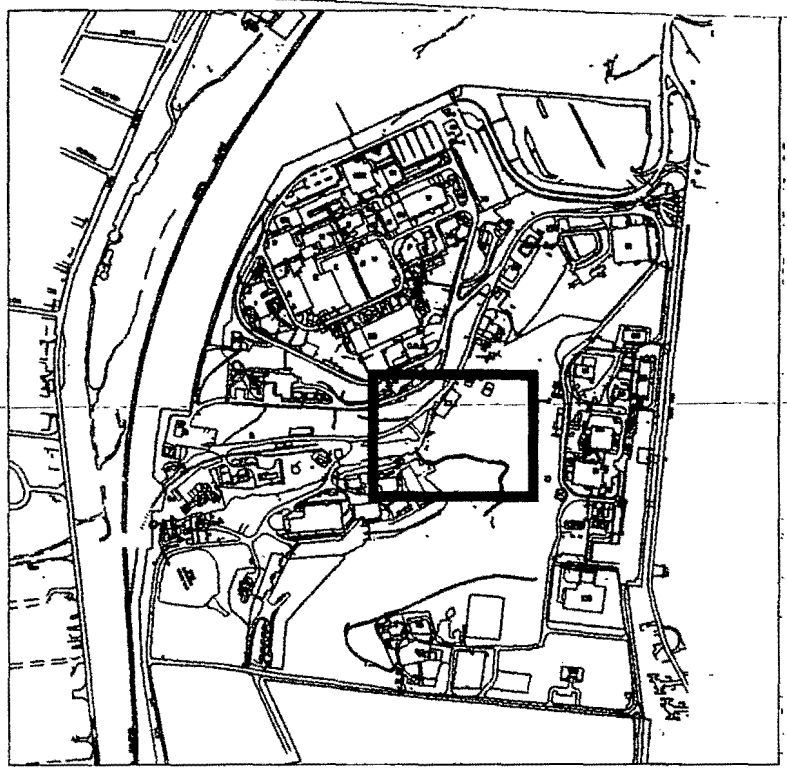
EG&G MOUND-30-03-03-01--9510250006

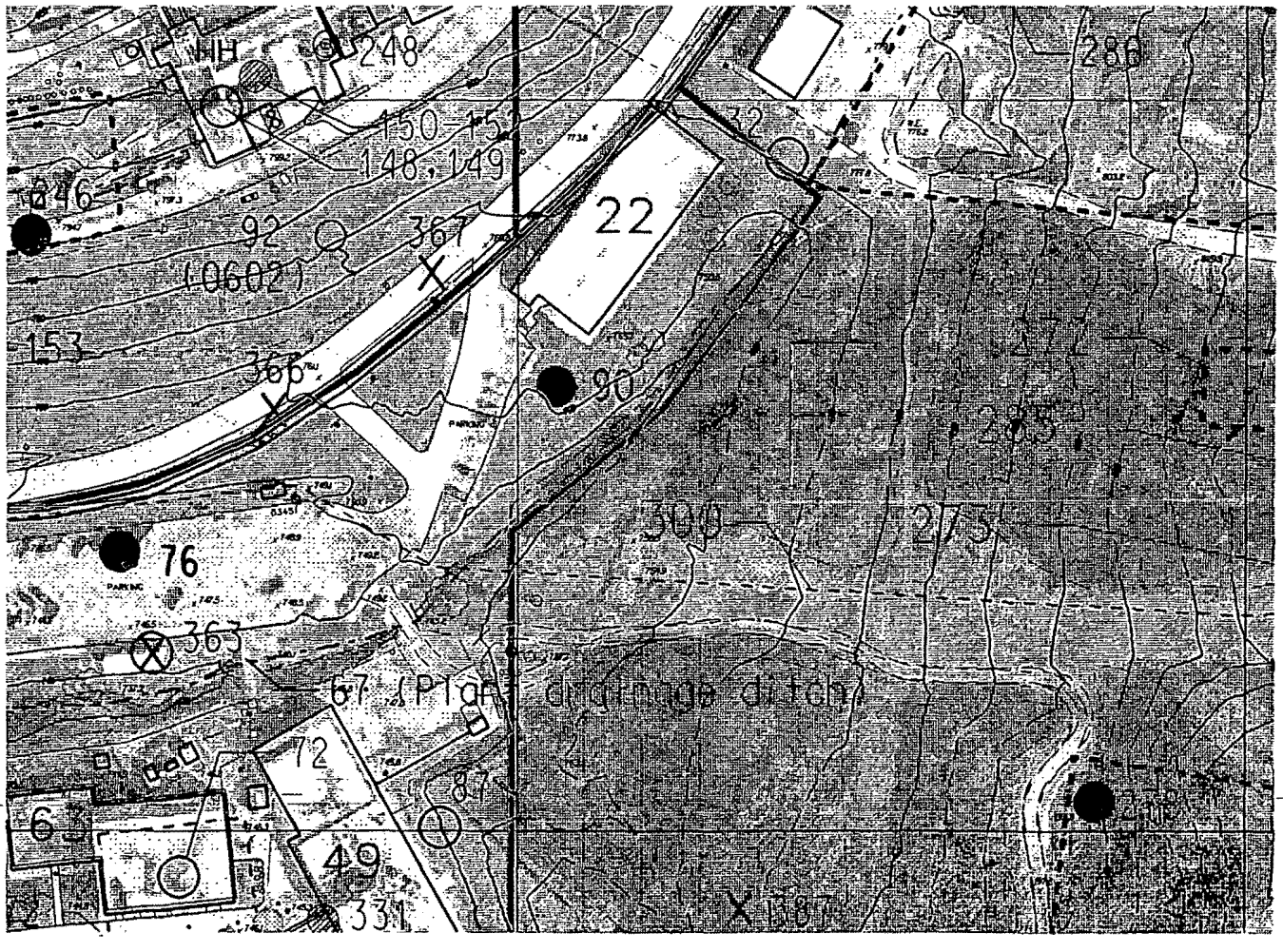
MOUND PLANT

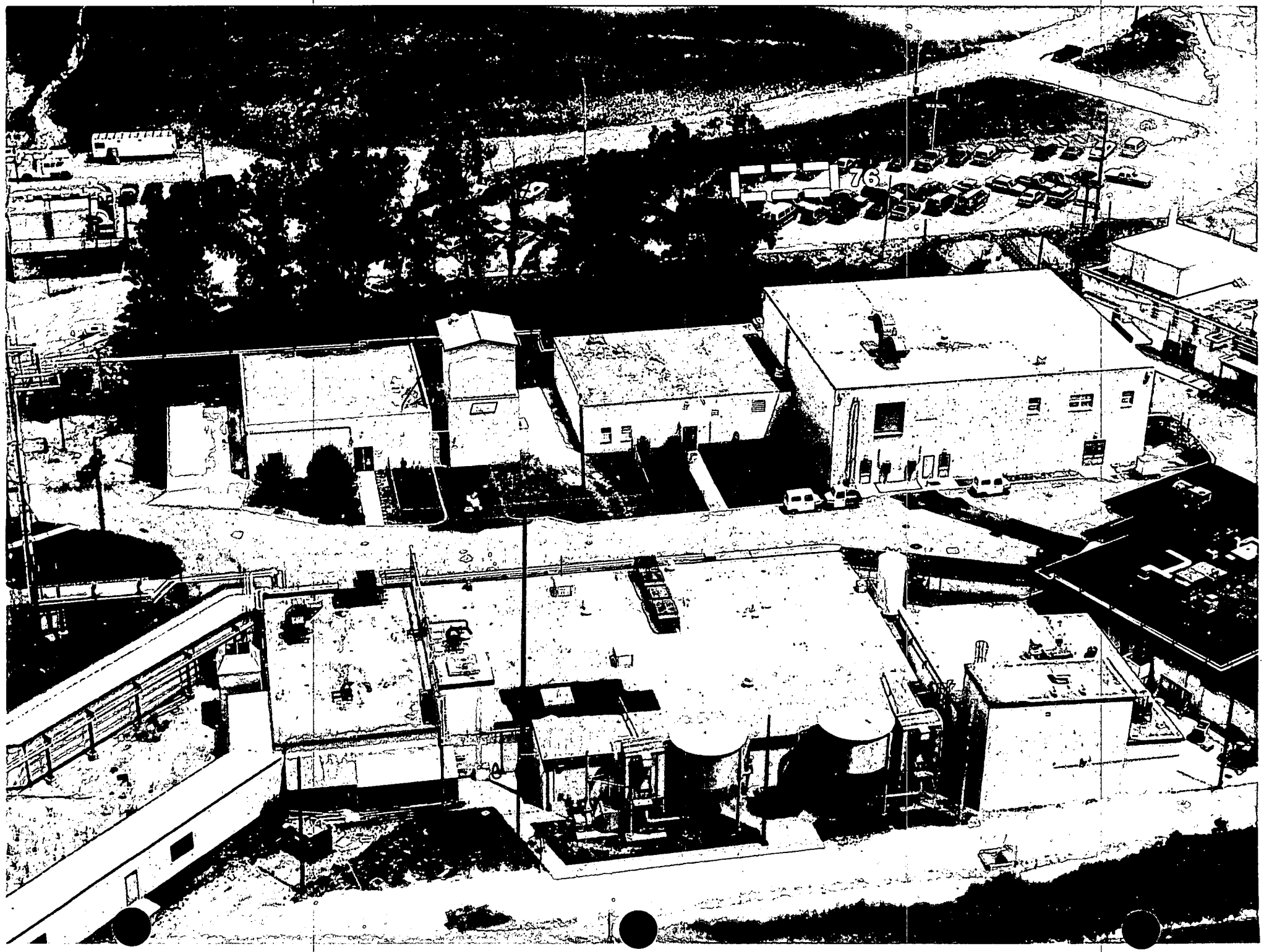
AREA C

PRS 76

July 10, 1995






76

MOUND PLANT
PRS 76
JULY 10, 1995

PRS HISTORY: This location was identified as a potential release site as a result of historical information on operations conducted in the warehouse and conjecture as to how the building was dismantled and disposed. There is no sampling data that indicated that a release has occurred at this location.

PROCESS DESCRIPTION: Warehouse 9 was built as part of the original construction of Mound and was originally used to store cement. It was later used to ship and receive drummed radioactive materials. It was a wooden structure with an elevated wooden floor. In 1955 the warehouse was used for unloading thorium drums to be used in the planned thorium refinery. It was last used in 1954 and photographs indicate it was gone by 1962. It was probably sold for salvage and as many of the old warehouses, the flooring was too contaminated to remove from he site and may have been burned in place.

CONTAMINATION: No data exists that documents whether any contaminants were released as a result of operations conducted in Warehouse 9. Based on the record of operations associated with the site, Thorium is the contaminant which may have been potentially released. Two independent verification studies of the WTS Pipeline Removal which was conducted in the area of Site # 76 indicated no Thorium levels at or near 5 pCi/g. See attached data.

REFERENCES: Operable Unit 9 Site Scoping Report 12 - Site Summary Report, Dec 1994, RI/FS, OU9, Site Scoping Report: Vol. 7 - Waste Management, July 1992, OU9, Site Scoping Report, Vol. 3 - Rad Site Survey, Dec. 1992, OU6 WTS Pipeline Removal Verification Report, Oct. 1994, Battelle Independent Verification Study of the WTS Pipeline Removal, 1985-1986.

PREPARED BY: D. Gault

RECOMMENDATION: _____

_____

CONCURRENCE:

DOE: _____

USEPA: _____

OEPA: _____

MOUND PLANT
PRS 76

RECOMMENDATION: Further Assessment. Sampling data from locations adjoining to PRS76 did not indicate any contamination radioactive or chemical above action levels. Since there is no sampling data available from the area of the warehouse location itself, it is recommended that the exact location of the warehouse be established and soil samples be taken for analysis of Thorium and plutonium through Mound soil screening and Gamma Spectoscopy. If these results confirm that PRS76 is not an area of concern, it will be changed to a no further action potential release site.

CONCURRENCE:

DOE: Arthur K Clemente 10/18/95

USEPA: Timothy J. Fish 10/18/95

OEPA: [signature] 10/18/95

SUMMARY OF COMMENTS AND RESPONSES:

Comment period from October 24, 1995 to February 15, 1996.

☐ No comments were received during the comment period.

☐ Comment responses can be found on page_____ of this package.

☒ Comments received on November 6, 1995 and resolved during a December 19, 1995 meeting with the stakeholder.

REFERENCE MATERIAL
PRS 76

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	Ref
72	Area 13, Polonium-Contaminated Wood from Dayton Unit IV	H-7	Historical	Polonium-210	1, 4, 5	None Suspected	S	6	14	Tables B.1 and B.9	6
73	Evaporator Storage Area (AKA Lower storage area)	H-7	Historical	Actinium-227, Cesium-137, Radium-226	4				14, 15, 16	Table B.9 RSS[c] Locations S0692 and S0697 (Appendix E in Ref. 6)	6
74	Quonset Hut (former)	H-7	Historical	Polonium-210, cobalt-60, bismuth					14	Table B.9 RSS[c] Locations S0684, S0685, and S0689 (Appendix E in Ref. 6)	6
75	Railroad Siding	G-6 G-7	Inactive	Thorium and daughters	4	Suspected thorium	S	4	14	Table B.1	6
76	Warehouse 9	G-7	Historical	Thorium-232	4	Suspected thorium	S	4	No Data		
77	Warehouse 10	G-9	Historical	Polonium-210	4	None suspected			No Data		
78	Warehouse 13	G-9	Historical	Reactor waste including Strontium-90, Cesium-137, and Nickel-63	4	Cesium 137	S	4	No Data		
79	Warehouse 15	E-8	Historical	Radioactive waste Plutonium-238 wastes and sludge Thorium sludge constituents (c)	4	Suspected	S	4	See Area 7 (No. 66)	Table B.9	6
80	Warehouse 15A	F-8	Historical	Plutonium-238, thorium	4						
81	Drilling Mud Drum Storage Areas (3 locations)	H-5 I-4	Historical	Barium	4, 5, 18	None Suspected			No Data		
82	Building 57 Diesel Fuel Storage Tank (Tank 118)	H-5	In service	Diesel fuel	3				No Data		
83	Building 2 Propane Storage Tank (Tank 122)	H-7	Inactive	Propane	3				No Data		
84	Building 56 Diesel Fuel Storage Tank (Tank 223)	F-5	Historical	Diesel fuel	3	Tank Removed			No Data		

				Operational Jurisdiction				Historic Activities			
No.	Site Name	Location	Status	Regulated Units	Regulatory Authority	Spill Response	SWMU	Evidence Of Release	Response Authority	Further Action Recommended	FFA OU
69	Overflow Pond	H-5 I-5	Waters of the U.S.	(Cont.)	(Cont.)	(Cont.)	SWMU	No	CERCLA	Yes	9
70	Retention Basins and Weir Basin	H-5	Waters of the U.S.				SWMU	No	CERCLA	Yes	9
71	Building 85 Waste Solvent Tank (Tank 136)	I-5	Inactive	PBR	RCRA	RCRA	SWMU	No	CERCLA	No	5
72	Area 13, Polonium-Contaminated Wood from Dayton Unit IV	H-7	Historical	Runoff to plant drainage ditch	NA			Yes	CERCLA	Yes	5
73	Evaporator Storage Area	H-7	Historical		NA			No	CERCLA	No	5
74	Quonset Hut (former)	H-7	Historical		NA			No	CERCLA	No	5
75	Railroad Siding	G-6 G-7	Inactive		AEA	AEA		Yes	AEA	D&D	
76	Warehouse 9	G-7	Historical		NA			Yes	CERCLA	Yes	5
77	Warehouse 10	G-9	Historical		NA			Yes	CERCLA	Yes	5
78	Warehouse 13	G-9	Historical		NA			Yes	AEA	D&D	
79	Warehouse 15	E-8	Historical		NA			Yes	CERCLA	Yes	5
80	Warehouse 15A	F-8	Historical		NA			Yes	CERCLA	Yes	5
81	Drilling Mud Drum Storage Areas (3 locations)	H-5 I-4	Historical		NA		SWMU	No	CERCLA	No	5
82	Building 57 Diesel Fuel Storage Tank (Tank 118)	H-5	In service		BUSTR	BUSTR			NA	OM	
83	Building 2 Propane Storage Tank (Tank 122)	H-7	Inactive		AEA	NA		No	NA	OM	
84	Building 56 Diesel Fuel Storage Tank (Tank 223)	F-5	Historical		NA			No	CERCLA	Yes	2
85	Building 29 Solvent Storage Shed	E-8	Inactive	PBR	RCRA	RCRA	SWMU	No	NA	OM	
86	Building 29 Septic Tank (Tank 224)	E-9	Historical		NA			Yes	AEA	Yes	6
87	Building 49 Solvent Storage Shed	G-7	Inactive	PBR	RCRA	RCRA	SWMU	No	NA	OM	
88	Tritium in Buried Valley Aquifer	H-4	Historical		SDWA			Yes[d]	AEA	OM	
89	Test Fire Residual Storage Area	H-7	In Service	PBR	RCRA	RCRA	SWMU	No	NA	OM	
90	Site Survey Project Potential Hot Spot Location S0425	G-8	Grounds		AEA	NA		Yes	AEA	Yes	6
91	Main Hill Seep 0601	F-5	NA		NA			Yes	CERCLA	Yes	2
92	Main Hill Seep 0602	G-7	NA		NA			Yes	CERCLA	Yes	2

Circulates

Document Control No. _____

Environmental Restoration Program

OPERABLE UNIT 9, SITE SCOPING REPORT: VOLUME 7 - WASTE MANAGEMENT

MOUND PLANT
MIAMISBURG, OHIO

February 1993

FINAL
(Revision 0)

Department of Energy
Albuquerque Field Office

Environmental Restoration Program
EG&G Mound Applied Technologies

that time. No other historical data or references to these shacks or bunkers could be found during the research for this report.

The Site Survey Project (DOE 1991c) reportedly located the area through its gamma surveys of the plant. Cesium-137 was found in the area at levels of 31 pCi/g measured in a core from 60 inches deep (DOE 1991c). It is speculated that wastes from the reactor waste pilot plant were also stored at the explosives bunker site, but limited data indicate that at least the incoming casks were stored at the Quonset hut (Bradley 1952e). There is no recent information on the adjacent detonator shack.

5.1.10. Old Warehouses (Historical)

Numerous wooden buildings were built by Maxon Construction Company during the initial phase of plant construction in 1947. These temporary buildings included warehouses for shipping and storing construction materials and equipment and supplies, as well as for use as office space (Figure 5.2). Several of the warehouses were retained by Mound after plant construction to provide enclosed storage. Warehouses numbered 1 through 8 and 11 and 12 (Figure 5.2) were apparently demolished in the early 1950s. There are no records that indicate that these 10 structures were ever used by Mound. The temporary office buildings (Figure 5.2) in the north parking lots were also demolished during this time period. Warehouses 9, 10, 13, 14, 15 and 15a were used to stage or store radioactive wastes for shipment offsite. The records of use of these building are sketchy and fragmented.

Two structures for unloading boxcars were located along the south side of the railroad siding south of the present Building 22 (Figure 5.2). The larger of the two was Warehouse 7, located at the far end of the siding; the smaller was Warehouse 9. These were sometimes referred to as the old railroad warehouses. Both buildings were wooden structures with elevated wooden floors and with docks along their north sides. Warehouse 7 is not known to have been used by Mound. Warehouse 9 had a heavy floor structure and was apparently used to ship and receive drummed radioactive materials. Until December 1954, Warehouse 9 served as the central point of waste shipments (MCC 1951-1956). In September 1953, drums of waste from the Purex pilot plant were moved from Warehouse 13, where they had been stored, to Warehouse 9 for shipment to ORNL for burial (MCC 1953-1957). In 1955, Warehouse 9 was used for the unloading of thorium drums for the planned thorium refinery. The drums were moved by truck to other areas of the plant for storage. Neither of the old railroad warehouses was used for unloading of the lead casks used to ship radioactive materials into Mound; the casks were too heavy and required crane unloading along the siding. Warehouse 9 was last used December 7, 1954. Warehouse 15A was used thereafter for waste shipments (MCC 1951-1956). Review of photographs indicates that it was gone by August 1962. It was probably sold for salvage

and, as with many of the old warehouses, the flooring was too contaminated to remove from the site and may have been burned in place. The site of Warehouse 9 currently lies under a paved parking lot.

Warehouse 10 was located on the SM/PP Hill in an area now partially occupied by Building 38 (Figure 5.2). Warehouse 10 was used in the early 1950s to store materials contaminated with polonium-210 from the Dayton units (Bradley 1953e). Over the years much of the radioactivity died away and by August 1956, the materials were either cleaned and sold for salvage or shipped to ORNL for burial (Meyer 1956b). The building itself was sold for salvage, but the flooring was too contaminated and was burned in place during the fall of 1956 (Meyer 1956e, 1957a).

Warehouse 13 was located on the SM/PP Hill in the area now occupied by the SM Building (Figure 5.2). It was a wooden structure and probably had a concrete floor. During the mid-1950s, Warehouse 13 was used to store waste materials from the radium/actinium program and the Purex pilot plant (Bradley 1953f). In 1952, materials contaminated with low levels of radioactivity from the radium/actinium program were placed in Warehouse 13 until they were moved to the Quonset hut for shipment offsite (Bradley 1952f). These were probably solid wastes of some sort, as all liquids were processed in an evaporator (see project descriptions in this report). In March 1953, eight 55-gallon drums of sludge with high gamma radiation (1.5 rem), along with miscellaneous tanks, pipes, and valves from the Purex pilot plant, were moved to Warehouse 13 for storage (MCC 1952-1957). By September 1953, the sludge drums were moved from Warehouse 13 to Warehouse 9 for shipment offsite. One of the drums apparently leaked and the contents were redrummed in Warehouse 13. The floors of Warehouse 13 were scrubbed (MCC 1953-1957). No record was found of the decommissioning of Warehouse 13, but it is noted during a review of photographs that the building was gone by August 1956. The floor remained and was used as a pad for storage of thorium drums in 1959.

Warehouse 14 was located on the SM/PP Hill, on the west side of the access road just south of the present Building 30 (Figure 5.2). It was a wooden structure and probably also had a concrete floor. Very little is actually known about this structure. A logbook entry on August 30, 1958, indicates equipment destined for disposal was stored in Warehouse 14 (MCC 1951-1961). No other data were given. Another log book entry, dated January 18, 1966, indicates that WD sludge was moved to the Warehouse 14 area, behind the SM Building (MRC 1961-1968). In January 1966, drums of apparently recoverable plutonium-238 and contaminated trash were to be moved from Warehouse 14 to the new storage Building 31. Contaminated trash was apparently stored since May 1965 (McMannon 1963-1966). There are no records of the decommissioning of Warehouse 14, but it is noted during a review of photographs that the building was gone by March 1968. The floor is still present.

from 1.5 to 8 REM at 1-ft from the surface of the solution (Bradley 1953a). On January 26, the sludge was scooped out and put in 55-gallon drums. Eight drums were moved to Warehouse 13 for storage until a shielded shipping container could be fabricated. About 10 gallons of sludge from the sump were placed in a 30-gallon drum and mixed with sodium nitrate to maintain suspension. The sump and trench were decontaminated to 60 to 70 and 30 to 40 mREM, respectively (MCC 1952-1957).

The spill in Room 1B apparently necessitated the project termination. From February 4 to March 10, 1953, the pilot plant equipment was dismantled (Bradley 1953b). In addition to the 8 drums of sludge removed from the spill, 14 drums of sludge were emptied from the holding and process tanks. The settling and mixing tanks were moved to Warehouse 13 for storage, and the holding tanks were sent to the "lower storage area" (MCC 1952-1957). The storage areas are described in Section 5 of this report. The large 1,000-gallon tank and the liquid evaporator were retained in Room 1B for use with the radium/actinium program. At least some of the materials were loaded for off-plant shipment on February 18, 1953 (MCC 1952-1957).

Part of the ventilation and exhaust system on the east side of the GP Building, now known as the SW Building, was decontaminated after the dismantling of the pilot plant. Forty-four 55-gallon drums were filled with tiles and dirt from the exhaust duct and shipped to ORNL for burial in March 1953. Soil cleanup only included the loose surface and did not extend any deeper than a few inches. Residual levels at depth were as high as at the surface (MCC 1952-1957). Some of the exhaust duct remained in place and was not removed until the decontamination of the radium/actinium project (Meyer 1958a). Some of the underground duct may still be in place.

In Warehouse 13, some of the sludge drums leaked and were redrummed. These were apparently the drums of hot waste from the trench cleanup. Wipe samples on the floor where the leak occurred indicated 875 disintegrations/minute (d/m), and other areas were zero d/m. All of the drums were moved to Warehouse 9 for shipment off-plant by September 1953. The floor of the warehouse was then washed and scrubbed (MRC 1953-1957).

2.12. REACTOR FUELS PROGRAMS

Throughout the 1950s and 1960s, Mound conducted basic research into the chemical and physical properties of proposed reactor fuels. In 1953, Mound embarked on the first of the reactor fuels programs in support of the Aircraft Nuclear Propulsion Project (ANPP). The liquid-cycle reactor for the ANPP contained a liquid nuclear fuel that circulated through the reactor and heat exchanger, and the fluid operating a turbine was heated at the exchanger. The use of a fused-salt fuel system was considered for the reactor in this system. Mound was assigned to determine the phase relationships

J:\DGN\MOUND\M8488 OU9 vol 7, 122192 overlay on m9489

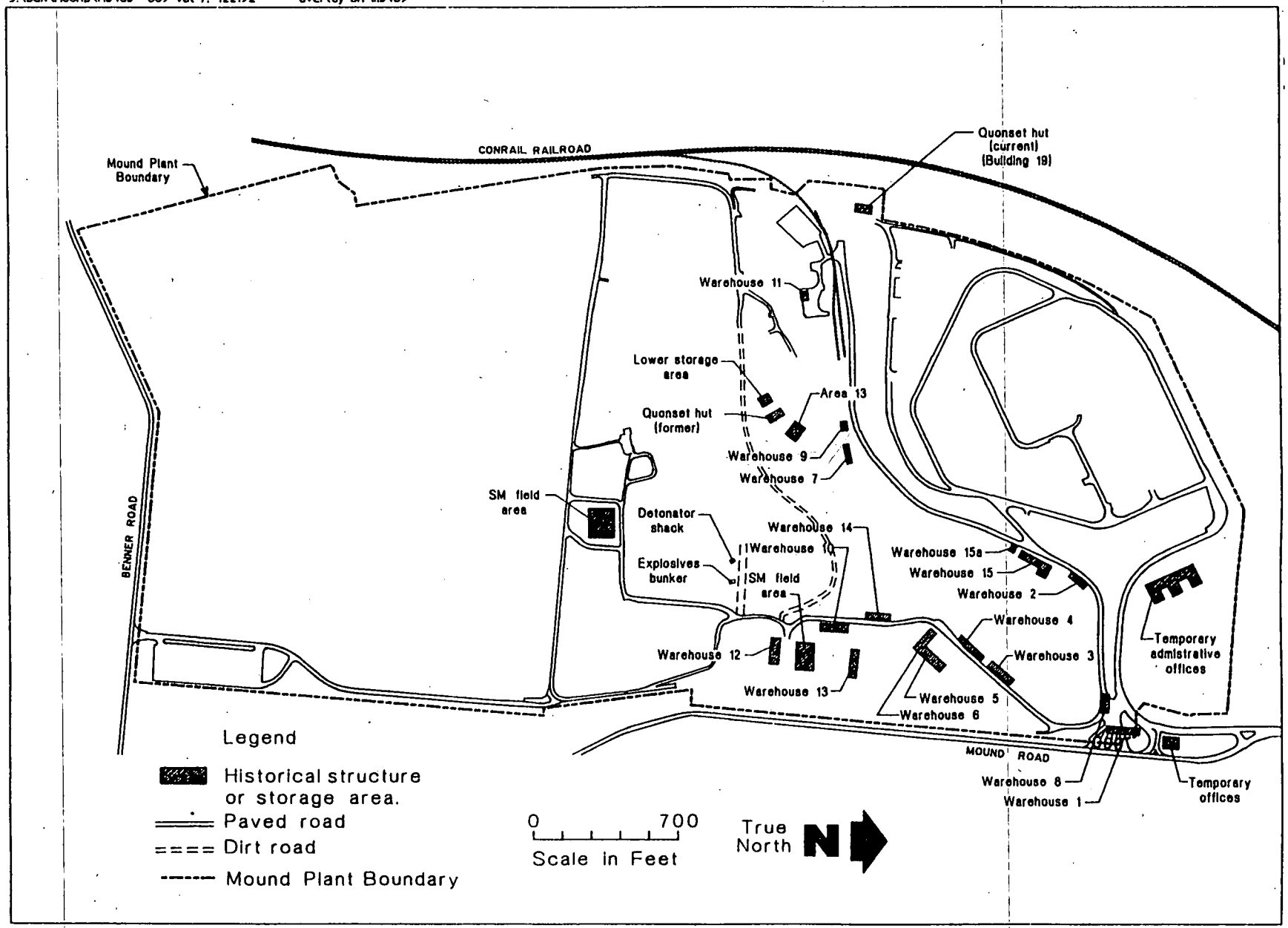
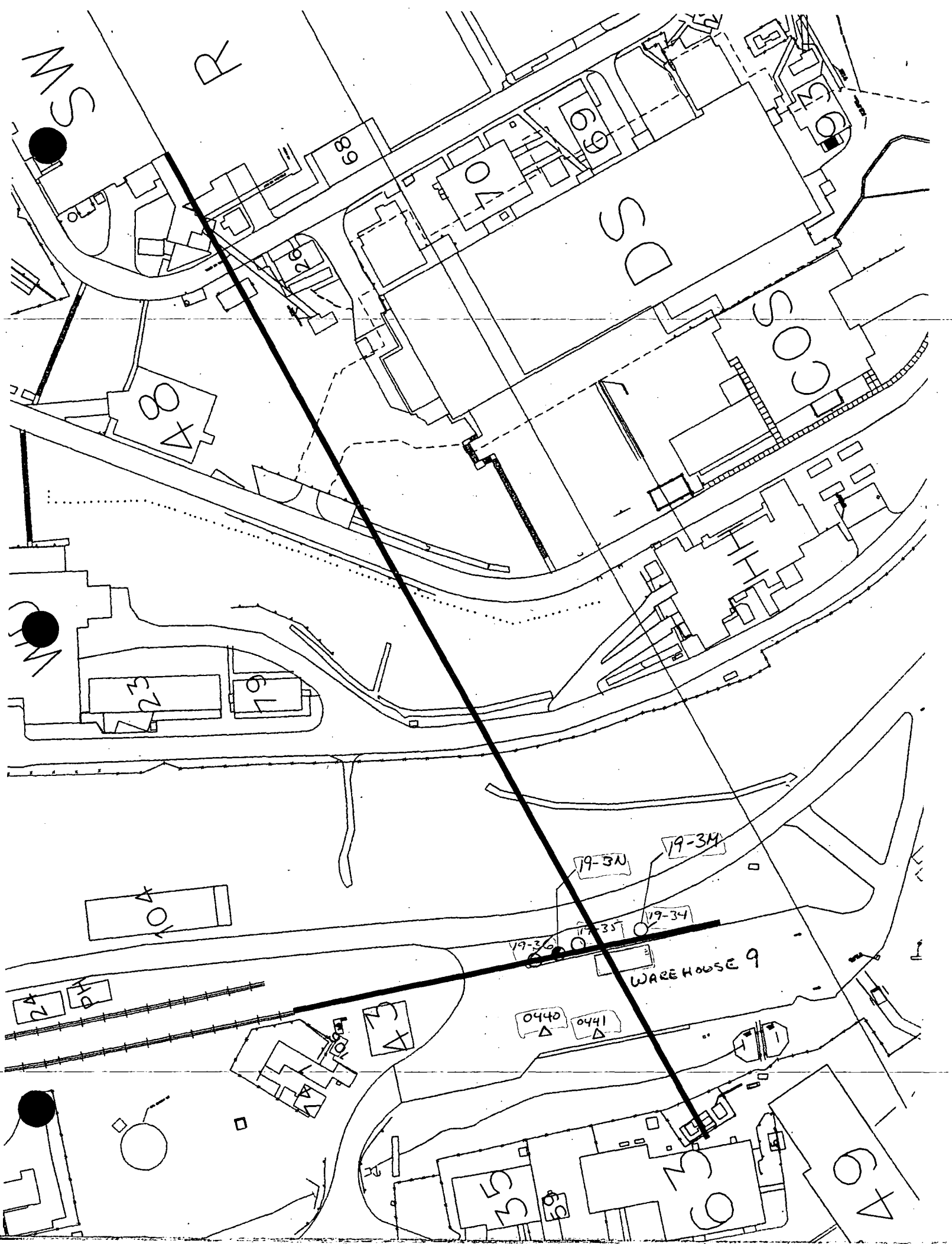


Figure 5.2. Historic buildings, structures, and storage areas.


19-3N
19-3M
19-34
19-35
19-36
WAREHOUSE 9
0440
0441

ENVIRONMENTAL RESTORATION PROGRAM

OPERABLE UNIT 6, AREA 19 AND AREA 14

VERIFICATION REPORT

MOUND PLANT

MIAMISBURG, OHIO

OCTOBER 1994

DEPARTMENT OF ENERGY

ALBUQUERQUE FIELD OFFICE

ENVIRONMENTAL RESTORATION PROGRAM

EG&G MOUND APPLIED TECHNOLOGIES

FINAL

(REVISION 0)

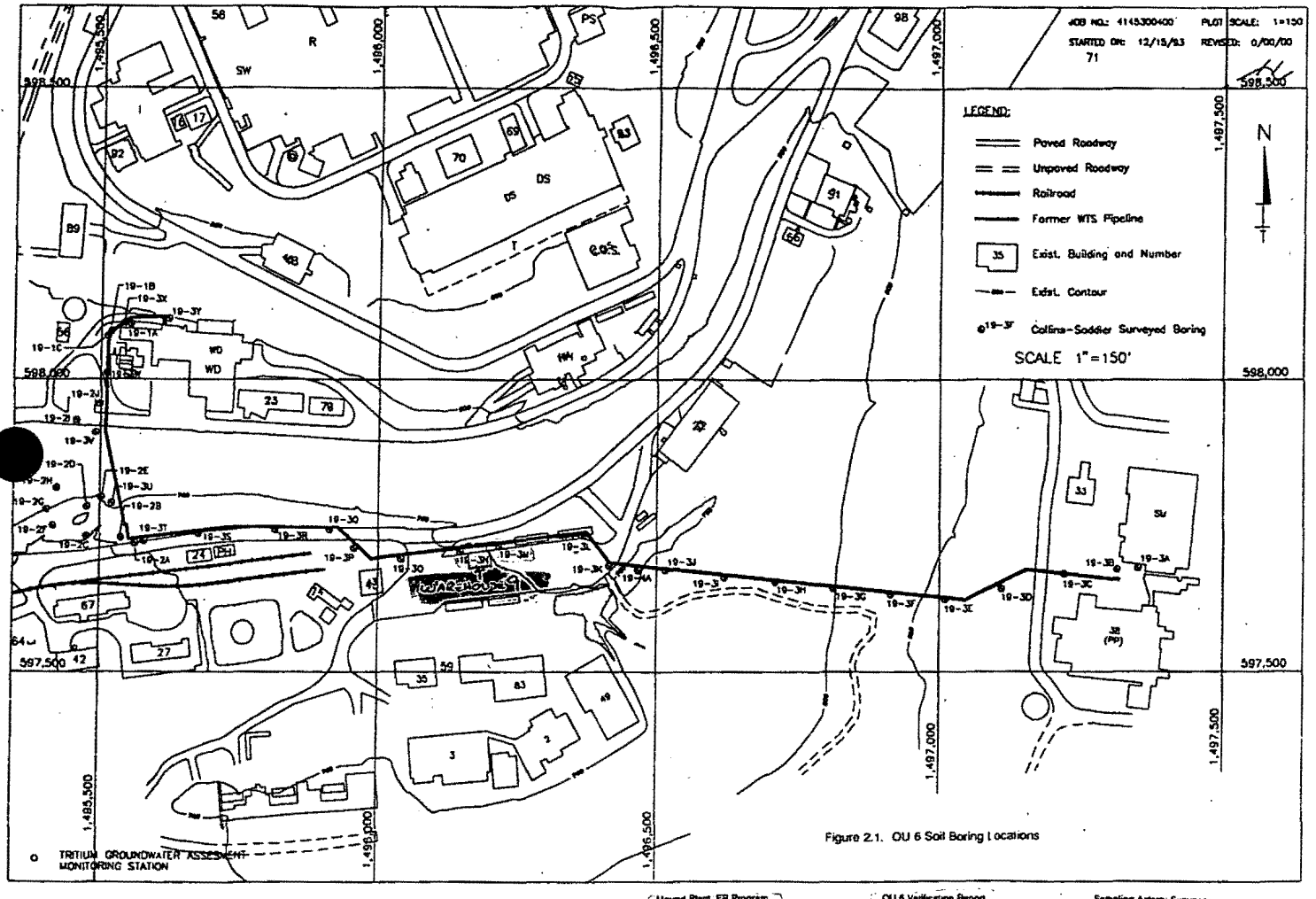


Figure 2.1. OU 6 Soil Boring Locations

Table IV.6 Radiological Analytical Data

Sample Number	Boring Location	Sample Depth	Units	Am-241	Q	Pu-236	Q	Pu 238/240	Q	Th-228	Q	Th-230	Q	Th-232	Q	Tritium	Q	U-234	Q	U-235	Q	U-238	Q
010002	19-3A	1-3'	pCi/g	0.30		5.04		0.20	U	0.84		0.59		0.50		14.00	U	0.54		0.07	UJ	0.48	
011002	19-3A	1-3'	pCi/g	0.26	U	132.05		1.92		0.84		0.88		0.71		14	U	0.68		0.07	U	0.52	
020003	19-3B	3-4'	pCi/g	0.31		100.92		0.54	J	1.10		0.99		0.98		14	U	0.52		0.05	J	0.71	
020006	19-3B	6-7'	pCi/g	0.30	U	16.55		0.30		3.66		0.95		0.16		14	U	0.53		0.10		0.53	
030004	19-3C	4-6'	pCi/g	0.31	U	3.25		0.11	U	3.52		0.61		0.23		14	U	0.39		0.07	U	0.37	
040007	19-3D	7-9'	pCi/g	0.31	U	0.23	U	0.11	U	1.16		1.40		0.72		14	U	0.75		0.07	U	0.74	
040012	19-3D	12-14'	pCi/g	0.33	U	0.23	U	0.11	U	0.98		0.84		0.68		14	U	0.55		0.10		0.61	
050004	19-3E	4-6'	pCi/g	0.27	U	0.45	U	0.21	U	0.47	U	0.44		0.38		14.00	U	0.49		0.07	UJ	0.42	
050010	19-3E	10-11.5'	pCi/g	0.40	U	0.45	U	0.21	U	0.48		0.43		0.24		14.00	U	0.61		0.10	J	0.70	
060000	19-3F	0-2'	pCi/g	0.39	U	7.54		0.11	U	1.76		1.25		0.97		14	U	0.67		0.07	U	0.59	
060005	19-3F	5-7'	pCi/g	0.37	U	1.48		0.11	U	1.23		1.25		0.80		14	U	0.56		0.06		0.55	
070001	19-3G	1-2'	pCi/g	0.40	U	6.10		0.12	J	1.53		0.97		1.10		14	U	0.52		0.07	U	0.72	
070012	19-3G	12-12.5'	pCi/g	0.36	U	0.23	U	0.11	UJ	1.44		1.21		1.31		14	U	0.67		0.07	U	0.67	
071001	19-3G	1-2'	pCi/g	0.34	U	10.96		0.11	UJ	1.18		1.05		0.96		14	U	0.52		0.07	U	0.71	
074000	19-3G	BLANK	pCi/L	99.64	U	0.93	U	0.44	U	2.78		1.50		0.35		700		0.33		0.29	U	0.24	U
080001	19-3H	1-3'	pCi/g	0.37	U	1.10		0.11	U	0.84		1.25		0.51		14	U	0.76	J	0.12	J	0.65	
080009	19-3H	9-11'	pCi/g	0.26	U	0.23	U	0.11	U	1.55		0.97		0.98		14	U	0.77	J	0.09	J	0.82	
090002	19-3I	2-4'	pCi/g	0.33	U	0.22	U	0.11	U	0.44		0.90		0.34		14	U	0.58		0.07	U	0.58	
090017	19-3I	17-19'	pCi/g	0.28	U	0.40	U	0.19	U	0.42	U	1.24		0.53		14.00	U	0.69		0.07	UJ	0.66	
100011	19-3J	11-13'	pCi/g	0.32	U	0.23	U	0.11	U	0.84		0.80		0.36		14	U	0.73		0.03	J	0.71	
100020	19-3J	20-22'	pCi/g	0.23	U	0.23	U	0.11	U	1.08		1.00		0.47		14	U	0.83	J	0.09	J	0.77	
101020	19-3J	20-22'	pCi/g	0.35	U	0.23	U	0.11	U	0.78		0.92		0.35		14	U	0.69		0.06	J	0.66	
104000	19-3J	BLANK	pCi/L	60.30	U	0.93	U	0.44	UJ	0.96	U	0.51		0.24	U	530	U	0.41		0.29	U	0.24	U
110006	19-3K	6-8'	pCi/g	0.36	U	0.45	U	0.21	U	0.89		0.95		1.27		14.00	U	1.16		0.11	JJ	1.21	
110017	19-3K	17-19'	pCi/g	0.31	U	0.45		0.11	U	0.74		0.83		0.50		14	U	0.71		0.06		0.67	
120001	19-3L	1-3'	pCi/g	0.38	U	3.01	J	0.21	U	2.58		1.32		1.90		17.40		0.85		0.10	J	0.85	
120020	19-3L	20-22'	pCi/g	0.29	U	0.22	U	0.11	U	4.17		0.88		0.44		14	U	0.68		0.07	U	0.77	
124000	19-3L	BLANK	pCi/L	61.85	U	0.93	U	0.44	U	0.96	U	0.34		0.24	U	530.00	U	0.36		0.29	UJ	0.26	
130003	19-3M	3-6'	pCi/g	0.37	U	6.82		0.11	U	0.69		0.84		0.58		14	U	0.72		0.07	U	0.74	
130008	19-3M	8-9'	pCi/g	0.39	U	0.33		0.11	U	1.35		1.48		1.46		14	U	0.93		0.12		1.12	
140006	19-3N	7-9'	pCi/g	0.32	U	2.50		0.11	U	0.87		1.00		0.58		14	U	0.65		0.06		0.72	
140001	19-3N	0.5-2.5'	pCi/g	0.35	U	20.18		0.20		4.23		0.82		0.57		14	U	1.12		0.18	J	1.09	
150001	19-3O	1-3'	pCi/g	0.43		31.96		0.23		1.05		1.09		0.70		14	U	0.91		0.19	J	0.73	
150020	19-3O	20-22'	pCi/g	0.33	U	0.23	U	0.11	U	0.73		0.70		0.44		14	U	0.83		0.16	J	0.87	
160018	19-3P	18-20'	pCi/g	0.40	U	0.46	U	0.22	U	0.46	U	0.49		0.37		14.00	U	0.71		0.06	J	0.80	
160010	19-3P	10-12'	pCi/g	0.36	U	0.23	U	0.11	U	1.51		1.31		1.18		14	U	0.71	J	0.07	J	0.90	
170007	19-3Q	7-9'	pCi/g	0.38	U	0.23	U	0.11	UJ	1.07		1.02		1.02		14	U	0.65		0.07	U	0.68	
170020	19-3Q	20-22'	pCi/g	0.34	U	0.23	U	0.11	UJ	1.40		1.26		1.18		14	U	0.70		0.13	J	0.74	
171020	19-3Q	20-22'	pCi/g	0.37	U	0.23	U	0.11	UJ	1.20		0.79		0.96		14	U	0.59		0.07	J	0.74	
180012	19-3R	10-12'	pCi/g	0.22	U	0.37	U	0.18	U	0.39		0.69		0.37		14.00	U	0.49		0.07	UJ	0.82	
180020	19-3R	20-22'	pCi/g	0.30	U	0.23	U	0.11	U	1.05		1.00		0.51		14	U	0.72	J	0.07	U	0.69	
190007	19-3S	7-9'	pCi/g	0.37	U	0.23	U	0.11	UJ	0.66		1.08		0.46		18.70		0.70		0.06	J	0.68	
190020	19-3S	20-22'	pCi/g	0.32	U	0.23	U	0.11	UJ	0.50		0.92		0.40		14	U	0.81		0.07	J	0.70	
191020	19-3S	20-22'	pCi/g	0.24	U	0.23	U	0.11	UJ	0.39		1.17		0.25		17.30		0.82		0.06	J	0.78	
200020	19-3T	20-22'	pCi/g	0.22	U	0.41	U	0.20	U	0.43	U	0.86		0.46		14.00	U	0.76		0.10	J	0.77	
200009	19-3T	9-11.5'	pCi/g	0.29	U	0.23	U	0.11	U	0.84		1.01		0.36		14	U	0.89	J	0.12	J	0.77	
210005	19-3U	5-7'	pCi/g	0.34		46.22		0.20		1.11		1.08		0.92		14	U	1.16	J	0.22	J	0.75	
210012	19-3U	12-14'	pCi/g	0.33	U	4.97		0.11	U	1.36		0.68		0.92		14	U	1.19	J	0.06	J	0.88	
220005	19-3V	5-7'	pCi/g	0.31	U	0.39	U	0.19	U	1.09		1.15		1.46		14.00	U	0.77		0.07	UJ	0.65	
220010	19-3V	10-11.5'	pCi/g	0.32	U	0.45	U	0.21	U	0.47	U	0.91		0.58		14.00	U	0.61		0.06	UJ	0.64	
230005	19-3W	5-7'	pCi/g	0.39	U	1.11		0.11	U	0.71		0.55		0.54		14	U	0.44		0.07	U	0.53	
230014	19-3W	15.15.5'	pCi/g	0.35	U	0.22	U	0.11	U	0.65		0.79		0.85		14	U	0.76		0.07		0.91	
240004	19-3X	4-6'	pCi/g	0.37	U	0.23	U	0.11	UJ	1.39		1.07		1.22		14	U	1.19		0.07	U	0.74	
240011	19-3X	11-12.5'	pCi/g	0.36	U	17.57		0.12	J	1.20		0.95		0.97		14	U	0.77		0.07	U	0.91	
250009	19-3Y	9-11.5'	pCi/g	0.28	U	0.74		0.11	U	1.24		1.10		1.09		14	U	0.82		0.06		0.85	
250016	19-3Y	16-17.5'	pCi/g	0.28	U	0.23	U	0.11	UJ	1.04		0.78		0.93		14	U	0.65		0.09	J	0.84	
260002	19-4A	1-3'	pCi/g	0.66		68.84		0.91		1.23		1.01		0.47		14	U	0.60	J	0.07	U	0.59	
260010	19-4A	9-11'	pCi/g	0.30	U	0.23	U	0.11	U	0.86		1.23		0.39		14	U	0.69	J	0.07	J	0.70	
260020	19-4A	20-22'	pCi/g	0.34	U	0.23	U	0.11	U	0.81		0.70		0.44		14	U	0.80	J	0.08	J	0.88	
270000	19-2A	0-2'	pCi/g	0.30	U	0.44	U	0.21	U	1.76		2.59		2.39		14.00	U	0.61		0.07	UJ	0.64	
270006	19-2A	6-8'	pCi/g	0.31	U	0.23	U	0.11	UJ	0.80		0.97		0.36		14	U	0.81		0.07	U	0.74	
270013	19-2A	13-15'	pCi/g	0.39	U	0.23	U	0.11	UJ	0.43		1.06		0.36		14	U	0.70		0.07	U	0.78	
270020	19-2A	20-22'	pCi/g	0.29	U	0.23	U	0.11	UJ	0.66		0.83		0.35		14	U	0.73		0.07	U	0.87	
274000	19-2A	BLANK	pCi/L	79.54	U	0.93	U	0.44	UJ	0.96	U	0.30		0.24	U	556.7		0.29	U	0.29	U	0.24	U
280006	19-2B	6-8'	pCi/g	0.27	U	0.44	U	0.21	U	0.51		0.73		0.21		15.30		0.56		0.07	UJ	0.70	
280013	19-2B	13-15'	pCi/g	0.30	U	0.45	U	0.22	U	0.45		0.81		0.39		14.00	U	0.78		0.15	J	0.82	
280020	19-2B	20-22'	pCi/g	0.28	U	1.68		0.22	U	0.52		0.88		0.42		14.00	U	0.87		0.07	UJ	0.81	
280000	19-2B	0-2'	pCi/g	0.19	U	0.88		0.11	U	0.40		0.07		0.07		14	U	0.26		0.07	U	0.11	
281000	19-2B	0-2'	pCi/g	0.22	U	0.23	U	0.11	U	0.24	U	0.56		0.35		14	U	0.23		0.07	U	0.25	
294000	19-2C	BLANK	pCi/L	48.74	U	0.93	U	0.93	U	0.96	U	0.29	U	0.24	U	530	U	0.29	U	0.29	U	0.24	U
290000	19-2C	0-2'	pCi/g	0.32	U	10.67		0.11	UJ	0.76		0.94		0.55		14	U	0.62	J	0.07	UJ	0.70	J
290006	19-2C	6-8'	pCi/g	0.31	U	0.23	U	0.11	U	0.80		1.06		0.48		14	U	0.79	J	0.21	J	0.97	
290013	19-2C	13-15'	pCi/g	0.35	U	1.35		0.11	U	1.10		0.97		0.89		14	U	0.83	J	0.07	U	0.72	
300000	19-2D	0-2'	pCi/g	0.23	U	2.67		0.11	U	0.50		0.68		0.28		14	U	0.44		0.07	U	0.42	
301000	19-2D	0-2'	pCi/g	0.41	U	16.86		0.11	U	1.27		1.12		0.82		21.3		1.35		0.07	U	0.78	
310000	19-2E	0-2'	pCi/g	0.32	U	21.51		0.45		2.64		1.29		0.46		34.0		7.45		0.15		0.62	
320000	19-2F	0-2'	pCi/g	0.22	U	0.23	U	0.11	U	0.72		0.78		0.43		14	U	0.81		0.24	J	0.82	
320006	19-2F	6-8'	pCi/g	0.33	U	0.23	U	0.11	U	1.10		0.88		0.42		14.9		0.80		0.13	J	0.95	
330006	19-2G	6-8'	pCi/g	0.43	U	1.53		0.22	U	0.76		0.65		0.90		22.00		0.69		0.08	J	0.69	
330000	19-2G	0-2'	pCi/g	0.29	U	3.83		0.11	U	1.08		1.37		0.72		16		0.79		0.07	U	0.65	
340000	19-2H	0-2'	pCi/g	0.36	U	1.22		0.11	U	1.32		0.77		1.07		14	U	0.88		0.07	U	0.92	
340006	19-2H	6-8'	pCi/g	0.38	U	0.35		0.11	U	1.49		0.98		1.05		14	U	1.02	J	0.07	U	0.97	
341000	19-2H	0-2'	pCi/g	0.37	U	0.51		0.11	U	2.19		1.10		1.20		14	U	1.22	J	0.09	J	0.92	
350013	19-2I	13-14.5'	pCi/g	0.39	U	0.40	U	0.19	U	0.81		0.74		0.85		14.00	U	0.65		0.07	UJ	0.71	
354000	19-2I	BLANK	pCi/L	47.02	U	0.93	U	0.44	U	0.96		0.29	U	0.24	U	530.00	U	0.29	U	0.29	UJ	0.24	U
350000	19-2I	0-2'	pCi/g	0.33	U	0.23	U	0.11	U	1.39		1.29		0.82		15	U	0.76		0.07		0.88	
350006	19-2I	6-8'	pCi/g	0.34	U	0.23	U	0.11	U	1.31		1.14		0.94		16.4		0.64		0.16		0.64	
350020	19-2I	20-22'	pCi/g	0.31	U	1.77		0.11	U	1.28		1.22		1.01		14	U	0.82	J	0.07	U	0.73	
360000	19-2J	0-2'	pCi/g	0.32	U	11.37		0.33		10.69		1.01		0.66		14	U	0.97		0.12	J	0.93	
360006	19-2J	6-8'	pCi/g	0.39	U	1.99		0.11	U	1.34		1.29		0.62		14	U	1.07		0.22	J	0.96	
360013	19-2J	13-15'	pCi/g	0.34	U	0.51		0.11	U	1.00		0.74		0.50		14	U	0.77		0.09	J	0.67	
360020	19-2J	20-22'	pCi/g	0.25	U	0.25		0.11	U	1.34		0.87		0.69		14	U	0.76		0.11	J	0.82	
370012	19-1A	12-14'	pCi/g	0.44	U	3.22		0.11	U	2.01		0.78		0.85		14	U	0.55		0.07	U	0.60	
370006	19-1A	6-8'	pCi/g	0.43	U	18.11		0.27		1.49		0.92		0.95		14	U	0.68	J	0.12	J	0.80	
380006	19-2B	6-8'	pCi/g	0.31	U	82.57		0.26	J	0.70		0.68		0.39		20.30		1.02		0.07	U	0.84	
380012	19-2B	12-14'	pCi/g	0.34	U	2.58		0.11	U	0.59		1.11		1.02		14	U	1.00		0.06		0.88	
384000	19-2B	BLANK	pCi/L	78.43	U	0.93	U	0.93	U	0.96	U	0.29	U	0.24	U	530	U	0.29	U	0.29	U	0.24	U
390011	19-2C	12-14'	pCi/g	0.45	U	0.84		0.11	U	1.07		1.07		1.03		14	U	0.81		0.07	U	0.89	
391006	19-2C	6-8'	pCi/g	0.36	U	0.23	U	0.11	U	1.29		0.93		1.20		14	U	0.76		0.07		0.89	
390006	19-2C	6-8'	pCi/g	0.44	U	5.38		0.11	UJ	1.12		0.82		1.25		14	U	1.04		0.07	J	0.88	
400000	NONE	SPIKE	pCi/g	0.86		103.93		1.54		13.35		2.77		1.21		14	U	0.94		0.08		0.92	
410010	NONE	SPIKE	pCi/g	0.37	U	17.09		0.37		2.64		1.59		0.88		14	U	0.77		0.07		0.78	
420020	NONE	SPIKE	pCi/g	0.35	U	0.23	U	0.11	U	1.15		1.55		0.68		14	U	0.54		0.06		0.78	

6 CONCLUSIONS

A soil sampling verification investigation at Mound's OU 6 Area 19 and Area 14 was performed. Based on extensive testing, a review of all the analytical data for both radiological and non-radiological parameters and a statistical analysis of the analytical data, a conclusion was reached that the mean value of the analytical results for Pu-238 and Thorium isotopes have attained the cleanup criteria.

The results of the subsurface soil samples in Area 19-1 and Area 19-2 indicate that the cleanup criteria for Plutonium and Thorium isotopes was attained. However, one sample, 19-1B did exceed the ALARA value of 25 pCi/gram for Plutonium. The results of the subsurface investigation in Area 19-3 indicate that the cleanup criteria for Thorium isotopes was attained.

The results of the soil samples for Pu-238 indicate that some contamination still exists. Levels of Pu-238 of 132.05 and 100.92 pCi/gram were found at the Area 3 locations, 19-3A and 19-3B, respectively. In addition, a Pu-238 value of 82.57 pCi/gram was obtained from a sample collected at the Area 1 location, 19-1B. However, the mean and upper 95 percent confidence value for Pu-238 in Area 3 location indicates that the cleanup was successful.

The statistical analysis of the soil samples for the non-radiological parameters indicated no exceedances of the risk-based threshold levels for volatile organic compounds, semi-volatile organics, pesticides/PCBs, or inorganic analytes. Of the semi-volatile organic compounds analyzed, only a few compounds were detected at concentrations above the risk-based threshold level or cleanup value, but based on the statistical analysis the semi-volatile organic compounds are not a concern.

In conclusion, based on the mean and upper 95% confidence limit, D&D remedial activities in Area 19 and Area 14 have achieved the established goals. Based on these results, no further action is required.

EG&G SCANNING FACILITY MCA RECORD

E-10

SAMPLE TYPE

DISTRIBUTION:

R.R. DAILY
D.G. DRAPER
FILE #
VOLUME #

SAMPLE TYPE : WTS STUDY
SAMPLE CONDITION : WET
DATE (When Collected) : 7/24/86
DATE (When Screened) : 7/24/86
SAMPLE TAKEN BY : BATTELL

SM
PP
WTS
CONT.
SS
41

MCA WELL "A"

SAMPLE#	GRAMS	Pu WT.FACTOR	GROSS Ct Th	GROSS Ct Pu	Pu-238 pCi/g	Th-232 pCi/g	GRID LOCATION AND DEPTH
168	457	0.167	978	650	43	0.6	HOLE #60 SURFACE
169	358	0.167	755	611	43	0.5	HOLE #60 2-3
170	483	0.167	1184	822	61	0.8	HOLE #60 3-4
171	466	0.167	783	556	34	0.4	HOLE #60 6-7
172	413	0.167	794	626	44	0.5	HOLE #62 SURFACE
173	239	0.17	722	782	68	0.7	HOLE #62 3-4
174	409	0.167	853	639	44	0.6	HOLE #62 4-5
175	564	0.167	1024	637	40	0.6	HOLE #62 5-6
176	382	0.167	875	538	29	0.6	HOLE #15 SURFACE
177	260	0.167	998	638	41	1.1	HOLE #15 2-3
178	501	0.167	1417	746	46	1.0	HOLE #15 5-6
179	417	0.167	1159	710	47	0.9	HOLE #15 8-9
180	363	0.167	1039	642	40	0.8	HOLE #18 SURFACE
181	306	0.167	972	729	55	0.9	HOLE #18 1-2
182	453	0.167	1201	677	41	0.9	HOLE #18 3-4
183	474	0.167	1144	632	36	0.8	HOLE #18 4-5
184	363	0.167	2197	964	44	1.5	HOLE #9 SURFACE
185	442	0.167	1151	627	35	0.8	HOLE #9 2-3
186	445	0.167	1093	602	33	0.8	HOLE #9 5-6
187	544	0.167	923	501	22	0.5	HOLE #9 7-8
188	453	0.167	1002	635	40	0.7	HOLE #12 SURFACE
189	417	0.167	1243	701	44	1.0	HOLE #12 1-2
190	383	0.167	1120	710	48	0.9	HOLE #12 4-5
191	440	0.167	1315	740	48	1.0	HOLE #12 5-6
192	583	0.167	1264	697	43	0.7	HOLE #10 SURFACE
193	476	0.167	1223	659	38	0.8	HOLE #10 3-4
194	508	0.167	779	536	31	0.4	HOLE #10 4-5
195	581	0.167	1099	620	36	0.6	HOLE #10 6-7
0		0			0	0.0	
0		0			0	0.0	

SCREEN BY: TROY J. PEARSON III 5315

Review By: _____ Approved By: _____

MOUND SOIL SCREEN DATA

SOIL SCANNING FACILITY HCA RECORD

SAMPLE TYPE

DISTRIBUTION:

R.R. DAILY
D.G. DRAPER
FILE #
VOLUME #

SAMPLE TYPE	: WTS STUDY	SR
SAMPLE CONDITION	: WET	PP
DATE (When Collected)	: 7/24/86	WTS
DATE (When Screened)	: 7/24/86	CONT.
SAMPLE TAKEN BY	: BATTELL	SS
		41

HCA WELL "B"

SAMPLE#	GRAMS	Pu Wt.FACTOR	GROSS Ct Th	GROSS Ct Pu	Pu-238 pCi/g	Th-232 pCi/g	GRID LOCATION AND DEPTH
196	426	0.167	958	796	58	0.5	HOLE #23 SURFACE
197	317	0.167	892	1011	90	0.6	HOLE #23 2-3
198	427	0.167	1188	1647	172	0.8	HOLE #23 3-4
199	441	0.167	1002	606	30	0.6	HOLE #23 5-9
200	362	0.167	604	517	25	0.3	HOLE #24 SURFACE
201	362	0.167	1383	766	44	0.7	HOLE #24 3-4
202	367	0.167	1112	646	33	0.8	HOLE #24 4-5
203	499	0.167	1086	594	26	0.6	HOLE #24 7-8
204	265	0.167	1067	654	35	1.0	HOLE #22 SURFACE
205	426	0.167	1438	3775	466	1.0	HOLE #22 3-4
206	403	0.167	1324	1341	126	0.9	HOLE #22 4-5
207	499	0.167	1069	609	29	0.6	HOLE #22 5-6
208	417	0.167	1323	709	37	0.9	HOLE #14 SURFACE
209	349	0.167	1203	689	37	0.9	HOLE #14 2-3
210	370	0.167	1253	4115	518	0.9	HOLE #14 5-6
211	514	0.167	1289	657	31	0.7	HOLE #14 7-8
212	524	0.167	1085	579	24	0.5	HOLE #11 SURFACE
213	440	0.167	1309	609	23	0.8	HOLE #11 3-4
214	471	0.167	1448	676	29	0.9	HOLE #11 5-6
215	511	0.167	1240	618	26	0.7	HOLE #11 7-8
216	446	0.167	1334	671	31	0.9	HOLE #13 SURFACE
217	228	0.17	936	588	29	0.9	HOLE #13 2-3
218	363	0.167	1332	752	43	1.0	HOLE #13 5-6
219	375	0.167	1564	769	40	1.2	HOLE #13 7-8
0		0			0	0.0	
0		0			0	0.0	
0		0			0	0.0	
0		0			0	0.0	
0		0			0	0.0	
0		0			0	0.0	

SCREEN BY: TROY J. PEARSON III 5315

Review By: A. Tolar Approved By: _____

MOUND SOIL SCREEN DATA

Document Control No. _____

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

FOR CIRCULATION

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.

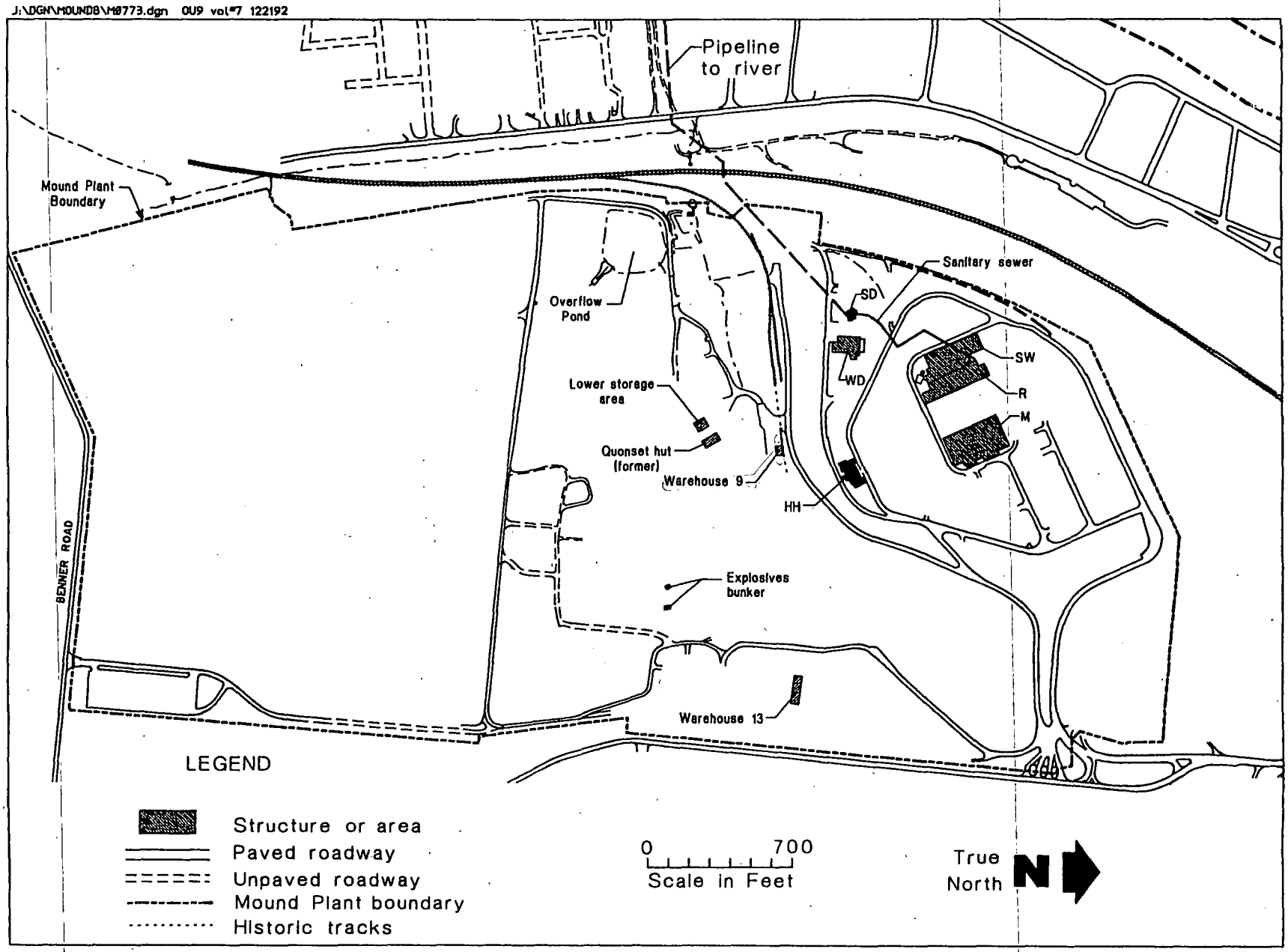
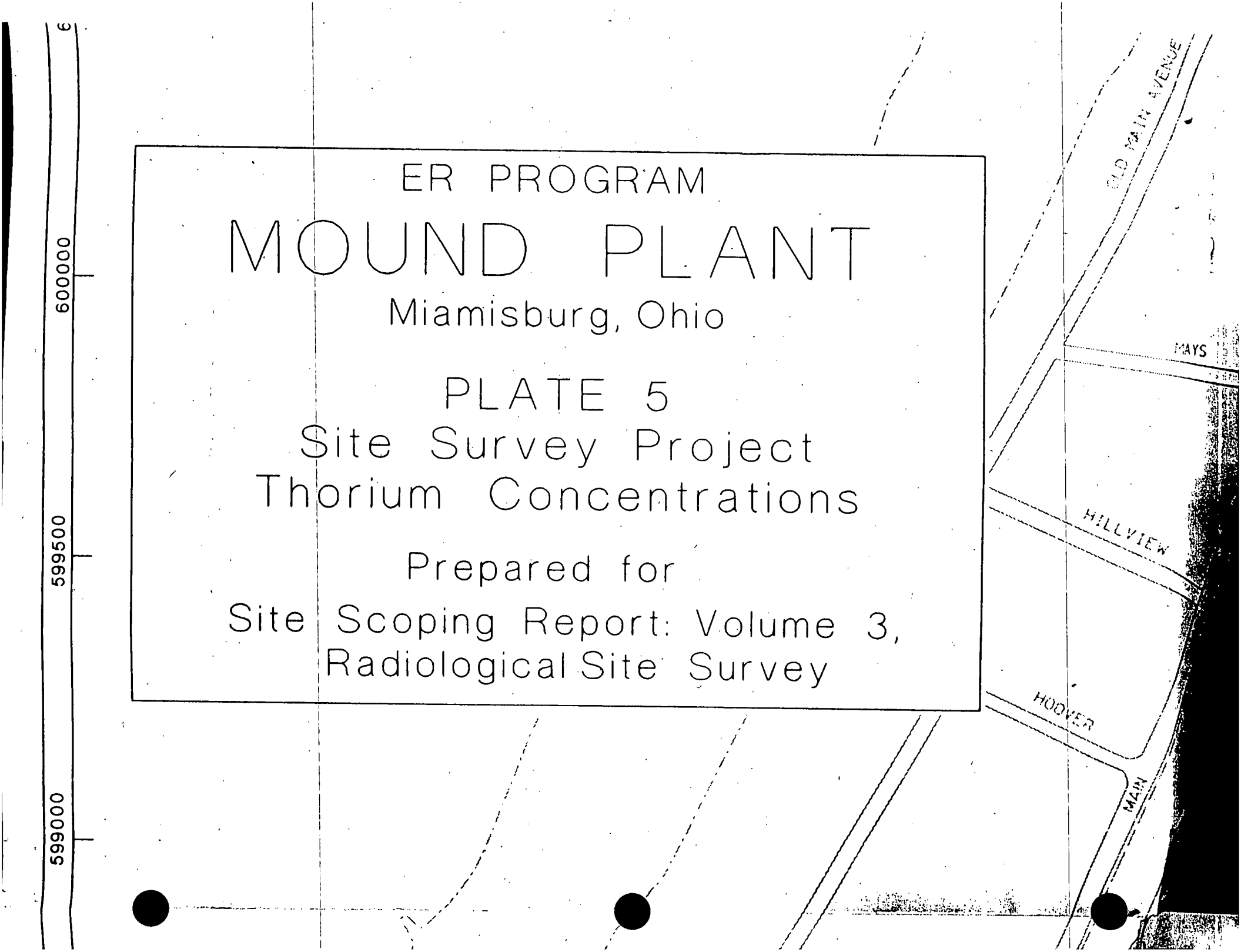
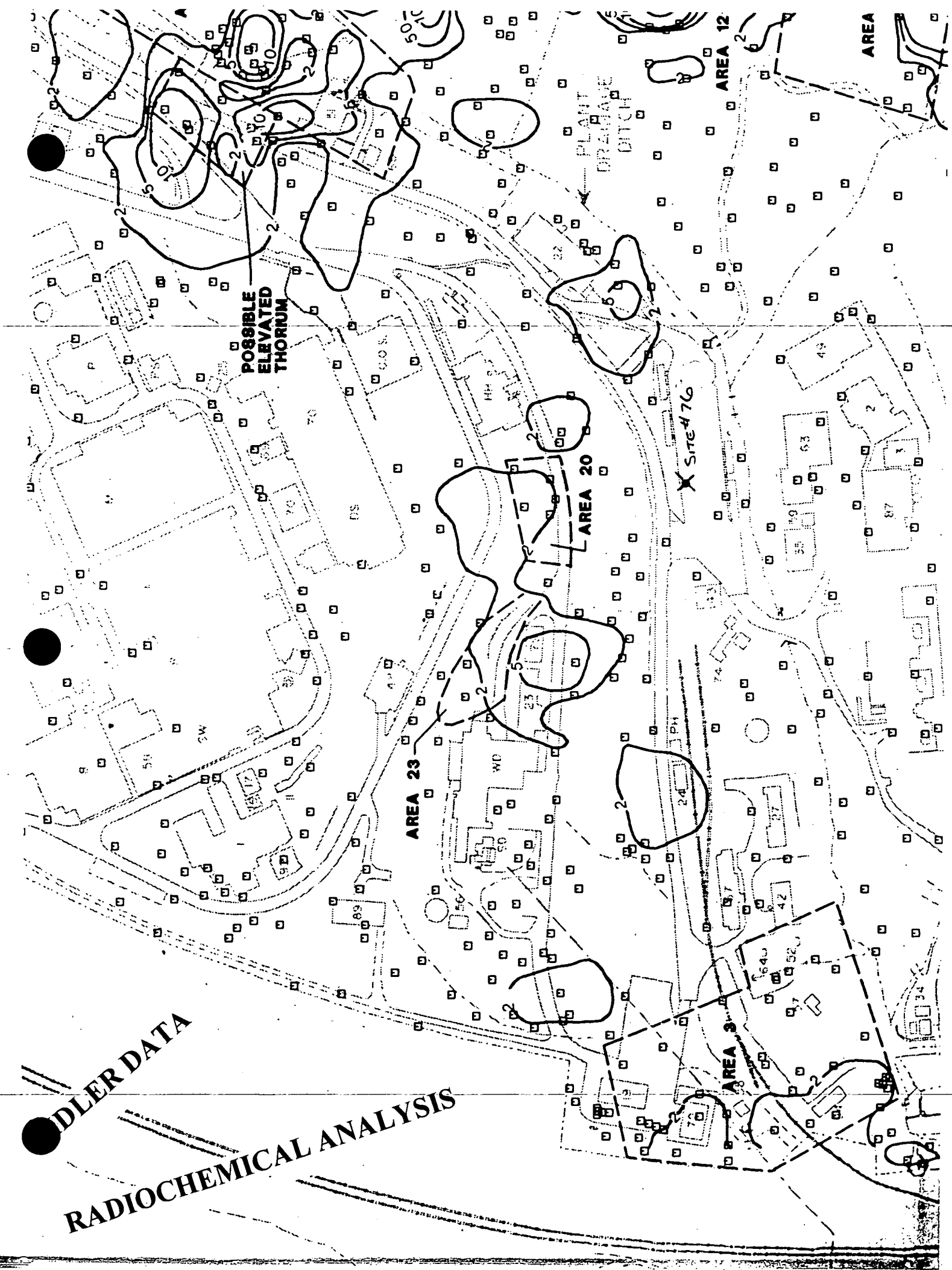
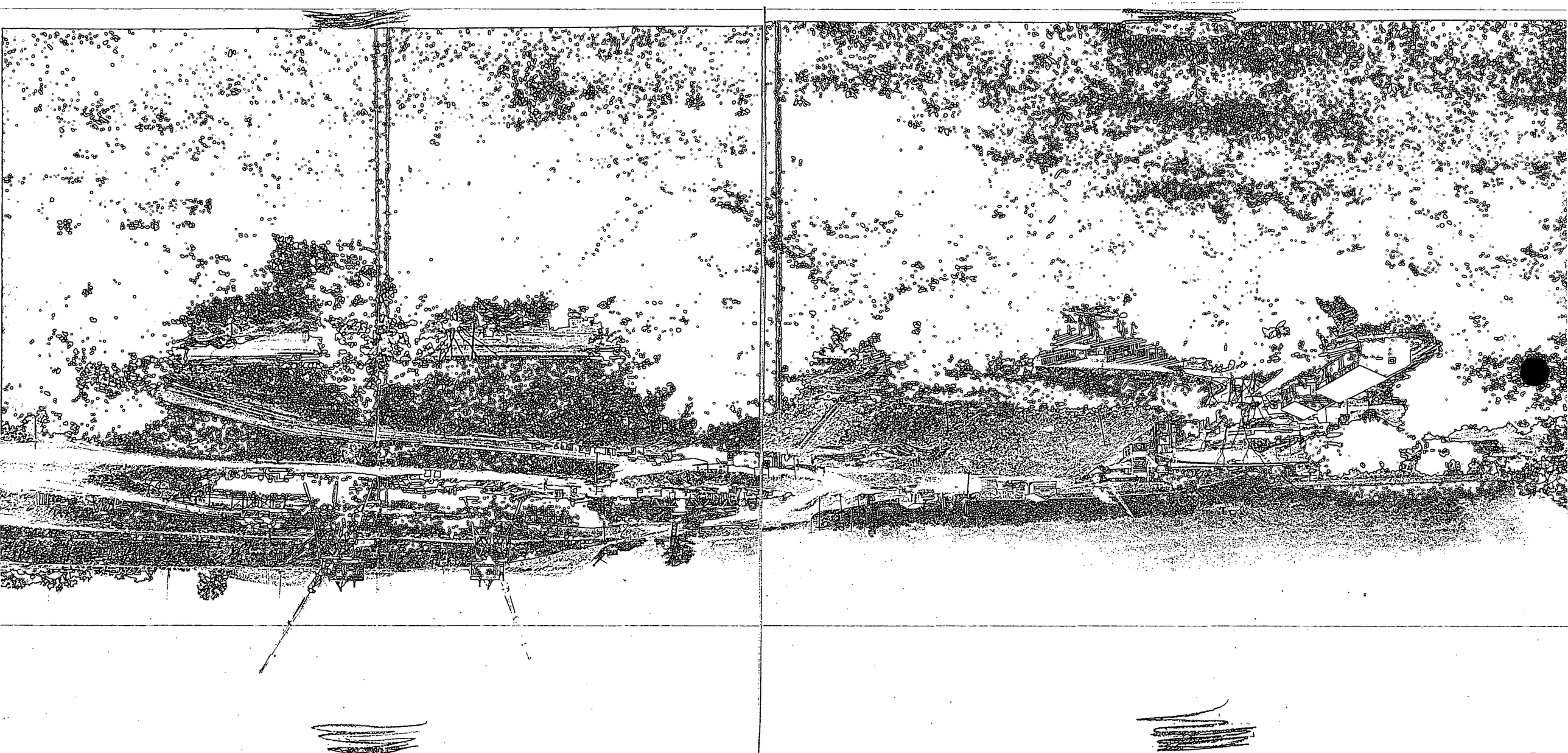


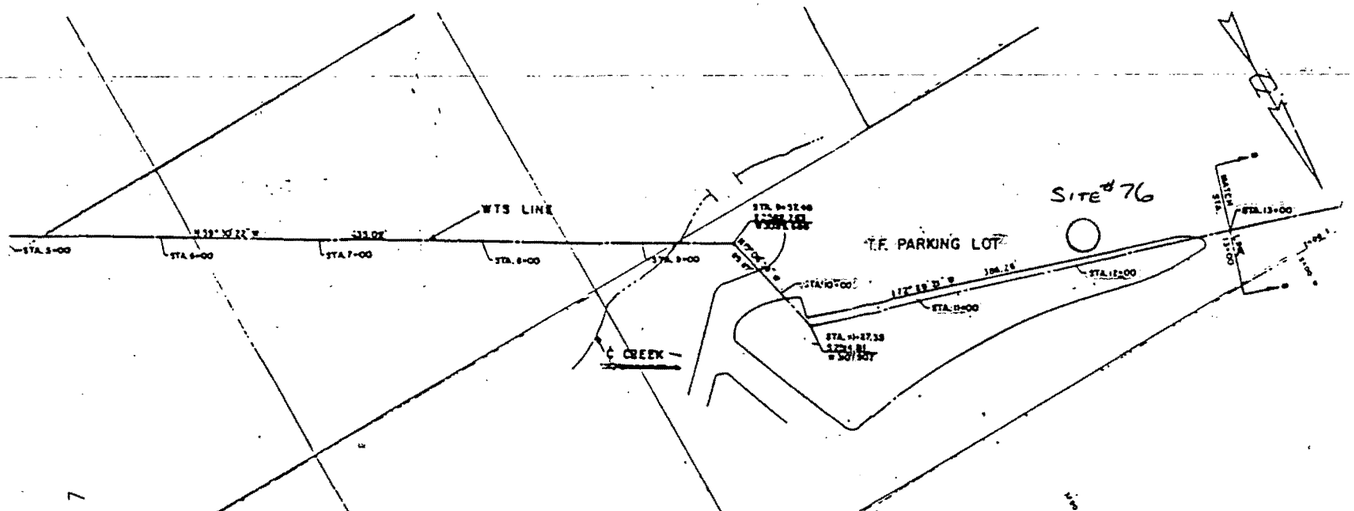
Figure 9.1. Reactor waste processing areas.


ER PROGRAM
MOUND PLANT
Miamisburg, Ohio
PLATE 5
Site Survey Project
Thorium Concentrations
Prepared for
Site Scoping Report: Volume 3,
Radiological Site Survey
600000
599500
599000
OLD MAIN AVENUE
MAYS
HILLVIEW
HOOVER
MAIN


POSSIBLE ELEVATED THORIUM
AREA 12
AREA
PLANT DRAINAGE DITCH
SITE 476
AREA 20
AREA 23
AREA 3
DLER DATA
RADIOCHEMICAL ANALYSIS

REV	DESCRIPTION	DATE
DRAFT		
REGULATOR RELEASE A		
REGULATOR RELEASE B		
PUBLIC RELEASE 0		
FINAL 0	Revised recommendation page to document: (1) The expiration date for the public comment period has expired. (2) Comments were received and resolved without the need to revise the PRS document.	Apr. 22, 1996





NOTE: 1 THE COORDINATES, BEARINGS, AND DISTANCES BETWEEN ANGLE POINTS ON THE WTS LINE WERE OBTAINED FROM MOUND LAB DRAWING Nº FSE1980I SHEETS 2, 3, AND 4.

2 THE ORIGINAL WTS PROFILE WAS OBTAINED FROM MOUND LAB DRAWING "RADIOACTIVE WASTE PROCESSING FACILITY" SHEET Nº G-6.

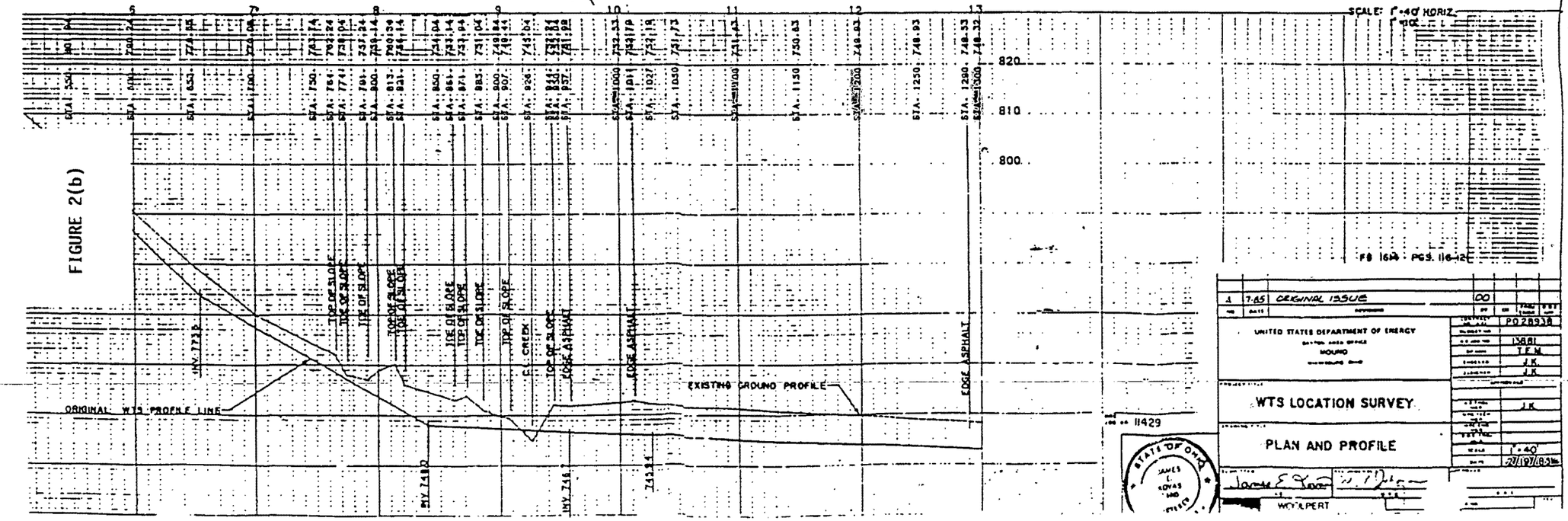
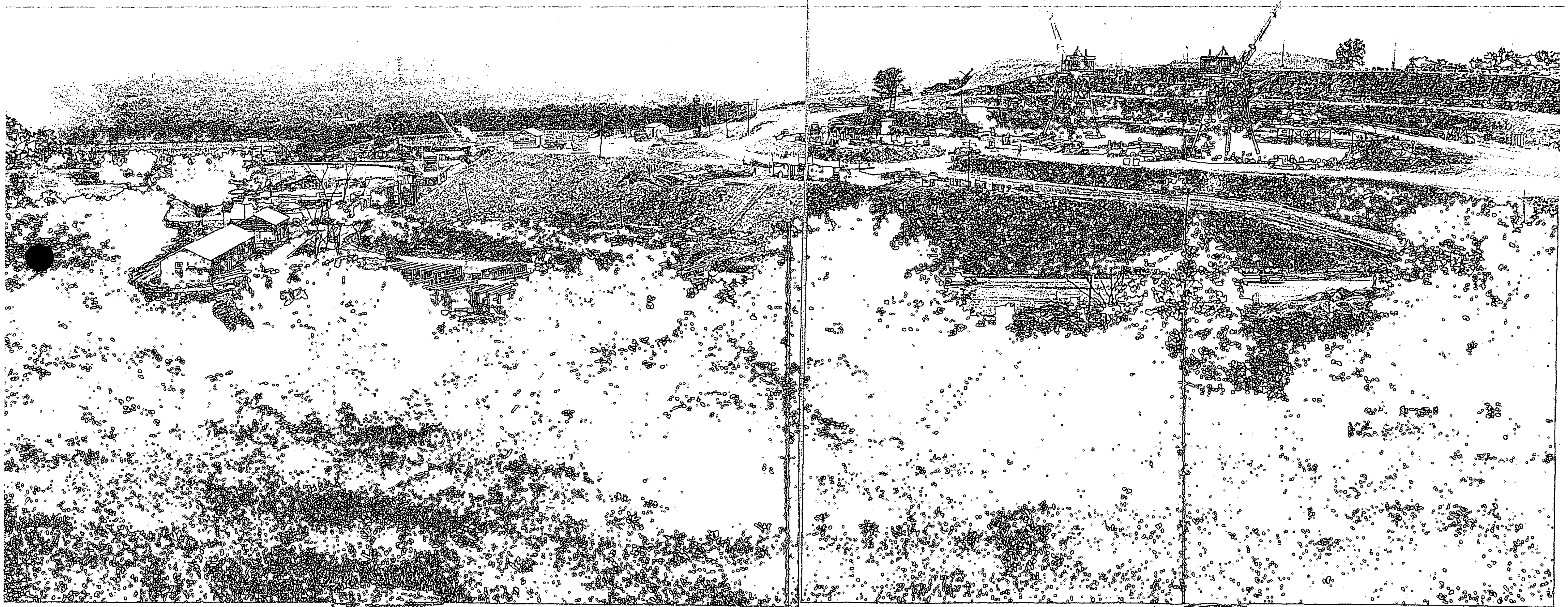
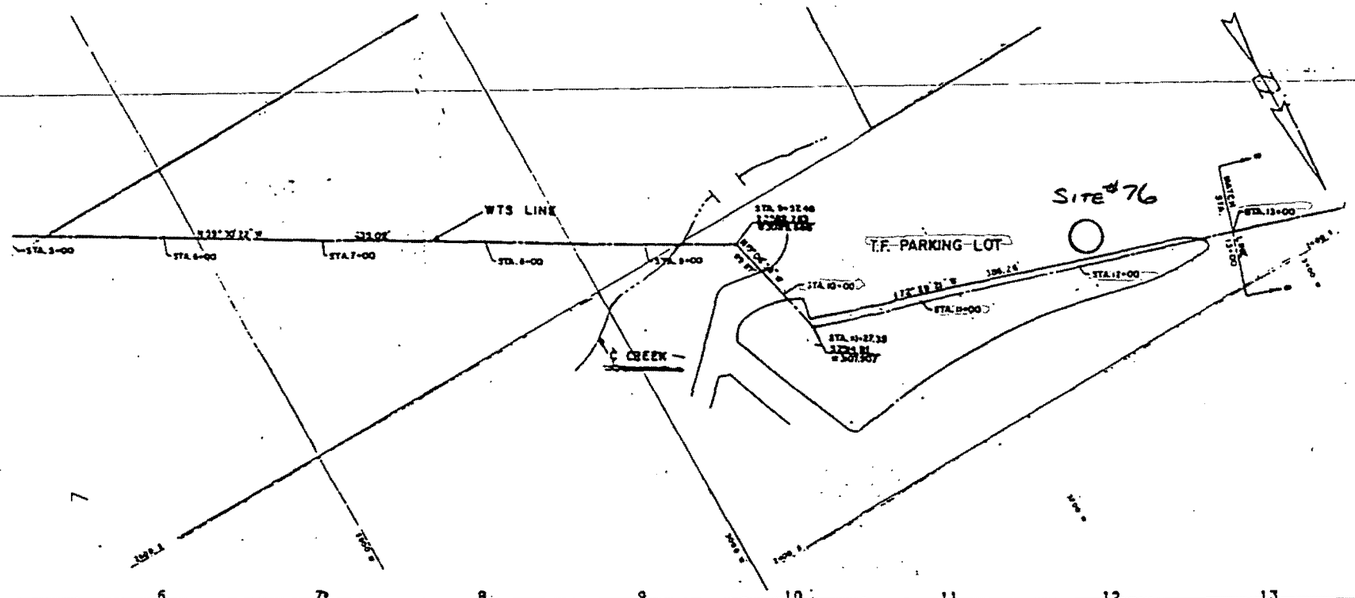


FIGURE 2(b)





NOTE: 1 THE COORDINATES, BEARINGS, AND DISTANCES BETWEEN ANGLE POINTS ON THE WTS LINE WERE OBTAINED FROM MOUND LAB DRAWING Nº FSE1980I SHEETS 2, 3, AND 4.

2 THE ORIGINAL WTS PROFILE WAS OBTAINED FROM MOUND LAB DRAWING "RADIOACTIVE WASTE PROCESSING FACILITY" SHEET Nº G-6.

FIGURE 2(b)