND
20N6	27	2.6
20N7	37	14.7
22N4	ND	2.0
23N1	25	ND
23N2	26	1
23N5	25	ND
B18001 (Building 24)	38	6.7
21.5N2.5	25	ND

PKS  
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<sup>a</sup> See Plate 1 for grid location

ND Radiological contamination not detected above the Mound Plant Soil Screening Facility detection limits of 25 pCi/g for Pu-238 and 2 pCi/g for Th-232

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:

NR - Not recorded

NC - No sample/reading taken

NA - Reading not taken; contamination criteria not exceeded.

a - Mound Soil Screening Facility detection level not exceeded.

b - Concentration at or above the Mound Soil Screening Facility detection level.

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

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	8.45	4.5	NC	6	a	0.6	a
18N01	253.5	185	12.48	9.0	NC	16	a	1.1	a
18N02	130	80	6.5	4.0	NC	WIPE	c	WIPE	c
18N03	130	75	6.5	5.0	NC	WIPE	c	WIPE	c
18N04	130	60	6.5	4.5	NC	6	a	0.8	a
18N06	130	90	6.5	6.5	NC	WIPE	c	WIPE	c
18N07	170.3	100	9.72	7.0	NC	13	a	0.7	a
18N08	170.3	170	9.72	11.0	NC	22	a	1.1	a
18N09	170.3	150	9.72	10.5	NC	NR		NR	
18N12	152.1	100	8.45	6.5	NC	0	a	0.3	a
19N01	253.5	155	12.48	9.5	NC	3	a	0.6	a
19N02	130	85	6.5	4.0	NC	NC		NC	
19N03	130	70	6.5	5.0	NC	4	a	0.8	a
19N04	130	60	6.5	4.0	NC	WIPE	c	WIPE	c
19N05	130	65	6.5	4.0	NC	WIPE	c	WIPE	c
19N06	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
19N09	176.8	170	8.97	9.5	NC	39	b	0.9	a
19N10	176.8	70	8.97	3.5	NC	10	a	1.1	a
20N01	253.5	95	12.48	5.0	NC	3	a	0.2	a
20N02	130	105	6.5	6.5	NC	16	a	0.6	a
20N03	130	105	6.5	6.5	NC	8	a	0.7	a

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▲

266  
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TRIA 34.1

# MOUND SOIL SCREEN DATA

## PENDIX 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 3	a a	1 0.8	a a
21N02	176.8	140	8.97	6.5	NC	7 19	a a	1 0.7	a 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	8.97	4.5	NC	WIPE	c	WIPE	c
21N10	157.3	90	8.45	6.5	NC	19	a	0.9	a
22N01	253.5	145	12.48	8.5	NC	24	a	1.3	a
22N02	176.8	135	8.97	5.5	NC	3	a	0.6	a
22N03	176.8	115	8.97	6.0	NC	18	a	1.1	a
22N04	152.1	100	8.45	9.5	NC	19	a	2	b
22N05	152.1	105	8.45	8.0	NC	10	a	1.4	a
22N08	176.8	115	8.97	4.5	NC	WIPE	c	WIPE	c
22N09	176.8	95	8.97	6.0	NC	WIPE	c	WIPE	c
23N01	253.5	170	12.48	10.5	NC	25	b	0.8	a
23N02	176.8	160	8.97	5.0	NC	16 26	a b	0.8 1.0	a a
23N03	152.1	115	8.45	5.5	NC	3	a	1.1	a
23N04	152.1	95	8.45	6.0	NC	12	a	0.7	a

Mound Plant, ER Program  
Revision 0

O5 Phase 1 Non-AOC Field Report  
March 1995

DECONTAMINATION & DECOMMISSIONING PROGRAM

SAMPLING AND ANALYSIS PLAN  
FOR THE OTHER SOILS AREAS

MOUND PLANT  
MIAMISBURG, OHIO

FINAL (Rev 1)

Prepared for:

EG&G MOUND APPLIED TECHNOLOGIES  
AND  
THE U.S. DEPARTMENT OF ENERGY

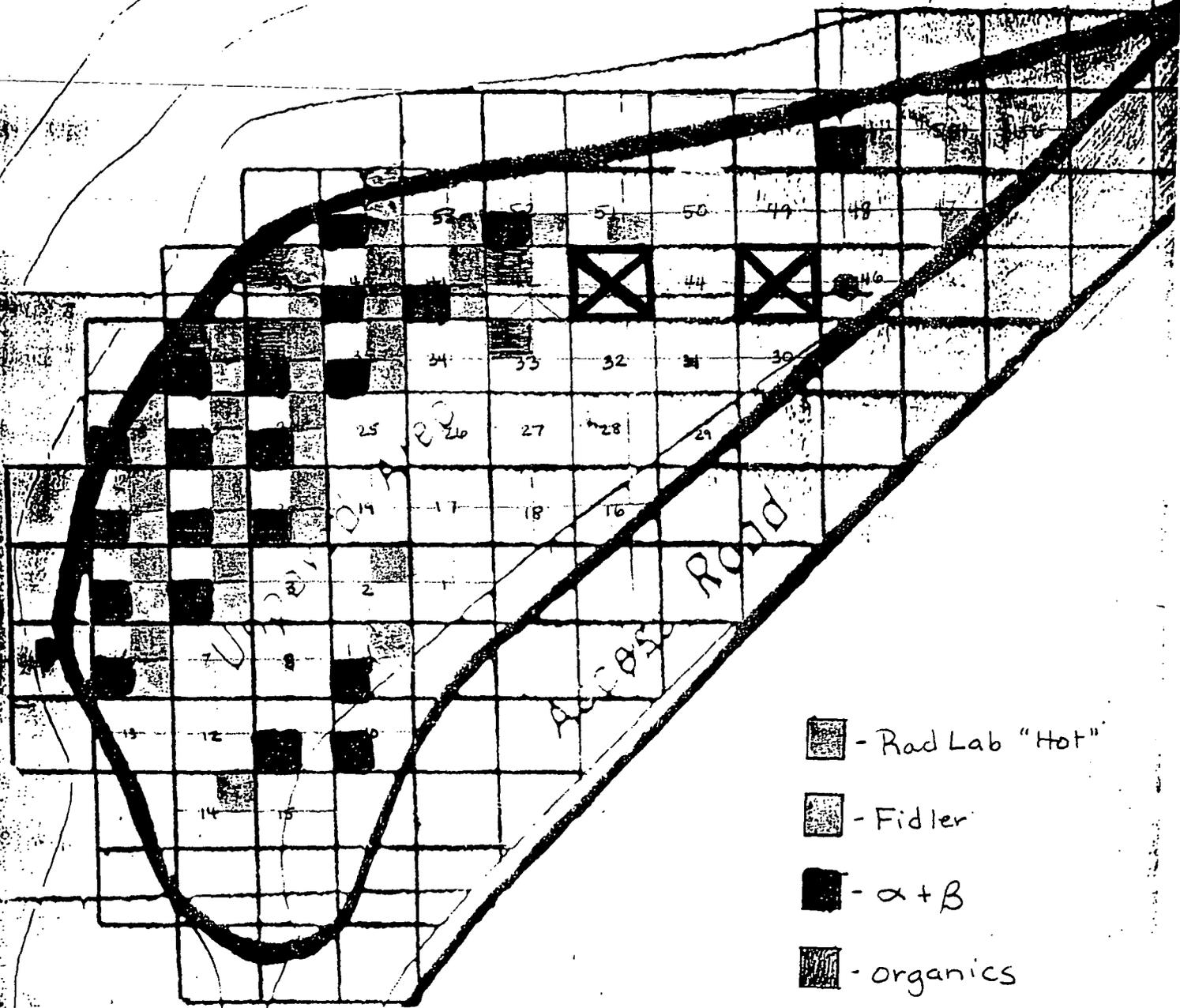
Prepared by:

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION  
4031 COLONEL GLENN HIGHWAY, SUITE 300  
BEAVERCREEK, OHIO 45431-1600

JUNE 1994

# AREA 8

S0333 860



-  - Rad Lab "Hot"
-  - Fidler
-  -  $\alpha + \beta$
-  - organics
-  - metals
-  - all of the above

KEY TO SAMPLE NOMENCLATURE

Examples 0804-5001

08 = Area 8  
04 = location 04 (see color map)  
50 = Soil sample  
01 = 0-1 foot sample depth

---

Sample depths on this job are:

01 = 0-1 foot  
04 = 1-4 foot  
08 = 4-8 foot  
12 = 8-12 foot



CLIENT/SUBJECT \_\_\_\_\_

TASK DESCRIPTION \_\_\_\_\_

PREPARED BY \_\_\_\_\_

MATH CHECK BY \_\_\_\_\_

METHOD REV. BY \_\_\_\_\_

DATE \_\_\_\_\_

DATE \_\_\_\_\_

DATE \_\_\_\_\_

APPROVED BY _____	
DEPT _____	DATE _____

MOUND SOIL SCREEN DATA

FIDLER DATA

Sample #	Rad Lab		FIDLER		α	β	ORGANIC	
	Plut	Thor	CH1	CH2			OVA	OVM
0840-5004	-	58.7	-	28K	-	-	-	-
0840-5008	26	13.5	-	10K	60	2.2K	-	-
0839-5004	-	-	-	23K	-	-	-	-
0839-5008	-	-	-	35K	-	-	-	-
0839-5012	-	8.0	-	-	-	-	52	-
0809-5004	-	5.8	-	-	83	1K	-	-
0843-5004	-	60.7	-	17K	211	6.6K	-	-
0843-5008	-	-	-	20K	-	-	-	-
0843-5012	-	-	-	24K	-	-	-	-
0853-5004	-	-	2K	100K	-	-	-	-
0853-5008	-	-	-	25K	-	-	-	-
0853-5012	-	-	-	7K	-	-	-	-
0814-5004	29	-	-	-	-	-	-	-
0851-5004	-	-	-	23K	-	-	-	-
0810-5004	-	-	-	-	55	1K	-	-
0810-5008	-	-	-	-	127	1.2K	-	-
0810-5010	-	-	-	-	86	458	-	-
0811-5004	-	-	-	-	-	1K	-	-
0852-5004	-	-	1K	42K	-	-	-	-
0852-5008	-	-	-	9K	-	1583	-	-
0854-5001	-	-	-	9K	-	1030	-	-
0854-5004	-	-	-	-	-	1370	-	-
0855-5004	-	-	-	10K	-	-	-	-
0847-5004	-	-	-	40K	-	-	-	-
0833-	-	-	-	-	-	-	10	128
0842-	-	-	-	-	-	-	7100	124
0842	-	-	-	-	-	-	84	155
0837-5004	-	-	-	-	-	-	-	1
0837-5008	-	-	-	-	-	-	-	7
0837-5012	-	-	-	-	-	-	-	3.9
0836-	-	-	-	-	-	-	3.5	-

**WEX**  
MANAGERS

**FIDLER DATA**

CLIENT/SUBJECT \_\_\_\_\_ W.O. NO. \_\_\_\_\_

TASK DESCRIPTION \_\_\_\_\_ TASK NO. \_\_\_\_\_

PREPARED BY \_\_\_\_\_ DEPT \_\_\_\_\_

MATH CHECK BY \_\_\_\_\_ DEPT \_\_\_\_\_

METHOD REV. BY \_\_\_\_\_ DEPT \_\_\_\_\_ DATE \_\_\_\_\_

APPROVED BY \_\_\_\_\_

DEPT \_\_\_\_\_ DATE \_\_\_\_\_

**MOUND SOIL SCREEN DATA**

Sample #	Rad Lab		Fidler		Organics			
	Plot	Thor	Ch1	Ch2	A	B	OVA	OVM
0802-5004	-	6.4	-	-	-	-	-	-
0804-5004	-	26.3	-	13K	103	1.7K	-	-
0804-5012	25	-	-	-	-	-	-	-
0805-5004	-	10.2	-	-	-	734	-	-
0805-5008	-	55.1	-	17K	-	5.2K	-	-
0806-5004	-	7.2	-	13K	51	1.2K	-	-
0836-5004	-	22.2	-	11K	174	2.1K	-	-
0837-5004	-	9.1	-	10K	-	-	-	-
0837-5008	-	10.3	-	11K	-	1.7K	-	-
0837-5012	-	18.3	-	10K	-	-	-	-
0841-5004	43	43.4	-	18K	162	3.6K	-	-
0841-5008	53	6.7	-	7K	162	1.3K	-	-
0841-5012	-	7.1	-	10K	-	-	-	-
0838-5004	-	16.6	-	11K	112	1.7K	-	-
0838-5008	151	81.5	-	20K	604	6.5K	-	-
0820-5004	-	20.5	-	20K	215	1579	-	-
0820-5008	34	-	-	12K	-	1284	-	-
0821-5004	30	35.5	-	22K	267	3495	-	-
0821-5008	-	-	-	12K	92.3	1284	-	-
0821-5012	27	-	-	-	-	-	-	-
0822-5004	-	100.4	-	40K	544	7.2K	-	-
0822-5008	131	87.2	-	30K	1.5K	7.5K	-	-
0822-5009	-	17.3	-	8K	318	1.2K	-	-
0823-5004	-	19.1	-	13K	205	2547	-	-
0823-5008	-	267.1	1.5K	80K	33K	28.4K	-	-
0823-5011	-	228.7	-	35K	790	3895	-	-
0824-5004	-	21.1	-	15K	267	2084	-	-
0824-5012	-	-	-	-	174	-	-	-
0835-5004	33	25.8	-	18K	264	2.6K	-	-
0835-5008	77	93.9	-	8K	64	1.2K	-	-
0835-5011	-	-	-	-	-	1.1K	-	-

je No. 1  
/08/95

TEST RESULTS -- SODIUM IODIDE SOIL SCREEN  
( MD-80030, OP. 1355 )  
400 SECOND COUNT  
PREPARED BY BETTY PETERS -EXT. 4408

SAMPLE NO.	DATE COLLECTED	DATE SCREENED	SAMPLER	SAMP TYPE	88 KEV WINDOW	17 KEV WINDOW	MORE ISO- TOPES	GRID LOCATION	WELL
9501338	02/07/95	02/08/95	[REDACTED]	5983	CONT	0.0	0	N	WESTON AREA 8 OTHER SOILS C 0804-5001 AT 0-1'
9501339	02/07/95	02/08/95	[REDACTED]	5983	CONT	26.3	0	N	WESTON AREA 8 OTHER SOILS B 0804-5004 AT 1-4'
9501341	02/07/95	02/08/95	[REDACTED]	5983	CONT	2.0	19	N	WESTON AREA 8 OTHER SOILS B 0804-5008 AT 4-8'
9501342	02/07/95	02/08/95	[REDACTED]	5983	CONT	1.7	25	N	WESTON AREA 8 OTHER SOILS A 0804-5012
9501343	02/07/95	02/08/95	[REDACTED]	5983	CONT	0.1	7	N	WESTON AREA 8 OTHER SOILS C 0805-5001 AT 0-1'
9501344	02/07/95	02/08/95	[REDACTED]	5983	CONT	10.2	0	N	WESTON AREA 8 OTHER SOILS B 0805-5004 AT 1-4'

→ Pu-238  
→ Th-232

MOUND SOIL  
SCREEN DATA

TEST RESULTS - SODIUM IODIDE SOIL SCREEN  
 ( MD-80030, OP. 1355 ).  
 400 SECOND COUNT  
 PREPARED BY BETTY PETERS -EXT. 4408

*T14-232 P5-238*

AMPLE NO.	DATE COLLECTED	DATE SCREENED	SAMPLER	SAMP TYPE	88 KEV WINDOW	17 KEV WINDOW	MORE ISO- TOPES	GRID LOCATION	WELL
501365	02/08/95	02/09/95	[REDACTED]	5983	CONT	5.8	5 N	WESTON AREA 8-OTHER SOILS A 0809-5004 AT 4'	
501366	02/08/95	02/09/95	[REDACTED]	5983	CONT	0.9	19 N	WESTON AREA 8 OTHER SOILS B 0809-5010 AT 10'	

WELL

**MOUND SOIL  
 SCREEN DATA**

TEST RESULTS - SODIUM IODIDE SOIL SCREEN  
( MD-80030, OP. 1355 )  
400 SECOND COUNT  
PREPARED BY BETTY PETERS -EXT. 4408

SAMPLE NO.	DATE COLLECTED	DATE SCREENED	SAMPLER	SAMP TYPE	88 KEV WINDOW	17 KEV WINDOW	MORE ISO-TOPES	GRID LOCATION	WELL
9501331	02/07/95	02/07/95	[REDACTED]	5983	CONT	0.0	0	N	WESTON AREA 8 OTHER SOILS C MND17-0802-5001 AT 1'
9501329	02/07/95	02/07/95	[REDACTED]	5983	CONT	6.4	7	N	WESTON AREA 8 OTHER SOILS A MND17-0802-5004 AT 4'
9501330	02/07/95	02/07/95	[REDACTED]	5983	CONT	0.7	6	N	WESTON AREA 8 OTHER SOILS B MND17-0802-5008 AT 8'
9501328	02/07/95	02/07/95	[REDACTED]	5983	CONT	1.1	13	N	WESTON AREA 8 OTHER SOILS A MND17-0802-5011 AT 11'
9501332	02/07/95	02/07/95	[REDACTED]	5983	CONT	0.2	6	N	WESTON AREA 8 OTHER SOILS A MND17-0803-5001 AT 0-1'
9501326	02/07/95	02/07/95	[REDACTED]	5983	CONT	0.7	7	N	WESTON AREA 8 OTHER SOILS B MND17-0803-5004 AT 1-4'
9501325	02/07/95	02/07/95	[REDACTED]	5983	CONT	1.0	13	N	WESTON AREA 8 OTHER SOILS A MND17-0803-5008 AT 4-8'
9501324	02/07/95	02/07/95	[REDACTED]	5983	CONT	0.8	6	N	WESTON AREA 8 OTHER SOILS C MND17-0803-5012 AT 8-12'

**MOUND SOIL  
SCREEN DATA**

TEST RESULTS - SODIUM IODIDE SOIL SCREEN  
 ( MD-80030, OP. 1355 )  
 400 SECOND COUNT  
 PREPARED BY BETTY PETERS -EXT. 4408

MOUND SOIL  
 SCREEN DATA

SAMPLE NO.	DATE COLLECTED	DATE SCREENED	SAMPLER	SAMP TYPE	88 KEV WINDOW	17 KEV WINDOW	MORE ISO- TOPES	GRID LOCATION	WELL
9501350	02/08/95	02/09/95	[REDACTED]	5983	CONT	55.1	0	N	WESTON AREA 8 OTHER SOILS B 0805-5008 AT 8'
9501351	02/08/95	02/09/95	[REDACTED]	5983	CONT	1.3	18	N	WESTON AREA 8 OTHER SOILS B 0805-5012 AT 12'
9501352	02/08/95	02/09/95	[REDACTED]	5983	CONT	0.4	0	N	WESTON AREA 8 OTHER SOILS C 0806-5001 AT 1'
9501353	02/08/95	02/09/95	[REDACTED]	5983	CONT	7.2	21	N	WESTON AREA 8 OTHER SOILS C 0806-5004 AT 4'
9501354	02/08/95	02/09/95	[REDACTED]	5983	CONT	0.9	14	N	WESTON AREA 8 OTHER SOILS A 0806-5008 AT 8'
9501355	02/08/95	02/09/95	[REDACTED]	5983	CONT	1.0	10	N	WESTON AREA 8 OTHER SOILS A 0806-5010 AT 10'
9501356	02/08/95	02/09/95	[REDACTED]	5983	CONT	0.0	12	N	WESTON AREA 8 OTHER SOILS B 0807-5001 AT 1'
9501357	02/08/95	02/09/95	[REDACTED]	5983	CONT	0.9	7	N	WESTON AREA 8 OTHER SOILS A 0807-5004 AT 4'
9501358	02/08/95	02/09/95	[REDACTED]	5983	CONT	1.4	15	N	WESTON AREA 8 OTHER SOILS A 0807-5008 AT 8'
9501359	02/08/95	02/09/95	[REDACTED]	5983	CONT	1.0	7	N	WESTON AREA 8 OTHER SOILS B 0807-5010 AT 10'
9501360	02/08/95	02/09/95	[REDACTED]	5983	CONT	0.0	0	N	WESTON AREA 8 OTHER SOILS C 0808-5001 AT 1'
9501361	02/08/95	02/09/95	[REDACTED]	5983	CONT	1.2	9	N	WESTON AREA 8 OTHER SOILS B 0808-5004 AT 4'
9501362	02/08/95	02/09/95	[REDACTED]	5983	CONT	1.0	19	N	WESTON AREA 8 OTHER SOILS A 0808-5008 AT 8'
9501363	02/08/95	02/09/95	[REDACTED]	5983	CONT	0.8	11	N	WESTON AREA 8 OTHER SOILS C 0808-5012 AT 12'
9501364	02/08/95	02/09/95	[REDACTED]	5983	CONT	0.2	0	N	WESTON AREA 8 OTHER SOILS C 0809-5001 AT 1'

# MOUND SOIL SCREEN DATA

TEST RESULTS - SODIUM IODIDE SOIL SCREEN  
 ( MD-80030, OP. 1355 )  
 400 SECOND COUNT  
 PREPARED BY BETTY PETERS -EXT. 4408

*TH-252*

SAMPLE NO.	DATE COLLECTED	DATE SCREENED	SAMPLER	SAMP TYPE	88 KEV WINDOW	17 KEV WINDOW	ISO-TOPIES	GRID LOCATION	OTHER WELL
9501440	02/14/95	02/15/95	[REDACTED]	5983	CONT	0.0	0	N	WESTON AREA 8 OTHER SOILS C 0823-5001
9501433	02/14/95	02/15/95	[REDACTED]	5983	CONT	19.1	0	N	WESTON AREA 8 OTHER SOILS C 0823-5004
9501429	02/14/95	02/15/95	[REDACTED]	5983	CONT	267.1	0	Y	WESTON AREA 8 OTHER SOILS A (+/-) 0823-5008 (DENCE)
9501428	02/14/95	02/15/95	[REDACTED]	5983	CONT	228.7	0	Y	WESTON AREA 8 OTHER SOILS B 0823-5011
9501430	02/14/95	02/15/95	[REDACTED]	5983	CONT	0.3	0	N	WESTON AREA 8 OTHER SOILS C 0824-5001
9501431	02/14/95	02/15/95	[REDACTED]	5983	CONT	21.1	0	N	WESTON AREA 8 OTHER SOILS A 0824-5004
9501432	02/14/95	02/15/95	[REDACTED]	5983	CONT	2.1	19	N	WESTON AREA 8 OTHER SOILS B 0824-5008
9501437	02/14/95	02/15/95	[REDACTED]	5983	CONT	2.1	9	N	WESTON AREA 8 OTHER SOILS B 0824-5012
9501438	02/14/95	02/15/95	[REDACTED]	5983	CONT	0.1	0	N	WESTON AREA 8 OTHER SOILS C 0825-5001
9501442	02/14/95	02/15/95	[REDACTED]	5983	CONT	1.1	8	N	WESTON AREA 8 OTHER SOILS A 0825-5004
9501434	02/14/95	02/15/95	[REDACTED]	5983	CONT	1.0	10	N	WESTON AREA 8 OTHER SOILS A 0825-5008
9501435	02/14/95	02/15/95	[REDACTED]	5983	CONT	1.0	19	N	WESTON AREA 8 OTHER SOILS B 0825-5010
9501439	02/14/95	02/15/95	[REDACTED]	5983	CONT	0.0	5	N	WESTON AREA 8 OTHER SOILS C 0826-5001
9501441	02/14/95	02/15/95	[REDACTED]	5983	CONT	1.3	9	N	WESTON AREA 8 OTHER SOILS B 0826-5004
9501436	02/14/95	02/15/95	[REDACTED]	5983	CONT	1.4	14	N	WESTON AREA 8 OTHER SOILS A 0826-5008

4 SUBMITTED FOR GAMMA SCAN

No. 1  
6/95

TEST RESULTS - SODIUM IODIDE SOIL SCREEN  
( MD-80030, OP. 1355 )  
400 SECOND COUNT  
PREPARED BY BETTY PETERS -EXT. 4408

SAMPLE NO.	DATE COLLECTED	DATE SCREENED	SAMPLER	SAMP TYPE	88 KEV WINDOW	17 KEV WINDOW	ISO-TOPE	GRID LOCATION	WELL
501457	02/16/95	02/16/95	[REDACTED]	5983	CONT	0.4	0	N	WESTON AREA 8 OTHER SOILS A 0835-5001
501458	02/16/95	02/16/95	[REDACTED]	5983	CONT	25.8	33	N	WESTON AREA 8 OTHER SOILS B 0835-5004
501459	02/16/95	02/16/95	[REDACTED]	5983	CONT	4.1	20	N	WESTON AREA 8 OTHER SOILS C 0835-5008
501460	02/16/95	02/16/95	[REDACTED]	5983	CONT	4.1	6	N	WESTON AREA 8 OTHER SOILS A 0835-5011
501461	02/16/95	02/16/95	[REDACTED]	5983	CONT	3.4	2	N	WESTON AREA 8 OTHER SOILS B 0836-5008
501462	02/16/95	02/16/95	[REDACTED]	5983	CONT	2.8	18	N	WESTON AREA 8 OTHER SOILS C 0836-5012

MOUND SOIL  
SCREEN DATA

TEST RESULTS - SODIUM IODIDE SOIL SCREEN  
 ( MD-80030, OP. 1355 )  
 400 SECOND COUNT  
 PREPARED BY BETTY PETERS -EXT. 4408

SAMPLE NO.	DATE COLLECTED	DATE SCREENED	SAMPLER	SAMP TYPE	88 KEV WINDOW	17 KEV WINDOW	MORE ISO-TOPIES	GRID LOCATION	WELL
501479	02/16/95	02/20/95	[REDACTED]	5983	CONT	0.3	8	N	WESTON AREA 8 OTHER SOILS A 0834-5001
501478	02/16/95	02/20/95	[REDACTED]	5983	CONT	1.0	4	N	WESTON AREA 8 OTHER SOILS C 0834-5004
501476	02/16/95	02/20/95	[REDACTED]	5983	CONT	0.9	14	N	WESTON AREA 8 OTHER SOILS C 0834-5008
501482	02/16/95	02/20/95	[REDACTED]	5983	CONT	0.7	17	N	WESTON AREA 8 OTHER SOILS B 0834-5012
501475	02/16/95	02/20/95	[REDACTED]	5983	CONT	0.6	13	N	WESTON AREA 8 OTHER SOILS B 0839-5001
501477	02/16/95	02/20/95	[REDACTED]	5983	CONT	8.0	14	N	WESTON AREA 8 OTHER SOILS A 0839-5012
501480	02/16/95	02/20/95	[REDACTED]	5983	CONT	0.3	8	N	WESTON AREA 8 OTHER SOILS B 0840-5001
501481	02/16/95	02/20/95	[REDACTED]	5983	CONT	13.5	26	N	WESTON AREA 8 OTHER SOILS A 0840-5008
501474	02/16/95	02/20/95	[REDACTED]	5983	CONT	2.0	7	N	WESTON AREA 8 OTHER SOILS C 0840-5012

**MOUND SOIL  
 SCREEN DATA**

TEST RESULTS - SODIUM IODIDE SOIL SCREEN  
 ( MD-80030, OP. 1355 )  
 400 SECOND COUNT  
 PREPARED BY BETTY PETERS -EXT. 4408

SAMPLE NO.	DATE COLLECTED	DATE SCREENED	SAMPLER	SAMP TYPE	88 KEV WINDOW	17 KEV WINDOW	MORE ISO- TOPES	GRID LOCATION	WELL
410	02/14/95	02/14/95	[REDACTED]	5983	CONT	0.2	11	N	WESTON AREA 8 OTHER SOILS A 0820-5001
411	02/14/95	02/14/95	[REDACTED]	5983	CONT	20.5	19	N	WESTON AREA 8 OTHER SOILS B 0820-5004
412	02/14/95	02/14/95	[REDACTED]	5983	CONT	1.8	34	N	WESTON AREA 8 OTHER SOILS A 0820-5008
413	02/14/95	02/14/95	[REDACTED]	5983	CONT	1.6	5	N	WESTON AREA 8 OTHER SOILS B 0820-5012
414	02/14/95	02/14/95	[REDACTED]	5983	CONT	0.2	2	N	WESTON AREA 8 OTHER SOILS C 0821-5001
415	02/14/95	02/14/95	[REDACTED]	5983	CONT	35.5	30	N	WESTON AREA 8 OTHER SOILS A 0821-5004
416	02/14/95	02/14/95	[REDACTED]	5983	CONT	3.5	20	N	WESTON AREA 8 OTHER SOILS B 0821-5008
417	02/14/95	02/14/95	[REDACTED]	5983	CONT	1.3	27	N	WESTON AREA 8 OTHER SOILS C 0821-5012
418	02/14/95	02/14/95	[REDACTED]	5983	CONT	0.2	6	N	WESTON AREA 8 OTHER SOILS A 0822-5001
419	02/14/95	02/14/95	[REDACTED]	5983	CONT	100.4	0	Y	WESTON AREA 8 OTHER SOILS B 0822-5004
420	02/14/95	02/14/95	[REDACTED]	5983	CONT	87.2	131	N	WESTON AREA 8 OTHER SOILS C 0822-5008
421	02/14/95	02/14/95	[REDACTED]	5983	CONT	17.3	19	N	WESTON AREA 8 OTHER SOILS C 0822-5009
422	02/14/95	02/14/95	[REDACTED]						

MOUND SOIL  
 SCREEN DATA

TEST RESULTS - SODIUM IODIDE SOIL SCREEN  
 ( MD-80030, OP. 1355 )  
 400 SECOND COUNT  
 PREPARED BY BETTY PETERS -EXT. 4408

SAMPLE NO.	DATE COLLECTED	DATE SCREENED	SAMPLER	SAMP TYPE	88-KEV WINDOW	17-KEV WINDOW	MORE ISO-TOPE	GRID LOCATION	WELL
501681	02/23/95	02/23/95	[REDACTED]	5983	CONT	0.3	0	N	WESTON AREA 8 OTHER SOILS C 0843-5001
501680	02/23/95	02/23/95	[REDACTED]	5983	CONT	60.7	0	Y	WESTON AREA 8 OTHER SOILS A 0843-5004
501679	02/23/95	02/23/95	[REDACTED]	5983	CONT	2.7	0	N	WESTON AREA 8 OTHER SOILS B 0845-5001
501682	02/23/95	02/23/95	[REDACTED]	5983	CONT	2.9	10	N	WESTON AREA 8 OTHER SOILS A 0854-5001
501683	02/23/95	02/23/95	[REDACTED]	5983	CONT	4.1	0	N	WESTON AREA 8 OTHER SOILS B 0854-5004
501684	02/23/95	02/23/95	[REDACTED]	5983	CONT	0.9	3	N	WESTON AREA 8 OTHER SOILS C 0854-5008
501685	02/23/95	02/23/95	[REDACTED]	5983	CONT	1.3	8	N	WESTON AREA 8 OTHER SOILS A 0854-5012

**MOUND SOIL  
 SCREEN DATA**

Reviewed by:  
 COMMENTS: N/D

1  
3/95

TEST RESULTS - SODIUM IODIDE SOIL SCREEN  
( MD-80030, OP. 1355 )  
400 SECOND COUNT  
PREPARED BY BETTY PETERS -EXT. 4408

SAMPLE NO.	DATE COLLECTED	DATE SCREENED	SAMPLER	SAMP TYPE	88 KEV WINDOW	17 KEV WINDOW	MORE ISO- TOPES	GRID LOCATION	WELL
501657	02/23/95	02/23/95	[REDACTED]	5983	CONT	1.8	5	N	WESTON AREA 8 OTHER SOILS C
501661	02/23/95	02/23/95	[REDACTED]	5983	CONT	93.9	77	Y	WESTON AREA 8 OTHER SOILS A 0835-5008
501656	02/23/95	02/23/95	[REDACTED]	5983	CONT	58.7	0	N	WESTON AREA 8 OTHER SOILS A 0840-5004
501662	02/23/95	02/23/95	[REDACTED]	5983	CONT	0.4	6	N	WESTON AREA 8 OTHER SOILS B 0847-5001
501663	02/23/95	02/23/95	[REDACTED]	5983	CONT	0.6	22	N	WESTON AREA 8 OTHER SOILS A 0847-5008
501653	02/23/95	02/23/95	[REDACTED]	5983	CONT	2.6	12	N	WESTON AREA 8 OTHER SOILS C 0855-5001
501658	02/23/95	02/23/95	[REDACTED]	5983	CONT	2.9	0	N	WESTON AREA 8 OTHER SOILS B 0855-5004
501654	02/23/95	02/23/95	[REDACTED]	5983	CONT	1.5	0	N	WESTON AREA 8 OTHER SOILS B 0855-5008
501651	02/23/95	02/23/95	[REDACTED]	5983	CONT	1.1	14	N	WESTON AREA 8 OTHER SOILS C 0855-5012
501660	02/23/95	02/23/95	[REDACTED]	5983	CONT	3.0	3	N	WESTON AREA 8 OTHER SOILS C 0856-5001
501659	02/23/95	02/23/95	[REDACTED]	5983	CONT	1.5	7	N	WESTON AREA 8 OTHER SOILS A 0856-5004
501655	02/23/95	02/23/95	[REDACTED]	5983	CONT	1.0	1	N	WESTON AREA 8 OTHER SOILS B 0856-5008
501652	02/23/95	02/23/95	[REDACTED]	5983	CONT	0.9	5	N	WESTON AREA 8 OTHER SOILS A 0856-5011

MOUND SOIL  
SCREEN DATA

TEST RESULTS - SODIUM IODIDE SOIL SCREEN  
 ( MD-80030, OP. 1355 )  
 400 SECOND COUNT  
 PREPARED BY BETTY PETERS -EXT. 4408

DATE SCREENED	SAMPLER	SAMP TYPE	88 KEV WINDOW	17 KEV WINDOW	MORE ISO- TOPES	GRID LOCATION	WELL
02/20/95		5983	CONT	0.3	7	N	WESTON AREA 8 OTHER SOILS B 0841-5001
02/20/95		5983	CONT	43.4	43	N	WESTON AREA 8 OTHER SOILS B 0841-5004
02/20/95		5983	CONT	6.7	53	N	WESTON AREA 8 OTHER SOILS C 0841-5008
02/20/95		5983	CONT	7.1	20	N	WESTON AREA 8 OTHER SOILS A 0841-5012
02/20/95		5983	CONT	0.6	4	N	WESTON AREA 8 OTHER SOILS C 0853-5001
02/20/95		5983	CONT	3.4	16	N	WESTON AREA 8 OTHER SOILS A 0853-5012

**MOUND SOIL  
 SCREEN DATA**

TEST RESULTS - SODIUM IODIDE SOIL SCREEN

( MD-80030, OP. 1355 )

400 SECOND COUNT

PREPARED BY BETTY PETERS -EXT. 4408

DATE SCREENED	SAMPLER	SAMP TYPE	88 KEV WINDOW	17 KEV WINDOW	MORE ISO- TOPES	GRID LOCATION	WELL
1/15/95	[REDACTED]	CONT	0.4	2	N	WESTON AREA 8 OTHER SOILS B 0836-5001	
1/15/95	[REDACTED]	CONT	22.2	0	N	WESTON AREA 8 OTHER SOILS B 0836-5004	

**MOUND SOIL  
SCREEN DATA**

1  
5/95

TEST RESULTS - SODIUM IODIDE SOIL SCREEN  
( MD-80030, OP. 1355 )  
400 SECOND COUNT  
PREPARED BY BETTY PETERS -EXT. 4408

SAMPLE NO.	DATE COLLECTED	DATE SCREENED	SAMPLER	SAMP TYPE	88 KEV WINDOW	17 KEV WINDOW	MORE ISO-TOPES	GRID-LOCATION	WELL
501447	02/15/95	02/15/95	[REDACTED]	5983	CONT	0.1	0	N	WESTON AREA 8 OTHER SOILS A 0837-5001
501446	02/15/95	02/15/95	[REDACTED]	5983	CONT	9.1	8	N	WESTON AREA 8 OTHER SOILS B 0837-5004
501448	02/15/95	02/15/95	[REDACTED]	5983	CONT	10.3	23	N	WESTON AREA 8 OTHER SOILS C 0837-5008
501449	02/15/95	02/15/95	[REDACTED]	5983	CONT	18.3	6	N	WESTON AREA 8 OTHER SOILS B 0837-5012
501444	02/15/95	02/15/95	[REDACTED]	5983	CONT	0.1	0	N	WESTON AREA 8 OTHER SOILS A 0838-5001
501445	02/15/95	02/15/95	[REDACTED]	5983	CONT	16.6	0	N	WESTON AREA 8 OTHER SOILS C 0838-5004
501450	02/15/95	02/15/95	[REDACTED]	5983	CONT	81.5	151	N	WESTON AREA 8 OTHER SOILS C 0838-5008
501443	02/15/95	02/15/95	[REDACTED]	5983	CONT	1.7	18	N	WESTON AREA 8 OTHER SOILS B 0838-5012

**MOUND SOIL  
SCREEN DATA**

TEST RESULTS - SODIUM IODIDE SOIL SCREEN  
 ( MD-80030, OP. 1355 )  
 400 SECOND COUNT  
 PREPARED BY BETTY PETERS -EXT. 4408

**MOUND SOIL  
 SCREEN DATA**

SAMPLE NO.	DATE COLLECTED	DATE SCREENED	SAMPLER	SAMP TYPE	88 KEV WINDOW pCi/g	17 KEV WINDOW pCi/g	MORE ISO-TOPES	GRID LOCATION	WELL	
9501895	03/06/95	03/07/95	[REDACTED]	5983	CONT	1.2	24	N	WESTON HS C0028 8701-5001	C
9501893	03/06/95	03/07/95	[REDACTED]	5983	CONT	1.2	3	N	WESTON HS C0028 8701-5004	B
9501892	03/06/95	03/07/95	[REDACTED]	5983	CONT	0.9	9	N	WESTON HS C0028 8701-5008	A
9501891	03/06/95	03/07/95	[REDACTED]	5983	CONT	1.1	3	N	WESTON HS C0028 8702-5001	A
9501894	03/06/95	03/07/95	[REDACTED]	5983	CONT	0.9	14	N	WESTON HS C0028 8702-5004	C
9501897	03/06/95	03/07/95	[REDACTED]	5983	CONT	1.2	0	N	WESTON HS C0028 8702-5008	B
9501883	03/06/95	03/07/95	[REDACTED]	5983	CONT	1.0	1	N	WESTON HS C0028 8702-5011	A
9501881	03/06/95	03/07/95	[REDACTED]	5983	CONT	1.5	24	N	WESTON HS C0028 8703-5001	B
9501886	03/06/95	03/07/95	[REDACTED]	5983	CONT	1.5	16	N	WESTON HS C0028 8703-5004	C
9501890	03/06/95	03/07/95	[REDACTED]	5983	CONT	1.2	4	N	WESTON HS C0028 8703-5007	B
9501882	03/06/95	03/07/95	[REDACTED]	5983	CONT	1.2	35	N	WESTON HS C0028 8704-5001	C
9501889	03/06/95	03/07/95	[REDACTED]	5983	CONT	0.7	7	N	WESTON HS C0028 8704-5004	C
9501885	03/06/95	03/07/95	[REDACTED]	5983	CONT	1.1	12	N	WESTON HS C0028 8704-5005	C
9501888	03/06/95	03/07/95	[REDACTED]	5983	CONT	1.4	13	N	WESTON HS C0028 8705-5001	A
9501884	03/06/95	03/07/95	[REDACTED]	5983	CONT	1.3	1	N	WESTON HS C0028 8705-5004	B

description: WESTON AREA 8 0823-5011

\*\*\* R A D I O N U C L I D E A N A L Y S I S R E P O R T \*\*\*\*\*

Nuclide #	Nuclide Name	Confid.	Concen- [redacted] [redacted] p[redacted]/g	Error (%)
1	Th-234U	0.996	41.19	6.18
2	Pa-234mU	0.395	99.83	6.96
3	Pb-214U	0.726	5.17	3.85
4	Bi-214U	0.365	4.42	5.30
5	U-235	0.751	2.41	6.02
6	Ac-228Th	0.876	355.67	0.32
7	Th-228Th	0.990	368.17	5.51
8	Ra-224Th	0.999	453.39	2.62
9	Pb-212Th	0.997	402.42	1.44
10	Bi-212Th	0.724	366.59	0.85
11	Tl-208Th	0.995	371.48	0.65
12	Ra xrays	0.791	48.14	6.09
13	Rn xrays	0.899	5.04	9.44
14	Po xrays	0.319	3237.67	4.71
15	Pb xrays	0.994	422.41	3.81
16	Bi xrays	0.997	2401.67	3.91

NOTE: X-rays are listed for qualitative identification only. Concentration values associated with these identifications should be disregarded.

5

These peaks were not identified:

Peak #	Channel	Energy (keV)	Intensity (gam/sec)	SE Cand. (keV)	DE Cand. (keV)	Error (%)
123	4858.95	1093.35	3.13E+001	1604.35	2115.35	7.68
146	7074.72	1591.50	1.13E+002	2102.50	2613.50	5.11

GAMMA SPECTROSCOPY

**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		

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**Table I.1 Soil Analyte List (Continued)**

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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)

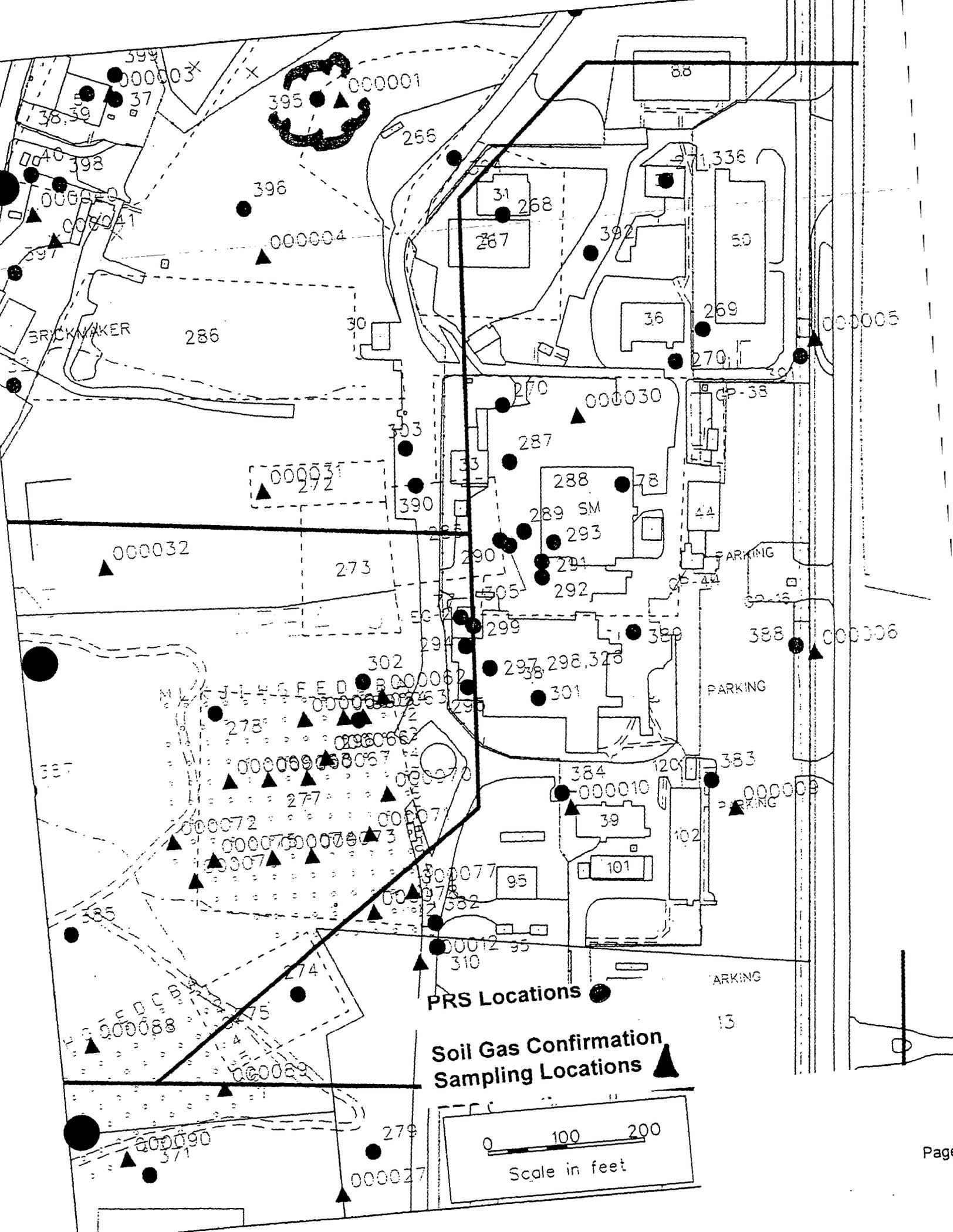
Radionuclides

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

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**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.



PRS Locations ●

Soil Gas Confirmation  
Sampling Locations ▲

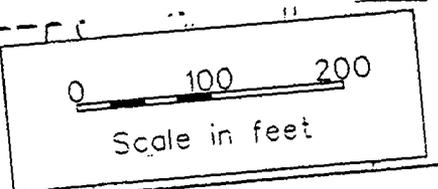


Table A.1. Soil Gas Confirmation Detected Volatile Organic Compounds

ANALYTE	SGC NAC 000002	SGC NAC 000003	SGC NAC 000004	SGC NAC 000005	SGC NAC 000006	SGC NAC 000007	Background	10 <sup>6</sup> Construction Worker Guidelines
VOLATILES (µg/Kg)								
Acetone								10500000
1,2-Dichloroethene (total)							NA	21500000
2-Butanone	12						NA	46500000
Benzene	1 J						NA	8900
Carbon Disulfide							NA	1400000
Chloroform			67				NA	NA
Chloromethane							NA	NA
Ethylbenzene							NA	480
Methylene Chloride	6			7	8		NA	NA
Tetrachloroethene							NA	10500000
Toluene	1 J	J					NA	1250000
Trichloroethene						7	NA	11000
Xylene (total)							NA	21500000

J - Numerical value is an estimated quantity  
 NA - Value not available  
 µg/kg - micrograms per kilogram

H - Analyzed outside holding time  
 D - Sample was diluted

"A non-entry indicates that the analyte was not detected in the analysis."

Note: No entry for SGC NAC 000001 indicating no volatiles were detected.

Table A.2. Soil Gas Confirmation Detected Semivolatile Organic Compounds

ANALYTE	SGC NAC 000001	SGC NAC 000002	SGC NAC 000003	SGC NAC 000004	SGC NAC 000005	SGC NAC 000006	Background	10 <sup>6</sup> Construction Worker Guidelines
<b>SEMIVOLATILES (µg/Kg)</b>								
Acenaphthene		190 J	63 J				NA	NA
Acenaphthylene		750				42 J	NA	NA
Anthracene		1300	66 J		25 J	55 J	NA	32000000
Benzo(a)anthracene		1500	180 J		160 J	300 J	NA	4100
Benzo(a)pyrene		1300	180 J		200 J	450	NA	410
Benzo(b)fluoranthene		1000	180 J		190 J	460	NA	4100
Benzo(g,h,i)perylene		550	100 J		100 J	260 J	NA	NA
Benzo(k)fluoranthene		1000	160 J		190 J	440	NA	41000
Bis(2-ethylhexyl)phthalate							NA	215000
Butylbenzylphthalate							NA	215000000
Carbazole		600	62 J			34 J	NA	NA
Chrysene		1500	220 J		240 J	490	NA	410000
Di-n-butyl phthalate	120 J			280 J			NA	105000000
Di-n-octyl phthalate							NA	21500000
Dibenz(a,h)anthracene		180 J	40 J		37 J	87 J	NA	410
Dibenzofuran		1100	23 J				NA	NA
Diethyl phthalate							NA	NA
Fluoranthene		3400 D	480		400 J	800	NA	42500000
Fluorene		1500	2 J				NA	NA
Indeno(1,2,3-cd)pyrene		690	120 J		130 J	320 J	NA	4100
2-Methylnaphthalene		970					NA	NA
Naphthalene		4000 D	24 J				NA	NA
Phenanthrene		4700 D	380		150 J	280 J	NA	NA
Phenol							NA	650000000
Pyrene	24 J	2700 D	440		340 J	730	NA	32000000

Table A.3. Soil Gas Confirmation Detected Pesticides/PCB's

ANALYTE	SGC NAC 000008	SGC NAC 000010	SGC NAC 000031	SGC A66 000041	SGC A61 000044	SGC A13 000060	Background	10 <sup>6</sup> Construction Worker Guidelines
PESTICIDES/PCB (µg/kg)								
Aroclor-1248				110	98		ND	380
Aroclor-1254	43				55		ND	21500
Alpha-Chlordane							ND	NA
Gamma-Chlordane						3.7	ND	NA
4,4'-DDT							13000	9000
Dieldrin		4.4	5*				ND	185
Endosulfan I				3.4*	2.4*		ND	NA
Endosulfan II							NA	NA
Endrin			11*				ND	NA
Heptachlor						2.9	ND	NA

Note: No entry for SGC NAC 000001 indicates no pesticides were detected.

Table A.4. Soil Gas Confirmation Detected TAL Inorganics

ANALYTE	SGC NAC 000001	SGC NAC 000002	SGC NAC 000003	SGC NAC 000004	SGC NAC 000005	SGC NAC 000006	Background	10 <sup>6</sup> Construction Worker Guidelines
INORGANICS (mg/kg)								
Aluminum	11000	1190	1910	11400	7970	7780	19000	NA
Antimony		0.3 B		0.24 B	0.41 B		NA	425
Arsenic	1.5 B	2.1 B	2.9 B	1.4 B	7	7.2	8.6	320
Barium	48.6	20.7 B	23.7 B	47.1 B	73.6	86	180	75000
Beryllium	0.56		0.12 B	0.65	0.38	28	1.3	0.7
Bismuth							NA	NA
Cadmium		0.25 B	19 B		0.36 B	0.5 B	2.1	1050
Calcium	162000	159000	95000	152000	13600	86200	310000	NA
Chromium	13.2	6.7	3.8	15.2	13	11.6	20	1050000
Cobalt	9.8 B	4.5 B	2.3 B	10.1 B	7.5 B	7.6 B	19	NA
Copper	16.2	11.9	9.9	17.1	14.5	15.2	26	NA
Cyanide							ND	21400
Iron	21300	10600	5680	20000	17200	17700	35000	NA
Lead	6.7	5.2	11.2	8.1	30.9	25.1	48	NA
Lithium	21 B	12.5 B	6.2 B	23 B	7.7 B	10.3 B	26	NA
Magnesium	6160	57800	27900	5070	5210	35600	40000	NA
Manganese	695	384	270	612	383	589	1400	135000
Mercury			0.13				NC	320
Molybdenum	0.43 B	1.2 B	0.77 B			1.5 B	27	NA
Nickel	18.4	9.9	6.4 B	20.6	11.1	16.1	32	21500
Potassium	1780	742 B	300 B	2080	574 B	744 B	1900	NA
Selenium							NA	NA
Silver			0.24 B				1700	5500000
Sodium	228 B	888	150 B	137 B	411 B	18 B	240	NA
Thallium							460	NA
Tin	1.1 B			1.4 B	1 B		20	NA
Vanadium	14.9	3	4.7	16.3	23.1	18.9	25	7500
Zinc	53.3	29.5		67	59	69.2	140	320000

Table A.5. Soil Gas Confirmation Detected Nitrate-Nitrite

ANALYTE	SGC NAC 000001	SGC NAC 000002	SGC NAC 000003	SGC NAC 000004	SGC NAC 000005	SGC NAC 000006	Background	10 <sup>6</sup> Construction Worker Guidelines
GENERAL ANALYTES								
% Solids (%)	83.9	93.8	88.5	83.3	78.4	75.0	NA	NA
Nitrate/Nitrite (MG-N/KG)	2.0	1.8	1.2	2.1	7.2	4.8	26	NA

ANALYTE	SGC NAC 000007	SGC NAC 000008	SGC NAC 000009	SGC NAC 000010	SGC NAC 000011	SGC NAC 000012	Background	10 <sup>6</sup> Construction Worker Guidelines
GENERAL ANALYTES								
% Solids (%)	83.9	95.0	78.9	83.9	90.1	84.7	NA	NA
Nitrate/Nitrite (MG-N/KG)	1.6	26.5	2.2	5.9	5.3	1.8	26	NA

ANALYTE	SGC NAC 000013	SGC NAC 000014	SGC NAC 000015	SGC NAC 000016	SGC NAC 000017	SGC SAN 000018	Background	10 <sup>6</sup> Construction Worker Guidelines
GENERAL ANALYTES								
% Solids (%)	81.7	80.9	74.0	85.3	72.8	84.2	NA	NA
Nitrate/Nitrite (MG-N/KG)	2.1	4.9	3.0	2.4	6.4	13.7	26	NA

ANALYTE	SGC NAC 000019	SGC NAC 000020	SGC NAC 000021	SGC NAC 000022	SGC NAC 000023	SGC NAC 000024	Background	10 <sup>6</sup> Construction Worker Guidelines
GENERAL ANALYTES								
% Solids (%)	85.3	87.6	77.4	78.3	77.5	89.5	NA	NA
Nitrate/Nitrite (MG-N/KG)	6.5	2.1	6.1	2.2	11.6	2.2	26	NA

Table A.6. Soil Gas Confirmation Detected Radionuclides

ANALYTE	SGC NAC 000001	SGC NAC 000002	SGC NAC 000003	SGC NAC 000004	SGC NAC 000005	SGC NAC 000006	SGC NAC 000007	Background	10 <sup>6</sup> Construction Worker Guidelines
RADIONUCLIDES (pCi/g)									
Americium-241								ND	4.95
Bismuth-207								ND	0.175
Bismuth-210								ND	NA
Cesium-137						0.86		0.42	0.46
Cobalt-60								NC	0.1
Plutonium-238	1.42	0.0690	0.833	0.870	0.543	4.32	0.537	0.13	5.5
Plutonium-239/240			0.0252					0.18	5.5
Potassium-40	21.7	2.95	6.53	27.4	15.1	14.3	10.8	37	NA
Radium-226	1.03	0.478	0.508	1.15	1.2	0.870	0.537	2	0.14
Thorium-228	1.52	0.277	0.370	1.24	1.05	1.06	0.431	1.5	0.85
Thorium-230	0.814	0.374	0.621	0.980	1.19	1.18	0.582	1.9	44
Thorium-232	1.30	0.184	0.415	1.17	0.950	1.18	0.328	1.4	50
Uranium-234	2.19	0.401	0.419	0.934	0.874	0.761	0.551	1.1	37.5
Uranium-235	0.0974		0.0400	0.0349	0.0328			0.11	3.35
Uranium-238	2.35	0.392	0.512	0.918	0.913	0.815	0.574	1.2	11