300502-0605090005

CH2M HILL Mound, Inc.
1075 Mound Road
P.O. Box 750
Miamisburg, OH 45343-0750

CH2MHILL

SMO-255/06
April 10, 2006

Mr. Don Pfister, Director
Miamisburg Closure Project
U. S. Department of Energy
175 Tri-County Parkway
Springdale, OH 45246

ATTENTION: Paul Lucas

SUBJECT: **Contract No. DE-AC24-03OH20152:** Deliverable #39 Potential release site and removal action documentation; Section C.2.3.1.3 Remaining Response Actions; PRS 240 PRS Package, Final

Dear Mr. Pfister:

Attached is the following Final document for your records:

- PRS 240 PRS Package, Final

If you or members of your staff have any questions regarding the document, or if additional support is needed, please contact Dave Rakel at 937-865-4203.

Sincerely,

Michael D. Ebben
Site Manager

ME/jg

Enclosures

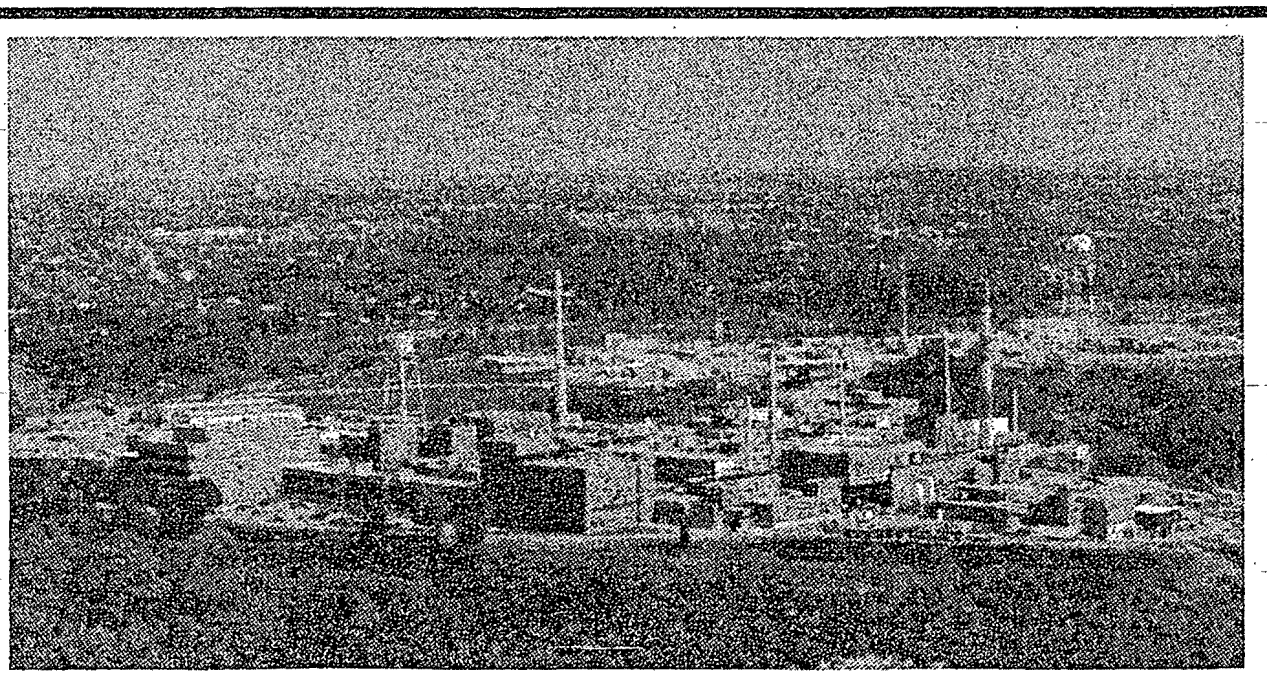
cc: T. Fischer, USEPA, (1) w/attachments
B. Nickel, OEPA, (1) w/attachments
S. Helmer, ODH, (1) w/attachments
J. Colleli, ODH, (1) w/attachments
M. Wojciechowski, Tetra Tech, (1) w/attach
G. Gorsuch, DOE/MCP, (1) w/attachments
R. Tormey, DOE/OH, (1) w/attachments
G. Desai, DOE/HQ, (1) w/attachments
F. Bullock, MMCIC, (3) w/attachments
Public Reading Room, (1) w/attachments
C. Kline, CH2M Hill, (1) w/attachments
Admin Record, (2) w/attachments
ER Records, CH2M Hill, (1) w/attachs
DCC (1) w/attachments
M. Ebben, CH2M Hill, w/o attachments
K. Armstrong, CH2M Hill, w/o attachments
D. Rakel, CH2M Hill, w/o attachments
D. Kramer, CH2M Hill, w/o attachments
J. Fontaine, CH2M Hill, w/o attachments
MOAT Coordinator, CH2M Hill, w/o attachs
S. Barr, CH2M Hill, w/o attachments
M. McDougal, CH2M Hill, w/o attachments
file, CH2M Hill, w/o attachments

300502-060509000S

MOUND

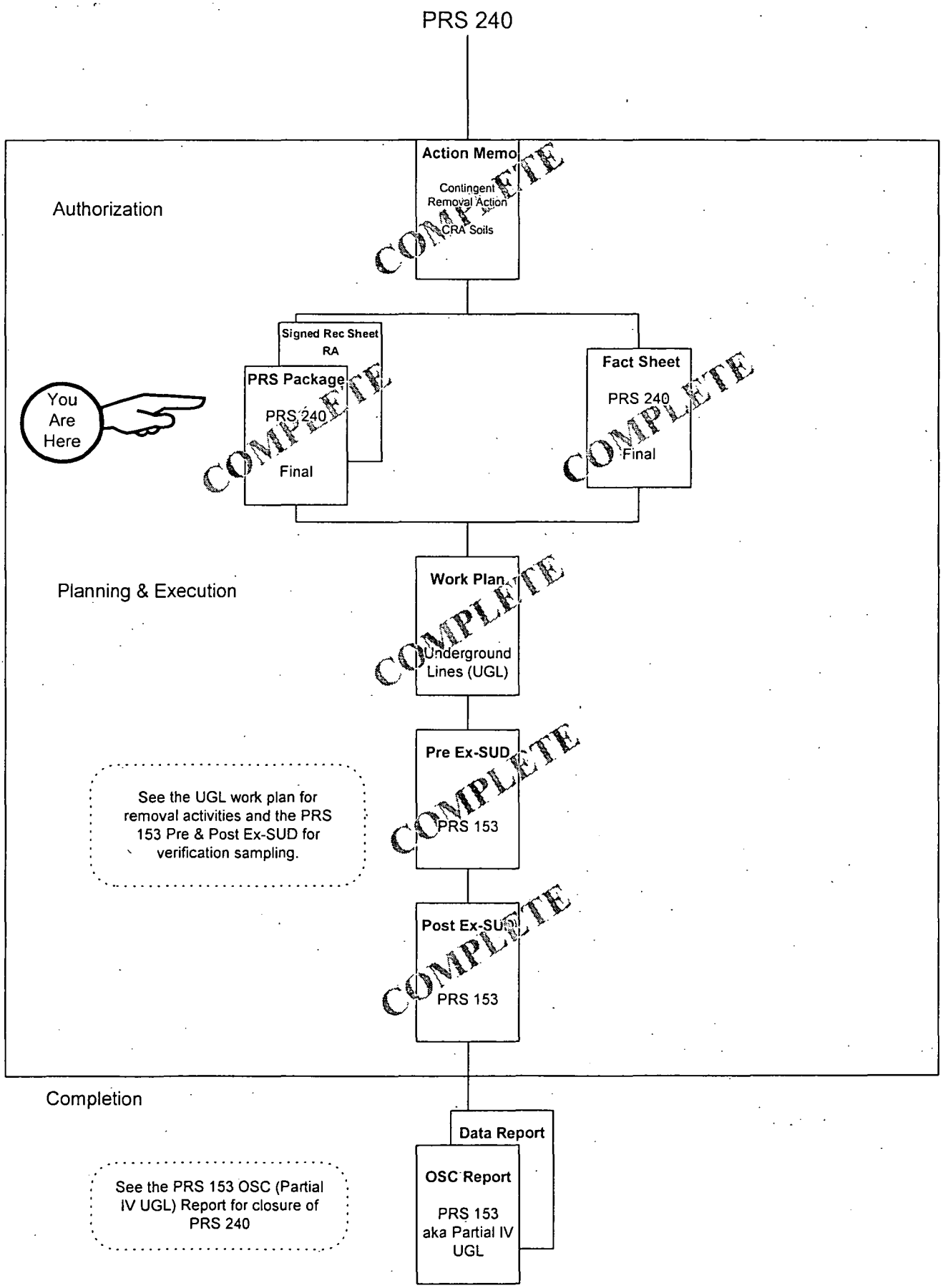
Environmental
Restoration
Program

MOUND PLANT
Potential Release Site Package
PRS # 240



Final April 2006

PRS 240



10Apr06stp

This page intentionally left blank

The Mound Core Team
500 Capstone Circle
Miamisburg, OH 45342

Mr. Frank Bullock, PE
Director of Operations
Miamisburg Mound Community Improvement Corporation
720 Mound Road
COS Bldg. 4221
Miamisburg, Ohio 45342-6714

Dear Mr. Bullock:

The Core Team, consisting of the U.S. Department of Energy Miamisburg Closure Project (DOE-MCP), U.S. Environmental Protection Agency (USEPA), and the Ohio Environmental Protection Agency (OEPA), appreciates your review of the PRS 240 PRS Package, Public Review Draft, February 2006 and concurrence with the Removal Action determination.

Should you require additional detail, please contact Paul Lucas at (513) 246-0071 and we will gladly arrange a meeting or telephone conference.

Sincerely,

DOE/MCP:	Paul Lucas, Remedial Project Manager	4/4/06 date
USEPA:	Timothy J. Fischer, Remedial Project Manager	4/5/06 date
OEPA:	Brian K. Nickel, Project Manager	4/4/06 date

This page intentionally left blank

Technical Review of the Mound Site
Prepared for the Experi-Center
by EHS TECHNOLOGY GROUP, LLC

Reference Document: Evaluation of Potential Release Site 240, Potential Soil Contamination S0472 Data Package, Public Review Draft, February 2006

Purpose: The purpose of this PRS data package is to notify the public of the Response Action recommended for the removal of contamination from PRS 240. PRS 240 is a soil area on the hillside south of the former ATS Building (#125). This Data Package satisfies the Public Notification requirement.

Background: PRS 240 is a radiological hot spot located southwest of Area 23. Area 23 is a larger area identified with elevated levels of thorium-230. In the mid 1980's a Radiological Site Survey analyzed one surface sample at PRS 240 for plutonium and thorium contamination. The concentration of thorium was 7.5 pCi/g (regulatory guideline is 5 pCi/g) and the concentration of plutonium was 1.2 pCi/g (below Mound ALARA guideline criteria of 25 pCi/g). A further twenty-eight samples were collected and analyzed for organics, metals and radionuclides. Of these samples, the maximum sample results above the cleanup objectives were 124.5 pCi/g for Plutonium-238 (55 pCi/g cleanup objective), 3.17 pCi/g Radium-226 (2.9 pCi/g cleanup objective), and 12.84 pCi/g Uranium-238 (2.2 pCi/g cleanup objective). Based on these elevated levels of radiological contamination, the CORE Team has recommended a Response Action of removal of the contamination.

Technical Assessment: EHS has had the opportunity to review and comment on this PRS Data Package. We concur with the Removal Action designation for this PRS. Once remediation is complete, coordination between CH2M Hill, cleanup contractor at the Mound Site, and Miamisburg Mound Community Improvement Corp (developer of the site) will result in the result in the return of the area to that proposed in the Mound Comprehensive Reuse Plan.

From: "Frank Bullock" <FBullock@mound.com>
To: "David Rakel (E-mail)" <RAKEDA@doe-md.gov>, "Paul Lucas (E-mail)" <Paul.Lucas@ohio.doe.gov>, "Tim Fischer (E-mail 2)" <fischer.timothy@epamail.epa.gov>, "Brian. Nickel (E-mail)" <brian.nickel@epa.state.oh.us>
Date: 3/24/06 5:11PM
Subject: Potential Release Site 240 - Comments

Thank you for the opportunity to review this document. MMCIC concurs with EHS's comments on this document.

If you have any questions, please let us know.

Frank Bullock, PE
MMCIC
Director of Operations
Miamisburg, Oh 45342
(937) 865-4052
www.Mound.com

<<PRS 240- March 2006-Expericenter.pdf>>

MIAMISBURG CLOSURE PROJECT

POTENTIAL RELEASE SITE PACKAGES

The following document is available (February 24, 2006) for public information in the CERCLA Public Reading Room, 955 Mound Rd., Miamisburg, Ohio.

PRS Site Package 240
(Potential Soil Contamination, S0472)

Questions can be referred to Paul Lucas at (513) 246-0071

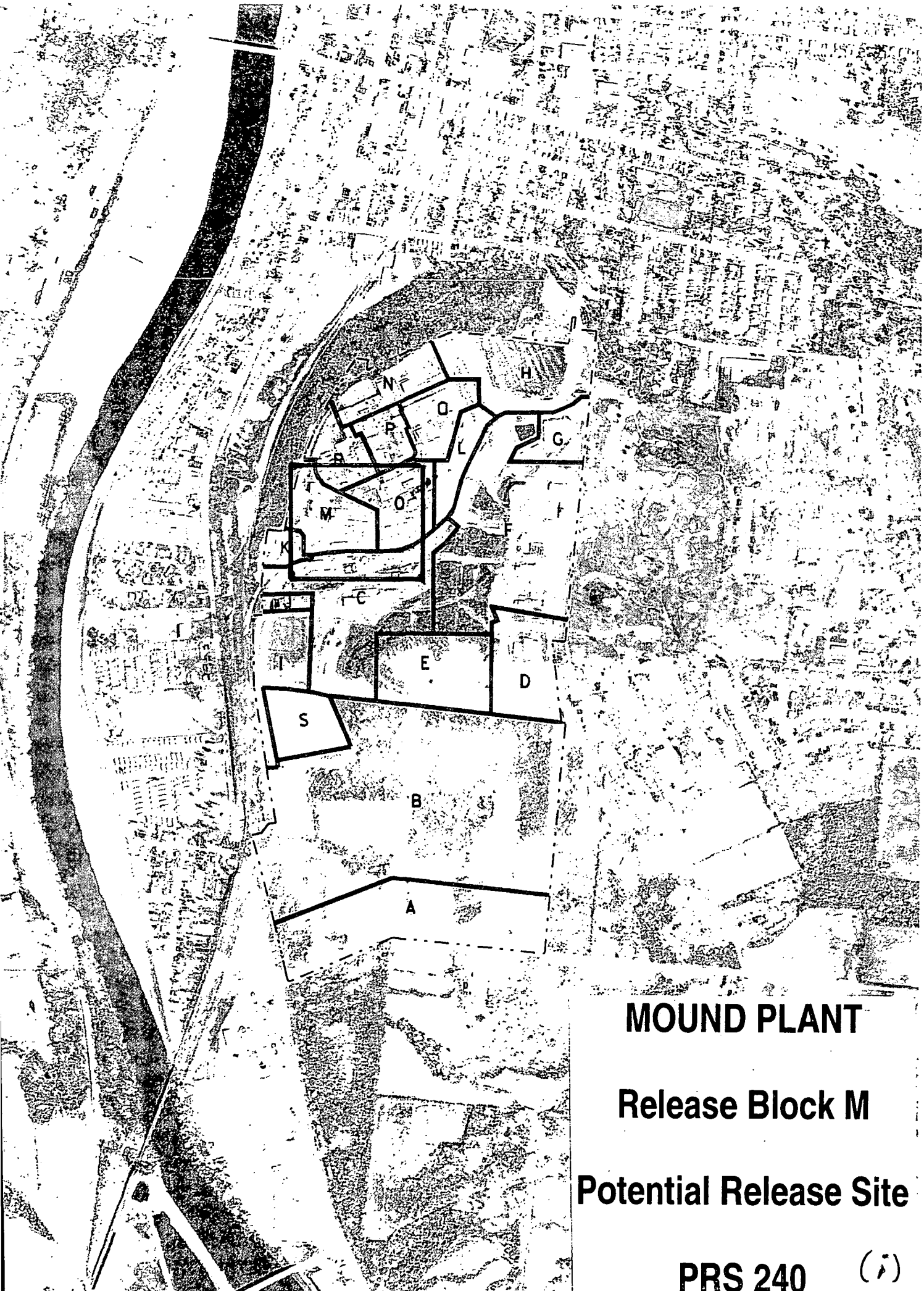
U.S. Department of Energy
U.S. Environmental Protection Agency
Ohio Environmental Protection Agency

This page intentionally left blank

PRS 240 (FILE)

REV	DESCRIPTION	DATE
WORKING DRAFT (to DOE)	Originally binned further assessment in March 1997.	**October 2004**
DRAFT (to Core Team)		**November 2004**
DRAFT PROPOSED FINAL (incorporates Core Team comments)	Binned a removal action by the Core Team.	**December 2004**
PUBLIC REVIEW DRAFT	Public review period runs from February 24, through March 26, 2006	**February 2006**
FINAL	MMCIC concurs with the Removal Action determination. MMCIC response is included in the Final document.	**April 2006**

This page intentionally left blank



MOUND PLANT

Release Block M

Potential Release Site

PRS 240

(i)

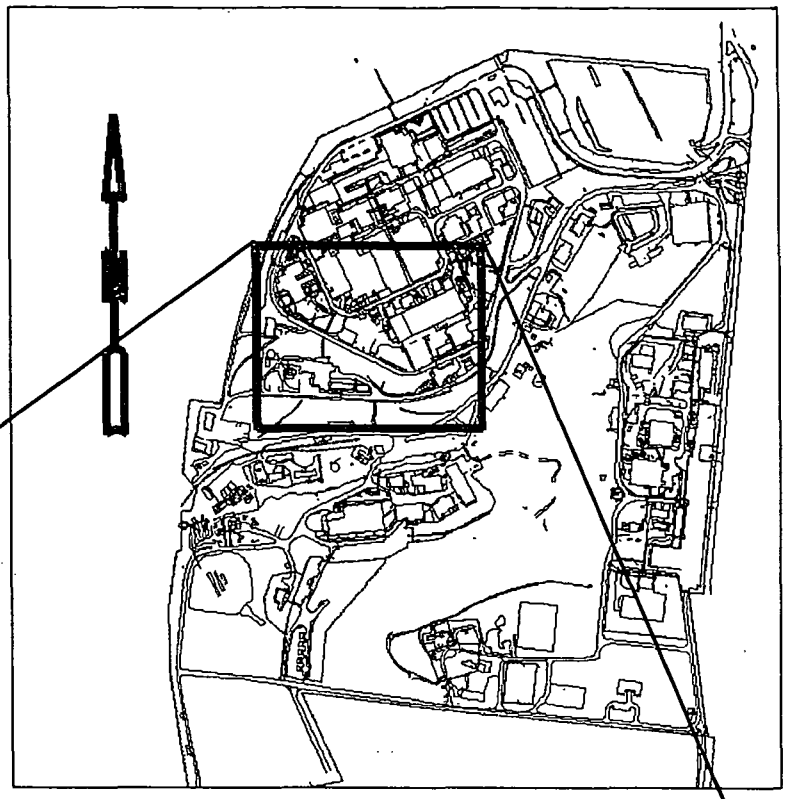
H
N
O
P
L
G
R
O
M
240
F
C
I
E
D
S
B
A

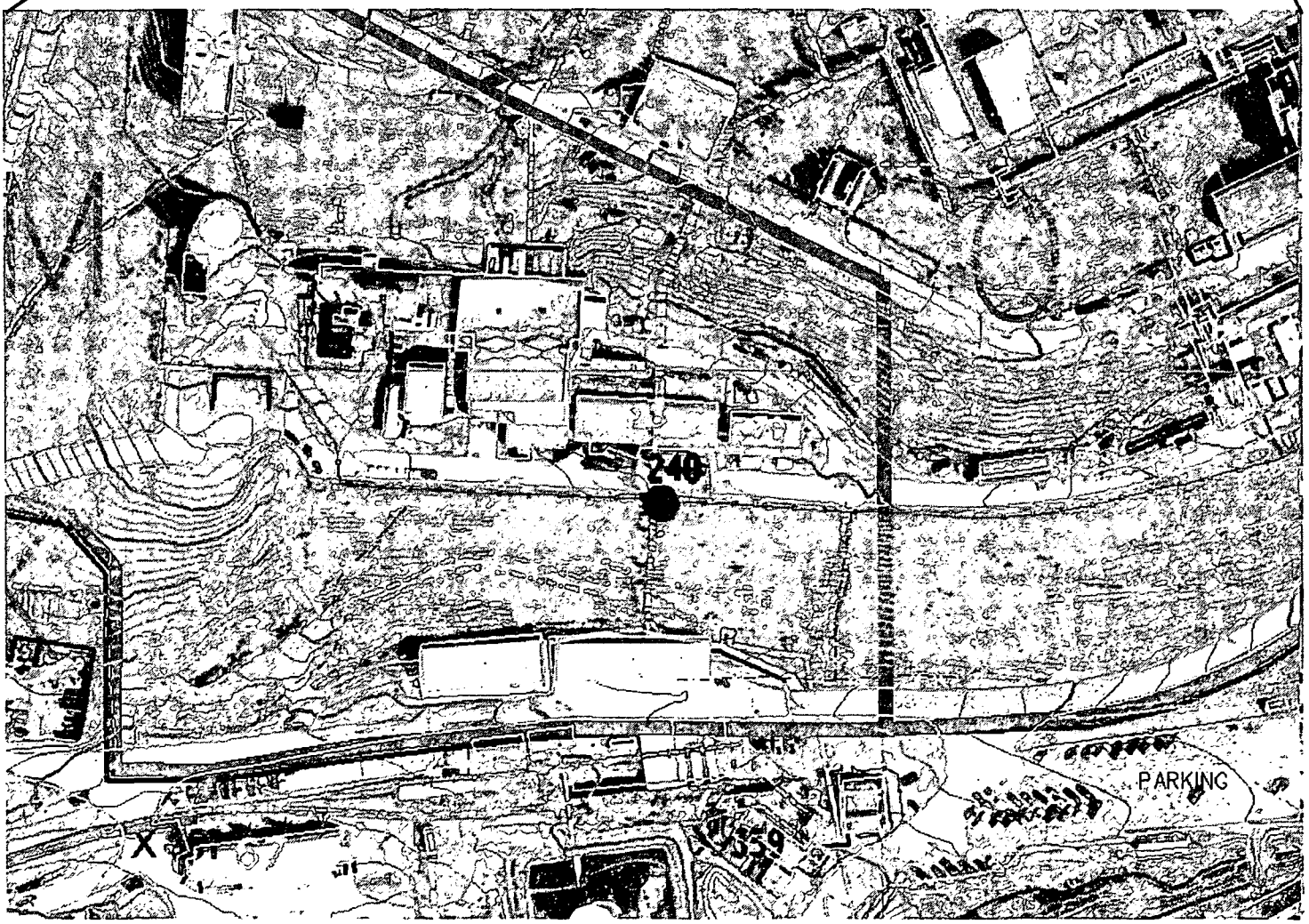
Mound Plant

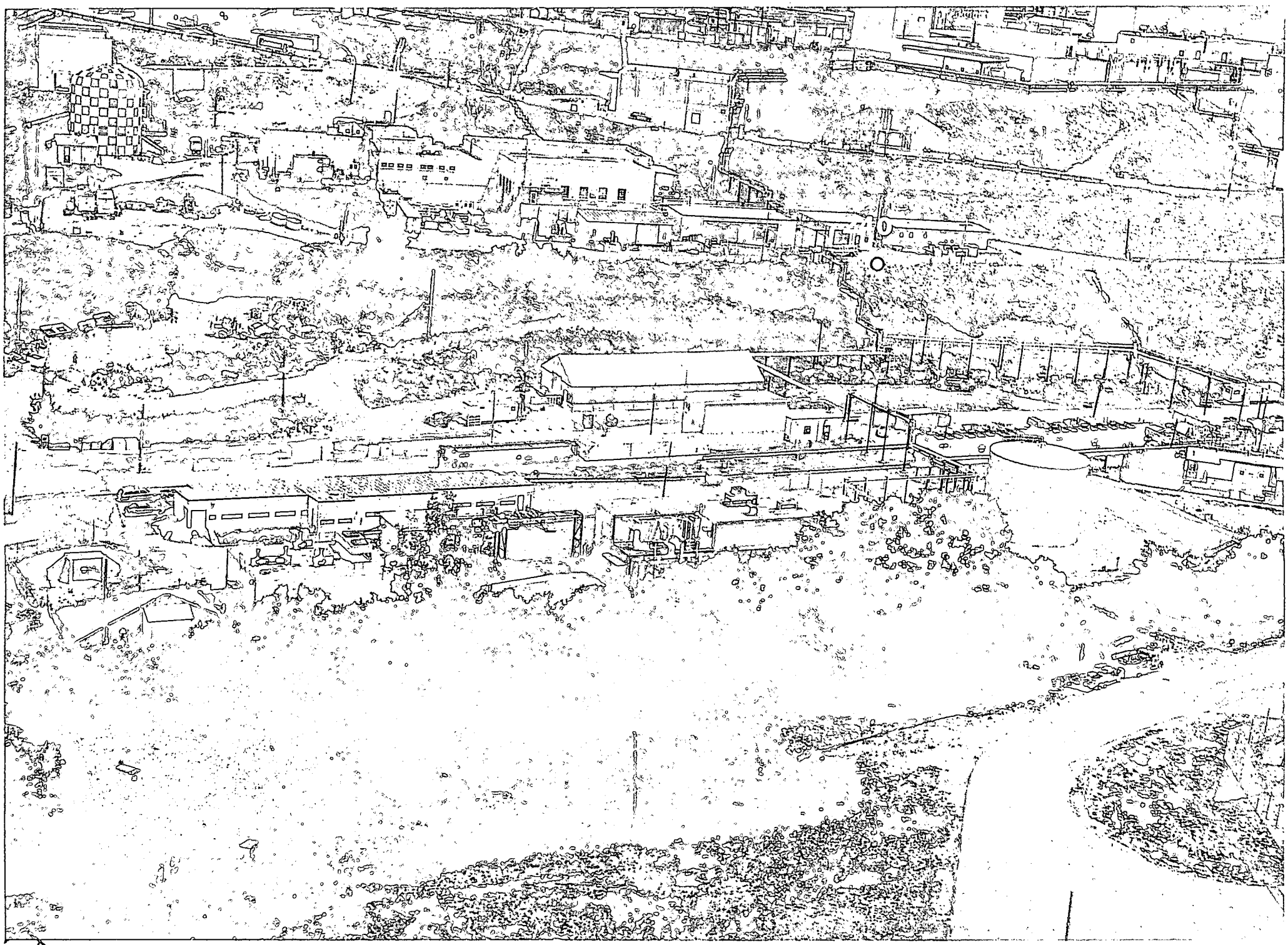
Release Block M

Potential Release Site

PRS 240







PRS 240

PRS HISTORY:

PRS 240 is identified as a radiological hot spot located southwest of Area 23.[1] PRS 240 (hot spot S0472) was identified in the mid-1980s by the Site Survey Project. The larger Area 23 was identified in 1990 by field surveys and sampling that identified elevated levels of thorium-230.[2]

CONTAMINATION:

In the mid 1980's, the Radiological Site Survey[2] analyzed one surface sample at PRS 240 for plutonium and thorium contamination. Results showed:

- The concentration of surface thorium was 7.5 pCi/g (the regulatory guideline (40CFR192) for thorium-230 is 5 pCi/g).
- The concentration of plutonium-238 was 1.2 pCi/g (Mound ALARA guideline criteria is 25 pCi/g).

From the Soil Gas Survey,[3] conducted in 1993, Freon 11 was detected at 80.1 ppb, Freon 113 at 13 ppb, and toluene at 5 ppb. The value for toluene is below the calculated 10^{-6} risk guideline of 414600 ppb.[6] There are no guideline values for Freon 11 and Freon 113.

In 1995, the Other Soils Characterization[4] analyzed PRS 240 and the surrounding soil for organics (by field instrumentation), metals (by x-ray fluoroscope) and radionuclides (field analysis by FIDLER and lab analysis by gamma spectroscopy). Twenty-eight samples were collected at depths of every four feet until 12 feet or refusal was reached. Sample results showed:

Contaminant	# Samples Analyzed to Concentrations Low Enough to Allow for Comparison to Guideline Criteria*	# Samples in Excess of Guideline Criteria	Maximum Concentration Detected	Guideline Criteria
Plutonium-238	3	3	124.5 pCi/g (in surface soil)	25 pCi/g (Mound ALARA in soil)
Thorium-232	28	0	1.11 pCi/g (in subsurface soil)	15 pCi/g[5] (in subsurface soil)
Thorium-230	28	0	less than 17.7 pCi/g	44 pCi/g[7]
Cobalt-60	23	0	less than 0.1 pCi/g	0.1 pCi/g[7]
Americium-241	28	0	0.17 pCi/g	
Cesium-137	28	0	0.4 pCi/g	0.46 pCi/g[7]
Radium-226	28	0	3.17 pCi/g	5 pCi/g[5] (in surface soil)
Uranium-238	14	0	8.44 pCi/g	11 pCi/g[7]

* Some sample analysis was not performed to concentrations low enough to allow for comparison to guideline criteria.

- All metal detections were below their 10^{-6} Risk Based Guideline Criteria in soils.
- Volatile organic compounds were detected, by field instruments, in one sample.

READING ROOM REFERENCES:

1) Operable Unit 9 (OU9), Site Scoping Report: Volume 12: Site Summary Report, Final, December 1994. (pages 6-10)
2) OU9, Site Scoping Report: Volume 3 - Radiological Site Survey, Final, June 1993. (pages 11-14)
3) Soil Gas Survey and Geophysical Investigations, February 1993 (pages 15-17)
7) Risk Based Guideline Values, December 1995.

OTHER REFERENCES:

4) Other Soils Characterization Report, May 1996. (pages 18-21.1)
5) Code of Federal Regulations, 40 CFR 192.12 and 40 CFR 192.41.
6) Comparison of Actual Soil Gas Values with Calculated Acceptable Soil Gas Values, March 1996. (pages 22-24)

PREPARED BY:

Richard Bauer, Member of EG&G Technical Staff
Eric Horstman, Member of EG&G Technical Staff

MOUND PLANT
PRS 240
POTENTIAL HOT SPOT LOCATION S0472

RECOMMENDATION:

Potential Release Site (PRS) 240 is a soil area on the hillside south of the former ATS Building (#125). Location S0472 was made a PRS due to an isolated thorium result of 7.5 pCi/g. There is no known source of contamination. As part of the Other Soils Characterization in 1995, twenty-eight samples were collected at and around PRS 240 and analyzed for organics, metals, and radionuclides. Maximum sample results above cleanup objectives were 124.5 pCi/g Pu-238 (55 pCi/g cleanup objective), 3.17 pCi/g Ra-226 (2.9 cleanup objective), and 12.84 pCi/g U-238 (2.2 pCi/g cleanup objective).

Therefore, a **RESPONSE ACTION** is recommended for the removal of the contamination.

CONCURRENCE:

DOE/MCP: Paul Lucas — 12/15/04
Paul Lucas, Remedial Project Manager — Date

USEPA: Timothy J. Fischer — 12/15/04
Timothy J. Fischer, Remedial Project Manager — Date

OEPA: Brian K. Nickel — 12/15/04
Brian K. Nickel, Remedial Project Manager — Date

SUMMARY OF COMMENTS AND RESPONSES:

Comment period from _____ to _____

☐ No comments were received during this comment period.

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

This page intentionally left blank

REFERENCE MATERIAL
PRS 240

Document Control No. _____

Environmental Restoration Program

OPERABLE UNIT 9 SITE SCOPING REPORT: VOLUME 12 – SITE SUMMARY REPORT

MOUND PLANT
MIAMISBURG, OHIO

December 1994

Final

U.S. Department of Energy
Ohio Field Office

EG&G Mound Applied Technologies

Description of History and Nature of Waste Handling						Hazardous Conditions and Incidents			Environmental Data		
No.	Site Name	Location	Status	Potential Hazardous Substances	Ref	Releases	Media	Ref	Analytes[a]	Results	Re
231	T Building, Corridor 8 Alpha Wastewater Sump (Tank 233)	F-7	Historical Filled with concrete 1982	Alpha wastewater from process area floor drains	3, 4	Unknown - filled with concrete			No Data		
232	T Building, Corridor 7 Alpha Wastewater Sump (Tank 234)	F-7	Historical Filled with concrete 1982	Alpha wastewater from process area floor drains	3, 4	Unknown - filled with concrete			No Data		
233	Room T-63 Alpha Wastewater Sump (Tank 235)	F-7	Historical Filled with concrete 1982	Alpha wastewater from process area floor drains	3, 4	Unknown - filled with concrete			No Data		
234	Building 58 Diesel Fuel Storage Tank (Tank 222)	E-6	Historical	Diesel fuel	3	Tank Removed			No Data		
235	Area of Possible Elevated Thorium Activity	E-8	Grounds	Thorium	6	Possible fugitive dust	S	4, 6	1 14, 15	SGS[b] Table B.3 Locations 2021, 2148, and 2149 Table B.1	12 6
236	Site Survey Project Potential Hot Spot Location S0166	F-6	Grounds	Plutonium-238	6	Isolated activity from unknown sources			13	Table B.9 (Appendix E in Ref. 6)	6
237	Site Survey Project Potential Hot Spot Location S0175	E-5 E-6	Grounds	Cobalt-60, Cesium-137	6				14, 15	Table B.9 (Appendix E in Ref. 6)	6
238	Site Survey Project Potential Hot Spot Location S1092	G-7	Grounds	Thorium	6				14	Table B.9 (Appendix E in Ref. 6)	6
239	Site Survey Project Potential Hot Spot Location S0208	F-5	Grounds	Plutonium-238	6				13	Table B.9 (Appendix E in Ref. 6)	6
240	Site Survey Project Potential Hot Spot Location S0472	G-6	Grounds	Thorium	6				14	Table B.9 (Appendix E in Ref. 6)	6

Reference List

Table V.3. (page 3 of 4)

No.	Site Name	Status[a]	Historic Activities: Evidence of Release	Historic Activities: Response Authority	Further Action Recommended	FFA OU
231	T Building, Corridor 8 Alpha Wastewater Sump (Tank 233)	Historical Inactive Filled with concrete 1982	No	AEA	D&D	
232	T Building, Corridor 7 Alpha Wastewater Sump (Tank 234)	Historical Inactive Filled with concrete 1982	No	AEA	D&D	
233	Room 1-63 Alpha Wastewater Sump (Tank 235)	Historical Inactive Filled with concrete 1982	No	AEA	D&D	
235	Area of Possible Elevated Thorium Activity	Grounds	Yes	AEA	Yes	6
237	Hot Spot Location S1052	Grounds	Yes	AEA	Yes	6
238	Site Survey Project Hotspot S1029	Grounds	Yes	AEA	Yes	6
240	Site Survey Project Potential Hot Spot Location S0472	Grounds	Yes	AEA	Yes	6
252	B Building Stack	Inactive	No	AEA	D&D	
266	Area 8, Thorium-Contaminated Soils from Areas 1 and 9	Inactive	Yes	AEA	Yes	6
267	Area 9, Thorium Storage and Redrumming Area (AKA Former Thorium Storage)	Inactive	Yes	AEA	Yes	
272	Area 10, Concrete Debris	Inactive	Yes	AEA	Yes	6
273	Area 12, Thorium-Contaminated Soil from Area 1	Inactive	Yes	AEA	Yes	6
283	Area 1, Bulk Transfer of Thorium Drums (AKA Plutonium Recoverable Waste Storage)	Grounds	Yes	AEA	Yes	6
284	Building 21, Thorium Sludge Storage Facility	Surplus	Yes	AEA	Yes	6
285	Area 11, Contamination from SM Building Operations	Historical	Yes	AEA	Yes	6
286	Area 16, SM Building Sanitary Sewage Septic Tank\Leach Field	Surplus	Yes	AEA	Yes	6

Table B.9. Summary of Radiological Data[a,b]

Site Name	Radiological Contaminants															
	Potassium-40	Plutonium-239	Plutonium-238	Cesium-137	Thorium-Total	Tritium	Thorium-232	Cobalt-60	Radium-224, -226, -228	Radon-222	Americium-241	Actinium-227	Uranium-233, -234, -238	Bismuth-210m	Bismuth-207	Reference
172. WDA Building Basement Wash Sump (AKA Glass Melter Room Sump)			257,000			1302 (c)	65.7									7
174. WD Building Drum Staging Area			1.302			ND										7
236. Site Survey Project Potential Hot Spot Location S0166			1.76			12.73										6
237. Site Survey Project Potential Hot Spot Location S0175				10				82	.8							6
[illegible] Survey Project Potential Hot Spot Location S1092			0.31		323	.5										6
239. Site Survey Project Potential Hot Spot Location S0208			61			.72										6
240. Site Survey Project Potential Hot Spot Location S0472			1.2		7.5											6
258. Area H Open Burn Pit (AKA Pyrotechnic Waste Disposal Area)			0.81		<2											6
59. Pyrotechnic Waste Shed			0.31		<2											7
60. Thermal Treatment Unit			0.81		<2											7
[illegible]9. Building 31, Contaminated Material Storage Building			8.15		150											6
[illegible]. Underground Sewer Lines G6 and G7						ND										7
[illegible]. Old Firing Range Drum Storage Area	26.2			0.121	1.48				12.2							7
[illegible]. Waste Oil Drum Field Area			NR		9.2											7
[illegible]. Warehouse 14 (AKA Pad 14)			10.2	<2												
[illegible]. Site Survey Project Potential Hot Spot Location C0007			.39		41.6											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."

This page intentionally left blank

ENVIRONMENTAL RESTORATION PROGRAM

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

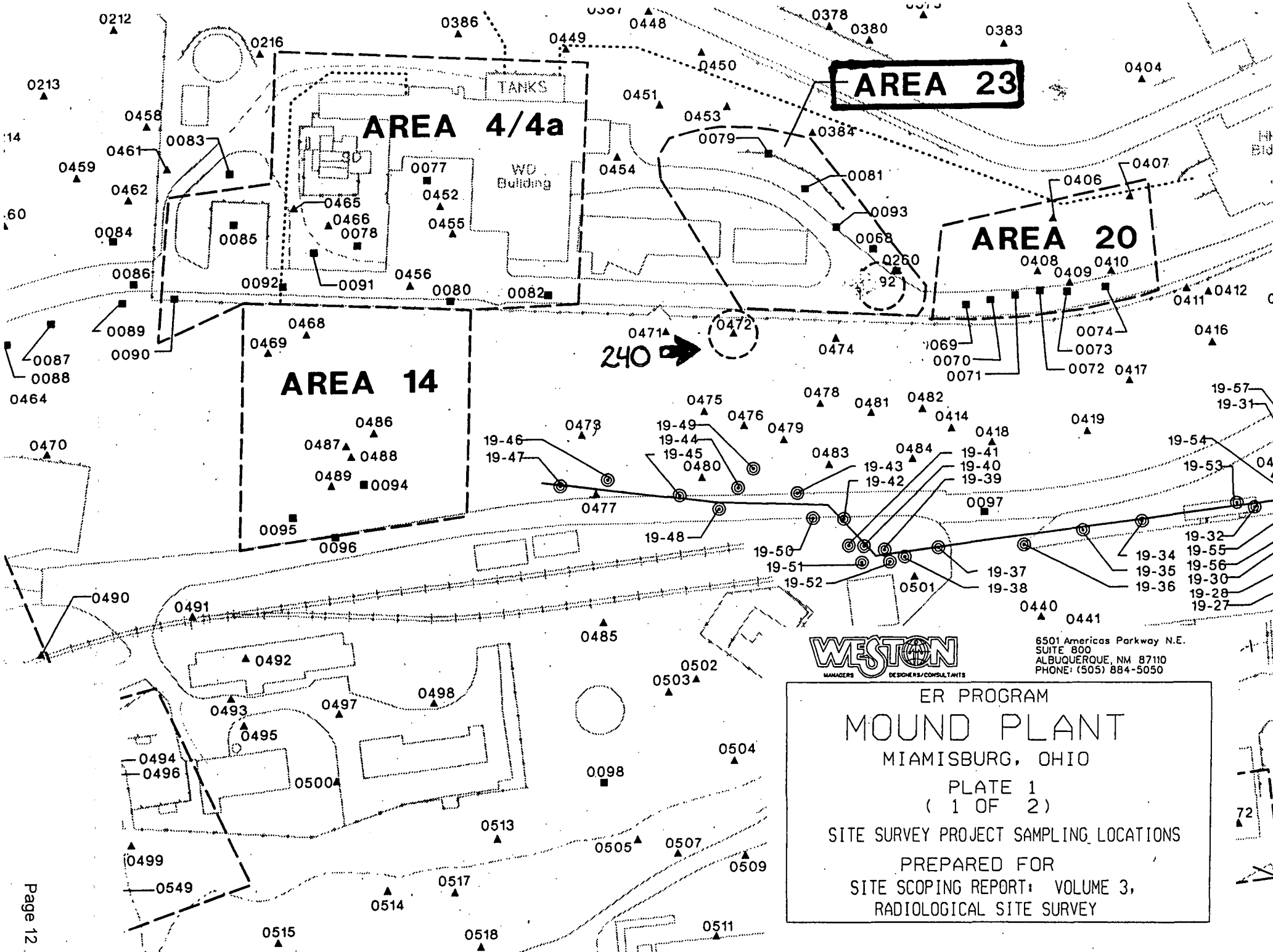
MOUND PLANT
MIAMISBURG, OHIO

June 1993

DEPARTMENT OF ENERGY
ALBUQUERQUE FIELD OFFICE

ENVIRONMENTAL RESTORATION PROGRAM
EG&G MOUND APPLIED TECHNOLOGIES

FINAL


AREA 4/4a
AREA 23
AREA 20
AREA 14
TANKS
WD Building
240
WESTON
MANAGERS DESIGNERS/CONSULTANTS
6501 Americas Parkway N.E.
SUITE 800
ALBUQUERQUE, NM 87110
PHONE: (505) 884-5050
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

Sample locations S0472 and S1092, shown on Plate 1 as possible hot spots, are probably not associated with the thorium project, as S1092 is largely thorium-230 and is associated with Area 23, described in a companion section of this report.

~~5.10. EXCAVATED MATERIALS DISPOSAL AREA~~

The excavated materials disposal area is located on the SM/PP Hill adjacent to Area 1 and south of the water tower (Figure 5.1). The area is colloquially known as Rader's Hill. The area contains the overburden soils excavated during the D&D of the waste transfer line on the west slope of the SM/PP Hill. The excavation is known as Area 19. The excavation overlapped the southern margin of Area 12, known to be contaminated with thorium. During excavation, soils that had thorium concentrations were staged and later segregated depending on the thorium concentrations. Soil with thorium concentration greater than 5 pCi/g were boxed for offsite disposal and those with less were moved to the excavated materials disposal area (Draper 1985). About 52 samples were collected from the disposal area in 1984 and analyzed in the Mound soils screening facility. Results indicate total thorium levels around 1 pCi/g; the highest was 1.2 pCi/g (MRC 1984). The data sheets are included in Appendix E.

5.11. RAILROAD SIDING

The railroad siding or spur that enters Mound Plant from the west has been used extensively for shipping and receiving radioactive materials and radioactively contaminated wastes. Through the 1950s and 1960s, the siding was used for unloading lead casks containing the bismuth/polonium mixtures used in the polonium processing. In the mid-1950s, the siding was the site of the unloading of thorium drums, as well as the decontamination of the boxcars in which the drums were shipped. The siding historically extended about 500 feet east of their current location. The eastern portions were removed or simply buried at an unknown date. The portion that would underlie the waste transfer line, known as Area 19 (Plate 1), is gone and may have been removed when the line was built in 1967 (DOE 1992g). Portions of the siding east of Area 19 (Plate 1) are known to be in place, but covered by a thin layer of soil.

The siding itself was not a sampling target during the Site Survey Project (Stought et al. 1988); however, some limited sampling has been performed. Site Survey Project samples S0485 and S0491 (Appendix E) located near the siding (Plate 1) indicated levels of plutonium-238 below 5 pCi/g and less than 2 pCi/g of thorium. Subsequent sampling along the siding indicates that elevated thorium ~~contamination may be very localized. Two samples collected in 1987 and analyzed by the Mound Plant~~

Table V.7. Isolated Locations of Elevated Activity

Plate 1 Location[a]	Coordinates South	Coordinates West	MRC ID No.	Mo-Yr	Depth (inch)	Plutonium-238 (pCi/g)	Thorium[b] (pCi/g)	Tritium (pCi/mL)	Cobalt-60 (pCi/g)	Cesium-137 (pCi/g)	Radium-226 (pCi/g)	Americium-241 (pCi/g)
C0007[c]	1800	1860	8352	11-84	54	0.39	41.63					
			8353	11-84	108	0.08	5.14					
C0028	2375	1755	1245	12-82	18	11.40	5.61					
			1246	12-82	48	NR	109.00					
			1247	12-82	66	NR	109.00					
			1248	12-82	102	NR	58.00					
			1250	12-82	156	NR	97.00					
			1251	12-82	216	0.29	29.45					
			1252	12-82	234	0.06	b					
			1253	12-82	252	0.03	b					
S0166	1750	3350	4000	10-83	0	34.50	b					
S0175	1375	3580	9845	06-85	0	NR	NR		82	10	0.8	LDL
S0208	1660	3765	3085	10-83	0	61.00	b	0.72				
S0307	2175	2060	2821	10-83	0	5.36	6.46					
S0425	2500	2945	4108	10-83	0	1.08	5.74					
S0472	2175	3505	6701	08-84	0	1.20	7.50					

ENVIRONMENTAL RESTORATION PROGRAM

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

MOUND PLANT
MIAMISBURG, OHIO

February 1993

DEPARTMENT OF ENERGY
ALBUQUERQUE OFFICE

ENVIRONMENTAL RESTORATION PROGRAM
EG&G MOUND APPLIED TECHNOLOGIES

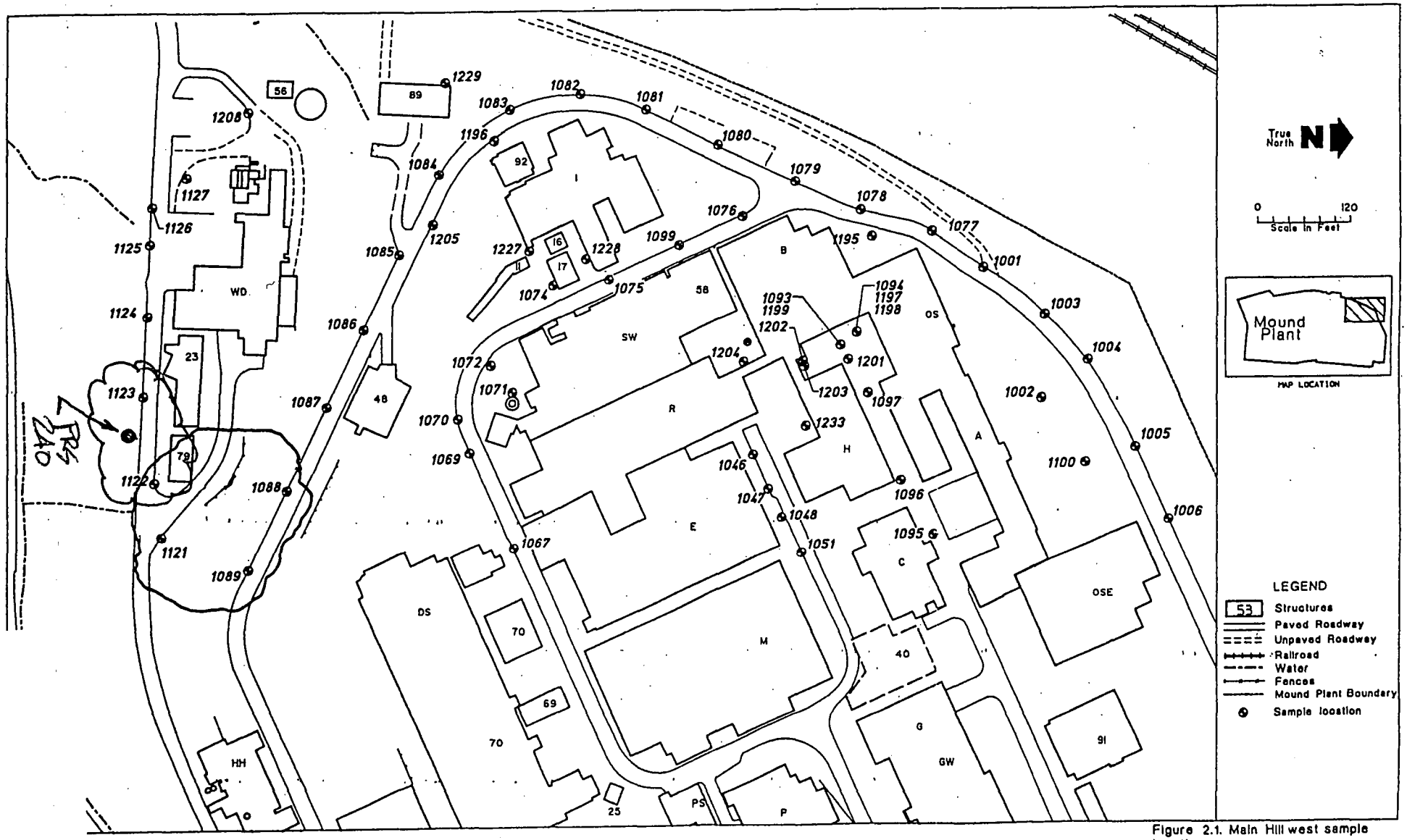


Figure 2.1. Main Hill west sample location map.

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-01-1113-0005	17 AUG 92	---	---	---	---	---	---	11	---
MND-01-1114-0005	17 AUG 92	---	9	---	---	315	10	357	5 *
MND-01-1114-1005	17 AUG 92	---	---	---	---	259	9	263	3 *
MND-01-1115-0005	17 AUG 92	---	---	---	---	56	---	13	---
MND-01-1117-0005	18 AUG 92	---	---	---	---	---	12	8	---
MND-01-1117-1005	18 AUG 92	---	---	---	---	---	15	9	---
MND-01-1118-0005	18 AUG 92	---	---	---	---	---	3	---	---
MND-01-1119-0005	18 AUG 92	---	---	---	---	---	---	---	213
MND-01-1122-0005	18 AUG 92	801	13	---	---	---	---	---	---
MND-01-1123-0005	18 AUG 92	---	---	---	---	---	---	---	5 *
MND-01-1124-0005	18 AUG 92	---	---	---	---	---	---	---	8884 *
MND-01-1127-0005	18 AUG 92	---	---	---	---	---	4	---	27 *
MND-01-1129-0005	18 AUG 92	---	10	---	---	37	12	4	11 *
MND-01-1190-0005	24 SEP 92	240	477	---	---	---	---	---	3 *
MND-01-1190-1005	24 SEP 92	287	707	---	---	---	---	---	3 *
MND-01-1192-0005	24 SEP 92	---	---	---	---	---	---	---	5 *
MND-01-1193-0005	24 SEP 92	---	---	---	---	---	---	---	16 *
MND-01-1196-0005	25 SEP 92	---	---	---	---	---	---	4	64
MND-01-1197-0002	25 SEP 92	---	---	---	---	---	---	23	5
MND-01-1198-0008	25 SEP 92	---	24	13	518	33	---	474	5
MND-01-1199-0002	25 SEP 92	---	10218	---	120	---	---	479	---
MND-01-1201-0007	25 SEP 92	---	4716	13	811	---	---	130	48
MND-01-1201-1007	25 SEP 92	---	5895	---	612	---	---	117	43
MND-01-1202-0002	25 SEP 92	---	6419	66	2499	9	---	1921	3
MND-01-1202-1002	25 SEP 92	---	9301	41	1706	---	---	1737	---
MND-01-1203-0002	25 SEP 92	---	1475	---	334	---	---	45	192
MND-01-1204-0005	25 SEP 92	---	453	---	---	---	---	11	5
MND-01-1205-0005	25 SEP 92	---	---	---	---	---	---	---	21
MND-01-1206-0005	26 SEP 92	---	---	---	---	---	---	---	23142
MND-01-1207-0005	26 SEP 92	---	---	---	---	---	---	---	90 -
MND-01-1227-0005	28 SEP 92	---	10	---	---	---	---	---	4788
MND-01-1228-0005	28 SEP 92	---	---	---	---	---	---	---	11
MND-01-1230-0005	28 SEP 92	---	---	---	---	---	---	---	13
MND-01-1230-1005	28 SEP 92	---	---	---	---	---	---	---	5
MND-01-1231-0005	28 SEP 92	---	48	---	---	---	34	21	5
MND-01-1232-0005	28 SEP 92	---	4	---	---	---	13	8	24
MND-01-1233-0002	29 SEP 92	---	29	---	---	---	---	---	72
MND-01-1233-1002	29 SEP 92	---	29	---	---	---	---	---	64

otes:

Only sample locations having positive detections are shown.

*: Associated trip, ambient, equipment or field blank contained specified compound.

B: Indicates blank sample.

w: Indicates water sample.

**: Freon 113 & TCE Off-Scale

This page intentionally left blank

OTHER SOILS CHARACTERIZATION REPORT

MOUND PLANT
MIAMISBURG, OHIO

MAY 1996

U.S. DEPARTMENT OF ENERGY
OHIO FIELD OFFICE

DECONTAMINATION AND DECOMMISSIONING PROGRAM
EG&G MOUND APPLIED TECHNOLOGIES

S0472

Four samples from hot spot S0472 (Area 91) triggered field screening action levels:

- One sample exceeded limits for hazardous compounds
- Three samples exceeded limits for radionuclides

Elevated concentrations of chromium were detected by the PXRF in soil samples collected from the site. Elevated concentrations of Pu238 were found in excess of 124 pCi/g in soil samples collected from the site.

Table 5.15 shows Hot Spot S0472 field results exceeding action levels. Figure 5.20 graphically represents Hot Spot S0472 field sampling results.

Table 5.15 Hot Spot S0472 Field Sampling Results

Sample ID	FIDLER		Organics		Rad Laboratory				
	Channel 1 (1K)	Channel 2 (5K)	OVA	OVM	Pu 238 (25)	Th 232 (5)	Ra 226 (5)	Cs 137 (15)	Am 241(20)
9101-5014	<1000	<5000	<1	NA	118.5 *	0.99	<1.32	0.12	0.16
9103-5001	<1000	<5000	<1	<1	124.5 *	0.81	3.17	<0.15	<0.17
9104-5012	<1000	<5000	<1	<1	120.9 *	0.68	2.19	<0.09	<0.15
9105-5001	<1000	<5000	<1	<1	<120.2 U	0.56	1.52	0.19	<0.13

Sample ID	PXRF Metals								
	As (102.07)	Ba (1489)	Cd	Cr HI	Cr LO (164.43)	Pb (172)	Hg	Se	Ag (2559)
9101-5014	<34	269.35	<44.5	<347	<60.7	<10	<37	18.082	51.4189
9103-5001	<34	224.45	<44.5	<347	<60.7	<10	<37	16.062	<29
9104-5012	77.629	227.02	<44.5	<347	<60.7	<10	<37	<14	41.1578
9105-5001	84.481	187.86	<44.5	<347	229.98 *	<10	<37	<14	<29

S1092

Four samples from hot spot S1092 (Area 92) triggered field screening action levels:

- Four samples exceeded limits for hazardous compounds

Organic vapors from soil samples peaked at 30 meter units on the OVA.

Table 5.16 shows Hot Spot S1092 field results exceeding action levels. Figure 5.21 graphically represents Hot Spot S1092 field sampling results.

Table 5.16 Hot Spot S1092 Field Sampling Results

Sample ID	FIDLER		Organics		Rad Laboratory				
	Channel 1 (1K)	Channel 2 (5K)	OVA	OVM	Pu 238 (25)	Th 232 (5)	Ra 226 (5)	Cs 137 (15)	Am 241(20)
9201-5008	<1000	<5000	120 *	NA	<138.5 U	0.74	<1.26	<0.08	<0.18
9201-5012	<1000	<5000	30 *	NA	<47.19 U	0.65	2.43	<0.08	<0.11
9205-5008	<1000	<5000	130 *	NA	<142.4 U	0.64	<2.03	<0.09	<0.19
9205-5012	<1000	<5000	40 *	NA	<147.1 U	0.93	<1.86	<0.1	0.16

Sample ID	PXRF Metals								
	As (102.07)	Ba (1489)	Cd	Cr HI	Cr LO (164.43)	Pb (172)	Hg	Se	Ag (2559)
9201-5008	NA	NA	NA	NA	NA	NA	NA	NA	NA
9201-5012	NA	NA	NA	NA	NA	NA	NA	NA	NA
9205-5008	NA	NA	NA	NA	NA	NA	NA	NA	NA
9205-5012	NA	NA	NA	NA	NA	NA	NA	NA	NA

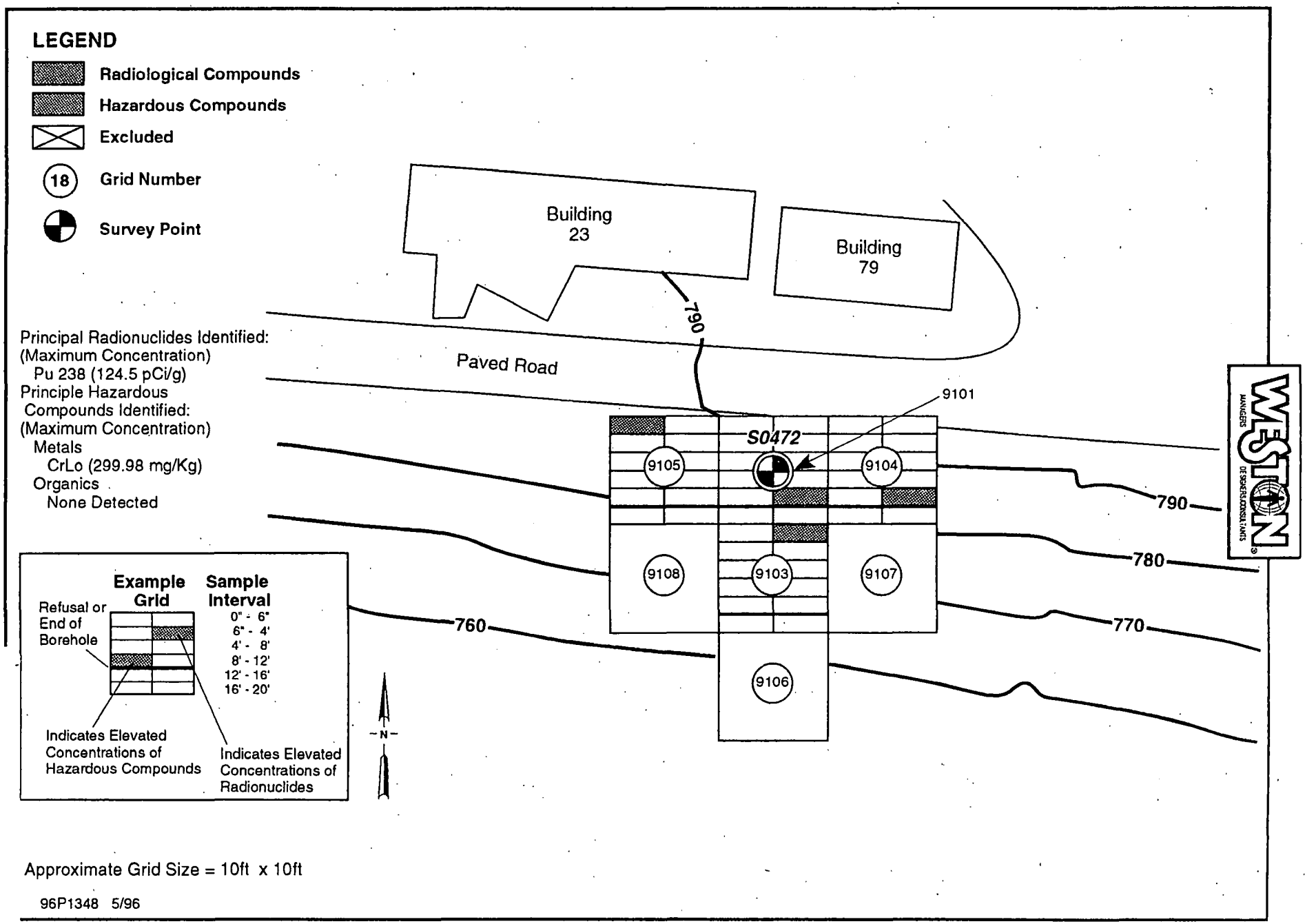


FIGURE 5.20 HOT SPOT S0472

Sample ID		Co 60	Cs 137	Ra 226	Ac 227	Th 230	Th 232	Pa 231	U 238	Pu 238	Am 241
8866-5004		<0.03	<0.03	0.82	<0.17	<4.86	1.35	<0.58	1.4	<47.25	<0.05
8870-5004		<0.02	0.03	1.3	<0.2	<3.9	0.7	<1	<3.1	60	<0.04
8870-5008		<0.02	<0.02	1	<0.1	<3.2	0.5	<1	<3.1	<29.2	<0.03
8870-5012		<0.02	<0.02	0.9	<0.2	<3.9	0.7	<1	<3.5	<39.5	<0.04
8872-5001		<0.09	<0.1	<2.2	<0.9	<22.3	8.6	<9.1	<9.8	<183.7	<0.2
8872-5004		<0.04	<0.05	1.7	<0.4	<9.2	0.8	<2.6	<6.8	<74.2	<0.09
8872-5008		<0.07	<0.06	1.9	<0.5	<10.7	0.8	<2.6	<9.2	<107.5	<0.1
8872-5012		<0.06	<0.04	1.9	<0.4	<9.7	1.1	<3.1	<7.6	<95.8	0.1
8875-5004		<0.02	<0.02	1.6	<0.2	<4	0.9	<1	<3.4	<41.5	<0.04
8875-5008		<0.02	<0.02	0.6	<0.2	<4	0.8	<0.6	0.6	<45.7	<0.04
8875-5012		<0.02	0.02	1.2	<0.2	<4.1	0.7	<0.8	<3.4	<44.1	<0.04
8879-5001		<0.03	0.07	<2.1	<0.3	<7.1	3.6	<1.8	<4	<56.7	<0.08
8879-5004		<0.02	0.05	1.18	0.52	<5.1	1.9	<1	<3.5	<45	<0.05
8879-5008		<0.03	<0.03	1	<0.2	<5.8	0.9	<1.4	<4.6	<48	<0.06
8882-5001		<0.03	0.2	1.8	<0.2	<4.2	1	<0.9	<3.7	<42.4	<0.05
8882-5004		<0.03	0.03	1.57	0.31	<4.35	0.6	<0.85	<3.84	42.24	<0.05
8882-5008		<0.01	<0.02	0.9	<0.12	<2.8	0.42	<0.5	<2.33	<30.17	<0.03
8882-5012		<0.03	<0.02	1.6	<0.16	<3.7	0.7	<0.8	<4	<34	<0.04
8884-5004		<0.03	0.15	1.5	<0.2	<5.8	1	<1.4	<4.4	<49	<0.05
8884-5008		<0.03	<0.02	1.42	<0.19	<4.24	0.89	<0.8	<4.2	<44.62	<0.04
8884-5012		<0.05	<0.04	1.2	<0.3	<9	0.8	<2	<8.1	<92.3	<0.1
8885-5004		<0.03	0.1	1.78	<0.22	<5.67	2.1	<1.1	<4.66	<49.26	<0.06
8885-5008		<0.03	<0.02	1.5	<0.15	<4.06	0.74	<0.82	<3.65	<36.22	<0.04
8885-5012		<0.02	<0.02	1.78	<0.18	<4.28	0.85	<0.74	<4.15	<42.95	<0.05
8886-5001		<0.02	0.22	1.48	<0.12	<4.89	1.3	<0.84	<3.41	<39.16	<0.04
8886-5004		<0.02	0.18	1.11	<0.14	<3.77	1.2	<0.76	<2.94	<32.85	<0.04
8886-5008		<0.02	<0.02	1.43	<0.16	<3.73	0.77	<0.78	<3.73	<38.59	<0.04
8886-5012		<0.02	<0.02	0.58	<0.15	<4.08	0.74	<0.54	0.39	<43.55	<0.04
9001-5004		<0.02	0.02	1.43	<0.13	<4.61	0.75	<0.79	<3.4	<48.95	<0.05
9002-5001		<0.02	0.08	1.99	<0.18	<4.31	0.6	<0.91	<3.54	<40.36	<0.05
9002-5004		<0.02	0.03	0.7	<0.13	<3.92	0.8	<0.56	0.7	<43.55	<0.04
9002-5008		<0.02	<0.02	0.58	<0.12	<3.65	0.73	<0.54	<0.36	<42.45	<0.04
9002-5012		<0.03	<0.02	1.57	<0.21	<4.6	0.74	<0.96	<3.63	<49.63	<0.05
9002-5014		<0.02	<0.02	0.58	<0.11	<3.73	0.74	<0.52	<0.22	<46.95	<0.04
9003-5001		<0.02	0.17	1.18	0.11	<4.65	1.04	<0.05	0.57	<47.15	<0.05
9003-5008		<0.02	<0.02	1.47	<0.19	<4.39	0.83	<0.83	<3.16	<44.98	<0.04
9003-5011		<0.02	0.02	0.58	0.27	<4.02	0.68	<0.58	0.47	<56.95	<0.04
9005-5001		<0.03	0.12	1.95	<0.2	<4.96	0.88	<1.12	<4.06	<45.19	<0.05
9005-5004		<0.02	0.06	0.7	<0.12	<1.32	0.79	<0.54	0.31	<43.55	<0.04
9005-5008		<0.02	<0.02	0.51	<0.13	<3.82	0.76	<0.56	0.26	<41.65	<0.04
9005-5011		<0.03	<0.03	1.2	<0.2	<6.4	0.7	<1.6	<5.1	<63	<0.07
9101-5001		<0.08	<0.14	<2.19	<0.74	<17.7	0.66	<3.55	<12.33	<167.6	<0.19
9101-5004		<0.09	0.17	<1.24	<0.8	<16.2	0.66	<3.5	<18.5	<160.2	<0.17
9101-5008		<0.06	0.13	2.89	<0.59	<15.76	0.65	<3.67	<14.99	<133.1	<0.14
9101-5012		<0.11	0.15	1.86	<0.7	<16.44	1.04	<3.44	<15.39	<139.4	<0.19
9101-5012		<0.06	<0.03	2.2	<0.2	<5.2	1.1	<1.3	<5.5	<37.9	<0.05
9101-5014		<0.12	0.12	<1.32	0.7	<15.57	0.99	<4.59	<16.05	118.5	0.16
9101-5014		<0.03	<0.03	2.1	<0.1	<3.6	0.8	<1.3	<3.8	<28	<0.04
9103-5001		<0.13	<0.15	3.17	<0.58	<14.48	0.81	<4.04	<15.64	124.5	<0.17
9103-5004		<0.1	<0.09	<1.7	<0.6	<13.76	0.54	<3.45	8.44	<140.8	<0.15
9103-5008		<0.09	<0.09	<1	0.99	<15.13	0.71	<3.28	<10.81	<126.7	0.17
9103-5012		<0.12	0.13	<1.87	<0.63	<16.96	1.11	<3.89	<12.92	<161.7	<0.14
9104-5001		<0.12	0.3	<1.76	0.5	<13.01	0.73	<3.29	<17.28	<137.8	<0.14
9104-5004		<0.1	<0.12	3.17	<0.52	<12.01	0.53	<2.63	<13.48	<109.2	<0.13
9104-5008		<0.08	0.08	<0.92	0.49	<12.26	0.59	<2.65	<11.24	<111.6	<0.1
9104-5008		<0.02	<0.03	2	<0.2	<5.3	0.7	<1.1	<4.4	<61.9	<0.06
9104-5012		<0.07	<0.09	2.19	<0.51	<16.39	0.68	<4.24	<16.79	120.9	<0.15
9105-5001		<0.07	0.19	1.52	<0.7	<14.05	0.56	<3.26	<13.45	<120.2	<0.13
9105-5004		<0.1	0.22	2.89	<0.6	<15.08	0.62	<3.07	<12.84	<118	<0.12
9105-5008		<0.09	<0.09	<1.89	<0.71	<17.42	0.83	<3	<10.11	<174.6	<0.2
9105-5012		<0.09	<0.1	2.07	<0.58	<15.85	0.9	<3.89	<16.38	<122	<0.13
9106-5001		<0.02	0.3	1.2	<0.2	<5	0.6	<1.1	<3.2	<49	<0.05
9106-5004		<0.02	0.1	1.3	<0.2	<3.7	0.6	<1	<3.4	<36	<0.04
9106-5008		<0.03	<0.02	1.6	<0.1	<3.9	0.7	<1	<3.7	<36	<0.04
9107-5001		<0.03	0.4	1.9	<0.1	<4	0.7	<1.3	<4.7	<40.4	<0.04
9107-5004		<0.02	0.08	1.2	<0.2	<3.6	0.6	<0.9	<2.8	<36.1	<0.04
9107-5008		<0.02	<0.02	1.6	<0.2	<5	0.5	<1.2	<3.2	<47	<0.05
9108-5001		<0.03	0.4	0.6	<0.2	<4.4	0.8	<0.6	0.6	<49.6	<0.05
9108-5004		<0.02	0.05	0.6	<0.1	<3.9	0.7	<0.6	0.6	<43.2	<0.04

Gamma Scan Data

Sample ID		Co 60	Cs 137	Ra 226	Ac 227	Th 230	Th 232	Pa 231	U 238	Pu 238	Am 241
9108-5008		<0.02	<0.02	1.6	<0.2	<5.5	0.6	<1.3	<3.9	<55	<0.06
9201-5004		<0.11	<0.12	3.28	<0.68	<14.96	1.14	<3.36	<17.67	<117.7	<0.15
9201-5008		<0.14	<0.08	<1.26	<0.75	<17.54	0.74	<4.95	<19.99	<138.5	<0.18
9201-5012		<0.08	<0.08	2.43	<0.48	<11.53	0.65	<2.87	<13.86	<47.19	<0.11
9201-5012		<0.03	<0.03	2	<0.3	<5.6	0.9	<1.2	<4.5	<65.7	<0.07
9201-5016		<0.1	0.09	1.99	<0.49	<13.27	0.96	<3.39	14.15	<106.1	<0.16
9202-5004		<0.11	<0.1	3.29	3.55	38.77	0.43	2.93	<7.18	<266.3	<0.3
9202-5008	D	<0.08	<0.05	2.05	<0.64	<15.56	0.72	<2.94	<15.47	<144.6	<0.17
9202-5008		<0.12	0.13	3.05	<0.64	<14.11	0.95	<2.91	<18.78	<125.7	<0.15
9202-5012		<0.14	0.17	<1.43	<0.75	<16.54	0.95	<2.91	<16.95	<142.1	<0.14
9203-5004		<0.12	<0.08	2.63	<0.65	<13.69	0.69	<3.25	<13.97	<146.9	<0.18
9203-5008		<0.12	0.13	3.05	<0.64	<14.11	0.95	<2.91	<18.78	<125.7	<0.15
9203-5012		<0.08	<0.08	<1.05	0.6	<14.16	0.8	<2.81	<11.68	<168.1	<0.17
9203-5016		<0.1	0.05	2.76	<0.49	<13.7	0.67	<3.18	10.23	<113.1	<0.15
9203-5020		<0.07	<0.09	1.56	<0.56	<12.91	0.65	<2.8	<10.65	<131.9	0.11
9203-5020		<0.03	<0.03	1.9	<0.2	<4.5	0.8	<0.9	<3.8	<55.1	<0.05
9204-5004		<0.08	0.06	<1.86	<0.61	14.89	0.84	<3.46	<18.63	<109.4	<0.15
9204-5008		<0.1	<0.1	<1.67	<0.82	<13.89	0.83	<3.58	<14.39	<179.5	<0.15
9204-5012		<0.11	<0.09	2.28	<0.66	<17.32	0.54	<4.01	<16.14	<171	<0.18
9204-5016		<0.13	<0.1	<1.95	<0.62	<17.14	0.94	<3.65	14.24	<129.9	<0.13
9205-5004		<0.06	<0.05	<1.73	<0.7	<17.23	0.67	<3.76	<15.52	<147.9	<0.15
9205-5008		<0.09	<0.09	<2.03	<0.6	<14.81	0.64	<4.26	8.54	<142.4	<0.19
9205-5012		<0.11	<0.1	<1.86	0.94	<16.2	0.93	<3.43	<9.18	<147.1	0.16
9205-5012		<0.04	<0.03	1.4	<0.3	<5.3	1.1	<1.2	<4.6	<59	<0.06
9301-5002		<0.01	<0.01	0.9	<0.08	<2.6	0.2	<0.7	<2	<28	<0.03
9302-5002		<0.02	0.04	1.19	<0.14	<3.39	0.54	<0.57	<2.71	<30.83	<0.04
9303-5002		<0.01	<0.02	0.96	<0.14	<3.5	0.52	<0.61	<2.69	<34.74	<0.04
9304-5002		<0.02	<0.02	0.6	<0.1	<3	0.3	<0.4	0.4	<33.6	<0.03
9402-5008		<0.01	<0.01	0.8	<0.1	<2.5	0.3	<0.6	<2.2	<23	<0.03
9403-5001		<0.01	<0.01	0.79	<0.1	<2.12	0.15	<0.5	<1.9	<22.6	<0.02
9403-5004	D	<0.01	0.03	1.45	<0.07	<1.62	0.66	<0.29	<1.34	<15.95	<0.02
9403-5004		<0.02	<0.02	0.79	<0.21	<2.75	0.31	<0.53	<2.45	<25.62	<0.03
9403-5008	D	<0.01	0.02	0.96	<0.06	<1.38	0.37	<0.25	<1.18	<12.59	<0.01
9403-5008		<0.02	0.02	1.3	<0.16	<3.78	0.71	<0.66	<2.86	<37.08	<0.04
9403-5009		<0.02	<0.02	1.05	<0.13	<3.15	0.5	<0.7	<2.63	<30.43	<0.03
9404-5001		<0.01	0.03	1.3	<0.1	<3.2	0.4	<0.8	<2.3	<29.8	<0.03
9404-5004	D	<0.02	0.02	1.1	<0.1	<3.2	0.4	<0.7	<2.6	<28	<0.03
9404-5004		<0.02	<0.01	1.3	<0.1	<3.2	0.4	<0.8	<2.3	<35.9	<0.03
9404-5008		<0.03	<0.05	0.78	<0.26	<5.13	0.23	<1.03	<3.81	80.7	<0.05
9405-5001		<0.02	0.12	1.47	<0.15	<3.5	0.48	<0.63	<2.61	<33.08	<0.04
9405-5009		<0.02	<0.02	1.63	<0.18	<4.11	0.68	<0.75	<2.89	<38.01	<0.04
9901-5004		<0.02	<0.02	1.4	<0.16	<3.87	0.7	<0.71	<2.81	<34.59	<0.04
9901-5007		<0.02	<0.02	0.85	<0.14	<3.21	0.47	<0.66	<2.78	156.2	<0.03
9909-5004		<0.02	<0.02	1.4	<0.14	<3.5	0.59	<0.73	<2.95	<30.61	<0.03
9909-5008		<0.02	<0.02	1.07	<0.12	<2.98	0.41	<0.68	<2.92	141.1	<0.03
9909-5009		<0.02	<0.02	1.72	<0.17	<3.67	0.51	<0.88	<3.95	<32.5	<0.04

This page intentionally left blank

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

SCREENING POTENTIAL RELEASE SITES BASED ON SOIL GAS READINGS

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

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

$$Ct = (Cg/Pb)*[[Pb * Kd / H] + [pw / H] + [pt - pw]]$$

where

Cg	concentration of volatile chemical concentrations as soil vapor in ng/ml
Pb	Bulk density of the soil in g/ml
Kd	soil/water partition coefficient in ml/g
H	Dimensionless Henry's Law Constant
pw	water filled porosity
pt	total porosity
Ct	target soil concentration in ng/g or ug/kg (ppb)

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

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

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

$$Cg = (Pb*Ct)/[[Pb*Kd/H] + [pw/H] + [pt-pw]]$$

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

Pb	1.6	Bulk density of the soil in g/ml
pw	0.15	water filled porosity
pt	0.43	total porosity
foc	0.02	fraction organic material in soil (used in developing the SSL values)

Typical chemicals that are detected with soil gas sampling are					
NAME	Henry's	Kd	Calculated Acceptable	Calculated Acceptable	Calculated Acceptable
			Soil Screening Level Value	Soil Gas Reading	Soil Gas Reading
		ml/g	mg/kg (ppm)	ng/ml	ppb
Toluene	2.52E-01	3.42	22.06	1.56E+03	414600
Trichloroethene (TCE)	4.35E-01	2.24	0.07	1.26E+01	2400
111 Trichloroethane (TCA)	7.63E-01	2.2	3.01	9.46E+02	173400
Trans-1,2 Dichloroethene (DCE)	2.29E-01	1	0.70	1.41E+02	35700
cis-1,2 Dichloroethene (DCE)	1.85E-01	2.78	0.31	1.97E+01	15000
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.