EG&G MOUND-30-03-04-02--9612020009

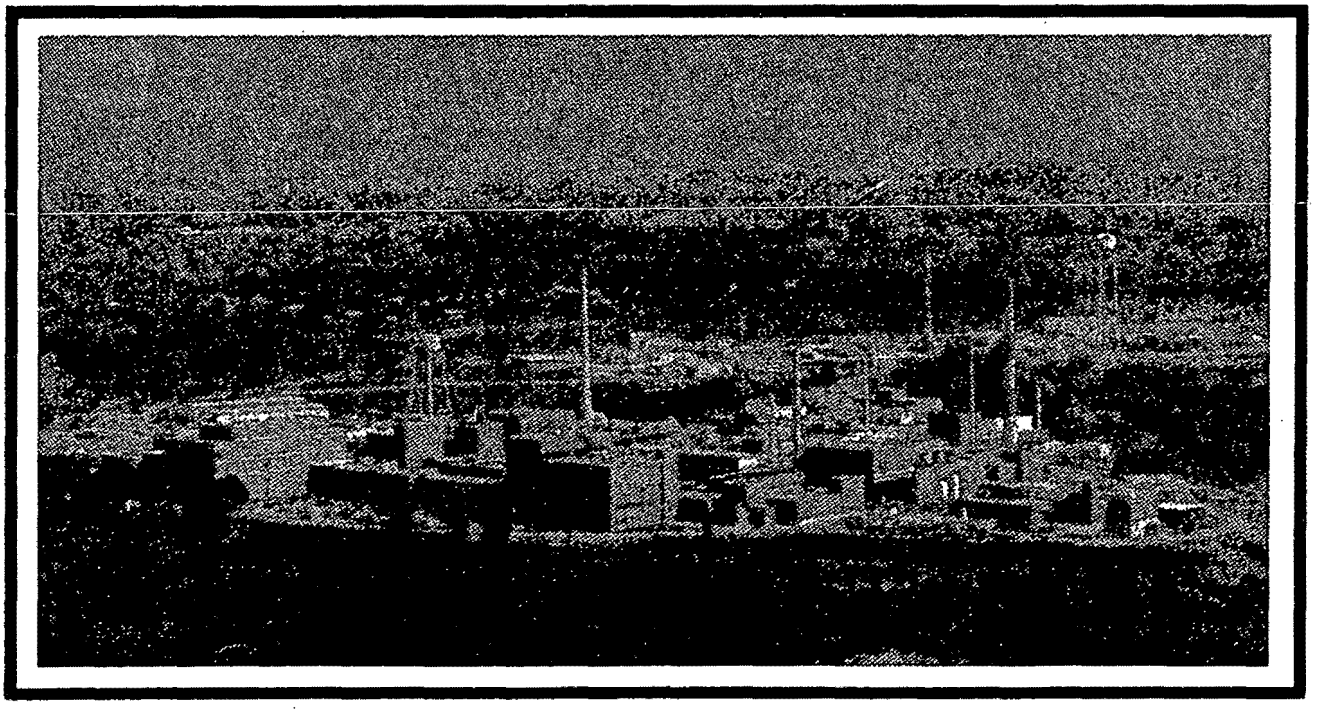
MOUND

Environmental
Restoration
Program

MOUND PLANT

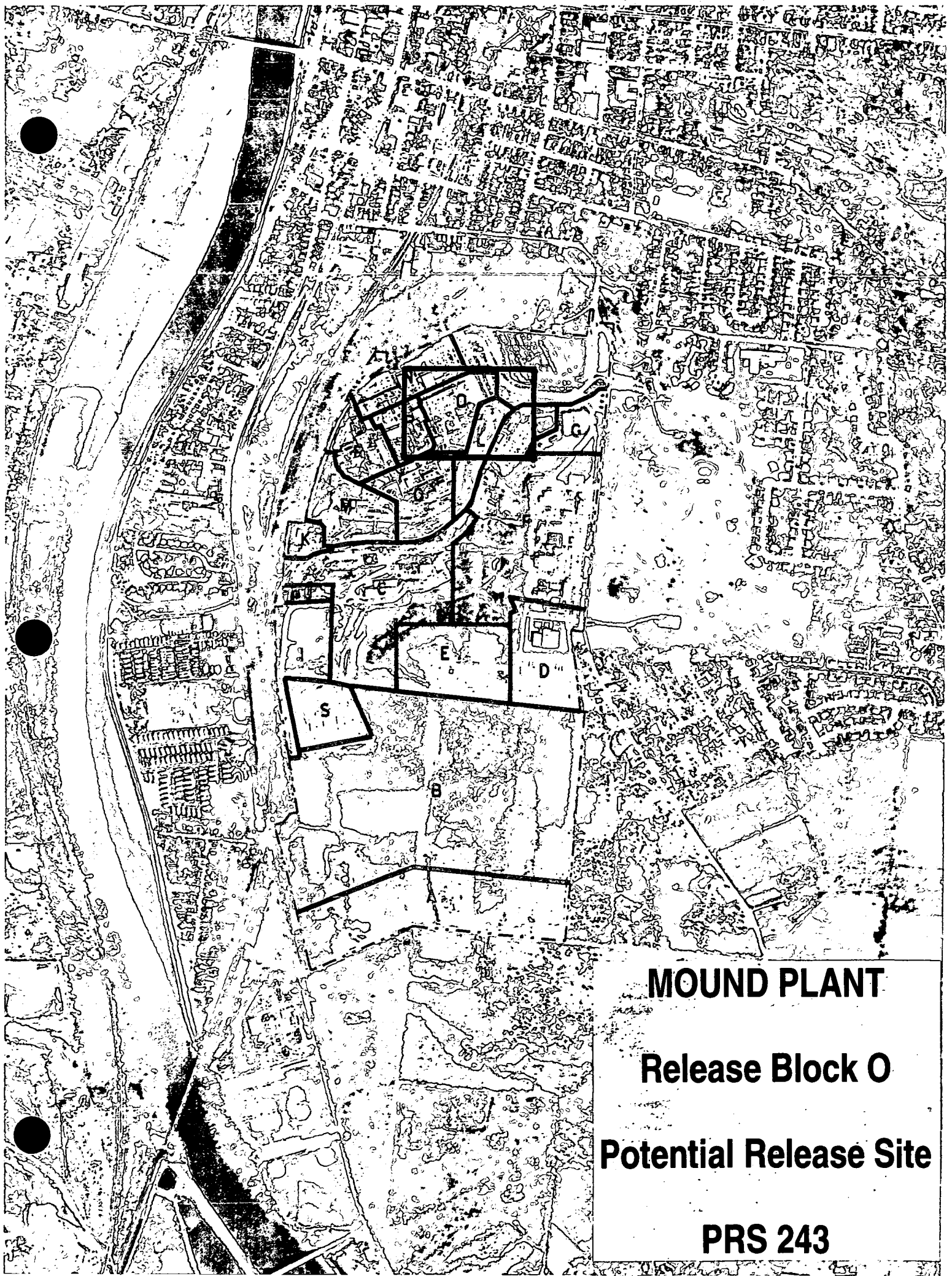
Potential Release Site Package

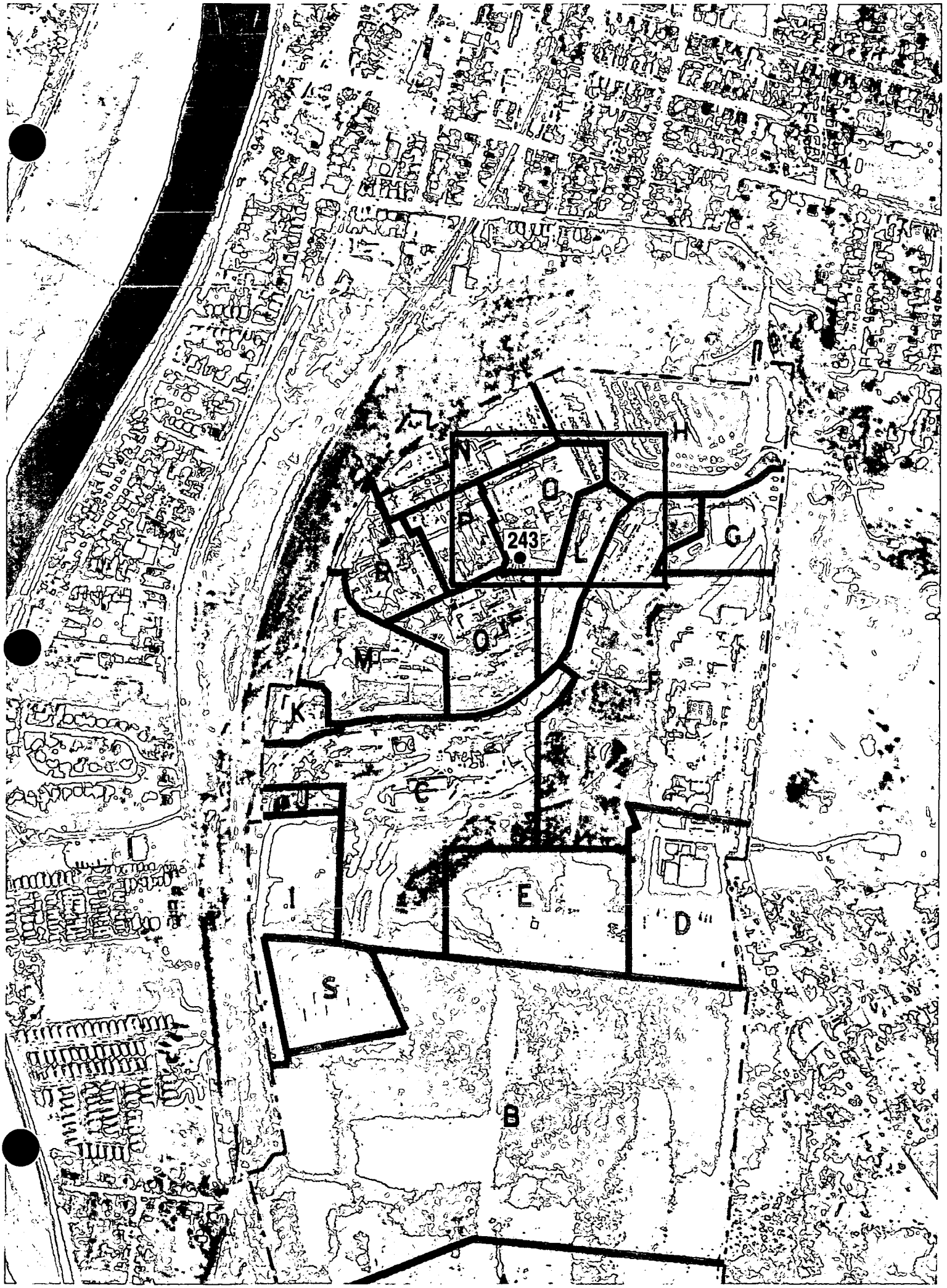
PRS # 243



PRS 243

REV	DESCRIPTION	DATE
PUBLIC RELEASE 0	Available for comments.	Aug. 20, 1996
FINAL 1	Comment period expired. No comments. Recommendation page annotated.	Oct. 16, 1996
FINAL 2	Signature page changed to show correct review period.	Nov. 19, 1996


MOUND PLANT
Release Block O
Potential Release Site
PRS 243

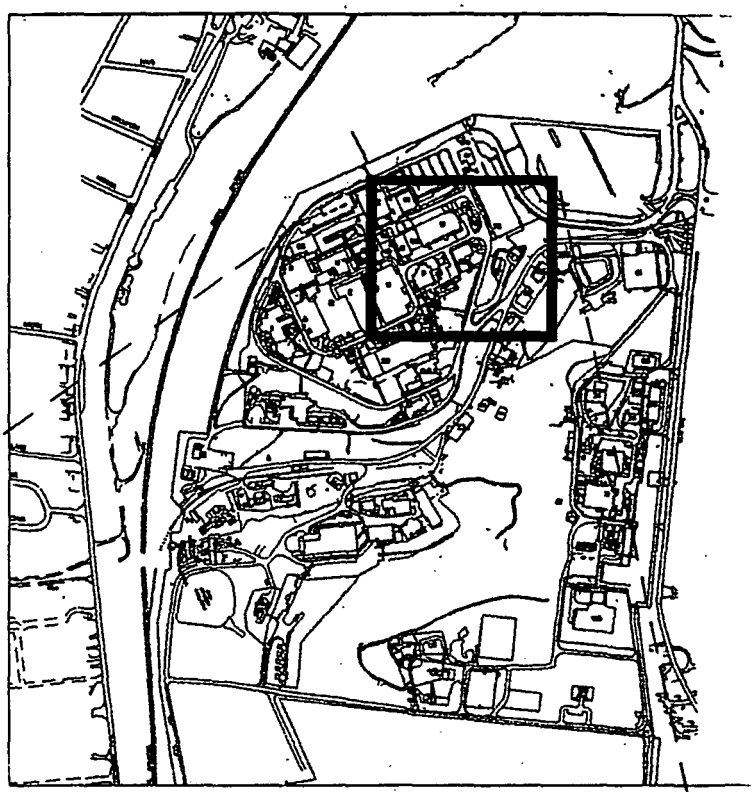

N
O
P
243
H
G
R
Q
M
K
C
I
E
D
S
B

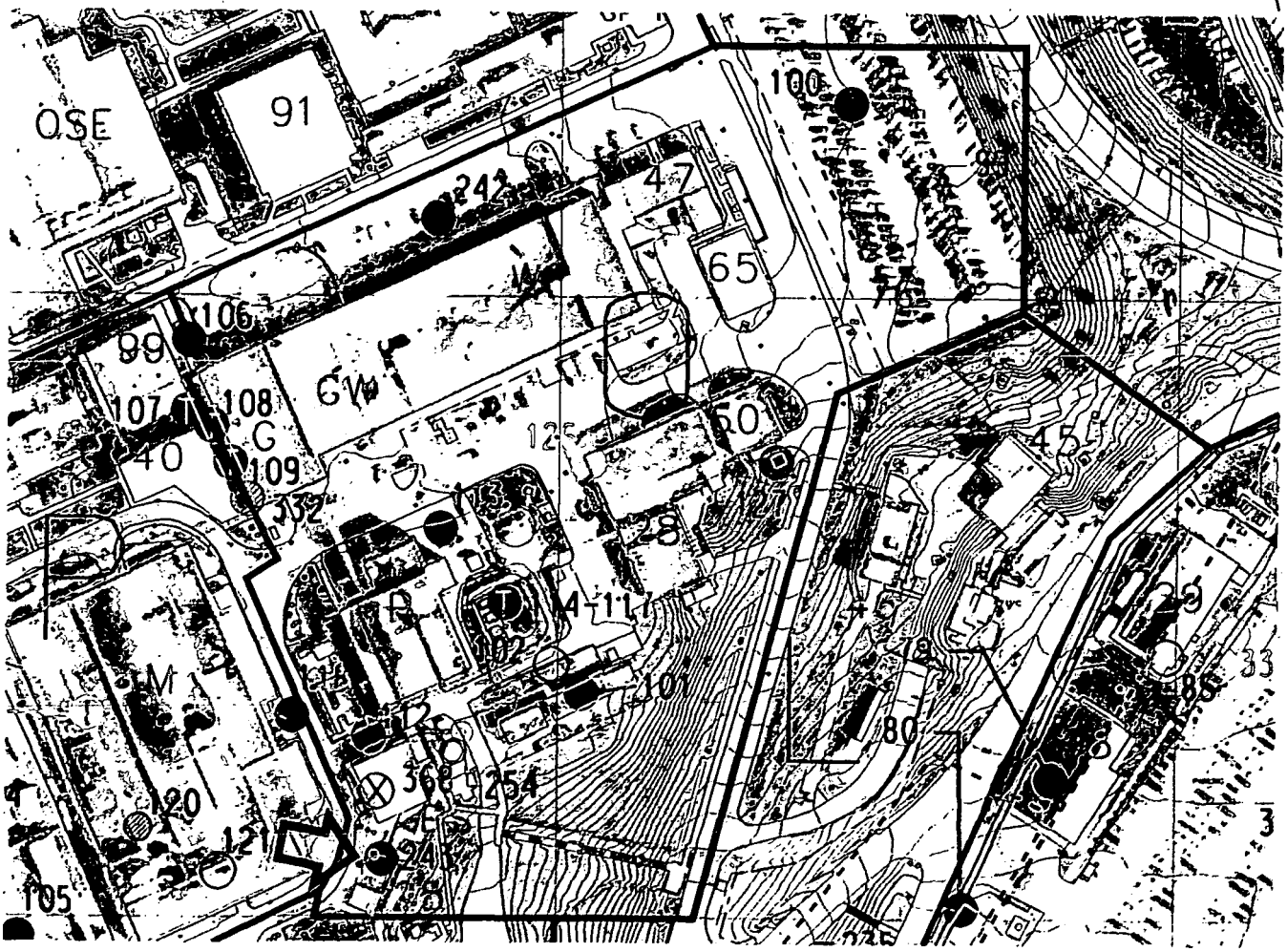
MOUND PLANT

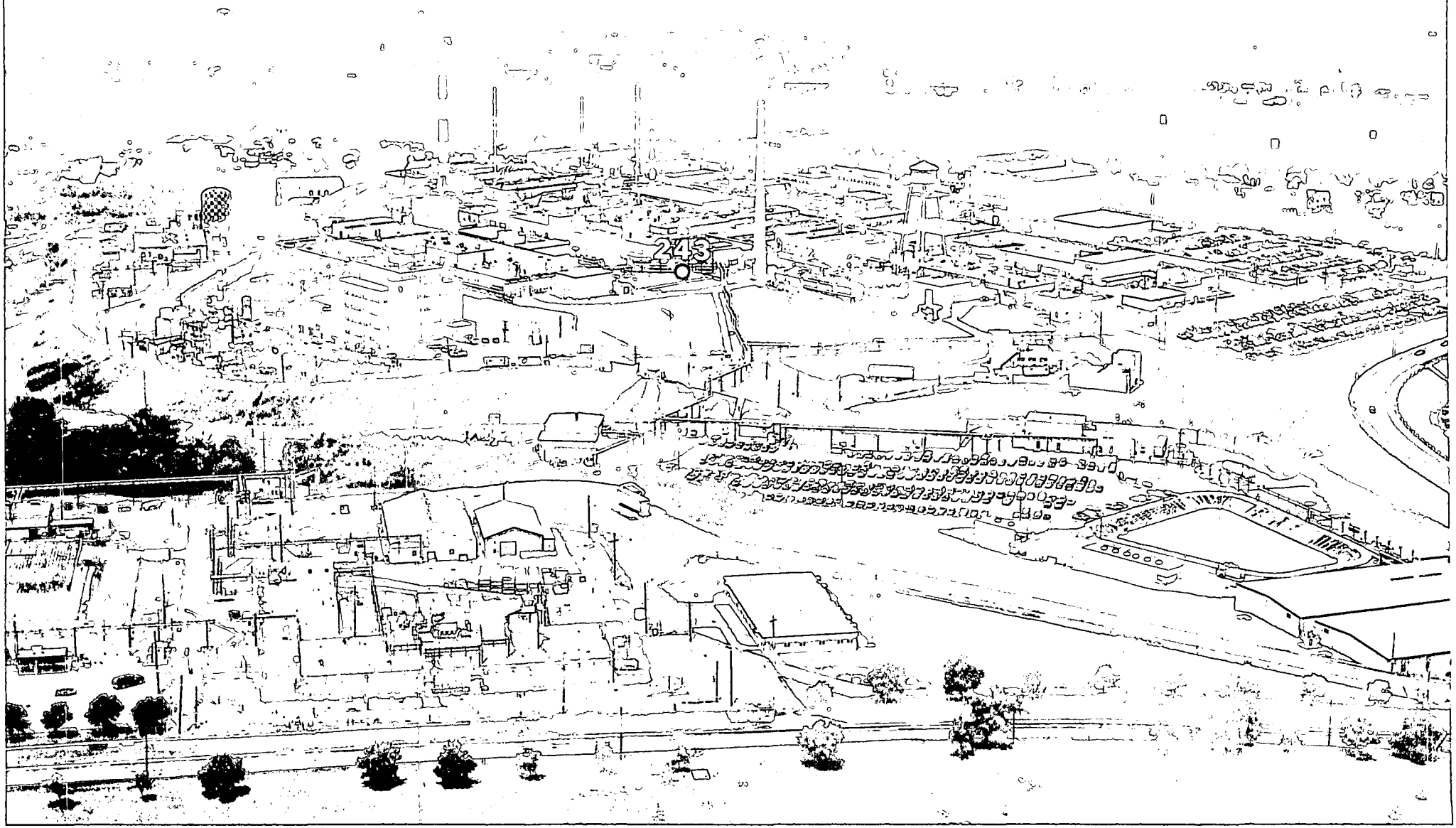
Release Block O

Potential Release Site

PRS 243






243

243

PRS 243

PRS HISTORY:

The location of PRS 243 is southeast of M Building, on the south side of the roadway. The site is a PRS due to a toluene detection found during the Soil Gas Survey.[1, 2]

CONTAMINATION:

A) The 1983 Radiological Site Survey[3] investigated radionuclides via Mound Soil Screening, radiochemistry and gamma spectroscopy. One surface sample (S0161) was taken in the vicinity of PRS 243. The sample was analyzed for plutonium-238 via Mound Soil Screening and radiochemical analysis, and for thorium via Mound Soil Screening. Sample analysis found no evidence of radiological concentrations in excess of Mound ALARA (25 pCi/g for plutonium) or regulatory limits (5 pCi/g for thorium in surface soil).[3, 5]

B) The 1992 Site Soil Gas Survey[2] investigated VOCs by soil gas/gas chromatography. Eight types of VOCs were investigated. One sample was taken at PRS 243 at a depth of 5 feet. Results showed:

Contaminant	Maximum Concentration Detected	Calculated Guideline Criteria
Toluene	19 ppb (in soil)[2]	414,600 ppb (in soil)[4]

NOTE: ppb = parts per billion

READING ROOM REFERENCES:

1) Operable Unit 9 Site Scoping report: Volume 12-Site Scoping Report, December 1994. (pages 5-7)
2) Soil Gas Survey and Geophysical Investigations Main Hill and SM/PP Hill Areas Reconnaissance Sampling, February 1993. (pages 8-10)
3) Operable Unit 9 Site Scoping Report: Volume 3 - Radiological Site Survey, June 1993. (pages 11-13)

OTHER REFERENCES:

4) Comparison of Actual Soil Gas Values with Calculated Acceptable Soil Gas Values, 3/96. (pages 14-16)
5) Code of Federal Regulations, 40CFR192.12 and 40CFR192.41.

PREPARED BY:

Eric Horstman, Member of EG&G Technical Staff

MOUND PLANT
PRS 243
SOIL CONTAMINATION - PAINT SHOP BUILDING

RECOMMENDATION:

This soils location was identified as a Potential Release Site (PRS) because of the detection of toluene during the Mound Reconnaissance Sampling soil gas survey.

Calculations were performed converting the toluene 10^{-6} Risk Based Guideline Value (given in mg contaminant per kg soil) to a corresponding 10^{-6} Risk Based Guideline Values for soil gas concentrations (parts contaminant per parts soil gas). The results of the calculation showed that the toluene detection was approximately 20,000 times less than the toluene guideline criteria. Additionally, one surface sample taken in the vicinity of PRS 243 showed that plutonium-238 and thorium-232 concentrations were below their respective guideline criteria of 25 pCi/g and 5 pCi/g.

Therefore, since the Volatile Organic Compound (VOC) soil gas detections establishing this soils location as a PRS have been shown not to be evidence of contamination above guideline criteria and since there is no additional lab data or history of evidence of contamination, PRS 243 requires NO FURTHER ASSESSMENT.

CONCURRENCE:

DOE/MB: Arthur W. Kleinrath, Remedial Project Manager — 8/20/96 (date)

USEPA: Timothy J. Fischer, Remedial Project Manager — 8/20/96 (date)

OEPA: Brian K. Nickel, Project Manager — 8/20/96 (date)

SUMMARY OF COMMENTS AND RESPONSES:

Comment period from ~~9/15/96~~ 9/16/96 to 10/15/96

☒ No comments were received during the comment period.

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

REFERENCES
FOR

PRS 243

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

Table A.1. Comprehensive Tabulation of Potential Release Sites

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	Ref
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, 1079, 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
	W Building Stack (NCPDF)	E-6	In service	Tritium	4, 18						
	W Building Stack (SW1C)	E-6	In service	Uranium-238	4, 18						
	W Building Stack (HEFS)	E-6	In service	Tritium	4, 18						
	B Building Stack	E-6	Inactive	Polonium-210, Tritium	4, 18						
	T Building WEST Stack	F-6	In service	Tritium, Plutonium-238 -239, Uranium-238	4, 18						
	T Building EAST Stack	E-7	In service	Tritium, Plutonium-238, Uranium-238	4, 18						
	WD Building Stack (ALR)	F-6	In service	Plutonium-238	4, 18						

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: Vol. 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 Scping Report: Vol. 3 - Radiological Site Survey (FINAL)."
7. DOE 1993c "Operable Unit 3, Misc. 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 Scpoing Report: Vol. 9 - 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: Vol. 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 1976a, 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."

Duplicate
22-03-12-10
#950216-0001

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

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	---	226 *	11
MND–01–1055–1005	5 AUG 92	---	---	---	---	---	---	4 *	5
MND–01–1057–0005	5 AUG 92	---	---	---	---	---	---	---	24
MND–01–1062–0003	5 AUG 92	---	---	---	---	13	---	6	---
MND–01–1064–0005	11 AUG 92	---	---	---	---	---	---	---	19
MND–01–1066–0005	11 AUG 92	---	---	---	---	6	---	---	228
MND–01–1067–0005	11 AUG 92	---	---	---	---	---	---	11	133
MND–01–1069–1005	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–01–1076–0005	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	15 AUG 92	---	83	13	485	---	---	978	---
MND–01–1097–0002	14 AUG 92	---	---	---	---	---	---	6	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–01–1106–0003	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

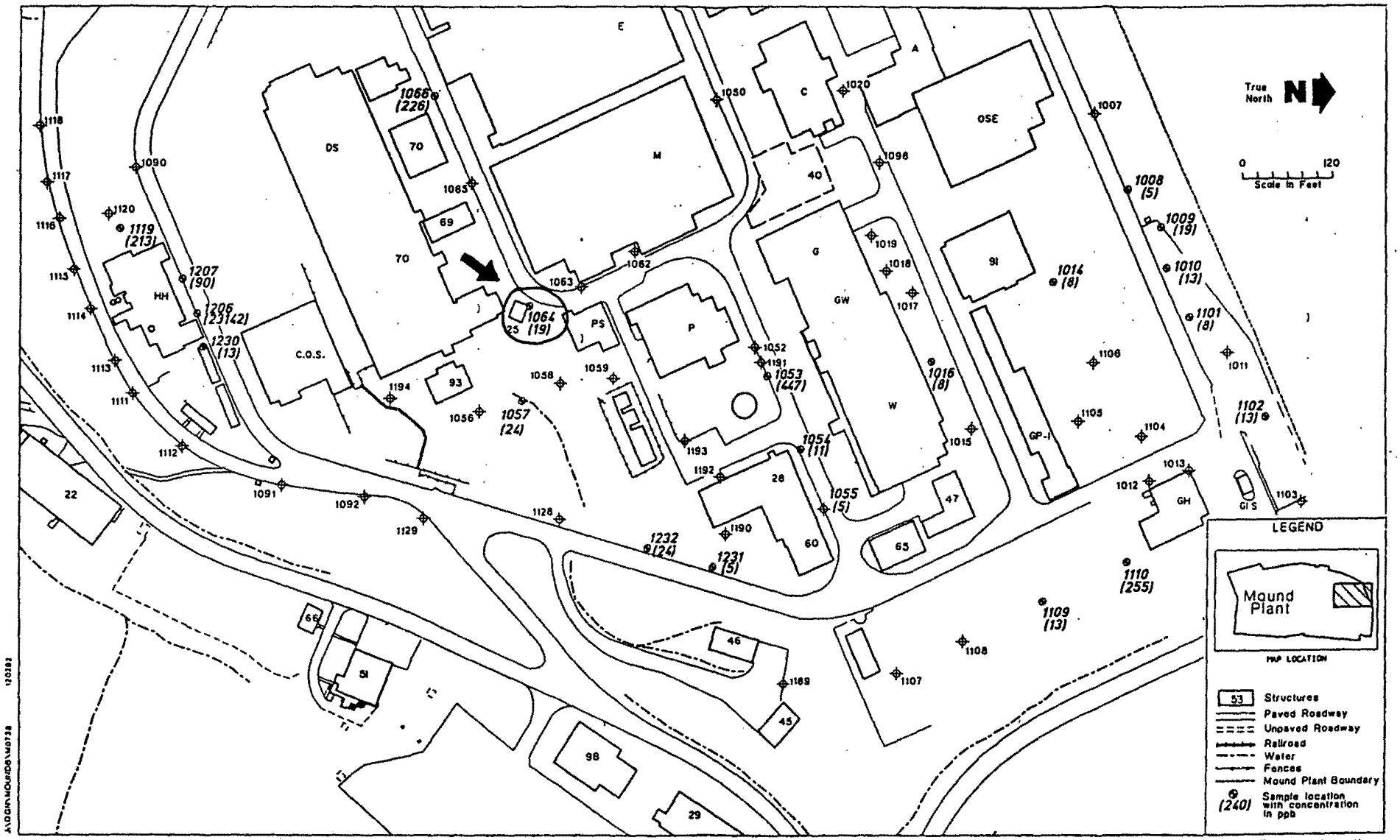


Figure 2.20. Toluene detection map for Main Hill East.

ENVIRONMENTAL RESTORATION PROGRAM

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

MOUND PLANT
MIAMISBURG, OHIO

June 1993

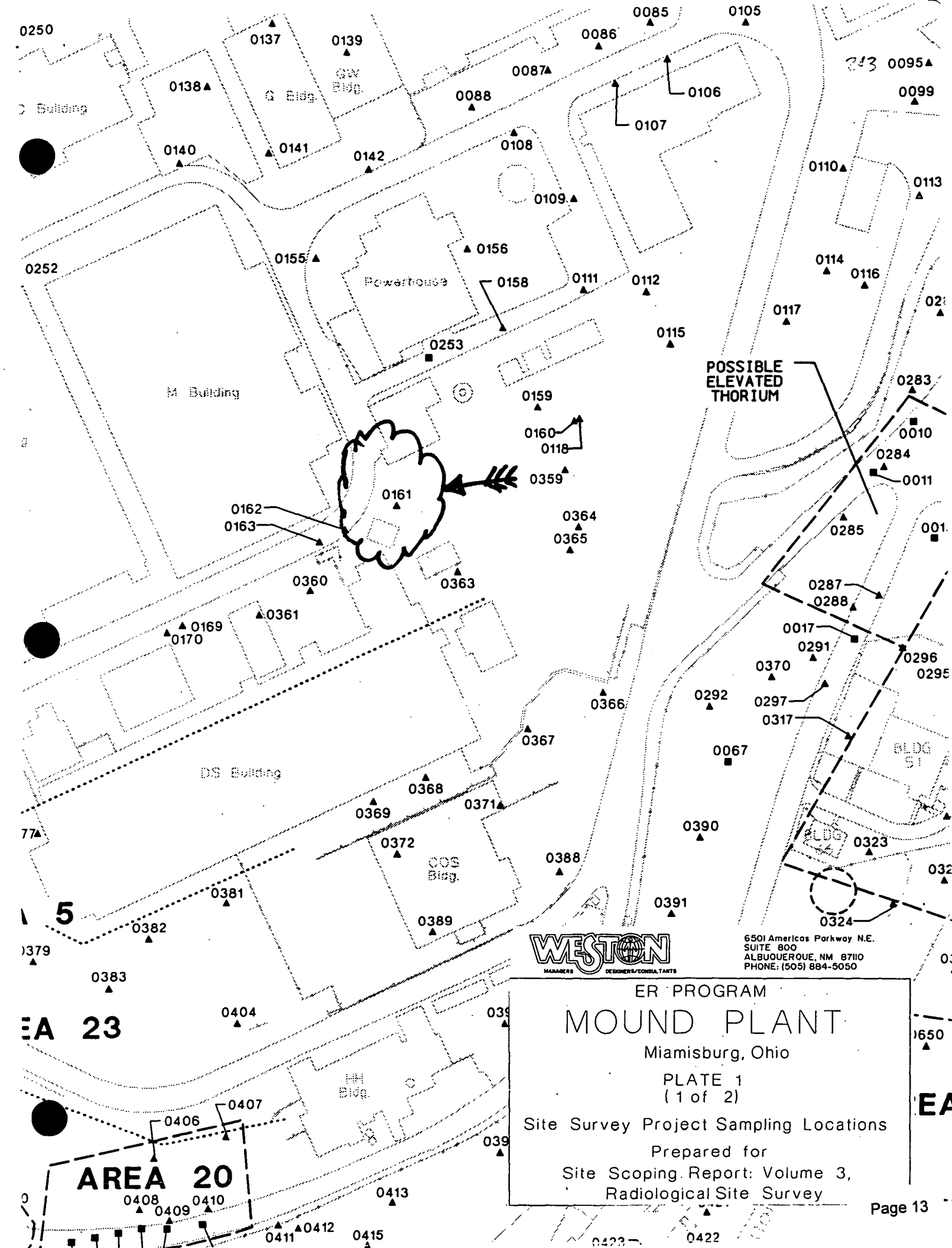
DEPARTMENT OF ENERGY
ALBUQUERQUE FIELD OFFICE

ENVIRONMENTAL RESTORATION PROGRAM
EG&G MOUND APPLIED TECHNOLOGIES

FINAL

Map Location[a]	Coordinates South	Coordinates West	MRC ID No.	Mo-Yr	Depth (inch)	Pu-238 (pCi/g)	Thorium[b] (pCi/g)	Tritium (pCi/mL)	Co-60 (pCi/g)	Cs-137 (pCi/g)	Ra-226 (pCi/g)	Am-241 (pCi/g)
S0161	1775	2795	3093	10-83	0	1.19	b					
S0162	1775	2845	6206	08-84	0	0.62	b					
S0163	1775	2870	6207	08-84	0	0.34	b					
S0164	1505	3175	3098	10-83	0	0.25	b					
S0165	1750	3300	6211	08-84	0	0.22[c]	b					
S0166	1750	3350	4000	10-83	0	34.50	b					
S0167	1775	3225	6212	08-84	0	0.81	b					
S0168	1775	3275	3099	10-83	0	1.76	b	12.73				
S0169	1790	3010	8424	11-84	0	0.05	b					
S0170	1790	3025	3097	10-83	0	0.41	b					
[illegible]	[illegible]	[illegible]	3098	10-83	0	1.87	b					

[a]Map locations are given using a "C" to designate core locations and an "S" to designate surface locations.
[b]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.
[c]MRC IDs 10119 and 10120 were also assigned to the samples from core location C0059, also in Area 16.
[d]MRC IDs 10121 to 10124 were also assigned to the samples from core location C0060, also in Area 16.
[e]MRC IDs 10125 to 10128 were also assigned to the samples from core location C0061, also in Area 16. MRC ID 10128 was also assigned to the samples taken at 72 and 90 inches at C0058.
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
NR - No result given
pCi/g - picocuries per gram
pCi/mL - picocuries per milliliter


POSSIBLE ELEVATED THORIUM
Powerhouse
M Building
DS Building
COS Bldg.
HH Bldg.
AREA 20
AREA 23
WESTON
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

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	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	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	5600
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.