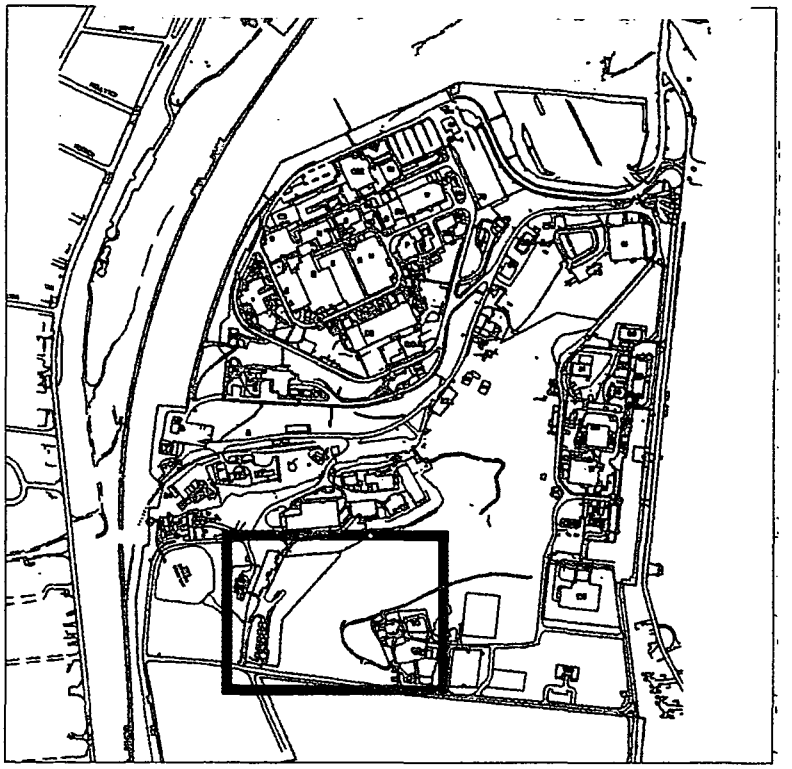
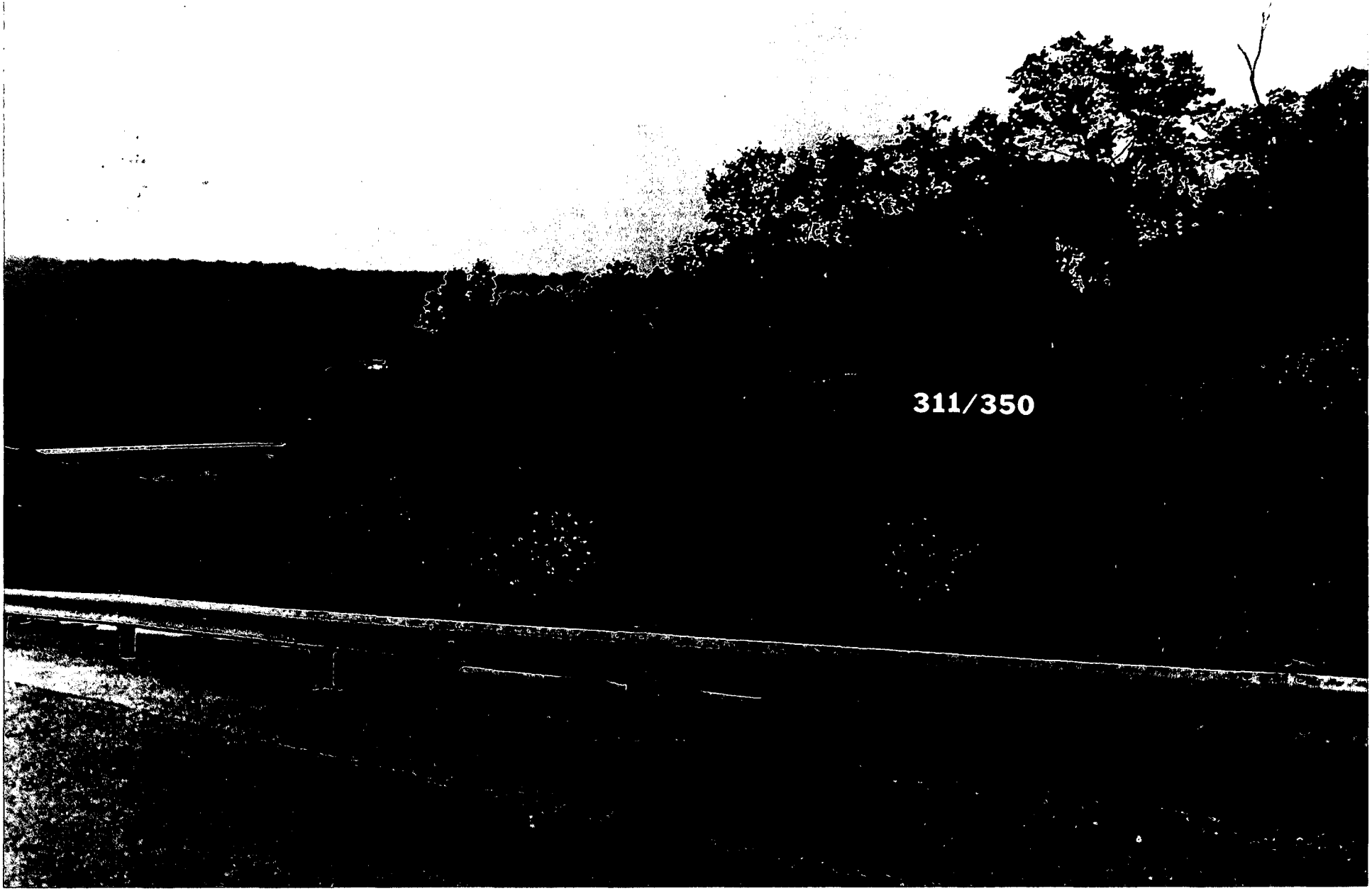
MOUND PLANT

AREA C

PRS 311/350

July 5, 1995




311/350

MOUND PLANT
PRS 311/350
JULY 5, 1995

PRS HISTORY: PRS 311 was an isolated plutonium hot spot identified Oct 83 during the site survey project (location S0706).

PRS 350 incorporated elevated plutonium samples identified in the vicinity of PRS 311 during the OU5 Phase I Investigation June 94.

PROCESS DESCRIPTION: No radioactive or hazardous waste generating processes are known to have occurred at the location of PRS 311.

CONTAMINATION: Isolated plutonium-238 hot spot identified July 83 during the Site Survey Project (location S0706). Contamination level was 28.9 pCi/g Pu-238 and thorium less than 2 pCi/g.

PRS 311 and the surrounding soil scheduled to be revisited August 95 as part of the "Other Soils Characterization" effort.

The area contained in PRS 350 identified several samples of Pu-238 ranging between 25-50 pCi/g during the OU5 Phase I Investigation June 94.

REFERENCES: Sampling and Analysis Plan for the Other Soils Areas, June 94
OU9 Scoping Report, Volume 3, Radiological Site Survey Report. OU5, Operational Area Phase I Investigation, December 94

PREPARED BY: Liebson/Horstman

RECOMMENDATION: _____

_____

CONCURRENCE:

DOE: _____

USEPA: _____

OEPA: _____

REFERENCE MATERIAL
PRS 311
(ALSO KNOWN AS HOT SPOT S0706)
AND
PRS 350

Document Control No. DGC
W.P. DAVIS

Environmental Restoration Program

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

MOUND PLANT
MIAMISBURG, OHIO

June 1993

FINAL

Department of Energy
Albuquerque Field Office

Environmental Restoration Program
EG&G Mound Applied Technologies

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

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

2.1.4. Sample Analyses

2.1.4.1. FIDLER Screening

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

2.1.4.2. Radiochemical Analysis for Plutonium-238

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

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

2.1.4.3. Radiochemical Analysis for Thorium

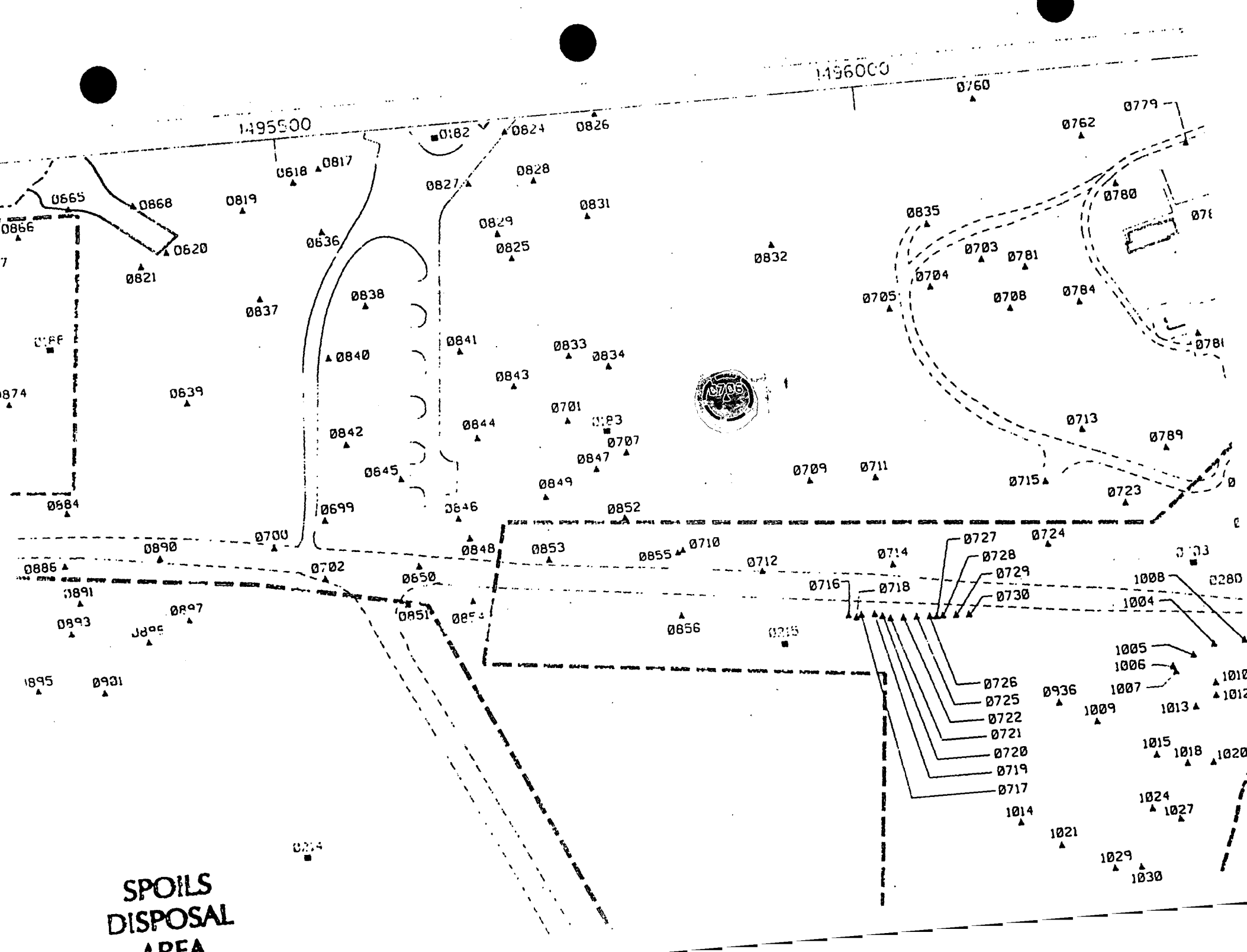
Samples with thorium concentrations in excess of 2 pCi/g by FIDLER screening were also radiochemically analyzed for thorium, resulting in the radiochemical analysis of about 12 percent of the samples. The LDLs for the thorium isotopes using radiochemical procedures were estimated to be

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

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

2.1.4.4. Gamma Spectroscopy

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


1495500
1496000
SPOILS
DISPOSAL
AREA

RADIOCHEMICAL ANALYSIS

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)
S0701	3275	4165	2937	10-83	0	0.37	b					
S0702	3295	4415	2934	10-83	0	0.16	b					
S0703	3325	3785	5851	07-84	0	0.51	b					
S0704	3325	3835	4019	10-83	0	0.11	b					
S0705	3325	3875	5852	07-84	0	0.24	b					
S0706	3325	4035	4021	07-84	0	28.90	b					
S0707	3325	4135	5853	07-84	0	0.37	b					
S0708	3375	3785	5850	07-84	0	0.05	b					
S0709	3425	4010	5855	07-84	0	7.67	b					
S0710	3425	4135	5854	07-84	0	0.30	b					
S0711	3450	3960	4018	10-83	0	1.88	b					
S0712	3475	4085	5856	07-84	0	7.84[c]	25.25[c]					
S0713	3500	3785	5849	07-84	0	0.23	b					
S0714	3525	3985	5857	07-84	0	3.01	b					
S0715	3525	3835	4017	10-83	0	0.45	b					
S0716	3545	4040	10466	08-85	0	3.06	b					
S0717	3550	4030	10465	08-85	0	12.05	b					
S0718	3550	4035	4020	10-83	0	0.28	b					
S0719	3555	4020	10464	08-85	0	17.10	b					

f Map Location[a]	Coordinates South	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)
C0289	2422.7	2081.0	None[d]	07-84	0	NR	0.6					
			None[d]	07-84	12	NR	1.1					
			None[d]	07-84	24	NR	0.5					
			None[d]	07-84	36	NR	0.8					
			None[d]	07-84	48	NR	1.0					
			None[d]	07-84	60	NR	0.8					
C0290	2401.5	2102.1	None[d]	07-84	0	NR	0.7					
			None[d]	07-84	12	NR	0.8					
			None[d]	07-84	24	NR	0.8					
			None[d]	07-84	36	NR	0.8					
			None[d]	07-84	48	NR	0.6					
			None[d]	07-84	60	NR	0.9					
			None[d]	07-84	72	NR	0.8					
C0291	2915.3	2490.3	None[d]	07-84	0	NR	0.6					
			None[d]	07-84	12	NR	0.4					
			None[d]	07-84	24	NR	0.5					
			None[d]	07-84	36	NR	0.4					
			None[d]	07-84	48	NR	0.4					
			None[d]	07-84	60	NR	0.3					
			None[d]	07-84	72	NR	0.5					
			None[d]	07-84	84	NR	0.4					
			None[d]	07-84	96	NR	0.7					
			None[d]	07-84	108	NR	0.6					
			None[d]	07-84	120	NR	0.3					
			None[d]	07-84	132	NR	0.3					
S1092	2185	3362	8413	12-84	f	0.31	323.5[g]					

[a]C denotes core location and S denotes surface sample location on Plate 1.

[b]Thorium results of $\leq$ 2 pCi/g are listed as "b".

[c]Verification sample analyzed for QA/QC.

[d]No MRC ID assigned because *in situ* gamma spectrometry was performed for thorium-232.

[e]Gamma results could not be confirmed using the gamma spectroscopy printout given in this appendix.

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

[g]Sample results were given isotopically for this sample and included 0.99 pCi/g thorium-228; 321 pCi/g thorium-230; and 1.5 pCi/g thorium-232, for a total of 323.5 pCi/g.

LDL - The sample result was below the Lower Detection Limit, which was estimated to be 0.5 pCi/g for cesium-137, cobalt-60, and americium-241. The LDL for radium-226 or actinium-227 was estimated to be 1 pCi/g.

NR - No result provided. (Note: no samples were taken for plutonium-238 when *in situ* gamma spectrometry was performed.)

Document Control No.

Environmental Restoration Program

OPERABLE UNIT 5
OPERATIONAL AREA PHASE II INVESTIGATION
NON-AOC FIELD REPORT

MOUND PLANT
MIAMISBURG, OHIO

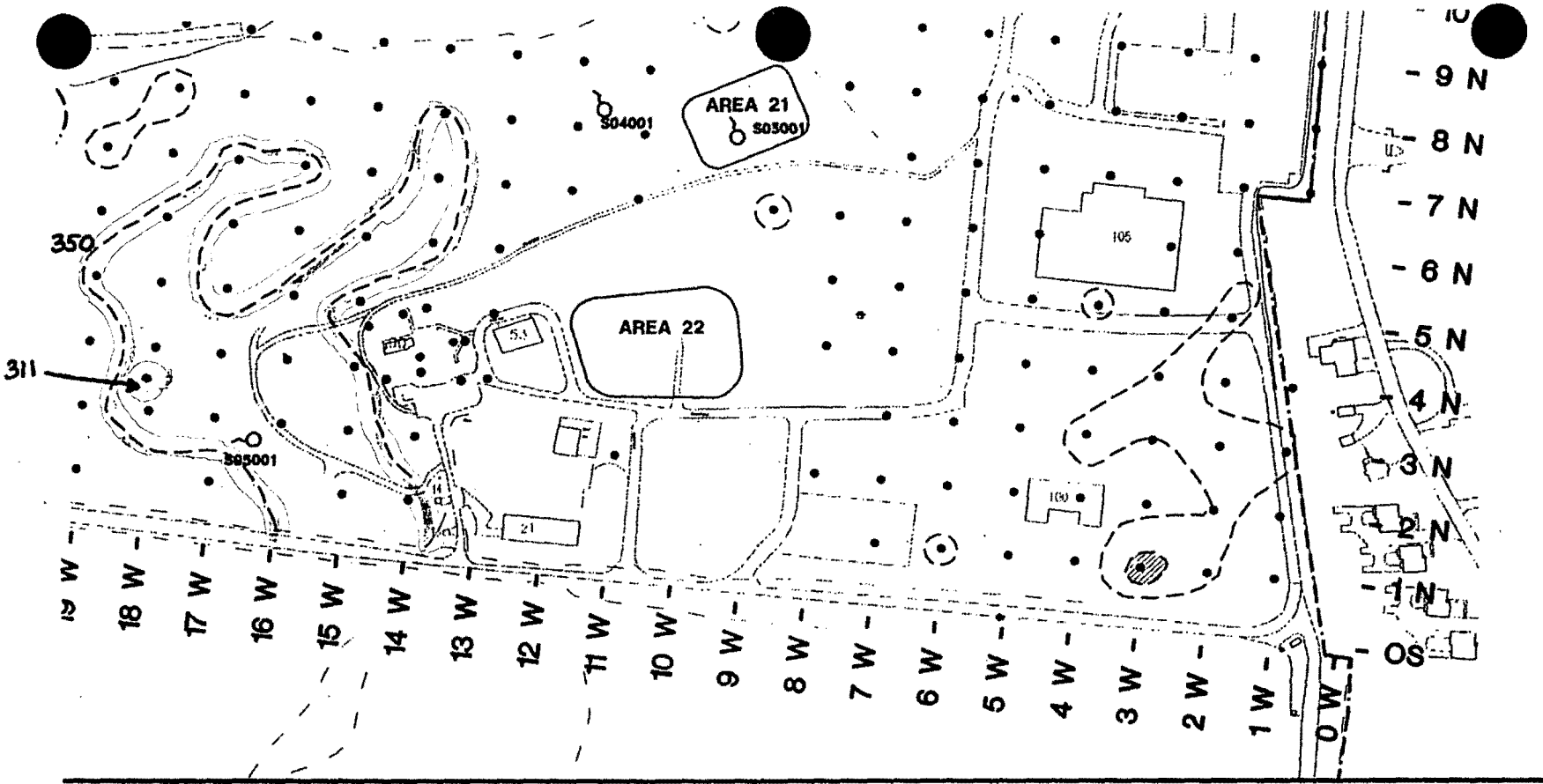
VOLUME I - TEXT

June 1995

Final (Revision 0)

U.S. Department of Energy
Ohio Field Office

EG&G Mound Applied Technologies



TE 3

TITLE:

LOCATIONS OF ELEVATED SURFACE SOIL PU-238 ACTIVITY

Structures

Plant Boundary

Paved/Unpaved Roadway

Ephemeral Stream

OU5 Boundary

Non-AOC Sampling and Survey Locations: Soil Gas Samples, Soil Screening Facility Radiological Samples, and FIDLER Survey

Monitoring Well

Piezometer

1 N - 1 W - Grid Lines

Seeps

Contour for Pu-238 Concentrations Between 25 - 50 pCi/g

Contour for Pu-238 Concentrations · 50 pCi/g

Note: Information on Basemap is Derived from the Weston OU9 Site Scoping Report, 1993, & Referenced to the 1927 Ohio State Plane Coordinate System

AREAS OF SPECIAL INTEREST AND ADDITIONAL SAMPLI

- Surface Soil Sampling Locations (Area H Pyrotechnic Waste Disposal Area and Building 34 Firefighting Training Area
- Soil Gas and Soil Screening Facility Radiological Sampling Locations (Fuel Area and Additional Sampling [o])
- Soil Screening Facility Radiological Sampling Locati (Additional Sampling [o])
- Surface and Subsurface Soil Sampling Locations (Building 24)
- o OU5 Discussion Paper (See Appendix B)

FIDLER DATA

Table II.2. Summary of Elevated Surface Radiological Activity in Non-AOC (FIDLER Survey)
Page 1 of 5

Location	Channel 1 (cpm)		Channel 2 (kcpm)		Out Channel (kcpm)
	CC	RDG	CC	RDG	RDG
1N2	114.9	130	6.4	8.0	a
1N3		--		8.0	a
1N4		--		7.0	a
1N5		--		8.0	a
1N6		--		7.5	a
1N14		120		9.0	a
1N15		--		9.0	a
2N2	102.1	--	5.4	9.0	a
2N3		--		8.5	a
2N5		--		6.5	a
2N6		--		6.0	a
2N8		--		6.5	a
2N14		--		8.0	a
2N15	173.2	--	8.7	9.0	a
2N16		--		9.5	a
2N18		--		9.5	a
2N19		--		10.0	a
3N1	114.9	--	6.4	6.5	a
3N2	149.4	--	6.7	8.5	a
3N3		150		8.5	a
3N4		150		9.0	a
3N5	136.8	--	5.2	7.0	a
3N6		--		6.0	a
3N16	200.1	--	9.7	10.0	a
3N17		--		10.5	a
3N18		--		10.0	a
3N19	173.2	--	8.7	9.0	a

FIDLER DATA

Table II.2. Summary of Elevated Surface Radiological Activity in Non-AOC (FIDLER Survey)
Page 2 of 5

Location	Channel 1 (cpm)		Channel 2 (kcpm)		Out Channel (kcpm)
	CC	RDG	CC	RDG	RDG
3N20	130	--	5.2	9.0	a
3N21		--		8.0	a
3N22	138	150	7.3	8.5	a
4N4	136.8	--	5.2	7.0	a
4N6.5		1000		80.0	45.0
4N5		--		5.5	a
4N7		--		6.0	a
4N13	165.3	--	7.6	8.5	a
4N19	173.2	--	8.7	9.5	a
4N20	130	--	5.2	5.5	a
4N22	154	--	6.7	8.0	a
5N13	173.2	--	8.7	9.5	a
5N15		--		9.5	a
5N16	200.1	--	9.7	11.0	a
5N18		--		10.5	a
5N19	130	--	5.2	9.5	a
5N20		--		6.5	a
5N21		--		6.0	a
5N23	138	--		6.5	a
6N3	154	--	6.7	9.0	a
6N7	123.1	140	4.5	9.0	a
6N8	177.7	--	9.3	9.5	a
6N9		--		9.5	a
6N11	173.2	--	8.7	9.5	a
6N12		--		10.0	a
6N13		190	8.7	9.5	a
6N14		---		11.0	a

FIDLER DATA

Table II.2. Summary of Elevated Surface Radiological Activity in Non-AOC (FIDLER Survey)
Page 3 of 5

Location	Channel 1 (cpm)		Channel 2 (kcpm)		Out Channel (kcpm)
	CC	RDG	CC	RDG	RDG
6N15	173.2	--	8.7	10.0	a
6N16		--		10.0	a
6N17		--		10.0	a
6N18	130	--	5.2	9.0	a
6N19		155		7.5	a
6N20		--		6.5	a
6N21		180		6.5	a
7N7	123.1	--	4.5	5.5	a
7N11	173.2	--	8.7	9.5	a
7N12		175		10.5	a
7N15		--		9.5	a
7N16		--		10.0	a
7N18	130	150	5.2	10.0	a
7N19		--		5.5	a
7N21	154	--	6.7	7.5	a
7N23	141.4	--	5.3	8.0	a
7N27		--		8.5	a
8N7	123.1	--	4.5	8.5	a
8N8		--		7.5	a
8N12	202.4	--	10.4	10.5	a
8N16	130	--	5.2	6.0	a
8N17		--		6.0	a
8N20		--		5.5	a
8N23	118.4	--	6.9	7.0	a
8N24	154	--	6.7	7.0	a
9N1	123.1	--	9.9	10.5	a
9N3		125	4.5	5.0	a

Table II.3. Summary of Elevated Surface Soil Radiological Activity in the Non-AOC
Page 1 of 2

MOUND SOIL SCREEN DATA

Grid Location[a]	Mound Soil Screening Facility Data	
	Plutonium-238 (pCi/g)	Thorium-232 (pCi/g)
1N2	25	0.9
1N3	60	ND
1N6	25	ND
1N14	38	ND
1N15	34	ND
2N2	25	ND
2N15	37	ND
2N16	28	ND
2N17	31	ND
2N18	40	ND
3N1	38	ND
3N2	49	ND
3N3	25	ND
3N4	31	ND
3N15	28	ND
3N16	36	ND
3N17	35	ND
3N18	46	ND
4N3	25	ND
4N16	31	ND
4N18	37	ND
4N19	35	ND
5N2	30	ND
5N4	27	ND
5N14	25	ND
5N15	41	ND
5N18	39	ND

MOUND SOIL SCREEN DATA

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

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

[a] See Plate 1 for grid location

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

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

	FIDLER SURVEY DATA					MOUND SOIL SCREENING FACILITY DATA			
SMPID	Contamination Criteria CH1	FIDLER Readings CH1	Contamination Criteria CH2	FIDLER Readings CH2	FIDLER Readings Out Channel	Plutonium - 238		Thorium - 232	
	Units: CPM	Units: CPM	Units: KCPM	Units: KCPM	Units: KCPM	Units: pCi/g		Units: pCi/g	
	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	Note:	RESULTS	Note:
01N01	113	60	8.06	3.2	NC	3	a	1	a
01N02	113	130	8.06	8.01	NC	25	b	0.9	a
01N03	113	110	8.06	8.0	NC	60	b	1.1	a
01N04	113	75	8.06	7.0	NC	6	a	0.7	a
01N05	113	100	8.06	8.0	NC	15	a	1.3	a
01N06	113	90	8.06	7.5	NC	25	b	1.1	a
01N07	113	40	8.06	3.5	NC	10	a	0.3	a
01N14	113	120	8.06	9.0	NC	38	b	1.1	a
01N15	113	105	8.06	9.0	NC	34	b	1	a
01N16	210.6	130	12.22	9.0	NC	NR		NR	
01N17	210.6	135	12.22	9.0	NC	21	a	0.7	a
01N18	210.6	120	12.22	9.0	NC	24	a	0.6	a
01N19	210.6	135	12.22	9.0	NC	NR		NR	
01N21	170.3	110	9.72	7.5	NC	NR		NR	
01N22	210.6	135	12.22	7.0	NC	20	a	0.6	a
01N23	210.6	145	12.22	7.0	NC	17	a	0.9	a
02N01	98.8	70	6.76	4.4	NC	12	a	0.5	a
02N02	98.8	90	6.76	9.0	NC	25	b	1	a
02N03	98.8	90	6.76	8.5	NC	21	a	0.9	a
02N04	98.8	30	6.76	4.5	NC	NR		NR	
02N05	98.8	60	6.76	6.5	NC	19	a	0.8	a
02N06	98.8	60	6.76	6.0	NC	17	a	0.8	a
02N07	98.8	60	6.76	4.5	NC	1	a	0.4	a
02N08	98.8	100	6.76	6.5	NC	NR		NR	
02N11	157.3	55	8.45	3.5	NC	0	a	0.5	a
02N14	98.8	110	6.76	8.0	NC	6	a	0.5	a
02N15	179.4	120	10.92	9.0	NC	37	b	1	a
02N16	179.4	140	10.92	9.5	NC	28	b	1	a
02N17	179.4	130	10.92	6.0	NC	31	b	0.9	a

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

	FIDLER SURVEY DATA					MOUND SOIL SCREENING FACILITY DATA			
SMPID	Contamination Criteria CH1	FIDLER Readings CH1	Contamination Criteria CH2	FIDLER Readings CH2	FIDLER Readings Out Channel	Plutonium - 238		Thorium - 232	
	Units: CPM	Units: CPM	Units: KCPM	Units: KCPM	Units: KCPM	Units: pCi/g		Units: pCi/g	
	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	Note:	RESULTS	Note:
02N18	179.4	170	10.92	9.5	NC	40	b	1	a
02N19	179.4	150	10.92	10.0	NC	20	a	1	a
02N20	130	85	6.5	6.5	NC	18	a	1.3	a
02N21	130	90	6.5	6.5	NC	NR		NR	
02N22	179.4	115	10.92	7.0	NC	21	a	0.8	a
02N23	179.4	80	10.92	6.5	NC	15	a	1	a
03N01	113	105	8.06	6.5	NC	38	b	0.7	a
03N02	152	145	8.45	8.5	NC	49	b	0.9	a
03N03	152	150	8.45	8.5	NC	25	b	1	a
03N04	152	150	8.45	9.0	NC	31	b	0.8	a
03N05	137.8	100	6.5	7.0	NC	9	a	0.9	a
03N06	137.8	100	6.5	6.0	NC	21	a	0.7	a
03N07	137.8	100	6.5	5.0	NC	13	a	0.8	a
03N13	170.3	90	9.72	6.0	NC	6	a	0.6	a
03N14	170.3	75	9.72	5.5	NC	9	a	0.5	a
03N15	210.6	150	12.22	9.5	NC	28	b	1.4	a
03N16	210.6	155	12.22	10.0	NC	36	b	0.8	a
03N17	210.6	150	12.22	10.5	NC	35	b	0.8	a
03N18	210.6	150	12.22	10.0	NC	46	b	0.7	a
03N19	179.4	160	10.92	9.0	NC	19	a	1.1	a
03N20	130	80	6.5	9.0	NC	24	a	1.6	a
03N21	130	100	6.5	8.0	NC	22	a	0.9	a
03N22	139	150	9.23	8.5	NC	1	a	1.1	a
03N23	139	100	9.23	6.5	NC	17	a	0.6	a
04N01	157.2	65	8.45	6.1	NC	0	a	0.8	a
04N02	98.8	70	6.72	4.5	NC	7	a	0.4	a
04N03	98.8	90	6.72	5.0	NC	25	b	0.8	a
04N04	137.8	120	6.5	7.0	NC	10	a	1.1	a
04N05	137.8	110	6.5	5.5	NC	20	a	1	a

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

	FIDLER SURVEY DATA					MOUND SOIL SCREENING FACILITY DATA			
SMPID	Contamination Criteria CH1	FIDLER Readings CH1	Contamination Criteria CH2	FIDLER Readings CH2	FIDLER Readings Out Channel	Plutonium - 238		Thorium - 232	
	Units: CPM	Units: CPM	Units: KCPM	Units: KCPM	Units: KCPM	Units: pCi/g		Units: pCi/g	
	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	Note:	RESULTS	Note:
04N06	137.8	100	6.5	5.0	NC	0	a	0.3	a
04N6.5	137.8	1000	6.5	80	45	NC		NC	
04N07	137.8	100	6.5	6.0	NC	19	a	0.8	a
04N08	179.4	100	10.92	8.5	NC	0	a	1.1	a
04N13	170.3	130	9.72	8.5	NC	13	a	0.7	a
04N14	170.3	110	9.72	6.0	NC	16	a	1.4	a
04N15	179.4	170	10.92	8.5	NC	19	a	1.2	a
04N16	179.4	140	10.92	8.0	NC	31	b	0.8	a
04N17	179.4	170	10.92	8.0	NC	15	a	1	a
04N18	179.4	160	10.92	8.5	NC	37	b	1	a
04N19	179.4	150	10.92	9.5	NC	35	b	1.5	a
04N20	130	75	6.5	5.5	NC	21	a	1.1	a
04N21	130	50	6.5	4.5	NC	11	a	0.1	a
04N22	157.3	120	8.45	8.0	NC	0	a	0.9	a
04N23	139	100	9.23	6.5	NC	16	a	0.6	a
05N02	253.5	115	12.48	9.0	NC	30	b	1.2	a
05N03	253.5	95	12.48	5.5	NC	16	a	1.3	a
05N04	253.5	115	12.48	7.5	NC	27	b	1.1	a
05N05	253.5	105	12.48	7.0	NC	1	a	0.8	a
05N06	184.6	70	11.7	4.0	NC	0	a	0.3	a
05N07	184.6	160	11.7	6.5	NC	0	a	0.8	a
05N08	184.6	125	11.7	8.5	NC	18	a	1.2	a
05N13	179.4	145	10.92	9.5	NC	16	a	1.2	a
05N14	179.4	120	10.92	7.0	NC	25	b	0.2	a
05N15	179.4	140	10.92	9.5	NC	41	b	0.5	a
05N16	210.6	140	12.22	11.0	NC	16	a	1.1	a
05N17	210.6	145	12.22	9.0	NC	18	a	1	a
05N18	210.6	165	12.22	10.5	NC	39	b	0.8	a
[illegible]	[illegible]	[illegible]	6.5	9.5	NC	7	a	0.9	a

APPENDIX D

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

	FIDLER SURVEY DATA					MOUND SOIL SCREENING FACILITY DATA			
SMPID	Contamination Criteria CH1	FIDLER Readings CH1	Contamination Criteria CH2	FIDLER Readings CH2	FIDLER Readings Out Channel	Plutonium - 238		Thorium - 232	
	Units: CPM	Units: CPM	Units: KCPM	Units: KCPM	Units: KCPM	Units: pCi/g		Units: pCi/g	
	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	Note:	RESULTS	Note:
05N20	130	105	6.5	6.5	NC	18	a	0.9	a
05N21	130	95	6.5	6.0	NC	3	a	0.6	a
05N22	157.3	65	8.45	4.0	NC	20	a	0.9	a
05N23	139	105	9.23	6.5	NC	23	a	0.8	a
06N02	157.3	75	8.45	6.5	NC	19	a	1.3	a
06N03	157.3	120	8.45	9.0	NC	1	a	1.1	a
06N05	253.5	90	12.48	5.0	NC	14	a	1	a
06N06	122.2	90	5.59	4.5	NC	11	a	0.8	a
06N07	122.2	140	5.59	9.0	NC	0	a	1.7	a
06N08	184.6	115	11.7	9.5	NC	24	a	1.4	a
06N09	184.6	150	11.7	9.5	NC	33	b	1	a
06N11	179.4	150	10.92	9.5	NC	20	a	0.8	a
06N12	179.4	175	10.92	10.0	NC	10	a	0.8	a
						13	a	0.8	a
06N13	179.4	190	10.92	9.5	NC	13	a	0.8	a
06N14	179.4	160	10.92	11.0	NC	30	b	1.3	a
06N15	179.4	165	10.92	10.0	NC	6	a	1	a
06N16	179.4	140	10.92	10.0	NC	29	b	0.8	a
06N17	179.4	150	10.92	10.0	NC	25	b	1.3	a
06N18	130	125	6.5	9.0	NC	7	a	0.9	a
06N19	130	155	6.5	7.5	NC	39	b	1.2	a
06N20	130	130	6.5	6.5	NC	18	a	1.1	a
06N21	130	80	6.5	6.5	NC	1	a	0.7	a
06N22	139	125	9.23	5.5	NC	NR		NR	
06N23	139	85	9.23	4.0	NC	18	a	0.5	a
07N01	253.5	140	12.48	8.5	NC	22	a	1.3	a
07N02	115.7	65	6.11	4.5	NC	24	a	0.7	a
07N03	253.5	140	12.48	9.5	NC	21	a	1.5	a
07N04	253.5	135	12.48	8.5	NC	0	a	1.2	a

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

	FIDLER SURVEY DATA					MOUND SOIL SCREENING FACILITY DATA			
SMPID	Contamination Criteria CH1	FIDLER Readings CH1	Contamination Criteria CH2	FIDLER Readings CH2	FIDLER Readings Out Channel	Plutonium - 238		Thorium - 232	
	Units: CPM	Units: CPM	Units: KCPM	Units: KCPM	Units: KCPM	Units: pCi/g		Units: pCi/g	
	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	Note:	RESULTS	Note:
07N05	253.5	125	12.48	8.5	NC	11	a	0.8	a
07N06	122.2	85	5.59	4.5	NC	3	a	0.3	a
07N07	122.2	120	5.59	5.5	NC	12	a	0.9	a
07N11	179.4	170	10.92	9.5	NC	0	a	0.7	a
07N12	179.4	175	10.92	10.5	NC	24	a	0.9	a
07N13	179.4	120	10.92	6.5	NC	7	a	0.6	a
07N14	179.4	100	10.92	8.5	NC	27	b	0.8	a
07N15	179.4	140	10.92	9.5	NC	6	a	1.2	a
07N16	179.4	170	10.92	10.0	NC	13	a	0.9	a
07N17	179.4	150	10.92	8.5	NC	0	a	0.8	a
07N18	130	150	6.5	10.0	NC	26	b	1.3	a
07N19	130	85	6.5	5.5	NC	20	a	1.1	a
07N20	157.3	120	8.45	6.0	NC	12	a	0.6	a
07N21	157.3	90	8.45	7.5	NC	7	a	0.7	a
07N22	143	95	6.63	5.0	NC	5	a	0.4	a
						12	a	0.8	a
07N23	143	115	6.63	8.0	NC	11	a	0.8	a
						25	b	1.0	a
07N24	143	100	6.63	5	NC	12	a	0.5	a
						19	a	0.6	a
07N25	143	70	6.63	5	NC	10	a	0.5	a
07N26	143	90	6.63	4.5	NC	4	a	0.3	a
						0	a	0.5	a
07N27	143	110	6.63	8.5	NC	10	a	0.9	a
						3	a	0.7	a
08N01	253.5	175	12.48	9.5	NC	4	a	0.9	a
08N02	122.2	75	5.59	4.5	NC	WIPE	c	WIPE	c
08N03	122.2	85	5.59	4.0	NC	WIPE	c	WIPE	c
08N04	130	80	6.5	3.5	NC	WIPE	c	WIPE	c

DECONTAMINATION & DECOMMISSIONING PROGRAM

SAMPLING AND ANALYSIS PLAN FOR THE OTHER SOILS AREAS

MOUND PLANT
MIAMISBURG, OHIO

FINAL (Rev 1)

Prepared for:

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

Prepared by:

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

JUNE 1994

2.1.10 Hot Spot S0706

Hot Spot S0706 is located in the southwest corner of the Mound Plant Site. This hot spot is in an area approximately 150 feet north of the "east-west" roadway and 500 feet west of the Building 21. This hot spot is close to the intersection of a grassy opening and the existing tree line. (See Figure 2.7)

2.1.11 Hot Spot S0971

Hot Spot S0971 is located in the southeast corner of the Mound Plant Site. This hot spot is in a grassy area near a run-off ditch, approximately 300 feet west of Contractor Gate #2, on the northern side of the "east-west" access road. (See Figure 2.8)

2.1.12 Hot Spot S0982

Hot Spot S0982 is located on the southern end of the top of the SM/PP Hill. This hot spot is in a grassy area west of the access road running past the water tower and approximately 250 feet west of Building 105. There is a drop off of about 10 feet in the vicinity of this hot spot. (See Figure 2.8)

2.1.13 Hot Spot S1092

Hot Spot S1092 is located on the southern slope of the Main Hill. This hot spot is in an area approximately midway between the WD and HH Buildings, near or on the northeast side of the access road. Part of the area is covered with concrete and asphalt and part could be located in the surface drainage ditch. (See Figure 2.3)

2.2 DATA FROM PREVIOUS INVESTIGATIONS

The 13 Hot Spots were specifically identified in the OU9, Site Scoping Report, Volume III - Radiation Site Survey (DOE 1992b). In this report, the sampling data collected during the Mound Site Survey Project (Stought et. al., 1988) was reviewed. Isolated locations of radioactive contamination, known as hot spots, were identified that contained concentrations of one or more radionuclides that exceeded baseline levels at Mound Plant. The criteria used for identifying these potential hot spots were as follows:

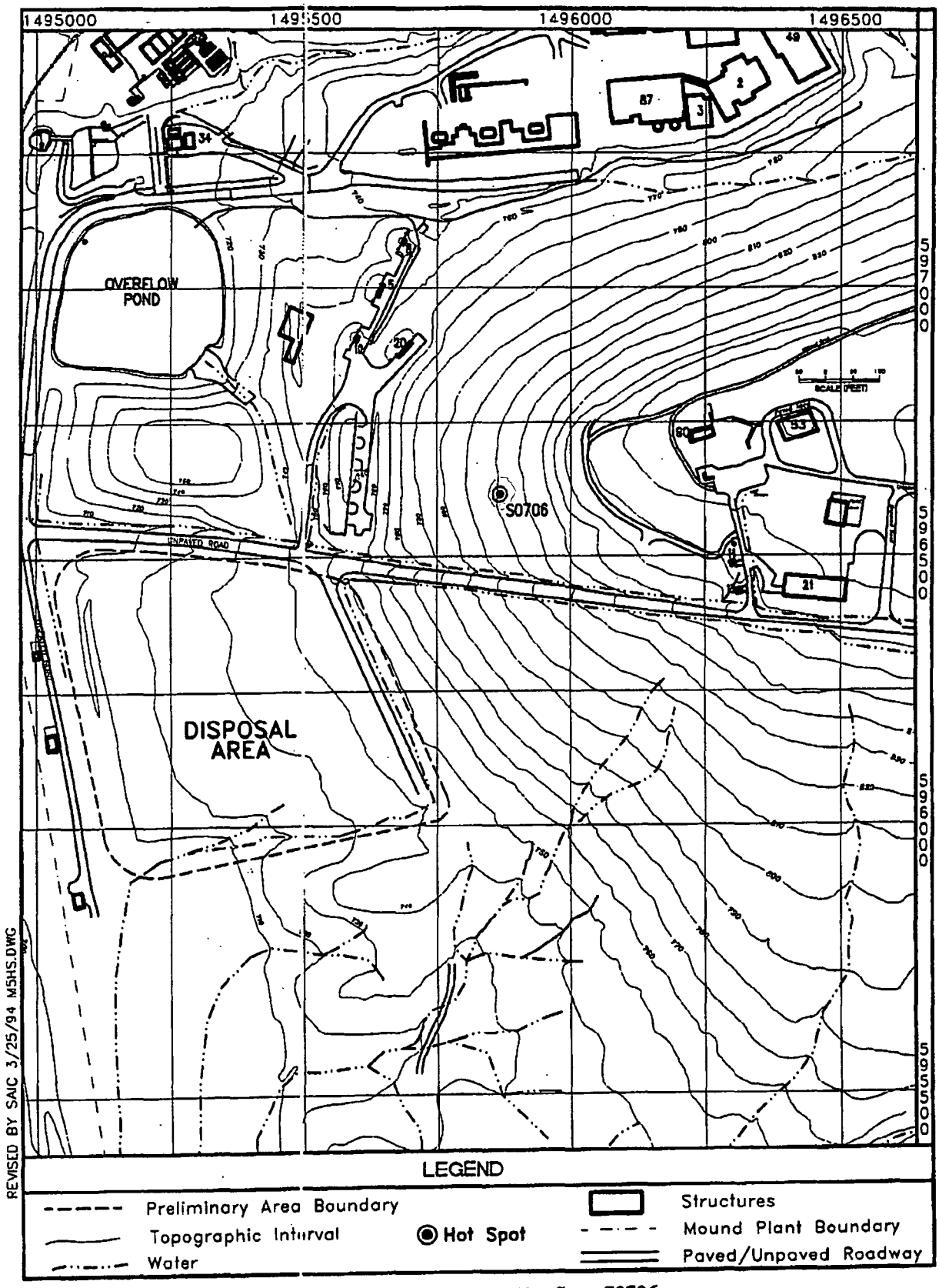


Figure 2.7. Location of Hot Spot S0706

Table II.1 Historical Data from the Mound Site Survey Project - Hot Spots
Page 2 of 2

Hot Spot ID #[a]	(Mo-Yr)	Depth	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)
S0647[d]	10-83	0	NR	NR		LDL	270	LDL	LDL
S0706	07-84	0	28.90	b					
S0971	07-84	0	0.15	5.02					
S0982	07-84	0	0.43	14.94					
S1092	12-84	e	0.31	323.5[f]					

GAMMA SPECTROSCOPY

[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 pCi/g, using FIDLER screening. Therefore, radiochemical analysis was not performed.
[c]The boring log for this location indicates that sampling was not performed to bedrock (Appendix B).
[d]Contaminated soil was excavated from this location in 1984. Post-cleanup soil concentrations of cesium-137 were less than 2 pCi/g (Draper 1984).
[e]The depth given for this sample was "SS." For mapping purposes (Plate 1), this is assumed to be a surface sample.
[f]Isotopic results are available for this sample and include 0.99 pCi/g of thorium-228; 321 pCi/g of thorium-230, and 1.5 pCi/g of thorium-232, for a total of 323.5 pCi/g of thorium. 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.
NR - No result given
pCi/g - picocuries per gram
pCi/mL - picocuries per milliliter

RADIOCHEMICAL ANALYSIS

Table III.1. A Listing of Suspected Contaminants of Concern Based on Historical Data Sources

Hot Spot	Depth[1] of Contaminant (feet)	Suspected Contaminants	Sampling Depth (feet)
C0007	9[a]	Thorium, Plutonium	9
C0028	21[a]	Thorium, Plutonium	21
S0166	surface	Plutonium	13
S0175	surface	Cobalt, Cesium, Radium, Americium	7
S0208	surface	Plutonium, Tritium	1.5
S0307	surface	Thorium, Plutonium	15
S0425	surface	Thorium, Plutonium	16
S0472	surface	Thorium, Plutonium	28
S0647	surface	Cobalt, Cesium, Radium, Americium	2.5
S0706	surface	Plutonium	5
S0971	surface	Thorium, Plutonium	3
S0982	surface	Thorium, Plutonium	3
S1092	surface	Thorium, Plutonium	28

[1]Vertical location at hot spot where contamination was detected.
[a]Core sample. Depth is estimate based on previous results.