

MOUND



Environmental
Restoration
Program

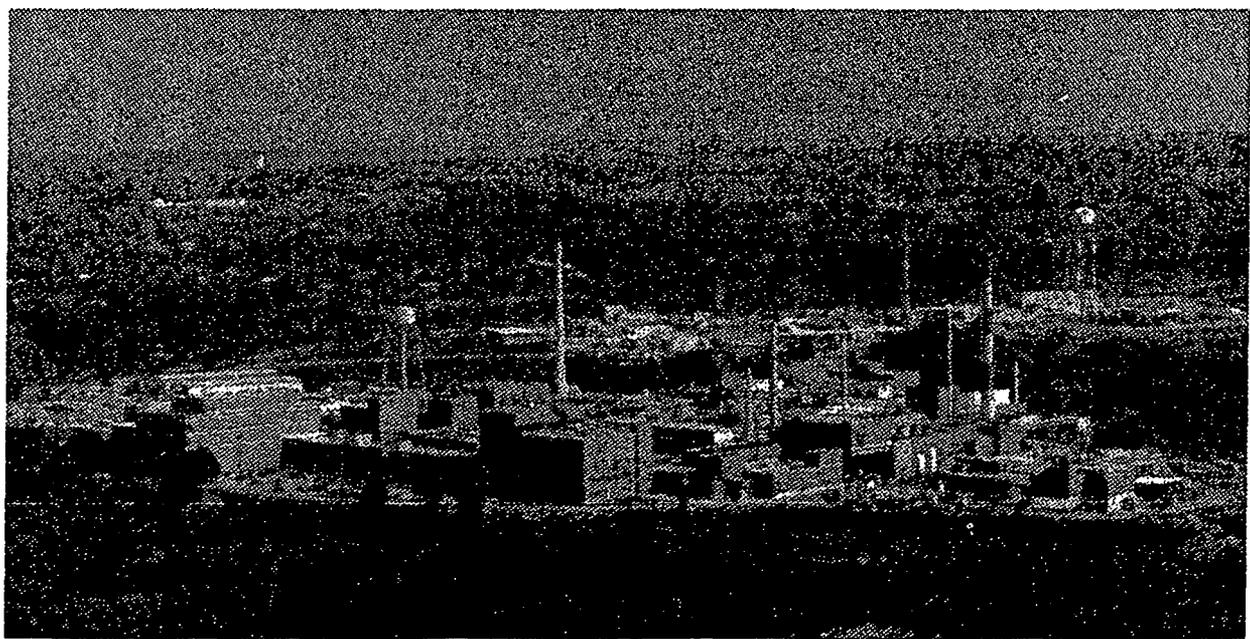


OhioEPA

MOUND PLANT

Potential Release Site Package

PRS # 241



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 June 17, 1997. Public comment will be accepted on these packages from June 17, 1997, through July 18, 1997.

- PRS 30: Building 27 Propane Tank
- PRS 129/130: Former Solvent Storage Sites
- PRS 241: Soil Contamination - Main Hill Parking Lot Area
- PRS 307: Soil Contamination - Building 29
- PRS 318: PCB Transformer and Capacitor Locations
- PRS 320-325: Former Sites - Dayton Units 1-4/Dayton Warehouse/Scioto Facility
- PRS 383: Soil Contamination
- PRS 408: Soil Contamination - "Prism" Oil

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

PRS 129/130

| REV | DESCRIPTION | DATE |
|----------------------------|--|-----------------------|
| 0 PUBLIC RELEASE | Available for comments. | Mar. 21, 1997 |
| 1 FINAL | Comment period expired. Comments. Recommendation page annotated. | Sept. 29, 1997 |



The Mound Core Team
P.O. Box 66
Miamisburg, Ohio 45343-0066

AUG 20 1997

Miamisburg Mound Community Improvement Corporation
720 Mound Road
COS Building 4221
Miamisburg, Ohio 45342-6714

Dear Mr. Bird:

The Core Team, consisting of the U.S. Department of Energy Miamisburg Environmental Management Project (DOE-MEMP), U.S. Environmental Protection Agency (USEPA), and the Ohio Environmental Protection Agency (OEPA), appreciates the input provided by the public stakeholders of the Mound facility. The public stakeholders have significantly contributed to the forward progress that has been made on the entire release block strategy for establishing the safety of the Mound property prior to its return to public use after remediation and residual risk evaluation.

Attached please find responses to your July 14, 1997 comments on PRS packages 129/130, 241, 307, 318, 408, and 320/321/322/323/324/325. Document revisions in accordance with the attached responses are expected to be completed in August 1997.

Should the responses require additional detail, please contact Art Kleinrath at (937) 865-3597 and we will gladly arrange a meeting or telephone conference.

Sincerely,

DOE/MEMP: Arthur W. Kleinrath
Arthur W. Kleinrath, Remedial Project Manager

USEPA: Timothy J. Fischer
Timothy J. Fischer, Remedial Project Manager

OHIO EPA: Brian K. Nickel
Brian K. Nickel, Project Manager

| | |
|---------|----------------------------------|
| Subject | PRS 241 - Northwest Parking Lots |
| Version | Public Release May 21, 1997 |

SUBSTANTIVE COMMENTS:

- 1) Freon-113 was detected at 865 ppb in soil gas samples from PRS 241; however, no Mound Guideline Value has been developed for Freon for comparison to PRS-specific results. How did the Core Team evaluate the effect of this compound on PRS 241?
- 2) Cesium-137 was detected at a maximum concentration of 0.5 pCi/g, which is slightly above the Guideline Value of 0.46 pCi/g. Did the Core Team conclude that Cesium-137 levels were equivalent to the rounded GV in their recommendation statement that "all radionuclides are at or below guideline criteria?"

RESPONSE:

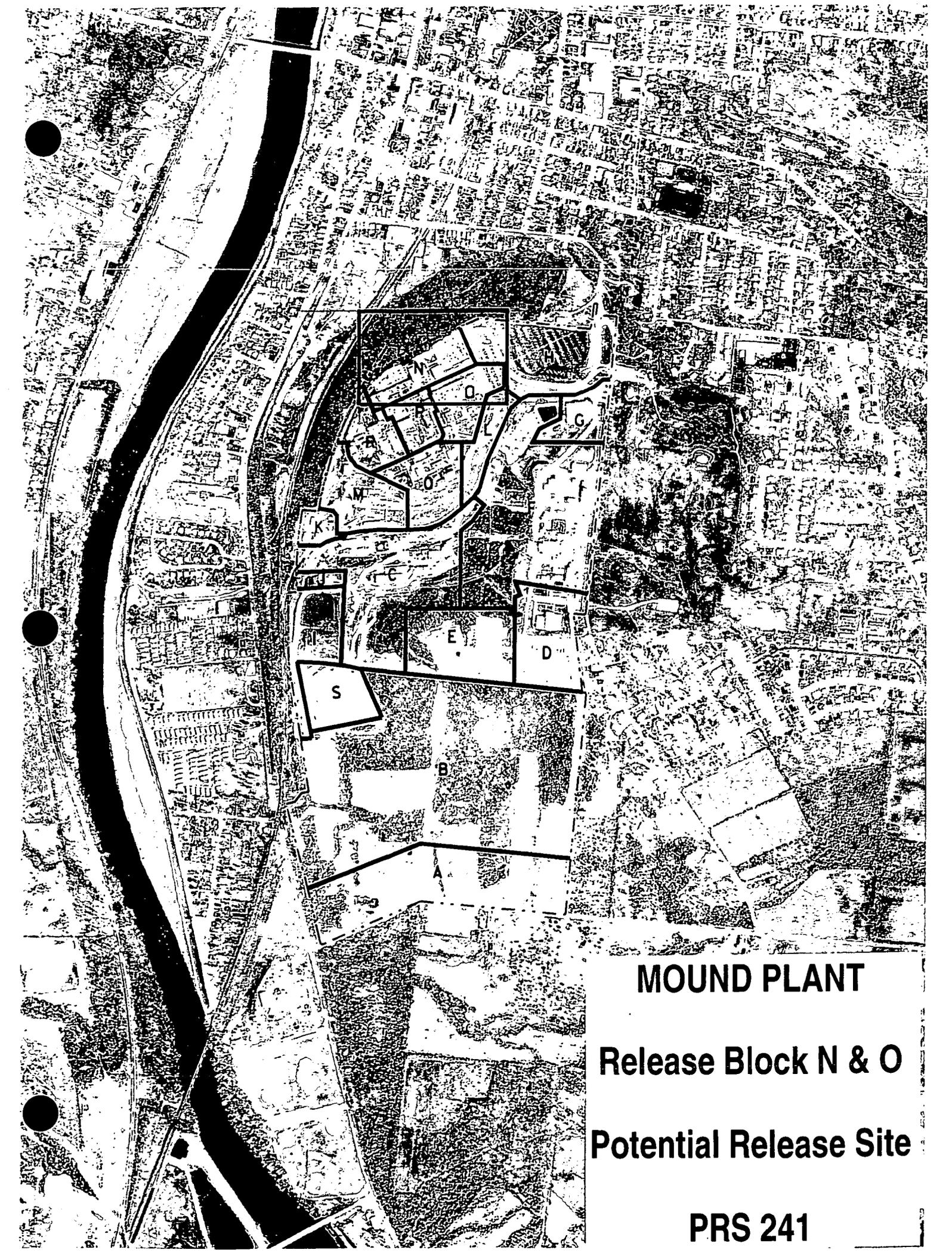
- 1) *The EPA has not included toxicity data for freon-113 in the IRIS (Integrated Risk Information System) or HEAST (Health Effects Assessment Summary Tables) databases. Due to the lack of published toxicity data, Mound site-specific Guideline Values could not be calculated. Therefore, in the case where there is not a Guideline Value or applicable regulatory criteria, sample results were compared by analogy to other chemicals of that family.*
- 2) *The conclusion was that the Cesium-137 level detected was equivalent to the rounded Guideline Value.*

ERRATA:

- 1) The dates 1983 and 1984 in the first paragraph under the subheading "CONTAMINATION" should presumably read 1992 and 1993, since the Radiological Site Survey final document was issued in June 1993.

RESPONSE:

- 1) *The text will be revised to reflect the 1992 and 1993 dates.*



MOUND PLANT

Release Block N & O

Potential Release Site

PRS 241



241

H

G

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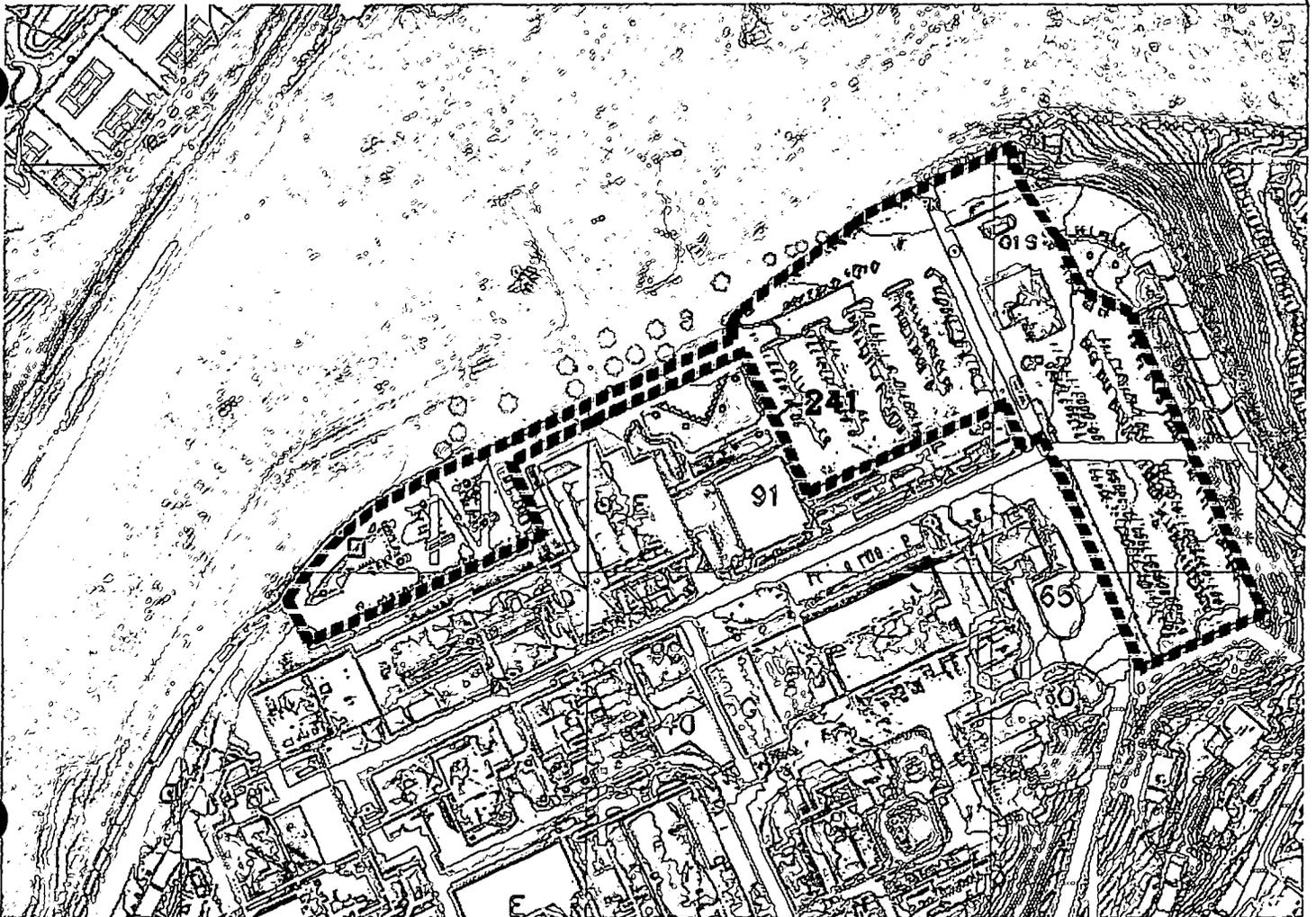
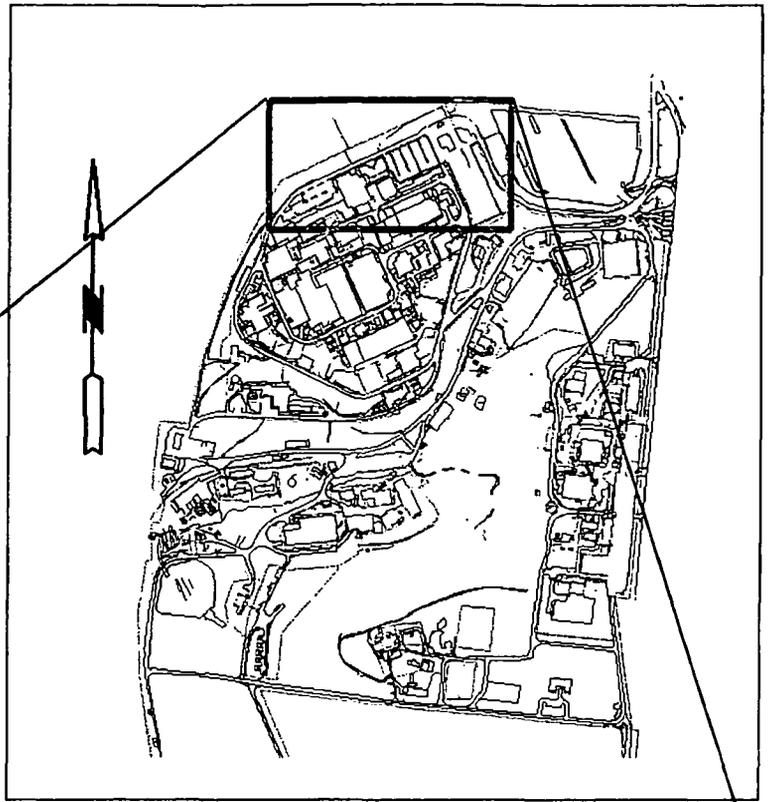
A

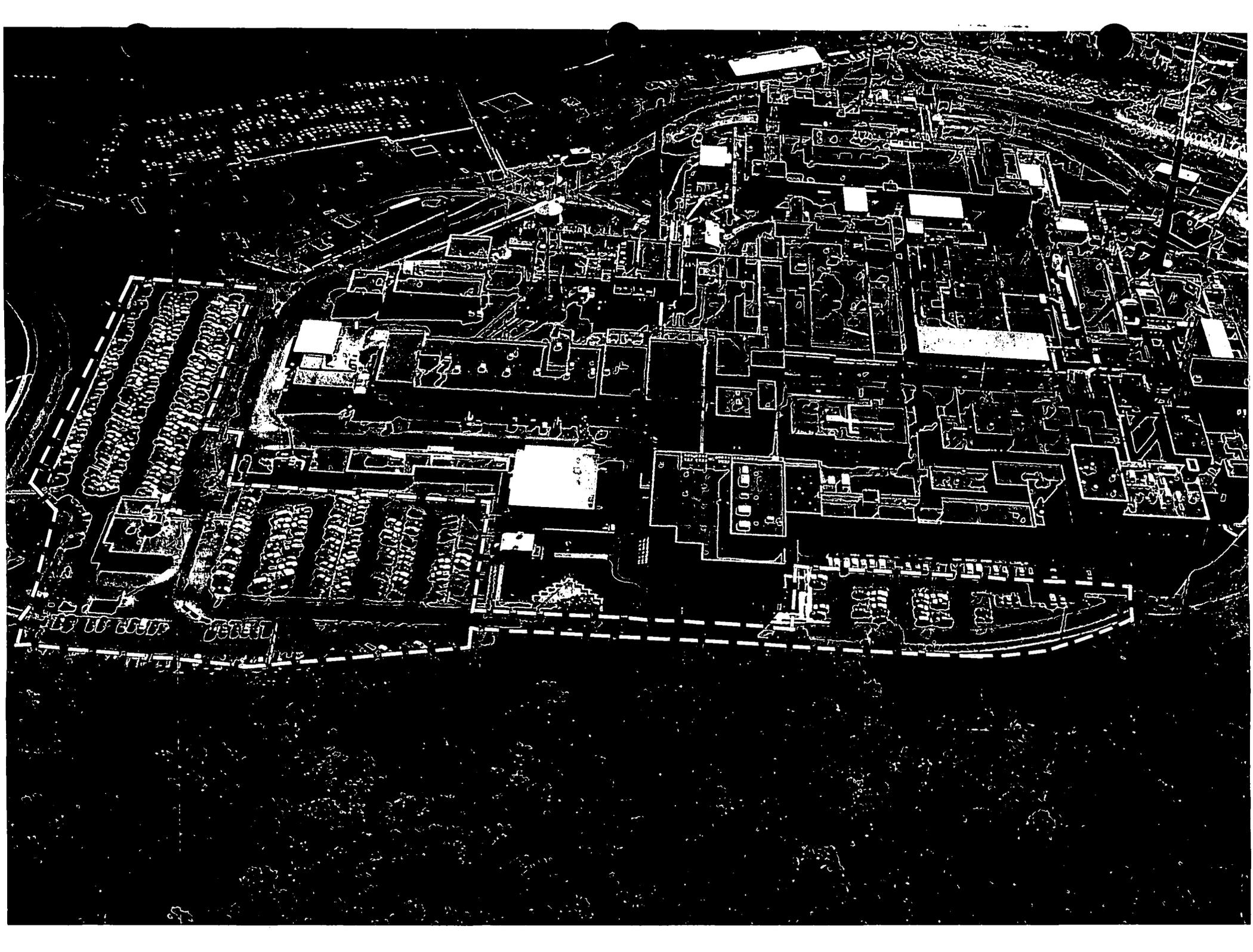
Mound Plant

Release Block N & O

Potential Release Site

PRS 241





PRS 241

PRS HISTORY:

PRS 241 is a soils area located in the northwest parking lots, including the parking lots east of OSE building, south of GH building and the parking lot in north of A Building. This PRS was created due to the Soil Gas Survey and Geophysical Investigation - Reconnaissance Sampling Report, Feb. 1993 because of several positive soil gas detections.⁴ These areas have always been and still are parking lots. No operations are known to have been performed in the parking lots east of OSE Building and north of A Building that would generate hazardous or radioactive wastes. Activities in the parking lot south of GH Building resulted in the creation of several other PRS's; PRS 99 which is known as Area 6 which contains WD Building Filter-Cleaning Waste whose contaminants of concern are polonium-210, cobalt-60, and radium-266; PRS 100 which is known as Area F which contains the Chromium Trench involving chromium plating bath solution treated with sodium bisulfide, cadmium, nickel, and silver.¹

In 1987 a trench was dug to investigate the "Groundwater Occurrence and Movement in the Consolidated Bedrock at the D.O.E. Mound Laboratory". The trench located within the parking lot along the northern edge of the plant boundary running from a point north of GH Building to a point north of Building 91 was 4 ft. wide, 650 ft. long, and 23 ft. deep. The lithologic log of the trench showed concrete and fill to a depth of 1.5 ft.² This indicates that the use of fill material in constructing the parking lots was relatively nominal.

CONTAMINATION:

In 1992 and 1993 the Radiological Site Survey Project investigated the soils on the Mound Plant Site for radionuclides by:

- screening using a sodium iodide detector (FIDLER) to identify areas of suspected radioactivity contamination;
- sampling of surface and subsurface soil; and
- analysis of soil samples using one or more of the following methods: radiochemical analysis for plutonium-238 and thorium isotopes, gamma spectroscopy, *in situ* gamma spectroscopy, and liquid scintillation for tritium.

Results found:³

| Contaminant | Maximum Concentration | Guideline Criteria |
|---------------|-----------------------|--------------------|
| Plutonium-238 | 17.60 pCi/g | 25 pCi/g |
| Thorium | 4.47 pCi/g | 15 pCi/g |
| Tritium | 1.54 pCi/ml | 20 pCi/ml |
| Cesium-137 | 0.5 pCi/g | 0.46 pCi/g* |
| Radium-226 | 0.9 pCi/g | 5 pCi/g |

* Background for Cesium-137 at Mound is 0.42 pCi/g

In 1992 the "Reconnaissance Sampling Report Soil Gas Survey and Geophysical Investigations, Mound Plant Main Hill and SM/PP Hill" investigated soils contaminated with volatile organic compounds by collecting soil gas and analyzing by gas chromatography.

Results found: ⁴

| Contaminant | Maximum Concentration | Guideline Criteria ⁵ |
|-----------------------|-----------------------|---------------------------------|
| Trichloroethene (TCE) | 8 ppb | 2,400 ppb |
| Toluene | 255 ppb | 414,600 ppb |

* Freon 113 was detected at 865 ppb, no health risk guideline values exist

READING ROOM REFERENCES:

- 1) OU9 Site Scoping Report: Vol. 12 - Site Summary Report, December 1994. (pages 6-7)
- 2) Groundwater Occurrence and Movement in the Consolidated Bedrock at the D.O.E. Mound Laboratory, March 1987. (pages 8-11)
- 3) Operable Unit 9, Site Scoping Report Volume 3 - Radiological Site Survey, June 1993. (pages 12-26)
- 4) Reconnaissance Sampling Report - Soil Gas and Geophysical investigations Mound Plant and SM/PP Hill, Feb. 1993. (pages 27-30)

OTHER REFERENCES:

- 5) Comparison of Actual Soil Gas Values with Calculated Acceptable Soil Gas Values, March 1996. (pages 31-33)

PREPARED BY:

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

**MOUND PLANT
PRS 241
Soil Contamination-Main Hill Parking Lot Area**

RECOMMENDATION:

PRS 241 consists of the northwest parking lots, including the parking lots east of OSE building, south of GH building and the parking lot north of A Building. This PRS was created due to the Soil Gas Survey and Geophysical Investigation - Reconnaissance Sampling Report, Feb. 1993 because of several positive soil gas detections. These areas have always been and still are parking lots. No operations are known to have been performed in the parking lots east of OSE Building and north of A Building that would generate hazardous or radioactive wastes.

In 1992, reconnaissance soil gas sampling detected 8 ppb of trichloroethene (TCE) and 255 ppb toluene. These results were below calculated acceptable soil gas values. In addition, all radionuclides are at or below guideline criteria.

Therefore, NO FURTHER ASSESSMENT is recommended for PRS 241.

CONCURRENCE:

| | | |
|-----------|---|----------------|
| DOE/MEMP: | <u>Arthur W. Kleinrath</u> | <u>5/13/97</u> |
| | Arthur W. Kleinrath, Remedial Project Manager | (date) |
| USEPA: | <u>Timothy J. Fischer</u> | <u>5/13/97</u> |
| | Timothy J. Fischer, Remedial Project Manager | (date) |
| OEPA: | <u>Brian K. Nickel</u> | <u>5/14/97</u> |
| | Brian K. Nickel, Project Manager | (date) |

SUMMARY OF COMMENTS AND RESPONSES:

Comment period from 6/17/97 to 7/18/97

- No comments were received during the comment period.
- Comment responses can be found on page 1-2 of this package.

REFERENCE MATERIAL
PRS 241

Environmental Restoration Program

**OPERABLE UNIT 9 SITE SCOPING REPORT:
VOLUME 12 - SITE SUMMARY REPORT**

**MOUND PLANT
MIAMISBURG, OHIO**

December 1994

Final

**U.S. Department of Energy
Ohio Field Office**



EG&G Mound Applied Technologies

| Description of History and Nature of Waste Handling | | | | | | Hazardous Conditions and Incidents | | | Environmental Data | | |
|---|---|----------|------------|--|-------|---|-------|----------|--|--|----|
| No. | Site Name | Location | Status | Potential Hazardous Substances | Ref | Releases | Media | Ref | Analytes ^a | Results | Re |
| 241 | Northwest Parking Lots | D-7 | Grounds | Toluene, Freon-113, Trichloroethene | 12 | Indicated by Soil Gas Survey | S | 12 | 1 | SGS ^b Table B.4 Locations 1002, 1007, 1008, 1009, 1010, 1014, 1101, 1102, 1106, 1109, 1110 | 12 |
| 242 | VOC Potential Hot Spot Location 1016 | D-7 | Grounds | Toluene, Trichloroethene | 12 | | | | 1 | SGS ^b Table B.4 | 12 |
| 243 | VOC Potential Hot Spot Location 1064 | E-7 | Grounds | Toluene | 12 | | | | | | |
| 244 | VOC Potential Hot Spot Locations 1076, 1077, 1078, and 1080 | E-6 | Grounds | Toluene, Freon-113, 1,1,1-Trichloroethane | 12 | | | | | | |
| 245 | VOC Potential Hot Spot Location 1085 | F-6 | Grounds | Freon-113, Trichloroethene, 1,1,1- Trichloroethane | 12 | | | | | | |
| 246 | VOC Potential Hot Spot Locations 1117 and 1118 | G-7 | Grounds | Tetrachloroethene | 12 | | | | | | |
| 247 | VOC Potential Hot Spot Location 1129 | F-8 | Grounds | Freon-113, Trichloroethene, 1,1,1- Trichloroethane, Tetrachloroethene | 12 | Indicated by soil gas survey | S | 12 | 1 | SGS ^b Table B.4 | 12 |
| 248 | HH Building Stack | F-7 | In service | Polonium-210, Tritium | 4, 18 | None suspected beyond routine emissions | A | 4, 18 | Emissions reported in Annual Environmental Monitoring Reports | | 18 |
| | uilding Stack (NCPDF) | E-6 | In service | Tritium | 4, 18 | | | | | | |
| | uilding Stack (SW1C) | E-6 | In service | Uranium-238 | 4, 18 | | | | | | |
| | uilding Stack (HEFS) | E-6 | In service | Tritium | 4, 18 | | | | | | |
| | B Building Stack | E-6 | Inactive | Polonium-210, Tritium | 4, 18 | | | | | | |
| | uilding WEST Stack | F-6 | In service | Tritium, Plutonium-238 -239, Uranium-238 | 4, 18 | | | | | | |
| | uilding EAST Stack | E-7 | In service | Tritium, Plutonium-238, Uranium-238 | 4, 18 | | | | | | |
| | uilding Stack (ALR) | F-6 | In service | Plutonium-238 | 4, 18 | | | | | | |

LETTER REPORT

GROUNDWATER OCCURRENCE AND MOVEMENT
IN THE CONSOLIDATED BEDROCK
AT THE
D.O.E. MOUND LABORATORY
MIAMISBURG, OHIO

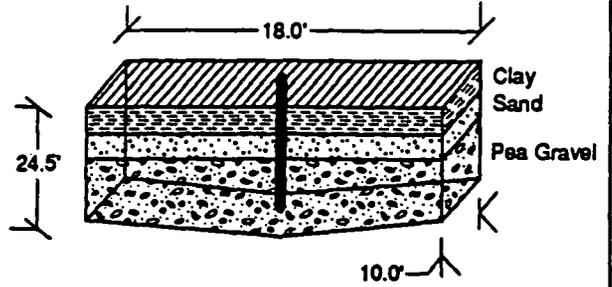
PREPARED FOR

MONSANTO RESEARCH CORPORATION
MIAMISBURG, OHIO

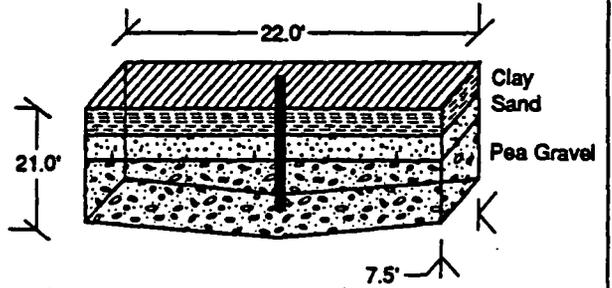
MARCH 19, 1987

TERRAN CORPORATION
HYDROGEOLOGIC CONSULTANTS
P.O. BOX 1410 FAIRBORN, OHIO

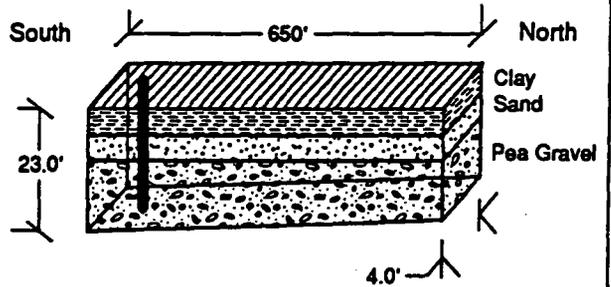
Well 0722 (F.K.A. PIT 12)
 Surface Area: 1,372 ft²
 Volume: 4,410 ft³
 Well Diameter: 4 inches
 Screen Slot Size: 0.01
 Back Fill Material: Pea Gravel



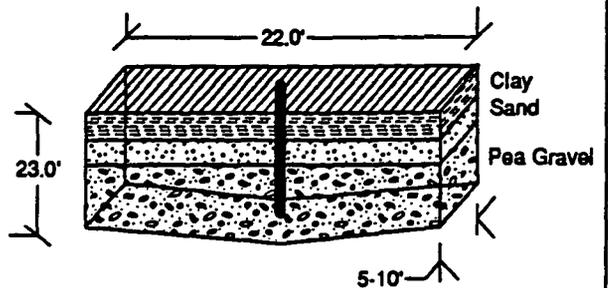
Well 0723 (F.K.A. PIT 6)
 (PIT 48)
 Surface Area: 1,239 ft²
 Volume: 3,465 ft³
 Well Diameter: 4 inches
 Screen Slot Size: 0.01
 Back Fill Material: Pea Gravel



Well 0712 (F.K.A. PIT 1)
 (North Trench)
 Surface Area: 30,084 ft²
 Volume: 59,800 ft³
 Well Diameter: 4 inches
 Screen Slot Size: 0.01
 Back Fill Material: Pea Gravel



Well 0724 (F.K.A. PIT 7)
 (PIT 45)
 Surface Area: 1,242-1,472 ft²
 Volume: 2,530-5,060 ft³
 Well Diameter: 4 inches
 Screen Slot Size: 0.01
 Back Fill Material: Pea Gravel



As numbered on pit logs in the report titled "Groundwater Occurrence and Movement in Consolidated Bedrock at the DOE Mound Laboratory," March 19, 1987 (Terran 1987).

F.K.A. - Formerly known as

MND-Scop-OU2-01/4-14-92

Figure 4.2. As-built diagrams of test pits with monitoring wells on the Main Hill.

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**



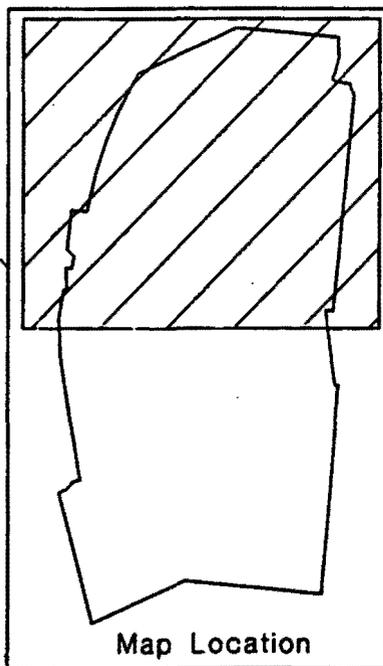
ER PROGRAM
MOUND PLANT

Miamisburg, Ohio

PLATE 1
(1 of 2)

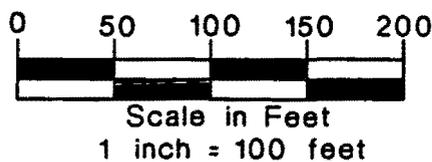
Site Survey Project Sampling Locations

Prepared for
Site Scoping Report: Volume 3,
Radiological Site Survey

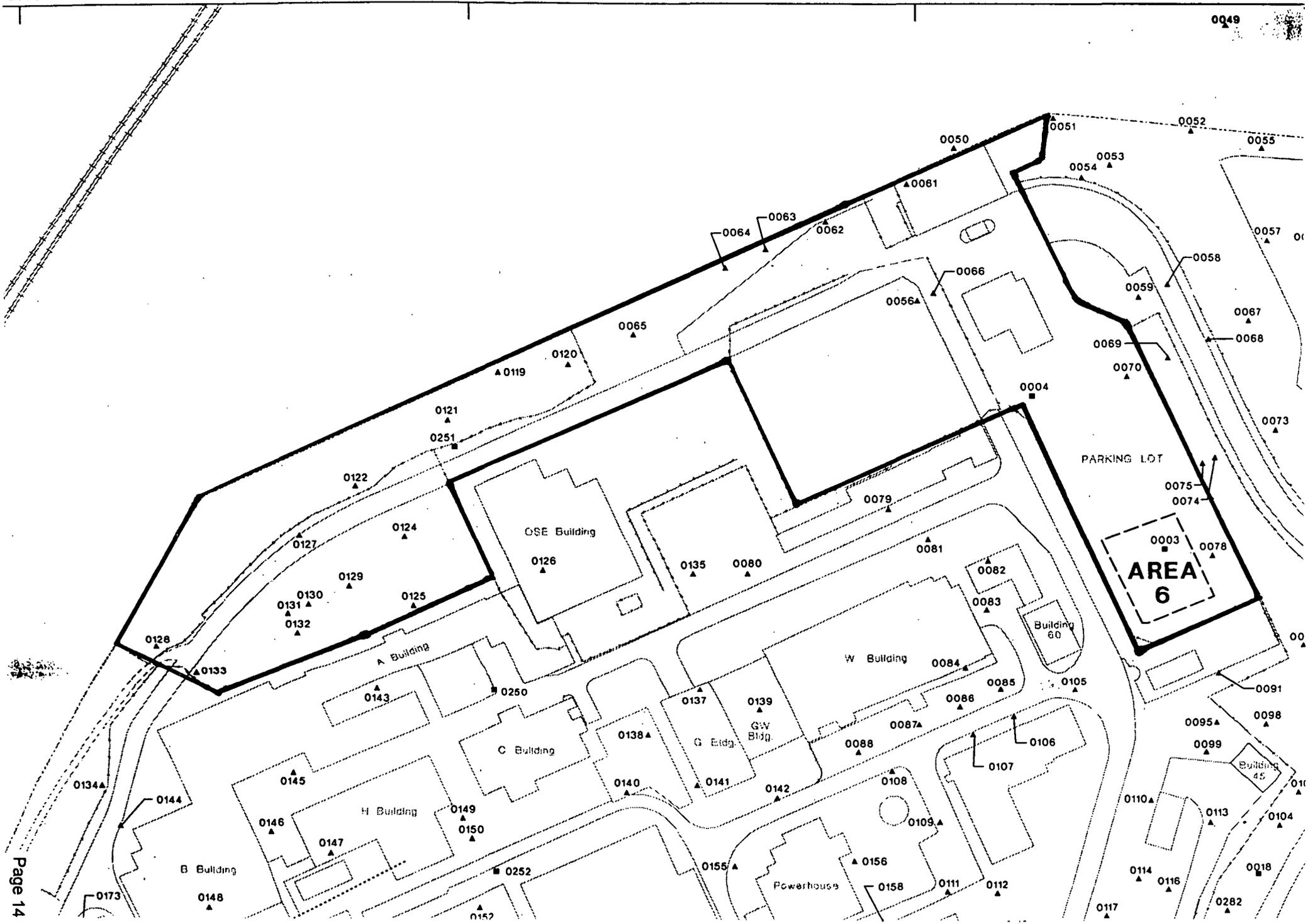


Legend

-  Structure
-  Paved road
-  Dirt road
-  Water
-  Mound Plant Boundary
-  Surface Location
-  Core Location
-  Potential Release Site
-  Elevated Activity
-  Sampling Location for Verification Survey of Former WTS Pipeline



NOTE: Accuracy of surface locations is +/- 25 feet.



| Map Location ^a | Coordinates | | MRC ID No. | Mo-Yr | Depth (inch) | Pu-238 (pCi/g) | Thorium ^b (pCi/g) | Tritium (pCi/mL) | Co-60 (pCi/g) | Cs-137 (pCi/g) | Ra-226 (pCi/g) | Am-241 (pCi/g) |
|---------------------------|-------------|------|-----------------------|-------|--------------|-------------------|------------------------------|------------------|---------------|----------------|----------------|----------------|
| | South | West | | | | | | | | | | |
| S0037 | 1675 | 1730 | 6738 | 08-84 | 0 | 1.09 | b | | | | | |
| S0038 | 1700 | 1630 | 6735 | 08-84 | 0 | 0.18 | b | | | | | |
| S0039 | 1700 | 1680 | 2970 | 10-83 | 0 | 0.22 | b | 0.76 | | | | |
| S0040 | 1700 | 1705 | 6737 | 08-84 | 0 | 1.52 | b | | | | | |
| S0041 | 1725 | 1605 | 6734 | 08-84 | 0 | 0.91 | b | | | | | |
| S0042 | 1725 | 1655 | 6736 | 08-84 | 0 | 0.33 | b | | | | | |
| S0043 | 1725 | 1755 | 6741 | 08-84 | 0 | 0.48 | b | | | | | |
| S0044 | 1775 | 1505 | 2969 | 10-83 | 0 | 0.45 ^c | b | 0.72 | | | | |
| S0045 | 1775 | 1555 | 6733 | 08-84 | 0 | 1.49 | b | | | | | |
| S0046 | 1775 | 1680 | 2972 | 10-83 | 0 | 0.86 | b | 1.06 | | | | |
| S0047 | 1785 | 1490 | 6732 | 08-84 | 0 | 0.44 | b | | | | | |
| S0048 | 1785 | 1855 | 2973 | 10-83 | 0 | 0.28 | b | | | | | |
| S0049 | 0900 | 1860 | No MRC results given. | | | | | | | | | |
| → S0050 | 0910 | 2200 | 6762 | 08-84 | 0 | 0.36 | b | | | | | |
| S0051 | 0925 | 2085 | 4058 | 10-83 | 0 | 0.19 | b | | | | | |
| S0052 | 1000 | 1950 | 6764 | 08-84 | 0 | 0.89 | b | | | | | |
| S0053 | 1000 | 2050 | 6763 | 08-84 | 0 | 3.46 | b | | LDL | LDL | 1 | LDL |
| S0054 | 1000 | 2085 | 4057 | 10-83 | 0 | 0.19 ^c | b | | | | | |
| S0055 | 1050 | 1885 | 4059 | 10-83 | 0 | 0.62 | b | | | | | |

Radiochemical Analysis

| Map Location ^a | Coordinates | | MRC ID No. | Mo-Yr | Depth (inch) | Pu-239 (pCi/g) | Thorium ^b (pCi/g) | Tritium (pCi/mL) | Co-60 (pCi/g) | Cs-137 (pCi/g) | Ra-226 (pCi/g) | Am-241 (pCi/g) |
|---------------------------|-------------|------|------------|-------|--------------|----------------|------------------------------|------------------|---------------|----------------|----------------|----------------|
| | South | West | | | | | | | | | | |

| | | | | | | | | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|
| S0056 | 1050 | 2310 | 4056 | 10-83 | 0 | 0.19 | b | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|

| | | | | | | | | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|
| S0057 | 1150 | 1925 | 6765 | 08-84 | 0 | 0.55 | b | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|

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|-------|------|------|------|-------|---|------|---|--|--|--|--|--|
| S0058 | 1150 | 2050 | 6781 | 08-84 | 0 | 0.57 | b | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|

| | | | | | | | | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|
| S0059 | 1150 | 2085 | 4081 | 10-83 | 0 | 1.68 | b | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|

| | | | | | | | | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|
| S0060 | 1175 | 1885 | 4060 | 10-83 | 0 | 0.28 | b | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|

| | | | | | | | | | | | | |
|-------|------|------|------|-------|---|-------------------|---|--|--|--|--|--|
| S0061 | 0925 | 2265 | 4064 | 10-83 | 0 | 1.50 | b | | | | | |
| S0062 | 0925 | 2365 | 4065 | 10-83 | 0 | 1.50 | b | | | | | |
| S0063 | 0925 | 2440 | 6766 | 08-84 | 0 | 17.60 | b | | | | | |
| S0064 | 0925 | 2490 | 4066 | 10-83 | 0 | 0.25 | b | | | | | |
| S0065 | 0950 | 2615 | 4067 | 10-83 | 0 | 0.02 | b | | | | | |
| S0066 | 1050 | 2290 | 4063 | 10-83 | 0 | 1.07 ^c | b | | | | | |

| | | | | | | | |
|-------|------|------|------|-------|----|------|------|
| C0002 | 1200 | 1860 | 8340 | 11-84 | 36 | 0.10 | 4.47 |
| | | | 8341 | 11-84 | 72 | 0.01 | 2.49 |

| | | | | | | | | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|
| S0067 | 1225 | 1985 | 6433 | 08-84 | 0 | 0.24 | b | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|

| | | | | | | | | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|
| S0068 | 1225 | 2035 | 6434 | 08-84 | 0 | 0.45 | b | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|

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|-------|------|------|------|-------|---|------|---|--|--|--|--|--|
| S0069 | 1225 | 2085 | 6435 | 08-84 | 0 | 0.10 | b | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|

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|-------|------|------|------|-------|---|------|---|--|--|--|--|--|
| S0070 | 1225 | 2135 | 6436 | 08-84 | 0 | 0.60 | b | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|

| | | | | | | | | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|
| S0071 | 1250 | 1385 | 3030 | 10-83 | 0 | 0.17 | b | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|

| | | | | | | | | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|
| S0072 | 1350 | 1960 | 6439 | 08-84 | 0 | 0.24 | b | | | | | |
|-------|------|------|------|-------|---|------|---|--|--|--|--|--|

1.92

Radiochemical Analysis

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

| | | | | | | | | | | | | |
|-------|------|------|------|-------|---|------|---|------|--|--|--|--|
| S0073 | 1350 | 2010 | 3031 | 10-83 | 0 | 0.57 | b | 1.68 | | | | |
| S0074 | 1350 | 2085 | 6440 | 08-84 | 0 | 0.48 | b | | | | | |
| S0075 | 1350 | 2100 | 3032 | 10-83 | 0 | 0.40 | b | | | | | |

Gamma Spectroscopy

| | | | | | | | | | | | | |
|-------|------|------|-------|-------|-----|----|----|--|-----|-----|-----|-----|
| C0003 | 1420 | 2180 | 10665 | 10-85 | 18 | NR | NR | | LDL | LDL | 0.4 | LDL |
| | | | 10666 | 10-85 | 36 | NR | NR | | LDL | LDL | 0.6 | LDL |
| | | | 10667 | 10-85 | 54 | NR | NR | | LDL | LDL | 0.7 | LDL |
| | | | 10668 | 10-85 | 72 | NR | NR | | LDL | LDL | 0.7 | LDL |
| | | | 10669 | 10-85 | 90 | NR | NR | | LDL | LDL | 0.8 | LDL |
| | | | 10670 | 10-85 | 108 | NR | NR | | LDL | LDL | 0.9 | LDL |
| | | | 10671 | 10-85 | 126 | NR | NR | | LDL | LDL | 0.7 | LDL |
| | | | 10672 | 10-85 | 144 | NR | NR | | LDL | LDL | 0.5 | LDL |
| | | | 10673 | 10-85 | 162 | NR | NR | | LDL | LDL | 0.4 | LDL |
| | | | 10674 | 10-85 | 180 | NR | NR | | LDL | LDL | 0.5 | LDL |

| | | | | | | | | | | | | |
|-------|------|------|------|-------|---|-------------------|---|------|--|--|--|--|
| S0076 | 1450 | 1885 | 3027 | 10-83 | 0 | 2.57 ^c | b | 1.31 | | | | |
| S0077 | 1450 | 2010 | 3028 | 10-83 | 0 | 0.76 | b | | | | | |

| | | | | | | | | | | | | |
|-------|------|------|------|-------|----|------|------|------|--|--|--|--|
| S0078 | 1450 | 2135 | 3029 | 10-83 | 0 | 1.59 | b | 1.54 | | | | |
| C0004 | 1200 | 2240 | 8342 | 11-84 | 36 | 0.10 | 4.47 | | | | | |
| | | | 8343 | 11-84 | 72 | 0.01 | 2.49 | | | | | |

| | | | | | | | | | | | | |
|-------|------|------|------|-------|---|------|---|------|--|--|--|--|
| S0079 | 1250 | 2440 | 3039 | 10-83 | 0 | 0.03 | b | 1.32 | | | | |
| S0080 | 1250 | 2615 | 3040 | 10-83 | 0 | 1.19 | b | | | | | |
| S0081 | 1300 | 2415 | 6135 | 08-84 | 0 | 0.10 | b | | | | | |
| S0082 | 1350 | 2365 | 3038 | 10-83 | 0 | 0.04 | b | | | | | |
| S0083 | 1400 | 2390 | 3043 | 10-83 | 0 | 1.14 | b | | | | | |
| S0084 | 1450 | 2440 | 6136 | 08-84 | 0 | 0.08 | b | | | | | |

Radiochemical Analysis

| Map Location ^a | Coordinates | | MRC ID No. | Mo-Yr | Depth (Inch) | Pu-238 (pCi/g) | Thorium ^b (pCi/g) | Tritium (pCi/mL) | Co-60 (pCi/g) | Cs-137 (pCi/g) | Ra-226 (pCi/g) | Am-241 (pCi/g) |
|---------------------------|-------------|------|------------|-------|--------------|-------------------|------------------------------|------------------|---------------|----------------|----------------|----------------|
| | South | West | | | | | | | | | | |
| S0104 | 1760 | 2195 | 4082 | 10-83 | 0 | 0.18 | b | 0.38 | | | | |
| S0105 | 1525 | 2340 | 3058 | 10-83 | 0 | 0.01 | b | 0.90 | | | | |
| S0106 | 1525 | 2415 | 6202 | 08-84 | 0 | 0.06 | b | | | | | |
| S0107 | 1525 | 2465 | 6201 | 08-84 | 0 | 0.52 | b | | | | | |
| S0108 | 1525 | 2565 | 3061 | 10-83 | 0 | 0.38 | b | 2.87 | | | | |
| S0109 | 1600 | 2540 | 6197 | 08-84 | 0 | 0.55 | b | | | | | |
| S0110 | 1675 | 2315 | 6203 | 08-84 | 0 | 0.41 | b | | | | | |
| S0111 | 1675 | 2565 | 6198 | 08-84 | 0 | 0.72 | b | | | | | |
| S0112 | 1700 | 2515 | 6200 | 08-84 | 0 | 0.12 | b | | | | | |
| S0113 | 1725 | 2265 | 3057 | 10-83 | 0 | 0.06 ^c | b | | | | | |
| S0114 | 1750 | 2365 | 6204 | 08-84 | 0 | 0.07 | b | | | | | |
| S0115 | 1750 | 2515 | 6199 | 08-84 | 0 | 0.41 ^c | b | | | | | |
| S0116 | 1775 | 2340 | 6205 | 08-84 | 0 | 0.04 | b | | | | | |
| S0117 | 1775 | 2415 | 3058 | 10-83 | 0 | 0.01 | b | | | | | |
| S0118 | 1775 | 2615 | 3060 | 10-83 | 0 | 0.62 | b | 2.13 | | | | |
| S0119 | 0925 | 2770 | 6767 | 08-83 | 0 | 0.42 | b | | LDL | 0.5 | 0.9 | LDL |
| S0120 | 0950 | 2695 | 4068 | 10-83 | 0 | 0.25 | b | | | | | |
| S0121 | 0950 | 2845 | 4069 | 10-83 | 0 | 0.46 | b | | | | | |
| S0122 | 0975 | 2970 | 4070 | 10-83 | 0 | 0.04 ^c | b | | | | | |

Gamma Spectroscopy



| Map Location ^a | Coordinates | | MRC ID No. | Mo-Yr | Depth (inch) | Pu-238 (pCi/g) | Thorium ^b (pCi/g) | Tritium (pCi/mL) | Co-60 (pCi/g) | Ce-137 (pCi/g) | Ra-226 (pCi/g) | Am-241 (pCi/g) |
|---------------------------|-------------|------|------------|-------|--------------|-------------------|------------------------------|------------------|---------------|----------------|----------------|----------------|
| C0251 | 0980 | 2850 | 8509 | 12-84 | 36 | 0.05 | b | | | | | |
| S0124 | 1050 | 2945 | 4071 | 10-83 | 0 | 0.30 | b | 0.75 | | | | |
| S0125 | 1125 | 2970 | 4072 | 10-83 | 0 | 0.25 | b | | | | | |
| S0126 | 1150 | 2820 | 4073 | 08-83 | 0 | 0.40 | b | | | | | |
| S0127 | 1000 | 3050 | 4075 | 10-83 | 0 | 0.30 | b | | | | | |
| S0128 | 1050 | 3250 | 4077 | 10-83 | 0 | 0.26 ^c | b | | | | | |
| S0129 | 1075 | 3025 | 4074 | 10-83 | 0 | 0.51 | b | 0.20 | | | | |
| S0130 | 1075 | 3075 | 7101 | 09-84 | 0 | 0.95 | b | | | | | |
| S0131 | 1075 | 3100 | 4078 | 10-83 | 0 | 0.28 | b | | | | | |
| S0132 | 1100 | 3100 | 7100 | 09-84 | 0 | 0.67 | b | | | | | |
| S0133 | 1100 | 3225 | 4078 | 10-83 | 0 | 0.03 | b | | | | | |
| S0134 | 1175 | 3375 | 4079 | 10-83 | 0 | 0.47 | b | | | | | |
| S0135 | 1225 | 2670 | 3033 | 10-83 | 0 | 0.64 | b | | | | | |
| C0250 | 1255 | 2930 | 8395 | 12-84 | 36 | 0.01 | b | | | | | |
| S0137 | 1350 | 2720 | 6177 | 08-84 | 0 | 0.18 ^c | b | | | | | |
| S0138 | 1375 | 2795 | 6178 | 08-84 | 0 | 0.12 | b | | | | | |
| S0139 | 1400 | 2670 | 3034 | 10-83 | 0 | 0.23 | b | | | | | |
| S0140 | 1425 | 2845 | 3037 | 10-83 | 0 | 0.36 | b | | | | | |
| S0141 | 1450 | 2770 | 6179 | 08-84 | 0 | 0.68 | b | | | | | |

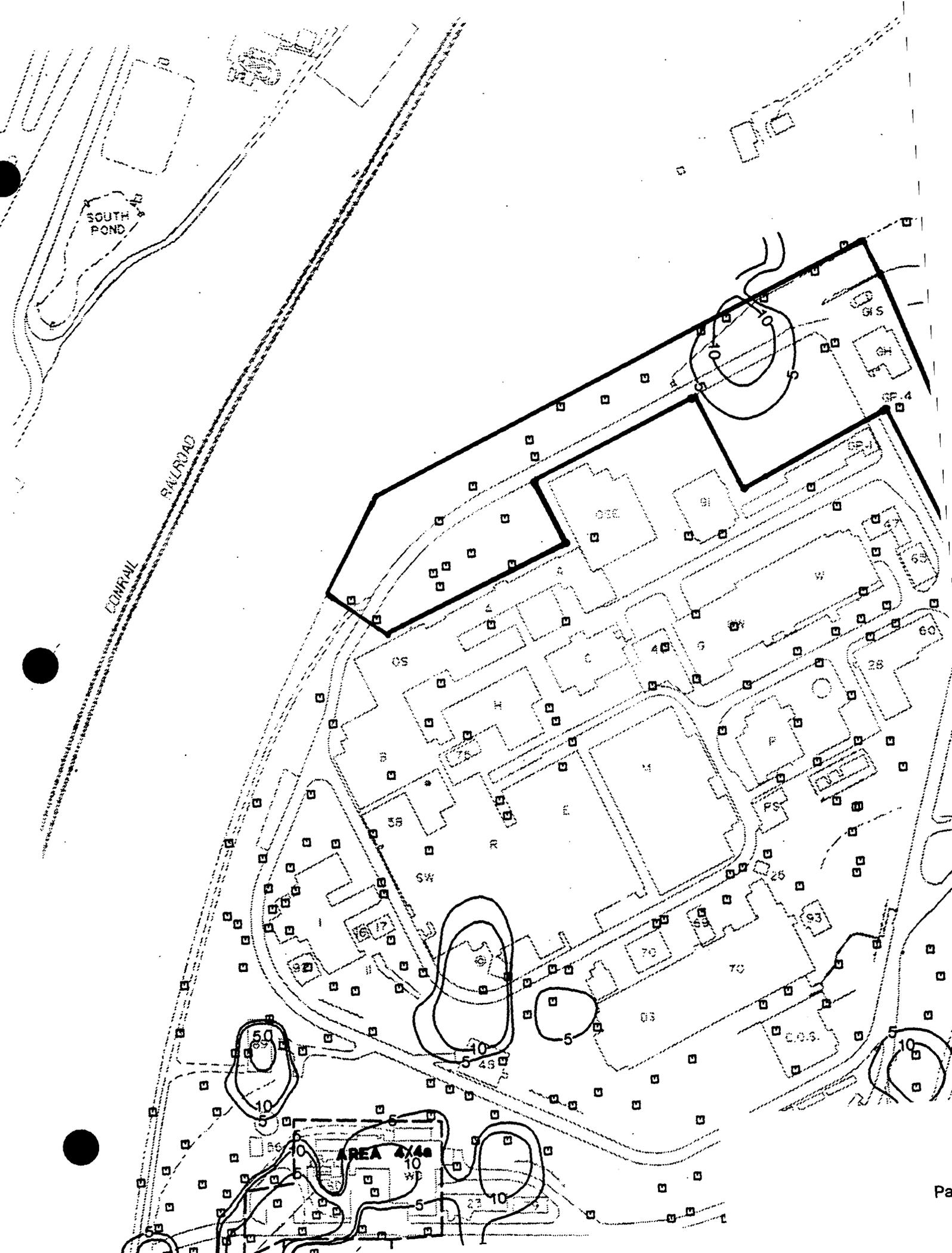
Radiochemical Analysis

ER PROGRAM
MOUND PLANT
Miamisburg, Ohio

PLATE 4
Site Survey Project
Plutonium Concentrations

Prepared for
Site Scoping Report: Volume 3,
Radiological Site Survey

HCL



SOUTH POND

CONRAIL RAILROAD

AREA 4/4a

Pa

ER PROGRAM
MOUND PLANT

Miamisburg, Ohio

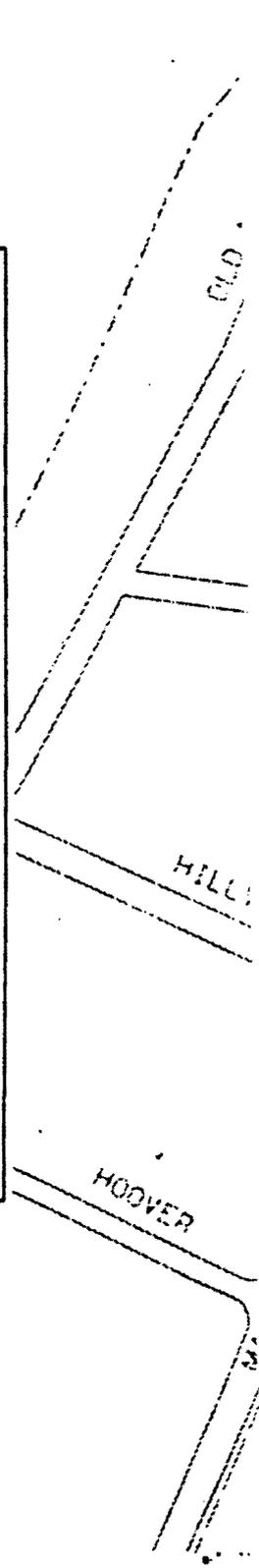
PLATE 5

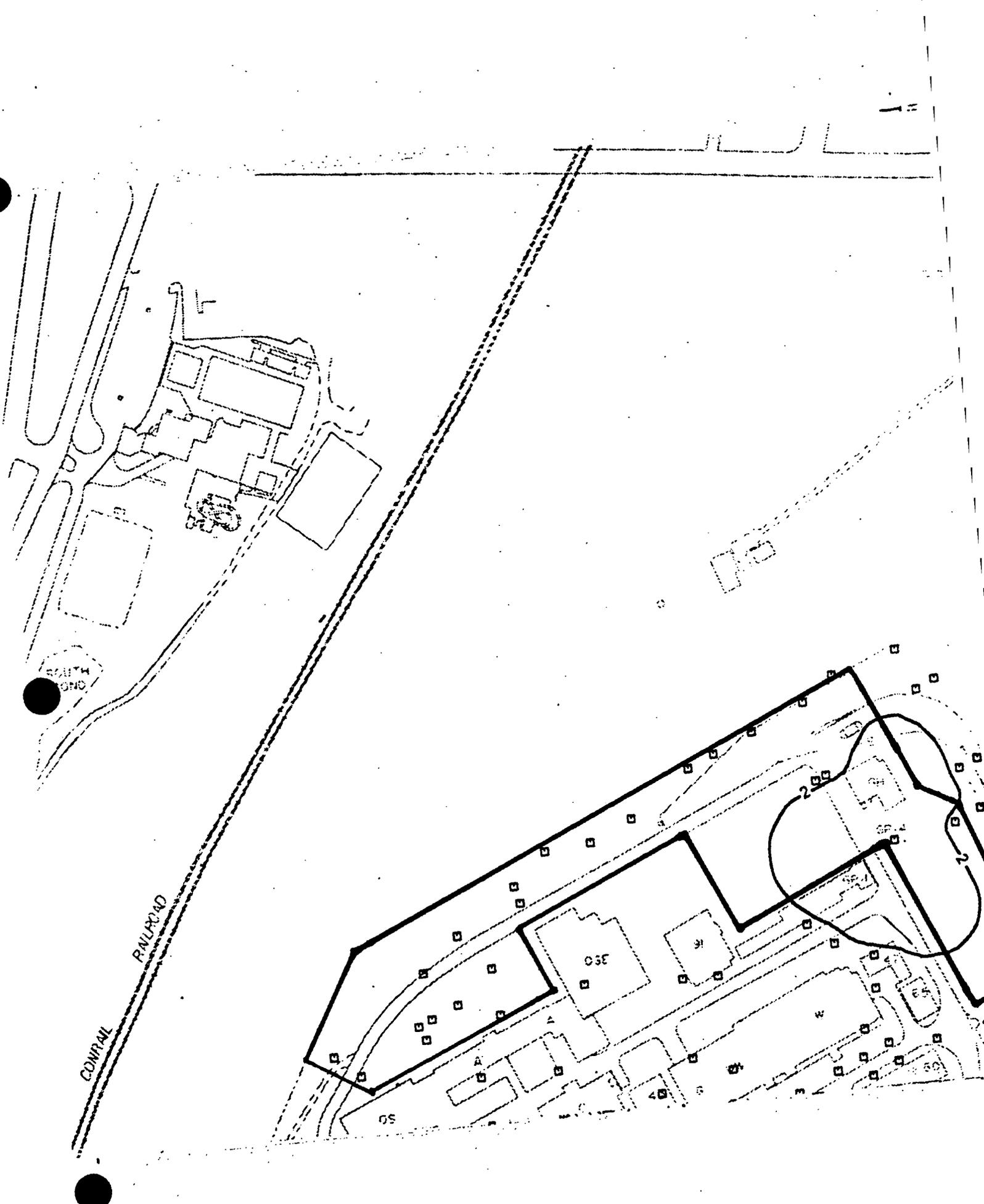
Site Survey Project

● Thorium Concentrations

Prepared for

Site Scoping Report: Volume 3,
Radiological Site Survey





CENTRAL RAILROAD

SOUTH BOND

Environmental Restoration Program

**RECONNAISSANCE SAMPLING REPORT
SOIL GAS SURVEY AND GEOPHYSICAL
INVESTIGATIONS, MOUND PLANT
MAIN HILL AND SM/PP HILL**

**REPORT
APPENDICES A, B AND D**

**MOUND PLANT
MIAMISBURG, OHIO**

February 1993

**Department of Energy
Albuquerque Field Office**

Environmental Restoration Program
EG&G Mound Applied Technologies



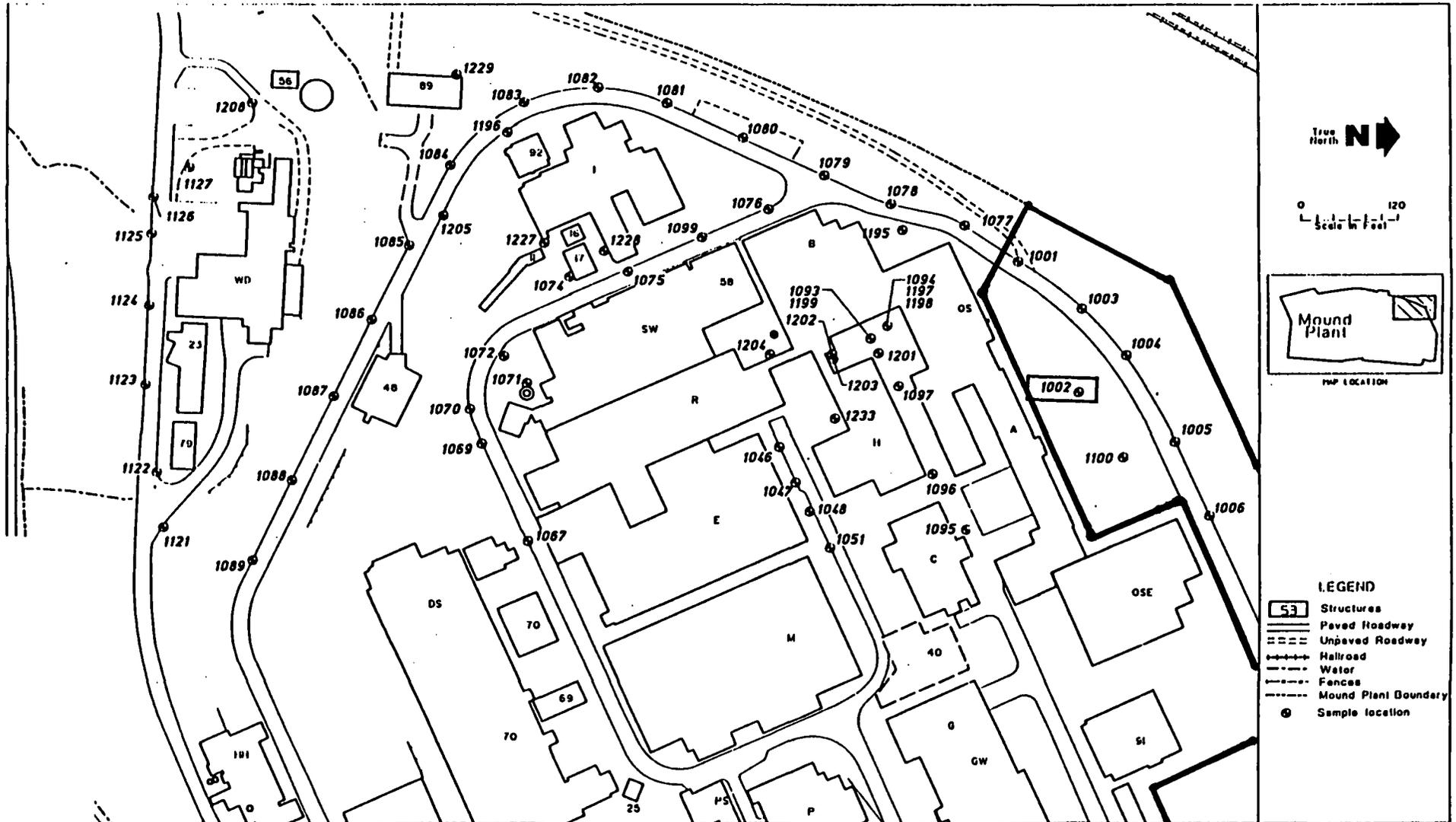


Figure 2.1. Main Hill west sample location map.

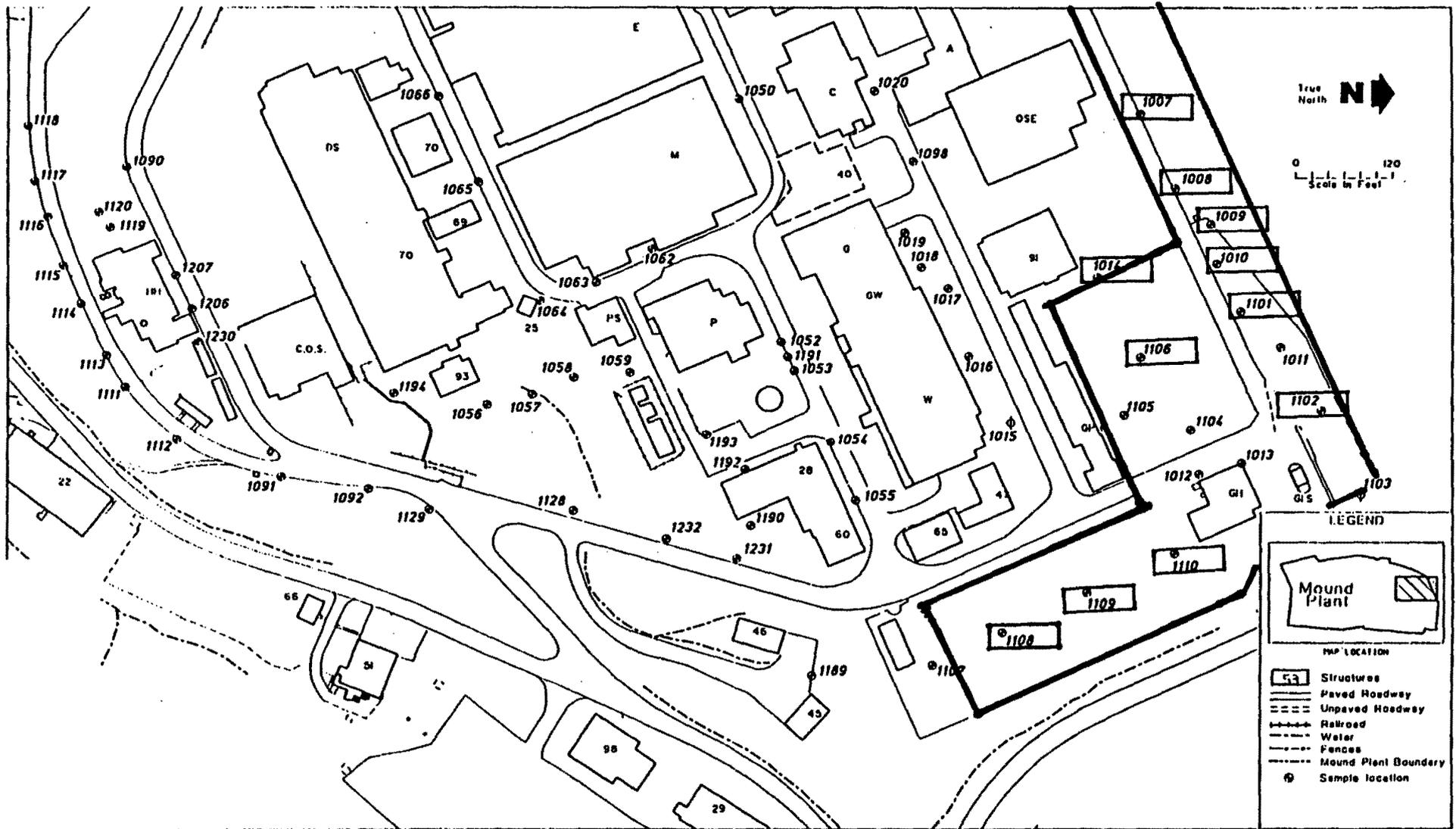


Figure 2.2. Main Hillcrest sample location map.

Gas Chromatography

TABLE II.4. SUMMARY OF POSITIVE DETECTIONS - MAIN HILL
(ppb)

| SAMPLE ID | SAMPLE DATE | FREON 11 | FREON 113 | TRAN-12DCE | CIS-12DCE | 111TCA | PCE | TCE | TOLUENE |
|------------------|-------------|----------|-----------|------------|-----------|--------|------|---------|---------|
| MND-01-1002-1003 | 28 JUL 92 | --- | --- | --- | --- | --- | --- | --- | 40 |
| MND-01-1003-0005 | 28 JUL 92 | --- | --- | --- | --- | --- | --- | --- | 3* |
| MND-01-1005-0005 | 28 JUL 92 | --- | --- | --- | --- | --- | --- | --- | 21* |
| MND-01-1007-0005 | 29 JUL 92 | --- | --- | --- | --- | --- | --- | 2 | --- |
| MND-01-1008-0005 | 29 JUL 92 | --- | --- | --- | --- | --- | --- | --- | 5 |
| MND-01-1008-1005 | 29 JUL 92 | --- | --- | --- | --- | --- | --- | --- | 3 |
| MND-01-1009-0005 | 29 JUL 92 | --- | --- | --- | --- | --- | --- | 4 | 19 |
| MND-01-1010-0005 | 29 JUL 92 | --- | --- | --- | --- | --- | --- | --- | 13 |
| MND-01-1014-0005 | 29 JUL 92 | --- | --- | --- | --- | --- | --- | --- | 8 |
| MND-01-1016-0003 | 30 JUL 92 | --- | --- | --- | --- | --- | --- | 2 | 8 |
| MND-01-1046-0005 | 4 AUG 92 | --- | --- | --- | --- | 2 | --- | 188 | 3* |
| MND-01-1047-0005 | 4 AUG 92 | --- | --- | --- | --- | 7 | --- | 4 | --- |
| MND-01-1048-0005 | 4 AUG 92 | --- | --- | --- | --- | 6 | --- | 4 | --- |
| MND-01-1050-0003 | 4 AUG 92 | --- | --- | --- | --- | --- | --- | 8 | --- |
| MND-01-1050-1003 | 4 AUG 92 | --- | --- | --- | --- | --- | --- | 17 | 27* |
| MND-01-1051-0003 | 4 AUG 92 | --- | --- | --- | --- | --- | --- | 8 | 5* |
| MND-01-1052-0003 | 4 AUG 92 | --- | --- | --- | --- | --- | --- | --- | 13* |
| MND-01-1053-0002 | 5 AUG 92 | 2 | --- | --- | --- | --- | --- | --- | 447 |
| MND-01-1054-0005 | 5 AUG 92 | 4 | --- | --- | --- | 7 | --- | 228* | 11 |
| MND-01-1055-1005 | 5 AUG 92 | --- | --- | --- | --- | --- | --- | 4* | 5 |
| MND-01-1057-0005 | 5 AUG 92 | --- | --- | --- | --- | --- | --- | --- | 24 |
| MND-01-1082-0003 | 5 AUG 92 | --- | --- | --- | --- | 13 | --- | 6 | --- |
| MND-01-1084-0005 | 11 AUG 92 | --- | --- | --- | --- | --- | --- | --- | 19 |
| MND-01-1086-0005 | 11 AUG 92 | --- | --- | --- | --- | 6 | --- | --- | 226 |
| MND-01-1087-0005 | 11 AUG 92 | --- | --- | --- | --- | --- | --- | 11 | 133 |
| MND-01-1089-1005 | 12 AUG 92 | --- | --- | --- | --- | --- | --- | --- | 37 |
| MND-01-1070-0005 | 12 AUG 92 | --- | --- | --- | --- | --- | --- | --- | 5 |
| MND-01-1070-1005 | 12 AUG 92 | --- | --- | --- | --- | --- | --- | --- | 5 |
| MND-01-1072-0005 | 12 AUG 92 | --- | --- | --- | --- | --- | --- | --- | 106 |
| MND-01-1074-0005 | 12 AUG 92 | --- | 799 | --- | --- | --- | 1191 | --- | 5 |
| MND-01-1074-1005 | 12 AUG 92 | --- | 812 | --- | --- | --- | 1117 | --- | 5 |
| MND-01-1075-0005 | 12 AUG 92 | --- | --- | --- | --- | --- | --- | --- | 80 |
| MND-01-1078-0005 | 12 AUG 92 | --- | 2934 | --- | --- | 148 | --- | --- | --- |
| MND-01-1077-0005 | 12 AUG 92 | --- | --- | --- | --- | --- | --- | --- | 27 |
| MND-01-1079-0005 | 13 AUG 92 | --- | 13 | --- | --- | --- | --- | --- | --- |
| MND-01-1080-0005 | 13 AUG 92 | --- | 13 | --- | --- | --- | --- | --- | --- |
| MND-01-1085-0005 | 13 AUG 92 | --- | 102 | --- | --- | 22 | --- | 41 | --- |
| MND-01-1086-0005 | 13 AUG 92 | --- | 47 | --- | --- | --- | --- | --- | --- |
| MND-01-1093-0005 | 15 AUG 92 | --- | **131000 | 247 | 40800 | --- | --- | **34780 | 53* |
| MND-01-1094-0005 | 14 AUG 92 | --- | 83 | 13 | 485 | --- | --- | 978 | --- |
| MND-01-1097-0002 | 14 AUG 92 | --- | --- | --- | --- | --- | --- | 8 | 8 |
| MND-01-1099-0005 | 15 AUG 92 | --- | --- | --- | --- | --- | --- | 4 | 8* |
| MND-01-1101-0005 | 16 AUG 92 | --- | 865 | --- | --- | --- | --- | --- | 8 |
| MND-01-1102-0005 | 16 AUG 92 | --- | 419 | --- | --- | --- | --- | --- | 13 |
| MND-01-1108-0003 | 16 AUG 92 | --- | 329 | --- | --- | --- | --- | 6 | --- |
| MND-01-1108-0005 | 16 AUG 92 | --- | --- | --- | --- | --- | --- | 6 | --- |
| MND-01-1109-0005 | 16 AUG 92 | --- | --- | --- | --- | --- | --- | 8 | 13 |
| MND-01-1110-0005 | 16 AUG 92 | --- | --- | --- | --- | --- | --- | --- | 255 |

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

SCREENING POTENTIAL RELEASE SITES BASED ON SOIL GAS READINGS

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

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

$$C_t = (C_g/P_b) * [(P_b * K_d / H) + [p_w / H] + [p_t - p_w]]$$

where

| | |
|----------------|--|
| C _g | concentration of volatile chemical concentrations as soil vapor in ng/ml |
| P _b | Bulk density of the soil in g/ml |
| K _d | soil/water partition coefficient in ml/g |
| H | Dimensionless Henry's Law Constant |
| p _w | water filled porosity |
| p _t | total porosity |
| C _t | target soil concentration in ng/g or ug/kg (ppb) |

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

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

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

$$C_g = (P_b * C_t) / [(P_b * K_d / H) + [p_w / H] + [p_t - p_w]]$$

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

| | | |
|----------------|------|---|
| P _b | 1.6 | Bulk density of the soil in g/ml |
| p _w | 0.15 | water filled porosity |
| p _t | 0.43 | total porosity |
| foc | 0.02 | fraction organic material in soil (used in developing the SSL values) |

| Typical chemicals that are detected with soil gas sampling are: | | | | | |
|---|----------|------|---|---|---|
| NAME | H | Kd | Calculated/Acceptable Soil Screening Level Value | Calculated/Acceptable Soil Gas Reading | Calculated/Acceptable Soil Gas Reading |
| | | ml/g | mg/kg (ppm) | ng/ml | ppb |
| Toluene | 2.52E-01 | 3.42 | 22.06 | 1.56E+03 | 414800 |
| Trichloroethene (TCE) | 4.35E-01 | 2.24 | 0.07 | 1.26E+01 | 2400 |
| 111 Trichloroethane (TCA) | 7.63E-01 | 2.2 | 3.01 | 9.46E+02 | 173400 |
| Trans-1,2 Dichloroethene (DCE) | 2.29E-01 | 1 | 0.70 | 1.41E+02 | 35700 |
| cis-1,2 Dichloroethene (DCE) | 1.85E-01 | 2.78 | 0.31 | 1.97E+01 | 5000 |
| Freon 11 | NA | NA | | | |
| Freon 113 | NA | NA | | | |
| Tetrachloroethene (PCE) | 7.09E-01 | 2.78 | 0.09 | 2.13E+01 | 3100 |

na not available

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

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