U-003-1005.1

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AGENDA, OVERHEADS AND HANDOUTS FROM THE FERNALD WASTE PIT WORKSHOP OF DECEMBER 7, 1993

12/07/93

DOE/FERMCO/PUBLIC
21
HANDOUTS
OU1

Fernald's Waste Pits: A Workshop

December 7, 1993 • 7 to 9 p.m.
Executive Resource Associates, Classroom B
10991 Hamilton-Cleves Highway

Why are we here? — **Dave Lojek**
- Purpose of workshop
- Format

What is in the pits? — **Dick Kasparek**
- Types of contaminants
- Where and how much

Where are the contaminants going? — **R.D. George**
- Air contamination
- Water contamination

How do we clean up the pits? — **Terry Hagen**
- Options being explored
- How they will be evaluated

What's next? — **Steve Houser**
- Schedule of activities
- How to participate

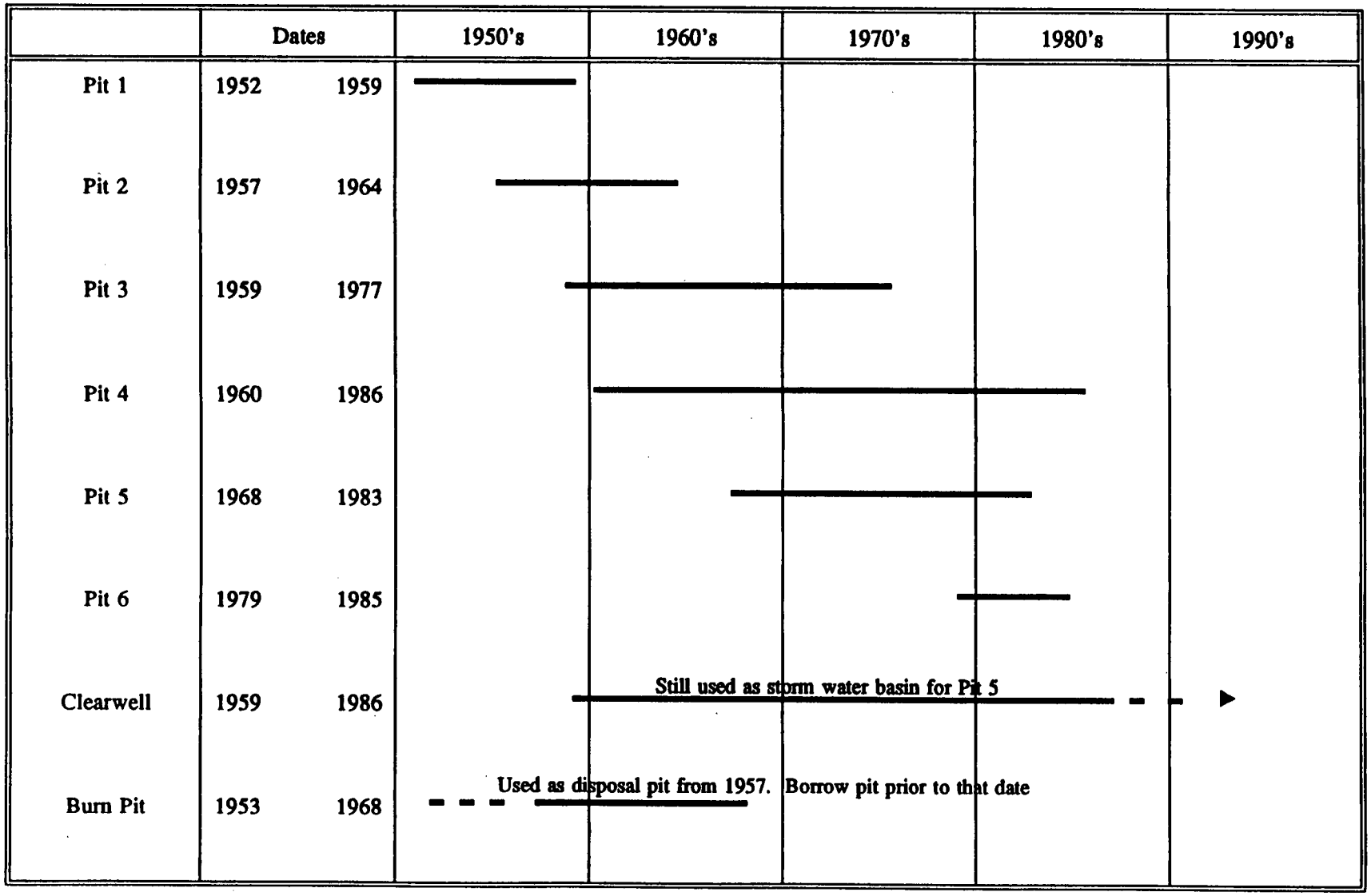

FIGURE 1-20. HISTORICAL TIMELINE OF PIT USAGE

FER/OU1RI/TK.FIG1-20/09-28-93 2:01pm

8 5 0 5 8

TABLE 1-11

SUMMARY OF OPERABLE UNIT 1 WASTE PIT CONTENTS BASED ON PROCESS KNOWLEDGE

Source	Solids to Waste Pits[a]																	
	Waste Pit 1			Waste Pit 2			Waste Pit 3			Waste Pit 4			Waste Pit 5			Waste Pit 6		
	Uranium (MTU)	Mass (MT)	Volume (m^3)	Uranium (MTU)	Mass (MT)	Volume (m^3)	Uranium (MTU)	Mass (MT)	Volume (m^3)	Uranium (MTU)	Mass (MT)	Volume (m^3)	Uranium (MTU)	Mass (MT)	Volume (m^3)	Uranium (MTU)	Mass (MT)	Volume (m^3)
General Sump Sludge[a]	2	10,764	7,500	1	6,578	4,600	12	41,720	29,000				20	53,493	37,100			
Raffinate[b]				7	433	500	633	39,754	41,400				501	30,070	31,300			
Magnesium Flouride																		
Depleted Slag[c]	636	6,783	4,700	59	634	400				329	7,845	5,300				332	8,082	5,500
Trailer Cake[d]	92	18,401	13,000	71	14,208	9,900	150	30,072	20,900	55	11,137	7,700						
Slag Leach[d]							63	12,605	8,700				26	5,239	3,600			
UAP Filtrate[e]	3	1,712	1,200	8	3,763	2,600												
Depleted Residues[e]	339	2,163	1,500	32	202	100				1,818	3,590	2,500				1,100	1,853	1,200
Graphite/Ceramics[f]	3	150	60	0	13	5				1	450	230						
Water Treatment Sludge[g]							0	2,669	1,900				0	3,857	2,700			
Thorium Wastes[h]		80	100		0	0		89	100		1,093	800		1,007	1,000		0	0
Totals	1,075	40,054	28,060	178	25,832	18,105	858	126,909	102,000	2,203	24,115	16,530	547	93,666	75,700	1,432	9,935	6,700

Notes: a) See Appendix F.6.3.
b) See Appendix F.6.4.
c) See Appendix F.6.7.
d) See Appendix F.6.5.
e) See Appendix F.6.8.
f) See Appendix F.6.6.
g) See Appendix F.6.9.
h) See Appendix F.6.10. Note that the thorium values are not included in the uranium column totals and do not include thorium deposited in the waste pits through the general sump.
i) See Appendix F.6.11.

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TABLE 1-12

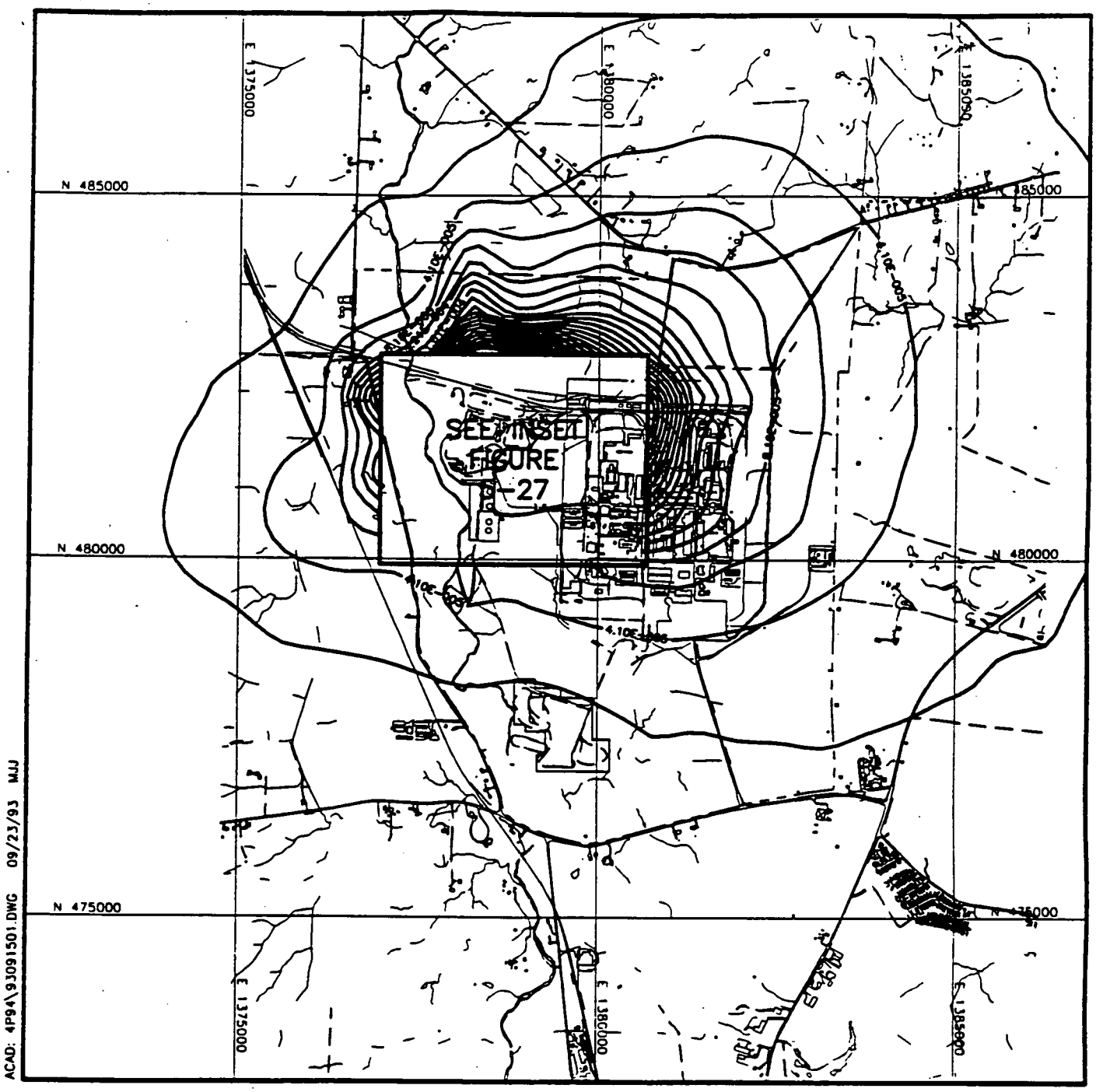
SUMMARY OF OPERABLE UNIT 1 WASTE PIT CONSTITUENTS BASED ON PROCESS KNOWLEDGE

Constituent	Solids to Waste Pits (MT)[a]					
	Waste Pit 1	Waste Pit 2	Waste Pit 3	Waste Pit 4	Waste Pit 5	Waste Pit 6
Uranium (U)	1,075	178	858	2203	547	1432
Aluminum (Al)	52	120	710	0	420	0
Antimony (Sb)	0	0	1	0	0	0
Arsenic (As)	0	1	64	0	41	0
Barium (Ba)	5	12	75	0	45	0
Boron (B)	0	0	1	0	0	0
Bismuth (Bi)	0	0	0	0	0	0
Cadmium (Cd)	0	0	4	0	3	0
Calcium (Ca)	3,776	2,524	31,585	0	36,800	0
Chloride (Cl)	316	695	39	0	25	0
Chromium (Cr)	0	0	4	0	2	0
Cobalt (Co)	0	0	1	0	1	0
Copper (Cu)	2	4	22	0	13	0
Dysprosium (Dy)	0	0	2	0	1	0
Erbrium (Er)	0	0	0	0	0	0
Europium (Eu)	0	0	0	0	0	0
Flouride (F)	18	39	81	0	38	0
Gadolinium (Gd)	0	0	1	0	1	0
Holmium (Ho)	0	0	0	0	0	0
Iron (Fe)	18	49	812	0	513	0
Lead (Pb)	0	0	4	0	3	0
Lutetium (Lu)	0	0	0	0	0	0
Magnesium (Mg)	10	30	673	0	430	0
Manganese (Mn)	4	9	26	0	14	0
Molybdenum (Mo)	0	1	54	0	35	0
Nickel (Ni)	0	0	1	0	0	0
Samarium (Sm)	0	0	0	0	0	0
Sodium (Na)	485	1,078	960	0	624	0

TABLE 1-12
(Continued)

Constituent	Solids to Waste Pits (MT)[a]					
	Waste Pit 1	Waste Pit 2	Waste Pit 3	Waste Pit 4	Waste Pit 5	Waste Pit 6
Terbium (Tb)	0	0	0	0	0	0
Thorium (Th)	1	2	97	74	72	0
Thulium (Tm)	0	0	0	0	0	0
Tin (Sn)	1	2	7	0	4	0
Vanadium (V)	0	5	395	0	257	0
Yttrium (Y0)	0	0	3	0	2	0
Ytterbium (Yb)	0	0	0	0	0	0
Zinc (Zn)	0	0	9	0	6	0
NH3	0	1	50	0	32	0
CO3	0	3	238	0	155	0
MgF2	11,952	10,694	41,183	18,263	5,056	7,750
PO4	592	1,338	6,491	0	3,516	0
P2O5	0	8	623	0	405	0
SiO2	757	889	3,092	334	1,169	0
SO4	0	36	2,915	0	1,896	0
V2O5	0	4	310	0	202	0
NO3	0	66	7,529	0	4,475	0
Dolomite	11,953	3,592	0	0	0	0
Unaccounted	9,037	4,452	27,959	3,241	36,860	753
		0				
Totals	40,054	25,832	126,909	24,115	93,666	9,935

Notes: a) See Appendix F.6.10 for further details.



0 2000 4000
SCALE IN FEET

FIGURE 5-26
ISOPLETH OF GROUND LEVEL CONCENTRATION (pCi/m^3) OF URANIUM 238
FOR THE OU-1 FUTURE EMISSIONS SCENARIO SITE-WIDE
FERNALD, OHIO

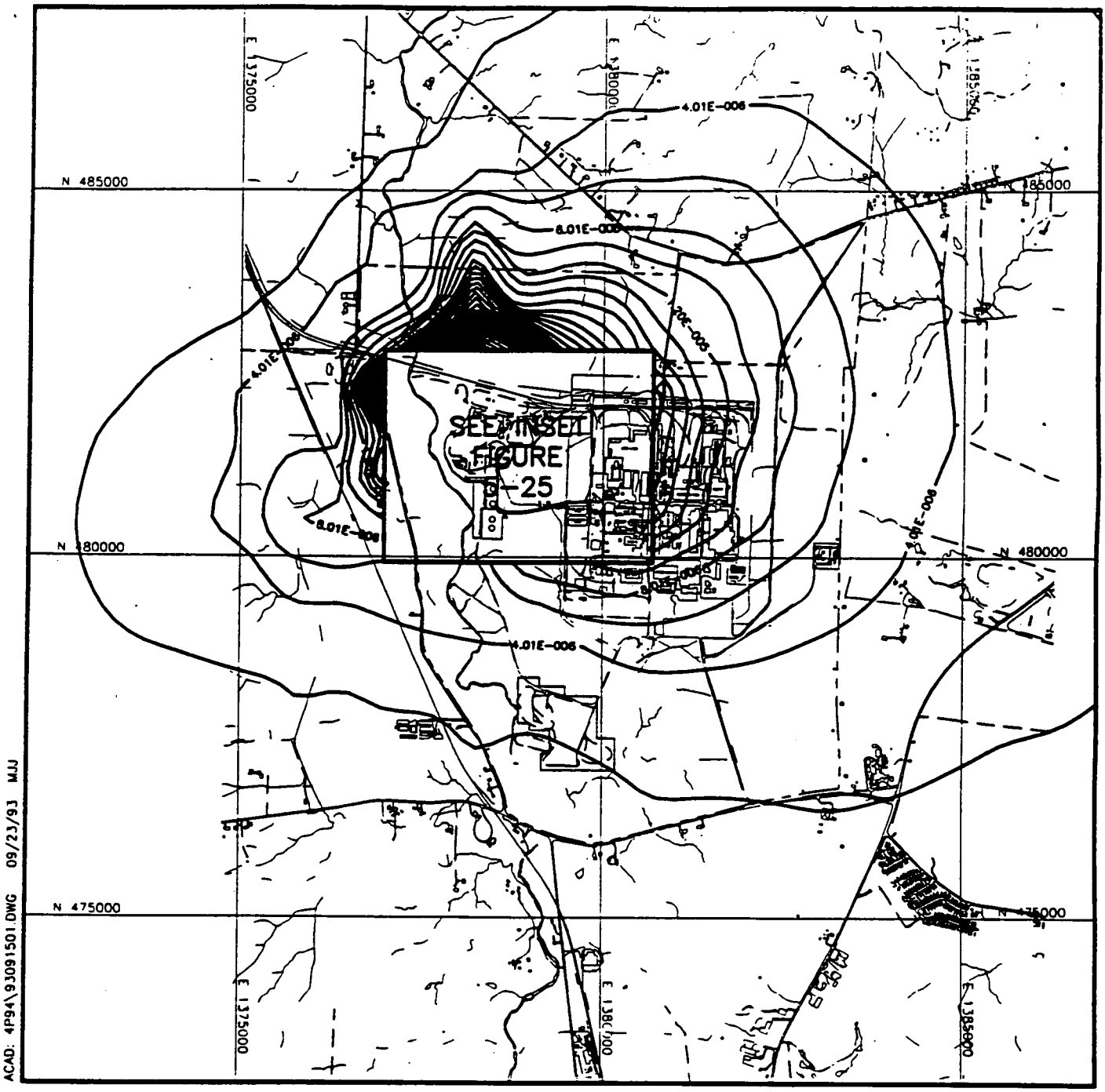


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FIGURE 5-24
ISOPLETH OF GROUND LEVEL CONCENTRATION (pCi/m3) OF RADON FOR THE OU-1 FUTURE EMISSIONS SCENARIO SITE-WIDE
FERNALD, OHIO

0 2000 4000
SCALE IN FEET

FIGURE 5-22
ISOPLETH OF GROUND LEVEL CONCENTRATION (µg/m3) OF ARSENIC FOR THE OU-1 FUTURE EMISSIONS SCENARIO SITE-WIDE
FERNALD, OHIO

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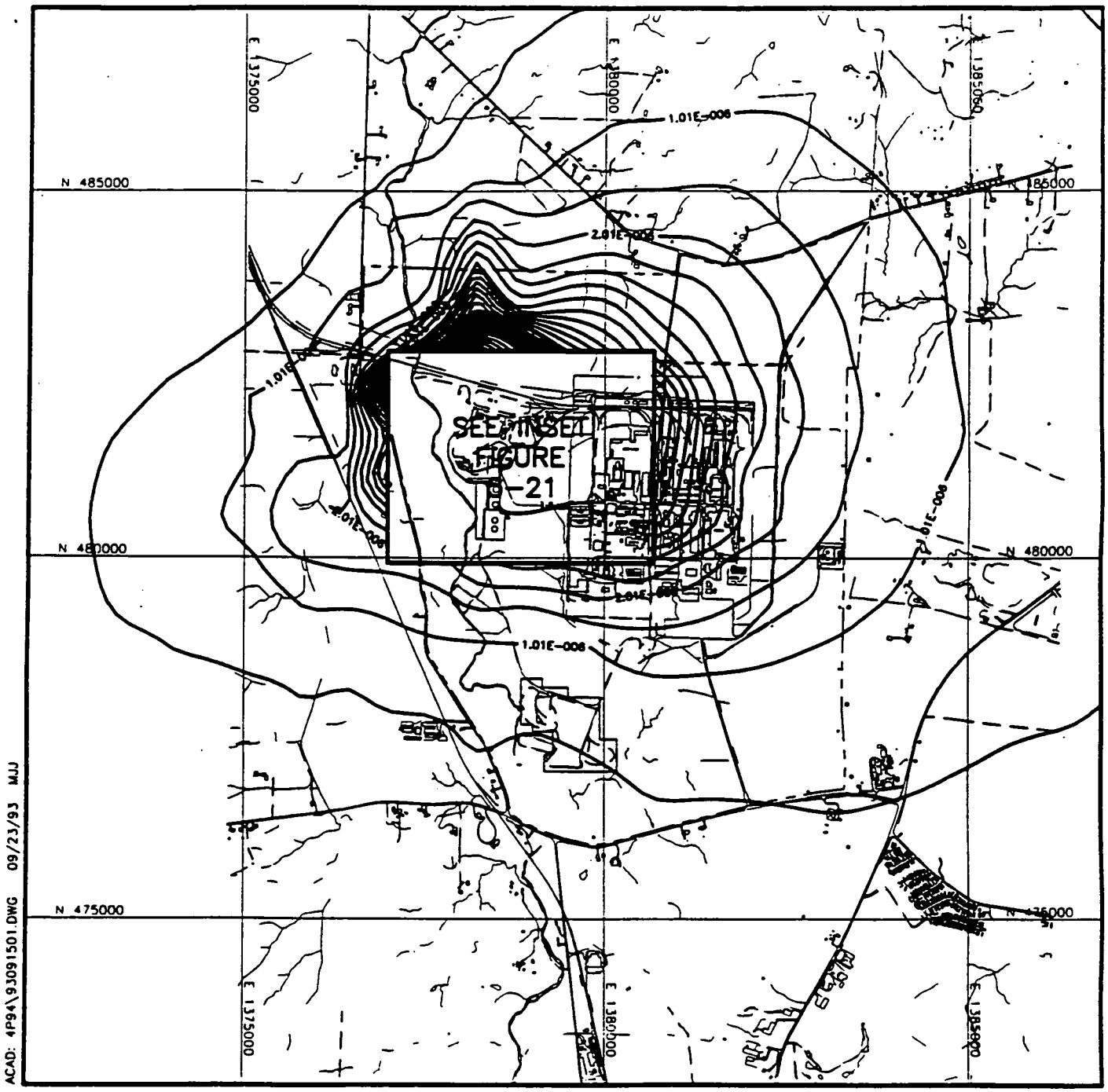

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SCALE IN FEET

FIGURE 5-20
ISOPLETH OF GROUND LEVEL CONCENTRATION (pCi/m3) OF URANIUM 238
FOR THE OU-1 CURRENT EMISSIONS SCENARIO SITE-WIDE
FERNALD, OHIO

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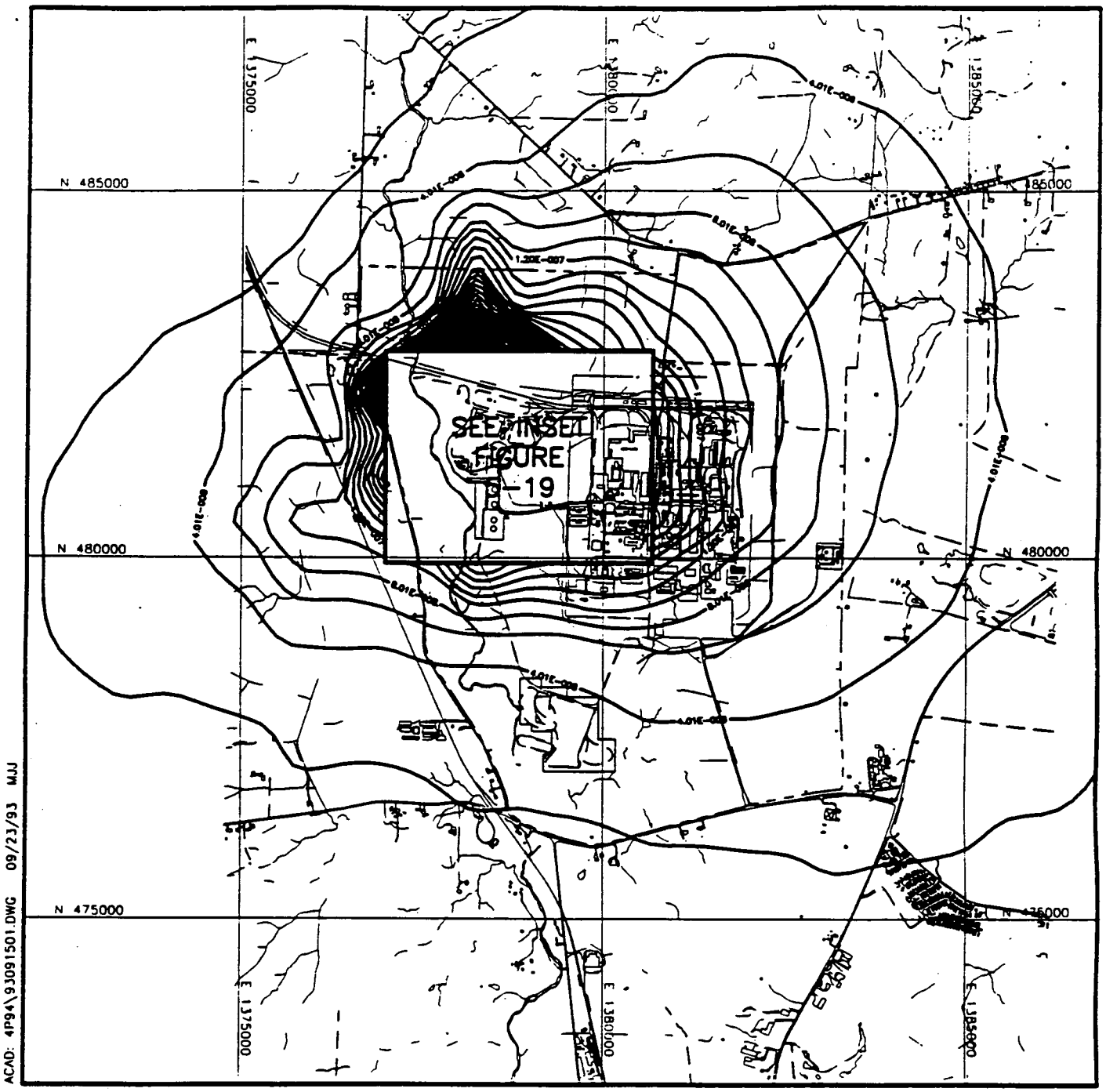

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SCALE IN FEET

FIGURE 5-18
ISOPLETH OF GROUND LEVEL CONCENTRATION (pCi/m^3) OF RADON FOR THE OU-1 CURRENT EMISSIONS SCENARIO SITE-WIDE
FERNALD, OHIO

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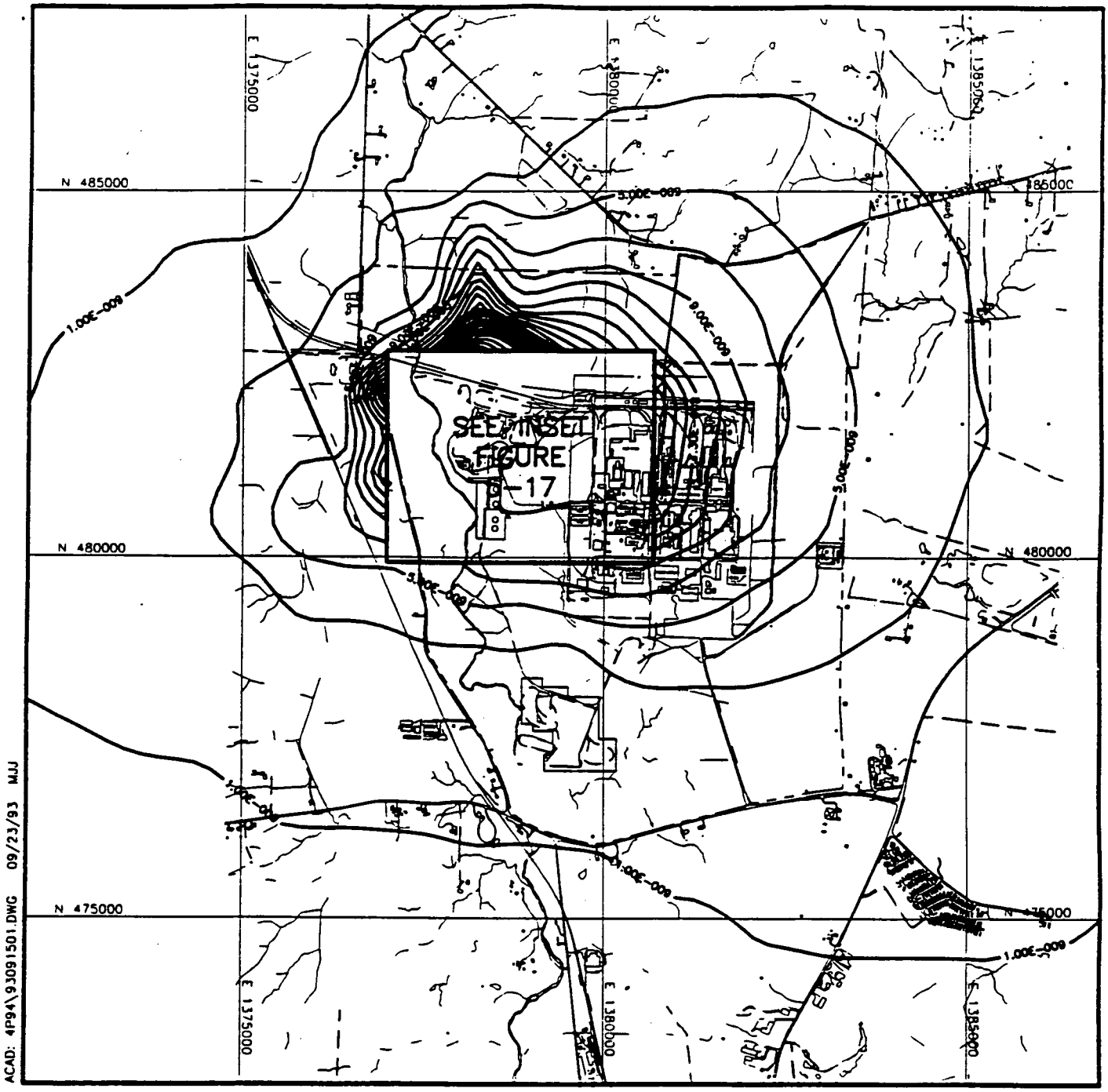

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SCALE IN FEET

FIGURE 5-16
ISOPLETH OF GROUND LEVEL CONCENTRATION (μg/m3) OF ARSENIC FOR THE OU-1 CURRENT EMISSIONS SCENARIO SITE-WIDE
FERNALD, OHIO

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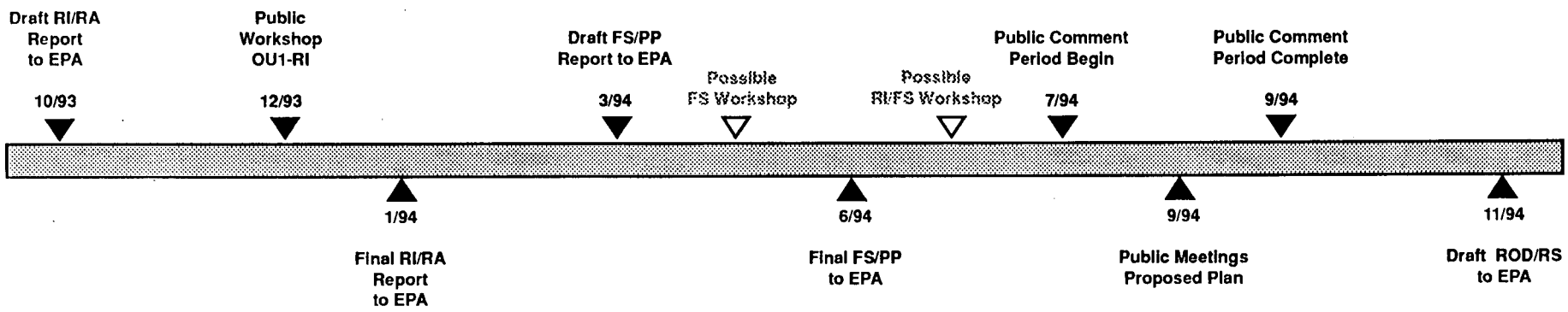
CURENT RI/FS SCHEDULE
12 MONTH LOOK-AHEAD



Graphics 2485.2 12/93

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CERCLA EVALUATION CRITERIA

- Overall protection of human health and the environment
- Compliance with ARARs

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, and volume through treatment
- Short-term effectiveness
- Implementability
- Cost

- State Acceptance
- Community Acceptance

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ALTERNATIVES TO BE EVALUATED IN DETAIL

- Waste Excavation; Waste Processing and Drying; Offsite Disposal at NTS
- Waste Excavation; Waste Processing and Drying; Offsite Disposal at a Permitted Commercial Facility
- Waste Excavation; Waste Processing; Vitrification; Onsite Disposal
- Waste Excavation; Waste Processing; Cement Solidification; Onsite Disposal

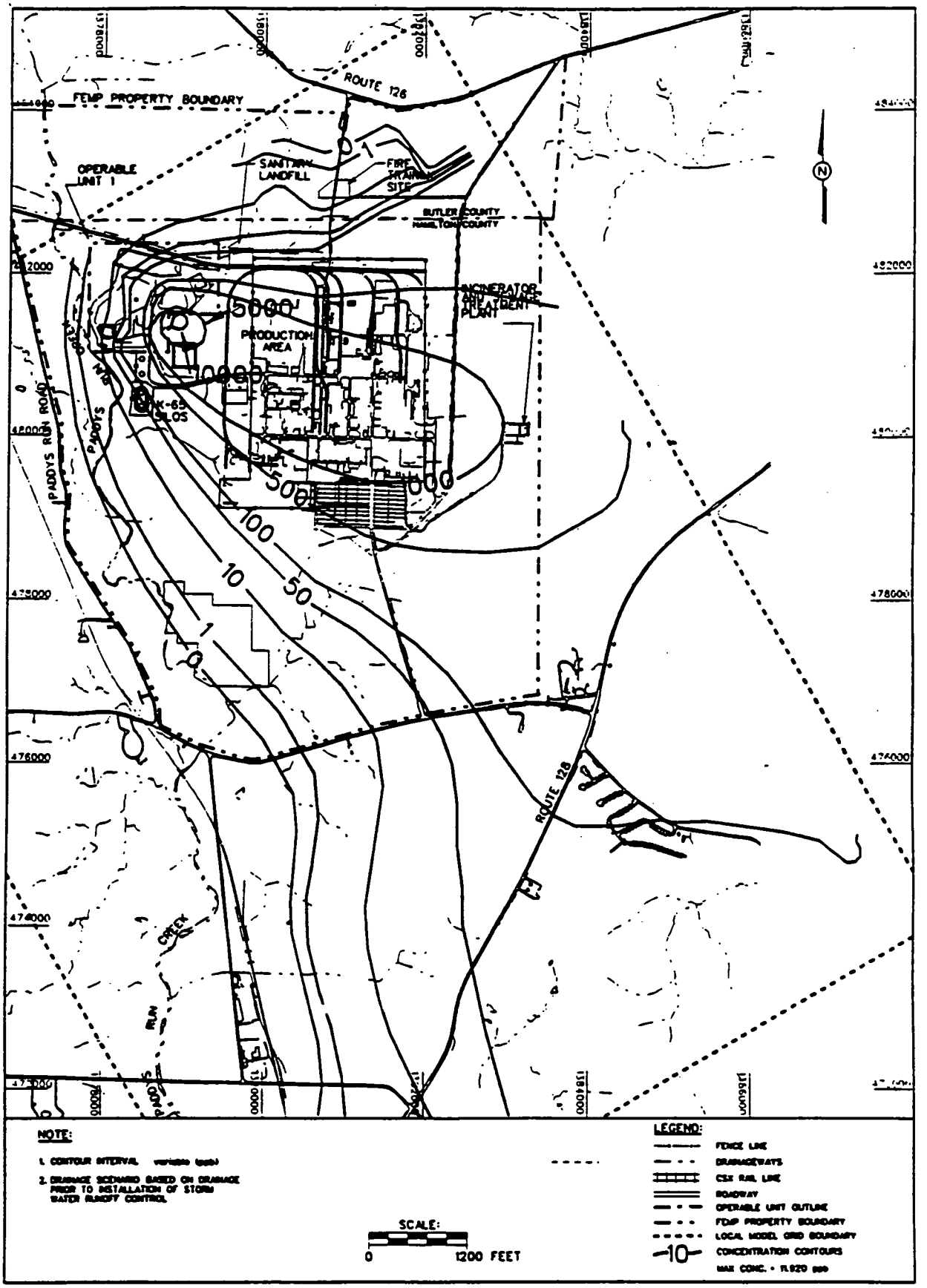

FIGURE 5-14. PROJECTED CONCENTRATION OF TOTAL URANIUM IN GROUNDWATER BENEATH FEMP AFTER 1000 YEARS DUE TO LOADING FROM OPERABLE UNIT 1 WASTE AREAS

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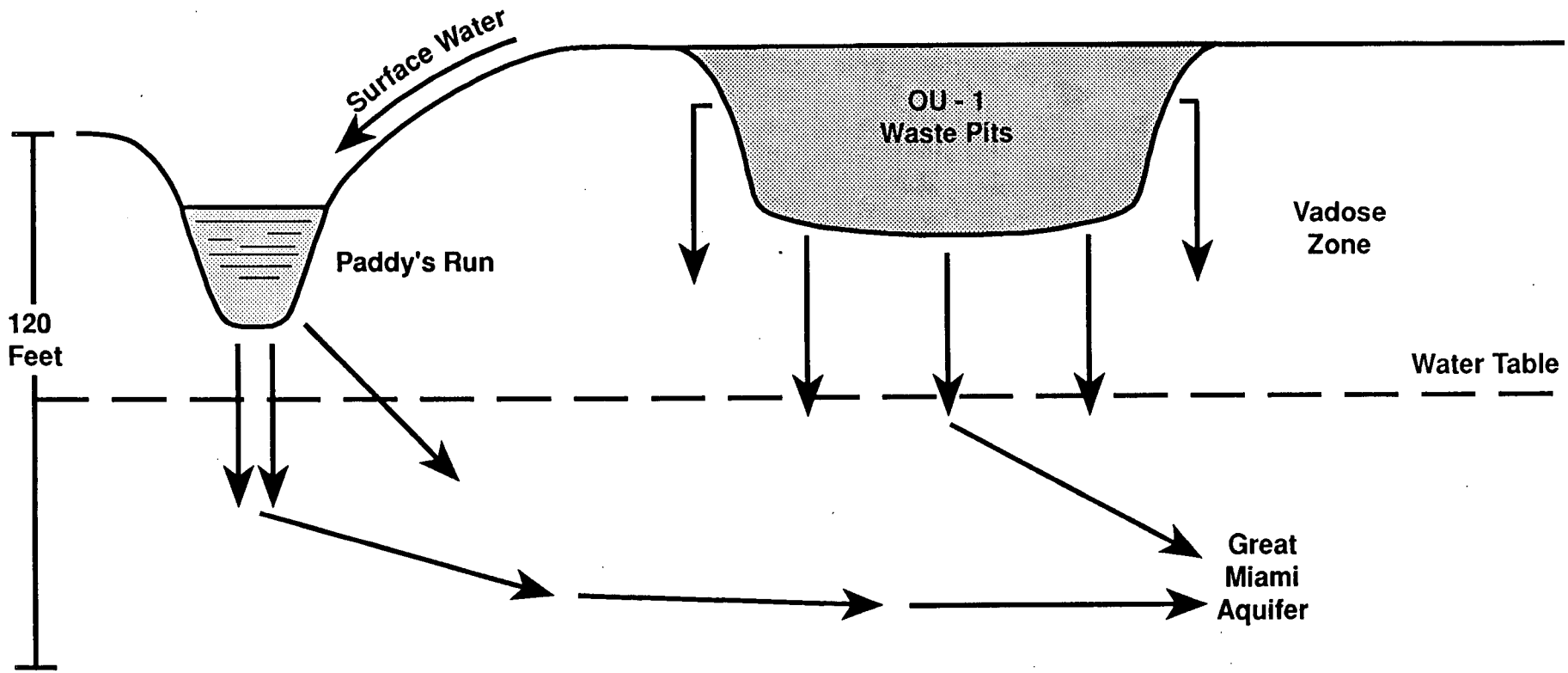
SURFACE WATER AND LEACHATE TRANSPORT MODEL



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WHERE IS LEACHATE AND GROUNDWATER CONTAMINATION FROM THE PITS GOING?

	CURRENT MAXIMUM AQUIFER CONCENTRATIONS		
	2000 SERIES WELLS [ug/L]	3000 SERIES WELLS [ug/L]	4000 SERIES WELLS [ug/L]
URANIUM	35.1	218	6.4

AQUIFER LOADING FROM THE PITS IS ORDERS OF MAGNITUDE GREATER THAN LOADING FROM PADDY'S RUN.

HIGHEST URANIUM CONCENTRATION IN PERCHED ZONED WAS 11.48 mg/L (WELL 1021;SOUTH OF WASTE PIT 4)

MAXIMUM LOADINGS ARE FOR WELLS 2022, 3084, AND 4101

	BACKGROUND [DOE;1993] & Table 4.2 [ug/L]	MODELED LOADING AFTER 630 YEARS [mg/L]	MODELED LOADING AFTER 1000 YEARS [mg/L]
URANIUM	13	12.5	11.92

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WHERE IS SURFACE WATER CONTAMINATION FROM THE PITS GOING?

ANALYTE	MODELED		MEASURED	
	PADDY'S RUN [ug/L]	GREAT MIAMI RIVER [ug/L]	PADDY'S RUN [ug/L]	GREAT MIAMI RIVER [ug/L]
URANIUM 238	255	0.307	6 TO 20	<1.0

MODELED RESULTS FOR PADDY'S RUN ARE ONE ORDER OF MAGNITUDE ABOVE MEASURED

MODELED RESULTS FOR THE GREAT MIAMI RIVER CORRELATE WELL WITH MEASURED RESULTS

MODELED CONCENTRATIONS ACCOUNT FOR SURFACE WATER FROM OU-1 ONLY

APPROXIMATELY 33% OF SURFACE RUNOFF TO PADDY'S RUN LEACHES TO THE GREAT MIAMI AQUIFER

WHERE IS AIR CONTAMINATION FROM THE PITS GOING?

ANALYTE	CROSBY ELEM. SCHOOL [pCi/m3]	MORGAN ELEM. SCHOOL [pCi/m3]	ELDA ELEM. SCHOOL [pCi/m3]	ROSS HIGH SCHOOL [pCi/m3]	ROSS DAYCARE [pCi/m3]	GUIDANCE DOE [pCi/m3]
RADON 222	0.029	0.01	0.06	0.041	0.053	3000 ABOVE BACKGROUND
URANIUM 238	0.000850	0.000040	0.000189	0.000124	0.000164	0.1

ALL CONCENTRATIONS ARE LISTED IN PICO CURIES PER CUBIC METER (pCi/m3)

CERCLA GUIDANCE REQUIRES MODELING AT SENSITIVE RECEPTOR POINTS

MODELED CONCENTRATIONS ACCOUNT FOR AIR DISPERSION FROM OU-1 ONLY

MODELED CONCENTRATION ARE LISTED AS ANNUAL AVERAGES

HAVE A QUESTION?

Forgot to ask a question about the waste pit area? Just write it down and an answer will be mailed to you, usually within 30 days.

Question/Comment: _____

_____

_____

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_____

_____

_____

Name: _____

Address: _____

_____

_____

Operable Unit 1 Workshop
December 7, 1993

EVALUATION

Thank you for attending the meeting to discuss issues related to the waste pit area at the Fernald site. Please take a few moments to answer the questions below:

1. Was the presentation on the waste pits presented at a suitable level of knowledge for this audience?

2. Was the presentation too long? too short?

3. Did the presenter(s) explain in simple language and enough detail the information/materials they used?

4. Were questions adequately answered throughout the meeting?

5. Do you have any other constructive comment/criticism about tonight's meeting?

OPTIONAL

Name_____ Phone_____